



NOTE

- The position just on the border line is within the area.
- Despite the condition settings, the area check output turns OFF when normal area check cannot be performed such as in return-to-origin incomplete status, except manual/automatic mode, during a memory error.
- Initial setting is (0: ON within the area).

■ Comparison number 1 <PINT1>

■ Comparison number 2 <PINT2>

Sets the points to define the area.

Setting range
0 to 29999

Possible point number range to use is P0 to P29999. All the specified axes are the target of the area. When the R-axis is specified, make sure that the R-axis data of comparison point is specified.



NOTE

- Use the same unit system for comparison point 1 and 2.
- An error occurs when no comparison points exist, or the comparison points are different in the unit system and area check cannot be performed.
- If it is in such a state during automatic operation, the operation will be stopped and an error occurs. The area check output where an error occurred will be off and automatic operation stops while an error occurring.
- All the specified axes are target of the area check. Give special attention to settings when there is a rotation axis.
- Make sure that the comparison point data ranges to a certain extent. If the two of comparison point data is specified nearly equal, the area check may be unstable.

8. Standard coordinates

When selecting [Edit] - [Standard Coordinate] from the initial screen, the "STD COORD" screen will appear. In this hierarchy, the standard coordinates can be set.

* The first arm and second arm of the robot described in this manual are equivalent to the X-arm and Y-arm of the conventional RCX series (RCX240, RCX142, and RCX40).

The standard coordinates for SCARA type robots are treated as Cartesian coordinates using the X-arm rotating center as the coordinate origin.

The following operations and functions are enabled on SCARA type robots by setting the standard coordinates.

- Moving the robot arm tip in the direction of the Cartesian coordinates.
- Using PALLET definitions, SHIFT coordinates, and HAND definitions.
- Using commands requiring coordinate conversion, such as linear/circular interpolation and pallet movement commands.



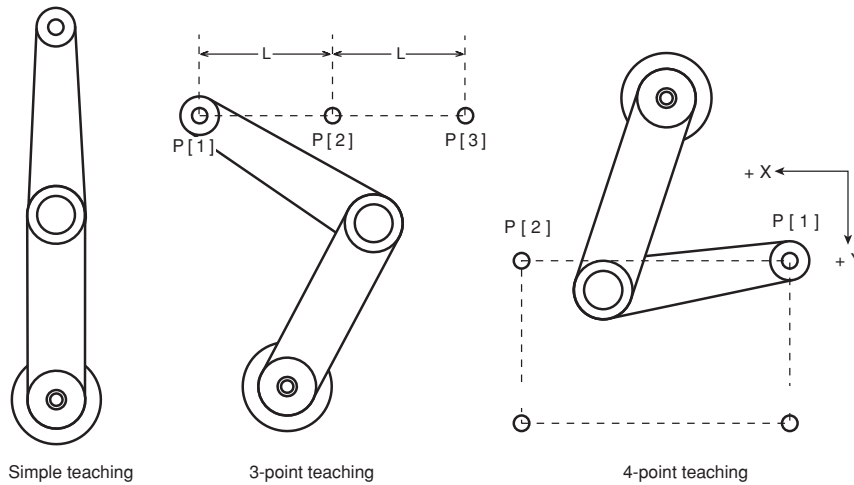
NOTE

On Cartesian type robots, it is not necessary to set the standard coordinates.

To set the standard coordinates, two methods shown below are available.

- Simple teaching
Align the first arm and second arm of the SCARA type robot on the straight line, and then input the lengths of the first arm and second arm to set the standard coordinates.
- 3-point teaching
Perform the teaching of three points arranged on the line at equal intervals, and input the direction and length from the start point to the end point so as to set the standard coordinates.
- 4-point teaching
Perform the teaching of four points that form a rectangle. The first point is specified as the teaching origin and the positions of other 3 points are input relative to the first point.
* This method is different from that described in RCX240 operator's manual.

■ Setting the standard coordinates



CAUTION

When setting the standard coordinates, note the following points.

- Always perform teaching with the same hand system carefully and accurately.
- Set the teach points as near as possible to the center of actual work area and also separate them from each other as much as possible.
- The plane formed by the robot X and Y-axis movement must be parallel to the actual working plane.
- Perform point teaching at the rotation center of the R-axis.
- The standard coordinate setting accuracy greatly affects the Cartesian coordinate accuracy.

The following parameters are automatically set when the standard coordinates are input.

1) Arm length (mm)

M1 = ###.###

First arm length (distance between the first arm and second arm rotation centers)

M2 = ###.###

Second arm length (distance between the second arm and R-axis rotation centers)

2) Offset pulse

M1 = #####

X-axis offset pulse (angle formed by the first arm when the axis 1 motor is located at the "0" pulse position and the X-axis of the standard coordinates)

M2 = #####

Y-axis offset pulse (angle formed by the first arm and second arm when the axis 2 motor is located at the "0" pulse position)

M4 = #####

R-axis offset pulse (angle formed by the R-axis direction when the R-axis motor is located at the "0" pulse position and the X-axis of the standard coordinates)

When using multiple robots, set the standard coordinates for each robot.

However, the offset pulse of the R-axis is not set automatically. Set it by editing the parameters directly.

- * The first arm and second arm of the robot described in this manual are equivalent to the X-arm and Y-arm of the conventional RCX series (RCX240, RCX142, and RCX40).



CAUTION

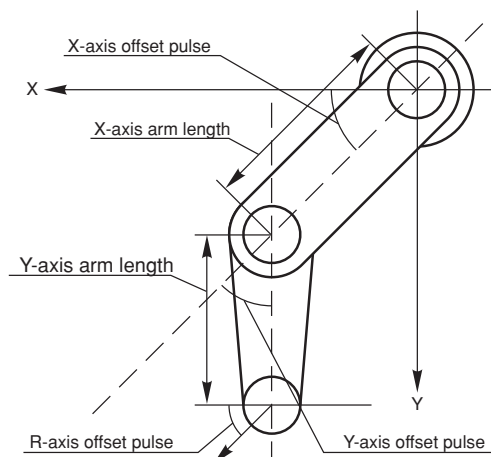
When using multiple robots, be sure to check the current target robot. The robot is changed from the "QUICK MENU" screen. For details, refer to "5.2 Quick menu" in Chapter 2.



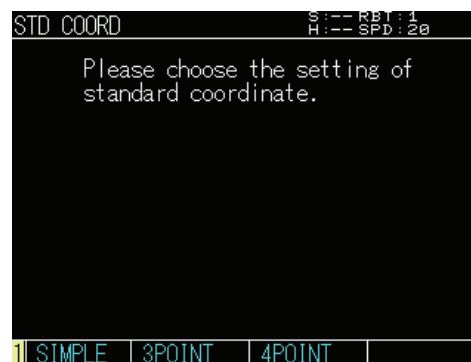
NOTE

- The standard coordinates have been set at shipment.
- The offset pulse value equals the pulse value that axis 1, axis 2, and R-axis move on the X-axis of the standard coordinates.

■ Setting the standard coordinates



■ Selecting standard coordinate setting method



Valid keys	Menu	Function
F1	SIMPLE	Moves to the screen that allows you to set the standard coordinates by simple teaching.
F2	3POINT	Moves to the screen that allows you to set the standard coordinates by 3-point teaching.
F3	4POINT	Moves to the screen that allows you to set the standard coordinates by 4-point teaching.
ESC		Returns to the previous screen.

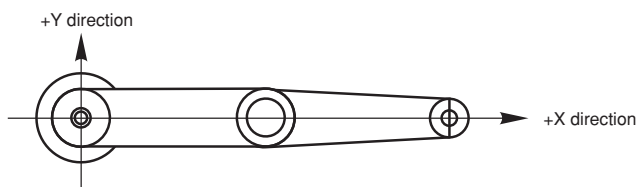
8.1 Setting the standard coordinates by simple teaching



NOTE

Align the rotation centers of the first arm, second arm, and R-axis on the line as much as possible.

■ Setting the standard coordinates by simple teaching



Step 1 Press the F1 key (SIMPLE) on the "STD COORD" setting screen (Edit → Standard Coordinate).

► **Step 1** Setting the standard coordinates by simple teaching



Step 2 Align the first arm and second arm on the line.

Move the first arm and second arm using the Jog key operation or Jog operation in the servo off status to the position where they are aligned, and then press the F4 key (NEXT). At this time, the direction shown in the figure above becomes the +X direction.



WARNING

When performing the operation with the Jog key, the robot is in operation. Therefore, do not enter the robot movement range to prevent any hazard.

During the operation with the Jog key, the operation can be performed by adjusting the speed and inch distance.

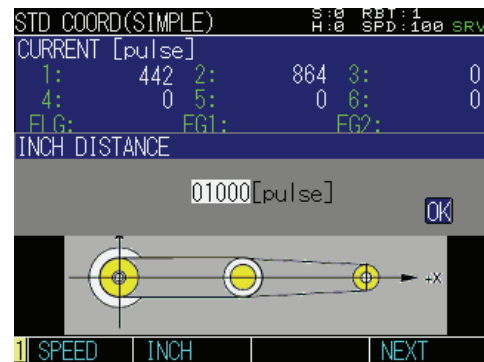
To adjust the speed, select the F1 key (SPEED) to display the speed setting pop-up screen. Adjust the speed on this screen.

For details about speed adjustment, refer to "2.3 Changing the Jog movement speed" in Chapter 3.

To adjust the inch amount, select the F2 key (INCH) to display the inch amount adjustment pop-up screen. Use 0 to 9 keys to input the pulse value.

* The first arm and second arm of the robot described in this manual are equivalent to the X-arm and Y-arm of the conventional RCX series (RCX240, RCX142, and RCX40).

Step 2 Setting the inch amount



Step 3 Input the arm lengths.

Use 0 to 9 keys to input the first arm length, and then press the F4 (NEXT).

Next, input the second arm length, and then press the F4 key (NEXT).

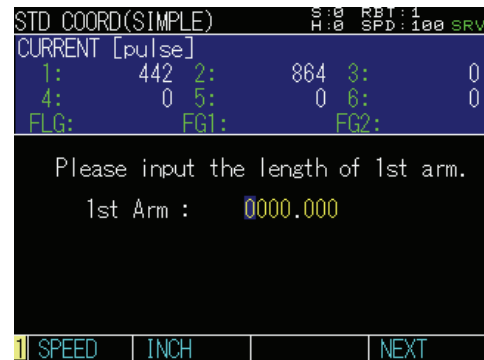
Step 4 Set the standard coordinates.

Check the arm length and offset pulse value. Select (SET), and then press the ENTER key to save the settings. After the settings have been saved, press the F4 key (FINISH) or ESC key to exit the setting.

When pressing the F4 key (FINISH) or ESC key in the status that the settings are not saved, the setting is completed without saving. If the calculation cannot be performed, corresponding alarms occur.

* The first arm and second arm of the robot described in this manual are equivalent to the X-arm and Y-arm of the conventional RCX series (RCX240, RCX142, and RCX40).

Step 3 Inputting the first arm and second arm lengths



Step 4 Checking the settings



8.2 Setting the standard coordinate by 3-point teaching

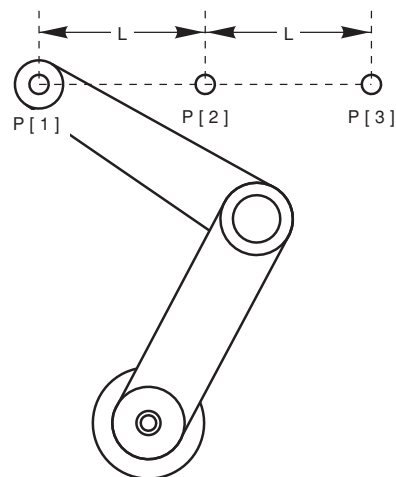


NOTE

Separate the teach points from each other as much as possible.

■ Setting the standard coordinate by 3-point teaching

Precondition: All 3 points P[1], P[2] and P[3] must be aligned, with P[2] set at the midpoint between P[1] and P[3].



Step 1 Press the F2 key (3POINT) on the "STD COORD" screen (Edit → Standard Coordinate).

► Step 1 Setting the standard coordinate by 3-point teaching



Step 2 Determine the point P1.

Use the Jog key to move the robot tip to the point P1 and press the F4 key (NEXT) to set the position.



WARNING

When performing the operation with the Jog key, the robot operates. Therefore, do not enter the robot movement range to prevent any hazard.



NOTE

Perform teaching carefully to obtain accurate points. Precise standard coordinates cannot be set if a point is inaccurate.

► Step 2 Setting the inch distance



To adjust the speed, select the F1 key (SPEED) to display the speed setting pop-up screen. Adjust the speed on this screen.

For details about speed adjustment, refer to "2.3 Changing the Jog movement speed" in Chapter 3. To adjust the inch amount, select the F2 key (INCH) to display the inch amount adjustment pop-up screen. Use 0 to 9 keys to input the pulse value.

Step 3 Determine the points P2 and P3.

Perform the same operation stated in Step 2.

Step 4 Determine the direction from P1 to P3.

Use the F1 key (+X) to F4 key (-Y) to determine the direction from P1 to P3.

Step 4 Inputting the direction from P1 to P3

```
STD COORD(3POINT)      S:1  R:1:1
                        H:1  SPD:100
CURRENT [pulse]
1: 442 2: 867 3: 0
4: 0 5: 0 6: 0
FLG:  FG1:  FG2:

Please choose the direction
from P1 to P3.

| X+ | X- | Y+ | Y- |
```

Step 5 Input the length from P1 to P3.

Use 0 to 9 keys and "." key to input the length from P1 to P3, and then press the F4 key (NEXT). The upper limit of the input value is "1000".

Step 5 Inputting the length from P1 to P3

```
STD COORD(3POINT)      S:1  R:1:1
                        H:1  SPD:100
CURRENT [pulse]
1: 13800 2: 4319 3: 0
4: 0 5: 0 6: 0
FLG:  FG1:  FG2:

Please input distance from P1 to P3.

0000.000

| | | | NEXT |
```

Step 6 Set the standard coordinates.

Check the arm length and offset pulse value. Select (SET), and then press the ENTER key to save the settings. After the settings have been saved, press the F4 key (FINISH) or ESC key to exit the setting. When pressing the F4 key (FINISH) or ESC key in the status that the settings are not saved, the setting is then completed without saving. If the calculation cannot be performed, corresponding alarms occur.

```
STD COORD(3POINT)      S:0  R:1:1
                        H:0  SPD:100
CURRENT [pulse]
1: -200864 2: 306216 3: 8
4: 2 5: 0 6: 0
FLG:  FG1:  FG2:

Offset Pulse

1st Arm : 110.000 -200863
2nd Arm : 110.000 306216

SET

| | | | FINISH |
```

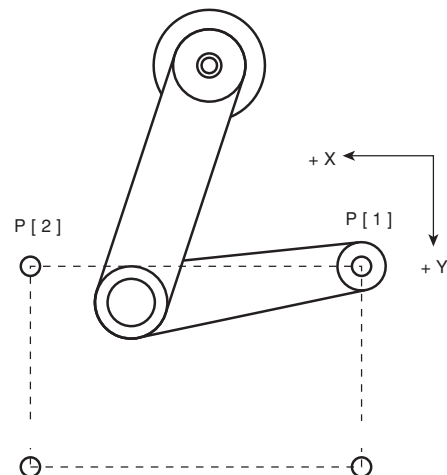
8.3 Setting the standard coordinate by 4-point teaching



NOTE

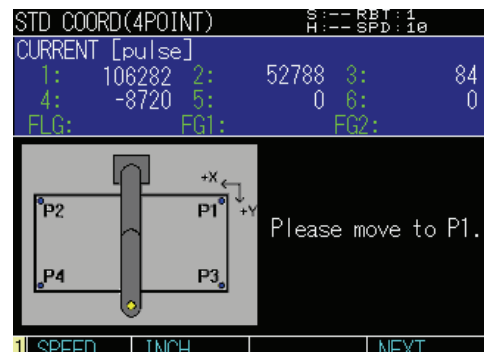
- Separate the teach points from each other as much as possible.
- If one side length is inadequate, an error may occur and the point cannot be set.

■ Setting the standard coordinate by 4-point teaching



Step 1 Press the F3 key (4POINT) on the "STD COORD" screen (Edit → Standard Coordinates).

Step 1 Setting the standard coordinate by 4-point teaching



Step 2 Determine the point P1.

Use the Jog key to move the robot tip to the point P1 and press the F4 key (NEXT) to set the position.



WARNING

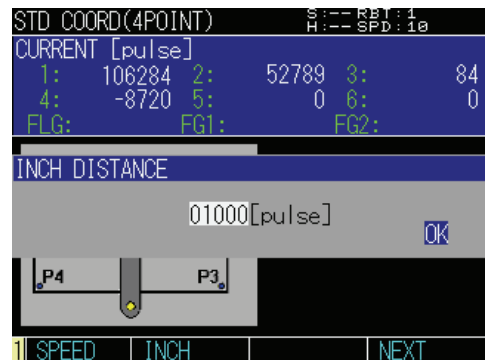
When performing the operation with the Jog key, the robot operates. Therefore, do not enter the robot movement range to prevent any hazard.



NOTE

Perform teaching carefully to obtain accurate points. Precise standard coordinates cannot be set if a point is inaccurate.

Step 2 Setting the inch distance



To adjust the speed, select the F1 key (SPEED) to display the speed setting pop-up screen. Adjust the speed on this screen.

For details about speed adjustment, refer to "2.3 Changing the Jog movement speed" in Chapter 3.

To adjust the inch amount, select the F2 key (INCH) to display the inch amount adjustment pop-up screen. Use 0 to 9 keys to input the pulse value.

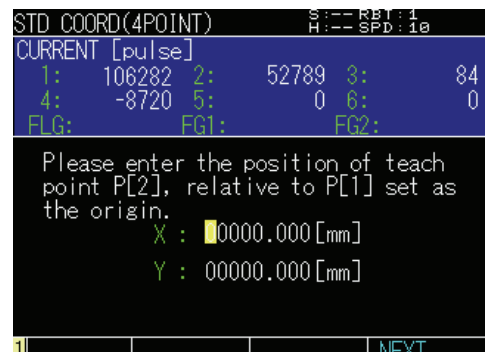
Step 3 Determine the points P2 and P3.

Perform the same operation stated in Step 2.

Step 4 Inputting each point coordinate with P1 as the origin

Step 4 Input coordinate values of each point from the P1 as the origin point.

Use 0 to 9 and "." keys to input the coordinates of each point from P1. The upper limit of input value is 9999.999.



Step 5 Set the standard coordinates.

Check the arm length and offset pulse value. Select (SET), and then press the Input key to save the settings. After the settings have been saved, press the F4 key (FINISH) or ESC key to exit the setting.

When pressing the F4 key (FINISH) or ESC key in the status that the settings are not saved, the setting is then completed without saving the settings.

If the calculation cannot be performed, the alarm occurs.

Step 5 Confirming the setting

