DCS & Labelling Worldwide

DR 300
Operation Manual

SATO Group of Companies	
BARCODE SATO INTERNATIONAL PTE LTD 438A Alexandra Road #05-01/ 02, Alexandra Technopark, Singapore 119967 Tel: +65-6271-2122 Fax: +65-6271-2151 Website: www.barcodesato.com Email: sales@sato-int.com	**SATO EUROPE NV** Leuvensesteenweg 369, 1932 Sint-Stevens-Woluwe, Brussels, Belgium Tel: +32 (0)-2-788-80-00 Fax: +32 (0)-2-788-80-80 Website: www.sato-europe.com Email: info@sato-europe.com
SATO UK LTD Valley Road, Harwich, Essex England Co12 4RR, United Kingdom Tel: +44-1255-240000 Fax: +44-1255-240111 Website: www.satouk.com Email: enquiries@satouk.com	**SATO DEUTSCHLAND GMBH** Schaberweg 28, 61348 Bad Homburg, Germany Tel: +49 (0)-6-1726-8180 Fax: +49 (0)-6-1726-818-199 Website: www.sato-deutschland.de Email: info@sato-deutschland.de
SATO POLSKA SP Z O.O. Ul Okolna 2, 50-422 Wroclaw Poland Tel: +48-71-335-23-20 Fax: +48-71-335-23-25 Website: www.sato-europe.com Email: info@sato-europe.com	**SATO AMERICA INC.** 10350 Nations Ford Road Suite A, Charlotte, NC 28273 Tel: +1-704-644-1650 Fax: +1-704-644-1662 Website: www.satoamerica.com Email: satosales@satoamerica.com
SATO SHANGHAI CO, LTD 11 Floor, D, Pudong South Road 1111, Pudong New Area, Shanghai, China 200120 Tel: +86 (0)-21-58307080 Fax: +86 (0)-21-58307978 Website: www.barcodesato.com Email: sales@satochina.com	**BAR CODE SATO ELECTRONICS (S) PTE LTD** 438A Alexandra Road #05-01/02, Alexandra Technopark, Singapore 119967 Tel: +65-6271-5300 Fax: +65-6273-6011 Website: www.barcodesato.com www.satosingapore.com Email: sales@satosingapore.com
SATO BAR CODE & LABELLING SDN BHD Suite B-08-11&12, Block B Plaza Mont' Kiara, No.2, Jalan Kiara Mont' Kiara, 50480 Kuala Lumpur, Malaysia Tel: +60-3-6203-5950 Fax: +60-3-6203-1209 Website: www.barcodesato.com Email: sales@satosbl.po.my	**BARCODE SATO (THAILAND) CO. LTD** 370/8 Supattra Building, 5th Floor, Rama9 Road, Bangkapi, Huay Kwang Bangkok 10320, Thailand Tel: +662-719-7780-3 Fax: +662-719-7784 Website: www.barcodesato.com Email: sales@satothailand.co.th

Warning

It is essential that the safety and operating procedures contained within this manual be brought to the attention of, and are used by, all personnel likely to operate this printer/product.

This printer/product must only be used for the purpose for which it was designed.

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Electrostatic discharges on the connector pins and on the memory card may damage the printer.

In the case of fire, water must not be used on the product to extinguish the fire, and the appropriate type of fire extinguisher should be readily available.

No modifications, either mechanical or electrical, should be made to this printer/product or accessory without the written consent of SATO Europe GmbH. Any modifications made without this consent may invalidate guarantee claims.

Other manuals relating to this printer include additional information relating to other aspects of the safe operation of the printer, and are available from your SATO supplier.

All consumable waste, such as the label backing paper and used carbon ribbon must be disposed of carefully, and in a manner that will cause the minimum of environmental pollution.

Should you have any doubts regarding the setting, operating or any safety aspects of this printer/product, please contact your SATO supplier.

SATO Europe GmbH makes no guarantee that all the features described in this manual are available in all models, and, due to SATO's policy of continuous development and improvement, specifications are liable to change, without notice.

Consumables

Always use SATO carbon ribbons or equivalent. The use of incorrect materials may cause malfunctions of the printer and void the warranty.

Conventions

Text that appears bold italic and all in capitals such as ***LABEL*** refers to a key or an LED on the operation panel.

Text that appears enclosed in brackets such as <ESC> refers to an Escape sequence of a data string.

Text that appears bold italic such as ***On-Line*** refers to a function or to a result.

Text that appears in bold such as **VR1** refers to electrical components like pins, resistors connectors and so on.

Warranty and Copyright

SATO Europe GmbH makes no guarantee of any kind with regard to this material, including, but not limited to, the implied guaranties of merchantability and fitness for a particular purpose.

SATO Europe GmbH shall not be liable for errors contained herein or for any incidental consequential damages in connection with the furnishing, performance, or use of this material.

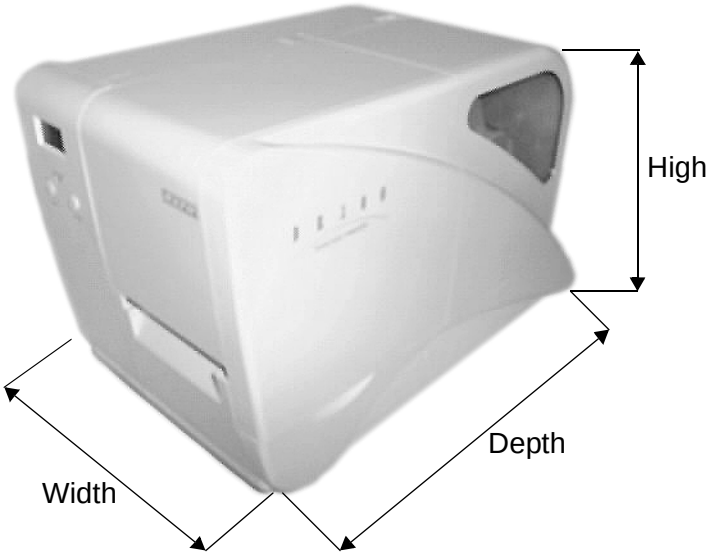
The information in this document is subject to change without notice.

Contents

1. Overview and Specifications

The DR300 is a true stand-alone printer designed to meet the needs of the most discerning users. With a resolution of 8 dots per mm quality labels are assured. The fast 32-bit RISC processor results in the DR300 formatting and printing labels and tags to the highest quality and the fastest through-put speeds up to 125mm per second. The DR300 is designed to print in both Direct Thermal and Thermal Transfer mode.

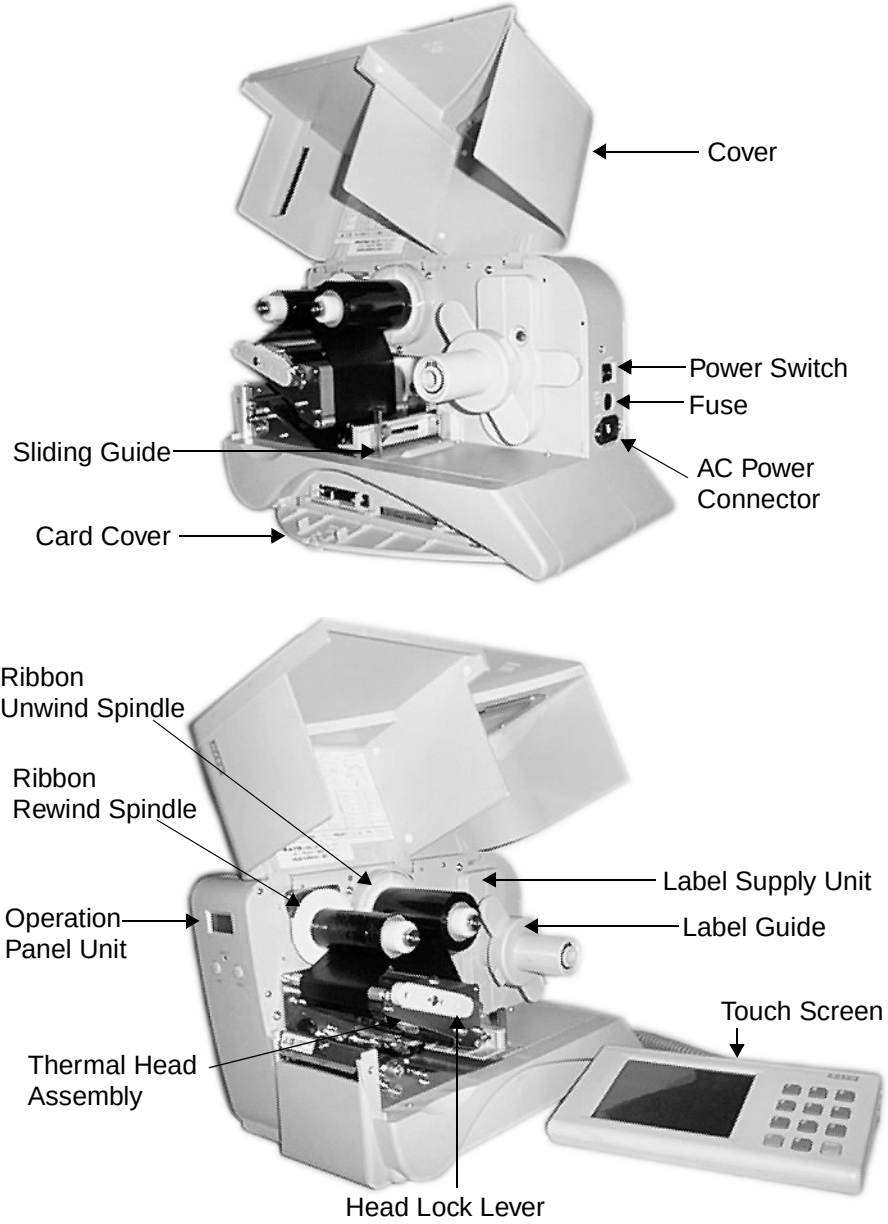
1.1 Dimensions



DIMENSIONS	
Width	21,2 cm
Depth	39,5 cm
Height	24,0 cm
Weight	8,45 kg
POWER REQUIREMENTS	
Voltage	220 V (+/- 10 %) 50/60 Hz (+/- 1%)
Power Consumption	50 Watts Idle 300 Watts Operating

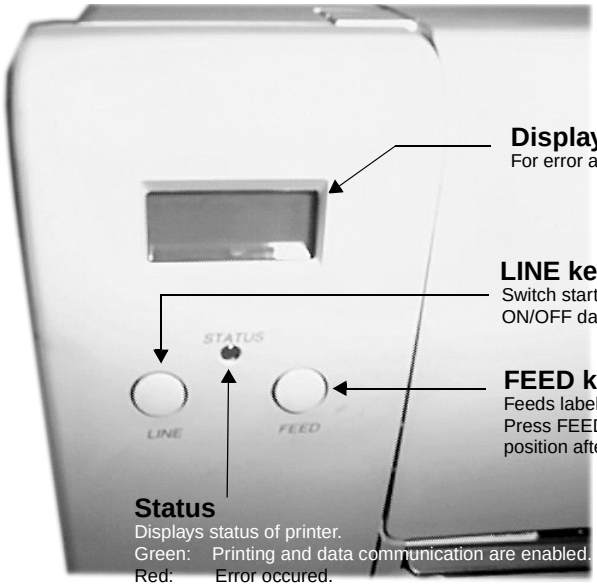
1.2 Components

General



Operation panel unit

Displays operation and error messages



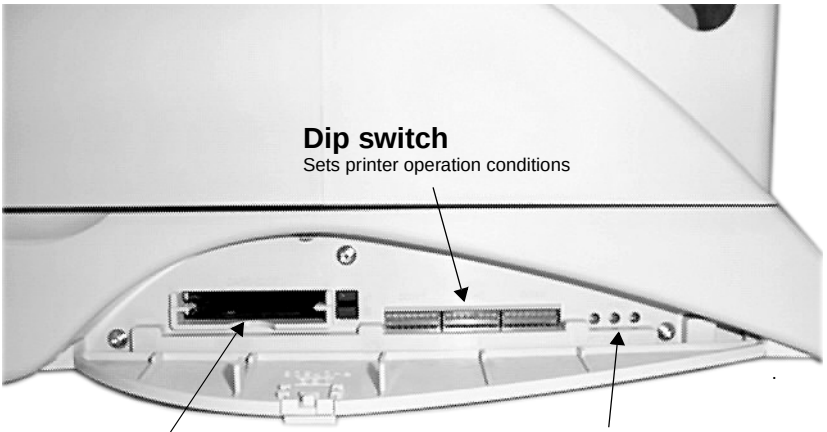
Display
For error and operation messages

LINE key
Switch start/stop printing and ON/OFF data transmission

FEED key
Feeds label
Press FEED to align label to correct position after changing of new label roll.

Status
Displays status of printer.
Green: Printing and data communication are enabled.
Red: Error occured.
No light: Printing and data communication prohibited.
Display will be de-activated when Touch Screen is connected!

Card cover unit

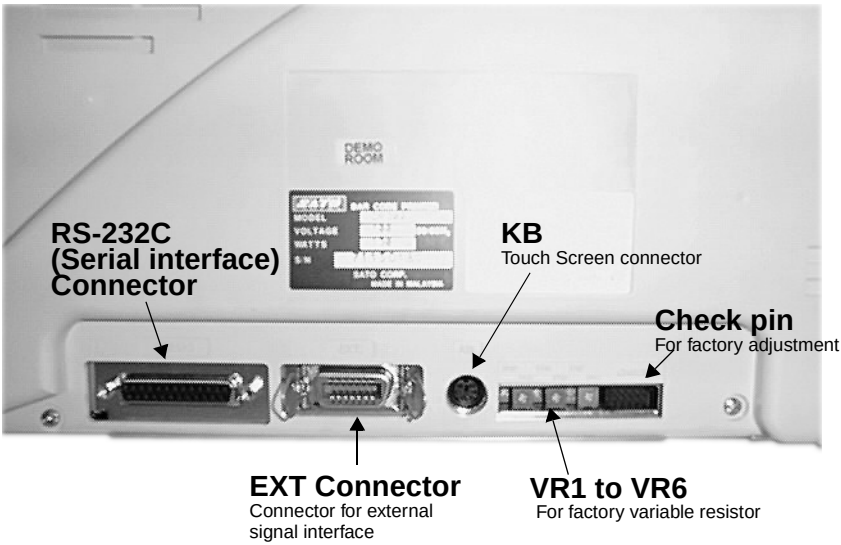


Dip switch
Sets printer operation conditions

PC card slot
Pc card slot for memory cards

Adjustable Variable Resistor
Variable control for sevice adjustment.
Do not alter unless specially instructed.
PRINT: Print darkness adjustment.
OFFSET: Cut, dispense, tear off position adjustment.
PITCH: Pitch adjustment.

Back panel unit



1.3 Specifications

General

Head Density	8 dots/mm
Print Method	Thermal Transfer/Direct Thermal
CPU	32-bit RISC CPU
Memory	EP-PROM 4Mb x 2 DRAM 512 Kb x 2
Print Speed	75, 100, 125 mm/second(Selectable)
Bar Code Type	UPC-A/E, EAN-8, EAN-13, NW 7 Code 39, ITF2/5, Code128, UCC/EAN128, BookLand
Bar Code Ratio	1 : 2, 1 : 2.5, 1 : 3 (Software defined)
Font Expansion	1-9 times (Both horizontally and vertically)

Head Density	8 dots/mm
Font Type	U - Font W 5 x P 9 (Alphanumeric, notation) S - Font W 17 x P 17 (Alphanumeric, notation) M - Font W 24 x P 24 (Alphanumeric, notation) WB - Font W 48 x P 48 (Alphanumeric, notation) OCR - A Font W 15 x P 22 (Alphanumeric, notation) OCR - B Font W 20 x P 24 (Alphanumeric, notation) **IBM 850 Code Set Table
Print Area	Max W 76 mm x P 178 mm (Optional print area expansion)
Label Size	Width 25 - 80 mm Pitch 19 - 181 mm (Label size is inclusive of label web)
Label Thickness	0.1 - 0.26 mm
Interface	RS - 232 C (Ready / Busy, Xon / Xoff, Status - 3)
Operation Panel	Key: LINE Key, FEED Key LCD: 8 digits x 2 Lines (English character display, Back Lit) [Only applicabie to Online specification only] STATUS: 2 - color LED (Red, Green)
Adjustment VR	PRINT: Print Darkness PITCH: Pitch adjustment OFFSET: Print position adjustment
User Mode	1. Print Darkness 2. Print Speed 3. Vertical Offset 4. Horizontal Offset
Features	Graphics Print, Sequential Numbering, Line / Box, Print Position Adjustment, Back,- Feed, Tear - Off, Calendar, Inverse Image, Zero Slash Selection, Non Standard Code Setting, Hex Dump, Customized Design Character (16 x 16, 24 x 24)
Self Check/ Detection	Head Element Broken, Paper End, Ribbon End, Head Open, Memory Card Error, Test Print
Options	Touch Screen Unit, Cutter Unit, Dispenser Unit, Rewinder Unit, PC Card (JEIDA Type 11)

Paper, Carbon Ribbon Specification

Paper	Size	Min. W 25 mm-Max W 80 mm (inciusive of label web) Min. P 19 mm-Max W 181 mm (inciusive of label web)
	Thickness	0.1 mm-0.26 mm
	Type	Rolled paper
	Diameter	Max outer diameter: 250 mm
Carbon ribbon	Type	ST111
	Length	300 m/roll
	Width	Max 84 mm
	Thickness	4.5 gm
	Winding	Face-in type

Operating Environment Condition

Input power supply voltage	Voltage AC 220 V +- 10%	
Power consumption	50 Watts idle, 300 Watts operating	
Environment condition	Operating temperature	5 - 40 °C
	Operating humidity	30 - 80% (No condensation)
	Storage temperature	5-50 °C
	Storage humidity	30 - 90% (No condensation)
	Except paper and carbon ribbon	

Software Specification

	Online specification	Stand alone specifica-ton
Format registration Recall function (Printer main body)	Main body 10 formats (50 fields)	Main body 10 formats (50 fields)
Sequential numbering	Yes (Numeric only)	Yes (Numeric only)
Copy function	No	Yes
Box/Line print	Yes	Yes
Graphic	BMP file	BMP file
Reverse print	Yes	Yes
Calendar function	Increment Yes/No	Increment Yes/No
Alphanumeric table	No	Yes
10 Item f unction (Store in PC card)	No	Yes
Price field function	No	Yes
C/D calculation	No	Yes
Input check function	No	Yes
Rotate image	Yes	Yes
Image copy	Yes	Yes
Customized character	Yes	Yes
Operating mode	Continuous mode, cutter mode, dispense mode, tear off mode,	Continuous mode, cutter mode, dispense mode, tear off mode,
Media size designation	Media parameter	Media parameter
Printing offset	Yes	Yes
Display setting	No	Yes
Startup d-isplay setting	No	Yes
Format control function	No	Yes
Card maintenance function	No	Yes
Online maintenance function	No	Yes

Printer Main Body Operation Unit

LCD display unit	8 x 2 lines	LCD display is activated when touch screen is not connected.
Operation key	Feed key	Paper feeding
	Line key	Temporary halts printing (print pause)
LED	2 color LED	RED : error display GREEN: On-line
DIP Switch	DIPSW 1	Serial interface (Setting baud rate, etc.)
	DIPSW 2	Setting operation mode, etc. Setting Hex dump function
	DIPSW 3	Setting zero slash and non-standard proto-code
Variable control VR	PITCH	Pitch adjustment
	OFFSET	Cutter, dispense, tear off position adjustment
	PRINT	Print darkness adjustment

1.4 Ribbon

Use only SATO thermal transfer ribbons which were formulated expressly for use in all SATO printers. Use of other than approved ribbons may result in unsatisfactory print quality and/or damage to the print head and may void your warranty.

1.5 Installation Considerations

Printer operation can be affected by the printer environment. The location of the printer should be free from dust, humidity, and sudden vibrations. To obtain optimum results from the printer, avoid locations influenced by:

- Direct or bright sunlight since bright light will make the label sensor less responsive and may cause the label to be sensed incorrectly.
- Warm temperatures which can cause electrical problems within the printer.

2. Configuration

2.1 DIP Switch Settings

Three DIP switches DSW1, DSW2, and DSW3 are located in the mechanical section of the printer and is accessed through the front door. These switches can be used to set:

- RS232C transmit/receive parameters
- Thermal transfer or direct thermal mode
- Head check mode
- Hex dump mode
- Receive buffer size
- Operation mode

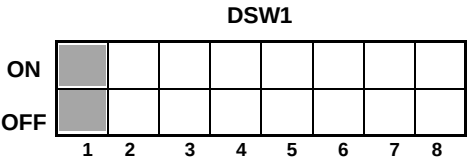
Each switch is an eight position “toggle” switch. The ON position is always to the bottom. To set the switches, first switch the unit Off, then position the DIP switches. After placing the switches in the desired positions, switch the printer back on. The switch settings are read by the printer electronics when the printer is switched on again. They will not become effective until this has been done.

RS232 Transmit/Receive Setting

Data Bit Selection (DSW1-1)

This switch sets the printer to receive either 7 or 8 bit data bits for each byte transmitted.

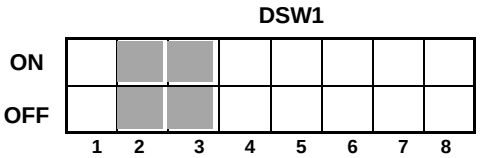
DSW1-1	SETTING
OFF	8 Data Bits
ON	7 Data Bits



Parity Selection (DSW1-2, DSW1-3)

These switches select the type of parity used for error detection.

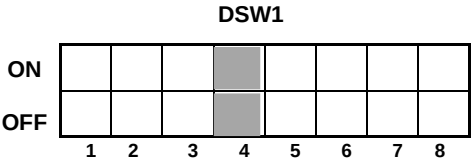
DSW1-2	DSW1-3	SETTING
OFF	OFF	No Parity
OFF	ON	Even
ON	OFF	Odd
ON	ON	Not Used



Stop Bit Selection (DSW1-4)

Selects the number of stop bits to end each byte transmission.

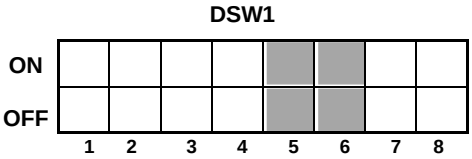
DSW1-4	SETTING
OFF	1 Stop Bit
ON	2 Stop Bits



Baud Rate Selection (DSW1-5, DSW1-6)

Selects the data rate (bps) for the RS232 port.

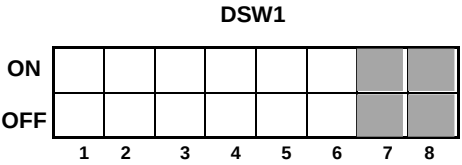
DSW1-5	DSW1-6	SETTING
OFF	OFF	9600
OFF	ON	19200
ON	OFF	4800
ON	ON	2400



Protocol Selection (DSW1-7, DSW1-8)

Selects the flow control and status reporting protocols.

DSW1-7	DSW1-8	SETTING
OFF	OFF	Rdy/Bsy
OFF	ON	Xon/XOff
ON	OFF	Bi-Com (Status 3)
ON	ON	Reserved

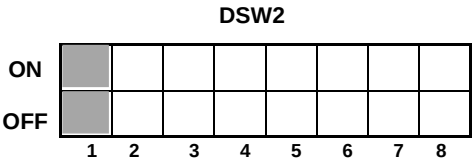


Printer Set Up

Print Mode Selection (DSW2-1)

Selects between direct thermal printing on thermally sensitive paper and thermal transfer printing using a ribbon.

DSW2-1	SETTING
OFF	Therm Xfr
ON	Direct Therm

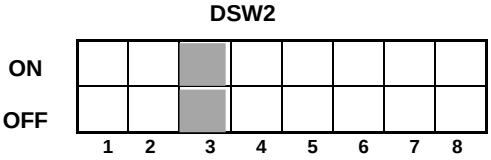


Reserved for Future Use (DSW2-2)

Head Check Selection (DSW2-3)

When selected, the printer will check for head elements that are electrically malfunctioning.

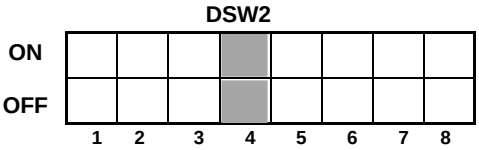
DSW2-3	SETTING
OFF	Disabled
ON	Enabled



Hex Dump Selection (DSW2-4)

Selects Hex Dump mode.

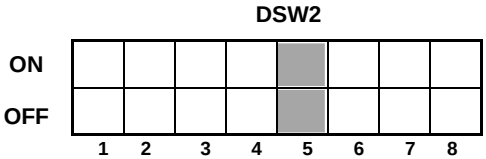
DSW2-4	SETTING
OFF	Disabled
ON	Enabled



Receive Buffer Selection (DSW2-5)

Selects the operating mode of the receive buffer.

DSW2-5	SETTING
OFF	Single Job
ON	Multi Job

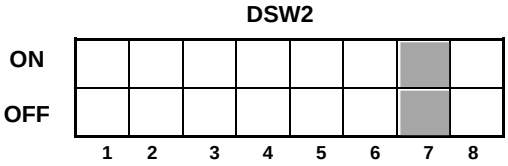


Reserved for Future Use (DSW2-6)

Size Check (DSW2-7)

Controls the length of the loaded media to the size installed by software.

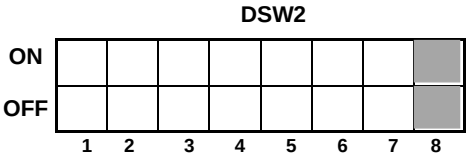
DSW2-7	SETTING
OFF	Disabled
ON	Enabled



Demand Mode (DSW2-8)

Enables the Tear-Off function for Dispenser use.

DSW2-8	SETTING
OFF	Disabled
ON	Enabled

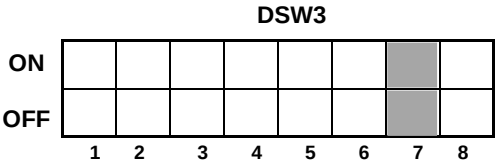


Reserved for Future Use (DSW3-1 - DSW3-6)

Selecting Protocol Control Codes (DSW3-7)

Selects the command codes used for protocol control.

DSW3-1	Setting
OFF	Standard
ON	Non-Standard



Selecting Protocol Control Codes

Protocol control codes are the special control characters that prepare the printer to receive instructions. For example, the **<ESC>** character tells the printer that a command code will follow and the **<ENQ>** character asks for the printer status.

There are two pre-defined sets of Protocol Control codes to choose from. Each set is made up of six special characters. The ***Standard Protocol Control*** codes are non-printable characters, and the ***Non-Standard Protocol Control*** codes are printable characters. The Non-Standard set may be useful on host computers using protocol converters or in an application where non-printable ASCII

characters cannot be sent from the host. This manual uses the Standard Protocol Control codes for all of the examples. Alternately, the user may define and download a set of custom Protocol Control Codes.

Note: ***If the data being sent to the printer is "Standard" and the printer is set to "Non-Standard" the printer will do nothing.***

The Protocol Control codes are selected by a DIP switch DSW3-7 on the front panel.

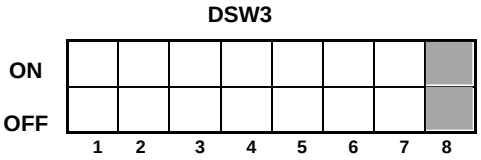
Selecting Protocol Control Codes

CONTROL CHARACTER	STANDARD DSW2-7 OFF	NON-STANDARD DSW2-7 ON	DESCRIPTION
STX	02 Hex	7B Hex = {	Start of Data
ETX	03 Hex	7D Hex = }	End of Data
ESC	1B Hex	5E Hex = ^	Command code to follow
Null	00 Hex	7E Hex = ~	Cutter command
ENQ	05 Hex	40 Hex = @	Get printer status, Bi-Com mode
Can	18 Hex	21 Hex = !	Cancel print job, Bi Com mode
Off-Line	40 Hex	5D Hex =]	Take printer Off-Line

Zero Slash (DSW3-8)

Enables or disables the slash in the Zero of all Matrix Fonts.

DSW3-8	SETTING
OFF	Enabled
ON	Disabled



2.2 Default Settings

Switch Selections

All switches are placed in the ***Off*** position (default) for shipping. This will result in the following operating configuration:

Communications: 8 data bits, no parity, 1 Stop bit, 9600 Baud
Protocol: Ready/Busy
Receive Buffer: Single Job
Protocol Codes: Standard

Software Default Settings

The printer stores the software settings upon receipt and uses them until they are again changed by receipt of a command containing a new setting. These settings are stored in non-volatile RAM and are not affected by switching the printer off. The printer may be reset to use the default software settings by depressing the ***LINE*** and ***FEED*** keys simultaneously while switching the printer on and selecting "DEFAULT YES". This will result in the following default configuration:

	DR300
Print Darkness	3
Print Speed	2 (100mm/s)
Print Reference	Vertical = 0000, Horizontal = 0000
Zero	Slash
Auto On Line	Enabled

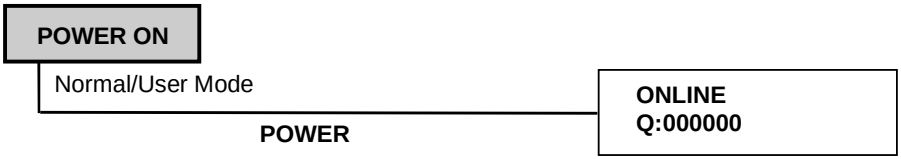
Once the default operation is completed, a "DEFAULT COMPLETE" message will be displayed on the LCD panel. The printer should be switched off while this message is being displayed. This saves the default settings in the EEPROM where they will be automatically loaded the next time the printer is switched on.

DEFAULT
COMPLETE

Printer Adjustments

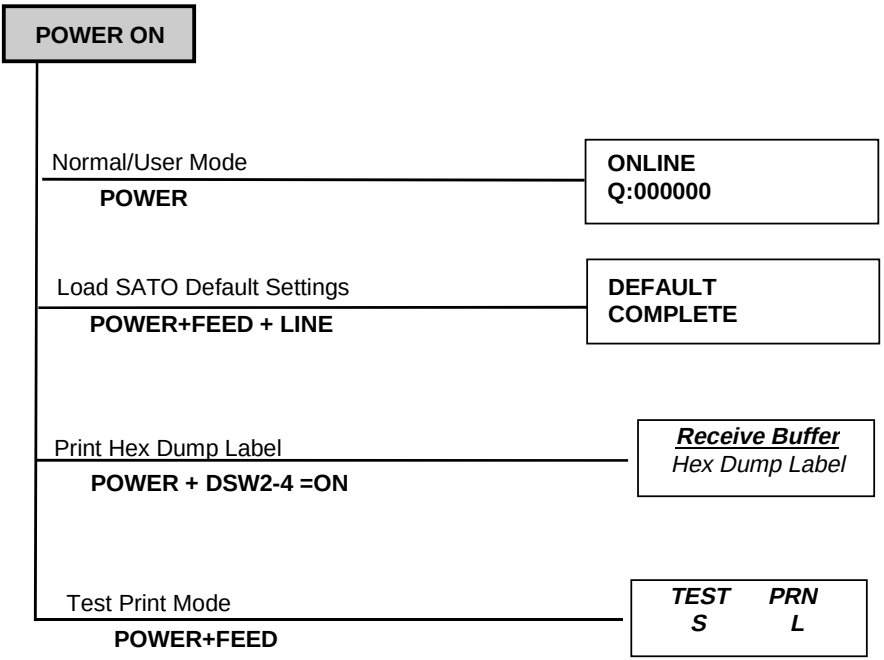
The LCD Panel is used in conjunction with the ***LINE*** and ***FEED*** switches by the operator to manually enter printer configuration settings. Many of the settings can also be controlled via software

commands and in the case of conflict between software and control panel settings, the printer will always use the last valid setting.



2.3 Printer Adjustments

The LCD Panel is used in conjunction with the **LINE** and **FEED** switches by the operator to manually enter printer configuration settings. Many of the settings can also be controlled via software commands and in the case of conflict between software and control panel settings, the printer will always use the last valid setting. If you load a label job that includes software settings and then enter a new setting via the operation panel, the manually set values will be used by the printer. If you set the values manually and then download a job with software settings, the software settings will be used.



Normal Mode

When the printer is switched on, the readout will display the following message.

```
ONLINE
Q:000000
```

The LCD Panel will display the **ONLINE** status on the top line of the display and the bottom line will contain the label quantity (Q) status. The **ONLINE** message will be changed to OFF Line whenever the print head is opened and closed. As soon as a print job is received, the Quantity message will indicate the number of labels to be printed. As soon as the label job begins to print, the display will indicate the number of labels remaining in the print job that remain to be printed.

User Mode

To enter the USER mode, perform the following steps:

STEP	PROCEDURE	
1.	Press the **LINE** key while powering on the printer.	OFFLINE 000000
2.	After the single audible signal release the key.The printer now displays the USER mode adjustment.	USER MODE
3.	Press the **FEED** key and the printer displays the first USER Mode (DARKNESS)	

Print Darkness Setting

There are five **Darkness** (or heat range) settings. The higher numbers represent darker settings. The current setting is indicated by an underline under one of the range settings.

To change the setting perform the following steps:

STEP	PROCEDURE	
1.	Use the **LINE** key to step the underlined cursor to the desired setting.	DARKNESS L 1 2 3 4 5 D
2.	Once the correct setting is underlined, press the **FEED** key to accept the setting and advance to the next adjustment.	

Print Speed Adjustment

There are three SPEED settings on the DR300. Each setting is listed on the bottom line of the display. The current setting is indicated by an underline under one of the speed settings.

SPEED 1 2 3	1 = 75 mm/s 2 = 100 mm/s 3 = 125 mm/s

To change the setting perform the following steps:

STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to the desired setting.
2.	Once the correct setting is underlined, press the **FEED** key to accept the setting and advance to the next adjustment.

Vertical Offset

Set the Vertical Offset value to establish a new base reference point. To change the setting perform the following steps:

STEP	PROCEDURE
1.	Use the **LINE** key to switch between the positive (+) or the negative (-) selection. A positive selection moves the vertical base reference point forward (away from the print mechanism) while a negative selection moves the vertical base reference point back into the mechanism. V:OFFSET V:±0000
2.	Once the correct setting is underlined, press the **FEED** key to accept the setting and advance to the adjustment. V:OFFSET V:±0000
3.	Use the **LINE** key to step the counter to the desired position. The display will increment one step for each time the **LINE** key is pressed. If the **LINE** key is held down for more then two seconds, it will automatically go into the fast scroll mode (max. 400).
4.	Once the setting is correct, press the **FEED** key to accept the setting and advance to the Horizontal Offset adjustment.
5.	You may wish to check your settings by printing a test label after you have completed the adjustments to ensure that they are correct.

Horizontal Offset

Set the Horizontal Offset value to establish a new base reference point. To change the setting perform the following steps:

STEP	PROCEDURE
1.	Use the **LINE** key to switch between the positive (+) or the negative (-) selection. A positive selection moves the horizontal base reference point to the right side of the label in print direction, while a negative selection moves the horizontal base reference point to the left side of the label in print direction. H:OFFSET H:±0000
2.	Once the correct setting is underlined, press the **FEED** key to accept the setting and advance to the adjustment. H:OFFSET H:±000
3.	Use the **LINE** key to step the counter to the desired position. The display will increment one step for each time the **LINE** key is pressed. If the **LINE** key is held down for more then two seconds, it will automatically go into the fast scroll mode (max. 400).
4.	Once the setting is correct, press the **FEED** key to accept the setting and advance to the Print Darkness Setting.
5.	You may wish to check your settings by printing a test label after you have completed the adjustments to ensure that they are correct.

3. Interface Specification

3.1 Overview

This section explains the interface specification for the DR300 printer. These specifications include detailed information on how to properly interface your printer with your host system and includes data about the following:

- Interface Type
- Using The Receive Buffer
- RS232C Serial Interface

3.2 Interface Type

The RS232C Serial interface allows connectivity to a number of other hosts. For instructions on how to properly configure the printer for either of these interface types, see the printer configuration instructions in Chapter 2 of this manual.

WARNING: ***Never connect or disconnect interface cables or use a switch box with power applied to either the host or the printer. This may cause damage to the interface circuitry in the printer/host and is not covered by warranty.***

3.3 The Receive Buffer

The printers have the ability to receive a data stream from the host in one of two ways. The receive buffer may be configured to accept one print job at a time or multiple print jobs. The single job print buffer is generally used by software programs that wish to maintain control of the job print queue so that it can move a high priority job in front of ones of lesser importance. The multiple job buffer, on the other hand prints all jobs in the order they are received by the printer, and the order of printing cannot be changed.

Single Job Buffer

The printer receives and prints one job at a time. Each job must not exceed 34 K bytes. DIP Switch 2-5 (Off).

Multi Job Buffer DIP Switch 2-5 (On).

The printer is able to continuously receive print jobs, compiling and printing other jobs at the same time. It acts much like a “print buffer” to maximize the performance of the host and the printer. The Multi Job Buffer mode is selected with DSW2-5. The Multi Job Buffer uses either the **Ready/Busy** with **DTR** (pin 20) or **X-On/X-Off** flow control protocols. See these sections for more details. With an empty receiving buffer, the status of **DTR** is “high” (or an **X-On** status if using **X-On/X-Off**), meaning the printer is ready to receive data. When the receive buffer is holding 32K bytes of data (2K bytes from being full), **DTR** will go “low” (or an **X-Off** is sent) indicating the printer can no longer receive data. This condition is called “Buffer Near Full”. See Figure 3-1.

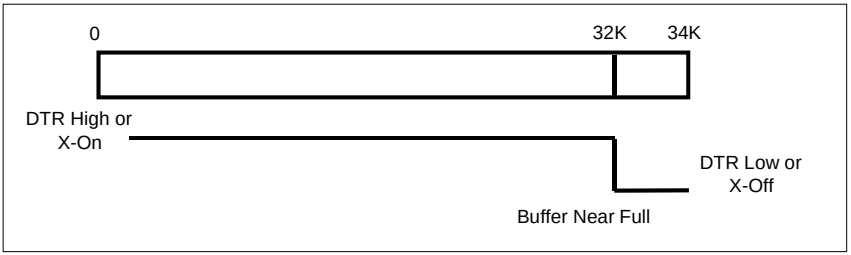


Fig. 3.1

The receiving buffer will not be able to receive more data again until a “Buffer Available” condition occurs. This takes place when the receiving buffer has emptied so that only 26K bytes of data are being held (8K bytes from being full). At this time, **DTR** will go

"high" or an **X-On** is sent to tell the host that it can again receive data. See Figure 3-2.

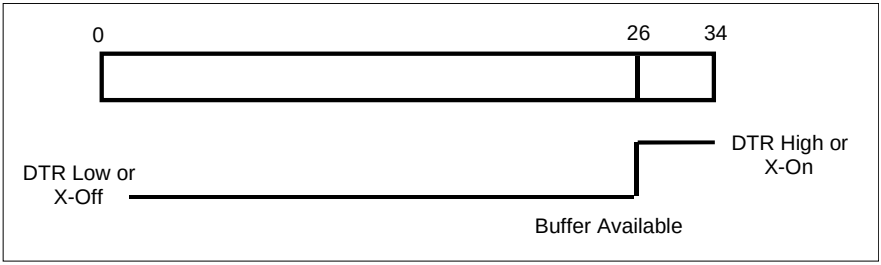


Fig. 3.2

All printer error conditions (i.e., label out, ribbon out) will cause the printer to go busy (**DTR** "low" or **X-Off**) until the problem is corrected and the printer is placed on-line. The printer will also be busy if taken off-line from the front panel.

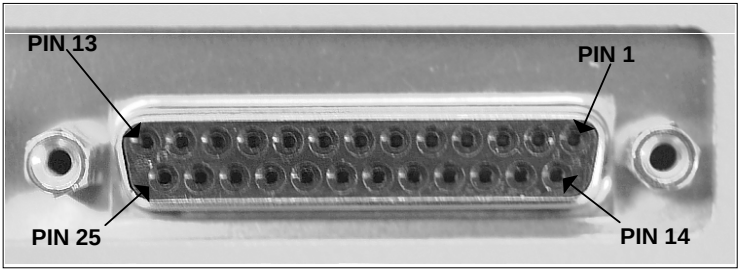
3.4 RS232C Serial Interface

General Specifications

Asynchronous ASCII	Half-duplex communication. Ready/Busy Hardware Flow Control Pin 20, DTR Control Pin 4, RTS Error Condition X-On/X-Off Software Flow Control. Bi-Directional communication (ENQ/Response)
Data Transmission Rate	2400, 4800, 9600 and 19200 bps
Character Format	1 Start Bit (fixed) 7 or 8 data bits (selectable) Odd, Even or No Parity (selectable) 1 or 2 Stop bits (selectable)

Electrical Specifications

Connector	DB-25S (Female)



Cable	DB-25P (Male), 1,5m maximum length. For cable configuration, refer to cable requirements appropriate to the RS232C protocol chosen.
Signal Levels	High = +5V to +12V Low = -5V to -12V

Pin Assignments

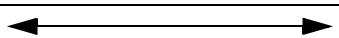
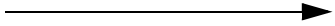
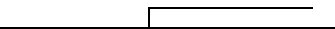
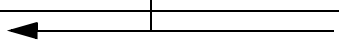
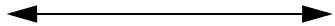
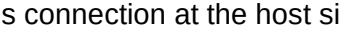
RS232C Interface Signals

PIN	DIRECTION	SIGNAL DESCRIPTION
1	Reference	FG (Frame Ground)
2	To Host	TD (Transmit Data) - Data from the printer to the host computer. Sends X-On/X-Off characters or status data (Bi-Directional protocol).
3	To Printer	RD (Receive Data) - Data to the printer from the host computer.
4	To Host	RTS (Request to Send) Used with Ready/Busy flow control to indicate an error condition. RTS is high and remains high unless the print head is open, (in this case, RTS would return to the high state after the print head is closed and the printer is placed back on-line) or an error condition occurs during printing (e.g., ribbon out, label out).
5	To Printer	CTS (Clear to Send) - When this line is high, the printer assumes that data is ready to be transmitted. The printer will not receive data when this line is low. If this line is not being used, it should be tied high (to pin 4).
6	To Printer	DSR (Data Set Ready) - When this line is high, the printer will be ready to receive data. This line must be high before data is transmitted. If this line is not being used, it should be tied high (to pin 20).
7	Reference	SG (Signal Ground).
20	To Host	DTR (Data Terminal Ready) - This signal applies to Ready/Busy flow control. The printer is ready to receive data when this pin is high. It goes low when the printer is off-line, either manually or due to an error condition, and while printing in the Single Job Buffer mode. It will also go low when the data in the buffer reaches the Buffer Near Full level.

Ready/Busy Flow Control

Ready/Busy is the hardware flow control for the serial interface on the printer. By raising/lowering the voltage level on Pin 20 of the RS232 port, the printer notifies the host when it is ready to receive data. Pin 4 (RTS) and Pin 20 (DTR) are the important signals on the printer for this method of flow control. The host must be capable of supporting this flow control method for it to function properly.

Cable Requirements

HOST	INTERCONNECTION	PRINTER
FG		1 FG (Frame Ground)
TD		3 RD (Receive Data)
		4 RTS (Request to Send)
		5 CTS (Clear to Send)
		6 DSR (Data Set Ready)
*		20 DTR (Data Terminal Ready)
SG		7 SG (Signal Ground)

* This connection at the host side of the interface would depend upon the pin that is being used as the Ready/Busy signal by the driving software. Typically on a PC, it would be either CTS (pin 5) or DSR (pin 6) on a DB-25 connector.

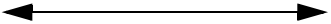
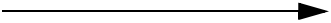
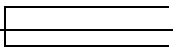
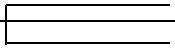
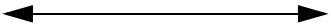
X-On/X-Off Flow Control

X-On/X-Off flow control must be used whenever hardware (Ready/Busy) flow control is not available or desirable. Instead of a voltage going high/low at pin 20, control characters representing “Printer Ready” (X-On = 11 hexadecimal) or “Printer Busy” (X-Off = 13 hexadecimal) are transmitted by the printer on pin 2 (Transmit Data) to the host. In order for this method of flow control to function correctly, the host must be capable of supporting it. **X-On/X-Off** operates in a manner similar to the function of pin 20 (**DTR**) as previously explained. When the printer is first switched on and goes on-line, an **X-On** is sent out. In the Single Job Buffer mode, when the printer receives a print job, it transmits an **X-Off** and begins printing. When it is done printing, it transmits an **X-On**. In the Multi Job Buffer mode, the printer sends an **X-Off** when the “Buffer Near Full” level is reached and a **X-On** when the data level of the buffer drops below the “Buffer Available” mark. When the printer is taken off-line manually, it transmits an **X-Off** indicating it cannot accept

data. When it is placed back on line manually, it sends an **X-On**, indicating it is again available for receipt of data. If an error occurs during printing (paper out, ribbon out), the printer sends nothing in the Single Job Buffer mode since the last character transmitted was an **X-Off**. When the error is cleared and the printer resumes printing, no **X-On** is sent until the current job is completed and the printer is once again read to receive the next job. If it is in the Multi Job Buffer mode, it sends an **X-Off** as soon as an error condition is detected. When the error is cleared and the printer is placed back on-line, it transmits an **X-On** indicating it is again ready to accept data.

Upon switch up, if no error conditions are present, the printer will continually send **X-On** characters at five millisecond intervals until it receives a transmission from the host.

Cable Requirements

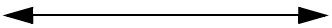
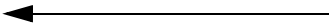
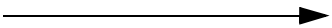
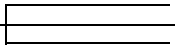
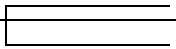
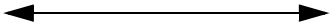
HOST	INTERCONNECTION	PRINTER
FG		1 FG (Frame Ground)
RD		2 TD (Transmit Data)
TD		3 RD (Receive Data)
		4 RTS (Request to Send)
		5 CTS (Clear to Send)
		6 DSR (Data Set Ready)
		20 DTR (Data Terminal Ready)
SG		7 SG (Signal Ground)

Bi-Directional Communications

This is a two-way communications protocol between the host computer and the printer, thus enabling the host to check printer status. When this protocol is selected, there is no busy signal from the printer (pin 20, **DTR**, is always high). The host must request the complete status from the printer, including ready/busy. Whenever the host requests printer status, it transmits an **ENQ** to the printer and the printer will respond with its status within five milliseconds. If printing, it will respond upon finishing the current label, then resume printing. In order for this protocol to work properly, pin 6 (**DTR**) and pin 5 (**CTS**) must be held high by the host. One way to ensure these pins are always in the correct state is to tie pin 20

(**DTR)** to pin 6 (**DSR**) and pin 4 (**RTS**) to pin 5 (**CTS**) at the printer end of the cable.

Cable Requirements

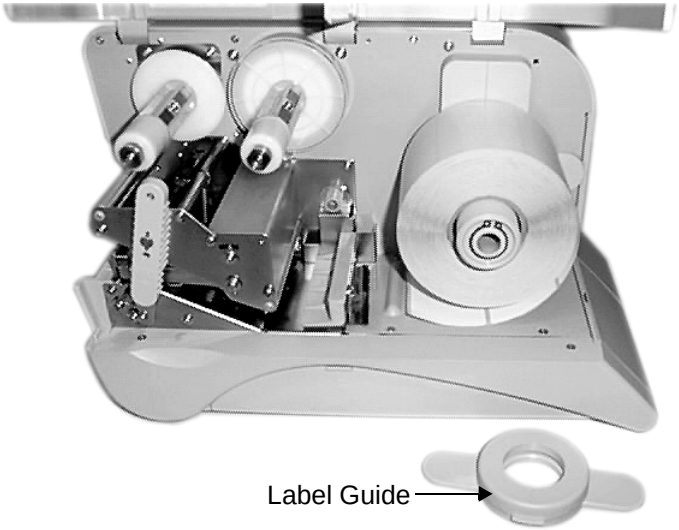
HOST	INTERCONNECTION	PRINTER
FG		1 FG (Frame Ground)
RD		2 TD (Transmit Data)
TD		3 RD (Receive Data)
		4 RTS (Request to Send)
		5 CTS (Clear to Send)
		6 DSR (Data Set Ready)
		20 DTR (Data Terminal Ready)
SG		7 SG (Signal Ground)

If a **CAN** (18 hexadecimal) is received by the printer, it will cancel the current print job and clear all data from the receive buffer.

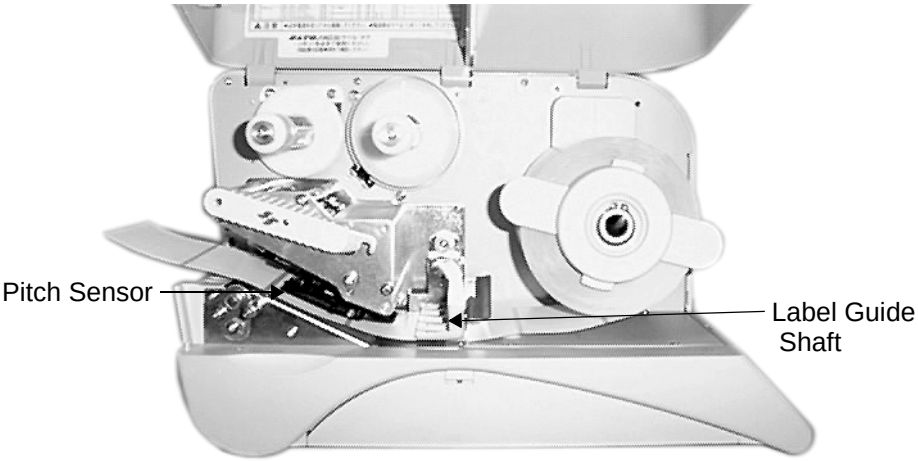
4. Settings

4.1 Setting Labels or Tags

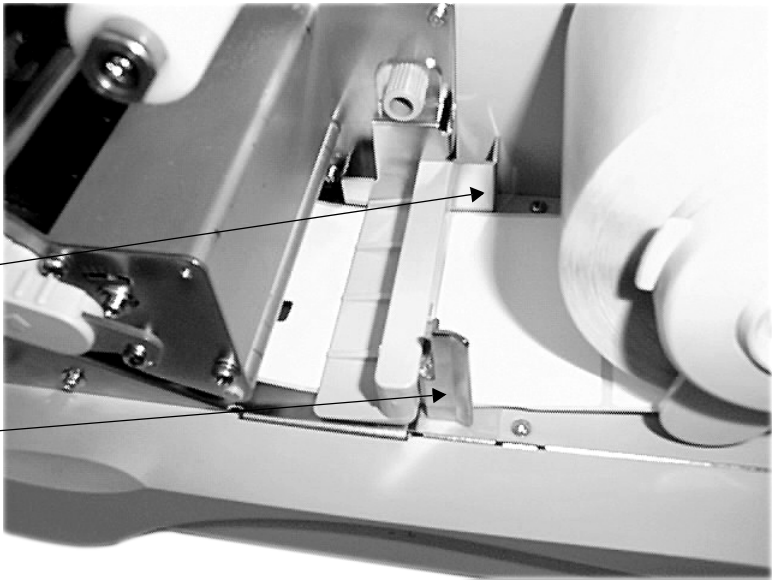
1. Open cover while power supply is off.
2. Remove label guide and set label.



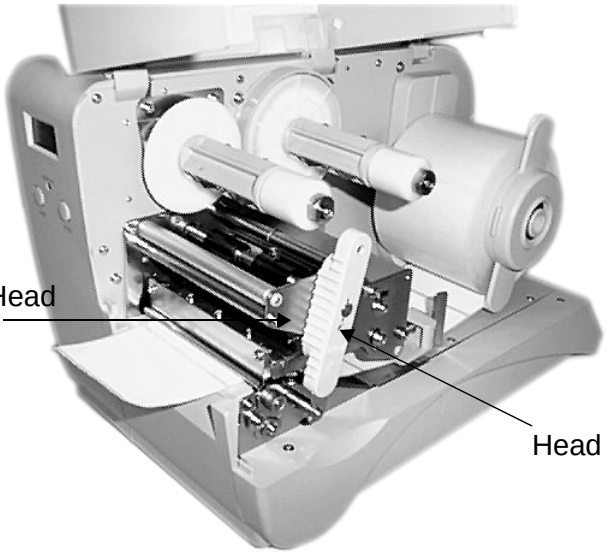
4. To open thermal head turn head lock lever to the direction of the arrow on the lever.
5. Pass paper underneath the pitch sensor and paper guide shaft.



6. Lightly push the entire paper against the paper guide designated position.
7. Adjust the sliding guide until it touches the label.

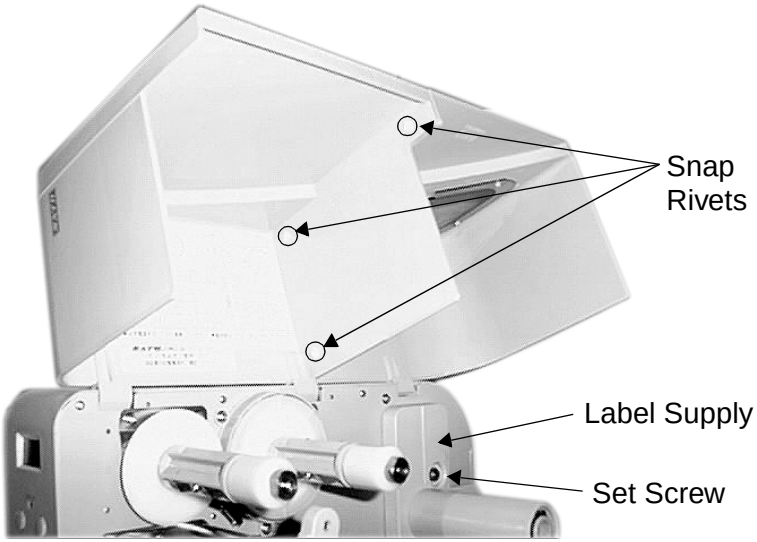


8. Turn head lock lever to the direction of the arrow to close the thermal head. Close cover.

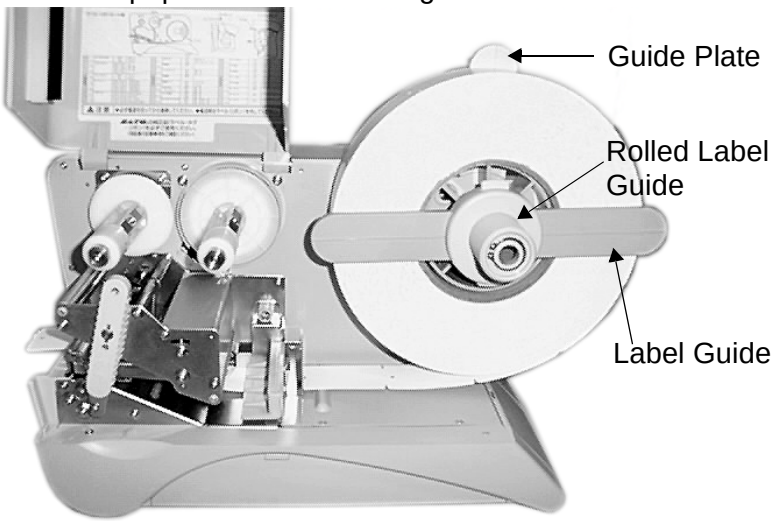


4.2 Setting large diameter rolled label

1. Remove right half of the cover fastened with snap rivets. Pull out 3 snap rivets on the cover by pushing their center with finger.
2. Alter set position of label supply component. Alter position of set screw.

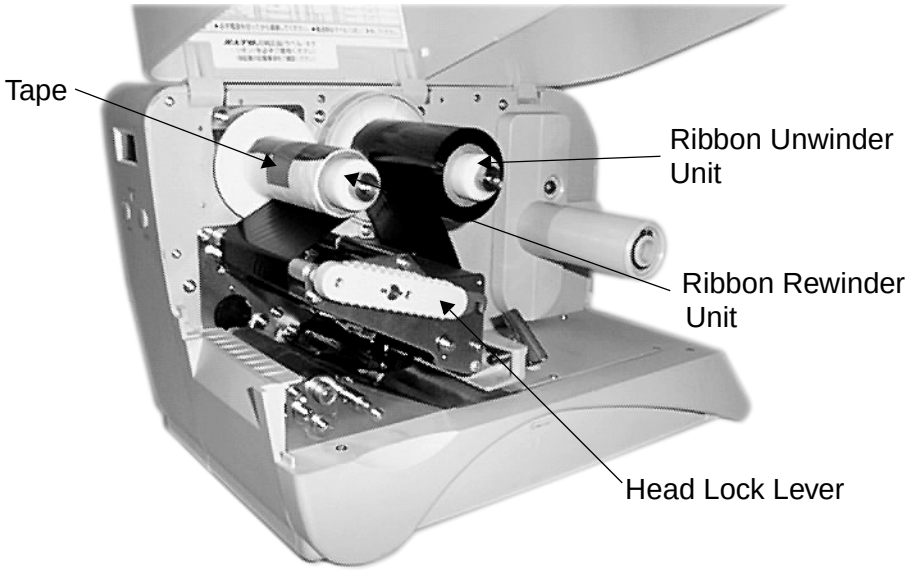


3. Insert guide plate in label supply component. Set large diameter rolled paper and rolled label guide.



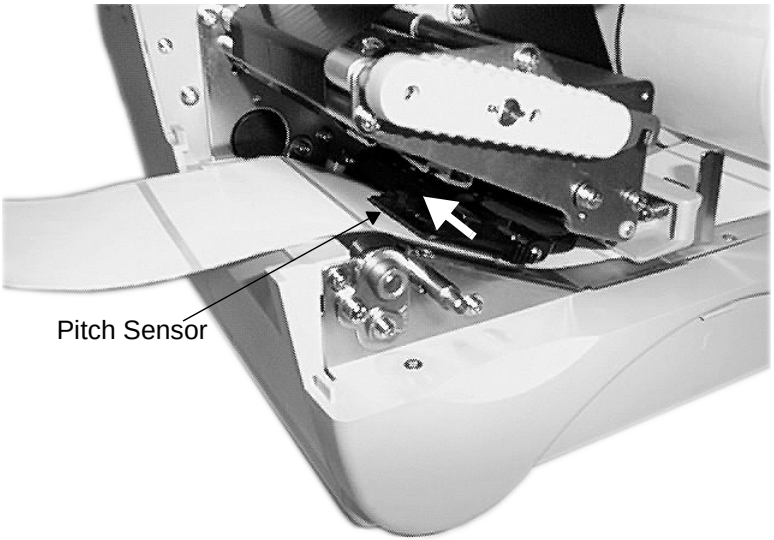
4.3 Setting carbon ribbon

1. Open cover while power supply is off.
2. Open thermal head. Turn head lock lever to the direction of the arrow on lever.
3. Insert carbon ribbon onto ribbon unwinder unit.
   Insert carbon ribbon to the depth end. (Caution on direction of Face-in-type winding). Set ribbon core on ribbon rewinding unit.
4. Pass carbon ribbon from ribbon unwinder unit to ribbon rewinding unit underneath the thermal print head. Fixed carbon ribbon on ribbon core with tape.



4.4 Pitch sensor adjustment

1. Open cover while power supply is off.
2. Slide pitch sensor in the direction of the arrow and push it to inner most position.
3. Close thermal head and cover.

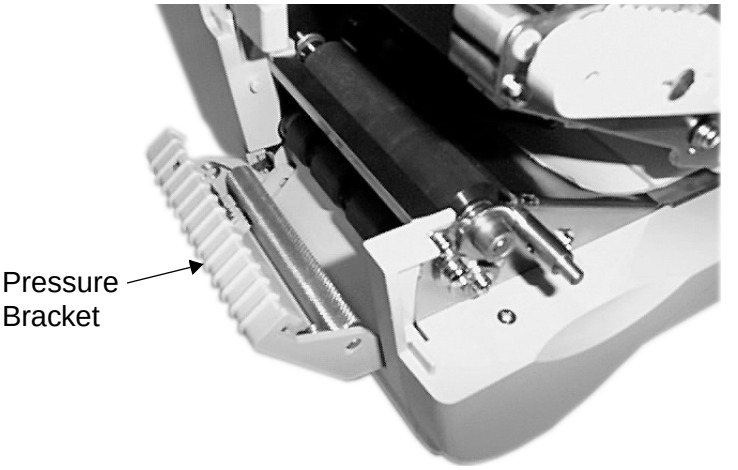


4.5 Setting optional types

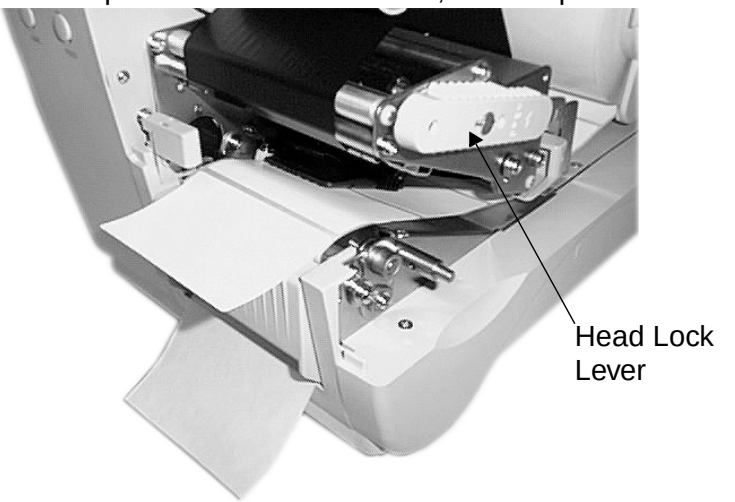
4.5.1 Dispenser

Setting label

1. Open thermal head by raising head lock lever.
2. Pull up pressure bracket of dispenser unit once, then pull down.

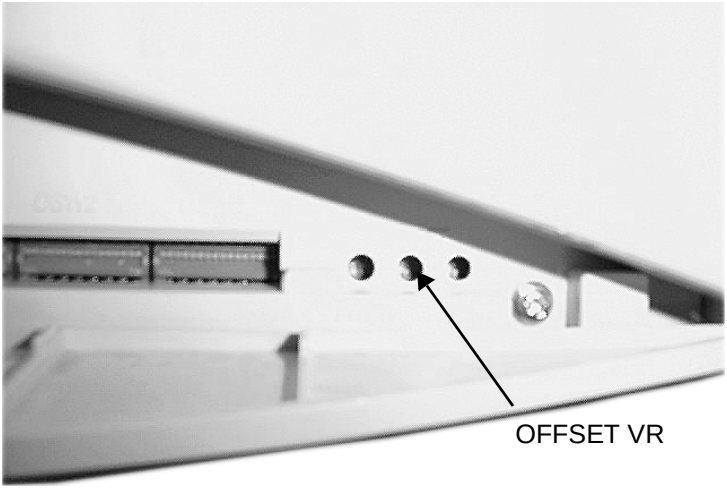


3. Set label. When setting label on dispenser unit peel 3-4 labels from backing paper and pass the backing paper under the pressure bracket.
4. Lock the print head after label is set, then set pressure bracket.



Stop position adjustment

Correct stop position for dispense mode is the position where label is 2-3 mm on backing paper. Adjust **OFFSET (VR**) to obtain correct stop position. Backwards against printing direction, forward to printing direction.



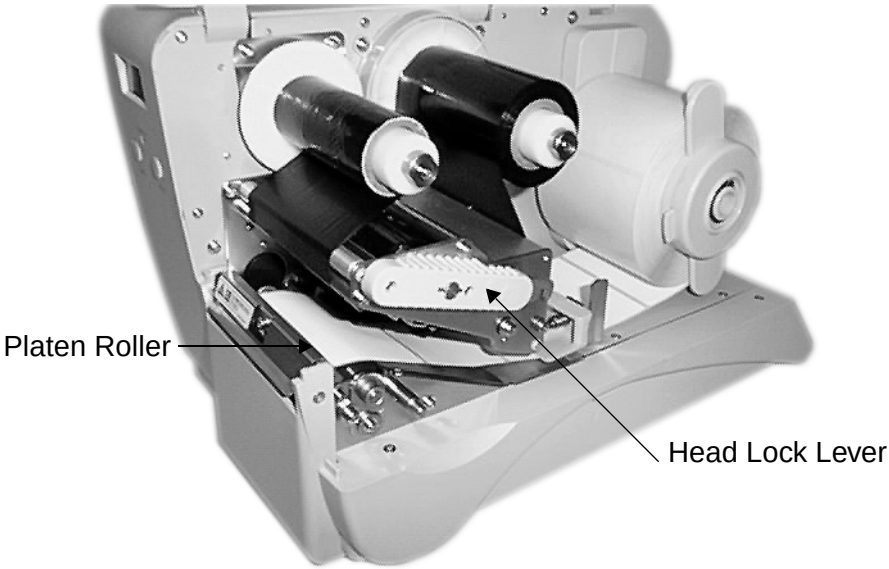
Caution!

1. **There may be cases the dispenser does not function properly due to the thickness of labei used.**
2. **Printing accuracy at peeling is V (Vertical) direction ± 1.5 mm.**
3. **Dispenser unit is effective for label pitch 25-181 mm. However, label size limitation may vary with application conditions.**

4.5.2 Cutter

Paper set position

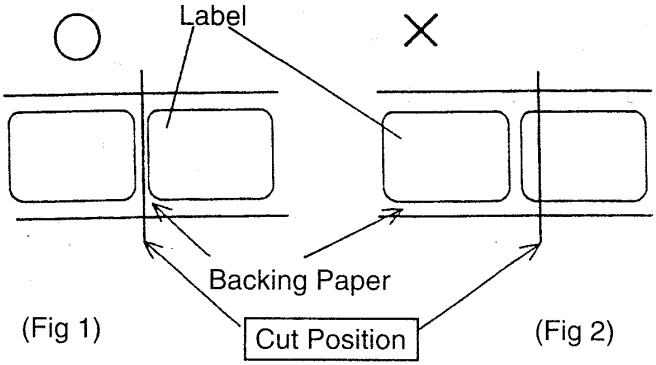
1. Open cover.
2. Set label.
3. Open thermal head by raising head lock lever.
4. Set the tip of label on platen roller.
5. Close thermal head.
6. Close cover.



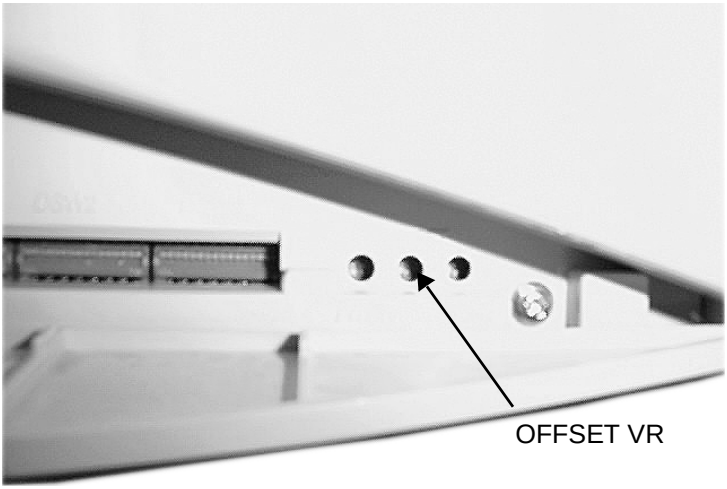
Cut position adjustment

Cut of label.

Correct cutting position is at the label gap portion.

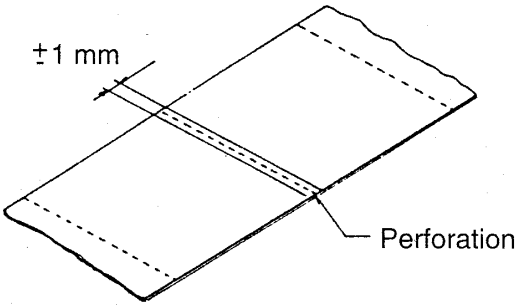


Adjust **"OFFSET"VR** to obtain the correct cut position, backwards against printing direction, forward to printing direction. Cutting on to the label must be avoided because glue that accumulates on the blade will affect cutter blade sharpness.



Cutting paper with perforation.

As for paper with perforationt 1 mm from perforation is non cut area. Adjust **"OFFSET" VR** to obtain correct cut position.



Cutter replacement

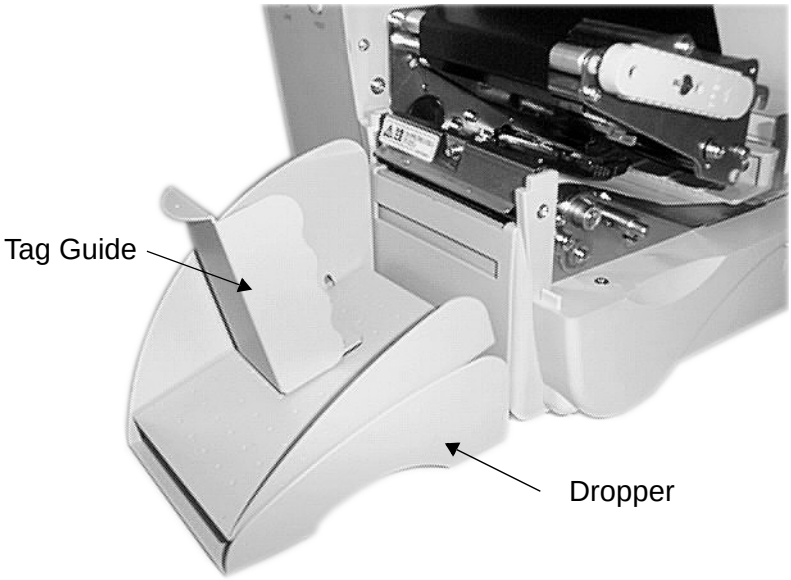
Replace cutter when blade becomes blunt and cut edges are snappy. (Please contact sales outlet where you purchased.)

Note: ***1. Paper thickkness 0,1 mm - 0,26 mm***
2. Accuracy of cut is +/- 1,5 mm
3. Paper pitch 25 - 181 mm
4. +/- 1 mm from perforation is non cut area.

4.5.3 Dropper

Dropper

1. Set dropper in front of the cover of printer main body as shown in the following drawing.
2. Attach the dropper to the front cover of printer cutter.



Basic usage of droper

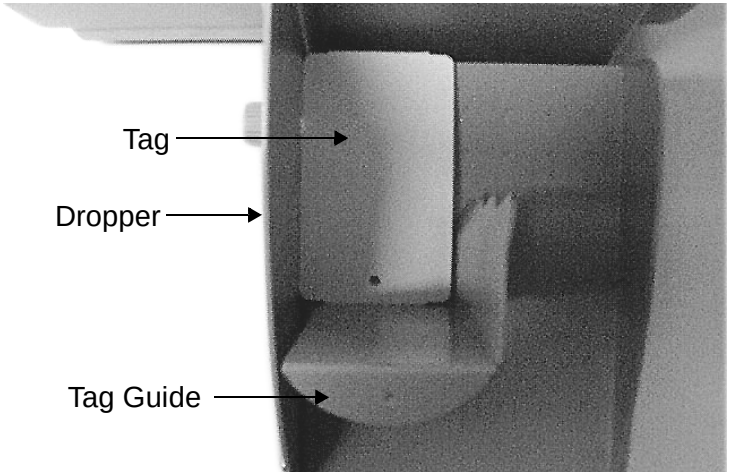
1. First adjust scale position (inclination of bottom plate) corresponding to the size of paper by loosening dropper screw.
2. Adjust the scale according to label pitch for a good stacking position.
3. The number of sheets that can be dropped varies with the scale position and paper thickness.

Stack position adjustment, standard tag (greater than 40 mm)

1. Set stacker scale in between from [Label size] to [Large].
2. Determine tag guide position by matching with the size of tag to be cut.

Tag guide set position

1. When setting a tag guide, set it with space of approx. 3 mm on printer main body side and approx. 3 mm side of tag.



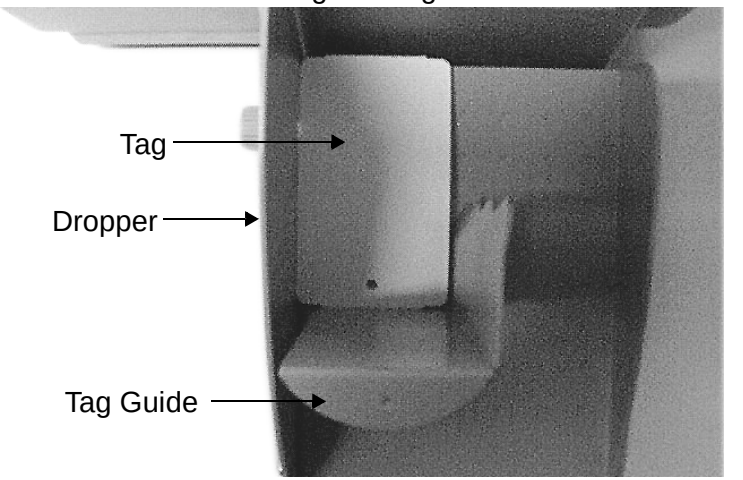
Stack position adjustment, small tag (less than 35 mm)

1. Set stacker scale in between from [Label size] to [Short].

2. Set guide plate to stacker. This guide plate works to prevent overturning, when small pitch tag is issued.
3. Determine tag guide position by matching to size of tag to be cut.

Tag guide set position.

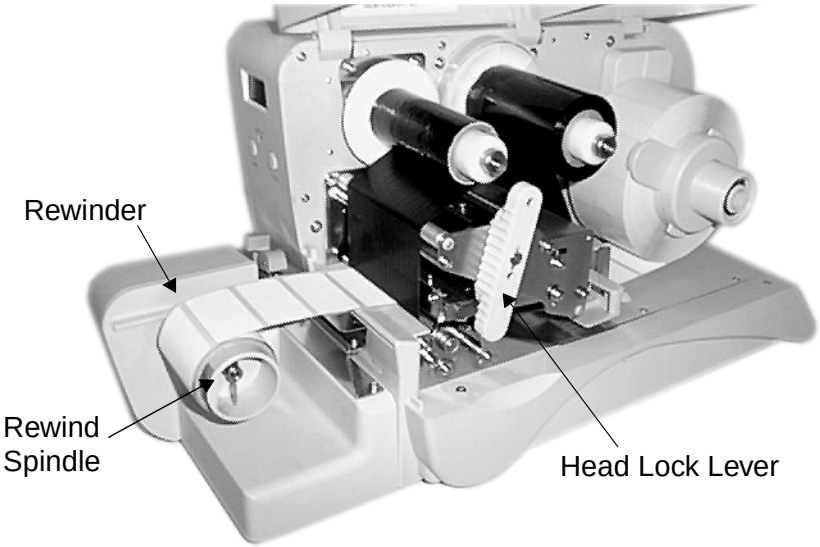
1. When setting tag guide, set it with space of approx. 3 mm on printer main body side and approx. 3 mm on side of tag as shown in the following drawing.



4.5.4 Rewinder

Paper set position

1. Open cover.
2. Set label.
3. Open thermal head by raising head lock lever.
4. Feed the labels through the print area in the normal manner. Feed the labels out and attach to an empty core on the rewind spindle. Wind some revolution to ensure the labels are secure on the core.
5. Close thermal head.
6. Close cover

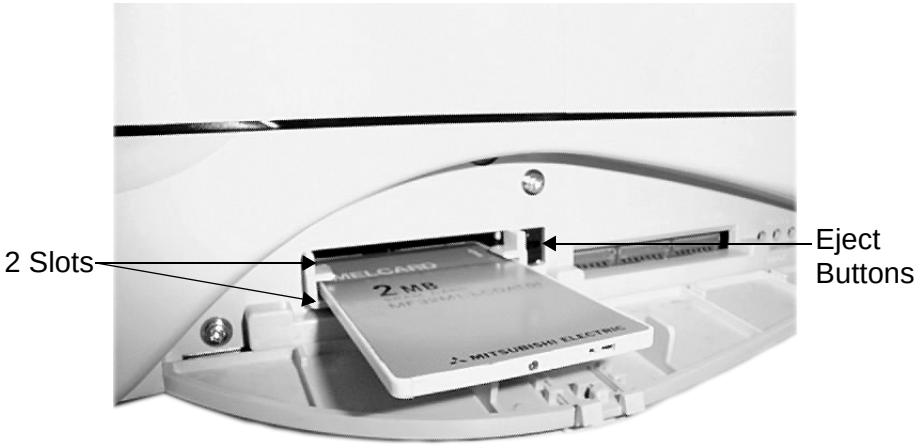


4.5.5 Setting PC Card

Printing format and graphic data can be stored in PC card. 128K, 256K, 512K, 1 M, 2M bytes TYPE 11 PCMCIA memory cards (JEIDA Ver4.2/ PCMC1A2 equivalent) are available.

Installation.

1. Power off printer and open card cover. There are 2 card slots available.
2. Insert memory card into the designated slot.
3. Confirm direction of memory card before inserting into the slot. Take caution not to force the card in reverse direction that may damage the connector of the memory card as well as the connector on the main PCB.
4. Confirm projection of eject button on the right hand side of the slot when memory card is inserted properly.



Removal

1. Push the eject button at the right side of the card slot.
2. Remove the slightly ejected memory card.

Caution!

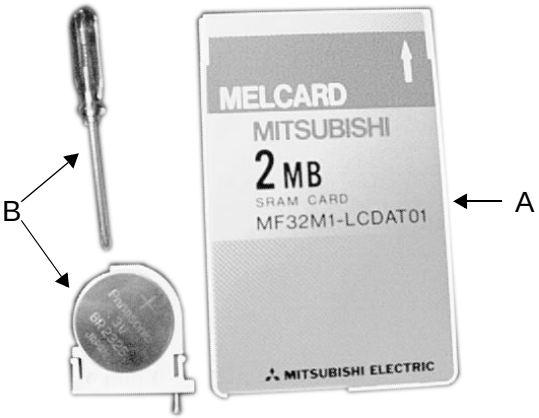
1. Ensure that power is switched oft when installation and removal of any memory card to prevent any possible damage to the memory card, connectors and printer.

2. Close card cover to prevent intrusion of hazardous objects when no card is in the slot.

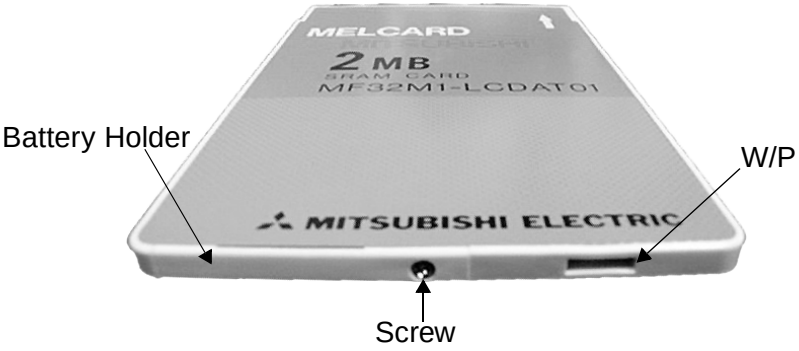
3. **Please use memory card which complies with TYPE 11 JEIDA Ver. 4.2/PCMCIA 2.1 (self-contained battery type) standard.**
4. **Replace memory card battery when printer prompts low battery message.**

Battery installation/exchange

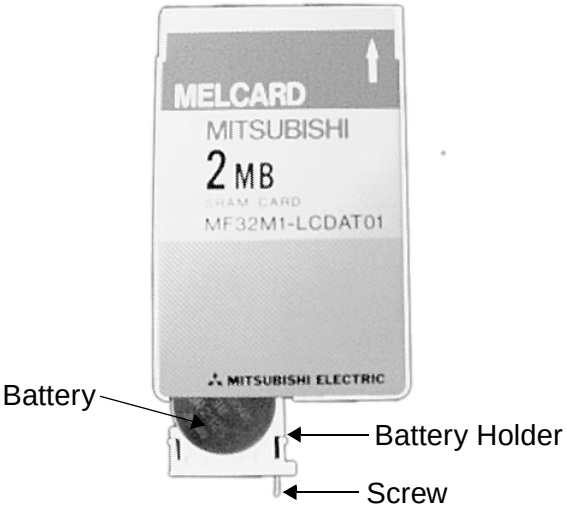
1. Confirm and identify the followings:
   A. Memory Card
   B. Coin type lithium battery (BR2325 type) and small screw driver (used for battery installation).



2. Pull out the battery holder for memory card.
   Turn the screw anti-clockwise 2-3 times with screw driver and pull out the battery holder.
   The battery holder is made to be locked on its way as not to be drawn out completely.



3. Replace battery.
   Set battery on the battery holder.
   Push it in the battery holder and lock it by turning the screw 2-3 times in clockwise direction with screw driver.
   Take caution not to touch the battery with bare hands to prevent poor contact.
   Periodically replace the memory card battery.
   When any new memory card is used, it must be formatted.



Special remarks

- Ensure the battery is installed in the card to preserve stored information.
- Avoid drop or hit it against hard objects. Do not bend the card.
- Do not wet the card.
- Avoid placing under direct sun light and near heating objects.
- Keep the connector clean from dust and dirt.
- Do not touch the connector with bare hand.
- Avoid high temperature and high humidity environment.
- Keep in soft case when not in use to prevent static charge.

Please read the instructions provided by manufacturer carefully.

5. Troubleshooting

5.1 Print Quality Problems

Nothing is displayed on the display	
Check Point	**Remedy**
If power cable is firmly plugged into the power outlet?	Plug power cable again in the outlet firmly.
If power cable is firmly plugged into the equipment?	Plug power cable again in the power connector firmly?
If power cable is damaged?	Replace power cable.
If Fuse on is OK?	Check the fuse at the back of printer. If it was blown, exchange with equivalent fuse. If it is blown again after exchange, contact local dealer.
If current is supplied to the outlet for power supply to the equipment?	Check power source for the power supply outlet. If there is not problem for the power source, check the electricity supply of the building. Check for any power shut down.
Paper feeds, but no printing	
If thermal head is dirty or label sticks on, it?	Clean dirt off from thermal head with cleaning kit if print head is dirty. Avoid using metallic tool which may damage print head.
If genuine label, carbon ribbon exclusively for the equipment are used?	Genuine label, carbon ribbon exclusively for this equipment must be used.
If pitch sensor is dirty?	Clean dirt off from pitch sensor with cleaning kit.
Poor print image	
If label, carbon ribbon are properly set?	Check if label, carbon ribbon are fixed firmly and at correct position by lifting head assembly.

If printing darkness is too light or too dark?	Reset print darkness via user mode setting.
If platen roller is dirty?	Wipe dirt off from the platen roller with cleaning kit.
If thermal head is dirty or label sticks on it?	Clean dirt or label glue off from thermal head with cleaning kit. Remove label if it sticks on the print head. Avoid removing with metallic tool to prevent damage to the print head.
If dirty label is used?	Use clean label.
If genuine label, carbon ribbon exclusively for the equipment are used?	Genuine label, carbon ribbon exclusively for this equipment must be used.
Print image shifts from its position.	
If label, carbon ribbon are properly set?	Check if label, carbon ribbon are fixed firmly and at correct position by lifting head assembly.
If platen roller is dirty?	Clean dirt off from the platen roller with cleaning kit.
If deformed label, carbon ribbon is used?	Use new label, carbon ribbon which are in good conditions.
If genuine label, carbon ribbon exclusively for the equipment are used?	Genuine label, carbon ribbon exclusively for this equipment must be used.
If content of data, signal from the computer are correct?	Reset printer with power off/on. If similar message is displayed, check content of software and communication configuration settings at the computer side.
If print position offset setting is correct?	Adjust print position offset.

5.2 Troubleshooting the RS232C (Serial) Interface

1. Is the RS232C Serial cable connected securely to your serial port on the PC (DB-9S Male) and to the RS232C connector on the printer?

Warning: Never connect or disconnect interface cables (or use a switch box) with power applied to either the printer or the host. This may cause damage to the interface circuitry and is not covered by warranty.

2. Is the cable defective? At the very least, you should be using a "Null Modem Cable," which crosses pins in a specific manner. This should enable your printer to print. We recommend that you use a cable built to specifications described in Chapter 3, Interface Specifications.
3. Check for obvious errors in the data stream. Remember that all print jobs for serial data must be framed by an STX and ETX.
4. If after sending your job to the printer, it only "beeps" (or displays a Framing Error message on the LCD panel), you may have a configuration problem. There may be some inconsistencies with the Baud Rate, Parity, Data Bits, or Stop Bits in relation to your host computer. If you are confused as to what the printer's current RS232 settings are, you may choose the SATO defaults (all DIP switches in the OFF position) to achieve 9600 baud, no parity, 8 data-bits, and 1 stop bit).
5. If you still are unable to get printer output, try the Hex Dump. In this case, the printer monitors its RS232C interface for incoming data.

5.3 Error Signals

LED	LCD MESSAGE	AUDIBLE BEEP	ERROR CONDITION	TO CLEAR
On	MACHINE ERR	1 Long	Machine Error	Switch power ON/OFF
On	HEAD ERR	1 Long	Head	Switch power ON/OFF
On	SENSOR ERR	3 Short	Sensor	Switch power ON/OFF
Blinks	CARD R/W ERR	1 Long	Memory Card Read/Write	Switch power ON/OFF
Blinks	CARD LO-BATT1	1 Long	Memory Card Battery Low	Switch power ON/OFF
Blinks	CARD LO-BATT2	1 Long	Memory Card Battery End	Switch power ON/OFF
Blinks	HEAD OPEN	3 Short	Head Open	Close head lever
Blinks	CUTTER ERR	3 Short	Cutter	Switch power ON/OFF
On	PARITY ERR	3 Short	RS232 Parity Error	Switch power ON/OFF
On	OVERRUN ERR	3 Short	RS232 Overrun Error	Switch power ON/OFF
On	FRAMING ERR	3 Short	RS232 Fra-ming Error	Switch power ON/OFF
On	BUFFER ERR	3 Short	Buffer Overflow	Switch power ON/OFF
Blinks	PAPER END	3 Short	Label End	Open/close Head Reload paper
Blinks	RIBBON END	3 Short	Ribbon End	Open/close Head Reload ribbon
Blinks	MEDIA ERR	3 Short	Media Error	Open/Close Head Lever

6. Maintenance

This equipment is for printing important information in the form of bar code and character.
Periodical preventive maintenance is recommended to keep the printer in good condition.

Timing for maintenance.

Thermal head, platen roller:
After printing every one roll or 150 m of label.

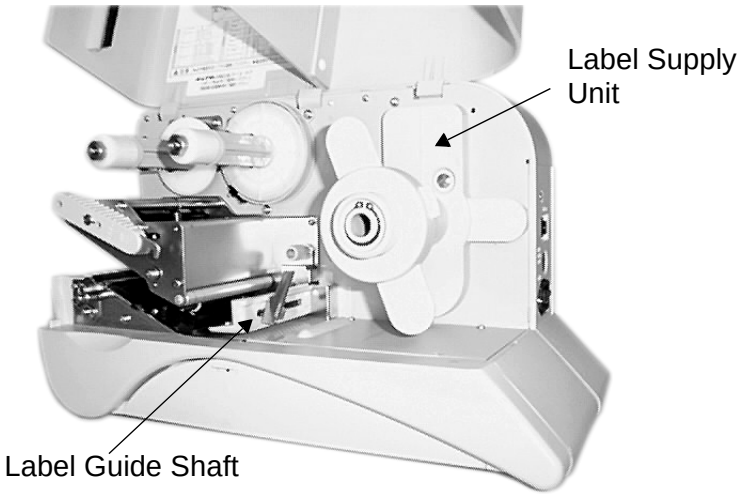
Others:
After printing every 6 rolls or 900 m of label.

Caution for maintenance!

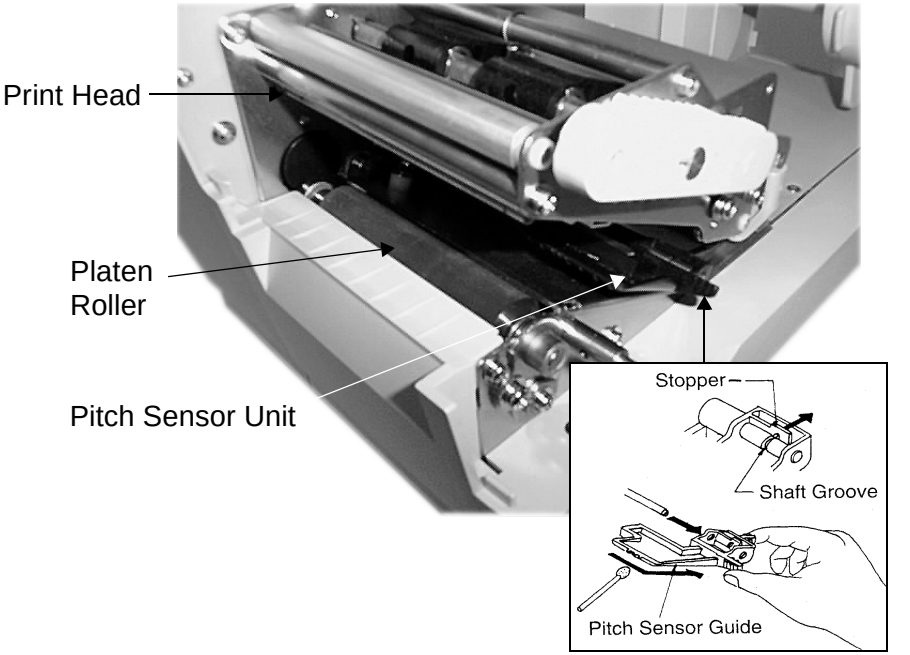
1. **The above recommended cleaning frequency is just an estimation. Do carry out any cleaning when dirt or dust gathered.**
2. **Use applicator and cotton cloth for cleaning each component. Avoid metallic tools to prevent damage to printer parts especially print head.**
3. **Ensure that power is switched off before performing any cleaning.**

Cleaning method for printer parts

Cleaning of label supply unit and label guide shaft unit. Label guide shaft unit can be removed by removing a set screw.



Cleaning for pitch sensor unit. Pull out pitch sensor guide unit and clean its bottom portion. If label stuck, remove pitch sensor guide unit from the shaft groove by pulling the stopper in the arrow direction, pull it out and clean its bottom area.
Print head unit. Clean print head unit and platen roller



Cleaning with rubbing sheet. Usage of rubbing sheet is indicated on the rubbing sheet.

Appendix

MANUFACTURERS DECLARATION OF CONFORMITY

Product identification	Product:	Thermo- / Thermotransfer Printer
	Type:	**DR300**
	Options:	all

Means of conformity
The product is in conformity with the **EMC Directive 89/336/EEC, 92/31/EEC and 93/68/EEC** based on test results using harmonised standards.

standards used:	EN55022 class B,	1998	Emission for ITE
	EN50082 –1,	1992	Generic Immunity Standard for residential, commercial and light industry
	EN61000-3-2,	1995	Current harmonics

Test carried out by: EMC Test Haus Dr. Schreiber GmbH
accredited acc. EN45001
Eiserfelderstraße 316
57080 Siegen

Test report no: 6 / 127

Date: 08.04.1999

The product is in conformity with **Low Voltage Directive 73/23/EEC** based on test results using harmonised standards

standards used: EN60950/A4: 1997

Test carried out by: TÜV Product Service.
Certificate No: AL 98 12 15569 012
Report No: 17G0127
Date: 16.12.98

Manufacturer: Bar Code SATO Electronics (M) Sdn. Bhd.
Lot 20, Jalan 223
46100 Petaling Jaya
Selangor Darul Ehsan Malaysia

EC Representative: SATO Europe GmbH Im Hülsenfeld 13
40721 Hilden Germany

Function: Managing Director SATO Europe GmbH
Date: 27.04.1999

Signature: S. Matsui

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