

Setting the Origin

[photo] According to this assembly instruction manual, even after assembly, the sample motions might not work correctly.

To ensure good sample motion, PLEN's origin must be set.

Preparation

- 1) Install PLEN MotionEditor on your PC from the accessory CD.
Install while referring to the instructions accompanying PLEN MotionEditor.
- 2) [photo] After charging the accessory battery, connect it to PLEN.
- 3) [photo] Verify that both switches on the back are set to OFF.
The left switch is the control board power switch, and the right switch is the servo power switch.
(PLEN is OFF when the switches are down, as shown in the photo.)
- 4) Use the accessory USB cable to connect PLEN to a PC.
- 5) [icon] Launch PLEN MotionEditor by means of the shortcut on the desktop.
Shortcut to MotionEditor.exe
- 6) Select COM Port [icon] Click OK.
Select the serial port connected to the robot.
When Auto Search is selected, the connectable ports are retrieved automatically.
[Auto Search] [] Use this port next time (changeable in setting)
- 7) MotionEditor The specified serial port failed to open.
If the message to the left is displayed, it is possible that
 - the battery is not charged
 - the USB cable is not connected securely
 Resume from Step 2.
- 8) [screenshot] If there is no connection problem the window to the left is displayed.
[illegible]

- 9) [screenshot] The dialog for setting the origin is displayed.
 Select Set from menu > Define servo name and operating range.

Key to Screenshot 9

Pirkus•R MotionEditor – Undefined

File (F) Set (S) Tools (T) Window (W) Help (H)
 Set COM port
 Define servo name and operating range
 Undefined Define servo configuration
 Undefined Define functionality
 Define key frame editing screen

- 10) [screenshot] Move or maximize the display so that all dialogs are displayed as shown in the screenshot.

Key to Screenshot 10

Pirkus•R MotionEditor – [Set servo name & operating range]

File (F) Set (S) Tools (T) Window (W) Help (H)

Robot name: PLEN

00	Right leg: Thigh yaw	12	Left leg: Thigh yaw	[Open]
01	Right leg: Thigh roll	13	Left leg: Thigh roll	
02	Right leg: Thigh pitch	14	Left leg: Thigh pitch	[Save]
03	Right leg: Knee pitch	15	Left leg: Knee pitch	
04	Right leg: Ankle roll	16	Left leg: Ankle roll	[Save As]
05	Right leg: Ankle pitch	17	Left leg: Ankle pitch	
06	Right: Shoulder pitch	18	Left: Shoulder pitch	[Download]
07	Right: Shoulder roll	19	Left: Shoulder roll	
08	Servo_08	20	Servo_20	[Upload]
09	Right: Elbow roll	21	Left: Elbow roll	
10	Servo_10	22	Servo_22	
11	Servo_11	23	Servo_23	

(The images to the left have been maximized.)

Precautions before Proceeding to the Next Step

[photo] The servo is powered up from the next step.
Immediately after switching on the power, if you find that a servo is loaded, cut power immediately.

Notes: If the loaded state continues, the servo will break down.
If the servo is hot, wait for it to cool sufficiently before continuing operation.

How to Respond after Finding the Aforementioned Location

[screenshot] In the dialog for setting the origin, the name corresponding to the PLEN joint is written as “Right leg: Thigh yaw.”
Press the button to the right of the box containing the corresponding joint name.

Key to Screenshot

Pirkus•R MotionEditor – [Set servo name & operating range]
File (F) Set (S) Tools (T) Window (W) Help (H)

Robot name: PLEN

00	Right leg: Thigh yaw	12	Left leg: Thigh yaw	[Open]
01	Right leg: Thigh roll	13	Left leg: Thigh roll	
02	Right leg: Thigh pitch	14	Left leg: Thigh pitch	[Save]
03	Right leg: Knee pitch	15	Left leg: Knee pitch	
04	Right leg: Ankle roll	16	Left leg: Ankle roll	[Save As]
05	Right leg: Ankle pitch	17	Left leg: Ankle pitch	
06	Right: Shoulder pitch	18	Left: Shoulder pitch	[Download]
07	Right: Shoulder roll	19	Left: Shoulder roll	
08	Servo_08	20	Servo_20	[Upload]
09	Right: Elbow roll	21	Left: Elbow roll	
10	Servo_10	22	Servo_22	
11	Servo_11	23	Servo_23	

[screenshot] Move the displayed scroll bar slider (in the screenshot to the left) in the direction that releases the servo load, and press the button that reads “Define as Origin.”
 This is only a temporary solution.
 The intended origin is set according to the procedure that starts in the next step.

Key to Screenshot

Define Servo Maximum, Minimum, and Origin

The servomotor will break down if a range exceeding the servomotor capacity is specified. Pay close attention when defining the range. [Close]

Servo name: [Right leg: Thigh yaw] [✓] Reverse the direction of rotation.

For the current location:

[Define it as the minimum]	[Define it as the origin]	[Define it as the maximum]
[Move it to the minimum]	[Move it to the origin]	[Move it to the maximum]

[] Set in KO mode and read the current value.

- 11) [photo] Turn on the servo power.
 Push up the right switch on the back.
 If a servo is loaded, immediately cut power. Read the previous section and release the servo.
- 12) [screenshot] In the dialog for setting the origin, the name corresponding to the PLEN joint is written as “Right leg: Thigh yaw.”
 Press the button to the right of the box containing the corresponding joint name.

Key to Screenshot 12

Pirkus•R MotionEditor – [Set servo name & operating range]

File (E) Set (S) Tools (T) Window (W) Help (H)

Robot name: PLEN

00 Right leg: Thigh yaw	12 Left leg: Thigh yaw	[Open]
01 Right leg: Thigh roll	13 Left leg: Thigh roll	
02 Right leg: Thigh pitch	14 Left leg: Thigh pitch	[Save]
03 Right leg: Knee pitch	15 Left leg: Knee pitch	
04 Right leg: Ankle roll	16 Left leg: Ankle roll	[Save As]
05 Right leg: Ankle pitch	17 Left leg: Ankle pitch	
06 Right: Shoulder pitch	18 Left: Shoulder pitch	[Download]
07 Right: Shoulder roll	19 Left: Shoulder roll	
08 Servo_08	20 Servo_20	[Upload]
09 Right: Elbow roll	21 Left: Elbow roll	
10 Servo_10	22 Servo_22	
11 Servo_11	23 Servo_23	

- 13) [screenshot] Set the origin by moving the displayed scroll bar slider in the necessary direction.
This is reflected by pressing the button that reads “Define as Origin.”
Repeat the same steps for all joints.

Key to Screenshot

Define Servo Maximum, Minimum, and Origin

The servomotor will break down if a range exceeding the servomotor capacity is specified. Pay close attention when defining the range. [Close]

Servo name: [Right leg: Thigh yaw] [] Reverse the direction of rotation.

For the current location:

[Define it as the minimum]	[Define it as the origin]	[Define it as the maximum]
[Move it to the minimum]	[Move it to the origin]	[Move it to the maximum]

[] Set in KO mode and read the current value.

- 14) [photo] First, set Left : Shoulder pitch as shown in the photo.
Set it so that the lines for the shoulder and silver aluminum part that holds the arm are almost parallel, as shown by the blue lines in the photo to the left.
Set Right: Shoulder pitch similarly.
- 15) [photo] Set the shoulder roll and elbow roll for both arms so as to connect them straight, as shown in the photo to the left.
However, to avoid contact with leg parts, set the shoulder roll about 2 cm away from leg, as shown by the blue lines in the photo to the left.
- 16) [photo] Set the thigh yaw of both legs so that the legs are parallel, as shown by the blue lines in the photo to the left.
- 17) [photo] Set the thigh roll of both legs so that the servos and body parts are almost parallel, as shown by the blue lines in the photo to the left.
- 18) [photo] Set the thigh pitch, knee pitch, and ankle pitch of both legs so that the screws (indicated by the blue circles in the photo to the left) of the output shafts of the joints are almost aligned.
The photo to the left shows only the left leg. Set the right leg similarly.
- 19) [photo] Set the ankle roll so that the servos and ankle parts are almost parallel, as shown by the blue lines in the photo to the left.

Saving and Uploading [screenshot]

Key to Screenshot

Pirkus•R MotionEditor – [Set servo name & operating range]

File (F) Set (S) Tools (T) Window (W) Help (H)

Robot name: PLEN

00	Right leg: Thigh yaw	12	Left leg: Thigh yaw	[Open]
01	Right leg: Thigh roll	13	Left leg: Thigh roll	
02	Right leg: Thigh pitch	14	Left leg: Thigh pitch	[Save]
03	Right leg: Knee pitch	15	Left leg: Knee pitch	
04	Right leg: Ankle roll	16	Left leg: Ankle roll	[Save As]
05	Right leg: Ankle pitch	17	Left leg: Ankle pitch	
06	Right: Shoulder pitch	18	Left: Shoulder pitch	[Download]
07	Right: Shoulder roll	19	Left: Shoulder roll	
08	Servo_08	20	Servo_20	[Upload]
09	Right: Elbow roll	21	Left: Elbow roll	
10	Servo_10	22	Servo_22	
11	Servo_11	23	Servo_23	

If the origin could be set to some extent by means of the aforementioned procedure, save the origin data and upload it to PLEN.

To check the operation, execute the included motions in PLEN.

The motion data normally is located in the following directory:

C:\Program Files\I Bee\PLEN MotionEditor\Data\MotionFiles\.

For information regarding the usage of PLEN MotionEditor (e.g., the playback method), refer to the instructions that accompany PLEN MotionEditor.

If the motion is unsatisfactory after only setting the origin, attempt to improve the motion. Before doing so, do not forget to back up the original file.

Uploading Motions

Motions must be uploaded to PLEN to wirelessly operate it by means of a compatible cell phone or other Bluetooth device.

For information regarding the usage of PLEN MotionEditor (e.g., the motion upload method), refer to the instructions that accompany PLEN MotionEditor.

Next, the PLEN motion list featured in our company's demonstrations will be introduced. Please refer to it.

However, check the uploaded motions in advance to ensure that they all operate normally.

[screenshot]

Key to Screenshot

Motion List

[see list below]

[see list below]

[see list below]

[see list below]

[Read]

[Cancel]

Not all motion names are listed in the screenshot above, so the list is as follows:

- 00: Throw box to the front
- 01: 1 step forward
- 02: Throw box to the side
- 03: Move to the left
- 04: Lift box
- 05: Move to the right
- 06: Move to the left
- 07: 1 step backward
- 08: Move to the right
- 09: Put box down
- 10: Throw box forward
- 11: 1 step forward while holding a box
- 12: Throw box to the side
- 13: Turn counterclockwise while holding a box
- 14: 4 steps forward while holding a box
- 15: Turn clockwise while holding a box
- 16: Move left while holding a box
- 17: 4 steps backward while holding a box
- 18: Move right while holding a box
- 19: 1 step backward while holding a box
- 20: Skate left # Included motion name: roller skate left
- 21: Right leg up
- 22: Skate right # Included motion name: roller skate right
- 23: Accelerate left
- 24: Brake
- 25: Accelerate right
- 26: Skate backward to the left # Included motion name: roller skate backward to the left
- 27: Lift right leg backward
- 28: Skate backward to the right # Included motion name: roller skate backward to the right
- 29: Brake backward
- 30: Rise from face-up position [after falling from] roller skates¹
- 31: Rise from face-down position [after falling from] roller skates

¹ Translator's note: Without seeing the robot in action, it's difficult to know what 30 and 31 mean. These translations seem to be implied.

32: T-shape balance

75 to 86 set the motions for operating by means of the crosshair cursor of a compatible cell phone. The motion data for cursor operation are located at
C:\Program Files\I Bee\PLEN MotionEditor\Data\Motion Files\FOR Cursor
Operation\Walking

75: Start walking forward

76: Walking forward

77: Stop walking forward

78: Start walking backward

79: Walking backward

80: Stop walking backward

81: Start turning clockwise

82: Turning clockwise

83: Stop turning clockwise

84: Start turning counterclockwise

85: Turning counterclockwise

86: Stop turning counterclockwise

End of List

If motion transfer fails or the motion list is displayed incorrectly, press the [disconnect icon] button of PLEN MotionEditor to disconnect, and then press the [connect icon] button to attempt to reconnect.

The connection will be re-established normally.

The aforementioned are brief explanations of how to set the origin of PLEN and how to check its operation.

For details regarding PLEN MotionEditor, refer to the instructions that accompany PLEN MotionEditor.