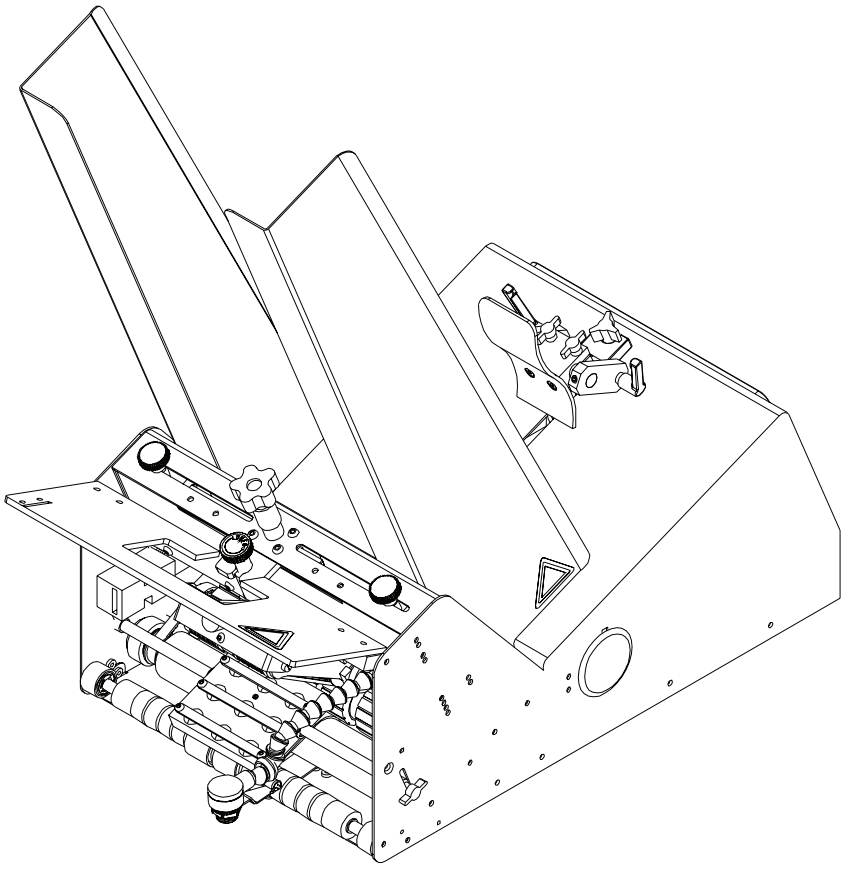
Reliant 3700

Product Guide



Thiele Technologies
A Barry-Wehmiller Company

Streamfeeder®

Part Number: 00900383

Thiele Technologies, Inc. - Streamfeeder
103 Osborne Road
Minneapolis, MN 55432-3120 USA

TEL: 763.502.0000
FAX: 763.502.0100
E-MAIL: service@streamfeeder.com
WEB: www.streamfeeder.com

Printed in the USA.

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Before You Begin

Welcome to Streamfeeder. This manual was included with your new Streamfeeder Reliant 3700 Universal Friction Feeder. It provides all the information you need to efficiently operate and maintain the product.

Who Should Read This Manual

This manual is primarily intended for operators who will be using the Reliant 3700 Universal Friction Feeder in their day-to-day operations. *Please read it thoroughly before you operate the machine*.

Qualified technicians should also be familiar with the information in this manual.

How This Manual Is Organized

This manual is divided into the following main areas:

- "**Safety**": *This section is at the front of this manual for good reason. It covers all safety issues that you should be familiar with before you go any further with adjustments, power-up, or operation*.
- Section 1, "**About the Machine**": *Introduces you to the feeder. It provides a complete description of all controls, connectors, and sensors*.
- Section 2, "**Preparing for Operation**": *Includes all adjustments you should make before attempting to do a power-up and successfully run material through the machine*.
- Section 3, "**How to Operate**": *Walks you through the basic steps needed to run the machine — from power-up to shutdown*.
- Section 4, "**Operational Troubleshooting**": *Gives you the basic diagnostic information you need to quickly and accurately solve problems to minimize downtime*.
- Section 5, "**Inspection and Care**": *Covers all the steps you can take to keep your feeder running properly to minimize downtime and increase longevity of parts*.
- Section 6, "**Additional Wedges**": *Contains information about the setup and use of parts which are optional on the Reliant 3700*.
- Sections 7 and 8, "**Mechanical Components**" and "**Electrical Components**": *These sections contain extensive detailed information for qualified technicians responsible for servicing and maintaining the Reliant 3700*.
- Section 9, "**Technical Troubleshooting**": *Gives you the basic diagnostic information you need to quickly and accurately solve problems to minimize downtime*.

NOTE

The information in Sections 4 and 9 is designed to be a quick and easy method for the operator to minimize downtime. Streamfeeder does not recommend opening the feeder compartment, or performing any part replacement based on the information given in this manual. For more detailed information, please consult with a qualified technician.

Message Conventions

Here are eight types of messages that appear in this manual which help emphasize information of particular interest:

DANGER signifies an operator action or specific equipment area that can result in serious injury or death if proper precautions are not taken.

WARNING signifies an operator action or specific equipment area that can result in personal injury if proper precautions are not taken.

CAUTION signifies an operator action or specific equipment area that can result in equipment damage if proper precautions are not taken.

ELECTRICAL DANGER signifies an operator action or specific equipment area that can result in personal injury or death from an electrical hazard if proper precautions are not taken.

TIP signifies information that is provided to help the operator minimize problems in the operation of the machine.

NOTE provides useful additional information that the operator should be aware of to perform a certain task.

CHECK signifies an action that should be reviewed by the operator before proceeding.

IMPORTANT signifies alerting the operator to actions that can potentially lead to operational problems or equipment damage if instructions are not followed properly.

Safety

Make sure you thoroughly read this Section until you become familiar with all the safety issues relating to the safe operation of this machine.

Please read all of the Warnings that follow to avoid possible injury. Although Streamfeeder has made every effort to incorporate safety features in the design of this machine, there are residual risks that do exist that an operator should be aware of to prevent personal injury.

Please read all of the Cautions that follow to prevent damage to the machine. The Reliant 3700 Universal Friction Feeder is built with the highest quality materials. However, damage can occur if the machine is not operated and cared for within design guidelines as recommended by Streamfeeder.

Danger

- **Equipment interior contains incoming 120- or 240-VAC electrical power. Bodily contact with these high voltages can cause electrocution, which can result in serious injury or death.**

Warnings

- **When operating the feeder, always make sure the discharge safety shield is in the closed position (covering the discharge belts and rollers).** Failure to do so may expose your hands or fingers to moving parts which can cause serious injury.
- **When performing service or maintenance on the feeder, always lift the discharge safety shield to disengage the safety interlock, turn Off the main power switch, and disconnect the feeder from the electrical power source.** Failure to do so may expose you to dangerous high voltage or moving parts which can cause serious injury.
- **When performing initial adjustments prior to operation, always make sure you lift the discharge safety shield to disengage the safety interlock, turn Off the main power switch, and disconnect the feeder from the electrical power source.** Failure to do so may expose you to a potential start-up and moving parts which can cause serious injury.
- **Make sure you always plug the machine into a 3-prong, properly grounded and fused electrical power source.** Never remove or disable the grounding lug at the outlet. Failure to follow these warnings may expose you to dangerous high voltage which can cause serious injury.

Warnings (cont.)

- **Do not attempt to make any adjustments while the machine is running.** Failure to follow this warning may expose you to moving parts which can cause serious injury.
- **Never attempt to clear a jam from the machine until you turn Off the main power switch and disconnect the machine from the electrical power source.** Failure to do so may expose you to a potential start-up and moving parts which can cause serious injury.
- **Do not attempt to gain access to the inside of the feeder.** Refer all questions or problems to a qualified technician.

Cautions

- **When the machine is not in use, avoid stacking or storing materials on the carriage assembly to prevent damage to the belts.**
- **When replacing fuses, always use the exact type supplied with the machine as shipped from the factory. IMPORTANT: Always make sure power module is replaced exactly as removed. Failure to follow this caution can result in damaged electrical parts.**
- **When performing routine cleaning of parts, only use those methods and cleaning solvents (isopropyl alcohol) which are specified by Streamfeeder.** Failure to do so may cause unpredictable results and can cause damage to machine parts. See Section 5, Inspection and Care, for recommendations.
- **Do not attempt to use the machine for any other purpose other than what was recommended by Streamfeeder.** Failure to follow this caution may cause unpredictable performance, and/or can cause damage to machine parts.
- **Avoid leaving any loose cabling near any moving parts.** Failure to follow this caution may result in damage to machine parts.
- **Avoid any type of direct impact to the sensor and extension assembly.** Failure to follow this caution will cause damage to the photo sensor or extension.
- **Do not apply lubricants to any part of the machine.**
- **Do not attempt to gain access to the inside of the feeder. Do not attempt to remove and replace parts.** Refer all questions or problems to a qualified technician.

Labeling

Streamfeeder has affixed safety labels to those areas of the Reliant 3700 Universal Friction Feeder where potential operator hazards do exist (such as moving belts or rollers). Shown below are label examples, along with their respective locations.

Feed Belt Guards

Discharge Safety Shield

Electrical Noise

The air contains electromagnetic interference (EMI) fields and radio frequency interference (RFI), also known as “electrical noise.” Usually this noise is small enough in size (amplitude) to not be a problem. If intense enough, however, it can cause problems for other electrical equipment.

Streamfeeder has designed the feeder with noise immunity in mind. Even the sensors provided with the machine have a certain amount of noise immunity built-in. However, in extremely noisy environments, these design considerations are not necessarily immune to electrical noise and therefore, operational problems can occur. *If you suspect any such electrical noise problems, please report it to a qualified technician*.

Safety Listings and Certifications

CE

This symbol on the back panel means the product is in compliance with the following standards under the provisions of the Machinery Directive 89/392/EEC and the amendments 91/368/EEC, 93/44/EEC and 93/68/EEC, and the EMC Directive 89/336/EEC.

Specifications

Maximum Product Size:	11.75 in. W x 14 in. L (298.5 cm x 355.6 mm)
Minimum Product Size:	3.75 in. W x 3.75 in. L (95.3 cm x 95.3 mm)
Optional:	2 in. W x 2.5 in. L (50.8 cm x 63.5 mm)
Min/Max Product Thickness:	.003 in. to 1 in. (.076 mm to 25.4 mm)
Speed:	5700 in/min (144,780 mm/min)
Batch Size:	1 to 99 pieces
Modes:	One shot or batch count
Electrical Requirements:	115/230vac, 50/60 Hz, 3A
Weight:	75 lb. (34 kg)
Warranty:	One-year limited

1 About Your Machine

Features

NOTE

- *Feeders can be configured two ways: one-shot mode or batch count mode.*
- *One-shot mode feeders are capable of feeding one piece of material when a flight signal is received.*
- *Batch count mode feeders are capable of feeding 1-99 pieces of material when a flight signal is received.*
- *For purposes of illustration, a batch count feeder is shown in all drawings of this manual.*

The Reliant 3700 Universal Friction Feeder is designed for reliability, flexibility, and ease of use with a variety of host systems. Included are such applications as gripper arm envelope inserters and infeed conveyors for various wrapping machines.

All parts required for setup, loading, feeding, sensing and easy operator control are combined into one compact unit.

Review the *main assemblies* in Figure 1-1 to become familiar with names and locations of feeder parts and adjustments. This will help to prepare you for initial setup. Descriptions are found in Table 1-1.

Review the *control panel components* in Figure 1-2 to become familiar with names and locations of specific connectors, switches, and controls. This will help to prepare you for installation and operation. Descriptions are found in Table 1-2.

Main Assemblies

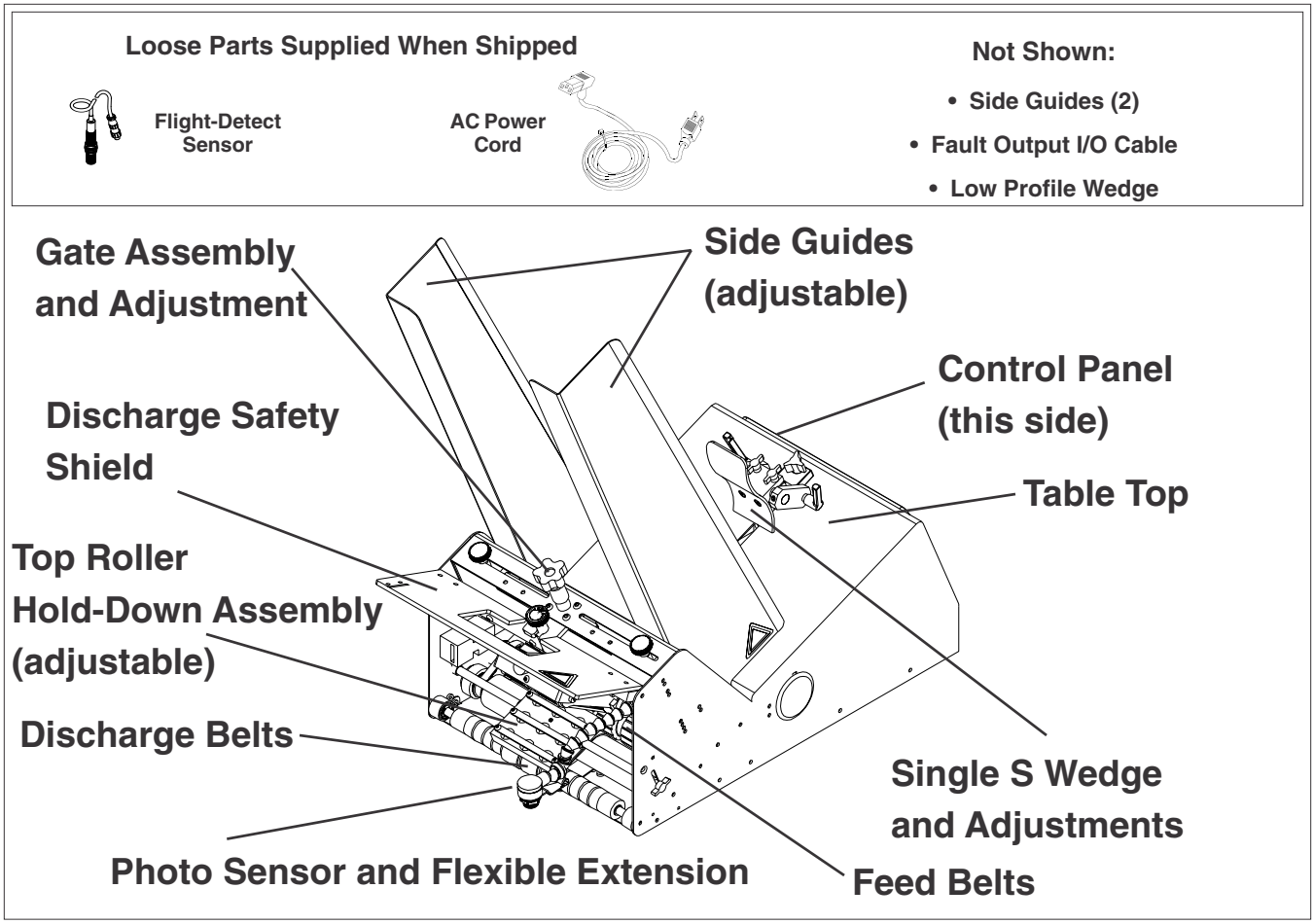


Figure 1-1. Main Assemblies of the Reliant 3700 Universal Friction Feeder

Table 1-1. Main Assemblies Feature Descriptions

Feature	Description
Gate assembly and adjustment	Mounted on a gate bracket assembly above the feed belts, this device provides a curvature to help preshingle stacked material. When properly adjusted, a clearance is created to help singulate and feed material. *(Note: For multiple page material, a 1 to 1.5 maximum thickness is typical.)*
Table top	Used to support the back wedge.
Side guides (adjustable)	Holds a stack of material to be fed and helps keep it straight for proper entry through the gate assembly area. Single adjustment knob allows you to move side guides together or apart for different size material. Can be positioned equally or offset. *(Note: Dual-knob design also available.)*
Back wedge and adjustment	Lifts the material to keep it off the table top, reduces excessive contact with the feed belts, and helps push the material against the curvature of the gate assembly. To achieve proper lift, adjustment wing-nuts and locking levers allow you to slide the wedge to various positions and angles.
Photo sensor and flexible extension	Also called a *sheet-detect* photo sensor, it “looks” for the leading edge of the material to stop the feeder. For optimum setting, a flexible extension allows you to adjust for distance and perpendicular angle to material.
Feed belts and discharge belts	*Feed belts:* Provides the friction and motion necessary to pull individual material from the bottom of the stack and through the gate assembly area. *Discharge belts:* Combined with the top roller hold-down assembly, provides the friction and motion necessary to pull material away from the gate assembly area.
Top roller hold-down assy (adjustable)	A block of small rollers mounted on a movable shaft. Used to gently force the material down on the discharge belts so that it can be controlled after it exits the gate assembly area. To achieve proper downward pressure, T-nuts allow you to loosen the shaft to adjust block up or down.
Control panel	All connectors and switches for sensor, interface, and AC power are located here. For descriptions, see Figure 1-2 and Table 1-2.
Discharge safety shield	Provides residual risk protection to operator when feeder is running. Built-in interlock switch stops the feeder when opened.
LOOSE PARTS	
AC power cord, 8 ft. (2.44 m)	IEC320 removal three-prong. Shipped loose.
Flight-detect sensor	Mounted at a remote location. It "looks" for a target on-line (such as a hold-down ski or conveyor lug) to start the feeder.
Fault output I/O cable	Provides the interface for host system integration.

Control Panel Components

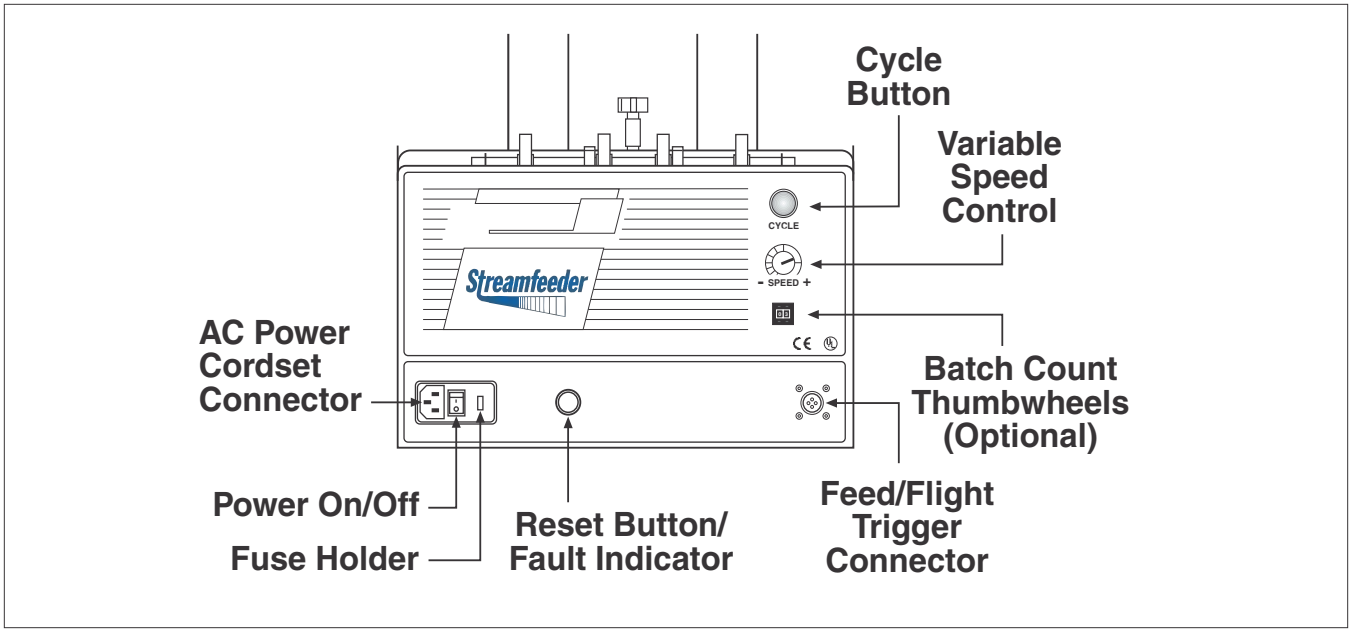


Figure 1-2. Control Panel Components

Table 1-2. Control Panel Feature Descriptions

Feature	Description
AC power cordset connector	Cordset plugs into this IEC320 connector to provide feeder with power from a grounded/fused outlet. Switchable for either 115- or 230-VAC.
Feed/flight trigger connector	The remote flight-detect sensor plugs into this 4-pin connector to provide the “start” signal to begin a feed cycle.
Power On/Off	Toggles AC power On or Off.
Fuse holder	Contains two replaceable GMD3, 3-Amp, 5-mm fuses. *IMPORTANT: Always make sure power module is replaced exactly as removed. Failure to follow this caution can result in damaged electrical parts.*
Reset button/fault indicator	Labeled **Reset**, the primary purpose of this pushbutton switch/indicator is to reset the feeder after: 1) a “time-out” occurs or, 2) the discharge safety shield is opened or, 3) "miss-feed" occurs. Time-outs occur: 1) during a misfeed or, 2) when the hopper runs out of material; or 3) *flashing* during "miss" condition. Built-in indicator illuminates: 1) *steady* during a time-out condition; 2) *flashing* during an “open” discharge safety shield.
Variable speed control	This dial switch (labeled **Speed**) allows the feeder speed to be synchronized with an inserter, or infeed conveyor. Turning counter-clockwise decreases speed; clockwise increases speed.
Cycle button	This pushbutton switch (labeled **Cycle**) is primarily used during preparation and test, this is used to manually start (or run) a feeder cycle. To “start” a cycle, push **Cycle** completely in and then release.
Batch count thumbwheels (optional)	*Note: Batch count feeders only.* These two wheels allow you to select a number from 1 to 99 to which the feeder will always count and then stop.
Fault ouput connector (not shown)	The fault output I/O cable plugs into this connector to provide the host system interface.
Fault configuration selector switch (not shown)	This switch allows the operator to select between stopping the feeder or sounding an alarm only when a fault is detected.

2 Preparing for Operation

When performing initial feeder adjustments prior to operation, always make sure you turn Off the main power switch and disconnect all equipment from the electrical power source. Failure to do so can expose you to a potential startup and moving parts which can cause serious injury.

Do not attempt to make any adjustments while the feeder and machine of application are running. Failure to do so can expose you to moving parts which can cause serious injury. Do not wear loose clothing when operating the feeder.

Avoid making adjustments with loose or unsecured parts. This can potentially damage parts.

Once the Streamfeeder Reliant 3700 Universal Friction Feeder is installed on your host system, you are ready to prepare the machine for operation. To do so, you must perform several adjustments with the material you are going to be feeding. And, you must do a test run with this material to verify it is set correctly before you begin cycling the feeder with your particular application. *You will have to perform this procedure for material you plan to feed*.

The adjustments you must make (in order) are as follows:

1: Gate assembly adjustment
2: Side guides setting
3: Back wedge adjustment
4: Top roller hold-down assembly setting
5: Photo sensor adjustment
6: Manual test to verify

STEP 1: Gate Assembly Adjustment

NOTE

Hopper refers to the space where the material is stacked (made up of the side guides).

NOTE

Keep in mind the gate assembly works with the wedge to provide the proper lift, curvature of the material, and proper belt/material contact to separate and feed one piece at a time.

IMPORTANT

Feeding problems will occur with either too much material in the hopper, or too large a gap between the gate assembly and the material.

Review

The gate assembly provides the curvature to help preshingle material and the proper gap to help the feed belts pull material through the gate assembly area — one at a time. The downward pressure (or weight) of the stack in the hopper will provide the force to help push the material against the curvature of the gate assembly, and help it contact the feed belts. This preshingling will allow the gate assembly to efficiently separate (and singulate) material.

To achieve the optimum separation, you have to use the adjustment knob to either increase (clockwise) or decrease (counterclockwise) the gap between gate assembly and the feed belts. Depending on the characteristics of the material you are using, you may have to change the gate assembly from the factory-set *high* spring tension to a *low* spring tension. See “Changing from Factory Set High-Tension to Low-Tension” to follow (page 7).

Objective

Adjust the gate assembly for minimum gap, with minimum pressure on the material. Your objective is to adjust the clearance so that a single piece of material passes without resistance. The optimum setting should be a gap adjustment of 1.5 thickness of material.

STEP 1: Gate Assembly Adjustment (continued)

Excessive lowering of the gate assembly can damage material or lead to premature wear of the O-rings or feed belts.

LOWER

If bottom piece of material does not move freely, then the gate assembly is too tight. This can lead to premature wear of the O-rings or feed belts.

TIP

A wider gap between material and belt provides the highest tolerance for curled and bent edges.

Procedure

To adjust the gate assembly for proper gap, follow these steps:

1. Slide two pieces of sample material under the gate assembly. You may have to pull up on the adjustment knob to allow the material to be inserted (Figure 2-1).
2. Test the *top* piece for clearance. Grasp with two hands and slide it front-to-back under the gate assembly (Figure 2-2). A proper adjustment allows a "slight" amount of drag on the top piece of material.
3. With the top piece removed, test the *bottom* piece of material for clearance. It should move freely, without any resistance.
4. Adjust the knob on the gate assembly until the material has the desired drag: clockwise to increase clearance, counterclockwise to decrease clearance (Figure 2-3).
5. Remove the top piece and turn the adjustment knob counterclockwise 1/4 turn to lower the gate assembly. This should set the gap for the optimum 1.5 thickness of material.
6. Repeat drag tests and adjust as needed until the desired clearance is achieved.

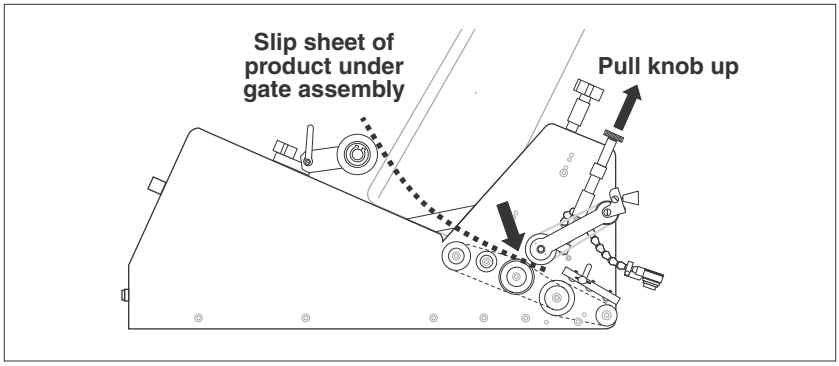


Figure 2-1. Lifting Gate Assembly Upward to Insert Material

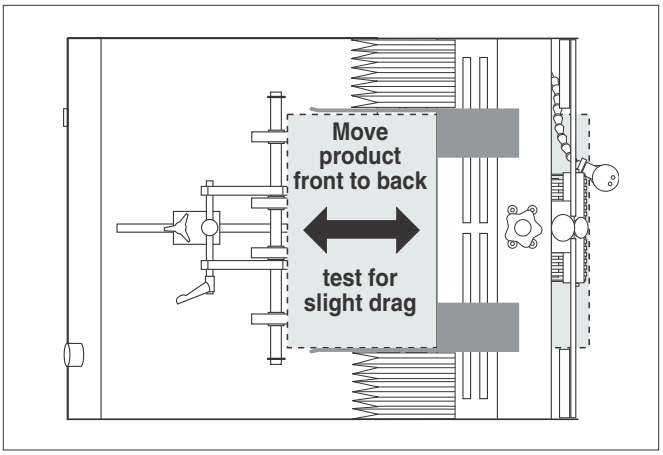


Figure 2-2. Using Two Pieces of Material to Set Gap

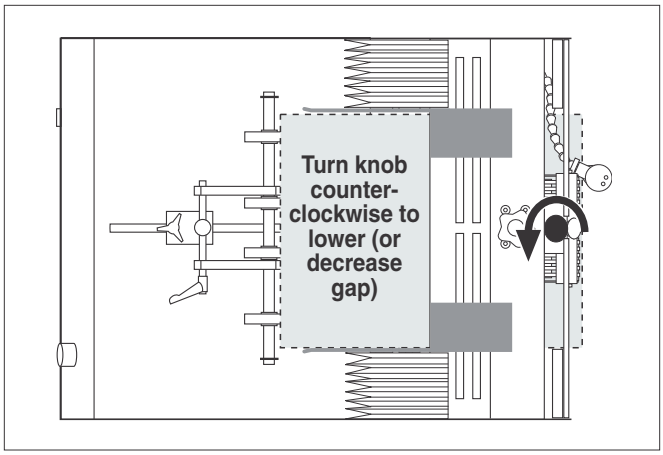


Figure 2-3. Adjusting Gate Assembly for Correct Gap

STEP 1: Gate Assembly Adjustment (continued)

NOTE

When feeding product with varying thickness throughout, it may be necessary to turn both adjustment rollers 1-2 ***full turns*** *counterclockwise to compensate for the differential thickness. This procedure allows the gate horizon to "float."*

IMPORTANT

The adjustment knob set screws are pre-set at the factory to lock the knob to the threaded rod. DO NOT OVER-TIGHTEN! Over-tightening the set screws may damage the components.

To adjust the gate for effective material skew control, follow these steps:

1. Repeat drag test.
2. Test the piece for uneven side-to-side drag. Grasp with two hands and slide it front-to-back under the gate assembly. A proper adjustment allows for equal drag on the left and right sides of the piece of material.
3. To compensate for greater drag on one side of the material, turn the *opposite* adjustment roller *counterclockwise* 1/8 turn. Next, turn the other adjustment roller *clockwise* 1/8 turn.
4. Repeat drag tests and adjust as needed until equal drag is achieved. You may need to repeat this procedure after observing the feeder cycling (refer to Section 3, How to Operate).

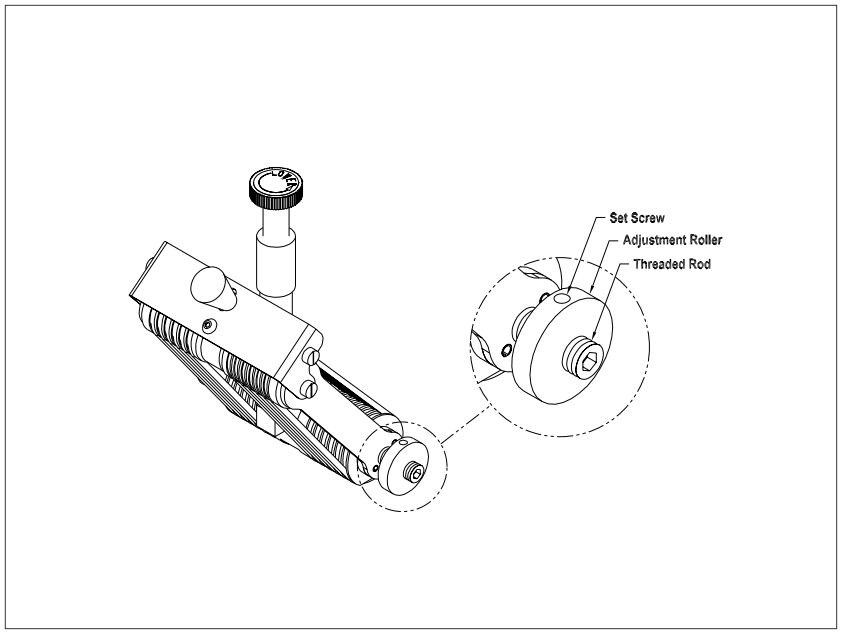


Figure 2-4. Horizon Adjustment (shown on Advancing O-Ring Gate)

Changing From Factory Set High-Tension to Low-Tension

Excessive lowering of the gate assembly can damage material and/or lead to premature wear of the O-rings or feed belts.

IMPORTANT

When changing from a low-tension to high-tension setting, you may have to adjust the stack height downward to prevent feeding problems.

NOTE

Certain types of single-sheet material may require even more tension than the high-tension setting can provide. To increase tension even further, place a washer between the cylinder and spring.

Review

The Reliant 3700 is shipped to you with a high-tension spring in the gate assembly. This works well for most materials, allows for tall stack height, and helps provide the best performance in preventing doubles. However, certain types of material may demand that you change the gate assembly from a *high-tension* setting to a *low-tension* setting (for example, irregular shaped material).

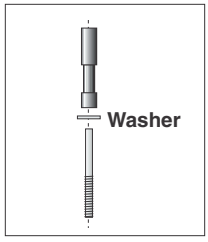
If you are feeding a material of irregular thickness, you should change to low-tension. This provides the following benefits:

1) allows the gate assembly to adjust to the irregular thicknesses.
2) prevents marking on the material by the gate assembly.
3) prevents peeling back the top sheet of a multi-page item.

Procedure

To change the spring from a *high* to a *low* tension, follow these steps:

1. Remove the gate assembly from gate bracket assembly. To do so, pull cylinder down with one hand, lift up on knob with other, and tip at slight angle to remove.
2. Remove the adjustment knob by turning counterclockwise (Figure 2-5A). Then lift the cylinder off of top of spring (Figure 2-5B).
3. Turn the cylinder around so the cylinder collar faces up (Figure 2-5C). Then place the cylinder on top of the spring.
4. Replace the adjustment knob (make about 8 revolutions of the knob before reinstalling gate assembly on gate plate).



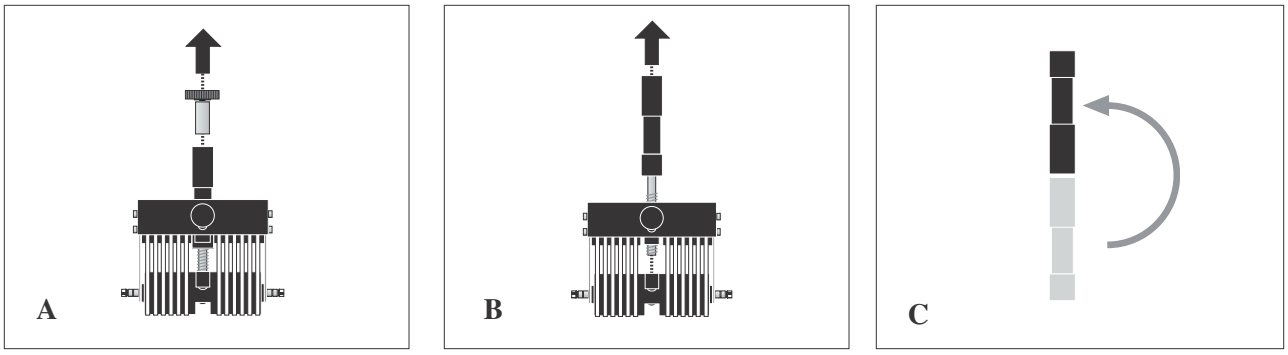


Figure 2-5. Adjusting Gate Assembly for Low-Tension

STEP 2: Side Guides Setting

Review

The side guides hold the stack of material being fed, and they guide the material through the feeder in a straight line of movement. You can adjust the side guides to accommodate different sizes of material.

Objective

Adjust the side guides so the material stack maintains uniformity from top to bottom, with no drifting or binding. Adjustments are made *horizontally*.

Make sure the space between the side guides can accommodate the size of the material being fed. Consider the following as you adjust the guides:

- An initial starting point should always be that each guide is of equal distance from the center point of the machine.
- Each edge of the material should rest equally on the belts, on both sides of the gate assembly (or equidistant spacing). *However, there can be certain instances where guides do not need to be centered due to material characteristics. This is called offset spacing.*
- Adjust both side guides to be as close as possible to either sides of the material, without causing binding, curling of edges, or resistance to movement.

Procedure

One-Knob Side Guides (standard). To adjust each side guide for proper *equidistant* horizontal spacing using the single-knob adjustment, follow these steps (Figure 2-6):

1. Place a small stack of material in the hopper.
2. Using the side guides adjustment knob (centrally located between the two guides), turn in either direction until guides are located at the recommended distance from the material: .0625 in. (1.6 mm) from each edge, .125 in. (3.1 mm) overall.
3. Visually check both guides for proper spacing from material.

Two-Knob Side Guides (optional). To adjust each side guide for proper *equidistant* horizontal spacing using the dual-knob adjustment, follow these steps:

1. Place a small stack of material in the hopper.
2. Start by loosening each side guide wing adjuster (counterclockwise) This will allow you to move each side guide as needed.
3. Grasp the lower part of each guide and slide to the recommended distance from the material: .0625 in. (1.6 mm) from each edge, .125 in. (3.1 mm) overall. Tighten each wing adjuster after you establish proper position for each guide.
4. Visually check both guides for proper spacing from material.

TIP

A good "rule-of-thumb" measurement to use is about .0625 in. (1.6 mm) between material edge and side guide (.125 in. or 3.1 mm overall).

NOTE

There are two types of side guide adjustments available:

1) One-Knob: Both side guides controlled simultaneously by a single knob (as shown in Figures 2-6 and 2-7).

2) Two-Knob: Each side guide controlled by a separate knob.

STEP 2: Side Guides Setting (continued)

One-Knob Side Guides. To adjust each side guide for proper *offset* horizontal spacing using the single-knob adjustment, follow these steps (Figure 2-7):

1. Push down on the side guides spring-loaded adjustment knob to disengage guides from gear mechanism.
2. Grasp whichever side you wish to offset first and move into position.
3. Place a small stack of material in the hopper, with edge of paper against offset guide.
4. Move the second side guide so that it is located at the recommended distance from the material: .0625 in. (1.6 mm) from each edge, .125 in. (3.1 mm) overall.
5. Lift up on the spring-loaded adjustment knob so the guides lock into place.
6. Visually check both guides for proper spacing from material.

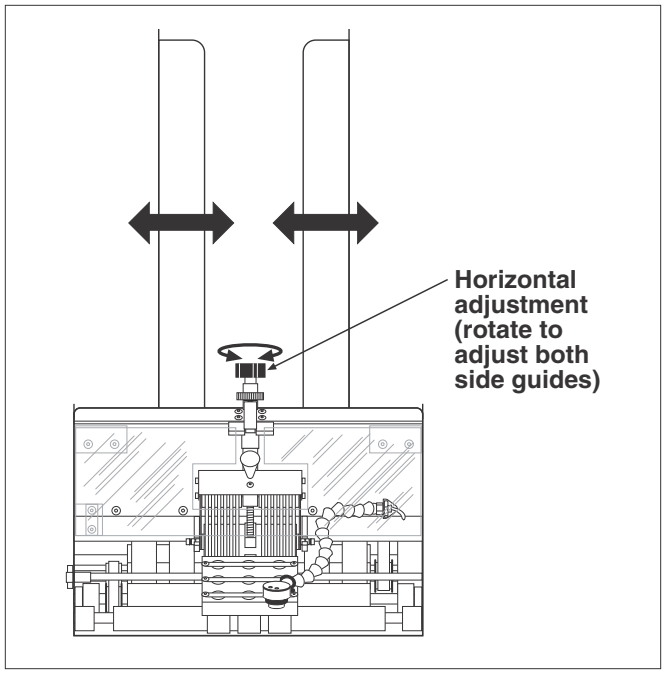


Figure 2-6. Horizontal Adjustment of Side Guides

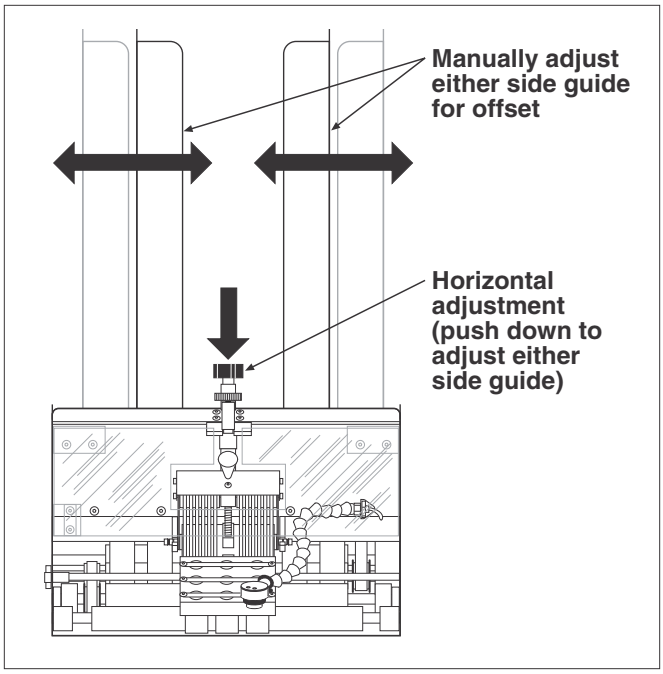


Figure 2-7. Individual Side Guide Offset

Two-Knob Side Guides. To adjust each side guide for proper *offset* horizontal spacing using the dual-knob adjustment, follow these steps:

1. Start by loosening each side guide wing adjuster (counterclockwise). This will allow you to move each side guide as needed.
2. Repeat steps 2-5 above.
3. Tighten each wing adjuster after you establish proper position for each guide.
4. Visually check both guides for proper spacing from material.

STEP 3: Back Wedge Adjustment

NOTE

Keep in mind the back wedge works with the gate assembly to provide the proper lift, curvature of the material, and proper belt/ material contact to separate and feed one sheet at a time.

TIP

There are a number of feeding problems which can be solved by simply adjusting the back wedge to different positions. Some of these problems include double feeds, skewing, twisting, poor singulation, ink or varnish buildup on the belts, and jamming at the gate assembly area.

NOTE

For more information about optional wedges and their use with various materials, see Section 6, Additional Wedges.

Review

The back wedge provides proper lift to the material to help keep it off the table top and creates the force necessary to push material against the gate assembly. By adjusting it back and forth from the gate assembly or pivoting side to side, you can create the lift and force necessary to preshingle material against the curvature of the gate assembly. Also, it keeps other sheets off the feed belts until proper separation of the bottom sheet at the gate assembly has occurred.

Here are some general guidelines that should help you determine how the back wedge should be positioned for your particular material:

- *Moving the individual rollers (optional Articulating Roller Wedge) to the outside* of the back wedge shaft (Figure 2-8A) will create a bow in the center. The bow will stiffen the material to promote better singulation of thinner material.
- *Pivoting the back wedge from its perpendicular to the gate assembly* (Figure 2-8B) will increase or decrease the amount of drag or contact (traction) on the feed belts for a given side. This can also be used to control twisting or skewing of material as it leaves the gate assembly area.
- *If the back wedge is positioned too far backward* from the gate assembly (Figure 2-8C), then the belts are driving the material before the bottom sheet has separated and left the gate assembly area. This pushes the gate assembly up, creating more pressure on the material, O-rings, and feed belts. The result can be premature buildup of ink or varnish on the belt surfaces. It can also cause more than one material at a time to be forced under the gate assembly, creating a double feed.

  By moving the back wedge forward, only the bottom material can make contact with the belt surface. Slippage is reduced, minimizing buildup on the belt surface. Double feeding is also reduced.
- *If the back wedge is positioned too far forward* to the gate assembly (Figure 2-8D), then a pinch point can be created between the top surfaces of the wedge and the material. Moving the back wedge even closer toward the gate assembly can allow material to overhang the wedge, creating too much lift of the material off the feed belts.

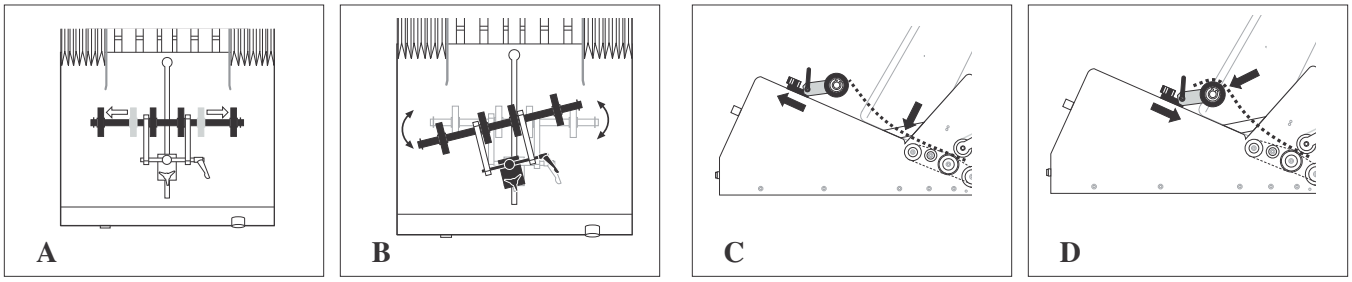


Figure 2-8. Tips for Proper Back Wedge Adjustment

STEP 3: Back Wedge Adjustment (continued)

Objective

Adjust the back wedge for proper support of the material off the table top, without creating any pinch or stress points.

Procedure

To adjust the back wedge for initial positioning, follow these steps:

1. Grasp a handful of material, approximately 2 to 2.5 in. (5 to 6 cm) thick, and preshingle the edges with your thumb (Figure 2-9).
2. Place the preshingled material in the hopper so that the edges rest against the curvature of the gate assembly (Figure 2-10).
3. Turn the back wedge wing-nut adjustment counterclockwise to loosen the wedge (Figure 2-10).

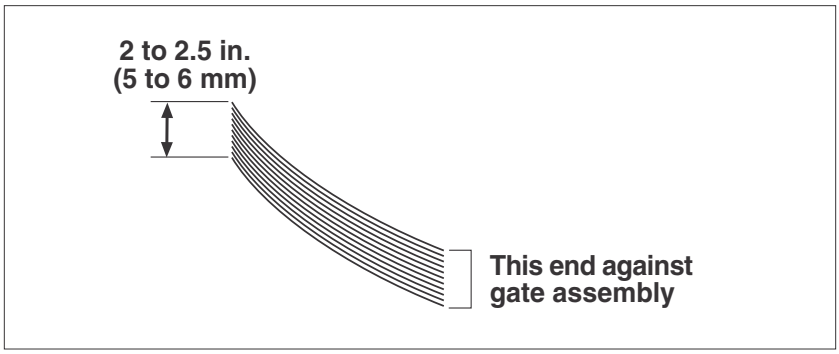


Figure 2-9. Preshingling a Small Stack of Material By Hand

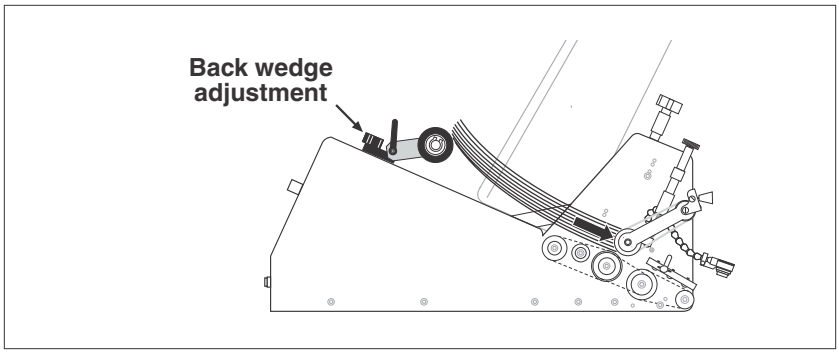


Figure 2-10. Positioning Material Prior to Loosening Back Wedge

NOTE

Moving the back wedge too far forward to the gate assembly can create a pinch point between the wedge and the material. If moving the back wedge in is not effective, then an optional wedge may be required. See Section 6, Additional Wedges, for more information.

4. Move the back wedge forward and backward until the bottom sheet is not touching the table top (Figure 2-11). A good starting point is to measure about .625 in. (16 mm) from the bottom sheet to front edge of table top. Then as you test, you can "fine tune" from this point. *You can also fine-tune back wedge location by loosening the lever handle to pivot the "S" back and forth (Figure 2-12).*

STEP 3: Back Wedge Adjustment (continued)

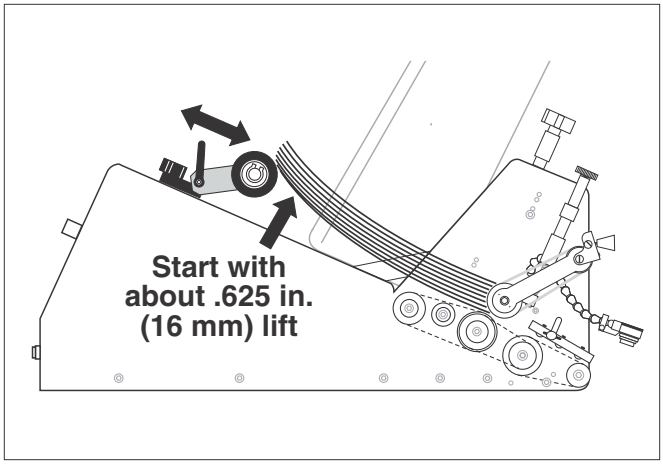


Figure 2-11. Adjusting Back Wedge

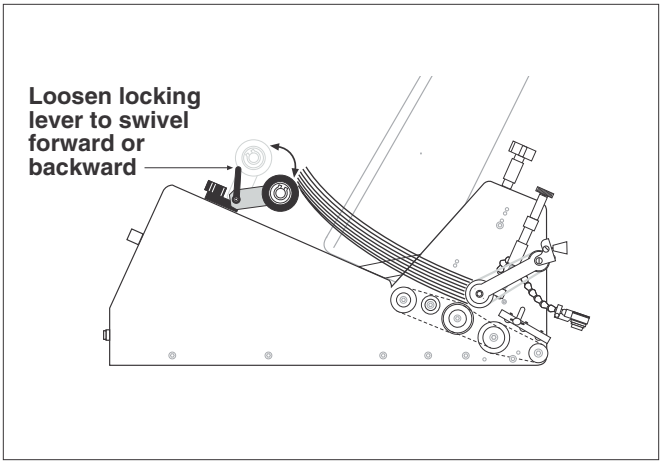


Figure 2-12. "Fine Tune" Adjusting Wedge

5. Make sure the edge of the back wedge assembly is parallel with the edge of the material stack (Figure 2-13). Adjust as required and then tighten wing-nut.

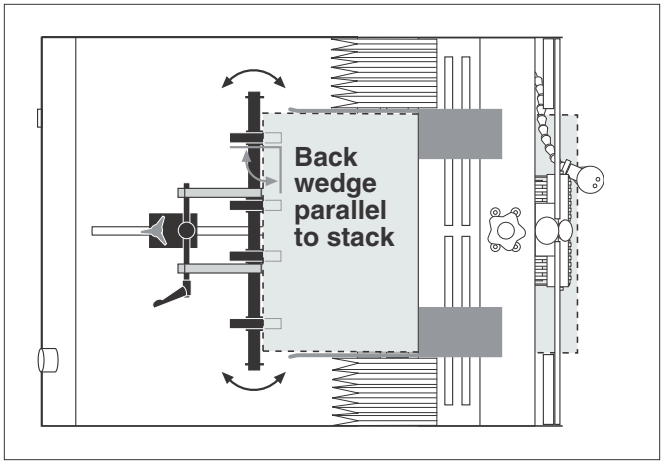


Figure 2-13. Adjusting Back Wedge for Parallel

STEP 4: Top Roller Hold-Down Assembly Setting

Review

The top roller hold-down assembly consists of an array of ball bearings in a block that is mounted on a movable shaft, just above the discharge belt. This assembly rests on top of the material as it exits the gate assembly area. Incorrect hold-down pressure can damage material.

Objective

Adjust the top roller hold-down assembly for proper amount of pressure so that the material exits the discharge area efficiently and squarely.

Procedure

To adjust the top roller hold-down assembly for proper pressure, follow these steps:

1. Loosen the two T-nuts on either side of the shaft (Figure 2-14A).
2. Lift up on the top roller hold-down assembly and insert one piece of material to be fed under the rollers (Figure 2-14B). Then allow the assembly to lightly rest on top of the material.
3. Retighten (or lock) the two T-nuts to secure the top roller hold-down assembly in position. The proper pressure (or gap) should be retained.
4. Verify assembly is set for proper amount of pressure (or drag) by sliding the material back and forth. There should be a very slight amount of drag.

IMPORTANT

If the roller closest to the gate assembly is tighter than the roller furthest from the gate assembly, jamming may occur.

If either adjustment is too tight, material damage may occur.

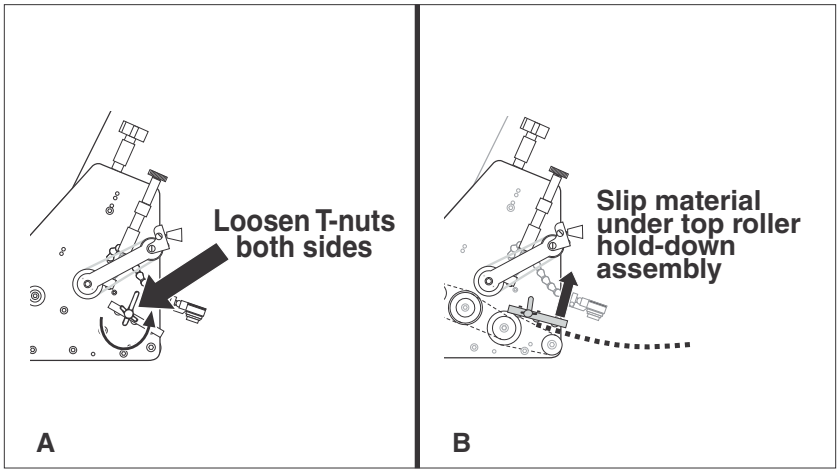


Figure 2-14. Adjusting Top Roller Hold-Down Assembly

STEP 5: Photo Sensor Adjustment

NOTE

Standard photo sensor shipped from the factory is a diffuse reflective detector. No adjustment for gain is required or necessary.

Review

The **Flight-Detect** photo sensor is mounted on the line to detect a target (for example, a conveyor lug) so as to eject a product. The **Sheet-Detect** photo sensor is mounted on the flexible arrm extension assembly to detect the leading edge of a product about to be ejected so as to turn the feeder Off.

*In preparing for operation, your initial concern should be to properly position the **Sheet-Detect** photo sensor.*

Objective

For the **Sheet-Detect** photo sensor to be effective, it must be adjusted within a specified range and angle to the product.

Procedure

Only adjust the photo sensor when the feeder power is Off. Do not attempt to adjust the photo sensor while the feeder power is On or while the feeder is running. Doing so will expose you to pinch points which can cause injury to hands or fingers.

Potential damage to feeder parts is avoided if adjustments are made when the feeder power is Off.

To adjust the **Sheet-Detect** photo sensor for proper positioning, follow these steps:

1. Aim and align the photo sensor straight toward (perpendicular to) the product (Figure 2-15). If the photo sensor is at an angle, the light will not be reflected straight back to the receiver.

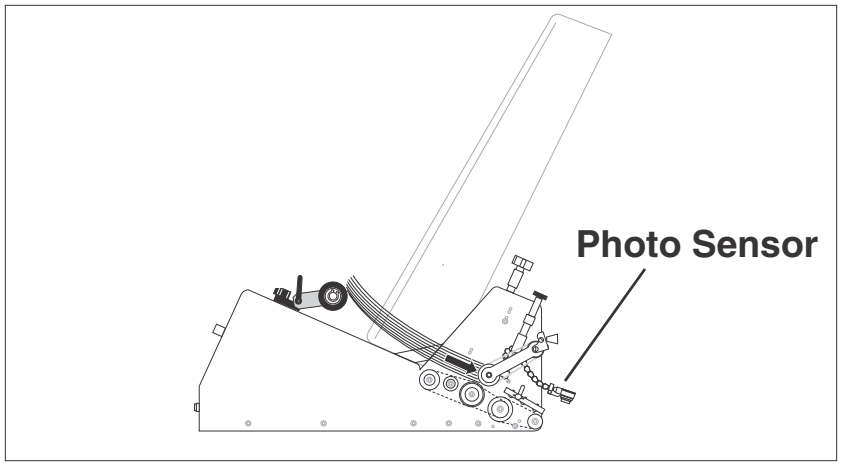


Figure 2-15. Adjusting Photo Sensor for Perpendicular Position

STEP 5: Photo Sensor Adjustment (continued)

IMPORTANT

On the feeder, such objects as shafts, guides, belts, and supports may cause false "reads" if the photo sensor is not adjusted properly for the material. The resulting problem can be intermittent or continuous feeding. See Section 4, Operational Troubleshooting, for a solution.

NOTE

For any questions you may have about adjusting the Flight-Detect photo sensor, consult with a qualified technician.

TIP

Avoid light colored backgrounds in the discharge area.

2. Position the photo sensor at distance between 1 to 1-1/2 in. (25 to 38 mm) from the product. Initially use the adjustable arms on the extension assembly. *When only the green LED is On, you will know when the photo sensor is positioned properly. The amber LED is On when product is staged.*
3. When making the adjustment, be aware of any background objects beyond the product range. *On the feeder, such objects as shafts, guides, belts, and supports may cause false returns if the photo sensor is not adjusted properly for the product (or target). The resulting problem can be continuous feeding. See Section 4, Operational Troubleshooting, for a solution.*

STEP 6: Manual Test to Verify

Now that you have made all the necessary adjustments for operation, it is recommended that you verify material singulation and separation at the feeder for your particular application. Before you power-up and run your machine with a full hopper, manually feed several sheets of material through the gate assembly area.

Prepare your test by loading the hopper with approximately 2 to 2.5 in. (5 to 6 cm) of material. Make sure you preshingle the stack so that material rests against the curvature of the gate assembly.

1. Manually feed several sheets of material slowly through the gate assembly area. Move the drive belts by pressing your thumb against the discharge belt.
2. Observe how individual material enters and exits the gate assembly area. Remember, a properly set gap will allow each new sheet to enter at about the center line of the cylinder while the bottom sheet is exiting the gate assembly area (Figure 2-16). Ideally, this means a slight overlap of both the first sheet and the second sheet (.125 in., or 3 mm) at the gate assembly area. The overlap occurs as the bottom sheet is exiting and the next sheet is entering.
3. If feeding doubles, move the wedge in toward the gate assembly. Test again.
4. If sheets are overlapping excessively or, if the machine is feeding doubles, reduce the gap slightly by moving the knob about 1/8 turn counterclockwise. Test again.
5. As material moves through the hold-down area, check for any skewing or jamming. Also check for damage to the material.
6. If this or other feeding problems still persist (slipping, skewing, jamming), then review all the adjustment procedures in Section 2, Preparing for Operation.

NOTE

If the gate assembly is too tight, the feeder will have difficulty pulling the material through the gate assembly area. This will cause "missed" feeds.

NOTE

For certain types of materials, you may have to position the material "off-center" to prevent any skewing affect.

TIP

Moving the back wedge too far forward to the gate assembly can create a pinch point between the tip of the triangle wedges and the material. If moving the back wedge in is not effective, then an optional wedge may be required. See Section 6, Additional Wedges, for more information.

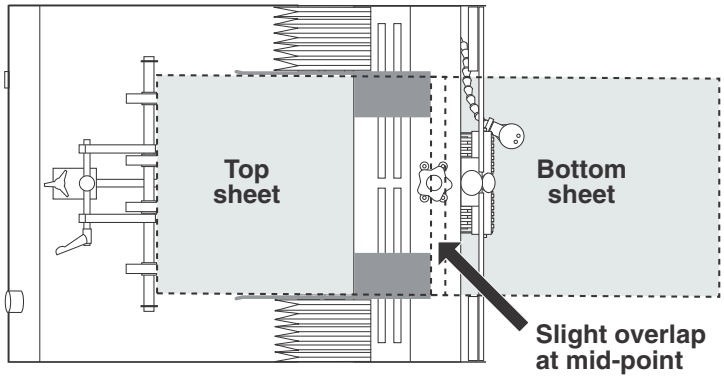


Figure 2-16. Optimum Overlap and Separation of Material

Notes

3 How to Operate

This section provides a *sequence of operation* for the Reliant 3700 Universal Friction Feeder. It also provides information for *clearing a jam* and for *shutdown*.

Sequence of Operation

Successful power-up and operation is assured if you apply the following sequence of steps:

1: Loading material in the hopper

2: Determining stack height

3: Powering On feeder

4: Setting/adjusting speed

5: Running test cycles

6: Final check

STEP 1: Loading Material in the Hopper

NOTE

Preshingling prevents multiple sheets from jamming under the gate assembly at startup.

1. Start by preshingling by hand a small stack of material so that it conforms to the curvature of the gate assembly. Push in gently to make sure lead edges touch the gate bracket assembly and front edges of the hopper guides (Figure 3-1).
2. At the back wedge, notice how it helps lift the trailing edges of the material off the table top and feed belts. Also notice how the lifting helps to push the preshingled edges against the curvature of the gate assembly (Figure 3-2).

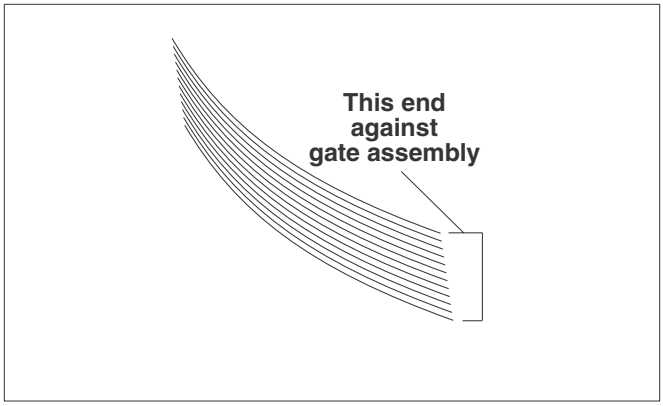


Figure 3-1. Preshingling of First Stack

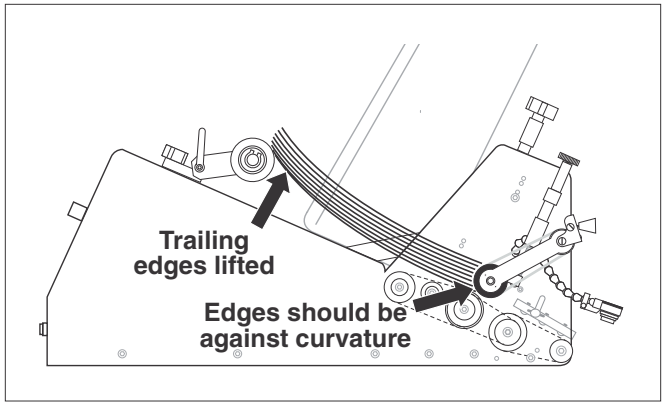


Figure 3-2. Leading Edges Against Gate Bracket Assembly and Side Guides

STEP 2: Determining Stack Height

1. Gradually add more material to the hopper after the initial stack is formed around the gate assembly. As stack height will have a preferred minimum and maximum, you will have to experiment to determine effective range of height (Figure 3-3).
2. Make sure the material is loaded in the hopper as straight as possible. Before adding to hopper, "jog" each hand-full of material on a flat surface to make sure lead edges are as even as possible. As you add each handful, gently push in each stack so that lead edges rest firmly against front of side guides.

TIP

Stack height affects the downward pressure on the feed belts. Greater downward pressure can increase the chances for double feeds.

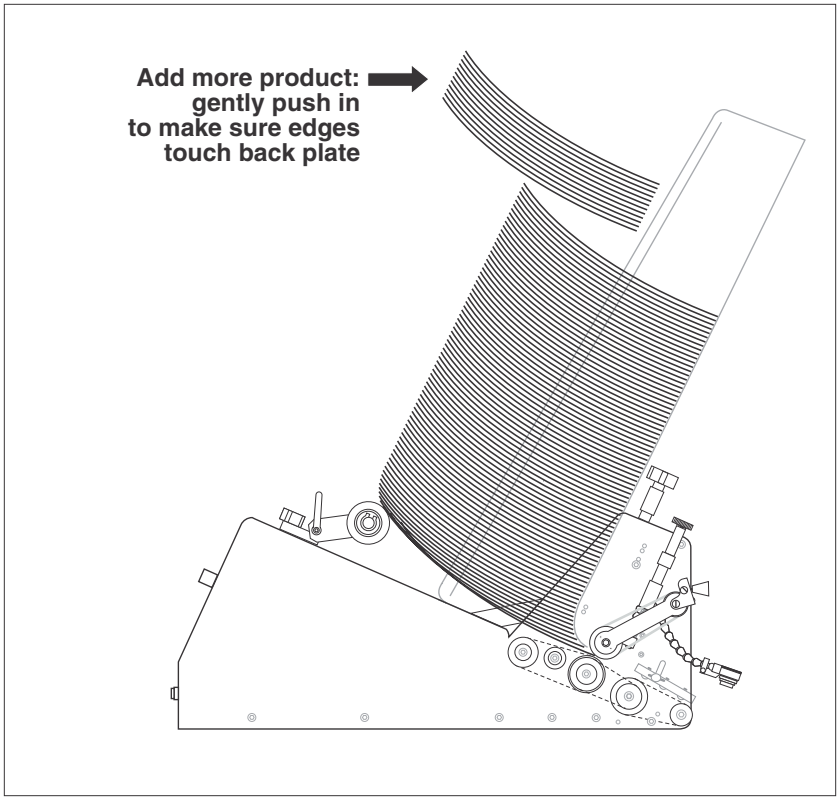
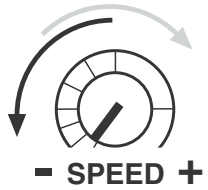


Figure 3-3. Adding More Material to Hopper

STEP 3: Powering On Feeder

Turn the feeder power On by pushing the horizontal line (—) at the **Power** On/Off rocker switch.

STEP 4: Setting/Adjusting Speed



1. Set the variable speed control to the lowest speed (counterclockwise).
2. Start by slowly turning the control clockwise to gradually increase feeder speed to coincide with the production line speed of your particular application.

STEP 5: Running Test Cycles

TIP

It might be helpful to know that a properly set gap will allow the leading edge of sheet to enter at about the center line of the cylinder, as the previous or bottom sheet is exiting the gate assembly area.

- First test the feeder *off-line* by pressing and releasing the **Cycle** pushbutton switch. Cycle as many times as you need to ensure the material is feeding properly. Make sure the material is preshingling against the gate assembly, and has proper separation out of the gate assembly area.
- Watch for any damage to material.
- Test the feeder on-line (with the photo sensors).

STEP 6: Final Check

Make sure:

- Leading edge of bottom sheet stops at proper location.
- Proper separation is occurring at gate assembly area.
- Effective preshingling is occurring at curvature of gate assembly.
- Material is not being damaged during cycling.
- Feeder is secured and will not move during operation.

Clearing a Jam

If a jam occurs during operation, follow these steps:

1. Open the discharge safety shield (interlock switch prevents feeder from starting while shield is in the “open” position).
2. Remove jammed product from feeder. While doing so, try to determine the cause of the jam (see Section 4, Operational Troubleshooting).
3. Verify whether any adjustments are loose. If so, refer back to Section 2, Preparing for Operation, for proper adjustment procedures.

NOTE

Reposition photo sensor (as required).

4. Close the discharge safety shield and reset the feeder by pressing the reset/fault indicator button (labeled **Reset**).

Shutdown

Should you not be using the feeder for long periods of time, follow these steps to ensure safe and secure storage:

1. Turn the feeder power Off by pushing the circle (**O**) at the rocker **Power** On/Off rocker switch.
2. Disconnect the feeder power cord from the AC power source.
3. Cover the feeder with a cloth or plastic tarp to prevent dust and debris from accumulating.

4 Operational Troubleshooting

Table 4-1. Quick-Look Troubleshooting

Problem	Cause	Solution
No AC power to feeder	1. On/Off switch in "Off" (or "**O**" position). 2. Power cord loose or not plugged into outlet (or AC power source). 3. Female end of power cable loose or not plugged into AC power inlet at rear of feeder. 4. Faulty external run input connection or cable. 5. No voltage is being applied to the external run input connection. 6. Faulty safety interlock switch. 7. Blown fuse.	1. Check that the switch is pressed to "On" (or "__" position). 2. Check and secure power cord at AC outlet. 3. Check and secure cord at AC power inlet (rear of feeder). 4. Check and secure cable connections. Replace if necessary. 5. Consult with a qualified technician.* 6. Consult with a qualified technician.* 7. Consult with a qualified technician.*
Feeding doubles	1. Gate assembly improperly adjusted (possibly more than one sheet thickness). 2. Back wedge improperly adjusted. 3. Worn O-rings (or if applicable, angled edge). 4. Material interlocking. 5. Static buildup.	1. Review gate assembly adjustment in Section 2, Preparing for Operation. 2. Review back wedge adjustment in Section 2, Preparing for Operation. 3. Rotate O-rings. Or, if applicable, replace angled edge (see Section 5, Inspection and Care, for procedure). If wear is excessive, consult with a qualified technician.* 4. Check material and source. 5. Check material and source.
Continuous feeding and timing out	1. Possible overlapping. 2. Photo sensor not adjusted properly; may be "seeing" background objects.	1. See "Feeding Doubles" above. 2. Review photo sensor adjustment in Section 2, Preparing for Operation.
Feed belts are operating, but material not feeding	1. Material stack weight is too low when stack height is down, resulting in reduction of down pressure. 2. Binding in side guides. 3. Slippery feed belts (material buildup). 4. Sheet adhesion or interlocking between the bottom and next sheet. 5. Gate assembly may be down too tight. 6. Too much weight in hopper.	1. Review loading the material in Section 3, How to Operate. 2. Adjust the side guides farther apart to allow freedom of movement between sheets. 3. Consult with a qualified technician.* 4. Review loading the material in Section 3, How to Operate, or review back wedge adjustment in Section 2, Preparing for Operation. 5. Review gate assembly adjustment in Section 2, Preparing for Operation. 6. Remove material from stack. Test again.

Table 4-1. Quick-Look Troubleshooting (continued)

Problem	Cause	Solution
Feed belts not operating; continuous alarm sound	1. Feeder operation was stopped due to a "time-out" fault (i.e., miss, jam, no material in hopper).	1. Check if reset button/fault indicator is illuminated. Press Reset button.
Feed belts not operating; intermittent alarm sound	1. Discharge safety shield not closed completely.	1. Check if reset button/fault indicator is blinking. Press Reset button.
Feed belt(s) not tracking on rollers	1. Excessive weight in hopper. 2. Excessive down pressure on gate assembly. 3. Off-centered product from center point of machine. 4. Stack is bearing down on edge of belt. 5. Belt wear. 6. Rollers out of adjustment.	1. Reduce weight. Test again. 2. Rotate clockwise 1/8 turn to increase gap and manually test. Also, review gate assembly adjustment in Section 2, Preparing for Operation. 3. Review side guides setting in Section 2, Preparing for Operation. 4. Move stack away from belt, even if this causes stack to be aligned off center from center line of feeder. 5. Review gate assembly adjustment and back wedge adjustment in Section 2, Preparing for Operation. Also see Section 5, Inspection and Care. If wear is excessive, consult with a qualified technician.* 6. Consult with a qualified technician.*
Jamming occurs during operation	1. Improper adjustment of any of the following areas: a. Gate assembly. b. Back wedge. c. Top roller hold-down assembly.	a. Turn the Power switch to "Off" by pushing the circle ("O"). b. Removed jammed material from feeder. While doing so, try to determine the cause of the jam. c. Verify each adjustment by reviewing Section 2, Preparing for Operation.
Material skewing	1. Back wedge not aligned properly. 2. Hold-down spring tension either too loose or too tight.	1. Review back wedge adjustment in Section 2, Preparing for Operation. 2. Review hold-down spring installation in Section 2, Preparing for Operation.
Material too far from gripper jaw (inserter application only)	1. Photo sensor "staging" leading edge of material too far from hopper plate. 2. Gripper jaw adjusted too far from edge of hopper plate.	1. Review photo sensor adjustment in Section 2, Preparing for Operation. 2. Adjust gripper jaw as required per insert owner's manual.
Material too deep in gripper jaw (inserter application only)	1. Photo sensor "staging" leading edge of material too far past hopper plate. 2. Gripper jaw adjusted too close to edge of hopper plate.	1. Review photo sensor adjustment in Section 2, Preparing for Operation. 2. Adjust gripper jaw as required per inserter owner's manual.

5 Inspection and Care

When performing initial feeder adjustments prior to operation, always make sure you turn Off the main power switch and disconnect all equipment from the electrical power source. Failure to do so can expose you to a potential startup and moving parts which can cause serious injury.

Do not attempt to make any adjustments while the feeder and machine of application are running. Failure to do so can expose you to moving parts which can cause serious injury. Do not wear loose clothing when operating the feeder.

Avoid making adjustments with loose or unsecured parts. This can potentially damage parts.

Please read this Section to learn how to:

- Visually inspect your machine to detect part problems which may require adjustment or replacement.
- Periodically care for your machine to prevent any operational problems.

Visual Inspection

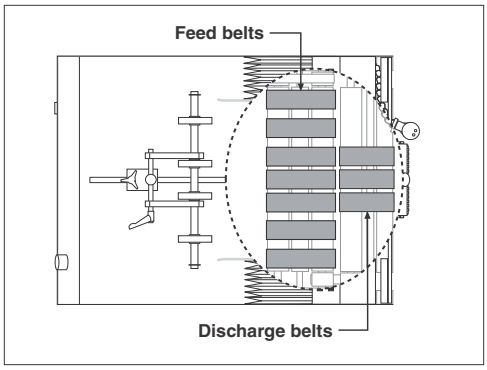


Figure 5-1. Inspecting Feed and Discharge Belts

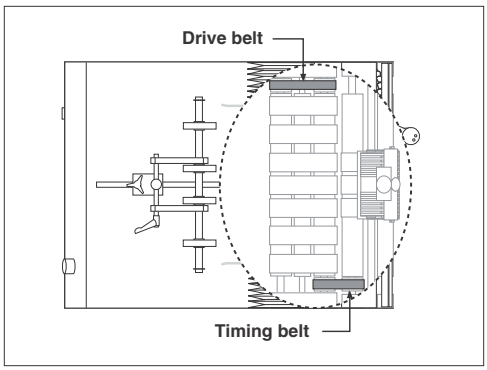


Figure 5-2. Inspecting Timing Belt and Drive Belt

Checking for Feed and Discharge Belt Wear

Referring to Figure 5-1, check for visual signs of:

- Walking. Replace as required.
- Cracking. Replace as required.
- Thinning. Replace as required.

Checking for Timing and Drive Belt Wear

Referring to Figure 5-2, check for visual signs of:

- Fraying. Replace as required.
- Missing teeth. Replace as required.
- Cracking. Replace as required.
- Paper residue buildup. Clean from belts, especially in grooves. For more information, see “Preventive Care,” to follow.

Visual Inspection (continued)

Ensuring Proper Feed and Discharge Belt Tracking

Referring to Figure 5-3, check for visual signs of:

- Stretching.
- Improper roller adjustment.

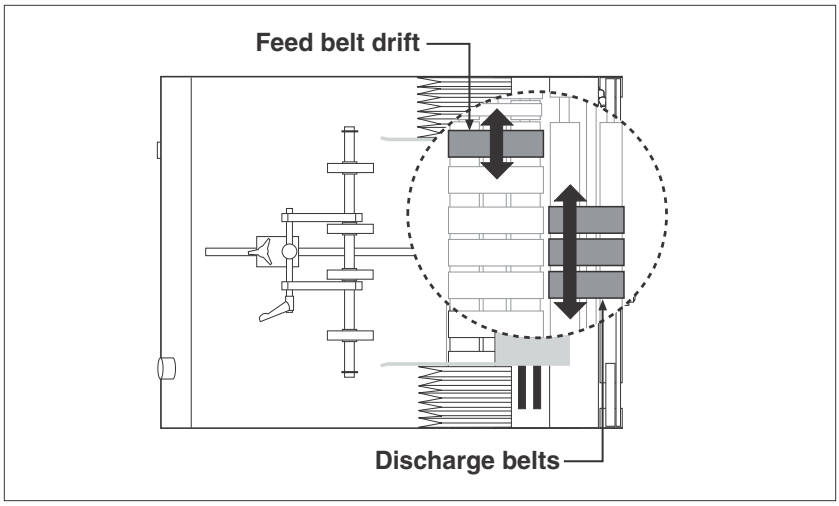


Figure 5-3. Ensuring Proper Feed Belt Tracking

Ensuring Proper Timing and Drive Belt Tracking

Referring to Figure 5-4, check for visual signs of:

- Misaligned timing pulleys.

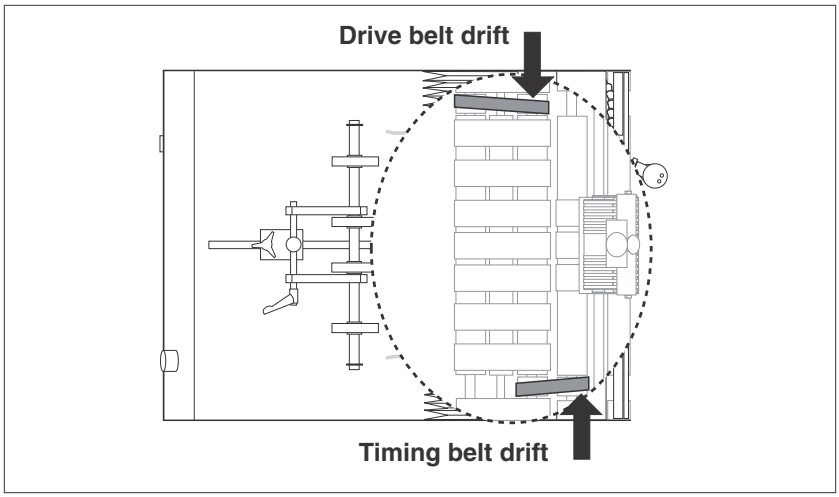


Figure 5-4. Ensuring Proper Drive Belt Tracking

Visual Inspection (continued)

Checking for Gate Assembly Wear

Check for visual signs of wear:

- Advancing O-ring, or standard O-ring: Flat areas along the O-rings (Figures 5-5 and 5-6, respectively).
- Bar Gate: Angled wedge begins to flatten excessively (Figure 5-7).

See “Preventive Care” to follow.

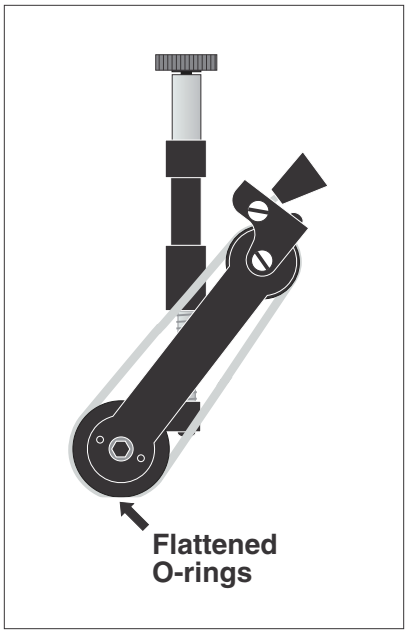


Figure 5-5. Advancing O-Ring Gate

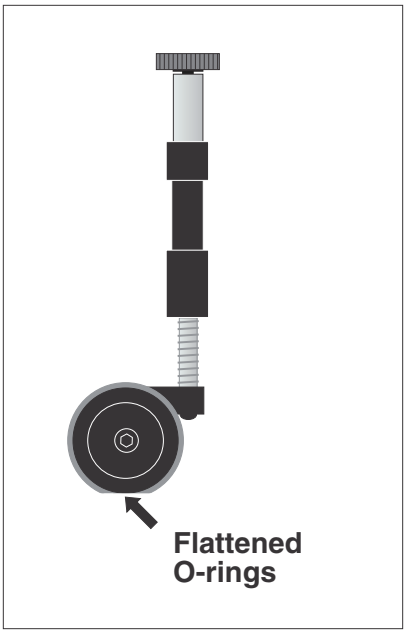


Figure 5-6. Standard O-Ring Gate

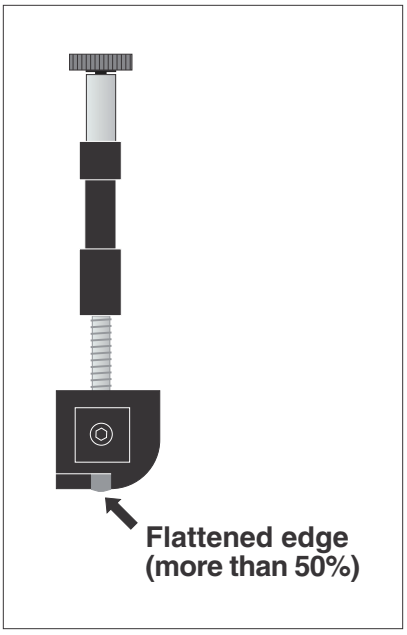


Figure 5-7. Bar Gate

Visual Inspection (continued)

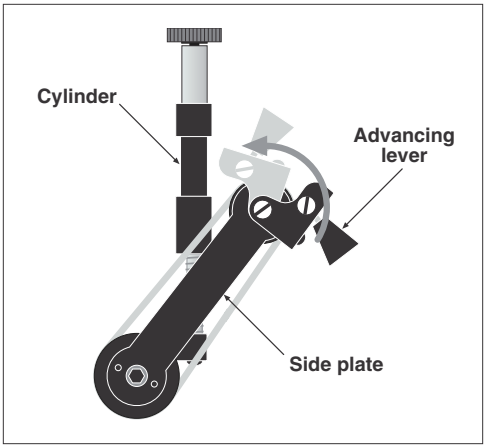


Figure 5-8. Advancing O-Ring Gate

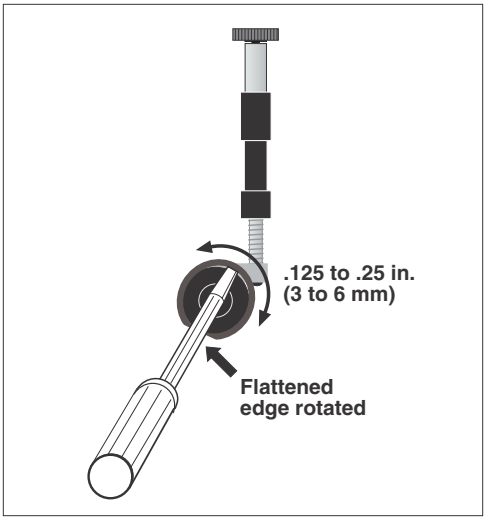


Figure 5-9. Standard O-Ring Gate

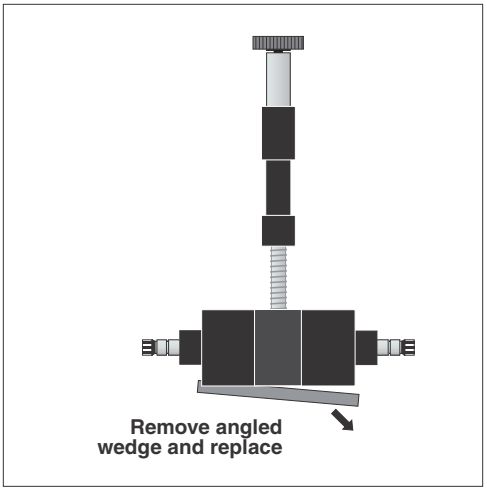


Figure 5-10. Bar Gate

Advancing O-Ring Gate: Adjusting Worn O-Rings

To adjust worn O-rings on advancing O-ring gate (Figure 5-8):

1. Turn Off feeder and remove power cord from outlet.
2. Open discharge safety shield to access gate.
3. Make sure advance knob is in-line with the side plate and secure. Then loosen left and right locking wing nuts.
4. Rotate O-rings by grasping advance knob and pushing toward gate cylinder about .125 to .25 in. (3 to 6 mm).
5. Retighten locking wing nuts. Then loosen advance knob and move to original position (in-line with side plate). Retighten.
6. Close discharge safety shield and restore power.

Standard O-Ring Gate: Adjusting Worn O-Rings

To adjust worn O-rings on standard O-ring gate (Figure 5-9):

1. Turn Off feeder and remove power cord from outlet.
2. Open discharge safety shield to access gate.
3. Remove gate assembly from gate plate.
4. Insert a screwdriver in slot on top of gate assembly and rotate screwdriver clockwise or counterclockwise 360° so as to move worn area of O-ring about .125 to .25 in. (3 to 6 mm).
5. Remove screwdriver and repeat for each ring as necessary.
6. Reinstall gate assembly, close discharge safety shield, and restore power.

Replacing Worn Angled Wedge

To replace a worn angled wedge (Figure 5-10):

1. Turn Off feeder and remove power cord from outlet.
2. Open discharge safety shield to access gate.
3. Remove gate assembly from gate plate.
4. Remove plate (two screws).
5. Remove angled wedge.
6. Install new angled wedge. Reinstall plate (two screws).
7. Reinstall gate assembly, close discharge safety shield, and restore power.

Preventive Care

Use only isopropyl alcohol (98% concentration). Other solvents will cause belts to wear prematurely, and even cause total breakdown of material.

Cleaning schedule for various materials:

- *Typical: every month*
- *Dusty: after every shift*
- *High ink or varnish: 1 time per shift*

Cleaning Feed and Discharge Belts

To clean feed belts (Figure 5-11):

1. Turn Off feeder and remove power cord from outlet.
2. Open discharge safety shield.
3. Remove gate assembly from gate plate for easier access to belts.
4. Apply a small amount of isopropyl alcohol to a soft cloth.
5. Use your hand to move the feed belt, start with one feed belt at a time and carefully press the moistened area of the cloth to the belt. As you rotate the belt, use moderate pressure to wipe across the belt, making sure to wipe in direction of grooves. After several rotations of the belt, repeat for each belt.
6. Taking a dry portion of the cloth, go back to the first feed belt cleaned and use moderate pressure against the belt for several revolutions to ensure the belt is dried. Repeat for each belt.
7. Reinstall gate assembly, close discharge safety shield, and restore power.

To clean discharge belts (Figure 5-12):

1. Turn Off feeder and remove power cord from outlet.
2. Open discharge safety shield.
3. To access discharge belts, move top roller hold-down assembly away from discharge belts by loosening two T-nuts on either side of shaft. Lift up on top roller assembly.
4. Repeat steps 4-6 above. Repeat for each belt.
5. Reinstall gate assembly, return roller hold-down assembly to original position, close discharge safety shield, and restore power.

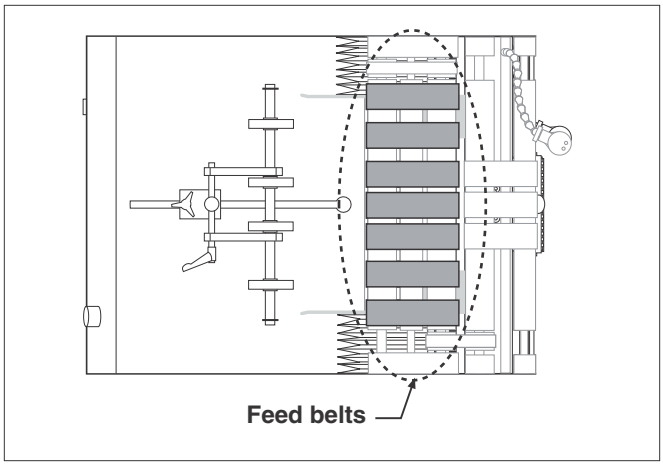


Figure 5-11. Cleaning Feed Belts

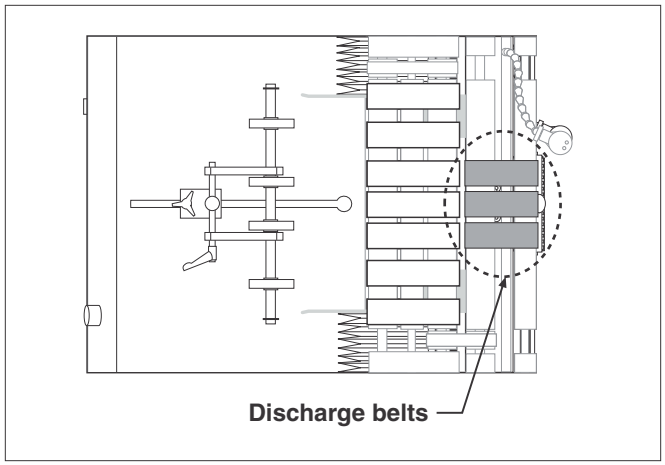


Figure 5-12. Cleaning Discharge Belts

Preventive Care (continued)

Cleaning Gate Assembly

Use only isopropyl alcohol (98% concentration). Do not use any other types of solvents. They will cause premature wear of the belts, or even total breakdown of the material.

To clean gate assemblies:

1. Turn Off feeder and remove power cord from outlet.
2. Open discharge safety shield to access gate.
3. Remove gate assembly from gate bracket assembly.
4. Apply a small amount of isopropyl alcohol to a soft cloth.
5. Wipe across O-rings (Figures 5-13 or 5-14), or angled wedge if applicable (Figure 5-15). First wipe in one direction, then the other.
6. Taking a dry portion of the cloth, go back and wipe all surfaces to ensure they are dried.
7. Reinstall gate assembly, close discharge safety shield, and restore power.

NOTE

Depending on the application, it may be necessary to move the feeder from original installation so as to access gate assembly.

Cleaning schedule for various materials:

- *Typical: every month*
- *Dusty: after every shift*
- *High ink or varnish: 1 time per shift*

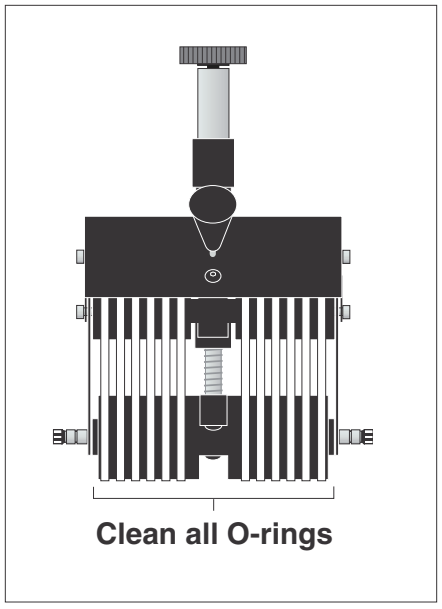


Figure 5-13. Advancing O-Ring Gate

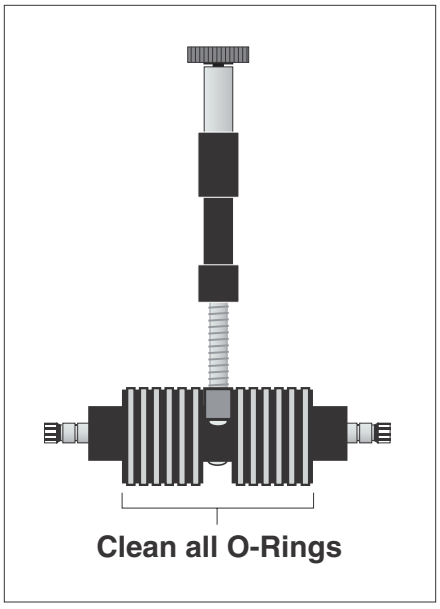


Figure 5-14. Standard O-Ring Gate

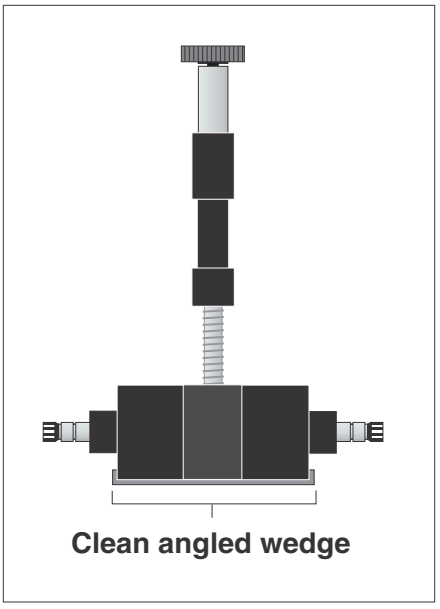


Figure 5-15. Bar Gate

Preventive Care (continued)

Do not use any solvents or cleaning agents when cleaning the photo sensor lens. This will result in surface damage and eventual faulty performance.

Cleaning Photo Sensor

To clean the photo sensor lens:

1. Turn Off feeder and remove power cord from outlet.
2. Open discharge safety shield to access photo sensor.
3. Using a soft, dry cloth, wipe across the face of the photo sensor lens (Figure 5-16).
4. Recheck the adjustments to make sure it is still in alignment to the target (for a review refer back to Section 2, Preparing for Operation).
5. Close discharge safety shield and restore power.

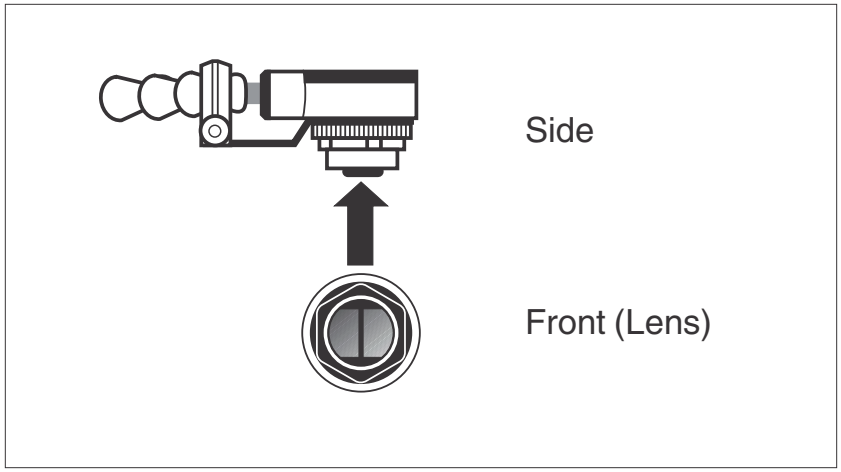


Figure 5-16. Cleaning Photo Sensor

Notes

6 Additional Wedges

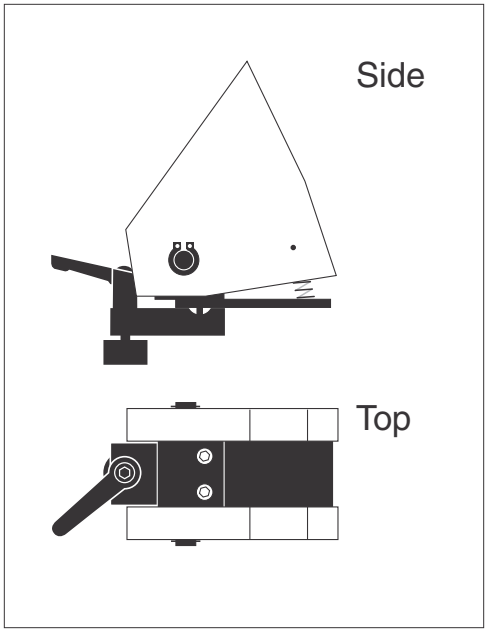
This Section provides information about setting up various wedges which are optional with the Reliant 3700 Universal Friction Feeders.

Now that you are familiar with the basic principles of using a wedge, it is simply a matter of combining these principles with the information provided in this Section. This will allow you to get optimum performance when setting up the wedge included with your particular feeder.

The following wedges are covered:

- Load compensating
- Articulating roller
- Extended narrow
- Combination triangle and low-profile
- Separate triangle and low-profile
- Separate articulating roller and low-profile

Load Compensating



When to use: Effective for moderately thick material. Due to characteristics of material, no mid-range support is required.

Setup guidelines: Adjust so the top angle of wedge preshingles the stack against the curvature of gate assembly. Edges of material should not extend beyond the tip of wedge. Ideal separation should be: as the stack moves down the wedge, 3 or 4 sheets of material separate out and come to rest on lower angle of wedge. Then, 3 or 4 sheets of material fall to table top, which are then replaced with another 3 or 4 sheets from stack above (Figure 6-1).

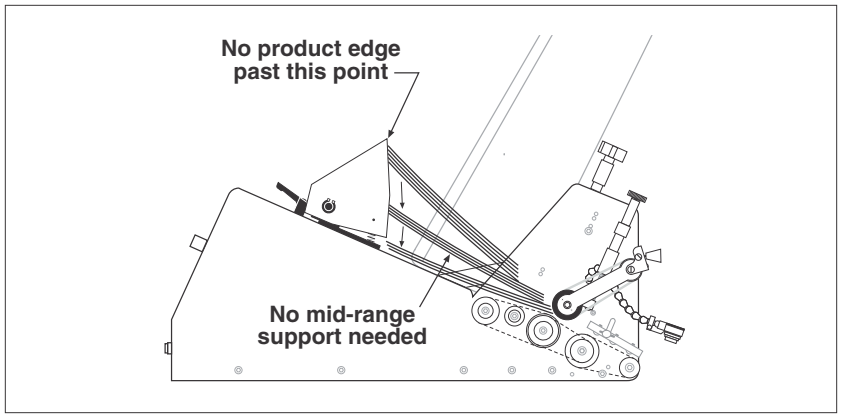
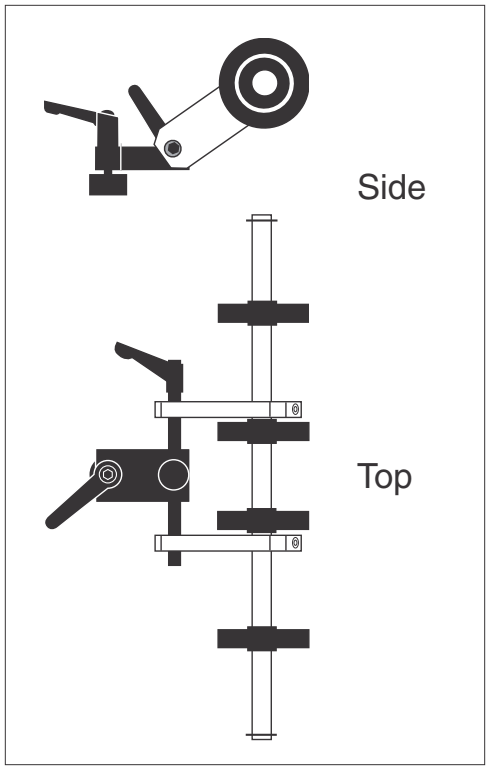


Figure 6-1. Load Compensating Wedge Setup

Articulating Roller



When to use: Effective for very thick and/or ridged material. Due to characteristics of material, no mid-range support is required.

Setup guidelines: Adjust so the roller edges preshingle the stack against the curvature of gate assembly. Again, make sure edges of material does not extend back more than the mid-point of roller (Figure 6-2). *Note: With some material that tends to bind together (for example, perforated material), it may be beneficial to separate 4 to 5 sheets of material at the bottom to provide some air space.*

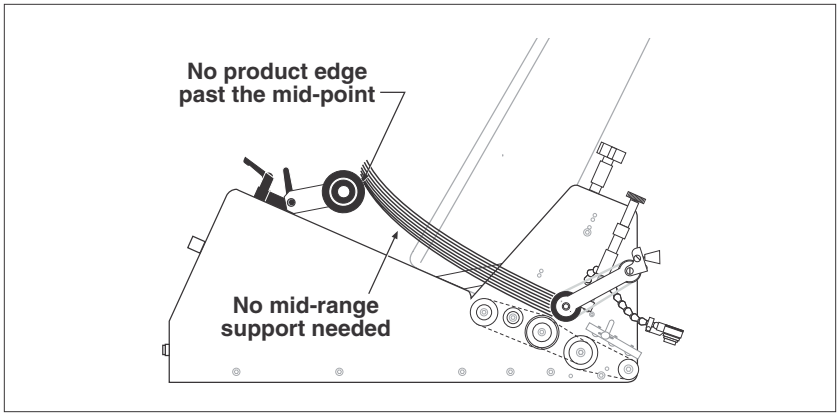
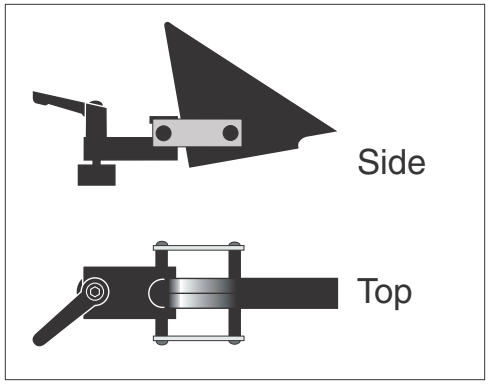


Figure 6-2. Articulating Roller Wedge Setup

Extended Narrow



When to use: Effective for moving in close to the gate assembly for supporting very small material. Due to characteristics of material, no mid-range support is required.

Setup guidelines: Adjust so the wedge preshingles the bottom of stack against the curvature of gate assembly. Make sure edges of material do not extend back more than the mid-point of wedge (Figure 6-3).

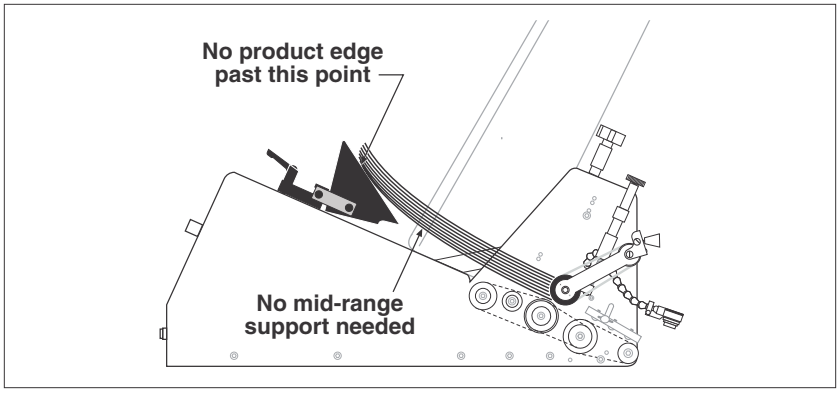
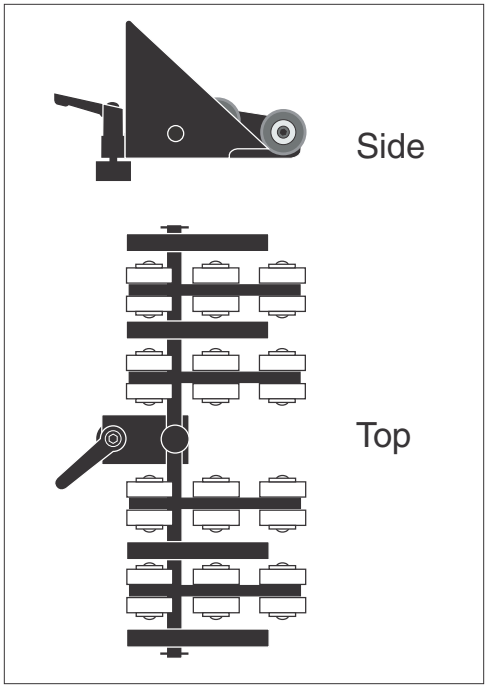


Figure 6-3. Extended Narrow Wedge Setup

Combination Triangle and Low-Profile



When to use: For thin material with minimal body, thus requiring minimal mid-range support.

Setup guidelines: Adjust so that bottom of stack preshingles against the curvature of gate assembly. Make sure edges of material do not touch or overhang tips of triangle wedges as this creates pressure points. Roller(s) should lift bottom of stack off table top to eliminate friction and create body (Figure 6-4).

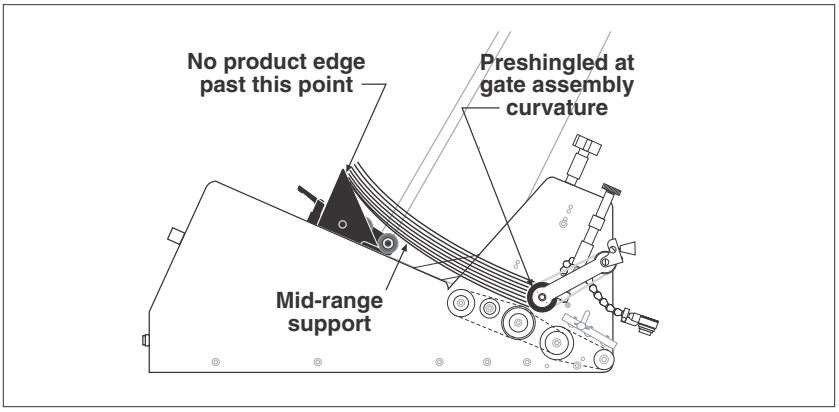
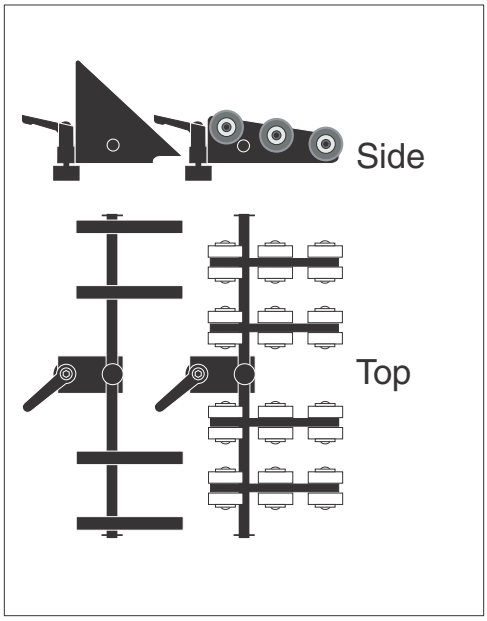


Figure 6-4. Combination Triangle/Low-Profile Wedge Setup

Separate Triangle and Low-Profile



When to use: If moving separate triangle wedge assembly back from the gate assembly, bottom of stack still touches table top, you need mid-range support.

Setup guidelines: Adjust the triangle wedge the same way that you would the combined triangle/low-profile wedge assembly (see above). Set the low-profile wedge relative to the triangle wedge so it lifts bottom of the stack off the table top to eliminate friction and create body. Make sure edges of material do not touch or overhang tips of triangle wedges, as this creates pressure points (Figure 6-5).

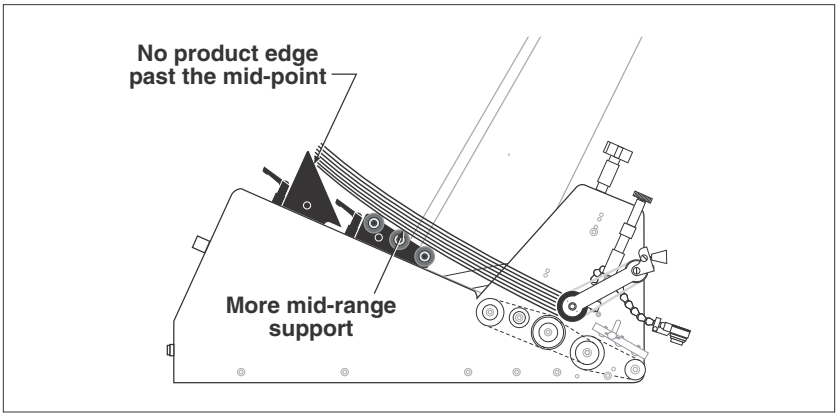
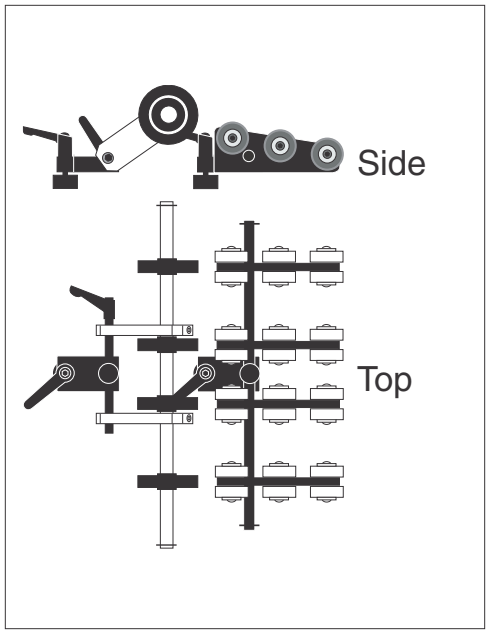


Figure 6-5. Separate Triangle and Low-Profile Wedge Setup

Separate Articulating Roller and Low-Profile



When to use: For thicker material with more body, thus requiring medium mid-range support. Longer material may also benefit.

Setup guidelines: Initially adjust articulating wedge so that roller edges preshingle the bottom of the stack against the curvature of gate assembly. Make sure edges of material do not extend back more than mid-point of rollers (Figure 6-6). Set the low-profile wedge so that roller(s) lift bottom of stack off the table top to eliminate friction and create body.

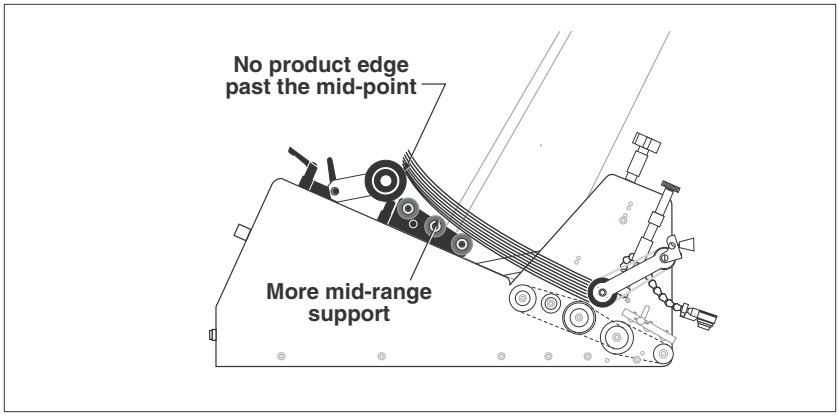
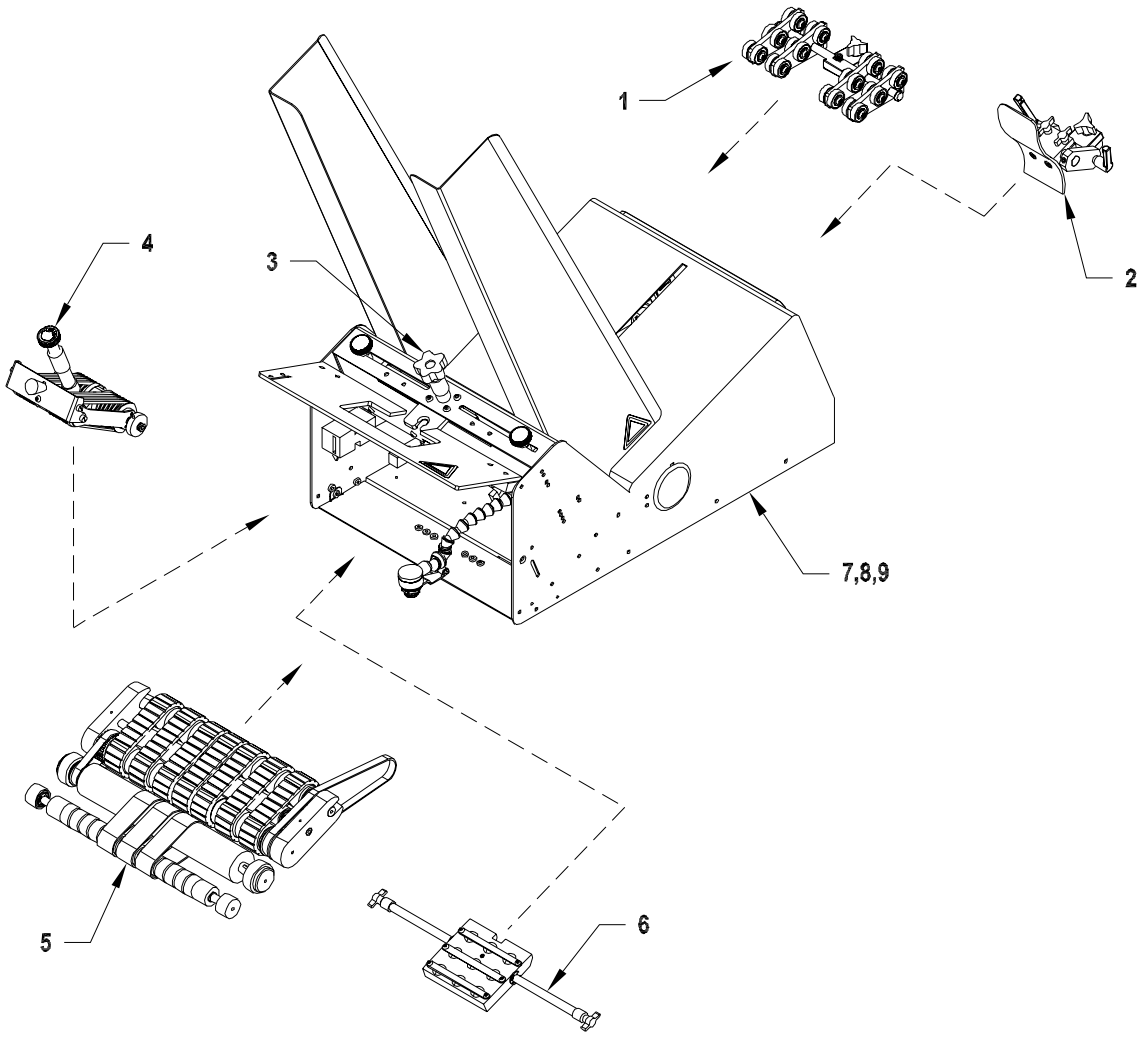


Figure 6-6. Separate Articulating Roller and Low-Profile Wedge Setup

7 Mechanical Components



1: LOW PROFILE WEDGE ASSEMBLY #63311050

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
1-1	1	Wedge Guide Shaft	44633018
1-2	1	SHCS 10-32 X 5/8” LG	00002320
1-3	1	Knob 3 Lobe 10-32 X 5/8	44633033
1-4	1	Wedge Block	44633014
1-5	1	T-Nut Round	44633016
1-6	12	Shaft Belt Tension	33500020
1-7	24	Bearing Ball R6	23500095
1-8	24	Washer Flat #10	00002607
1-9	24	BHCS 10-32 X 3/8” LG	00002305
1-10	4	Narrow Roller Wedge	43560050
1-11	2	Ring Grip 3/8 Waldes	00001110

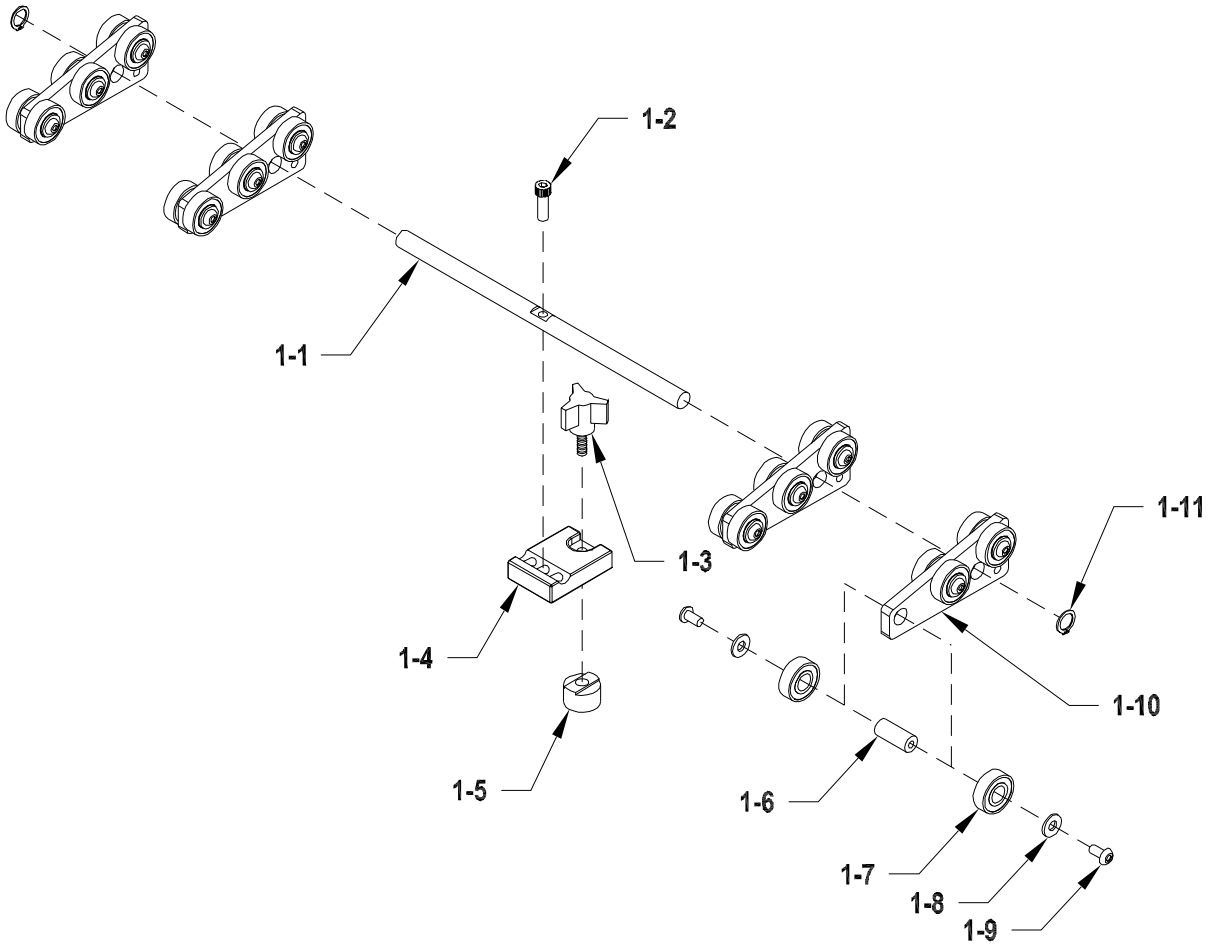


Diagram 1

Low Profile Wedge
Assembly #63311050

2: SINGLE S WEDGE
ASSEMBLY #63311026

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
2-1	2	Knob Wing 10-32	23500076
2-2	2	SHCS 10-32 X 1” LG	00002335
2-3	1	S Wedge	44633025
2-4	2	Screw Flat Head 10-32 X 1/2” LG	00002330
2-5	2	Spacer .25 X .375 Tapped 10-32	44633027
2-6	2	Screw Socket Set 1/4-20 X 1/4” LG	00002205
2-7	1	Block Mounting	44633026
2-8	1	Shaft Pivot Block	44633028
2-9	2	Adjustment Clamping Handle 1/4-20 X .63	44340015
2-10	2	Bracket Roller Wedge Pivot	43500165
2-11	1	SHCS 10-32 X 5/8” LG	00002320
2-12	1	Shaft Wedge Guide	44633032
2-13	1	Knob 3 Lobe 10-32 X 5/8	44633033
2-14	1	Wedge Block	44633014
2-15	1	T-Nut Round	44633016

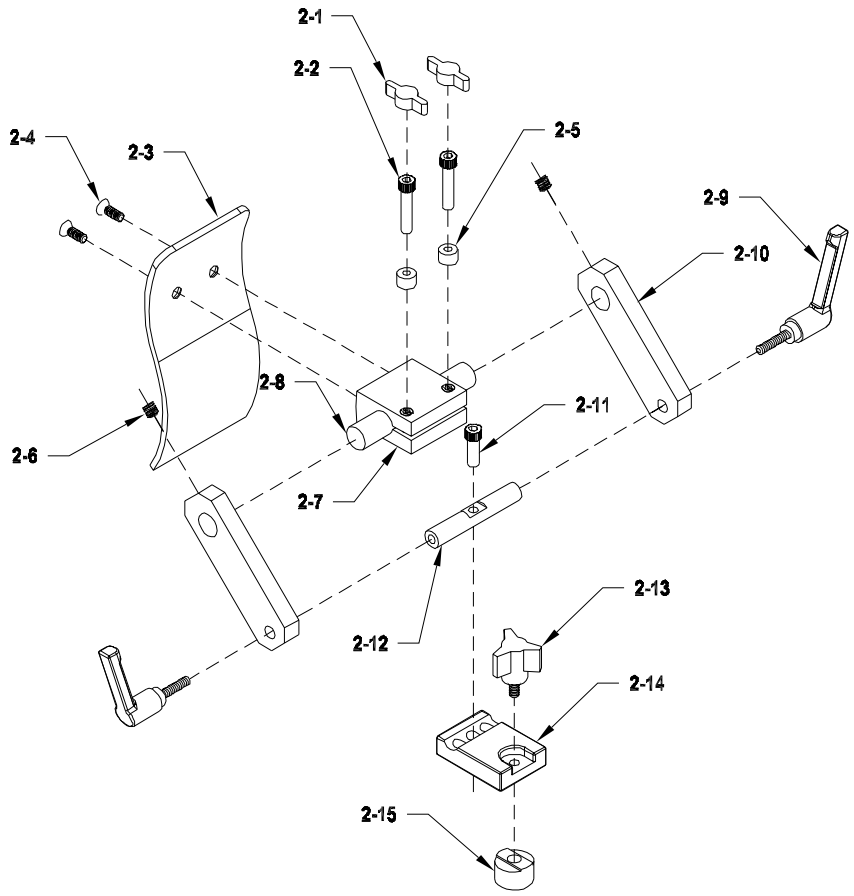


Diagram 2

Single S Wedge
Assembly #63311026 REV A

3: 1 KNOB GATE PLATE
ASSEMBLY #64011004

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
3-1	1	Guide Adjustment Cover Side	44646012
	4	BHCS 10-32 X 3/8” LG	00002805
3-2	1	Gate Support Bar Lower	44646003
	2	Hook Gate J	15000007
	2	SHCS 8-32 X 5/8” LG	00002215
3-3	2	Rail Side Guide Support	44646006
3-4	2	Guide Adjustment Block	44646001
	4	Screw Socket Set 1/4-20 X 1/4” LG	00002205
3-5	1	Guide Stationary Block Side	44646002
3-6	4	Rack	44646010
3-7	2	Spacer Lower	44646015
3-8	1	Block Adjustment Reference	44646004
	4	BHCS 10-32 X 3/8” LG	00002805
3-9	1	Shaft Pinion Adjustment	44646005
3-10	1	Solid Gate Plate	44640004
3-11	4	Screw Flat Head 10-32 X 3/8” LG	00002234
3-12	2	Knob Plastic 10-32	44681021
	2	Screw Socket Set 10-32 X 1 1/2” LG	00003313
	2	Spacer Upper	44646016
3-13	1	Knob 5 Lobe	44646009
	1	Spring Retainer Upper	44646008
	1	Spring Retainer Lower	44646007
	1	Spring Compression	44646013
3-14	2	Screw Flat Head 10-32 X 1/2” LG	00002830

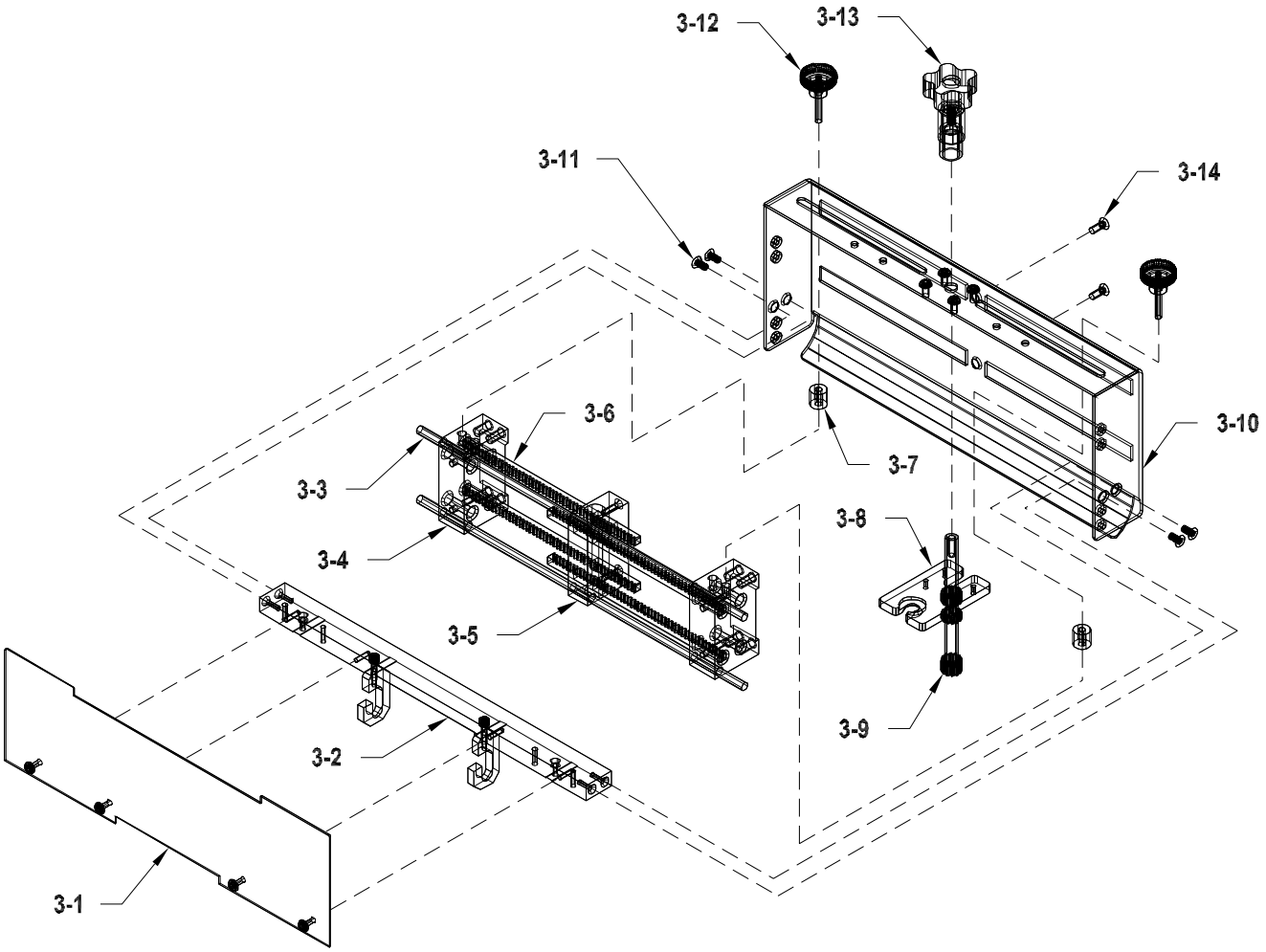


Diagram 3

Solid Gate Plate
Assembly #64011004

4: ADVANCING O RING GATE w/HORIZON ADJUST & COVER ASSEMBLY #67511028

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
4-1	1	Handle Studded 10-32 X 1/2”	44657007
4-2	1	BHCS 8-32 X 1/2” LG	00002302
4-3	1	Spacer Belt Indexer .312 X .375	44657010
4-4	2	Screw Shoulder 8-32 Slotted	00003320
4-5	2	Screw Shoulder 8-32 X 1/8	00003321
4-6	1	Belt Indexer Bracket	44657005
4-7	1	Pinch Roll Cam	44657003
4-8	1	Belt Indexer Shaft	44657008
	2	O Ring Take Up Roller	44657002
	1	Belt Indexer Center Hub	44657009
	2	Clip E 1/2 Waldes	00001155
	2	Screw Socket Set 8-32 X 5/16 Cup Point	00002211
4-9	2	Roller	44872003
	2	Adjustment Screw	44872005
	2	Screw Socket Set 10-32 X 3/8” LG Nylon Tip	44872007
4-10	12	O Ring Advancing	44657006
4-11	2	Side Plate Adjust	44872002
4-12	4	Pin Roll 1/8 X 1/2	00001161
4-13	1	BHCS 10-32 X 1” LG	00002340
4-14	1	Gate Cylinder w/Horizon (Not Sold Separately)	44872004
4-15	1	BHCS 10-32 X 1/2” LG	00002334
4-16	1	Mount Gate Lift Shaft	15000001
4-17	1	Shaft Gate Lift	23560084
	1	Spring Gate Compression	23500083

4: ADVANCING O RING GATE w/HORIZON ADJUST & COVER ASSEMBLY #67511028 (continued)

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
4-18	1	Cylinder Gate Spring Tension	23500019
4-19	1	Adjustment Knob Assembly for Gate	23511037
4-20	2	BHCS 8-32 X 1/2” LG	00002302
4-21	1	Key Safety Interlock	44649010
4-22	2	Nut Keps 8-32	00002121
4-23	1	Cover Advancing Gate Protective	44675028

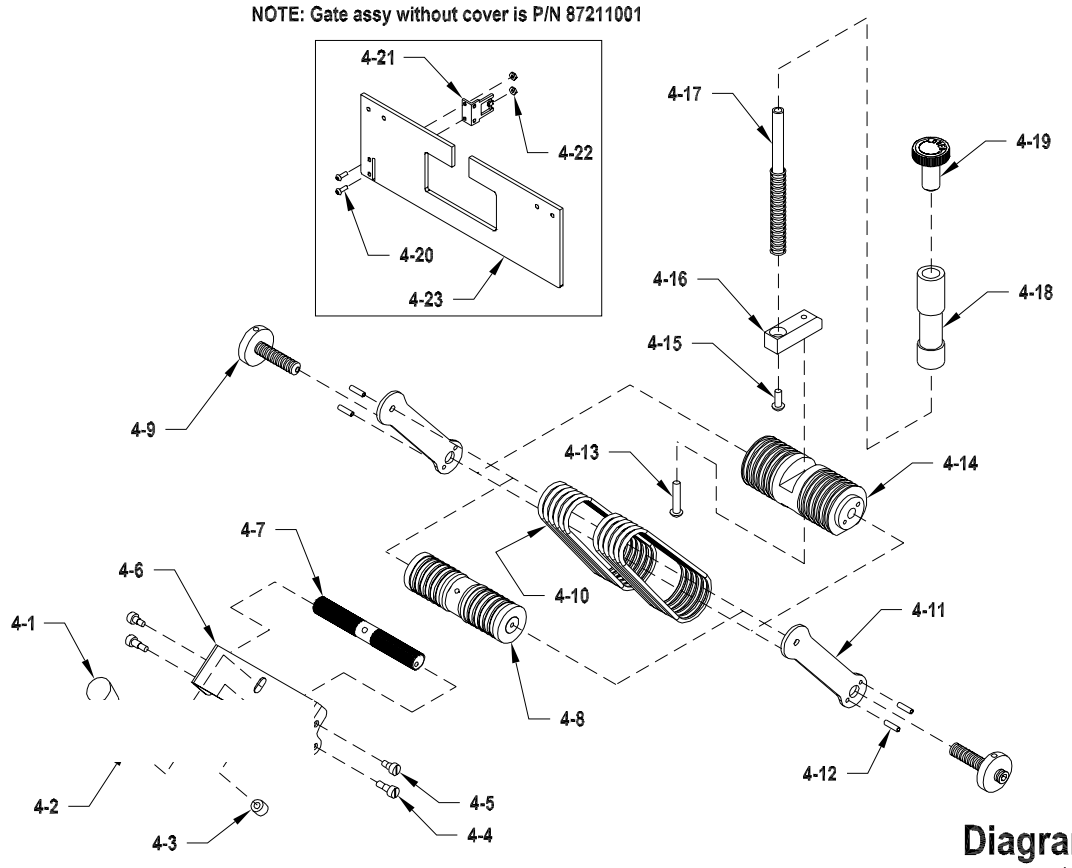


Diagram 4
Advancing O Ring Gate w/Horizon Adjust & Cover Assy #67511028

5: GROOVED GUM CARRIAGE
ASSEMBLY #67511162

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
5-1	1	Shaft Front Discharge	51080045
	2	Double Detect Bearing Cup Holder	23560121
	2	Bearing Ball R6	23500095
	2	Clip E 3/8 Waldes	00001150
5-2	1	Shaft Rear Discharge	44675046
	1	Pulley 16T 1/2 Bore w/Flange	43560097
	2	Holder Outboard Bearing Cup	23500032
	2	Bearing Ball R8	23500094
	2	Clip E 1/2 Waldes	00001155
	2	Screw Socket Set 10-32 X 1/8” LG	00003352
	1	Key Woodruff 1/8 X 3/8	00003351
5-3	1	Shaft Drive	44630019
	1	Pulley 20T 1/2 Bore w/Flange Driven	23500097
	1	Pulley 24T 1/2 Bore Flangeless	43560098
	2	Clip E 1/2 Waldes	00001155
	2	Bearing Ball R8	23500094
	3	Screw Socket Set 10-32 X 5/16” LG (1 for flanged pulley, 2 for flangeless pulley)	00002217
	1	Screw Socket Set 10-32 X 1/4” LG (for flanged pulley)	00002216
	2	Key Woodruff 1/8 x 3/8	00003351
5-4	1	Shaft Discharge Feed Roller	43550036
	1	Belt Support Tube	44630003
	2	Bearing Ball R6	23500095
	2	Clip E 3/8 Waldes	00001150
5-5	1	Idler Shaft	43555047
	1	Tube Driven	44630004
	4	Bearing Ball R8	23500094
	3	Clip E 1/2 Waldes	00001155

5: GROOVED GUM CARRIAGE
ASSEMBLY #67511162 (continued)

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
5-6	3	Discharge Belt Clear 1W	44675015
5-7	1	Belt Drive Timing 78XL037	23560078
5-8	1	Holder Carriage Right Side	44485005
5-9	7	Belt Feed Tan Grooved Composite	23500162
5-10	1	Drive Belt 190XL037	44675021
5-11	1	Holder Carriage Left Side	44485006

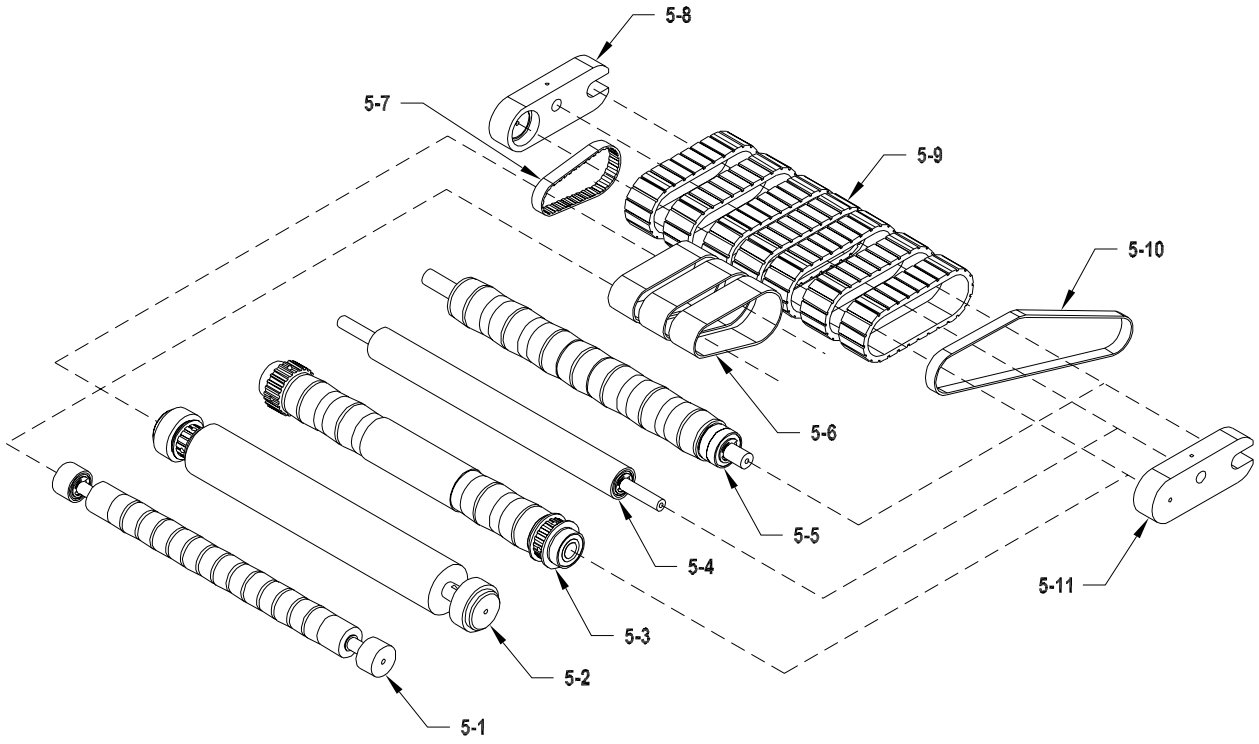


Diagram 5
Grooved Gum Carriage
Assy #67511162

6: HOLD DOWN
ASSEMBLY #67511023

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
6-1	2	Clip E 3/8 Waldes	00001150
6-2	1	Shaft Hold Down	44675026
6-3	2	Cap Protective	44675025
6-4	2	SHCS 10-32 X 5/8” LG	00002320
	2	Spacer .25 X .375 Tapped 10-32	44633027
	2	Knob Wing 10-32	23500076
6-5	1	Screw Socket Set 10-32 X 1/4” LG Cup Point	00002216
6-6	1	Block Hold Down	44675023
6-7	9	Ball 5/8 Chrome Steel	44500033
6-8	3	Cover Hold Down	44675024
6-9	6	BHCS 8-32 X 1/4” LG	00002210

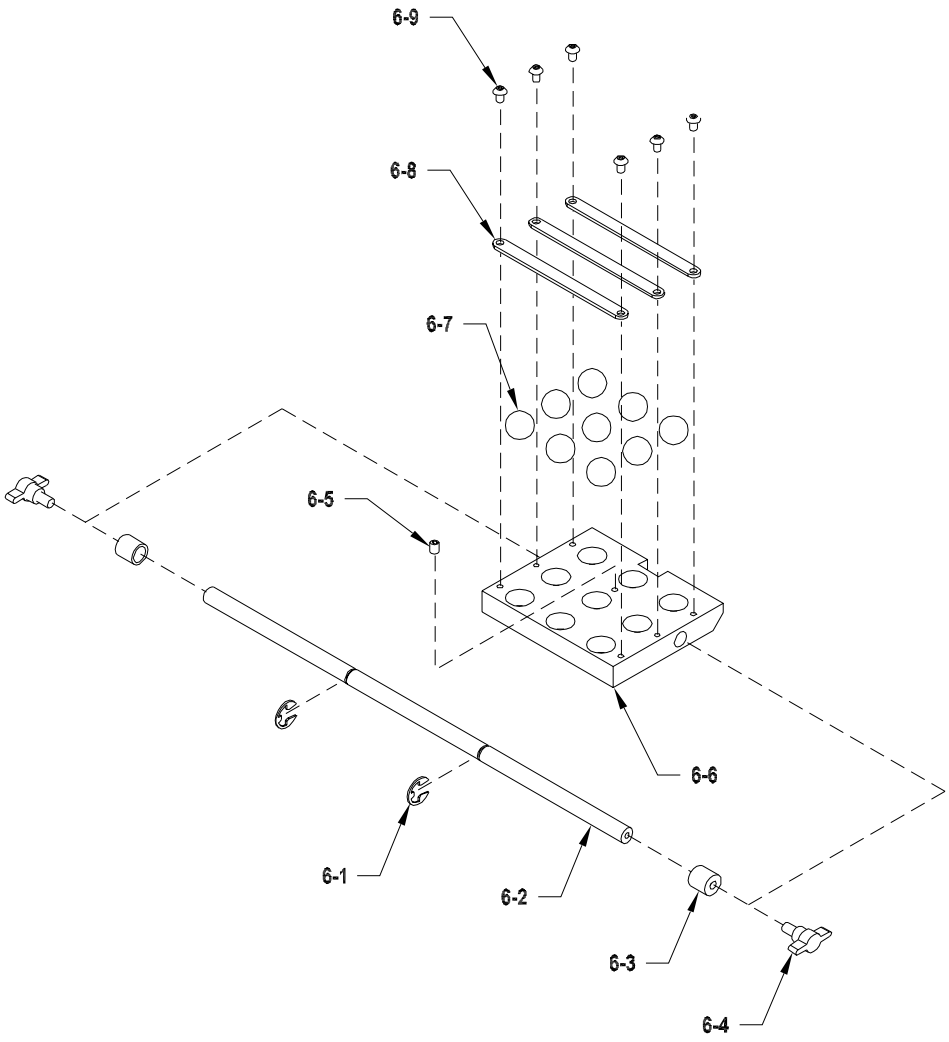


Diagram 6

Hold Down
Assy #67511023

7: ELECTRICAL COMPONENTS
ASSEMBLY #67511002

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
7-1	1	Base Plate	44630002
7-2	1	Board Stepper Drive BLD72-5	44649030
7-3	1	Grommet 3/4 X 3/8 X1/2	44649054
7-4	1	Board Power DC 5V & 12V 2.5 X 4.25	44649033
7-5	1	Bracket Power Supply Mounting	44649036
7-6	1	Motor Drive Stepper Assy	53511390
7-7	1	Motor Mount	44630011
7-8	1	Pulley 18T 1/2 Bore W/Flange & Hub	44350053
	2	Screw Socket Set 10-32 X 1/8” LG	00003352
7-9	4	Foot Recessed 5/8 Cylindrical	44642042
7-10	1	Nut Hex 6-32 Zinc	00002113
7-11	1	Fan Assembly ST/Reliant Cooling	64911035
7-12	1	Transformer Power 300VA	53500700
7-13	1	Bracket Mounting CPU Board	44649038
7-14	1	Board I/O Expansion	44675035
7-15	4	Standoff Male/Female 6-32 X 1	44649048

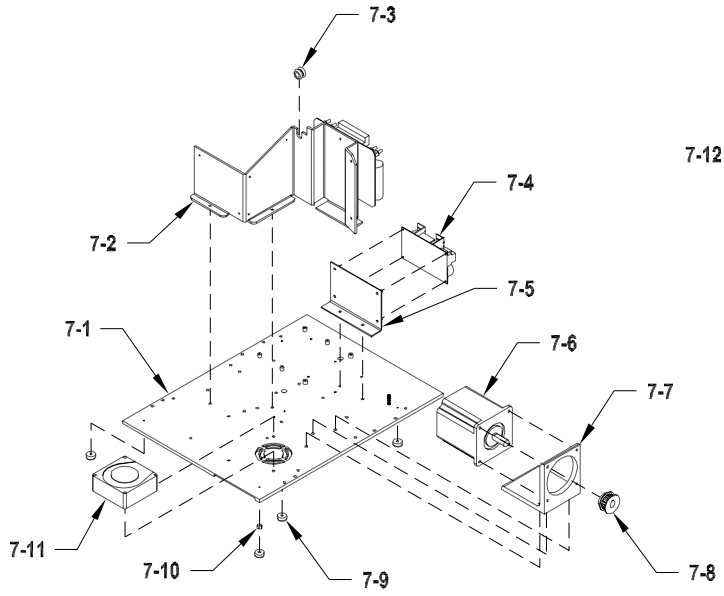
7: ELECTRICAL COMPONENTS
ASSEMBLY #67511002 (continued)

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
7-16	1	Board ES CPU	44675037
NS	16	Cable Tie Wrap	435SO263
NS	2	Terminal Female	44649046
NS	34	Sheathing #O HP Black	44649085
NS	1	Cable Ribbon 2 Inch 50 Pin	44675036
NS	4	Terminal Disconnect Female 22-18 ga	53500045
NS	4	Joint Wire Crimp Style	53500152
NS	2	Terminal Disc Female .020 22-18 AWG	53500254
NS	1	Cable DC Power Supply Assy AC Input	63011006
NS	1	Cable Ground Wire Assembly	63011007
NS	1	Harness Safety Interlock	64911001

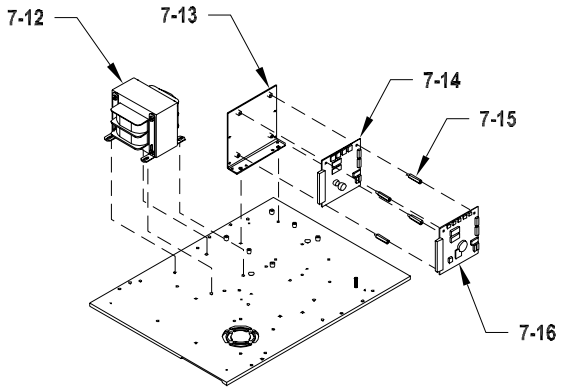
7: ELECTRICAL COMPONENTS
ASSEMBLY #67511002 (continued)

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
NS	1	Harness Sheet Sensor	64911002
NS	1	Harness DC Power Supply	64911003
NS	1	Harness Drive Control	64911007
NS*	3	Holder Adhesive Wire	23500079
NS*	3	Cable Tie Wrap	435SO263
NS*	1	Power Cord (115V Models Only)	53511020
NS*	1	Power Cord / Allen Wrench Set (230V Only)	53522210

*Part is not included with assembly #67511002. Must be ordered separately.



FRONT AREA



REAR AREA

Diagram 7

Electrical Components
Assy #67511002

8: BASE FEATURES 1

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
8-1	2	Mount Front Base Plate	44675003
8-2	2	Mount Back Base Plate	44675004
8-3	1	Cover Bottom Protective	44675022
8-4	1	Bracket Rubber Spacer	44640009
8-5	1	Support O Ring Cover	43555068
8-6	1	Sensor ST Sheet Assembly	64911011
8-7	1	Switch Safety Interlock Assembly	64911009
8-8	2	Shaft Top Cover Hinge Mount	44640011
8-9	2	Hinge Top Cover Mount	44640012
8-10	1 1	Side Guide Right 2624 Label Warning	44640003 44600005
8-11	1 1	Side Guide Left 2624 Label Warning	44640002 44600005
8-12	1	Shell Reliant	44675001
8-13	1	Plug 2 Hole Cover	44500061
8-14	1	Label Warning (For Protective Cover)	44600004
NS	1	Belt Tensioner Assembly	23511290
NS	2	Guard Accordion Rear	44600001
NS	1	Sensor Flight Assembly	63011038

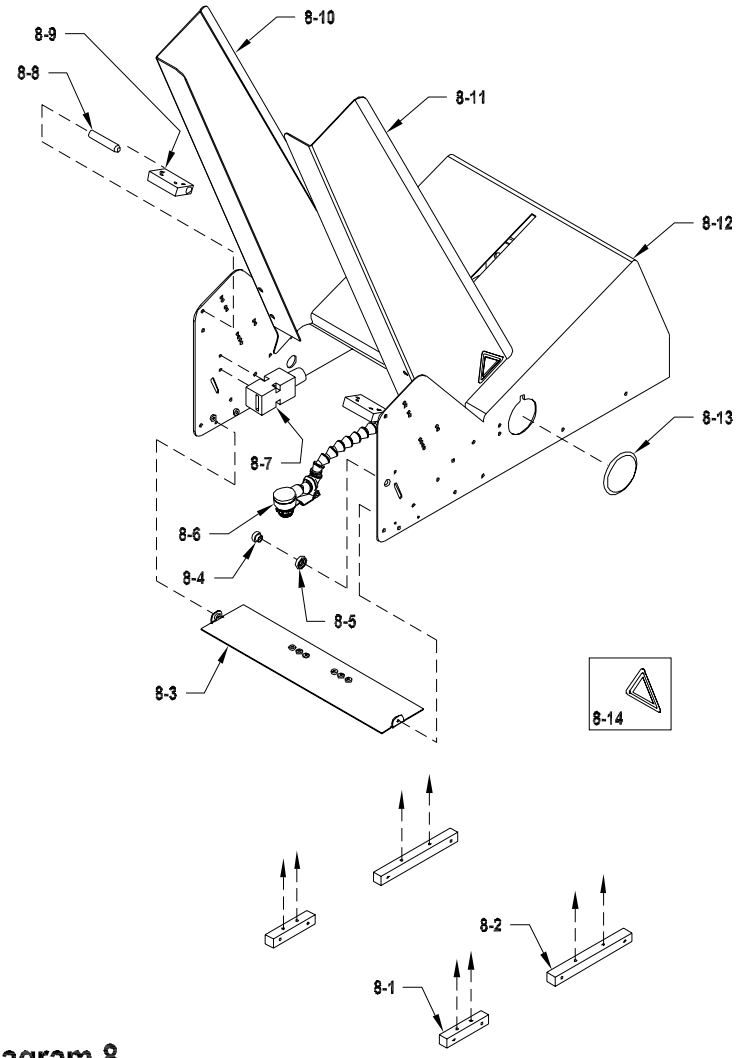


Diagram 8
Base Features 1

9: BASE FEATURES 2

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
9-1	1	Module AC Power Entry (w/o fuse)	44649034
	2	Fuse 3A 250V Slo-Blo GMD 5 X 20mm	53500006
9-2	1	Harness Fault/Reset Switch Assembly	67511034
9-3	1	Graphic Standard Lower	44699017
9-4	1	Harness Flight Trigger	64911005
9-5	1	Cover Plate	44699016
9-6	1	Miss Detect Assembly	69911066
9-7	1	Graphic Standard Upper	44699010
9-8	1	Harness Cycle Button Assembly	69911002
9-9	1	Harness Potentiometer Assembly	67511030
9-10*	1	Thumbwheel Assembly	69911001

*On applicable models only.

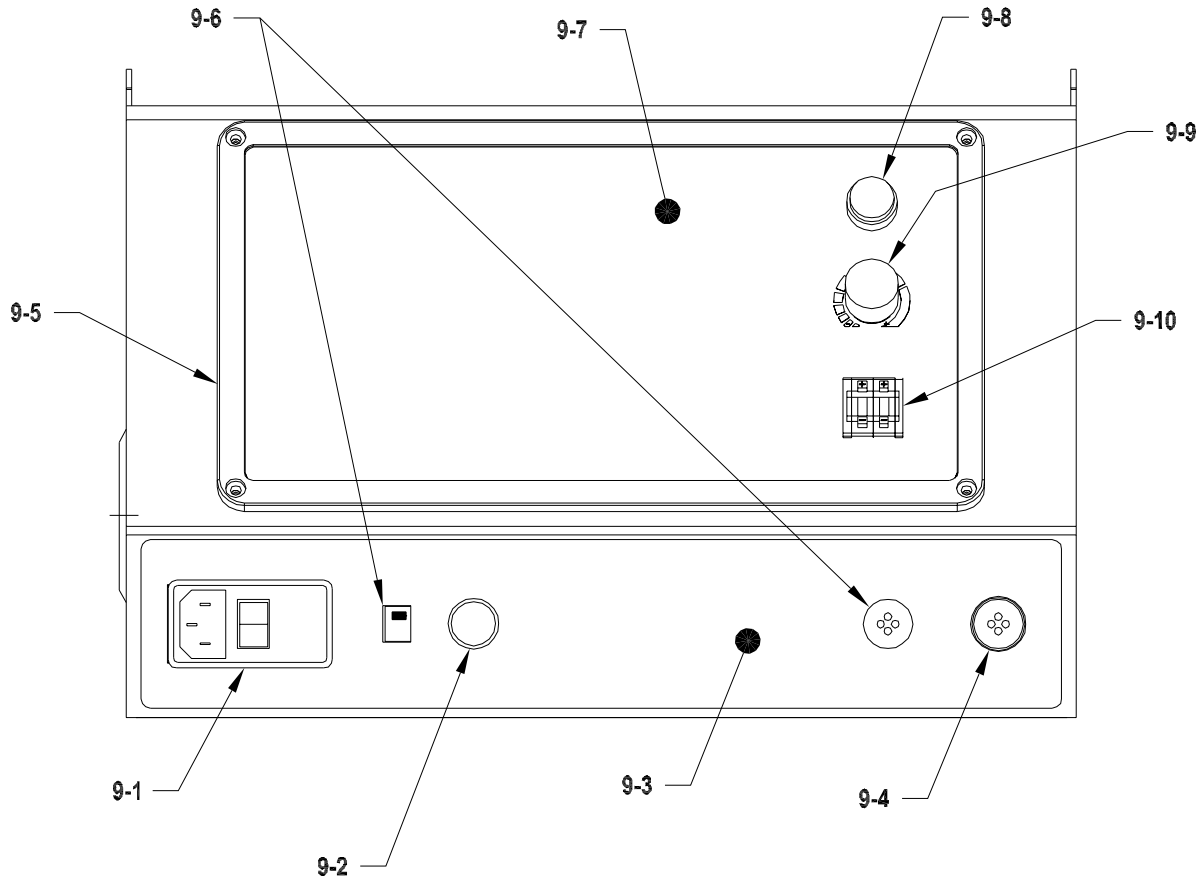
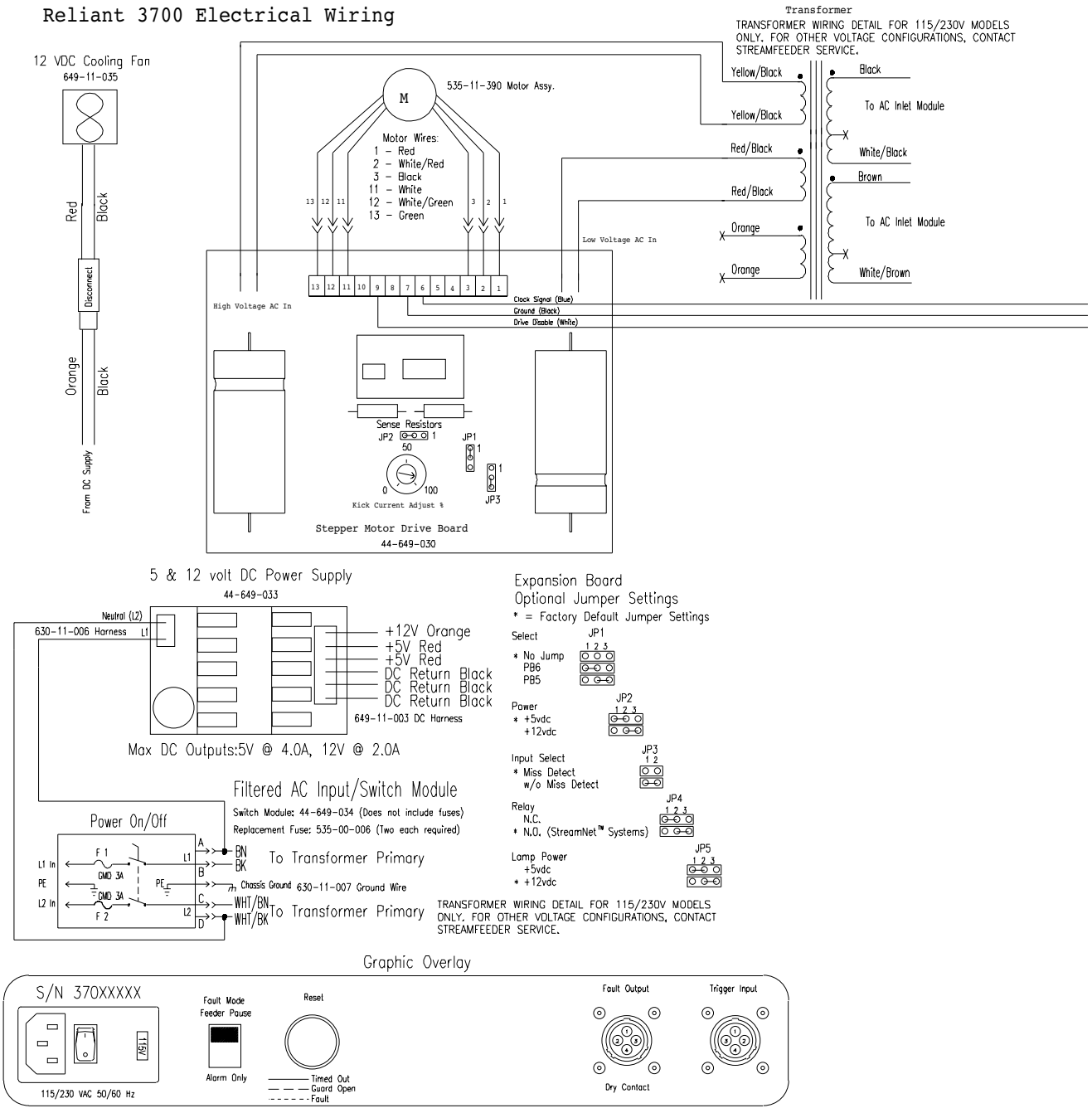
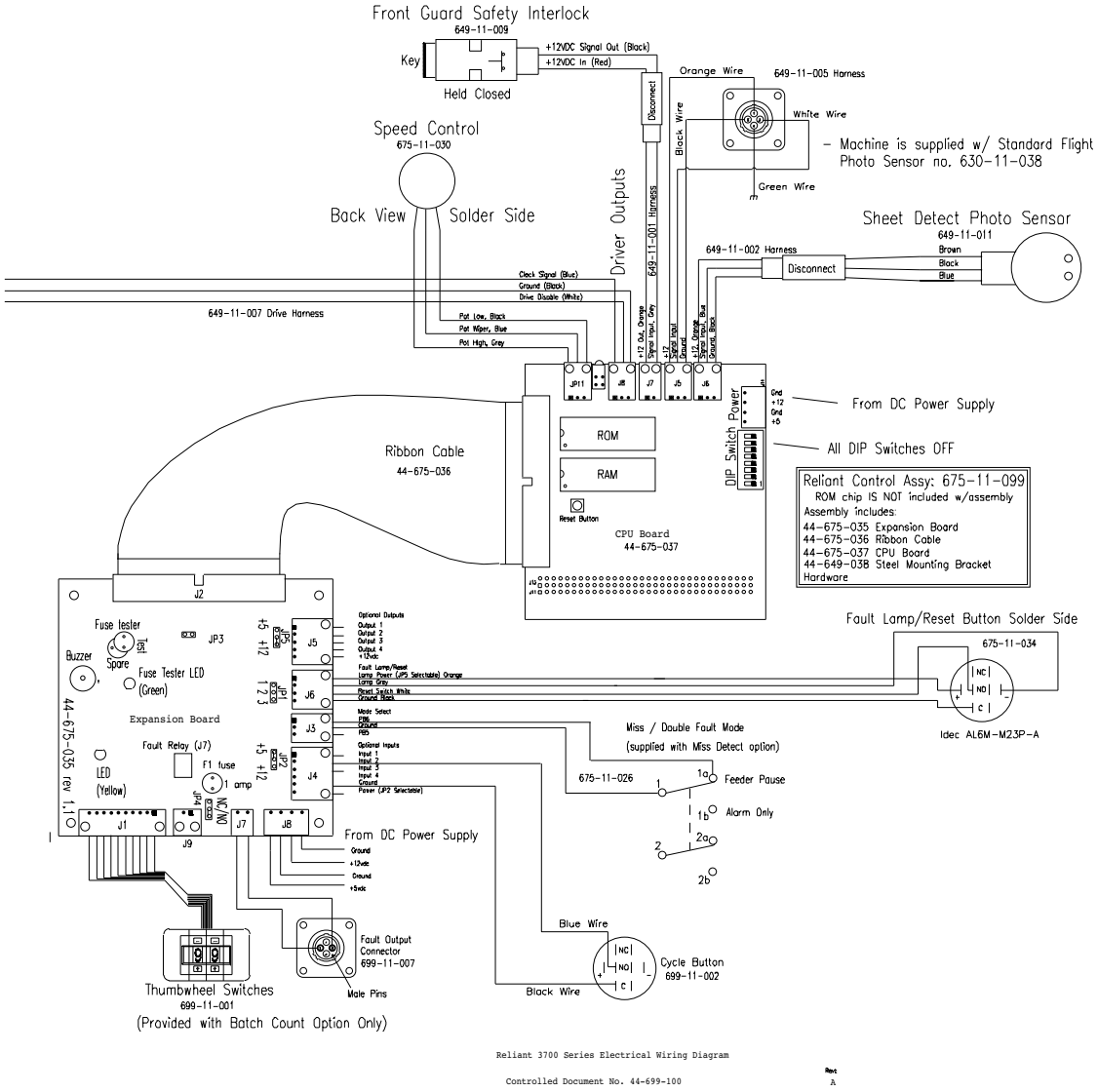


Diagram 9
Base Features 2

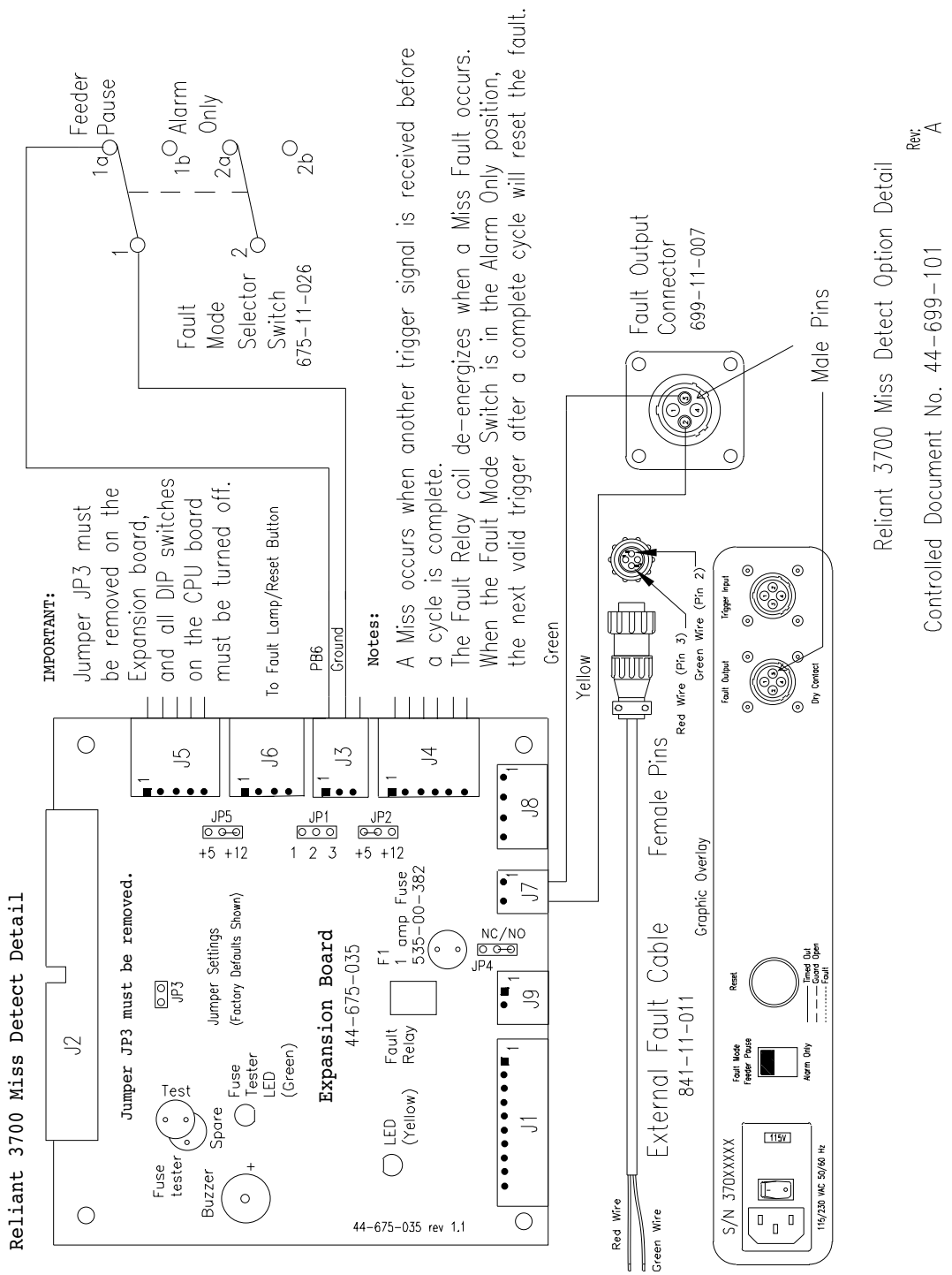
Reliant 3700 Electrical Wiring



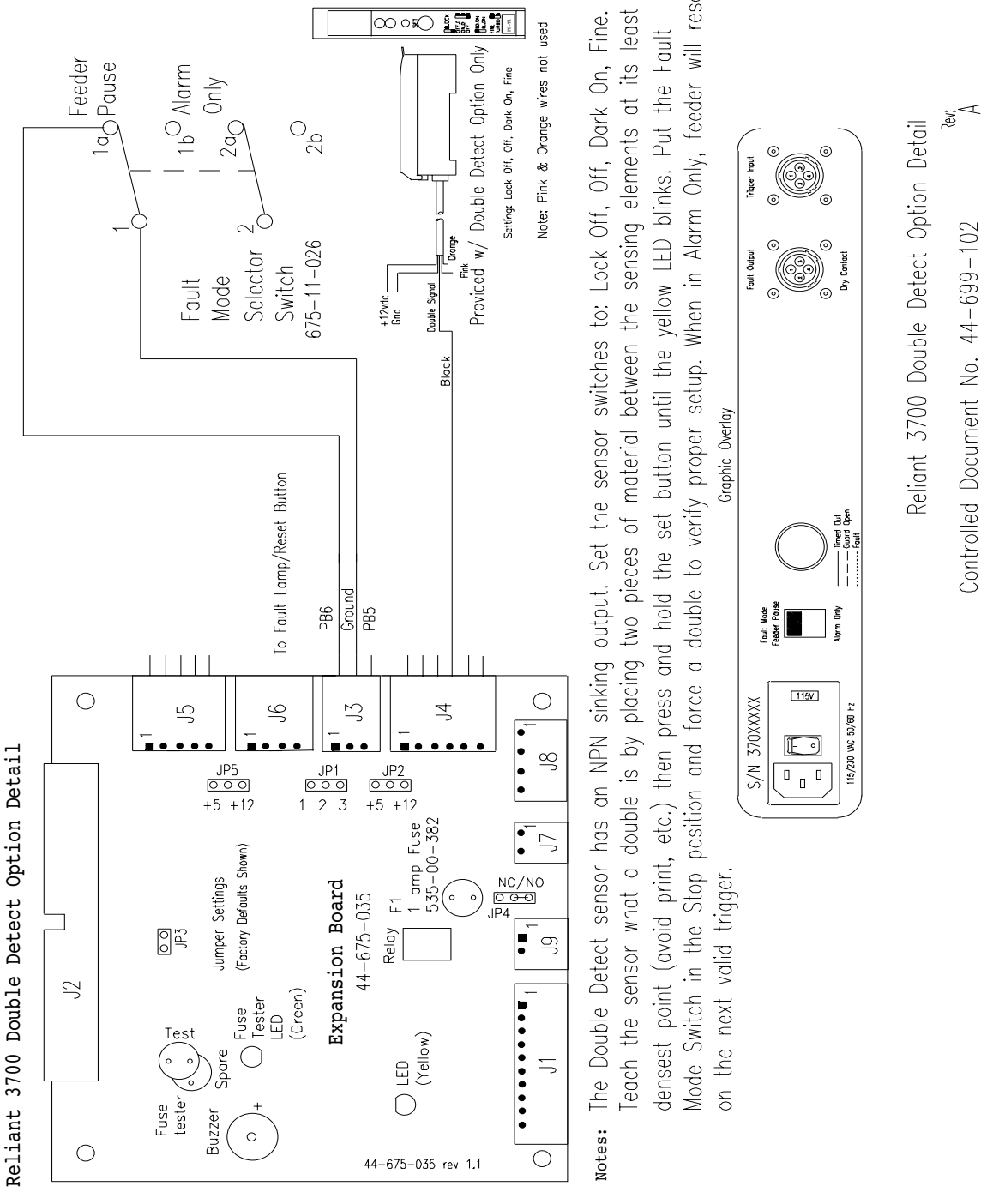
8 Electrical Components



Reliant 3700 Miss Detect Detail



Reliant 3700 Double Detect Detail (option)

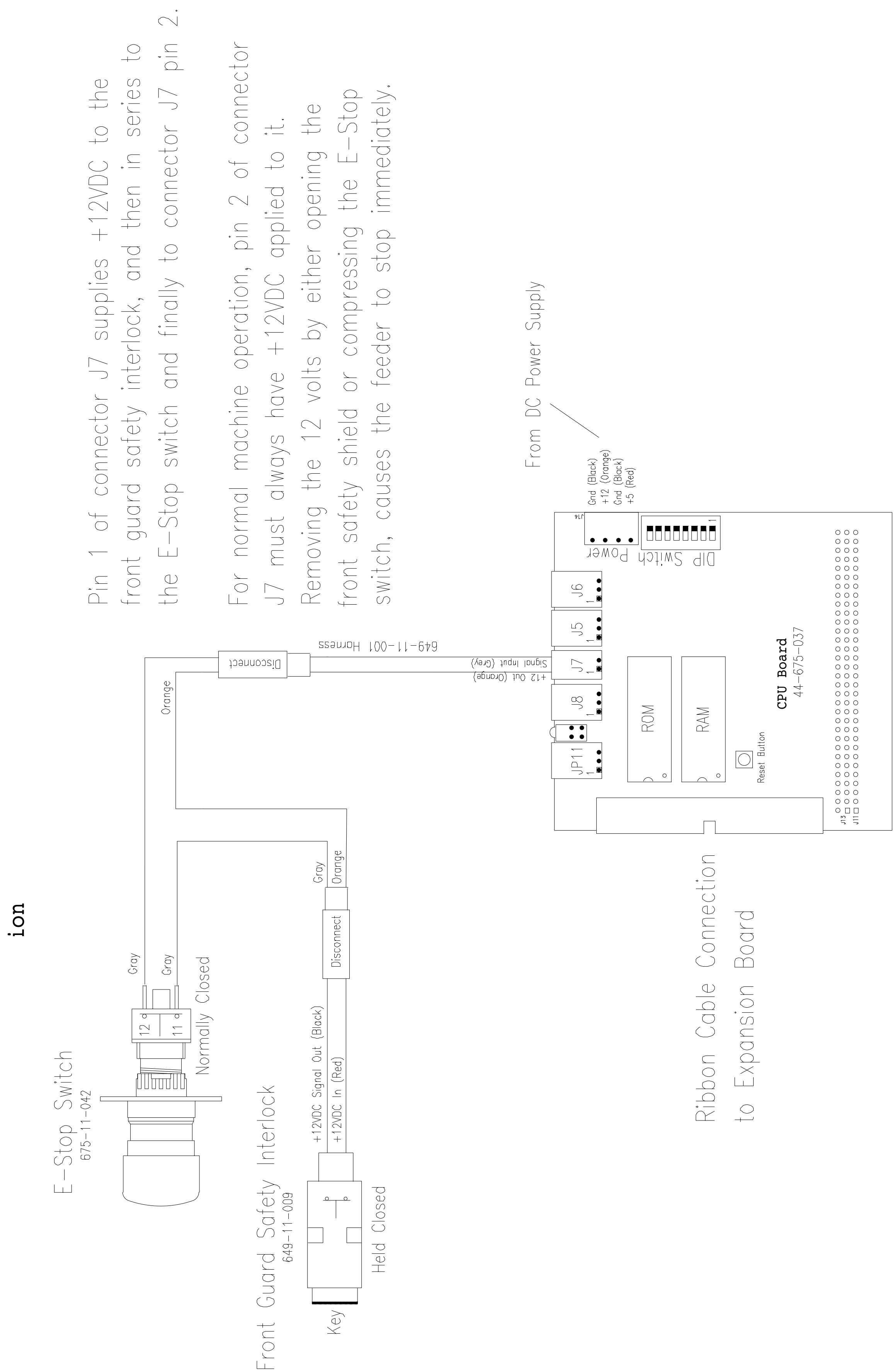


Notes: The Double Detect sensor has an NPN sinking output. Set the sensor switches to: Lock Off, Off, Dark On, Fine. Teach the sensor what a double is by placing two pieces of material between the sensing elements at its least densest point (avoid print, etc.) then press and hold the set button until the yellow LED blinks. Put the Fault Mode Switch in the Stop position and force a double to verify proper setup. When in Alarm Only, feeder will reset on the next valid trigger.

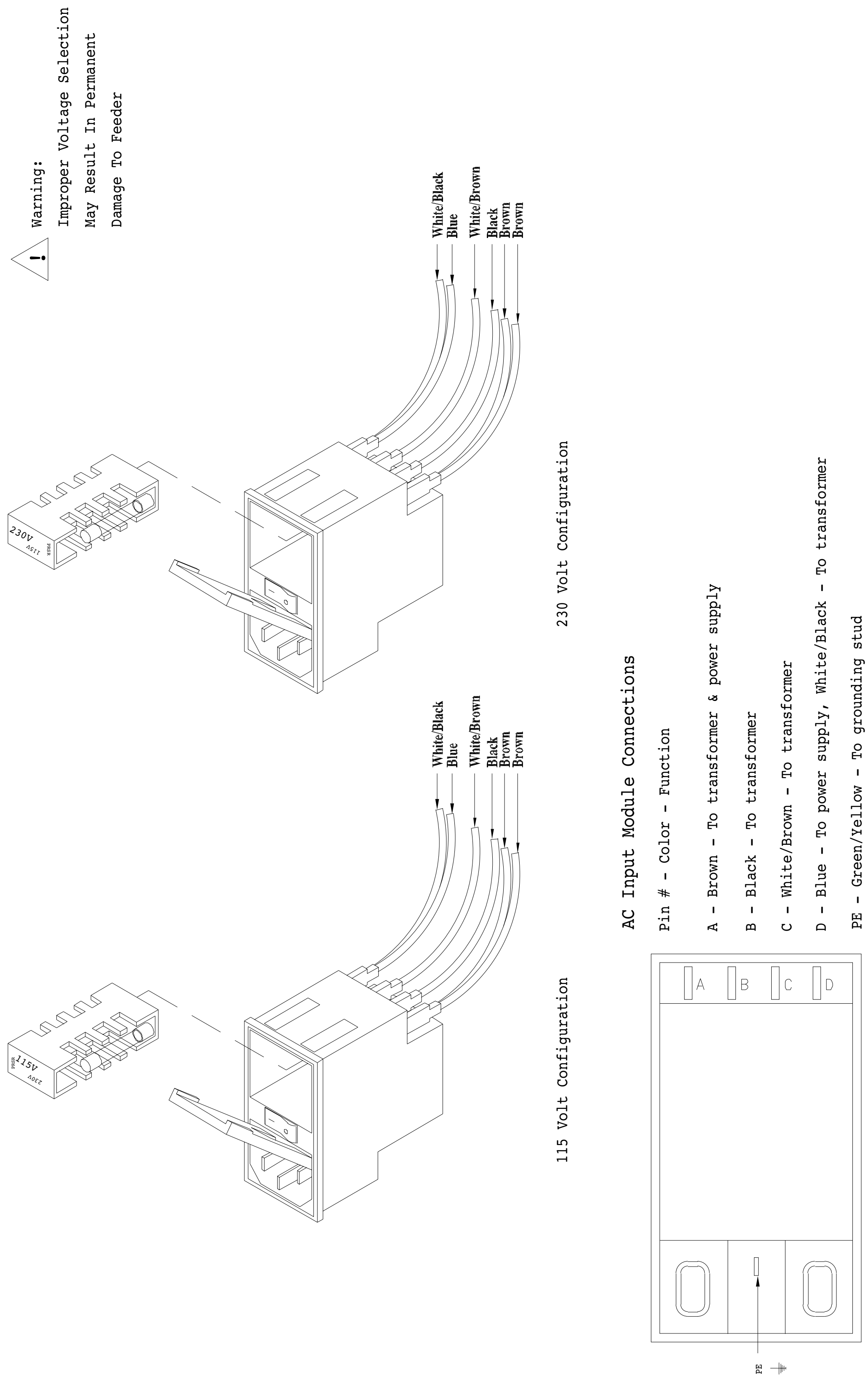
Reliant 3700 Double Detect Option Detail

Controlled Document No. 44-699-102 Rev: A

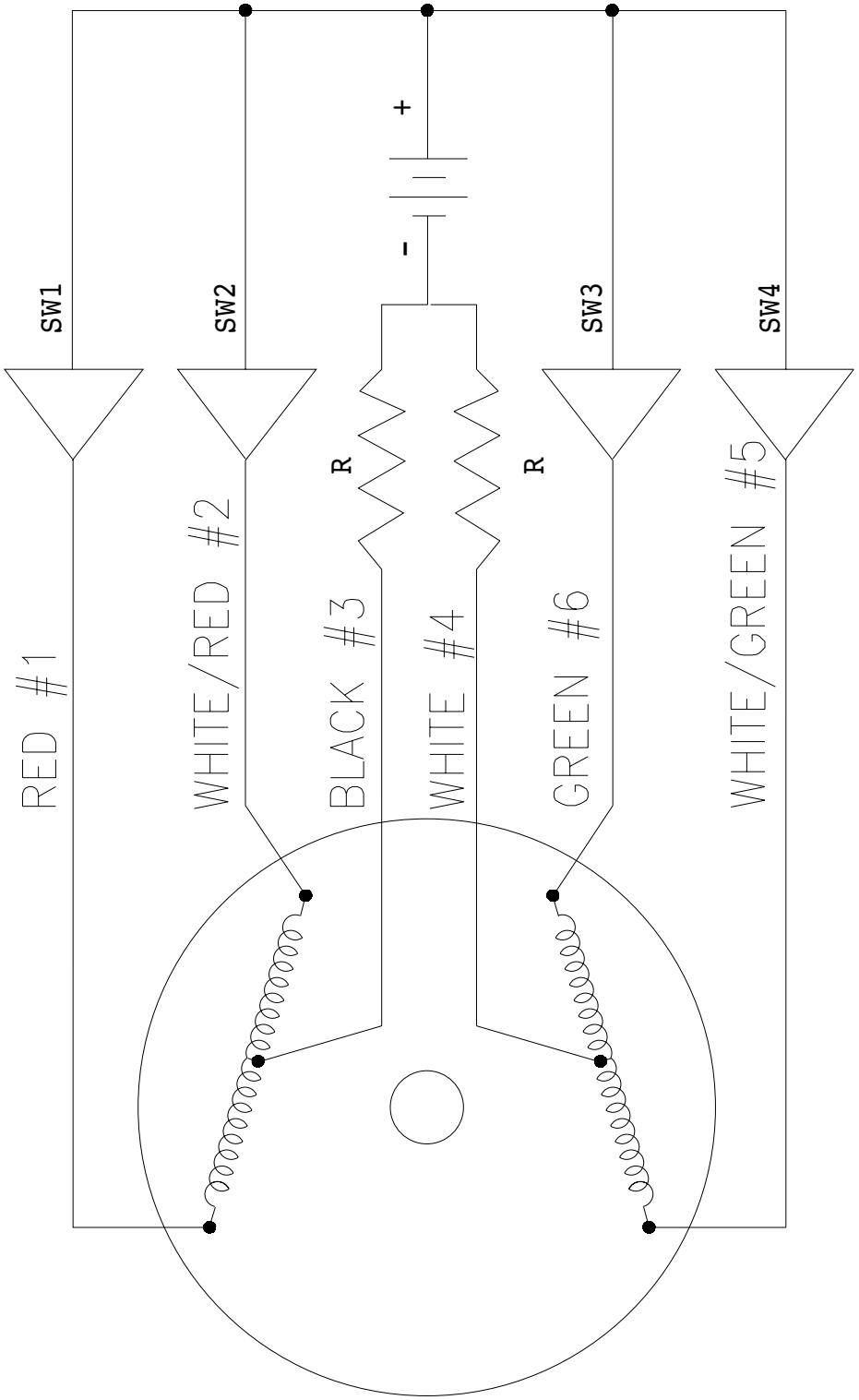
Reliant Series Emergency Stop Detail (option)



Power Entry Module



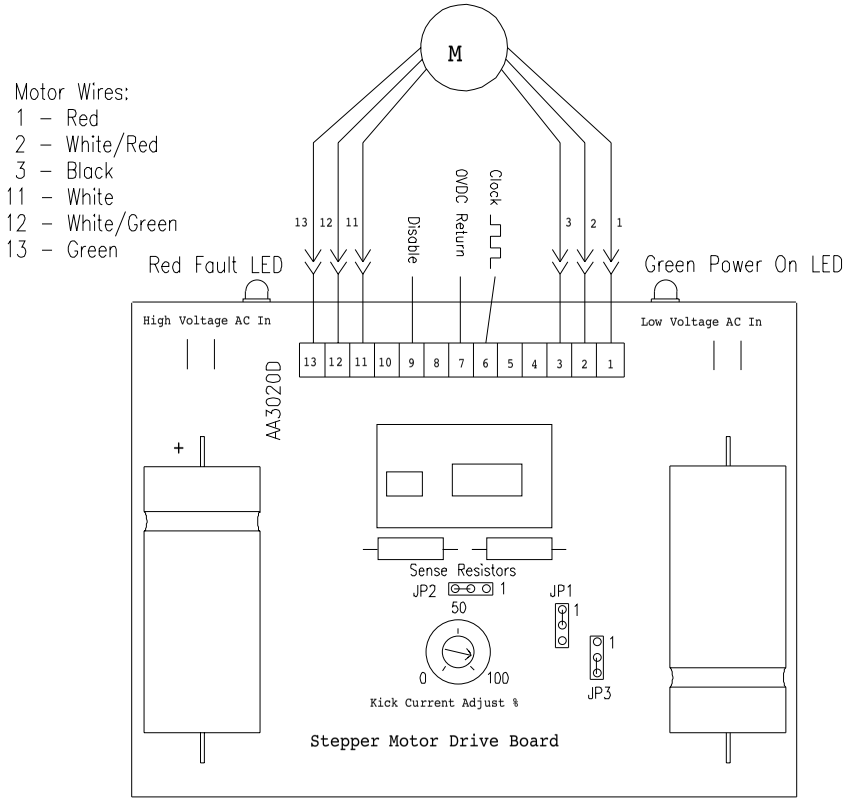
Reliant Series DC Stepping Motor



#535-00-467

nments

1 - Motor Phase 1
2 - Motor Phase 3
3 - Phases 1 & 3 Common
4 - Not Used
5 - Not Used
6 - Clock Input
7 - 0 VDC/Ground
8 - Not Used
9 - Motor On/Off (Active Low)
10 - Not Used
11 - Phases 2 & 4 Common
12 - Motor Phase 2
13 - Motor Phase 4



NOTES - Drive is rated at 10 amps DC current max.
Motor Kick Current Adjustment set at 85 - 90%.

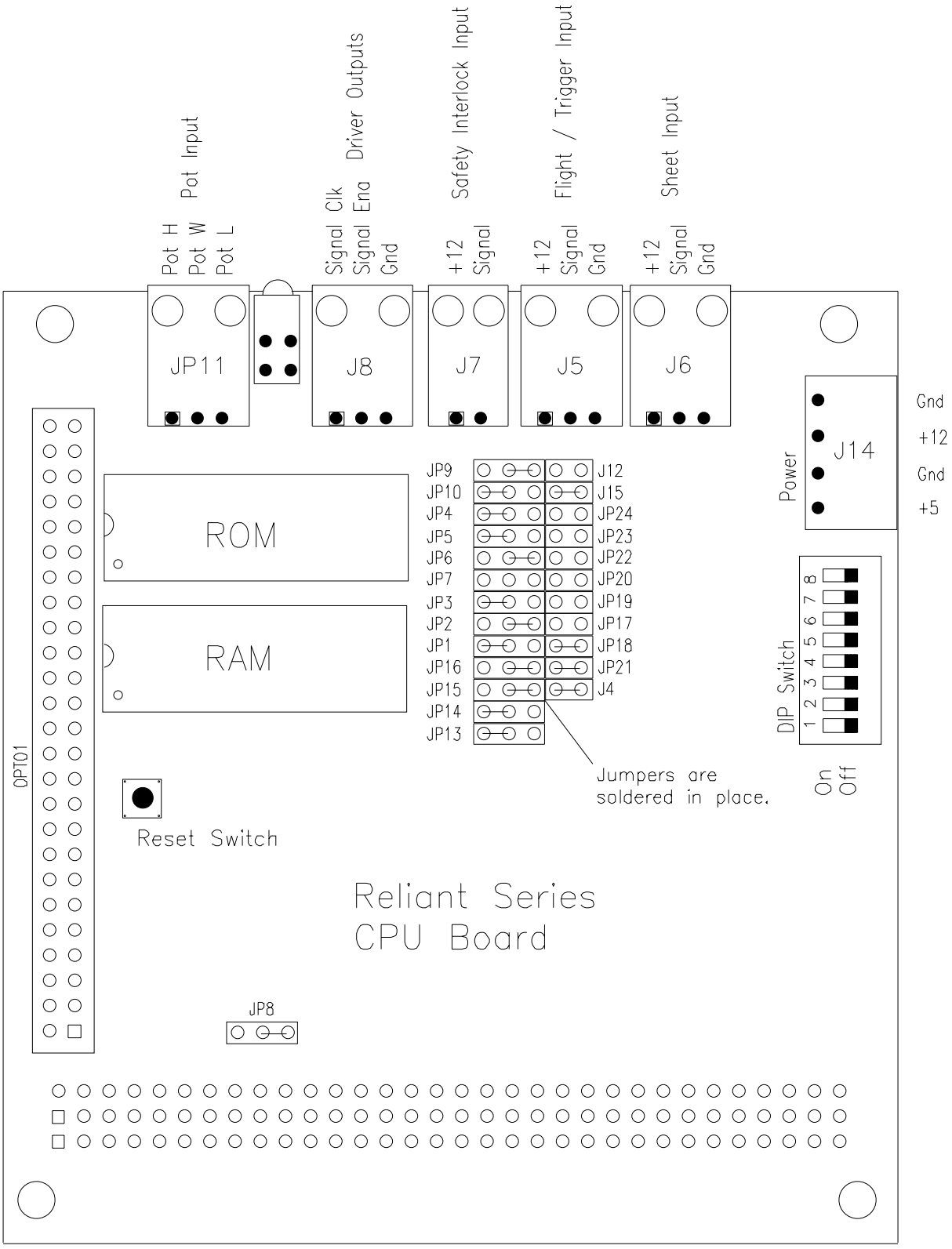
Jumper Settings

Function	JP1	JP2	JP3
Negative Going Clocks	1 - 2	X	X
Positive Going Clocks	2 - 3	X	X
Terminal 5 = CCW	X	1 - 2	X
Terminal 5 = Direction	X	2 - 3	X
Fault Detection Enabled	X	X	2 - 3
Fault Detection Disabled	X	X	1 - 2
FACTORY DEFAULTS	1 - 2	2 - 3	2 - 3

Fault Detection Protection LED Indication

1	Red LED - Slow Blink	Short in Motor, Cable, or on Board
2	Red LED - Fast Blink	Open in Motor, Cable or on Board
3	Red LED - On Steady	Ground Fault (Voltage shorted to 0 volts)

Reliant Series CPU Board



EPROM Replacement

A qualified service technician should perform the changes listed in this document. Always disconnect the AC inlet power cord before performing any service activity.

When replacing the EPROM on the CPU board, please take the following precautions:

1. Always discharge yourself when handling any electronic component (CPU board or EPROM).
2. When removing the EPROM from the socket, be very careful not to bend any pins on the IC.
3. When inserting the EPROM:
   a. Verify the orientation (as shown in figure 8-1). The notch should be on the side closest to the 50 pin ribbon cable connection.
   b. Make sure all the pins on the EPROM are in the socket before applying pressure to completely seat the IC.

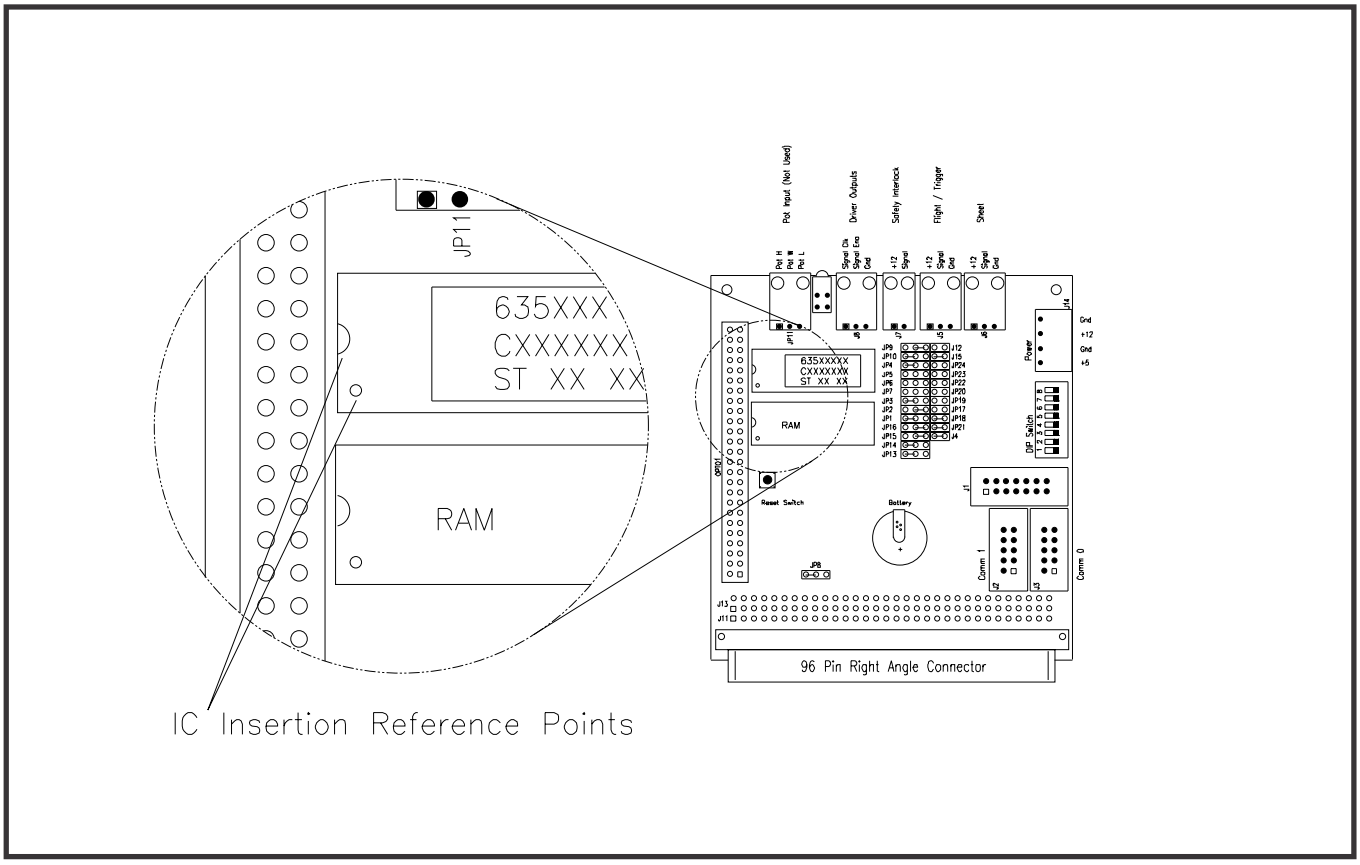


Figure 8-1. EPROM Location on CPU Board

Fault Output; How To Configure

The Reliant 3700 Feeder includes a fault output, and a fault mode select switch (see Figure 8-2).

The Fault Output provides a dry contact output when any of the following faults occur:

1. Feeder timed out.
2. Guard open.
3. Miss feed.
4. Double feed.

When the fault mode select switch is set to Feeder Pause, miss feed conditions will stop the feeder, flash the amber light, and energize the audible buzzer until the reset button is pressed. When set to Alarm Only, miss feed conditions will illuminate the amber light and energize the audible buzzer until the next valid feeder trigger is received.

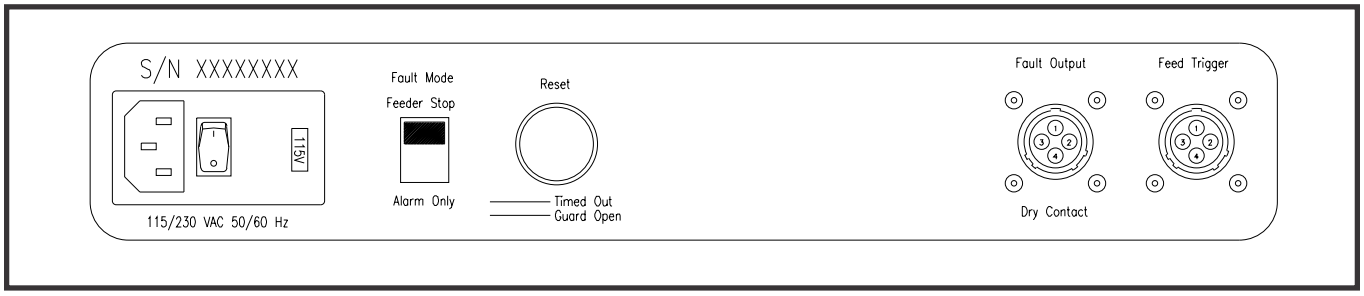


Figure 8-2. Controls and Switches

Pin #	Function	Wire Color
1	No connection	White
2	Contact common	Green
3	Contact N.O. or N.C	Red
4	No connection	Black

** Selectable N.O. or N.C. contact rated at 1 amp maximum; internally fused.*

Figure 8-3. Fault Output (Dry Contact) Pin-Outs

Optional Burn-Thru Double Detection Calibration Procedure

TIP

False double detects may be caused by heavy print or ink on the product. To counter, evenly slide the upper and lower sensing devices on an alernate position on the product. Ideally select a position on the product with less ink or print. Double detect performance is optimized when the sensors are positioned close to the hold down assembly.

To calibrate the burn-thru double detection option on a Reliant Series Universal Friction Feeder, refer to Figure 8-4 below and follow these simple steps.

1. Place two pieces of product between the double detect sensors and under the hold down assembly.
2. Press and hold the SET button until the yellow calibration indicator begins to flash.
3. Release the SET button. The yellow calibration indicator will go dark.
4. Test the setting by placing one piece of product between the double detect sensors and under the hold down assembly. The red operation indicator should not be illuminated.
5. Again place two pieces of product between the double detect sensors and under the hold down assembly. The red operation indicator should be illuminated.

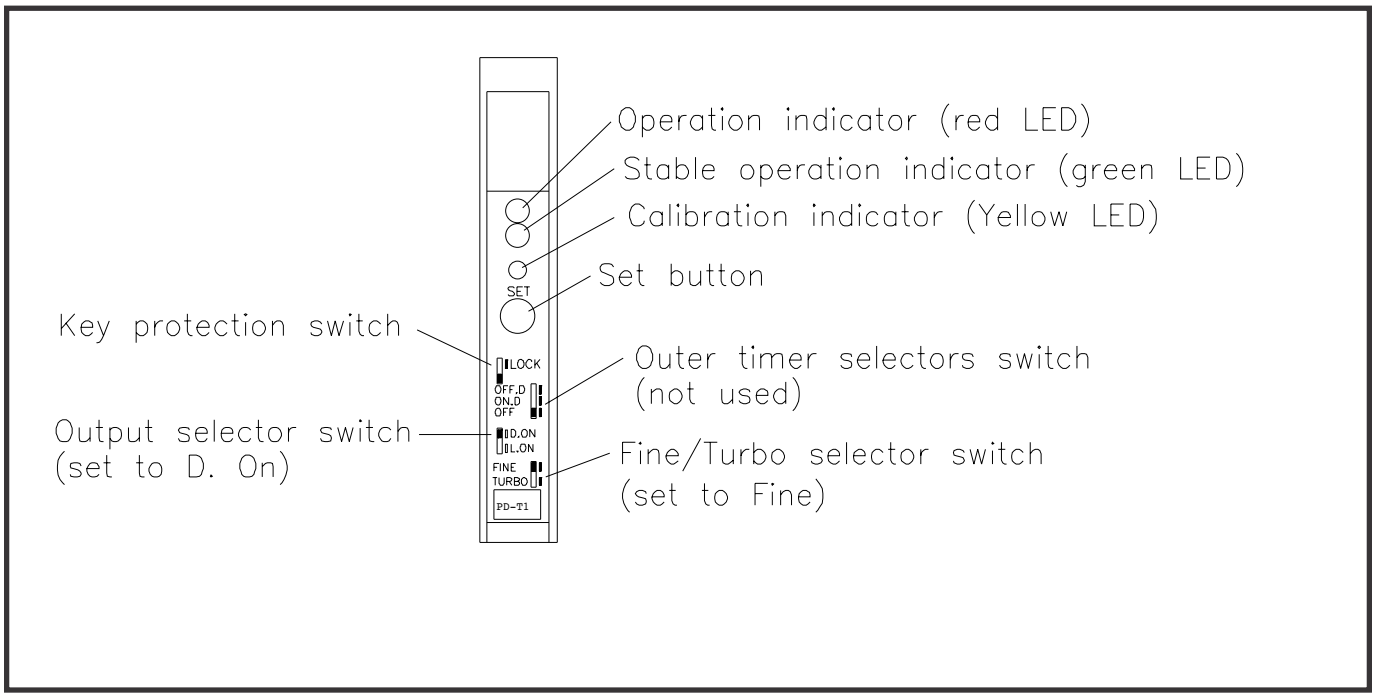


Figure 8-4. Sensor Components and Switch Settings

Notes

9 Technical Troubleshooting

General Troubleshooting Terms

Only a qualified technician should perform electrical troubleshooting activities. This unit operates on 115V or 230V electrical power. Bodily contact with these voltages can result in serious injury or death.

The "drive" consists of the AC power supply (transformer), the stepper motor drive board, and the motor. The "controls" consist of the DC power supply and the control assembly. This control assembly consists of the CPU board, the I/O expansion board, and any ribbon cables and wiring harnesses. Once it is determined that you have a drive problem, a controls problem, or both, the first thing to check is the power supply for that section.

IMPORTANT

Reliant Model 3700 has a few electrical control options available. To effectively troubleshoot you need to determine how your feeder has been configured. One or more of these options are installed during the manufacturing process because the machine is configured to order.

You must determine if your feeder has been supplied with Batch controls or One-Shot controls. Machines supplied with batch controls will feed multiple pieces each time it is triggered. Machines supplied with One-Shot controls will feed only one piece of material each time it is triggered. A visual inspection of the feeder will help you determine which controls you have:

1. Batch Controls: This feeder will have a cycle button, speed control knob, and a two-digit thumbwheel assembly for programming a selectable batch size. The ROM label on the CPU board will have three lines of text printed on it. The top line of the text will have a number you should look for, followed by a revision letter. Number 63511006 indicates the machine has been supplied with Batch Count capabilities.
2. One-Shot Controls: This feeder will have a cycle button, and speed control knob, but will NOT have a thumbwheel assembly. The ROM label on the CPU board will have three lines of text printed on it. The top line of the text will have a number you should look for, followed by a revision letter. Number 63511007 indicates the machine has been supplied with One-Shot capabilities.

If any other number appears on the top line, your machine is not a factory standard, and may have custom controls. If this is the case, contact the dealer through which you purchased the machine for further details.

Gaining Access to the Electronics

Access to the electronics is obtained by removing the four screws securing the electrical components access cover. The cycle button, speed control knob, and (for Batch control feeders) the thumbwheel assembly is mounted on the cover plate.

Wiring Diagrams

TIP

Many of the wiring harnesses have numbered labels on them. Try to match the harness numbers to the numbers shown on the wiring diagrams, to help you determine the option(s) you have.

Use the wiring diagrams found elsewhere in this manual for reference concerning the details for your machine. You may need to use a combination of two diagrams depending upon the option(s) you have. Always refer to the diagram titled Reliant 3700 Electrical Wiring. This diagram details a standard Model 3700 Batch Count or One-Shot feeder. However, if you have either the Miss Detect or the Double Detect option or both, you will additionally need to refer to the page showing the wiring detail for the option(s) you have. Look at the graphic overlay on your machine. This overlay has a serial number printed on it near the power switch. The wiring diagrams show a representation of the graphic overlay associated with a machine's configured option(s). Try to find the drawing that most closely matches the overlay on your machine.

The Fault Lamp Reset Button

The Fault Lamp Reset Button will indicate each type of fault with a unique blinking routine. The audible beeper on the Expansion board will also sound in parallel with the blink routine. There are four possible blink/beep routines, as follows:

1. Lamp/Beep Steady On. This routine indicates the feeder has "timed out." A time out occurs when the sheet sensor does not sense the leading edge of a piece of fed material within about 2 seconds between sheets after a cycle begins. Keep in mind that the feeder must be set up correctly, evidenced by good separation between sheets. The sheet sensor must see a gap between fed sheets. If there is trouble with this routine, refer to the section titled "*Steady beep is heard, reset button is illuminated, and pressing button does not reset fault*."
2. Lamp/Beep alternates On/Off. This routine indicates that the front safety shield is open. The safety shield must be closed at all times during feeder operation. If there is trouble with this routine, refer to the section titled "*On/Off beeping sound is heard, reset button blinks, and pressing button does not reset fault*."
3. Lamp/Beep, On/Off combined with a Low Tone/High Tone. This routine indicates a miss has been detected. This is supplied with Miss Detect, evidenced by the presence of a fault output connector. A miss is detected if another trigger signal is given before a feed cycle has been completed.
4. Short duration Lamp/Beep followed by a longer duration Lamp/Beep. This routine indicates a double has been detected. This should only occur if the Double Detect option is installed.

Table 9-1. Quick-Look Troubleshooting

Problem	Solution
No power to feeder when power switch is turned on **NOTE** *This power module is designed to hold 5mm x 20mm fuses, as well as 1.25" x .25" fuses. The machine ships from Streamfeeder's facility with 5mm x 20mm fuses.*	1. Make sure there is power present at the AC main where the feeder is plugged in. 2. Check three-wire AC power cord for integrity at all three points. 3. Remove power cord from AC input switch module and disconnect the four space connector leads located on the back of the module inside the feeder. 4. Check the two fuses located inside the feeder's input power module. BOTH fuses must be present and test good. a. Observe the voltage label showing through the window on the fuse housing for the proper orientation when the holder is re-inserted. b. A small screwdriver inserted under the tab will allow you to pry open the fuse housing. Remove the red fuse holder. If the smaller 5mm x 20mm fuse is present, verify that the metal tab "finger" is holding the fuse in the forward position. Make sure it has not allowed the fuse to slide back toward the outside of the feeder and away from where contact with the metal pressure points inside the module body is made. c. Use an ohmmeter to test the fuses. A visual inspection will not always be sufficient to determine fuse integrity. If necessary, replace with fuses of the same rating only. 5. Reconnect power cable and, with power switch turned "on", check for presence of AC at the output spade connectors on the back of the module where the transformer primary lead connections are made. 6. If steady AC power is not measured as in the previous step, the module's internal contacts are most likely worn, and the module must be replaced.
Fuses blow on power up **NOTE** *A fuse failure indicates a problem with the last item connected before failure occurs.*	1. Install known good fuses of same rating only. 2. Disconnect all AC loads from the input: a. The transformer primary. b. The DC supply's AC input leads. c. Remove the red and yellow wire pairs from the stepper motor drive board. 3. Reconnect AC loads one item at a time while alternately applying power between new connections. Connect each load as follows one at a time to determine the faulty part: a. Connect the transformer primary leads to the AC input module. b. Connect leads to the two-pin AC input connector of the DC power supply. c. Connect the red and yellow wire pairs of the transformer secondary to the stepper motor drive board.

Table 9-1. Quick-Look Troubleshooting (continued)

Problem	Solution
Decreased power experienced after fuse is replaced *Never apply more than 125V when the fuse holder is in the 115V position. Applying 230V to the feeder when the fuse holder is in the 115V position will damage the feeder's internal electronics.*	If the input power module fuse holder is installed in the 230V position, and the line power is at 115V, the feeder will have noticeably decreased power.
Decreased power experienced after drive board is replaced	The drive board must have its "kick current" dial set to at least 90%.
Motor does not run, is noisy, makes a "growling" sound, or runs in reverse **NOTE** *A digital multimeter with frequency measurement capabilities is necessary for the following tests. If your meter does not have the ability to make a frequency measurement, an oscilloscope may be used instead.*	1. Verify green LED on the stepper motor drive board is illuminated. If not, verify transformer secondary leads measure correct voltages: 40 VAC across yellow pair of wires, and approximately 4.5 VAC to 5.5 VAC across red pair of wires. If green LED is not illuminated and the transformer voltages test good, replace drive board. Otherwise, continue with next step. 2. Look at the red LED on the stepper motor drive board. Is it illuminated? a. If yes, go to section titled "Drive board red LED illuminated," b. If no, continue with next step. 3. Remove white wire from pin 9 of the stepper motor drive board 13-pin connector. This is the drive disable line coming FROM the CPU board on connector J8 pin 2. The drive board is enabled by default when no connection is made at pin 9. 4. Cycle the feeder. If the motor runs, the output on connector J8 pin 2 of the CPU board is bad, and the CPU board must be replaced. If not, continue with next step. 5. Measure for the presence of pulse train. The pulse train comes FROM the CPU board connector J8 pins 1 (signal) and 3 (ground), and goes TO the stepper motor drive board at pins 6 (signal input) and 7 (ground). Test points are pins 6 and 7 on the 13-terminal connector to the drive board. a. Power-up the feeder and verify the reset button is not illuminated. If a reset cannot be accomplished refer to the section titled "On/Off beeping sound is heard, reset button is illuminated, and pressing button does not reset fault." b. Verify signal is present on pins 6 and 7. When the speed control knob is fully CCW, no pulse or a very low pulse frequency will be measured. When the speed control is fully CW, the frequency could be measured as high as 8.2 kHz. It is recommended to set the run speed at about 50% where the frequency measured should be somewhere between 3000 and 4000 Hz.

Table 9-1. Quick-Look Troubleshooting (continued)

Problem	Solution
Motor does not run, is noisy, makes a "growling" sound, or runs in reverse (continued)	c. Check integrity of both ends of drive wiring harness between the CPU board connector J8 and the 13-terminal connector to the drive board. d. Using a digital multimeter or an oscilloscope, measure the amplitude of the pulse train and verify that it is at least 2.3VDC. e. If pulse test results are good, replace the stepper motor drive board. If the pulse tests results are negative, the pulse output on connector J8 of the CPU board is bad, and the control assembly must be replaced.
Drive board red LED illuminated **IMPORTANT** *The stepper motor drive board has been designed to protect itself if motor problems occur. If a problem with the motor wires or motor is found and corrected, the board will still drive a good motor after correction is made. However, the board cannot protect itself from transient voltage spikes and/or power sags or brownouts. It is highly recommended that in plants where power problems are evident or in question, a high quality surge suppressor or line conditioner should be employed for added protection.*	1. Slow Blink: (about once per second) indicates a SHORT in motor, motor cable, or drive power component. a. Check integrity of motor wires and/or cable. None of the wires should be exposed, and should have their full insulation so they may not short to each other or any other part of the machine. b. If wires look OK, go to section titled "Testing stepper motor drive board output pins." c. If stepper motor drive board test results are positive, replace the motor. For further information, see the section titled "Testing motors." 2. Fast Blink: (multiple times per second) indicates an OPEN in motor, motor cable, or drive component. a. Check integrity of motor wires and/or cable. None of the wires should measure open, or be disconnected or loose from their terminals. b. If wires check OK, go to section titled "Testing stepper motor drive board output pins". c. If stepper motor drive board test results are positive, replace the motor. For further information, see the section titled "Testing motors." 3. On Steady: indicates a ground fault (wire shorted to zero volts). a. Remove ground fault.
Testing stepper motor drive board output pins **NOTE** *A digital multimeter is required for these tests.* **NOTE** *Measuring zero volts drop across one of these pins may be evidenced by blowing fuses on power-up. See section titled "Fuses blow on power up."*	1. Remove 13-terminal plug-in motor wire coupler from the drive board. 2. Test motor phase pins. a. Set the multimeter to Diode Test. b. Place the RED meter lead on one of the leads between the large black sense resistors located at the center of the drive board located above jumper JP2. c. Touch the BLACK meter lead to each phase terminal (pins 1, 2, 12, and 13). This should give readings between 0.450V and 0.550V. If any readings are significantly greater than or less than 0.450V to 0.55V, then the unit is faulty and must be replaced. 3. Test motor common pins: a. Touch the BLACK meter lead to the positive lead of the large blue capacitor on the left side of the board, which is located below the red fault indicator LED. b. Touch the RED meter lead to pins 3 and 11. These pins should give readings between 0.450V and 0.550V. If any readings are significantly greater than or less than 0.450V to 0.55V, then the unit is faulty and must be replaced.

Table 9-1. Quick-Look Troubleshooting (continued)

Problem	Solution
Fan does not operate/ Testing DC power supply **NOTE** *The DC supply has dual outputs: 5 and 12 volts DC.* **NOTE** *When the output is shorted, a faintly audible clicking sound can be heard coming from the supply. This is the power supply protecting itself from failure due to a short on its output.* **IMPORTANT** *Continued operation of the machine without the cooling fan working properly will cause further damage to the internal electronic components.*	1. Refer to the DC power supply board diagram. Remove 6-pin DC wiring harness connector from output of DC supply. Measure the supply's output pins for the presence of DC power. a. If voltages are not present, verify AC power is being applied to AC input. b. Also check the fuse on the supply's AC input. If the fuse is bad, and replacing it causes fuse failure to occur again, replace the supply. c. If the fuse is good, AC power is being applied, and DC power cannot be measured, replace supply. 2. Verify good electrical connections to pins in DC wiring harness 6-pin quick disconnect plug. Reconnect harness. 3. Check for shorted wires in the DC wiring harness on output of supply. A short will cause the supply to shut down. The power supply should operate normally after the short is removed. 4. Test DC wire harness 4-pin plug in connectors to the CPU and Expansion Boards for the presence of 5 and 12 volts DC. 5. Test wire harness to fan quick-disconnect plug for the presence of 12VDC. 6. Replace fan.
CPU board "heartbeat" pulse not present	1. Two LEDs are located on the CPU board. The "heartbeat" LED is the green LED. The green LED should blink at regular intervals under normal operation when the feeder is powered on. Make sure the front safety shield is closed completely, and no error conditions are present. 2. Check output of DC power supply. See section titled "Fan does not operate/Testing DC power supply." 3. Verify ribbon cable integrity between CPU board and Expansion Board. 4. Check that the ROM and RAM chips are seated properly in their sockets. Improperly seated chips may cause the CPU board to indicate a problem by illuminating the red LED located next to the green "heartbeat" LED. The red LED should not illuminate. 5. Replace Reliant Control Assembly. 6. Replace ROM chip.

Table 9-1. Quick-Look Troubleshooting (continued)

Problem	Solution
On/Off beeping sound is heard, reset button blinks, and pressing button does not reset fault **NOTE** *Power must be on during the following tests. Exercise caution.* **NOTE** *The following steps assume the output of the DC power supply is working and both 5 and 12 volts are present at the CPU and Expansion Board input connectors. If not, see section titled "Fan does not operate/Testing DC power supply."* **NOTE** *The following steps assume the blinking green "heartbeat" LED is present on the CPU board. If not, see section titled "CPU board 'heartbeat' pulse not present".*	1. Remove reset button harness from Expansion Board connector J6. 2. Using a small metal blade screwdriver, short pins 3 and 4 together on Expansion Board connector J6. 3. Did shorting these pins reset the feeder? a. Yes: The reset switch harness assembly is faulty. Repair or replace as necessary. b No: Verify continuity at reset button closure, reconnect the reset button harness to the Expansion Board connector J6. Press the reset button after trying each of the following steps: 4. Verify that the discharge safety shield is closed completely. 5. Is E-Stop option installed? a Yes: Go to step 6. b. No: Go to step 7. 6. Verify E-Stop switch is out of the locking stop position by twisting and pulling the red knob out. 7. Remove the safety interlock harness from connector J7 of the CPU board. 8. Using a small metal blade screwdriver, short pins 1 and 2 together on CPU board connector J7, keep them shorted, and press the reset button. Does pressing the reset button reset feeder? a. Yes: Go to step 9. b. No: Go to step 10. 9. Connector J7 input is good. Check the integrity of safety interlock harnesses and the safety interlock switch. If E-Stop option is installed, check the integrity of this harness and switch assembly as well. Repair or replace as necessary. 10. Replace Reliant Control Assembly. 11. Replace ROM chip.
Steady beep is heard, reset button is illuminated, and pressing button does not reset fault **NOTE** *Power must be on during the following tests. Exercise caution.*	1. Verify firm connection and that the integrity of the ribbon cable connected between the CPU and Expansion Boards is intact. 2. Remove reset button harness from Expansion Board connector J6. 3. Using a small metal blade screwdriver, short pins 3 and 4 together on Expansion Board connector J6. Did shorting these pins reset the feeder? a. Yes: The reset switch harness assembly is faulty. Repair or replace as necessary. b No: Verify reset switch integrity, reconnect to Expansion Board connector J6 and go to step 4.

Table 9-1. Quick-Look Troubleshooting (continued)

Problem	Solution
Steady beep is heard, reset button is illuminated, and pressing button does not reset fault (continued) **NOTE** *The following steps assume the output of the DC power supply is working and both 5 and 12 volts are present at the CPU and Expansion Board input connectors. If not, see section titled "Fan does not operate/Testing DC power supply."* **NOTE** *The following steps assume the blinking green "heartbeat" LED is present on the CPU board. If not, see section titled "CPU board 'heartbeat' pulse not present".*	4. Verify the sheet sensor's power-on green LED is illuminated. Is the green LED illuminated? a. Yes: Go to step 5. b. No: Go to step 7. 5. Verify the sheet sensor's yellow LED sensing indicator illuminates when the sensor is covered, and goes dark when the sensor is uncovered. Is the yellow LED illuminated when the sheet sensor is covered, and dark when the sensor is uncovered? a. Yes: Go to step 6. b No: Go to step 7. 6. Cover the sensor so that the yellow sensing LED is illuminated and press the reset switch. Did the feeder reset? a. Yes: The feeder times-out as it should. Go through feeder setup and make sure the sensor sees the leading edge of the next sheet shortly after a piece of sheet material is removed from the feeder. If the leading edge of the next piece of material is not detected in time, the feeder "times-out" and stops, causing the steady audible beep and reset button lamp to illuminate. b. No: Go to step 7. 7. Remove the sheet detect sensor harness from CPU connector J6 and measure for the presence of 12VDC across pins 1 and 3 of connector J6 on the board. Is the voltage present? a. Yes: Go to step 8. b. No: Go to step 9. 8. Test sheet sensor input. Using a small metal blade screwdriver, short pins 1 and 2 together on CPU board connector J6, keep them shorted, and press the reset button. Does the feeder reset? a. Yes: The sheet sensor input on the CPU board is good. Repair faulty sheet sensor harness and/or replace sheet sensor. b. No: Go to step 9. 9. Replace Reliant Control Assembly. 10. Replace ROM chip

Table 9-1. Quick-Look Troubleshooting (continued)

Problem	Solution
Feeder Will Not Cycle: Testing the Trigger and/or Cycle Button Inputs **NOTE** *The terms "flight sensor" and "trigger sensor" are synonymous.* **NOTE** *Power must be on during the following tests. Exercise caution.* **NOTE** *The following steps assume the output of the DC power supply is working and both 5 and 12 volts are present at the CPU and Expansion Board input connectors. If not, see section titled "Fan does not operate/Testing DC power supply."* **NOTE** *The following steps assume the blinking green "heartbeat" LED is present on the CPU board. If not, see section titled "CPU board 'heartbeat' pulse not present".* **NOTE** *The following steps assume the drive board green LED is illuminated and the red LED is NOT illuminated. If this is not true, see section titled "drive board red LED illuminated." Also, the following steps assume the drive output pins test good. See the section titled "Testing stepper motor drive board output pins."*	**The Trigger Input** 1. Verify the flight or trigger sensor's power-on green LED is illuminated. Is the green LED illuminated? a. Yes: Go to step 2. b. No: Go to step 3. 2. Verify the trigger sensor's yellow LED sensing indicator illuminates when the sensor is covered, and goes dark when the sensor is uncovered. Is the yellow LED illuminated when the trigger sensor is covered, and dark when the sensor is covered? a. Yes: Go to step 3. b. No: Go to step 4. 3. Remove the trigger sensor wire harness from CPU connector J5 and measure for the presence of 12VDC across pins 1 and 3 of connector J5 on the board. Is the voltage present? a. Yes: Go to step 4. b. No: Go to step 5. 4. Test trigger sensor input. Using a small metal blade screwdriver, short pins 1 and 2 together on CPU board connector J5. Does the feeder trigger? a. Yes: The trigger sensor input on the CPU board is good. Repair faulty trigger sensor wire harness and/or replace trigger sensor. b. No: Go to step 5. 5. Replace Reliant Control Assembly. 6. Replace ROM chip. **The Cycle Button Input** 1. Remove the cycle button wiring harness connector from the Expansion Board at Connector J4. 2. Using a piece of wire, carefully short pin 2 to pin 5 of connector J4 on the Expansion Board. Shorting these two pins together should cause the feeder to run. Does the feeder cycle when the pins are shorted to one another? a. Yes: The cycle button input on the Expansion Board is good. Repair faulty cycle button wire harness and/or replace cycle button. b. No: Go to step 3. 3. Replace Reliant Control Assembly. 4. Replace ROM chip.

Table 9-1. Quick-Look Troubleshooting (continued)

Problem	Solution
Testing the Fault Output Connector	1. Remove fuse F1 from the Expansion Board and measure across its pins for continuity. If continuity is not measured, replace the fuse. 2. Fuse F1 is connected in series with a set of contacts inside the mini relay located on the Expansion Board. These contacts are brought out through connector J7. Jumper block JP4 selects the normally open or normally closed set of contacts. The normally open contacts close when the machine is powered on. Test the contacts: a. Set jumper block JP4 in the N.O. position b. Using an ohmmeter, measure across pins 1 and 2 of connector J7. You should measure an open load. c. Power on the machine. The contacts should close and you should measure continuity across J7. If not, replace the Expansion Board.
Testing Motors	Refer to the wiring diagram of the 6-lead DC Stepping Motor found elsewhere in this manual. These motors are NOT repairable, and should never be opened. The motors used in the Reliant Series of feeders have two windings: three leads associated with each winding, for a total of six leads. Each winding has a wire at each end of the winding, with a wire connected also at the center of the winding. This center tap is also called the “common” wire, while the end wires are called the “phase” wires. Motors are inductors. Inductors are tough to troubleshoot unless there is a catastrophic failure associated with the windings inside the inductor. An ohmmeter may be used to test for catastrophic failures, but is useless when a motor has a problem that is not catastrophic. Therefore, a motor can still have a problem even though it appears there is not a problem as measured with an ohmmeter. The following are tests that you can make with an ohmmeter: 1. All three leads of each individual winding should measure continuity in any combination of two. Conversely, an OPEN should NOT be measured in any combination of two of the three leads tested in a single winding. If an open is measured in a single winding, it is a clear indication that the motor is bad and needs to be replaced. 2. Since there are two separate windings, they need to measure electrically separate from each other. For example, any combination of one lead from one winding to any lead of the other winding should measure as OPEN. If a short is measured between windings, it is a catastrophic failure inside the motor and it must be replaced. 3. Both windings need to be insulated from the body of the motor. If continuity is measured between any motor lead and the body of the motor, a catastrophic failure has occurred inside the motor and it must be replaced.

Thiele Technologies
A Barry-Wehmiller Company

Streamfeeder®

103 Osborne Road • Minneapolis, MN 55432-3131 USA
TEL: 763.502.0000 • FAX: 763.502.0100
E-MAIL: service@streamfeeder.com
WEB: www.streamfeeder.com

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