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At all times the printer must be operated with EC-JET approved spares and consumables. Maintenance not identified in this user manual must be carried out by EC-JET engineers or authorized distributors.

About this Manual

The purpose of this user manual is to provide the operator with sufficient information to operate the EC-JET Ink Jet Printer. The information of this manual applies to all EC-JET series printers.

Products described in this user manual are subject to continuous development, and reviews of this user manual will be made accordingly in subsequent editions or reissues.

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1. Safety

1.1. Warnings and Cautions

At appropriate points within the text of this manual, additional safety statements will be displayed. These are designed to alert your attention to hazards and important information that assists you in carrying out your activities on this printer safely and efficiently. Each safety statement has a separate meaning so that you can identify the importance of the information provided. Examples and descriptions of safety statements have been provided as follows:



WARNING: A WARNING ALERTS YOU TO HARMFUL OR POTENTIALLY LETHAL ACTIVITIES. A DESCRIPTION OF THE HAZARD IS GIVEN AND THE CONSEQUENCES OF IGNORING THEM. A WARNING CAN ALSO BE SHOWN AS A SPECIAL HAZARD, FOR EXAMPLE, EYEROTECTION (SEE BELOW).



THE EYE PROTECTION WARNING ICON IS SHOWN THROUGHOUT THE MANUAL TO INDICATE. THAT APPROVED EYE PROTECTION, WHICH CONFORMS TO EUROPEAN AND INTERNATIONAL SAFETY STANDARDS, MUST BE WORN WHEN CARRYING OUT INK OR SOLVENT RELATED ACTIVITIES.



CAUTION: A CAUTION ALERTS THE USER TO ACTIIVITIES THAT MAY CAUSE DAMAGE TO EQUIPMENT OR REDUCE ITS OPERATING EFFIENCY, BUT IS NOT DIRECTLY HAZARDOUS TO PERSONNEL.

NOTE: A Note provides important additional information but is not safety related. The hand icon may not always be shown depending on the importance of the Note. A Note with a hand icon indicates that you should take particular notice of the information provided.

1.2. Lethal Voltages



WARNING: LETHAL VOLTAGE. DANGEROUS VOLTAGES ARE PRESENT IN THIS EQUIPMENT WHEN ELECTRICAL POWER IS APPLIED. THERE IS A DANGER OF DEATH OR INJURY FROM ELECTRIC SHOCK.

UNDER NO CIRCUMSTANCES ARE YOU TO ATTEMPT TO OPEN THE SCREEN DOOR OR THE BACK ACCESS DOOR AND REMOVE OR ADJUST ANY COMPONENTS FITTED WITHIN THE PRINTER.

ONLY FULLY TRAINED OPERATORS OR APPROVED SERVICE

ENGINEERS ARE QUALIFIED TO OPEN THE FRONT INK SYSTEM DOOR WHEN ADDING INK OR SOLVENT, ONLY FULLY TRAINED EC-JET APPROVED SERVICE ENGINEERS ARE QUALIFIED TO OPEN THE SCREEN DOOR OR THE BACK ACCESS DOOR TO MAINTAIN OR ADJUST THE INTERNAL PARTS.

1.3. Operation

All users operating the printer must be aware of the following hazards associated with ink jet printers. The following safety information should be made available to all personnel and is applicable to anybody in the printer's operating environment. Only fully trained and competent personnel should operate or maintain EC-JET printers. If you are in any doubt as to your ability to operate or maintain the printer, did not hesitate to consult your supervisor for guidance or contact your local EC-JET distributor who will be happy to advise you.

1. Don't smoke or use naked flames in the vicinity of the printer. The printer contains flammable inks and solvents.
2. Always ensure that the printer electrical supply is isolated prior to performing cleaning or maintenance activities. Lethal voltages are present in the printer cabinet and printhead when mains power is applied which can cause death or serious injury if the correct electrical procedures are not observed.
3. Only the fully trained operators or service engineers qualified to open the front ink system door to add the ink or solvent. Only fully trained EC-JET approved service engineers qualified to open the screen door or the back access door.
4. Always check that all covers are correctly fitted and all doors are closed before you use it. If you are not sure, ask your supervisor for guidance. Covers act as safety barriers and also ensure the printer retains its electromagnetic compatibility.
5. It is recommended that the printer is situated at least 600mm from floor level for your comfort.

1.4. Inks and Solvents

Whenever inks and solvents are used, safety eyeglasses to the appropriate European and International Directives must be worn. Solvent resistant gloves must be worn when contact with inks or solvents is likely.

The effects of solvents and inks are potentially harmful. Prior to use, ensure the printing area is properly ventilated and the Material Safety Data Sheets have been read and fully understood. If you are unsure, contact your supervisor for guidance.

If the Material Safety Data Sheets have not been supplied or are not available, please contact your local EC-JET distributor. Always refer to the Material Data Safety Sheets before working with inks and solvents.

Store all inks and solvents in original containers, in a well-ventilated cabinet and away from heat sources. Ensure all spilt ink or ink deposits are removed immediately using the correct solvent for



the ink used.

1.5. First Aid

Ensure that first aid information is readily available in the event of ingestion, inhalation, or contact with the skin or eyes. Ideally all operators should be trained in First Aid and should be aware of the effects of working with flammable and toxic substances. All operators should have access to the ink and solvent Material Safety Data Sheets, which explain the hazards and medical action to be taken if first aid is necessary.

1.5.1. Eye Contact

Flush eyes using clean running water for a minimum of 10 minutes. Obtain immediate medical attention.

1.5.2. Skin Contact

Remove any contaminated clothing and wash the affected skin area thoroughly with proprietary cleaner. Do NOT attempt to use solvents to remove ink from skin.

1.5.3. Inhalation

Evacuate the person into a fresh air environment. If the person experiences any difficulty in breathing, obtain immediate medical attention.

1.5.4. Ingestion

Do not induce vomiting; obtain immediate medical attention and give the casualty half a litre of water to drink.

1.6. In Case of Emergency

If the printer needs to be stopped quickly due to an emergency, press the red [stop] key on the printer to stop the printing and switch the printer power switch on the rear panel of the printer to the (off) position. Call for medical assistance as required.

1.7. Noise Emissions

The noise emission level from this printer does not exceed 70dBA. This means that there is no hazard to hearing and, therefore, no legal requirement for ear protection to be worn when working in the vicinity of this printer.

2. Introduction

A safety section has been provided at the front of this manual for your use. You are strongly advised to read the Safety section carefully before attempting to use the EC-JET printer.

2.1. Printer System Overview

The EC-JET printers provide a means of application of printed information onto a wide range of products. This information would typically be the date, production codes, consumer information, product or corporate identification, product traceability, and many others. It can be widely used in pharmaceutical, chemical, food, construction materials, tobacco, ceramics, electronics and other industries.

The printer is normally fixed to a production line in such a way that printing takes place as the product passes the print head. The presence of the product and printing can be synchronized using a product detecting sensor.

The printer consists of a cabinet and a print head. The cabinet houses the electronics module, the ink system, a power supply and a message screen display. The print head is attached to the rear of the cabinet via a flexible conduit.

The print head is supplied with ink by the ink system which the print head forms into a continuous stream of ink drops which recycle to ink system. When printing is required, drops of ink for printing the message are deflected from the stream out of the print head onto the product, providing a non-contact method of printing. The process is controlled by the electronics module which also stores the messages to be printed. The message is programmed using the touch screen.



2.2. System Description

The EC-JET printers are designed to provide versatile, uninterrupted operation in factory environments.



The available raster types and compatible print heads of EC2000 are as follows:

PRINTER MODEL	PRINTER HEAD TYPE	RASTER TYPE	CHARACTERS
EC-JET2000	60μm	5 Dot High Speed	5
		7 Dot High Speed	5、 7
		9 Dot High Speed	5、 7、 9
		12 Dot High Speed	5、 7、 9、 12
		16 Dot Standard Speed	5、 7、 9、 12、 16
		16 Dot High Speed	5、 7、 9、 12、 16
		24 Dot Standard Speed	5、 7、 9、 12、 16、 24
		24 Dot High Speed	5、 7、 9、 12、 16、 24
		32 Dot Standard Speed	5、 7、 9、 12、 16、 24、 32
		34 Dot Standard Speed	5、 7、 9、 12、 16、 24、 32

2.2.1. Operating Simplicity

EC-JET printer adapt an One-Button start-up and shutdown procedure,minimizing operator's workload . Intelligent is easier to adjust and operation is more simple and clear by using the color touch screen, windows style and WYSIWYG operating instructions.

2.2.2. Diagnostics

A comprehensive diagnostics package is built into the printer to enable problems to be identified and rectified quickly.

2.2.3. Real-time Machine Control

Computer components within printer keep on detecting the level of ink or solvent, viscosity if ink, pressure and charge value and show the detecting result on the diagnosis menu. We can see these data from the screen.

2.2.4. Print head Design

The print head is robustly designed for industrial environments. It is hermetically sealed and is permanently attached to the printer itself by a 2 metres (or optionally 3 or 4 metres) length of conduit.

Three micro valves are installed in EC2000 printhead. It offers clean leaner for the nozzle through cleaning pump and special pipe within the cabinet to make sure start and shutdown of EC2000 printer unpolluted.

2.2.5. Printing Drops

To form a printed pattern, each drop must be directed to a different place on the product being printed. To achieve this, the drops pass through a charge electrode (within the print head), which applies a different charge to each drop. This causes the flight path of the drops to differ as they



travel between two deflector plates. When the drops reach the product, they form one line of drops called a raster. As the product passes under the print head, rasters are laid down side by side to form the printed message.

2.2.6. Ideal Pitch

Unprinted drops in a raster carry no charge and are therefore not deflected. These drops are captured by a gutter in the print head, and returned to ink tank. Gaps between raster (perhaps to separate readable characters) are created by the printer simply not printing a raster as the product continues to move past the printhead.

2.2.7. Detecting Products

A photocell or product detecting sensor is used to inform the printer when the product has been detected. After a predefined delay, the first raster of the pattern will be printed, followed by the remaining rasters of the pattern, as described above.

2.2.8. Conveyor Speed

For production setups using a conveyor, variation in conveyor speed can produce variation in the appearance of the printed message. If the product is moving very slowly, the rasters could be printed too close together and the characters formed would be too thin. Conversely, if the product is moving very fast, the rasters could be printed too far apart, resulting in unprinted gaps between the rasters. This problem is overcome by either varying the print width (through a user menu option) to match the production of rasters with the conveyor speed, or by using a shaft encoder to control the rate at which each raster is printed in relation to the conveyor movement.

2.2.9. Ink Blockage Prevention



It is essential to use the correct solvent for the ink being used, i.e. the solvent used in the ink base: MEK solvent for MEK based ink, ETHANOL solvent for ETHANOL based ink, etc.

The principle of continuous ink jet printing has proved to be the most effective means of printing with an ink which is required to dry instantly, within a second, on almost any surface.

2.2.10. Blockages

If ink is required to dry on the product it will also have a tendency to dry in the printer, with a possibility of causing a blockage.

The continuous ink jet printer overcomes this problem by continuously producing the print drops in operation. Although the ink is evaporating quickly during this process, it does not cause a nozzle blockage, as there is a constant replacement of ink in the nozzle.

2.2.11. Automatic Cleaning at Start and Shutdown

A potential problem arises on shutdown when ink is left in the nozzle; as it is fast drying it will soon dry and clog up the nozzle. To overcome this, special procedures to clean at start and shutdown are necessary.

EC2000 printer is equipped with a cleaning pump. A special cleaning nozzle, a micro valve and a washing line are arranged in the printhead. It executes an automatic cleaning procedure during

shutdown. Cleaning pump offers clean solvent to printhead through cleaning pipes to make sure the surface of nozzle be cleaning before shutdown.

Similarly, when it is turned on, EC2000 can intelligently select the corresponding start-stop procedure according to the duration and status of the shutdown to ensure that the machine is always in the best startup and working state.

2.2.12. 、 Velocity of Drop

Ink velocity can impose a minor change in the mass of a drop, which will affect the final printing position of the drop. However, precise placement of drops is more dependent on the speed of the drops as they travel through the deflector plates;

For this reason, the velocity of drop (VOD) is constantly monitored and compared with the optimum (VOD reference) value printed on the print head conduit. A “feedback loop” is used to increase or decrease ink pressure, thus maintaining the correct speed of drops for accurate placement and therefore quality of print.

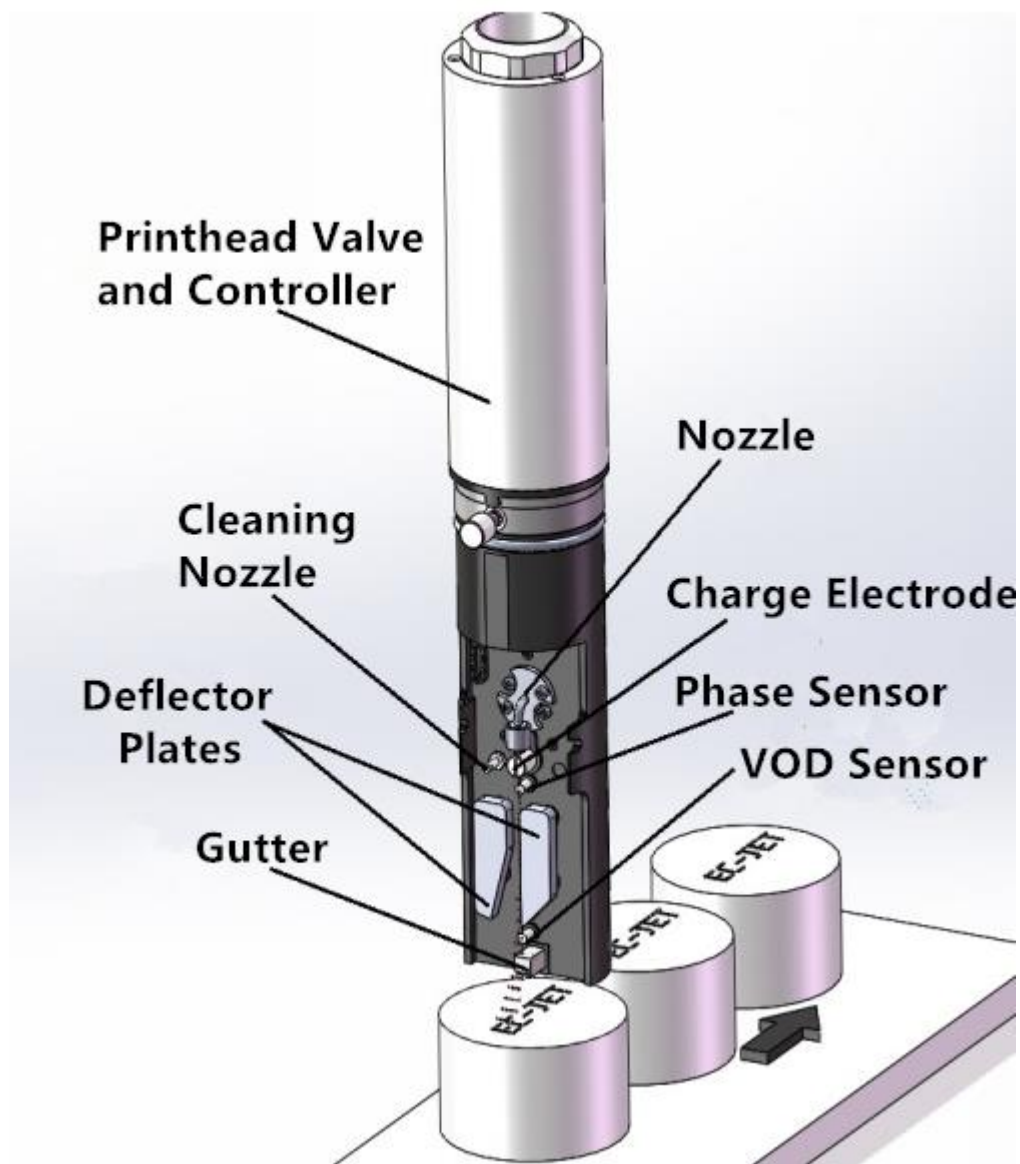
2.3. Principles of Operation

A conducting ink is supplied under pressure to an ink gun and forced out through a small nozzle of typically 40 to 70 micro diameters. As it passes through the nozzle the liquid is piezo-electrically pulsed (modulated) and the stream breaks up into a continuous series of drops which are equally spread and are of the same size.

Surrounding the jet at the point where the drops separate from the liquid stream is a charge electrode. A voltage is applied between the charge electrode and the drop stream. When the drop breaks off from the stream it carries a charge proportional to the applied voltage at the instant at which it breaks off. By varying the charge electrode voltages at the same rate as the drops are produced, it is possible to charge every drop to a predetermined level.

The drop stream continues its flight and passes between two deflector plates which are maintained at a constant potential, typically plus and minus 5 kilovolts. In the presence of this field a drop is deflected towards one of the plates by an amount proportional to the charge carried. Drops which are uncharged are unelected and are collected by a gutter to be recycled into the ink tank. Those drops which are charged, and, therefore, deflected, are printed on the substrate, which is travelling at a certain degree and speed to the direction of the drop deflection.

By varying the charge on the individual drops, whatever pattern is required (including alphanumeric characters) may be printed. A series of drops deflected across the substrate is known as a raster.



3. Controls and Indicators

3.1. Getting Started

This section of manual is intended to help you understand the setting-up of the printer and tells you how to switch it on, program a simple message, start the printer jet, print the message and stop the printer.

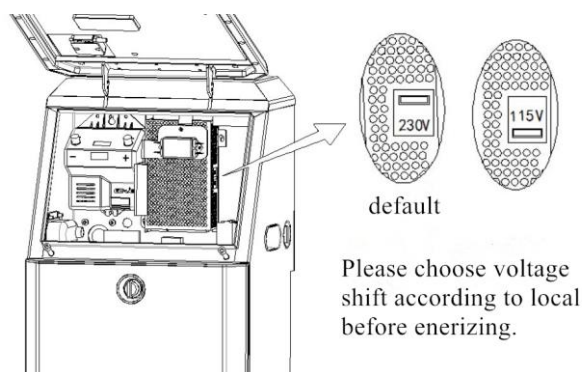
3.2. Installation

The printer should always be installed by a fully trained, EC-JET approved, service engineer. Guarding and safety interlocks should all be in place and working correctly. EC-JET can accept no liability for damage to either machine or personnel in the event of the printer being installed, moved or maintained by unauthorized and/or untrained personnel.

3.3. Power Connection

EC-JET2000 serial printer make use of a single-phase 50/60 Hz AC power supply of 110V or 220V.

Switch on the right voltage before power on ,the swift button can be as picture below.



There are two types of power supply:

115V for the range of 85~132Vac, 50/60Hz。

230V for the range of 170~264Vac, 50/60Hz。

NOTE: *Some printers may use wide-domain power supply. It can adapt to the voltage range of 100~240Vac automatically. In this case,it will not have the option switch of inputting voltage.*

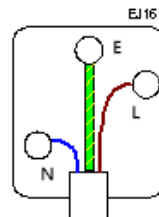
Disconnect the power supply plug before your switch on. Use a flat screwdriver to switch.(the figures shown on the PSU value)



WARNING: It may damage the printer if the option switch of inputting voltage is set to the wrong position. Confirm the power voltage of the place you use before setting the option switch of inputting voltage.

Before connecting to the power supply, make sure the ON/OFF switch is in the OFF position. The wires in this electrical supply lead are colorized in accordance with the following code:

GREEN-YELLOW	EARTH (E)
BLUE	NEUTRAL (N)
BROWN	LIVE (L)



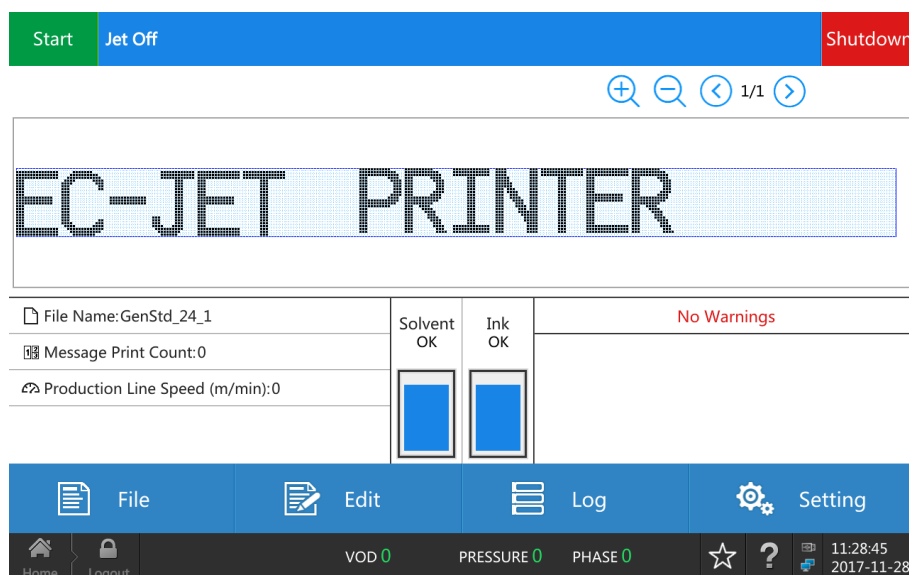
3.4. Switch on the Printer

The printer power switch adopts the left and right automatic reset knob switch, which is on the right hand side of the printer.

The following screen is displayed when power is switched on by rotating the power to the right:



After the buzzer ringing for one time, the printer enters to automatic checks. When these checks are completed, the following display will be seen:



NOTE: Rotary switch will automatic reset after releasing, but the printer still keeps the condition of power on.

3.5. Login

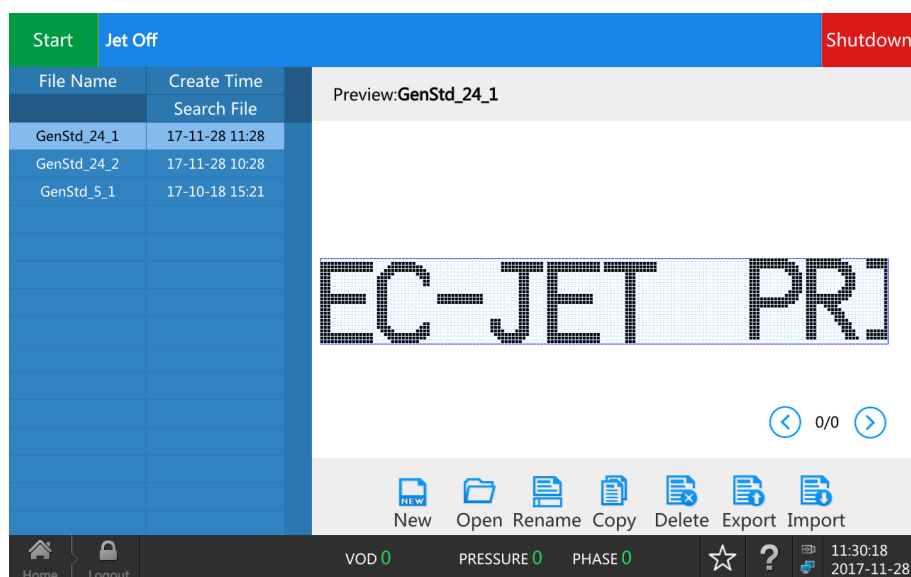
User must log in to operate the printer. There are four levels: User1, User2, User3, Admin. Different user is allowed to operate different menu.

You can set automatic login when switch on the printer. Locate in Setup->System Setup->automatic login when switch on the printer, then choose “Yes”.

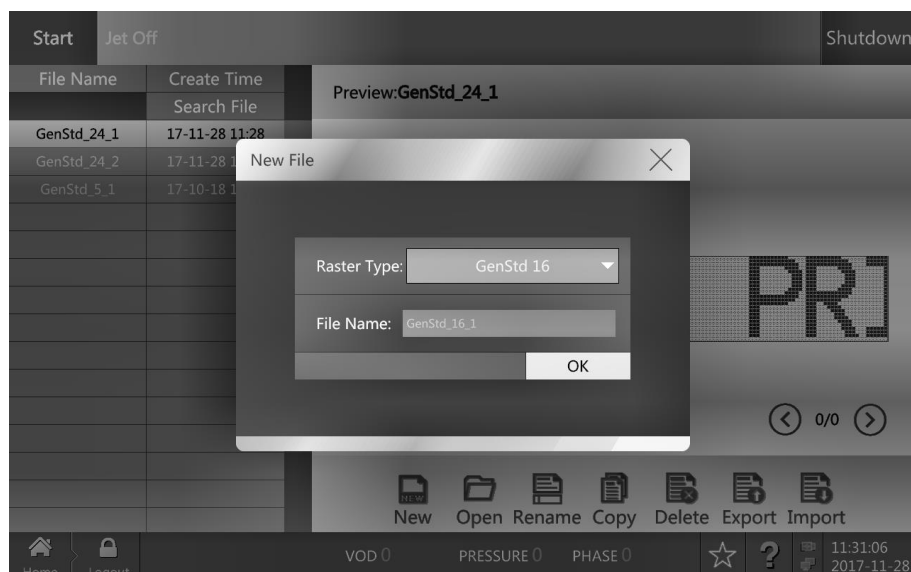
Otherwise, you need to input the password to log in when switch on the printer.

3.6. Creating a Simple Message

Press  File key in Home.

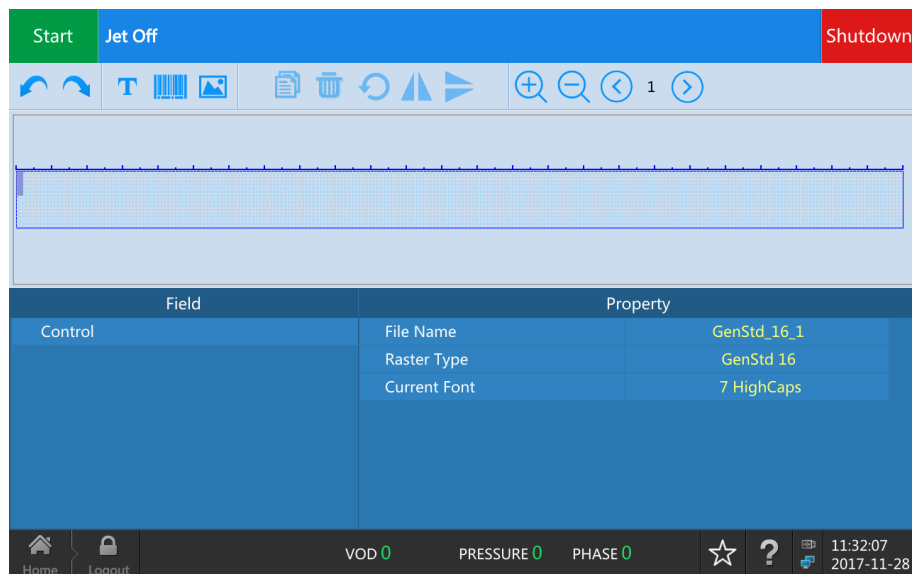


Then press  New key.

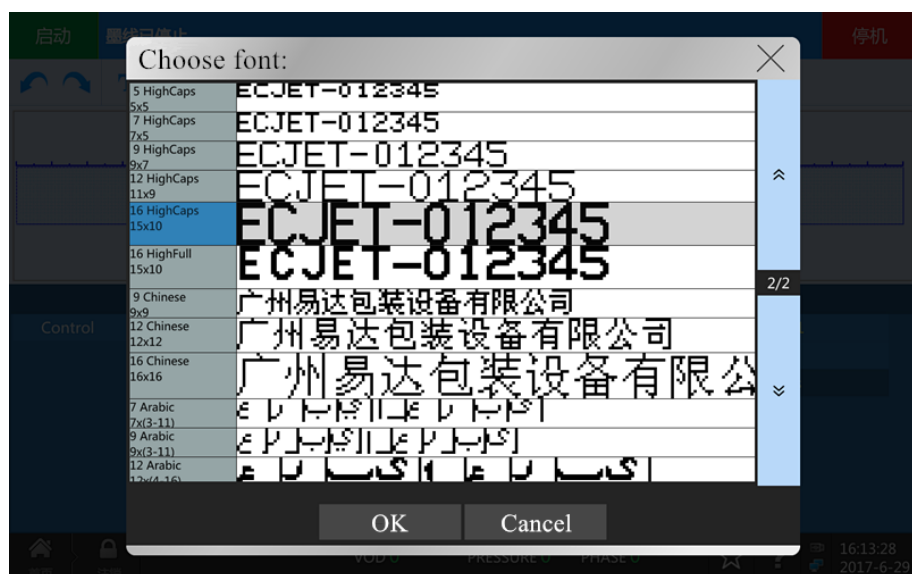


The system will give a default file name after choosing the type of raster. You can revise the file name and make sure not to have the same name of existing file.

Enter the interface to edit message after pressing OK:

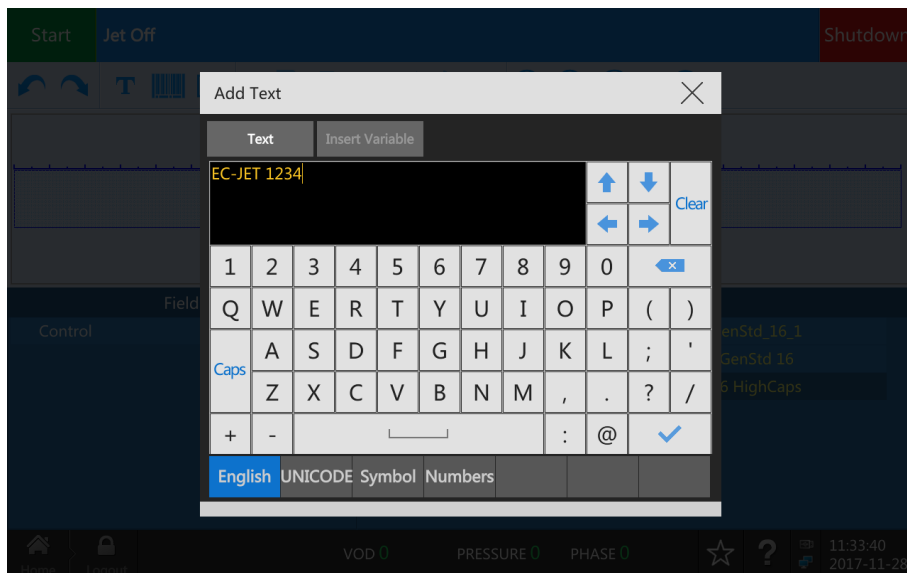


Click Property->Current Font.

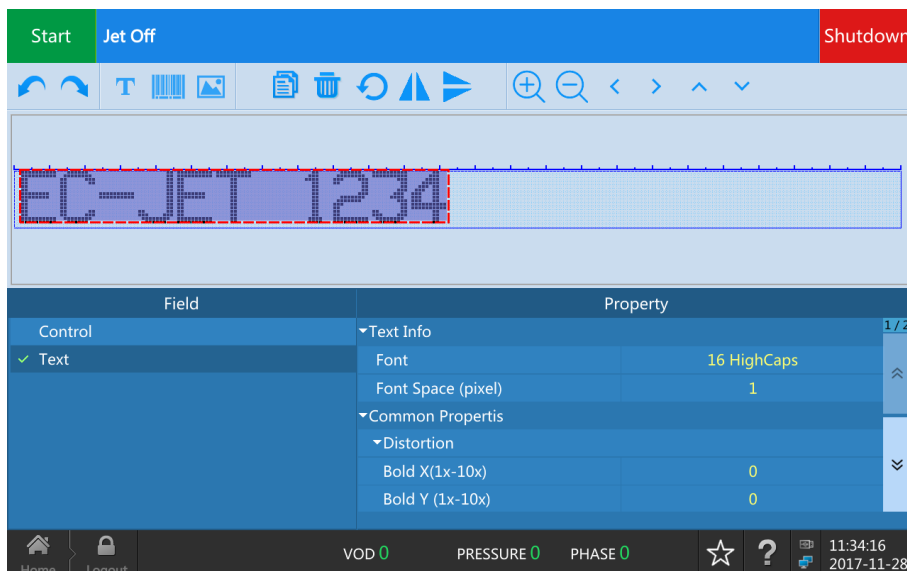



Choose the required font then press OK.

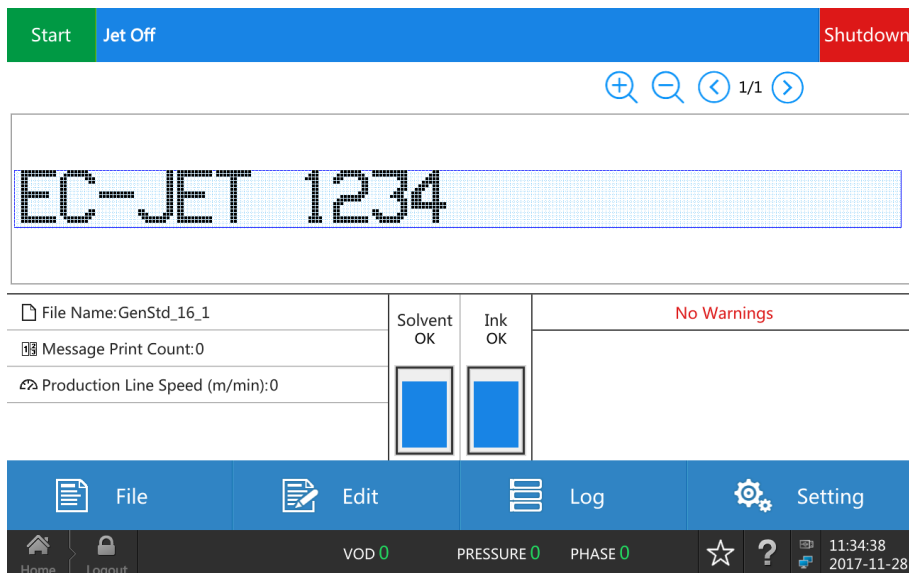
Press **T** key, input the text.



Press  key.



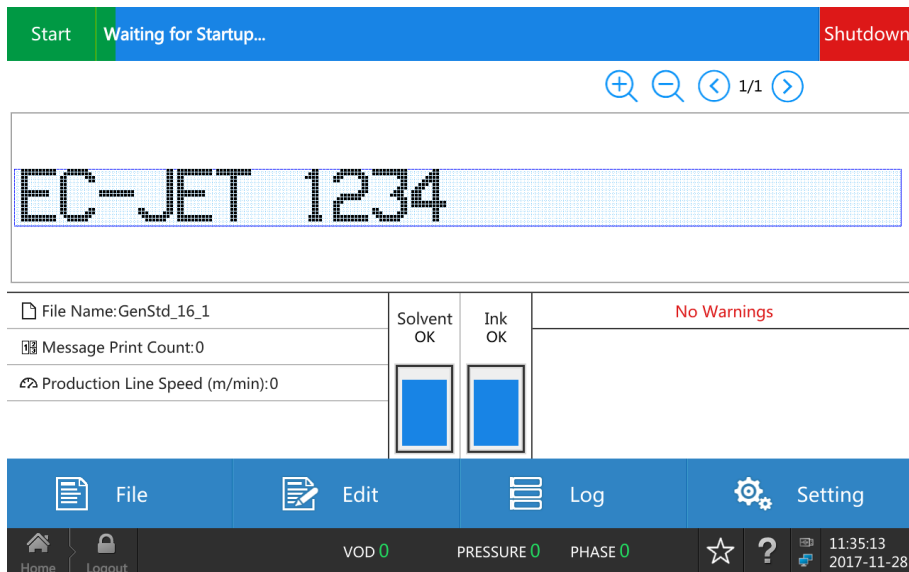
Press  key to finish editing. System will save the current file automatically.



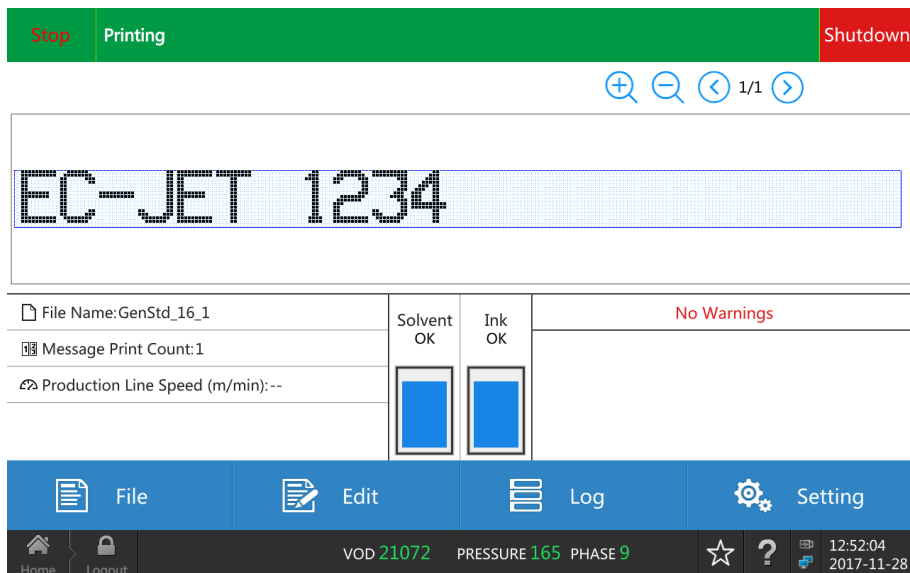
Now, it finishes editing the simple message.

3.7. Start Print

Press **Start** key to start print. The status line will show “Waiting for Startup...”. The printer executes to start jet, adjusting ink jet until prepare to print. Once it is ready, the status line will show “Printing”. The count of data printing will accumulate.

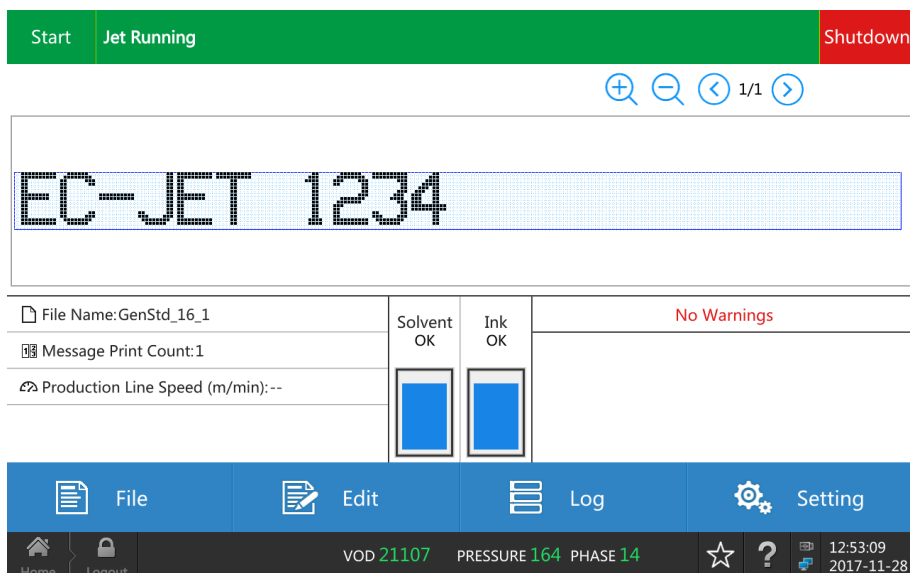


After everything is ready(that is the printhead is on the fixed position and the printing distance is right), run the conveyor. It can be printed by pushing the button of start after this. If every setup is normal, it will have a good printing.




3.8. Stop Print

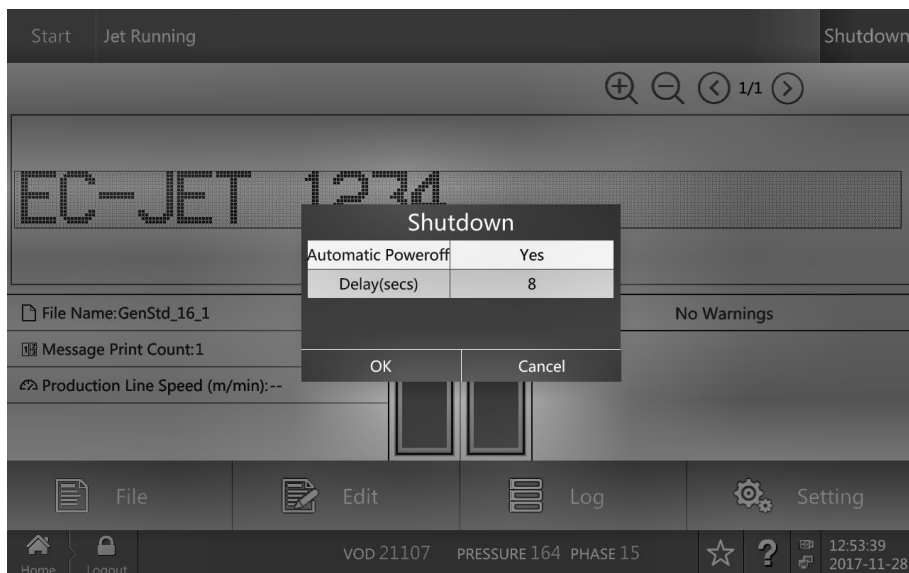
Press  key.



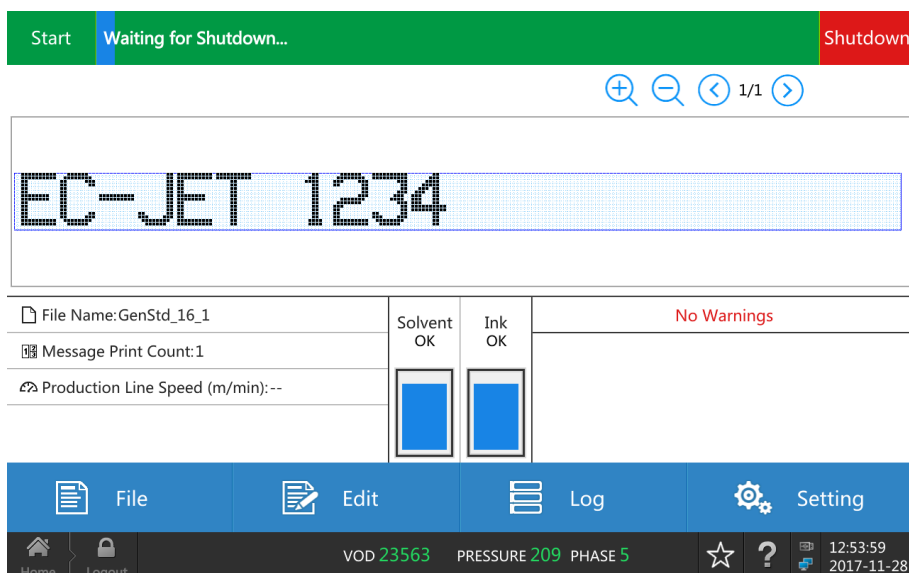
It still runs jetting when stop printing.

3.9. Shutdown

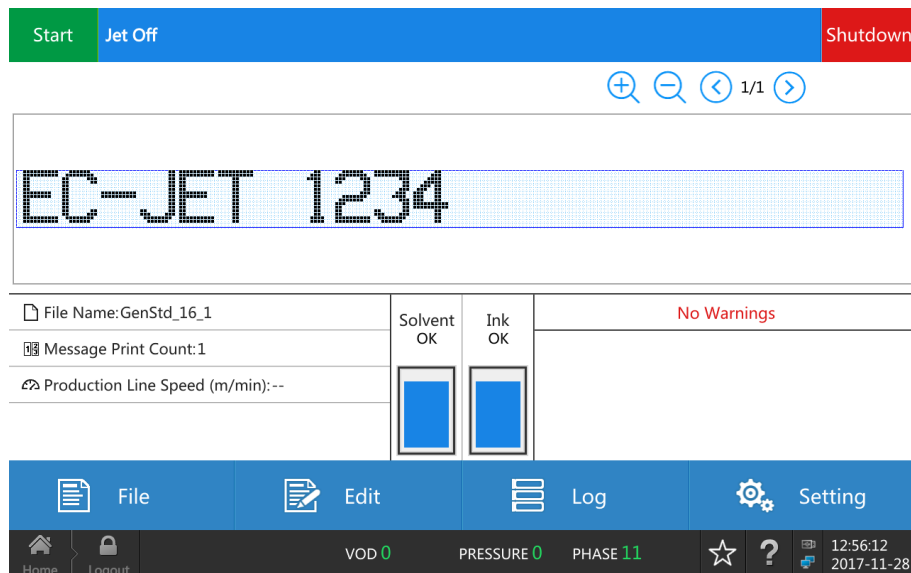
Press  key. There is a pop-up box to set “Automatic Power off”, “Delay”. Press OK.



Printer starts to execute the shutdown procedure, including the ink discharges from nozzle, execute nozzle cleaning procedure automatically (This can avoid the nozzle blockages causing by ink drying.) The whole process of shutdown is about 4 minutes. The status line will show “Waiting for shutdown...”during executing to stop.



When the printer finishes shutdown, the status line will show: Jet Off.



3.10. Switch off the Printer

3.10.1. Switch off the printer when jet running or printing:

Press **Shutdown** key and it will have a pop-up box to set “automatic switch off the printer” to Yes. Printer will power off automatically after finishing shutdown procedure and shutdown delay.

3.10.2. Switch off the printer when jet stop:

Press **Shutdown** key and press OK in the pop-up box. The printer will switch off the printer immediately.

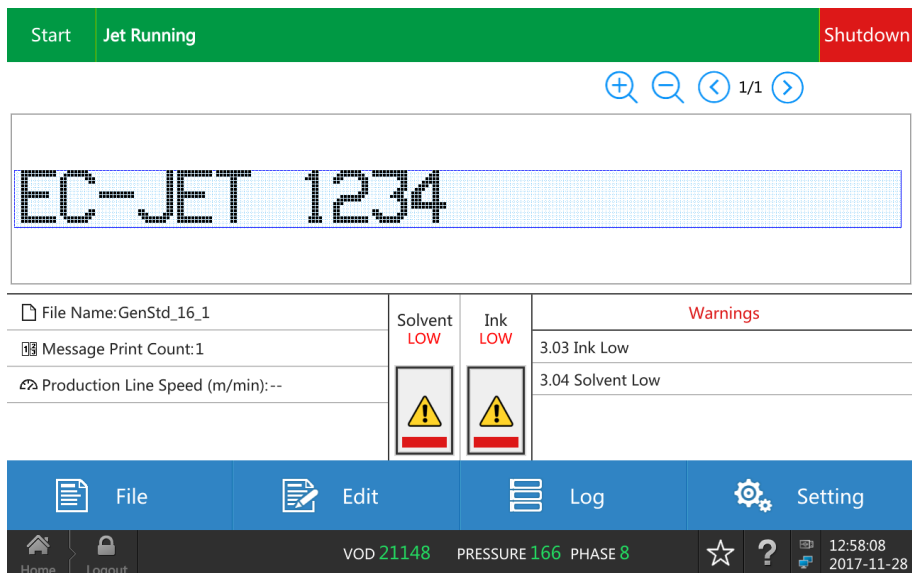
3.10.3. Emergency power off

Rotate the power switch in the right side of the printer to left directly and the printer will power off immediately.

NOTE: If not emergency, Don't power off directly when the printer is printing or running jet. This will lead to the printhead failure. If any problems, it needs to clean the system thoroughly for once.

3.11. Check the Condition of Printer

The current condition can be seen in Home, including the jetting status, ink/solvent level and current warning message of the printer.



3.11.1. Status line from the top



Show the jetting status of the printer.

- ◆ Jet off -- The jet has been stopped.
- ◆ Jet running -- The jet is running but printing is stopped.
- ◆ Printing -- The jet is running and the printer is ready to print.

3.11.2. Solvent

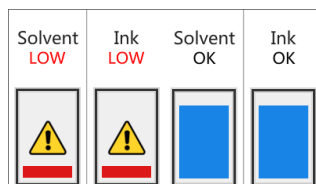
Show status of solvent level check.

- ◆ OK - Solvent level is acceptable.
- ◆ LOW - Add one bottle of solvent.

3.11.3. Ink

Show status of ink level check.

- ◆ OK - Ink level is acceptable.
- ◆ LOW - Add one bottle of ink.



The ink and solvent levels should show OK. If not, they must be refilled with the correct ink or solvent.

3.11.4. Current warning message

Current warning messages of the printer are listed in the warning message list.


Current Warning Message
3.03 Ink Low
3.04 Solvent Low

The warning message will be deleted automatically when the warning status eliminates.

Notes:Some warning messages need to delete manually. Press this message and then press pop-up delete key.

3.12 Low Pressure	Delete
-------------------	--------

4. Printing Setup

Press  key in Home to enter the interface of printer setup.



Press  key from the left to enter printing setup menu.

4.1. Horizontal Reverse

ON: Open horizontal reverse. **OFF:** Close horizontal reverse.

4.2. Vertical Reverse

ON: Open vertical reverse. **OFF:** Close vertical reverse.

4.3. Speed of Production Line

Three modes can be chosen according to the production line:

Fixed speed:

This mode can be used if the speed of production line is fixed. You only need to set the right speed of production line and the shaft encoder doesn't need to be installed.

Shaft encoder:

Use this mode and install shaft encoder if the speed of production line is variable. You need to set the right parameter of shaft encoder, including pulse count per round and perimeter of shaft encoder.

Ignore:

This mode is under the situation of unknown speed of production line and unknown parameter of shaft encoder, to reach the requirement of data position and width according to the actual printing situation to adjust the parameter.

4.4. Constant Speed(m/min)

Value of speed of production line.

This parameter only applies to fixed speed of speed of production line.

4.5. Pulse Count Per Round of Shaft Encoder(ppr)

It is a pulse count after the shaft encoder rotates for one round.

This parameter only applies to (production line) setting as shaft encoder.

4.6. Perimeter of Shaft Encoder(mm)

Perimeter of shaft encoder= 3.14 * diameter of shaft encoder.

This parameter only applies to the speed of production line being shaft encoder.

4.7. Printing Trigger

Photocell edge:

The printer prints data when the signal of photocell edge is detected.

Photocell level:

The printer prints data when the signal of photocell level is detected.

Interior:

Trigger by printer automatically, continue printing data, and don't need photocell.

Remote:

Control the printing by communication command.

4.8. Aux In

Off

Not available.

Resets SN

The series number of current printing data will reset if the signal of photocell edge is detected;

Horizontal Reverse

Change the horizontal direction of current printing data and the data direction is based on the Aux In level.

Vertical Reverse

Change the vertical direction of current printing data and the data direction is based on the Aux In level.

Horizontal and Vertical Reverse

Change the horizontal and vertical direction of current printing data and the data direction is based on the Aux In level.

4.9. Print Delay

Indicate the delay from printing trigger to start printing. This decides the position of data printing on the products.

Making main photocell detects to the edge of products and measuring the distance from printhead to the data starting position on the products(in mm).

4.10. Print Interval

Indicate the interval of each printing in the mode of continuous printing.

4.11. Print Width

Indicate the horizontal distance between dots in data.

Adjust the height to width ratio of character in printing data and the whole width of data through this parameter.

4.12. Print Height

The height of printing data can be magnified and shrinked in a certain amount. Please decide this value according to the printing effect.


4.13. Repeated Trigger

Trigger once is the continuous printing time of current data. This parameter only applies to “printing trigger” being “photocell edge”.

4.14. Data Bold

Bold the whole data, including the space within the data.

5. Installation Setup

Press  Install key from the left side list of setup menu to enter installation setup menu.

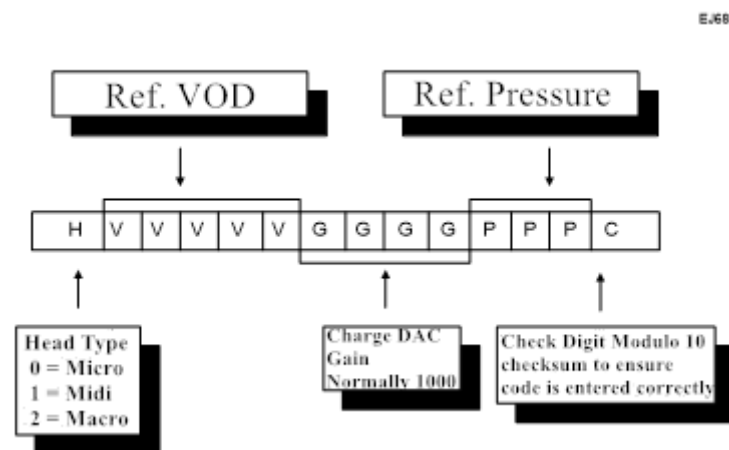
Installation setup menu divided into four classes: “printhead”, “alarm output”, “remote communication”, “consumable”.

5.1. Printhead Setup

Printhead code

Printhead Code	12108010001701
----------------	----------------

To be used when a new printhead has been fitted to the printer and/or when a reset to default has occurred. The 14 digits are encoded as follows:



Press the right side button of printhead code when it needs to revise printhead code. A printhead code editing box will be pop-up. Then input the printhead code according to the rules of printhead code in above picture.

The screenshot shows the Printhead Code editing box. The box displays the current code 12108010001701. It includes a numeric keypad with buttons for numbers 0-9, a decimal point, and a checkmark. There are also buttons for navigation (up, down, left, right) and a 'Clear' button. The box is titled 'Printhead Code' and has a close button (X) in the top right corner.

Type of Printhead	Midi62
Ref. Pressure	170
Ref. VOD	21080

Type of printhead, Reference pressure and Reference VOD that can't be edited directly. Their values are decided by the value of printhead code.

5.1.1. Printhead Height

Printhead Height (m)	0
----------------------	---

The jet must be stopped to set up this option. As for printhead to printer cabinet height, Pressure varies by 5 units for every meter. Printhead Height can set up from the value between -9.5 and +9.5 meters. However, printheads are currently a maximum of 6 meters in length, so the maximum value here should be 6.0. For brevity, the installation height of printhead relative to Printer is calculated by half a meter or one meter. If the printhead is mounted below the printer, the value should be inputting the following format -X.Xm. If the printhead is mounted above the printer, it is not necessary to place + in front of the value. The value may be entered simply as -X.Xm.

NOTE: Be carefully when setting this option; poor printer performance will result if incorrectly set.

The printer will automatically change the pressure reference according to inputted printhead height. In the menu you can see the calculated solvent-added pressure

5.1.2. Modulation Settings

Modulation Setting	131
--------------------	-----

Set the reference modulation voltage value

5.1.3. Conduit Length

Restart the printer after changing the new printhead. The system will detect the length of new printhead conduit automatically.

Conduit Length	2M
----------------	----

5.2. Alarm Output

The printer offers three-way relay output. Each way is dynamic contact, that is contact closes when action. It can control current circuit of the voltages under 60V and the current under 1A. It usually controls the outside alarm indicator light. You need to offer extra power supplier to outside alarm indicator light. Don't want to get power supply from the printer.

Four modes of alarm signal:

1. Pulse output: Contact pulse closes twice during alarm occurring.
2. Continuous output: Contact close continuously during alarm occurring.
3. Continuous pulse output: Contact pulse close during alarm occurring.
4. No output: No action on contact.



Port1: Continuous Pluse	Port2: Continuous	Port3: Continuous
Warning Items		Ouput Port
2.00 Print Head Temperature	1	1 / 4
2.01 Deflector Voltage	1	<div> <div></div> <div></div> <div></div> <div></div> </div>
2.02 Charge	2	
2.03 VOD	3	
2.04 300V Power Supply	No Warnings	
2.05 Temperature/Deflector	1	<div> <div></div> <div></div> <div></div> <div></div> </div>
2.06 Ink Tank Empty	1	
2.07 Pressure	1	
2.08 Internal Spillage	1	
2.09 CSN Failure	1	

Alarm output interface divides into two parts, above and under section. Three buttons above represent the output of the three ways. Pressing the button can switch the different alarm output way.

The following lists represent different alarm items. Press the menu from output port drop-down menu to select this alarm output port or select no alarm output.

5.3. Remote Communication

EC2000 printer support RS-232 and LAN TCP this two ways to remote communication. See “EC-JET Communication Protocol V3.1” for specific communication format. Setup interface of remote communication is below:

Network Listening Port	8888
Baud Rate	38400
Communication Address	0
Checksum Option	None
Print Trigger State	No
Print Go State	No
Print End State	Yes
Remote Buffer State	No
Printing mode	Once
No printing data	Unprint
Cache numbers	32
Clear the cache when stop	No

5.3.1. Network Listening Port

Network listening port is used to set the connection of TCP. TCP communication needs to set the IP address of printer and the IP address of communication host to a same LAN, and need to use the specified listening port to access.

5.3.2. Baud Rate

Baud Rate is used to set the communication rate during using RS-232 communication.

5.3.3. Communication Address



Communication address is used to set the [ADDR] value of communication frame. The printer will give up this frame data if the [ADDR] value of communication frame is different from the communication address setting in the printer. See “EC-JET Communication Protocol V3.1” for the specific format of communication frame.

5.3.4. Verify Mode

To make sure no mistake on the communication data frame during transmission, it can use verify mode in the communication frame to confirm the receiving data is correct.

Two communication frame verify mode supported by EC2000 printer:

- CRC16 Mode
- MOD256 Mode

See “EC-JET Communication Protocol V3.1” for specific algorithm of frame verification.

It can set the verify mode to “None”, if it doesn’t need to verify.

5.3.5. Printer Transmit Signal

Print Trigger State, Print Go State, Print End State, Remote Buffer State, this four menus represent four signals of four printer sending to remote host forwardly. Their respective meanings are as follows:

Signal	Meaning
Print Trigger State	Send this signal during trigger printing.
Print Go State	Send this signal when start printing.
Print End State	Send this signal when finish printing.
Remote Buffer State	Send this signal during number of remote buffer less than critical value.

5.3.6. Printing Mode

1 Continuous

2 Once

5.3.7. Printing Data

Empty

How the trigger printing manages when the buffer is empty. Three modes can be chosen as below:

1. Unprint

Ignore the printing signal.

2. Unprint and alarm

Ignore the printing signal and alarm.

3. Accidental shutdown

Stop printing and report the failure.



5.3.8. Number of Buffer

Sets the number of data bars that the remote buffer can cache

5.3.9. Clear Buffer

It can choose to whether clear the remote buffer or not when the printing stops.

5.4. Consumable

Management Mode	Factory Mode
Agent PIN	
Remain Solvent Time	-4
Remain Ink Time	0
Solvent Addition Count	0
Ink type	MEK

Management Mode:

Three kinds of management mode:

◆ Factory mode

Use in the factory during testing.

◆ Factory fresh mode

It changes to factory fresh mode when the factory finishes testing and checking. It can only print 7 dots raster data in this mode.

◆ Bound Mode

Change to bound mode when input the distributor PIN in the factory mode. In this mode, new CSN quality mode will be reminded to verify and add new consumable when the time of consumable of ink and solvent is empty.

Distributor PIN

A length of four characters related to distributor PIN will be shown under bound mode.

Solvent remaining time

Show the time of current solvent CSN can be used.

Ink remaining time

Show the time of current ink CSN can be used. This time is calculated by the number of printing ink drops. This value will be meaningless if it doesn't in the status of printing and the printing time is less than 1 minute.

Adding time of solvent



Show the automatic adding time of solvent from starting the printer. This count value will be cleared after restart.

Type of ink

Set the type of using ink.

6. System Setup

6.1. System

Press  key on the left side of setup interface. Select  key from the right.

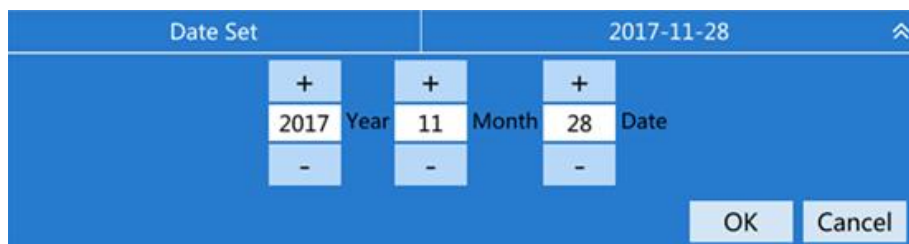
Date Set	2017-11-28	⌵
Time Set	14:15:16	⌵
Display Language	English	
Network Set	192.168.0.230	⌵
Screen Brightness	100	
Touch Indicator	Yes	
Auto Login	Yes	

Date Setup



Time Setup

To change time and date, The printer must stop printing.

Press the setup menu, setting page will pop-up.



The image shows a 'Date Set' dialog box with a blue header. The header contains 'Date Set' and '2017-11-28' with an up arrow. The main area has three columns for Year, Month, and Date. Each column has a '+' button above a text box and a '-' button below it. The text boxes contain '2017', '11', and '28' respectively. The labels 'Year', 'Month', and 'Date' are placed between the columns. At the bottom right are 'OK' and 'Cancel' buttons.

You can press  key and  key to trim the setting, or press **2017** text box to input the value directly.

Language

Display Language	English
Network Set	English
Screen Brightness	简体中文
Touch Indicator	繁體中文
Auto Login	Italiano

This option sets the printer software to display the language of all screens. For example, menu, dialog box, and system information.

Please ensure the printer isn't on the status of "printing" if it needs to set the language. Press the language button to show the language list. Press the language name to choose the language and back to the zone setting.

NOTE: The printer will use the selected language of date and time format.

Internet Setup

Network Set	192.168.0.230
Server IP address	192.168.0.230
Subnet mask	255.255.255.0
Default gateway	192.168.0.1
OK Cancel	

The printer and the communication host need to set to the same LAN when use the Internet for remote communication. It can use the Internet setting menu to revise configuration when the Internet of printer and communication host isn't in the same LAN.

Screen Brightness

Screen Brightness	80
-------------------	----

Press the screen. The brightness will be changed according to the value changing among 20, 40, 80, 100.

Touch Indicator

Touch Indicator	Yes
-----------------	-----

The printer buzzer will ring once for successful revise when the setting is revised. Close this prompt tone for setting to "No".

Auto Login

Auto Login	Yes
------------	-----

Set to whether use by inputting the password when start each time. Automatic login when start each time by setting to yes. Input the password when start each time by setting to no.


6.2. Password

Select **Password** key. There is four accounts of current system listed, Admin, User1, User2, User3.


User Name	Password	Operations
Admin	***	Reset
User1	***	Reset
User2	***	Reset
User3	***	Reset

After pressing the corresponding user of **Reset** key, a user password revising dialog box will be pop-up.





Input the original password and new password twice. Press  key to revise.

6.3. Font

Press  key to enter font setting.

Font	Use	
5 HighCaps	Use	1/2
7 HighCaps	Use	
9 HighCaps	Use	
12 HighCaps	Use	⌵
16 HighCaps	Use	
16 HighFull	Use	
24 HighFull	Use	
24 HighCaps	Use	
32 HighFull	Use	
9 Chinese	Use	⌴
12 Chinese	Use	
16 Chinese	Use	

This interface will list all the font be used on the printer. Press the button of corresponding font name. Some fonts can be forbidden.

Font	Use	
5 HighCaps	Use	1/2 ⌵
7 HighCaps	Use	
9 HighCaps	Use	
12 HighCaps	Use	
16 HighCaps	Use	
16 HighFull	Use	
24 HighFull	<input type="checkbox"/> unused	⌴
24 HighCaps	Use	
32 HighFull	Use	
9 Chinese	Use	
12 Chinese	Use	
16 Chinese	Use	

Save
Delete
Upload

There is a **Save** key below when the setting being revised. Press this button to save all revise.

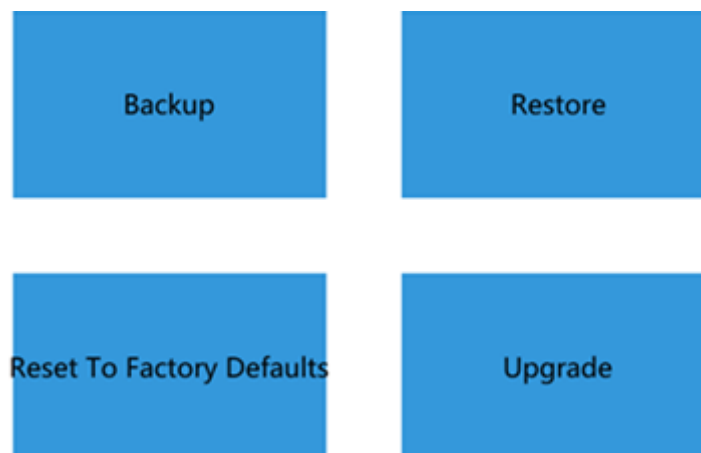
Press **Delete** key to delete the selected font from printer.



Press **Upload** key to import the new font file from USB disk.


6.4. Back up

Press **Restore** key to enter the interface of backup and restore.




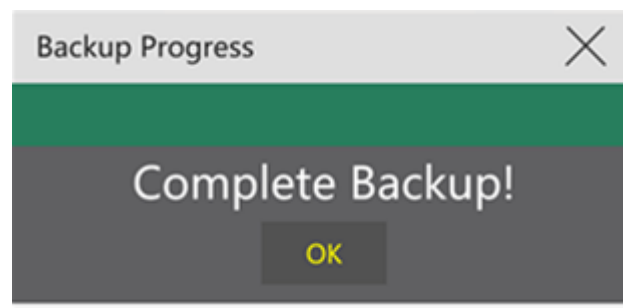
It is used to save the production line setting and file of current machine to USB flash disk.
Insert the USB flash disk to the USB flash disk port from the back side of printer. Then press “backup” button. It will be pop-up a dialog box to input the saving name of backup file:



Press  key after finishing inputting the file name. There is a progress dialog box of backup showing in the screen:



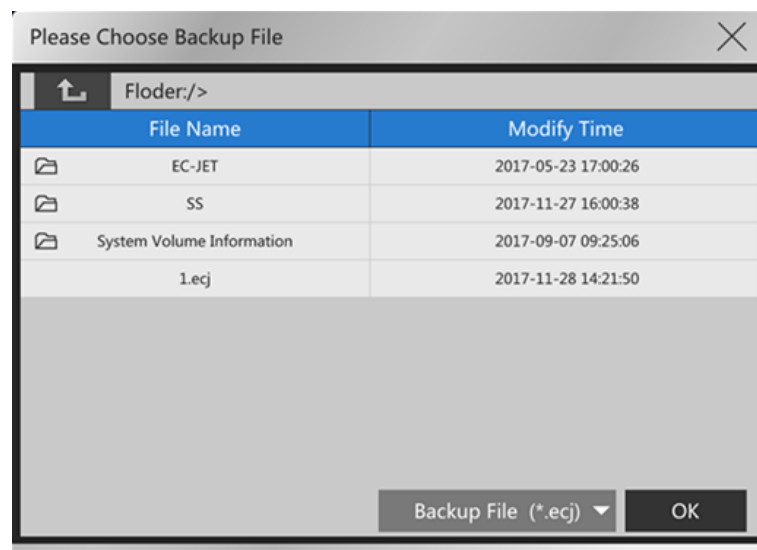
Press  key after finishing backup.



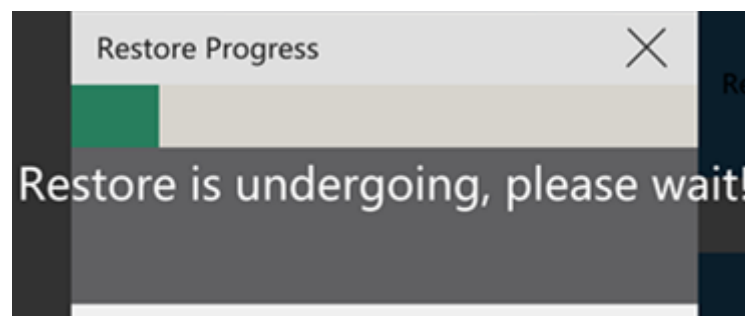
6.5Restore

Restore the production line setting and file having backup to USB flash disk before to the printer.
Insert the USB flash disk to the USB flash disk port from the back side of printer. Press “restore”

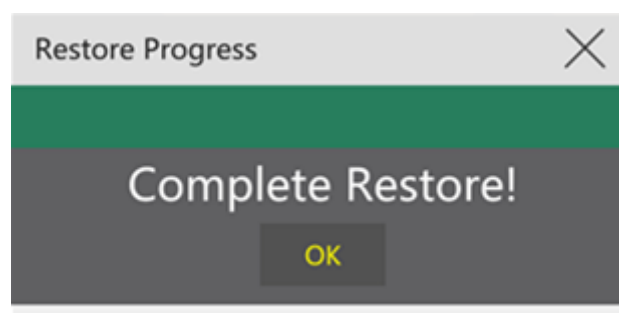
button. There is a file dialog box pop-up. The current backup file of USB flash disk will be shown in the dialog box.



Select the file needed to restore. Press **OK** key. The progress dialog box of restore will be shown in the screen:

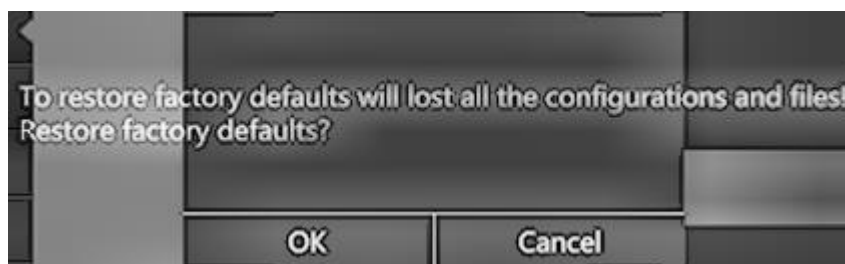


Press **OK** key after finishing restore.



6.6 Reset To Factory Defaults

Reset to factory defaults will delete all the files saving in the printer and reset to the factory setting. Press “Reset to factory defaults” key:



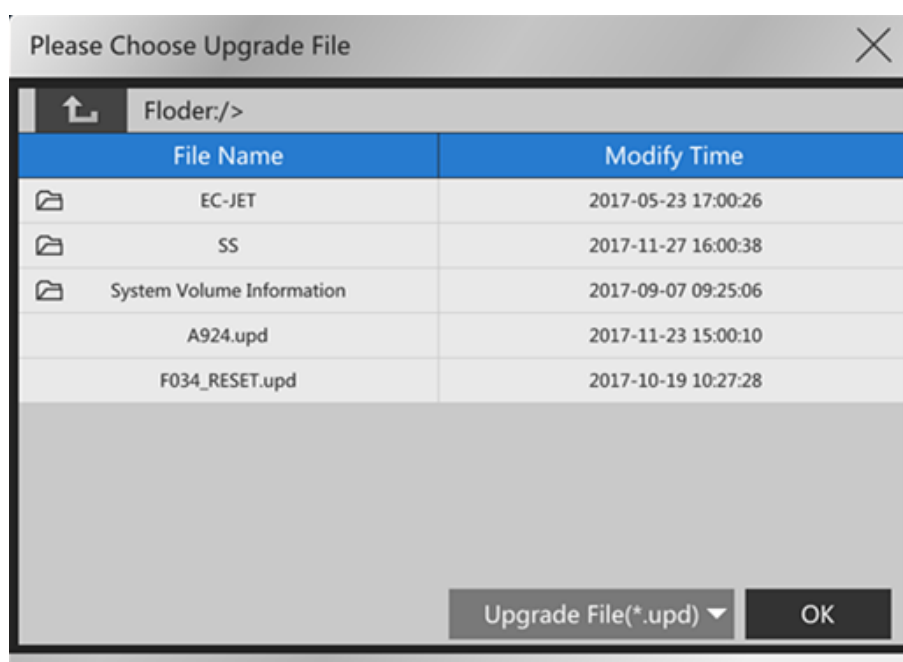
Press **OK** key to reset. It needs to restart the printer after reset to factory defaults.

Press **OK** key to automatic restart after the below dialog box showing in the screen.

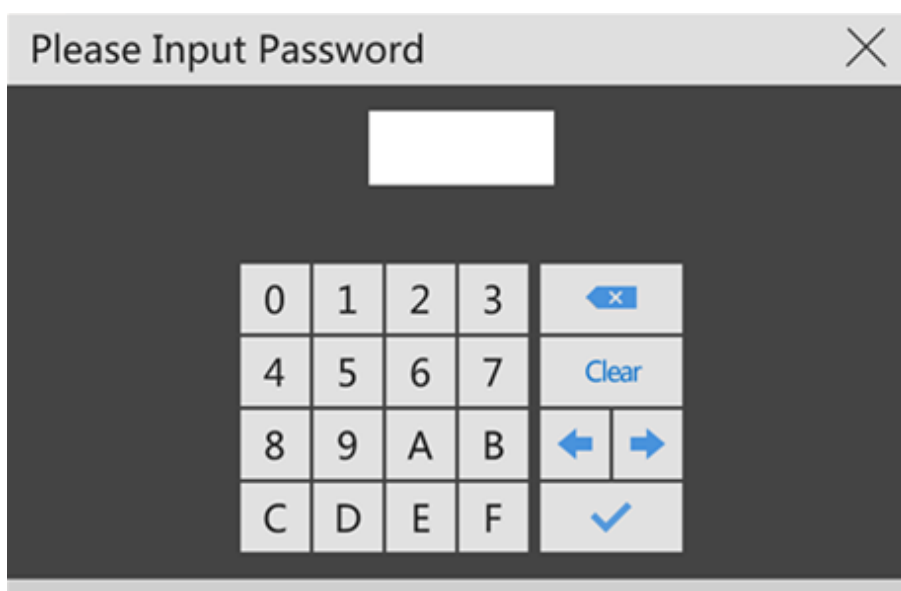



6.7.Upgrade

Upgrade to new version by pressing this key when new printer software is released.




needed to upgrade. Then press **OK** key. A dialog box needed to input password of the file will be pop-up:



Press  key to enter the upgrade procedure after inputting the password. Please wait to finish upgrade patiently. Don't power off the printer. The printer will restart automatically after finishing upgrade.

6.8.Information

Press  key to enter the system information interface.

Software	171123	⌵
Logic	171121	
Charge Data	FE1FFA2	
Valve Action	1710091	
Font	1AE9595	
CPU	42 °C, 18% RAM: 10% ROM: 3%	
ID	9B00000057A9BE3C	



System information interface mainly shows the system version information and status.

Software

Version of software.

Logic

Version of logic.

Charging data

Version of charging data.

Valve action

Version of valve action.

Font Library

Version of font library.

CPU

Show the temperature of CPU, usage CPU, RAM usage and Flash usage

6.9.ID

Offer the main board ID when generate the new upgrade file. Insert the USB flash disk to the USB flash disk port from the back side of printer. Press this menu twice to save the ID to the ID.TXT file in the root directory of USB flash disk.



7. Diagnostic

There are a large number of diagnostic functions. However, not all functions are valid at all times - some are only valid when the jet is stopped (e.g. “Clear Nozzle”); some are valid only when the jet is running and printing is stopped (e.g. “Start Print”), and some are only valid when both the jet and printing have been started(e.g. “Test Printer”).

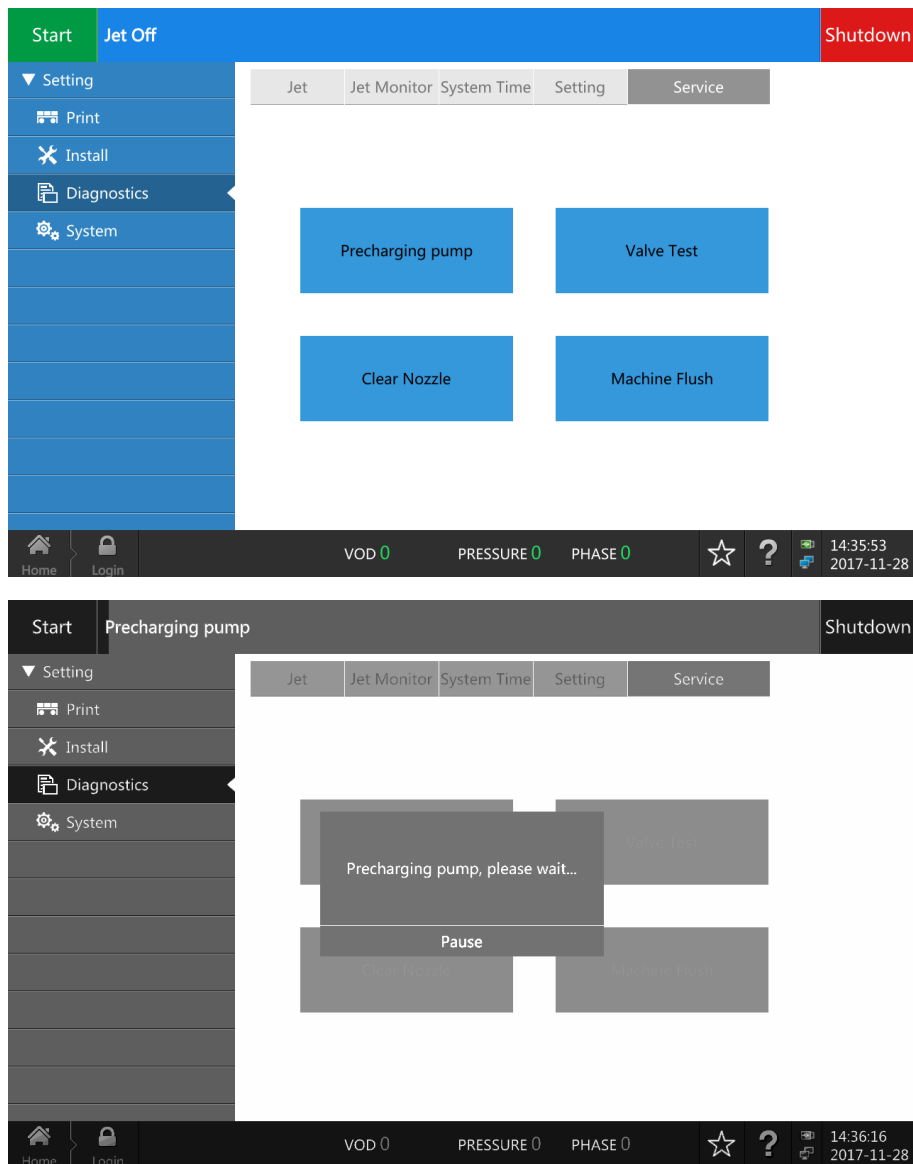
To keep the size of the diagnostics menu small, and to prohibit the use of functions which are invalid for the current state of the printer, only valid functions are displayed and are selectable at any given time. This is in addition to menu variations due to the password level.

Menu	Admin	User1	User2	User3	
Start Print	●	●	●	●	
Shutdown	●	●	●	●	
Shortcut Key	●	○	●	●	
Shortcut Key Setting	●	-	○	○	
Reset Serial Number	●	-	●	●	
Reset Data Count	●	-	●	●	
Modulation Setting	●	-	●	●	
New File	●	-	○	●	
Open File	●	-	●	●	
Rename File	●	-	○	●	
Copy File	●	-	○	●	
Delete File	●	-	○	●	
Export File	●	-	○	●	
Import File	●	-	○	●	
Edit File	●	-	●	●	
Log Setting	●	-	○	○	
Delete Log	●	-	○	○	
Clear Log	●	-	○	○	
Printing Setting	●	-	●	●	
Install	●	-	○	●	
Diagnosis	●	-	○	●	
Set Pressure	●	-	-	○	
Online Shift Data	●	-	-	●	
Automatic Phase	●	-	-	○	
VOD Adjustment	●	-	-	○	
Warm Up Cycle	●	-	-	○	
Charge Calibration	●	-	-	○	
Charge	●	-	-	○	
Printhead Cover Detection	●	-	-	●	
Cleaning Pump Purge	●	-	-	○	
Printhead Recognition	●	-	-	●	
Valve Test	●	-	-	○	
Reset To Factory Defaults	●	-	-	○	
Upgrade System	●	-	-	○	
	● Represent that menu can be seen and the command can be executed				
	○ Represent that menu can be seen but the command can't be executed				
	- Represent that menu can't be seen				

7.1. Cleaning Pump Purge

The machine installing for the first time or the cleaning pump after maintenance must execute the cleaning pump purge procedure. Otherwise, there is no solvent in the cleaning pump and the printer can't clean the printhead and pipeline when start-up and shutdown.

Add ink and solvent as required after finishing installing the printer. Enter the interface of diagnosis to start the “cleaning pump purge” procedure. The printer will automatically empty the air in the pump and fill with solvent.



7.2. Start Jet

Attempts to start the jet but does not start printing.

The following message will be displayed while starting the jet: Starting Jet, please wait...



7.3. Stop Jet

Stop the printer being printing or jet running to jet. It executes the nozzle and pipeline cleaning procedure during the procedure of stopping jet. Being standby and not power off after finishing.

7.4. Quick Jet

Start the jet without printing. (The checking system mentioned below is different from that of “Start Jet”) Please note this operation does not check any of the following:

- Ink
- Solvent
- Phase
- VOD
- Modulation
- Detection of Printhead cover


The following message will be displayed while starting the jet:

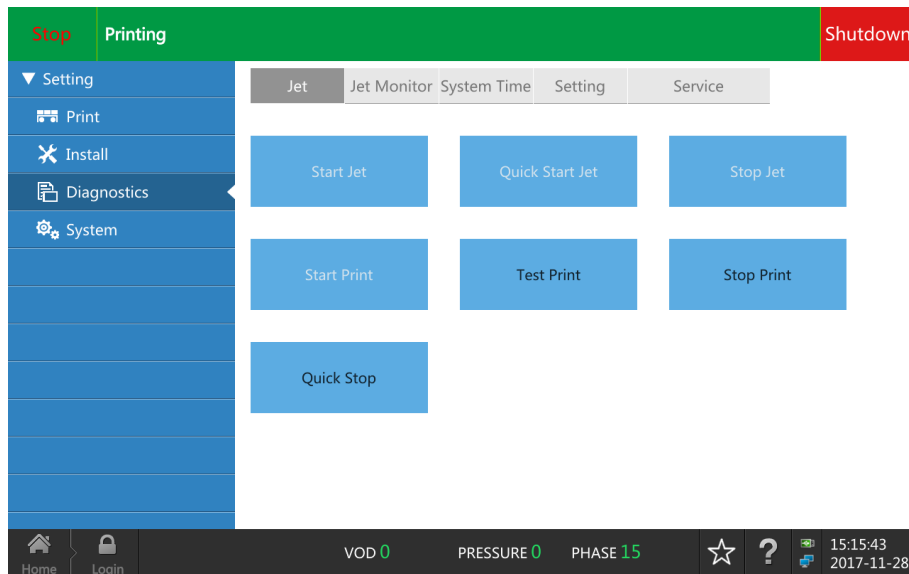


WARNING: THIS COMMAND WILL START THE JET EVEN IF THE INK LEVEL IS LOW.
THE PUMP MAY BE DAMAGED IF IT IS RUN WITHOUT INK.

7.5. Start Print

Start Print means make the printer ready to print, then Start printing status. Note that this option

has a lower level function than the  button which sets, for example, “Phase” option setting will automatically set to “On” when pressed “Start” but the current statu will not.



7.6. Stop Print

Stops printing but does not shutdown the jet.

The following message will be displayed while stopping printing:



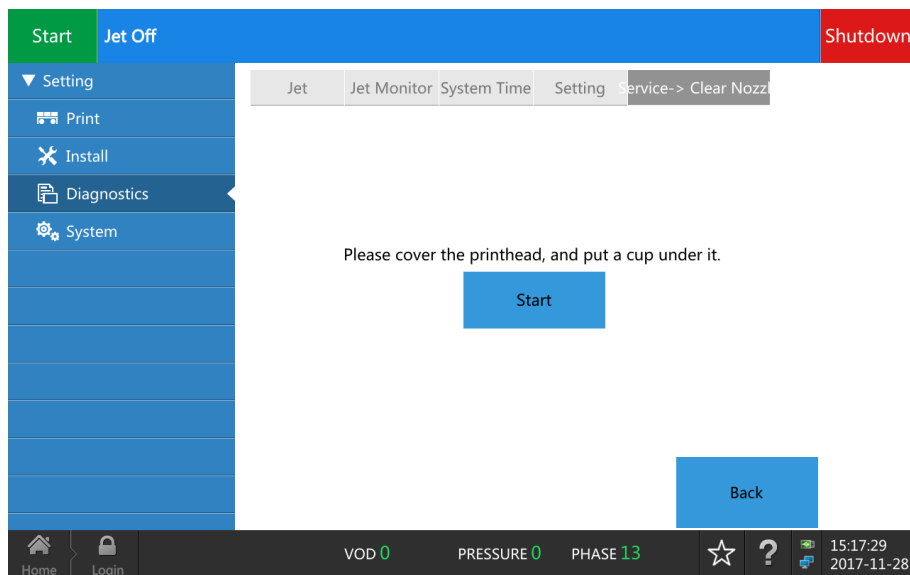
7.7. Test Print

Select this option to issue a trigger the print command. Triggered print command of test print is same as the photocell trigger command.

This command is valid only when the photocell mode from setup menu is set to Triggered and the printer is on the status of printing. This command is invalid if the photocell set to OFF.

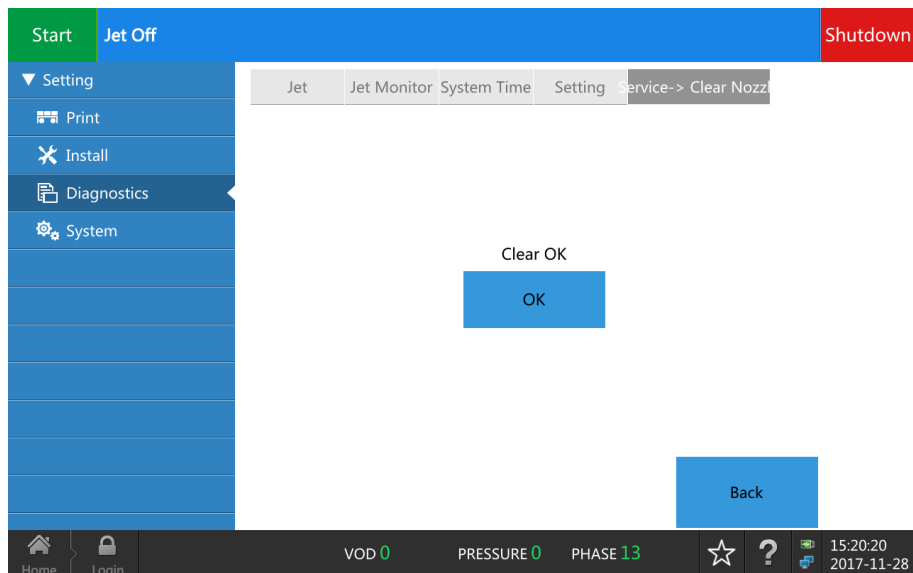
It will not print if using the shaft encoder and the production line doesn't start. Only print when the production line starts.

7.8. Clear Nozzle



EC2000 cleaning nozzle procedure is automatically finished by printer, without manual intervention and taking down the printhead cover. Please put a container collecting effluent below the printhead according to the hint from the screen when execute this command. The printer will start to cleaning procedure after confirmation. Clean the nozzle cavity and orifice repeatedly. At the same time, the cleaning nozzle within the printhead will clean the surface of nozzle.





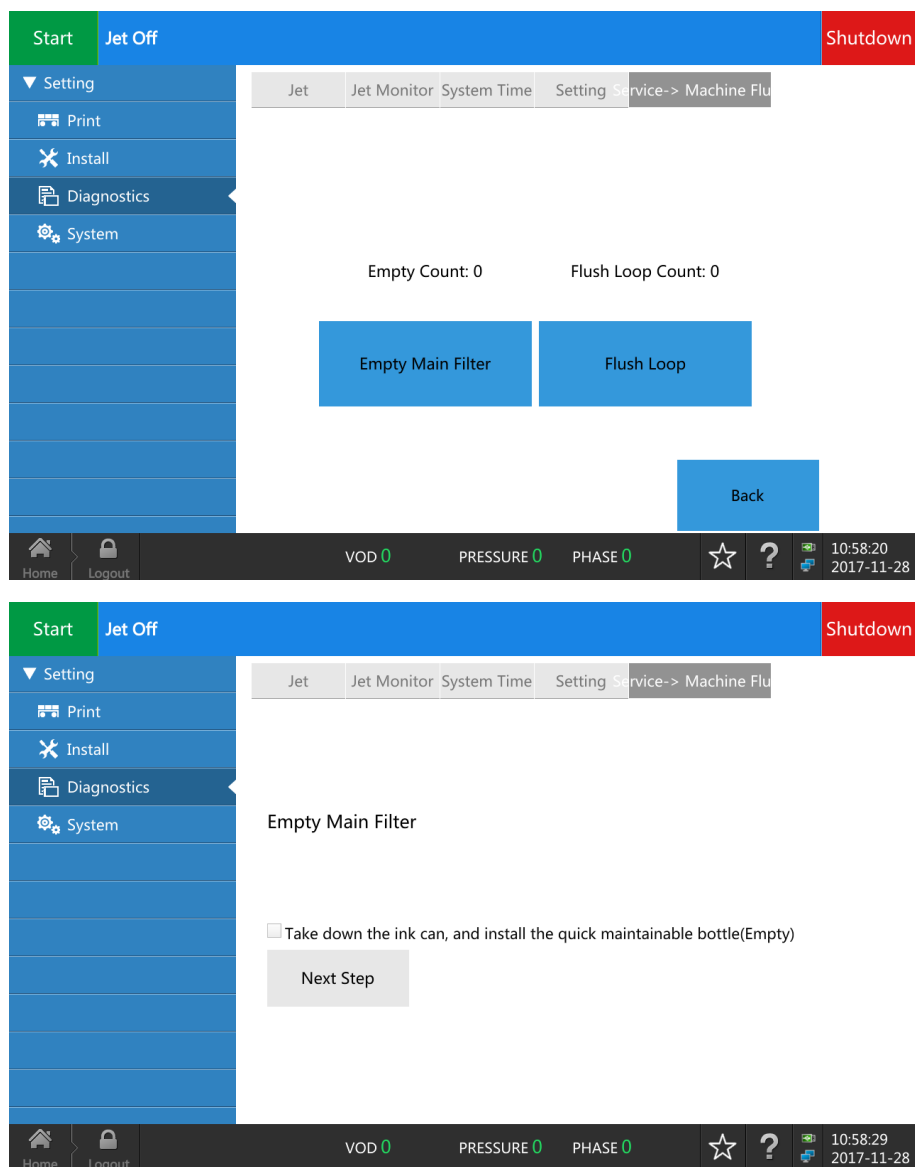
7.9. Clean Printer

The EC2000 has a machine cleaning program on the diagnostics page that allows engineers to clean and dry the machine on site.

1 Open the lower door from the front side of printer. pull out the ink system and take out the solvent tank. Pour out the solvent and store it safely.

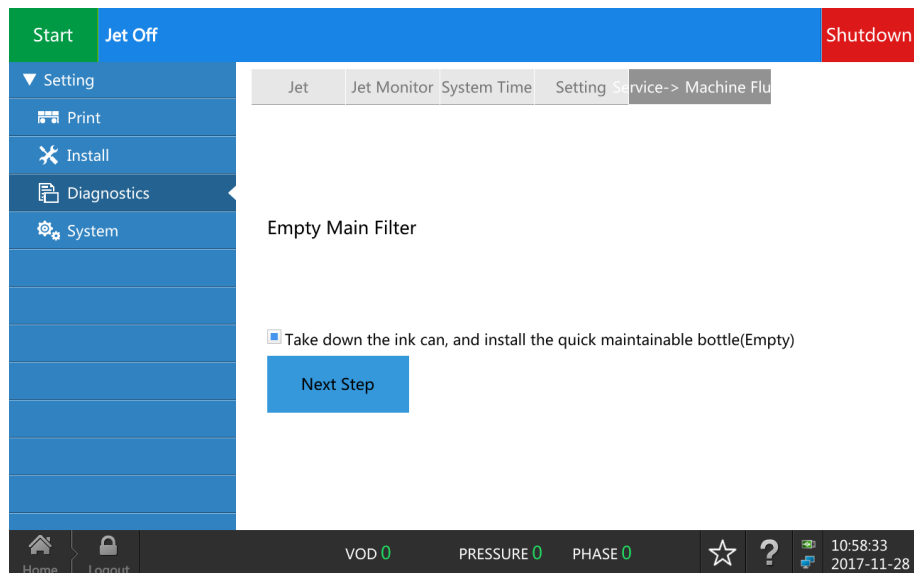


2 Enter the interface of diagnosis. Press the button of clean printer. Select to empty the main filter in the pop-up interface. Then operate it according to the screen.

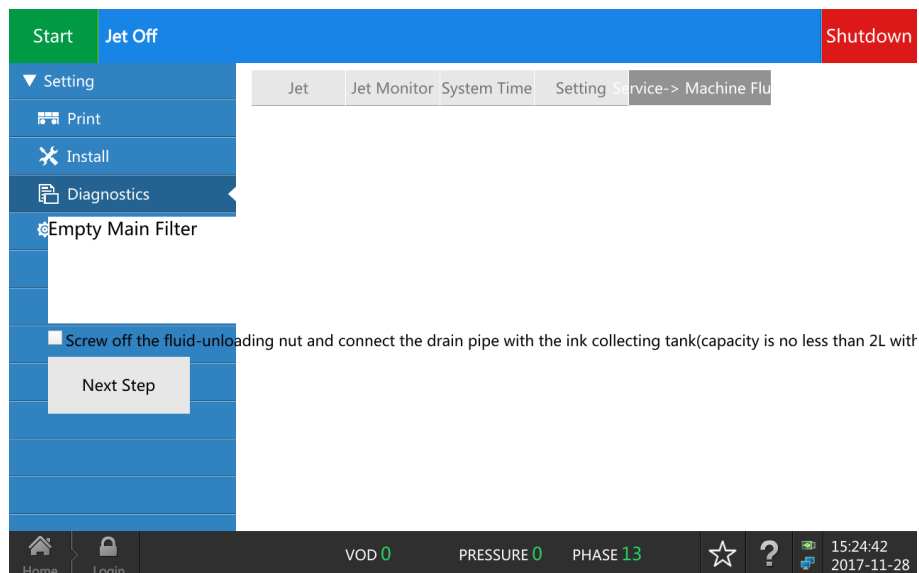


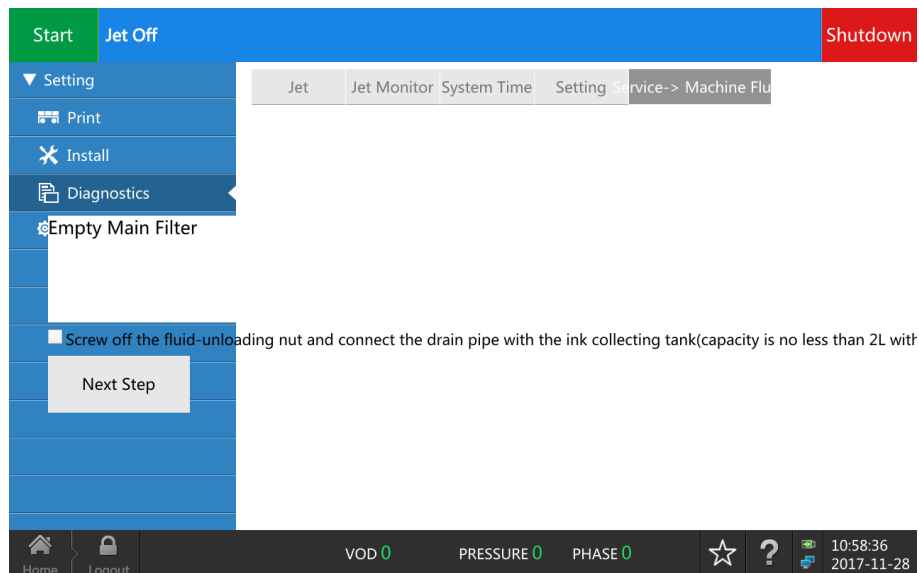
3 Take out the ink tank and install an ink SMART bottle. Press in the screen after confirmation and then press “Next Step”.





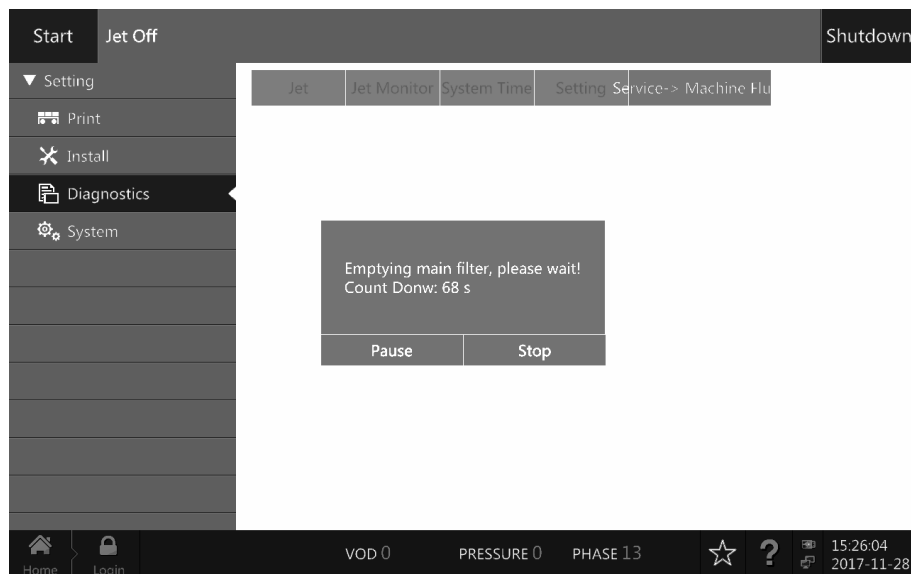
4 Unscrew nut inside the cabinet and connect the lower liquid discharge pipe to ink collecting tank. Pay attention to the collecting tank needs to more than 2L. Press the hint box in the screen after confirmation and then press “Next Step”.

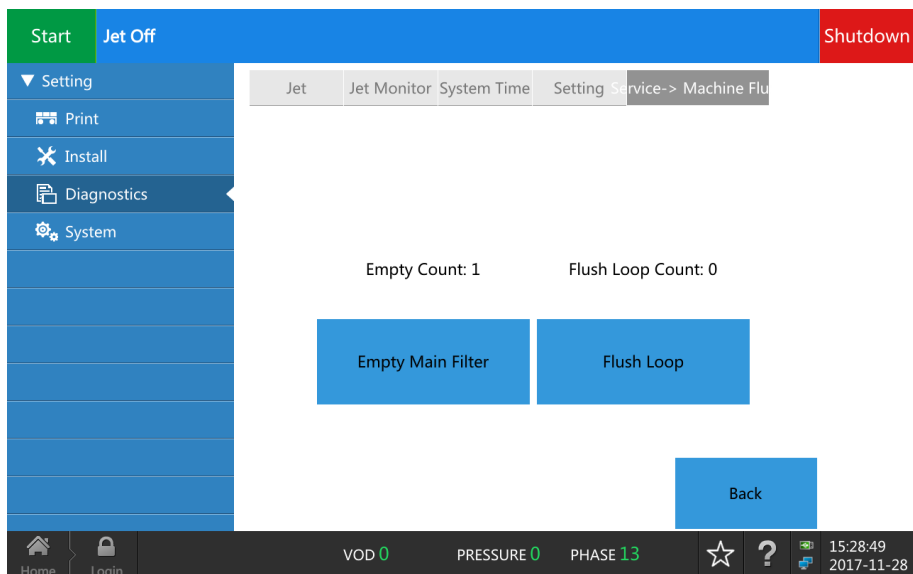
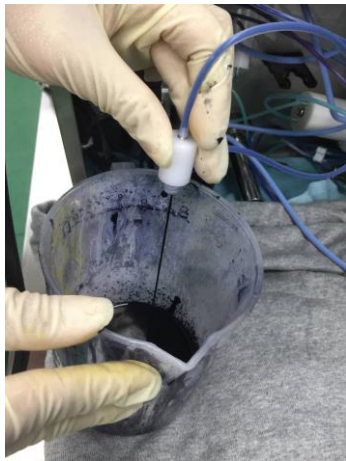
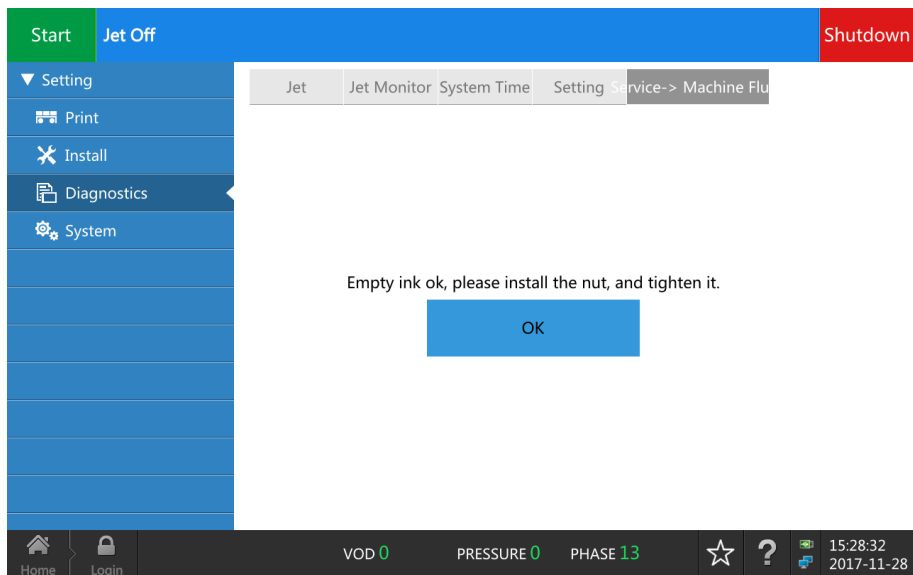




5 The screen shows the count down of emptying progress when the printer executes the emptying procedure. Install and tighten the nut after finishing emptying procedure and then press “OK”. The screen return to start interface and the empty time accumulates 1.

The first 15 seconds will clean the feed pipe (red color) and flush pipe (blue color) of the printhead and the nozzle when it executes the emptying ink procedure each time.



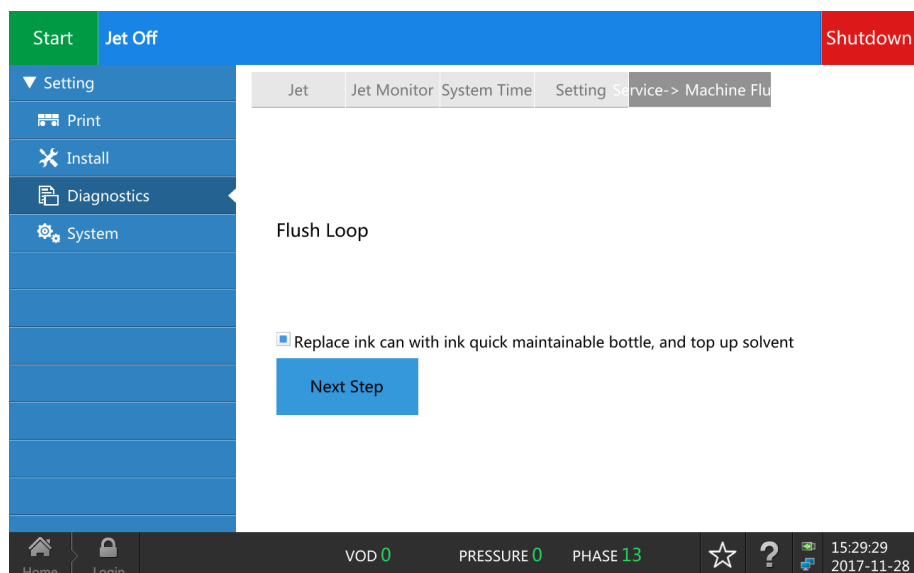
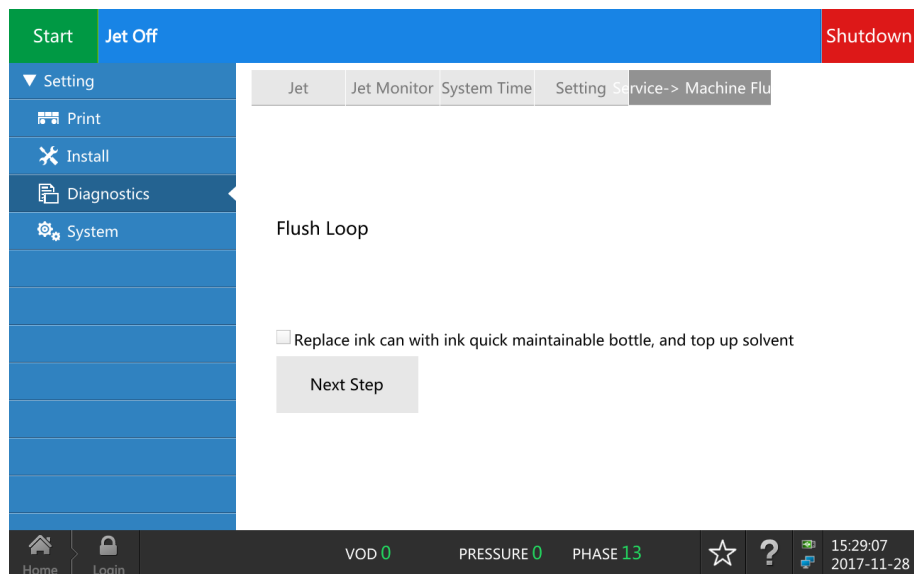


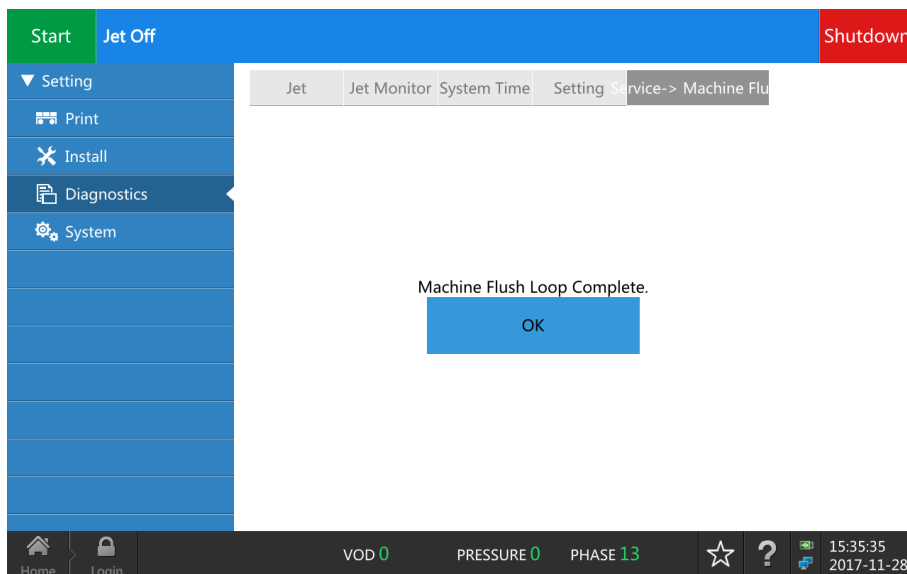
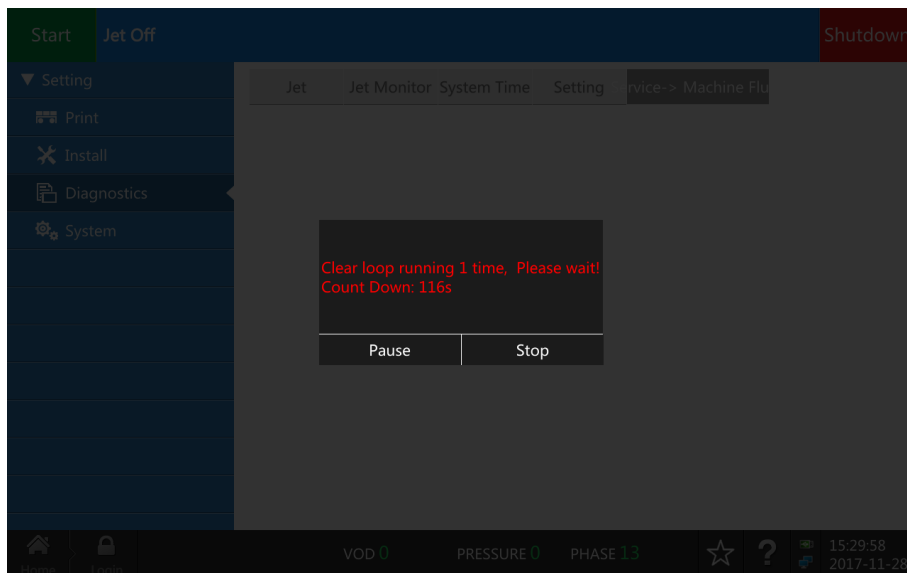
6 Replace the ink tank with the ink SMART bottle filling the leaner and tighten the cap assembly.



Then press “cycle cleaning”.

Clean the cleaning pump and cleaning pipe(the green one) connecting the printhead when it executes to cycle cleaning.





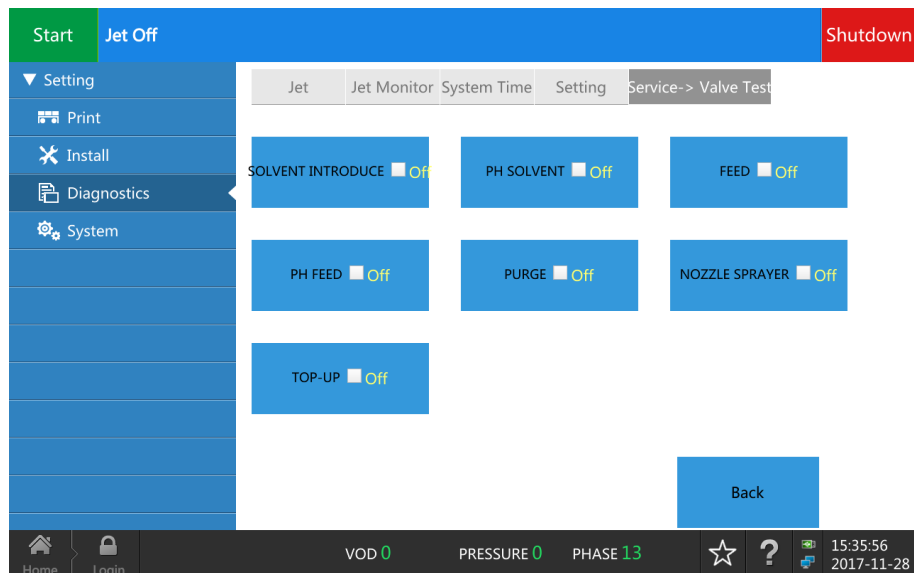
7 Press “OK” after cycle cleaning finishing showing in the screen. The screen will return to start interface and the cycle cleaning time accumulates 1.

8 Repeat the steps 3 to 6 above. Clean the printer 2 to 4 times according to the need. Empty the filter in the end and connect the triple valve of fluid-discharge based on step 4. Press “back” to exit cleaning procedure.

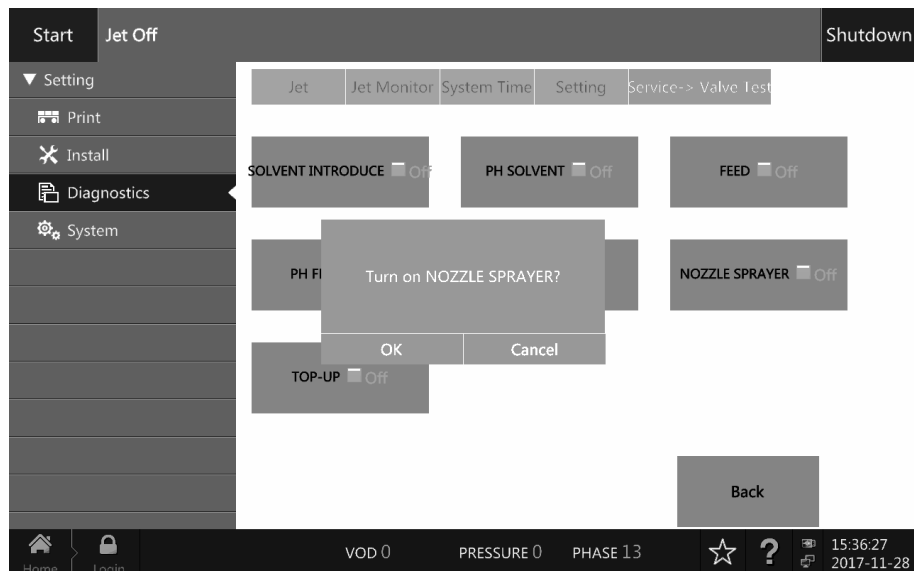
9 Clean and dry the ink tank which changing in step 1. Install in the cabinet and close the door.

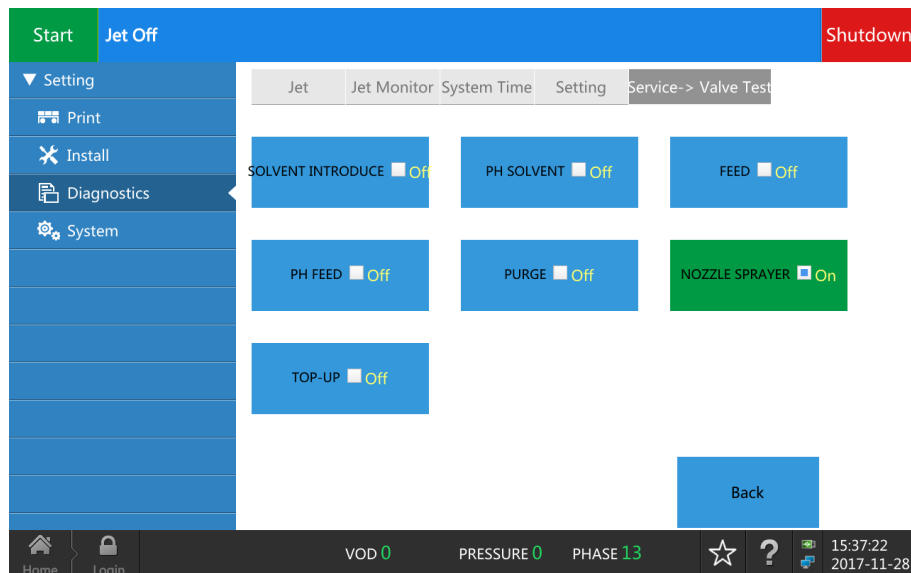
7.10. Valve Test

Valve test is used to detect the working status of each valve and some ink system failures in the printer. Only execute by EC-JET approved engineer.



NOTE: The solvent will be sprayed from the cleaning nozzle of printhead when execute the printhead cleaning valve. Please wear the protective equipment. Pay attention to fire safety. System needs to be confirmed when execute this command.





7.11. Monitor Jet

This groups together the ink and solvent control parameters on a single screen. The parameters are displayed only; they cannot be changed by the user.

Pressure

The pressure currently set on the pressure DAC (same as Set Pressure)

VOD

The most perfect VOD value should equivalent to the Ref VOD. It will not influence the printing quality if the VOD is near the Ref VOD.

NOTE: The warning “No VOD readings” will be displayed on the status line when a valid VOD has not been obtained for 15 minutes. The warning will be redisplayed every 15 minutes while no VOD readings as obtained.

Modulation

The current modulation voltage.

Phase

The system will load the phase automatically when it is On. And unload when Off.

Add Solvent

When Press (Set Pressure) exceeds this value, solvent will be automatically added by the printer.

Ref. VOD

The reference VOD as input with the printhead code.

Ref. MOD

The reference modulation determined by the last print head calibration or set by the user (same as Ref Modulation in the SETUP menu).

Read Press

The current read pressure being measured by the pressure transducer. This will normally be the 2-3 of the Press (Set Pressure).



7.12. Set Pressure

Displays the current pressure set in the pressure DAC.

Your local distributor may ask you to use this option to:

1. Diagnose and/or check for any pressure loss.
2. Purge the filter without resetting the filter time, e.g. if changing ink only.
3. Clean out print head by use of the venture vacuum.
4. Use Quick Start Jet to try and obtain VOD measurements and ascertain if ink is thick or thin.

8. Daily Maintenance

There are two levels of daily maintenance: User - performed by the operator, and Service - performed by EC-JET Trained Service Engineers.

User maintenance is required daily (each time the printer is used) and weekly.

Service (scheduled) maintenance is required after every 4000 jet running hours.

The following table defines the user maintenance requirements for EC-JET printers:

	Monitor	Clean	Change/Add
Printer Cabinet	Daily/Each time is used	Weekly/On demand	No need
Print Head	Daily/Each time is used	Daily/On demand	No need
Ink and Solvent	Start up/In use	No need	On demand
Air Filter	Daily on many dust or easy polluted/Once a week	Weekly/By need	On demand

8.1. Cleaning the Printer Cabinet

8.1.1. General

The exterior of the printer can be cleaned using a soft cloth lightly soaked in a mold detergent.

CAUTION: Do not use abrasive cleaning agents. Do not use excessive pressure when wiping over the LCD screen; excessive pressure can cause damage.

8.1.2. Ink Spillages

If ink is accidentally spilled onto the exterior of the printer the following procedures are recommended:



WARNING: ALWAYS WEAR RUBBER GLOVES AND SAFETY GLASSER WHEN HANDLING SOLVENT. DO NOT USE SOLVENT IN CONFINED AREAS WITHOUT ADEQUATE VENTILATION.



CAUTION: USE ONLY EC-JET SOLVENT. ENSURE THAT THE SOLVENT MATCHES THE TYPE USED IN THE PRINTER.

Do not use excessive amounts of solvent. It is not recommended that solvent is used frequently to remove ink from the front panel and LCD screen as this can lead to deterioration of the membrane surface. Better to use a soft cloth with solvent to wipe lightly.

8.1.3. Clear Nozzle, See Chapter 7.8

8.1.4. Cleaning the Print Head

The EC2000 has a "Automatic nozzle cleaning" program. Under normal circumstances, the nozzle is dirty. The nozzle cleaning can be performed automatically by executing the "cleaning nozzle" program. If necessary, it can be repeated 2-3 times.

Only when the machine "cleaning nozzle program" fails, or if the nozzle/contamination of the nozzle causes the contamination of the nozzle to be particularly serious, it is necessary to manually clean the nozzle.



CAUTION: USE ONLY EC-JET SOLVENT. ENSURE THAT THE SOLVENT MATCHES THE TYPE USED IN THE PRINTER.



WARNING: POTENTIALLY LETHAL VOLTAGES ARE PRESENT WITHIN THE PRINthead. BE SURE ALL POWER IS SWITCHED OFF BEFORE THE PRINthead IS OPENED FOR INSPECTION AND CLEANING.

Print head Cleaning Procedure

After wearing approved, solvent resistant gloves:

Remove the print head cover and hold the print head as shown below. Place a suitable container underneath and wash the entire printed circuit board (PCB) surface with the appropriate solvent. Do not use the wrong solvent; make sure it is the solvent corresponding to the ink type being used in the printer.

Simply squirt the solvent in short bursts onto the affected parts with a short delay between bursts to allow ink to dissolve. The surplus solvent will run down the print head and can be collected in the container for disposal.

Allow the print head to dry completely by letting it stand for a few minutes. Do not dry the print head with a cloth or towel as this may leave fibers that could interfere with the printed drops. Particular care should be taken to ensure that the space between the nozzle and charge electrode is free of solvent. If not, it can usually be removed by inverting the wash bottle and blowing off the excess solvent.



WARNING: MOST INK BASES ARE FLAMMABLE. IT IS THEREFORE IMPORTANT TO DISPOSE OF THE WASTE CLEANING FLUID IN ACCORDANCE WITH LOCAL REGULATIONS.

CAUTION: DO NOT BE TEMPTED TO IMMERSE THE PRINthead IN SOLVENT OR AN ULTRASONIC BATH. THIS MAY DAMAGE THE PRINthead AND WILL VOID THE WARRANTY.





8.2. Replenishing Ink and Solvent

8.2.1. NOTE:

- 8.2.1.1. Please verify the consumable CSN before adding ink and solvent;
- 8.2.1.2. Check the ink or solvent specification are consistent with the using printer before replenishing;
- 8.2.1.3. Only add ink or solvent when ink or solvent low warning;
- 8.2.1.4. Each add no more than 500ML.

8.2.2. EC2000 Consumable Verification

- 8.2.2.1. Put the ink or solvent bottle near the RFID reader and the label near the consumable CSN reader during the first time using. After the machine reading the CSN, a dialog box will showing CSN is correct on the screen.



- 8.2.2.2. The ink or solvent change from “low” to “OK” , the printer will automatically pop-up “please input CSN quality code”. Please put the ink or solvent bottle to the CSN quality code reader closely and put the tag near the RFIC reader closely , the printer will read the CSN quality code.



- 8.2.2.3. Open the ink system door and find the RFID assembly;
- 8.2.2.4. Hold the ink or solvent bottle, keep label alignment of RFID, putting into the groove about 2 seconds. When the light of the RFID turn green with one-long alarming, it means read successfully. When shown the following interface, printer read the correct CSN.



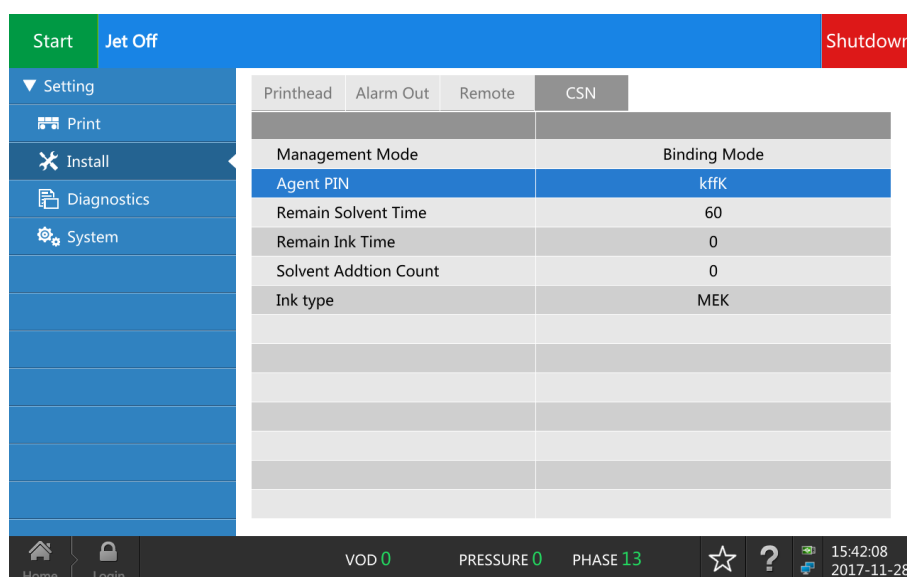


Click OK.

Note1: If it can't read the correct CSN, then printer shows the following interface. Please check whether choose the correct consumable, then continue to verify.



Note2: You can see the remaining time of ink or solvent on “install: consumable” interface.



Note3: Printer shows the remaining time of ink only after “printing” status lasted for more than a minute.

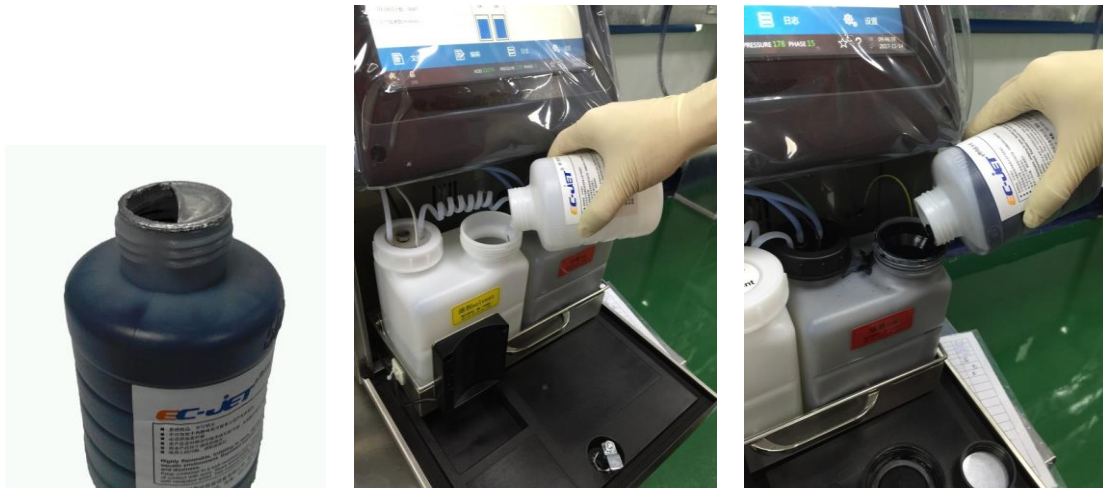
NOTE: If it don't verify the CSN according to the hint, printer will show every 15 minutes.

8.2.3. Refilling the Ink or Solvent:

8.2.3.1. Withdraw the ink system gently until stops, if necessary, another hand hold the ink

routine gently;

- 8.2.3.2. Remove the ink or solvent bottle cap, then cut the sealing foil along the edge more than half circle and fold inside;
- 8.2.3.3. Pour the ink or solvent into the corresponding tank. After the liquid in the bottle is finished, take away the empty tank. **(Note: the solvent tank is white and the ink tank is black.)**
- 8.2.3.4. Pull out the solvent tank, and fill in solvent to 2L container. Tighten the cap of solvent tank after refilling, push back the ink system.



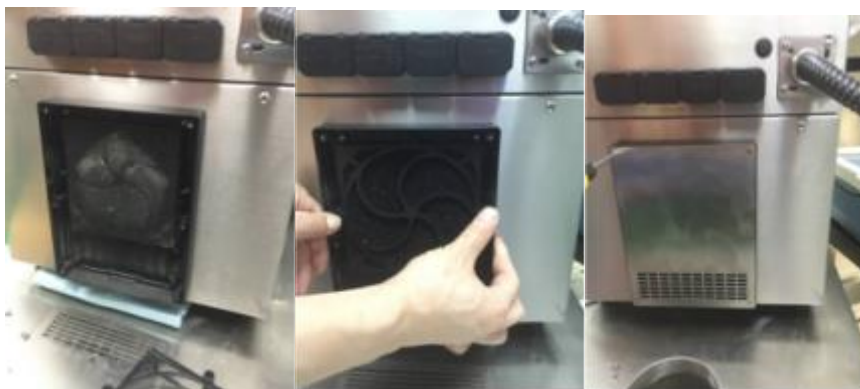
8.3. Cleaning/Replacing the Air Filter

There are two air filters(the inlet and outlet filter) in the model.

8.3.1. Cleaning and Replacement of Air Inlet Filter

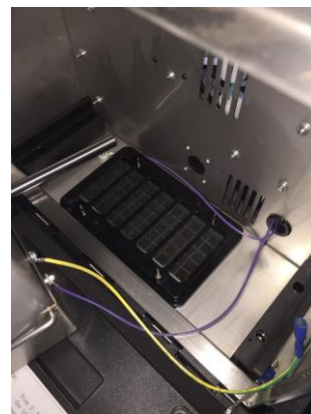
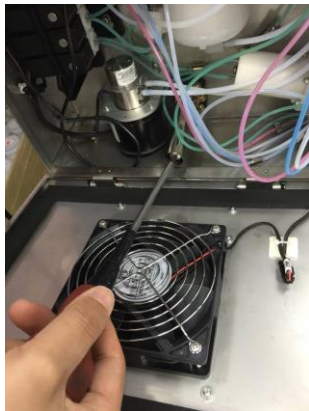
- 8.3.1.1. **The inlet air filter is located in the rear of the machine. According to the environment, periodically perform routine maintenance.** Suggest to clean every week, to replace filter when is blocked by dust.
- 8.3.1.2. Clean or replace the inlet air filter, open the inlet air baffle and inlet air filter cover on the back of the machine.
- 8.3.1.3. Take out the inlet air filter, clean the filter by taping or blowing with compressed air.
- 8.3.1.4. **Re-install the filter into outlet air cover after cleaning.**(图片是 EC1000 的?)





8.3.2. Cleaning/Replacing the Air Outlet Filter

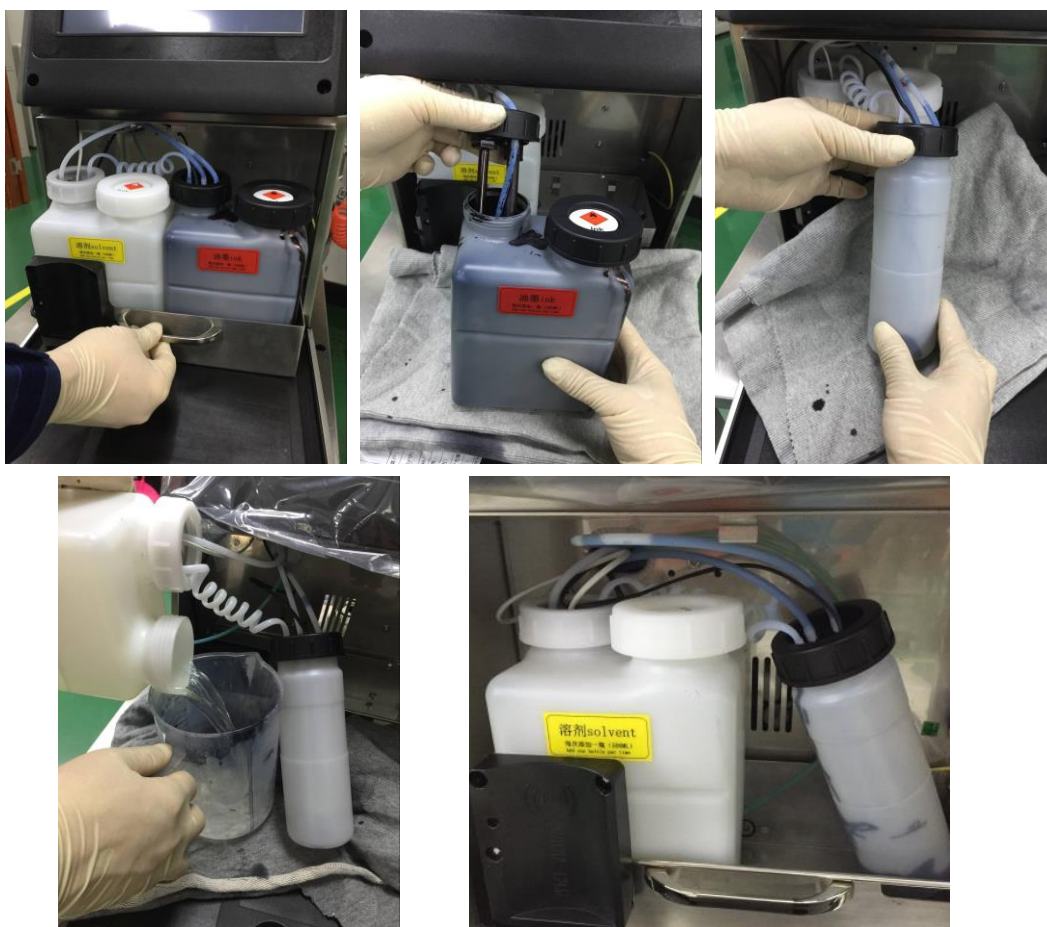
- 8.3.2.1. Unscrew the thumb screw in the back of machine and open the ink system door.
- 8.3.2.2. Unscrew ink tank limit thumb screw of the guide rail(some machine only have one guide rail).
- 8.3.2.3. Open the front door(ink system door),hold ink system by hand and gently take it out from the printer.
- 8.3.2.4. Take out ink system tank assembly.
- 8.3.2.5. Unscrew the thumb screw in the outlet of the fans.
- 8.3.2.6. Replace the dust proof cotton and return to each part according to the reverse steps.



8.4. Quick Maintenance Mode

This quick maintenance mode is for users requesting to maintain and repair the machine urgently, but the EC-JET authorized engineers can't come on users' site. Sending EC2000 machines to agents or resellers by courier for maintenance or repairing, easy operation, no need to empty the ink and solvent tank.

- 8.4.1.1. Open the ink system door;
- 8.4.1.2. Hold the ink system and draw out until it can't move;
- 8.4.1.3. Take out the ink tank, put a clean cloth or paper under the ink tank, unscrew the connector of the ink routine, take out the ink dip tube and level sensor carefully then put into the SMART bottle, show as following picture, screw the connector of routine.



- 8.4.1.4. Remove the solvent tank, pour the solvent to a container(about 2 litre) and tighten the cap. Then take a mark on it.
- 8.4.1.5. Screw the ink tank and solvent tank cap, then store in case avoiding high temperature and fire.
- 8.4.1.6. Clean the SMART ink and solvent bottle and put in the ink-system bracket, setup the bracket, screw the thumb and close the ink-system door.

- 8.4.1.7. Pack the machine, send back to agents or resellers, EC-JET and agents or resellers will provide you more dedicated service.
- 8.4.1.8. EC-JET agents or resellers will send the machine back to customer. Follow above opposite steps to change the SMART bottles into ink and solvent tank, then you can use the printer normally.

9. Warning and Fault Messages

9.1. Warning and Fault Messages

This section describes the printer warning messages for the EC-JET printers. The error messages may occur at any time and are NOT a direct response to user commands, although a user response may be required.

Each system warning is given a unique code number which identifies the type and source of the error, and is followed by a short description when displayed on the screen, e.g.:

“3.03 Ink Low”

9.2. Summary of Warning Messages

9.2.1. System Failures

These prevent normal printer operation. Contact with EC-JET distributor when necessary.

9.2.2. Print Failures

These occur when the software detects a problem which affects printing.

- 2.00 Print head temperature
- 2.01 Deflector voltage
- 2.02 Charge
- 2.03 VOD
- 2.04 300V power supply
- 2.05 Temperature/Deflector
- 2.06 Ink tank empty
- 2.16 Internal Spillage

9.2.3. System Warnings

These are errors which are not serious enough to shut down the printer, but give advance warning of potential problems.

- 3.00 No VOD Adjustments
- 3.01 Jet Shut Down Incomplete
- 3.02 Over Speed(Print Go)
- 3.03 Ink Low
- 3.04 Solvent Low
- 3.05 Print Go Remote Data
- 3.06 Service Time
- 3.07 Print Head Cover Off
- 3.08 Print Head Not Fitted
- 3.09 New Print Head Fitted



- 3.10 Charge Calibration Range
- 3.11 Safety Override Detected
- 3.12 Low Pressure
- 3.13 Modulation
- 3.14 Over Speed (variable data)

9.3. System Failures

System failures occur when the software detects a condition which prevents normal printer operation.

These prevent normal printer operation. Contact with EC-JET distributor when necessary.



WARNING: LETHAL VOLTAGE. UNKNOWN HIGH VOLTAGES MAY BE PRESENT WITH SOME SYSTEM FAILURES. DO NOT TAMPER WITH THE PRINTER OR PRINthead. WAIT UNTIL THE FAILURE SHUTDOWN IS COMPLETE.

9.3.1. Print Failures

These occur when the software detects a problem which affects printing.

When a Print Failure occurs a message is displayed on the screen status line and a jet shutdown sequence is started.

The internal alarm buzzer is switched on, the “print ready” line set low and the alarm relay is activated(if enabled).

When the shutdown sequence is complete the Print Failure screen is displayed:



The user should normally select  to reset the printer.

Following a print failure shutdown, the software sets:



- Pressure to zero
- EHT off
- All valves closed
- 300V off - these settings cannot be altered until the print failure has been cleared(i.e. the jet cannot be restarted).

The following pages give a brief description of each Print Failure and what should be done to correct it. In each case, if the suggested action does not rectify the error condition, you should contact your local distributor.

9.3.2.2.00 Print Head Temperature

The print head temperature sensor indicates that a temperature around or in the print head has exceeded the safe operating limit. This may mean that a fire has occurred within the head cover.

Possible Causes

- Excessive local heat source:
Relocate the print head away from the heat source.
- Fire in the print head:
Have your printer checked by your local engineer.

9.3.3.2.01 Deflector Voltage

The voltage on the deflector plates has discharged which is normally caused by ink build-up.

Possible causes

- Excess build-up of ink on deflector plates.
Clean the print head as described earlier in this manual (see “Daily Maintenance”).
- Static discharge.
Check for any source of excess static electricity.
- Printhead still wet after cleaning.
Allow the print head to fully dry before starting the jet.
- Debris or fibers creating a discharge path.
Clean the printhead and check for debris.



9.3.4.2.02 Charge

This failure occurs when the jet is being started, or when it is running.

Possible causes

- Blocked nozzle or misaligned jet:
Carry out the nozzle clear procedure described in the Troubleshooting section of this manual (see “troubleshooting - Clearing the Print Head Nozzle”).
- Print head code or modulation values set incorrectly.
Check the Print head and Modulation (MOD) values printed on the print head serial number label found on the conduit, with the stored values. (see “Changing the System Setup”).



9.3.5.2.03 Velocity Of Drop (VOD)

This failure may occur when the jet is being started.

Possible causes

- Misaligned jet.

Carry out the nozzle clear procedure described in the Troubleshooting section of this manual. (see “Troubleshooting - Clearing the Print head Nozzle”).

- Print head code or modulation values set incorrectly.



Check the Print head and Modulation values printed on the print head serial number label found on the conduit, with the stored values. (see “Changing the System Setup”).

- Build-up of ink on the sensors.

Clean the printhead.

- Blocked filter.

Contact your local EC-JET distributor for assistance.

9.3.6.2.04 300V Power Supply

Possible cause

- The 300 volt power supply output is out of tolerance or has failed.

Contact your local EC-JET distributor.

9.3.7.2.05 Temperature/Deflector

A failure has occurred which the printer has not been able to fully identify (see Print Failures “2.00” and “2.01”).

9.3.8.2.06 Ink Tank Empty

This failure occurs when the ink level sensor has been indicating low for a predetermined time.

Micro 8 hours

Midi 8 hours

Macro 3 hours

This prevents the ink from running out completely if the user fails to top up the ink reservoir following an “Ink Low” error (see System Warning “3.03”). This failure only occurs when the jet is running since the jet cannot be started when the ink is low.

9.3.9.2.16 Internal Spillage Fault

This may occur either at switch on, or during normal running. A sensor within the ink system detects the unwanted presence of ink or solvent within the cabinet tray.

Possible causes

- The ink or solvent tanks have been overfilled.
- A leak has developed within the ink system.
- Leak sensor is shorted or has failures.
- A lure fitting has become loose on the main filter or damper.


Allow the printer to run to bring the viscosity back into range.

- There is a pressure loss in the system.

Contact your local EC-JET distributor.

9.4.2.3.01 Jet Shut Down Incomplete

This indicates that the printer was previously switched off while the jet was running or before the printer had completed the shutdown routine. Completion of the shutdown routine is important and must be allowed to finish.

The warning does not stop the printer from functioning. It will be reported at every subsequent printer start-up until a jet shutdown routine is fully completed. Press the  key and wait for the message.

“ Jet Off”

9.4.3.3.02 Over Speed (Print Go)

This indicates that the printer may have missed printing at least one pattern or is receiving false triggers from the photocell.

When the Photocell Mode is set to Trigger, each print delay is started following the photocell trigger.

At the end of the delay a “print go” is issued to start printing. If the printer has not printed the last pattern by this time, the warning is reported and the new pattern is not printed. In effect, this will mean that alternate objects will NOT be printed on.

The warning applies to the current printing is reset automatically when printing is restarted.

Possible cause

- The next object has arrived at the print head before the last pattern is complete because:
 1. The line speed is too fast.
 2. The pattern is too long compared to size of the objects to be printed on.
- The photocell is giving false triggers.

9.4.4.3.03 Ink Low

If the ink level sensor indicates that the ink reservoir is low then this warning is given. It is cleared automatically when a sufficient amount of ink is added.

Do NOT put in more than one bottle(500ml) each time.

If the ink low condition is detected before the jet is started, then the jet cannot be started until the ink tank is replenished.

If the condition is detected while the jet is running, the jet will continue to run for several hours until the ink is dangerously low, at which point a failure will occur (see Print Failure “2.06”).

9.4.5.3.04 Solvent Low

If the solvent level sensor indicates that the solvent reservoir is low, then this warning is given. It is cleared automatically when a sufficient amount of solvent is added to the reservoir.

Do NOT put in more than one bottle (500ml) each time.



If the solvent low condition is detected before the jet is started, then the jet cannot be started until the solvent tank is replenished.

If the condition is detected while the jet is running, the jet will continue to run regardless, but no attempt will be made to add solvent.

9.4.6.3.05 Print Go/ Remote Data

A “print go” has occurred and printing data has not been received from the remote interface.

Make sure the transmission cable and the port are right setting.

9.4.7.3.06 Service Time

When the jet is started, the time remaining to the next service is checked. If it exceeds 4000 hours then this warning is reported and the jet is started as normal.

This warning will be reported on every jet start up until the service time has been reset.

Maintenance should be made when there is warning, otherwise it will affect the machine performance and stability.

9.4.8.3.07 Print Head Cover Off

This warning is reported if the print head cover is removed.

The supply to the EHT plates is switched off (by hardware) when the cover is removed.



WARNING: THERE IS A LINK WHICH, WHEN FITTED, DISABLES THIS AUTOMATIC SHUT OFF. THEREFORE, THE PRESENCE OF THIS WARNING IS NOT A GUARANTEE THAT THE EHT IS OFF.

Printing is suspended when the cover is removed and is resumed a few seconds after the cover is refitted.

The warning supplies to the currently printing pattern - it is reset automatically when printing is restarted.

9.4.9.3.08 Print Head Not Fitted

At start up the software checks the type of print of print head that is fitted. If it does not recognize the print head type this warning is reported.

The system will continue to operate on the assumption that the print head has not been changed, and will continue with the same print head type as used previously (i.e. the currently stored NVR print head type).

If a new type of print head has been fitted, but has not been detected correctly, the modulation frequency, voltage, etc., will all be incorrect. Therefore, the jet will not break up properly, and a phase fault (2.02) will probably occur when starting the jet.

9.4.10.3.09 New Print Head Fitted

At start up the software checks the type of print head fitted. The last print head type used is stored in the printer is memory.

If the currently fitted type is not the same as the type stored in memory then this error is reported and the type in memory is updated.

This warning should only ever occur when a new print head is fitted. If it occurs at other times

then the memory may be corrupt, or the print head connector faulty.

Under normal circumstances this warning just confirms that the print head type has been changed. The defaults for VOD, modulation, etc., will be used, until the user enters a new print head code in the SETUP menu.

If the wrong type of print head has been detected for any reason, the modulation frequency, voltage, etc. will all be incorrect. Therefore, the jet will not break up properly, and a phase fault (2.02) may occur when starting the jet, or poor print quality may result.

9.4.11. 3.10 Charge Calibration Range

Contact your local EC-JET distributor if this error is reported.

9.4.12. 3.11 Safety Override Detected

This warning message alters the user when the safety override link is fitted.

WARNING: DO NOT START THE PRINTER WHEN THIS ERROR MESSAGE IS PRESENT.
PRINTER SAFETY CIRCUITS AND SENSORS WILL NOT BE FUNCTIONING.
IN THE EVENT OF THIS ERROR MESSAGE OCCURRING, SWITCH OFF THE
PRINTER AND CONTACT YOUR LOCAL EC-JET DISTRIBUTOR
IMMEDIATELY.

9.4.13. 3.12 Low Pressure

When starting the jet the printer has detected a loss of ink pressure, which will affect the printer's performance.

Possible causes

- The main ink filter is blocked.
- Pump output is low.

Contact your local EC-JET distributor.

9.4.14. 3.14 Over Speed (Variable Data)

This indicates that the printer has missed at least one pattern because it cannot generate the pattern's variable data (e.g. sequential numbers) at the required rate - i.e. the printer was still generating pixel data for the next "print go" when the "print go" occurred.

The warning applies to the current pattern - it is reset automatically when printing is restarted.

Possible cause

- The amount of variable data in the pattern is too long for the current rate of print triggers. Reduce the amount of variable data, if possible.

NOTE: This warning indicates the printer cannot generate pixels fast enough, whereas System Warning 3.02 indicates the printer cannot print the rasters fast enough..

This warning is only likely to occur for fast rasters (e.g. rasters smaller than 16 drops for Micro print head), where pixel generation by the software is slower than the rate at which the hardware can print rasters.



10. Troubleshooting

This section provides general advice on fault diagnosis on the EC-JET Ink Jet Printers, as well as specific procedures for identifying and rectifying faults. Fault diagnosis is complicated by the number of variables involved in producing good print quality. Fast, non-contract printing involves fluid dynamics, physics, electronics, computing and chemistry.

Many of the faults that could occur within the printer are self-diagnosed by the integral software. Upon diagnosis, the operator is alerted by way of error messages (warnings and faults) which appear in the status line of the display screen.

Before attempting any fault diagnosis for the first time, operators are advised to familiarize themselves with the “Warning and Fault Messages” section of this manual, as it contains information which is useful in rectifying many simple faults.

Problems can be found to have either a single cause or several combines causes. The complications arising from the simultaneous failure of several different components make it impossible to consider such faults in this user manual. In this section, individual problems are linked to their most probable causes.

The most successful fault diagnosis technique will be found by investigating each problem, separately, in turn. Do not begin by assuming the most complicated combination of faults; always start by investigating the most simple possibilities.

10.1. Where to Start

All problems with printer operation are distinguished from each other by the symptoms displayed. These symptoms can be obvious faults with print quality; error messages on the display; or any other signs by which it is apparent that the printer is not functioning correctly. When the symptoms have been correctly identified, the possible cause(s) of the symptoms the printer is displaying can be investigated.

The recommended fault diagnosis sequence is as follows:

- 10.1.1.1. Collect as much information as possible on ALL the symptoms that the printer is displaying, including error messages, print samples and signs of electrical or mechanical malfunctions.
- 10.1.1.2. Use the “Identifying Faults” sub-section to identify all the possible causes of the symptoms that the printer is displaying.
- 10.1.1.3. Start with the most probable cause, and investigate each of the possible causes in turn. This will eliminate all the possible causes that are not responsible for the problem, until the actual cause is established.
- 10.1.1.4. When the actual cause of the symptoms has been established, use the “Problem Solving” sub-section to perform the necessary adjustments and repairs to rectify the fault.
- 10.1.1.5. Finally, check that the printer operates correctly and that any error messages have been cleared, and that there is not a second fault causing supplementary symptoms.

If, after rectifying one fault the symptoms have not been eliminated, continue with the fault



diagnosis until all faults have been identified and rectified. Only when all faults have been eliminated, and the printer is operating correctly, has the fault diagnosis been completed.

The “Identifying Faults” sub-section includes lists of symptoms (by print sample and by description), and gives references to fault codes which identify the particular type of fault.

The “Problem Solving” sub-section provides problem solving instructions for each fault code number, and defines checks, adjustments and repair procedures for all the faults identified in “Identifying Faults”. These procedures explain how to check whether the fault is present and how to rectify it.

Use the following list of action points to approach fault diagnosis in a logical way:

- If possible, ask whoever found the problem to describe it in detail, including any action taken.
- Do not jump to conclusions. Take the time to examine the printer carefully. Is there sufficient ink and solvent? Are there any signs of ink leakage? Are there any loose wiring connections?
- Check the Print Status option for any error messages that have been logged.
- Make use of the Diagnostics options to check and record the jet monitoring parameters of Pressure, Velocity Of Drop, Modulation and Phase. Compare these with the reference values and identify any out-of-specification measurements.(See “Diagnostics”)
- Make print samples (if possible) and examine the prints carefully for signs of print quality problems.
- Only when all of the symptoms have been noted should an attempt be made to identify the possible cause of the problem.

10.2. Identifying Faults

Some faults are best identified by the appearance of the print when a sample of the test pattern is printed. Other faults may not permit a print to be made, or may produce other symptoms such as fault messages. To accommodate these differences, this sub-section is divided into two parts: “Identifying Faults by Print Sample” and “Identifying Faults by Symptom”.

10.3. Identifying Faults by Print Sample

This part of the manual is intended to help distinguish between different types of print fault, in order to identify the possible causes.

There are several ways in which print quality can be affected, and in some cases print quality problems can be caused by more than one fault. For most faults, it is not difficult to identify the cause of the problem, but some faults have similar symptoms, making accurate diagnosis a little more difficult. For example, a low modulation problem can give similar symptoms to high viscosity.

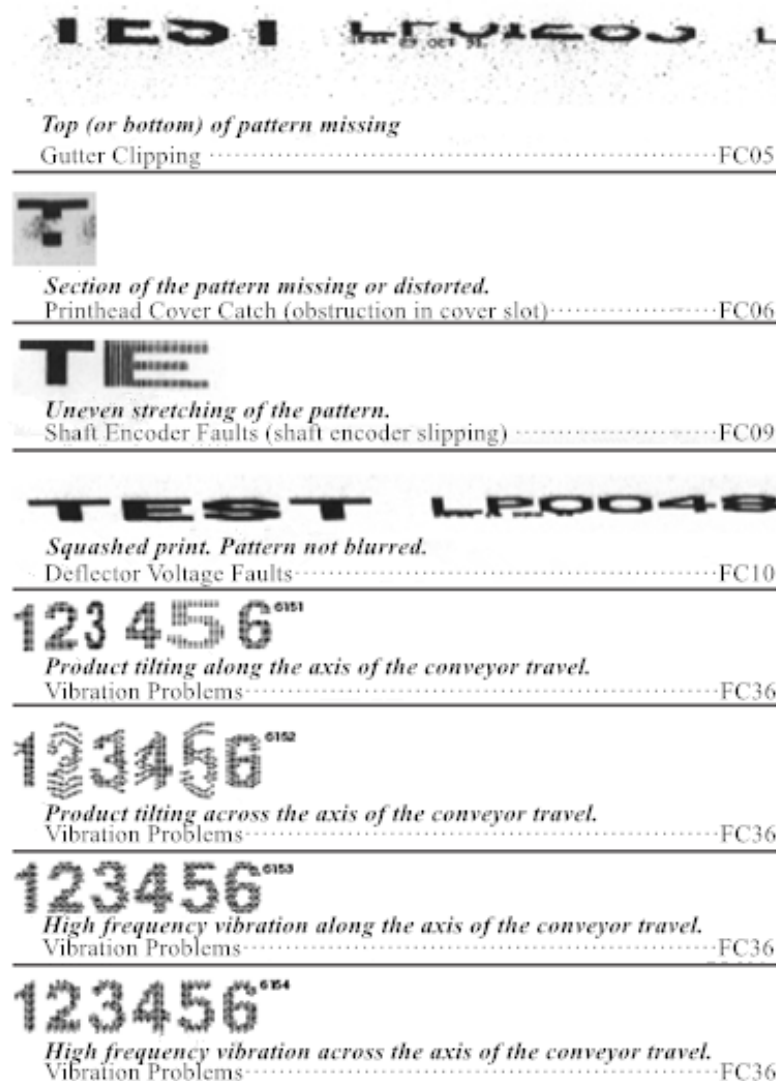
In cases where the cause of the print fault is not immediately obvious from the print sample, secondary symptoms should always be sought that will help to distinguish between the possible

causes. In the example above, the current modulation would need to be checked, and the pressure, the Velocity Of Drop, and the operation of the ink system components investigated. These additional pieces of information will then enable you to decide which of the possible causes is the reason for the print fault.

The following list classifies faults by the appearance of the print sample they produce. The list shows print samples of the standard test pattern which can be compared with samples taken from the printer under investigation. Below each sample, or set of samples, is a brief description of fault symptoms. Also provided are the possible causes of the fault and a reference to a particular fault code number in the “Problem Solving - Print Samples” part, where the problem and its method of rectification is described in more detail.

NOTE: Throughout this manual, reference to the “top” of the print means the part of the pattern closest to the negative deflector plate of the print head (i.e. the least deflected drop).

Identifying Faults by Print Sample:



10.4. Identifying Faults by Symptom

When it is not possible to identify a fault by the visible effect on the print sample, it becomes necessary to look for other symptoms. For example, it may not be possible to start the jet satisfactorily, so it will be impossible to obtain any sort of print.

However, in most circumstances there will be some obvious indication as to the nature of the fault, the best example being the fault messages displayed in the screen status line.

The “Warning and Fault Messages” section lists all of the warning and fault messages. This section also gives a detailed explanation of the condition that the printer control logic has detected which has resulted in the particular message being displayed. If there is no fault message, or if the message on its own is not enough to identify the problem, refer to the following list of symptoms to identify the possible cause of the fault.

The list is organized to group the symptoms into the five different stages of printer operation:

10.4.1.1. Before switching on.

10.4.1.2. After switching on.

10.4.1.3. When the jet is started.

10.4.1.4. During printing.

10.4.1.5. After the jet is stopped.

Note: that these groupings only indicate the earliest point at which the symptom could be observed; the symptom could also be observed later in the cycle of printer operation. For example, solvent contamination might be observed at any time, but it is included in the first group because it is possible to check this symptom before switching on.

The next below each symptom describes the different types that can give rise to the symptom, with references to fault code numbers by which the faults are identified in the “Problem Solving” subsection, where the problem and its method of rectification is described in more detail.

Symptom and Possible Causes	Fault Code
BEFORE SWITCHING ON	
Ink deposits in the print head or on the cover slot.	
Jet Alignment Problem.....	FC32
Ink leaking from gutter	
Gutter Problems.....	FC35
AFTER SWITCHING ON	
Ink leaking from gutter.	
Gutter Problems.....	FC35
Low pressure warning on start-up.	
Pressure Loss (mechanical).....	FC12
Partial or total pressure loss.	
Pressure Loss (mechanical).....	FC12
Discrepancy between Set and Read Pressures	
Pressure Loss (mechanical).....	FC12

Symptom and Possible Causes	Fault Code
WHEN THE JET IS STARTED	
No jet at start-up.	
Jet Alignment Problems (nozzle blockage).....	FC32
Messy printing data after start-up.	
Jet Alignment Problems (nozzle out of alignment).....	FC32



No VOD adjustment on start-up.

Pressure Loss (mechanical)..... FC12

Blocked gutter.

Gutter Problems..... FC35

Jet catching print head cover slot.

Printhead Cover Block..... FC06

Jet Alignment Problems.....FC32

Ink leaking from gutter or poor gutter action.

Gutter Problems.....FC35

DURING PRINTING

Poor print quality.....Refer to “Identifying Faults by Print Sample” (page 75)

Jet velocity reduces - increased VOD reading.

Gutter Problems.....FC35

Messy print, missing drops.

Gutter Block.....FC05

Printhead cover Block.....FC06

No Print.

Print delay value incorrectly set.....FC39

Part of message missing.....FC40

AFTER THE JET IS STOPPED**Poor purge of nozzle at shutdown.**

Gutter Problems.....FC35

10.5. Problem Solving

This sub-section describes the faults identified in the previous sub-section “Identifying Faults”.

For each fault, identified by a fault code(FC) number, procedures are given for confirming the presence of the fault, and actions necessary to rectify the fault.

Fault codes not referenced in this manual are faults that can only be rectified by a Service Engineer.

10.5.1. Problem Solving - Print Samples

FC05 Gutter Block

Diagnosis

This fault is also known as “gutter block” and is similar to the associated problem of Printhead Cover block. When the problem occurs, the droplets with smallest deflection fall on the gutter and therefore can not be printed out.

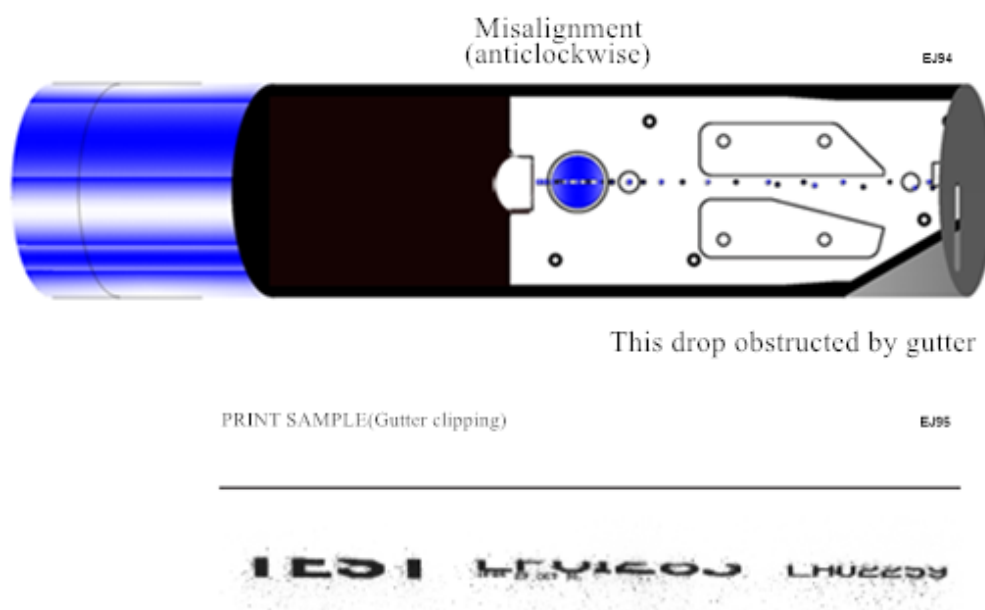
If the jet is misaligned on the gutter, the least deflected drops may catch the edge of the gutter. The



will cause the loss of the drops from the top of the print pattern.

As printing continues, the ink will build up on the gutter edge and the print loss will increase, sometimes leading to deflector plate shorting and EHT failures.

The following diagram illustrates the problem:



Above printing indicate if the gutter is block ,the droplet on the top of printing will be block and can not be print out .

Cause and Cure:

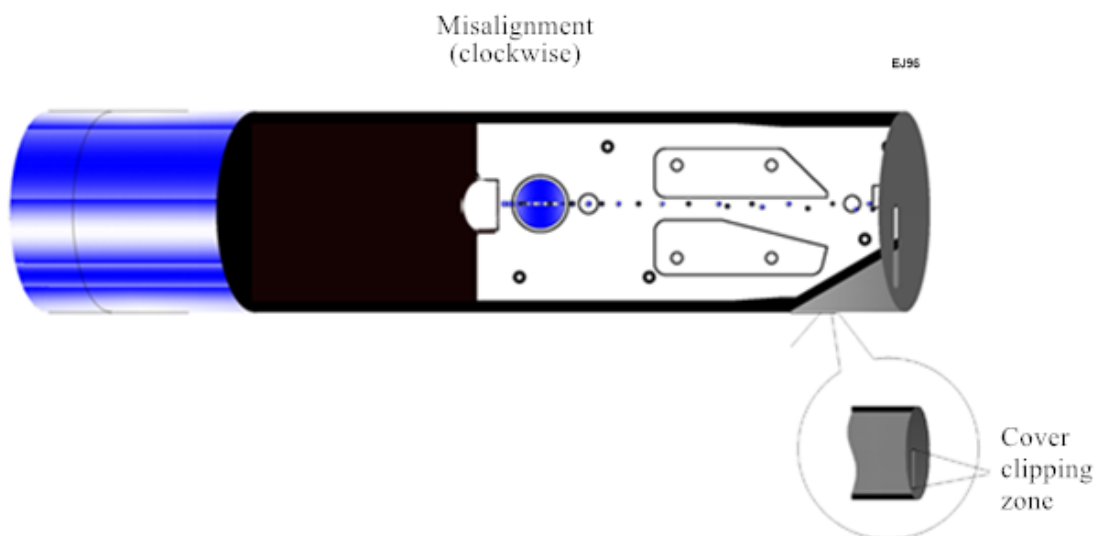
Check the EHT settings (see - “Changing the System Setup”). Check the jet alignment.

FC06 Printhead Cover Block

Diagnosis

This problem is caused by the most deflected drops catching the edge of the exit slot in the printhead cover, and thus failing to be printed.

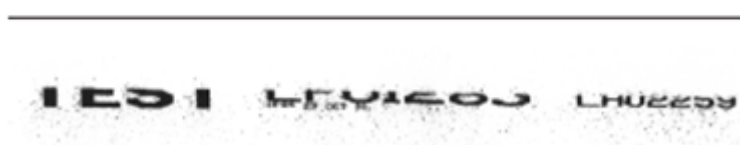
The following diagram illustrates the condition:



NOTE: It is sometimes possible for the least deflected drops to clip the cover slot, in which case the effect is similar to the Gutter Clipping fault.

PRINT SAMPLE(Gutter clipping)

EJ95

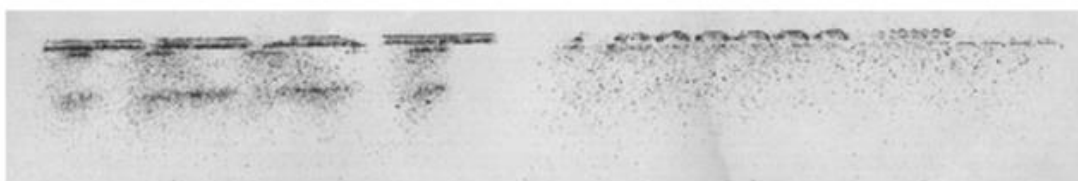


Most commonly, the drops are lost at the bottom of the print, as in the above print sample. Whether the top or the bottom of the print is missing, a typical result of print head cover catch is a fine diffuse spray of drops.

Cause and Cure:

Check the EHT settings and connections. Check the print head cover slot for an obstruction, which may be a build up of ink. If the print head cover is badly out of place on the print head, the drops to be printed may miss the cover slot altogether. Ensure that the conduit is not pulling the print head out of line with the cover slot.

Print Samples



The above print sample shows what can happen if the print head cover slot is obstructed by dried ink, dust or some other contaminant, such as a hair.

Cause and Cure:

Clean the exit slot using the appropriate solvent for the type of ink being used in the printer. Make sure that the print head cover is correctly positioned and securely fitted on the print head.

NOTE: Some of the Printhead Cover Catch print samples may show similarities with Phasing Errors problems. The fundamental difference to note is that phasing errors still print ALL the drops, although not in the correct positions, while print head cover catch (or clipping) problems show a considerable loss in the number of drops printed.

10.5.2. Problem Solving - Ink System Mechanical Faults

FC12 Pressure Loss

There are several ways in which a pressure loss can manifest itself:

- a Low Pressure warning on start-up (error 3.12);
- a No VOD Adjustments warning (error 3.00);
- a significant discrepancy between Set Pressure and Read Pressure when the



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pressure is set to 255 by the service engineer in Diagnostics;

- An obvious leak of ink from around the pump, the tubing or the manifold.

The following identifies how each of the ink system components can contribute to a loss of pressure in the system.

Ink Tank Reservoir

- Debris in the ink tank can cause either a partial or a total pressure loss. The debris can be pieces of foil seals from ink bottles, or other extraneous material that has fallen into the reservoir.

Pre-pump Filter

- Debris from the ink tank reservoir that has been drawn into the body of the filter can cause a total, or more usually a partial, pressure loss.
- Over tightening of the connectors onto the threaded stud of the filter body can cause a partial pressure loss by constricting the olive and reducing the size of the flow aperture; the actual filter membrane may have become blocked; it has done its job of protecting the pump.

Pump Assembly

The pump assembly is an electromagnetically-coupled gear pump.

- The pump motor has failed, resulting in loss of drive and hence total pressure loss.
- The pump motor has decoupled from the pump, so that the motor is spinning wildly but not turning the gears in the pump head, again resulting in a total pressure loss;
- The gears in the pump are worn, resulting in less than totally efficient drive and a partial pressure loss.
- A leak has developed on the output side of the pump.

NOTE: If the pump motor is turning but the pump itself is not, there will be a normal reading for Set Pressure, but a zero reading for Read Pressure.

Main Ink Filter

- The filter has fulfilled its task and has eventually collected an excess of debris and become blocked.
- The PTFE tubing has been incorrectly fitted to the filter. If the tubing is pushed too far into the elbow assembly, a pressure loss can result due to reduced flow.
- The stainless steel inserts, when pushed into the PTFE tubing, have pared off a little of the inner wall of the tubing causing a blockage which reduces flow, and hence pressure.
- A leak has developed at an assembled or welded joint.

Ventury Assembly

- The pressure transducer is faulty. Check the transducer and its associated wiring before suspecting a fault in the pressure circuit hybrid of the IMP PCB.
- The vacuum venture has either become blocked, or the stainless steel insert has been lost through incorrect assembly.
- A leak has developed at an assembly joint or crack. The manifold has simply become worn-out after years of ink flow.

10.5.3. Problem Solving - Printhead Mechanical Faults

FC32 Jet Alignment Problems

Possible causes:



- The jet has been shut down incorrectly.
- Ink has been leaking from the nozzle during a period of non-use.
- The ink is contaminated causing quantities of salt deposits to build up around the nozzle.
- The nozzle problem (the cap loose, the diamond cracked, the nozzle assembly distorted).

Before attempting to rectify a jet alignment problem, it is advisable to investigate which of these possible causes is most likely to have occurred, and to take the appropriate steps to ensure it does not reoccur.

First, execute the “clean nozzle” program. The EC2000 clean nozzle program is automatically executed by the machine. Refer to section 7.8. Normally this will solve the problem and repeat it 2-3 times if necessary. "Cleaning the nozzle" can remove any ink build-up or other impurities in the nozzle that result in misalignment of the jet.

If cleaning the nozzle does not solve the problem, please contact your EC-JET distributor.

(此处本来有清洗喷嘴的图片，修改后删除)

FC35 Gutter Problems

The faults which can occur in the gutter line are as follows:

- Blocked gutter which can be due to:
 - Incorrect shutdown not purging the gutter;
- Ink leaking from the gutter during a period of non-use:
 - Print head mounted lower than the printer (causing siphoning effect).
- Poor gutter action (inadequate suction):
 - Very thick ink, e.g. pressure is 40 points above the reference pressure value.

If you suspect a gutter blockage, do not attempt to clear it yourself; contact EC-JET or your local distributor.

FC36 Vibration Problems

Vibration can cause a series of problems. The followings are the most common problems.

Detection

Poor print quality is the most common indicator of vibration problems. This is because the print drops are relatively stable while in flight, so vibration in either the product being marked or the print head it will result in the drops being misplaced or obstructed.

The various types of vibration and their effects are described in the following:

Product Vibration/Tilting

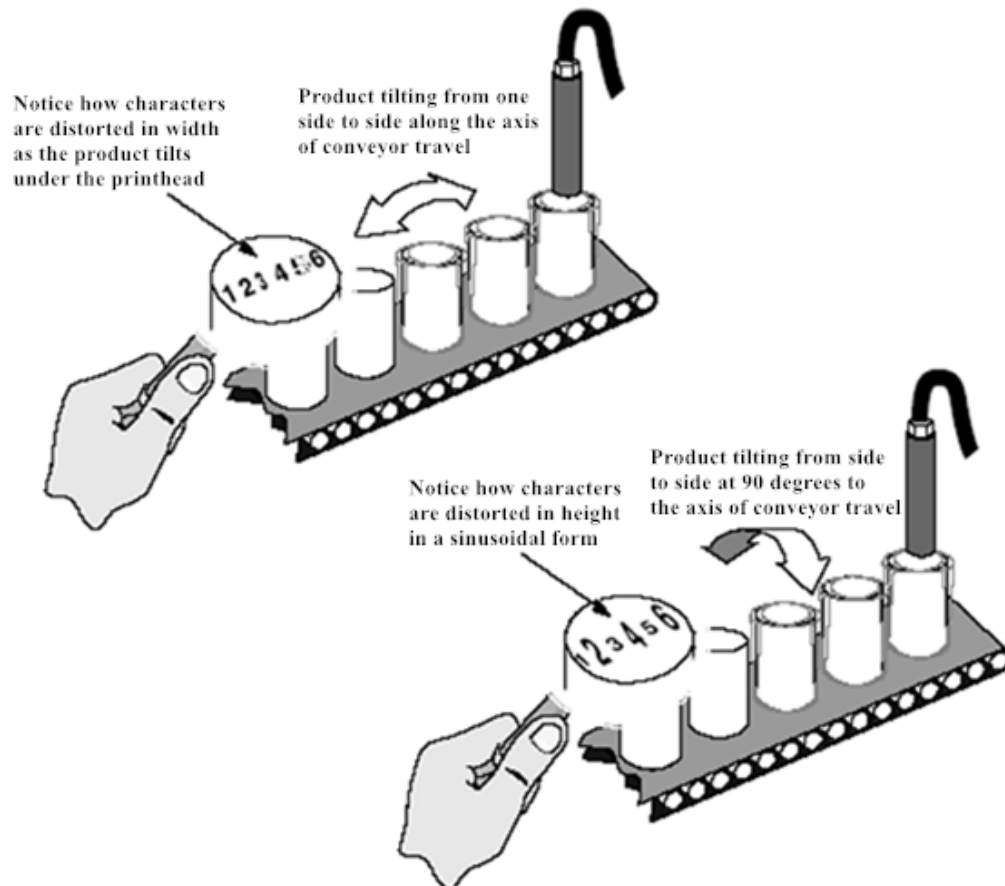
The product can tilt from one side to the other, either along the axis of the conveyor travel or at 90 degrees to it(i.e. across the conveyor width). When the product tilts along the axis of the conveyor

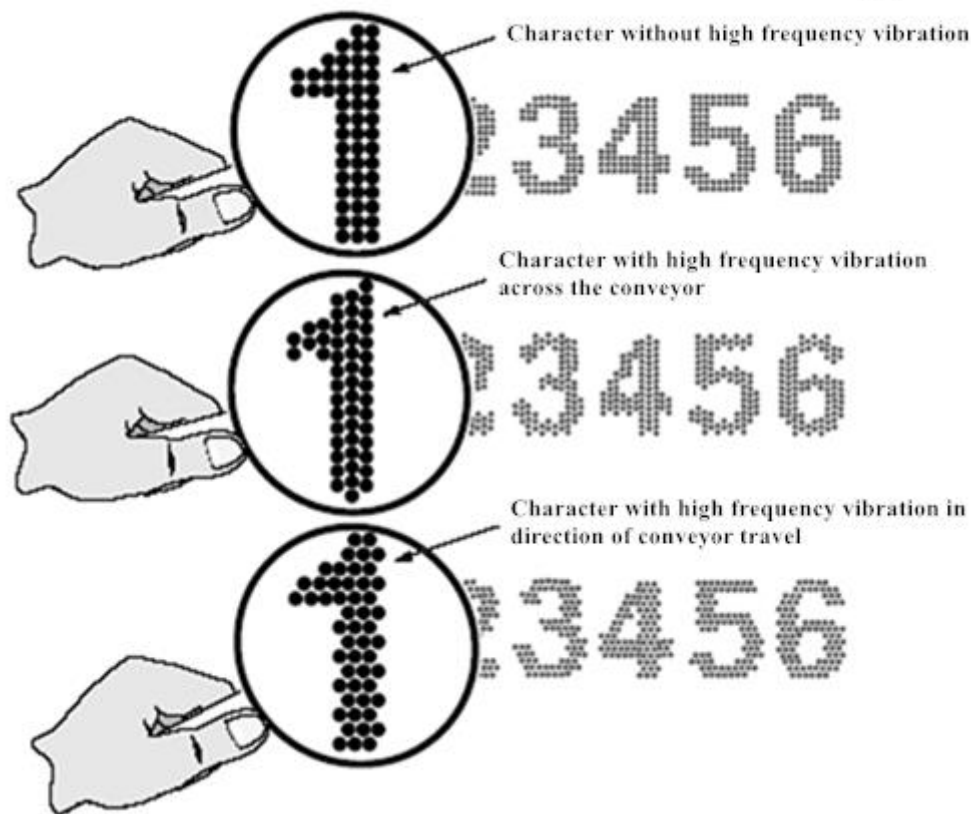
travel, the width of some characters will be contracted and some expanded, as the product tilts first one way then the other.

Similarly, when the product tilts at 90 degrees to the axis of the conveyor travel, the height of some characters will be contracted and some expanded, as the product tilts first one way then the other.

This is shown in the following illustrations:

EJ103

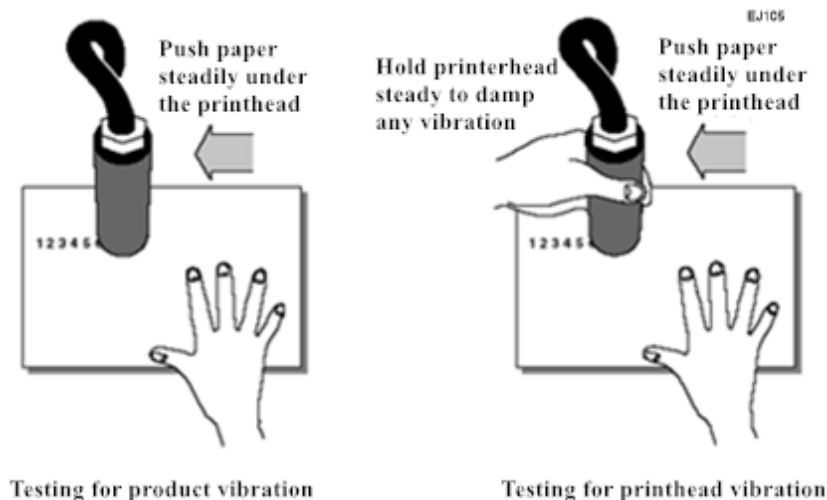




To determine whether high frequency vibration is affecting the product or the print head, simply pass a piece of paper under the print head and trigger the print. Take care to move the paper at a steady speed.

If it is the product which is vibrating, then the print quality will be good. If the print quality is poor, the vibration is likely to be coming from the print head.

To test for print head vibration, pass a piece of paper under the print head in the same way as described above, but this time hold the print head with your other hand to dampen any vibration in it. If print quality improves as a result, then the print head is suffering from the effects of vibration.



Knocking and Strong Vibration

Strong vibration and knocking to the print head is the most serious vibration problem likely to occur, since this will affect operation of the printer itself. Severe vibration or knocking will lead to the printer shutting itself down and displaying one or both of the following fault messages:

“2.01 Deflector Voltage”

“2.03 Velocity of Drop”

It will also be found necessary to clean the print head more often than would be expected.

To understand what is happening, consider that the stream of drops is relatively stable once in flight. Therefore, if the print head suffers vibration or sudden movement, the drops will be obstructed either by the VOD sensor or the edge of the gutter. This will cause ink to be splashed on the VOD sensor and deflector plates, and to build up deposits on the gutter.

10.5.4. Blockage Caused by Knocking and Strong Vibration

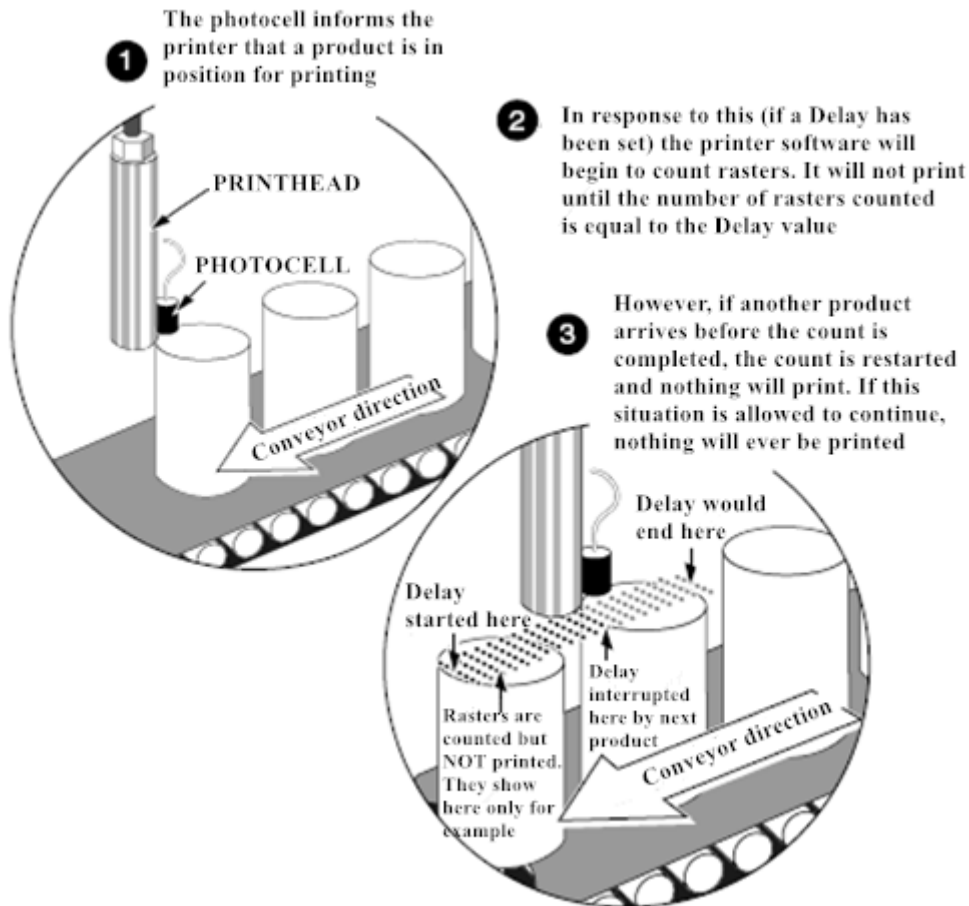
FC39 No Print - Print Delay Problem

Normally, when the system detects a product passing the photocell, it will activate a “print go” signal which causes the current message to be printed immediately. The Print Delay option of the SETUP menu is used to delay printing to allow the product to travel further before printing, thus controlling exactly where the message is to be printed. For instance, if the product is a long one and the message is to be printed in the middle, it will be necessary to set the delay to a value appropriate to the speed of the conveyor and the length of the message, which will cause printing to occur at the desired place.

What actually happens is that when the system detects a product passing the photocell, it will delay printing by counting the number of rasters it would have printed, until that count becomes equal to the value of the Print Delay option.

However, if the Print Delay value is set to an inappropriate value, it is possible for the next product to arrive before the delay expires. This resets the delay to begin counting again, and since the conveyors travelling at the same speed, the next product will once again arrive before printing has occurred and the delay will be reset; and so on. If this is allowed to continue, printing will never occur.

The following illustrates this problem :

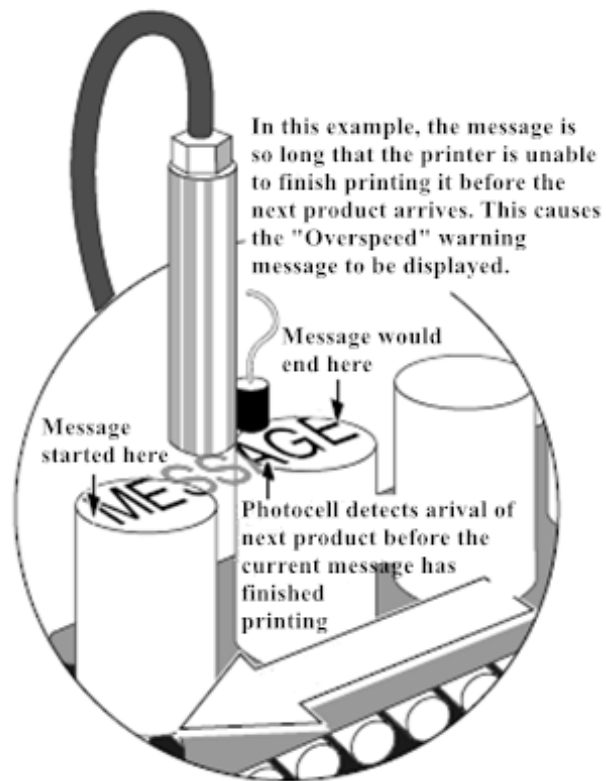


FC40 Part of Message Missing - Over Speed (Print Go) Error

If the message to be printed is too long for the product or the conveyor is travelling faster than the system can print, the following warning message will be displayed in the status line of the display:

“3.02 Over Speed (Print Go)”

The following illustrates the problem:



Appendix 1: Installation & Setting Up

This appendix is to help you install and set up the printer. Normally this procedure will be carried out by EC-JET Service Engineers when commissioning a new printer.

These notes are provided as a guide to be used if the printer is relocated or changes are made to ancillary equipment. Guarding and safety interlocks should all be in place and working correctly. EC-JET can accept no liability for damage to either machine or personnel in the event of the printer being installed, moved or maintained by unauthorized and/or untrained personnel.

If you are unsure of any procedure it is recommended that you contact your local EC-JET distributor.

1.1 Unpacking the System

Please carefully remove the cardboard packaging and check for the following contents:

- EC-JET Printer
- EC-JET User Manual, a guide to quick use
- Packing list
- Final test print sample sheet
- Total Quality Plan packing card
- Key for cabinet, specified cleaning set, air filter set

1.2 Where to Put the Printer

The EC-JET printer must be sited on a firm, solid base (preferably a EC-JET cabinet or mounting table) and with a clean power supply, i.e. free from electrical interference.

The printer physical dimensions, in millimeters, are as follows:

555 (high) x 305 (deep) x 330 (wide)

The printer weighs 23.5 kg (not including ink or packaging).

1.3 Accessories

The following accessories are available for purchase with the EC-JET printer:

- RS232 Communication Cable - allows multiple, remote printer control from Windows based PC system.
- Shaft Encoder - enables even print width at uneven line speeds.
- Photocell - detects presence of product.
- Printhead Gantry.
- Positive Air Kit - to prevent condensation and dust interfering with print quality.

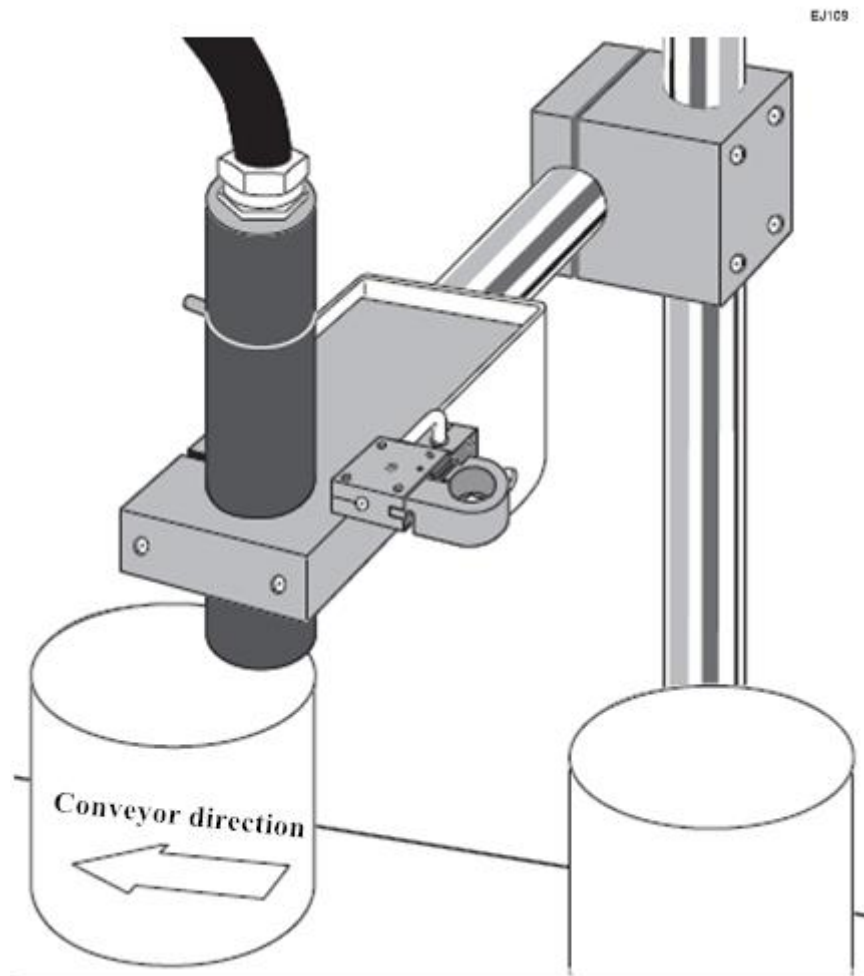
For a full list of all available accessories, please contact EC-JET or your EC-JET distributor.

1.4 Power Connection

Please refer to the chapter 3.1.2.

1.5 Attaching the Printhead to the Production Line

The print head can operate from any angle if clamped in place with a EC-JET head bracket to ensure secure and vibration free operation.



1.5.1 Print Height

If the printhead is moved nearer to the surface to be printed, height of the printed character will decrease - if moved further away, its height will increase.

However, adjustment of the print height should be controlled through the SETUP menu.

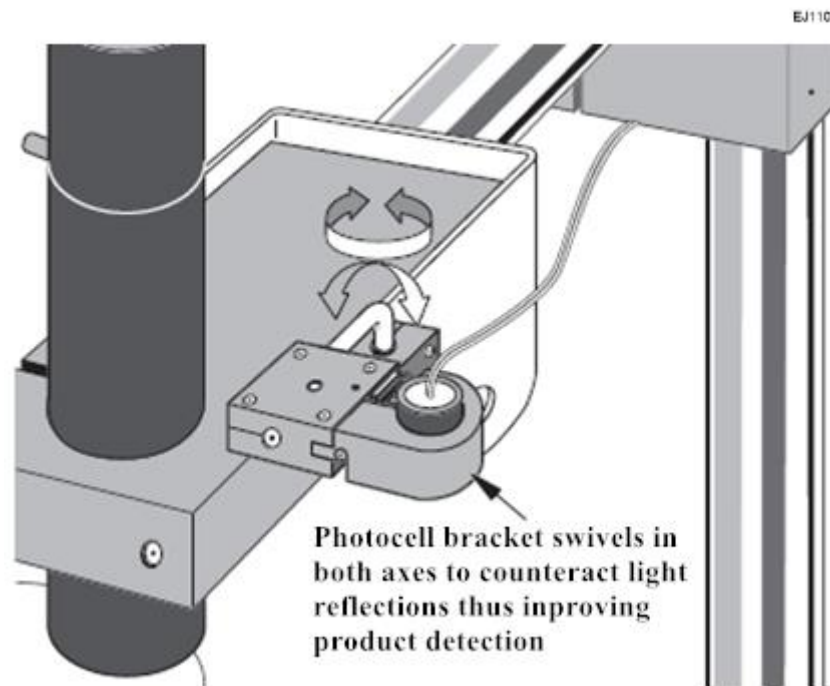
NOTE: Do not attempt to adjust the printer character height by changing the print head-to-product distance. This may result in deterioration of print quality.

1.6 Setting up the Photocell

The photocell is used to detect the presence of a product to be printed on. There are variations in

the way this “trigger” can be interpreted by the system, but usually a message is printed in response to a signal from the photocell.

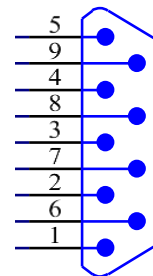
The photocell should be mounted upstream of the print head (so it detects the product before the product reaches the print head), as close to the print head as possible and at a distance from the product which gives consistently reliable triggering when a product passes it. A delay between the photocell being triggered and the print taking place can be set by a menu command, to aid fine adjustment of print positioning on the product.



1.6.1 Photocell Connections

The photocell is connected to the system via a 9-pin D - Type connector. The function of each pin is described below:

Pin 1	+ 24volts
Pin 2	0 volts
Pin 3	+ 5 volts
Pin 6	Next Object Signal



If the photocell has a screened conductor, it should be connected to the shell of the D - Type connector and to the printer chassis at the printer end of the cable (it must not be connected to D volts).

CAUTION: Electromagnetic Compatibility performance may be compromised by the use of unsuitable photocells. Use only EC-JET approved accessories.

1.7 Setting up the Shaft Encoder

Shaft encoders are recommended for production lines where variable speed is likely. A shaft encoder generates a pulse for a fixed distance of product movement. This can be used to produce

constant width print as the line speed increases or decreases.

If an encoder is to be fitted, it should be attached to a suitable production line drive shaft, with appropriate gearing if necessary. It must be installed and driven in a position where it best follows the movement of the product being printed on.

The calculations shown in the next few pages should be used to select the optimum arrangement for your application. EC-JET will be happy to advise on the best position and gearing for shaft encoder installation.

The selection of encoder and gearing will determine the printed pitch and the maximum possible line speed for the application. The printer allows some variation using the Print Width parameter, but the initial selection of the encoder and gearing is critical.

EC-JET offer a range of shaft encoders:

- 2500 pulses per revolution
- 5000 pulses per revolution
- 10000 pulses per revolution

Each is available with either a 3m or 5m connecting cable.

For applications where the encoder needs to be driven from a conveyor belt or from the product, EC-JET provide the encoder wheels:

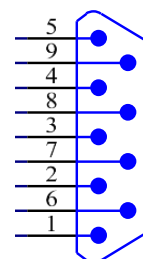
- 188.8mm circumference (60mm diameter)

A given encoder and drive gearing will have a fixed encoder pitch - that is, the distance travelled by the product for each pulse cycle of the encoder output. The width control in the printer is used to generate rasters at integer multiples of the encoder pitch. This multiplier is the pitch factor and will always be a whole number. The calculations on the following pages show how this is used and explain the difference between pitch factor and print width.

1.7.1 Shaft Encoder Connections

The shaft encoder is connected to the system via a 9-pin D - Type connector. The function of each pin is described below:

Pin 1	+ 24volts
Pin 2	0volts
Pin 3	+ 5volts
Pin 8	Single Ended Input



The screened conductor should be connected to the shell of the D -Type connector and to the printer chassis at the printer end of the cable (it must not be connected to 0 volts).

CAUTION: EMC performance may be compromised by the use of unsuitable shaft encoders. Use only EC-JET approved accessories.

1.7.2 Selecting the Encoder, Gearing, and Print Width

When using a shaft encoder it is vitally important that the calculations are followed and the print width is computed based on the geometry of the set up. If guessed at, messages will not be printed

at the required size; rasters will be printed too close together or too far apart.

The calculations take you through a series of steps as shown below. There is also a worked example and a problem solving section afterwards.

Step 1: Define the required raster pitch for the application.

Step 2: Select the encoder, gearing and pitch factor that gives an actual raster pitch close to that required.

Step 3: Check the calculated print performance (size and speed) is adequate.

Step 4: Calculate the printer width from the pitch factor and enter it.

Step 5: Check print samples for performance.

Step 1: Define the Required Raster Pitch for the Application

For each raster type on each printhead type there is a drop pitch which gives the best quality print, i.e. 1:1 aspect ratio at the default printer settings. This value is known as the ideal pitch; a table later in the section lists them. For a particular application you may want to choose a different pitch, bearing in mind that the aspect ratio can be adjusted using the Print Height setting (see “Changing the System Setup”).

The required raster pitch is calculated by:

Required raster pitch (mm)

$$\frac{\text{Printed Length(mm)}}{\text{Number of Characters x Character Width (rasters)}}$$

That is:
$$\frac{\text{Printed Length(mm)}}{\text{Number of Rasters in Message}}$$

Where:

Printed length = length of message on product. This must be less than the length of any area left clear for printing.

Number of characters = number of characters in the longest line of the message.

Character width = number of rasters in each character; see the following table.

(Alternatively, obtain the number of rasters in the message by creating the message on the printer and noting the x-position of the cursor just after the end of the message.)

Character	Height	Width
5 HighCaps	5	6
7 HighCaps	7	6
7 Chinese	7	8
9 HighCaps	9	8
9 Chinese	9	10
12 HighCaps	11	10
12 Chinese	12	13
16 HighCaps	15	11
16 HighFull	15	11
16 Chinese	16	17
24 HighCaps	24	16
24 Chinese	24	25
32 HighCaps	32	20

The character width varies with the size of character chosen. The figures in the table include the gaps between characters; this will introduce a small error as the gap after the last character is not printed.

For example: Consider printing “Sell By 19 Nov 0000” in 7 High Full using a Midi print head and the 7 GEN STD raster onto a print area 38mm long.

From the table above, the width of each character is 6 rasters. The message is 17 characters long including spaces. Therefore, the required raster pitch is given by:

$$\text{Required raster pitch (mm)} = \frac{38\text{mm}}{17 \text{ Character} \times 6 \text{ Raster}} = 0.373\text{mm}$$

This will be the maximum pitch possible; any larger and the message will not fit in the print target area (38mm).

Note: the ideal drop pitch for the 60 micron printhead of EC-JET is 0.4mm. If the actual drop pitch is bigger than 0.4mm, the raster distance will be wider, the line speed will increase.

Step 2: Select the Encoder, Gearing, and Pitch Factor

A particular combination of encoder and encoder drive (gearing or wheel) will give a particular encoder pitch; that is, the distance the product will travel for each cycle of the encoder output signal. The encoder pitch will be multiplied by the pitch factor (a whole number) to give the actual raster pitch. This should be as close as possible to the required raster pitch.

The table below gives the encoder pitches for standard EC-JET encoders and wheels. The encoder pitch for other gearing or drives can be calculated using:

$$\text{Encoder Pitch (mm)} = \frac{\text{Wheel Circumference (mm)}}{\text{Encoder Pulses Per Revolution}}$$

Where:



Wheel Circumference = Distance the product moves for one revolution of the encoder. This may be 3.14 x roller diameter, or 3.14 x star-wheel diameter, etc., depending on the application.

The encoder pitch will be multiplied by a whole number to give the actual raster pitch. By selecting a suitable encoder and gearing, the actual raster pitch can be made close to the required raster pitch.

$$\text{Actual Raster Pitch (mm)} = \text{Encoder Pitch (mm)} \times \text{Pitch Factor}$$

Where:

Pitch Factor is a whole number.

This will probably require trial and error.

For each encoder pitch you try, the starting point for the pitch factors can be:

$$\text{Pitch Factor} = \frac{\text{Required Pitch (mm) (rounded to the nearest whole number)}}{\text{Encoder Pitch (mm)}}$$

Using the example from Step 1, the required raster pitch is 0.373mm. A standard EC-JET encoder and wheel will be used to try to achieve this.

No	Shaft / Shaft Wheel	Encoder Pitch X Pitch Factor = Actual Raster Pitch		
1	2500ppr/188.2mm	0.075mm	5	0.375
2	5000ppr/188.2mm	0.0375mm	10	0.375
3	10000ppr/188.2mm	0.0188mm	20	0.375

For this example, the actual pitch using EC-JET standard encoder wheel and the resulting two encoder are close to the desired pitch, taking into account the higher pulse value, the higher cost encoder, we will start with 5000PPR encoder with EC-JET standard encoder wheel (diameter 60mm, perimeter 188.2mm) factor 10 (this is covered in later sections).

Step 3: Check the Expected Print Performance

Any difference between the required raster pitch and the actual raster pitch will influence the print performance. There is also a limitation due to the frequency of the encoder signals. In particular, the printed message length and the maximum line speed must be checked. If there are any problems with these, the selection process must be repeated.

$$\text{Printed Message Length(mm)} = \text{Number of Rasters} \times \text{Actual Raster Pitch (mm)}$$

Where:

Number of Rasters = as calculated in Step 1

Actual Raster Pitch = as calculated in Step 2

$$\text{Max. Line Speed (m/s)} = \text{Actual Raster Pitch(mm)} \times \text{Raster Rate (kHz)}$$

Where:

Actual Raster Pitch = as calculated in Step 2

Raster Rate = Maximum Rate of Raster Production (see the following table)



The raster rate varies with printhead type and raster:

Raster Type	60um PH Raster Speed (kHz)
7 GEN STD	5.714
16 GEN STD	1.5
24 GEN STD	0.895

The maximum line speed calculated above should be compared with that expected for the production line – use the section “Line Speeds Per Product Frequency” later in this manual if necessary.

The line speed may also be limited by the encoder signal response:

Max. Encoder Speed (m/s) = Encoder Pitch (mm) x Specified Frequency (kHz)

Where:

Encoder Pitch = value from table in Step 2 for encoder/ gearing

Specified Frequency = Limiting Signal Frequency (see the following table).

The specified frequency varies with encoder type:

Shaft Encoder	Frequency (kHz)
2500ppr	20.0
5000ppr	80.0
10000ppr	

This gives the following maximum encoder speeds for standard EC-JET encoders and wheels:

Encoder	Maximum Encoder Speeds for EC-JET Standard Wheel (188.2mm)	
2500ppr	0.075	1.5m/s
5000ppr	0.0375	3m/s
10000ppr	0.0188	1.5m/s

The maximum encoder speed must also be higher than the production line maximum speed.

Referring back to the example, the actual raster pitch is 0.375 mm (Step 2) and the number of rasters is 102 (Step 1).

Printed Message Length (mm) = 102×0.3750 (mm)
= 38.25 (mm)

This will fit in the target area of 38mm.

The message is printed using the Midi 7 GEN STD raster with a raster rate of 5.33 kHz.

Max. Line Speed (m/s) = $0.375 \text{ mm} \times 5.33 \text{ kHz}$



$$=2 \text{ m/s}$$

The Max. Encoder Speed of the 5000ppr encoder/gearing chosen in Step 2 is 3 m/s.

This will not limit the expected printable maximum line speed.

If we choose 2500ppr or 10000ppr encoder with EC-JET standard wheel, the Max. Encoder Speeds are only 1.5m/s, will limit the expected printable maximum line speed.

Step 4: Enter the Printer Width Parameter

The “Print Width” parameter is used by the printer to generate the pitch factor and print rasters at the actual pitch calculated in Step 2. Print Width is a setting accessed from the SETUP menu. The way it can be changed is described in “Changing the System Setup”.

The relationship between Print Width and Pitch Factor is:

$$\text{Print Width} = \text{Pitch Factor} - 1$$

The requirement to subtract 1 arises from the printer software operation.

Referring back to the worked example, the pitch factor calculated at Step 2 is 10.

Therefore, the Print Width parameter entered at the printer must be $10 - 1 = 9$.

This will print one raster for every 9 encoder pulses.

Step 5: Check the Print Performance

Having entered the print width and created a message using the character size and raster from the calculation, prints must be taken at a variety of normal running speeds to confirm the settings. This must include the maximum running speed.

Note: If the customer has strict requirement on the message width, necessary to calculate the drop pitch as requirement and design encoder wheel diameter rather than using EC-JET standard encoder wheel and choose the right encoder, check if suitable following Step 3.

1.7.3 Encoder and Print Width Problems

Important Notes:

10.5.4.1. Never assume that the entered print width value is correct; always go back to the calculations.

10.5.4.2. Never assume that the line speed is known accurately; try to measure it or estimate it as you see it on the day. (Refer to the “Line Speeds per Product Frequency” section later in the manual).

The encoder will only maintain a fixed print width up to the lower of the maximum line speed and the maximum encoder speed calculated in Step 3. When this speed is exceeded, the printed message length can increase dramatically and unpredictably. The same effect can be seen if the print width value is incorrectly calculated or entered. Very often a printer will be set up on line with a shaft encoder, the pitch factor poorly calculated (if at all) and print samples taken.

Troubleshooting must follow a logical sequence:

1. If the message length measured on the print samples is larger than that calculated in Step 3, then it is possible that the line speed is too high. This can easily be checked:



- a) From the SETUP menu, set Shaft Encoder to Off. Note down the original Print Width setting, then set Print Width to 0.
- b) Note the original Print Delay setting. Multiply this by the original Print Width setting. Enter the new value.
- c) Run the line at the same speed and take print samples.

The printer will now be generating rasters at its maximum rate.

- i) If the printed length of the message is still too long, then the line speed is too high for the print head/raster being used. No adjustment of the encoder, gearing, or Print Width will influence this.
- ii) If the printed length of the message is now shorter than required, the original print width was wrong. It may need to be increased or decreased. Only going through the calculations will give the correct value to enter. Remember to check the maximum encoder speed.

Remember to enable the shaft encoder using the SETUP menu and adjust the Print Delay.

2. If the message length measured on the original samples (i.e. with the shaft encoder enables and the original Print Width settings) was shorter than that required, then the print width must be increased. The calculations will give the correct setting; if guessed at the results could still be unpredictable.

1.8 Using the Printer Alarm Output

When there is a print warning or failure, the printer activates a 24 volt external alarm, where fitted.

The Alarm Beacon available from EC-JET is as follows:

The Alarm Beacon Single Stage 24V.

The pin connections are as follows:

Alarm out port 1

Normally open contact: DB9 pin 6, pin 1.

Alarm output Port 2

Normally open contact: DB9 pin 7, pin 2.

Alarm output Port 3

Normally open contact: DB9 pin 8, pin

3.NOTE: The total power of all alarm output equipment can't over 12W.

1.9 Filling with Ink and Solvent

Switch the printer on and check if the ink or solvent level warning messages are displayed. Fill the system with ink and solvent as necessary (see "Daily Maintenance").

Appendix 2: Technical Specification

Introduction

The EC-JET Continuous Ink Jet Printer is a fast, reliable, non-contact printer capable of applying sell by dates, batch codes and other variable information to a wide range of substrates on the production line.

Technical Data

Cabinet

Top cover: Stainless steel grade 304 (Special surface)

Dimensions

External height:	555mm
External depth:	305mm
External width:	330mm

Weight

Printer weight: 25.5kg (excluding ink, solvent and packaging)

Power Requirements

115V, Voltages range: 85~132Vac, 50/60Hz。

230V, Voltages range: 170~264Vac, 50/60Hz。

This equipment is a Class 1 earthed Electrical connections at the rear of the cabinet comply with the extra low voltage safety requirements.



WARNING: THIS PRINTER MUST BE EARTHED/GROUNDED. (Acquired EN60950 Certificate)

Environmental

Operating temperature:	-5 to +45 Celsius ambient
Humidity range:	Up to 90% relative humidity, non-condensing
Acoustic emission:	Less than 70DB

Ink System

Construction



System enclosure:	Stainless steel grade 304
Ink tank:	Black HDPE
Solvent tank:	Nature HDPE

Capacity

Ink tank:	1600ml approximately
Solvent tank:	1600ml approximately

Pressure

Pressure range:	Up to 4.48 bar (65 p.s.i.) normal operating pressure
Maximum pressure:	6.2 bar (90 p.s.i.) maximum under fault conditions

Level Control

Ink tank sense low:	Warning reported at approximately 400ml
Solvent tank sense low:	Warning reported at approximately 400 ml

Performance

Solvent consumption:	<10ml/h at 20 Celsius ambient using EC1240 MEK black ink
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Memory Capacity

Message storage capacity:	2 areas, 32 messages each area
Logo storage capacity:	Up to 100 logos
Chinese character:	12000 inside

Printhead

Types

Micro:	40 micron
Midi:	50 micron, 60 micron and 70 micron

Construction

Printhead:	Polyformaldehyde(POM)
Cover:	Stainless steel grade 304
Minimum Conduit bend radius:	230mm

Dimensions

Conduit length:	2m or 4m
Conduit diameter:	20mm
Print head dimensions:	Diameter 42mm, length 243mm

Throw Distance (recommended)

Micro:	3.5mm
Midi:	10mm



Printing Performance Data

Raster Information

Lines of print:	Maximum one line of 3 High characters, or up to four lines of 7 High characters, or up to six lines of 5 High characters
Rasters available:	Paired raster set (printer model dependent) of 7 Chinese, 9 Chinese, 12 Chinese, 16 Chinese, 24 Chinese; and of English/Number/Symbol: 5 Height Caps, 7 Height Caps, 9 Height Caps, 12 Height Caps, 16 Height Caps, 16 Height Full, 24 Height Full, 32 Height Full, Logo Edit.

Character Height Range

Minimum character height:	1.1mm (Micro print head) using 7 dot raster
Maximum character height:	12mm (Midi 60 micron print head) using 16 dot raster

Certificate Acquired

Safety Standards

Meet TUV/GS standards.

Mechanical Requirements

Meet 89/392/EEC requirement (Revision 91/368/EEC and 93/44/EEC).

Low Voltage Safety Requirements

Meet 73/23/EEC requirements.

EMC Performance

Meet 86/366/EEC requirements (Revision 92/31/EEC).

European Safety Standards

EN292-1, -2: 1991	Mechanical Safety
EN60079-10: 1996	Electronic Equipment Radioactive Gas Requirement – harmful gas classification
EN60204: 1992	General technical Configuration
EN60529: 1992	Cabinet Protection Technical Configuration (IP level)
EN60590: 1992	Information Technical and Equipment Technical Configuration

EMC

European EMC Standards

EN50081-1: 1992	EMC Emissions
EN50082-1: 1992	EMC Immunity
EN50082-1: 1995	EMC Immunity



U.S. EMC Standards

FCC 47CFR Part 15,Class A



Appendix 3: Printable Line Speeds

The following table shows the line speed at which good printing will be obtained for each raster type and print head model at ideal pitch:

16 Dot Standard Speed	36	9 Dot High Speed	213
24 Dot Standard Speed	20	12 Dot High Speed	136
5 Dot High Speed	382	16 Dot High Speed	87
7 Dot High Speed	274	32 Dot High Speed	13

The line speeds shown above can be adjusted if printing at more than ideal pitch, i.e. double or treble pitch (see “Appendix 1: Installation and Setting Up”).

NOTE: Print quality will be impaired if printing takes place at anything other than ideal pitch.

Ideal Pitch

Otherwise known as single pitch, this is dependent on the raster (i.e. printer type) being used. Printers with the faster rasters have an increased pitch capacity because the overall character height is larger. This helps to form “square” (more precise and uniform) character.

Double Pitch

Twice the ideal pitch. Print height may need to be increased to maintain character proportion.

Triple Pitch

Three times the ideal pitch. Print height may need to be increased to maintain character proportion.

Appendix 4: Dimension

