

Product Manual

Sortrac 1-A

Standard and High Speed Air Pushers

Application Guidelines, Specifications,
Installation Procedures, Maintenance, and
Spare Parts



To contact Intelligrated:
For service: Customer Service and Support (CSS)
Hotline 1-877-315-3400
On the World Wide Web: www.intelligrated.com

By mail:

Intelligrated
7901 Innovation Way
Mason, OH 45040

(513) 701-7300

Read these documents thoroughly before attempting to perform maintenance or repairs to the applicable Intelligrated conveyor system components or devices. Exercise extreme caution when working around moving and rotating conveyor equipment. Wear the proper clothing and safety equipment. DO NOT attempt to perform any maintenance until the equipment is de-energized, locked out and tagged out in accordance with established company procedures.

The information presented in these documents are correct at the time of publication. Intelligrated has made every effort to ensure that the information presented is correct and free from error. However, some errors or misprints may occur. Please contact Intelligrated with any corrections.

This document is copyrighted © 2010 by Intelligrated, all rights reserved. No Part of this manual may be reproduced and/or distributed to parties other than the customer and the customer's employees for whom it was originally produced.

The following terms are trademarks™ of Intelligrated; Accuglide™, BOSS™ UniSort™, EZ-set™. The following terms are registered trademarks® of Intelligrated; Accuzone®, UniSort®, E-Z Set®. Intelligrated® is a registered trademark.

Direct questions and comments concerning the information contained in this manual to:

Documentation Department
Intelligrated
7901 Innovation Way
Mason, OH 45040

Ph (513) 701-7300

Fax (513)701-7349

customerservice@intelligrated.com



Package Conveyors



| | | |
|--|---|---|
|  <p>Do Not Climb, Sit, Stand, Walk, Ride, or Touch the Conveyor at Any Time</p> |  <p>Do Not Perform Maintenance on Conveyor Until Electrical, Air, Hydraulic and Gravity Energy Sources Have Been Locked Out or Blocked</p> |  <p>Operate Equipment Only With All Approved Covers and Guards in Place</p> |
|  <p>Do Not Load a Stopped Conveyor or Overload a Running Conveyor</p> |  <p>Ensure That All Personnel Are Clear of Equipment Before Starting</p> |  <p>Allow Only Authorized Personnel To Operate or Maintain Material Handling Equipment</p> |
|  <p>Do Not Modify or Misuse Conveyor Controls</p> |  <p>Keep Clothing, Body Parts, and Hair Away from Conveyors</p> |  <p>Remove Trash, Paperwork, and Other Debris Only When Power is Locked Out and Tagged Out</p> |
|  <p>Ensure That ALL Controls and Pull Cords are Visible and Accessible</p> |  <p>Know the Location and Function of All Stop and Start Controls</p> |  <p>Report All Unsafe Conditions Jams should be cleared ONLY BY Authorized, Trained, Personnel</p> |

POST IN PROMINENT AREA

Product Manual Issue and Revision Date(s)

First Issue

June, 2005

Product Manual Revision Summary

| Revision Date | Section(s) | Revision Summary |
|----------------------|-------------------------------------|---|
| September, 2009 | Section A Section G Section H | Update Air Connections New information on diverter adjustments in Section G. Modify text in Section H - topic Adjustment. |

| | |
|---|--------|
| Product Manual Issue and Revision Date(s) | 1 - 1 |
| Product Manual Revision Summary | 1 - 1 |
| Section A Product summary | |
| Section B Application Guidelines | |
| Design Features | B - 3 |
| Operation | B - 4 |
| Automatic Operation | B - 4 |
| Manual Operation | B - 5 |
| Section C Specifications | |
| Paddle Size | C - 1 |
| Diverter Cycle Time | C - 1 |
| Air Connections | C - 2 |
| Mounting | C - 2 |
| Minimum Diverter Spacing | C - 2 |
| Power Requirements | C - 2 |
| Section D Engineering Data | |
| Example - Ten Pusher System | D - 1 |
| Section E Layout Dimensions | |
| Section F Accessories | |
| Section G Installation Procedures | |
| Introduction | G - 1 |
| Accepting Shipment | G - 1 |
| Lost Shipments | G - 1 |
| Shortages or Errors | G - 1 |
| Damaged Shipments | G - 1 |
| Claims and Returns | G - 1 |
| Codes and Standards | G - 2 |
| Warning Signs | G - 2 |
| Safety Precautions | G - 2 |
| Safety Instructions | G - 3 |
| Parts Replacement | G - 3 |
| Factory Assistance | G - 3 |
| Mechanical Installation | G - 5 |
| Electrical Installation | G - 6 |
| Adjustment Instructions | G - 9 |
| Air System Installation | G - 13 |
| Section H Maintenance Procedures | |
| Introduction | H - 1 |
| Maintenance Safety Instructions | H - 1 |
| Maintenance Logs | H - 2 |
| Factory Assistance | H - 2 |
| Adjustments | H - 3 |

| | |
|--|-------|
| Actuators (Limit Switches and Cam) | H - 3 |
| Air Cylinder and 4-Way Valve | H - 3 |
| Air Filter, Regulator and Lubricator | H - 3 |
| Guide Blocks | H - 3 |
| Scheduled Maintenance | H - 4 |
| Troubleshooting | H - 5 |
| Section I Spare Parts | |
| General Information | I - 1 |

SECTION A: PRODUCT SUMMARY

- Overview:** The Sortrac 1A air pushers rapidly distributes merchandise to multiple destinations. They are designed to be mounted adjacent to the sort conveyor opposite each discharge station. Each unit has a long life cycle and non-lubricated design requiring minimal maintenance and allows for easy field installation.
The 1A air pushers have many significant design features such as padded paddle for low impact sortation, fully automatic operation and built-in anti-stall timer, safety air pressure release and safety circuitry. In addition, each unit's pneumatic system is complete with filter, regulator, gauge, and flexible hose with safety quick disconnect from main supply line. Each unit's electrical system is complete with control box, ON-OFF, RESET and AUTO TEST switches, stall warning light and terminal strip connections.
- Designation (LEO):**
- Capacity** The 1A air pushers will sort cartons, parcels, tote boxes, mail sacks and/or other items weight up to 100 lbs. at varying sort rates up to 60 object per minute. For specific requirements, consult the factory.
- Paddle Size:** 18" stroke - 16" wide x 6" high
24" or 30" stroke - 24" wide x 6" high
- Diverter Cycle Time:** For detailed information, refer to Section C - Specifications
Cycle time will vary due to type and weight of parcels, air pressure, and type of sort belt. The belt should have .20 to .26 coefficient of friction on top surface and FS bottom surface.
- Air Connections:** One (1) five foot flexible hose with quick disconnect plug and 1/2" NPT socket. Socket has pneumatic shut-off and ball check valve.
- Mounting:** The center line of each diverter must be aligned with the center line of each discharge point at installation. Optional mounting hardware is available upon request and includes rails, nuts, bolts, lock washer, flat washers and installation drawing.
- Minimum Diverter Spacing** 26" (width of paddle + 2").
- Power Requirements** Clean, dry, compressed air supply at 100 psig.
Electrical supply of 115 VAC, 1 phase, 60 hertz.
Controls: Pulse signal, minimum 25 milliseconds duration. Maximum 200 milliseconds duration for standard duty. Maximum 50 milliseconds duration for high speed.

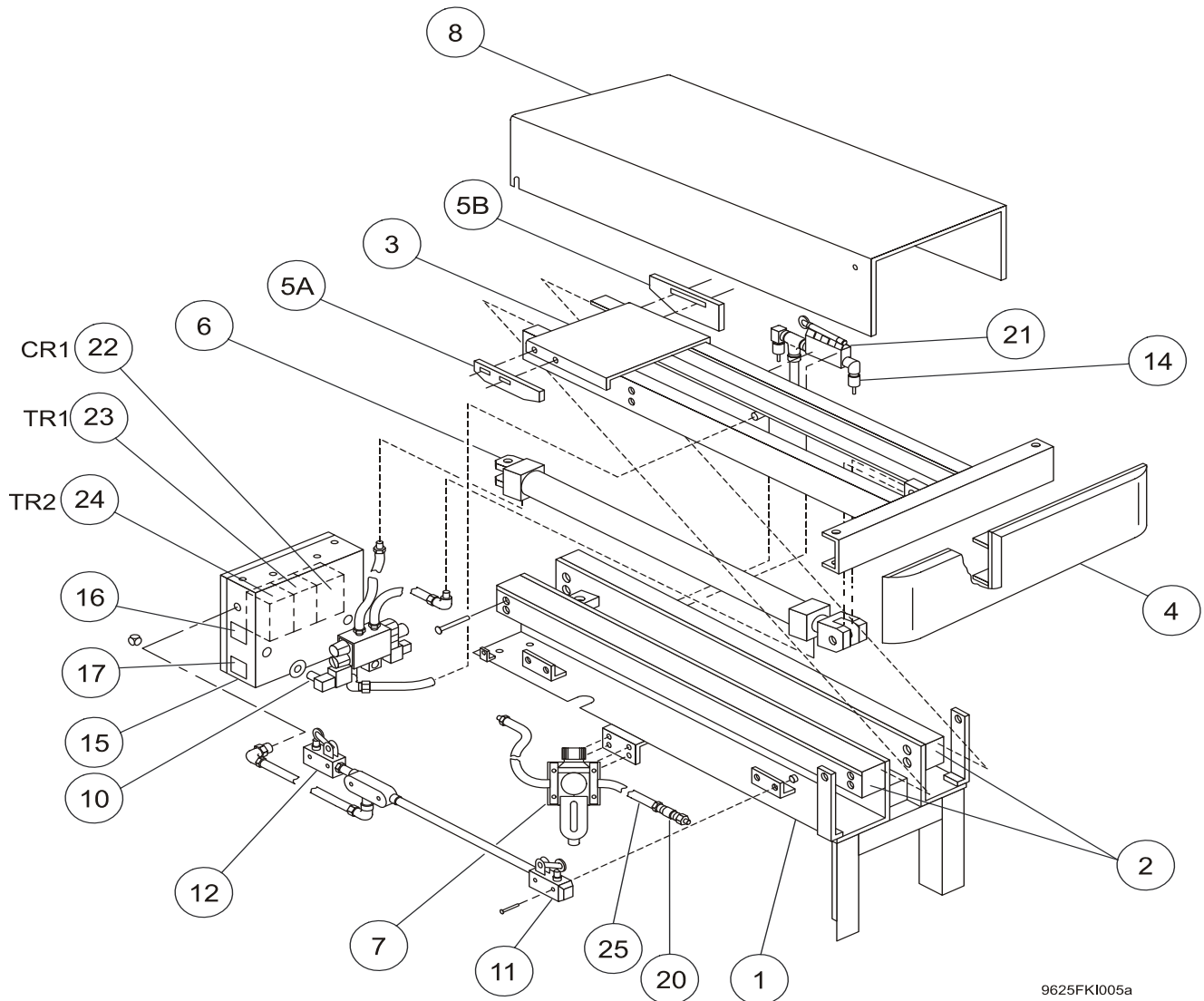
SECTION B: APPLICATION GUIDELINES

The Sortrac 1A air pushers rapidly distribute merchandise to multiple destinations. They are designed to be mounted adjacent to the sort conveyor opposite each discharge station. The pusher or paddle is mounted directly to the piston rod of an air cylinder and parcels are pushed at 90 degree angles off the conveyor onto accumulation conveyors, into discharge chutes or directly into bins or hoppers. Each unit has a long life cycle and non-lubricated design requirement for minimum maintenance and allows for easy field installation.



The Sortrac 1A air pusher mechanism is an air cylinder activated unit which moves a paddle across a moving conveyor belt.

Figure B - 1 shows the components with numerical references used to define the action of the pusher.



9625FKI005a

Figure B - 1 Sortrac 1A Air Pusher (Standard Unit Shown)

| Key No. | Description |
|----------|--|
| 1 | The base frame is of welded steel construction with two bearing blocks bolted in place. |
| 2 | Bearing blocks. |
| 3 | The paddle frame assembly of welded steel construction slides over the bearing blocks. |
| 4 | The cushioned paddle assembly is attached to the forward end of the paddle frame, which contacts the conveyed merchandise during a sortation cycle. |
| 5A 5B | Attached to the trailing end of the paddle frame are two plastic actuator cams which provide directional control and cushioning for the air cylinder |
| 6 | Air cylinder |
| 7 | Plant air is supplied to the pusher through a filter-regulator assembly (R-R unit). |
| 8 | Cover |
| 10 | A four-way (4) air valve is solenoid actuated to deliver air to the proper end of the air cylinder. |
| 11 12 | Timing of the solenoid actuation is a function of the limit switches LS-1 and L-2 which are operated by actuator cam. |
| 13 | |
| 14 | A pair of speed control mufflers are adjacent to the two-way valve for precise control of paddle speed on the outbound stroke. |
| 15 | On the underside of the base frame is mounted the control box with toggle switches. |
| 16 | 2 position toggle switch. |
| 17 | 3 position toggle switch. |
| 20 | Male Connector |
| 21 | A two-way cam operated air valve is mounted on the opposite side of the pusher. |
| 22 | DPDT Relay CR-1 |
| 23 | Timing Relay TR-1 |
| 24 | Timing Relay TR-2 |
| 25 | Hose Connection |

Design Features

The air pushers have many significant design features such as padded paddle for low impact sortation, fully automatic operation and built-in anti-stall timer, safety air pressure release and safety circuitry.

In addition, each unit's pneumatic system is complete with filter, regulator, gauge, and flexible hose with safety quick disconnect from the main supply line. Each unit's electrical system is complete with control box, ON-OFF, RESET and AUTO TEST switches, stall warning light and terminal strip connections.

Each air pusher is shipped pretested as a complete assembled unit ready for installation.

Operation

Automatic Operation

A pusher is normally kept in the automatic mode and ready for sortation by setting the lower toggle switch (17) in the "AUTO" position and the upper toggle switch (16) in the "ON" position. In this condition, air is admitted through the four-way valve (10) to the rod end of the cylinder, thus keeping the pusher in its "HOME" position. An incoming signal pulse (115 VAC) (50 msec minimum, 50 msec maximum) from the control system energizes relay CR-1 (22) which causes the four-way valve to transfer incoming air to the opposite end of the cylinder. This action extends the air cylinder causing the paddle to move out across the conveyor belt. The stroke limit of the paddle is determined by the cam (5a) contacting limit switch LS-1, (11) which reverses the air flow to the cylinder.

When the paddle is away from its "HOME" position, a timing relay TR-1 (24) is set up by limit switch LS-2 (12) being activated. If the pusher is not back to its "HOME" position in 1.5 seconds, the timer TR-1 (24) will time out. This will lock out the pusher from cycling, exhaust the air from both ends of the cylinder, and provides a signal to shutdown the conveyor and other system controls connected to its output terminals. In this condition the four-way valve is de-energized and its internal spool is spring centered thus opening both exhaust ports. To return the system to normal operation, the following procedure is required.

1. Determine which pusher has malfunctioned or stalled by checking the Red Anti-Stall Signal lights (28) on the control boxes (underside). An illuminated light indicates a pusher "FAULT".
2. Turn "OFF" the upper toggle switch (16) on the pusher control box and disconnect the air hose by use of the quick-disconnect coupling.
3. Free any apparent jam between the paddle and conveyor merchandise so that the paddle can be returned manually to its "HOME" position.
4. Be sure all persons are clear of the conveyor and pushers.
5. Reconnect the air hose coupling and check the air pressure gauge for at least 80 PSI and be sure no air leaks are present in the pusher pneumatic system.
6. Switch upper toggle switch to "ON" position. (Wait 3 seconds for control circuit to reset).
7. Cycle the pusher to be sure no binding or resistance is present in the machine by momentarily pressing the "TEST-AUTO" switch to the "TEST" position. Then set switch to "AUTO" position.
8. Replace all unsorted items on the conveyor belt to their original coded locations.
9. Reset and start belt conveyor drive unit.

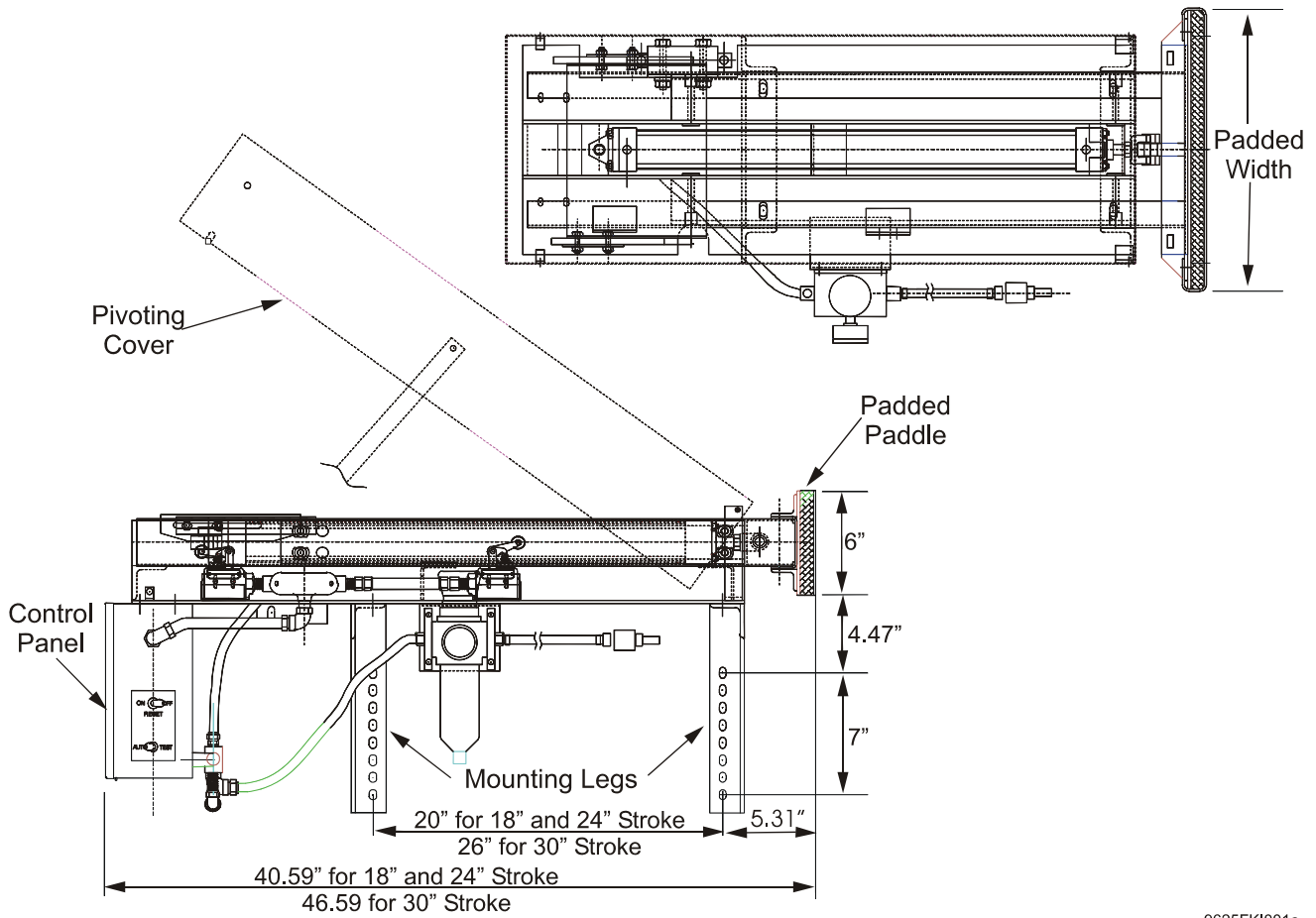
Manual Operation

The pusher can be cycled in a "TEST" mode for maintenance and adjustment purposes. The procedure should be as follows:

1. Coded merchandise should not be on the moving sortation belt to avoid "OUT OF SYNC" pusher cycles that could cause a jam and possible damage.
2. Turn upper toggle switch (16) to the "OFF" position.
3. Disconnect air supply by uncoupling the air line quick disconnect (20).
4. Make any necessary mechanical adjustments as required.
5. Pusher paddle must be moved to the "HOME" position. Never stand in front of paddle. Always move when positioned from back or side of unit.
6. Reconnect air line and check air pressure. 80 PSI should be showing on pusher gauge. Adjust the regulator knob (7) to obtain proper pressure.
7. Turn upper toggle switch to the "ON" position and wait for 3 seconds for the circuit timer TR-2 (23) to reset and arm the circuit.
8. Stand well behind pusher and keep hands and arms away from moving parts during testing.

Momentarily depress lower toggle switch (17) toward the "TEST" position just long enough to start the pusher cycle. Holding the "TEST" toggle for longer than 150 milliseconds will cause erratic operation.

SECTION C: SPECIFICATIONS



9625FKI001a

Figure C - 1

Paddle Size

18" stroke - 16" wide x 6" high

24" or 30" stroke - 24" wide x 6" high

Diverter Cycle Time

Cycle time will vary due to type and weight of parcels, air pressure, and type of sort belt. Belt should have .20 to .26 coefficient of friction on top surface and FS bottom surface.

| Sortrac 1A Air Pushers | Product No. | Stroke | Paddle Width | Cycle Time in Seconds | Free Air Required in Cubic Feet |
|------------------------|-------------|--------|--------------|-----------------------|---------------------------------|
| Standard Duty | 799077 | 18" | 16" | .70 - 1.1 | .56 @ 80 psig |
| | 710559 | 24" | 24" | .70 - 1.1 | .56 @ 80 psig |
| | 791283 | 30" | 24" | .85 - 1.3 | .70 @ 80 psig |
| High Speed | 799076 | 18" | 24" | .47 - 1.4 | .56 @ 80 psig |
| | 799061 | 24" | 24" | .47 - 1.4 | .56 @ 80 psig |
| | 736708 | 30" | 24" | .47 - 1.4 | .70 @ 80 psig |

Air Connections

One (1) five foot flexible hose with quick disconnect plug and 1/2" NPT socket. Socket has pneumatic shut-off and ball check valve.

Mounting

The center line of each diverter must be aligned with the center line of each discharge point at installation. Optional mounting hardware is available upon request and includes rails, nut, bolts, lock washer, flat washers and installation drawing.

Minimum Diverter Spacing

26" (width of paddle + 2").

Power Requirements

Clean, dry, compressed air supply at 100 psig.

Electrical supply of 115 VAC, 1 phase, 60 hertz.

Controls: Pulse signal, minimum 25 milliseconds duration. Maximum 200 milliseconds duration for standard duty. Maximum 50 milliseconds duration for high speed.

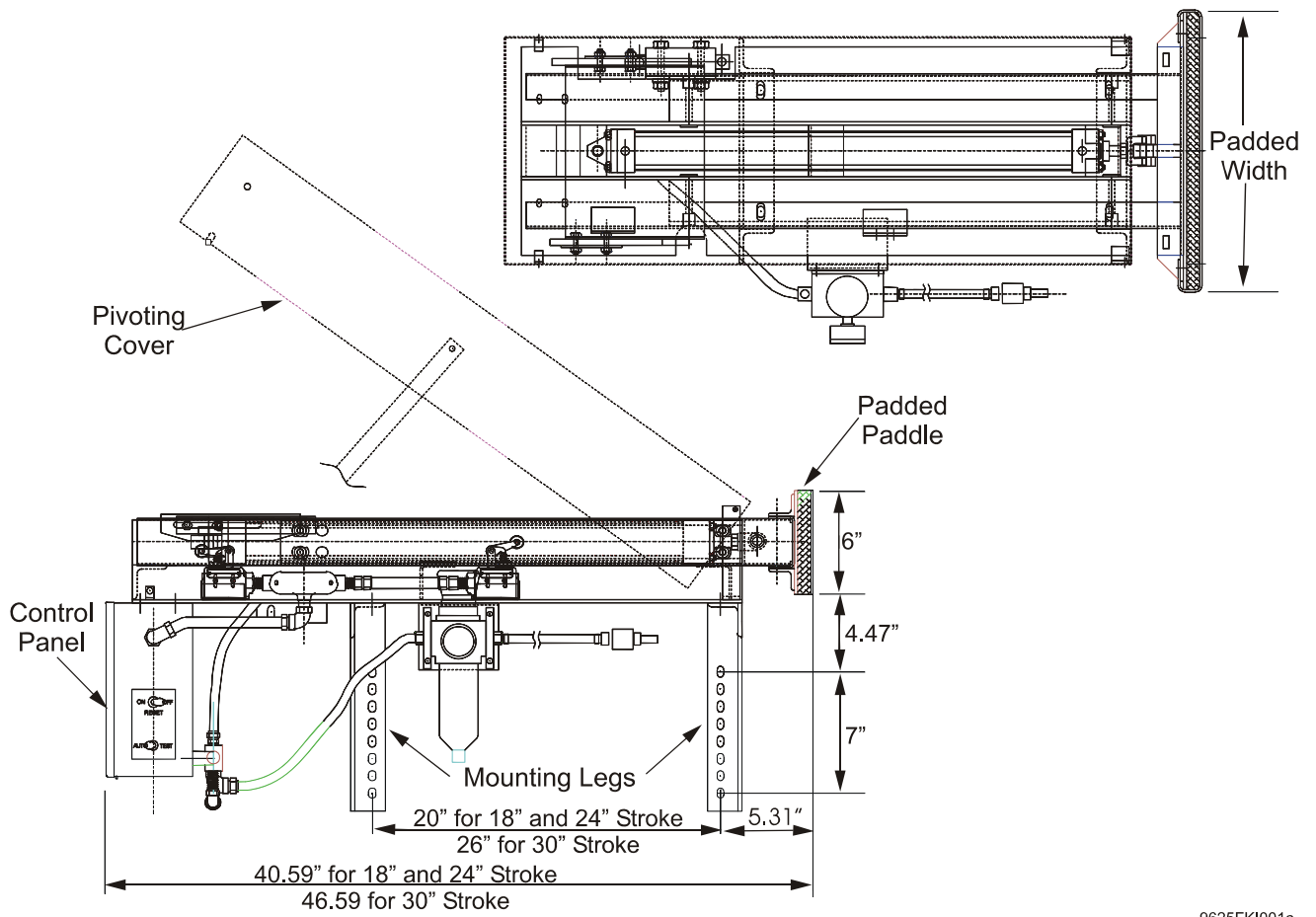
SECTION D: ENGINEERING DATA**Example - Ten Pusher System**

At 80 PSI, one Model 248 air pusher requires an air supply of .56 cubic feet of free air per cycle.* Assuming a maximum cycle rate of 60 per minute and a 25% loss factor, the total system air requirement is $.56 \times 60 \times 1.25 = 42.0$ SCFM of free air. Follow manufacturer's recommendations in sizing the compressor.

*The cubic feet of free air required per cycle of the pusher may be calculated from the following:

$$\text{Cubic Feet of Free Air} = 2\pi \times \left(\frac{\text{Bore}^2}{2}\right) \times \frac{\text{Stroke}}{1728} \times \left(\frac{14.7 + \text{PSIG}}{14.7}\right)$$

SECTION E: LAYOUT DIMENSIONS



9625FKI001a

SECTION F: ACCESSORIES

SECTION G: INSTALLATION PROCEDURES

Introduction

Accepting Shipment

Immediately upon delivery, check that all equipment received agrees with the bill of lading or carrier's freight bill.

Note: Do not sign the freight bill before checking the equipment for completeness and for damage.

Lost Shipments

Report lost shipments to the Manufacturer's Customer Service Department.

Shortages or Errors

Before signing the freight bill, note any shortages or errors clearly on the freight bill. Report any shortages or errors to the Manufacturer's Customer Service Department in writing within ten (10) days after receipt of shipment.

Damaged Shipments

If shipping damage is evident upon receipt of the shipment, proceed as follows:

- Before signing the freight bill, note the extent of the damage clearly on the freight bill. Immediately contact the transportation carrier to request an inspection.
- Do not destroy the crating or packing materials until the carrier's agent has inspected them.
- If possible, take photographs of the damage in order to document negligence on the part of the carrier.

Unless otherwise agreed by the Manufacturer, the Purchaser (User) shall be responsible for filing claims with the transportation carrier. A copy of the inspection report and a copy of the freight bill should be sent to the Manufacturer's Traffic Department.

Claims and Returns

All equipment furnished in accordance with the Manufacturer's Agreement is not returnable for any reason except where authorized in writing by the Manufacturer. Notification of return must be made to the Manufacturer's Customer Service Department, and if approved, a Return Goods Authorization will be sent to the Purchaser (User). If the product to be returned is boxed, affix the authorization (sealed in the Return Authorization Envelope) to the exterior surface on any side of the shipping carton (not top or bottom). If the product is not boxed, affix the authorization to any smooth, flat surface on the equipment.

Send authorized return shipment(s) transportation charges prepaid to the address indicated on the Return Goods Authorization. If initial shipment is refused, the Purchaser (User) shall be liable for all freight charges, extra cost of handling, and other incidental expenses.

Codes and Standards

The conveyor equipment is designed and manufactured to comply with the American National Standard Institute's Safety Standards for Conveyors and Related Equipment (ANSI/ASME B20.1) and with the National Electrical Code (ANSI/NFPA70). The Purchaser/Operator shall be familiar with, and responsible for, compliance with all codes and regulations having jurisdiction regarding the installation, use, and maintenance of this equipment. Appropriate lock-out and tag-out policies and procedures shall comply with the minimum safety requirements outlined in the American National Standard Institute's current publication (ANSI Z244.1).

Warning Signs

Warning signs and labels are to be posted on or near the conveyor equipment and shall not be removed, painted over, or altered at any time. All safety devices, warning lights, and alarms associated with the conveyor system should be regularly tested for proper operation and serviced as needed. If the original safety item(s) become defective or damaged, refer to the conveyor parts list(s) of bill(s)-of-materials for replacement part numbers.

Safety Precautions

Extreme caution should be observed by all personnel during installation and maintenance of this machine. Moving parts can cause serious personal injury.

For optimum safety, it is imperative that;

1. the pusher switch be in the "OFF" position and,
2. the air line "Quick Disconnect" be uncoupled when working on or around the machine.

Failure to follow the maintenance recommendations may cause personal injury, damage to the equipment, and/or void the warranty.

Products designed and manufactured by Intelligrated are capable of being used in a safe manner, but Intelligrated cannot be responsible for their safety under all circumstances. The purchaser must install and use the products in a safe and lawful manner in compliance with applicable health and safety regulations and laws and general standards of reasonable care. Initial compliance is the responsibility of the designer and installer of the system employing a Intelligrated product or combination of products. Continued compliance in the use and maintenance of these products is the responsibility of the user.

Guards, guarding and other safety devices that may be required are often dependent upon the application or installed location of Intelligrated products. Therefore, a safety review must be conducted to identify any potential hazards and the appropriate response prior to start-up and use of the products.

If any stated or implied safety instructions in this manual are lower or less stringent than standards set by local, state or federal laws or codes or by ANSI or accepted industry standards, those more stringent standards apply.

As the manufacturer, Intelligrated *insists* on compliance with the above and *will not knowingly furnish its products* to anyone who fails to so comply.

Safety Instructions

- Turn off power source(s) and affix appropriate lock-out and tag-out device(s) to operating controls before servicing the equipment. Only trained and qualified personnel who are aware of the safety hazards should perform equipment adjustments or required maintenance while the conveyor is in operation.
- Observe location and function of all control devices and safety stops.
- Do not overload air pusher; know design limits.
- Do not start or operate pushers without visual inspection of area.
- Use extreme caution near moving parts to avoid the hazard of hands, hair, or clothing being caught.
- Do not walk, ride, sit, or climb on or near the air pushers.
- Do not attempt to repair any equipment while the equipment is running, replace any component without appropriate replacement parts, or modify the system without prior approval by the manufacturer.
- Do not operate the equipment until all safety guards are securely in place, all tools and non-product materials are removed from or near the surfaces, and all personnel are in safe positions.
- Do not remove or modify any safety devices provided.
- Do not clear jams or reach into any unit before first turning off the equipment power or air source(s) and affixing appropriate lock-out and tag-out device(s).
- Service air pusher only with authorized maintenance personnel.
- Only authorized trained personnel should operate air pusher.
- Keep areas around air pushers free of obstructions.
- Report all unsafe practices or conditions to your supervisor.

Parts Replacement

To minimize production downtime, selected conveyor spare parts should be stocked for replacement of defective components when required. Refer to the equipment bill(s)-of-materials where quantity requirements or code numbers are not indicated on the conveyor parts list. For added convenience, a list of selected spare parts for standard products is included in this manual (see Section I).

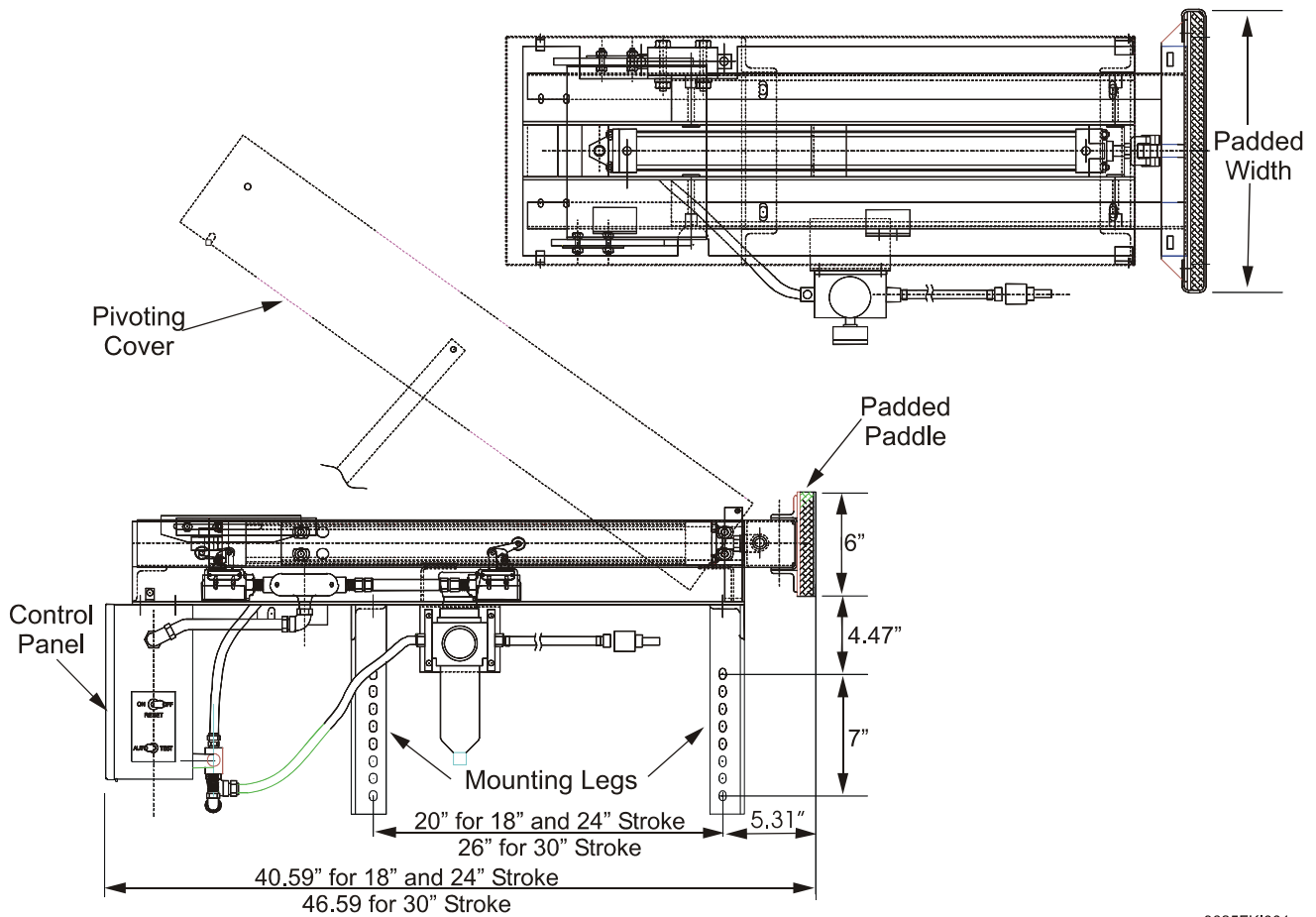
Factory Assistance

Contact Customer Service for installation, operation, or maintenance assistance, or replacement parts.

Mechanical Installation

Figure G - 1 gives the basic overall dimensions and clearance requirements for bolting the Sortrac 1-A Air Pusher to the conveyor bed. Mounting hardware including spacers, 3/8" diameter bolts and structural steel lower supports must be supplied by the customer.

The minimum clearance of the paddle over the conveyor belt is 1/2". Since some paddle droop in the fully extended position is common with this machine, it may be necessary to raise the forward legs to maintain the 1/2" belt clearance.



9625FKI001a

Figure G - 1

Electrical Installation

The pusher receives its signal to operate from a process controller, memory system or a photoelectric signal. The duration of the signal pulse is from 25 milliseconds (minimum) to 60 milliseconds (maximum). The voltage of the signal pulse is 115 VAC.

For more details of the internal wiring of the pusher, refer to Figure G - 2 and Figure G - 3.

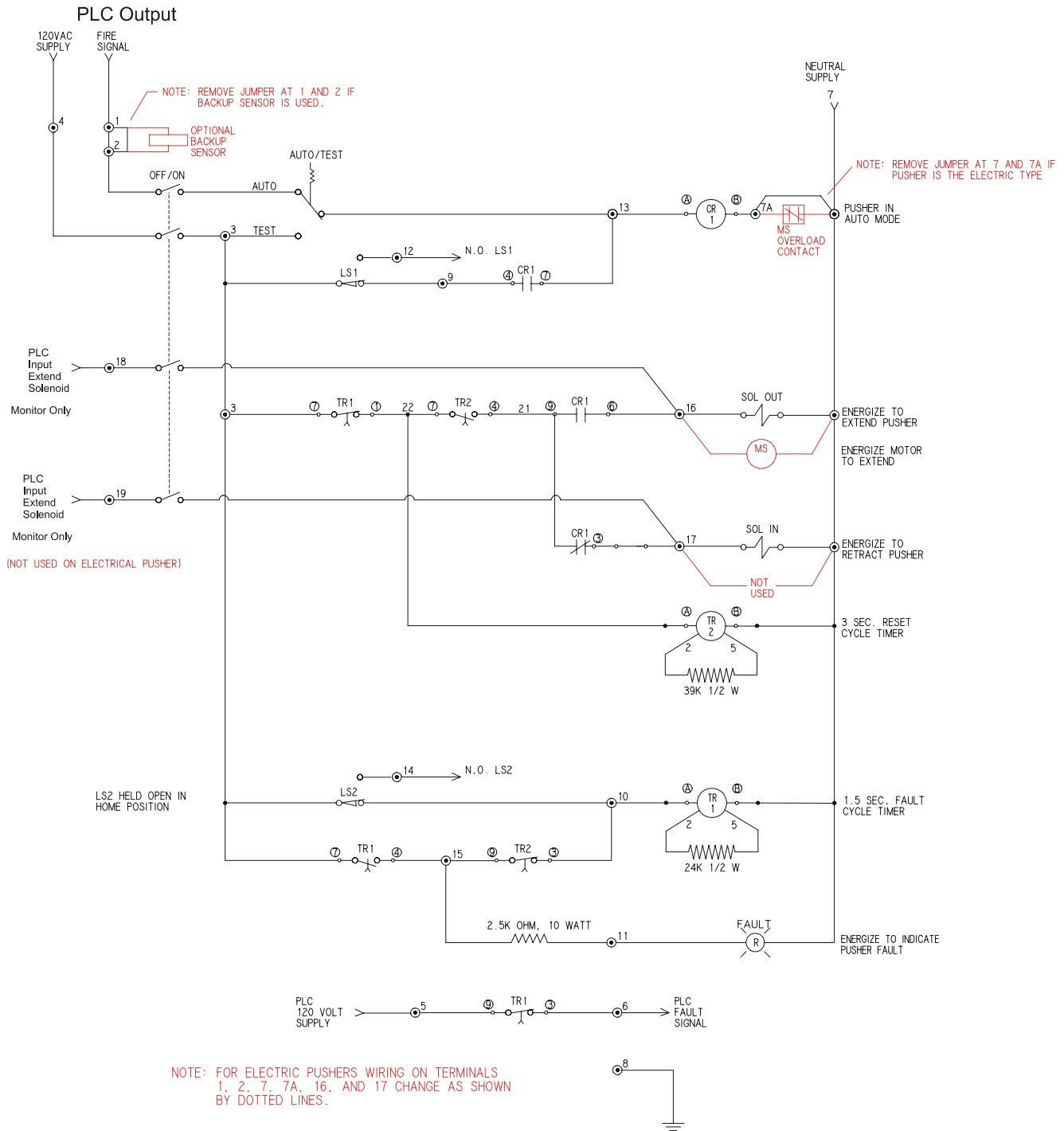
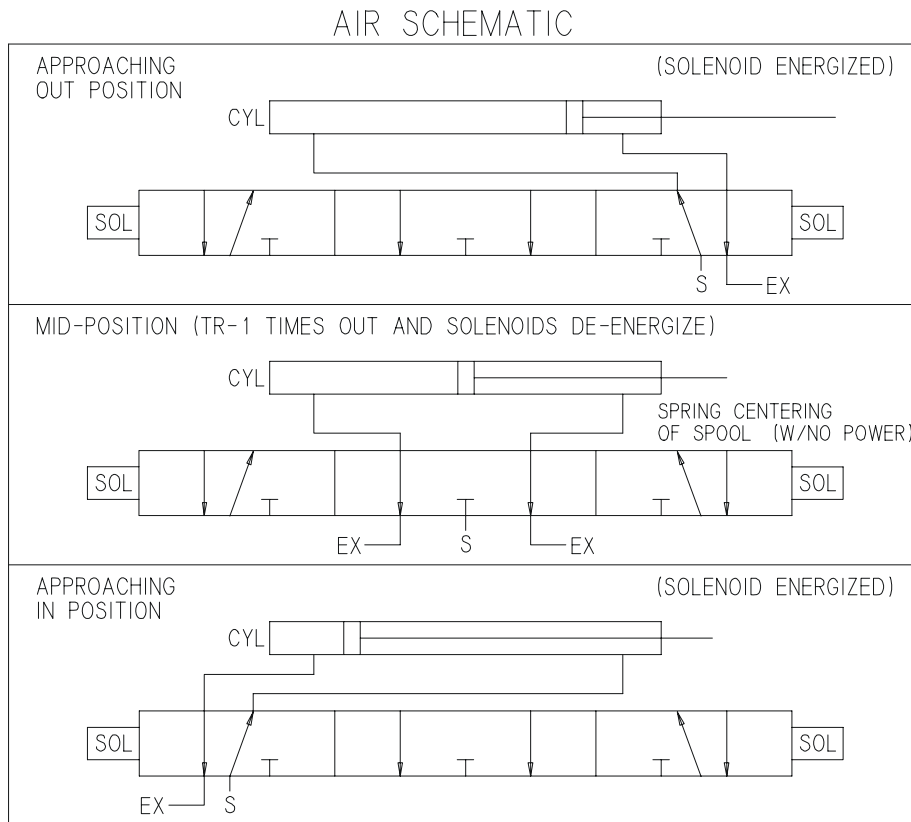


Figure G - 2 Wiring Diagram



9625FK1003a

Figure G - 3

Notes:

1. Secure 10 watt resistor in a manner to prevent vibration from breaking the lead of the resistor.
2. Termination to terminals must be as shown.
3. L.S. positions shown with pusher home.
4. All wires will be #14 awg., have THHN insulation and control red. Neutral wire to be white. Ground wire to be green.
5. Wires to be labeled at all ends, i.e. solenoids, limit and control switches, relay sockets, etc.
6. Designed for future removal of relays for remote pusher controls.

Figure G - 4 shows the arrangement of components in the control panel.

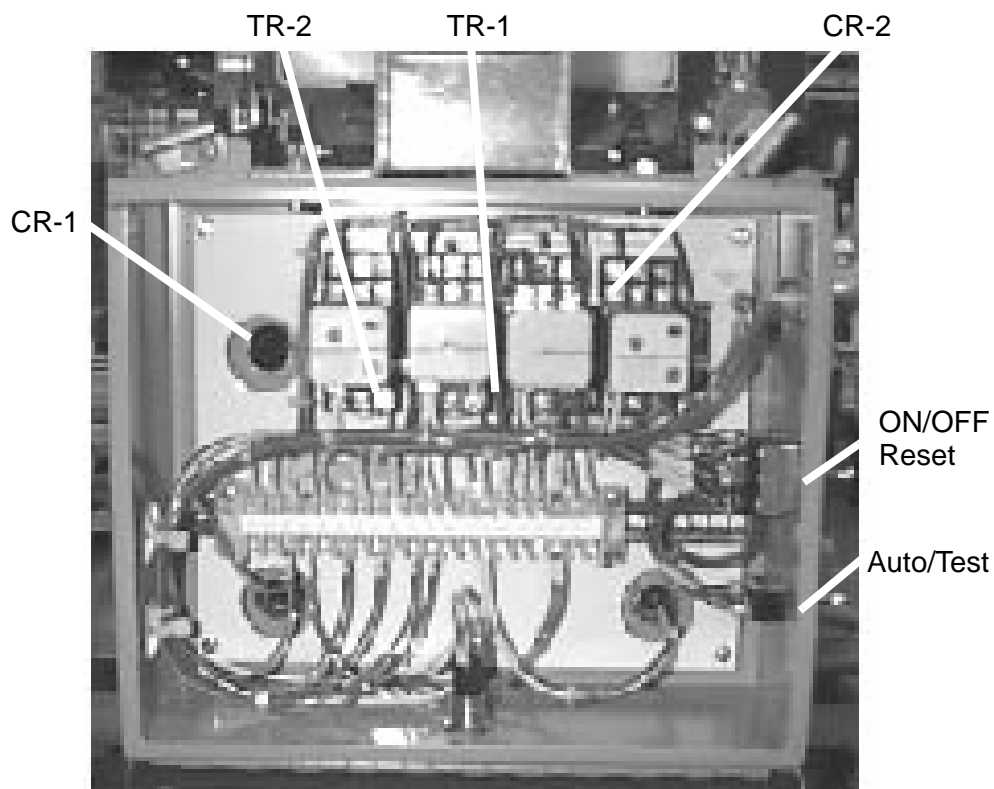


Figure G - 4 Control Panel

Adjustment Instructions

The following should be followed to return the diverter unit adjustments to factory-set positions.

Care and precautions must be taken at all times during this procedure to prevent possible injury to persons or property due to cylinder/paddle extension.

1. The air supply IS NOT to be connected to the unit until all adjustments per this instruction are complete.

For this instruction, the right side of the unit is the side the operator is facing when paddle extension is to the right.

2. The adjustment procedure begins on the right side of the diverter unit. As shown in Figure G - 5, white nylon limit switch cam plate should be positioned so that distance from the end of adjust slot to the end of metal clamp plate is approximately 3/8". With paddle completely retracted, the (retract) limit switch should be activated.



Figure G - 5

3. Figure G - 6 shows the entire right side of the unit. Note that (extend) limit switch to the right (nearest paddle) is in released position. At this time, pull out the paddle by hand to fully extended position.



Figure G - 6

- As shown in Figure G - 7, the white nylon limit switch cam plate should be activating the limit switch when paddle is in this fully extended position.

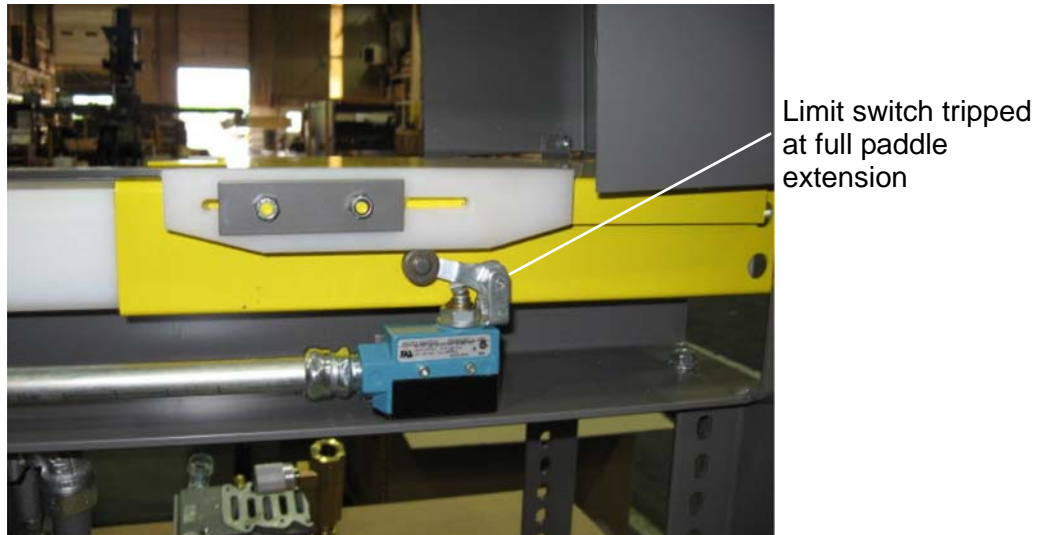


Figure G - 7

- Move the paddle back to the home (retracted) position. Standing now on the left side of the divert unit, the white nylon limit switch cam plate on that side should be adjusted so that distance from end of adjust slot to end of metal clamp plate is approximately 5/16". See Figure G - 8. Also note here that with the left side cam plate in this position, the 2-way brass valve must be in the closed (depressed) position. If necessary, loosen diagonally opposed mounting bolts holding valve to bracket, move valve upward as required in bracket slots, then retighten bolts.

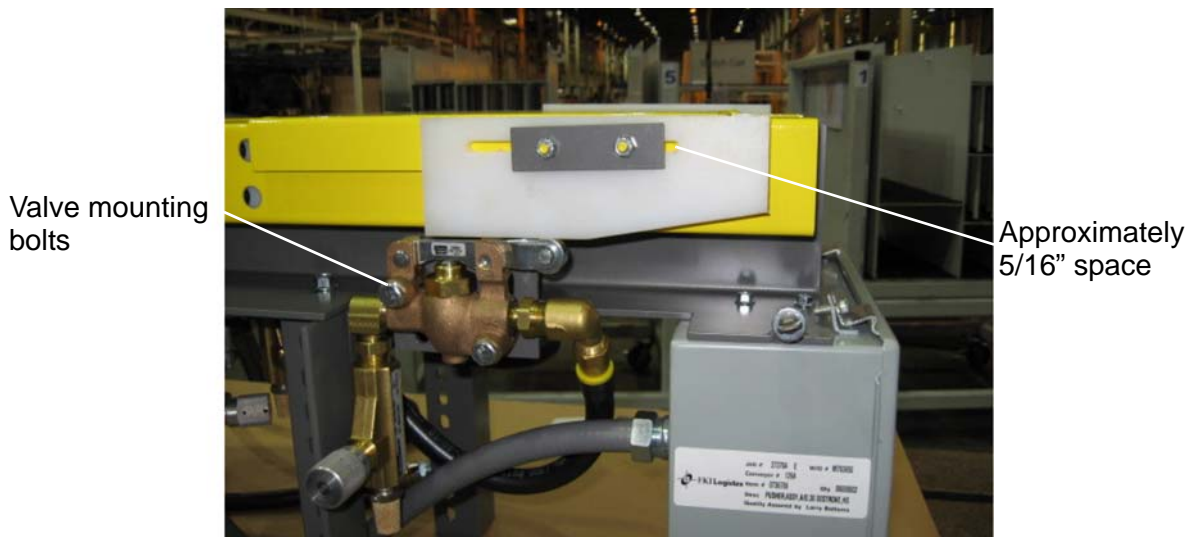


Figure G - 8

- Looking at Figure G - 9, note the location of the three pneumatic flow (speed) controls. Valve A (on right side of unit) controls extend stroke speed. Valve B (on the left side at 2-way valve) controls retract stroke speed. Valve C controls the retract stroke “cushion” speed, which is the speed of the cylinder in the last few inches of retract travel, just before paddle returns to home position. Depression of the 2-way brass valve, as noted above, switches the air flow to Valve C.



Figure G - 9

- The flow control valves have numbered calibration marks on the adjustment knob and adjacent stem of the valve body. The three valves should be adjusted to the following approximate settings, taking the readings at the marks on the top side of valve body, see Figure G - 10.

Valve A (extend speed) :45
 Valve B (retract speed): 45
 Valve C (retract cushion speed): 2



Figure G - 10

8. Check that control box toggle switches are in correct positions, see Figure G - 11



Figure G - 11

9. The air supply may now be connected to the unit. The air pressure is to be set to 80 psi at the diverter's filter-regulator unit (on right side of unit). See topic "Air System Installation" in this section.
10. The unit may now be checked for proper operation using the spring-loaded Auto/Test toggle switch on the control box. Momentarily trip switch to the test position to check operation.
11. The cylinder should not extend to its completely extended stroke, but 1/2" to 1" short of full stroke. If cylinder is "slamming" before changing to its retract stroke, Valve A needs to be adjusted to a lower number setting which will reduce extend speed, see Figure G - 10.

Air System Installation

The pusher air system terminates in a 5'-0" flexible hose with a quick disconnect plug and ballcheck. A matching socket with 1/2" NPT connector (*supplied with the pusher*) must be attached to the air manifold at each pusher location.

An air dryer is recommended in the line to reduce excess water which can cause sluggish operation or damage to the equipment.

The regulated air pressure on each pusher must be maintained at 80 PSI.

The air supply must be capable of maintaining the required flow volume for the sorting capacity of the system. A 2" diameter manifold is recommended with each pusher being tapped directly from this line with a 3/4" pipe. The air pressure in the manifold should be held at 100 to 125 PSIG. A low pressure air switch is required at the far end of the manifold to insure a minimum operating pressure of 90 PSIG in the manifold. If the pressure in the manifold drops below 90 PSIG the entire sortation system should stop until the proper pressure is restored. (*Low air pressure switch furnished by others*).

With a system over 100 feet long, the main supply line (*from the compressor*) should be connected to the manifold near the center of the system. If this is not possible then the manifold system should be increased in size or a surge tank added to the system.

SECTION H: MAINTENANCE PROCEDURES

Introduction

The recommended inspection and maintenance functions in this section apply to intermittent-duty conveyor applications. Additional inspections may be required for continuous-duty operation or extreme environmental conditions.

CAUTION: Always disconnect air hose and turn toggle switch to OFF position before performing any maintenance or removing any covers from the pusher. Manually, return the paddle to home position before reconnecting air hose and turning toggle switch to "ON" position. Stand clear of paddle and cylinder linkage during test cycling. Rapidly moving parts are hazardous.

Before restarting the equipment:

- Remove all foreign objects from the equipment.
- Be sure that all guards and safety devices are properly installed and working.
- Make sure that all persons are clear of the conveyor and are aware that the conveyor is about to be restarted.

Maintenance Safety Instructions

- Turn off power source(s) and affix appropriate lock-out and tag-out device(s) to operating controls before servicing the equipment. Only trained and qualified personnel who are aware of the safety hazards should perform equipment adjustments or required maintenance while the conveyor is in operation.
- Observe location and function of all control devices and safety stops.
- Do not overload air pusher; know design limits.
- Do not start or operate pushers without visual inspection of area.
- Use extreme caution near moving parts to avoid the hazard of hands, hair, or clothing being caught.
- Do not walk, ride, sit, or climb on or near the air pushers.
- Do not attempt to repair any equipment while the equipment is running, replace any component without appropriate replacement parts, or modify the system without prior approval by the manufacturer.
- Do not operate the equipment until all safety guards are securely in place, all tools and non-product materials are removed from or near the surfaces, and all personnel are in safe positions.
- Do not remove or modify any safety devices provided.
- Do not clear jams or reach into any unit before first turning off the equipment power or air source(s) and affixing appropriate lock-out and tag-out device(s).
- Service air pusher only with authorized maintenance personnel.
- Only authorized trained personnel should operate air pusher.
- Keep areas around air pushers free of obstructions.
- Report all unsafe practices or conditions to your supervisor.

Maintenance Logs

Maintenance logs should be kept for all of a system's conveyors. Each log sheet should show:

- The date when an Inspection or Maintenance function was performed.
- Details of the Inspection or Maintenance function.
- Names of personnel performing the inspection or Maintenance function.

Factory Assistance

Contact Customer Service for installation, operation, or maintenance assistance, or replacement parts.

Adjustments

Actuators (Limit Switches and Cam)

If the cam (5a) fails to make proper adjustment with the retract limit switch LS-1 (11) the air cylinder will bottom out with a "BANG" and the paddle will remain extended across the conveyor belt. Check the alignment of the cam with the LS-1 roller and tighten all bolted connections securely. Be sure the limit switch plunger is depressed at least 1/16" beyond the "CLICK" or actuation position. If malfunctions still occur in the outbound stroke, it may be necessary to replace the LS-1 limit switch (11) or adjust plastic cam (5a).

The LS-2 (12) limit switch is held in the down position (contacts held open) when the pusher is in the home position. It should be adjusted for actuation and overtravel in the same manner as the LS-1 limit switch.

Air Cylinder and 4-Way Valve

The compressed air flow through the pneumatic system is factory tested under "NO LOAD" and "FULL LOAD" conditions with 80 PSI air supply at the pusher air gauge. Due to mechanical changes during break-in or sorting light weight merchandise it may be necessary to readjust the air flow.

To readjust the air flow and the resultant paddle velocity, see the topic Adjustment Procedures in Section G of this manual.

Air Filter, Regulator and Lubricator

Figure I-2 (Section I - Spare Parts) shows the location of the combination F-R unit and air pressure gauge. This unit receives incoming plant air from the hose (25) supplied with the pusher. The filter (7) traps any foreign matter (both liquids and solids) from the air stream. The manually operated valve in the bottom of the filter should be opened periodically to expel collected liquids and residue. This operation should be done before the liquid level reaches the baffle plates in the filter bowl. The air regulator (7) has an air pressure gauge and a regulating knob for varying the air pressure to the pusher.

CAUTION: Stay clear of moving machine parts while performing this adjustment.

Refer to the Manufacturer's Bulletin for further details on the F-R unit.

Guide Blocks

The guide blocks (2) are factory set for proper clearances and smooth operation. Should the blocks require tightening or replacement, they can be easily serviced through the mounting bolt access holes in the side of the paddle frame assembly (1).

Scheduled Maintenance

The intervals indicated for performing maintenance in Table H.1 apply to an 8 hour/day operation. An application may subject the equipment to conditions that require more frequent maintenance. This may best be determined by performing maintenance more frequently when the conveyor is first put into operation and then lengthening the intervals as experience suggests.

Table H-1 Preventive Maintenance and Inspection Guide

| | |
|-----------------------|---|
| Daily Inspection | Observe operation under power to detect unusual sounds in air cylinder and pusher linkages. |
| | Check air pressure for 80 psi. Adjust regulator if required. |
| | Check for excess water collection in filter bowls and drain if required. |
| | Check that daily inspection and monthly maintenance tasks are being performed and logged. |
| Monthly Maintenance | Check for loose screws and bolts. Tighten as required. |
| | Check filter-regulator (F-R units). Drain water as required. |
| | Check padded paddle for tears or separations in foam pad from belting or plastic backing. Repair if needed with plastic contact cement (Permabond #268). |
| Six Month Maintenance | Clean inside of pusher and remove build-up of dirt, especially around guide blocks. |
| | Check paddle in its extended position for excessive droop which may cause interference between the conveyor belt and paddle. Adjust pusher support frame to correct this condition. |
| | Check for proper engagement of actuator cams (5A and 5B) with limit switch LS-1 and LS-2. |

CAUTION: Before performing maintenance on a conveyor, make certain that the conveyor's power disconnect is locked in the open position and tagged to prevent accidental or unexpected application of power.
 Do not perform maintenance while the conveyor (exception - belt tracking) is in operation.
 Maintenance must be performed only by qualified personnel who are trained in normal and emergency operations of the conveyor and who are knowledgeable of all safety devices, their locations and functions.

Table H-2 Lubrication Schedule

| Parts to be Lubricated | Method of Application | Frequency of Application | Recommendation or Equal |
|-------------------------|-----------------------|--------------------------|---------------------------|
| Air Cylinder Clevis End | Oil Can | Annually | SAE #20 Non-Detergent Oil |

Troubleshooting

Basic troubleshooting provisions are outlined in Table H-3. For troubleshooting the specific conveyor system installed, always check the maintenance information.

CAUTION: Do not clear jams or reach into any unit before first turning off the equipment power source(s) and making certain that all moving parts are fully stopped. To avoid personal injury or equipment damage, lock-out and tag-out the conveyor operation control(s) before attempting to correct any malfunction.

Table H-3 Basic Troubleshooting Problems and Solutions

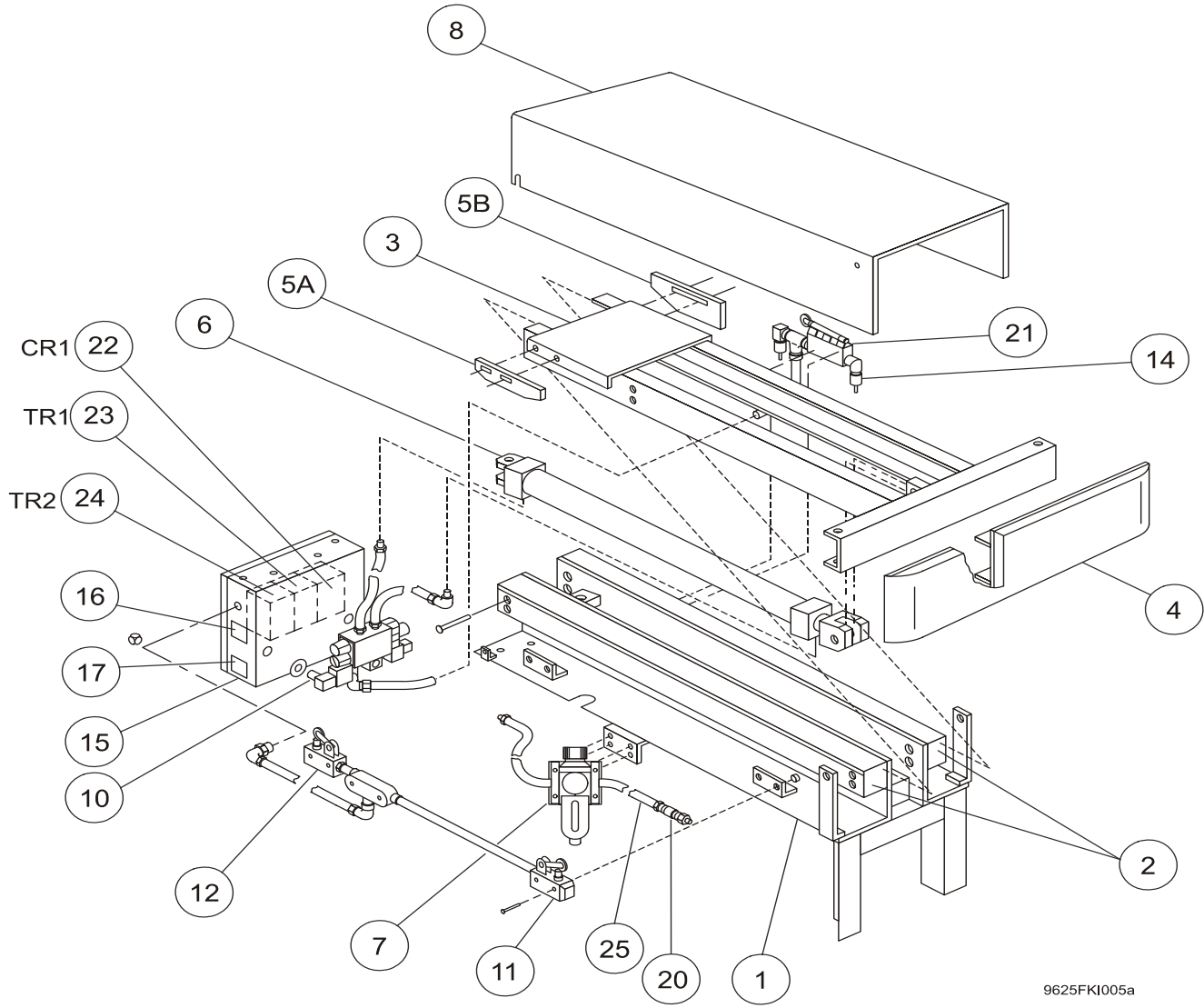
| Problem | Possible Cause | Possible Solution |
|--|--|--|
| Pusher fails to fire automatically | Pusher paddle is not in home position | Move pusher paddle to home position. |
| | Air supply | Check air supply, check accuracy of gauge; readjust air supply to 80 psi. |
| | Memory, controller or photoeye | Check and fix output of memory controller or photoeye. |
| | Control relay, limit switch, solenoid on air valve | Check toggle switch, control relay, limit switch or solenoid on air valve. |
| | Loose, disconnected or broken wires | Repair faulty wires. |
| Pusher fails to fire automatically on occasions | Limit switch cams improperly adjusted | Re-adjust. |
| | Control or time delay relays are loose in socket | Correct by replugging in relay and secure with clamp spring wire. |
| | Loose or partially broken wires | Correct faulty wires. |
| Pusher fires erratically | Limit switches that may be damaged internally or are improperly adjusted | Replace limit switches. |
| | Bad static switch if firing continues after system warm up | Change memory static switch. |
| Pusher fires manually not automatically | Check for 115 VAC input from controller or memory static switch | Correct input problem or change static switch. |
| Conveyor shuts down and pusher is in home position ready to fire | Bad time delay relay | Replace time delay relay. |
| | Loose or open wire | Repair faulty wires. |
| | LS-2 limit switch | Adjust or replace LS-2. |
| | Low air pressure shutdown switch | Pressure switch set too high; reset to 95 psi, or replace same. |

| Problem | Possible Cause | Possible Solution |
|---|--|--|
| Conveyor operational, but pushers won't fire | Memory, controller or photoeye output Bad static switch (Memory) Burned out solenoid, control relay or bad limit switch Loose wires | Check and fix output of controller or photoeye. Replace static switch (Memory) Replace 4-way valve, control relay or limit switch. Repair faulty wires. |
| Conveyor starts up, but shuts down shortly thereafter | Heaters in conveyor starter circuit Time delay relay Loose wire LS-2 limit switch | Re-check heater size or replace. Replace time delay relay. Repair faulty wires. Replace LS-2 limit switch. |
| Pushers fire late | Sluggish pusher motion (mechanical) Sluggish pusher motion (pneumatic) Memory system setting causes late firing by pushers as parcels leave keying station | Turn off pusher power, disconnect air hose and manually cycle pusher. Determine source of binding and repair. Reset air pressure to 80 psi. Speed control valves may require readjustment for a no-load cycle time of 1.2 seconds. Reset distance in software. |
| Pushers fire early | Memory system setting causes early firing by pushers as parcels leave keying station | Reset distances in software. |

SECTION I: SPARE PARTS**General Information**

The purpose of this section is to identify the critical replacement parts required for a solid preventive maintenance program and to minimize the chances for extended down time.

The following pages illustrate the location of these recommended spare parts as they apply to each particular unit.



9625FKI005a

Figure I - 1 Sortrac 1A Air Pusher (Standard Unit Shown)

Table I-1 Sortrac 1A Pusher

| Key No. | Part Description | Part Number |
|---------|---|-------------|
| 1 | Base Frame Assembly (18" and 24" Stroke) | 710554 |
| | Base Frame Assembly (30" Stroke) | 710307 |
| 2 | Bearing Block | 710052 |
| 3 | Paddle Frame Assembly (18" and 24" Stroke) | 710555 |
| | Paddle Frame Assembly (30" Stroke) | 736756 |
| 4 | Paddle Assembly - 6 x 24 (18" and 24" Stroke) | 783557 |
| | Paddle Assembly - 6 x 30 (30" Stroke) | 710327 |
| 5A | Hyfax - Cam L.S. | 710328 |
| 5B | Hyfax - Cam Valve | 710329 |
| 6 | Air Cylinder Mosier - (18" and 24" Stroke) High Speed Units | 799059 |
| | Air Cylinder Mosier (30" Stroke) High Speed Units | 794685 |
| 7 | Gauge - 160 PSI | 136393 |
| | Filter/Regulator - Mod. 4599-5206, SB | 372038 |
| 8 | Cover (18" and 24" Stroke) | 710557 |
| | Cover (30" Stroke) | 710311 |
| 10 | 4-Way Valve Schrader Bellows - High Speed Unit | 794685 |
| 11, 12 | Limit Switch - SPDT - LS1-LS2 | 794682 |
| 14 | Flow Valve | 133542 |
| | Muffler | 0132212 |
| 15 | Light Lens - Sylvania 35F 2841 | 710331 |
| | Light Bulb - Sylvania 27F257 | 710332 |
| | Light Housing - Sylvania #441326 | 710330 |
| 16 | 2 Position Toggle Switch | 270646 |
| 17 | 3 Position Toggle Switch | 270645 |
| 20 | Mall Conn. - Hansen #3-R25 | 794654 |
| 25 | Hose Conn. - Hansen #3-L276 | 794655 |
| 21 | Poppet Valve - S-B 3295-9001 | 794681 |
| 22 | DPDT Relay - 700-HB32A1 | 273483 |
| 23, 24 | Time Relay - CLF41-70010 | 273339 |

