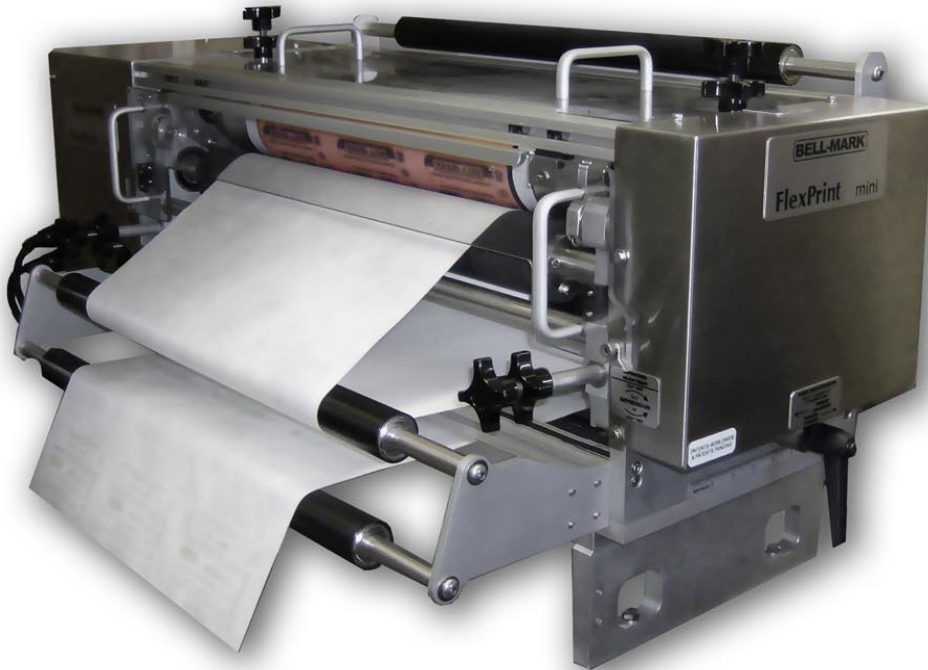


# BELL-MARK

INNOVATIVE CODING AND PRINTING SOLUTIONS FOR OVER 40 YEARS



## *Mini FlexPrint Operator's Manual*



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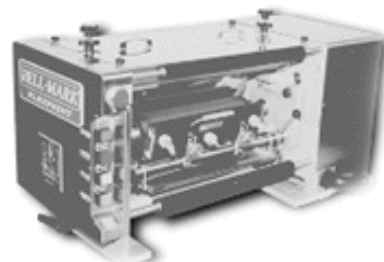
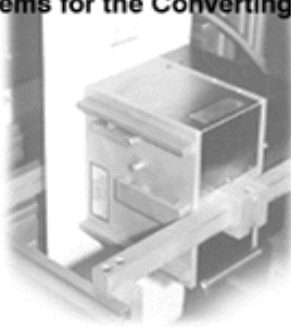
# BELL-MARK

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## SAFETY

**Before working on the printer, please read this section thoroughly. Always keep personal safety in mind while working on the machine.**

### SAFETY FLAGS

Throughout this manual we will use the following graphic symbols: **CAUTION** and **WARNING** to alert the operator to any and all known or perceived safety concerns.

**CAUTION**

**THIS SAFETY WARNING POINTS OUT AREAS THAT CAN CAUSE PERSONAL INJURY OR DAMAGE TO THE MACHINE.**

**WARNING**

**THIS SAFETY WARNING POINTS OUT AREAS THAT CAN CAUSE SERIOUS INJURY.**

- **Do not operate this equipment while under the influence of alcohol or while taking medications that may impair your judgment.**
- Only trained personnel should be allowed to operate this equipment.
- **Use the safety covers that are installed on the printer.**

- Do not attempt to defeat the safety switches and equipment interlocks.
- **Keep your fingers away from the printer's moving parts during operation.**
- Disconnect electrical power and pneumatic supplies before performing services or repairs on the printer.
- **The printer and its component parts should only be used for the purposes for which they were sold, and for which they were designed and constructed.**
- Do not wear loose clothing, such as neckties or shirts with loose sleeves.
- **Do not wear jewelry such as rings, necklaces or bracelets when working on the printer.**
- Pull back and tie long hair that might get caught in the machine.

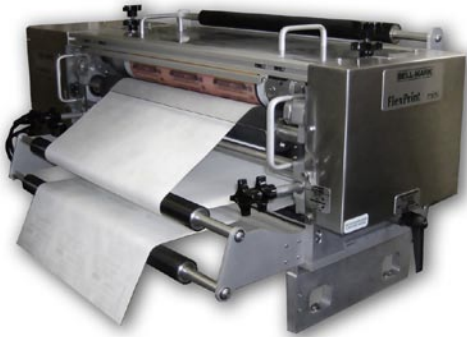
We have endeavored to make this instruction manual as accurate as possible. Illustrations, photographs and text have been carefully checked. If, in the course of using this manual you find any errors, or have any comments regarding its content, please do not hesitate to inform your Bell-Mark representative.

All instructions should be read, carefully studied and understood before attempting operation, maintenance or repair of the equipment described herein. If there is a question regarding any of the information presented here, please call 717-292-5641 or FAX 717-292-5686 and request Technical Support.

Due to the variability of local conditions, customer procedures and operator skill levels, neither the authors, nor Bell-Mark Corporation assume any responsibility for any accidents; injuries, damages or other losses incurred resulting from the material presented in this manual.



## GENERAL DESCRIPTION OF THE FLEXPRINT



**Mini FlexPrint**

The Bell-Mark FlexPrint™ is a state-of-the-art, one color, in-line, PLC controlled, rotary Flexographic printer. The FlexPrint is patented and performs high-quality printing on Tyvek™, paper, and film.

“In-Line” printing eliminates the expense of purchasing preprinted web material. It also solves package registration problems on horizontal form/fill/seal and vacuum packaging machines.

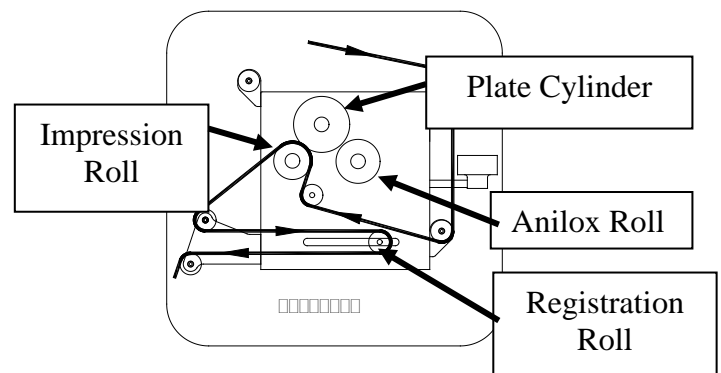
The FlexPrint was designed for in-line printing and coding on all horizontal form/fill/seal packaging machines, including the Dixie™, Hooper™, Mahaffy & Harder™, Multivac™, Prime Equipment™, and Tiromat™.

Typical applications include printing the name of the product, product descriptions, product codes, lot numbers, instructions, company logotypes, and bar codes.

The word *Flex* comes from the flexible printing plate that is unique to this type of printer. The flexible magnetic plate backing conforms to the curvature of the printer’s plate cylinder and as a result, changing the plate is very simple.

This printer is sold with one type of drive, three widths, two different means of control, and one plate cylinder diameter.

The Mini Flexprint uses a servo-driven plate cylinder and impression roll. Here, the packaging machine’s own encoder controls the plate cylinder and impression rolls, eliminating undue stress on seals. This drive is excellent for thinner films, and higher speed applications and offers “hands-off” operation when changing cycle speeds.



The Names of Key Printer Rolls

The Mini FlexPrint is available in three widths: Models 360FP, 460FP and 600FP. The maximum printing widths for these printers is 14”, 18”, and 24” respectively.

Two methods of control for this printer are available. One model has its own printer-mounted controls with a pushbutton panel integrated with the machine. The second model uses the packaging machine’s electronic control panel, the Human-Machine-Interface (HMI) to access the printer’s command string (See Figure 1).



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Printer-Mounted Button Panel



HMI Controlled Printer (Printer-Mounted E-Stop Button Only)



Human-Machine Interface (HMI)

Figure 1-FlexPrint Controls

The Mini Flex-Print is available with a 12" circumference plate cylinder (max. print length=9.0").

### THEORY OF OPERATION

As noted, under "General Description", the Bell-Mark Mini Flex-Print is available with one type of drive, the "Servo" drive system.

The printer utilizes an open doctor blade inking system that uses an "inkwell" bottle feed to the anilox (inking) roll. This roll is driven at a variable speed by a separate drive motor. During the pre-ink cycle the anilox roll ramps up to match the plate cylinder speed and makes one revolution. During the re-ink cycle the anilox roll ramps up to match the plate cylinder speed if the print cylinder did not rotate 180 degrees from the home sensor during the print cycle it will re-ink the opposite direction (the shortest path) if it passed the 180 degree mark it will make

a full pass and then back to the home position.

The Servo model uses a servomotor linked directly to the plate cylinder. In this case, either the packaging machine encoder or a separate printer-mounted encoder is used to supply feedback to the servo, providing synchronized movement between the printing plate and the web.

A typical Mini Flex-Print cycle begins when the packaging machine sends a signal to the printer, indicating that it is about to advance. With the plate cylinder in the "home" position (the plate having just completed the inking cycle), the following sequence occurs, as the web advances.

### SERVO SEQUENCE OF OPERATIONS

This model is stopped and held at its home position by the servomotor. "Home" is established by the setting of the home proximity switch (factory set). The remainder of the operational sequence is explained in detail as follows:

1. Upon power-up, the servo system waits for a "home initiate signal" from the packaging machine. The print cylinder rotates until it receives an input from the home proximity sensor. If the print cylinder was on the sensor when it received the "home initiate signal", it backs off the sensor and then rotates forward until the sensor signals it again.
2. The system then waits for a "pre-ink signal" from the packaging machine. Upon receiving this signal, the plate cylinder rotates one revolution and the system pulls in and drops out the anilox roll to "ink" the printing plate.
3. The system then waits for an "index signal" from the packaging machine, and upon receiving this signal, the servo drive rotates the plate cylinder at the speed being dictated by the encoder. This causes the printing plate to track against the web, completing the print.



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4. When the system receives an “end of index” signal from the packaging machine, it drops out the impression cylinder, disengages the clutch, and continues to rotate the plate cylinder for the re-inking cycle in which the anilox roll ramps up to match the plate cylinder speed taking the shortest path to re-ink the print plate (either CW or CCW) by pulling in and dropping out the anilox roll to re-ink the print plate for the next index.
5. Once finished the plate cylinder returns home, pulls in the impression cylinder, engages the clutch, and waits for the next index signal.

## INSTALLATION OF THE MINI FLEXPRIINT

When the printer is received, immediately inspect it for damage. If damage is found contact the shipping carrier. If necessary, Bell-Mark can assist you in preparing your claim.

A Bell-Mark installation specialist is tasked with installing each new printer. This technician is an expert and is also the person who will train end-user personnel.

The Mini FlexPrint is designed to rest on the frame of a packaging machine. It must be facing in the correct direction (see Figures 1 and 2). A web path label on the printer shows the proper orientation. The printer should be mounted as close as possible to the sealing head. To avoid web-tracking problems, it is essential that the machine is centered and that the printer’s rolls are parallel with the packaging machine rolls. It is also essential that the printer be mounted level, so that the Inkwell™ inking system will function properly.



Figure 1-Mounted FlexPrint



Figure 2-Mounted Flexprint and EasyPrint MLP Combination



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After the Mini FlexPrint has been positioned, it must be bolted to the packaging machine's frame for permanent mounting.



Figure 3-Mounting Bolts

This is done by marking the bolt hole locations on the machine bed, through the four mounting slots (Figure 3). Before tightening these mounting bolts, align the printer's centerline (circumferential scribe line on the plate cylinder) with the centerline of the packaging machine and verify that the printer's rolls are parallel with the packaging machine's rolls. Also, with a machinist's bubble level, check that the printer is level. Shim the printer if necessary, and then tighten the mounting bolts.

### PERSONNEL REQUIREMENTS

Operating and maintenance personnel should be familiar with horizontal form-fill-seal packaging machines and / or industrial printers. They should also be trained and knowledgeable in electrical power and pneumatics.

### ELECTRICAL REQUIREMENTS

The FlexPrint requires standard 230VAC, 20-amp service. The connection box is located at the end of a 16 ft. umbilical cord attached to the printer. All external electrical connections are made to this box.

The printer requires a triggering signal from the packaging machine to begin the printing cycle. The triggering signal must be 50 milliseconds long. This signal can be 24VDC, 115VAC, 230VAC, or dry contact, as supplied by the packaging machine.

# CAUTION

**NOTE:** The proper relay to accept this signal must be installed in the printer control circuit prior to energizing the printer.

### PNEUMATIC REQUIREMENTS

The FlexPrint requires a minimum of 5 cfm of clean, dry, **non-lubricated** compressed air at 60 PSI. This is typically provided in a 1/4" line that should be connected to the printer via a pressure regulator (supplied).

### MAGNETIC PRINTING PLATE MOUNTING

Every FlexPrint printer uses photopolymer printing plates affixed to a magnetic-backed mat (Figure 4). The steel construction of the plate cylinder permits easy mounting and removal of these plates.

The plate cylinder's surface has a circumferential scribe line that marks the centerline of the cylinder. It also has a horizontal scribe line that marks where the first line of print on the plate should be located.

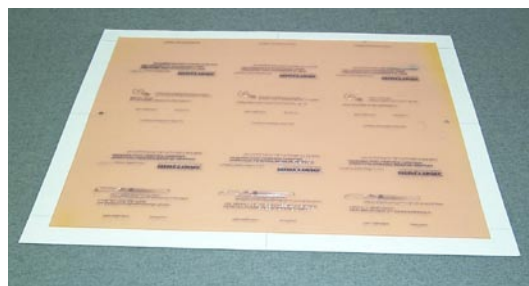


Figure 4-Typical Printing Plate and Matte

The following steps describe the sequence that should be used to mount the printing plate on your FlexPrint printer.

**NOTE:** If you are *changing* the printing plate, and the FlexPrint is to be inactive for an extended period of time before resuming printing, the procedure for draining and cleaning the inking system (as outlined later in this manual) should be performed.



1. Turn the unit off at either the “Stop” button on the FlexPrint or at the packaging machine HMI.
2. Remove the Lexan™ guards from the top and sides of the printer. These guards have magnetic interlock switches that will prevent printer operation while the plate is being mounted and the web is being threaded through the printer.
3. On the Mini Flex printer, since the servomotor was de-energized when the cover interlocks were opened, the plate cylinder can be manually rotated without further steps.
4. The printing plate (Figure 4) has a magnetic backing (matte) that holds it in position on the steel plate cylinder. If you are removing a plate that is already mounted, grasp the upper corners of the mat, and remove it as shown in Figure 5. There will be some slight resistance from the servomotor.



Figure 5-Plate Removal

5. After removal of the printing plate, follow the recommended procedures for its cleaning and storage as found elsewhere in this manual.
6. The plate cylinder has two lines scribed into its surface that will be used to align the new plate. The center mark on the plate should be lined up with the

circumferential (vertical) scribe line on the plate cylinder (Figures 6 and 7). Since the “HOME” location of the plate cylinder is related to the horizontal scribe line, the leading edge of the print should be lined up with this line (Figures 8 and 9). NOTE: this is the print, not the print matte



Figure 6-Centering the Plate



Figure 7-Correct Vertical Plate Alignment

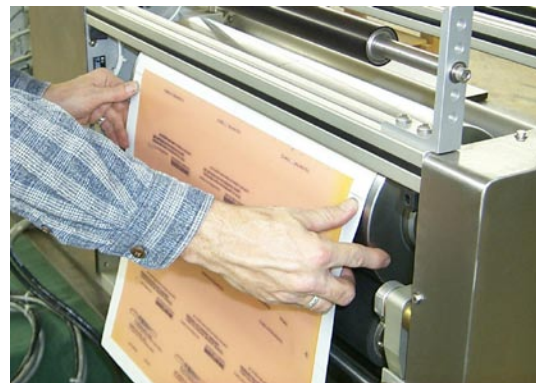


Figure 8-Aligning the Leading Edge



Figure 9-Correct Leading Edge Alignment

7. After positioning the plate's leading edge, you may now rotate the plate cylinder, allowing the plate's magnetic backing to hold it in place. The plate mounting is now complete.
8. If necessary, at this time thread the web through the printer (See "Threading the Web" later in this manual).
9. At this point, if the printer has a clean, empty inking system, you should follow the procedure for inserting an ink bottle into the Inkwell system.
10. Replace the safety covers.
11. Before energizing the printer with the new plate in place, you may want to manually back off both the impression and inking systems very slightly (1/4 clockwise turn on the knobs) as shown in Figures 10 through 13. This is to compensate for the possibility that the new plate may be slightly thicker than the previous one due to plate wear. This procedure should be established and refined as you gain printing experience.



Figure 10-Adjusting Impression



Figure 11-Impression Adjust And Lock Knobs



Figure 12-Adjusting Inking





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With this system, a self-feeding 16 oz. ink bottle is easily inserted into the feed receptacle to supply ink to the ink reservoir.



Figure 16-Inserting the Ink Cartridge

In turn, the rotating anilox roll is submerged approximately 1/8<sup>th</sup> inch in this reservoir where it picks up a thick film of ink. The adjacent open doctor blade system “doctors” this ink film, removing the excess fluid from the roll’s engraved surface.

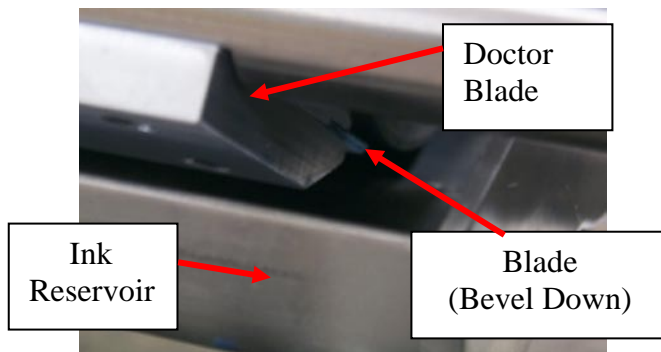


Figure 17-The Open Doctor Blade

A pivoting blade holder, positioned by a factory-set stop, holds this doctor blade against the roll’s surface at the proper angle.

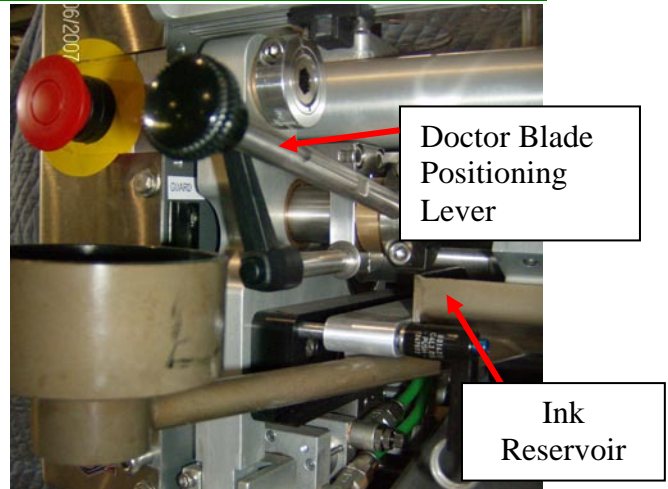


Figure 18-Inkwell Mounting

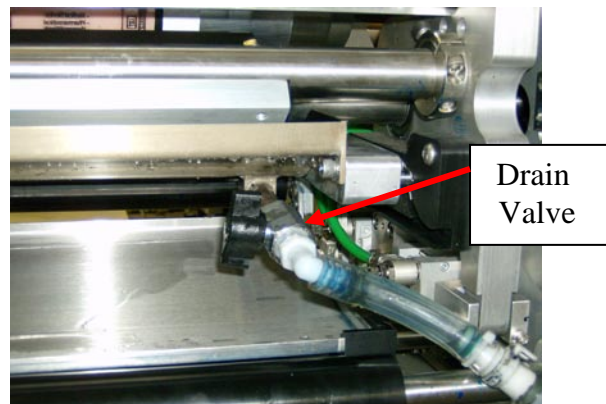


Figure 19-Inkwell Drain

The reservoir is equipped with a drain valve to allow draining of excess ink after bottle removal. After draining, a solvent bottle may be substituted for the ink bottle to clean this inking system.

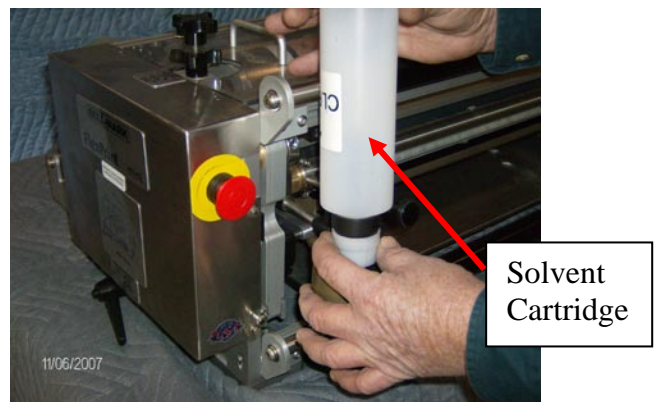


Figure 20-Inkwell Cleaning



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For final cleaning, the ink reservoir may be easily removed from the printer by pulling down and away from the printer.

The following steps outline the procedure for using the Mini Flex Print Inkwell™ System. When preparing the printer for operation:

1. Remove the Lexan™ guard at the inking section of the printer.
2. Verify that the Inkwell system drain valve is closed.
3. Loosen the doctor blade adjustment lock handle, and verify that the doctor blade is positioned properly against the anilox roll. This is accomplished by moving the adjustment handle until the doctor blade carrier is against its stop pin and then lock it in place (Note: the doctor blade must be clamped in the carrier with the blade bevel positioned as shown in Figure 17, with the bevel facing “down” toward the Inkwell pan).
4. Replace the guard.
5. Insert an ink bottle into the Inkwell bottle receptacle as shown in Figure 16.
6. Start the printer. The anilox roll will begin to rotate, and when the ink in the Inkwell pan reaches the proper level, the doctor blade will “meter” the ink on the roll. You should be able to see a “wet” coating of ink over the full width of the roll.
7. The Mini Flex Print is now ready to print.

The following steps outline the procedure to be used when the printer is to be stopped and cleaned in preparation for either

extended shutdown (e.g. overnight) or a change in ink type or color.

1. Stop printer at either the integral control **STOP** button or the **HMI**.
2. Remove the inkbottle from the Inkwell bottle receptacle.
3. Remove the guard and drain the ink from the Inkwell pan, either back into the bottle that you are using (having removed the plunger cap), or into another clean container, using the drain valve to control ink flow.
4. Close the drain valve, and replace the guard.
5. Insert a solvent bottle (containing the proper solvent for your ink) into the Inkwell bottle receptacle (See Figure 20).
6. Start the printer and allow the anilox roll to rotate for 3 to 5 minutes, with the doctor blade metering cleaning fluid to the roll. During the latter part of this cleaning cycle, the packaging machine may be cycled several times to clean the plate.
7. Stop the printer/packaging machine, and remove the solvent bottle.
8. Remove the guard. Release the doctor blade carrier, and back it away from the stop pin.
9. Drain the cleaner from the Inkwell pan into a waste container.
10. Release the ***right-hand*** Inkwell pan and tilt the pan toward the drain to remove the majority of the cleaner.
11. Close the drain valve.
12. Remove the **drip pan** from the printer.



13. Now, remove both the right-hand *and* left-hand Inkwell pan locating pins, and remove the pan from the printer.

## CAUTION

Care should be taken when removing the Inkwell pan from the printer that the pan does not come in contact with the anilox roll, as it could damage the surface of this roll.

14. Manually finish cleaning the doctor blade, Inkwell pan and anilox roll, if required.

## PRINTING OPERATIONS

After the FlexPrint has been properly installed and Set-Up has been completed, you are ready to begin production printing. A short review of how your printer works follows.

When the printer is started, the ceramic anilox roll is driven at a constant speed by the internal drive motor. The inkwell system supplies a continuous flow of ink to the open doctor blade, which is in contact with this engraved anilox roll. The doctoring action of the blade meters the proper film of ink onto the roll for transfer to the printing plate.

Upon receiving an index signal from the packaging machine, the plate cylinder is “unlocked” and the controller turns the rotational control of this cylinder over to an encoder/servo. As the web moves through

the printer, the packaging machine is dictating its print speed.

This means that if the web speeds up or slows down, the plate cylinder will track this web speed exactly. At the end of the print cycle, a signal is sent to the controls to take over the task of rotating the plate cylinder, returning it to the HOME position.

During this trip home, the printing plate is re-inked to prepare for the next cycle. Proper contact between web media, printing plate and inking roll is accomplished by the use of pneumatic cylinders controlled by proximity sensors.

### PRINTER CONTROLS

Printer-mounted controls, when applicable, include the **START** switch (green indicator); the **STOP** switch (red indicator); the **PRE-INK** switch (yellow indicator); and the **EMERGENCY STOP** (red mushroom button –see Fig. 21).

The **pre-ink** feature is used whenever the printer has been standing-by at idle (anilox roll rotating) but not printing. Pressing this just prior to commencing printing will pre-ink the plate, assuring a good first print.

### EMERGENCY STOP

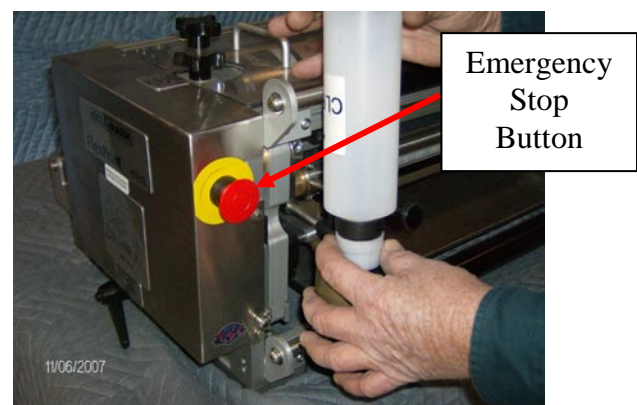


Figure 21-FlexPrint E-Stop

In case of emergency, press the Emergency Stop located at the top of the printer.



On some models of servo-driven printers, the FlexPrint will not have local controls. These printers still have a printer-mounted E-Stop button, and can also be stopped in an emergency situation via the E-Stop switch on the packaging machine.



**USE EMERGENCY STOP ONLY IN AN EMERGENCY SITUATION**

**ADJUSTMENTS**



**DO NOT MAKE THESE ADJUSTMENTS WHILE THE WEB IS MOVING.**

**THE OPEN DOCTOR BLADE SYSTEM**

This part of the machine is factory set and should not require extensive adjustment. The doctor blade stop collar and pin (Figure 22) are set to provide the proper contact pressure between the doctor blade and the anilox roll. Periodic replacement of the doctor blade will be required, as this item will wear with use.



Figure 22-Doctor Blade Stop Collar

**PRINT REGISTRATION**

**THE REGISTRATION ROLL**

Print registration is adjusted by the registration roll handle (Figures 23 & 24). If, after several printed packages have been through the sealing dies, the print is not registered properly, this handle should be loosened and the roll moved forward or backward to align the print to the formed pocket. One linear unit of roll movement equals two linear units of printed image movement.



Figure 23-Registration Lock Handle



Figure 24-Registration Adjustment Scale

**HOW TO ADJUST PRINT QUALITY**

Many factors can affect print quality. Assuming that the ink is of the proper viscosity and consistency (press ready ink should drain from a #2 Zahn cup in 18-24 seconds), the printing plates are in good condition and properly mounted, and all machine and web alignments are within acceptable limits – the following steps should be used to optimize the sharpness and clarity of your print.



There are two specific adjustments that an operator can make to alter the print quality; “**Inking**”, and “**Impression**”. These adjustments involve controlling the position of mechanical “stops” within (on each side of) the printer. Usually these adjustments are made by identical moves, side-to-side, but each stop may be adjusted separately and then locked in place as needed to provide a uniform print across the web. After the initial set-up, these adjustments are usually infrequent.

The first adjustment that may be made is to the **inking system**. The inking system is the unit subassembly that includes the anilox roll and the inkwell system. This subassembly is moved pneumatically toward and away from the printing plate cylinder during the inking portion of the print cycle. Its forward inking position is established by means of an adjustable stop. The adjusting and locking knobs used to make this adjustment are shown in Figures 25 and 26.

For the “**inking**” adjustment: To **darken** the print, turn the knobs **CCW**. To **lighten** the print, turn them **CW**. Wait 2-3 cycles between adjustments. These adjustments provide for more or less contact between the anilox roll and the printing plate during inking. Proper inking can also be checked by stopping the machine and visually inspecting the print mat for even ink distribution.



Figure 25-Inking Adjustment



Figure 26-Stop & Lock Knobs

The second adjustment that can be made is to the **impression roll**. The impression roll provides support for the web at the print line (where the plate and the web make contact). Its location is also controlled pneumatically, and its forward stop is adjustable. The adjusting and locking knobs used to make this adjustment are shown in Figures 27 and 28. Again, you must adjust both the right and left sides to achieve a uniform print.

For the “**Impression**” adjustment: To **increase** the contact, turn the adjusting knobs **CCW**. To **decrease** contact, turn them **CW**. These adjustments provide for the printing plate/web clearance during the printing portion of the print cycle to provide more or less contact between the web and the printing plate. While this distance is factory set, it may be necessary to adjust it to maintain print quality. This adjustment can be made every cycle.



Figure 27-Impression Adjustment



Figure 28-Stop & Lock Knobs

**Note: To achieve the optimum print, the general rule is "the least amount of ink and impression equals the best print quality."**

## SHUT DOWN PROCEDURE

### SHORT TERM SHUTDOWN

If the FlexPrint is to be shut down for short periods, such as lunch or other breaks, it is not necessary to power down the FlexPrint system. The FlexPrint can continue to idle without damage.

### LONG TERM SHUTDOWN

At the end of the shift, or the end of the workweek, or whenever the FlexPrint will be idle for long periods, it is necessary to clean all ink out of the system. This can be done easily as follows:

1. Remove the ink cartridge from the Inkwell System.
2. Drain any residual ink from the system by using the ink reservoir drain valve.
3. Insert the proper Inkwell solvent cleaning cartridge into the system (determined by the type of ink that you are using).
4. Cycle the printer through the number of cycles needed to clean both the Anilox Roll and the printing plate.
5. After draining the residual solvent from the reservoir, it should be removed from the printer for final cleanup.

## CARE OF PHOTOPOLYMER PRINTING PLATES

Because the photopolymer printing plate is made by exposure to UV light, great care should be taken with its storage when it is not in use. It is important that the plate be protected from any exposure to direct sunlight and from unnecessary exposure to regular light for any extended length of time. Such exposure could cause hardening and cracking of the plate, making it unusable. Off-line storage should be in a dark and dry area. Ideally, storage would be in a slightly rolled condition, preferably at approximately the same diameter as the plate cylinder. If you store your printing plates in a stacked condition, NEVER stack them face-to-face, and ALWAYS use a protective paper sheet between them. If they have just been cleaned, make sure that the plate surface is dry, before storage.



Besides cleaning the printing plate in place in the printer (as described in the Inkwell section), you may want to manually clean it after removal. Be sure to use only the cleaner that Bell-Mark recommends for your specific ink. A hand-pump spray bottle is a good way to get the cleaner where it is needed. Use only a lint-free cloth and a soft-bristle toothbrush along with the cleaner. NEVER RUB THE PLATE! Be sure to dab when cleaning with the cloth, and use the toothbrush sparingly for spot cleaning.

**CAUTION**

**NEVER SUBMERGE PLATES IN ANY SOLUTIONS, SURFACE CLEAN ONLY.**

## **TECHNICAL SUPPORT AND OPTIONAL EQUIPMENT**

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Since 1959, Bell-Mark has designed, manufactured and serviced high-performance coding, marking and printing products for the industrial marketplace. Our products are in use by over 15,000 companies throughout the world.

### **TECHNICAL SUPPORT**

To schedule service calls or for Technical Support, call **717-292-5641**, or **FAX 717-292-5686**

### **THE INTERNET**

Visit Bell-Mark on the World Wide Web: <http://www.bell-mark.com/>. Our web site shows Coders and In-Line Printers for the Packaging Industry, Printers for the Converting and Extrusion Industry and, EasyPrint Thermal Transfer Printers. The site also includes information on Career Opportunities, Service, Trade Show participation, Distributors, and What's New.

### **SPARE PARTS AND CONSUMABLES**

Bell-Mark is your reliable resource for consumables and spare parts. Contact Bell-Mark for ink, cleaning solvent, ink and solvent cartridges, inking sleeves, rolls, printing plates, thermal transfer ribbons, belts, tubing and replacement parts. Bell-Mark also sells an excellent hand cleaner that is perfect for removing our printing inks from hands.

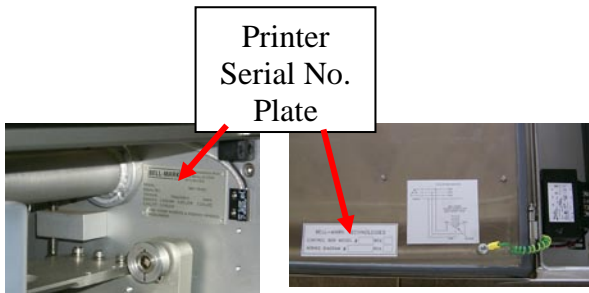
Once your preferred ink is determined, it would be advisable to have on hand a back up supply of ink and solvent cartridges.

Although not a requirement, it is best to have a supply of spare parts on hand in the event of a shutdown emergency. To this end, a list of recommended and optional spare parts for your specific model printer is included with this manual. Also included are drawings that will allow you to identify any component of your FlexPrint. When you call for parts or service, please be sure to have the **Serial Numbers** for both the printer and the control enclosure (See below). These numbers will allow your Bell-Mark



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representative to properly identify your equipment.



To place an order for spare parts and consumable goods call Bell-Mark at **973-882-0202**.

### OPTIONAL EQUIPMENT

**Bell-Mark's Multiple Column Coder (MCC)** is a code date imprinting system that

may be mounted on the FlexPrint. The MCC is used to add variable information such as last sale date, product batch code or lot numbers. With the MCC installed, registration is maintained and valuable loading bed space is maximized.

**Bell-Mark's EasyPrint Thermal Printer** is another available option. Mounted on the FlexPrint, this thermal transfer printer is used to add variable information such as counts, sequentially changing codes, bar codes or any other information that lends itself to computer control.

When ordered, these options will be installed at the factory, or may be field-installed on existing printers.



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**APPENDIX**



## GLOSSARY

**Anilox roll** – An engraved roll that applies ink to the printing plate.

**Doctor blade** – A thin, knife-like blade, that smoothes ink on a roller (allowing the ink to uniformly fill the roll's engraved cells) and removes excess ink from the roller.

**Doctoring** – Scraping excess ink from the anilox roll.

**HMI** – (for Human/Machine Interface) The electronic control panel of any machine (used here to designate the packaging machine controls).

**Homing** – The “zero” position on the plate cylinder used to ensure proper registration; also “Home”.

**Impression roll** - The printer roll that provides a “backing” for the web at the print line. In effect, this roll acts as the platen for the printing action. On the FlexPrint printer, this roll has an elastomer cover, and also acts as the S-Wrap roll in an S-Wrap model printer.

**Offsetting** – When excessive ink causes ink to *set off*, or transfer onto another surface. An unwanted condition.

**Plate Cylinder** – The largest diameter cylinder on the machine, it holds the printing plate or matte. This roll is also sometimes referred to as the “print cylinder”.

**Roll** – A cylinder (mounted on bearings) that guides the web through the machine. Some rolls are passive and only turn when the web turns; some are geared and pull the web or rotate to provide some other operational function. Often called “guide roll” or “idler roll”.

**Registration roll** – The adjustable roll in the lower portion of the printer (near the web exit point) that has a positioning/locking handle. Repositioning this roll in a linear direction changes the location of the print (i.e. its registration) on the package being printed.

**Web** – The material in a packaging machine that is used to form product-holding pockets and/or cover these pockets. Usually there is a bottom web, for the pockets and a top web that is sealed to the bottom web pockets, forming the cover. In most applications, the FlexPrint prints on the top web. This is also sometimes referred to as the “print media”.



## PRINTER MAINTENANCE

**WARNING**

When performing certain maintenance tasks on the FlexPrint, it is necessary to remove the Lexan™ safety covers and/or the gearbox cover. Before removing these covers, be sure to use the proper lock-out/tag-out procedures with regard to both the electric power and pneumatic connections to the printer

### DRIVE TRAIN

All bearings in the FlexPrint (with the exception of the one-way bearing in the plate cylinder drive) are sealed and do not require lubrication. This one-way bearing should be lubricated at specific intervals (determined by your printer's duty cycle) with medical grade white lithium grease. This may be accomplished by using a needle-type grease gun (See Figure 29 for this grease-port location). For applications involving a nominal 5-days/week, 8-hours/day operation, this interval is about 6 months.

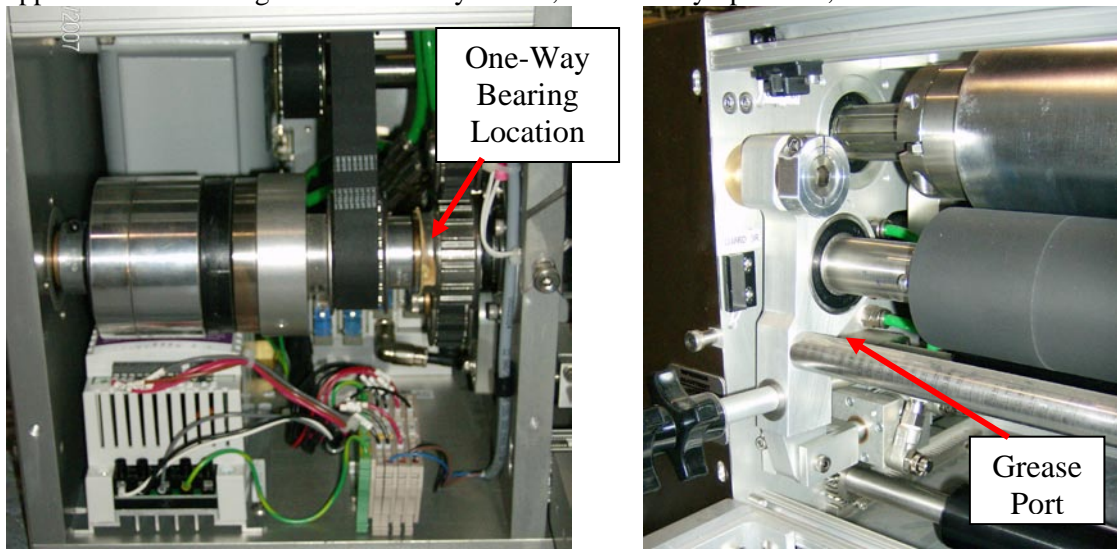


Figure 29-Greasing the One-Way Bearing

### INKWELL SYSTEM

The open doctor blade system utilizes a replaceable blade that will wear with use. The working edge of this blade material contains a bevel. When mounting new blade material, it is important that this bevel faces “down” toward the Inkwell pan. (See Figure 17).

### PLATE ALIGNMENT



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If for some reason the “HOME” position of the plate cylinder must be reestablished, the following sequence should be followed.

1. To set the home position, turn the plate cylinder in the direction of printing, to within 3/16” of where the first line of print would come into contact with the impression roll (the rubber-coated roll). This is the print cylinder’s home position.
2. Next, loosen the screws on the collar holding the “HOME” proximity flat head trigger screw (Located in the gearbox, on the plate cylinder shaft-See Figure 30). When this collar turns, each revolution brings this screw within the sensing field of the proximity switch. This flat head trigger screw should never touch the sensor, but when rotated, should pass within 3/16” of the sensor.

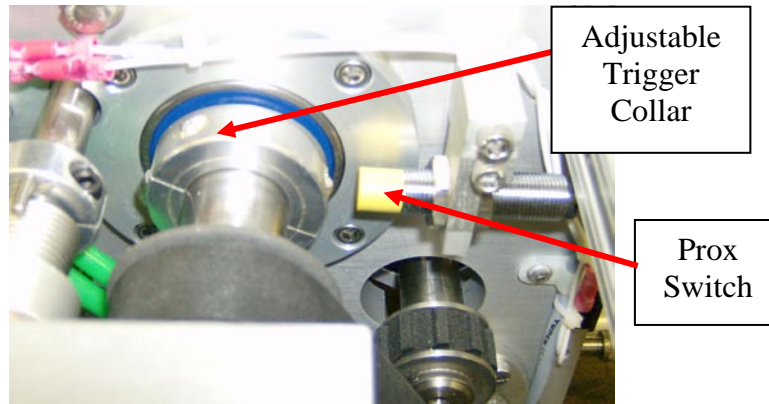


Figure 30-Homing Collar & Proximity Switch

3. Rotate the collar counter-clockwise (when viewed as in Figure 30) until the leading edge of the trigger screw just enters the edge plane of the prox switch. Now tighten the screws on the collar. The printer is now in its “HOME” or Start position.

## FLEXPRINT SPECIFICATIONS

Specification	360	460	600
Max. Print Area Across Web	14”	18”	24”
Max. Print Area. Machine Direction	9”	9”	9”
Speed	All Models: 17 cpm Standard - 35 cpm Maximum		
Printing Element	Steel, chrome plated. Equipped for magnetic back drive plate system.		
Power	220VAC, 1 Phase, 50/60Hz. 10 amp cont. 15 amp fused.		
Air	10.0 CFM @ 60 PSI		
Signal	Dry Contact		
Mounting	Machine Bed or Top Mount on Hood.		
Weight (Approximately)	200 lbs.	225 lbs.	250 lbs.
Footprint	37.5 x 11.50	41.5 x 11.50	47.5 x 11.50



## TROUBLESHOOTING

# WARNING

When performing certain troubleshooting tasks on the FlexPrint, it is necessary to remove the Lexan™ safety covers and/or the gearbox cover. Before removing these covers, be sure to use the proper lock-out/tag-out procedures with regard to both the electric power and pneumatic connections to the printer. Extreme caution should be used when working on the printer, its gearbox, and its electrical control enclosure.

### A. Problem: Printer won't start

1. Verify that unit has incoming power.
2. Check circuit breakers (In the Control Enclosure-see Figure A2 and the appropriate electrical schematic).
3. Verify that the Lexan™ safety covers (front, top, and back) are in place and installed properly. These covers are equipped with magnetic safety interlock switches (see examples, Figure A3) that will prevent the printer from operating if the covers are not in their correct location.



Figure A2: Circuit Breakers  
(In Control Enclosure)



Figure A3: Interlock

### B. Problem: Printer starts, but Plate Cylinder does not return to its “HOME” position

1. Check circuit breakers – See A above
2. Check servo coupler for proper operation – See O below



3. Check all electrical cable connections to be sure they are tight and locked in place
4. Check air supply to printer

**C. Problem: Plate Cylinder does not “HOME” completely**

1. Check the HOME prox switch trigger collar for proper adjustment (See Figure C1 and “Printer Maintenance” section of manual).

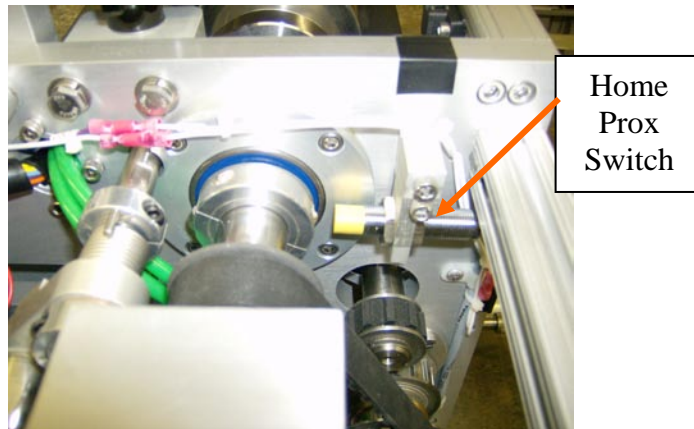


Figure C1: Home Prox Switch

2. Check operation of pneumatic clutch by manually engaging the clutch solenoid (solenoid valve bank In Printer Gearbox-See Figure C2).

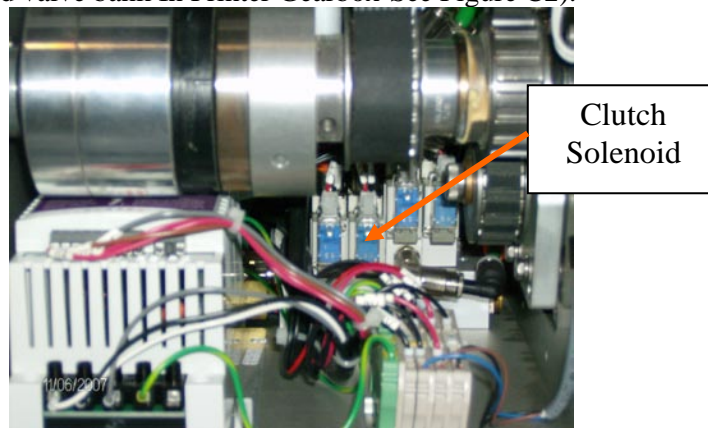


Figure C2: Solenoid Valve Bank

**D. Problem: Anilox Roll is not inking properly or not inking at all.**

1. Observe ink level in Inkwell pan; has it risen to the proper level (the bottom edge of the Anilox Roll should be submerged from 1/16” to 1/8” into the ink).
2. Verify that ink is flowing properly from the Inkwell bottle cartridge (See Figure D2).

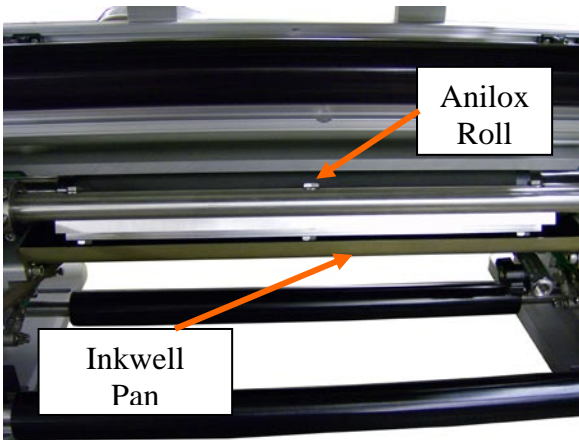


Figure D1: Inkwell System

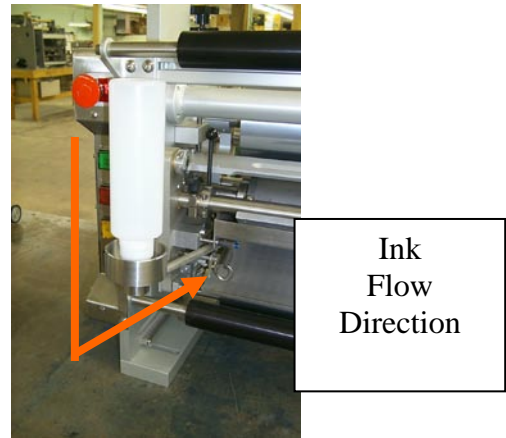


Figure D2: Ink Cartridge

3. Check to see that doctor blade carrier is seated properly on its stop pin.

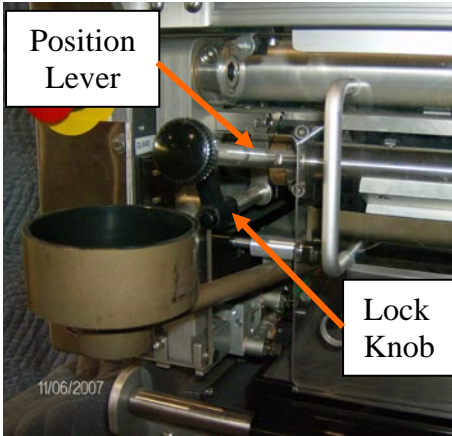


Figure D3-1: Doctor Blade

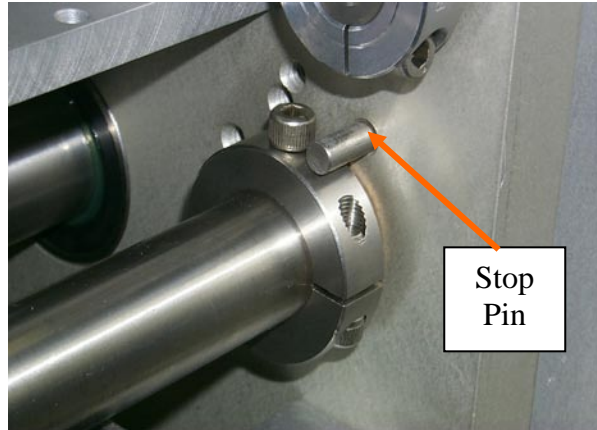


Figure D3-2: Stop Pin

4. Check to see that the doctor blade is installed properly, and that its leading edge is oriented correctly (bevel down, facing the Inkwell pan – Figure D4-2).

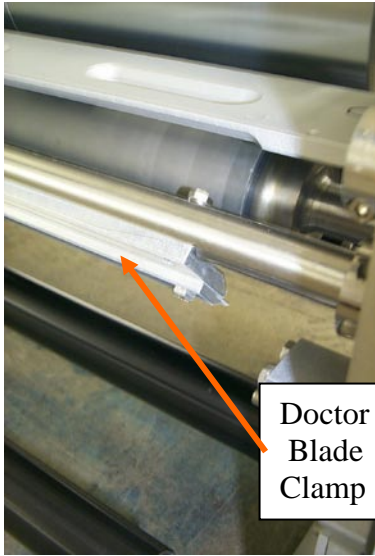


Figure D4-1

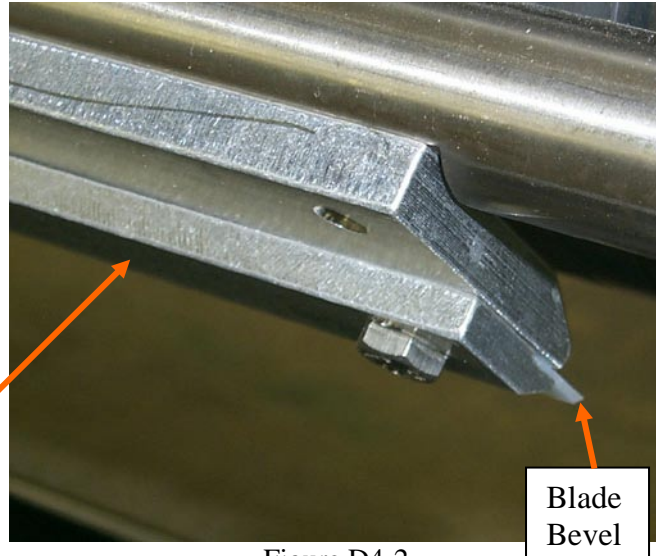


Figure D4-2

**E. Problem: Printing plate does not ink properly or not inking at all.**

1. Verify that the Anilox Roll is inking (Figure E1).
2. Check Anilox Roll stop position setting to verify that there is “kiss contact” between the roll and the printing plate (Figure E2).

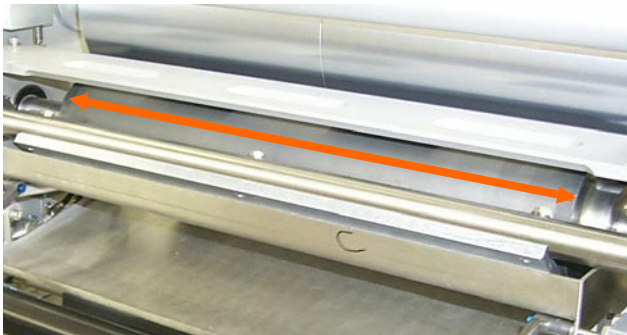


Figure E1: Anilox Roll Inking

The visible top surface of the roll should be completely covered with a thin film of ink.

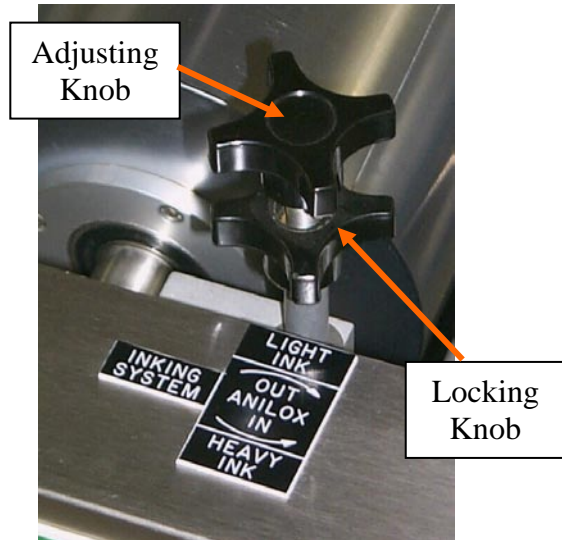


Figure E2: Stop Adjustment

3. Confirm that the flow controls for the Anilox Roll air cylinder(s) are not excessively restricting airflow. If these flow controls are closed, the Inking System Carrier plates will not move properly (Figures E3-1 & -2).

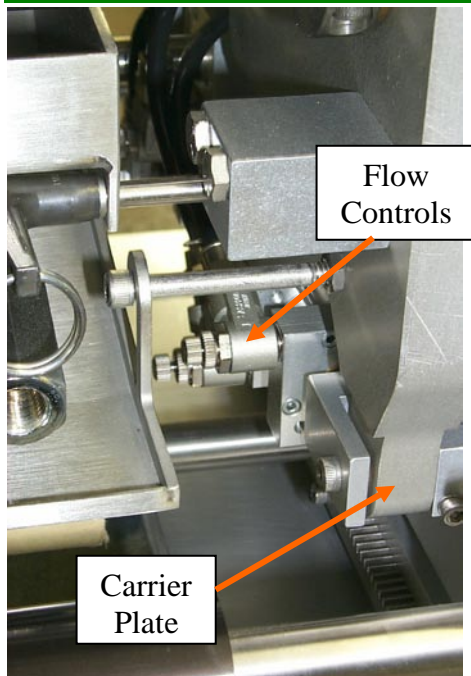


Figure E3-1: Inking System Carrier

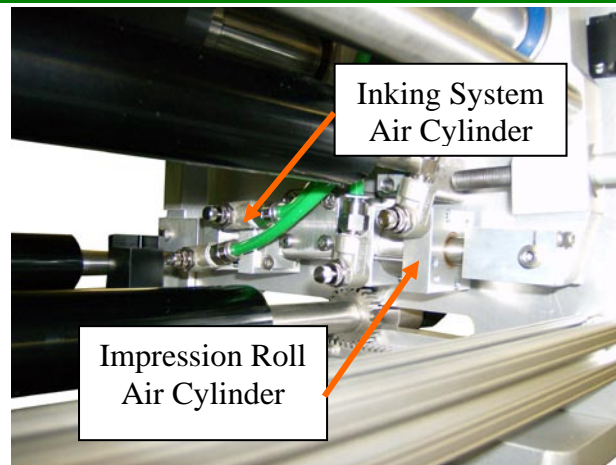


Figure E3-2: Flow Controls

4. Manually activate the Anilox Roll solenoid valve to check air cylinder operation (Figure E4).

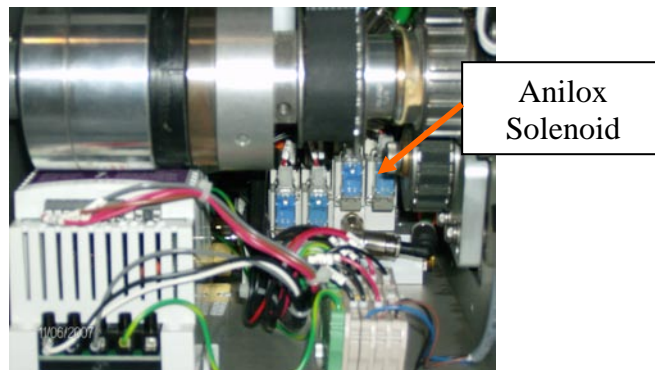


Figure E4: Solenoid Valve Bank

**F. Problem: Printing plate inks, but image is not transferred to the web (print media).**

1. Check the Impression Roll stop settings to verify that there is “kiss contact” between the roll and the web. These stops may be adjusted independently (one adjusting knob on each side – Figure F1), but once the proper contact is established, the two knobs should be adjusted in or out simultaneously.



Figure F1: Impression Roll Stop

2. Confirm that the flow controls for the Impression Roll air cylinder(s) are not excessively restricting airflow (See Figure E3-2)
3. Manually activate the Impression Roll solenoid valve to check air cylinder operation (See Figure F3)

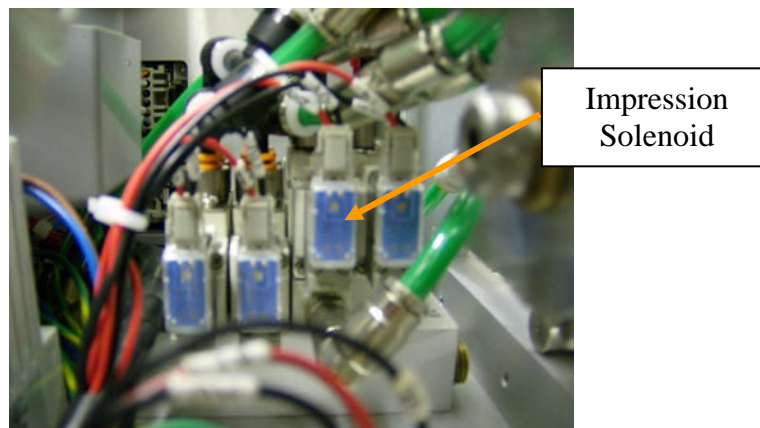


Figure F3: Solenoid Valve Bank

**G. Problem: Impression Roll rotates, but Plate Cylinder does not turn.**

1. Manually rotate Plate Cylinder in normal (printing) direction. The Impression Roll should also rotate in the proper direction. If not, the one-way bearing may need to be replaced (See Figure G1).
2. Check timing belt for proper tension, as well as missing or worn teeth. Replace if necessary (See Figure G1).

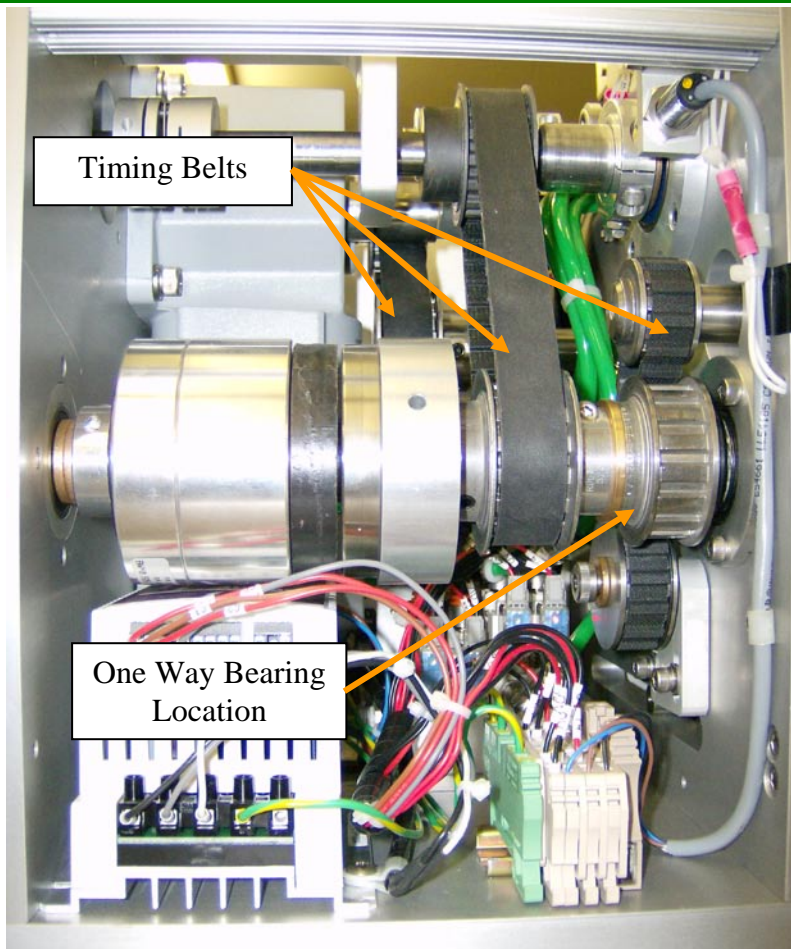


Figure G1: Printer Gearbox

**H. Problem: Excessive noise from gearbox.**

1. Check drive train for loose or misaligned belts, gears, pulleys, and tension adjusters.
2. Check gears for lubrication. If necessary, lubricate with good medical grade grease.

**I. Problem: Printed image is not centered, is misaligned, or is a partial print.**

1. Review plate-mounting procedure (See “Magnetic Printing Plate Mounting”).

**J. Problem: Print quality is poor.**

1. Move Anilox Roll stop adjustment knobs clockwise until image is lost. Then, slowly and evenly turn the knobs counter-clockwise until optimal image is achieved (See Figure E2).
2. Move Impression Roll stop adjustment knobs in the same manner as described for Anilox adjustment in (1.) above (See Figure F1).



3. Check doctor blade for proper installation, alignment, and excessive wear. Also inspect for the presence of foreign material, or nicks (See Figures D4-1 & -2).
4. If necessary, verify that the ink is of the proper PH and viscosity.

**K. Problem: Inking system does not doctor properly. Excessive fluid remains on the Anilox Roll.**

1. Recheck setup procedure.
2. Verify that the doctor blade system stop pin is set correctly and that the doctor blade carrier is rotated properly against this stop pin (See Figures D3-1 & -2).
3. Check for worn doctor blade, and that the bevel on the blade is oriented properly (See Figure D4-2).

**L. Problem: Excessive fluid is being applied to the substrate.**

1. Recheck setup procedure.
2. Check fluid viscosity. For water based inks, press ready ink will empty a #2 Zahn cup in 18-24 seconds.

**M. Problem: The system appears to be doctoring properly, but not enough fluid being applied to the substrate.**

1. Check Anilox Roll engraving (cells) for fill-in of dried ink. If the cells are clogged, clean using anilox wash (IK5936) and brush (P61322).
2. Check Anilox Roll for wear.

**N. Problem: Difficulty maintaining print registration**

1. Check Plate Cylinder and/or plate mounting for proper placement.
2. Check timing belt for proper tension, as well as missing or worn teeth (See Figure G1). Replace if necessary.
3. Confirm that the one-way bearing is working properly (See G above).
4. Check operation of air clutch (See B above).
5. Check for proper top web tension, there should be no slack in the web.
6. Check for proper operation of the packaging machine top web tensioning system.

**O. Problem: Difficulty maintaining print registration (Servo drive printer)**

1. Check timing belt for proper tension, as well as missing or worn teeth (See Figures G1). Replace if necessary.
2. Check Flex-Coupler (between servomotor and Plate Cylinder shaft-See Figure O1) for loose socket-head cap screws (2).

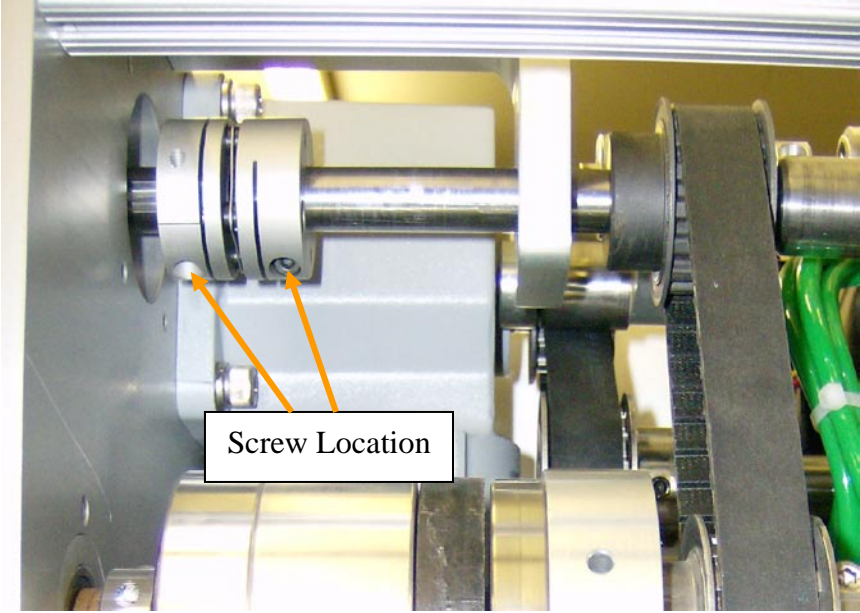


Figure O1: Flex-Coupler