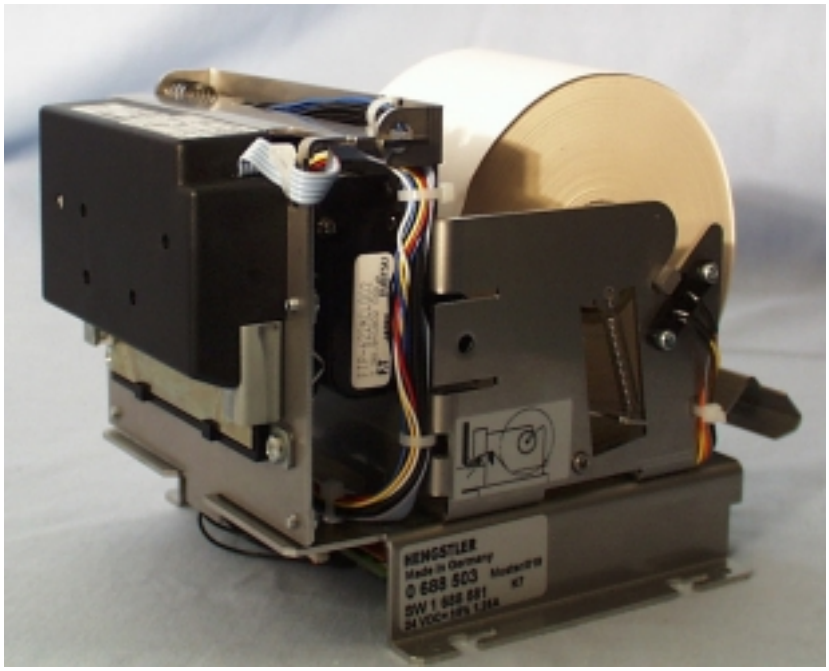
HENGSTLER



2 688 434

Service Manual

PIXI Coupon Printer

HENGSTLER GmbH

PO Box 1151

D-78550 Aldingen

Germany

Telephone: +49 (0) 7424 890

Fax: +49 (0) 74 24 89210

e-mail: info@hengstler.de

Homepage: http://www.hengstler.de

Modification number: 290799

1. Modifications Listing

Modification number
None

2. Document History

2.1 Previous Versions

29.07.99 First release

2.2 Modifications

3. Bibliography

Specification / System Description 0 688 825
Specification / System Description 0 688 824

4. Contents

5. Preface

The PIXI Voucher Printer is a modular constructed build-in printer with thermal print mechanism and integrated paper cutter. An extensive paper sensor system monitors the paper progress.
The paper dispenser is based on a paper roll of up to 100 meters length with a weight of 78 g/m².
Printer applications include voucher printing at Info Point terminals.

 **Please note:**

The PIXI Voucher Printer User Documentation covers:
- Software Manual
- Installation Manual
- as well as this Service Manual

This Service manual covers topics which are relevant to service personnel.

- PIXI Standard Software Manual (SWH 2 688 181_581)
- PIXI 302 Software Manual (SWH 2 688 181_583)
- User Manual (2 688 435)
- Data Protocol Manual (2 688 259)


This symbol identifies text which gives important advice relating to the correct and safe operation of the unit.

6. Safety Advice

- The PIXI Voucher Printer is a quality product, manufactured according to recognised technology standards. It left the factory in a condition compliant with all safety regulation.
- In order to maintain this condition and to guarantee operation without danger to the User, the advice and warnings contained in this handbook must be followed.
- This unit has been built and tested according to EN 60950 relating to the safety of IT equipment. It has Protection Class III.
- The installation and assembly of electrical devices should only be undertaken by a qualified electrician.
- This unit should only be used once it has been built-in.
- When building equipment in, it must be guaranteed that the device requirements set for the fixture by the corresponding device safety norms are not in any way negatively influenced, leading to a reduction of the equipment safety levels.
- Before switching the unit on, it must be guaranteed that the operating and control voltages connected, do not exceed the values stated in the technical data specifications.
- Control and data lines must only be connected using SELV (separated extra low voltage system) circuits or circuits with power limitation which meet the requirements of EN 60950.
- The power plug connecting to the external power supply must be protected by external fusing. The corresponding socket must be installed, with easy access, close to the unit.

If you suspect that the device cannot be operated without danger, it must be switched off and put in a condition such that operation cannot accidentally be resumed. This may be the case if:

- damage to the unit is visible;
- the unit has been stored for a long time in unsuitable conditions:
- the unit has been subject to extreme transport demands.

If, as the result of equipment failure or error, there could be a danger of personal accident or damage to property, this must be avoided through additional safety measures, such as the installation of a position switch or a guard or barrier.

6.1 Electro-magnetic Compatibility

The unit is designed for use in domestic, commercial or industrial applications.

7. Additional Information

Delivery
Please check that the delivery is complete by reference to the accompanying delivery documentation.

Unpacking
Having unpacked the equipment, please check that there has been no damage in shipping. Make sure that all parts, including and accompanying accessories have been removed from the packaging.

Claims
Any damage claims caused through transportation are only valid if the delivery company is advised without delay.
A damage report must be completed immediately and sent back to the manufacturer with the defective part(s).
When returning goods, the original packaging should be used if at all possible.
The following information should accompany all returns:

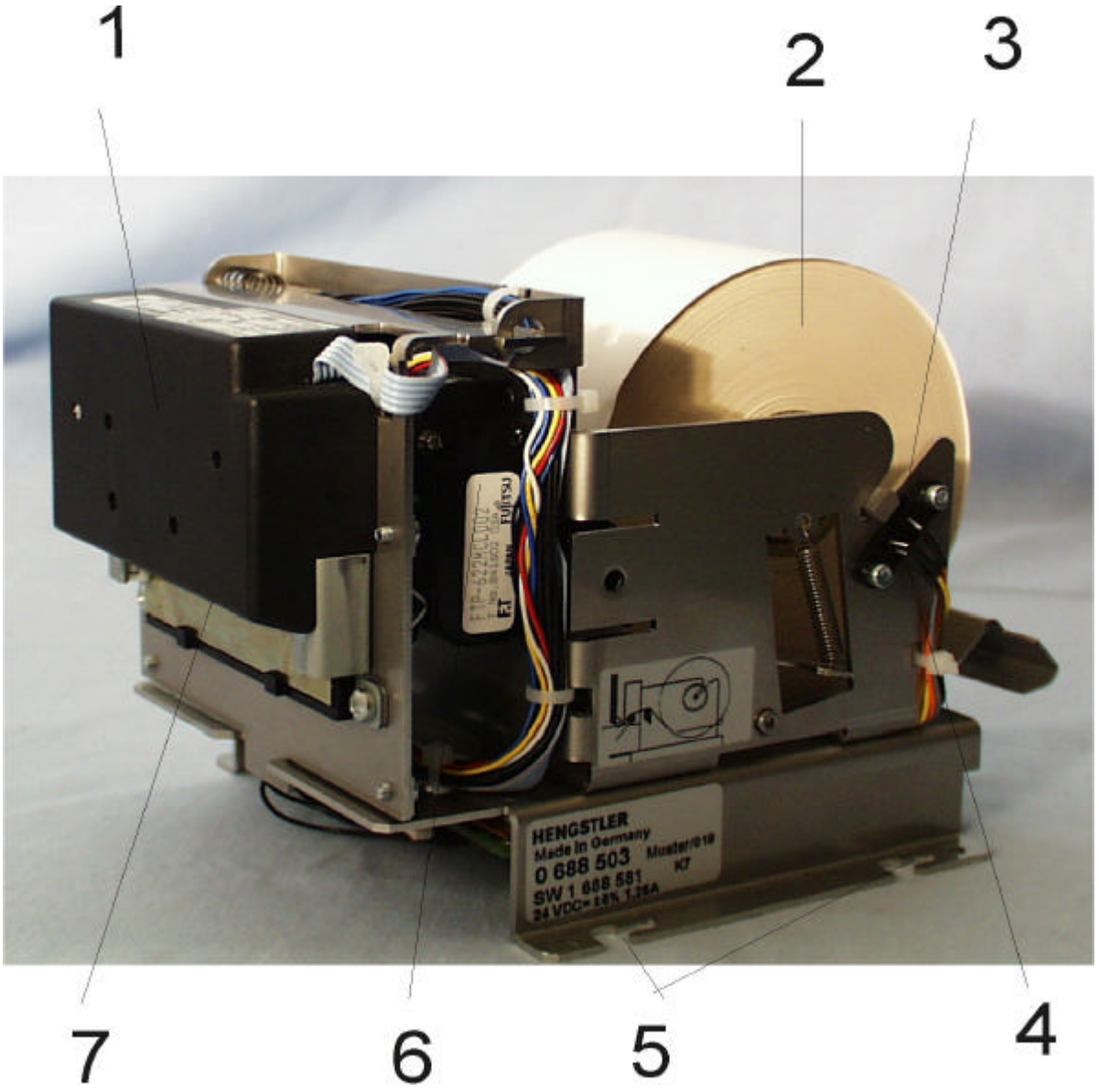
- Name and address of recipient.
- Device, type and serial numbers.
- A damage report with description of the defect.

7.1 Glossary

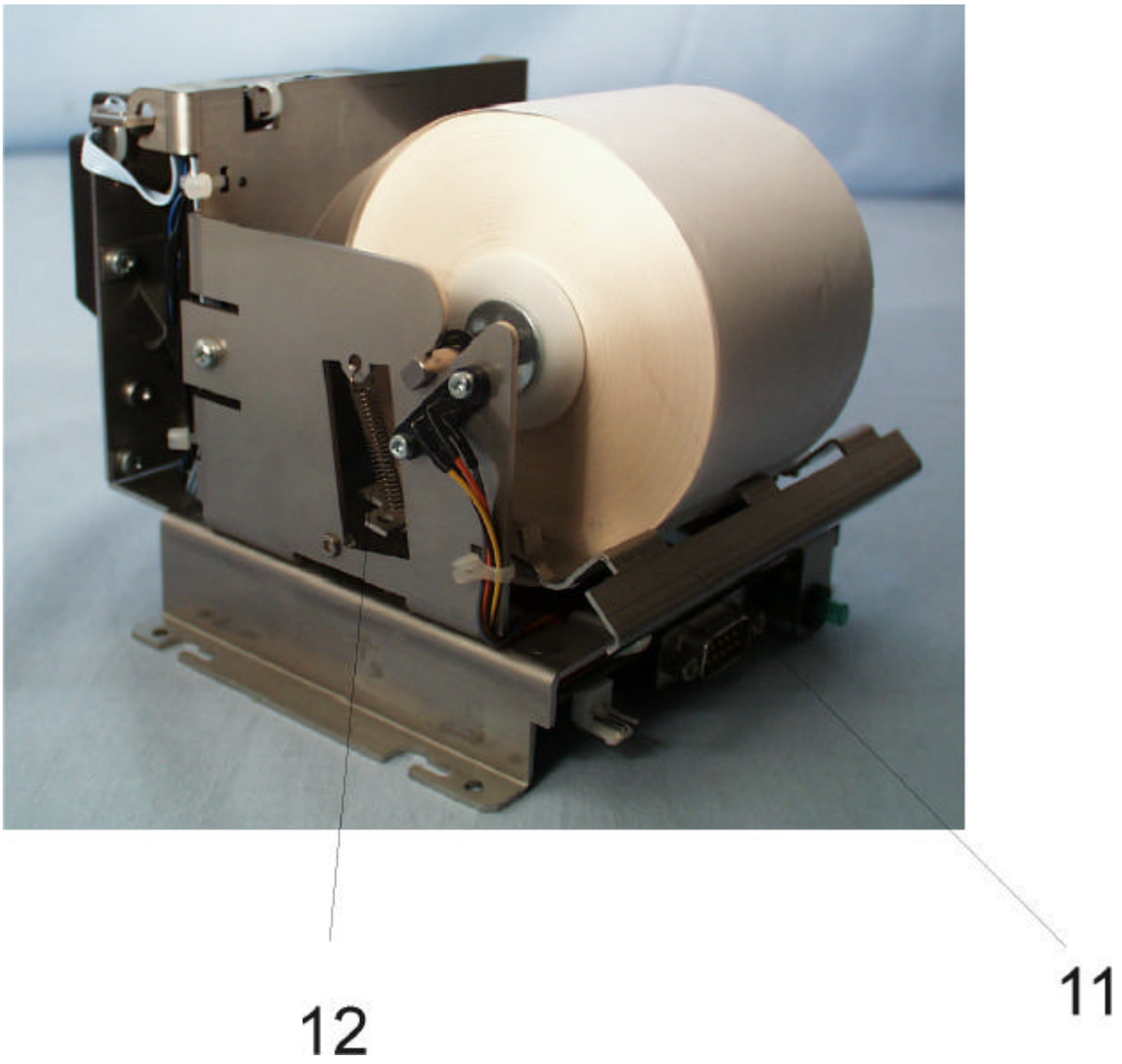
BoF	Bottom of Form sensor
BPZ	Block Check Character
cpi	Characters per inch
cpl	Characters per line
CPOS	Cutter position for paper transport
CSC	Customer Service Centre
CST	Customer Service Terminal
Dot	Pin or thermal point printing
dpi	Dots per inch
DPOS	Print position for paper transport
EMC	Electro Magnetic Coupling
ESD	Electro Static Discharge
GDI	Graphic device interface
Host	Host computer
HTp	Hengstler thermal print mechanism
lpi	Lines per inch
lps	Lines per second
McbF	Mean cycle between Failure
Mk	Mark Recognition (1, 2, n)
MPOS	Mark position for paper transport
MTBF	Mean time between Failure
MtbSC	Mean time between Service Call
MttR	Mean time to Repair
PCS	Print Contrast Signal
PE	Paper End message
pps	Pulses per second
PrA	Presenter output sensor
PrE	Presenter input sensor
PVE	"Paper-out pending" message
PWE	Paper weekend message
Step	Smallest paper advance distance in inches
ToF	Top of Form sensor

8. Version Description

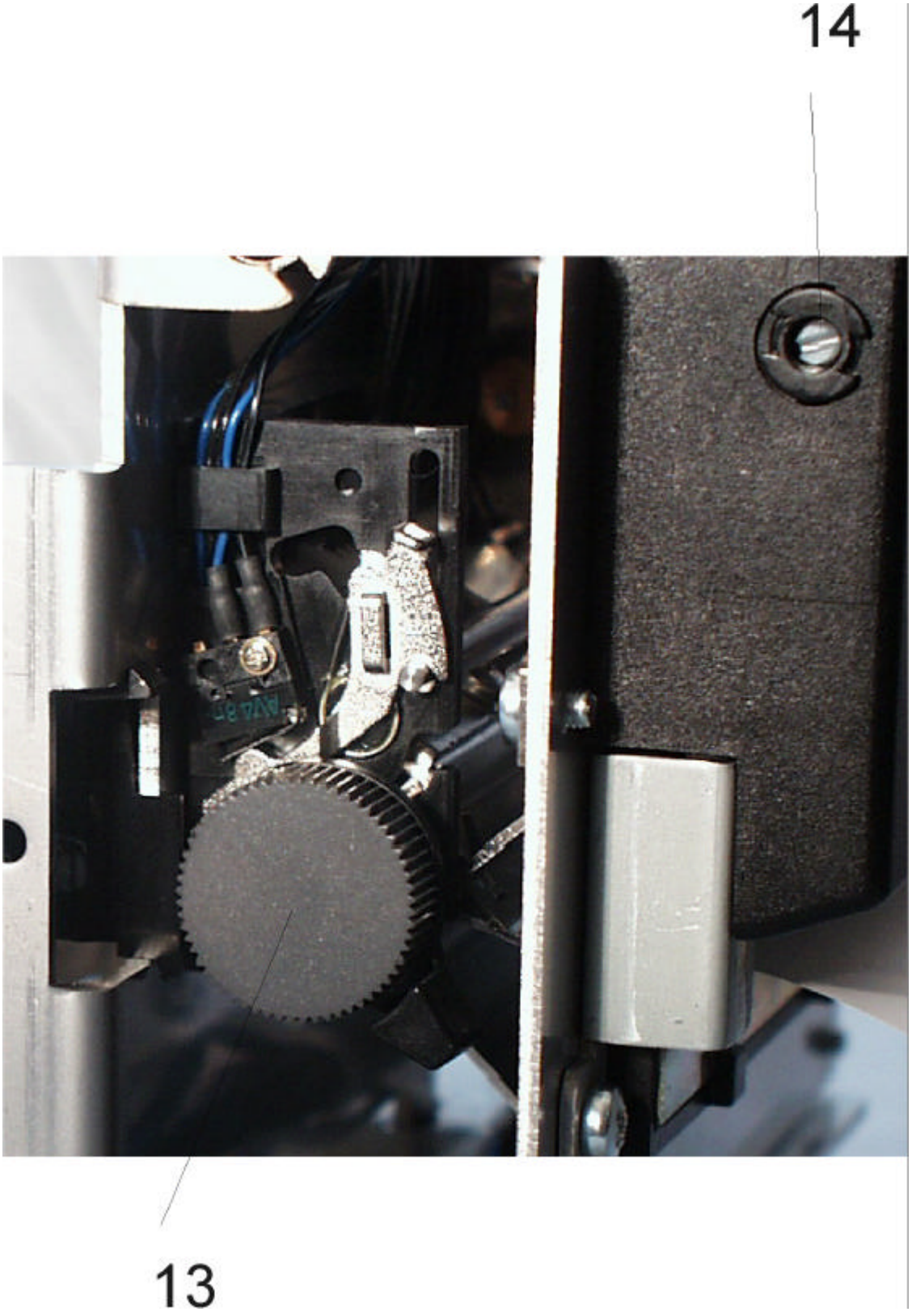
8.1 PIXI Device Description



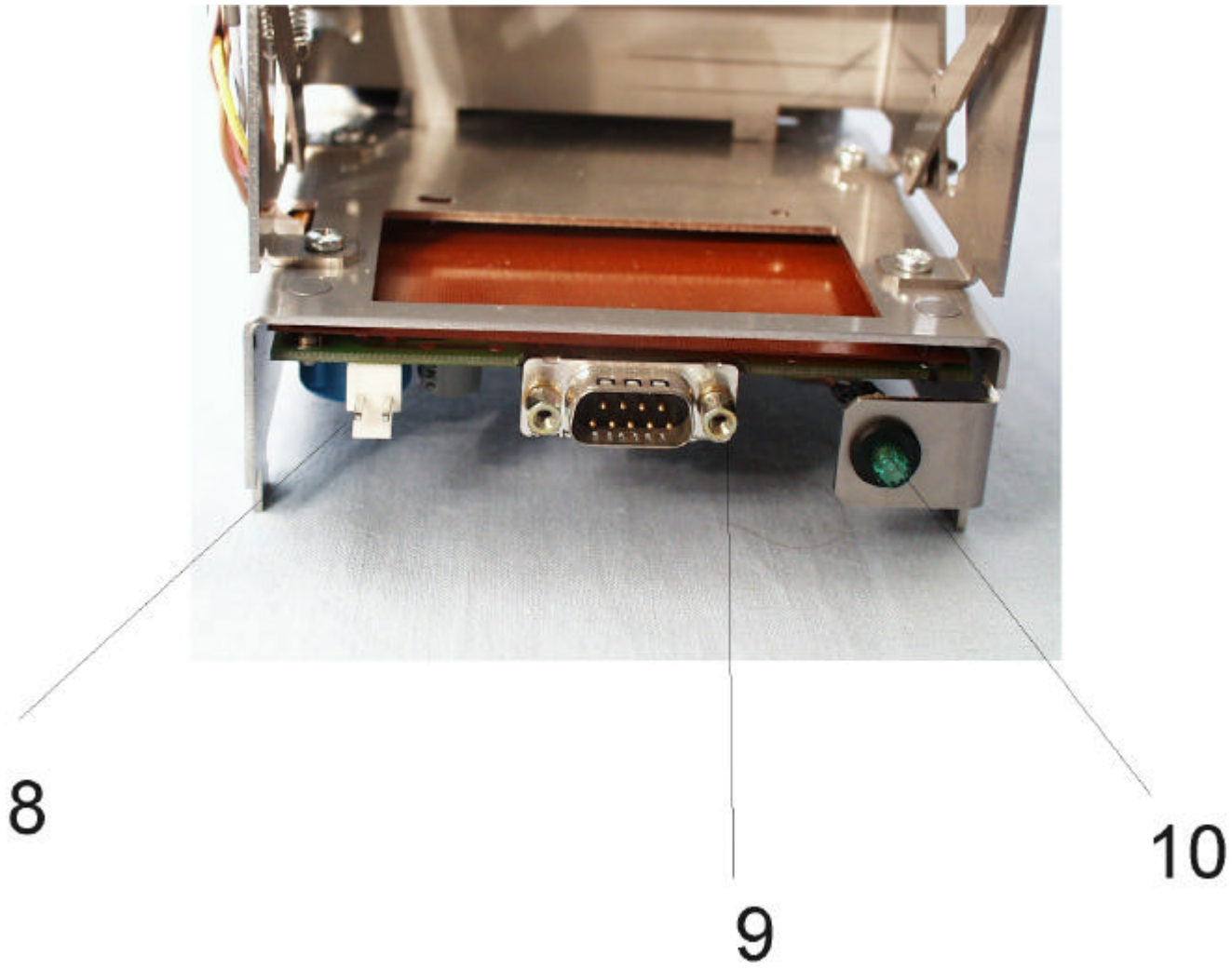
1 = Cutter
2 = Paper supply
3 = Paper spindle position
4 = Paper out pending sensor
5 = Unit fixing points
6 = Thermal print mechanism
7 = Paper exit point



11 = Paper out pending sensor rocker
12 = Rocker spring



13 = Wheel to raise print head manually
14 = Screw to turn cutter manually



8 = Power supply connection
9 = Data connection
10 = Combined “in operation” display and LF key

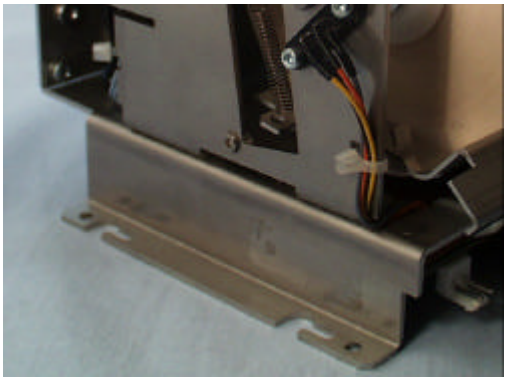
9. Installation

9.1 Mechanical Fixings

The mechanical installation of the unit must be carried out according to the printer fixing points.
The printer can be installed horizontally or vertically with the cutter underneath.

9.2 Installation

The unit should be installed by locating the mounting points (5) on the two mounting screws either by sliding or hanging them on.
The mounting screws must then be tightened in order to hold the printer securely in position.



9.3 Electrical Connections

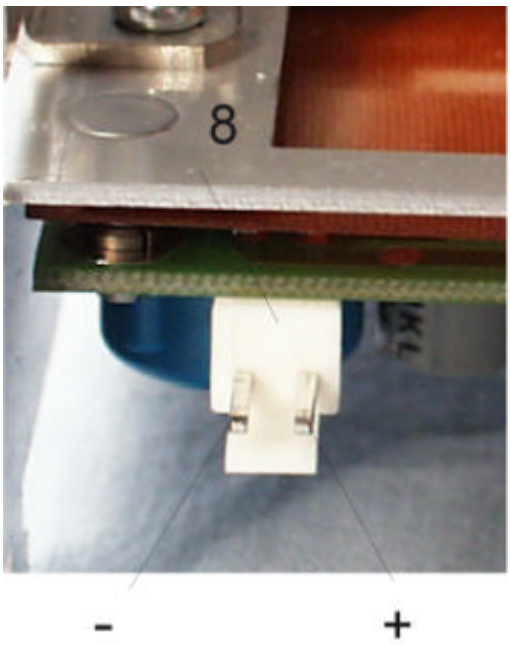
Please note

- The device must be disconnected from any power source during connection
- The power supply cable is attached to connector **(9)**
- The data cable is attached to connector **(10)**
- If it is not mounted on a conductive surface, the chassis must be earthed to the protective conductor

10. Set-Up

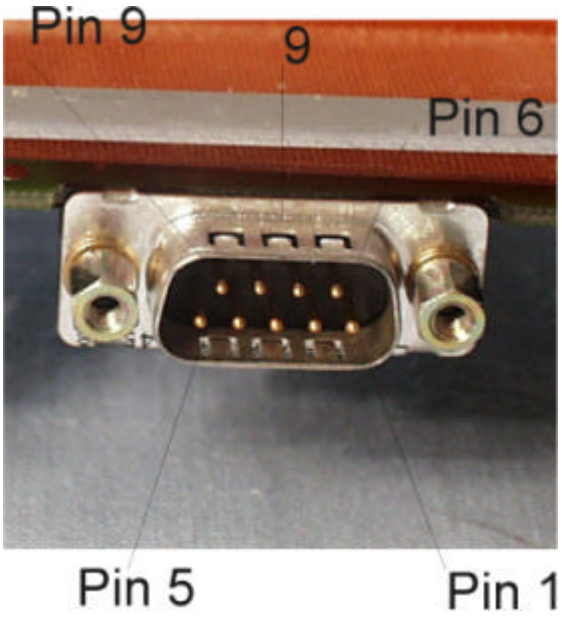
10.1 Power Supply Cable

Connect the power supply cable to connector **(8)**.

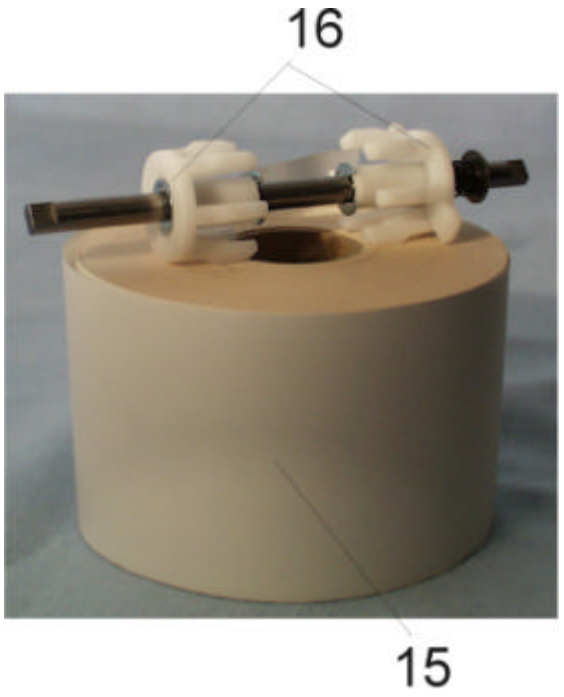


10.2 Data Cable

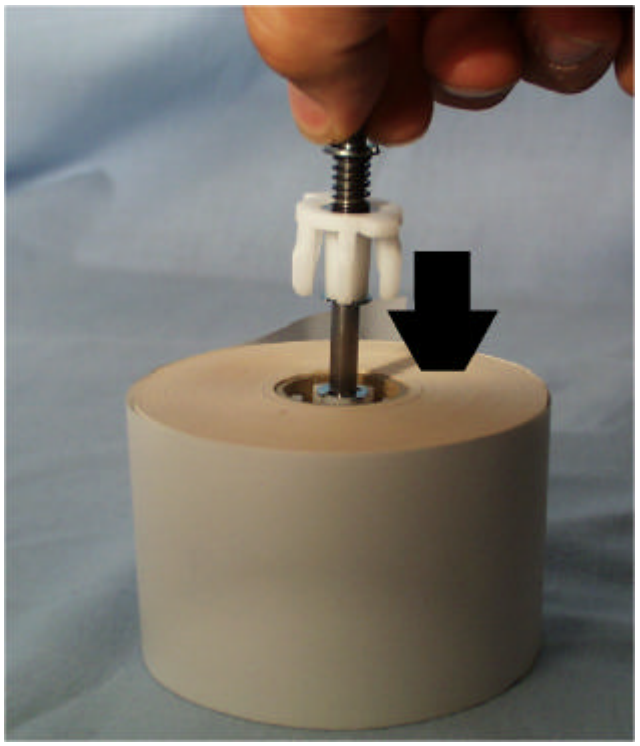
Connect the data cable to connector **(9)**.

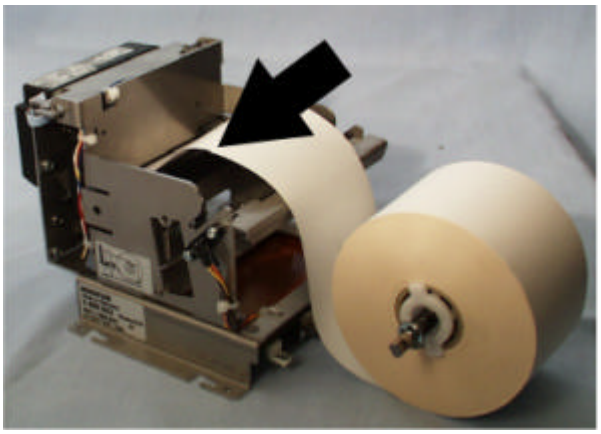


10.3 Inserting the Paper



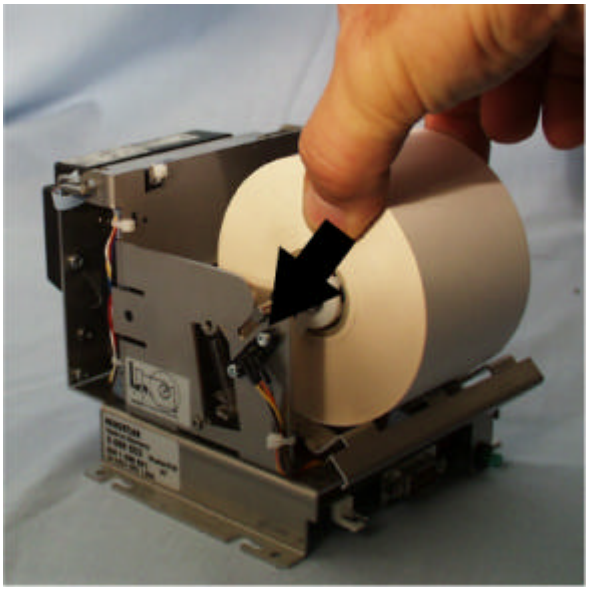
15 = Paper roll with the thermo-sensitive surface on the outside
16 = Paper spindle





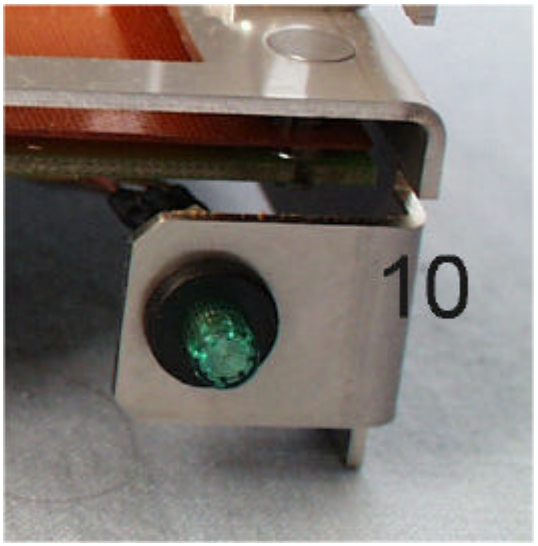
After the paper spindle has been inserted into the paper roll, the paper must be inserted into the print mechanism with the thermo-sensitive surface inwards.

Please note:
The print head (13), must be closed.



Lay the paper roll in the paper spindle position.

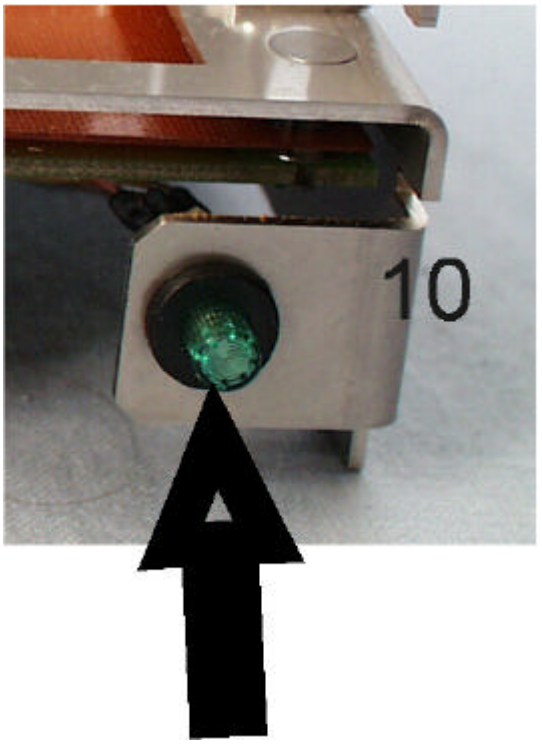
10.4 Power On



The LED will light up to indicate that the power has been connected and switched on correctly.

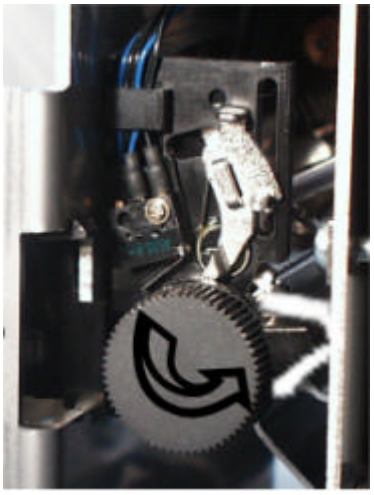
11. Operation

The printer operates solely as a result of commands sent over the interface. These operating commands are described in the corresponding Software Manual.
A single press of the LF key advances the paper by one line. If you press the LF key for a longer time, a FF is carried out.

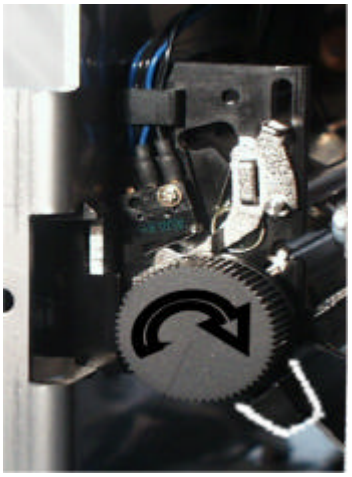


11.1 Changing the Paper

Raise the print head with the lever **(13)** and remove any paper remaining in the unit.



Print head opened



Print head closed

Close the print head and insert the paper as described in 10.3.

12. Errors & Disturbances

Error description	Cause	Counter measures
No print possible	End of paper reached or no paper available	Insert new paper roll
	Power switched off	Check power connections and/or switch power on.
	Print head is open	Close print head with lever **(5)**.
	Data interface incorrect	Check data interface; data cable, plug-in connections, etc.
Paper isn't cut	Cutter defective	Call service technician
Paper can't be inserted	Print head open	Close the print head with lever **(13)**
	Paper remaining in paper route	Remove any residual paper
	Defective sensor in the print mechanism	Request service call

 **Please note**

If none of the above solves the problem or if the problem reoccurs, please contact your Service Technician.

13. Technical Data

13.1 Complete unit

Print type:	Non-impact, parallel
Print method:	Thermal sensitive
Cutting method:	Guillotine
Print width:	max. 56 mm at 448 dots

13.1.1 Paper Specification

Paper width:	58.. +/- 0.5
Paper weight:	56gsm^2 +/-5
Roll length:	100m
Roll core internal diameter:	25.4mm (1”)
Paper roll external diameter:	95mm
Thermo-sensitive surface:	Inside
Paper manufacturer:	Blumberg
Paper manufacturers part number:	TF 00 22 00
Hengstler part number:	3 810 849
Voucher length:	Depends on format

13.1.2 Paper sensors

13.1.2.1 Paper out

The sensor in the print mechanism identifies paper out when no more paper is detected in front of the sensor.

13.1.2.2 Paper out pending sensor

The following calculations are made, based on the above paper specification.

Paper length in metres	**Core diameter in millimetres**
0	29.9
1	31.1
2	32.3
3	33.1
4	34.6
5	35.4

The paper out sensor is triggered by a core diameter value of 34.6mm, +/- 4%.

13.1.3 Dimensions

Please refer to Dimensions Sheet 0 688 819

13.1.4 Weight

Weight without paper	approx. 1010g

13.1.5 Emulations

Number of print characters	-- 28 cpl at 16*22(h*v) 12.7cpi -- 32 cpl at 14*22(h*v) 14.5cpi -- 37 cpl at 12*22(h*v) 16.9cpi -- 44 cpl at 10*22(h*v) 20.3cpi
Print matrix	16*22, 14*22, 12*22, 10*22 (h*v)
Print widths	12.7, 14.5, 16.9, 20.3cpi
Line separation	6 and 8 lpi programmable in n/203”
Character set	4 character sets fixed in the Flash (IBM II) Country specific character sets
Print attributes	Underline Inverse N-fold width n-fold height

Details are to be found in the corresponding Software Manual.

13.1.6 Tests and Approvals

13.1.6.1 Electro-magnetic Compatibility (EMC)

Noise emission	EN 50081-1
Noise immunity	EN 50082-1

Hengstler standard test environment:
Power supply lines fed twice through ferrite sleeves (3 533 140).

13.1.6.2 Safety Tests

EN 60950

13.1.6.3 Environment Test

IEC 721 3-3, 3K3 with ambient temperature from 0 to +50°C.

13.1.6.4 Vibration Test

DIN EN 60068-2-6

Displacement: 0.15mm
Frequency range: 10 – 60 Hz

Acceleration: 10mps^2
Frequency range: 60 - 500 Hz

13.1.6.5 Shock Test

DIN EN 60068-2-27
300 mps^2
Duration: 6ms
Type: half sine

13.1.7 Packaging

Meets postal requirements. Individual packaging to be defined.

13.1.8 Environment

Ambient temperature	
Operational:	0°C...+ 50°C continuous
Storage:	-40°C...+ 70°C
Humidity	
Operational:	35%...80%
Storage:	10%..90%
Temperature modification:	8°K/hour
Impact load:	3 AXIS (5 cm)
Vibration stress:	0.25 g

13.1.9 Power Supply

Power supply:	24 vDC = (SELV) +/-5%
Power take-up	approx. 2 VA in standby
FTP-622:	approx. 10 VA during printing peak 50 VA
Plug:	JST 2 pin

Please note
1.5 AT fuse to be connected

If the print mechanism's power supply is <=30 VA some functions have restricted use since the print ratio within one line can go above 70% which overloads the power unit.
In such cases, a power unit delivering 60 VA must be used.
The following functions are affected:

- Underline of more than 128 sequential dots
- Inverse print (see underline)
- Semi-graphic characters from 0B0H to 0DFH (see underline)
- Graphics (see underline)
- Barcode *(must be tested)*
- n-fold width *(must be tested)*

128 dots correspond approximately to the following number of characters:

- 8 characters at 12.7 cpi
- 9 characters at 14.5 cpi
- 10 characters at 16.9 cpi
- 12 characters at 20.3 cpi

13.1.10 Standards

13.1.10.1 Noise Emission acc. EN 50022, Class A

This printer is Class A device.
The device can cause radio interference in a domestic situation.
If this occurs, the user can be required to carry out appropriate counter-measures at his expense.

13.1.10.2 Noise Immunity acc. EN 500082-1

The following conditions must be met:

- Power supply cable must have a maximum length of 3 metres, encase in a double ferrite sleeve (3 533 140)
  Ferrite core data
  Description: Ferrite sleeve with plastic housing 10.5x31.9x18
  Manufacturer: Würth Elektronik
  Part number: 7427111
- A power unit equipped with a power filter must be used

13.1.11 EMC Test Environment

- Built-in in a 19” ratiopac housing 6HE or 84TE from the Schroff company
- Screened data cable
- Power supply: hinged ferrite used on the cabling within the 19” housing

Würth no.: 742 710 1
Hengstler no.: 3 533 140

13.1.12 Earthing

The printer housing must be earthed.

13.2 Individual Components

13.2.1 FTP622 Print Mechanism

Print resolution	8 Dots/mm horizontal and vertical
Print speed / Paper transport speed	Max. 312.5 dotlines/s = 37.5 mm/s at 70 % printing ratio
Paper length	50km (12.5% print ratio)

MTBF calculation
Assumptions:

Voucher length	100mm
Number of vouchers per year	77 000
Print ratio	12,5%

Result:
Print head MTBF = 5.6 years based on 8 hours operation per day

13.2.2 Drive

Dotline resolution	2 step
Step resolution	Full step (2 phase)
Step distance	0,0625 mm
Step frequency	600 pps
Spool resistance	6 ohm
Power take-up	max. 500 mA with 2 phase
Gearing play	18 steps

13.2.3 Controller Service Life

MTBF calculations

The accepted MTBF for the Controller is **69.4 months**.

Input buffer	8 kb

13.2.4 Cutter Service Life

Cutting principle	Guillotine
Cut option	Full and part cut
Number of cuts	1,000,000
Cut duration	max. 400 ms
Throughput width	60mm
Paper strength	0.07 – 0.1mm
Drive	DC motor with gearing
Blade material	Stainless steel

MTBF calculation

Number of vouchers per year	77,000

Cutter MTBF is 12.8 years.
Equivalent to 37,376 hours at 8 hours per day.

13.3 Setting Print Density

The print density can be influenced using pluggable bridges or the emulation command ***FS D***. After power-on, the values set by the bridges is read out and used as the default setting. This value can be overwritten with the ***FS D*** command but this value is lost again if the unit is powered off.
By modifying the time that power is applied to the print head, the amount of energy used can be altered in 3 steps of +/-15%, through the bridges. This in turn affects the print density on the vouchers. The final result depends on the paper used and the corresponding values can be found in the paper specification. Looking from the front of the unit, where the voucher is ejected, the bridges must be plugged towards the back of the unit. The default value is 00 or 11 and the value cannot be changed while the printer is in operating mode. The value is set once during power-on. The left bridge is for the value 01 and the right-hand one, for 10.

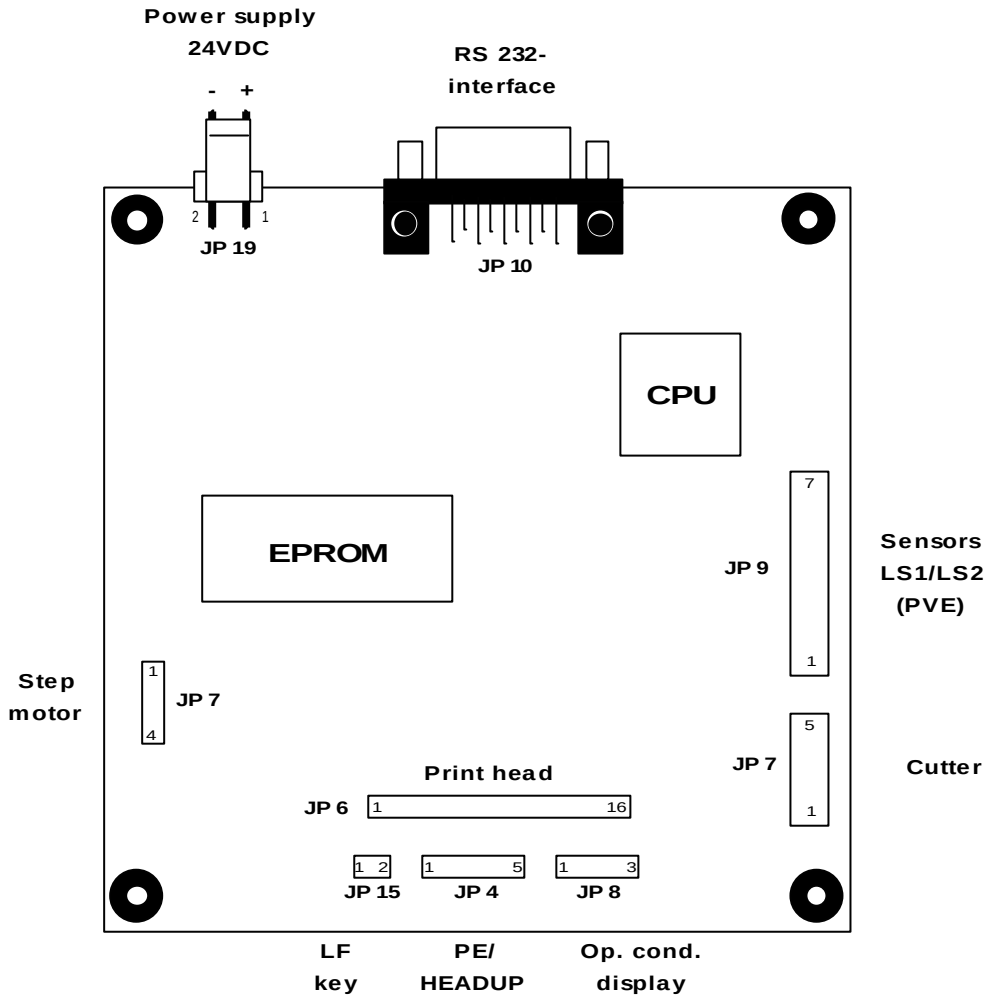
Value	Function	Description
00	Powering time: normally 1 msec at 0 °C	Default value
01	Powering time: -15 % 0.85 msec at 0 °C	Minimum definable time
10	Powering time: +15 % 1.15 msec at 0 °C	Maximum definable time
11	Powering time: normally 1 msec at 0 °C	Default value

14. Further Documentation

PIXI Standard & 302 Measurements sheet	0 688 819
PIXI Standard Software manual	SWH 2 688 181_581
PIXI 302 Software manual	SWH 2 688 181_583
User Manual	2 688 435
Data protocol manual	2 688 259
System documentation, PIXI Standard	0 688 825
System Documentation, PIXI 302	0 688 824

15. Plug Assignment

15.1 Controller Overview



15.2 Data Interfaces

15.2.1 V24/RS232 to Printer

Plug description:	JP10
Plug type:	DSub 9 pin
Mating part:	

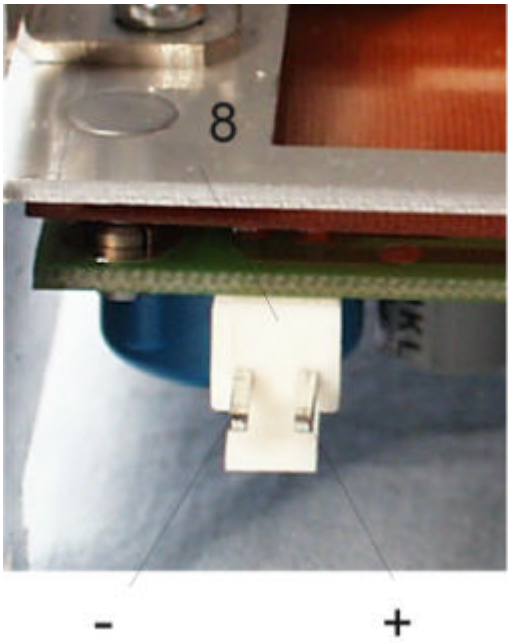
PIN	NAME	DESCRIPTION	I/O	FUNCTION/COMMENT
1	-			Free
2	RxD	ReceiveData	I	V24 Receive line
3	TxD	TransmitData	O	V24 Transmit line
4	DTR	DataTerminalReady	O	Hardware protocol (buffer control)
5	GND	Earth		Earth connection
6	-			Free
7	-			Free
8	CTS	ClearToSend	I	Host ready to receive
9	-			Free

15.2.2 To the Host

PC side			Printer side
PIN	NAME	DESCRIPTION	CONNECTION
1	-		-
2	RxD	ReceiveData	To PIN 3
3	TxD	TransmitData	To PIN 2
4	DTR	DataTerminalReady	To PIN 6 and PIN 8
5	GND	Masse	To PIN 5
6	DSR	DataSend Ready	To PIN 4
7	-		-
8	CTS	ClearToSend	To PIN4
9	-		

Recommended cable norm AT – AT LINK-CABLE 4 – 6/ 8

15.3 Power Supply



Plug description:	JP19
Plug type:	JST B2PS-VH
Mating part:	JST VHR-2N

PIN	NAME	DESCRIPTION	I/O	FUNCTION/COMMENT
1	24V	24V Input		Power supply connection
2	Ground	Masse		Earth connection

The power supply cable has a 2-pin JST plug.
The 5v logic power is created internally on the board.

15.4 Step Motor Connection

Plug description:	JP2
Plug type:	JST B 6B-XH-A
Mating part:	

PIN	NAME	DESCRIPTION	I/O	FUNCTION/COMMENT
1	PHI.0	Phase 2	O	Phase 2 Step motor
2	PHI.1	Phase 0	O	Phase 0 Step motor
3	PHI.2	Phase 1	O	Phase 1 Step motor
4	PHI.3	Phase 3	O	Phase 3 Step motor
5				
6				

15.5 Thermal Print Head Connection

Plug description:	JP6 Print head FTP622
Plug type:	JST PH 16
Mating part:	

PIN	NAME	DESCRIPTION	I/O	FUNCTION/COMMENT
1	24V	24V head		Head power supply
2	24V	24V Head		Head power supply
3	Earth	Head earth		Head earth connection
4	Earth	Head earth		Head earth connection
5	STRB0	Strobe 0	O	
6	STRB1	Strobe 1	O	
7	STRB1	Strobe 1	O	
8	HDTHERM	Thermistor		Sensor connection
9	STRB2	Strobe 2	O	
10	LATCHN	Data strobe	O	
11	STRB2	Strobe 2	O	
12	5V	Head 5V		Logic power connection
13	HEADCLK	Clock input	O	Head clock input
14	HDDAT	Data input	O	Head data input
15	Earth	Head earth		Head earth connection
16	24V	Head 24V		Head power supply

15.6 Paper Out/Head Up Connection

Plug description:	JP4
Plug type:	JST B 5B-XH-A
Mating part:	

PIN	NAME	DESCRIPTION	I/O	FUNCTION/COMMENT
1	Sense HDUP	Anode HDUP	O	Diode 0 R -> Vcc
2	Coll. PAPE	Collector	I	Paper out light barrier
3	Sense HDUP	Cathode HDUP	O	Diode 220 R -> Earth
4	HDUP	Collector	I	Head up light barrier
5	Earth	Earth		Sensor earth connection

15.7 Sensor Connection LS1/LS2

Plug description:	JP9 PAPVE
Plug type:	JST B 7B-XH-A
Mating part:	

PIN	NAME	DESCRIPTION	I/O	FUNCTION/COMMENT
1	5V	5V current		
2	Coll. LS1	Collector	I	Light barrier collector
3	Sense LS1	Cathode LS1	O	Diode LS1 220 R -> Earth
4	Earth	Earth		Sensor earth connection
5	5V	5V current		
6	SENSE LS2	Cathode LS2	O	Diode LS2 220 R -> Earth
7	Coll. LS2	Collector	I	Light barrier collector

15.8 Operational Mode Display Connection

Plug description:	JP8
Plug type:	JST B 3B-XH-A
Mating part:	

PIN	NAME	DESCRIPTION	I/O	FUNCTION/COMMENTEN
1	Ready	LED green	I	
2	Earth	Earth		Earth connection
3	Ready			See pin 1

15.9 Cutter Connection

Plug description:	JP7
Plug type:	JST B 5B-XH-A
Mating part:	JST XHP-5

PIN	NAME	DESCRIPTION	I/O	FUNCTION/COMMENT
1	CUT-	Motor connection	O	Motor minus connection
2	CUT+	Motor connection	O	Motor plus connection
3	Earth	Earth		Earth connection
4	RESET	Reset	I	Active TTL low
5				

The connection corresponds to the Hengstler cutter.
The maximum power is 2A at connectors 1 and 2. Connector 4 has a pull-up resistor of 3.3 Kohm to Vcc and can be switched active to TTL low level (<0.8V) by a switch or transistor.

15.10 Key Connection

Plug description:	JP15
Plug type:	JST B 2B-XH-A
Mating part:	

PIN	NAME	DESCRIPTION	I/O	FUNCTION/COMMENT
1	Taster	Key		Linefeed
2	Ground	Earth		Earth connection

16. Replacement Parts & Accessories

16.1 Replacement Parts

Description	Part number	Usage per unit
Paper spindle	E1688321	1%
Print mechanism	3537260	0,5%
Cutter	0685701	0,2%
Paper roll holder	E1688284	1%
Controller	E1688301	0,2%
Power cable 3m With ferrit core	Z1688299	0,2%
Power cable 1.1m With ferrit core	Z1688253	0,2%
Paper roll holder for **Printer 0688505**	E1688310	1%

16.1.1 Wear & Tear Parts

Thermal paper (1 roll)	3810849	Min. 25 pcs. per order
Thermal paper (1 roll) for **Printer 0688505**	3810850	Min. 25 pcs.per order

Hengstler's Sales Partners in Germany

for Printers, Counters & Sensors

Please contact us if you would like to be put in touch with our Sales Partner in your area.

HENGSTLER GmbH
PO Box 1151
D-78550 Aldingen
Germany

Telephone: +49 (0) 7424 890
Fax: +49 (0) 74 24 89210
e-mail: info@hengstler.de
Homepage: http://www.hengstler.de