



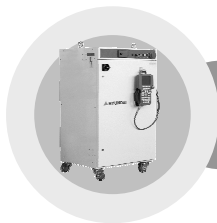
WARNING



**THE INSTALLATION SHALL BE  
MADE BY QUALIFIED INSTALLATION  
PERSONNEL AND SHOULD  
CONFORM TO ALL NATIONAL AND  
LOCAL CODES**

Hyundai Robot

Hi4aUC071001FMEN3



## Hi4a Controller Function Manual

**User Coordinate**



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# 1

## Overview



# 1. Overview

## 1.1. User coordinate

When working at the 3 dimension space, the XY plane must be changed if it's necessary because the creation and the adjustment of all objects can be done at surface of XY plane.

If it changes the surface of XY plane, direction of coordinate system changes while observation direction doesn't change about drawn object so smooth operation can be done when observation direction changes at the beginning.

Changed coordinate system as operator wants is called user coordinate and it often uses when changing operation plane (XY plane) as three dimensional operation is needed.

This function is the function to use as defining the coordinate system in space as user own discretion and manual operation or shift on defined user coordinate system operation is possible. Also, location of step can teach as the user coordinate.

## 1.2. Location information when recording the step

When step recording by the [REC] key, the location information can be recorded as form of base coordinate system, robot coordinate system, encoder, and user coordinate system.

- Pose recording type: Base, Robot, Encoder, U, Un





# 2

## Operation



## 2. Operation

User Coordinate

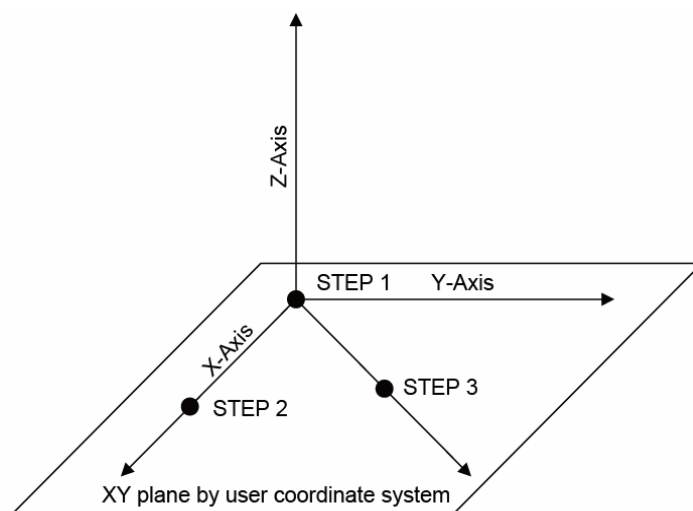
### 2.1. Registration of user coordinate

#### 2.1.1. Resistraion at controller parameter

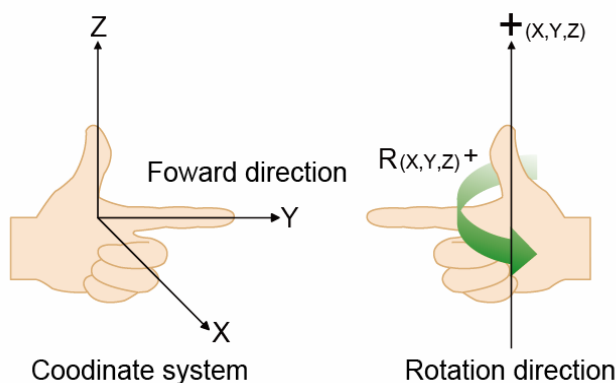
##### (1) Operating program teaching

Choose the program at one's discretion and record the following 3 steps.

- Move the robot using Jog to the origin of user coordinate and record S1.
- Move the robot using Jog to the one point in X axis of user coordinate and record S2.
- Move the robot using Jog to the one point in XY plane of user coordinate and record S3.



<REFERENCE>



### (2) Registration of user coordinate

If you choose 『[PF2]: System 』 → 『2: Controller parameter』 → 『12: Coordinate setting 』 → 『1: User coordinate』 from the top menu of the manual mode, it will indicate as the following.

- User Coordinate Number :  
Define user coordinate number as defining user own discretion.
- Program number for registration:  
Input the program number that teach the user coordinate.

```
00:00:23 *** System setting *** A:0 S:2
1: User parameter
2: Controller parameter
3: Machine parameter
4: Application parameter
5: Initialize
6: Automatic constant setting

Use [Number]/[Up]/[Down] and press [SET].
>
Previous Next
```

```
00:00:34**Controller parameter**A:0 S:2
12: Coordinate setting
13: Reserve program setting
14: Network
15: Gain change at low speed
17: Position error checking in waiting
18: MODBUS environment setting
19: Register License key

Use [Number]/[Up]/[Down] and press [SET].
>
Previous Next
```

```
00:00:42*Coordinate assignment* A:0 S:2
1: User coordinate
2: Stationary tool coordinate

Use [Number]/[Up]/[Down] and press [SET].
>
Previous Next
```

```
00:00:55 ** User coordinate ** A:0 S:2

User Coordinate Number      = [ 0 ]
Program No. for registration = [OnL]

Select and Enter number. Press [SET]
>[1 - 10]
Delete Execute
```

when registration of user coordinate has normal completion

```
08:09:05 ** User coordinate ** A:0 S:4

User Coordinate Number      =[ 1 ]
Program No. for registration =[100]

Defined User-coordinate
{1}
User-coordinate pose : number 1
Origin : {X=0, Y=1768.00, Z=2035.00}
X-Dir  : {X=0, Y=-1.00, Z=0}
Y-Dir  : {X=1.00, Y=0, Z=0}
Executing completed

>_
Execute
```

### 2.1.2. Registration by instruction execution

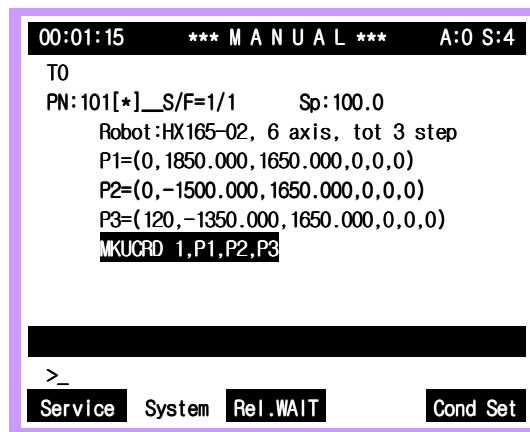
You can register the user coordinate using the instruction as following.

(1) Instruction input method :

- Command / Etc. / MKUCRD
- Command ► 3962 ► SET

(2) MKUCRD <Coord. number>,<Origin pose>,<X dir. pose>,<XY plane pose>

- Coord. number : User coordinate number to create
- Origin pose : Located pose at origin
- X dir. pose : Located pose at X-axis
- XY plane pose : Located pose at XY plane



The above instruction is to register the user coordinate using pose variable and the location can be detected by sensor and can register the user coordinate by online.

## 2.2. Selection of User coordinate

- (1) If you press 『[PF5]: Cond Set』, following contents will be indicated.

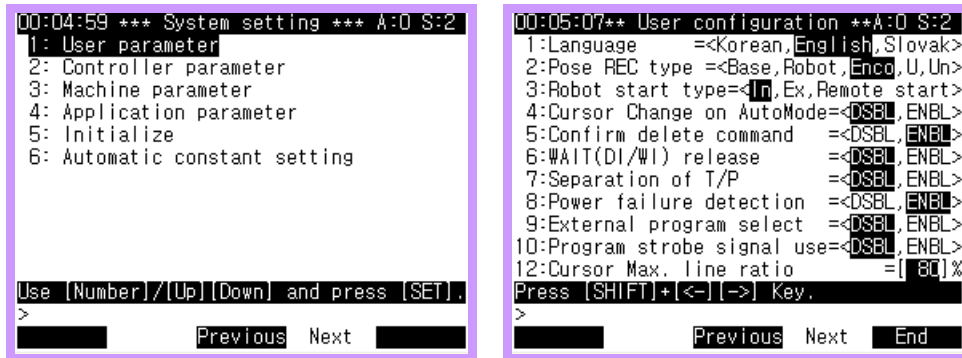
```
00:04:18 *** Condition set *** A:D S:2
1: Cycle type    =<1Step,1Cycle,Continu>
2: Step go/back max.speed(mm/s)  =[200]
3: Func in step GO/BACK  =<Off,On,1 On>
4: Speed rate=[100] GunStep=<DSBL,ENBL>
5: Robot lock      =<DSBL,ENBL>
   Servo gun lock  =<DSBL,ENBL>
6: Rec speed type=<Standard,[%],[mm/s]>
7: Interpolation base  =<P-tool,S-tool>
8: Select user coordinate  =[0]

Press [SHIFT]+[<-][>-] Key.
>
AppliCnd      End
```

- (2) From the above screen, user coordinate can be selected as item 8.

## 2.3. Selection of recorded method

Select 『[PF2]: System』 → 『1: User parameter』 from the top menu of manual mode.



Set up to “U” and “UN” at 『2: Pose REC type = <Base,Robot,Enco,U,Un>』 from above screen.

“U” saves the location of user coordinate that has been currently set up unknown number of user coordinate. This method can choose the coordinate system according to the number of discretionary user coordinate by registration/selection function of user coordinate afterwards.

“Un” records as the number of user coordinate to the current setting. According to, the coordinate system can move/change when identical coordinate system must change, this method must follow the user coordinate that has been absolutely recorded.

## 2.4. Form modification of recorded coordinate system

- (1) 『[PF2]: System』 → 『1: User parameter』 → 『2: Pose REC type = <Base, Robot, Enc, **U**, Un>』

In the case of recorded step after setting up as “U”, when inputting [QuickOpen] key on recorded step,

00:04:38 \*\*\* Data kro. pozl. \*\*\* A:0 S:2

POSE OF CURRENT STEP

X: [ ]mm T1:[ ]mm  
 Y: [ ]mm T2:[ ]mm  
 Z: [ ]mm T3:[ ]mm  
 RX:[ ]deg T4:[ ]mm  
 RY:[ ]deg T5:[ ]mm  
 RZ:[ ]deg T6:[ ]mm

Coord.:<Base,Robot,Encoder,**U**,Un> U[ ]

Robot Configuration: <Define,Self-Cfg>  
 <Front,Rear> <Up,Down> <Flip,Non-flip>  
 within |PI|: S=<Y,N> R1=<Y,N> R2=<Y,N>

Stis. [Press [SHIFT]+[<-][>-] Key.

>\_ [ ] [ ] [Save]

- (2) 『[PF2]: System』 → 『1: User parameter』 → 『2: Pose REC type = <Base, Robot, Enc, **U**, **Un**>』

In the case of recorded step after setting up as Un, when inputting [QuickOpen] key on recorded step

00:04:38 \*\*\* Data kro. pozl. \*\*\* A:0 S:2

POSE OF CURRENT STEP

X: [ ]mm T1:[ ]mm  
 Y: [ ]mm T2:[ ]mm  
 Z: [ ]mm T3:[ ]mm  
 RX:[ ]deg T4:[ ]mm  
 RY:[ ]deg T5:[ ]mm  
 RZ:[ ]deg T6:[ ]mm

Coord.:<Base,Robot,Encoder,**U**,**Un**> U[ ]

Robot Configuration: <Define,Self-Cfg>  
 <Front,Rear> <Up,Down> <Flip,Non-flip>  
 within |PI|: S=<Y,N> R1=<Y,N> R2=<Y,N>

Press [SHIFT]+[<-][>-] Key.

>\_ [ ] [ ] [Save]

## 2.5. Exeptional control and caution

- **Error messages that occur when it's in unusual condition while registering user coordinate**

**『E1010 More teach points required』**

It occurs when step that has been recorded within the teaching program for the coordinate system registration is below 3. Please teaching the 3 steps within designated program.

**『E1011 Points too close to one another』**

It occurs when the distance of 3 points are below 1mm within recorded teaching program for registering the coordinate system and correct the teaching step.

**『E1012 Recorded points are linear』**

It occurs when direction of each axis user coordinate can't decide while the 3 points exist almost at the identical straight line within teaching program for registering the coordinate system and confirms the teaching program.

- When selecting the user coordinate ( 『[PF5]: Cond Set』 → 『8: Select user coordinate』 ),  
**『Verify the coordinate & Jog state. [ANY』**  
 If the coordinate system is set up as axis or tool coordinate system, it's impossible to select the user coordinate or to change when JOG operating of robot.
- When registering user coordinate ( 『[PF2]: System』 → 『2: Controller parameter』 → 『12: Coordinate setting』 → 『1: User coordinate』 ), when inputting the discretionary input **『User Coordinate Number』** , in the case of indicating as following **『OnL』** at **『Program No. for registration』** ,

08:09:05    \*\* User coordinate \*\*    A:0 S:4

User Coordinate Number        =[ 1 ]  
 Program No. for registration    =[ 100 ]

Defined User-coordinate  
 {1}  
 User-coordinate pose : number 1  
 Origin : {X=0, Y=1768.00, Z=2035.00}  
 X-Dir : {X=0, Y=-1.00, Z=0}  
 Y-Dir : {X=1.00, Y=0, Z=0}

Enter number and press [SET]

>[1 - 10]\_

Delete                      Execute

This is the coordinate system number that has been already defined from discretionary job program. If you want to setting the new user coordinate, set up other number.





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