

FORCE FLEX FEEDER

MODEL FF-20

OPERATION AND MAINTENANCE MANUAL



12050 49th STREET NORTH - CLEARWATER, FL. 33762-4301
PHONE: 727.571.3330 - FAX: 727.571.3443 - TOLL FREE: 1.800.INSERTER
web: surefeed.com

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Special Note:

Some pictures and illustrations may have color, hue and contrast graphically altered for clarity when printing in black and white and may not necessarily reflect the actual color of the product when viewed on compact disk.

DEFINITIONS

1	ON
0	OFF
∅ or PH	PHASE
~	VAC (volts alternating current)
.....—	VDC (volts direct current)
!	WARNING or CAUTION
	HAZARDOUS
	HEAT

Section I

Installation of the

FORCE FLEX FEEDER MODEL FF-20



DIRECT MAIL SOLUTIONS

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Section - I

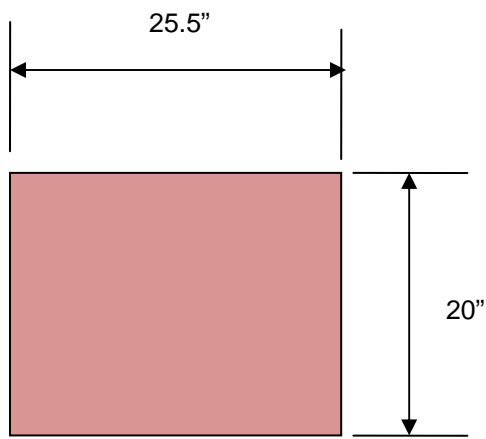
Installation

PITNEY BOWES FORCE FLEX FEEDER



Figure I-1

**FORCE FLEX_SA Floor plan
(Shown without other conveyors)**



Requirements

- Floor Space = 3.6 Sq. Ft.
- Electrical = 115/230 V~, 1 PH, 50/60 HZ, 5A
- Air = None
- Vacuum = None
- Weight = 100 #

Figure I-2

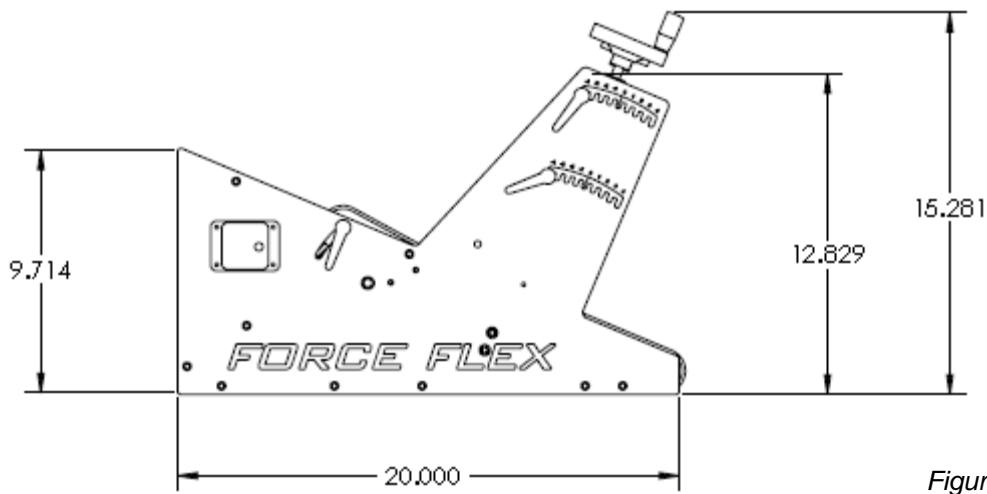
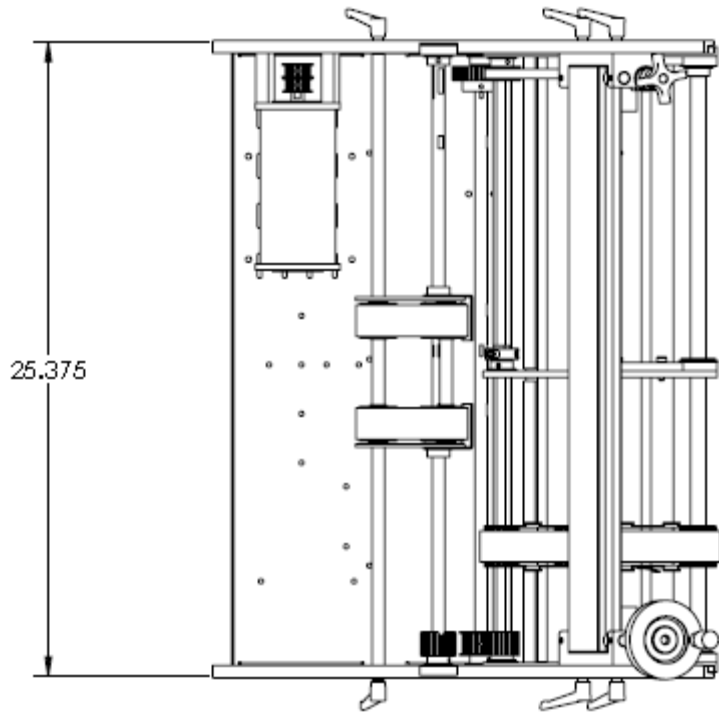


Figure I-3

Environment:

The installation of the FORCE FLEX FEEDER is intended for operation in a specific environment. See Operating Environment Table below for details.

Operating Environment Table

ITEM		SPECIFICATION
Environmental Conditions	Ambient Operating Temperature	0 to 35° C
	Storage Temperature	-25 to 85° C
	Ambient Operating Humidity	30% to 95% RH (with no condensation)
	Ambient Storage Humidity	5% to 95% RH (with no condensation)
	Pollution Level	Pollution level 2 (conforming to UL/EN60950-1)
	Corrosion Gas	There must be no combustible or corrosive gas.
	Operating Altitude	2,000 m above sea level or lower
Installation Requirements	Ground	Ground (earth) connection required
	Cooling Method	Natural cooling

Figure I-4

Installation: Positioning the Components

Once the FORCE FLEX FEEDER has been removed from the shipping container, perform the following:

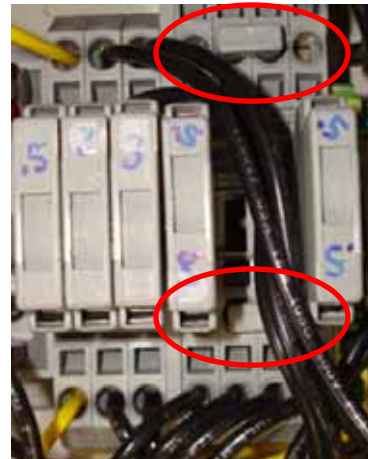
1. Inspect the location where the machine is to be set up.
(Note: The manufacturer recommends that the area be a relatively flat and smooth concrete or hard wood surface, similar substrates are acceptable. The area should be free of holes, divots, loose floorboards, etc. and not subject to retaining moisture from water seepage.) (Warning: In the event the floor does not meet the recommended requirements, seek an alternate location or reschedule the installation after repairs to the floor have been completed.)
2. The side guides (left and right hand) must be re-attached to the Force Flex Feeder. See later section for details.

Installation: Electrical Setup Connections

3. Inspect the line current at the point where the power cable of the machine is to be plugged in.
(Note: Conventional wall sockets, ceiling line drops and D-Boxes should be free of cracks, rust, visible signs of heat stress and flash marks.) (Special Note: For installations in Europe check the condition of the voltage converter box or other voltage reducing device that may be in use. In the event of a line voltage inspection failure, report your findings to the person or persons in charge of the building and postpone the installation until corrections are made.)
4. Check the line voltage to ensure that the minimum and maximum requirements are present.
5. Check to see what volt value the transformer is pinned out.



110 VAC
2 JUMPERS



240 VAC
1 JUMPER

6. Position the FORCE FLEX FEEDER in the designated location.
7. Check entire machine for any items that may be obstructing proper operation. This includes packing/shipping components.
8. Plug the power cables for the FORCE FLEX FEEDER into the proper sized site receptacle.



(Warning: To avoid possible damage to the machine and prevent possible injury, keep the work areas free of all packing material and other debris.)

Section II

Safety Features & Warnings

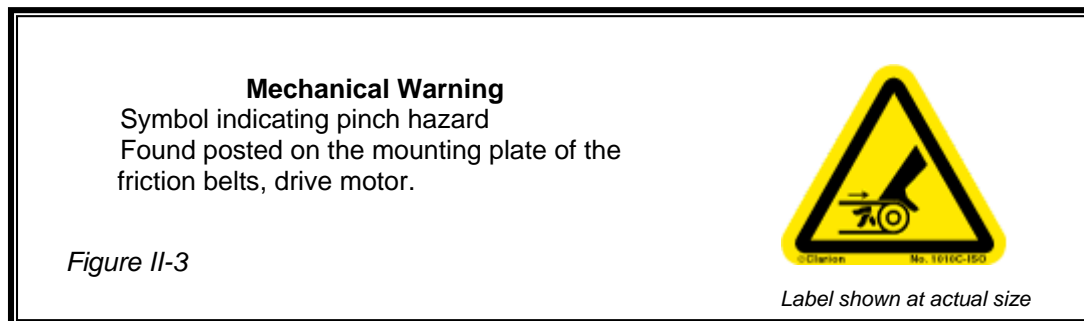
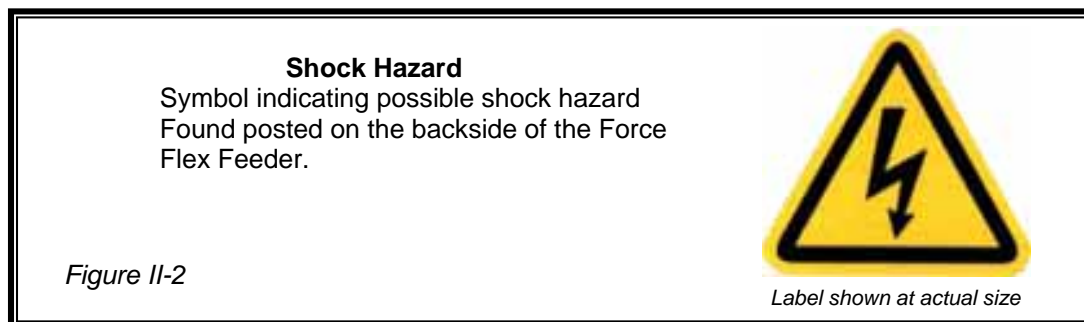
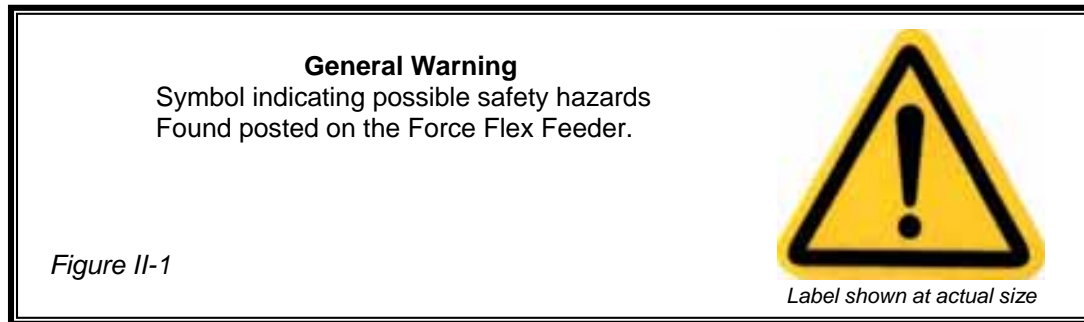



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Section II

Safety Features:

All FORCE FLEX FEEDER systems have been designed with covers to areas containing moving parts as well as caution or warning labels or stickers to safeguard persons operating and or working on or around this equipment. These are as follows:



Note: This symbol  appears as a visual alert in the text of this manual next to written warnings regarding possible safety issues and or possible machine damage that may occur as a direct result of failure to follow specific instructions as written.

(Note: The safety devices, door locks, warning labels and stickers are installed by the manufacturer to safeguard all persons operating and or working on or around the FORCE FLEX FEEDER. Removing, altering or disabling any of these items will void any and all warranties, either real or implied, purchased or offered with the FORCE FLEX FEEDER. All companies connected with the manufacturing, promotion and sale of the FORCE FLEX FEEDER shall be held harmless for any and all injuries and damage in the event the safety devices, door locks, warning labels and stickers are removed, altered or disabled)

In addition to the safety devices and warnings installed on the FORCE FLEX FEEDER by the manufacturer, the following recommendations for safe operation and maintenance of the FORCE FLEX FEEDER are as follows:



- Any persons designated to operate, work on or near the FORCE FLEX FEEDER must be fully trained by a factory-authorized representative.
- Do not operate or perform any type of maintenance on the FORCE FLEX FEEDER while under the influence of drugs or alcohol.
- Do not operate or perform any type of maintenance on the FORCE FLEX FEEDER in or around freestanding water.
- Do not wear loose or baggie fitting shirts, shirts with billowing sleeves, bracelets, rings, necklaces, neckties or other loose apparel that may come into close proximity with moving parts of the machine.
- Do not place any items near or over the “Emergency Stop Switches” that might inhibit or obstruct line of sight or access to the Emergency Stop Switches. The “Emergency Stop Switches” must be clearly visible and accessible at all times.
- Wear protective safety eyeglasses or goggles and use a particle mask or similar device when cleaning off the FORCE FLEX FEEDER with compressed air. Alert all other persons in the area to stand a minimum of thirty (30) feet from the area where compressed air is put to such use.
- Hearing protection is not required for safe operation of the FORCE FLEX FEEDER. Typically, decibel levels have been found to be less than 85 decibels in machines properly maintained and in good operating condition.
- All persons having hair greater than shoulder length who operate, work on or near the FORCE FLEX FEEDER should keep their hair pulled back in ponytail fashion then pinned up or otherwise contained to the top of their head or confined under the back of their shirt.
- Turn off the main power to the FORCE FLEX FEEDER before opening any of the service doors for general cleaning and or general maintenance. Follow the “Lock Out Procedures” as stated on page 14 for extensive repairs involving disassembly of the machine either in whole or in part or replacing any of the electrical components.

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- Any persons working near any of the electrical motors or pump motors of the FORCE FLEX FEEDER should use caution. Electrical motors and product heaters give off heat, contact with or exposure to bare skin may result in burns.
- The FORCE FLEX FEEDER was designed to feed and transport paper only. Do not attempt to feed and / or run materials made of or containing glass, metal, wood, liquids, foods, powders, gasses, explosives or toxic and hazardous chemicals on the FORCE FLEX FEEDER. (Note: The manufacture recognizes and acknowledges that the FORCE FLEX FEEDER is capable of successfully running and / or transporting compact disk and audio cassettes inserted into paper envelopes, however the manufacture and other companies connected with the promotion and sale of the FORCE FLEX FEEDER do not assume any responsibility for any damage to the FORCE FLEX FEEDER or product and shall be held harmless for any damages and or injuries resulting in this practice.)

Special Advisement:

The manufacturer and other companies connected with the promotion and sale of the FORCE FLEX FEEDER shall be held harmless for any and all injuries sustained to any person or persons as a result of failure to comply with the recommendations for safe operation and maintenance of the FORCE FLEX FEEDER as shown and / or described herein.

The Lithium batteries used in our products may contain Perchlorate Material --- special handling may apply. See www.disc.ca.gov/hazardouswaste/perchlorate.

If any equipment is provided with a replaceable battery and if replacement by an incorrect type could result in an explosion (for example, with some lithium batteries), the following applies:

- If the battery is placed in an 'operator access area', there shall be a marking close to the battery or a statement in both the operating and servicing instructions;
- If the battery is placed elsewhere in the equipment, there shall be a marking close to the battery or a statement in the servicing instructions.

This marking or statement shall include the following or similar text:


CAUTION

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE

DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS

Lock Out Procedure

Before beginning extensive repairs involving disassembly of the machine either in whole or in part, performing general maintenance or replacing any of the electrical components, the machine must be locked out of service to ensure that power will not be restored to the machine while the work is being performed. To lock a machine out of service, perform the following:

 **Warning:** The following procedure is published herein for the expressed purpose of providing a safe work environment conducive to persons performing repairs and or maintenance and or general cleaning of the FORCE FLEX FEEDER and or any other components connected to or associated with the FORCE FLEX FEEDER. This procedure must be followed without exception to ensure the safety of any person or persons performing the previous stated task.

The manufacturer and other companies connected with the promotion and sale of the FORCE FLEX FEEDER shall be held harmless for any and all injuries sustained to any person or persons and or damage to the FORCE FLEX FEEDER and or any other components connected to or associated with the FORCE FLEX FEEDER as a result of failure to comply with the “Lock Out Procedure”.

1. Turn the main power switch to the off position.
2. Disconnect the power cable from its source by performing the following:
 - a. Follow the main power line from the machine back to the receptacle or source of supplied power and disconnect it at the source.
 - b. Place the plug connector close to the machine in such a position that will remain in your field of vision while repairs or maintenance is being performed.
3. Notify all other persons in the area where the work is being performed that the machine will be out of service, especially if the work you are performing requires you to be crouched behind or beside the machine or in some other way obscured from the sight of other persons in the area.
4. When the work has been completed reconnect the plug to the power source and then test cycle the machine to ensure that power has properly restored and the machine is fully functional.
5. Notify all other persons in the area that the machine is fully operational and that the drive motors will become enabled when the power switch is placed in the on position.

Suggested Lock Out Devices

The following are some suggested devices specifically designed to provide a greater degree of safety when locking out the power supply to a machine. These devices can be purchased from most safety equipment suppliers and vendors.

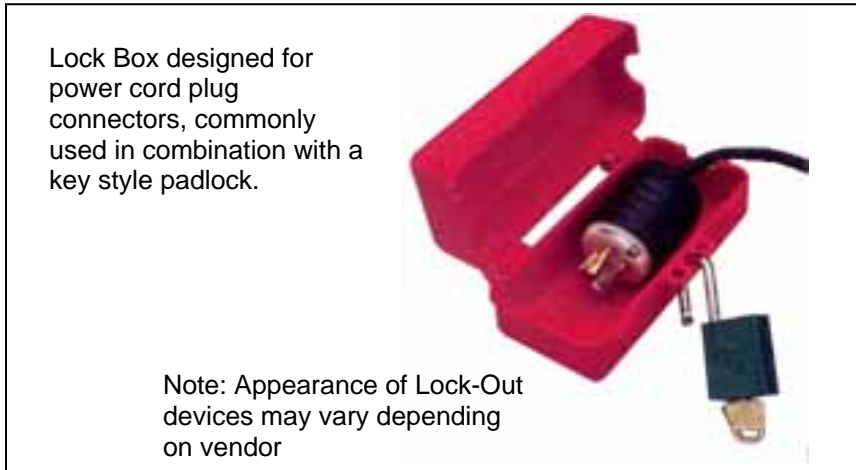


Figure II-4

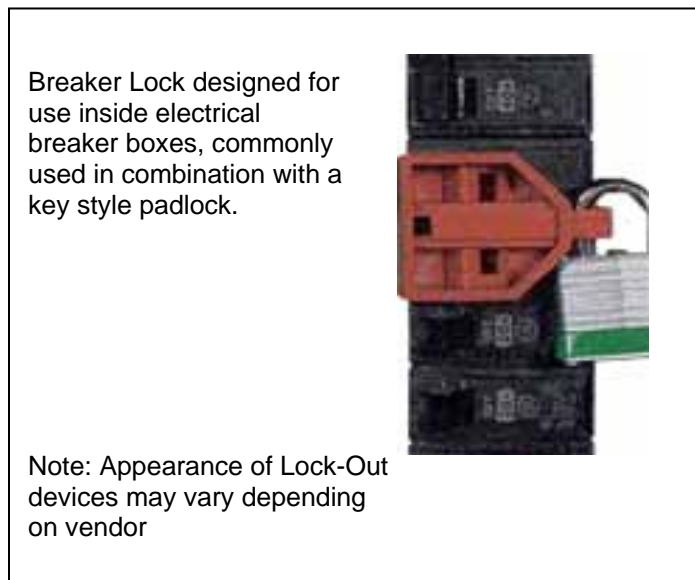


Figure II-5

Warning Alert tags, commonly used in combination with all lock out devices.

Front View of Lock Out Tag



Back View of Lock Out Tag



Figure II-6

Section III

General Set-Up

FORCE FLEX FEEDER

MODEL FF-20



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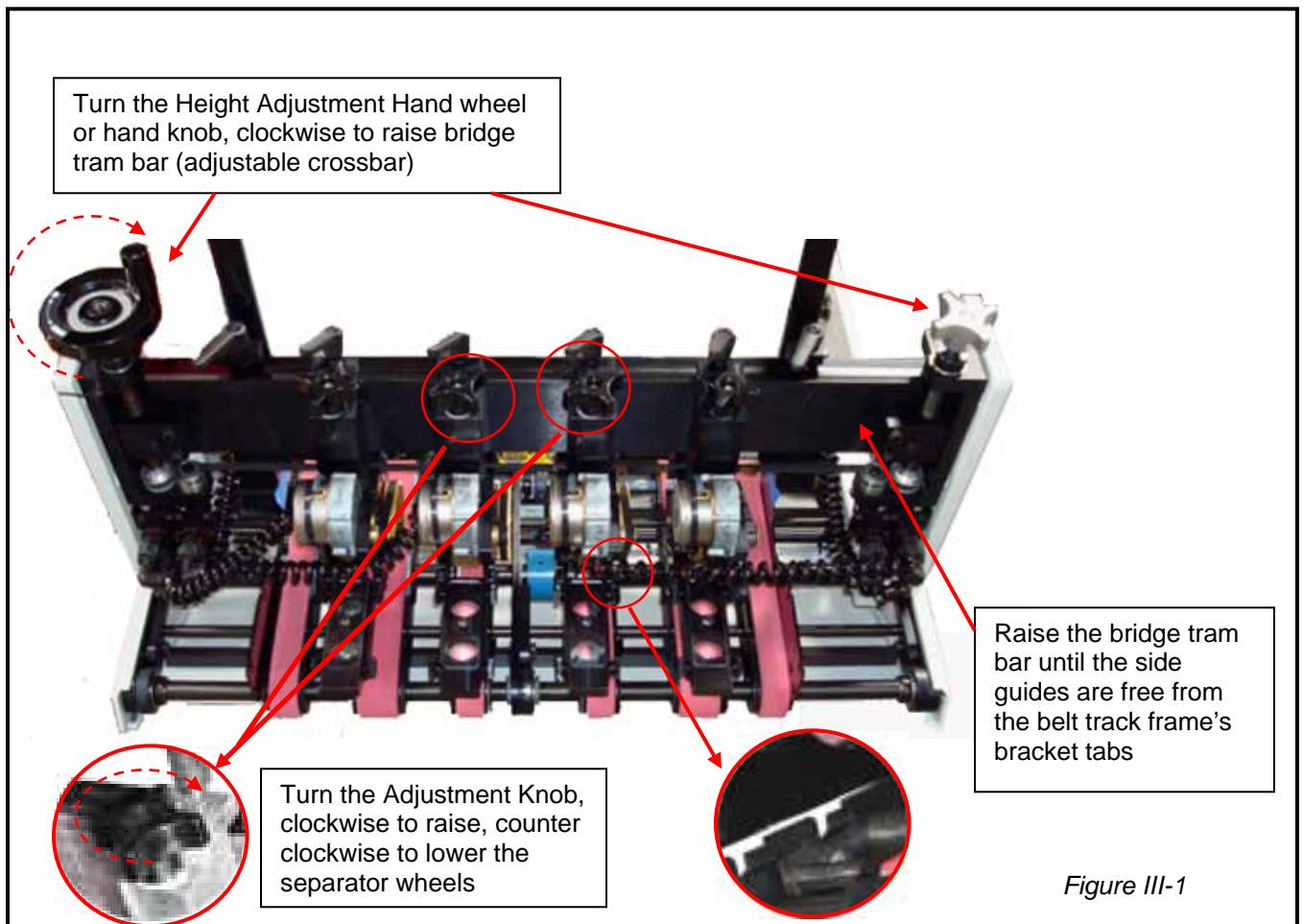
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Section – III

This FORCE FLEX FEEDER is comprised of a Force Flex feeder that can stand alone (SA), be mounted to an optional stand or be incorporated onto a conveyor.

FORCE FLEX FEEDER SET-UP

- A. Center the material in the Force Flex Feeder by performing the following:
1. Raise the bridge tram bar by turning the hand wheel or hand knob of the bridge tram bar height adjustment in a clockwise direction. Raise the bridge tram bar until the material side guides are free from the bracket tabs on the belt track frames of the transport belt track assembly, see figure III-1.
NOTE: The material side guides should always securely engage the belt track frames during operation. Failure to do so may cause damage to belts or shafts and cause problems in product alignment.



2. Raise each separator wheel by turning the adjustment knob atop each separator assembly in a clockwise direction, see figure III-1.
3. Fold one (1) piece of material in half to establish a center crease. (Note: The crease needs to be made in the direction of travel that the material is to be run in, see figure III-2.)

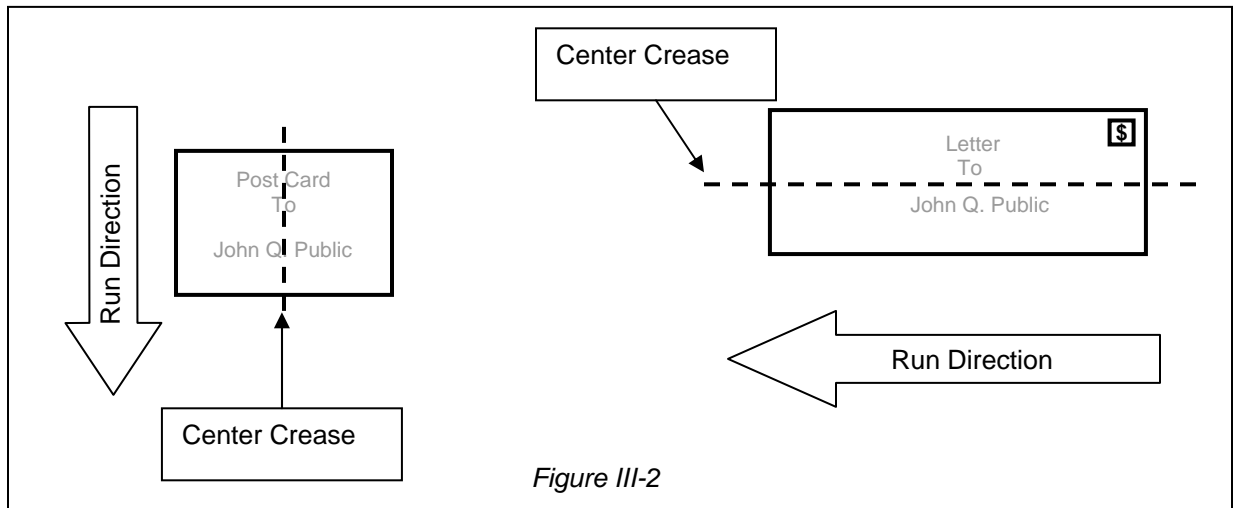


Figure III-2

4. Align the center crease of the set up piece with the blue Nip roller on the transport belt carriage and back wedge center channel, see figure III-3

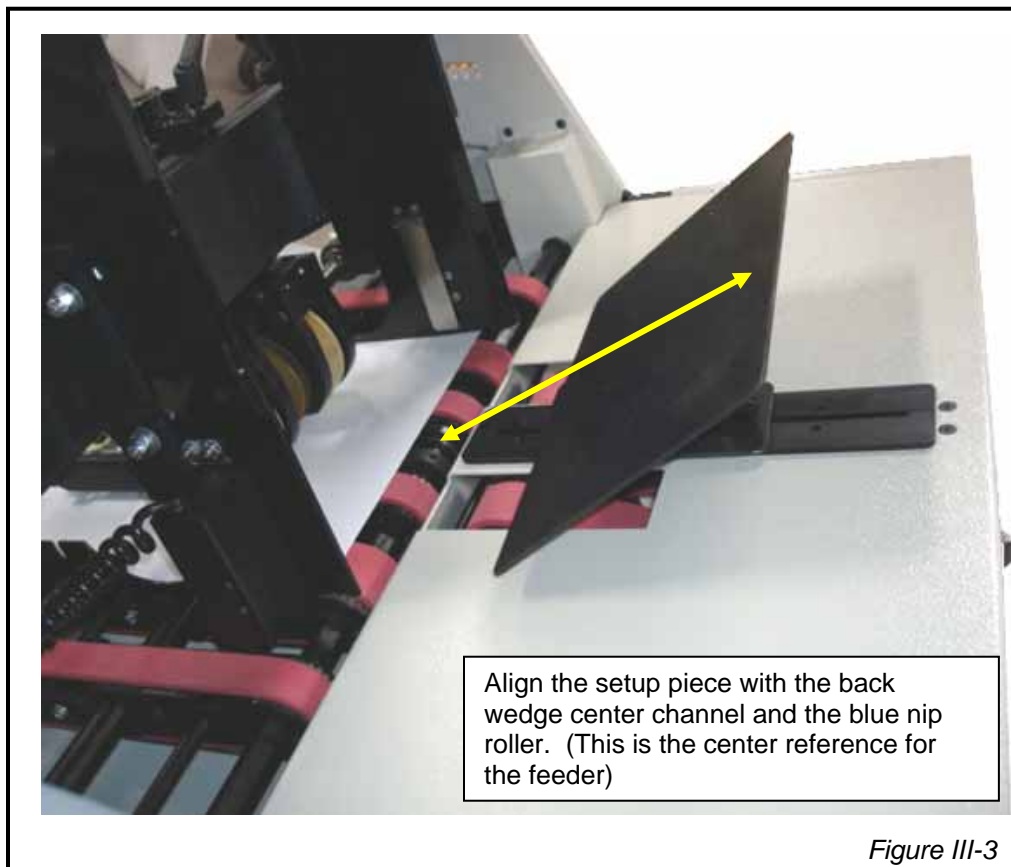
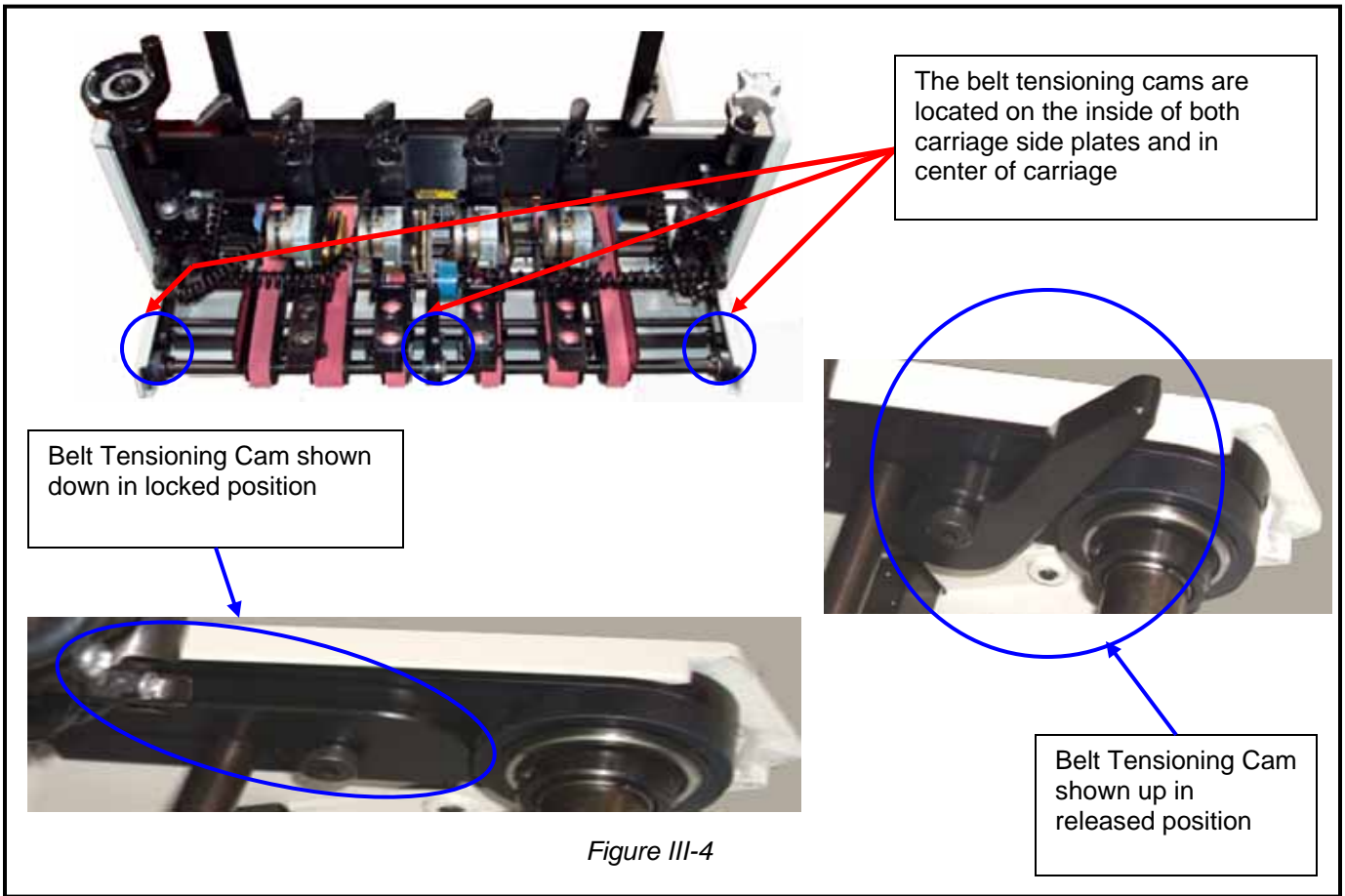
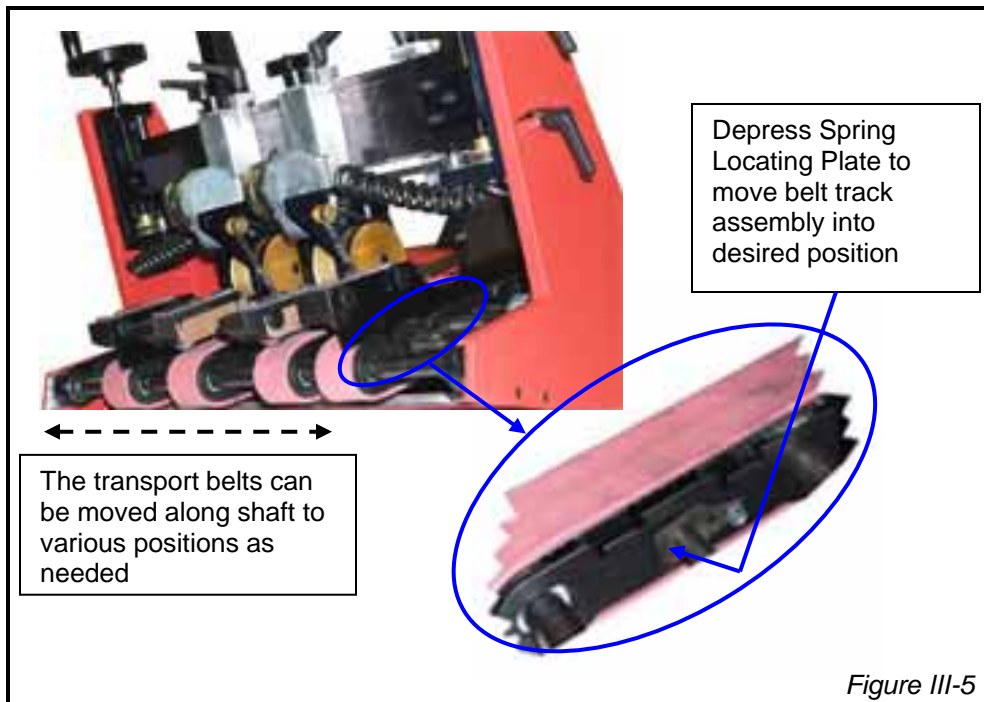



Figure III-3

5. Lift the belt tensioning cams on both sides of the transport belt carriage to release belt pressure, see figure III-4.



- Depress the Spring Locating Plate and move the belt tracks into positions that evenly support and feed the specific size product being set up, see figure III-5. (**Helpful Tip:** Both outer belt tracks should be set even with the outside edges of the material being set up.) (Note: The belt tracks cannot easily be moved until the belt pressure has been released as depicted in step 5.)



7. Loosen the ratchet handles located at the top of both material side guide clamps, by turning them counter clockwise.
8. Slide the material side guide to the outside edge of the outer belt tracks located under the edges of the set up material.
9. Lightly tighten the ratchet handles just enough to hold the material side guides in position.
 **(Caution:** Do not tighten fully at this time.)
10. Lower the bridge tram bar until the material side guides are seated in the belt track bracket tabs, see figure III-6. **(Helpful Tip:** The material side guides clamps are slotted so that you can lift up on the side guides without disturbing the clamps and manually assist in the seating process. The clamps may also need to be moved slightly to accommodate seating the side guides.)

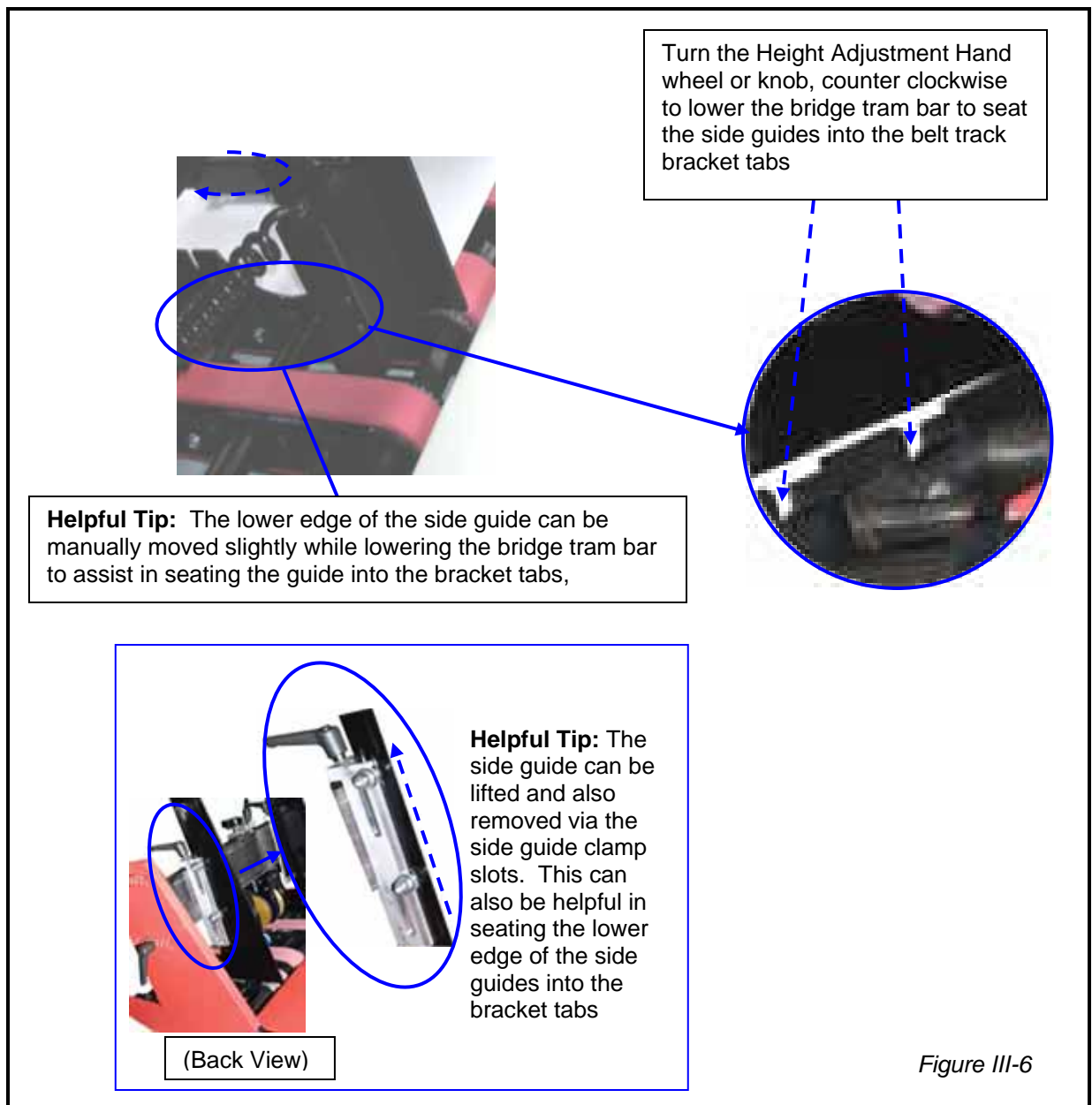


Figure III-6

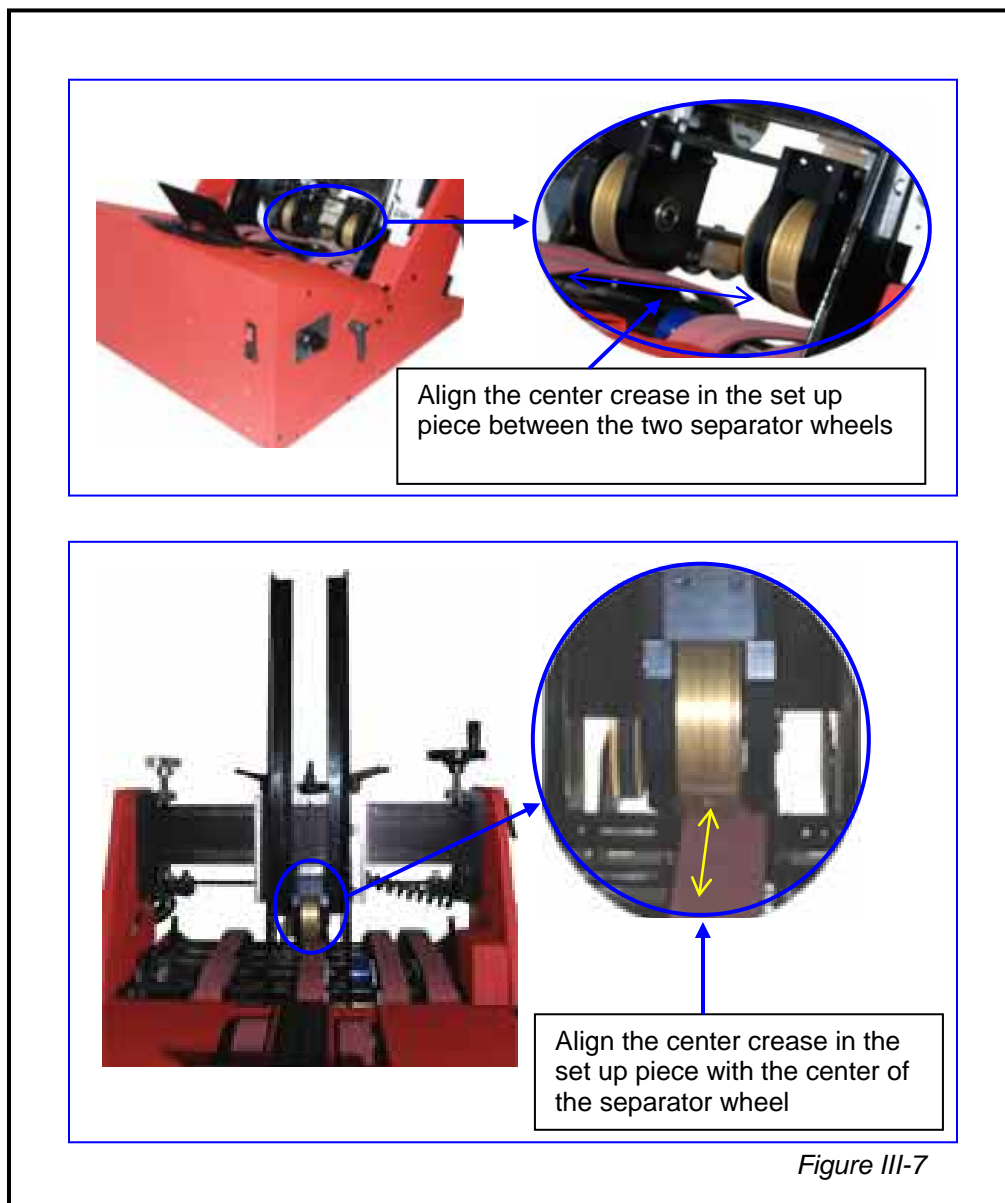
11. Once the material side guides are in place, moderately tighten the ratchet handles located at the top of both side guide clamps.

! (Caution: Do not over tighten. Over tightening may result in damage to the clamps and cause scarring to the bridge tram bar.)

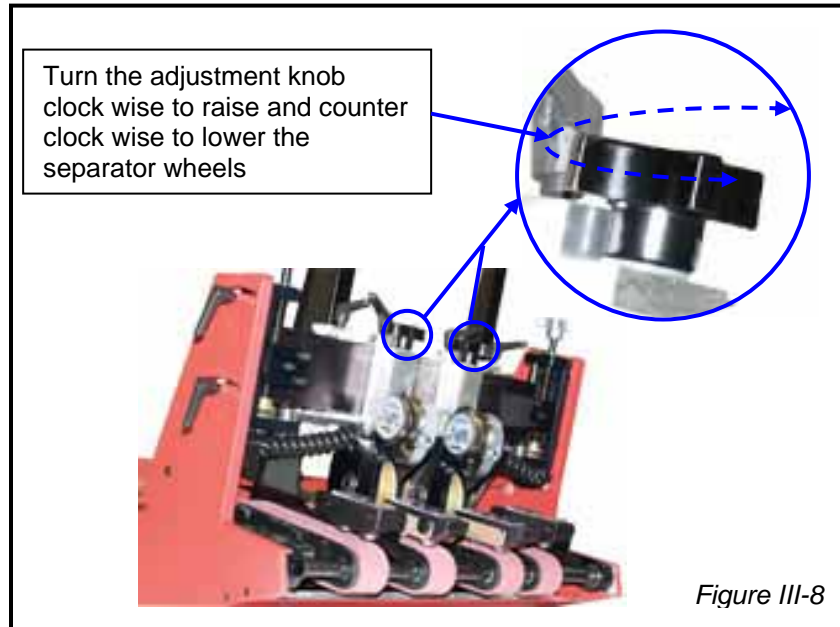
The Force Flex Feeder comes equipped with two Dynamic Rotation Separator Wheels. Depending on the size or texture of the paper being set up only one of the separator wheels may be required. To accomplish this and keep the material centered in the feeder, the separator wheels have been designed to be easily removed from the feeder. See discussion at figure III-17.

B. Set the pressure of the separator wheels by performing the following:

1. Place the product material, previously creased in Step A, under the center of the one separator wheel or centered between the separator wheels, see figure III-7.



2. Set the height of the “Separator Wheel” to allow the thickness of one (1) piece of material to pass under it. To do this, turn the adjustment knob clock wise to raise the wheel, counter clock wise to lower the wheel, see figure III-8. (Note: There should be a little resistance felt by hand, when the material is directly under the separator wheels, when this is properly set)
(**Helpful Tip:** The thinner the material is, the more critical this setting is)



- C. Set the Back Wedge in the following manner:
 1. Set the “Shaker Wedge” under the material to obtain the proper stack angle for feeding, see figure III-9. The variables of this setting may be dependent on the characteristics of the material. A “Wedge Extension” can be used when setting up narrow material. The Force Flex Feeder comes with several different size Back Shaker Wedges, choose the one that best fits the size paper you’re running.
(**Helpful Tip:** The more the wedge is pushed under the material, the less critical the separator wheel setting becomes. If the wedge is placed out from the material, the separator wheel setting will become more critical)

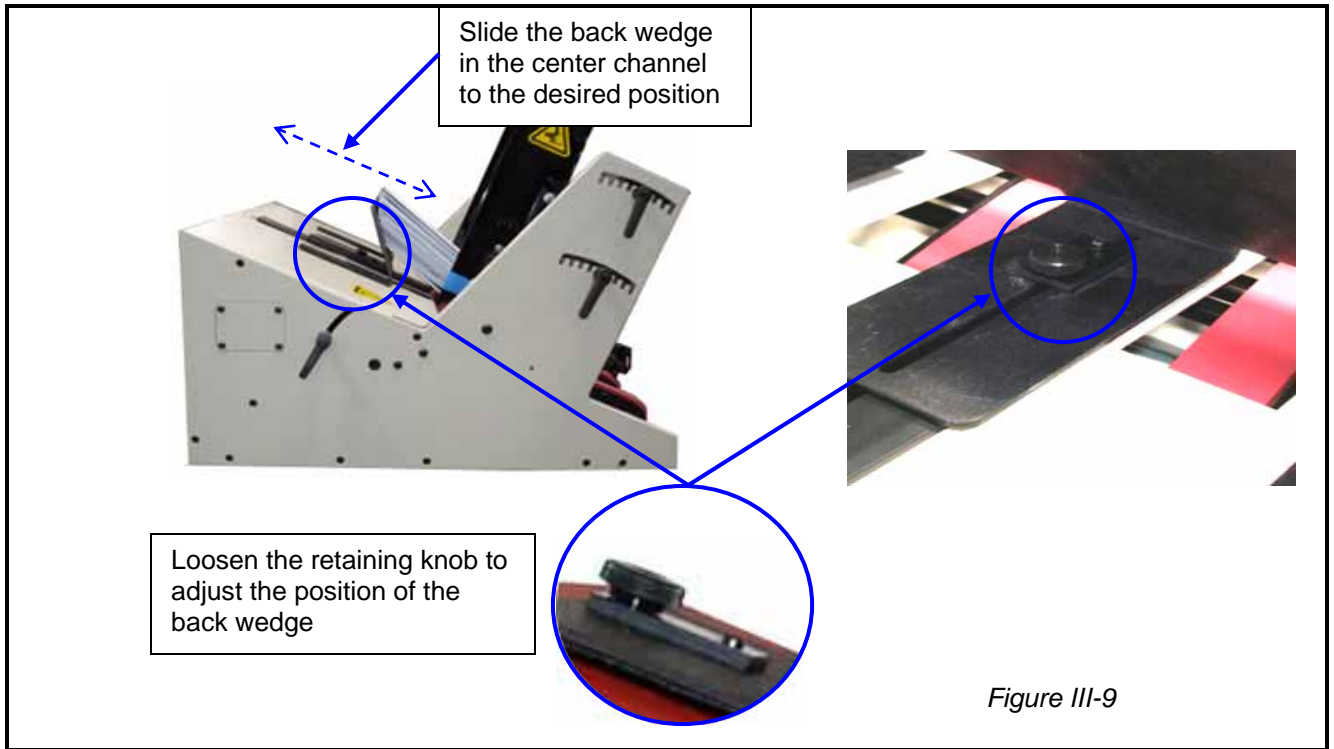


Figure III-9


Back Wedge recommendations for common type paper stocks

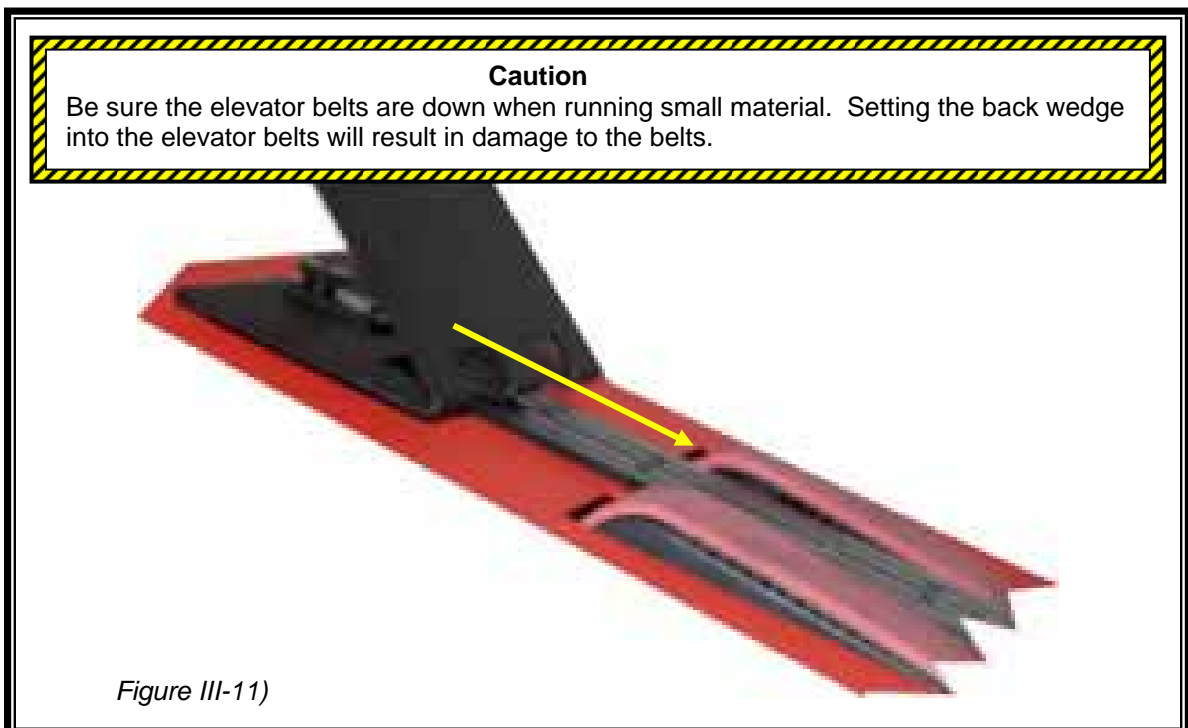
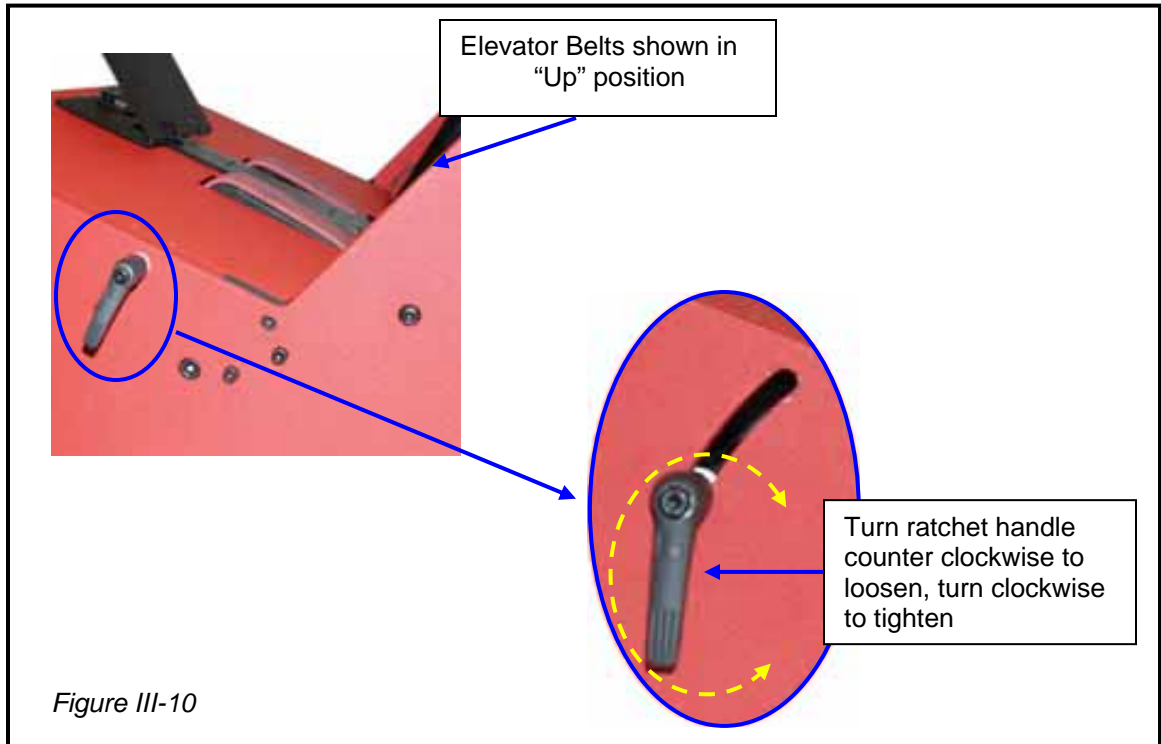
<p>For ridged stock, place the leading edge of the stock to be set up under the separator wheels at 6 o'clock, position the lowest point of the back wedge so that it is just touching the trailing edge of the sample piece.</p>	
<p>For flimsy stock, place the leading edge of the stock to be set up under the separator wheels approximately half an inch beyond the 6 o'clock position and set the back wedge so that the trailing edge of the sample is about a half to one inch up the incline from the lowest point of the back wedge.</p>	
<p>For stock containing static, place the leading edge of the stock to be set up under the separator wheels at 6 o'clock, position the back wedge so the trailing edge of the sample is mid-way between the lowest and highest point of the back wedge.</p>	
<p>Note: These are basic starting points for a set-up. Further adjustments may be required.</p>	

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D. Set the Elevator Belts by performing the following:

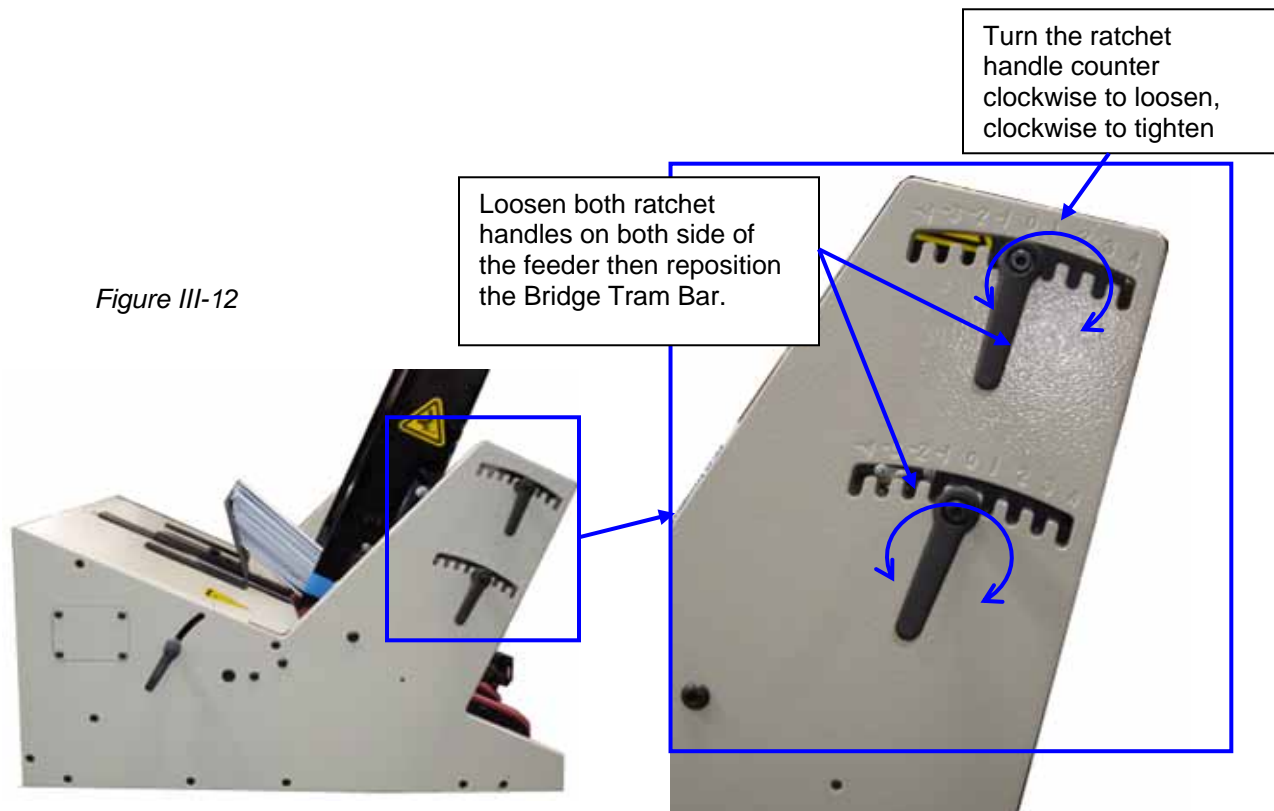
1. Loosen the ratchet handle found on each side plate of the Force Flex Feeder, see Figure III-10.
2. Adjust the elevator belts to the desired height. (Note: Commonly the elevator belts are raised into use for large stock measuring approximately 8' X 10' or larger)
3. Tighten the ratchet handles using moderate force to secure the setting.

 **(Caution:** Over tightening the ratchet handle may result in damage to the side plate finish and /or the ratchet handle.)



The Force Flex Feeder has several unique features that enable it to run a wide range of stocks.

Adjustable Bridge Tram Bar Angle



Adjusting the bridge tram bar can be accomplished by performing the following:

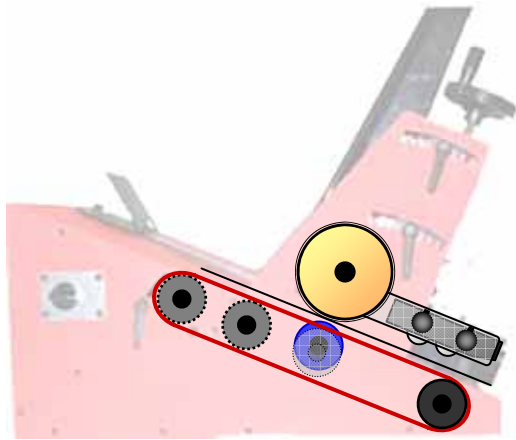
1. Loosen both ratchet handles located on both side plates of the feeder, see figure III-12.
2. Manually move the bridge tram bar to the desired position. (Note: Each incremental position equals 3/8")

⚠ (Caution: To avoid damage to the machine, make sure that all retaining ratchet handles are showing the exact same reference on the feeder side plate.)

3. Tighten both ratchet handles located on both side of the feeder side plate using moderate force.

⚠ (Caution: Do not over tighten ratchet handles.)

(Special Note: Changing the position of the bridge tram bar can have very dramatic effects on the paper. For details of these effects, see figures III-13 through III-15.)



“0” Position

With the bridge tram bar in the “0” position, the separator wheels and the blue nip roller form a positive or forced nip on the paper. The paper travels straight and flat between the bearing surfaces of the separator wheels and nip roller as shown in this illustration. (Note: In the “0” position a positive nip also occurs when the separator wheels are positioned over the red gum belts.) Effectively, the “Y” axis of the paper runs straight while the “X” axis remains flat as shown in illustration.

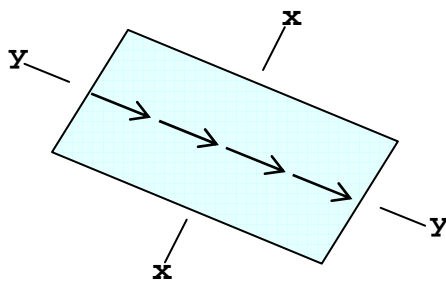
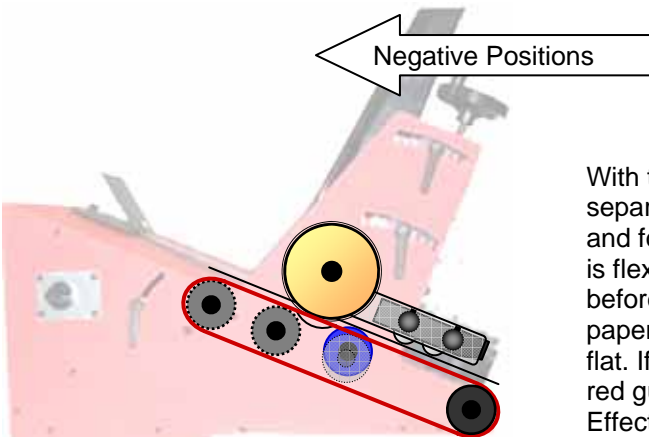


Figure III-13



“Negative” Position

With the bridge tram bar in a “Negative” position, the separator wheels are moved back from the blue nip roller and form a passive or flexed nip on the paper. The paper is flexed down, length-wise by the separator wheels before traveling over the blue nip roller. Although the paper still travels straight it does not necessarily remain flat. If the separator wheels are positioned between the red gum belts, the paper will also be flexed width-wise. Effectively, the paper is first flexed on the “Y” axis under the separator wheels and then flexed on the “X” axis by the gum belts as shown in illustration b.

(Note: The “Negative” position decreases the amount of red gum belt surface under the stack of paper in the feeder.)



(Caution: The more pressure that is applied by the separator wheels, the more flex will occur. Excessive pressure may blemish, damage or destroy the paper.)

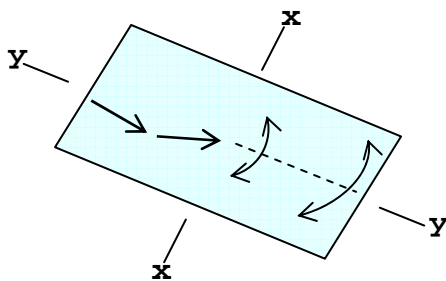
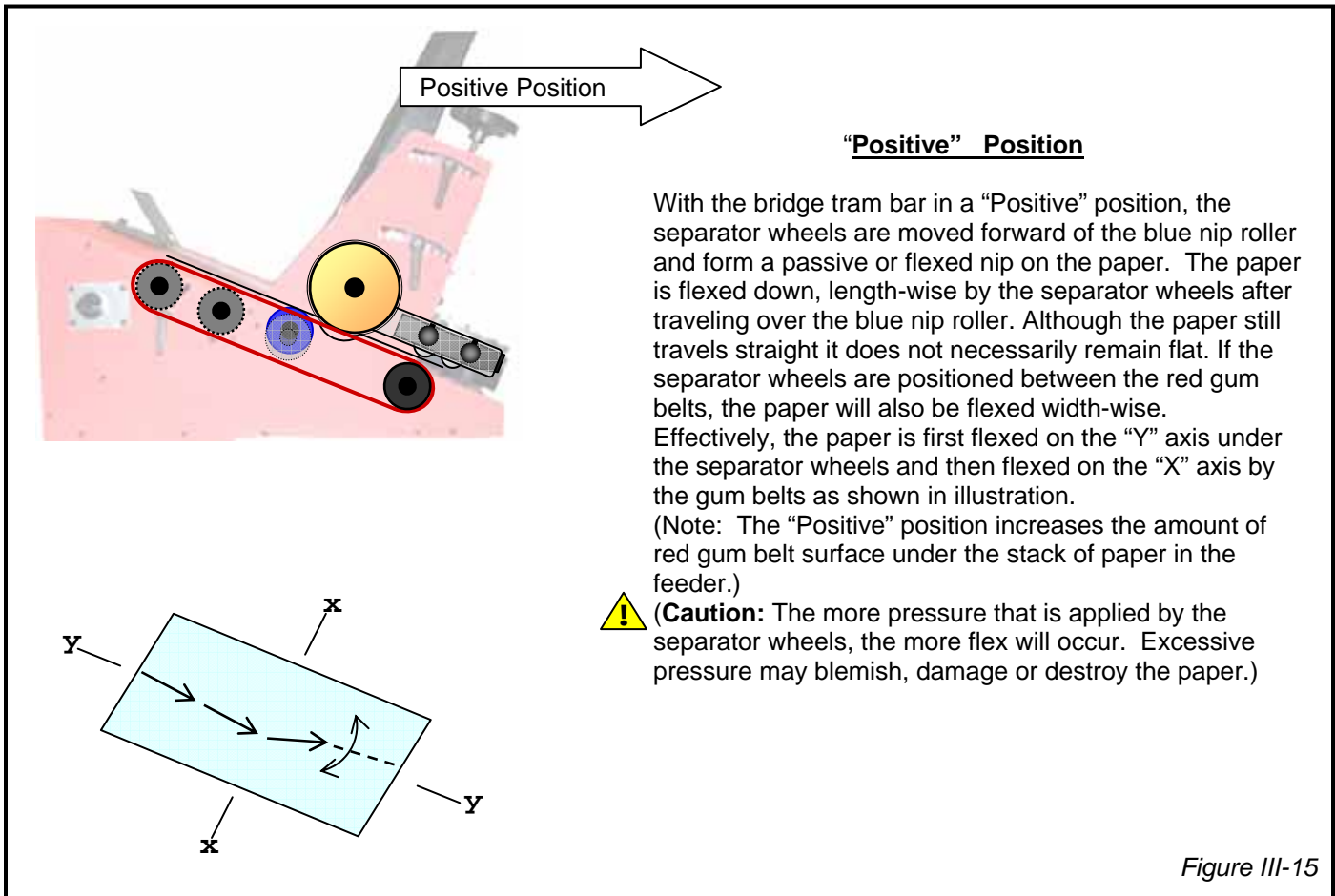
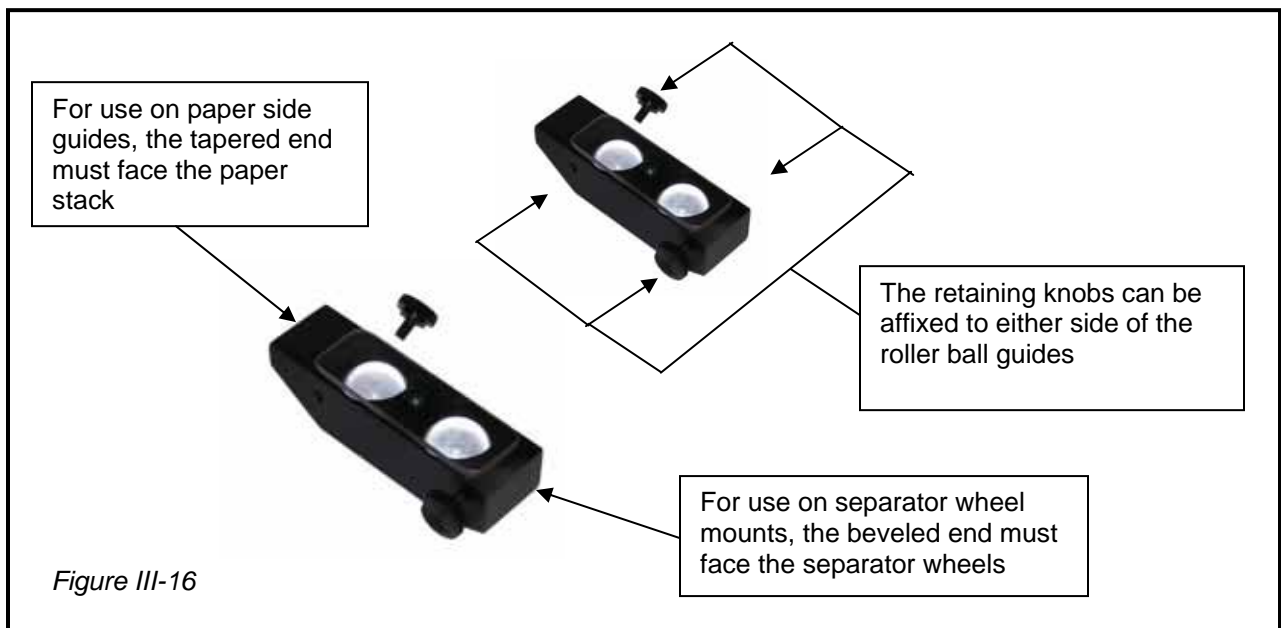


Figure III-14



Removable Roller Ball paper drive assist

Roller Ball paper drive assists may be mounted on both paper side guides and/or mounted in front of both separator wheels, see figure III-16.



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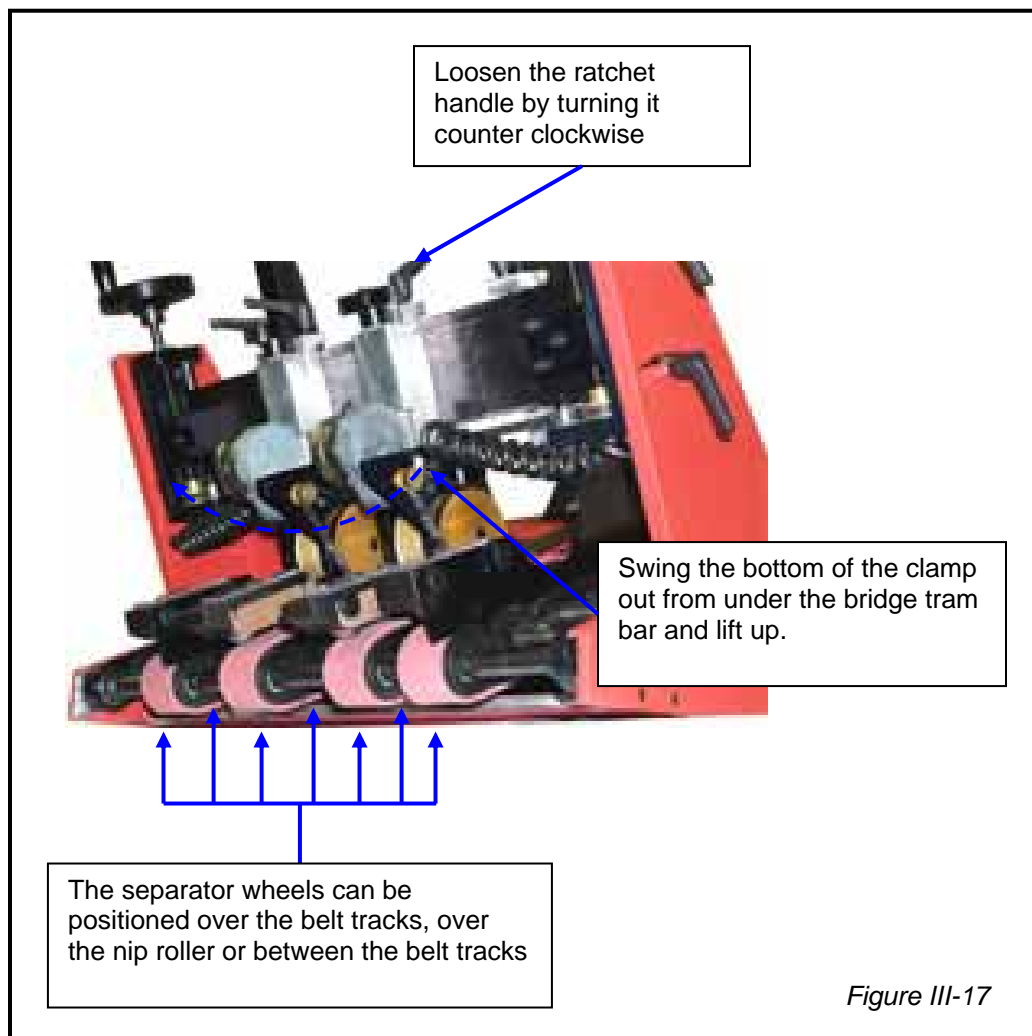
The Force Flex Feeder also comes equipped with removable and / or re-positional Dynamic Rotation Separator Wheels, see figure III-17.

To remove a separator wheel assembly, perform the following;

1. Loosen the ratchet handle located at the top of the separator wheel clamp, see figure III-17.
2. Swing the bottom of the separator wheel clamp out from under the bridge tram bar, then lift up and set beside the feeder.

⚠ (Caution: Do not move the separator wheel assembly too far from the feeder at this time. The rotation motor is still connected to the feeder.)

3. Unplug the rotation motor from the feeder harness, see figure III-18.



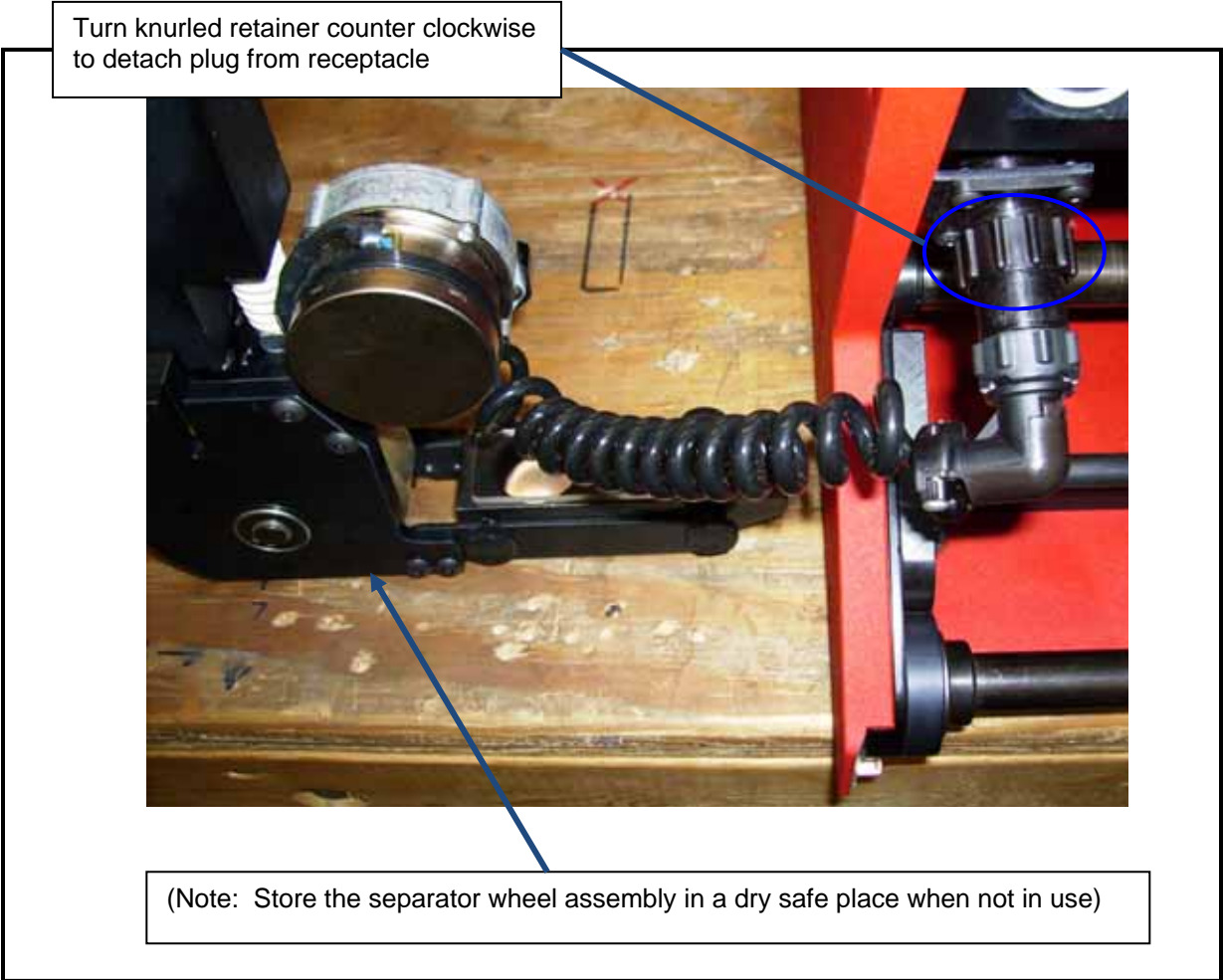
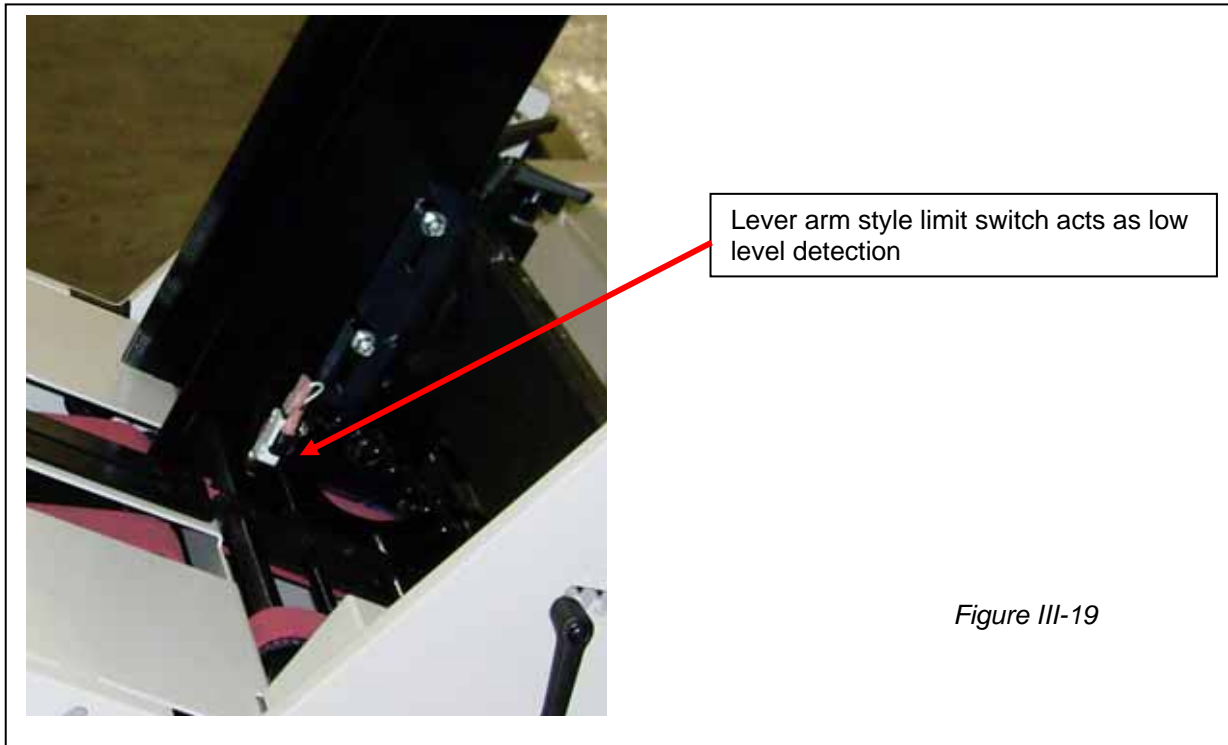


Figure III-18

Paper Sensor Adjustment (FORCE FLEX FEEDER)

The paper sensor(s) are located on each of the material side guides mounted to an adjustable angle bracket. This sensor is set to detect and confirm the presence of paper (product) in the infeed section of the feeder. These sensors do not normally need to be adjusted for each job, once the setting has been made, it should remain set unless otherwise disrupted. In the event the settings have been disrupted, perform the following:

1. Position the sensor directly in line with the access port of the material side guide. See figure III-19.



Control Panel and Switch Operation

Force Flex Feeder Operator Control Panel and Speed Control-Figures III-20A and B

Located on backplane of Feeder

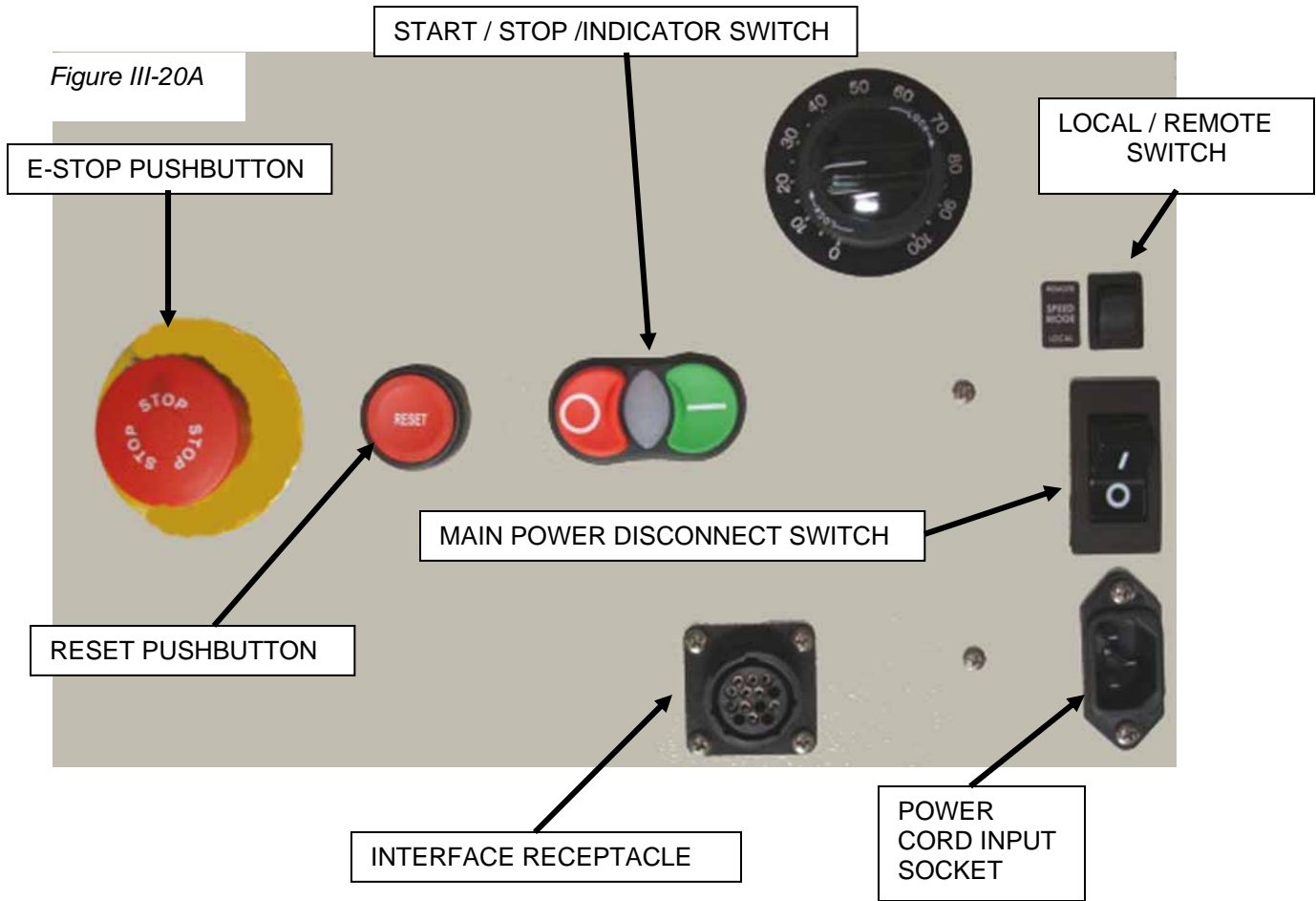


Figure III-20A

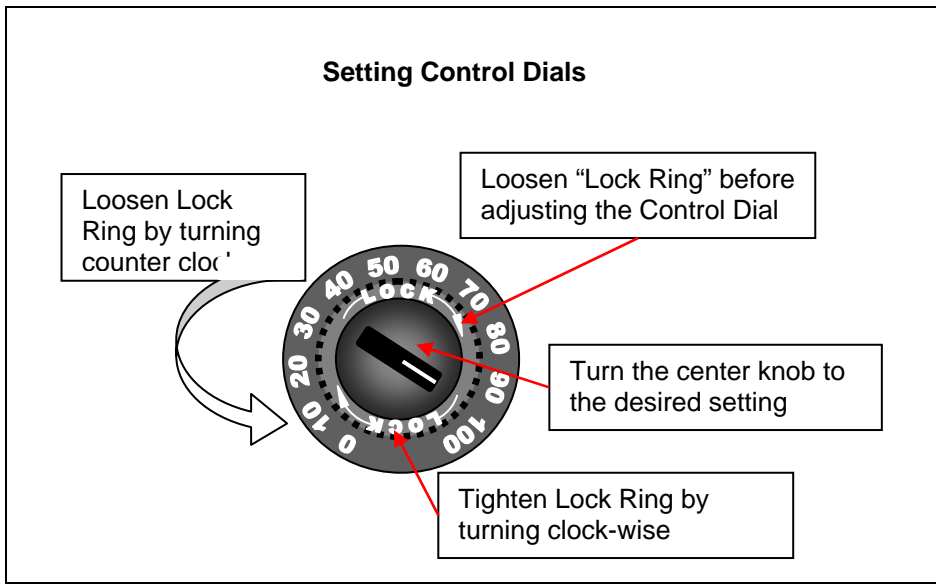
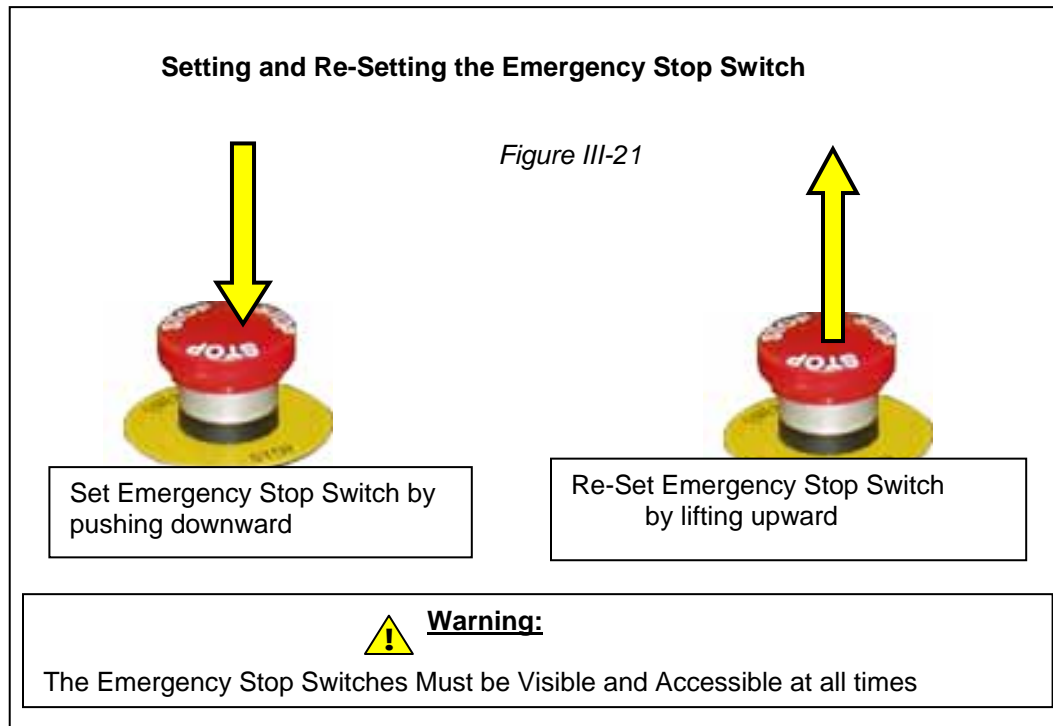


Figure III-20B

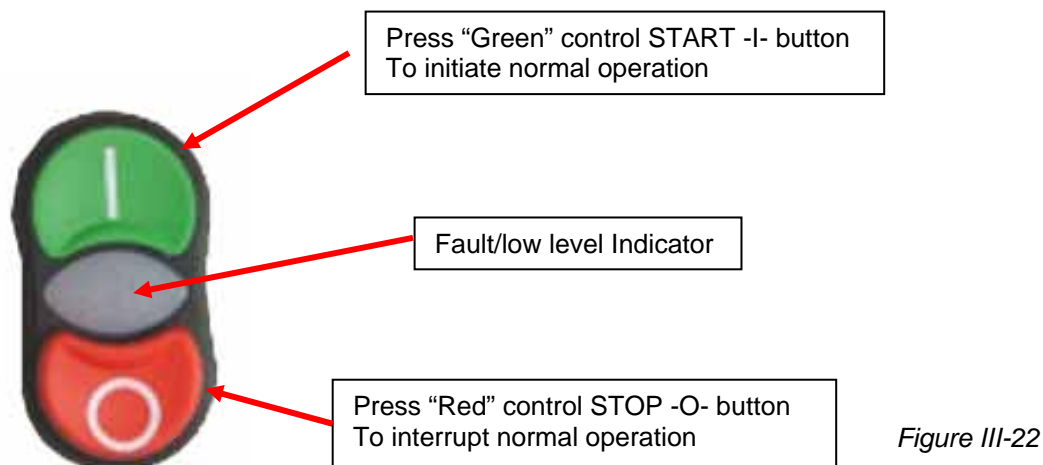


Special Note: Pursuant to Community Legislation on Machinery, Comments on Directive 98/37/EC 1.2. Controls and 1.2.1 Safety and reliability of control systems

The “E-Stop” button / buttons found on the Force Flex Base are by design in compliance to meet and / or exceed the mandates and requirements as stated in the Community Legislation on Machinery, Comments on Directive 98/37/EC.

By manufacture design the E-Stop buttons are to be used in the event of an emergency.

For a selective stop to interrupt normal machine operation, depress the “Red” control Stop button. The machine can be re-started without delay at the operator’s discretion. See figure III-22.

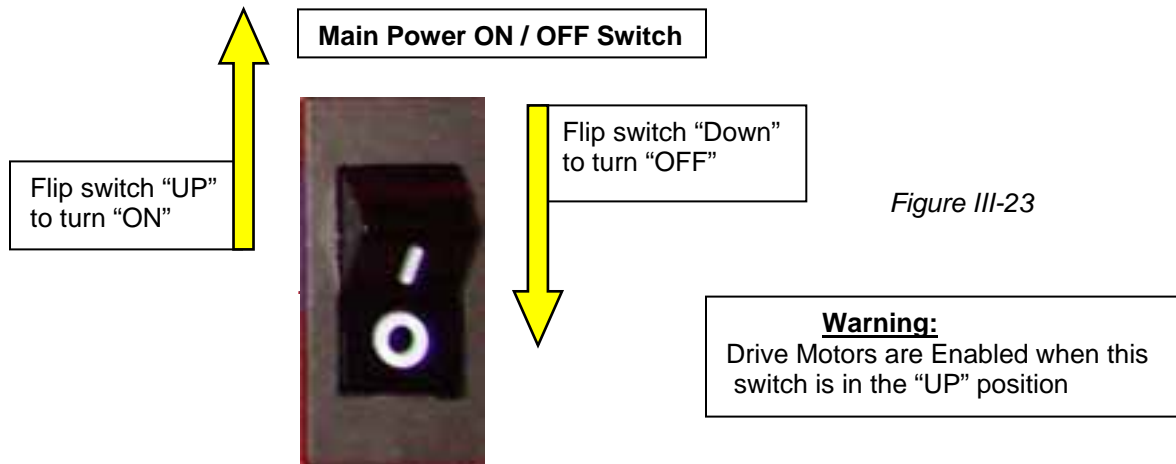


Operating the FORCE FLEX FEEDER

Once the basic set up is completed, turn the power switch to the “On” position and initiate the operation of the Force Flex Feeder.

Power:

1. Turn power to the machine on by flipping the white power switch, located on the electrical enclosure, in an upward direction. See figure III-23.



2. Press the green START switch button to initiate Feeder operation. See figure III-22. Observe how the Force Flex Feeder separates and feeds material, if doubling occurs, advance the back wedge further under the stack of paper, or apply more pressure using the separator wheels.
3. When you have adjusted the feeder to operate properly, adjust the belt speed of the feeder to the desired running speed. See figure III-20B.

Section IV

General Service

FORCE FLEX FEEDER MODEL FF-20



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Section - IV

FORCE FLEX FEEDER Maintenance:

The general maintenance of the FORCE FLEX FEEDER is limited due to the design and materials used in manufacturing. The frequency of general cleaning required for the FORCE FLEX FEEDER is dependent on the amount of running time put on the machine.

General Cleaning:

Removing debris from the machine with compressed air.

1. Acquire and use eye protection, safety goggles or safety glasses with side guards. Also use respiratory protection, a simple disposable cloth or paper style particle mask is sufficient.
2. Alert all other people in the area to stand clear of the work area a minimum of 30 feet, (7.7 meters) where compressed air is being used to blow off machines.
3. Turn off the machine and disconnect the power line.



(Warning: To prevent accidental injury, refer to “The Lock Out / Tag Out Procedure” on page 14.)

4. Remove any loose items from the surfaces of the machine, i.e. Ballpoint pens, pencils, tape dispensers, paper clips rubber bands etc.
5. Open all service doors located on the front side of the machine and remove any loose items that might have been left inside, i.e.; spare parts, tools, personal effects such as purses car keys etc. **(Note:** After a complete visual inspection has been completed and loose items removed, leave the service doors open.)
6. Hold the air nozzle firmly at arm’s length and clean off the machine beginning with the top surfaces then work your way down.



(Warning: Be sure to keep the direction of compressed air blowing away from you.)

(Note: High volume businesses running three (3) shifts five (5) days a week should plan this function once a week. Businesses producing light to moderate volume should plan this function once a month.)

Cleaning Friction Belts:

1. Acquire and use eye protection, safety goggles or safety glasses with side guards.
2. Turn off the machine and disconnect the power lines.
3. Clean the following material belts;
 - ✓ Red Feeder Transport and Elevator Belts of the Force Flex Feeder

Apply a liberal amount of "Simple Green" general-purpose cleaner or ("Isopropyl Alcohol", 70% by volume see warning below) to a soft cloth and wipe down the belt you wish to clean. Advance the belt being cleaned by hand until the entire belt surface has been cleaned.

⚠ (Warning: Do not spray or pour Simple Green general-purpose cleaner or Isopropyl Alcohol directly onto the belts, free flowing liquids may seep into some electronic components and cause damage)

(Note: "Simple Green" general-purpose cleaner and / or "Isopropyl Alcohol" can be purchased at most local grocery stores and drug stores.)

⚠ (Warning: Isopropyl Alcohol is FLAMABLE, do not use near an open flame or any other source or device that gives off heat.)

Removing the Feeder Transport Belt Carriage for easy cleaning:

1. Turn off the Force Flex Feeder and unplug the Force Flex Feeder from the power supply and interconnections to other peripherals. See FORCE FLEX FEEDER Belt Replacement instructions for more details.
2. Lift and position (turn 90° or 180° if necessary) the Feeder so the Transport Belt Carriage overhangs the platform edge.

⚠ (Warning: The Force Flex Feeder weighs in excess of 90 pounds, practice safe lifting techniques when moving the feeder or acquire assistance to move the feeder.)

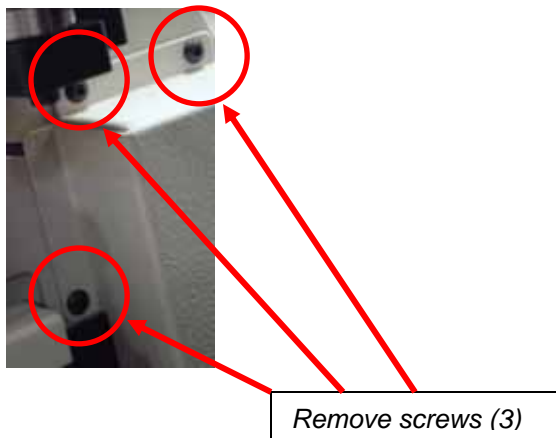
3. Remove all belt guards (2) to access carriage latches, see figures IV-1A & B



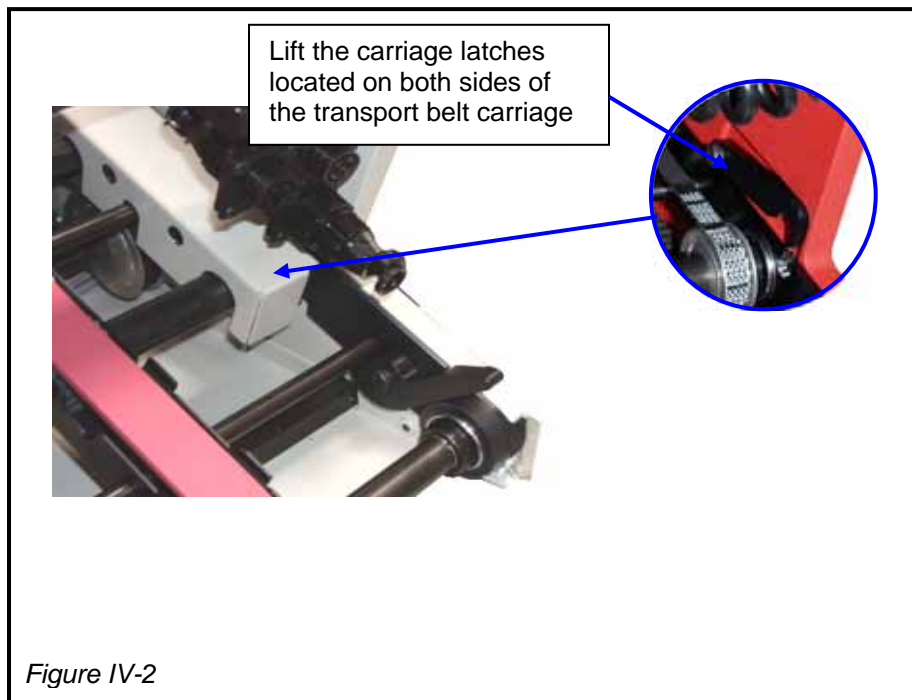
Remove shoulder bolts (2)

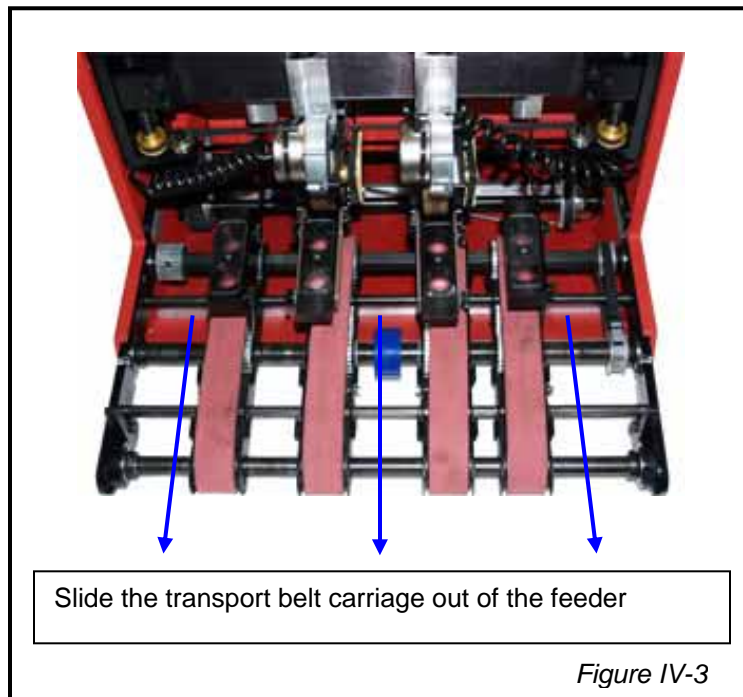
Figure IV-1A

FIG IV-1B: LEFT SIDE GUARD VIEWED FROM DISCHARGE

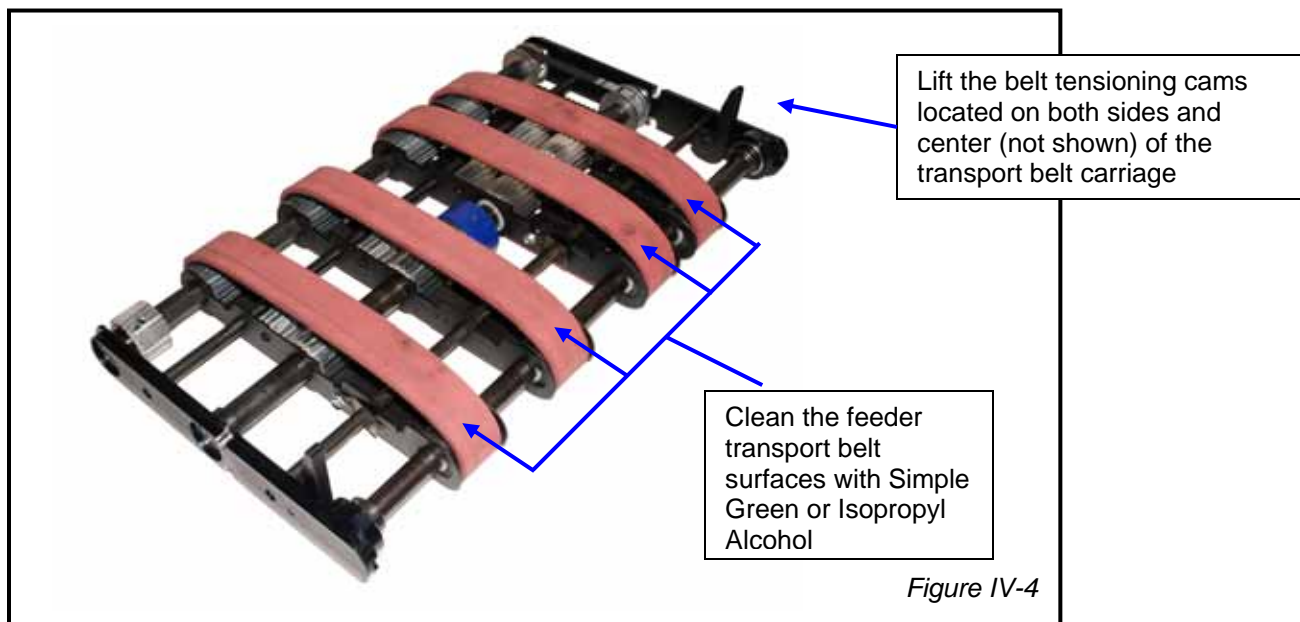


- 4. Lift both carriage latches, see figure IV-2.
- 5. Slide the transport belt carriage out of the Feeder, see figure IV-3.






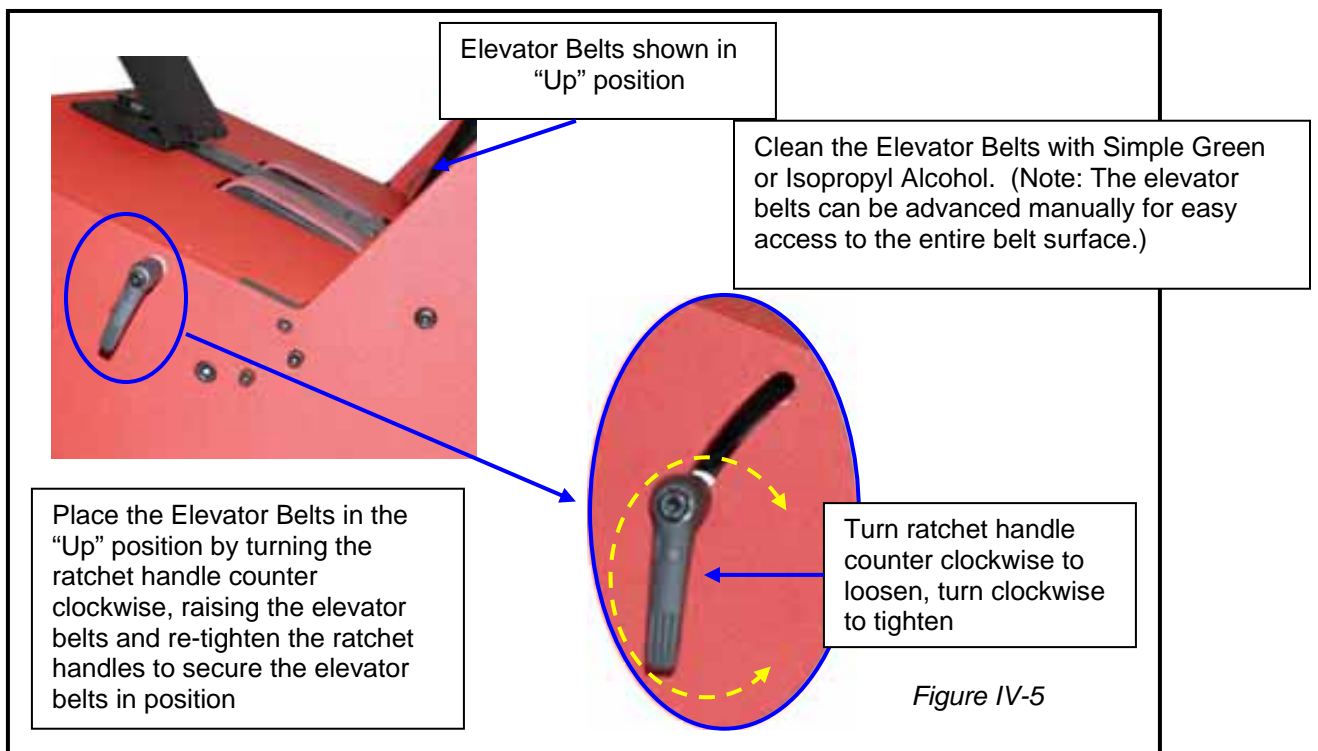
Once the Transport Belt Carriage is out of the feeder, the feeder transport belts can be easily cleaned using a liberal amount of Simple Green (diluted to manufacturer's specifications) or Isopropyl Alcohol applied with a clean cloth.




While the Transport Belt Carriage is out of the feeder, clean the elevator belts by performing the following:

1. Raise the Elevator Assembly to the topmost position by:
 - a. Loosen the ratchet handle found on each side plate of the Force Flex Feeder, see figure IV-5.
 - b. Adjust the elevator belts to the desired height. (Note: Commonly the elevator belts are raised into use for large stock measuring approximately 8' X 10' or larger)
 - c. Tighten the ratchet handles using moderate force to secure the setting.

 **(Caution:** Over tightening the ratchet handle may result in damage to the side plate finish and or the ratchet handle.)



2. Apply a liberal amount of Simple Green (diluted to manufacturer's specifications) or Isopropyl Alcohol to a clean cloth.
3. Wipe down the portion of the elevator belts visible on the topside of the feeder.
4. Advance the elevator belts manually to continue cleaning.
Note: Repeat steps 3 and 4 until the total length of the elevator belts have been cleaned.

 **Warning:** DO NOT attempt to clean elevator belts while the machine is running.

FORCE FLEX FEEDER Belt Replacement

Transport Belts

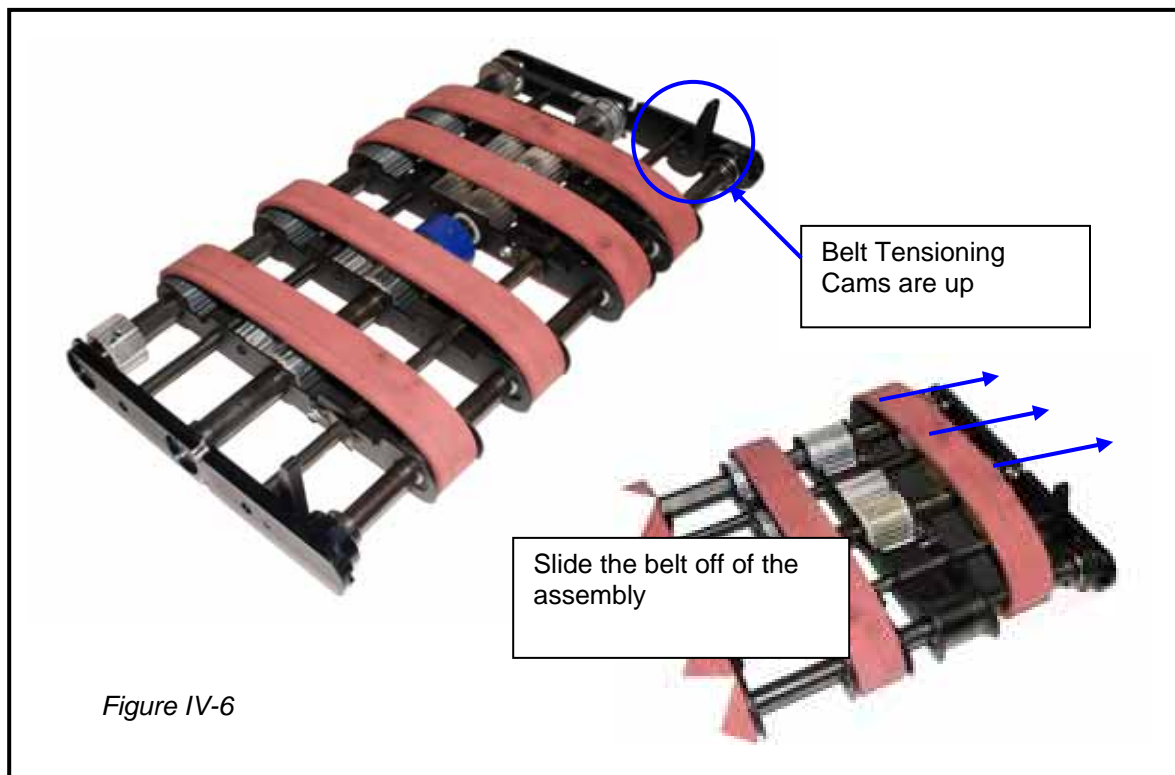
Prepare the work area, clear off the top surface of the FORCE FLEX FEEDER.

1. Turn the main power switch to the off position.
2. Disconnect the power cables from their sources by performing the following:
 - a. Follow the main power line and all other power cables from the machine back to the receptacle or source of supplied power and disconnect it at the source.
 - b. Place the plug connector close to the machine in such a position that will remain in your field of vision while repairs or maintenance is being performed.
3. Notify all other persons in the area where the work is being performed that the machine will be out of service, especially if the work you are performing requires you to be crouched behind or beside the machine or in some other way obscured from the sight of other persons in the area.
4. It may be necessary to move the FORCE FLEX FEEDER clear of other equipment. Ensure that all interconnect cables (electric power, communication, etc) and any mechanical connecting devices have been removed and protected from damage during this process.
5. Remove Force Flex Feeder from its mounting by performing the following:
 - a. Disconnect all electrical wiring from feeder to power and other peripherals.
 - b. Place feeder on table, cart or suitable flat surface.
6. Follow the instructions listed under **Removing the Transport Belt Carriage** section.

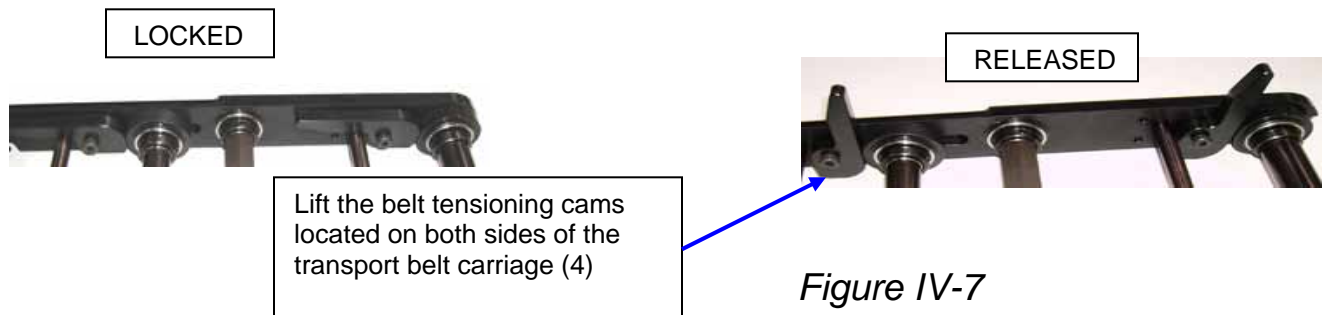


(Warning: The Force Flex Feeder weighs in excess of 90 pounds, practice safe lifting techniques when moving the feeder or acquire assistance to move the feeder.)

- a. Remove both belt guards and lift both carriage latches, see figures IV-1 & 2.
- b. Slide the transport belt carriage out of the feeder, see figure IV-3.
- c. Lift both belt tensioning cams, see figure IV-1. The individual feeder transport belts will now easily slip off either end of the carriage. Please note the possible variation in belt widths and their individual positioning on the carriage. See figures IV-4 & 6.
- d. While the transport belt carriage is out of the feeder, check the nip roller for undue wear or damage. If replacement is required, please see separate section- **Nip Roller Replacement**.



- e. Replace any worn or damaged transport belts as required. Check for worn or noisy bearings, loose or bent shafts and any damage to timing belt pulleys or drive belt.
- 7. Replace the Transport Belt Carriage by sliding back into its original position.
 - a. Ensure that drive pulley on Carriage engages timing belt on feeder drive shaft. See figure IV-8.
 - b. Push both carriage latches into the notches of the carriage, see figure IV-2.
 - c. Turn both belt tensioning cams to the locking position, see figure IV-7.



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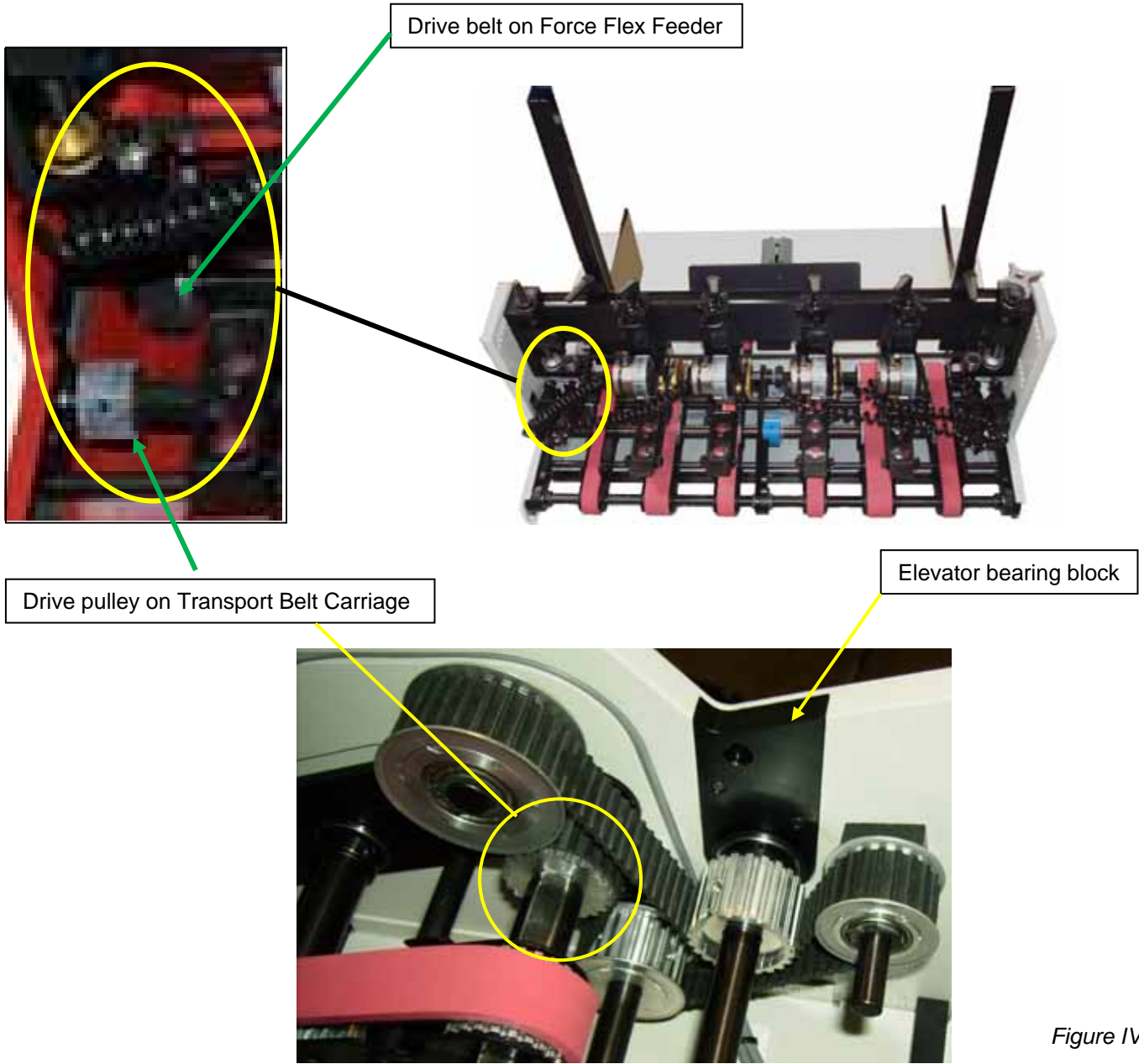


Figure IV-8

FORCE FLEX FEEDER Belt Replacement

Elevator Belts

Prepare the work area, clear off the top surface of the FORCE FLEX FEEDER.

1. Turn the main power switch to the off position.
2. Disconnect the power cables from their sources by performing the following:
 - a. Follow the main power line and all other power cables from the machine back to the receptacle or source of supplied power and disconnect it at the source.
 - b. Place the plug connector close to the machine in such a position that will remain in your field of vision while repairs or maintenance is being performed.
3. Notify all other persons in the area where the work is being performed that the machine will be out of service, especially if the work you are performing requires you to be crouched behind or beside the machine or in some other way obscured from the sight of other persons in the area.
4. To access the elevator belt assembly, remove the Allen socket head screws attaching the vibrating top plate to the feeder frame.
 - a. Remove from each side frame, (3) Allen socket head screws. See figure IV-9
 - b. Lift top plate up and away from feeder frame. It may be necessary to disconnect electrical wiring from top plate's electrical components.
 - c. Set top plate aside.

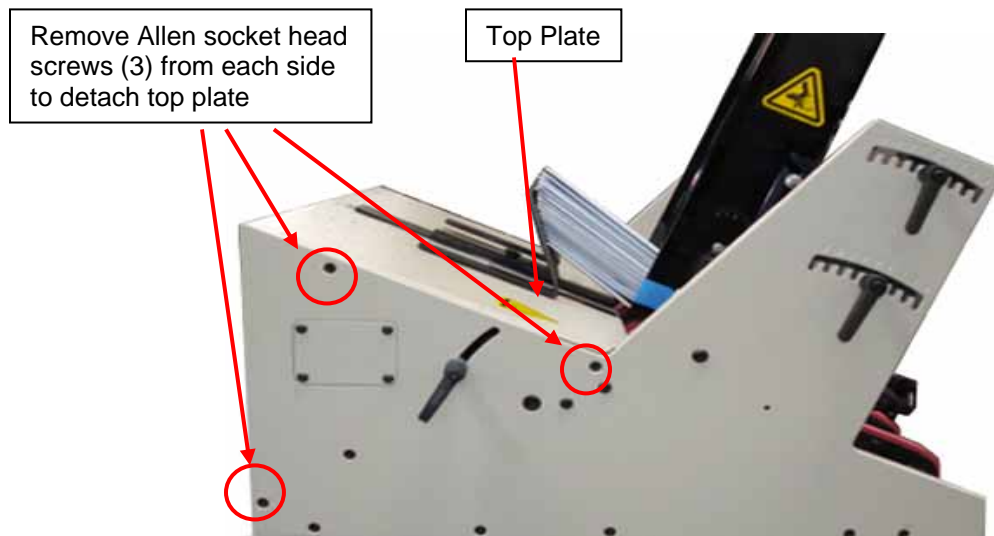


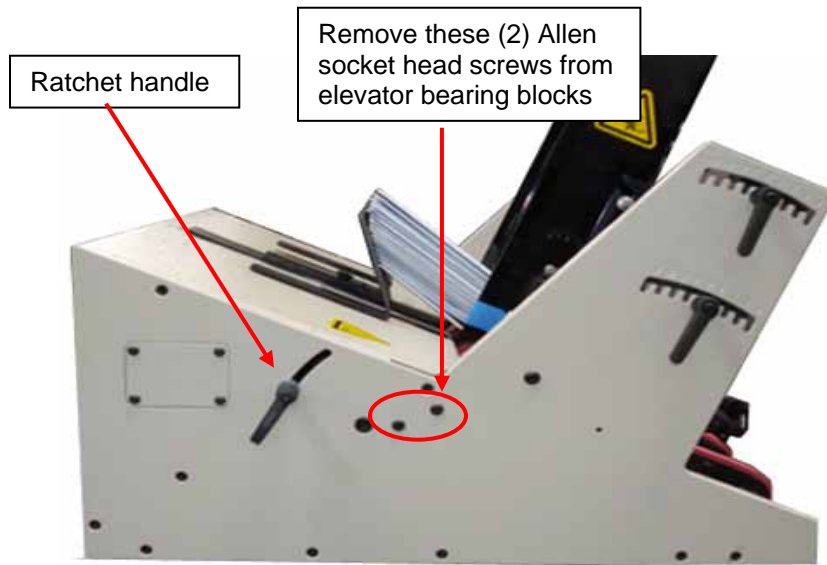
Figure IV-9

5. Detach the elevator belt assembly from the feeder frame by removing from both sides of frame :
 - a. Both ratchet handles
 - b. Allen socket head screws (2) from each elevator bearing block

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- c. Lift elevator assembly from frame. See figure IV-10 and -11.

Figure IV-10



6. Loosen Allen socket head screws from both ends of elevator idler shaft and move shaft ends in slots to release belt tension. See figure IV-11.

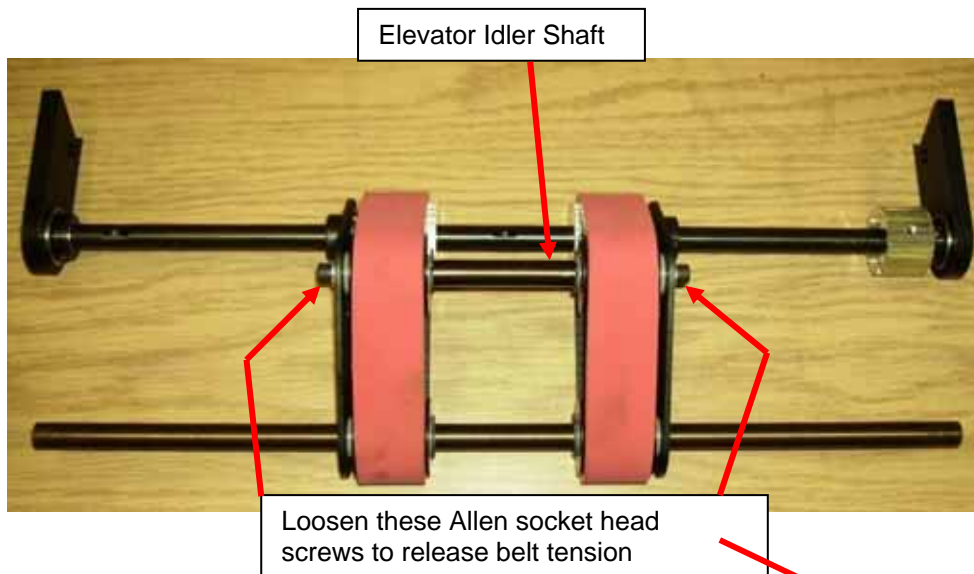


Figure IV-11



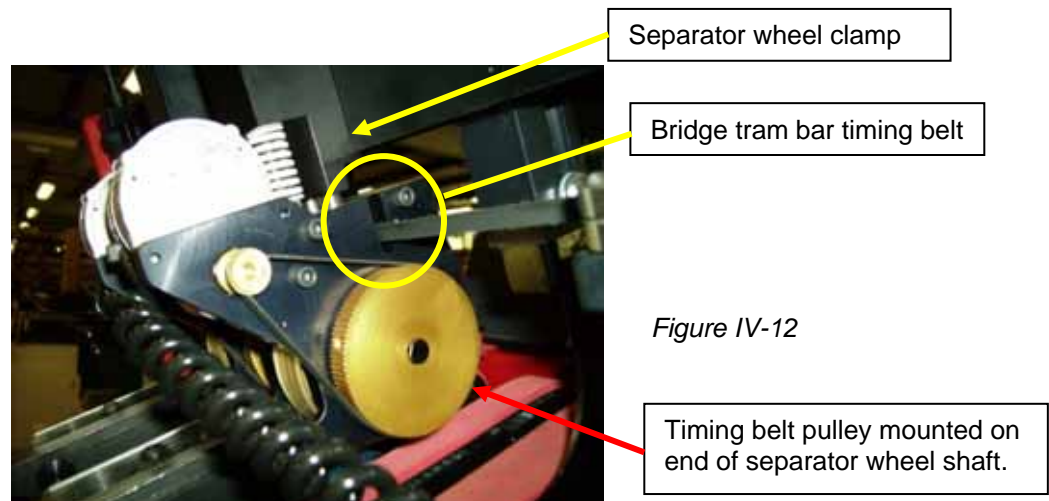
7. Slide elevator belts off one end of assembly and replace with new belts.
8. Re-assemble and install elevator assembly and top plate by following previous instructions in reverse.

FORCE FLEX FEEDER Belt Replacement

Material Separator Belt-this item is an extremely low wear component due to its low rotational speed.

Prepare the work area, clear off the top surface of the FORCE FLEX FEEDER base.

1. Turn the main power switch to the off position.
2. Disconnect the power cables from their sources by performing the following:
 - a. Follow the main power line and all other power cables from the machine back to the receptacle or source of supplied power and disconnect it at the source.
 - b. Place the plug connector close to the machine in such a position that will remain in your field of vision while repairs or maintenance is being performed.
3. Notify all other persons in the area where the work is being performed that the machine will be out of service, especially if the work you are performing requires you to be crouched behind or beside the machine or in some other way obscured from the sight of other persons in the area.
4. Replace the material separator belts (motor drive or separator wheel) by first detaching material separator assembly from the bridge tram bar. To do this:
 - a. Loosen the ratchet handle located at the top of the separator wheel clamp to permit clamp to be pulled straight out away from bridge tram bar. See figure IV-12.
 - b. When the separator wheel clamp has cleared the bridge tram bar, then drop assembly down to clear timing belt on bridge tram bar. NOTE: The bridge tram bar should be raised up enough so separator wheel assembly can be removed. Reference figures III-17 and -18 in previous section.



(Caution: Do not move the separator wheel assembly too far from the feeder at this time. The motor is still connected to the feeder.)

- c. Unplug the rotation motor from the feeder harness.

- d. Remove the two (2) Allen socket head screws attaching the separator motor. This will permit the motor drive belt to be released from the drive pulleys. See figure IV-13.

Remove button socket head screws (opposite side)

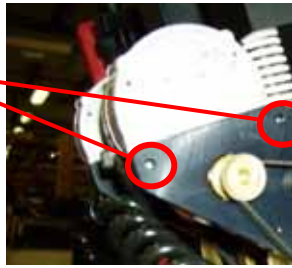
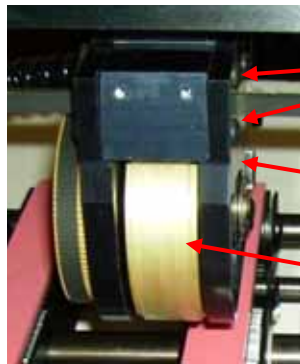


Figure IV-13

5. Replace with new motor drive belt and re-install separator motor if separator wheel belt is not in need of replacement. If wheel belt requires replacement;
 - a. Remove both set screws from timing belt pulley mounted on end of separator wheel shaft. See figure IV-12.
 - b. Remove RH separator side plate from assembly by removing (6) Allen socket head screws- side plate, wheel and shaft should remain assembled. See figure IV- 14.



Remove RH separator side plate (wheel and shaft attached) by removing Allen socket head screws (6)

Side plate

Separator wheel

Figure IV-14

- c. Remove the material separator belt from wheel.
- d. Place the new material separator belt on the material separator; make sure the belts fit snugly inside the relief of the material separator wheel.

FORCE FLEX FEEDER Roller Replacement

Nip Roller

Prepare the work area, clear off the top surface of the FORCE FLEX FEEDER.

1. Turn the main power switch to the off position.
2. Disconnect the power cables from their sources by performing the following:
 - a. Follow the main power line and all other power cables from the machine back to the receptacle or source of supplied power and disconnect it at the source.
 - b. Place the plug connector close to the machine in such a position that will remain in your field of vision while repairs or maintenance is being performed.

3. Notify all other persons in the area where the work is being performed that the machine will be out of service, especially if the work you are performing requires you to be crouched behind or beside the machine or in some other way obscured from the sight of other persons in the area.
4. It may be necessary to move the FORCE FLEX FEEDER clear of other equipment. Ensure that all interconnect cables (electric power, communication, etc) and any mechanical connecting devices have been removed and protected from damage during this process.
5. Remove Force Flex Feeder from its mounting position by performing the following:
 - a. Disconnect all electrical wiring from feeder to base and other peripherals.
 - b. Lift and position (turn 90° or 180° if necessary) the Feeder so the Transport Belt Carriage overhangs the surface edge.

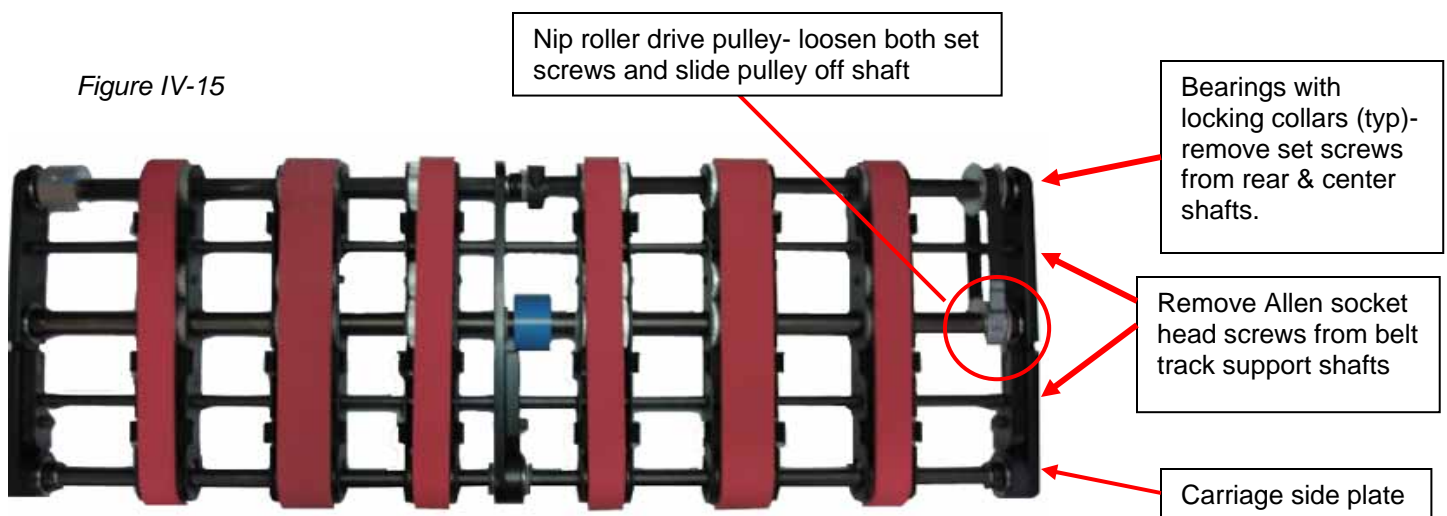


(Warning: The Force Flex Feeder weighs in excess of 90 pounds, practice safe lifting techniques when moving the feeder or acquire assistance to move the feeder.)

- c. Lift both belt tensioning cams, see figure IV-1.
- d. Lift both carriage latches, see figure IV-1.
- e. Slide the transport belt carriage out of the Feeder, see figure IV-2.

Removing the Nip Roller

1. Remove the carriage side plate opposite end of timing belt drive.
 - a. Remove Allen socket head screws that attach side plate to both belt track support shafts and loosen set screws in bearings with locking collars. See figure IV-15.



- b. Pull carriage side plate containing bearings and belt tensioning cam from ends of all shafts and remove drive pulley. See figure IV-15.

- c. Remove belt track assemblies by depressing spring locating plate on side of belt track and then sliding belt tracks off shafts. See figure IV-16.

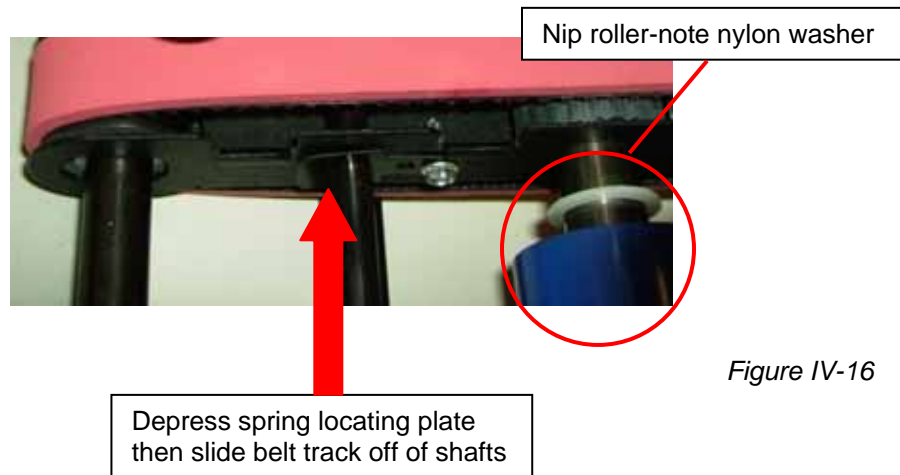


Figure IV-16

- d. Loosen the two (2) set screws in the blue nip roller, and then slide the nip roller off of the shaft.
2. Install the new roller:
 - a. Slide the new nip roller onto the shaft. (Note: Do not tighten the setscrews at this time.) Remember to replace nylon washers in original locations.
 - b. Adjust the position of the roller to the necessary location; moderately tighten one of the set screws in roller once it is back into the original position, then double check the measurements before tightening the second set screw in each roller.
 - c. Re-install all belt tracks, nylon washers and drive pulley and belt.
 3. Re-install the carriage side plate with attached bearings and belt tensioning cam to the belt track support shafts using Allen socket head screws. Tighten set screws in bearing collars.
 4. Replace transport belt carriage into feeder frame, lock into place and lock belt tensioning cams down.
 5. Replace both guards previously removed.

Setting the Tram

After any major service overhaul, it is advisable to square up the feeder to ensure proper operation of the feeder.

The next process is referred to as setting the tram or tramping the feeder.

Normally this is a factory setting that does not require adjustment. However, raising the bridge may be required to run thick material and this adjustment may be required. This setting is critical to the performance of the feeder. This will ensure that the separator wheels are level with respect to the nip rollers. To do this:

1. Loosen the bridge mounting screws located at each end of the bridge.
2. Turn the separator adjustment knob counter clock-wise until the material separator wheels are in their lowest position.
3. Cut two (2) strips of 20 # bond or 50 # offset paper, (copier, or printer paper) approximately 1" X 5", typically these measure .004 in thickness. Using the recommended paper will provide uniform thickness and drag friction between the material separators and the red gum belts. (Note: Do not use a textured paper such as Classic Linen or Classic Laid, or any of the slick paper such as Cass Coat or Enamel. These types may not provide you uniform thickness or sufficient friction to set the tram.)
4. Place one (1) strip of paper under each material separator, allowing the full weight of the bridge tram bar to rest on the paper.
5. Tighten one (1) of the two screws at each end of the bridge tram bar.
6. Move the paper strips to feel if the resistance or drag is equal under each separator wheel. If one moves with less resistance than the other, loosen the screw on the side that is tighter and raise that side of the bridge slightly and tighten the screw at that end of the bridge tram bar.
7. Check the resistance or drag under each separator wheel with the paper strips again and adjust accordingly. (Note: It may be necessary to repeat this step # 6 a few times while setting the tram.)
8. Once the tram has been set, tighten the other remaining screws at each end of the bridge tram bar.

This procedure must be followed whenever the bridge tram bar is adjusted up or down, as stated previously for extremely thick materials.

Section V

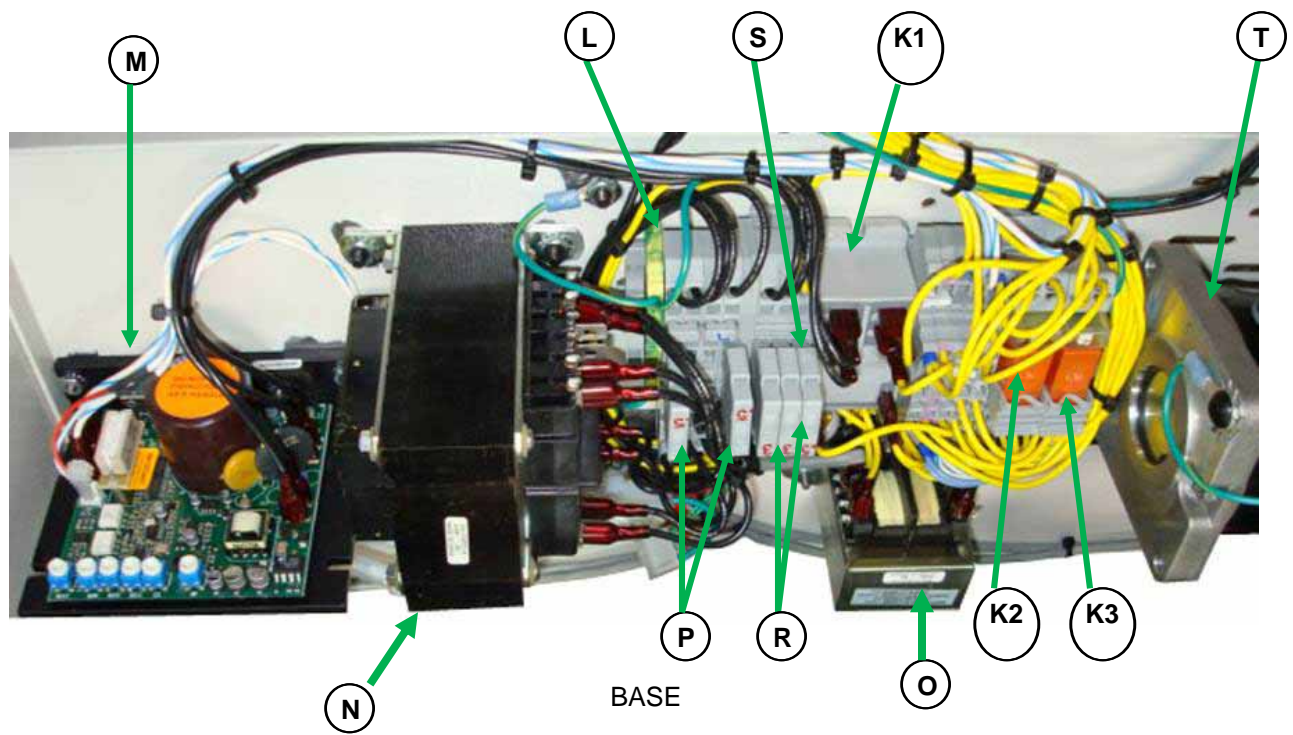
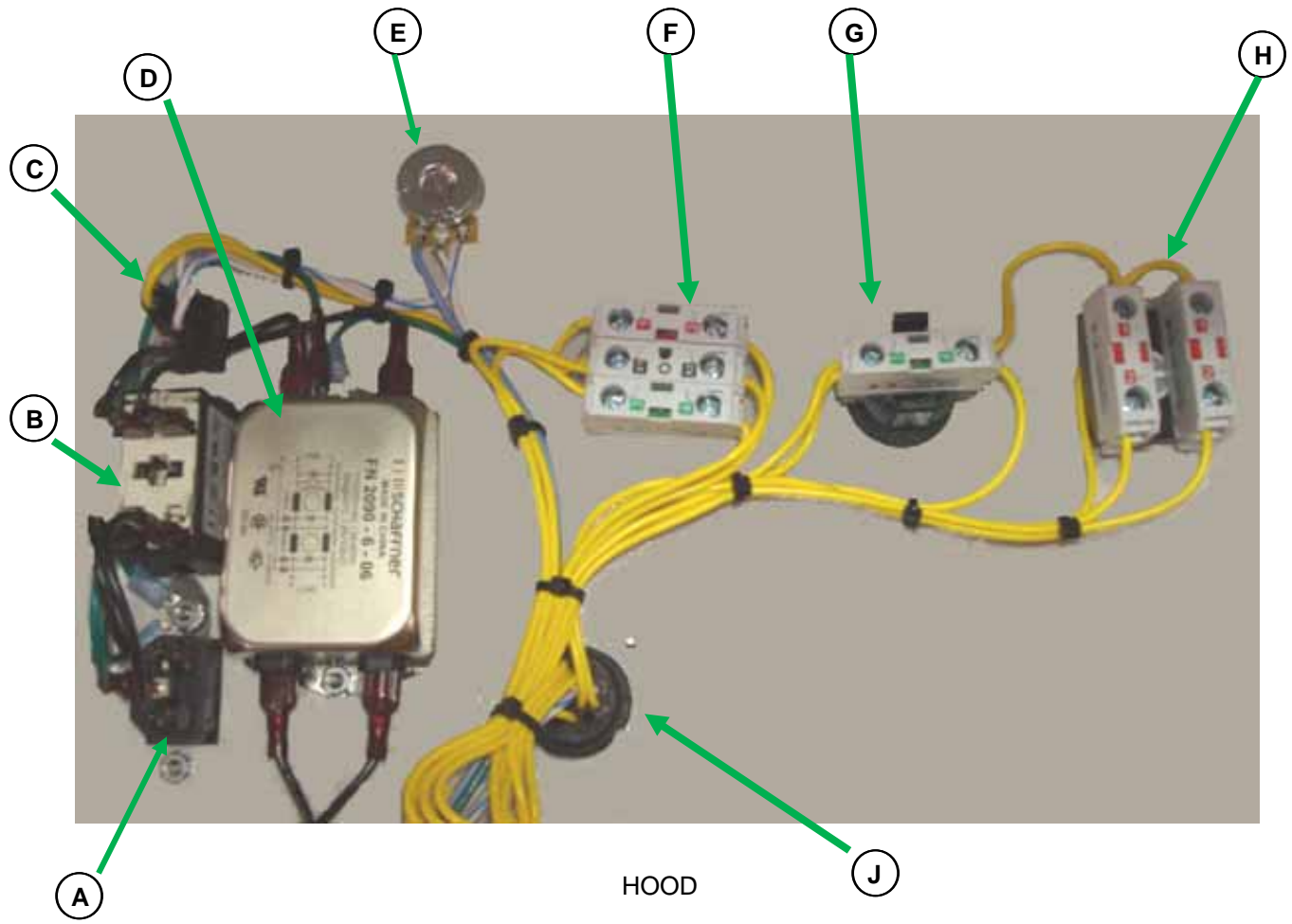
Electrical Components

FORCE FLEX FEEDER

MODEL FF-20



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Hood Component Identification Table

Item	Component	Function
A	J0-Power Inlet	Connection for power supply cord
B	CB1-ON/OFF	5 AMP Circuit Breaker
C	RS1-Mode Switch	Provides remote/local control selection
D	FLTR1-Line Filter	6 AMP for noise reduction
E	POT1	Potentiometer
F	PB1	Illuminated Push Button-START/STOP
G	RESET	Reset pushbutton
H	ES1-E STOP	Push-Pull Switch w/ 1 N.C. contact
J	Receptacle	

Base Component Identification Table

Item	Component	Function
K	K1-Relay	DPDT, 30A, 24V~ for master control
	K2, K3-Relays	DPDT, 24V AC
L	Terminal Block, Ground	Provides contact point for AC ground
M	DC MOTOR CONTROL	Controls speed of Feeder belt motor
N	TRANSFORMER	Step down 230 to 115vac, filters noise
O	24 V TRANSFORMER	Transforms incoming line voltage to specific voltage to machine
P	F1A, 1B fuses	0.5A-T1 transformer primary
R	F2A, 2B fuses	1.6A-T2 transformer to DCDRV dc motor control
S	F1C fuse	0.5A-T1 transformer secondary
T	Feeder Motor	Main belt drive
K4	Option-24V trigger relay	SPDT, 24V AC/DC
K5	Option-5 to 28VDC interface	Output Module 4-28VDC, 12-280VAC

Section VI

Wiring Diagrams for

FORCE FLEX FEEDER

MODEL FF-20



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Section VII

Trouble Shooting

FORCE FLEX FEEDER

MODEL FF-20



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Troubleshooting Guide

Problem:	Things to Check:
No power to all components of the machine	Check Main Breaker Check power to the machine
No power to Motor controller	Check FU 2A, 2B fuses 1.6AMP (L1, L2) Check 3AMP Circuit Breaker (CB1)
Feeder is not feeding	Check Feeder On/Off Button Check Connection at Base Feeder needs to be full (Limit switch depressed) Check all cable connections
Feeder will not run.	Check fuse condition. Check outlet power source. Check power switch Check all cable connections
Feeder runs but no material is being dispensed.	Check material supply. Remove all material and follow setup procedure. Check rollers and belts for excessive wear or dirt.
Feeder does not create a gap between pieces.	Lower separator adjustment and observe. If a gap is not present after this adjustment, return separator to original position and move the back guide forward. Lower rear elevator belts slightly.
Feeder does not detect material.	Adjust position of the sensor.
Thick material does not feed well.	Decrease the height at the back of the material stack. Increase the opening at the separation device (the thicker the material the less critical the setting is).
Thin material does not feed.	Adjust separation device as described in section 2. Remove material and fan the stack allowing air to separate the pieces. Raise the rear of the material stack by moving the wedge forward.

