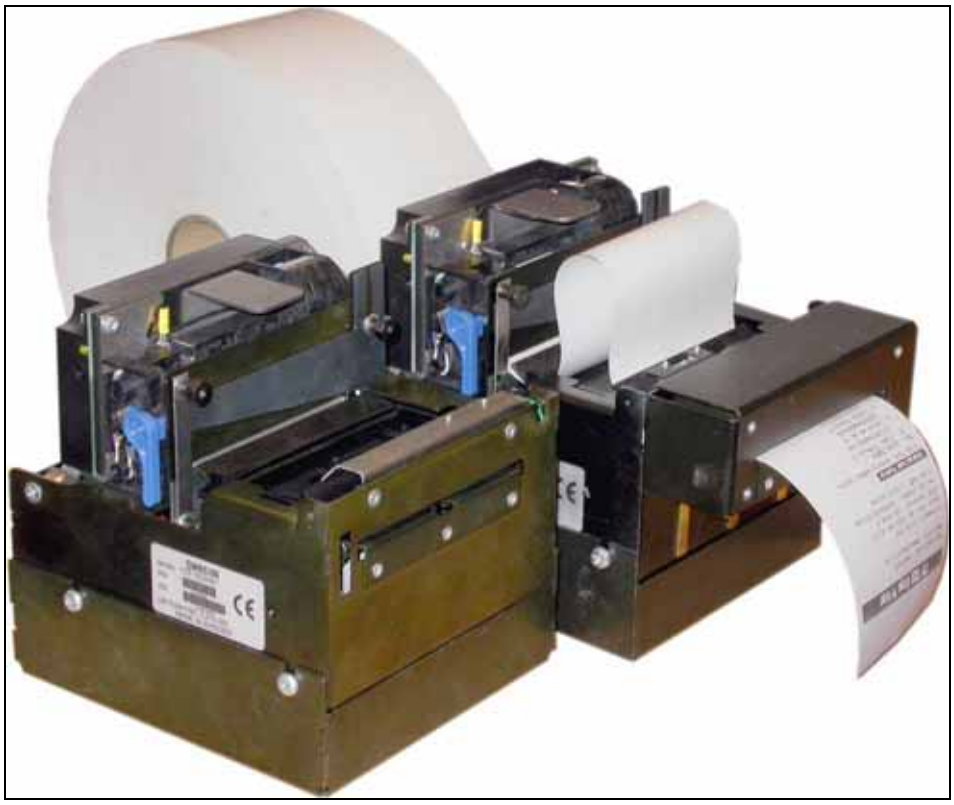
TTP 7020/7030 Kiosk Printer

Technical Manual



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SWECOIN

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REVISION HISTORY

Edition B, major changes

This edition describes firmware version 1756-250.

Obsolete commands ESC C, ESC c, ESC f, ESC M, ESC x, ESC Y, ESC 3, ESC F, SEC SI, ESC SO, SI, SO, ESC S, ESC V, ESC q, have been removed from the manual.

Edition C, major changes

This edition describes firmware version 1756-300.

1 INTRODUCTION

1.1 About this manual

This manual contains the information required to install the TTP 7020 and TTP 7030 printers and to run them from a host computer such as a PC.

Chapter 5 gives the applicable control codes and escape sequences supported by the printer processor firmware.

Other chapters of the manual contain information about the printer error codes, communications-parameters, test print functions, specifications, replacement parts, etc.

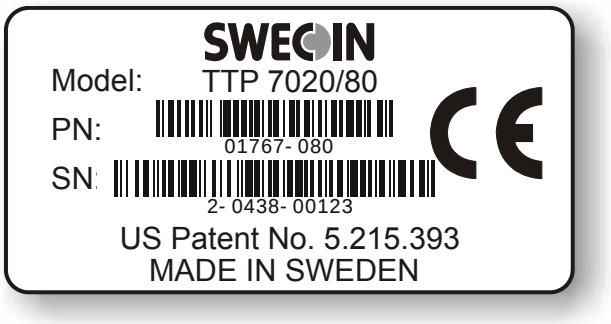
1.2 Updating

This manual will be updated as, from time to time, printer functions and features may be added or amended. You will always find the latest edition on our web site (www.swecoin.se). You can order printed copies of the current manual by e-mail, fax, or phone.

If you require functions not found in the manual edition at your disposal, you are welcome to consult one of our representatives for information.

1.3 Identification labels

A type label is positioned on the side on the left side of the printer (side of the blue lever).



The type plate shows the model No. of the printer, the part number and serial number as both Code 128 bar codes and readable text. The Serial number contains three groups:

2- 0438- 00123

2 shows which factory the printer was manufactured in.

- 0438 means week 38 of year 04, that is September 13 to September 17 2004. This is for example used to determine if warranty is valid for this printer or not.

-00123 is the serial number of the printers produced that week.

2 PRODUCT PRESENTATION

The TTP 7020 and TTP 7030 are kiosk printers using direct thermal printing. The print speed is up to 75 mm per second.

The printers have integrated control boards. TTP 7020 communicates with the host computer through an IEEE-1284 bi-directional parallel port, while TTP 7030 uses the USB interface. Both TTP 7020 and TTP 7030 can be equipped with an optional serial port.

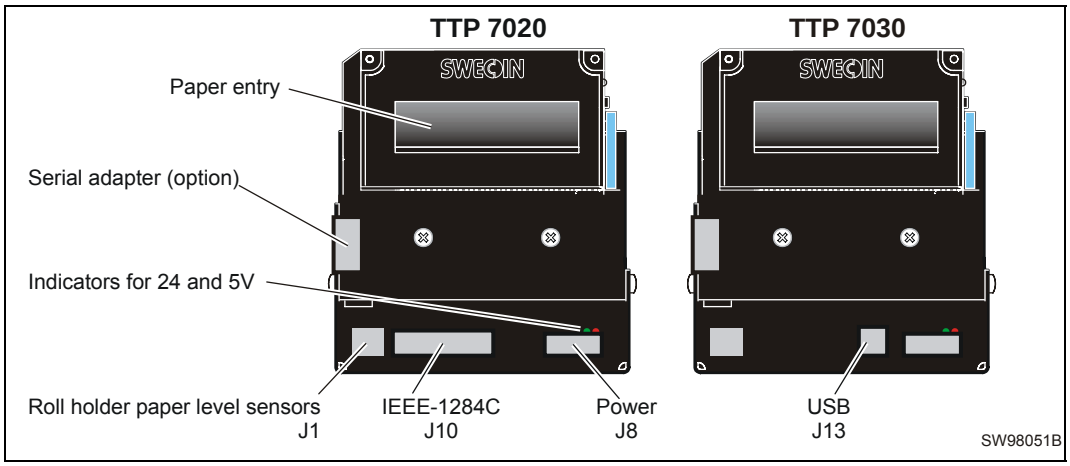


Figure 1. Printer exterior, rear view

Printer drivers for Linux and Microsoft Windows™ are available, and the printer is compatible with the Plug and Play standard. It is also possible to address the printer directly from the kiosk software without using drivers.

The loop generating presenter mechanism handles documents of various lengths. It holds the printout until printed, then cuts and presents the complete printout to the customer. The retract-and-retain version of the printer can retract uncollected printouts into a wastebasket inside the kiosk.

A flip-up print module gives the operator access to the paper path, and print head, for maintenance purposes.

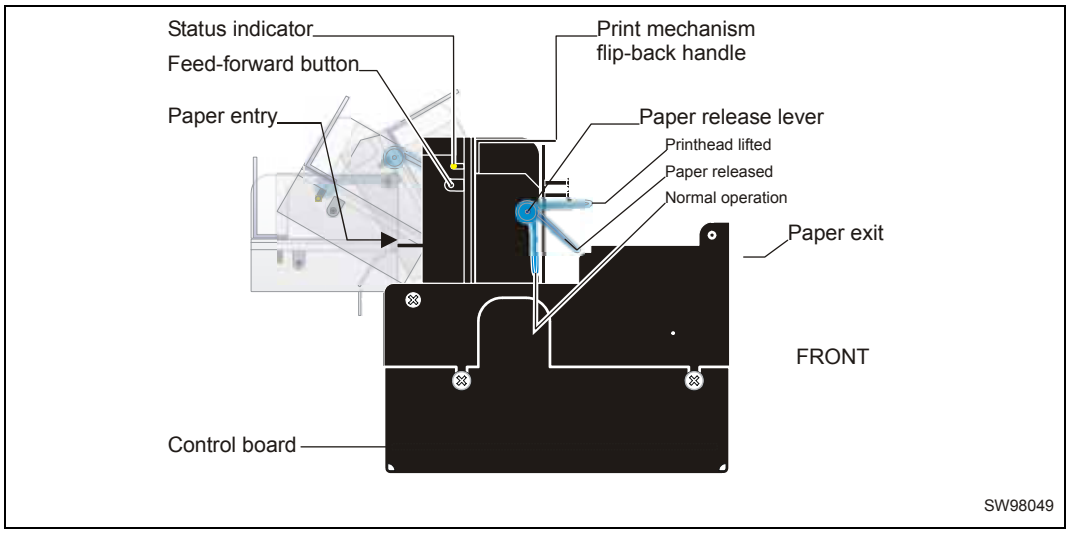


Figure 2. Printer exterior, side view

2.1 Indicators

2.1.1 Status indicator

- The status indicator (see Figure 1) has several functions:

  ON constantly — the printer is operational

  Blinks, pauses, blinks — indicates warnings of non-severe error. The number of blinks reflects the *warning-code*:

  2 Paper low[1]
  3 Weekend low[1]

  Warning-codes are reset automatically when the condition causing them are removed.

  Flashes rapidly — indicates severe error. Hold down the feed-forward button and the number of blinks will reflect the *error-code*.

1	Presenter jam, paper cannot be ejected / retracted
2	Cutter cannot return to home position
3	Out of paper
4	Printhead lifted
5	Paper wrapped around platen (under head)
6	Temp error >60°C
7	Presenter jam, motor cannot rotate
Fast flashes	Checksum error, firmware
Steady light	Wrong firmware type or target for firmware loading

  Error-codes are reset:

  1 When the conditions causing them are removed
  2 When the printer is turned off/on
  3 When the **blue** printhead release arm is lifted and then lowered.

2.1.2 Control board indicators

The control board has two power indicators behind the power connector.

- Green indicator constantly ON: 24 V present
- Red indicator constantly ON: 5 V OK (generated on control board)

2.2 Feed-forward (FF) button

- Feed, cut, and present a complete page.
  Any data in the print buffer will be printed. If the buffer is empty the page will be blank.
  In black mark mode, the page will be synchronized with the black mark.
- Press and hold while turning on the power, or while opening and closing the printhead to print a self-test printout. See page 13.

[1] This signaling is disabled by default. It can be disabled/enabled by setting parameter p52

3 INSTALLATION

3.1 Installation considerations

The TTP 70x0 printer should be installed in some kind of enclosure such as a self-service kiosk. The illustration below gives an example of a printer-mounting shelf. See also "Printer dimensions" on page 79. 3D solid models and outline drawings for CAD are available on www.swecoin.se.

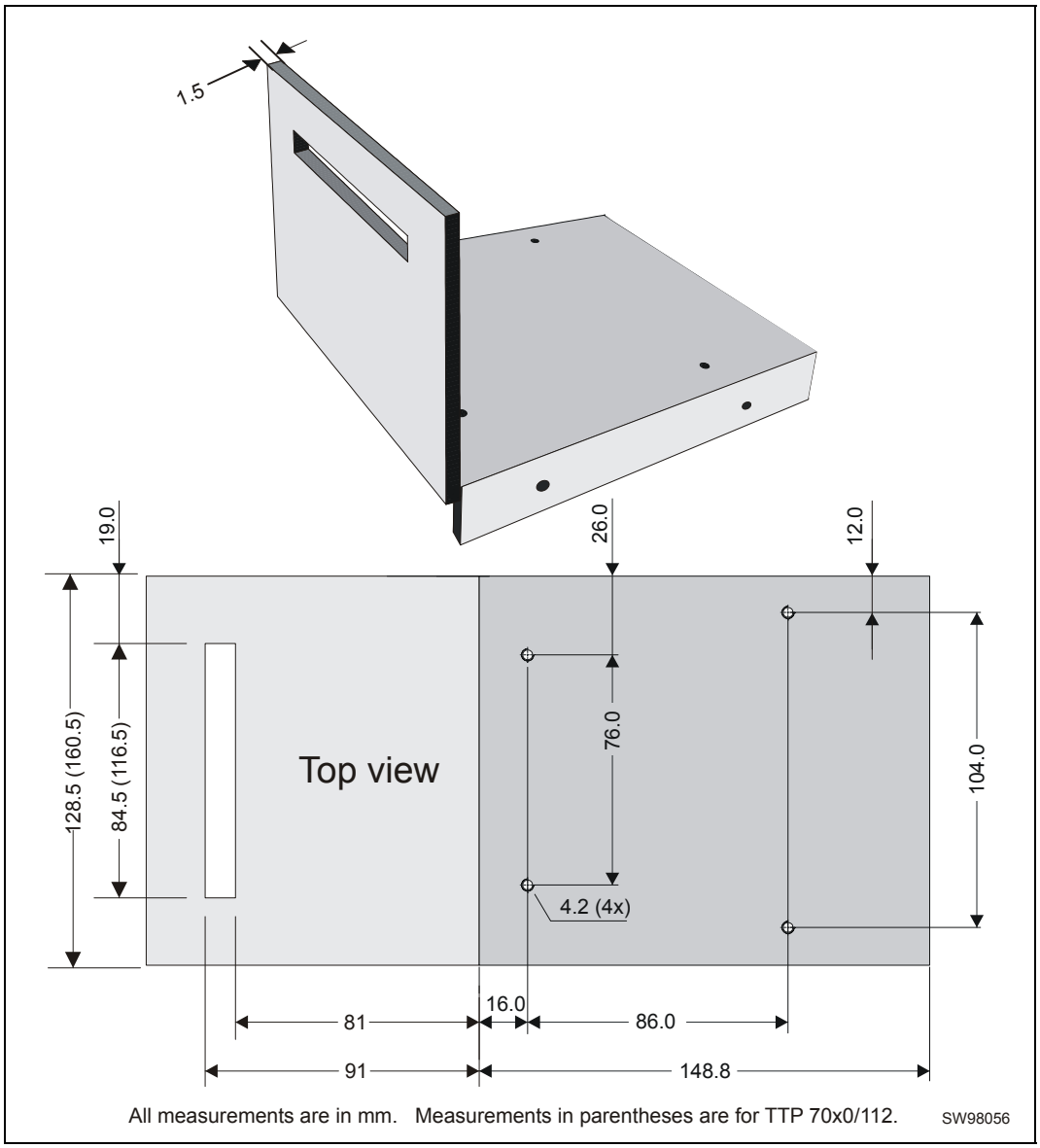


Figure 3. Example of a simple shelf for fastening a standard printer

Additional space is required for paper loading and paper jam removal. Consider mounting the printer on a movable platform so that the printer can be maintained outside the kiosk enclosure.

3.1.1 Electrostatic discharges, and earth currents

Preventing ESD and earth currents from affecting the printer operation requires proper connection of the printer chassis to protective earth through a mounting platform or through a separate earth conductor.

3.1.2 Ambient light

There is an optical sensor just inside the paper exit at the front of the printer.

To ensure proper printer operation, design the printer enclosure so that it prevents direct sunlight or light from indoor lamps from reaching the sensor through the paper exit.

3.2 Connecting to the computer

3.2.1 TTP 7020

Connect the printer to the parallel port of the computer to be used.

Connector J10 is an IEEE-1284 type C, 36-pole mini Centronics, with clip latches. See page 64 for pin assignment of J10.

Use only certified cables marked IEEE-1284. See page 82 for Swecoin ordering number. You can also use commercially available cables such as AMP 158393-3.

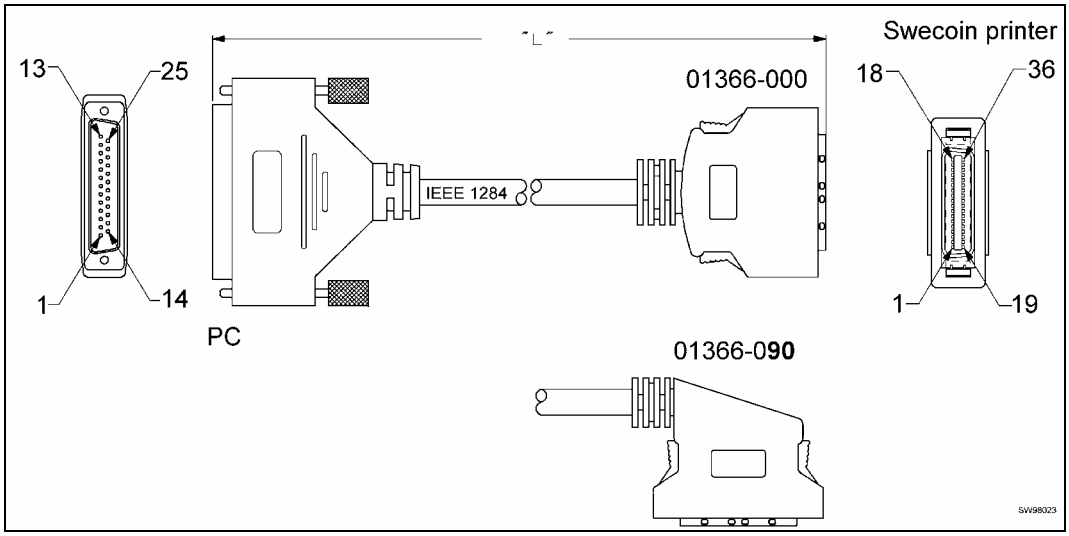


Figure 4. IEEE-1284 cable with type A and type C connectors

3.2.2 TTP 7030

Connect J13 of the printer to the USB port of the computer or the USB hub to be used. USB connectors can be recognized by the following symbol: .

Connector J13 is a 4-pin USB type B connector. See Table 7 for pin assignment.

A suitable cable is available from Swecoin, see page 82 for ordering number.

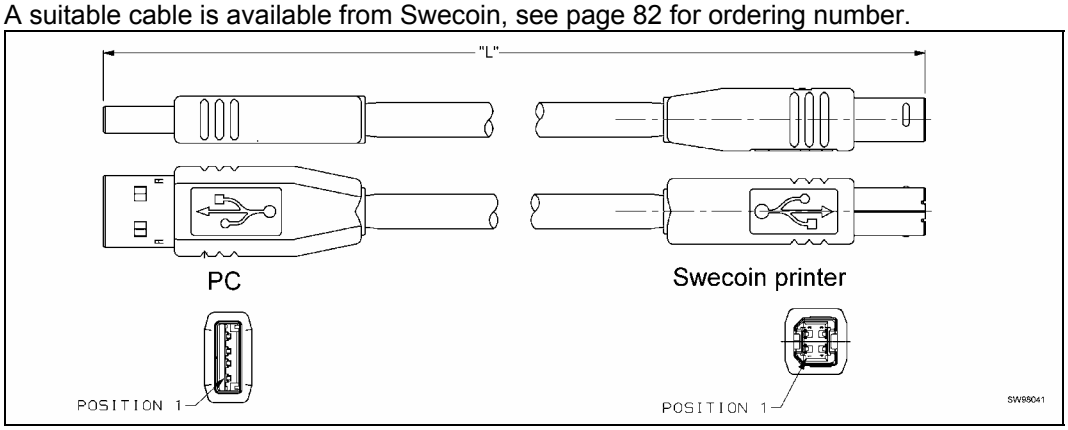


Figure 5. USB cable with type A and type B connectors

3.2.3 Using a serial adapter, TTP 7020 and TTP 7030

1. Loosen the control board module, see Control board, Removal on page 68.
2. Connect the serial adapter to J4 on the control board.
3. Fasten the control board module, see Control board, replacement on page 68.
4. Fasten the serial adapter with the two screws on the right hand side of the printer.

Connect a Swecoin serial cable, ordering No.10825-000, between the printer and the computer to be used. We strongly recommend using the Swecoin cable because many incompatible cables are available.

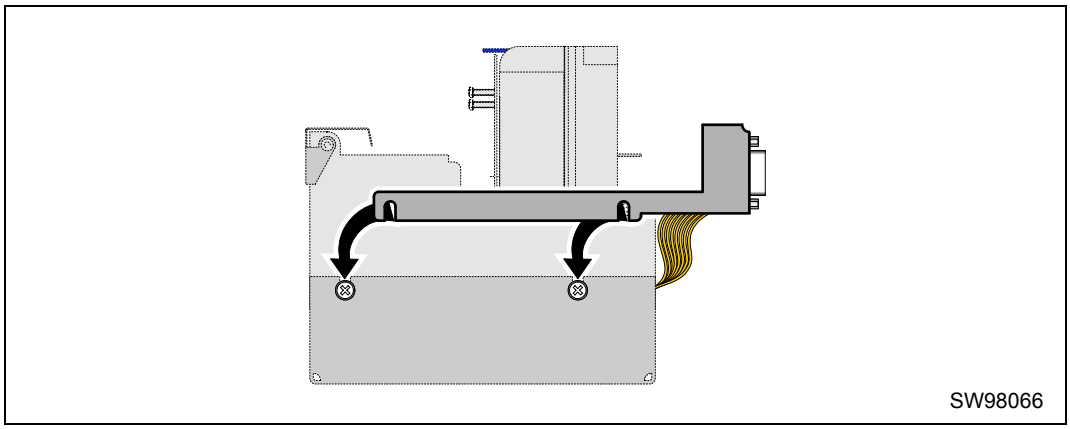


Figure 6. Fitting a serial adapter to the printer.

3.3 Connecting the power

Using the Swecoin power supply (see page 82 for ordering number):

1. Make sure the line voltage selector on the power supply is set to your local line voltage (only PSU 01035-014).
2. Connect the cable from the power supply to J8.
3. Connect the power cable to the line outlet.
4. Turn ON the power.

If you use another type of power supply unit, connect the voltages according to the following illustration.

NOTE! – *The protective ground and the 24V ground must be separated in the power supply to avoid ground loops!*

At the printer end of the cable, use an AMP Mate-N-Lok connector housing and two contact-sockets:

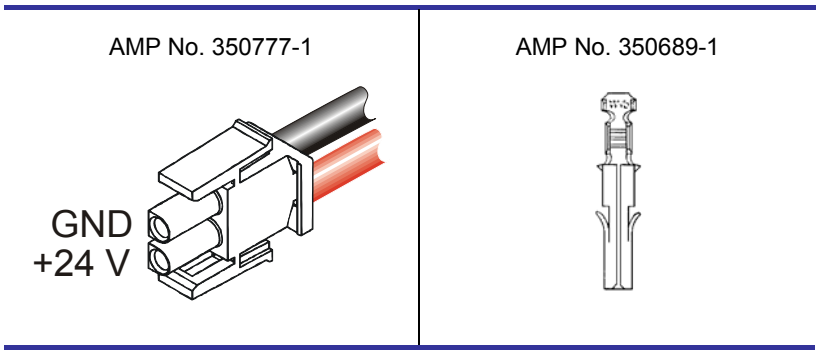


Figure 7. Power connection

Mode	80 mm paper width	112 mm paper width
Idle	150 mA	150 mA
Standard text printing	2.5 A average	3.5 A average
All black printing	8.5 A	11 A

Table 1. Current consumption

3.4 Making a test printout

1. Switch OFF the power.
2. Hold the feed-forward button depressed while powering ON the printer. Keep the button depressed until printing starts.

This produces a printout showing the firmware program version and date, control board revision number and serial number, name of loaded fonts and logotypes, and the parameter settings.

3. Each successive press of the button will produce a test printout.

Switch the printer OFF and ON again to exit self-test mode.

If a power button is not available for the printer, follow the below procedure[1]:

1. Lift the printhead.
2. Hold the FF-button pressed while lowering the head, and keep it pressed until after the auto-load is completed.
3. Release the button and a self-test printout will be printed.

[1] Introduced in firmware version 2.44b

3.5 Installing a printer driver

Printer drivers for Linux and most versions of Microsoft Windows™, are available on the Swecoin web site *www.swecoin.se*, or on disk from Swecoin. See page 2 for address, and page 82 for ordering number. Please follow the installation instructions that accompany the drivers.

3.5.1 Status monitoring through Windows

Status can be fetched from a language monitor (70x0MON.DLL) that is installed into Windows with the driver. Documentation of the language monitor is available on the drivers' page on the Swecoin web site.

If you want to monitor status through the language monitor, make sure that the printer is selected as default printer, and that bi-directional support is enabled in the port section of the driver settings.

NOTE! – *On TTP 7020, parameter p5 should be set to 1 to make status replies possible when paper is out. See page 51.*

3.5.2 Settings available in the driver

The looks of the dialogue boxes vary between driver versions, but essentially the same settings can be made.

You start with the Printing Preferences window. Here you find the portrait/landscape setting, and an advanced button.

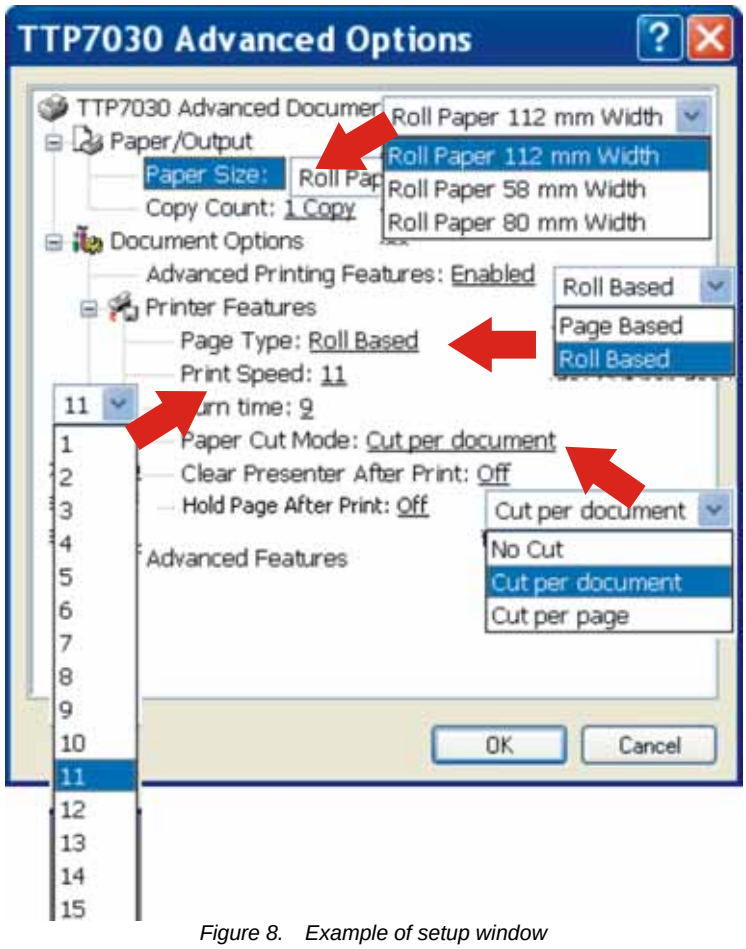


Figure 8. Example of setup window

The advanced button contains the Swecoin specific settings:

Paper/Output

- Paper size: Roll paper 58 mm / 80 mm / 112 mm
- Copy Count: **1** to 9999

Document options

Advanced printing features: **Enabled** / disabled

Printer features:

- Page Type: **Page based**/Roll based[1]
- Printing Speed: 1 to 19
- Paper sensitivity: 1 to15
- Retract setting: Eject, Eject after x sec., Retract, Retract after x sec.[2]
- Paper cut mode: No Cut / **Cut per document** / Cut per page[3]
- Clear presenter after print: On / **Off**
- Hold page after print On /**Off**[4]

Advanced features

- Paper advance: 0-100 mm (**14 mm**)[5]
- Paper eject: 0-255 (**30**)[6]
- Paper reverse: 0-100 mm (**0 mm**)[7]
- Black mark check: **False**/True[8]
  - Minimum black mark: 0-100 mm (**3 mm**)
  - Maximum black mark: 0-100 mm (**16 mm**)
  - Cut position: 0-100 mm (**25 mm**)
- Scaling: 10-400% (**100%**)[9]
- Contrast/brightness

---

[1] Page based give the page size set in the Paper Size setting. Roll based save paper by cutting after the last print on the page.

[2] Only applicable on retract & retain versions of the printer.

[3] "Cut per page" give three pages when a 3-page document is printed, while "Cut per document" give one long page with all information printed on it.

[4] ON means that the following page in a multi-page document is not printed until the customer takes the already printed page.

[5] Paper Advance is advance before cut, that is bottom margin.

[6] This eject is roughly in 2mm-steps, see description of the eject-command (run presenter) on page 36.

[7] Paper reverse is reverse before print, and reduces the 190 mm top margin with the value entered here. So a setting of 10 gives 190 – 10 = 10 mm top margin. Caution! Avoid settings above 10.

[8] When black marks are used to synchronize cut, set page type to roll based to avoid conflicting page definitions.

[9] Scaling to for instance 99% can be used when you need to print forms with fixed page length that otherwise would not fit on a page.

3.6 Paper level sensors

The printer has inputs for one paper-near-end sensor, and one weekend sensor.

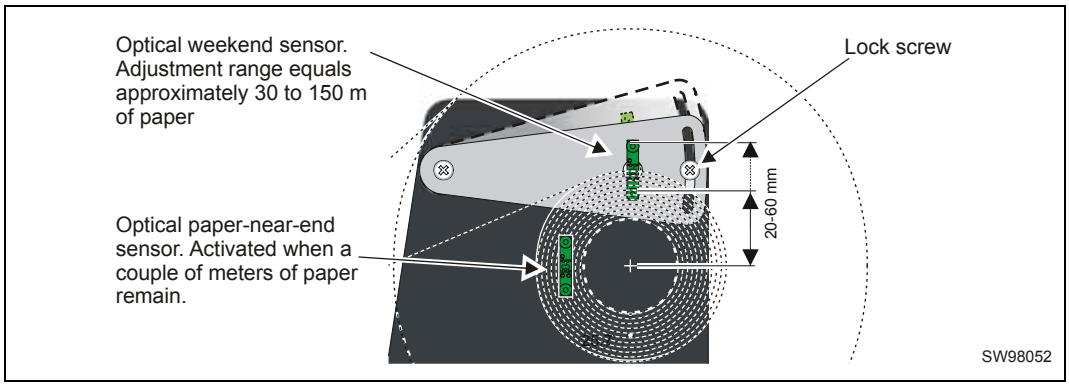


Figure 9. Sensors on 200 mm roll holder

The paper-near-end sensor alerts the system when a couple of meters of paper remain on the roll. The purpose of this sensor is to get an early alert so that you can replace the paper roll in time in remotely located kiosks.

The weekend sensor should alert when the remaining paper does not last over a weekend. A reason to use this sensor is that it is more expensive to get a service technician out on a weekend or holiday, than it is to replace the roll before it is totally empty.

The Swecoin 110 mm and 150 mm paper roll holders are equipped with paper-near-end sensors, while the 200 mm roll holders have both paper-near-end and weekend sensors.

When installing the Swecoin roll holder just connect the cable from the roll holder to connector J1 at the back of the printer. See Figure 1 on page 7.

If you use custom designed roll holders, connect the sensors according to Figure 10.

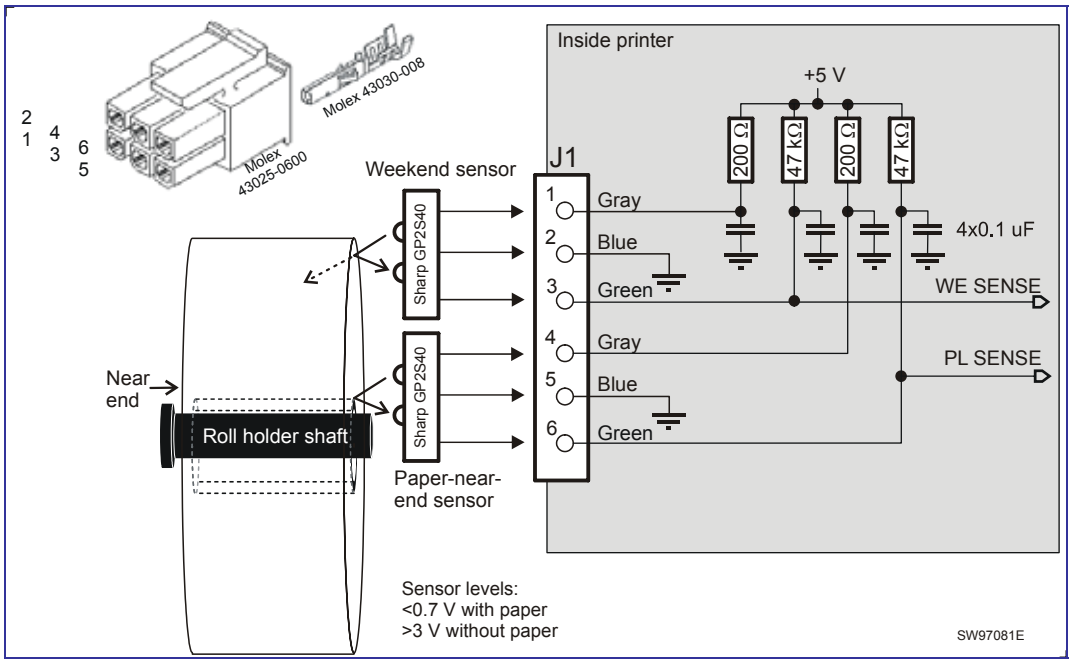


Figure 10. Paper-near-end sensor connection

4 OPERATION

4.1 Installing a paper roll

1. Turn the new paper roll as shown. The paper should be inserted into the printer with the temperature-sensitive side up.

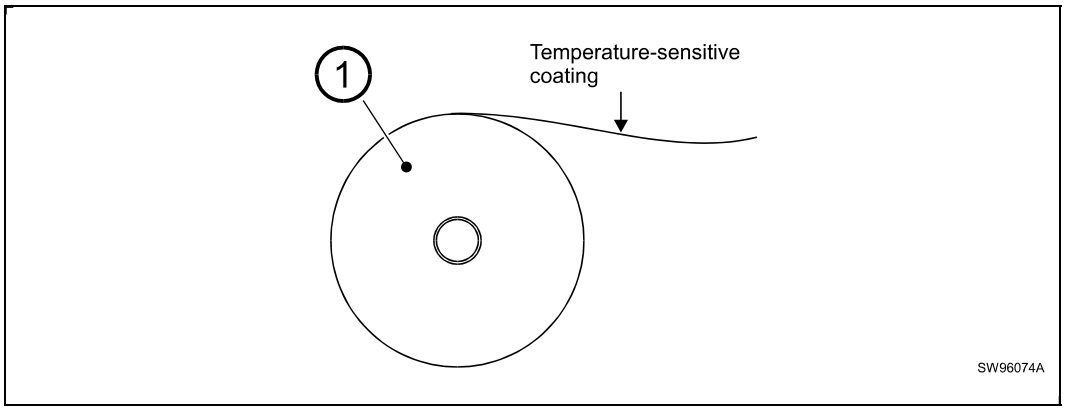


Figure 11. Turn the paper roll so that the paper leaves the roll from the top

2. Tear off a full turn of the paper (approximately 0.5 m) from the new paper roll.

> ***CAUTION!***
> *This is important since the outer end of the paper is usually fixed to the roll with some type of glue or self-adhesive substance that might otherwise cause paper jam or even print head damage.*

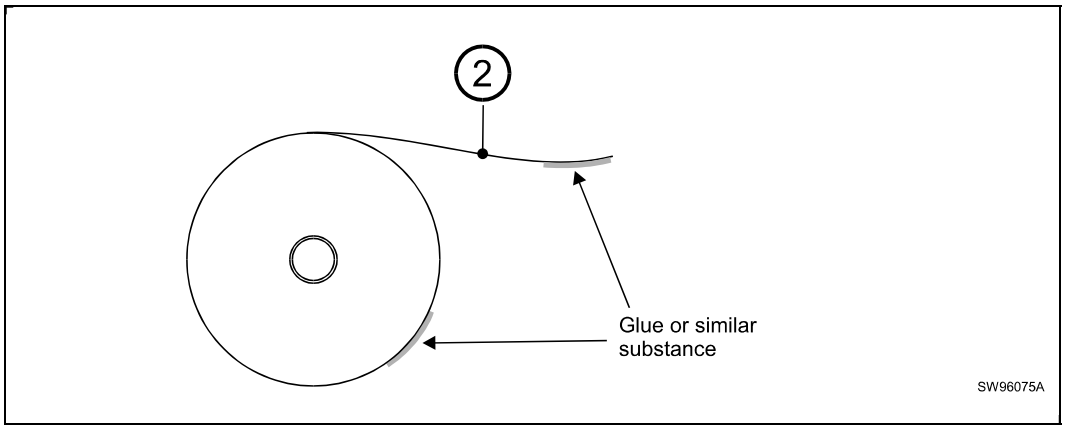


Figure 12. Tear off 0.5 m from the new paper roll

3. Make sure the printer is turned ON.

4. Cut the paper in a suitable angle:

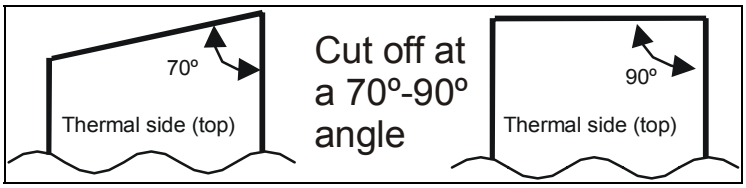


Figure 13. Suitable paper edge for auto load

NOTE 1! *— The paper sensor is at the same side as the blue paper release lever (where the arrow points in Figure 14). If the paper is cut in a direction opposite to that as shown in the figure above, the sensor will not detect the paper.*

5. Insert the paper through the paper entry opening at the back of the printer. The printer will now feed, cut and eject a printout, and then automatically go on-line.

NOTE 2! *— In high temperature and high humidity, the paper may lose its stiffness resulting in paper jam at automatic paper loading. In such cases, load paper manually.*

Figure 14. Insert the new paper

4.2 Clearing paper jams

Should a paper jam occur, follow the procedure below:

1. Tear off the paper close to the paper roll and flip back the print module.

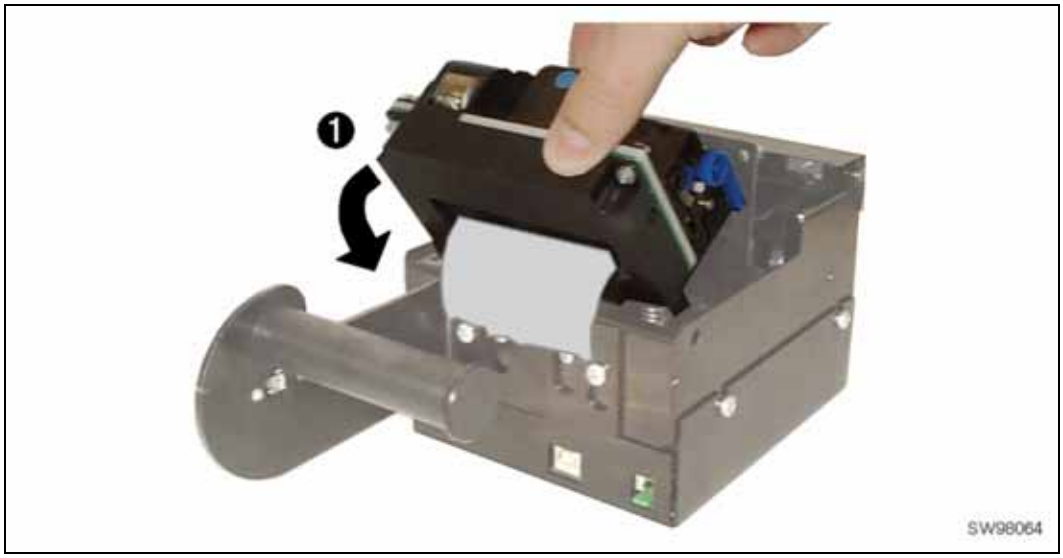


Figure 15. Flip open the print module

2. Lift the print head by pushing the paper release lever upwards.
3. Remove any paper trash by gently pulling the paper up and out of the print module.

⚠ ***CAUTION!*** — *<u>Never</u> pull paper backwards through the print mechanism.*

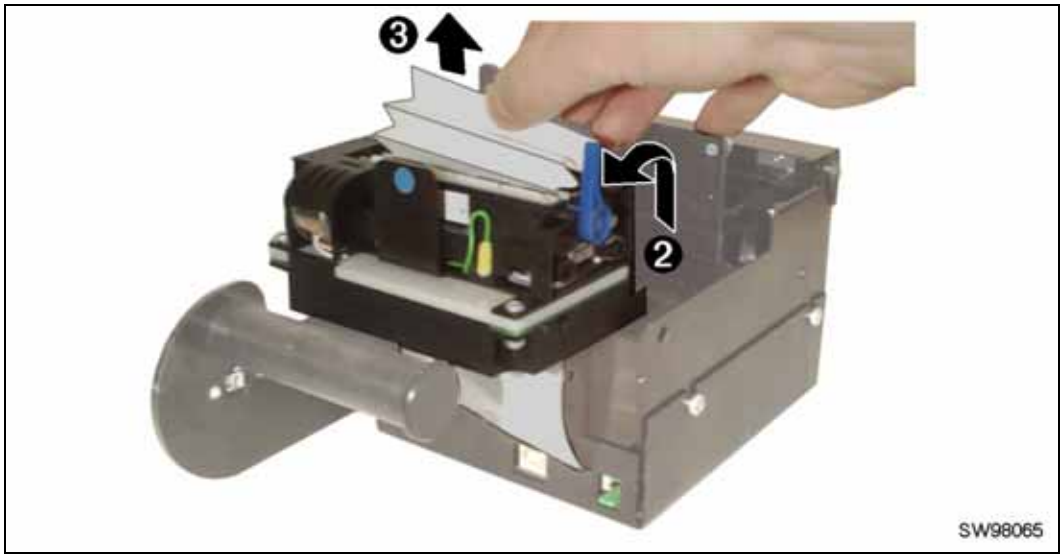


Figure 16. Remove paper trash

5 PROGRAMMING

There are two completely different ways of setting up the printout: Text oriented and driver oriented style.

Text oriented

The printout can be seen as the page of a simple word processor. You send text and graphics to the printer, which prints the information in the same sequence as the data is received. Design features are limited to the font stored in the flash PROM of the printer.

It is possible to select a fixed page length. If you do that, text and logotypes can also be printed in landscape orientation.

There are two text cursors, one for portrait, and one for landscape. The start positions of the cursors are the upper left corner for the portrait cursor, and the upper left corner for the landscape cursor, see Figure 17. You can switch between these cursors at any time; the cursor will retain its last position on the ticket.

Driver oriented

When a Windows driver is used, you can use any Windows program to design the ticket with text, graphics, bar codes or whatever you want to print and in any orientation you want.

The Windows driver issues all the necessary commands. By setting up printing preferences in the driver you select how the printer should cut and present the printout.

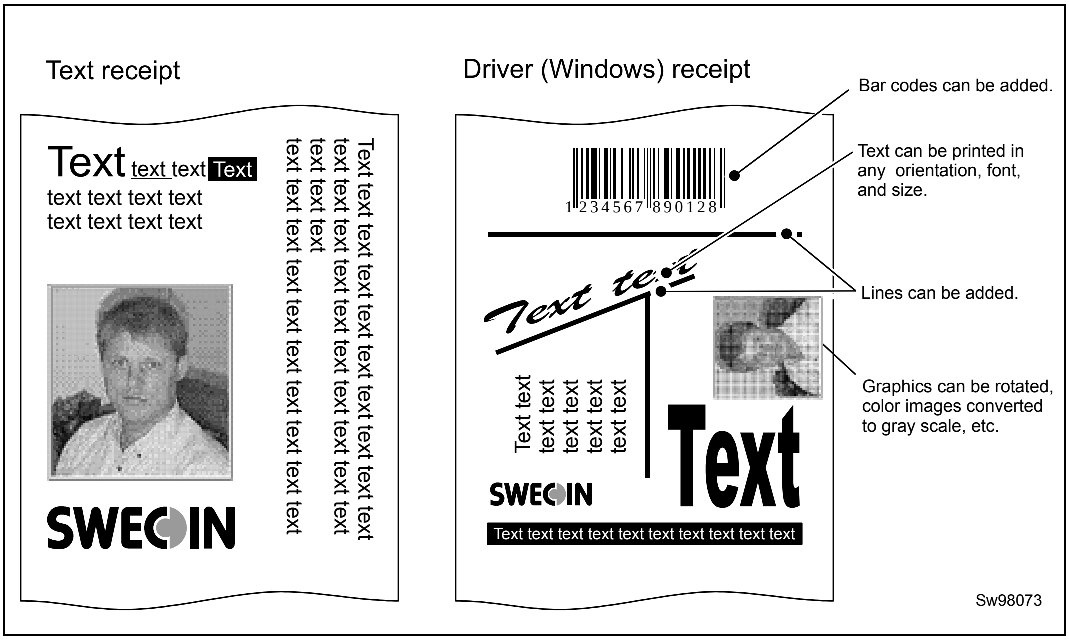
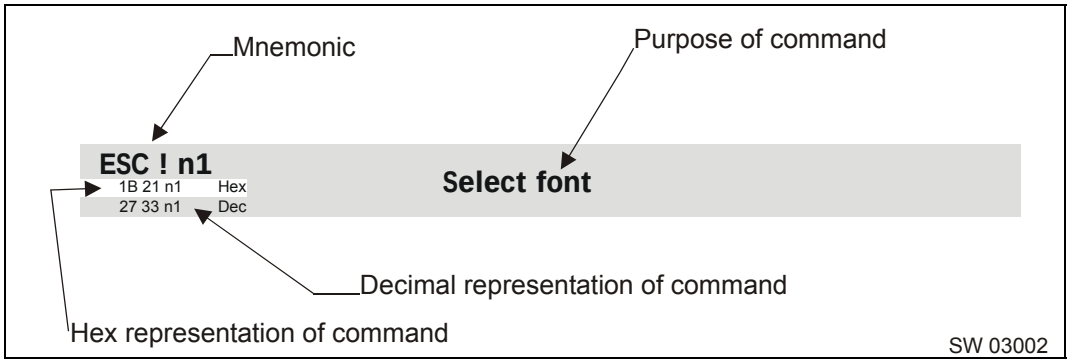


Figure 17. Ticket styles

5.1 How the commands are described



5.1.1 Mnemonic

Is the popular command name that should be easy to remember.

5.1.2 Hex

Give the command in hex representation

5.1.3 Decimal

Give the command in decimal representation

5.1.4 Values

n1, n2, etc. represents values that you set with the commands. What you should enter here depends on what you want the command to do.

5.1.5 Examples

Command examples are formatted in **`Courier`** and typed in the same way as used in the Swecoin TTP editor:

```
<ESC>&P<001><019>
```

Where **`<ESC>`** means the escape character 27 decimal (hex 1B). Numbers between less-than and greater-than characters, for example **`<015>`**, means 15 decimal (hex F). When the numbers indicate a hex value, h is appended to the number.

`<065>`, `<65d>`, `<41h>` and **`A`** are four different ways of expressing the character A.

5.2 Summary of control codes & escape sequences

Command	Hex	Decimal	Function	Page
BS	08	8	Backspace	27
CAN	18	24	Cancel	27
CR	0D	13	Carriage return	28
EM	19 n1	25 n1	Enforced Clear Presenter	36
ENQ	05	5	Clear Presenter	36
ESC ACK	1B 06 n1	27 6 n1	Acknowledge Marker	43
ESC !	1B 21 n1	27 33 n1	Select Font	25
ESC #	1B 23 n1	27 35 n1	Calibrate Blackmark Sensor	24
ESC & 000	1B 26 00	27 38 0	Load Font	37
ESC & 001	1B 26 01	27 38 1	Load Logotype	37
ESC & 004	1B 26 04	27 38 4	Store current Parameter Values	37
ESC & C	1B 26 43	27 38 67	Erase all Fonts	37
ESC & D	1B 26 44	27 38 68	Erase Fonts 4 to 7	38
ESC & F	1B 26 46 n1	27 38 70 n1	Recall Parameter Profile	38
ESC & L	1B 26 4C	27 38 76	Erase all Logotypes	37
ESC & P	1B 26 50 n1...n2	27 38 80 n1...n2	Set Parameter Value	38
ESC ?	1B 3F	27 63	Reset (full)	37
ESC @	1B 40	27 64	Reset (initialize)	37
ESC b	1B 62 n1...n5	27 98 n1...n5	Print Bitmap at XY-position	31
ESC B	1B 42 n1	27 66 n1	Bold	26
ESC B C	1B 42 43 n1	27 66 67 n1	Barcode Clear	30
ESC B S	1B 42 53 n1...n11	27 66 83 n1...n11	Barcode field Specify	29
ESC B W	1B 42 57 n1	27 66 87 n1	Barcode Write	30
ESC d	1B 64 n1	27 100 n1	Make n Linefeeds	28
ESC ENQ 001	1B 05 01	27 5 1	Status Enquiry	39
ESC ENQ 002	1B 05 02	27 5 2	Paper-near-end Enquiry	40
ESC ENQ 004	1B 05 04	27 5 4	Fonts and Logotype Enquiry	40
ESC ENQ 006	1B 05 06	27 5 6	Status Report	41
ESC ENQ 007	1B 05 07	27 5 7	Firmware-version Enquiry	41
ESC ENQ 009	1B 05 09	27 5 9	Serial-number Enquiry	42
ESC ENQ 010	1B 05 0A	27 5 10	Control board revision Enquiry	42
ESC ENQ 011	1B 05 0B	27 5 11	Head temperature Enquiry	42
ESC ENQ 012	1B 05 0C	27 5 12	Bootware version Enquiry	42
ESC ENQ c	1B 05 63	27 5 99	Device ID Enquiry	43

Command	Hex	Decimal	Function	Page
ESC ENQ P	1B 05 50 n1	27 5 80 n1	Parameter-setting data Enquiry	43
ESC FF	1B 0C n1	27 12 n1	Eject (run presenter)	36
ESC g	1B 67 n1...n5	27 103 n1...n5	Print Logotype	33
ESC h	1B 68 n1	27 104 n1	Text Height	26
ESC i	1B 69 n1	27 105 n1	Italics	26
ESC j	1B 6A n1	27 106 n1	Paper Reverse	34
ESC J	1B 4A n1	27 74 n1	Paper Advance	34
ESC L	1B 4E n1	27 78 n1	Print Logotype at Current Position	33
ESC N	1B 4E n1	27 78 n1	Align Text	25
ESC NUL	1B 00	27 0	Load Firmware	38
ESC o	1B 6F n1	27 111 n1	Text and Logotype Orientation	25
ESC p	1B 70	27 112	Print	34
ESC P	1B 50 n1	27 80 n1	Print Self-test Printout	34
ESC r	1B 72 n1...n9	27 114 n1...n9	Print Ruler Line	32
ESC RS	1B 1E	27 30	Cut only, no Eject	35
ESC s	1B 73 n1	27 115 n1	Send dot-line, 203 dpi	31
ESC t	1B 74 n1...n5	27 116 n1...n5	Print Text at XY	27
ESC T	1B 54 n1	27 84 n1	Reversed/Inversed Text	26
ESC u	1B 75 n1	27 117 n1	Underline	26
ESC w	1B 77 n1	27 119 n1	Text Width	27
ESC Z	1B 5A	27 90	Go to next Top of Form	24
FF	0C	12	Form Feed	28
HT	09	9	Horizontal Tabulation	28
LF	0A	10	Linefeed	28
RS	1E	30	Cut and Eject	35

Table 2. Control codes & escape sequences in alphabetical order

***NOTE!** – In all responses from the printer the most significant byte (MSB) is transmitted first*

5.3 Software command syntax

The commands in this section are grouped after what they do, and these groups are sorted in a theoretical usage sequence. It starts with commands for specifying the printed page — through text-and-graphics commands — to cut-and-present commands. System and status commands are presented at the end.

5.3.1 Page setup

Page setup is now done with parameters instead of dedicated commands. This makes it possible to store the setup in the non-volatile parameter memory. To minimize doubling of functions the page setup commands have been removed from this manual. The parameters to use are described on page 58.

5.3.2 Black mark (top-of-form) commands

See also “Aligning preprint and thermal print” on page 58.

ESC #	Calibrate Blackmark Sensor
1B 23 n1	Hex
27 35 n1	decimal

Looks for a black mark, measures the contrast of the mark and sets parameter n51 to a suitable value for the detected voltage, then reverses to the start position.

To make the calibration permanent, send **`ESC & 4h`**, store parameter values.

NOTE! – *Be sure to first set up the length of the black mark and the distance between two black marks in the parameter setup.*

ESC # is available in hardware revision B or higher.

ESC Z	Go to next Top of Form
1B 5A	Hex
27 90	Decimal

In black mark mode, an **`ESC Z`** start looking for a black mark at the current position and continues for one page length. If no black mark is found, the printer stops and bit 3 in status byte 2 is set to 1 (See **`ESC ENQ 6h`**).

When black mark mode is disabled, ESC Z will perform a form feed without cut (disregarding the setting of parameter 34).

5.3.3 Text commands

Text received by the printer is printed with the currently selected font and font attributes. Text exceeding the page width is wrapped with the line spacing selected.

ESC o n1		Text and Logotype Orientation
1B 6F n1	hex	
27 111 n1	decimal	

Changes the orientation of text and logotypes.

n = 0 Gives portrait orientation

n = 1 Gives landscape orientation

Portrait and landscape can be mixed on the same printout. There are two cursors, one for portrait and one for landscape. The cursor always starts at the top left corner of the document. Looking at the paper when it exits the printer, the portrait cursor is at the top left corner of the printout, moving to the right as text is typed, while the landscape cursor is at the top right corner, moving downwards.

NOTE! — *Landscape orientation can only be used with fixed document mode.*

ESC N n1		Align Text
1B 4E n1	hex	
27 78 n1	decimal	

Changes the alignment of text and logotypes.

`ESC N 0`= Left `ESC N 1` = Center `ESC N 2` = Right

ESC ! n1		Select Font
1B 21 n1	hex	
27 33 n1	decimal	

This command selects one of eight fonts. The font design depends on which fonts have been loaded[1] into the printer. Make a test printout to see which fonts are available in your printer.

`ESC ! 0` selects normal font (font 0)	`ESC ! 4` selects font 4
`ESC ! 1` selects font 1	`ESC ! 5` selects font 5
`ESC ! 2` selects font 2	`ESC ! 6` selects font 6
`ESC ! 3` selects font 3	`ESC ! 7` selects font 7

Table 3. Font selection commands

Lines, too long to be printed in the selected font, are automatically wrapped around.

Different fonts can be used on the same line.

Selecting an empty or invalid font location, will set bit 4 of byte 1 in the status enquiry response to ”1". See “Parameter setting data enquiry” on page 43.

NOTE! — *If more than 256 characters are sent to the printer before an LF, the first part of the buffer contents is printed-out automatically. The text is formatted according to the already received formatting commands.*

[1] For font loading, see “Font loading” page 44.

ESC B n1 — Bold

1B 42 n1	Hex
27 66 n1	decimal

Normal **Bold**

n = 0 Turns OFF bold (Normal)

n = 1 Turns ON **bold**

Bold is designed for normal character width and shows less and less as the width increases.

ESC i n1 — Italics

1B 69 n1	Hex
27 105 n1	decimal

Normal *Italics*

n = 0 Turns OFF Italics (Normal)

n = 1 Turns ON *Italics*

ESC T n1 — Reversed/Inversed Text

1B 54 n1	Hex
27 84 n1	decimal

Reverse print

Selects normal or reversed print.

n = 0 Gives normal print, black on white

n = 1 Gives reversed print, white on black

Single words, characters, or complete text lines can be reversed.

NOTE! – *Reverse text and underline XOR's the background with the foreground. This means that the order in which the commands are issued affect the printout if one text overlaps another.*

ESC u n1 — Underline

1B 75 n1	hex
27 117 n1	decimal

Underline

n = 0 Turns OFF underline

n = 1 Turns ON a 1 pixel wide underline

n = 2 Turns ON a 2 pixel wide underline, etc. up to n=7.

Characters, single words, or complete text lines can be underlined.

ESC h n1 — Text Height

1B 68 n1	hex
27 104 n1	decimal

Double height

Applicable n values are 000 — 015.

n = 1 Increases the character height to 2 times the basic character height.

n = 2 Increases the character height to 3 times the basic character height etc.

n = 0 Resets the character height to the basic character height.

In combination with variable character width (**`Esc w n`**), give highly legible characters depending on the font to which the command has been applied.

Different fonts and heights can be mixed on the same print line.

ESC w n1		Text Width	Double width
1B 77 n1	hex		
27 119 n1	decimal		

Applicable n values are 000 — 007.

n = 1 Increases the character width to 2 times the basic character width.

n = 2 Increases the character width to 3 times the basic character width etc.

n = 0 Resets the character width to the basic character width.

In combination with variable character height (`ESC h n`), give highly legible characters depending on the font to which the command has been applied.

Different fonts and widths can be mixed on the same print line.

ESC t n1…n5 data			Print Text at XY
1B 74 n1...n5	data	hex	
27 116 n1...n5	data	decimal	

Prints a text string at the specified X-Y position. The string will use the formatting set by font, reversed, width, height, bold, italics, and underline commands.

n1n2 Two byte definition of the X print position (in pixels).

n3n4 Two byte definition of the Y print position (in pixels).

n5 The number of characters in the string.

data The text string. The length must be exactly the number of characters specified by n5, otherwise the printer will stop, waiting for more characters.

After the string has been printed, the cursor will return to the position it had before the string command was issued.

NOTE 1! *— The* `ESC t` *command clears any text preceding it on the same line. Commands will not be cleared.*

NOTE 2! — *The Y print-position only works if fixed page length is used. Start a page by specifying page length for example* `<ESC>C<004><160>`*, then turn off auto page length with* `<ESC>c<000>`

BS		Backspace
08	Hex	
8	Decimal	

Moves the print-position one step to the left. Backspace can be used to combine characters. For instance to print a Ø, send text commands `O BS /` to the printer, and the slash will overprint the O.

Only one backspace can be used at a time. Excessive backspaces will be ignored.

CAN		Cancel
18	hex	
24	decimal	

Cancels print data and attributes on the same line as the command itself. ESC commands, issued on the same line as the `CAN` command, are not cancelled.

CR — Carriage Return

0D	hex
13	decimal

By default, carriage return is ignored.

By changing the default settings, you can:

Interpret is as `CR` which returns print position to beginning of line without line feed.

Interpret `CR` as `CR/LF` which inserts line space as specified by the line spacing setting (see parameter p13), and returns the print position to beginning of the line.

See “Carriage return and line feed behavior” on page 53.

LF — Linefeed

0A	hex
10	decimal

Linefeed is interpreted as `CR/LF` by default. This inserts line spaces as specified by the line spacing setting (see parameter p13), and returns the print position to beginning of the line. LF also converts text from the input buffer to pixel lines and stores them in the line buffer, ready to be printed.

By changing the default settings, you can:

Interpret `LF` as Linefeed. This inserts line space as specified by the line spacing setting (see parameter p13), without returning the print position to the beginning of the line.

Ignore `LF`.

See “Carriage return and line feed behavior” on page 53.

ESC d n1 — Make n Linefeeds

1B 64 n1	hex
27 100 n1	decimal

Executes the number of linefeeds as defined by variable n1. The length of each line feed is determined by the default value for selected font (see parameter p13 on page 52).

The print position is returned to the beginning of the line. Any text on the line is lost. To avoid losing text, send an `LF` before sending `ESC d n`.

FF — Form Feed

0C	hex
12	decimal

Prints data from the input buffer and feeds the paper to the top of the next page.

In fixed document length (FORM-mode) this command prints data in the input buffer and feeds the paper to the top of next page.

In variable document length mode `FF` advances to the minimum page length. If the printout already is longer than the minimum page length, FF does not feed the paper at all.

In black-mark mode, the `FF` command looks for a black mark, see `ESC Z`

If "Auto cut" is set to 1 (see page 53), `FF` effect form-feed, cut, and eject.

NOTE! *— Use parameter p37 and p38 to define page length.*

HT — Horizontal Tabulation

09	hex
9	decimal

Shifts the current print position to the next Tab position.

Set tab positions with parameters p15 – p30.

5.3.4 Barcode Commands

TTP 7020 and 7030 can print EAN 8, EAN 13, UPC, 2-of-5 Interleaved, ISBN, Code39, and Code128 barcodes in portrait and landscape orientation. The text under the code is printed with the selected font.

Example:

```
<ESC>BS<00h><00h><78h><00h><00h><
0Ch><00h><50h><00h><02h><00h>

<ESC>BW<00h>733104000099<00h>

<RS>
```

The above will print an EAN barcode with height = 10 mm, 15 mm in from the right margin.

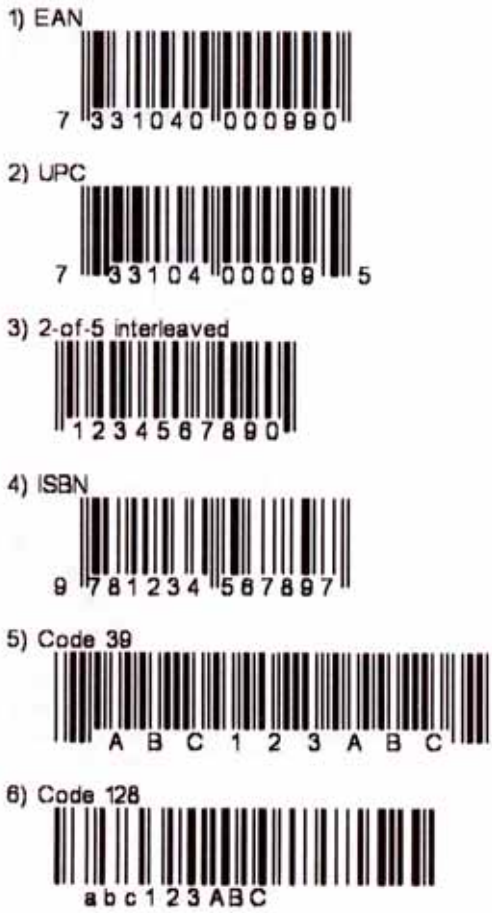
The below will print the same barcode in landscape orientation.

```
<ESC>c<00h><ESC>o<01h>

<01h><ESC>BS<00h><00h><78h><00h><
00h><0Ch><00h><50h><00h><02h><00h
>

<ESC>BW<00h>733104000099<00h>

<RS>
```



ESC B S n1...n11		**Barcode field Specify**
1B 42 53 n1...n11	hex	
27 66 83 n1...n11	decimal	

Bar codes can only be printed in portrait mode unless fixed page length is selected.

The command reserves an information field as a bar code field. The command also identifies the type, number of digits, and the configuration of bars to be placed in the bar code field.

n1 Specifies the bar code field No. (0—15). Bar code fields may be specified in any order.

n2n3 Sets the X coordinate of the bar code field origin (n2 is the higher-order and n3 the lower-order byte).

n2 and n3 must be 1-byte hexadecimal or decimal numbers. The values must not place the bar code outside the total pixel count that can be handled by the printer.

n4n5 Specifies the Y coordinate of the bar code field position, (n4 is the high, and n5 the lower-order byte).

n4 and n5 must be 1-byte hexadecimal or decimal numbers.

n6 Specifies the number of bar code digits, but is ignored by the printer.

n7n8 Specifies the height of the bars.

n9 Specifies the type of bar code. The following types are supported.

n9 = 0 EAN 8 or 13 (auto detect). The printer calculates the necessary check digit.

n9 = 1 UPC

b9 = 2 2/5 Interleaved (even number of characters must be sent)

n9 = 3 ISBN

n9 = 4 Code128

n9 = 6 Code39

n10 Specifies the thickness of the narrow bar 0=1 pixel, 1=2 pixel, and so on.

n11 Specifies the wide-bar-to-narrow-bar ratio. Only used in Code 39 and 2-of-5 interleaved where different ratios are allowed

ESC	BW	n1	nx	
1B	42 57	n1	nx	Hex
027	066 087	n1	nx	Decimal

Barcode Write

Writes data to the bar code field reserved by the ESC BS command.

n1 Specifies the field No. Range 0 to 15. Fields can be specified in any order but other values than 0 to 15 are ignored.

n2 . . . nx Specifies bar code data bytes.
To create a bar code add-on, insert a space character and then the data for the add-on. Two of five characters are allowed of the add-on.

NUL must be placed at the end of the bar code data.

Any invalid bar code character terminates the command, and print <Invalid barcode> on the printout.

5.3.5 Example:

```
<ESC>BS<h00><h00><h32><h00><h00><h0C><h00><h50><h00><h02><h00><«»
<ESC>BW<h00>733104000099<h00><«»
<RS><«»
```

Will print one barcode with height = 10 mm and moved 10 mm to the right

ESC	B	C
1B 42 43 n1	Hex	
27 66 67 n1	decimal	

Barcode Clear

Clears the bar code field reserved by command ESC BS.

n Specifies which bar code field to clear. The range is 0 to 15. The fields may be cleared in any order.

5.3.6 Graphics commands

In 80 mm printers, the line length is 72 bytes and in 112 mm printers it is 104 bytes.

ESC b n1…n5 data			Print Bitmap at XY-position
1B 62 n1...n5	Data	hex	
27 98 n1...n5	Data	decimal	

Prints a black & white Windows bitmap (BMP-file) at the specified X-Y position. The bitmap must be a complete uncompressed Windows bitmap where the data starts with BM. Max size is limited to the free RAM printed on the self-test printout.

n1 Always 0

n2n3 Two byte definition of the X print position (in pixels).

n4n5 Two byte definition of the Y print position (in pixels).

data Bitmap data.

After the bitmap has been printed, the cursor will return to the X-position that it had before the bitmap command was issued.

Selecting horizontal mode (with `ESC o 0h`) prints the image in portrait orientation, while selecting the vertical mode (with `ESC o 1h`) prints the image in landscape orientation.

NOTE! — *The Y print-position and horizontal/vertical orientation only works if fixed page length is used.*

ESC s n1 data			Send dot-line, 203 dpi
1B 73 n1	Data	Hex	
27 115 n1	Data	Decimal	

Sends one line of dot data. This command is used to build images, one dot line at a time by the printer driver and should not be combined with text commands.

n Determines the number of bytes. Range: 1-255.

<data> 1 – x bytes, where x is the printhead width in bytes. The printhead width is in the spec. of the printer.
For example:

- 80 mm printers use 72 bytes
- 112 mm printers use 104 bytes

If you specify less data then the actual printhead width, the printer will fill the rest of the dot line with spaces.

If more than the specified no. of bytes are received, the rest of the bytes are discarded.

ESC r n1...n9	
1B 72 n1...n9	hex
27 114 n1...n9	decimal

Print Ruler Line

Prints a ruler line across the paper.

A ruler line is normally used to divide the printout into logical parts to make it easier to read. A ruler line is actually an area defined by a start X-Y position and a stop X-Y position. This area is filled with black or a checkered pattern.

n1n2 Two byte definition of the X start position

n3n4 Two byte definition of the Y start position

n5n6 Two byte definition of the X stop position (must be larger than n1n2)

n7n8 Two byte definition of the Y stop position (must be larger than n3n4)

n9 Fill pattern, 0=black, 3= Checkered

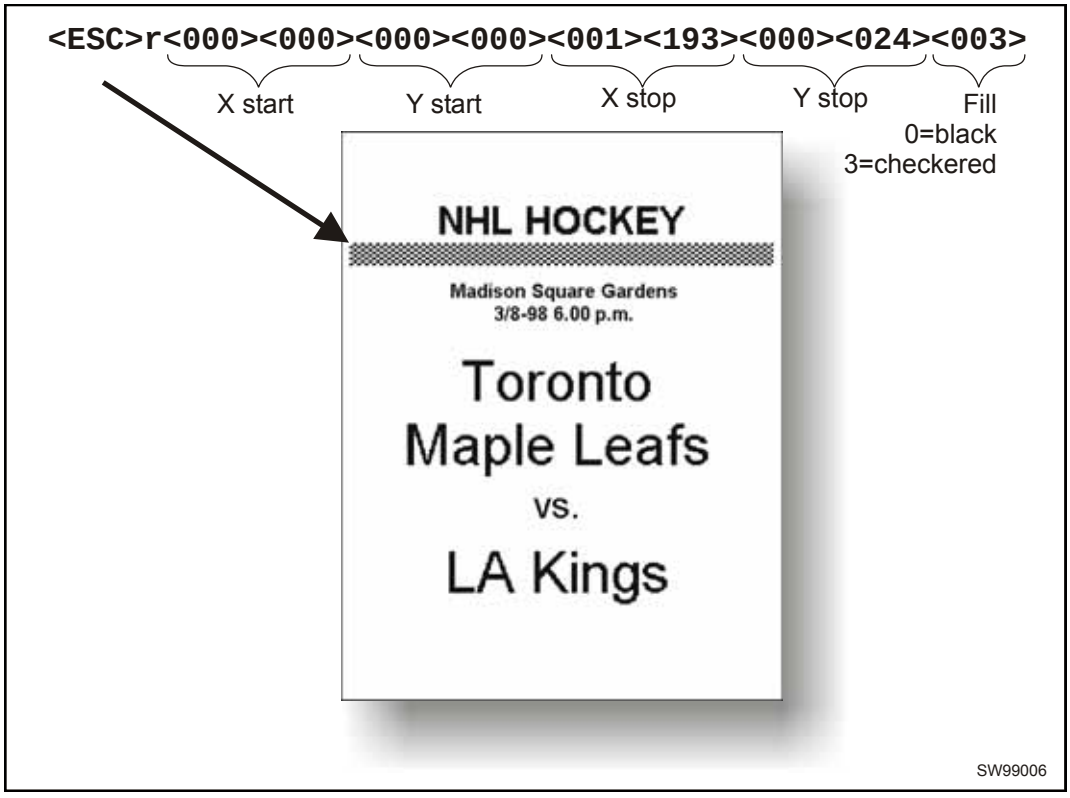


Figure 18 Printout with checkered ruler line

ESC g n1…n5 — Print Logotype

1B 67 n1...n5	hex
27 103 n1...n5	decimal

Prints a customized logotype[1] stored in the flash PROM. See also “Logotypes” on page 46.

n1 One-byte logotype identification No. (0—15)

n2n3 Two-byte definition of desired print position in X-direction measured from left-hand edge of the page (see page 58 regarding definition of ”page”). X-direction is perpendicular to the paper transport direction.

n4n5 Two-byte definition of desired print position in Y-direction. In variable document mode the Y-position is ignored. The resolution is 0.125mm in both X and Y directions

ESC L n1 — Print Logotype at Current Position

1B 4C n1	Hex
27 76 n1	Decimal

Prints a customized logotype stored in the flash PROM at the position of the cursor. The bottom line of the logotype is positioned at the baseline of the text on the line. If the logotype is higher than the text, the line spacing is increased.

See also Logotypes on page 46.

n One-byte logotype identification No. (0—15)

[1] For logotype loading, see "ESC & 1" on page 37.

5.3.7 Print commands

ESC p		Print
1B 70	Hex	
27 112	Decimal	

This command makes the printer print the contents of the line buffer.
Text is converted from text to pixel lines and stored in the line buffer when an LF is received. If the line buffer is empty when ESC p is received, nothing is printed.

`Text to be printed <LF><ESC>p` prints "Text to be printed" on the paper.

Printout is effected automatically at:

Cut (**`RS`** and **`ESC RS`**)

Form feed (**`FF`**)

Clear presenter (**`ENQ`**)

Run presenter (**`ESC FF n`**)

Print buffer full

Press on FF-button

ESC P n1		Print Self-test Printout
1B 50 n1	Hex	
27 80 n1	decimal	

This command makes the printer generate a self-test page based on the current parameter settings and print that page. The parameter values printed are the ones currently being used. They can differ from Power-ON default values if for example a printout from Windows has been done before **`ESC P`** is sent to the printer. To make a self test printout with the Power-ON default settings, power up the printer with the FF button pressed.

n = 0 Gives standard self-test printout.

n = 1 Gives a character set printout using the font selected by parameter p14.

ESC J n1		Paper Advance
1B 4A n1	hex	
27 74 n1	decimal	

The value n represents the number of dot lines the paper is to be transported forwards. Range: 1–255.

A dot line is 0.125 mm, and 255 dot lines equal approximately 32 mm.

ESC j n1		Paper Reverse
1B 6A n1	hex	
27 106 n1	decimal	

The value n represents the number of dot lines the paper is to be transported backwards. Range: 1–255.

CAUTION! – *Paper reverse may cause problems when used at the top of the page. Doing so may cause paper jam when feeding forward again. You may also loose grip of the paper. NEVER reverse more than 10 mm at top of page!*

A dot line is 0.125 mm, and 255 dot lines equal approximately 32 mm.

5.3.8 Cut and present commands

RS	
1E	Hex
30	Decimal

Cut and Eject

Effects a paper cut-off and an eject through the presenter module. The RS command automatically gives the eject length of 50 mm in addition to the factor stored in parameter p47.

If the printout length is too short, paper-feed is added until the minimum printout length (set by parameters 37 and 38) is reached, before execution of the Cut command.

NOTE! – *The cut position is 17 mm before the print line. This makes the last 5 lines on a page end up in the beginning of the next page. To get the cut after the text, Please set parameter 49 to auto.*
You can also use <RS> together with the paper advance command: **<ESC>J<160><RS>**
Gives a cut & eject <u>after</u> the last text line.

ESC RS	
1B 1E	Hex
27 30	Decimal

Cut only, no Eject

Effects paper cut-off only.

Eject can be effected with the **ESC FF n** command (see page 36).

To avoid thin strips of paper in the printer, multiple cut commands without paper feed in-between will not be performed. If the printout length is too short, paper-feed is added until the minimum printout length is reached, before execution of the cut command.

See Also Note on cut position for the <RS> command above.

NOTE 1! – *Use the cut command if you want full control over the printer from your system. But remember that you also must add commands to feed to the correct cut position and eject the paper so that the customer can get hold of it.*

NOTE 2! – *Top margin settings that moves the paper counts as paper feed*

ESC FF n1 — Eject (run presenter)

1B 0C n1 hex
27 12 n1 decimal

ESC FF ejects the document through the presenter module. Variable **n** represents the number of eject-steps.

- One step is approximately 2 mm
- The maximum number of steps is 255

Normally, this command is placed after a cut command (**ESC RS**) to partially eject the printout to the customer. Set the number of eject steps so that a good portion of the printout is retained in the presenter module, avoiding that the printout drops to the floor.

Another use of the command is to eject a part of a long document without preceding cut. The reason to do this is to limit the size of the loop build-up in the presenter.

NOTE! – *The loop is limited to the value set by **ESC f n** to avoid paper jam. The default setting of n=18, gives a loop of just above 0.5 m. When this length has been looped, the printer presents that part of the printout. Then, without cutting the paper, it continues to print the rest of the printout.*

Feed, cm	n1	Feed, cm	n1	Feed, cm	n1	Feed, cm	n1	Feed, cm	n1
1	6	6	36	11	55	16	69	21	82
2	15	7	40	12	58	17	71	22	85
3	21	8	43	13	62	18	73	23	88
4	27	9	48	14	65	19	76	24	92
5	33	10	52	15	67	20	79	25	95

Figure 19 Approximate settings for different eject

EM — Enforced Clear Presenter

19 n1 Hex
25 n1 Decimal

Same function as **ENQ** but overrides the Retract and Retain parameter (p45) with another presenter behavior. The function of n can be 0 to 255 0-99 ejects while 100-255 retracts (see the description of parameter 45). The command will clear the presenter immediately (with printing synchronization).

<EM><000> Ejects the presented page

<EM><100> Retracts the presented page

ENQ — Clear Presenter

05 Hex
5 Decimal

Clear the paper-path in the presenter form printouts. For example, to eject a document not removed during the previous print/cut/eject operation. Parameter No. 45 controls how the presenter is cleared.

5.3.9 System related commands

ESC ?		Reset (full)
1B 3F	Hex	
27 63	Decimal	

Restarts the printer with a complete reset. This is the same as power off/on.

ESC @		Reset (initialize)
1B 40	Hex	
27 64	Decimal	

Terminates the processing and initializes the control board. The control board is reset to default-values (same as after power ON). Do not use this command as part of a print data command string.

ESC & 001		Load Logotype
1B 26 01	Hex	
27 38 1	decimal	

Stores a logotype bitmap in the flash PROM. The logotype is printed with the **ESC g** and **ESC L** commands, see page 33. Also see Logotypes on page 46.

NOTE! — *If the logo width exceeds the print width, the operation is aborted.*

ESC & L		Erase all Logotypes
1B 26 4C	Hex	
27 38 76	decimal	

Erases all logotypes stored in the flash PROM.

NOTE! — *This command is only executed if at least one logotype has been loaded*

ESC & 004		Store current Parameter Values
1B 26 04	Hex	
27 38 4	decimal	

Stores the current setting of all parameter values in the setting memory. These parameters are then used as default parameters. Storing takes approximately 4 seconds. The printer activates the presenter motor temporarily to indicate that storing is complete.

ESC & 000		Load Font
1B 26 00	hex	
27 38 0	decimal	

This command is used to load a font to the printer flash PROM. The font is placed in the first free address position in the order of load sequence.

A Swecoin font-file consists of a header containing data describing the font as well as data for each individual character in the font.

Fonts can be designed with the font editor and loaded or deleted with the software available for free on the Swecoin web site. The font loading and deleting commands described here should only be used if you do not work in the Windows environment.

For complete specification of the font format, see page 44.

NOTE! *– The available font memory is printed on the self-test printout. A maximum of 8 fonts can be addressed. Exceeding any of these limits will cause this command to fail.*

ESC & C		Erase all Fonts
1B 26 43	Hex	
27 38 67	decimal	

Erases all fonts stored in the flash PROM.

NOTE! *— This command is only executed if at least one font has been loaded*

ESC & D		Erase Fonts 4 to 7
1B 26 44	Hex	
27 38 68	Decimal	

Erases fonts number 4–7. Fonts 0–3 are not affected by this command.

The operation is complete when the printer resets automatically and activates the presenter motor temporarily. Takes approximately 4 seconds.

ESC & F		Recall Parameter Profile
1B 26 46	Hex	
27 38 70	decimal	

This command resets the parameters of the printer to factory default.

Temporarily sets all parameters to predefined values that are stored in the printer. To keep the values as default, store them in the flash PROM with command **`ESC & 4`**. Unless you save the parameters, a reset command or power OFF/ON will return the parameters to the settings stored in the flash PROM.

ESC & P n1…n2		Set Parameter Value
1B 26 50 n1...n2	hex	
27 38 80 n1...n2	decimal	

A number of bytes in the flash PROM hold various parameter values called *default parameters*. One or several of them can be overridden temporarily with this command.

n1 Parameter number, range 1 -255.

n2 Parameter value.

See “Default parameter settings” on page 48.

The permanently stored parameters will be used again after a printer-reset command or at power ON.

The temporary values can, however, be stored in the flash PROM as permanent values with command **`ESC & 4`**.

SET SEVERAL PARAMETERS AT ONCE

`ESC & P <000> <FromPar><ParCount><Data>`

FromPar is the parameter number to start writing and ParCount is the number of bytes being sent. For every byte sent the parameter number is incremented.

Example:

`<ESC>&P<000><015><005><005><010><015><020><025>«»`

Sets the first 5 tabs to 5, 10, 15, 20, and 25. (FromPar 15, ParCount 5)

ESC NUL		Load Firmware
1B 00	Hex	
27 0	Decimal	

This command should be used when you integrate firmware loading into your kiosk program.

NOTE! – *Utility programs to load firmware into the printer are available from www.swecoin.se*

This command should only be used when loading new firmware into the printer. See also “Firmware” on page 72.

5.3.10 Status reporting commands

See also "**Status reporting**" on page 47.

NOTE! – *All status commands are immediate, that is they pass the print queue and is answered directly.*

ESC ENQ 001

1B 05 01 hex
27 5 1 decimal

Status Enquiry

A status enquiry results in response **ACK** (06h) if all sensors are clear, but **NAK** (15h) + code if one or more sensors report fault condition.

Error code	Meaning
ACK	OK (printer is operable)
NAK 01h	Paper left in presenter module. Attempt to clear the paper path failed.[1]
NAK 02h	Cutter jammed
NAK 03h	Out of paper
NAK 04h	Printhead lifted
NAK 05h	Paper-feed error. No paper detected in presenter although 10 cm has been printed. Paper might be wound around the platen or, in some way, has been forced above the presenter module.
NAK 06h	Temperature error. The printhead temperature has exceeded the 60 °C maximum limit.
NAK 07h	Presenter not running (no feedback from code wheel)
NAK 0Ah	Black mark not found
NAK 0Bh	Black mark calibration error
NAK 0Ch	Index error
NAK 0Dh	Checksum error
NAK 0Eh	Wrong firmware type or target for firmware loading
NAK 0Fh	Firmware cannot start because no firmware is loaded or firmware checksum is wrong.
NAK 10h	Waste bin timed out. If the customer doesn't take the paper and the printer clears the presenter due to a timeout, the pending error bit is set and error code NAK 16 is reported.
NAK FFh	Undefined error

Table 4. Error codes

NOTE! — *Errors 02h, 05h, and FFh are terminal faults that require you to reset the printer before it will be operable again. The printer automatically recovers from the other error conditions as soon as the error is corrected.*

A status enquiry command can only return one status code at a time. If there are two or more simultaneous errors, each error condition should be cleared and the status enquiry repeated in order to get a complete report of all status codes

The host computer cannot be certain that all error conditions have been cleared until an **ACK** is received.

The possible error conditions are reported in the above order.

NOTE! *– If you want to read out all status information directly, use* ***ESC ENQ E****.*

[1] From firmware version 3.00, the printer will retry three times (cut + clear presenter), when failing to clear the presenter.

ESC ENQ 002

1B 05 02 hex
27 5 2 decimal

Paper-near-end Enquiry

This command requests a paper-near-end sensor (paper low) status from the printer in a 1-byte format.

Value = (01h) indicates ”No paper”

Value = (00h) indicates ”Paper present” at the sensor position

---

NOTE! *– The status of the sensor is sampled every time the printout is cut. If three succeeding samples show "no paper", the status reply changes to 00. This is to prevent false alarm if the side of the paper roll is not clean. If you want the momentary status of the sensor, use* ***ESC ENQ 6*** *and extract the paper-near-end bit.*

ESC ENQ 004

1B 05 04 hex
27 5 4 decimal

Fonts and Logotype Enquiry

Requests multiple bytes of information regarding loaded fonts and logotypes.

EXAMPLE (↲= CR LF)

Send→ **ESC ENQ 04d**

Read← **0:7504 TTPMono 9↲**
1:14618 Arial 9↲
2: ↲
3: ↲
4: ↲
5: ↲
6: ↲
7: ↲
Free font memory:246122↲
00: ↲
01: ↲
02: ↲
03:14 110 Recycle↲
04: ↲
05:103 65 Warning↲
06: ↲
07: ↲
08: ↲
09: ↲
10: ↲
11: ↲
12: ↲
13: ↲
14: ↲
15: ↲
16: ↲
Free logotype memory:189512↲

ESC ENQ 006 — Status Report

1B 05 06 hex
27 5 6 decimal

Results in a 2-byte response, reflecting the status of each sensor. This command is intended as a go/no go indication. When everything is OK, this status report returns 0.

NOTE! *– If no weekend sensor is installed, 64 is returned when everything is OK. If no weekend or paper-near-end sensors are installed, 64+2=66 is returned when OK.*

First byte, bit No.:								Second byte, bit No.:							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Pending error code*	Print data exists**	Power has been OFF***	-	Error Black mark	Paper at wastebin	-	Buffer overflow	Wastebin fitted	Weekend sensor	Printhead lifted	Cutter not home	Paper at presenter	-	Paper-near-end****	Out of paper
Mask first reply byte with EDh								Mask second reply byte with FBh							

Table 5. Sensor status

TIP! – *Mask away the undefined bits in your application program to avoid having to change the application, if future firmware releases starts using them.*

* This bit indicates that an error code is available. Use **ESC ENQ 1** to fetch it.

** This bit tells you that there are data in the printer that have not yet been printed. There are two possible reasons for that:
1) The last command received by the printer was not a command that triggers a printout.
2) The printer is printing

*** When parallel cable is connected, both printer and host computer must have been off to set this bit. This is because the interface powers the RAM in the printer.

**** This paper-near-end bit differs from the **ESC ENQ 2** response, see page 40.

Bits 0, 3, and 5 in the first byte are reset when read.

ESC ENQ 007 — Firmware-version Enquiry

1B 05 07 Hex
27 5 7 decimal

Results in a 2-byte response representing the version of the installed firmware.

The first byte represents major versions, and the second byte minor versions.

If no firmware is loaded, the printer will answer with **00h**.

EXAMPLE

Send→ **ESC ENQ 07d**

Read← **<02h><29h>**

That is, a response with the value **<01h><29h>** indicates version 2.41.

ESC ENQ 009 — Serial-number Enquiry

1B 05 09 hex
27 5 9 decimal

Results in an 6-byte response representing the serial number.

EXAMPLE

Send→ **ESC ENQ 09d**

Read← **00h 00h 02h 2Bh C6h 28h** (hex), or **000 000 002 043 198 040** (dec)

ESC ENQ 010 — Control board revision Enquiry

1B 05 0A hex
27 5 10 decimal

Results in a 1-byte response representing the control board revision. A minus sign indicates that no revision has been made, while A indicates the first revision, and so on.

EXAMPLE

Send→ **ESC ENQ 10d**

Read← **n** Where **n** can be 'A' (ASCII) or41h (hex) or 065 (dec)

ESC ENQ 011 — Head temperature Enquiry

1B 05 0B hex
27 5 11 decimal

Results in a 1-byte response representing the temperature of the Printhead.

EXAMPLE

Send→ **ESC ENQ 11d**

Read← **n** Where **n** is a value representing the approximate temperature in Celsius.

ESC ENQ 012 — Bootware version Enquiry

1B 05 0C hex
27 5 12 decimal

Results in a 2-byte response representing the version of the installed bootware.

The first byte represents major versions, and the second byte minor versions.

EXAMPLE

Send→ **ESC ENQ 12d**

Read← **<001><030>**

That is, a response with the value **<01h><30h>** indicates version 1.48.

NOTE! – *The TTP 7020 and 7030 does not store boot program in the flash memory so this query will always be answered with <000><000>*

ESC ENQ c — Device ID Enquiry

1B 05 63	hex
27 5 99	decimal

Results in a string containing the device ID in the Windows Plug and Play string format. The two first bytes represent the string length.

EXAMPLE

Send→ **`ESC ENQ 99d`**

Read←`00d 106d` This indicates that the string is 104 characters (plus two characters indicating the string length)

Read← **`"MANUFACTURER:Swecoin AB;COMMAND SET:None;MODEL:TTP7020;CLASS:PRINTER;DESCRIPTION:Ticket Printer TTP7020;"`**

NOTE! – *The string shown here is just an example. Read out the actual string from your printer.*

ESC ENQ P n1 — Parameter-setting data Enquiry

1B 05 50 n1	Hex
27 5 80 n1	Decimal

This command requests information about the setting of parameter n1, that is, the parameter value stored in flash PROM or any parameter value temporarily set by other ESC commands.

n1= 1 gives the setting of parameter 1, etc.
The parameter names are listed on page 50.

n1 = 0 gives a response where the first two bytes specifies the length of data to come (high-byte, low byte), and followed by a block of data for all parameters in the temporary setup.

ESC ACK n1 — Acknowledge Marker

1B 06 n1	hex
27 6 n1	decimal

n1 = One-byte marker. Range 1h to 255h

The "acknowledge marker" n is placed in the command queue and when the execution of commands reaches the marker it is sent back to the host computer. This is an addition to the status commands that pass the queue and are answered immediately when received.

EXAMPLE:

"Print data" `<LF><esc>p`**`<ESC><ACK><01h>`**

Wait for <01h>

`<RS><ESC><ACK><02h>`

Wait for <02h>

The printer will send **`<01h>`** when <print data> has executed and **`<02h>`** when the ejecting has been performed.

NOTE 1! — *You must wait for the acknowledge marker to return before sending any more data to the printer.*

NOTE 2! — *Acknowledge marker cannot be used for events that write to the flash PROM, for instance font loading. This is because the writing procedure erases the buffer, including the markers, and uses all RAM in the printer.*

5.4 Font loading

The printer can store 8 fonts in its flash PROM. The memory available for fonts is printed on the self-test printout. The character size is fixed[1], so you must load one font file for each character size you require. The fonts are given font numbers when they are loaded into the printer. The first font is assigned number 0 and the next font 1 etc. up to font 7. Parameter p14 “Font Selection” will determine what font to use when no font selection command has been received (see page 48).

You cannot erase a single font, but must erase font 4-7 with command **ESC & D,** or all eight fonts with **ESC & C**, then reload the fonts you wanted to keep.

Windows software for font generation and management is available on the Swecoin web site. If you need to load fonts in a non-Windows environment, use the **ESC & NUL** command.

The time required for processing the font data that is loaded is typically 15–20 seconds per font, excluding transfer time. During this time, any data sent to the printer will be lost.

NOTE! *— The font processing ends with a reset. The presenter motor runs momentarily to indicate that the printer is ready to be used.*

CAUTION! — *Loading to the flash PROM will erase the RAM completely since the RAM is used during the loading process. Any print data residing in RAM will thus be lost.*

5.4.1 File format

A font consists of a header describing the font, then data for every character in the font. The header has to be downloaded even if the font consists of a single character only. Below is a description of the font header.

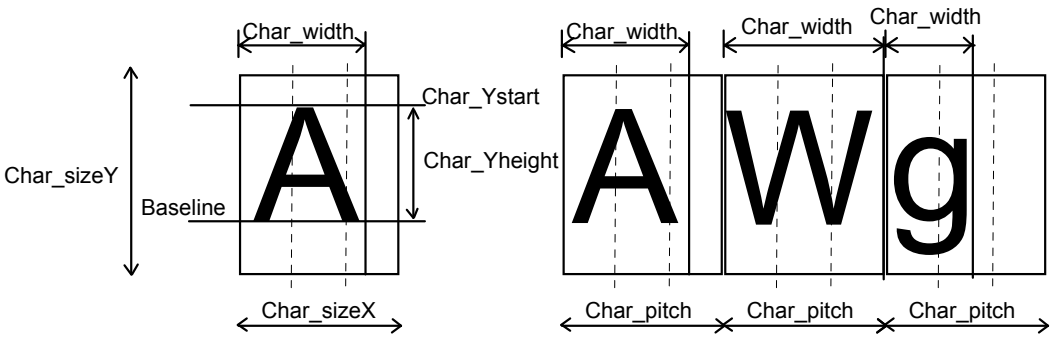
1 byte	Reserved	Should always be 0 (zero)
1 byte	Reserved	Should always be 0 (zero)
1 byte	Char. width (X)	The number of bytes required for the width of one character, usually 2 or 3. Range 1 to 8.
1 byte	Character pitch	The maximum width of one character in the set. This value is used for tab position calculation. Range 1 to 255.
1 byte	Char. height (Y)	The maximum height of one character matrix measured in pixels. This is also the minimum line spacing for this character set.
27 byte	Font name	String of characters used to identify the character set. This will be printed on status printouts. (E.g. Swiss 10 cpi.)

Char_matrix table: 256 records, each containing 3 bytes.

3 byte Char_width (pixels) + Char_Ystart(pixels) + Char_Yheight(pixels)

Char_bitmap data: Bitmap data for all characters that are to be defined.

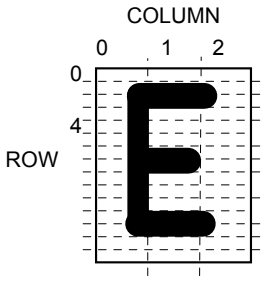
[1] Multiple height, and width commands can be used on all fonts.



Character bitmap data:

A character is made up of a bitmap the size of which is:

Char. width (X) * Char. Height (Y) bytes.



The bitmap data consists of bitmap patterns for each character in a character set for which the parameter Char_width in the Char_matrix table is set to a value between 1 and 24. A character that has its Char_width set to zero, is not included in the bitmap data.

The bitmap for one character is then defined according to the following table:

(COL 0, ROW Ystart) , (COL 1, ROW Ystart) , (COL 2, ROW Ystart)

(COL 0, ROW Ystart+1) , (COL 1, ROW Ystart+1) , (COL 2, Ystart+1)

.

.

(COL 0, ROW Ystart+Yheight), (COL 1, ROW Ystart+Yheight), (COL 2, ROW Ystart+Yheight)

In this example, each row consists of 3 columns equal to 3 bytes.

In order to minimize the required storage space, only rows between Ystart and Ystart+Yheight are included in the character bitmap.

5.5 Logotypes

Up to 16 logotypes can be stored in the flash PROM of the printer. The logotypes can be positioned and printed out with commands **ESC g** or **ESC L**.

The exact number of logotypes and their sizes is determined by the total amount of memory used for fonts, logotypes and loaded firmware. Make a test printout to see how much memory is available.

5.5.1 Loading

Windows software that converts black and white BMP bitmap files to logotypes and load them into the printer is available on the Swecoin web site. If you need to load logotypes in a non-Windows environment, use the **ESC & 1** command.

The time required by the printer to process logotype data, excluding transfer time from the PC, is typically 15 to 20 seconds, per logotype. During this time, any data sent to the printer will be lost.

5.5.2 File format

A header containing information about the logotype number, size and logotype name shall define each loaded logotype. Immediately after the header follows the actual bitmap of the logotype.

ESC & 01H <Header><Bitmap>

Header:

Byte 0 Logotype number used to identify the logotype when printing.

Byte 1 X size measured in bytes.

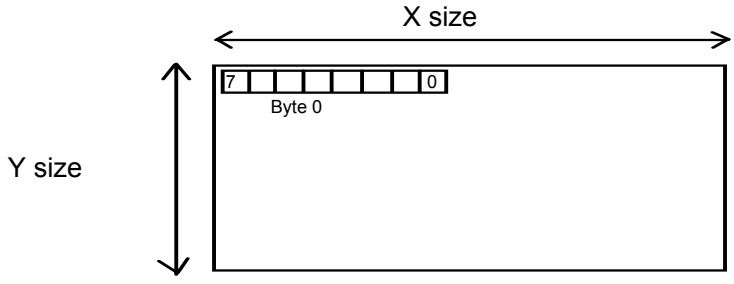
Byte 2 Y size measured in pixels.

Byte 3—15 A logotype name that will be printed on test printouts.

Bitmap:

The bitmap **must** have exactly (X size * Y size) number of bytes. 1=black, 0=white dot.

Bit No. 7 in byte 0 represents the top left corner of the logotype.



5.5.3 Printing

To print a logotype you can use two commands, **ESC L n1**, prints the logotype at the current cursor position, just like any character. **ESC g n1 n2n3 n4n5** prints the logotype at a specified X-Y position.

n1 One byte logotype number, (0—15)

n2n3 Two byte X position measured in pixels from the left hand edge of the print window.

n4n5 Two byte Y position in pixels from top of the page.
These bytes must always be inserted but they are ignored in variable-page-length mode where logotypes are always printed at the current Y-position.

5.5.4 Erasing

All logotypes are erased with the **ESC & L** command.

CAUTION! — *Loading to the flash PROM will erase the RAM completely since the RAM is used during the loading process. Any print data residing in RAM will thus be lost.*

5.6 Status reporting

The printer is equipped with a number of sensors that report the printer status and various error conditions such as out-of-paper, previous printout not removed, etc.

A good practice in unattended printer applications is to check for errors and paper availability before printing.

1. Send a Status Report Query (**ESC ENQ 6**, page 41) and check that the answer is "No errors"
2. If an error is indicated, read out the error message with Status Request (**ESC ENQ 1**, page 39), and take appropriate actions. Repeat this step until no more error code is available. If weekend sensor signals that paper is below this level, check again after next document is printed. If the sensor still signals a level below the weekend level after three successive print/check cycles, report the condition to the systems supervisor so that he can schedule a service visit to the printer. This three-cycle check is to ensure that dirt on the side of the roll does not cause the alarm.
3. Send a paper-near-end query (**ESC ENQ 2**, page 40) to see if the sensor reports low paper level.
4. If paper-near-end is indicated, report the condition to the systems supervisor so that he can schedule a service visit to the printer.
5. Print the printout.

NOTE 1! — A status reply must be read! *Sending a second status query without reading the reply of the first query may lock the printer.*

NOTE 2! — *When using a multitask OS, status queries and responses may not be transferred immediately from your application to the printer and vice versa. So write your program in such a way that it repeats the query if it gets a timeout or an invalid reply. Good practice is to ask once every 2-3 seconds, five times before giving up.*

NOTE 3! — *You should construct your application in such a way so as not to request status while printing, as this can result in loss of data.*

6 DEFAULT PARAMETER SETTINGS

Some of the printer settings can be stored in the flash PROM so that they will be used also after power OFF.

The stored parameter settings are printed out on the self-test printout.

The number in front of the function is the parameter number (n) used when setting the parameter with the command **ESC & P n v**.

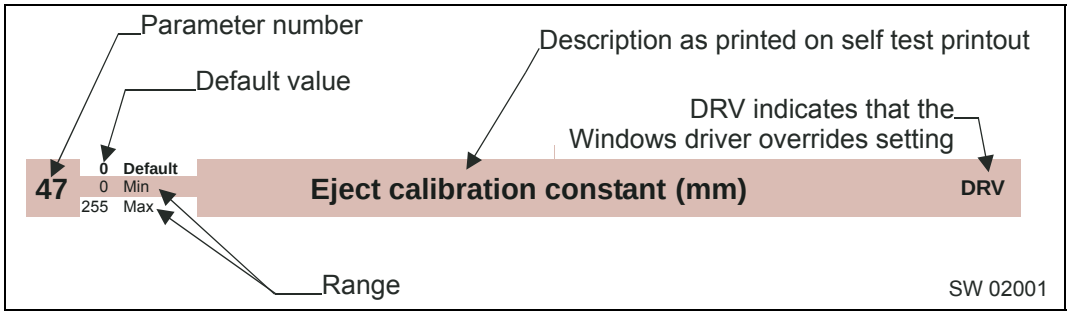
You can use the parameter settings pretty much like normal commands. Either send the parameter values with each printout, or set them up once and then send **ESC & 4h** to store all settings in the flash PROM.

You can always return to factory default settings by sending **ESC & F 10**, and then storing those settings with **ESC & 4h.**

NOTE 1! – *The parameters can be locked so that no changes are possible. Check parameter 53 on the self-test printout to find out.*

NOTE 2! – *If you try to set a parameter to an invalid value, the parameter will be set to the nearest valid value below.*

6.1 How the parameters are described



6.1.1 Default value

The default values indicated are "factory default settings" you get by sending **ESC & F 10**. These are not necessarily the settings that your printer was originally delivered with because many printers have customized settings when delivered.

6.1.2 Examples

Command examples are formatted in **Courier** and typed in the same way as used in the Swecoin TTP editor:

```
<ESC>&P<001><019>
```

Where <ESC> means the escape character 27 decimal (hex 1B). Numbers between less-than and greater-than characters, for example **<015>**, means 15 decimal (hex F).

6.2 Summary of parameter settings

Parameter	Description	ESC&F <010> Default	Page
1	Baud rate	96 (9600 Baud)	50
2	Data bits	8	50
3	Parity	0 (No parity)	50
4	Flow control	2 (Hardware)	50
5	Disable parallel port signaling	0 (No)	51
7	Burn time	9	51
8	Print speed	17 (75 mm/s)	51
9	Presenter loop length	10 (32 cm)	51
10	Pulse control	1 (1 burn pulse)	52
12	Font attributes	0 (off)	
13	Line spacing	0 (Auto)	52
14	Font selection	0 (TTP Mono 9)	52
15 to **30**	Tab stop	4, 8, 12 etc.	52
33	CR/LF	0 (LF = CR/LF, CR=Ignored)	53
34	Auto cut after FF	0 (Off)	53
35	Black mark mode	0 (Off)	53
36	Document mode	1 (Variable)	54
37 and **38**	Page length, Minimum / fixed / BM	4, 0 (102.4 mm)	54
39	Max black mark length	50 (5 mm)	55
40	Min black mark length	30 (3 mm)	55
41 and **42**	Black mark cut offset	0, 0 (0 mm)	55
43 and **44**	Top margin	0, 0 (Disabled)	55
45	Wastebasket	3 (Eject and retract after 30 s)	56
47	Eject calibration constant	0	56
49	Bottom margin	1 (Auto)	56
51	Black mark level	50 (0.97 V)	57
52	Warning level	0 (Off)	57
56	Max status code	255	57

NOTE! – *When the printer is set up the way you like it to be, you send* ***`ESC & 4h`****, and all settings will be stored.*

6.3 Serial interface set-up

1	96	Default	**Baud rate[1]**
	24	Min	
	11	Max	

Sets the communication speed on the serial interface.

<ESC>&P<001><024>	2400 bps
<ESC>&P<001><048>	4800 bps
<ESC>&P<001><096>	9600 bps
<ESC>&P<001><019>	19200 bps
<ESC>&P<001><038>	38400 bps
<ESC>&P<001><057>	57600 bps
<ESC>&P<001><011>	115200 bps

NOTE! – *If you set an invalid value, the baud rate will return to the previous value.*

2	8	Default	**Data bits[1]**
	7	Min	
	8	Max	

Selects if 7-bit ASCII, or 8-bit, is used on the serial interface.

<ESC>&P<002><007>	7-bits (characters 0-127)
<ESC>&P<002><008>	8-bits (characters 0-255)

3	**0**	**Default**	**Parity[1]**
	0	Min	
	2	Max	

Select what parity to use on the serial interface.

<ESC>&P<003><000>	No parity
<ESC>&P<003><001>	Odd parity
<ESC>&P<003><002>	Even parity

4	**2**	**Default**	**Flow-control[1]**
	0	Min	
	2	Max	

Select what handshaking to use on the serial interface.

<ESC>&P<004><000>	No flow control
<ESC>&P<004><001>	Xon / Xoff [2]
<ESC>&P<004><002>	Hardware

[1] The new value is not valid until the parameters are stored and the printer restarted.

[2] DO NOT USE if you send any type of binary data like graphics data, status requests etc. Xon / Xoff only works when plain text is sent unidirectional *to* the printer. Graphics and status replies may well contain the Xon (11h) and Xoff (13h) characters and will obstruct the communication.

6.4 Parallel port setup

5 — 0 Default, 0 Min, 1 Max

Disable parallel port signaling

Pins 12 and 15 on the parallel port signals paper out and error. However, in an unattended kiosk you may not want this because it causes the host computer to stop communicating, and the operating system may display a banner on the kiosk screen.

By disabling the hardware signals, the kiosk software can for example use status commands to find out paper level and alert appropriate personnel when the level is low, then close the kiosk when paper is out.

<ESC>&P<005><000>	No, paper out and error signals are *not* disabled
<ESC>&P<005><001>	Yes, paper out and error signals are disabled

NOTE! — *When enabled, the hardware signal on pin 12 and 15 will block all communication until the error is corrected. This means that it will be impossible to ask for status.*

6.5 Print setup

7 — 9 Default, 1 Min, 15 Max

Burn time — DRV[1]

A long burn time gives darker print. On insensitive paper types you may have to increase the burn time to get an acceptable print quality.

8 — 17 Default, 1 Min, 17 Max

Max print speed[1] — DRV

The main reason to decrease the print speed is to enhance print quality, and to reduce the peak current consumption.

n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	**17**
mm/s	21	27	32	37	41	45	48	52	55	57	60	63	66	68	71	73	**75**

NOTE! — *Some settings result in printer chassis resonance causing excessive noise and deteriorated print quality*

9 — 15 Default, 3 Min, 255 Max

Presenter Loop length

Limits the maximum loop length. When the set length is reached, the printer ejects part of the printout and continues too print. You use this when you have very limited space for the loop inside the kiosk. Each step represents a 3.2-cm increment.

Setting the parameter to 0 disables the looping and feeds the paper straight out.

<ESC>&P<009><000>	Disable the loop
…	
<ESC>&P<009><007>	16 cm loop
…	
<ESC>&P<009><015>	48 cm loop

[1] DRV indicates that, when using Windows, the driver takes over this setting so please set appropriate value in the driver properties/document defaults.

10 — Print head pulse control

1 Default
0 Min
3 Max

Controls what the printer does with buffered data:

<ESC>&P<010><000> 1 burn pulse + history

<ESC>&P<010><001> 1 burn pulse

<ESC>&P<010><002> 2 burn pulses + history

<ESC>&P<010><003> 2 burn pulses

Adding history pulse enhances print quality. Dividing burning into two burn pulses reduces the peak current consumption.

13 — Line spacing

0 Default
0 Min
30 Max

The line spacing is normally set by the font height. With this parameter you can set a line spacing that is higher that the font height. Line spacing settings lower than the font height will be ignored.

<ESC>&P<013><030> 30 pixels or font height, whichever is the largest

14 — Font selection

0 Default
0 Min
7 Max

Store which font number is used if no font is specified. Font is selected using the "Select Font " command described on page 25. Selecting an invalid font gives a software error status message (invalid index).

15 to 30 — Tab stop

- Default
1 Min
255 Max

Stores 16 different TAB stop positions. The position is set in increments of 2.5-mm.

Tab position 255 sets a tab stop on the last position of the line. Use this if you want underline or reversed text to extend across the full paper width.

To set all tab stops at once, follow the procedure "Set several parameters at once" described on page 38.

To move a single tab stop, use the set parameter command **<ESC>&P**. for example:

<ESC>&P<015><010> Set the first tab stop 25 mm from the left margin.

Default positions are one TAB on each cm; that is parameter values 4, 8, 12 etc.

33 CR/LF behavior[1]

0 Default
0 Min
4 Max

Carriage Return and Line Feed can be interpreted in five different ways to suit different operating systems.

<ESC>&P<033><000>	LF = CR/LF	CR = Ignored
<ESC>&P<033><001>	LF = CR/LF	CR = CR
<ESC>&P<033><002>	LF = LF	CR = CR
<ESC>&P<033><003>	LF = LF	CR = CR/LF
<ESC>&P<033><004>	LF = Ignored	CR = CR/LF

NOTE! *– The character currently interpreted as LF converts text from the input buffer to pixels on the paper.*

34 Auto cut after FF

1 Default
0 Min
2 Max

Decides if the printer should cut after executing an FF command, or if it should just feed the form length.

<ESC>&P<034><000>	No cut
<ESC>&P<034><001>	Cut
<ESC>&P<034><002>	Forced cut at black mark (cuts directly when a black mark is detected). This works only if black mark mode is selected (n36=2).

35 Black mark mode

0 Default
0 Min
1 Max

When enabled, marks on the paper set the form length. Minimum one form length is always fed. If a black mark is found before that, the printer feeds to the next black mark, then cuts and ejects. This ensures that no small paper stripes are cut of and left in the printer. Note that this parameter is used when loading paper and when pressing the FF button. So even if black mark is enabled in the Windows driver and works, parameters for black mark must be set up correctly.

<ESC>&P<035><000>	Normal
<ESC>&P<035><001>	Black mark synchronization enabled

[1] v=0 is suitable for Windows, v=1 for UNIX, v=2 for DOS, and v=4 for Macintosh

36 — Document mode — DRV

1	Default
0	Min
2	Max

Determines what should control the page length:

`<ESC>&P<036><000>` Fixed Document Mode. Shorter documents will automatically be extended, while longer documents will be divided into several pages of the desired length.
Page length will be the length set by parameters 37 and 38

`<ESC>&P<036><001>` Variable Document Mode. The length of the page varies with the contents (printouts shorter than the value specified by parameters 37 and 38 will be extended to that length)

`<ESC>&P<036><002>` Black Mark Mode. Marks on the paper set the form length. Minimum one form length is always fed. If a black mark is found before that, the printer feeds to the next black mark, then cuts and ejects. This ensures that no small paper stripes are cut of and left in the printer.

NOTE! – *Max page length in Fixed Document Mode is A5-size, which is 148.5 mm.*

37 & 38 — Page length — DRV

4 , 0	Default
2 , 224	Min
255 , 255	Max

Defines three different things:

1) The minimum length of a page in variable document mode
2) The actual page length in fixed document mode
3) The distance between black marks in black mark mode

One step is 0.125 mm. Settings shorter than 75 mm, will be interpreted as 75 mm.

`<ESC>&P<037><005><ESC>&P<038><205>` Set page length to A5 (148.5 mm)

Length	p37	p38
75 mm	<002>	<088>
100 mm	<003>	<032>
112 mm	<003>	<128>
150 mm	<002>	<176>
200 mm	<006>	<064>
250 mm	<007>	<208>
300 mm	<009>	<096>

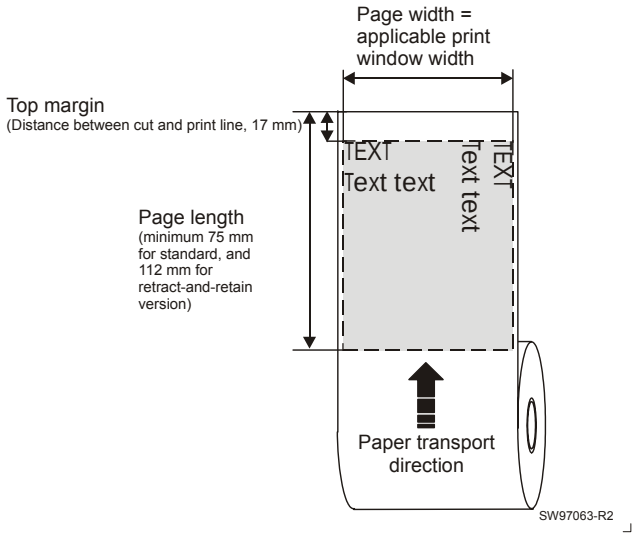


Figure 20. Definition of page size

Fixed document mode

Max *fixed document mode* page length is depends of the amount of free ram. Make a self-test printout to check how much is available in your printer. (Depends on firmware version).

$$Page\ length = \frac{Free\ RAM\ in\ bytes - 1024}{Paper\ width} - top\ margin - bottom\ margin$$

Paper length, top, and bottom margins are in pixel lines. Paper width is in bytes or mm. (1 byte = 1 mm.)

Example: if Free RAM on a TTP 70x0/112 is 114627 bytes, page width is 104 mm = 104 bytes, top margin is 20 mm, and bottom margin 10 mm (20 x 8 =160 and 10 x 8 = 80 pixel lines):

$$Page\ length = \frac{114627 - 1024}{104} - 160 - 80 = 852\ pixel\ lines = 106\ mm$$

If a too large fixed page is specified the printout will be blank from memory full to the cut.

39 — BM (black mark) length — DRV

50 Default
16 Min
160 Max

Specifies the length of the black mark in 0.125-mm steps. Measure the length of the black mark on your paper and enter that value here.

Marks 5 mm longer than this value are interpreted as paper out. The default value of 80 equals 10 mm.

`<ESC>&P<039><040>` Sets max black mark length to 5 mm.

40 — Min BM (black mark) length "Garbage Filter" — DRV

30 Default
15 Min
159 Max

Specifies the minimum length of the black mark in 0.125-mm steps. Shorter marks are ignored. The default value of 24 equals 3 mm.

`<ESC>&P<040><036>` Sets min black mark length to 4 mm.

41 & 42 — BM (black mark) cut offset — DRV

0 , 0 Default
0 , 0 Min
255 , 255 Max

Defines the paper feed between the black mark detection and cut. One step is 0.125 mm.

`<ESC>&P<041><001><ESC>&P<042><144>` Feeds 50 mm between black mark and cut.

43 & 44 — Top margin

0 , 0 Default
0 , 0 Min
255 , 255 Max

Defines the distance between the top of the paper and the top of the first text line in 0.125 mm steps. The top margin feed is effectuated when the presenter is cleared from the previous page.

0 = disabled top margin. This gives the physical top margin of the printer, which is 17 mm.

Avoid settings 1 – 16 mm because then the printer must reverse the paper before starting to print, which may cause paper jam, especially at small roll diameters.

`<ESC>&P<043><000><ESC>&P<044><240>` Add 30-mm top margin.

45 Waste basket mode DRV

3 Default
0 Min
130 Max

Sets the function of the "retract and retain" function. If no retract unit is fitted, the printer will eject the page when the set time has elapsed.

`<ESC>&P<045><000>`	Eject page when new page is printed. (Wastebasket disabled)
`<ESC>&P<045><003>`	Eject page when new page is printed. Page not taken after 30s will be retracted. (Range 1-30, 1 step = 10 s)
`<ESC>&P<045><100>`	Retract page when new page is printed
`<ESC>&P<045><103>`	Retract page when new page is printed. Page not taken after 30s will be retracted. (Range 101-130, 1 step = 10 s)

47 Eject calibration constant DRV

40 Default
0 Min
255 Max

Sets the eject length of the printout, that is the length of paper that protrudes outside the printer after a cut command. This eject length should be 40-63 mm. Marks on the test printout show max and min eject length.

The default value when loading firmware is 40, but should be set individually from printer to printer. The set value is shown in a line on the test printout.

After sending the command, store the parameters, and wait until the presenter motor buzzes. Then make a self test printout to check if the set eject length is correct.

EXAMPLE:

```
<ESC>&P<047><050>
<ESC>&<004>
```

This examples sets parameter 47 to 50 and stores the parameters as default settings

49 Advance before cut (Bottom margin) DRV

1 Default
0 Min
1 Max

Selects if the cut command cuts at the position where the paper is at, or if the printer should advance the paper before cutting.

`<ESC>&P<049><000>`	Off
`<ESC>&P<049><001>`	Automatic Distance Calculation

"Automatic Distance Calculation" means advancing the paper with the Head-To-Cutter distance (17 mm on the TTP 70x0).

Set to 1 if the printer is used in text mode and 0 if it is used from a driver that takes care of this in the driver.

NOTE! – *The paper is advanced before the FF command calculates the page length to see if the page length is longer than the set minimum length.*

51 Black mark sensitivity DRV

50 Default
0 Min
255 Max

This parameter is used by command ESC # to store the calibration of the black mark sensor. Normally there is no need to set this parameter manually.
0 is white and 255 is pitch black (out of paper).

NOTE! – *This parameter is not available on printers with hardware revision A of the control board. The revision is printed on the test printout.*

52 Warning level

0 Default
0 Min
255 Max

Turns on/off indication of Paper near end and Weekend paper lever on the status indicator (Figure 1). This affects only the status indicator, not the status enquiries

<ESC>&P<052><000>	No indication
<ESC>&P<052><001>	Paper Near End indication
<ESC>&P<052><002>	Weekend level indication
<ESC>&P<052><003>	Paper near end and weekend indication

56 Max status code

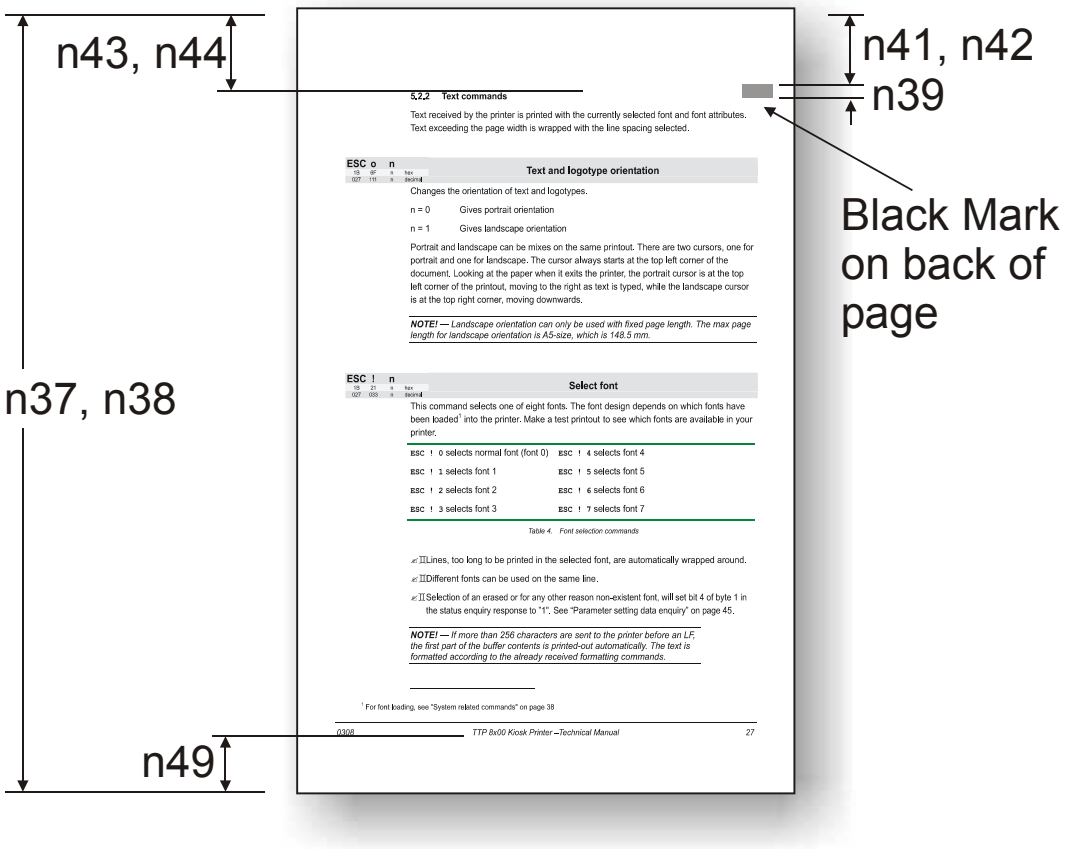
255 Default
0 Min
255 Max

This will control the highest status code that is reported by **<ESC><ENQ><006>** and **<ESC><ENQ><001>** (Pending-status-code bit). You use this if your kiosk software is not written so it masks away unknown status messages.

Example: If you want the status reply from firmware 3.0 to be compatible with software written for TTP 7000, set parameter 56 to 6h and error codes 7 and up will not be reported.

7 PAGE SETUP

7.1 Printable area



Top margin, bottom margin, page length, and synchronization with preprint are set up with parameters in the printer.

7.2 Aligning preprint and thermal print

The printer can synchronize the cutting of the printout with black-marks printed on the back of the paper. You use this function when you have preprint on the media and you don't want a cut in the middle of that preprint, or text printed on top of the preprint.

The sensor used to detect the black-marks is the same sensor as used for paper end detection. It is positioned 9 mm from the edge of the paper on the side of the **blue** release arm, and 25 mm behind the cutter (as seen from the presenter [output] side of the printer). The sensor accuracy is about ±0.5 mm so avoid designing printouts with too high demands for synchronization.

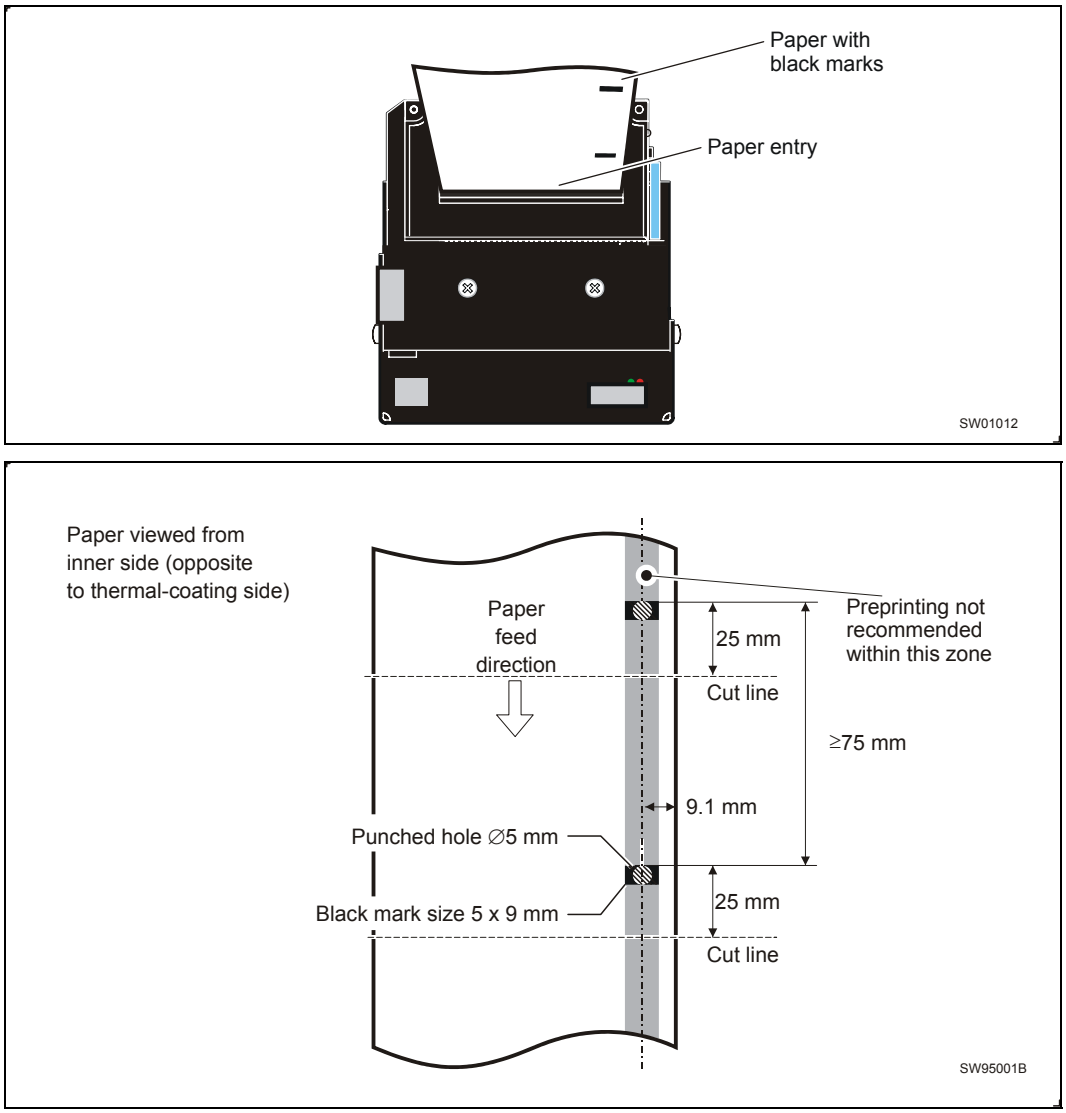


Figure 21. Recommended black mark size and position

The sensor triggers on the black-to-white transition of the black-mark, which is when the black print ends (trailing edge).

Since the same sensor is used for both paper end and black-mark detection, the printer must know the length of the black-mark to avoid signaling end-of-paper when it detects a black-mark. The default setting accepts black-marks in the range 3 –16 mm, and works perfectly with the recommended black-mark length of 5 mm. Marks shorter than 3 mm are interpreted as dirt, and marks longer than 16 mm as out-of-paper. You can change both these values by changing the printer default settings.

Black mark mode is selected by setting parameter 35 to 1, and storing the parameters.

NOTE! – *It is essential that you store the parameters in the printer for black mark synchronization even if you enable black marks in the Windows driver. This is because Windows is not used at paper loading, and feeding with the FF button on the printer.*

7.3 Parameters used

7.3.1 Parameter n35 Black mark

Enables/disables black mark check.

7.3.2 Parameters n37 and n38 - Page length minimum

Measure the distance from the trailing edge of one black mark to the trailing edge of the next. The resolution is 0.125 mm so multiply the distance by 8, then calculate the value to enter as n37 and n38.

Example: If the page length is 100mm,
(100 x 8) / 256 = 3.125.
n37 is the integer value, that is 3, while
n38 is the fraction, 0.125 x 256 = 32

7.3.3 Parameter n39 – Max Black Mark length

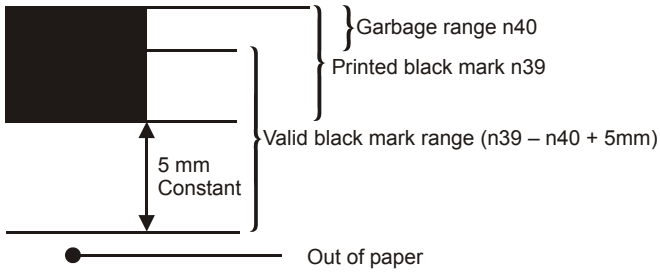
Measure the height of the black mark. The resolution is 0.125 mm so multiply the black mark length (in millimeters) by 8 and enter the value as n39.

7.3.4 Parameter n40 – Min Black Mark length (Garbage Filter)

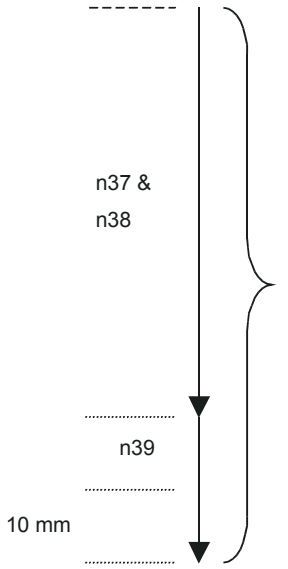
This parameter is actually a filter to filter-out garbage on the paper. If a spot is smaller than this value, it will not be regarded as a black mark. 1. About ⅓ of the black mark length is usually a suitable setting.

GARBAGE, BLACK MARK AND OUT OF PAPER DETECTION

For every step the paper is feed, the black mark sensor is sampled to detect garbage, black marks or out of paper.



When the printer detects blackness is has to check if it is only garbage; if the paper gets white again within n40 x 0.125 mm, then it is garbage and the spot is ignored. If it is still black after n40 x 0.125 mm, it is probably a black mark.

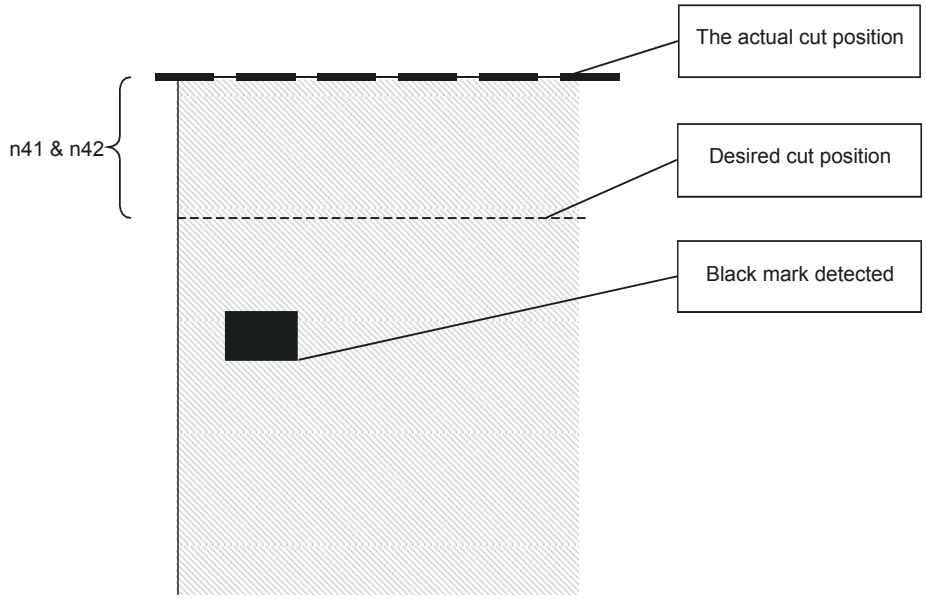


If the paper gets white within an additional n39-n40 plus 5 mm then it is a Blackmark. The 5-mm is a constant added to make sure that noise on the edge not will interfere with the samples. If it at this point still is still black we have detected out of paper.

Be careful about n40 and n39. If n39 – n40 is too small, then the minimum detection area will be too little. This area should not be less than 2 mm.

7.3.5 Parameter n41 and n42 –Black mark cut offset

After the black mark is detected (black to white change) the printer feeds another distance to place the paper in cut position. This distance cannot be negative so placing the black mark too close to the paper edge is better than too far away.



(ESC x n1 n2 is an obsolete command that sets n41 and n42. It is implemented for backward compatibility with old drivers. Set parameters n41 and n42 with the ESC & P n1 n2 command instead.)

FF (FORM FEED)

Use FF to print the buffer content, go to the next top of form (black mark), and cut the paper.

ESC Z (GO TO NEXT TOP OF FORM)

Use ESC Z to move the paper to the next top of form. This is practically a Form-Feed without printing and cut. It searches for the next black mark for maximum one page length + black mark length (256 x n37+n38 + n39)/8. An additional length of 20 mm is added to be sure to pass the edge of the next black mark. If there is no black mark within the set distance plus 20 mm, an error is raised.

7.3.6 Example

The commands are used together in the following way:

The following examples are not made for a specific programming language or editor, but can be implemented with the tools of your choice. The data sent **to the printer** are marked with "Send→".

When setting up the printer:

Send→	`ESC & P 35d 1d`	Enables black mark sync
Send→	`ESC & P 37d 4d`	Sets distance between two black marks
Send→	`ESC & P 38d 0d`	n37=4d and n38=0d gives 128 mm
Send→	`ESC & P 39d 80d`	Sets max Blackmark to 80 x 0.125 = 10mm
Send→	`ESC & P 40d 24d`	Sets max Blackmark to 24 x 0.125 = 3 mm
Send→	`ESC & P 41d 0d`	
Send→	`ESC & P 42d 200d`	Sets Blackmark offset to 200 x 0.125 = 25mm
Send→	`ESC & P 43d 0d`	
Send→	`ESC & P 44d 0d`	Sets Blackmark top margin to 0mm
Send→	`ESC & 4d`	Stores the above parameters as default parameters.

The above sets up and stores the parameters in the flash prom of the printer, so this need only be sent once to the printer when setting it up for Blackmark sync.

Document:

Send→	the text and graphics

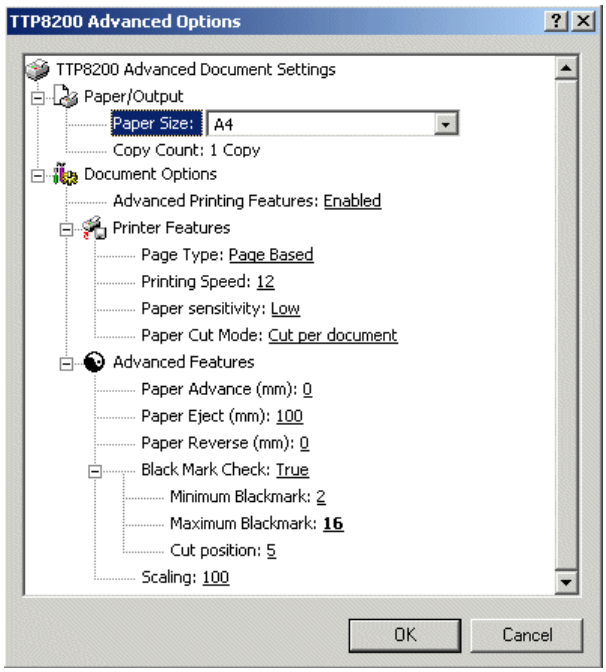
At the end of the document:

Send→	`ESC Z`	Feeds the printout to the next black-mark + the additional feed specified by the `ESC x` command.
Send→	`RS`	Cuts and ejects the printout.

Simple calibration process:

1. Enable black mark mode by setting parameters n35 to n42 as described on the previous pages.
2. Load paper with black marks into the printer
3. Send the `ESC #` command and wait until the paper stops
4. If the paper has returned to it's original position, the calibration is finished
5. If not, it was not possible to distinguish the black mark. Check the n37 and n38 settings and try again).
6. Save the settings with `ESC & 4`

7.4 Black-mark sensing from within "Windows"



In Windows, the printer driver controls when the paper is cut and ejected. Settings in the driver take over form the default parameter settings in the printer.

The settings are available in the Windows *Printing Preferences Menu*, in the Advanced Options window. The names of the options boxes differ between driver versions, but the same settings are available:

You set n35 to 1 by setting
Black Mark Check: True

You set n37, n38 by setting
Paper Size. If no standard paper size is corresponds to the page length you have, create a new form with that length in the Windows "Printer Server Properties".

You set n39 by setting
Maximum Black mark: to the length of the black mark on your paper

You set n40 by setting
Minimum Blackmark: to the value you want for scrap filter

You set n41, n42 by setting
Cut Position: to the length of transport that you want between black mark and cut.

HINT! – *When everything is set up correctly and the printer prints as it should; print a page, then without switching the power off, send the store parameters command ESC & 04h to the printer (for example using the PRTMON.EXE program from www.swecoin.se. If you do this, parameters that the driver uses are stored in the printer as default parameters. This way the printer synchronizes on black mark also when you load paper, if you press the FF button, etc.*

8 INTERFACE

The printer has one standard interface and an optional serial interface. There are no selections to be made, but only one interface can be used at a time. The printer will not function properly if data is received on more than one interface at a time.

NOTE! *— If you use the printer through a Windows driver, you need not read the rest of this chapter.*

8.1 Parallel, TTP 7020

The TTP 7020 parallel port is bi-directional and support Compatibility and Reverse-Nibble modes.

NOTE! *– If you intend to use any other mode than Compatibility Mode, we recommend you to get the documents for the IEEE-1284 standards, and study them thoroughly.*

Pin Host IEEE1284-A (D-Sub)	Direction	Pin Printer IEEE1248-C	Compatible Signal names	Nibble and byte mode Signal names
1	⇨	15	nStrobe	HostClk
2-9	⇨	6-13	Data	Data
10	⇦	3	nAck	PtrClk
11	⇦	1	Busy	PtrBusy
12	⇦	5	PError	AckDataReq
13	⇦	2	Select	Xflag
14	⇨	17	nAutoFd	HostBusy
15	⇦	4	nFault	nDataAvail
16	⇨	14	nInit	nInit
17	⇨	16	nSelectIn	IEEE 1284 Active
18-25	GND	19-35	Ground	Ground
	+⇨	18	Host Logic High	
	.⇦	36	Peripheral Logic High	

Table 6. Signal names for the parallel port.
Signal names starting with "n" are active LOW signals

8.1.1 Error signaling

All errors that are not reset when status is read will set the nFault signal, for example:

- Head lifted
- Cutter not home
- Out of paper

This error also sets the Paper Out/End (PE) together with nFault:

- Out of paper

NOTE! – *The signaling of nFault and PE can be switched on/off with parameter p5.*

8.2 USB, TTP 7030

The USB (Universal Serial Bus) is an interface designed to handle peripherals daisy chained to a single connector. The transfer speed is up to 12 Mbits/s, which is quite adequate for the printer. Use this interface in operating systems with USB support, for instance Windows XP. USB devices are Plug and Play compatible and hot swappable, which means that they can be connected and disconnected without turning off the power, or rebooting the computer.

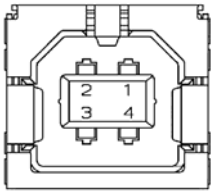
	Contact Number	Signal Name	Comment
	1	VCC	Cable power
	2	– Data	
	3	+ Data	
	4	Ground	Cable ground

Table 7. USB connector (J13) pin assignment

8.3 Serial (option on both TTP 7020 and TTP 7030)

The printer has a 10-pin connector on the control board. This connector can be used to connect to an external RS-232 adapter. See page 11 for installation instructions.

The transfer speed of the serial interface can be set to between 2 400 and 115 200 bits/s.

This low transfer speed limits the printing speed. Printing full-width graphics with 115 200 bits/s result in printing speeds of about 24 mm/s for the 80-mm version of the printer, and 16 mm/s for the 112-mm version.

Applications where text-only printouts are to be printed are suitable for serial interface because of its easy to use bi-directional capability.

Printer	2 (RXD)	3 (TXD)	4 (DTR)	5 (GND)	6 (DSR)	7 (RTS)	8 (CTS)
PC (9 pole D-sub)	3 (TXD)	2 (RXD)	6 (DSR)	5 (GND)	4 (DTR)	8 (CTS)	7 (RTS)

Table 8. Serial connector pin assignment

Setup options

Baud: *2 400, 4 800, 9 600, 19 200, 38 400, 57 600, 115 200 bits/s*
Flow control: *None, Xon / Xoff, or Hardware*
Data bits: *7/8*
Stop bits: *1 (fixed)*
Parity: *None, Odd, or Even*

Default settings: 9600 bits/s, 8-bits, No parity, 1 stop bit, and hardware flow control.

See also: Default parameter settings on page 48

9 MAINTENANCE

9.1 Fault finding

In connection with service of the printer it is good practice to remove paper dust and lint from the paper path, cutter and sensor areas. Paper dust, when accumulated, may interfere with printer functions such as optical sensors.

To avoid smudging the paper, do not apply oil on the cutting knife.

Symptom	Suggested actions
Nothing is printed when you press the feed-forward button in self-test mode, but the document is transported, cut and ejected.	• Check that the paper roll is turned the correct way with thermal sensitive layer facing up. • Check that the paper used meets the paper specification. See "Paper specification" on page 80. • Check that the print head ribbon cable is fully inserted into the connectors at each end.
Paper jam	• Check cutter-home switch.
Printer does not work at all	• Check that the paper release lever is lowered (print head presses against the paper). • Check that power is supplied to the printer. • Check the function of the paper-out sensor.
Self-test prints OK, but the printer works strangely in normal operation.	• Check that both ends of the interface cable are properly connected. • Application program might be incorrect. Contact system manager. • If using the serial interface, ensure that all communications parameters match the PC's serial port configuration
No cutting	• Check that the connectors for the cutting motor/home-position switch are fully seated on the control board.
Bad cutting (uneven top and bottom document edges).	• Switch OFF printer and remove any obstructing paper particles in cutter and presenter modules.
Inconsistent cutter operation	• Check cutter-home switch.
Paper is fed straight through the printer. Paper does not loop.	• Check presenter sensor. • Check setting of parameter p9.
Missing print or irregular spots.	• Paper may be too humid. Let it adapt to ambient temperature and humidity for approximately 24 hours before use. • The paper used might not meet the paper specification. See "Paper specification" on page 80.
White longitudinal lines in the printout.	• Faulty print head, replace print module.
Faint print.	• The paper used might not meet the paper specification. See "Paper specification" on page 80. • Clean print head with ethyl or isopropyl alcohol. • Adjust print contrast, see page 51.
Strange characters or graphics printed, or any kind of strange printer behavior.	• Might be caused by erroneous data sent from the host. Check validity of transferred data. • If using the serial interface, ensure that all communications parameters match the PC's serial port configuration

Table 9. Faultfinding

9.2 Cleaning the print head

The print head can be cleaned without removal.

1. Tilt the print module backwards.
2. Lift the print head with the print head release lever.
3. Clean the heat elements with a cotton swab immersed in ethyl or isopropyl alcohol.

9.3 Removing the print head

1. Tilt the print module backwards.
2. Remove the plastic lock from the print head pressure shaft.
3. Pull the print head shaft out so that it disengages from the inner bushing. Then turn it so that you can lift the lever end of the shaft up, and remove the shaft.

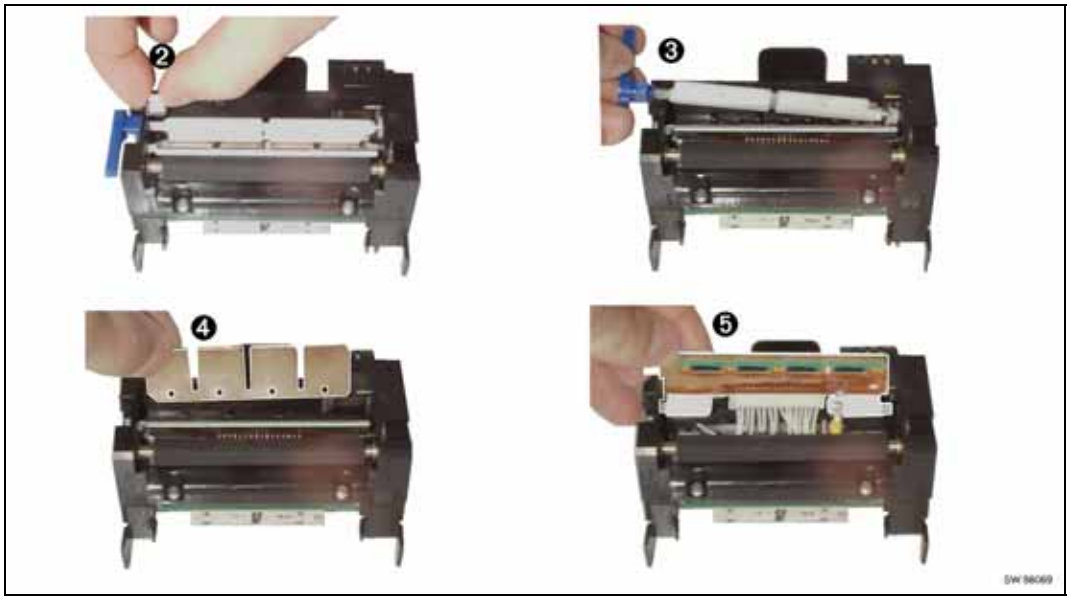


Figure 22. Loosening the print head

4. Remove the leaf spring pressurizing the print head.
5. Lift the print head.
6. Gently loosen the print head cable from the print head, making sure not to damage the flexible board of the print head.
7. Remove the print head.

9.4 Installing the print head

Install the print head in the reverse order.

***NOTE**! Make sure the spring on the print head pressure shaft is seated correctly.*

9.5 Printer disassembly

⚠ ***CAUTION!*** *Use standard procedures for handling of ESD sensitive components. Dismantling the printer will expose the control board with its sensitive electronics.*

WARNING! *The print module tilt mechanism can close like a mousetrap over your fingers. Make it a rule to always unhook the two springs from the print module when disassembling the printer.*

9.5.1 Tools required

- Phillips screwdrivers No. 1
- Nutdriver 5.5 mm
- Spring hook

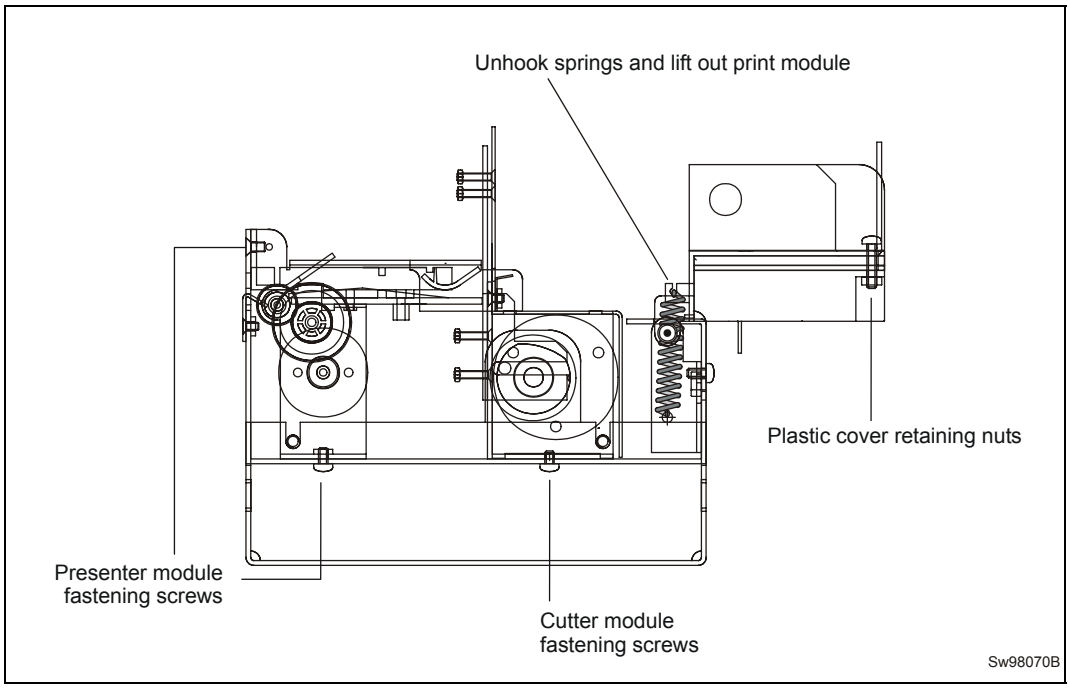


Figure 23. Screws for removing the different modules of the printer

9.5.2 Print module

REMOVAL

1. Remove the plastic cover by removing the two nuts holding it.
2. Disconnect the flat cable that interconnects the control board and the print module.
3. Flip the print module fully backward.
4. Unhook the two springs from the print module using a spring hook or a pair of pliers.
5. Return the print module to the normal operating position and lift it straight up.

REPLACEMENT

Install the print module in the reverse order.

9.5.3 Control board

REMOVAL

1. Loosen the four screws holding the control board module to the printer.
2. Remove the module and disconnect all cables from the control board.

3. Remove the four screws holding the board, and remove it.

REPLACEMENT

Install the control board in the reverse order.

NOTE! *– When the printer is assembled, load new firmware to the printer. See page 71.*

9.5.4 Cutter module

1. Loosen the four screws holding the control board module to the printer.
2. Remove the module and disconnect the cutter cable from J2 on the control board.
3. Remove the two screws holding the cutter module to the chassis.
4. Flip the print module back and lift the cutter module out of the printer chassis.

REPLACEMENT

Install the cutter module in the reverse order.

9.5.5 Presenter module

REMOVAL

1. Loosen the four screws holding the control board module to the printer.
2. Remove the module and disconnect the presenter module cable from J3 on the control board.
3. Remove the cutter module.
4. Remove the two screws and the plate holding the presenter module to the front of the printer chassis.
5. Remove the two screws holding the presenter module to the bottom of the printer chassis.
6. Slide the presenter backwards and lift it out of the printer chassis.

REPLACEMENT

Install the presenter module in the reverse order.

9.6 Replacement parts

Not all parts are replacement parts:

1. Screws, washers, nuts etc. are available in a common hardware store, and are thus not replacement parts.
2. Parts that are considered as *not* being worn by normal printer use are not replacement parts, for example the printer chassis.

Should you require any of these non-replacement parts, contact Swecoin for advice.

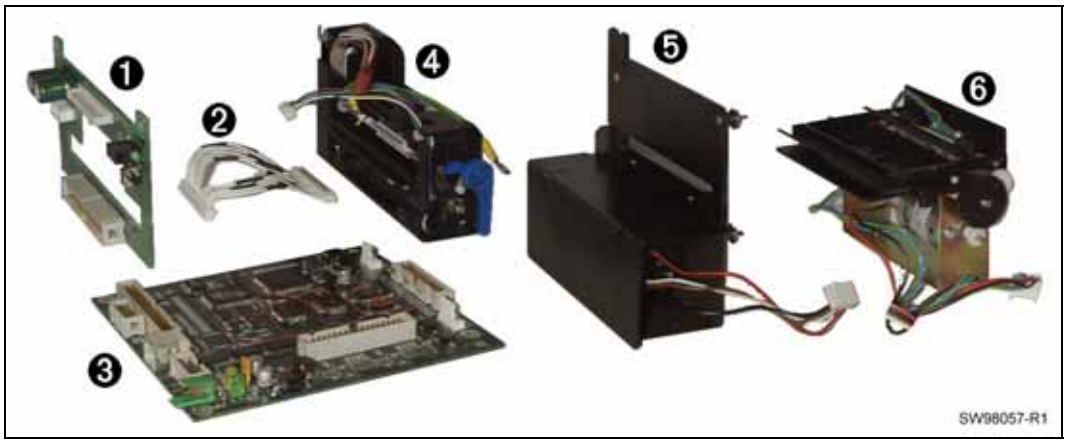


Figure 24. Replacement part modules

Item	Ordering No.		Designation	Quantity	Note
	80 mm	112 mm			
1+2+4	01544-080	01544-112	Print module	1	Complete with print head, connection board, and print head cable
2	01125-000		Print head cable	1	Included in print module
3	101877		Control board 7020	1	
3	101878		Control board 7030	1	
4	01136-080	01136-112	Thermal print mech.	1	
5	01121-080	01121-112	Cutter module	1	With motor, sensor, cable, and connector
6	101999	102001	Presenter module	1	With motor, sensor, cable, and connector

Table 10. Replacement parts

NOTE! *See also Ordering numbers on page 82.*

9.7 Fitting a shutter

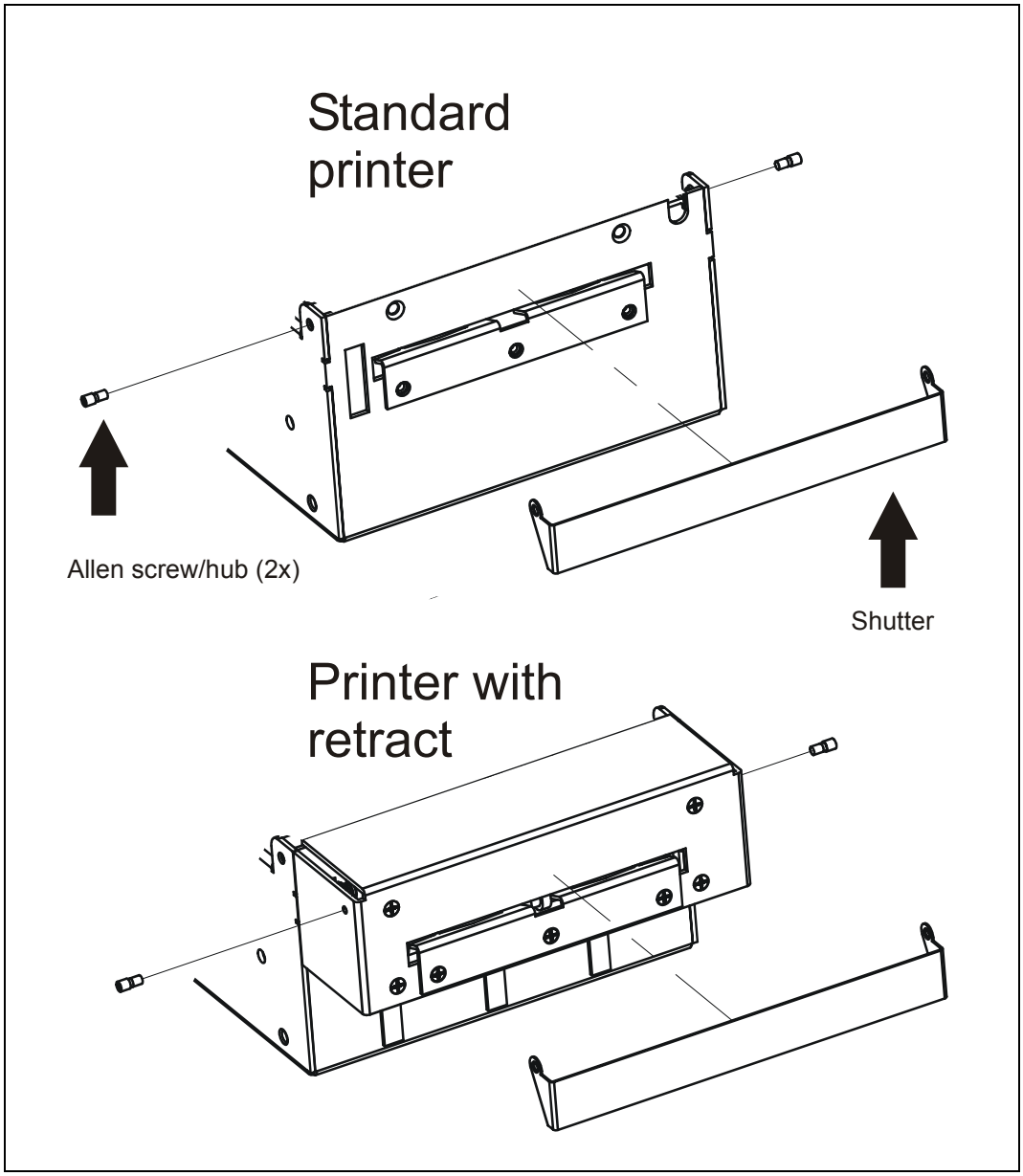


Figure 25. Fitting a shutter

The shutter kit contains a shutter and two hub-screws. In addition to this, you need an 1.5 mm Allen-key.

1. Fit one hub screw.
2. Hook the shutter onto the screw and insert the other screw, through the hole in the shutter and into the thread in the printer.
3. Make sure the head of the screw goes into the hole of the shutter and then tighten it.
4. Verify that the shutter opens/closes as it should by printing a couple of documents.

9.8 Firmware

The firmware is stored in flash-PROM on the control board. A replacement control board may not contain the same firmware version that you are currently using, so if you replace the control board for some reason, upgrade it to the firmware version you want to use.

9.8.1 Loading

NOTE! – *We recommend you to design your kiosk system so that remote upgrade of firmware is possible. If you need to upgrade firmware in the future, the kiosks can be spread over a vast area and upgrade can become very expensive.*

Fetch the firmware from the Swecoin web site http://www.swecoin.se. There you will also find a loader program (Windows™ software) facilitating the loading of the firmware into the printer.

The loader program contains a help file with detailed instructions on how to load the firmware into the printer.

In non-Windows environments, use the following procedure to load the firmware:

1. Send ESC NUL (1BH 00H) to the printer.
2. Wait 0.5 seconds.
3. Send the firmware file to the printer.
4. Wait until the printer buzzes to confirm that the loading is complete (the presenter motor runs for a second).

CAUTION! *The loading and burning can take up to one minute. Do not abort before one minute by turning OFF the power to the printer. Doing so may leave the printer in a state where new firmware cannot be loaded.*

9.9 Bootware

The control board uses a small program that we call bootware to start the board and makes it ready to receive firmware. Without bootware the board is dead and cannot communicate. After a proper firmware loading, the bootware is no longer necessary.

To load bootware:

1) Connect a jumper to short the pins of connector JMP1 on the control board.
2) Connect a serial adapter to control board connector J4.
3) Connect the PC to the serial port through a 01902-000 boot cable (this is a normal serial cable but pins 1 and 8 are interconnected in both ends).
4) Turn the printer ON.
5) Start the H83068.exe loader software.
6) Select boot file (1779-xxx.bin), and application file (1756-xxx.bin)
7) Press the load button
8) When loading is complete, remove the jumper from JMP1, and load fonts and set up parameters using for example the TTP editor.

9.9.1 Firmware history

Functions and features are being added from time to time affecting the firmware in the printer. The following table lists the changes of general interest.

Notice that the list may not contain the latest firmware versions. Please visit our web site http://www.swecoin.se for current information.

FW version	Change
1756-230	*First version released to customer.*
1756-230a	*Code128 barcode added*
1756-240	*Flash-memory programming verification routine updated.*
1756-241	*Reset from paper jam error by opening/closing print head*
1756-242	*The direction of cutter motor (TTP70x0) has been changed to avoid damaging cutter blade.* *Will now indicate head up when the print head is lifted.*
1756-250	*Bug fixes* 1. *Status bit for FF-button will now work.* 2. *Black mark handling with Wastebin fitted will now work.* 3. *Barcode with double height fonts, and text under barcode will now work as intended* 4. *Wastebin timer corrected so it now runs like a clock* 5. *Problem with forever spinning presenter solved* 6. *Reversed Italics and underlined text improved* *New functions* 1. *Lifting the head followed by pressing FF-button and then lowering the head again can now print the self-test printout.* 2. *Chip revisions (Parallel and/or USB) added to self-test printout, and burn time has been removed.* 3. *When in fixed document mode, the printer will temporary enter variable document mode during self-test printout.*

1756-300	*Small improvements* 1. *The printer will now retry three times (cut + clear presenter), when failing to clear the presenter.* 2. *Short delay (1 s) added before autoload starts, to avoid paper jam and limit noise at start of autoload.* 3. *Parameter n36 (Document mode) extended with "2-Black mark mode".* 4. *Parameter n49 defaults to 1* 5. *Parameter n56 "Max status code" added (default value: 255).* 6. *Print buffer handling Speeded-up* 7. *nFault (parallel port) will now be set on at types of general faults.* 8. *ESC 'P' + unknown, will terminate ESC 'P' command sequence.* 9. *Adding an ACK-marker will now force printout.* *Bug fixes* 10. *Parallel and USB IRQ are only enabled when detected* 11. *Speed-compensation when using long burn times and high speed improved.* 12. *The error state clean up process will make sure that a found ACK-marker will be answered before deleted.* 13. *The printer will no longer report PrintDataInBuffer when it's in TestMode, otherwise the driver will try to clear it up, and causing two-three extra empty receipts.* 14. *Fixed where the Feed Button stops responding [1756-256:A1].* 15. *Fixed the bug where ESC ENQ 06h reported an pending error, but ESC ENQ 01 said "No error"* 16. *The FF-button will now work regardless of how "AutoCut after FF" (parameter 34) is set.* 17. *The test receipt didn't print parameter 49 correctly, now fixed.*

Table 11. Firmware history

10 SPECIFICATIONS

Specification subject to changes without notice.

10.1 Print data

Printer control	Windows 98/ME/2000/XP, and Linux drivers. Direct addressing through ESC sequences
Plug and Play	Yes
Print method	Direct thermal line printing
Resolution	8 dots/mm (203 dpi)
Feed pitch	1/8 mm (203 lpi)
Print speed	Up to 75 mm/s
Print width	
80-mm version	72 mm, 576 dots
112-mm version	104 mm, 832 dots
Interfaces	TTP 7020: Parallel IEEE-1284 TTP 7030: USB Optional external RS-232 serial interface adapter is available for both TTP 7020 and TTP 7030.

Serial interface settings	*Baud:*	*2 400, 4 800, 9 600, 19 200, 38 400, 57 600, 115 200 bits/s*
	Data bits:	*7 or 8*
	Parity:	*None, Odd or Even*
	Stop bits:	*1 (fixed)*
	Flow control:	*None, Xon / Xoff, or Hardware*
	Default settings:	*9600 bits/s, 8 data bits ,no parity, 1 stop bit, no flow control.*

10.2 Text modes (non-Windows applications)

Orientation	Horizontal (portrait mode) and Vertical (Landscape mode)
Number of possible fonts: 8	
Font memory	Free memory depends on firmware version, see self-test printout
Font technology	Bitmap fonts, non scaleable
Font format	Swecoin proprietary
Standard fonts	TTP Mono 9, Arial 9, Symbol 9, Wingdings 10, and Code 39
Text attributes	Bold, underline, reverse print, multiple-width, multiple height. Attributes can be combined on the same text line.
Logotypes	16 logotypes can be stored in flash memory
Logotype memory	Free memory depends on firmware version, see self-test printout

10.3 Basic character set

The default fonts use Windows code page 1252 Western which contains ISO 8859-1 (ANSI) characters. You can use other character sets by creating and loading appropriate font files.

Characters 0 to 31 are control codes that cannot be changed, but 32 to 255 can be custom designed.

The table below shows the characters stored in flash PROM on the printer control board.

Dec	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
Hex	20	21	22	23	24	25	26	27	28	29	2a	2b	2c	2d	2e	2f
Key		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
Dec	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
Hex	30	31	32	33	34	35	36	37	38	39	3a	3b	3c	3d	3e	3f
Key	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
Dec	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
Hex	40	41	42	43	44	45	46	47	48	49	4a	4b	4c	4d	4e	4f
Key	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Dec	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
Hex	50	51	52	53	54	55	56	57	58	59	5a	5b	5c	5d	5e	5f
Key	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
Dec	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
Hex	60	61	62	63	64	65	66	67	68	69	6a	6b	6c	6d	6e	6f
Key	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
Dec	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
Hex	70	71	72	73	74	75	76	77	78	79	7a	7b	7c	7d	7e	7f
Key	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	A0127
	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	□
Dec	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
Hex	80	81	82	83	84	85	86	87	88	89	8a	8b	8c	8d	8e	8f
Key	A0128	A0129	A0130	A0131	A0132	A0133	A0134	A0135	A0136	A0137	A0138	A0139	A0140	A0141	A0142	A0143
	€	□	‚	ƒ	„	…	†	‡	ˆ	‰	Š	‹	Œ	□	□	□
Dec	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
Hex	90	91	92	93	94	95	96	97	98	99	9a	9b	9c	9d	9e	9f
Key	A0144	A0145	A0146	A0147	A0148	A0149	A0150	A0151	A0152	A0153	A0154	A0155	A0156	A0157	A0158	A0159
	□	‘	’	“	”	•	–	—	˜	™	š	›	œ	□	□	Ÿ
Dec	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
Hex	a0	a1	a2	a3	a4	a5	a6	a7	a8	a9	aa	ab	ac	ad	ae	af
Key	A0160	A0161	A0162	A0163	A0164	A0165	A0166	A0167	A0168	A0169	A0170	A0171	A0172	A0173	A0174	A0175
		¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬	-	®	¯
Dec	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
Hex	b0	b1	b2	b3	b4	b5	b6	b7	b8	b9	ba	bb	bc	bd	be	bf
Key	A0176	A0177	A0178	A0179	A0180	A0181	A0182	A0183	A0184	A0185	A0186	A0187	A0188	A0189	A0190	A0191
	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
Dec	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
Hex	c0	c1	c2	c3	c4	c5	c6	c7	c8	c9	ca	cb	cc	cd	ce	cf
Key	A0192	A0193	A0194	A0195	A0196	A0197	A0198	A0199	A0200	A0201	A0202	A0203	A0204	A0205	A0206	A0207
	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
Dec	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
Hex	d0	d1	d2	d3	d4	d5	d6	d7	d8	d9	da	db	dc	dd	de	df
Key	A0208	A0209	A0210	A0211	A0212	A0213	A0214	A0215	A0216	A0217	A0218	A0219	A0220	A0221	A0222	A0223
	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
Dec	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
Hex	e0	e1	e2	e3	e4	e5	e6	e7	e8	e9	ea	eb	ec	ed	ee	ef
Key	A0224	A0225	A0226	A0227	A0228	A0229	A0230	A0231	A0232	A0233	A0234	A0235	A0236	A0237	A0238	A0239
	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë				
Dec	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255
Hex	f0	f1	f2	f3	f4	f5	f6	f7	f8	f9	fa	fb	fc	fd	fe	ff
Key	A0240	A0241	A0242	A0243	A0244	A0245	A0246	A0247	A0248	A0249	A0250	A0251	A0252	A0253	A0254	A0255
		ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

Table 12. Code page 1252 character table

Dec	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
Hex	20	21	22	23	24	25	26	27	28	29	2a	2b	2c	2d	2e	2f
Key		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
		!	∀	#	∃	%	&	∍	(	)	*	+	,	−	.	/
Dec	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
Hex	30	31	32	33	34	35	36	37	38	39	3a	3b	3c	3d	3e	3f
Key	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
Dec	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
Hex	40	41	42	43	44	45	46	47	48	49	4a	4b	4c	4d	4e	4f
Key	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
	≅	Α	Β	Χ	Δ	Ε	Φ	Γ	Η	Ι	ϑ	Κ	Λ	Μ	Ν	Ο
Dec	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
Hex	50	51	52	53	54	55	56	57	58	59	5a	5b	5c	5d	5e	5f
Key	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
	Π	Θ	Ρ	Σ	Τ	Υ	ς	Ω	Ξ	Ψ	Ζ	[	∴	]	⊥	_
Dec	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
Hex	60	61	62	63	64	65	66	67	68	69	6a	6b	6c	6d	6e	6f
Key	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
	_	α	β	χ	δ	ε	ϕ	γ	η	ι	φ	κ	λ	μ	ν	ο
Dec	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
Hex	70	71	72	73	74	75	76	77	78	79	7a	7b	7c	7d	7e	7f
Key	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	A0127
	π	θ	ρ	σ	τ	υ	ϖ	ω	ξ	ψ	ζ	{	|	}	~	□
Dec	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
Hex	80	81	82	83	84	85	86	87	88	89	8a	8b	8c	8d	8e	8f
Key	A0128	A0129	A0130	A0131	A0132	A0133	A0134	A0135	A0136	A0137	A0138	A0139	A0140	A0141	A0142	A0143
	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
Dec	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
Hex	90	91	92	93	94	95	96	97	98	99	9a	9b	9c	9d	9e	9f
Key	A0144	A0145	A0146	A0147	A0148	A0149	A0150	A0151	A0152	A0153	A0154	A0155	A0156	A0157	A0158	A0159
	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
Dec	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
Hex	a0	a1	a2	a3	a4	a5	a6	a7	a8	a9	aa	ab	ac	ad	ae	af
Key	A0160	A0161	A0162	A0163	A0164	A0165	A0166	A0167	A0168	A0169	A0170	A0171	A0172	A0173	A0174	A0175
	□	ϒ	′	≤	⁄	∞	ƒ	♣	♦	♥	♠	↔	←	↑	→	↓
Dec	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
Hex	b0	b1	b2	b3	b4	b5	b6	b7	b8	b9	ba	bb	bc	bd	be	bf
Key	A0176	A0177	A0178	A0179	A0180	A0181	A0182	A0183	A0184	A0185	A0186	A0187	A0188	A0189	A0190	A0191
	°	±	″	≥	×	∝	∂	•	÷	≠	≡	≈	…	|	—	↵
Dec	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
Hex	c0	c1	c2	c3	c4	c5	c6	c7	c8	c9	ca	cb	cc	cd	ce	cf
Key	A0192	A0193	A0194	A0195	A0196	A0197	A0198	A0199	A0200	A0201	A0202	A0203	A0204	A0205	A0206	A0207
	ℵ	ℑ	ℜ	℘	⊗	⊕	∅	∩	∪	⊃	⊇	⊄	⊂	⊆	∈	∉
Dec	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
Hex	d0	d1	d2	d3	d4	d5	d6	d7	d8	d9	da	db	dc	dd	de	df
Key	A0208	A0209	A0210	A0211	A0212	A0213	A0214	A0215	A0216	A0217	A0218	A0219	A0220	A0221	A0222	A0223
	∠	∇	®	©	™	∏	√	·	¬	∧	∨	⇔	⇐	⇑	⇒	⇓
Dec	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
Hex	e0	e1	e2	e3	e4	e5	e6	e7	e8	e9	ea	eb	ec	ed	ee	ef
Key	A0224	A0225	A0226	A0227	A0228	A0229	A0230	A0231	A0232	A0233	A0234	A0235	A0236	A0237	A0238	A0239
	◊	〈	®	©	™	∑	⎛	⎜	⎝	⎡	⎢	⎣				
Dec	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255
Hex	f0	f1	f2	f3	f4	f5	f6	f7	f8	f9	fa	fb	fc	fd	fe	ff
Key	A0240	A0241	A0242	A0243	A0244	A0245	A0246	A0247	A0248	A0249	A0250	A0251	A0252	A0253	A0254	A0255
		〉	∫	⌠	⎮	⌡	⎞	⎟	⎠	⎤	⎥	⎦	⎫	⎬	⎭	□

Table 13. Symbol character table

10.4 Bar codes (non-Windows applications)

Orientation	Horizontal and vertical
Symbology	EAN, UPC, Interleaved 2-of-5, ISBN, Code39, and Code 128
Add-on	2, or 5 digit add-on can be added to EAN, UPC codes 5 digit add-on can be added to ISBN

10.5 Paper handling

Paper width	80 mm or 112 mm depending on model
Printout length	75–500 mm before partially ejecting printout. No upper limit for printout length. (112-500mm for Retract-and-retain versions of the printer)
Cutting	Guillotine cutter
Presenter operation	Stores the printout until it is fully printed and cut, then presents part of the printout to the customer. When the customer pulls the ticket, a sensor reacts on the pull and feeds out the full printout. Extremely long printouts can be partially ejected to limit loop buildup.
Eject length after cut	Programmable eject length. Full eject, or printout held until the customer removes it. Eject of uncollected printouts.
Printout retraction	Optional retract and retain function pulls back uncollected printouts and throws them in a wastebasket inside the kiosk.
Paper loading	Automatic feed, cut, and eject when paper is detected. Automatic "on-line" after successful paper load. Automatic synchronization to Top-of-form marks when black-mark mode is selected in the parameter setup.
Sensors	Optical sensors: Out of paper, paper left in presenter, paper pulled, paper near end (optional) and weekend level sensor (optional). Switch sensors: Cutter not in home position and print head lifted.

10.6 Printer dimensions

NOTE! *– Additional space is required for paper roll and handling.*

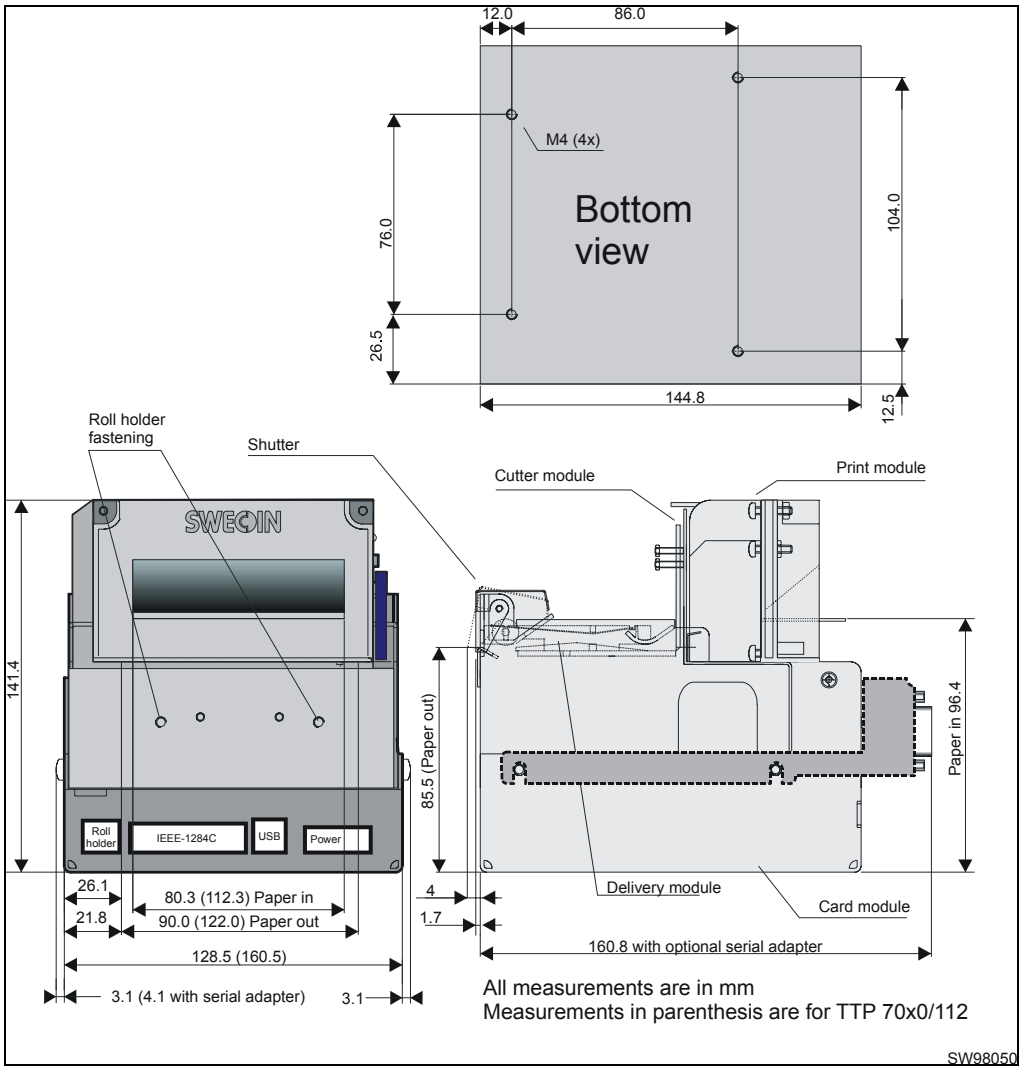


Figure 26. Measurements drawing

10.7 Environmental conditions

Temperature	Operating:	0 to +50 °C
	Storage and transportation:	–20 to +60 °C
Relative humidity	Operating:	35 to 75%, non-condensing
	Storage and transportation:	10 to 90%, non-condensing

10.8 Miscellaneous

Weight	2.4 kg (80 mm), 2.85 kg (112 mm)
Typical throughput	1.5 s/printout (length 75 mm, print, cut, and present)
Power requirements	
80 mm version	24Vdc ±10%, idle 150 mA, average 2.5A, peak 8.5A
112 mm version	24Vdc ±10%, idle 150 mA, average 3.5A, peak 11A
Life expectancy	Print head: more than 50 km paper, more than100 million pulse lines (typically) Cutter: 500 000 cuts (typically) Control board: 40 000 hours (typically)
MTBF[1]	250 000 printouts (typically)

10.9 Paper specification

10.9.1 General

Paper supply	Roll paper with heat sensitive coating (thermal paper)
Type of paper	TF50KS-E2C, AF50KS-E, Mitsubishi TF 8075, or equivalent is recommended
Number of layers	One
Paper weight	55—110 g/m²
Paper thickness	0.054—0.10 mm
Surface smoothness	450-s minimum according to Bekk TAPPI T 479
Reflection	80% minimum according to SCAN P3
Core	Paper or plastic
Core inner diameter	Minimum 25 mm
Paper end	Must not be glued to the core
Paper width	80 +0/–0.3 mm, or 112 +0/–0.3 mm depending on model
Paper length	Approx. 150 m (with 110-mm roll diameter and 65 g/m²) Approx. 250 m (with 150-mm roll diameter and 65 g/m²) Approx. 450 m (with 200-mm roll diameter and 65 g/m²)

10.9.2 Thermal coating

Thermal coating	Outer side
Sensitivity	Activated at approx. 68 °C saturated at approx. 75 °C.
Dynamic sensitivity	1.14 ±0.04 OD
Top coating	Standard, semi or UV (if applicable)

[1] MTBF figure does not include paper jam

10.9.3 Perforation

Tear-off perforation	Punching must be done from outer side (thermal coating side) with a sharp perforation tool.

10.9.4 Preprinting

General	To endure the heat developed during printing, the preprint must meet the requirements applicable for preprinting on paper intended for laser printing. OCR-blind ink must be used for preprint on the inner side of the roll. Ink used for preprinting on the thermal side must be non-abrasive. The ink must not smear while wound up on the supply roll or during the printing process.
Print side	One side or both sides.

10.9.5 Black mark size and position

See also page setup on page 58.

Print side	Inner side (opposite to thermal coating side)
Sensor position	25 mm before cutter, and 9.1 mm from left edge of ticket entry when seen from the front of the printer (on the side of the blue release arm).
Mark length range	3 to 18 mm, default 5 mm
Mark width	Minimum 5 mm centered on the sensor position, recommended width is 9 mm
Print density	Standard wet offset mode is recommended for printing of the black-marks. The full mark area must be printed. Screen-printing is not allowed. Measurement of print density must be performed relative to the white paper background. Using a MacBeth densitometer, the print density must be greater than 1.3. Anti-gloss filter is not allowed. Using a Gretag densitometer, the print density must be greater than 1.5. The reflection from the black-mark must be less than 10%. The reflection from the paper must exceed 80%.
Preprinting	Preprinting in the zone passing over the black-mark sensor is not recommended. If required, OCR blind type of ink must be used, (outside the 700-1100 nm range).
Punched holes	Punching must be done from the thermally coated side. Distorted print can be expected within a zone of approximately 2-mm around the edges of the hole. The function must be tested.

10.10 Ordering numbers

10.10.1 Printer assembly

Print Width:	80 mm	112 mm
TTP 7020 (parallel)	01767-080	01767-112
TTP 7020 with retract and retain function	01867-080	01867-112
TTP 7020 evaluation kit containing one basic printer with 150 mm roll holder and one each of the options marked with * in the options list, and a parallel cable. (Only one evaluation kit/customer.)	01798-080	01798-112
TTP 7030 (USB, no roll holder)	01768-080	01768-112
TTP 7030 with retract and retain function	01868-080	01868-112
TTP 7030 evaluation kit containing one basic printer with 150 mm roll holder and one each of the options marked with * in the options list, and an USB cable. (Only one evaluation kit/customer.)	01799-080	01799-112

10.10.2 Options

Print Width:	80 mm	112 mm
75 W Power supply unit (see figure 27) with 0.5 m PSU-to-printer cable*	01776-000	
150 W Power supply unit (see figure 28) with 0.5 m PSU-to-printer cable, on/off switch, and fuse	01035-014	
One sensor (paper-near-end) with 150 mm cable	01483-000	
Two sensors (paper-near-end + weekend) with 200 mm cable	01579-000	
IEEE-1284 cable, straight 1.8 m	01366-000	
IEEE-1284 cable, 90° angled 1.8 m	01366-090	
USB cable, 1.8 m	01542-000	
Serial adapter	01437-000	
Serial cable, 1.5 m	10825-000	
Paper roll, no preprint, for ∅110 mm roll holders, 65g/m²*	04767-000	04768-000
Technical manual*	01587-000	
Printer driver package, Windows 9x and NT4/2000/XP*	101368	
Shutter, mechanical	103150	103151

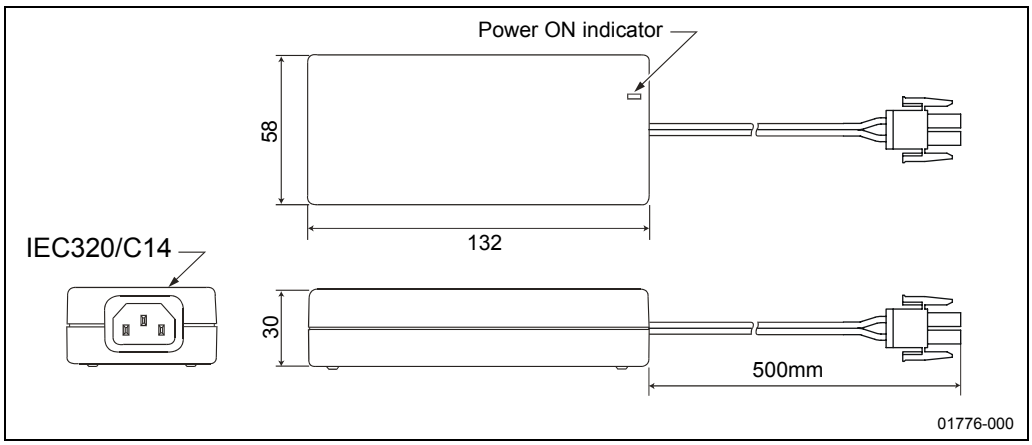


Figure 27. 75W Power supply unit.

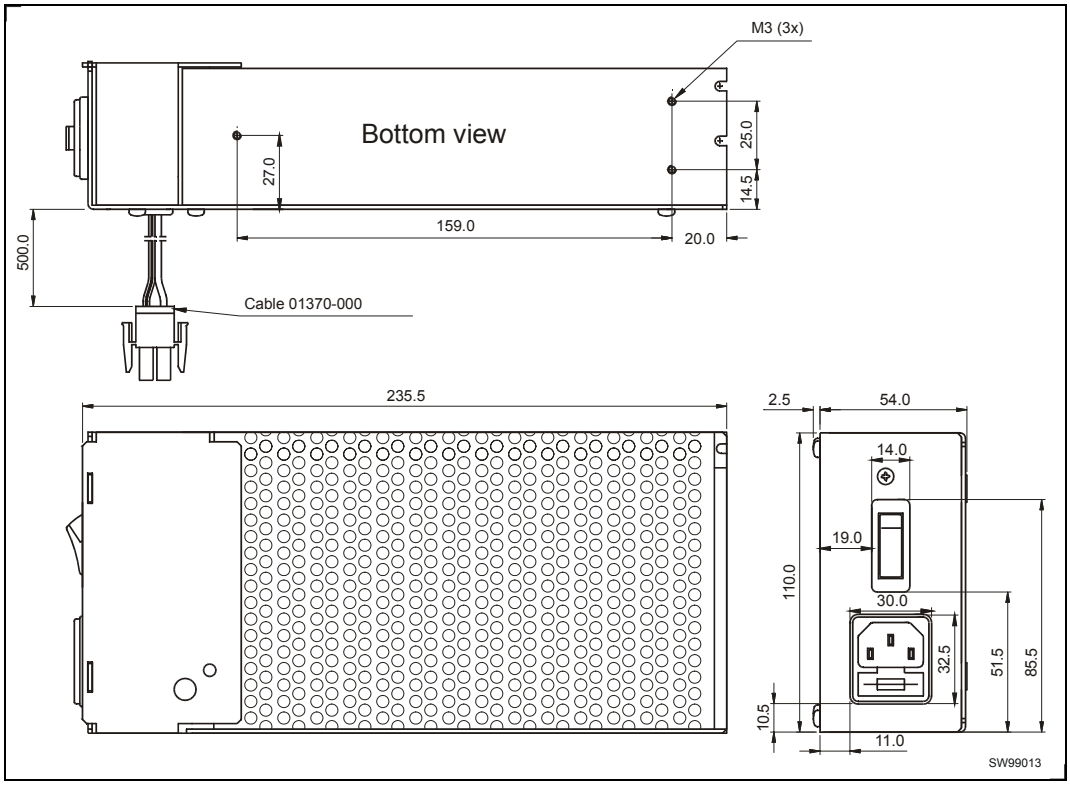


Figure 28. 150W Power supply unit.

NOTE! – *Mains cord is not included in the PSU's.*

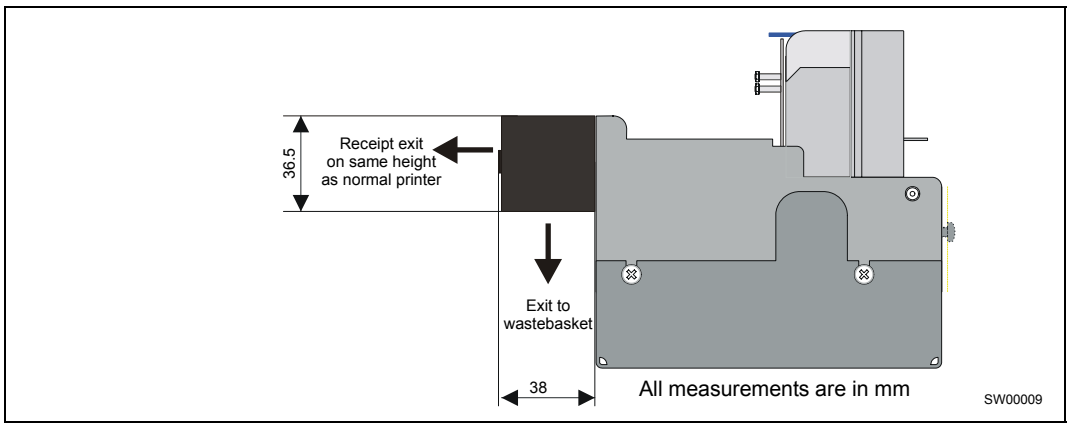


Figure 29. Retract and retain version.

Choose between four modes in the default parameter setup:

1. Retract when new printout is printed
2. Retract after a preset time
3. Eject to customer when new printout is printed (wastebasket off)
4. Eject to customer when new printout is printed, but retract if not collected within a preset time

No additional commands are required

NOTE! – *Use paper rolls with an inner diameter of 40 mm or more when using the "retract and retain" option.*

10.10.3 Roll holders

Print Width:	80 mm	112 mm
Paper roll holder for up to 110 mm roll diameter. With paper-near-end sensor.	01148-080	01148-112

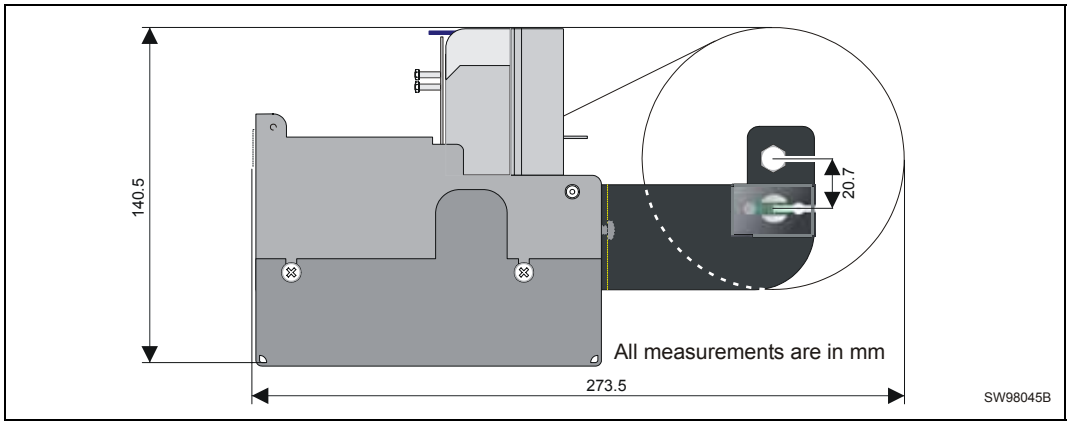


Figure 30. Roll holder for paper rolls up to 110-mm

Print Width:	80 mm	112 mm
Paper roll holder for up to 150 mm roll diameter. With paper-near-end sensor.	01123-080	01123-112

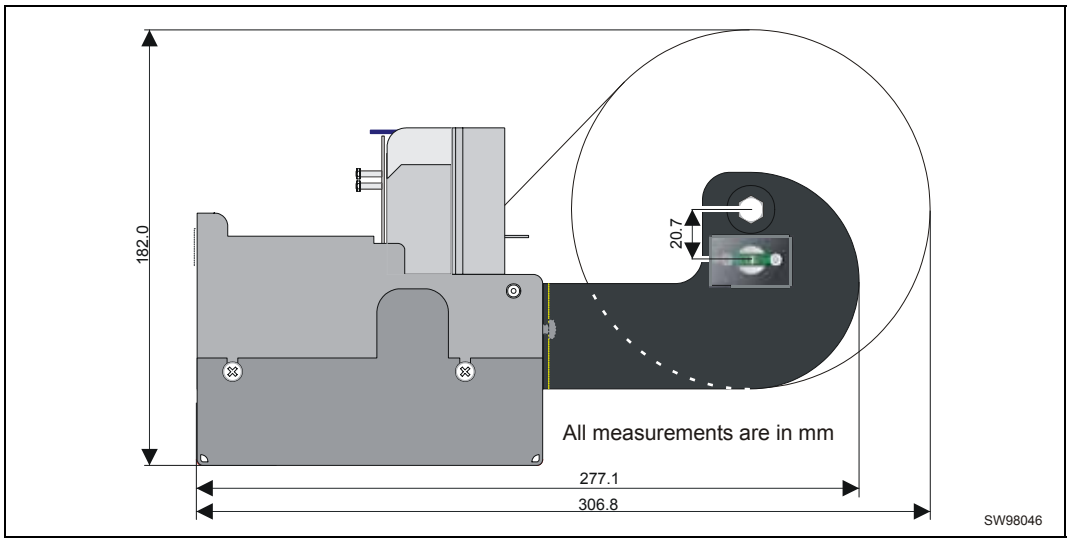


Figure 31. Roll holder for paper rolls up to 150-mm

	Print Width:	80 mm	112 mm
Paper roll holder for up to 200 mm roll diameter. With paper-near-end and weekend sensors.		01149-080	01149-112

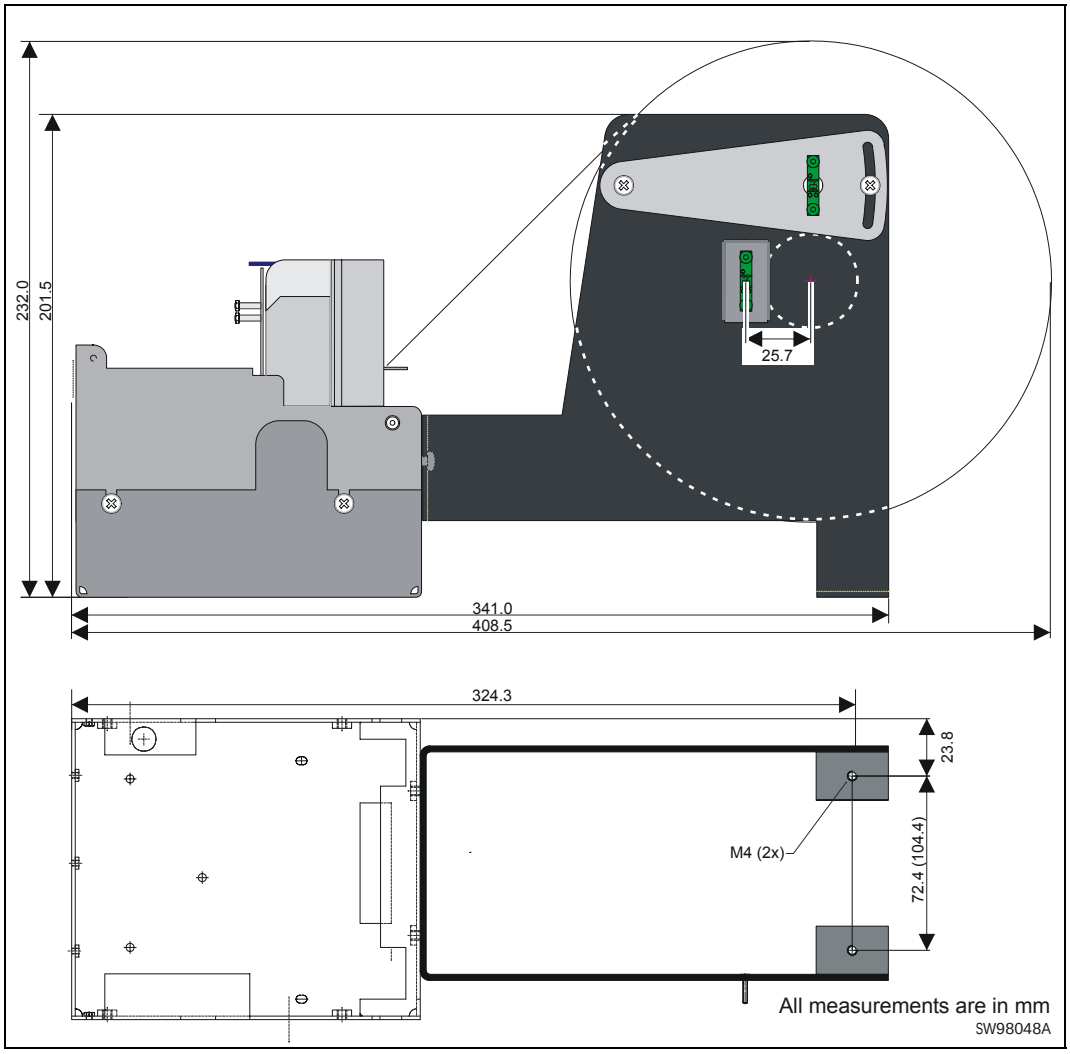


Figure 32. Roll holder for paper rolls up to 200-mm

	Print Width:	80 mm	112 mm
Paper roll holder for up to 150-mm roll mm roll placed below printer. With paper-near-end sensor.		01884-080	01884-112

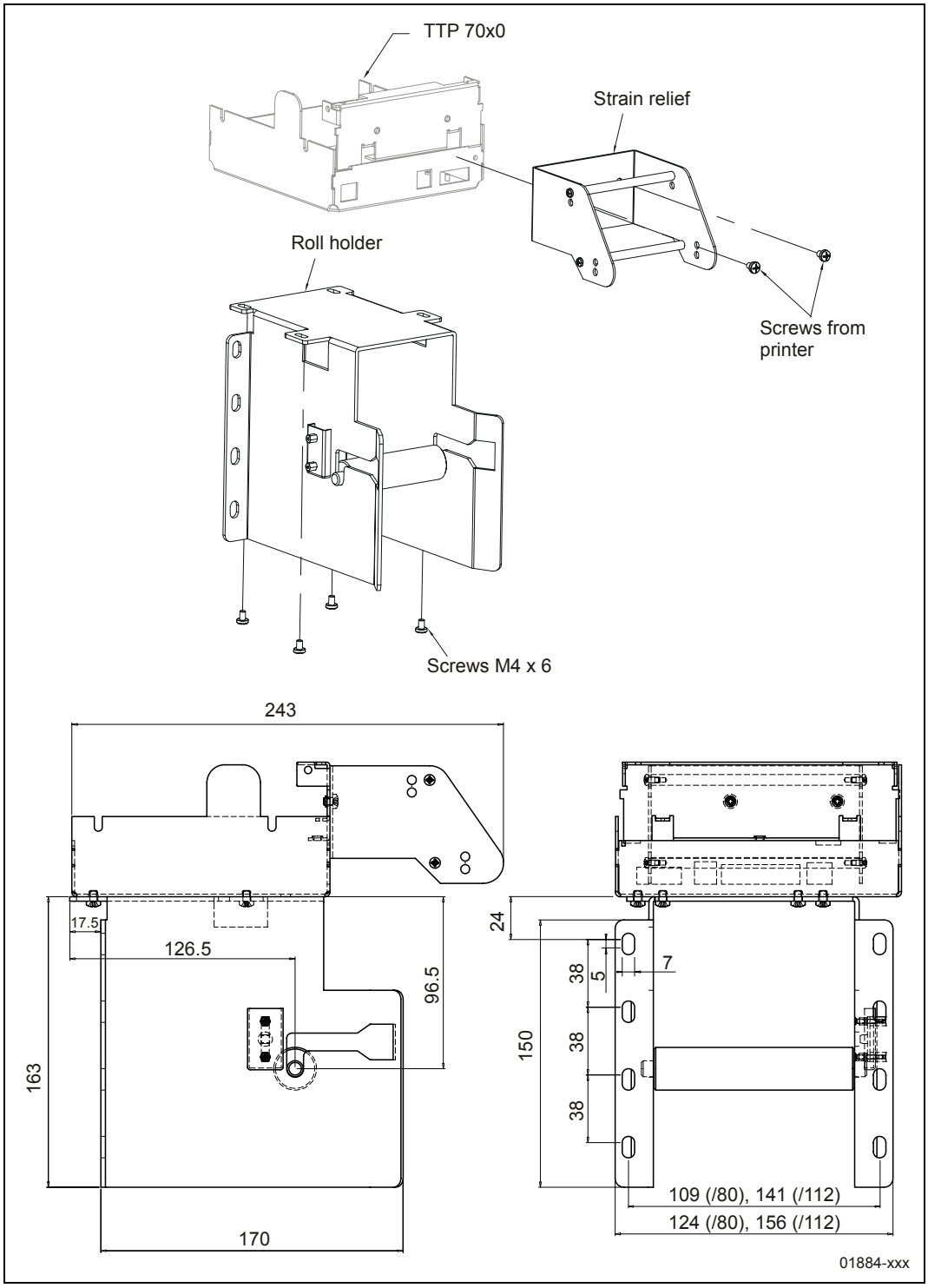


Figure 33. Roll holder 01884-080 and 01884-112 for paper placed under TTP 70x0.

	Print Width:	80 mm	112 mm
Paper roll holder for up to 250-mm roll mm roll placed below printer. With paper-near-end and weekend sensors.		01754-080	01754-112

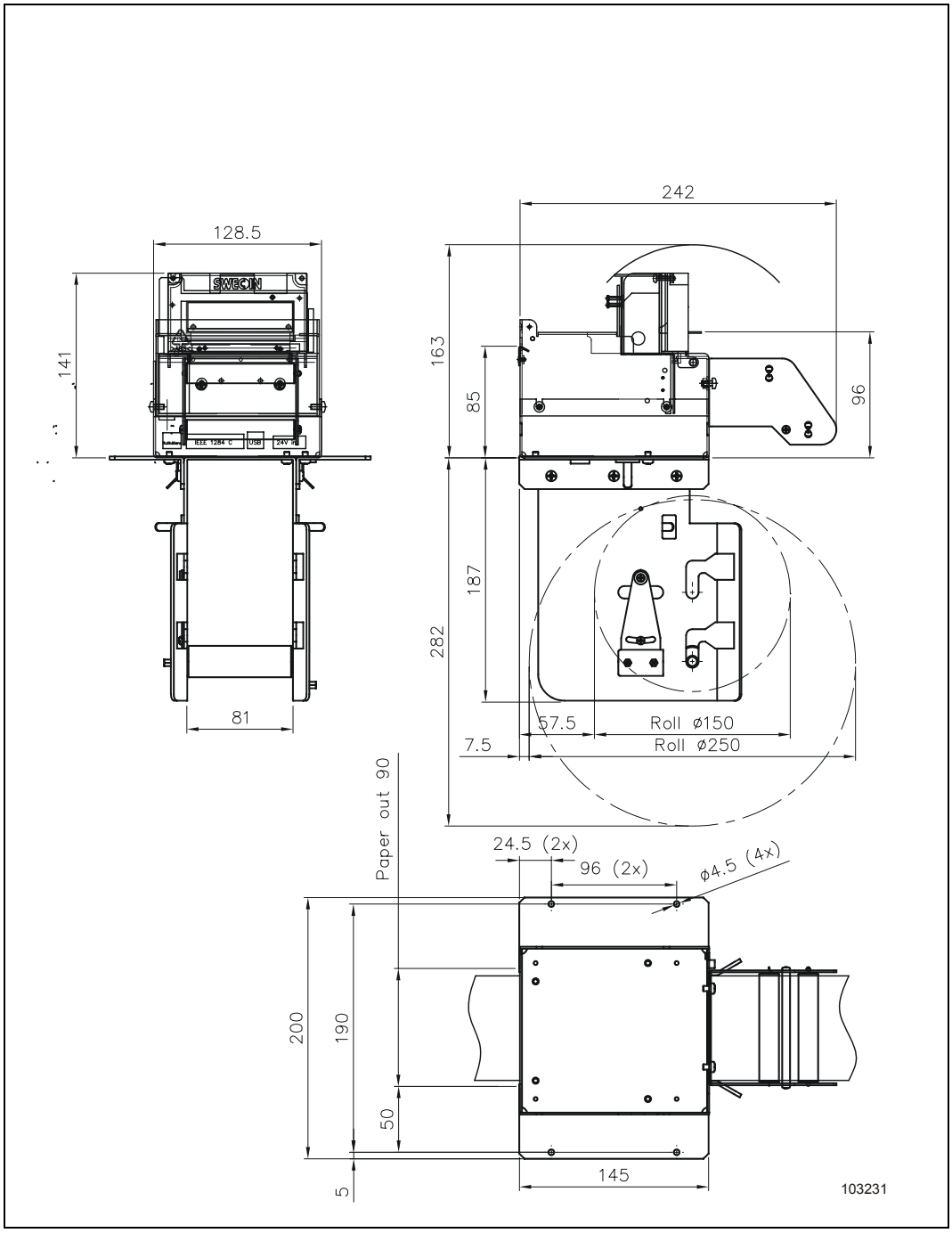


*Figure 34. Roll holder 01754-080 for paper placed under TTP 70x0/**080**. The roll can be fitted on two different levels, one for 150-mm roll, and one for 250-mm roll. This way, minimal space is required under the printer.*

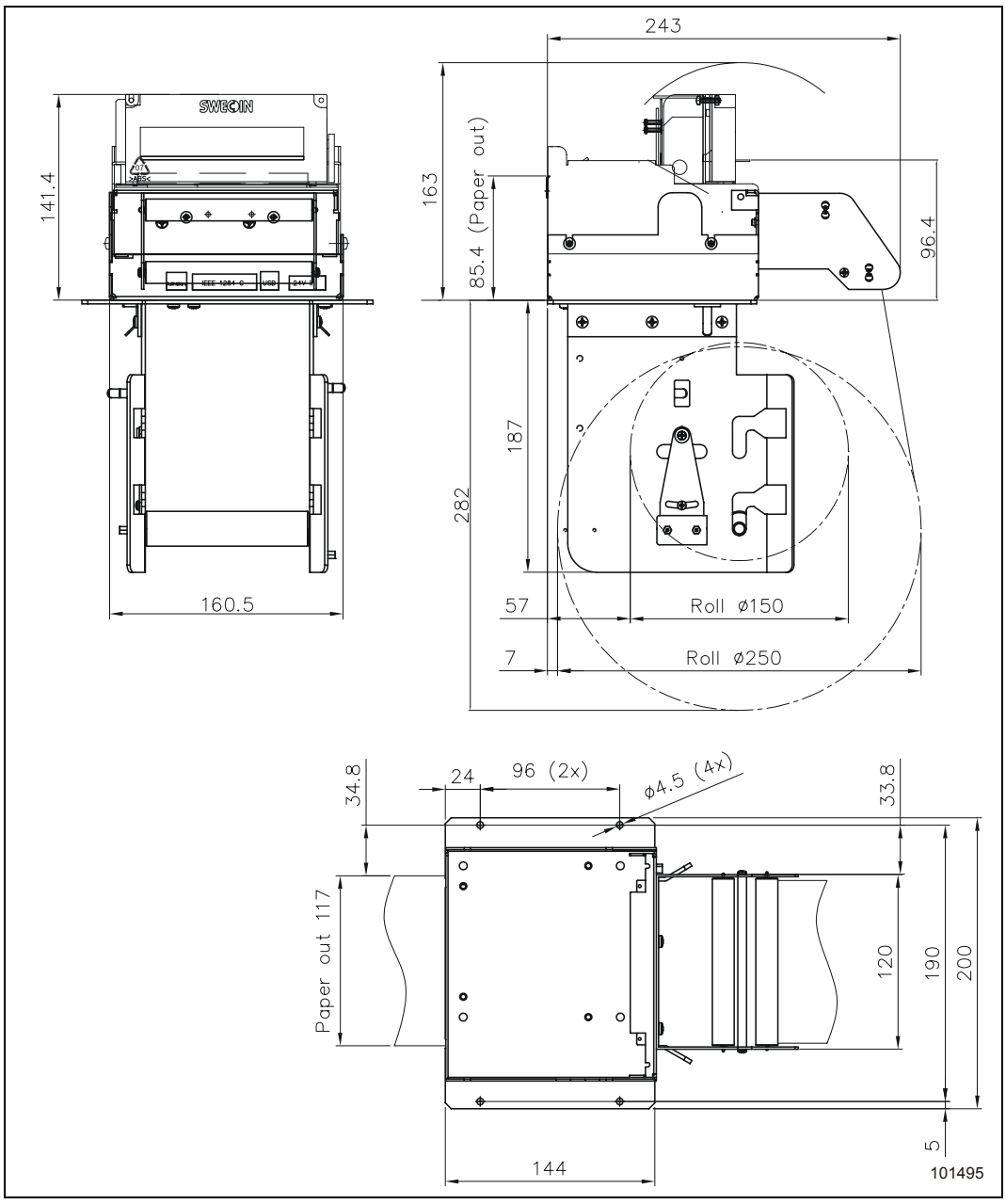


*Figure 35. Roll holder 01754-112 for paper placed under TTP 70x0/**112**. The roll can be fitted on two different levels, one for 150-mm roll, and one for 250-mm roll. This way, minimal space is required under the printer.*

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