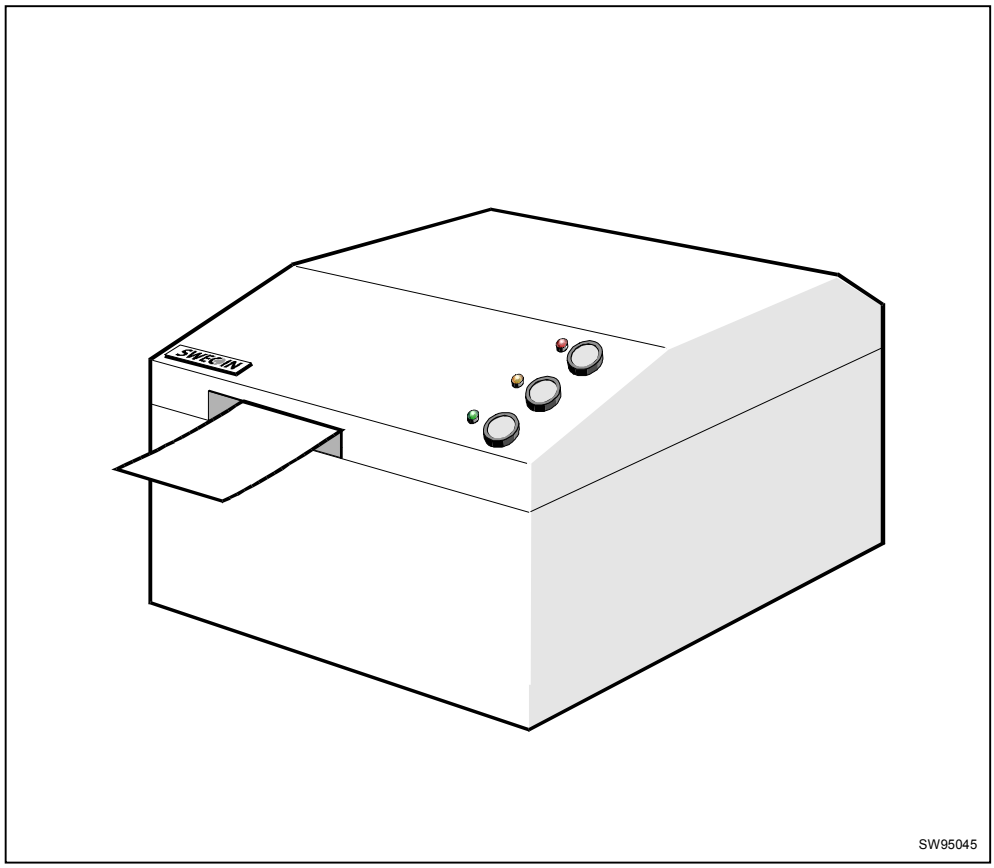
Ticket Printer/Encoder
Model TTPM2

Technical Specification



Publ No.: 00874-000 Ed. E
(old No. 38-1111-00)

SWECOIN

Related manuals

Related manuals

TTPM2 Selection Guide, 101193

TTPM2 Operators' Guide, 00861-000

TTPM2 Technical Specification, 00874-000

TTPM2 Installation and Programming Manual, 00759-000

TTPM2 Service Manual, 00693-000

This is a publication of Swecoin AB
Box 322, SE-192 30 Sollentuna, Sweden

Phone +46 8 623 45 60

Fax +46 8 594 709 89

E-mail techsupport@swecoin.se
sales@swecoin.se

Web site http://www.swecoin.se

© Swecoin AB 1997-2003

All rights reserved. Reproduction in whole or in parts is prohibited without written consent of the copyright owner. We have taken great care to ensure that the information in this manual is correct and complete. However, if you discover any errors or omissions, or if you wish to make suggestions for improvements, you are welcome to send your comments to us. Swecoin AB disclaims any liability resulting from the use of this information and reserves the right to make changes without notice.

Edition E, September, 2003

Printed in Sweden

This edition of the manual is based on firmware 906-400 and control board 2448-901.

CONTENTS

1 Introduction 5

1.1 Versions and configurations 5

1.2 Installation considerations 8

2 Performance 10

3 Magnetic stripe data 11

3.1 Encoding 11

3.2 Decoding 11

4 Print data 12

4.1 General 12

4.2 Graphics printing 12

4.3 Bar code printing 12

4.4 Text printing 13

5 Ticket separation and cancellation 15

5.1 Separation 15

5.2 Cancellation 15

6 Control board 16

7 Command set 17

7.1 Syntax 17

7.2 Summary of commands 18

8 Error codes 20

9 Power requirements 21

9.1 Desktop printer 21

9.2 OEM printer mechanism 21

10 Dimensions 22

10.1 Desktop printer 22

10.2 Desktop printer with CD200 and Front load mechanism 24

10.3 OEM printer mechanism 25

10.4 Weight 25

10.5 Power supply for OEM printer mechanism 26

11 Environmental conditions 27

12 MTBF 27

13 Document stock 28

13.1 Ticket base material 28

13.2 Coating and preprint....28
13.3 Magnetic media....29
13.4 Ticket dimensions and perforation....29

14 Ordering information....32

15 Index....33

REGISTER NOW!

If you wish to stay informed of product changes, manual updates etc., you are welcome to subscribe to our bulletin service.

To register as a subscriber, either visit our web site www.swecoin.se to fill in your subscription request, or send an e-mail to bulletins@swecoin.se

Enter the text **Subscribe bulletins** as the subject.
Do not enter any text in the message area.

REVISION HISTORY

Edition C

Chapter/section/page	Change
Page 10	Erroneously placed illustration in Ed. B corrected

Edition D

Chapter/section/page	Change
Page 18	Updated command and error code list
Page 32	Updated order number list

Edition E

Chapter/section/page	Change
Page 11	105 and 161 bpi versions added
Page 18	Updated command and error code list
Page 21	Current consumption for OEM mechanism clarified
Page 32	Updated order number list

1 INTRODUCTION

The TTPM2 is a ticket printer/encoder with versatile paper handling. It encodes data on a magnetic stripe and prints text, graphics and bar codes. Finally, it cuts and ejects the ticket. The tickets can be credit card size (54x86 mm), or 54x110 mm. Fanfold or roll ticket stock, or single tickets can be handled, in one or two ticket feed tracks.

Already printed and encoded tickets can be read and re-encoded, and print can be added, for example to change the ticket validity.

1.1 Versions and configurations

The TTPM2 comes in two basic versions, the desktop printer with enclosure and built-in power supply, and the OEM printer mechanism for kiosk applications. Both these versions are available in a number of configurations, and can also be modified according to customer requests.

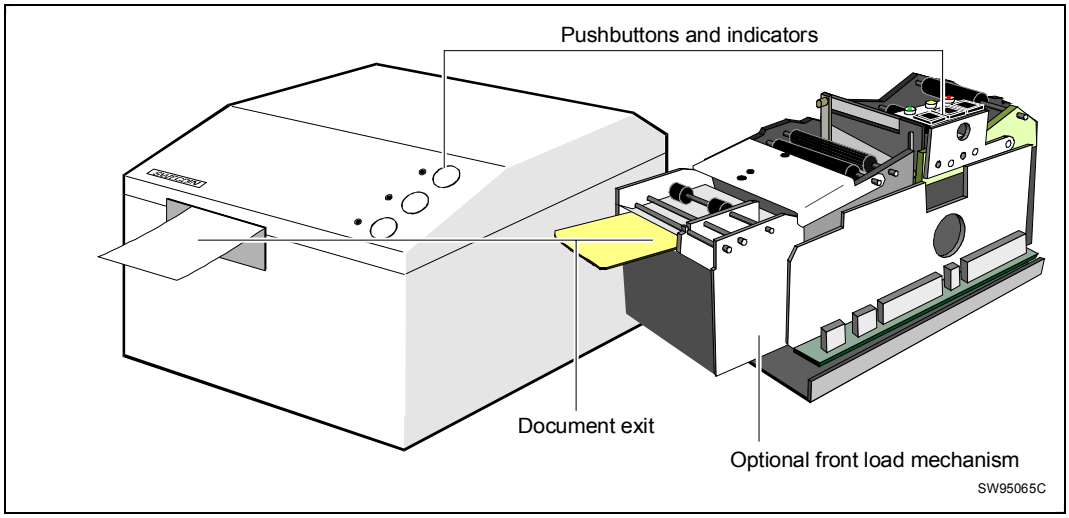


Figure 1. Front view, desktop printer, and OEM printer mechanism

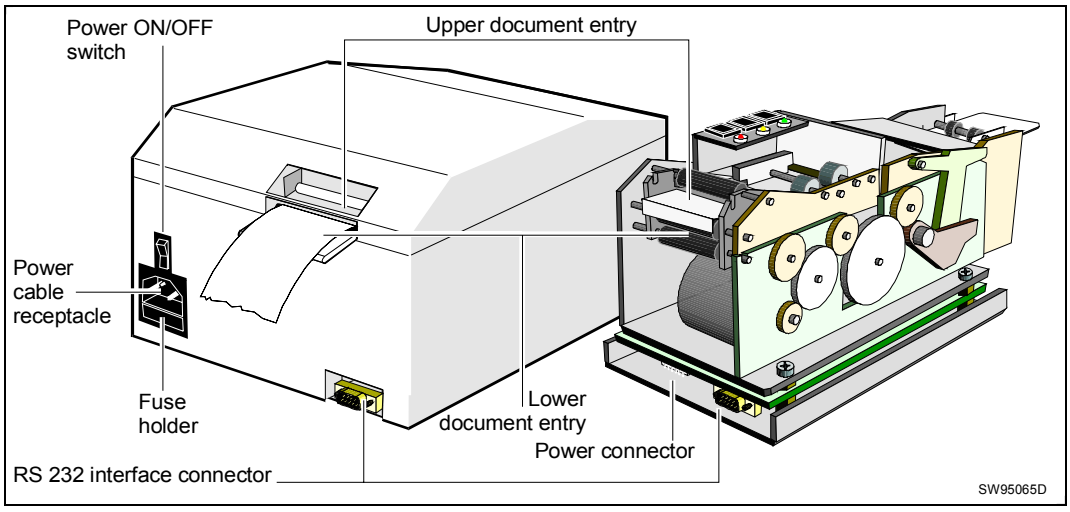


Figure 2. Rear view, desktop printer, and OEM printer mechanism

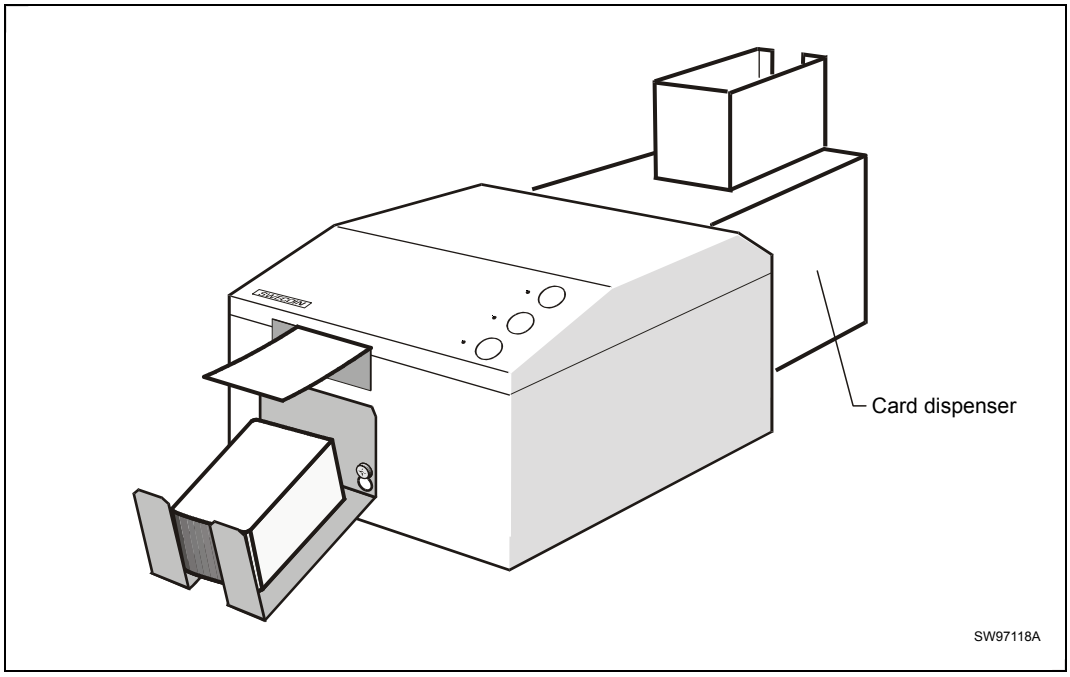


Figure 3. TTPM2 printer with card dispenser. Also the OEM printer mechanism can be equipped with card dispenser.

A TTPM2 with card dispenser loads sheet cut tickets into the lower track of the printer, leaving the upper track for single ticket handling.

The card dispenser can be ordered with an optional paper low switch.

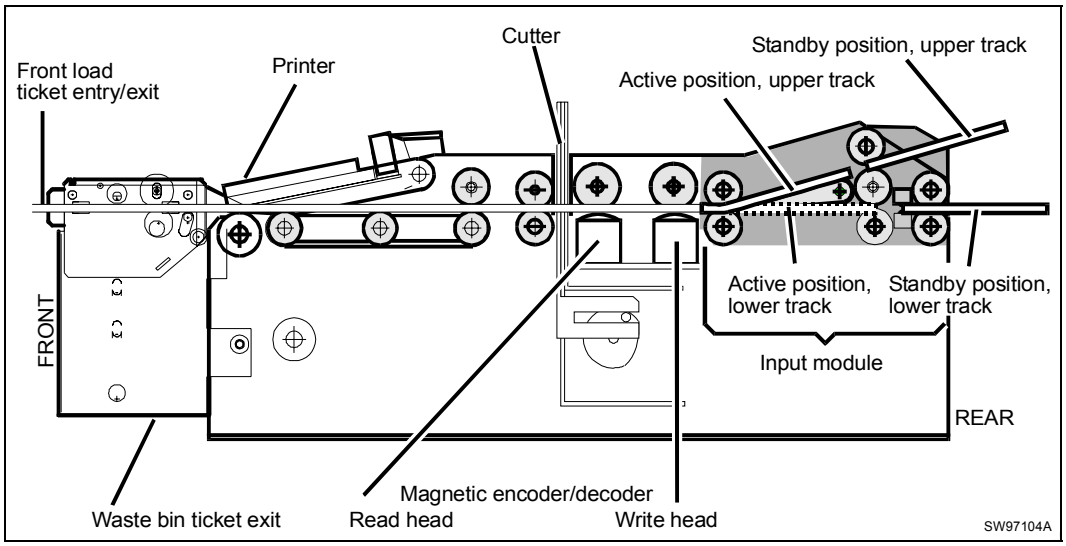


Figure 4. Printer interior.

To avoid paper jam, the TTPM2 has a straight paper path where tickets pass virtually without bending.

The input module has two ticket tracks:

The upper track is normally used for single tickets, but there is a printer version in which the upper track is configured for consecutive ticket stock. The upper track is also used for handling of tickets inserted through the front load entry/exit.

The lower track always handles consecutive ticket stock. Both fanfold, roll, and card dispenser ticket stock can be used. The lower track ticket entry is at the back of the printer. Ticket stock in lower track can be retracted to a standby position to clear the paper path for tickets from the upper track, then automatically loaded again when needed.

Tickets can be parked in an active position ready for being encoded, decoded, printed or cancelled.

The magnetic stripe encoder/decoder has separate heads so that it can encode, read and verify the data in one single sweep.

1.2 Installation considerations

The TTPM2 OEM printer mechanism is designed to be installed in some kind of enclosure such as a self service kiosk.

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

Trouble free printer operation also requires that the printer's optical sensors be shielded from ambient light.

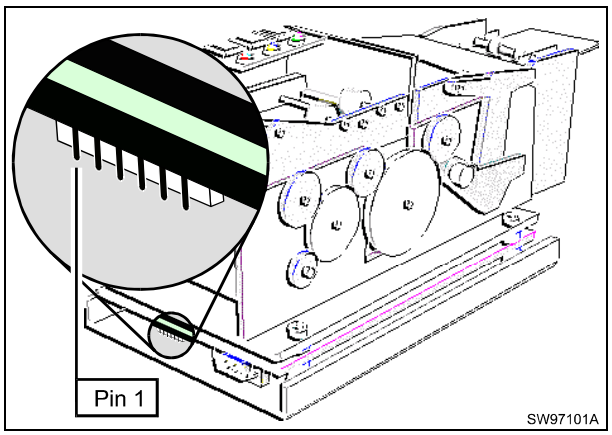
Additional space is required for paper stock. Consider mounting the printer on a movable platform so that the printer can be maintained outside the printer enclosure.

1.2.1 Power supply

The printer mechanism requires +5 Vdc 0.35 A, and +24 Vdc 2 A continuous, 6 A peak. At standby, no current is drawn from the +24 Vdc.

With a Swecoin power supply unit (see ordering information on page 32, and dimensions drawing on page 26), just connect the cable from the power supply to control board connector J5.

If you use another type of power supply unit, connect the voltages according to the following table. At the TTPM2 end of the cable, use a Molex 22-01-2065 connector housing, and six Molex 08-50-0032 contact springs:

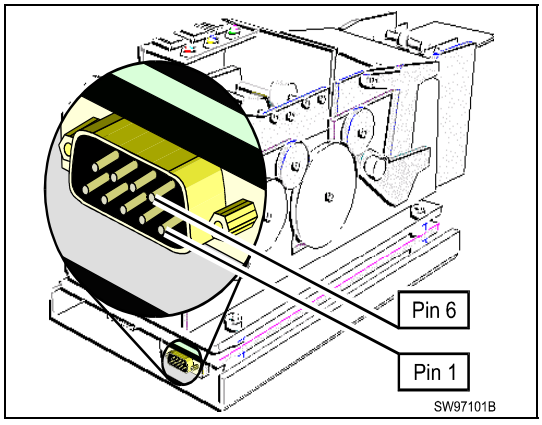


Pin	Voltage
1	+5 V
2	Ground (for 5 V)
3	+24 V
4	+24 V
5	Ground (for 24 V)
6	Ground (for 24 V)

Figure 5. Power supply connector J5 pin assignment

NOTE! – *Both the 5 V and 24 V ground, as well as the chassis of the printer, must be connected to ground potential (safety ground).*

1.2.2 Communications cable



Pin	Function
2	RXD (Receive data)
3	TXD (Transmit data)
4	DTR (Data terminal ready)
5	Ground
7	RTS (Request to send)
8	CTS (Clear to send)

Figure 6. RS232 serial interface connector pin assignment

A serial communications cable is available from Swecoin. See ordering information on page 32. The cable is 1.5 m long with 9-pole D-sub connectors at both ends.

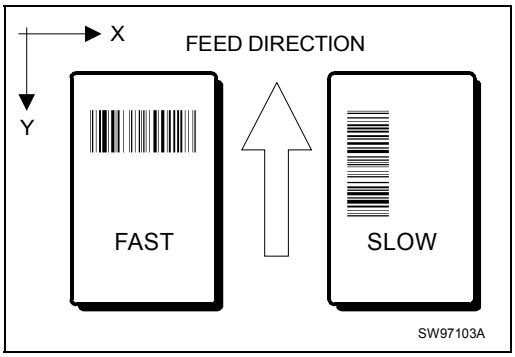
9-pole to 25-pole D-sub adapters are commercially available.

2 PERFORMANCE

Typical throughput	20 tickets/minute (3s/ticket) when printing and encoding already downloaded information on 86 mm tickets.

NOTE! *– Data transfer time is not included in the above throughput. Typically add 0.3 s fixed time + 1 s/Kbytes of transferred data.*

Read/decode speed	150 mm/s
Cut time	0.2 s
Bar codes	For east and west oriented bar codes, the print speed is reduced to approx. 50 mm/s



Track swapping time	In dual consecutive track printers (both from lower to upper, and from upper to lower): 1.2 s
Card dispenser	First ticket loading time: 2 s Loading time for following tickets: Loading is concurrent with printing of previous ticket. Total throughput is not affected by card dispenser.

3 MAGNETIC STRIPE DATA

3.1 Encoding

Track combinations	ISO track 2 and ISO track 3, standard (with HiCo, only one track at a time can be used for encoding or reading)
	ISO track 1 and ISO track 2
	Single center track
Track density	Track 1: 210 BPI
	Track 2: 75 BPI
	Track 3: 210 BPI
	Center Track: 75 or 210 BPI, (must be specified when ordering printer)
	Special versions with 105 and 161 dpi available on request.
Coercivity	Low: 300 Oersted ISO7811-2 (standard)
	High: 2750 Oersted ISO7811-6 (for household-magnet proof encoding)
	Other non-standard coercivities available on request.
Encoding format	ISO 7811-2 format, or hexadecimal format. Software selectable.
Synchronization	Hex encoding: Synchronization zeroes must be added in the beginning of the message. 6 zeroes for 75 BPI tracks and 15 zeroes for 210 BPI tracks. Zeroes are automatically added from the end of the string to the end of the ticket.
ISO encoding:	Sync. digits, start, stop, and check digit are automatically added.
Coding length	About 80 mm regardless of ticket length
Useful message length	Track 1: 492 bits (123 hex, or 79 6-bit characters)
	Track 2: 200 bits (50 hex, or 37 5-bit characters)
	Track 3: 492 bits (123 hex, or 95 5-bit characters)
Read-after-write	Automatically performed (can be disabled).

3.2 Decoding

Tracks	ISO encoded data on tracks 1—3 can be read, decoded and transmitted to the host computer.
	Hex coding on track 2 can be read and transmitted to host computer.
	Software selectable number of read/decoding retries.

See also ”Document stock” on page 21 for specification of stripe position, etc.

4 PRINT DATA

4.1 General

Printing method	Direct, parallel, thermal print
Print width	384 pixels = 51.06 mm
Ticket size	54x86 mm and 54x110 mm

4.2 Graphics printing

Pixels/line	384
Resolution, X-axis	7.52 pixels/mm (191 dpi)
Resolution, Y-axis	5.7 pixels/mm (145 dpi)
Max graphics size	384x400 pixels if all ticket memory is used for graphics.
No. of graphical elements	Limited only by the size of the fixed ticket memory.

4.3 Bar code printing

Bar code standards	EAN-13 (UPC-A): 13 digits printed as bar code. Check digit (digit 13) must be calculated in host computer and sent to the printer. Automatic wide/narrow bar ratio setting. Code 39: Variable No. of characters in upper case alphanumeric coding. Leading and trailing asterisk added automatically. Independently selectable bar width (narrow or wide). 2-of-5 interleaved.
Basic height	16 pixels (2.8 mm for north and south orientated bar codes, 2.1 mm for east and west orientated bar codes)
Scaling	From 1 to 16 x basic height
Orientation	North, South, East and West oriented bar codes (see also ”Performance” on page 10)
No. of bar codes	Up to 15 bar codes/ticket

4.4 Text printing

Fonts	Three mono spaced and one proportionally spaced font. Custom designed fonts can be ordered.
Character size, W x H	Font 1 and 3 = 8 x 16 pixels. Font 2 = 16 x 30 pixels. Font 4, width = 4 to 8 pixels depending on character, height = 16 pixels.
Scaling	Font 1 and 4: From 1 to 16 x nominal size. Scaling in X and Y direction are independent of each other. Fonts 2 and 3: Width from 1 to 3 x nominal size, height from 1 to 16 x nominal size
Text orientation	The proportionally spaced font (font 4), and one mono spaced font (font 1) can be printed in any of the four orientations North, South, East and West. The other two mono-spaced fonts can only be printed in North orientation.
Text field contents	Fixed, or variable text
No. of text fields	Up to 16 text fields and 16 variable fields/ticket
Basic character set	The table below shows the basic characters stored in PROM on the printer control board. The set contains printable characters from decimal position 32 (space) through 127.

Dec	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Hex	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
Key	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
	NUL	□	□	ETX	□	ENQ	ACK	□	□	□	LF	□	□	CR	□	NAK
Dec	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Hex	10	11	12	13	14	15	16	17	18	19	1a	1b	1c	1d	1e	1f
Key	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□	CAN	□	□	□	□	□	□	□
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		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
	SPACE	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
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	Ä	Ö	Å	Ü	_
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	ä	ö	å	ÿ	Δ

Table 1 Character set used in firmware versions up to 906-360

***NOTE!** – Decimal 34/HEX 23 (") cannot be used in messages as it is used as string identifier in the programming language of the printer.*

From firmware version 906-370, characters 128 to 255 where added. Customer firmware (not beginning with 906) may contain other characters than the ones shown below. Cyrillic and Hebrew versions available.

Dec	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Hex	0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
Key	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
	NUL	□	□	ETX	□	ENQ	ACK	□	□	□	LF	□	□	CR	□	NAK
Dec	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Hex	10	11	12	13	14	15	16	17	18	19	1a	1b	1c	1d	1e	1f
Key	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
	□	□	□	□	□	□	□	□	CAN	□	□	□	□	□	□	□
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		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
	SPACE	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
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	{	|	}	~	Δ
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	□	Ž	□
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	□	ž	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	ì	í	î	ï
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
	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

Table 2 Character set used from firmware versions 906-370

***NOTE!** – Decimal 34/HEX 23 (") cannot be used in messages as it is used as string identifier in the programming language of the printer.*

5 TICKET SEPARATION AND CANCELLATION

5.1 Separation

5.1.1 Gapped tickets

For specification of gapped tickets, see page 30.

Cutter	Guillotine-type, DC-motor operated, with camshaft, micro-switch controlled
Cutter position	Between encoding/decoding module and printhead
Cutter life expectancy	500 000 cuts or more

5.1.2 Non-gapped tickets

For specification of non-gapped ticket, see page 31.

Burst separator	Strikes the ticket stock across the perforation so that the tickets burst apart. DC-motor operated, with camshaft, micro-switch controlled
Separator position	Between encoding/decoding module and printhead
Separator life expectancy	1 000 000 separations or more

5.2 Cancellation

Tickets that fail magnetic encoding, and tickets that the host computer consider to be invalid, expired etc. can be cancelled by the TTPM2.

Repeated read attempts	Software selectable
Cancellation print	Striping of entire print area. User defined print on top of cancellation striping, for instance ”VOID”.
Encoding cancellation	Magnetic code is automatically erased on cancelled tickets.
Output of cancelled tickets	Cancelled tickets are returned to the operator or, in case of printers equipped with Front Load 2 or 3 option, they can be redirected to a waste bin ticket-exit.
Retract	Printers equipped with Front Load 2 or 3 option can retract uncollected tickets and redirect them to the wastebasket inside the kiosk.

6 CONTROL BOARD

Controller	8-bit micro controller type Dallas 80C320
Firmware memory	512 Kbytes EPROM
Page memory	128 Kbytes nonvolatile (battery backed up) RAM
Backup battery	Expected life: 7 years Type: 3V Lithium (Varta CR2025 or equivalent)
Interface	Serial: RS232C (V.24)
Data format	8 data bits, 1 stop bit, no parity
Transmission speed	1200, 9600, 19200, or 115200 bps, switch selectable
Handshaking	Hardware (RTS/CTS) or software (XON/XOFF)

Connection

TTPM2 (9 pole)	**PC** (25 pole)	**PC** (9 pole)
2 RXD	2 TXD	3 TXD
3 TXD	3 RXD	2 RXD
4 DTR	6 DSR	6 DSR
5 GND	7 GND	5 GND
7 RTS	5 CTS	8 CTS

Set up

DIP-switches are accessible through the service opening at the bottom of the TTPM2 enclosure. The functions of these DIP-switches are (default settings in parenthesis):

Switch 1 / **2**	**Bits/s**	ON / OFF	1200	OFF / OFF	(9600)	ON / ON	19200	OFF / ON	115200

3 **Read-after-write** ON = Disable for ISO magnetic track 1 or 3 data (OFF)
4 **Auto clear** ON = Clear all fixed and variable data during printing (OFF)
5 **Handshaking** ON = XON/XOFF, OFF = RTS/CTS (OFF)
6 **ACK/NAK + error code** ON = enabled, OFF = Silent (ON)

7 / **8**	**Mode**	OFF / OFF	Standard	ON / OFF	DCT	OFF / ON	CD200	ON / ON	Test

Standard = Consecutive lower track + single-ticket upper track
DCT = Dual Consecutive Track (formerly called SGA)
CD200 = Card dispenser mode
Test = Reserved setting, not to be used!

7 COMMAND SET

The command set is designed in accordance with industry standards and is enhanced with functions unique to this product. The command language uses only printable ASCII characters for easy adaptation to any host system.

NOTE! *– This chapter is only a summary. See the " Installation and Programming Manual" for full details.*

7.1 Syntax

- A command string always starts with an exclamation mark (ASCII 33 or HEX 21) serving as command identifier.
- The characters immediately following the ! (21H) is the actual command to the printer. The command consists of 1—3 characters followed, when applicable, by a sub command, formatting commands, and data separated by space characters as shown in Figure 7.
- Carriage Return and Line Feed end each command.

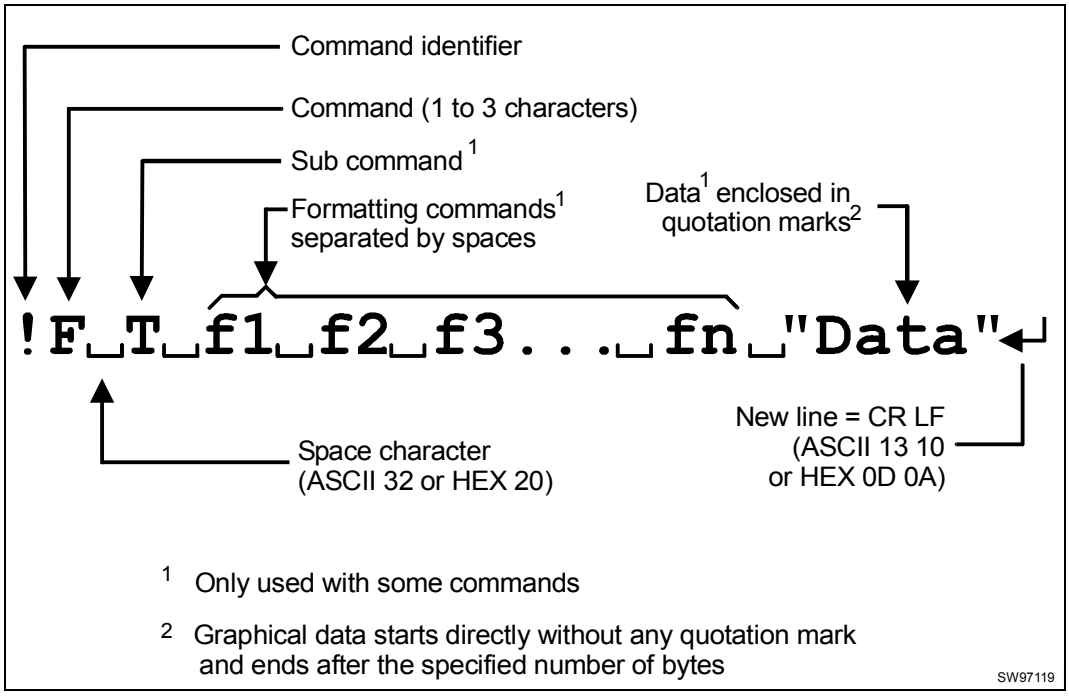


Figure 7. Command syntax

7.2 Summary of commands

7.2.1 System related commands

!C	Clear all
!CA	Clear all and enable extended acknowledgement[1]
!G	Set encoding speed
!P	Encode and print document
!P@	Encode and print document, and eject it in wastebasket (FL2 and FL3 printers)
!PE	Encode and print document, and eject it to tray (for FL3 printers)[2]
!PS	Print slow[3])
!PM	Print medium
!PF	Print fast
!U	Firmware version query [4])
!S	Status request
ENQ	Status request immediate
CAN	General reset, equivalent to power OFF/ON (takes 20 s to execute)
!Q	Writes a transaction string to RAM [5])
!V	Reads the transaction string written by !Q [4])
!W	Reads thermal print progress indicator [4])
!X	Set resolution
!Y	Read ticket counter [6])
!Z	Burn time

7.2.2 Document entry related commands

!E	Ejects document through the upper rear document entry (for example after de-coding)
!L1	Selects lower rear document entry, and waits if paper is out (for units with dual consecutive entries[7])
!L2	Selects upper rear document entry , and waits if paper is out (for units with dual consecutive entries [6])

---

[1] Added in firmware version 01789-406

[2] Added in firmware version xxxxx-399s

[3] Added in 3.39zb

[4] Added in firmware version xxxxx-332

[5] Only in firmware 01660-xxx

[6] Added in firmware version xxxxx-360

[7] !L1, !L2, !L17 or !L18 **must** be selected on units with dual document entries

!L3 Loads document through front entry

!L4 Ejects document through front entry

!L5 Transports document to waste bin (only for printers with front load 2 and 3)

!L17 Selects lower rear document entry and signals if paper is out (for units with dual consecutive entries [4])

!L18 Selects upper rear document entry and signals if paper is out (for units with dual consecutive entries [4])

!T Sets timeout for retract function[1]

7.2.3 Print-parameter related commands

!F T Print text

!F G Print graphics

!F C Print bar code

!F M Specifies No. of retries + cancellation text to be printed if encoding fails

7.2.4 Magnetic encoding/decoding related commands

!D Reads and decodes data in ISO format from track 2 (or center track)

!D1 Reads and decodes data in ISO format from track 1

!D3 Reads and decodes data in ISO format from track 3

!I Defines data to be encoded in ISO format on track 3

!J Defines data to be encoded in ISO format on track 1

!K Defines data to be encoded in Hex format on track 1 or 3 (as applicable)

!M Defines data to be encoded in ISO format on track 2 (or center track)

!N Defines data to be encoded in hexadecimal format on track 2 (or center track)

!N+ Same as !N but reverses the bit order [3])

!O Reads data in hexadecimal format from track 2 (or center track)

[1] Introduced in firmware version 3.75

[2] !L1, !L2, !L17 or !L18 **must** be selected on units with dual document entries

[3] Added in firmware version xxxxx-332

8 ERROR CODES

TTPM2 reports error conditions in the form of error codes. An error condition is reported as a NAK (15H) followed by a one-character error code. The error codes have been defined, starting with ASCII character "1" (31H) according to the following table:

"1" No paper in the input path selected with !L1, !L2, !L17, or !L18.

"2" Paper jam when executing !L1, !L2, !L17, or !L18.

"3" Reserved.

"4" Cutter error. No full cut performed. Cutter blade returned to home position by reversing the cutter motor.

"5" Cutter error. Cutter blade not returned to home position.

"6" Cutter error. Cutter blade not moving. If this error code is received immediately after power ON, it indicates that something is wrong with the +24V supply.

"7" Paper jam when executing the !P command.

"8" Magnetic encoding on track 2 (or center track) failed.

"9" Magnetic encoding on track 1 or 3 failed.

"A" Not possible to read magnetic information with !D command.

”B” No document inserted within time limit following an !L3 command (front load).

”C” Document inserted (front load) but immediately retracted.

”D” Document inserted through front load is blocked.

”E” Document blocked in the front load input feeder during an !L3 command. Also used when combining the characters | and } in a hex magnetic string to get normal behavior if the encoding was successful. If an error occurs then the ticket is transported back to the start position and NAK + ‘E’ is sent.

“G” Document found in the ticket path during power on has been erased, VOID-printed and ejected.

“P” If !P is sent to the printer and paper is out, it replies with NAK + P and discards data.[1]

"X" Critical error. This is issued when the printer must be turned off, error condition cleared, then turned off again.

NOTE! *– For TTPM2 to send ACK, or NAK + error codes, the DIP-switch 6 on the TTPM2 control board must be set to ON. The DIP-switch position OFF places the unit in a silent mode preventing these codes from being transmitted to the host computer.*

[1] Introduced in firmware version 4.13

9 POWER REQUIREMENTS

9.1 Desktop printer

Supply voltage	115 Vac or 230 Vac, switch selectable
Supply current	Up to 4A at 115 Vac, and 2A at 230 Vac
Fuse	5x20 mm 3.15A/250V slow blow. Replacement fuse inside power cable receptacle
Power consumption	50—190 W depending on print density
Frequency	50—60 Hz

9.2 OEM printer mechanism

24 Vdc ±5%	Idle: 0 mA	
	Text printing:	Average 2A, peak 6A
	All black printing:	6A
5 Vdc ±5%	350 mA	
Power connector	6-pin Molex KK type connector, 2.54 mm division. Positioned at the rear bottom of the control board.	

10 DIMENSIONS

10.1 Desktop printer

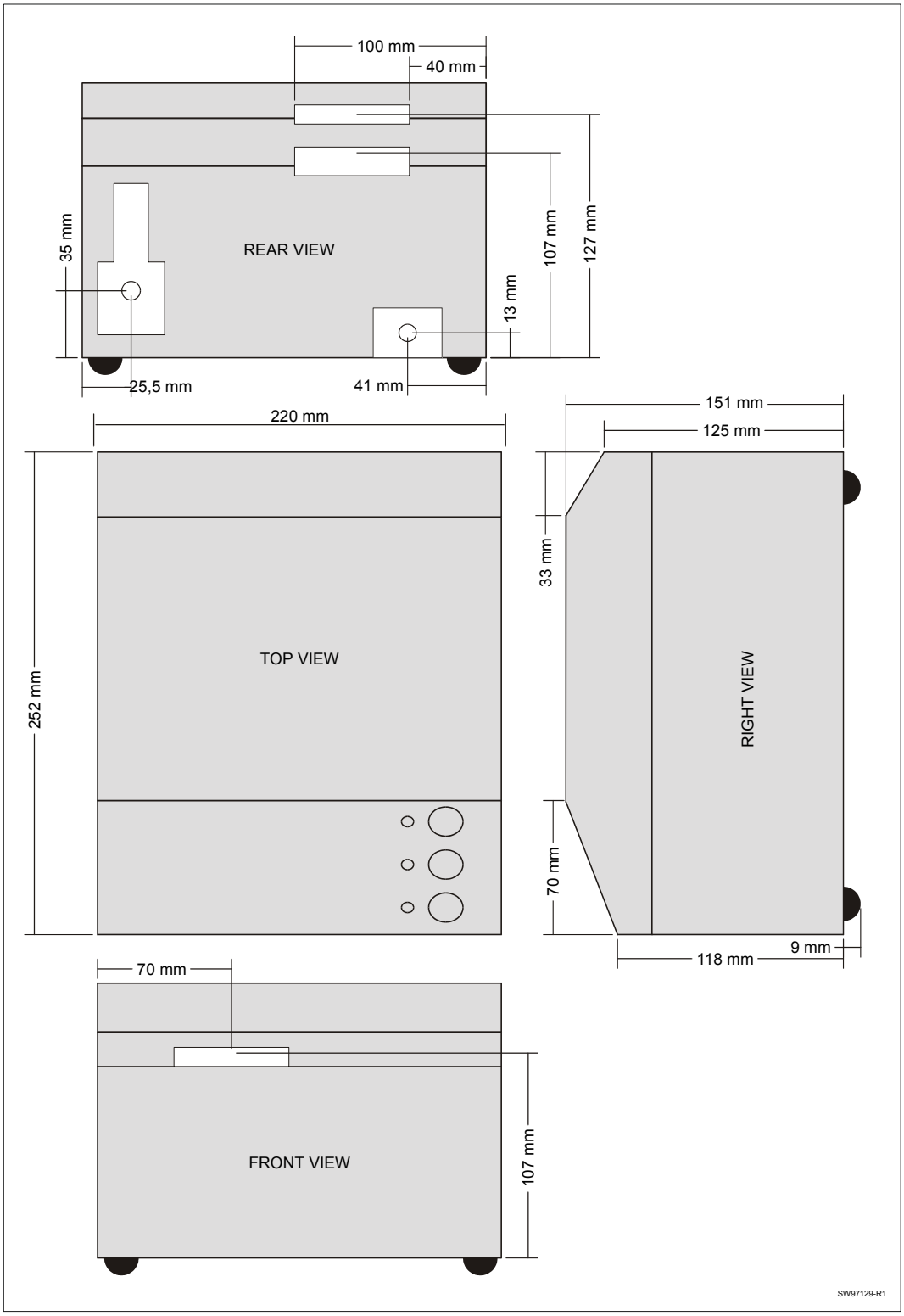


Figure 8. Desktop printer dimensions . All measurements are in mm

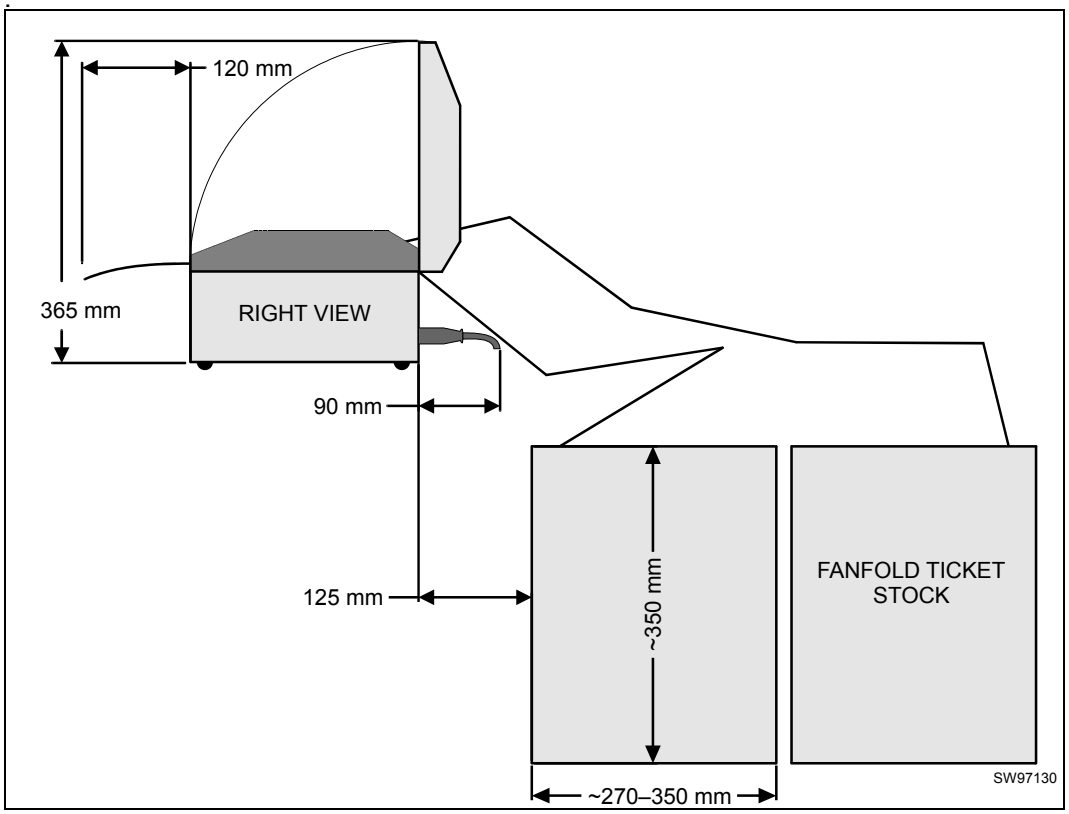


Figure 9. Approximate space required around the printer

10.2 Desktop printer with CD200 and Front load mechanism

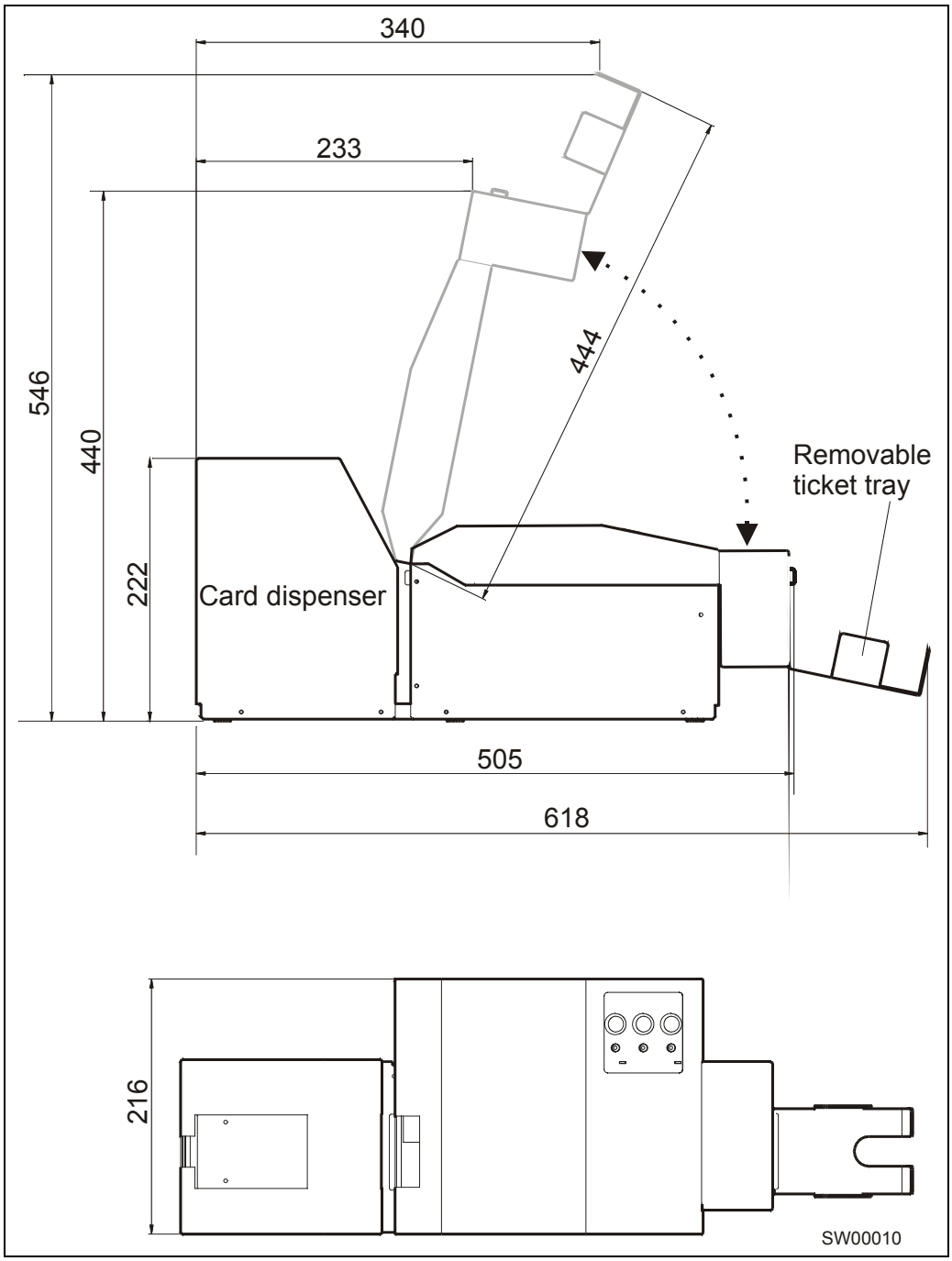


Figure 10. Desktop printer, dimensions . All measurements are in mm

10.3 OEM printer mechanism

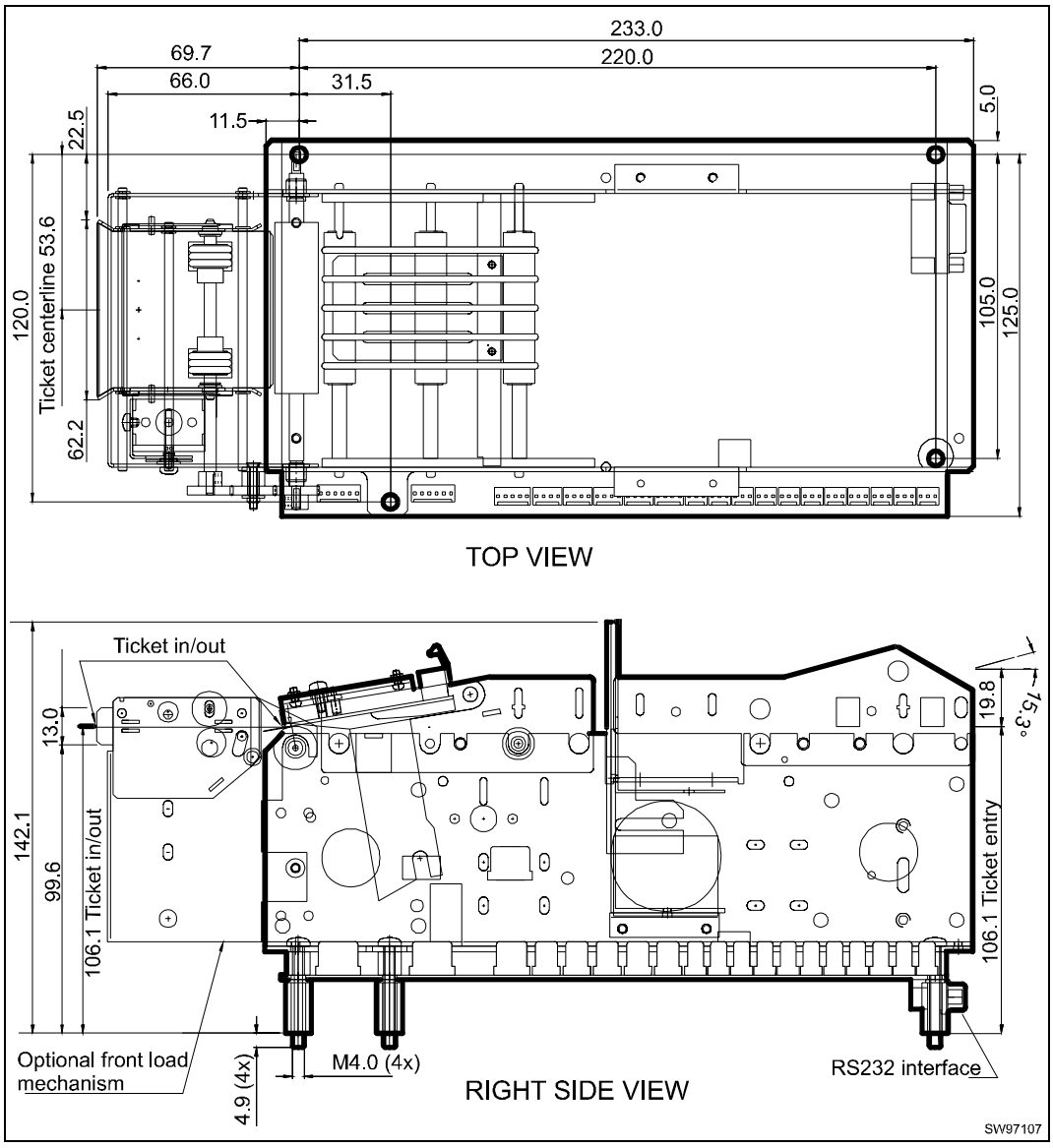


Figure 11. OEM printer mechanism dimensions. All measurements are in mm

10.4 Weight

Approximately 7200g

10.5 Power supply for OEM printer mechanism

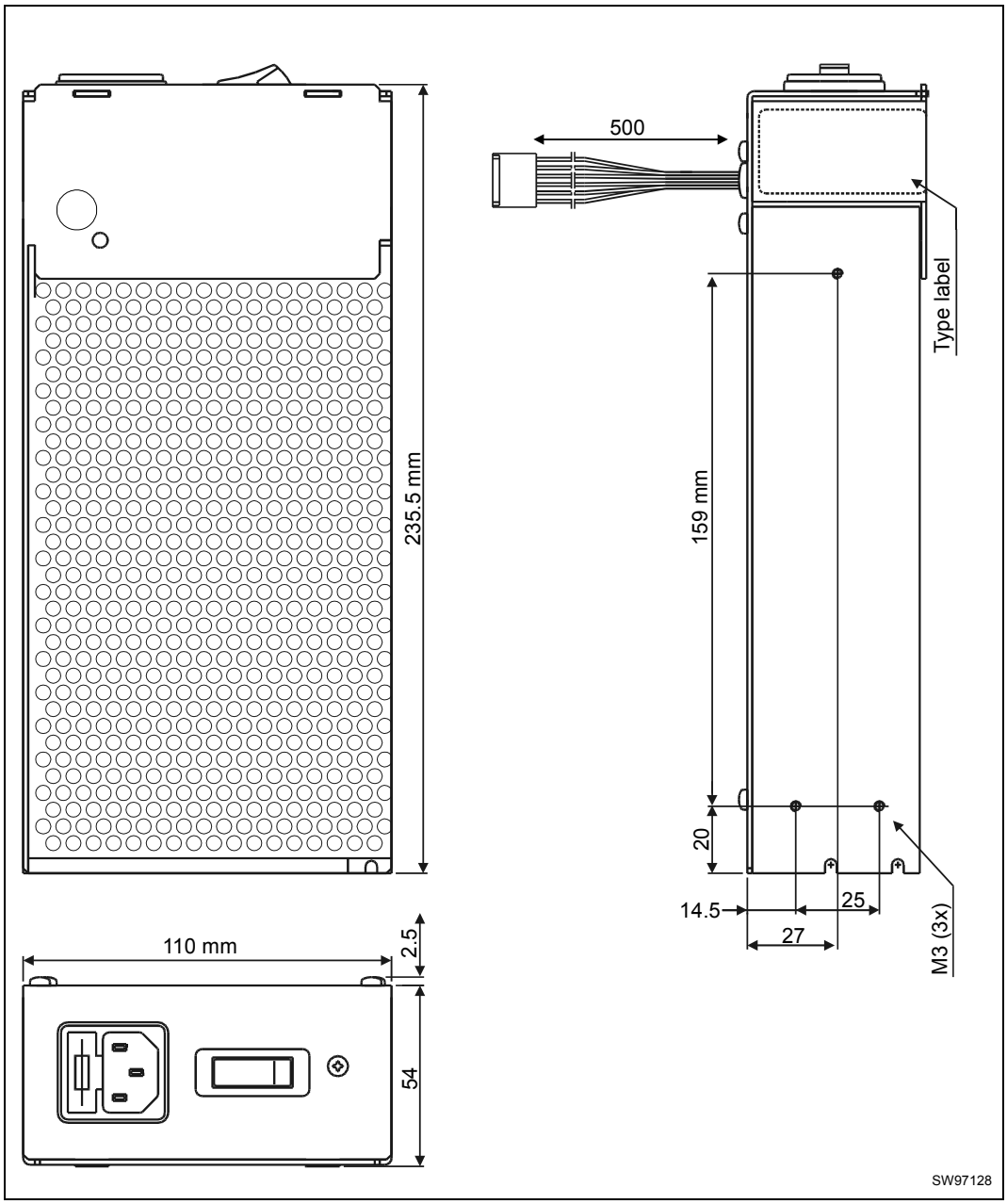


Figure 12. Power supply 38-1035-002 dimensions. All measurements are in mm

11 ENVIRONMENTAL CONDITIONS

Temperature	Operation	+5 °C to +40 °C
	Storage	–10 °C to +50 °C (without paper)
	Transportation	–10 °C to +50 °C (without paper)
Relative humidity	Operation	35–75%, non-condensing
	Storage	10–90%, non-condensing (without paper)
	Transportation	10–90%, non-condensing (without paper)

Shock and vibration

Vibration tolerance during operation:

From 5 to 18 Hz with a displacement of 0.3 mm.
From 19 to 100 Hz at a constant acceleration of 0.2 g, peaked, swept sine wave.

Shock during shipping:

Printers that are factory packaged for shipment can tolerate a drop of 800 mm without sustaining any damage.

12 MTBF

Complete unit	Approximately 1.4 years for the typical user profile given below. **User profile:** Operational 12 month/year. Average 30 000 documents /month. Average printing density 20 % black. Cleaning of printer every 2 months.	
TTPM2 components	Printhead	1 000 000 tickets typically (54 x 86 mm)
	Control board	65 000 hours typically
	Cutter	500 000 cuts typically
	Read/write head	1 000 000 tickets typically, with full tape stripe

NOTE! *– Type of ticket stock and stripe material affects the life of the TTPM2 to a high degree. For maximum MTBF, avoid abrasive inks and coatings, inks with whiteners, and slurry stripes. Also clean the printer regularly.*

13 DOCUMENT STOCK

The TTPM2 printers are produced and calibrated for the customers ticket stock. To ensure accurate ticket issuing, we do require 100 tickets of the customer ticket stock for each ordered printer.

13.1 Ticket base material

Material	Paper, 100 % chemical pulp, no ground wood permitted Laminate (Triplex) Plastic (PVC)
Stiffness	18—36 g/cm (in grain direction)
Thickness	Paper and laminate: 0.18—0.40[1] mm, 170—210 g/m²
	Plastic (PVC): 0.18—0.25 mm
	Factory setting: 0.18—0.25 mm (default)
	0.26—0.32 mm (optional)
	0.33—0.40 mm (optional)
Curl	Deviation from flatness < 0.6 mm across the length, width, or diagonal of the ticket

13.2 Coating and preprint

Thermal coating	Shall meet or exceed the ANSI 3.11 specification
	Smoothness: Max. 75 Sheffield units
	Properties: Same as fax grade 3
Top coating	The thermo-sensitive surface of the document stock can be provided with a protective UV or moisture proofing top coating.
Preprint	Tickets can be preprinted on one or both sides. Ink for thermo-sensitive side: Laser printer approved ink without whiteners Ink for magnetic stripe side: Offset ink

CAUTION! *– Never use abrasive inks as they reduce the life of the thermal print head.*

Thermal print to preprint alignment

Tolerances in the printer, and in the ticket stock itself, can cause misalignment between the preprint of the ticket stock and the thermal print. The ticket guides in the printer are adjusted to 54.38 ± 0.05 mm. Narrower adjustment tolerances would cause

[1] 0.18-0.32 mm for Frontload 1 and Frontload 2 versions of the printer

paper jam when the relative humidity changes the ticket width. A ticket width of 53.98 ± 0.2 mm gives a maximum misalignment of 0.65 mm (54.38 + 0.05 – (53.98 – 0.2)).

TIP! *– Avoid designing tickets that require close alignment between preprint and thermal print.*

13.3 Magnetic media

Magnetic stripe	Side stripe positioned according to ISO 7811/2
	Center track (option)
Magnetic media	Full tape, transfer tape or slurry

CAUTION! *– In case of slurry, care must be taken to avoid excess slurry material and abrasive particles that may cause unduly high degree of wear on the magnetic recording and read heads in the TTPM2*

Coercivity	Low: 300 Oersted
	High: 2750 Oersted (option)
	Other non-standard coercivities available on request

If a ticket is perforated, for stub separation for example, the perforation shall not infringe on the magnetic track to prevent interference with magnetically encoded data.

13.4 Ticket dimensions and perforation

Stock format	Gapped or non-gapped consecutive Fanfold form tickets.
	Sheet-cut (single) tickets for manual or dispenser loading.
	Roll tickets with black marks or punched holes as top of form indicators.
Perforation cut direction	Perforation and cutting of ticket material must be done from the thermally sensitive side of the paper.
Document standard	ISO No. 7810
Ticket width	53.98 ± 0.20 mm
Ticket length	85.6 ± 0.25 mm, or 110.0 ± 0.25 mm
Corner radius	3.15 ± 0.3 mm (preferably without minus tolerance). Used for optical detection of top-of form.
Perforation for stub	Placed at the trailing end of the ticket
Gapped tickets	Two tabs according to Figure 13.
Non gapped tickets	Equal distance between tabs according to Figure 14.

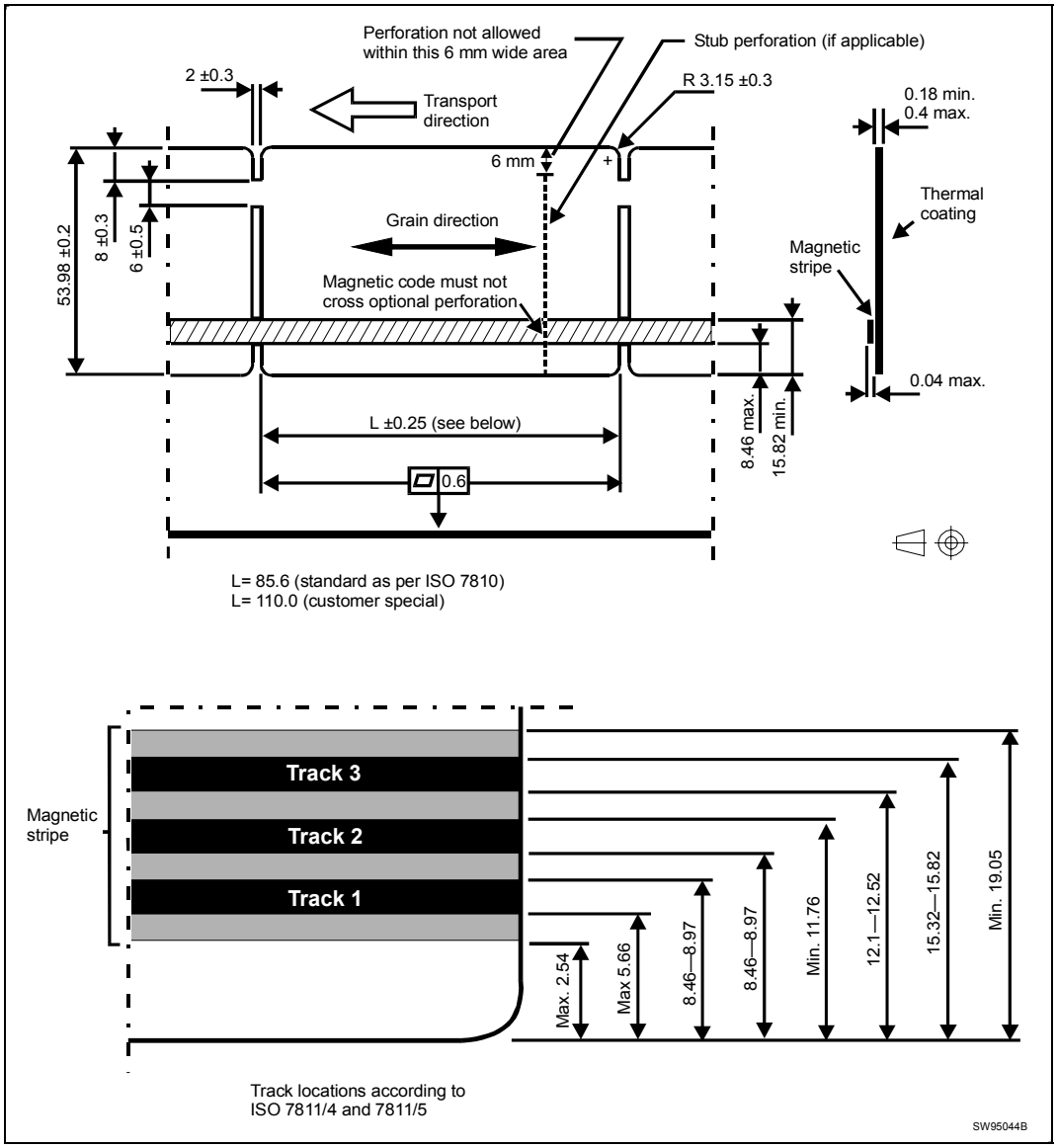


Figure 13. Gapped tickets (for printers with cutter)

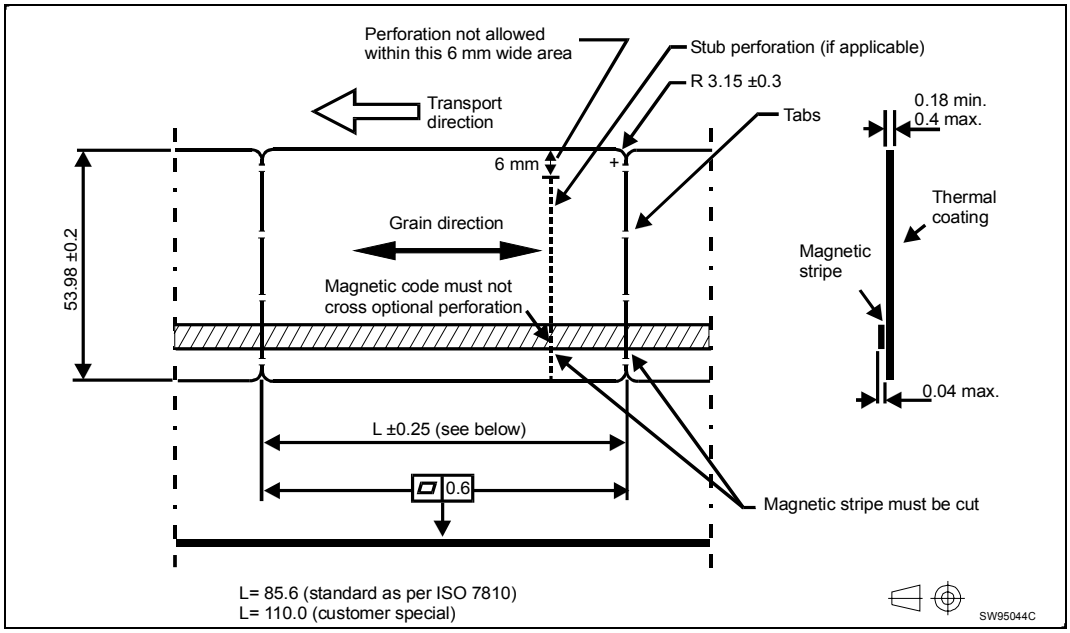


Figure 14. Non gapped tickets (for printers with burst separator)

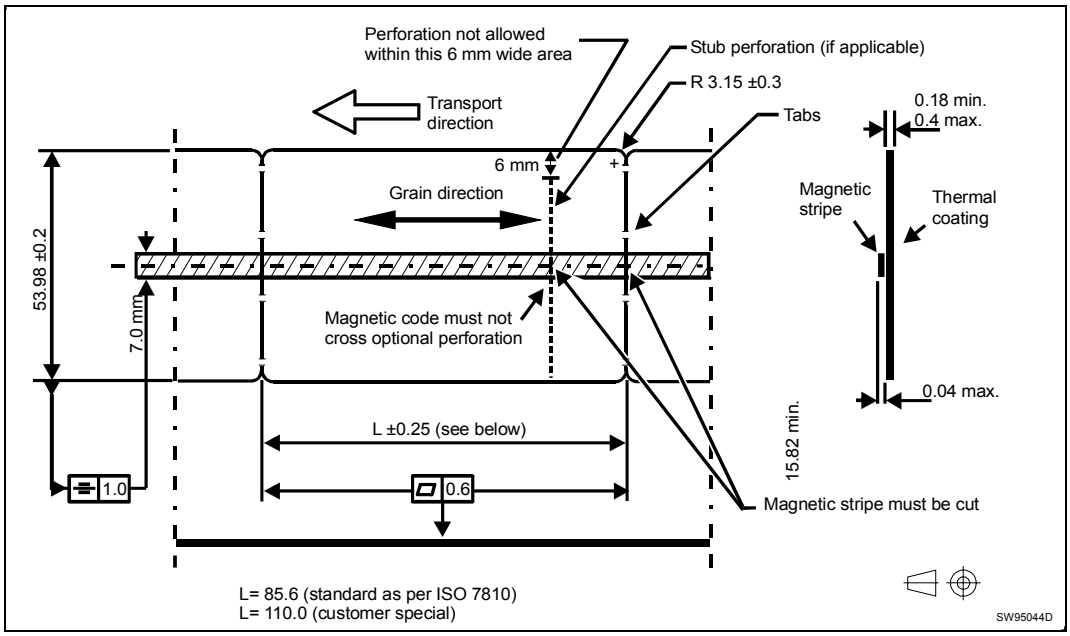


Figure 15. Both gapped and non-gapped tickets with center track can be used in printers ordered with center track option

14 ORDERING INFORMATION

The modularity of TTPM2 makes it possible to create thousands of different versions of it. The TTPM2 Selection Guide (Publication No. 101193) describe the concept. Please refer to it and contact Swecoin, or a Swecoin representative for configuration help. If you need a configuration not already available, or any other modifications, don't hesitate to contact us to see if the functions you need are possible to achieve.

Functions				Ordering No.		
Magnetic stripe	*Ticket type*	*Continuous feed*	*Handfed*	*Desktop*	*OEM*	*Evaluation Kit*[1]
Tracka 2&3 75/210 bpi LoCo	Fanfold Gapped	1 rear	1 rear	02440-000	02440-001	02440-800
		2 rear	-	02440-008	02440-018	02440-808

In addition to the ordering No's above, you must also specify:
Range for ticket thickness adjustment: 0.18—0.25 mm, 0.26—0.32mm, or 0.33—0.40mm
Firmware version. If unspecified, the latest firmware version will be fitted.

Ordering No.	Accessory description
02293-000	Output tray (delivered as standard for desktop printers)
00729-000	Fanfold ticket paper input tray
01035-002	Power supply for OEM printer mechanism, 150 VA (preferred model)
10828-050	Power supply for OEM printer mechanism, 50 VA (obsolete, only replacement part)
10825-000	Serial RS232 cable, 1.5 m
102531	Rear control panel and ticket guide option

[1] The evaluation kit contains a desktop printer, all available manuals, a disk with utility programs, 50 sample tickets, and a serial cable.

15 INDEX

A

Accessories 32
ACK/NAK....20
Active position 7
Ambient light.... 8

B

Bar code 12
Battery 16
Burst separator 15

C

Cancellation....15
Card dispenser 6
Carriage Return 17
Center track....31
Center track tickets....31
Character set....13
Coating and preprint 28
Code 39....12
Coding length 11
Coercivity....11, 29
Command set 17
Command syntax....17
Commands
  Document entry related 18, 19
  Magnetic encoding/decoding 19
  Print related 19
  Summary 18
  System related....18
Communications cable 9
Connection 16
Corner radius....29
Critical error 20
Cut time 10
Cutter....15
Cutter error 20
Cyrillic....14

D

Data bits 16
Data transfer time....10
Decoding 11
Dimension drawing 25
DIP switches....16
Document
  Dimensions....29
  Stock 28
Document-entry commands....18, 19

E

EAN-13....12
Earth.... 8
Encode speed 10
Encoding 11
  Cancellation....15
Encoding format 11
Environmental conditions 27
Error codes....20
ESD 8

F

Fonts 13
Front view.... 5
Full tape.... 29
Fuse 21

G

Gapped tickets.... 30
Graphics 12
Ground 8

H

Handshaking.... 16
Hebrew 14
Hex encoding.... 11
Hico 11, 29
Humidity.... 27

I

Input module.... 7
Installation 8
Interface 16
ISO encoding.... 11

L

Laminate.... 28
Light.... 8
Line Feed.... 17
Loco.... 11, 29
Lower track.... 7

M

Magnetic encoding
  Commands 19
  Failiure.... 20
Magnetic media 29
Magnetic stripe 29
Magnetic stripe data 11
Moisture proofing coating 28

N

NAK 1 20
NAK 2 20
NAK 4 20
NAK 5 20
NAK 6 20
NAK 7 20
NAK 8 20
NAK 9 20
NAK A.... 20
NAK B.... 20
NAK C 20
NAK D 20
NAK E.... 20
NAK G 20
NAK P.... 20
NAK X.... 20
No document inserted 20
No paper.... 20
Non gapped tickets.... 31

O

OEM printer mechanism....25

P

Paper....28
Paper jam....20
Parity....16
Perforated tickets....31
Perforation....29
Performance....10
Plastic....28
Power
  Connector....21
Power consumption....21
Power supply....8, 26
  Current....21
  Voltage....21
Preprint....28
Print
  Format parameter commands....19
  Method....12
  Width....12
Print data....12
Printer
  Design....7
Printer mechanism....22, 24, 25
Progress indicator....18
Protective ground....8

R

Read attempts....15
Read-after-write....11
Rear view....5
Resolution....12
Retract....15

S

Separator....15
Serial interface connector....9
Set up....16
Shock....27
Slurry....29
Space required....23
Standby position....7
Stock format....29
Stop bit....16
Summary of commands....18
Syntax....17
System commands....18

T

Temperature....27
Text....13
Ticket base material....28
Ticket dimensions....29
Ticket size....12
Ticket tracks....7
Top coating....28
Track
  Coercivity....11
  Combinations....11
  Density....11
Track swapping time....10
Transfer tape....29
Transmission speed....16

U

Upper track....7
UV coating....28

V,W

Vibration....27