

DATECS

USER'S MANUAL

**ESC/POS
Thermal Printer
built-in module
DK-2300**



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DATECS DK-2300

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INTRODUCTION

DATECS DK-2300

/// Main Features ///

DATECS DK-2300 is an ESC/POS thermal printer built-in module with 3-inch wide printing mechanism. Its abundant features allow it to be widely used for different applications and working conditions.

DATECS DK-2300 can quickly and easily print text and/or graphics, depending on customer's needs – barcodes, logo, etc.

DATECS DK-2300 has all the features of popular models **Datecs ESC / POS printers**.

Features:

- Small size;
- High speed printing of 130 mm/s;
- Easy paper-loading;
- Paper holder settable to various positions for retaining paper.
- Can be used with 2 types of thermal paper – 78 mm or 58 mm wide;
- High reliability by the use of long-life head and simple mechanism;
- Easy maintenance of head and paper by the use of new head open mechanism:
 - 100 km paper long (100 million pulses) – normal temperature and normal humidity, with recommended paper;
 - 1 million cuts – normal temperature and normal humidity, with recommended paper
- Operating temperature range from – 20°C to +60°C;
- Auto cutter
- PE, PNE, Black mark sensors
- Supports protocol for POS and BARCODE;
- Serial RS232 and USB interfaces;

Parameter	Description	
Printing	Printing Method	Direct thermal
	Printer mechanism	LT2321V
	Auto cutter	ACS-530 (07X103)
	Resolution	203 dpi (8 x 8 точки/mm)
	Dot pitch	Horizontal – 0.125 mm (8 dots/mm) Vertical – 0.125 mm (8 dots./mm)
	Max. Print Width	52 mm (416 dots/line) 72 mm (576 dots/line)
	Font A and Font C	
	Number of characters per line	34 48
		Font B and Font D
		46 64
Media: Roll Thermal Paper	Paper Feed System	Step
	Printing Speed (Max)	130 mm/s (1040 dots/s)
	Paper width, mm	60 80
	Diameter, mm	60, 80, 102 mm
Fonts	Paper thickness, μ m	60-75
	Resident Fonts	Font A: 12 x 24 dots Font B: 9 x 16 dots
	Loadable	Font C: 12 x 24 dots Font D: 9 x 16 dots
Resident Barcodes	1D	EAN 13, EAN 8, UPC A, UPC E, Codabar, Code 39, Code 93, Code 128, Interleaved 2 of 5
	2D	PDF417
Logo Registration	1 Black & White	416 x 272 dots 576 x 272 dots
Emulation	ESC/POS	Continuous paper Mode Label/Black Mark Mode

Parameter		Description
Interfaces	Serial	RS232 – max. 115200 bps
	USB	Virtual COM
Sensors	Paper end (PE) sensor	Optron
	PNE – paper near end	Optron
	Platen holder open sensor	Mechanical
	Auto cutter start position sensor	Mechanical
Input Buffer		128 KB (131072 bytes)
Adapter	Model:	SA165A
	Input:	100 – 240 V ~, 50–60 Hz, 1,5 A
	Output:	24V, 2A, 48W
Weight	Without paper:	1,1 kg
Dimensions (mm)		113 (W) X 182 (D) X 98 (H)
Environment	Operating temperature conditions:	Temperature from -20°C to 60°C Humidity from 35% RH to 85% RH
	Storage temperature conditions:	Temperature from -25°C to 65°C Humidity from 10% RH to 90% RH
Reliability	Printing head:	100 km paper long (100 million pulses) – normal temperature and normal humidity, with recommended paper;
	Auto cutter life:	1 million cuts – normal temperature and normal humidity, with recommended paper
Cables		RS-232 interface cable;
	Option	Mini USB cable A to B cable

SAFETY INSTRUCTIONS

which must be strictly observed!

**Warning**

- Prior to operation, read carefully **DK-2300** safety instructions and save them for later reference.
- During printing or cutter operation, never touch the printer. Otherwise, injury to human body and/or auto cutter breakage may occur.
- Static electricity may cause breakage of IC, etc. in the thermal head. Take sufficient grounding measures.
- Do not pull by force the paper set on the printer.
- Do not touch the heating element of the print head by hands. Otherwise, printing quality may be degraded by dirty fingers
- Do not use metal objects nor sandpaper to clean the print head.
- There is a cutter inside the paper exit. Never insert fingers into the paper exit not only during printing, but also in non-operating state.
- Avoid printing with head surface wetted by dew condensation, etc..
- Set paper straightforward without slack.
- Use the printer in the stable without vibrations.
- Clean regularly the platen.
- Press the center part or both sides to close the platen holder securely.
Closing the platen holder with one side pressed may cause single side closure, resulting in uneven printout.
- Do not drop or put foreign matter, such as clips and pins into the printer. This may cause problems.
- Do not use a paper, other than recommended.
- During printing and just after printing, the temperature of print head and its periphery rise high. Never touch these places to avoid burning.
- Do not disassemble or modify the printer.

DATECS NOTICE





- Before use, be sure to read this manual. And keep it handy for reference when needed.
- **DATECS** reserves the right to change the content of this manual without prior notice.
- Reproduction, transfer, or transmission of the contents of this manual without prior consent is strictly prohibited.
- **DATECS** is not liable for any problems resulting from the use of optional products and consumable supplies other than the designated products contained herein.
- Do not handle, disassemble or repair the parts other than those specified in this manual.
- **DATECS** is not liable for any damage caused by user's erroneous use of the printer and inadequate environment.
- Data residing in the printer is temporary. Therefore, all data will be lost if power is lost. **DATECS** is not liable for any damage or loss of profits caused by data loss due to failures, repairs, inspections, etc.
- Please contact us if there are any mistakes or ambiguities within this manual.
We would be grateful!

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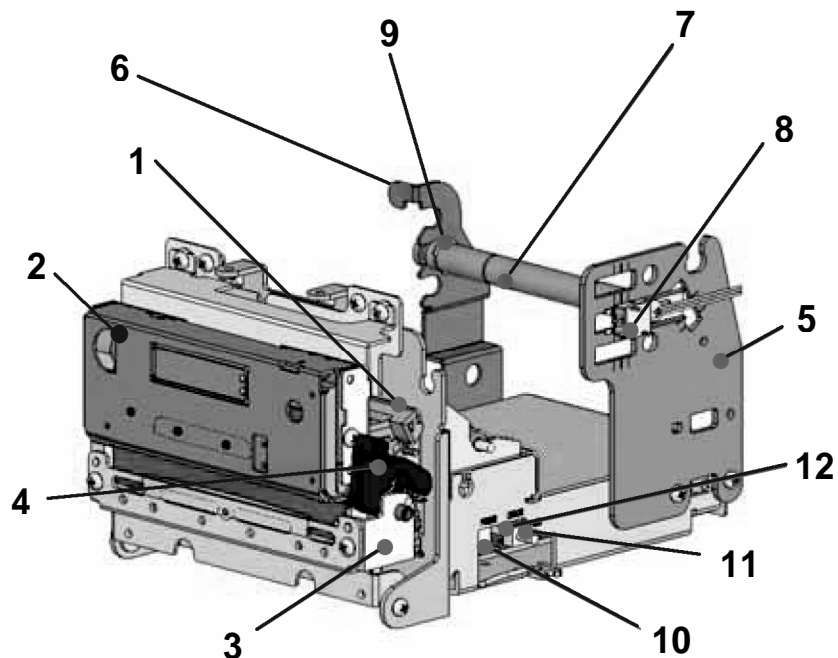
Confirmation of Carton Contents

DATECS DK-2300

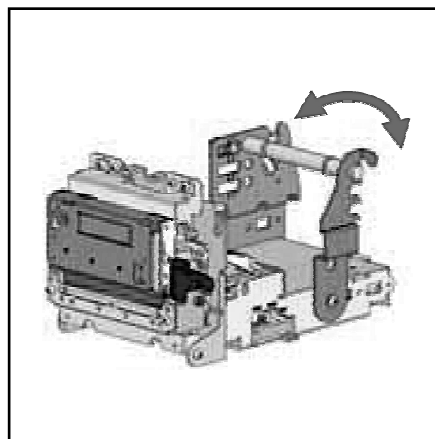
When unpacking the printer, check carefully that the following accessories are included in the carton:

Item	Part Name
1	Thermal printer built-in module DK-2300 
2	Adapter (Input:100 – 240 V ~, 50–60 Hz, 1,5 A Output: 24V, 2A, 48W) 
3	A test roll of thermal paper 
4	User's Manual 
5	RS232 Interface cable

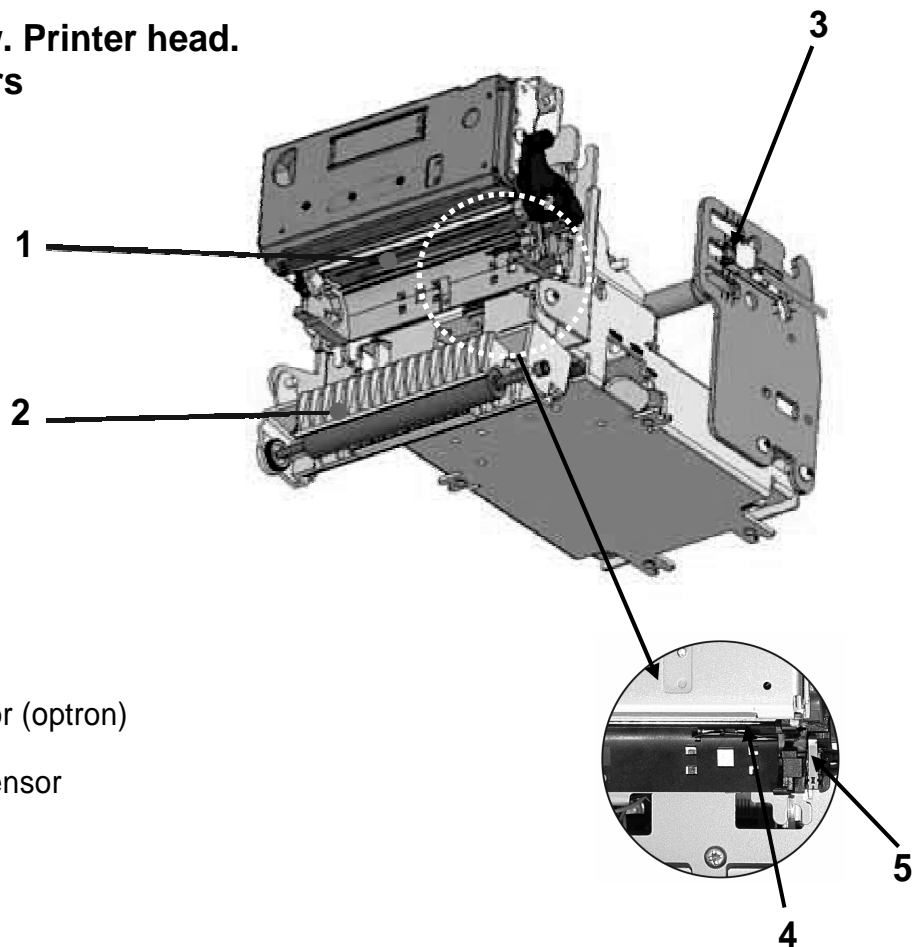
Main View. Components.



- ① Printer mechanism
- ② Auto cutter
- ③ Platen holder
- ④ Platen open lever
- ⑤ Paper holder
- ⑥ Shaft stopper
- ⑦ Paper shaft
- ⑧ Paper near end (PNE) sensor (optron)
- ⑨ E-ring
- ⑩ POWER and ERROR LEDs
- ⑪ FEED button
- ⑫ Operation unit



**Front view / right view. Printer head.
Platen holder. Sensors**

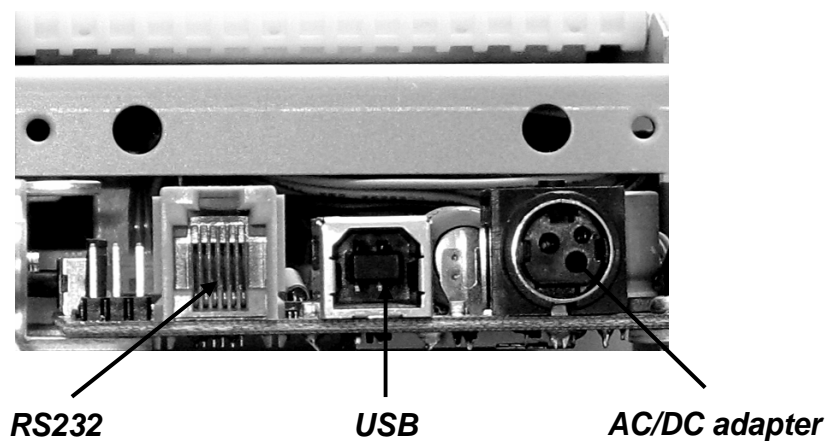


- ① Printer Head
- ② Platen
- ③ PNE sensor (optron)
- ④ PE (paper end) sensor (optron)
- ⑤ Platen holder open sensor (mechanical)



To open the platen holder press the blue lever to unlock. Conversely, to close the platen holder – press holder until you hear a click (lock).

Rear view / connections



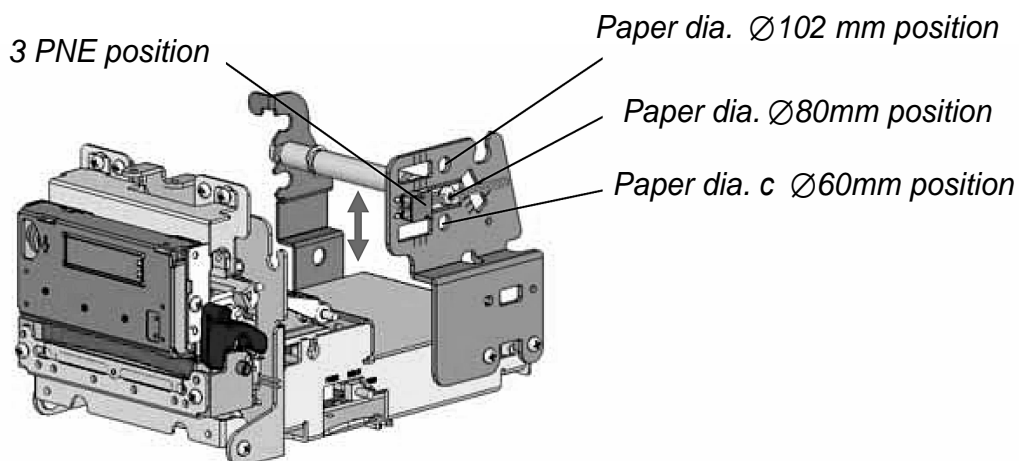
RS232

USB

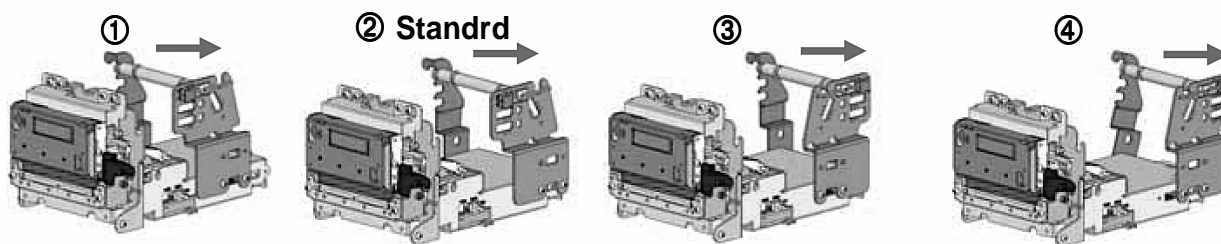
AC/DC adapter

Paper shaft and PNE sensor position

3 options for positioning the paper shaft and PNE sensor in a vertical direction



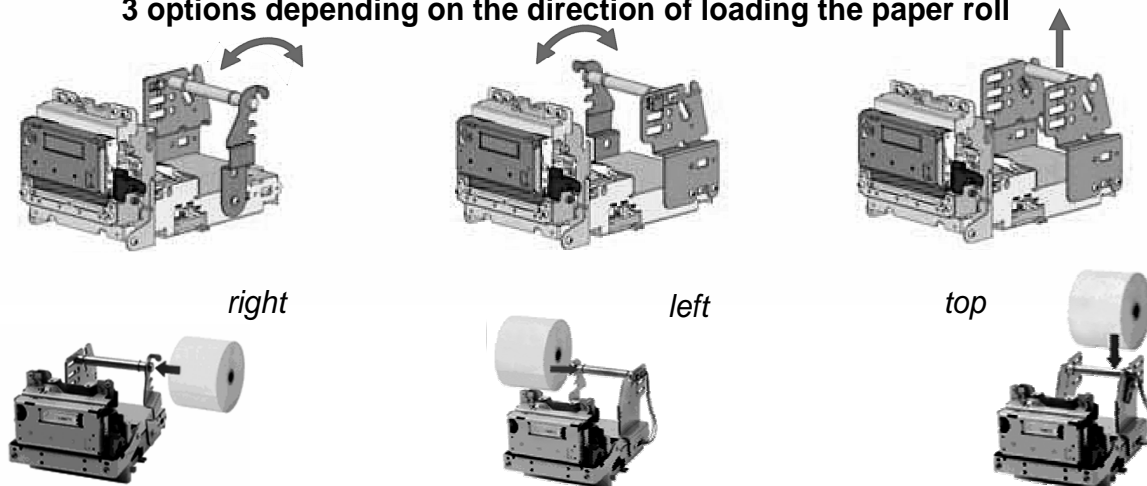
4 options for positioning the paper holder in horizontal direction



① – 1 position in forward ③ – 1 position back;
④ – 2 position back.

* To realize positioning ③ and ④ turn the holder.

3 options depending on the direction of loading the paper roll



FEED button Functions

button	Functions	
FEED	1. Pressing FEED button – feeding the media while the button is pressed, after releasing the button the feeding stops.	
	2. Holding FEED button when power on	SHORT SELF TEST print.
	3. Holding FEED button while power on for ~ 2.5 sec and releasing it after the 2-beep .	It starts Hex DUMP mode . All input data are printed hexadecimal and as text.
	4. Holding FEED button while power on for ~ 4.5 sec and releasing it after the 3-beep .	LONG SELF TEST print.
	5. Holding FEED button while power on for ~ 6.5 sec and releasing it after the 4-beep .	Entering hardware setup mode (hardware menu)
	6. Holding FEED button while power on for more than 8.5 sec and releasing it after the 5-beep 4-tone beep .	Program mode – loading the printer firmware.
	7. Resume the printing after loading a new paper roll.	
	8. At the time of cutter lock error, pressing the FEED button after removing the cause of the error can clear the error.	

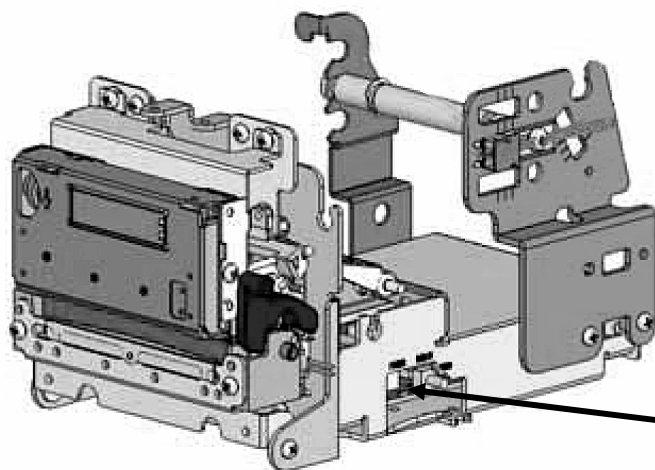
LEDS

LED	Function
POWER	<p>1. It lights green – the printer power is on.</p> <p>2. It blinks green – the printer thermal head is overheated. The printer stops printing. When the printer head temperature returns to normal the POWER LED lights green and the printer continues to print.</p>
ERROR	<p>1. Blinks red (once per second) – paper near end or paper end.</p> <p>2. Blinks red (3 times per second) – the auto cutter is. After removing the auto cutter failure the ERROR LED stops blinking and the printer continues to print.</p> <p>3. Lights red when the platen holder is opened.</p>

DIP switches

DIP Switches Location

The DIP switches location is shown in the illustration below:



The DIP switches are located on the main board

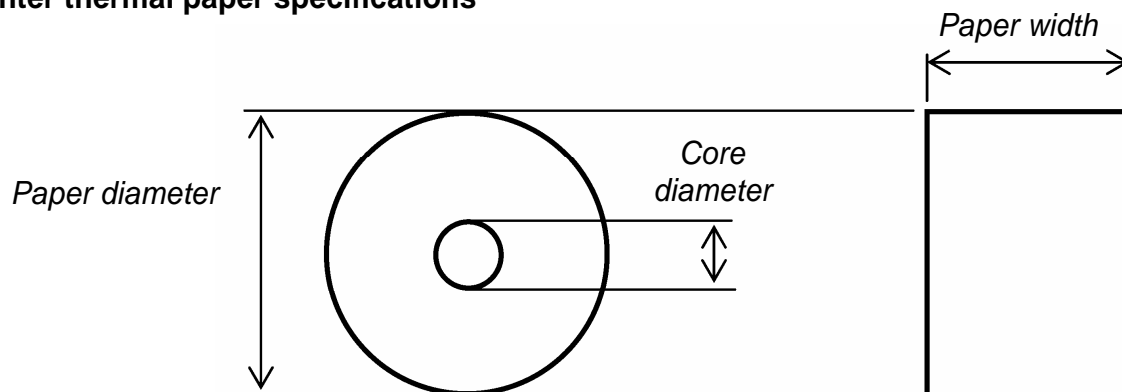
DIP Switch Settings

Sw1	Sw2	Sw3	Baud rate (bps)
OFF	OFF	OFF	1200
OFF	OFF	ON	2400
OFF	ON	OFF	4800
OFF	ON	ON	9600
ON	OFF	OFF	19200
ON	OFF	ON	38400
ON	ON	OFF	57600
ON	ON	ON	115200

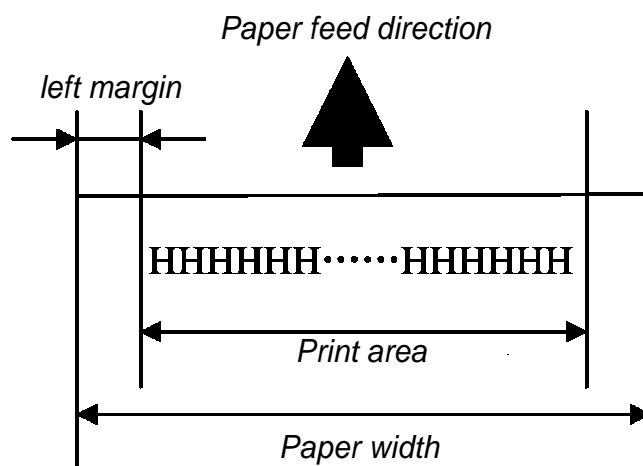
Switch	OFF	ON
Sw4	Hardware protocol	Xon/Xoff protocol
Sw5	Standard commands	Extended commands
Sw6	Automatic cutter disabled	Automatic cutter enabled
Sw7	Standard mode	Protocol mode
Sw8	Continuous paper mode	Label mode

Paper loading

Printer thermal paper specifications



1. Paper width – 60 +0, -1 / 80 +0, -1 mm
2. Paper diameter – $\varnothing 102$ mm max ($\varnothing 25$ mm min)
3. Paper thickness – 60 μm до 75 μm
4. Core diameter – inner: $\varnothing 12$ mm / external: $\varnothing 18$ mm ± 1
5. Print area:



Paper width, mm	Left margin, mm	Print area, mm
60 +0, -1	3 ± 2	54
80 +0, -1	4 ± 2	72

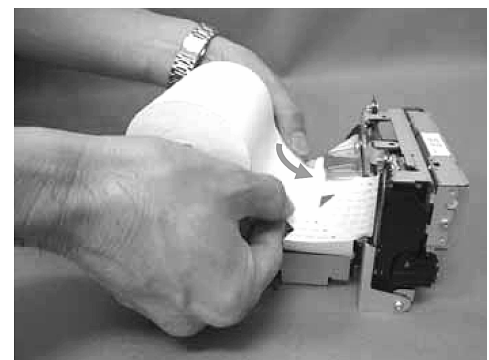
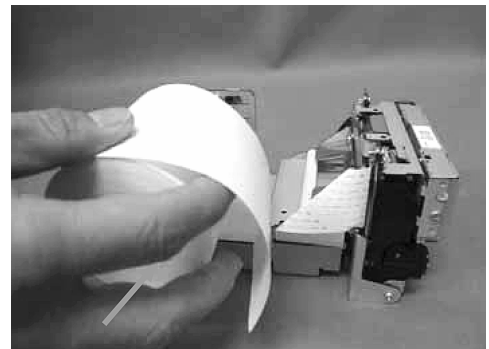
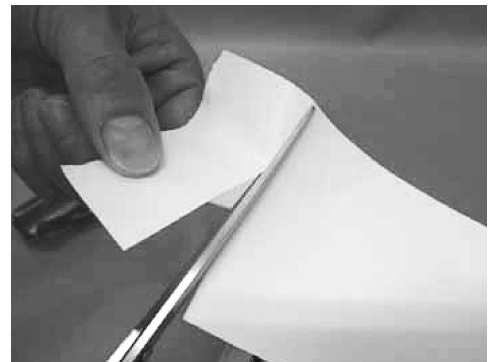
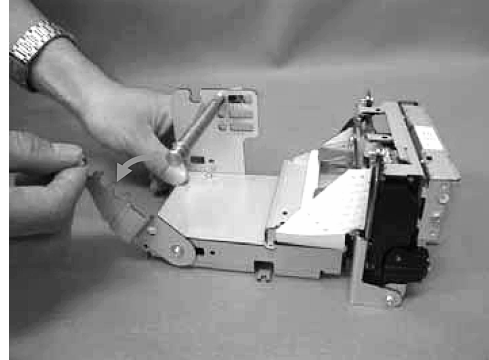


It is necessary to change the settings of the print density, depending on the paper type and paper thickness.

Replacing paper

Replacing paper in the following procedures:

1. Remove the shaft stopper.
If paper core remains, remove it.
2. If the end of the replacement paper is uneven, cut it straight by scissors.
3. Observing the direction of paper winding, set the paper to the paper shaft till the core hooks the E-ring. Then press in the shaft stopper till it is locked.
4. Insert the paper end into the paper slot. Press the **FEED** button to feed the paper and to remove 12 mm or more of the media outside of the printer



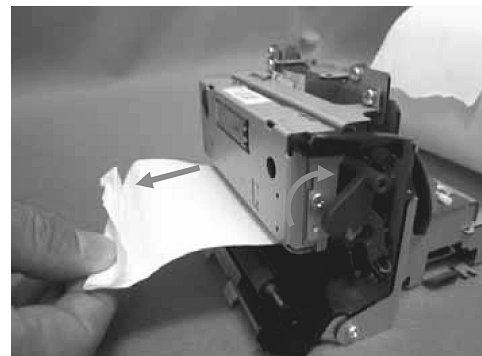
Removing Paper Jam

Remove paper jam in the following procedure:

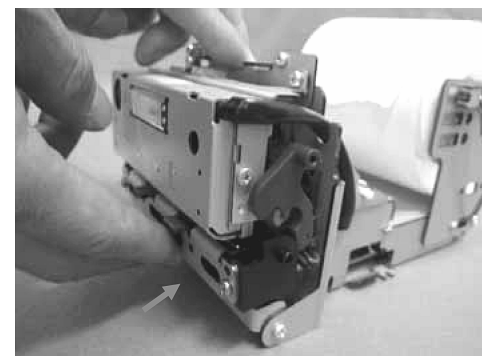
1. Cut the paper.



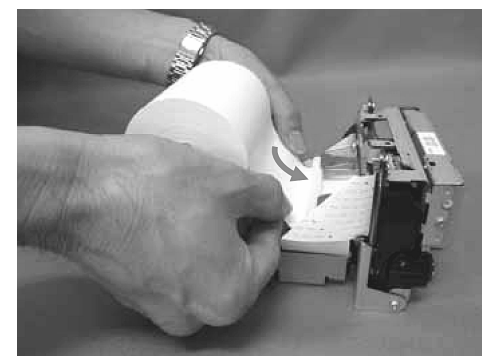
2. Open the platen holder and remove the cause of the paper jam.



3. Close the platen holder.
Push until it lock firmly.



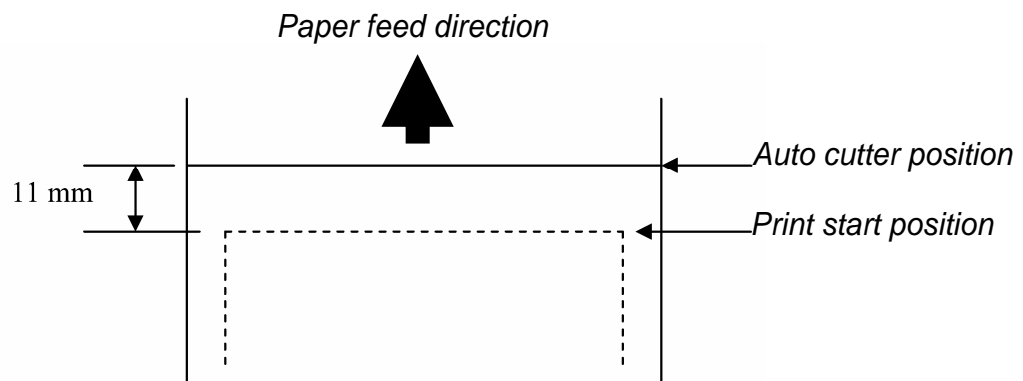
4. Load the paper.
Press **FEED** button to feed the paper and remove 12 mm (or more) of it outside of the printer.



Auto cutter

Auto cutter specifications

- | | |
|----------------------|---|
| 1. Cutting method: | Slide cutter (V-shaped movable blade) |
| 2. Cutting mode: | Full cutting (Cut down), supporting partial cutting (uncut at once point) |
| 3. Cutting duty: | 20 cuts/min (max) |
| 4. Paper thickness: | 60 μm to 75 μm |
| 5. Cutting position: | Approx. 11 mm between print position and cutting position |



- | | |
|----------------------------|--|
| 6. Minimum cutting length: | 30 mm |
| 7. Error detection: | Home position detection by mechanical sensor |



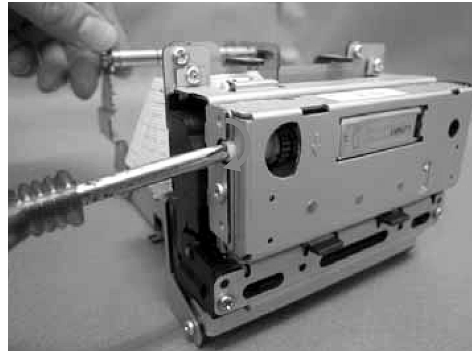
Allow for sufficient margin in setting the cutting position of the cutter in consideration of warp or variation in paper.

A margin of more than 5 mm is recommended between print end and cutting position.

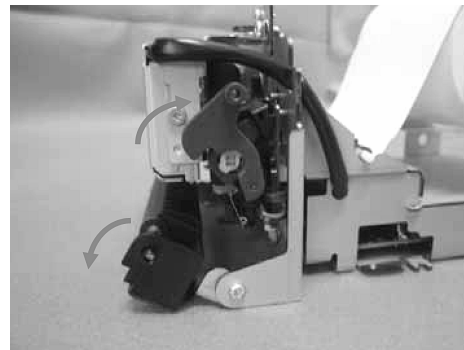
Releasing Cutter Lock (Cutter Error)

Use the follow procedure to release the cutter lock (cutter error):

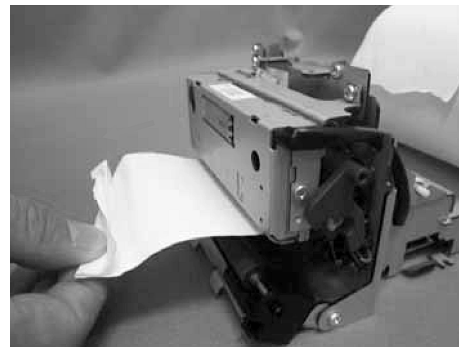
1. Press the **FEED** button to try to release the cutter lock.
If it is not possible, rotate the cutter motor by using a screwdriver to have the cutter blade rested. Press the **FEED** button to return the cutter to a normal position.



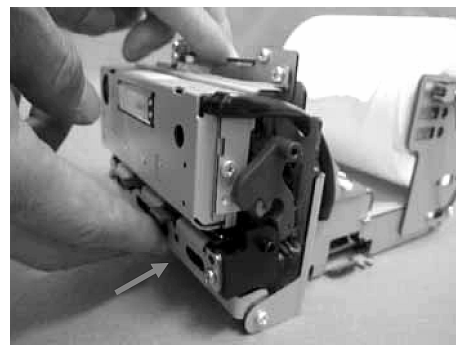
2. Open the platen holder.



3. Remove the cause of the cutter lock as paper jam etc.



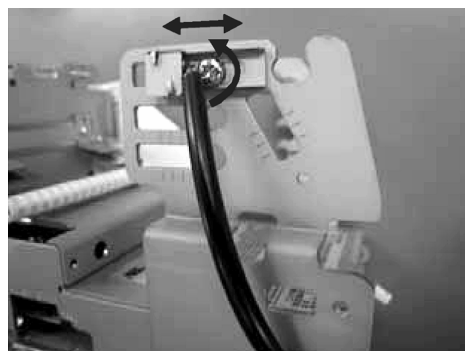
4. Close the platen holder.
Push the platen until it locks firmly.
Press the **FEED** button to feed the paper and to remove it outside of the printer..



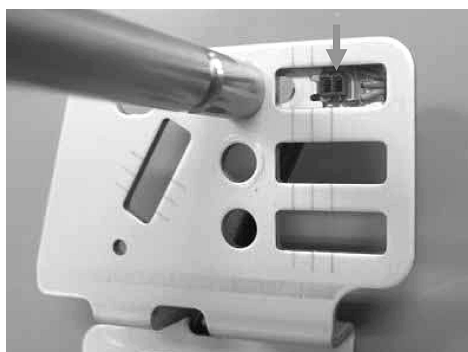
Setting PNE (Paper Near End) sensor

Use the following procedure to set **PNE** sensor:

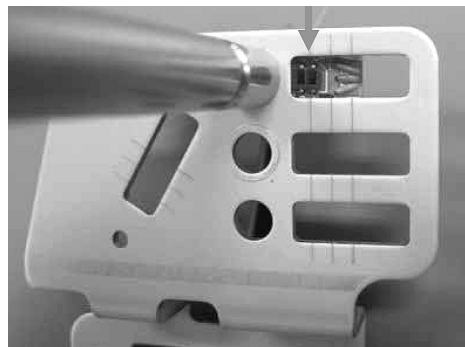
1. Holding the paper shaft by hand, loosen the screw a little. Shift the PNE sensor position (using the Δ mark and the scale). When the sensor position is determined, tighten the screw by holding the paper shaft by hand.



Setting example



*Position to detect PNE
with much paper remaining*

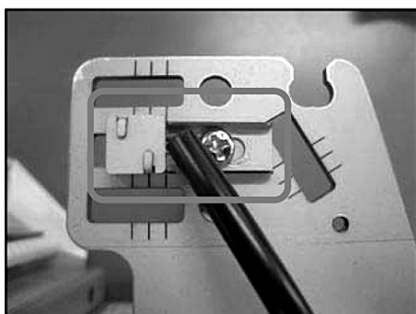


*Position to detect PNE
with little amount of paper remaining*

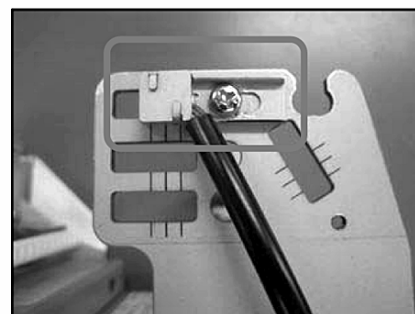
PNE sensor settings for working with different diameters of the paper roll:
(60 mm, 80 mm, 102 mm)



Paper dia. $\varnothing 60$ mm position



Paper dia. $\varnothing 80$ mm position



Paper dia. $\varnothing 102$ mm position

SELF TEST printing

Short SELF TEST

Press the **FEED** button, while Power On the printer, and then release the **FEED** button. The printer will print a **Short Self Test**, which contains **information about**:

- Printer's model; Firmware version;
- Interface;
- Baud rate;
- Flow control;
- USB mode;
- Black Mark mode;
- Protocol mode;
- Reader module;
- Intensity;
- Temperature;
- Date and Time;
- Switches.

Long SELF TEST

Press and Hold the **LF** button, while Power On the printer. Release – **after ~ 4.5 sec and after the 3-beep**. The printer will print a **Long Self Test**, which **contains additional information about**:

- Resident font sizes;
- Characters per line;
- Text formatting;
- Resident character set;
- Resident barcode symbols;
- Printer's configuration

Troubleshooting **DK-2300**

If you're having printing problem refer to the table below for possible causes:

No	Problem	Possible Causes
1.	Paper feeds after issuing a print job, but no printed text visible on paper.	Thermal media is specially coated on outside of roll. Remove paper roll and reload properly. See section "Loading Paper" for details on loading paper.
2.	ERROR LED blinks red (once per second)	Paper end (The printer is out of paper) or paper near end. Load a new paper roll, as is described in the section " Loading Paper ".
		Paper cover not installed properly. See section " Loading Paper " for details on replacing paper cover.
		Thermal media not imaging correctly. Verify that you are using the recommended thermal media.
3.	ERROR LED blinks red (3 times per second)	The auto cutter is locked. Try to return the cutter to normal position, pressing FEED button. If it is not possible to do it, follow the procedures, described in the section " Releasing Cutter Lock (Cutter Error) ".
4.	ERROR LED lights red	The platen holder is opened. Close the platen holder. (Push the platen until it locks firmly).
5.	POWER LED blinks green and the printer stops the printing	The printer thermal head is overheat. When the printer head temperature returns to normal the POWER LED lights green and the printer continues to print.
6.	Printing is light or missing only on half of the print width.	The platen holder is not properly closed. See section " Loading Paper ".
		If the platen holder is closed properly and the problem persists, contact technical support
7.	Bad print	Verify that you are using the recommended thermal media.
		The power supply does not match to the specified for this printer. Check the power.

No	Command	Description
1	BEL	Sounds the buzzer
2	HT	Horizontal Tab command
3	LF	Printing a line and Paper Feeding command
4	FF	Printing and paper feeding to the black mark position
5	CR	The operation of the command depends on the state of the configuration flags 2, 3 and 4
6	DC2 =	Image LSB/MSB select
7	DC3 (DC3 (Ruled line) commands sequence start
8	DC3 +	Sets the ruled line ON
9	DC3 -	Sets the ruled line off
10	DC3 A	Selects ruled line A
11	DC3 B	Selects ruled line B
12	DC3 C	Clears selected ruled line buffer
13	DC3 D	Sets a single dot in selected ruled line buffer
14	DC3 F	Ruled line pattern set
15	DC3 L	Ruled line line set
16	DC3 M	Selects ruled line combine mode
17	DC3 P	Ruled line 1 dot line print
18	DC3 p	Ruled line n dots line print
19	DC3 v	Ruled line image write
20	CAN	Canceling print data in page mode
21	ESC FF	Printing data in page mode
22	ESC RS	Sounds the buzzer
23	ESC SP	Setting character spacing
24	ESC #	Setting EURO symbol position
25	ESC \$	Specifying the absolute horizontal position of printing
26	ESC %	Selecting/Canceling the printing of downloaded user character sets
27	ESC &	Selecting user character set
28	ESC !	Specifying printing mode of text data
29	ESC *	Printing graphical data

No	Command	Description
30	ESC -	Selecting/Canceling underlining
31	ESC .	Printing self test/diagnostic information
32	ESC 2	Specifying 1/6-inch line feed rate
33	ESC 3	Specifying line feed rate n/203 inches
34	ESC <	Changes print direction to opposite
35	ESC =	Data input control
36	ESC >	Selecting print direction
37	ESC @	Initializing the printer
38	ESC CAL	Black mark mode sensor calibration
39	ESC D	Setting horizontal tab position
40	ESC E	Specifying/Canceling highlighting
41	ESC F	Filling or inverting the page area in page mode
42	ESC G	Specifying/Canceling highlighting
43	ESC I	Specifying/Canceling Italic print
44	ESC J	Printing and Paper feed n/203 inches
45	ESC L	Selecting page mode
46	ESC M	Selecting character font – A, B, or B1
47	ESC R	Selecting country
48	ESC T	Printing short self test
49	ESC U	Selecting/Canceling underlined printing
50	ESC V	Selecting/Canceling printing 90° right turned characters
51	ESC W	Defining the print area in page mode
52	ESC X	Specifying max printing speed
53	ESC Y	Selecting intensity level
54	ESC Z	Returning diagnostic information
55	ESC \	Specifying relative horizontal position
56	ESC]	Loading the default settings stored in Flash memory
57	ESC ^	Saving current settings in Flash memory
58	ESC _	Loading factory settings
59	ESC `	Reading the Battery Voltage and Thermal head temperature

List of commands for ESC/POS Mode

DATECS DK-2300

№	Command	Description
60	ESC a	Aligning the characters
61	ESC b	Increasing text line height
62	ESC c5	Enabling/Disabling the functioning of the button LF
63	ESC d	Printing and feeding paper by n- lines
64	ESC i	Feeding paper backwards
65	ESC m	Paper cutting
66	ESC o	Temporarily feeding paper forward
67	ESC r	Full command for sounding buzzer
68	ESC s	Reading printer settings
69	ESC u	Selecting code table
70	ESC v	Transmitting the printer status
71	ESC {	Enabling/Canceling printing of 180°turned characters
72	GS FF	Printing in page mode and returning to standard mode
73	GS \$	Specifying the absolute vertical position in page mode
74	GS (A	Printing a self-test
75	GS)	Setting printer flags (memory switches)
76	GS *	Defining a Downloaded Bit Image (logo)
77	GS /	Printing a Downloaded Bit Image
78	GS :	Starting/ending macro definitions
79	GS B	Enabling/Disabling inverse printing (white on black)
80	GS C	Read the Real Time Clock
81	GS H	Selecting printing position of HRI Code
82	GS L	Setting the left margin
83	GS Q	Printing 2-D barcodes
84	GS R	Filling or inverting a rectangle in page mode
85	GS S	Selecting 2-D barcode cell size
86	GS T	Selecting the print direction in page mode
87	GS U	Selecting standard mode
88	GS V	Paper cutting
89	GS W	Setting the print area width

№	Command	Description
90	GS X	Drawing a rectangular box with selected thickness in page mode
91	GS Z	Printing the non blank page area only in page mode
92	GS \	Specifying the relative vertical position in page mode
93	GS ^	Executing macro
94	GS c	Setting the Real Time Clock
95	GS f	Setting the font of HRI characters of the barcode
96	GS h	Setting the height of the barcode
97	GS k	Printing a barcode
98	GS p	Settings for 2D barcode PDF417
99	GS q	Selecting the height of the module of 2D barcode PDF417
100	GS v 0	Printing a raster bit image
101	GS w	Selecting the horizontal size (Scale factor) of the barcode
102	GS x	Direct text print in page mode



* For details about commands for ESC/POS mode see Programmer's User.