

SIGN MAKER  
**CAMM-1**

**Model PNC-1050**

**User's Manual**

## For the USA

### FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Unauthorized changes or modification to this system can void the users authority to operate this equipment.

The I/O cables between this equipment and the computing device must be shielded.

## For Canada

### CLASS B NOTICE

This digital apparatus does not exceed the Class B limits for radio noise emissions set out in the Radio Interference Regulations of the Canadian Department of Communications.

### CLASSE B AVIS

Cet appareil numérique ne dépasse pas les limites de la classe B au niveau des émissions de bruits radio-électriques fixés dans le Règlement des signaux parasites par le ministère canadien des Communications.

## NOTICE

### Grounding Instructions

Do not modify the plug provided - if it will not fit the outlet, have the proper outlet installed by a qualified electrician.

Check with qualified electrician or service personnel if the grounding instructions are not completely understood, or if in doubt as to whether the tool is properly grounded.

Use only 3-wire extension cords that have 3-prong grounding plugs and 3-pole receptacles that accept the tool's plug.

Repair or replace damaged or worn out cord immediately.

### Operating Instructions

**KEEP WORK AREA CLEAN.** Cluttered areas and benches invites accidents.

**DON'T USE IN DANGEROUS ENVIRONMENT.** Don't use power tools in damp or wet locations, or expose them to rain. Keep work area well lighted.

**DISCONNECT TOOLS** before servicing; when changing accessories, such as blades, bits, cutters, and like.

**REDUCE THE RISK OF UNINTENTIONAL STARTING.** Make sure the switch is in off position before plugging in.

**USE RECOMMENDED ACCESSORIES.** Consult the owner's manual for recommended accessories. The use of improper accessories may cause risk of injury to persons.

**NEVER LEAVE TOOL RUNNING UNATTENDED.** **TURN POWER OFF.** Don't leave tool until it comes to a complete stop.

## CAUTION

1. Unauthorized copying or transferral, in whole or in part, of this manual is prohibited.
2. The contents of this operation manual and the specifications of this product are subject to change without notice.
3. The operation manual and the product have been prepared and tested as much as possible. If you find any misprint or error, please inform us.
4. We cannot in any way assume any responsibility whatsoever with regard to whatever consequences that may happen subsequent to the making of changes or alterations to this product. We also cannot in any way assume responsibility for whatever may result when this product is operated, or with regard to whatever results from making use of any explanatory documentation.

## Thanks and Best Wishes

Thanks you very much for purchasing the < CAMM-1 > PNC-1050.

Since we wish you many years of productive use of your PNC-1050, we ask you to read this manual and make yourself familiar with the PNC-1050's operational procedures and requirements before running it.

If you find some abnormality immediately turn OFF the power switch and check the user's manual to find out what is wrong.

## Introduction

The manual is divided into four chapters and an appendix. When operating the PNC-1050, please refer to one of the following chapters for information related to your application at the time:

<b>Chapter 1</b>	<b>Basic Knowledge of the PNC-1050</b>
<b>Chapter 2</b>	<b>Cutting Operational Procedures</b>
<b>Chapter 3</b>	<b>Explanation of Display Menu</b>
<b>Chapter 4</b>	<b>Technical Guide</b>
<b>Appendices</b>	

- In Chapter 1, you will find all the basic information necessary for setting up and operating the PNC-1050 in a safe and efficient manner. Items outlined in this chapter include names of unit parts, items provided as accessory as well as precautions to ensure your safety and avoid damage to the unit.
- Chapter 2 helps you to understand the operational procedures you should follow for proper cutting sheet processing. Detailing the many ways in which the PNC-1050 can be used to cut sheets are offered in this chapter.
- Chapter 3 briefly covers the various settings that can be made using the display menus. It describes the functions and the procedures used to make menu settings.
- Chapter 4 covers the instruction set built into the PNC-1050, and the device control instructions. This chapter gives brief information on CAMM-GL III and device control instructions for those who wish to program the computer themselves. Those who plan to use commercially available software to output data to the PNC-1050 may skip this chapter. A " CAMM-GL III Programmer's Manual " is available for separate purchase for those wishing to create their own programs for the CAMM-1 . For further information, please contact the nearest Roland Digital Group dealer or distributor.
- Finally, the appendix area provides you with a table displaying items optionally available for use with your PNC-1050, a index to ease your use of this manual.

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# Chapter 1 Basic Knowledge of the PNC-1050



## 1.1 Outline of the PNC-1050

### ■ *Exclusive Sprocket Cutting Machine*

The PNC-1050 is a 15"-width sprocket type exclusive cutting machine.

### ■ *Intelligent CAMM-GL III Instruction System (mode 1 and mode 2)*

CAMM-GL III (mode 1 and mode 2) is built in as the instruction set for the PNC-1050.

### ■ *Automatic instruction set recognition function*

The instruction system is determined automatically.

### ■ *High-speed 200 mm/sec Operation*

A maximum cutting speed of 200 mm/sec (in all directions) ensures highspeed operation.

### ■ *Wide Cutting Area*

The area where cutting can be performed is 335 mm × 24998 mm ( 13-1/8" × 984-1/8") for the PNC-1050.

### ■ *Smoothing Function*

The carriage moves smoothly when cutting circles and curves, making possible quick, attractive cutting.

### ■ *High Resolution*

The software resolution of 0.025 mm/step and the hardware resolution of 0.003125 mm/step (micro-step control) assure high overall resolution.

### ■ *Automatic Interface recognition*

The interface connected to the computer (parallel or serial) is determined automatically.

### ■ *Cutting Matched to Sheet Thickness*

To reduce the load on the blade when cutting thick sheets, cutting conditions matched to the thickness can be set via the control panel.

### ■ *Soft Landing Function*

This function gently raises and lowers the cutter, protecting the blade.

### ■ *Settings stored in Memory*

The current configuration, as made by settings on the panel, is memorized, and is retained even while power is off. This eliminates the need for redoing the same group of settings.

### ■ *User Registration Function*

You can label and register up to four sets of frequently used conditions in the display menu ([SELECT USER DFLT]).

## 1.2 Cautions Before Use



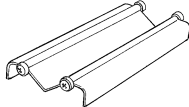
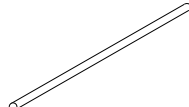


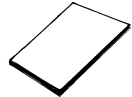
### WARNING

- To prevent your fingers from being pinched or caught, do not touch the tool carriage with your hand while in operation.
- Do not use your hand to move the tool carriage while the power is on.

- Power supply voltage should be within  $\pm 10\%$  of the fixed rating.
- Never attempt to disassemble or modify the unit.
- The PNC-1050 operates movable parts which have edged tools attached. Proper care should be afforded during handling.
- Take care that your hands, fingers or hair do not become tangle in the tool carriage.
- The tool carriage moves suddenly in cases such as the following. Take care to ensure that your hands or other items do not become caught.
  - When the power is turned on.
  - The front sheet guide has been raised
  - The front sheet guide has been lowered
  - A sheet has been loaded and the ENTER key pressed
  - When cutting data is downloaded from the computer.
  - When [MOVE SHEET/VIEW] is selected using the control panel.
  - When [MOVE SHEET/ORIGIN] is selected using the control panel.
- Be sure to set the sheet correctly and securely. An improperly loaded sheet may result in damage to the unit.
- Do not place heavy objects on the PNC-1050. Doing so may cause the unit to warp or result in faulty cutting.
- Use a sheet whose area overlapping the pinwheel is less then 5 mm(3/16") thick.
- Check that the power supply cord and transmission input cable from the computer are firmly connected and will not come loose during use resulting in a poor connection.
- When you are not going to use the PNC-1050 for sometime, prepare the unit in the following way:
  - Disconnect the power supply cord from the wall socket.
- Liquids or metals subject to melting should not be placed in or on the PNC-1050.
- Avoid locations where the PNC-1050 may be subject to strong shock.
- The unit should not be installed in any of the following location which may result in damage and mechanical failure:
  - Locations subject to direct sunlight.
  - Locations with high temperatures or humidity.
  - Dusty areas.
  - Locations subject to strong vibration.
  - Where there is a lot of electrical noise.
  - Poorly ventilated area which may result in a build-up of excess heat.

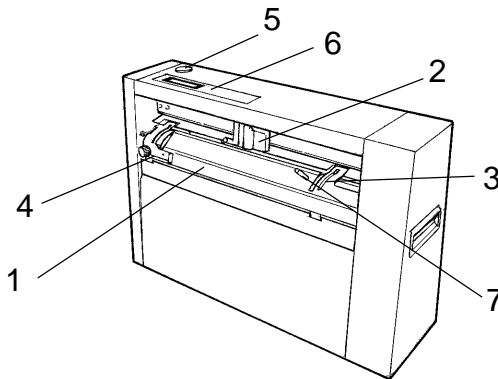
## 1.3 Checking Accessory

The following accessories are packed together with the main unit. Before using, be sure to check to make sure that all accessories have been included.

Blade for Sheet : 1 	Blade Holder : 1 	Sheet Base : 1 	Shaft : 1 
Separate Cutter : 1 	Power Code : 1 	User's Manual : 1 	

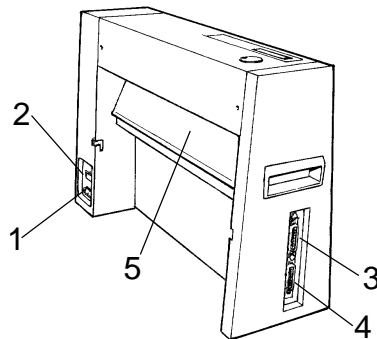
## 1.4 Part Names and Functions

### (1) Front View



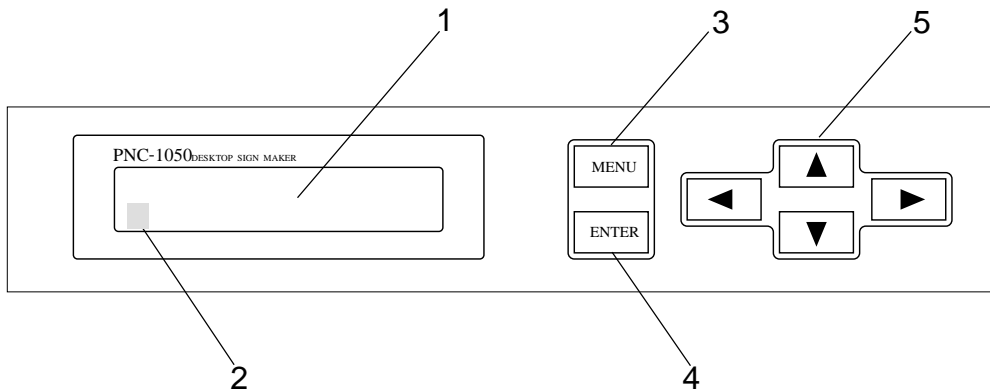
1. Front Sheet Guide  
This secures the sheet and toggles between the cutting mode and the setup mode.
2. Tool Carriage  
The blade holder or pen are mounted to this part of the PNC-1050.
3. Pin Wheel  
The protrusions ( pins ) around the perimeter mesh with the holes in the sheet for sheet feeding. The left-hand pinwheel can be shifted approx. 8 mm ( 5/16" ) from side to side to match the size of the sheet.
4. Pinwheel Door  
This shifts to match the position of the pinwheel.
5. Pen Force Knob  
Sets the pen force to be used with the tool.
6. Control Panel  
Use this control panel for all menu setting and PNC-1050 operations. ( For further details, please refer to page 7.)
7. Handle  
Hold this when raising or lowering the front sheet guide.

### (2) Rear View



1. Power Connector  
Connect provided power supply cord to this connector.
2. Power Switch  
When pushed toward [ | ], power is turned ON. Push toward [ ○ ] to turn it OFF.
3. Parallel Connector ( In Compliance with the specification of Centronics )  
This interface is used to connect the PNC-1050 to the computer using a parallel cable.
4. Serial Connector ( RS-232C Specifications )  
This interface is used to connect the PNC-1050 to the computer using a serial cable.
5. Rear Sheet Guide  
This supports the sheet during cutting operations.

### (3) Control Panel



1. Display  
Provides display of the menus and the coordinates of the blade (pen), as well as error messages.
2. Blinking Cursor  
Employed to select the desired item from the menu. The key moves it to the right, the key moves it to the left.
3. **MENU** Key  
Employed to select among the available menus, or to cancel the making of a setting at a particular menu.
4. **ENTER** Key  
Pressed to confirm setting of an item over which you have placed the cursor.
5. **◀, ▶, ▲, ▼**, Cursor Keys  
The **▲, ▼** keys are used to move the sheet. The **◀, ▶** keys are pressed to move the tool carriage, and to select a desired item from the menu.



## Chapter 2 Cutting Operational Procedures

### 2.1 Operation Flow

To use the PNC-1050, follow the procedure described below to carry out cutting. See the pages specified for explanations of each method of operation.

- 1 . Connect the host computer and the PNC-1050 (see page 8).
- 2 . Turn on the power.
- 3 . Load the sheet to be cut (see page 10 and 11).
- 4 . Install a blade holder in the tool carriage (see page 11).

※ When using the PNC-1050 for the first time, or when checking operation, be sure to carry out demo cutting to make sure that the unit functions correctly.

- 5 . Use the control panel to move the carriage to the desired area, select "TEST CUT," and check that the sheet is cut correctly. If cutting is not correct, change the **offset**, **speed**, or **pen force** settings ( see pages 14 ).
- 6 . Use the control panel to set the instructions to [ AUTO]. [ AUTO ] is the factory default value.
- 7 . Using the control panel, set **I/O (connected interface)** to [AUTO]. [AUTO] is the factory default value ( see page 8 ).
- 8 . Send cutting instructions from the computer.  
( see page 15 ).
- 9 . Affix the sheet that has been cut.

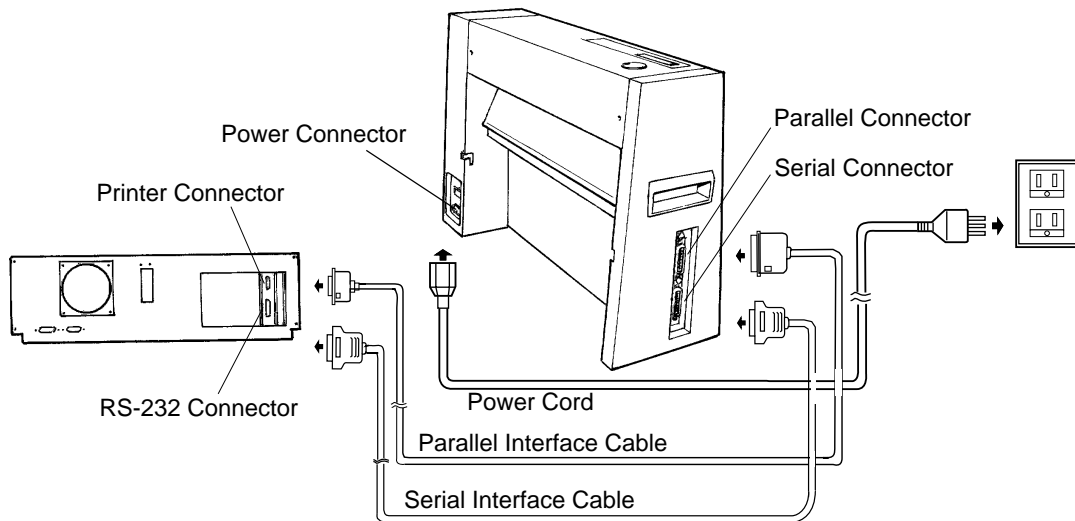
If cutting does not begin even after cutting instructions have been downloaded, try switching the setting for the I/O interface connecting the computer to either a [SERIAL] or [PARALLEL] position (see page 23) . When you have established a serial connection, don't forget to set the communication parameters to match those of the computer.

## 2.2 Connection to the Computer

Plug the PNC-1050 into an electrical outlet using the power cord provided.

When using the parallel interface, secure the connectors at each end of the cable with the lock pins on the parallel terminals of the computer and the left side of the PNC-1050.

For serial connection, attach the serial cable to the RS-232C connector on the computer and the serial terminal on the PNC-1050. Tighten the screws at each end of the serial cable to secure the cable to the connectors ( parallel interface cable and serial interface cable are optionally available ).



When the control panel is set to [AUTO], the PNC-1050 will automatically determine, during cutting data transmission, whether the connection established with the computer uses a serial or a parallel interface. (If the serial interface is used, the communication parameters are determined automatically as well.)

SELECT I/O PORT
<PARA> SERIAL AUTO

However, once data has been sent from the computer to the PNC-1050, the communication parameters are stored in the PNC-1050, and the settings remain even after the power has been turned off. For the reason, if the connection the computer is changed, or the communication parameters for the computer are altered, change the I/O setting on the panel to [AUTO] ( see Chapter 3 " Explanation of Display Menu " for details of the settings made with the control panel) .

## 2.3 Setup Mode and Cutting Mode

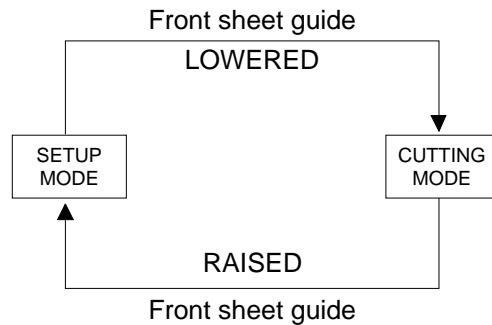
The display menus are organized into two modes: Setup Mode and Cutting Mode.

### Caution

Be sure to use the handle when raising or lowering the front sheet guide. When the front sheet guide is raised, the tool carriage moves suddenly, which can be extremely dangerous. Take care to ensure that your hands or other objects do not become caught in the moving parts. Gently lower the sheet guide. Misaligned positions of the pinwheels and the pinwheel doors may result in pin breakage and failure to cut correctly.

### ● Setup Mode

Whenever the Sheet guide is in the raised position, in other words, when sheet (paper) has not yet been loaded, the unit will be in the Setup Mode. In this mode you can make the settings required in preparing for cutting (or plotting), such as the settings for the RS-232C communication protocol.



### ● Cutting Mode

Whenever the Sheet guide is in the lowered position, in other words, after sheet (paper) has already been loaded, the unit will be in the Cutting Mode.

In this mode you can make the settings associated with sheet movement and the actual cutting operation.

Once the sheet (paper) has been loaded, and the Sheet guide is lowered, the unit switches from the Setup Mode to the Cutting Mode.

For information on the organization of all the available menus, refer to Chapter 3 "Explanation of Display Menu"

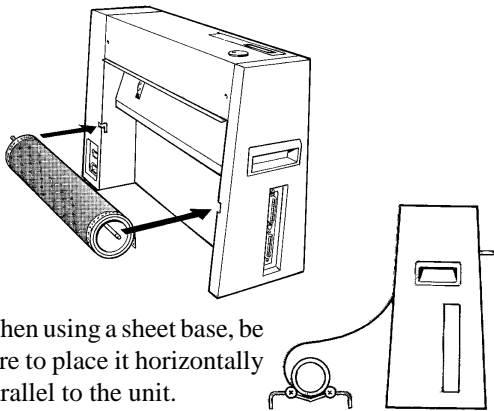
## 2.4 Loading a Sheet

### Caution

- The PNC-1050 is a sprocket type cutting machine designed exclusively for use with roll sheets. Be sure to use only sprocket types sheets.
- Sheets which can be loaded using a shaft are those with a diameter of 95 mm (3-11/16") and length up to 10 yards. For sheets of larger size, use the sheet base included with the unit. The following explanation describes usage with the shaft.

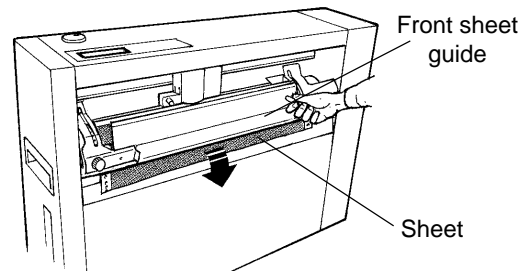
1

Pass the shaft through the roll sheet and install as shown in the figure. When loading a sheet, keep the rear sheet guide raised. Pull out the amount of sheet that is to be used.



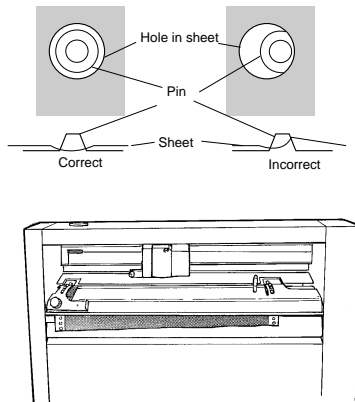
2

Lift up the front sheet guide pass the end of the sheet through, and pull out as shown in of the figure.



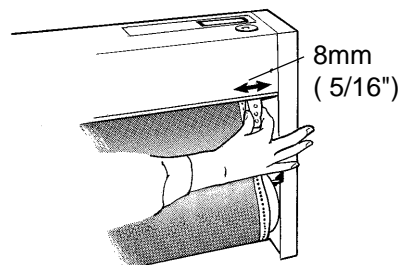
3

Engage the holes along the edges of the sheet with the pins on the pinwheels. When doing this, be sure that the pins are centered in the holes.



4

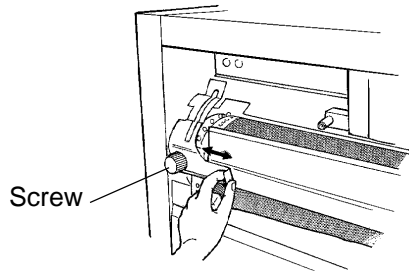
The right-hand pinwheel is permanently secured in place, but the left-hand pinwheel can be manually moved approx. 8 mm (5/16") from side to side. Adjust this when the holes in the sheet do not engage properly with the pinwheel.



\* The pinwheel may be easier to move if grasped from the rear the unit.

## 5

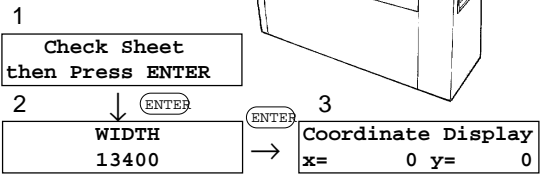
If the pinwheel has been moved, the pinwheel door must also be shifted to match the position of the pinwheel. Loosen the screw indicated by the arrow in the figure, and adjust so that the pins are centered in the pin wheel door. After moving, retighten the screw securely.



## 6

After completing steps 1 through 5, completely lower both the front and rear sheet guides. (The sheet may not be advanced properly when the rear sheet guide is lowered, depending on the sheet. If this is the case, carry out cutting with the rear sheet guide remaining raised.)

The following message appears on the display. Press the control panel keys as explained in the procedure given below. When sheet loading has been completed, message 3 is shown.



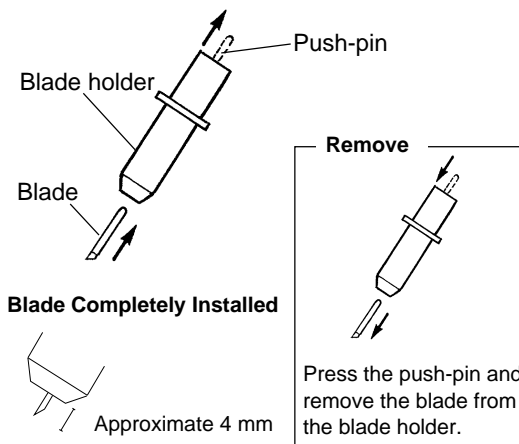
## 2.5 Installing the Blade

### Caution

When setting or changing the blade, handle the blade carefully to avoid injury.

## 1

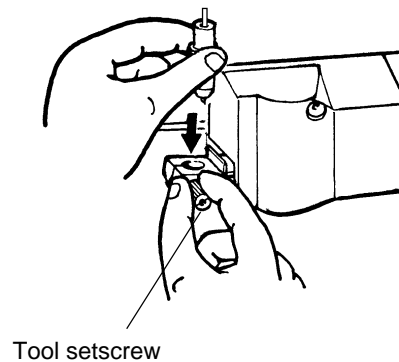
Insert the blade into the blade holder until it snaps into place with an audible click. Be careful not to break off the blade when doing this.



## 2

Loosen the tool setscrew on the tool carriage and insert the blade holder.

Tighten the tool mounting screw so that the blade holder does not move.



## 2.6 Performing Demo Cutting

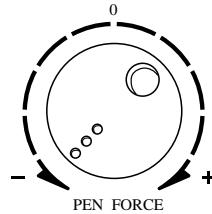
### Caution


Never attempt to raise or lower the rear sheet guide while cutting is in progress.

The PNC-1050 is equipped with a “demo cutting” function to conveniently allow you to check whether or not it is capable of operating normally. Should you ever suspect that the PNC-1050 is not performing satisfactorily, you should follow the steps below to perform the demo cutting.

\* A computer is not required in order to carry out the demo-cutting.

1. Install the blade ( see “ 2.5 Installing the Blade “).
2. Set the pen force to the smallest possible value (the pen force knob should be at the furthest point to the left).  
If after the first test you feel that the sheet was not cutout clean enough, you can try gradually increasing the pen force knob until you have the optimum level.)




3. Hold down the  key on the panel while you turn the power ON. You will then see the display below.

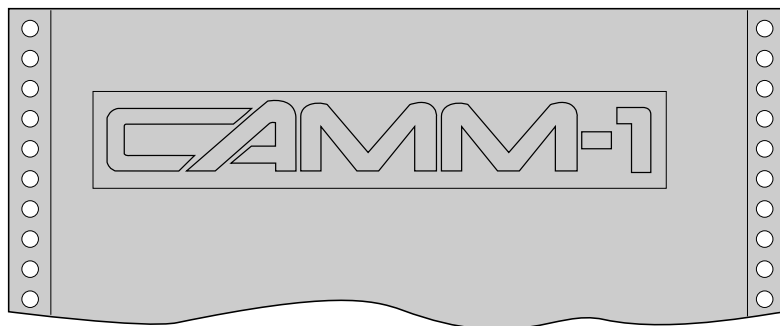


4. Load a sheet ( see “ 2.4 Loading a Sheet “ ). Once the front sheet guide has been lowered, you will see the display at right.

Check Sheet  
then Press ENTER

5. Press the  key.

After the unit has scanned and calculated the media’s size, it will begin working on the Demo Cutting.  
The shape shown below is cut.



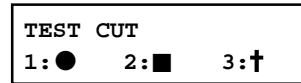
## 2.7 Cutting Test

In order to carry out cutting optimally, it is necessary to set cutting conditions that match the sheet, giving consideration to the sheet's thickness and type of material. The PNC-1050 can perform a cutting test to check the cutting conditions. Please set cutting conditions that are appropriate for the type of sheet being used.

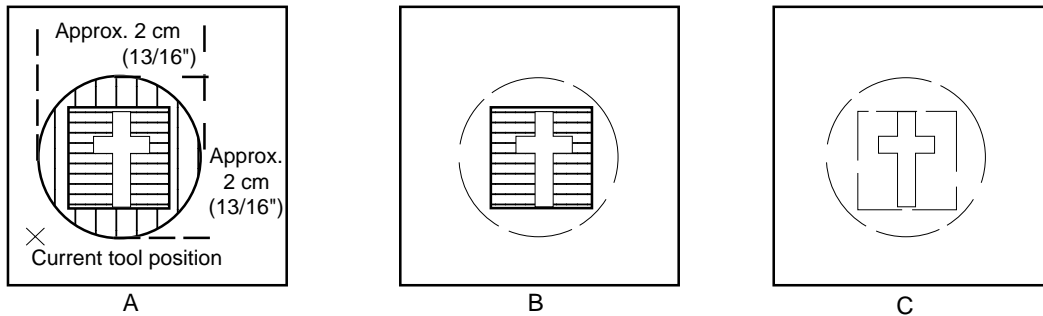
### ● Procedure

- Load the sheet. Using the ◀ and ▶ keys on the panel, move the tool carriage to the position on the sheet where you wish to make the test cutout.
  - \* Note that an area of approximately 2 square centimeters (a little less than a square inch) is required to make a test cutout (given that the tip of the blade after it has moved is at the origin at lower-left).

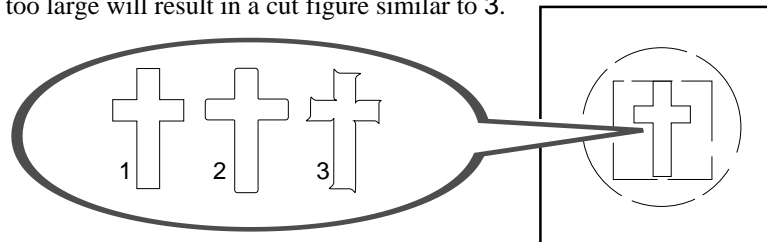
- Once you have obtained the display shown at right, press the **MENU** key 7 times.



- Use the ◀ and ▶ keys to move the blinking cursor to [1: ● 2: ■ or 3: †] and press the **ENTER** key. The selected shape is then cut, with the origin point at the center. When performing these three cutting tests, it is recommended that the same origin point be used for each.



- First, peel off the circular area (○), making sure that it peels off without peeling off the square area (□). B
- Then peel off the square area (□). Speed and force are appropriate if there is only a slight trail left on the base paper by the cutter. C
- The remaining cross-shaped area is used to check whether the offset value is set correctly. When the offset value has been correctly set, the corners of the figure should appear cleanly cut as shown in 1 of the figure below. If the offset value is too small, the corners will appear slightly rounded as illustrated by 2; an offset value which is too large will result in a cut figure similar to 3.

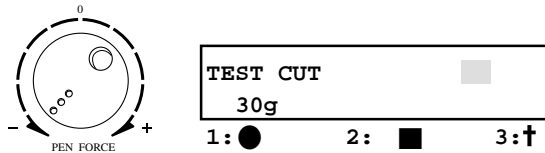


D

7. If the sheet was not cut correctly in steps 1 through 6 of the cutting test, change the cutting conditions.

• **Changing the Pen Force**

Use the pen force control on the top of the unit to adjust pen force knob to the appropriate setting. When the pen force control is rotated all the way counterclockwise, the tool pressure is 30 g (minimum setting). Pen force increases as the control is rotated clockwise, to a maximum of 200 g. During the cutting test, Pen force is indicated in the upper right area of the display screen. Use this display when adjusting pen force.



• **Changing the Speed**

1. Speed can be changed either in the setup mode or in the cutting mode. This explanation describes how to change speed when in the cutting mode. When the cutting test screen is displayed, press the **(MENU)** key three times to display the following message.

SELECT HIT"ENTER"  
TOOL FONT PEN-CHANGE

2. Use the **(LEFT)** and **(RIGHT)** keys to select first [TOOL,] then [CUTTER,] and enable these selections by pressing the **(ENTER)** key. When the following message appears, use the **(UP)** and **(DOWN)** keys to change the speed, then press the **(ENTER)** key.

SETSPEED  
CUTTER 20 cm/s

• **Changing the Offset**

1. While the cutting test screen is displayed, press the **(MENU)** key seven times.

SELECT COMPENSATION  
OFFSET SMOOTHING

2. Use the **(LEFT)** and **(RIGHT)** keys to select [OFFSET,] and press the **(ENTER)** key to enable the selection.

When the following message appears, use the **(UP)** and **(DOWN)** keys to change the offset value, and enable the selection by pressing **(ENTER)** key.

SET OFFSET VALUE  
10

8. One offset unit is equal to 0.025 mm. This means that the offset value in the procedure described above is 0.25 mm. Whenever the cutting conditions have been modified, it is recommended that you once again perform a cut test to confirm correct positioning and orientation.

The Chart below describes symptoms that occur when cutting conditions are not optimal. Use this chart for comparison with the results of the cutting test .

Setting	Condition	Cutting result
Force	Too small	Some parts of the sheet remain uncut
	Too large	The base paper is cut, and the cutter requires frequency replacement
Speed	Too fast	Some parts of the sheet remain uncut
	Too slow	Operating efficiency is reduced.
Offset	Too small	Corners are rounded
	Too large	Corners flare outward, with "horns"



## 2.8 Downloading Cutting Data

Cutting data is downloaded from a computer (software) to the PNC-1050 and cutting operations are performed accordingly.

This section describes general items related to data output from the computer and should be used for general reference purposes during data output operations. For specific details concerning cutting data output procedures, refer to the operation manual for the specific software you are using.

\* Before downloading cutting data to the PNC-1050, fully complete the procedures outlined from section " 2.4 Loading a Sheet" to section" 2.7 Cutting Test."

1. When performing cutting with commercial software, specify the PNC-1050 as the output device. If a selection for the PNC-1050 is not available, select any one of the models listed below.

- **PNC-1000** CAMM-GL III is built into the PNC-1050 as
- **PNC-1100** the instruction set.
- **PNC-1000A** The models shown here are those which
- **PNC-1800** operate under CAMM-GL III.
- **PNC-1900**
- **PNC-1600**

2. Select which interface protocol is being used for connecting the computer to the PNC-1050 (either a parallel interface conforming to Centronics standards or a RS-232C serial interface).
3. Transmit the cutting data from the computer to the PNC-1050.

Once all cutting data has been downloaded from the computer and received by the PNC-1050, cutting operations will begin.

## 2.9 Care and Maintenance

### CAUTIONS

- **Turn off the power supply to the PNC-1050 before cleaning.**
- **Never use thinner or other strong detergents to clean your unit.**
- **Never attempt to oil the internal workings of your unit.**

### ■ Unit Cleaning

When the cover of the unit requires cleaning, gently wipe the soiled area using a clean cloth dampened with either water or alcohol. Use a dry cloth to clean the display of the operation panel.

### ■ Cleaning the Blade Tip

If a blade was used, wipe the blade with a soft cloth to remove any pieces of the sheet that may be adhering to it.

## 2.10 Troubleshooting

### Error Messages

If an error message is displayed, the display can be cleared by pressing the **(MENU)** key.

If the error message concerns an instruction, the message itself will be cleared by pressing the **(MENU)** key, but the error itself will not be cleared. In addition, if the error message is ignored in the PNC-1050 is operated, operations past that point will not be corrected. The error itself can only be cleared by downloading the OE instruction.

If a non-recoverable error occurs, the power to the PNC-1050 must be turned off to clear the error.

**Command Err1: Command  
Not Recognized**

Appears if an instruction that the PNC-1050 cannot interpret is sent. This error is generated if an instruction from the [MODE2] set is sent when the unit has been set to recognize [MODE1,] or viceversa. Change the setting for the recognized instruction set, using the

**Command Err2: Wrong  
Number of Parameters**

this error should no longer occur.

**Command Err3: Out of  
Parameter range**

Appears if the number of parameters differs from the permissible number.

**Command Err5: Unknown  
Character Set**

if the value specified for a parameter is out of the permissible range.

**ESC.E Err10: Output  
Request Overlap**

if an unusable character is specified.

More precisely, there is a certain amount of delay between the moment an output instruction is given and the instant actual output begins. This error message appears if the new output request arrives during this delay time. (The

instruction.) delay  
time can be set using the [ESC].M  
**ESC.E Err11: Device Control  
Not Recognized**

Appears if an output instruction is sent from the computer during

**ESC.E Err12: Wrong  
Parameter**

if a device control instruction that the PNC-1050 cannot interpret is sent.

Appears if an invalid parameter has been specified for a device control instruction.

**ESC.E Err13: Out of  
Parameter range**

Appears if the value for a device control instruction parameter exceeds the permissible limit.

**ESC.E Err14:  
Termination Error**

**Appears if**

the number of parameters for a device control instruction is more than that permissible.

**ESC.E Err15:  
Framing/Parity Error**

**Appears if**

the number of framing, stop, parity, data bits, or the number of settings for the PNC-1050 options (The cause probably is incorrect of these settings your computer is set to use.)

**ESC.E Err16 Buffer**

## Troubleshooting

**Overflow**

Appears if the I/O buffer has overflowed. (There is a problem with the connecting cable, or the settings for Handshaking. Make sure you are using a cable appropriate for the computer being used. Also, check that the setting for Handshaking is correct.)

**ESC.E Err18**

**Indeterminate Error**

Appears if a communication error other than “Err10 “ through “Err16 “, one uninterpretable by the PNC-1050, occurs during data communications.

### Power not supplied to unit.

- Check to make sure the power cord is connected properly.  
Firmly connect the power supply cord to the unit.
- Recheck the power switch. Is it actually at ON?  
Turn on the power supply switch.

### Unit does not operate even when Cutting data is downloaded from computer.

- Faulty connection between computer and PNC-1050.  
Firmly connect the connecting cable between the unit and the computer.
- The power supply switch is not on.  
Turn on the power supply switch.
- Interface type settings do not match.

---

Reset the interface settings so that those of the computer and the PNC-1050 match.

- Under serial interface, communication parameter settings do not match.

Reset the serial interface communication parameter settings to match those of the computer or set the unit to [AUTO].

- Problems with the connected computer's software or hardware.

Investigate and correct computer or software oriented symptoms.

- Computer (software) settings are incorrect.

Refer to the software operation manual and correct accordingly.

- Is the sheet guide lowered ?

Lower the sheet guide.

### **Sheets are not properly cut.**

- Blade holder is not firmly attached to tool carriage.

Install the blade holder securely.

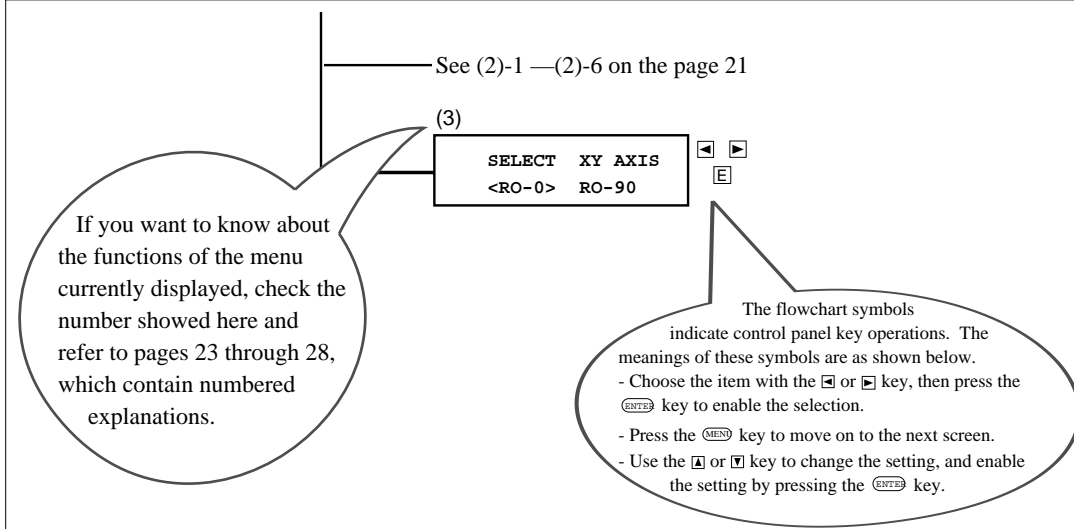
- Blade is chipped.

Replace with a new blade.

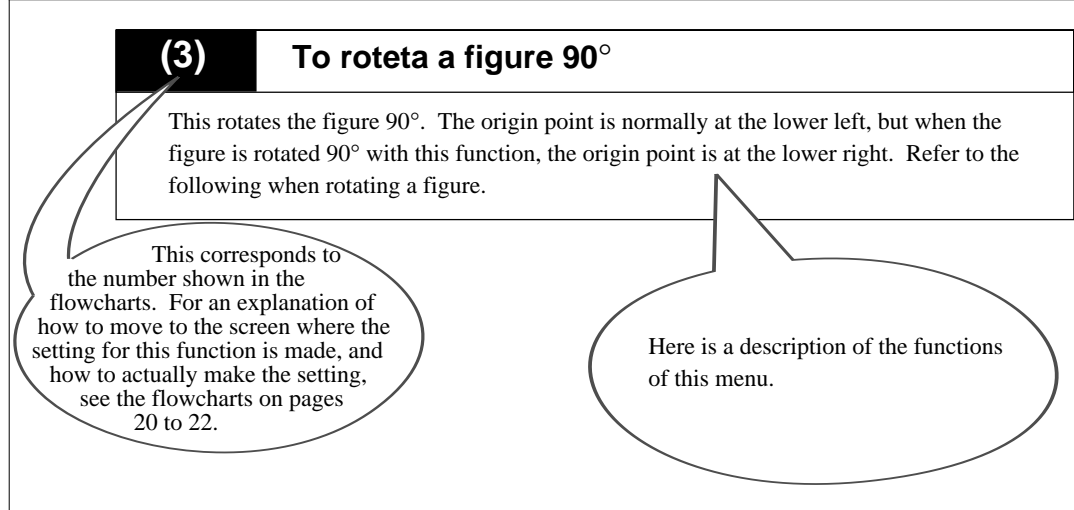
# Chapter 3 Explanation of Display Menu

This chapter contains flowcharts for the display menus, along with explanations of each menu. Given below is a description of how to read this chapter.

## Display Menu Flowchart

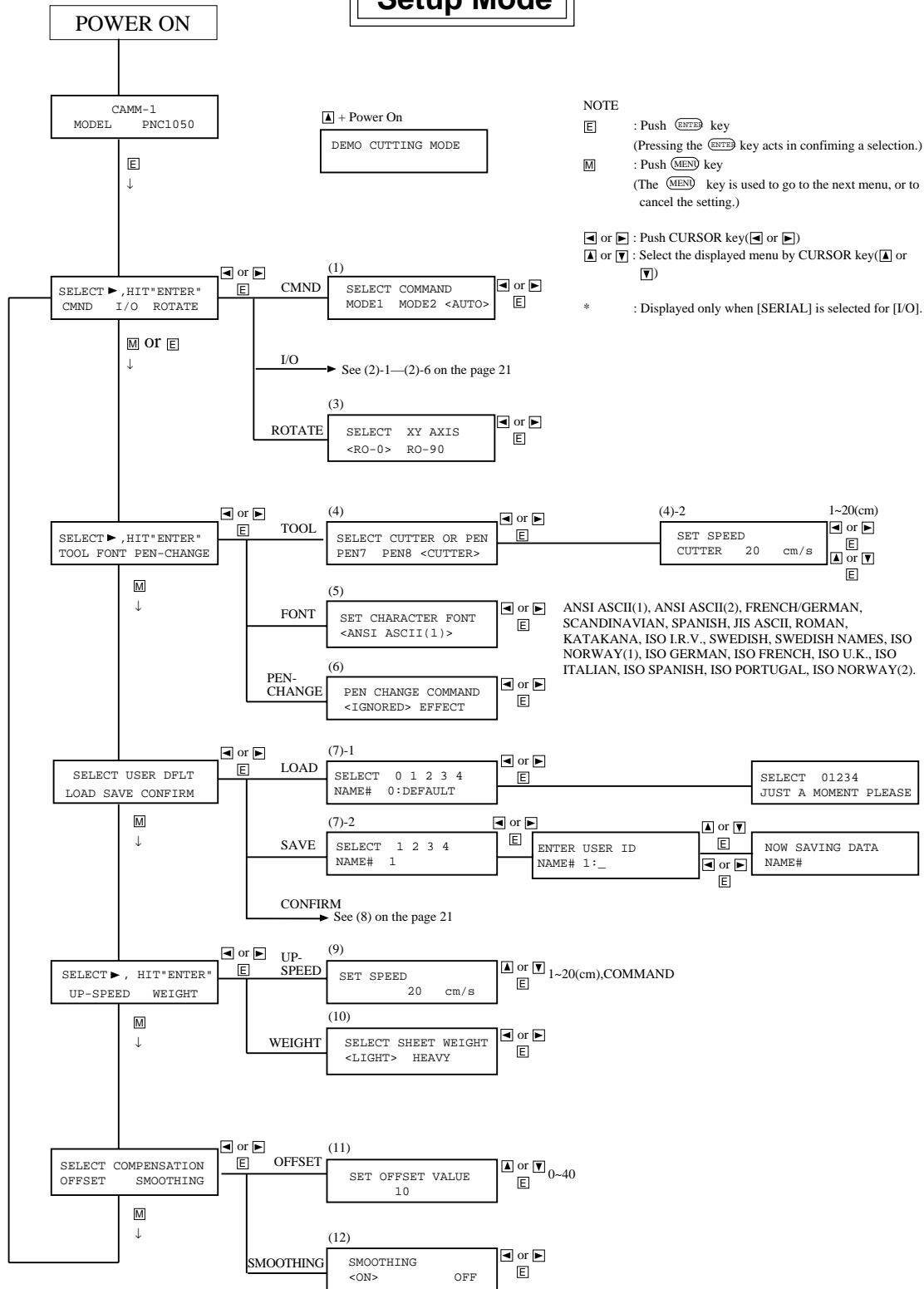


## Description of Functions

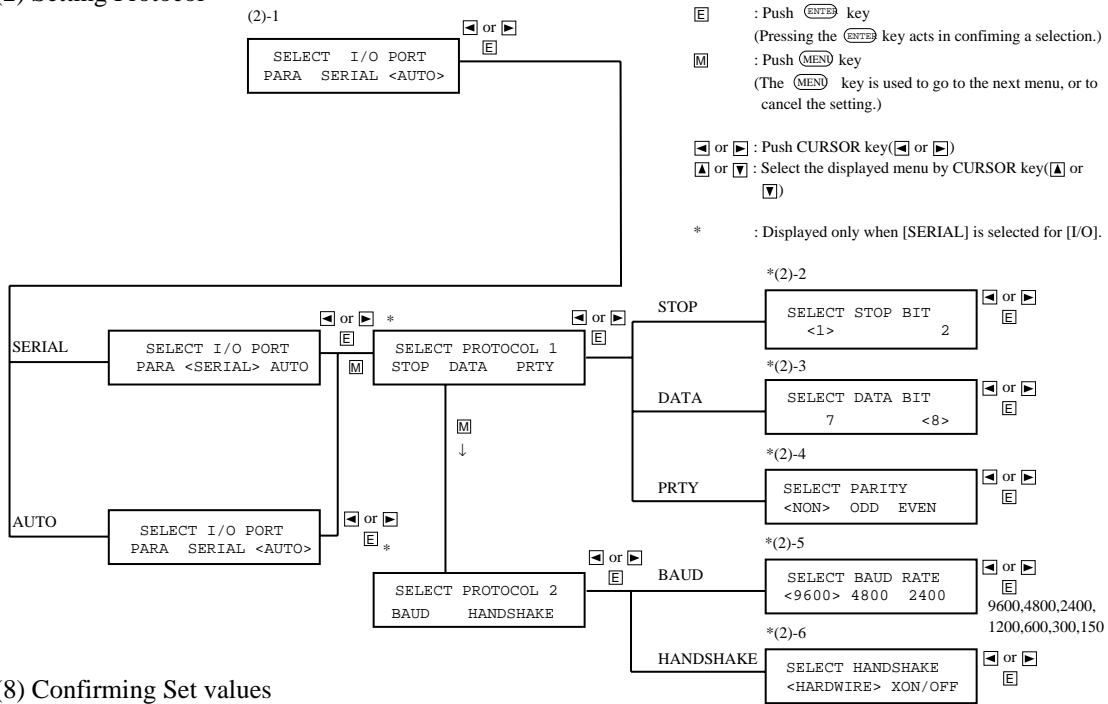


# 3.1 Display Menu Flow Chart

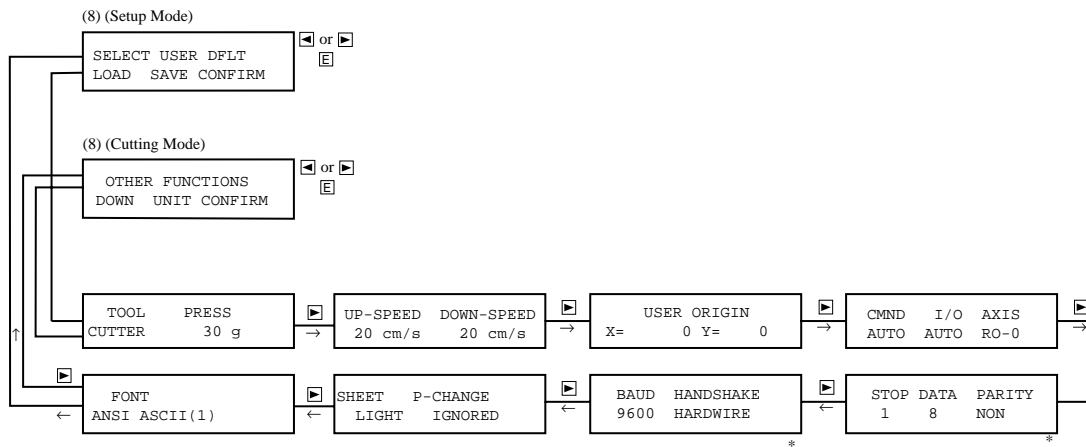
## Setup Mode



## (2) Setting Protocol



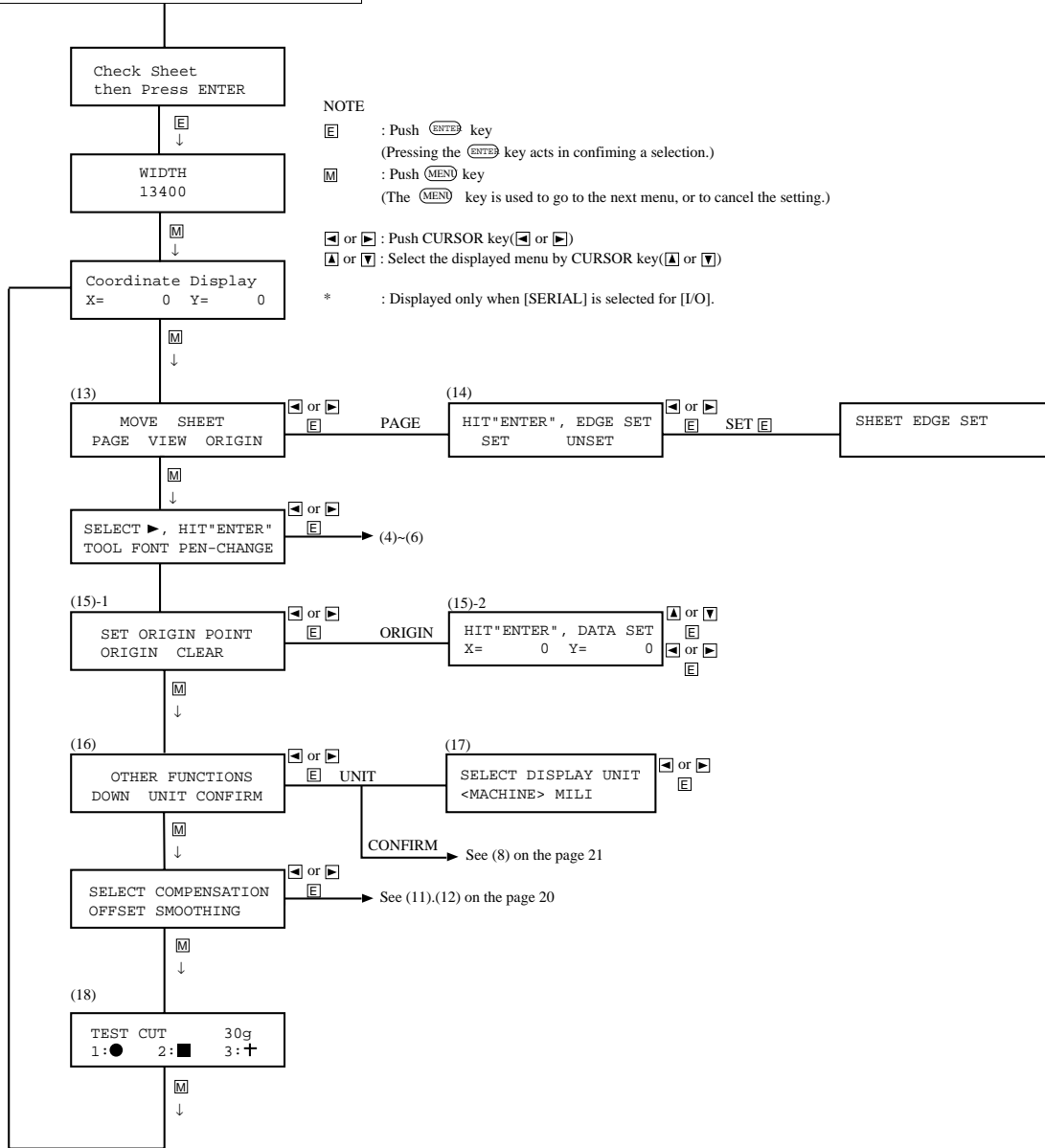
## (8) Confirming Set values



# Cutting Mode

POWER ON

Hold Down the Front Sheet Guide





## 3.2 Description of Functions

**(1)**

### Selects the instruction set

The mode of the CAMM-GL III instruction set is determined automatically.  
When set to [MODE 1], mode 1 of CAMM-GLIII is set for unit operations.  
When set to [MODE 2], mode 2 of CAMM-GLIII is set for unit operations.

**(2) - 1**

### Setting the I/O port

- When set to [AUTO], the PNC-1050 automatically determines the type of computer connection. Matching serial connection parameters are automatically selected for connections using the serial interface.
- A [PARA] (Parallel) setting establishes a parallel connection with the computer.
- A [SERIAL] setting establishes a serial connection with the computer .

**(2) - 2**

### Setting the stop bits

This sets the stop bit to match the computer's setting.

**(2) - 3**

### Setting the data bits

This sets the data bit length to match the computer's setting.

**(2) - 4**

### Setting the parity

This sets parity to match the computer's setting.

**(2) - 5**

### Setting the baudrate

This sets the baud rate to match the computer's setting.

**(2) - 6****Setting the handshake**

This sets the handshake protocol to match the computer's setting.

**(3)****To rotate a figure 90°**

This rotates the figure 90°. The origin point is normally at the lower left, but when the figure is rotated 90° with this function, the origin point is at the lower right. Refer to the following when rotating a figure.

**(4) - 1****Tool selection**

When carrying out normal cutting, select [CUTTER.] The PNC-1050 can make plots on paper using plotter pens from Roland DG Corporation. When attempting to plot, select any of the pens numbered from one to eight (Pen No. 1 to 8).

The PNC-1050 is not equipped with all the sophisticated plotting functions of a dedicated plotter. For this reason, it is recommended that you check plot output before beginning cutting operations.

**(4) - 2****Speed setting (While the tool is lowered)**

This sets the speed for lowering the tool. If the speed for lowering the tool is altered, the speed for raising the tool (9) is changed as well. For details, see (9) Setting the Speed on page 26.

**(5)****Setting the character set**

The PNC-1050 is equipped with the character sets listed below. When plotting on paper, select the appropriate character set from the list.

ANSI ASCII(1),	ANSI ASCII(2),	FRENCH/GERMAN,	SCANDINAVIAN,
	SPANISH,	JIS ASCII,	ROMAN,
KATAKANA,		ISO I.R.V.,	SWEDISH, SWED-
ISH NAMES,	ISO NORWAY(1),		ISO GERMAN, ISO
FRENCH,	ISO U.K.,	ISO ITALIAN,	ISO SPANISH,
ISO PORTUGAL,	ISO NORWAY(2)		

**(6)****Setting the pen change command**

When using something other than software designed for cutting to output data, the computer may send a pen change command to the PNC-1050. If there is no need to change the tool, select [IGNORED.] When this is done, the PNC-1050 will continue operation while ignoring any pen change commands. If [EFFECT] is selected, the following is displayed when a pen change command is received. When this occurs, change the pen tool and press the **ENTER** key. Plotting will begin again.

**(7) - 1****Calling up the preference set**

This calls up conditions which have been stored in step (7)-2. When a number is selected with the **◀** and **▶** keys, the title corresponding to the selected number appears at the bottom of the display. Select the title of the conditions to be used. To call up the factory default settings, select 0 (zero). The message [DEFAULT] will appear at the bottom of the display. The values for each of the factory defaults are shown in the following table.

Item		Default Setting
Instruction set		AUTO
Interface		AUTO
Rotation		0° (no rotation)
Protocol	Baud rate	9600
	Data bit	8
	Stop bit	1
	Parity	NON
	Handshaking	HARDWIRE
Tool		CUTTER
Tool-down speed		20 cm/sec
Tool-up speed		20 cm/sec
Pen change instruction control		IGNORED
Font		ANSI ASCII(1)
Sheet Weight		LIGHT
Cutter Point Compensation		10 (Cutting coordinate units)
User origin coordinates		(0,0)

## (7) -2

### Saving the setting values

This enables the values set for the items listed below to be stored together as a set with a title. Up to four sets with titles can be stored.

What follows is an explanation of how to store these conditions.

Set the desired values for each of the items. Refer to the flowchart on page 20 to display the screen for (7)-2. Use the ◀ and ▶ keys to select a number from 1 to 4, and enable the choice by pressing the **ENTER** key. Input a title for the setting values to be stored by using the ▲ and ▼ keys to select alphanumeric characters and the ◀ and ▶ keys to move the cursor. The title may be up to 12 characters in length. After inputting the title, press the **ENTER** key to enable the setting.

Items for which values can be stored are listed below.

Instruction set,	Interface,	Rotation,	Baud rate,	Data bit,
Stop bit,	Parity,	Handshake,	Tool type,	Tool-down
Speed,	Tool-up speed,	Pen change instruction control,	Font,	
Sheet weight,	Cutting point compensation,	User origin coordinates,		
Coordinate units				

## (8)

### Checking the status of current settings

This is for confirming the conditions that are currently in effect. See the flowchart on page 22 for a list of the items that can be confirmed. To move on to the next display, press the ◀, ▶, ▲, ▼, or **ENTER** key. Pressing the **MENU** key returns the display to the screen for selecting [CONFIRM.]

## (9)

### Speed setting (While the tool is raised)

This screen sets the speed with which the tool is raised. If the speed for raising the tool is faster than the speed for lowering the tool, the sheet may become misaligned during cutting. If this is the case, set the speed to the same value as for lowering the tool. Also, holding down the ▼ key when making the setting cause a display known as the [COMMAND] screen to appear. When the setting for this item is made, tool speed is according to the speed of the tool speed setting instruction (VS instruction) sent from the computer. In such cases, the speed specified by the VS instruction takes priority over the speed for lowering the tool set in step (4) -2.

## (10)

### Weight setting

The factory default setting is [LIGHT,] but this should be changed to [HEAVY] when cutting a thick sheet. When set to [HEAVY,] cutting speed is slower and the load on the tool carriage is reduced.

**(11)****Offset value setting**

Set the appropriate offset value for the sheet being used. For details, see the description of the cutting test on page 14.

**(12)****Smoothing ON/OFF**

The smoothing function is switched [ON] when the PNC-1050 is shipped from the factory. This enables arcs and other curves to be cut smoothly, without jaggedness.

Since it is ordinarily set to ON, curved lines, such as arcs, will be cut flawlessly. However, when cutting out small-sized characters or intricate designs, some of the corners may turn out rounded. If this should occur, you should set Smoothing to OFF, and try making the cutout again.

**(13) - PAGE****Page feed setting**

Selecting [PAGE] with the ◀ and ▶ keys and pressing the **ENTER** key causes the portion of the sheet that has already been cut to move toward the front of the unit, and the screen for (13)-2 is displayed. This screen allows the origin point after movement to be set. When [UNSET] is selected, the PNC-1050 sets the origin point automatically. To manually set the origin point, use the ▲ and ▼ keys to move the tool carriage to the position where the origin point is to be set. Then use the ◀ and ▶ keys to select [SET,] and press the **ENTER** key.

**(13) - VIEW****Confirming current cutting**

This confirms how cutting was carried out, with the sheet remaining loaded and in place. When [VIEW] is selected, the cut portion of the sheet is moved toward the front of the unit. To confirm cutting that is currently in progress, you must first pause the cutting. To do this, press the **ENTER** key while cutting is in progress. The following message appears on the display, and cutting is paused. Press the **MENU** key once to display the screen for (13). After using the method just described to confirm cutting, press the **MENU** key again to return to the screen above. Then select [CONT] to continue cutting.

PAUSE	ON
CONT	STOP






**(13) - ORIGIN****Checking the origin**

This confirms the origin point currently in effect. Selecting [ORIGIN] and pressing the **ENTER** key moves the tool carriage to the origin point that is currently set.

## **(14) Clearing the user origin**

This cancels the origin point set in step (12)-2 and resets it to the factory default.

## **(15) Setting the user origin**

Use the , , , and  keys to move the tool carriage to the position where the origin point is to be set. The coordinate values shown on the display change as the tool carriage moves. When the desired position has been reached, press the  key to enable the setting.

## **(16) Move the tool up or down**

Move the tool up or down  
When cutting operations are not being performed, the tool carriage rests in the up position.

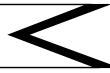
## **(17) Unit setting**

This changes the units used for the coordinate values appearing on the display. When set to [MACHINE,] cutting coordinate units are used. These are displayed as integers, with each unit equal to 0.025 mm. When [MILI] is selected, the coordinate values are displayed in millimeters.  
(when millimeters have been selected for [Offset] and [Unit,] the coordinate display is in millimeters)

## **(18) Cutting test execution**

This confirms the status of the cutting test. For details, see the explanation of the cutting test on page 13.

# Chapter 4 Technical Guide



## 4.1 List of CAMM-GL III Instructions

### mode 1

Inst.	Format	Meaning of Parameter [Parameter Range (Default)]	Explanation
H	H	None	Move to User Origin
D	D x1, y1,...,xn, yn	xn : Absolute X-axis coordinate [*1] yn : Absolute Y-axis coordinate [*1]	Cut Absolute Line
M	M x, y	xn : Absolute X-axis coordinate [*1] yn : Absolute Y-axis coordinate [*1]	Tool-up to Absolute Coodeinate Point
I	I Δx1, Δy1,...,Δxn, Δyn	xn : Relative X-axis coordinate [*1] Δyn : Relative Y-axis coordinate [*1]	Cut Relative Line
R	R Δx, Δy	Δxn : Relative X-axis coordinate [*1] Δyn : Relative Y-axis coordinate [*1]	Tool-up Move to Relative Coordinate Point
L	L p	p : Line pattern [-5 — +5(0)]	Specify Line Type
B	B l	l : Pitch length [*2 1.5% of (P2-P1) ]	Specify Bloken Line Pitch
X	X p,q,r	p : Coordinate axis [0, 1] q : Tick interval [*1] r : Number [1—32767]	Plot Coordinate System
P	P c1c2...cn	c1— cn : Character string	Plot Character
S	S n	n : Character size [0 — 127(61)]	Set Character Size
Q	Q n	n : Rotation angle (90° as a unit) [n =0 — 3(0)]	Specify Character Rotate Angle
N	N n	n : No. of special symbol [1—15]	Plot Special Symbol
C	C x, y, r, Ø1, Ø2,(Ød)	x, y : Center coordinates [*1] r : Radius [*1] Ø1•Ø2 : Start angle • End angle [*1] Ød : Chord tolerance [*1 (5°)]	Cut Arc
E	E r, Ø1, Ø2,(Ød)	x, y : Center coordinates [*1] r : Radius [*1] Ø1•Ø2 : Start angle • End angle [*1] Ød : Chord tolerance [*1 (5°)]	Cut Arc from Tool Position
A	A x, y	x : Center x coordinate [*1] y : Center y coordinate [*1]	Specify G & K Center Coordinate
G	G r,Ø1, Ø2,(Ød)	r : Radius [*1] Ø1 : Start angle [*1] Ø2 : End angle [*1] Δd : Chord tolerance [*1 (5°)]	Cut Arc Around A-Instruction Center
K	K n, l1, l2	n : Division line angle [*1] l1 : Division line end point distance [*1] l2 : Division line start point distance [*1]	Cut Division Line
T	T n, x, y, d, t	n : Hatching pattern [0 — 3] x, y : Rectangle size [*1] d : Hatching spacing [*1] t : Hatching angle [1 — 4]	Cut and Hatch Rectangle
^	^PD1000,1000;		Call mode 2

### mode 2

Inst.	Format	Meaning of Parameter [Parameter Range (Default)]	Explanation
AA	AA x,y,Øc,(Ød);	x, y : Absolute center coordinates [*1] Øc : Center angle [*1] Ød : Chord tolerance [*1 (5°)]	Arc Absolute
AR	AR Δx, Δy,Øc,(Ød);	Δx, Δy : Relative center coordinates [*1] Øc : Center angle [*1] Ød : Chord tolerance [*1 (5°)]	Arc Relative
CA	CA n; CA;	n : Character set No. [0 — 4, 6 — 9, 30 — 39 (value set by cotrol panel)]	Alternate Character set
CI	CI r,(Ød);	r : Radius [*1] Ød : Chord tolerance [*1 (5°)]	Circle
CP	CP nx,ny; CP;	nx : Number of characters in X-axis direction [*1] ny : Number of characters in Y-axis direction [*1]	Character Plot

\* 1 : - ( 2<sup>26</sup> ) — + ( 2<sup>26</sup> -1 )

\* 2 : - ( 2<sup>26</sup> ) ° — + ( 2<sup>26</sup> -1 ) °

\* 3 : 0 — + ( 2<sup>26</sup> -1 )

Inst.	Format	Meaning of Parameter [Parameter Range (Default)]	Explanation
CS	CS n; CS;	n : Character set No. [0 — 4, 6 — 9, 30 — 39 (value set by control panel)]	Standard Character Set
DF	DF;	None	Default
DI	DI run, rise; DI;	run : X-axis direction vector [*1 (1)] rise : Y-axis direction vector [*1 (0)]	Absolute Direction
DR	DR run, rise; DR;	run : X-axis direction vector [*1 (1)] rise : Y-axis direction vector [*1 (0)]	Relative Direction
DT	DT t;	t : Label terminator [ [ETX](CHR\$(3)) ]	Define Label Terminator
EA	EA x, y;	x, y : Absolute XY coordinates of opposite angle of rectangle [*1]	Edge Rectangle Absolute
ER	ER Δx, Δy;	Δx, Δy : Relative XY coordinates of opposite angle of rectangle [*1]	Edge Rectangle Relative
EW	EW r, Ø1, Øc(Ød);	r : Radius [*1] Ø1 : Start angle [*1] Øc : Center angle [*1] Ød : Chord tolerance [*1 (5°)]	Edge Wedge
FT	FT n(d(Ø)); FT;	n : Pattern [1 — 5 (1)] d : Spacing [*2 ((P2x-P1x) x 0.01)] Ø : Angle [*1 (0°)]	Fill Type
IM	IM e; IM;	e : Error mask value [0 — 255 (223)]	Input Mask
IN	IN;	None	Initialize
IP	IP P1x, P1y, P2x, P2y; IP;	P1x, P1y : XY coordinates of P1 [*1] P2x, P2y : XY coordinates of P2 [*1]	Input P1 & P2
IW	IW LLx, LLy, URx, URy; IW;	x1, y1 is lower left coordinates, x2, y2 is upper right coordinates	Input Window
LB	LB c1c2c3...cn CHR\$(3)	c : Character string	Label
LT	LT n(l); LT;	n : Pattern number [0 — 6 (solid line)] l : 1 pitch length [*2 (1.5% of (P2-P1))]	Line Type
OA	OA;	None	Output Actual Point
OC	OC;	None	Output Commanded Position
OE	OE;	None	Output Error
OF	OF;	None	Output Factor
OH	OH;	None	Output Hard-Clip Limits
OI	OI;	None	Output Identification
OO	OO;	None	Output Option Parameter
OP	OP;	None	Output P1 & P2
OS	OS;	None	Output Status
OW	OW;	None	Output Window
PA	PA x1, y1...xn, yn; PA;	xn, yn : Absolute XY coordinates [*1]	Cut Absolute
PD	PD x1, y1...xn, yn; PD;	xn, yn : XY coordinates [*1]	Tool Down
PR	PR Δ1, Δy1...Δxn, Δyn; PR;	Δxn, Δyn : Relative XY coordinates [*1]	Cut Relative
PT	PT d; PT;	d : Pen thickness (mm) [0—5 (0.3)]	Pen Thickness
PU	PU x1, y1...xn, yn; PU;	xn, yn : XY coordinates [*1]	Tool Up
RA	RA x, y;	x, y : Absolute XY coordinates of opposite angle of rectangle [*1]	Shade Rectangle Absolute
RR	RR Δx, Δy;	Δx, Δy : Relative XY coordinates of opposite angle of rectangle [*1]	Shade Rectangle Relative
SA	SA;	None	Select Alternate Set

\* 1 : - ( 2<sup>26</sup> ) — + ( 2<sup>26</sup> - 1 )

\* 2 : - ( 2<sup>26</sup> ) ° — + ( 2<sup>26</sup> - 1 ) °

\* 3 : 0 — + ( 2<sup>26</sup> - 1 )



Inst.	Format	Meaning of Parameter [Parameter Range (Default)]	Explanation
SC	SC Xmin, Xmax, Ymin, Ymax; SC;	Xmin, Ymin : User XY coordinates of P1 [*1] Xmax, Ymax : User XY coordinates of P2 [*1]	Scaling
SI	SI w, h; SI;	w : Character width (cm) [-128 — +127.99999 (3.8)] h : Character height (cm) [-128 — +127.99999 (5)]	Absolute Character Size
SL	SL tanØ; SL;	tanØ : Character slant [*1 (0)]	Character Slant
SM	SM s; SM;	s : Character or symbol [CHR\$(33) — CHR\$(58), CHR\$(60) — CHR\$(126) (Default : Clears symbol mode)]	Symbol Mode
SR	SR w, h; SR;	w : Character width (%) [*1 (3.8 cm)] h : Character height (%) [*1 (5 cm)]	Relative Character Size
SS	SS;	None	Select Standard Set
TL	TL lp(lm); TL;	lp : Tick length in positive direction [*2 (0.5%)] lm : Tick length in negative direction [*2 (0.5%)]	Thicke Length
UC	UC (c,)Δx, Δy,(c.) .....,Δxn, Δyn; UC;	c : Tool control value [-67108863 — -99, +99 — +67108863] Δxn : Units of movement in X-axis direction [-99<Δxn<+99] Δyn : Units of movement in Y-axis direction [-99<Δyn<+99]	User Defined Character
VS	VS v; VS;	v : Tool speed (cm/sec.) [1 — 20 (value set by control panel)]	Velocity Select
WD	WDc1c2...cn[label terminator] WD[label terminator]	cn:character[CHR\$(32)-CHR\$(160)-CHR\$(223)]	Write to Display
WG	WG r,Øl,Øc(,Ød);	r : Radius Øl : Startangle[*] Øc : Center angle[*] Ød : chord tolerance[*](5°)	Shad Wedge
XT	XT;	None	X-Tick
XY	YT;	None	Y-Tick

## ● mode1, mode2 common instructions

Inst.	Format	Meaning of Parameter [Parameter Range (Default)]	Explanation
!NR	!NR ;	None	Not Ready
!PG	!PG n ;	n : [-1600 — +1600 mm]	Page Feed
!ST	!ST n ;	n : [0, 1]	Select Tool

\* 1 : - ( 2<sup>26</sup> ) — + ( 2<sup>26</sup> - 1 )

\* 2 : - ( 2<sup>26</sup> ) ° — + ( 2<sup>26</sup> - 1 ) °

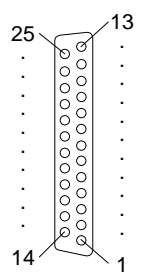
\* 3 : 0 — + ( 2<sup>26</sup> - 1 )

## 4.2 The Specifications of the Interfaces

### Serial Interface (RS-232C)

#### ● Connector

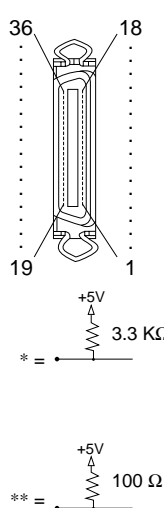
Signal Name	Terminal Number	Signal Name	Pin Connection
NC	25	13	NC
NC	24	12	NC
NC	23	11	NC
NC	22	10	NC
NC	21	9	NC
DTR	20	8	NC
NC	19	7	SG
NC	18	6	DSR
NC	17	5	CTS
NC	16	4	RTS
NC	15	3	RXD
NC	14	2	TXD
	1		FG



### Parallel Interface (in compliance with specifications of Centronics)

#### ● Connector

Signal Name	Terminal Number	Signal Name	Pin Connection
NC	36	18	HIGH**
HIGH*	35	17	GND
NC	34	16	GND
GND	33	15	NC
HIGH*	32	14	NC
NC	31	13	HIGH*
GND	30	12	GND
	29	11	BUSY
	28	10	ACK
	27	9	D7
	26	8	D6
	25	7	D5
	24	6	D4
	23	5	D3
	22	4	D2
	21	3	D1
20	2	D0	
19	1	STROBE	



### Device Control Instruction

Device control instructions are used to determine the communication sequence between the PNC-1050 and computer through RS-232C interface and/or tell the PNC-1050 the current computer state. among them, some device control instructions set the output specifications of mode 2 instructions.

Each device control instruction is organized with three letters: ESC (1Bh), “.” and one uppercase letter. Device control instructions are of two types: one with parameters and the other without parameters.

Parameters can be omitted. A semicolon “;” is used as a delimiter to separate parameters if they are input in succession. A “,” without parameters means that parameters were omitted.

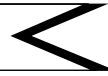
If parameters are omitted, the default value is set. For a device control instruction with parameters, a terminator needs to be input in order to signify the end of instructions. A colon “:” is used as the terminator which cannot be omitted.

Instruction	Format	Parameter	Range ([ ] is default)	Explanation
<b>Handshake Instructions</b>				
ESC .B Output Remaining Buffer Capacity	[ESC].B	None		Outputs the current remaining buffer capacity to the computer.
ESC .M Set Handshake Output Specifications (1)	[ESC].M<P1>;<P2>; <P3>;<P4>;<P5>;<P6>;	P1: Delay time P2: Output trigger character P3: Echo terminator P4: Output terminator P5: Output terminator P6: Output initiator	0-32767 (msec) [0 (msec)] [0 (Sets nothing)] [0 (Sets nothing)] [13 ([CR])] [0 (Sets nothing)] [0 (Sets nothing)]	Sets handshake output specifications.  Note: When you specify some values to <P4> and <P5>, always set 0 to <P6>. When you specify some value to <P6>, always set 0 to <P5>.
ESC .N Set Handshake Output Specifications (2)	[ESC].N<P1>;<P2>; <P3>;.....;<P11>;	P1: Intercharacter delay P2-P11 : Xoff character (for Xon/Xoff) Immediate response character (for ENQ/ACK)	0-32767 (msec) [0 (msec)] [All 0 (Sets nothing)]	Sets an intercharacter delay, and also an Xoff character for performing the Xon/Xoff handshake.

Instruction	Format	Parameter	Range ([ ] is default)	Explanation
ESC .H Sets ENQ/ACK Handshake Mode1	[ESC].H<P1>;<P2>; <P3>; ***** ;<P12>:	P1: The number of bytes for data block P2: ENQ character P3-P12 : ACK character (only when <P2> is set)	0-15358 (byte) [80 (byte)] [0 (Sets nothing)] [All 0 (Sets nothing)]	When receiving the ENQ character set by <P2>, compares the value set by <P1> and the remaining buffer capacity, and returns the ACK character to the host computer when the remaining buffer capacity is larger. The [ESC].H with no parameter performs a dummy handshake.
ESC .I Set Xon/Xoff Handshake and ENQ/ACK Handshake Mode2	[ESC].I<P1>;<P2>; <P3>; ***** ;<P12>:	P1: Limit of the remaining buffer capacity (for Xon/Xoff) The number of data block bytes (for ENQ/ACK (mode2)) P2: ENQ character (for ENQ/ACK (mode2)) 0 (for Xon/Xoff) P3-P12 : Xon character(for Xon/Xoff) ACK character (for ENQ/ACK (mode2))	10-15358 (byte) [80 (byte)] [0 (Sets nothing)] [All 0 (Sets nothing)]	Used for performing the Xon/Xoff handshake and the ENQ/ACK handshake mode 2. The [ESC].I instruction with no parameter performs a dummy handshake. In a dummy handshake, always returns the ACK character to the host computer, regardless of the remaining buffer capacity, when receiving the ENQ character.
ESC .@ Controls DTR	[ESC].@ P1;P2:	P1: Ignored P2: DTR signal control	0-255 [1]	Controls the DTR signal (No. 20 pin of RS-232C). An even number parameter (e.g. 0) always sets the DTR signal to High without performing the hardware handshake. An odd number parameter (e.g. 1) performs the hardware handshake and controls the DTR signal according to the remaining buffer capacity.

Instruction	Format	Parameter	Range ([ ] is default)	Explanation																
<b>Status Instructions</b>																				
ESC .O Outputs the Status of Buffer, Pause	[ESC].O	None		Outputs the status codes of PNC-1050 shown in the table below. <table border="1"> <thead> <tr> <th>Code</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Data remaining in buffer.</td> </tr> <tr> <td>8</td> <td>Buffer empty.</td> </tr> <tr> <td>16</td> <td>Data remaining in buffer. PNC-1050 being paused (Pause On being displayed).</td> </tr> <tr> <td>24</td> <td>Buffer empty. PNC-1050 being paused (Pause On being displayed).</td> </tr> </tbody> </table>	Code	Meaning	0	Data remaining in buffer.	8	Buffer empty.	16	Data remaining in buffer. PNC-1050 being paused (Pause On being displayed).	24	Buffer empty. PNC-1050 being paused (Pause On being displayed).						
Code	Meaning																			
0	Data remaining in buffer.																			
8	Buffer empty.																			
16	Data remaining in buffer. PNC-1050 being paused (Pause On being displayed).																			
24	Buffer empty. PNC-1050 being paused (Pause On being displayed).																			
ESC .E Output RS-232C Error Code	[ESC].E	None		Outputs an error code related to RS-232C interface (see the table below), and clears the error simultaneously. At the same time, the error being displayed is canceled. <table border="1"> <thead> <tr> <th>Error code</th> <th>Possible cause and action</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>No I/O errors</td> </tr> <tr> <td>10</td> <td>Cause: after execution of an output command, other output instructions are sent before the output was not completed. Action: let the computer to read the PNC-1050 output by the output instruction and then send another output instruction.</td> </tr> <tr> <td>11</td> <td>Cause: an error occurs in a device control instruction. Action: correct your program.</td> </tr> <tr> <td>13</td> <td>Cause: parameters are overflowing. Action: correct your program.</td> </tr> <tr> <td>14</td> <td>Cause: the number of the parameters set is more than specified or a colon ':' was not used to terminate. Action: correct your program.</td> </tr> <tr> <td>15</td> <td>Cause: framing error, parity error or over-run error at the time of data receipt . Action: match the communication protocols of both computer and PNC-1050(baud rate, data bit length, stop bit length).</td> </tr> <tr> <td>16</td> <td>Cause: the I/O buffer overflows. Action: This error does not occur when hardware handshake is performed, but may occur when software handshake is performed. If this error occurs, check the remaining buffer capacity of the PNC-1050 and send less data than the remaining buffer capacity.</td> </tr> </tbody> </table>	Error code	Possible cause and action	0	No I/O errors	10	Cause: after execution of an output command, other output instructions are sent before the output was not completed. Action: let the computer to read the PNC-1050 output by the output instruction and then send another output instruction.	11	Cause: an error occurs in a device control instruction. Action: correct your program.	13	Cause: parameters are overflowing. Action: correct your program.	14	Cause: the number of the parameters set is more than specified or a colon ':' was not used to terminate. Action: correct your program.	15	Cause: framing error, parity error or over-run error at the time of data receipt . Action: match the communication protocols of both computer and PNC-1050(baud rate, data bit length, stop bit length).	16	Cause: the I/O buffer overflows. Action: This error does not occur when hardware handshake is performed, but may occur when software handshake is performed. If this error occurs, check the remaining buffer capacity of the PNC-1050 and send less data than the remaining buffer capacity.
Error code	Possible cause and action																			
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16	Cause: the I/O buffer overflows. Action: This error does not occur when hardware handshake is performed, but may occur when software handshake is performed. If this error occurs, check the remaining buffer capacity of the PNC-1050 and send less data than the remaining buffer capacity.																			
ESC .L Output I/O buffer size	[ESC].L	None		PNC-1050 outputs the size of the I/O buffer to the computer when receiving this instruction. It usually outputs 1024 (bytes).																
ESC J Abort Device Control Instruction	[ESC].J	None		Aborts both the currently executed device control instruction and output.																
ESC .K Abort CAMM-GL III Instruction	[ESC].K	None		Continues to execute the CAMM-GL III instruction in operation, aborts other incoming CAMM-GL III instructions and clears the data buffer.																
ESC .R Initialize Device Control Instruction	[ESC].R	None		Initializes all settings established by the device control instructions. Execution of [ESC].R brings the same states as the following device control instructions are executed. [ESC].J, [ESC].M., [ESC].N., [ESC].H., [ESC].I: and [ESC].@:																

# Appedices



## Appendix A Option Table

Option name	Product number	Description
Spare Blades ( for standard vinyl sheet )	ZEC-U1005	Cemented Carbide Blade ( 5 pcs./set)
Spare Blades ( for thick, fluorective vinyl sheet )	ZEC-U5025	Cemented Carbide Blade ( 5 pcs./set)

Option name	Product number	Description
Water-based fiber-tipped pens	XD-4SPA-WNG	0.3 mm 4 black
	XD-4SPB-WNG	0.3 mm one each-black, red, blue and green
	XD-4SPC-WNG	0.3 mm one each-orange, pink, blown and purple
	XD-4SPA-WWG	0.6 mm 4 black
	XD-4SPB-WWG	0.6 mm one each-black, red, blue and green
	XD-4SPC-WWG	0.6 mm one each-orange, pink, blown and purple
Thick water-based fiber tipped pens	XD-4SPA-WBG	2.0 mm 4 black
	XD-4SPB-WBG	2.0 mm one each-black, red, blue and green
	XD-4SPC-WBG	2.0 mm one each-orange, pink, blown and purple
	XD-4SPD-WBG	2.0 mm 4 red
	XD-4SPE-WBG	2.0 mm 4 blue
	XD-4SPF-WBG	2.0 mm 4 green
	XD-4SPG-WBG	2.0 mm 4 orange
	XD-4SPH-WBG	2.0 mm 4 pink
	XD-4SPI-WBG	2.0 mm 4 blown
	XD-4SPJ-WBG	2.0 mm 4 purple
32 color plotter pens ( 0.3 mm )	XR-2P1A-WN—XR-2P8A-WN	Fiber tipped pen ( 0.3 mm ) × 2 in 1 color
	XR-2P1B-WN—XR-2P8B-WN	
	XR-2P1C-WN—XR-2P8C-WN	
	XR-2P1D-WN—XR-2P8D-WN	
32 color plotter pens ( 0.6 mm )	XR-2P1A-WW—XR-2P8A-WW	Fiber tipped pen ( 0.6 mm ) × 2 in 1 color
	XR-2P1B-WW—XR-2P8B-WW	
	XR-2P1C-WW—XR-2P8C-WW	
	XR-2P1D-WW—XR-2P8D-WW	

## Appendix B Specification of PNC-1050

### The specification of hardware

	PNC-1050
Mechanism	Sprocket feed with cutting device
Maximum Cutting Area	335 mm × 2498 mm 13-3/16" × 984-1/8"
Max. Cutting speed	200 mm (7-7/8") / sec
Max. tool force	200 g
Number of tool up/down	11 per sec.
Mechanical resolution	0.003125 mm / step (micro step controlled)
Software resolution	0.025 mm / step
Interface	Parallel ( in compliance with the specification of Centronics ) , Serial ( RS-232C specification )
Buffer size	2 K byte
Instruction system	CAMM-GL III (mode1, mode2)
Key	◀, ▶, ▲, ▼, ENTER, MENU
Switch, etc.	POWER, Pen force knob
Display	Liquid crystal display (20 characters x 2 lines)
Power consumption	0.5 A / 117 V, 0.3 A / 220-230 V, 0.3 A / 240 V
Acoustic noise level	Cutting mode: under 60 dB(A) Standby mode: under 50 dB(A) ( according to ISO 7779 )
External dimensions	585 ( W ) x 207 ( D ) x 391 ( H ) mm 23-1/16" ( W ) x 8-3/16" ( D ) x 15-7/16" ( H )
Weight	15.5kg ( 34.2 lb. )
Operating temperature	5 — 40°C
Operating humidity	35% — 80% (non-condensing )

### Interface specification

[Parallel]	
Standard	In Compliance with the specification of Centronics
Input Signal	STROBE ( 1BIT ), DATA (8BITS )
Output Signal	BUSY ( 1BIT ), $\overline{\text{ACK}}$ ( 1BIT )
I/O Signal Level	TTL level
Transmission Method	Asynchronous
[Serial]	
Standard	RS-232 Specifications
Transmission Method	Asynchronous, duplex data transmission
Transmission Speed	150, 300, 600, 1200, 2400, 4800, 9600
Parity Check	Odd, Even, None
Data Bits	7 bits 8 bits
Stop Bits	1 bit or 2 bits

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