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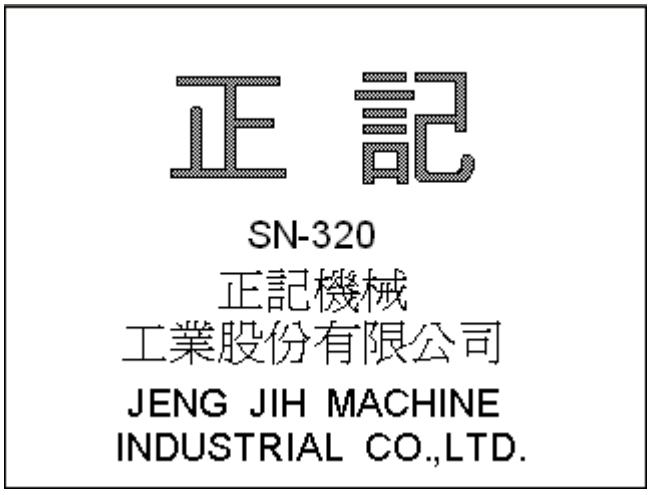
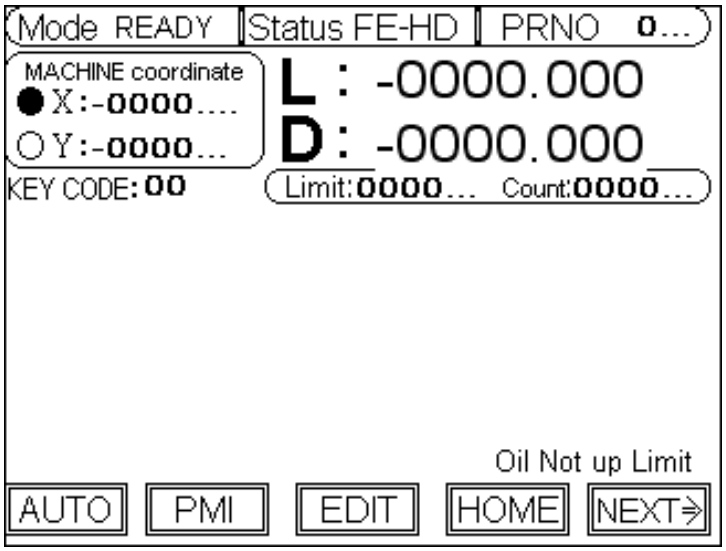
I. Power-On Screen

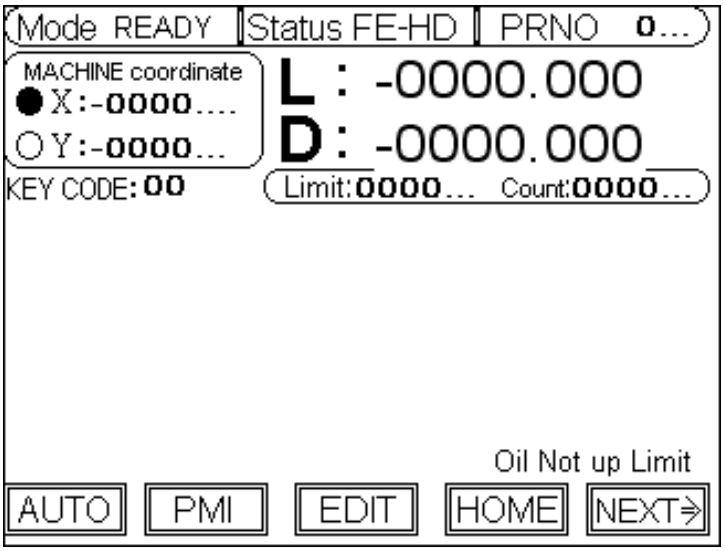


After power-on, the screen appears as above and you can press any key to show the standby screen.

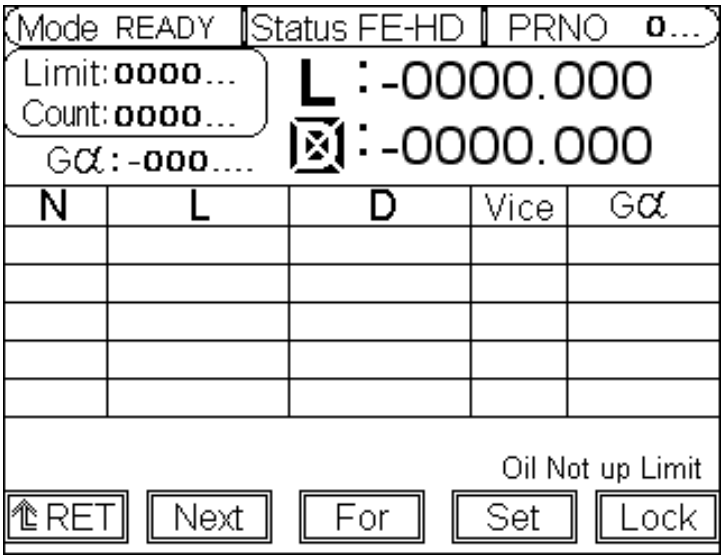
II. Standby Screen



※ Press the corresponding function key at the bottom of the screen to select your desired mode, or press the Toggle key at the furthest right to show the 2nd page as follows:



III. Auto Mode



Press the Auto key on the standby screen to enter Auto mode as above, with the following function keys:

Return: Go back to the standby screen.

Simulation: Execute the “Next Work”.

If the selection remains highlighted, do not press the “Regenerate Key” because the program is still running.

Regenerate: Execute the “Previous work”

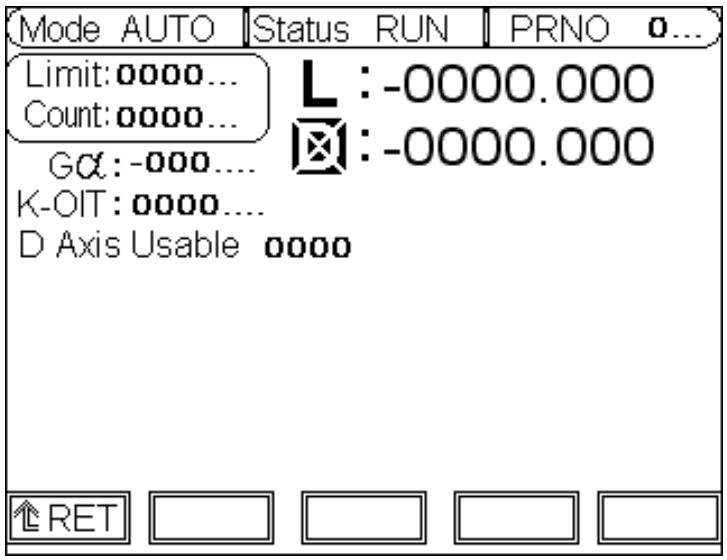
If the selection remains highlighted, do not press the “Simulation Key” because the program is still running.

Lock:

When certain work is performed, pressing this key will pause the program.

※Press this key again to cancel.

Settings: Enter the Auto Setting page (as follows).



Configurable items include:

Limit: Specify the total number of work pieces.

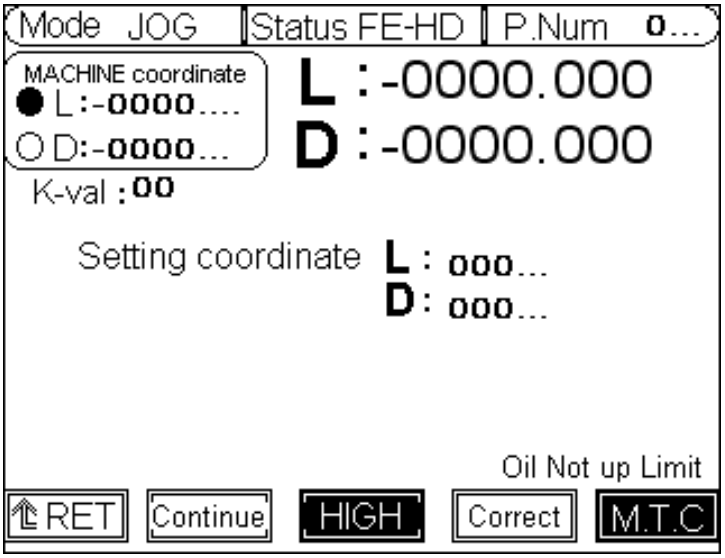
Count: When a work piece is finished, one is added to the count and the count will be compared with your limit settings. The Limit area on the Auto screen is automatically highlighted and the Start key is invalid when the count reaches your limit settings. The situation remains the same until the count is set to zero.

Full Compensation: Perform compensation for the position axis.

Off-Limit Area: Specify the limit value for moving forward, which ranges from 999.999 to 0.

D Valid: D is valid when “0” is entered (the position axis is operational); D is invalid when “1” is entered (the position axis is not operational).

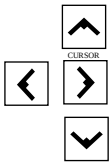
IV. Jog Mode



Press the Jog key on the standby screen to enter Jog mode as above, with the following function keys:

Return: Go back to the standby Screen

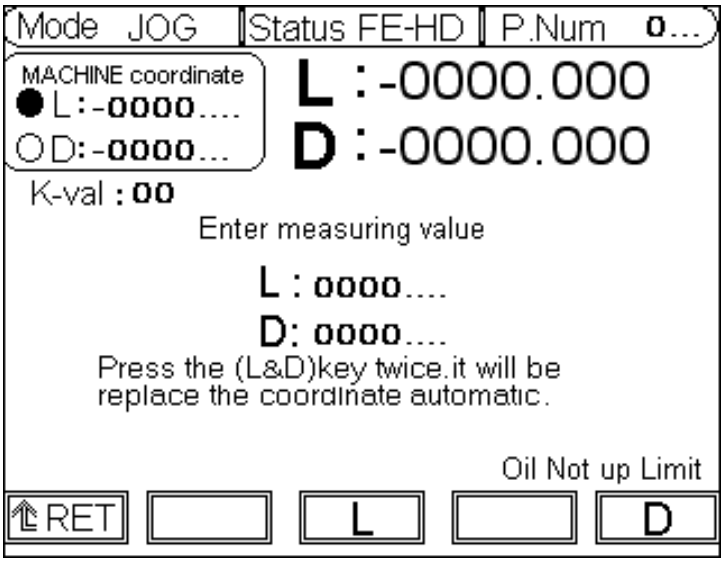
Continuous, 1mm, 0.1mm, 0.01mm, 0.001mm: Press the corresponding key to switch between the continuous, 1mm, 0.1mm, 0.01mm, and 0.001mm dynamic charts. During jogging, movement is conducted according to the selected format.

Ex.: Current format – 1mm and current coordinates X100mm.Y100mm.When the Jog key 

is pressed, the coordinate value is changed in 1mm increments.

High, Medium, and Low Speed: The variations on the jog multiplication factor are 100%, 50%, and 10%.

Calibration: Press the Calibration key to jump to the Calibration page as follows:



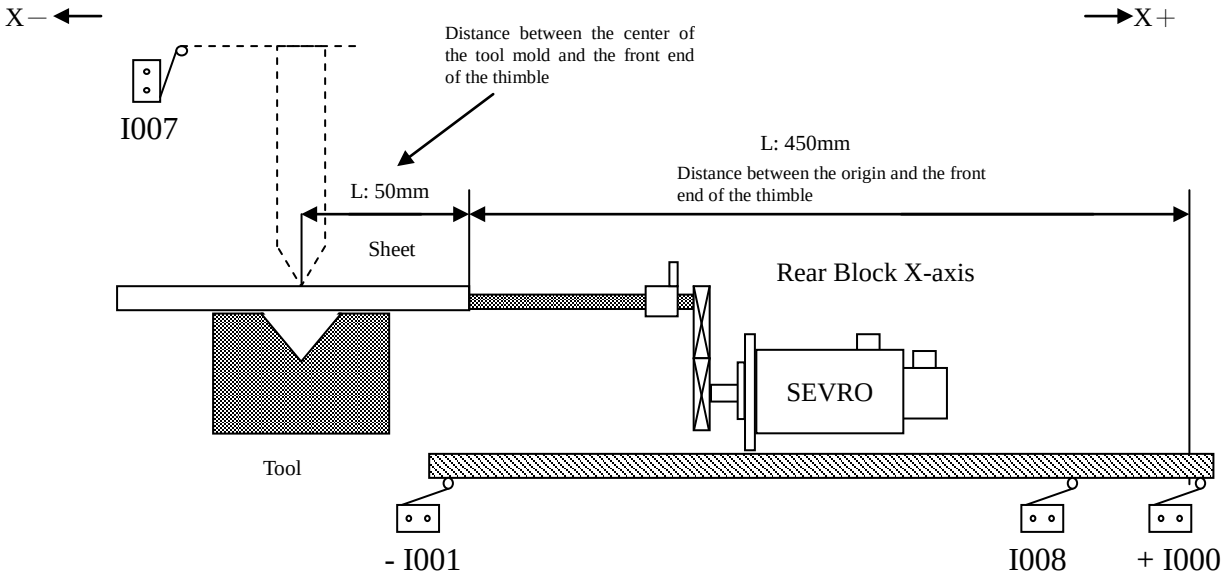
Return: Go back to Jog mode.

L: After an actual measurement is entered, fill it in the L:0000 field and double-click the L function key to calibrate the work origin of the rear scale axis.

D: After an actual measurement is entered, fill it in the D:0000 field and double-click the D function key to calibrate the work origin of the position axis.

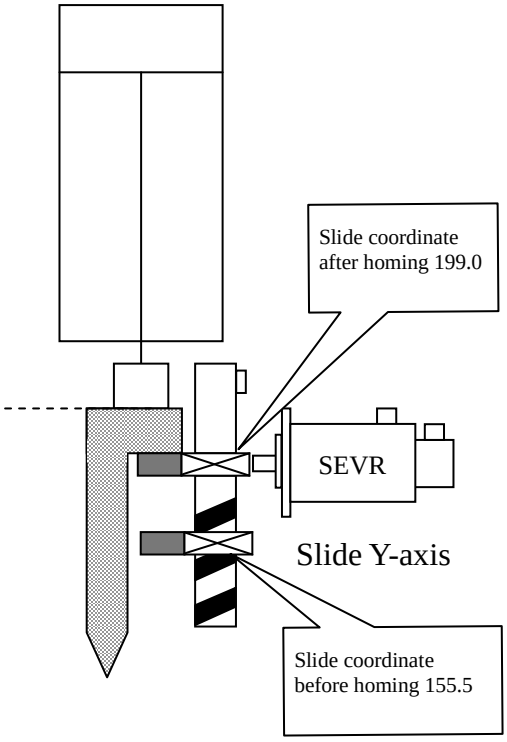
Ex.:

Take the calibration of the rear scale axis as an example. When the tool mold is fitted and die spotting is finished, the distance between the rear scale axis thimble and origin is 450mm. If the actual measurement between them is 50mm, you can fill the value in the L field on the calibration screen and double-click the L function key to calibrate the new work coordinates.



※ Calibration is often done during the update of the work origin of the rear scale axis after the tool is replaced or the setting of the work origin if the position axis receives no origin signal.

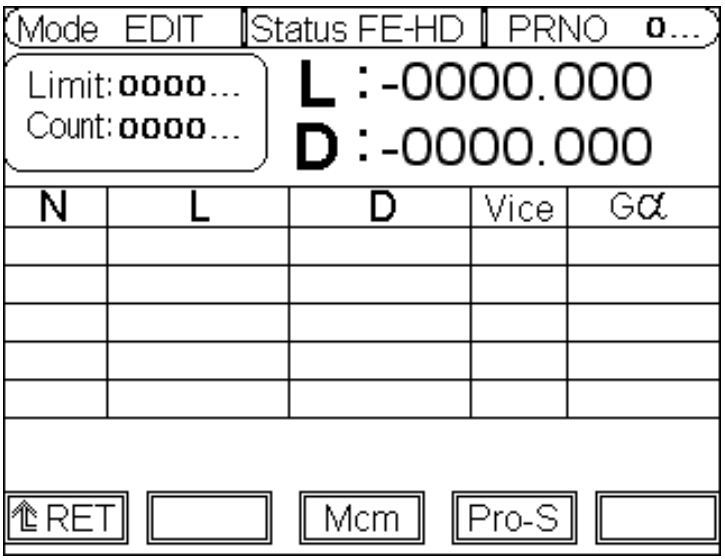
※ Calibration is not allowed until homing is finished.



Position axis calibration: As shown in the above figure, the position axis is at 155.5 before homing and at 199.0 after homing. Based on the rule of thumb, the axis should be at 199.0. Fill 199.0 in the D: _____ field and double-click the D function key to finish calibration. Meanwhile, the program coordinate shown becomes 199.0.

Positioning: Fast positioning is performed, after your coordinates are filled in the positioning coordinate field of the rear scale axis _____ and position axis _____ field and the Positioning key is pressed.

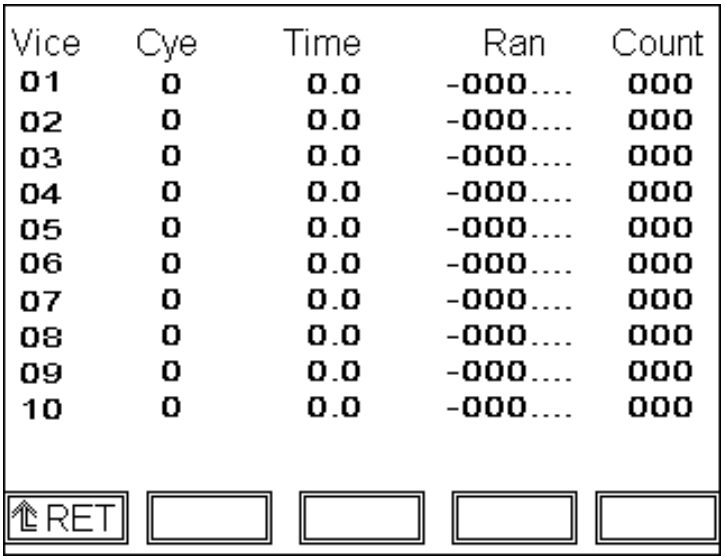
V. Edit Mode



Press the Programming key on the standby screen to enter Edit mode as above, with the following function keys:

Return: Go back to the standby screen

Parameter: Press the Parameter key to jump to the Parameter page as follows.



Return: Go back to Programming mode

Cycle:

If 1 is shown, a new cycle will be performed; “Arc Bend”

If 0 is shown, a new cycle will not be performed and only the specified receding distance is used.

Dwell Time:

Cycle setting 1: The dwell time refers to the amount of time between each bending and next dwell, when a new cycle is performed.

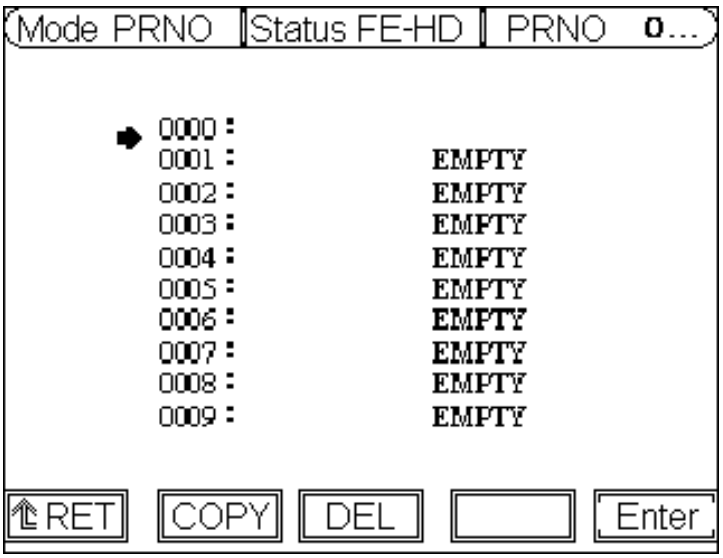
Cycle setting 0: The dwell time refers to the amount of time before the next work is performed.

Receding: The receding distance of the rear scale axis or cycle distance when bending work is performed. (Unit: mm)

Number of times: If the cycle is set to 1, the work is performed according to the settings of the receding distance and number of times.

Ex.: If receding is set to 3mm and the number of times is set to 10, when the work is performed, the rear scale axis will move forward 3mm and repeat this action 10 times, after the receding signal disappears.

Program Selector: Press the Program Selector key to jump to the Selection page as follows.

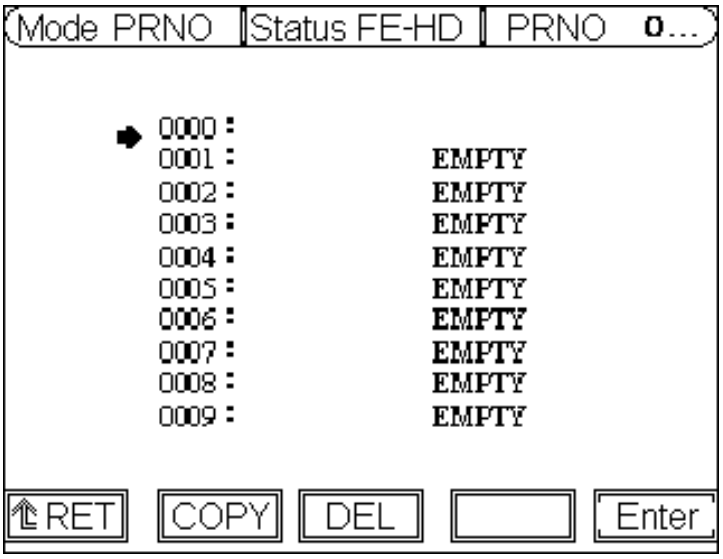


Return: Go back to Edit mode.

Delete: Delete a program.

Confirm: Confirm the selected program.(You can also press the Enter key ↵ on the controller panel.)

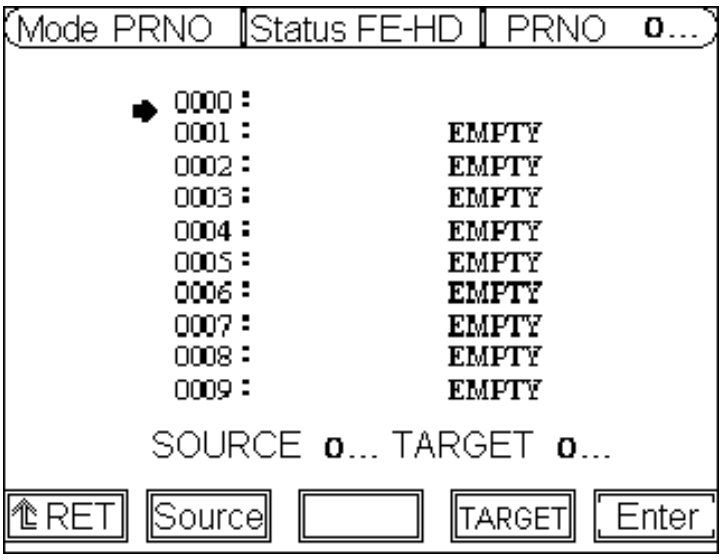
Copy: Jump to the Copy page to copy a program (as follows).



Delete: Delete a program.

Confirm: Confirm the selected program.

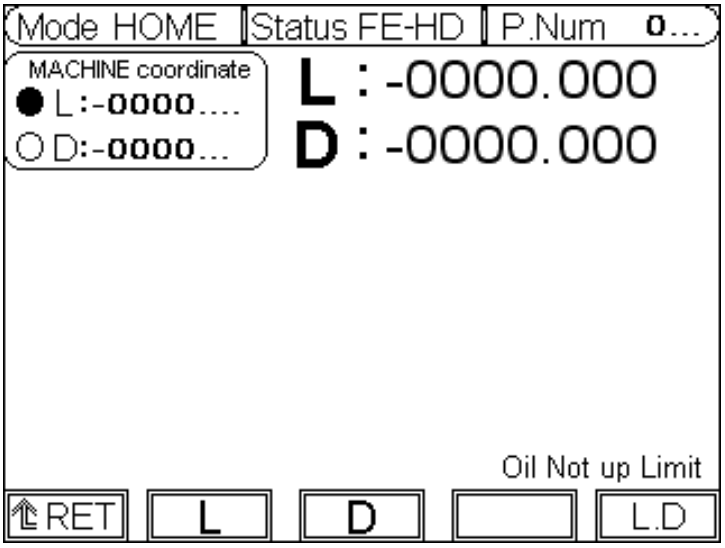
Copy: A dialogue-type screen appears as shown in the following figure with a click on the Copy key in Copy page. Move the cursor to the program to be copied with the CURSOR keys and press the **Source key**; then, move the cursor to the program to be overlaid and press the **Destination key**. Press the **Confirm key** to finish program copying.



EX.: Observe the following steps to copy the program 0 to the program 6.

1. Move to the program 0 and press the Source key.
2. Move to the program 6 and press the Destination key.
3. Press the Confirm key.

VI. Origin Mode



Press the Origin key on the standby screen to enter Origin mode as above, with the following function keys:

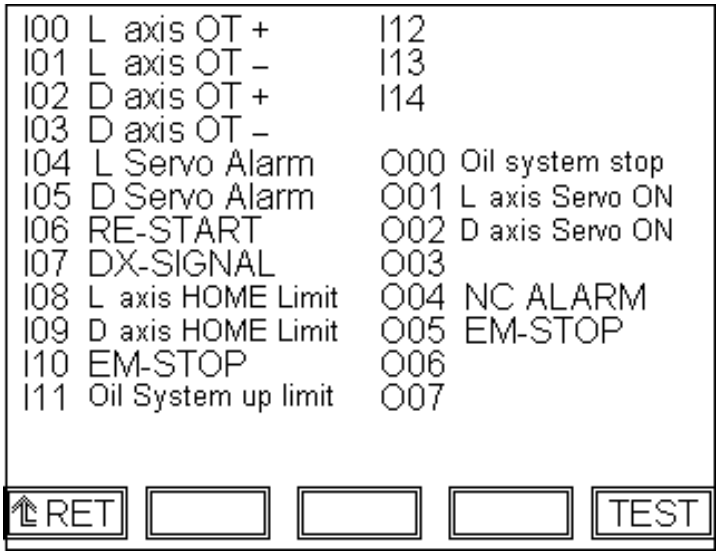
Return: Go back to the standby screen

L: Select the Rear scale axis to perform homing and press the L key and CYCST key for execution.

D: Select the Position axis to perform homing and press the D key and CYCST key for execution.

Simultaneous Movement: Select the rear scale axis and position axis to perform homing and press the Simultaneous Movement key and CYCST key for execution.

VII. Monitoring Mode

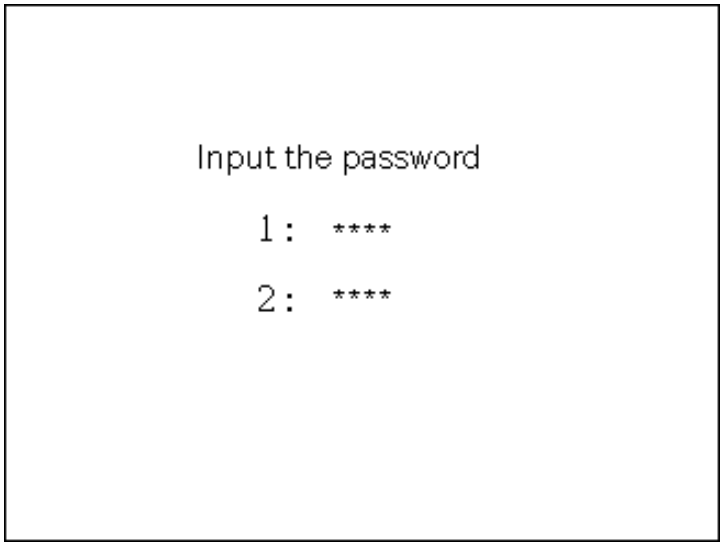


Return: Go back to the standby screen

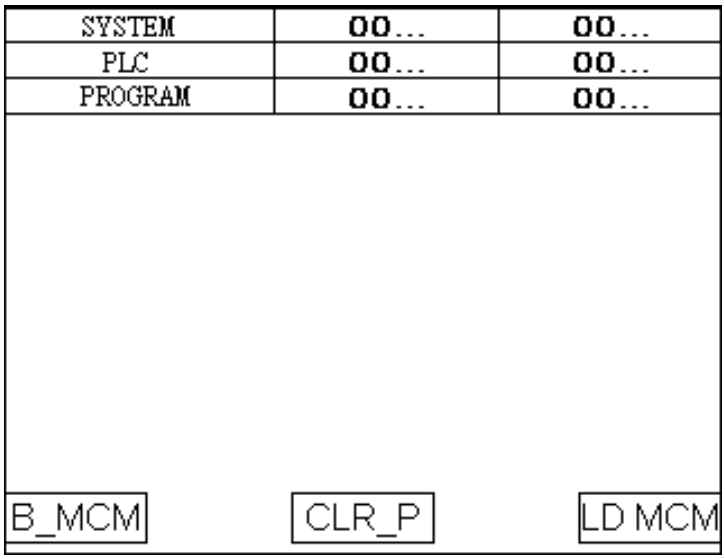
Test: Double-click the Test key to activate manual output control by taking advantage of the numeric keys 0 ~ 7 on the controller panel. Double-click the key again to cancel the output test.

VIII. MCM Parameters

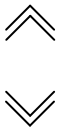
With a password.



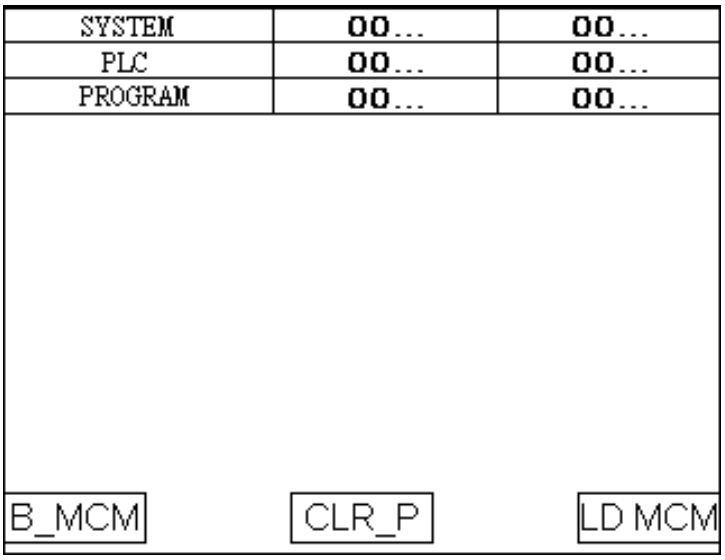
Without a password.



Press the MCM Parameter key on the standby screen to enter Parameter Setting mode. If you have set a password, the screen appears as shown in the first figure above when the MCM Parameter key is pressed. If you haven't set a password, the screen appears as shown in the second figure above.

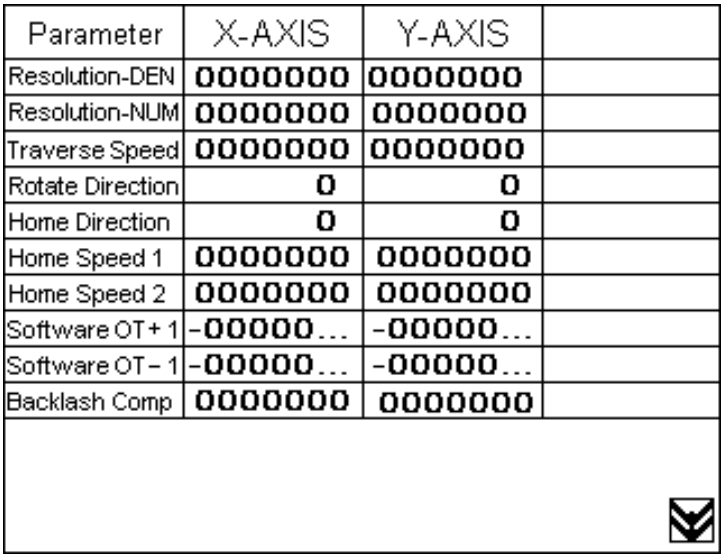
※Press the key  to switch between the parameter setting pages.

Parameter Setting Page 1



System Date: Display the recently edited system date (unwritable).
PLC Date: Display the recently edited LAD date (unwritable).
Program Date: Display the recently edited program date (unwritable).

Parameter Setting Page 2



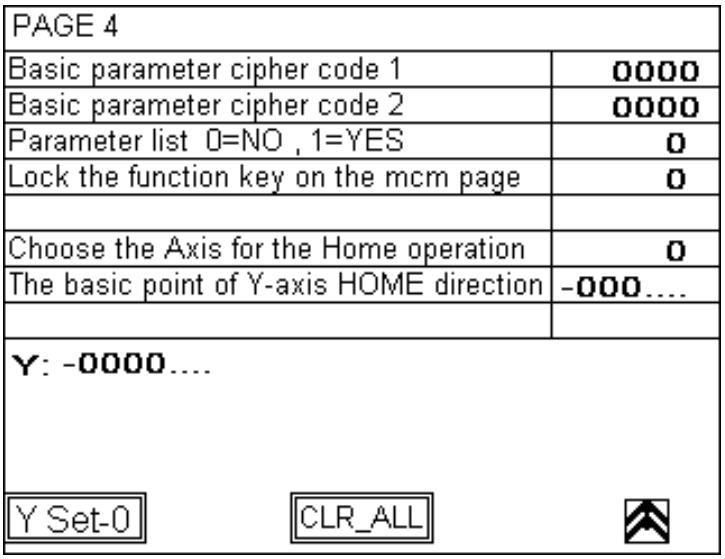
Parameter Setting Page 3

Parameter	X-AXIS	Y-AXIS	
Software OT+ 2	-00000...	-00000...	
Software OT- 2	-00000...	-00000...	
JOG Feed-Rate	0000000	0000000	
Setting the range of Grid	0000.0...	0000.0...	
Home Limit	0000000	0000000	
OT Limit	0000000	0000000	
Axis limit	0000000	0000000	
(0:NC 1:NO)			

Parameter Setting Page 4

PAGE 3	
Y-Opening default setting	000....
D-axis HOME limit setting	000....
Pulse train form 0:P+D 1:P+N	0
G00 Linear accel/decel	0000
0=Metric mode 1=Inch mode	0
Language 0=Chinese 1:English	0

Parameter Setting Page 5



Description of MCM Parameters

1. Set the X-axis resolution denominator (number of pulses).
2. Set the X-axis resolution numerator (distance).
   Format = □□□□□□□ (Default =100)
3. Set the Y-axis resolution denominator (number of pulses).
4. Set the Y-axis resolution numerator (distance).
   Format = □□□□□□□ (Default =100)

The numerator or denominator of the resolution is set based on the specifications of the mechanical axial gearing (such as ball screw) and the number of pulses received by the driver. No unauthorized change of setting is allowed.

$$\text{Resolution} = \frac{\text{Ball screw pitch}}{\text{Number of pulses}} \times \text{GR}$$

Ex.:

Ball screw pitch of X-axis = 5.000mm = 5000 um

Number of pulses received by the driver = 2500 pulses (2500 pulses per revolution)

Gear Ratio = 4:1(Servomotor rotates 4 turns = ball screw Rotates 1 turn)

$$\text{Resolution} = \frac{5000}{2500} \times \frac{1}{4}$$

$$= \frac{1}{2}$$

5. Set the max. X-axis feed-rate.
6. Set the max. Y-axis feed-rate.
   Format = □□□□□ (Default =10000) Unit: mm/min.

   Note: The integer format is adopted for this setting.

   Ex.: If the setting value is 5000, it means that the maximum X-axis feed rate will be 5000 mm per minute.

   The maximum feed rate is calculated as follows:

   F_{max} = 0.95 x RPM (the maximum rpm of the servomotor) x Pitch (ball screw pitch) ÷ GR

   Ex.: The max. X-axis servo motor rpm is 3000 with a 5mm pitch and GR = 5:1 (Servomotor rotates 5 turns = ball screw rotates 1 turn)
   $F_{max} = 0.95 \times 3000 \times 5 \div 5 = 2850$ mm/min
   Recommended setting: 2850.

7. Set the motor rotation direction on X-axis.
8. Set the motor rotation direction on Y-axis.
   Format = □ (Default = 0)

   If the setting value is 0, the revolution direction is CW.
   If the setting value is 1, the revolution direction is CCW.

※ **The machine design is varied between manufacturers. The servomotor can be mounted on the left, right, front, or back of the ball screw. After the servomotor is mounted, you can correct the machine direction by taking advantage of parameter settings. The machine coordinate direction will be affected by this parameter.**

9. Set the X-axis homing direction.
10. Set the Y-axis homing direction.
    Format = □ (Default = 0)

    If the setting value is 0, the homing operation is executed in the positive direction.
    If the setting value is 1, the homing operation is executed in the negative direction.

11. Set the X-axis homing speed (first velocity).
12. Set the Y-axis homing speed 1 (first velocity).
    Format = □□□□ (Default = 2500); unit: mm/min.

13. Set the X-axis homing speed 2 (second velocity).
14. Set the Y-axis homing speed 2 (second velocity).
    Format = □□□□ (Default = 40); unit: mm/min.

※ When the tool returns to home, the machine moves to the **limit switch** at the first velocity and the length of the **limit switch must be greater than the distance required for deceleration.** Otherwise the machine will run over the limit switch and result in a homing error.

The equation to calculate the length of the limit switch is:

The length of limit switch ≥ (FDCOMxACC)÷60,000

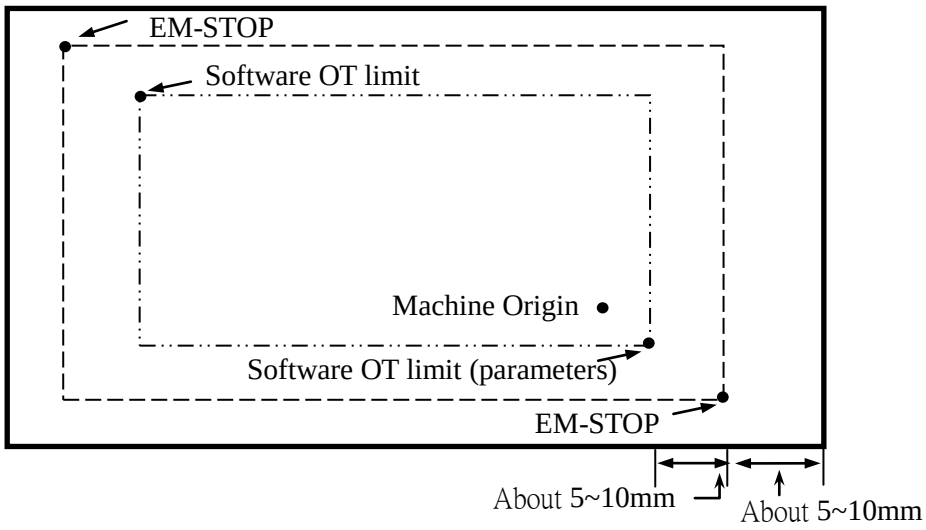
Note: ① FDCOM = Homing velocity 1
② ACC = G01 acceleration and deceleration time
③ 60,000 msec (60 secs × 1000 = 60,000 msec)

Ex.: FDCOM, the homing velocity 1 = 3000 mm / min
ACC, accel/decel time = 100 ms
Minimal Length of Limit Switch = (3000 x 100) ÷ 60,000 = 5 mm

15. Set X-axis software OT Limit (+).
16. Set Y-axis software OT Limit (+).
    Format = □□□□.□□□ (Default= +9999.999)
    Unit is mm.
    The setting is the positive distance from the machine origin.

17. Set X-axis software OT Limit (-).
18. Set Y-axis software OT Limit (-).
    Format = □□□□.□□□ (Default= -9999.999)
    Unit is mm.
    The setting is the negative distance from the machine origin.

The concept and description of OT limit:



Note: The distance between the setting point of software OT limit and EM-STOP is about 5~10mm.

19. Set X-axis backlash compensation.
20. Set Y-axis backlash compensation.
    Format = □□□□ (Default=0); unit = um.

21. Set X-axis software OT Limit 2 (+).
22. Set Y-axis software OT Limit 2 (+).
    Format = □□□□.□□□ (Default= +9999.999)
    Unit is mm.
    The setting is the positive distance from the machine origin.

23. Set X-axis software OT Limit 2 (-).
24. Set Y-axis software OT Limit 2 (-).
    Format = □□□□.□□□ (Default= -9999.999)
    Unit is mm.
    The setting is the negative distance from the machine origin.

※ **The software OT Limit 2 setting also uses the same method for the software OT Limit setting. The only difference is that the software OT Limit 2 setting is used only for checking each setting for correctness when a program is added.**

25. Set the X-axis Jog speed (mm/min).
26. Set the Y-axis Jog speed (mm/min).
    Format = □□□□□ (Default =1000)

27. X-axis servomotor homing grid distance

28. Y-axis servomotor homing grid distance
    Format = □□□□.□□□ (Default =1000.000)
    The maximum distance for servomotor homing grid.

Ex.:

If the distance per revolution by X-axis servomotor = 5.000 mm, MCM216 = 5.200.

29. Origin signal format.0 = NO normal open; 1 = NC normal closed.
    Format = □ (Default = 0)

30. Limit signal format.0 = NO normal open; 1 = NC normal closed.
    Format = □ (Default = 0)

31. Abnormal axial signal format. 0 = NO normal open; 1 = NC normal closed.
    Format = □ (Default = 0)

32. Machine open degree setting.
    Reserved.

33. Height setting of the Home point for angular axis.
    Reserved.

34. Pulse format.
    Format = □ (Default = 0)
    Set the pulse for axial output.
    = 0 pulse + direction.
    = 1 positive pulse + negative pulse.

35. Set the constants of the G00 acceleration/deceleration time.
    Format = □□□ (Default = 100); unit: Millisecond (msec).
    Setting Range: 4~512 ms.
    If MCM #166 = 0, type of acceleration/deceleration for G00 = Linear.
    If MCM #166 = 1, type of acceleration/deceleration for G00 = “S” curve. When doing so, the setting is still the same as the linear type, but the actual acceleration/deceleration time is twice the time that is set.

36. Switch between the Metric and British systems.
    Format = □ (Default=0)

Setting = 0 Metric
Setting = 1 British

37. Switch between Traditional Chinese / English.
    Format = □ (Default=0)
    Setting = 0 Chinese
    Setting = 1 English

38. Parameter password 1.
    Format = □□□□
    Set the password used to enter the MCM Parameters pages.

39. Parameter password 2.
    Format = □□□□
    Set the password used to enter the MCM Parameters pages.

40. Parameter List.
    Format = □
    0 - Hidden; 1 - Displayed

41. Function keys in Parameters pages.
    Format = □
    0 - Hidden; 1 - Displayed

※ You can press RESET key and enter the Parameters pages. When restarting, the controller settings are set to 0.

42. Homing axis.
    Format = □
    1 - L-axis (rear scale axis), 2 - D-axis (position axis), 3- L-axis and D-axis.

43. The basis point for Y-axis homing direction.
    Format = □□□□.□□□
    The distance it moves away from the origin signal, when position axis homing is completed.

※ **This parameter is used when the position axis receives the origin signal.**

IX. I/O Table

I/O Deployment				
Input Point	Description	Remarks	Out point	Description
I00	＃Rear Scale Limit (+)		O00	Hydraulic Stop Signal
I01	＃Rear Scale Limit (-)		O01	L-axis Servo ON
I02	＃ Position-axis Limit (+)		O02	D-axis Servo ON
I03	＃ Position-axis Limit (-)		O03	
I04	Abnormal L-axis Servo		O04	Controller Alarm
I05	Abnormal D-axis Servo		O05	Emergency Stop Output
I06	Restart		O06	
I07	Receding Signal		O07	
I08	＃Rear Scale Axis (L-axis) Origin Signal			
I09	＃ Position-axis (L-axis) Origin Signal			
I10	Emergency Stop			
I11	Upper Hydraulic Limit			
I12				
I13				
I14				

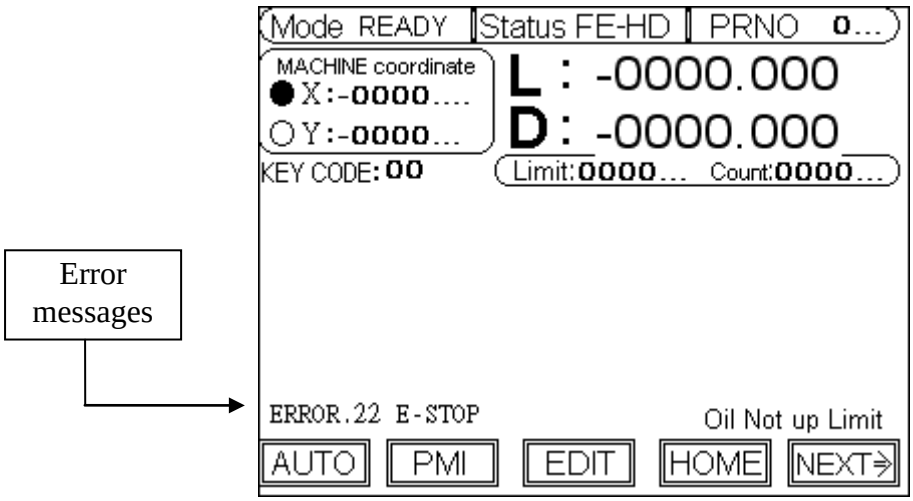
Note: ◎ means that free planning is allowed together with “Wait for input” when the input signal function is enabled.

＊ means that the validness is determined by the parameter settings.

＃ means that the validness for Contact A or B is determined by the parameter settings.

X. Abnormal Messages

When an error occurs during the execution of the program, the error message is displayed on the LCD, as shown in the following figure. Possible error messages of the controller and their solutions are described in the following:



* ERROR-01 MCM DATA ERROR OR BATTERY FAIL

Description: MCM parameter settings are incorrect or the memory battery has low power.

Recommended Remedy:

1. Check that the “MCM parameters” are correct.
2. If the controller has not been switched on for more than one year, the data in the memory will be lost. Where the controller generates a (BT1) low power message, switch on the controller to charge the battery.

* ERROR-10 RS232 ERROR

Description: An error in RS232C communication signal of the controller.

Recommended Remedy:

1. Check and make sure that the baud rate of the controller is same as the baud rate of the computer.
2. Check the cable connection between the controller and the computer.

* ERROR-12 NO ROOM

Description: An error occurs when the controller loads the preprocessor program.

Recommended Remedy:
Switch off and on the controller again to reload the preprocessor program.

* ERROR-11 PROGRAM MEMORY ERROR

Description: An error in program memory. Low battery.

Recommended Remedy:
Check the memory battery. If the controller generates a (BT1) low power message, replace the battery. (If the controller has not been switched on for more than one year, the data in the memory will be lost.)

*** Method for clearing all program data:**

1. Enter the Parameter List.
2. The Help for each corresponding function key will be shown when the Parameter List is not locked. Press the “Clear Program” key for 2 seconds to remove all program data in the controller.
   (If the Parameter List is locked, disable the lock function in the Parameter List.)
3. The controller restarts and the system automatically reloads the required programs.
4. Burning is not allowed because the system is protected after all program data are removed.

* ERROR-14 X-AXIS OVER TRAVEL

Description: The X-axis moves beyond the pre-set hardware over-travel limit.

Recommended Remedy:
Use the JOG (single step) function to return the axial movement from the limit to within normal range.

* ERROR-14 Y-AXIS OVER TRAVEL

Description: The Y-axis moves beyond the pre-set hardware over-travel limit.

Recommended Remedy:
Use the JOG (single step) function to return the Y-axial movement from the limit to within normal range.

* ERROR-18 END OF FILE NOT FOUND

Description: Program end error.

Recommended Remedy:
Check the program content for blanks.
If the subprogram is called, check the subprogram content for the end code “M99”.

* ERROR-20 SOFTWARE OVER-TRAVEL

Description: The program runs beyond the software over-travel limit.

Recommended Remedy:
Check the program or reset the settings (for software travel limit).

* ERROR-22 EM-STOP, HOME AGAIN

Description: The controller is now in the emergency stop state.

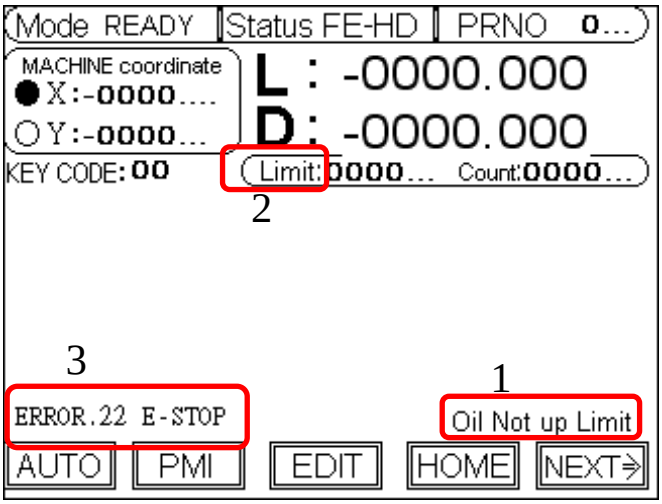
Recommended Remedy:
After the cause of the emergency is removed, restore the emergency stop button and press “reset”.
If the controller remains in the emergency stop state, please check its connection.
(The input point I14, then, goes out of the emergency stop state)

* ERROR-30.1 BATT. LOW

Description: The battery (BT1) for data storage is out of charge or service.

Recommended Remedy:
Switch on the controller for 4 hours to charge the memory battery. Restart the controller after the battery is fully charged. If the alarm still appears after restart, replace the battery (BT1).

XI. Attachment



1. **User Defined Error State Display Area:** The main states include **Not Homing, X-axis Failure, Y-axis Failure, Emergency Stop, Off-limit Area, Lower than Upper Hydraulic Limit.**

Not Homing: When the axial movement is abnormal, the controller determines the number of axes that should perform homing according to the parameters, and which axis should perform homing. If homing is not performed, the program can't be launched.

X-axis Failure: When the I4 signal is sent to the controller, it means X-axis is abnormal.

Y-axis Failure: When the I5 signal is sent to the controller, it means Y-axis is abnormal.

Emergency Stop: The message appears when you press the Emergency Stop key.

Off-limit Area: Before running a program, the controller checks if the X-axis of each work is within the off-limit area. If this is the case, the message appears.

Not Reach Upper Hydraulic Limit: The message appears if no signal is received for upper hydraulic limit when the D-axis has to move.

2. **Limit and Count:** When the work count reaches the specified number, the program can't be executed. No more work is permitted until the count is

reset to zero.

3. **User Defined Positioning Error:** ERR51, ERR52, ERR53, ERR54

ERROR51: If the rear scale axis value is more than the maximum limit of X-axis during fast positioning, the message appears.
(Remedy: Specify a value for rear scale axis that is less than the maximum limit)

ERROR52: If the rear scale axis value is less than the minimum limit of X-axis (off-limit area settings) , the message appears.
(Remedy: Specify a value for rear scale axis that is more than the minimum limit)

ERROR53: If the position-axis value is more than MCM16 (Software OT Limit 2), the message appears.
(Remedy: Specify a value for position axis that is less than MCM 16 (Software OT Limit 2 settings)

ERROR54: If the position-axis value is more than MCM17 (Software OT Limit 2), the message appears.
(Remedy: Specify a value for position axis that is less than MCM 17 (Software OT Limit 2 settings)