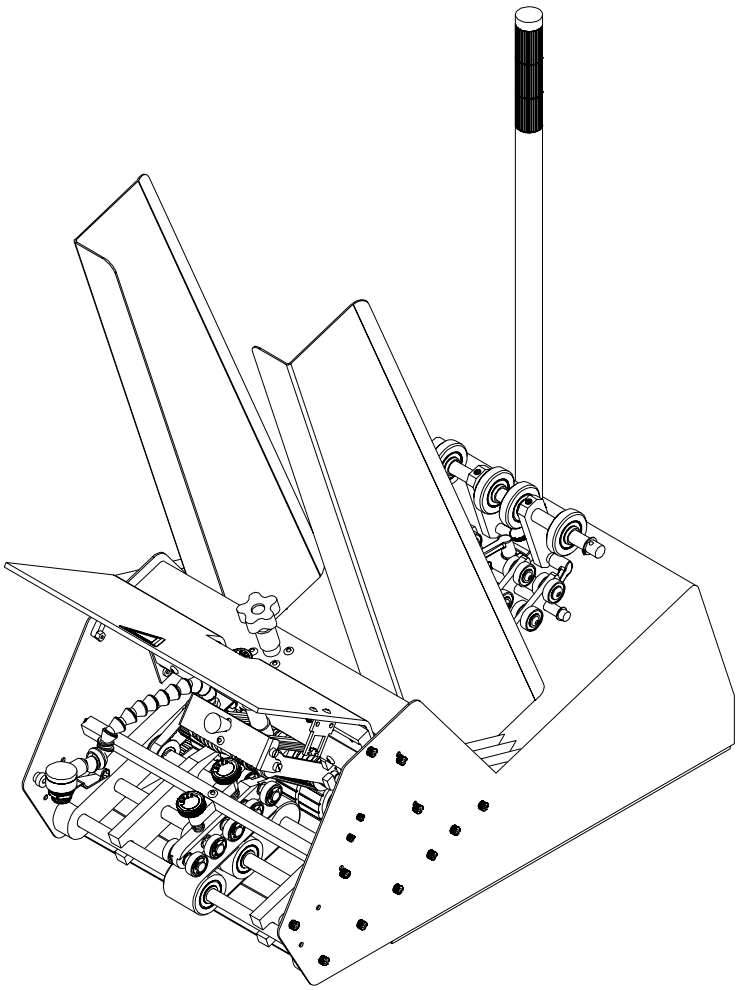
Pro Series ST-1250

Product Guide



Thiele Technologies
A Barry-Wehmiller Company

Streamfeeder®

Part Number 00900324

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Contents

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.

SPECIFICATIONS

Maximum Product Size..... 12 in. W x 14 in. L (30.4 cm x 35.5 cm)

Minimum Material Size..... 3.75 in. W x 3.75 in. L (95.2 mm x 95.2 mm)

Optional..... 2 in. W x 2.5 in. L (50.8 mm x 63.5 mm)

Min/Max Product Thickness.... .003 in to 1 in. (.07 mm - 25.4 mm)

Belt Speed..... 5500 in/min (14,000 cm/min or 140 meters)

Electrical Requirements..... 115/230V, 50/60Hz, 6A

Overall Dimensions..... 23.32 in. L (5.9 cm)
13.15 in. W (3.3 cm)
28.82 in. H (adjustable) (7.3 cm)

Weight..... 89 lbs. (40.3 kg)

1 About the Machine

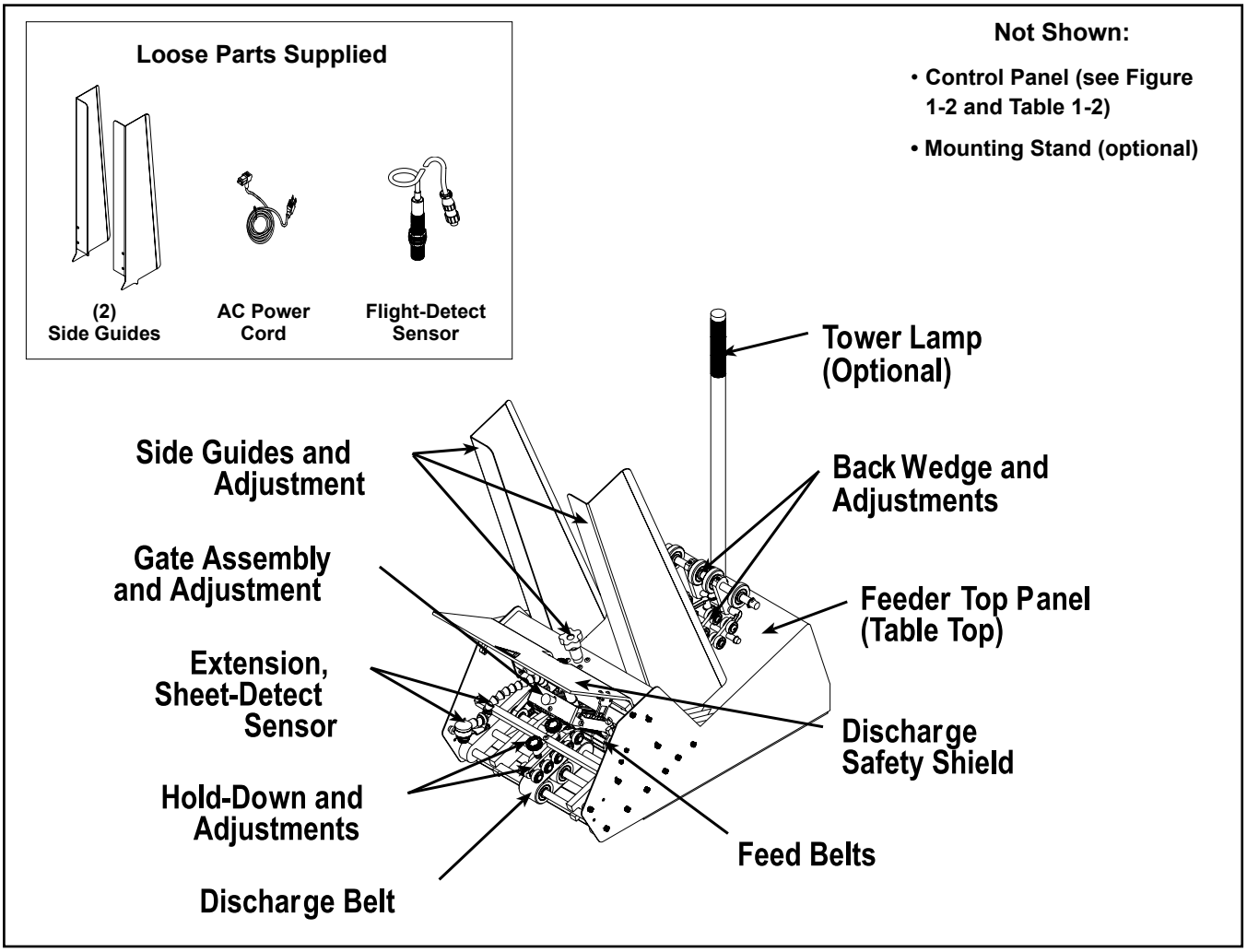
Features

The ST-1250 is designed for reliability, flexibility, and ease of use.

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

Review the diagram below to become familiar with names and locations of feeder parts and adjustments. This will help to prepare you for initial setup.

Main Assemblies



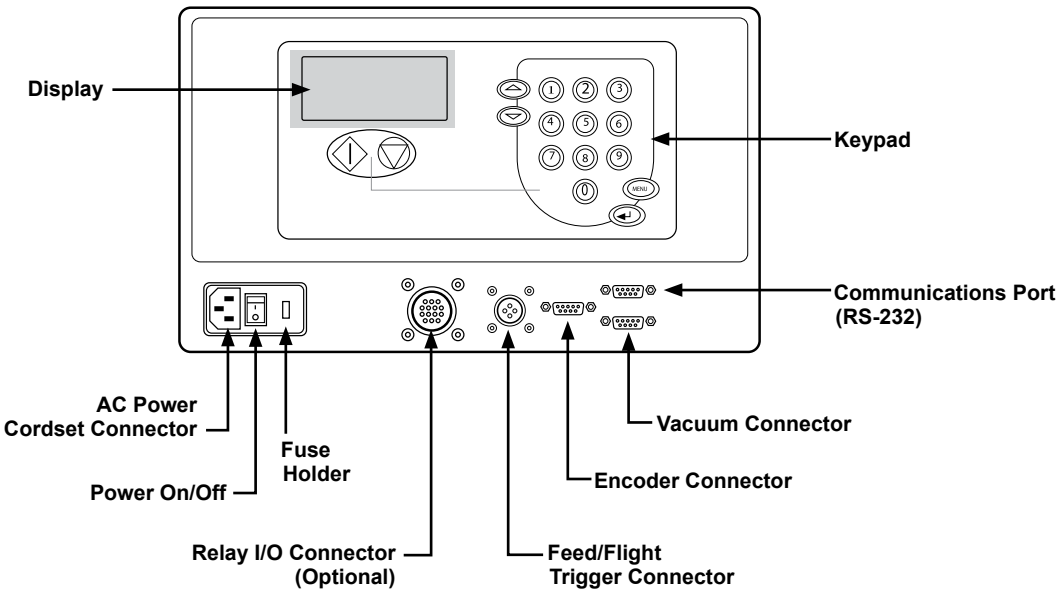
Loose Parts Supplied:

- **AC Power Cord**
- **Side Guides**
- **Product Guide**
- **External Run Input Cord (Optional)**

Main Assemblies Feature Descriptions

Feature	Description
Gate assembly and adjustment	*Mounted on a gate plate directly above the feed belts, this device provides a curvature to help preshingle stacked product. Adjustment knob allows you to set downward pressure. When properly adjusted, a one-thickness gap is created to help singulate and eject product.*
Top panel (table top)	*Used to support the back wedge.*
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. Adjustment knob allows you to move the side guides equally offset for different size products.*
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. To achieve proper lift, adjustment wing-nuts allow you to adjust the wedge to various positions and angles.*
Hold-down and adjustments	*This series of rollers provides a varying pressure on top of product to force it down on the discharge belt, helping to eject a single product after it exits the gate assembly area. During setup, knob allows you to set downward pressure.*
Extension, sheet-detect sensor	*Mounted on the feeder extension arm, it "looks" for the leading edge of the product to stop the feeder momentarily. For effective operation, a flexible extension allows you to adjust for distance and perpendicular to product.*
Flight-detect sensor	*Mounted at a remote location, it "looks" for a target on-line (such as a flighted conveyor) to start the feeder.*
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.*
Control panel	*All connectors and switches for sensor, interface, and AC power are located here. Also contains numeric keypad and vacuum fluorescent display for operator control interface.*
Discharge safety shield	*Provides residual risk protection to operator when feeder is running.*
Stand (optional)	*Supports the feeder and allows for easy mobility. Includes built-in height adjustment.*
Tower lamp (optional)	*Mounted on the feeder, it contains green, amber, and red colored lights which alert the operator to various status conditions.*

Control Panel Components

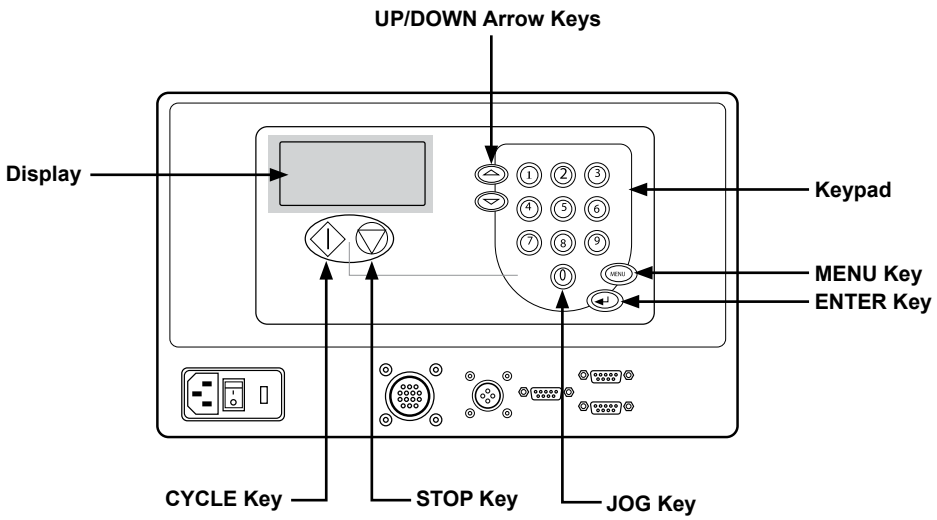


Control Panel Feature Descriptions

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 a replaceable GMD3, 3-Amp, 5-mm x 20 mm fuse. 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 (Optional)	*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. This port's availability is firmware-dependent.*
Feed/Flight Trigger	*The remote flight-detect sensor plugs into this 4-pin connector to provide the "start" signal to begin a feed cycle.*
Vacuum Connector	*This 9-pin connector is used to energize the vacuum for each feed cycle.*
Encoder Connector	*This 9-pin connector is used to interface with an encoder signal. The speed following feature requires this input from an optional encoder kit.*

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 Feature Descriptions

Feature	Description
Display	*This 4-line x 20-character display provides menus for the operator control interface and provides status of feeder during cycling.*
Keypad	*Used to enter data which controls feeder activity, such as speed or batch count, etc.*
UP/DOWN arrow keys	*Scrolls through the system configuration menus. Also, is used to increase and decrease the speed or batch count, etc.*
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, etc.*
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.*
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.

Run Display Defined

The Run Display 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.

Ready	*The feeder is ready to feed when a flight signal is received or when the* **CYCLE** *key is pressed.*
Suspended	*The feeder will not feed when it receives a flight signal or when the* **CYCLE** *key is pressed. Pressing the* **CYCLE** *key will advance the feeder to the "Ready" mode.*
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, open the discharge safety shield (to disengage the interlock), and disconnect feeder from the electrical power source. Failure to do so can expose you to a potential start-up and 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 feeder is installed, you are ready to prepare the machine for operation. You must perform several adjustments with the product you are going to be feeding and do a test run with this product to verify that it is set correctly before going on-line. *You will have to perform this procedure for each product 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 adjustment

6: Manual test to verify

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 the proper gap to help the feed belts advance 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 (counterclockwise) the gap between gate assembly and the feed belts. Depending upon 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.

STEP 1: Gate Assembly Adjustment (continued)

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

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

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. Also see Step 4, Hold-Down Setting.

TIP

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

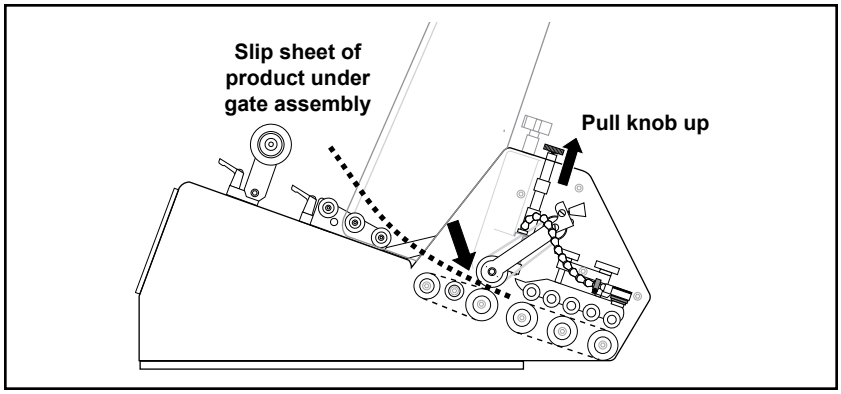
NOTE

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

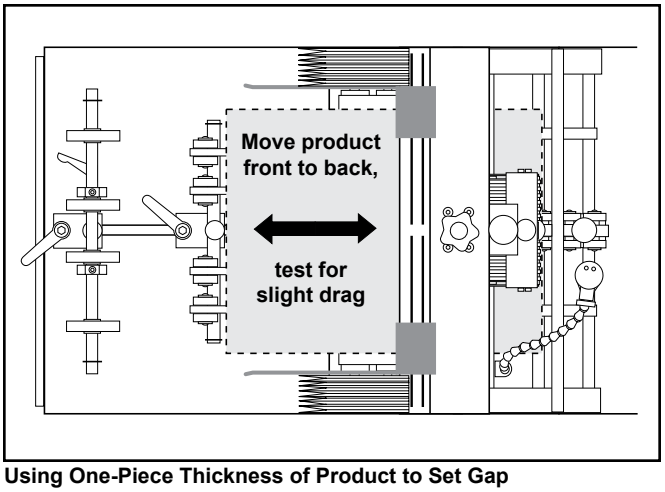
Procedure

To adjust the gate assembly for proper gap:

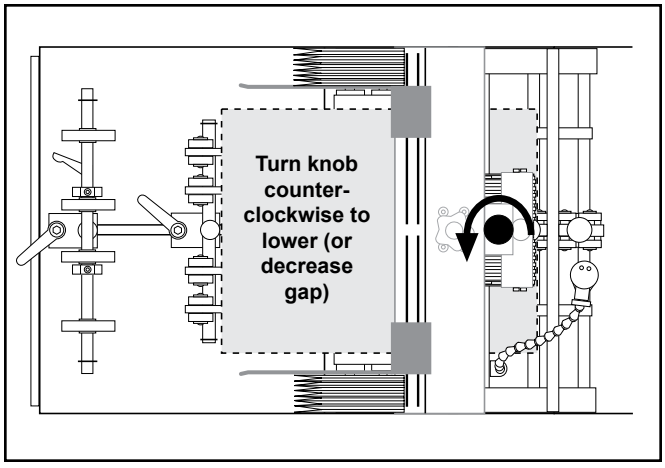
1. Slide a single sheet of test product under the gate assembly. It may be necessary to pull up on the adjustment knob to allow the piece to be inserted.
2. Test the piece for clearance. Grasp the product with two hands and slide it front-to-back under the gate assembly. A proper adjustment allows a slight amount of drag on the top of the piece.
3. Adjust the knob on the gate assembly until the piece has the desired drag. Turn the knob clockwise to increase clearance or counterclockwise to decrease clearance.
4. Repeat the drag tests and adjust as needed to achieve acceptable clearance.



Lifting Gate Assembly Upward to Insert Product



Using One-Piece Thickness of Product to Set Gap



Adjusting Gate Assembly for Correct Gap

STEP 1: Gate Assembly Adjustment (continued)

NOTE

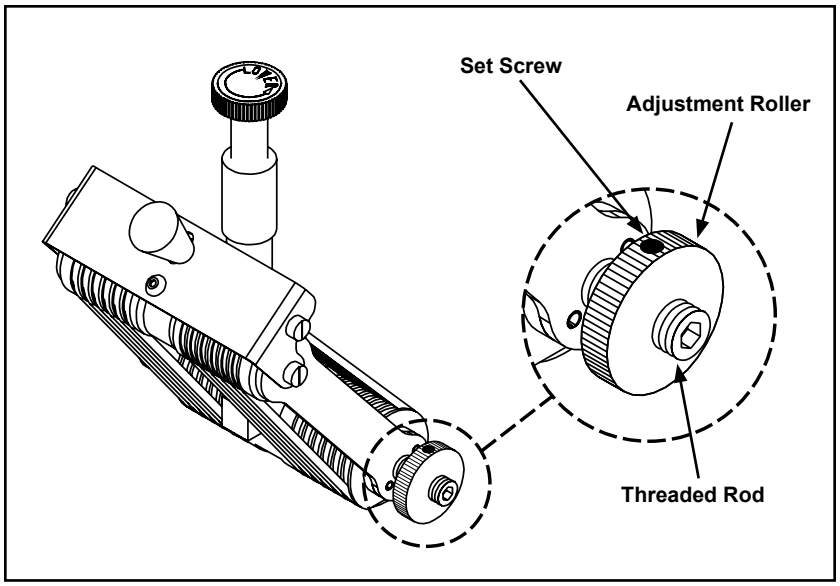
When feeding product with varying thickness throughout, it may be necessary to turn both adjustment rollers 1-2 ***full turns*** *counter-clockwise to compensate for the differential thickness. This procedure allows the gate horizon to "float."*

IMPORTANT

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

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

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



Horizon Adjustment Mechanism (shown on Advancing O-Ring Gate)

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.*

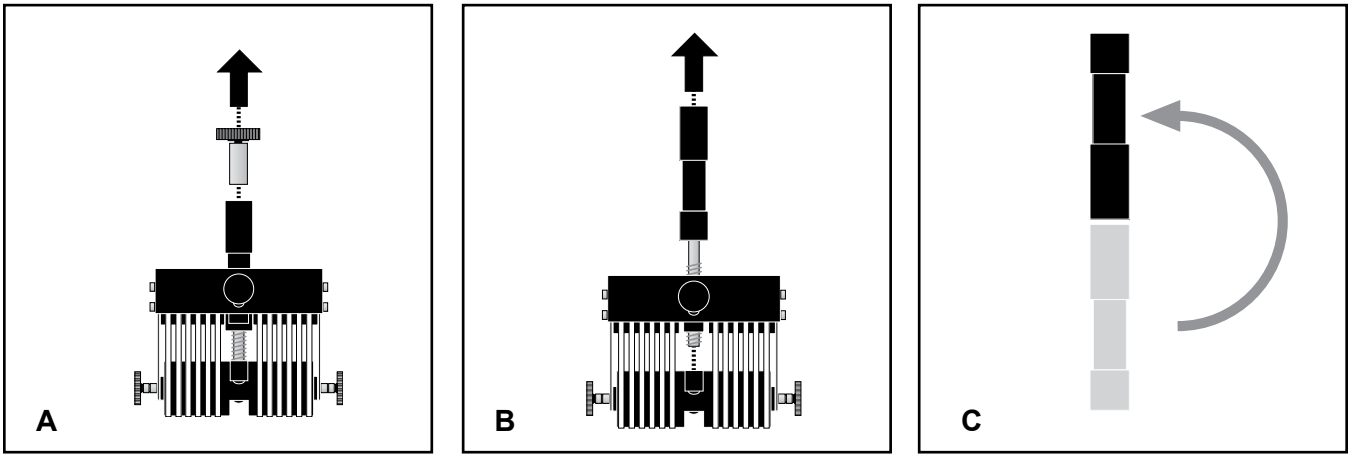
If you are feeding a product of irregular thickness, you should change to low-tension. This provides the following benefits:

- 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 counterclockwise (Fig. A).
3. Lift the cylinder off of top of spring (Fig. B).
4. Turn the cylinder around so that the cylinder collar faces up (Fig. C).
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).

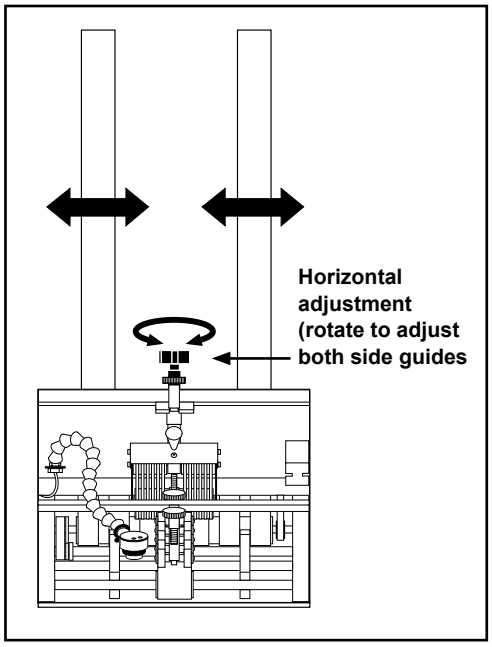


Adjusting Gate Assembly for Low-Tension

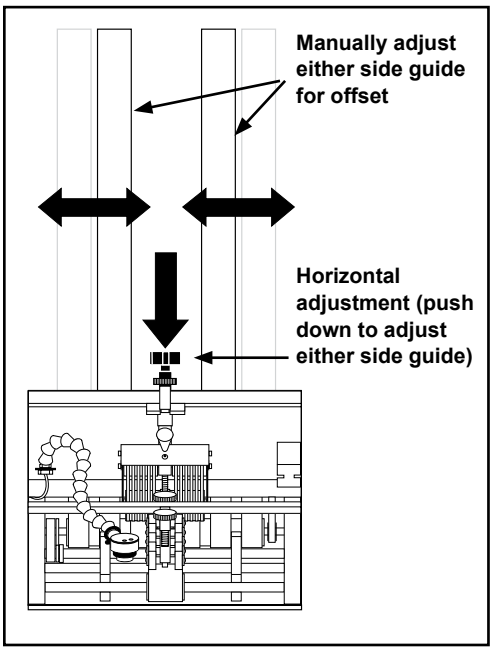
STEP 2:
Side Guides Setting

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).



Horizontal Adjustment of Side Guides



Individual Side Guide Offset

Review

The side guides hold the stack of product being fed and 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 the product stack maintains uniformity from top to bottom, with no drifting or binding. Adjustments are made *horizontally*.

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

- An initial starting point should always be that each guide is of equal distance from the center point of the machine.
- Each edge of the product should rest equally on belts either side of gate assembly (or equidistant spacing). *There can be certain instances where guides do not need to be centered due to product characteristics. This is called offset spacing.*
- 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.

Procedure

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

1. Place a small stack of product in the hopper.
2. Using the side guides adjustment knob (centrally located between the two guides), turn in either direction until guides are located at the recommended distance from the product: 1/16 in. (1.6 mm) for each edge, 1/8 in. (3.1 mm) overall.
3. Visually check both guides for proper spacing from product.

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

1. Push down on the side guides adjustment knob to disengage guides from gear mechanism.
2. Grasp whichever side you wish to offset first and move into position.
3. Place a small stack of product in the hopper, with edge of paper against offset guide.
4. Move the second side guide so that it is located at the recommended distance from the product: 1/16 in. (1.6 mm) for each edge, 1/8 in. (3.1 mm) overall.
5. Lift up on the adjustment knob so that the guides lock into place.
6. Visually check both guides for proper spacing from product.

STEP 3: Back Wedge Adjustment

NOTE

Keep in mind the back wedge works with the gate assembly to provide the proper lift, curvature of the 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.

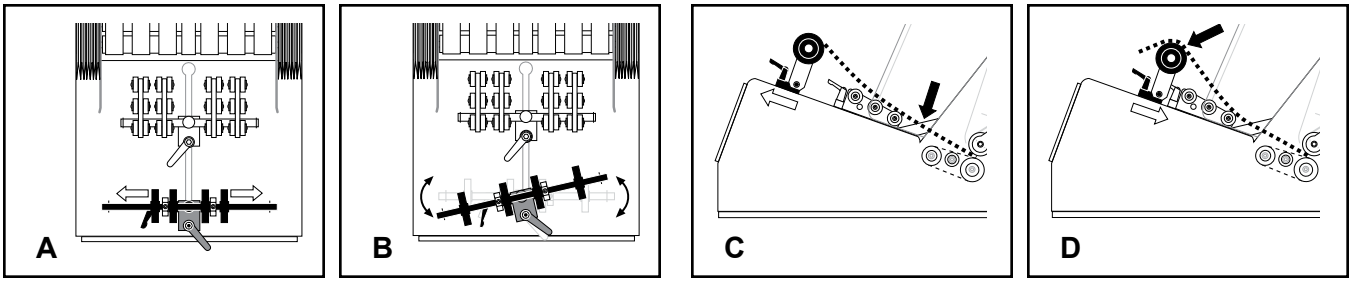
Review

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 (for illustration purposes, the optional Articulating Roller Wedge is shown):

- *Moving the individual rollers to the outside* of the back wedge shaft (Fig. A) 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* (Fig. B) 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 (Fig. C), 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 (Fig. D), then a pinch point can be created between the top surfaces of the individual rollers and the product. Moving the back wedge even closer toward the gate assembly can allow product to overhang the wedge, creating too much lift of the product off the feed belts.



Tips for Proper Back Wedge Adjustment

STEP 3:
Back Wedge Adjustment (continued)

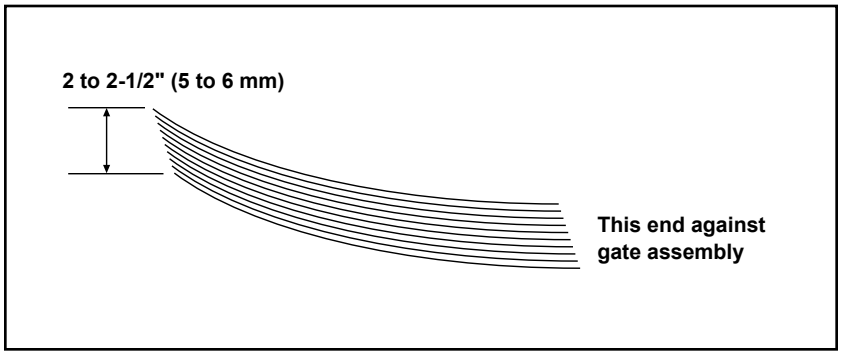
Objective

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

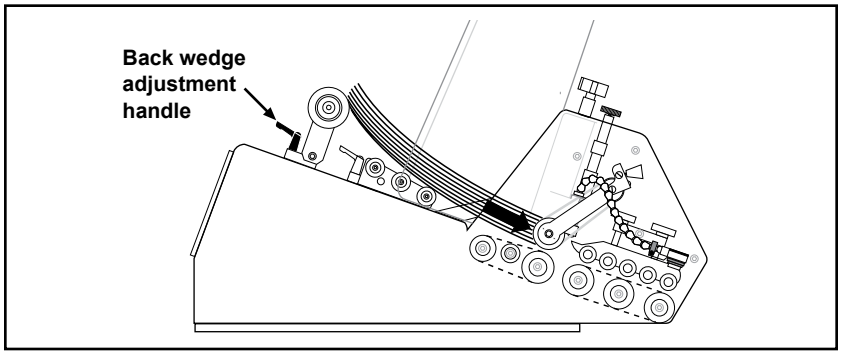
Procedure

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 the edges rest against the curvature of the gate assembly.
3. Turn the back wedge adjustment handle counterclockwise to loosen the wedge.



Preshingling a Small Stack of Material By Hand



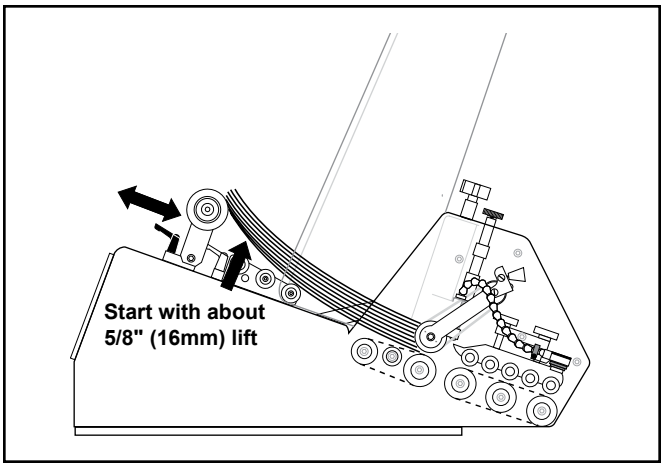
Positioning Product Prior to Loosening Back Wedge

STEP 3:
Back Wedge Adjustment (continued)

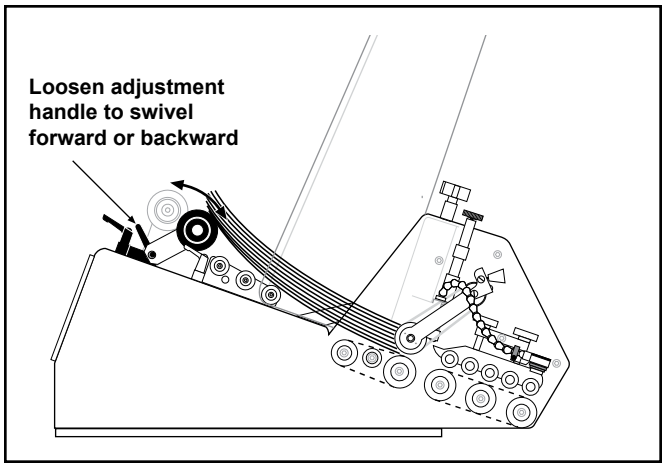
NOTE

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

4. Move the back wedge forward and backward 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. *You can also fine tune back wedge location by loosening the roller swivel adjustment handle to pivot the rollers back and forth (Articulating Roller Wedge only).*

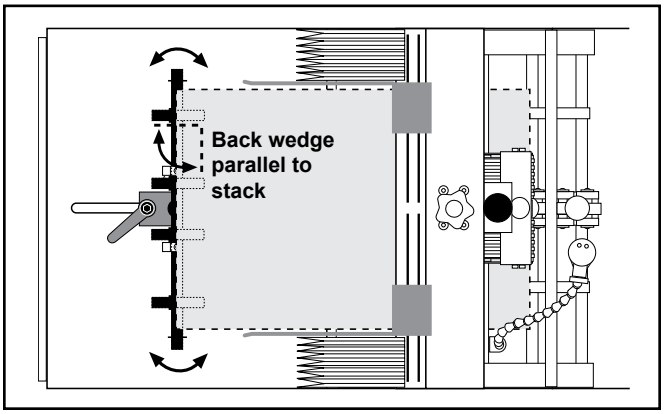


Adjusting Back Wedge for Proper Lift

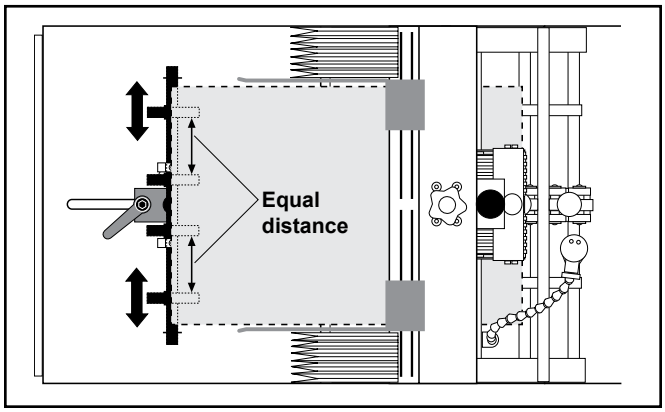


Adjusting Roller Position

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 adjustment handle.
6. Check that individual rollers 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 Rollers

STEP 4: Hold-Down Setting

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.

Review

The hold-down assembly consists of several floating rollers which rest on top of the product as it exits the gate assembly area. The assembly applies pressure to the product, giving the discharge belt 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.

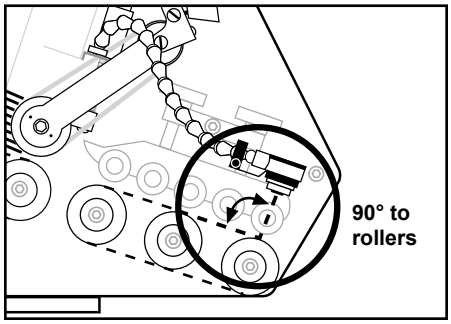
Objective

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.

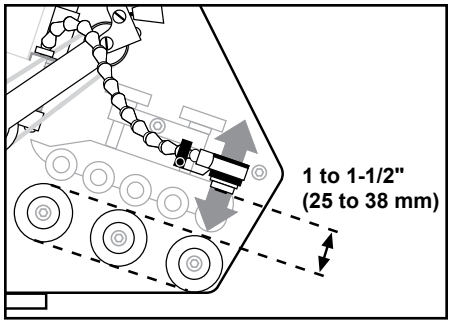
STEP 5: Photo Sensor Adjustment

TIP

Avoid light colored backgrounds in the discharge area.



Adjusting for Perpendicular Position



Adjusting for Distance

Review

The **Flight-Detect** photo sensor is mounted on the line to detect a target and instruct the feeder to eject a product. The **Sheet-Detect** photo sensor is mounted on the flexible feeder extension assembly to detect the leading edge of a product about to be ejected.

Objective

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

Procedure

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

1. Aim and align the photo sensor straight toward (perpendicular to) the product (Figure 2-18). 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 (Figure 2-19). *When only the green LED is On, you will know when the photo sensor is positioned properly. The amber LED is On when product is staged.*
3. When making the adjustment, be aware of any background objects beyond the product range. *On the feeder, such objects as shafts, guides, belts, and supports may cause false returns if the photo sensor is not adjusted properly for the product (or target). The resulting problem can be continuous feeding. See Section 4, Operational Troubleshooting, for a solution.*

STEP 6:
Manual Test to Verify

Now that you have made all the necessary adjustments for operation, it is recommended that you verify 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.

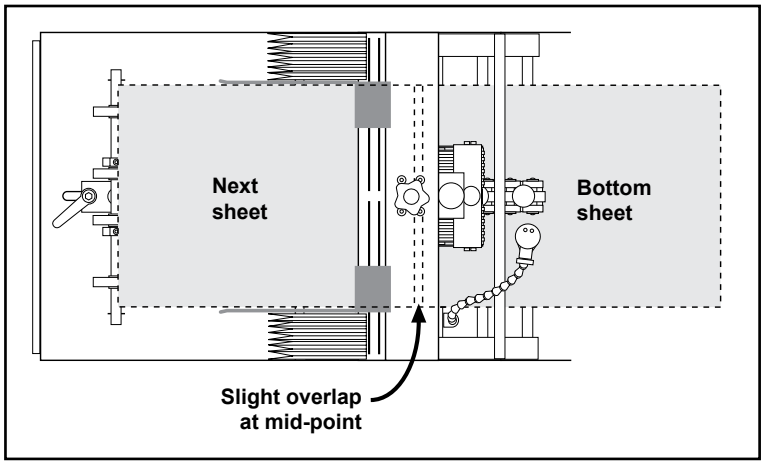
1. Manually feed several sheets of product slowly through the gate assembly area. Move the drive belts by pressing your thumb against the discharge belt.
2. Observe how individual product enters and exits the gate assembly area. Remember, a properly set gap will allow each new sheet to enter at about the centerline of the cylinder while the bottom sheet is exiting the gate assembly area (see below). 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, move the wedge in toward the gate assembly. Test again.
4. If sheets are overlapping excessively or, if the machine is feeding doubles, reduce the gap slightly by moving the knob about 1/8 turn counterclockwise. Test again.
5. As product moves through the hold-down area, check for any skewing or jamming. Also check for damage to the product.

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 wedge and the product. If moving the back wedge in is not effective, then an optional wedge may be required. See Section 6 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

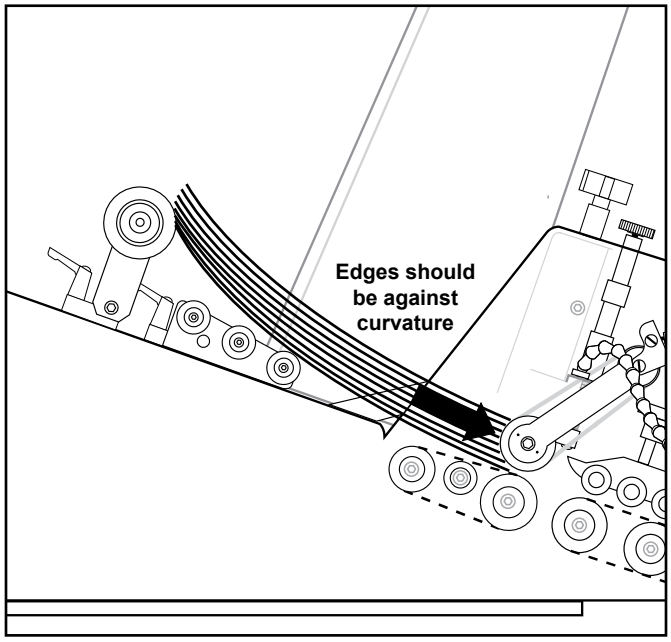
NOTE

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

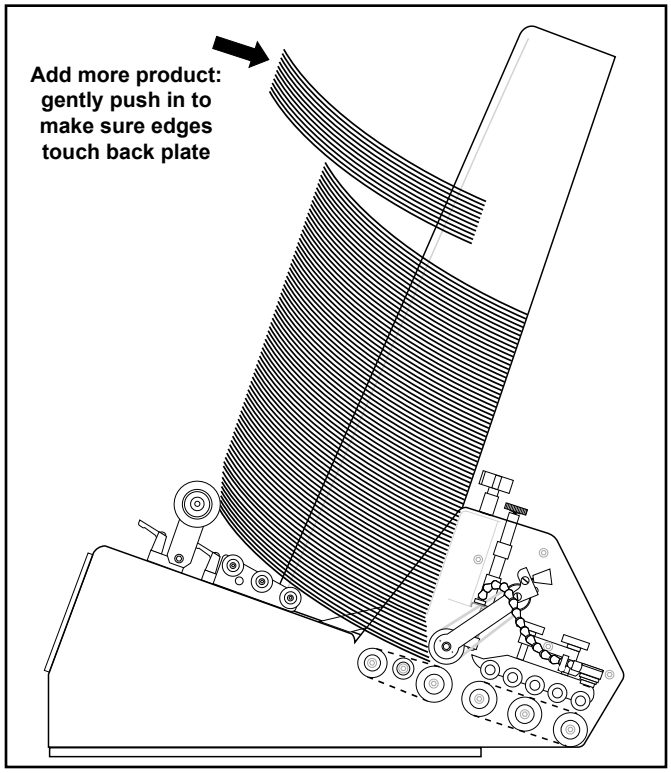
TIP

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

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



Placing Product Against Gate Assembly



Adding More Product to Fill Hopper

Quick Setup/Cycle Sequence

If the ST-1250 is prepared for operation and you want get the feeder started in the quickest way possible, use the following sequence:

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

IMPORTANT

Menus can be customized to suit your changing on-site needs via the “Passcode” menu.

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 “Run Display” screen.

If you wish to configure all the parameters of your machine via the menus, then use the following sequence for accessing the menus. Also refer to the Pro Series Menu Guide for a listing of full current menus.

1. Turn power **On**.
2. Press *any* key to advance to “Run Display” 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 “Run Display” 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 "Status" screen.
3. Press **CYCLE** key to *stage* product and advance to "Status" 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

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 (see Section 4, Operational Troubleshooting).
4. Verify whether any adjustments are loose. If so, refer back to Section 2, Preparing for Operation, for proper adjustment procedures.
5. Reposition photo sensor (as required).

Shutdown

Should you not be using 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. Cover the feeder with a cloth or plastic tarp to prevent dust and debris from accumulating.

NOTE

You may want to follow the same procedure for the Sheet-Detect photo sensor also to prevent damage to any loose or hanging cabling.

4 Operational Troubleshooting

This table is intended to provide you with quick solutions to the more common day-to-day problems you may encounter. For additional troubleshooting information, refer to the Technical Troubleshooting section.

Problem	Cause	Solution
No AC power to feeder	1. On/Off switch in "Off" (or "O" position).	Move switch 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 at rear of machine.
Feeding doubles	1. Gate assembly improperly adjusted (possibly more than one sheet thickness).	Review gate adjustment procedure.
	2. Back wedge improperly adjusted.	Review back wedge adjustment procedure.
	3. Worn O-rings (or angled edge).	Rotate O-rings (or replace angled edge). If wear is excessive, consult with a qualified technician.
	4. Material interlocking.	Check material and source.
	5. Static buildup.	Check material and source.
Feed belts are operating, but material not feeding	1. Material stack height is too low when stack height is down, resulting in reduction of down pressure.	Review material loading procedure.
	2. Binding in side guides.	Adjust side guides farther apart to allow freedom of movement between sheets.
	3. Slippery feed belts.	Consult with a qualified technician.
	4. Sheet adhesion or interlocking between the bottom and next sheet.	Review material loading procedure and back wedge adjustment procedure.
	5. Gate assembly may be down too tight.	Review gate assembly adjustment procedure.
	6. Too much weight in hopper.	Remove material from stack. Test again.

Operational Troubleshooting (continued)

Problem	Cause	Solution
Feed belt(s) not tracking on rollers	1. Excessive weight in hopper. 2. Excessive down pressure on gate assembly. 3. Off-centered product from center point of machine. 4. Belt wear.	Reduce weight. Test again. Rotate gate adjustment 1/8 turn to increase gap and manually test. Review gate assembly adjustment procedure. Review side guide setting procedure. Review gate assembly adjustment procedure. Also review inspection and care procedures. If wear is excessive, consult with a qualified technician.
Jamming occurs during operation	1. Improperly adjustment in one or more of the following areas: A. Gate assembly. B. Back wedge. C. Top roller hold-down assembly. D. Discharge alignment rails.	1. Turn the Power switch to "Off" by pressing the circle (O). 2. Remove jammed material from feeder. While doing so, try to determine the cause of the jam. 3. Verify each adjustment by reviewing the "Preparing for Operation" section of the manual.
Material skewing	1. Back wedge not aligned properly. 2. Excessive gate pressure on one side.	Review back wedge adjustment procedure. Review gate assembly adjustment procedure.

5 Inspection and Care

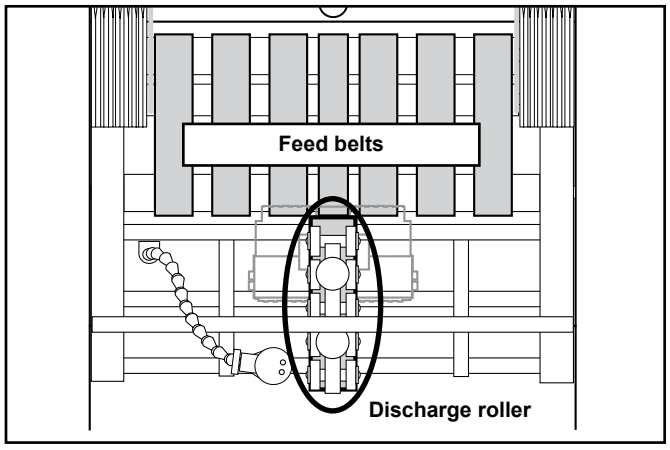
When performing initial adjustments prior to operation, always make sure you turn Off the main power switch, open the discharge safety shield (to disengage the interlock), and disconnect feeder from the electrical power source. Failure to do so can expose you to a potential start-up and moving parts 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

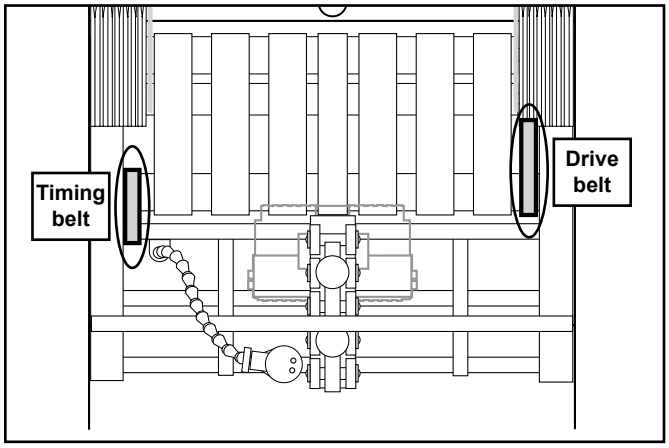


Checking for Feed and Discharge Belt Wear

Check for visual signs of:

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

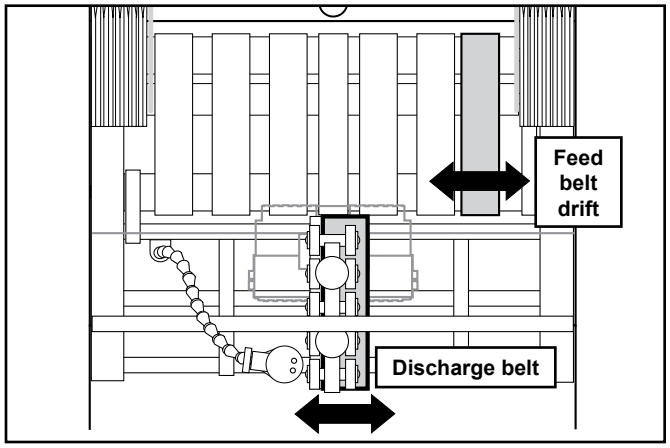
Visual Inspection (continued)



Checking for Timing and Drive Belt Wear

Check for visual signs of:

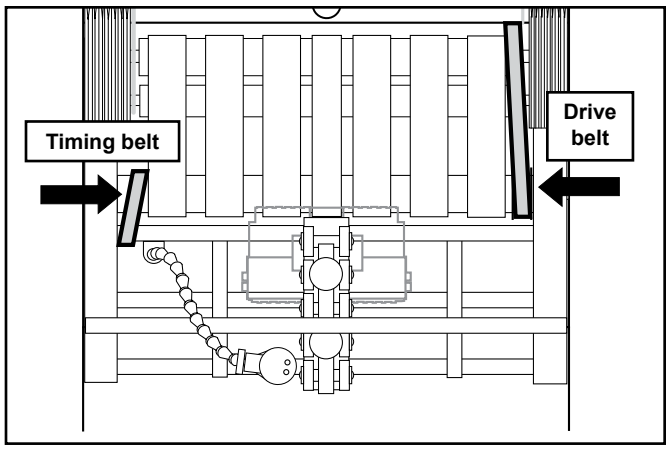
- Fraying. Replace as required.
- Missing teeth. Replace as required.
- Cracking. Replace as required.



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)

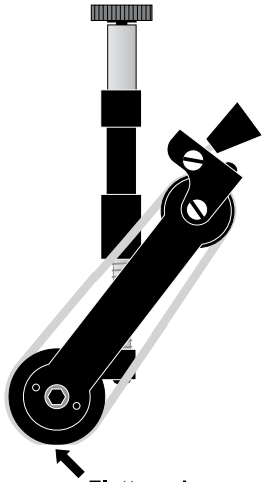
Checking for Gate Assembly Wear

Check for visual signs of wear:

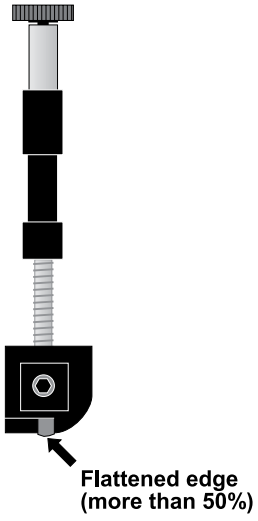
- Bar gate: Bar material begins to flatten excessively.
- Standard O-ring or advancing O-ring (if applicable): Flat areas along the O-rings.

See “Preventive Care” to follow.

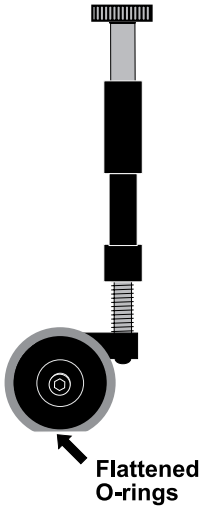
Advancing O-Ring Gate



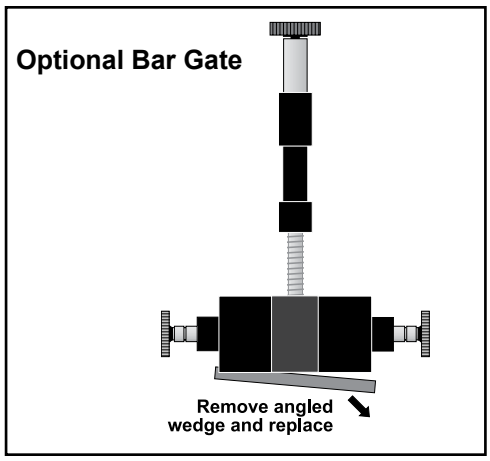
Optional Bar Gate II



Optional Standard O-Ring Gate



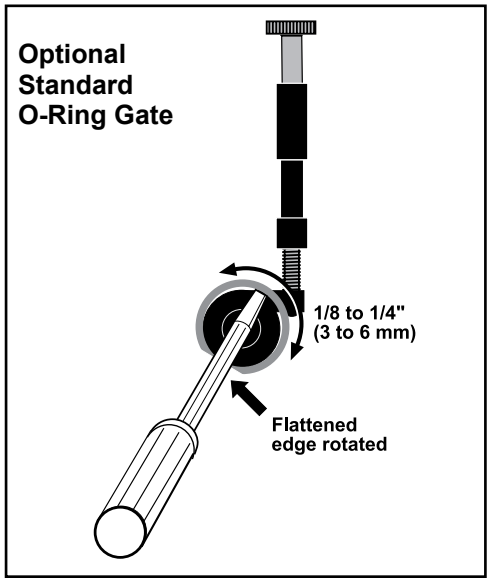
Visual Inspection (continued)



Replacing Worn Bar Material

To replace a worn bar material:

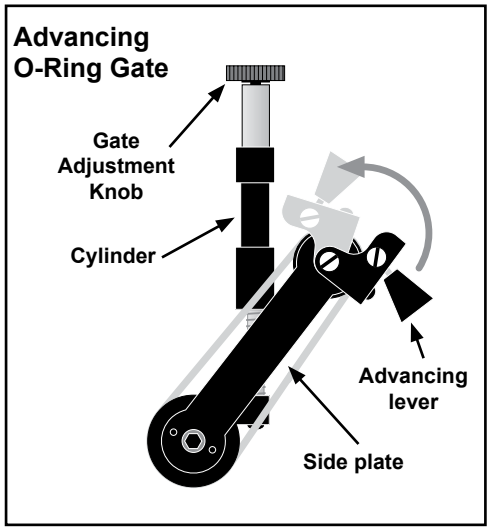
1. Turn Off feeder and remove power cord from outlet.
2. Remove gate assembly from gate plate.
3. Remove plate (two screws).
4. Use a pliers to grip and remove bar material.
5. Install new bar material by inserting one end and then pushing in until centered. *Do not grip bar material with pliers as this may cause damage to the edge.*
6. Reinstall clamp (two screws).
7. 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 counterclockwise 360° 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.
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. Remove gate assembly from gate plate.
3. Lower advancing lever away from gate adjustment knob.
4. Rotate O-rings by grasping advance knob and pushing toward gate cylinder about 1/8 to 1/4 in. (3 to 6 mm).
5. Lower advancing lever to resting position away from gate adjustment knob.
6. Reinstall gate assembly and restore power.

Preventive Care

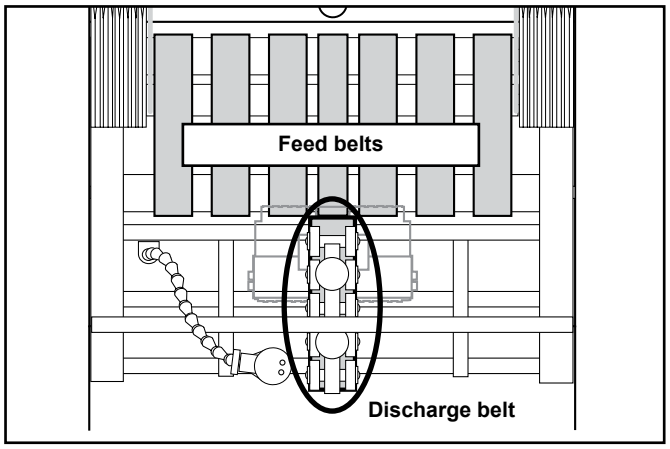
Use only isopropyl alcohol (98% concentration). Other solvents will cause belts to wear prematurely, and even total breakdown of material.

Do not use any solvents or cleaning agents when cleaning the keypad or display. This will result in surface damage. Do not spray any cleaning solutions directly on the keypad or display surfaces, as this could lead to faulty performance.

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 through 5 for the discharge belt also.
7. Reinstall gate assembly and restore power.



Cleaning Keypad and Display

Visually check the keypad and display area for excessive dust or grime buildup. When cleaning, use a mild cleaning solution and spray directly on a soft cloth or rag.

Preventive Care (continued)

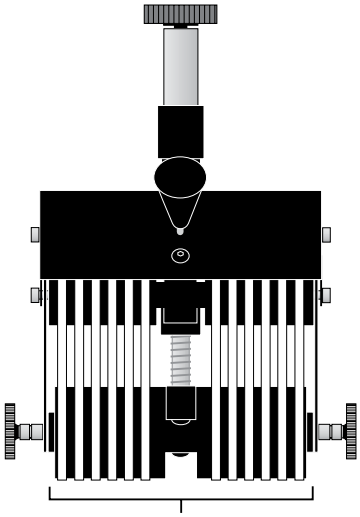
Cleaning Gate Assembly

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

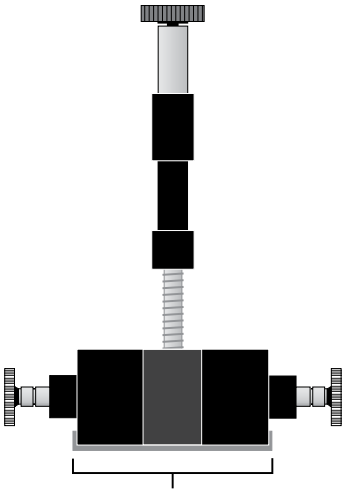
To clean gate assemblies:

1. Turn Off feeder and remove power cord from outlet.
2. Remove gate assembly from gate plate.
3. Apply a small amount of isopropyl alcohol to a soft cloth.
4. Wipe across bar material (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.

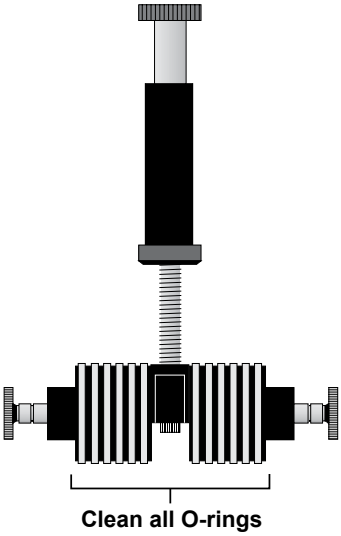
Advancing O-Ring Gate



Optional Bar Gate



Optional Standard O-Ring Gate



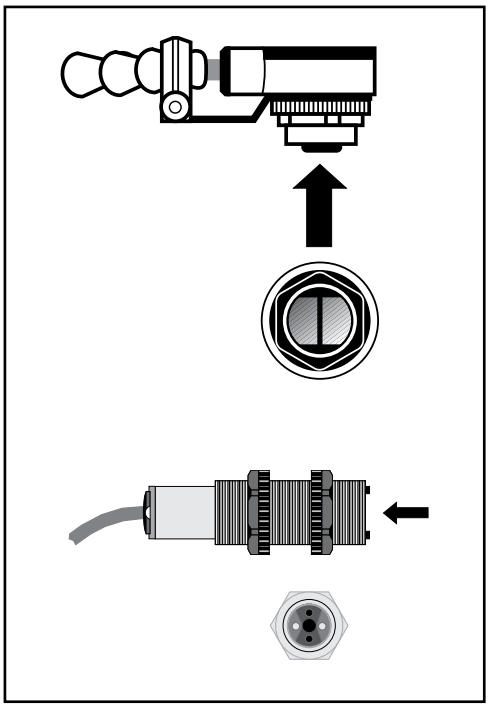
Preventive Care (continued)

Cleaning Photo Sensors

To clean the photo sensor lenses:

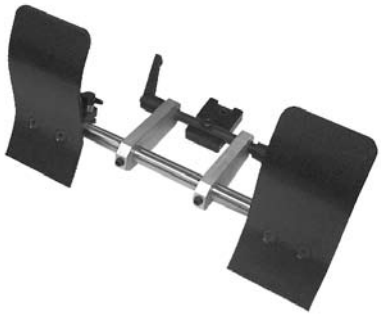
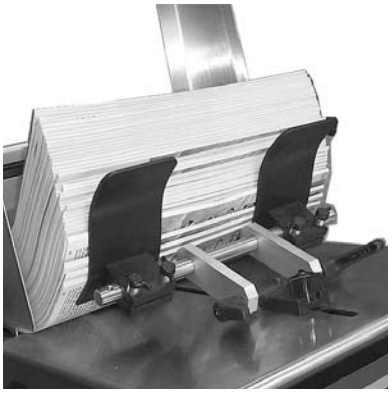
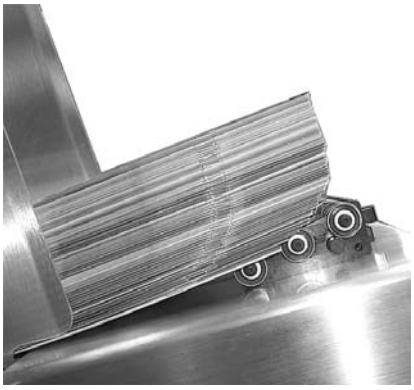
1. Turn Off feeder and remove power cord from outlet.
2. Open the discharge safety shield (to access sheet-detect sensor).
3. Using a soft, dry cloth, wipe across the face of each lens.
4. Repeat step 3 above for flight-detect sensor.
5. Recheck the adjustments of both photo sensors to make sure they are still in alignment to the targets.
6. Close discharge safety shield and restore power.

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

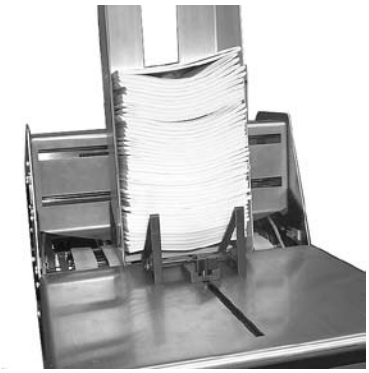
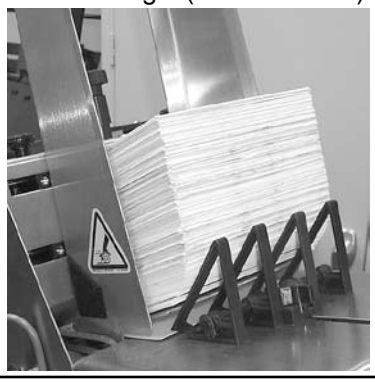


6 Wedge Applications

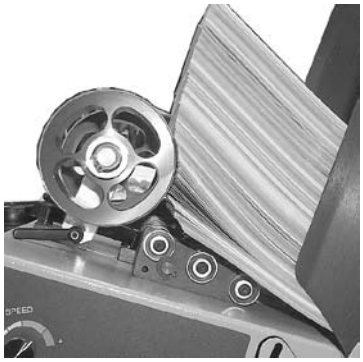
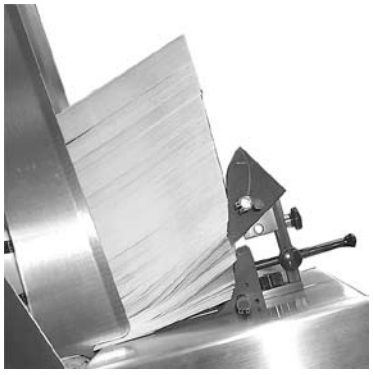
There is a variety of wedges that may be utilized for feeding various materials of differing properties. A wedge may be used either alone or in combination with another wedge depending upon the size and/or properties of the material that is being fed. The following will help to identify which wedge to use for a specific material.

Part Number	Description/Setup Example	Material Usage
63311214 (Standard) 	Large Triangle (5 inches wide) 	Light to medium weight products from 3 to 6 inches in length (longer if used with Low Profile wedge) such as Z-fold and C-fold letters, business reply cards, payment booklets, and tagboard.
63311025 (Standard) 	Double "S" 	Light to heavy weight products from 4 to 14 inches in length such as large envelopes, flat sheets, card stock and folded products.
63311050 (Standard) 	Low Profile 	Medium to heavy weight products from 8 to 14 inches in length such as magazines, flat sheets, and other flexible products greater than 8 inches. Most often used with Double S, Articulating, Large Articulating, or Large Triangle wedge, but may be used alone as shown in the photo.

Wedge Applications (continued)

Part Number	Description/Setup Example	Material Usage
63311017 (Optional) 	Small Triangle (4 inches wide) 	Light to medium weight products from 3 to 6 inches in length such as Z-fold and C-fold letters, business reply cards, and small booklets.
63311710 (Optional) 	Medium Triangle (5 inches wide) 	Light to medium weight products from 3 to 6 inches in length such as Z-fold and C-fold letters, business reply cards, and booklets.
63311212 (Optional) 	Extended Narrow 	Light to medium weight, small narrow products from 3 to 6 inches in length such as multifold leaflets, credit cards, business cards, trading cards, and coupons.
63311340 (Optional) 	Articulating Roller 	Light to heavy weight products from 6 to 14 inches in length such as envelopes, chipboard, corrugated, and heavy flat sheets.

Wedge Applications (continued)

Part Number	Description/Setup Example	Material Usage
63311350 (Optional) 	Large Articulating Roller 	Light to heavy weight products from 6 to 17 inches in length such as large envelopes, flat sheets, card stock, and corrugated.
63311026 (Optional) 	Single "S" 	Light to heavy weight products from 4 to 14 inches in length such as envelopes, card stock, and folded products.
63311968 (Optional) 	Combination 	Light to heavy weight products such as envelopes, card stock, booklets, and folded leaflets.
63311214 and 63311050 	Triangle and Low Profile (Combined) 	Medium to heavy weight products from 8 to 14 inches in length such as magazines, flat sheets, and other flexible products greater than 8 inches.

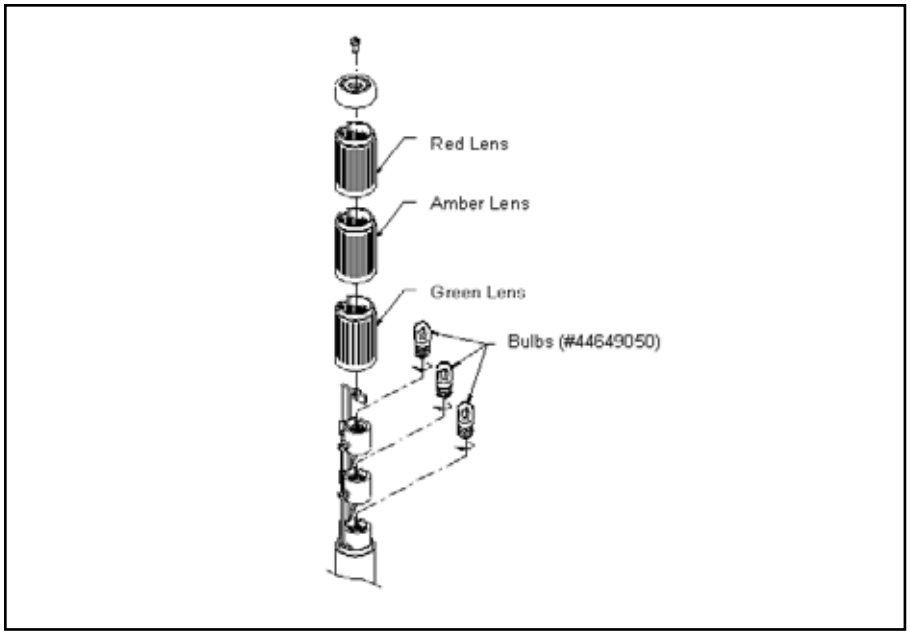
7 Service and Maintenance Procedures

Replacing Tower Lamp Bulbs

Follow this procedure to replace tower lamp bulbs (from optional tower lamp).

1. Remove the small Phillips-head screw on the top of the tower lamp.
2. Pull upward on the lenses to remove them,exposing the bulbs and bulb holders.
3. Remove the bad bulb by turning it counterclockwise.
4. Replace the bulb by inserting a new bulb and turning it clockwise until finger tight.

The bulb is an industry standard (1487) 14 VDC bulb powered by the feeder's 12 VDC supply. Utilizing a 14 VDC bulb with a heavier filament greatly increases bulb life. High quality bulbs such as (GE or Sylvania) are recommended.



Bulb and Lens Assembly

Optional Low Stack Detection

This unit operates on 115V or 230V electrical power. Bodily contact with these voltages can result in serious injury or death. Always disconnect the AC inlet power cord before performing any service activity.

TIP

The following tools are required for this procedure:

- Phillips-head screwdriver
- Allen wrenches – 7/64, 3/32, 1/8

NOTE

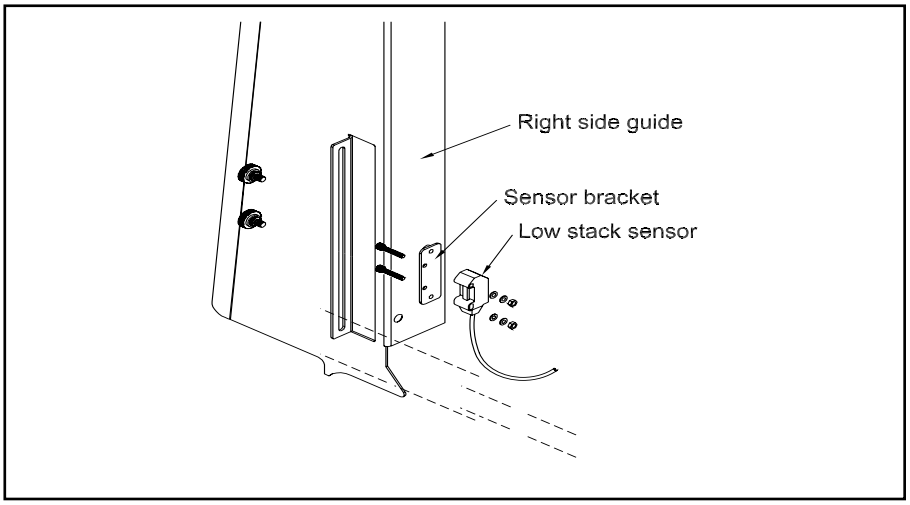
When using low stack detection with an optional tower lamp, solid amber and green lights signal a low stack condition.

Installation Procedure

Low Stack Sensor

To install the low stack detection option, you must first install the low stack sensor. To complete this task follow these steps:

1. Turn Off feeder and remove power cord from outlet.
2. Remove and replace right material side guide from feeder with new low stack side guide.
3. Secure sensor bracket to new side guide using two screws with black round knobs.
4. Secure low stack sensor to sensor bracket with plate and fasteners.



Low Stack Sensor Components

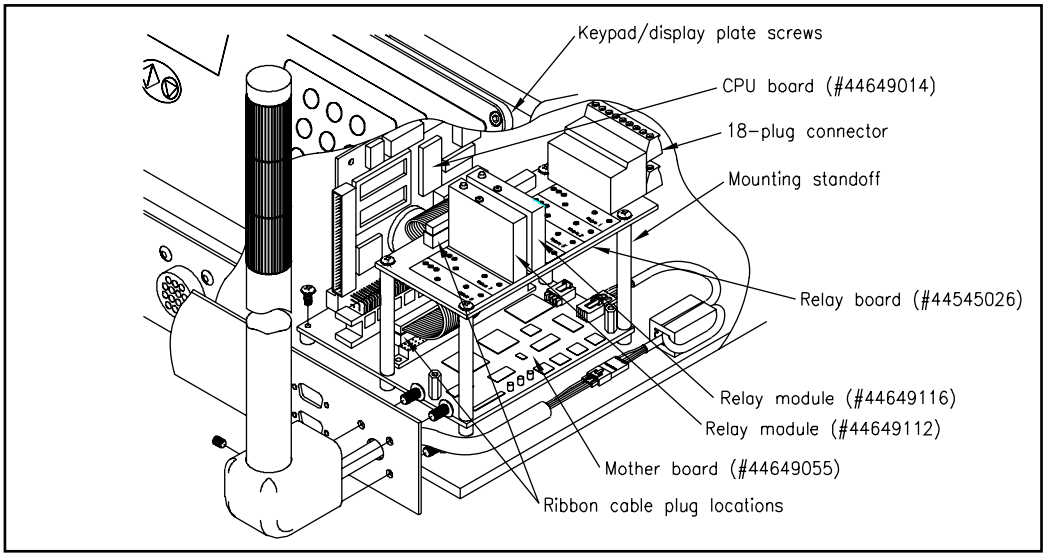
Motherboard and Relay Board

With the low stack sensor successfully installed, the next step is to install the motherboard and relay board.

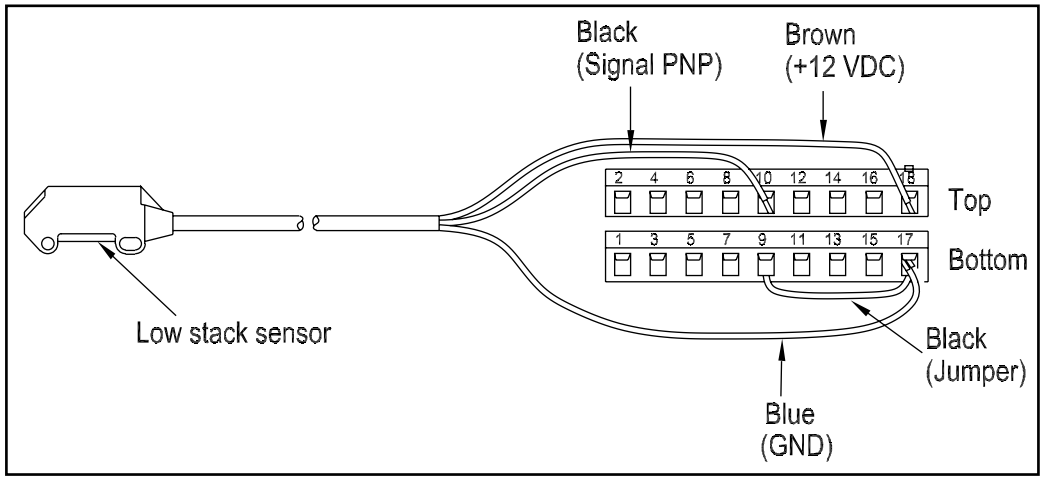
1. Verify that power cord has been removed from outlet.
2. Remove keypad/display plate by removing four screws.
3. Remove “L” bracket and CPU board by removing two Phillips screws.
4. Remove CPU board from “L” bracket.
5. Initially secure motherboard with two screws closest to CPU board.
6. Place four standoffs over the other four screw holes located on the motherboard. Position and secure relay board at these four locations.
7. Connect relay board to motherboard with ribbon cable.

Low Stack Detection (continued)

8. Install the white relay module in module 5 position. Tighten screw to secure.
9. Plug CPU into 96-pin connector located on the motherboard.
10. Following path of gray sheet sensor cable, route low stack sensor cable to interior of feeder. Use wire ties to secure cables together.
11. Connect low stack sensor wires and one jumper wire to 18-plug connector on relay board. See Figure 7-4.
12. Remove Jumper J14 from CPU board.
13. Reinstall keypad/display plate with four original screws.



Motherboard, CPU Board and Relay Board (output relay module #6 P/N 4464911 provided with I/O option only)



Sensor Wiring Connections

Low Stack Detection (continued)

Sensor Positioning

To position and adjust the low stack sensor, follow these steps:

1. Loosen two black slide adjustment knobs and slide bracket/sensor to desired vertical position and retighten. When product falls below the selected vertical position, the low stack sensor will signal the feeder of a low stack condition. Output relay module #6 will also energize during a low stack condition. This module is provided with the I/O option only.
2. The green status LED located on the sensor should be illuminated when the feeder power is on. When product stack falls below the sensor preset position the sensor's amber LED will no longer be illuminated, the tower lamp Amber light will illuminate and the feeder display will display "LOW STACK."

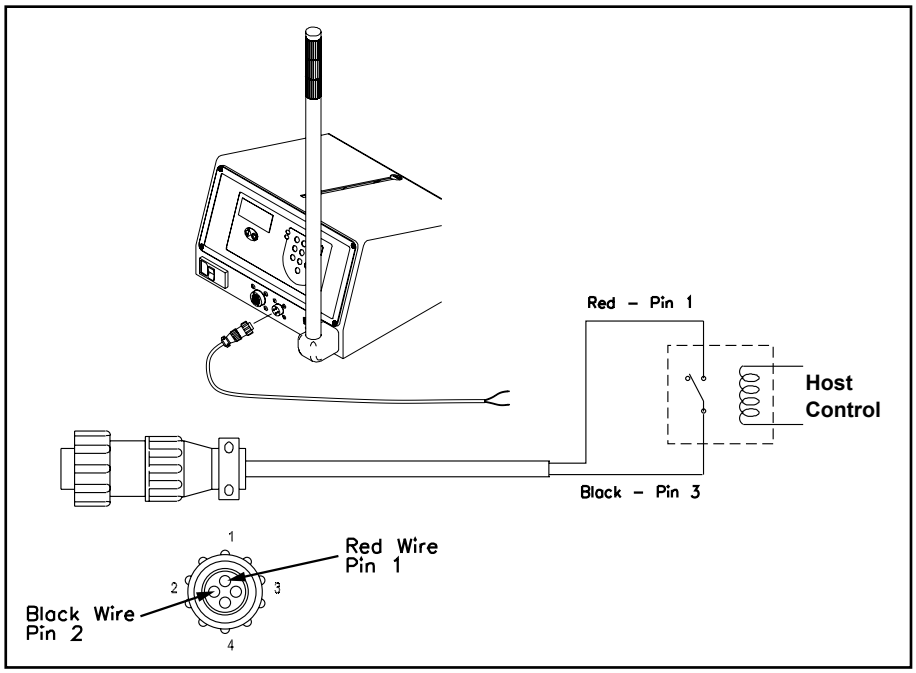
Sensorless Feed Trigger Wiring

Connecting to the Trigger Input

The information in this section provides an overview of how to interface to the trigger input without using an external photoelectric sensor.

Procedure

1. Remove any existing trigger sensor from the feeder or IQuipped™ control box.
2. Connect the sensorless trigger cable to the feeder trigger input.
3. Wire the sensor-less cable to the host equipment. The host equipment triggering the feeder to start is to be a dry contact of a relay. Any other equipment must not power this input. When the host equipment relay or contacts close the feeder should trigger.



Field Wiring.

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.

This feeder is almost always used as a component piece of equipment in a larger system. An E-Stop switch is not included on this feeder 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 your local codes and authorities. 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 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.

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 signals 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.

IMPORTANT

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

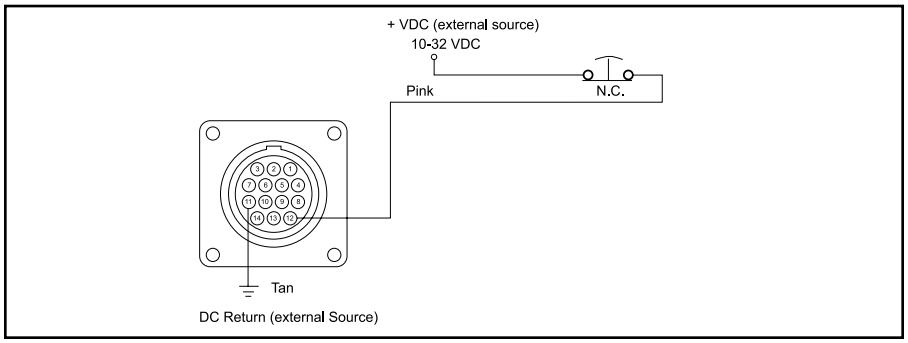
NOTE

This option requires software version 1.05 or greater, and requires the systems interface I/O option.

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

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

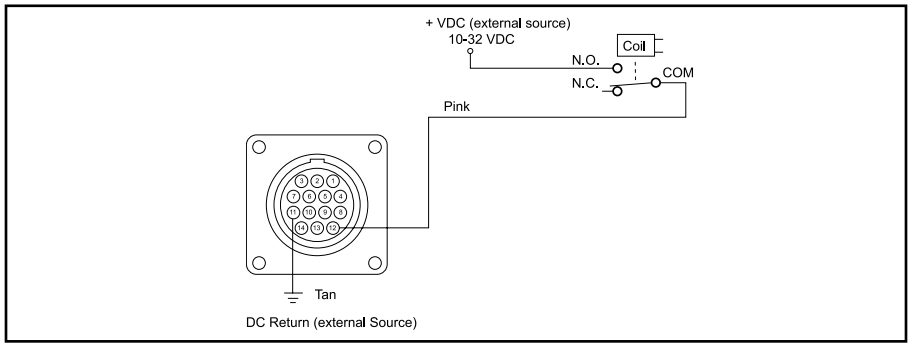
A maintained button/switch with a normally closed contact is used to switch power (10-32 VDC) to the internal input module. When power is removed (switch contact open) the feeder will stop feeding.



External Switch and Relay Contact wiring

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.

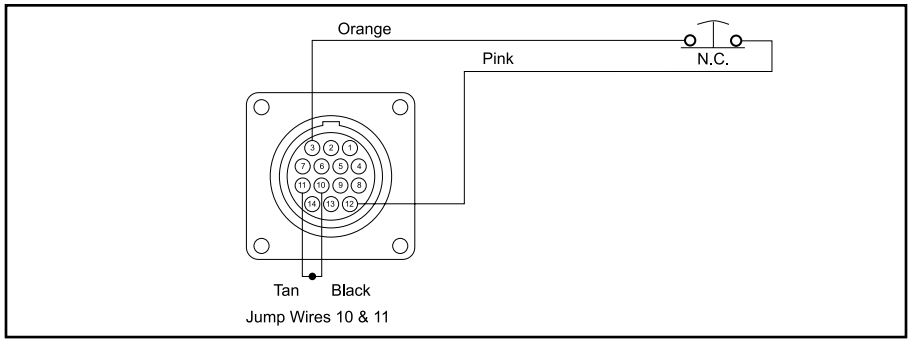


Relay Contacts

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

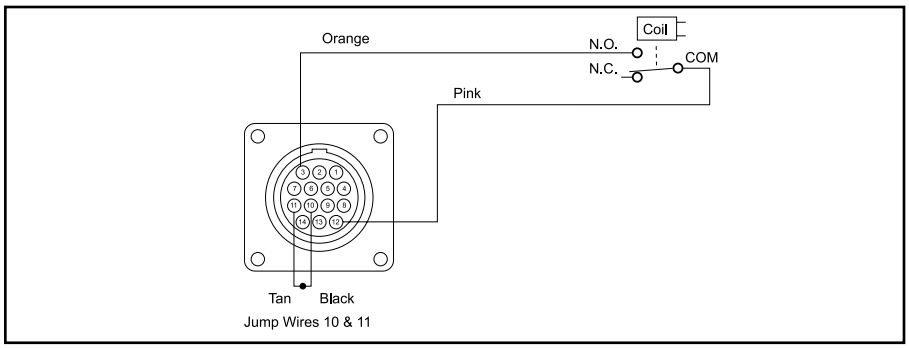
There are two ways that the R-stop input can be wired when the feeder and not the host device supplies (12 VDC) power.

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

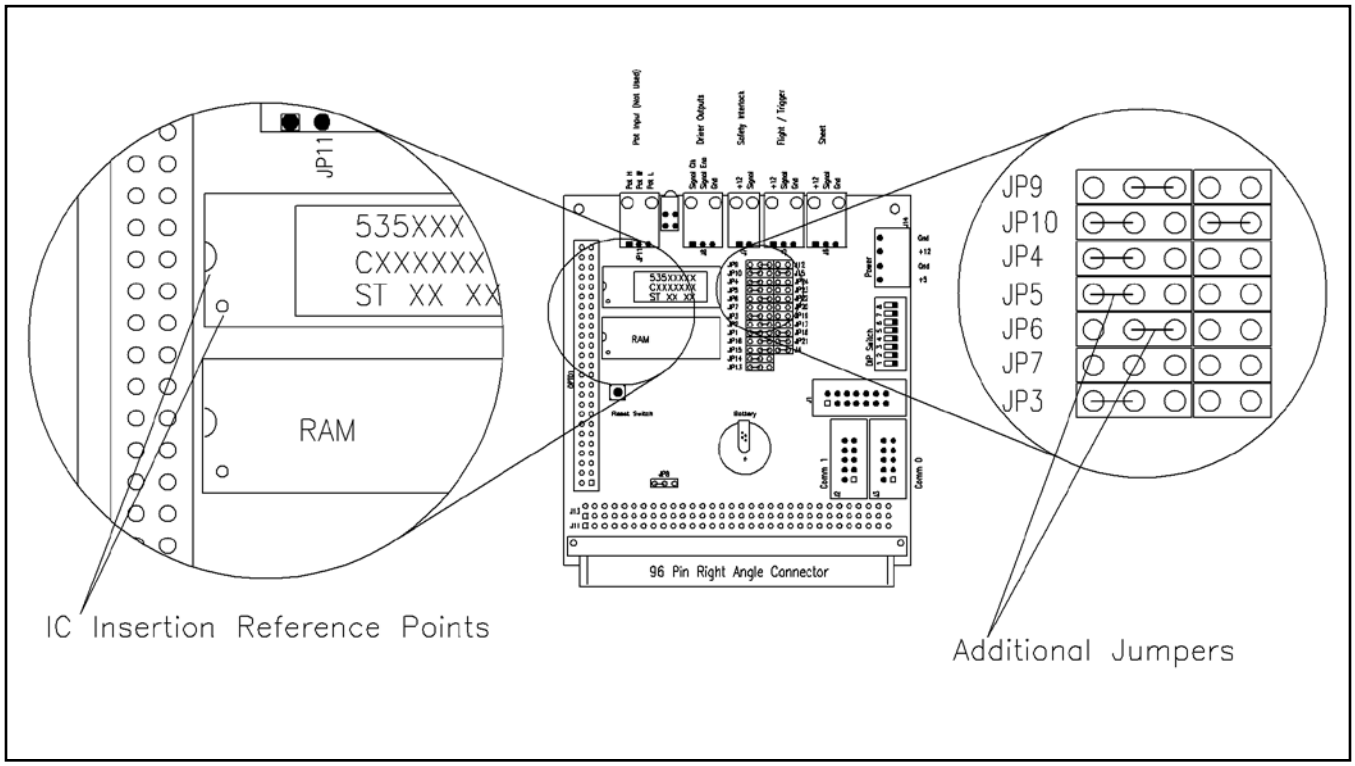
EPROM Replacement

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

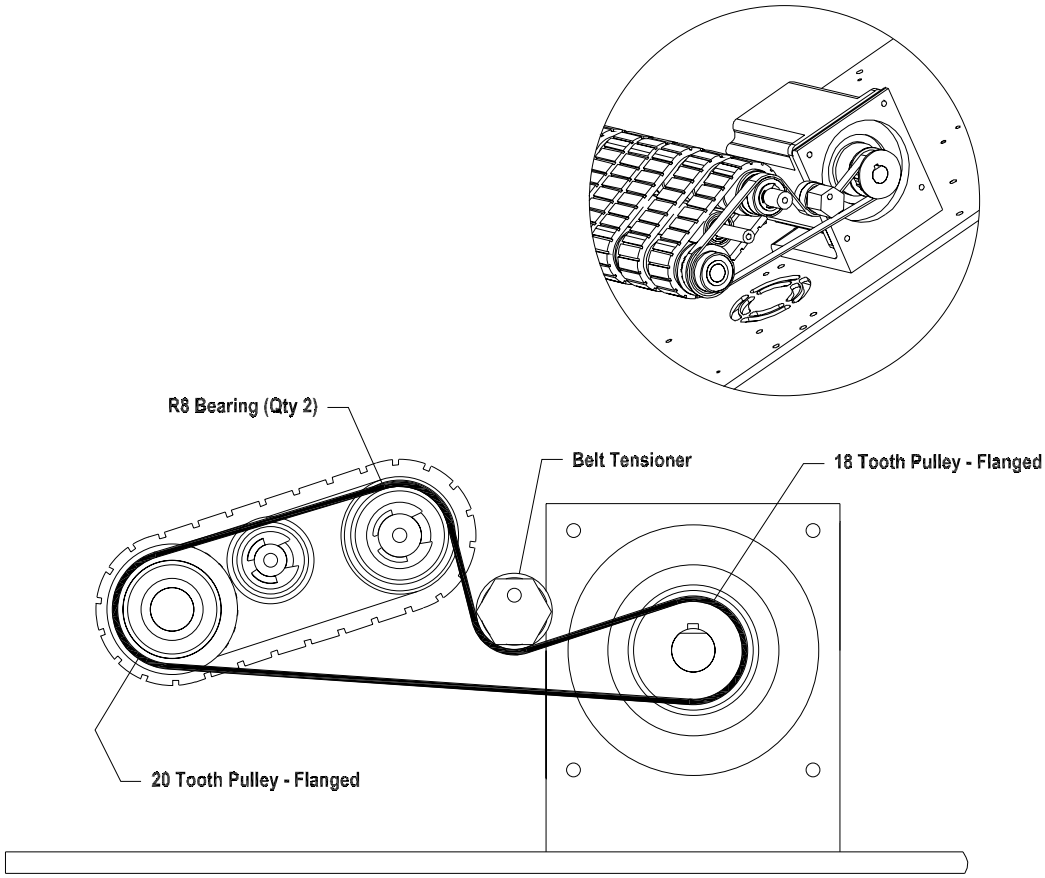
To install or replace a programmed EPROM on the CPU/control board, follow these steps:

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 (as shown in the diagram below, 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.



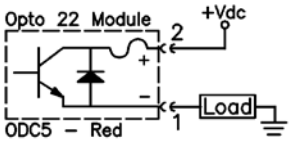
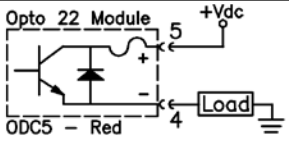
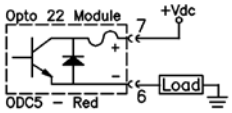
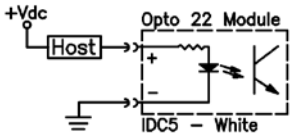
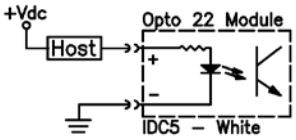
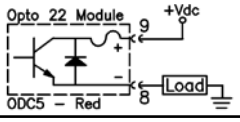
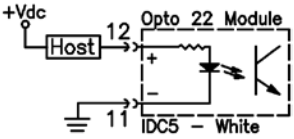
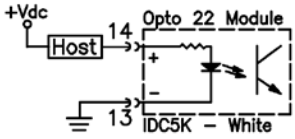
EPROM Location on CPU Board

Drive Motor Belt Routing



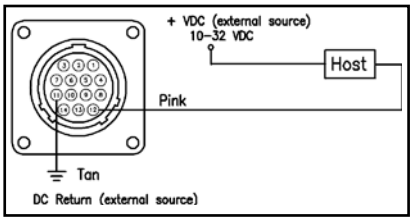
8 I/O Options

Quick-Look Reference Guide - Sourcing

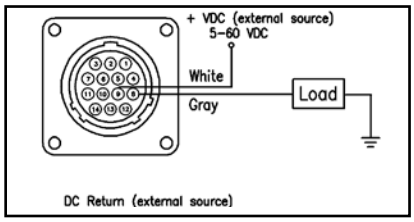
Module	Electrical	Signal	Description
# 1 Double/Miss Output		Double Miss T	This output is asserted if there is a signal present at the Double input. Miss is asserted anytime there are two consecutive flight/trigger signals before the cycle has finished. Double and Miss are menu selectable. Miss has an adjustable time period of 20 - 999 ms.
# 2 Busy/Done Output		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		Ready	This output is asserted anytime the feeder is ready to be triggered.
# 4 Double Input		Double	This input is provided with the Double option. The input is monitored for the indication that a double has occurred. This function is wired internally. This input has a minimum time period of >50ms.
# 5 Low Stack Input		Low Stack	This input is provided with the Low Stack option. The input is used to monitor the Low Stack sensor. This function is wired internally. This input has a minimum time period of >50ms.
# 6 Low Stack Output (Optional)		Low Stack	This output is provided with the Low Stack option. The output is asserted when the Low Stack input is asserted.
# 7 R-Stop Input		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		Ext Trigger	This input is used to trigger the feed cycle. This input is edge triggered and inverted by the input module. This input has a minimum time period of >50ms.

External Wiring Reference Diagrams

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.

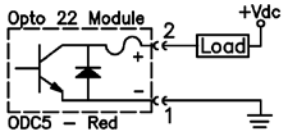
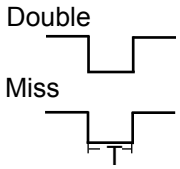
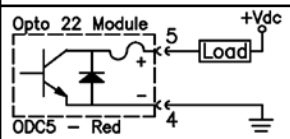
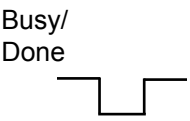
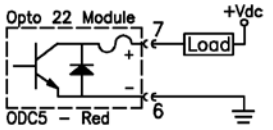
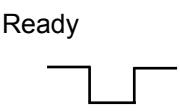
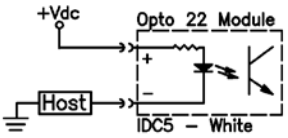
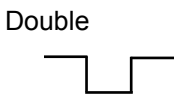
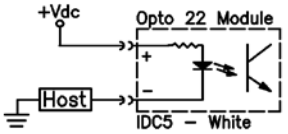
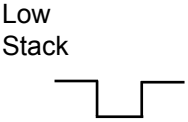
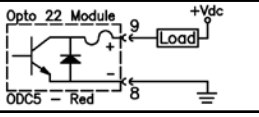
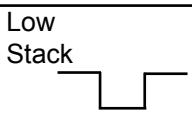
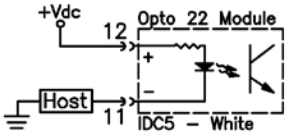
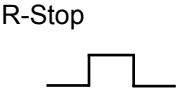
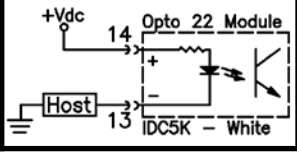
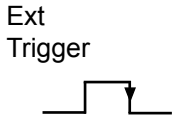


Sourcing Input

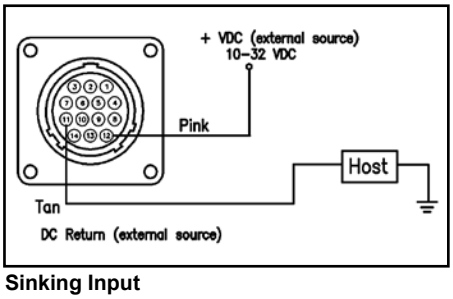


Sourcing Output

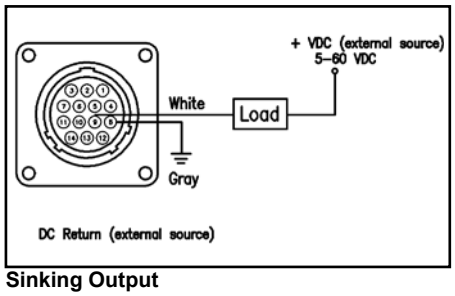
Quick-Look Reference Guide - Sinking

Module	Electrical	Signal	Description
# 1 Double/Miss Output			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 - 999 ms.
# 2 Busy/Done Output			Busy: This output is asserted while the motor is running. Done: This output is asserted when a batch is done feeding.
# 3 Ready Output			This output is asserted anytime the feeder is ready to be triggered.
# 4 Double Input			This input is provided with the Double option. The input is monitored for the indication that a double has occurred. This function is wired internally. This input has a minimum time period of >50ms.
# 5 Low Stack Input			This input is provided with the Low Stack option. The input is used to monitor the Low Stack sensor. This function is wired internally. This input has a minimum time period of >50ms.
# 6 Low Stack Output (Optional)			This output is provided with the Low Stack option. The output is asserted when the Low Stack input is asserted.
# 7 R-Stop Input			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			This input is used to trigger the feed cycle. This input is edge-triggered and inverted by the input module. This input has a minimum time period of >50ms.

External Wiring Reference Diagrams

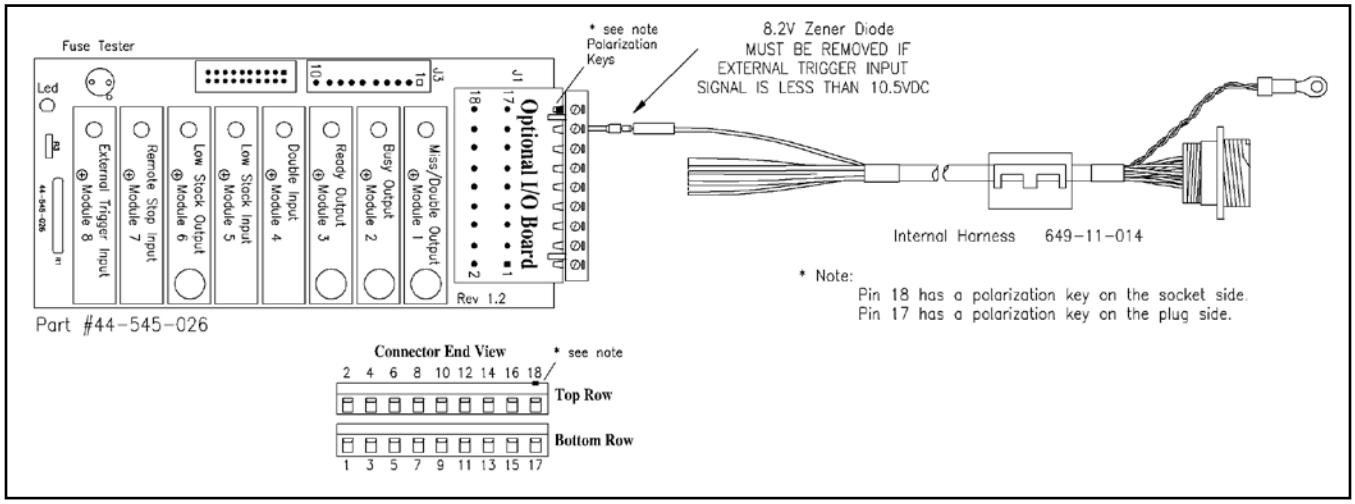


Sinking Input



Sinking Output

Relay Rack and Module Reference Diagrams

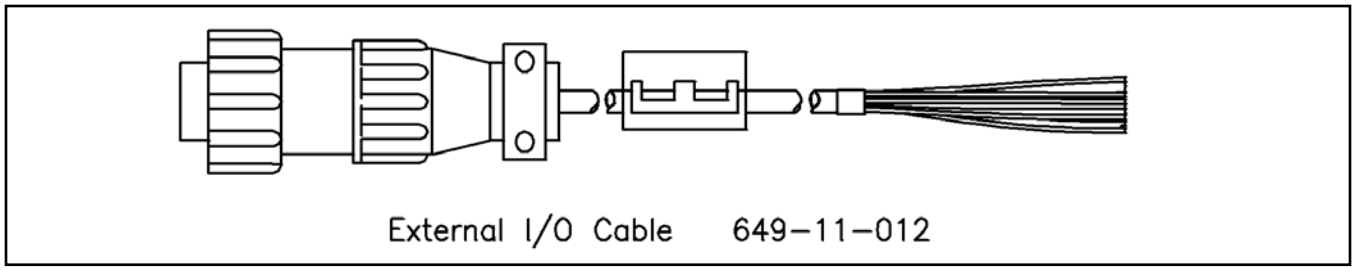


I/O Cable Wiring

External I/O Cable Wiring Table

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/Done Output (-)	2	ODC5
5	Green	Busy/DoneOutput (+)		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**

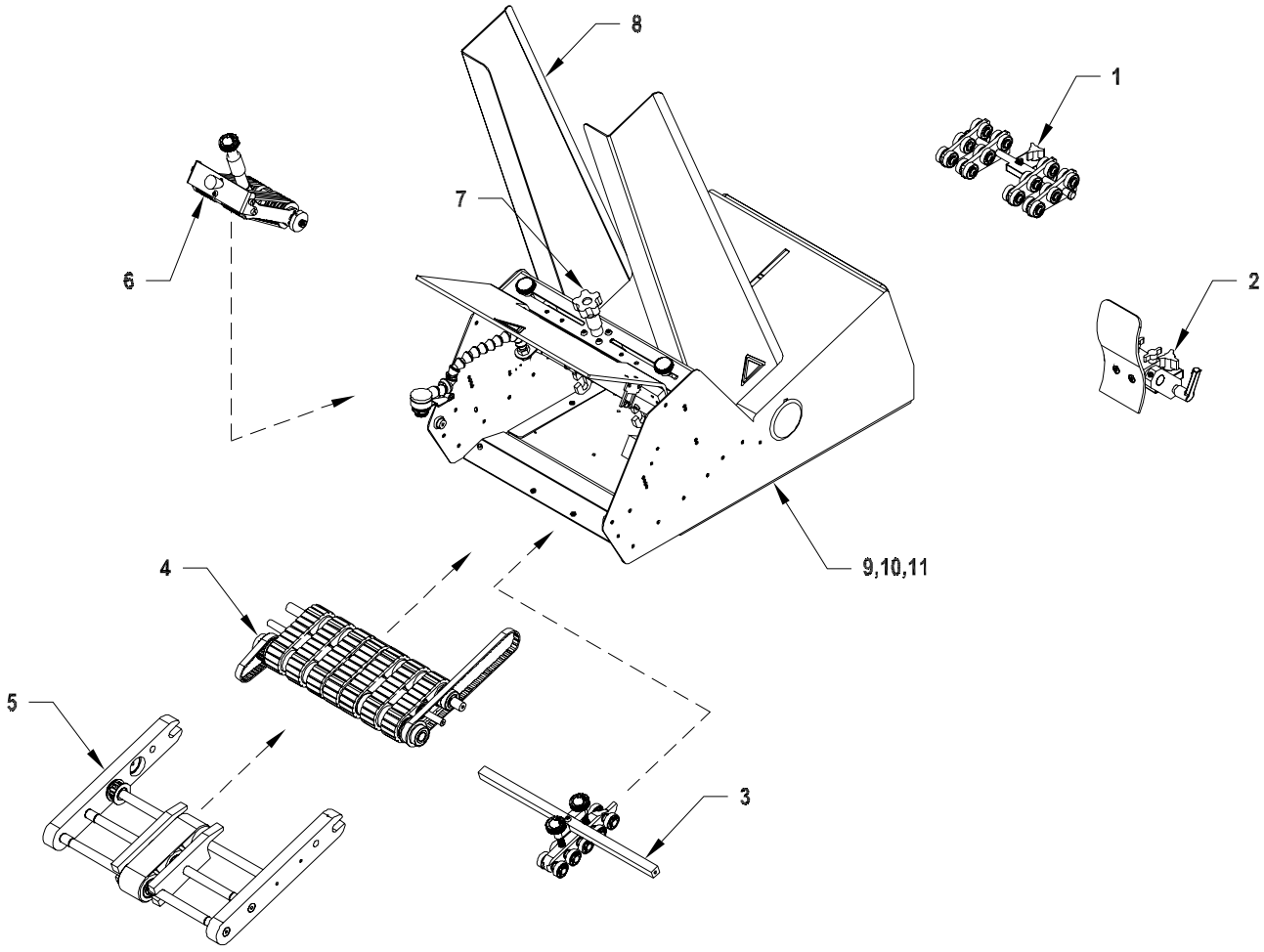
- **Bolded Modules** are included as part of the standard package.
- **Pins 3 and 10** are provided as a low current source for biasing input modules.
- Fuse Tester is used to test the continuity of an output module fuse. If the LED illuminates, the fuse is GOOD.



Notes

9 Mechanical Components

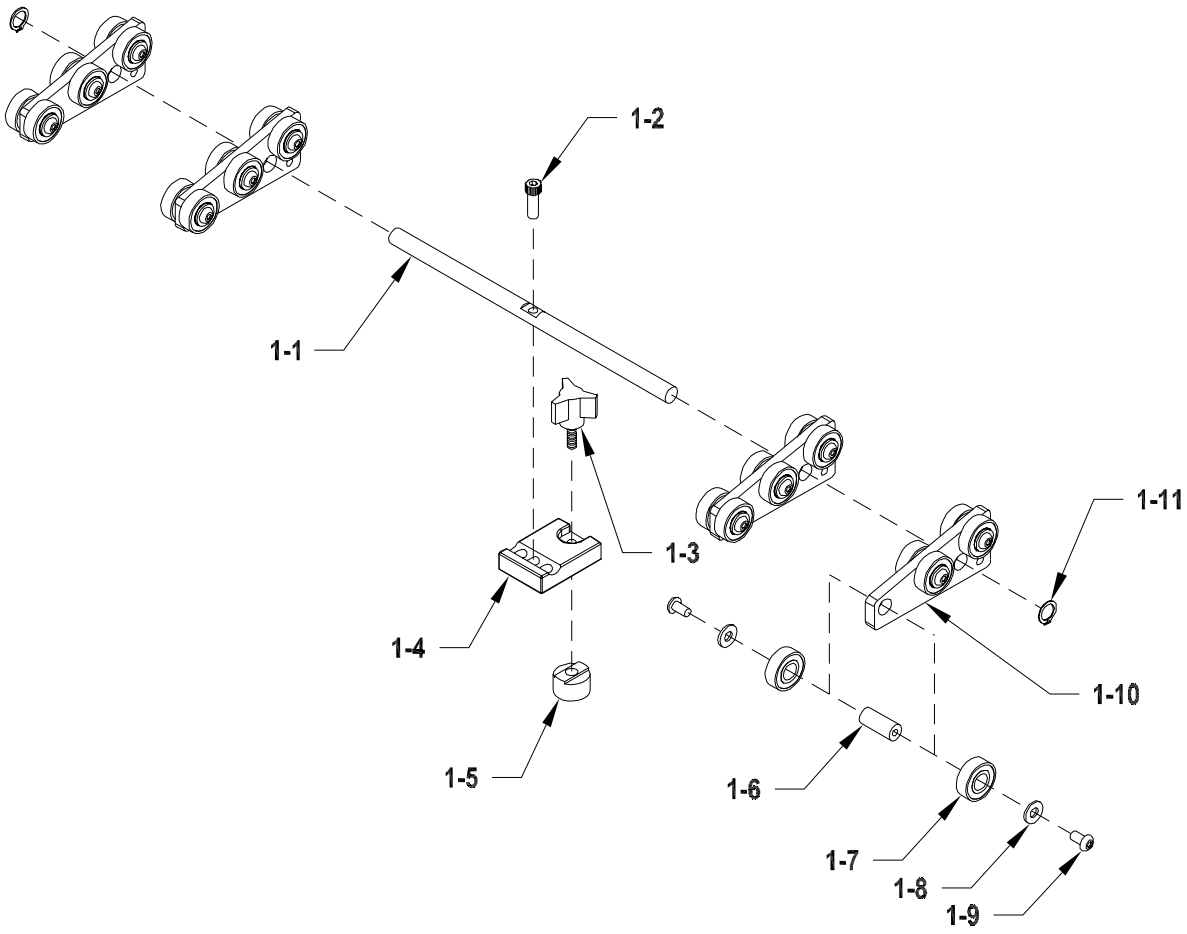
ST-1250



ST-1250

Diagram Number	Description	Part Number
1	LOW PROFILE WEDGE ASSEMBLY	63311050
2	SINGLE S WEDGE ASSEMBLY (OPTIONAL)	63311026
3	5 AXLE HOLD DOWN ASSEMBLY	43511310
4	GROOVED GUM RUBBER BELT FEED SECTION ASSEMBLY	63011031
5	CLEAR URETHANE DISCHARGE SECTION ASSEMBLY	63011033
6	ADVANCING O RING GATE WITH HORIZON ADJUSTASSEMBLY	87211001
7	SOLID GATE PLATE ASSEMBLY	64011004
8	SIDE GUIDE KIT 2624 ASSEMBLY	64011002
9	ELECTRICAL COMPONENTS ASSEMBLY	63011002
10	BASE FEATURES 1	
11	BASE FEATURES 2	

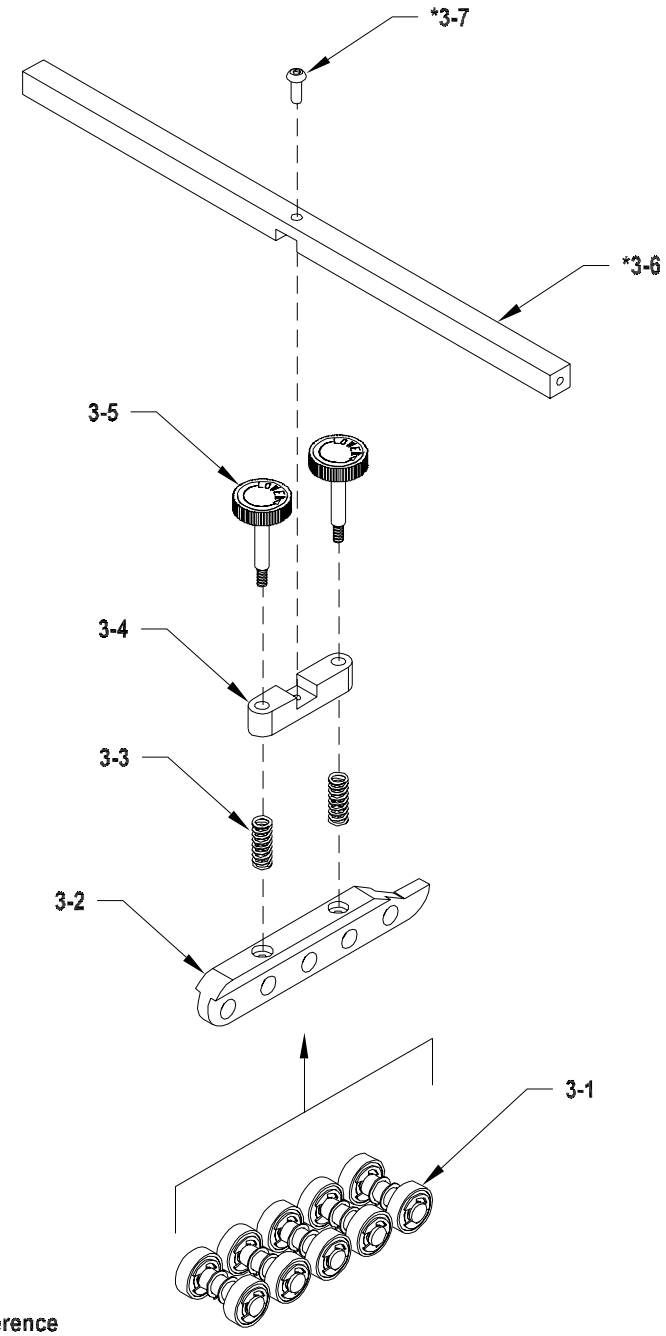
1: LOW PROFILE WEDGE
ASSEMBLY #63311050



1: LOW PROFILE WEDGE
ASSEMBLY #63311050

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

3: 5 AXLE HOLD DOWN
ASSEMBLY #43511310



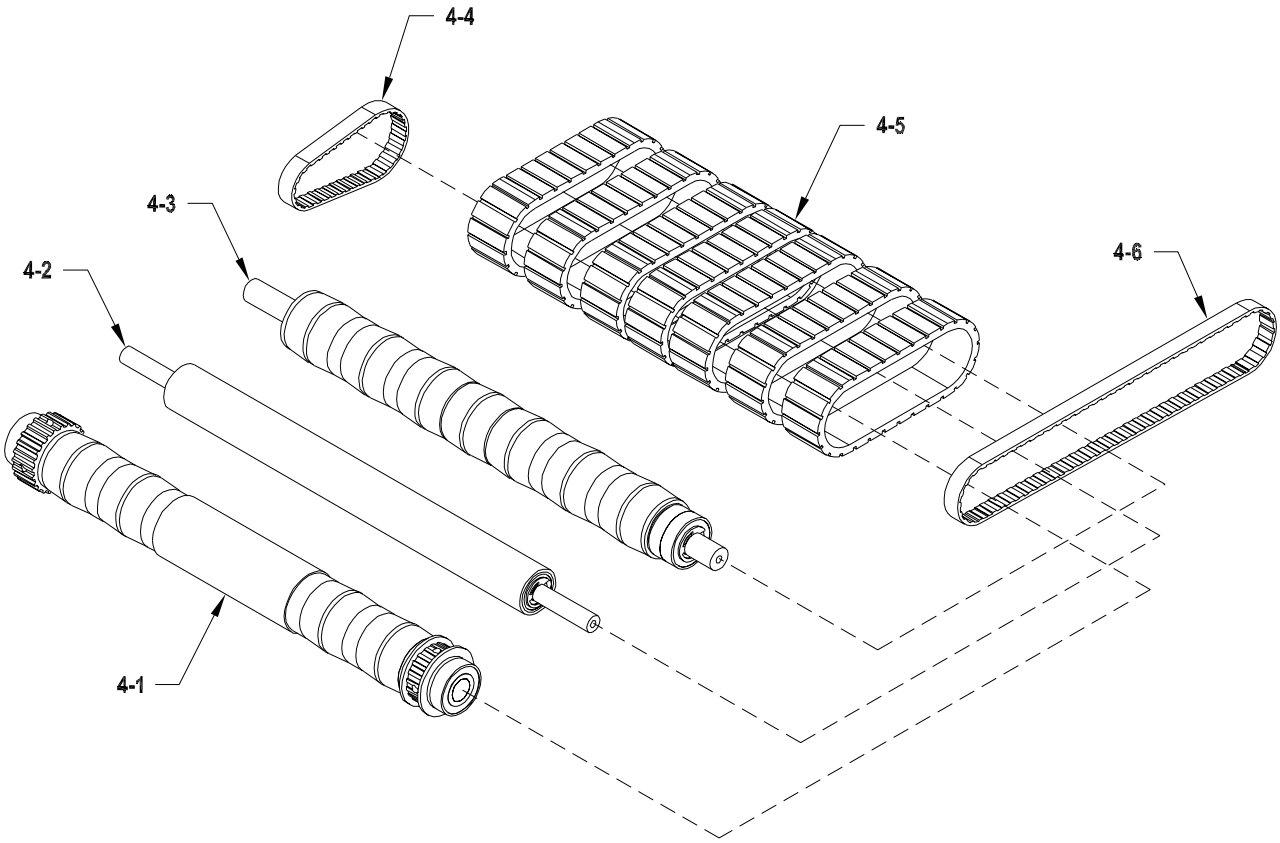
*Part exists in diagram for reference only and is not included with this assembly. Must be ordered separately.

3: 5 AXLE HOLD DOWN
ASSEMBLY #43511310

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
3-1	5	Bearing Holder Shaft	43560008
	10	Bearing Ball R6	23500095
	10	Ring Grip 3/8 Waldes	00001110
	20	Clip E 3/8 Waldes	00001150
3-2	1	Holder Bearing 5 Axle	43560310
3-3	2	Spring Compression	23560083
3-4	1	Bar Hold Down Adjustment	23560086
3-5	2	Screw Cross Bar Hold Down Adjustment	23560087
	2	Hold Down Knob 1	23560077
	2	Grommet Rubber	00001130
	2	Label Gate Adjustment Knob	23500084
3-6*	1	Cross Support Bar	43555215
3-7*	1	BHCS 10-32 x 1/2” LG	00002334

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

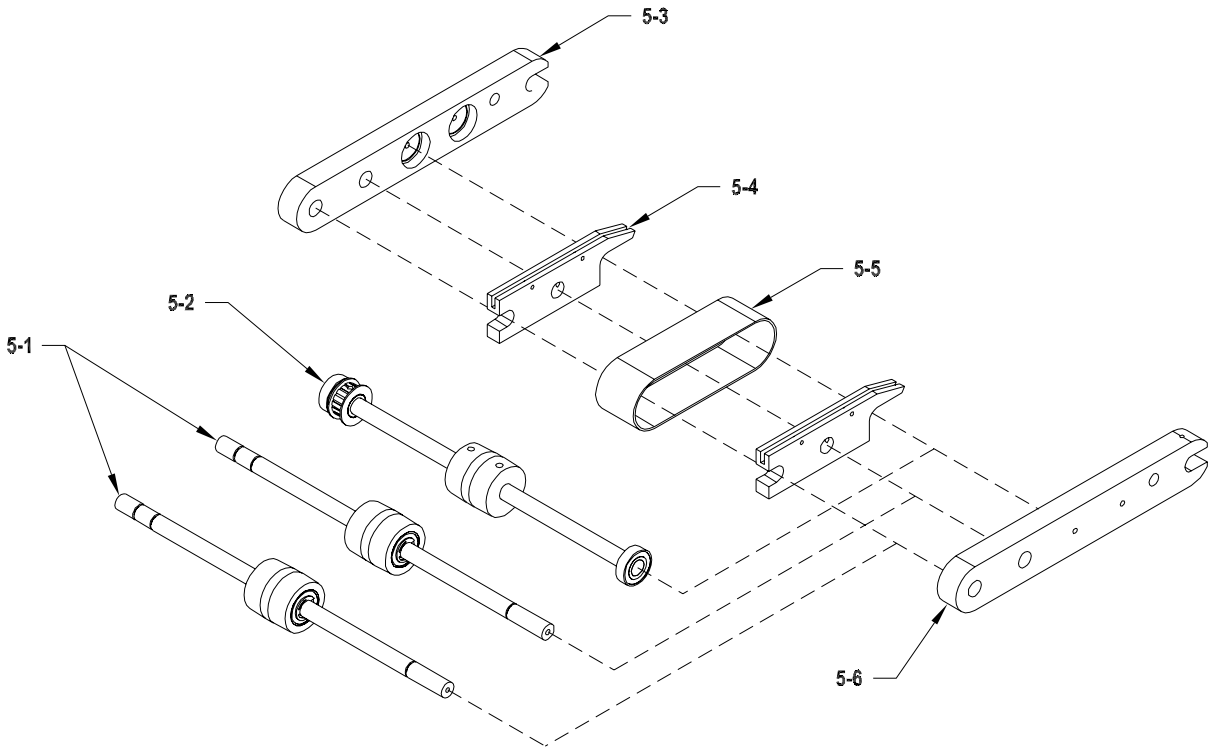
4: GROOVED GUM RUBBER BELT FEED SECTION
ASSEMBLY #63011031



4: GROOVED GUM RUBBER BELT FEED SECTION
ASSEMBLY #63011031

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
4-1	1	Shaft Drive	44630019
	1	Pulley 24T 1/2 Bore Flangeless	43560098
	1	Pulley 20T 1/2 Bore w/Flange Driven	23500097
	2	Bearing Ball R8	23500094
	2	Clip E 1/2 Waldes	00001155
	2	Key Woodruff 1/8 X 3/8	00003351
	1	Screw Socket Set 10-32 X 1/4” LG Cup	00002216
	3	Screw Socket Set 10-32 X 5/16” LG Cup	00002217
4-2	1	Shaft Discharge Feed Roller EX	43550036
	1	Belt Support Tube	44630003
	2	Bearing Ball R6	23500095
	2	Clip E 3/8 Waldes	00001150
4-3	1	Idler Shaft	43555047
	1	Tube Driven	44630004
	4	Bearing Ball R8	23500094
	3	Clip E 1/2 Waldes	00001155
4-4	1	Belt Drive Timing 78XL037	23560078
4-5	7	Belt Feed Tan Gum Grooved Composite 1W	23500162
4-6	1	Belt Drive 170XLO37	43500096

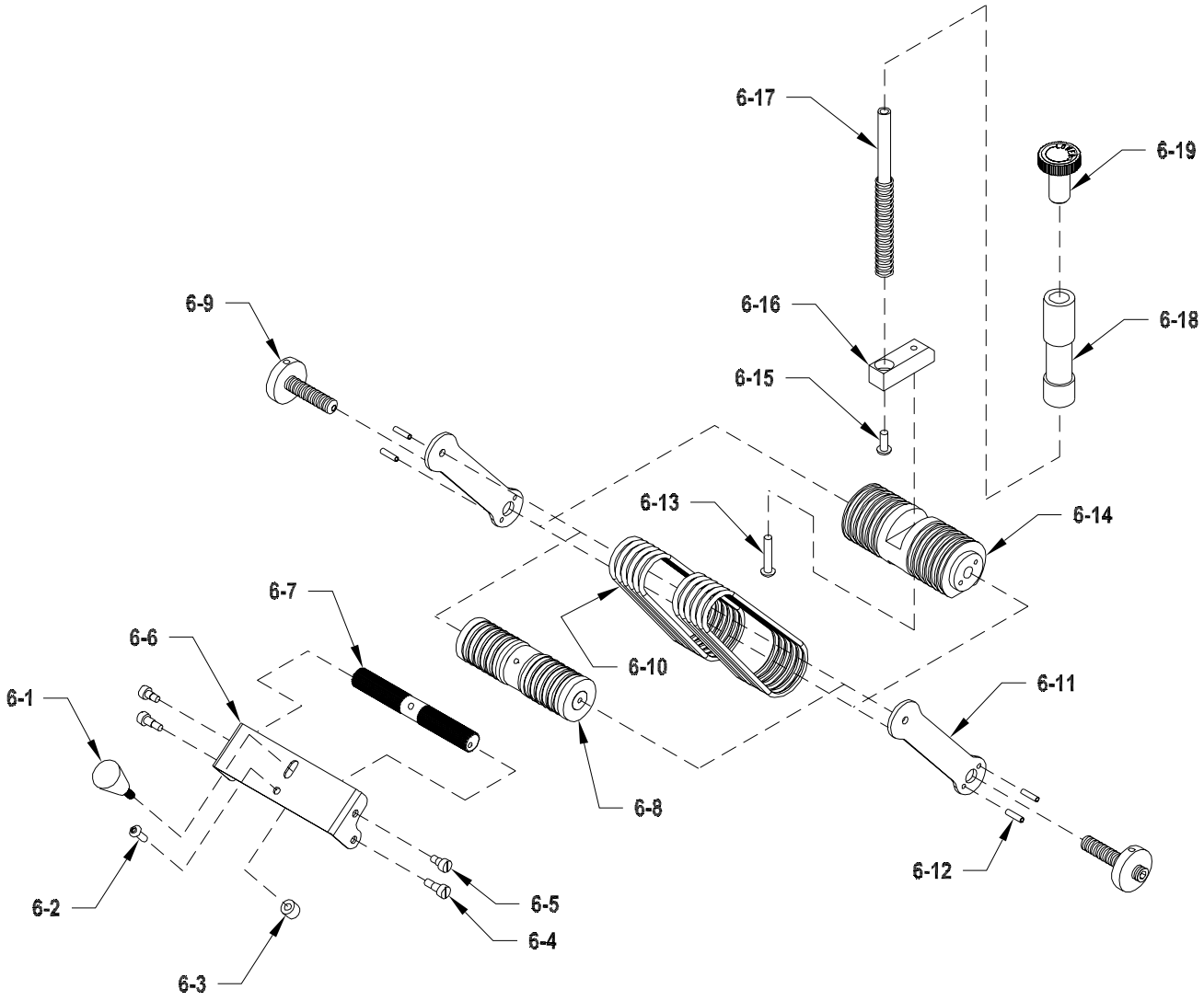
5: CLEAR URETHANE DISCHARGE SECTION
ASSEMBLY #63011033



5: CLEAR URETHANE DISCHARGE SECTION
ASSEMBLY #63011033

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
5-1	2	Idler Shaft	43555047
	2	Roller Crown Driven with Bearings	23511105
	4	Clip E 1/2” Waldes	00001155
5-2	1	Shaft Drive SS 1/2	43555211
	1	Drive Crown Pulley	23560106
	1	Pulley 16T 1/2” Bore with Flange	43560097
	2	SHSS 10-32 X 1/8” LG	00003352
	2	SHSS 1/4-20 X 1/2” LG	00002327
	2	Bearing Ball R8	23500094
	1	Woodruff Key 1/8 X 3/8	00003351
5-3	1	Holder Right Hand Carriage	23560202
5-4	2	Rail Material Support Slide	23560082
5-5	1	Belt Discharge Clear 1.5 Wide	23560088
5-6	1	Holder Left Hand Carriage	23560203

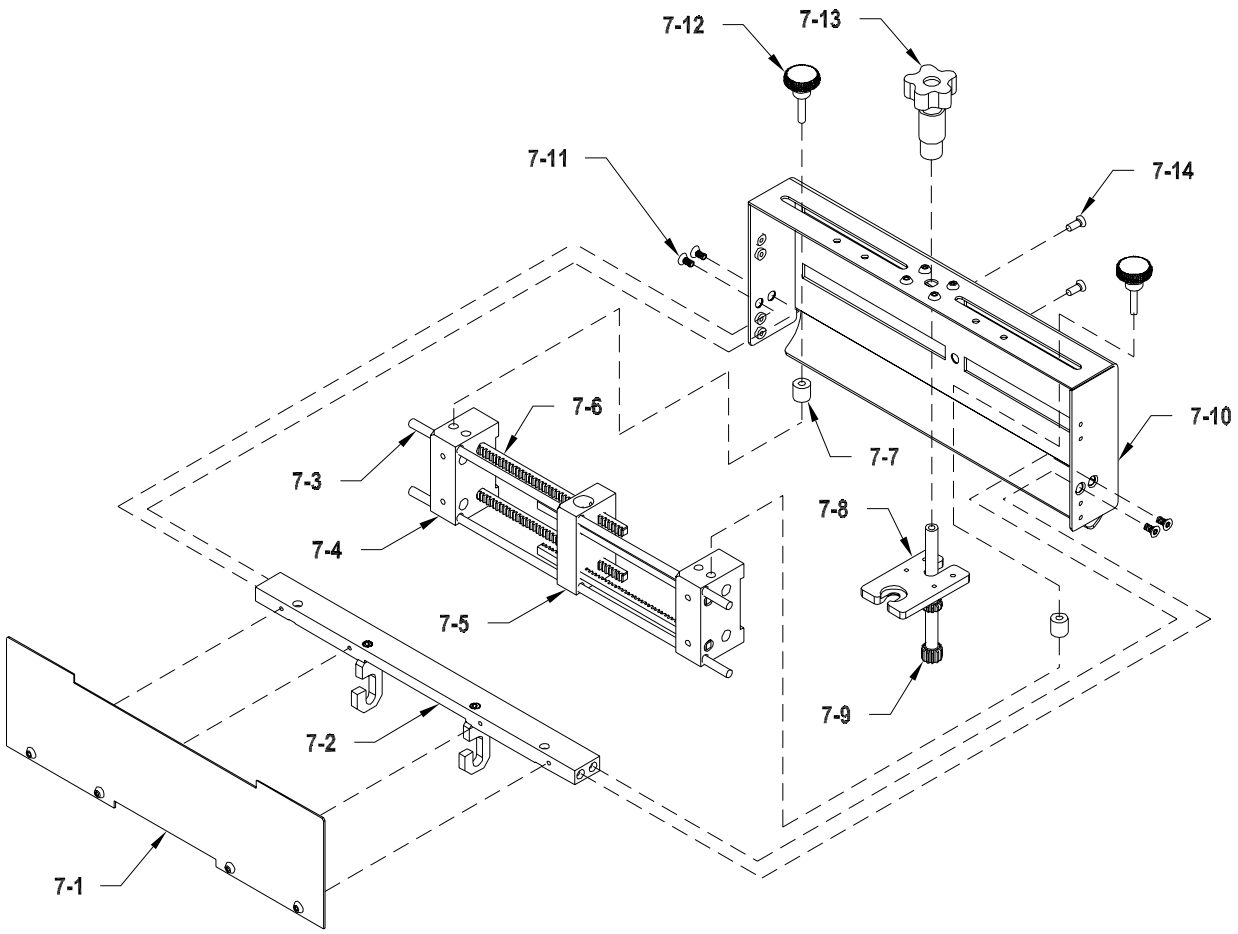
6: ADVANCING O RING GATE WITH HORIZON ADJUST
ASSEMBLY #87211001



6: ADVANCING O RING GATE WITH HORIZON ADJUST
ASSEMBLY #87211001

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
6-1	1	Handle Studded 10-32 X 1/2”	44657007
6-2	1	BHCS 8-32 X 1/2” LG	00002302
6-3	1	Spacer Belt Indexer .312 X .375	44657010
6-4	2	Screw Shoulder 8-32 Slotted	00003320
6-5	2	Screw Shoulder 8-32 X 1/8	00003321
6-6	1	Belt Indexer Bracket	44657005
6-7	1	Pinch Roll Cam	44657003
6-8	1	Belt Indexer Shaft	44657008
	2	O Ring Take Up Roller	44657002
	1	Belt Indexer Center Hub	44657009
	2	Clip E 1/2 Waldes	00001155
	2	SHSS 8-32 X 5/16 Cup Point	00002211
6-9	2	Roller	44872003
	2	Adjustment Screw	44872005
	2	SHSS 10-32 X 3/8” LG Nylon Tip	44872007
6-10	12	O Ring Advancing ST	44657006
6-11	2	Side Plate Adjust	44872002
6-12	4	Pin Roll 1/8 X 1/2	00001161
6-13	1	BHCS 10-32 X 1” LG	00002340
6-14	1	Gate Cylinder w/Horizon	44872004
6-15	1	BHCS 10-32 X 1/2” LG	00002334
6-16	1	Mount Gate Lift Shaft	15000001
6-17	1	Shaft Gate Lift	23560084
	1	Spring Gate Compression	23500083
6-18	1	Cylinder Gate Spring Tension	23500019
6-19	1	Sleeve Adjusting Knob	23500037
	1	O Ring	23500240
6-20	1	SHCS 1/4-28 x 1” LG	00002400
	1	Knob 1 Black	23500077
	1	Label Gate Adjustment Knob	23500084

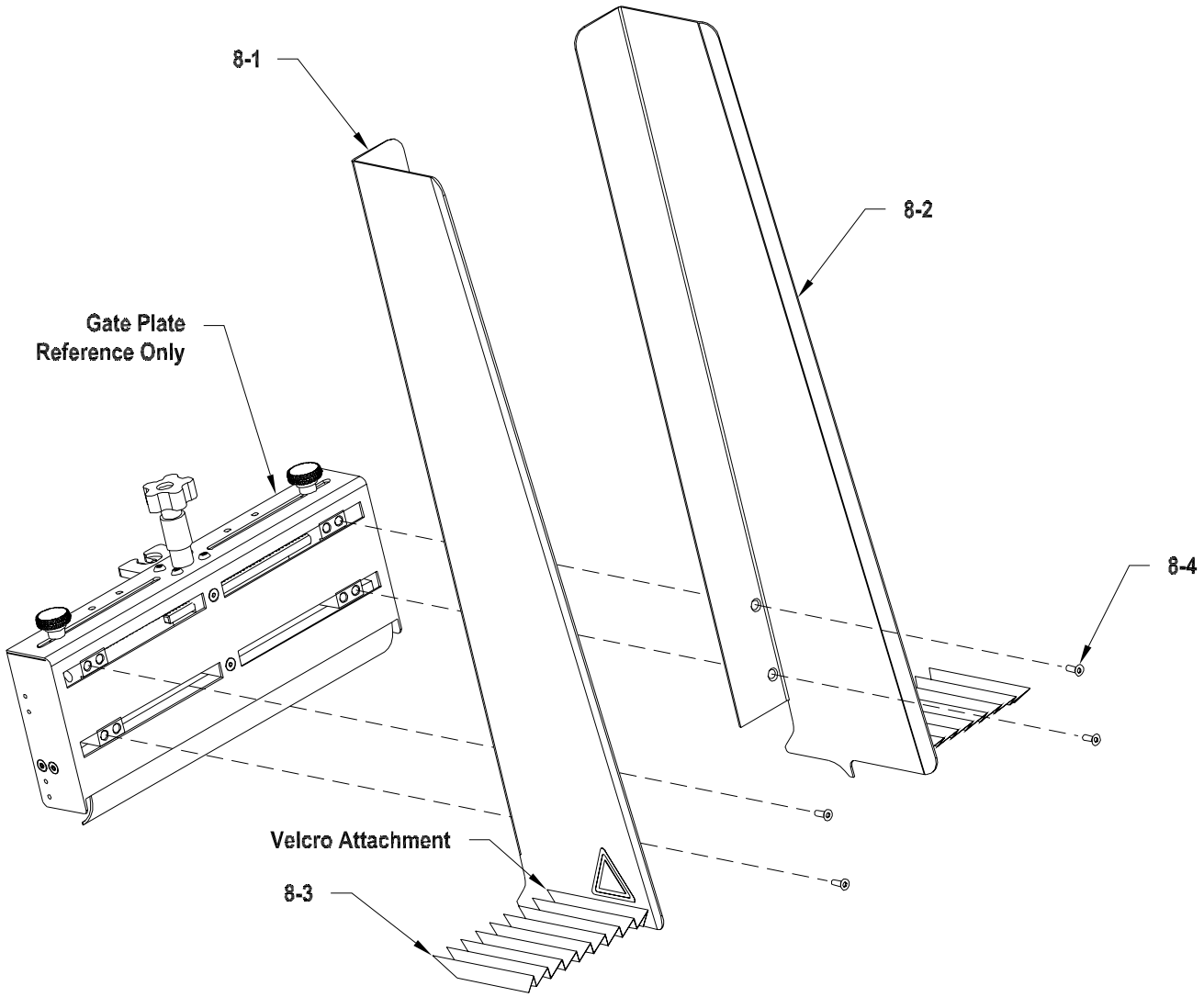
7: SOLID GATE PLATE
ASSEMBLY #64011004



7: SOLID GATE PLATE
ASSEMBLY #64011004

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

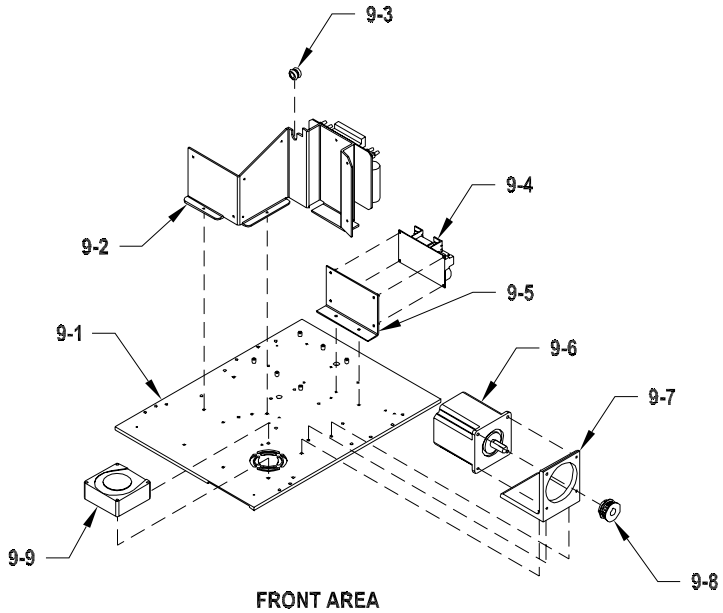
8: SIDE GUIDE KIT 2624
ASSEMBLY #64011002



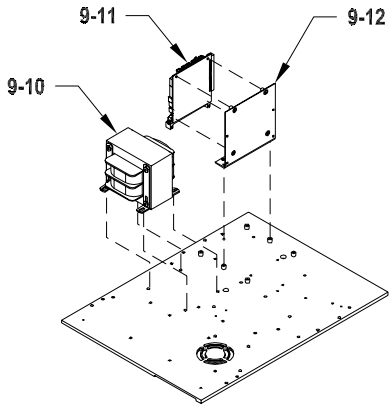
8: SIDE GUIDE KIT 2624
ASSEMBLY #64011002

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
8-1	1	Side Guide Left 2624	44640002
	1	Warning Label Side Guide	44600005
8-2	1	Side Guide Right 2624	44640003
	1	Warning Label Side Guide	44600005
8-3	2	Guard Rear Accordion	44600001
8-4	4	FHSS 10-32 X 1/2” LG	00002830

9: ELECTRICAL COMPONENTS
ASSEMBLY #63011002



FRONT AREA

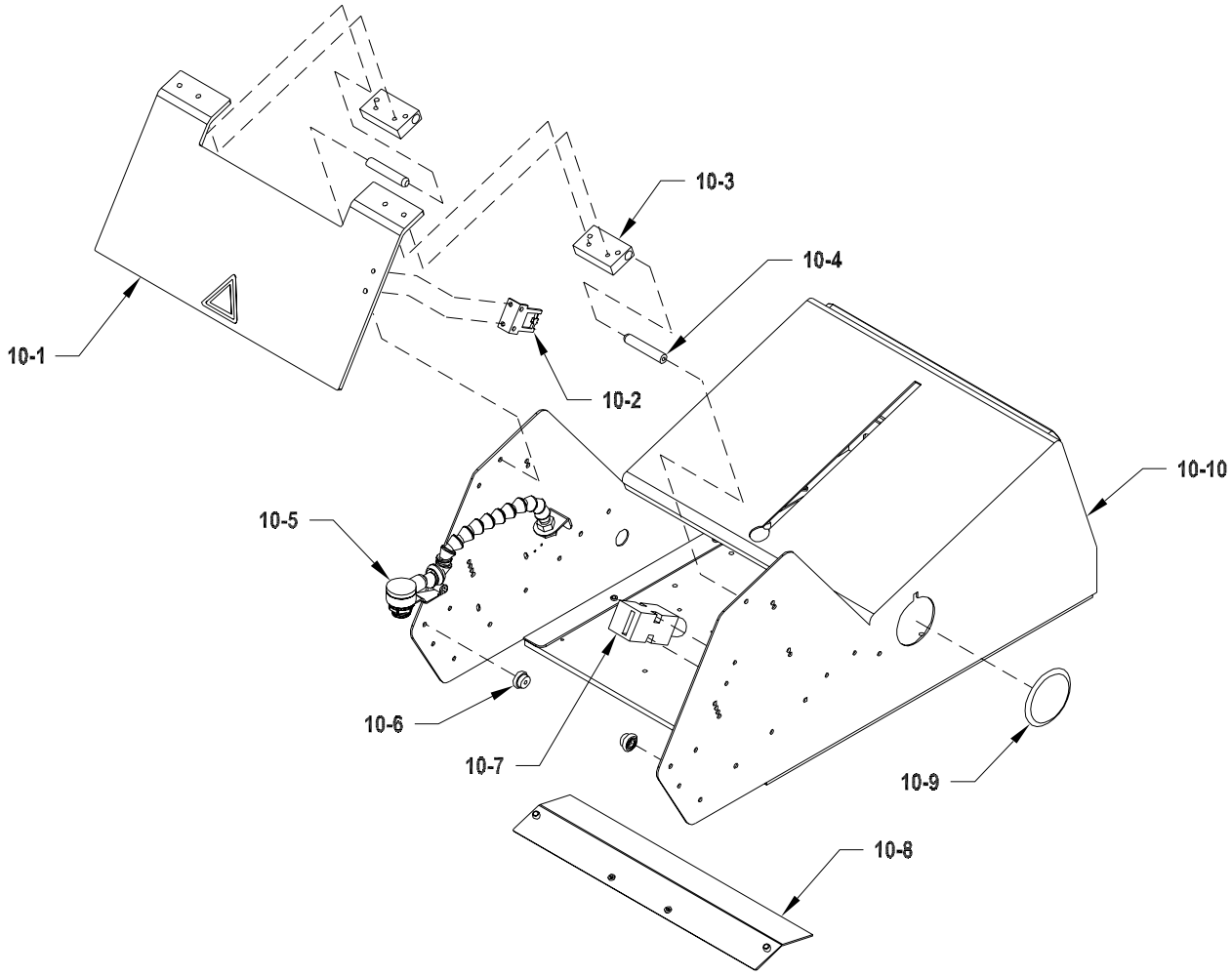


REAR AREA

9: ELECTRICAL COMPONENTS
ASSEMBLY #63011002

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
9-1	1	Base Plate	44630002
9-2	1	Board Stepper Drive BLD72-5	44649030
9-3	1	Grommet 3/4 X 3/8 X1/2	44649054
9-4	1	Board Power DC 5V & 12V 2.5 X 4.25	44649033
9-5	1	Bracket Power Supply Mounting	44649036
9-6	1	Motor Drive Stepper Assy	53511390
9-7	1	Motor Mount	44630011
9-8	1	Pulley 18T 1/2 Bore W/Flange & Hub	44350053
9-9	1	Fan Assembly ST/Reliant Cooling	64911035
9-10	1	Transformer Power 300VA	44683025
9-11	1 1	Board CPU w/96 Pin Connector Connector T & B 96 Pin	44649014 44649031
9-12	1	Bracket Mounting CPU Board	44649038
NS	16	Cable Tie Wrap	435SO263
NS	2	Terminal Female	44649046
NS	1	Cable Communication Female DB9	44649047
NS	34	Sheathing #O HP Black	44649085
NS	4	Terminal Disconnect Female 22-18 ga	53500045
NS	4	Joint Wire Crimp Style	53500152
NS	2	Terminal Disc Female .020 22-18 AWG	53500254
NS	1	Cable DC Power Supply Assy AC Input	63011006
NS	1	Cable Ground Wire Assembly	63011007
NS	1	Harness Safety Interlock	64911001
NS	1	Harness Sheet Sensor	64911002
NS	1	Harness Flight Trigger	64911005
NS	1	Harness Power Supply DC Output	64911006
NS	1	Harness Drive Control	64911007
NS	1	Harness Encoder	78511002
NS	1	Harness Vacuum Control	14771108

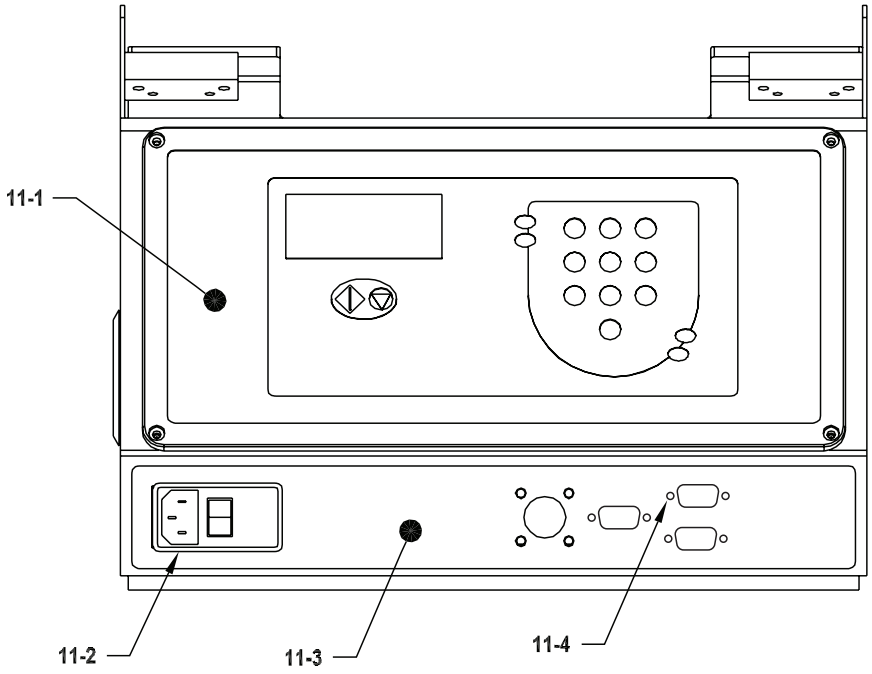
10: BASE FEATURES 1



10: BASE FEATURES 1

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
10-1	1	Cover Top Protective	44640006
	1	Label Warning	44600004
10-2	1	Key Safety Interlock	44649010
10-3	2	Hinge Top Cover Mount	44640012
10-4	2	Shaft Top Cover Hinge Mount	44640011
10-5	1	Sensor ST Sheet Assembly	64911011
10-6	2	Support O Ring Cover	43555068
	2	Bracket Rubber Spacer	44640009
10-7	1	Switch Safety Interlock Assembly	64911009
10-8	1	Cover Bottom Protective	44640008
10-9	1	Plug 2 Hole Cover	44500061
10-10	1	Shell ST1250	44630001
NS	1	Sensor ST Flight Assembly 50mm	63011038
NS	2	Holder Adhesive Wire	23500079
NS	1	Belt Tensioner Assembly	23511290
NS	2	Cable Tie Wrap	435SO263
NS	1	Power Cord (115V Model)	53511020
NS	1	Power Cord & Allen Wrench Set (230V Model)	53522210

11: BASE FEATURES 2

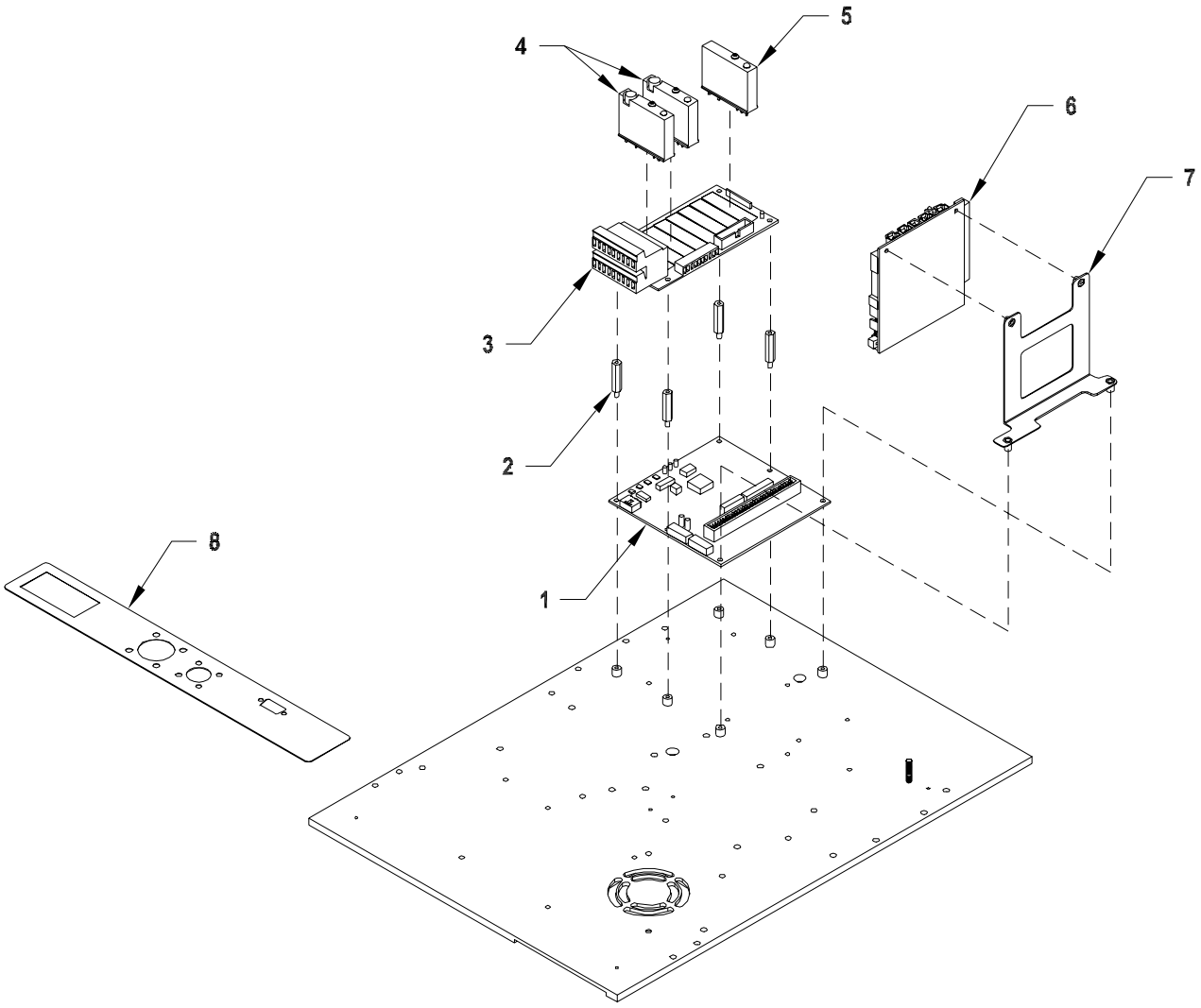


BASE FEATURES 2

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
11-1	1	Keypad/Display w/Cable ST1250	63011008
11-2	1	Module AC Power Entry (w/o Fuse)	44649034
	1	Fuse 3A 250V Slo-Blo GMD 5 x 10 mm	53500006
11-3	1	Graphic ST1250 Standard Lower	44649003
11-4	6	Screw Lock Assy. D-sub	53500182

10 Optional Components

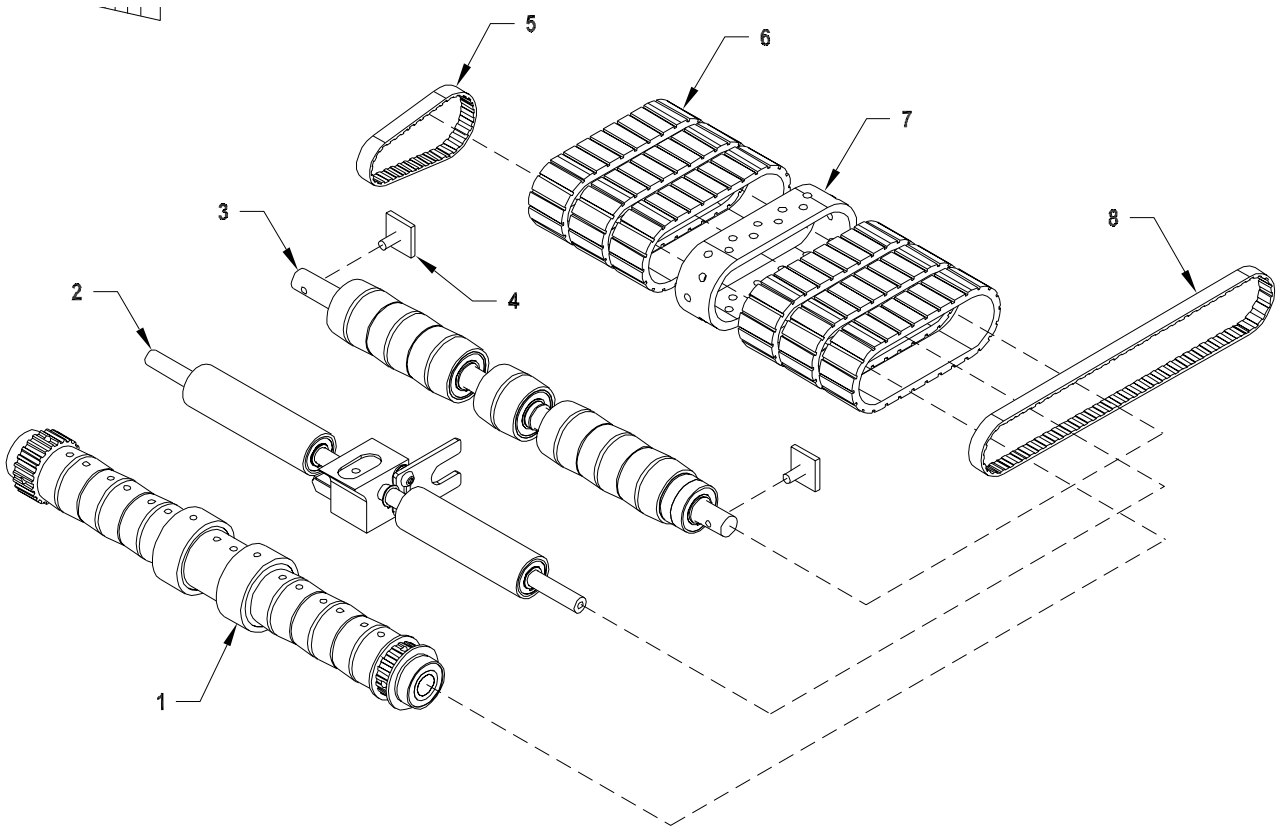
SYSTEMS INTERFACE I/O
ASSEMBLY #68311020



SYSTEMS INTERFACE I/O
ASSEMBLY #68311020

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
1	1	Board Motherboard w/o Options	44649055
2	4	Standoff Male/Female 6-32 X 1	44649048
3	1	Board Relay I/O	44649128
4	3	Relay Module DC Output 5-60VDC 3A	44649112
5	1	Relay Module DC Input 2.5–16VDC Hi Speed	44649115
	2	Relay Module DC Input 10-32VAC	44649116
6*	1	Board CPU w/96-Pin Connector	44649014
7	1	Bracket Stabilizing PCB to Mother	44649125
NS	1	Cable Ribbon Relay I/O	44649007
NS	1	Cable External Systems Interface 14 Pin	64911012
NS	1	Harness I/O Internal 14 Pin	64911014
NS	1	Harness Encoder 9-pin D-sub Female	78511002
NS	1	Harness Vacuum Control 9-pin D-sub Male	14771108

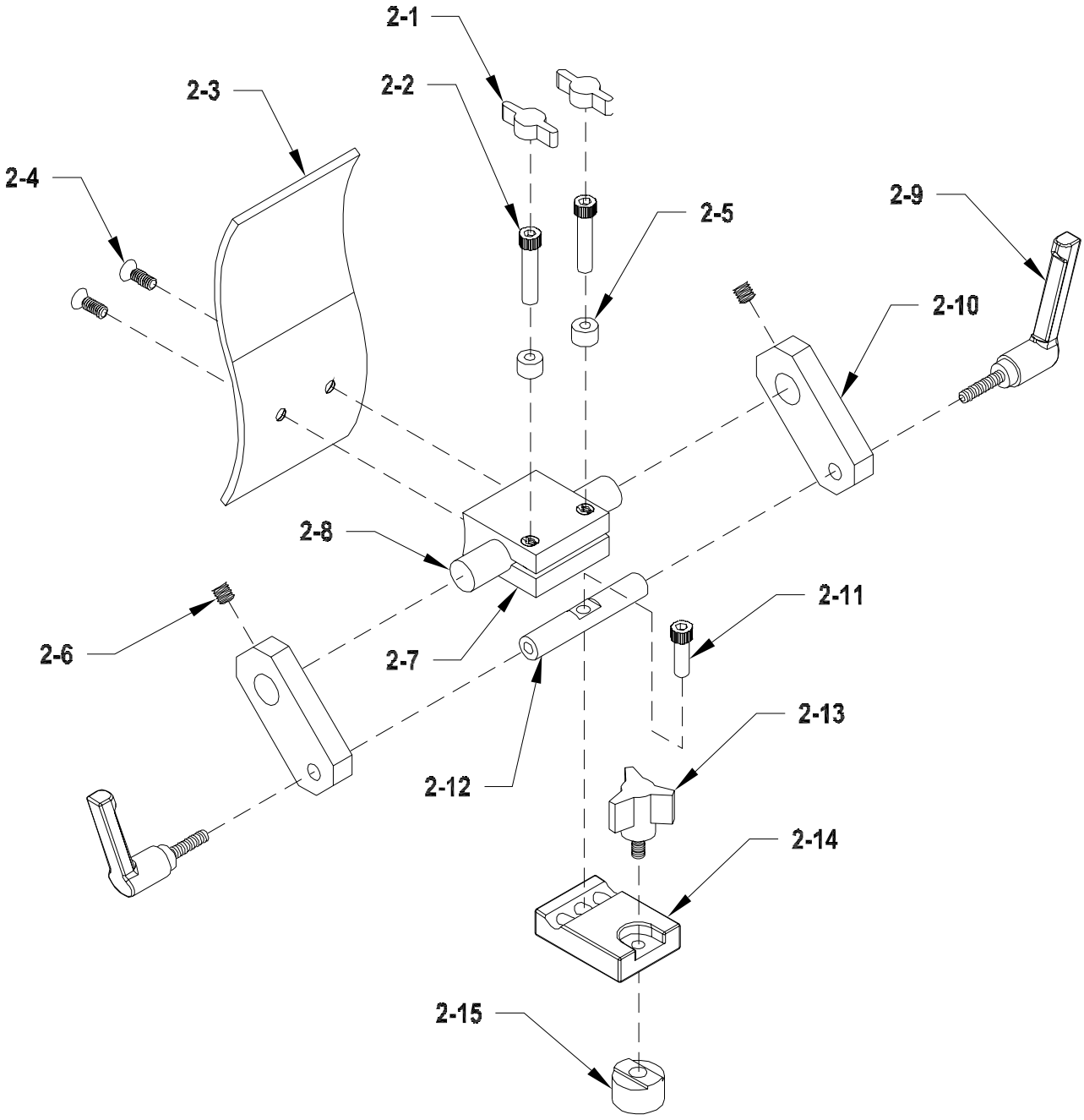
VACUUM ASSIST CARRIAGE WITH ADJUSTABLE TRANSPORT ASSEMBLY #63011096



VACUUM ASSIST CARRIAGE WITH ADJUSTABLE TRANSPORT
ASSEMBLY #63011096

DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
Assembly #			63011201
1	1	Shaft Drive 3/4	43555205
	1	Roller Flat Drive	23560206
	2	Roller Feed .75 Inch Bore	23500126
	6	Crown Drive Roller	23560208
	1	Pulley 24T 1/2 Inch Bore Flangeless	43560098
	1	Pulley 20T 1/2 Inch Bore w/Flange Driven	23500097
	2	Bearing Ball R8	23500094
	2	Key Woodruff 1/8 X 3/8	00003351
	15	SHSS 10-32 X 1/4" LG Cup Point (2 for Each Crown Drive Roller) (2 for Flat Drive Roller) (1 for Flanged Pulley)	00002216
	5	SHSS 10-32 X 5/16" LG Cup Point (2 for Flangeless Pulley) (1 for Flanged Pulley) (1 for Each Blue Feed Roller)	00002217
Assembly #			63011202
2	1	Shaft Discharge Feed Roller EX	43550036
	1	Manifold	44485001
	4	Washer Flat #10	00002607
	1	Bracket Material Alignment	44485002
	2	BHCS 10-32 X 3/8" LG	00002305
	6	Ring Grip 3/8 Waldes	00001110
	2	Belt Support Roller Assembly	23511270
	1	Nipple 90 Degree Brass Hose	44450029
Assembly #			63011203
3	1	Shaft Idler	43555147
	7	Roller Crown Driven with Bearings	33511028
	12	Ring Grip 1/2 Waldes	00001115
	2	Bearing Ball R8	23500094
4	2	Plate Vacuum Belt Tension	44485004
	2	SHCS 10-32 X 5/8" LG	00002320
5	1	Belt Drive Timing 78XL037	23560078
6	6	Belt Feed Tan Gum Grooved Composite 1W	23500162
7	1	Feed Belt Blue Vacuum 1W	44485003
8	1	Belt Drive 170XL037	43500096
NS	6 ft	Vinyl Flex Hose 3/8 ID 19/32 OD 250 PSI	44450026
NS	1	Connector Vacuum 3/8 Plastic Bulkhead	53500218
NS	1	Connector Vacuum 3/8 Plastic Insert 90 Deg.	53500219
NS	1	Connector 3/8 X 3/8 Tube Elbow	53500220

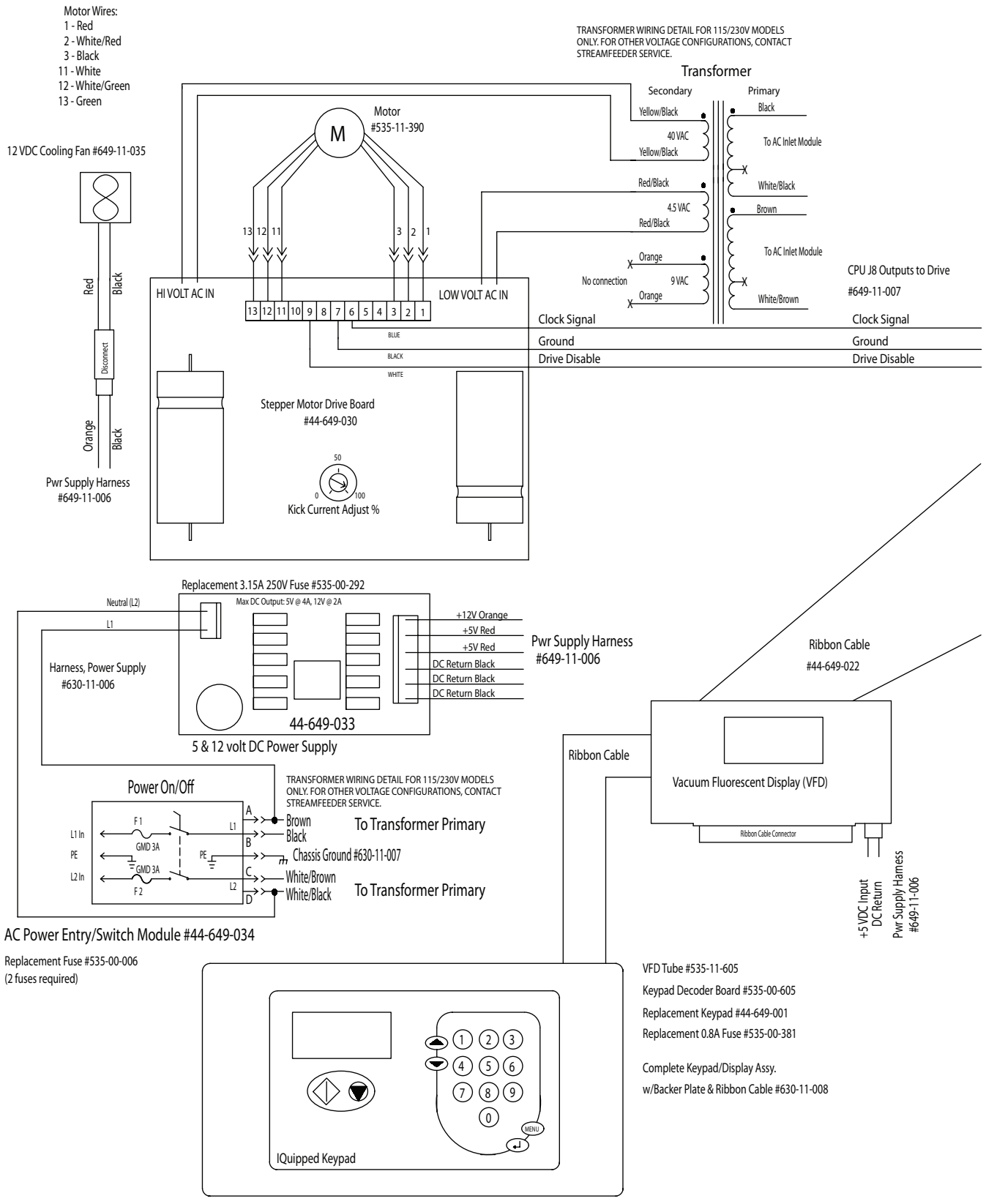
SINGLE S WEDGE
ASSEMBLY #63311026

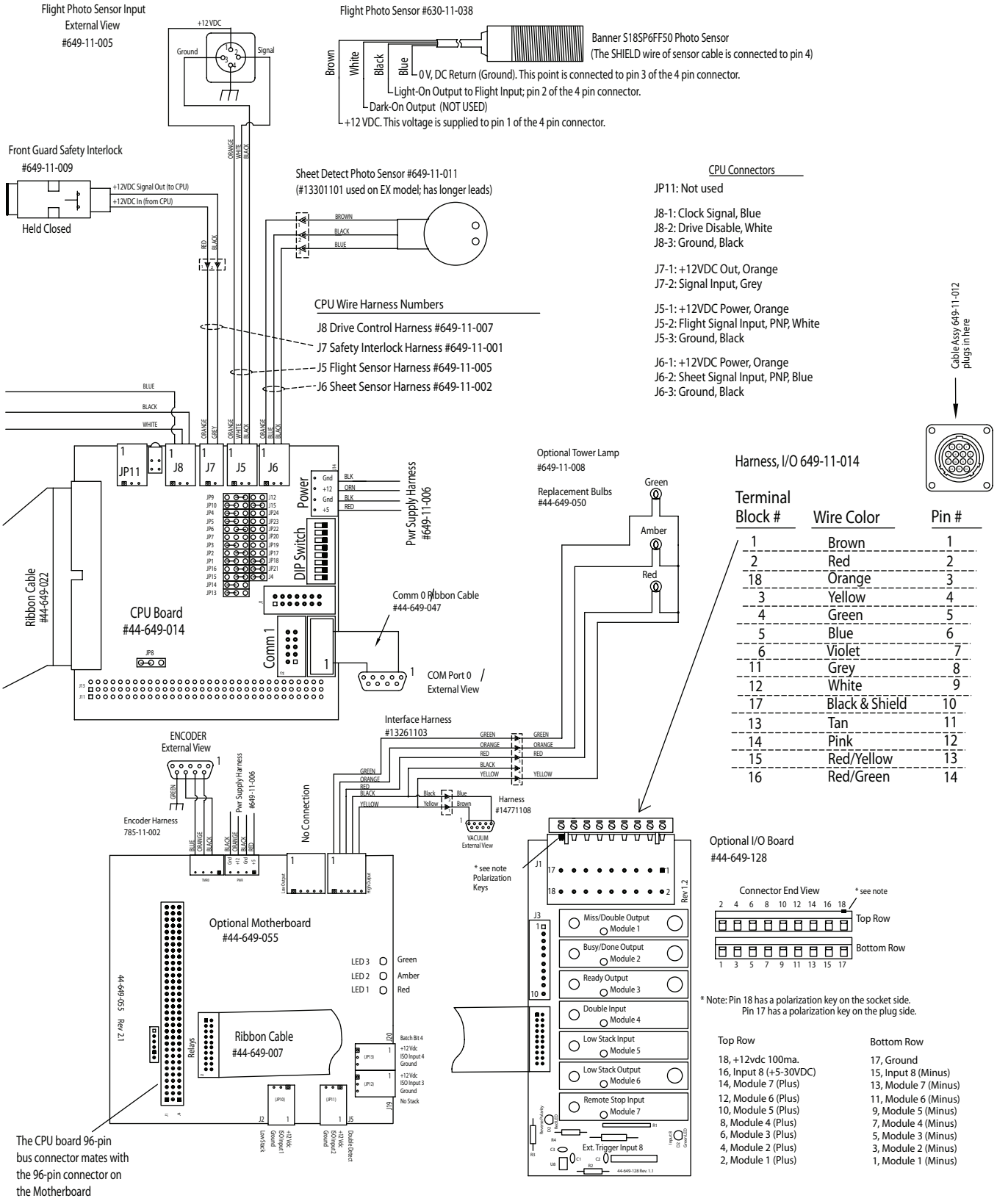


SINGLE S WEDGE
ASSEMBLY #63311026

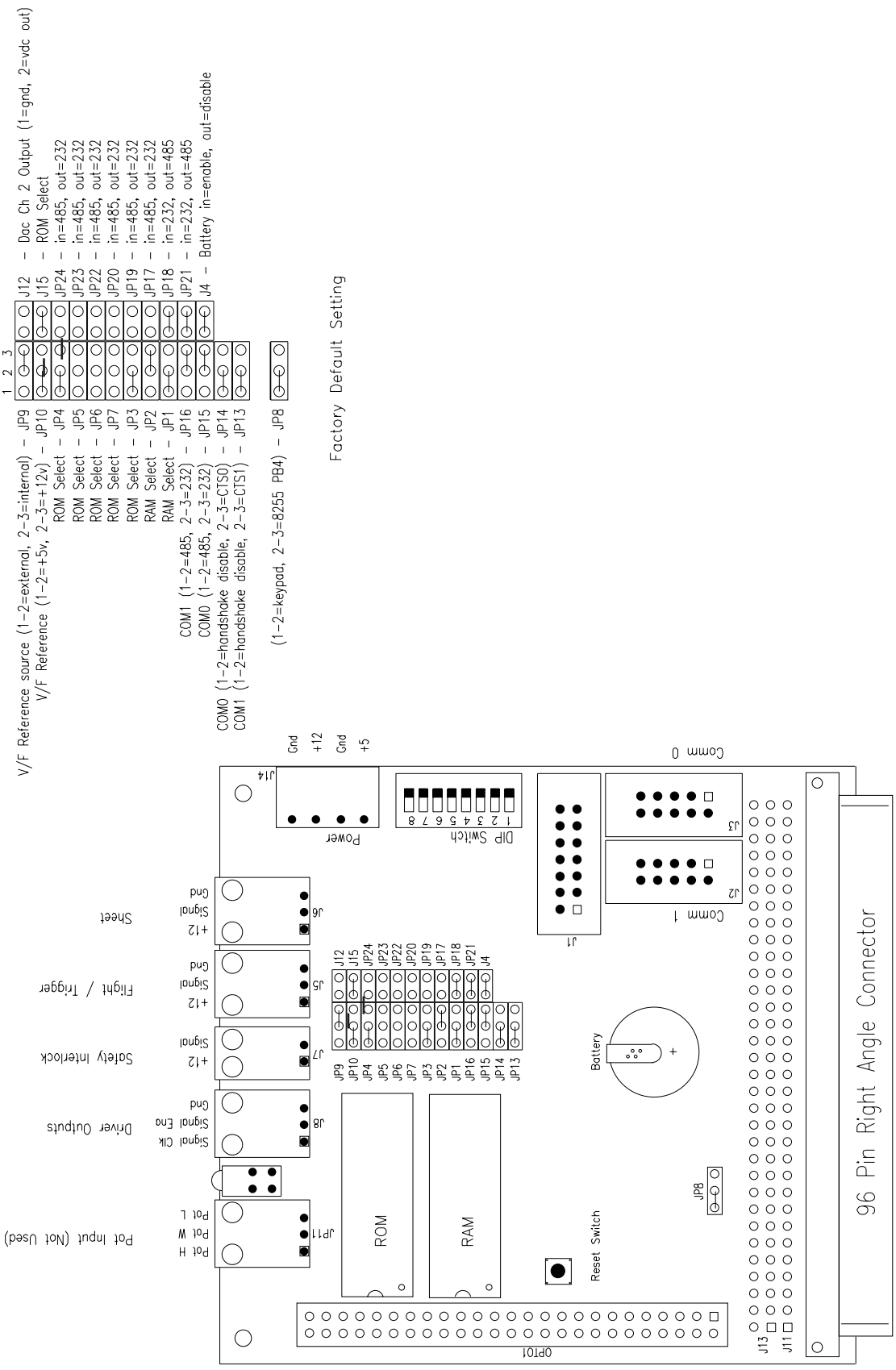
DIAGRAM NUMBER	QTY	DESCRIPTION	PART NUMBER
2-1	2	Knob Wing 10-32	23500076
2-2	2	SHCS 10-32 x 1” LG	00002335
2-3	1	S Wedge	44633025
2-4	2	FHDD 10-32 x 1/2” LG	00002330
2-5	2	Spacer .25 x .375 Tapped 10-32	44633027
2-6	2	SHSS 1/4-20 x 1/4” LG	00002205
2-7	1	Block Mounting	44633026
2-8	1	Shaft Pivot Block	44633028
2-9	2	Adjustment Clamping Handle 1/4-20 x .63	44340015
2-10	2	Bracket Roller Wedge Pivot	44340013
2-11	1	SHCS 10-32 x 5/8” LG	00002320
2-12	1	Shaft Wedge Guide	44633032
2-13	1	Knob 3 Arm 10-32 x 5/8”	44633033
2-14	1	Wedge Block	44633014
2-15	1	T-Nut Round	44633016

11 Electrical Components

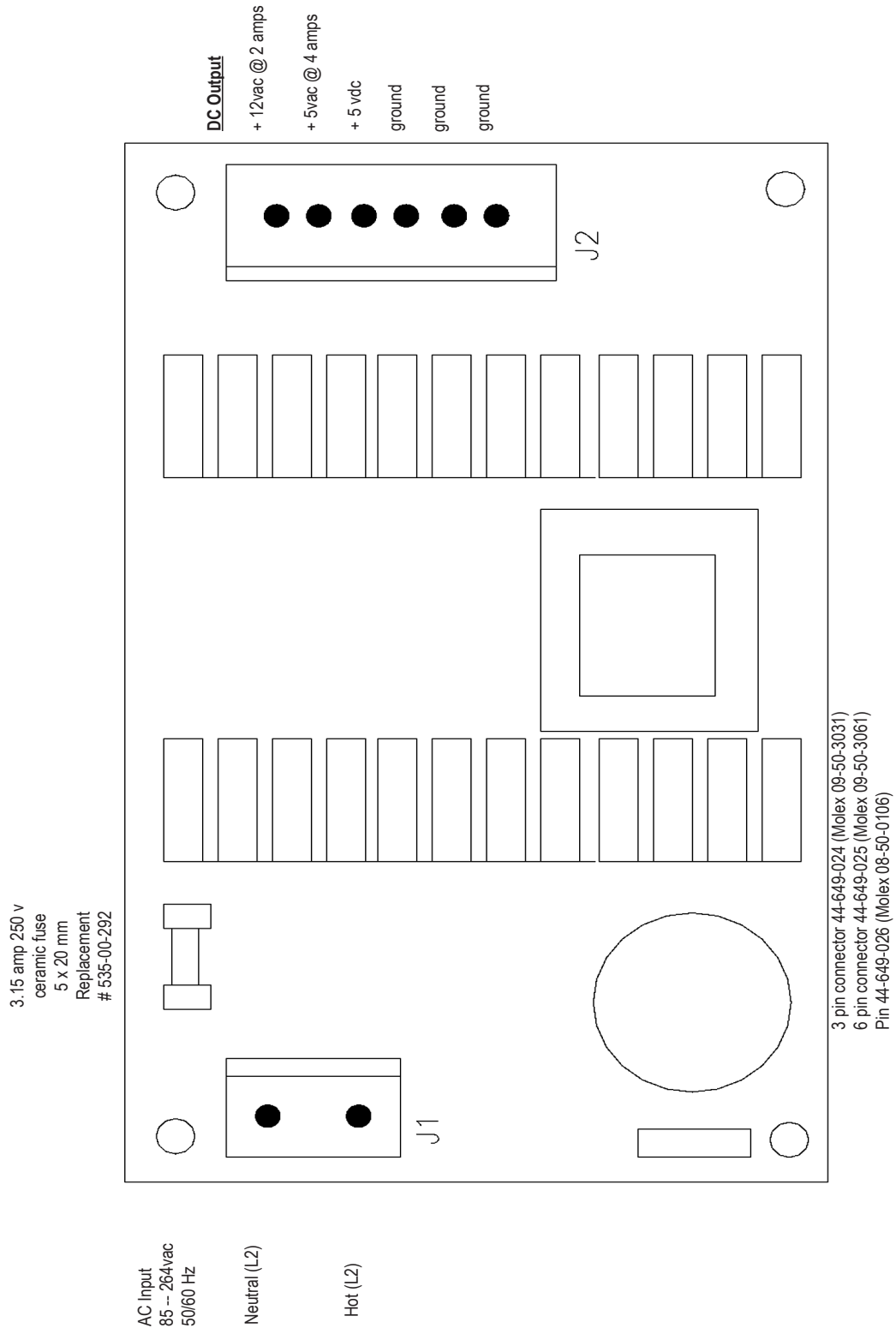



Flight Photo Sensor Input
External View
#649-11-005
+12VDC
Ground
Signal
Flight Photo Sensor #630-11-038
Banner S18SP6FF50 Photo Sensor
(The SHIELD wire of sensor cable is connected to pin 4)
Brown
White
Black
Blue
0 V, DC Return (Ground). This point is connected to pin 3 of the 4 pin connector.
Light-On Output to Flight Input; pin 2 of the 4 pin connector.
Dark-On Output (NOT USED)
+12 VDC. This voltage is supplied to pin 1 of the 4 pin connector.
Front Guard Safety Interlock
#649-11-009
+12VDC Signal Out (to CPU)
+12VDC In (from CPU)
Held Closed
Sheet Detect Photo Sensor #649-11-011
(#13301101 used on EX model; has longer leads)
CPU Connectors
JP11: Not used
J8-1: Clock Signal, Blue
J8-2: Drive Disable, White
J8-3: Ground, Black
J7-1: +12VDC Out, Orange
J7-2: Signal Input, Grey
J5-1: +12VDC Power, Orange
J5-2: Flight Signal Input, PNP, White
J5-3: Ground, Black
J6-1: +12VDC Power, Orange
J6-2: Sheet Signal Input, PNP, Blue
J6-3: Ground, Black
CPU Wire Harness Numbers
J8 Drive Control Harness #649-11-007
J7 Safety Interlock Harness #649-11-001
J5 Flight Sensor Harness #649-11-005
J6 Sheet Sensor Harness #649-11-002
Cable Assy 649-11-012
plugs in here
JP11
J8
J7
J5
J6
Power
DIP Switch
Pwr Supply Harness
#649-11-006
Ribbon Cable
#44-649-022
CPU Board
#44-649-014
Comm 1
Comm 0 Ribbon Cable
#44-649-047
COM Port 0
External View
Optional Tower Lamp
#649-11-008
Replacement Bulbs
#44-649-050
Green
Amber
Red
Harness, I/O 649-11-014
Terminal Block # | Wire Color | Pin #
1 | Brown | 1
2 | Red | 2
18 | Orange | 3
3 | Yellow | 4
4 | Green | 5
5 | Blue | 6
6 | Violet | 7
11 | Grey | 8
12 | White | 9
17 | Black & Shield | 10
13 | Tan | 11
14 | Pink | 12
15 | Red/Yellow | 13
16 | Red/Green | 14
ENCODER
External View
Encoder Harness
785-11-002
Pwr Supply Harness
#649-11-006
No Connection
Interface Harness
#13261103
Harness
#14771108
VACUUM
External View
* see note
Polarization
Keys
Optional Motherboard
#44-649-055
Ribbon Cable
#44-649-007
Relays
LED 3
LED 2
LED 1
Green
Amber
Red
Batch Bit 4
+12 Vdc
ISO Input 4
Ground
+12 Vdc
ISO Input 3
Ground
No Stack
Optional I/O Board
#44-649-128
Connector End View
* see note
Top Row
Bottom Row
Miss/Double Output
Module 1
Busy/Done Output
Module 2
Ready Output
Module 3
Double Input
Module 4
Low Stack Input
Module 5
Low Stack Output
Module 6
Remote Stop Input
Module 7
Ext. Trigger Input 8
* Note: Pin 18 has a polarization key on the socket side.
Pin 17 has a polarization key on the plug side.
Top Row
18, +12vdc 100ma.
16, Input 8 (+5-30VDC)
14, Module 7 (Plus)
12, Module 6 (Plus)
10, Module 5 (Plus)
8, Module 4 (Plus)
6, Module 3 (Plus)
4, Module 2 (Plus)
2, Module 1 (Plus)
Bottom Row
17, Ground
15, Input 8 (Minus)
13, Module 7 (Minus)
11, Module 6 (Minus)
9, Module 5 (Minus)
7, Module 4 (Minus)
5, Module 3 (Minus)
3, Module 2 (Minus)
1, Module 1 (Minus)
The CPU board 96-pin
bus connector mates with
the 96-pin connector on
the Motherboard

CPU Detail


V/F Reference source (1-2=external, 2-3=internal) - JP9
V/F Reference (1-2=+5v, 2-3=+12v) - JP10
ROM Select - JP4
ROM Select - JP5
ROM Select - JP6
ROM Select - JP7
ROM Select - JP3
RAM Select - JP2
RAM Select - JP1
COM1 (1-2=485, 2-3=232) - JP16
COM0 (1-2=485, 2-3=232) - JP15
COM0 (1-2=handshake disable, 2-3=CTS0) - JP14
COM1 (1-2=handshake disable, 2-3=CTS1) - JP13
(1-2=keypad, 2-3=8255 PB4) - JP8
Factory Default Setting
J12 - Dac Ch 2 Output (1=gnd, 2=vdc out)
J15 - ROM Select
JP24 - in=485, out=232
JP23 - in=485, out=232
JP22 - in=485, out=232
JP20 - in=485, out=232
JP19 - in=485, out=232
JP17 - in=485, out=232
JP18 - in=232, out=485
JP21 - in=232, out=485
J4 - Battery in=enable, out=disable
Pot Input (Not Used)
Pot H
Pot W
Pot L
Driver Outputs
Signal Clk
Signal Ena
Gnd
Safety Interlock
+12
Signal
Flight / Trigger
+12
Signal
Gnd
Sheet
+12
Signal
Gnd
Power
Gnd
+12
Gnd
+5
DIP Switch
Comm 0
Comm 1
Battery
ROM
RAM
Reset Switch
96 Pin Right Angle Connector

Power Supply

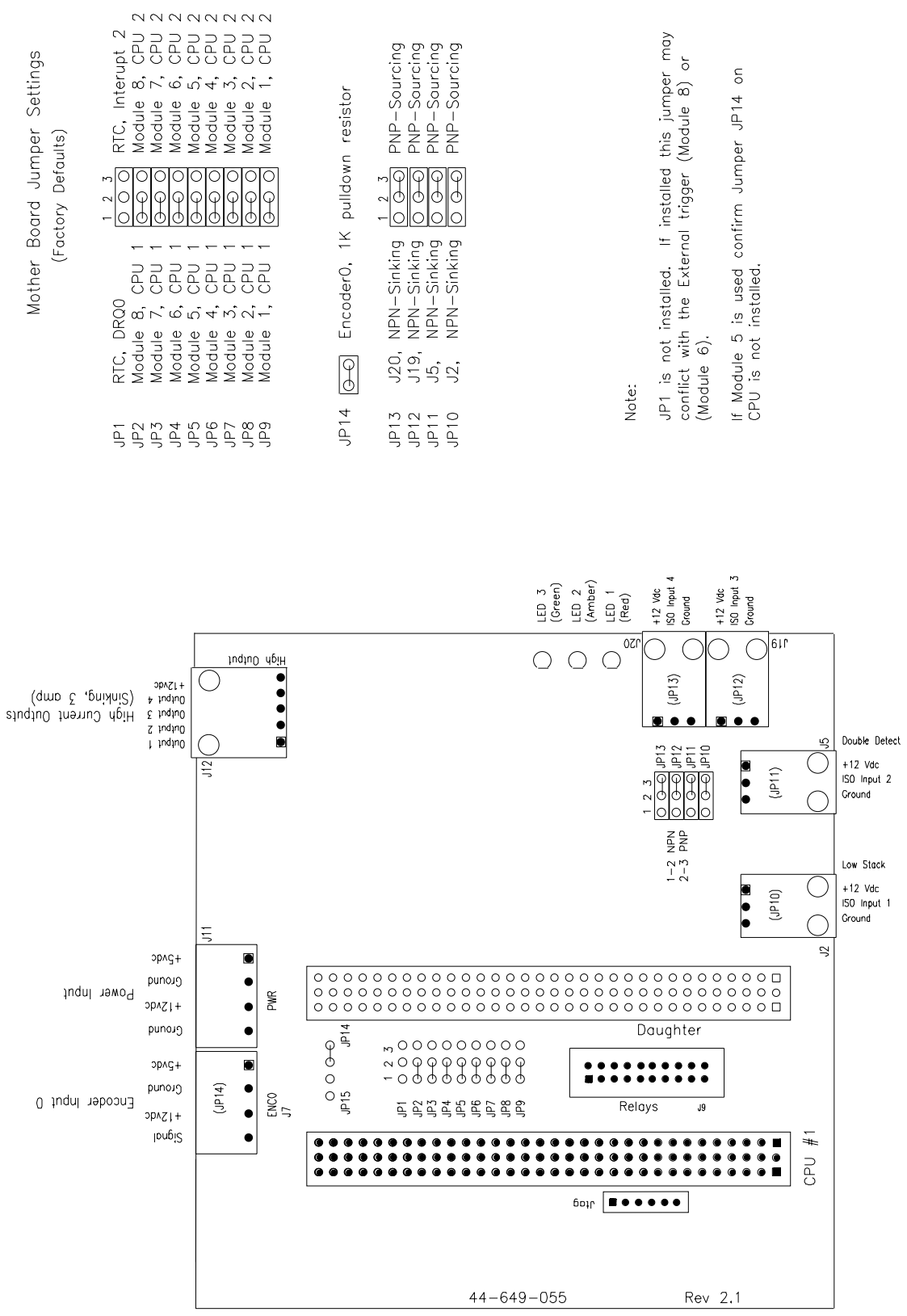


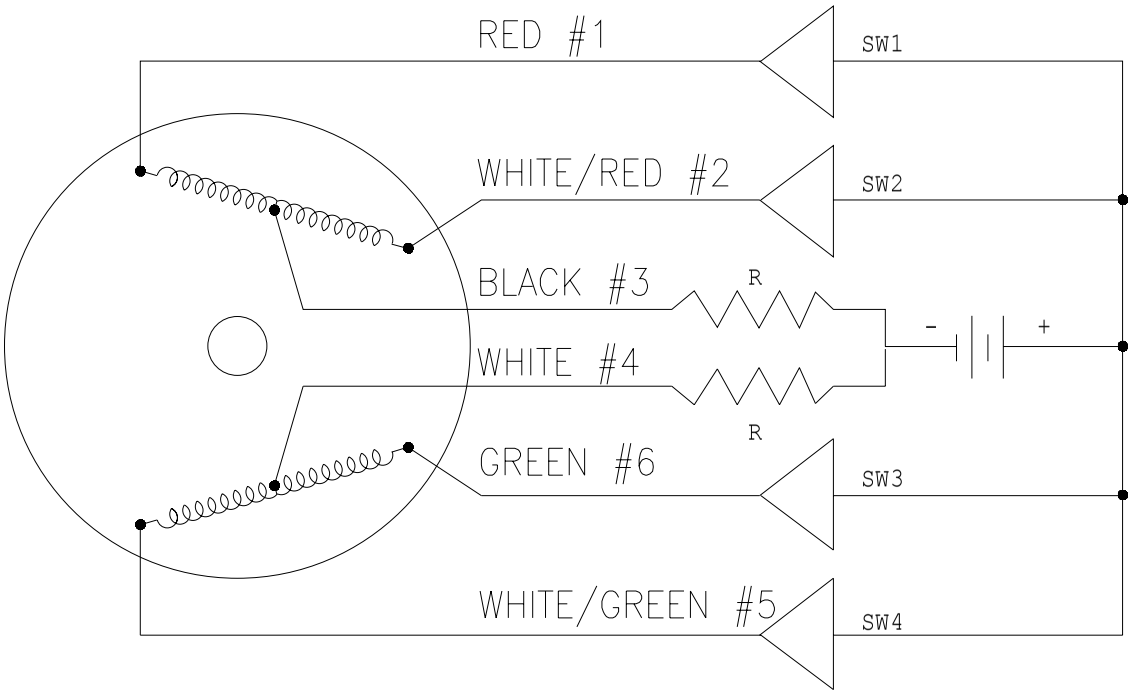
AC Input Module

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

Motherboard





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

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.

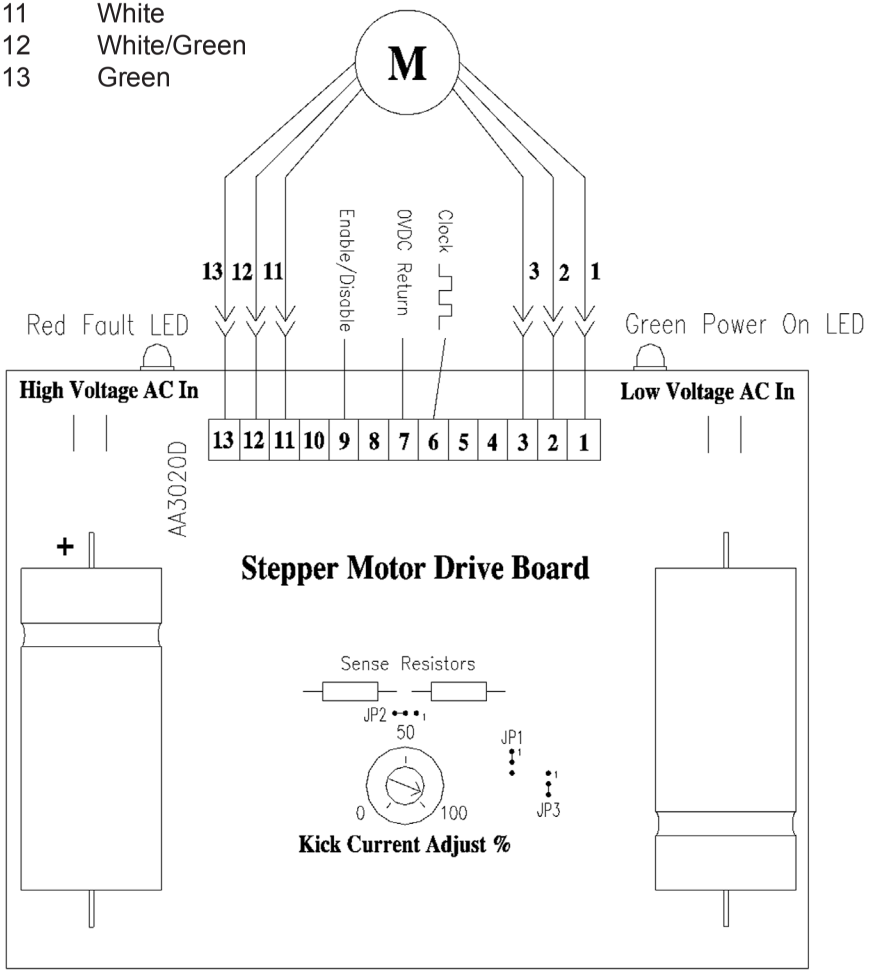
NOTE

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

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

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

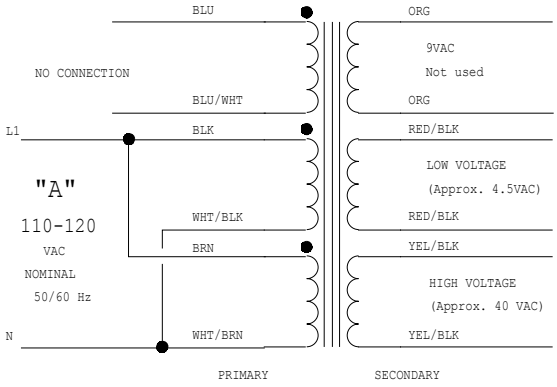
Fault Detection Protection LED Indictaion

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

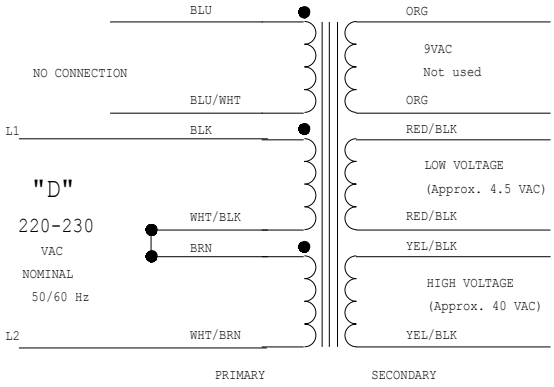
NO TE

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

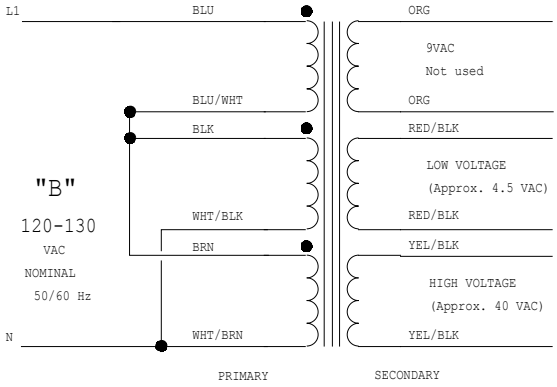
Transformer



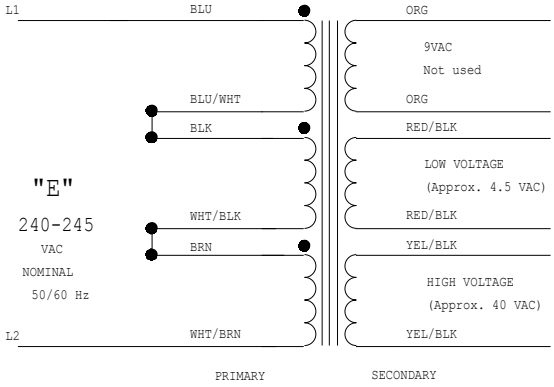
Standard wiring for most North American applications



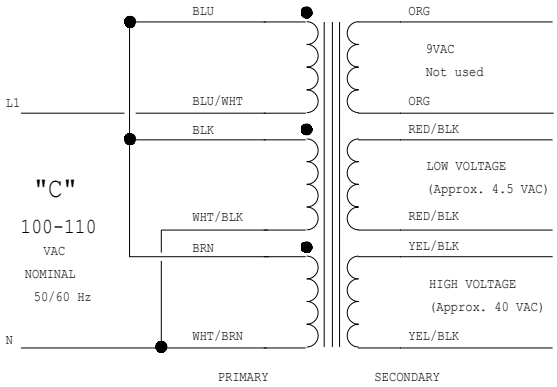
Standard wiring for Continental Europe, some 230V US applications



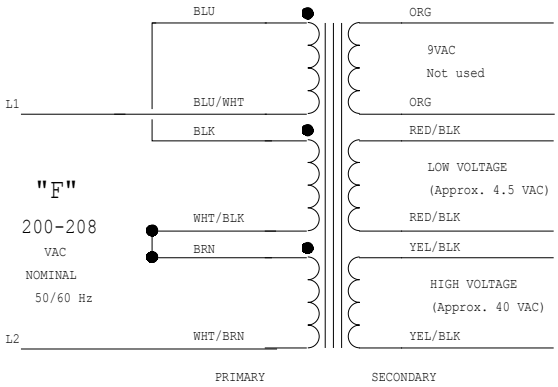
North America where voltage is over 120V



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



Standard wiring for Japan



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

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
Bottom Row
18, +12vdc 100ma.
17, Ground
16, Module 8
15, Module 8
14, Module 7
13, Module 7
12, Module 6
11, Module 6
10, Module 5
9, Module 5
8, Module 4
7, Module 4
6, Module 3
5, Module 3
4, Module 2
3, Module 2
2, Module 1
1, Module 1
J1
J3
Rev 1.2
Fuse Tester
Ribbon Cable
Test
Spare
Led
R3
R1
44-545-026
U1 Module 1
U2 Module 2
U3 Module 3
U4 Module 4
U5 Module 5
U6 Module 6
U7 Module 7
U8 Module 8
1, Ground
2, +5vdc 50ma.
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
* Note: Pin 18 has a polarization key on the socket side.
Pin 17 has a polarization key on the plug side.

12 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.

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 feeder is plugged in. 2. Check three-wire AC power cord for integrity at all three points. 3. Remove power cord from AC input switch module and disconnect the four connections to AC loads located on the back of the module inside the feeder. 4. Check the two fuses located inside the feeder's input power module. BOTH fuses must be present and test good. 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 feeder and away from where contact with the metal pressure points inside the module body is made. c. Use an ohmmeter to test the fuses. 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.

Technical 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 does 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. 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. 5. Replace fan. Note: Continued operation of the machine without the 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.

Technical 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.
"FRONT GUARD OPEN" message displayed	1. Make sure the safety interlock under the front guard is fully engaged. 2. Make sure DC power supply harness integrity is intact, and is fully plugged into 4-pin DC input connector on CPU board. 3. Jumper CPU board connector J7 pins 1 and 2 together. a. If message on display is still present after pressing the green "cycle" key, re place CPU board. b. If message goes away after pressing the green "cycle" key, continue with next step.

Technical Troubleshooting (continued)

Problem	Solution
"FRONT GUARD OPEN" message displayed (continued)	4. Using an ohmmeter, check the wiring harness connected between J7 and the safety interlock switch harness for integrity. If continuity is not measured, replace harness or repair broken wire. 5. Using an ohmmeter, check for continuity between wires connected to safety interlock switch. The switch is closed when the key on the front guard is inserted into the slot on the interlock switch. If continuity is not measured, replace switch or repair broken wire.
"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. 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 harness. 5. Check the sensor wires for integrity and positive connection at the pins of the quick disconnect. 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.

Technical Troubleshooting (continued)

Problem	Solution
CPU board "heartbeat" pulse not present (continued)	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 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.*	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. 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.*	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.

Technical Troubleshooting (continued)

Problem	Solution
Motor does not run, is noisy, makes a "growling" sound, or runs in reverse (continued) NOTE *This test requires a meter that has frequency measurement capabilities, or an oscilloscope.*	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 87Hz minimum, and at 100% run speed, about 8.7 kHz maximum. It is recom mended 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 con nector J8 and the drive board's 13-pin connector. 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 ex posed, 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.

Technical Troubleshooting (continued)

Problem	Solution
Testing stepper motor drive board output pins 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.
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 in Pro Series feeders have two windings, three leads associated with each winding, for a total of six leads. Each winding has a wire at each end of the winding with a wire connected 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.

Technical Troubleshooting (continued)

Problem	Solution
Testing the transformer	Refer to the wiring diagram of the Pro Series Transformer found elsewhere 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 Pro Series 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. 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 yel low 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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