Upon receipt of the product and prior to initial operation, read these instructions thoroughly, and retain for future reference.

MOTOMAN INSTRUCTIONS

The DX200 operator’s manual above corresponds to specific usage. Be sure to use the appropriate manual.

Part Number: 165471-1CD
Revision: 0
MANDATORY

• This manual explains MOTOPAL of the DX200 system. Read this manual carefully and be sure to understand its contents before handling the DX200.

• General items related to safety are listed in Chapter 1: Safety of the DX200 INSTRUCTIONS. To ensure correct and safe operation, carefully read the DX200 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 DX200.

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

To ensure safe and efficient operation at all times, be sure to follow all instructions, even if not designated as “CAUTION” and “WARNING”.

---

NO

TE

To ensure safe and efficient operation at all times, be sure to follow all instructions, even if not designated as “CAUTION” and “WARNING”.

---

3/125
WARNING

- Before operating the manipulator, check that servo power is turned OFF pressing the emergency stop buttons on the front door of the DX200 and the programming pendant. 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.

*Figure 1: Emergency Stop Button*

- 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.

*Figure 2: Release of Emergency Stop*

- Observe the following precautions when performing teaching operations within the P-point maximum envelope of the manipulator:
  - View the manipulator from the front whenever possible.
  - Always follow the predetermined operating procedure.
  - Keep in mind the emergency response measures against the manipulator’s unexpected motion toward you.
  - 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 power for the DX200.
  - 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 DX200 and the programming pendant.
Definition of Terms Used Often in This Manual

The MOTOMAN is the YASKAWA industrial robot product. The MOTOMAN usually consists of the manipulator, the controller, 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>DX200 controller</td>
<td>DX200</td>
</tr>
<tr>
<td>DX200 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 Number Keys</td>
<td>“Axis Keys” and “Number Keys” are generic names for the keys for axis operation and number input.</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, or that the item is directly selected by touching the screen.

**Registered TradeMark**

In this manual, names of companies, corporations, or products are trademarks, registered trademarks, or brand names for each company or corporation. The indications of (R) and TM are omitted.
# Table of Contents

1 Introduction ..................................................................................................................................... 1-1

1.1 Difference between MOTOPAL for DX100 and MOTOPAL for DX200 ............................. 1-1

1.2 Application CD and CF ...................................................................................................... 1-1

1.2.1 Application CD ........................................................................................................ 1-1

1.2.2 Application CF ........................................................................................................ 1-1

1.2.3 How to Replace the Programming Pendant ......................................................... 1-1

1.3 Flow of Setting Up MOTOPAL ........................................................................................... 1-2

2 Setup Files of MOTOPAL ............................................................................................................... 2-1

2.1 Data Structure in the Application CF ................................................................................. 2-1

2.2 IO Assignment ................................................................................................................... 2-3

2.2.1 Setup of ConveryerIO.ini ....................................................................................... 2-3

2.2.2 Setup of StationIO.ini ........................................................................................... 2-7

2.2.3 Setup of HandIO.ini .............................................................................................. 2-9

2.3 Setup of Basic Information ............................................................................................... 2-12

2.3.1 Setup of BasicParam.ini ..................................................................................... 2-12

2.3.1.1 Hand Type and Pick Position ................................................................ 2-18

2.3.2 Setup of SystemInfo.ini ...................................................................................... 2-19

2.3.3 Setup of Layout.ini .............................................................................................. 2-20

2.4 Setup of Palletizing Motion .............................................................................................. 2-22

2.4.1 Created Jobs ...................................................................................................... 2-22

2.4.1.1 How to Customize Pick Jobs ........................................................................ 2-23

2.4.1.2 How to Customize Product Master Job......................................................... 2-23

2.4.2 Pick Motion ......................................................................................................... 2-23

2.4.3 How to Customize the Structure in Pick Jobs..................................................... 2-24

2.4.4 How to Customize the Positions of Pick Motion ................................................. 2-25

2.4.4.1 P1 (Conveyor Approach Position) ................................................................. 2-25

2.4.4.2 P2 (Pick Approach Position 2) ....................................................................... 2-25

2.4.4.3 P3 (Pick Approach Position 1) ....................................................................... 2-26

2.4.4.4 P4 (Pick Position) .......................................................................................... 2-27

2.4.4.5 P5 (Pick Get Away Position 1) ...................................................................... 2-27

2.4.4.6 P6 (Pick Get Away Position 2) ...................................................................... 2-27

2.4.4.7 P7 (Conveyor Get Away Position) ................................................................. 2-28

2.4.4.8 Tool Frame .................................................................................................... 2-29

2.4.5 Place Motion ........................................................................................................ 2-30

2.4.6 How to Customize the Structure of Product Master Job ........................................ 2-31
## Table of Contents

2.4.7 How to Customize the Positions in Product Master Job ........................................2-33
  2.4.7.1 P1 (Station Approach Position) .............................................................2-33
  2.4.7.2 P2 (Place Approach Position 2) .............................................................2-35
  2.4.7.3 P3 (Place Approach Position 1) .............................................................2-36
  2.4.7.4 P4 (Place Position) ................................................................................2-38
  2.4.7.5 P5 (Place Get Away Position 1) ............................................................2-38
  2.4.7.6 P6 (Place Get Away Position 2) ............................................................2-39
  2.4.7.7 P7 (Station Get Away Position) .............................................................2-39
  2.4.7.8 Station Frame ........................................................................................2-41

2.5 Pattern Files ............................................................................................................2-41
  2.5.1 Notes for Creating Pattern Files .........................................................................2-41
  2.5.2 Multiple Products Simultaneous Picking Function ..............................................2-42

3 Jobs and Ladder Program .............................................................................................3-1
  3.1 Variables ................................................................................................................3-1
    3.1.1 Variables for System .........................................................................................3-1
      3.1.1.1 Variables for System Which MOTOPAL and the Sample Jobs Use ..........3-1
      3.1.1.2 Variables for System Which Only the Sample Jobs Use .........................3-2
    3.1.2 Variables for Operation ....................................................................................3-3
      3.1.2.1 Variables for Operation Which MOTOPAL and the Sample Jobs Use....3-3
      3.1.2.2 Variables for Operation Which Only the Sample Jobs Use .................3-4
    3.1.3 Variables for Conveyors ..................................................................................3-6
      3.1.3.1 Variables for Conveyors Which MOTOPAL and the Sample Jobs Use ..3-6
      3.1.3.2 Variables for Conveyors Which Only the Sample Jobs Use .....................3-6
    3.1.4 Variables for Stations .......................................................................................3-10
      3.1.4.1 Variables for Stations for MOTOPAL and the Sample Jobs .................3-10
      3.1.4.2 Variables for Station Which Only the Sample Jobs Use .......................3-12
    3.1.5 Variables for Positions ....................................................................................3-13
      3.1.5.1 Variables for Positions Which MOTOPAL and the Sample Jobs Use ....3-13
  3.2 IO ..........................................................................................................................3-14
    3.2.1 IO for Operation ..............................................................................................3-14
      3.2.1.1 Input Which MOTOPAL, the Sample Jobs and the Sample Ladder Program Use 3-14
      3.2.1.2 Input Which Only the Sample Jobs and the Sample Ladder Program Use 3-14
      3.2.1.3 Output Which MOTOPAL, the Sample Jobs and the Sample Ladder Program Use 3-15
      3.2.1.4 Output Which Only the Sample Jobs and the Sample Ladder Program Use 3-15
    3.2.2 IO for Conveyors ............................................................................................3-16
      3.2.2.1 Input ........................................................................................................3-16
      3.2.2.2 Output ...................................................................................................3-18
# Table of Contents

3.2.3 IO for Stations ................................................................. 3-19  
  3.2.3.1 Input ................................................................. 3-19  
  3.2.3.2 Output ............................................................... 3-21  

3.3 Sample Jobs ........................................................................ 3-22  
  3.3.1 Switch Station................................................................. 3-24  
  3.3.2 Conditions for Continuous Movement ...................... 3-25  

3.4 Sample Ladder Program...................................................... 3-26  
  3.4.1 System Ladder Section .............................................. 3-26  
  3.4.2 User Ladder Section ................................................... 3-28  

4 SETTING Menu of MOTOPAL .................................................. 4-1  
  4.1 REGISTER POSITIONs Menu ........................................... 4-2  
    4.1.1 How to Register the Positions ................................... 4-2  
  4.2 CONVEYOR / STATION POSITION Menu .................. 4-4  
  4.3 Tool File and User Coordinate File ............................... 4-12  
  4.4 Backup ........................................................................... 4-12  

5 The Start Up Way ..................................................................... 5-1  

6 Appendix. 1. Details of Sample Job ........................................ 6-1  
  6.1 MASTER.JBI ..................................................................... 6-1  
  6.2 INIT_VAR.JBI ................................................................. 6-2  
  6.3 CLEAR_OPE_TABLE.JBI ................................................. 6-3  
  6.4 CLEAR.CV_TABLE.JBI ...................................................... 6-3  
  6.5 RECEIVE_OPE_INF.JBI .................................................... 6-4  
  6.6 INIT_STATIONS.JBI .......................................................... 6-5  
  6.7 CANCEL_WORKING_ST_INIT.JBI ................................. 6-6  
  6.8 SWITCH_STATION.JBI ..................................................... 6-7  
  6.9 SET_NEXT_OPE.JBI ........................................................ 6-8  
  6.10 RENEW_NEXT_OPE.JBI ............................................... 6-10  
  6.11 RETURN_OPEORG.JBI .................................................. 6-12  
  6.12 GO_TO_WAIT_POS.JBI .................................................. 6-13  
  6.13 CONFIRM.JBI ............................................................... 6-14
1 Introduction

1.1 Difference between MOTOPAL for DX100 and MOTOPAL for DX200

Due to the controller specification difference, the following is not compatible between MOTOPAL for DX100 and MOTOPAL for DX200:

- Sample Ladder

1.2 Application CD and CF

MOTOPAL is shipped with the application CD and CF (CompactFlash). The CD and CF are included in the envelope which is put into DX200. These CD and CF are necessary to set up MOTOPAL.

1.2.1 Application CD

The application CD contains the data shown in Table 1-1 Contents of the Application CD.

<table>
<thead>
<tr>
<th>Folder</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>PatternEditor</td>
<td>Installer of PatternEditor is included. Install PatternEditor into your PC. PatternEditor is the application software to create the pattern files. Refer to Section 2.5 “Pattern Files” on page 2-41.</td>
</tr>
<tr>
<td>Palletizing</td>
<td>Backup of the “Palletizing” folder in the application CF.</td>
</tr>
<tr>
<td>SampleDxData</td>
<td>Backup of the “SampleDxData” folder in the application CF.</td>
</tr>
</tbody>
</table>

1.2.2 Application CF

The application CF contains the data shown in Table 1-2 Contents of the Application CF. You need to insert this CF into the Programming Pendant before starting up MOTOPAL.

<table>
<thead>
<tr>
<th>Folder</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palletizing</td>
<td>Data which MOTOPAL uses are included. You need to set up some of the data before using MOTOPAL. Refer to chapter 2 Setup Files of MOTOPAL.</td>
</tr>
<tr>
<td>SampleDxData</td>
<td>The sample Jobs and sample Ladder programs are included. These Jobs and Ladder programs are also loaded into DX200. But you need to modify those Jobs and Ladder programs according to your system. Refer to chapter 3 Jobs and Ladder Program.</td>
</tr>
</tbody>
</table>

1.2.3 How to Replace the Programming Pendant

To replace a Programming Pendant, remove the CF from the Programming Pendant, and then insert the CF into a new Programming Pendant. MOTOPAL is automatically forwarded to the Programming Pendant through the controller.
1.3 Flow of Setting Up MOTOPAL

For MOTOPAL to function well, you need to set up the related files and data properly as *Fig. 1-1 Setup Flow*.

*Fig. 1-1: Setup Flow*

1. Set up all necessary files of MOTOPAL
   (Refer to 2. Setup Files of MOTOPAL.)

2. Create / Modify the sample Jobs and Ladder Programs.
   (Refer to 3. Jobs and Ladder Programs)

3. Execute SETTING menu of MOTOPAL.
   (Refer to 4. SETTING Menu of MOTOPAL)

4. Set the start up way of MOTOPAL.
   (Refer to 5. The Start Up Way)
## Setup Files of MOTOPAL

There are some data in the application CF which you need to set up. This chapter explains how to set up those data in the application CF.

### 2.1 Data Structure in the Application CF

*Table 2-1 Data Structure of the Palletizing Folder* shows the data structure of Palletizing folder in the application CF. You need to properly set up the files which are marked with "Yes" in the column "Need to Setup" in the table while you can use original files which are marked with “No” in the column "Need to Setup" in the table.

<table>
<thead>
<tr>
<th>Folder</th>
<th>File</th>
<th>Note</th>
<th>Need to be in CF 1)</th>
<th>Need to Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Root</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Palletizing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Confirm</td>
<td>PatternFore1Cnfmr.pat</td>
<td>Pattern files for confirmation programs. Refer to Section 4.2 &quot;CONVEYOR / STATION POSITION Menu&quot; on page 4-4 regarding confirmation programs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PatternFore2Cnfrm.pat</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PatternRev1Cnfrm.pat</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PatternRev2Cnfrm.pat</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ProductCnfrm.csv</td>
<td>Automatically generated file. Don’t change.</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PaletteCnfrm.csv</td>
<td>Automatically generated file. Don’t change.</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>xxxxx.ini</td>
<td>Automatically generated file. Don’t change.</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Controller</td>
<td></td>
<td>The folder for transferring data between the Programming Pendant and the controller.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- IO</td>
<td>ConveyerIO.ini</td>
<td>The file to assign IO for conveyors. Refer to Section 2.2.1 “Setup of ConveyerIO.ini” on page 2-3.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>StationIO.ini</td>
<td>The file to assign IO for stations. Refer to Section 2.2.2 “Setup of StationIO.ini” on page 2-7.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HandIO.ini</td>
<td>The file to assign IO for a hand. Refer to Section 2.2.3 “Setup of HandIO.ini” on page 2-9.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- JobMakeParam</td>
<td>JobMakeParam.Deault</td>
<td>The file to specify the positions of palletize motion. Refer to Section 2.4 “Setup of Palletizing Motion” on page 2-22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>xxxxx.ini</td>
<td>Automatically generated file. Don’t change.</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Parameter</td>
<td>BasicParam.ini</td>
<td>The file to specify the basic information. Refer to Section 2.3.1 “Setup of BasicParam.ini” on page 2-12.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CvStPosParam.ini</td>
<td>The file for MOTOPAL to save data. Don’t change.</td>
<td>Yes</td>
</tr>
<tr>
<td>Folder</td>
<td>File</td>
<td>Note</td>
<td>Need to be in CF</td>
<td>Need to Setup</td>
</tr>
<tr>
<td>--------</td>
<td>---------------</td>
<td>----------------------------------------------------------------------</td>
<td>------------------</td>
<td>---------------</td>
</tr>
<tr>
<td></td>
<td>Layout.ini</td>
<td>The file to change the layout of the buttons in PALLETIZE STATUS VIEW. Refer to Section 2.3.3 “Setup of Layout.ini” on page 2-20.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>SystemInfo.ini</td>
<td>The file to set the input range in MOTOPAL. Refer to Section 2.3.2 “Setup of SystemInfo.ini” on page 2-19</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Product.csv</td>
<td>Automatically generated file. Don’t change.</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Palette.csv</td>
<td>Automatically generated file. Don’t change.</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>- Pattern</td>
<td>The folder to store pattern files which are created by PatternEditor. Refer to Section 2.5 “Pattern Files” on page 2-41</td>
<td>No 2)</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>- Temp</td>
<td>The folder for MOTOPAL to put the calculation data.</td>
<td>No 2)</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>- Template</td>
<td>PickUp.tmp</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PrdMaster.tmp</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

1 The files which are marked with “Yes” in this column must be in the CF at the beginning of setup.

2 The folder itself must be in the CF at the beginning of setup.
2.2 IO Assignment

2.2.1 Setup of ConveyerIO.ini

By ConveyerIO.ini you can assign the input signal number and output signal number which are basically related to the MANUAL OPERATION of CONVEYOR window of MOTOPAL. Set up ConveyerIO.ini according to Table 2-2 Contents of ConveyerIO.ini.

Fig. 2-1: MANUAL OPERATION of CONVEYOR Window

Table 2-2: Contents of ConveyerIO.ini (Sheet 1 of 4)

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Input1]</td>
<td>The items below [Input1] are for the input signal assignment of CV1.</td>
<td></td>
</tr>
<tr>
<td>Exist</td>
<td>The input signal the status of which is shown at &quot;Product Exist&quot; in MANUAL OPERATION of CONVEYOR window.</td>
<td>00010</td>
</tr>
<tr>
<td>Abnormal</td>
<td>The input signal the status of which is shown at &quot;Error&quot; in MANUAL OPERATION of CONVEYOR window.</td>
<td>00022</td>
</tr>
<tr>
<td>SetPos1Ret</td>
<td>The input signal the status of which is shown at &quot;Return&quot; of &quot;Positioning1&quot; in MANUAL OPERATION of CONVEYOR window.</td>
<td>00042</td>
</tr>
<tr>
<td>SetPos1Out</td>
<td>The input signal the status of which is shown at &quot;Advance&quot; of &quot;Positioning1&quot; in MANUAL OPERATION of CONVEYOR window.</td>
<td>00043</td>
</tr>
<tr>
<td>SetPos2Ret</td>
<td>The input signal the status of which is shown at &quot;Return&quot; of &quot;Positioning2&quot; in MANUAL OPERATION of CONVEYOR window.</td>
<td>00044</td>
</tr>
<tr>
<td>SetPos2Out</td>
<td>The input signal the status of which is shown at &quot;Advance&quot; of &quot;Positioning2&quot; in MANUAL OPERATION of CONVEYOR window.</td>
<td>00045</td>
</tr>
<tr>
<td>[Input2]</td>
<td>The items below [Input2] are for the input signal assignment of CV2.</td>
<td></td>
</tr>
<tr>
<td>Exist</td>
<td>Same as Input1.</td>
<td>00011</td>
</tr>
<tr>
<td>Abnormal</td>
<td>Same as Input1.</td>
<td>00023</td>
</tr>
<tr>
<td>SetPos1Ret</td>
<td>Same as Input1.</td>
<td>00046</td>
</tr>
<tr>
<td>SetPos1Out</td>
<td>Same as Input1.</td>
<td>00047</td>
</tr>
<tr>
<td>SetPos2Ret</td>
<td>Same as Input1.</td>
<td>00050</td>
</tr>
<tr>
<td>SetPos2Out</td>
<td>Same as Input1.</td>
<td>00051</td>
</tr>
<tr>
<td>[Input3]</td>
<td>The items below [Input3] are for the input signal assignment of CV3.</td>
<td></td>
</tr>
</tbody>
</table>
### MotoPal

#### Setup Files of MOTOPAL

#### 2.2 IO Assignment

**Table 2-2: Contents of ConveyerIO.ini (Sheet 2 of 4)**

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exist</td>
<td>Same as Input1.</td>
<td>00040</td>
</tr>
<tr>
<td>Abnormal</td>
<td>Same as Input1.</td>
<td>00062</td>
</tr>
<tr>
<td>SetPos1Ret</td>
<td>Same as Input1.</td>
<td>00052</td>
</tr>
<tr>
<td>SetPos1Out</td>
<td>Same as Input1.</td>
<td>00053</td>
</tr>
<tr>
<td>SetPos2Ret</td>
<td>Same as Input1.</td>
<td>00054</td>
</tr>
<tr>
<td>SetPos2Out</td>
<td>Same as Input1.</td>
<td>00055</td>
</tr>
<tr>
<td>[Input4]</td>
<td>The items below [Input4] are for the input signal assignment of CV4.</td>
<td>-</td>
</tr>
<tr>
<td>Exist</td>
<td>Same as Input1.</td>
<td>00041</td>
</tr>
<tr>
<td>Abnormal</td>
<td>Same as Input1.</td>
<td>00063</td>
</tr>
<tr>
<td>SetPos1Ret</td>
<td>Same as Input1.</td>
<td>00056</td>
</tr>
<tr>
<td>SetPos1Out</td>
<td>Same as Input1.</td>
<td>00057</td>
</tr>
<tr>
<td>SetPos2Ret</td>
<td>Same as Input1.</td>
<td>00060</td>
</tr>
<tr>
<td>SetPos2Out</td>
<td>Same as Input1.</td>
<td>00061</td>
</tr>
<tr>
<td>[Input5]</td>
<td>The items below [Input5] are for the input signal assignment of CV5.</td>
<td>-</td>
</tr>
<tr>
<td>Exist</td>
<td>Same as Input1.</td>
<td>00093</td>
</tr>
<tr>
<td>Abnormal</td>
<td>Same as Input1.</td>
<td>00105</td>
</tr>
<tr>
<td>SetPos1Ret</td>
<td>Same as Input1.</td>
<td>00095</td>
</tr>
<tr>
<td>SetPos1Out</td>
<td>Same as Input1.</td>
<td>00096</td>
</tr>
<tr>
<td>SetPos2Ret</td>
<td>Same as Input1.</td>
<td>00097</td>
</tr>
<tr>
<td>SetPos2Out</td>
<td>Same as Input1.</td>
<td>00100</td>
</tr>
<tr>
<td>[Input6]</td>
<td>The items below [Input6] are for the input signal assignment of CV6.</td>
<td>-</td>
</tr>
<tr>
<td>Exist</td>
<td>Same as Input1.</td>
<td>00094</td>
</tr>
<tr>
<td>Abnormal</td>
<td>Same as Input1.</td>
<td>00106</td>
</tr>
<tr>
<td>SetPos1Ret</td>
<td>Same as Input1.</td>
<td>00101</td>
</tr>
<tr>
<td>SetPos1Out</td>
<td>Same as Input1.</td>
<td>00102</td>
</tr>
<tr>
<td>SetPos2Ret</td>
<td>Same as Input1.</td>
<td>00103</td>
</tr>
<tr>
<td>SetPos2Out</td>
<td>Same as Input1.</td>
<td>00104</td>
</tr>
<tr>
<td>[Output1]</td>
<td>The items below [Output1] are for the output signal assignment of CV1.</td>
<td>-</td>
</tr>
<tr>
<td>FExist</td>
<td>The output signal which is turned on or off when pressing the &quot;Product Exist&quot; button in MANUAL OPERATION of CONVEYOR window and [INTERLOCK] key on the Programming pendant.</td>
<td>12526</td>
</tr>
<tr>
<td>CVRun</td>
<td>The output signal which is turned on or off when pressing the &quot;Forward&quot; in MANUAL OPERATION of CONVEYOR window and [INTERLOCK] key on the Programming pendant.</td>
<td>10022</td>
</tr>
<tr>
<td>PicComplete</td>
<td>The output signal which is output by pulse when pressing the &quot;Pick Done&quot; in MANUAL OPERATION of CONVEYOR window and [INTERLOCK] key on the Programming pendant.</td>
<td>10010</td>
</tr>
<tr>
<td>SetPos1Ret</td>
<td>The output signal which is turned on when pressing the &quot;Return&quot; of &quot;Positioning1&quot; in MANUAL OPERATION of CONVEYOR window and [INTERLOCK] key on the Programming pendant. Also, this output signal is turned off when pressing the &quot;Advance&quot; of &quot;Positioning1&quot; in MANUAL OPERATION of CONVEYOR window and [INTERLOCK] key on the Programming pendant.</td>
<td>10042</td>
</tr>
<tr>
<td>SetPos1Out</td>
<td>The output signal which is turned on when pressing the &quot;Advance&quot; of &quot;Positioning1&quot; in MANUAL OPERATION of CONVEYOR window and [INTERLOCK] key on the Programming pendant. Also, this output signal is turned off when pressing the &quot;Return&quot; of &quot;Positioning1&quot; in MANUAL OPERATION of CONVEYOR window and [INTERLOCK] key on the Programming pendant.</td>
<td>10043</td>
</tr>
</tbody>
</table>
2.2 IO Assignment

**Table 2-2: Contents of ConveyerIO.ini (Sheet 3 of 4)**

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>SetPos2Ret</td>
<td>The output signal which is turned on when pressing the &quot;Return&quot; of &quot;Positioning2&quot; in MANUAL OPERATION of CONVEYOR window and [INTERLOCK] key on the Programming pendant. Also, this output signal is turned off when pressing the &quot;Advance&quot; of &quot;Positioning2&quot; in MANUAL OPERATION of CONVEYOR window and [INTERLOCK] key on the Programming pendant.</td>
<td>10044</td>
</tr>
<tr>
<td>SetPos2Out</td>
<td>The output signal which is turned on when pressing the &quot;Advance&quot; of &quot;Positioning2&quot; in MANUAL OPERATION of CONVEYOR window and [INTERLOCK] key on the Programming pendant. Also, this output signal is turned off when pressing the &quot;Return&quot; of &quot;Positioning2&quot; in MANUAL OPERATION of CONVEYOR window and [INTERLOCK] key on the Programming pendant.</td>
<td>10045</td>
</tr>
<tr>
<td>[Output2]</td>
<td>The items below [Output2] are for the output signal assignment of CV2.</td>
<td>-</td>
</tr>
<tr>
<td>FExist</td>
<td>Same as Output1.</td>
<td>12527</td>
</tr>
<tr>
<td>CVRun</td>
<td>Same as Output1.</td>
<td>10023</td>
</tr>
<tr>
<td>PicComplete</td>
<td>Same as Output1.</td>
<td>10011</td>
</tr>
<tr>
<td>SetPos1Ret</td>
<td>Same as Output1.</td>
<td>10046</td>
</tr>
<tr>
<td>SetPos1Out</td>
<td>Same as Output1.</td>
<td>10047</td>
</tr>
<tr>
<td>SetPos2Ret</td>
<td>Same as Output1.</td>
<td>10050</td>
</tr>
<tr>
<td>SetPos2Out</td>
<td>Same as Output1.</td>
<td>10051</td>
</tr>
<tr>
<td>[Output3]</td>
<td>The items below [Output3] are for the output signal assignment of CV3.</td>
<td>-</td>
</tr>
<tr>
<td>FExist</td>
<td>Same as Output1.</td>
<td>12530</td>
</tr>
<tr>
<td>CVRun</td>
<td>Same as Output1.</td>
<td>10062</td>
</tr>
<tr>
<td>PicComplete</td>
<td>Same as Output1.</td>
<td>10040</td>
</tr>
<tr>
<td>SetPos1Ret</td>
<td>Same as Output1.</td>
<td>10052</td>
</tr>
<tr>
<td>SetPos1Out</td>
<td>Same as Output1.</td>
<td>10053</td>
</tr>
<tr>
<td>SetPos2Ret</td>
<td>Same as Output1.</td>
<td>10054</td>
</tr>
<tr>
<td>SetPos2Out</td>
<td>Same as Output1.</td>
<td>10055</td>
</tr>
<tr>
<td>[Output4]</td>
<td>The items below [Output4] are for the output signal assignment of CV4.</td>
<td>-</td>
</tr>
<tr>
<td>FExist</td>
<td>Same as Output1.</td>
<td>12531</td>
</tr>
<tr>
<td>CVRun</td>
<td>Same as Output1.</td>
<td>10063</td>
</tr>
<tr>
<td>PicComplete</td>
<td>Same as Output1.</td>
<td>10041</td>
</tr>
<tr>
<td>SetPos1Ret</td>
<td>Same as Output1.</td>
<td>10056</td>
</tr>
<tr>
<td>SetPos1Out</td>
<td>Same as Output1.</td>
<td>10057</td>
</tr>
<tr>
<td>SetPos2Ret</td>
<td>Same as Output1.</td>
<td>10060</td>
</tr>
<tr>
<td>SetPos2Out</td>
<td>Same as Output1.</td>
<td>10061</td>
</tr>
<tr>
<td>[Output5]</td>
<td>The items below [Output5] are for the output signal assignment of CV5.</td>
<td>-</td>
</tr>
<tr>
<td>FExist</td>
<td>Same as Output1.</td>
<td>12532</td>
</tr>
<tr>
<td>CVRun</td>
<td>Same as Output1.</td>
<td>10105</td>
</tr>
<tr>
<td>PicComplete</td>
<td>Same as Output1.</td>
<td>10093</td>
</tr>
<tr>
<td>SetPos1Ret</td>
<td>Same as Output1.</td>
<td>10095</td>
</tr>
<tr>
<td>SetPos1Out</td>
<td>Same as Output1.</td>
<td>10096</td>
</tr>
<tr>
<td>SetPos2Ret</td>
<td>Same as Output1.</td>
<td>10097</td>
</tr>
<tr>
<td>SetPos2Out</td>
<td>Same as Output1.</td>
<td>10100</td>
</tr>
<tr>
<td>[Output6]</td>
<td>The items below [Output6] are for the output signal assignment of CV6.</td>
<td>-</td>
</tr>
<tr>
<td>FExist</td>
<td>Same as Output1.</td>
<td>12533</td>
</tr>
<tr>
<td>CVRun</td>
<td>Same as Output1.</td>
<td>10106</td>
</tr>
</tbody>
</table>
### Table 2-2: Contents of ConveyerI0.ini (Sheet 4 of 4)

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>PicComplete</td>
<td>Same as Output1.</td>
<td>10094</td>
</tr>
<tr>
<td>SetPos1Ret</td>
<td>Same as Output1.</td>
<td>10101</td>
</tr>
<tr>
<td>SetPos1Out</td>
<td>Same as Output1.</td>
<td>10102</td>
</tr>
<tr>
<td>SetPos2Ret</td>
<td>Same as Output1.</td>
<td>10103</td>
</tr>
<tr>
<td>SetPos2Out</td>
<td>Same as Output1.</td>
<td>10104</td>
</tr>
</tbody>
</table>

If there are any input or output signals which are not used, either set “0” to those items or delete those items from ConveyerI0.ini file.

Regarding the detail of DX200 inputs and outputs, refer to DX200 Concurrent I/O manual (Part No. 165294-1CD).
2.2 Setup Files of MOTOPAL

2.2.2 Setup of StationIO.ini

By StationIO.ini, you can assign the input signal number and output signal number which are basically related to the MANUAL OPERATION of STATION window in MOTOPAL. Set up StationIO.ini according to Table 2-3 Contents of ConveyerIO.ini.

Fig. 2-2: MANUAL OPERATION of STATION Window

Table 2-3: Contents of ConveyerIO.ini (Sheet 1 of 2)

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Input1]</td>
<td>The items below [Input1] are for the input signal assignment of ST1.</td>
<td></td>
</tr>
<tr>
<td>SetPosition</td>
<td>The status of this signal is shown at &quot;Pallet Num.&quot; in MANUAL OPERATION of STATION window. &quot;001&quot; is shown when this signal is turned ON and both &quot;SetPosition2&quot; and &quot;SetPosition3&quot; signals are turned OFF.</td>
<td>00012</td>
</tr>
<tr>
<td>SetPosition2</td>
<td>The status of this signal is shown at &quot;Pallet Num.&quot; in MANUAL OPERATION of STATION window. &quot;002&quot; is shown when this signal is turned ON and &quot;SetPosition3&quot; signal is turned OFF.</td>
<td>00013</td>
</tr>
<tr>
<td>SetPosition3</td>
<td>The status of this signal is shown at &quot;Pallet Num.&quot; in MANUAL OPERATION of STATION window. &quot;003&quot; is shown when this signal is turned ON.</td>
<td>00014</td>
</tr>
<tr>
<td>SetPosition4</td>
<td>The status of this signal is used when a job is executed. An alarm occurs when &quot;000&quot; is shown at both &quot;Layer&quot; and &quot;Pieces&quot; because this status is considered as undesired substance on the pallet.</td>
<td>00015</td>
</tr>
<tr>
<td>Abnormal</td>
<td>The status of this signal is shown at &quot;Error&quot; in MANUAL OPERATION of STATION window.</td>
<td>00036</td>
</tr>
<tr>
<td>[Input2]</td>
<td>The items below [Input2] are for the input signal assignment for ST2.</td>
<td></td>
</tr>
<tr>
<td>SetPosition</td>
<td>Refer to &quot;SetPosition&quot; of [Input1].</td>
<td>00016</td>
</tr>
<tr>
<td>SetPosition2</td>
<td>Refer to &quot;SetPosition2&quot; of [Input1].</td>
<td>00017</td>
</tr>
<tr>
<td>SetPosition3</td>
<td>Refer to &quot;SetPosition3&quot; of [Input1].</td>
<td>00020</td>
</tr>
<tr>
<td>SetPosition4</td>
<td>Refer to &quot;SetPosition4&quot; of [Input1].</td>
<td>00021</td>
</tr>
<tr>
<td>Abnormal</td>
<td>Same as Input1.</td>
<td>00037</td>
</tr>
<tr>
<td>[Input3]</td>
<td>The items below [Input3] are for the input signal assignment for ST3.</td>
<td></td>
</tr>
<tr>
<td>SetPosition</td>
<td>Refer to &quot;SetPosition&quot; of [Input1].</td>
<td>00064</td>
</tr>
<tr>
<td>SetPosition2</td>
<td>Refer to &quot;SetPosition2&quot; of [Input1].</td>
<td>00065</td>
</tr>
<tr>
<td>SetPosition3</td>
<td>Refer to &quot;SetPosition3&quot; of [Input1].</td>
<td>00066</td>
</tr>
<tr>
<td>SetPosition4</td>
<td>Refer to &quot;SetPosition4&quot; of [Input1].</td>
<td>00067</td>
</tr>
<tr>
<td>Abnormal</td>
<td>Same as Input1.</td>
<td>00076</td>
</tr>
</tbody>
</table>
### Table 2-3: Contents of ConveyerIO.ini (Sheet 2 of 2)

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>SetPosition</td>
<td>Refer to “SetPosition” of [Input1].</td>
<td>00070</td>
</tr>
<tr>
<td>SetPosition2</td>
<td>Refer to “SetPosition2” of [Input1].</td>
<td>00071</td>
</tr>
<tr>
<td>SetPosition3</td>
<td>Refer to “SetPosition3” of [Input1].</td>
<td>00072</td>
</tr>
<tr>
<td>SetPosition4</td>
<td>Refer to “SetPosition4” of [Input1].</td>
<td>00073</td>
</tr>
<tr>
<td>Abnormal</td>
<td>Same as Input1.</td>
<td>00077</td>
</tr>
<tr>
<td>[Input5]</td>
<td>The items below [Input5] are for the input signal assignment for ST5.</td>
<td>-</td>
</tr>
<tr>
<td>SetPosition</td>
<td>Refer to “SetPosition” of [Input1].</td>
<td>00107</td>
</tr>
<tr>
<td>SetPosition2</td>
<td>Refer to “SetPosition2” of [Input1].</td>
<td>00110</td>
</tr>
<tr>
<td>SetPosition3</td>
<td>Refer to “SetPosition3” of [Input1].</td>
<td>00111</td>
</tr>
<tr>
<td>SetPosition4</td>
<td>Refer to “SetPosition4” of [Input1].</td>
<td>00112</td>
</tr>
<tr>
<td>Abnormal</td>
<td>Same as Input1.</td>
<td>00121</td>
</tr>
<tr>
<td>[Input6]</td>
<td>The items below [Input6] are for the input signal assignment for ST6.</td>
<td>-</td>
</tr>
<tr>
<td>SetPosition</td>
<td>Refer to “SetPosition” of [Input1].</td>
<td>00113</td>
</tr>
<tr>
<td>SetPosition2</td>
<td>Refer to “SetPosition2” of [Input1].</td>
<td>00114</td>
</tr>
<tr>
<td>SetPosition3</td>
<td>Refer to “SetPosition3” of [Input1].</td>
<td>00115</td>
</tr>
<tr>
<td>SetPosition4</td>
<td>Refer to “SetPosition4” of [Input1].</td>
<td>00116</td>
</tr>
<tr>
<td>Abnormal</td>
<td>Same as Input1.</td>
<td>00122</td>
</tr>
<tr>
<td>[Output1]</td>
<td>The items below [Output1] are for the output signal assignment for ST1.</td>
<td>-</td>
</tr>
<tr>
<td>Full</td>
<td>The status of this signal is shown at “Full” in MANUAL OPERATION of STATION window.</td>
<td>30032</td>
</tr>
<tr>
<td>Disbursement</td>
<td>This signal is output by pulse when pressing the “Eject Pallet” button in MANUAL OPERATION of STATION window and [INTERLOCK] key on the Programming pendant.</td>
<td>10026</td>
</tr>
<tr>
<td>[Output2]</td>
<td>The items below [Output2] are for the output signal assignment for ST2.</td>
<td>-</td>
</tr>
<tr>
<td>Full</td>
<td>Same as Output1.</td>
<td>30036</td>
</tr>
<tr>
<td>Disbursement</td>
<td>Same as Output1.</td>
<td>10027</td>
</tr>
<tr>
<td>[Output3]</td>
<td>The items below [Output3] are for the output signal assignment for ST3.</td>
<td>-</td>
</tr>
<tr>
<td>Full</td>
<td>Same as Output1.</td>
<td>30084</td>
</tr>
<tr>
<td>Disbursement</td>
<td>Same as Output1.</td>
<td>10074</td>
</tr>
<tr>
<td>[Output4]</td>
<td>The items below [Output4] are for the output signal assignment for ST4.</td>
<td>-</td>
</tr>
<tr>
<td>Full</td>
<td>Same as Output1.</td>
<td>30090</td>
</tr>
<tr>
<td>Disbursement</td>
<td>Same as Output1.</td>
<td>10075</td>
</tr>
<tr>
<td>[Output5]</td>
<td>The items below [Output5] are for the output signal assignment for ST5.</td>
<td>-</td>
</tr>
<tr>
<td>Full</td>
<td>Same as Output1.</td>
<td>30127</td>
</tr>
<tr>
<td>Disbursement</td>
<td>Same as Output1.</td>
<td>10117</td>
</tr>
<tr>
<td>[Output6]</td>
<td>The items below [Output6] are for the output signal assignment for ST6.</td>
<td>-</td>
</tr>
<tr>
<td>Full</td>
<td>Same as Output1.</td>
<td>30133</td>
</tr>
<tr>
<td>Disbursement</td>
<td>Same as Output1.</td>
<td>10120</td>
</tr>
</tbody>
</table>

**NOTE:** If there are any input or output signals which are not used, either set “0” to those items or delete those items from StationIO.ini file.

**NOTE:** Regarding the details of DX200 input and output signals, refer to DX200 Concurrent I/O manual (Part No. 165294-1CD).
2.2.3 Setup of HandIO.ini

By HandIO.ini, you can assign the input signal number and output signal number which are basically related to the MANUAL OPERATION of HAND window in MOTOPAL. Set up HandIO.ini according to Table 2-4 Contents of HandIO.ini.

**Fig. 2-3: MANUAL OPERATION of HAND Window**

![MANUAL OPERATION of HAND Window](image)

**Table 2-4: Contents of HandIO.ini (Sheet 1 of 3)**

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Valve1]</td>
<td>The items below [Valve1] are for setting information and the signal assignment of Valve1.</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>The string you write is shown at the name of the valve in MANUAL OPERATION of HAND window.</td>
<td></td>
</tr>
<tr>
<td>State1Name</td>
<td>The string you write is shown at the button 1 of the valve in MANUAL OPERATION of HAND window.</td>
<td></td>
</tr>
<tr>
<td>State1In</td>
<td>The input signal the status of which is shown at the button 1 of the valve in MANUAL OPERATION of HAND window.</td>
<td></td>
</tr>
<tr>
<td>State1Out</td>
<td>The output signal which is turned on when pressing the button 1 of the valve in MANUAL OPERATION of HAND window and [INTERLOCK] key on the Programming pendant. Also, this output signal is turned off when pressing the button 2 of the valve in MANUAL OPERATION of HAND window and [INTERLOCK] key on the Programming pendant.</td>
<td></td>
</tr>
<tr>
<td>State2Name</td>
<td>The string you write is shown at the button 2 of the valve in MANUAL OPERATION of HAND window.</td>
<td></td>
</tr>
<tr>
<td>State2In</td>
<td>The input signal the status of which is shown at the button 2 of the valve in MANUAL OPERATION of HAND window.</td>
<td></td>
</tr>
<tr>
<td>State2Out</td>
<td>The output signal which is turned on when pressing the button 2 of the valve in MANUAL OPERATION of HAND window and [INTERLOCK] key on the Programming pendant. Also, this output signal is turned off when pressing the button 1 of the valve in MANUAL OPERATION of HAND window and [INTERLOCK] key on the Programming pendant.</td>
<td></td>
</tr>
</tbody>
</table>
### Table 2-4: Contents of HandIO.ini (Sheet 2 of 3)

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Valve2]</td>
<td>The items below [Valve2] are for setting information and the signal assignment of Valve2.</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Same as Valve1.</td>
<td></td>
</tr>
<tr>
<td>State1Name</td>
<td>Same as Valve1.</td>
<td></td>
</tr>
<tr>
<td>State1In</td>
<td>Same as Valve1.</td>
<td></td>
</tr>
<tr>
<td>State1Out</td>
<td>Same as Valve1.</td>
<td></td>
</tr>
<tr>
<td>State2Name</td>
<td>Same as Valve1.</td>
<td></td>
</tr>
<tr>
<td>State2In</td>
<td>Same as Valve1.</td>
<td></td>
</tr>
<tr>
<td>State2Out</td>
<td>Same as Valve1.</td>
<td></td>
</tr>
</tbody>
</table>

| [Valve3] | The items below [Valve3] are for setting information and the signal assignment of Valve3. |         |
| Name   | Same as Valve1.                                                          |         |
| State1Name | Same as Valve1.                                                        |         |
| State1In  | Same as Valve1.                                                         |         |
| State1Out | Same as Valve1.                                                         |         |
| State2Name | Same as Valve1.                                                        |         |
| State2In  | Same as Valve1.                                                         |         |
| State2Out | Same as Valve1.                                                         |         |

| Name   | Same as Valve1.                                                          |         |
| State1Name | Same as Valve1.                                                        |         |
| State1In  | Same as Valve1.                                                         |         |
| State1Out | Same as Valve1.                                                         |         |
| State2Name | Same as Valve1.                                                        |         |
| State2In  | Same as Valve1.                                                         |         |
| State2Out | Same as Valve1.                                                         |         |

| [Valve5] | The items below [Valve5] are for setting information and the signal assignment of Valve5. |         |
| Name   | Same as Valve1.                                                          |         |
| State1Name | Same as Valve1.                                                        |         |
| State1In  | Same as Valve1.                                                         |         |
| State1Out | Same as Valve1.                                                         |         |
| State2Name | Same as Valve1.                                                        |         |
| State2In  | Same as Valve1.                                                         |         |
| State2Out | Same as Valve1.                                                         |         |

| [Sensor1] | The items below [Sensor1] are for setting information and the signal assignment of Sensor1. |         |
| Name   | The string you write is shown at the name of the sensor in MANUAL OPERATION of HAND window. |         |
| Input  | The input signal the status of which is shown at the sensor in MANUAL OPERATION of HAND window. |         |

| [Sensor2] | The items below [Sensor2] are for setting information and the signal assignment of Sensor2. |         |
| Name   | Same as Sensor1.                                                          |         |
| Input  | Same as Sensor1.                                                         |         |
2.2 IO Assignment

The items below are for setting information and the signal assignment of Sensor3.
- Name: Same as Sensor1.
- Input: Same as Sensor1.

The items below are for setting information and the signal assignment of Sensor4.
- Name: Same as Sensor1.
- Input: Same as Sensor1.

The items below are for setting information and the signal assignment of Sensor5.
- Name: Same as Sensor1.
- Input: Same as Sensor1.

The items below are for setting information other than above items.
- Name: Same as Sensor1.
- Input: Same as Sensor1.

The input signal the status of which is shown at "Error" in MANUAL OPERATION of HAND window.

Table 2-4: Contents of HandIO.ini (Sheet 3 of 3)

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Sensor3]</td>
<td>The items below [Sensor3] are for setting information and the signal assignment of Sensor3.</td>
<td>-</td>
</tr>
<tr>
<td>Name</td>
<td>Same as Sensor1.</td>
<td>-</td>
</tr>
<tr>
<td>Input</td>
<td>Same as Sensor1.</td>
<td>-</td>
</tr>
<tr>
<td>[Sensor4]</td>
<td>The items below [Sensor4] are for setting information and the signal assignment of Sensor4.</td>
<td>-</td>
</tr>
<tr>
<td>Name</td>
<td>Same as Sensor1.</td>
<td>-</td>
</tr>
<tr>
<td>Input</td>
<td>Same as Sensor1.</td>
<td>-</td>
</tr>
<tr>
<td>[Sensor5]</td>
<td>The items below [Sensor5] are for setting information and the signal assignment of Sensor5.</td>
<td>-</td>
</tr>
<tr>
<td>Name</td>
<td>Same as Sensor1.</td>
<td>-</td>
</tr>
<tr>
<td>Input</td>
<td>Same as Sensor1.</td>
<td>-</td>
</tr>
<tr>
<td>[Sensor6]</td>
<td>The items below [Sensor6] are for setting information and the signal assignment of Sensor6.</td>
<td>-</td>
</tr>
<tr>
<td>Name</td>
<td>Same as Sensor1.</td>
<td>-</td>
</tr>
<tr>
<td>Input</td>
<td>Same as Sensor1.</td>
<td>-</td>
</tr>
<tr>
<td>[Other]</td>
<td>The items below [Other] are for setting information other than above items.</td>
<td>-</td>
</tr>
<tr>
<td>Abnormal</td>
<td>The input signal the status of which is shown at &quot;Error&quot; in MANUAL OPERATION of HAND window.</td>
<td>00035</td>
</tr>
</tbody>
</table>

**NOTE** If there are any input or output signals which are not used, either set "0" to those items or delete those items from StationIO.ini file.

**NOTE** Regarding the detail of DX200 inputs and outputs, refer to DX200 Concurrent I/O manual (Part No. 165294-1CD).
## 2.3 Setup of Basic Information

### 2.3.1 Setup of BasicParam.ini

By BasicParam.ini, you can set basic information of your system. Set up BasicParam.ini according to Table 2-5 Contents of BasicParam.ini.

### Table 2-5: Contents of BasicParam.ini (Sheet 1 of 6)

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>[BaseInfo]</td>
<td>The items below [BaseInfo] are for setting information of your system.</td>
<td>-</td>
</tr>
<tr>
<td>ConveyerNum</td>
<td>Number of conveyor in your system.</td>
<td>1</td>
</tr>
<tr>
<td>StationNum</td>
<td>Number of station in which a pallet is placed in your system.</td>
<td>1</td>
</tr>
<tr>
<td>[Conveyor]</td>
<td>The items below [Conveyor] are for setting information of your conveyors.</td>
<td>-</td>
</tr>
<tr>
<td>StdPos1</td>
<td>The place where a product is positioned on CV1 in view from the downstream of CV1.</td>
<td>0</td>
</tr>
<tr>
<td>StdPos2</td>
<td>The place where a product is positioned on CV2 in view from the downstream of CV2.</td>
<td>0</td>
</tr>
<tr>
<td>StdPos3</td>
<td>The place where a product is positioned on CV3 in view from the downstream of CV3.</td>
<td>0</td>
</tr>
<tr>
<td>StdPos4</td>
<td>The place where a product is positioned on CV4 in view from the downstream of CV4.</td>
<td>0</td>
</tr>
<tr>
<td>StdPos5</td>
<td>The place where a product is positioned on CV5 in view from the downstream of CV5.</td>
<td>0</td>
</tr>
<tr>
<td>StdPos6</td>
<td>The place where a product is positioned on CV6 in view from the downstream of CV6.</td>
<td>0</td>
</tr>
</tbody>
</table>

Table continues on the next page.
<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>StdPos1</td>
<td>The place where a pallet is positioned on ST1 in view from the robot.</td>
<td>0</td>
</tr>
<tr>
<td>StdPos2</td>
<td>The place where a pallet is positioned on ST2 in view from the robot.</td>
<td>0</td>
</tr>
<tr>
<td>StdPos3</td>
<td>The place where a pallet is positioned on ST3 in view from the robot.</td>
<td>0</td>
</tr>
<tr>
<td>StdPos4</td>
<td>The place where a pallet is positioned on ST4 in view from the robot.</td>
<td>0</td>
</tr>
<tr>
<td>StdPos5</td>
<td>The place where a pallet is positioned on ST5 in view from the robot.</td>
<td>0</td>
</tr>
<tr>
<td>StdPos6</td>
<td>The place where a pallet is positioned on ST6 in view from the robot.</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 2-5: Contents of BasicParam.ini (Sheet 2 of 6)

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
</table>

[Hand] The items below [Hand] are for setting information of your hand.
### Table 2-5: Contents of BasicParam.ini (Sheet 3 of 6)

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>HandType</td>
<td>Hand type.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>0 : Vacuum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 : Clamp (with a fixed panel and a movable panel)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 : Clamp (with both movable panels)</td>
<td></td>
</tr>
<tr>
<td>FixedHandPos</td>
<td>This item needs to be set only when choosing 1(clamp hand with a fixed panel and a movable panel) as HandType. This item means the position of the fixed panel at &quot;Normal Pick&quot; position in view from the downstream of a conveyor. &quot;Normal Pick&quot; is the position which is normally used to pick a product on a conveyor and is registered in CONVEYOR POSITION window (refer to Section 4.2 “CONVEYOR / STATION POSITION Menu” on page 4-4).</td>
<td>0</td>
</tr>
<tr>
<td>ReversePic</td>
<td>The item to set whether to use &quot;Reverse Pick&quot; or not. &quot;Reverse Pick&quot; is the position to pick a product on a conveyor with the hand reversed from &quot;Normal Pick&quot;. &quot;Reverse Pick&quot; is registered in CONVEYOR POSITION window (refer to Section 4.2 “CONVEYOR / STATION POSITION Menu”).</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>0 : Reverse Pick is NOT used.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 : Reverse Pick is used.</td>
<td></td>
</tr>
</tbody>
</table>
Table 2-5: Contents of BasicParam.ini (Sheet 4 of 6)

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Length of the hand. Set the long side of your hand by mm. You don’t need to set correct value. But don’t set too big value, because this item influences Tool Load Information in the Tool Files. Setting too big value could cause slowing down the robot or robot alarms.</td>
<td>0</td>
</tr>
<tr>
<td>W</td>
<td>Width of the hand. Set the short side of your hand by mm. You don’t need to set correct value. But don’t set too big value, because this item influences Tool Load Information in the Tool Files. Setting too big value could cause slowing down the robot or robot alarms.</td>
<td>0</td>
</tr>
<tr>
<td>H</td>
<td>Height of the hand. Set the height of your hand by mm. You don’t need to set correct value. But don’t set too big value, because this item influences Tool Load Information in the Tool Files. Setting too big value could cause slowing down the robot or robot alarms.</td>
<td>0</td>
</tr>
<tr>
<td>M</td>
<td>Mass of the hand. Set the mass of your hand by Kg. You don’t need to set correct value. But don’t set too big value, because this item influences Tool Load Information in the Tool Files. Setting too big value could cause slowing down the robot or robot alarms.</td>
<td>0</td>
</tr>
</tbody>
</table>
2.3 Setup of Basic Information

PicupPosType  The position of the hand in the way of a conveyor flow. This item needs to be set only when choosing 1(clamp hand with a fixed panel and a movable panel) or 2(clamp hand with both movable panels) as HandType.

0 : Center of a product
   When the length of the clamp panel is always shorter than the length of a product, this item should be set to 0.

1 : Fixed
   When the length of the clamp panel can be longer than the length of a small product, this item needs to be set to 1. If the clamp panel overhang from a product at both back and forth of a product, the clamp panel interfere with other products on a pallet when placing. If the clamp panel overhang from a product just at back of a product, it is possible to place a product on a pallet without interference. But still be careful to create pattern files so that the clamp panel doesn’t interfere with other products on a pallet.

---

Table 2-5: Contents of BasicParam.ini (Sheet 5 of 6)

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>PicupPosType</td>
<td>The position of the hand in the way of a conveyor flow. This item needs to be set only when choosing 1(clamp hand with a fixed panel and a movable panel) or 2(clamp hand with both movable panels) as HandType.</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>Center of a product</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>Fixed</td>
<td></td>
</tr>
</tbody>
</table>
### Table 2-5: Contents of BasicParam.ini (Sheet 6 of 6)

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>DangaeType</td>
<td>The item to set which side of the clamp panel of your hand needs to be adjusted when the size of products change. This item needs to be set only when choosing 1 (clamp hand with a fixed panel and a movable panel) as HandType.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 : Only the movable panel side</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>1 : Both sides</td>
<td></td>
</tr>
<tr>
<td>[Other]</td>
<td>The items below [Other] are for setting information other than above items.</td>
<td>-</td>
</tr>
<tr>
<td>PathOffset</td>
<td>Refer to Section 2.4.7.1 “P1 (Station Approach Position)” on page 2-33 and Section 2.4.7.7 “P7 (Station Get Away Position)” on page 2-39.</td>
<td>0</td>
</tr>
</tbody>
</table>
### 2.3.1.1 Hand Type and Pick Position

The setting regarding [Hand] in BasicParam.ini decide the hand position against a product when picking a product according to Table 2-6 Setting in BasicParam.ini and Hand Position.

**Table 2-6: Setting in BasicParam.ini and Hand Position**

<table>
<thead>
<tr>
<th>Setting of items</th>
<th>Hand position against a product</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Hand position against a product</strong></td>
</tr>
<tr>
<td></td>
<td><strong>The way of Conveyor Flow</strong></td>
</tr>
<tr>
<td><strong>HandType</strong></td>
<td><strong>PicupPosType</strong></td>
</tr>
<tr>
<td>0 : Vacuum hand</td>
<td>-</td>
</tr>
<tr>
<td>1 : Clamp (with a fixed panel and a movable panel)</td>
<td>0 : Center of a product</td>
</tr>
<tr>
<td></td>
<td>1 : Both sides</td>
</tr>
<tr>
<td>1 : Fixed</td>
<td>0 : Only the movable panel side</td>
</tr>
<tr>
<td></td>
<td>1 : Both sides</td>
</tr>
<tr>
<td>2 : Clamp (with both movable panels)</td>
<td>0 : Center of a product</td>
</tr>
<tr>
<td></td>
<td>1 : Fixed</td>
</tr>
</tbody>
</table>
2.3.2 Setup of SystemInfo.ini

By SystemInfo.ini, you can set the basic information of MOTOPAL. Set up SystemInfo.ini according to Table 2-7 Contents of SystemInfo.ini.

Table 2-7: Contents of SystemInfo.ini

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Position]</td>
<td>The items below [Position] are for internal data of MOTOPAL. So, you don’t need to set these items.</td>
<td>-</td>
</tr>
<tr>
<td>[Product]</td>
<td>The items below [Product] are for setting input range of the size and the mass of products in PRODUCT windows of MOTOPAL.</td>
<td>-</td>
</tr>
<tr>
<td>SizeMaxL</td>
<td>The maximum value of the length of products. This item is also used to calculate the Tool Load Information in the Tool Files. So, don’t set too big value. Setting too big value could cause slowing down the robot or robot alarms.</td>
<td>1500</td>
</tr>
<tr>
<td>SizeMaxW</td>
<td>The maximum value of the width of products. This item is also used to calculate the Tool Load Information in the Tool Files. So, don’t set too big value. Setting too big value could cause slowing down the robot or robot alarms.</td>
<td>1500</td>
</tr>
<tr>
<td>SizeMaxH</td>
<td>The maximum value of the height of products. This item is also used to calculate the Tool Load Information in the Tool Files. So, don’t set too big value. Setting too big value could cause slowing down the robot or robot alarms.</td>
<td>1000</td>
</tr>
<tr>
<td>WeightMax</td>
<td>The maximum value of the mass of products. This item is also used to calculate the Tool Load Information in the Tool Files. So, don’t set too big value. Setting too big value could cause slowing down the robot or robot alarms.</td>
<td>50</td>
</tr>
<tr>
<td>SizeMinL</td>
<td>The minimum value of the length of products.</td>
<td>10</td>
</tr>
<tr>
<td>SizeMinW</td>
<td>The minimum value of the width of products.</td>
<td>10</td>
</tr>
<tr>
<td>SizeMinH</td>
<td>The minimum value of the height of products.</td>
<td>10</td>
</tr>
<tr>
<td>WeightMin</td>
<td>The minimum value of the mass of products.</td>
<td>0</td>
</tr>
<tr>
<td>[Palette]</td>
<td>The items below [Palette] are for setting input range of the size of pallets in PALLET window of MOTOPAL</td>
<td>-</td>
</tr>
<tr>
<td>SizeMaxL</td>
<td>The maximum value of the length of pallets.</td>
<td>2000</td>
</tr>
<tr>
<td>SizeMaxW</td>
<td>The maximum value of the width of pallets.</td>
<td>2000</td>
</tr>
<tr>
<td>SizeMaxH</td>
<td>The maximum value of the height of pallets.</td>
<td>500</td>
</tr>
<tr>
<td>SizeMinL</td>
<td>The minimum value of the length of pallets.</td>
<td>50</td>
</tr>
<tr>
<td>SizeMinW</td>
<td>The minimum value of the width of pallets.</td>
<td>50</td>
</tr>
<tr>
<td>SizeMinH</td>
<td>The minimum value of the height of pallets.</td>
<td>10</td>
</tr>
<tr>
<td>[OverHang]</td>
<td>The items below [OverHang] are for setting the maximum value of overhang in OVERHANG window of MOTOPAL. The minimum value is 0.</td>
<td>-</td>
</tr>
<tr>
<td>dLMax</td>
<td>The maximum value of the length of overhang.</td>
<td>100</td>
</tr>
<tr>
<td>dWMax</td>
<td>The maximum value of the width of overhang.</td>
<td>100</td>
</tr>
<tr>
<td>[Piling]</td>
<td>The items below [Piling] are for setting the maximum value of the total height of products on a pallet.</td>
<td>-</td>
</tr>
<tr>
<td>PileMaxHeight</td>
<td>The maximum value of the total height of products on a pallet. By this item “Layer Num” in PATTERN window of MOTOPAL is limited.</td>
<td>2200</td>
</tr>
<tr>
<td>[Other]</td>
<td>The items below [Other] are for setting information other than above items.</td>
<td>-</td>
</tr>
<tr>
<td>ProductClearance</td>
<td>Refer to Section 2.4.7.1 “P1 (Station Approach Position)” on page 2-33 and Section 2.4.7.7 “P7 (Station Get Away Position)” on page 2-39.</td>
<td>0</td>
</tr>
<tr>
<td>UFrameInterval</td>
<td>Internal data of MOTOPAL. Don’t change the value.</td>
<td>4000</td>
</tr>
<tr>
<td>IOWatchCycleInterval</td>
<td>Internal data of MOTOPAL. Don’t change the value.</td>
<td>100</td>
</tr>
<tr>
<td>MonitorCycleInterval</td>
<td>Internal data of MOTOPAL. Don’t change the value.</td>
<td>100</td>
</tr>
</tbody>
</table>
2.3.3 Setup of Layout.ini

By Layout.ini, you can change the layout of all buttons in PALLETIZE STATUS VIEW of MAIN window. Set up layout.ini according to Table 2-8 Contents of Layout.ini.

![PALLETIZE STATUS VIEW](image)

Table 2-8: Contents of Layout.ini (Sheet 1 of 2)

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>[CV1]</td>
<td>The items below [CV1] are for setting the position of the CV1 button.</td>
<td>-</td>
</tr>
<tr>
<td>X</td>
<td>X coordinate value of the button.</td>
<td>100</td>
</tr>
<tr>
<td>Y</td>
<td>Y coordinate value of the button.</td>
<td>40</td>
</tr>
<tr>
<td>[CV2]</td>
<td>The items below [CV2] are for setting the position of the CV2 button.</td>
<td>-</td>
</tr>
<tr>
<td>X</td>
<td>X coordinate value of the button.</td>
<td>180</td>
</tr>
<tr>
<td>Y</td>
<td>Y coordinate value of the button.</td>
<td>40</td>
</tr>
<tr>
<td>[CV3]</td>
<td>The items below [CV3] are for setting the position of the CV3 button.</td>
<td>-</td>
</tr>
<tr>
<td>X</td>
<td>X coordinate value of the button.</td>
<td>260</td>
</tr>
<tr>
<td>Y</td>
<td>Y coordinate value of the button.</td>
<td>40</td>
</tr>
<tr>
<td>[CV4]</td>
<td>The items below [CV4] are for setting the position of the CV4 button.</td>
<td>-</td>
</tr>
<tr>
<td>X</td>
<td>X coordinate value of the button.</td>
<td>340</td>
</tr>
<tr>
<td>Y</td>
<td>Y coordinate value of the button.</td>
<td>40</td>
</tr>
<tr>
<td>[CV5]</td>
<td>The items below [CV5] are for setting the position of the CV5 button.</td>
<td>-</td>
</tr>
<tr>
<td>X</td>
<td>X coordinate value of the button.</td>
<td>420</td>
</tr>
<tr>
<td>Y</td>
<td>Y coordinate value of the button.</td>
<td>40</td>
</tr>
<tr>
<td>[CV6]</td>
<td>The items below [CV6] are for setting the position of the CV6 button.</td>
<td>-</td>
</tr>
<tr>
<td>X</td>
<td>X coordinate value of the button.</td>
<td>500</td>
</tr>
<tr>
<td>Y</td>
<td>Y coordinate value of the button.</td>
<td>40</td>
</tr>
<tr>
<td>[ST1]</td>
<td>The items below [ST1] are for setting the position of the ST1 button.</td>
<td>-</td>
</tr>
<tr>
<td>X</td>
<td>X coordinate value of the button.</td>
<td>150</td>
</tr>
<tr>
<td>Y</td>
<td>Y coordinate value of the button.</td>
<td>120</td>
</tr>
<tr>
<td>[ST2]</td>
<td>The items below [ST2] are for setting the position of the ST2 button.</td>
<td>-</td>
</tr>
<tr>
<td>X</td>
<td>X coordinate value of the button.</td>
<td>120</td>
</tr>
</tbody>
</table>
Table 2-8: Contents of Layout.ini (Sheet 2 of 2)

<table>
<thead>
<tr>
<th>Item</th>
<th>Meaning</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Y coordinate value of the button.</td>
<td>200</td>
</tr>
<tr>
<td>[ST3]</td>
<td>The items below [ST3] are for setting the position of the ST3 button.</td>
<td>-</td>
</tr>
<tr>
<td>X</td>
<td>X coordinate value of the button.</td>
<td>150</td>
</tr>
<tr>
<td>Y</td>
<td>Y coordinate value of the button.</td>
<td>280</td>
</tr>
<tr>
<td>[ST4]</td>
<td>The items below [ST4] are for setting the position of the ST4 button.</td>
<td>-</td>
</tr>
<tr>
<td>X</td>
<td>X coordinate value of the button.</td>
<td>450</td>
</tr>
<tr>
<td>Y</td>
<td>Y coordinate value of the button.</td>
<td>120</td>
</tr>
<tr>
<td>[ST5]</td>
<td>The items below [ST5] are for setting the position of the ST5 button.</td>
<td>-</td>
</tr>
<tr>
<td>X</td>
<td>X coordinate value of the button.</td>
<td>480</td>
</tr>
<tr>
<td>Y</td>
<td>Y coordinate value of the button.</td>
<td>200</td>
</tr>
<tr>
<td>[ST6]</td>
<td>The items below [ST6] are for setting the position of the ST6 button.</td>
<td>-</td>
</tr>
<tr>
<td>X</td>
<td>X coordinate value of the button.</td>
<td>450</td>
</tr>
<tr>
<td>Y</td>
<td>Y coordinate value of the button.</td>
<td>280</td>
</tr>
<tr>
<td>[Robot]</td>
<td>The items below [Robot] are for setting the position of the ROBOT button.</td>
<td>-</td>
</tr>
<tr>
<td>X</td>
<td>X coordinate value of the button.</td>
<td>340</td>
</tr>
<tr>
<td>Y</td>
<td>Y coordinate value of the button.</td>
<td>210</td>
</tr>
<tr>
<td>[Hand]</td>
<td>The items below [Hand] are for setting the position of the HAND button.</td>
<td>-</td>
</tr>
<tr>
<td>X</td>
<td>X coordinate value of the button.</td>
<td>250</td>
</tr>
<tr>
<td>Y</td>
<td>Y coordinate value of the button.</td>
<td>190</td>
</tr>
</tbody>
</table>
2.4 Setup of Palletizing Motion

When you create a program in PROGRAM menu of MOTOPAL, MOTOPAL creates the Jobs. Those Jobs realize the palletizing motion of the created program. This section explains how to customize the contents of the created Jobs.

2.4.1 Created Jobs

MOTOPAL creates the following Jobs when you create a program by PROGRAM menu of MOTOPAL. The palletizing motion is divided into 2 parts; Pick motion and Place motion. The instructions of Pick motion are written in 2 Pick Jobs; Normal Pick Job and Reverse Pick Job. The instructions of Place motion are written in Product Master Job. Product Master Job also realizes the whole palletizing motion by calling Pick Jobs.

- xxxyzPICK.JBI: Normal Pick Job
  The Job to pick a product from a conveyor with "Normal Pick" position.  

- xxxyzPICK_REV.JBI: Reverse Pick Job
  The Job to pick a product from a conveyor with "Reverse Pick" position.  

- xxxyz.JBI: Product Master Job
  The Job to execute whole palletizing operations.

- xxxyz2.JBI: Product Master Job (for the second layer of the pallet)
  The Job to execute whole palletizing operations.
  It is executed when a product is placed on a 2-layer pallet.

- xxxyz3.JBI: Product Master Job (for the third layer of the pallet)
  The Job to execute whole palletizing operations.
  It is executed when a product is placed on a 3-layer pallet.

xxx : Product number
y : Conveyor number
z : Station number

---

Table 2-9: Job Examples

<table>
<thead>
<tr>
<th>Job</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>10011.JBI</td>
<td>Product Master Job for palletizing products the number of which is 100 from conveyor 1 to station 1.</td>
</tr>
<tr>
<td>15023PICK.JBI</td>
<td>Normal Pick Job for palletizing products the number of which is 150 from conveyor 2 to station 3.</td>
</tr>
<tr>
<td>20054PICK_REV.JBI</td>
<td>Reverse Pick Job for palletizing products the number of which is 200 from conveyor 5 to station 4.</td>
</tr>
</tbody>
</table>

---

1 There are two ways of picking products method from a conveyor, "Normal Pick" and "Reverse Pick". A product is normally picked when "Normal Pick" is set, and it is picked with the reversed hand when Reverse Pick is set.
2.4.1.1 How to Customize Pick Jobs

You can customize the structure of Normal Pick Job and Reverse Pick Job according to Section 2.4.3 “How to Customize the Structure in Pick Jobs” on page 2-24. And you can customize the positions in the Jobs according to Section 2.4.4 “How to Customize the Positions of Pick Motion” on page 2-25.

2.4.1.2 How to Customize Product Master Job

You can customize the structure of Product Master Job according to Section 2.4.6 “How to Customize the Structure of Product Master Job” on page 2-31. And you can customize the positions in the Job according to Section 2.4.7 “How to Customize the Positions in Product Master Job” on page 2-33.

2.4.2 Pick Motion

Pick motion consists of 7 points as shown in Fig.2-5 Pick Motion.

Fig. 2-5: Pick Motion

(Conveyor Approach Position) P1  ↓  P7 (Conveyor Get Away Position)

(Pick Approach Position 2) P2  ↓  P6 (Pick Get Away Position 2)

(Pick Approach Position 1) P3  ↓  P5 (Pick Get Away Position 1)

P4 (Pick Position)
2.4.3 How to Customize the Structure in Pick Jobs

PickUp.tmp is the template file for Normal Pick Job and Reverse Pick Job. MOTOPAL creates Normal Pick Job and Reverse Pick Job based on PickUp.tmp as shown in Fig.2-6 PickUp.Tmp and Pick Job.

Fig. 2-6: PickUp.Tmp and Pick Job

<table>
<thead>
<tr>
<th>Example of PickUp.tmp</th>
<th>Pick Job created by the example of PickUp.tmp</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. CALL JOB:HAND_OPEN</td>
<td>CALL JOB:HAND_OPEN</td>
</tr>
<tr>
<td>1. P1 : MOVJ VJ=100.00</td>
<td>JUMP *Minimum IF B004=0</td>
</tr>
<tr>
<td>1. P2 : MOVL V=1600.0</td>
<td>MOVJ VJ=100.00</td>
</tr>
<tr>
<td>1. P3 : MOVL V=1600.0</td>
<td>JUMP *Pick</td>
</tr>
<tr>
<td>1. P4 : MOVL V=1600.0</td>
<td>*Minimum</td>
</tr>
<tr>
<td>2. CALL JOB:HAND_CLOSE</td>
<td>MOVJ VJ=100.00</td>
</tr>
<tr>
<td>1. P5 : MOVL V=1600.0</td>
<td>*Pick</td>
</tr>
<tr>
<td>1. P7 : MOVL V=1600.0</td>
<td>MOVL V=1600.0</td>
</tr>
<tr>
<td>3. PULSE OT#(NextOK)</td>
<td>MOVL V=1600.0</td>
</tr>
<tr>
<td></td>
<td>MOVL V=1600.0</td>
</tr>
<tr>
<td></td>
<td>MOVL V=1600.0</td>
</tr>
<tr>
<td></td>
<td>PULSE OT#(I092) T=0.10</td>
</tr>
<tr>
<td></td>
<td>END</td>
</tr>
</tbody>
</table>

1. Positions
   - You can put P1 to P7 positions which are shown in Section 2.4.2 “Pick Motion” on page 2-23 by writing Px(x=1-7), colon and MOVx instruction into PickUp.tmp.
   - MOVx instruction written in the right of the colon is written in Pick Jobs as it is.
   - You don’t need to use all positions from P1 to P7.
   - You cannot put other positions than P1 to P7.
   - Only P1 have 2 positions in Pick Jobs which differ only in height. One is Maximum height position and the another is the Standard height position. In Pick Jobs B004 decides which position is used. B004 means the swing height by which a robot needs to approach a conveyor and is set by other Jobs such as Product Master Job.

2. Other instructions than MOVx instruction
   - When you want to put other instructions than MOVx instruction, just put the instructions into PickUp.tmp.
   - The instructions in PickUp.tmp are written in Pick Job as it is.
3. PickDone signal

- When you want to output the signal "Pick Done" which is the signal for the conveyor to forward next product, just put "PULSE OT#(NextOK)" into PickUp.tmp. As shown in Fig.2-6 PickUp.Tmp and Pick Job, "NextOK" is translated to the suitable integer variable Ixxx. To this Integer variable Ixxx the signal number needs to be set in advance. (Refer to Section 3.1.3.1 "Variables for Conveyors Which MOTOPAL and the Sample Jobs Use" on page 3-6).

### 2.4.4 How to Customize the Positions of Pick Motion

#### 2.4.4.1 P1 (Conveyor Approach Position)

P1 has 2 positions; Maximum height position and Standard height position which differ only in height. You can change only these height. The horizontal positions are same as P2.

**Necessary Data to be changed for customizing the height of P1**

<table>
<thead>
<tr>
<th>Data</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered data &quot;Maximum Swing Height&quot; in REGISTER POSITIONS window.</td>
<td>Data is used as the height of Maximum height position of P1 and P7. Regarding the way to change the data, refer to Section 4.1 &quot;REGISTER POSITIONS Menu&quot; on page 4-2.</td>
</tr>
<tr>
<td>Registered data &quot;Std Height over CVs&quot; in REGISTER POSITIONS window.</td>
<td>Data is used as the height of Standard height position of P1 and P7. Regarding the way to change the data, refer to Section 4.1 &quot;REGISTER POSITIONS Menu&quot;.</td>
</tr>
</tbody>
</table>

#### 2.4.4.2 P2 (Pick Approach Position 2)

You can change the position of P2 by tcpTpick32. Refer to “Example of setting tcpTpick43” on page 2-26 also because the setting way is similar.

**Necessary Data to be changed for customizing P2**

<table>
<thead>
<tr>
<th>Data</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| Item "tcpTpick32" in JobMakeParam.Default file | Position in view from P3 to P2 in Tool Frame.  
  Data format : X, Y, Z, Rx, Ry, Rz  
  Unit (X, Y, Z) : mm  
  Unit (Rx, Ry, Rz) : Degree  
  Coordinate : Tool Frame (Refer to Section 2.4.4.8 "Tool Frame" on page 2-29) |
2.4.4.3 P3 (Pick Approach Position 1)

You can change the position of P3 by tcpTpick43.

**Necessary Data to be changed for customizing P3**

<table>
<thead>
<tr>
<th>Data</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item &quot;tcpTpick43&quot; in JobMakeParam_Defalt file.</td>
<td>Position in view from P4 to P3 in Tool Frame. Data format: X, Y, Z, Rx, Ry, Rz Unit (X, Y, Z): mm Unit (Rx, Ry, Rz): Degree Coordinate: Tool Frame (Refer to Section 2.4.4.8 &quot;Tool Frame&quot; on page 2-29)</td>
</tr>
</tbody>
</table>

**Example of setting tcpTpick43**

When you want to slide the hand in the crossing way of a conveyor flow by 200 mm as Fig. 2-7(a Example of Setting TcpTpick43, you need to set (0, -200, 0, 0, 0, 0) to tcpTpick43.

**Fig. 2-7(a): Example of Setting TcpTpick43**

![Fig. 2-7(a): Example of Setting TcpTpick43](image)

**Fig. 2-7(b): Example of Setting TcpTpick43**

![Fig. 2-7(b): Example of Setting TcpTpick43](image)

tcpTpick43 = 0, -200, 0, 0, 0, 0
2.4.4.4 P4 (Pick Position)

Pick Position P4 is automatically calculated by MOTOPAL and cannot be customized.

2.4.4.5 P5 (Pick Get Away Position 1)

You can change the position of P5 by tcpTpick45. Refer to “Example of setting tcpTpick43” on page 2-26 also because the setting way is similar.

- Necessary Data to be changed for customizing P5

<table>
<thead>
<tr>
<th>Data</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item &quot;tcpTpick45&quot; in JobMakeParam.Default file</td>
<td>Position in view from P4 to P5 in Tool Frame. Data format: X, Y, Z, Rx, Ry, Rz Unit (X, Y, Z): mm Unit (Rx, Ry, Rz): Degree Coordinate: Tool Frame (Refer to Section 2.4.7.8 “Station Frame” on page 2-41)</td>
</tr>
</tbody>
</table>

2.4.4.6 P6 (Pick Get Away Position 2)

You can change the position of P6 by tcpTpick56. Refer to “Example of setting tcpTpick43” on page 2-26 also because the setting way is similar.

- Necessary Data to be changed for customizing P6

<table>
<thead>
<tr>
<th>Data</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item &quot;tcpTpick56&quot; in JobMakeParam.Default file</td>
<td>Position in view from P5 to P6 in Tool Frame. Data format: X, Y, Z, Rx, Ry, Rz Unit (X, Y, Z): mm Unit (Rx, Ry, Rz): Degree Coordinate: Tool Frame (Refer to “Tool Frame”)</td>
</tr>
</tbody>
</table>
2.4.4.7 P7 (Conveyor Get Away Position)

You can change only the height of P7 by each station. The horizontal positions are same as P6.

- **Necessary Data to be changed for customizing the height of P7**

<table>
<thead>
<tr>
<th>Data</th>
<th>Meaning</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item &quot;TurnHightST1&quot; in JobMakeParam.Default file</td>
<td>Swing height between conveyors and station1.</td>
<td>0 : Standard height position 1 : Maximum height position</td>
</tr>
<tr>
<td>Item &quot;TurnHightST2&quot; in JobMakeParam.Default file</td>
<td>Swing height between conveyors and station2.</td>
<td></td>
</tr>
<tr>
<td>Item &quot;TurnHightST3&quot; in JobMakeParam.Default file</td>
<td>Swing height between conveyors and station3.</td>
<td></td>
</tr>
<tr>
<td>Item &quot;TurnHightST4&quot; in JobMakeParam.Default file</td>
<td>Swing height between conveyors and station4.</td>
<td></td>
</tr>
<tr>
<td>Item &quot;TurnHightST5&quot; in JobMakeParam.Default file</td>
<td>Swing height between conveyors and station5.</td>
<td></td>
</tr>
<tr>
<td>Item &quot;TurnHightST6&quot; in JobMakeParam.Default file</td>
<td>Swing height between conveyors and station6.</td>
<td></td>
</tr>
</tbody>
</table>

Registered data "Maximum Swing Height" in REGISTER POSITIONs window. Data is used as the height of Maximum height position of P1 and P7. Regarding the way to change the data, refer to Section 4.1 "REGISTER POSITIONs Menu" on page 4-2.

Registered data "Std Height over CVs" in REGISTER POSITIONs window. Data is used as the height of Standard height position of P1 and P7. Regarding the way to change the data, refer to Section 4.1 "REGISTER POSITIONs Menu".

- **Detail**

As the height of P7, either Standard height position or Maximum height position is chosen. Which height is used is decided by TurnHightSTx (x: station number). And which TurnHightSTx (x: station number) is used is decided by the station which you select in CREATE window of PROGRAM menu of MOTOPAL. For example, if you select station 2 in CREATE window, the setting of TurnHightST2 is used as the height of P7 in the created Job.

And as the actual height of Standard height position and Maximum height position, the registered data "Std Height over CVs" and "Maximum Swing Height" are used.
2.4.8 Tool Frame

MOTOPAL sets the Tool Frame so that the Tool Frame at Pick position (Normal Pick and Reverse Pick) becomes as shown in Fig. 2-8 Tool Frame.

MOTOPAL sets the Tool Frame after completing CONVEYOR / STATION POSITION menu (Refer to Section 4.2 “CONVEYOR / STATION POSITION Menu” on page 4-4).

Fig. 2-8: Tool Frame
2.4.5 **Place Motion**

Place motion consists of 7 points as shown in *Fig. 2-9 Place Motion*.

*Fig. 2-9: Place Motion*

- (Station Approach Position) P1
- (Place Approach Position 1) P3
- (Place Position) P4
- (Place Approach Position 2) P2
- (Place Get Away Position 1) P5
- (Place Get Away Position 2) P6
- (Station Get Away Position) P7
2.4.6 How to Customize the Structure of Product Master Job

PrdMaster.tmp is the template file for place motion in Product Master Job. MOTOPAL creates Product Master Job based on PrdMaster.tmp as Fig.2-10 PrdMaster.Temp and Product Master Job.

Fig. 2-10: PrdMaster.Temp and Product Master Job

### Example of PrdMaster.tmp

<table>
<thead>
<tr>
<th>Example of PrdMaster.tmp</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. P1: MOVJ VJ=100.00</td>
</tr>
<tr>
<td>2. CALL JOB: HAND_OPEN</td>
</tr>
<tr>
<td>3. CALL JOB: SET_NEXT_OPE</td>
</tr>
<tr>
<td>4. P5: MOVL V=1600.0</td>
</tr>
<tr>
<td>5. P7: MOVL V=1600.0</td>
</tr>
</tbody>
</table>

### Product Master Job created by the example of PrdMaster.tmp

1. NOP
2. JOB Template
3. PrdMaster.tmp
4. Product
5. Product Name
6. SET LI000 B167
7. MUL LI000 100
8. ADD LI000 B168
9. VAL2STR LS000 LI000
10. JUMP LABEL: LS000
11. *0
12. CALL JOB: 01022PICK IF B005=0
13. MOVJ C00000 VJ=100.00
14. MOVL C00001 V=1600.0
15. MOVL C00002 V=1600.0
16. MOVL C00003 V=1000.0
17. CALL JOB: HAND_OPEN
18. CALL JOB: SET_NEXT_OPE
19. SET B167 1
20. SET B168 1
21. MOVJ C00004 VJ=100.00
22. MOVL C00005 V=1600.0
23. MOVL C00006 V=1600.0
24. JUMP * END
25. *101
26. ... *1009
27. CALL JOB: 01022PICK IF B005=0
28. MOVJ C00594 VJ=100.00
29. MOVL C00595 V=1600.0
30. MOVL C00596 V=1600.0
31. MOVL C00597 V=1000.0
32. CALL JOB: HAND_OPEN
33. CALL JOB: SET_NEXT_OPE
34. SET B167 10
35. SET B168 10
36. PULSE OT#(I153) T=0.10
37. MOVL C00598 V=1600.0
38. MOVL C00599 V=1600.0
39. PULSE OT#(I154) T=0.10
40. JUMP * END
41. *1010
42. * END
43. SET B004 0
44. END
1. Positions
   - Positions of P1 to P7 shown in Section 2.4.5 “Place Motion” on page 2-30 can be reflected in the Product Master Job. In PrdMaster.temp, describe Px (x: 1 to 7) and “:” (colon), then MOVx instruction to the right of the colon.
   - All move instructions described at the right side of “Px:” are reflected to the Product Master Job.
   - There is no need to describe all positions from P1 to P7 but necessary positions only.
   - Other positions than P1 to P7 cannot be described in the Product Master Job.
2. Other instructions than MOVx instruction
   - When you want to put other instructions than MOVx instruction in the Product Master Job, just put instructions into PrdMaster.tmp.
   - The instructions described in PrdMaster.tmp are reflected to the Product Master Job.
   - The "HAND_OPEN" Job in Fig. 2-10 PrdMaster.Temp and Product Master Job on page 2-31 is a fictional job.
   - The “SET_NEXT_OPE” Job in Fig.2-10 PrdMaster.Temp and Product Master Job are the sample jobs of MOTOPAL. This job sets the next operation and should be done when a robot temporarily stops for placing a product, etc. (Refer to Section 3.3 “Sample Jobs” on page 3-22 and Section 3.3.2 “Conditions for Continuous Movement” on page 3-25)
3. Overhead process
   - In this part, Label information is calculated by the number of the current layer and the piece to jump to the suitable label.
4. Palletizing motion for 1st piece of 1st layer.
5. Label
   - The label expresses the number of the current layer and the piece as below.
     *xyy or *xxyy
     x or xx : The number of the current layer
     yy : The number of the current piece
6. Call Pick Job
   - In this part, Normal Pick Job or Reverse Pick Job is called depending on the pattern.
   - By B005 it is possible to skip a Pick Job in such a case that the robot already have a product.
7. Renew the number of the current layer and the piece. This part is inserted just before any MOVx instruction after P4.
8. Repeat palletizing motion by each piece of each layer.
9. Palletizing motion for the last piece of the last layer.
10. Output the signal "Full" by pulse
    - The instruction to output the signal "Full" by pulse is automatically inserted just before any MOVx instruction after P4 in case of the last piece of the last layer. If there is no MOVx instruction after P4, the instruction is inserted just before JUMP *END.
2. Setup Files of MOTOPAL
2.4 Setup of Palletizing Motion

- The number of I variable in this instruction changes according to the station number. Refer to "Variables for stations which MOTOPAL and the sample Jobs use".

11. Output the signal "Eject Pallet" by pulse

- The instruction to output the signal "Eject Pallet" by pulse is automatically inserted just after the last MOVx instruction in case of the last piece of the last layer.

- The number of I variable in this instruction changes according to the station number. Refer to "Variables for stations which MOTOPAL and the sample Jobs use".

12. Set the current swing height

- Either of the following value is set to B004 which means the last swing height between conveyors and the station.
  0 : Standard height position
  1 : Maximum height position

2.4.7 How to Customize the Positions in Product Master Job

2.4.7.1 P1 (Station Approach Position)

You can change the horizontal position and the height of P1 as explained below.

- Necessary Data to be changed for customizing the horizontal position of P1

<table>
<thead>
<tr>
<th>Data</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item &quot;PathOffset&quot; in BasicParam.ini file</td>
<td>The horizontal distance between P1/P7 and a pallet.</td>
</tr>
<tr>
<td></td>
<td>Unit : mm</td>
</tr>
</tbody>
</table>

- Detail

Regarding the horizontal position of P1, you can specify only the horizontal distance between P1/P7 and the edge of a pallet. MOTOPAL calculate the optimized path from a conveyor to a pallet. And you can set where in this path you want P1 to be by setting PathOffset. P1 is away from a pallet by Default Offset plus PathOffset as Fig. 2-11 Horizontal Position of P1. Default Offset is the longer value of the length or the width of the product and automatically calculated by MOTOPAL.

Fig. 2-11: Horizontal Position of P1
## Necessary Data to be changed for customizing the height of P1

<table>
<thead>
<tr>
<th>Data</th>
<th>Meaning</th>
<th>Value</th>
</tr>
</thead>
</table>
| Item "TurnHightST1" in JobMakeParam.Default file | Swing height between conveyors and station1. | 0: Standard height position  
1: Maximum height position |
| Item "TurnHightST2" in JobMakeParam.Default file | Swing height between conveyors and station2. |
| Item "TurnHightST3" in JobMakeParam.Default file | Swing height between conveyors and station3. |
| Item "TurnHightST4" in JobMakeParam.Default file | Swing height between conveyors and station4. |
| Item "TurnHightST5" in JobMakeParam.Default file | Swing height between conveyors and station5. |
| Item "TurnHightST6" in JobMakeParam.Default file | Swing height between conveyors and station6. |
| Item "ProductClearance" in SystemInfo.ini file | The distance between the top of the current layer and the bottom of the product at P1.  
Unit: mm |
| Registered data "Maximum Swing Height" in REGISTER POSITIONs window. | Data is used as the height of Maximum height position of P1 and P7.  
Regarding the way to change the data, refer to Section 4.1 "REGISTER POSITIONs Menu" on page 4-2. |
| Registered data "Std Height over STs" in REGISTER POSITIONs window. | Data is used as the height of Standard height position of P1 and P7.  
Regarding the way to change the data, refer to Section 4.1 "REGISTER POSITIONs Menu". |

## Detail

As the height of P1, either Standard height position or Maximum height position is chosen. Which height is used is decided by TurnHightSTx (x:station number). And which TurnHightSTx (x:station number) is used is decided by the station which you select in CREATE window of PROGRAM menu of MOTOPAL. For example, if you select station 2 in CREATE window, the setting of TurnHightST2 is used as the height of P1 in the created Job.

### In case of choosing 0(Standard Height position) to TurnHightSTx

When you choose 0(Standard Height position) to TurnHightSTx, the height of P1 is determined by MOTOPAL according to the following rule. By this rule the height of P1 of each layer become as shown in fig. 2-12(b) Height of P1 on page 2-35.

- The highest position among the following positions is used as the height of P1.
  - Top of the current layer + ProductClearance
  - The height of P2
  - The height of "Std Height over STs"

- But if the highest position among the above positions exceeds the "MaxSwing Height", "MaxSwing Height" is used as the height of P1.
2.4 Setup of Palletizing Motion

In case of choosing 1 (Maximum height position) to TurnHightSTx

When you choose 1 (Maximum Height position) to TurnHightSTx, the height of P1 is always the one of "Maximum Swing Height".

2.4.7.2 P2 (Place Approach Position 2)

You can change the position of P2 by ustTPlace32dis. Refer to “Example of setting ustTPlace43dis” on page 2-36 also because the setting way is similar.

- **Necessary Data to be changed for customizing P2**

<table>
<thead>
<tr>
<th>Data</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item &quot;ustTPlace32dis&quot; in JobMakeParam.Default file</td>
<td>Distance between P3 and P2 in X-axis and Y-axis of Station Frame. And position in view from P3 to P2 in Z-axis of Station Frame. Data format: X, Y, Z, 0, 0, 0. Unit (X, Y, Z) : mm. Coordinate: Station Frame (Refer to Section 2.4.7.8 “Station Frame” on page 2-41)</td>
</tr>
</tbody>
</table>
2.4.7.3 P3 (Place Approach Position 1)

You can change the position of P3 by ustTPlace43dis.

- **Necessary Data to be changed for customizing P3**

<table>
<thead>
<tr>
<th>Data</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| Item "ustTPlace43dis" in JobMakeParam.Default file | Distance between P4 and P3 in X-axis and Y-axis of Station Frame. And position in view from P4 to P3 in Z-axis of Station Frame.  
Data format: X, Y, Z, 0, 0, 0  
Unit (X, Y, Z): mm  
Coordinate: Station Frame (Refer to Section 2.4.7.8 “Station Frame” on page 2-41) |

- **Example of setting ustTPlace43dis**

By X and Y value of ustTPlace43dis, you can specify only the distance between P4 and P3 in both X-axis and Y-axis of station frame. You cannot specify the direction of X and Y in ustTPlace43dis. Or it is no meaning to set minus value to X and Y of ustTPlace43dis. They are always regarded as plus value because they are distance.

Z of usetPlace43dis is the position in view from P4 to P3, so Z can have minus value.

The direction of X and Y is decided by the pattern which you select in PATTERN window of PROGRAM menu of MOTOPAL. The vector from P3 to P4 becomes similar to the way from the last piece of the pattern to the first piece of the pattern.

For example, if ustTPlace43dis is (200, 100, 150, 0, 0, 0), the vector from P3 to P2 becomes as Fig. 2-13 ustTPlace43dis and the Vector from P3 to P4 (UstTPlace43dis = (200, 100, 150, 0, 0, 0)) on page 2-37. And the position of P3 becomes as Fig. 2-14 P3 (Place Approach Point 1) on page 2-37 in case of the shown pattern.
Fig. 2-13: \( \text{ustTPlace43dis} \) and the Vector from P3 to P4
\( (\text{ustTPlace43dis} = (200, 100, 150, 0, 0, 0)) \)

- Vector from P3 to P4 = (200, 100, 150, 0,0,0)
- Vector from P3 to P4 = (200, -100, 150, 0,0,0)
- Vector from P3 to P4 = (200, 100, 150, 0,0,0)

Fig. 2-14: P3 (Place Approach Point 1)
2.4.7.4 P4 (Place Position)

Place Position P4 is automatically calculated by MOTOPAL. But you can adjust the position by ustTplaceoffset.

- **Necessary Data to be changed for customizing P4**

<table>
<thead>
<tr>
<th>Data</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| Item "ustTplaceoffset" in JobMakeParam.Defalt file | Offset of P4 position in Station Frame  
Data format : X, Y, Z, Rx, Ry, Rz  
Unit (X, Y, Z) : mm  
Unit (Rx, Ry, Rz) : Degree  
Coordinate : Station Frame (Refer to Section 2.4.7.8 “Station Frame” on page 2-41) |

2.4.7.5 P5 (Place Get Away Position 1)

You can change the position of P5 by tcpTPlace45.

- **Necessary Data to be changed for customizing P5**

<table>
<thead>
<tr>
<th>Data</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| Item "tcpTPlace45" in JobMakeParam.Defalt file | Position in view from P4 to P5 in Tool Frame.  
Data format : X, Y, Z, Rx, Ry, Rz  
Unit (X, Y, Z) : mm  
Unit (Rx, Ry, Rz) : Degree  
Coordinate : Tool Frame (Refer to Section 2.4.4.8 “Tool Frame” on page 2-29) |

- **Example of setting tcpTPlace45**

When you want the robot to just rise after placing a product by 200 mm as Fig.2-15(a Example of Setting TcpTPlace45, you need to set (0, 0, 200, 0, 0, 0) to tcpTPlace45.

*Fig. 2-15(a): Example of Setting TcpTPlace45*
2.4.7.6 P6 (Place Get Away Position 2)

You can change the position of P6 by tcpTPlace56. Refer to “Example of setting tcpTPlace45” on page 2-38 also because the setting way is similar.

**Necessary Data to be changed for customizing P6**

<table>
<thead>
<tr>
<th>Data</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| Item "tcpTPlace56" in JobMakeParam.Default file | Position in view from P5 to P6 in Tool Frame. Data format: X, Y, Z, Rx, Ry, Rz  
Unit (X, Y, Z): mm  
Unit (Rx, Ry, Rz): Degree  
Coordinate: Tool Frame (Refer to Section 2.4.4.8 “Tool Frame” on page 2-29) |

2.4.7.7 P7 (Station Get Away Position)

You can change the horizontal position and the height of P7 as explained below. The way to set the data is almost same as P1. So refer to Section 2.4.7.1 “P1 (Station Approach Position)” on page 2-33 also.

**Necessary Data to be changed for customizing the horizontal position of P7**

<table>
<thead>
<tr>
<th>Data</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item &quot;PathOffset&quot; in BasicParam.ini</td>
<td>The horizontal distance between P1/P7 and a pallet. Unit: mm</td>
</tr>
</tbody>
</table>

**Detail**

Refer to Section 2.4.7.1 “P1 (Station Approach Position)”. 
### Necessary Data to be changed for customizing the height of P7

<table>
<thead>
<tr>
<th>Data</th>
<th>Meaning</th>
<th>Item</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item &quot;TurnHightST1&quot; in JobMakeParam.Default file</td>
<td>Swing height between conveyors and station1.</td>
<td>0 : Standard height position</td>
<td>1 : Maximum height position</td>
</tr>
<tr>
<td>Item &quot;TurnHightST2&quot; in JobMakeParam.Default file</td>
<td>Swing height between conveyors and station2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item &quot;TurnHightST3&quot; in JobMakeParam.Default file</td>
<td>Swing height between conveyors and station3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item &quot;TurnHightST4&quot; in JobMakeParam.Default file</td>
<td>Swing height between conveyors and station4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item &quot;TurnHightST5&quot; in JobMakeParam.Default file</td>
<td>Swing height between conveyors and station5.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item &quot;TurnHightST6&quot; in JobMakeParam.Default file</td>
<td>Swing height between conveyors and station6.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item &quot;ProductClearance&quot; in SystemInfo.ini file</td>
<td>The distance between the top of the current layer and the bottom of the product at P1. Unit : mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Registered data &quot;Maximum Swing Height&quot; in REGISTER POSITIONs window.</td>
<td>Data is used as the height of Maximum height position of P1 and P7. Regarding the way to change the data, refer to Chapter 4 SETTING Menu of MOTOPAL.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Registered data &quot;Std Height over STs&quot; in REGISTER POSITIONs window.</td>
<td>Data is used as the height of Standard height position of P1 and P7. Regarding the way to change the data, refer to Chapter 4 SETTING Menu of MOTOPAL.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Detail

As the height of P7, either Standard height position or Maximum height position is chosen. Which height is used is decided by TurnHightSTx (x:station number). And which TurnHightSTx (x:station number) is used is decided by the station which you select in CREATE window of PROGRAM menu of MOTOPAL. For example, if you select station 2 in CREATE window, the setting of TurnHightST2 is used as the height of P7 in the created Job.

**In case of choosing 0(Standard Height Position) to TurnHightSTx**

The height of P7 is decided according to the following rule. Refer to Section 2.4.7.1 “P1 (Station Approach Position)” on page 2-33 also because the setting way is similar.

- The highest position among the following positions is used as the height of P7.
  - Top of the current layer + ProductClearance
  - The height of P6
  - The height of "Std Height over STs"
- But if the highest position among the above positions exceeds the "MaxSwing Height", "MaxSwing Height" is used as the height of P7.

**In case of choosing 1(Maximum Height Position) to TurnHightSTx**

The height of P7 is always the one of "Maximum Swing Height".
2.4.7.8 Station Frame

MOTOPAL sets the Station Frame so that the Station frame becomes as shown in Fig. 2-16 Station Frame view from a robot\(^1\). MOTOPAL sets the Station Frame after completing CONVEYOR / STATION POSITION menu.

**Fig. 2-16: Station Frame**

2.5 Pattern Files

You need to create pattern files by PatternEditor and put the files into Pattern folder if needed. This section describes the notes when creating pattern files.

2.5.1 Notes for Creating Pattern Files

When you create pattern files, care about the following notes.

- **Create only 1st layer pattern**: A pattern file can contain several patterns by several layers. But MOTOPAL uses always 1st layer pattern because you can select a pattern by each layer type in MOTOPAL. So, it is no meaning to create several patterns in a pattern file.

- **Place a product in good order**: The order to place a product in a pattern file needs to be set so that products are put from one corner of a pallet to the diagonal corner of a pallet regularly as shown in Fig. 2-17 Order to Place a Product. The approaching way to "Place Position" is same in all pieces in a pattern and decided by a pattern as show in Fig. 2-13 ustITPlace43dis and the Vector from P3 to P4 (UstITPlace43dis = (200, 100, 150, 0, 0, 0)) on page 2-37. Therefore if the order in a pattern is wrong, a product which a robot is about to place could interfere with other products already placed in a pallet.

---

\(^1\) Z is the vertical way.
2.5.2 Multiple Products Simultaneous Picking Function

By setting the items in the PatternEditor, multiple products can be simultaneously picked from the conveyor and placed on the pallet.

Setting items: MaxNum.
- (the maximum number of products for picking and placing)
  - : WorkpieceNum.
- (the number of products to be picked and placed)

When executing this function, please note the following points:

- When the hand type is clamp, set “1” to “W” direction of the maximum number of products and simultaneous motion for picking and placing.
- Also, when the hand type is clamp, set “fixed” to the PicupPosType in the BasicParam. ini.
- Please do not set the number of products which is more than maximum available number for gripping.
MotoPal

3 Jobs and Ladder Program

3.1 Variables

MOTOPAL creates only Product Master Jobs and Pick Jobs explained in Section 2.4.1 “Created Jobs” on page 2-22. But you need to create other Jobs and Ladder Program by yourself. Without those Jobs and Ladder Program, MOTOPAL and your system don’t work properly. MOTOPAL supply the sample of those Jobs and sample Ladder Program which are stored in DX200. This chapter explains about the sample Jobs and sample Ladder Program. So, create / modify the Jobs and Ladder Program using the sample Jobs and Ladder Program as reference.

3.1 Variables

The sample Jobs work depending on some variables. And also MOTOPAL reads and writes some variables which the sample Jobs use. This section explains variables MOTOPAL and the sample Jobs use.

3.1.1 Variables for System

3.1.1.1 Variables for System Which MOTOPAL and the Sample Jobs Use

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable name in job</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>B001</td>
<td>OpelInfo</td>
<td>Operation information of MOTOPAL. Always set 0.</td>
<td></td>
</tr>
<tr>
<td>B004</td>
<td>SwingHeight</td>
<td>The last Swing Height 0:Standard Height, 1:Maximum Height</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>This variable is used in Pick Jobs and Product Master Jobs which MOTOPAL creates (Refer to Section 2.4.3 “How to Customize the Structure in Pick Jobs” on page 2-24 and Section 2.4.6 “How to Customize the Structure of Product Master Job” on page 2-31). Value is set at the end of the Product Master Jobs and read at the beginning of Pick Jobs.</td>
<td></td>
</tr>
<tr>
<td>B005</td>
<td>Grip status of the hand 0:Not Gripping, 1:Gripping</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>This variable is used in Product Master Jobs which MOTOPAL creates (Refer to Section 2.4.6 “How to Customize the Structure of Product Master Job”). If value is 0, Pick Jobs is executed in Product Master Jobs. And if value is not 0, Pick Jobs is not executed in Product Master Jobs. But MOTOPAL doesn’t set any value to this variable. So, you need to set the value to B005 by yourself if necessary.</td>
<td></td>
</tr>
</tbody>
</table>
### 3.1 Variables

#### 3.1.1.2 Variables for System Which Only the Sample Jobs Use

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable name in job</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>B006</td>
<td>CvNo _Confirm</td>
<td>Conveyor number for confirmation program.</td>
<td>After creating the confirmation program, MOTOPAL sets the number of the selected conveyor to B006. Refer to Section 4.2 “CONVEYOR / STATION POSITION Menu” on page 4-4.</td>
</tr>
<tr>
<td>B007</td>
<td>StNo _Confirm</td>
<td>Station number for confirmation program.</td>
<td>After creating the confirmation program, MOTOPAL sets the number of the selected station to B007. Refer to Section 4.2 “CONVEYOR / STATION POSITION Menu”.</td>
</tr>
<tr>
<td>I000</td>
<td>PrdNo _Confirm</td>
<td>The product number for confirmation program. 999: The product number for Normal Pick. 998: The product number for Reverse Pick.</td>
<td>After creating the confirmation program, MOTOPAL sets the number to I000 depending on the selected Pick Type. Refer to Section 4.2 “CONVEYOR / STATION POSITION Menu”.</td>
</tr>
</tbody>
</table>

### 3.1.1.2 Variables for System Which Only the Sample Jobs Use

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable name</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>B002</td>
<td>CvNum</td>
<td>The number of conveyors in your system.</td>
<td>These variables need to be initialized properly in the sample Job &quot;INIT_VAR&quot;.</td>
</tr>
<tr>
<td>B003</td>
<td>StNum</td>
<td>The number of stations in your system.</td>
<td></td>
</tr>
<tr>
<td>B008</td>
<td>OpeNum</td>
<td>The number of operation (program) registered in OPERATION window.</td>
<td>These variables are set properly by the sample Jobs before being used.</td>
</tr>
<tr>
<td>B009</td>
<td>Current OpeNo</td>
<td>Currently executing operation number.</td>
<td></td>
</tr>
<tr>
<td>B010</td>
<td>Valid OpeExist</td>
<td>Existence of valid operation 0: Doesn't exist, 1: Exist</td>
<td></td>
</tr>
<tr>
<td>S000</td>
<td>JobName</td>
<td>Currently executing Product Master Job name.</td>
<td></td>
</tr>
</tbody>
</table>
### 3.1.2 Variables for Operation

#### 3.1.2.1 Variables for Operation Which MOTOPAL and the Sample Jobs Use

All variables explained here are related to the information set in OPERATION window of MOTOPAL.

*Fig. 3-1: Operation Window of MOTOPAL*

![Operation Window of MOTOPAL](image)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>B020</td>
<td>Product number for operation 1</td>
<td>These variables are set when you &quot;ADD&quot; or &quot;DELETE&quot; a program in Operation window of MOTOPAL.</td>
</tr>
<tr>
<td>B021</td>
<td>Conveyor number for operation 1</td>
<td></td>
</tr>
<tr>
<td>B022</td>
<td>Station number for operation 1</td>
<td></td>
</tr>
<tr>
<td>B030</td>
<td>Product number for operation 2</td>
<td></td>
</tr>
<tr>
<td>B031</td>
<td>Conveyor number for operation 2</td>
<td></td>
</tr>
<tr>
<td>B032</td>
<td>Station number for operation 2</td>
<td></td>
</tr>
<tr>
<td>B040</td>
<td>Product number for operation 3</td>
<td></td>
</tr>
<tr>
<td>B041</td>
<td>Conveyor number for operation 3</td>
<td></td>
</tr>
<tr>
<td>B042</td>
<td>Station number for operation 3</td>
<td></td>
</tr>
<tr>
<td>B050</td>
<td>Product number for operation 4</td>
<td></td>
</tr>
<tr>
<td>B051</td>
<td>Conveyor number for operation 4</td>
<td></td>
</tr>
<tr>
<td>B052</td>
<td>Station number for operation 4</td>
<td></td>
</tr>
<tr>
<td>B060</td>
<td>Product number for operation 5</td>
<td></td>
</tr>
<tr>
<td>B061</td>
<td>Conveyor number for operation 5</td>
<td></td>
</tr>
<tr>
<td>B062</td>
<td>Station number for operation 5</td>
<td></td>
</tr>
<tr>
<td>B070</td>
<td>Product number for operation 6</td>
<td></td>
</tr>
<tr>
<td>B071</td>
<td>Conveyor number for operation 6</td>
<td></td>
</tr>
<tr>
<td>B072</td>
<td>Station number for operation 6</td>
<td></td>
</tr>
</tbody>
</table>
### Variables for Operation Which Only the Sample Jobs Use

<table>
<thead>
<tr>
<th>Variable</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>B023</td>
<td>Valid status of Operation 1 0:Invalid, 1:Valid</td>
<td>These variables are set properly by the sample Jobs before being used.</td>
</tr>
<tr>
<td>B033</td>
<td>Valid status of Operation 2 0:Invalid, 1:Valid</td>
<td></td>
</tr>
<tr>
<td>B043</td>
<td>Valid status of Operation 3 0:Invalid, 1:Valid</td>
<td></td>
</tr>
<tr>
<td>B053</td>
<td>Valid status of Operation 4 0:Invalid, 1:Valid</td>
<td></td>
</tr>
<tr>
<td>B063</td>
<td>Valid status of Operation 5 0:Invalid, 1:Valid</td>
<td></td>
</tr>
<tr>
<td>B073</td>
<td>Valid status of Operation 6 0:Invalid, 1:Valid</td>
<td></td>
</tr>
<tr>
<td>I020</td>
<td>&quot;Valid (Cv)&quot; signal number for operation 1</td>
<td></td>
</tr>
<tr>
<td>I021</td>
<td>&quot;Valid (St)&quot; signal number for operation 1</td>
<td></td>
</tr>
<tr>
<td>I022</td>
<td>&quot;Switch (St)&quot; signal number for operation 1</td>
<td></td>
</tr>
<tr>
<td>I023</td>
<td>&quot;Initialize (St)&quot; signal number for operation 1</td>
<td></td>
</tr>
<tr>
<td>I024</td>
<td>&quot;Cancel Initialization (St)&quot; signal number for operation 1</td>
<td></td>
</tr>
<tr>
<td>I030</td>
<td>&quot;Valid (Cv)&quot; signal number for operation 2</td>
<td></td>
</tr>
<tr>
<td>I031</td>
<td>&quot;Valid (St)&quot; signal number for operation 2</td>
<td></td>
</tr>
<tr>
<td>I032</td>
<td>&quot;Switch (St)&quot; signal number for operation 2</td>
<td></td>
</tr>
<tr>
<td>I033</td>
<td>&quot;Initialize (St)&quot; signal number for operation 2</td>
<td></td>
</tr>
<tr>
<td>I034</td>
<td>&quot;Cancel Initialization (St)&quot; signal number for operation 2</td>
<td></td>
</tr>
<tr>
<td>I040</td>
<td>&quot;Valid (Cv)&quot; signal number for operation 3</td>
<td></td>
</tr>
<tr>
<td>I041</td>
<td>&quot;Valid (St)&quot; signal number for operation 3</td>
<td></td>
</tr>
<tr>
<td>I042</td>
<td>&quot;Switch (St)&quot; signal number for operation 3</td>
<td></td>
</tr>
<tr>
<td>I043</td>
<td>&quot;Initialize (St)&quot; signal number for operation 3</td>
<td></td>
</tr>
<tr>
<td>I044</td>
<td>&quot;Cancel Initialization (St)&quot; signal number for operation 3</td>
<td></td>
</tr>
<tr>
<td>I050</td>
<td>&quot;Valid (Cv)&quot; signal number for operation 4</td>
<td></td>
</tr>
<tr>
<td>I051</td>
<td>&quot;Valid (St)&quot; signal number for operation 4</td>
<td></td>
</tr>
<tr>
<td>I052</td>
<td>&quot;Switch (St)&quot; signal number for operation 4</td>
<td></td>
</tr>
<tr>
<td>I053</td>
<td>&quot;Initialize (St)&quot; signal number for operation 4</td>
<td></td>
</tr>
<tr>
<td>I054</td>
<td>&quot;Cancel Initialization (St)&quot; signal number for operation 4</td>
<td></td>
</tr>
<tr>
<td>I060</td>
<td>&quot;Valid (Cv)&quot; signal number for operation 5</td>
<td></td>
</tr>
<tr>
<td>I061</td>
<td>&quot;Valid (St)&quot; signal number for operation 5</td>
<td></td>
</tr>
<tr>
<td>I062</td>
<td>&quot;Switch (St)&quot; signal number for operation 5</td>
<td></td>
</tr>
<tr>
<td>I063</td>
<td>&quot;Initialize (St)&quot; signal number for operation 5</td>
<td></td>
</tr>
<tr>
<td>I064</td>
<td>&quot;Cancel Initialization (St)&quot; signal number for operation 5</td>
<td></td>
</tr>
<tr>
<td>I070</td>
<td>&quot;Valid (Cv)&quot; signal number for operation 6</td>
<td></td>
</tr>
<tr>
<td>I071</td>
<td>&quot;Valid (St)&quot; signal number for operation 6</td>
<td></td>
</tr>
<tr>
<td>I072</td>
<td>&quot;Switch (St)&quot; signal number for operation 6</td>
<td></td>
</tr>
<tr>
<td>I073</td>
<td>&quot;Initialize (St)&quot; signal number for operation 6</td>
<td></td>
</tr>
<tr>
<td>I074</td>
<td>&quot;Cancel Initialization (St)&quot; signal number for operation 6</td>
<td></td>
</tr>
</tbody>
</table>
## Jobs and Ladder Program

### 3.1 Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>S010</td>
<td>Product Master Job name for operation 1.</td>
<td>These variables are set properly by the sample Jobs before being used.</td>
</tr>
<tr>
<td>S020</td>
<td>Product Master Job name for operation 2.</td>
<td></td>
</tr>
<tr>
<td>S030</td>
<td>Product Master Job name for operation 3.</td>
<td></td>
</tr>
<tr>
<td>S040</td>
<td>Product Master Job name for operation 4.</td>
<td></td>
</tr>
<tr>
<td>S050</td>
<td>Product Master Job name for operation 5.</td>
<td></td>
</tr>
<tr>
<td>S060</td>
<td>Product Master Job name for operation 6.</td>
<td></td>
</tr>
</tbody>
</table>
## 3.1.3 Variables for Conveyors

### 3.1.3.1 Variables for Conveyors Which MOTOPAL and the Sample Jobs Use

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable name in job</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>I082</td>
<td>PickDone No_Cv1</td>
<td>&quot;Pick Done&quot; signal number for CV1.</td>
<td>These variables are used in Pick Jobs (Refer to Section 2.4.3 &quot;How to Customize the Structure in Pick Jobs&quot; on page 2-24). These variables need to be initialized properly in the sample Job &quot;INIT_VAR&quot;.</td>
</tr>
<tr>
<td>I092</td>
<td>PickDone No_Cv2</td>
<td>&quot;Pick Done&quot; signal number for CV2.</td>
<td></td>
</tr>
<tr>
<td>I102</td>
<td>PickDone No_Cv3</td>
<td>&quot;Pick Done&quot; signal number for CV3.</td>
<td></td>
</tr>
<tr>
<td>I112</td>
<td>PickDone No_Cv4</td>
<td>&quot;Pick Done&quot; signal number for CV4.</td>
<td></td>
</tr>
<tr>
<td>I122</td>
<td>PickDone No_Cv5</td>
<td>&quot;Pick Done&quot; signal number for CV5.</td>
<td></td>
</tr>
<tr>
<td>I132</td>
<td>PickDone No_Cv6</td>
<td>&quot;Pick Done&quot; signal number for CV6.</td>
<td></td>
</tr>
</tbody>
</table>

### 3.1.3.2 Variables for Conveyors Which Only the Sample Jobs Use

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable name in job</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>B080</td>
<td>Currently executing operation number for CV1.</td>
<td>The value of this variable changes in case there are several operations by which CV1 is used within the programs registered in MOTOPAL operation window. When the pallet is full of products, the operation will shift to the next one. (Refer to Section 3.3.1 &quot;Switch Station&quot; on page 3-24)</td>
<td></td>
</tr>
<tr>
<td>B081</td>
<td>Ooperation1 uses CV1? 0:Operation1 doesn’t use CV1. 1:Operation1 uses CV1.</td>
<td>These variables are used to find the next operation when switching operation.</td>
<td></td>
</tr>
<tr>
<td>B082</td>
<td>Ooperation2 uses CV1? 0:Operation2 doesn’t use CV1. 1:Operation2 uses CV1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B083</td>
<td>Ooperation3 uses CV1? 0:Operation3 doesn’t use CV1. 1:Operation3 uses CV1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B084</td>
<td>Ooperation4 uses CV1? 0:Operation4 doesn’t use CV1. 1:Operation4 uses CV1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B085</td>
<td>Ooperation5 uses CV1? 0:Operation5 doesn’t use CV1. 1:Operation5 uses CV1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B086</td>
<td>Ooperation6 uses CV1? 0:Operation6 doesn’t use CV1. 1:Operation6 uses CV1.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Jobs and Ladder Program
#### 3.1 Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable name in job</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>B090</td>
<td>Currently executing operation number for CV2.</td>
<td>The value of this variable changes in case there are several operations by which CV2 is used within the programs registered in MOTOPAL operation window. When the pallet is full of products, the operation will shift to the next one. (Refer to Section 3.3.1 “Switch Station” on page 3-24)</td>
<td></td>
</tr>
<tr>
<td>B091</td>
<td>Operation1 uses CV2? 0:Operation1 doesn’t use CV2. 1:operation1 uses CV2.</td>
<td>These variables are used to find the next operation when switching operation.</td>
<td></td>
</tr>
<tr>
<td>B092</td>
<td>Operation2 uses CV2? 0:Operation2 doesn’t use CV2. 1:operation2 uses CV2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B093</td>
<td>Operation3 uses CV2? 0:Operation3 doesn’t use CV2. 1:operation3 uses CV2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B094</td>
<td>Operation4 uses CV2? 0:Operation4 doesn’t use CV2. 1:operation4 uses CV2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B095</td>
<td>Operation5 uses CV2? 0:Operation5 doesn’t use CV2. 1:operation5 uses CV2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B096</td>
<td>Operation6 uses CV2? 0:Operation6 doesn’t use CV2. 1:operation6 uses CV2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B100</td>
<td>Currently executing operation number for CV3.</td>
<td>The value of this variable changes in case there are several operations by which CV3 is used within the programs registered in MOTOPAL operation window. When the pallet is full of products, the operation will shift to the next one. (Refer to Section 3.3.1 “Switch Station”)</td>
<td></td>
</tr>
<tr>
<td>B101</td>
<td>Operation1 uses CV3? 0:Operation1 doesn’t use CV3. 1:operation1 uses CV3.</td>
<td>These variables are used to find the next operation when switching operation.</td>
<td></td>
</tr>
<tr>
<td>B102</td>
<td>Operation2 uses CV3? 0:Operation2 doesn’t use CV3. 1:operation2 uses CV3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B103</td>
<td>Operation3 uses CV3? 0:Operation3 doesn’t use CV3. 1:operation3 uses CV3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B104</td>
<td>Operation4 uses CV3? 0:Operation4 doesn’t use CV3. 1:operation4 uses CV3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B105</td>
<td>Operation5 uses CV3? 0:Operation5 doesn’t use CV3. 1:operation5 uses CV3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B106</td>
<td>Operation6 uses CV3? 0:Operation6 doesn’t use CV3. 1:operation6 uses CV3.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 3.1 Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable name in job</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>B110</td>
<td>Currently executing operation number for CV4.</td>
<td>The value of this variable changes in case there are several operations by which CV4 is used within the programs registered in MOTOPAL operation window. When the pallet is full of products, the operation will shift to the next one. (Refer to Section 3.3.1 “Switch Station” on page 3-24)</td>
<td></td>
</tr>
<tr>
<td>B111</td>
<td>Operation1 uses CV4? 0:Operation1 doesn’t use CV4. 1:operation1 uses CV4.</td>
<td>These variables are used to find the next operation when switching operation.</td>
<td></td>
</tr>
<tr>
<td>B112</td>
<td>Operation2 uses CV4? 0:Operation2 doesn’t use CV4. 1:operation2 uses CV4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B113</td>
<td>Operation3 uses CV4? 0:Operation3 doesn’t use CV4. 1:operation3 uses CV4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B114</td>
<td>Operation4 uses CV4? 0:Operation4 doesn’t use CV4. 1:operation4 uses CV4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B115</td>
<td>Operation5 uses CV4? 0:Operation5 doesn’t use CV4. 1:operation5 uses CV4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B116</td>
<td>Operation6 uses CV4? 0:Operation6 doesn’t use CV4. 1:operation6 uses CV4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B120</td>
<td>Currently executing operation number for CV5.</td>
<td>The value of this variable changes in case there are several operations by which CV5 is used within the programs registered in MOTOPAL operation window. When the pallet is full of products, the operation will shift to the next one. (Refer to Section 3.3.1 “Switch Station”)</td>
<td></td>
</tr>
<tr>
<td>B121</td>
<td>Operation1 uses CV5? 0:Operation1 doesn’t use CV5. 1:operation1 uses CV5.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B122</td>
<td>Operation2 uses CV5? 0:Operation2 doesn’t use CV5. 1:operation2 uses CV5.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B123</td>
<td>Operation3 uses CV5? 0:Operation3 doesn’t use CV5. 1:operation3 uses CV5.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B124</td>
<td>Operation4 uses CV5? 0:Operation4 doesn’t use CV5. 1:operation4 uses CV5.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B125</td>
<td>Operation5 uses CV5? 0:Operation5 doesn’t use CV5. 1:operation5 uses CV5.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B126</td>
<td>Operation6 uses CV5? 0:Operation6 doesn’t use CV5. 1:operation6 uses CV5.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Jobs and Ladder Program

#### 3.1 Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable name in job</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>B130</td>
<td>Currently executing operation number for CV6.</td>
<td>The value of this variable changes in case there are several operations by which CV6 is used within the programs registered in MOTOPAL operation window. When the pallet is full of products, the operation will shift to the next one. (Refer to Section 3.3.1 &quot;Switch Station&quot; on page 3-24)</td>
<td></td>
</tr>
<tr>
<td>B131</td>
<td>Operation1 uses CV6? 0:Operation1 doesn’t use CV6. 1:operation1 uses CV6.</td>
<td>These variables are used to find the next operation when switching operation.</td>
<td></td>
</tr>
<tr>
<td>B133</td>
<td>Operation3 uses CV6? 0:Operation3 doesn’t use CV6. 1:operation3 uses CV6.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B134</td>
<td>Operation4 uses CV6? 0:Operation4 doesn’t use CV6. 1:operation4 uses CV6.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B135</td>
<td>Operation5 uses CV6? 0:Operation5 doesn’t use CV6. 1:operation5 uses CV6.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B136</td>
<td>Operation6 uses CV6? 0:Operation6 doesn’t use CV6. 1:operation6 uses CV6.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I080</td>
<td>CvValdNo_Cv1</td>
<td>&quot;Valid&quot; signal number for CV1</td>
<td>These variables need to be initialized properly in the sample Job &quot;INIT_VAR&quot;.</td>
</tr>
<tr>
<td>I090</td>
<td>CvValdNo_Cv2</td>
<td>&quot;Valid&quot; signal number for CV2</td>
<td></td>
</tr>
<tr>
<td>I100</td>
<td>CvValdNo_Cv3</td>
<td>&quot;Valid&quot; signal number for CV3</td>
<td></td>
</tr>
<tr>
<td>I110</td>
<td>CvValdNo_Cv4</td>
<td>&quot;Valid&quot; signal number for CV4</td>
<td></td>
</tr>
<tr>
<td>I120</td>
<td>CvValdNo_Cv5</td>
<td>&quot;Valid&quot; signal number for CV5</td>
<td></td>
</tr>
<tr>
<td>I130</td>
<td>CvValdNo_Cv6</td>
<td>&quot;Valid&quot; signal number for CV6</td>
<td></td>
</tr>
</tbody>
</table>
### 3.1.4 Variables for Stations

#### 3.1.4.1 Variables for Stations for MOTOPAL and the Sample Jobs

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable name in job</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>B147</td>
<td>LyrNo_St1</td>
<td>Layers for ST1.</td>
<td>The status of these variables are shown on the STATION buttons in MOTOPAL MAIN window. Also, the status of these variables can be confirmed and modified on the MANUAL OPERATION window of STATION. (Refer to Section 2.4.6 &quot;How to Customize the Structure of Product Master Job&quot; on page 2-31).</td>
</tr>
<tr>
<td>B148</td>
<td>Pcs_St1</td>
<td>Pieces for ST1.</td>
<td></td>
</tr>
<tr>
<td>B167</td>
<td>LyrNo_St2</td>
<td>Layers for ST2.</td>
<td></td>
</tr>
<tr>
<td>B168</td>
<td>Pcs_St2</td>
<td>Pieces for ST2.</td>
<td></td>
</tr>
<tr>
<td>B187</td>
<td>LyrNo_St3</td>
<td>Layers for ST3.</td>
<td></td>
</tr>
<tr>
<td>B188</td>
<td>Pcs_St3</td>
<td>Pieces for ST3.</td>
<td></td>
</tr>
<tr>
<td>B207</td>
<td>LyrNo_St4</td>
<td>Layers for ST4.</td>
<td></td>
</tr>
<tr>
<td>B208</td>
<td>Pcs_St4</td>
<td>Pieces for ST4.</td>
<td></td>
</tr>
<tr>
<td>B227</td>
<td>LyrNo_St5</td>
<td>Layers for ST5.</td>
<td></td>
</tr>
<tr>
<td>B228</td>
<td>Pcs_St5</td>
<td>Pieces for ST5.</td>
<td></td>
</tr>
<tr>
<td>B247</td>
<td>LyrNo_St6</td>
<td>Layers for ST6.</td>
<td></td>
</tr>
<tr>
<td>B248</td>
<td>Pcs_St6</td>
<td>Pieces for ST6.</td>
<td></td>
</tr>
<tr>
<td>B149</td>
<td>Pallet_Num1</td>
<td>Pallet No. for ST1</td>
<td>The status of these variables can be confirmed and modified on the MANUAL OPERATION window of STATION. (Modification is available when “0” is set to both “Layer” and “Pieces”. 1 to 3 can be set.)</td>
</tr>
<tr>
<td>B169</td>
<td>Pallet_Num2</td>
<td>Pallet No. for ST2</td>
<td></td>
</tr>
<tr>
<td>B189</td>
<td>Pallet_Num3</td>
<td>Pallet No. for ST3</td>
<td></td>
</tr>
<tr>
<td>B209</td>
<td>Pallet_Num4</td>
<td>Pallet No. for ST4</td>
<td></td>
</tr>
<tr>
<td>B229</td>
<td>Pallet_Num5</td>
<td>Pallet No. for ST5</td>
<td></td>
</tr>
<tr>
<td>B249</td>
<td>Pallet_Num6</td>
<td>Pallet No. for ST6</td>
<td></td>
</tr>
</tbody>
</table>

MANUAL OPERATION Window of STATION
### Jobs and Ladder Program

#### 3.1 Variables

These variables are used in the Product Master Job. (Refer to Section 2.4.6 “How to Customize the Structure of Product Master Job” on page 2-31.)

These variables need to be initialized properly in the sample Job "INIT_VAR".

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable name in job</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>I143</td>
<td>FullNo_St1</td>
<td>“Full” signal number for ST1.</td>
<td></td>
</tr>
<tr>
<td>I144</td>
<td>EjectNo_St1</td>
<td>“Eject Pallet” signal number for ST1.</td>
<td></td>
</tr>
<tr>
<td>I153</td>
<td>FullNo_St2</td>
<td>“Full” signal number for ST2.</td>
<td></td>
</tr>
<tr>
<td>I154</td>
<td>EjectNo_St2</td>
<td>“Eject Pallet” signal number for ST2.</td>
<td></td>
</tr>
<tr>
<td>I163</td>
<td>FullNo_St3</td>
<td>“Full” signal number for ST3.</td>
<td></td>
</tr>
<tr>
<td>I164</td>
<td>EjectNo_St3</td>
<td>“Eject Pallet” signal number for ST3.</td>
<td></td>
</tr>
<tr>
<td>I173</td>
<td>FullNo_St4</td>
<td>“Full” signal number for ST4.</td>
<td></td>
</tr>
<tr>
<td>I174</td>
<td>EjectNo_St4</td>
<td>“Eject Pallet” signal number for ST4.</td>
<td></td>
</tr>
<tr>
<td>I183</td>
<td>FullNo_St5</td>
<td>“Full” signal number for ST5.</td>
<td></td>
</tr>
<tr>
<td>I184</td>
<td>EjectNo_St5</td>
<td>“Eject Pallet” signal number for ST5.</td>
<td></td>
</tr>
<tr>
<td>I193</td>
<td>FullNo_St6</td>
<td>“Full” signal number for ST6.</td>
<td></td>
</tr>
<tr>
<td>I194</td>
<td>EjectNo_St6</td>
<td>“Eject Pallet” signal number for ST6.</td>
<td></td>
</tr>
</tbody>
</table>
### Variables for Station Which Only the Sample Jobs Use

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable name in job</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>I140</td>
<td>StValdNo_St1</td>
<td>&quot;Valid&quot; signal number for ST1.</td>
<td>These variables need to be initialized properly in the sample Job &quot;INIT_VAR&quot;.</td>
</tr>
<tr>
<td>I141</td>
<td>InitNo_St1</td>
<td>&quot;Initialize&quot; signal number for ST1</td>
<td></td>
</tr>
<tr>
<td>I142</td>
<td>SwitchNo_St1</td>
<td>&quot;Switch&quot; signal number for ST1</td>
<td></td>
</tr>
<tr>
<td>I145</td>
<td>InitDoneNo_St1</td>
<td>&quot;Initializing Done&quot; signal number for ST1</td>
<td></td>
</tr>
<tr>
<td>I146</td>
<td>CancelIntNo_St1</td>
<td>&quot;Cancel Initialization&quot; signal number for ST1</td>
<td></td>
</tr>
<tr>
<td>I150</td>
<td>StValdNo_St2</td>
<td>&quot;Valid&quot; signal number for ST2.</td>
<td></td>
</tr>
<tr>
<td>I151</td>
<td>InitNo_St2</td>
<td>&quot;Initialize&quot; signal number for ST2.</td>
<td></td>
</tr>
<tr>
<td>I152</td>
<td>SwitchNo_St2</td>
<td>&quot;Switch&quot; signal number for ST2</td>
<td></td>
</tr>
<tr>
<td>I155</td>
<td>InitDoneNo_St2</td>
<td>&quot;Initializing Done&quot; signal number for ST2</td>
<td></td>
</tr>
<tr>
<td>I156</td>
<td>CancelIntNo_St2</td>
<td>&quot;Cancel Initialization&quot; signal number for ST2</td>
<td></td>
</tr>
<tr>
<td>I160</td>
<td>StValdNo_St3</td>
<td>&quot;Valid&quot; signal number for ST3.</td>
<td></td>
</tr>
<tr>
<td>I161</td>
<td>InitNo_St3</td>
<td>&quot;Initialize&quot; signal number for ST3</td>
<td></td>
</tr>
<tr>
<td>I162</td>
<td>SwitchNo_St3</td>
<td>&quot;Switch&quot; signal number for ST3</td>
<td></td>
</tr>
<tr>
<td>I165</td>
<td>InitDoneNo_St3</td>
<td>&quot;Initializing Done&quot; signal number for ST3</td>
<td></td>
</tr>
<tr>
<td>I166</td>
<td>CancelIntNo_St3</td>
<td>&quot;Cancel Initialization&quot; signal number for ST3</td>
<td></td>
</tr>
<tr>
<td>I170</td>
<td>StValdNo_St4</td>
<td>&quot;Valid&quot; signal number for ST4.</td>
<td></td>
</tr>
<tr>
<td>I171</td>
<td>InitNo_St4</td>
<td>&quot;Initialize&quot; signal number for ST4</td>
<td></td>
</tr>
<tr>
<td>I175</td>
<td>SwitchNo_St4</td>
<td>&quot;Switch&quot; signal number for ST4</td>
<td></td>
</tr>
<tr>
<td>I176</td>
<td>CancelIntNo_St4</td>
<td>&quot;Cancel Initialization&quot; signal number for ST4</td>
<td></td>
</tr>
<tr>
<td>I180</td>
<td>StValdNo_St5</td>
<td>&quot;Valid&quot; signal number for ST5.</td>
<td></td>
</tr>
<tr>
<td>I181</td>
<td>InitNo_St5</td>
<td>&quot;Initialize&quot; signal number for ST5</td>
<td></td>
</tr>
<tr>
<td>I182</td>
<td>SwitchNo_St5</td>
<td>&quot;Switch&quot; signal number for ST5</td>
<td></td>
</tr>
<tr>
<td>I185</td>
<td>InitDoneNo_St5</td>
<td>&quot;Initializing Done&quot; signal number for ST5</td>
<td></td>
</tr>
<tr>
<td>I186</td>
<td>CancelIntNo_St5</td>
<td>&quot;Cancel Initialization&quot; signal number for ST5</td>
<td></td>
</tr>
<tr>
<td>I190</td>
<td>StValdNo_St6</td>
<td>&quot;Valid&quot; signal number for ST6.</td>
<td>These variables need to be initialized properly in the sample Job &quot;INIT_VAR&quot;.</td>
</tr>
<tr>
<td>I191</td>
<td>InitNo_St6</td>
<td>&quot;Initialize&quot; signal number for ST6</td>
<td></td>
</tr>
<tr>
<td>I192</td>
<td>SwitchNo_St6</td>
<td>&quot;Switch&quot; signal number for ST6</td>
<td></td>
</tr>
<tr>
<td>I195</td>
<td>InitDoneNo_St6</td>
<td>&quot;Initializing Done&quot; signal number for ST6</td>
<td></td>
</tr>
<tr>
<td>I196</td>
<td>CancelIntNo_St6</td>
<td>&quot;Cancel Initialization&quot; signal number for ST6</td>
<td></td>
</tr>
</tbody>
</table>
## 3.1.5 Variables for Positions

### 3.1.5.1 Variables for Positions Which MOTOPAL and the Sample Jobs Use

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable name in job</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>P000</td>
<td>StValdNo_St1</td>
<td>Registered Position data.</td>
<td>When [TO DX200 WINDOW] button is pressed on the windows for position registration in the MOTOPAL setting window, registered position data is set to this variable. Refer to Chapter 4 SETTING Menu of MOTOPAL.</td>
</tr>
<tr>
<td>P001</td>
<td>InitNo_St1</td>
<td>Operation Origin.</td>
<td>When you register &quot;Operation Origin&quot; in &quot;REGISTER POSITIONs&quot; window, MOTOPAL sets the operation origin position to this variable. Refer to Section 4.1 &quot;REGISTER POSITIONs Menu&quot; on page 4-2.</td>
</tr>
<tr>
<td>P002</td>
<td>SwitchNo_St1</td>
<td>Waiting position over conveyors.</td>
<td>When you register &quot;Waiting Pos over CVs&quot; in &quot;REGISTER POSITIONs&quot; window, MOTOPAL sets the waiting pos over CVs to this variable. Refer to Section 4.1 &quot;REGISTER POSITIONs Menu&quot;.</td>
</tr>
<tr>
<td>P003</td>
<td>InitDoneNo_St1</td>
<td>Maximum swing height</td>
<td>When you register &quot;Maximum Swing Height&quot; in &quot;REGISTER POSITIONs&quot; window, MOTOPAL sets the maximum swing height to this variable. Refer to Section 4.1 &quot;REGISTER POSITIONs Menu&quot;.</td>
</tr>
</tbody>
</table>
This section explains IO which MOTOPAL, the sample Jobs and the sample Ladder program use.

### 3.2.1 IO for Operation

#### 3.2.1.1 Input Which MOTOPAL, the Sample Jobs and the Sample Ladder Program Use

You cannot change the number of input signals explained here because MOTOPAL also uses the signals.

<table>
<thead>
<tr>
<th>Input Signal No.</th>
<th>General Input No.</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>#02552</td>
<td>IN#2035</td>
<td>Cycle Stop</td>
<td>The &quot;CYCLE STOP&quot; button in MAIN window of MOTOPAL shows the status of this signal.</td>
</tr>
<tr>
<td>#02560 - #02567</td>
<td>IG#256</td>
<td>Override Speed</td>
<td>The &quot;Override Speed&quot; in [ROBOT] button in MAIN window and the [Override Speed] in MANUAL OPERATION of ROBOT window shows the status of these signals status.</td>
</tr>
</tbody>
</table>

#### 3.2.1.2 Input Which Only the Sample Jobs and the Sample Ladder Program Use

The numbers of input signal explained here are default setting and you can change the number if necessary. But If you change the number, you need to modify the related parts of the sample Jobs and the sample Ladder program.

<table>
<thead>
<tr>
<th>Input Signal No.</th>
<th>General Input No.</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>#02553</td>
<td>IN#2036</td>
<td>Return operation origin.</td>
<td>By this signal the sample Jobs execute returning operation origin.</td>
</tr>
<tr>
<td>#02557</td>
<td>IN#2040</td>
<td>Select Operation</td>
<td>By this signal the sample Jobs recalculate the variables for operations.</td>
</tr>
</tbody>
</table>
3.2.1.3 Output Which MOTOPAL, the Sample Jobs and the Sample Ladder Program Use

You cannot change the number of output signals explained here because MOTOPAL also uses the signals.

<table>
<thead>
<tr>
<th>IO No.</th>
<th>General Input No.</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>#12552</td>
<td>OUT#2035</td>
<td>Cycle Stop</td>
<td>Pressing the [CYCLE STOP] button in MAIN window of MOTOPAL turn on / off this signal.</td>
</tr>
<tr>
<td>#12553</td>
<td>OUT#2036</td>
<td>Return operation origin.</td>
<td>Pressing the [RETURN OPEORG] button in MAIN window of MOTOPAL output this signal by pulse.</td>
</tr>
<tr>
<td>#12554</td>
<td>OUT#2037</td>
<td>Safety Speed</td>
<td>Pressing the [SAFETY SPEED] button in MAIN window of MOTOPAL turn on / off this signal.</td>
</tr>
<tr>
<td>#12555</td>
<td>OUT#2038</td>
<td>Switch the valid status of shock detection function</td>
<td>If you press [Shock Detection] button in MANUAL OPERATION of ROBOT window and [INTERLOCK] button on the Programming Pendant at same time, this signal is turned on / off.</td>
</tr>
<tr>
<td>#12556</td>
<td>OUT#2039</td>
<td>Reset Alarm / Error</td>
<td>If you press [Alarm / Error] button in MANUAL OPERATION of ROBOT window and [INTERLOCK] button on the Programming Pendant at same time, this signal is output by pulse.</td>
</tr>
<tr>
<td>#12557</td>
<td>OUT#2040</td>
<td>Select Operations</td>
<td>When you [ADD] or [DELET] a operation (program) in OPERATION window of MOTOPAL, this signal is turned on. And the sample Jobs turned off this signal after setting the variables for operations.</td>
</tr>
<tr>
<td>#12560 - #12567</td>
<td>OG#256</td>
<td>Override Speed</td>
<td>If you set the number to [Override Speed] in MANUAL OPERATION of ROBOT window, the number is output to this output signal group.</td>
</tr>
<tr>
<td>#30013</td>
<td>-</td>
<td>Alarm/Error Occurred</td>
<td>The [Alarm/Error] in MANUAL OPERATION of ROBOT window shows the status of this signal.</td>
</tr>
<tr>
<td>#50060</td>
<td>-</td>
<td>Safety Speed Set</td>
<td>The [SAFETY SPEED] button in MAIN window shows the status of this signal.</td>
</tr>
<tr>
<td>#50157</td>
<td>-</td>
<td>Work Home Position R1</td>
<td>The [RETURN OPEORG] button in MAIN window shows the status of this signal.</td>
</tr>
<tr>
<td>#50560</td>
<td>-</td>
<td>Shock Detection Valid R1</td>
<td>The [Shock Detection] in MANUAL OPERATION of ROBOT window shows the status of this signal.</td>
</tr>
<tr>
<td>#80023</td>
<td>-</td>
<td>Safety Plug Input</td>
<td>The [Safety Fence] in MANUAL OPERATION of ROBOT window shows the status of this signal.</td>
</tr>
<tr>
<td>#80025</td>
<td>-</td>
<td>External Emergency Stop</td>
<td>The [External E-STOP] in MANUAL OPERATION of ROBOT window shows the status of this signal.</td>
</tr>
</tbody>
</table>

3.2.1.4 Output Which Only the Sample Jobs and the Sample Ladder Program Use

The numbers of output signal explained here are default setting and you can change the number if necessary. But if you change the number, you need to modify the related parts of the sample Jobs and the sample Ladder program.

<table>
<thead>
<tr>
<th>IO No.</th>
<th>General Input No.</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>#12550</td>
<td>OUT#2033</td>
<td>Return operation origin Done</td>
<td>When the robot finish returning to the operation origin, the sample Jobs output this signal by pulse.</td>
</tr>
</tbody>
</table>
### 3.2.2 IO for Conveyors

The numbers of IO explained here are default setting and you can change the number if necessary. But if you change the number, you need to modify the related parts of the sample Jobs and the sample Ladder program.

And the number of IO needs to be linked to the setting of ConveyerIO.ini because most of IO explained here are related to the setting of ConveyerIO.ini (Refer to Section 2.2.1 "Setup of ConveyerIO.ini" on page 2-3).

#### 3.2.2.1 Input

<table>
<thead>
<tr>
<th>IO No.</th>
<th>General Input No.</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>#00010</td>
<td>IN#0001</td>
<td>Product Exist (CV1)</td>
<td></td>
</tr>
<tr>
<td>#00011</td>
<td>IN#0002</td>
<td>Product Exist (CV2)</td>
<td></td>
</tr>
<tr>
<td>#00022</td>
<td>IN#0011</td>
<td>Error (CV1)</td>
<td></td>
</tr>
<tr>
<td>#00023</td>
<td>IN#0012</td>
<td>Error (CV2)</td>
<td></td>
</tr>
<tr>
<td>#00040</td>
<td>IN#0025</td>
<td>Product Exist (CV3)</td>
<td></td>
</tr>
<tr>
<td>#00041</td>
<td>IN#0026</td>
<td>Product Exist (CV4)</td>
<td></td>
</tr>
<tr>
<td>#00042</td>
<td>IN#0027</td>
<td>Return of Positioning 1 (CV1)</td>
<td></td>
</tr>
<tr>
<td>#00043</td>
<td>IN#0028</td>
<td>Advance of Positioning 1 (CV1)</td>
<td></td>
</tr>
<tr>
<td>#00044</td>
<td>IN#0029</td>
<td>Return of Positioning 2 (CV1)</td>
<td></td>
</tr>
<tr>
<td>#00045</td>
<td>IN#0030</td>
<td>Advance of Positioning 2 (CV1)</td>
<td></td>
</tr>
<tr>
<td>#00046</td>
<td>IIIN#0031</td>
<td>Return of Positioning 1 (CV2)</td>
<td></td>
</tr>
<tr>
<td>#00047</td>
<td>IN#0032</td>
<td>Advance of Positioning 1 (CV2)</td>
<td></td>
</tr>
<tr>
<td>#00050</td>
<td>IN#0033</td>
<td>Return of Positioning 2 (CV2)</td>
<td></td>
</tr>
<tr>
<td>#00051</td>
<td>IN#0034</td>
<td>Advance of Positioning 2 (CV2)</td>
<td></td>
</tr>
<tr>
<td>#00052</td>
<td>IN#0035</td>
<td>Return of Positioning 1 (CV3)</td>
<td></td>
</tr>
<tr>
<td>#00053</td>
<td>IN#0036</td>
<td>Advance of Positioning 1 (CV3)</td>
<td></td>
</tr>
<tr>
<td>#00054</td>
<td>IN#0037</td>
<td>Return of Positioning 2 (CV3)</td>
<td></td>
</tr>
<tr>
<td>#00055</td>
<td>IN#0038</td>
<td>Advance of Positioning 2 (CV3)</td>
<td></td>
</tr>
<tr>
<td>#00056</td>
<td>IN#0039</td>
<td>Return of Positioning 1 (CV4)</td>
<td></td>
</tr>
<tr>
<td>#00057</td>
<td>IN#0040</td>
<td>Advance of Positioning 1 (CV4)</td>
<td></td>
</tr>
<tr>
<td>#00060</td>
<td>IN#0041</td>
<td>Return of Positioning 2 (CV4)</td>
<td></td>
</tr>
<tr>
<td>#00061</td>
<td>IN#0042</td>
<td>Advance of Positioning 2 (CV4)</td>
<td></td>
</tr>
<tr>
<td>#00062</td>
<td>IN#0043</td>
<td>Error (CV3)</td>
<td></td>
</tr>
<tr>
<td>#00063</td>
<td>IIIN#0044</td>
<td>Error (CV4)</td>
<td></td>
</tr>
<tr>
<td>#00093</td>
<td>IN#0068</td>
<td>Product Exist (CV5)</td>
<td></td>
</tr>
<tr>
<td>#00094</td>
<td>IN#0069</td>
<td>Product Exist (CV6)</td>
<td></td>
</tr>
<tr>
<td>#00095</td>
<td>IN#0070</td>
<td>Return of Positioning 1 (CV5)</td>
<td></td>
</tr>
<tr>
<td>#00096</td>
<td>IN#0071</td>
<td>Advance of Positioning 1 (CV5)</td>
<td></td>
</tr>
<tr>
<td>#00100</td>
<td>IN#0072</td>
<td>Return of Positioning 2 (CV5)</td>
<td></td>
</tr>
<tr>
<td>#00101</td>
<td>IN#0073</td>
<td>Advance of Positioning 2 (CV5)</td>
<td></td>
</tr>
<tr>
<td>#00102</td>
<td>IN#0074</td>
<td>Return of Positioning 1 (CV6)</td>
<td></td>
</tr>
<tr>
<td>#00103</td>
<td>IN#0075</td>
<td>Advance of Positioning 1 (CV6)</td>
<td></td>
</tr>
<tr>
<td>#00104</td>
<td>IN#0076</td>
<td>Return of Positioning 2 (CV6)</td>
<td></td>
</tr>
<tr>
<td>#00105</td>
<td>IN#0077</td>
<td>Advance of Positioning 2 (CV6)</td>
<td></td>
</tr>
<tr>
<td>#00106</td>
<td>IN#0078</td>
<td>Error (CV5)</td>
<td></td>
</tr>
</tbody>
</table>
### Jobs and Ladder Program

#### 3.2 IO

<table>
<thead>
<tr>
<th>IO No.</th>
<th>General Input No.</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>#00107</td>
<td>IN#0079</td>
<td>Error (CV6)</td>
<td></td>
</tr>
<tr>
<td>#02526</td>
<td>IN#2015</td>
<td>Valid (CV1)</td>
<td></td>
</tr>
<tr>
<td>#02527</td>
<td>IN#2016</td>
<td>Valid (CV2)</td>
<td></td>
</tr>
<tr>
<td>#02530</td>
<td>IN#2017</td>
<td>Valid (CV3)</td>
<td></td>
</tr>
<tr>
<td>#02531</td>
<td>IN#2018</td>
<td>Valid (CV4)</td>
<td></td>
</tr>
<tr>
<td>#02532</td>
<td>IN#2019</td>
<td>Valid (CV5)</td>
<td></td>
</tr>
<tr>
<td>#02533</td>
<td>IN#2020</td>
<td>Valid (CV6)</td>
<td></td>
</tr>
</tbody>
</table>
3.2.2.2 Output

<table>
<thead>
<tr>
<th>IO No.</th>
<th>General output No.</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>#00010</td>
<td>OUT#0001</td>
<td>Pick Done (CV1)</td>
<td></td>
</tr>
<tr>
<td>#00011</td>
<td>OUT#0002</td>
<td>Pick Done (CV2)</td>
<td></td>
</tr>
<tr>
<td>#00022</td>
<td>OUT#0011</td>
<td>Forward (CV1)</td>
<td></td>
</tr>
<tr>
<td>#00023</td>
<td>OUT#0012</td>
<td>Forward (CV2)</td>
<td></td>
</tr>
<tr>
<td>#00040</td>
<td>OUT#0025</td>
<td>Pick Done (CV3)</td>
<td></td>
</tr>
<tr>
<td>#00041</td>
<td>OUT#0026</td>
<td>Pick Done (CV4)</td>
<td></td>
</tr>
<tr>
<td>#00042</td>
<td>OUT#0027</td>
<td>Return of Positioning 1 (CV1)</td>
<td></td>
</tr>
<tr>
<td>#00043</td>
<td>OUT#0028</td>
<td>Advance of Positioning 1 (CV1)</td>
<td></td>
</tr>
<tr>
<td>#00044</td>
<td>OUT#0029</td>
<td>Return of Positioning 2 (CV1)</td>
<td></td>
</tr>
<tr>
<td>#00045</td>
<td>OUT#0030</td>
<td>Advance of Positioning 2 (CV1)</td>
<td></td>
</tr>
<tr>
<td>#00046</td>
<td>OUT#0031</td>
<td>Return of Positioning 1 (CV2)</td>
<td></td>
</tr>
<tr>
<td>#00047</td>
<td>OUT#0032</td>
<td>Advance of Positioning 1 (CV2)</td>
<td></td>
</tr>
<tr>
<td>#00050</td>
<td>OUT#0033</td>
<td>Return of Positioning 2 (CV2)</td>
<td></td>
</tr>
<tr>
<td>#00051</td>
<td>OUT#0034</td>
<td>Advance of Positioning 2 (CV2)</td>
<td></td>
</tr>
<tr>
<td>#00052</td>
<td>OUT#0035</td>
<td>Return of Positioning 1 (CV3)</td>
<td></td>
</tr>
<tr>
<td>#00053</td>
<td>OUT#0036</td>
<td>Advance of Positioning 1 (CV3)</td>
<td></td>
</tr>
<tr>
<td>#00054</td>
<td>OUT#0037</td>
<td>Return of Positioning 2 (CV3)</td>
<td></td>
</tr>
<tr>
<td>#00055</td>
<td>OUT#0038</td>
<td>Advance of Positioning 2 (CV3)</td>
<td></td>
</tr>
<tr>
<td>#00056</td>
<td>OUT#0039</td>
<td>Return of Positioning 1 (CV4)</td>
<td></td>
</tr>
<tr>
<td>#00057</td>
<td>OUT#0040</td>
<td>Advance of Positioning 1 (CV4)</td>
<td></td>
</tr>
<tr>
<td>#00060</td>
<td>OUT#0041</td>
<td>Return of Positioning 2 (CV4)</td>
<td></td>
</tr>
<tr>
<td>#00061</td>
<td>OUT#0042</td>
<td>Advance of Positioning 2 (CV4)</td>
<td></td>
</tr>
<tr>
<td>#00062</td>
<td>OUT#0043</td>
<td>Forward (CV3)</td>
<td></td>
</tr>
<tr>
<td>#00063</td>
<td>OUT#0044</td>
<td>Forward (CV4)</td>
<td></td>
</tr>
<tr>
<td>#00093</td>
<td>OUT#0068</td>
<td>Pick Done (CV5)</td>
<td></td>
</tr>
<tr>
<td>#00094</td>
<td>OUT#0069</td>
<td>Pick Done (CV6)</td>
<td></td>
</tr>
<tr>
<td>#00095</td>
<td>OUT#0070</td>
<td>Return of Positioning 1 (CV5)</td>
<td></td>
</tr>
<tr>
<td>#00096</td>
<td>OUT#0071</td>
<td>Advance of Positioning 1 (CV5)</td>
<td></td>
</tr>
<tr>
<td>#00097</td>
<td>OUT#0072</td>
<td>Return of Positioning 2 (CV5)</td>
<td></td>
</tr>
<tr>
<td>#00100</td>
<td>OUT#0073</td>
<td>Advance of Positioning 2 (CV5)</td>
<td></td>
</tr>
<tr>
<td>#00101</td>
<td>OUT#0074</td>
<td>Return of Positioning 1 (CV6)</td>
<td></td>
</tr>
<tr>
<td>#00102</td>
<td>OUT#0075</td>
<td>Advance of Positioning 1 (CV6)</td>
<td></td>
</tr>
<tr>
<td>#00103</td>
<td>OUT#0076</td>
<td>Return of Positioning 2 (CV6)</td>
<td></td>
</tr>
<tr>
<td>#00104</td>
<td>OUT#0077</td>
<td>Advance of Positioning 2 (CV6)</td>
<td></td>
</tr>
<tr>
<td>#00105</td>
<td>OUT#0078</td>
<td>Forward (CV5)</td>
<td></td>
</tr>
<tr>
<td>#00106</td>
<td>OUT#0079</td>
<td>Forward (CV6)</td>
<td></td>
</tr>
<tr>
<td>#12526</td>
<td>OUT#2015</td>
<td>Dummy Product Exist (CV1)</td>
<td></td>
</tr>
<tr>
<td>#12527</td>
<td>OUT#2016</td>
<td>Dummy Product Exist (CV2)</td>
<td></td>
</tr>
<tr>
<td>#12530</td>
<td>OUT#2017</td>
<td>Dummy Product Exist (CV3)</td>
<td></td>
</tr>
<tr>
<td>#12531</td>
<td>OUT#2018</td>
<td>Dummy Product Exist (CV4)</td>
<td></td>
</tr>
<tr>
<td>#12532</td>
<td>OUT#2019</td>
<td>Dummy Product Exist (CV5)</td>
<td></td>
</tr>
<tr>
<td>#12533</td>
<td>OUT#2020</td>
<td>Dummy Product Exist (CV6)</td>
<td></td>
</tr>
</tbody>
</table>
### 3.2.3 IO for Stations

The numbers of IO explained here are default setting and you can change the number if necessary. But if you change the number, you need to modify the related parts of the sample Jobs and the sample Ladder program. And the number of IO needs to be linked to the setting of StationIO.ini because most of IO explained here are related to the setting of StationIO.ini (Refer to Section 2.2.2 “Setup of StationIO.ini” on page 2-7).

#### 3.2.3.1 Input

<table>
<thead>
<tr>
<th>IO No.</th>
<th>General Input No.</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>#00012</td>
<td>IN#0003</td>
<td>Pallet in Place (ST1: 1st layer)</td>
<td></td>
</tr>
<tr>
<td>#00013</td>
<td>IN#0004</td>
<td>Pallet in Place (ST1: 2nd layer)</td>
<td></td>
</tr>
<tr>
<td>#00014</td>
<td>IN#0005</td>
<td>Pallet in Place (ST1: 3rd layer)</td>
<td></td>
</tr>
<tr>
<td>#00015</td>
<td>IN#0006</td>
<td>Pallet in Place (ST1: work presence sensor)</td>
<td></td>
</tr>
<tr>
<td>#00016</td>
<td>IN#0007</td>
<td>Pallet in Place (ST2: 1st layer)</td>
<td></td>
</tr>
<tr>
<td>#00017</td>
<td>IN#0008</td>
<td>Pallet in Place (ST2: 2nd layer)</td>
<td></td>
</tr>
<tr>
<td>#00020</td>
<td>IN#0009</td>
<td>Pallet in Place (ST2: 3rd layer)</td>
<td></td>
</tr>
<tr>
<td>#00021</td>
<td>IN#0010</td>
<td>Pallet in Place (ST2: work presence sensor)</td>
<td></td>
</tr>
<tr>
<td>#00026</td>
<td>IN#0015</td>
<td>Initialize (Ejection Done) (ST1)</td>
<td></td>
</tr>
<tr>
<td>#00027</td>
<td>IN#0016</td>
<td>Initialize (Ejection Done) (ST2)</td>
<td></td>
</tr>
<tr>
<td>#00036</td>
<td>IN#0023</td>
<td>Error (ST1)</td>
<td></td>
</tr>
<tr>
<td>#00037</td>
<td>IN#0024</td>
<td>Error (ST2)</td>
<td></td>
</tr>
<tr>
<td>#00064</td>
<td>IN#0045</td>
<td>Pallet in Place (ST3: 1st layer)</td>
<td></td>
</tr>
<tr>
<td>#00065</td>
<td>IN#0046</td>
<td>Pallet in Place (ST3: 2nd layer)</td>
<td></td>
</tr>
<tr>
<td>#00066</td>
<td>IN#0047</td>
<td>Pallet in Place (ST3: 3rd layer)</td>
<td></td>
</tr>
<tr>
<td>#00067</td>
<td>IN#0048</td>
<td>Pallet in Place (ST3: work presence sensor)</td>
<td></td>
</tr>
<tr>
<td>#00070</td>
<td>IN#0049</td>
<td>Pallet in Place (ST4: 1st layer)</td>
<td></td>
</tr>
<tr>
<td>#00071</td>
<td>IN#0050</td>
<td>Pallet in Place (ST4: 2nd layer)</td>
<td></td>
</tr>
<tr>
<td>#00072</td>
<td>IN#0051</td>
<td>Pallet in Place (ST4: 3rd layer)</td>
<td></td>
</tr>
<tr>
<td>#00073</td>
<td>IN#0052</td>
<td>Pallet in Place (ST4: work presence sensor)</td>
<td></td>
</tr>
<tr>
<td>#00074</td>
<td>IN#0053</td>
<td>Initialize (Ejection Done) (ST3)</td>
<td></td>
</tr>
<tr>
<td>#00075</td>
<td>IN#0054</td>
<td>Initialize (Ejection Done) (ST4)</td>
<td></td>
</tr>
<tr>
<td>#00076</td>
<td>IN#0055</td>
<td>Error (ST3)</td>
<td></td>
</tr>
<tr>
<td>#00077</td>
<td>IN#0056</td>
<td>Error (ST4)</td>
<td></td>
</tr>
<tr>
<td>#00107</td>
<td>IN#0080</td>
<td>Pallet in Place (ST5: 1st layer)</td>
<td></td>
</tr>
<tr>
<td>#00110</td>
<td>IN#0081</td>
<td>Pallet in Place (ST5: 2nd layer)</td>
<td></td>
</tr>
<tr>
<td>#00111</td>
<td>IN#0082</td>
<td>Pallet in Place (ST5: 3rd layer)</td>
<td></td>
</tr>
<tr>
<td>#00112</td>
<td>IN#0083</td>
<td>Pallet in Place (ST5: work presence sensor)</td>
<td></td>
</tr>
<tr>
<td>#00113</td>
<td>IN#0084</td>
<td>Pallet in Place (ST6: 1st layer)</td>
<td></td>
</tr>
<tr>
<td>#00114</td>
<td>IN#0085</td>
<td>Pallet in Place (ST6: 2nd layer)</td>
<td></td>
</tr>
</tbody>
</table>
### Jobs and Ladder Program

#### 3.2 IO

<table>
<thead>
<tr>
<th>IO No.</th>
<th>General Input No.</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>#00115</td>
<td>IN#0086</td>
<td>Pallet in Place (ST6: 3rd layer)</td>
<td></td>
</tr>
<tr>
<td>#00116</td>
<td>IN#0087</td>
<td>Pallet in Place (ST6): work presence sensor</td>
<td></td>
</tr>
<tr>
<td>#00117</td>
<td>IN#0088</td>
<td>Initialize (Ejection Done) (ST5)</td>
<td></td>
</tr>
<tr>
<td>#00120</td>
<td>IN#0089</td>
<td>Initialize (Ejection Done) (ST6)</td>
<td></td>
</tr>
<tr>
<td>#00121</td>
<td>IN#0090</td>
<td>Error (ST5)</td>
<td></td>
</tr>
<tr>
<td>#00122</td>
<td>IN#0091</td>
<td>Error (ST6)</td>
<td></td>
</tr>
<tr>
<td>#02534</td>
<td>IN#2021</td>
<td>Valid (ST1)</td>
<td></td>
</tr>
<tr>
<td>#02535</td>
<td>IN#2022</td>
<td>Valid (ST2)</td>
<td></td>
</tr>
<tr>
<td>#02536</td>
<td>IN#2023</td>
<td>Valid (ST3)</td>
<td></td>
</tr>
<tr>
<td>#02537</td>
<td>IN#2024</td>
<td>Valid (ST4)</td>
<td></td>
</tr>
<tr>
<td>#02540</td>
<td>IN#2025</td>
<td>Valid (ST5)</td>
<td></td>
</tr>
<tr>
<td>#02541</td>
<td>IN#2026</td>
<td>Valid (ST6)</td>
<td></td>
</tr>
<tr>
<td>#02542</td>
<td>IN#2027</td>
<td>Switch (ST1)</td>
<td></td>
</tr>
<tr>
<td>#02543</td>
<td>IN#2028</td>
<td>Switch (ST2)</td>
<td></td>
</tr>
<tr>
<td>#02544</td>
<td>IN#2029</td>
<td>Switch (ST3)</td>
<td></td>
</tr>
<tr>
<td>#02545</td>
<td>IN#2030</td>
<td>Switch (ST4)</td>
<td></td>
</tr>
<tr>
<td>#02546</td>
<td>IN#2031</td>
<td>Switch (ST5)</td>
<td></td>
</tr>
<tr>
<td>#02547</td>
<td>IN#2032</td>
<td>Switch (ST6)</td>
<td></td>
</tr>
<tr>
<td>#02550</td>
<td>IN#2033</td>
<td>Initialize</td>
<td></td>
</tr>
<tr>
<td>#02551</td>
<td>IN#2034</td>
<td>Switch</td>
<td></td>
</tr>
</tbody>
</table>
### 3.2.3.2 Output

<table>
<thead>
<tr>
<th>IO No.</th>
<th>General output No.</th>
<th>Meaning</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>#10012</td>
<td>OUT#0003</td>
<td>Full (ST1)</td>
<td></td>
</tr>
<tr>
<td>#10016</td>
<td>OUT#0007</td>
<td>Full (ST2)</td>
<td></td>
</tr>
<tr>
<td>#10026</td>
<td>OUT#0015</td>
<td>Eject Pallet (ST1)</td>
<td></td>
</tr>
<tr>
<td>#10027</td>
<td>OUT#0016</td>
<td>Eject Pallet (ST2)</td>
<td></td>
</tr>
<tr>
<td>#10036</td>
<td>OUT#0023</td>
<td>Initializing Done (ST1)</td>
<td></td>
</tr>
<tr>
<td>#10037</td>
<td>OUT#0024</td>
<td>Initializing Done (ST2)</td>
<td></td>
</tr>
<tr>
<td>#10064</td>
<td>OUT#0045</td>
<td>Full (ST3)</td>
<td></td>
</tr>
<tr>
<td>#10070</td>
<td>OUT#0049</td>
<td>Full (ST4)</td>
<td></td>
</tr>
<tr>
<td>#10074</td>
<td>OUT#0053</td>
<td>Eject Pallet (ST3)</td>
<td></td>
</tr>
<tr>
<td>#10075</td>
<td>OUT#0054</td>
<td>Eject Pallet (ST4)</td>
<td></td>
</tr>
<tr>
<td>#10076</td>
<td>OUT#0055</td>
<td>Initializing Done (ST3)</td>
<td></td>
</tr>
<tr>
<td>#10077</td>
<td>OUT#0056</td>
<td>Initializing Done (ST4)</td>
<td></td>
</tr>
<tr>
<td>#10107</td>
<td>OUT#0080</td>
<td>Full (ST5)</td>
<td></td>
</tr>
<tr>
<td>#10113</td>
<td>OUT#0084</td>
<td>Full (ST6)</td>
<td></td>
</tr>
<tr>
<td>#10117</td>
<td>OUT#0088</td>
<td>Eject Pallet (ST5)</td>
<td></td>
</tr>
<tr>
<td>#10120</td>
<td>OUT#0089</td>
<td>Eject Pallet (ST6)</td>
<td></td>
</tr>
<tr>
<td>#10121</td>
<td>OUT#0090</td>
<td>Initializing Done (ST5)</td>
<td></td>
</tr>
<tr>
<td>#10122</td>
<td>OUT#0091</td>
<td>Initializing Done (ST6)</td>
<td></td>
</tr>
<tr>
<td>#12534</td>
<td>OUT#2021</td>
<td>Cancel Initialization (ST1)</td>
<td></td>
</tr>
<tr>
<td>#12535</td>
<td>OUT#2022</td>
<td>Cancel Initialization (ST2)</td>
<td></td>
</tr>
<tr>
<td>#12536</td>
<td>OUT#2023</td>
<td>Cancel Initialization (ST3)</td>
<td></td>
</tr>
<tr>
<td>#12537</td>
<td>OUT#2024</td>
<td>Cancel Initialization (ST4)</td>
<td></td>
</tr>
<tr>
<td>#12540</td>
<td>OUT#2025</td>
<td>Cancel Initialization (ST5)</td>
<td></td>
</tr>
<tr>
<td>#12541</td>
<td>OUT#2026</td>
<td>Cancel Initialization (ST6)</td>
<td></td>
</tr>
<tr>
<td>#12551</td>
<td>OUT#2034</td>
<td>Switch Done</td>
<td></td>
</tr>
</tbody>
</table>
3.3 Sample Jobs

Table 3-1 Sample Jobs is the list of Sample Jobs.

Table 3-1: Sample Jobs

<table>
<thead>
<tr>
<th>Job Name</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>MASTER</td>
<td>Master Job</td>
</tr>
<tr>
<td>INIT_VAR</td>
<td>This Job initializes some of the variables explained in Section 3.1 “Variables” on page 3-1.</td>
</tr>
<tr>
<td>CLEAR_OPE_TABLE</td>
<td>This Job clears the variables explained in Section 3.1.2.2 “Variables for Operation Which Only the Sample Jobs Use” on page 3-4.</td>
</tr>
<tr>
<td>CLEAR_CV_TABLE</td>
<td>This Job clears the B variables explained in Section 3.1.3.2 “Variables for Conveyors Which Only the Sample Jobs Use” on page 3-6.</td>
</tr>
<tr>
<td>RECEIVE_OPE_INF</td>
<td>After you [ADD] or [DELETE] a program in Operation window of MOTOPAL, MOTOPAL sets the operation information to the variables explained in Section 3.1.2.1 “Variables for Operation Which MOTOPAL and the Sample Jobs Use” on page 3-3. And then this job will be executed. This Job sets the proper value to some of the variables explained in Section 3.1.2.2 “Variables for Operation Which Only the Sample Jobs Use” according to the operation information which MOTOPAL sets.</td>
</tr>
<tr>
<td>INIT_STATIONS</td>
<td>This Job clears the number of layers and pieces of stations when the signal &quot;Initialize(Ejection Done) &quot; is turned on.</td>
</tr>
<tr>
<td>CANCEL_WORKING_ST_INIT</td>
<td>This Job cancels clearing the number of layers and pieces even if the signal &quot;Initialize(Ejection Done)&quot; of the station is turned on. This cancellation is done when the signal &quot;Initialize(Ejection Done) &quot; of the station is turned on but it is obvious that a robot place a product to the station after the signal is turned on.</td>
</tr>
<tr>
<td>SWITCH_STATION</td>
<td>This Job is executed after a station is full of products. And this Job switches one operation to another if several operations share same conveyor. Refer to Section 3.3.1 &quot;Switch Station&quot; on page 3-24.</td>
</tr>
<tr>
<td>SET_NEXT_OPE</td>
<td>This job check which operation, conveyor and station are valid and decide the next executing operation after initializing or switching stations.</td>
</tr>
<tr>
<td>RENEW_NEXT_OPE</td>
<td>This job check which operation, conveyor and station are valid and decide the next executing operation.</td>
</tr>
<tr>
<td>RETURN_OPEORG</td>
<td>This Job makes a robot go to operation origin. You need to set cubic interference area around the operation origin to the INTERFERENCE AREA 64.</td>
</tr>
<tr>
<td>GO_TO_WAIT_POS</td>
<td>This Job makes a robot go to waiting position. You need to set cubic interference area around the waiting position to the INTERFERENCE AREA 63.</td>
</tr>
<tr>
<td>CONFIRM</td>
<td>You need to execute this Job after creating a confirmation program. Refer to Section 4.2 “CONVEYOR / STATION POSITION Menu” on page 4-4.</td>
</tr>
</tbody>
</table>

Followings show the job flow from the Master Job.

Refer to Chapter 6 Appendix. 1. Details of Sample Job.
3 Jobs and Ladder Program

3.3 Sample Jobs

MotoPal

Product Master Job

xxxxy Job generated by MotoPal

(xxx: product No., y: CV No., z: ST No.)

SET_NEXT_OPE_JBI

IN#2033=ON CANCEL_WORKING_ST_INIT_JBI

IN#2033=ON INIT_STATIONS_JBI

IN#2034=ON SWITCH_STATION_JBI

GO_TO_WAIT_POS_JBI

END
3.3.1 **Switch Station**

If several operations registered in OPERATION window of MOTOPAL share the same conveyor, the sample Jobs execute those operations one by one, not all at same time. After the pallet of one operation is full, the operation is switched to another as Section 3.3 “Sample Jobs” on page 3-22.

*Fig. 3-2: Switch Operation*
3.3.2 Conditions for Continuous Movement

When you create or modify the Jobs, care about the following conditions. On the following conditions, robot can NOT move continuously and can pause, which can cause slowing down of the cycle time. In other words, if you have to do what is explained in these condition, you should do that when it is acceptable for a robot to pause such as placing a product on a pallet.

The conditions that a robot can NOT move continuously

• If there are TIMER, PWAIT, TSYNC, CLEAR, ADVSTOP or ADVINIT between 2 MOVx instructions, a robot cannot move continuously between the 2 MOVx instructions.

Ex1.

```
MOVx
TIMER T=0.01
MOVx
```

• If you set value to one variable by DIN or GETS, and CALL or JUMP by the variable just after that, a robot cannot move continuously.

Ex2.

```
MOVx
GETS Bxxx $B***
CALL JOB:JOB IF Bxxx=0
MOVx
```

Ex3.

```
MOVx
DIN Bxxx IN#(x)
CALL Bxxx
MOVx
```

• If there are 60 or more instructions other than MOVx instructions between 2 MOVx instructions, a robot can NOT move continuously between the 2 MOVx instructions.

Ex4

```
MOVx
SET Bxxx 0
ADD Bxxx Bxxx
....
SET Bxxx Bxxx
MOVx
```
3.4 Sample Ladder Program

3.4.1 System Ladder Section

REMOTE SELECT
#80011
#70025

I/O PROHIBIT
#70025 #82014
#40057

CMD REMOTE NODE SELECT
#70025 #82015
#40042

PP/PANEL OPERATION PROHIBIT
#70025 #82016
#40056

SEQUENCE WAIT R1-JOB
#70030 #70034 #50080 #50063
#40130

#70031 #50081

#70032 #70036 #50082

#70033 #50083

WAITING UNTIL INTERFERENCE IS OFF
#50080 #40130
#70021

#50081

#50082

#50083

#70021 #50076 #50070

IN CUBE 1
#70034

IN CUBE 2
#70035

IN CUBE 3
#70036

IN CUBE 4
#70037
3.4.2 User Ladder Section

WORK INSTRUCTION CONTINUING PROHIBIT:1

---| ---| ---| 
#70040 | #51532 | #50070 | #70042
---| ---| ---| 
---| ---| ---| 
#70042

EXTERNAL START

#20010 EXTERNAL START

#20102 CALLING MASTER

#2012 RETURN OPERATION ORIGIN

#20201 CALLING MASTER JOB

#20201 CALLING MASTER

#20201 A/E RESET

#20201 ALARM ERROR RESET

#20015 PLAY MODE SELECT

#20015 TEACH MODE SELECT

#20015 INTERFERENCE 1 KEEP OUT

#20015 INTERFERENCE 2 KEEP OUT

#20015 WORK PROHIBITED

#20020 INTERFERENCE 1 KEEP OUT

#20020 INTERFERENCE 2 KEEP OUT

#20020 WORK PROHIBITED

#20020 INTERFERENCE 3 KEEP OUT

#20020 INTERFERENCE 4 KEEP OUT

#20020 INTERFERENCE 3 KEEP OUT

#20020 INTERFERENCE 4 KEEP OUT
3 Jobs and Ladder Program
3.4 Sample Ladder Program

--- | --- | --- | --- | --- | ---
 Phar | 50070 | IN OPERATION
--- | --- | --- | --- | --- | ---
 Phar | 50073 | SERVO POWER ON
--- | --- | --- | --- | --- | ---
 Phar | 50500 | MASTER TOP
--- | --- | --- | --- | --- | ---
 Phar | 70020 | ALARM OCCURRENCE
 Phar | 50014 | ERROR
--- | --- | --- | --- | --- | ---
 Phar | 50015 | STOP E BATTERY ALARM
--- | --- | --- | --- | --- | ---
 Phar | 40057 | CMD REMOTE MODE SELECT
 Phar | 50056 | IN CMD REMOTE
--- | --- | --- | --- | --- | ---
 Phar | 50064 | CMD PLAY MODE SELECT
 Phar | 50065 | IN PLAY MODE
--- | --- | --- | --- | --- | ---
 Phar | 50053 | CMD TEACH MODE SELECT
 Phar | 50017 | IN TEACH MODE
--- | --- | --- | --- | --- | ---
 Phar | 70004 | IN CUBE 1
--- | --- | --- | --- | --- | ---
 Phar | 70006 | IN CUBE 2
--- | --- | --- | --- | --- | ---
 Phar | 70009 | IN CUBE 3
--- | --- | --- | --- | --- | ---
 Phar | 70017 | OPERATION ORIGIN (IN CUBE 64)
 Phar | 50157 | INTERFERENCE 64
--- | --- | --- | --- | --- | ---
 Phar | 70008 | IN CUBE 4
3 Jobs and Ladder Program

3.4 Sample Ladder Program

WORK INSTRUCTION: 1

PRODUCT EXIST (CV1)

PRODUCT EXIST CV1

PRODUCT EXIST (CV2)

PRODUCT EXIST CV2

WORK INSTRUCTION 1

PRODUCT EXIST CV1

DUMMY PRODUCT EXIST CV1

WORK INSTRUCTION 1

PRODUCT EXIST CV2

DUMMY PRODUCT EXIST CV2

PALLET IN PLACE (ST1)

PALLET IN PLACE (ST1: 2ND LAYER)

PALLET IN PLACE (ST1: 3RD LAYER)

PALLET IN PLACE (ST1: WORK PRESENCE SIGNAL)

PALLET IN PLACE (ST2)

PALLET IN PLACE (ST2: 2ND LAYER)

PALLET IN PLACE (ST2: 3RD LAYER)

PALLET IN PLACE (ST2: WORK PRESENCE SIGNAL)

ERROR CV1

ERROR CV2

ERROR CV2
3 Jobs and Ladder Program
3.4 Sample Ladder Program

---

[Diagram of ladder program]

- INITIALIZE ST1
- INITIALIZE ST2
- PRODUCT EXIST CV3
- DUMMY PRODUCT EXIST CV4
- RETURN OF POSITIONING 1 CV1
- ADVANCE OF POSITIONING 1 CV1
- RETURN OF POSITIONING 2 CV1
- ADVANCE OF POSITIONING 2 CV1
3.4 Sample Ladder Program

---
| RETURN OF POSITIONING 1 (CV2) |
| #20066 RETURN OF POSITIONING 1 CV2 |

---
| ADVANCE OF POSITIONING 1 (CV2) |
| #20067 ADVANCE OF POSITIONING 1 CV2 |

---
| CANCEL INITIALIZATION ST3 |
| #20065 INITIALIZE ST4 |

---
| INITIALIZE (EJECTION DONE) (ST3) |
| #70073 #10075 INITIALIZING DONE ST3 |

---
| INITIALIZE ST3 |
| #00074 INITIALIZE ST3 |

---
| CANCEL INITIALIZATION ST4 |
| #20066 INITIALIZE ST4 |

---
| INITIALIZE (EJECTION DONE) (ST4) |
| #70074 #10075 INITIALIZING DONE ST4 |

---
| INITIALIZE ST4 |
| #00075 INITIALIZE ST4 |
3.4 Sample Ladder Program

---

#20130
PALLET 2 ST5

---

#20131
PALLET 3 ST5

---

#20132
PALLET WORK PRESENCE SIGNAL ST5

---

#20133
PALLET 1 ST6

---

#20134
PALLET 2 ST6

---

#20135
PALLET 3 ST6

---

#20136
PALLET WORK PRESENCE SIGNAL ST6

---

#20137
INITIALIZE
ST5

---

#70076
#70076
INITIALIZING DONE ST5

---

#00117
INITIALIZE ST5

---

#20140
INITIALIZE
ST6

---

#20141
ST ERROR (ST5)

---

#20142
ST ERROR (ST6)

---

#20143

---

#20144
3.4 Sample Ladder Program

---
#10010
PICK DONE CV1

---
#10011
PICK DONE CV2

---
#10012
FULL(ST1)  #10036
INITIALIZING DONE ST1

---
#79990
FULL ST1

---
#79990
FULL ST1

---
#10013
#10033

---
#10014
#10034

---
#10015
#10035

---
#10016
FULL(ST2)  #10037
INITIALIZING DONE ST2

---
#79991
FULL ST2

---
#79991
FULL ST2

---
#10017
#10036

---
#10020
#10037

---
#10020
#10038

---
#10020
#10040

---
#10010
#30030
PICK DONE CV1

---
#10011
#30031
PICK DONE CV2

---
#10012
#79990
FULL ST1

---
#79990
FULL ST1

---
#10013
#30032
FULL ST1

---
#10014
#30033

---
#10015
#30034

---
#10016
#79991
FULL ST2

---
#79991
FULL ST2

---
#10017
#30036

---
#10020
#30037

---
#10020
#30040

---
#10010
#30025

---
#10011
#30026

---
#10012
#30027
3 Jobs and Ladder Program

3.4 Sample Ladder Program

```
<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>#10064</td>
<td>#10076</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>FULL ST3</td>
<td>INITIALIZING DONE ST3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>#79992</td>
<td>FULL ST3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>#79992</td>
<td>FULL ST3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>#10068</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>#10066</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>#10067</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>#10070</td>
<td>#10077</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>FULL ST4</td>
<td>INITIALIZING DONE ST4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>#79993</td>
<td>FULL ST4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>#79993</td>
<td>FULL ST4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>#10071</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>#10072</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>#10073</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>#10074</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EJECT PALLET ST3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>#30094</td>
<td>EJECT PALLET ST3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>#10075</td>
<td>#10076</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EJECT PALLET ST4</td>
<td>EJECT PALLET ST4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>#10078</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>#30096</td>
<td>INITIALIZING DONE ST3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>#10077</td>
<td>#10078</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>INITIALIZING DONE ST4</td>
<td>#30097</td>
<td>INITIALIZING DONE ST4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3 Jobs and Ladder Program

3.4 Sample Ladder Program

---
| GRP | #10090 | #30110 |
---

ADVANCE OF POSITIONING 2 (CV5)
#10100
ADVANCE OF POSITIONING 2 (CV5)
#30120

RETURN OF POSITIONING 1 (CV6)
#10101
RETURN OF POSITIONING 1 (CV6)
#30112

ADVANCE OF POSITIONING 1 (CV6)
#10102
ADVANCE OF POSITIONING 1 (CV6)
#30122

RETURN OF POSITIONING 2 (CV6)
#10103
RETURN OF POSITIONING 2 (CV6)
#30123

ADVANCE OF POSITIONING 2 (CV6)
#10104
ADVANCE OF POSITIONING 2 (CV6)
#30124

FORWARD (CV5)
#10105
FORWARD CV5
#30125

FORWARD (CV6)
#10106
FORWARD CV6
#30126

FULL (ST5)
#10107
FULL ST5 1
#10121
INITIALIZING DONE ST5
#79994
FULL ST5

FULL (ST5)
#79994
FULL ST5
#30127
FULL (ST5)

FULL (ST6)
#10110
#30130

FULL (ST6)
#10111
#30131

FULL (ST6)
#10112
#30132

FULL (ST6)
#10113
#10122
FULL ST6 1
INITIALIZING DONE ST6
#79995
FULL ST6

FULL (ST6)
#79995
FULL ST6
#30133
FULL (ST6)

FULL (ST6)
#30134

91/125
3 Jobs and Ladder Program

3.4 Sample Ladder Program

---
#1014
---
#1015
---
#1016
---
EJECT PALLET (ST5)
---
#1017
EJECT PALLET ST5

---
UP
#10120
EJECT
PALLETS
---
#30140
EJECT
PALLETS
---

---
EJECT
PALLET ST5

---
EJECT

---
UP
#12510
---
#32530
---

---
#0010
PRODUCT
EXIST CV1
---
#0022
ERROR CV1
---
#20526
VALID (CV1)
---

---
#0011
PRODUCT
EXIST CV2
---
#0023
ERROR CV2
---
#20527
VALID (CV2)
---

---
#0040
PRODUCT
EXIST CV3
---
#0062
ERROR CV3
---
#20530
VALID (CV3)
---

---
#0041
PRODUCT
EXIST CV4
---
#0063
ERROR CV4
---
#20531
VALID (CV4)
---

---
#0093
PRODUCT
EXIST CV5
---
#0065
ERROR CV5
---
#20532
VALID (CV5)
---

---
#0094
PRODUCT
EXIST CV6
---
#0066
ERROR CV6
---
#20533
VALID (CV6)
---

---
PALLETS VALID (ST1)
---
---
PALLETS VALID (ST2)
---
---
PALLETS VALID (ST3)
---
---

---
#0002
FULL ST1
#0003
ERROR ST1
---
#20534
VALID (ST1)
---
PALLETS VALID (ST1)
---
---
PALLETS VALID (ST2)
---
---
PALLETS VALID (ST3)
---
---

---
#0036
FULL ST2
#0037
ERROR ST2
---
#20535
VALID (ST2)
---
PALLETS VALID (ST2)
---
---
PALLETS VALID (ST3)
---
---

---
#0038
FULL ST3
#0039
ERROR ST3
---
#20536
VALID (ST3)
---
PALLETS VALID (ST3)
3 Jobs and Ladder Program

3.4 Sample Ladder Program
3 Jobs and Ladder Program

3.4 Sample Ladder Program

```
<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>#10064</td>
<td>#12551</td>
<td>#12536</td>
<td>#00544</td>
</tr>
<tr>
<td>FULL ST3</td>
<td>SWITCH</td>
<td>CANCEL INITIALIZATION ST3</td>
<td>SWITCH (ST3)</td>
</tr>
<tr>
<td>#10074</td>
<td>#10074</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FULL ST3</td>
<td>EJECT</td>
<td>PALLET ST3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#02544</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SWITCH ST3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#30684</td>
<td>#10026</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FULL ST3</td>
<td>EJECT</td>
<td>PALLEST11</td>
<td></td>
</tr>
<tr>
<td>#10027</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#10075</td>
<td>EJECT</td>
<td>PALLET ST4</td>
<td></td>
</tr>
<tr>
<td>#10117</td>
<td>EJECT</td>
<td>PALLET ST5</td>
<td></td>
</tr>
<tr>
<td>#10120</td>
<td>EJECT</td>
<td>PALLET ST6</td>
<td></td>
</tr>
</tbody>
</table>
```
3.4 Sample Ladder Program

3.4 Sample Ladder Program

```
---                      ---                      ---                      ---                      ---                      ---
| A00028                  | A00027                  | A00014                  | A00015                  | A00117                  | A00120                  |
| INITIALIZE             | INITIALIZE             | INITIALIZE             | INITIALIZE             | INITIALIZE             | INITIALIZE             |
| ST1                    | ST2                    | ST3                    | ST4                    | ST5                    | ST6                    |
---                      ---                      ---                      ---                      ---                      ---
| A02543                  | A02544                  | A02545                  | A02546                  | A02547                  |                      |
| SWITCH                  | SWITCH                  | SWITCH                  | SWITCH                  | SWITCH                  |                      |
| ST1                    | ST2                    | ST3                    | ST4                    | ST6                    |                      |
---                      ---                      ---                      ---                      ---                      ---
| A01253                  | A01255                  | A02553                  | A02554                  | A02555                  |                      |
| RETURN OPERATION ORIGIN| CYCLE STOP              | RETURN OPERATION ORIGIN | RETURN OPERATION ORIGIN | RETURN OPERATION ORIGIN |                      |
```

**PALLET INITIALIZATION**

- A00028: INITIALIZE ST1
- A00027: INITIALIZE ST2
- A00014: INITIALIZE ST3
- A00015: INITIALIZE ST4
- A00117: INITIALIZE ST5
- A00120: INITIALIZE ST6

**SWITCH**

- A00120: INITIALIZE ST6
- A02543: SWITCH ST1
- A02544: SWITCH ST2
- A02545: SWITCH ST3
- A02546: SWITCH ST4
- A02547: SWITCH ST6

**CYCLE STOP**

- A01253: RETURN OPERATION ORIGIN
- A01255: RETURN OPERATION ORIGIN DONE
- A02553: RETURN OPERATION ORIGIN

- A02554: RETURN IN OPERATION
- A02555: RETURN OPERATION ORIGIN TIMEOUT

---
### 3.4 Sample Ladder Program

1 CYCLE SELECT

- CYCLE STOP
  - #02553
  - RETURN OPERATION ORIGIN

SAFETY SPEED

- #12554
- SAFETY SPEED

COLLISION DETECTION INVALID

- #12555
- COLLISION SWITCH
- #40061
- COLLISION DETECTION INVALID

SELECT OPERATIONS

- #12557
- SELECT OPERATIONS

- [ ]
- [ ]
- [ ]

- #70017
  - BM0V
  - #82560
  - 254
  - #02570

- #70017
  - BM0V
  - #12570
  - 254
  - #832500

- [ ]
- [ ]
- [ ]
Before you start to make a program in MOTOPAL, you need to register the necessary positions by the menus in SETTING window of MOTOPAL. In SETTING window there are 2 menu buttons; One is [REGISTER POSITIONS] button and the another is [CONVEYOR / STATION POSITION] button. These menu buttons can be enabled by S2C670.

- S2C670
  0 : Disable the menu buttons in SETTING window.
  1 : Enable the menu buttons in SETTING window.

Fig. 4-1: SETTING Window
4.1 REGISTER POSITIONs Menu

4.1.1 How to Register the Positions

1. Press [REGISTER POSITIONs] button in SETTING window. And REGISTER POSITIONs window appears.

   ![REGISTER POSITIONs Window](image)

   - [Position]
     You can select positions listed in Table 4-1 Positions to Be Registered in REGISTER POSITIONs Window

<table>
<thead>
<tr>
<th>Position</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation Origin</td>
<td>Operation Origin for a robot. When you register this position, the position data is written into position variable P001. And the sample Job &quot;RETURN_OPEORG&quot; uses P001 to make a robot return to the operation origin.</td>
</tr>
<tr>
<td>Waiting Pos over CVs</td>
<td>Waiting position for a robot when any products is not ready on any conveyors. When you register this position, the position data is written into position variable P002. And the sample Job &quot;GO_TO_WAIT_POS&quot; uses P002 to make a robot go to the waiting position.</td>
</tr>
<tr>
<td>Std Height over CVs</td>
<td>The height when a robot approach to a conveyor and get way from a conveyor. Only the height data is used and this height data is common for all conveyors. This height data are used for MOTOPAL to create a Job. Refer to Section 2.4.4.1 &quot;P1 (Conveyor Approach Position)&quot; on page 2-25 and Section 2.4.4.7 &quot;P7 (Conveyor Get Away Position)&quot; on page 2-28.</td>
</tr>
<tr>
<td>Std Height over Sts</td>
<td>The height when a robot approach to a station and get way from a station. Only the height data is used and this height data is common for all stations. This height data are used for MOTOPAL to create a Job. Refer to Section 2.4.7.1 &quot;P1 (Station Approach Position)&quot; on page 2-33 and Section 2.4.7.7 &quot;P7 (Station Get Away Position)&quot; on page 2-39.</td>
</tr>
</tbody>
</table>
4.1 REGISTER POSITIONs Menu

Table 4-1: Positions to Be Registered in REGISTER POSITIONS Window

<table>
<thead>
<tr>
<th>Position</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Swing Height</td>
<td>The height at which a robot can swing without any interference with other equipment. This height must be higher than the maximum height of the palletized products on a pallet. Only the height data is used. This position data are used for MOTOPAL to create a Job. Refer to Section 2.4.4.1 &quot;P1 (Conveyor Approach Position)&quot;, Section 2.4.4.7 &quot;P7 (Conveyor Get Away Position)&quot;, Section 2.4.7.1 &quot;P1 (Station Approach Position)&quot; and Section 2.4.7.7 &quot;P7 (Station Get Away Position)&quot;. And also when you register this position, the position data is written into position variable P000 if the selected position has been already registered. You can confirm the registered position by moving a robot to P000.</td>
</tr>
</tbody>
</table>

- [Status]  
  Whether the selected position in [Position] has been registered or not is shown.

- [REGISTER] button  
  By pressing this button, the current position of a robot is registered as the selected position in [Position].

- [TO DX200 WINDOW] button  
  Pressing this button changes the window to DX200 standard window. And also by pressing this button, the position data of the selected position in [Position] is written into position variable P000 if the selected position has been already registered. You can confirm the registered position by moving a robot to P000.

- [CLOSE] button  
  Pressing this button closes REGISTER POSITIONS window.

2. Select the position which you want to register in [Position].
3. Move the robot to the suitable position.
5. Repeat 2. to 4. until all positions are registered.

Register the operation origin, and then set the cubic interference area around the operation origin to the INTERFERENCE AREA 64.

Register the waiting position over the conveyors, and then set the cubic interference area around the waiting position over the conveyors to the INTERFERENCE AREA 63. Regarding the detail of setting the cubic interference area, refer to DX200 INSTRUCTIONS (Part No. 165292-1CD).
4.2 CONVEYOR / STATION POSITION Menu

In CONVEYOR / STATION POSITION menu you need to register the positions of conveyors and stations by using a teaching product and a teaching pallet.


   ![Teaching Product Window]

   - [Teaching Product Size]
     The size of the product which you use to teach the positions of conveyors and stations.
   - [From the robot’s flange to the bottom (D)]
     The distance from the robot’s flange to the bottom of the teaching product.
   - [CLOSE] button
     Pressing this button closes CONVEYOR/STATION POSITION window.

2. Set the data to [Length(L)], [Width(W)], [Height(H)], [From the robot’s flange to the bottom(D)]. You need to input only positive integer.

   ![NOTE]
   If you input the value which is out of the range, the message which indicate it appears when you try to change the window.

   ![NOTE]
   Input only positive integer. If you input decimal data, the following message appears when you try to change the window. In this case the input data are not properly reflected.

- [Conveyor]
  You can select the conveyor from the list.

- [Position]
  You can select positions listed in Table 4-2 Positions to Be Registered in CONVEYOR POSITION Window

Table 4-2: Positions to Be Registered in CONVEYOR POSITION Window

<table>
<thead>
<tr>
<th>Position</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Pick</td>
<td>The Position which is normally used to pick a product on a conveyor.</td>
</tr>
</tbody>
</table>
| CV Upstream       | The position of the upstream of a conveyor. When you register this position, follow the procedure below.  
  1. Pick a product at Normal Pick position 
  2. Move a robot to the upstream of a conveyor. 
  At this time, don't change the orientation of a product. 
  3. Register this position. 
  It is better that the position is as far from Normal Pick as possible. |
| Reverse Pick      | The position to pick a product on a conveyor with the hand reversed from "Normal Pick". 
  If you set 0 to ReversePic in BasicParam.ini, this position cannot be selected 
  (Refer to Section 2.3.1 “Setup of BasicParam.ini” on page 2-12). |

- [Status]
  Whether the selected position in [Position] has been registered or not is shown.

- [REGISTER] button
  By pressing this button, the current position of a robot is registered as the selected position in [Position].
4.2 CONVEYOR / STATION POSITION Menu

– [TO DX200 WINDOW] button
Pressing this button changes the window to DX200 standard window. And also by pressing this button, the position data of the selected position in [Position] is written into position variable P000 if the selected position has been already registered. You can confirm the registered position by moving a robot to P000.

– [CLOSE] button
Pressing this button closes CONVEYOR/STATION POSITION window.

4. Select the conveyor in [Conveyor].
5. Select the position in [Position].
6. Move the robot to the suitable position.
8. Repeat 4. to 7. until all positions are registered.

– [Position]
You can select positions listed in Table 4-3 Positions to be Registered in GRAB POSITION Window on page 4-7.
4.2 CONVEYOR / STATION POSITION Menu

Table 4-3: Positions to be Registered in GRAB POSITION Window

<table>
<thead>
<tr>
<th>Position</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 (CV1 Nor.Pick)</td>
<td>The position where a robot places the teaching product at reference place after picking the teaching product at Normal Pick position from conveyor 1. As the reference place you need to select the place where you can repeatedly move a robot to place a product at the same position such as a corner of a pallet. When you register this position, follow the procedure below. 1. Pick a product at Normal Pick position from conveyor 1. 2. Move a robot to the reference place. 3. Register this position.</td>
</tr>
<tr>
<td>P1 Inverse</td>
<td>The position where the position of the teaching product is exactly same as &quot;P1 (CV1 Nor.Pick)&quot; except for the orientation of the teaching product. The orientation of the teaching product and the hand is reversed from &quot;P1 (CV1 Nor.Pick)&quot;. When you register this position, follow the procedure below. 1. Register &quot;P1 (CV1 Nor.Pick)&quot;. At this time keep holding a teaching product. Don’t release it. 2. Reverse the product orientation. 3. Move a robot to the reference place. 4. Register this position.</td>
</tr>
<tr>
<td>P2 (CV1 Rev.Pick)</td>
<td>The position where a robot places the teaching product at reference place after picking the teaching product at Reverse Pick position from conveyor 1. When you register this position, follow the procedure below. 1. Pick a product at Reverse Pick position from conveyor 1. 2. Move a robot to the reference places. 3. Register this position.</td>
</tr>
<tr>
<td>P2 Inverse</td>
<td>The position where the position of the teaching product is exactly same as &quot;P2 (CV1 Rev.Pick)&quot; except for the orientation of the teaching product. The orientation of the teaching product and the hand is reversed from &quot;P2 (CV1 Rev.Pick)&quot;. When you register this position, follow the procedure below. 1. Register &quot;P2 (CV1 Rev.Pick)&quot;. At this time keep holding a teaching product. Don’t release it. 2. Reverse the product orientation. 3. Move a robot to the reference place. 4. Register this position.</td>
</tr>
</tbody>
</table>

- **[Status]**
  Whether the selected position in [Position] has been registered or not is shown.

- **[REGISTER] button**
  By pressing this button, the current position of a robot is registered as the selected position in [Position].

- **[TO DX200 WINDOW] button**
  Pressing this button changes the window to DX200 standard window. And also by pressing this button, the position data of the selected position in [Position] is written into position variable P000 if the selected position has been already registered. You can confirm the registered position by moving a robot to P000.

- **[CLOSE] button**
  Pressing this button closes CONVEYOR/STATION POSITION window.
10. Select the position in [Position].
11. Move the robot to the suitable position.
13. Repeat 10. to 12. until all positions are registered.

- [Teaching Pallet Size]
The size of the pallet which you use to teach the positions of stations.

- [CLOSE] button
Pressing this button closes CONVEYOR/STATION POSITION window.

15. Set the data to [Length(L)], [Width(W)], [Height(H)]. You need to input only positive integer.

NOTE
If you input the value which is out of the range, the message which indicates it appears when you try to change the window.

NOTE
Input only positive integer. If you input decimal data, the following message appears when you try to change the window. In this case the input data are not properly reflected.

- [Station]
  You can select the station from the list.

- [Position]
  You can select positions listed in Table 4-4 Positions to Be Registered in STATION POSITION Window.

### Table 4-4: Positions to Be Registered in STATION POSITION Window

<table>
<thead>
<tr>
<th>Position</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>NearLeft (CV1 Nor.Pick)</td>
<td>The position where a robot places the teaching product at near left corner of the teaching pallet in view of a robot after picking the teaching product at Normal Pick position from conveyor 1. When you register this position, follow the procedure below. 1. Pick a product at Normal Pick position from conveyor 1. 2. Move a robot to the near left corner of the teaching pallet. 3. Register this position.</td>
</tr>
<tr>
<td>FarLeft (CV1 Nor.Pick)</td>
<td>The position where a robot places the teaching product at far left corner of the teaching pallet in view of a robot. When you register this position, follow the procedure below. 1. Register “NearLeft (CV1 Nor.Pick)”. At this time keep holding a teaching product. Don’t release it. 2. Move a robot to the far left corner of the teaching pallet. 3. Register this position.</td>
</tr>
</tbody>
</table>

- [Status]
  Whether the selected position in [Position] has been registered or not is shown.
4.2 CONVEYOR / STATION POSITION Menu

- [REGISTER] button
  By pressing this button, the current position of a robot is registered as the selected position in [Position].

- [TO DX200 WINDOW] button
  Pressing this button changes the window to DX200 standard window. And also by pressing this button, the position data of the selected position in [Position] is written into position variable P000 if the selected position has been already registered. You can confirm the registered position by moving a robot to P000.

- [CLOSE] button
  Pressing this button closes CONVEYOR/STATION POSITION window.

17. Select the station in [Station]
18. Select the position in [Position].
19. Move the robot to the suitable position.
21. Repeat 17. to 20. until all positions are registered.

- [Pick Type]
  You can select "Normal" or "Reverse" which you want to adopt for the confirmation program.

- [Conveyor]
  You can select the conveyor which you want to adopt for the confirmation program.

- [Station]
  You can select the station which you want to adopt for the confirmation program.

- [CREATE CONFIRMATION PROGRAM] button
  By pressing this button, MOTOPAL creates the confirmation program that a robot pick a teaching product by the selected "Pick Type" from the selected conveyor and place a teaching product to the selected station. And you can run the program by executing the
sample Job "CONFIRM" in test operation. When you press this button, the Jobs explained in Section 2.4.1 “Created Jobs” on page 2-22 are created by MOTOPAL. The names of the Jobs are decided according to the following product number, conveyor number and station number.

- Product number (MOTOPAL sets this number to 1000)
  When Pick Type is "Normal": 999
  When Pick Type is "Reverse": 998

- Conveyor number (MOTOPAL sets this number to B006)
The number of the selected conveyor

- Station number (MOTOPAL sets this number to B007)
The number of the selected station

The sample Job "CONFIRM" call the created Jobs. By executing "CONFIRM" Job, a robot place teaching products in 2 layers with only one teaching product to each layer. The orientation of the teaching product in 2nd layer is reversed from the one in 1st layer.

- [Position Error]
  After executing the confirmation program, you need to input the position difference between the teaching product in 1st layer and the one in 2nd layer. You can input decimal data also.

- [MODIFY] button
  By pressing this button, MOTOPAL modifies the internal data according to the data in [Position Error] so that the position error disappears. This operation enable a robot to place products neatly on a pallet.

- [TO DX200 WINDOW] button
  By pressing this button, you can go to DX200 window where you can execute the sample Job "CONFIRM".

- [CLOSE] button
  Pressing this button closes CONVEYOR/STATION POSITION window.

23. Select the pick type in [Pick Type].
24. Select the conveyor in [Conveyor].
25. Select the station in [Station].
26. Create the confirmation program by pressing [CREATE CONFIRMATION PROGRAM].
27. Go to DX200 window and Execute the Job "CONFIRM" in test operation.
28. Input the position difference between the teaching product in 1st layer and the one in 2nd layer if there is any difference.
30. Repeat 26. to 29. until the position difference disappears.
31. Repeat 23. to 30. until the confirmation programs of all combination of Pick Type and Conveyor are confirmed. You don’t need to try all combination including stations, but you should create at least one confirmation program of each station to confirm the station position.
4  SETTING Menu of MOTOPAL
4.3  Tool File and User Coordinate File

See Table 4-5 Combination to Be Confirmed (Example) (In Case that the Number of Conveyors and Stations is 3.)

Table 4-5: Combination to Be Confirmed (Example)
(In Case that the Number of Conveyors and Stations is 3.)

<table>
<thead>
<tr>
<th>Pick Type</th>
<th>Conveyor</th>
<th>Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal 1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Reverse 1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Normal 2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Reverse 2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Normal 3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Reverse 3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

32. Press [CLOSE] button.

4.3  Tool File and User Coordinate File

After CONVEYOR/STATION POSITION menu is completed, MOTOPAL sets files in DX200 listed in Table 4-6 Files MOTOPAL Set.

Table 4-6: Files MOTOPAL Set

<table>
<thead>
<tr>
<th>File type and number</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool file #0</td>
<td>Tool data setting only for the hand.</td>
</tr>
<tr>
<td>Tool file #1</td>
<td>Tool data setting for the hand grabbing a product.</td>
</tr>
<tr>
<td>User coordinate file #1</td>
<td>User coordinate of CV1.</td>
</tr>
<tr>
<td>User coordinate file #2</td>
<td>User coordinate of CV2.</td>
</tr>
<tr>
<td>User coordinate file #3</td>
<td>User coordinate of CV3.</td>
</tr>
<tr>
<td>User coordinate file #4</td>
<td>User coordinate of CV4.</td>
</tr>
<tr>
<td>User coordinate file #5</td>
<td>User coordinate of CV5.</td>
</tr>
<tr>
<td>User coordinate file #6</td>
<td>User coordinate of CV6.</td>
</tr>
<tr>
<td>User coordinate file #11</td>
<td>User coordinate of ST1.</td>
</tr>
<tr>
<td>User coordinate file #12</td>
<td>User coordinate of ST2.</td>
</tr>
<tr>
<td>User coordinate file #13</td>
<td>User coordinate of ST3.</td>
</tr>
<tr>
<td>User coordinate file #14</td>
<td>User coordinate of ST4.</td>
</tr>
<tr>
<td>User coordinate file #15</td>
<td>User coordinate of ST5.</td>
</tr>
<tr>
<td>User coordinate file #16</td>
<td>User coordinate of ST6.</td>
</tr>
</tbody>
</table>

4.4  Backup

Make a backup of the data in the CompactFlash card for MOTOPAL after you complete setting menu of MOTOPAL because MOTOPAL stores the setting data into the CompactFlash card.
5  The Start Up Way

By S2C669 you can add the start up way of MOTOPAL.

- S2C669
  D0 bit : Enable the one touch start up button.
  D1 bit : Enable the automatic start up.

If you enable the one touch start up button, the button to start up MOTOPAL appears at the lower right corner of DX200 window.

If you enable the automatic start up, MOTOPAL automatically starts up after switching on DX200.

Refer also to DX200 OPTIONS INSTRUCTIONS FOR MOTOPAL OPERATION regarding the start up way.
6 Appendix. 1. Details of Sample Job

6.1 MASTER.JBI

```
//JOB  
//NAME MASTER  
//POS  
//NPOS 0,0,0,0,0,0  
//ALIAS  
//IN 5  
2033 Stinit  
2034 Switch  
2035 InCycleStop  
2036 InReturnOpeOrg  
2040 InSelectOpe  
//OT 1  
2035 OutCycleStop  
//GVARS 1,0,0,0,1,0,0,0  
B010 ValidOpeExist  
S000 JobName  
//INST  
//DATE 2012/02/20 00:00  
//COMM V1.10-00.D00  
//ATTR SC,RW  
//GROUP1 RB1  
//LVARS 0,0,0,0,0,0,0,0  
NOP  
CALL JOB:INIT_VAR  
JUMP *ClearVar IF IN#(InReturnOpeOrg)=OFF  
CALL JOB:RETURN_OPEORG  
JUMP *End  
*ClearVar  
SET ValidOpeExist 0  
*Top  
CALL JOB:RECEIVE_OPE_INF IF IN#(InSelectOpe)=ON  
CALL JOB:INIT_STATIONS IF IN#(Stinit)=ON  
CALL JOB:SWITCH_STATION IF IN#(Switch)=ON  
CALL JOB:RENEW_NEXT_OPE IF ValidOpeExist=0  
JUMP *ExeJob IF ValidOpeExist=1  
CALL JOB:GO_TO_WAIT_POS  
JUMP *ChkCS  
*ExeJob  
*Execute Product Master Job  
CALL JobName  
*ChkCS  
JUMP *Top IF IN#(InCycleStop)=OFF  
CALL JOB:GO_TO_WAIT_POS  
DOUT OT#(OutCycleStop) OFF  
*End  
END
```
6.2 INIT_VAR.JBI

//JOB
//NAME INIT_VAR
//POS
//NPOS 0.0,0.0,0.0
//ALIAS
//GVARS 3,54,0.0,0.0,0.0,0.0
B001 Opelinfo
B002 CvNum
B003 StNum
I080 CvValidNo_Cv1
I092 PickDoneNo_Cv1
I090 CvValidNo_Cv2
I092 PickDoneNo_Cv2
I100 CvValidNo_Cv3
I102 PickDoneNo_Cv3
I110 CvValidNo_Cv4
I112 PickDoneNo_Cv4
I120 CvValidNo_Cv5
I122 PickDoneNo_Cv5
I130 CvValidNo_Cv6
I132 PickDoneNo_Cv6
I140 StValdNo_St1
I141 InitNo_St1
I142 SwitchNo_St1
I143 FullNo_St1
I144 EjectNo_St1
I145 InitDoneNo_St1
I146 CancelInitNo_St1
I150 StValdNo_St2
I151 InitNo_St2
I152 SwitchNo_St2
I153 FullNo_St2
I154 EjectNo_St2
I155 InitDoneNo_St2
I156 CancelInitNo_St2
I160 StValdNo_St3
I161 InitNo_St3
I162 SwitchNo_St3
I163 FullNo_St3
I164 EjectNo_St3
I165 InitDoneNo_St3
I166 CancelInitNo_St3
I170 StValdNo_St4
I171 InitNo_St4
I172 SwitchNo_St4
I173 FullNo_St4
I174 EjectNo_St4
I175 InitDoneNo_St4
I176 CancelInitNo_St4
I180 StValdNo_St5
I181 InitNo_St5
I182 SwitchNo_St5
I183 FullNo_St5
I184 EjectNo_St5
I185 InitDoneNo_St5
I186 CancelInitNo_St5
I190 StValdNo_St6
I191 InitNo_St6
I192 SwitchNo_St6
I193 FullNo_St6
I194 EjectNo_St6
I195 InitDoneNo_St6
I196 CancelInitNo_St6
//INST
//DATE 2012/02/20 00:00
//COMM V1.10-00.D00
//ATTR SC,RW
//GROUP1 RB1
//LVA

NOP
SET Opelinfo 0
SET CvNum 6
SET StNum 6
SET CvValidNo_Cv1 2015
SET CvValidNo_Cv2 2016
SET CvValidNo_Cv3 2017
SET CvValidNo_Cv4 2018
SET CvValidNo_Cv5 2019
SET CvValidNo_Cv6 2020
SET PickDoneNo_Cv1 1
SET PickDoneNo_Cv2 2
SET PickDoneNo_Cv3 25
SET PickDoneNo_Cv4 26
SET PickDoneNo_Cv5 68
SET PickDoneNo_Cv6 69
SET StValdNo_St1 2021
SET StValdNo_St2 2022
SET StValdNo_St3 2023
SET StValdNo_St4 2024
SET StValdNo_St5 2025
SET StValdNo_St6 2026
SET InitNo_St1 15
SET InitNo_St2 16
SET InitNo_St3 53
SET InitNo_St4 54
SET InitNo_St5 88
SET InitNo_St6 89
SET SwitchNo_St1 2027
SET SwitchNo_St2 2028
SET SwitchNo_St3 2029
SET SwitchNo_St4 2030
SET SwitchNo_St5 2031
SET SwitchNo_St6 2032
SET FullNo_St1 3
SET FullNo_St2 7
SET FullNo_St3 45
SET FullNo_St4 49
SET FullNo_St5 80
SET FullNo_St6 84
SET EjectNo_St1 15
SET EjectNo_St2 16
SET EjectNo_St3 53
SET EjectNo_St4 54
SET EjectNo_St5 88
SET EjectNo_St6 89
SET InitDoneNo_St1 23
SET InitDoneNo_St2 24
SET InitDoneNo_St3 55
SET InitDoneNo_St4 56
SET InitDoneNo_St5 90
SET InitDoneNo_St6 91
SET CancelInitNo_St1 2021
SET CancelInitNo_St2 2022
SET CancelInitNo_St3 2023
SET CancelInitNo_St4 2024
SET CancelInitNo_St5 2025
SET CancelInitNo_St6 2026
END
### 6.3 CLEAR_OPE_TABLE.JBI

```
//JOB
//NAME CLEAR_OPE_TABLE
//POS
///NPOS 0,0,0,0,0,0
///ALIAS
///LVARS 1,3,0,0,0,0,0,0
LB000 OpeCnt
LI000 OpeClearBTblTop
LI001 OpeClearITblTop
LI002 OpeClearSTblTop
//INST
///DATE 2012/02/20 00:00
///COMM V1.10-00.D00
///ATTR SC,RW
///GROUP1 RB1
///LVARS 1,3,0,0,0,0,0,0
NOP
SET OpeCnt 0
*OpeTop
SET OpeClearBTblTop EXPRESS 23 + 10 * OpeCnt
CLEAR B[OpeClearBTblTop] 7
SET OpeClearITblTop EXPRESS 20 + 10 * OpeCnt
CLEAR I[OpeClearITblTop] 10
SET OpeClearSTblTop EXPRESS 10 + 10 * OpeCnt
SET S[OpeClearSTblTop] ""
INC OpeCnt
JUMP *OpeTop IF OpeCnt<6
END
```

### 6.4 CLEAR_CV_TABLE.JBI

```
//JOB
//NAME CLEAR_CV_TABLE
//POS
///NPOS 0,0,0,0,0,0
///ALIAS
///LVARS 0,1,0,0,0,0,0,0
LI000 CvBTableTop
//INST
///DATE 2012/02/20 00:00
///COMM V1.10-00.D00
///ATTR SC,RW
///GROUP1 RB1
///LVARS 0,1,0,0,0,0,0,0
NOP
SET CvBTableTop 80
CLEAR B[CvBTableTop] 60
END
```
6.5 RECEIVE_OPE_INF.JBI

//JOB
//NAME RECEIVE_OPE_INF
//POS //NPOS 0,0,0,0,0
//ALIAS
//OT 1
2040 OutSelectOpe
//GVARS 3,0,0,0,0,0,0,0
B008 OpeNum
B009 CurrentOpeNo
B10 ValidOpeExist
//LVARS 5,17,1,0,1,0,0,0
LB000 OpeNo
LB001 PrdNo
LB002 CvNo
LB003 StNo
LB004 JobNameLen
LI000 OpS_PrdNo
LI001 OpS_CvNo
LI002 OpS_StNo
LI003 OpS_OpeValid
LI004 OpS_CvValidNo
LI005 CvS_CvValidNo
LI006 OpS_StValidNo
LI007 StS_STValidNo
LI008 OpS_SwNo
LI009 StS_SWNo
LI10 OpS_InitNo
LI11 StS_InitNo
LI12 OpS_CancelIntNo
LI13 StS_CancelIntNo
LI14 OpS_JobName
LI15 CvS_OpeNo
LI16 CvS_CvForOpeX
LD000 JobNo
LS000 JName
//INST
//DATE 2012/02/20 00:00
//COMM V1.10-00.D00
//ATTR SC,RW
//GROUP1 RB1
//LVARS 5,17,1,0,1,0,0,0

NOP
SET ValidOpeExist 0
SET CurrentOpeNo 1
CALL JOB:CLEAR_OPE_TABLE
CALL JOB:CLEAR_CV_TABLE
SET OpeNo 1
SET OpeNum 0

"OpeTop"
SET OpS_PrdNo EXPRESS 20 + 10 * ( OpeNo - 1 )
SET PrdNo B[OpS_PrdNo]
SET PrdNo B[OpS_PrdNo]
JUMP *Next IF PrdNo=0
INC OpeNum

"Set value to each I variable.
SET OpS_CvNo EXPRESS 21 + 10 * ( OpeNo - 1 )
SET CvNo B[OpS_CvNo]
SET OpS_SiNo EXPRESS 22 + 10 * ( OpeNo - 1 )
SET SiNo B[OpS_SiNo]
SET OpS_CvValidNo EXPRESS 20 + 10 * ( OpeNo - 1 )
SET CvS_CvValidNo EXPRESS 80 + 10 * ( CvNo - 1 )
SET I[OpS_CvValidNo] [CvS_CvValidNo]
SET OpS_StValidNo EXPRESS 21 + 10 * ( OpeNo - 1 )
SET SiSTValidNo EXPRESS 140 + 10 * ( StNo - 1 )
SET I[OpS_StValidNo] [SiSTValidNo]
SET OpS_SwNo EXPRESS 22 + 10 * ( OpeNo - 1 )
SET SiSWNo EXPRESS 142 + 10 * ( StNo - 1 )
SET I[OpS_SwNo] [SiSWNo]
SET OpS_CvValidNo EXPRESS 23 + 10 * ( OpeNo - 1 )
SET SiSTValidNo EXPRESS 141 + 10 * ( StNo - 1 )
SET I[OpS_CvValidNo] [SiSTValidNo]
SET OpS_CancelIntNo EXPRESS 24 + 10 * ( OpeNo - 1 )
SET SiCancelIntNo EXPRESS 146 + 10 * ( StNo - 1 )
SET I[OpS_CancelIntNo] [SiCancelIntNo]

Generation of Job Name.
SET JobNo EXPRESS PrdNo * 100 + CvNo * 10 + StNo
VAL2STR JName JobNo
LEN JobNameLen JName
JUMP *SetJName IF JobNameLen=5
CATS JName "0" JName
JUMP *SetJName IF JobNameLen=4
CATS JName "0" JName

"SetJName"

Set a value to each B variable.
SET OpS_JobName EXPRESS 10 + 10 * ( OpeNo - 1 )
SET Si[OpS_JobName] JName
SET CvS_CvForOpeX EXPRESS 81 + 10 * ( CvNo - 1 ) + OpeNo - 1
SET B[CvS_CvForOpeX] 1
SET CvS_OpeNo EXPRESS 80 + 10 * ( CvNo - 1 )
JUMP *StValid IF B[CvS_OpeNo]>0
SET OpS_OpeValid EXPRESS 23 + 10 * ( OpeNo - 1 )
SET B[OpS_OpeValid] 1
SET B[CvS_OpeNo] OpeNo

"StValid"

Confirm if the ST of executing operation is valid.
SET OpeNo_Cv B[CvS_OpeNo]
SET OpS_StValidNo EXPRESS 21 + 10 * ( OpeNo_Cv - 1 )
SET StValidNo B[OpS_StValidNo]
JUMP *Next IF (StValidNo)=ON

Change if the ST of executing operation is invalid.
SET OpS_OpeValid EXPRESS 23 + 10 * ( OpeNo - 1 )
SET B[OpS_OpeValid] 1
SET B[CvS_OpeNo] OpeNo

"Next"
INC OpeNo
JUMP *OpeTop IF OpeNo<=6
DOUT OT#(OutSelectOpe) OFF
END
6.6  INIT_STATIONS.JBI

```plaintext
/*JOB
//NAME INIT_STATIONS
//POS
//INPOS 0,0,0,0,0,0
//ALIAS
//GVARS 2,0,0,0,0,0,0,0
B003 StNum
B010 ValidOpeExist
//LVARS 1,5,0,0,0,0,0,0
LB000 StCnt
LI000 StS_LyrNo
LI001 StS_InitNo
LI002 InitNo
LI003 StS_InitDoneNo
LI004 InitDoneNo
//INST
//DATE 2012/02/20 00:00
//COMM V1.10-00.D00
//ATTR SC,RW
//GROUP1 RB1
//LVARS 1,5,0,0,0,0,0,0
NOP
SET ValidOpeExist 0
SET StCnt 0
*Top
SET StS_InitNo EXPRESS 141 + 10 * StCnt
SET InitNo [StS_InitNo]
*Move to the next step if "Initialization of pallet" operation is turned OFF.
JUMP *Next IF IN#(InitNo)=OFF
SET StS_LyrNo EXPRESS 147 + 20 * StCnt
*Initialize "Layer" and "Pieces"
CLEAR B[StS_LyrNo] 2
SET StS_InitDoneNo EXPRESS 145 + 10 * StCnt
SET InitDoneNo [StS_InitDoneNo]
*Output "Initialization of pallet" signal.
PULSE OT#(InitDoneNo) T=0.10
WAIT IN#(InitNo)=OFF
*Next
INC StCnt
JUMP *Top IF StCnt<StNum
END
```

6.7 CANCEL_WORKING_ST_INIT.JBI

```
//JOB
//NAME CANCEL_WORKING_ST_INIT
//POS
///NPOS 0,0,0,0,0
///ALIAS
///GVARS 1,0,0,0,0,0,0,0
B009 CurrentOpeNo
///LVARS 0,4,0,0,0,0,0,0
LI000 OpS_InitNo
LI001 InitNo
LI002 OpS_CancelIntNo
LI003 CancelIntNo
///INST
///DATE 2012/02/20 00:00
///COMM V1.10-00.D00
///ATTR SC,RW
///GROUP1 RB1
///LVARS 0,4,0,0,0,0,0,0
NOP
SET OpS_InitNo EXPRESS 23 + 10 * ( CurrentOpeNo - 1 )
SET InitNo OpS_InitNo
'Complete if "Initialize" signal number is "0".
JUMP *End IF InitNo=0
'Complete if "Initialize" signal is turned OFF.
JUMP *End IF IN#(InitNo)=OFF
SET OpS_CancelIntNo EXPRESS 24 + 10 * ( CurrentOpeNo - 1 )
SET CancelIntNo OpS_CancelIntNo
'Output "Cancel Initialization" signal
PULSE OT#(CancelIntNo) T=0.10
WAIT IN#(InitNo)=OFF
'End
END
```
6.8 SWITCH_STATION.JBI

```
/JOB
//INAME SWITCH_STATION
//POS
//NPOS 0,0,0,0,0,0
//ALIAS
//OT 1
2034 SwitchDone
//GVARS 3,0,0,0,0,0,0
B002 CvNum
B003 StNum
B10 ValidOpExist
//LVARS 4,6,0,0,0,0,0
LB000 CvCnt
LB001 OpeNo
LB002 OpeCnt
LB003 StCnt
LI000 OpS_OpeNo
LI001 OpS_SWNo
LI002 SWNo
LI003 CvS_OpeNo
LI004 CvS_CvForOpeX
LI005 STS_SWN
//INST
//DATE 2012/02/20 00:00
//COMM V1.10-00.D00
//ATTR SC,RW
//GROUP1 RB1
//LVARS 4,6,0,0,1,0,0,0
NOP
SET ValidOpExist 0
SET CvCnt 0
*CvTop
  lSet operation number to active operation.
  SET CvS_OpeNo EXPRESS 80 + 10 * CvCnt
  SET OpeNo B[CvS_OpeNo]
  JUMP *NextCv IF OpeNo=0
  SET OpS_SWN EXPRESS 22 + 10 * ( OpeNo - 1 )
  SET SWNo [OpS_SWN]
  lMove to next conveyor if switch signal is turned OFF.
  JUMP *NextCv IF IN#(SWNo)=OFF
  SET OpS_OpeValid EXPRESS 23 + 10 * ( OpeNo - 1 )
  lInvalid active operation.
  SET B[OpS_OpeValid]=0
  SET CvS_CvForOpeX EXPRESS 81 + 10 * CvCnt + OpeNo - 1
  SET OpeCnt 0
  *OpeTop
  INC OpeCnt
  JUMP *SetOpeVl IF OpeCnt>=B008
  INC OpeNo
  INC CvS_CvForOpeX
  JUMP *ChkCvOpe IF OpeNo<=B008
  SET OpeNo 1
  SET CvS_CvForOpeX EXPRESS 81 + 10 * CvCnt
  *ChkCvOpe
  JUMP *SetOpeVl IF B[CvS_CvForOpeX]=0
  SET B[CvS_OpeNo]=OpeNo
  *SetOpeVl
  INC CvCnt
  JUMP *CvTop IF CvCnt<CvNum
  PULSE OT#(SwitchDone) T=0.10
  SET StCnt 0
  *StTop
  SET STS_SWN EXPRESS 142 + 10 * StCnt
  SET SWNo [STS_SWN]
  WAIT IN#(SWNo)=OFF
  INC StCnt
  JUMP *StTop IF StCnt<StNum
END
```
Appendix. 1. Details of Sample Job

6.9 SET_NEXT_OPE.JBI

```
//JOB
//NAME SET_NEXT_OPE
//POS
//NPOS 0,0,0,0,0,0
//ALIAS
//IN 2
//VARS 2033 StInit
2034 Switch
//VARS 21,0,0,0,1,0,0,0
B008 OpeNum
B009 CurrentOpeNo
B010 ValidOpeExist
B147 LyrNo_St1
B148 Pcs_St1
B149 Pallet_Num1
B167 LyrNo_St2
B168 Pcs_St2
B169 Pallet_Num2
B187 LyrNo_St3
B188 Pcs_St3
B189 Pallet_Num3
B207 LyrNo_St4
B208 Pcs_St4
B209 Pallet_Num4
B227 LyrNo_St5
B228 Pcs_St5
B229 Pallet_Num5
B247 LyrNo_St6
B248 Pcs_St6
B249 Pallet_Num6
S000 JobName
//LVARS 2,8,0,0,0,0,0,0
LB000 OpeCnt
LI000 OpS_OpeValid
LI001 OpS_CvValdNo
LI002 CvValdNo
LI003 OpS_StValdNo
LI004 StValdNo
LI005 OpS_JobName
LI006 OpS_StNo
LI007 OpS_PltNo
//DATE 2012/02/20 00:00
//COMM V1.10-00.D00
//ATTR SC,RW
//GROUP1 RB1
//LVARS 2,8,0,0,0,0,0,0
NOP
CALL JOB:CANCEL_WORKING_ST_INIT IF IN#(StInit)=ON
CALL JOB:INIT_STATIONS IF IN#(StInit)=ON
SET ValidOpeExist 0
INC CurrentOpeNo
JUMP *InitCnt IF CurrentOpeNo<=OpeNum

*OpTop
SET OpeCnt 0
SET OpeTop EXP 23 + 10 * (CurrentOpeNo - 1)
JUMP *NextOpe IF B[OpS_OpeValid]=0
SET OpS_CvValdNo EXP 20 + 10 * (CurrentOpeNo - 1)
SET CvValdNo [OpS_CvValdNo] OFF
JUMP *NextOpe IF IN#(CvValdNo)=OFF
SET OpS_StValdNo EXP 21 + 10 * (CurrentOpeNo - 1)
SET StValdNo [OpS_StValdNo] OFF
JUMP *NextOpe IF IN#(StValdNo)=OFF
SET OpS_PltNo EXP 149 + 20 * (StNo - 1)
```

Determine Station
JUMP *Judge1 IF StNo=1
JUMP *Judge2 IF StNo=2
JUMP *Judge3 IF StNo=3
JUMP *Judge4 IF StNo=4
JUMP *Judge5 IF StNo=5
JUMP *Judge6 IF StNo=6

Station 1
*Judge1
JUMP *Error IF IN#(3)=OFF
JUMP *JobB1 IF LyrNo_St1>0
JUMP *JobB1 IF Pcs_St1>0

Determine number of pallet Num. by IO
JUMP *JobSel4 IF IN#(6)=ON
JUMP *JobSel3 IF IN#(5)=ON
JUMP *JobSel2 IF IN#(4)=ON
JUMP *JobSel1

*JobB1
Determine number of pallet Num. by B variable
JUMP *JobSel4 IF Pallet_Num1>3
JUMP *JobSel3 IF Pallet_Num1=3
JUMP *JobSel2 IF Pallet_Num1=2
JUMP *JobSel1

Determine number of pallet Num. by IO
JUMP *JobSel4 IF IN#(10)=ON
JUMP *JobSel3 IF IN#(9)=ON
JUMP *JobSel2 IF IN#(8)=ON
JUMP *JobSel1

*JobB2

Determine number of pallet Num. by IO
JUMP *JobSel4 IF Pallet_Num2>3
JUMP *JobSel3 IF Pallet_Num2=3
JUMP *JobSel2 IF Pallet_Num2=2
JUMP *JobSel1

*Error Station 2
*Judge2
JUMP *Error IF IN#(7)=OFF
JUMP *JobB2 IF LyrNo_St2>0
JUMP *JobB2 IF Pcs_St2>0

Determine number of pallet Num. by B variable
JUMP *JobSel4 IF Pallet_Num3>3
JUMP *JobSel3 IF Pallet_Num3=3
JUMP *JobSel2 IF Pallet_Num3=2
JUMP *JobSel1

*Error Station 3
*Judge3
JUMP *Error IF IN#(45)=OFF
JUMP *JobB3 IF LyrNo_St3>0
JUMP *JobB3 IF Pcs_St3>0

Determine number of pallet Num. by IO
JUMP *JobSel4 IF IN#(48)=ON
JUMP *JobSel3 IF IN#(47)=ON
JUMP *JobSel2 IF IN#(46)=ON
JUMP *JobSel1

*JobB4

Determine number of pallet Num. by B variable
JUMP *JobSel4 IF Pallet_Num4>3
JUMP *JobSel3 IF Pallet_Num4=3
JUMP *JobSel2 IF Pallet_Num4=2
JUMP *JobSel1

*Error Station 4
*Judge4
JUMP *Error IF IN#(49)=OFF
JUMP *JobB4 IF LyrNo_St4>0
JUMP *JobB4 IF Pcs_St4>0

Determine number of pallet Num. by IO
JUMP *JobSel4 IF IN#(52)=ON
JUMP *JobSel3 IF IN#(51)=ON
JUMP *JobSel2 IF IN#(50)=ON
JUMP *JobSel1

*JobB5

Determine number of pallet Num. by B variable
Appendix 1. Details of Sample Job

6.9 SET_NEXT_OPE.JBI

```
*JobB4
'Determine number of pallet Num. by B variable
JUMP *JobSel4 IF Pallet_Num4>3
JUMP *JobSel3 IF Pallet_Num4=3
JUMP *JobSel2 IF Pallet_Num4=2
JUMP *JobSel1 IF Pallet_Num4=1
JUMP *Error
'Station 5
*Judge5
JUMP *Error IF IN#(80)=OFF
JUMP *JobB5 IF LyrNo_St5>0
JUMP *JobB5 IF Pcs_St5>0
'Determine number of pallet Num. by IO
JUMP *JobSel4 IF IN#(83)=ON
JUMP *JobSel3 IF IN#(82)=ON
JUMP *JobSel2 IF IN#(81)=ON
JUMP *JobSel1
*JobB5
'Determine number of pallet Num. by B variable
JUMP *JobSel4 IF Pallet_Num5>3
JUMP *JobSel3 IF Pallet_Num5=3
JUMP *JobSel2 IF Pallet_Num5=2
JUMP *JobSel1 IF Pallet_Num5=1
JUMP *Error
'Station 6
*Judge6
JUMP *Error IF IN#(84)=OFF
JUMP *JobB6 IF LyrNo_St6>0
JUMP *JobB6 IF Pcs_St6>0
'Determine number of pallet Num. by IO
JUMP *JobSel4 IF IN#(87)=ON
JUMP *JobSel3 IF IN#(86)=ON
JUMP *JobSel2 IF IN#(85)=ON
JUMP *JobSel1
*JobB6
'Determine number of pallet Num. by B variable
JUMP *JobSel4 IF Pallet_Num6>3
JUMP *JobSel3 IF Pallet_Num6=3
JUMP *JobSel2 IF Pallet_Num6=2
JUMP *JobSel1 IF Pallet_Num6=1
JUMP *Error
*JobSel4
'Exceeded pallet number error
SETUALM 8900 "PALLET_IO_ERROR" 0 SMODE=0
TIMER T=1.00
*JobSel3
'3 pallets
SET B[OpS_PltNo] 3
CAT$ JobName JobName "3"
JUMP *SetEnd
*JobSel2
'2 pallets
SET B[OpS_PltNo] 2
CAT$ JobName JobName "2"
JUMP *SetEnd
*JobSel1
'1 pallet
SET B[OpS_PltNo] 1
JUMP *SetEnd
*Error
'0 pallet error
SET B[OpS_PltNo] 0
SETUALM 8901 "NO_PALLET_ERROR" 0 SMODE=0
TIMER T=1.00
*SetEnd
```


6.10 RENEW_NEXT_OPE.JBI

/JOB
/NAME RENEW_NEXT_OPE
/IPRS
///INPOS 0,0,0,0,0,0
///ALIAS
///GVARS 21,0,0,0,1,0,0,0
B008 OpeNum
B009 CurrentOpeNo
B010 ValidOpeExist
B147 LyrNo_St1
B148 Pcs_St1
B149 Pallet_Num1
B167 LyrNo_St2
B168 Pcs_St2
B169 Pallet_Num2
B187 LyrNo_St3
B188 Pcs_St3
B189 Pallet_Num3
B207 LyrNo_St4
B208 Pcs_St4
B209 Pallet_Num4
B227 LyrNo_St5
B228 Pcs_St5
B229 Pallet_Num5
B247 LyrNo_St6
B248 Pcs_St6
B249 Pallet_Num6
S000 JobName
///LVARS 2,8,0,0,0,0,0,0
LB000 OpeCnt
LB001 SNs
LI000 OpS_OpeValid
LI001 OpS_CvValidNo
LI002 CvValidNo
LI003 OpS_StValidNo
LI004 StValidNo
LI005 OpS_JobName
LI006 OpS_SNs
LI007 OpS_PltNo
///INST
///DATE 2012/02/20 00:00
///COMM V1.10-00.D00
///ATTR SC,RW
///GROUP1 RB1
///LVARS 2,8,0,0,0,0,0,0
NOP
SET OpeCnt 0
*OpeTop
SET OpS_OpeValid EXPRESS 23 + 10 * (CurrentOpeNo - 1 )
JUMP *NextOpe IF B[OpS_OpeValid]=0
SET OpS_CvValidNo EXPRESS 20 + 10 * (CurrentOpeNo - 1 )
SET CvValidNo [OpS_CvValidNo]=OFF
JUMP *NextOpe IF IN#(CvValidNo)=OFF
SET OpS_StValidNo EXPRESS 21 + 10 * (CurrentOpeNo - 1 )
SET StValidNo [OpS_StValidNo]=OFF
JUMP *NextOpe IF IN#(StValidNo)=OFF
SET OpS_JobName EXPRESS 10 + 10 * (CurrentOpeNo - 1 )
SET JobName [OpS_JobName]=OFF
SET OpS_SNs EXPRESS 22 + 10 * (CurrentOpeNo - 1 )
SET SNs [OpS_SNs]=OFF
SET OpS_PltNo EXPRESS 149 + 20 * (SNs - 1 )
*Determine Station
JUMP *Judge1 IF SNs=1
JUMP *Judge2 IF SNs=2
JUMP *Judge3 IF SNs=3
JUMP *Judge4 IF SNs=4
JUMP *Judge5 IF SNs=5
JUMP *Judge6 IF SNs=6

Station 1
*Judge1
JUMP *Error IF IN#(3)=OFF
JUMP *JobB1 IF LyrNo_St1>0
JUMP *JobB1 IF Pcs_St1>0
Determine number of pallet Num. by IO
JUMP *JobSel4 IF IN#(6)=ON
JUMP *JobSel3 IF IN#(5)=ON
JUMP *JobSel2 IF IN#(4)=ON
JUMP *JobSel1
*JobB1
*Determine number of pallet Num. by B variable
JUMP *JobSel4 IF Pallet_Num1>3
JUMP *JobSel3 IF Pallet_Num1=3
JUMP *JobSel2 IF Pallet_Num1=2
JUMP *JobSel1 IF Pallet_Num1=1
JUMP *Error
*Judge2
JUMP *Error IF IN#(7)=OFF
JUMP *JobB2 IF LyrNo_St2>0
JUMP *JobB2 IF Pcs_St2>0
Determine number of pallet Num. by IO
JUMP *JobSel4 IF IN#(10)=ON
JUMP *JobSel3 IF IN#(9)=ON
JUMP *JobSel2 IF IN#(8)=ON
JUMP *JobSel1 IF Pallet_Num2=1
JUMP *Error
*Judge3
JUMP *Error IF IN#(45)=OFF
JUMP *JobB3 IF LyrNo_St3>0
JUMP *JobB3 IF Pcs_St3>0
Determine number of pallet Num. by IO
JUMP *JobSel4 IF IN#(48)=ON
JUMP *JobSel3 IF IN#(47)=ON
JUMP *JobSel2 IF IN#(46)=ON
JUMP *JobSel1
*JobB3
*Determine number of pallet Num. by B variable
JUMP *JobSel4 IF Pallet_Num3>3
JUMP *JobSel3 IF Pallet_Num3=3
JUMP *JobSel2 IF Pallet_Num3=2
JUMP *JobSel1 IF Pallet_Num3=1
JUMP *Error
*Judge4
JUMP *Error IF IN#(49)=OFF
JUMP *JobB4 IF LyrNo_St4>0
JUMP *JobB4 IF Pcs_St4>0
Determine number of pallet Num. by IO
JUMP *JobSel4 IF IN#(52)=ON
JUMP *JobSel3 IF IN#(51)=ON
JUMP *JobSel2 IF IN#(50)=ON
JUMP *JobSel1
Appendix. 1. Details of Sample Job

6.10 RENEW_NEXT_OPE.JBI

*JobB4
*Determine number of pallet Num. by B variable
JUMP *JobSel4 IF Pallet_Num4>3
JUMP *JobSel3 IF Pallet_Num4=3
JUMP *JobSel2 IF Pallet_Num4=2
JUMP *JobSel1 IF Pallet_Num4=1
JUMP *Error
*Station 5
*Judge5
JUMP *Error IF IN#(80)=OFF
JUMP *JobB5 IF LyrNo_St5>0
JUMP *JobB5 IF Pcs_St5>0
Determine number of pallet Num. by IO
JUMP *JobSel4 IF IN#(83)=ON
JUMP *JobSel3 IF IN#(82)=ON
JUMP *JobSel2 IF IN#(81)=ON
JUMP *JobSel1
*JobB5
*Determine number of pallet Num. by B variable
JUMP *JobSel4 IF Pallet_Num5>3
JUMP *JobSel3 IF Pallet_Num5=3
JUMP *JobSel2 IF Pallet_Num5=2
JUMP *JobSel1 IF Pallet_Num5=1
JUMP *Error
*Station 6
*Judge6
JUMP *Error IF IN#(84)=OFF
JUMP *JobB6 IF LyrNo_St6>0
JUMP *JobB6 IF Pcs_St6>0
Determine number of pallet Num. by IO
JUMP *JobSel4 IF IN#(87)=ON
JUMP *JobSel3 IF IN#(86)=ON
JUMP *JobSel2 IF IN#(85)=ON
JUMP *JobSel1
*JobB6
*Determine number of pallet Num. by B variable
JUMP *JobSel4 IF Pallet_Num6>3
JUMP *JobSel3 IF Pallet_Num6=3
JUMP *JobSel2 IF Pallet_Num6=2
JUMP *JobSel1 IF Pallet_Num6=1
JUMP *Error
*JobSel4
*Exceeded pallet number error
SETUALM 8900 "PALLET_IO_ERROR" 0 SMODE=0
TIMER T=1.00
*JobSel3
*3 pallets
SET B[OpS_PltNo] 3
CAT$ JobName JobName "3"
JUMP *SetEnd
*JobSel2
*2 pallets
SET B[OpS_PltNo] 2
CAT$ JobName JobName "2"
JUMP *SetEnd
*JobSel1
*1 pallet
SET B[OpS_PltNo] 1
JUMP *SetEnd
*Error
*0 pallet error
SET B[OpS_PltNo] 0
SETUALM 8901 "NO_PALLET_ERROR" 0 SMODE=0
TIMER T=1.00
*SetEnd
### Appendix. 1. Details of Sample Job

#### 6.11 RETURN_OPEORG.JBI

```
JOB
//NAME RETURN_OPEORG
//POS
//NPOS 0,0,2,0,0
//=TOOL 0
//=PULSE
//=PULSE
P00001=36545.-24665.48870.0,0.64371
P00003=63421.3574,22174.0,0.50824
//=ALIAS
//=OT 1
2033 ReturnOpeOrgDone
//=G VARS 2,0,0,0,0,2,0,0
B004 SwingHeight
B009 CurrentOpeNo
P001 OpeOrg
P003 MaxSwingHeight
//=LVARS 1,0,1,0,0,3,0,0
LB000 InOpeOrg
LD000 MaxHeight
LP000 CurrentUpPos
LP001 MaxHeightPos
LP002 OpeOrgUpPos
//=INST
//=DATE 2012/02/20 00:00
//=COMM V1.10-00.D00
//=ATTR SC,RW
//=GROUP1 RB1
//=LVARS 1,0,1,0,0,3,0,0
NOP
'Set "User output signal" value.
DIN InOpeOrg SOUT#(120)
JUMP *End IF InOpeOrg=1
CALL JOB:CANCEL_WORKING_ST_INIT IF CurrentOpeNo<>0
'Set "System variable"current value.
GETS CurrentUpPos $PX001
SET MaxHeightPos MaxSwingHeight
'Convert"Maximum Swing Height"to base coordinate.
CNVRT MaxHeightPos MaxHeightPos BF
GETE MaxHeight MaxHeightPos (3)
SETE CurrentUpPos (3) MaxHeight
MOVL CurrentUpPos V=250.0
SET OpeOrgUpPos OpeOrg
'Convert"Operation origin position"to base coordinate.
CNVRT OpeOrgUpPos OpeOrgUpPos BF
SETE OpeOrgUpPos (3) MaxHeight
MOVJ OpeOrgUpPos VJ=16.60
MOVL OpeOrg V=250.0
*End
PULSE OT#(ReturnOpeOrgDone) T=0.10
'Set "Standard Height Position" to "Swing Height Position".
SET SwingHeight 0
END
```
GO_TO_WAIT_POS.JBI

//JOB
//NAME GO_TO_WAIT_POS
//POS
//NPOS 0,0,0,2,0,0
//TOOL 0
//POSTYPE PULSE
//PULSE
P00002=63421,3573,-51507,0,0,50824
P00003=63421,3574,22174,0,0,50824
//ALIAS
//GVARS 1,0,0,0,0,2,0,0
B004 SwingHeight
P002 WaitPosOverCvs
P003 MaxSwingHeight
//LVARS 1,0,1,0,0,2,0,0
LB000 InWaitPos
LD000 MaxHeight
LP001 MaxHeightPos
LP002 WaitUpPos
//INST
//DATE 2012/02/20 00:00
//COMM V1.10-00.D00
//ATTR SC,RW
//GROUP1 RB1
//LVARS 1,0,1,0,0,3,0,0
NOP
*Set "User output signal" value.
DIN InWaitPos SOUT#(119)
JUMP *End IF InWaitPos=1
SET MaxHeightPos MaxSwingHeight
*Convert"Maximum Swing Height"to base coordinate.
CNVRT MaxHeightPos MaxHeightPos BF
GETE MaxHeight MaxHeightPos (3)
SET WaitUpPos WaitPosOverCvs
*Convert"Waiting Position over ???"to base coordinate.
CNVRT WaitUpPos WaitUpPos BF
SETE WaitUpPos (3) MaxHeight
MOVJ WaitUpPos VJ=100.00
MOVL WaitPosOverCvs V=1600.0
*End
*Set "Standard Height Position" to "Swing Height Position"
SET SwingHeight 0
END
CONFIRM.JBI

```
JOB
/NAME CONFIRM
/POS
/NPOS 0,0,0,0,0,0
/ALIAS
/OT 1
2034 SwitchDone
/GVARS 2,1,0,0,0,0,0,0
B006 CvNo_Confirm
B007 StNo_Confirm
I000 PrdNo_Confirm
/LVARS 0,7,1,0,1,0,0,0
L000 CvS_CvValdNo
L001 CvValidNo
L002 StS_StValdNo
L003 StValidNo
L004 StS_LyrNo
L005 SIS_InitDoneNo
L006 InitDoneNo
LD000 JobNo
LS000 JName
/INST
/DATE 2012/02/20 00:00
/COMM V1.10-00.D00
/ATTR SC,RW
/GRP1 RB1
/LVARS 0,7,1,0,1,0,0,0
NOP
CALL JOB:INIT_VAR
SET JobNo EXPRESS PrdNo_Confirm * 100 + CvNo_Confirm * 10 + StNo_Confirm
VAL2STR JName JobNo
SET CvS_CvValdNo EXPRESS 80 + 10 * ( CvNo_Confirm - 1 )
SET CvValidNo [CvS_CvValdNo]
SET StS_StValdNo EXPRESS 140 + 10 * ( StNo_Confirm - 1 )
SET StValidNo [StS_StValdNo]
SET StS_LyrNo EXPRESS 147 + 20 * ( StNo_Confirm - 1 )
CLEAR B[StS_LyrNo] 2
SET SIS_InitDoneNo EXPRESS 145 + 10 * ( StNo_Confirm - 1 )
SET InitDoneNo [SIS_InitDoneNo]
PULSE OT#(InitDoneNo) T=0.10
PULSE OT#(SwitchDone) T=0.10
*Top
WAIT IN#(CvValdNo)=ON
WAIT IN#(StValdNo)=ON
CALL JName
JUMP *Top IF IN#(StValdNo)=ON
CLEAR B[StS_LyrNo] 2
PULSE OT#(InitDoneNo) T=0.10
PULSE OT#(SwitchDone) T=0.10
END
```
DX200 OPTIONS
INSTRUCTIONS
FOR MOTOPAL SETUP

Specifications are subject to change without notice for ongoing product modifications and improvements.