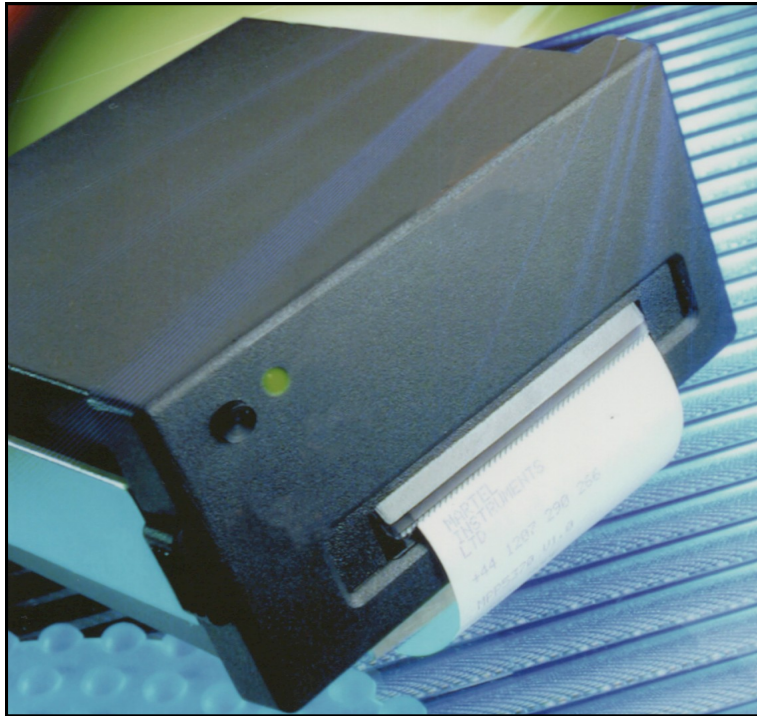**PRODUCT INFORMATION**

MARTEL

MPP5310 PANEL-MOUNT PRINTERS   *Applications Datasheet*

Features

- High speed, high resolution printing
- 5V and 10-35Vdc supply options
- Quiet, non-impact system
- Maintenance-free
- Compact and light weight
- High reliability
- Range of configurable options
- Versatile, for use with text or graphics
- 12, 16, 24, 32 or 48 characters per line
- Barcode capability
- Parallel or Serial interface
- Auto paper loading
- Connector options
- Windows drivers

Introduction

The MPP5310 is a compact thermal printer incorporating a fixed head mechanism and setting new performance standards for panel-mount units.

Designed for maximum versatility, the MPP5310 is capable of many different modes of operation. Numerous international character sets and barcodes are selectable and the printer will accept Centronics parallel or RS232 serial data. TTL and RS485 serial interfaces are available as a factory option.

Power supply options include a single 5Vdc (MPP5310) or a 10-35Vdc (MPP5310V) for ease of use and a self-test facility is incorporated. Paper changing is simplified by the use of a hinged front to the robust moulded enclosure, accompanied by automatic paper loading. The enclosure is available with a choice of colours.

The MPP5310 is one of a family of thermal printers manufactured in the UK by Martel. We would be pleased to discuss the possibility of customising any aspect of the printer to specific requirements.

ISO 9001

1. Printer Specification

1.1 Overall Specification

Printing system	Thermal line head system
Max characters per line	48 (24 default)
Character matrix	24x16, 24x12 or 24x8
Character size	3x2, 3x1.5 or 3x1 (Approx. 13, 17 or 25cpi)
Horizontal dot pitch	0.125mm (Approx. 200dpi)
Vertical dot pitch	0.125mm
Text line composition	24x384 dots
Printing width	48mm
Printing speed	10 lines per second
Paper width	58mm (+0/-1)
Paper OD	44mm
Paper roll length	25m
Character set	UK/United States (437)
Country codes	USA, France, Germany, UK, Denmark I/II, Sweden, Italy, Spain & Japan
Barcodes	UPC-A, UPC-E, EAN13, EAN8, Code39, 2 of 5, Codabar, Code 128

Interface
Serial
Input data format	RS232C
Baud rates	300, 600, 1200, 2400, 4800, 9600 and 19200
Handshaking	Hardware (CTS line) or Software (XON/XOFF)
Buffer size	5KBytes

Parallel
Input data format	<u>8-Bit Centronics</u>
Handshaking	STROBE and BUSY

Power supply (MPP5310)	5 (+/-0.25)Vdc
Current consumption, operating	4 Amps peak
Power supply (MPP5310V)	10-35 (+/-0.25)Vdc
Current consumption, operating	2.7A @ 10V, 1.75A @ 15V, 1.5A @ 20V, 1.2A @ 25V, 1.1A @30V, 1A @ 35V Peak

Dimensions
Bezel	112x66mm
Depth behind panel (MPP5310)	85mm
Depth behind panel (MPP5310V)	113mm
Panel cutout	107x60mm

Environmental Conditions
|	
Operating range	$0^{o}C$ to $+50^{o}C$
Storage range	$-20^{o}C$ to $+60^{o}C$
MTBF	Approx. 10 Million lines ($20^{o}C$, print ratio = 25%)

1.2 Printer Mechanism

The printer mechanism comprises a 384 element, thin film head and stepper motor driven transport. Head temperature compensation is utilised to provide constant print quality across the range of operating conditions.

The Status LED will flash to report an abnormal condition of the printer. The condition can be identified by the flash sequence:

Sequence			Condition	Solution
✳	✳	✳	Paper out	Fit new paper
✳✳	✳✳	✳✳	Thermal head too hot	Allow head to cool

1.3 Connections for 5Vdc models

The MPP5310 is supplied as standard with a connector requiring access from below the printer, alternatively the MPP5310R has a connector which is accessed from the rear.
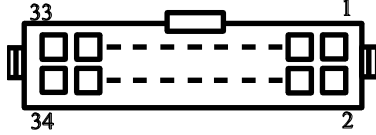
Mating connector required:
HIF3BA – 34D-2.54R (HIROSE) or equivalent

Signal	I/0	Definition	MPP5310	MPP5310R
0V	-	Ground	29, 30, 31, 32	29, 30, 31, 32
VCC	-	Logic supply (+5V)	28	27
+V	-	Print Supply (4-6V)	27, 33, 34	28, 33, 34
RXD	I	RS232 Receive data	22	21
TXD	O	RS232 Transmit data	20	19
CTS	O	RS232 Clear to send	19	20
BUSY	O	Parallel Data Handshake	21	22
STROBE	I	Parallel Data Store	1	2
D0	I	Parallel Data Bit 0	3	4
D1	I	Parallel Data Bit 1	5	6
D2	I	Parallel Data Bit 2	7	8
D3	I	Parallel Data Bit 3	9	10
D4	I	Parallel Data Bit 4	11	12
D5	I	Parallel Data Bit 5	13	14
D6	I	Parallel Data Bit 6	15	16
D7	I	Parallel Data Bit 7	17	18
0V	-	Parallel Data Screen	2, 4, 6, 8, 10, 12, 14, 16, 18	1, 3, 5, 7, 9, 11, 13, 15, 17
PE	O	Paper end signal	23	24
FEED	I	Paper feed signal	24	23
RESET	I	Initialisation signal	26	25

PAPER END
The PE signal goes low when the paper runs out.

FEED
A paper feed switch is provided on the front of the printer. Paper feed may also be controlled from the host and is advanced when FEED is low.

RESET
The RESET input initialises the printer. All input data will be cleared and the paper advanced by one line when RESET is low.

1.4 Connections for 10-35Vdc models

The MPP5310V is supplied as standard with a connector requiring access from below the printer, alternatively the MPP5310R has a connector which is accessed from the rear.
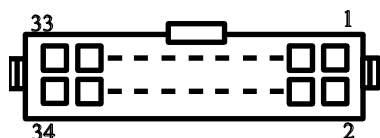
J1

Mating connector required:
Molex KK

1

Signal	I/0	Definition	MPP5310	MPP5310R
0V	-	Ground	1	1
VCC	-	Logic supply (+10-35Vdc)	2	2

J2

Mating connector required:
HIF3BA – 34D-2.54R (HIROSE) or equivalent

Signal	I/0	Definition	MPP5310	MPP5310R
0V	-	Ground	29,30,31,32	29,30,31,32
RXD	I	RS232 Receive data	22	21
TXD	O	RS232 Transmit data	20	19
CTS	O	RS232 Clear to send	19	20
BUSY	O	Parallel Data Handshake	21	22
$\overline{\text{STROBE}}$	I	Parallel Data Store	1	2
D0	I	Parallel Data Bit 0	3	4
D1	I	Parallel Data Bit 1	5	6
D2	I	Parallel Data Bit 2	7	8
D3	I	Parallel Data Bit 3	9	10
D4	I	Parallel Data Bit 4	11	12
D5	I	Parallel Data Bit 5	13	14
D6	I	Parallel Data Bit 6	15	16
D7	I	Parallel Data Bit 7	17	18
0V	-	Parallel Data Screen	2, 4, 6, 8, 10, 12, 14, 16, 18	1, 3, 5, 7, 9, 11, 13, 15, 17
PE	O	Paper end signal	23	24
$\overline{\text{FEED}}$	I	Paper feed signal	24	23
$\overline{\text{RESET}}$	I	Initialisation signal	26	25

PAPER END
   The PE signal goes low when the paper runs out.

FEED
   A paper feed switch is provided on the front of the printer. Paper feed may also be controlled from the host and is advanced when $\overline{\text{FEED}}$ is low.

RESET
   The $\overline{\text{RESET}}$ input initialises the printer. All input data will be cleared and the paper advanced by one line when $\overline{\text{RESET}}$ is low.

2. PRINTER CONFIGURATION

2.1 Configuration

There are two methods to configure the printer.
Method 1 uses some of the pins in the 34 way connector and is the printer default. However this method is limited to selecting Baud rate and handshaking and the set-up for Data received, Data transmitted, Clear to send and serial or parallel mode.
Method 2 uses the printer firmware to configure a wide range of options.

Selection of Method 2 is obtained through the configuration options detailed on pg 6.

2.2 Pin Selection — Serial Interface

The RS232 standard is used, and the baud rate is selectable from 1200, 2400, 4800 and 9600 bits per second via Pins 3, 5 and 7.

Baud	Pin 7	Pin 5	Pin 3
1200	0v	n/c	n/c
2400	n/c	n/c	0v
4800	n/c	0v	n/c
9600	n/c	n/c	n/c

n/c = no connection

Data Received from host (RxD) is pin 22.
Data Transmitted to host (TxD) is pin 20 .
Clear to Send (CTS) for hardware handshaking is pin 19.
RS232 0v is pin 29.

To select serial mode pin1 (STROBE) should be connected to 0v when power is first applied to the printer.

To select software handshaking (XON/XOFF) pin 17 should be connected to 0v.
No connection to pin 17 will select hardware handshaking (CTS).

TTL and RS485 serial interface are available as a factory option.

2.3 Pin Selection — Parallel Interface

8-bit data is latched into the printer by STROBE. BUSY is used for handshaking

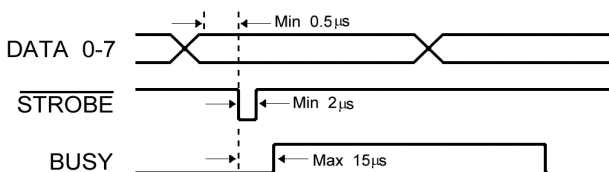One line is printed following receipt of one line of data and a CR or LF code.

Fig 1: Parallel Data Transfer Timing Diagram

2.4 Memory Selection

The printer incorporates a number of configurable *options*, each of which has a number of *settings*. The default settings of the standard printer are detailed in the table below in bold. To change the setting of any option, follow the procedure below:

1. Ensure the printer is OFF.
2. Press and hold the Mode button and power the printer ON. After about five seconds, the Status light will flash five times to show that the printer is in *configuration mode*. Release the Mode button.
3. Press the Mode button the same number of times as the *option* that you wish to change (for example to change baud rate, press the Mode button twice).
4. After a short delay, the Status light will flash the same number of times as the option that you have chosen. If you have made a mistake at this stage, simply wait: after a delay, the printer will power-on without changing any options.
5. To proceed with configuration, press the Mode button the same number of times as the *setting* that you wish to make (for example, to set the baud rate to 19200, press the Mode button once).
6. After a short delay, the Status light will flash the same number of times as the setting that you have made.

Option Number	Option	Setting Number (default in bold)	Setting (default in bold)
1	**Setup**	**1**	**Pin Selection**
		2	Memory Selection
2	**RS232 Protocol or Parallel**	**1**	**8, No parity**
		2	8, Odd parity
		3	8, Even parity
		4	7, Odd, parity
		5	7, Even Parity
		6	Parallel
3	**RS232 Baud Rate**	1	19200 baud
		2	**9600 baud**
		3	4800 baud
		4	2400 baud
		5	1200 baud
		6	600 baud
		7	300 baud
4	**RS232 Handshake**	**1**	**None**
		2	Software
		3	Hardware
5	**Default Font**	**1**	**Arial 16, 24 CPL**
		2	Arial 12, 32 CPL
		3	Arial 8, 48 CPL
6	**Character Format**	**1**	**Normal**
		2	Double Width
		3	Double Height
		4	Double Width and Height
7	**Print Density**	**1**	**Lowest**
		2	
		3	
		4	Highest
8	**Printer Current**		
		1	**Highest**
		2	
		3	
		4	Lowest
9	**Print Format**	1	Standard paper, upside down printing
		2	**Standard paper, normal printing**
		3	Labels, normal printing
		4	Labels, upside down printing

2.5 Software Selectable Functions

Bold	Form feed, plus setting
Underline	11 selectable international character sets
Double height, Double width	Reverse printing
Graphics	Inverse printing
Horizontal tab, plus setting	Reset

2.6 Control Codes and Escape Sequences

Function	Code	Decimal	Hex
Horizontal tab	HT	9	09
Line feed	LF	10	0A
Form feed	FF	12	0C
Carriage return	CR	13	0D
Double width on	SO	14	0E
Double width off	SI	15	0F
Cancel	CAN	24	18
Set print mode	ESC ! n	27 33 n	1B 21 n
Set barcode start position	ESC \$ $n1$ $n2$	27 36 $n1$ $n2$	1B 24 $n1$ $n2$
Set bit image (8 pin single density)	ESC * 0 $n1$ $n2$ $[d]$	27 42 0 $n1$ $n2$ $[d]$	1B 2A 00 $n1$ $n2$ $[d]$
Set bit image (8 pin double density)	ESC * 1 $n1$ $n2$ $[d]$	27 42 1 $n1$ $n2$ $[d]$	1B 2A 01 $n1$ $n2$ $[d]$
Set bit image (24 pin single density)	ESC * 32 $n1$ $n2$ $[d]$	27 42 32 $n1$ $n2$ $[d]$	1B 2A 20 $n1$ $n2$ $[d]$
Set bit image (24 pin double density)	ESC * 33 $n1$ $n2$ $[d]$	27 42 33 $n1$ $n2$ $[d]$	1B 2A 21 $n1$ $n2$ $[d]$
Underline on	ESC – 1	27 45 1	1B 2D 01
Underline off	ESC – 0	27 45 0	1B 2D 00
Reset	ESC @	27 64	1B 40
Set page length	ESC C n	27 67 n	1B 43 n
Set horizontal tabs	ESC D n	27 68 n	1B 44 n
Bold on	ESC G	27 71	1B 47
Bold off	ESC H	27 72	1B 48
Move n dot lines forwards ($1 \le n \le 23$)	ESC J n	27 74 n	1B 4A n
Set bit image	ESC K $n1$ $n2$ $[d]$	27 75 $n1$ $n2$ $[d]$	1B 4B $n1$ $n2$ $[d]$
Country select	ESC R n	27 82 n	1B 52 n
Double width on	ESC W 1	27 87 1	1B 57 01
Double width off	ESC W 0	27 87 0	1B 57 00
Compressed bit image graphics	ESC Z $n1$ $[d1]$ … $n24$ $[d24]$	27 90 $n1$ $[d1]$ … $n24$ $[d24]$	1B 5A $n1$ $[d1]$ … $n24$ $[d24]$
Print & feed paper	ESC d n	27 100 n	1B 64 n
Label advance	ESC f	27 102	1B 66
Enter label mode	ESC L	27 76_{10}	1B $4C_{16}$
Reversed on	ESC i 1	27 105 1	1B 69 01
Reversed off	ESC i 0	27 105 0	1B 69 00
Move n dot lines backwards ($1 \le n \le 23$)	ESC J n	27 106 n	1B 6A n
Double height on	ESC w 1	27 119 1	1B 77 01
Double height off	ESC w 0	27 119 0	1B 77 00
Inverse on	ESC { 1	27 123 1	1B 7B 01
Inverse off	ESC { 0	27 123 0	1B 7B 00
Set barcode height ($1 \le n \le 255$)	GS h n	29 104 n	1D 68 n
Print UPC-A barcode	GS k 0 $[d]$ NULL	29 107 0 $[d]$ 0	1D 6B 00 $[d]$ 00
Print UCP-E barcode	GS k 1 $[d]$ NULL	29 107 1 $[d]$ 0	1D 6B 01 $[d]$ 00
Print EAN13 barcode	GS k 2 $[d]$ NULL	29 107 2 $[d]$ 0	1D 6B 02 $[d]$ 00
Print EAN8 barcode	GS k 3 $[d]$ NULL	29 107 3 $[d]$ 0	1D 6B 02 $[d]$ 00
Print Code 39 barcode	GS k 4 $[d]$ NULL	29 107 4 $[d]$ 0	1D 6B 04 $[d]$ 00
Print 2 of 5 barcode	GS k 5 $[d]$ NULL	29 107 5 $[d]$ 0	1D 6B 05 $[d]$ 00
Print Codabar barcode	GS k 6 $[d]$ NULL	29 107 6 $[d]$ 0	1D 6B 06 $[d]$ 00
Print CODE128 barcode	GS k 7 n $[d]$	29 107 7 n $[d]$	1D 6B 07 n $[d]$
Set barcode magnification ($2 \le n \le 4$)	GS w n	29 119 n	1D 77 n

2.7 International Character Sets

Country	Code	Decimal	Hex
USA	ESC R 0	27 82 0	1B 52 00
France	ESC R 1	27 82 1	1B 52 01
Germany	ESC R 2	27 82 2	1B 52 02
UK	ESC R 3	27 82 3	1B 52 03
Denmark I	ESC R 4	27 82 4	1B 52 04
Sweden	ESC R 5	27 82 5	1B 52 05
Italy	ESC R 6	27 82 6	1B 52 06
Spain	ESC R 7	27 82 7	1B 52 07
Japan	ESC R 8	27 82 8	1B 52 08
Norway	ESC R 9	27 82 9	1B 52 09
Denmark II	ESC R 10	27 82 10	1B 52 0A

2.8 Print Mode (ESC!)   MPP5310

Bit	Function	Value 0	1
0	} Character font		
1	} (see below)		
2	} Print density		
3	} (see below)		
4	Double height	Cancelled	Set
5	Double width	Cancelled	Set
6	Undefined		
7	Underline	Cancelled	Set

2.9 Characters Per Line

Character Font	Bit 1	Bit 0
24 characters per line	0	0
48 characters per line	0	1
32 characters per line	1	0
Undefined	1	1

2.10 Print Density

Print Density		Bit 3	Bit 2
Light	1 (Default)	0	0
	2	0	1
	3 (Label Default)	1	0
Dark	4	1	1

# 3. PRINTER OPERATION

3.1 Power On Self Test

The self test procedure is initiated by applying power to the printer while the paper feed button is depressed. When the paper feed button is released a test print will be produced.

3.2 Replacing Paper Roll

Replacement paper roll—Part No. MM58

Access to the printer for changing the paper roll is provided by a hinged front panel. The spring-loaded catch on the left hand side of the printer front panel should be depressed to release the front panel.
The paper roll carrier is mounted on the rear of the printer front panel and will swing out from the main body for ease of roll changing.
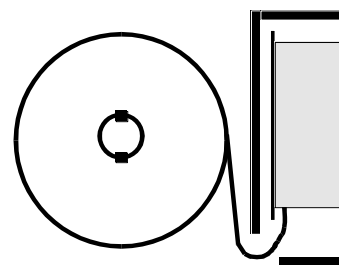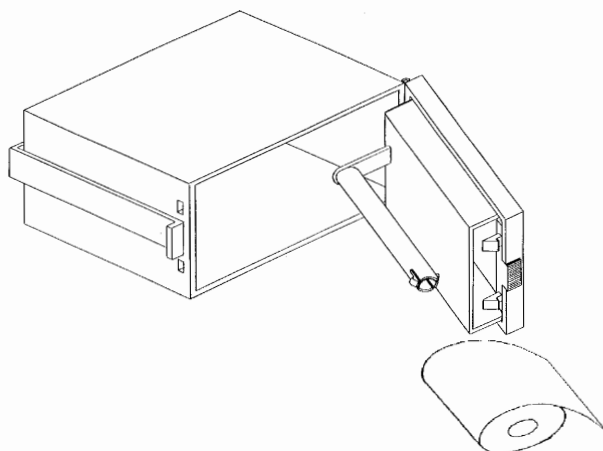
Correct paper path

The printer incorporates an automatic paper feed facility. With a new paper roll mounted on the carrier and with a clean straight edge to the paper, present the paper to the entry point at the lower edge of the mechanism. The paper will be sensed by the mechanism and automatically feed through into a position ready for printing
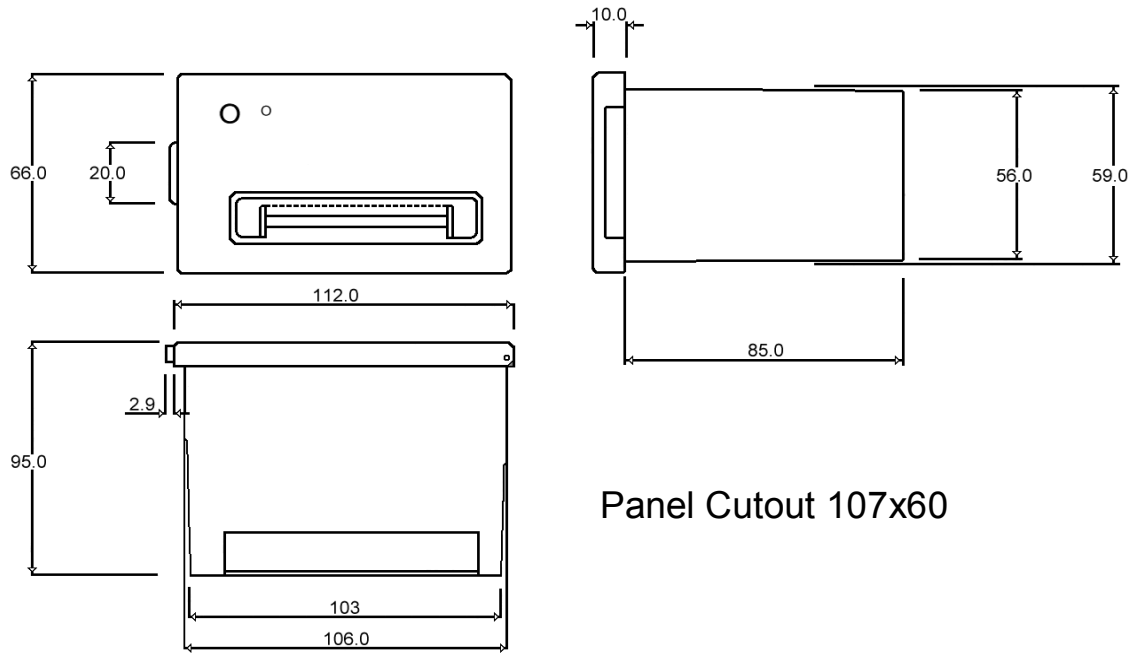
3.3 Dimensions

Panel Cutout 107x60
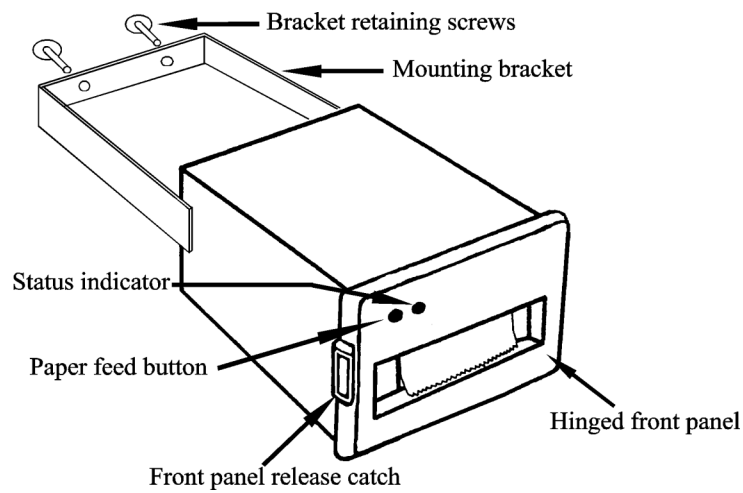
Bracket retaining screws

Mounting bracket

Status indicator

Paper feed button

Front panel release catch

Hinged front panel

4. CONSUMABLES & ACCESSORIES

4.1 Paper

Description	Part Number
Thermal Paper Roll, 58mm x 25m	MM58

4.2 Power & Data Cables

Description	Connection Type	Part Number
Power & Data Cable, 150mm, 34 way IDC plus bare end	Power & Comms	MGK87
Power Cable, 150mm, 2 way Molex KK plus bare end	Power (10-35V option)	MGK90

MPP5310/AD/M