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T50/T100 PTM

User Guide

Version 2 Issue 1



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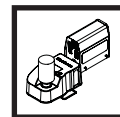
Table of Contents



Introduction	1	Appendix	35
Conditions	1	Troubleshooting	35
Safety Considerations	1	Examples of Poor Print Quality	36
Certification	2	Technical Specifications	37
About this Manual	2	Documentation History	38
Technical Support	2	Notes	39
Safety Requirements	3	Index	41
Handling the Equipment	3		
General Considerations	3		
Overview	5		
In the Box	5		
Additional Equipment	5		
Print Head Description	5		
External Components	6		
Labelling	7		
Operating Requirements	7		
Dimensions	9		
System Overview	10		
Stacked Installations	10		
Installation	13		
Print Head Set-up	13		
Mounting the Print Head	16		
Tilting a Print Head	17		
Stacked Head Installations	18		
Installing a Photocell	19		
Installing an Encoder	20		
Connecting to a PCM	20		
Commissioning a T50/T100 PTM	21		
Maintenance	25		
Cleaning/Priming the Nozzles	25		
Prime Modulation Setting	26		
Print Pause – Upto Two Weeks	27		
Moving, Storing, or Shipping a PTM	27		
Ink-Bottle Replacement	28		
Purging Trapped Air	29		
Ink-Filter Replacement	31		

Table of Contents

Introduction



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Safety Considerations

Safety considerations specific to the operation of the T50/T100 are provided under the section "*Safety Requirements*" on page 3. Before installing or operating a T50/T100 read and adhere to all of the safety instructions. Failure to read all safety instructions could lead to death, personnel injury, or damage to equipment.

The following paragraph formats are used throughout this manual to highlight safety issues and risk of damage to the equipment.



Warning

This symbol and text format is used throughout the manual to highlight warnings. A Warning is provided where circumstances could lead to personal injury or death.



Caution

This symbol and text format is used throughout the manual to highlight cautions. A caution is provided in circumstances where damage could occur to the equipment.

The following paragraph format is used throughout this manual to draw the reader to points of interest or notes.



Note

This symbol and text format is used throughout this manual to draw your attention to important information and tips.

Certification

Matthew's print heads are certified in accordance with the requirements for CE marking. The equipment complies with the EMC Rules for a Class A (industrial environment) computing device.

Operation of the equipment in a residential area may cause unacceptable interference to radio and TV reception.

Matthews Marking Products disclaims all responsibility regarding the CE directive if a print head is used, altered, or installed in any way other than described in this manual.

About this Manual

This manual contains technical information with regard to safety, installation, and maintenance of the T50/T100 print heads that are controlled by a Viacode PCM (Print Control Module). It is important that all information regarding safety is read and adhered to.

For information regarding the configuration and control of print heads, refer to the Technical Manual for the PCM.

It is recommended that the reader begins by reading the section named 'Safety Requirements' before continuing.

Technical Support

For technical support within the USA call:

Table 1 - Technical support details

Time	Telephone number
8:00 AM to 5:00 PM Eastern Time, USA–weekdays	1+ 412 665-2500
5:00 PM to 8:00 AM Eastern Time, USA–and weekends	1+ 412 365-8324

Safety Requirements



The following safety requirements are **important**. Read and adhere to the safety requirements before installing or operating a T50/T100 print head.

Failure to read the safety requirements can lead to death, personal injury, or damage to the equipment.

Handling the Equipment



Warning

- *To avoid injury to personnel or damage to equipment, always use proper lifting and/or carrying techniques with the equipment.*
- *The print head must be properly mounted. There is a risk of injury to personnel or damage to the equipment if it is mounted incorrectly.*
- *Safety glasses and solvent resistant gloves must be used when contact with ink or solvent liquids is possible. If cleaning solution comes in contact with skin, wash immediately. If contact is made with eyes or mouth, wash them for at least 15 minutes and seek medical advice.*
- *Make sure that all covers are correctly fitted to the unit before operation. Contact a supervisor for guidance if you are not sure. The covers provide a safety barrier to protect the user.*
- *All cables connected to a print head must be located out of travel zones. They must be free from potential damage.*
- *During operation the print head surfaces may be hot to the touch. Take appropriate precautions when priming a system or removing a Nozzle-Protector-Plate.*
- *Do not expose a print head to smoke or naked flames. Ink and cleaner are flammable substances.*
- *If equipment is used in a manner not specified by Matthews Marking, the protection provided by the equipment may be impaired.*
- *Never ship or transport a print head without following the procedures outlined in the maintenance section. Failure to correctly prepare a print head can cause damage or injury.*
- *Do not open or interfere with the print head's internal components. Only Matthews certified technicians are permitted to service the print head.*

General Considerations



Caution

- *Use only Matthew's inks and cleaners. Use of other inks and cleaners could cause damage to the print head or pose safety hazards and void the warranty.*

Safety Requirements – General Considerations

- *In the event of either a spillage or leak, print heads must be shutdown immediately and isolated from any sources of heat, spark, or flames. Refer to ink MSDS for cautions, warnings, and appropriate clean up procedures.*
- *Good housekeeping practices and proper containment of ink, ink residuals, and incidental line leakage is critical. The customer is responsible for ensuring proper care and procedures are followed to ensure that print heads and ancillary equipment are kept clean and well maintained.*
- *In accordance with applicable federal and state environmental laws, the customer is responsible for properly disposing of the waste generated by the printing equipment. Refer to the relevant ink and cleaner MSDS sheets for cautions, warnings, and proper handling procedures.*

Overview



In the Box

Carefully remove the T50/T100 print head from its packaging and inspect it to make sure that no damage has occurred as a result of shipping. If there are any discrepancies, please contact your local Matthews dealer for further advice. Ink and additional equipment, as shown below, are ordered separately to the print head.

Additional Equipment

The following equipment can be ordered separately to the print head. For further information contact your local dealer.

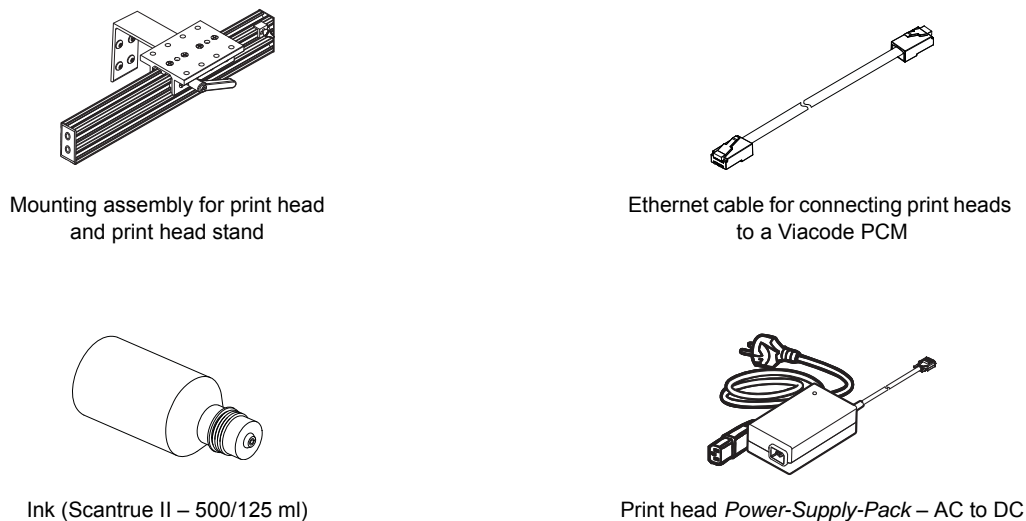


Figure 1 - Optional equipment

Print Head Description

The print heads can be supplied as either a 50 mm (T50) or 100 mm (T100), as shown below. The difference between the two lies within the number of nozzles that they have and hence the maximum print size. The 50 mm has 384 nozzles, the 100 mm has 768 nozzles.

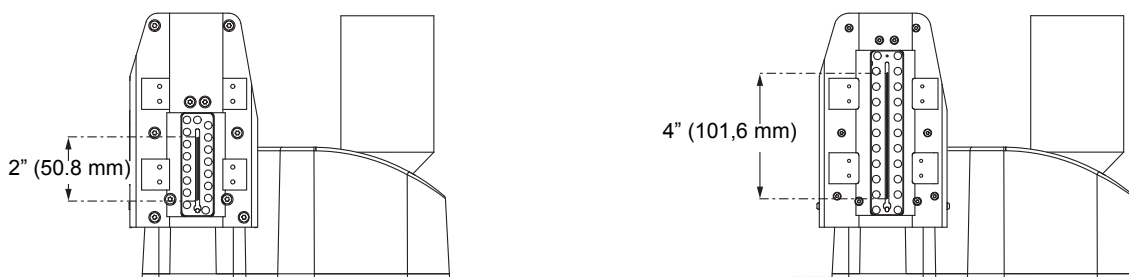


Figure 2 - 50 mm and 100 mm print head

External Components

Provided below is an overview of the T50/T100 and its main components. A description of the connections on the back of the head are also provided below.

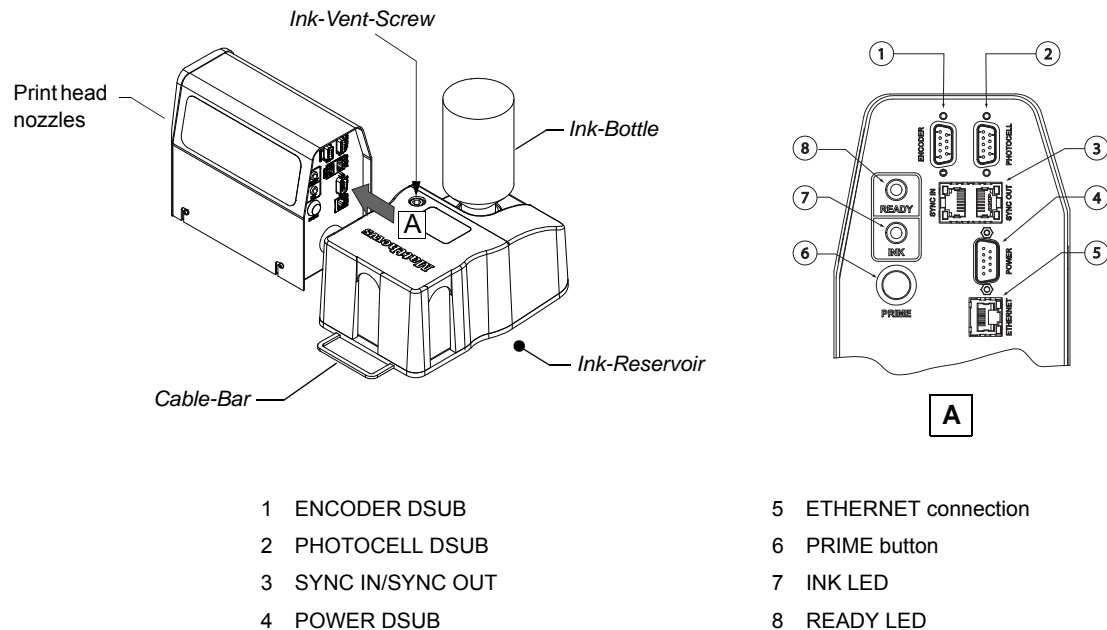


Figure 3 - External components

- ① **ENCODER DSUB** – An encoder monitors the speed of a print target on a production line and sends a signal to the print head. The signal from the encoder ensures that the speed of printing corresponds to the print target's speed.
- ② **PHOTOCCELL DSUB** – A photocell detects an approaching print target on a production line and sends a signal to the print head. The print head will then print the selected message one or more times as specified in the PCM's (Print Control Module) installation settings.
- ③ **SYNC IN/ SYNC OUT (RJ-45)** – Obsolete.
- ④ **POWER DSUB** – Used to connect the *Power-Supply-Pack* to the print head.
- ⑤ **ETHERNET** – Ethernet cable is used to connect print heads to a Viacode PCM. If more than one print head is used, they must be connected to an Ethernet switch first.
- ⑥ **PRIME button** – The print head's nozzles can be primed with ink or cleaned. Pressing the button and then releasing it will result in the nozzles being primed for a period of time less than a second. The vacuum pump will continue for thirty seconds after the prime.

Pressing the button and holding it in will flush the nozzles with ink until the button is released. Once released the vacuum pump will continue for thirty seconds. This function can be used to clear old ink or blocked nozzles.

- ⑦ **INK LED** – Ink level indicator: lit *Green* when there is sufficient ink, *Orange* when the ink level is detected as being low, and *Red* when there is no ink. ***Do not operate the print head when the LED is lit red! This will cause air to be sucked in to the ink system.***
- ⑧ **READY LED** – This signals whether the print head has warmed up and is ready for use. When the print head is **cold** (it needs to warm up), the LED is lit *Orange*. When the print head is **warm** it will turn *Green*. The warm-up time is dependent upon ambient temperatures and takes approximately two minutes.

Labelling

The print heads's serial plate is located on top of the *Ink-Reservoir*, as shown below.

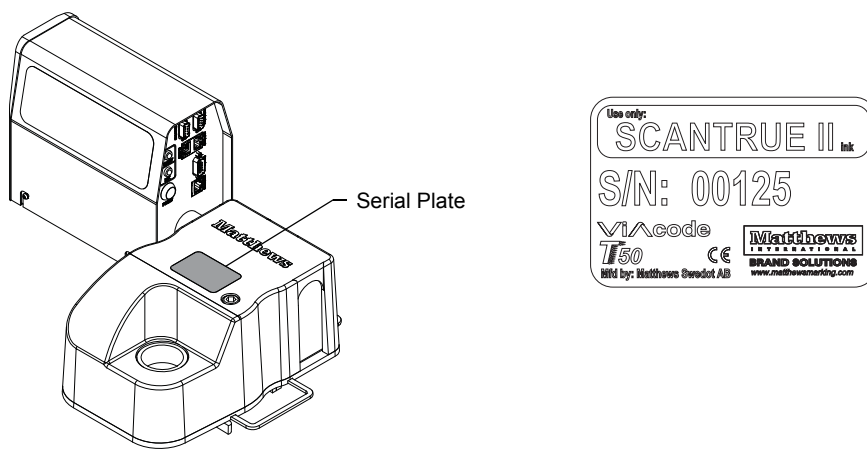


Figure 4 - T50/T100 Serial plate labelling

Operating Requirements.

Before installing or operating the print head, read and adhere to all of the safety instructions as provided under “*Safety Requirements*” on page 3.

The operating and power supply requirements for the T50/T100 are provided below in 2. Strictly obey the electrical specifications provided in this manual.

Table 2 - Operating requirements (Sheet 1 of 2)

Feature	Specification
Operating Temperature:	50°F – 104°F (10°C – 40°C)
Humidity Range:	10% – 90% RH (non-condensing)
Main power supply	Matthews power supply pack used: Single phase 110 – 240 VAC, 50 – 60 Hz, 0.8 A Direct connection: 24 VDC ± 0,5 V, 90 W, filtered DC

Table 2 - Operating requirements (Sheet 2 of 2)

Feature	Specification
Enclosure Classification:	IP 40 rating
Operating Environment:	The print head must be free from vibration or the possibility of being hit. It must be correctly mounted as described in this manual.

Dimensions

Provided below are the external dimensions of the T50/T100. All dimensions are provided in inches (rounded to two d.p.) and mm.

- Net weight \approx 10 lb. (4,9 kg)

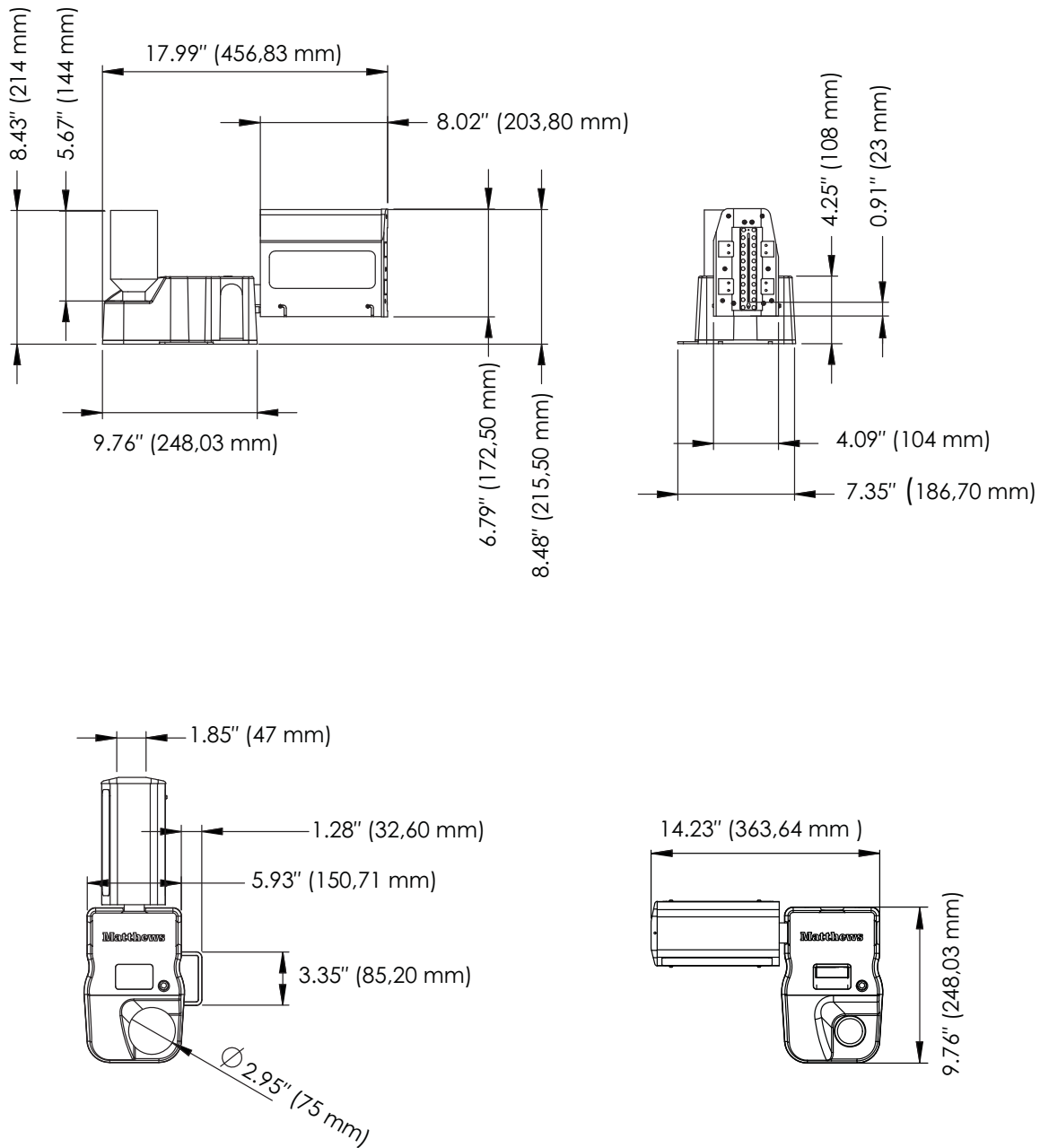


Figure 5 - External dimensions

System Overview

The T50/T100 print heads are configured and controlled using a Matthews Viacode PCM (Print Control Module), which is sold separately. Communication with print heads is done over a dedicated Ethernet network. A single print head can be connected to the PCM either directly or via an Ethernet switch. If more than one print head is installed they must be connected to a switch first and then to a PCM.

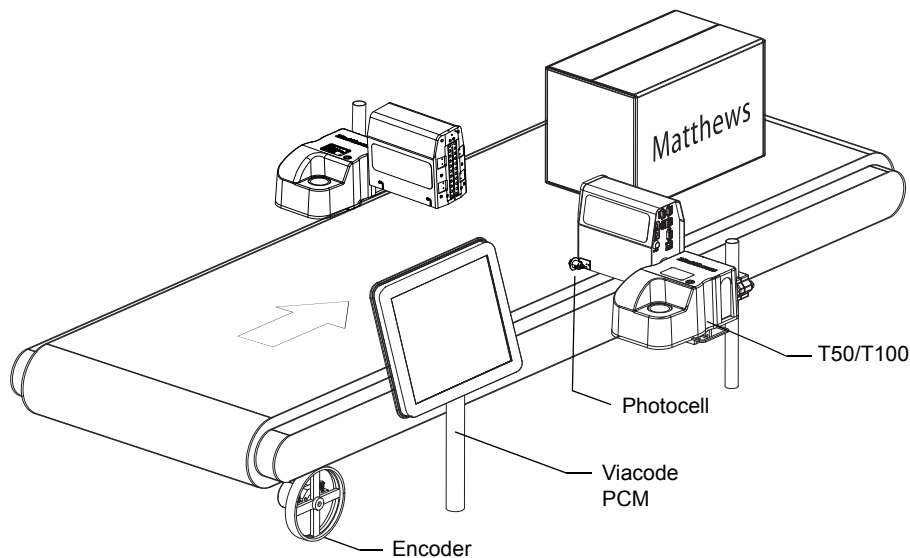


Figure 6 - System overview – typical set up

Message creation and editing is done in the graphical user interface (GUI) of the PCM. Information regarding the control and creation of messages can be found in the Technical Manual for the Viacode PCM.

A typical print system for a production line would consist of one or more print heads, an encoder, and a photocell, as shown above.

The photocell and the encoder are sold separately and can be purchased from Matthews. The photocell is used to detect an approaching print target and signal that a printout should be made.

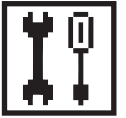
An encoder is used to monitor the speed of an approaching print target. The signal from the encoder is used to ensure that the print speed is matched to the print target's. An encoder is particularly important in installations where the speed of the production line (print target) is unpredictable. Matthews Marking recommends that an encoder is always used.

Stacked Installations

Print heads can be stacked so that a bigger print mark is obtained. For example, two 101,6 mm (T100) print heads can be stacked to produce a single mark that is up to 203,2 mm high. Or three could be stacked to produce a mark that is up to 304,8 mm high. There is no limit on the number of print heads that can be stacked.

A *Print-Head-Mounting-Plate* can be purchased from mathhews which is used to mount two stacked print heads when printing a single mark. The plate ensures correct vertical alignment of the heads. Refer to “*Stacked Head Installations*” on page 18 for further information.

Installation



Before installing or operating a T50/T100 print head read and adhere to all safety warnings, as provided under “*Safety Requirements*” on page 3.



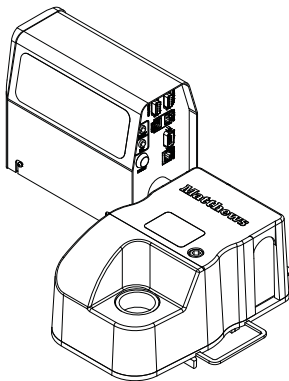
Caution

The T50/T100 print heads must be installed as described below. Failure to install them correctly can lead to poor print quality or ink leakage.

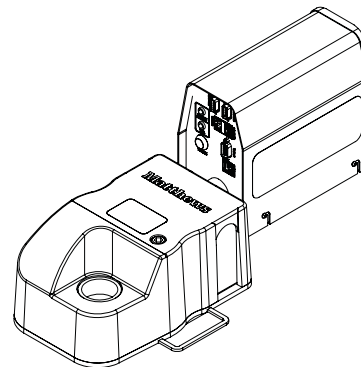
Print Head Set-up

Print heads are delivered with the head mounted so that it points to the left, as seen when standing behind the *Ink-Reservoir*. The head can also be mounted so that it points either to the right or straight ahead of the reservoir, as shown below.

Left Mounted



Straight Mounted



Right Mounted

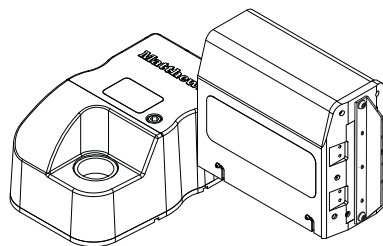


Figure 7 - Head mounting options

If required the print head can be re-positioned for a given installation. To re-position the print head follow the procedure described below.

Procedure – Repositioning the Print Head



Caution

The following procedure must be carried out by a Matthews certified technician only. Damage to the print head can occur if the procedure is not done correctly.

Installation – Print Head Set-up

1. Make sure that the *Ink-Vent-Screw* is closed and that the *Nozzle-Protector-Plate* is correctly attached to the print head.

Caution: *Failure to close the Ink-Vent-Screw and attach the Nozzle-Protector-Plate will result in ink spillage or air becoming trapped in the system*

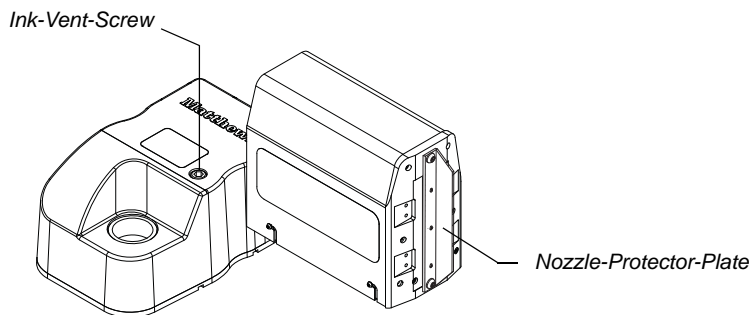


Figure 8 - Changing the head set-up.

2. Disconnect all cables and make sure that there is no power supplied to the print head.
3. Unscrew and remove the *Ink-Bottle* from the *Ink-Reservoir*.
4. Screw the *Ink-Reservoir-Cap* in to the *Ink-Inlet*, so that no ink is spilt.

Caution: *Ink spillage will occur if the Ink-Reservoir-Cap is not correctly inserted.*

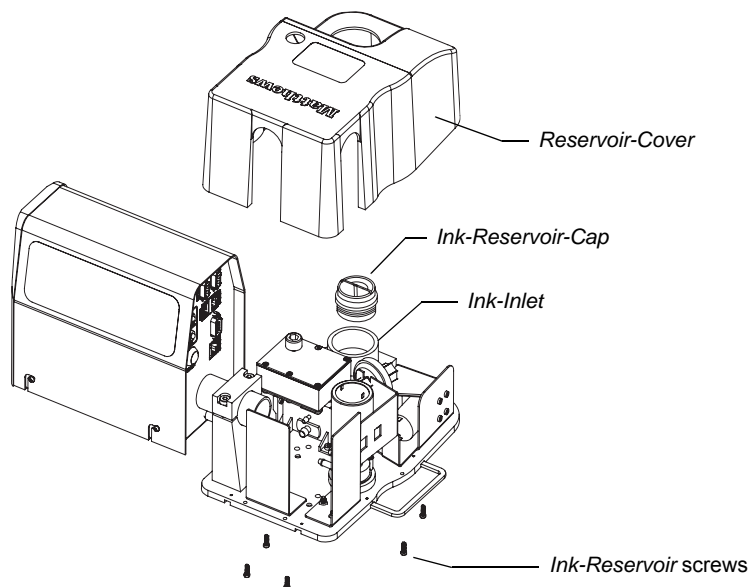


Figure 9 - Removing the Reservoir-Cover

5. Unscrew and remove the five screws that retain the *Reservoir-Cover*, as shown above.
6. Place the print head so that it is level. Unscrew the *Ink-Reservoir-Cap* and then remove the *Reservoir-Cover*. Screw the *Ink-Reservoir-Cap* back in to the *Ink-Inlet* once the cover has been removed.

7. Unscrew and remove the *Blanking-Plate* from the desired head-mounting-position.

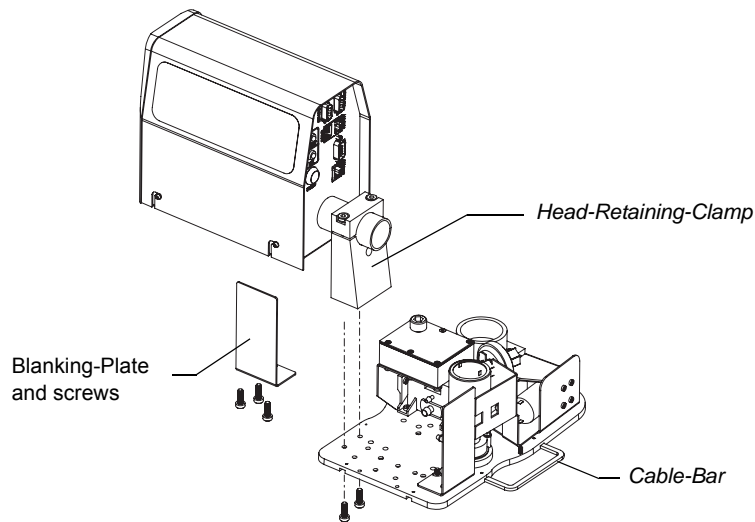


Figure 10 - Re-positioning the print head

8. Unscrew the *Head-Retaining-Clamp's* two screws from underneath the *Ink-Reservoir*. Make sure that the print head is held securely, it is heavy.
9. Carefully re-position the head in to the required position. Secure it with the *Head-Retaining-Clamp* and its two screws.
Note: It may be required, in installations where the print target does not travel horizontally, that the print head needs to be tilted. For further information refer to "Tilting a Print Head" on page 17.
10. Make sure that both the cables and the tubing to the print head are positioned so that they are free from risk of damage. Make sure that the tubing is not crushed or kinked.
Caution: If the ink tubing is kinked printing problems will occur.
11. Mount the *Blanking-Plate* in the position that the print head was originally. Use the three screws to secure it.
12. Mount the *Reservoir-Cover* back on to the *Ink-Reservoir* and secure it with the five screws.

13. Unscrew and re-position the *Cable-Bar* as required. The *Cable-Bar* can be positioned to the left, right, or straight ahead of the *Ink-Reservoir*, as shown below.

Note: The Cable-Bar is used to both guide and secure the print head's cables.

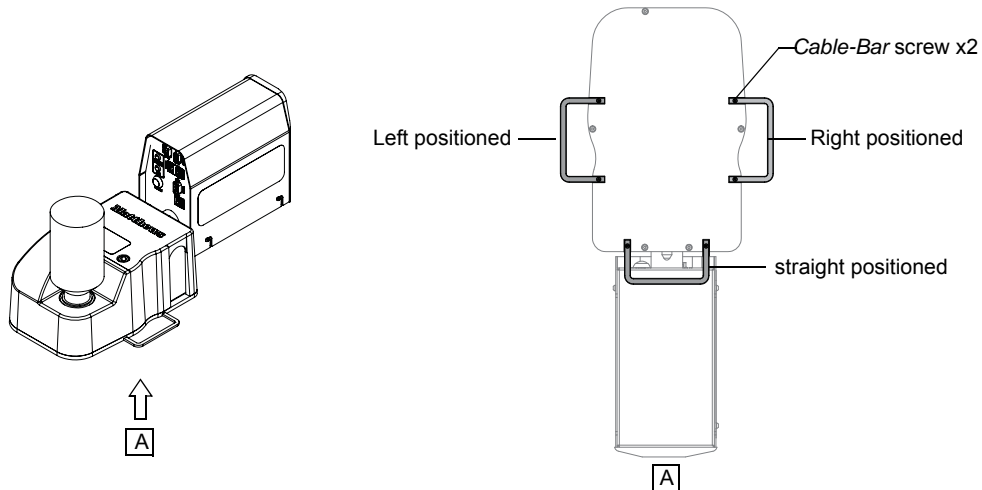


Figure 11 - Positioning the *Cable-Bar*

Mounting the Print Head



Caution

PTMs must be mounted correctly as described below. Poor print quality or ink leakage can occur if they are incorrectly mounted or positioned.

Make sure that the print target does not contact the PTM or its print guides. If a PTM is hit, print quality will be affected. There is a risk that small particles will enter the print head's nozzles and block them, if the print target contacts the print guides.

A specially designed mounting assembly and stand kit can be purchased from Matthews for easy mounting of the PTMs. For further information regarding this equipment contact your local dealer.

The following must be adhered to when mounting a T50/T100 print head. Make sure that:

- They are free from any vibration. It is recommended that PTMs are mounted in isolation (free standing) from the production line.

- The *Ink-Reservoir's* bottom plate, as shown below, is horizontal to the ground and at zero degrees to the x axis of the substrate's face.

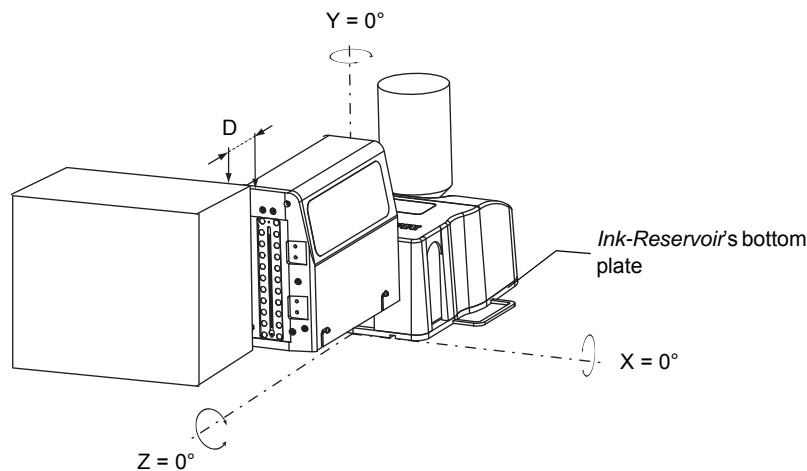


Figure 12 - Correct mounting of the print head

- The *Ink-Reservoir's* bottom plate is at zero degrees to the y axis of the substrate's face.
- The top most nozzle does not tilt either from or towards the approaching substrate's face. The nozzles must be at zero degrees to the z axis.
- The nozzles must be as close as possible (distance D) to the print target **but not in contact**. Refer to Figure 12 above.
- The print head must be protected from contact with the print target. Do not allow the print target to contact the print guides as shown below.

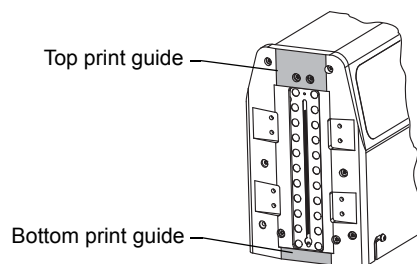


Figure 13 - Print head guides

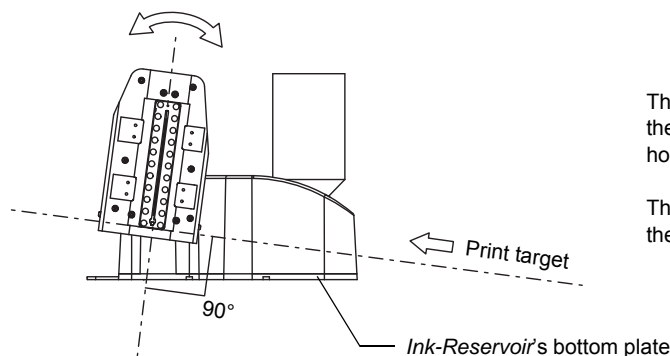
If necessary, install guard rails to ensure that the print target does not contact the print head.

Tilting a Print Head

If the print target does not travel on a horizontal plane, as shown below, the print head's nozzles can be tilted to the left or to the right of the Z axis, so that they are perpendicular to

Installation – Stacked Head Installations

the approaching print target. However, the *Ink-Reservoir's bottom plate* must remain horizontal in both the X and the Z axes.



The print head's tilt **must** not exceed 45°, and the *Ink-Reservoir's bottom plate* **must** remain horizontal.

The print head **must** be perpendicular, 90°, to the print target, as shown.

Figure 14 - Tilting a print head



Caution

*If a print head needs to be tilted more than 30°, it **must** be done by a matthews technician, as the ink pressure must also be adjusted.*

To tilt the print head, remove the *Reservoir-Cover* and loosen the *Head-Retaining-Clamp's*, two bolts, as shown in Figure 10 on page 15. Adjust the head as required and then re-tighten the bolts.

Stacked Head Installations

Print heads can be stacked vertically so that two or more are used to produce a single mark. For example, two 101,6 mm heads (T100) can be stacked to produce a mark that is up to 203,2 mm high. Or three could be stacked to produce a mark that is up to 304,8 mm high.

Provided below is an example of two print heads that are stacked to produce a single mark which contains both text and a graphic.



Figure 15 - Printing with two heads

In such installations it is important that the distance between the top most nozzle on the lower print head, and the bottom most nozzle on the upper print head are correctly spaced, as shown

below. The distance between the nozzles must be 0,13 mm apart.

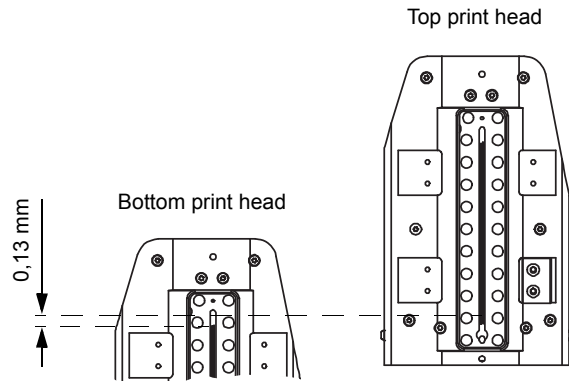


Figure 16 - Vertical nozzle adjustment

If the print heads are placed too far apart, greater than 0,13 mm, the mark will have a white gap. If they are too close together the mark will overlap, as shown below.

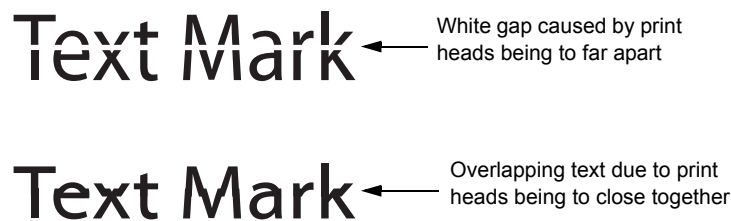


Figure 17 - Incorrect vertical spacing

It can be difficult to obtain the precise distance of 0,13 mm between the two heads. A visual inspection of a number of print tests in relation to fine adjustments is often enough to ensure the print heads are satisfactorily adjusted. In such cases there may well exist a slight error in the actual distance but the printout looks fine.

Installing a Photocell

A photocell detects an approaching print target and signals that a printout should be made. A photocell can be ordered from Matthews if required and is easily attached to the side of the print head, as shown in Figure 6 on page 10.

The photocell must be positioned so that it is upstream of the print head, so that the print target passes in front of it first, before passing the print head nozzles. If more than one print head is used, stacked installations, the photocell must be positioned on the first print head that the print target will pass in front of.

The photocell must be connected to the DSUB connection that is labeled PHOTOCELL on the back of the print head.

Once a photocell is connected it will be listed in the *Configuration* menu of the PCM. Further information regarding configuration can be found in the Technical Manual for the PCM.

Installing an Encoder

An encoder is used to monitor the speed of the approaching print target. Typically the encoder is mounted so that its wheel is rotated by the production line, as shown in Figure 6 on page 10.

The encoder sends a signal to the print head and ensures that the speed of printing is matched to that of the approaching print target.

An encoder must be used in installations where the speed of the production line is unpredictable or uneven. If an encoder is not used printouts will be affected by uneven movements in the production line. Matthews Marking recommends that an encoder is always used.

The encoder must be connected to the DSUB connection labelled ENCODER on the back of the print head. If more than one print head is used to produce a mark (stacked print head installations) the encoder is best connected to the first print head that the print target will pass in front of — although It can be connected to any of the print heads.

The PCM will list the print head that has the encoder connected to it when configuring a print head installation. Further information regarding configuration of a print installation and the encoder can be found in the PCM's Technical Manual.

Connecting to a PCM



Caution

Use only Matthew's print head cables and switches when connecting print heads to a PCM. The quality of printouts can be affected, or print problems can occur, if other cables/switches are used.

Print heads must be connected to a Viacode PCM in order to operate them. The PCM's User Interface (UI) is used to manage print heads as well as create the messages they will print.

Connection to a PCM is done using Matthews Ethernet cable. A single print head can be connected either directly or via a Matthews Ethernet switch.

• Single T50/T100

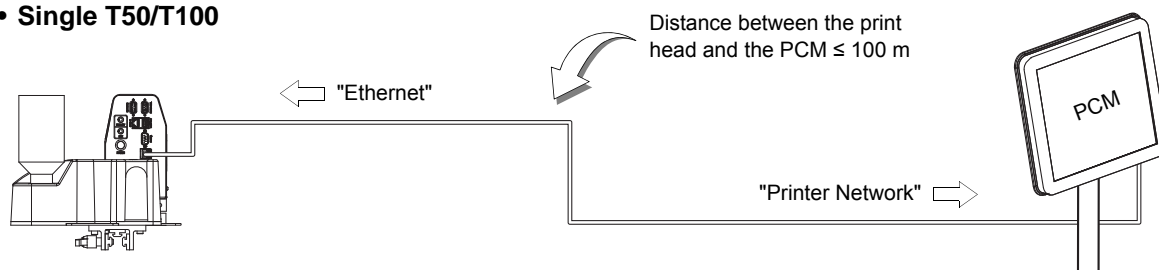


Figure 18 - Connecting a head to a PCM

If more than one print head is used they must first be connected to a Matthews Ethernet switch and then to a PCM, as shown below.

- **Two or more T50/T100s**

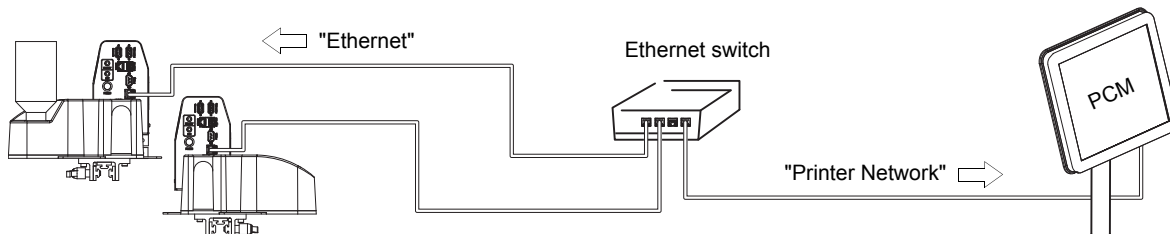


Figure 19 - Connecting two or more heads to a PCM

The maximum distance between the print heads and the switch is 100 m. The maximum distance between the switch and the PCM is also 100 m.

Print heads are connected to the RJ-45 connection that is labelled "Printer Network" on the PCM's interface panel. This connection must be used only for Viacode devices. It is a proprietary network. Do not connect Viacode devices to any other connection.

The Ethernet cable is connected to the RJ-45 connections labelled "Ethernet" on the print heads.

Once print heads are connected they will be available for selection when configuring an installation in the PCM. Further information regarding the operation and configuration of an installation can be found in the PCM's Technical Manual.

Commissioning a T50/T100 PTM

The following procedure lists the required steps when installing a T50/T100 PTM for the first time.

Procedure – Commissioning a T50/T100 Print Head

1. Make sure that the print head is correctly mounted as described under "*Mounting the Print Head*" on page 16.
2. Turn the *Ink-Vent-Screw*, located on top of the *Ink-Reservoir*, fully anti-clock wise. The *Ink-Vent-Screw* will protrude above the *Ink-Reservoir* when it is open, as shown in "Detail A" below.

Caution: Failure to open the Ink-Vent-Screw will lead to print failure or damage to the print head. Make sure it is open!

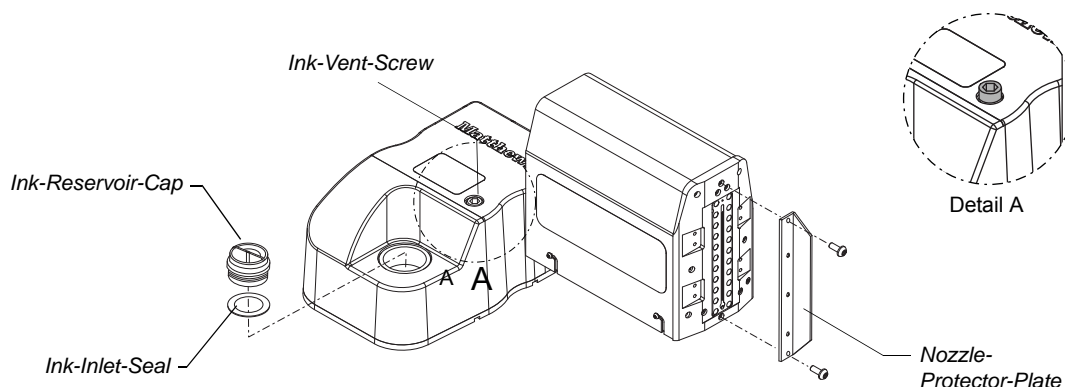


Figure 20 - Nozzle-Protector-Plate

3. Unscrew and remove the *Nozzle-Protector-Plate* from the front of the print head, as shown above. Store it in a clean place for future use.
4. Unscrew and remove the *Ink-Reservoir-Cap* from the *Ink-Inlet*. Store it in a clean place for future use.
5. Make sure that the *Ink-Inlet-Seal*, inside the *Ink-Inlet*, is clean and correctly seated.
6. Put a new *Ink-Bottle* into the *Ink-Inlet* as described under "*Ink-Bottle Replacement*" on page 28.
7. Connect an encoder/photocell to the back of the print head, as required.
8. Connect the print head(s) to the RJ-45 connector that is labelled "**Printer Network**" on the PCM's interface panel. A single print head can either be connected directly or via a dedicated Viacode Ethernet switch.

If more than one print head is installed, they must be connected to a dedicated Viacode Ethernet switch first, which in turn is connected to the PCM.

9. Connect the print head's *Power-Supply-Pack* to the DSUB connection that is labelled *Power* on the back of the print head. Connect the *Power-Supply-Cable* between the *Power-Supply-Pack* and a mains outlet supply. Make sure that the correct power is supplied to the print head.

Note: The Power-Supply-Pack and the Power-Supply-Cable are sold separately to the PTM.

10. Wait until the *READY LED* on the back of the print head illuminates green.

Note: The READY LED will illuminate green when the print head has reached the correct operating temperature, which takes approximately two minutes. It will illuminate orange while warming up.

11. Press and hold the *Prime* button on the back of the print head for five seconds and then release it. A distinct sound can be heard when the *Prime* sequence starts, allow the sequence to complete.

Note: The prime function pumps ink to the nozzles and takes approximately thirty seconds to complete.

12. Make a test print and verify that a satisfactory printout is produced. If the quality of print is poor refer to and follow the procedure for “*Purging Trapped Air*” on page 29.

It is recommended that the *Gutter Clean Interval* is used. This ensures that the gutter at the bottom of the PTM’s nozzles is kept clean and avoids ink build-up.

The *Gutter Clean Interval* is set from within the PCM’s *Configuration* menu. First select *Print Heads*, then the relevant *Marker*, and finally its *Advanced* options. For further information refer to the PCM’s Technical Manual.

Maintenance



Make sure that the following warnings and cautions are read and adhered to before carrying out any maintenance work on a PTM.



Warning

Safety glasses and solvent resistant gloves must be used when contact with ink or solvent liquids is possible. If cleaning solution comes in contact with skin, wash immediately. If contact is made with eyes or mouth, wash them for at least 15 minutes and seek medical advice.



Caution

- *Failure to maintain a T50/T100 PTM as described below can lead to printing problems which can be very difficult to resolve. The warranty will become void if a PTM is not maintained correctly.*
- *Never use a cloth, brush, or any other material to clean the PTM's nozzles. The nozzles are extremely sensitive to particles being trapped in them. The PTM must be cleaned with the use of the PRIME function only, as described below.*
- *Do not move the PTM without first closing the Ink-Vent-Screw and securing the Nozzle-Protector-Plate on to the nozzles. Failure to do so can result in ink spillage or cause air bubbles to become trapped in the ink system, which can be very difficult to resolve.*

Cleaning/Priming the Nozzles



Caution

Never use a cloth, brush, or any other material to clean the PTM's nozzles. The nozzles are extremely sensitive to particles being trapped in them. The PTM must be cleaned with the use of the PRIME function only, as described below.

The T50/T100 PTMs have a prime function which is activated by pressing the *PRIME* button on the back of the PTM. Refer to "Print Head Description" on page 5.

The prime function is used to prime the head with ink, solve problems with clogged nozzles, or resolve poor print quality.

Pressing and holding the button in until an audible sound is heard and then releasing it will cause the nozzles to be flushed with ink for less than one second. The vacuum pump will however continue for thirty seconds.

Keeping the button pressed in will continue to flush the nozzles with ink until it is released. Once released, flushing will stop but the vacuum pump will continue for up to thirty seconds.

When the nozzles are being flushed it is possible to observe ink seeping from them. The ink that is expelled travels down the face of the nozzles and in to the *Ink-Return-Orrifice* (gutter),

where it is sucked back in to the system. The orifice is located at the bottom of the print head, as shown below.

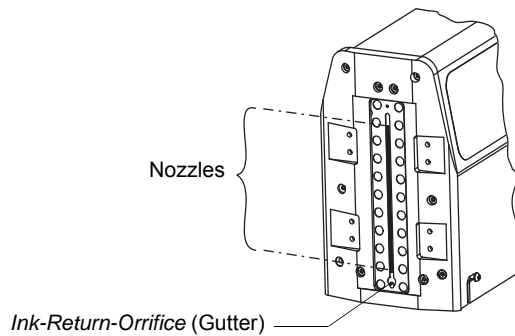


Figure 21 - Ink-return-orifice

All ink that is expelled from the nozzles is recycled through the ink system. There should not be any ink spillage from the nozzles.

Prime Modulation Setting

The rate of ink flow that flows from the nozzles when the prime button is pressed can be increased or decreased as required.

This setting is accessed from within the PCM's *Maintenance* menu under *Printer Maintenance*. Tapping the *PTM* button will display the *PTM Maintenance* window, as shown below.

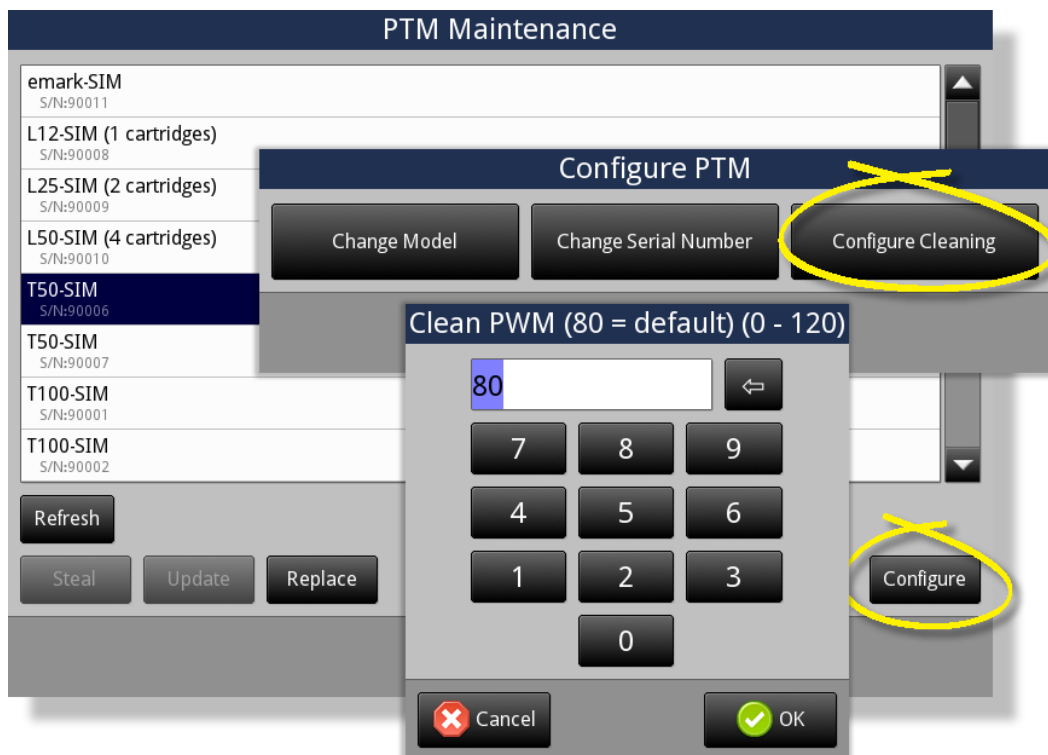


Figure 22 - Pulse width modulation

To change the modulation setting, first select the desired T50/T100 and then tap the *Configure* button, as highlighted. Then tap the *Configure Cleaning* button from the *Configure PTM* window, which will display the *Clean PWM* (Prime Width Modulation) window, as shown.

The default value for the *Prime Width Modulation* is 80. Entering a greater value will increase the ink flow rate. A value less than the default value will decrease the flow rate.

Print Pause – Upto Two Weeks



Caution

*If a PTM is to be moved/adjusted in any way that would disturb its stationary status it **must** be prepared as described under "Moving, Storing, or Shipping a PTM".*

- If a PTM is to remain inactive, leave the power supply ON. This will ensure that the *Gutter Clean interval (Automatic Cleaning)* can function and the PTM is kept in good working order. **The PTM must remain stationary!**
- If the power supply has to be disconnected put a rag under the print head's nozzles as ink can leak. **The PTM must remain stationary!**

The *Gutter Clean Interval* is set from within the PCM's *Configuration* menu. First select *Print Heads*, then the relevant *Marker*, and finally its *Advanced* options. It is recommended that the *Gutter Clean Interval* is always used.

Using the *Gutter Clean Interval* ensures that ink does not build up around the gutter. Any expelled ink that resides in the gutter will be sucked back into the ink system. For further information refer to the PCM's Technical Manual.

Moving, Storing, or Shipping a PTM



Caution

PTMs must be correctly prepared before: moving them in any way that would disturb their stationary status, storing them, or shipping them. Failure to correctly prepare them will lead to printing problems that can be difficult to resolve. The PTM's warranty will become void if a head is damaged as a result of not being correctly prepared.

Procedure – Preparing for: Moving, Storing, or Shipping

1. Press and hold the *PRIME* button on the back of the PTM for one second and then release it. Refer to "External Components" on page 6.
2. Disconnect all cables from the PTM.
3. Clean the *Nozzle-Protector-Plate* with a lint free cloth and then screw it on to the front of the PTM, finger tight. Make sure that it is mounted so the text "Gutter", that is printed on the plate, is positioned at the bottom of the nozzles. It should be mounted as shown in Figure 25 on page 30.

Caution: Failure to mount the Nozzle-Protector-Plate can lead to damage of the PTM.

4. Turn the *Ink-Vent-Screw* fully clockwise. Do not overtighten it, use forefinger and thumb force only.

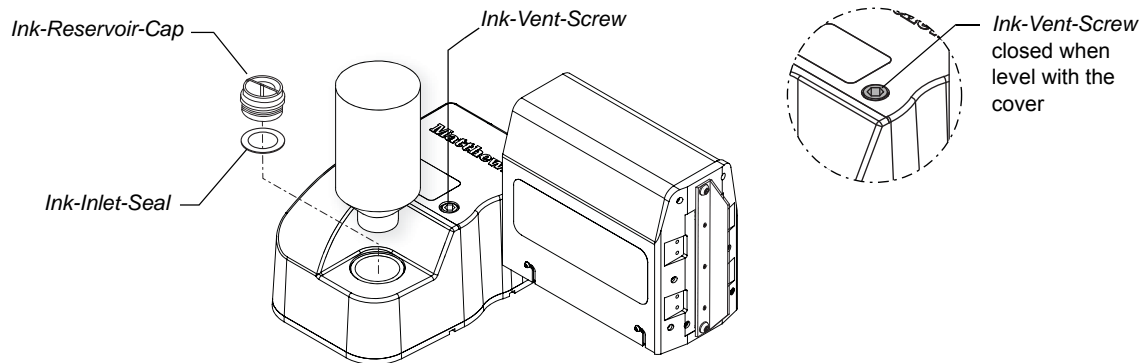


Figure 23 - Preparing for moving, shipping, or storage

5. Unscrew and remove the *Ink-Bottle* from the *Ink-Inlet*.
6. Make sure that the *Ink-Inlet-Seal*, inside the *Ink-Inlet*, is correctly seated and then screw *Ink-Reservoir-Cap* in to the *Ink-Inlet*. Make sure that it is hand tight.

If storing or shipping the PTM continue from Step 7, otherwise the PTM is ready and no further action is required.

7. Carefully put one plastic bag around the *Head* and one around the *Ink-Reservoir*. Use elastic bands to seal and secure the plastic bags on to the PTM.

Note: The plastic bags will catch any ink spillage that may occur during transport.

8. Place the PTM inside its original packaging and seal it, so that it is securely protected from being impacted or otherwise damaged.

The PTM is now ready for storage or shipping.

Ink-Bottle Replacement



Caution

Use only Matthews approved inks. If any other ink type is used it may cause damage to the PTM and void the warranty.

The *Ink-Bottle* should be replaced whenever the INK LED is lit *Orange*, indicating that the ink level is low. To replace the bottle simply unscrew it, anti-clock-wise, and then replace it with a new one.

The *Ink-Bottle*'s opening is fitted with a push valve which is pushed in whenever the bottle is screwed in to the *Ink-Inlet*.

The push valve prevents ink from spilling when the bottle is turned upside down.

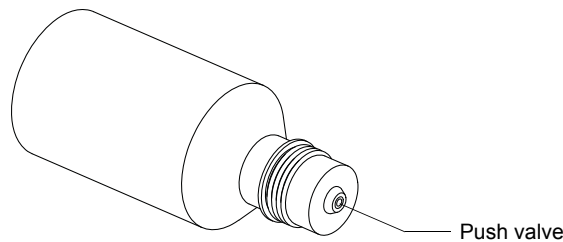


Figure 24 - Ink-Bottle

Before starting the following procedure make sure that all warnings and cautions, as listed under “*Maintenance*” on page 25 are read and adhered to.

Procedure – Ink-Bottle Replacement

1. Unscrew and remove the *Ink-Bottle* from the *Ink-Reservoir*. Hold the bottle over the *Ink-Inlet* to allow any drops of ink that may drip, fall in to the *Ink-Inlet*.
2. Make sure that the *Ink-Inlet-Seal*, inside the *Ink-Inlet*, is not stuck on to the *Ink-Bottle* and that it is correctly seated inside the *Ink-Inlet*. Refer to Figure 20 on page 22.
3. Get a new *Ink-Bottle* and make sure that it contains the correct type of ink. The same as that stated on the PTM.
4. Remove the foil seal that is located on top of the new bottle.
5. Make sure that there is only one seal in the *Ink-Inlet*.
6. Carefully screw the new *Ink-Bottle* in to the *Ink-Inlet*, clockwise. Tighten the bottle using only forefinger and thumb pressure.

Caution: Do not overtighten the Ink-Bottle. Overtightening the bottle will cause damage and result in ink leakage.

Purging Trapped Air

The following guide lists a series of actions that should be taken if a T50/T100 fails to print, produces poor quality printouts, or it is suspected that air bubbles are trapped in the ink system.

Before starting the following procedure make sure that all warnings and cautions, as listed under “*Maintenance*” on page 25 are read and adhered to.

Procedure – Purging Tapped Air

1. Make sure that the *Ink-Vent-Screw* is open. Then press and hold the *PRIME* button on the back of the print head for five seconds.

2. Make a test print and inspect the quality of the printout. If the printout is not satisfactory continue with this procedure.
3. Clean the *Nozzle-Protector-Plate* with a lint free cloth and then screw it on to the front of the print head, finger tight. Make sure that it is mounted so the text "Gutter", that is printed on the plate, is positioned at the bottom of the nozzles.

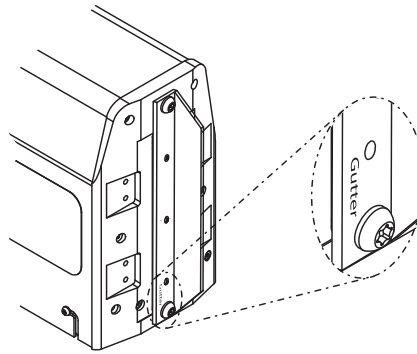


Figure 25 - Mounting the *Nozzle-Protector-Plate*

4. Circulate ink through the PTM's ink system for a period of fifteen minutes. The PCM has an automated function that allows the user to set the number of minutes that ink is to be circulated through the PTM's ink system. This function is accessible from within the *Maintenance* menu, under *Print Head Maintenance*. Refer to the PCM's Technical manual for further information.
5. Remove the *Nozzle-Protector-Plate* from the PTM.
6. Press and hold the *PRIME* button for five seconds and then release it.
7. Make a test print and inspect the printout. If the printout is not satisfactory continue with this procedure.
8. Use a lint free cloth and make sure that the *Nozzle-Protector-Plate* is clean, then screw it on to the PTM.
9. Use the PCM and circulate the ink in the PTM for a period of 2 – 3 hrs.
10. Remove the *Nozzle-Protector-Plate* from the PTM.
11. Press and hold the *PRIME* button for five seconds and then release it.
12. Make a number of printouts and inspect the quality of print. If air is still trapped in the system repeat Step 3 to Step 4 and circulate the ink for a minimum period of 24 hrs.
13. If the above procedure does not solve the problem, the PTM will require service by a qualified Matthews Technician

Ink-Filter Replacement

The *Ink Filter* inside the *Ink-Reservoir* must be replaced every two years or sooner, dependent upon operating environment. If the PTM is operated in dusty environments it will require replacement more frequently.

Before starting the following procedure make sure that all warnings and cautions, as listed under “*Maintenance*” on page 25 are read and adhered to.

Procedure – *link Filter* Replacement

1. Close the *Ink-Vent-Screw*.
2. Clean the *Nozzle-Protector-Plate* with a lint free cloth and then screw it on to the front of the print head, finger tight. Make sure that it is mounted so the text "Gutter", that is printed on the plate, is positioned at the bottom of the nozzles. It should be mounted as shown in Figure 25 on page 30.
3. Make sure that all cables are disconnected and that there is no power supplied to the PTM.
4. Unscrew and remove the *Ink-Bottle* from the *Ink-Inlet*.
5. Make sure that the *Ink-Reservoir-Cap* is securely screwed in to the *Ink-Inlet*, so that no ink is spilt. Then unscrew and remove the five screws that retain the *Reservoir-Cover*.

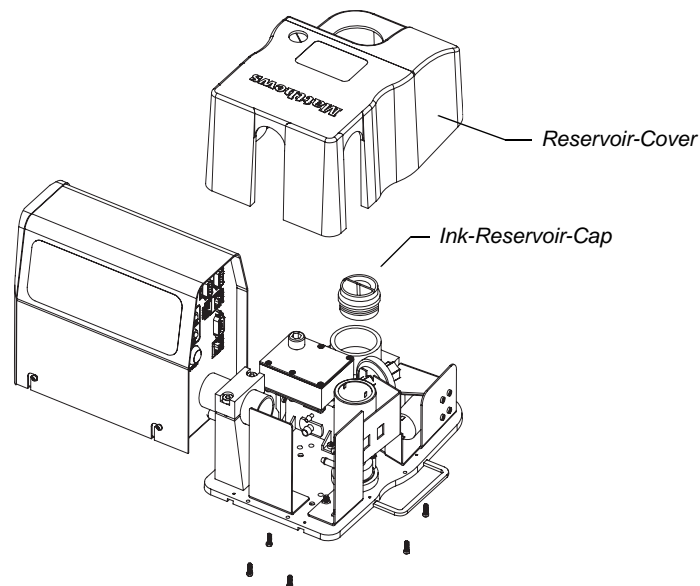


Figure 26 - Removing the *Reservoir-Cover*

6. Place the PTM so that it is level. Unscrew the *Ink-Reservoir-Cap* and then remove the *Reservoir-Cover*. Screw the *Ink-Reservoir-Cap* back in to its inlet once the cover is removed.

Maintenance – Ink-Filter Replacement

7. Remove the filter from its retaining bracket, then unscrew the *link Filter*'s two tube retaining nuts. Some ink spillage will occur. Make sure that there are paper towels at hand to absorb any spillage.

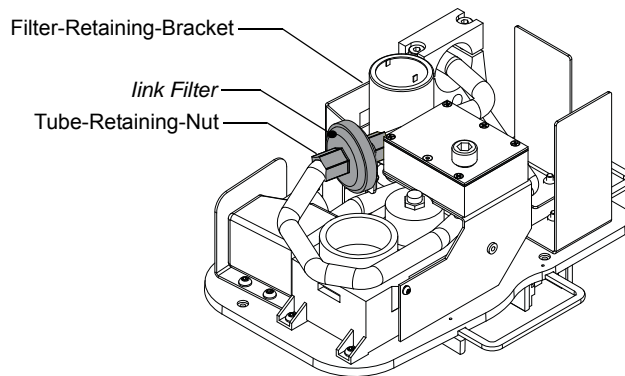


Figure 27 - Ink filter

8. Screw the new filter on to the existing *Tube-Retaining-Nuts*, tighten the nuts with finger pressure only. Make sure that the *Compression-Rings* and *Spacers* inside the *Tube-Retaining-Nuts* are correctly positioned as shown.

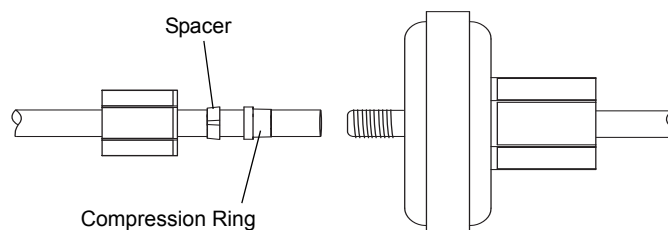


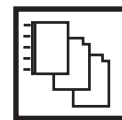
Figure 28 - *link Filter* compression ring

9. Inspect the filter to ensure that it is connected correctly and then mount it back in to the *Filter-Retaining-Bracket*.
10. Secure the *Reservoir-Cover* back on to the *Ink-Reservoir*.
11. Make sure that the PTM is correctly mounted as described under “*Mounting the Print Head*” on page 16.
12. Turn the *Ink-Vent-Screw*, located on top of the *Ink-Reservoir*, fully anti-clock wise.
13. Unscrew and remove the *Nozzle-Protector-Plate* from the front of the PTM.
14. Unscrew and remove the *Ink-Reservoir-Cap* from the *Ink-Inlet*. Store it in a clean place for future use.

15. Make sure that the rubber seal inside the *Ink-Inlet* is clean and correctly seated. Make sure that there is only one seal.
16. Put the *Ink-Bottle* into the *Ink-Inlet* and tighten it with forefinger and thumb pressure only.
17. Connect the power supply to the PTM. Wait until the *READY* LED on the back of the PTM illuminates green.
Note: The READY LED will illuminate green when the PTM has reached the correct operating temperature, which takes approximately two minutes. It will illuminate orange while warming up.
18. Press and hold the *Prime* button on the back of the PTM for five seconds and then release it. A distinct sound can be heard when the *Prime* sequence starts, allow the sequence to complete.
Note: The prime function pumps ink to the nozzles and takes approximately thirty seconds to complete.
19. Make a test print and verify that a satisfactory printout is produced. If the quality of print is poor refer to and follow the procedure for “*Purging Trapped Air*” on page 29

The PTM is now ready for use.

Appendix



Troubleshooting

Provided below is a print troubleshooting guide. If none of the suggested remedies solve the problem, contact your local Matthews dealer for further advice.







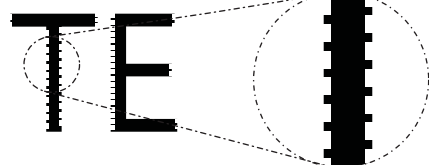
Table 3 - Troubleshooting guide

Fault	Possible cause	Remedy
No printout from the print head	No message selected for printout.	Select a message at the PCM.
	Selected message empty.	Check message contents at the PCM.
	PCM not switched on	Switch PCM on.
	Print head cable not connected.	Connect cable correctly.
	Print head connected incorrectly	Check connections
	Incorrect print head settings	Check that the installations settings are correctly set at the PCM. The PCM has a troubleshooting tab which can be used to check that the encoder and the trigger (photocell) are functioning correctly. This can be found in the <i>Configuration</i> menu of the PCM, under <i>Print Head Configuration</i> . For further information refer to the PCM's Technical Manual.
Poor printout quality. (see also below for specific examples)	Print distance (throw distance) too much.	Move the print head closer to the print target. Distance must be ≤ 5 mm.
	Nozzle(s) blocked	Flush the nozzles. Press and hold the <i>PRIME</i> button for 1 – 3 seconds.
	Air in the ink system	Refer to the procedure " <i>Purging Trapped Air</i> " on page 29.

Examples of Poor Print Quality

Provided below is a list of poor print quality examples. The possible cause for the poor print is also listed.

Table 4 - Examples of poor print

Example	Possible Cause	Fix
	Missing Droplet: Thin white stripes are produced which are caused by the loss of a jet(s) or air trapped in the ink system.	Trapped Air
	Slow/Short Droplet: A thin light stripe is produced. Secondary drops of ink are often seen beside the light stripes. Dust, dirt, or other small particles have entered an orifice. This results in ink drops losing their velocity. This is most often caused by the print target hitting the print head and shredding small particles which become trapped in the print head.	Clean Nozzles
	Mis-aimed Droplet: A thin light stripe is produced. Adjacent to it is a darker stripe. This is usually caused by a partial obstruction of an orifice.	Clean Nozzles
	Over Bold: The image appears faded around the edge. This can be the result of: excessive substrate speeds, throw distance, or type of material being printed on.	Adjust Throw Distance
	Blurred Image: The image appears blurred. The image has a combination of the above droplet malfunctions. This occurs when the distance between the print head and the print target is too great. Noticeably, the number of droplet malfunctions are much greater.	
	Smudged Image: The image is smudged. This is caused by the print target being too close to the print head. The print target hits the print guides and cause the ink to smudge.	
	Scalloped Edges: The mark has a notched appearance at the beginning and end of each character/mark. This can result when the print direction setting of the controller does not match that of the print target, or the print target speed does not match the print head's printing speed (timing problem).	Encoder/Timing fault

Technical Specifications

Table 5 - Technical specifications

Specification	Comment
Dimensions	Refer to "Dimensions" on page 9
Electrical	Matthews power supply pack used: Single phase 110 – 240 VAC, 50 – 60 Hz, 0.8 A Direct connection: 24 VDC \pm 0,5 V, 90 W, filtered DC
External Interface	Ethernet – Proprietary
Ink type	Scantrue II: pigmented oil based ink for porous surfaces. 500 ml or 125 ml ink cartridge.
IP classification	IP 40
Maximum mark size per print head (Can be increased, as required, by stacking print heads)	T50: 1.97" (50 mm) T100: 3.94" (100 mm)
Maximum print speed	T50/T100: 276 ft./min. (84 m/min) The value provided is an approximate value. It is dependent upon the contents of the message being printed, and the density setting used.
Message and object storage	Virtual – Unlimited
Minimum font height	T50/T100: 5/16" (2 mm)
Print direction	Bi-directional
Print head orientation	Horizontal only
Print/throw distance	\leq 0.2" (5 mm)
Resolution	Vertical: Physical – 192, addressable – 64 dpi Horizontal: up to 640 dpi

Documentation History

Each Technical Manual has been written for a specific HighRes PTM version or major hardware feature. Table 6 lists which manual should be used with which the print head.

Table 6 - Document history

Manual version number	Manual issue date (month/year)	Hardware version number	Major updates in manual
V2 I1	01/13	133701 and above	See note 2
V1 I1	01/12	133701 and above	See note 1
Note 2	a. Information regarding SYNC IN/SYNCOUT changed (see P. 6) b. Information regarding the use of SYNC IN/SYNCOUT for the encoder signal removed (see P. 20). c. Information regarding the tilting of a print head added (see P. 17). d. Information regarding prime modulation setting added (see P. 26)		
Note 1	First release.		

Notes

For the recording of miscellaneous notes

This image shows a full page of white paper with horizontal dotted lines, resembling notebook paper. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

This image shows a full page of a handwriting practice worksheet. It consists of numerous horizontal dotted lines spaced evenly down the page, providing a guide for letter height and placement. The background is plain white, and there are no other markings or text present.

Index



A

About this manual 2

C

Certification 2
Conditions 1

D

Dimensions 9

E

Electrical requirements 37
Enclosure classification 8
Encoder 6, 20
Ethernet 6

F

Font height 37

G

Gutter 25

H

Hardware version number 38

I

Ink bottle 28
Ink filter 31
Ink LED 7
Ink type 37
IP classification 37
IP rating 8

L

Labelling 7
LAN 1 21
LED
 Ink 7
 Ready 7

M

Maximum print speed 37
Minimum font height 37
Mounting assembly 5

N

Notes 1
Nozzle-Protector-Plate 22, 32
Nozzles 5

O

Operating requirements 7
Operating temperature 7

P

Photocell 6, 19
Power supply requirements 37
Prime button 6
Prime Width Modulation 27
Priming 25
Print head warm up 7
Print speed 37
Print Throw 17
Purging air 29

R

Ready LED 7
RJ45 21

S

Safety Requirements 1
Stacked heads 10
Support (technical) 2

T

Technical support 2
Throw distance 17, 37
Tilting a head 17

V

Version number, hardware 38

Index

Vertical alignment..... 18

W

Warm up 7

Warnings..... 1

