SI-1750

Product Guide

Thiele Technologies
A Barry-Wehmiller Company

Streamfeeder®

Part Number: 00900549

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Before You Begin

Message Conventions

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

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

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

ELECTRICAL DANGER signifies an 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 minimize problems in the installation or operation of the feeder.

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

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

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

WARNING LABELS affixed to this product signify an action or specific equipment area that can result in serious injury or death if proper precautions are not taken.

Before You Begin

Message Conventions

Avoid injury. Do not reach around guards.

Hazardous voltage. Contact will cause electric shock or burn. Turn off and lock out power before servicing.

Moving parts can crush and cut. Keep guards in place. Lock out power before servicing.

Pinch point. Keep hands and fingers clear.

Moving parts can crush and cut. Keep guards in place. Lock out power before servicing.

SAFETY

Make sure you thoroughly read this section to become familiar with all the safety issues relating to the safe operation of this product.

Please read all of the warnings that follow to avoid possible injury. Although every effort has been made to incorporate safety features in the design of this product, there are residual risks that an installer or operator should be aware of to prevent personal injury.

Please read all of the cautions that follow to prevent damage. This product is built with the highest quality materials. However, damage can occur if not operated and cared for within design guidelines as recommended.

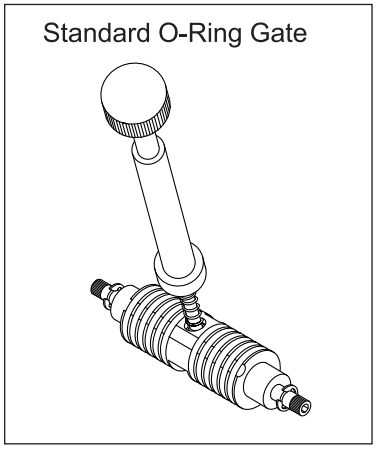
Danger

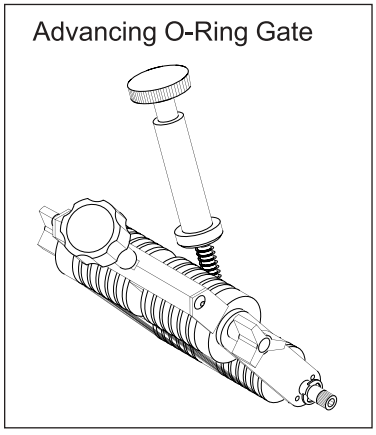
- **Equipment interior contains incoming 115 or 230VAC electrical power. Bodily contact with these high voltages can cause electrocution, which can result in serious injury or death.**

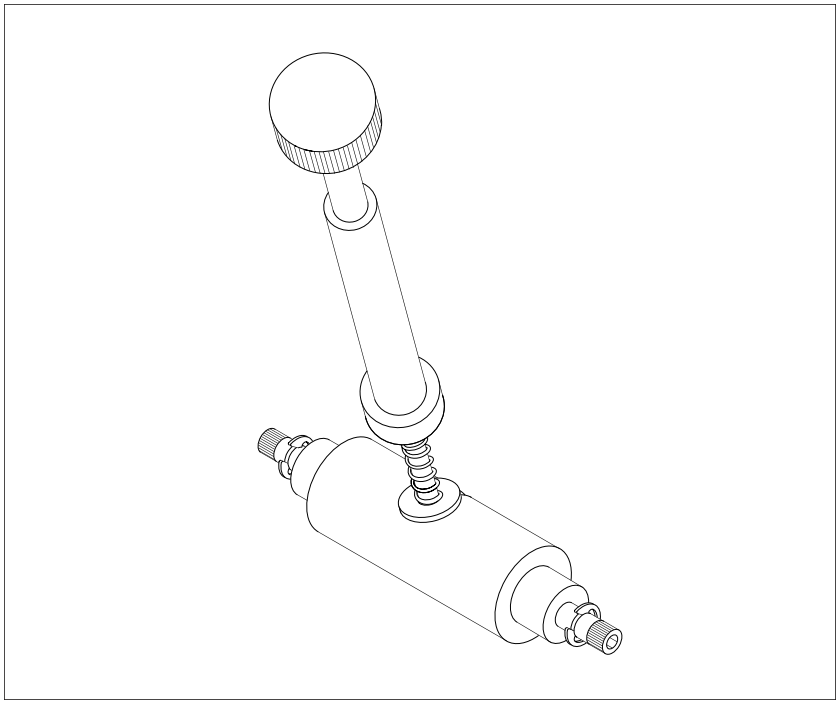
1 About Your Machine

The SI-1750 is designed to separate, singulate, and feed a variety of cut sheets and non-nested products. After product is loaded into the hopper, a simple push of a button starts the feed cycle. Sensors mounted on-line and on the feeder control the start and stop sequence of the feeder cycle.

The design feature that makes the SI-1750 unique is a part called the *gate assembly*. This patented technology is the main reason the feeder can separate, singulate, and feed individual sheets with accuracy and reliability — even at high speeds. A single-knob adjustment allows you to easily setup the feeder for many different types of product.







Bar Gate Assembly

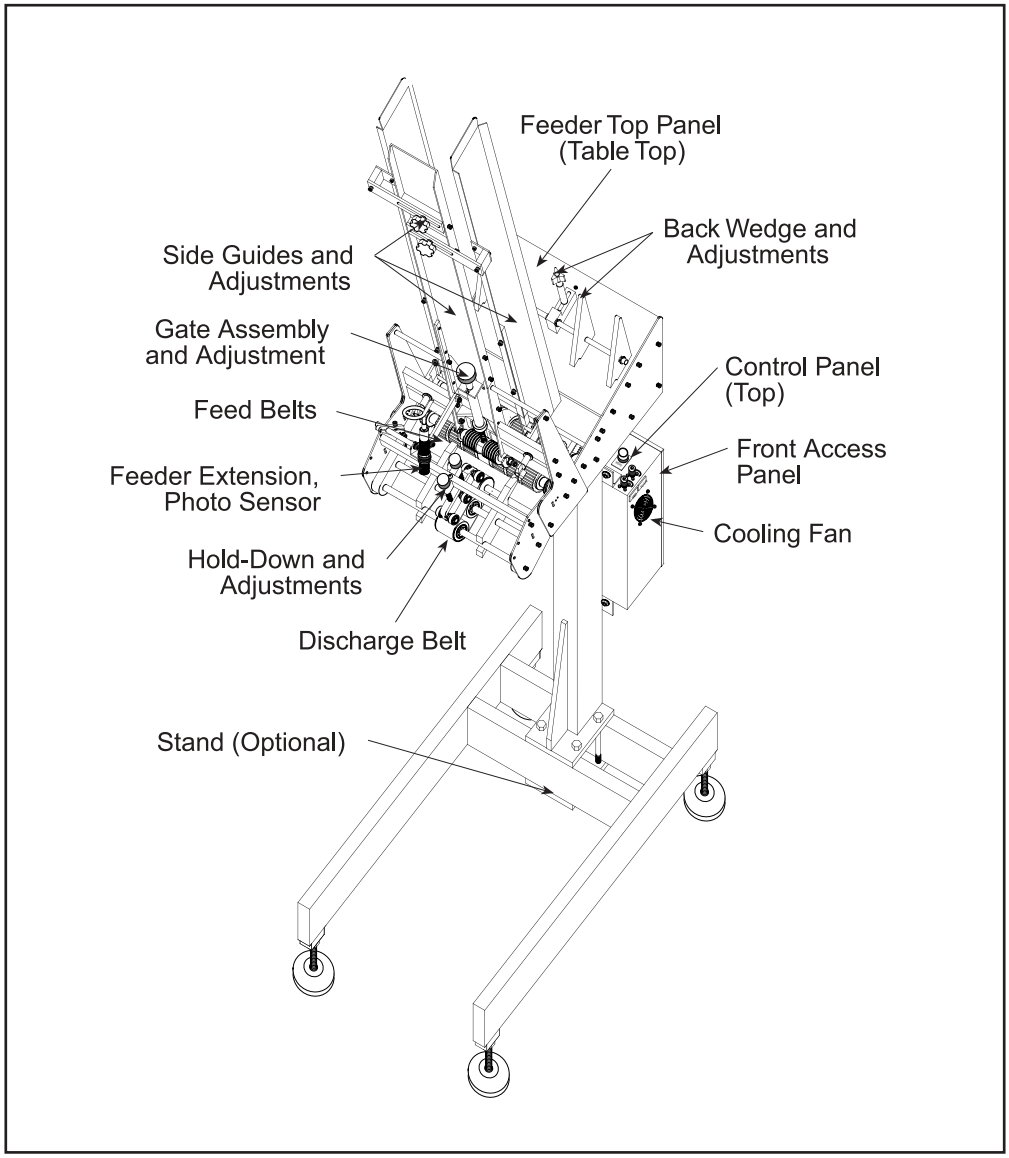
Main Features

NOTE

Your feeder may look slightly different than the model shown in the following diagrams.

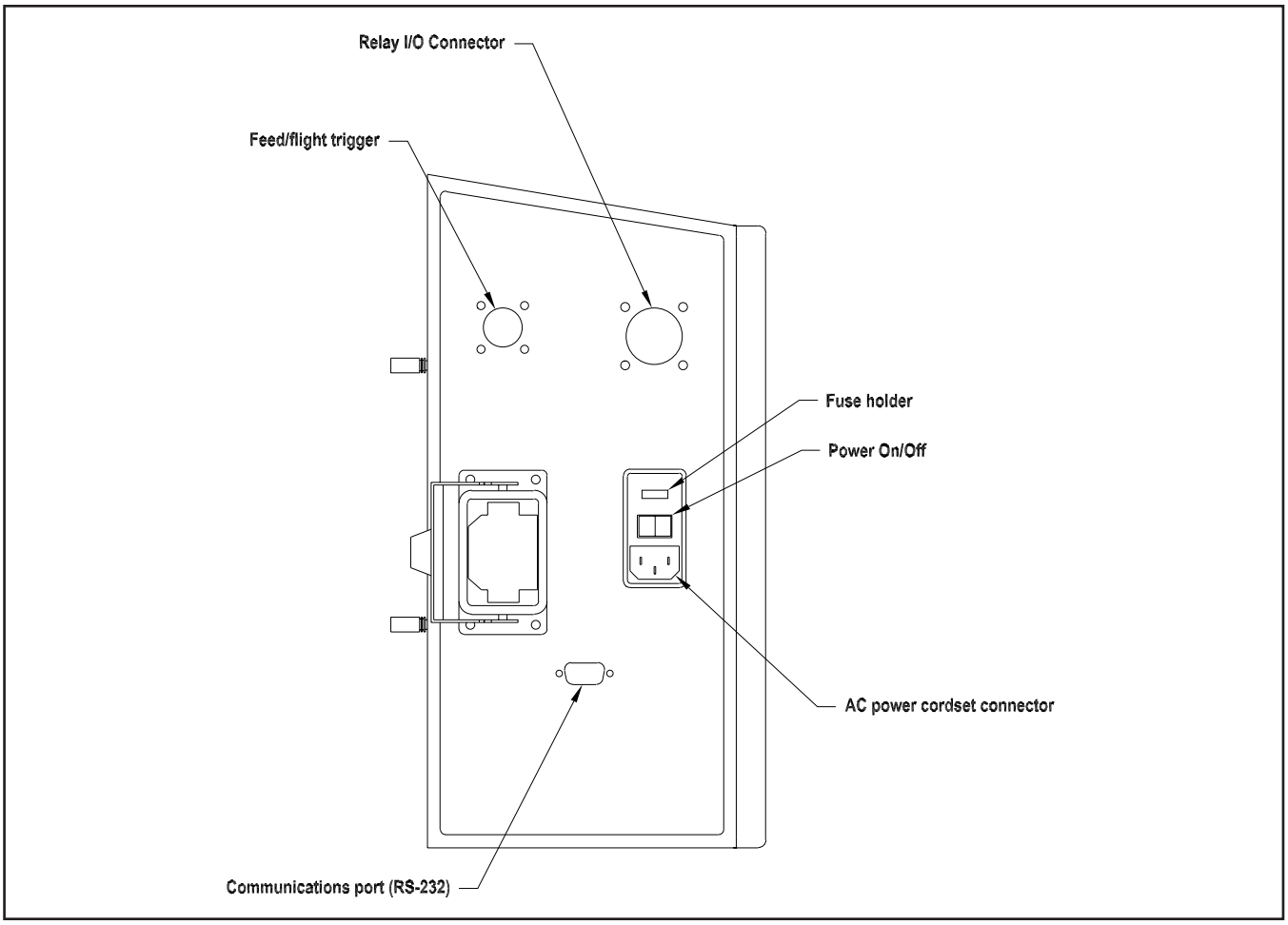
The machine is entirely powered by a single high-torque stepper motor that runs off of either a 120- or 240-VAC electrical power source. Once the machine is prepared for operation, the power-up and operation of the feeder is relatively easy.

But to get the most out of your machine, you should first become familiar with all of the features, including controls and sensors, connectors, and cables. Your feeder may look slightly different than the model shown in the following diagrams.



Feature Descriptions of SI-1750

FEEDER	**Contains the all hardware, drive motor, and belts for singulating and feeding product from a stack.**
Gate assembly and adjustment	*Mounted on a gate plate directly above the feed belts, this device provides a curvature to help preshingle stacked product. When properly adjusted, a one-thickness gap is created to help singulate and eject product. Three types of gate assemblies are available, standard O-ring gate, bar gate (optional), and advancing O-ring gate (optional).*
Top panel (table top)	*Used to support the back wedge. Also provides access to interior of feeder.*
Side guides and adjustments	*Holds a stack of product to be fed and helps keep it straight for proper entry through the gate assembly area.*
Back wedge and adjustments	*Lifts the product to keep it off the table top, reduces excessive contact with the feed belts, and helps push the product against the curvature of the gate assembly. Four (4) types of wedge assemblies are available, double S, low-profile, and articulating roller (optional), triangle wedge (optional).*
Hold-down and adjustments	*This series of rollers provides a varying pressure on top of product to force it down on the discharge belt, thus helping to eject a single product after it exits the gate assembly area.*
Extension, photo sensor	*Also called a sheet sensor, it "looks" for the leading edge of the product to stop the feeder momentarily. For effective operation, a movable extension allows you to adjust for distance and perpendicular to product.*
Feed belts	*Provides the friction and motion necessary to pull individual product from the bottom of the stack and through the gate assembly area.*
Discharge belts	*Combined with the hold-down rollers, provides the friction and motion necessary to pull product away from the gate assembly area. Rotates 50% faster than feed belts to separate and eject the bottom product away from next product entering the gate assembly area.*
CONTROLLER	**Contains the electronics and controls for operating the feeder. Also, it provides AC power and sensor communications to the feeder via an interconnect cable.**
Control panel (top)	*Contains all controls, flight sensor connector, and interface/power connectors.*
Front access panel	*Allows access to controller box interior.*
Cooling fan	*Draws external air into the interior of box to cool components.*
Stand (optional)	*Supports the feeder and controller.*



IQuipped Box Features

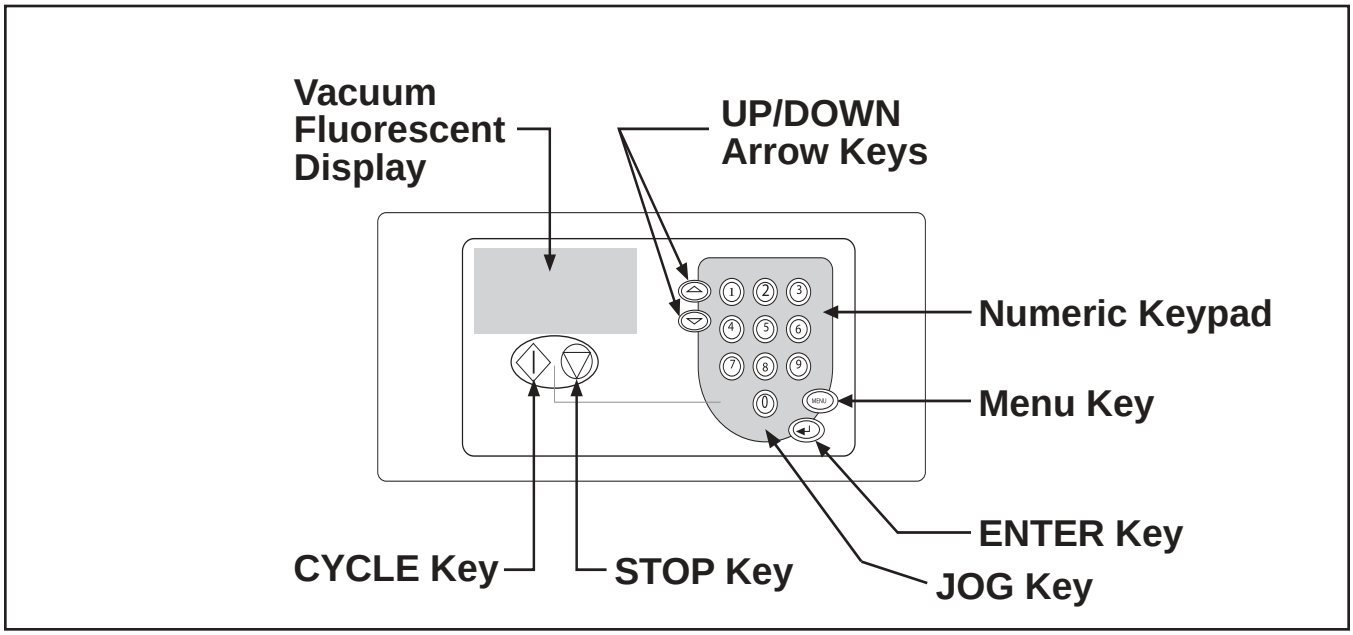
IQuipped Box Feature Descriptions

Feature	Description
AC power cordset connector	Cordset plugs into this IEC320 connector to provide feeder with power from 115-VAC or 230-VAC outlet.
Power On/Off	Toggles AC power On or Off.
Fuse holder	Contains 2 replaceable GMD3, 3.15-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.*
Relay I/O connector	This 14-pin connector is used to output to other devices, either AC or DC voltages, and/or receive input control signals.
Communications port (RS-232)	This 9-pin connector is used to either receive control/data signals from a computer, or send control/data signals to a computer.
Feed/flight trigger	The remote flight-detect sensor plugs into this 4-pin connector to provide the “start” signal to begin a feed cycle.

Control Interface

The control interface consists of a keypad and display arrangement which allows you to not only control the operation of the feeder, but it also allows you to monitor the status of the job being run.

Control Interface Features



Control Interface Feature Descriptions

Feature	Description
Vacuum fluorescent display	This 4-line x 20-character display provides menus for the operator control interface and provides status of feeder during cycling.
Numeric keypad	Used to enter data which controls feeder activity, such as speed or batch count.
UP/DOWN arrow keys	Scrolls through the system configuration menus. Also, is used to increase and decrease the speed or batch count.
MENU key	Toggles display between the Run Display screen and the configuration menus.
ENTER key	Allows run values to be stored from the system configuration menus. Also, it resets the piece count or batch count.
CYCLE key	First, used to advance feeder from the “Suspended” mode to the “Ready” mode. Second, clears feeder faults, such as doubles and missed feeds (if applicable). Finally, completes one feed cycle when in “Ready” mode.
STOP key	Stops the feeder and holds it in “Suspended” mode. Also used to cancel a pending batch.
JOG key	Advances the feed belts at a fixed slow speed. This function is useful during feeder setup and may be used to clear jams.

General

The *control interface* provides you with several different options for monitoring status, entering configuration parameters, and cycling the feeder.

To fully understand how the control interface works, you must first understand the Run Display. The default menu from which you will start all control functions is called the *Run Display*. This screen is the default screen that is shown when you press any key after powering On the machine.

Run Display Defined

The Run Display for *batch* control is a real-time reporting tool containing information on the status of the feeder, such as run speed, number of batches fed for a particular job, and the batch size.

There are three types of status messages available for viewing from the Run Display screen: *Ready*, *Suspended*, and *Running*.

IMPORTANT

Even though the Run Display is factory-set for immediate operation, it can be customized to suit your changing on-site needs. For more information, please see the Technical Information Section of this manual, and/or consult with a qualified technician.

Ready	The feeder is ready to feed when faults (miss, double, and guard open) are cleared and the display reads "ready."
Suspended	The feeder will not feed when it receives a flight signal. Pressing the **CYCLE** key will advance the feeder to the “Ready” mode. Pressing the **CYCLE** key again will cause the feeder to feed.
Running	The feeder is currently feeding product (cycling).

- When the feeder is “ready” to receive a flight signal, the word “Ready” will scroll across the top line. From the Run Display, you can adjust the speed of the feeder by pressing the **UP/DOWN Arrow** keys.
- When the feeder is “suspended” (or idle), the word “Suspended” will scroll across the top line.
- When the feeder is “running,” a rotating wheel is displayed.

Procedures for operating the feeder via the control interface are provided in Section 3, How to Operate.

2 Preparing for Operation

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

Do not attempt to make any adjustments while the machine is 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 SI-1750 is installed, you are then ready to prepare the machine for operation. To do so, you must perform several adjustments with the product you are going to be feeding. And, you must do a test run with this product to verify that it is set correctly before going online. *You will have to perform this procedure for each product that 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 setting

4: Hold-down setting

5: Photo sensor setting

STEP 1: Gate Assembly Adjustment

NOTE

Hopper refers to the space where the product is stacked (made up of the side guides and gate plate).

NOTE

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

Review

The gate assembly provides the curvature to help preshingle product and provides the proper gap to help the feed belts pull product 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 product against the curvature of the gate assembly, and help it contact the feed belts. This preshingling will allow the gate assembly to separate (and singulate) product as it moves toward the gap.

To achieve the optimum separation, you have to use the adjustment knob to either increase (clockwise) or decrease (counter-clockwise) the gap between gate assembly and the feed belts. Depending on the characteristics of the product 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.

Objective

Adjust the gate assembly for minimum gap, with minimum pressure on the product. Feeding problems will occur with either too much pressure on the product, or too large a gap between the gate assembly and the product.

Procedure

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

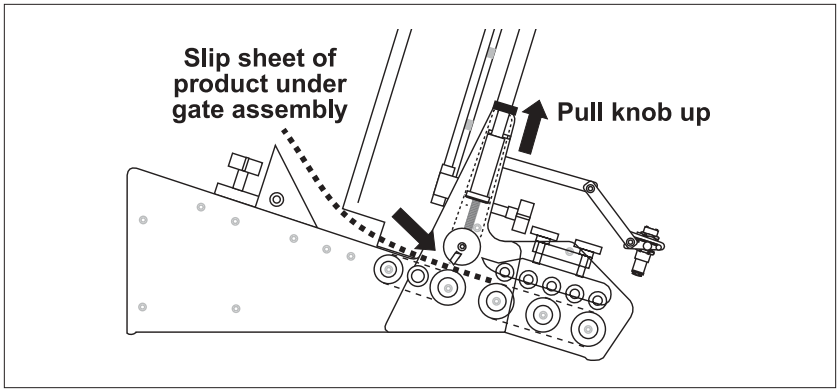
1. Slide a single sheet of sample product under the gate assembly. You may have to pull up on the adjustment knob to allow the product to be inserted.
2. Grasp the product with two hands and slide front-to-back under the gate assembly. A proper adjustment allows a “slight” drag on one-piece thickness of product.
3. Turn the gate assembly adjustment knob until the product has the desired drag: clockwise to increase gap, counter-clockwise to decrease gap.

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

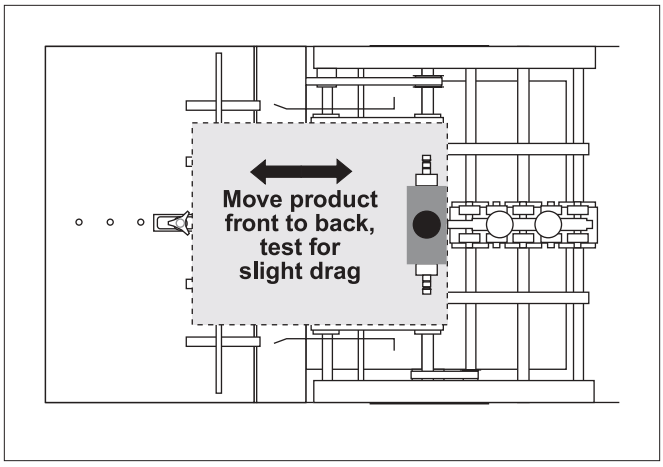
Due to the discharge belt and hold-down assembly spinning 50% faster than the feed belts, excessive gate assembly pressure can cause premature wear to O-rings or feed belts.

TIP

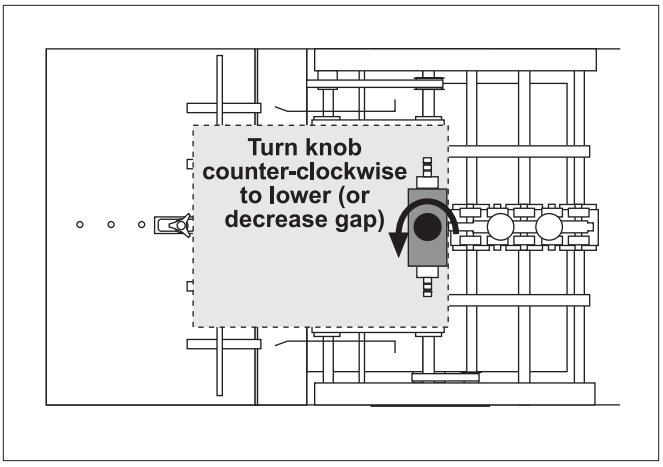
A wider gap between product and belt provides the highest tolerance for curled and bent edges.



Lifting Gate Assembly Upward to Insert Product



Using One-Piece Thickness of Product to Set Gap



Adjusting Gate Assembly for Correct Gap

Changing From Factory Set High-Tension to Low-Tension

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

Review

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

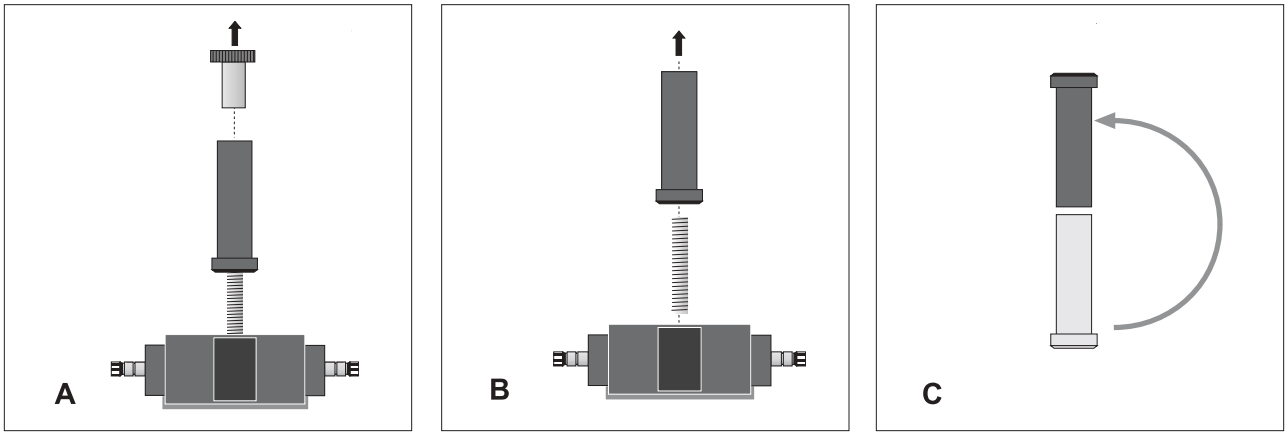
If you are feeding a product of irregular thickness, you should change to low-tension. This provides the following benefits:

- Allows the gate assembly to adjust to the irregular thickness among product pieces.
- Prevents marking on the product by the gate assembly.
- Prevents peeling back the top sheet of a multi-page product.

Procedure

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

1. Remove the gate assembly from gate plate (lift up on knob and tip at slight angle to remove).
2. Remove the adjustment knob by turning counter-clockwise.
3. Lift the cylinder off of top of spring.
4. Turn the cylinder around so that the cylinder collar faces up.
5. Place the cylinder on top of the spring.
6. Replace the adjustment knob (make about 8 revolutions of the knob before reinstalling gate assembly on gate plate).



Adjusting Gate Assembly for Low-Tension

STEP 2:
Side Guides Setting

Review

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

Objective

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

For vertical adjustment, make sure the bottom of the side guides cannot touch the feed belts.

For horizontal adjustment, make sure the space between the side guides can accommodate the size of the product being fed. Consider the following as you adjust the guides horizontally:

- 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 product should rest equally on belts either side of gate assembly. *However, there can be certain instances where guides do not need to be centered due to product characteristics.*
- Adjust both side guides to be as close as possible to either sides of the product, without causing binding, curling of edges, or resistance to movement.

NOTE

The bottom of the side guides cannot touch the feed belt. If the side guides are touching the product edges, skewing may occur as the product is fed through the gate.

TIP

A good "rule-of-thumb" measurement to use is about 1/16 in. (1.6 mm) between product edge and side guide (1/8 in. or 3.1 mm overall).

Procedure

To adjust each side guide for proper *vertical* positioning, follow these steps:

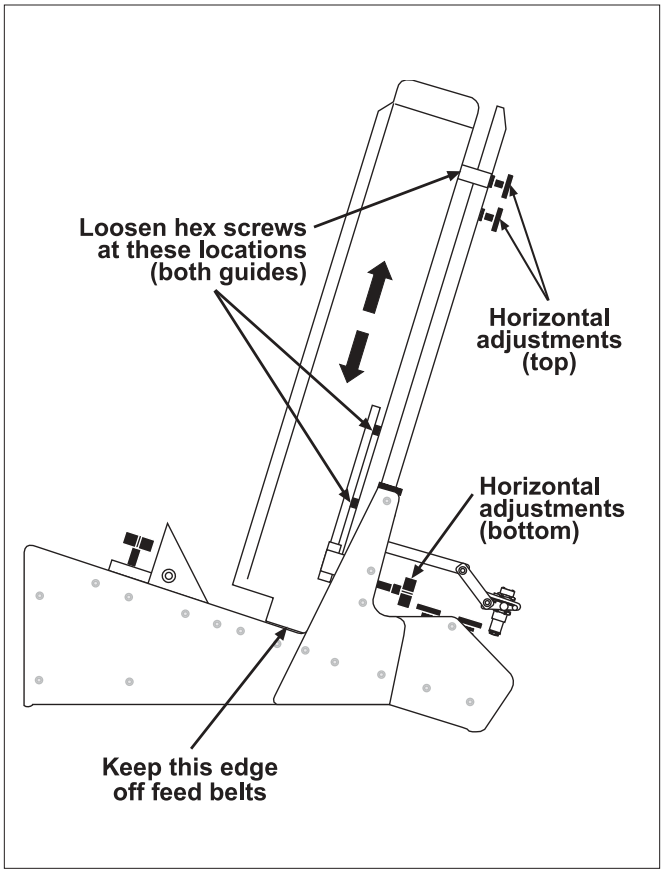
1. For the first guide, loosen the top hex screw that holds the upper part of the guide in place. Notice the slotted hole.
2. Do the same with the bottom two hex screws.
3. Slide the side guides up or down so that it is as low as possible *without touching the feed belt*.
4. Tighten all hex screws. Check clearance again.
5. Repeat steps 1 – 4 for second guide.

If the bottom edges of the side guides are too close to the feed belts, then contact between the two may occur while the machine is running, thus causing damage to the belts.

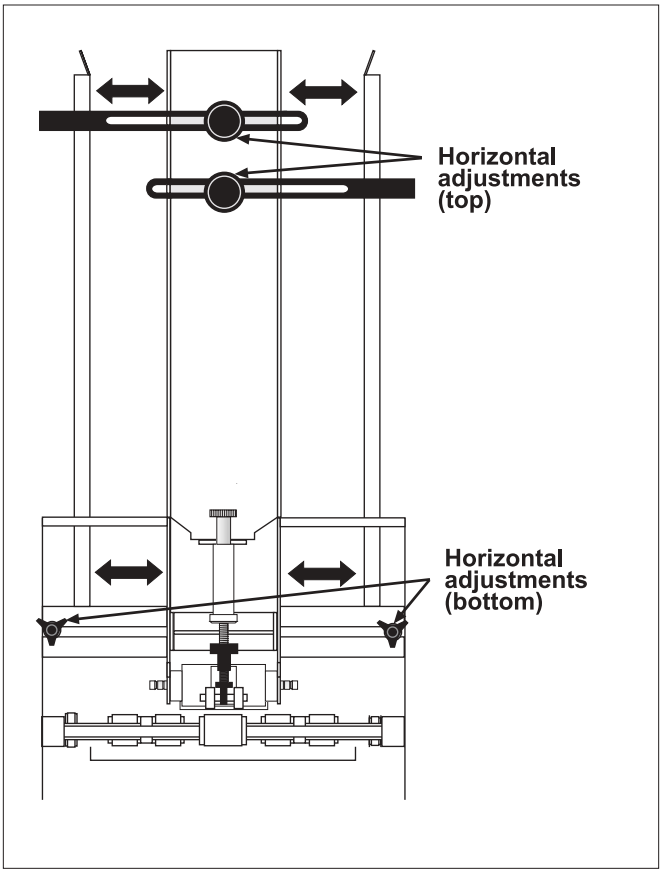
To adjust each side guide for proper *horizontal* spacing, follow these steps:

1. With a small stack of material in the hopper, start by loosening the bottom adjustment knob (counter-clockwise).
2. Grasp the lower part of each guide and move to the recommended distance from the product: 1/16 in. (1.6 mm) for each edge, 1/8 in. (3.1 mm) overall. Tighten the lower adjustment knob after you do this for each guide.
4. At the upper part of each guide, loosen the top adjustment knob (counter-clockwise).
5. Grasp the upper part of each guide and move to the recommended distance from the product: 1/16 in. (1.6 mm) for each edge, 1/8 in. (3.1 mm) overall. Tighten the upper adjustment knob after you do this for each guide.
6. Visually check both guides for parallel.

Avoid adjusting the side guides too close to the feed belts. Even slight contact with the belts can cause premature wear or even belt failure.



Vertical Adjustment of Side Guides



Horizontal Adjustment of Side Guides

STEP 3: Back Wedge Adjustment

NOTE

Keep in mind that the back wedge works with the gate assembly to provide the proper lift, curvature of the product, and proper belt/product 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.

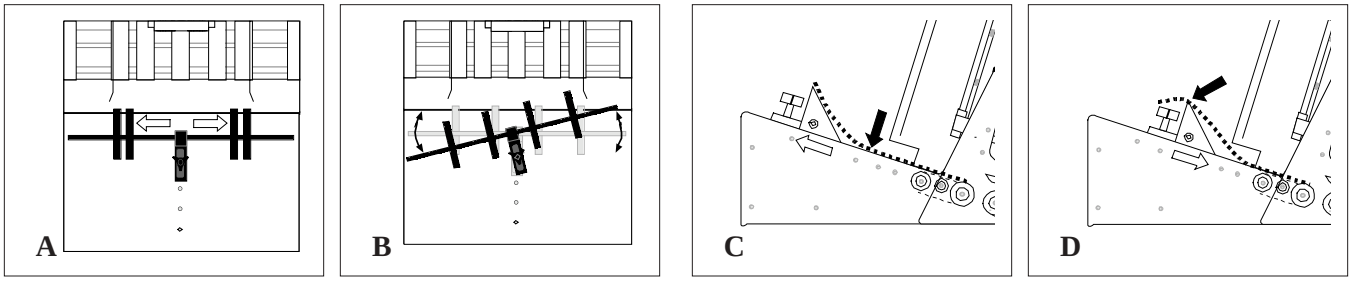
Review

The back wedge provides proper lift to the product to help keep it off the table top and feed belts, and it creates the force necessary to push product 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 product 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 product:

- *Moving the individual triangle wedges to the outside* of the back wedge shaft will create a bow in the center. The bow will stiffen the product to promote better singulation of thinner product.
- *Pivoting the back wedge from its perpendicular to the gate assembly* will increase or decrease the amount of drag of contact (or traction) on the feed belts for a given side. This can also be used to control twisting or skewing of product as it leaves the gate assembly area.
- *If the back wedge is positioned too far backward* from the gate assembly, then the belts are driving the product before the bottom sheet has separated and left the gate assembly area. This pushes the gate assembly up, creating more pressure on the product, 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 product at a time to be forced under the gate assembly, creating a double feed.

  By moving the back wedge forward, only the bottom product 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, then a pinch point can be created between the top corner of the individual wedges and the product. Moving the back wedge even closer towards the gate assembly can allow product to overhang the corner of the wedge, creating too much lift of the product off the feed belts.



Tips for Proper Back Wedge Adjustment

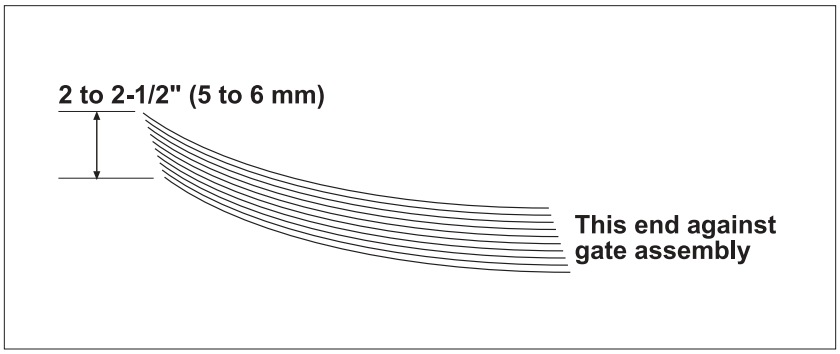
Objective

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

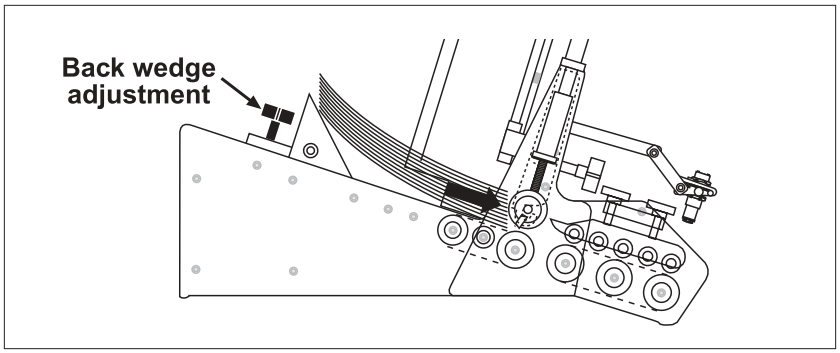
Procedure

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

1. Grasp a handful of product, approximately 2 to 2-1/2 in. (5 to 6 cm) thick, and preshingle the edges with your thumb.
2. Place the preshingled material in the hopper so that the edges rest against the curvature of the gate assembly.
3. Turn the back wedge knob counter-clockwise to loosen the wedge.
4. Move the back wedge forwards and backwards until the bottom sheet is not touching the table top. A good starting point is to measure about 5/8 in. (16 mm) from the bottom sheet to front edge of table top. Then as you test, you can “fine tune” from this point. *Refer back to the previous page for other helpful guidelines.*



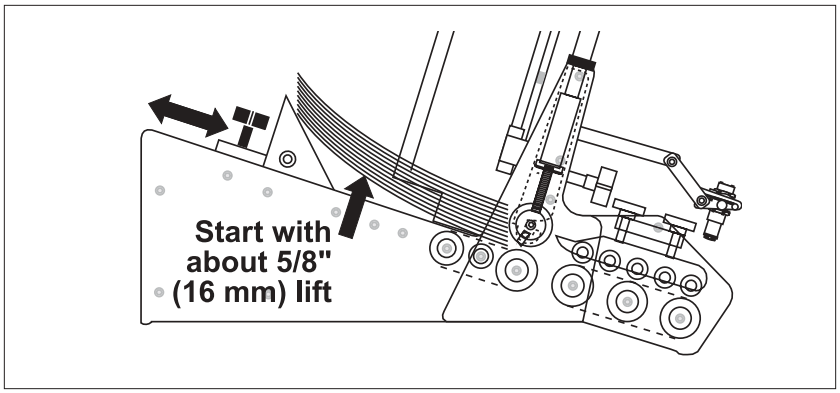
Preshingling a Small Stack of Material By Hand



Positioning Product Prior to Loosening Back Wedge

NOTE

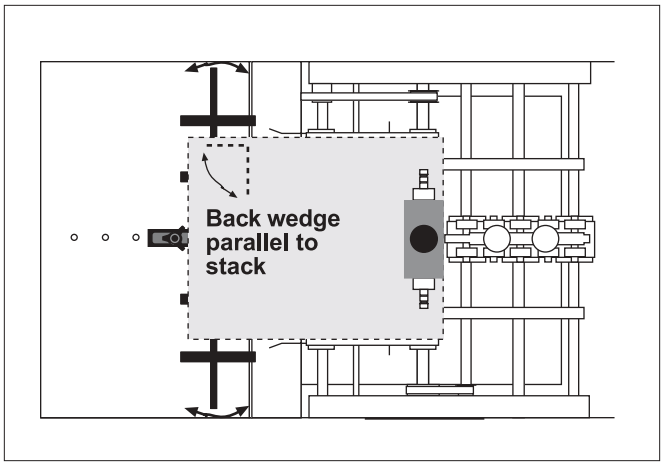
Moving the back wedge too far forward to the gate assembly can create a pinch point between the tip of the triangle wedges and the product. If moving the back wedge in is not effective, then an optional wedge may be required.



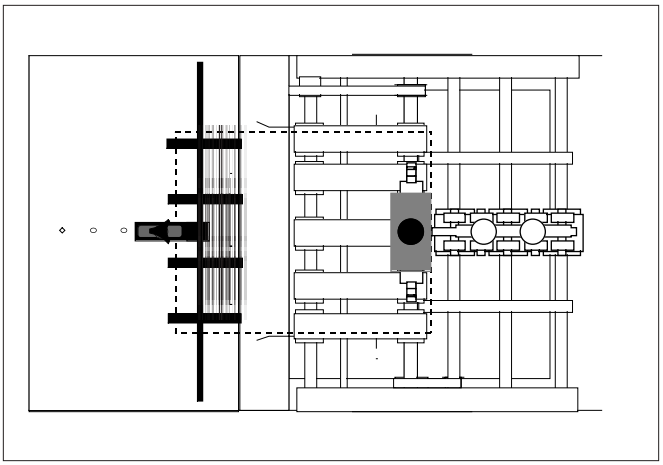
Adjusting Back Wedge for Proper Lift

5 Make sure the edge of the back wedge assembly is parallel with the edge of the product stack. Adjust as required and then tighten knob.

6. Check that individual triangle wedges are evenly spaced to provide enough support to lift the product off the table top and feed belts, without any bowing or twisting.



Adjusting Back Wedge for Parallel



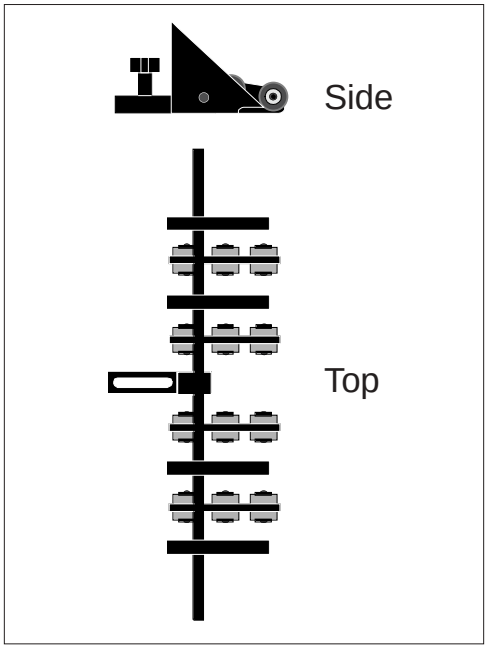
Evenly Adjusting Individual Wedges

Now that you are familiar with the basic principles of using a wedge, it is simply a matter of combining these principles to all wedges.

The following wedges are covered:

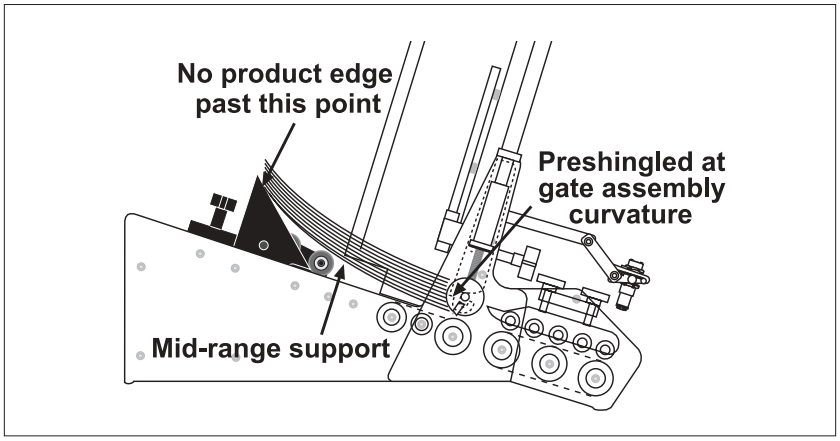
- Combination triangle/low-profile
- Separate triangle and low-profile
- Separate articulating roller and low-profile
- Articulating roller
- Extended narrow

Combination Triangle/ Low-Profile



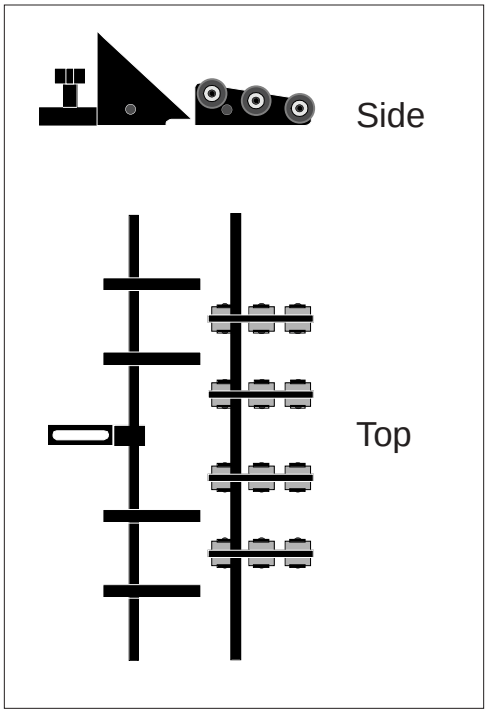
When to use: For thin product with minimal body, thus requiring minimal mid-range support.

Setup guidelines: Adjust so that bottom of stack preshingles against the curvature of gate assembly; make sure edges of product do not touch or overhang tip of triangle wedges, as this creates pressure points. Roller(s) should lift bottom of stack off table top to eliminate friction and create body.



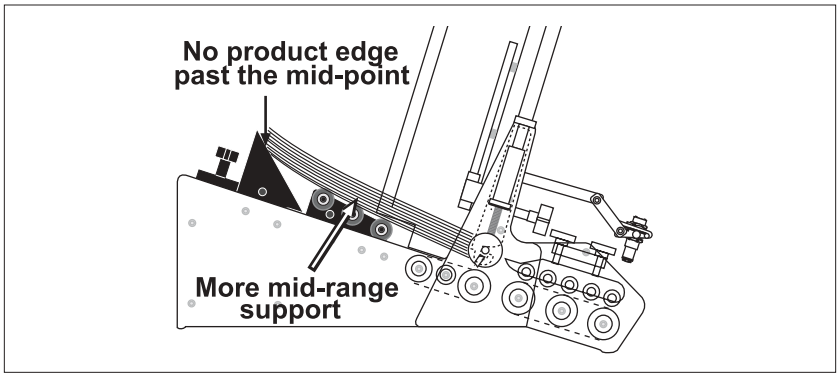
Combination Triangle/Low-Profile Wedge Setup

Separate Triangle and Low-Profile



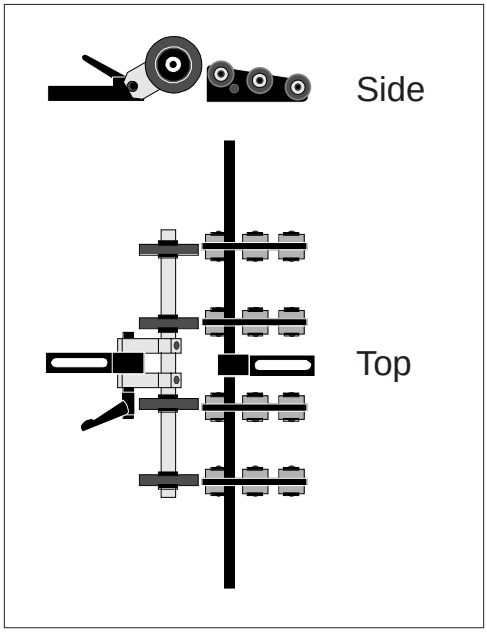
When to use: If moving combination triangle/low-profile wedge assembly back from the gate assembly, bottom of stack still touches table top. This means you need even more mid-range support.

Setup guidelines: Adjust the triangle wedge the same way that you would the combined triangle/low-profile wedge assembly (see previous page). Set the low-profile wedge relative to the triangle wedge so that it lifts bottom of the stack off the table top to eliminate friction and create body. Again, make sure edges of product do not touch or overhang tips of triangle wedges.



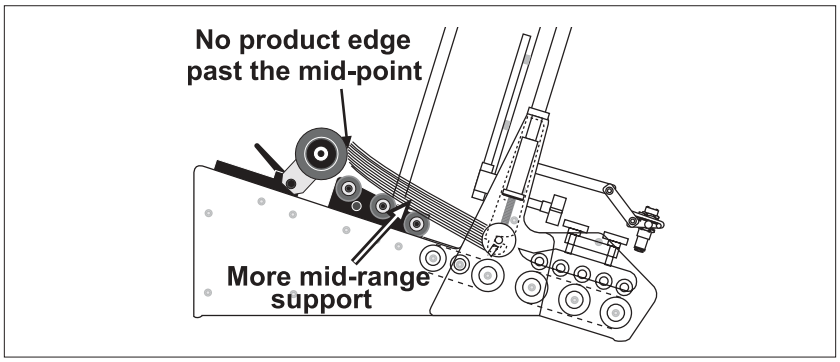
Separate Triangle and Low-Profile Wedge Setup

Separate Articulating Roller and Low-Profile



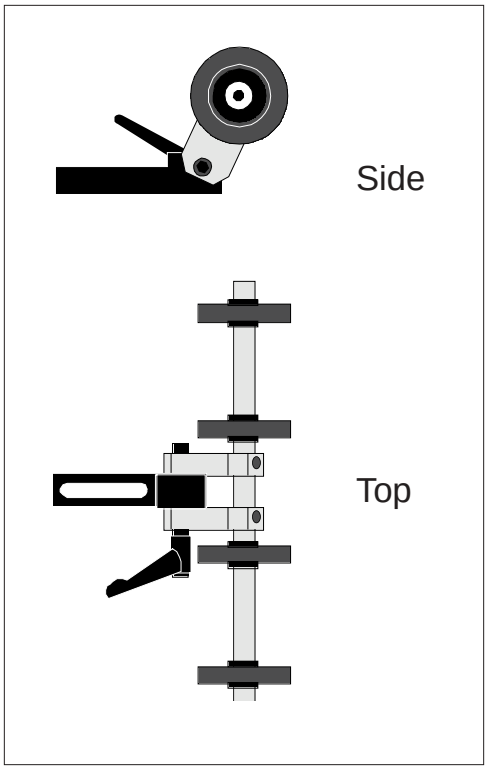
When to use: For thicker product with more body, thus requiring medium mid-range support. Longer product may also benefit.

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 product do not extend back more than mid-point of rollers. Set the low-profile wedge so that roller(s) lift bottom of stack off the table top to eliminate friction and create body.



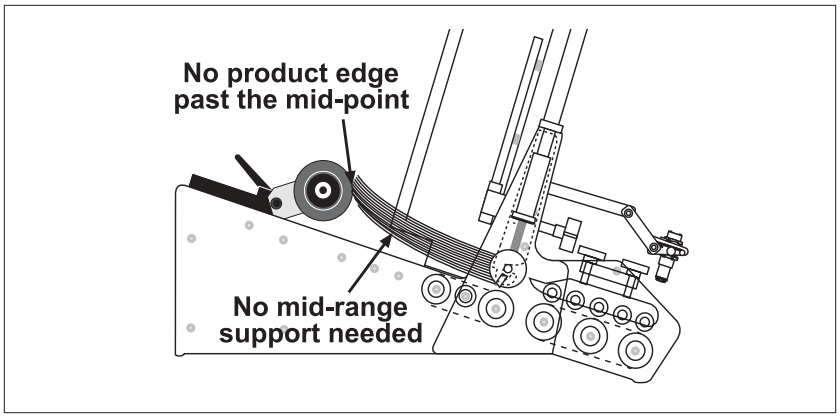
Separate Articulating Roller and Low-Profile Wedge Setup

Articulating Roller



When to use: Effective for very thick and/or ridged product requiring virtually no mid-range support.

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



Articulating Roller Wedge Setup

STEP 4:
Hold-Down Setting

Review

The hold-down assembly consists of several adjustable rollers which rest on top of the product as it exits the gate assembly area. With the correct amount of pressure applied to the product, the discharge belt will have the proper amount of contact and friction needed to pull product away from the gate assembly area. Incorrect hold-down pressure can cause overlap or insufficient gap between one product and the next.

Objective

Adjust the hold-down rollers to the proper amount of pressure to allow the discharge belt to pull and separate the bottom sheet as it exits the gate assembly area.

Procedure

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

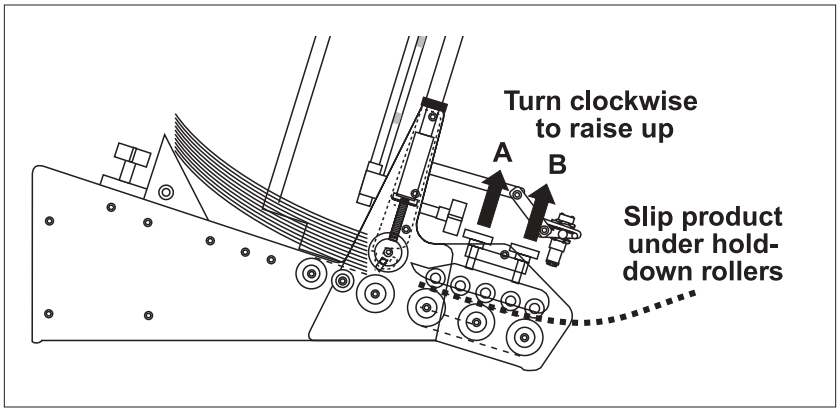
1. Insert one piece of product to be fed under the hold-down assembly. To facilitate this, turn all knobs clockwise several turns.
2. Turn knobs A and B counter-clockwise to lower the hold-down assembly so that a slight drag exists between the product and the hold-down rollers. Verify slight drag by sliding product side-to-side.
3. Turn knob A clockwise 1/8-turn so that slightly less drag exists on the roller closest to gate assembly. Again, verify drag by sliding product side-to-side.
4. Recheck knob B for proper drag on roller farthest from gate assembly (drag may have changed while adjusting knob A).

IMPORTANT

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

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

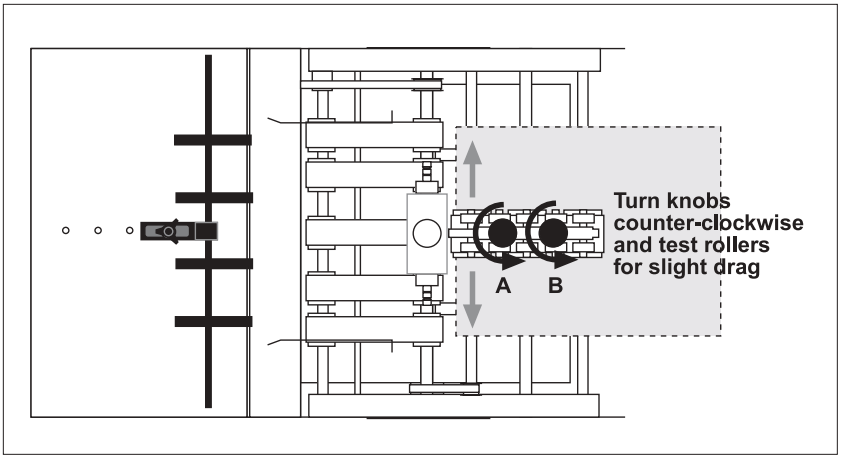
Due to the discharge belt and hold-down assembly spinning 50% faster than the feed belts, excessive gate assembly pressure can cause premature wear to O-rings or feed belts. Review “Step 1, Gate Assembly Adjustment”.



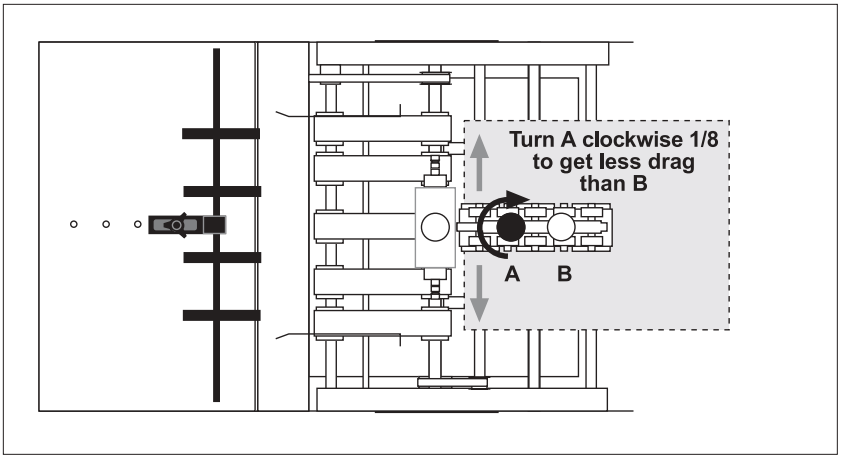
Inserting One Piece of Product Under Hold-down

NOTE

Often after you adjust the first roller you have to go back and readjust the second roller to make sure that the drag is correct.



Turning Knobs Counter-Clockwise to Insert Product



Turning Knob "A" Clockwise to Get Slight Drag

STEP 5: Photo Sensor Adjustment

Review

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

*For preparation for operation, your initial concern should be in properly adjusting the **Sheet** photo sensor.*

Objective

For the **Sheet** photo sensors to be effective, they must be adjusted within a specified range and angle to the product.

NOTE

Standard photo sensors shipped from the factory are two diffuse reflective detectors. No adjustment for gain is required or necessary.

NOTE

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

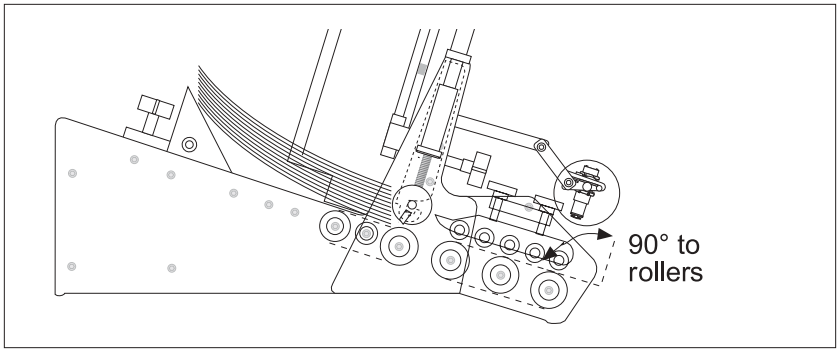
TIP

Avoid light colored backgrounds in the discharge area.

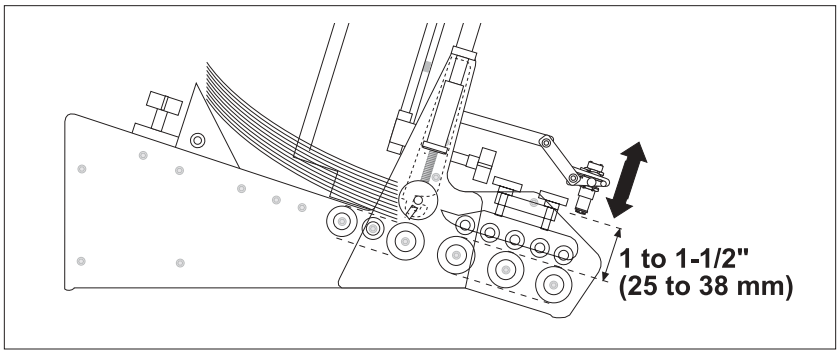
Procedure

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

1. Aim and align the photo sensor straight toward (perpendicular to) the product. If the photo sensor is at an angle, the light will not be reflected straight back to the receiver.
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. If the photo sensor needs further adjustment, loosen the two threaded locknuts.
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.*



Adjusting Photo Sensor for Perpendicular Position



Adjusting Photo Sensor for Distance

Manual Test To Verify

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

Prepare your test by loading the hopper with approximately 2 to 2-1/2 in. (5 to 6 cm) of product. Make sure you preshingle the stack so that product rests against the curvature of the gate assembly.

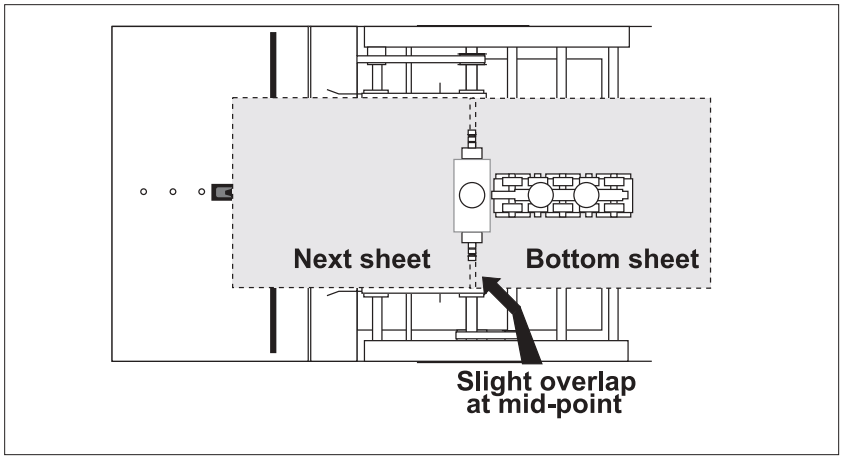
1. Manually feed several sheets of product slowly through the gate assembly area. Move the drive belts by pressing your thumb against the discharge belt.
2. Observe how individual product enters and exits the gate assembly area. Remember, a properly set gap will allow each new sheet to enter at about the center line of the cylinder while the bottom sheet is exiting the gate assembly area. Ideally, this means a slight overlap of both the first sheet and the second sheet (1/8 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, then move the wedge in towards the gate assembly. Test again.
4. If sheets are overlapping excessively or, if the machine is feeding doubles, then reduce the gap slightly by moving the knob about 1/8 turn counter-clockwise. Test again.
5. As product moves through the hold-down area, check for any skewing or jamming. Also check for damage to the product.
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 product through the gate assembly area. This will cause “missed” feeds.

NOTE

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 product. If moving the back wedge in is not effective, then an optional wedge may be required. See Appendix A for more information.



Optimum Overlap and Separation of Product

3 How to Operate

Operational Sequences

Successful power-up and operation of the feeder is assured if you apply each of following sets of procedures where needed:

- Loading product
- Quick setup/cycle sequence
- Accessing the menus for setup
- Starting a cycle
- Stopping the feeder
- Clearing a jam

Loading Product

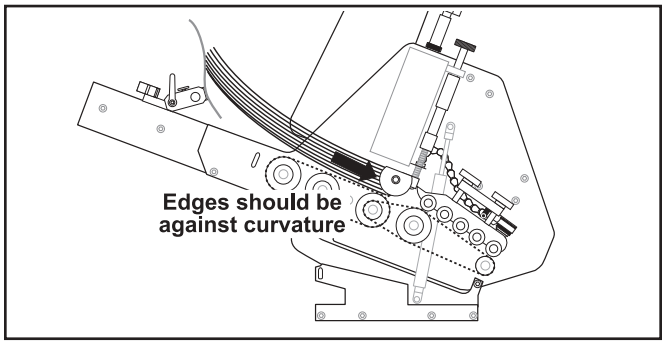
1. Preshingle a small stack of material and load in hopper.
2. With one end of the stack resting against the gate assembly, the other end will be resting on the back wedge.
3. Gradually add more product to the hopper. As stack height will have a preferred minimum and a maximum, you will have to experiment to determine the effective range of height.
4. As you add product, tamp each hand-full of product with your hand to make sure it rests evenly against the back plate.

NOTE

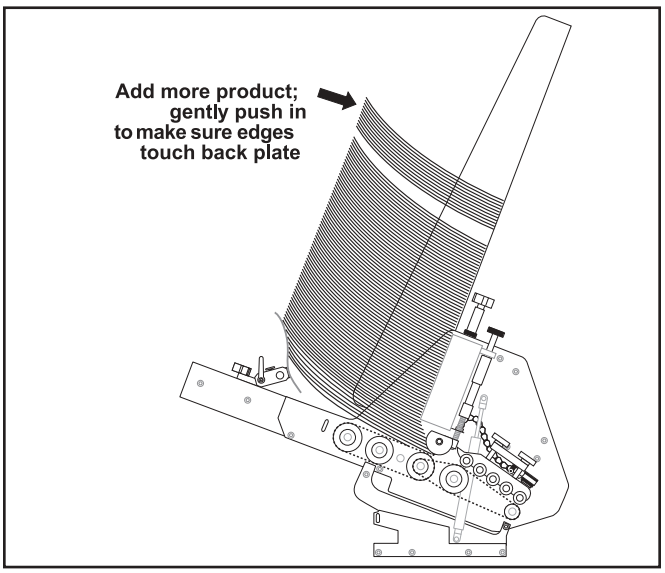
Preshingling prevents multiple sheets from jamming under the gate assembly at start-up.

TIP

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



Placing Product Against Gate Assembly



Adding More Product to Fill Hopper

Quick Setup/Cycle Sequence

If the feeder is prepared for operation and you want get the feeder started in the quickest way possible, use the following sequence:

IMPORTANT

Even though the Run Display is factory-set for immediate operation, it can be customized to suit your changing on-site needs via the "Passcode" menu. For more information, please consult with a qualified technician.

1. Turn power **On**.
2. Press *any* key to advance to "Suspended" screen.
3. Press **UP/DOWN Arrow** keys to desired speed percentage.
4. To set batch size:
   a. Press **MENU** key.
   b. Press **UP/DOWN Arrow** key until batch size is displayed .
   c. Press **ENTER** key.
   d. Press **UP/DOWN Arrow** key to desired batch size ***OR*** enter the desired batch size via the keypad.
   e. Press **ENTER** key to save.
   f. Press **MENU** key to return to "Suspended" screen.
   g. Press **CYCLE** key to advance to "Ready" screen.
   h. Trigger the flight-detect sensor to begin feeding *or,* press **CYCLE** key to test feed for one cycle.

Accessing the Menus for Setup

If you wish to configure all the parameters of your machine via the menus, use the following sequence for accessing the menus:

1. Turn power **On**.
2. Press *any* key to advance to “Suspended” screen.
3. Press **MENU** key.
4. Press **UP/DOWN Arrow** keys to view available menus:
   - Menu 1 Speed
   - Menu 2 Size
   - Menu 3 Clear
5. Press **ENTER** key to change speed or reset job count.
6. Press **UP/DOWN Arrow** keys to desired speed percentage or batch size.
7. Press **ENTER** key to save change.
8. Press **MENU** key to return to “Suspended” screen.

IMPORTANT

Menus can be customized to suit your changing on-site needs via the “Passcode” menu. For more information, please consult with a qualified technician.

TIP

Press and hold the UP/DOWN Arrow keys to quickly change values.

TIP

Press the MENU key to restore old value and return to “Suspended” screen.

Starting a Cycle

Once setup is complete, you can perform the following steps to start feeding.

1. Turn power **On**.
2. Press *any* key to advance to “Suspended” screen.
3. Press **CYCLE** key to *stage* product and advance to “Ready” screen.
4. Trigger the flight-detect sensor to begin feeding *or*, press **CYCLE** key to test feed one cycle.

Stopping the Feeder

The feeder can be stopped either manually or automatically. Pressing the **STOP** key will stop feed cycles and return the feeder to the "Suspended" status.

When a product fails to be staged in a preset amount of time, the feeder will automatically *timeout* or stop. If this occurs, the display will read "Feeder Timeout." Determine and resolve the cause of the *timeout* and press the **CYCLE** key to resume feeding.

Clearing a Jam

NOTE

*Pressing the **JOG** key to advance the feed belts may clear some jams. If the JOG key does not work, use the procedure listed.*

If a jam occurs during operation, follow these steps:

1. Turn power **Off**.
2. Open the discharge safety shield.
3. Remove jammed product from feeder. While doing so, try to determine the cause of the jam.
4. Verify whether any adjustments are loose. If so, refer back to Section 2, Preparing for Operation, for proper adjustment procedures.

Shutdown

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

1. Turn power **Off**.
2. Disconnect feeder from AC power source.
3. If removing the **Flight-Detect** photo sensor from the production line, disconnect cable connector from feeder and coil up for storage.

4 Troubleshooting

This table will provide you with quick solutions to the more common day-to-day problems you may encounter.

Quick-Look Troubleshooting

Problem	Cause	Solution
No AC power to feeder	1. On/Off switch in “Off” (or “0” position).	Check that switch pressed to “On” (or “—” position).
	2. Power cord loose or not plugged into outlet (or AC power source).	Check and secure power cord at AC outlet.
	3. Female end of power cable loose or not plugged into AC power inlet at rear of feeder.	Check and secure cord at AC power inlet (rear of feeder).
	4. Interconnect cable loose or not connected at controller box.	Check and secure interconnect cable end at controller box. Make sure it is locked.
Feeding doubles	1. Gate assembly improperly adjusted (possibly more than one sheet thickness).	Review gate assembly adjustment in Section 2, “Preparation for Operation”.
	2. Back wedge improperly adjusted.	Review back wedge adjustment in Section 2, “Preparation for Operation”.
	3. Worn angled edge (or if applicable, O-rings).	Replace angled edge. Or if applicable, rotate O-rings. (see Section 5, “Inspection and Care”, for procedure). If wear is excessive, consult with a qualified technician.*
	4. Product interlocking.	Check product and source.
	5. Static buildup.	Check product and source.
Continuous feeding, no gap	1. Possible overlapping.	See “Feeding Doubles” above.
	2. Incorrect hold-down pressure adjustment.	Review hold-down setting in Section 2, “Preparation for Operation”.
Continuous feeding, with gap	1. Photo sensor out of adjustment relative to product (target). Background objects such as shafts, guides, belts, and supports may be causing false returns.	Re-adjust feeder extension/photo sensor to “see” product only. Review photo sensor adjustment in Section 2, “Preparing for Operation”.

Quick-Look Troubleshooting (continued)

Problem	Cause	Solution
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.	Review loading the product in Section 3, “How To Operate”.
	2. Binding in side guides.	Adjust the side guides further apart to allow freedom of movement between sheets.
	3. Slippery feed belts due to buildup of material.	Consult with a qualified technician.
	4. Sheet adhesion or interlocking between the bottom and next sheet.	Review loading the product in Section 3, “How To Operate”, or review back wedge adjustment in Section 2, “Preparation for Operation”.
	5. Gate assembly may be down too tight.	Review gate assembly adjustment in Section 2, “Preparation for Operation”.
	6. Too much weight in hopper.	Remove product from stack. Test again.
Feed belt(s) not tracking on rollers	1. Excessive weight in hopper.	Reduce weight. Test again.
	2. Excessive down pressure on gate assembly.	Rotate clockwise 1/8 turn to increase gap and manually test. Also, review gate assembly adjustment in Section 2, “Preparation for Operation”.
	3. Off-centered product from gate plate.	Review side guides setting in Section 2, “Preparation for Operation”.
	4. Stack is bearing down on edge of belt.	Move stack away from belt, even if this causes stack to be aligned off center from center line of feeder.
	5 Belt wear.	Review gate assembly adjustment and back wedge adjustment in Section 2, “Preparation for Operation”. Also, see Section 5, “Inspection and Care”. If wear is excessive, consult with a qualified technician.*
	6. Rollers out of adjustment.	Consult with a qualified technician.
Jamming occurs during operation	1. Improper adjustment of any of the following areas: • gate assembly • back wedge • hold-down assembly	1. Turn the Power switch to Off by pushing the circle (O). 2. Remove jammed product from feeder. While doing so, try to determine the cause of the jam. 3. Verify each adjustment by reviewing Section 2, “Preparation for Operation”.

5 Inspection and Care

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

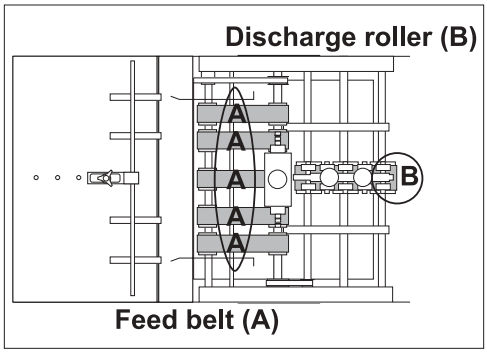
Do not attempt to make any adjustments while the machine is running. Failure to do so can expose you to moving parts which can cause serious injury. Do not wear loose clothing when operating the feeder.

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.

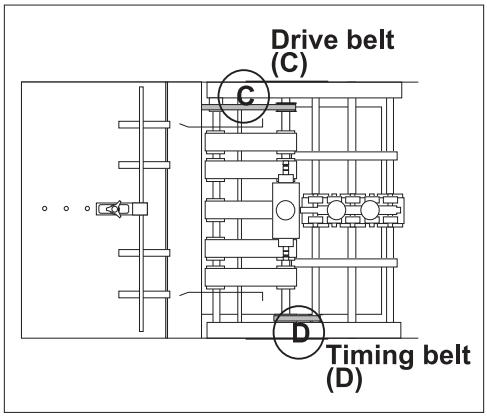
Visual Inspection



Checking for Feed and Discharge Belt Wear

Check for visual signs of:

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



Checking for Timing and Drive Belt Wear

Check for visual signs of:

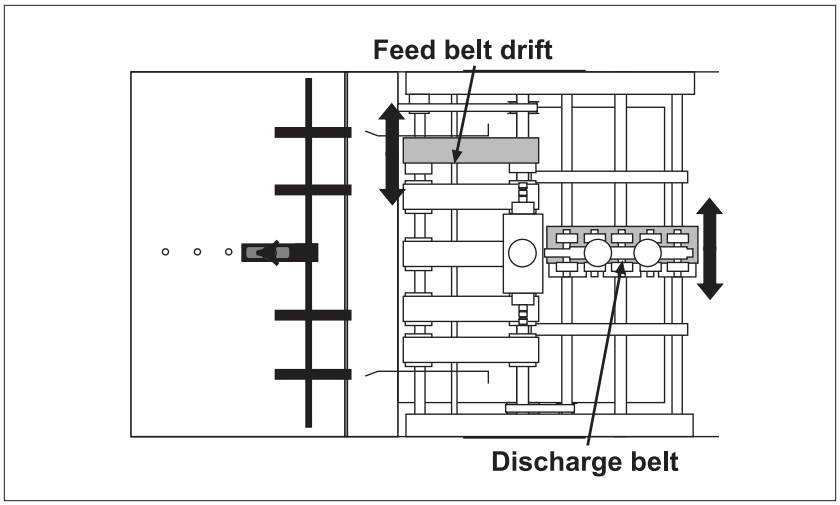
- Fraying. Replace as required.
- Missing teeth. Replace as required.
- Cracking. Replace as required.

Visual Inspection (continued)

Ensuring Proper Feed and Discharge Belt Tracking

Check for visual sign of:

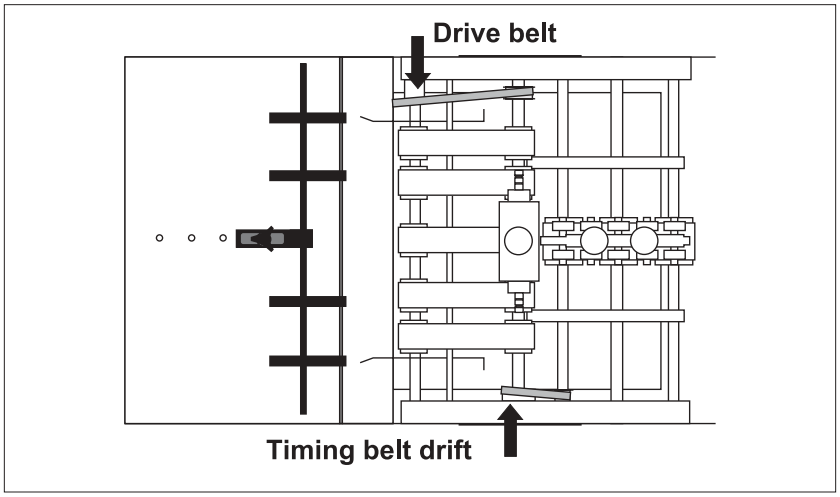
- Stretching.
- Improper roller adjustment.



Ensuring Proper Timing and Drive Belt Tracking

Check for visual signs of:

- Misaligned timing pulleys.



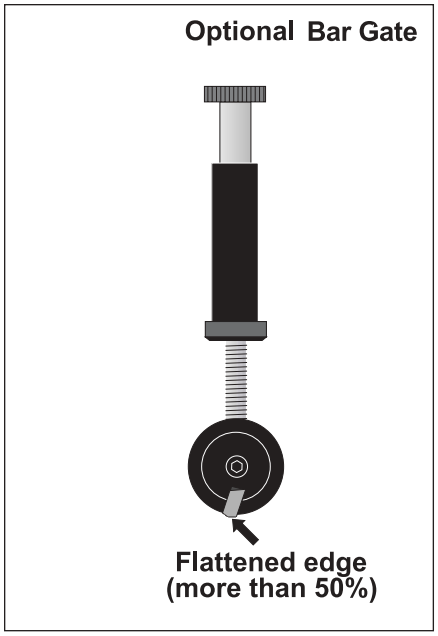
Visual Inspection (continued)

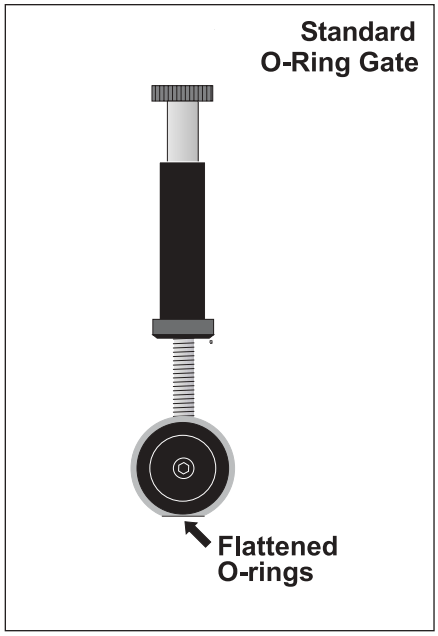
Checking for Gate Assembly Wear

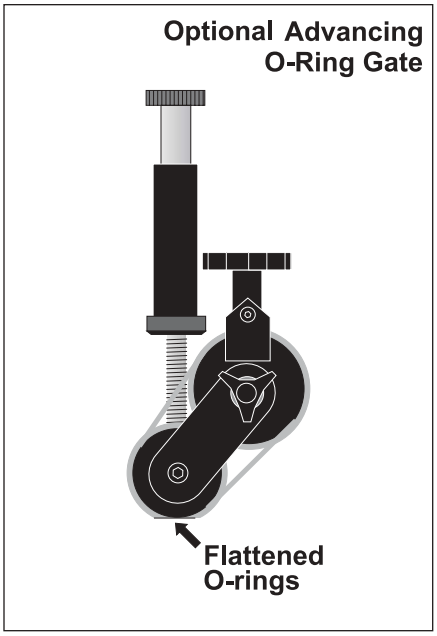
Check for visual signs of wear:

- Bar gate: Angled wedge begins to flatten excessively.
- Standard O-ring or advancing O-ring (if applicable): Flat areas along the O-rings.

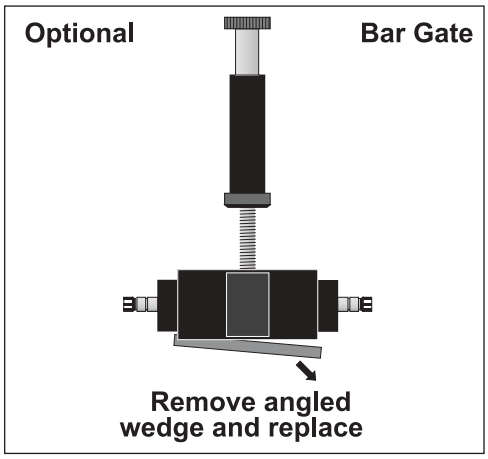
See “Preventative Care” to follow.







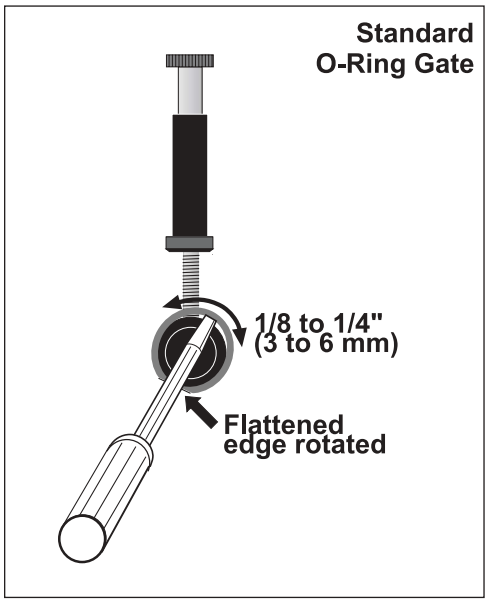
Visual Inspection (continued)



Replacing Worn Angled Wedge

To replace a worn angled wedge:

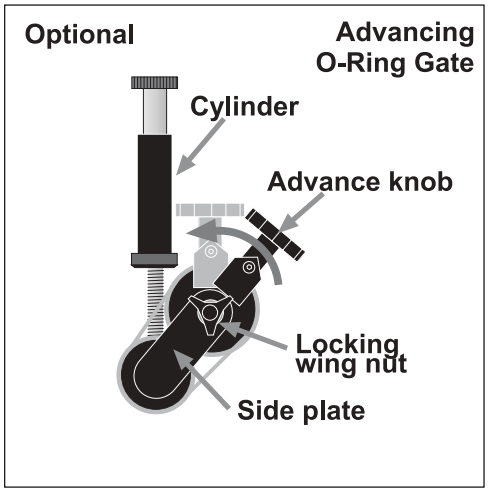
1. Turn Off feeder and remove power cord from outlet.
2. Remove gate assembly from gate plate.
3. Use a pliers to grip and remove angled wedge.
4. Install new wedge by inserting one end and then pushing in until centered. *Do not grip new wedge with pliers as this may cause damage to the edge.*
5. Reinstall gate assembly and restore power.



Standard O-Ring Gate: Adjusting Worn O-Rings

To adjust worn O-rings on standard O-ring gate:

1. Turn Off feeder and remove power cord from outlet.
2. Remove gate assembly from gate plate.
3. Insert a screwdriver in slot on top of gate assembly and rotate screwdriver clockwise or counter-clockwise 360° so as to move worn area of O-ring about 1/8 to 1/4 in. (3 to 6 mm).
4. Remove screwdriver and repeat for each ring as necessary.
5. Reinstall gate assembly and restore power.



Advancing O-Ring Gate: Adjusting Worn O-Rings

To adjust worn O-rings on advancing O-ring gate:

1. Turn Off feeder and remove power cord from outlet.
2. Make sure advance knob is in-line with the side plate and secure. Then loosen left and right locking wing nuts.
3. Rotate O-rings by grasping advance knob and pushing towards gate cylinder about 1/8 to 1/4 in. (3 to 6 mm).
4. Retighten locking wing nuts. Then loosen advance knob and move to original position (in-line with side plate). Retighten.
5. Reinstall gate assembly and restore power.

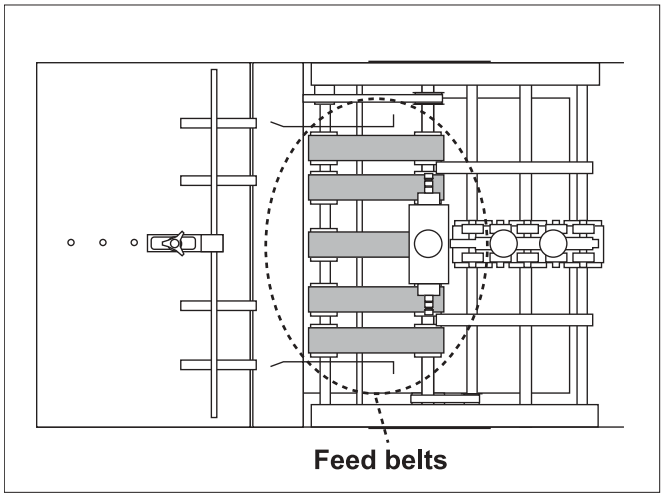
Preventative Care

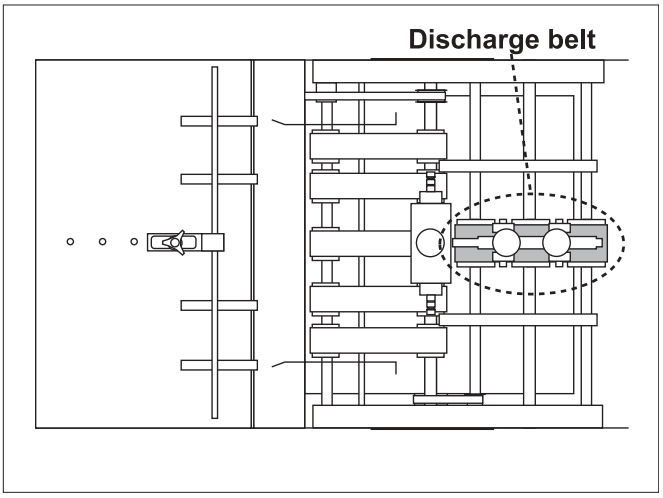
Use only isopropyl alcohol (98% concentration). Other solvents can cause belts to wear prematurely, and even total breakdown of material.

Cleaning Feed and Discharge Belts

To clean feed and discharge belts:

1. Turn Off feeder and remove power cord from outlet.
2. Remove gate assembly from gate plate for easier access to belts.
3. Apply a small amount of isopropyl alcohol to a soft cloth.
4. Use your hand to move the discharge 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 also. After several rotations of the belt, repeat for each belt.
5. 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.
6. Repeat steps 3 – 5 for the discharge belt also.
7. Reinstall gate assembly and restore power.





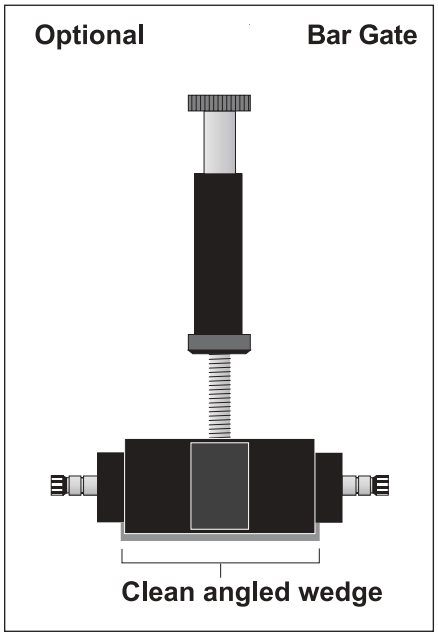
Preventative Care (continued)

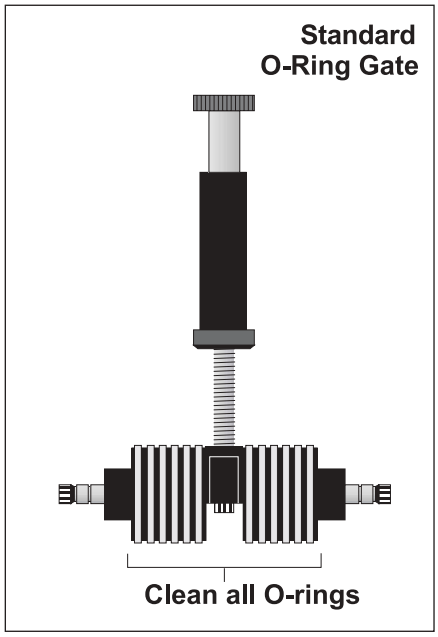
Cleaning Gate Assembly

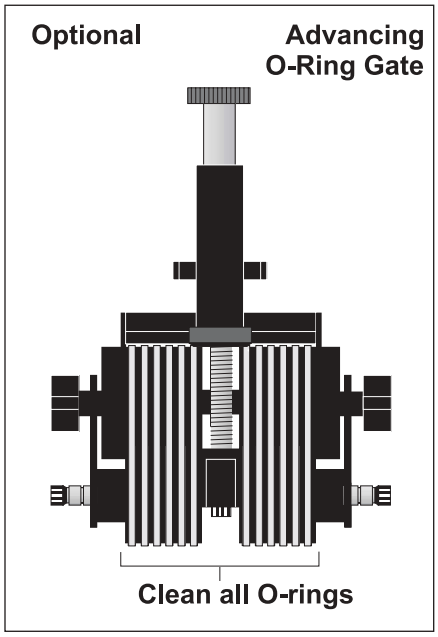
Use only isopropyl alcohol (minimum 98% concentration). Do not use any other types of solvents. They can cause premature wear of the belts, or even total breakdown of the material.

To clean gate assemblies:

1. Turn Off feeder and remove power cord from outlet.
2. Remove gate assembly from gate plate.
3. Apply a small amount of isopropyl alcohol to a soft cloth.
4. Wipe across angled wedge (or O-rings if applicable), first in one direction, then the other.
5. Taking a dry portion of the cloth, go back and wipe all surfaces to ensure they are dried.
6. Reinstall gate assembly and restore power.





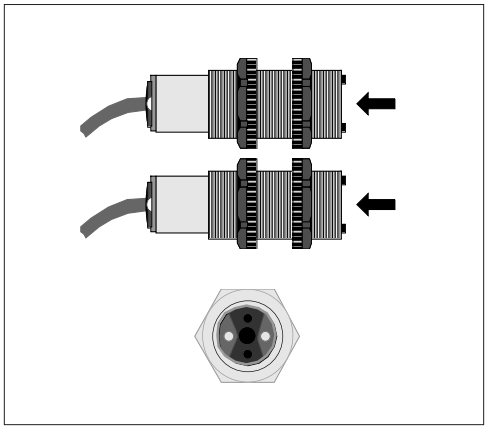


Turn off feeder and disconnect from main power source before cleaning. Do not attempt to open the access cover. Equipment interior contains incoming 120- or 240-VAC electrical power. Bodily contact with these high voltages can cause electrocution, which can result in serious injury or death.

Cleaning Controller Box

Visually check the fan ventilation area of the controller box for excessive dust or grime buildup that might inhibit air movement. For more information, consult with a qualified technician.

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



Cleaning Photo Sensors

To clean the photo sensor lenses:

1. Turn Off feeder and remove power cord from outlet.
2. Using a soft, dry cloth, wipe across the face of each lens.
3. Recheck the adjustments of both photo sensors to make sure they are still in alignment to the targets.
4. Restore power.

Emergency Stop Control

Emergency Stop (E-Stop) switches are intended for the safety of the machine operator in the event of an emergency. E-Stop switches should never be used as normal start/stop or power on/off switches.

Streamfeeder Universal Friction Feeders are almost always used as a component piece of equipment in a larger system. Streamfeeder does not include an E-Stop switch on our feeders because any E-Stop that is present must shut down the entire system, and not just the individual feeder.

It is important that you give consideration as to whether an E-Stop switch should be installed at the location where this feeder will be used. If you are not sure what is required, we recommend you check with local authorities, a competent engineering consulting firm, or a competent electrical contractor. On request, we will provide information on how to wire our feeder into your system E-Stop circuitry.

Remote Stop Input

The remote stop (R-Stop) input option allows the ST Series feeder to be connected to an external Run/Stop switch or host device relay contact. Removing power from this input module (#7) will cause the feeder to stop regardless of the product's position.

IMPORTANT

THE REMOTE STOP SHOULD NOT BE USED AS AN EMERGENCY STOP.

Menu configuration for the R-stop input allows the R-stop hardware input to be enabled or disabled. In addition, it allows you to specify whether or not operator intervention should occur after the R-stop signal clears. Refer to Configuring the System Menus for complete details. Connections to the 14-pin I/O connector will be made via the 8-foot cable included with this option.

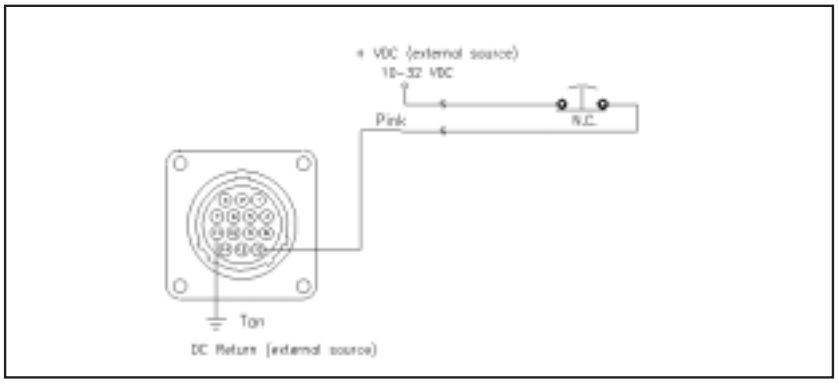
Wiring to External Switch or Relay Contacts; Power Supplied by Host System

There are two ways the R-stop input can be wired when the host device and not the feeder supplies power.

NOTE

This option requires software version 1.05 or greater.

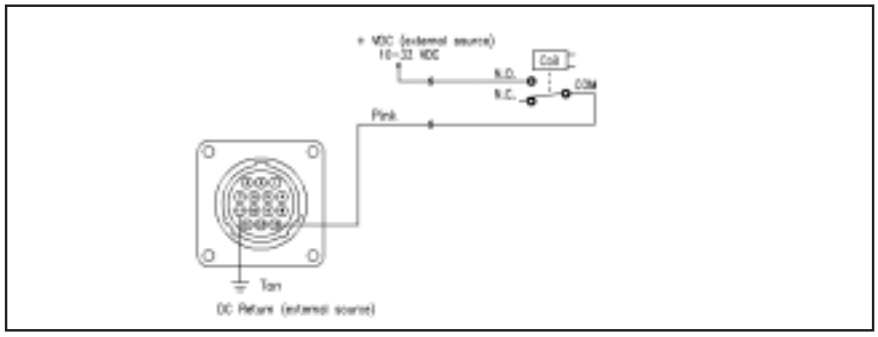
A maintained button/switch with a normally closed contact is used to switch power (10-32 VDC) to the internal input module. When power is removed (switch contact open) the feeder will stop feeding.



External Switch

Remote Stop Input (continued)

A relay contact or solid state relay with normally open contacts is used to switch power (10-32 VDC) to the internal input module. When power is removed (relay contact open) the feeder will stop feeding. Power must be applied to the host relay coil for the feeder to run.

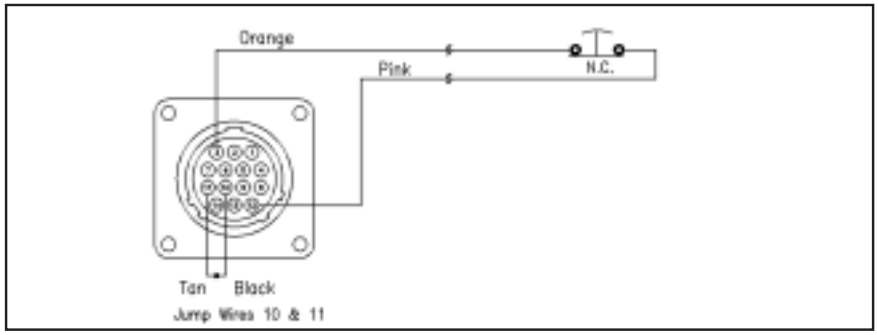


Relay Contacts

Wiring to External Switch or Relay Contacts; Power Supplied by Feeder

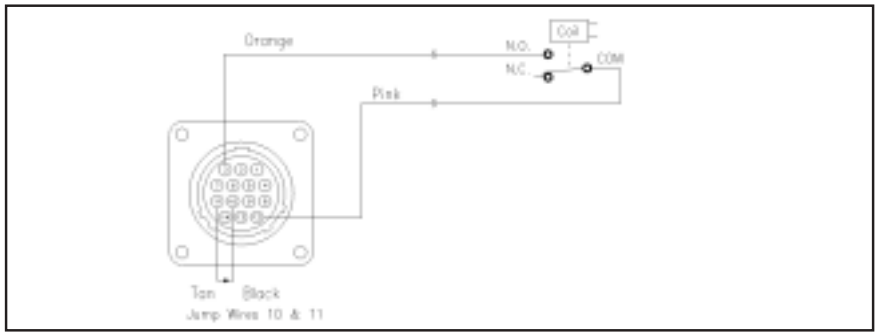
There are two ways the R-stop input can be wired when the feeder and not the host device supplies (12 VDC) power.

A maintained button/switch with a normally closed contact is used to switch 12 VDC to the internal input module. When power is removed (switch contact open) the feeder will stop feeding.



External Switch

A relay contact or solid state relay with open contacts is used to switch 12 VDC to the internal input module. When power is removed (relay contact open) the feeder will stop feeding. Power must be applied to the host relay coil for the feeder to run.



Relay Contacts

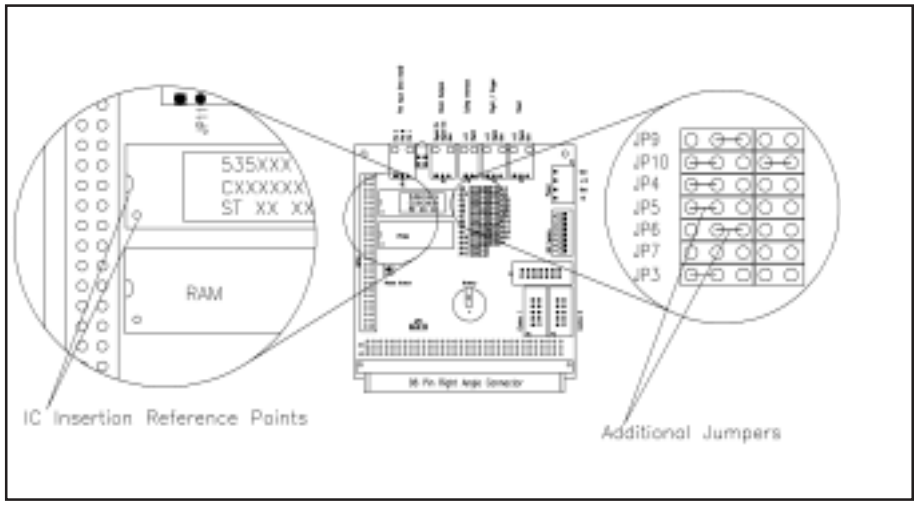
EPROM Replacement

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

Installation

To install or replace a programmed EPROM on the CPU/control board, refer to and carefully follow these steps:

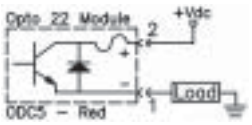
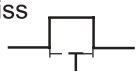
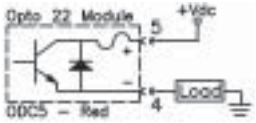
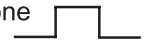
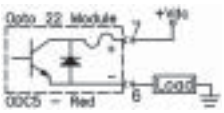
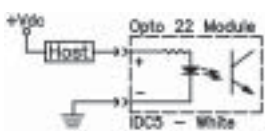
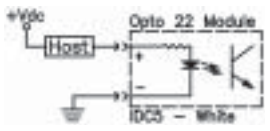
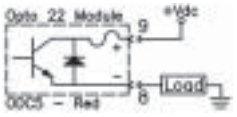
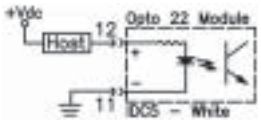
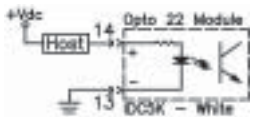
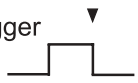
1. Always discharge yourself before handling any electronic component (CPU board or EPROM).
2. When replacing the CPU board, always verify the jumper settings on the new board match the settings on the old board.
3. When removing the EPROM from the socket, be very careful not to bend any pins on the IC.
4. When inserting the EPROM:
   a. Verify the orientation, the notch should be on the side closest to the 50-pin ribbon cable connection.
   b. Ensure all the pins on the EPROM are in the socket before applying pressure to completely seat the IC.
5. Confirm the additional jumpers on JP5 and JP6 have been installed. Note: JP5 and JP6 may have been factory installed.



EPROM Location on CPU Board

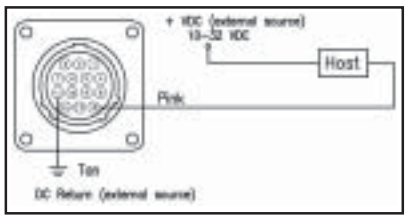
7 I/O Options

Quick-Look Reference Guide - Sourcing

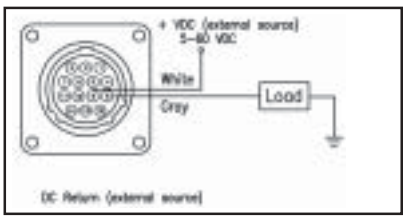
MODULE	ELECTRICAL	SIGNAL	DESCRIPTION
# 1 Double/Miss Output (Standard)		Double  Miss 	This output is asserted if there is a signal present at the Double input. Miss is asserted anytime there are two consecutive flight/trigger signals before the cycle has finished. Double and Miss are menu selectable. Miss has an adjustable time period of 20 - 999ms.
# 2 Busy/Done Output (Optional)		Busy/ Done 	Busy: This output is asserted while the motor is running. Done: This output is asserted when a batch is done feeding.
# 3 Ready Output (Standard)		Ready 	This output is asserted anytime the feeder is ready to be triggered.
# 4 Double Input (Optional)		Double 	This input is provided with the Double option and is monitored for the indication that a double has occurred. This function is wired internally and has a minimum time period of >50ms.
# 5 Low Stack Input (Optional)		Low Stack 	This input is provided with the Low Stack option and is used to monitor the Low Stack sensor. This function is wired internally and has a minimum time period of >50ms.
# 6 Low Stack Output (Optional)		Low Stack 	This output is provided with the Low Stack option and asserted when the Low Stack input is asserted.
# 7 R-Stop Input (Optional)		R-Stop 	This input is used to stop the feeder anytime this input is not asserted. The feeder will continue from the same location prior to the deactivation of this input. This input has a minimum time period of >50ms.
# 8 External Trigger Input (Standard)		Ext Trigger 	This input is used to trigger the feed cycle, is edge triggered, and inverted by the input module. This input has a minimum time period of >50ms.

A qualified service technician should perform the electrical integration of this equipment to the host machinery. Always disconnect the AC inlet power cord before performing any service activity.

External Wiring Reference Diagrams

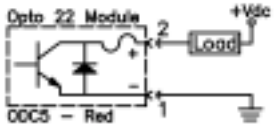
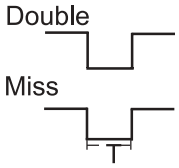
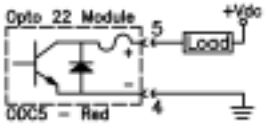
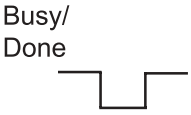
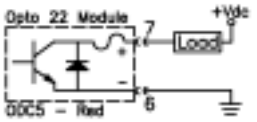
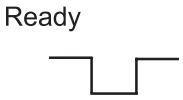
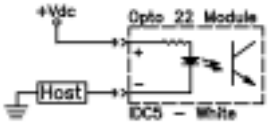
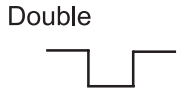
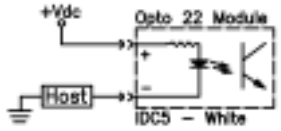
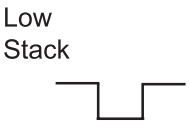
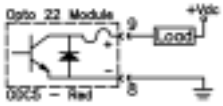
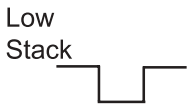
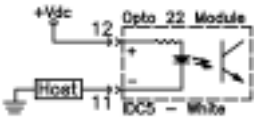
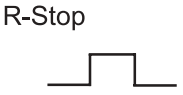
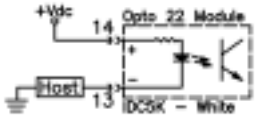
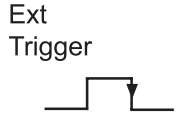


Sourcing Input

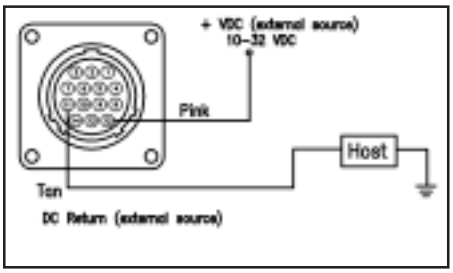


Sourcing Output

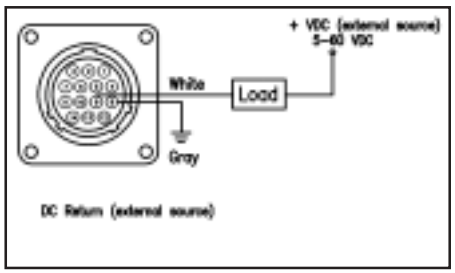
Quick-Look Reference Guide - Sinking

Module	Electrical	Signal	Description
# 1 Double/Miss Output (Standard)			This output is asserted if there is a signal present at the Double input. Miss is asserted anytime there are two consecutive flight/trigger signals before the cycle has finished. Double and Miss are menu selectable. Miss has an adjustable time period of 20 - 999ms.
# 2 Busy/Done Output (Optional)			Busy: This output is asserted while the motor is running. Done: This output is asserted when a batch is done feeding.
# 3 Ready Output (Standard)			This output is asserted anytime the feeder is ready to be triggered.
# 4 Double Input (Optional)			This input is provided with the Double option, and is monitored for the indication that a double has occurred. This function is wired internally and has a minimum time period of >50ms.
# 5 Low Stack Input (Optional)			This input is provided with the Low Stack option and is used to monitor the Low Stack sensor. This function is wired internally and has a minimum time period of >50ms.
# 6 Low Stack Output (Optional)			This output is provided with the Low Stack option and asserted when the Low Stack input is asserted.
# 7 R-Stop Input (Optional)			This input is used to stop the feeder anytime this input is not asserted. The feeder will continue from the same location prior to the deactivation of this input. This input has a minimum time period of >50ms.
# 8 External Trigger Input (Standard)			This input is used to trigger the feed cycle, is edge triggered, and inverted by the input module. This input has a minimum time period of >50ms.

External Wiring Reference Diagrams

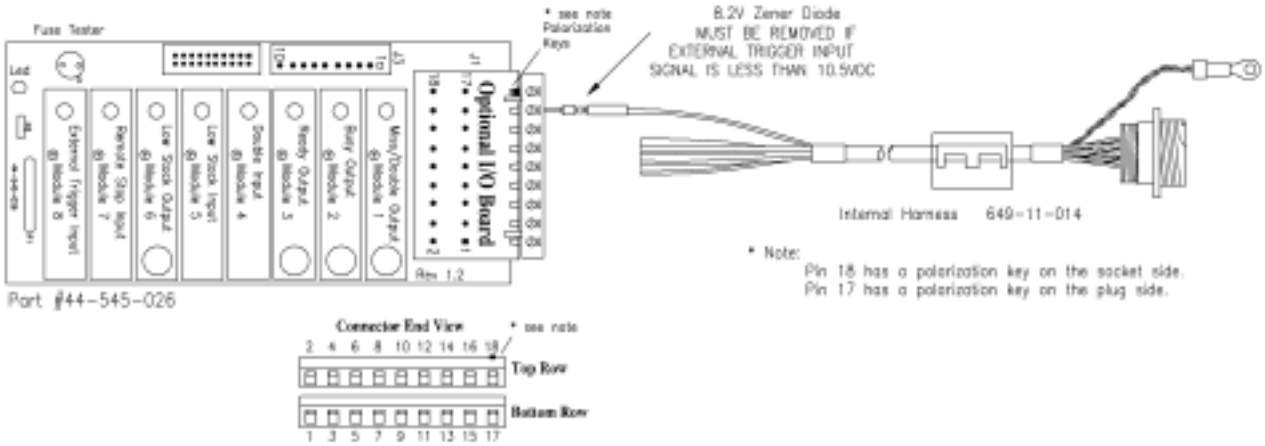


Sinking Input



Sinking Output

Relay Rack and Module Reference Diagrams



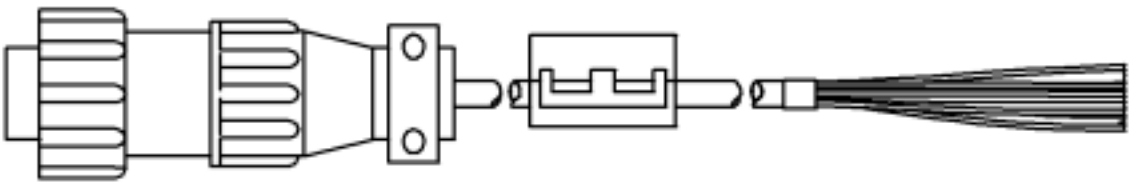
Reference Diagrams

I/O Cable Wiring

External I/O Cable Wiring

Pin #	Wire Color	Function	Module #	Module Type
1	**Brown**	**Miss/Double Output (-)**	**1**	**ODC5**
2	**Red**	**Miss/Double Output (+)**		**5-60VDC**
3	Orange	+12 VDC Supply (150ma. max)	-	
4	Yellow	Busy Output (-)	2	ODC5
5	Green	Busy Output (+)		5-60VDC
6	**Blue**	**Ready Output (-)**	**3**	**ODC5**
7	**Violet**	**Ready Output (+)**		**5-60VDC**
8	Gray	Low Stack Output (-)	6	ODC5
9	White	Low Stack Output (+)		5-60VDC
10	Black & Shield	DC Supply Ground	-	
11	Tan	Remote Stop Input (-)	7	IDC5
12	Pink	Remote Input (+)		10-32VDC
13	**Red /Yellow**	**External Trigger Input (-)**	**8**	**IDC5K**
14	**Red / Green**	**External Trigger Input (+)**		**12-24VDC**

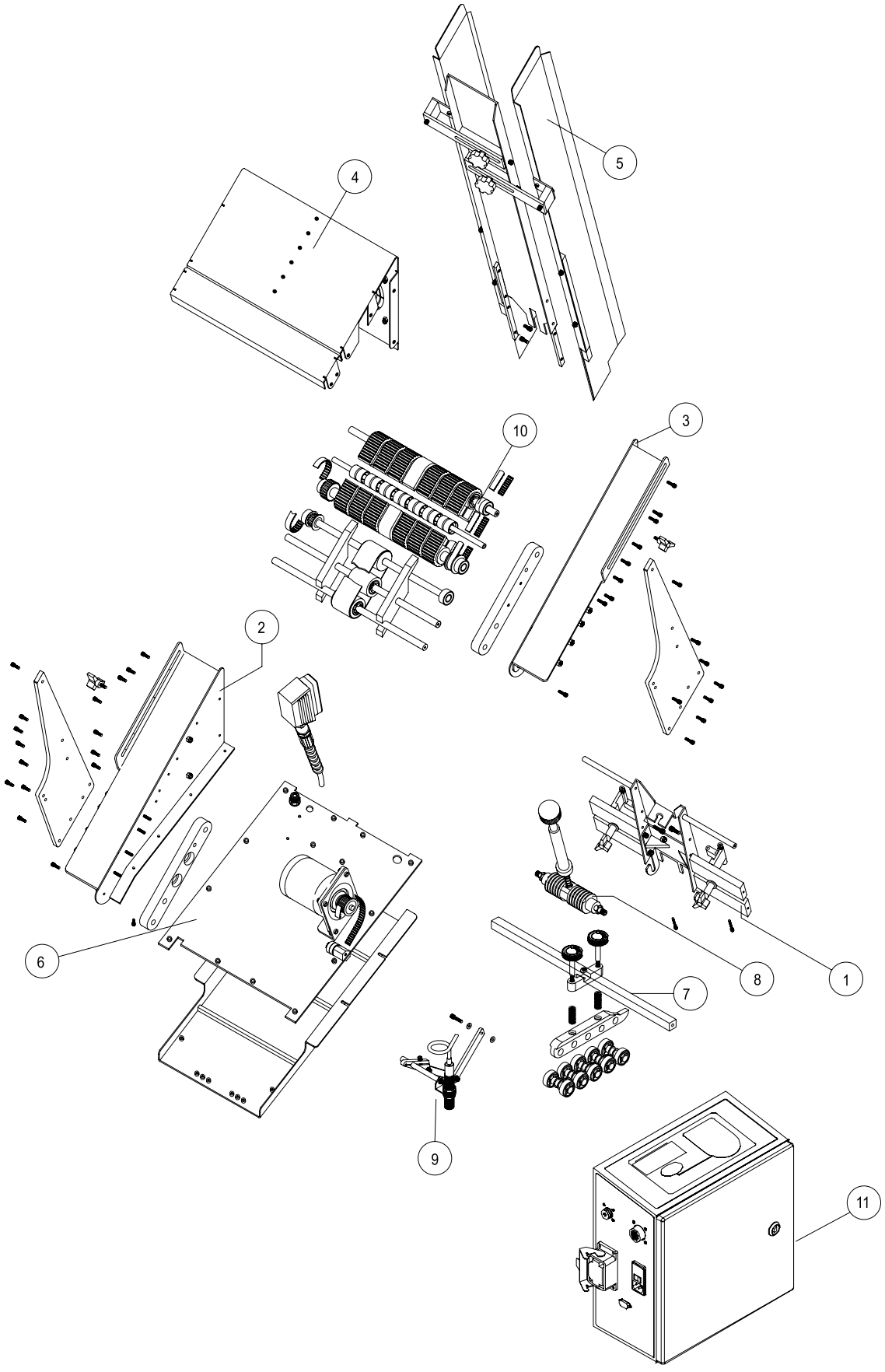
- **Bolded Modules** are included as part of the standard package.
- **Pins 3 and 10** are provided as a low current source for biasing input modules.
- Fuse Tester is used to test the continuity of an output module fuse. If the LED illuminates, the fuse is GOOD.



External I/O Cable 649-11-012

8 Mechanical Components

Item #	Description
1	Gate Holder Plate Assembly
2	Right Side Plate Assembly
3	Left Side Plate Assembly
4	Table Top Assembly
5	Tall Insert Guide Assembly
6	Base Plate Assembly
7	Hold Down Assembly
8	Gate Cylinder Assembly
9	Sheet Sensor Assembly
10	Grooved Gum Carriage Assembly
11	I-Quipped Box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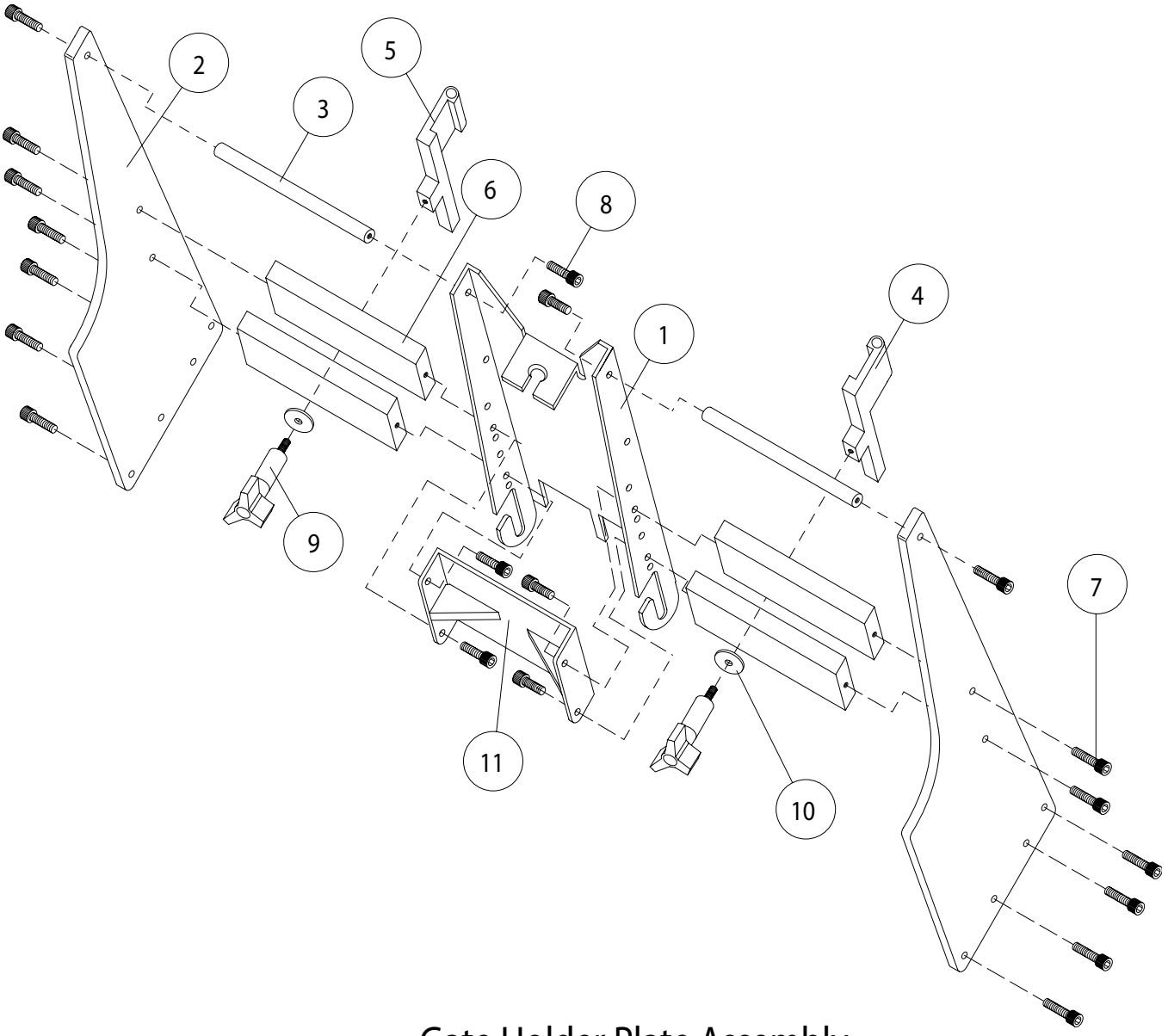
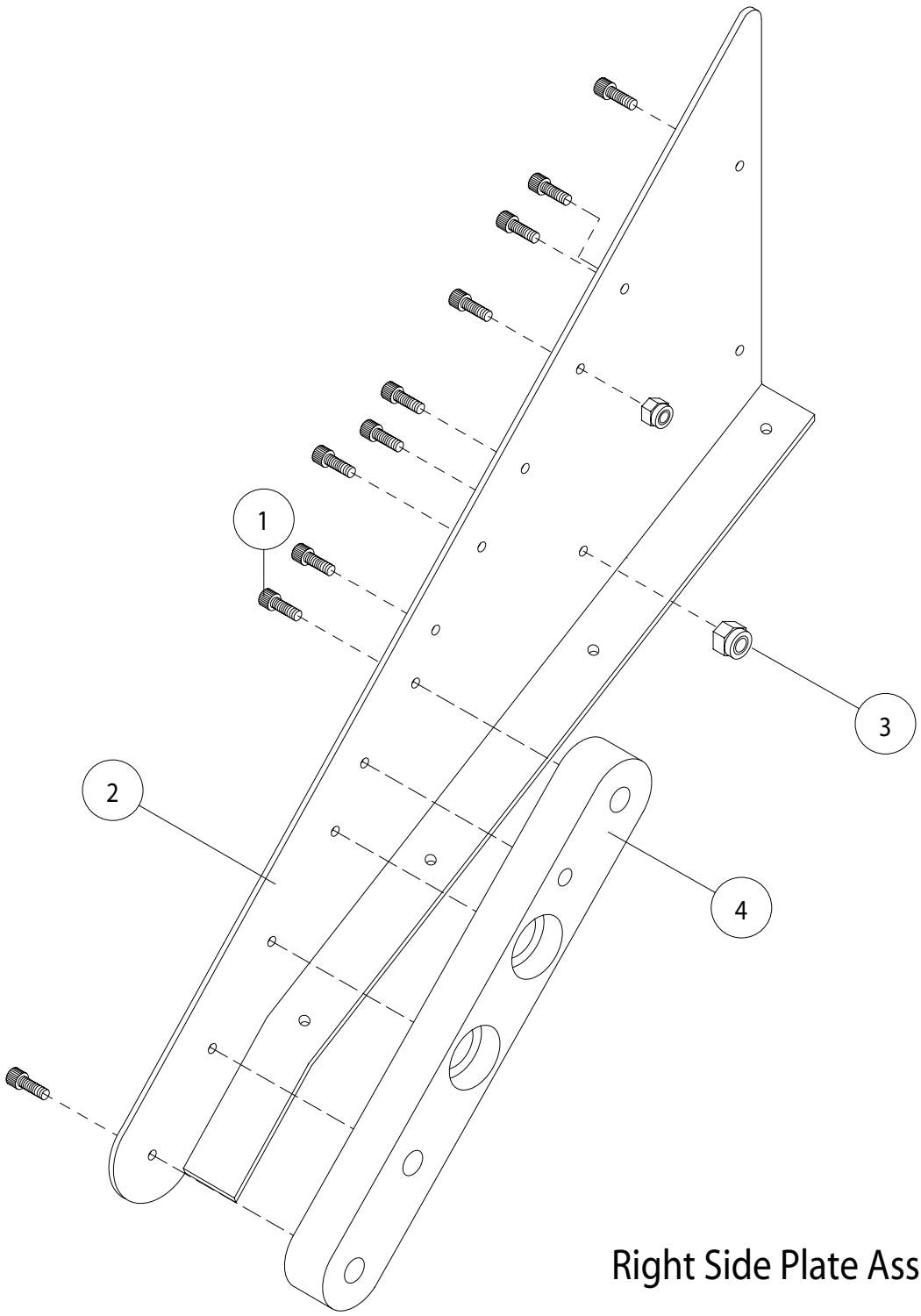


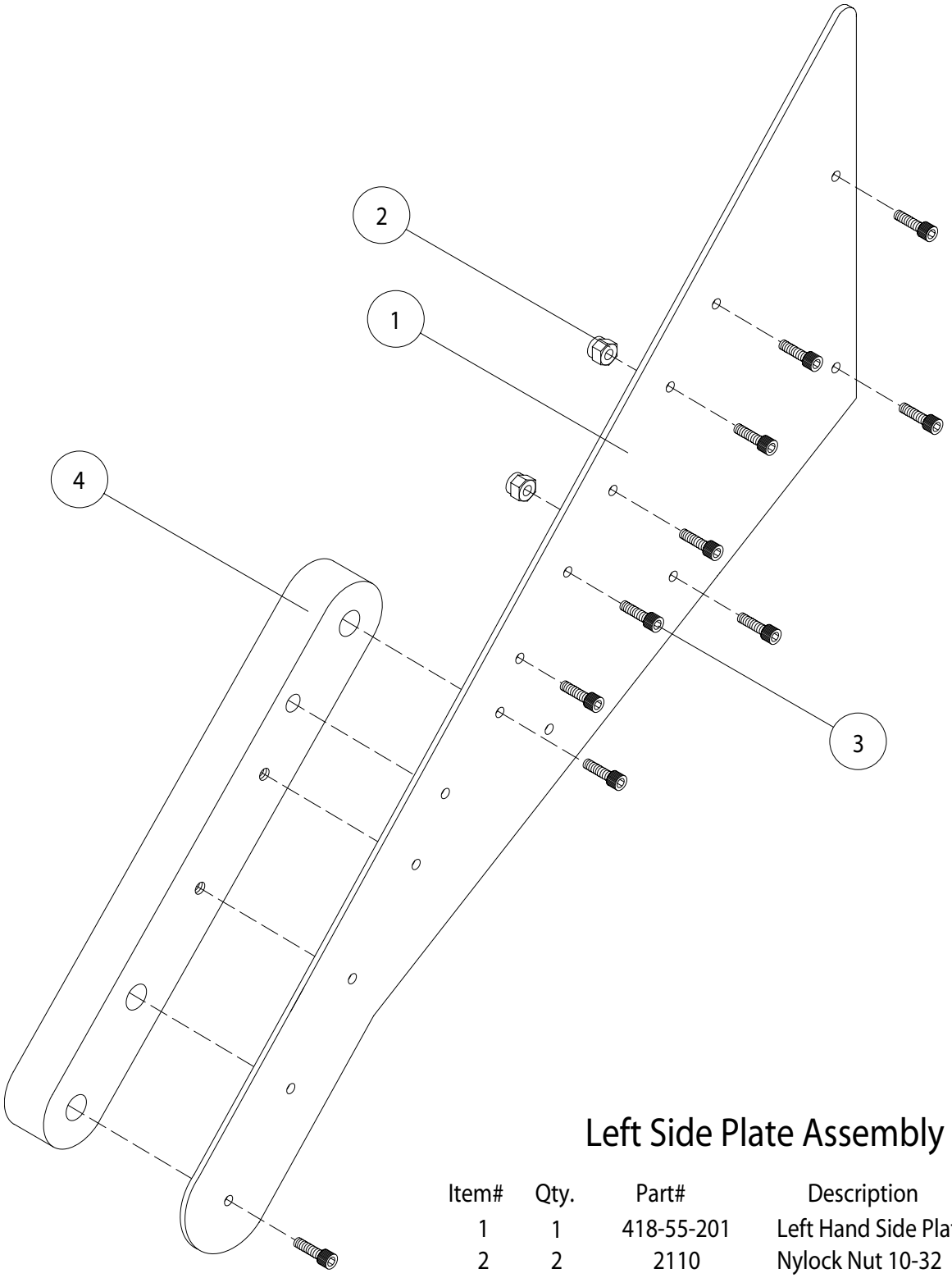
Gate Holder Plate Assembly

Item#	Qty.	Part#	Description
1	1	235-00-001	Gate Holder Plate
2	2	418-55-017	Insert Guide Stabilizing Bracket
3	2	418-55-010	Gate Support Shaft
4	1	418-55-014	Left Hand Side Guide Bracket
5	1	418-55-013	Right Hand Side Guide Bracket
6	4	418-55-016	Gate Support Bar
7	14	2315	SHCS 10-32 x 1/2"
8	6	2310	SHCS 10-32 x 3/8"
9	2	335-11-092	Medium Knob w/Extension
10	2	418-55-015	Oversized Washer
11	1	418-55-012	Back Up Plate



Right Side Plate Assembly

Item#	Qty.	Part#	Description
1	10	2310	SHCS 10-32 x 3/8"
2	1	418-55-200	Right Hand Side Plate
3	2	2110	Nylock Nut 10-32
4	1	235-60-202	Carriage Holder



Left Side Plate Assembly

Item#	Qty.	Part#	Description
1	1	418-55-201	Left Hand Side Plate
2	2	2110	Nylock Nut 10-32
3	10	2310	SHCS 10-32 x 3/8"
4	1	235-60-203	Carriage Holder

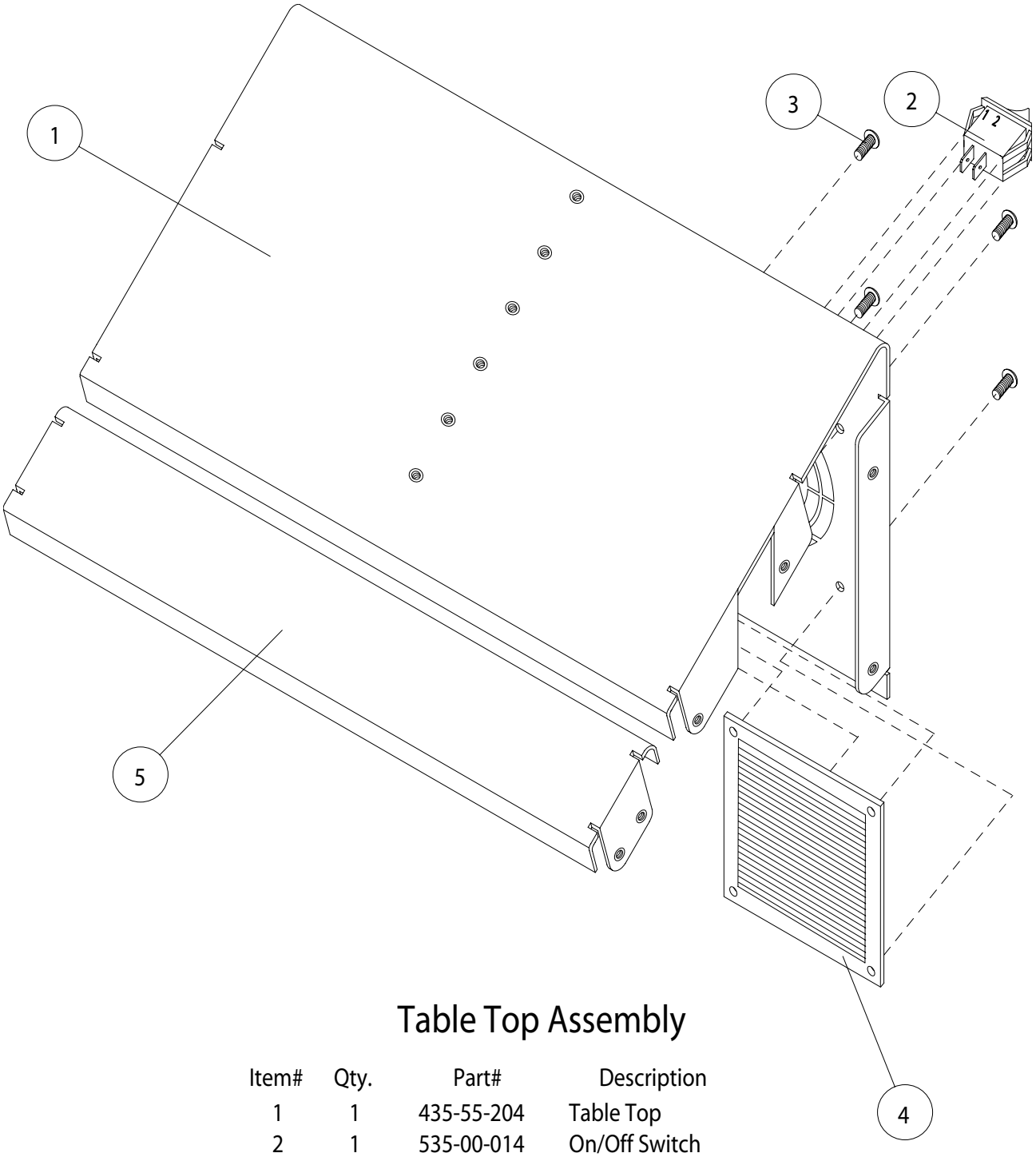
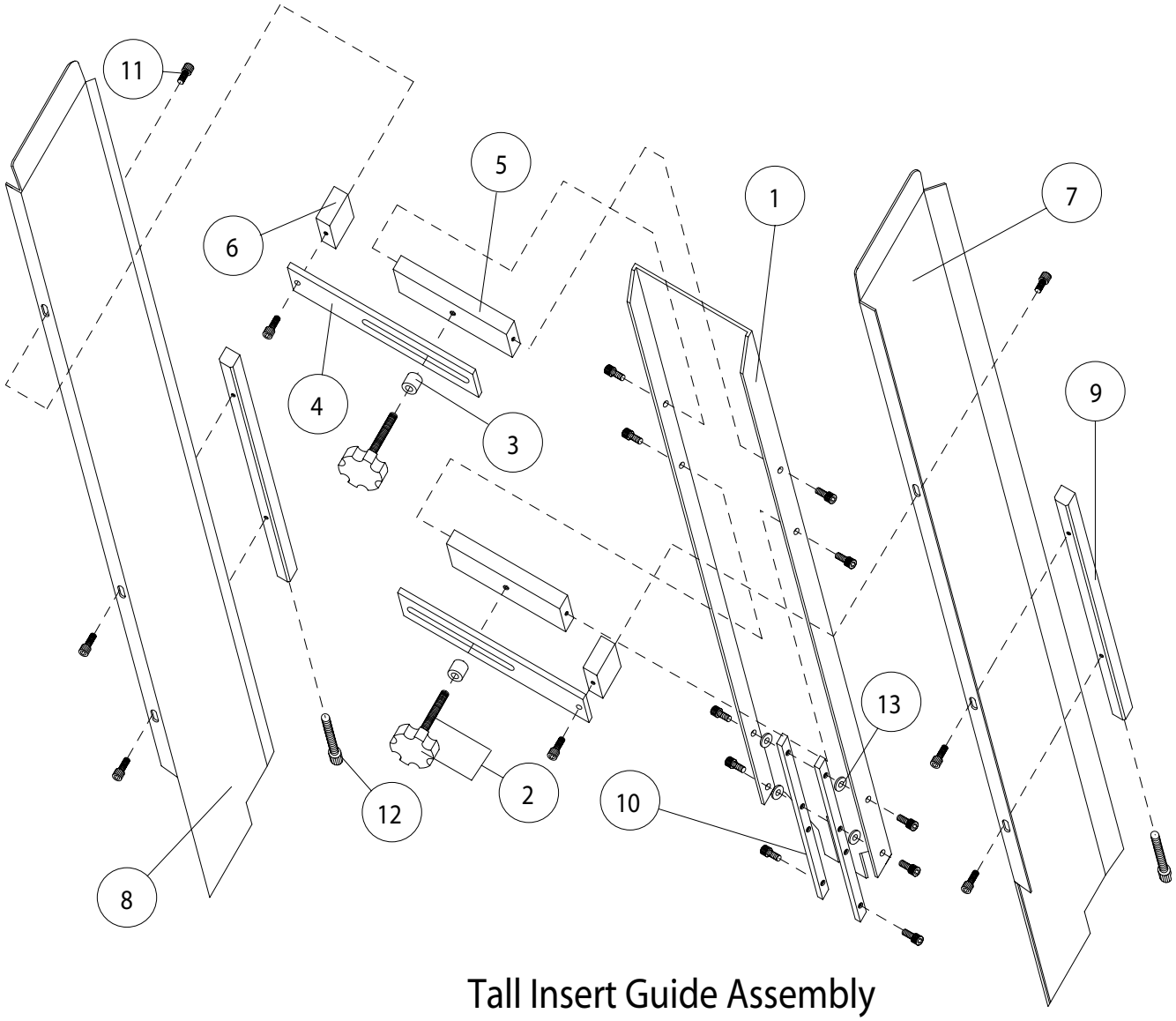


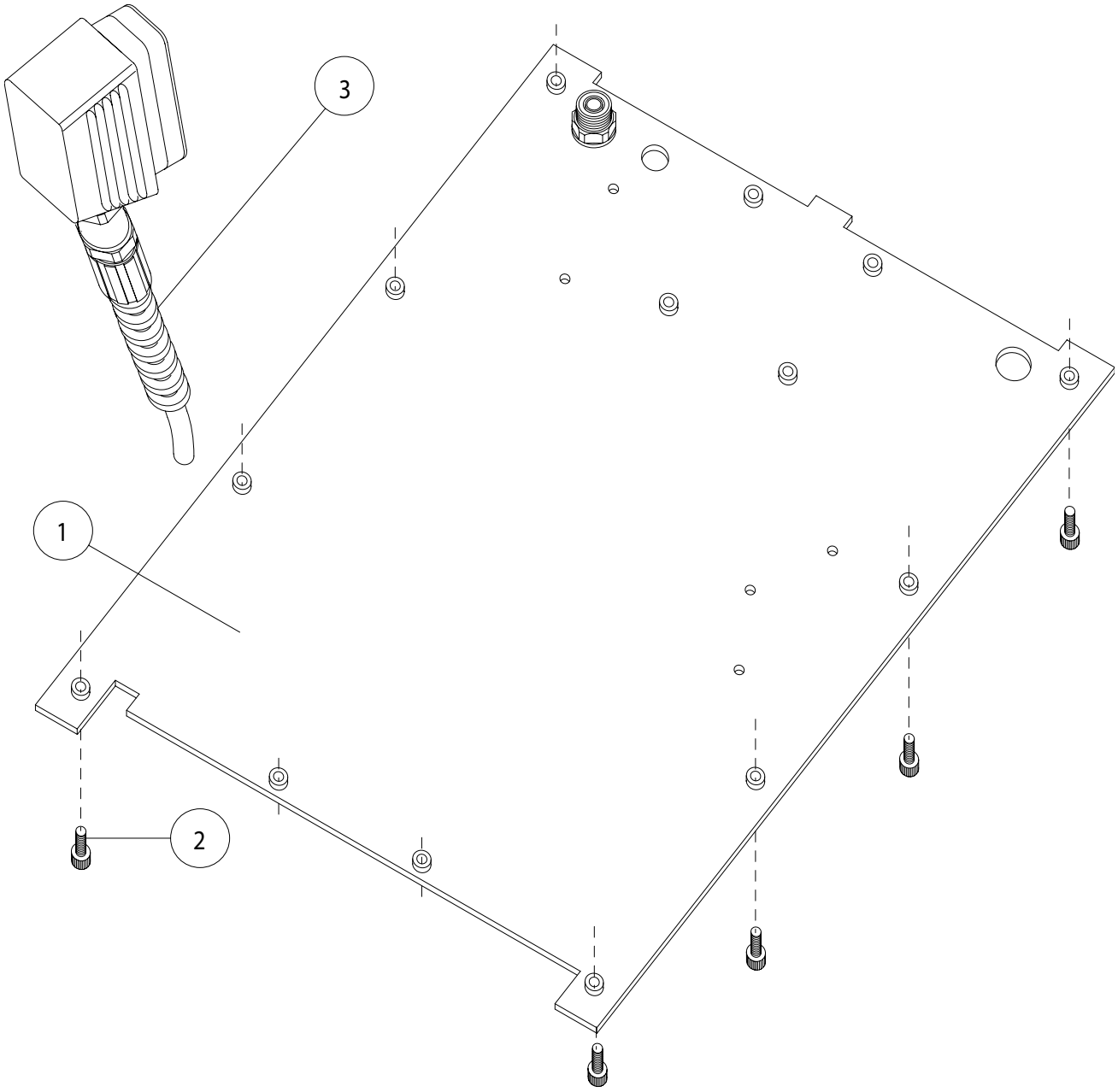
Table Top Assembly

Item#	Qty.	Part#	Description
1	1	435-55-204	Table Top
2	1	535-00-014	On/Off Switch
3	4	2305	BHCS 10-32 x 3/8"
4	1	535-00-105	Filter Screen
5	1	435-55-203	Timing Belt Acess Cover
NS	1	235-00-064	USA Label
NS	1	235-00-066	Nameplate
NS	4	1101	Blind Rivet
NS	1	535-00-023	Legend "Power"
NS	Items Not Shown On Drawing		



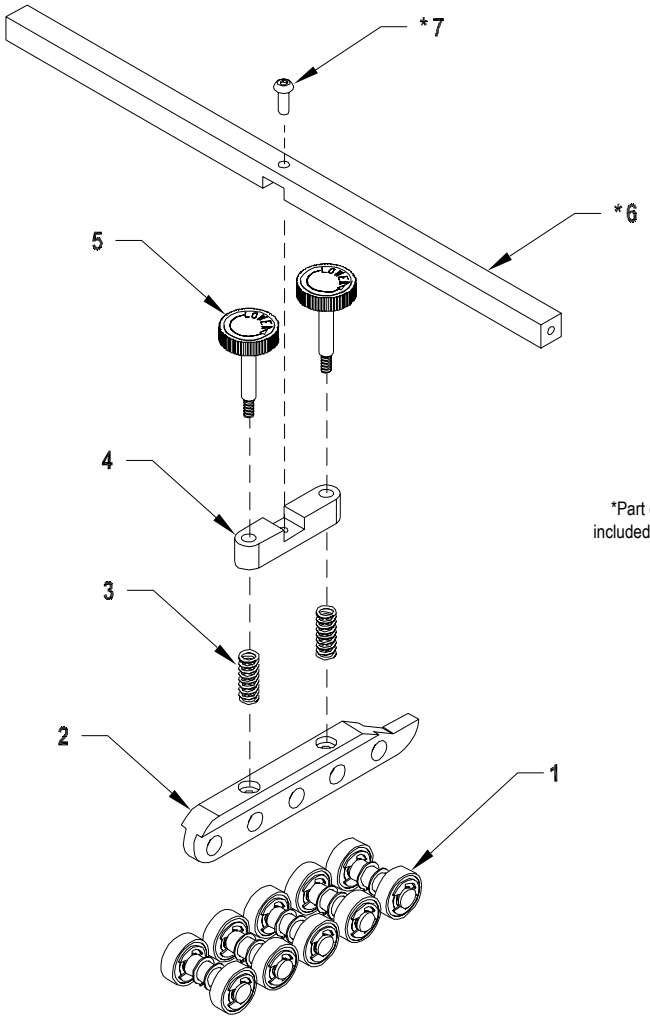
Tall Insert Guide Assembly

Item#	Qty.	Part#	Description
1	1	235-00-006	Tall Insert Guide
2	2	235-00-093	Large Thumb Screw
	2	2390	SHCS 1/4-20 x 1"
3	2	335-00-018	Sensor Extension Spacer
4	2	435-00-150	Adjusting Stabilizer Bracket
5	2	435-00-151	Center Stabilizer Mounting Bracket
6	2	435-00-152	Stabilizer Side Guide Spacer
7	1	435-60-208	Left Side Guide Extension
8	1	435-60-209	Right Side Guide Extension
9	2	435-00-157	Right/Left Side Guide Mounting Bracket
10	2	235-00-024	Tall Mounting Strap
11	18	2310	SHCS 10-32 x 3/8"
12	2	2396	SHCS 1/4-20 x 1-1/2"
13	4	2607	Flat Washer #10



Base Plate Assembly

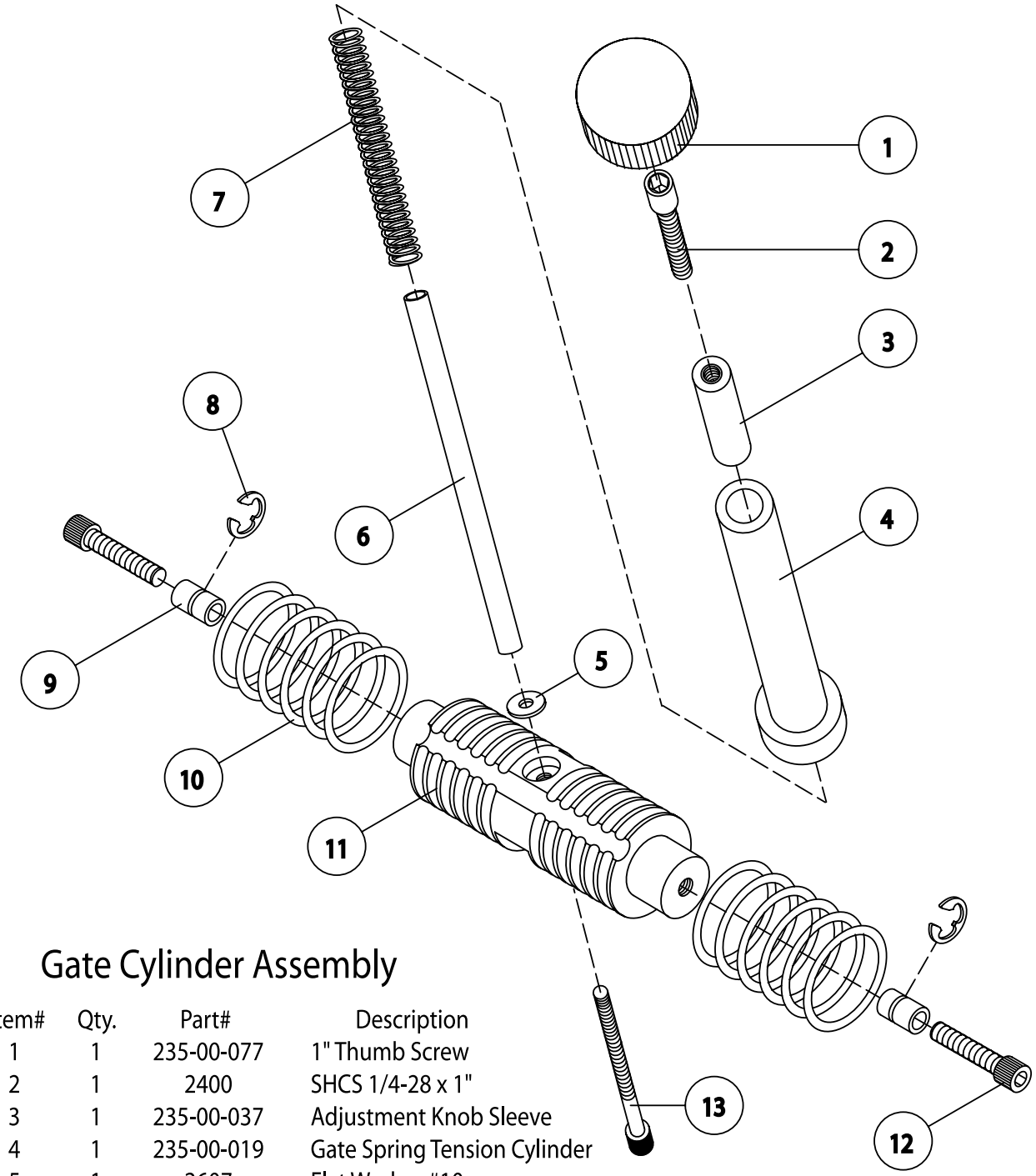
Item#	Qty.	Part#	Description
1	1	435-50-007	Base Plate
2	8	2310	SHCS 10-32 x 3/8"
3	1	535-11-005	2 Meter Power Cord



*Part exists in diagram for reference only and is not included with this assembly. Must be ordered separately.

5 AXLE HOLD DOWN ASSEMBLY #43511310

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
1	5	Bearing Holder Shaft	43560008
	10	Bearing Ball R6	23500095
	10	Ring Grip 3/8 Waldes	00001110
	20	Clip E 3/8 Waldes	00001150
2	1	Holder Bearing 5 Axle	43560310
3	2	Spring Compression	23560083
4	1	Bar Hold Down Adjustment	23560086
5	2	Screw Cross Bar Hold Down Adjustment	23560087
	2	Hold Down Knob 1	23560077
	2	Grommet Rubber	00001130
	2	Label Gate Adjustment Knob	23500084
6*	1	Cross Support Bar	41855223
7*	1	BHCS 10-32 x 1/2” LG	00002334

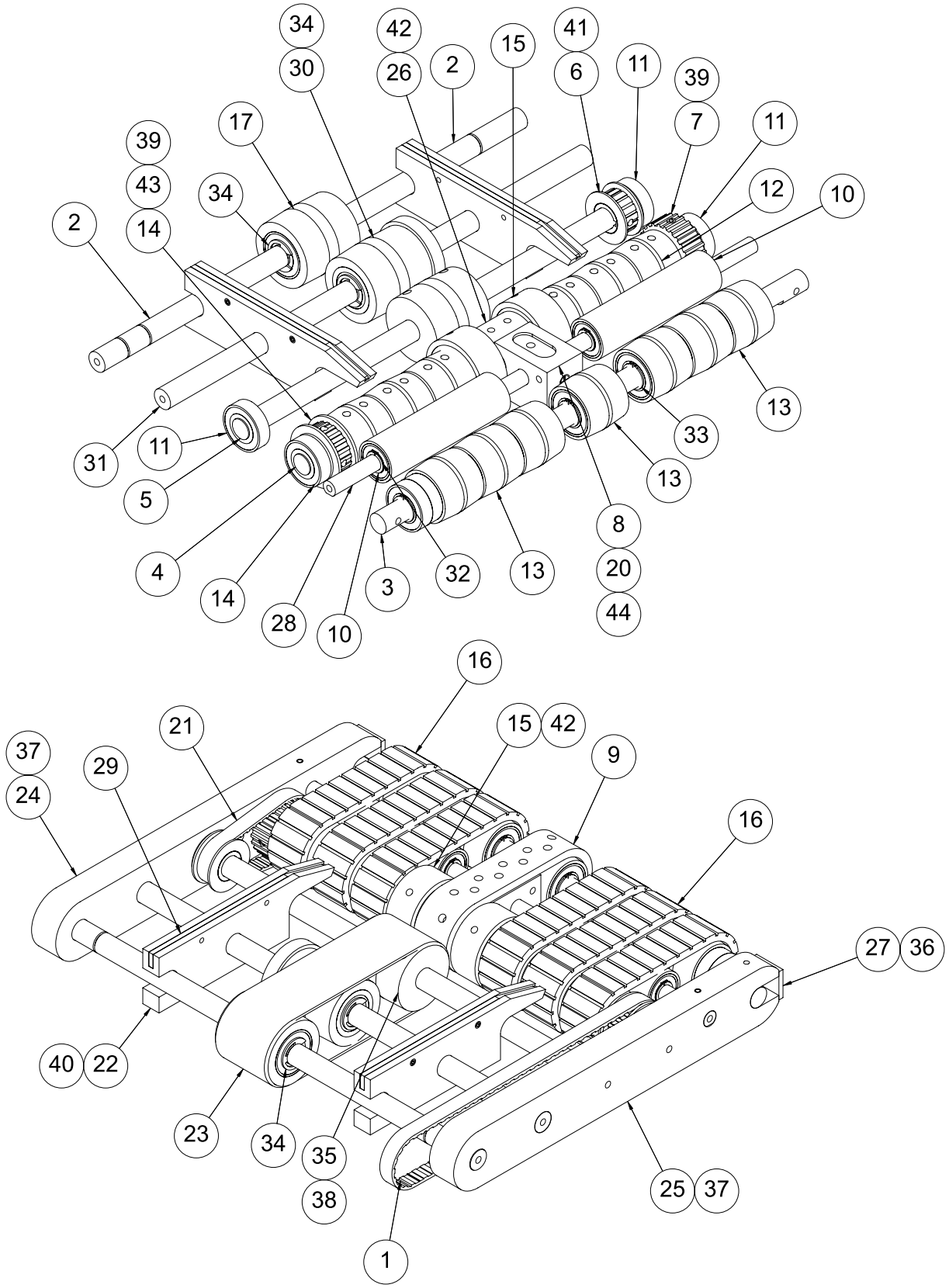


Gate Cylinder Assembly

Item#	Qty.	Part#	Description
1	1	235-00-077	1" Thumb Screw
2	1	2400	SHCS 1/4-28 x 1"
3	1	235-00-037	Adjustment Knob Sleeve
4	1	235-00-019	Gate Spring Tension Cylinder
5	1	2607	Flat Washer #10
6	1	235-60-084	EJ Gate Lift Shaft
7	1	235-00-083	Gate Compression Spring
8	2	1150	"E" Clip 3/8"
9	2	235-00-082	Spacer 1/2"
10	12	235-00-104	Gate Cylinder O-Ring
11	1	235-60-300	EJ Gate Cylinder
12	2	2390	SHCS 1/4-20 x 1"
13	1	2336	SHCS 10-32 x 1-1/2"

GROOVED GUM RUBBER BELT CARRIAGE ASSEMBLY #43533485

ITEM	QTY	NAME
1	1	43500096 DRIVE BELT 170 X L037
2	1	43555047 IDLER SHAFT
3	1	43555147 IDLER SHAFT
4	1	43555205 3-4 IN DRIVE SHAFT
5	1	43555211 DRIVE SHAFT
6	1	43560097 PULLEY 16T
7	1	43560098 PULLEY 24T
8	1	44485001 MANIFOLD
9	1	44485003 VACUUM BELT
10	2	23511270 BELT SUPPORT ROLLER
11	8	23500094 BEARING R8-2RS
12	6	23560208 CROWN DRV ROLLER
13	7	33511028 CROWN DRIVEN ROLLER WITH BEARINGS
14	1	23500097 PULLEY 20T
15	2	23500126 FEED ROLLER
16	6	23500162 BELT TRACTOR
17	1	23511105 CROWN PUL CUP WBEAR
18	1	51476005 BULK HEAD UNION
19	1	51476006 UNEQUAL UNION ELBOW
20	1	51476007 MALE ELBOW
21	1	23560078 TIMING BELT
22	2	23560082 MAT SUPPORT SIDE RAIL
23	1	23560088 CLEAR BELT
24	1	23560202 RS CARR HOLD
25	1	23560203 LS CARR HOLD
26	1	23560206 FLAT DRIVE ROLLER
27	2	44485004 VACUUM BELT TENSION PLATE
28	1	44841056 VAC CARRIAGE SHAFT
29	2	44970006 SLIDE
30	1	51277068 ROLLER DOUBLE DETECT CARRIAGE
31	1	51438009 SHAFT IDLE DISCHARGE 1450
32	4	1110 G RING 3_8
33	11	1115 G RING 1_2
34	4	1155 E CLIP 1_2
35	1	23560106 CROWN PULLEY W_SS
36	2	2320 S 10-32 5_8
37	2	3316 SS 6-32 X 1-4
38	2	2327 SS 1_4-20 1_2
39	3	2217 SS 10-32 5_16
40	4	2203 S 8-32 1_4
41	2	3352 SS 10-32 1_8
42	16	2216 SS 10-32 1_4
43	1	3351 1-8 X 3-8 WOODRUFF KEY
44	1	2228 F 6-32 3_4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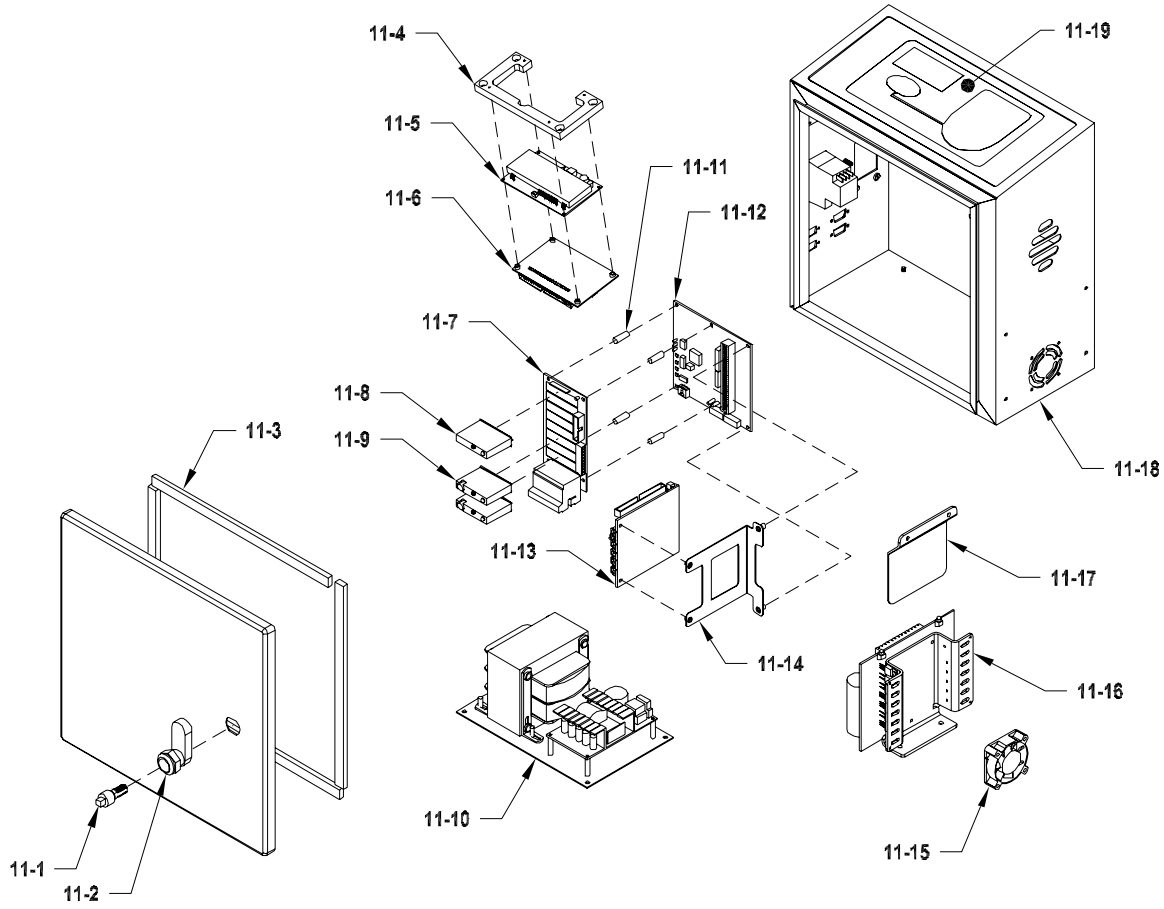
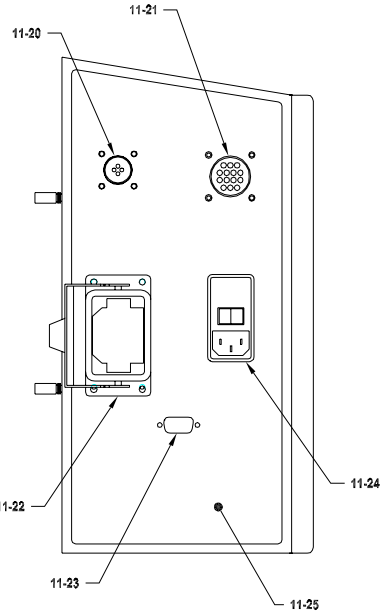
IQUIPPED BOX WITH I/O
ASSEMBLY #68311050





IQUIPPED BOX WITH I/0
ASSEMBLY #68311050

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
11-1	1	Insert 7mm Square	44683022
11-2	1	Cam Latch Lock	44683021
11-3	44”	Gasket	44683028
11-4	1	Bracket Display Mounting	44683002
11-5	1	Display VFD w/Connector Header Pin	53511605
11-6	1	Board Keypad Decoder	53500605
11-7*	1	Board Relay I/O	44649128
11-8*	1	Relay Module DC Input 2.5-16VDC Hi Speed	44649115
11-9*	3	Relay Module DC Output 5-60 VDC 3A	44649112
11-10	1	Power Pack Transformer/DC Supply Assy IQ	68311002
11-11*	4	Spacer Standoff .75 X .25 Round Nylon	44675045
11-12*	1	Board Motherboard w/o Options	44649055
11-13	1	Board CPU w/96-Pin Connector	44649014
11-14*	1	Bracket Stabilizing PCB	44649125
11-15	1	Fan Assembly ST Box	68311008
11-16	1	Board Stepper Drive BLD 72-2	53500467
11-17	1	Plate Deflector	44683003
11-18	1	Box IQuipped Control (Door Included)	44683001
11-19	1	Keypad ST Series IQuipped	44683005

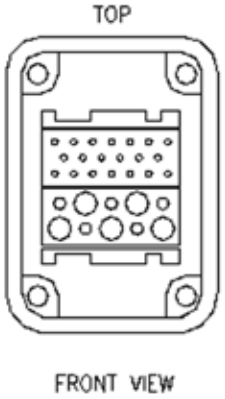
IQUIPPED BOX WITH I/0 (continued)
ASSEMBLY #68311050

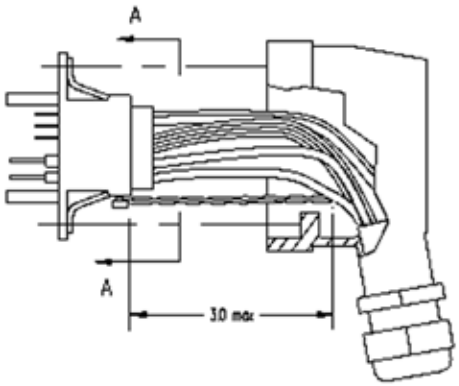
DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
11-20	1	Harness Flight Trigger	64911005
11-21*	1	Harness I/O Internal 14 Pin	64911014
11-22	1	Harness Receptacle Interconnect IQ Box	68311009
11-23	1	Cable Communication DB9 Female IQ Box	44683027
	2	Jackscrew 4-40 Male-Female	
11-24	1	Module AC Power Entry (w/o Fuses)	44649034
11-25*	1	Graphic Overlay With I/O	44683029
NS	16	Cable Tie Wrap	435SO263
NS	2	U-Bolt Square Bend 3-3/8	44360051
NS	1	Cable Ribbon Display	44649022
NS	1	Plate Mounting IQuipped Box	44683006
NS	2	Retainer Mounting IQuipped Box	44683007
NS	1	Key 7mm Square	44683023
NS	2	Fuse 3A 250V Slo-Blo GMD 5 X 20mm	53500006
NS	2	Terminal Ring	53500046
NS	11	Wire MTW 18 Ga Stranded Green/Yellow St	53500057
NS	1	Eprom	63511001
NS	1	Cable Ground Wire Assembly	63011007
NS	1	Harness Power Supply DC Outputs	64911006
NS	1	Harness Drive Control	64911007
NS	1*	Cable Ribbon Relay I/O	44649007
NS	1*	Cable External Systems 14 Pin	64911012

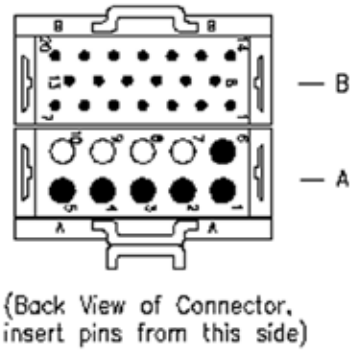
*Denotes feature associated with I/O assembly #68311014.

Connector End (from)	AWG	Color	Break-Out Board No. (to) Label Wires at This End	Signal
Pin B1	22	BRN	Label “9”	DC Ground
Pin B2	22	RED	Label “10”	DC Ground
Pin B3	22	ORG	Label “11”	+12V DC
Pin B4	22	YEL	Label “12”	+12V DC
Pin B5	22	GRN	Label “13”	Sheet Signal
Pin B6	22	BLU	Label “14”	Inverted Sheet --*
Pin B7	22	VIO	Label “15”	Low Stack Signal
Pin B8	22	GRY	Label “16”	Safety Interlock
Pin B9	22	WHT	Label “17”	Double Detect Signal
Pin B10	22	BLK	Label “18”	D-Detect Signal Inverted --*
Pin B11	22	BRN/WHT	Label “19”	Tower Lamp--N.C.--*
Pin B12	22	RED/WHT	Label “20”	Tower Lamp --Red
Pin B13	22	ORG/WHT	Label “21”	Tower Lamp--Amber
Pin B14	22	YEL/WHT	Label “22”	Tower Lamp--Green
Pin B15	22	GRN/WHT	Label “23”	Spare 1--*
Pin B16	22	BLU/WHT	Label “24”	Spare 2--*
Pin B17	22	VIO/WHT	Label “25”	Spare 3--*
Pin B18	22	GRY/WHT	Label “26”	Spare 4--*
Pin B19	22	WHT/BLK	Label “27”	Spare 5--*
Pin B20	22	BLK/WHT	Label “28”	Spare 6--*
Pin A1	18	RED	Label “1”	Motor Lead 1
Pin A2	18	WHT/RED	Label “2”	Motor Lead 2
Pin A3	18	BLK	Label “3”	Motor Lead 3
Pin A4	18	WHT	Label “4”	Motor Lead 4-11
Pin A5	18	WHT/GRN	Label “5”	Motor Lead 5-12
Pin A6	18	GRN	Label “6”	Motor Lead 6-13

* Not wired on mating connector





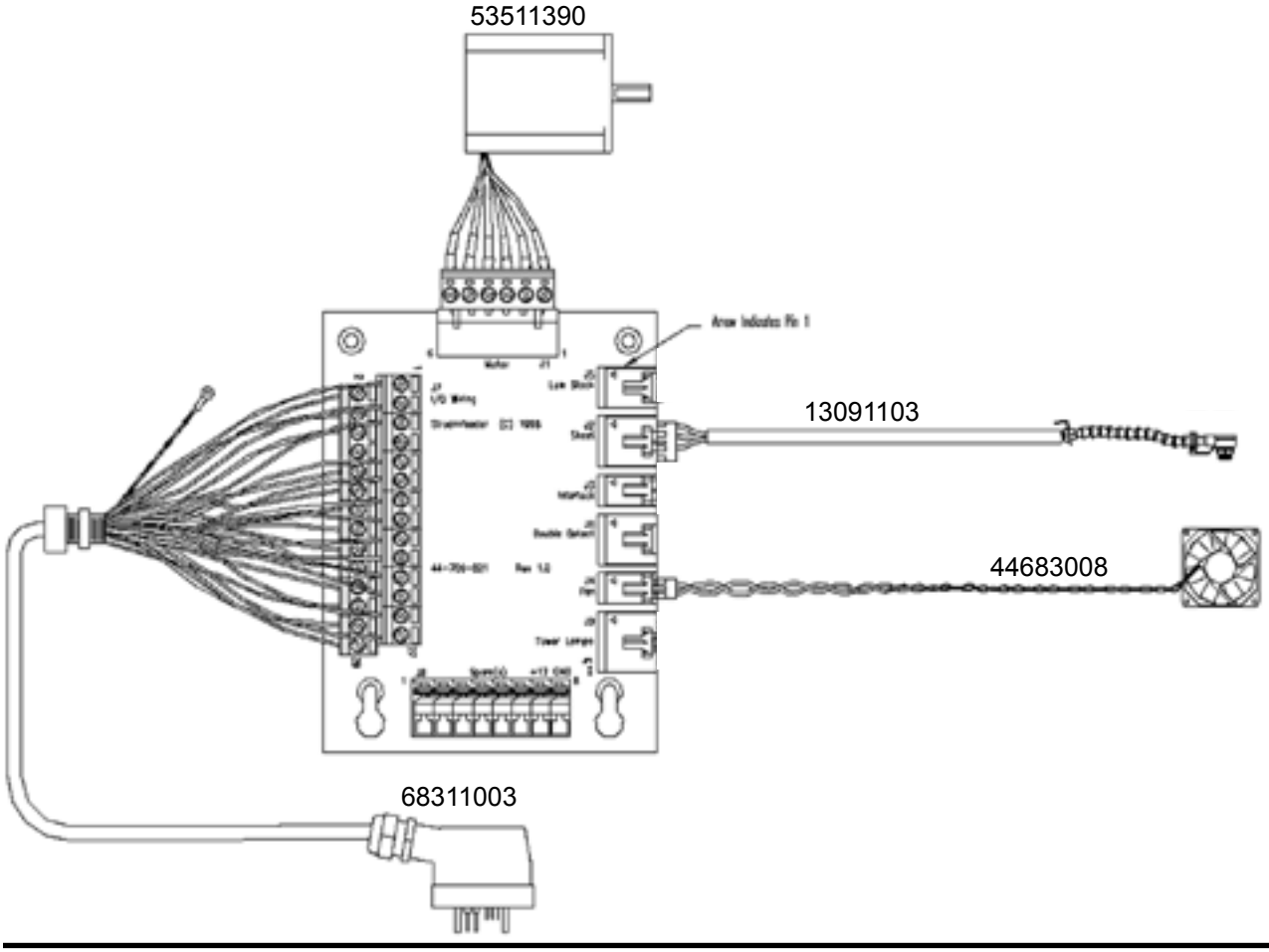


9 Electrical Components

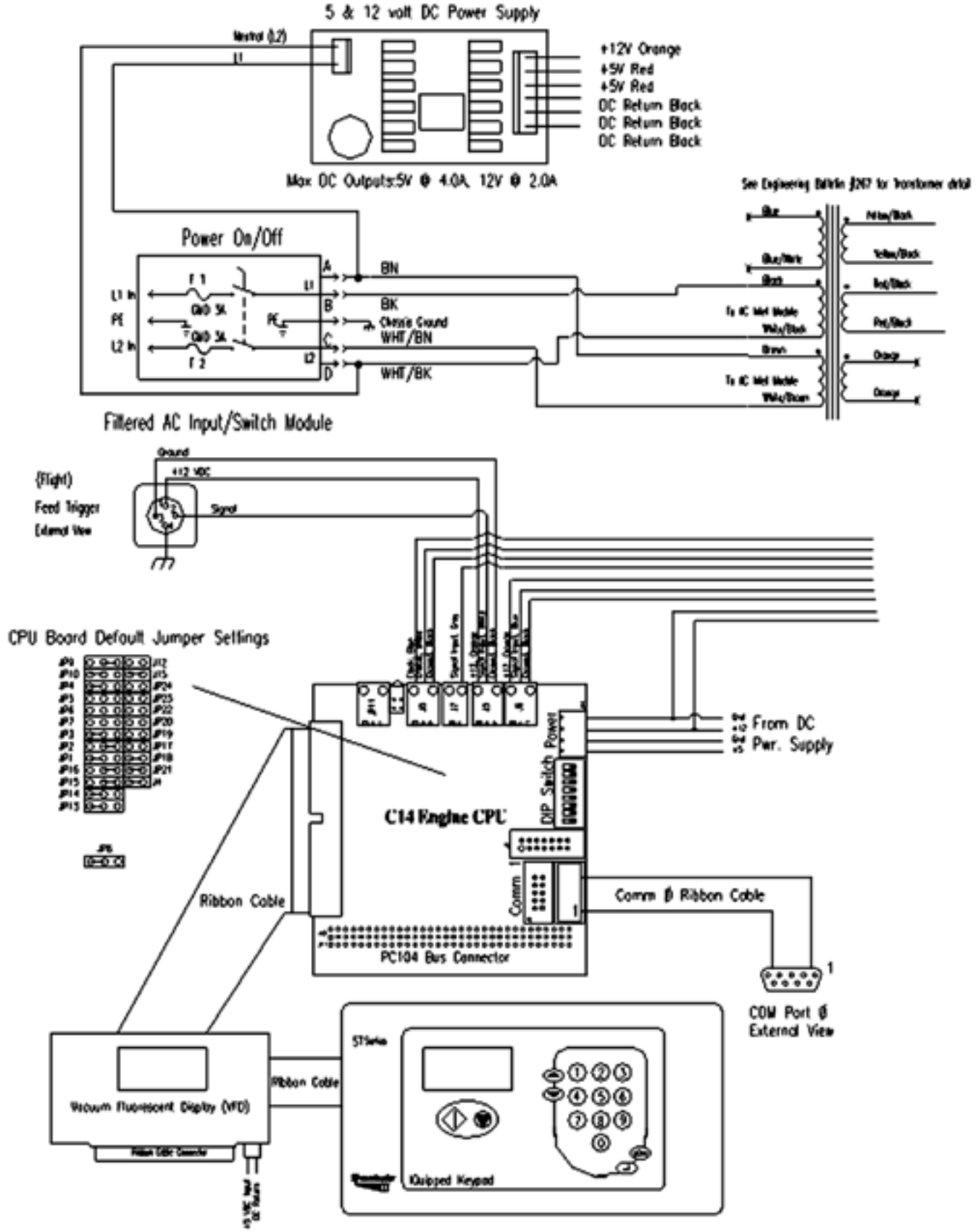
Electrical Detail

Supplied with Tower Lamp Option

Low Stack	J5-1	BRN		+ 12V DC
	J5-2	BLK		Low Stack Signal
	J5-3	BLU & WHT		DC Ground
Sheet	J2-1	BRN		+ 12V DC
	J2-2	BLK		Sheet Signal
	J2-3	BLU		DC Ground
	J2-4	WHT		Inverted Sheet Signal
Interlock	J3-1	ORG		+ 12V DC
	J3-2	GRY		Interlock Signal
Double Detect	J6-1	BRN	(n.c.)	+ 12V DC
IR Burn Through	J6-2	BLK	(RED)	Double Detect Signal
(mechanical)	J6-3	BLU	(WHT)	DC Ground
	J6-4	--	(n.c.)	n.c.
Fan	J4-1	RED		+12V DC
	J4-2	BLK		DC Ground
Tower Lamp	J9-1	GRN		Green Lamp
	J9-2	ORG		Amber Lamp
	J9-3	RED		Red Lamp
	J9-4	--		n.c.
	J9-5	YEL		+12V DC

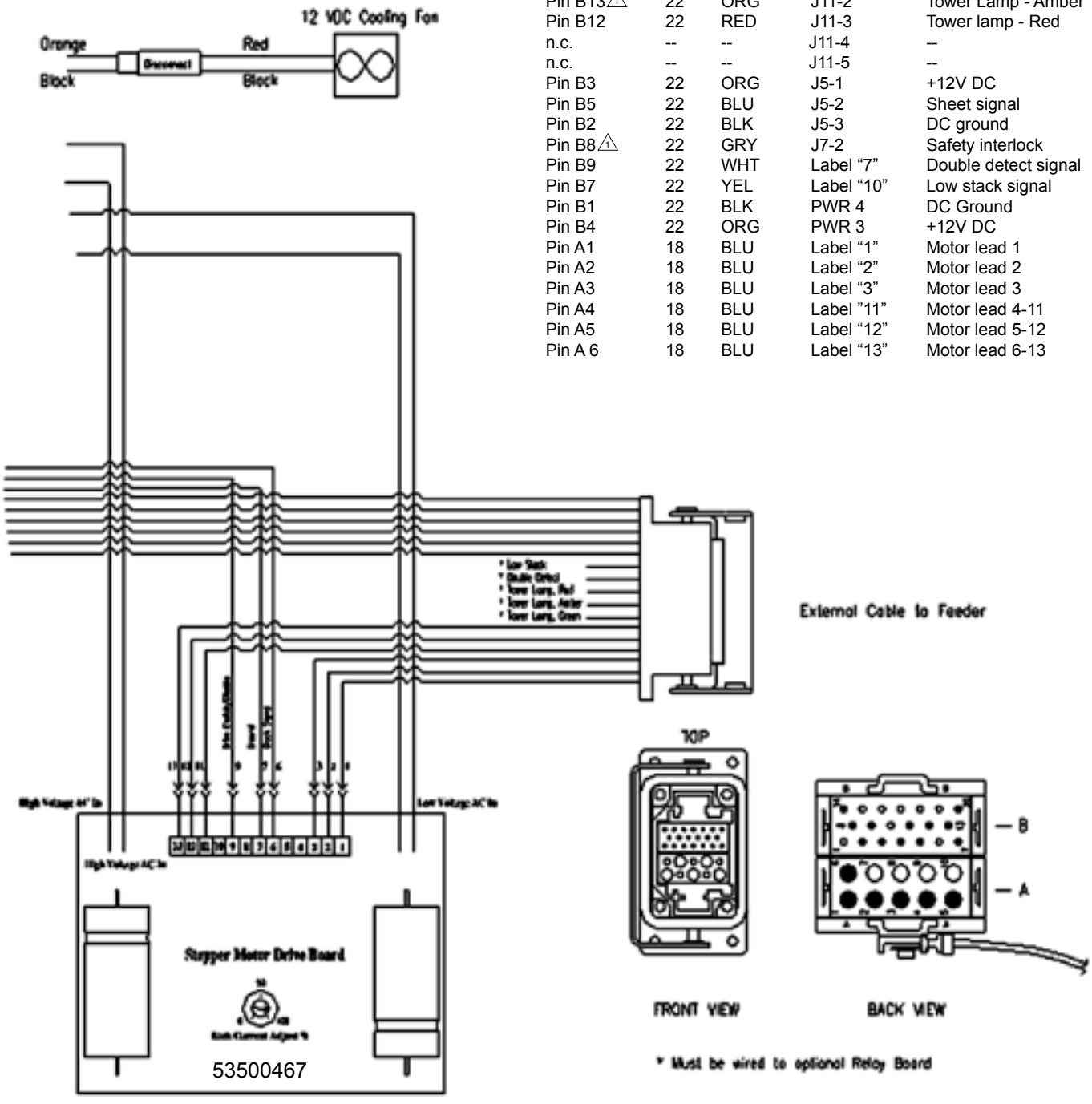


External IQuipped Box

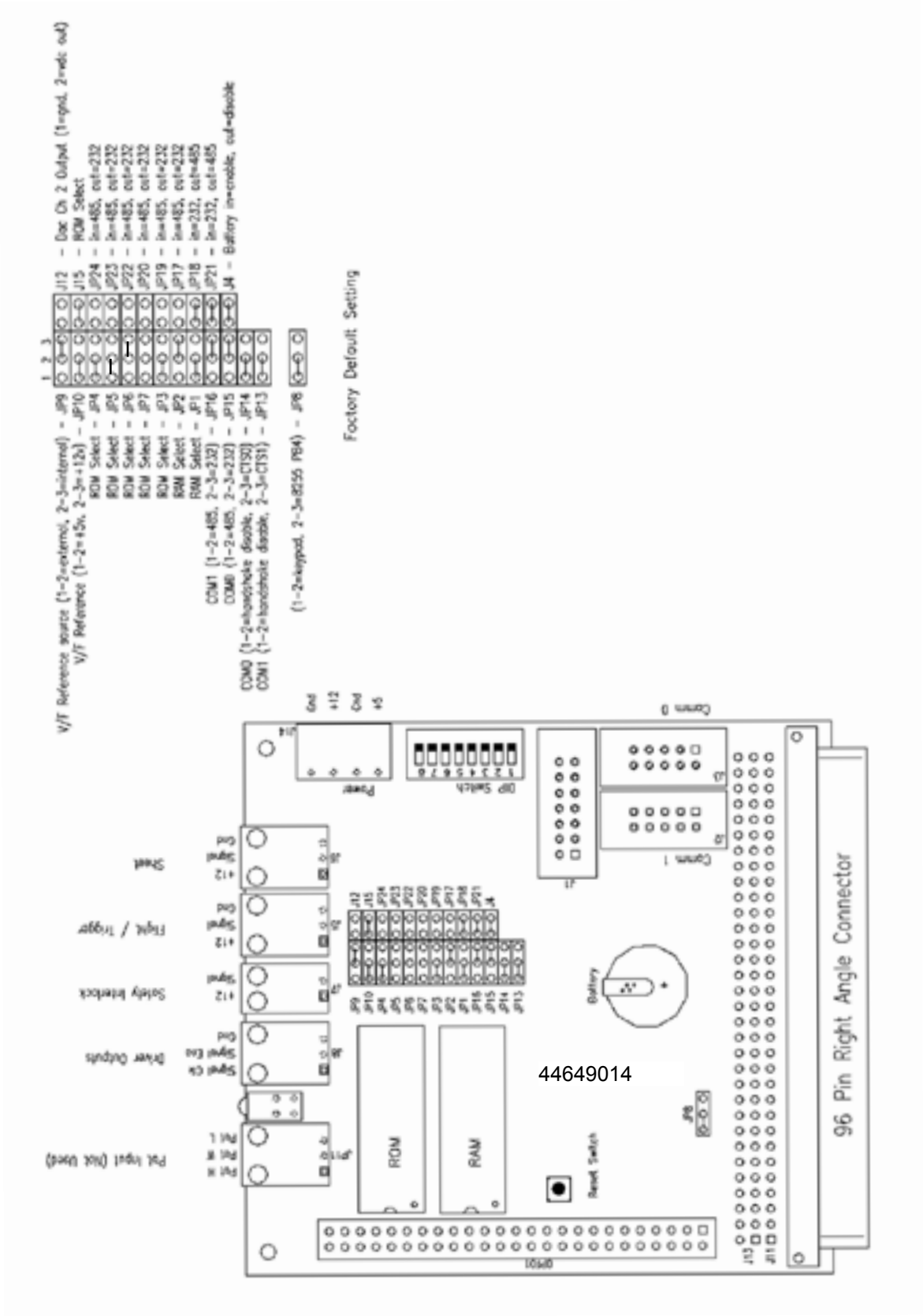


External IQuipped Box

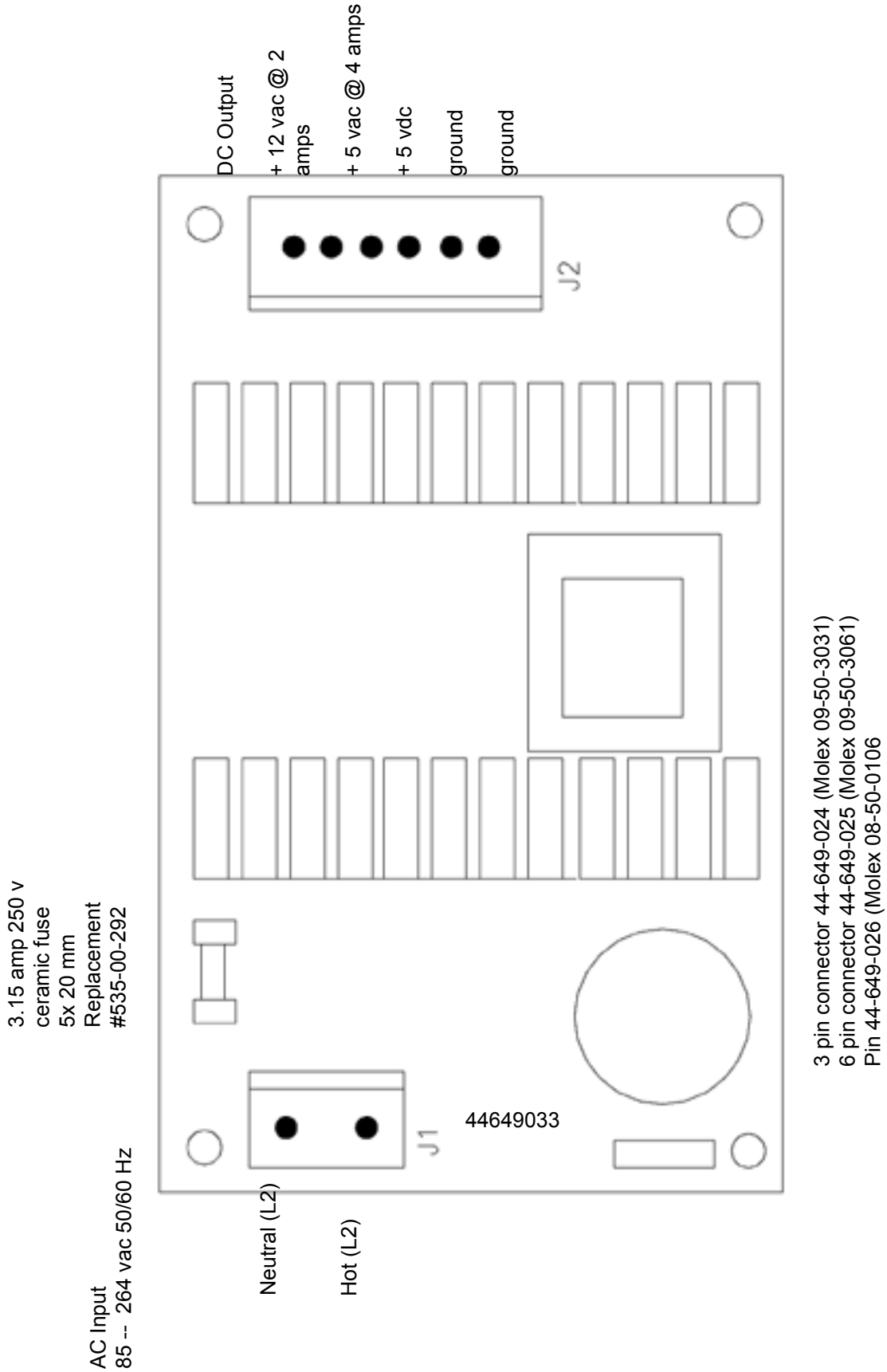
FR AME/ HOUSING END (FROM)	AWG	COLOR	(TO)	SIGNAL
Pin B14	22	GRN	J11-1	Tower Lamp - Green
Pin B13⚠1	22	ORG	J11-2	Tower Lamp - Amber
Pin B12	22	RED	J11-3	Tower lamp - Red
n.c.	--	--	J11-4	--
n.c.	--	--	J11-5	--
Pin B3	22	ORG	J5-1	+12V DC
Pin B5	22	BLU	J5-2	Sheet signal
Pin B2	22	BLK	J5-3	DC ground
Pin B8⚠1	22	GRY	J7-2	Safety interlock
Pin B9	22	WHT	Label “7”	Double detect signal
Pin B7	22	YEL	Label “10”	Low stack signal
Pin B1	22	BLK	PWR 4	DC Ground
Pin B4	22	ORG	PWR 3	+12V DC
Pin A1	18	BLU	Label “1”	Motor lead 1
Pin A2	18	BLU	Label “2”	Motor lead 2
Pin A3	18	BLU	Label “3”	Motor lead 3
Pin A4	18	BLU	Label ”11”	Motor lead 4-11
Pin A5	18	BLU	Label “12”	Motor lead 5-12
Pin A 6	18	BLU	Label “13”	Motor lead 6-13



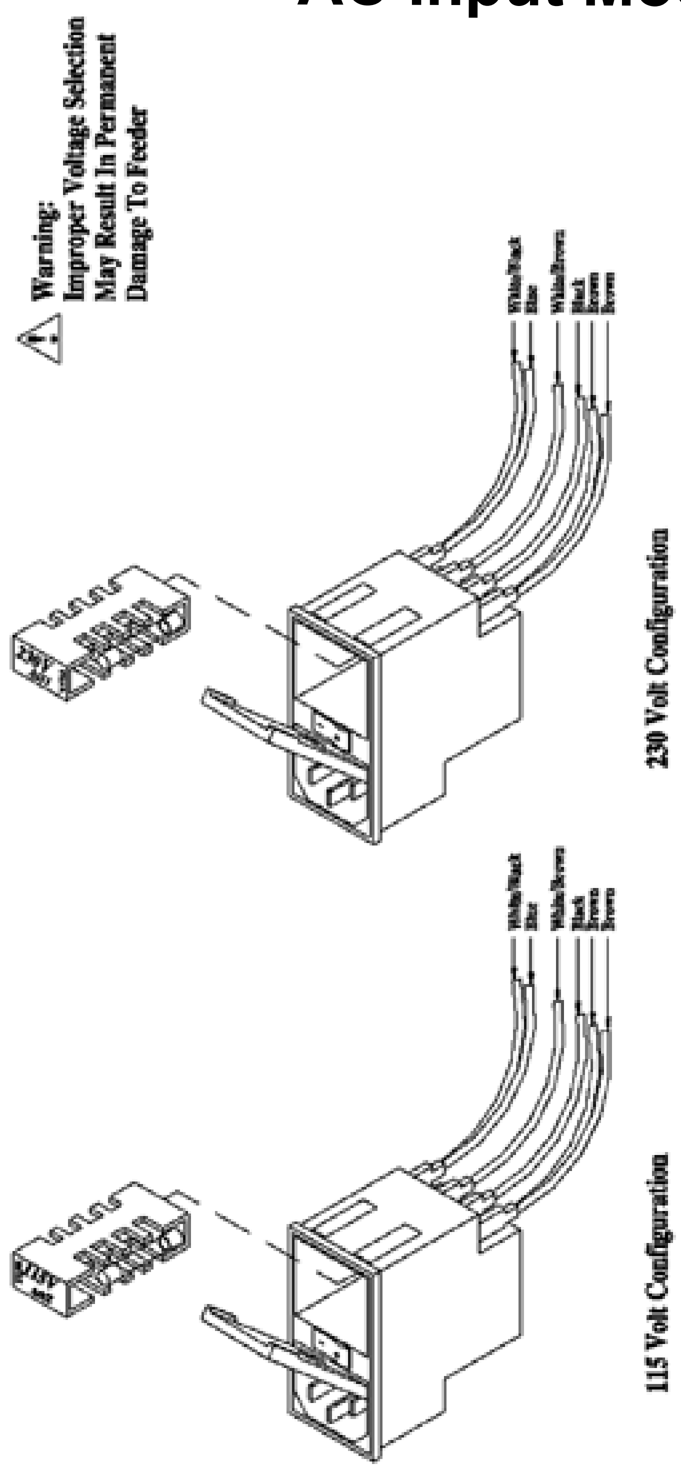
CPU Detail


Factory Default Setting
96 Pin Right Angle Connector
ROM
RAM
44649014

Power Supply

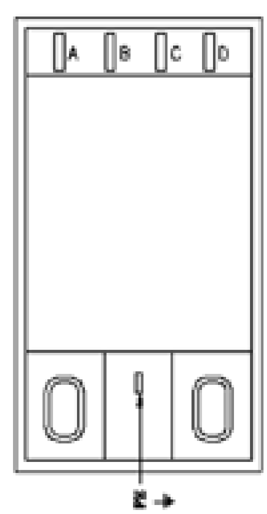


AC Input Module



AC Input Module Connections

Pin #	Color	Function
A	Brown	To transformer and power supply
B	Black	To transformer
C	White/Brown	To transformer
D	Blue	To power supply; White/Black - To transformer
PE	Green/Yellow	To grounding stud



44649034

Motherboard

Mother Board Jumper Settings
(Factory Defaults)

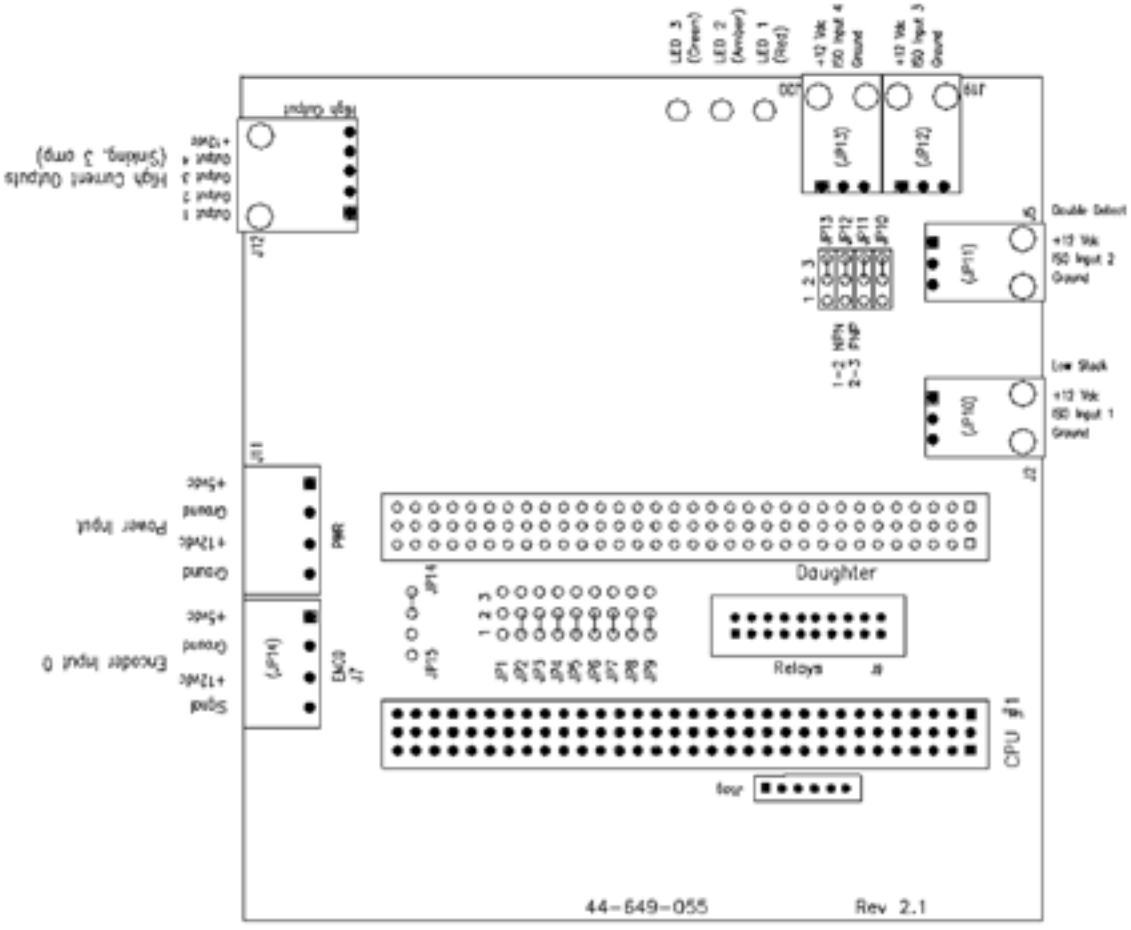
	RTC, DR00		RTC, Interupt 2
JP1	Module 8, CPU 1		Module 8, CPU 2
JP2	Module 7, CPU 1		Module 7, CPU 2
JP3	Module 6, CPU 1		Module 6, CPU 2
JP4	Module 5, CPU 1		Module 5, CPU 2
JP5	Module 4, CPU 1		Module 4, CPU 2
JP6	Module 3, CPU 1		Module 3, CPU 2
JP7	Module 2, CPU 1		Module 2, CPU 2
JP8	Module 1, CPU 1		Module 1, CPU 2
JP9			

JP14	Encoder0, 1K pulldown resistor	
JP13	J20, NPN-Sinking	PNP-Sourcing
JP12	J19, NPN-Sinking	PNP-Sourcing
JP11	J5, NPN-Sinking	PNP-Sourcing
JP10	J2, NPN-Sinking	PNP-Sourcing

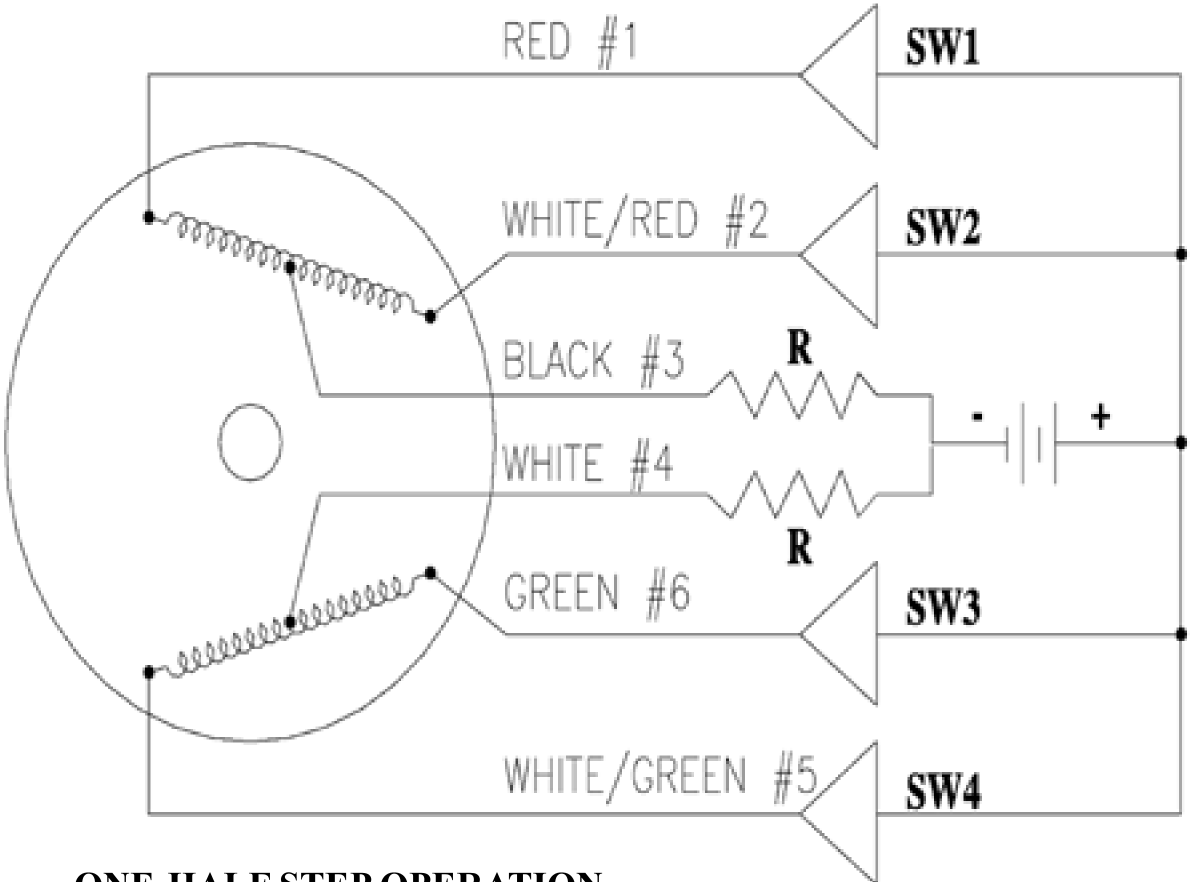
Note:

JP1 is not installed. If installed this jumper may conflict with the External trigger (Module 8) or (Module 6).

If Module 5 is used confirm Jumper JP14 on CPU is not installed.



Wiring Diagram: 6-Lead Stepper Motor



The motor must not be taken apart. Opening the motor will void the warranty. Removing the rotor will reduce output torque 5% or more. It is possible that reassembly will introduce very small steel particles into the interior of the motor which will contaminate it.

NOTE

The motor has sealed bearings which do not require lubrication for the life of the motor.

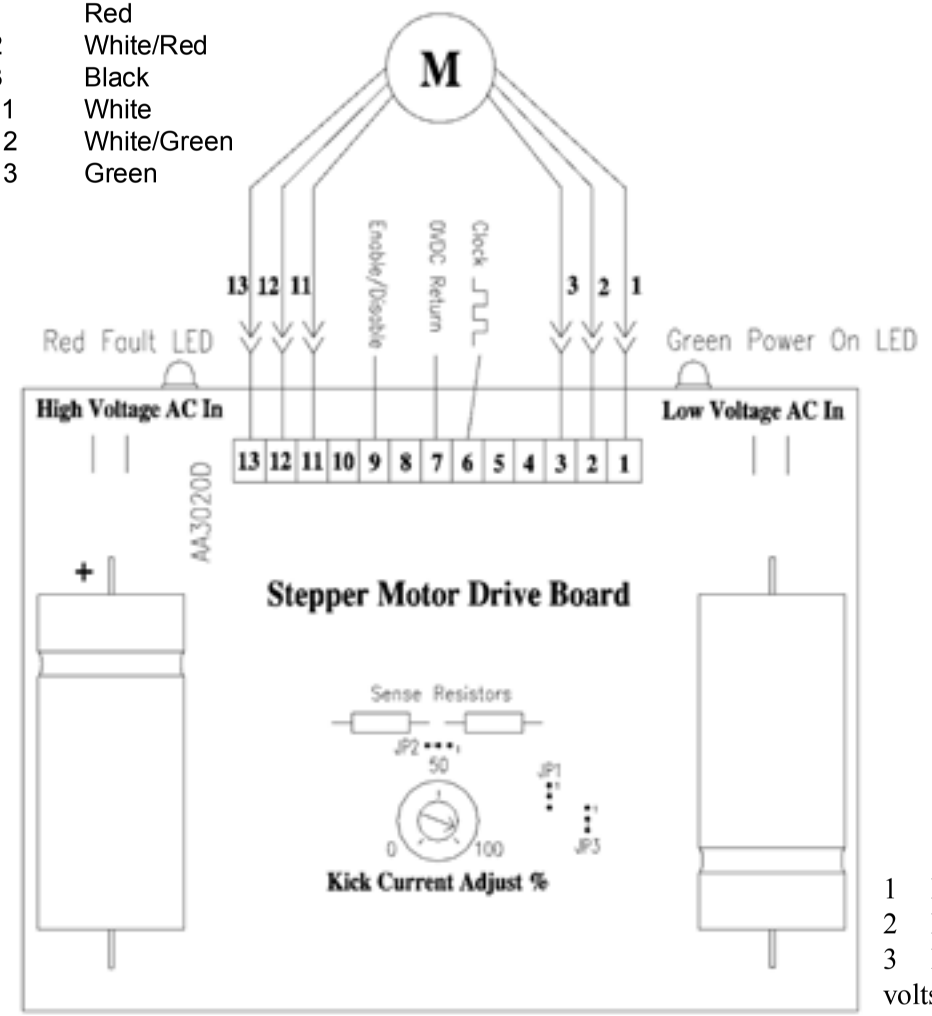
ONE-HALF STEP OPERATION
EIGHT-STEP INPUT SEQUENCE

STEP	SW1	SW2	SW3	SW4
1	ON	OFF	ON	OFF
2	ON	OFF	OFF	OFF
3	ON	OFF	OFF	ON
4	OFF	OFF	OFF	ON
5	OFF	ON	OFF	ON
6	OFF	ON	OFF	OFF
7	OFF	ON	ON	OFF
8	OFF	OFF	ON	OFF
1	ON	OFF	ON	OFF

Stepper Motor Drive Boards #44649030 and #53500467

Motor Wires:

1	Red
2	White/Red
3	Black
11	White
12	White/Green
13	Green



13 Pin Motor Coupler Pin Assignments

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 Phaes 2 & 4 Common
12 Motor Phase 2
13 Motor Phase 4

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

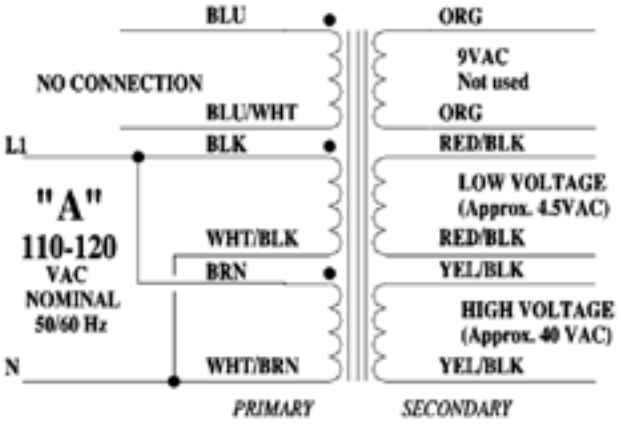
Fault Detection Protection LED Indictaion

1 Red LED-slow blink — Shorted wire in motor or cable
2 Red LED-fast blink — Open wire in motor or cable
3 Red LED-on steady — Ground fault (voltage shorted to 0) volts)

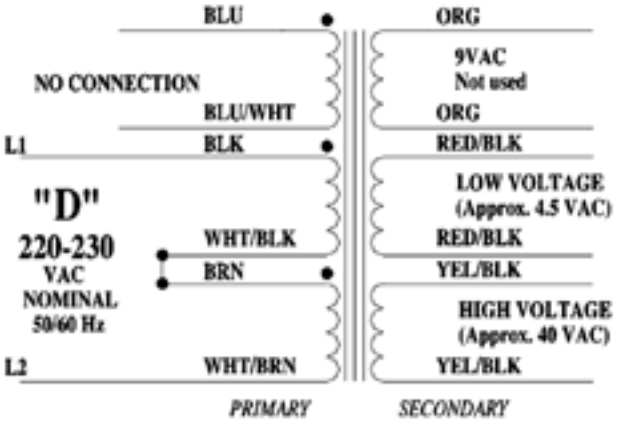
NOTE

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

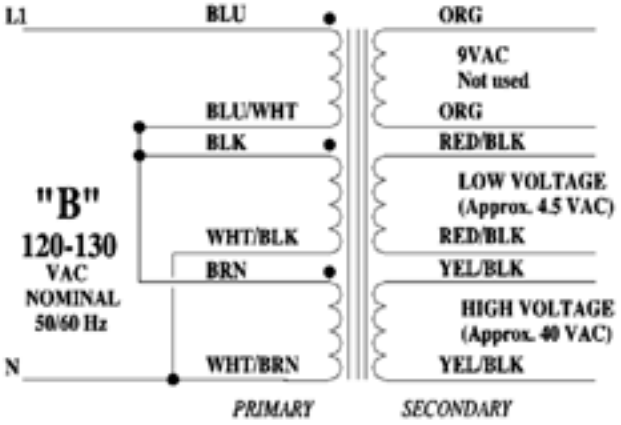
Transformer



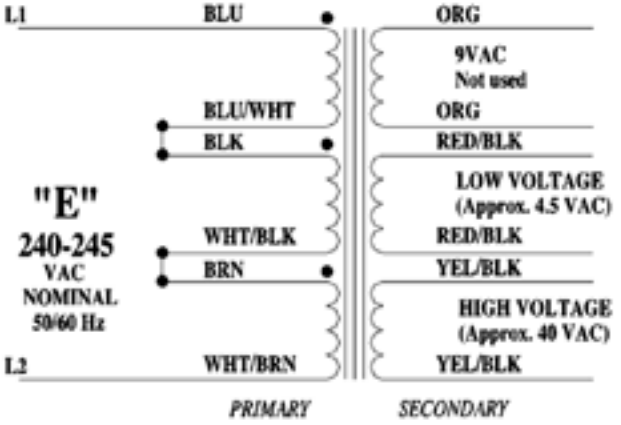
Standard wiring for most North American applications



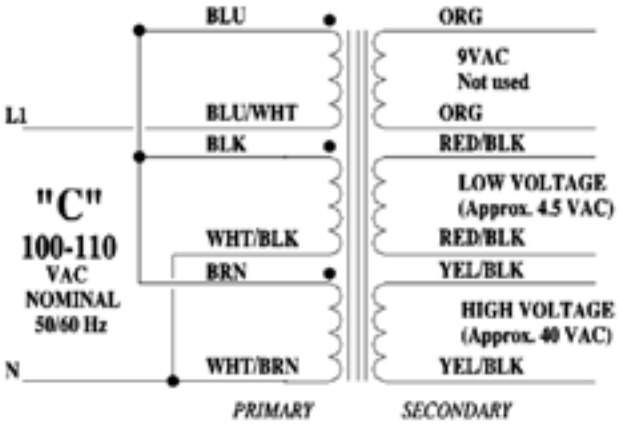
Standard wiring for Continental Europe, some 230V US applications



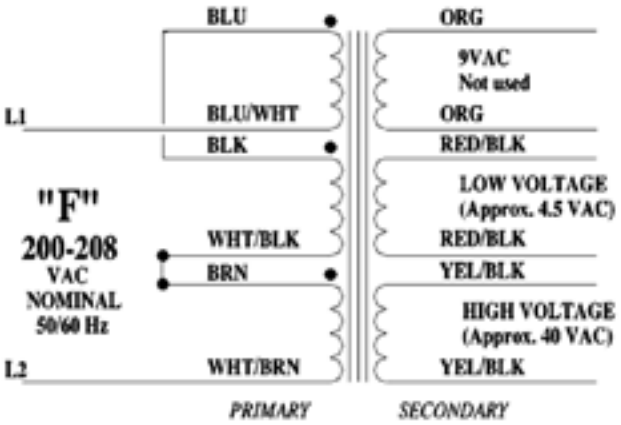
North America where voltage is over 120V



Standard wiring for U.K., Australia, New Zealand



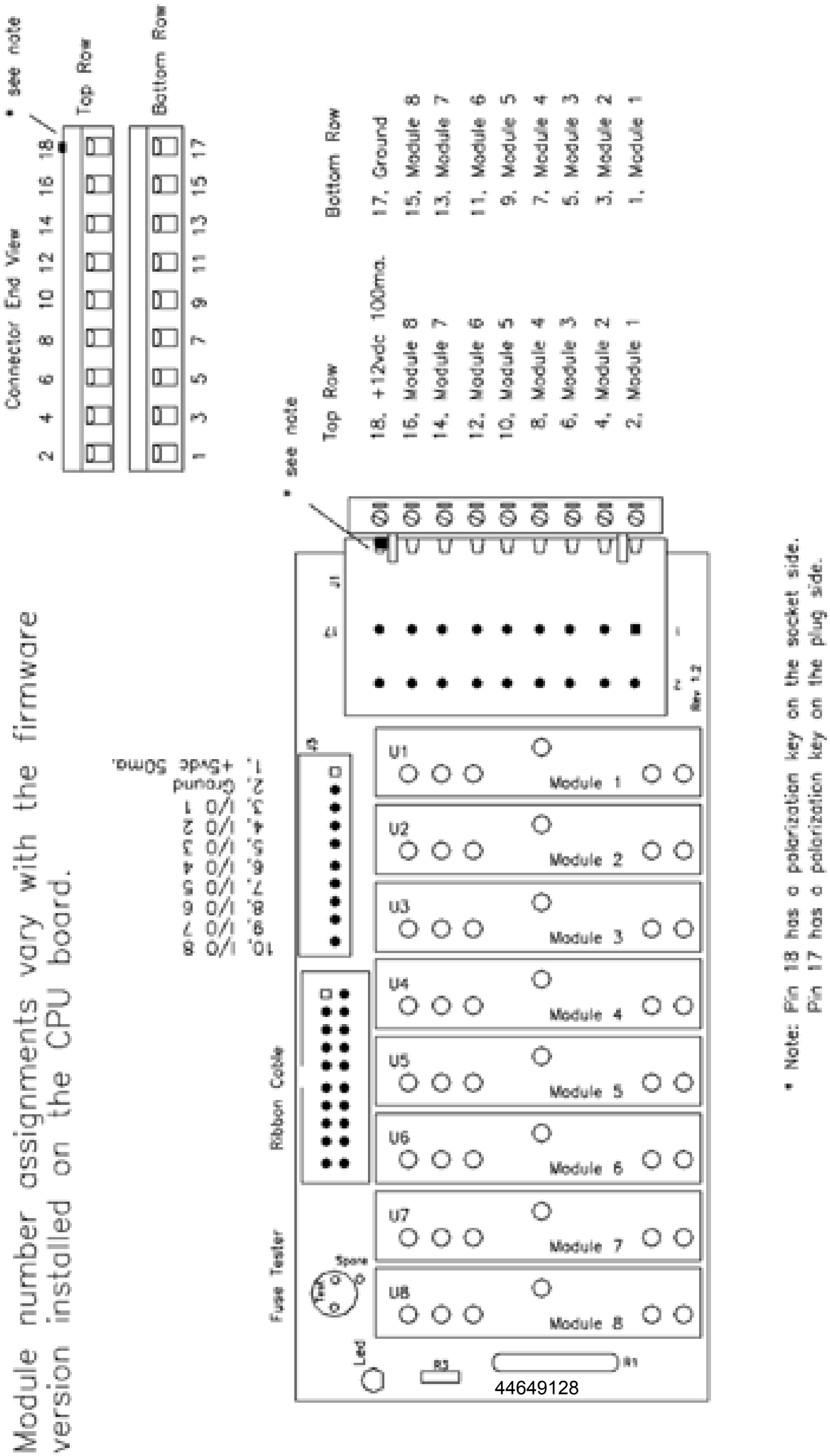
Standard wiring for Japan



Some Japanese (200V) applications, some US applications for 208V

53511701

I/O Board



Module number assignments vary with the firmware version installed on the CPU board.
Connector End View
2 4 6 8 10 12 14 16 18
1 3 5 7 9 11 13 15 17
Top Row
Bottom Row
* see note
Top Row
18, +12vdc 100ma.
16, Module 8
14, Module 7
12, Module 6
10, Module 5
8, Module 4
6, Module 3
4, Module 2
2, Module 1
Bottom Row
17, Ground
15, Module 8
13, Module 7
11, Module 6
9, Module 5
7, Module 4
5, Module 3
3, Module 2
1, Module 1
1, +5vdc 50ma.
2, Ground
3, I/O 1
4, I/O 2
5, I/O 3
6, I/O 4
7, I/O 5
8, I/O 6
9, I/O 7
10, I/O 8
J3
J1
Ribbon Cable
Fuse Tester
Spare
Led
R3
R1
U1
Module 1
U2
Module 2
U3
Module 3
U4
Module 4
U5
Module 5
U6
Module 6
U7
Module 7
U8
Module 8
44649128
* Note: Pin 18 has a polarization key on the socket side.
Pin 17 has a polarization key on the plug side.

10 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, the CPU board, the display/keypad decoder boards, the keypad, any ribbon cables and wiring harnesses, the sensors, the motherboard, and the relay I/O. Depending upon the options your machine has, you may or may not have the motherboard and/or relay I/O. Once it is determined that you have a drive or a controls problem, the next thing to check is the power supply for that section.

The tables that follow are designed to be a "quick lookup" for a problem you may be having. Wiring and board diagrams also contained in this manual are provided for reference and component recognition and connection during troubleshooting.

Quick-Look Troubleshooting

Problem	Solution
No power to feeder when power switch is turned on **IMPORTANT** *A visual inspection will not always be sufficient to determine fuse integrity.*	1. Make sure there is power present at the AC main where the control panel 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 connections to AC loads located on the back of the module inside the control panel. 4. Check the two fuses located inside the control panel's input power module. BOTH fuses must be present and test good. 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. a. Observe the voltage label showing through the window on the fuse housing for 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 and has not allowed the fuses to slide back toward the outside of the control panel and away from where contact with the metal pressure points inside the module body is made. c. Use an ohmmeter to test the fuses. 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 connectors on the back of 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 AC input leads. c. Remove the red and yellow wire pairs from the stepper motor drive board.

Quick-Look Troubleshooting (continued)

Problem	Solution
Fuses blow on power up (continued)	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.
Decreased power experienced after fuse is replaced **IMPORTANT** *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.
Fan(s) does/do not operate 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.*	1. Test output of DC supply. Note: The DC supply has dual outputs; 5 and 12 volts DC. 2. Test wire harness to fan for the presence of 12VDC. (NOTE: There are two cooling fans. One is located inside the feeder and the other is located inside the control panel.) 3. Check wiring harness for good electrical connections to pins in quick disconnect plugs. 4. Check for shorted wires in DC harness on output of supply or in the multi-conductor cable. 5. Replace fan. Note: Continued operation of the machine without a cooling fan working properly will cause further damage to the internal electronic components.
Keypad does not respond	1. Check green "heartbeat" LED located on the top of the CPU board. It will blink at regular intervals under normal operation when the feeder is in "Ready" or "Suspended" mode. If the blinking green "heartbeat" LED is not present, refer to the section titled "CPU board heartbeat pulse not present." 2. Check outputs of DC power supply and connections to the keypad board as well as to the CPU board. The keypad board is mounted "piggy back" to the display board. 3. Check all CPU jumpers for correct positioning, but specifically check jumper JP8 for correct positioning on pins 1 and 2. 4. Test fuse on the keypad decoder board. 5. Check 50-pin ribbon cable between keypad decoder board and the CPU board for positive connection and integrity. 6. Replace keypad decoder board. 7. If this does not give positive results, replace keypad.

Quick-Look Troubleshooting (continued)

Problem	Solution
Display does not function properly NOTE *Even though the display may not be working properly, it may still be possible to operate the feeder via the keypad. For example, if you can cycle the feeder by pressing the "cycle" key, and vary the speed with the up and down arrow keys, the keypad decoder board is most likely operational.* **IMPORTANT** *All user programmable parameters that are held in memory will be lost when the RAM is cleared.*	1. Check green "heartbeat" LED located on the top of the CPU board. It will blink at regular intervals under normal operation when the feeder is in "Ready" or "Suspended" mode. If the blinking green "heartbeat" LED is not present, refer to the section titled "CPU board heartbeat pulse not present." 2. Check outputs of DC power supply and connections to the keypad board as well as to the CPU board. The keypad decoder board is mounted "piggy back" to the display board. 3. Check fuse on the keypad decoder board. 4. Make sure keypad decoder board is operational by referring to the section titled "Keypad does not respond." 5. Test vacuum fluorescent display (VFD) tube. a. Remove keypad ribbon cable from the connector on the keypad decoder board. b. Remove four screws holding keypad decoder/display board combination to its mounting apparatus. c. Locate connector CN2 on the face of the VFD circuit board, and jumper pins 2 and 3. d. Apply 5VDC power to keypad decoder board DC input. e. A checkerboard pattern should be seen alternating across the screen's pixels where each character is normally displayed. If not, go to step 9. 6. Check 50-pin ribbon cable between keypad decoder board and the CPU board for positive connection and integrity. 7. Check all CPU jumpers for correct positioning, but specifically check jumper JP8 for correct positioning on pins 1 and 2. 8. Clear CPU board RAM by removing jumper J4 for 10 minutes. All user programmable parameters that are held in memory will be lost when the RAM is cleared. (It is recommended that the user programmable parameters should be noted in this manual prior to trouble for reference as needed in the future). After waiting 10 minutes, replace jumper J4 and reboot machine. 9. Replace display board. 10. If after determining the keypad decoder board, the ribbon cable, and the display board are all good components and this still does not give positive results, the CPU board is faulty and must be replaced.
"FEEDER TIMED OUT" message displayed	1. Double check the mechanical setup of the gate cylinder, material hold down, and wedge assembly is correct. Verify a gap is pulled between each piece of material as it is fed through the discharge of the feeder. If the sensor does not sense a gap between each piece of material, a feeder time out will occur. 2. Make sure the green LED on the body of the "sheet" sensor is illuminated when the feeder power is on. If not go directly to step 3. Also check the amber LED on the body of the same sensor is illuminated when a sheet of fed material is presented to the sensor, and is NOT illuminated when a sheet is not present. Finally, make sure the "sheet" sensor cannot sense anything in the background beyond the fed material. If the green and amber LEDs operate as they should, go to step 3b.

Quick-Look Troubleshooting (continued)

Problem	Solution
"FEEDER TIMED OUT" message displayed (continued)	3. Check connection to the CPU board at 3-pin connector J6. Note: Pin 1 is 12VDC, pin 2 is the signal input pin, and pin 3 is DC ground. Pins 1 and 3 give life to the sensor, and pin two requires 12VDC to be applied to it when a "sheet" is present and the output of the sensor is on. a. Measure between pins 1 and 3 of the CPU connector J6 for the presence of 12VDC. If this voltage is not present, the "sheet" sensor's green LED will not be illuminated, and the CPU board must be replaced. b. Jumper pins 1 and 2 on CPU board connector J6. Cycle the feeder while alternately removing the jumper and applying the jumper to simulate the output of the sensor as sheets are feeding through the feeder. If your feeder has One Shot controls, only one jump across the pins should complete a cycle. If your feeder is equipped with Batch Count controls, you should see the batch size decrement on the "Run Display" once for each jump across pins 1 and 2 until a cycle is complete. c. If steps 3a and 3b produce positive results as described above, all three pins of J6 on the CPU board are good. d. If jumping pin 1 to pin 2 does NOT produce positive results as described in step 3b above, the input is bad, and you must replace the CPU board. 4. Check the integrity of the "sheet" sensor wiring harness. Be sure to check for broken wires at the quick disconnects on both ends of the harnesses, including the multi-conductorr cable. 5. Check the sensor wires for integrity and positive connection at the pins of the quick disconnect where the sensor connects to the breakout board inside the feeder. 6. If all wire connections are good, the sensor's output is bad and it must be replaced.
CPU board "heartbeat" pulse not present	1. This LED should blink at regular intervals under normal operation when the feeder is in "Ready" or "Suspended" mode. Make sure the front safety guard is closed completely and no outside error conditions are present. 2. Check output of DC power supply. Check for shorted wires in DC harness on output of supply. 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. 3. Verify the cooling fan is operational and the supply is present at the 4-pin CPU board DC power input. If not, replace DC power supply. 4. Check CPU jumpers for correct positioning. 5. Check the EPROM and RAM chips are seated properly in their sockets. Note: Improperly seated chips may cause the CPU board to indicate a problem by illuminating the red LED located next to the green "heartbeat" LED. 6. Replace CPU board. 7. Replace EPROM.
Flight photo sensor does not trigger feeder	1. Check the trigger mode setup in the menu screen called "TRIG." Make sure it is set for "Flight Trigger," and the submenu is set for "Photo Sensor Input." 2. Check connection to the CPU board at 3-pin connector J5. a. Measure between pins 1 and 3 of the CPU connector J5 for the presence of 12VDC. If this voltage is not present, the "flight" trigger sensor's green LED will not be illuminated, and the CPU board must be replaced.

Quick-Look Troubleshooting (continued)

Problem	Solution
Flight photo sensor does not trigger feeder (continued) NOTE • *Pin 1 is 12VDC.* • *Pin 2 is the signal input pin.* • *Pin 3 is DC ground.* • *Pins 1 and 3 give life to the sensor.* • *Pin 2 requires 12VDC to be applied to it when a "flight" is present and the output of the sensor is on.*	b. Jumper pins 1 and 2 on CPU board connector J5. This will simulate the output of the "flight" sensor and should trigger a cycle. c. If steps 2a and 2b produce positive results as described above, all three pins of J5 on the CPU board are good. Go to step 3. d. If jumping pin 1 to pin 2 does NOT produce positive results as described in step 2b above, the input is bad, and you must replace the CPU board. 3. Test the integrity of the wiring harness leading to the flight sensor input connector. a. Measure 12VDC across pins 1 and 3 on the 4-pin circular connector. If voltage is not present, repair broken wire. b. Jumper pin 1 to pin 2. This should trigger a cycle. If not, repair broken wire. 4. Connect "flight" sensor to 4-pin circular connector and verify the sensor is getting power by checking the status LEDs on the sensor body for illumination. If not, check sensor leads for integrity. 5. Test the flight sensor for a switching output. If not present, replace flight sensor.
Motor does not run, is noisy, makes a "growling" sound, or runs in reverse TIP *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.* NOTE *This test requires a meter that has frequency measurement capabilities, or an oscilloscope.*	1. Cycle the feeder and check for a rolling icon in the upper right corner of the "Run Display". Note: This icon is active when the motor is supposed to be running. 2. Is the rolling icon present? a. Yes: Go to step 3. b. No: Check CPU board for "heartbeat" LED and verify keypad is working correctly. 3. 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 4.5VAC across red pair of wires. Go to section titled "Testing the transformer" for further information. If green LED is not illuminated and the transformer voltages test good, replace the drive board. Otherwise continue with next step. 4. Look at the Red LED on the stepper motor drive board. Is it illuminated? a. YES: Go to section titled "Drive board red LED illuminated." b. NO: Continue next step. 5. Remove white wire from pin 9 on the stepper motor drive board 13-pin connector. Note: 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. 6. 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 next step. 7. 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 drive board. a. Cycle the feeder and verify icon is rolling on the "Run Display." b. Verify signal is present on pins 6 and 7. The frequency measured here directly affects the speed of the motor. At 1% run speed the frequency will be about 87 Hz minimum, and at 100% run speed, about 8.7 kHz maximum. It is recommended to set the run speed at about 50% where the frequency measured should be about one half the value of 8.7 kHz (or about 4350 Hz). c. Check integrity of both ends of drive wiring harness between the CPU board connector J8 and the drive board's 13-pin connector.

Quick-Look Troubleshooting (continued)

Problem	Solution
Motor does not run, is noisy, makes a "growling" sound, or runs in reverse (continued)	d. Using a digital multimeter or an oscilloscope, measure the amplitude of the pulse train and verify it is at least 2.5VDC. e. If pulse tests good, replace the stepper motor drive board. If the pulse tests bad, the pulse output on connector J8 of the CPU board is bad, and the CPU board 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 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 tests 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 section titled "Testing stepper motor drive board output pins." c. If stepper motor drive board tests 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 **IMPORTANT** *Do not have power applied when doing 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 motor wire plug-in coupler from the drive board.* *2. Test motor phase pins. Note: A digital multimeter is required for these tests.* *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 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, then the unit is faulty and must be replaced.* *3. Test motor common pins: Note: A digital multimeter is required for these tests.* *a. Touch the BLACK meter lead to the positive lead of the large blue capacitor on the left side of the board 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, then the unit is faulty and must be replaced.*

DIAGNOSTICS / TESTS

Diagnostics / Tests

Problem	Solution
Testing motors **IMPORTANT** *These motors are NOT repairable and should never be opened.*	*Refer to the wiring diagram of the 6-lead DC Stepping Motor found elsewhere in this manual.* *The motors 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 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 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. That is, 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 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 must be replaced.*
Testing the transformer	*Refer to the wiring diagram found in this manual. Note there are three primary windings and also three secondary windings, six windings altogether. Most feeders are shipped from the factory with the transformer set up for configurations "A" and "D." Therefore, one of the primary windings is not used, and will be tied back. (The orange secondary leads are also not used in the ST Series of feeders and will be tied back.) Flipping the fuse holder around in the AC power entry module will set up the feeder for either 115VAC as shown in configuration "A," or for 230VAC as shown in configuration "D." In reality, flipping the fuse holder around re-wires the transformer primary windings as shown in configurations "A" and "D."* *Transformers are inductors. Inductors are difficult 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 transformer has a problem that is not catastrophic. Therefore, a transformer can still have a problem even though it appears there is not a problem as measured with an ohmmeter. Fortunately, transformers very rarely fail, so, chances are any problem you may have that leads to the transformer is most likely caused by some other component.*

Diagnostics / Tests (continued)

Problem	Solution
Testing the transformer (continued)	*The following assumes all crimp-on connectors are properly connected to the transformer wires and are making contact with them, or are NOT crimped onto the insulation preventing a good electrical connection to the individual wires of the transformer.* *1. The first step to testing a transformer is to remove the secondary windings from their loads. Remove the yellow and red wire pairs from the stepper motor drive board.* *2. Apply the correct power to the transformer primary depending upon the position of the fuse holder in the AC power entry module.* *3. Using an AC volt meter, measure the voltage across each secondary winding. Do not measure with one lead of your meter to ground or the chassis, but rather measure the wire pairs with respect to each other.* *a. Measure the yellow pair of wires with a black stripe on them by putting the red meter lead on one yellow wire, and the black meter lead on the other yellow wire. (It does not matter which meter lead goes to which transformer wire). You should measure approximately 40VAC between these two wires. If not, the transformer is faulty and must be replaced.* *b. Measure the red pair of wires with a black stripe on them, by putting the red meter lead on one red wire, and the black meter lead on the other red wire. (It does not matter which meter lead goes to which transformer wire). You should measure approximately 4.5VAC between these two wires. If not, the transformer is faulty and must be replaced.* *The following are tests you can make with an ohmmeter:* *1. Each of the six windings has two wires, one lead on each end of them. Make sure you measure continuity between winding leads. If a winding is measured open, the transformer is faulty and must be replaced.* *2. Next verify none of the windings are shorted to any other winding. Using your ohmmeter, you should NOT measure continuity from one winding to any of the other five windings. If a short is measured between windings, the transformer is faulty and must be replaced.*

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