

Lab 4 Create a Program

Student Name: _____

Assignment: The student will:

- **Create your team's first HandlingTool program**
- **Check the program Header information**
- **Teach, test, and execute from the Operator Panel**

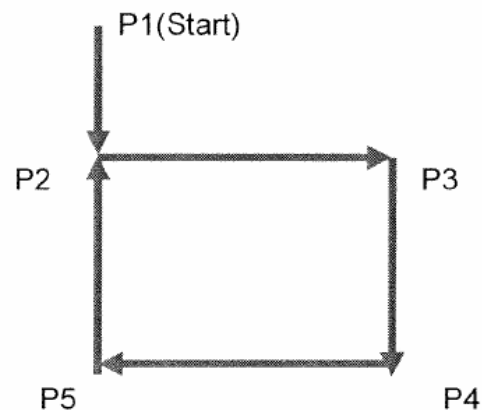
Condition: A FANUC robot and controller loaded with HandlingTool application software. The students will complete task individually.

- Step:**
- 1 Power up the controller, refer to Procedure 5-1
 - 2 Create a new teach pendant program, refer to Procedure 7-2 and Procedure 7-3. Create a program and name it PROG1 and complete the program Header information as desired.
 - 3 Fill in the default values from the Program Detail:
 - Program name: _____
 - Sub-type: _____
 - Group mask _____
 - Write protect _____
 - Ignore Pause _____

- 4 Teach a simple HandlingTool path that begins from Start position and can return back to the Start position without collision with any object.

PROG1:

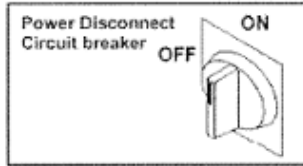
```
1: J P[1] 100% FINE
2: J P[2] 100% FINE
3: J P[3] 100% FINE
4: J P[4] 100% FINE
5: J P[5] 100% FINE
6: J P[2] 100% FINE
7: J P[1] 100% FINE
END
```



- 5 Test program in STEP and in Continuous from the Teach Pendant, refer to Procedure 7-8 and Procedure 7-9.
- 6 Power down the controller, refer to Procedure 5-3

Procedure 5-1 Turning On the Robot

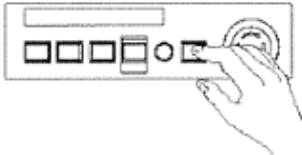
- Condition** ■ All personnel and unnecessary equipment are out of the workcell.



- Step 1** Visually inspect the robot, controller, workcell, and the surrounding area. During the inspection make sure all safeguards are in place and the work envelope is clear of personnel.
- Step 2** Turn the power disconnect circuit breaker on the operator panel to ON. **This completes turning on the robot for R-30iA controller.**

⚠ WARNING

DO NOT turn on the robot if you discover any problems or potential hazards. Report them immediately. Turning on a robot that does not pass inspection could result in serious injury.



- Step 3** For R-J3iB and earlier controllers, press the ON/OFF button on the operator panel.
- On the operator panel, the ON button will be illuminated, indicating robot power is on.
 - On the teach pendant screen, you will see a screen similar to the following.

```

                                     AUTO
UTILITIES Hints                       JOINT 100 %
                                     -----
                        HandlingTool (N. A.)
                                V6.4064

      Copyright 2006, All Rights Reserved
      FANUC LTD, FANUC Robotics America, Inc.
      Licensed Software: Your use constitutes
      your acceptance. This product protected
      by several U.S. patents.

[L TYPE ] LICENSE PATENTS                       HELP
```

Procedure 7-2: Naming a New Program

- Condition**
- No personnel or unnecessary equipment are in the work cell.
 - The teach pendant is enabled.

Step 1 Set the User frame number:

- Press **MENU**.
- Select SETUP.
- Press **F1**, [TYPE].
- Select Frames.
- If user frames are not displayed press **F3**, [OTHER], and select User Frame. If **F3**, [OTHER], is not displayed, press **PREV**.
- To select the user frame to use**, press **F5**, SETIND, type the number of the user frame you want, and press **ENTER**. This sets the active user frame (\$MNUFRAMNUM[1]) to the number of the frame you specify.


Naming the Program 2 Name the Program

- Press **SELECT**.
- If **F2**, CREATE, is not displayed, press **NEXT**.
- Continuously press the DEADMAN switch and turn the teach pendant ON/OFF switch to ON.

```
1 Words
2 Upper Case
3 Lower Case
4 Options          -- Insert --
Select
--- Create Teach Pendant Program ---
Program Name [      ]
-- End --
Enter program name
```

Program Name █ 1

- Type the program name:

 **NOTE:** If you are writing a program for production operation using RSR or PNS, name the program as follows:

- To display program header information**, press **F2**, DETAIL. You will see a similar screen.
-OR- Press **F3** EDIT to bypass Program Detail and display the TP Program screen.


Program Detail

```
Creation Date:          02-Jan-xxxx
Modification Date:     02-Jan-xxxx
Copy Source:           [          ]
Positions:  10  Size:   312 Byte
1; Program Name:      [ RSR1000 ]
2; Sub Type:          [ NONE    ]
3; Comment:           [          ]
4; Group Mask:        [ 1,*,*,* ]
5; Write protect:     [ ON      ]
6; Ignore pause:     [ OFF     ]
```

4 To skip setting program header information and begin editing the program, press **F1**, END, and skip to **Defining Default Motion Instructions** in this procedure.

5 To set or rename the program, move the cursor to the program name and press **ENTER**.

- a Move the cursor to select a method of naming the program: Words, Upper Case, or Lower Case.
- b Press the function keys whose labels correspond to the name you want to give to the program. These labels vary depending on the naming method you chose in Step a. To **delete a character**, move the cursor to the right of the character and press **BACK SPACE**.
- c When you are finished, press **ENTER**.

 **NOTE:** You cannot modify details if the program is set up as a system level macro. These macros are identified with the letter 's' at the far right side of the macro setup screen.

6 To select a sub type, move the cursor to the sub type and press **F4**, [CHOICE]. You will see a similar screen.

```
Sub Type
1 None
2 Macro
3 Cond
```

- a Select a sub type.
- b Press **ENTER**.

7 To type a comment, move the cursor to Comment and press **ENTER**.

- a Select a method of naming the comment.
- b Press the appropriate function keys to add the comment.

Procedure 7-3: Adding Motion Instructions to a TP Program

Adding Instructions

POINT [INST] TOUCHUP [EDCMD]
F2

Position has been recorded to
P[n]

Position has been recorded to
P[n]

[INST] [EDCMD]
F2

- 1 To record the position using the current default motion instruction,
- 2 Jog the robot to the location in the work cell where you want to record the motion instruction.
- 3 With the cursor on a blank line or on [END], press and hold the **[SHIFT]** key and press **[F1]**, POINT. The instruction will be added to the program automatically at the location of the cursor.
- 4 To record the position using one of the other three default motion positions,
- 5 Jog the robot to the location in the work cell where you want to record the motion instruction.
- 6 With the cursor on a blank line or on [END], press **[F1]**, POINT.
- 7 Use the cursor to select a new default motion instruction.
- 8 Press **[ENTER]**. This records the position and the motion instruction to the line at the cursor location. This also defines the current default motion instruction.
- 9 To add other instructions, press **[NEXT]** until **[F2]**, [INST] is displayed. Press **[F2]**, [INST]. Select the kind of instruction you want and use the appropriate selections on the screen to build the instruction.

When Finished Disable the Teach Pendant, and release the DEADMAN switch.

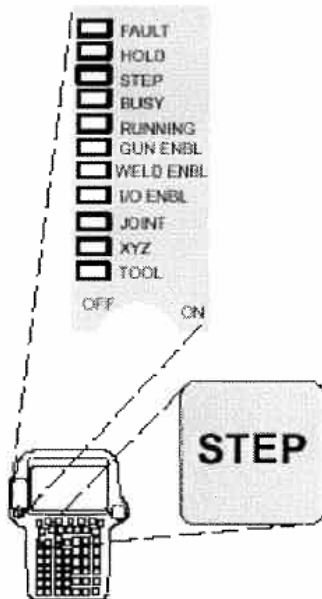
Procedure 7-8 Single Step Testing

NOTE: If the MODE SELECT switch is in the T1 position, the robot speed will be no greater than 250mm/sec, regardless of any other speed settings.

NOTE: You can perform single step testing from the teach pendant only with the MODE SELECT switch in the T1 or T2 position.

Condition ■ A program has been created and positions have been recorded.

- Step 1** Press **SELECT**
- 2** Select the program you want to test and press **ENTER**.
- 3** Press **STEP** to enable single step testing. The **STEP** indicator will turn on.
- 4** Move the cursor to the first line of the program you want to test. The program will start at the current cursor position. You will see a screen similar to the following.





```
USER_EX          LINE 1          ABORTED
USER_EX          H1             WORLD 100 %
                                     1/18
1: UFRAME_NUM=1
2: J P[1] 100% FINE
3: L P[2] 2000mm/sec FINE
4: UFRAME[7]=PR[10]
5: UFRAME_NUM=7
6: L P[3] 2000mm/sec CNT20
7: L P[4] 1000mm/sec CNT10
8: L P[5] 100mm/sec FINE
9: RO[3]=ON
10: WAIT .50(sec)
11: L P[4] 750mm/sec CNT10
12: L P[3] 1000mm/sec CNT20
13: UFRAME_NUM=1
14: L P[2] 1500mm/sec CNT100
15: J P[1] 100% FINE
[End]
POINT                                TOUCHUP>
```

1 J P[1] 100% CNT50

- 5** Continuously press the DEADMAN switch and turn the teach pendant ON/OFF switch to ON.


Procedure 7-9 Continuous Testing Using the Teach Pendant

 **NOTE:** If the MODE SELECT switch is in the T1 position, the robot speed will be no greater than 250mm/sec, regardless of any other speed settings.

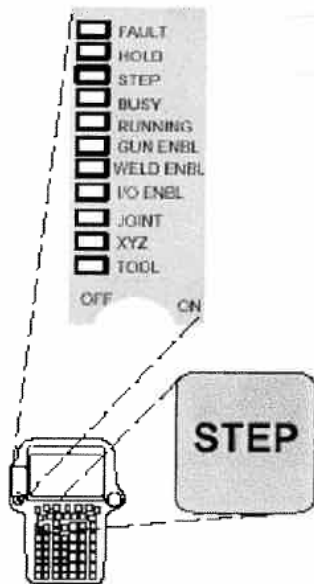
 **NOTE:** You can perform continuous testing from the teach pendant only with the MODE SELECT switch in the T1 or T2 position.

- Condition**
- A program has been created and positions have been recorded.
 - Test cycle conditions have been set. Refer to (Procedure 7-7)
 - All personnel and unnecessary equipment are out of the workcell.
 - You have tested the program in single steps. (Procedure 7-8)
 - The MODE SELECT switch is in the T1 or T2 position.
 - The Remote/Local Setup item in the System Configuration Menu is set to Local.

- Step**
- 1 Press **SELECT**.
 - 2 Select the program you want to test and press **ENTER**.
 - 3 Disable single step testing. If the STEP indicator is ON, press **STEP** to disable it.
 - 4 Move the cursor to line 1. The program will start at the current cursor position.
 - 5 Continuously press the DEADMAN switch and turn the teach pendant ON/OFF switch to ON.

 **NOTE:** If you compress the DEADMAN switch fully, robot motion will not be allowed and an error occurs. This is the same as when the DEADMAN switch is released. To clear the error, press the DEADMAN switch in the center position and press **RESET**.

- 6 Set the speed override to the value you want. First run the speed at 5% - 10% value.
- 7 Check program status on the top line of the teach pendant screen. If it is PAUSED, press **FCTN** and select ABORT (ALL).



⚠ WARNING

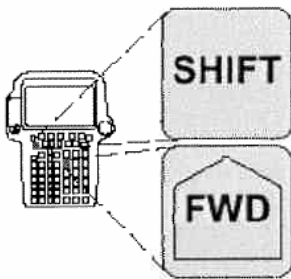
The next step causes a program instruction to run. This could cause the robot to move and other unexpected events to occur. Make sure all personnel and unnecessary equipment are out of the workcell and that all safeguards are in place; otherwise, you could injure personnel or damage equipment.

In the next step of this procedure, if you want to stop the program instruction before the instruction has finished executing, release the SHIFT key, release the DEADMAN switch, or press the EMERGENCY STOP button.

⚠ WARNING

If you execute motion instructions that contain the remote TCP (RTCP) motion option and you skip motion instructions during testing, the robot might have to change orientation dramatically to reach the destination position. This will cause it to move in a large area. Be aware that this might happen before you skip motion instructions during testing; otherwise, you could injure personnel or damage equipment.

📄 NOTE: You can test a program continuously in the forward direction only.



- 8 Press and hold down the **SHIFT** key and press and release the **FWD** key. You must hold in the **SHIFT** key continuously until the instruction has finished executing.

Run the program in 5% - 10% intervals, up to 100%. If positions with continuous termination type are changed, restart the process at a low speed.

- 9 Turn the teach pendant ON/OFF switch to OFF and release the DEADMAN switch.