ENCODER DISCHARGE

Under the following condition, Motoman requires a set-up operation as follows:

Condition:
1. Machine revolution data to be set to 0 at motor test run.
2. 4 days or more, with a battery not connected to an absolute encoder.

Notice) Under condition described above, capacitor built in the encoder may be charged with irregular voltage. This can cause erroneous operation of internal elements.

Set-up operation:
1. Shortcircuit across connector terminals 8 and 12 (or 2 and 6) for more than 2 minutes to discharge the capacitor.
2. Connect the wires for the encoder so that the battery (OBT for 8 or 2, RST for 12 or 6) is connected to the encoder.
3. Turn on the servopack power. If MAKE ABS DATA alarm is indicated, execute the operation from step 1 again.
4. Perform home position calibrating.

Notice) This set-up operation causes the motor-revolution data to be reset to 0.
HOME POSITION CALIBRATING

Home position calibrating is an operation in which the home position and encoder zero position coincide. Although this operation is performed prior to shipment at the factory, the following cases require this operation to be performed again:
- Charge in the combination of robot and YASKAWA ERC controller.
- Replacement of motor or encoder.
- Clearing stored memory.
  (by replacement of MM4 PC board, battery weak, etc.)
- Home position deviation caused by bumping the robot against a workpiece, etc.

HOME POSITION

Home position is pulse position "A" for each axis. Motoman-KOSB home position is shown as the right figure.

A: L-axis home position angle (90°)
B: U-axis home position angle (90°)
C: B-axis home position angle (-90°)

HOME POSITION REGISTRATION

Perform the home position calibrating by ERC teach pendant. Under the following condition, home position calibration is also possible by resetting absolute data after completion of home position:
HOME POSITION CALIBRATING

Perform the home position calibrating on OP2 display as follows:

Move the robot to home position.
Call up OP2 display by using user ID number.
Depress [Calibrate] soft key. The following display will appear.

Register the home position by using one of the methods below:
- Batch registration of all axes
- Individual registration

(1) Batch registration of all axes
Depress [Select] soft key.
The following soft keys will appear.

Depress [Done] soft key.
The home position of all axes displayed on the CRT display is registered.
The symbol "Completed" is displayed in "Completed Axes" column.
(2) Individual registration

Depress Setting soft key. The following soft keys will appear.

Resume  F1  Each axis  F2  All axes  F3  F4  F5

Depress Each axis soft key. The following soft keys appear.

Select SW  Register  F1  F2  F3  F4  F5

Move the cursor to "Select SW" of the axis whose home position is to be registered.

Depress Select SW soft key and set the "Select SW" on the CRT display will go ON and OFF alternately each time the Select SW soft key is depressed.

Depress Register soft key. The home position of only the axis on
which the "Select SW" is ON will be registered.

Note) Leave the "Select SW" OFF on axes on which the home position is not to be registered.

The symbol " Stevenson " is displayed and in "Completed Axis" column in relation to axes whose home position has been registered.

CHANGING THE ABSOLUTE VALUE OF HOME POSITION

When desiring to change the absolute value of only those axes whose home position has been registered, perform the following operation.

1. Depress All axes soft keys are displayed.

2. The following soft keys appear.

[F1]  [F2]  [F3]  [F4]  [F5]

3. Move the cursor to the absolute value of the desired axis.

4. Depress Datacheck soft key.

5. Enter the value to be changed.
HOME POSITION CALIBRATING COMPLETION

When the home position of robot and registered control reference position are the same, home position calibrating has been completed.

If it is not completed, position registration and playback operation cannot be performed.
Grease Replacement Procedures for S-, L- and U-axis Reduction Motor

<< S-axis >>
1. Remove plug B.
2. Inject grease (EPINOX AP0) into grease inlet on A using grease gun.
3. The grease replacement is completed when new grease appears from B.
   The new grease is distinguished from old grease by color.
4. Wipe parts B with a cloth and reinstall the plug.
   AMOUNT OF GREASE...700cc

<< L- and U-axis >>
1. Remove plugs on D and F.
2. Inject grease (EPINOX AP0) into grease inlets on C and E using grease gun.
3. The grease replacement is completed when new grease appears from D and F.
   The new grease is distinguished from old grease by color.
4. Wipe parts D and F with a cloth and reinstall the plugs.
   AMOUNT OF GREASE...300cc
REPLACEMENT PROCEDURE FOR BATTERY UNIT

Motoman and YASUNAIC ERC boad have a battery for ICROM and
backup to absolute encoder.
If battery alarm occurs, install a new battery as soon
as possible.

(1) MOTOMAN

If the battery charge becomes too low or is depleted, replace it
according to the following procedures.
1. Remove the side cover (U-axis motor side) of rotary head.
2. Remove the battery unit mounting screw (M5).
3. Remove the pins ①, ② (PC-2205-M, W) on both sides of battery.
4. Remove the old battery and mount the new battery.

NOTE
1. When the battery unit is replaced.
   Keep the power ON between YASUNAIC and Motoman.
2. Be sure to insert the pins in correct direction.
(2) YASNAG ERC

The manufacturing date is printed on the battery (JAPN-ERC03).

The battery must be replaced within one week after "BATTERY" display.
(When "BATTERY" is displayed on CRT, the red LED below the battery is lit on BB03 board.)

<< Battery replacing procedure >>
1. Remove the connector for battery.
2. Remove the battery mounting screw.
3. Install the new battery and connector.

Note) Although ICRAM and absolute encoder are backed up by the super capacitor, install a new battery as soon as possible if battery alarm occurs. Leaving the board without a battery over three days will result in the loss of the job data.
5. HOME POSITION CALIBRATING

Home position calibrating is an operation in which the home position and encoder zero position coincide. Although this operation is performed prior to shipment at the factory, the following cases require this operation to be performed again.

- Change in the combination of manipulator and YASMAC ERC controller
- Replacement of motor or encoder
- Clearing stored memory (by replacement of MM14 PCB board, battery weak, etc.)
- Home position deviation caused by bumping the manipulator against a workpiece, etc.

5.1 HOME POSITION

Home position is pulse position "0" for each axis.

The deviation values between home position and control reference position are set to RA parameters (RA00 to RA05). The deviation values are specified by angle of 1/1000° unit, and differ in manipulator type. See Para. 5.5.

<table>
<thead>
<tr>
<th>SC1G075</th>
<th>11320</th>
<th>10X11330</th>
<th>=</th>
<th>113300</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC1G083</td>
<td>-11330</td>
<td>10X11330</td>
<td>=</td>
<td>-113300</td>
</tr>
<tr>
<td>RC1G126</td>
<td>0-3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RC1G245 (+)</td>
<td>11725</td>
<td>10X11725</td>
<td>=</td>
<td>117250</td>
</tr>
<tr>
<td>RC1G253 (-)</td>
<td>-11330</td>
<td>10X11330</td>
<td>=</td>
<td>-113300</td>
</tr>
<tr>
<td>RC1G261 (+)</td>
<td>11320</td>
<td>10X11330</td>
<td>=</td>
<td>113300</td>
</tr>
<tr>
<td>RC1G269 (-)</td>
<td>-11725</td>
<td>10X11725</td>
<td>=</td>
<td>-117250</td>
</tr>
</tbody>
</table>

In the same way change

continued...
5.2 HOME POSITION REGISTRATION

Perform the home position calibrating by ERC teach pendant as follows:

(1) Move the robot to home position.
(2) Call up OP2 display, referring to Par. 2 (2).
(3) Depress Calibrate software key.
The following display will appear.

<table>
<thead>
<tr>
<th>Absolute Data</th>
<th>Completed Axes</th>
<th>Select SW</th>
</tr>
</thead>
<tbody>
<tr>
<td>S 1200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L 150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>U 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R 300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T 10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(4) Register the home position by using which of methods below.

- Batch Registration of All Axes
  (i) Depress Setting software key.
      The following software keys will appear.
      Resume Each axis All axes
  (ii) Depress All axes software key.
      The home position of all axes displayed on the CRT display is registered.
  (iii) The symbol "•" is displayed in "Completed Axes" column.

- Individual Registration
  (i) Depress Setting software key.
      The following software keys will appear.
      Resume Each axis All axes
  (ii) Depress Each axis software key.
      The following software keys.
      Select SW Register
5.2 HOME POSITION REGISTRATION (Cont’d)

(iii) Move the cursor to “Select SW” of the axis whose home position is to be registered.

(iv) Depress [Select SW] software key and set the “Select SW” on the CRT display will go ON and OFF alternately each time the [Select SW] software key is depressed.

(v) Depress [Register] software key.

The home position of only the axis on which the “Select SW” is ON will be registered.

Note: Leave the “Select SW” OFF on axes on which the home position is not to be registered.

(vi) The symbol “ ” is displayed and in “Completed Axis” column in relation to axes whose home position has been registered.

5.3 CHANGING THE ABSOLUTE VALUE OF HOME POSITION

When desiring to change the absolute value of only those axes whose home position has been registered, perform the following operation.

(i) Depress [ ] Key when [Disp chg] [ ] [Setting] software keys are displayed.

(ii) The following software keys appear.

[ ] [ ] [Data chg]

(iii) Move the cursor to the absolute value of the desired axis.

(iv) Depress [Data chg] software key.

(v) Enter the value to be changed.

5.4 HOME POSITION CALIBRATING COMPLETION

When the home position of robot and registered control reference position are the same, home position calibrating has been completed.

If it is not completed, position registration and playback operation cannot be performed.

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5.5 HOME POSITION ACCORDING TO MANIPULATOR TYPE

(i) Motoman-L Type
- Motoman-L06S, -L15S, -L30S, -L60S, -L100S, -L3G (6 Axis)
- Motoman-L100S (6 Axis)

RA Parameter Setting (L60S)

<table>
<thead>
<tr>
<th>RA00 (S)</th>
<th>RA01 (L)</th>
<th>RA02 (U)</th>
<th>RA03 (R)</th>
<th>RA04 (B)</th>
<th>RA05 (T)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>13000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

#A: L-axis home position angle (15°)

<table>
<thead>
<tr>
<th>L06S</th>
<th>L15S</th>
<th>L30S</th>
<th>L60S</th>
<th>L3G</th>
<th>L100S</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Motoman-L100S (4 Axis)

RA Parameter Setting

<table>
<thead>
<tr>
<th>RA00 (S)</th>
<th>RA01 (L)</th>
<th>RA02 (U)</th>
<th>RA03 (R)</th>
<th>RA04 (B)</th>
<th>RA05 (T)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>15000</td>
<td>0</td>
<td>0</td>
<td>-90000</td>
<td>0</td>
</tr>
</tbody>
</table>

#A: L-axis home position angle (15°)
B: B-axis home position angle (-90°)
5.5 HOME POSITION ACCORDING TO MANIPULATOR TYPE (Cont'd)

(2) Motoman-K Type
- Motoman-KSL. -K10S (6 Axis)

RA Parameter Setting

RA00 (S) 0
RA01 (L) 90000
RA02 (U) 90000
RA03 (R) 0
RA04 (B) -90000
RA05 (T) 0

A: L-axis home position angle (90°)
B: U-axis home position angle (90°)
C: B-axis home position angle (-90°)

(3) Motoman-V Type
- Motoman-V6S (6 Axis)

RA Parameter Setting

RA00 (S) 0
RA01 (L) 0
RA02 (U) 0
RA03 (R) 0
RA04 (B) 0
RA05 (T) 0

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5.5 HOME POSITION ACCORDING TO MANIPULATOR TYPE (Cont'd)

(4) Motoman-K Type (for handling between presses)
Motoman-K205S and -K204S differ in RA parameter setting values, but they are the same in
the home position setting.

- Motoman-K205S (3 Axis)

RA Parameter Setting

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA00 (S)</td>
<td>0</td>
</tr>
<tr>
<td>RA01 (L)</td>
<td>-90000</td>
</tr>
<tr>
<td>RA02 (U)</td>
<td>90000</td>
</tr>
<tr>
<td>RA03 (R)</td>
<td>0</td>
</tr>
<tr>
<td>RA04 (B)</td>
<td>-90000</td>
</tr>
<tr>
<td>RA05 (T)</td>
<td>0</td>
</tr>
</tbody>
</table>

4A: L-axis home position angle (-90°)
B: U-axis home position angle (90°)
C: B-axis home position angle (-90°)

- Motoman-K204S (1 Axis)

RA Parameter Setting

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA00 (S)</td>
<td>90000</td>
</tr>
<tr>
<td>RA01 (L)</td>
<td>-90000</td>
</tr>
<tr>
<td>RA02 (U)</td>
<td>90000</td>
</tr>
<tr>
<td>RA03 (R)</td>
<td>0</td>
</tr>
<tr>
<td>RA04 (B)</td>
<td>-90000</td>
</tr>
<tr>
<td>RA05 (T)</td>
<td>0</td>
</tr>
</tbody>
</table>

4A: L-axis home position angle (-90°)
B: U-axis home position angle (90°)
C: B-axis home position angle (-90°)

Note: The manipulator coordinate system differs with Motoman-K205S
because S axis is rotated at angles of 90.
5.5 HOME POSITION ACCORDING TO MANIPULATOR TYPE (Cont'd)

(a) R-axis: Horizontal Turning

RA Parameter Setting

RA00 (S) 90000
RA01 (L) 0
RA02 (U) 0
RA03 (R) 0
RA04 (D) 0
RA05 (T) 0

*A: S-axis home position angle (90°)

(b) R-axis: Vertical Turning

RA Parameter Setting

RA00 (S) 90000
RA01 (L) 0
RA02 (U) 0
RA03 (R) 0
RA04 (D) -90000
RA05 (T) 0

*A: S-axis home position angle (90°)
B: Z-axis home position angle (-90°)