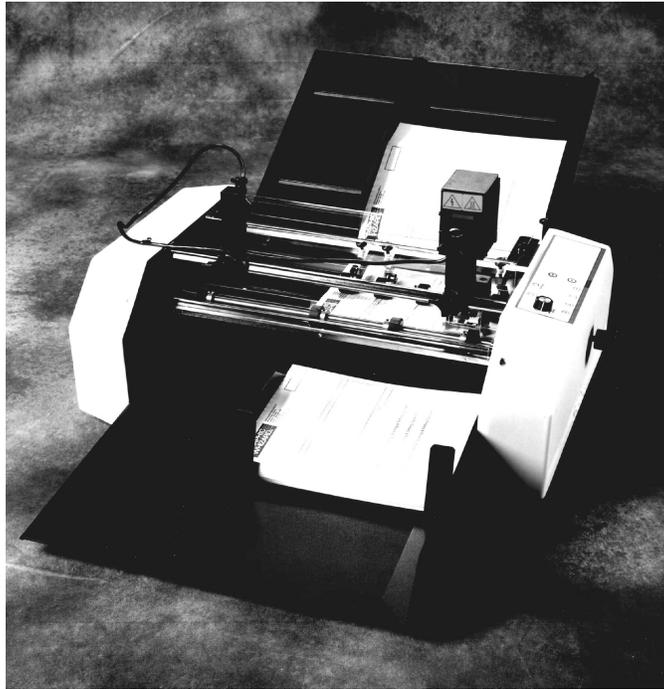


# GRAPHIC WHIZARD<sup>INC.</sup>

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Web Site: [www.graphicwhizard.com](http://www.graphicwhizard.com)

## GW 3000

### Reference Manual



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Version 99-04



DECLARATION OF CONFORMITY

**Application of Council Directive:**

73/23/EEC  
89/336/EEC

**Standard to which Conformity is declared:**

EN60950 for Safety  
EN50081-1 & EN50082-1 for EMC

**Manufacturer:**

Graphic Whizard Inc.  
2283 Argentia Road, Suite 21  
Mississauga, Ontario  
Canada L5N 5Z2

**Importer:**

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**Type of Equipment:**

Numbering, Perforating, Scoring & Slitting System

**Model:** GW 3000

**Serial Number:** \_\_\_\_\_

**Year of Manufacture:** \_\_\_\_\_

I hereby declare that the equipment specified above  
conforms to the above Directive and Standard.

Place: Mississauga, Ontario; Canada

Date: September 8, 1999



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Ron Miziolek, President

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## **1.0 GENERAL OPERATION**

The GW 3000 is a numbering, perforating, scoring, and slitting system. It operates at a single speed that is factory programmed to print 3000 sheets per hour, assuming 1 hit per page and a 10 millisecond solenoid pulse width. The operation of the machine is controlled by a microprocessor keypad interface. The system allows for a maximum of two numbering heads, for a maximum of 1 job with 1 hit per sheet that are stored and recalled for future use. Numbering can be done on single sheets (13# bond to 12 point card or 45 to 250 gsm paper) or multi-part carbonless forms (up to 10 parts) while simultaneously perforating, slitting and/or scoring. The unique friction feeder sends through one set at a time, even from the unglued side of a padded set. The pressure adjustable feed shaft ensures consistent registration. Perforations are done between the feed and main rollers producing a straight perforation, slit or score, avoiding tail whip. Perforating wheels are offered in a wide range of teeth configurations and can be quickly changed using the retaining ring pliers supplied. A photocell recognises the lead edge of the sheet and the microprocessor stops the sheet at the specific location(s) where numbers are required. The numbering heads are electrically operated (pneumatic drive optional). All this, in a compact design.

### **1.1 TECHNICAL DATA**

#### **Areas of use:**

Paper weight:	12# - 12 point (45-250 gsm)
Paper formats:	max. 18" x 18" (45 x 45 cm)
	min. 3" x 5" (7.6 x 12.7 cm)

#### **Electrical configuration:**

Voltage:	90-135 VAC or 180-270 VAC
Frequency:	60 Hz or 50 Hz
Fusing:	115/250V, 3/5A

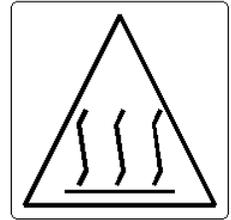
### **1.2 SAFETY REGULATIONS**

- **Before using the machine, you must read the operating instructions.**
- **Professionals must only eliminate damage or extraordinary malfunctions.**
- **Never insert your hand into the machine while it is running.**
- **Do not wear loose fitting clothing when working with the machine.**
- **Make sure that the machine stands on a level and well-ventilated positions.**

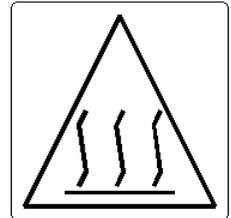
### 1.3 CAUTIONS CONCERNING MACHINE



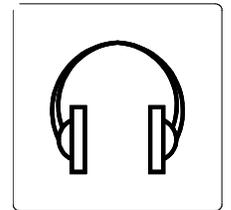
**CAUTION – The solenoids may get hot during operation. Do not touch the solenoid case while the machine is running and until it has been given enough time to cool down.**



**CAUTION – The motor may get hot during normal operation use. Do not touch any vicinity near motor.**



**CAUTION – On Electric Solenoid machines the noise levels can be excessive and hearing protection may be required.**



**CAUTION – Machine should never be left unattended.**



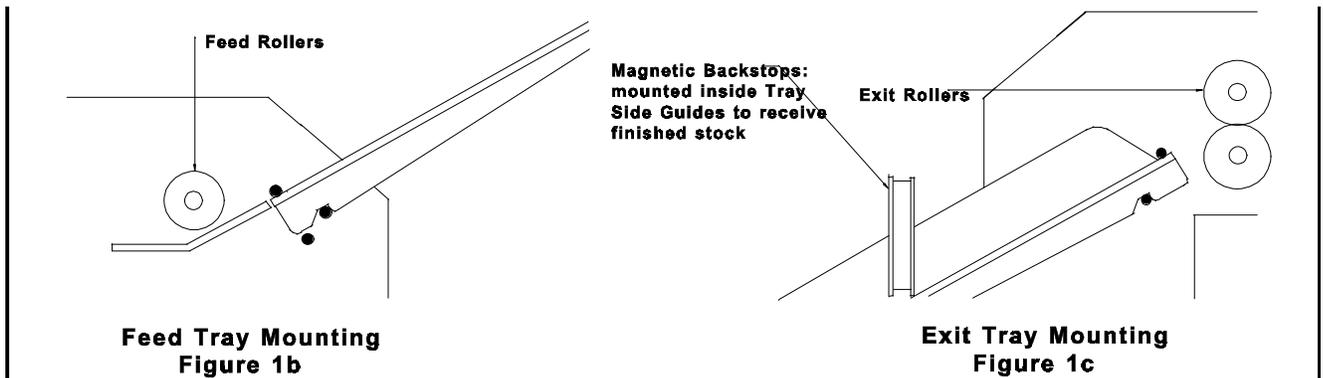
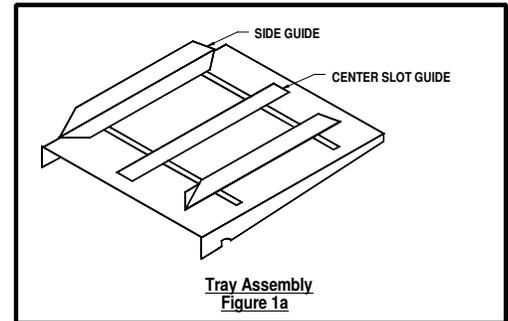
## **2.0 MACHINE ASSEMBLY**

### **2.1 Feed and Exit Trays**

The feed and exit tray assemblies are comprised of four components each: the tray, two tray side guides and a centre slot cover (see Figure 1a).

The trays sit in the machine on mounting pins inside the machine's side frames as shown in Figure 1b and 1c. The trays can be easily removed and stored elsewhere when not in use.

Place the tray side guides, bottom flange towards the centre and the centre slot cover on the tray as shown in Figure 1a and screw on the nylon wing nuts to secure the pieces on the tray. The operator side tray guide of both the feed and exit tray should be pulled all the way over to the operator side before tightening its two wing nuts.



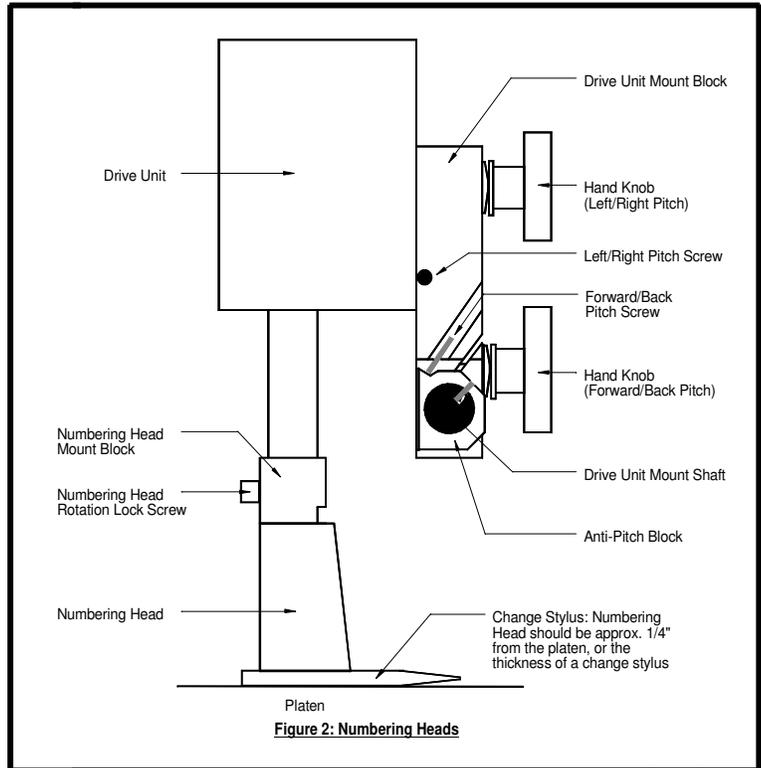
**Note: It is critical that the operator side tray guide be moved all the way over to the operator side of the machine to ensure that the stock being processed through the machine passes directly underneath the photocell. If the stock does not pass directly underneath the photocell, the machines will not recognise sheets and the program being run will not be initiated.**

Place a pile of the stock to be processed in the feed tray and use it to align the non-operator side tray guide to the pile. Allow a fraction of an inch so that the pile flows freely up and down the tray if released from the top. Set the exit tray in a similar manner, although the accuracy of the non-operator side guide position is not critical.

As a backstop to finished stock, there are two magnets included with the machine (unless equipped with the conveyor outfeed) that are set inside the side tray guides on the exit tray. Relative position of the magnets depends on the stock being processed, but the magnets should be set such that the stock does not slide down the exit tray too far, possibly causing sheets to get in uncollated order.

## 2.2 Numbering Heads

The numbering heads are already secured to the drive unit by two screws through the numbering head mount block as shown in Figure 2. The drive unit is then mounted to the drive unit mount block using the hand knob provided. While installing the drive unit, make sure the screw cap on the back of the drive unit fits in the cavity on the drive unit mount block so that the rubber plug provides some pressure against the screw cap. You may have to back out the left/right pitch screw in order to do this. Plug in the cord from the drive unit into the appropriate receptacle on the non-operator side cover (closest head to the closest receptacle). If your machine is equipped with more than one head, by convention, the numbering head and drive will refer to unit closest to the operator control panel as head #1 (**H1**) and the other will be head #2 (**H2**).

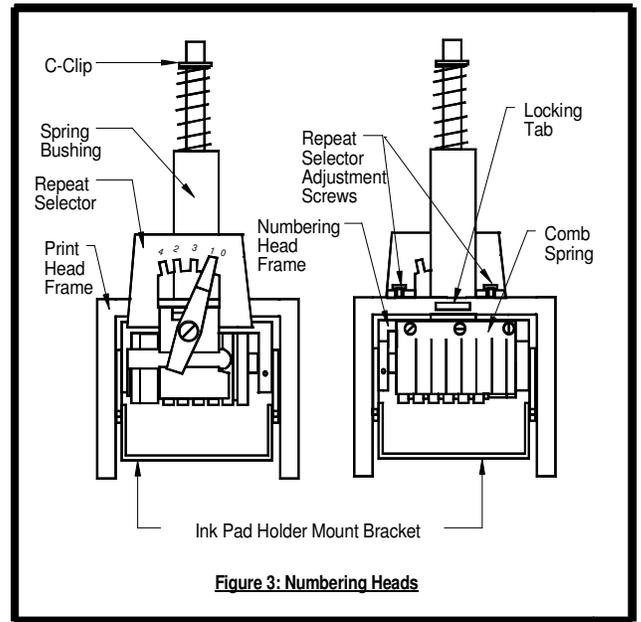


The height of the numbering head has been factory set and it is critical to the proper performance of the drive unit and numbering head. This distance is approximately  $\frac{1}{4}$ " or the thickness of a numbering wheel change stylus. However, the numbering head must be levelled to ensure that the numbering wheels strikes the sheet square to provide a quality inked impression and a flat crash impression on carbonless sets. This will be discussed later (Section 4.11).

The numbering heads can operate through 360°. This is done by loosening the numbering head rotation screw (using the large hexdriver supplied) located on the front of the numbering head mount block. Once the screw is loose, the head is free to rotate. Tighten the screw once the desired position is achieved in order to prevent any movement during machine operation. The standard numbering head is  $\frac{3}{16}$ " (4.5mm) Gothic style, reverse order, 6 digits with 2 drop wheels. The numbering head employs a pre-inked pad, which can be purchased in red or black. These ink pads will supply you with approximately 15,000 impressions. Uninked pads may be purchased if a different colour is required (Note: any ink used must be a **non-metal corrosive** one, labelled numbering machine ink).

The numbering head comes standard with six numbering wheels (a seventh numbering wheel is optional), the last two of which are drop wheels (this will be discussed later). The first 5 digits may be activated only. **The 6th (or 7th) digit must be changed manually.** Also available are letter prefix wheels (A-J; K-R; S-Z) and a  $\square$  prefix wheel. Modifications are possible with new numbering head orders or by special order.

The numbering heads also have a repeat function. The repeat selector (see [Figure 3](#)) allows a number to be repeated from one to four times. By leaving the repeat selector in the "0" position, the number will not change when the head returns to the print position. Using the "0" position prevents you from having to re-set the starting number when you are programming a new job (this will be discussed later). Position "1" changes the number consecutively with each stroke and positions "2", "3" and "4" repeat the number 2, 3 or 4 times respectively. The repeat functions are achieved by a mechanical ratchet action in the numbering head. When trying to use these functions, you may have to cycle the numbering head manually in order to match the number of repeats on a page to the number positions on a page.



### **2.3 Optional Conveyor Outfeed Plate**

The conveyor outfeed plate sits in the machine in the same fashion as the exit tray. Make sure that the spur gears mesh and do not force the conveyor outfeed plate into position. The pile tray is mounted on the end of the conveyor outfeed plate, with two Phillips screws and acts as a backstop for the finished stock.

### **2.4 Additional Switches and Controls**

The main on/off switch module is located under the feed tray on the back of the operator side plate. This module also houses the main fuseholder and power cord.

## 3.0 Operating Keyboard

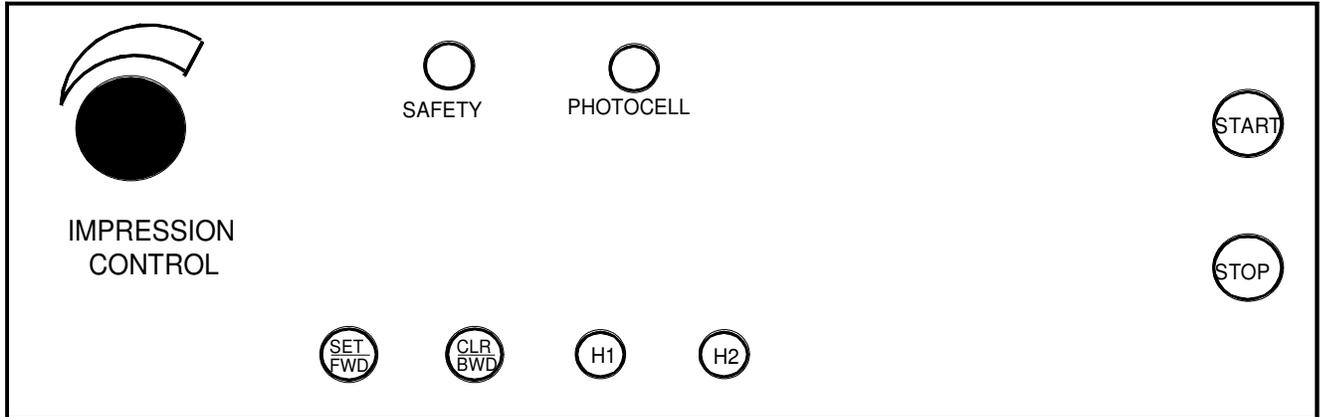


Figure 4: OPERATING KEYBOARD

The operating keyboard is comprised of various buttons and a Impression Control which consist of one potentiometer knobs that control the crash strength of the numbering heads, and can be adjusted to best suit the requirements of the job. For example, you may require stronger crash numbering for carbonless sets than for single sheet bond paper. This adjustment can be done while the machine is stopped or running.

The four buttons under the LED display will perform whatever function is shown directly on them.

**SET/FWD** - Used to set up a numbering job and incrementing the motor in a forward direction.

**CLR/BWD** - Used to clear programs and increment the motor backwards.

**H1** - Used to control head number one, which is the head closest to the operator.

**H2** - Used to control head number two, which is the head furthest away from the operator.

**START** - Used to start the machine.

**STOP** - Used to stop the machine.

Once you have plugged the machine in, turn the on/off switch to the 'on' position. The LEDs will flicker and then stop. The GW 3000 does systematic error checks, if it detects an error the LEDs will remain flickering, count the number of flickers and compare with the list of all possible error codes listed on page 21.

### 3.1 Running a Job

The machine is capable of storing a 1 job 1 hit for recall and future use. Ensure that there is paper in the feed tray first. Pressing the 'START' button will automatically begin the program that was previously programmed in the memory.

### 3.2 Stopping a Job

There are two methods of stopping the machine.

1. Once the program is running, pressing the 'STOP' button will cause the machine to finish the stock it is currently working on, move the next stock into the starting position and then stop the motor.
2. If you want to stop the machine while stock is still left in it, simply hold on to the stock in the feed tray. After about one second, the machine will automatically stop (since it is no longer seeing any new sheets). This is how it also stops when all of the stock in the feed tray is gone.

3. Pressing any of the other buttons will stop the machine defaulting the machine to its idle mode.

### **3.3 Clearing A Program**

To completely clear a program from the memory insert a paper in the feed tray. Press the SET/FWD button. The paper will then feed through and stop under the photocell. Press the CLR/BWD button and hold it down, next press the H2 button and this will clear the memory of the previous job.

You can now run just a perf/score/slit job by pressing START.

### **3.4 Changing and Programming a Job**

The following describes **Mode - Program Setup** operation:

- Loads a new sheet of paper, regardless if paper is already in the machine or not.
  - Paper is loaded into the machine at “Setup Paper Speed” and stops at “Paper Position Stop”.
  - Motor advances in single steps, or continuously at Setup Paper Speed using the <FWD> and <BWD> keys. The motor stops when the key is released.
  - Motor operation will stop while holding down either of the <FWD> and <BWD> keys once the existing programmed hit location is reached. Another key-down <FWD> or <BWD> must be detected before moving off of the hit position.
  - Heads fire according to the current program (i.e. when the sheet reaches the hit position), or when the <H1> and/or <H2> key is pressed.
  - <H2> can only be fired once <H1> is programmed at the same hit location. <H1> must be fired first, followed by <H2>. Pressing <H2> without having first programmed <H1> does nothing.
  - If <H1> / <H2> is pressed at a current hit position, the head to fire will be toggled ON/OFF. Pressing <H1> toggles ON/OFF SOL1, pressing <H2> toggles ON/OFF SOL2 when SOL1 is programmed.
  - If <H1> and <H2> are both programmed at the hit position and <H1> is removed, the <H2> hit data is automatically removed from the solenoid program.
    - If a solenoid head error is reported, hit data may still be programmed and saved.
  - Creation of hit data can be performed at any paper position. If the solenoid is fired at a new position, followed by pressing the <START> key, any existing old hit data will be overwritten and the new position and hit data saved.
  - When the <START> key is pressed, the changes to the program are saved to the EEPROM, the current sheet is ejected, and the next sheet is loaded to “Paper Position Stop”.
  - If the <STOP> key is pressed, any changes made during Setup are aborted and the solenoid program will be re-loaded from EEPROM. The exception is if a EEPROM error exists, then the solenoid program workspace in RAM will remain intact.
1. The following are the **Mode - Program Setup** (solenoid program) constraints:
    - There is a maximum of 1 hit position in a program.
    - SOL2 can only be enabled when SOL1 hit data exists, otherwise <H2> keypresses will be ignored.
    - Modification of existing hit data can only occur while at the hit position.
    - The user shall not be allowed to step backward past “paper stop position”
    - The perf shield shall be closed before entry to **Mode - Program Setup**.
    - An open perf shield condition with paper loaded disables the motor and solenoid operation until the perf shield is closed.

## 4.0 Setting up a Job

To set up the machine for a specific job, a few items must be adjusted depending on the specific stock being run, the number of heads being used and the number of perforations, slits or scores required. In order to keep it simple, adjustments required will be discussed from the feed end of the machine to the exit.

### 4.1 Aligning the Feed Tray Guides

As previously mentioned, the operator side tray guide should be seated all the way to the operator side. This will ensure that the stock passes directly underneath the photocell, allowing the program being run to initiate. With a pile of the stock placed in the tray, align the non-operator side tray guide with the pile. Allow a fraction of an inch so that the pile flows freely down the tray if released from the top.

Move the center slot cover so that it is in the middle of the two side tray guides and tighten the wing nuts.

It is very important that the stock enter the machine, square, to ensure that all perfs are square and straight. To test for square feeding, place a piece of stock in the feed tray and align the lead edge with a straight edge within the machine (such as the straight edge of the feed platen, or the edge of the first shaft in the machine). Now, check that the operator side feed tray guide is parallel to the close edge of the paper for squareness.

### 4.2 Setting Feed Tire Pressure

The friction feed system used in automatic Graphic Whizard machines is unique. It utilizes three top feed tires to feed sheets through with a consistent pull along the full lead edge of the sheet, and a continuous width sheet retarder (the strip of fine sandpaper on the feed platen) to separate sheets and prevent double feeding.

Once the feed tray and side tray guides have been assembled according to the sheet width required, you may locate the feed tires along the feed shaft. For proper sheet feeding, the position of the three feed tires along the width of the sheet is also important. Loosen the setscrews of the feed tire hubs using the small hexdriver provided in the accessory kit. Slide the feed tire hubs along the feed shaft, setting the two outer tires at about 1" in from the outside edges of the stock. The third, middle feed tire is simply centred. Keep the three setscrews of the feed tire hubs in line on the feed shaft. Tighten all setscrews. (see Figure 5)

**Warning: All feed and exit tires, and perf/score/slit boss wheels use setscrews to secure their positions. When tightening setscrews, do not over-tighten them. This**

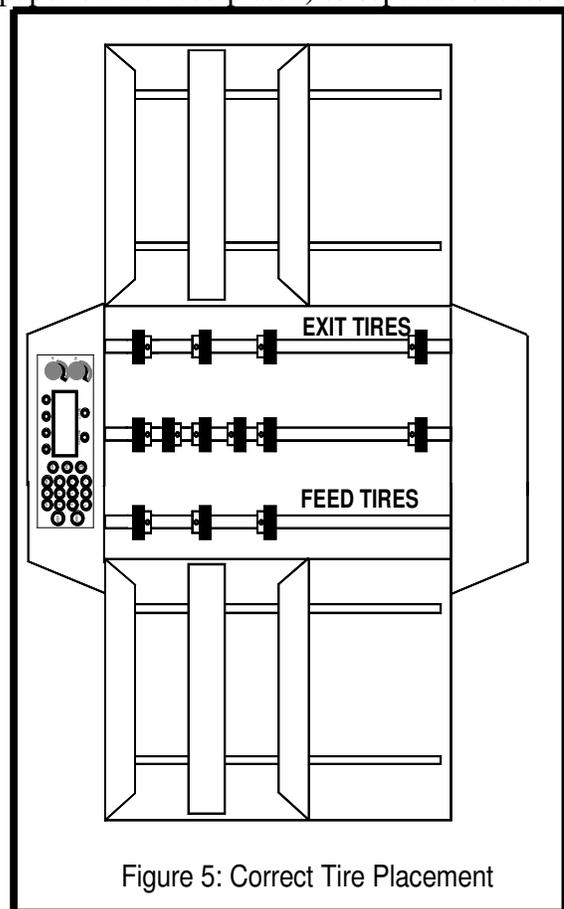
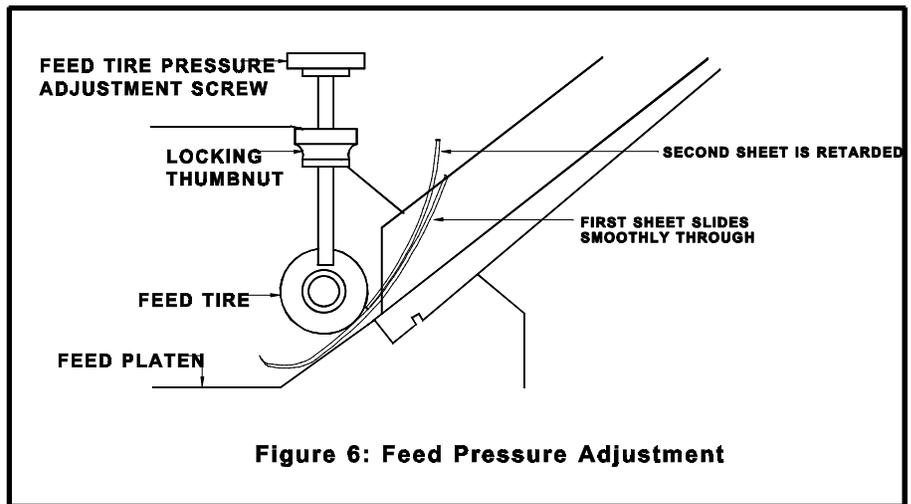


Figure 5: Correct Tire Placement

may scar the metal shafts and inhibit the free sliding movement of the *feed tire hubs* or *perf/score/slit boss wheels*.

To ensure consistent, trouble-free feeding, the feed tire pressures must be set as loose as possible. **The feed tires should never contact the retarder strip!** Our design allows for no double feeding with substantially reduced feed pressure than the typical friction feed system. The gap between the feed tires and the feed platen should be just less than the thickness of the stock being used. Remember that we are retarding the full lead edge of the next sheet or set. When setting the feed tire pressures, you should have the sense that the feed tires are just touching the paper. It is better to set the feed tire pressure to the minimum pressure required to prevent double feeding. The remedy to correct double feeding is to turn down the both feed tire pressure adjusting screws a ¼th turn until consistent feeding is achieved. If the feed tire pressure is too much, you will possibly mark or pull apart forms.

Adjustments for feed tire pressure are made with the feed tire pressure adjusting screws (see [Figure 6](#)). It is recommended to place two sheets of the stock in the feed tray with the feed tire pressure set loosely. Hold the two sheets in your hand with one sheet ahead of the other. Place the leading edge of the first sheet under the feed tires. Slowly tighten the feed tire pressure adjusting screws while jiggling the pages back and forth. The correct setting is achieved when the second page is no longer able to run under the feed tires.



All three feed tires should be adjusted to the same pressure setting to minimise skewing. To check that all the feed tires are adjusted to the same pressure, tear a strip off the stock being run and pass it under each feed tire separately. You should sense the same amount of drag under each feed tire. A tighter feed tire pressure on one side of the sheet will cause faster feeding of that side of the sheet (the sheet will skew or twist towards the feed tire with tighter pressure). To prevent this skewing, reduce pressure on the side of the feed tire shaft where you encounter more drag with a counter-clockwise, ¼th of the feed tire pressure adjusting screw and increase pressure on the other side by a clockwise, ¼th of that feed tire pressure adjusting screw. These adjustments should cause a change in the overall balance of pressure from the three feed tires without affecting the total feed tire pressure.

When you have the feed tire pressure set properly, you can then tighten down the white nylon thumbnuts to ensure the setting will be maintained.

**Note: The only time the feed is too loose is if double feeding occurs. If the feed is too tight, the feed tires will try to pull only the top sheet off a set. If this occurs, loosen the feed tire pressure a little on both feed tire pressure adjusting screws evenly until this no longer happens.**

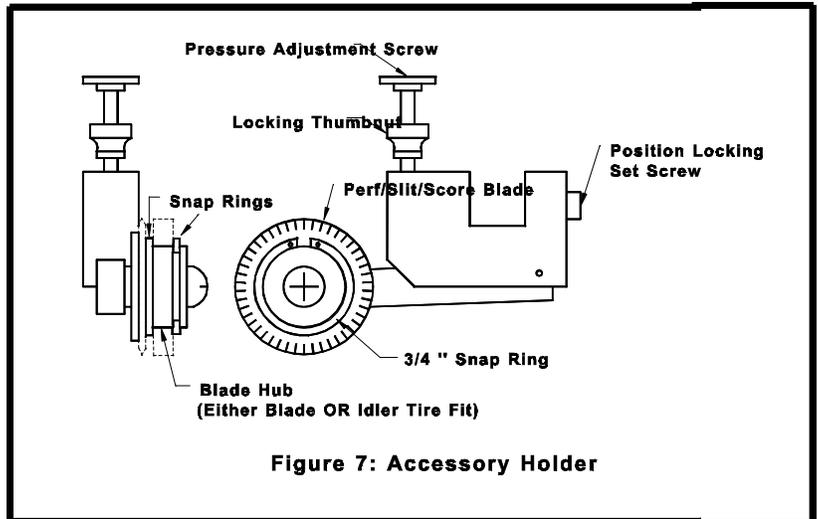
With the GW 3000, carbonless sets feed best from a non-glued edge! Glue thickens the set and can cause waves on the edge, while the unglued edges tend to be more consistently flat.

**Advisory:** It may require several attempts to get used to this sheet-feed technique, and it is recommended that you practice a few numbering jobs with scrap paper. However, some initial trial and error experimentation will allow you to develop long-term benefits in efficiency.

### **4.3 Perforating/Slitting**

Perforating, slitting and/or scoring can be performed with or without any numbering. The perforator blades are available with 2, 4, 6, 8 and 12 teeth per inch as well as Microperf. The blades can be easily interchanged using the ring pliers supplied with the machine.

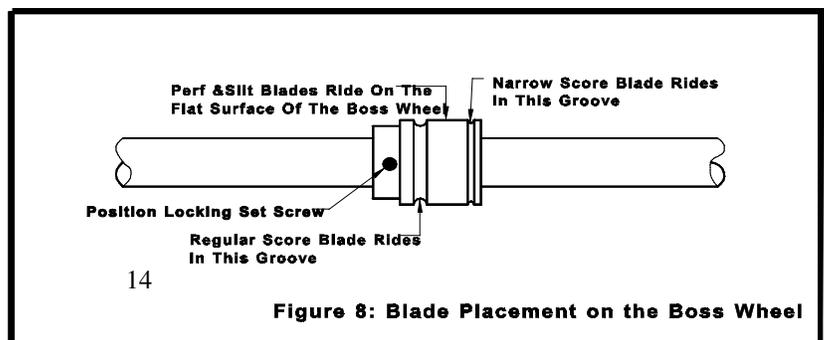
Remove the accessory holder (see [Figure 7](#)) from the machine. Simply remove the retaining clip from the blade hub and pop off the blade. Place the new blade on the blade hub and put the retaining clip back on. Ensure that the retaining clip sits completely in the groove in the blade hub in order to prevent any movement of the blade.



**Figure 7: Accessory Holder**

Using the small hexdriver, move the bottom boss wheel to the approximate location of the desired perforation or slit. (Note: Keep all of the setscrews of the boss wheel in line on the shaft.) Move the accessory holder to the position desired where the perf/slit blade will ride on the flat surface of the boss wheel (see [Figure 8](#)) and tighten the position locking set screw into the keyway of the square shaft (using the large hexdriver). Since you can control the depth of a perf/slit, it is critical that you locate your perf/slit wheel to the flat of the boss wheel. Tighten the pressure adjustment screw located on the top of the accessory holder and turn the handwheel at the same time. When the perf/slit blade turns with the handwheel, test a few sheets. Continue to make adjustments until the desired perforation depth is obtained.

To ensure a straight perforation, score or slit, run a few sheets through the machine. Using a straight edge, check if the perforation line is straight. If not, you may not have the main tires placed evenly across the sheet with one tire on the non-operator side. Next, flip the first inch of the lead edge of the sheet over and check to see if the perforation lines up. If it doesn't, double check that there is no excess play in the tray side guides and that the operator side tray guide of the feed tray is over to the operator side as much as possible. You may not be feeding the sheet into the machine, square. To ensure that the sheet is running through the machine square, you can feed a sheet into the machine using the handwheel and align the lead edge of the sheet with a straight edge in the machine (such as the edge of the bottom boss shaft). To adjust the squareness of feed, you can move the front or back of the operator side tray guide on the feed tray to make sure the sheet travels through the machine square. If you adjust the operator side tray guide, you must



**Figure 8: Blade Placement on the Boss Wheel**

adjust the non-operator side tray guide as well. Run a few more sheets through and check the sheet again. Continue until the perforation lines up. Now, take the lead edge of the sheet and fold it over to the last inch of the sheet. Again, you are checking to see that the perforation lines up. If it does not line up, again check that the perforation itself is straight. If not, check the main rollers for equal distribution over the sheet and also check that the feed tires have equal pressure along the sheet. The feed pressure adjustment screws dictate the paper travel. The general rule to remember is that a perforation runs away from a tighter tire. If the perforation runs towards the non-operator side, then loosen the operator screw by a 1/4th of a turn and tighten the non-operator side by an 1/4th of a turn. Vice versa for a perforation that skews towards the operator side. Make adjustment to the exit rollers in the same way you make adjustments to the main rollers if the perf starts straight and then tails off. If the perforation is straight but the perforation does not line up, you may still not be feeding the sheet through square.

Whether perforating or slitting, place one of the strippers close to the cut. The new cut in the sheet can often cause the sheet to curl up and can cause a jam otherwise.

#### **4.4 Scoring**

Setting up a score is similar to perforating or slitting although the scoring blade will run in the groove of the bottom boss wheel. With a score, it is more critical to control the depth of the blade, because this controls the depth of your score. When lining up the blade and groove of the boss wheel, do not tighten the boss wheel until you have run the score blade into the groove using the handwheel. Once you have the blade and boss wheel lined up you can adjust the depth of the score and run some test sheets, adjusting the depth of the score until you are satisfied. Making adjustments for a straight score are done in the same manner as a perf/slit (as discussed in Section 4.3).

#### **4.5 Idler Wheel Holders**

On the same-keyed shaft that the accessory holders are mounted on, for your perf/score/slit operation, there are two idler wheel holders. These holders, if possible should be mounted about 1 to 1 1/2" from the outside edges of the stock being run. As the stock leaves the feed tires, it will then be perfed/scored or slit. The idler wheel holders' purpose is to equalise the force along the stock as it passes through this section, so you do not encounter any skew, which you may encounter if you only had a perf/score/slit wheel contacting the paper before going through the main rollers.

#### **4.6 Main Rollers**

The main rollers are comprised of a bottom solid roller with 6 and 4 adjustable rollers on top. The top rollers are mounted on a spring-loaded shaft, to maintain pressure down to the bottom solid roller. The adjustable top rollers must be distributed along the shaft so that there is a roller on each end of the shaft, with the remainder distributed along the shaft. To ensure proper transport, a majority of the rollers should be on the stock, but do not load all rollers to one end of the shaft where you may encounter stock skew.

#### **4.7 Installing Ink Pads**

Loosen the large, star-shaped, lower knob on the drive-unit mount block and swivel the drive unit up. This will allow you better access to the numbering head itself. Slide the repeat selector, on the numbering head, over to the "0" position (see [Figure 3](#) if you are unfamiliar with the components of the numbering head). Pull down the numbering wheel frame, the ink pad mount plate swings away giving you better access to the ink pad and exposes the numbering wheels. Now press in the locking tab which sticks out from the top of the head frame. When you pull the numbering wheel frame down far enough, the locking tab will drop into a groove on the numbering head shaft and hold the head in this position. If

you pull the numbering wheel frame too far down, the repeat selector may jam the head. Simply pull the numbering wheel frame further down and press the repeat selector out of the way.

Remove an inkpad from its package (provided in the accessory kit) and grasp the two plastic fingers on the back of the ink pad holder. Before inserting the inkpad, you must first condition the pad. Because the pad is felt it may have swollen with ink and be thicker than need be. If inserted on the numbering head, an inkpad with a swollen felt could cause the number wheels to get too much ink and create splattering or fat images. To condition the inkpad, use a piece of coated stock (because it is less absorbent) and place the inkpad on the coated stock, felt side down. Press down hard on the inkpad to compress the felt. You can then soak up the excess ink with the pad. Once the pad is conditioned, you gently squeeze the plastic fingers inwards on the back of the ink pad holder and slide it into the groove on the ink pad holder plate, with the ink-reservoir side of the pad sliding in first. Release the tabs and the holder.

## **4.8 Locating the Numbering Heads**

To move the drive unit into the lateral position required, loosen the large star-shaped knob near the bottom of the drive unit mount block (refer to [Figure 2](#)). Loosen the setscrew in the anti-pitch block using the large hexdriver. This will allow you to slide the drive unit across the width of the machine. You may now move the drive unit to the location desired. Bring the anti-pitch block over to and against the drive unit. Now tighten the large star-shaped knob and set screw in the anti-pitch block to lock the drive unit in place.

The anti-pitch block and drive unit mount block act together when locating a number position. If the number position is slightly off, you can loosen one of the blocks and move it over the appropriate distance, using the fastened block as a reference point. Also, when going to replace the inkpad, you may move the drive unit aside, leaving the anti-pitch block in position as a reference when you wish to continue the job.

To turn the numbering head so that it prints the number in the correct rotation, first loosen the rotation lock screw on the numbering head mount block, just above the numbering head. The numbering head will then be free to rotate to the desired orientation.

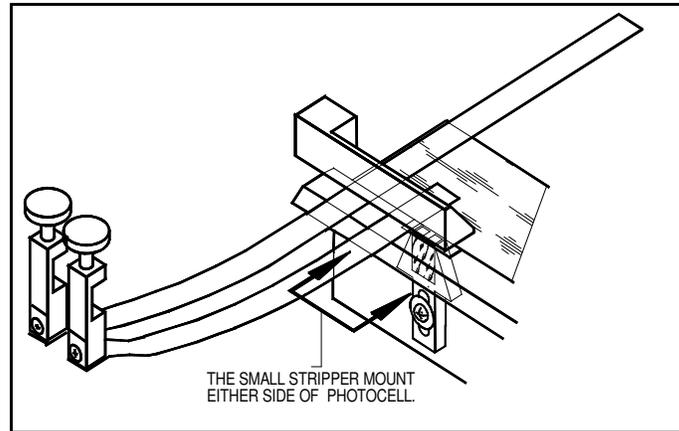
When satisfied, be sure that the head has been returned to the print position and all knobs have been tightened.

Once you have the numbering head in the correct physical position, program the job. It is advised that you run a few test sheets to check the strength and quality of the crash impression.

## **4.9 Stripper Assemblies**

Each machine is supplied with a minimum of 3 large stripper assemblies. Their purpose is to keep the stock flat as it runs through the machine and to ensure that the stock does not catch on the numbering head. The stripper blocks are to be mounted on the keyed square shaft, pointing down, and the same shaft that the accessory holders are mounted on. They should normally be located close to the numbering head but not underneath the numbering wheels (this can damage the numbering wheels!) or close to where a perf/score/slit is being performed.

There is also a short stripper supplied with the unit. This is the photocell stripper, it should remain under the photocell reflector, but not covering the photocell.



If you experience double images when numbering, it is possible that the stripper pressure is not enough to keep the stock flat for the crash and the stock is bouncing, allowing a second image to occur. If this occurs, simply bend the strippers down to create more pressure on the paper.

#### **4.10 Setting Impression Control**

After setting up the machine and then programming a job (Section 3.4), test sheets will have to be run to verify you are getting the correct impression, in other words: number sequence; crash strength; level impression; etc.

The Impression Control Dials, located on the control panel regulate the strength of the crash. Simply turn the dial clockwise if more impression is required for multi-part carbonless work. Check the bottom carbonless copies of the form to see if the impression strength is adequate. If the maximum setting is not adequate, contact your dealer.

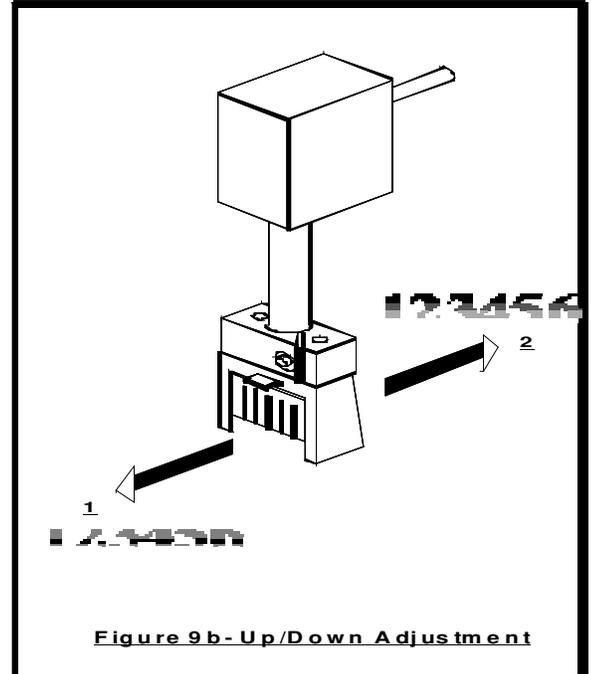
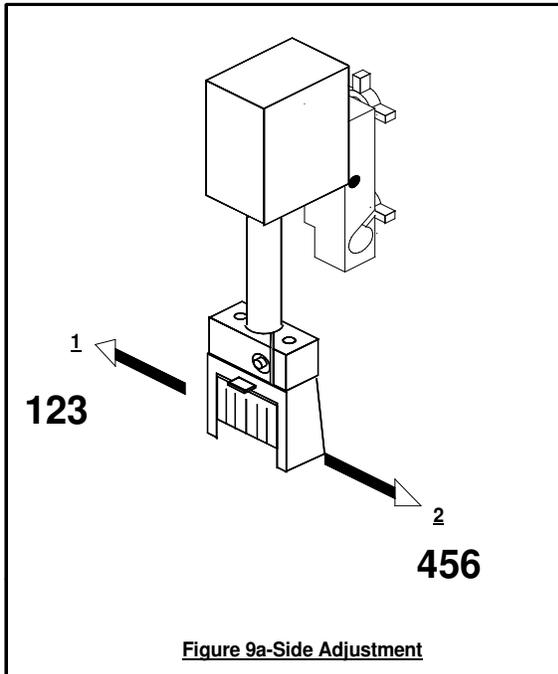
**Reminder: Carbonless impressions are created as a development process similar to developing a photograph. The numbering image will continue to darken for a full twenty-four hours but will reach about 80% of its full colour in about twenty minutes. Ink chemistry, offset powder and a number of other factors can affect both the time and the extent of the image. Your fresh impressions will be lighter than you want but trust them to darken. What you want to achieve is an even, level impression with minimal or no embossing of the stock.**

If making a number of impressions on the same sheet, you may have to turn up the Impression Control to ensure a consistent crash from hit to hit. With the electric solenoid drive for the numbering heads, jobs requiring multiple hits on a page require more work from the solenoids. A natural consequence of an electric solenoid working more often is that the coil heats up, giving the solenoid greater resistance to the electrical impulse. When this happens, the consequence is that the hits will get lighter. By increasing the Impression Control, you can overcome the greater resistance the solenoid will develop against the electrical impulse. Watching the job in progress, you will also find that the longer the job, there will be a need to increase the Impression Control to maintain a consistent hit over the whole job.

## **4.11 Flatness of Impression**

It is best to check for the flatness of the impression on the bottom crash copy from a carbonless set. The inked impression will not adequately show whether the impression is truly flat while the bottom crash impression shows this quite well. Make some test impressions on carbonless, verify the flatness of the crash impression and follow the proceeding instructions.

To adjust for an uneven side to side impression (i.e. if the impression is too light or too heavy across the machine), determine in which direction the numbering head must pivot to flatten the crash (consult [Figure 9a](#), which is viewed from the non-operator side of the machine). For adjustment '1' to pitch the numbering head away from the non-operator side, loosen the top hand knob on the drive unit mount block and turn the left/right pitch screw counter clockwise. Similarly, turn the left/right pitch screw



clockwise for adjustment '2'. To adjust for an uneven top to bottom impression, determine in which direction the numbering head must pivot to flatten the crash (consult [Figure 9b](#)). Adjustments for forward/backward pitch are made by first loosening the bottom hand knob on the drive unit mount block and turning the forward/back pitch screw in the appropriate direction. After adjusting, number another carbonless set and make necessary adjustments until the numbering head creates an equal impression along the whole number.

## **4.12 Exit Rollers**

The exit rollers are comprised of a bottom roller and four adjustable rollers on top. The top rollers are mounted on a spring-loaded shaft to maintain pressure down on the bottom solid roller. The adjustable top rollers must be distributed along the shaft so that there is a roller on each end of the shaft, with the remainder distributed along the shaft. To ensure proper transport, at least 2 rollers should be on the stock, but do not load all rollers to one end of the shaft where you may encounter stock skew.

Since the exit rollers follow the numbering head positions, make sure that an exit roller does not fall behind a numbering head, where you can possible track ink, producing ghost images down the sheet.

## **5.0 RUNNING A JOB**

### **5.1 Setting the Starting Number**

In order to set the starting number on the numbering head, you will have to pivot the drive unit back to get clear access to the numbering wheels. Pull down the numbering wheel frame and push in the locking tab to engage and lock the numbering head with the numbering wheels exposed.

Each individual numbering wheel can be rotated to the appropriate starting number using the change stick provided in the accessory kit. Remember that the standard head counts backwards so the number that you set to start the job on will be the last number required.

If you do not require all the digits to print (ie. 0097 is desired instead of 000097), the last two numbering wheels can be dropped from profile and locked down. To do this, rotate the numbering wheel to the "9" position. Turn the wheel slightly past this position while also pushing down on the "9". When the correct position is reached, the "9" will drop below type height. To restore a dropped wheel to its regular print position, simply rotate the wheel in the regular direction and it will "pop" out of its sunken position and back into regular print position.

Once your number has been set, and the inkpad has been installed (see Section 4.7), set the repeat selector to "0". Now, pull the numbering wheel frame downward to release the locking tab. Gently release the numbering wheel frame and allow it to return to its rest position. [**Caution:** the numbering wheel frame is spring loaded. Once you release the locking tab, the numbering wheel frame will spring back quickly. Please make sure that you keep your fingers clear of the inner workings of the numbering head] If you pull the numbering wheel frame down too far and it locks, refer to Section 4.4. If you do not return the numbering wheel frame to its rest position, the numbering head will not operate when the machine is running, since it is already at the end of its available stroke-length. Now you can pivot the drive unit back to the print position and re-tighten the large knob.

It is advised to set the repeat selector to '0' while running a few test sheets so that the starting number does not change. When you are ready to start your numbering job, then change the repeat selector to the action desired.

### **5.2 Setting the Repeat Selector**

The numbering heads can be set to repeat a number continuously ("0"), change with every crash ("1"), or change after a number of crashes (ie. "2, 3, or 4"). This setting will depend on the type of job required. The repeat selector is clearly in view on the front of the numbering head and requires no special tools to be changed (see [Figure 3](#)). Remember, for 2x, 3x and 4x repeat action, you may need to run a couple of test sheets to ensure these actions match your numbering sequence, since the numbering head is a mechanical process separate from the number position programming.

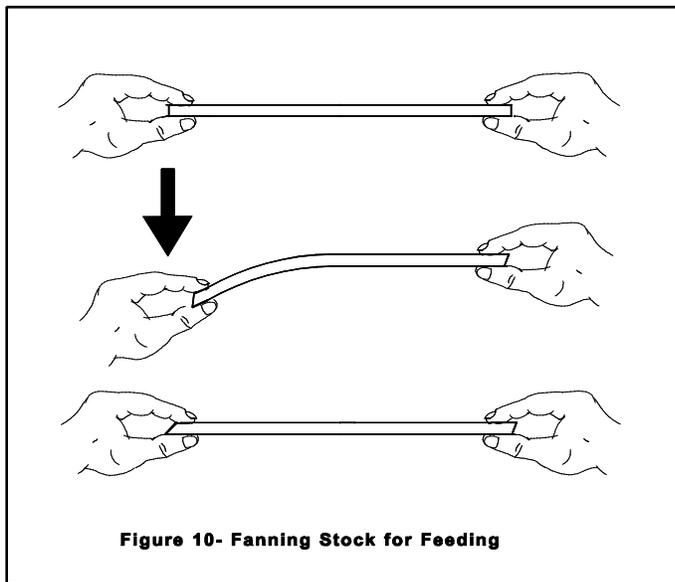
If the repeat sequence does not match the numbering sequence on your stock, you may need to manually engage the numbering head. Push down on the numbering wheel frame as many times as it takes to complete the repeat action, counting where the sequence was on your last test sheet.

**Example: Repeat action desired is a three time action. After running a test sheet, '9 9 8' is printed. The numbering head is in mid-sequence and to correct, push down on the numbering wheel frame twice to complete the repeat action. Test another sheet and the sequence printed now is '9 9 7'.**

The final feeding concern is the fanning of the stock. This procedure may also take some practice, and in particular when fanning carbonless sets across the un-glued edge. The following steps should be used in order to fan the pile:

### **5.3 Fanning**

- 1) Hold the paper as shown in Figure 10.
- 2) Lower your left hand while holding on to the pile firmly with your right hand.
- 3) Hold the pile tight with your left hand and loosely with the right.
- 4) Return the left hand to its original position.

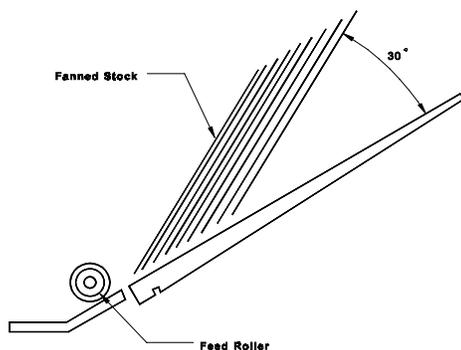


- 5) Repeat steps 1 through 4 until adequate fanning is obtained.

Try fanning while holding the stack in a vertical, upright position, with the glued edge resting on a table. This will maintain a flat, straight edge. When loading a fanned stack into the feed tires, hold the back end of the stack up high (at approximately a 30 degree angle, relative to the feed tray) so that the lead edge slips under the feed tires (see Figure 11). Then, gently lower the stack onto the feed tray. Before

starting the machine, rotate the handwheel one half turn and watch that the first sheet of the stack advances correctly, while the second sheet beneath it should be retarded from feeding into the machine.

The efficiency of the feeding can be improved by increasing the spacing between the sheets of your fanned stack. Begin with small stacks (10 to 20 sheets) and build up to larger stacks as you become more confident with your fanning.



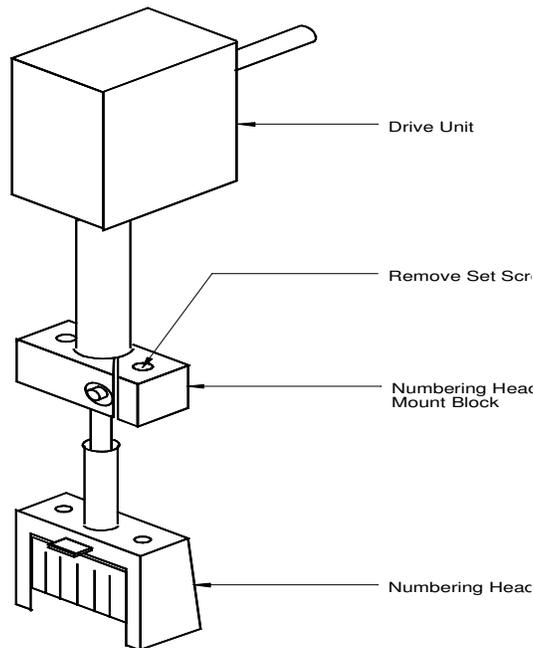
Once you have mastered the art of fanning, you can progress to back-feeding to provide continuous feeding and uninterrupted operation. To feed while the unit is operating, fan a stack and, while holding it in your right hand, carefully grasp the bottom set of the feeding stack with your left hand. Raise the back edge of this bottom set, thus slightly raising the back of the feeding stack, and slide the new stack under it. Release the new stack into the feed tray, letting it slide down under the feeding stack. Lower and release the back edge of the bottom set so that the stacks now sit together. This back-feeding procedure should be done while there is still sufficient stock in the feed tray to allow for the time needed to prepare and insert the new stack.

## 6.0 Maintenance

The GW 3000 is designed to be trouble-free through years of use. Only minor maintenance operations are required to keep it running like new.

### 6.1 Numbering Heads

With use, the numbering heads will acquire a coat of old ink, paper dust, etc. and therefore periodic cleaning is necessary. The minimum frequency of numbering head cleaning is once a month or when changing over colors. Detach the numbering head by removing the two setscrews on the numbering head mount block, using the larger hexdriver provided (see [Figure 12](#)). The head may then be cleaned with a petroleum based spray lubricant (such as WD-40 or Sprayaway RD-90) and a small brush (ie. an old toothbrush). Spray and soak the number wheels thoroughly. **Take care to keep the**



**Figure 12-Removing the Numbering Head**

**spray away from the rest of the machine.** Brush the wheels and then rotate them in order to clean every digit. Spray the numbering wheels a final time to rinse out the ink or dust. After cleaning, allow the head to dry completely (ie. leave it standing overnight) or blow it dry with compressed air. Wipe the head and reinstall.

**Important: Do not use solvents. Solvents will strip out the lubricants from the head, allow corrosion and impair the correct functioning of the print head.**

### 6.2 Machine Cleaning

After each job, or midway through a very large job, clean the feed tires. You can use warm water to clean off paper dust or drying powder, or blanket wash or alcohol if there is ink on the feed tires. Any type of rubber roller rejuvenator is also good to clean the feed tires, the rejuvenator will also soften the rubber. This will prevent glazing of the rubber. Brand new tires will require extra cleaning for the first job or two until the rubber beds in.

In addition, always watch that paper dust or dirt does not block the photocell sensor eyes. The “green” light on the control panel marked “PHOTOCELL” can verify correct photocell operation. If dirty,

simply wipe the photocell sensor eyes but **do not use solvents**. Either use a cotton swab or blow clean with compressed air. Ensure that the trays and guides are clean.

### **6.3 Lubrication**

The GW 3000 utilises ten oil-impregnated bronze bushings to support all shafts. An occasional drop of light machine oil will maintain their lubricating qualities. Wipe off any excess oil to avoid spoiling a job.

### **6.4 Friction Feed**

Over time, the rubber components of the feed tires may wear or harden. Use a rubber roller rejuvenator occasionally to soften the rubber. Other than the feed tires, another important element of the friction feed system is the full lead edge-retarding strip. The abrasive agent on the retarding strip prevents sheets from double feeding. As the abrasive agent wears, you will encounter more double feeds and when you see the green backing of the retarding strip you must replace it. To replace the retarding strip for the feed, adjust the feed shaft to its highest position. Using a scribe or sharp edge, etch into the feed platen where the retarding strip ends (you will use this scribed mark as a reference point when you apply the new retarding strip). Peel off the old retarding strip (you may need a knife or razor) and remove any old adhesive with alcohol. Replace with a new self-adhesive retarding strip. Make sure that there is some of the retarding strip surface under the feed tires to ensure proper operation.

## **7.0 TROUBLESHOOTING**

## SYMPTOM

## SOLUTION

### Friction Feeder

Double-Feeding	Adjust feed tires down by an $\frac{1}{4}$ turn (feed is too loose); if the retarding strip is glazed or worn (you can see the green backing), replace retarding strip (see Section 6.4)
Creasing, marking, or sets pulled apart	Adjust feed tires up by an $\frac{1}{4}$ turn (feed is too tight)
Kicking, turning	Balance adjustment on feed shaft required (one side is too tight); adjust feed tray guides closer together to eliminate side to side play (see Section 4.1 & 4.2 for adjustment instructions).
Not feeding paper	Feed may be too loose in which case, multiple sheets are jammed under the feed tires, check adjustment; if feed tires are smooth or glazed, clean, rejuvenate or replace; open feed tray guides (set too tight to paper width and pinching stock)

### Print Quality

Uneven crash impression	Adjust for crash flatness (see Section 4.11)
Faint colour or uneven colour impression	Replace ink pad. (see Section 4.7)
Excessive inking	Clean head (see Section 6.1); condition ink pad (see Section 4.7) or replace leaking ink pad.
Too heavy (embossing) or too light a crash	Adjust Impression Control dial. (see Section 4.10); check platen pad, if there is excessive wear, the platen pad may require replacing.
Ink spreading, smudging or not drying	Numbering machine ink is mineral oil with pigment. The oil is absorbed by the paper leaving the pigment behind as the image. On slick or glossy stocks, the supplied inkpad will not work effectively. Non-corrosive ink must be used as a substitute (such as fountain pen ink). An important factor with alternative inks is that the numbering heads be cleaned immediately after a job has been run.

## Registration

Inconsistent number location (poor number registration)	Check that the photocell is clear of any obstacles (see Section 6.2); if the number location seems to 'float', the feed tray guides may be too loose allowing sheets to skew as they feed (this will be seen more often with number locations closer to the non-operator side, furthest away from where the sheet passes the photocell; if numbers occur all over the place, the photocell may require readjustment (it is too sensitive, mis-registering the lead edge of the sheet))
Perf/score/slit line skewing	With a straight edge, check that the perf/score/slit is straight. If straight, the stock is not feeding square and the feed tray guides may need adjusting to ensure the stock enters square into the machine. If the perf/score/slit line is not straight but is bowed or has a tail whip, the rollers on the main shaft and/or the exit shaft may not be evenly balanced along the shaft, causing uneven pressure on one side of the stock. This causes a skew and the rollers must be evenly spaced across the shaft. A bowed line usually indicates the rollers on the main shaft are uneven, and a tail whip usually means the rollers on the exit shaft are uneven.

## Numbering Heads

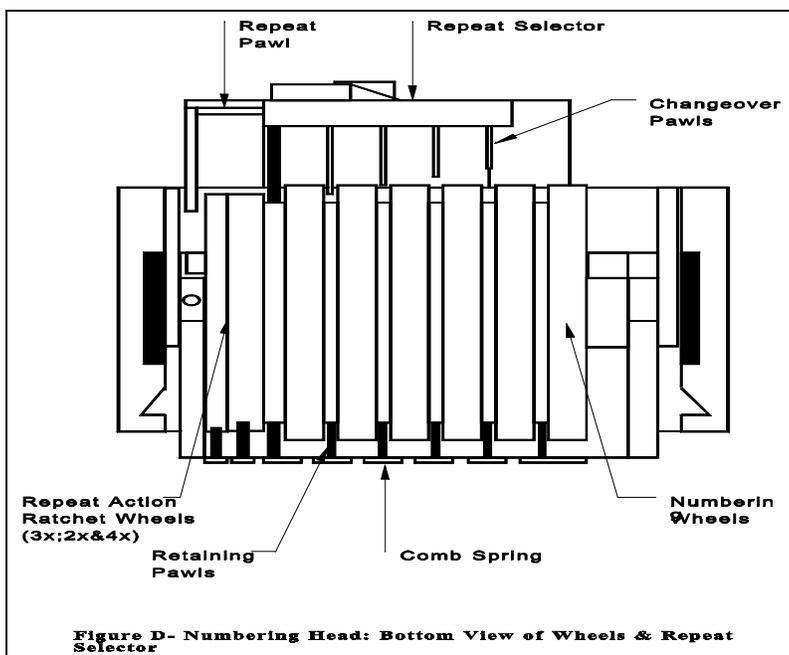
The numbering heads creating an impression, are a mechanical process separate from the programming of the machine. If encountering problems with the correct operation of the numbering head, such as numbering wheels not turning, numbers partially printing, numbering wheels turning out of sequence, etc. the repeat selector or other components may be out of alignment (refer to [Figure 4](#)). Being a mechanical process, alignment of the individual parts is very important. Remove the numbering head from the machine. Pressing down on the numbering head shaft, you will see the numbering head frame slide down the print head frame. While this happens, the ink pad holder mount bracket will swing away, exposing the numbering wheels (see [Figure D](#)).

The numbering wheels and repeat action ratchet wheels are mounted on a keyed shaft inside the numbering head frame. The wheels are then held in place, and refrained from spinning by the retaining pawls, which are forced to the numbering wheel flats by the comb spring. The retaining pawls must be aligned with the flats of the numbering wheels, or what looks like in between the numbering wheels. The comb spring must also apply a constant pressure against the retaining pawls. Consequently this alignment not in effect is that the numbering wheels may spin freely, causing partial impression or random numbering sequences.

Like the retaining pawls, the changeover pawls of the repeat selector must also be aligned to the flats of the numbering wheels. When an impression is made, the numbering wheel frame is propelled down the print head frame. The ink pad holder mount bracket swings away, the repeat selector is pushed back from the numbering wheels and the numbering wheels are then exposed to make their impression on the stock. After reaching the bottom of its stroke, the numbering wheel frame then returns to the top position. As this happens, the repeat selector's changeover pawls once again come into contact with the numbering wheel flats. Depending upon the action or sequence in place, the repeat pawl may only interact with one of the repeat action ratchet wheels before the changeover pawls interact with the numbering wheel flats. In most instances, the longest changeover pawl comes into contact with the flat of the unit wheel flat to change it over. After a "0" has been printed, there will be more changeover pawls changing more numbering wheels. When this happens, you may find the next impression, with a "9" as the last digit, printing lightly. This can be overcome by increasing the Impression Control to provide a stronger pulse to turn over more wheels. If you are encountering problems where numbers are not turning over, numbers are printed out of sequence, etc., then the problem may be that the changeover pawls of the repeat selector are not aligned with the flats of the numbering wheels.

The repeat selector is mounted on the print head frame by the two repeat selector adjustment screws. The repeat selector must be mounted to the print head frame squarely. If not, the changeover pawls will not engage the flats of the numbering wheels square, in this case some of the changeover pawls can not change their

numbering wheels. Visually, check that the changeover pawls are riding in-between the numbering wheels, centred on their flats. If not, the whole repeat selector may be moved to the proper position by loosening the repeat selector adjustment screws. Lastly, the changeover pawls must be parallel to each other.



## Error Codes

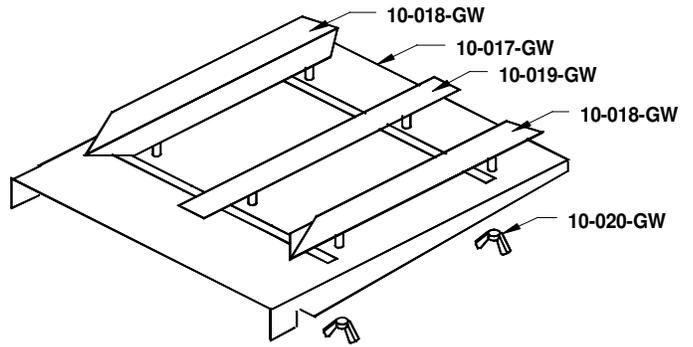
ERROR/BLINK NUMBER	ERROR CONDITION	CONDITION
01	PAPER JAM	<ul style="list-style-type: none"> <li>• Paper has lodged itself above the photocell and beneath the reflector.</li> <li>✓ Remove paper sideways- do not pull up against the reflector.</li> <li>• Dust has accumulated over the photocell.</li> <li>✓ Blast the groove below the reflector with air.</li> <li>• Photocell needs readjustment.</li> <li>✓ Consult your dealer.</li> </ul>
02	CH 1 OPEN	<ul style="list-style-type: none"> <li>• Head #1 is not plugged into channel #1.</li> </ul>
03	CH 1 SHORT	<ul style="list-style-type: none"> <li>• The solenoid has failed and replacement is necessary.</li> </ul>
04	CH 1 HOT	<ul style="list-style-type: none"> <li>• Machine has been running for a while, and the solenoids have heated up.</li> <li>✓ Turn the machine off to allow the head to cool down.</li> </ul>
05	CH 2 OPEN	<ul style="list-style-type: none"> <li>• Head #2 is not plugged into channel #2.</li> <li>• The program being ran is using two heads and there is only one drive unit.</li> <li>✓ Reprogram using Head #1.</li> </ul>
06	CHANNEL 2 SHORT	<ul style="list-style-type: none"> <li>• The solenoid has failed and replacement is necessary.</li> </ul>
07	CHANNEL 2 HOT	<ul style="list-style-type: none"> <li>• Machine has been running for a while, and the solenoids have heated up.</li> <li>✓ Turn the machine off to allow the head to cool down.</li> </ul>
08	AC LINE VOLTAGE OUT OF OPERATION RANGE	<ul style="list-style-type: none"> <li>• Check line voltage and consult your dealer.</li> </ul>
09	MOTOR VOLTAGE OUT OF RANGE	<ul style="list-style-type: none"> <li>• Motor has been running for a while and needs cooling down.</li> <li>• MSTP board needs replacing.</li> </ul>
10	EEPROM ERROR	<ul style="list-style-type: none"> <li>• A component problem has occurred.</li> <li>✓ Consult your dealer.</li> </ul>

<b>PART NO.</b>	<b>3K</b>	<b>DESCRIPTION</b>
10-001-GW	X	Black, Preinked Pad w/holder
10-002-GW	X	Black, Preinked Pad w/holder
10-003-GW	X	Uninked pad w/holder
10-004-GW	X	Felt Insert
10-005-GW	X	Red Ink, 4 oz. bottle
10-006-GW	X	Black Ink, 4 oz. bottle
10-007-GW	X	Changestick
10-008-GW	X	3/32" Hexdriver
10-009-GW	X	5/32" Hexdriver
10-010-GW	X	Ring Pliers
10-011-GW	X	3/4" Snap Ring
10-012-GW	X	Reverse Numbering Head (6 digits, 2 drop)
10-013-GW	X	Forward Numbering Head (6 digits, 5 drop)
10-014-GW	X	Condensed Reverse Numbering Head (8 digits, 4 drop)
10-015-GW	X	Date Stamp Head (month/day/year)
10-016-GW	X	5/8" Wave Washer
10-017-GW	X	Feed Tray
10-018-GW	X	Feed Tray Side Guides
10-019-GW	X	Feed Tray Slot Cover
10-020-GW	X	Locking Wingnuts
10-021-GW	X	Feed Platen Retarding Strip
10-022-GW	X	Feed Shaft Adjust Screw
10-023-GW	X	Locking Thumbnut
10-024-GW	X	Roller Tire (feed/main/exit)
10-025-GW	X	Roller Hub
10-026-GW	X	Roller Shaft
10-027-GW	X	3/8 " Set Screw Collar
10-028-GW	X	Shaft Bushing
10-029-GW	X	Feed Shaft Bushing w/Spring
10-030-GW	X	Shaft Bushing w/Spring
10-031-GW	X	Solid Bottom Roller
10-032-GW	X	Main Platen Crash Pad
10-033-GW	X	Main Platen
10-034-GW	X	Main Platen Grommets
10-035-GW	X	Main Platen Mount Brackets
10-040-GW	X	Hand Knob
10-041-GW	X	5/16" Disc Spring
10-042-GW	X	5/16" Flat Washer
10-043-GW	X	Solenoid w/plunger
10-044-GW	X	Solenoid plunger
10-053-GW	X	Drive Unit Cover
10-054-GW	X	Print Head Mount Block
10-055-GW	X	Exit Tray
10-056-GW	X	Magnetic Tray Side Guides
10-057-GW	X	Magnets (2)
10-058-GW	X	Handwheel
10-059-GW	X	120V Modular Line Cord
10-066-GW	X	5A, 250V Slow Blow Fuse
10-068-GW	X	Impression Control Dial Knob
10-071-GW	X	1/2 " Cord Strain Relief
10-084-GW	X	Accessory Holder w/12 TPI perf blade
10-085-GW	X	Accessory Holder Adjust Screw

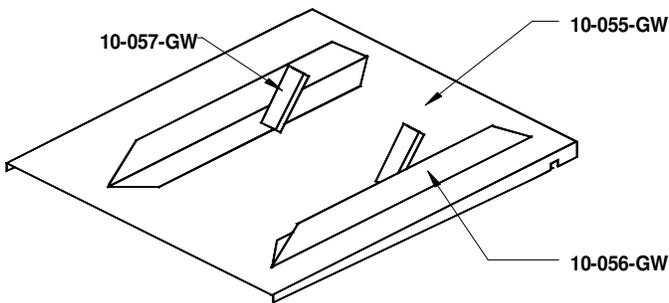
10-086-GW	X	Blade Mount Hub w/bearing
10-088-GW	X	Accessory Holder w/idler wheel
10-089-GW	X	Idler Wheel Tire
10-090-GW	X	Boss Wheel
10-091-GW	X	2 TPI Perf. Blade
10-092-GW	X	4 TPI Perf. Blade
10-093-GW	X	6 TPI Perf. Blade
10-094-GW	X	8 TPI Perf. Blade
10-095-GW	X	12 TPI Perf. Blade
10-096-GW	X	Microperf (42 TPI) Blade
10-097-GW	X	Microperf (72 TPI) Blade
10-098-GW	X	Slit Blade
10-099-GW	X	Score Blade
10-100-GW	X	Narrow Score Blade
10-101-GW	X	Double Score (1/4 " separation) w/Holder & Boss
15-005-GW	X	Red Quick Drying Ink, 2 oz. Bottle
15-006-GW	X	Black Quick Drying Ink, 2 oz. Bottle
15-036-GW	X	3/4 " Keyed Drive Unit Mount Shaft
15-037-GW	X	Anti-Pitch Block
15-038-GW	X	5/16" Dogged Set Screws
15-039-GW	X	Drive Unit Mount Block (left/right pitch control)
15-052-GW	X	Solenoid Mount Angle w/tube (left/right pitch)
15-072-GW	X	Complete Drive Unit
15-073-GW	X	Complete Drive Unit w/Reverse #ing Head
30-025-GW	X	Large Clutch Feed Pulley /12k
30-037-GW	X	Rubber Foot
40-003-GW	X	Timing Pulley- 18XL037X3/8
40-103-GW	X	Timing Pulley- 18XL037X1/2
50-007-GW	X	Main Structure Shaft
50-008-GW	X	Feed Platen/8000
50-009-GW	X	Shaft Adjust Blocks
50-011-GW	X	Drive Unit Mount Shaft Bracket
50-014-GW	X	Boss Wheel Shaft
50-019-GW	X	Cross Shaft
50-020-GW	X	Exit Rollers Safety Shield
50-021-GW	X	Timing Belt- 220XL037
50-022-GW	X	Belt Tensioner
50-023-GW	X	1 3/4 " Feed Pulley
50-033-GW	X	Fan Guard
50-035-GW	OP	Stand/8000
50-037-GW	OP	Regular Caster Wheel
50-038-GW	OP	Locking Caster Wheel
90-001-GW	X	Non-Operator Side Plate
90-002-GW	X	Operator Side Plate
90-003-GW	X	Non-Operator Side Cover w/guard
90-004-GW	X	Operator Side Cover
90-005-GW	X	Stepper Motor
90-006-GW	X	Motor Ferrite Bead
90-007-GW	X	Motor Guard
90-009-GW	X	Metal Display Panel
90-010-GW	X	Main Bottom Roller
90-011-GW	X	Photocell Reflector
90-012-GW	X	Accessory Holder Mount Shaft
90-013-GW	X	Stripper Assembly

90-015-GW	X	Safety Shield w/hinge & actuator /3/6/8k
90-016-GW	X	Safety Switch w/harness /3/6/8k
90-024-GW	X	O-Ring Feed Drive Belt/3/6/8k
90-025-GW	X	MSTP Board/3k
90-025-GW-X	X	MSTP Board: Exchange/3k
90-026-GW	X	MSTP Chip
90-028-GW	X	HV Voltage Solenoid Board 3/6k
90-028-GW-X	X	HV Voltage Solenoid Board 3/6k: Exchange
90-029-GW	X	ICPU Display Board
90-029-GW-X	X	ICPU Display Board: Exchange
90-031-GW	X	Low Profile Tie Mounts
90-032-GW	X	12V Cooling Fan
90-034-GW	X	Display Board Label
90-054-GW	X	Print Head Mount Screws
90-055-GW	X	Print Head Rotation Screw
90-059-GW	X	220V Line Cord
90-060-GW	X	MSTP Board 120V Connector
90-061-GW	X	MSTP Board 220V Connector
90-062-GW	X	Modular Switch w/fuseholder
90-063-GW	X	Line Filter
90-064-GW	X	Filter to MSTP Board Cable
90-065-GW	X	Board Mount Stand-Off
90-067-GW	X	Photocell Assembly
90-069-GW	X	Solenoid Connection: Board to Female Terminal
90-082-GW	X	Wire Transfer Tube
90-083-GW	X	Drive Shaft Bearing
90-084-GW	X	Drive Shaft Bearing w/Spring
90-085-GW	X	Plastic Electrical Guard
92-028-GW	X	HV Voltage Solenoid Board
92-028-GW-X	X	HV Voltage Solenoid Board: Exchange
94-003-GW	X	Non-Operator Side Cover w/guard

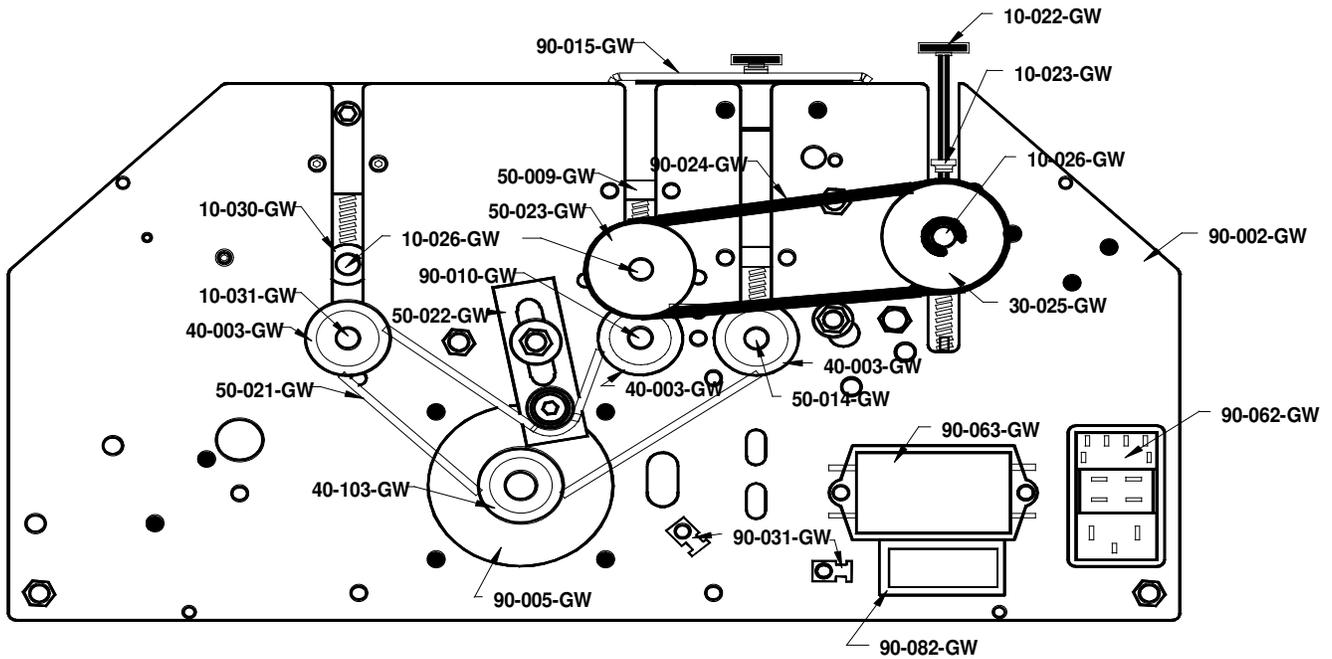
# GW 3000 ARTS DIAGRAM



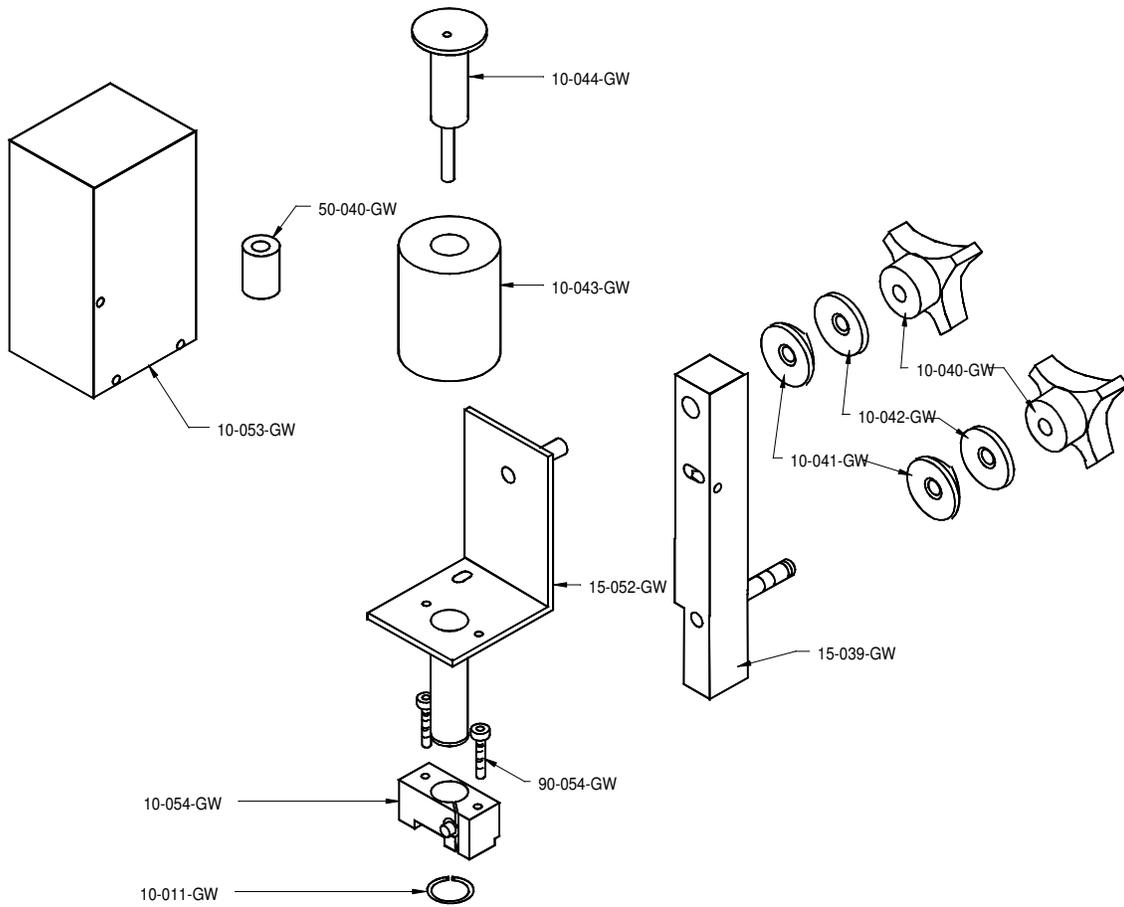
**FEED TRAY ASSEMBLY**



**EXIT TRAY ASSEMBLY**

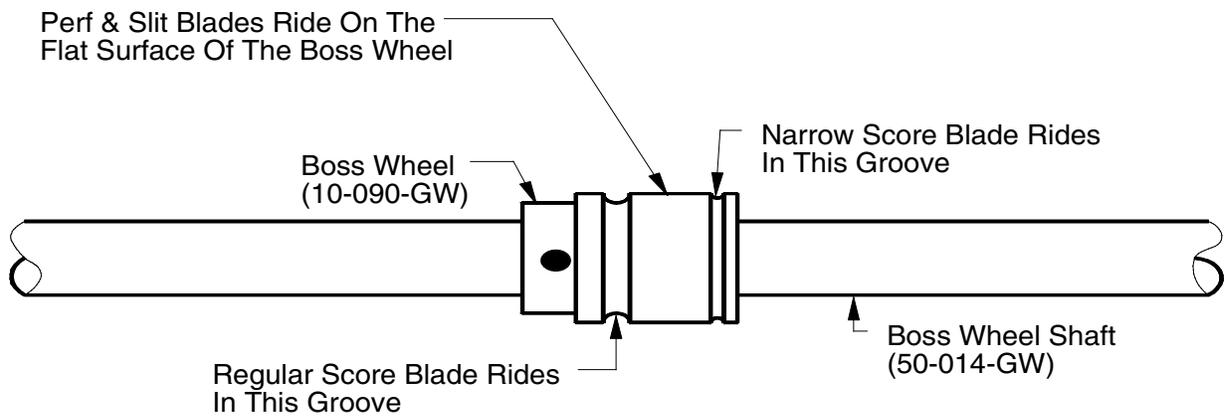


**GW 6000 OPERATOR SIDE**

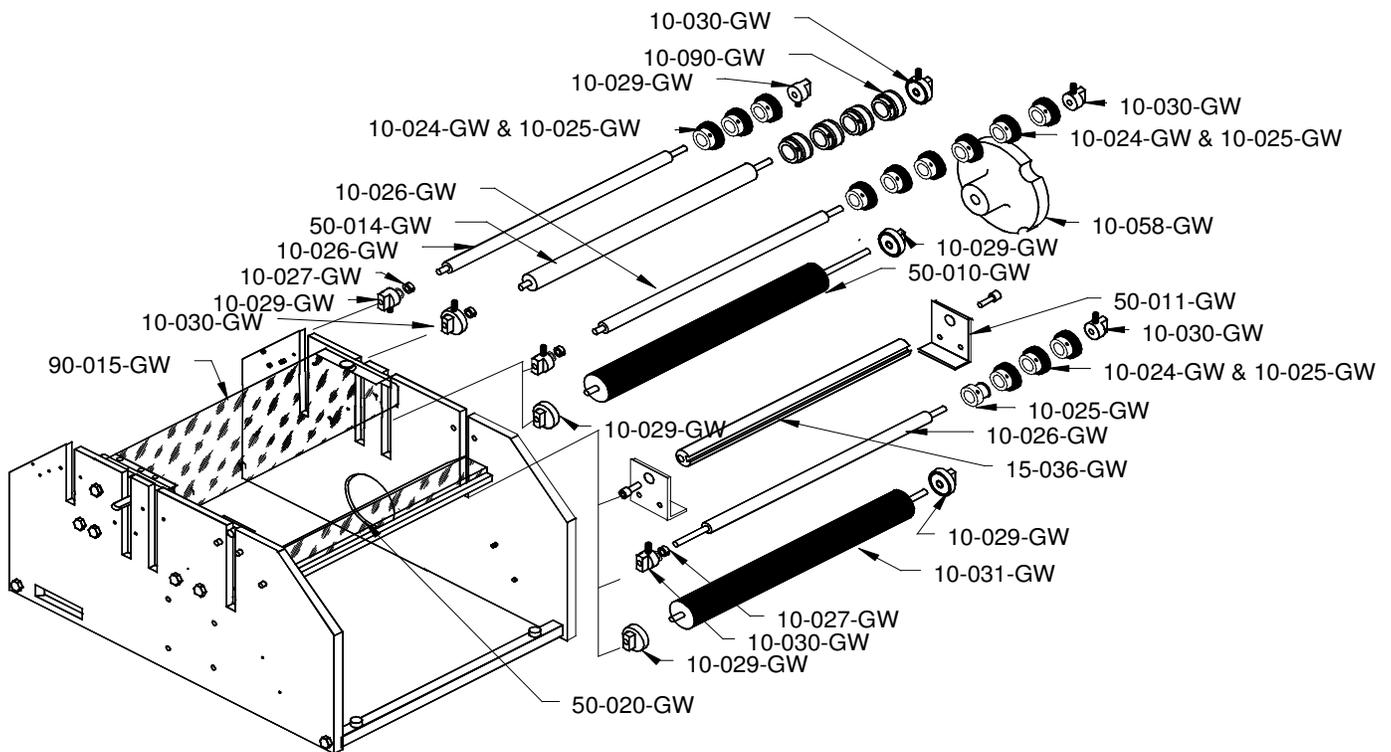
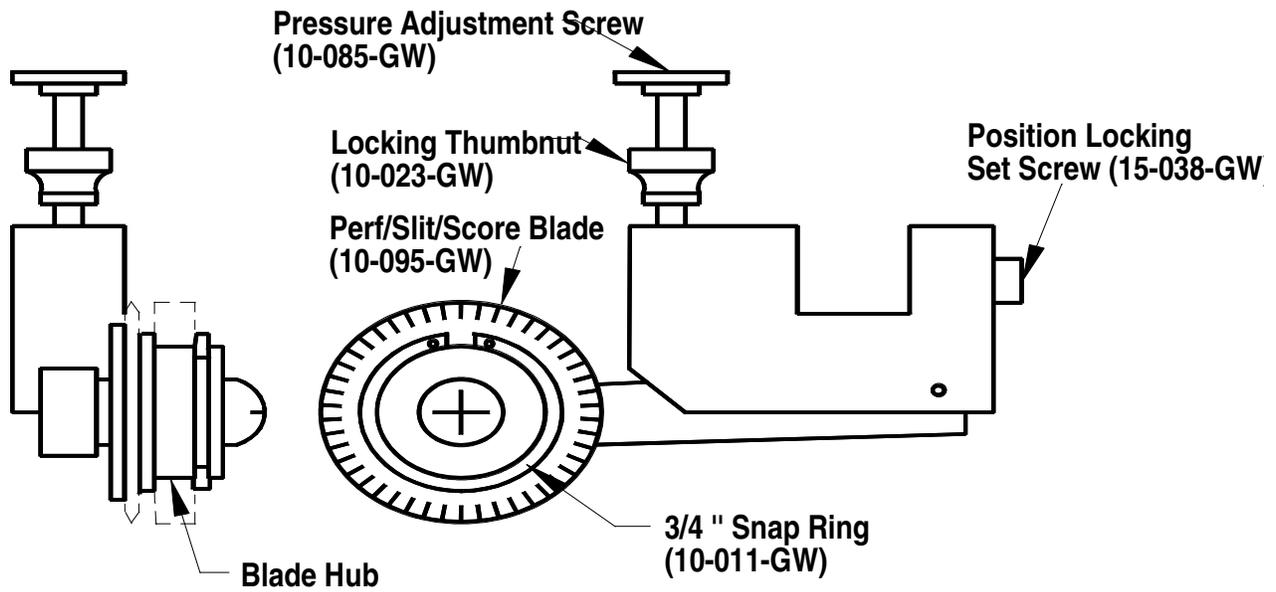


**ELECTRIC SOLENOID DRIVE UNIT (15-072-GW)**

**Blade Placement on the Boss Wheel**



# ACCESSORY HOLDER



**GW 3/6/8000 Shaft Placement**