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Chapter 1
Introduction

This manual provides system information for the PMT Function and contains the following sections:

SECTION 1 - INTRODUCTION
Provides general information about the structure of this manual, a list of reference documents, and customer service information.

SECTION 2 - SAFETY
This section provides information regarding the safe use and operation of Motoman products.

SECTION 3 - PMT INSTRUCTIONS
Provides detailed information about the PMT Function.

1.1 Reference to Other Documentation

For additional information refer to the following:

- NX100 Controller Manual (P/N 149201-1)
- Concurrent I/O Manual (P/N 149230-1)
- Operator’s Manual for your application
- Vendor manuals for system components not manufactured by Motoman

1.2 Customer Service Information

If you are in need of technical assistance, contact the Motoman service staff at (937) 847-3200. Please have the following information ready before you call:

- Robot Type (EA1400, HP20, etc.)
- Application Type (arcwelding, spot welding, handling)
- Robot Serial Number (located on back side of robot arm)
- Robot Sales Order Number (located on back of controller)
Chapter 2
Safety

2.1 Introduction

It is the purchaser’s responsibility to ensure that all local, county, state, and national codes, regulations, rules, or laws relating to safety and safe operating conditions for each installation are met and followed.

We suggest that you obtain and review a copy of the ANSI/RIA National Safety Standard for Industrial Robots and Robot Systems. This information can be obtained from the Robotic Industries Association by requesting ANSI/RIA R15.06-1999. The address is as follows:

Robotic Industries Association
900 Victors Way
P.O. Box 3724
Ann Arbor, Michigan 48106
TEL: (734) 994-6088
FAX: (734) 994-3338
INTERNET: www.roboticsonline.com

Ultimately, the best safeguard is trained personnel. The user is responsible for providing personnel who are adequately trained to operate, program, and maintain the robot cell. The robot must not be operated by personnel who have not been trained!

We recommend that all personnel who intend to operate, program, repair, or use the robot system be trained in an approved Motoman training course and become familiar with the proper operation of the system.
This safety section addresses the following:

- Standard Conventions (Section 2.2)
- General Safeguarding Tips (Section 2.3)
- Mechanical Safety Devices (Section 2.4)
- Installation Safety (Section 2.5)
- Programming, Operation, and Maintenance Safety (Section 2.6)

### 2.2 Standard Conventions

This manual includes the following alerts – in descending order of severity – that are essential to the safety of personnel and equipment. As you read this manual, pay close attention to these alerts to insure safety when installing, operating, programming, and maintaining this equipment.

⚠️ **DANGER!**
Information appearing in a DANGER concerns the protection of personnel from the immediate and imminent hazards that, if not avoided, will result in immediate, serious personal injury or loss of life in addition to equipment damage.

⚠️ **WARNING!**
Information appearing in a WARNING concerns the protection of personnel and equipment from potential hazards that can result in personal injury or loss of life in addition to equipment damage.

⚠️ **CAUTION!**
Information appearing in a CAUTION concerns the protection of personnel and equipment, software, and data from hazards that can result in minor personal injury or equipment damage.

🔍 **Note:** Information appearing in a Note provides additional information which is helpful in understanding the item being explained.
2.3 General Safeguarding Tips

All operators, programmers, plant and tooling engineers, maintenance personnel, supervisors, and anyone working near the robot must become familiar with the operation of this equipment. All personnel involved with the operation of the equipment must understand potential dangers of operation. General safeguarding tips are as follows:

- Improper operation can result in personal injury and/or damage to the equipment. Only trained personnel familiar with the operation of this robot, the operator's manuals, the system equipment, and options and accessories should be permitted to operate this robot system.
- Do not enter the robot cell while it is in automatic operation. Programmers must have the teach pendant when they enter the robot cell.
- Improper connections can damage the robot. All connections must be made within the standard voltage and current ratings of the robot I/O (Inputs and Outputs).
- The robot must be placed in Emergency Stop (E-STOP) mode whenever it is not in use.
- In accordance with ANSI/RIA R15.06-1999, section 4.2.5, Sources of Energy, use lockout/tagout procedures during equipment maintenance. Refer also to Section 1910.147 (29CFR, Part 1910), Occupational Safety and Health Standards for General Industry (OSHA).

2.4 Mechanical Safety Devices

The safe operation of the robot, positioner, auxiliary equipment, and system is ultimately the user's responsibility. The conditions under which the equipment will be operated safely should be reviewed by the user. The user must be aware of the various national codes, ANSI/RIA R15.06-1999 safety standards, and other local codes that may pertain to the installation and use of industrial equipment. Additional safety measures for personnel and equipment may be required depending on system installation, operation, and/or location. The following safety equipment is provided as standard:

- Safety fences and barriers
- Light curtains and/or safety mats
- Door interlocks
- Emergency stop palm buttons located on operator station, robot controller, and programming pendant

Check all safety equipment frequently for proper operation. Repair or replace any non-functioning safety equipment immediately.
2.5 Installation Safety

Safe installation is essential for protection of people and equipment. The following suggestions are intended to supplement, but not replace, existing federal, local, and state laws and regulations. Additional safety measures for personnel and equipment may be required depending on system installation, operation, and/or location. Installation tips are as follows:

- Be sure that only qualified personnel familiar with national codes, local codes, and ANSI/RIA R15.06-1999 safety standards are permitted to install the equipment.
- Identify the work envelope of each robot with floor markings, signs, and barriers.
- Position all controllers outside the robot work envelope.
- Whenever possible, install safety fences to protect against unauthorized entry into the work envelope.
- Eliminate areas where personnel might get trapped between a moving robot and other equipment (pinch points).
- Provide sufficient room inside the workcell to permit safe teaching and maintenance procedures.

2.6 Programming, Operation, and Maintenance Safety

All operators, programmers, plant and tooling engineers, maintenance personnel, supervisors, and anyone working near the robot must become familiar with the operation of this equipment. Improper operation can result in personal injury and/or damage to the equipment. Only trained personnel familiar with the operation, manuals, electrical design, and equipment interconnections of this robot should be permitted to program, operate, and maintain the system. All personnel involved with the operation of the equipment must understand potential dangers of operation.

- Inspect the robot and work envelope to be sure no potentially hazardous conditions exist. Be sure the area is clean and free of water, oil, debris, etc.
- Be sure that all safeguards are in place. Check all safety equipment for proper operation. Repair or replace any non-functioning safety equipment immediately.
- Do not enter the robot cell while it is in automatic operation. Be sure that only the person holding the programming pendant enters the workcell.
- Check the E-STOP button on the programming pendant for proper operation before programming. The robot must be placed in Emergency Stop (E-STOP) mode whenever it is not in use.
- Back up all programs and jobs onto suitable media before program changes are made. To avoid loss of information, programs, or jobs, a backup must always be made before any service procedures are done and before any changes are made to options, accessories, or equipment.
• Any modifications to PART 1, System Section, of the robot controller concurrent I/O program can cause severe personal injury or death, as well as damage to the robot! Do not make any modifications to PART 1, System Section. Making any changes without the written permission of Motoman will VOID YOUR WARRANTY!

• Some operations require standard passwords and some require special passwords. Special passwords are for Motoman use only. YOUR WARRANTY WILL BE VOID if you use these special passwords.

• The robot controller allows modifications of PART 2, User Section, of the concurrent I/O program and modifications to controller parameters for maximum robot performance. Great care must be taken when making these modifications. All modifications made to the controller will change the way the robot operates and can cause severe personal injury or death, as well as damage the robot and other parts of the system. Double-check all modifications under every mode of robot operation to ensure that you have not created hazards or dangerous situations.

• Check and test any new or modified program at low speed for at least one full cycle.

• This equipment has multiple sources of electrical supply. Electrical interconnections are made between the controller and other equipment. Disconnect and lockout/tagout all electrical circuits before making any modifications or connections.

• Do not perform any maintenance procedures before reading and understanding the proper procedures in the appropriate manual.

• Use proper replacement parts.

• Improper connections can damage the robot. All connections must be made within the standard voltage and current ratings of the robot I/O (Inputs and Outputs).
NOTES
Upon receipt of the product and prior to initial operation, read these instructions thoroughly, and retain for future reference.

MOTOMAN INSTRUCTIONS
MOTOMAN-□□□ INSTRUCTIONS
NX100 INSTRUCTIONS
NX100 OPERATOR’S MANUAL
NX100 MAINTENANCE MANUAL

The NX100 operator’s manuals above correspond to specific usage. Be sure to use the appropriate manual.
MANDATORY

• This manual explains the PMT function (Position Modification Function for Tool Deformation) of NX100. Read this manual carefully and be sure to understand its contents before handling the NX100.

• General items related to safety are listed in the Section 1: Safety of the NX100 Instructions. To ensure correct and safe operation, carefully read the NX100 Instructions before reading this manual.

CAUTION

• Some drawings in this manual are shown with the protective covers or shields removed for clarity. Be sure all covers and shields are replaced before operating this product.

• The drawings and photos in this manual are representative examples and differences may exist between them and the delivered product.

• YASKAWA may modify this model without notice when necessary due to product improvements, modifications, or changes in specifications. If such modification is made, the manual number will also be revised.

• If your copy of the manual is damaged or lost, contact a YASKAWA representative to order a new copy. The representatives are listed on the back cover. Be sure to tell the representative the manual number listed on the front cover.

• YASKAWA is not responsible for incidents arising from unauthorized modification of its products. Unauthorized modification voids your product's warranty.
NOTES FOR SAFE OPERATION

Read this manual carefully before installation, operation, maintenance, or inspection of the NX100.
In this manual, the Notes for Safe Operation are classified as “WARNING”, “CAUTION”, “MANDATORY”, or "PROHIBITED".

**WARNING**
Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to personnel.

**CAUTION**
Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury to personnel and damage to equipment. It may also be used to alert against unsafe practices.

**MANDATORY**
Always be sure to follow explicitly the items listed under this heading.

**PROHIBITED**
Must never be performed.

Even items described as “CAUTION” may result in a serious accident in some situations. At any rate, be sure to follow these important items.

**NOTE**
To ensure safe and efficient operation at all times, be sure to follow all instructions, even if not designated as “CAUTION” and “WARNING”.
Before operating the manipulator, check that servo power is turned OFF when the emergency stop buttons on the front door of the NX100 and programming pendant are pressed. When the servo power is turned OFF, the SERVO ON LED on the programming pendant is turned OFF.

Injury or damage to machinery may result if the emergency stop circuit cannot stop the manipulator during an emergency. The manipulator should not be used if the emergency stop buttons do not function.

Once the emergency stop button is released, clear the cell of all items which could interfere with the operation of the manipulator. Then turn the servo power ON.

Injury may result from unintentional or unexpected manipulator motion.

Observe the following precautions when performing teaching operations within P-point maximum envelope of the manipulator:
- View the manipulator from the front whenever possible.
- Always follow the predetermined operating procedure.
- Ensure that you have a safe place to retreat in case of emergency.

Improper or unintended manipulator operation may result in injury.

Confirm that no person is present in the P-point maximum envelope of the manipulator and that you are in a safe location before:
- Turning ON the NX100 power.
- Moving the manipulator with the programming pendant.
- Running the system in the check mode.
- Performing automatic operations.

Injury may result if anyone enters the P-point maximum envelope of the manipulator during operation. Always press an emergency stop button immediately if there is a problem. The emergency stop buttons are located on the right of the front door of the NX100 and the programming pendant.
Definition of Terms Used Often in This Manual

The MOTOMAN manipulator is the YASKAWA industrial robot product.
The manipulator usually consists of the controller, the playback panel, the programming pendant, and supply cables.
In this manual, the equipment is designated as follows.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Manual Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>NX100 Controller</td>
<td>NX100</td>
</tr>
<tr>
<td>NX100 Programming Pendant</td>
<td>Programming Pendant</td>
</tr>
<tr>
<td>Cable between the manipulator and the controller</td>
<td>Manipulator Cable</td>
</tr>
</tbody>
</table>
Descriptions of the programming pendant, buttons, and displays are shown as follows:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Manual Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programming Pendant</td>
<td></td>
</tr>
<tr>
<td>Character Keys</td>
<td>The keys which have characters printed on them are denoted with [ ]. ex. [ENTER]</td>
</tr>
<tr>
<td>Symbol Keys</td>
<td>The keys which have a symbol printed on them are not denoted with [ ] but depicted with a small picture. ex. page key</td>
</tr>
<tr>
<td>Axis Keys</td>
<td>The cursor key is an exception, and a picture is not shown.</td>
</tr>
<tr>
<td>Numeric Keys</td>
<td></td>
</tr>
<tr>
<td>Keys pressed simultaneously</td>
<td>When two keys are to be pressed simultaneously, the keys are shown with a “+” sign between them, ex. [SHIFT]+[COORD]</td>
</tr>
<tr>
<td>Displays</td>
<td>The menu displayed in the programming pendant is denoted with { }. ex. {JOB}</td>
</tr>
</tbody>
</table>

**Description of the Operation Procedure**

In the explanation of the operation procedure, the expression "Select • • • " means that the cursor is moved to the object item and the SELECT key is pressed.
PMT Function

Data Conversion by PMT Function

2.1 Outline .................................................................2-1
   - PMT data conversion by instruction .........................2-1
   - PMT data conversion by programming pendant ...........2-2

2.2 PMT Data Conversion by Instruction .......................2-4
   2.2.1 Registering GETTOOL Instruction ......................2-4
   2.2.2 Registering SETTOOL Instruction ......................2-5
   2.2.3 Registering PMT Instruction ............................2-6

2.3 PMT Data Conversion by Programming Pendant ........2-8

Tool Data Backup History

Instruction List for PMT Function

Parameter

Alarm List
1 PMT Function

The PMT function corrects the position data when the tool is deformed during operation (PMT: Position Modification for Tool Deformation). When a tool inadvertently collides with peripheral jigs or walls during operation and is deformed, the tool center point will be dislocated and the taught position of the job programmed would be shifted; it requires a great deal of time and effort for correction. In such a case, the PMT function can be used to correct the position data easily and accurately. By specifying the desired job, the position data of the taught tool dimensions before deformation are converted automatically to the position data of the tool dimensions after deformation. In the PMT function, the tool before deformation is called “the original tool” and the tool after deformation is called “the orientation tool”.

![Diagram of Tool at Teaching (Original tool) and Deformed Tool (Orientation tool) with Dislocation of Tool Center Point]

- For a job in which teaching is performed by using several types of tools, only the position data obtained by the specified original tool is converted.
- The position variables are not converted in the PMT function.
2.1 Outline

The data can be converted by the PMT function using instructions or the programming pendant.

PMT data conversion by instruction

The following window is a job example (PMT0) to convert the data by instructions. Carry out Job PMT0 to convert the data using the PMT function.

Refer to "2.2 PMT Data Conversion by Instruction" for the programming of each instruction, GETTOOL, SETTOOL, and PMT.

Before converting the data, prepare a job, like TOOL0 in the preceding example, to obtain the amount of tool deformation by using a touch sensor or other device.

**NOTE**

- Before converting the data by a PMT instruction, be sure to save the data of the original tool by using a GETTOOL instruction.
- For a system with the independent control function enabled, do not use PSTART, an independent control instruction, to start a job that includes a PMT instruction.
PMT data conversion by programming pendant

The following outline describes how to convert the data by using the programming pendant. Refer to "2.3 PMT Data Conversion by Programming Pendant" for more information.

Select (PMT) under {UTILITY} in JOB CONTENT window.

Save the tool constants used before the tool deformation as the original tool data.

Set the new tool constants to be used after the tool's deformation.
JOB: Convert the data of WORK1 using the PMT function.

<table>
<thead>
<tr>
<th>PMT</th>
<th>TOOL NO.</th>
<th>CONVERSION MODE</th>
<th>JOB NAME</th>
<th>JOB</th>
<th>EXECUTE</th>
<th>CANCEL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>06</td>
<td>PMT</td>
<td>WORK1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Main Menu  Short Cut
### 2.2.1 Registering GETTOOL Instruction

<table>
<thead>
<tr>
<th>Operation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Press [INFORM LIST]</td>
<td></td>
</tr>
<tr>
<td>2 Select the instruction group</td>
<td>“ARITH”</td>
</tr>
<tr>
<td>3 Select “GETTOOL”</td>
<td>The instruction appears, with the same additional items that were previously set, in the input buffer line.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Select any additional items in</td>
<td>Press [SELECT] two times, and the DETAIL EDIT window of the GETTOOL instruction appears. Move the cursor to “PUT TO” and press [SELECT]. The selection dialog box appears. Select “PMT DATA,” and the following window appears.</td>
</tr>
<tr>
<td>the DETAIL EDIT window</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Press [ENTER]</td>
<td>The GETTOOL instruction with the additional items is added to the program for the job. To cancel these settings, press [CANCEL], and the JOB CONTENT window reappears.</td>
</tr>
</tbody>
</table>
## 2.2.2 Registering SETTOOL Instruction

<table>
<thead>
<tr>
<th>Operation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Press [INFORM LIST]</td>
</tr>
<tr>
<td>2</td>
<td>Select the instruction group “ARITH”</td>
</tr>
<tr>
<td>3</td>
<td>Select “SETTOOL” &lt;br&gt;The instruction appears, with the same additional items that were previously set, in the input buffer line.</td>
</tr>
<tr>
<td>4</td>
<td>Select any additional items in the DETAIL EDIT window &lt;br&gt;Press [SELECT] two times, and the DETAIL EDIT window of the SETTOOL instruction appears. Set the TOOL FILE and the P-VAR ROBOT.</td>
</tr>
<tr>
<td>5</td>
<td>Press [ENTER] &lt;br&gt;The SETTOOL instruction is registered with the additional items. To cancel these settings, press [CANCEL], and the JOB CONTENT window reappears.</td>
</tr>
</tbody>
</table>
2.2.3 Registering PMT Instruction

NOTE: Add PMT instructions for the number of jobs to be converted.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Press [INFORM LIST]</td>
<td></td>
</tr>
<tr>
<td>2 Select the instruction group “ARITH”</td>
<td></td>
</tr>
<tr>
<td>3 Select “PMT” instruction</td>
<td>The instruction appears, with the same additional items that were previously set, in the input buffer line.</td>
</tr>
<tr>
<td>4 Select any additional items</td>
<td>Move the cursor to the name of the job of which data is to be converted, and press [SELECT]. A list of jobs appears. Select the job subject to conversion for PMT function.</td>
</tr>
</tbody>
</table>
2.2 PMT Data Conversion by Instruction

<table>
<thead>
<tr>
<th>Operation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4</strong> (Cont’d) Select any additional items</td>
<td>Move the cursor to the name of the job to save the data, and press [SELECT]. A list of jobs appears.</td>
</tr>
</tbody>
</table>

When the name of the job to save the data does not have to be specified, move the cursor to "PMT," and press [SELECT]. The DETAIL EDIT window appears.

For the “BACKUP JOB,” select “UNUSED”.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5</strong> Press [ENTER]</td>
<td>The PMT instruction with the additional items is added to the program.</td>
</tr>
</tbody>
</table>
When the PMT function is used, the tool dimensions and the job taught position data are rewritten. In order to secure the data, prepare the backup files beforehand.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Select (UTILITY) from the main menu in the job contents window in teach mode</td>
<td>The JOB CONTENT window appears.</td>
</tr>
<tr>
<td>2 Select (PMT)</td>
<td>The PMT window appears.</td>
</tr>
</tbody>
</table>
## 2.3 PMT Data Conversion by Programming Pendant

<table>
<thead>
<tr>
<th>Operation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Select No. of the tool for conversion</td>
<td>The confirmation dialog to save the tool dimensions before deformation appears. Select &quot;NO&quot; if the tool dimensions after deformation are already registered. Select &quot;YES&quot; if the tool dimensions after deformation are not registered yet.</td>
</tr>
<tr>
<td></td>
<td><img src="image1.png" alt="Backup Data Confirmation" /></td>
</tr>
<tr>
<td></td>
<td>The indication of &quot;•&quot; would appear on the display if the registered tool dimensions are the ones before deformation.</td>
</tr>
<tr>
<td>4 Register and confirm tool dimensions</td>
<td>Set the tool dimensions by inputting with the Numeric Keys or by selecting (\text{TOOL CALIBRATION}) of (\text{UTILITY}). For details of methods to set tool dimensions, refer to “9.9 Tool Data Setting” of the NX100 Instruction manual. Confirm the tool dimensions before and after the PMT conversion (ORIGINAL TOOL and ORIENTATION TOOL), then select “EXEC”.</td>
</tr>
<tr>
<td></td>
<td><img src="image2.png" alt="Tool Dimensions Input" /></td>
</tr>
</tbody>
</table>
2.3 PMT Data Conversion by Programming Pendant

<table>
<thead>
<tr>
<th>Operation</th>
<th>Explanation</th>
</tr>
</thead>
</table>
| **5** Select “CONVERSION MODE”. | The following three methods are available for selecting a job.  

```
<table>
<thead>
<tr>
<th>PMT</th>
<th>TOOL NO.</th>
<th>CONVERSION MODE</th>
<th>JOB NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SINGLE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>RELATED</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>ALL</td>
<td></td>
</tr>
</tbody>
</table>
```

- **Method 1: SINGLE**  
  When only the specified job is to be converted, select “SINGLE” from “CONVERSION MODE”.

- **Method 2: RELATED**  
  When the jobs related to the specified job are to be converted together, select “RELATED” from “CONVERSION MODE”.

- **Method 3: ALL**  
  When all the jobs registered in NX100 are to be converted, select “ALL” from “CONVERSION MODE”.

Select “EXEC” to convert all the jobs.

| **6** Select the job for conversion | Select “JOB NAME” to display the Job List, then select the job to be converted. |
| **7** Select “EXEC” | The window returns to the JOB CONTENT window when the conversion is completed. |

**NOTE**

- For a job after conversion, be sure to confirm the path after conversion by performing NEXT/BACK operations.
- If the steps beyond the manipulator’s range of motion are created, “/OV” will be indicated in the corresponding step as shown in the following window. The “/OV” will disappear by correcting the positions.
3 Tool Data Backup History

The modification history of the tool constants can be viewed in the TOOL BACKUP window. The history of the tool data backup is updated when a GETTOOL instruction with “PMTDATA” added is carried out.

When a GETTOOL instruction is carried out and the data of the original tool and the orientation tool are the same, only the execution date and time in the backup history are updated.

The backup history would be also updated when the original tool is saved in operating PMT function with the programming pendant.

Tool Backup Window

<table>
<thead>
<tr>
<th>Operation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Select “ROBOT” under the main menu</td>
</tr>
<tr>
<td>2</td>
<td>Select (TOOL BACKUP) The TOOL BACKUP window appears.</td>
</tr>
</tbody>
</table>
## 4 Instruction List for PMT Function

### GETTOOL

**Function**

Gets the data from a tool file.

**Additional items**

- Tool data storage directory
  - P, PMTDATA
- Tool file TL# (<Tool file number>)
  - 0 to 23

**Example**

<table>
<thead>
<tr>
<th>GETTOOL PMTDATA TL# (0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GETTOOL P000 TL# (0)</td>
</tr>
</tbody>
</table>

### SETTOOL

**Function**

Rewrites the data in the tool file.

**Additional items**

- Tool file TL# (<Tool file number>)
  - 0 to 23
- Adjustment method +, -
- Position variable robot P

**Example**

<table>
<thead>
<tr>
<th>SETTOOL TL# (0) P000</th>
</tr>
</thead>
<tbody>
<tr>
<td>SETTOOL TL# (0) +P000</td>
</tr>
</tbody>
</table>

### PMT

**Function**

Converts the data.

**Additional items**

- Tool file TL# (<Tool file number>)
  - 0 to 23
- Name of the job of which data is subjected to conversion JOB:
- Name of the job where the data is to be saved*2 JOB:

**Example**

<table>
<thead>
<tr>
<th>PMT TL# (0) JOB:WORK1</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMT TL# (0) JOB:WORK1 JOB:WORK0</td>
</tr>
</tbody>
</table>

---

*1 When “PMTDATA” is selected for the storage destination of the tool data, the specified data from the tool file is saved as the data of the backup tool.

*2 When the name of the job specified as the job to save the data does not exist, the job used before converting the data (the job of which data is to be converted) is saved with the specified job name (JOB COPY).

When the name of the job specified as the job to save the data already exists, the specified job is rewritten by the job used before converting the data.
## 5 Parameter

<table>
<thead>
<tr>
<th>Parameter No.</th>
<th>Meaning</th>
<th>Units</th>
<th>Initial Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>S3C900</td>
<td>The allowable difference (values of X, Y, and Z) between the present tool constant and the tool data automatic setting in the operation of a SETTOOL instruction.</td>
<td>0.001mm</td>
<td>20000</td>
</tr>
</tbody>
</table>
### 6 Alarm List

<table>
<thead>
<tr>
<th>Alarm No.</th>
<th>Message</th>
<th>Meaning</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>4605</td>
<td>SETTOOL ERROR</td>
<td>An error occurred when executing a SETTOOL instruction.</td>
<td>• Check if the tag set value is correct.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The difference between the current tool constant and a new set value exceeded the allowable range (parameter set value).</td>
<td>• Check if the parameter is set correctly.</td>
</tr>
</tbody>
</table>
NX100 OPTIONS
INSTRUCTIONS
FOR PMT FUNCTION

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