

The SORVEH Technical Training Department



# **Egg jet Oprating Manual**

Document Number: WI706-(01)

## **Introduction**

### **Who should use this manual:**

SORVEH service personnel and those customers who are qualified to perform their own printer service and maintenance intend this manual for use.

### **Warning**

Customers who intend to service and maintain the printer themselves must have only qualified personnel perform those procedures. Qualified personnel are considered to be those persons who have the proper technical training (successful completion of a training course covering this printer), have experience to work on this equipment and are aware of the hazards to which they will be exposed.

This manual contains information on installing, setting up, maintaining, troubleshooting and servicing the printer.

### **Overview of the SORVEH EGGJET printer**

The SORVEH is a non-contact printer capable of printing up to 4 lines of code on the eggshell. The Egg jet utilizes up to six high performances, piezo electric Print head, capable of printing in excess of 3500dots per second per jet in four font heights covering from 2mm to 18mm tall print. The Print head features 128 vertically in line jets.

### **Keypad**

The keypad has 53 tactile response keys with 8\*21 character graphic LCD display. Characters are available from the keypad through the use of the <SHIFT> and <CONTROL> keys. The following combinations are available:

<ALT>	Enter production, expiry, time, counter
<CAPS><CONTROL>	Alternative alphabet (depending on the model)
<CAPS>	Toggle between upper case and lower case character
<Back Space> With <CAPS>	deletes characters

### **Inks**

The ink is contained in a disposable ink cartridge. This cartridge is inserted into the ink housing. Capillary action ensures the print element is always supplied with ink and no form of pressurization is required. Consequently the ink supply system remains very clean.

### **Physical configuration of the printer**

The egg jet is available in one configuration. The complete system is integrated into one assembly. This allows the printer to be moved from one place to another very easily only dependant on a main power outlet.

The egg jet consists of four main sections: the ink supply, the Print head and the keypad/electronics and the conveyor belt.

The Print heads contain the Print head and a mounting bracket for the photocell. The ink is supplied to the Print head from the ink cartridge via a small polyethylene tube to a stainless steel ink tank and through a manual valve via PE tube to the print heads.

### **Message facility**

The controller features user-friendly programming through an in-built keypad. The printer has been designed to offer a wide variety of print options. Package detection by photocell can provide either individual package message printing. Character heights, widths and boldness can be mixed within a message and fully programmable from the keypad. These features together with character spacing allow numerous text appearances. The micro-controller at the heart of the printer is capable of printing time and date functions as standard.

A message store of 7 messages 120 character on each line is available. This allows number of messages to be programmed into the printer while printing and recalled within seconds by telling the printer which stored message to print.

All programmed information, including the time, date, messages, delay, width and auto-repeat is retained within the system, even when the power is turned off, for each message.

### **Introduction**

The policy of SORVEH system international inc. is to manufacture non-contact printing / coding systems and supplies that meet high standards of performance and reliability. We enforce strict quality control techniques to eliminate the potential for defects and hazards in our products.

The intended use of the Egg jet printer is to print information directly onto a product. Use of this equipment in any other fashion may lead to serious personal injury.

The safety guidelines provided in this chapter are intended to educate the operator on all safety issues in order to operate and maintain the printer in a safe manner.

### **Safety conventions used in this manual**

Specific safety information is listed throughout this manual in the form of Warning and Caution statements. Pay close attention to these statements. They contain important information on avoiding potential hazards to you or on the equipment.

### **Warning statements:**

- Are used to indicate hazards or unsafe practices which COULD result in severe personal injury or death;

- Appear in bold type;
- Are preceded by the word WARNING.

**Caution statements:**

- Are used to indicate hazards or unsafe practices which COULD result in minor personal injury or product or property damage,
- Appear in bold type,
- Are always preceded by the word CAUTION.

**Equipment safety guidelines**

**Warning:**

Always observe the following safety guidelines when installing, servicing or maintaining the printer and associated equipment.

**No smoking:**

Do not smoke when near the printer or Print head. Ink is combustible.

**Comply with electrical codes**

All electrical wiring and connections must comply with applicable local codes. Consult the appropriate regulatory agency for further information.

**Do not remove warning labels**

Do not, under any circumstances, remove or obstruct any warning or instruction labels on the printer.

**Placement of printer**

**WARNING:**

Do not place the printer in an explosive atmosphere.

**Equipment safety guidelines**

**WARNING:**

The spit function may cause drops of ink to become airborne. Avoid inhalation of airborne ink.

**The spit function:**

When the printer is idle, the spit function ejects ink droplets from the Print head orifices at regular intervals, when using inks for non-porous surfaces. Avoid inhaling these ink droplets.

Refer to programming section for more information on the spit function.

**Spit safety guidelines:**

Provide local or general ventilation to maintain a safe working environment. If inhaled, these ink droplets are too large to reach the lungs. Rather, the ink droplets will deposit primarily in the nose, pharynx and epiglottis. Any volatile solvent remaining in the deposited ink droplet may be absorbed through mucous membranes, or may evaporate and reach the lungs.

**Ink safely guidelines****WARNING:**

Always observe the following safely guidelines when working with any ink or cleaning solution.

**CAUTION:**

For continued protection against possible hazards or damage to the printer. Use only SORVEH ink according to directions specified on the label, material safety data sheets, and ink source bulletin.

**CAUTION:** Do not use M.E.K. based chemicals in the Egg jet.

Wear safety glasses

Wear safety glasses with side shields (or equivalent eye protection) when handling solvent wash and/or maintenance spray. If splashed into your eyes, flush eyes with water for 15 minutes and see a doctor immediately.

Avoid skin contact:

Wear rubber gloves when handling any ink or cleaning solution. Avoid contact with skin and mucous membranes (nasal passage, throat). Upon contact with skin wash with soap and water. See a doctor if irritation persists.

Avoid breathing vapours

Avoid prolonged exposure to vapours. Consult the Material Safety Data sheet (MSDS) for recommendations on engineering controls and personal protective equipment.

**Read the Material Safety Data Sheets (MSDS):**

Read and understand the Material Safety Data Sheet (MSDS) before using any ink or cleaning solution. An MSDS exists for each type of ink and cleaning solution: the appropriate sheet or sheets are supplied with the product when shipped.

**CAUTION:** Do not store inks in warm areas.

**Store inks properly:**

Certain Metsa inks and solvent wash are flammable and must be stored appropriately. Storage must comply with local regulations; contact the appropriate regulatory agency for further

information. The label on the bottle or the Material Safety Data Sheet will indicate if a particular fluid flammable.

**Dispose of ink properly:**

Do not pour any ink or cleaning solution into sinks, sewers or drains. Waste dispose must comply with local regulations. For more information, contact the appropriate regulatory agency.

Medical emergencies

**WARNING:** In the event of a medical emergency, contact a doctor immediately.

**Specifications**

The Egg jet contains five or six print heads each head is 128 dots, piezo – electric jet element producing a maximum character height of 17mm. Printing produces 3500 dots per second, per jet. Printed object is placed approximately 5mm from the face of the Print head.

**Keypad/Driver Electronics**

The Keypad/Driver electronics module contains three major components: the power supply, the driver electronics and the keypad.

**Power Supply**

The power supply unit is an industrial isolated switch mode 240VAC compatible unit.

No jumpers are required to set the main voltage. The supply delivers an output of [12VDC@1A,5VDC@2A](#) and a TTL power fail signal. Although, it is not to be adjusted after leaving SORVEH. The unit contains a fused over current and voltage protection and a thermal cut- out.

**CAUTION:**

Once the power supply is interrupted, wait for approximately 10 seconds before restoring the power.

**Driver Electronics:**

**Warning:** The Driver Electronics Printed Circuit Board (PCD) is static sensitive and should not be touched. There are no user serviceable components within this PCB.

The Driver Electronics includes a single PCB Which receives information from the keypad and then converts this information into the specified electrical characteristics required to drive the print element.

**Print head Metal Casing**

The stainless steel metal casing allows the print head to move in vertical plane only. The height of the print head must be adjusted according to the egg size to be printed. This adjustment is achieved through loosening the screw positioned next to the ink cartridge at the end of the

stainless steel tunnel and by turning two large knobs at the top allowing the sliding rods to move one within the other.

Technical Specification

### Physical Specifications

Printhead	Compact stainless steel
Keyboard	52 tactile response keys on a built in keypad
Display	21 character 8 line graphic LCD with back lit
Mounting Accessories	Stainless steel conveyor

### **Introduction**

The first time the Egg jet is set up; it should be installed as described in this chapter. If SORVEH or your local distributor has done insulation, then this chapter should be read for background information only.

### **Insulation**

#### **1. Mount the printer**

The Egg jet is supplied with or without a conveyor belt. If a conveyor is supplied, then simply place the printer on the supplied tunnel. Set the conveyor so it's completely level horizontally in both X and Y planes. Then position the print head at a right angle to the eggs so the distance between the print head and the eggs is not greater than 5mm. The screws can be loosened to allow the print head to move along with the vertical plane. The product must be guided past the print head as close as possible to the front of the print head (approximately 5mm). Once this is achieved screws can be securely fastened.

### **CAUTION:**

The Egg jet printer should not be mounted in an area of extreme heat, humidity, vibration, cold or dust.

#### **2. Mount the photocell (Product detector)**

When supplied, the photocell should be correctly positioned and adjusted. If not, the photocell should be fastened on to the photocell-mounting bracket, which is designed to be attached to the side of the conveyor belt

Position the photocell so that the product is detected just before it reaches the Print head. Point the Photocell at the egg tray.

Attach the Photocell cable (a male 9 - way D – Connector) to the auxiliary input, located on the controller case.

Adjust the sensitivity of the photocell by turning the screw in the rear of the photocell until it reliably detects the product as if it passes, but does not activate by anything moving in the background. A red light under rear of the photocell is illuminated when the photocell is turned on.

#### **3. Insert the ink cartridge**

Insert the ink cartridge in to the ink holder. Press the ink cartridge until the needle breaks through the plastic button of ink cartridge, then turn the first ink valve to open position and press the ink bag slowly until ink introduced to the first print head and all the air comes out of the Print head nozzle. Turn the ink valve to close position and turn the next valve to open position and repeat the same procedure. It is important to do this slowly to make sure all the air is removed from the system for a reliable operation. Note that there is two ink cartridges supplied, each one separately will feed 3 print heads.

#### **4.Connect the cable and switch on**

Insert the mains power cable (supplied) into the mains filter (power receptacle) located adjacent to the ON/OFF switch. This cable is 2 meters in length, and is the only cable restricting the movement of the Egg jet. Once plugged in, turn the mains power switch on.

After the ink bag connected to the print head apply some cleaning spray to the nozzles and press the ink bag unit until all the air is removed from the system and ink starts to flow from the nozzles. It is important not to have any air the ink tube left because this will affect the quality of print.

#### **5-Clean the print head and check for print quality**

First, spray the print head jet area with maintenance spray. Press gently on the ink bag and see fresh ink exits out of nozzles.

At the main menu press F1 with P=01, R=01, W=01, B=01, G=50, D=01 and pressing 7 on keypad to set all print heads to on.

Check that all 128 jets are free of obstruction by observing the spit. Check that the print quality is good. If the top dot or a few dots are missing at the beginning of the printed message, the jets may have dry ink on them, press firmly on the centre of the ink cartridge and apply cleaning spray on the nozzles and wipe with a piece of paper. Make sure the paper does NOT touch the nozzle plate since it will damage the nozzle plate and this causes degradation in print quality. You may wipe the nozzle plates only with the SWABS provided with the machine.

The printheads work well with a negative ink pressure set between -1 to -4cm below the nozzle holes.

Make sure to have a good low inductance clean earth connected to the body of the controller. The controller will work from 180vac to 240vac, if there are problems on the mains voltage lines use an AC stabilizer.

Before switching the unit on make sure the printhead connectors are well connected. There are five round connector from the controller to the printheads.

#### **Getting a print with ink**

**1-** switch the machine on

**2-** Press N to open a new message and start typing the message in max. 4 lines, use the backspace to delete characters with caps lock ON and it will delete characters in front of it. To change from each line to next use enter.

**3-** to save message and exit press F1 and use up/down cursor keys to select the memory locations, then press enter to permanently store the message. Please note each message will have its own parameters (B,W,G,F,..) saved with it.

**4-** There are 3 fonts available in the system, font 1 has the most condensed matrix and depending on the setting on main menu with F4 it will print either characters with 2mm height or 4mm height. The fonts from 2 and 3 are 32\*24 matrix and the 2mm of 4mm setting is ignored on them.

**5-** Parameter W is used to increase the width of characters, with font 1 it is recommended to set W at 2 or 3

**6-** Parameter B is to increase the boldness of characters, this is recommended to be set to one for eggshell.

**7-** Parameter G is to set the printing speed for good readability.

**8-** Parameter D is the delay from start print of first print from sensor detection.

**9-** Parameter R has submenus and they are opened when return is pressed.

**9.1-** Print quantity is the number of prints for each sensor detection. This can be Set from 1 to 99 depending on number of eggs in each tray.

**9.2-** Delay for section 8.1 print quantities, this delay is for adjusting space between prints

Note: the first delay from sensor detection is set by D parameter in the main menu while this value which is sub menu of R is the delay between the prints

**10-** Parameter P is the spit rate; this stops ink drying in to printhead when there are stops on the production line. This will cause a small amount of ink to be fired. The recommended setting for food blue is between 40 to 70 depending on room temperature.

F1 on the main menu will send all the parameters for the print engine. Then press number 7 to switch all heads on. Next try to get a print on a piece of paper by applying a pulse to the sensor. Then switch the conveyor on and place a piece of paper of an egg tray with eggs and set the delay value to get the first print on the first egg. Set the G parameter to fit the whole message on the first egg. Then set the print quantity as the number of rows in each egg tray, and set the delay between each print to get a correct print exactly on each egg.

### **MORNING START UP**

- Open ink valves
- Remove print head caps
- Turn on the power
- Press F1 (power to print heads)
- Press 7 (signal on to print heads)

## **EVEVING switch off**

It is very important to switch off the system properly at the end of a working day to make an easy morning startup.

- Press 9 (remove power from print heads)
- Turn power off
- Close ink valves
- Apply solvent inside the caps and place it over print heads

Note :If machine will stay switched off more than one week,then remove ink cartridge and insert solvent cartridge and flush all ink inside print heads.

## **Introduction**

Programming capability

The system has the following programming capability:

### **Initial set – up.**

- The current time and date: Sets the system time (which are maintained even when the unit is switched off)
- Periodic Spit function: sets to expel a small amount of ink periodically (when using inks for non-porous surfaces).

### **Print Control**

- Character width: Controls the width of the printed characters.
- Product delay: Sets the pause between print initialisation (photocell detection) and print commence.
- Bold: Bolds entire message. Up to 9 Levels of boldness are available.
- Gap: Specifies the space distance between each printed vertical dots in generating characters

### **Message text. (String of to 120 characters).**

- Selecting the active message (from 1 to 7)
- Editing a message
- Entering a new message

### **Insert:**

In addition to the print control commands, the controller has local commands, which allow specific commands to be inserted into the message, with the use of an ALT within the message.

These local commands include:

Clock/time functions: Prints the Hour, minute or press time.

Calendar functions: Prints the month, day and/or year within the message, or press F5

Expiration Date: Allows a future date to be calculated and added by system.

Programming the controller is accomplished by using the built-in keypad, which has an 8-line LCD display.

Use of the keypad

There are 26 uppercase letters (A-Z), 10 numerals (0-9), space ({SPACE}) Key, and carriage return {ENTER} key on the Egg jet keypad.

Pressing the <CNTRL> key displayed in red on the Egg jet Keypad can generate a second set of characters, mostly miscellaneous symbols.

Additionally, to generate uppercase letters, press (in the order specified) <CAPS> then the appropriate letter key.

**NOTE: If a key is held down, the key will generate repeatedly. This function can be Useful when scrolling from the start of a message to the end.**

**Function commands**

**Function command descriptions**

All commands are displayed on the keypad display. Press the upper case letter within the command to access the function. Function keys are used in the following cases:

To set system parameters

To control message properties (global commands)

A brief explanation of the abbreviated function commands is listed below.

A more detailed description and examples of each function are explained later in this chapter.

**Gap:** Press **(G)** to change spacing between vertical lines forming the characters.

**Select:** Press **(S)** to select a stored message.

**Delay:** Press **(D)** to change print delay.

**Font:** Press **(F)** to select desired font.

**Bold:** Press **(W)** to change the width of the characters of a message.

**Time:** Press **(T)** to set the clock.

**New:** Press **(N)** to create a new message.

**Pause:** Press **(P)** to change the SPIT parameters of the Egg jet printer.

**Date:** Press **(C)** to change the production date.

**Expiry:** Press **(X)** to change the expiry date with four-digit day offset.

The following characters are used for editing, and have the functions described:

Command	Press key (S)	For this function
Carriage Return	{ENTER}	Enter value or message currently displayed
Delete	{CAPS} Back space	Delete the character at the cursor and move any right text one space left
Cursor Right	Space	Cursor right (When entering a message)
Cursor Left	Arrow Left	Cursor left (When editing a message)
Lower Case	{CAPS} OFF	Enter lower case characters
Insert Mode	{ALT} ON	Toggle between insert and overwrite
Red characters	{CTRL} ON	Red colour characters activated.
Cursor Right	Arrow right	Cursor right (when entering message)

## **Set up commands**

### **Time**

Use this function to set the internal system clock.

Press the (T) (Time) key on the keypad to access the time function.

Once pressed, the keypad will Display, time (in 24 Hour format) on display.

To only view the time, enter just T (terminated with a <CR>). The time is then displayed which can be examined. Press <CR> to go back to the main menu.

To change the date, time and /or year, the following procedure must be performed. Press (T) a menu will appear asking for the time. At the prompt, type a two-digit code, (e.g. 14 for 2PM), the hour, then minute and then second.

Once entered all parameters of the previous values are updated.

Press <CR> when all six values are entered to return control to the main menu, accepting the currently displayed date.

Example: Type C, to access the date function.

A two-digit code is now required type 02 to set the year to 2002. The display shows the month field. Type 12 to set the month to 12 and the day to 25 set the day.

### **Spit**

#### **Warning:**

The Spit function may cause drops of ink to spray. Avoid inhalation of ink in air. Wear eye protection.

When using faster drying ink (inks for non-porous substrates) the Egg jet must be programmed to spit periodically. Since the Egg jet dose not re circulate ink. The Spit function works to prevent the effect of ink drying on the nozzle plate when the printer is idle and/or when there is a delay in the products moving past the print head. Depending on the Spit setting, the Egg jet print head will periodically expel a small amount of ink.

Spitting is automatically inhibited once a product is detected. This is to prevent spitting onto products. Each droplet is 70 pico liters in volume. The Egg jet ejects a droplet from each print head orifice for a total of 128 droplets per Spit.

Spit parameters range from 0 to 99, 1 am very quick spitting and 99 are rare spitting. It is recommended the Spit Parameter be set 50. When using faster drying inks (inks for non-porous surfaces). When using ink for porous surfaces, the Spit function can be set to (00) to stop spitting.

Press (P) and then a < CR> to display the currently set Spit parameter without altering it and then return to the main menu.

### **Print Control Commands**

The Print control commands. Listed Below, are entered by pressing the appropriate key in the main menu:

<b>DELAY</b>	<b>(D)</b>	Product delay (1-99)
<b>WIDTH</b>	<b>(W)</b>	Character width
<b>GAP</b>	<b>(G)</b>	Inter-character spacing (1-99)
<b>BOLD</b>	<b>(B)</b>	Bolds text (1-9)

#### **Delay:**

The product delay sets the distance that the product will travel between the print trigger and the start of printing. And, consequently, is used to determine where on the product the message will appear.

Press the (D) key at the main menu to view/change the product delay. Enter any delay value between 1 and 99. Where 1 is no delay and 99 is the maximum delay.

#### **Width:**

The Width command controls the width of printed characters. Press the (W) Key

From the main menu to view/change the character width. Enter any width from 1 to 9 where 1 is the minimum width 9 is the maximum width.

#### **Gap:**

The Gap (or space) command determines how closely the vertical lines generating each characters of message are formed together. Press G in the main menu to view/change the Gap value. Enter all gap values between 1 and 99. Consequently, a gap of 1 is the minimum and a gap of 99 is the maximum.

The setting of this value is dependent on the production line speed.

#### **Font:**

The font of the message may be by pressing the (F) key. Entering a number between 1 to 3 and then pressing F1 key at the main menu can change the message font.

### **Message commands**

This group of commands is used to create or edit the message to be printed.

The controller has a standard store of 7message, each capable of printing up to 120 characters per line.

Each message is given a number from 1 to 7. The particular message is retrieved and printed when it is selected using the (S) command from the main menu.

### Selecting a message

Press (S) at the main menu to display/change the currently active message.

Enter any value from 1 to 7 by Pressing Arrow up/down keys and enter.

When a pre-defined message is selected, for example 1 the Egg jet will print that message, along with the DELAY, WIDTH, REPEAT and GAP value setting.

If a message is selected that dose not exit, (for example 2), a new message must be entered using the (N) key. Once entered, the message is stored under the number 2

For example, press S at the main menu to select messages number 19.

Press (S) at the main menu to select any other message previously entered.

Once pressed, the top line of the display will show.

MESS: xxxxxxxx (Where x is a character in the message).

Use UP/Down arrow keys to select the message number. Then press Enter to display message contents. If the correct message selected press Enter again and the cursor will move to active message screen.

Use the cursor keys to move around the message. And press any key to edit the character in the message at the position of the new flashing cursor. After making all editing, press <F1> key to enter the message into memory.

### New message

Press (N) at the main menu to create a new message. The display will show a clear page for editing.

Use keyboard to enter characters within the message. Three different sizes can be selected using F2 key for characters. By pressing F2 the size is toggled between small mediums large. F3 key allows the keyboard to change from Persian to English. F1 key is used to exit the message and the message number can be selected using the up/down arrow keys. To exit then press Enter.

**Note:** Make sure to use space for empty spaces between each character when editing for first time (Do not use Arrows), specially when medium or large size character setting is used, the user must clear previous blank spaces before characters.

### Message Manipulation

**Note:** Set the default font and default boldness level in the main menu the same way you would set the delay.

**Note:** Alternatively press time then hour & minute is inserted automatically.

### Hour

The hour of the day (in 24 hour format only) can be added to the message with the inclusion of the (ALT = ON) press (Z) within the message.

The printed hour is determined by the system time. The hour is always printed as two numerals (0-9), and is effected by all other commands (font, bold, etc). For example, entering a message of THE HOUR IS will print the THE HOUR IS 14.

### **Minute**

The minute of the hour can be added to the message with the inclusion of the (ALT= ON) press (x) command within a message. The minute is always printed as two numeral (0-9) as is determined by the system time, and are effected by all other commands. For example, entering a message of THE MINUTE IS will print THE MINUTE IS 35 if it is 35 minutes passed the hour.

### **Year**

The year of the year can be added to the message with the inclusion of the (ALT = ON) press (E) command within a MESSAGE. The month will always print as two numerals (0-9), and are effected according to all other commands (fonts, bold, etc)

### **Month**

The month of the year can be added to the message with the inclusion of the (ALT = ON) press (E) command within a MESSAGE. The month will always print as two numerals (0-9), and are effected according to all other commands (fonts, bold, etc)

For example a message of IT IS THE \*\* MONTH OF THE YEAR will print IT IS THE 11 MONTH OF THE YEAR if it is November.

### **Day**

The day of the year can be added to the message with the inclusion of the (ALT=ON) press (E) command within a MESSAGE. The month will always print as two numerals (0-9), and are effected according to all other commands (fonts, bold, etc)

For example a message of IT IS THE \*\* DAY OF THE YEAR will print IT IS THE 18 DAY OF THE 11 MONTH assuming the date is the 18<sup>th</sup> of November.

### **Expiry Year**

The year offset can be added to the message with the inclusion of (ALT=ON) press (y) nn anywhere in the message. An offset on nn (01-99) year can be added to the real time clock from that date. This is a useful feature if the actual date and a durability date are required to be printed.

### **Expiry day**

The year offset can be added to the message with the inclusion of (ALT=ON) press (K) nn anywhere in the message. An offset on nn (01-31) day can be added to the real time clock from

that date. This is a useful feature if the actual date and a durability date are required to be printed.

Use F5 or F6 to insert completed date as day/month/year in the message.

## **Ink Maintenance**

### **CAUTION**

A new ink bag must be of the same type and color as the cartridge it replaces.

Replacing different families of ink with each other will clog the print head ink supply system and will damage the print head permanently.

Changing the ink type or color

To change from one ink type to another or from one color to another, it is necessary to flush out the old ink before installing a cartridge of different ink. A trained service technician should only perform this procedure, because incorrect or insufficient flushing will cause the ink to clog the system.

Clogging can cause delays in achieving the change over. The procedure below explains how to change the ink type or color.

**1-** Remove the old ink cartridge, and replace the ink feed tube with new ink feed tube.

**Note:** Only use PE tube for ink feed tube.

**2-** Fill a new syringe with Metsa solvent wash. Place the syringe directly and firmly in the print head ink feed and wash the print head very gently with solvent.

Repeat this procedure few times but make sure the solvent must be very clean and DO NOT apply too much pressure to the syringe or the nozzle holes will be damaged.

**3-** Using the same syringe blow air in to the print head until the solvent is also flushed out.

**4-** Insert the new cartridge and force ink through the print head by applying pressure to the cartridge. The print quality must be checked and adjusted if necessary.

**Note:** The print quality will usually improve (if all jets are present) after some use. If the print quality is not improved look for the following symptoms:

Ink cartridge too low

- Loss of print after few prints
- Loss of top drops from the print message

Purging the print head

The piezo tubes within the print head have two functions, one is to pull ink from the cartridge and the second is to force a droplet of ink through the jet plates.

It is therefore essential that there is no air within the ink system. To ensure there is no air in the system, the ink system must be purged.

To purge the print head you must press down firmly on the ink cartridge while the print head is pointing upwards. This will cause the trapped air in the print head to be released from the print head nozzles. This method can also be useful for freeing dried ink from the jet plate.

**Note:** Do not release the pressure of the ink cartridge until the print head is once again rotated back to its printing position. Otherwise, air could be drawn back in.

**Note:** The cartridge height is adjusted and positioned at correct level at installation, and should not need adjustment.

### **Setting cartridge height**

The ink cartridge holder has a small sharp needle that supplies ink to the ink feed tube and this supplies ink to the capillary chambers within the print head. There is no shut off valves, and for this reason the ink level is critical.

### **Starting after shut down**

The print head will usually have dried ink on the jet plate even after being shut down for a period of few minutes. The following steps explain how to start the printer after it has been shut down:

**1-**Apply only Egg jet solvent wash or maintenance spray to the jet plate.

DO NOT rub or wipe the jet plate.

**2-**After allowing the solvent to soften the ink, by pressing the ink bag force fresh ink through the print head.

**3-**Check that all jets are firing, if all jets are not firing, then apply pressure to the ink cartridge for a short period and then try printing again.

### **Handling instructions for the piezo jet print head**

The print head contains an ASIC and should be handled according to the same rules as other electronic components.

The print head is build up of polymer parts, which are glued together. Therefore do not expose the print head to unsuitable solvents.

The nozzle plate is covered with a non-wetting coating which is sensitive to physical impact. You should not expose the non-wetting coating to direct UV light as this may degrade the non-wetting performance.

The print head should not be exposed to electrostatic discharge and the printer should be well grounded in the application. Flushing of the print head can be done with the wash provided by SORVEH. Other fluids such as solvents or acetone or kettons must not be used.

When the print head is not attached to an ink supply system, the ink inlet pipe should be protected against contamination.

During handling, the nozzle plate must be protected from physical impact of any nature. Scratches on the nozzle plate might damage the non-wetting properties and disturb drop formation.

Mounted in an application the print head must be protected from physical contact with the print media, as this could damage the nozzle plate. A distance of 5 mm maximum is recommended to be held between the nozzle plate and the print media.

The prints head actuator and nozzle plate are because of their small dimensions are sensitive for particles and debris. The print head has for this reason an internal filter mounted on top of the actuator in order to prohibit particles from entering the actuator area. The filter, which is made out of stainless steel, has a filter mesh size of 15 um.

A polymer coating with non-wetting properties covers the nozzle plate surface. This should assure that ink remaining on the nozzle plate surface is forced back into the nozzle holes. Under some circumstances ink and debris from the operating environment could stick to the nozzle plate and cause disturbances in ink ejection.

This requires cleaning, cleaning operation could be done in following ways:

- A small purge;

Tests have shown that 15-20 micro liter of ink should be purged from the print head.

- Using SORVEH cleaning spray.

**Troubleshooting information**

Troubleshooting Chart

Refer to the following chart for troubleshooting information.

**CAUTION:**

Do not overuse maintenance spray.

Fault	Possible Cause	Solution
No Power On Indication	No power	Check mains (main AC) Supply Check on/off switch on printer. Check Fuses in power supply.
Difficult to start printer after shutdown	Ink dried on jet plate	Spray with maintenance spray and press the ink bag (possibly purge). Do not spray connector sockets, cables or the umbilical feeder tube. For long-term shutdown (more than one week), wash thoroughly and blow air through system or place cap on print head.

<b>Fault</b>	<b>Possible Cause</b>	<b>Solution</b>
No printer on test even though print head is heard firing	No ink  Jet plate faulty	Check ink supply by priming pressure on cartridge. Check jet plate is not damaged
No ink when cartridge is primed	Cartridge empties.  New cartridge only.  Wrong ink installed	Replace with new cartridge. Ensure filter spigot has penetrated cartridge. Mixing ink cause blockage, wash out with solvent wash.
	Ink tube printed or cut          Ink leak	If tubing length allows cut tube and reconnects. If not, replace tube. Use spring provided to cover tube. Note: Print head tubing is usually caused by insufficient care when replacing the print head cover. Remove cartridge and check around the print head for leaks. Repair or replace tubing as needed.
Print head fires on test print but dose not print message on product.	Faulty photocell.  Wrong delay and width setting.  No message loaded	Check photocell operation and setting. Check delay and width setting and readjust if needed. Reload message on keypad.
No print on test	Empty cartridge.  Air leak.  Air in system.	Replace with new cartridge. Check for leaks in the air tube and repair or replace. Check for air the print head by pointing jets upward and forcing ink by pressure on the cartridge until no bubbles are present.

<b>Fault</b>	<b>Possible Cause</b>	<b>Solution</b>
	Wrong ink level  Faulty jet plate.  Ink blockage.	Check for correct ink level setting of cartridge box.  Check jet plat condition.  Press cartridge and ensure full ink supply. If not, then wash the system thoroughly.
Message prints, but only for shirt time.	Filter blocked.  Incorrect ink level.	Wash the print head backwards  Readjust the ink level
Drops dots at the bottom of the message	Flooding at the jet plate.  Debris in the print head	Lower the ink level.  Clean the print head.
Drops a line of dots	Debris in the print head	Purge the system. If still dropping a line of dots, wash the print head.
Drops dot after line stops Dots out of line in print	Incorrect Spit setting  Debris in jet plate	Adjust Spit setting.  Remover and clean the jet plate.
Ink flooding in print head enclosure	Ink leak    Ink level too high.	Check for damage to ink line: repair or replace.  Check jet plate and.  Reset the level of the cartridge in relation to the print head.
Wavy or poorly-defined print	Check distance between print head and substrate.	Readjust distance (Should be approx. 5mm (0.20in))
Inconsistent print quality.	Static.	Ground the substrate immediately before printing. Use a static eliminator if needed.
Not printing in the desired position.	Print head too high or too low.  Incorrect delay.    Variation in conveyor speed.	Adjust print head height on mounting bracket.  Adjust DELAY setting on keypad.  Adjust photocell position.  Provide constant conveyor speed.
Message erratic-early and late firing.	Check position or sensitivity of photocell.	Adjust photocell.

<b>Fault</b>	<b>Possible Cause</b>	<b>Solution</b>
Print misses every other product.	Product too close together.	Separate products. Reposition photocell immediately above center of the print head.
High ink using	Leaks or flooding.  Excessive purging.	Check for leaks or flooding. Check ink level. Check why frequent purging needed.
Blurred/spattered print	Unclean jet (s).  Print head located too far from product.	Remove and clean jet plate. Move print head closer to product.
No print at all	Out of ink. Print head has dried ink on it. Object blocking photocell.  Ink level too low.	Replace cartridge. Clean print head of dried ink. Clear photocell of obstruction. Raise ink holder 5mm (0.20in).
	Message has not been processed for printing. Ink tube restricted.	Press F1  Remove inks and tight bends from the ink tube. Remove and reposition.
Unreadable print/jets missing.	Unclean piezo block or jet plate. Incorrect ink level.	Clean jet plate.  Check and adjust ink level.
No print after short production break.	Excessive Spit interval.	Decrease Spit interval.
Print not correct position.	DELAY, WIDTH, or GAP values changed.	Reset Delay, Width, or GAP.
Print degradation.	Excessive Spit interval. Ink level set incorrectly.	Decrease Spit interval. Adjust ink level.
Ink dose not dries correctly.	BOLD/WIDTH values changed.	Reset to correct value.
Excessive ink use.	Excessive purging caused tube to split.	Remove and replace tube.

