# Lab 3   Create a USER Frame

**Student Name:**_____

**Assignment:**   The student will:
- **Create a USER Frame using the three-point method**

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**Condition:**   A FANUC robot and controller loaded with HandlingTool application software.

**Step:**   **1**   Power up the robot using Procedure 5-1 Turning On the Robot.

**2**   Create a USER Frame using the three-point method as described in Procedure 6-6.

**3**   Jog the robot in the X, Y, and Z directions.

**4**   Jog the robot in the W, P, and R direction of the USER Frame and observe robot motion.

**5**   Select the USER Frame in the jog menu using Procedure 6-9.

Completed: ☐

Instructor: _____

## 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.



2 Turn the power disconnect circuit breaker on the operator panel to ON. **This completes turning on the robot for R-30iA controller.**
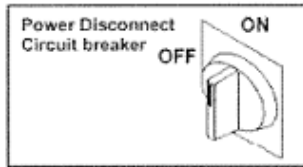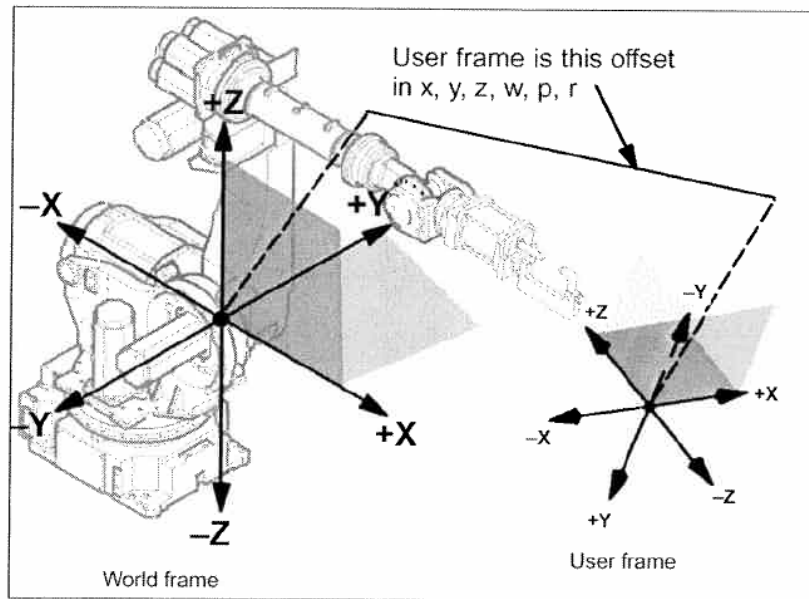
> ⚠ **WARNING**
> **DO NOT turn on the robot if you discover any problems or potential hazards. Report them immediately. Turning on a robot that does not pass inspection could result in serious injury.**
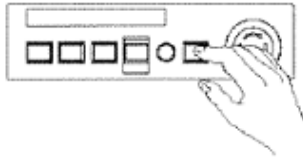


3 **For R-J3iB and earlier controllers,** press the ON/OFF button on the operator panel.

- **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.


[ TYPE ] LICENSE PATENTS          HELP
```

Figure 6-6 World and User Frames



User frame is this offset in x, y, z, w, p, r

World frame

User frame

**Three Point Method**

Recording three points defines the user frame. The three points are the origin, a position along the +x-axis of the user frame, and a position on the x-y plane of the user frame (defines the x-y plane and the y-z plane). Use Procedure 6-6 to define the user frame using the three point method.

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## Procedure 6-6 Setting Up the User Frame Using the Three Point Method

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**Condition**
- The tool frame you want to select has been set up.
- (Procedure 6-1, Procedure 6-2, or Procedure 6-3)

> ⚠ **WARNING**
> If you set up a new frame, make sure that all frame data is zero or uninitialized before you record any positions. Press F4, CLEAR, to clear frame data.
>
> If you modify an existing frame, make sure that all frame data is set the way you want before you change it.
>
> Otherwise, you could injure personnel or damage equipment.

**Step**

1 Press MENU.

2 Select SETUP.

3 Press F1, [TYPE].

4 Select Frames.

5 To choose the motion group for the frame you are setting up in systems with multiple motion groups press F3, [OTHER], and select the group you want. The default motion group is Group 1.

> ⚠️ **WARNING**
> Do not run a KAREL program that includes motion statements if more than one motion group is defined on your controller. If your controller is set up for more than one motion group, all motion must be initiated from a teach pendant program. Otherwise, the robot could move unexpectedly, personnel could be injured, and equipment could be damaged.

6  If user frames are not displayed, press [F3], [OTHER], and select User/RTCP. If [F3], [OTHER], is not displayed, press [PREV].

7  To display the settings for all frames , press [PREV] repeatedly until you see a screen similar to the following.

```
SETUP Frames
  User/RTCP Setup / Three Point
        X        Y        Z     Comment
  1:    0.0      0.0      0.0  *************
  2:    0.0      0.0      0.0  *************
  3:    0.0      0.0      0.0  *************
  4:    0.0      0.0      0.0  *************
  5:    0.0      0.0      0.0  *************
  6:    0.0      0.0      0.0  *************
  7:    0.0      0.0      0.0  *************
  8:    0.0      0.0      0.0  *************
  9:    0.0      0.0      0.0  *************
Active UFRAME/RTCP $MNUFRAMNUM[1]=0
```

8  To set the numerical values to zero, move the cursor to the frame number, press [F4], CLEAR, and then press [F4], YES, to confirm.

9  Press [F2], DETAIL.

10 To select a frame,

a  Press [F3], FRAME.

b  Type the desired frame number.

c  Press [ENTER].

11 Press [F2], [METHOD].

**12** Select Three Point. You will see a screen similar to the following.

```
SETUP Frames
   User/RTCP Setup/ Three Point
   Frame Number: 2

      X:  0.0      Y:  0.0      Z:  0.0
      W:  0.0      P:  0.0      R:  0.0

   Comment: ****************
   Orient Origin Point:        UNINIT
   X Direction Point:          UNINIT
   Y Direction Point:          UNINIT

   Active UFRAME/RTCP $MNUFRAMNUM[1]=1
```

**13** To add a comment:

  **a**  Move the cursor to the comment line and press `ENTER`.

  **b**  Select a method of naming the comment.

  **c**  Press the appropriate function keys to enter the comment.

  **d**  When you are finished, press `ENTER`.

**14** Define the origin point of the user frame: (Orient Origin Point)

  **a**  Move the cursor to Orient Origin Point.

  **b**  Jog the robot TCP to the origin. Figure 6-4 Defining the
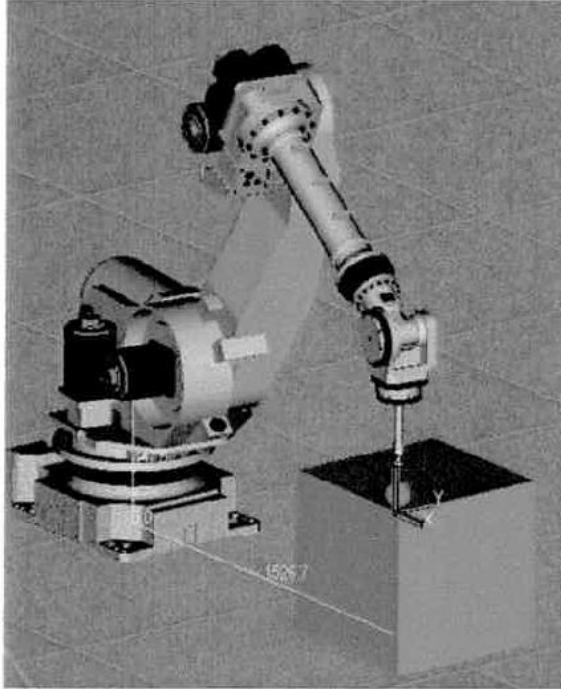
Origin, the origin is labeled number 1.

c Press and hold the SHIFT key and press F5, RECORD.

**Figure 6-4 Defining the Origin**
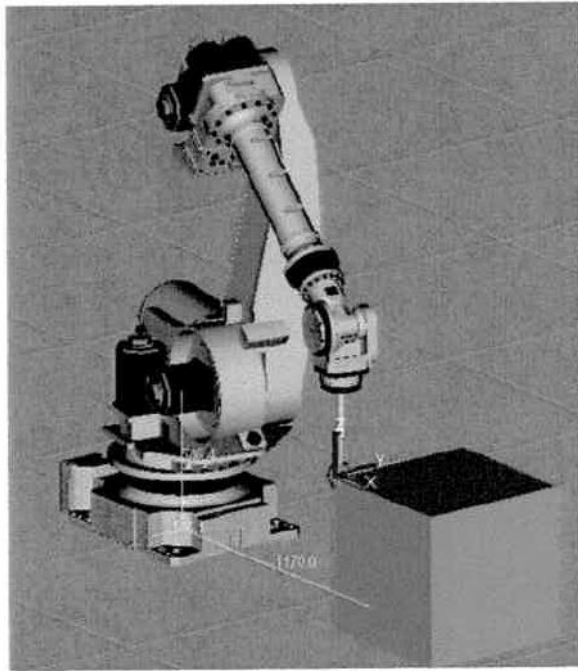


15 Define the [+X (J1)] direction point (X Direction Point) :

a Move the cursor to X Direction Point.

b Jog the robot tool tip along the x-axis. In Figure 6-5 Defining the X Direction Point this point is labeled number 2.

c Press and hold the SHIFT key and press F5, RECORD.

**Figure 6-5 Defining the X Direction Point**



16 Define a point on the positive X-Y plane (Y Direction Point)

    a   Move the cursor to Y Direction Point.

    b   Jog the robot to a location on the positive X-Y plane. In Figure 6-6 Defining the X-Y Plane, this point is labeled number 3.

    c   Press and hold the ⌊SHIFT⌋ key and press ⌊F5⌋, RECORD.

**Figure 6-6 Defining the X-Y Plane**
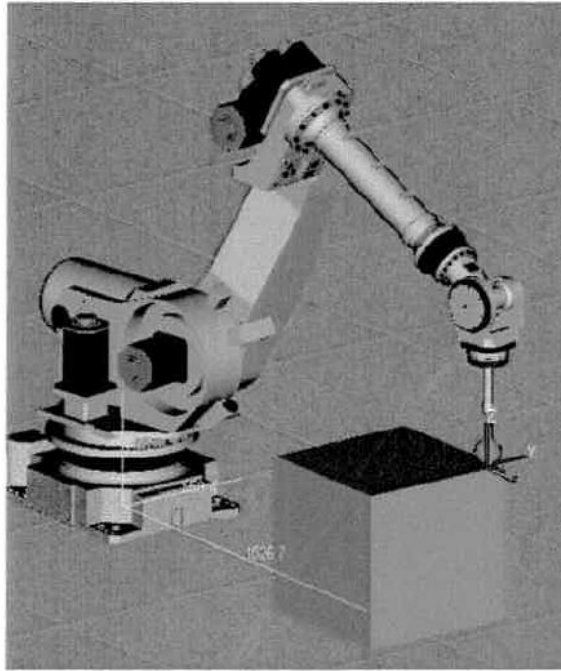


17 **To select the user frame to use**, press F5, SETIND, type the number of the user frame you want, and press ENTER. This sets the active user frame ($MNUFRAMNUM[1]) to the number of the frame you want. If F5, SETIND, is not displayed, press PREV.

-OR-

Use the Jog Menu. Press and hold SHIFT and press COORD, move the cursor to User, and type the number of the frame you want to use.

18 Jog the robot in the +x, +y, and +z directions. The robot should move in the correct directions according to the frame you defined. If the robot does not move in the correct directions, go to Step 15. Otherwise, go to Step 19.

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⚠ **CAUTION**
**When you are finished setting the frame configuration, save the information to the default device so that you can reload the configuration data if necessary. Otherwise, if the configuration is altered, you will have no record of it.**

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19 **To move to a recorded position**, move the cursor to the desired position, press and hold the SHIFT key and press F4, MOVE_TO.