LNC-T800

Operator's Manual

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Leading Numerical Controller

LNC Technology Co., Ltd.

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1 CNC Group Instruction

1.1 Types of Operation Device

Ragarding the panel for the operators to proceed manipulation, it is divided into the MDI Data Input Panel and the Operation Panel. MDI Data Input Panel's major funtion is to let users edit or modify the program word by word, and to set values. The Operation Panel is the control panel used to achieve kinds of manufacturing needs, and it is composed of switches and buttons of many kinds of functions, and a Manual Pulse Generator (handwheel, MPG), etc. The design of the Operation Panel may differ due to the differences between types of machine tools, but this system provides a standard panel for machine tool manufacturers to utilize.

1.1.1 LCD Monitor

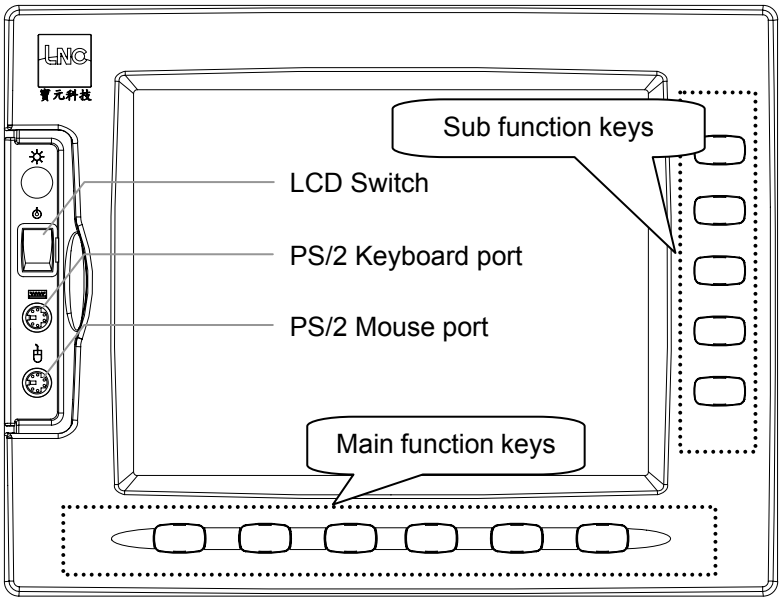


Figure 1.1-1 LCD Monitor

1.1.2 MDI Data Input Panel

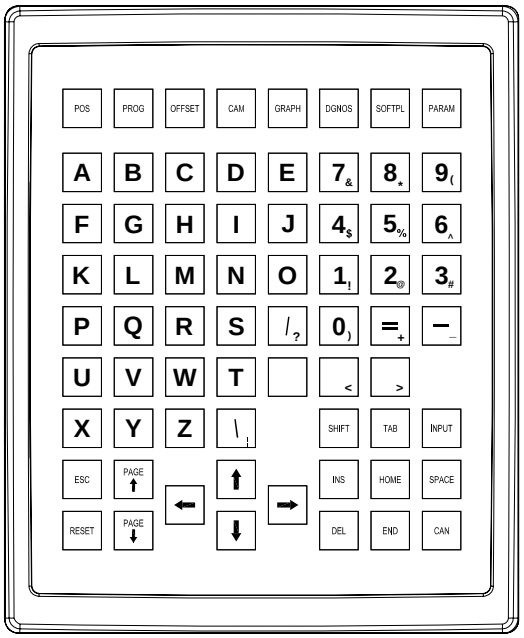


Figure 1.1-2 MDI Data Input Panel

1.2 Operation Device Introduction

Buttons shown on the LCD monitor and the MDI Data Input Panel can be divided into 4 types according to the functions respectively:

(1). Major function button :

Right below the LCD are 6 horizontal buttons. They can be sued by users to input selections of functions displayed at the lower side of the monitor.

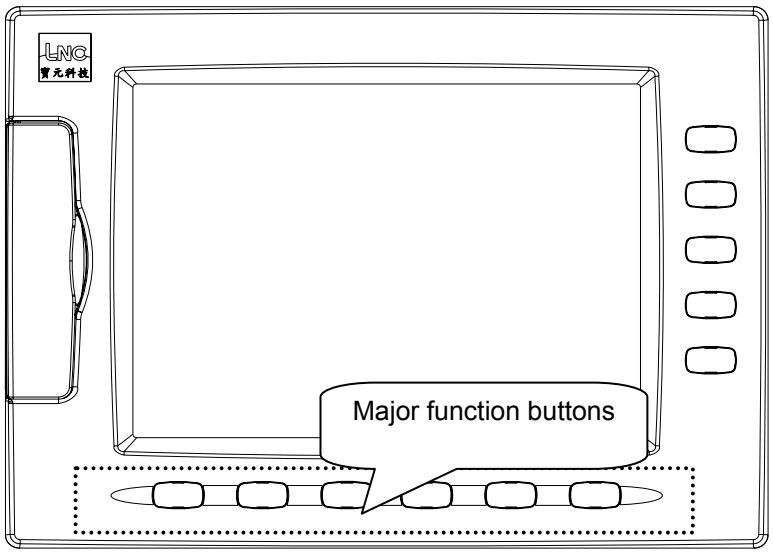


Figure 1.2-1 6 major function buttons below the monitor

(2). Minor function button:

After selecting the major function buttons, minor function contents will be displayed on the right side of the monitor. Click the corresponding minor function button to make selection.

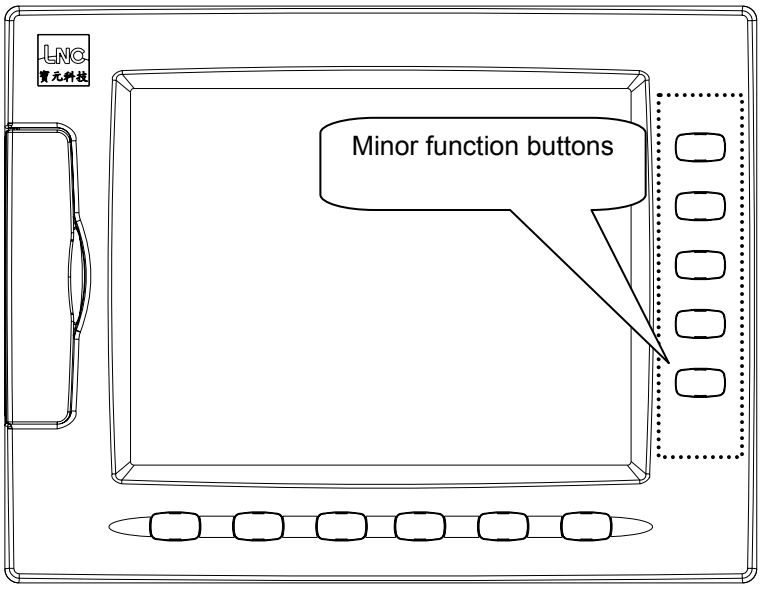


Figure 1.2-2 5 minor function buttons on the right side of the monitor

(3). Function group selection buttons:

Select from 8 types of function including POS, PROG, OFFSET, CAM, GRAPH, DGNOS, SOFTPL and PARAM.

<POS> : Coordinate display screens

<PROG> : Program-related information screens

<OFFSET> : Tool compensation setting

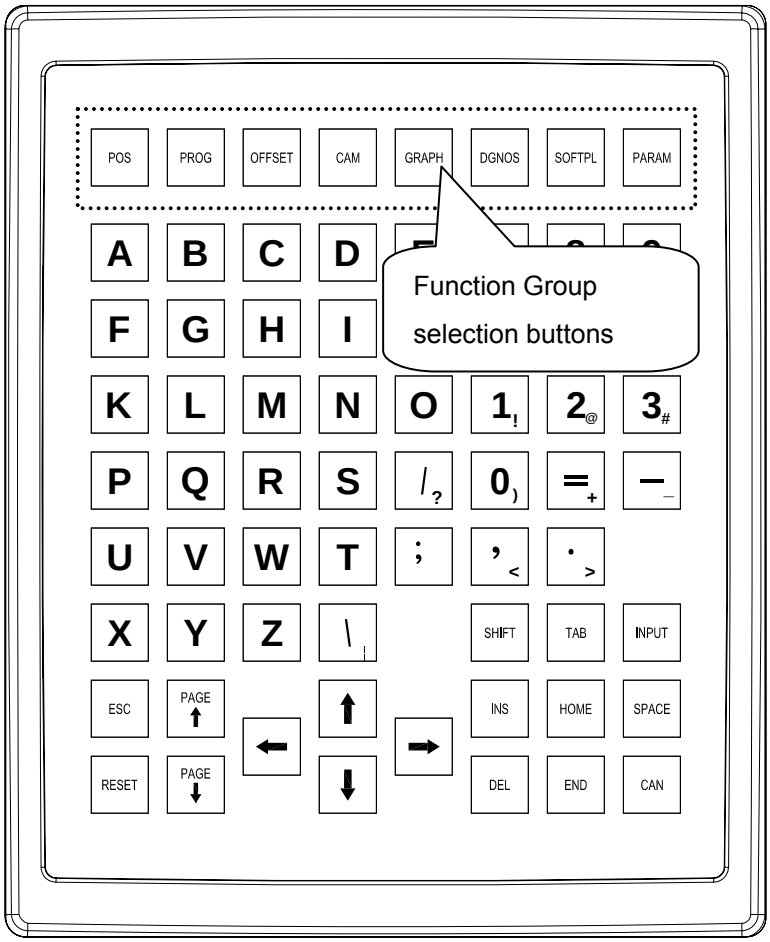
<CAM> : Graphic-aided part program editing

<GRAPH> : Draw tool path

<DGNOS> : Display instant information of the diagnosis screen

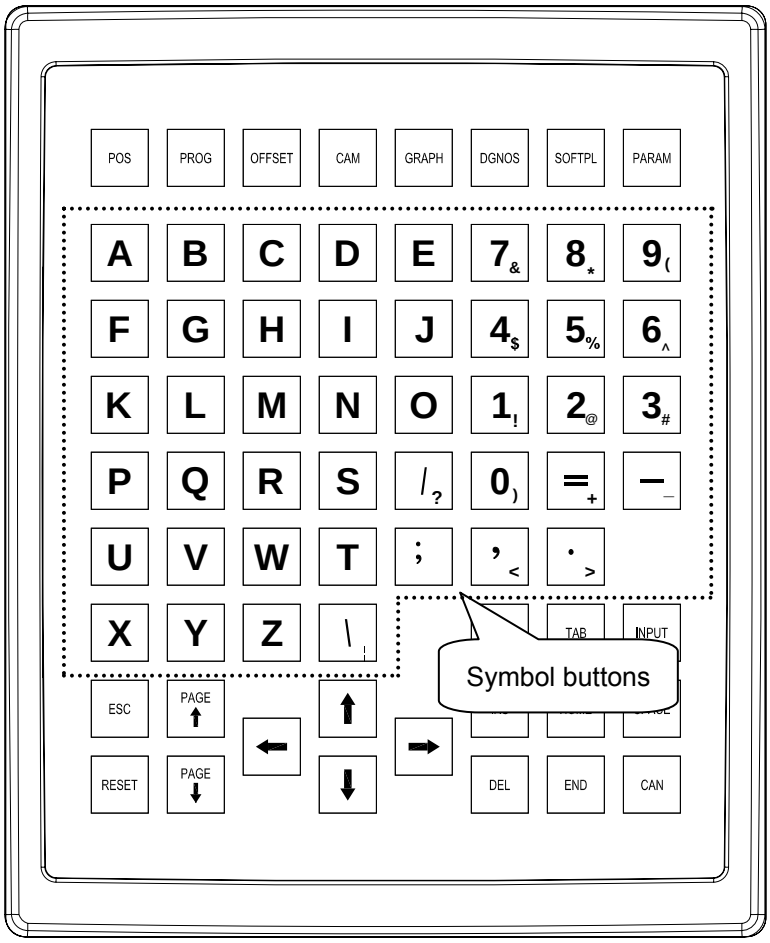
<SOFTPL> : Software Panel switch

<PARAM> : Display parameter screen.



(4). Letter and symbol buttons:

These letters, symbols and number buttons are mainly used to edit program and input data. Some of the symbols are shrinked to the right lower corner of the buttons, and if need to use these shrinked symbols, just hold the SHIFT button and click the symbol buttons.



(5). Edit buttons:

Use these buttons along with the cursor on the monitor to modify programs, set data and switch pages.

<SHIFT> : Accompany symbol and number buttons to input special symbols.

<INPUT> : Input button, confirm the input data.

<INS> : Switch between Insert Character and Replace Characer modes

<DEL> : Character cancellation button.

<HOME> : When editing program, move the cursor to the beginning of a line

<END> : When editing program, move the cursor to the end of a line

<SPACE> : Input a blank character

<CAN> : Cancel previous character

<PAGE↑> : Move to previous page

<PAGE↓> : Move to next page.

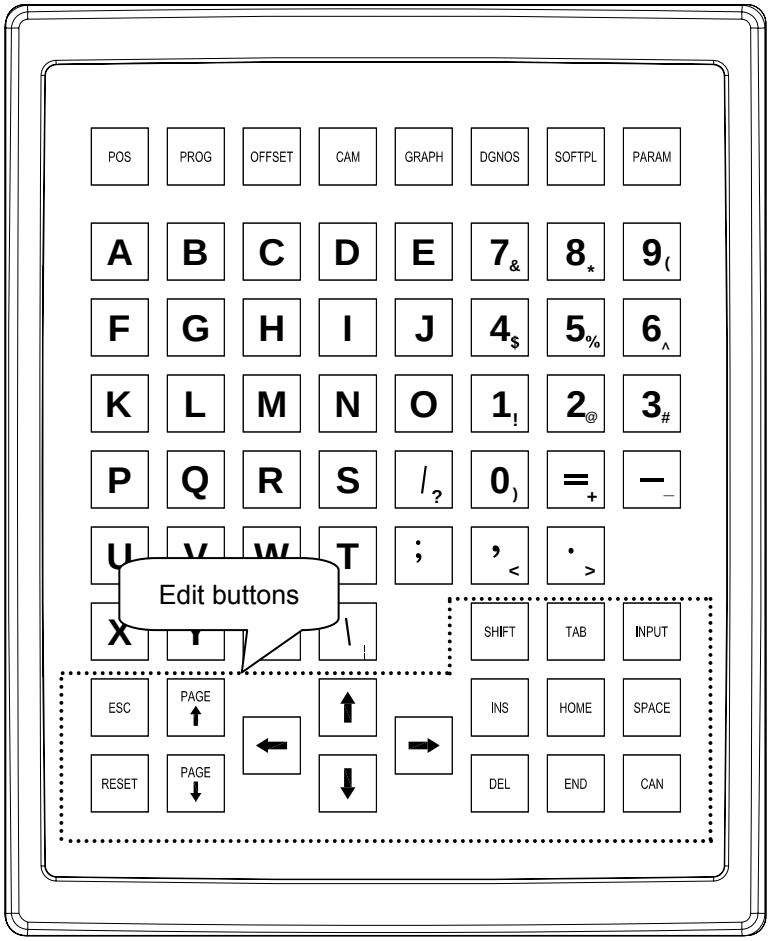
<→> : Cursor moves rightward

<←> : Cursor moves leftward

<↑> : Cursor moves upward

<↓> : Cursor moves downward

<RESET> : Reset system



1.3 Screen and Fnction Instruction

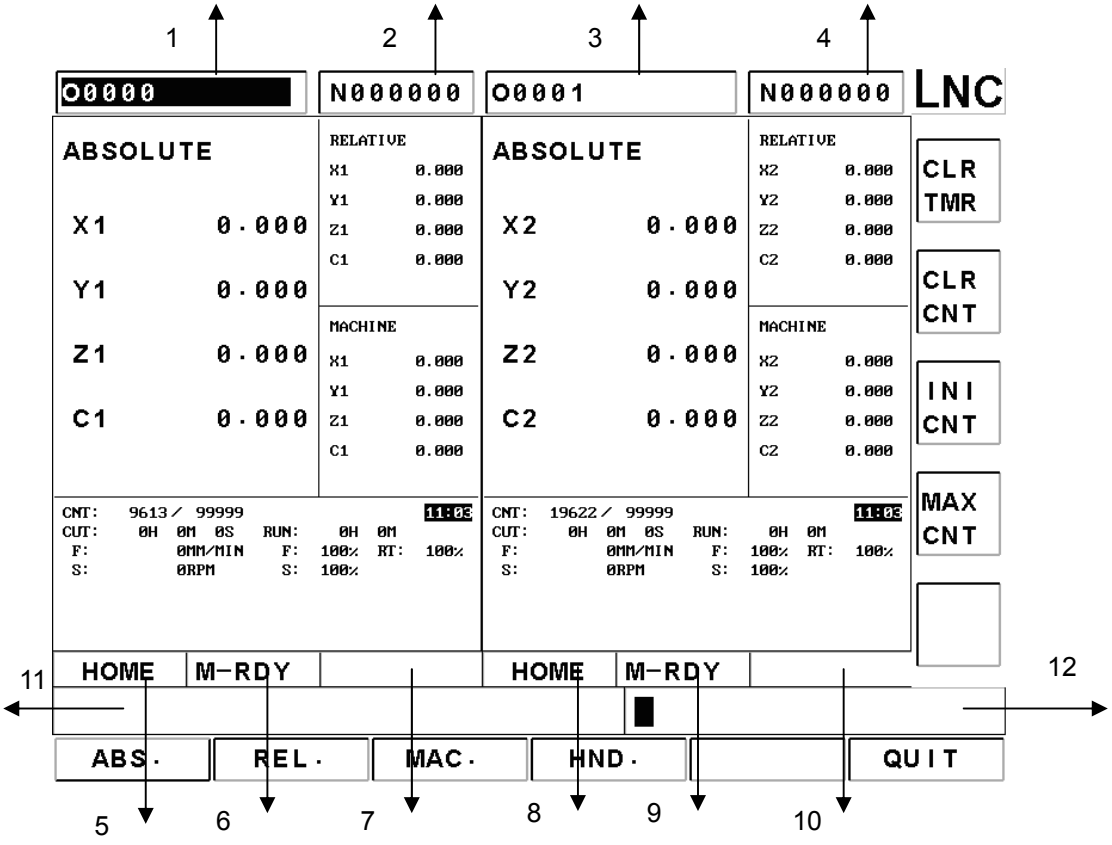
There are 7 function groups in this controller. They are Coordinate (POS), Program (PROG), Compensation (OFFSET), Graph (GRAPH), Diagnosis (DGNOS), Soft Panel (SOFTPL), and Parameter (PARAM). In this manual,【 】is used to indicate the function buttons below and on the right side of the monitor, and < > for buttons on the MDI Data Input Panel.

1.3.1 Alposition of the Display Screen

When switching groups in dual systems, both systems' groups will be switched. The figure below is a screen displaying simultaneous data of both systems, and on the left side of the screen (X1, Y1, Z1, C1) is System 1, on the right side of the screen (X2, Y2, Z2, C2) is System 2. The position dedicated to System 1 and System 2 can be changed by Pr.4989.

The buttons only work on the currently working system. To know which the currently working system is, distinguish from whether the cursor stays on position 1 or 3 in the figure below. When cursor stays on position 1, the currently working system is System 1; and when on position 3, the currently working system is System 2.

The screen introduction below is for the system data screens appear in the screen.



1: System 1 currently specified program name.

2: System 1 currently executed block.

3: System 2 currently specified program name.

4: System 2 currently executed block.

5: System 1 mode information.

6: System 1 machine status information.

7: System 1 alarm information (Alarm), warning information (Waring).

8: System 2 mode information.

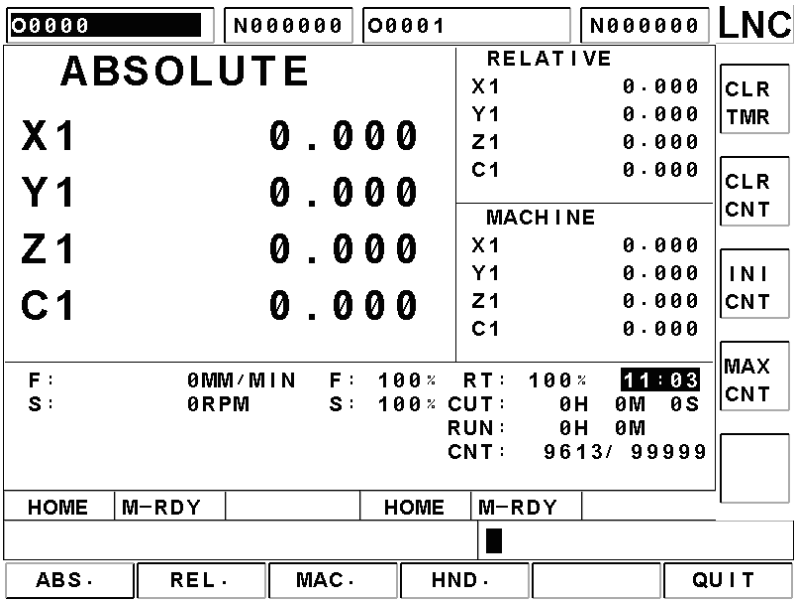
9: System 2 machine status information.

10: System 2 alarm information (Alarm), warning information (Waring).

11: Simple information prompt area.

12: Input area.

Data of both systems can be displayed on the screen simultaneously or separately as shown in the following figure:



1.3.2 Functions of Each Function Group

Tree Diagram of POS Function Keys

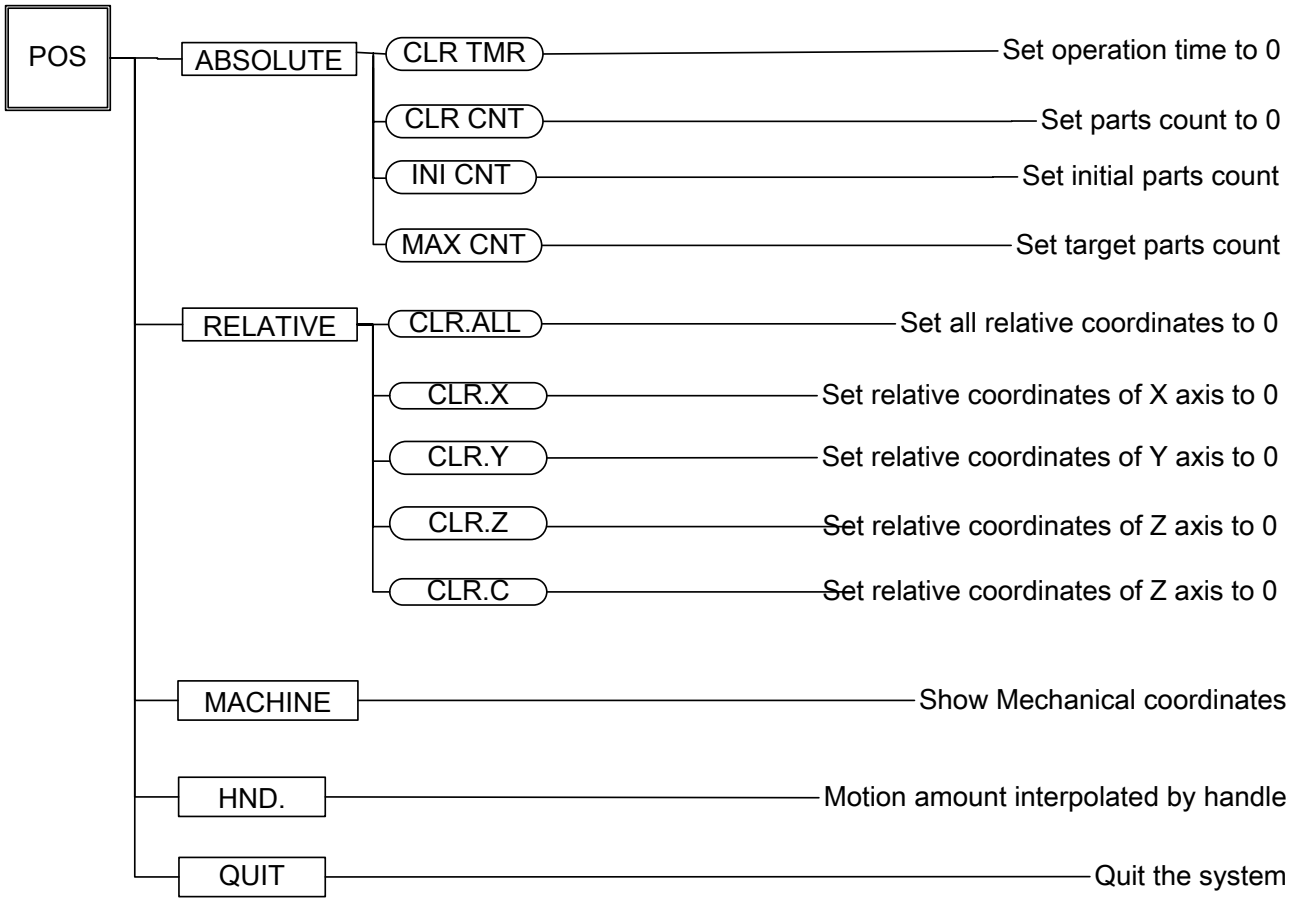


Figure 1.3-1 Tree Diagram of POS Function Keys

Tree Diagram of PROG Function Keys

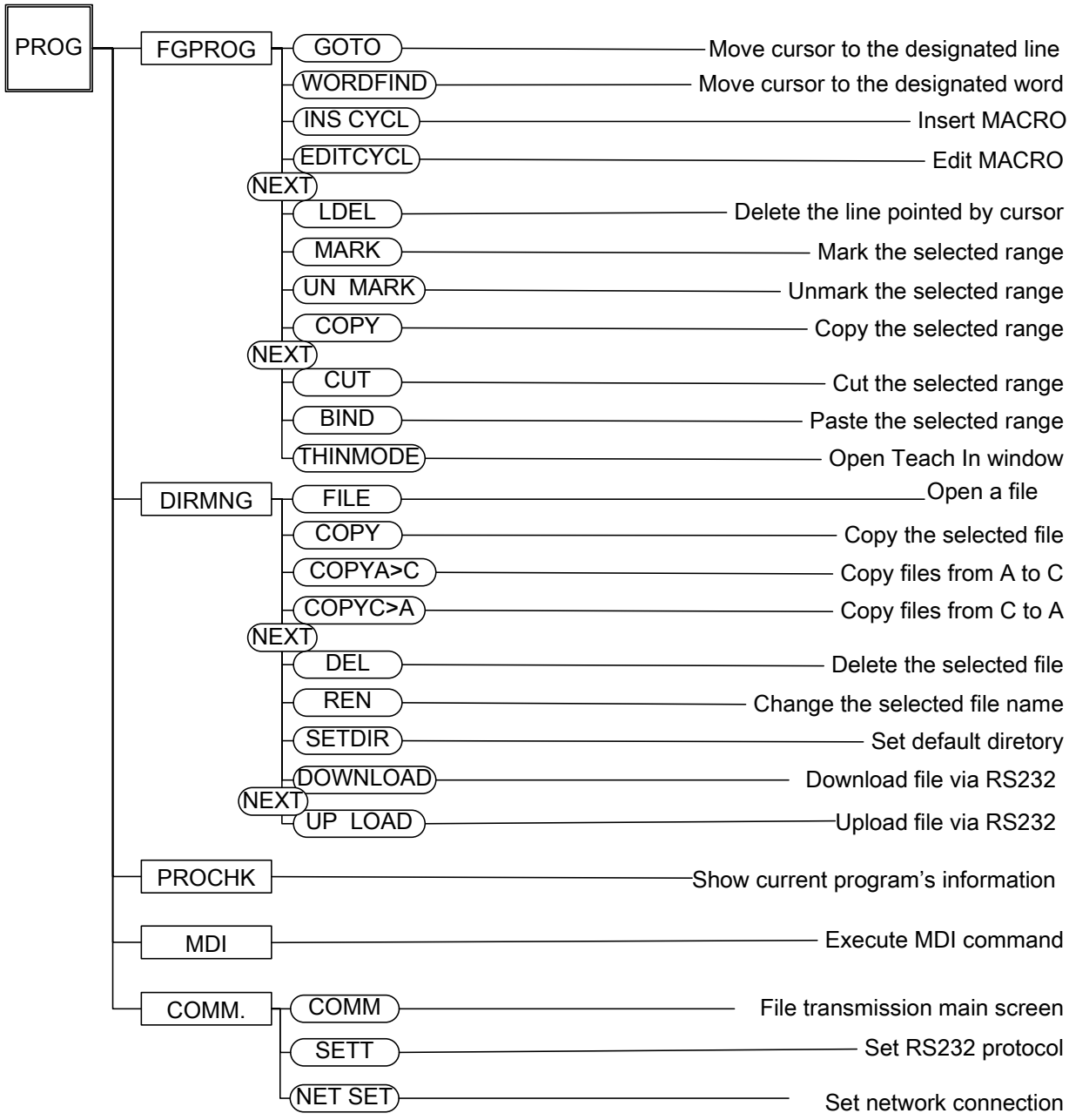


Figure 1.3-2 Tree Diagram of PROG Function Keys

Tree Diagram of OFFSET Function Keys

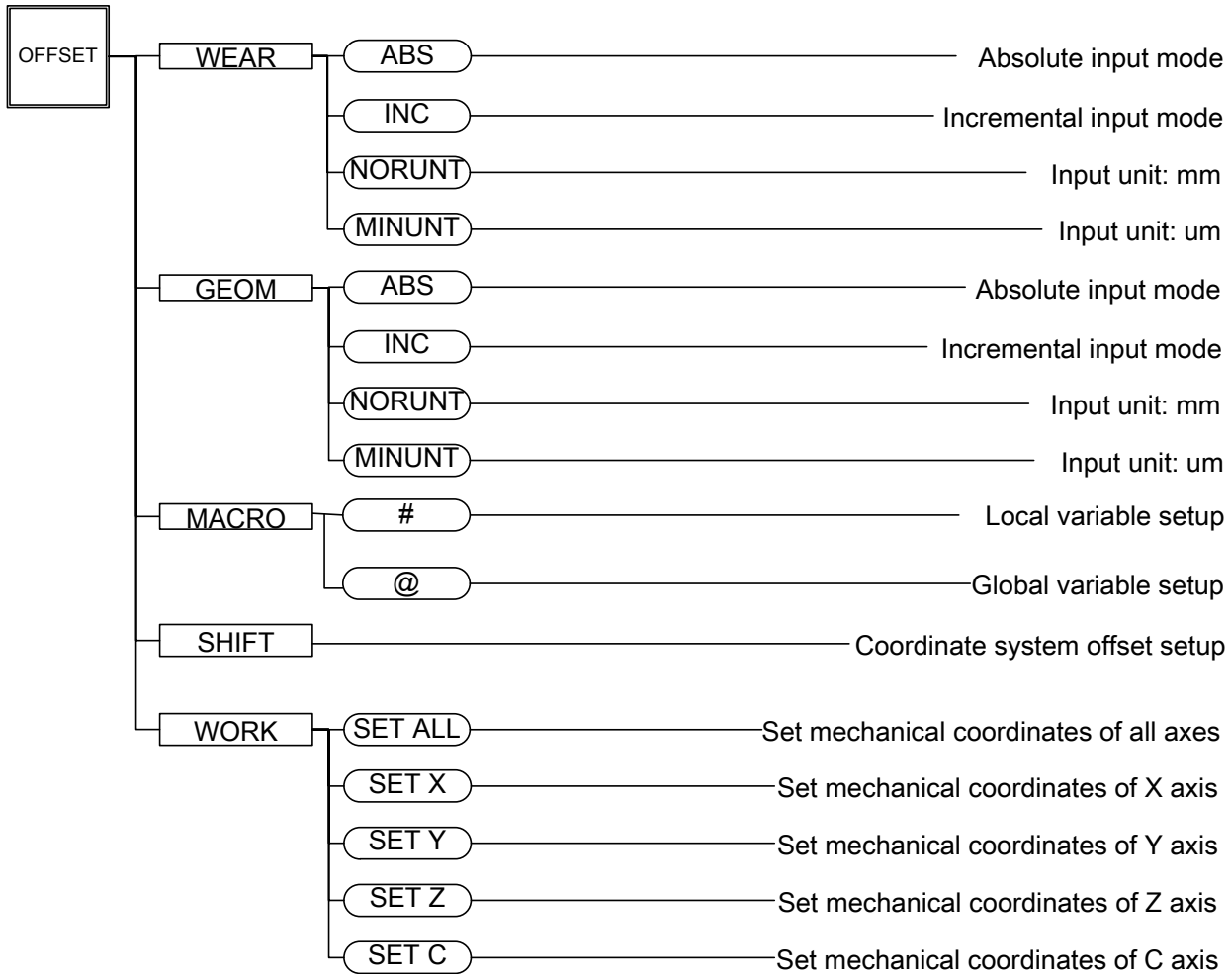


Figure 1.3-3 Tree Diagram of OFFSET Function Keys

Tree Diagram of GRAPH Function Keys

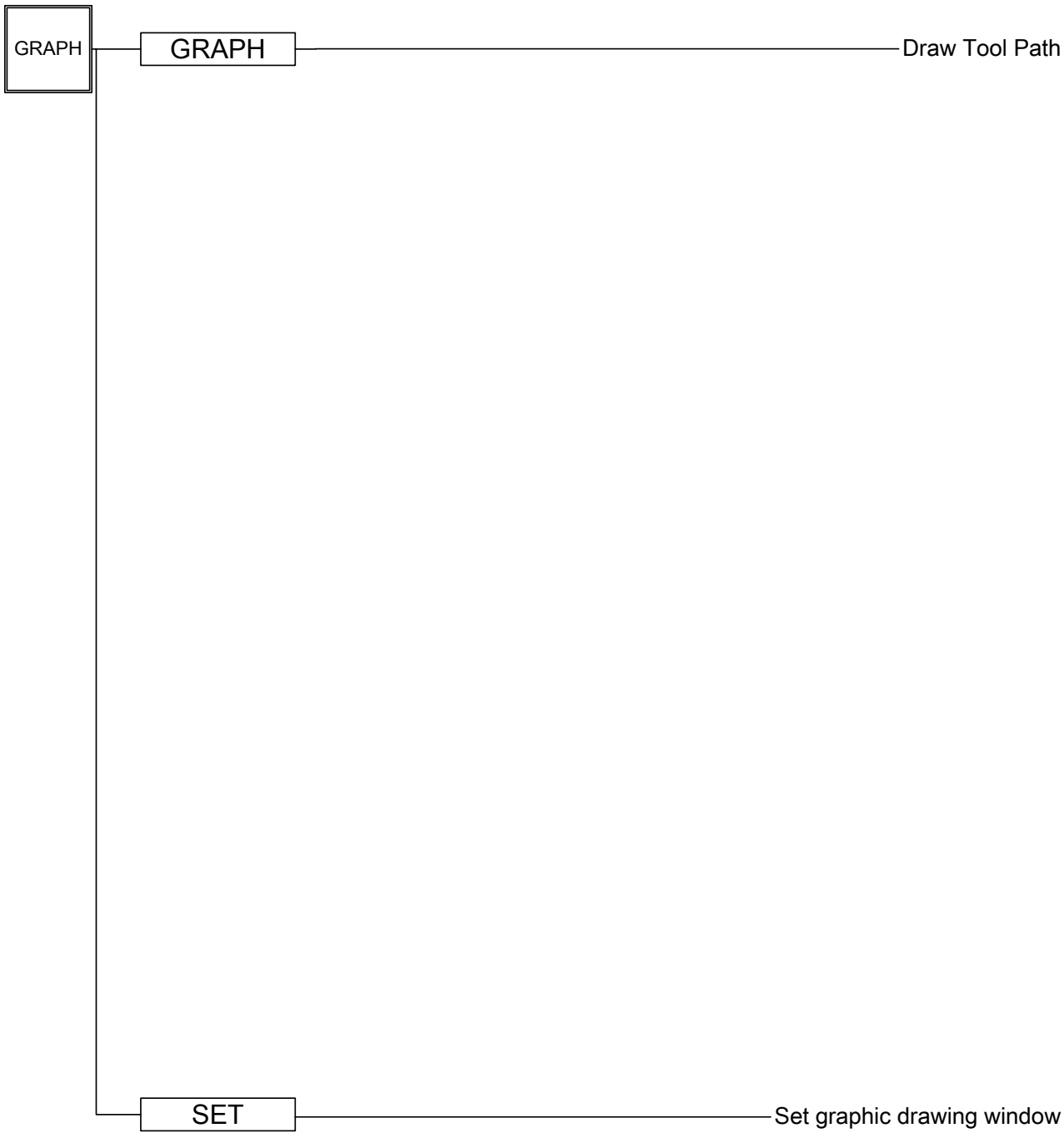


Figure 1.3-4 Tree Diagram of GRAPH Function Keys

Tree Diagram of DGNOS Function Keys

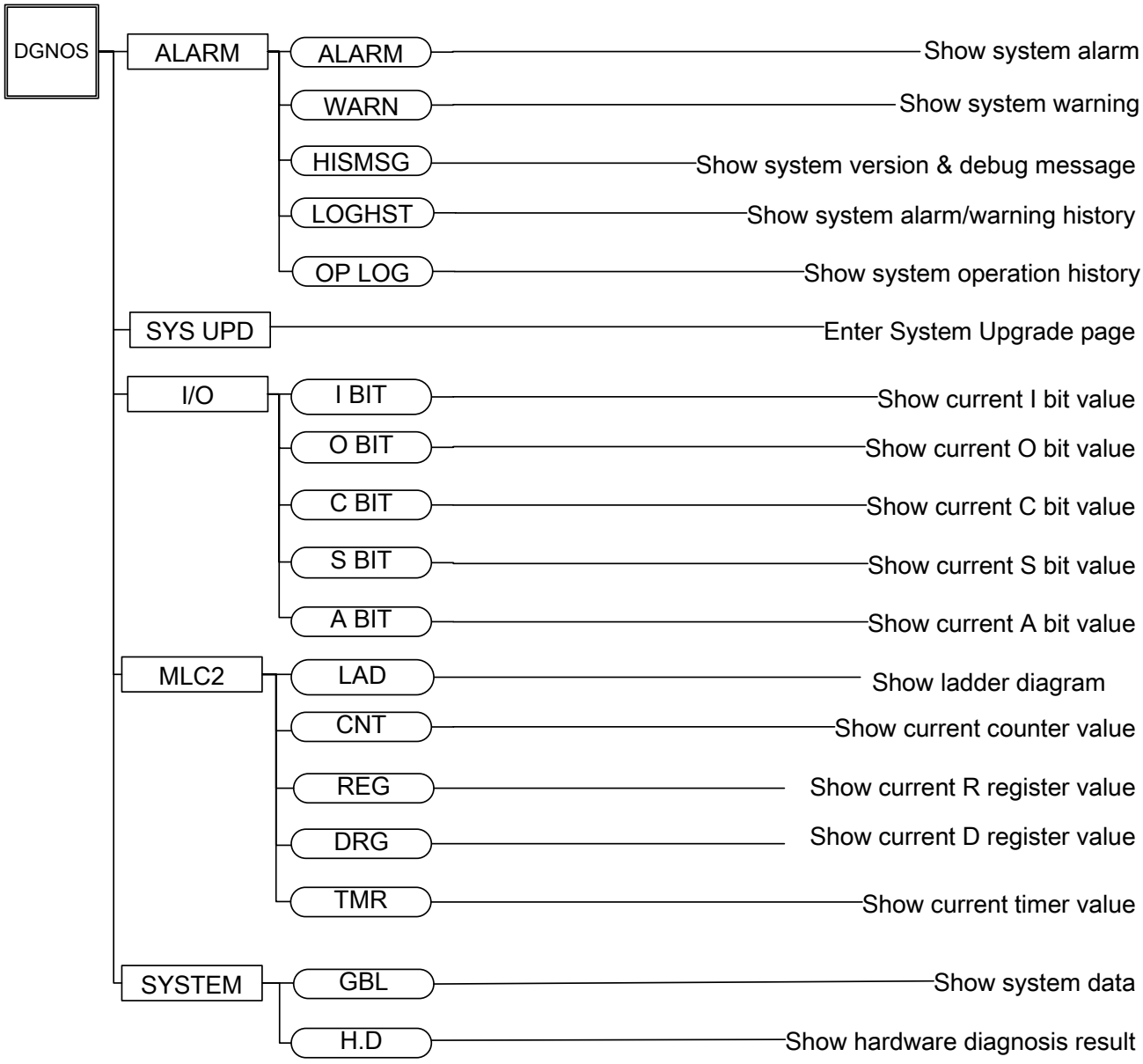


Figure 1.3-5 Tree Diagram of DGNOS Function Keys

Tree Diagram of SOFTPL Function Keys

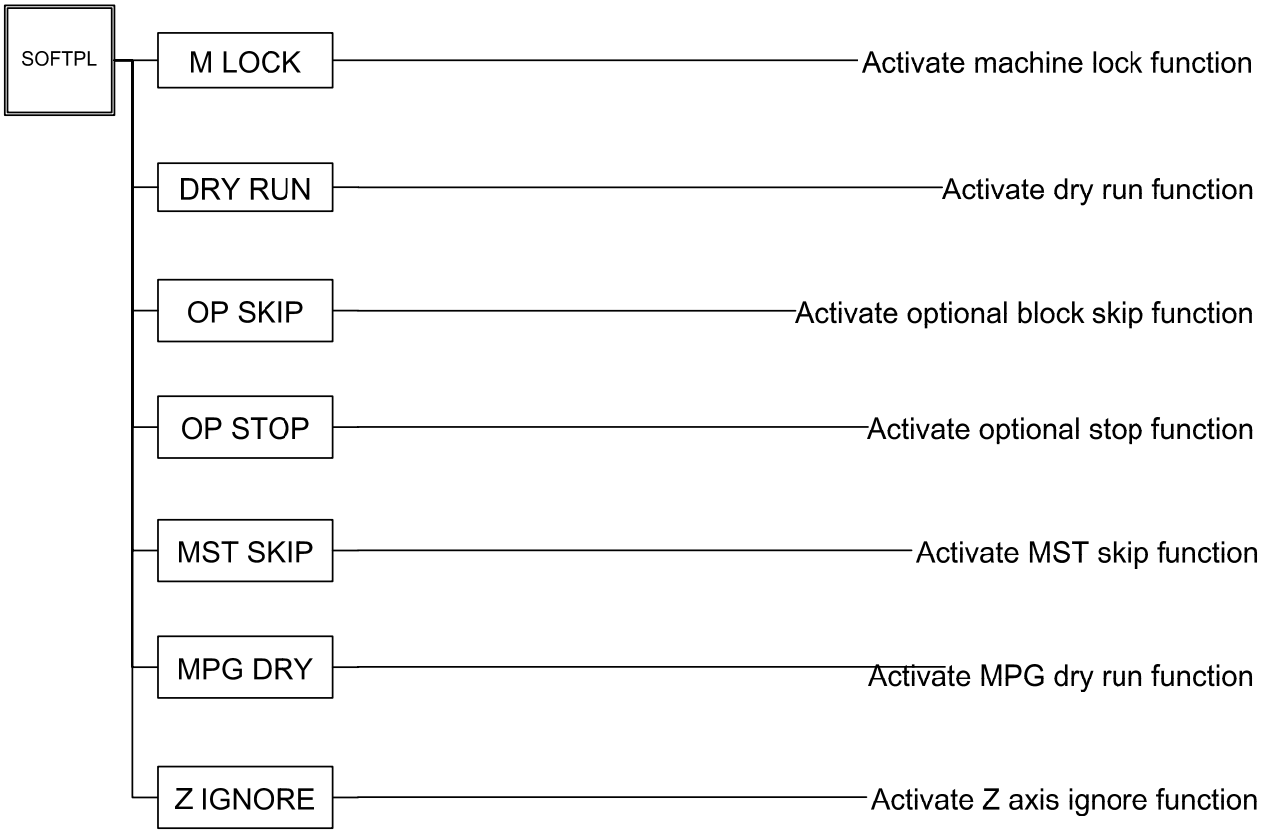


Figure 1.3-6 Tree Diagram of SOFTPL Function Keys

Tree Diagram of PARAM Function Keys

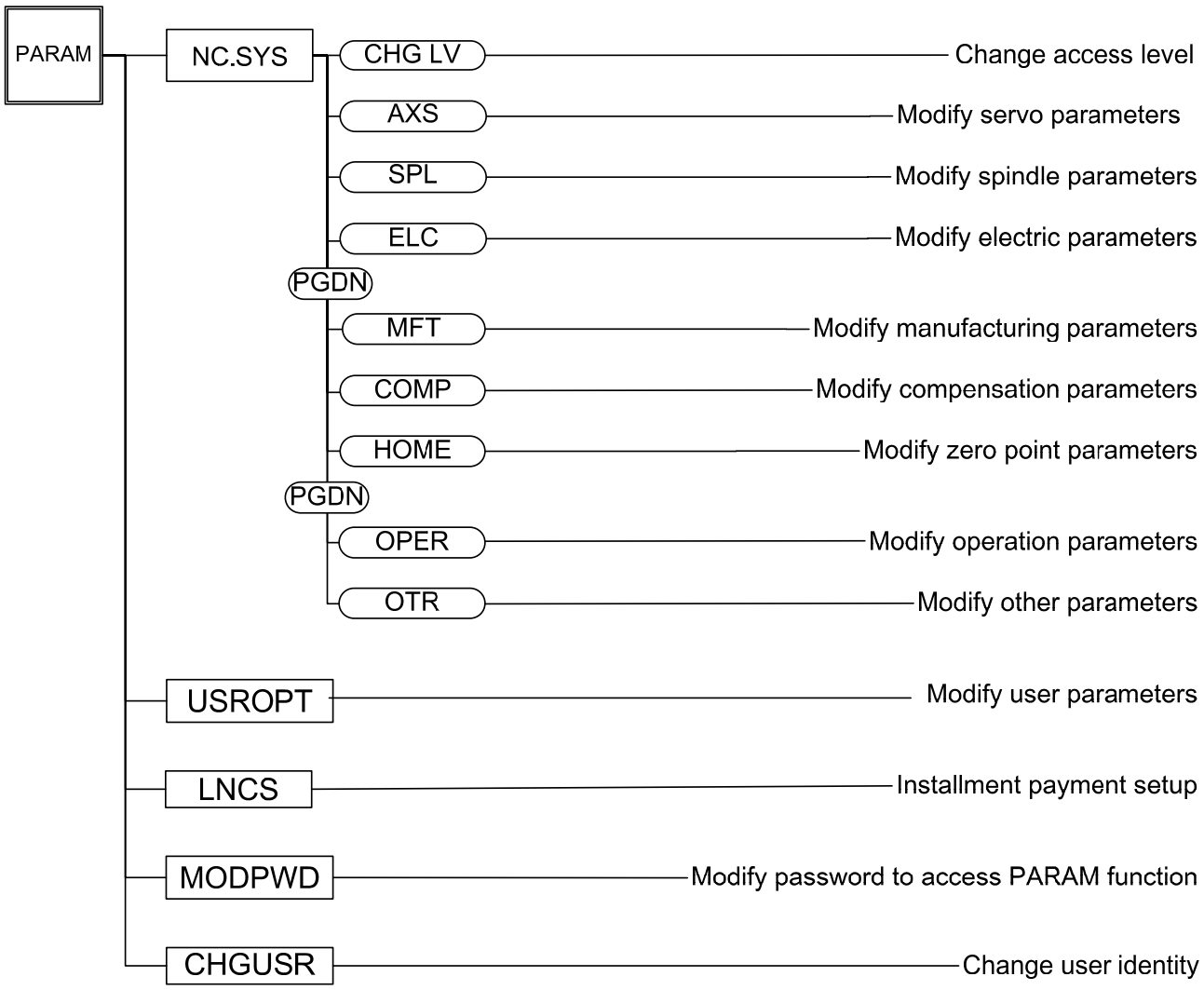


Figure 1.3-7 Tree Diagram of PARAM Function Keys

1.3.3 Absolute Coordinate screen

Click【ABS.】to enter Absolute Coordinate major screen.

The screens aside are relative coordinate and machine coordinate minor screens.

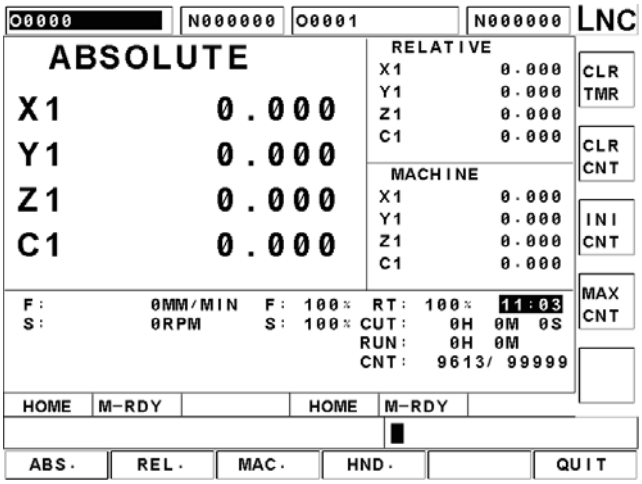


Figure 1.3-8 Absolute Coordinate major screen

Absolute coordinate is program coordinate, (current value － tool offset = program value), which displays current positions of each axis subtract offset of each axis.

1.3.4 Relative Coordiante Screen

Click【REL.】to enter Relative Coordiante major screen.

The screens aside are absolute coordinate and machine coordinate minor screens.

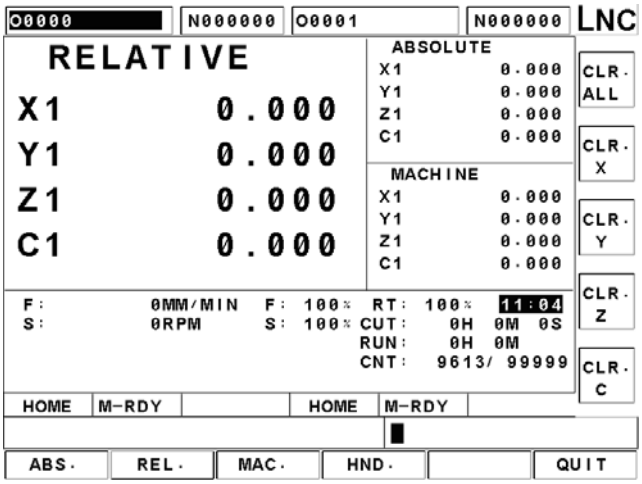


Figure 1.3-9 Relative Coordiante major screen

Relative coordiante system indicates the distance between current position and any point specified by users. Therefore, users can make the relative coordiante values return to zero at any time, they can also directly input values which are not zero.

Meanwhile, if want to reset coordinate values, and make X coordinate as 100. 000, Y coordinate as 200. 000 and Z coordinate as 300. 000, just input X100. Y200. Z300. And click <INPUT>, then coordinate values will be reset immediately.

If want to zero relative coordinate values of the 3 axes simultaneously or respectively, simply click corresponding minor function buttons **【CLR. All】,【CLR. X】,【CLR. Y】,** and **【CLR. Z】**.

1.3.5 Machine Coordinate Screen

Click【**MAC.**】to enter Machine Coordinate major screen.

The screens aside are absolute coordinate and relative coordinate minor screens.

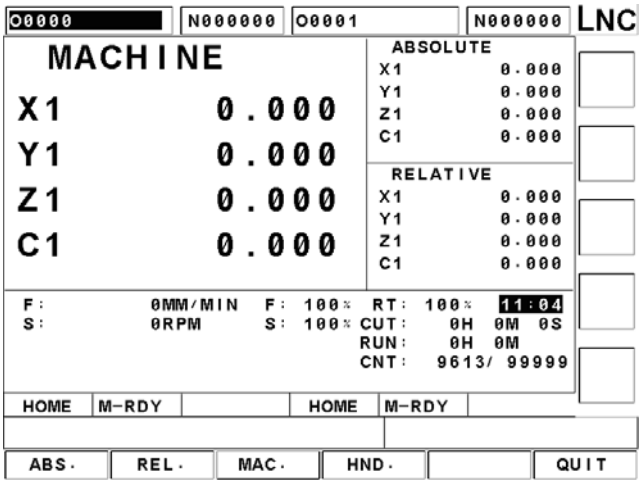


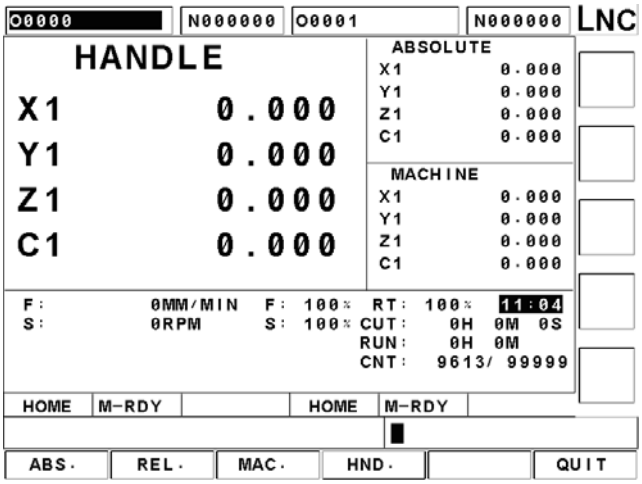
Figure 1.3-10 Machine coordinate major screen

Machine coordinate is the distance of the current position and the reference point. Each machine owns a reference point, and, for the sake of safety, search the home point before manufacturing every time when restarting the system.

1.3.6 Handle Interrupt Screen

Click【**HND.**】to enter handle interrupt major screen.

The screens aside are absolute coordinate and relative coordinate minor screens.



In MDI Mode, users can use handle interrupt function to increase or decrease tool's movement amount, and change the cutting path.

absolute coordinate	Not effected by handle interrupt, still displays program coordinate
relative coordiante	Not effected by handle interrupt
machine coordinate	Effected by handle interrupt and change, displays actual machine position

Because absolute coordinate is not affected by handle interrupt, the later tool path will have an offset between the original program path, and this offset can be eliminated by manual home returning. For detailed instruction on this function, refer to "Select Axis Direction Signal of Handle INT" (C BITS 066 ~ 071) and "MPG Ratio Select" (R014) in software application manual.

1.3.7 Quit System

Click【**QUIT**】function button, and password input window is displayed. Correctly input the password, and click 【OK】 button to leave CNC system and return to DOS operation system. click【CANCEL】button to return to execute program.

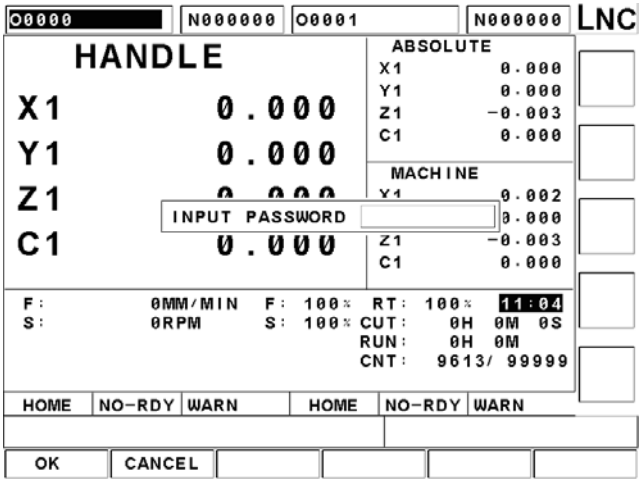


Figure 1.3-11 Quit System

1.4 Program Function (PROG)

Click **<PROG>** to enter Program Function Group screen. This function group provides functions including part program editing, checkup, file management, and communication, etc.

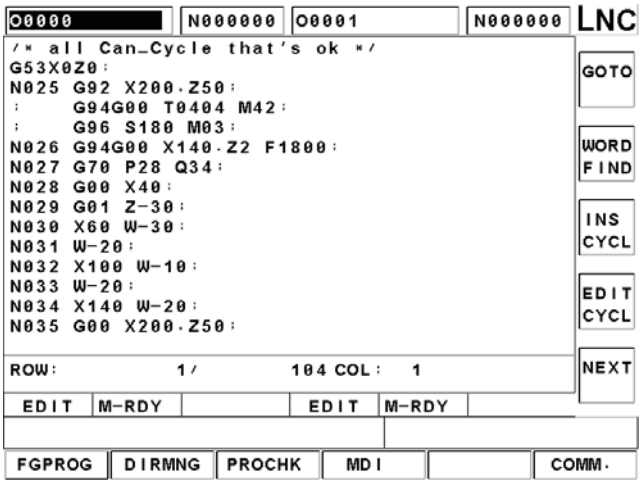


Figure 1.4-1 Program Function Group

1.4.1 Current Program

In edit mode, click【FGPROG】to display contents of the program currently opened in the controller. Meanwhile, use the minor function button on the right side and the Input Line below to edit the program.

【GOTO】

Click【GOTO】function button to directly input line number after “LN” in the dialogue box, and then click【OK】to position cursor directly to the line.

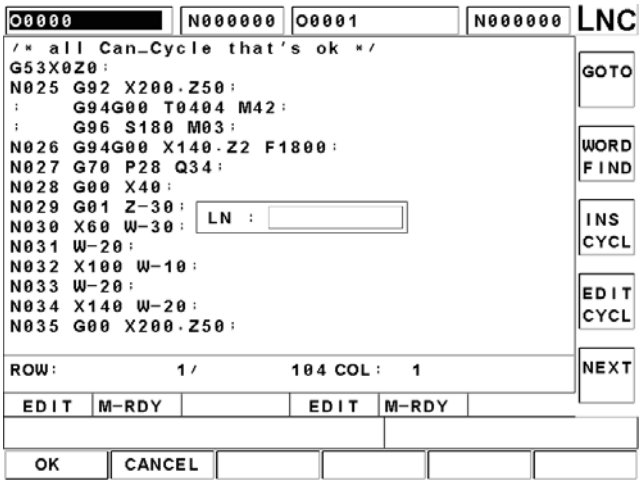


Figure 1.4-2 Line Positioning input column

【WORDFIND】

Click 【WORDFIND】 function button to directly input the key word to be searched after “KEY” in the dialogue box, and then click【OK】to directly position cursor to the key word. If want to search for the next same key word, click again【WORDFIND】function button, and it will automatically search by using the key word of the last time as the default, and click【OK】button to search afterward.

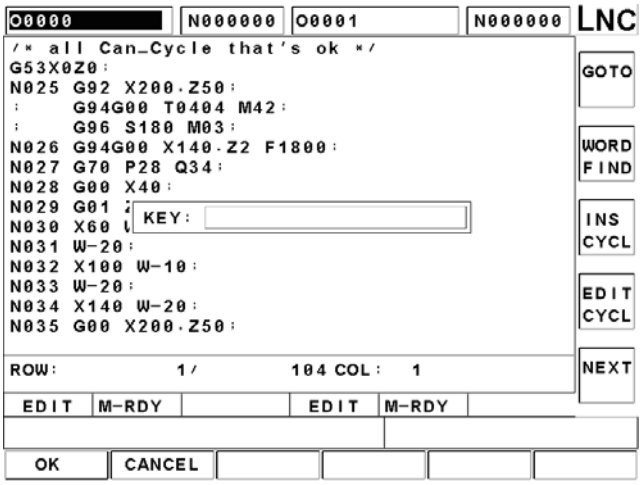


Figure 1.4-3 String Search input column

【LDEL】

Directly delete the line of program codes where the cursor is, or delete all marked lines.

【MARK】

Move cursor to the begin/end line of the lines to be marked, and click**【MARK】**function button on the right side, and move cursor to the begin/end line of the lines to be marked, and click **【MARK】** function button again to mark the lines. (Figure 2.5-3)

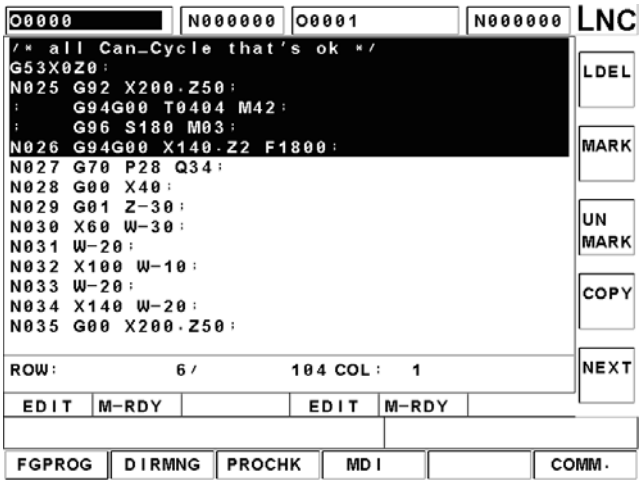


Figure 1.4-4 Mark Range function

【UNMARK】

Cancel previous marks.

【Copy】

Copy the marked range.

【CUT】

Clip the marked range.

【BIND】

Paste previously copied or clipped range of program code.

【THINMODE】

Click **【THINMODE】** function button, then the button of Teach becomes to **【THINCANC】** and **【THININST】** function button, and absolute coordinate and machine coordinate appear on the right side of the window. Firstly, move cursor to the previous line of the position to be inserted, switch to manual operation modes (JOG, RAPID and MPG) and move machine to desired position, then click **【THININST】** to insert current absolute coordinate to the program where the cursor is. To cancel Teach Mode, just click **【THINCANC】** button.

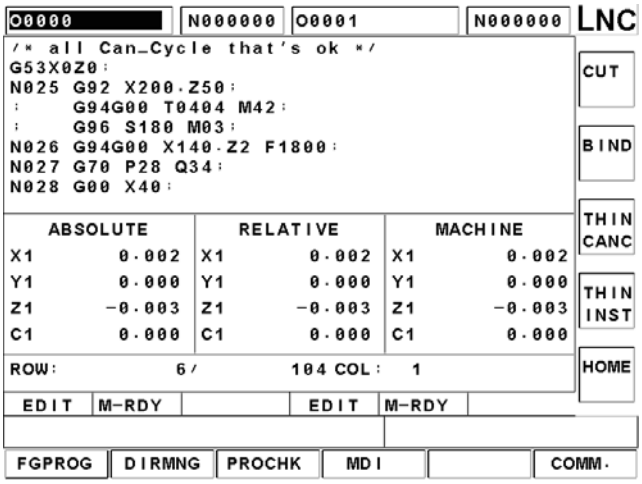


Figure 1.4-5 Teach input function

NOTE: In Edit Mode, program start can not be executed.

1.4.2 Background Program

In MEM mode, click【**BGPROG**】to enter Background Edit Mode. Background edit allows users to edit another part program while in MEM mode and executing a part program, and the editing method is the same as that of editing current program in edit mode.

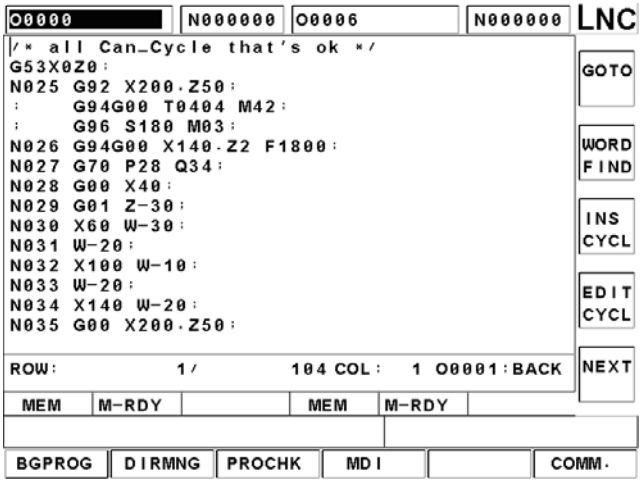


Figure 1.4-6 Background Edit Mode

1.4.3 Program Checkup

In MEM Mode, click 【**PROCHK**】major function button to enter Auto Program Checkup screen as the following figure shows. The upper half of the monitor displays program content, and the currently executed program is highlighted. The lower half displays coordinate values, current M/S/G/T code values, and actual speed, etc.

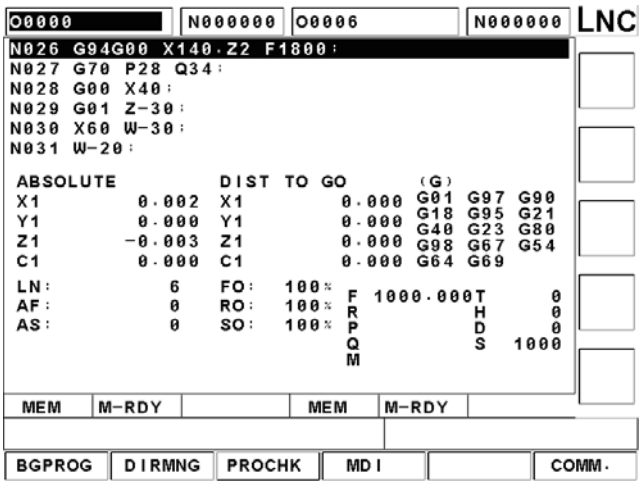


Figure 1.4-7 In mem mode, click【PROCHK】major function button

1.4.4 MDI

In MDI Mode, click【MDI】major function button to enter MDI screen as the following figure shows. In this screen, it is able to directly execute the input block program. The operation method is: directly compile the program to be executed in the edit area, the program can be more than 1 line, when input is finished, click Cycle Start button, and then the just compiled program will be executed from the beginning, and related information will be displayed. It is safer to preceed tests in this way, and is more efficient. If the program contains no M30, when the last line of program is executed, the controller uses M30 to end the program. If the program contains M0, when M0 is executed the program stops, and the status will switch to B-STOP; if click Cycle Start button again, it will re-execute from the 1st line, click Reset to cancel this mode. In MDI mode, and the status is B-STOP, it is able to switch to MEM Mode and keeps manufacturing, and then switch back to MDI mode to keep editing part program.

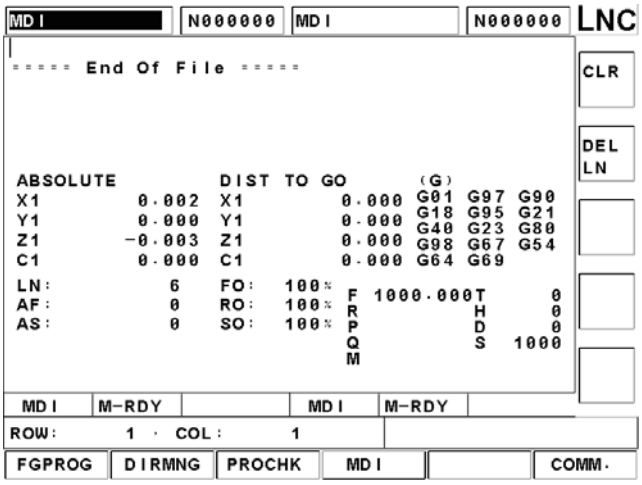


Figure 1.4-8 In MDI Mode, click【MDI】major function button

1.4.5 DIRMNG

In file management screen, system provides functions including File Open, Copy, Delete, Rename, Set Folder, etc. Detailed instructions are as following:

【FILE】

1. Enter file management screen, and use direction buttons to move cursor to select the file to be opened, and then click <INPUT> to open a file.

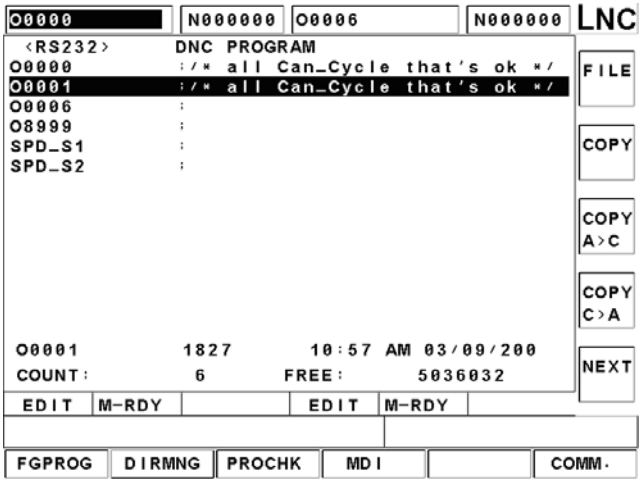


Figure 1.4-9 File Management

2. Click 【File】 button, a dialogue box appears. Move cursor to select or directly input the name of file to be opened, and then click <INPUT> to open a file.

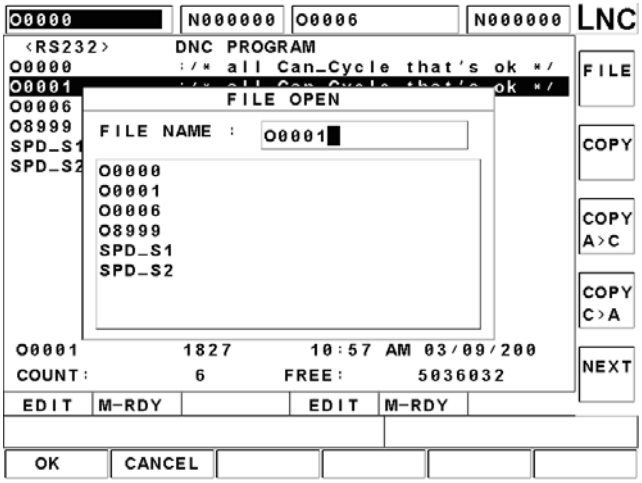


Figure 1.4-10 Click 【File】 function button

3. In **MEM Mode**, the opened file is Background Program; in **EDIT Mode**, the opened file is Current Program; files can not be opened in other modes.

【Copy】

1. Click 【COPY】 function, and a dialogue box appears. Click Up, Down, Left, Right buttons to select source file. FDD and online disk can also be the source. After selection, click【OK】button.

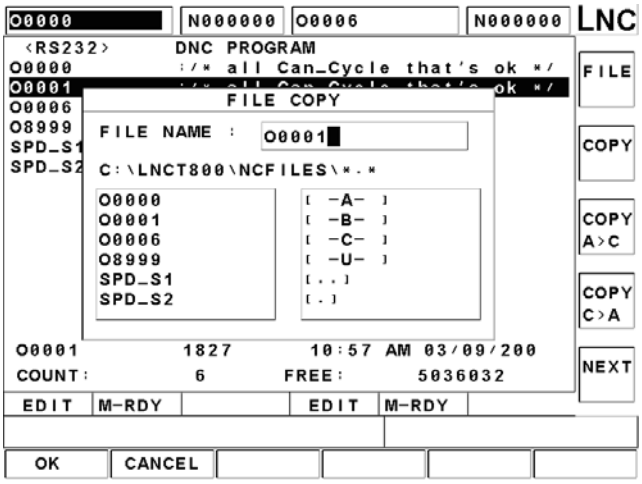


Figure 1.4-11 Copy File Function Button

2. After clicking 【OK】button, the destination file use the source file's name as the default file name, if want to use a different file name, manually input the name and click【YES】button to finish copy. When copy is finished, users can use Program List to check.

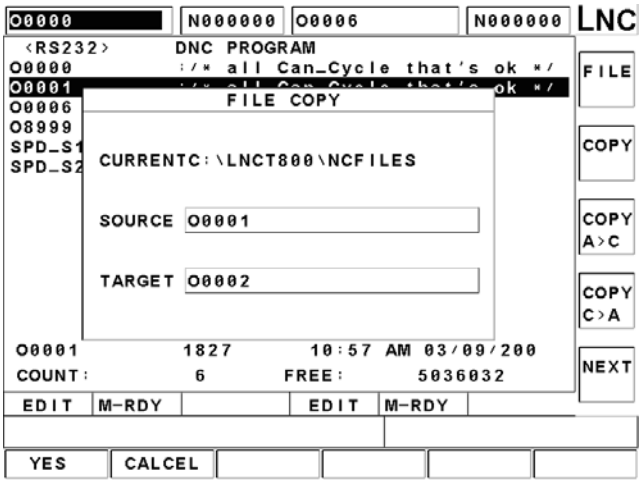


Figure 1.4-12 Input destination file name

【COPY A>C】

1. Copy files from a disk to the controller. Before executing this function, make sure a disk containing the program is inserted in the FDD. After clicking this function button, a box appears to show the file list of the disk. Move the cursor to the specific file to be copied, and then click 【OK】.

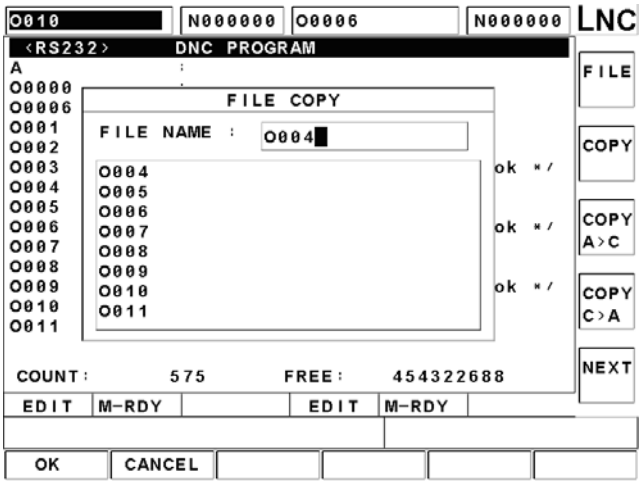


Figure 1.4-13 Copy A>C operation screen 1

2. After clicking【OK】, the name of the source file becomes the default of destination file's name. If users want to assign a different file name, input the desired name, and then click 【YES】to finish copy.

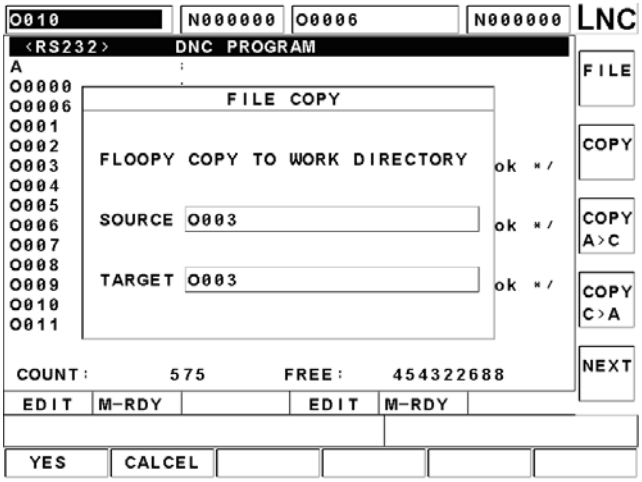


Figure 1.4-14 copy A>C operation screen 2

【COPY C>A】

1. Copy files from the controller to a disk. Before executing this function, make sure a disk containing the program is inserted in the FDD. After clicking this function button, a box appears to show the file list currently in the cutting path. Move the cursor to the specific file to copy, and then click 【OK】.

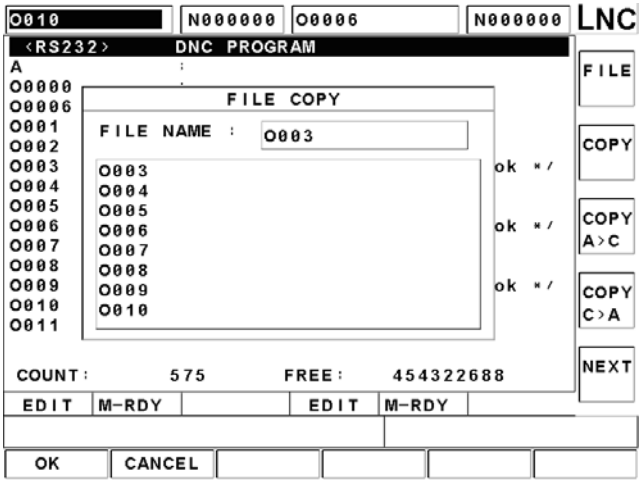


Figure 1.4-15 copy C>A operation screen 1

2. After clicking 【OK】, the name of the source file becomes the default of destination file's name. If want to assign a different file name, input the desired name and click 【YES】to finish copy.

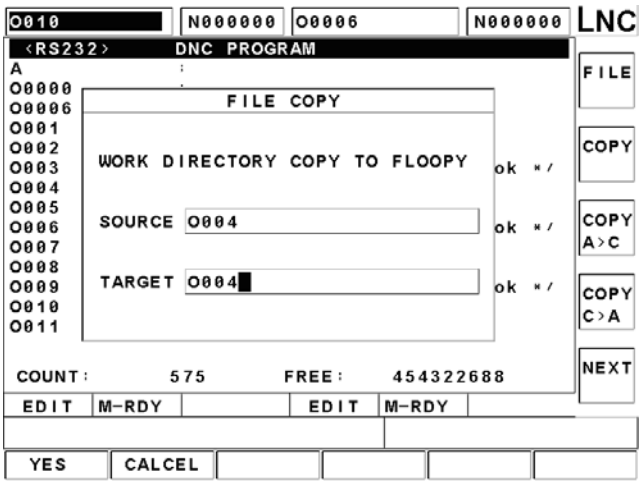


Figure 1.4-16 Copy C>A operation screen 2

【DEL】

1. Delete a file. After clicking this function button, a dialogue box appears on the screen for the selection of the file users want to delete. After selecting the file, click 【OK】.

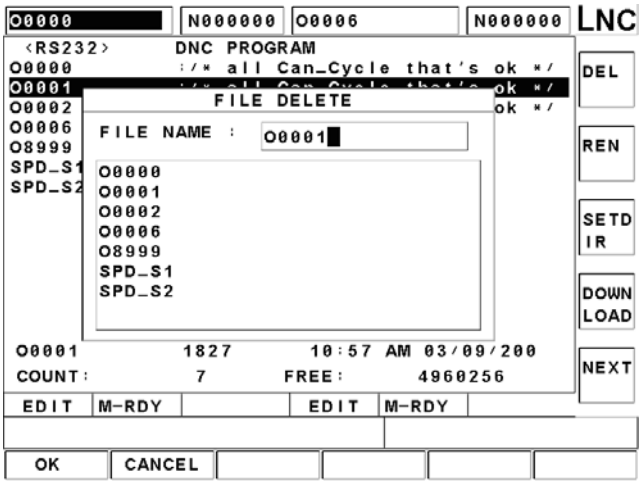


Figure 1.4-17 Click【Delete】function button

2. After clicking 【OK】, a message appears for users to confirm the deletion. If user is sure to delete the file, click【OK】to finish the process of file deletion. After the deletion is completed, user can inspect the result with the Program List.

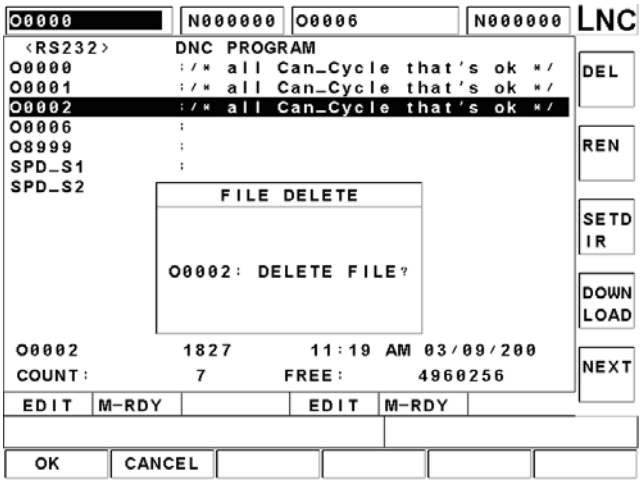


Figure 1.4-18 Users can confirm again

【REN】

1. Change the name of a file. After clicking this function button, a dialogue box appears on the screen. After the selection of the file which users want to change name, click【OK】.

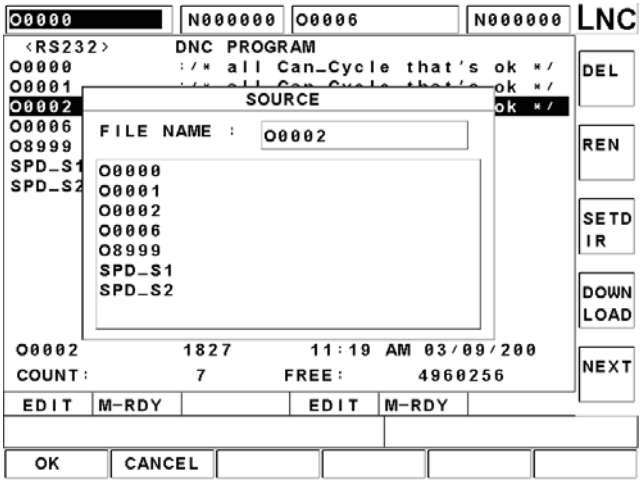


Figure 1.4-19 After clicking【Rename】function button

2. After clicking 【OK】, one more dialog box appears to show the location and name of the file users select, and provides an input column for users to input the desired new name. After the input, click 【YES】to finish the process of Change Name. After the process is completed, users can inspect the result with Program List.

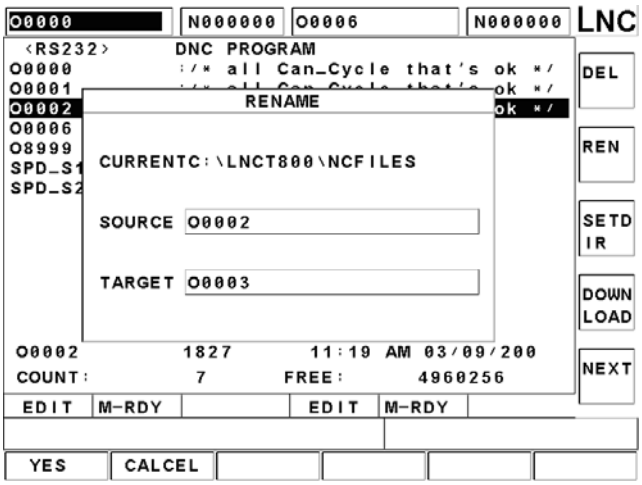


Figure 1.4-20 Input destination file name

【SETDIR】

Change the path of the work folder. After clicking the function button, a dialogue box appears. Users can input or click Up or Down to select the path of the work folder. After the selection, click Right or Left buttons to move the cursor to the Input Line and click 【OK】.

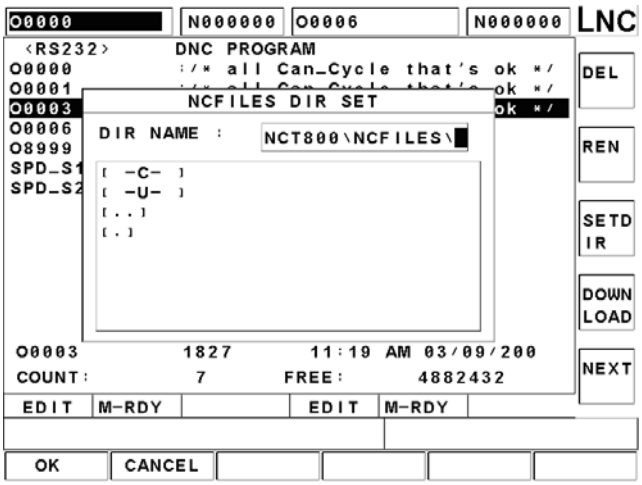


Figure 1.4-21 Set part program folder

【DOWNLOAD】

1. Transmit files from NC side to PC side via RS232. Click the【DOWNLOAD】function button. The screen is as the following.

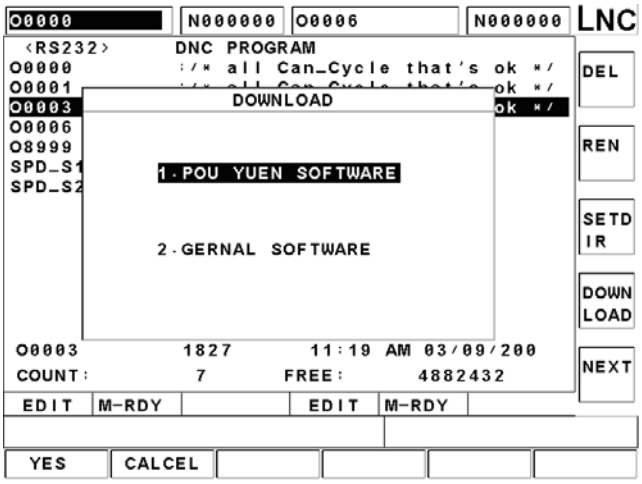


Figure 1.4-22

2. Select 【2.GERNAL SOFTWARE】 to switch to the screen of communication connection as the following figure shows. Refer to 【COMM.】for detailed instructions on the operation.

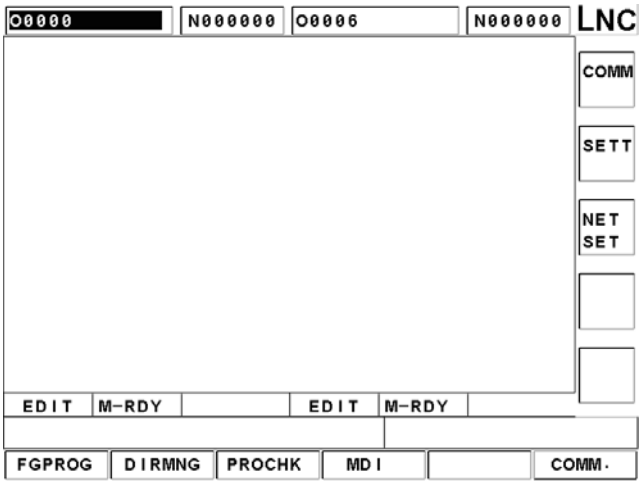


Figure 1.4-23

3. Select 【1.POU YUEN SOFTWARE】 to switch to the screen as the following figure.

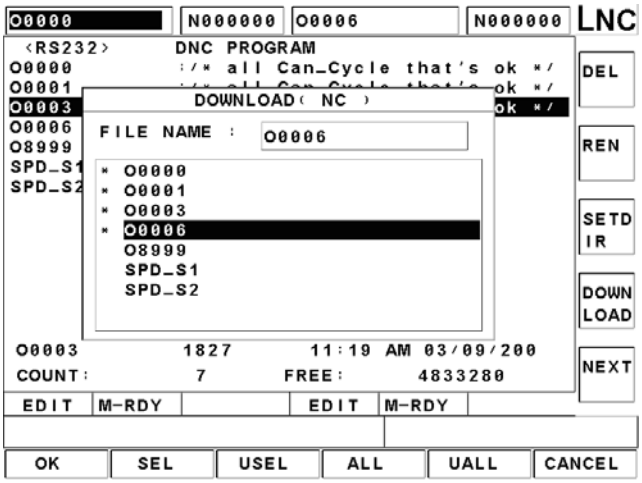


Figure 1.4-24

- Introduction of function buttons

  【SEL】, 【USEL】, 【ALL】 and **【UALL】** are effective only when the cursor is at the file list**.**

  【OK】: After selecting the file to download, click 【OK】 to move to the next step.

  【SEL】: Add the file where the cursor is to the list for download. The file selected is marked with an asterisk (*) in front of it.

  【USEL】: Delete selected file from the list. The asterisk will then disappear.

  【ALL】: Select all the files on the list.

  【UALL】: Cancel the selection of all the files.

  【CANCEL】: Cancel the function of file download.

- Introduction of the operation of columns is as the following.

  a. At the column showing a single file name, click Up or Down to switch to file list.

  b. At file list, click Right or Left to switch to the column showing a single file name.

- Introduction of Download function

  a. When executing this function, make sure hardware connection is normal, and the PC has to run LNCTools which is developed by our company. Make sure also the communication protocols of both sides are consistent.

  b. Select files on NC side to be downloaded.

  c. If download a file only, move cursor to the desired file and click 【YES】.

d. Select save path or file name to be stored on PC side.

①. If download a file only, users can select destination path and file name on PC side. Users can also input a new file name. After selection, click 【YES】 to move to next step.

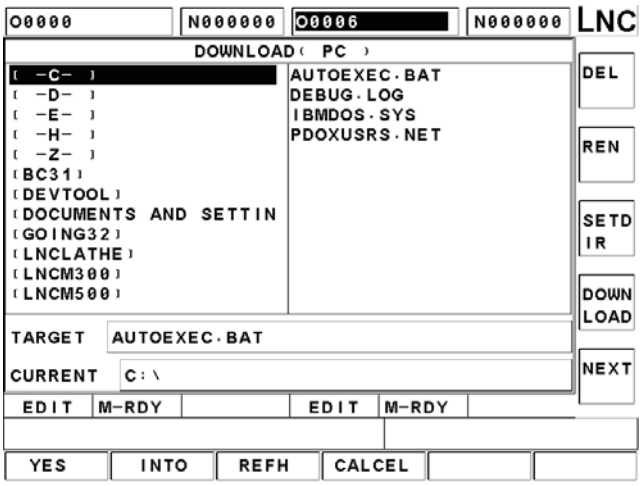


Figure 1.4-25

②. If download more than a file, users can only select the path on PC side for download, destination file names will be the same as the source files. After selection, click 【YES】 to move to next step.

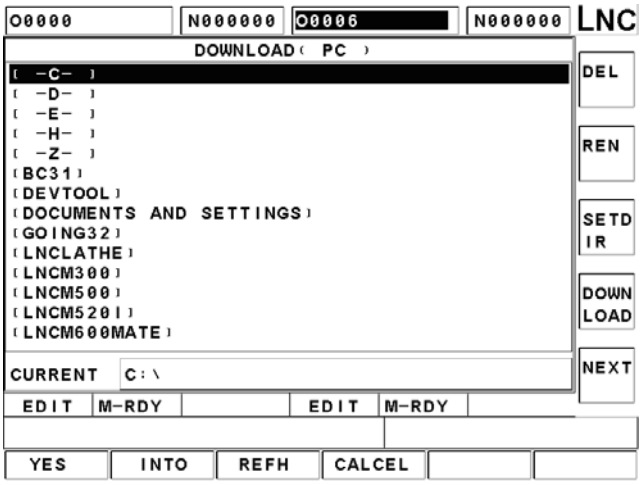


Figure 1.4-26

e. Inspect the name of the file to be downloaded. If decide to download the file, click 【OK】 to start downloading file to PC side.

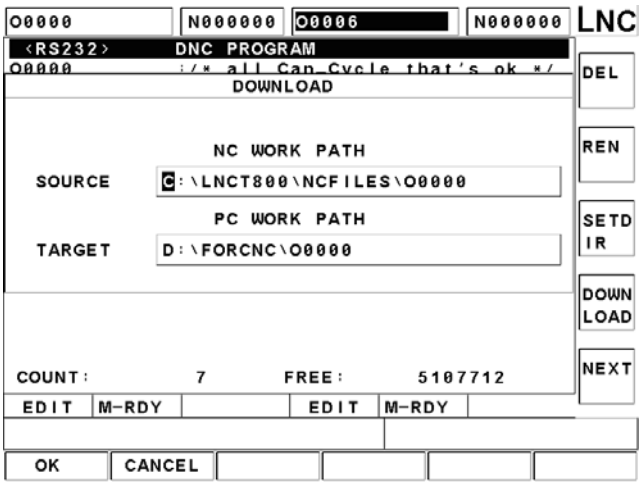


Figure 1.4-27

【UPLOAD】

1. Transmit file from PC side to NC side via RS232. Click 【UPLOAD】 function button to show the following screen.

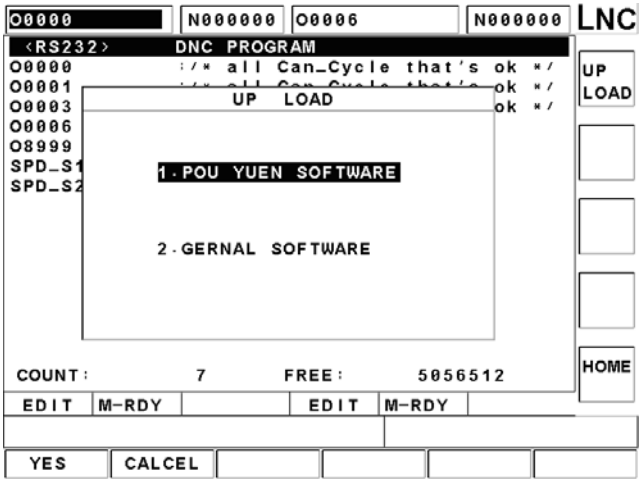


Figure 1.4-28

2. Select 【2.GENERNAL SOFTWARE】 to switch to the screen of communication connection as the following figure. Refer to 【COMM.】 for detailed instructions on the operation.

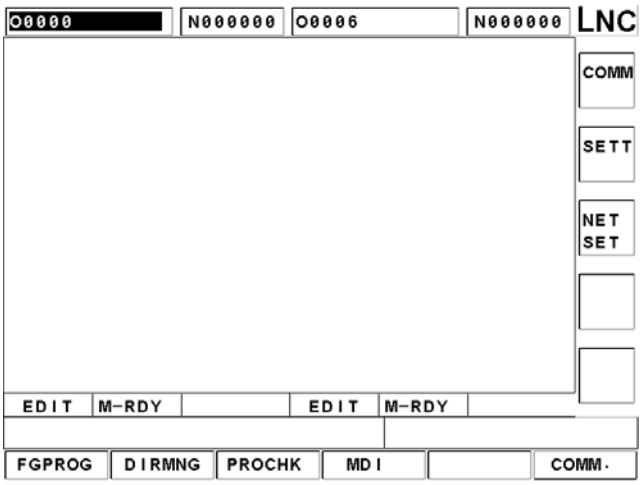


Figure 1.4-29

3. Select 【1.POU YUEN SOFTWARE】 , and if PC side is running the transmission software developed by LNC, the following screen appears.

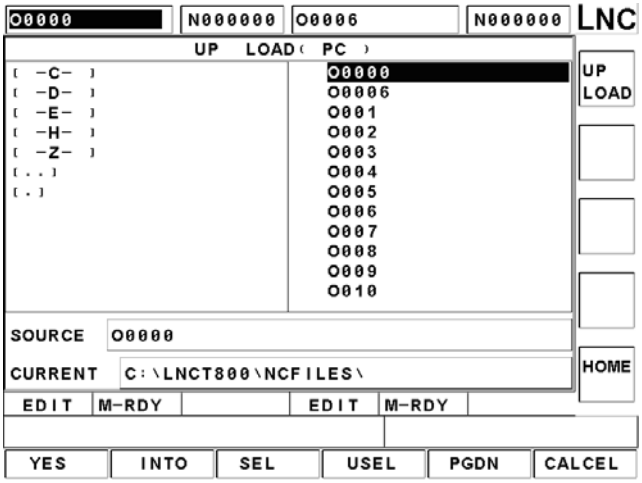


Figure 1.4-30

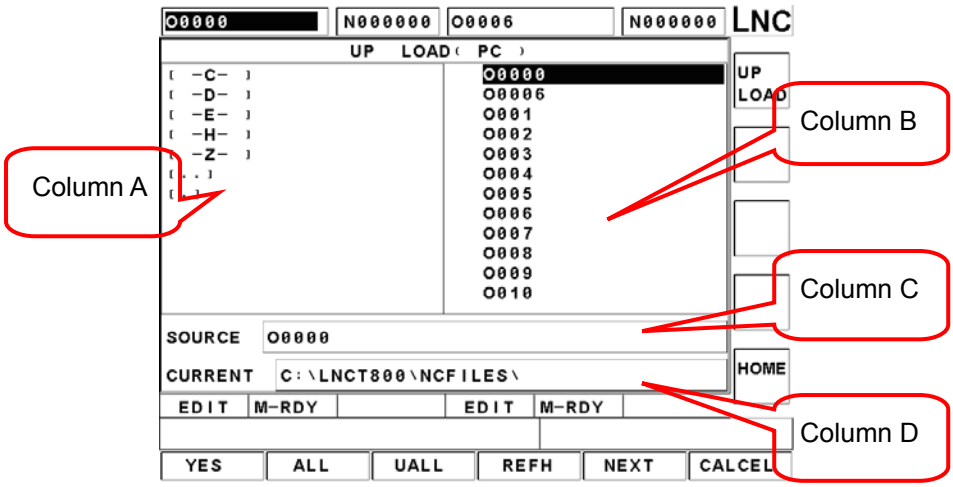


Figure 1.4-31

◆ Introduction of function buttons

【SEL】,【USEL】,【All】 and 【UALL】 are effective only when the cursor is at the file list.

【YES】: This function button is not effective when the cursor is at folder selection column. Click this button to move to next step.

【INTO】: This function button works as the <input> button. Click this button at folder selection column to enter subsidiary folders. Click this button at other columns will work as the 【OK】 button.

【SEL】: Add the file where the cursor is to the list for download. The file selected is marked with an asterisk (*) in front of it.

【USEL】: Delete selected file from the list. The asterisk (*) will then disappear.

【ALL】: Select all the files on the list.

【UALL】: Cancel the selection of all the files.

【REFH】: Refresh folders and file lists in work path.

【CANCEL】: Cancel the function of file upload.

◆ Introduction of column operation methods

a. **Column A :** Column of folder selection. Displays all drive letters and folders in work path excluding which with Chinese names. When cursor is at column A, click Right to switch to column B, and click Left to switch to column C. Click Up or Down to select folder, and then click enter key or 【Enter】 button to switch work path.

b. **Column B :** Column of file selection. Displays file list in work path excluding which with Chinese names. When cursor is at column B, click Right to switch to column C, and click

Left to switch to column A. Click Up or Down to move cursor, the file name where cursor is is displayed in column C.

c. **Column C :** Displays file name where cursor is in column B. When cursor is at column C, click Up to switch to column A, and click Down to switch to column D. If don't want to find file through column B, directly input file name in this column.

d. **Column D :** Current work path of PC side. When cursor is at column D, click Up to switch to column C, and click Down to switch to column B. If length of work path is too long to be displayed in column D, click Right and Left to move cursor to inspect the correctness of the path. This column does not provide the function to let users input data, but it memorizes the last used path and hence reduces the time needed for path searching.

◆ Introduction of Upload function

a. When executing this function, make sure hardware connection is normal, and the PC has to run LNCTools which is developed by our company. Make sure also the communication protocols of both sides are consistent.

b. Select file in PC side to be uploaded. If upload a file only, move cursor to the file and click 【OK】.

c. Select files in NC side to Save As. The path to upload to NC is the same as current working path. If want to save to other path, use File Management to set the desired working path at first.

①. If upload a file only, select or enter a file name to save. After selecting, click 【OK】to move to next step.

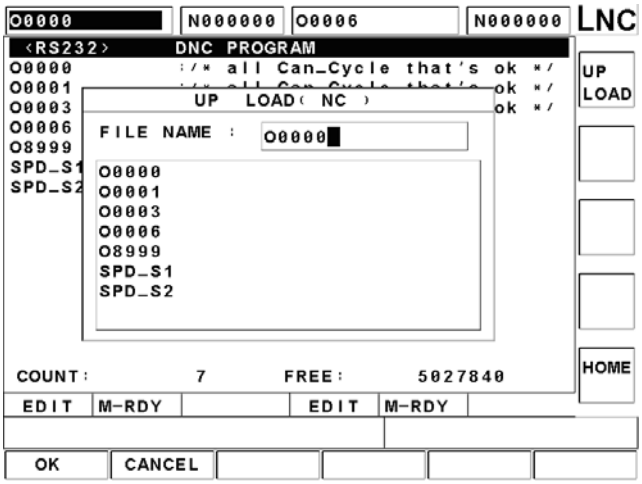


Figure 1.4-32

②. If upload more than a file, destination file names will be the same as source files. Move to next step directly.

d. Inspect uploaded file names, and if surely to upload files click【OK】to start uploading files to NC side.

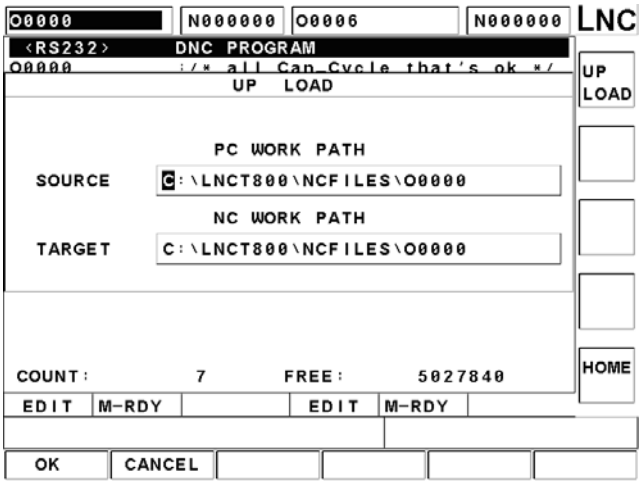


Figure 1.4-33

1.4.6 COMM. (RS232 Communiaction)

In Edit mode, users can click 【COMM.】 function button to perform file transmission or receiving functions between controller and other PC.

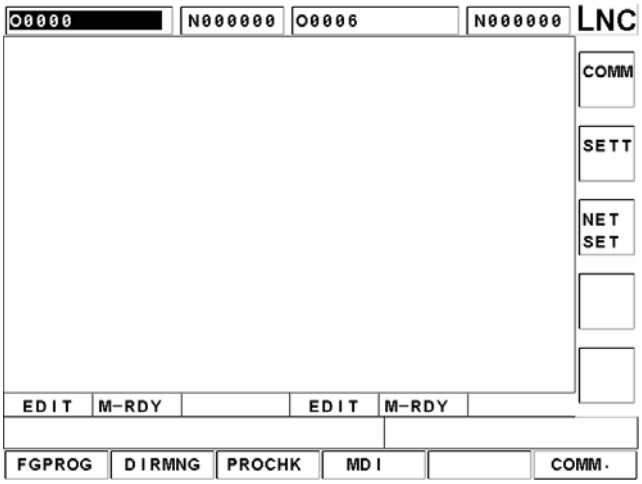


Figure 1.4-34 Communiaction Connection major screen

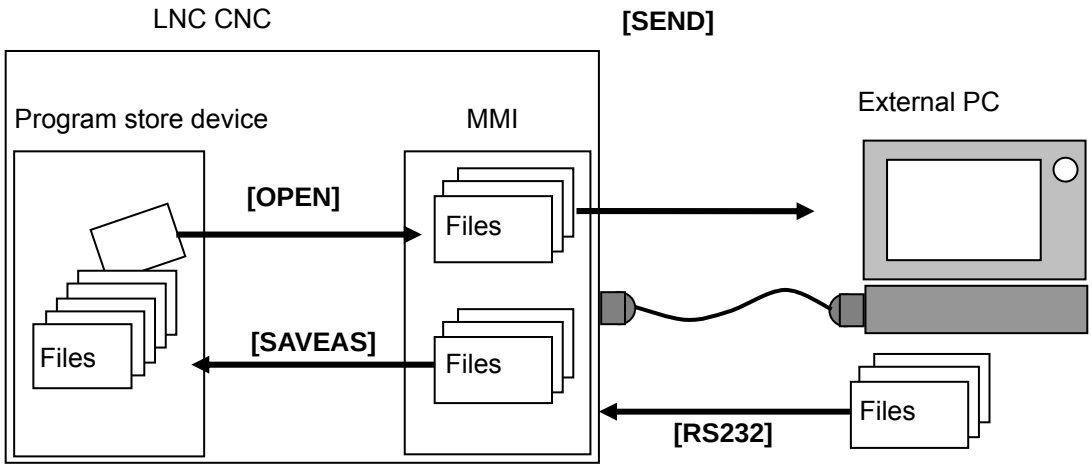


Figure 1.4-35 File transmission or receiving between controller and other PC

Click 【COMM】 function button, and then functions of **【COMM】**、**【SETT】** and **【NET SET】** appear.

【COMM.】

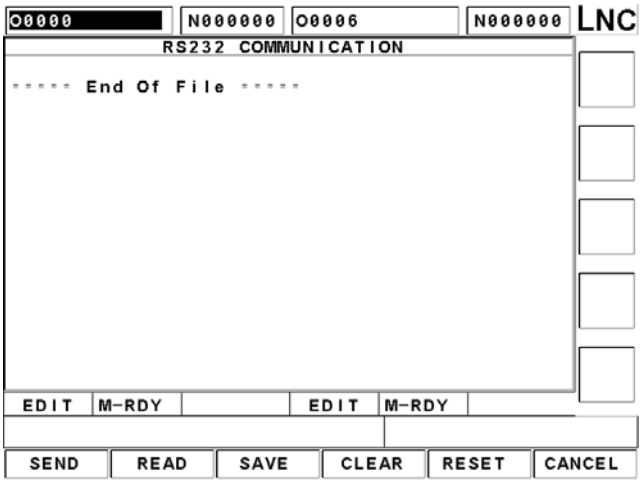


Figure 1.4-36 File Transmission Major Screen

Before using RS232, make sure wiring is OK, and check if RS232 settings are compatible with external device. When RS232 transmission screen appears, controller is ready to receive programs at any time; controller receives automatically and displays the external program on screen whenever a program comes in, and meanwhile external PC dominates the transmission.

After users click【**COMM.**】, buttons on screen become function buttons of 【**SEND**】,【**READ**】,【**SAVE**】, 【**CLEAR**】,【**RESET**】,【**CANCEL**】, etc.

Introduction on each function button is as the following:

【**SEND**】**:**Transmit part programs in controller to external PC by RS232.

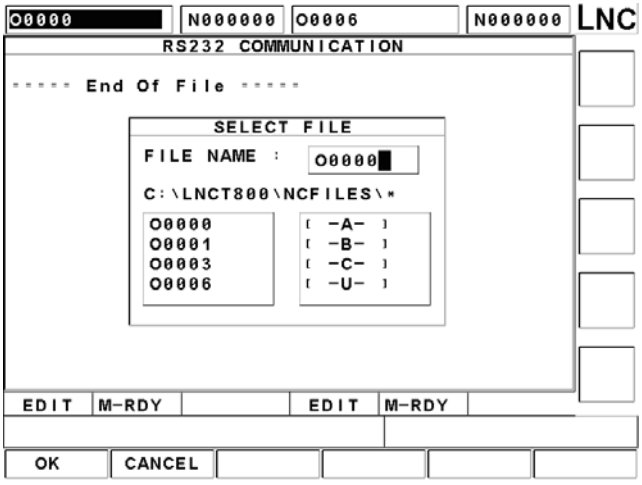


Figure 1.4-37 Select file transmission function

【READ】:Read part programs transmitted from external PC to controller by RS232.

【SAVE】:Save received part program. Part program transmitted to controller are not saved after the transmission, users have to manually save the programs. Click Save function button, and the following screen appears, select the save path and file namem and then click【OK】button finish the process of saving file.

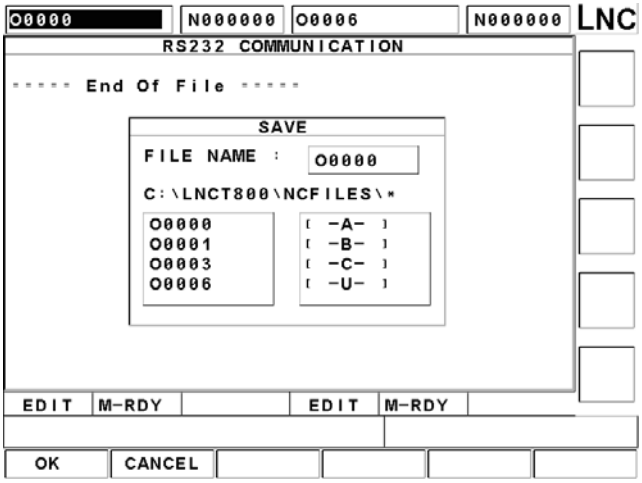


Figure 1.4-38 Save file function screen

【CLEAR】: Give up and clear program files on screen. If the received data are not correct, click this function button to reset transmission status of the hardware.

【SETT】

Settings of RS232 must be correct and compatible with PC in order to successfully proceed RS232 transmission. Adjust with the following parameters:

Parameter Serial Number	Name
P0388	File Transmission Port (0:not use, 1:COM1, 2:COM2)
P0389	File Transmission Rate (bps)
P0390	File Transmission Data Bit (5~8 bit)
P0391	File Transmission Stop Bit (0:1 bit,1:1. 5 or 2bit)
P0392	File Transmission Parity Check Bit (0:not ust, 1:odd, 2:even)
P0393	File Transmission Code (0:ASCII, 1:EIA, 2:ISO)

【NET SET】

Click Network Setting function button, and the following screen is displayed. Up tp 10 online disks can be set.

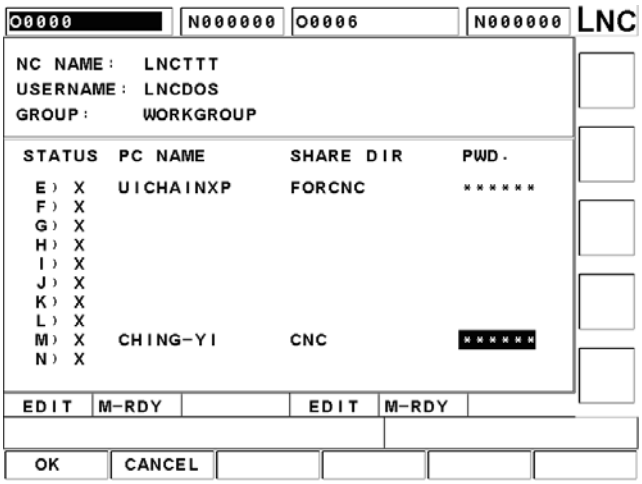


Figure 1.4-39

◆ Introduction of columns

a. **NC NAME:** Displays computer name in the content of C：\Net\system.ini. The name cannot be duplicated in the same web domain. Default content of file is LNCDOS.

b. **USERNAME :** Displays user name in the content of C：\Net\system.ini. The name is the account used to log in computer. Default content of file is LNCDOS.

c. **GROUP:** Displays workgroup in the content of C：\Net\system.ini. The name is the workgroup name used to log in controller. Default content of file is WORKGROUP.

d. **STATUS**

①. Displays drive letter used for connection in C：\Net\2net.bat.

②. 10 drive letters from E to N.

③. Driver letter is fixed, users cannot set by themselves.

④. ○ and X after drive letter indicates the connection condition of the drive. ○ indicates there is a connection, and X indicates no connection.

⑤. If previously set online drive letter is not E~N, online drives E~X will be deleted after using Network setting functions.

e. **PC NAME:** Input complete computer name which controller connects to. Chinese names are not supported, and the biggest length is 12 digits.

f. **SHARE DIR :** Input shared folder names in computer which controller connects to. Chinese names are not supported, and the biggest length is 12 digits.

g. **PWD:** This column is used to input the password used to log in connected computer. The real content of password shows while being entered in input column, but after clicking Enter button the column will use 6 asterisks (*) to show the password. The biggest length of password is 12 digits.

◆ Introduction of function buttons

a. Use Up, Down, Right, Left buttons to move cursor to input column.

b. Input data in input line, and click Enter button to input data to the column assigned by cursor.

c. Data in column will be deleted after clicking Enter button if not data input in Input Line.

d. Use Page Up and Page Down to switch page.

e. Cancel：Quit network setting page without saving changes.

f. ESC : Same function as Cancel button.

g. 【OK】: Data changed will be stored after 【OK】 button is clicked. Network settings will be effective after reboot, a prompt box appears to ask whether users want to reboot. The screen is shown below as the following.

◆ Network condition may sometimes be not very good and makes a connection hard to be made. If the above functions are used but a certain online drive cannot be connected, the same drive will be attempted to be connected to automatically for 3 times and, if all failed, next online drive will be connected to. When all online drives are tried, it will then enter system.

1.5 Compensation Function (OFFSET)

Click <OFFSET> to enter【WEAR】, 【GEOM】, 【SHIFT】, 【MACRO】, 【WORK】. Operators can modify these settings in MDI Mode when machine preparation is done.

1.5.1 WEAR : Tool Wear Compensation

Click 【WEAR】 button to enter the following screen, and then manually input data in MDI mode.
When users input wear compensation while program is running, a password input dialogue box appears. After the password is correctly input, the values can be input. Some users are not used to input password when input compensation values, so they can set Pr.0899 as 0, then password protection is disabled. Timings for password protection are shown in the following chart:

NC status	Parameter 0206	Parameter 0899	Password protection	Remark
Machine not ready	—	—	—	Cursor locked, unable to input
Machine ready	—	—	No	Not in program execution
Cycle Start	0	—	No	Can't do wear compensation when in motion
Machine Hold	1	0	No	Password protection not enabled
Section stop	1	1	Yes	

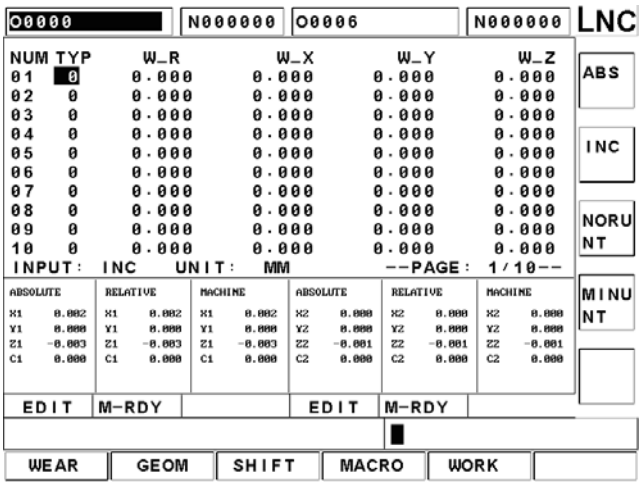
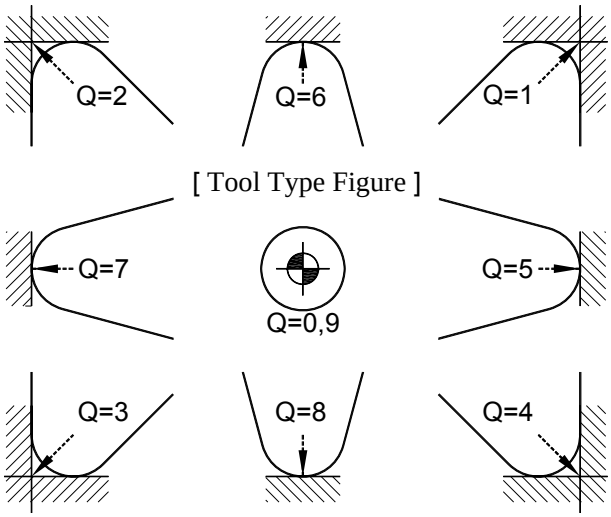


Figure 1.5-1 Tool Offset

Figures and decription of each column are as the following:



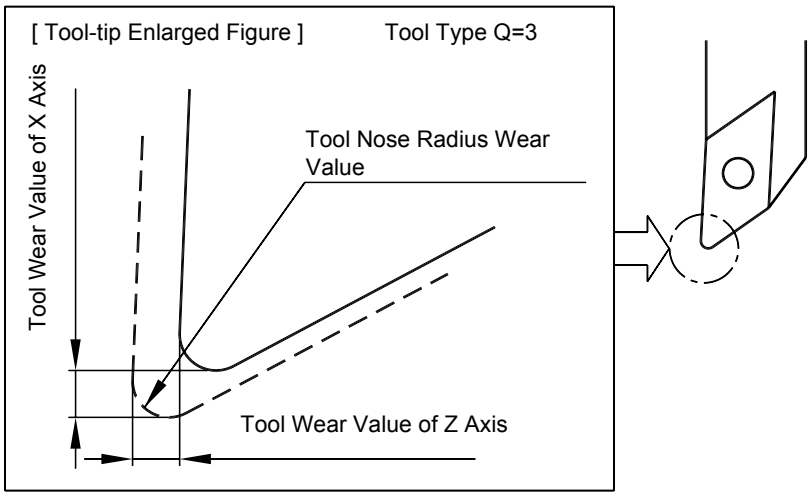


Figure 1.5-2 Tool Type & Wear Value

Types: tool type

W_X: X AXIS wear compensation value

W_Z: Z AXIS wear compensation value

W_R: Radius wear compensation value

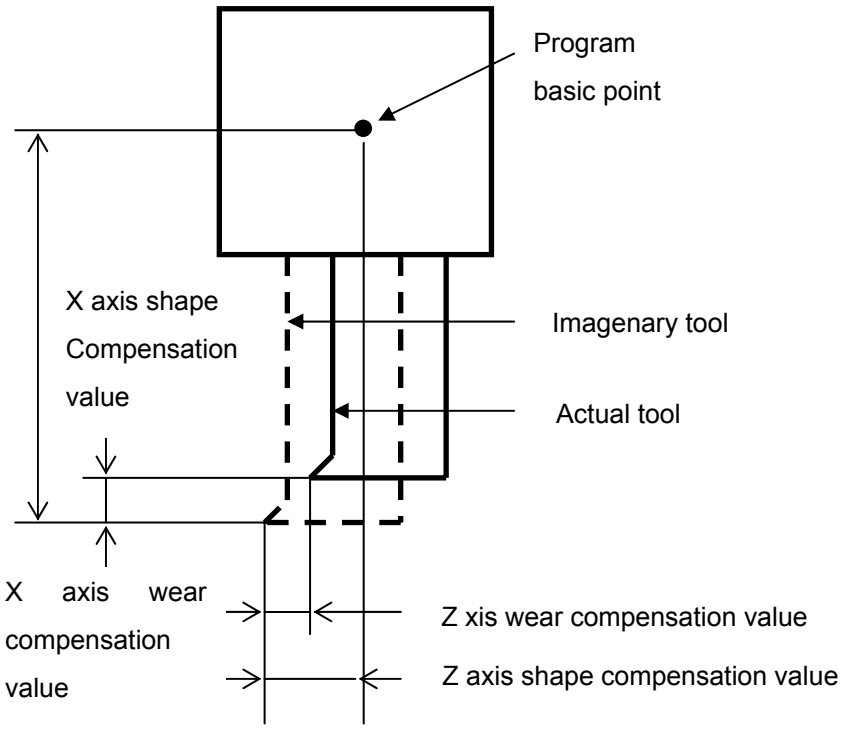


Figure 1.5-3

Each time when use a tool compensation number in a part program, absolute coordinate changes along with tool compensation value, and the value is:

absolute coordinate value = machine coordinate values – external offset (WORK SHIFT) – G54 ~ G59 offset – (tool shape compensation value + tool wear compensation value)

Click <PAGE↓> buttonto see more sets of setting (up to 30 sets).

Move cursor to the set to be set, in MDI mode, input setting values, and click <INPUT> to write into controller.

1.5.2 GEOM：Tool Shape Compensation

Click【GEOM】button to enter the following screen, and perform modification.

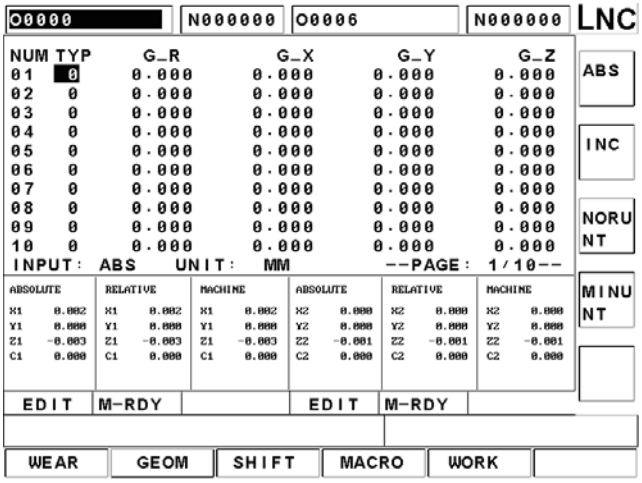


Figure 1.5-4 tool shape compensation screen

Types: tool type

G_X: X AXIS shape compensation value

G_Z: Z AXIS shape compensation value

G_R: radius shape compensation value

Directly input and midify values in MDI mode when preparation is done. But to G_X, G_Z, use【MXxx】and【MZzz】to perform compensation value setting. The formula is as the following:

Compensation value =machine coordinate values –external offset (WORK SHIFT) –G54 ~ G59offset – input value

1.5.3 SHIFT：Work Coordinate Offset

Click【**SHIFT**】button to enter the following Work Coordinate Offset (WORK SHIFT) setting screen:

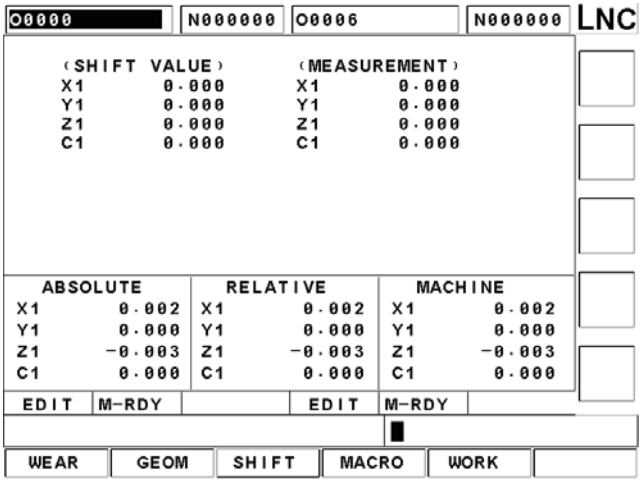


Figure 1.5-5 Work Coordinate Offset (WORK SHIFT) setting screen

In MDI Mode, there are 2 input methods. Instructions are as the following.

Method 1 : Directly input offset amount of each axis, input【X20. Z20.】, and click 【INPUT】. The input values are updated to offset values, i.e., offset value = input value.

Method 2 : Input measured values, input【MXxx MZzz】, and click【INPUT】. The input values are updated to measured values, i.e., measured value = input value.

Offset value formula is as the following:

offset value =machine coordinate values - input value -G54 ~ G59offset - (wear compensation value +shape compensation value)

1.5.4 MACRO Variable

Click 【**MACRO**】 button to enter Macro Variable screen. In this function, variables can be input ormodified. The modification method is to move cursor the position which is to be modified, and input desired value, and then click <INPUT>. Variables begin with # are Local Variable, and those begin with @ are Global Variables. Refer to the chapter of macro in programmer's manual for detailed instructions.

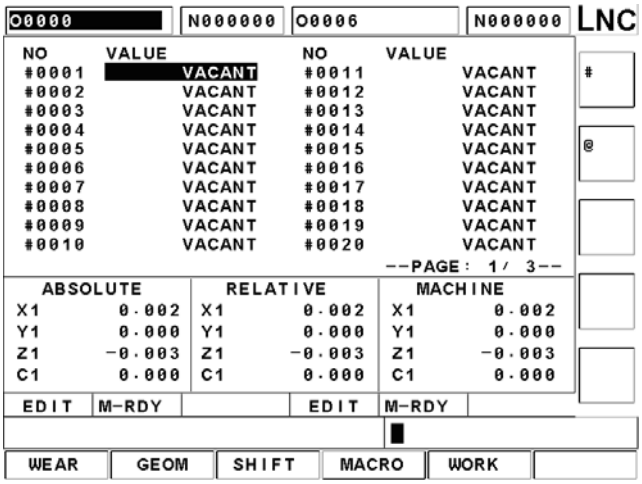


Figure 1.5-6 Local Variable of Macro Variable

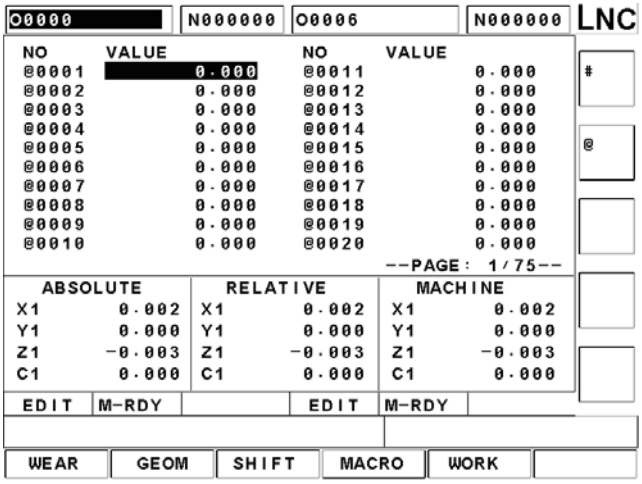


Figure 1.5-7 Global Variable of Macro Variable

1.5.5 WORK：Workpiece Coordinate System

Click function button【**WORK**】 to enter workpiece coordinate system setting screen. There are totally 7 sets of workpiece coordinate system to be set which respectively represent expansion offset, and G54 to G59. When preparation is done, operators can use cursor to mark sets, and input strings of Xxx…Zxx…, xx represents the axis-direction to be input with values, and click <INPUT>, and then coordinate value will be renewed immediately for part programs to call different coordinate systems.

The 1st page is expansion offset (0), G54, G55, G56, etc. workpiece coordinate system, and the next pageis for G57, G58, G59, etc.

G54 machine coordinate values of home point =G54 setting value +expansion offset (0) setting value.

G55 machine coordinate values of home point =G55 setting value +expansion offset (0) setting value.

G56 machine coordinate values of home point =G56 setting value +expansion offset (0) setting value.

G57 machine coordinate values of home point =G57 setting value +expansion offset (0) setting value.

G58 machine coordinate values of home point =G58 setting value +expansion offset (0) setting value.

G59 machine coordinate values of home point =G59 setting value +expansion offset (0) setting value.

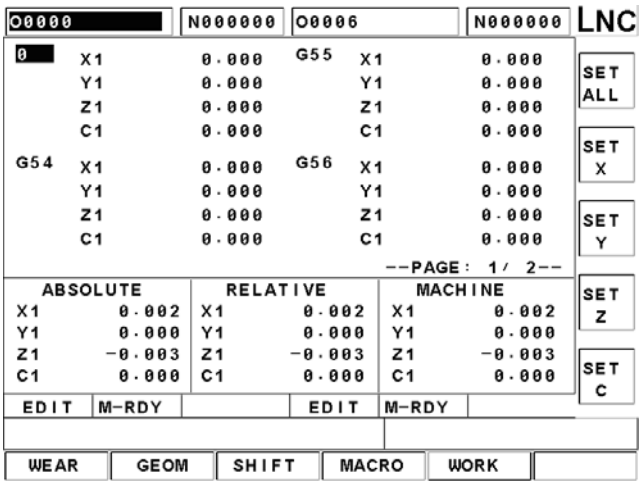


Figure 1.5-8 Workpiece coordinate system setting screen-1

Expansion offset setting directly effects other coordinate systems. G54 to G59 are workpiece coordinate systems, when being set, consider workpiece coordinate, tool and program content. If want to reset a coordinate system, move cursor to the number of the coordinate system to be set, and input axis name and new coordinate value, and then click <INPUT> to set the value to the cursor-specified coordinate system. 3 axes can be written in a row, but remember to input decimal points to avoid misleading. (E.g.: X100. Z200.).

1.6 Graph Function (GRAPH)

1.6.1 Function Introduction

Click <**GRAPH>** group button. On the screen of this group, cutting path, vision angles of the path and settings for display range are shown.

1.6.2 GRAPH

Path display screen is as the following figure. The coordinate values displayed at the upper right part are current tool absolute coordinate and coordinate vision angles are displayed at the lower right part.

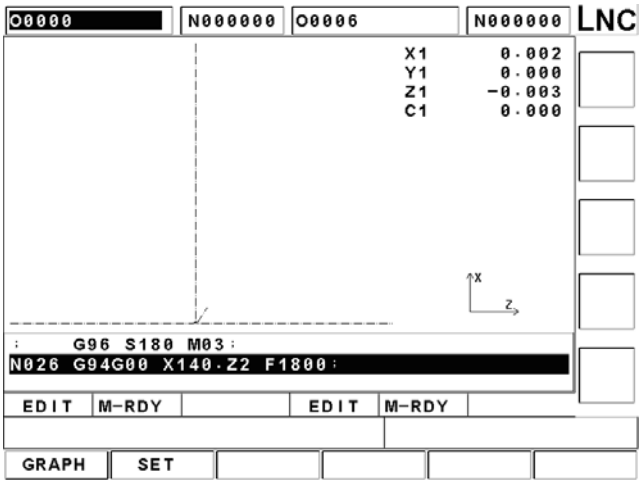


Figure 1.6-1 Path Display screen

1.6.3 SET

This page is mainly for the use of setting related parameters for the display of cutting path. Usages of parameters are stated below.

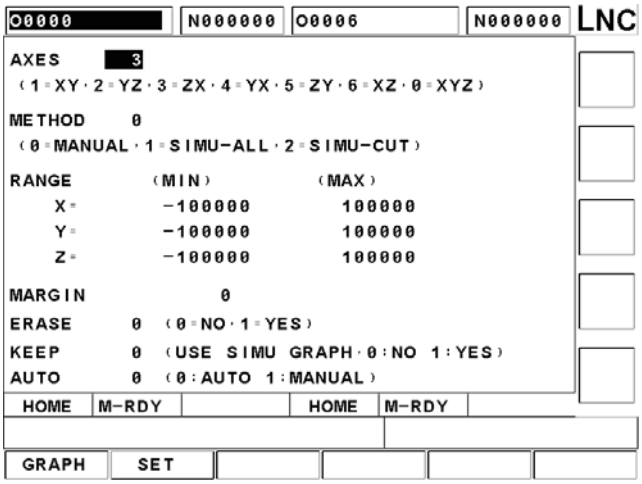


Figure 1.6-2 Window definition major screen

- **AXES:**

  Input coordinate vision angles (1=XY, 2=YZ, 3=ZX, 4=YZ, 5=ZY, 6=XZ, 0=XYZ) used when displaying the path.

- **METHOD:**

  Input drawing range on【**GRAPH**】screen (0=manual, 1=result preview－whole travel, 2=result preview －cutting travel).

  0-MANUAL : Preview drawing range is to read manually set maximum and minimum value.

  1-SIMU-ALL: Preview drawing range is to read program cutting path's maximum and minimum value.

  2-SIMU-CUT: Preview drawing range is to read program-performed cutting path's maximum and minimum value.

- **RANGE(MAX):**

  Set maximum values of X, Y, Z AXIS ranges of manual drawing.

- **RANGE(MIN):**

  Set minimum values of X, Y, Z AXIS ranges of manual drawing.

- **MARGIN:**

  Set the values of preserved margins of【**GRAPH**】screen.

- **ERASE:**

  When program preview is not performed, and path display is performed, select here whether to erase the previous path display screen when cutting starts. (0=NO, 1=YES).

1.7 Diagnosis Function (DGNOS)

Click **<DGNOS>** to enter the screen containing functions of **【ALARM】, 【SYSUPD 【IOCSA】, 【MLC2】,** and **【SYSTEM】.** On diagnosis function screen HMI signals and machine status can be obtained, and hence brings the convenience to maintenance and system test.

1.7.1 ALARM

Click **【ALARM】** to enter a minor function display screen which contains **【ALARM】, 【WARN】, 【HISMSG】, 【LOGHST】, 【OP LOG】** functions. When any Alarm or PLC-related operation alarm appears, Alarm or information is displayed on the monitor. Therefore, operators can use this button to obtain status explanations.

When problems occur during system operation,alarm information will be generated, and users can depend on it to find out the problem and resolution. If system gives out an alarm, users operations will immediately be stopped, and relevant information will be listed on the monitor. When the problem is resolved, click <RESET> to cancel the status.

When operation caution appears on screen, click **【HISMSG】** button for detailed information. The display of a caution will not interrupt the process of manufacturing, and it just reminds users the solution for certain condition.

Operation alarm is decided along with the design of PLC LADDER. For example, if the protection door is not well closed, the mechanism of LADDER will generate an alarm of 【DOOR NOT CLOSE】, and the malfunction of cooling water circulation for cutting will result in the message of【COOLANT LOW】, and so on. Therefore, when an alarm occurs, carefully inspect the condition of the machine and peripheral equipments.

(This section is applicable to tool machine manufacturing personnel.)

The compilation of alarm messages is done by technician of tool machine manufacturing factories in accordance with the designs of PLC LADDER, and considerations for machine operation. Users should not change them discretionarily. When machines leave the factory, customers should be immediately informed of the related instructions. The contents of these alarms should be compact and clear.

【**ALARM**】**:** This screen mainly displays abnormalities inside of the system.

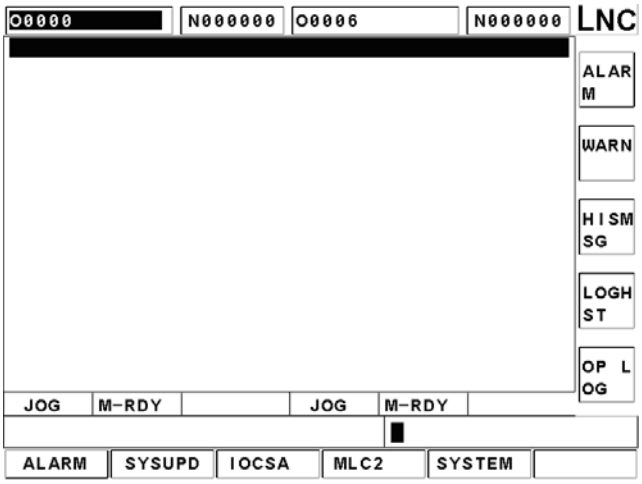


Figure 1.7-1

【**WARN**】**:** This screen mainly displays abnormalities of PLC.

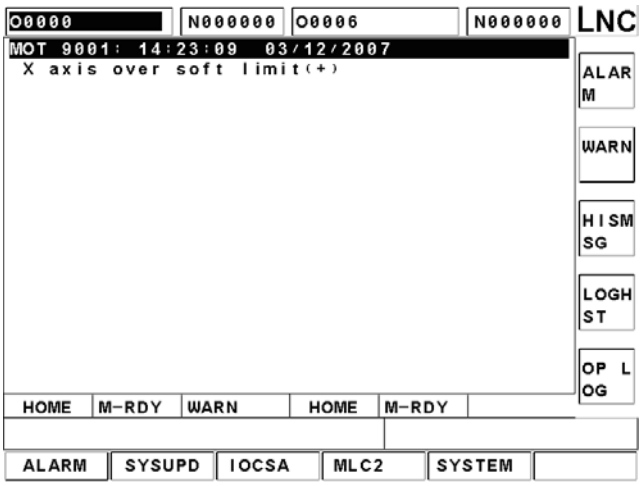


Figure 1.7-2

【**HISMSG**】**:** This screen mainly displays system version information and grammar status of manufacturing.

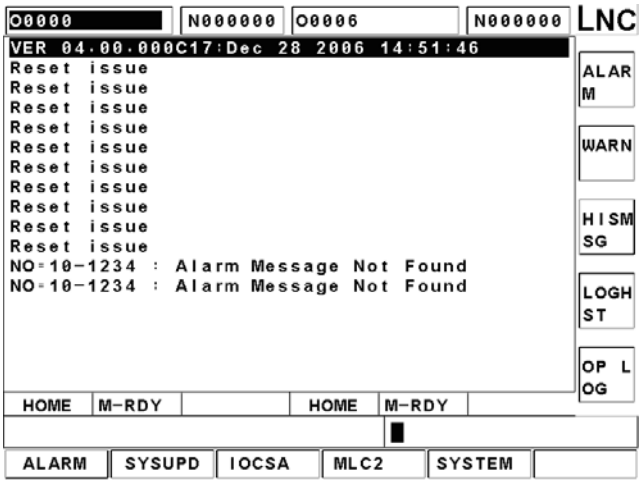


Figure 1.7-3 Information function screen

【**LOGHST**】**:** This screen mainly records previous alarms and warnings.

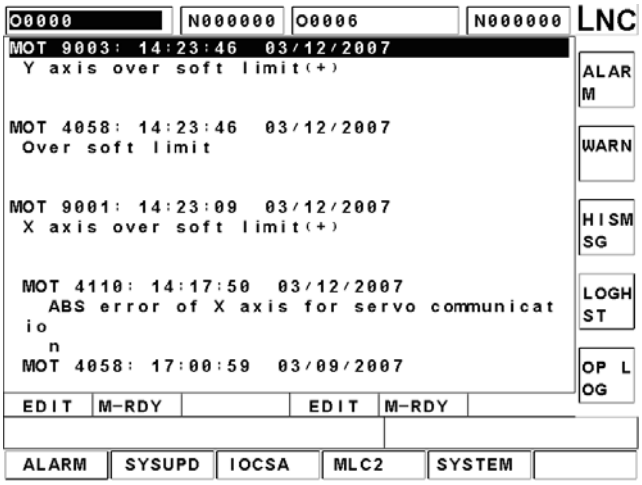


Figure 1.7-4

【OP LOG】

This screen mainly records previous operations such as managment, measurement, tool compensation, thermal, variable, coordinate, statistics, RG.D of PLC, System, User, Change of controller mode and status, and Change of S bit status.

Each of the records is divided into 2 lines. The formats are as the following：

Format 1：Related to operation page

Time/Date：【Page Name：Modify Data 1｜Modify Data 2｜Modify Data 3｜…】

(Previous value → Modified value)

Format 2：Not related to operation page

Time /Date：【Simple button action｜Modification of controller information｜…】

Previous value → Modified value

The format of time is hh：mm：ss; hh represents hour；mm represents minute；ss represents second. The format of date is MM/DD/YYYY, MM represents month；DD represents day；YYYY represents year. 【Page Name】indicates which page is edited. And the next item is the category of the data modified, and data category appears one at a time.【Previous Values】 indicates the value of data prior to modification, and 【Modified Value】 indicates the value of data after modification.

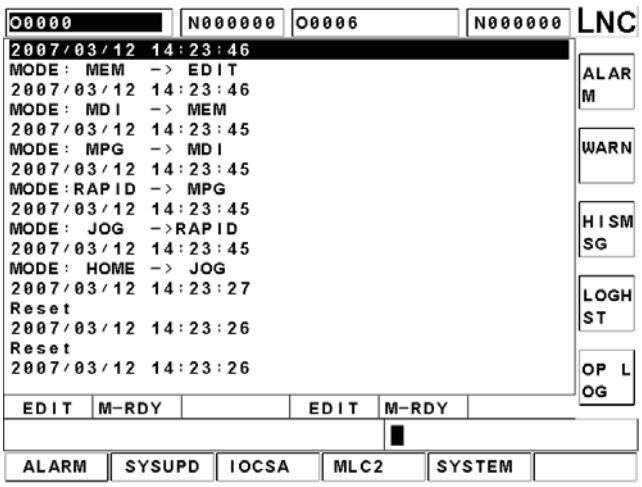


Figure 1.7-5

1.7.2 SYSUPD ：System Update

This function can be executed only when machine is in NO-RDY status. Firstly click EMG-STOP, and click 【SYSUPD】, and then the system update screen appears. Users can use Up and Down to select the item to proceed. After selection, click 【YES】 to perform the function.

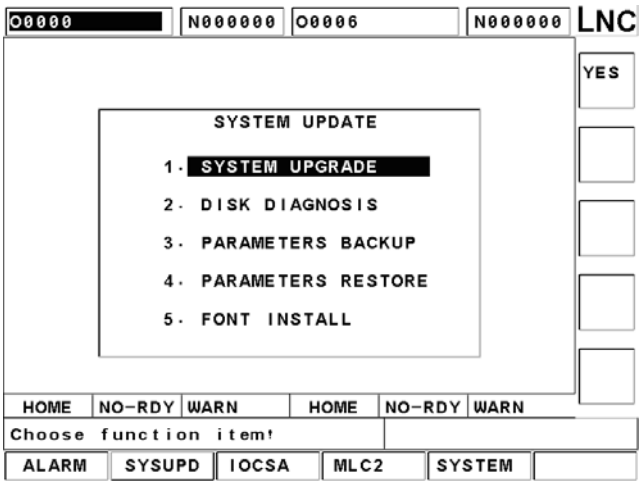


Figure 1.7-6 System Upgrade screen

A. SYSTEM UPGRADE:
Select 【SYSTEM UPGRADE】 and click 【YES】. There are 2 methods to upgrade.
【1. GENERAL DISK/NET】: Upgrade by online drives or disk.
【2. RS232 TRANSMISSION】: Upgrade by RS232.

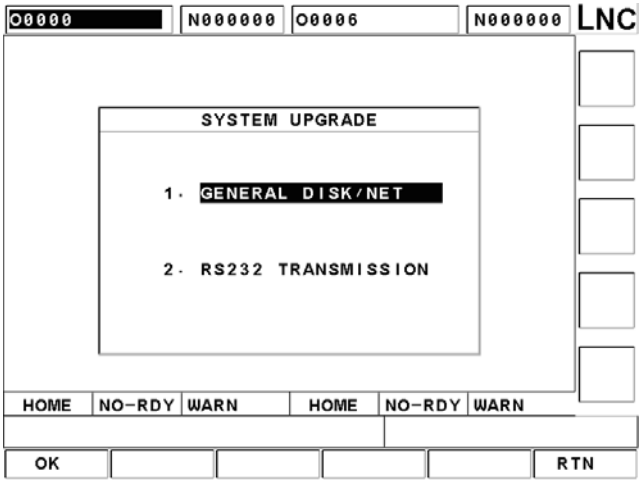


Figure 1.7-7 upgrade method Selection Screen

Select desired method according to necessity, and click【OK】button.

1. Upgrade by 【1. GENERAL DISK/NET: 】

   a. After selecting this method, a dialog box appears to let users select the path of file source.

      Column A：When cursor is at column A, use Up and Down buttons to move cursor to column B. Column A displays source path of upgrade files, if the path is known, directly enter it in column A.

      Column B：When cursor is at column B, use Right and Left buttons to move cursor to column A. Column B is used for the selection of source folder of upgrade files, and it displays both drive letters and folder names. Use Up and Down buttons to move cursor to desired folder, and click 【INPUT】button; and meanwhile column A displays the selected path, and column B displays folders and drive letter in the path.

   b. After selecting source path, move cursor to column A and click 【OK】.

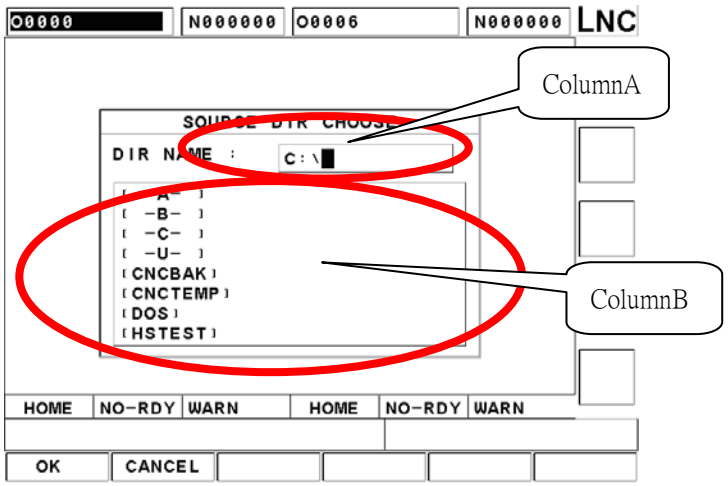


Figure 1.7-8 Upgrade Path Selection screen

c. After selecting path, confirm if surely to upgrade from that path. If yes, click 【OK】.

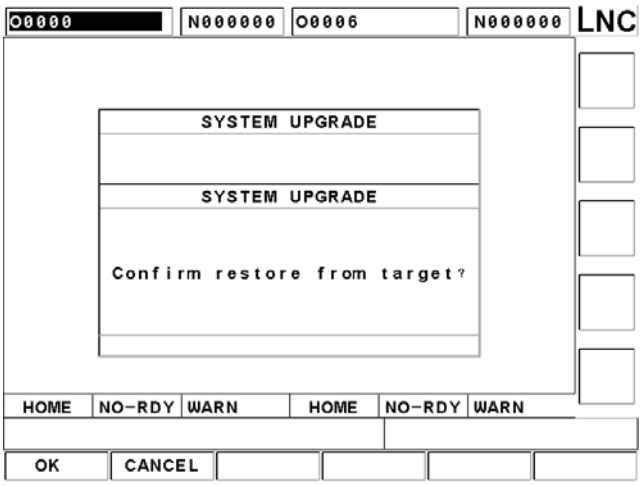


Figure 1.7-9 upgrade Path 【OK】ation Screen

d. If the specified path is incorrect, the following screen appears.

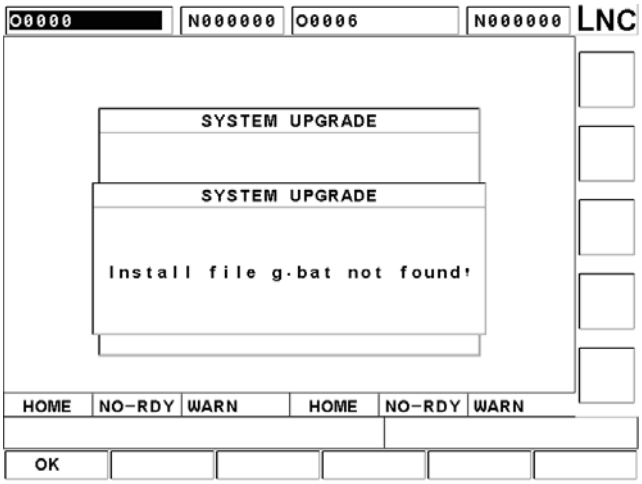


Figure 1.7-10 Upgrade Path Error Prompt screen

e. If the source path is correct, system automatically enters the installation screen.

2. Upgrade by【2. RS232 TRANSMISSION】

When executing this function, make sure hardware connection is normal, and the PC has to run LNCTools which is developed by our company. Make sure also the communication protocols of both sides are consistent.

Select source path of upgrade files. The path is on the connected PC. (Refer to the introductions of upload, download and DNC functions of File Manager for the information about columns and function buttons.)

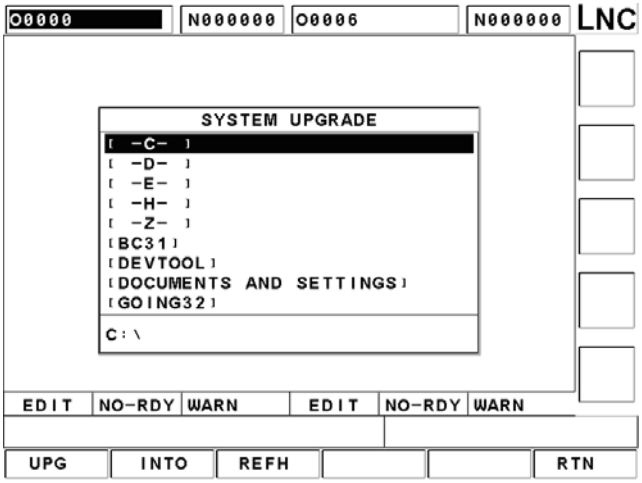


Figure 1.7-11 Upgrade Path Selection screen

After clicking Upgrade, confirm if surely to upgrade from that path. If yes, click【UPG】 button.

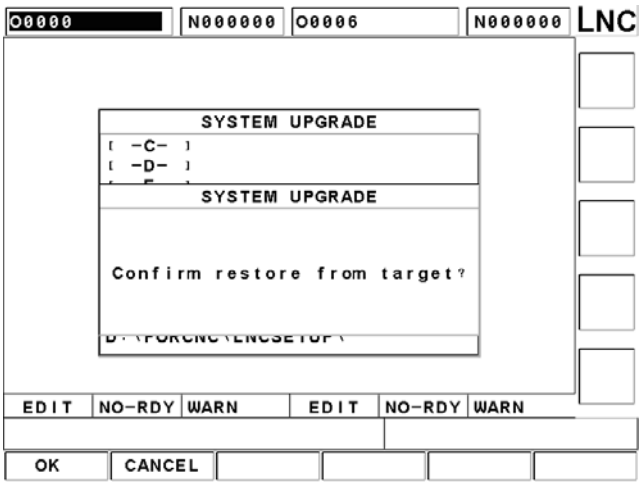


Figure 1.7-12 Upgrade Path 【OK】ation screen

If the source path is correct, system automatically enters the installation screen.

Introduction of System Installation:

After leaving the system, the following screen appears. Version of current installed software in CF card (Current Version) is displayed on the screen, and if this is the first time to install, it displays Not Install and the version of the software (Installing Version) to be installed now. Click【N】if don't want to install, and it will reboot to enter the system. Click 【Y】 if want to install, it will also reboot after the installation, and enter the system.

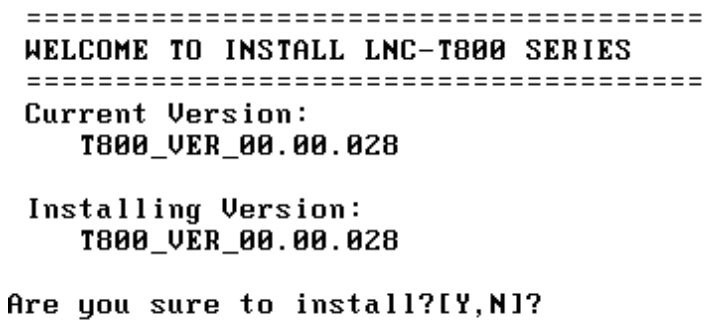


Figure 1.7-13 Screen of instruction before upgrade

B. HD CHECK

The following dialog box appears. Click 【OK】and return to DOS mode.

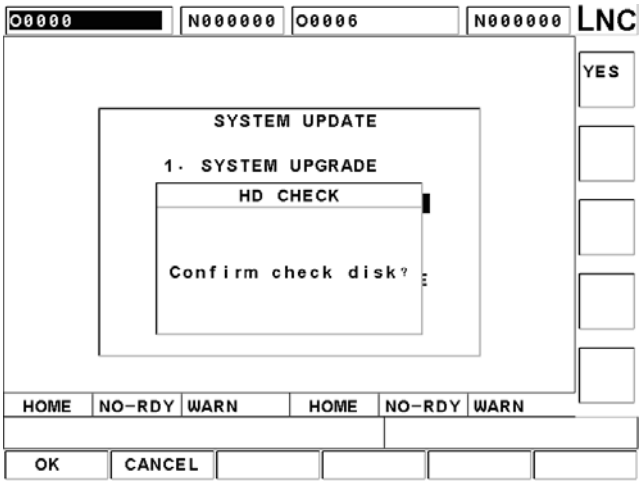


Figure 1.7-14 Screen of HDD Diagnosis

Users input drive letter A or C. If users do not input, it will diagnose drive C by default.

```
  Welcome maintenance utility ...
What DRIVE to DIAG[A,C]?
```

Figure 1.7-15 Select letter of drive to be diagnosed

Users can choose between 4 work items： (1) Scan for Virus, (2) Disc Scan, (3) Disk Defrag, (4) Reboot

```
  Welcome maintenance utility ...
What DRIVE to DIAG[A,C]?C

1.PCscan
  Virus checking
2.DISK doctor
  disk diagnostic and errer-fix
3.DEFRAG
  Disk access performance enhancement

0.Quit

Choise an Option[0,1,2,3]?
```

Figure 1.7-16 Options of HDD diagnosis functions

C. PARAM BACKUP

The following dialog box appears after selecting this function. It displays parameter types for backup. Move cursor with Up and Down to desired type, and click Select to start the backup of files of the type. If want to backup parameters of all types, click Select All. After selecting, click 【OK】.

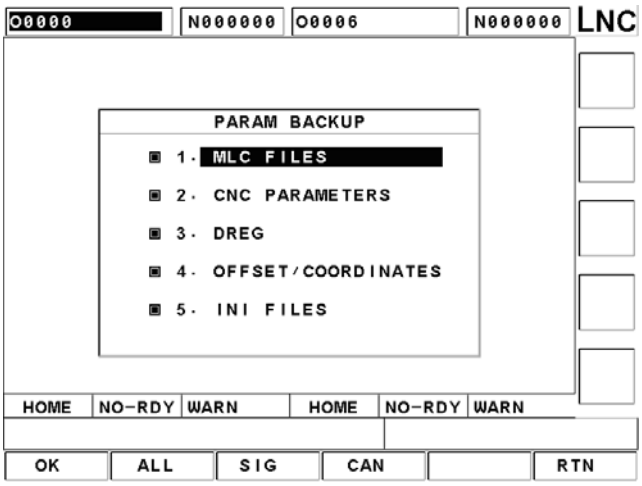


Figure 1.7-17 Parameter Backup Item Selection screen

Select method of parameter backup.

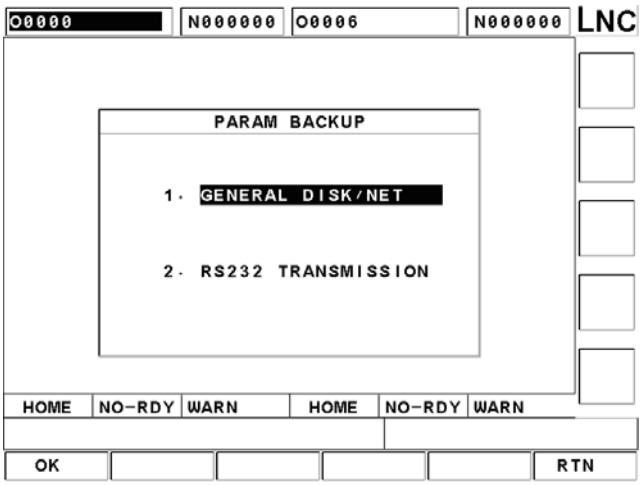


Figure 1.7-18 Parameter Backup Method Selection screen

1. If use 【1. GENERAL DISK/NET】, the following screen appears. Select the path to save file, and click【OK】.

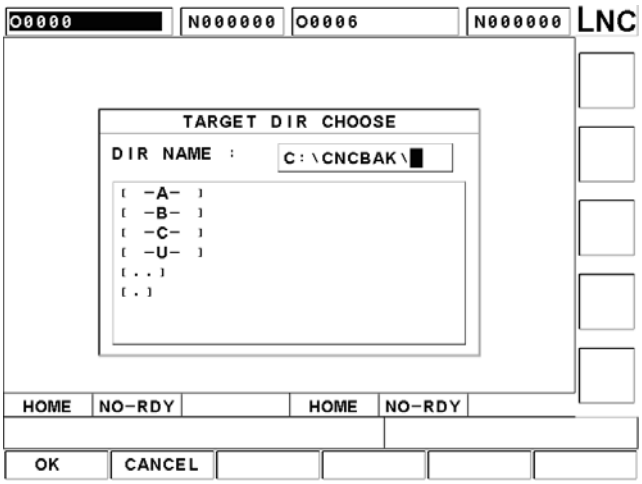


Figure 1.7-19 Parameter Backup Path Selection 1

2. If use 【2. RS232 TRANSMISSION】, the following screen appears. Select the path to save files, and click 【BAK】. When executing this function, make sure hardware connection is normal, and the PC has to run LNCTools which is developed by our company. Make sure also the communication protocols of both sides are consistent.

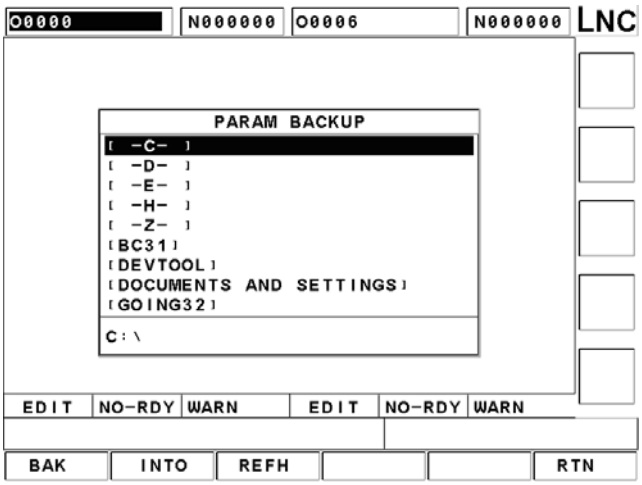


Figure 1.7-20 Parameter Backup Path Selection 2

D. PARAM RESTORE

Use Up and Down to move cursor to the type to lead in, and click Select to start the restored files of the option. If want to restore parameters of all types, click Select All. After selecting, click【OK】button.

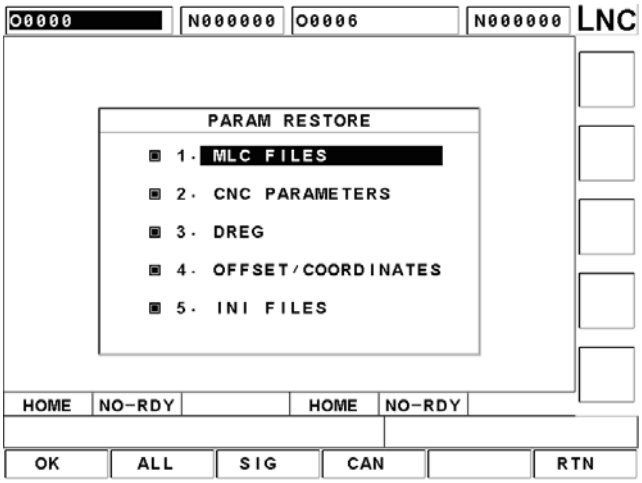


Figure 1.7-21 Parameter Type Selection

Select method to lead in parameters.

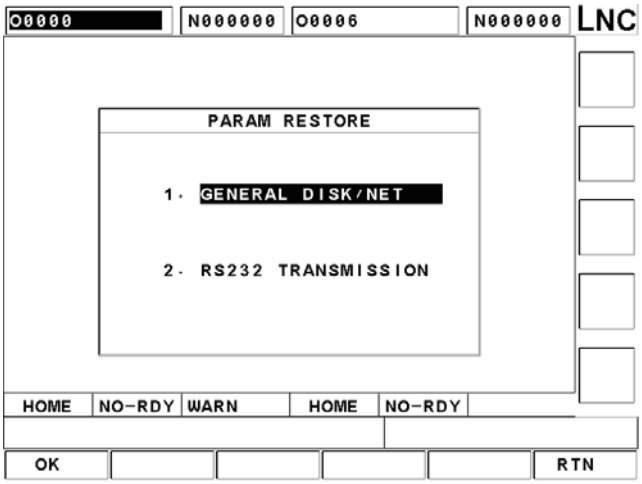


Figure 1.7-22 Parameter Lead In Method Selection

1. If use 【1. GENERAL DISK/NET】, the following screen appears. At input line, users can use Up and Down to switch to subsidiary screen of folder selection, and at the subsidiary screen, use Right and Left to return to input line. After input or selection of source path, check if cursor is at input line, and if not, move cursor to input line. Click【OK】to lead in parameter files.

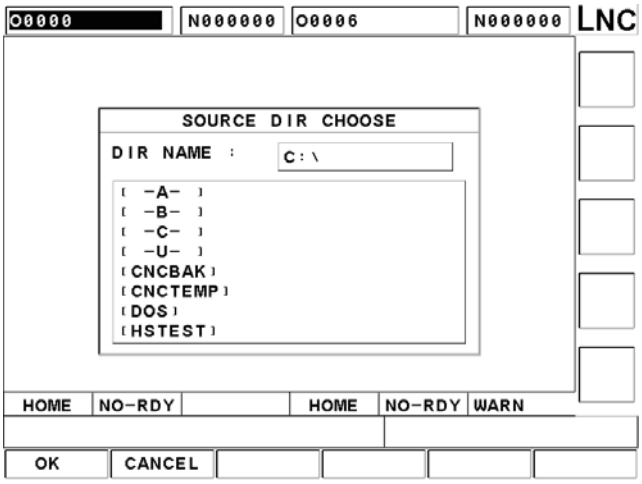


Figure 1.7-23 Parameter Restore Path Selection screen 1

2. If use 【2. RS232 TRANSMISSION】, the following screen appears. Click 【RES】after selecting the path for restore. When executing this function, make sure hardware connection is normal, and the PC has to run LNCTools which is developed by our company. Make sure also the communication protocols of both sides are consistent.

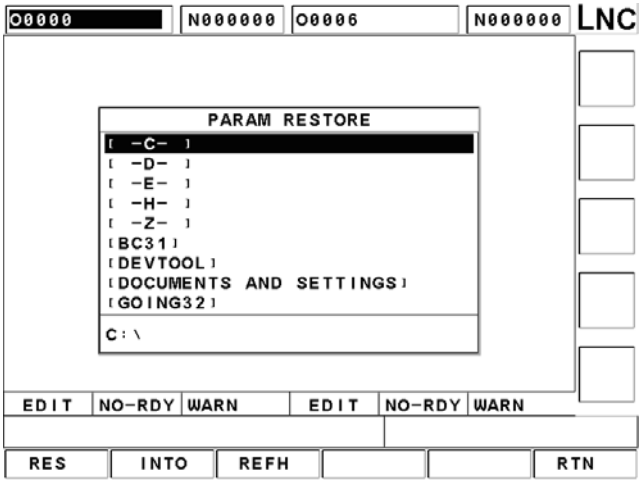


Figure 1.7-24 Parameter Restore Path Selection screen 2

a. After restoring finishes, it automatically reboots and enters system.

E. Font Installation

Select method to install font.

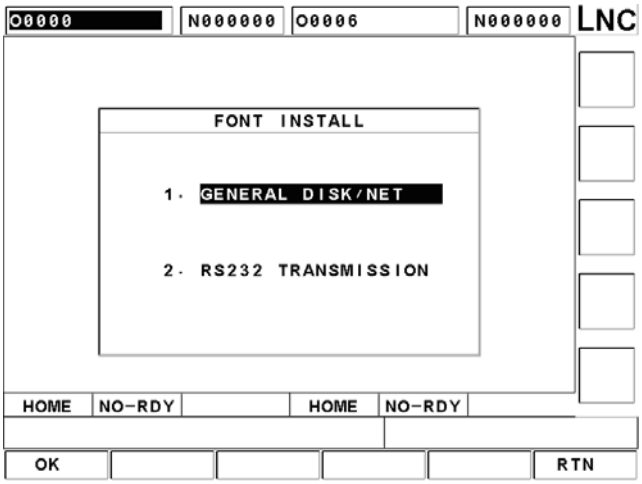


Figure 1.7-25 Font Installation Method Selection screen

1. If use 【1. GENERAL DISK/NET】, the following screen appears. At input line, users can use Up and Down to switch to subsidiary screen of folder selection, and at the subsidiary screen, use Right and Left to return to input line. After input or selection of source path, check if cursor is at input line, and if not, move cursor to input line, and click【OK】.

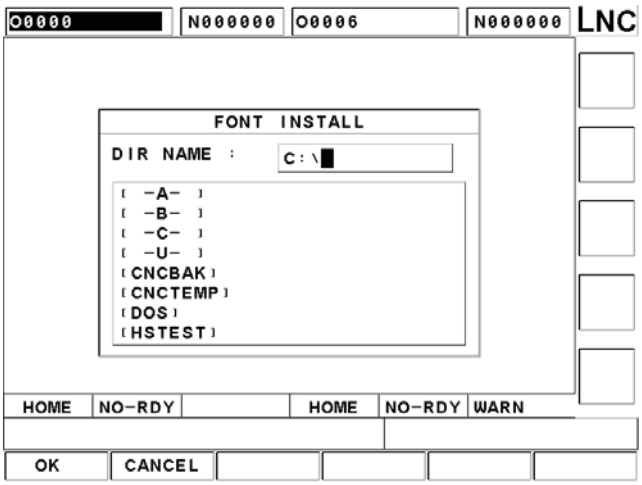


Figure 1.7-26 Font Installation Path Selection Screen 1

2. If use 【2. RS232 TRANSMISSION】, the following screen appears. Click 【FONT】after selecting the path for installation. When executing this function, make sure hardware connection is normal, and the PC has to run LNCTools which is developed by our company. Make sure also the communication protocols of both sides are consistent.

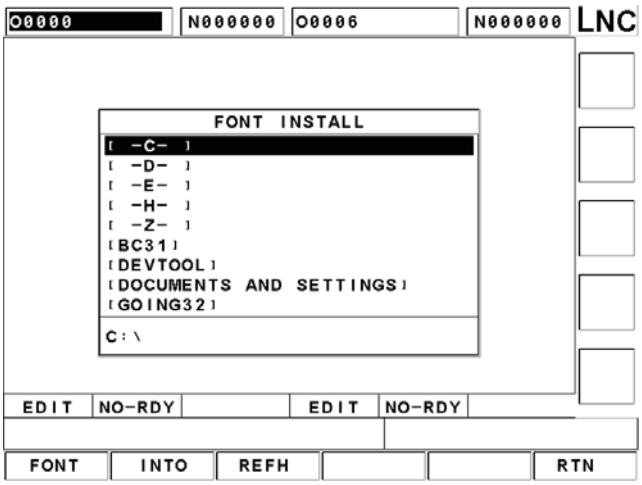


Figure 1.7-27 Font Installation Path Selection Screen 2

3. After clicking 【OK】, users will be asked if the path is correct. If yes, click 【OK】.

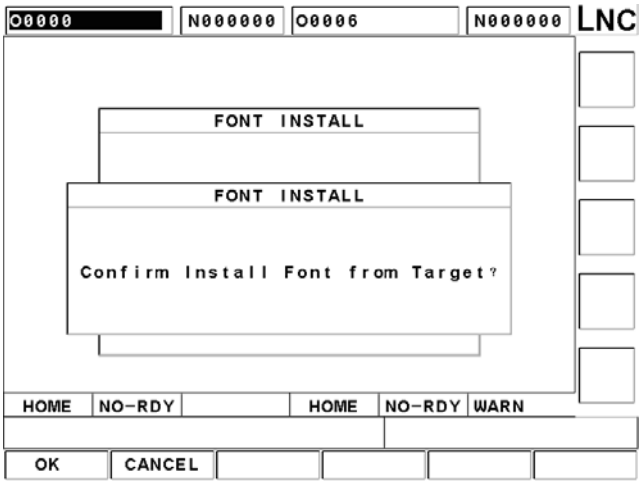


Figure 1.7-28 Font Installation Path

1. If path is correct, it will quit system, and the following screen appears. Click Y to start installing font.

Figure 1.7-29 Font Installation

2. The following screen appears after installation is complete. Click any button to finish installation and reboot.

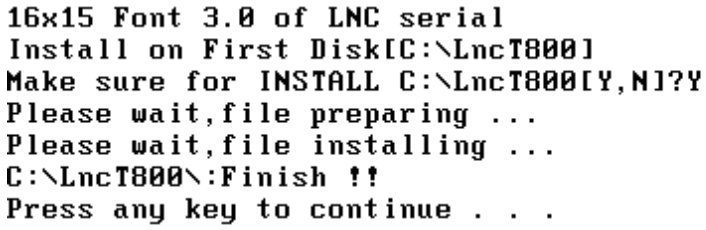


Figure 1.7-30 Font Installation Complete screen

1.7.3 IOCSA

【**IOCSA**】is used to inspect I/O and system interior status. There are I, O, C, S, A.

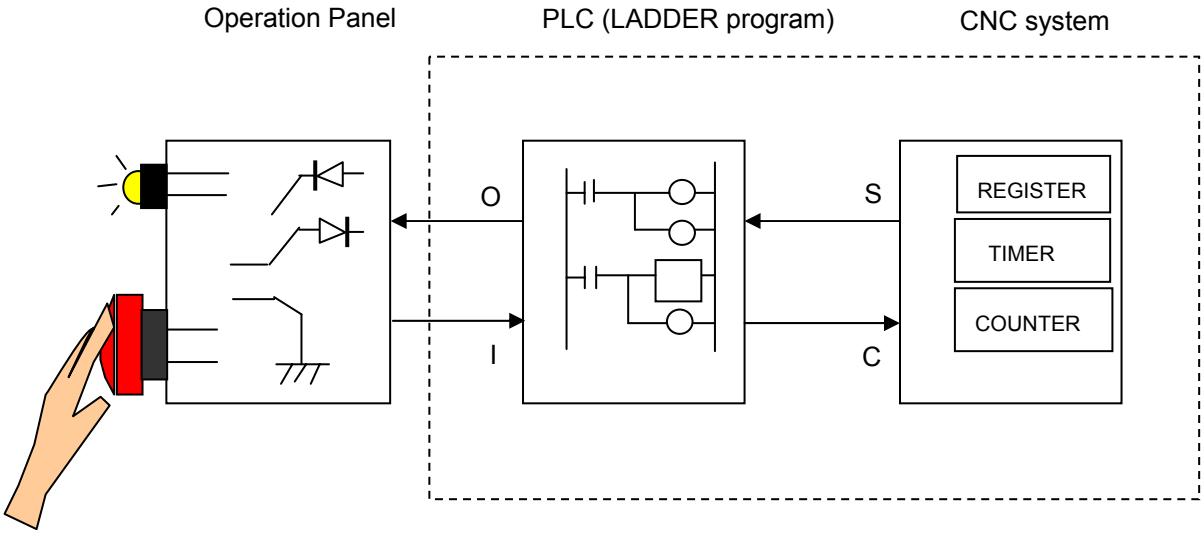


Figure 1.7-31 I/O and System Interior Status

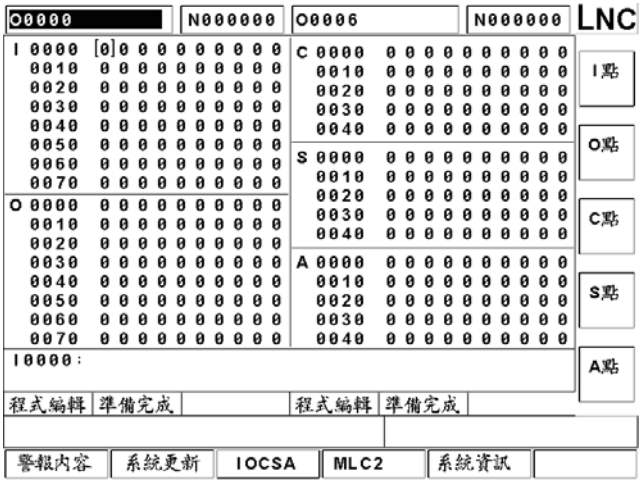


Figure 1.7-32 IOCSA Major Screen

This screen has 5 parts. Appoint focus by using function buttons on the right side. Use <PAGE↑>, <PAGE↓> to switch IOCSA pages. In IOCSA window, click Up, Down, Left, Right direction buttons to move cursor to specified positions. During the movment, instructons on certain IOCSA can be seen. Besides, positioning methods are provides. Add the number to be positioned after I, O, C, S, A, and click <INPUT> to directly position to the specified position. E.g.: Input I111, O222, C121, S8, A124.

1.7.4 MLC2

Click 【**MLC2**】major function button to enter the screen as the following. On the screen, there are 5 minor functions including【**LAD**】, 【**CNT**】, 【**REG**】, 【**DRG**】, and【**TMR**】.

Click 【**LAD**】, the screen is as the following:

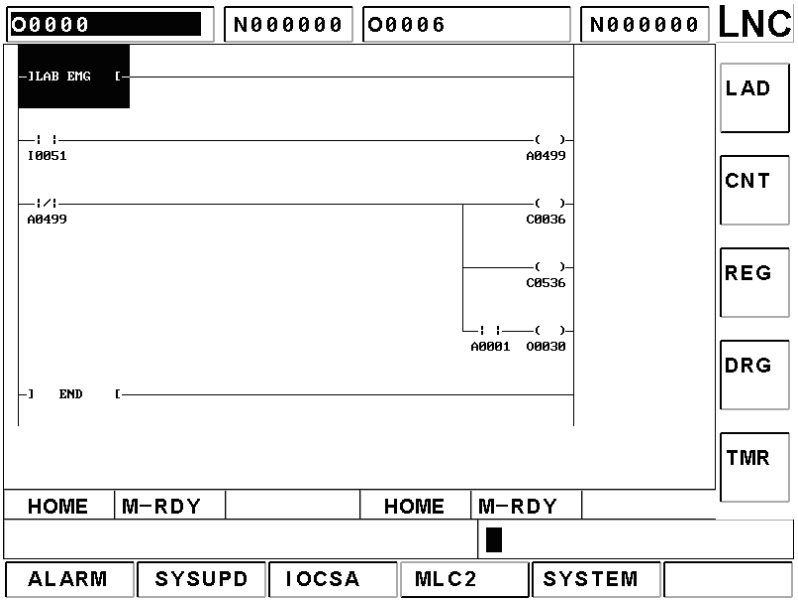


Figure 1.7-33 MLC2\LADDER Graph

In the Input Line of【LAD】screen, input letters such as I, O, C, S, A, R, TM, etc., followed by numbers to perform search, and then click <INPUT> to find the specified position. E.g.: Input TM001 or TM1 to find the respective positions.

Click 【**CNT**】**,** the screen is as the following:

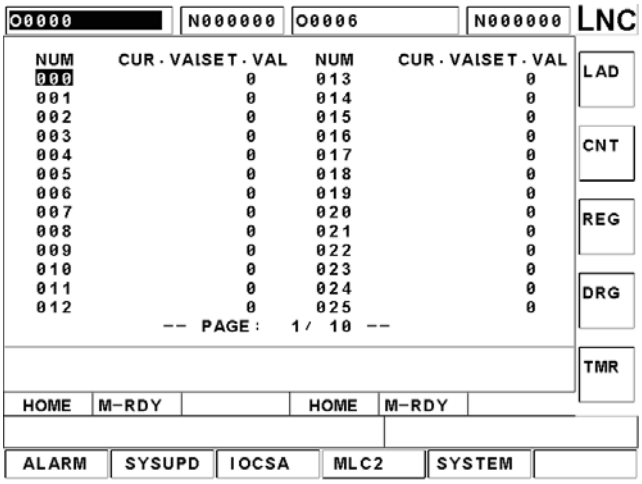


Figure 1.7-34 MLC2\Counter

Click 【**REG**】**,** the screen is as the following:

In Input Line, input Rxxxx and click <INPUT> to directly position to the input Variable position. E.g., input R123 and click <INPUT> to position to Variable R0123.

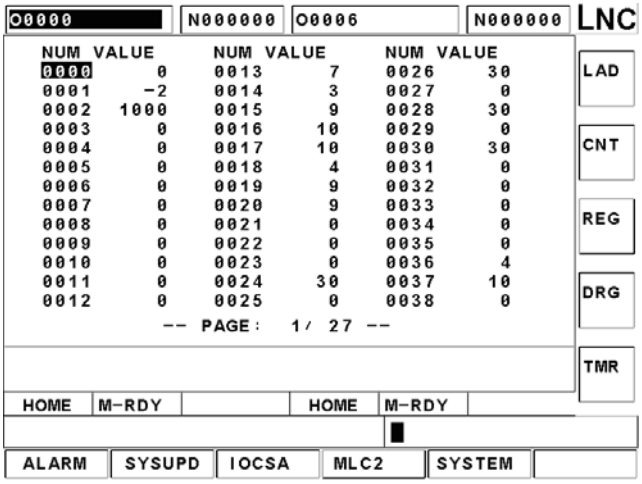


Figure 1.7-35 MLC2\Variable R

Click 【**DRG**】, the screen is as the following:

In Input Line, input Dxxxx and click <INPUT> to directly position to the input Variable position. E.g., input D123 and click <INPUT> to position to Variable D0123.

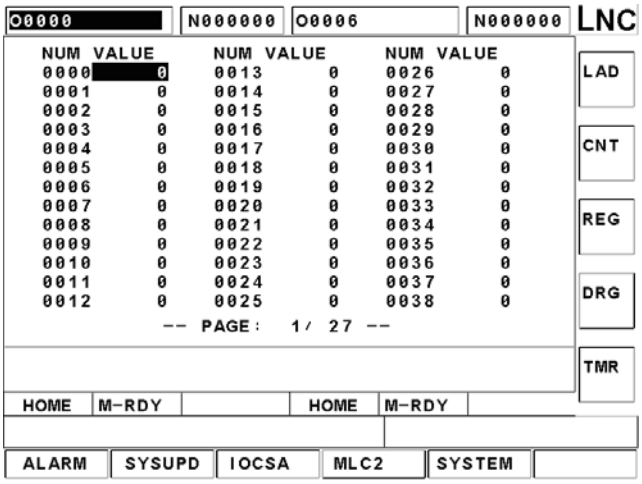


Figure 1.7-36 MLC2\Variable D

Click 【**TMR**】**,** the screen is as the following:

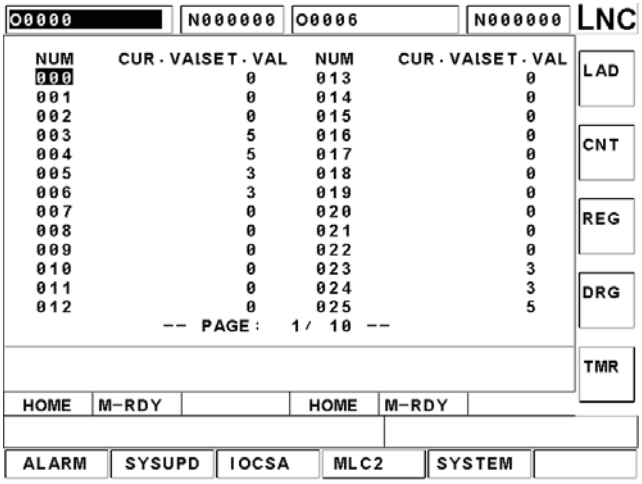


Figure 1.7-37 MLC2\Timer

1.7.5 System Information

【GBL】

The【GBL】page displays system maintenance variables, and this function is useful to designers and system maintenance technician. The screen is as the following:

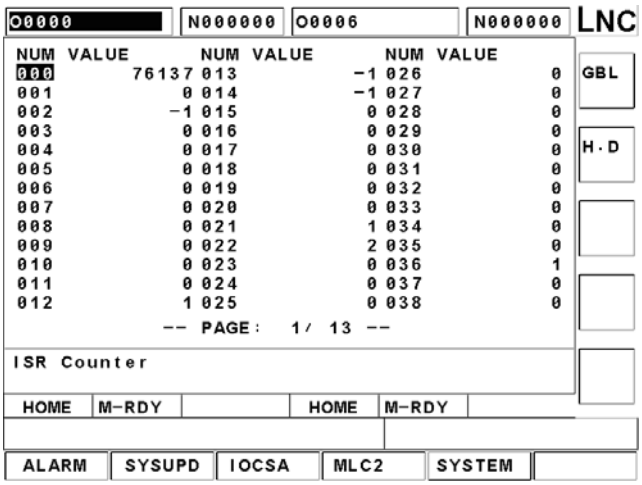


Figure 1.7-38 System Information\System

【H.D】: Hardware Information

Diagnosis function is composed of 5 items which inspect respectively the following objects.

1. Serial number of 1st motion card
2. Serial number of 2nd motion card
3. D disk Status: display if there is a 2nd CF card installed
4. RAMDISK Status: display if a RAMDISK is currently installed
5. RAMDISK Use: If a RamDisk is installed, users can distinguish from here whether it is usable.

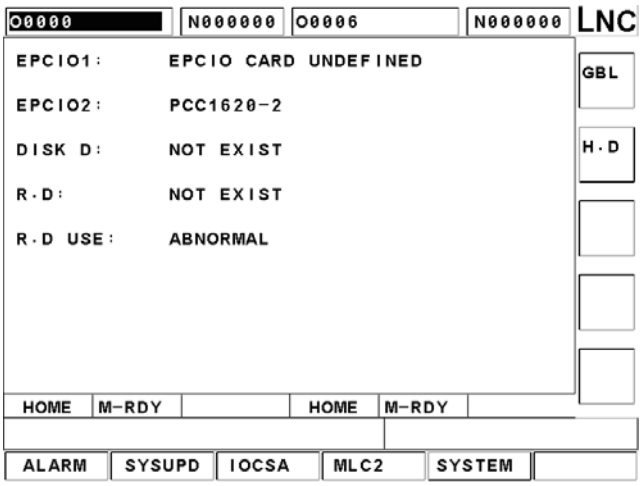


Figure 1.7-39 System Information\Hardware Diagnosis

1.8 Software Panel function (SOFTPL)

Click **<SOFTPL>** to enter the following screen. On the screen, there are 7 function switches which are **【M LOCK】, 【DRY RUN】, 【OP SKIP】, 【OP STOP】, 【MST SKIP】, 【MPG DRY】,** and **【Z IGNORE】.**

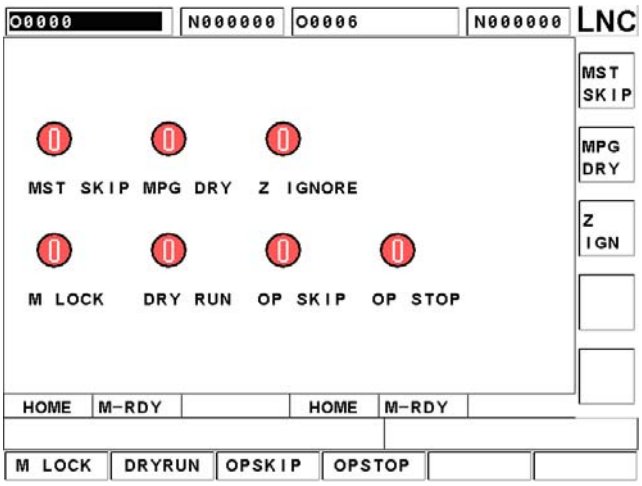


Figure 1.8-1 Software Panel function screen

When respectively click a button corresponding to the displayed functions, the function icon on screen will turn from Red to Green which indicates that the function is enabled. Click again to disable the function.
The following chart lists instruction on the functions:

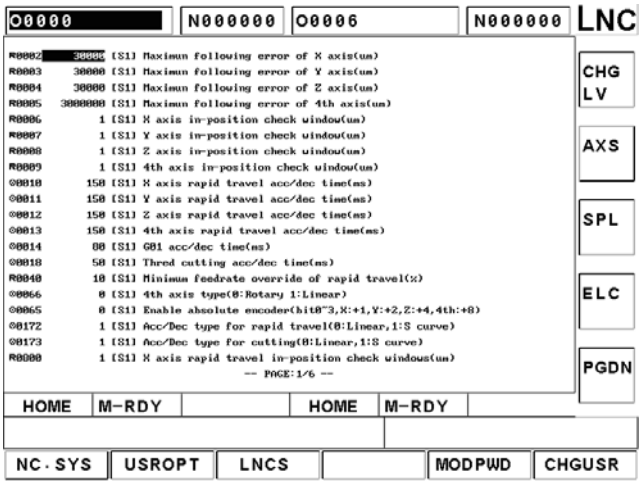
Function Switch	Function Enable (ON)	Function Disable (OFF)
MPG DRY	MPG can modify program coordinates, but servo axis does not be affected.	MPG can modify program coordinates, and servo axis is changed also.
OP SKIP	Single blocks begin with a / symbol will be ignored, and won't be executed.	Single blocks begin with a / symbol will be executed.
OP STOP	Whenever M01 is met, program will halt. If users want to continue the execution, click CYCLE START.	Controller ignores M01, and directly moves on to execute next single block.
DRY RUN	When program is running, servo feed complies with the rate by Dry Run parameters, rather than with the rate assigned by program.	Servo feed complies with the rate assigned by program.
MST SKIP	Ignore M code, S code, T code commands	Consider M code , S code , T code commands
M LOCK	When program is running, controller continues running program, but motion commands for servo axis will not be output, therefore servo axis does not move.	When program is running, motion commands of servo axis are output along with the program.
Z IGNORE	Does not execute any command relevant to Z axis.	Execute Z axis commands.

Chart 1-1

1.9 PARAM

Click **<PARAM>**, and parameter setting screen appears. This screen contains functions of 【**NC.SYS**】, 【**USROPT**】, etc.

1.9.1 NC.SYS：System Parameter>



After clicking <PARAM >, parameter setting page appears on screen, and 2 minor function buttons of 【**MODPWD**】and【**CHGUSR**】appear at the lower part of thescreen.

Move cursor to the parameter which is to be modified, on the right side of the parameter is the description of the parameter, and if the word string is too long and can not be displayed totally, use Right or Left buttons to move the word description. And then in the input area, directly input the desired parameter values, and click <INPUT>, then a password input dialogue box appears. After the password is correctly input, the values can be input. If leave the parameter function page and Pr.0899 is set as 0, when re-enter parameter function page to modify parameters, values will be directly input without the constraint of password protection; if leave parameter page and Pr.0899 is set to 1, when re-enter parameter page to modify parameters, the password input dialogue box will appear again, and after the password is input correctly, then the values can be input.

There are 3 timings when changing of parameters takes effect:

1. ⊙ (takes effect after reboot).
2. R (takes effect after reset)
3. Blank (takes effect at once).

Because system parameters are the references used by the controller when performing any kind of calculation, the modification and adjustment of parameters have to be extra careful, and operators have to thouroughly understand the meaning of a parameter before modifying it. In order to prevent users from mistakenly modifying certain parameters and resulting in the machine's malfunction, this controller divides users into 2 identities: General User and Manufacturer. According to different user identities, the content of the minor function buttons on the right side differ. Moreover, the color of Manufacture parameters displayed is purple, and that of those of General User is green.

- **User Identity as MAKER**
  Click 【**NC.SYS**】, and parameter setting screen appears. Categories of parameter including【AXS】, 【SPL】, 【ELC】, 【MFT】, 【COMP】, 【HOME】, 【OPER】, 【OTR】, etc. Moreover, there is a function button,【CHG LV】, which is used to change the identity of user when changing the password. The process of the operation is firstly move cursor to parameter's position, and click Change Level; if the parameter belongs to manufacturer level, it will become a general user level parameter. Otherwise, if the password before the change belongs to general user level parameter, after the change it will become manufacturer level.

- **User Identity as END USER**
  Click【**NC.SYS**】, and parameter setting screen appears. Because manufacturers can decide which kind of parameter is to be permitted to users to make modification, number of displayed parameters is not certain. General users can modify less parameters than manufacturers.

1.9.1.1 MODPWD

Click 【**MODPWD**】, and a change password dialogue box appears. This function is majorly dedicated to let users to change the password needed when modifying parameters. The password used for leaving system is not set here.

- **User Identity as MAKER**

  If you click【**MODPWD**】 with a identity of manufacturer, the password to be modified can be:

  ✧ The password used when changing to the identity of manufacturer from the identity of general user.

  ✧ The password used when changing password with the identity of manufacturer.

- **User Identity as END USER**

  If you click【**MODPWD**】 with a identity of general user, the password to be modified can only be the password used when changing password with the identity of general user.

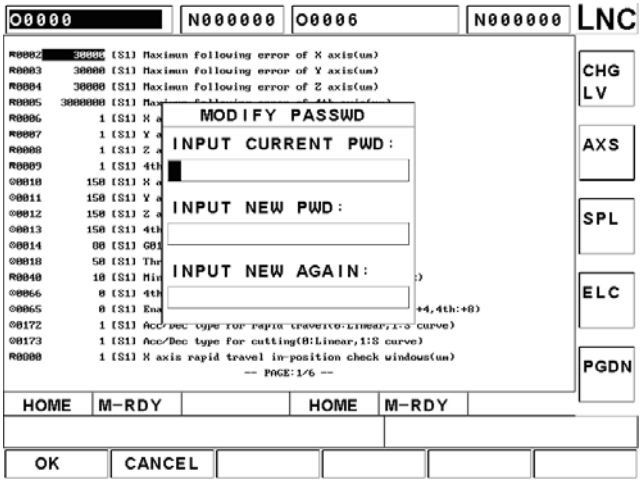


Figure 1.9-1 Change Password

1.9.2 CHGUSR

Click 【CHGUSR】, and a dialogue box used for changing identity appears. The 【*】symbol indicates the current identity.

This function let users switch personalities between general user and manufacturer. When switch from general user to manufacturer, system requires a password, and input it switches after the password is correctly input. When switch from manufacturer to general user, no password is needed.

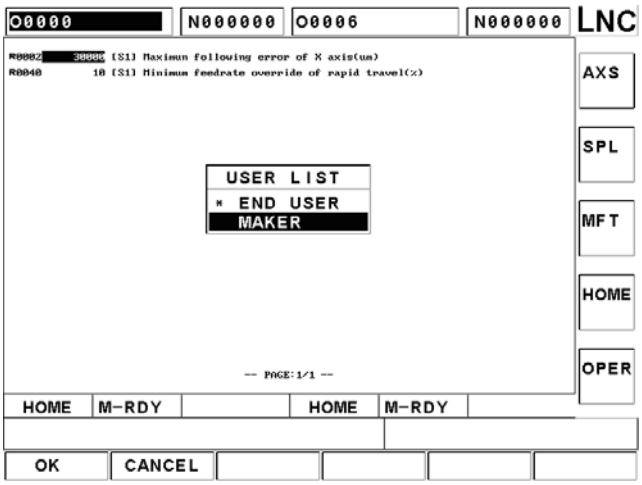


Figure 1.9-2 Switch Personality

1.9.3 USROPT

Click【USROPT】to enter User Parameter modification screen. The method of modifying user parameters is the same as that of system parameters. Please refer to the previous chapter.

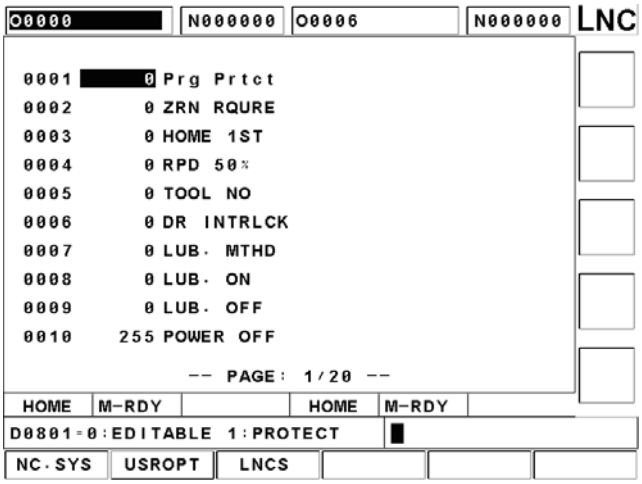


Figure 1.9-3 Users Parameter

1.10 RESET

There are at least 3 timings to use <RESET> button:

1. When alarm occurs, users have to take relevant procedures. When problem is resolved, click RESET button to return to normal system function.
2. After editing a program, cursor stays at a certain line of the program. Use RESET to move cursor back to the start of program. If not, program will be executed from the place where cursor stays.
3. Cancel an action which is currently performing. If click RESET while program is running, machine stops actions, cursor returns the beginning of program at the same time, and system returns to status of NC Ready.

2 LNC Controller Operation Instruction

2.1 Introduction of File Operation

2.1.1 Open File

The 1st step to start manufacturing is to open manufacturing program. Open File is divided to open a new file and open an existing file. Instructions are as the following.

- Open Existing File:
  1. Switch to Edit Mode (EDIT), and make sure machine is currently in the status of preparation done.
  2. Switch to <PROG> module.
  3. Click 【DIRMNG】 function button to switch to File Manager screen.
  4. Click Up, Down buttons to move cursor to the file to be opened.
  5. Click <INPUT>function button to open an existing file.
- Open new file:
  1. Switch to Edit Mode (EDIT), and make sure machine is currently in the status of preparation done.
  2. Switch to <PROG> module.
  3. Click 【DIRMNG】 function button to switch to File Manager screen.
  4. In the Input Line, enter a new file name.
  5. Click <INPUT>function button to open the new file.

2.1.2 Copy File

2.1.2.1 Copy File from Disk to Controller

Instruction of operation procedures is as the following:

1. Switch to Edit Mode (EDIT), and make sure machine is currently in the status of preparation done.
2. Switch to <PROG> module.
3. Click 【DIRMNG】 function button to switch to File Manager screen.
4. Insert the disk containing part programs to FDD.
5. Click 【COPY A>C】 function button, and a file list of the files in the disk appears. Move cursor to select the files to be copied, and click【OK】 button.
6. After clicking 【OK】button, the destination file use the source file's name as the default file name, if want to use a different file name, manually input the name and click【OK】button to finish copy.

2.1.2.2 Copy File from Controller to Disk

Instructions are as the following:

1. Switch to Edit Mode (EDIT), and make sure machine is currently in the status of preparation done.
2. Switch to <PROG> module.
3. Click 【DIRMNG】 function button to switch to File Manager screen.
4. Insert the disk containing part programs to FDD.
5. Click【COPY C>A】function button, and a list of files in the controller will be displayed. Move cursor to the file to be copied, and click 【OK】.
6. After clicking 【OK】button, the destination file use the source file's name as the default file name, if want to use a different file name, manually input the name and click【OK】button to finish copy.

2.1.2.3 Copy File to Controller from Any Source

Instructions are as the following:

1. Switch to Edit mode and make sure machine preparation is done.
2. Switch to <PROG> module.
3. Click 【DIRMNG】function button to switch to the screen of File Manager.
4. Click【COPY】function button, after clicking this function button, a dialog box appears on screen. Use Up, Down, Right, Left to move cursor to source file. FDD and online drive can also be the file source. Click 【OK】after selection.
5. File name of the target file will be the same as the source file. If want to use a different name, input the name and click 【OK】to finish copy process. After copy, users can use program list to check result.

2.1.3 Delete File

Instructions on Delete File are as the following：

1. Switch to Edit mode and make sure machine preparation is done.
2. Switch to <PROG> module.
3. Click 【DIRMNG】function button to switch to the screen of File Manager.
4. The Delete File function button is on the 2nd page of File Manager. Therefore click Next Page at first to find the function button.
5. Click 【DEL】, and then file list is displayed. Select the file to be deleted, and click 【OK】.
6. A message box for users to confirm the deletion appears. If surely to delete file, click 【OK】to finish the process of Delete File. After delete, users can use program list to check result.

2.1.4 Rename File

Instructions on Rename File are as the following ：

1. Switch to Edit mode and make sure machine preparation is done.
2. Switch to <PROG> module.
3. Click 【DIRMNG】to switch to the screen of File Manager.
4. The Rename File function button is on the 2nd page of File Manager. Therefore click Next Page at first to find the function button.
5. Click【REN】, and then file list is displayed. Select the file to be renamed, and click【OK】.
6. After clicking【OK】button, a dialog box appears. It display the path and the file name users select, and provides an input line for users to input the new file name. When input is done, click 【OK】to finish file rename process. Use program list to check result.

2.2 Program Edit

This chapter contains instructions on program edit and relevant functions.

2.2.1 Program Edit

1. Switch to Edit mode and make sure machine preparation is done.
2. Open the manufacturing program to be edited.
3. Click 【FGPROG】 function button to switch to program edit screen.
4. Input program codes in edit screen.

2.2.2 Line Positioning

To position to certain position of the program, take the following procedures.

1. Switch to Edit mode and make sure machine preparation is done.
2. Click 【FGPROG】 function button to switch to program edit screen.
3. Click 【GOTO】 function button, and an input box appears. Input serial number of the line to be positioned in the input box, and click 【OK】 button to position to the appointed line.

2.2.3 Search for Word String

To search for certain word string of the program, take the following procedures.

1. Switch to Edit mode and make sure machine preparation is done.
2. Click 【FGPROG】 function button to switch to program edit screen.
3. Click【WORDFIND】button, and an input box appears. Input word string to be searched in the input box, and click 【OK】 button. Cursor will stayed at the first corresponding word string.
4. If it is not the desired word string. Click 【WORDFIND】again, and the input box appears will contain the word string input last time. Click 【OK】 to keep searching downward. Repeat this procedure until finding the desired result or reaching the end of program.

2.2.4 Copy Data Segment

To copy certain data segment of the program, take the following procedures.

1. Switch to Edit mode and make sure machine preparation is done.
2. Click 【FGPROG】 function button to switch to program edit screen.
3. Move cursor to the first line of the segment to be copied.
4. Click 【NEXT】 to switch function button list and find 【MARK】 function button. Click it to highlight the line.
5. Move cursor to the last line of the segment to be copied.
6. Click 【MARK】again to highlight the whole segment. Click 【COPY】, and move cursor to the position where to paste the copied program segment.
7. Click 【BIND】 to paste the copied segment at where cursor is. The data lines originally at where the segment is pasted will be moved to behind the segment.
8. Click 【UNMARK】 to cancel the highlight, and then data segment copy is done.

2.2.5 Delete Data Segment

To delete a single line of data, move cursor to the line and click 【LDEL】 to delete the line. To delete a segment of data, take the following procedures.

1. Switch to Edit mode and make sure machine preparation is done.
2. Click 【FGPROG】 function button to switch to program edit screen.
3. Move cursor to the first line of the segment to be deleted.
4. Click 【NEXT】 to switch function button list and find 【MARK】 function button. Click it to highlight the line.
5. Move cursor to the last line of the segment to be deleted.
6. Click 【MARK】 again to highlight the whole segment. Click 【LDEL】, and the highlighted segment will be deleted.

2.2.6 Teach Input

When compiling a program, after moving the machine to a certain position in manual modes such as JOG, RAPID, and MPG, etc., system can automatically write absolute coordinates of the position into the program. The method with which the program is generated is as the following.

1. Switch to Edit mode and make sure machine preparation is done.
2. Click 【FGPROG】 function button to switch to program edit screen.
3. Click 【NEXT】 to switch function button list, and find 【THINMODE】 function button.
4. Click 【THINMODE】 function button, and then it disappears, but instead, function buttons of Cancel Teach and Insert appear.
5. Switch to any manual mode, such as JOG, RAPID, MPG, etc., and move machine to desired position.
6. Click **【THININST】**, and the current coordinates will be input to program.
7. When Teach Input is done, click **【THINCANC】** function button to cancel teach mode, and then buttons of Cancel Teach and Insert disappear, but Teach button appear.

2.3 Manual Data Input (MDI)

During manufacturing, if want to independently execute certain segments of program commands, it can be done in this mode. The method is as the following.

1. Switch to MDI mode, and make sure machine preparation is done.
2. Switch to <PROG> module.
3. Click【MDI】function button to switch to Manual Input screen.
4. Edit the program to be executed in edit screen.
5. When compilation is done, click cycle start, then the edited manufacturing program will be executed.

2.4 Execution of Part Program

The method to execute manufacturing program after opening a file or editing a part program is as the following.

1. Make sure the current manufacturing program is the one to be executed.
2. Switch to MEM Mode, and make sure machine is currently in the status of preparation done.
3. Click Cycle Start.

2.5 Origin Return (HOME)

Before executing manufacturing, proceed to Origin Return process to assure the correctness of coordinates. The method is as the following.

1. Switch to HOME mode, and make sure machine preparation is done.
2. Click the axis direction button which has to return to origin. (X+, Y+, Z+…)
3. After Origin Return, make sure axis direction indicator is alight. If yes, the axis' Origin Return process is done.

2.6 Instruction on JOG Operation

The method to move machine in JOG mode is as the following.

1. Switch to JOG mode, and make sure machine preparation is done.
2. Depending on the direction to move to, click corresponding direction buttons, e.g. X+, X-, Y+, Y-….

2.7 Instruction on MPG Operation

The method to move machine in MPG mode is as the following.

1. Switch to MPG mode, and make sure machine preparation is done.
2. Select the desired axis direction to move to on MPG.
3. Select movement magnification on MPG. The bigger the magnification is, the faster the machine moves.
4. After setting is done, rotate MPG to move the machine.

2.8 Tool Wear Compensation Setting

Instruction on tool wear compensation is as the following:

1. Make sure machine is currently in the status of preparation done.
2. Switch to <OFFSET> group.
3. Click 【WEAR】 function button to switch to tool wear compensation setting screen.
4. Use UP, Down buttons along with Page Down, Page Up buttons to move cursor to the number of tool to be set.
5. Compensation categories include【W_R】, 【W_X】, 【W_Y】, 【W_Z】. Use Left, Right buttons to move cursor the category to be set.
6. In Input Line, input compensation values and click <INPUT> to finish tool compensation setting.

2.9 Tool Length Compensation Setting

Instruction on tool length compensation is as the following:

1. Make sure machine is currently in the status of preparation done.
2. Switch to <OFFSET> group.
3. Click 【GEOM】function button to switch to tool length compensation setting screen.
4. Use UP, Down buttons along with Page Down, Page Up buttons to move cursor to the number of tool to be set.
5. Compensation categories include 【G_R】, 【G_X】, 【G_Y】, 【G_Z】. Use Left, Right buttons to move cursor the category to be set.
6. In Input Line, input compensation values and click <INPUT> to finish tool compensation setting.

2.10 Setting of Work Coordinate System (00, G54~G59)

The method to set work coordinate system is as the following：

1. Make sure machine preparation is done.
2. Switch to <OFFSET> module.
3. Click 【WORK】 function button to switch to coordinate system setting screen.
4. Use Up, Down, Right, Let buttons to move cursor to the work coordinate system to be set.
5. There are 2 methods to set coordinate system including manual input and button input. According to necessity to select from the following methods.
   - ◆ Manual Input：
     a. In input line, directly input desired coordinates of each axis. The format of input is X_Y_Z_, e.g. X10.Y20.Z30.
     b. Remember to input the points to avoid misconception. E.g. X100. Z200.
     c. Click <INPUT> to input values into controller, and coordinate system setting is done.
   - ◆ Button Clicking Input：
     a. Introduction of function buttons：
        【SET All】: Set current coordinate values of all 3 axes of the machine directly into the coordinate system where cursor stays.
        【SET X】: Set current coordinate values of X of the machine directly into the coordinate system where cursor stays.
        【SET Y】: Set current coordinate values of Y of the machine directly into the coordinate system where cursor stays.
        【SET Z】: Set current coordinate values of Z of the machine directly into the coordinate system where cursor stays.
     b. Move machine coordinate to desired teach-in position at first.
     c. According to the axis direction needed to teach in to click corresponding function buttons. E.g. To teach in X-AXIS, click 【SET X】; to teach in coordinates of all axes, click 【SET All】.

2.11 Parameter Setting

The method of parameter setting is as the following:

1. Make sure machine is currently in the status of preparation done.
2. Switch to <PARAM> group.
3. Click 【NC.SYS】 function button to switch to parameter screen.
4. Use Up, Down, Right, Let buttons to move cursor to the parameter to be set. If the serial number of the parameter to be edit is known, input Pxxxx in input line, and click INPUT button to position to the parameter. The xxxx represents the serial number of the parameter.
5. After moving to the parameter, input desired values in input line, and click <INPUT>.
6. A box asking for a password appears. Input correct password to proceed to parameter modification.
7. Default value of password is 0000. The password can be changed. Please well remember the changed password, if not, parameters will not be able to be changed.

2.12 Backup System Parameters

It is recommended to backup machine setting parameters after machine adjustment is done. The method to backup parameters is as the following:

1. Prepare an empty disk, make sure it's not write-protected, and scan it for virus at first. Insert it to FDD.
2. Click emergent stop to let machine enter the NO-RDY status.
3. Switch to <DGNOS> group.
4. Click 【SUSUPD】 function button to switch to system upgrade operation screen.
5. Use UP, Down buttons to move cursor to PARAM BACKUP position, and click【OK】 button.
6. Click 【ALL】 function button to select all parameter categories and click 【OK】 button.
7. Use UP, Down buttons to move cursor to GENERAL DISK/NET Method and click 【OK】 button.
8. Clear the displayed folder path, and input A:\. Click 【OK】 button to start backup parameters. When the backup is done, a prompt appears in prompt line.

2.13 Restore System Parameter

If the storage devices of machine break down, or the storage devices have to be replaced, and the backup of parameters has to be led in, refer to following instructions to proceed to the process.

1. Insert the disk containing parameter backup to FDD.
2. Click emergent stop to let machine enter the NO-RDY status.
3. Switch to <DGNOS> group.
4. Click 【SUSUPD】 function button to switch to system upgrade operation screen.
5. Use UP, Down buttons to move cursor to parameter lead-in position and click【OK】button.
6. Click 【ALL】 function button to select all parameter categories and click【OK】button.
7. Use UP, Down buttons to move cursor to GENERAL DISK/NET Method and click【OK】button.
8. Clear the displayed folder path, and input A:\. Click 【OK】button. Users will be asked to confirm the process. Click 【OK】to start parameter lead-in. When the process is done, system will reboot automatically.