"We Convey Solutions"

ENGINEERED SYSTEM COMPONENTS MANUALS

Job #PACQ35678

Precision AirConvey Corporation
465 Corporate Boulevard
Pencader Corporate Center
Newark, DE 19702
Phone: 302.999.8000
Fax: 302.999.8510

210 Executive Drive #6
Pencader Corporate Center
Newark, DE 19702
main: 302-999-8000
fax: 302-999-8510
www.precisionairconvey.com

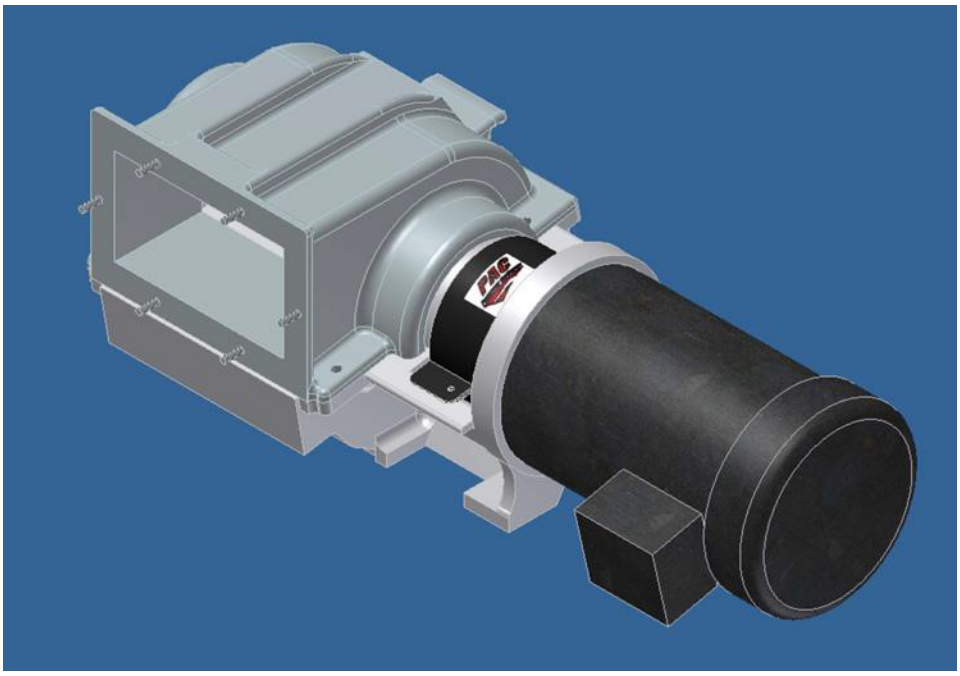
Trim Removal System Suggested Maintenance

The following document outlines periodic preventative maintenance and inspection schedules for the Precision AirConvey cutter fan trim system. Inspection and Maintenance intervals are manufacturer's minimums based on prior experience and average usage. Increased demand or elevated operating temperatures may require more frequent preventive maintenance to maintain system reliability.

	Daily	Monthly	Quarterly	Annually	As Required
Main and Balance Fans					
Lubricate Fan Bearings		X			
Lubricate Motor Bearings		X			
Check Drive Belt Tension and Wear			X		
Check and Record All Fan Motor Amp Readings			X		
Inspect Fan Blades for Wear and Material Accumulation				X	
Clean Impeller Wheel				X	
Verify Vibration within Acceptable Limits				X	
Reverse Jet Filter					
Empty Dust Barrel	X				
Verify Slide Gate Open	X				
Check Pressure Drop Across Filters	X				
Verify Adequate Manifold Air Pressure	X				
Verify Audible Indication of Filter Cleaning Pulse	X				
Drain Pneumatic Line Drip Leg		X			
Inspect Air Lines for Leakage			X		
Inspect Interior of Hopper for Bridge			X		
Verify Solenoid Valves work properly			X		
Replace Filters					X

Back Flow Dampers					
Lubricate Pivot Point			X		
Verify Diverter is Functioning Properly			X		
Inspect Air Lines and Solenoids for Leakage			X		
Check Proximity Switches for Proper Operation			X		
Visually Inspect Condition of Diverter Valve Assembly Including Damper Flap and Control Linkage			X		
Slant Screen Separator					
Inspect Screen for Damage		X			
Remove and Clean Screen		X			
Inspect Screen for Cleanliness		X			
Electrical Control Panel					
Check Amp Draw on All Motors			X		
Check All Wire Terminations for Tightness and Arcing			X		
Cutters					
Check and Record Amp Draw			X		
Install Spare Cutters, Send Cutters Out for Sharpening			X		
Backflow Damper					
Lubricate Pivot Points			X		
Verify Free Operation of Damper			X		
Diverter Valve					
Lubricate Pivot Points			X		
Inspect Pneumatic lines for Leaks			X		
Verify Proper Operation of Proximity Switches			X		
Verify Proper Operation of Diverter Valve			X		

"We Convey Solutions"



78 and 811 Series Cutters and Granulators

Installation, Operation, Troubleshooting and Maintenance Manual

PAC 78 and 811 Series Cutter/Granulator Manual (April 2019)

Made in the USA

For service inquiries or additional information on this or any other Precision AirConvey solution, please visit **www.airconvey.com**, or contact one of the following:

Telephone: (302)999-8000
Fax: (302)369-5680
Email: get-facts@airconvey.com

Precision AirConvey
Pencader Corporate Center
465 Corporate Boulevard
Newark, DE 19702

Table of Contents

Introduction

PAC cutters and granulators are equipped with angled rotor knives to provide shock-free, efficient cutting and low noise levels. A shaftless cutting chamber and external rotor end disc prevent material from wrapping around the rotor. The open box rotor allows for free passage of air and minimal pressure drop. The granulator features a screen, available in different diameter hole sizes, which exposes the material to additional cuts until the size of the material can fit through the screen holes. The 78 and 811 Cutters and Granulators are available in a two (2) or six (6) blade models.

Features:

- Extremely precise cutting clearances between rotor knives and bed knife.
- Class ABEC-7 super precision ball bearings are preloaded and assembled with disc springs so no adjustment or lubrication of bearings is required. Bearings are outboard mounted to prevent contamination.
- Flange mounted motor provides compact arrangement and ensures precise shaft alignment.
- Cast-iron housing, shear angle rotor, ribbed top cover and radiused corners keep noise radiation to an absolute minimum. Sound enclosures are only required in extreme conditions.
- Custom isolators prevent cutter vibration.
- All models are available with a rear discharge or optional bottom discharge.

Throughout this manual, the 78 and 811 Cutter or Granulator is also referred to as the Cutter, Granulator or the unit.

To ensure optimum performance and safe operation of the unit, everyone who installs, uses or maintains it must read and carefully follow the instructions in this manual.

Specifications

Model	78	811
Serial Number		
Component Materials		
Housing	Cast Iron	Cast Iron
Rotor	Ductile Iron (Dynamically Balanced)	Ductile Iron (Dynamically Balanced)
Top Cover (Hood)	Cast Aluminum	Cast Aluminum
Knife Material*	☐ AISI D-2 Steel ☐ CPM10V (AISI A-11 Steel) ☐ Tungsten Carbide Inlaid	☐ AISI D-2 Steel ☐ CPM10V Insert (AISI 1020 Steel) ☐ Tungsten Carbide Inlaid
Motor Horsepower		
Motor RPM		
Dimensions Without Motor (cm)	41.43 L x 27.94 W x 29.69 H	54.29 L x 37.78 W x 45.40 H
Mounting Footprint	See Schematic on Page	
**Granulator Screen Hole Sizes (cm)	0.32, 0.48, 0.64, 0.95, 1.27, 1.91, 2.54, 3.81, 5.08	
Cutting Clearance	See Table Below	
Schematics	See Figure 18 and Figure 19 on Page 32	

FIGURE 1

* Knives available with special coatings for extreme applications
**Special hole sizes available on request

Precision Cutting Clearances			
Class of Cutter or Granulator	**Cut**	**Score**	**Cutting Clearance**
FSP, spin grind in cutter (Model 78 only)	½ mil film	¼ mil	< .00025”
FP, spin grind in cutter	1 mil film	½ mil	< .0005”

FIGURE 2

General Safety

Always follow the general safety and accident prevention rules in addition to those set forth in this manual.

WARNING:
POWER MUST BE DISCONNECTED FROM CUTTER BEFORE SERVICING ANY COMPONENT.
AFFIX CUTTER TO WORKBENCH OR OTHER STABLE WORK AREA DURING MAINTENANCE.
WEAR NO-CUT GLOVES WHEN WORKING WITH CUTTER OR HANDLING KNIVES

No work should ever be done without following lockout/tagout procedures.
Related information can be found at the U.S. Department of labor web site **www.osha.gov**
On 29 CFR 1910.147 and the EU-OSHA website **osha.europa.eu**.
Removal or installation of cutters and granulators should only be performed by qualified service technicians. Any electrical work must be performed by a qualified electrician.
A safety switch kit can be purchased for the 78 and 811 units. This is an additional safety precaution and, as stated above, lockout/tagout procedures must be used prior to any work being started.
A safety switch kit consists of two (2) brackets each attached to the inlet and outlet sides of the cutter after the transitions are installed, a safety switch attached to one bracket and an actuator pin to the other. This will shut down power if someone attempts to remove the inlet or outlet transition or hood from the unit.
Attempting to remove or removing any component without following lockout/tagout procedures can cause serious or fatal injuries. Follow all company safety rules and regulations that apply to mechanical or electrical service and operation.
The 78 and 811 Cutters and Granulators are designed and built with safety as a prime consideration. Each unit is checked at the factory for safety and operation.
Follow the maintenance schedules outlined in this manual for good performance and safe operation. Maintenance should only be done by qualified personnel and only with proper tools.
Carefully read the following safety rules before proceeding with installation, operation or maintenance. The rules are essential to ensure safe operation of the unit. Failure to follow these rules may void the warranty and/or result in damage to the unit or personal injury.

Safety Instructions

Safety instructions in this manual are boldfaced for emphasis. The signal words **DANGER**, **WARNING** and **CAUTION** are used to indicate hazard seriousness levels as follows:
DANGER – Immediate hazard which WILL result in severe injury or death.
WARNING – Hazard or unsafe practice which COULD result in severe injury or death.
CAUTION – Hazard or unsafe practice which COULD result in minor injury or in product or property damage.

78 & 811 Cutter Safety

Precision AirConvey cutters are to be utilized in an environment that assures the utmost safety for all personnel. Please adopt your safety program into the use of all Precision AirConvey apparatus paying particular attention to the cutters. **Strict adherence to lock/tag out is critical for safe operation.**

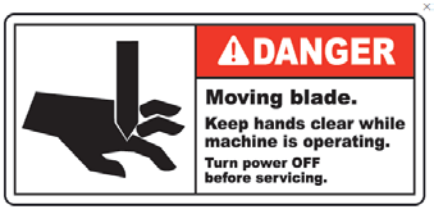
Safety Labels

Safety labels on the unit provide important safety information. If any label is missing or damaged, contact the manufacturer, request a new label and apply it to the unit.

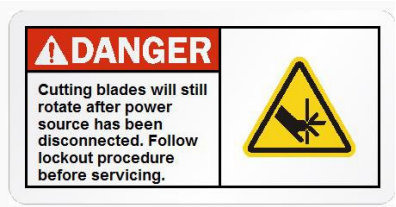
There are 4 labels on all cutters:

Universally recognizable symbol for lock/tag requirement. This is located in two (2) places on all PAC cutters.

Universally recognized symbol noting steps required to assure safe operation & maintenance. There is one (1) located on all PAC cutters.



Universally recognized symbol noting rotating blades. There is one (1) located on all PAC cutters.



Universally recognized symbol noting rotating blades. There is one (1) located on all PAC cutters.

Precision AirConvey cutters are to be used in an enclosed system, there should be no direct access to a cutter.

Receiving and Inspection

Upon receipt, inspect the unit closely for damage. Record any indication of damage on the delivery receipt, especially if the unit will not be immediately installed. Obtain the delivery person's signed agreement to recorded damages to facilitate future insurance claims.

Since the unit is shipped F.O.B. Factory, the manufacturer's responsibility for the shipment ceases when the carrier signs the bill of lading.

If the unit is received short or in damaged condition, notify the carrier and insist on a notation of the loss or damage across the face of the freight bill. Otherwise, no claim can be enforced against the carrier.

If concealed loss or damage is discovered, you must notify your carrier at once and request an inspection. If you do not request an inspection, the carrier will not consider any claim for loss or damage. The carrier will conduct an inspection and may grant a concealed damage notation. If you give the carrier a clear receipt for goods that have been damaged or lost in transit, you do so at your own risk and expense.

Installation

Unpacking the Unit

NOTE: Save all packaging materials for use when shipping the unit back to Precision AirConvey for service.

Open the carton from the top and lift (2 people required) the unit out of the carton. Lifting straps may be used.

1. Place the unit with the board still attached on a work bench.
2. Place a 1.905cm board on the work bench near the edge of the table to rest the back of the cutter on when removing the bottom board.

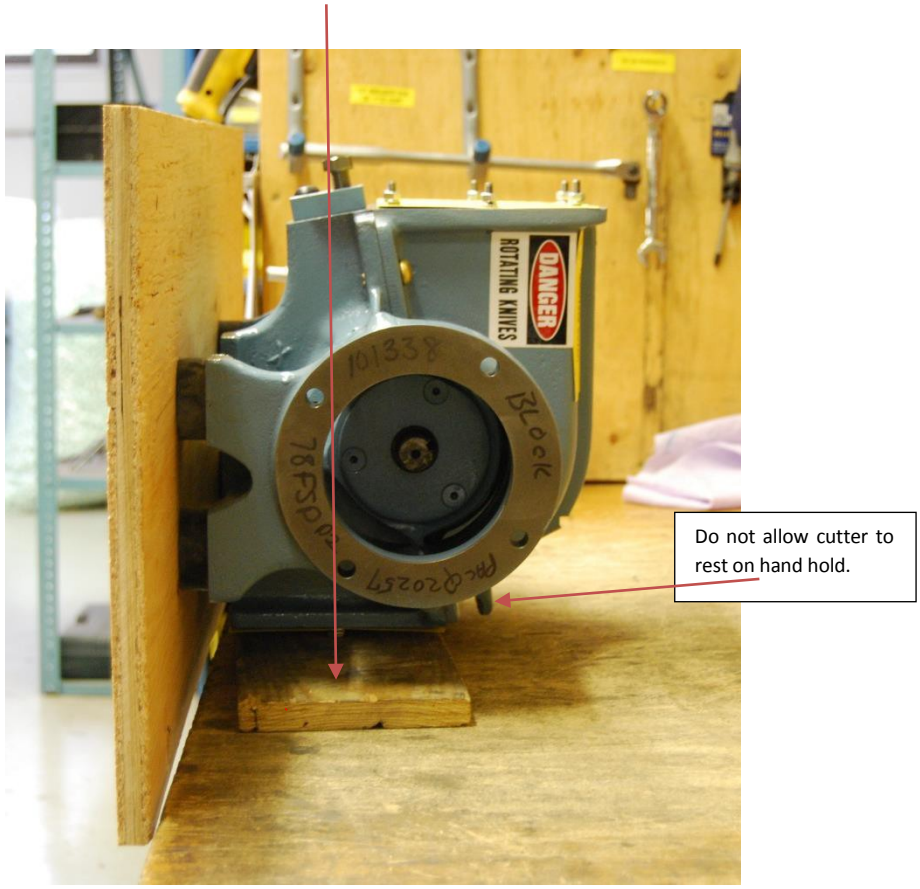


FIGURE 3

IMPORTANT: This step insures that no pressure is placed on the pins on the back of the cutter which can cause cutting clearance and performance issues.

3. Remove the bolts from the bottom board with a box wrench and remove the board. Save the 3/8-16 x 1" bolts and bottom board with the other shipping container materials for use when returning the unit to PAC for service.
4. Roll the cutter forward off the board and stand upright on the work bench.
5. Remove the front and back safety covers from the cutting chamber.

Remove the top guard (seen with arrow noting in Figure 4); leave the bottom guard in place.

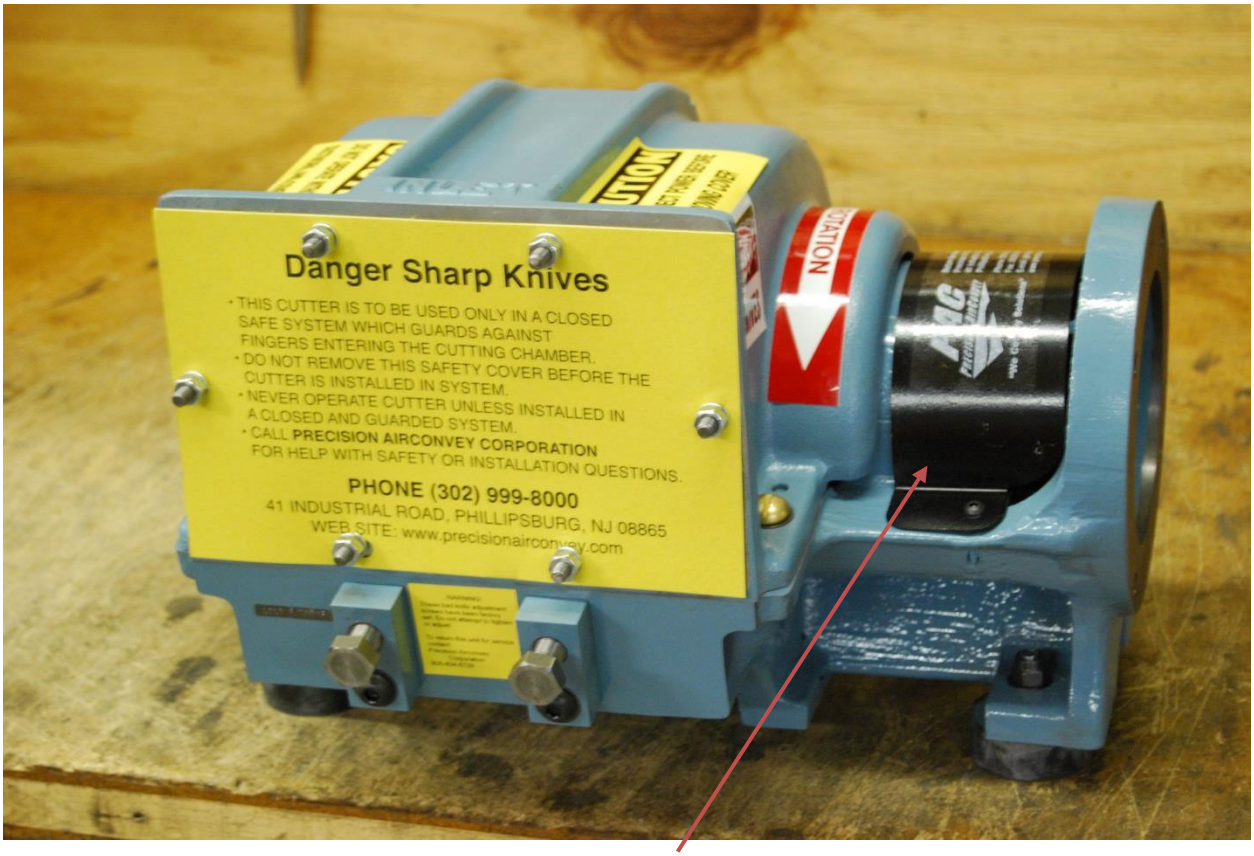

Danger Sharp Knives
• THIS CUTTER IS TO BE USED ONLY IN A CLOSED SAFE SYSTEM WHICH GUARDS AGAINST FINGERS ENTERING THE CUTTING CHAMBER.
• DO NOT REMOVE THIS SAFETY COVER BEFORE THE CUTTER IS INSTALLED IN SYSTEM.
• NEVER OPERATE CUTTER UNLESS INSTALLED IN A CLOSED AND GUARDED SYSTEM.
• CALL PRECISION AIRCONVEY CORPORATION FOR HELP WITH SAFETY OR INSTALLATION QUESTIONS.
PHONE (302) 999-8000
41 INDUSTRIAL ROAD, PHILLIPSBURG, NJ 08865
WEB SITE: www.precisionairconvey.com

FIGURE 4

Checking the Unit Prior to Installation

1. Each unit has been inspected at the factory for the required cutting tolerance. Inspection document and test materials are supplied in an envelope attached to the shipping board.
2. Inspect the unit to make sure no damage has occurred during shipping.
3. If the unit is supplied with a motor, remove the top coupling guard.

WARNING - Do not put your hands inside the cutting chamber. The knives are extremely sharp and can cause severe injury even when idle. Always wear no-cut gloves when checking the unit.

4. Slowly turn the coupling counter clockwise to listen and feel for any knife contact or rubbing between the rotor and hood or housing. If there is any knife contact or rubbing, call Precision AirConvey before proceeding.

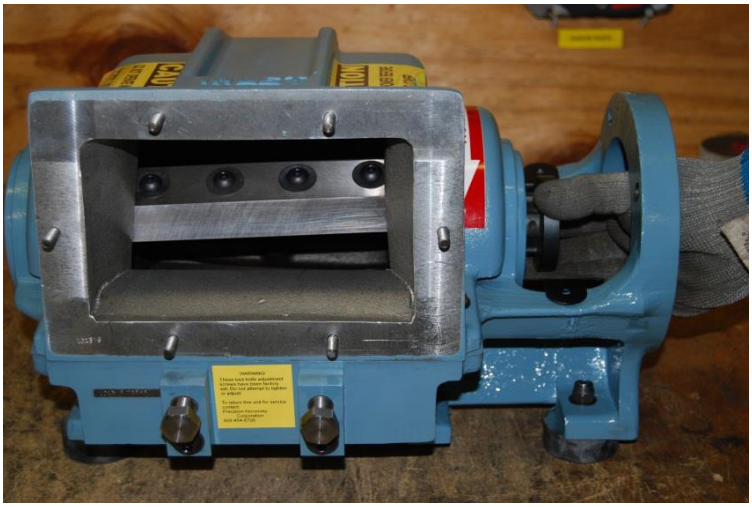


FIGURE 5

5. There are two different size films supplied with each unit. (See Figure 1&2 of the manual for models and film sizes.)
    a. The thinner of the two films is used to check the score. The score is the gap between the bed knife (stationary) and the rotor knives.
        i. Lay the film in the cutting chamber so it hangs across the bed knife.

FIGURE 6

        ii. Slowly turn the rotor by hand in the direction of the rotation arrow on the hood of the cutter. The film should score (crease the film without cutting all of the way through).
    b. The heavier of the two films is used to check the cut. Follow the
        i. Lay the film in the cutting chamber so it hangs across the bed knife.
        ii. Slowly turn the rotor by hand in the direction of the rotation arrow on the hood of the cutter until the film material is cut all the way through.
6. Use compressed air to blow the cut trim out of the cutter.

If the unit passes both tests, proceed to Coupling and Motor Installation. If the unit does not pass this test call customer service at (302)999-8000.

IMPORTANT: DO NOT TIGHTEN OR ADJUST THE BED KNIFE ADJUSTMENT SCREWS. THE BED KNIFE IS PRESET AT THE FACTORY TO GUARANTEE PROPER PERFORMANCE. ADJUSTING THE BED KNIFE WILL VOID THE WARRANTY.

Coupling and Motor Installation

1. Attach the coupling to the rotor.
    a. Grease the rotor shaft with Bel-Ray Termalene WG-150 or equivalent and insert shaft key.
    b. Slide coupling onto rotor shaft and leave set screws loose.
    c. Insert coupling sleeve into Coupling.
2. Attach the coupling to the motor.
    a. Grease the rotor shaft and slide coupling onto shaft.
    b. Using a combination square, measure from the mounting face of the motor to the front of the coupling. See Coupling Measurement Chart on next page for proper distance.
    c. Tighten the set screws on motor coupling. Recheck the measurement after tightening both screw sets.
    d. If the motor requires an adapter plate, position the motor adapter plate on motor and attach using four (4) ½" -13 x 1-1/2" long hex head screws.
3. Attach the motor to the cutter.
    a. Set the motor c-face into the cutter flange aligning the four (4) mounting holes so the conduit box on the motor faces the rear discharge of the cutting unit.
    b. Bolt the motor to the cutter flange using four (4) 3/8"-16 x 1-1/4" long socket head cap screws and four (4) 1.10" OD x .0402" ID x .049" thick Belleville washers. **Make sure the bolts do not bottom out in the motor housing.** The bolt size depends on the thickness of the cutter flange. The flange is a cast part and thickness will vary.
    c. Making sure not to compress the sleeve, slide the loose coupling flange on the rotor shaft until the sleeve is completely seated in the teeth of each flange.
    d. Tighten the set screws on the rotor coupling.
    e. Using a shim stock to make sure there is a minimum of 0.762mm gap between the bearing cover and rotor coupling flange. If the gap is not correct or the coupling is compressed, remove the motor and adjust accordingly.
    f. Slowly turn the rotor in the opposite direction of the rotation arrow using the coupling flange as a handhold to insure there is no binding or rotor knife to bed knife contact. If contact occurs, stop the installation and contact the factory for assistance. Otherwise, proceed to the next step.
    g. Install the upper and lower coupling guards with the two (2) 10-32 x ½" button head screws.

h. Follow your company's lockout/tagout procedure for startup.

Model	Frame Size	Coupling Set	Measurement
78	56	4J	1 -11/16”
78	56	5J	1- 7/16”
78	145	4J	1 -11/16”
78	145	5J	1- 7/16”
78	184	4J	1 -11/16”
78	184	5J	1- 7/16”
78	184	6J	2 -1/16”
78	184	5J	2-7/16”
78	213	5J	2-7/16”
78	215	6J	2-1/16”
811	56	5J	1-7/8”
811	145	5J	1-7/8”
811	184	5J	1-7/8”
811	184	6J	1-7/16”
811	213	5J	2-7/8”
811	213	6J	2-7/16”
811	213	6S	2-5/16”
811	184	6S	2-5/16”
811	215	6S	2-5/16”

FIGURE 7

Replacing an Existing Unit

CAUTION - Do not lay the cutter on the outlet side. This will put pressure on the handle on the hood and may bend the alignment pins which will damage the unit. Ensure all tubing, ducting, silencers, etc. are supported independently of the cutter assembly before proceeding.
WARNING - Do not put your hands inside the cutting chamber. The knives are extremely sharp.

1. Support the cutter with lifting straps, and remove the 3/8" hex bolts that attach the cutter to the shipping board.
2. Making sure lockout, tag-out procedures are being followed, set the unit in its original configuration.
3. Attach the four (4) 3/8" hex head bolts that attach the cutter's vibration isolators to the mounting plate, and tighten securely.
4. Install the inlet and outlet transitions with the ¼"-20 bolts and lock washers on the outlet side, and ¼"-20 nuts and lock washers on the inlet side of the cutter. Tighten securely so there are no air leaks. Reinstall all ductwork as necessary.
5. The cutter side drive coupling was set at the factory so there is 0.030-inch minimum clearance between the coupling and bearing cover.
6. Make sure the c-flange on the housing, and the motor are clean and free of any burrs.
7. Slide the sleeve on to the cutter side coupling, lift the motor and align the teeth on the sleeve with the teeth on the motor side coupling.
8. Turn the motor to align the holes on the housing with the holes on the motor. Hand tighten (1) 3/8"-16 socket head cap screw with a Bellville washer. See Coupling Measurement Chart in Figure 7 if adjustment is needed.
9. Install the remaining motor flange bolts and tighten. Hand turn the rotor clockwise to recheck for rubbing or knife contact.
10. Install the coupling guards.
11. The unit is now ready. Follow your company's lockout, tag-out procedures for startup.

PLEASE NOTE BELOW:

- The 3/8" cap screw length is determined by the thickness of the motor flange. The flange is a cast part and the thickness will vary.
- Make sure the bolts do not bottom out in the motor, because the threads will strip easily. The bolt length variation is normally 1¼" to 1½".
- Make sure the set screws on the couplings are tight using a t-handle Allen wrench.

Optional Equipment

A safety switch kit (Part No. SFTYSWITCH78KIT for Model 78; Part No. SFTYSWITCH811KIT for Model 811) can also be purchased from PAC. This is an additional safety precaution and, as stated above, lockout tag-out procedures must be used prior to any work being started.

A safety switch kit consists of two (2) brackets, each attached to the inlet and outlet sides of the cutter after the transitions are installed; a safety switch attached to one bracket; and an actuator pin attached to the other bracket. This will shut down power if someone attempts to remove the inlet or outlet transition, or the hood off of the unit.

Optional brake motor requirement – PAC supplies a standard motor brake kit. Please contact the factory for a quote.

New Cutter Installation

Follow all local and company codes and standards when installing equipment. Cutters and granulators must be attached with vibration isolators to a mounting plate and can be mounted either horizontally (inlet and outlet are horizontal) or vertically (with the inlet facing down or up), on the floor or hanging from the ceiling. When mounting the units vertically, the isolators and cutters must be through-bolted when installed and tubing must be independent from the cutter. Contact the factory for vertical mount isolators.

Vertical Mounted Cutters

Isolators

The PAC supplied isolators are designed for use when the cutter is sitting horizontally. The isolator as supplied is threaded on the bottom so the bolted isolators can hold the cutter to the mounting plate or cutter stand as well as hold the cutter in position.

Vertically-mounted PAC cutters **DO NOT USE THE ISOLATOR**, as it is supplied. The threaded stud must be cut off and the hole in the isolator drilled out with a 9.525mm drill bit. The bolts that you use must then be rated to handle a 45kg cutter. Cutter ducting (transitions) should not add weight to the cutter – they must be suspended and anchored in a manner that exerts no extra force (weight) on the cutter.

Electrical Specifications

PAC is not providing the electrical installation for the system, nor are we responsible for it. However, to ensure successful performance of the system, PAC has established the following guidelines for the electrical schematic. PAC recommends the fan be inoperable when the cutter is not running. This will prevent two unwanted occurrences.

1. When a fan draws air through a turned off cutter chamber, it causes the rotor to turn in the reverse direction. Depending on the volume of air, the rotor can reach speeds in excess of 500 RPM. If the cutter is turned on with the rotor turning in reverse, the motor may burn out trying to overcome the reverse rotation.
2. Due to the high speeds the cutter can achieve in reverse, the operator may mistakenly think the cutter is turned on and feed material into it. The cutter may cut the material while turning in reverse, but it will eventually wrap around the rotor and clog.

PAC recommends a quick disconnect be installed on the electrical equipment. Cutters and fans are dangerous if the proper safety precautions are not followed when operating this equipment. PAC also recommends following proper lockout/tagout procedures when servicing the equipment to ensure the power cannot be turned on during service.

Initial Startup and Proper Shutdown

- After starting the cutter, verify the cutter knives are rotating in the same direction as the rotation arrows on the cutter housing.
- Optional brake motor requirement – PAC supplies a standard motor brake kit. Please contact the factory for a quote.
- Take amp readings at time of start up to verify amp rating is below Full Load Amps (FLA) on the motor.

Please reference Figure 8 on the next page for more information.

WARNING: Turn the system fan off before the cutter.

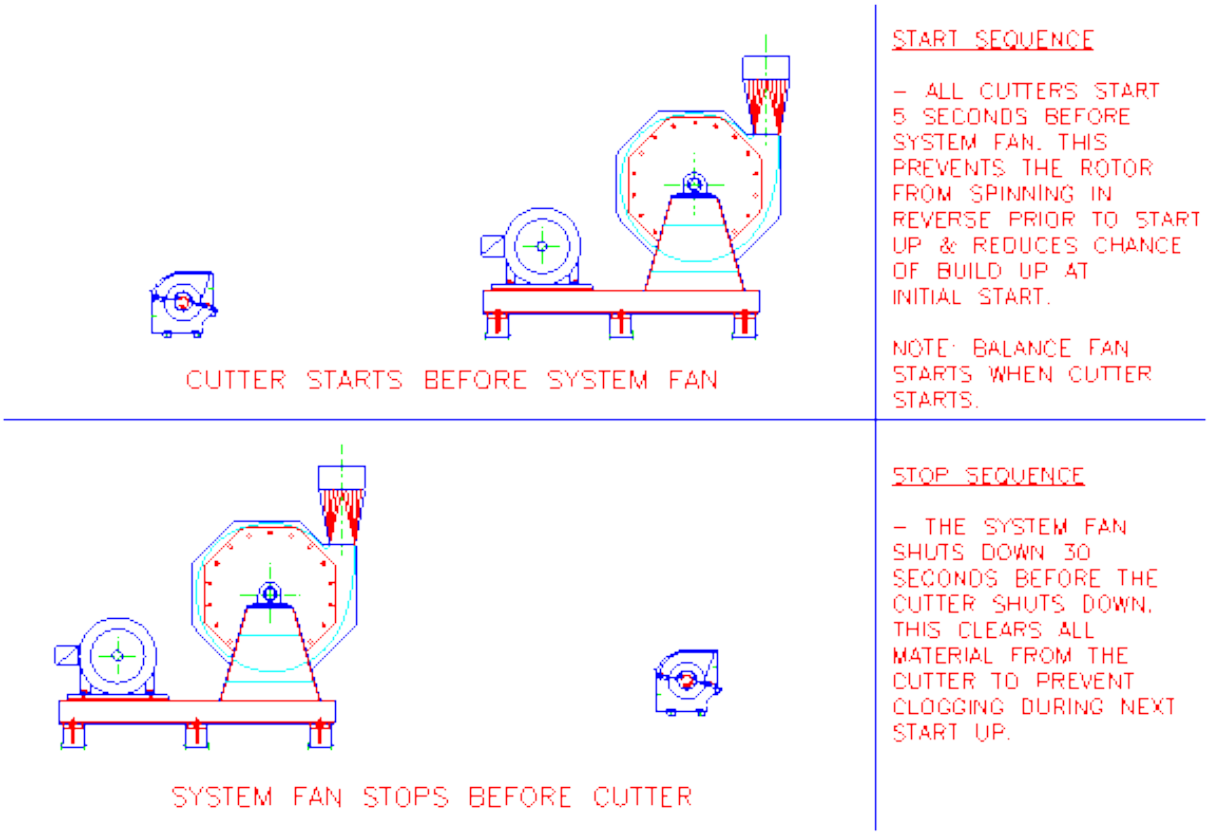

CUTTER STARTS BEFORE SYSTEM FAN
START SEQUENCE
- ALL CUTTERS START 5 SECONDS BEFORE SYSTEM FAN. THIS PREVENTS THE ROTOR FROM SPINNING IN REVERSE PRIOR TO START UP & REDUCES CHANCE OF BUILD UP AT INITIAL START.
NOTE: BALANCE FAN STARTS WHEN CUTTER STARTS.
SYSTEM FAN STOPS BEFORE CUTTER
STOP SEQUENCE
- THE SYSTEM FAN SHUTS DOWN 30 SECONDS BEFORE THE CUTTER SHUTS DOWN. THIS CLEARS ALL MATERIAL FROM THE CUTTER TO PREVENT CLOGGING DURING NEXT START UP.

FIGURE 8

Operation

The cutter works on a rotary cutting principle as illustrated below. Material enters through the inlet and is cut at the interface between a fixed bed knife and rotor-mounted knives to provide multiple cuts for each complete rotation of the rotor. Cut material exits through the outlet.

CAUTION - Do not adjust cutter or granulator blades and this will void the warranty and may result in knife damage. Contact *Precision AirConvey* for knife sharpening and cutter service.

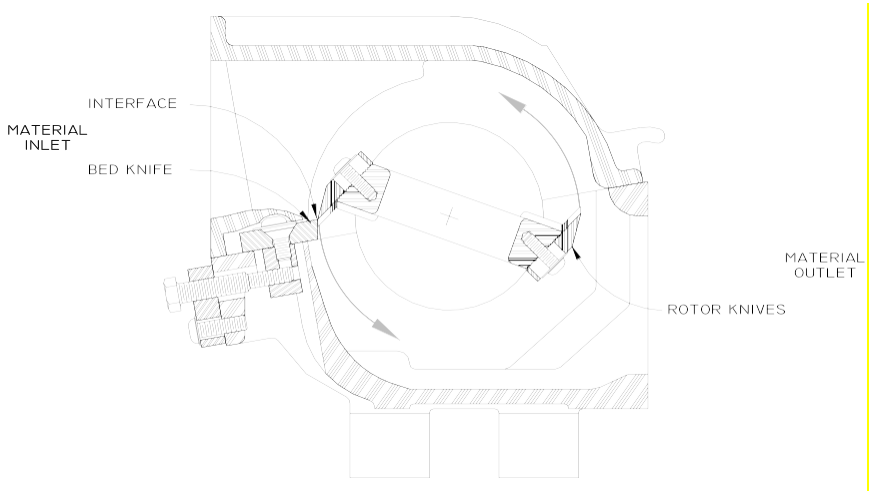


FIGURE 9

Knife Clearance

True cutting requires the clearance between the rotor and bed knives must be less than the thickness of the material being cut. The *PAC* knife setting methods outlined can result in knife Clearances down to 0.00635mm with no knife-to-knife contact. Cutters set to this clearance will cut all types of thin films.

Additionally, very close clearances provide longer useful knife life. The closer the starting clearance, the longer the operating time before the knives wear to the point where they will no longer cut. The rotor knives of the 78 and 811 cutters and granulators are positioned at a shear angle. This reduces both the cutting force and the operating noise level.

Factory Set Knife Clearances

The "Precision" 78FP and 811 FP cutter or granulator is set to cut film 0.0254mm thick and uniformly score film 0.0127mm thick.
The "Super-Precision" 78FSP cutter or granulator is set to cut film 0.0127mm thick and uniformly score film 0.00635mm thick.

NOTE: Scored film is creased, not cut, to verify no knife-to-knife contact.

Knife Material

The standard knife material is AISI D2 tool steel. PAC engineers may specify CPM-10V (equivalent to AISI A11 tool steel) or tungsten carbide insert knives based on the type of material being cut.

		MATERIAL TYPE												
		Paper	Synthetic Paper	Polyethylene Films (HDPE, MDPE, UHMWPE)	Clay Coated Materials	Softer Plastics	EVA (Ethylene-vinyl Acetate)	Acrylic	PVC	Non-woven materials	Abrasive Materials (TiO2, Calcium Carbonate)	Stretchy Thin Films	LLDPE	Polyesters (PET; Polyethylene Terephthalate, PC; Polycarbonate, PB; Polybutyrate)
KNIFE TYPE	**D2 Tool Steel** - High wear resistance - Low cost - Wears faster than carbide - High shock resistance	■		■	■	■	■							
	A8 Tool Steel (CPM) - Higher wear resistance then D2 Steel - Less expensive than Tungsten Carbide - Greater shock resistance than Tungsten Carbide - Good for materials that can shatter							■	■					
	Tungsten Carbide - Hardest, longest lasting edge - Highest wear resistance - Most expensive - Can crack under sever impacts		■							■	■	■	■	■

FIGURE 10

Inbound and Outbound Cutter Transition

A PAC cutter will effectively operate only with air flowing through it and as such the inbound and outbound air flow is contained within transitions and ducting. A cutter transition is a metallic fabricated component that on one end has a rectangular opening with a series of outside rim holes that match up to tapped holes on the face of the cutter. The other side of this transition is necked down to a diameter that is application specific, or – matching the size of the ducting that it is fastened to for the purpose of continuous air flow.

This transition is purposefully fastened to the face of the cutter with bolts that to assure are installed on the threaded studs supplied with the cutter. These fasteners cannot be replaced or modified for any quick disconnect fasteners. Once a cutter is turned off, components (blades) continue to rotate for up to 120 seconds. The inability to gain quick access via this fastened transition is purposeful. Although not required, a clutch or brake is available immediate stoppage of the rotating components.

Ducting Connecting to Inbound and Outbound Cutter Transition

Connecting to the cutter transition in all instances is some form of ducting. This ducting may be manufactured of rigid aluminum or steel, flexible aluminum or steel, PVC, iron, etc. It is critical the joint, connecting the ducting to the cutter transition, requires a tool to detach. For example, a coupling with bolts that require tightening/loosening. Alternatively, a shrink sleeve can be put in place that requires heat to conform and join the joint as that requires a tool to remove.

This ducting is purposefully fastened to the cutter transition in a manner that requires a tool to remove. Quick disconnect or quick release options are not to be used. Once a cutter is turned off, components (blades) continue to rotate for up to 6 minutes. The inability to gain quick access via this coupled joint is purposeful. Although not required, a clutch or brake is available immediate stoppage of the rotating components.

PAC Cutters (Figure 11) are supplied with molded rubber isolators (Figure 12 and Figure 13).

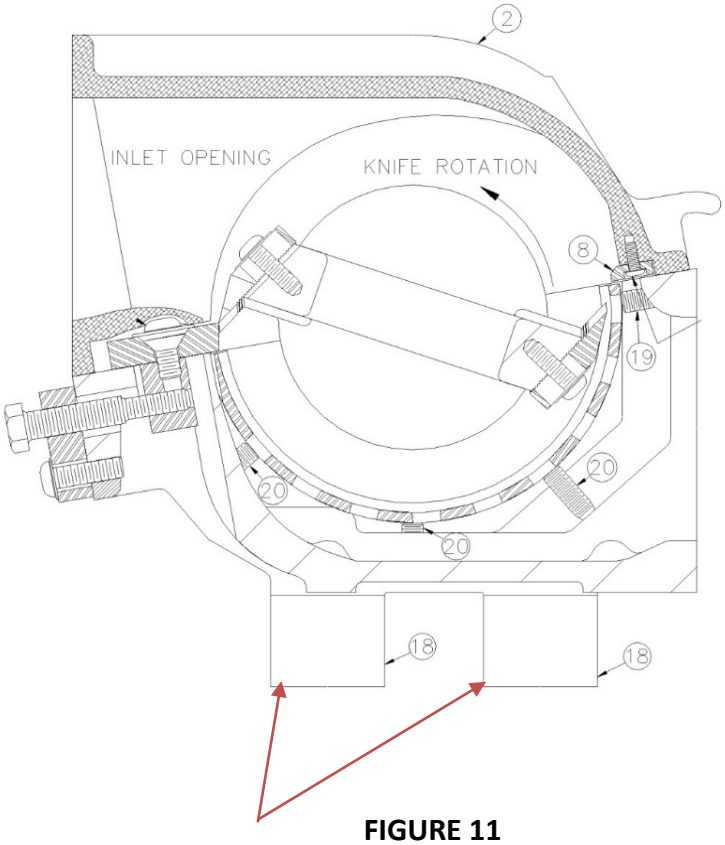


FIGURE 11

FIGURE 12

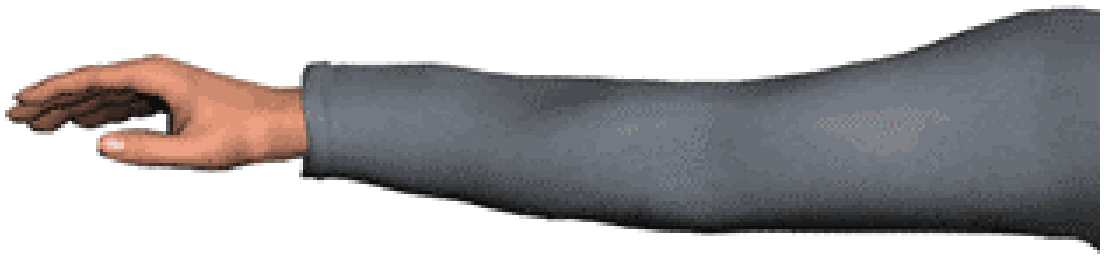
FIGURE 13

Automatic Operation Only

PAC cutters are meant to be operated in a sealed system only with air flowing through the system. They are not to be used in a manual mode or in a mode that material is hand fed into the cutter or ducting.

Cutter Transition and Ducting Assembly

The combined length of the transition and ducting that is to be inaccessible without a tool must be greater than 36" (91.44cm) thereby preventing the ability to reach into a cutter through the ducting and having hands in harm's way.



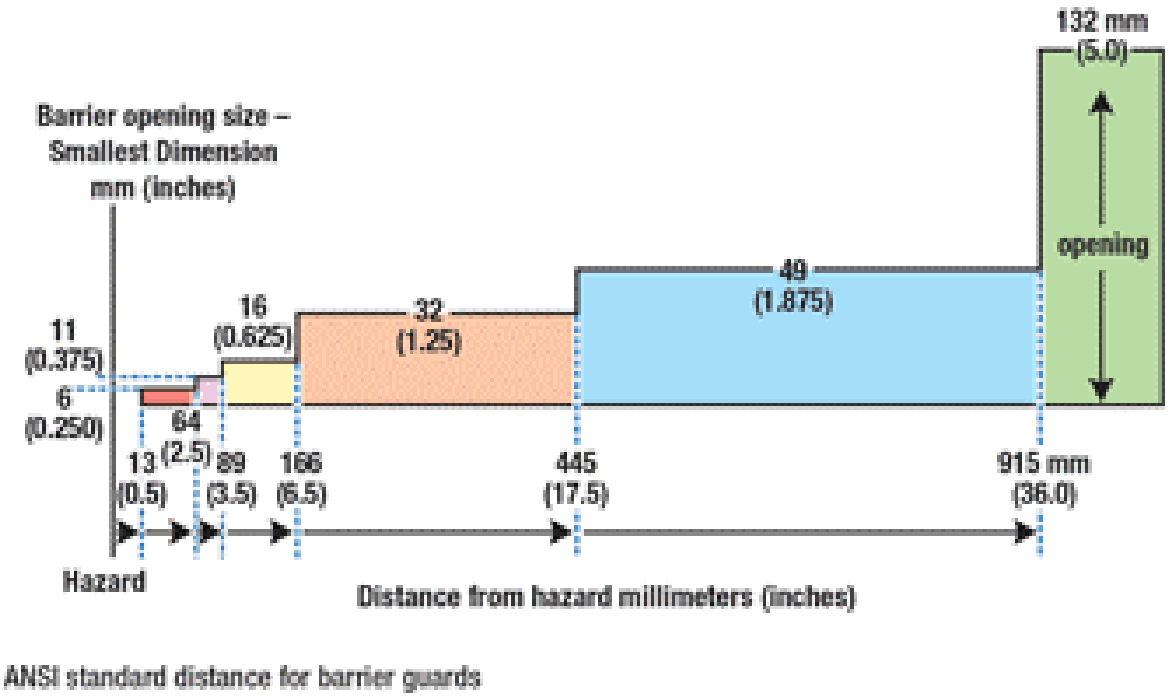


FIGURE 14

Cutter Sound Generation

PAC Cutters generate sound through several means:
1) Air flow
2) Material flow
3) Motor in operation
4) High speed rotating blades

The sound generated will vary according to all of these factors. In most instances, the stand alone cutter in operation with zero sound attenuation will generate a level of noise requiring ear protection. It is for that reason that PAC offers several avenues of sound attenuation:
A) In-line, inlet silencer (put in place as a section of ducting)
B) In-line, outlet silencer (put in place as a section of ducting)
C) Box silencer (enclosing the cutter inside of a sound attenuated box)
D) Cutter isolators (rubber mounts) standard on all cutters
E) Inlet silencer (prior to the cutter, the material entering the trim system flows through a silenced in-feed.

Components A, B, C and E are manufactured with perforated steel and an outer housing. Between the perforated steel and the outer housing, foam is put in place to absorb the sound. With the proper sound attenuation, all PAC cutters and trim systems can be brought down well below the OSHA (Occupational Safety & Health Administration) prescribed levels for required hearing protection.

Precision AirConvey can recommend or suggest sound levels resulting from a cutter and corresponding system, however will not guarantee a sound level (dBA) indifferent to the level of sound attenuation selected, or not selected, as levels may vary according to:
I) Distance between cutter and operator
II) Factors influencing sound (i.e. reverberation off of surrounding walls or ceilings)
III) Material being processed
IV) Other influencing sounds (i.e. lift truck backup horn, nearby equipment in operation, etc.)

Reference Figure 15 for permissible sound levels, or those where hearing protection is not required, based upon a specific duration, using sound as a function of level (dBA) and time (hours).

OSHA's Permissible Noise Exposures	
Duration per day (hours)	**Sound level dBA slow response**
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
<.25	115

FIGURE 15

Maintenance and Troubleshooting

Maintenance

Cutter and granulator performance is a key element in overall system performance. The knives must be sharpened, and the unit components must be serviced on a regular basis to maintain system performance and extend the life of the unit. Maintenance on your cutter or granulator is dependent upon throughput and type of material being cut. Contact the factory for recommended maintenance intervals or to join our Cutting Edge Service Program to receive priority service and discounted pricing.

Maintenance on cutters and granulators must be carried out by suitably qualified technicians, and local safety standards must be maintained.

To return you cutter or granulator to PAC for service:

1. Follow the Cutter Removal Safety and Instructions on the following pages.
2. Use the original carton, plywood base and four (4) isolators for packaging.
3. Securely attach to a pallet or create for freight shipments. Bolts through the plywood are recommended.
4. Ship Model 78 cutters/granulators prepaid via UPS, FedEx or LTL.
5. Ship Model 811 cutters/granulator prepaid via LTL due to weight restrictions.
6. Ship prepaid to:
   Precision AirConvey Corporation
   41 Industrial Road
   Phillipsburg, NJ 08865
   (302)999-8000

DANGER – The Electrical Supply must be securely isolated before performing work on the machine components.

Cutter Removal Safety

No work should ever be done without following lockout/tagout procedures. Related information can be found at the U.S. Department of labor web site *www.osha.gov* on 29 CFR 1910.147 Control of Hazardous Energy (Lockout/Tagout).

Removal or installation of cutters and granulators should only be performed by qualified service technicians. Any electrical work must be performed by a qualified electrician.

A safety switch kit (Part No. SFTYSWITCH78KIT for Model 78; Part No. SFTYSWITCH811KIT for Model 811) can also be purchased from PAC. This is an additional safety precaution and, as stated above, lockout tag-out procedures must be used prior to any work being started.

A safety switch kit consists of two (2) brackets, each attached to the inlet and outlet sides of the cutter after the transitions are installed; a safety switch attached to one bracket; and an actuator pin attached to the other bracket. This will shut down power if someone attempts to remove the inlet or outlet transition, or the hood off of the unit.

Trying to remove any component without following lockout, tag-out procedures can cause serious or fatal injuries. Follow all company safety rules and regulations that apply to mechanical or electrical service and operation.

Cutter Removal Instructions

After the unit has been properly electrically disconnected as stated above:

1. Remove the six (6) ¼”-20 nuts and washers from the inlet transition, and the six (6) ¼”-20 bolts and washers from the outlet transition on the cutter. ***DO NOT*** remove the four (4) brass screws that attach the hood to the housing. Hoods are not interchangeable and must remain with the original housing.

CAUTION - Support the motor with lifting straps. Do not let the motor hang by the wiring or conduit.

2. Once the motor is supported with lifting straps, remove the four (4) 3/8” –16 socket head cap screws.
3. Remove the four (4) 3/8”-16 hex head bolts that attach the vibration isolators to the mounting plate, leaving the isolators attached to the cutter.
4. The unit can now be removed.
5. Install the original inlet and outlet covers on to the cutter to prevent anyone from putting their hands inside the cutting chamber.
6. Mount the unit to the original plywood the unit was shipped in using 3/8”-16 bolts, and put inside of the original carton.
7. The unit is ready to be shipped to Precision AirConvey for service. To contact customer service, call (302)999-8000. See further instructions under the Maintenance & Troubleshooting section of this manual.

CAUTION – Lay the hood upside down, not on the machined surface. Do NOT interchange hoods between cutters. They are fitted in pairs and will not interchange correctly.

Cutter/Granulator Replacement Instructions

DANGER:
Disconnect power to the granulator before servicing any component.
Secure the granulator to a workbench or other stable work area during maintenance.
Wear no-cut gloves when working with the granulator or when handling the knives.

1. Shut down the trim removal system and electrically lock out the fan and granulator.
2. Uninstall the granulator and remove the inlet and outlet transitions.
3. Affix the granulator, resting on its vibration isolators, to a stable flat work surface.
4. Remove the granulator hood (item 2) by removing the four (4) 3/8-16UNC slotted brass screws and four (4) Belleville washers (items 13, 16).
5. Lift the hood off the two (2) locator pins in the base (items 1, 14).
6. While the Granulator is resting on its vibration isolators (item 18), loosen the two (2) recessed 3/8-24UNF screen-securing setscrews (item 19) located on the rear or discharge side of the granulator.
7. Rotate the granulator onto its discharge flange.
8. Loosen the three (3) bottom right and left side 3/8-24UNF screen clamp setscrews (item 20). **NOTE: DO NOT LOOSEN SHOULDER BOLTS (ITEM 22).**
9. Back the setscrews out only enough to loosen or disengage the granulator screen clamp (item 21).
10. Remove the screen (item 23) by rotating it out of its slot. If the screen will not rotate and/or waste material has packed the slot carefully tap the screen along the clamp sides with a ½" diameter soft brass or hard wood dowel to free it.
11. Clean all machined surfaces and the screen track groove.
12. Carefully install the new screen. The screen clamps should guide the new screen into place. The new screen should be seated 0.015" to 0.030" below flush on the discharge or rear edge of the base.
13. **IMPORTANT** - Check to make sure there is clearance between the screen and bed knife.
14. Tighten all clamping setscrews to 20 in-lbs. of torque.
15. Slowly (by hand) rotate the rotor backwards. If the rotor knives do not clear the bed knife, contact the factory for assistance.
16. Wipe clean all mating surfaces with a clean rag of the hood (item 2) and base (item 1).
17. Using the two (2) locator pins for proper alignment, place the cover onto the base making sure that the mating surfaces are in full contact, without rocking. (Reference Figure 16 and Figure 17 on next page for cover placement.)
18. Fasten with the four (4) 3/8-16UNC slotted brass screws and Belleville washers (items 13, 16).

IMPORTANT - To avoid cutter distortion and rotor rub, attach covers to bases with matching serial numbers. The base serial number appears on the front face, to left of bed knife adjustment screw.

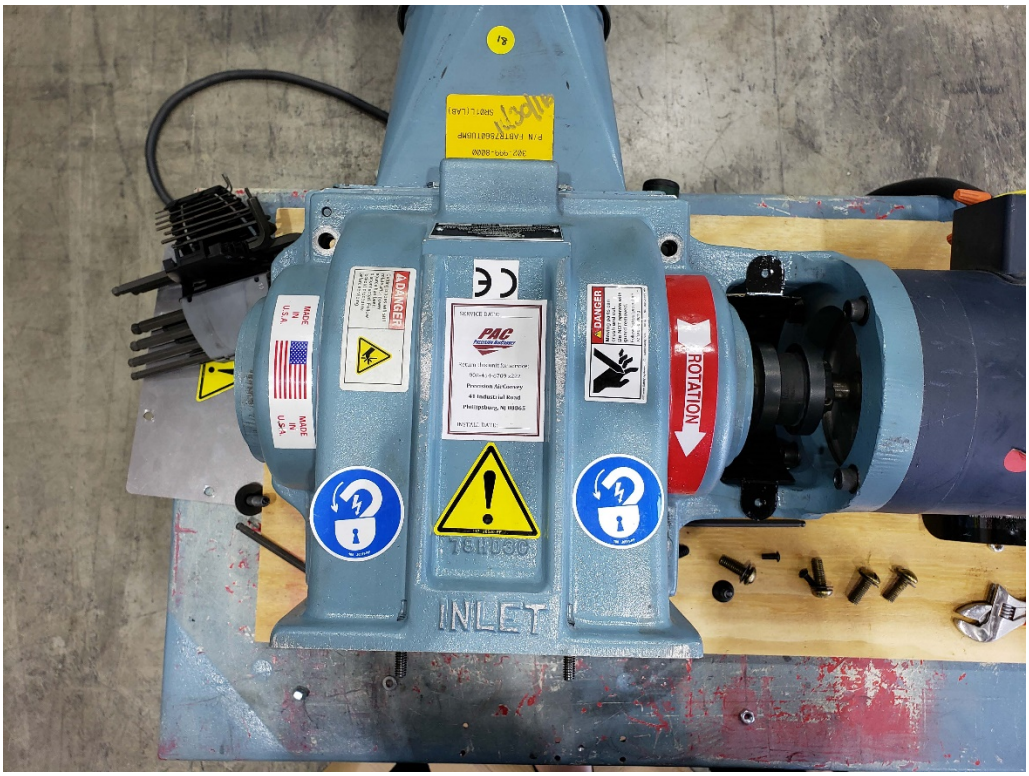


FIGURE 16

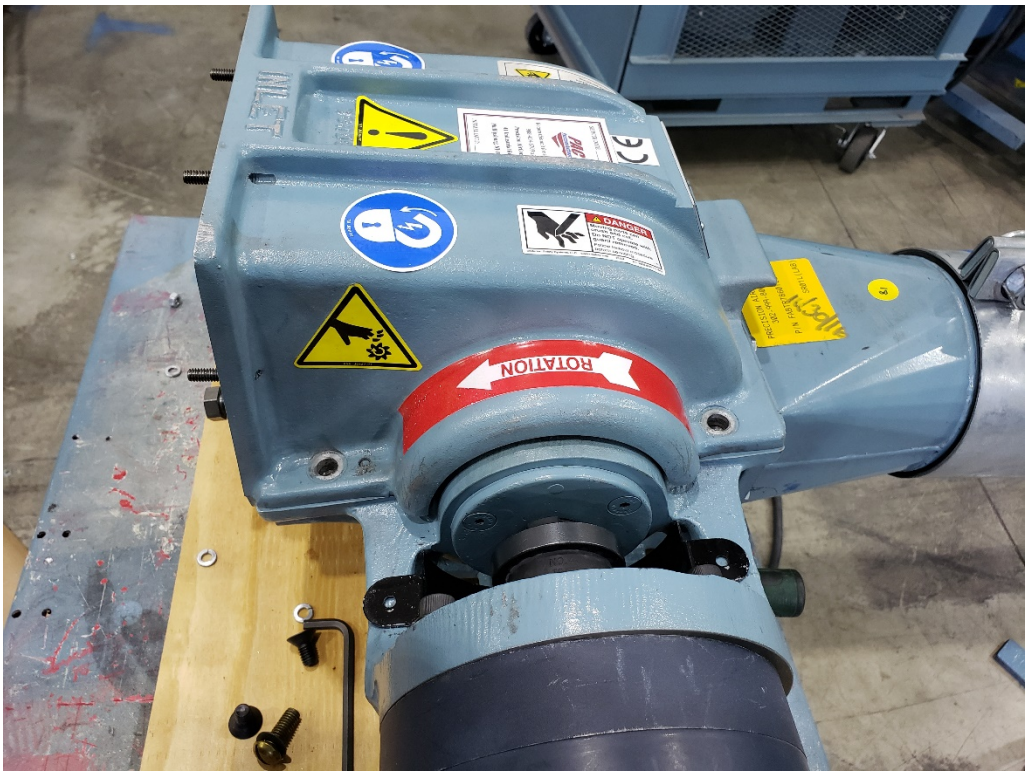


FIGURE 17

Cutting Edge Service Program

We strongly recommend customers send their entire unit in when knives need to be sharpened so we can use our custom fixtures and technical expertise to:

- measure rotor clearances;
- verify bearing pre-load;
- check bearing play;
- inspect for damage or wear to the housing and measure bore tolerances;
- inspect for damage or wear to the rotor and measure journal tolerances;
- clean unit, knives and mating surfaces;
- inspect hood fit for pin binding, rotor clearances and mating surfaces;
- test the unit and document cutting tolerance based on the model.

These elements are critical to the function and life of the unit, so we have established the Cutting Edge Service Program for customers to send their units to the factory for scheduled maintenance.

Advantages of the Cutting Edge Service Program are:

- expedited service and turnaround time (typically 2-3 days after receipt)
- 15% savings on sharpening services

Contact PAC to enroll. (302)999-8000

Troubleshooting

The equipment fitted in cutters and granulators is all of superior quality, supplied by recognized manufacturers. However, as with all machinery, components do occasionally fail or require adjustment. The following troubleshooting list is as fully detailed as possible to ensure that should any faults occur, the machine downtime is reduced to a minimum and should not be regarded as a potential list of machine faults. It should be noted that any checks must be carried out by competent personnel. For example, any checks carried out on the electrical circuitry must be carried out by a suitably qualified technician or engineer. Similarly, any checks carried out on hydraulic components must be carried out by a suitably qualified technician or engineer. Take amp readings at time of start-up.

Replacement Parts

When ordering parts contact Precision AirConvey and have all of the following information ready:

- Cutter or granulator serial number stamped on the nameplate.
- Cutter or granulator model stamped on the nameplate.
- Knife material.
- Description of part required.
- Part number, if known.
- Special paint or coatings required.

Service and Parts

Phone: (302)999-8000

Fax: (908)454-3600

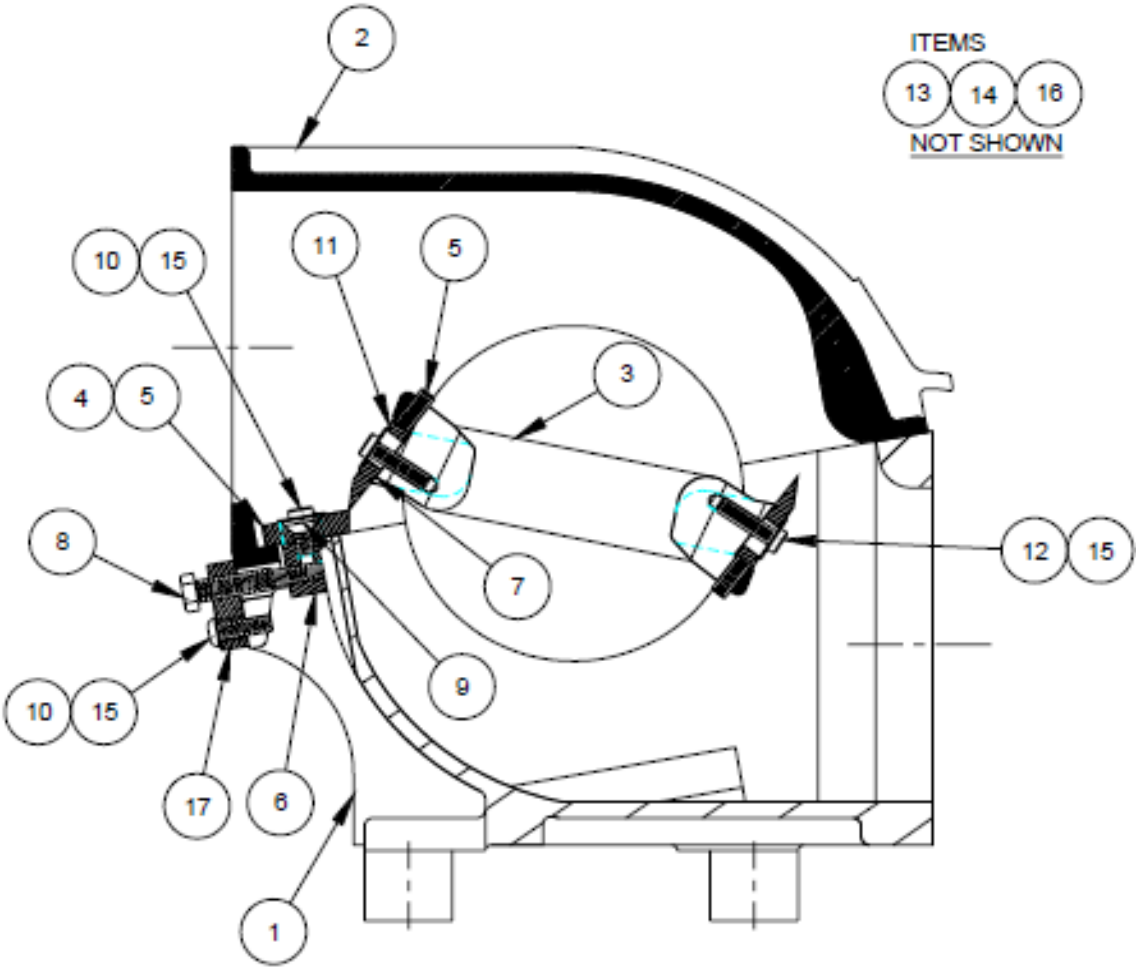


FIGURE 18

ITEM LIST	
ITEM No.	DESCRIPTION
1	BASE
2	HOOD
3	ROTOR
4	BED KNIFE
5	ROTOR KNIFE ADJUSTMENT SCREW 3/8-24x1.0
6	ADJUSTMENT BLOCK
7	KNIFE SEAT
8	BED KNIFE ADJUSTMENT SCREW
9	FLAT HEAD SOCKET SCREW 3/8-24x1.25
10	BUTTON HEAD CAP SCREW 3/8-16x1.25
11	ROTOR KNIFE
12	BUTTON HEAD CAP SCREW 3/8-16x1.25
13	BRASS MACHINE SCREW 3/8-16x1.0
14	DOWEL PIN Ø1/4x0.88
15	Ø3/8 DISC SPRING 0.402 IDx1.10 OD
16	Ø3/8 DISC SPRING 0.382 IDx0.75 OD
17	ADJUSTMENT PAD

FIGURE 19

Precision AirConvey
41 Industrial Road
Phillipsburg, NJ 08865
(302)999-8000

Declaration of Incorporation

In respect to the following European Directives:
European Machinery Directive 2006/42/EC

Machine: Models 78 and 811 Cutter/Granulators
Serial Number:
Completed and Declared:

In consideration to all harmonized European standards, including but not limited to: EN12100-2010, EN13849-1, EN1412, EN ISO 60204, EN12012-1:2018

The above machinery equipment, is compliant with all sections of Annex I of the Directive 2006/42/EC, but is incomplete due to specific safety and control functions which are intended to be performed by interconnected machinery. This machine must not be put into service until it is suitably connected to the appropriate interconnected machinery where the total assembly is declared by the supplier to be in conformity to the directive.

Signed for and on behalf of Precision AirConvey. 41 Industrial Road, Phillipsburg, NJ 08865. United States.
T: +1 302 999 8000

Signature: _____	EU Representative: _____
Name: _____	Address: _____
Position: _____	_____
Date: _____	Telephone: _____

"We Convey Solutions"

Balance Fan

Installation, Operating and Maintenance Manual

For service inquiries or additional information on this or any other Precision AirConvey product, please visit **www.airconvey.com.**

or contact us via one of the following:

Telephone: 302-999-8000

Fax: 302-999-8510

Email: get-facts@airconvey.com

Precision AirConvey
Pencader Corporate Center
465 Corporate Boulevard
Newark, DE 19702

Contents

INTRODUCTION

A Balance Fan, also called a Heavy Duty Backward Inclined (HDBI) fan, is used in numerous systems to draw air out. Balance fans do not handle material; they are capable of moving large volumes of air at low pressures. Balance fans are typically horizontally mounted (HM) on the top of slant screen separators. Balance fans can also be pedestal mounted on the rear of the separator.

Balance fans come in two different arrangements: 4 and 9. An Arrangement 4 fan has the motor connected to the fan via direct drive. There are no bearings or v-belt. The motor is directly attached to the fan. An Arrangement 9 fan has the motor mounted on the side of the same pedestal that the fan and bearings are mounted. The motor is driven by v-belts connecting the motor to the drive shaft.

If the impeller is rotating in the wrong direction, it will greatly reduce the efficiency of the fan. Be sure to check this at the beginning of every use.

To ensure optimum performance and safe operation of the unit, anyone who installs, uses or maintains it must read and carefully follow the instructions in this manual.

Throughout this manual, the Balance Fan is also referred to as the fan, the blower or the unit.

Specifications

Weight:

BALANCE Arrangement & Motor	Lbs.
BALANCE 160, ARRGT 4HM	210
BALANCE 180, ARRGT 4HM	270
BALANCE 200, ARRGT 4HM	320
BALANCE 300, ARRGT 4	850
BALANCE 330, ARRGT 4	1176
BALANCE 160, ARRGT 4HM, W/ 15HP MOTOR	492
BALANCE 180, ARRGT 4HM, W/ 25 HP MOTOR	653
BALANCE 200, ARRGT 4HM, W/ 40 HP MOTOR	824
BALANCE 300, ARRGT 4, W/ 40 HP MOTOR	1354
BALANCE 300, ARRGT 4, W/ 50 HP MOTOR	1487
BALANCE 330, ARRGT 4, W/ 60 HP MOTOR	1911

BLOWER SPECIFICATIONS

Blower Serial Number:		Model:	
Rotation:		Discharge:	
Wheel Size and Type:		Arrangement:	
Motor Pulley:		Fan Pulley:	
Fan Belt:			

BLOWER DESIGN TARGET DATA

CFM:		SP:		(inches of water gauge)
Motor BHP:		Altitude:		(Feed above sea level)
Fan RPM:				

MOTOR DATA

HP:		RPM:	
Voltage:		Phase:	
Hz:		Frame Size:	

***NOTE*: Due to our commitment to continuous product improvement, we reserve the right to change the specifications without notice.**

SAFETY

Always follow the general safety and accident prevention rules in addition to those set forth in this manual.

Please Note: Hazardous voltage can cause electrical shock or death. High speed rotating equipment can cause severe personal injury. Lock out/tag out to prevent personal injury BEFORE starting ANY service or inspection. NEVER operate without ALL required safety guards in place. You MUST read and understand all instructions in this manual.

Safety Instructions & Accessories

1. **Safety Instructions:** All installers, operators and maintenance personnel should read AMCA Publication 410-96, **"Recommended Safety Practices for Users and Installers of Industrial and Commercial Fans."** This manual is included with the blower.
2. **Sound**: Some blowers can generate sound that could be hazardous to personnel. It is the responsibility of the user to measure the sound levels of the blower and/or system, determine the degree of personnel exposure, and comply with all applicable safety laws and requirements to protect personnel from excessive noise.
3. **Air Pressure and Suction:** In addition to the normal dangers of rotating machinery, the blower can present additional hazards from the suction or pressure created at the blower inlet or discharge. Suction at the blower inlet can draw materials into the blower where they become high velocity projectiles at the discharge and cause severe personal injury or death. It can also be extremely dangerous to persons in close proximity to the

inlet or discharge as the forces involved can overcome the strength of most individuals. Never operate a blower with a non-ducted inlet and/or discharge. If the blower inlet and/or discharge are non-ducted, it is the user's responsibility to install an inlet and/or discharge guard.

4. **Temperature:** Many blowers, blower components and motors operate at temperatures that could cause injury. If this potential hazard could exist in your installation, steps must be taken by the user to protect anyone from coming in contact with this equipment.
5. **Spark Resistance;** (Per AMCA Standard 99-0401-86 and ISO 13499) **NO GUARANTEE OF ANY LEVEL OF SPARK RESISTANCE IS IMPLIED BY SPARK RESISTANT CONSTRUCTION. IT HAS BEEN DEMONSTRATED THAT ALUMINUM IMPELLERS RUBBING ON RUSTY STEEL CAN CAUSE HIGH INTENSITY SPARKS. AIR STREAM MATERIAL AND DEBRIS OR OTHER SYSTEM FACTORS CAN ALSO CAUSE SPARKS.**
6. **Safety Accessories; Guards:** All moving parts must be guarded to protect personnel. Safety requirements can vary, so the number and types of guards required to meet company, local, state and OSHA regulations must be determined and specified by the actual user or operator of the equipment. **NEVER start any blower without having all required safety guards properly installed. All blowers should be checked on a regular schedule, for missing or damaged guards. If any required guards are found to be missing or defective, the power to the blower should be immediately turned off and locked out in accordance with OSHA regulations. Power to the blower should NOT be tuned back on until the required guards have been repaired or replaced.** This blower can become dangerous due to a potential "windmill" effect, even though all electrical power has been turned off or disconnected. The blower wheel should be **carefully** secured to prevent any rotational turning ***BEFORE*** working on any parts of the blower/motor assembly that could move.
7. **Access or Inspection Doors: NEVER OPEN ANY ACCESS OR INSPECTION DOORS WHILE THE BLOWER IS OPERATING. SERIOUS INJURY OR DEATH COULD RESULT FROM THE AFFECTS OF AIR PRESSURE, AIR SUCTION OR MATERIAL THAT IS BEING CONVEYED. DISCONNECT OR LOCK OUT POWER TO THE BLOWER AND LET THE BLOWER WHEEL COME TO A COMPLETE STOP *BEFORE* OPENING ANY TYPE OF ACCESS OR INSPECTION DOOR.**
8. Safety instructions in this manual are boldfaced for emphasis. The signal words **DANGER**, **WARNING** and **CAUTION** are used to indicate hazard seriousness levels as follows:
   DANGER – Immediate hazard which WILL result in severe injury or death.
   WARNING – Hazard or unsafe practice which COULD result in severe injury or death.
   CAUTION – Hazard or unsafe practice which COULD result in minor injury or in product or property damage.

The Balance Fan is designed and built with safety as a prime consideration. Each unit is checked at the factory for safety and operation.

Follow the maintenance schedules outlined in this manual for good performance and safe operation. Maintenance should be done only by qualified personnel and only with proper tools.

Carefully read the following safety rules before proceeding with installation, operation or maintenance. The rules are essential to ensure safe operation of the unit. Failure to follow these rules may void the warranty or result in damage to the unit or personal injury.

Safety Labels

Safety labels on the unit provide important safety information. If any label is missing or damaged, contact the manufacturer, request a new label and apply it to the unit.

RECEIVING AND INSPECTION

Upon receipt, inspect the BALANCE Fan closely for damage. Record any indication of damage on the delivery receipt, especially if the unit will not be immediately installed. Obtain the delivery person's signed agreement to recorded damages to facilitate future insurance claims.

Since the BALANCE Fan is shipped F.O.B. Factory, the manufacturer's responsibility for the shipment ceases when the carrier signs the bill of lading.

If the unit is received short or in damaged condition, notify the carrier and insist on a notation of the loss or damage across the face of the freight bill. Otherwise no claim can be enforced against the carrier.

If concealed loss or damage is discovered, you must notify your carrier at once and request an inspection. Unless you do this, the carrier will not consider any claim for loss or damage. The carrier will make an inspection and may grant a concealed damage notation. If you give the carrier a clear receipt for goods that have been damaged or lost in transit, you do so at your own risk and expense.

THEORY OF OPERATION

Balance fans draw air out of separators equivalent to or slightly greater than the volume entering the separator to create a zero or slightly negative pressure in the separator. By drawing air out of the separator, the material entering is free to be discharged by the force of gravity out of the chute. The Balance fan also draws out dust and fine particulates in the air entering the separator. The dust and other particles pass through the impeller to the atmosphere or dust collector. The configuration is based on the user's system. For some

applications, the dust collector is placed between the screen and fan resulting in clean filtered air being drawn from the separator.

INSTALLATION INSTRUCTIONS

Vibration

Before any mounting method is selected, the user should be aware of the effects vibration will have on the blower, motor and other parts. Improper blower installation can cause excessive vibration resulting in premature wheel and/or motor bearing failure, that is not covered under warranty. Vibration eliminator pads, springs or bases should be properly installed to prevent any blower vibration from transmitting to the foundation, support structure or ducting.

Note: SHUT THE BLOWER DOWN IMMEDIATELY IF THERE IS ANY SUDDEN INCREASE IN VIBRATION.

Mounting Methods

Note: The improper design of an elevated platform structure could result in a resonant condition, and consequently, cause a life threatening, catastrophic, structural failure.

1. **Floor Mounted Units:** Centrifugal blowers should be mounted on a flat, level, concrete foundation weighing 2-3 times the weight of the complete blower/motor assembly. It is recommended that the foundation be at least 6 inches larger than the base of the blower. The foundation should include anchor bolts. Place the blower over the anchor bolts and shim under each bolt until the blower is level. After shimming, flat washers, lock washers and lock nuts should be tightened at each anchor bolt. Any gaps between the blower base and the foundation should be grouted. If the blower will be sitting on vibration pads or mounts, follow the recommended mounting procedures supplied with the vibration elimination equipment.
2. **Elevated Units:** Improper mounting of elevated blowers can cause vibration problems. The structure that the blower/motor assembly will be mounted on must be strong enough to support at least 3 times the weight of the entire blower/motor assembly. **An insufficient support will cause excessive vibration and lead to premature wheel and/or motor bearing failure**. Bracing of the support structure must be sufficient to prevent any side sway. The entire structure should be welded at all connection joints to maintain constant alignment of the platform.
3. **Duct Work Connections:** All duct connections to the blower may include flexible connectors between the ducting and the blower inlet and/or discharge. This will eliminate distortion, noise and vibration from transmitting to the duct and building. The connectors should be selected to handle the operating conditions for air volume and

pressure the blower will produce. **All ducting or accessories, added by the user, should be independently supported. DO NOT use the blower/motor assembly to support any additional weight.** Inlet and/or discharge duct elbows should be located a minimum of 2 blower wheel diameters from the blower. Any duct elbows located closer than 2 wheel diameters to the blower inlet or discharge **WILL** reduce the air performance and blower efficiency. Any duct elbows near the blower discharge should be in the **same rotational direction** as the **blower rotation**.

Non-Ducted Blower Inlet: Blowers without ducting on the inlet **must** have an inlet guard. The blower should be located so the blower inlet is, at a minimum, 1 wheel diameter away from any wall or bulkhead to eliminate a reduction in air flow. **Non-Ducted Blower Discharge:** Any blower with no ducting on the discharge **must** have a discharge guard.

4. **Safety Guards:** Fans supplied by Precision AirConvey include guards in compliance with OSHA safety regulations. For blowers built with high temperature construction, a "heat slinger guard" is standard. It is the responsibility of the user to make sure the blower meets all local, state and OSHA safety regulations.

Methods Applicable for Arrangement 9:

5. **Set Screw and Taper-lock Bushing Torque Values:** All blower wheel set screws are tightened to the proper torque prior to shipment. Some wheels may have taper-lock hubs and split, taper-lock bushings to secure the wheel to the blower shaft. **NOTE:** Check all set screw or taper-lock bushing torques. Forces encountered during shipment, handling, rigging and temperature can affect factory settings. **Note**: Set screws should never be used more than once. If the set screws are loosened, they MUST be replaced. Use only knurled, cup-point, set screws with a nylon locking patch.
6. **Blower Bearings:** If the blower bearings have set screws to lock the bearings onto the blower shaft, the set screws should be tightened. Blower bearings should be lubricated in accordance with the bearing manufacturer's recommendation and with the same type of grease. **Bearings are pre-lubricated at the factory.** The blower shaft/bearing guard (if included) should only be removed for inspection **before** startup and during inspection or maintenance, **but only after the power to the motor has been turned off and locked out. The blower shaft/bearing guard MUST be replaced before the power is turned back on.**
7. **V-Belt Drives:** If Precision AirConvey supplied the belts and sheaves (drives package), they were carefully selected for the specific operating conditions supplied to us by the customer. If the user is supplying the sheaves and/or belts, it is their responsibility to make the correct component selections for the specific operating conditions. Their selection must also **NOT ALLOW** the blower to exceed its **maximum safe speed or hub**

load. If you do not know the maximum safe speed or hub load for this blower, **DO NOT** make any drive selection without first consulting Precision AirConvey. **"Timing" belts should never be used on blowers.** If you are replacing belts and/or sheaves, check belt tension or proper alignment. Sheave set screws or taper-lock bushing bolts should be tightened.

8. **V-Belt Drive Installation: Power to the motor must be turned off and locked out, BEFORE inspecting, installing or servicing any components of the drives.**
   If you are installing new belts, inspect and replace worn or damaged sheaves, bearings or shafts while the power is **turned off and locked out.** This will eliminate additional down time later to replace any other parts that are worn or defective.
   If you are installing a complete set of new drives, the most critical installation are alignment of the sheaves and belt tension. **Misaligned sheaves and/or improper belt tension will cause excessive fan vibration and result in premature belt and/or bearing failure.** The blower and motor shafts must be parallel and the sheaves must rotate in the same vertical plane.

ASSEMBLY STEPS:

1. Remove belt guard and shaft guard, if supplied, and remove any protective coating from the end of the blower and/or motor shafts.
2. The adjustable motor slide base should be used for belt tension adjustment. Adjust the motor on the slide base by turning the adjustment bolt(s) in the end of the slide base, so the motor is as close as possible to the blower.
   NOTE: The 4 nuts that secure the motor feet onto the motor slide base should be loosened **just enough** so the motor will **slide** along the slide base **before** you loosen or tighten the belt tension adjustment bolt(s).
3. If you are replacing the belt(s) and/or sheaves, remove belt(s) from sheaves and then loosen the sheaves.
4. Check the blower and motor shafts for any nicks or burrs. Remove any burrs with a file or emery paper.
5. Slide the new sheaves onto the blower and motor shafts. **DO NOT** drive or pound the sheaves as this may damage the blower and/or motor bearings.
6. Check the blower and motor shafts to ensure they are **parallel.**
7. Place the belt(s) over the sheaves. **DO NOT** force, pry or "roll" the belts, as this could damage the cords in the belt(s). If there is more than 1 belt, all belts should be the same length.
8. Align the blower and motor sheaves with a straight-edge. If the sheaves are not the same width, align by sight. For more precise methods, consult your local drives dealer.
   NOTE: Any sheave with a taper-lock bushing will slide a little on the shaft as the bolts are tightened. You will need to compensate for the sliding before performing step 9.

9. Tighten the set screws in the sheaves or the bolts in the taper-lock bushings
10. Adjust the motor slide base until the belts appear to be snug, then repeat **Step 6** above.
11. Tighten the 4 nuts holding the motor feet onto the motor slide base, then repeat **Step 6** above.

    CAUTION: BEFORE ATTEMPTING STEPS 12 AND 15, MAKE SURE THE AREA AROUND THE BLOWER IS SAFE AND SECURED SO NO ONE CAN GET NEAR THE BLOWER AND POSSIBLY GET INJURED WHEN IT IS STARTED.
12. Unlock power to the motor and run the blower for a few minutes to allow belts to "seat" properly. Then turn off and lock out power to the motor.
13. Loosen the 4 bolts holding the motor feet onto the motor slide base and re-adjust the belt tension. **Final belt tension should be checked with a "tensioning gauge".**
14. Tighten the 4 nuts holding the motor feet onto the motor slide base.
15. Unlock power to motor and run the blower. The belts should be running with proper tension. If not, repeat steps 13 and 14 after **you have turned off and locked out power to the motor.**
16. **Turn off and lock out power to the motor,** reinstall belt guard and shaft guard, unlock power to motor and run the blower.
17. After running the blower for 3 days, **lock out power to motor,** remove belt guard and repeat steps 13 through 16.

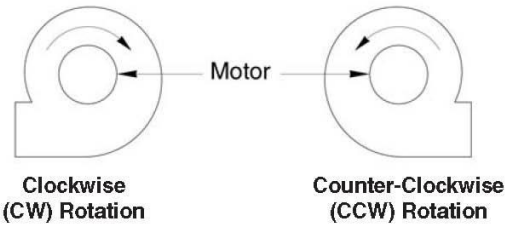
INSTRUMENTATION

There is no additional instrumentation for the user to be made aware of. Fan operating RPM is frequently controlled by a Variable Frequency Drive (VFD) located in the optional control panel supplied by PAC. If a control panel was not purchased, it is the customer's responsibility to provide the VFD for the fan.

INITIAL STARTUP INSTRUCTIONS

1. If possible, *CAREFULLY* spin the blower wheel by hand to ensure it rotates freely and that no rubbing or clicking noise is heard.
2. Check all blower, foundation and duct work hardware to make sure it is tight.
3. Check all blower wheel set screws to make sure they are tight.
4. If the wheel has a taper-lock bushing, make sure the bolts are tightened.
5. Make certain there is no foreign material in the blower or duct work that can become a projectile.
6. Make sure all inspection doors in the duct work are securely bolted or locked.
7. Ensure all electrical power components are properly sized and matched for your electrical system.

8. Check that all required guards are properly secured.
9. Any dampers should be fully opened and closed to make sure there is no binding or interference.
10. If your blower is mounted on an elevated support structure, make sure the structure is welded at all the joint connections and the structure is properly braced to prevent "side sway".
11. Close any dampers to minimize load on motor. This is especially important for blowers with high temperature construction. **Never** subject a "cold" blower to a "hot" gas stream. If the blower will be handling "hot gases" greater than 150°F (65°C) it is imperative that the blower be subjected to a gradual rate of temperature increase, not to exceed 15°F/minute (8°C/minute). The same temperature limits are also important when the blower is experiencing a drop in temperature until the temperature drops down to 150°F (65°C). Only, when the entire blower has reached an equilibrium temperature of 150°F (65°C), or less, should the power be turned off.
12. Make sure the power source connections to the blower motor are per the motor manufacturer's instructions.
13. Make sure the blower wheel is stationary prior to startup. **Starting a blower with a wheel that is rotating backwards can cause wheel damage.**
14. Apply power to the blower motor momentarily (i.e. "bump start") to check for proper blower wheel rotation. If the blower is rotating in the wrong direction, reconnect the motor leads per the motor manufacturers wiring schematic. **Blower rotation is determined by viewing the blower from the motor side of the blower, NOT from the inlet side**. After reconnecting the leads, repeat this step.
15. Apply power to the blower motor and let it come up to full speed. **Turn off the power.** Look and listen for any unusual noise or mechanical abnormality while the blower wheel is still spinning. If any are noticed, lock out the power, wait for the blower wheel to come to a complete stop, locate the cause and correct it.
16. Measure, record and keep the following motor data for future reference and comparison:



ELECTRICAL

A. Disconnect Switches:

All blower motors should have an independent disconnect switch located in close visual proximity to turn off the electrical service to the blower motor. **Disconnects must be locked out in accordance with OSHA "lock out-tag out" procedures any time inspection or maintenance is performed on the blower and/or motor assembly.**

The "lock out-tag out" procedure should be performed by a licensed electrician or authorized personnel.

All disconnects should be sized in accordance with the latest National Electric Codes (NEC) and any local codes and should be installed only by a licensed electrician. "Slow blow" or "time delay" fuses or breakers should be utilized since the initial start-up time for the blower motor, although rare, can be up to 10 seconds.

B. Motors:

1. **DO NOT connect or operate a motor without reading the supplied motor manufacturer instructions.** The basic principle of motor maintenance is to **KEEP THE MOTOR CLEAN AND DRY.** This requires periodic inspections of the motor. The frequency of the inspections depends on the type of motor, the service and environment where it will be in operation, and the motor manufacturers instructions.
2. **Cleaning:** Cleaning should be limited to exterior surfaces only. **Follow motor manufacturers cleaning instructions.**
3. **Lubrication:** Most small motors have sealed bearings that are permanently lubricated for the life of the motor. Some larger motors have grease plugs that should be replaced with grease fittings to perform re-lubrication. These motors, or any motor with grease fittings, should be lubricated in accordance with the motor manufacturers recommendations. Lubrication frequency is dependant on the motor horsepower, speed and service. **BE SURE** to use compatible grease. **DO NOT** over grease.
4. **Location:** If the motor will be subjected to weather, it is recommended that a weather cover be installed to keep rain and snow off of the motor. Motors are not guaranteed to be "watertight". Be careful to allow enough openings between the motor and the motor cover to let the motor "breathe". If the back end of the motor is covered, the cover should be no closer than 3" to the back of the motor for proper ventilation.
5. **Wiring Connections:** All wiring connections should be made for proper voltage and phase as shown on the motor nameplate. Connections should follow the motor manufacturer's recommendations as shown on the wiring schematic. This wiring diagram can be located on the outside of the motor, inside of the motor conduit box or on the motor nameplate. **Reversing some wires may be necessary to achieve the correct blower rotation.**
6. **Motors with Thermal Overload Protection:** If a motor is equipped with thermal overloads, the thermal overload must be wired per the wiring schematic to be operable. ***There are 3 types of thermal overloads:***

a. **Automatic:** This motor will automatically shut down the motor if the internal temperature exceeds the design limits.
b. **Manual:** This motor will have a button. If the motor overheats, it will shut down. After you have inspected the motor and eliminated the over heating problem, you will need to "reset" it by pushing the button. **Lock out the power BEFORE inspecting the motor.**
c. **Thermostats:** This motor thermostat is a temperature sensing device **ONLY**. If the motor overheats, the thermostats will open or close (depending on the type) and send a **"signal"** to the electrical box. ***THEY WILL NOT TURN THE MOTOR OFF.*** **These are pilot circuit devices that must be connected to the magnetic starter circuit.**

7. **EXPLOSION PROOF Motors:** No motor is explosion proof. Explosion proof motors are designed so if there is an explosion **WITHIN** the motor, the explosion will be **CONTAINED INSIDE** the motor and will not to get into the atmosphere. All explosion proof motors must be selected based on the atmosphere and/or the environment in which the motor will be operating. Explosion proof motors are designed, rated, and labeled for their operating conditions based on Classes, Groups and "T" Codes. **The Class, Group and "T" code of an EXP motor MUST be selected based on the atmosphere and/or environmental conditions in which the motor will be operating. Consult the National Electric Code (NEC) and the National Fire Protection Association (NFPA) for the proper EXP motor Class, Group and "T" Code required for your specific application and location.**

   NOTICE:

   a. **All EXP motors have some type of thermal overload as required by Underwriters Laboratories (UL). Refer to Section 6 above.**
   b. **All EXP motors are required to have the UL and Canadian Standards Association (CSA) listing numbers on the motor name plate or on a separate plate attached to the motor. The Class, Group and "T" Code in which the motor is designed for must also be listed. MAKE SURE YOU LOCK OUT THE POWER TO THE MOTOR BEFORE INSPECTING ANY MOTOR WITH AUTOMATIC THERMALS. WHEN THE THERMALS COOL DOWN, THEY WILL ALLOW THE MOTOR TO AUTOMATICALLY START UP AGAIN, UNLESS YOU HAVE LOCKED OUT THE POWER TO THE MOTOR. IF AN EXPLOSION PROOF MOTOR IS USED IN AN AREA CONTAINING VOLITILE LIQUIDS, GASES, FUMES OR DUST FOR WHICH THE MOTOR WAS NOT DESIGNED TO OPERATE IN, AN EXPLOSION AND/OR FIRE CAN OCCUR.**

      ALL WIRING CONNECTIONS, INSPECTION AND MAINTENANCE OF ANY MOTOR MUST BE PERFORMED BY A LICENSED ELECTRICIAN IN ACCORDANCE WITH THE

MOTOR MANUFACTURERS RECOMMENDATIONS, ALL ELECTRICAL CODES AND OSHA REGULATIONS. FAILURE TO PROPERLY INSTALL, WIRE CONNECTIONS, INSPECT OR PERFORM ANY MAINTENANCE TO A MOTOR CAN RESULT IN MOTOR FAILURE, PROPERTY DAMAGE, EXPLOSION, ELECTRICAL SHOCK AND/OR DEATH.

8. **Normal Motor Operating Temperatures: The normal operating temperature of a fully loaded, open type, electric motor operating in a 70°F. (21°C.) ambient temperature is 174°F. (79° C.)**

C. Maximum Blower Speed and Variable Frequency Drives (VFD):

If you will be using a VFD with this blower, DO NOT exceed the maximum safe blower speed. Installing and using a speed control device requires special training and certification as required by the speed control manufacturer. See the manufacturer's instructions for proper use, installation and wiring connections for the maximum speed settings. It may be necessary to "block out" some speeds to eliminate a resonant vibration problem. The maximum safe blower speed is shown on the data sheet shipped with the blower. If you have lost the data sheet, contact Precision AirConvey. You must provide the serial number from the blower name plate for PAC to determine the maximum safe blower speed. Precision AirConvey will only extend the motor manufacturers warranty, when used with a speed controlling device, if the motor displays "Inverter Duty" on the motor name plate. If the motor does not have "Inverter Duty" marked on the motor name plate, and you have a motor failure, you will be required to contact the motor manufacturer for any service or warranty claims.

MAINTENANCE

Maintenance on the BALANCE fan must be carried out by suitably qualified technicians, and local safety standards must be maintained.

Work should not be performed on the machine components without the Electrical Supply being securely isolated.

Task	Maintenance intervals according to use			
	Daily	Weekly	Monthly	Yearly
Check all Hardware		X		
Check Wheel Balance				X
Check Blower shaft and bearings				X
Oil Motor Bearings*				
Oil Blower Bearings**				

*** Only applicable if the motor bearings are not sealed. If they are not sealed, refer to motor maintenance manual**

**** Refer to chart in Maintenance section for proper frequency of lubrication**

A. Hardware:

All blower and foundation hardware should be checked ensure it is tight. Wheel set screws or taper-lock bushings should be tightened. **NOTE:** If any set screws have loosened, they must be replaced. **NEVER** use set screws more than once. **Replace with knurled, cup-point set screws with a nylon locking patch.**

B. **Motor Bearing Lubrication:**

Most smaller motors have sealed bearings that never require re-lubrication for the life of the motor. For motors with grease fittings, consult the motor manufacturer's recommendations for lubrication frequency and grease type. **DO NOT** over grease the motor bearings. Generally, 1-2 shots should be adequate. Use a hand operated grease gun at no more than 40 PSI. ***If possible, carefully*** **lubricate the motor bearings while the motor is running.**

C. **Blower Bearing Lubrication (Arrangement 9)**

Blower bearings should be re-lubricated per the chart below for all **clean and dry** applications where the ambient temperature or blower air temperature is -20°F (-29°C) up to 120°F (49°C). If your application is dirty, moisture laden air, or is outside the temperature limits stated, consult the bearing manufacturer for the proper grease type and lubrication frequency. The chart below is affixed to every belt driven blower base. **NOTE: For high temperature applications that require high temperature grease in the**

blower bearings, a chart similar to below will specify that ONLY Dow Corning DC44 (silicone based) high temperature grease should be used.

DO NOT over grease the blower bearings. Generally, 1-2 shots should be adequate. Use a hand-operated grease gun at no more than 40 PSI. **IF POSSIBLE, CAREFULLY lubricate the blower bearings while the blower is running.**

D. **Wheel Balance:** All blower wheels are Balanced at the factory. It is not uncommon that additional "trim balancing" is required after the blower is assembled. Trim balancing of the blower assembly is typically <u>always</u> necessary for all replacement wheels. **After any wheel is installed, the final Balance of the entire blower assembly should be checked.** Air stream material or chemicals can cause abrasion or corrosion of the blower parts. This wear is generally uneven and, over time, will lead to the wheel becoming unBalanced, causing excessive vibration. When this happens, the wheel must be reBalanced or replaced. The other air stream components should also be inspected for wear or structural damage and cleaned or replaced if necessary. **After cleaning any blower wheel, it should be Balanced and then "trim Balanced" <u>on the motor shaft</u>.**
    a. There are two ways to Balance a blower wheel:
        i. **Add balancing weights for <u>fabricated</u> aluminum, steel or stainless steel wheels:**
            1. Balance weights should be rigidly attached to the wheel at a location that will not interfere with the blower housing nor disrupt air flow. It is preferred they are welded to the wheel. When trim balancing the wheel, **on the blower,** be sure to ground the welder **directly** to the blower wheel. Otherwise, the welding current will likely pass through the motor and damage the motor bearings.
        ii. **Grinding off material for cast aluminum wheels: (on some models)**
            1. If you are grinding on the wheel to remove material, be very careful not to grind too much in one area. This could affect the structural integrity of the wheel.

               <u>NOTE</u>: Removing any Backward Inclined or Airfoil wheel from the blower for cleaning, requires special attention when reinstalling the wheel back into the blower housing. Make sure you reinstall the wheel so the proper wheel to-inlet clearance is maintained. Failure to do this will affect the blower's airflow (CFM), static pressure (SP) capabilities and efficiency. Consult Precision AirConvey assistance if necessary.

E. **Vibration:** As mentioned previously in this manual, excessive vibration may cause premature motor bearing failure that could lead to catastrophic blower failure. After

performing any type of routine maintenance, the vibration readings should be taken. New readings should be taken (maximum every 12 months) and compared to the readings previously recorded during the initial startup. **If any major differences is present, the cause should be determined and corrected before the blower is put back into operation.**

a. The most common causes of vibration problems are:
    i. Wheel unBalance
    ii. Mechanical looseness
    iii. Poor blower inlet and/or discharge conditions
    iv. Foundation stiffness.

F. **Blower Shaft & Bearing Replacement**: (Arrangement 9)

The blower shaft and bearings for Precision AirConvey blowers are carefully selected to match the maximum load and operating conditions for each specific model. If the instructions in this manual and those provided by the bearing manufacturer are followed, you should not need to replace the bearings for many years.

When you do need to replace the bearings, it is strongly recommended that the blower shaft also be replaced. Use the following applicable steps when replacing the blower bearings and/or blower shaft:

a. **LOCK OUT THE POWER SOURCE TO THE MOTOR AND ALLOW THE WHEEL TO COME TO A COMPLETE STOP.**
b. If necessary, disconnect the inlet and/or discharge duct work from the blower.
c. Remove the inlet side of the blower housing.
d. Measure the location of the blower wheel on the shaft, then remove the locking hardware in the wheel hub.
e. **Carefully** remove the blower wheel.
f. Remove the blower shaft/bearing guard and belt guard (if applicable).
g. Loosen the 4 bolts holding the motor onto the motor adjustment base.
h. Loosen the tension adjustment bolt(s) on the end of the motor adjustment base.
i. Remove the belt(s), loosen the blower sheave set screws or taper-lock hub bolts and remove the blower sheave.
j. Disconnect any lube lines to the bearings (if applicable).
k. On most models, there is a rust preventative coating that was applied to the blower shaft before shipment. Remove this coating at all areas with a solvent or degreaser. **WARNING: Do not use gasoline to remove the coating.**
   CAUTION: Use gloves to protect your skin.
l. Measure location between bearings and distance from the bearings to each end of the shaft.
m. Remove the hardware holding the bearings on the blower shaft. Then, remove blower shaft from bearings.

n. Remove the hardware holding the bearings on the blower base. **Be careful not to change the location of any bearing pads that are under the bearings.**
o. When replacing the bearings, we strongly recommend that the blower shaft be replaced. However, if you intend to use the same blower shaft, file down all the setscrew marks on the shaft.
p. Install new bearings onto the new blower shaft or onto the original shaft. Be sure the bearing locking collars are facing each other and the set screws are in line with each other.
q. Place the blower shaft/bearing assembly onto the blower base with any bearing pads located under each bearing as were under the original bearings.
r. Install the hardware to bolt the bearings to the blower base, **but do not tighten at this time.**
s. Slide the blower shaft into the bearings so the dimensions match those originally taken.
t. Tighten the bearing mounting bolts that hold the bearings on the blower base.
u. Using a soft-faced mallet, **GENTLY** tap on the blower shaft in between the two bearings while turning the blower shaft by hand. This will "**seat**" the bearing races. **The shaft MUST TURN freely.**
v. Tighten the set screws in both bearings. **NOTE:** If there are 2 set screws per bearing, tighten the set screws in line with each other on each bearing and then the other set screws.
w. Turn the blower shaft again to make sure it turns freely and does not bind.
x. Slide blower sheave onto the blower shaft.
y. Align the blower and motor sheaves and adjust belt tension per the instructions in **Section 1** on pages .
NOTE: Install new shaft key and any sheave set screws.
z. Reconnect any bearing lube lines (if applicable.)
aa. While rotating the blower shaft, lubricate blower bearings with fresh grease
bb. Install new set screws into the wheel, or taper-lock hub bolts into the hub. **Do not use old screws or bolts.**
cc. Install the blower wheel onto the blower shaft making sure it is in the same original location.
dd. Install new shaft key into the wheel.
ee. Turn the wheel by hand to determine if there is any binding of the shaft in the bearings, or if there is any interference between the back plate of the wheel and the blower housing.
ff. Tighten the wheel set screw, over the key first. Next, tighten the set screw onto the blower shaft. Or, tighten the taper-lock hub bolts. Reinstall the blower inlet

side housing.

gg. Turn the wheel by hand to determine if there is any interference between the wheel and the inlet side of the blower housing.

hh. Unlock power to motor and turn on.

ii. Let blower run for 10 minutes.

jj. **Turn off and lock out power to the motor.**

kk. Check all hardware and set screws to make sure they are tight.

ll. Reinstall all safety guards supplied with the blower or by the user, and any duct work connections.

mm. Unlock power to motor and turn on.

nn. **Repeat steps 1, 6, 38, 39 and 40 (in that order) after 8 hours and again after 1 week.**

G. **Safety Equipment & Accessories:**

It is the users responsibility to ensure that all safety guards required by company, local, state and OSHA regulations are properly secured and fully functional at all times. If any guards become defective or non-functional at any time, **the power to the blower <u>MUST</u> be turned off and locked out** until complete repairs and/or replacements have been made, installed and inspected by authorized personnel. Any accessories used in conjunction with the blower should also be inspected to make sure they are functioning within their intended limits and design specifications. The manufacturer's maintenance manuals should be referred to for correct maintenance procedures. These accessories include, but are not limited to, the following: shaft seals, inspection doors, vibration isolators or vibration bases, air flow or pressure measuring equipment, hoods, controls, special coatings, silencers, expansion joints, valves, flexible connectors, and filters.

TROUBLESHOOTING

The equipment fitted in the BALANCE fan is all of superior quality, supplied by recognized manufacturers, however, as with all machinery, components do occasionally fail or require adjustment. The following troubleshooting list is as fully detailed as possible to ensure that should any faults occur, the machine downtime is reduced to a minimum. This should not be regarded as a potential list of machine faults. It should be noted that all checks should be completed by competent personnel, i.e. all checks carried out on the electrical circuitry must be carried out by a suitably qualified technician or engineer, similarly, all checks carried out on hydraulic components must be carried out by a suitably qualified technician or engineer.

Problem	**Cause**
Excessive Vibration	• Loose mounting bolts, wheel set screws, taper-lock hubs • Misalignment of sheaves, blower bearings, or motor* • Worn or corroded blower wheel • Accumulation of foreign material on blower wheel • Bent motor shaft • Worn motor bearings • Worn blower bearings* • Worn sheaves and/or belts* • Motor out of Balance • Inadequate structural support • Support structure is not sufficiently cross based • Weak or resonant foundation • Foundation not flat and level
Airflow (CFM) Too Low	• Blower wheel turning in wrong direction (rotation) • Actual system static pressure (SP) is higher than expected • Motor speed (RPM) is too low • Dampers or valves not adjusted properly • Leaks or obstructions in duct work • Filters dirty • Inlet and/or discharge guards are clogged • Duct elbow too close to blower inlet and/or discharge • Improperly designed duct work • Blower wheel not properly located relative to the inlet bell
Airflow (CFM) Too High	• Actual system static pressure (SP) is lower than expected • Motor speed (RPM) too high • Filter not in place • Dampers or valve not adjusted properly

Problem	Cause
Motor Overheating	Note: a normal motor will operate at 174 degrees Fahrenheit • Actual system static pressure (SP) is lower than expected • Voltage supplied to motor is too high or too low • Motor speed (RPM) too high or defective motor • Air density high than expected • Motor wired incorrectly or loose wiring connections • Cooling fan cover on back motor is clogged (fan cooled motors only)
Excessive Noise	• Wheel rubbing inside of housing • Worn or corroded blower wheel • Accumulation of foreign material on blower wheel • Loose mounting bolts, wheel set screws, or taper-lock hubs • Bent motor shaft • Bent blower shaft* • Worn motor bearings • Motor out of Balance • Motor bearings need lubrication • Blower bearings need lubrication* • Vibration originating elsewhere in system • System resonance or pulsation • Inadequate or faulty design of blower support structure • Blower operating near "stall" condition due to incorrect system design or installation
Fan Doesn't Operate	• Motor wired incorrectly and/or loose wiring connections • Incorrect voltage supply • Defective fuses or circuit breakers • Power turned off elsewhere • Motor wired incorrectly or loose wiring connections • Defective motor

*Arrangement 9 only

Belt Tensioning

After installing new belts, check tension midway between sheaves. Belts should deflect about 1/64" per inch of span length with approximately 20-lb. force. Allow unit to run for 4 – 6 hours, then it will be necessary to re-tighten belts again as new belts tend to initially stretch.

"We Convey Solutions"

Electrical Specifications

Precision AirConvey Corporation (PAC) is not providing the electrical installation for the system, nor are we responsible for it. However, to ensure successful performance of the system, PAC has established the following guidelines for the electrical schematic. PAC recommends the fan be inoperable when the cutter is not running. This will prevent two unwanted occurrences.

1. When a fan draws air through a turned off cutter chamber, it causes the rotor to turn in the reverse direction. Depending on the volume of air, the rotor can reach speeds in excess of 500 RPM. If the cutter is turned on with the rotor turning in reverse, the motor may burn out trying to overcome the reverse rotation.
2. Due to the high speeds the cutter can achieve in reverse, the operator may mistakenly think the cutter is turned on and feed material into it. The cutter may cut the material while turning in reverse, but it will eventually wrap around the rotor and clog.

PAC recommends a quick disconnect be installed on the electrical equipment. Cutters and fans are dangerous if the proper safety precautions are not followed when operating this equipment. PAC also recommends following proper lockout/tagout procedures when servicing the equipment to ensure the power cannot be turned on during service.

Interlocks

If the system is supplied with interlocks, the procedures listed below must be followed:

1. The cutter must be operating in order for the fan to be turned on.
2. If the fan interlock is opened, the cutter will turn off as well as the fan.
3. If the cutter interlock is opened, the fan will turn off as well as the cutter.

Power Requirements

PAC equipment is supplied with standard electrical components. These components run on a standard power supply as determined by the customer and PAC technical staff and is included in the system layout drawing.

When reordering replacement electrical components, obtain the following information from the equipment nameplate:

1. Horse power (HP), if applicable
2. RPM, if applicable
3. Phase (Ph), typically 3 ph
4. Voltage (V), typically 230/460V
5. Hertz (Hz), typically 60 Hz

Control Panel

If the PAC technical staff has determined that your system requires a control panel, the power supply is laid out in the following drawing (Dwg. No. 0763M088). Any additions to the control panel will have an additional drawing issued.

"We Convey Solutions"

Dust Plenum

Installation, Operating and Maintenance Manual

PAC Dust Plenum Manual (October 2012)

Printed in USA

For service inquiries or additional information on this or any other Precision AirConvey product, please visit **www.airconvey.com.**

or contact us via one of the following:

Telephone: 302-999-8000

Fax: 302-999-8510

Email: get-facts@airconvey.com

Precision AirConvey
Pencader Corporate Center
465 Corporate Boulevard
Newark, DE 19702

Contents

INTRODUCTION

Dust Plenums are used to filter the air being removed from air handling equipment, such as a slant screen separator or cyclone. The air from the discharge side of the separation devise is filtered through the bags and typically discharged back into the facility. The typical number of bags in a plenum filter varies from 4 to 16, increasing by increments of 2. However, larger dust plenums can be designed to meet customer needs. The typical bag is 16 inches in diameter and 120 inches (10 feet) long. Other size bags are available with different diameters and lengths. Bags can be rolled up or cut to fit an application, but will lose surface area.

To ensure optimum performance and safe operation of the unit, everyone who installs, uses or maintains it must read and carefully follow the instructions in this manual.

Throughout this manual, the Dust Plenum is also referred to as the Plenum or the unit.

Specifications

Plenums are 99% efficient up to 10 microns and 100% over 10 microns.

DIMENSIONS*:	64” L x 44” x 17” H
WEIGHT**:	6 bag plenum with empty bags 175 lbs. (est.)
SCHEMATICS:	See Page **Error! Bookmark not defined.**

*Approximate for 6 bag dust plenum (w/o bags)

** Weight of the Plenum increases when bags fill with dust. Roofing support must be sufficient to support the plenum and bags that have accumulated dust. The amount of allowable accumulation will vary by material type and density.

***NOTE*: Due to our commitment to continuous product improvement, we reserve the right to change the specification without notice.**

SAFETY

Always follow the general safety and accident prevention rules in addition to those set forth in this manual.

The Dust Plenum is designed and built with safety as a prime consideration. Each unit is checked at the factory for safety and operation.

Follow the maintenance schedules outlined in this manual for good performance and safe operation. Maintenance should be done only by qualified personnel and only with proper tools.

Carefully read the following safety rules before proceeding with installation, operation or maintenance. The rules are essential to ensure safe operation of the unit. Failure to follow these rules may void the warranty and/or result in damage to the unit or personal injury.

Safety Instructions

Safety instructions in this manual are boldfaced for emphasis. The signal words **DANGER**, **WARNING** and **CAUTION** are used to indicate hazard seriousness levels as follows:

DANGER – Immediate hazard which WILL result in severe injury or death.

WARNING – Hazard or unsafe practice which COULD result in severe injury or death.

CAUTION – Hazard or unsafe practice which COULD result in minor injury or in product or property damage.

Safety Labels

Safety labels on the unit provide important safety information. If any label is missing or damaged, contact the manufacturer, request a new label and apply it to the unit.

When cleaning or emptying the dust plenum, wear proper protective equipment to prevent exposure to the large amounts of dust. This includes a breathing mask and safety glasses.

RECEIVING AND INSPECTION

Upon receipt, inspect the Dust Plenum closely for damage. Record any indication of damage on the delivery receipt, especially if the unit will not be immediately installed. Obtain the delivery person's signed agreement to recorded damages to facilitate future insurance claims.

Since the Dust Plenum is shipped F.O.B. Factory, the manufacturer's responsibility for the shipment ceases when the carrier signs the bill of lading.

If the unit is received short or in damaged condition, notify the carrier and insist on a notation of the loss or damage across the face of the freight bill. Otherwise no claim can be enforced against the carrier.

If concealed loss or damage is discovered, you must notify your carrier at once and request an inspection. This is absolutely necessary. Unless you do this, the carrier will not consider any claim for loss or damage. The carrier will make an inspection and may grant a concealed damage notation. If you give the carrier a clear receipt for goods that have been damaged or lost in transit, you do so at your own risk and expense.

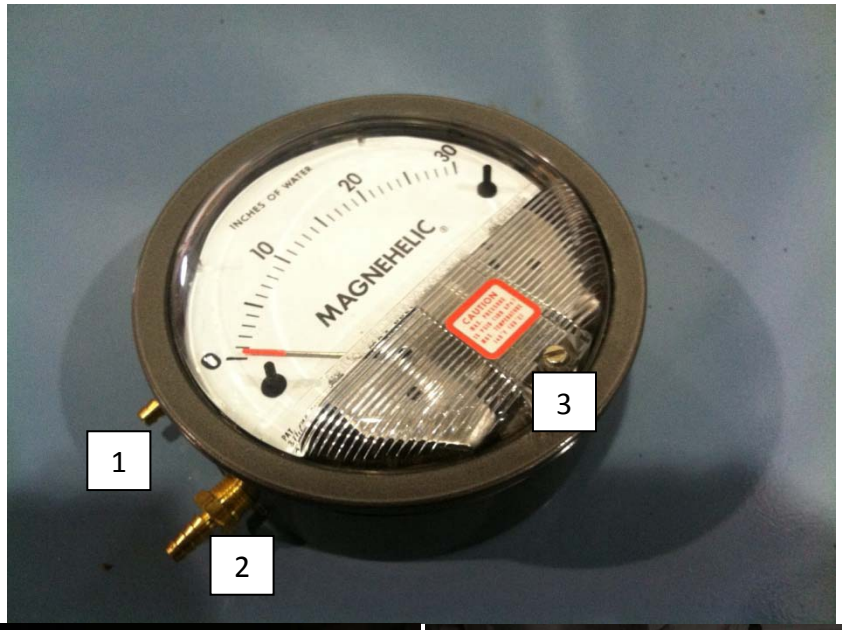
THEORY OF OPERATION

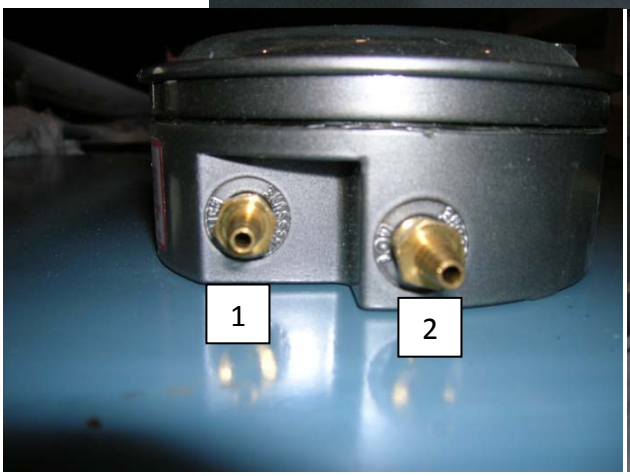
The dust plenum filters out dust and other fine particles from a trim system. The air with dust and other particles is removed from the separation device and travels to the plenum. The unit is made up of a plenum and filter bags. The size of the plenum is tailored to the customers needs.

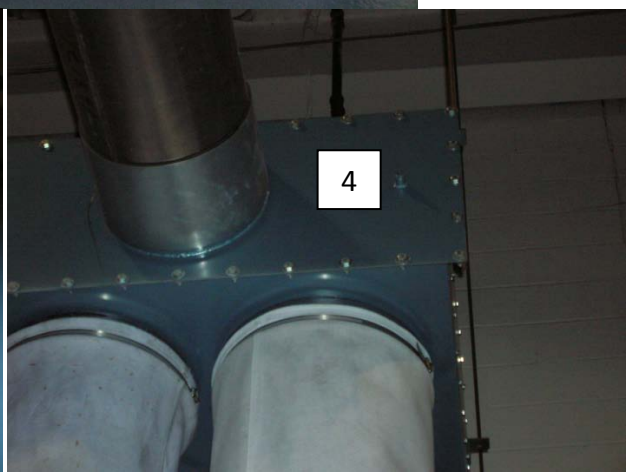
INSTALLATION INSTRUCTIONS

To assemble the dust plenum, first secure the front plate to the plenum. The dust plenum must be secured to the ceiling with either all-thread or gripples. While these are the recommended methods for mounting the dust plenum, other methods may be used if they are safe and more efficient.

The next component of the system, optional but strongly recommended, is the Magnehelic Gauge. This device is used to measure the pressure differential in the system. It can be mounted on the plenum itself or lower to the ground where the user can easily read it. The pressure fitting is on the right of the front plate when facing the inlet. Tubing is included with the gauge and allows the user to mount it closer to ground level. The tubing of this gauge should not exceed 20 feet. The high pressure port connects to the plenum and the low pressure port remains open to the warehouse atmosphere. The labels are found on the gauge. Once the plenum has been installed, the filter bags can be secured to the system. The filter bags included with the plenum are usually 16 inches in diameter and 120 inches long. However, dimensions can vary for different applications. The bags are secured to the plenum with worm/hose clamps. The bottoms of the bags are closed with quick release straps.







1- High Pressure Port – Tubing to dust plenum connects here
2- Low Pressure Port – This port is left open to the atmosphere
3- Zero – This screw can be adjusted to zero the needle on the gauge
4- Pressure fitting – This plug on the front plate of the dust plenum is where the tubing from the Magnehelic Gauge is connected

INSTRUMENTATION

The dust plenum is a component to the trim system. The only instrumentation that the user should be concerned with is the Magnehelic gauge (pictured above). However, not every plenum is equipped with one.

UNIT OPERATION

During unit operation, there is not much work that needs to be done for the plenum. If present, the Magnehelic gauge should be monitored during operation. When a pressure differential of 1.5" of H_2O is measured in the system, this is a good indicator that the plenum and dust filters need to be cleaned. Some systems can go up to 3" of H_2O before separation performance is affected. These pressure readings are purely guidelines for the customer and a cleaning schedule is material and design dependant. The filter bags should also be monitored for cleanliness.

MAINTENANCE

Maintenance on the Dust Plenum must be carried out by suitably qualified technicians, and local safety standards must be maintained.

Work should not be performed on the machine components without the Electrical Supply being securely isolated.

The bags should be emptied and cleaned as needed. This solely depends on the work environment and customer needs. When emptying and cleaning dust filters, be sure to check the opening in the plenum for a clog that may need to be cleared.

Washing Instructions for Shaker Felt Filter Bag

Synthetic filter media are washable, irrespective of whether they have been used for dust collection or for the separation of solids from liquids.

Filter sleeves which have become blinded should not be removed from the plant, but should be cleaned mechanically and/or pneumatically until all surface dust has been removed. Preferably, this should be done by shutting off the dust supply and operating the cleaning mechanism for some time. There should be no interruption in the cleaning operation between normal operating conditions and the suspension of the product.

1. IN THE CASE OF EASILY REMOVABLE WATER SOLUBLE SOILING, place the filter sleeves in a large tub and add cold water. Stir with a wooden or plastic lath. Please observe the rule, *"plenty of rinsing and little movement"*. Shaker Felt is a three-dimensional filter medium. Particles which have penetrated into the depths of the shaker felt must be removed from the pores by deep rinsing.
   If cold water is ineffective, the temperature of the bath should be increased to 120º-140ºF. Steeping overnight intensifies the effect and saves the filters. A non-ionic wetting agent may be added (e.g., 1-2 gm/liter Levapoon* 150, Bayer AG) and/or a mild washing

powder (e.g., 3 gm/liter Fewamat*, Henkel AG) to speed up the washing operation. Textiles are subject to abrasion. Improper mechanical treatment leads to surface damage and fraying of the Shaker Felt. Use of drum-type washing machines is recommended, provided that the filter media are adequately protected from friction on the drum walls. This can be accomplished, for example, by wrapping the filter in large sacks of a very open weave.

2. ALKALINE SOILING (e.g., cement and lime) may be leached out by acids. We recommend two hours steeping of the filter media in a bath containing 1-2 ml/liter (milliliters per liter liquid), temperature of 120ºF maximum.
3. ACID SOILING (e.g., from anionic minerals) is removed by alkalis (steeping in a bath containing 1-2 ml/liter ammonium hydroxide), temperature of 120ºF maximum.
4. RESINATED SOILING (e.g., resins, pitch) are dissolved by solvent additions to the bath. We recommend, for example, several hours cold steeping in a 1-10 gm/liter Diadavin WTS*, Bayer AG, depending on the degree of soiling. Heating up of the wash liquid tends to evaporate rapidly on heating. To guard against dangers to health, the work rooms should be adequately ventilated and the Factory's Act regulations must be observed.
5. THE FILTER MEDIA MAY BE DRIED either by exposure to the air or in industrial dryers at temperatures not exceeding 200ºF.

If regular cleaning of filters is required and it inhibits the continuous operation of a system, it is recommended to have an extra set of dust plenum filters available.

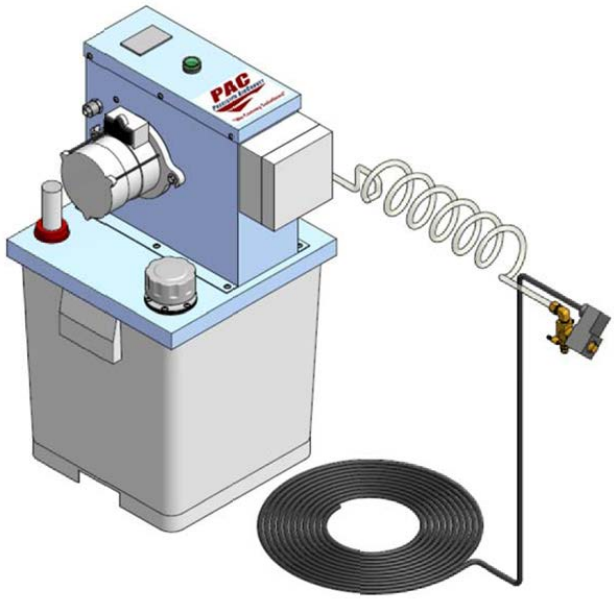
REPLACEMENT PARTS

Filter Bags – DUSTPLNUMFLTRBAG(Diameter)X(Length)*

*Diameter and Length are inches that correspond to the respective measurement. Parentheses () are not included in the actual part number. Ex. DUSTPLNUMFLTRBAG16X120

Worm Clamps – DUSTPLNUMSSCLMP

Quick Release Straps – DUSTPLNUMQRNS



EnviroPulse 16-3
103622
Oil Mist Kit

Original User Instructions
Installation, Operating and Maintenance Manual

PAC EnviroPulse 16-3 Oil Mist Kit Manual (April 2022)

For service inquiries additional information on this or any other Precision AirConvey product, please visit **www.airconvey.com.**

or contact us via one of the following:

Phone: +1- 302-999-8000

Fax: +1-302-369-5680

Email: get-facts@airconvey.com

Precision AirConvey
Pencader Corporate Center
465 Corporate Boulevard
Newark, DE, 19702, USA

Table of Contents

INTRODUCTION

The EnviroPulse 16-3 is a required component for systems running adhesive materials. The kit works by applying a thin film of oil to the internal surfaces of the convey path. This thin film of oil is critical for keeping the adhesive from adhering to the interior of the tubing, elbows, and other components.

Features:

- Able to interlock with press
- Interlock with trim system
- Equipped with an oil pressure switch to ensure consistent, monitored timed oil injections and provide feedback in the event of an oil injection fault

To ensure optimum performance and safe operation of the unit, anyone who installs, uses or maintains it must read and carefully follow the instructions in this manual.

Throughout this manual, the EnviroPulse 16-3 is also referred to as the Oil Mist Kit, Oil Mist or the unit.

Specifications

MODEL:	EnviroPulse 16-3
DIMENSIONS:	15” (381mm) L x 17” (432mm)W x 29” (737mm) H
WEIGHT:	Empty: 36 Lbs (16 Kg). Full*: 123 Lbs. (56Kg). * Filled with 13 gallons (49 L) of 5W Food Grade Mineral Oil
ELECTRICAL:	110 V
OIL:	5W Food Grade Mineral Oil**
SCHEMATICS:	See Page 20

NOTE: Due to our commitment to continuous product improvement, we reserve the right to change the specifications above with or without notice.

SAFETY

Always follow general safety and accident prevention rules in addition to those set forth in this manual.

When installing and using the Oil Mist Kit, keep the unit on a flat, stable surface. Avoid placing it in an area where it is at risk for being knocked over or run into with a fork lift.

Ensure there are no tripping hazards around the unit while it is in use.

In the event of an oil spill while filling, clean up the spill immediately. An oil spill poses a slipping hazard.

Do not rest objects on the unit.

The Oil Mist is designed and built with safety as a prime consideration. Each unit is checked at the factory for safety and operation.

Follow the maintenance schedules outline in this manual for good performance and safe operation. Maintenance should be done only by qualified personnel and only with proper tools.

Carefully read the following safety rules before proceeding with installation, operations or maintenance. The rules are essential to ensure safe operations of the unit. Failure to follow these rules may void the warranty and/or result in damage to the unit and/or personal injury.

If at any time the unit shuts down from over-amperage or a power surge, the electrical reset button is located on the side of the electrical box. Press the Reset Button shown in **Figure 1** when the unit needs to be reset.

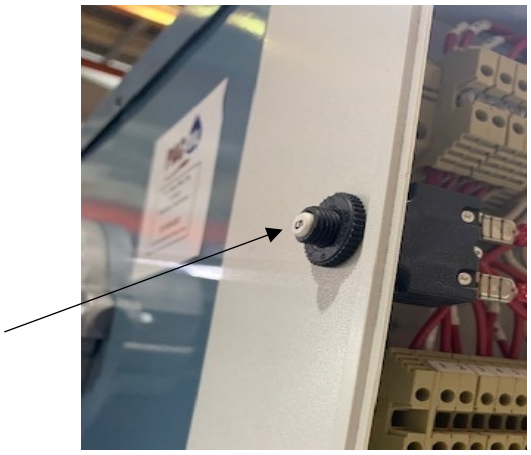


Figure 1

Safety Instructions

Safety instructions in this manual are boldfaced for emphasis. The signal words **DANGER**, **WARNING** and **CAUTION** are used to indicate hazard seriousness levels as follows:

DANGER – Immediate hazard which WILL result in severe injury or death.

WARNING – Hazard or unsafe practice which COULD result in severe injury or death.

CAUTION – Hazard or unsafe practice which COULD result in minor injury or in product or property damage.

Safety Labels

Safety labels on the unit provide important safety information. If any label is missing or damaged, contact the manufacturer, request a new label, and apply it to the unit.

RECEIVING AND INSPECTION

Upon receipt, inspect the Oil Mist Kit closely for damage. Record any indication of damage on the delivery receipt, especially if the unit will not be immediately installed. Obtain the delivery person's signed agreement to recorded damages to facilitate future insurance claims.

If the unit is received short or in damaged condition, notify the carrier and insist on a notation of the loss or damage across the face of the freight bill. Otherwise, no claim can be enforced against the carrier.

If concealed loss or damage is discovered, notify your carrier at once and request an inspection. This is absolutely necessary. If you don't do this, the carrier will not consider any claim for loss or damage. The carrier will make an inspection and may grant a concealed damage notation. If you give the carrier a clear receipt for goods that have been damaged or lost in transit, you do so at your own risk and expense.

THEORY OF OPERATION

The Oil Mist Kit is operating with an 13 gallon (49.2 L) oil storage tank. It does not require compressed air and can be refilled with oil while it is operating. The self-contained pump within the oil mist operates at 100 psi (6.9 Bar). This pressure range allows for oil use optimization when used in conjunction with PAC supplied atomizing nozzles. It has an editable timer built into the PLC logic so the timed operation sequence can be tailored to the trim adhesive characteristics of the application. If desired, the customer can compensate for different levels of adhesion on a run-by-run basis. The atomizing nozzle allows for an extremely efficient operation by coating the ductwork throughout the system While conserving oil.

INSTALLATION INSTRUCTIONS

The assembled unit is shipped with 50 feet of tubing and two (2) nylon ferrules for connection between the kit base and injection nozzle. The customer is responsible for obtaining 5W Food Grade Mineral Oil and making all necessary electrical connections.

Mechanical

The Oil Mist Kit is a non-pressurized oil containment vessel with a top mounted self-contained oil pump, PLC and solenoid to control the flow of oil to the pickup nozzle. There is 50 feet (15 meters) of tubing supplied with the Oil Mist Kit to allow routing from the canister to the infeed nozzle. During installation, the routing of the tubing should be as direct as possible between the reservoir and nozzle. Trim the tubing length as necessary for fit and use the brass fittings and nylon ferrules supplied for each end of the tubing.

The oil reservoir must be inspected daily to ensure the oil level is adequate. Therefore, the selected location should allow easy access to the equipment.

1. Locate the oil reservoir as close as possible to the infeed nozzle in a location favorable to daily inspection and easy refill.
2. Attach the supplied tubing to the outlet of the oiler and route the tubing to the inlet of the nozzle, keep the tube length as short as possible to minimize the backpressure in the tubing. Use the supplied nylon ferrules when attaching the tubing to the fittings to seal the lines completely.

Electrical

Unless specified otherwise, the unit requires 110 volt power from a dedicated location of the Customer's choosing. Power is not supplied by the trim system control panel. Isolated control circuits communicate run and fault signals between oiler and control panel. The oiler PLC is responsible for timing of injections, monitoring of the oil level and pump function.

INSTRUMENTATION

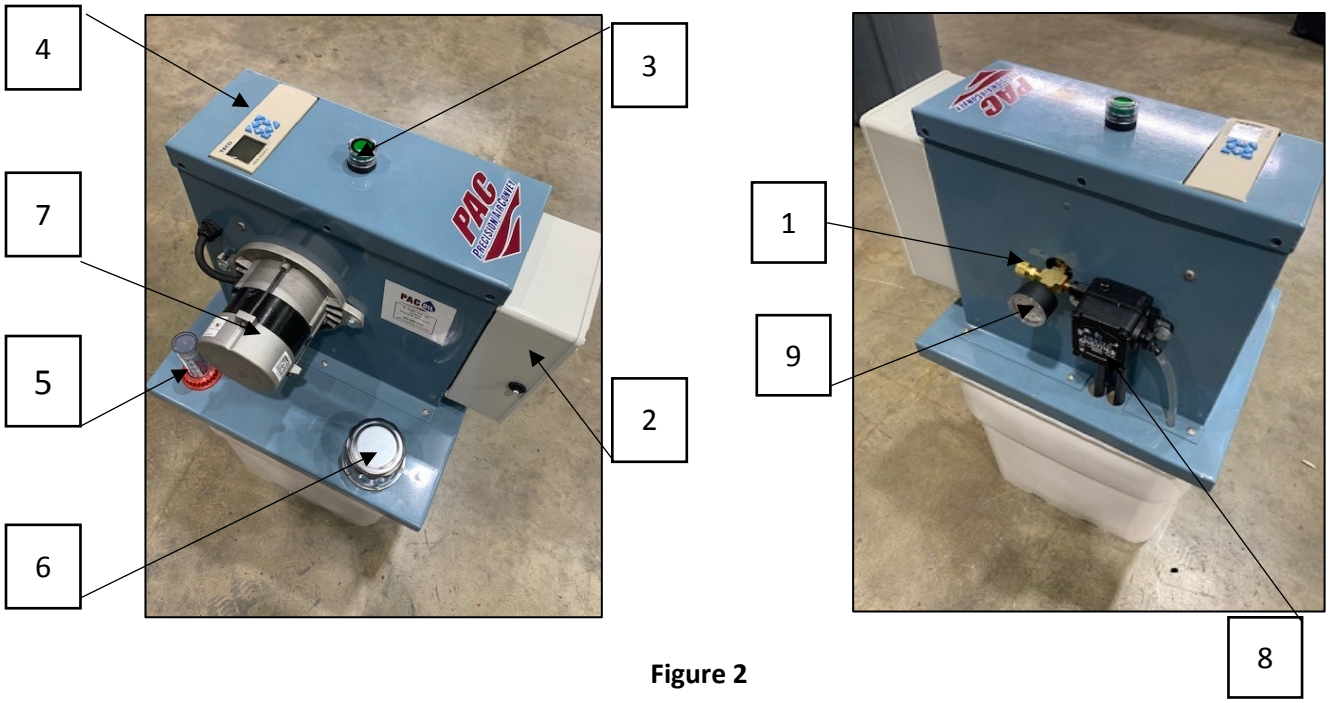


Figure 2

1. **Oiler Outlet** – Connection for tube between base and atomizing nozzle.
2. **Control Box** – Wiring of the controls.
3. **Indicator Light/Function Test Button** – Start button with green indicator light.
4. **Menu to Program Time** - User screen for timer adjustment. Illuminates green temporarily when any button is pushed.
5. **Oil Level Indicator** – Provides user with an accurate visual gauge on the amount of oil in the container.
6. **Fill Cap** – Cap that covers opening to refill oil container.
7. **Pump Motor** – Operates the pump.
8. **Pump** – Operates at 100 psi (6.9 bar).
9. **Oil Pressure Gauge** – Indicates oil pressure generated by pump.

INITIAL STARTUP INSTRUCTIONS

CAUTION: The unit was tested at the factory prior to shipment, so there will be residual oil in the system components.

1. Wire the unit according to the factory supplied electrical diagram on pages 22 and 23.
2. Install factory supplied poly tubing between the pump outlet and the solenoid mounted in the trim system inlet nozzle.

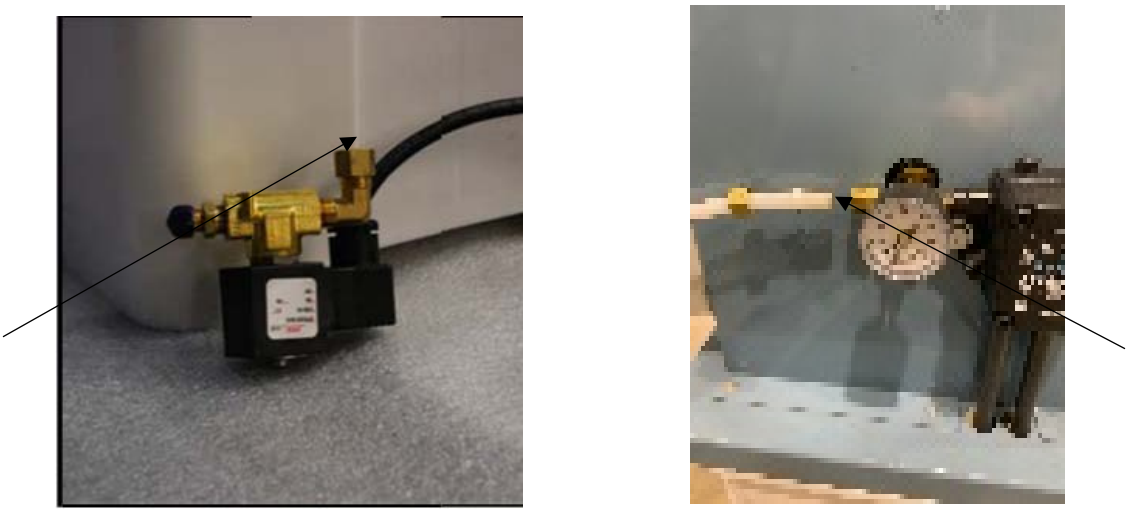


Figure 3

3. Remove the brass nut, ferrule, and sleeve from the pump outlet. Discard the brass ferrule and use the supplied nylon ferrules to prevent leaks. Add the brass nut and nylon ferrule onto the poly tubing. Insert the brass sleeve into the end of the tubing and attach to the pump outlet. See pictures below. Attach the other end of the poly tubing to the trim system inlet nozzle following the same process.
4. Fill the unit slowly with customer supplied 5W food grade mineral oil until the site gauge reaches the full mark. Verify the level indicator is properly reflecting the oil level (during shipping, the mechanical arm may become bound).

5. Before applying power, be certain tubing connections are tight. Press the flashing green light on top of unit down and hold for 5 seconds. After 5 seconds, the pump will turn on (you may release the button) and run for 15 seconds. Using a 3/8" open ended wrench, crack bleeder valve 1/4 turn. This allows air to purge through the tubing back to the tank. Solenoid will open after 10 seconds to allow oil to travel toward solenoid. Be sure to shut bleeder valve before the pump shuts off.

Figure 4

6. If the light stays illuminated solid green, priming is successful and gauge should read 100 psi. If light still flashes, repeat priming process (from Step 5) until light remains solid.
7. The unit is now primed and set up is complete.

If air is ever sucked in through the suction intake, unit will lose prime, drop pressure and fault. Green light will begin flashing and unit will shut down. The unit will not restart until the fault condition is cleared.

To clear the fault:

1. Press and hold the green button on top of the lid for 5 seconds. The pump will turn on and run for 10 seconds.
2. During this time, the pump can be primed by following steps 5 through 7 above.
3. If prime is successful, the unit will pressurize to 100 psi (6.9 Bar), as indicated on the oil pressure gauge, and the light will remain solid green and indicate normal operation.

coats he oil the

UNIT OPERATION

The Oil Mist Kit works by actuating a valve which forces oil into the air stream. The oil coats the interior surfaces of the trim system to prevent adhesives from sticking to the tubing, bends, and equipment.

Without oil, the adhesive material can stick to the tubing and clog. It is critical to the operation of any trim removal system handling adhesive material to provide oil to the inlet nozzles. **Never run the system without operating the oil mist system.**

The rate of oil being fed to the system depends upon several factors:

1. The type of adhesive
2. The amount of exposed adhesive
3. The line speed of the system
4. The size and shape of the trim
5. The air speed of the system

The initial setting of a one (1) second injection every three hundred (300) seconds is set at the factory. The system may need to be adjusted depending upon the factors listed above. If more aggressive adhesives are used, a reduced time in between injections may be necessary. Refer to instructions on page 23 to change injection settings.

PAC has provided the ability to interlock the Oil Mist Kit directly with the customer's press via a normally open isolated contact. This interlock provides the ability to further conserve oil consumption by automatically reverting to a reduced oil injection timing sequence when the press is not running. Refer to the Electrical Schematics on pages 22 and 23.

By default, the Oil Mist Kit is supplied with a jumper wire between terminals 5 - 6; between 7 - 8; and, between 9 - 10 (illustrated below).

Jumper Wires

Figure 5

With the press interlocks in use, the unit will operate on a reduced oil injection time sequence when the press is not running and automatically revert back to the standard oil injection sequence when the press is running. This function allows for the conservation of oil while the press is not in operation and, at the same time, prevents the internal sources of the trim system from becoming dry. This keeps the trim system at a ready state for clog free operation.

In the event of a low oil condition or low oil pressure condition, the oil kit PLC will activate the green indication light on the unit to flash slowly and send a fault signal to the main panel for indication of a general oil system fault.

PROPER SHUTDOWN INSTRUCTIONS

The unit will start and stop automatically when properly connect to the main control panel. For maintenance and service related work, properly shut down and isolate the entire trim system.

Optional (not included) local oiler disconnects can be added between the control panel and oiler. Powering off a local oiler disconnect without turning off the main trip system will activate the internal oiler fault shutdown timer within the main panel, resulting in a trim system shutdown.

MAINTENANCE

CAUTION – Maintenance on the Oil Mist Kit must be carried out by qualified technicians. In addition to these user instructions, local safety standards must be maintained and adhered to.

DANGER – Securely isolate the electrical supply before performing work on the machine component.

Task	Maintenance intervals according to use			
	Daily	Monthly	Quarterly	Yearly
Check oil level and fill screen	X			
Check vent is clear	X			
Check all fittings		X		
Check motor pump coupling			X	
Check submerged oil inlet filter				X

Check Oil Level and Fill Screen

- Check the external visual level indicator (Figure 6) to ensure the oil level is above 1/8 full. If required, fill the unit with mineral oil.

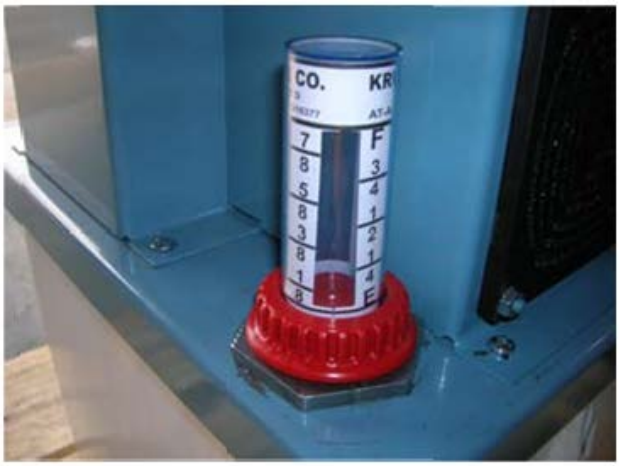


Figure 6

- Clear any debris from the oil fill screen (Figure 7) where the oil is poured into the unit.

Figure 7

Check Vent

- Remove the fill cap and inspect the bottom of the cap (Figure 8) to ensure that the vent is open to atmosphere and unobstructed. Clean or change as needed.

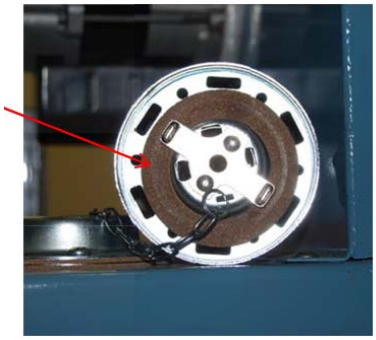


Figure 8

Check All Fittings

- Check for leakage in the fittings (nylon ferrules).
- Tighten or replace fittings as needed.

Check Motor Pump Coupling

- Verify coupling is tightened (Figure 9).

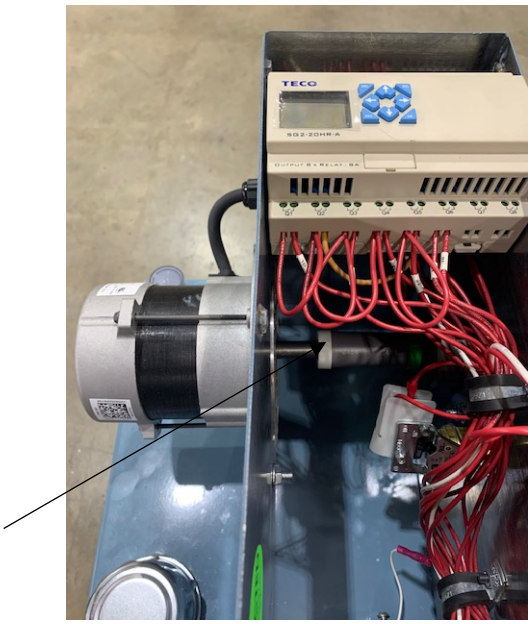


Figure 9

Check Submerged Inlet Oil Filter

- Remove the blue top and inspect the submerged oil inlet filter (Figure 10).
- Clean or change as necessary.

Figure 10

TROUBLESHOOTING

The equipment fitted in the Oil Mist Kit is of superior quality, supplied by recognized manufacturers. However, as with all machinery, components do occasionally fail or require adjustment. The following troubleshooting list is as fully detailed as possible to ensure that should any faults occur; the machine downtime is reduced to a minimum and should not be regarded as a potential list of machine faults. It should be noted that all checks must be carried out by competent and trained personnel. All checks carried out on the electrical circuitry must be carried out by a suitably qualified technician or engineer. Similarly, all checks carried out on hydraulic components must be carried out by a qualified technician or engineer.

Fault conditions

If the oil level drops below the float switch, the pump will shut down and the light will blink a steady flash indicating a fault condition has occurred. Fill with oil. When the oil reaches the required level, the pump will automatically start and return pressure to 100 psi (6.9 Bar).

If air is introduced into the system and pressure drops below 60 psi (4.1 Bar), a fault condition will occur. Refer to the Initial Startup Instructions on Page 10 and follow steps 4 through 7.

If unit is full, primed and not still working, remove the blue top and inspect the submerged oil inlet filter for debris and clean as necessary.

Refer to the Maintenance section on starting on Page 13 for further information.

REPLACEMENT PARTS

Service and Parts:

Phone: +1-302-999-8000

Fax: + 1 - 302-369-5680

PAC recommends you keep the following oil mist kit parts in stock:

Please provide the Part Description and part number when ordering replacement parts.

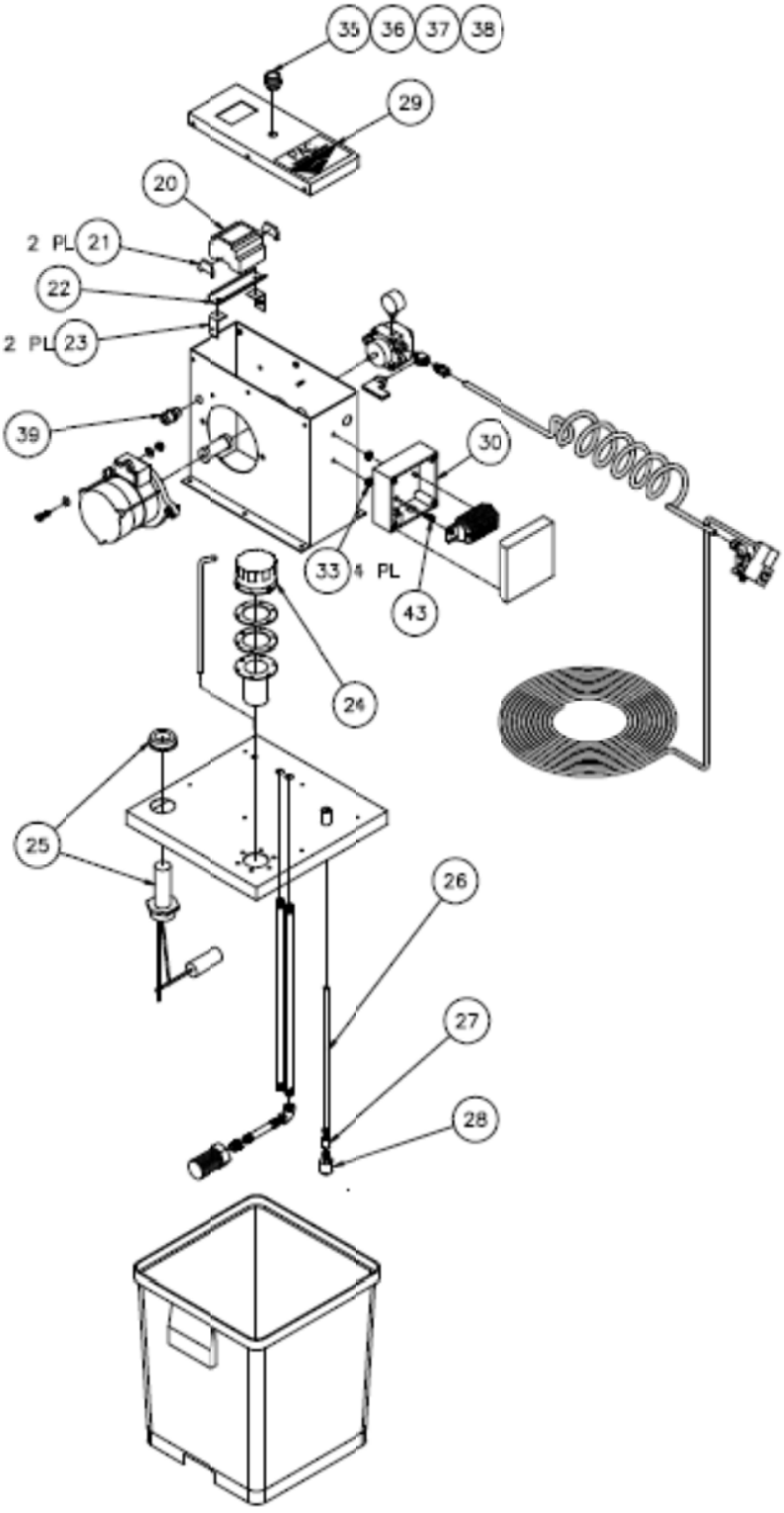
Part Description	Part Number	Item Number from B.O.M. (Next Page)
5W Food Grade Mineral Oil (5 gallons) (20 L)	100178	N/A
Pump	101042-9	7
Motor	101042-10	5
Atomizing Nozzle (5 GPH)	101386	N/A
3/8” Poly Tubing	101042-40	14
Suction Filter	101042-18	19
Low Level Sight Gauge	101042-41	25
PLC	103783	20
0-1,100 kPa Pressure Gauge	103062	8
13 Gallon Original Pail	102924	4
Solenoid Assembly	101799	13
Pressure Switch	101636	34
Fill Cap with Screen	101042-13	24
Coupling (oil pump to motor)	101042-11	6

SCHEMATICS

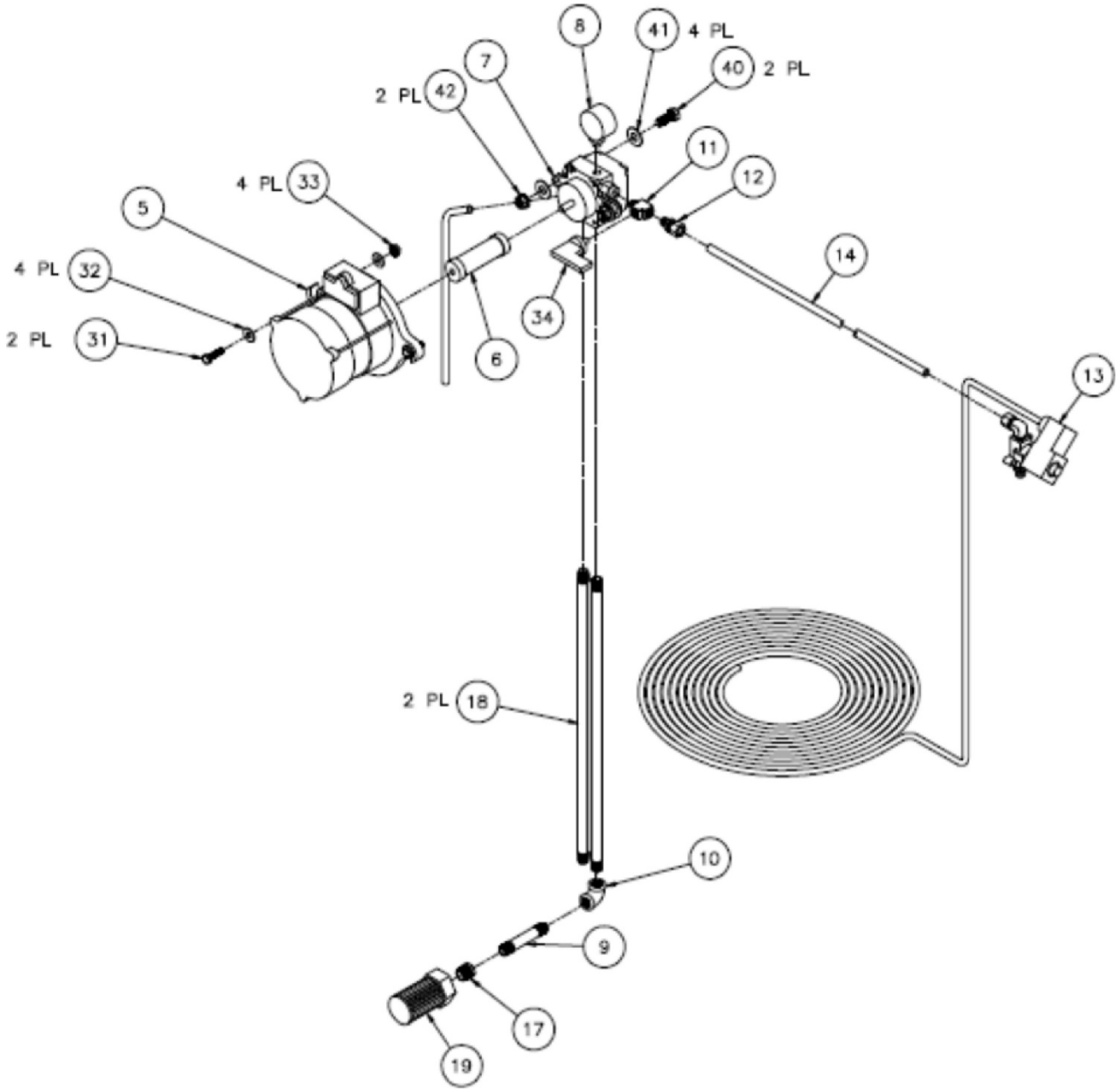
Bill of Materials

ITEM NO.	QTY	DESCRIPTION	PART NO.
1	1	TOWER, OIL MIST	101612
2	1	BASE OILMIST	103061
3	1	TOWER CAP, OIL MIST	103763
4	1	13 GALLON ORIGINAL PAIL	102924
5	1	MOTOR, 1/6 HP, 3450 RPM, OIL PUMP	101042-10
6	1	COUPLIING, OIL PUMP TO MOTOR	101042-11
7	1	OIL PUMP, OIL MIST	101042-9
8	1	PRESSURE GAUGE, 0-1,100kPa, 1/8"NPT BOTTOM MOUNT	103062
9	1	PIPE, 1/4" NPT BOTH ENDS, 3-1/2" LG	101042-29
10	4	PIPE ELBOW, 90DEG, 1/4" NPT FEMALE	101042-20
11	1	TEE, BRASS, 1/8" PIPE, FEM X FEM X MALE	101631
12	1	ADAPTER, BRASS, COMPRESSION, 3/8" TUBE OD TO 1/8" NPTF	101632
13	1	ASSEMBLY, SOLENOID, INDIVIDUAL OIL MIST	101799
14	50	TUBING 3/8" OD HDPE NATURAL	101042-40
15	4	TUBE SUPPORT, BRASS	101042-44
16	4	PLASTIC SLEEVE, FOR 3/8" DIA TUBING	101042-45
17	1	REDUCING HEX BUSHING, 3/8" MNPT X 1/4" FNPT	101042-21
18	2	PIPE, 1/4" NPT BOTH ENDS, 18" LONG, OIL MIST	101042-31
19	1	SUCTION FILTER, 3/8" NPT FEMALE	101042-18
20	1	TECO PROGRAMMABLE RELAY, WITH DISPLAY, OIL MIST	101042-36
21	4	TERMINAL BLOCK END BRACKET, OIL MIST	101042-37
22	1	#3 DIN RAIL, STEEL, 5-3/16" LONG, PLC	101042-6
23	2	CLIP, TOWER DIN RAIL MOUNT, OIL MIST	101042-5
24	1	BREATHER CAP, 3" DIA, W/40MICRON SCREEN, RESEVOIR FILL	101042-13
25	1	SIGHT GAUGE, AT-A-GLANCE	101042-41
26	1	PIPE, 1/8" NPT BOTH ENDS, 14" LG	101042-27
27	1	COUPLING, FULLY THREADED, 1/8" NPT	101042-22
28	1	LIQUID LEVEL SWITCH	101042-26
29	1	PAC LABEL	PACLBL2.5X4.25
30	1	ELECTRICAL BOX	101727
31	2	HEX HEAD BOLT, 1/4-20 X 1" LG ZINC PLATED	101042-51
32	4	WASHER, 1/4" FLAT, ZINC PLATED	101042-52
33	4	SERRATED-FLANGE HEX LOCKNUTS, 1/4-20 ZINC PLATED	101042-53
34	1	PRESSURE SWITCH, 1/8 NPT, 20-120 PSI	101636
35	1	PUSH BUTTON, ILLUMINATED, GREEN	101637
36	1	BLOCK, CONTACT, 1 N.O.	101638
37	1	BLOCK, LAMP, LED	103097
38	1	N/A	N/A
39	1	RELIEF, STRAIN (MMC:7529K331)	101641
40	2	BOLT, HEX HEAD, 3/8"-16 X 1" LONG, ZINC PLATED	101042-48
41	4	WASHER, 3/8" FLAT, ZINC PLATED	101042-49
42	2	SERRATED-FLANGE HEX LOCKNUTS, 3/8-16 ZINC PLATED	101042-50
43	2	SOCKET HEAD CAP SCREW 1/4-20 X 1/2" LG	101042-58
44	22	FLANGE BUTTON HEAD SOCKET CAP SCREW, 10-32 X 3/8" LG, SS	101042-46

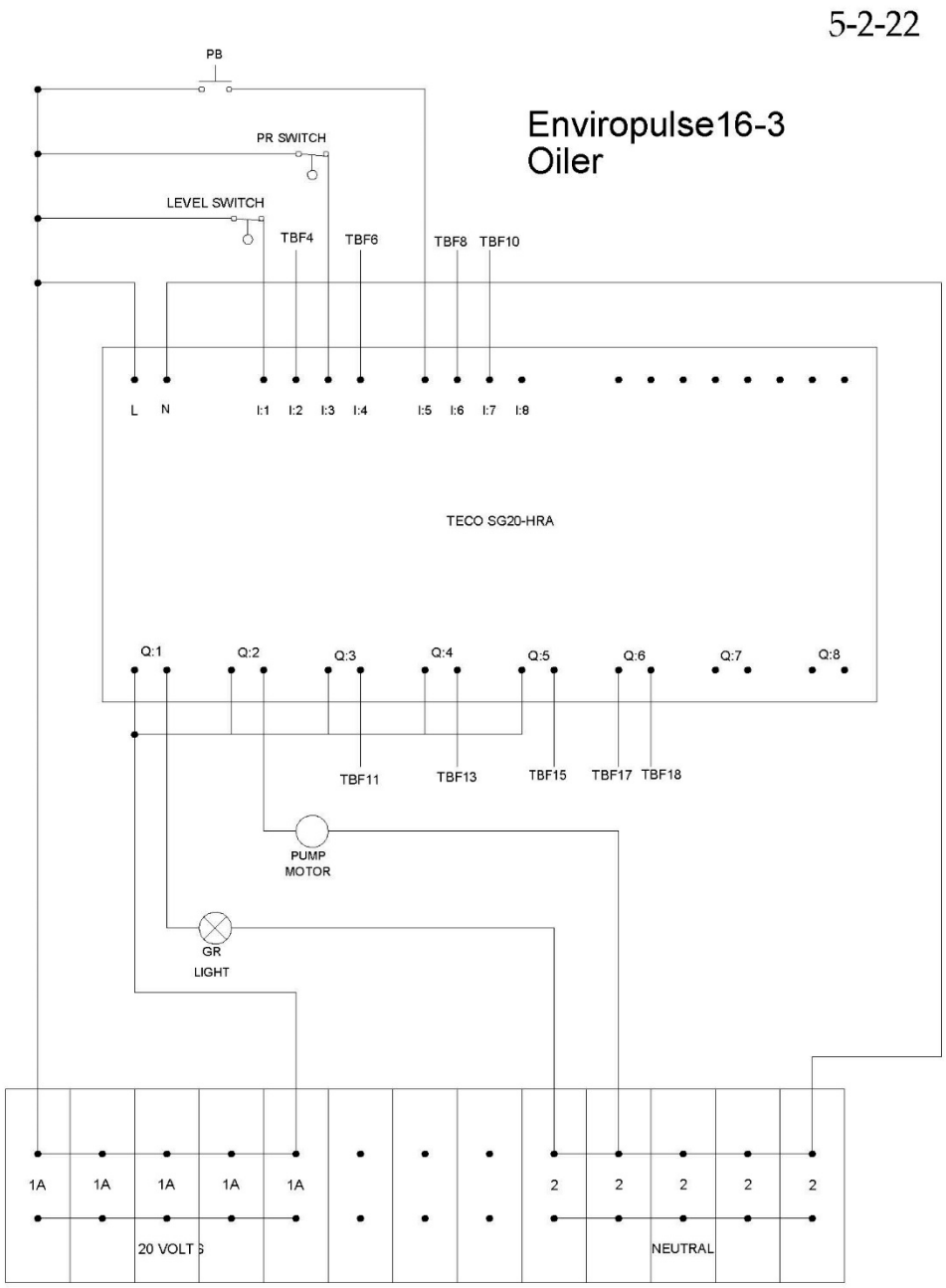
Exploded Views



Precision AirConvey
EnviroPulse 16-3 Oil Mist



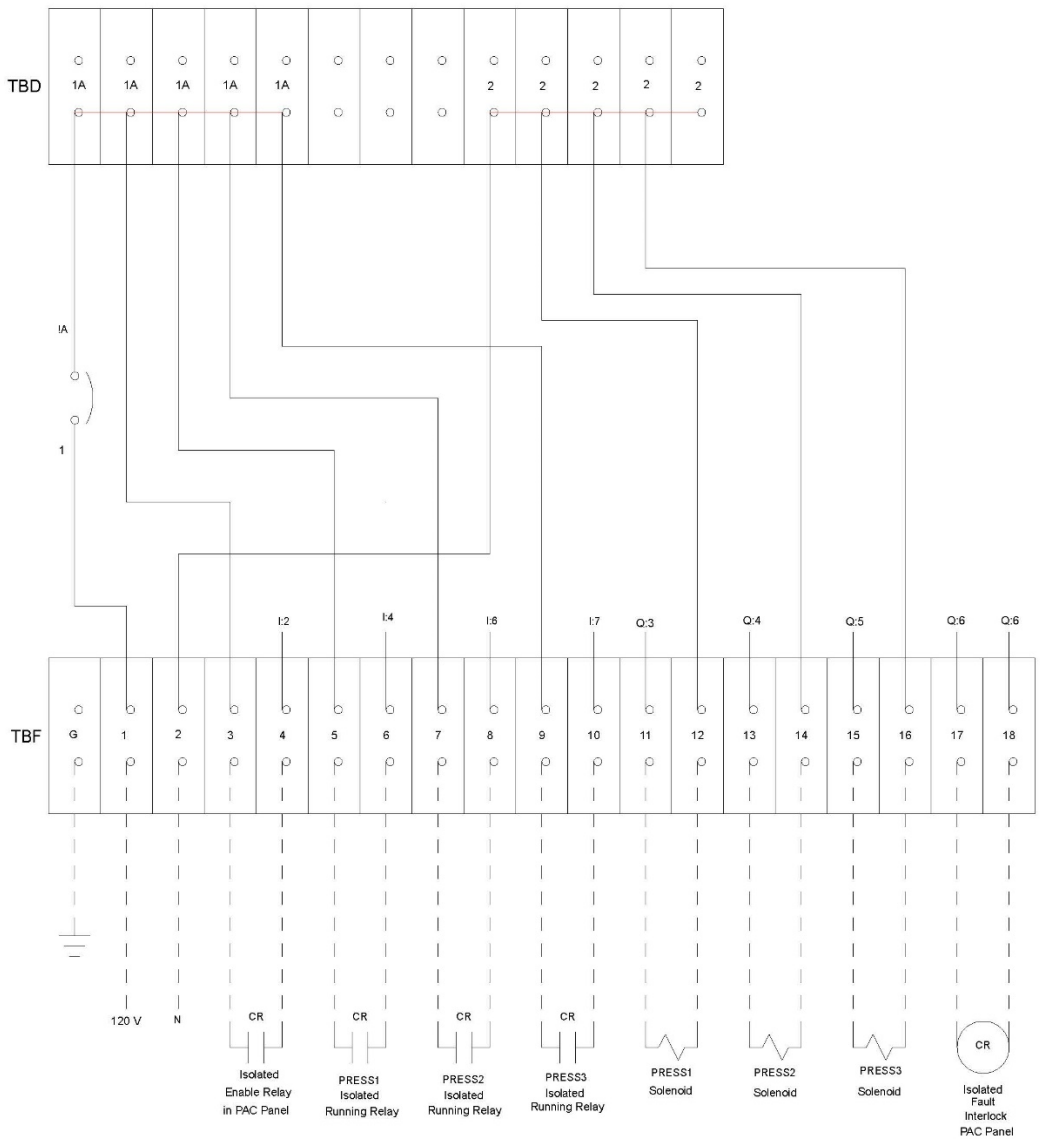
Electrical:


5-2-22
Enviropulse16-3
Oiler
PB
PR SWITCH
LEVEL SWITCH
TBF4
TBF6
TBF8
TBF10
L
N
I:1
I:2
I:3
I:4
I:5
I:6
I:7
I:8
TECO SG20-HRA
Q:1
Q:2
Q:3
Q:4
Q:5
Q:6
Q:7
Q:8
TBF11
TBF13
TBF15
TBF17
TBF18
PUMP
MOTOR
GR
LIGHT
1A
1A
1A
1A
1A
2
2
2
2
2
20 VOLT
NEUTRAL

5-2-22

Enviropulse 16-3 Oiler

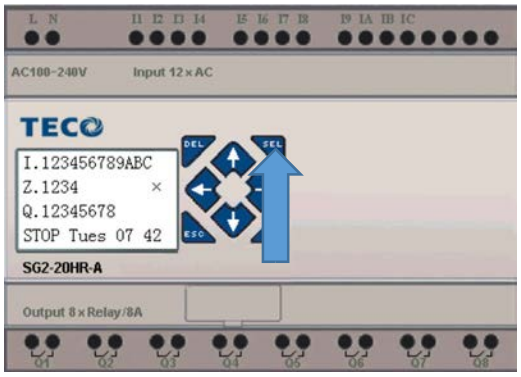
2 0f 2



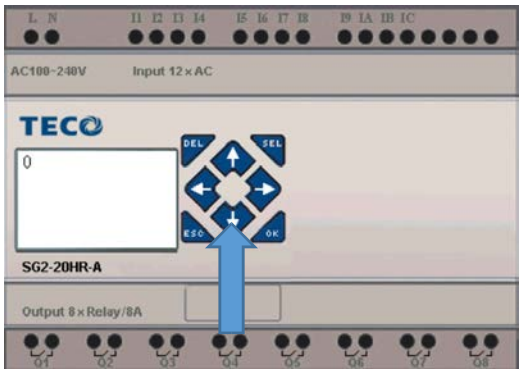
Changing Timer Settings

Up to three oil nozzles can be connected to the EnviroPulse 16-3 Oiler. All having individual timing function. Oiler is only enabled when trim system is running. When oiler is enabled, nozzle will spray timed function for each press only when press is running (default 1 second spray every 5 minutes). Otherwise nozzle will spray on maintenance mode (default 1 sec spray every 10 minutes). Both timers are adjustable via instructions below.

Timer Adjustment Procedure

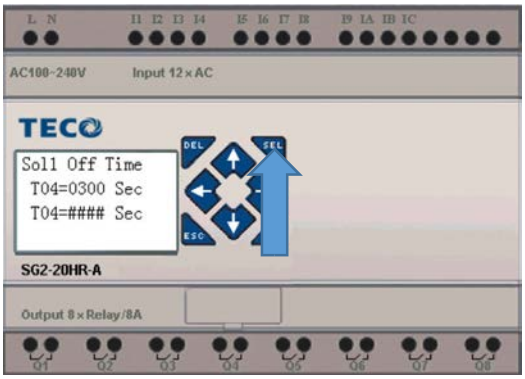


Press “SEL” to bring up screen below showing 0

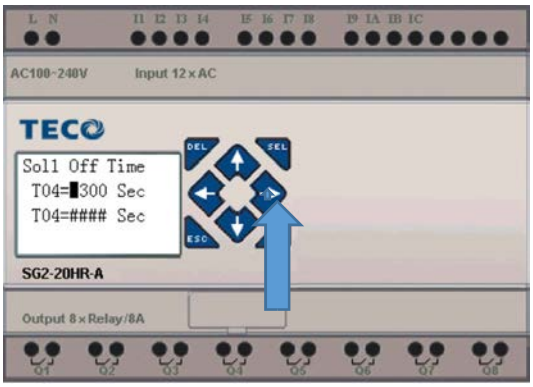


Depress down arrow approximately 25 times. It will scroll through zeros until “Sol1 Off Time” is displayed below.

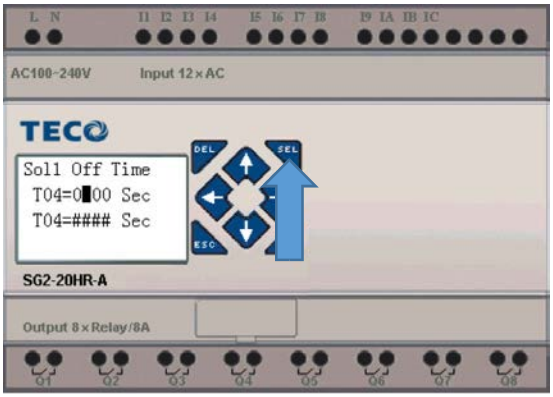
Continued pressing of the down arrow will scroll through “Sol2 Off Time”, “Sol3 Off Time”, Sol1 Maint Shot”, “Sol2 Maint Shot” and “Sol3 Maint Shot”. All timer adjustment procedures are the same. Repeat instructions below to adjust all the timers.



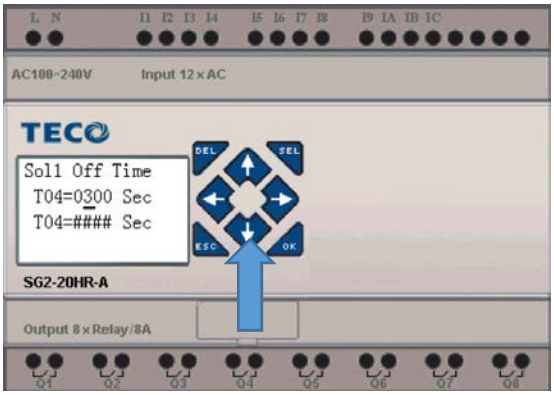
Once on the specific timer you want to adjust, press “SEL”



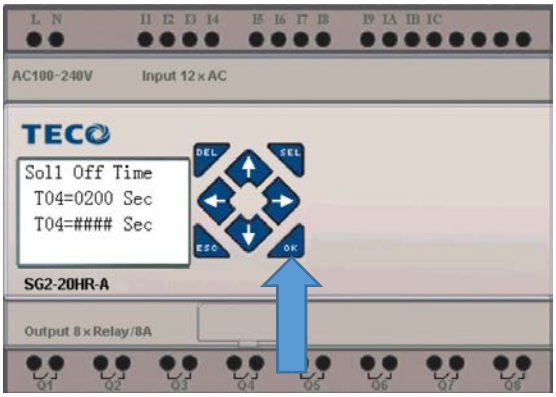
Value to change will flash black. Scroll left and right to highlight the value you want to change.



Once you highlight the value to change, press “SEL”



Line will flash underneath number to change. Use UP/DOWN arrows to change highlighted value. Use LEFT/RIGHT arrows to scroll to different values if needed



Once all values are changed, press “OK”. If “OK” is not pressed, values will not be changed. Press “ESC” once to back out of timer adjustment. UP/DOWN arrows can now be pressed to access other timers.

Be sure to leave a minimum of a 5 second offset between timers. Spray time is set for 1 second and cannot be changed. Timer adjustments are for the duration between sprays only.

Maintenance shots are set for 10 minute cycles. It is highly recommended to not increase this interval.

Enviropulse16-3 with Adjustable Maintenance Mode

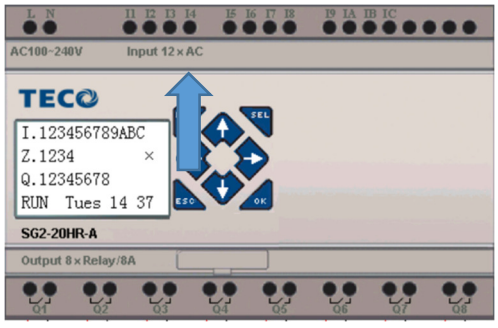
Up to three oil nozzles can be connected to the Enviropulse 16-3 Oiler. All having individual timing function. Oiler is only enabled when trim system is running. When oiler is enabled, nozzle will spray timed function for each press only when press is running (default 1 second spray every 5 minutes). Otherwise nozzle will spray on maintenance mode (default 1 sec spray every 10 minutes). Both timers are adjustable via instructions below.

Priming instructions

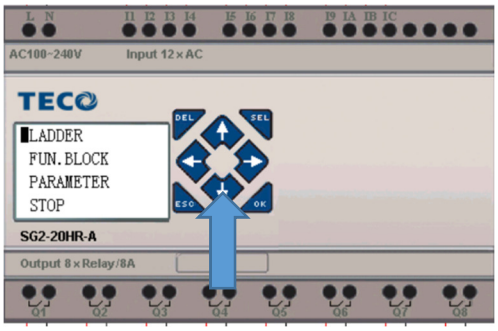
Using a 3/8” open ended wrench, have ready on bleeder valve nut on side of pump. The soft tubing attached to this valve and drains into the tank. Press green indicator button on top of unit for 5 seconds. After 5 seconds, light will go out and pump will turn on. With pump running, open bleeder valve. You will notice air and oil flowing back into tank through clear tube. Pump will run for 15 seconds. Then solenoids will open for 2 seconds to purge air and oil into trim system infeed nozzles. Be sure to close bleeder valve before pump shuts off. Process may need to be repeated several times to purge all air in system. If light stays on after priming, then you are done and system is primed. If light flashes, repeat procedure.

Timer Adjustment Procedure

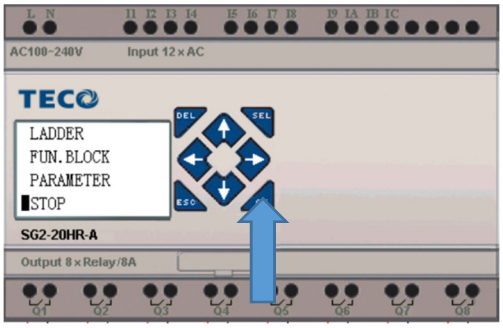
If prompted for password in below procedure, enter 1209



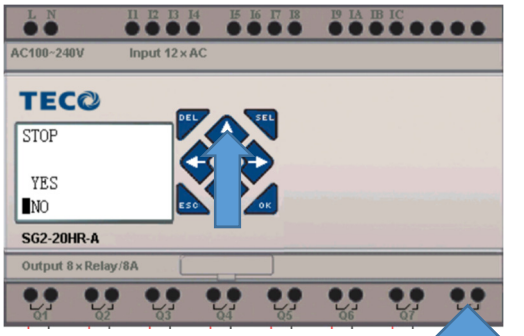
To update the program, begin by stopping the current program. Make sure trim system is off. From the main “RUN” screen, press “ESC” to access the screen below



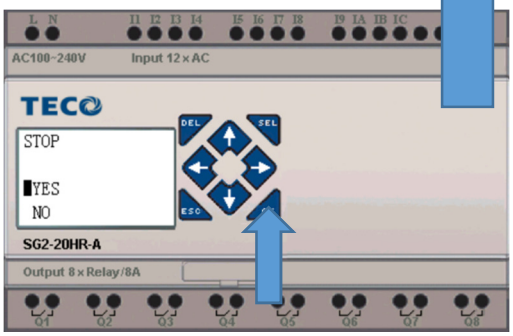
Use the “DOWN” arrow to access the “STOP” function below



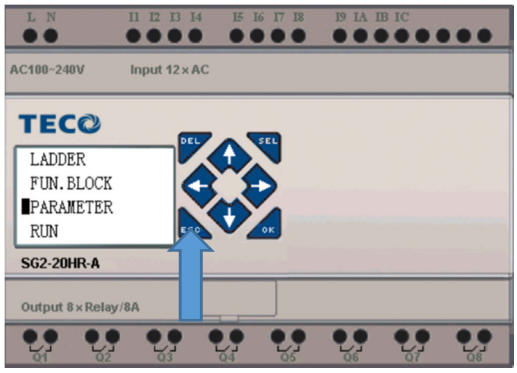
Press “OK”



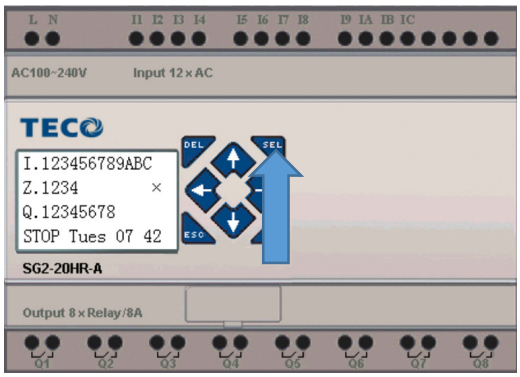
Press “UP” arrow to highlight YES



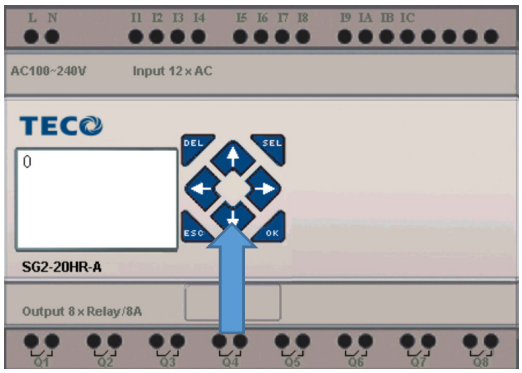
Press “OK” to show screen below



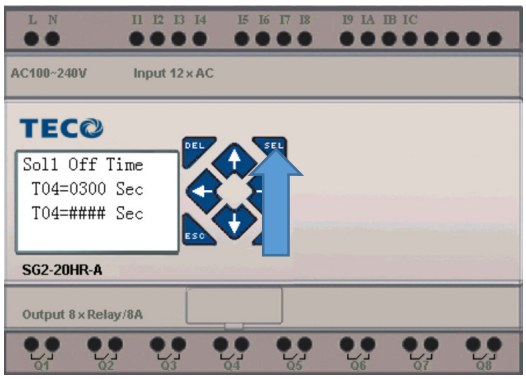
Now press “ESC” to get back to main screen below



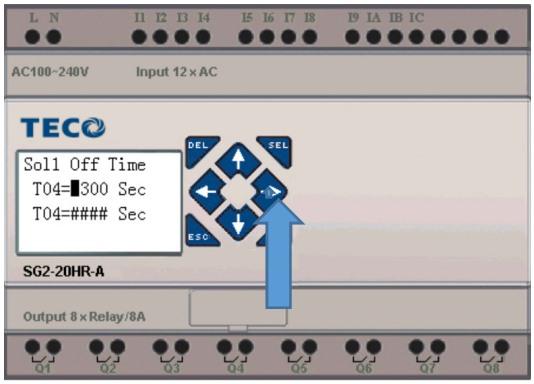
Press “SEL” to bring up screen below showing 0



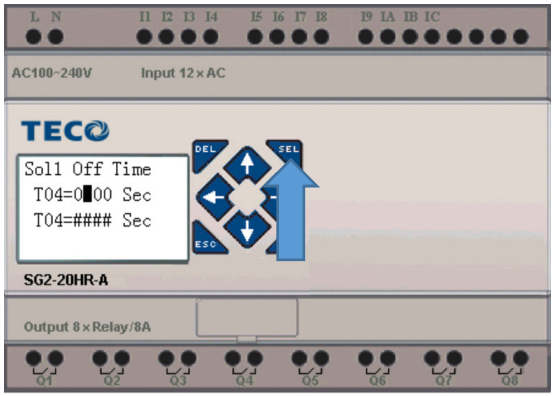
Depress down arrow 25 times. It will scroll through zeros until “Sol1 Off Time” is displayed below. Continued pressing of the down arrow will scroll through “Sol2 Off Time”, “Sol3 Off Time”, Sol1 Maint Shot”, “Sol2 Maint Shot” and “Sol3 Maint Shot”. All timer adjustment procedures are the same. Repeat instructions below to adjust all the timers.



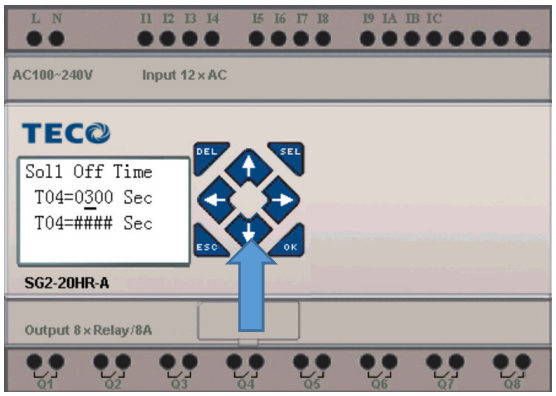
Once on the specific timer you want to adjust, press “SEL”



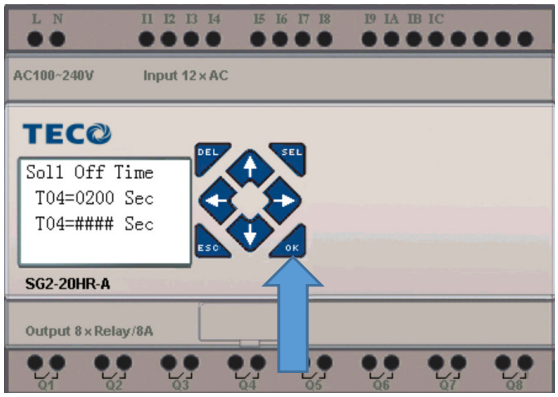
Value to change will flash black. Scroll left and right to highlight the value you want to change.



Once you highlight the value to change, press “SEL”



Line will flash underneath number to change. Use UP/DOWN arrows to change highlighted value. Use LEFT/RIGHT arrows to scroll to different values if needed

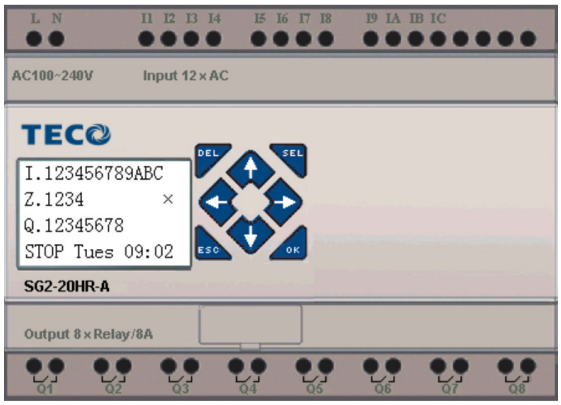


Once all values are changed, press “OK”. If “OK” is not pressed, values will not be changed. Press “ESC” once to back out of timer adjustment. UP/DOWN arrows can now be pressed to access other timers.

Be sure to leave a minimum of a 5 second offset between timers. Spray time is set for 1 second and can not be changed. Timer adjustments are for the duration between sprays only.

Maintenance shots are set for 10 minute cycles. It is highly recommended to not increase this interval

When finished, press “ESC” to access screen below.



Repeat procedure to stop program. But instead of stopping, press run. Unit is now ready for operation

"We Convey Solutions"

OVP Fan

Installation, Operating and Maintenance Manual

PAC OVP Fan Manual (September 2012)

Printed in USA

For service inquiries additional information on this or any other Precision AirConvey product, please visit **www.airconvey.com.**

or contact us via one of the following:

Telephone: 302-999-8000

Fax: 302-999-8510

Email: get-facts@airconvey.com

Precision AirConvey
Pencader Corporate Center
465 Corporate Boulevard
Newark, DE 19702

Contents

INTRODUCTION

OVP fans are used to convey air and material. There are a variety of fan/motor combinations. The size of the motor depends on the power requirement of the fan blade. OVP fans are primarily used in material conveying systems where a variety of materials are passed through the fan. OVP fans generate a higher static pressure. The wheel design is much narrower than a Material Handling (MH) Wheel. Its diameter is much greater in comparison to its length. This type of fan is used to meet different material handling needs. OVP wheels are all made out of steel, regardless of diameter. The diameter range of OVP wheels is 16" to 31.5."

Fans can come in 3 different arrangements: 1, 4 and 9. Arrangement 1 is when the fan operates with a motor on the same unitary base. Arrangement 1 fans are drive by v-belts. The drive shaft is mounted in bearings on a common pedestal with the fan. This arrangement is used for high temperature and/or high horsepower applications. This arrangement is used when arrangement 9 is impractical. Arrangement 9 is an impractical choice when the motor is too large to mount on the side of the fan. Arrangement 1 is seen below:

Arrangement 4 is when the motor connected to the fan via direct drive. There are no bearings or v-belt. The motor is directly attached to the fan. Since it operates with no belts, it has a much higher efficiency. This arrangement is designed for standard temperature use. Arrangement 4 is seen below:

Precision AirConvey
OVP Fan

Arrangement 9 is a more compact version of arrangement 1. The motor is mounted on the side of the same pedestal that the fan and bearings are mounted on. The motor is driven by v-belts connecting the motor to the drive shaft. This arrangement is suitable for high temperature and/or corrosive environments. Arrangement 9 is seen below:

Precision AirConvey
OVP Fan

To ensure optimum performance and safe operation of the unit, everyone who installs, uses or maintains it must read and carefully follow the instructions in this manual.

Throughout this manual, the OVP Fan is also referred to as the Fan or the unit.

Specifications

Weight: OVP 6 Fan less motor – 480 lbs
OVP 3 Fan less motor – 310 lbs
OVP 2 Fan less motor – 185 lbs

BLOWER SPECIFICATIONS

Blower Serial Number:		Model:	
Rotation:		Discharge:	
Wheel Size and Type:		Arrangement:	
Motor Pulley:		Fan Pulley:	
Fan Belt:			

BLOWER DESIGN TARGET DATA

Motor BHP:	
Fan RPM:	

MOTOR DATA

HP:		RPM:	
Voltage:		Phase:	
Hz:		Frame Size:	

***NOTE*: Due to our commitment to continuous product improvement, we reserve the right to change the specification without notice.**

Wheel Specifications – OVP Wheel

Wheel	Weight (lbs.)	WR^2 (lbs.-ft.^{2})	Standard Material	Min. Motor HP required to accelerate wheel to 3600 RPM	
				Std. Eff.	Prem. Eff.
17A	26	6.8	Steel	1.5	1.5
17B	27	7.0	Steel	1.5	1.5
18A	28	8.2	Steel	1.5	1.5
18B	29	8.5	Steel	1.5	1.5
23A	51	24.3	Steel	5	5
23B	52	24.8	Steel	5	5
26.5A	61	38.6	Steel	15	10
26.5B	63	39.8	Steel	20	10
30A	75	60.8	Steel	25	20
30B	79	64.0	Steel	25	25

SAFETY

Always follow the general safety and accident prevention rules in addition to those set forth in this manual.

The OVP Fan is designed and built with safety as a prime consideration. Each unit is checked at the factory for safety and operation.

Follow the maintenance schedules outlined in this manual for good performance and safe operation. Maintenance should be done only by qualified personnel and only with proper tools.

Carefully read the following safety rules before proceeding with installation, operation or maintenance. The rules are essential to ensure safe operation of the unit. Failure to follow these rules may void the warranty or result in damage to the unit or personal injury.

Safety Instructions

Safety instructions in this manual are boldfaced for emphasis. The signal words **DANGER**, **WARNING** and **CAUTION** are used to indicate hazard seriousness levels as follows:

DANGER – Immediate hazard which WILL result in severe injury or death.

WARNING – Hazard or unsafe practice which COULD result in severe injury or death.

CAUTION – Hazard or unsafe practice which COULD result in minor injury or in product or property damage.

Safety Labels

Safety labels on the unit provide important safety information. If any label is missing or damaged, contact the manufacturer, request a new label and apply it to the unit.

The lockout and disconnect can be found on the control panel. These should always be activated whenever the system needs to be shut down or when maintenance needs to be performed on a component of the system.

A lockout typically looks like this:

RECEIVING AND INSPECTION

Upon receipt, inspect the OVP Fan closely for damage. Record any indication of damage on the delivery receipt, especially if the unit will not be immediately installed. Obtain the delivery person's signed agreement to recorded damages to facilitate future insurance claims.

Since the OVP Fan is shipped F.O.B. Factory, the manufacturer's responsibility for the shipment ceases when the carrier signs the bill of lading.

Units are usually completely assembled except when specifications call for unit less motor. They are then skidded, boxed or crated to fully comply with rail or trucking requirements for shipment. Accessories are sometimes shipped separately due to handling space requirements.

Although all equipment is carefully inspected and prepared for shipment at the factory, damage to fan and/or drive parts may occur due to rough handling during shipment.

If concealed loss or damage is discovered, you must notify your carrier at once and request an inspection. Unless you do this, the carrier will not consider any claim for loss or damage. The carrier will make an inspection and may grant a concealed damage notation. If you give the carrier a clear receipt for goods that have been damaged or lost in transit, you do so at your own risk and expense.

EXTENDED STORAGE

Units that will be held in storage for a period of up to two years, should have special provisions so operation-readiness can be maintained. Motors should be equipped with internal space heaters kept on continuously. Units should be crated and covered with polyethylene film. In addition, impellers should be hand-rotated once a month. For best results, keep units sheltered in a cool, dry location.

THEORY OF OPERATION

The radial design of the blades in the fans allows for efficient airflow to be generated, while allowing material to be conveyed at the same time. The housing can be flipped or rotated to change the direction of airflow, as required by the user. The OVP fan is Totally Enclosed Fan Cooled (TEFC). This is how the fan prevents itself from overheating.

INSTALLATION INSTRUCTIONS

Proper Handling

Small units should be handled carefully and lifted only by the base, **never** by the shaft, coupling, motor or housing. Large units must be lifted by the base or by lifting eyes. Precaution should be taken to avoid dropping or jarring equipment as this can cause damage to the shaft or wheel, which is not visibly noticeable, but can cause vibration problems.

Installation

Fans and motors should be mounted on structurally sound foundations. Concrete is the best, however, other types designed properly are acceptable. Equipment should be leveled on the foundation and shimmed or grouted in place. This will prevent putting the fan structure into a bind by bolting down on an uneven surface.

As a general rule, if vibration isolators are used, the fan should first be bolted to structural steel base and the isolation takes place between the structural steel base and the foundation. This prevents the fan base from floating due to uneven weight distribution and/or drive forces when mounted directly to vibration isolators.

If the fan did not come with vibration isolators, it is strongly recommended that they are purchased for the unit. This will dampen the vibration of the fan help increase the lifetime of the fan. Vibration isolators will also keep the fan level, and prevent vibration from resonating through the entire system. Another great benefit to having vibration isolators is that they will reduce the noise being produce by the fan.

NOTE: Whenever the housing on this or any other fan is removed, it is a good idea to re-caulk the housing with silicone to ensure a complete seal in the fan so no air escapes.

INSTRUMENTATION

There is no important instrumentation on the unit for the user to be aware of. Some fans are equipped with a Variable Frequency Drive (VFD), which allows the user to adjust the output of the fan manually. This is controlled by a dial on the control panel.

INITIAL STARTUP INSTRUCTIONS

Before Start-Up

1. Fasteners – all foundation bolts, wheel hub setscrews, wheel locking bolts and bearing locking collars must be tight.
2. Fan Impeller – turn over rotating assembly by hand to see that it runs free and does not bind or strike fan housing. If wheel strikes housing the wheel may have to be moved on the shaft or the bearing pillow blocks moved and re-shimmed.
3. Motor – check electrical wiring to motor. The current characteristics of the supply line must agree with the motor nameplate rating. Motor should be wired and fused in accordance with the National Electric Code and local codes..
4. Duct connections (if required) from fan to duct work must not be distorted. Ducts should never be supported by the fan. Expansion joints between duct connections should be used where expansion is likely to occur or where fan is mounted on vibration isolators. All duct joints should be sealed to prevent air leaks. All debris should be removed from ductwork and fan.

Start-up

1. “Jog” the motor to check for proper wheel rotation. The motor should be started in accordance with the manufacturer’s recommendations. Arrows on fan indicate the proper direction of rotation and airflow..
2. Check motor amperage against nameplate amperage to make sure motor is not overloading.

Balance and Vibration

All fan impellers are dynamically balanced prior to installation in the fan assembly. After assembly, fans supplied with motors are test run and fine-tune balanced to reduce vibration levels to acceptable limits as shown in table below (from AMCA Standard 204-96). After field installation, fans will need to be checked prior to commissioning, to assure that the vibration

levels do not change significantly from those achieved at the factory. It is recommended that the velocity values in the table below are not exceeded by more than 10% when field installed.

Fan Application Category	Rigid Mounted		Flexible Mounted	
BV – 3	mm/sec.	(in./sec.)	mm/sec.	(in.sec.)
	3.8	(0.15)	5.1	(0.20)

The installed vibration level of any fan is not solely dependent on the balance grade. Installation factors such as the mass and stiffness of the supporting system, will influence the "as installed" vibration level (Refer to AMCA Publication 202, ***Troubleshooting***). Therefore, the "as installed" fan vibration level is not the responsibility of the fan manufacturer unless specified in the purchase contract.

Start-up of High Temperature Construction Fans and Blowers

In addition to normal start-up procedure described above, certain measures must be taken against thermal expansion deformation.

1. Fan or blower should be brought to speed between 40°F and 150°F. It may be necessary to throttle back air entering fan or blower and slowly bleeding in heated air to accomplish this. (Note: If motor horsepower is sized for high temperature operation condition and not cold start-up, throttling inlet air will be mandatory to prevent motor overloading. It is recommended motor amperage be monitored during this procedure.
2. The maximum recommended rate of temperature rise is 15°F per minute.
3. The reverse situation of fan or blower shut-off also applies. That is the temperature must be lowered slowly before turning fan or blower off to prevent damage.

MAINTENANCE

Maintenance on the OVP Fan must be carried out by suitably qualified technicians, and local safety standards must be maintained.

Work should not be performed on the machine components without the Electrical Supply being securely isolated.

Maintenance Schedule

Task	Maintenance intervals

Precision AirConvey
OVP Fan

	according to use			
	Daily	Weekly	Monthly	Yearly
General Maintenance*				
- Air flow	X			
- Alignment		X		
- Hardware		X		
- Lubrication		X		
- Bearings		X		
- Wheel		X		
- General housekeeping		X		

*The Maintenance intervals can be adjusted to users needs, the schedule is a baseline

General Maintenance

1. Alignment – shaft must not be cocked in the bearings. Misalignment can cause overheating, wear to dust seals, bearing failure and vibration.
2. Hardware – check tightness of all bolts and setscrews.
3. Lubrication – check fan and motor bearings and add lubricant if necessary. Be careful not to over grease as this can damage bearing seals.
4. Air flow – make sure there is no debris and no unnecessary obstructions to airflow in outlet or inlet ductwork.
5. Bearings – tend to run hot on high-speed fans. Therefore, do not replace a bearing because it feels hot to the touch. Place a pyrometer or contact thermometer against the pillow block and check the temperature. Pillow block and flange mount bearings can have housing surface temperatures of 200°F (93°C) before the cause of overheating be investigated.
6. Wheel – inspect wheel blades for accumulation of dust and dirt. Clean thoroughly with stream of water jet, compressed air or a wire brush. This will help prevent an unbalanced condition. If blades are aluminum, be careful not to damage them. Cover the bearings so water won't enter the pillow block. The wheel should have proper clearances to prevent the blades from striking the housing. Make sure wheel is rotating in proper direction. Never run the fan at a higher speed or temperature than is shown on the fan nameplate. Contact Precision AirConvey with any questions.
7. General Housekeeping- Make sure the outside of the fan and motor are kept relatively clean and free of build-up of dust and dirt. At no time should a layer of dust and/or dirt exceed 3 mm (0.12") thick. Thick layers of dust and/or dirt are a fire and/or explosive hazard. Build-up can cause overheating of the fan and motor.

Fan Bearing Maintenance

For most applications, a lithium base grease (such as Mobilith AW2) conforming to a NLGI grade 2 consistency should be used. This type of grease inhibits rust, is water resistant, and has a temperature range of -30°F to 200°F with intermittent highs of 250°F. For extreme duty and higher temperature applications, use Mobilith SHC220, synthetic hydrocarbon grease.

Because oil lubricated bearings are usually used on high-speed or high temperature applications, refer to Precision AirConvey. factory for the type of oil you should use in your particular application.

When greasing bearings, it is important not to over-grease. This is especially true if the bearings are equipped with extended grease lines and the bearings are not visible. In this case, more bearing failures occur due to over-greasing than under-greasing. It is best to give the bearing just one "shot" of grease periodically if the bearings are not visible. When the bearings are visible, pump in grease until a small bead of grease forms around the bearing seals. It is very important that fan bearing greasing take place while the fan is operating. Caution should be taken while working on and near rotating equipment to avoid personal injury.

When oiling oil-lubricated bearings, oil should be poured into cup at top of bearing until it reached the overflow point at the lower oil cup.

Motor Maintenance

Lubricate motor bearings to the manufacturer's recommendations. Lubrication recommendations are included with the packet attached to the fan. Should this packet be missing, the following will apply:

Integral Horsepower Ball Bearings Motors:

Motors having pipe plugs or grease fittings should be re-lubricated while warm and at standstill. Replace one pipe plug on each end shield with grease fitting. Remove other plug for grease relief. On low pressure, grease, run and lubricate until new grease appears at grease relief. Allow motor to run for ten minutes to expel excess grease. Replace pipe plugs. Motors not having pipe plugs or grease fittings can be re-lubricated by removing end shield, cleaning grease cavity and refilling three-fourths or circumference of cavity.

Recommended re-lubrication intervals (General guide only)

H.P. Range	Standard Duty 8 Hr./ Day	Severe Duty 24 Hr./Day Dirty – Dusty	Extreme Duty Very Dirty High Ambients
1 ½ - 7 ½	5 years	3 years	9 months
10-40	3 years	1 year	4 months
50-150	1 year	9 months	4 months

Precision AirConvey
OVP Fan

Recommended Motor Greases
Polyrex EM – Exxon Oil Company
SRI #2 – Chevron Oil Company

Fan Motors used with Variable Frequency Drives (VFD)

1. Specify "Inverter Duty Motors" whenever possible. If this is not practical, premium efficiency motors *must* be specified.
2. Specify motors with inverter spike resistant magnet wire when possible.
3. Specify insulated bearings or provide shaft grounding to prevent shaft currents from causing bearing damage and premature failure. This is critical on motors that are 50 HP and larger since the cost of downtime and bearing replacement is typically much greater on larger motors, than the initial cost of one of these preventative measures. **Note:** Shaft currents can occur on any motor HP rating when used with a variable frequency drive.
4. Specify the same manufacturer for both the motor and variable frequency drive, if possible, for single-source responsibility.
5. A load reactor should be installed in series in the power leads between the VFD and the motor, located as closely as possible to the VFD. This is an inexpensive preventative measure, especially if the VFD is more than 75 feet from the motor.
6. The switching frequency of the IGBT's in the VFD should be kept as low as practical to prevent higher temperatures in the motor and the VFD. However, lower switching frequencies cause higher noise levels in the motor. Therefore, the application noise level versus the higher temperature must be carefully weighed. Generally, 2.5 Khz is optimal.
7. Good industrial wiring practices, including proper grounding, that meet local and national electric codes must be followed.
8. It is best to limit the minimum frequency to the motor to 10 Hz or more for extended periods of time.

Note: These are general recommendations only. As each application is different, you must consult the motor and drive manufacturer for specific requirements as they apply to your installation.

WARNING! Shaft currents are phenomena created by the interaction between motors and variable frequency drives that can cause premature motor bearing failures. The occurrence of shaft currents is common and cannot be predicted. Precision AirConvey has experienced many motor bearing failures that have been positively identified as 'shaft current' problems due to the distinctive failure pattern seen in the failed bearings.

Precision AirConvey recommends the adoption of the above list of design constraints for any fan/motor/VFD combination. Regardless if any or all precautions are taken, Precision AirConvey accepts no responsibility for shaft current related motor bearing failures and will extend only the warranties of the motor and/or variable frequency drive manufacturer (when supplied by Precision AirConvey). Further, Precision AirConvey will not be held liable for any consequential damages under any circumstances resulting from premature bearing failures due to shaft currents.

V-Belt Drive

If belts squeal at start-up, they are too loose and should be tightened. Periodically check belt and sheave wear, alignment, and tension. When belts show wear, replace all belts at once with a new matched set of belts. New belts will not work properly in conjunction with used belts due to difference in length. Belts and sheaves should be clean and free from grease. After installing new belts, check tension midway between sheaves. Belts should deflect about 1/64" per inch of span length with approx. 20-lb. force. Allow unit to run for 4 – 6 hours, then it will be necessary to re-tighten belts again because new belts tend to stretch initially. .

TROUBLESHOOTING

The equipment fitted in OVP Fan is all of superior quality, supplied by recognized manufacturers, however, as with all machinery, components do occasionally fail or require adjustment. The following troubleshooting list is as fully detailed as possible to ensure that should any faults do occur, then the machine downtime is reduced to a minimum, and should not be regarded as a potential list of machine faults. It should be noted that any checks should be carried out by competent personnel, i.e. any checks carried out on the electrical circuitry must be carried out by a suitably qualified technician or engineer, similarly, any checks carried out on hydraulic components must be carried out by a suitably qualified technician or engineer.

In the event that trouble is experienced in the field, listed below are the most common fan difficulties. These points should be checked in order to prevent needless delay and expense of factory service. If all of the points have been checked and there is still an issue, contact PAC

1. CAPACITY OR PRESSURE RATING
   A. Total resistance of system higher than anticipated.
   B. Speed too low.
   C. Dampers or variable inlet vanes not properly adjusted.
   D. Poor fan inlet or outlet conditions.
   E. Air leaks in system.
   F. Damaged wheel.
   G. Incorrect direction or rotation.
   H. Wheel mounted backwards on shaft.

2. VIBRATION & NOISE
   A. Misalignment of bearings, couplings, wheel, or V-belt drive.
   B. Unstable foundation, fan bolted to uneven foundation, not shimmed or grouted.
   C. Foreign material in fan causing unbalance.
   D. Worn bearings.
   E. Damaged wheel or motor.
   F. Broken or loose bolts and setscrews.
   G. Bent shaft.
   H. Worn Coupling.
   I. Fan wheel or driver unbalanced.
   J. 120 cycle magnetic hum due to electrical input. Check for high or unbalanced voltage.
   K. Fan delivering more than rated capacity.
   L. Loose dampers or variable inlet vanes.
   M. Speed too high or fan rotation in wrong direction.
   N. Vibration transmitted to fan from some other source.

3. OVERHEATED BEARINGS
   A. Too much grease.
   B. Poor alignment.
   C. Damaged wheel or driver.
   D. Bent shaft.
   E. Abnormal end thrust.
   F. Dirt in bearings.
   G. Excessive belt tension.

4. INCORRECT IMPELLER ROTATION
   A. Wiring is incorrect
      a. Switch 2 legs of 3 phases
   B. Incorrect rotation results in a 40% decrease in efficiency

Belt Tensioning

After installing new belts, check tension midway between sheaves. Belts should deflect about 1/64" per inch of span length with approx. 20-lb. force. Allow unit to run for 4 – 6 hours, then it will be necessary to re-tighten belts again because new belts tend to stretch initially.

REPLACEMENT PARTS

Service and Parts:

Phone: 302-999-8000

Fax: 302-999-8510

Recommended Spares:

1. Impeller(s)
2. Motor (if blower is critical to your operation)
3. V-belts
4. Fan Bearings
5. Drive Shaft

Contact Precision AirConvey with:

1. Fan serial number stamped on nameplate.
2. Fan code and model stamped on nameplate.
3. Fan arrangement.
4. Description of part required.
5. Part number if part is a casting.
6. Special materials, paints or coatings.

Replacement Part Needed

IMPELLER – Be sure to indicate direction of rotation as viewed from drive side, type of wheel and the operating speed.

MOTORS – The name of the motor manufacturer, motor model number, and serial number from the motor nameplate must be supplied to the factory for repairs or replacement.

V-BELTS – Indicate type of fan, include serial number and model, as well as the fan arrangement.

FAN BEARINGS – The following information should be indicated when ordering various types of bearings:

ANTI-FRICTION BEARINGS

1. State whether ball or roller.
2. Manufacturer.
3. Size and number.
4. Fixed or floating.

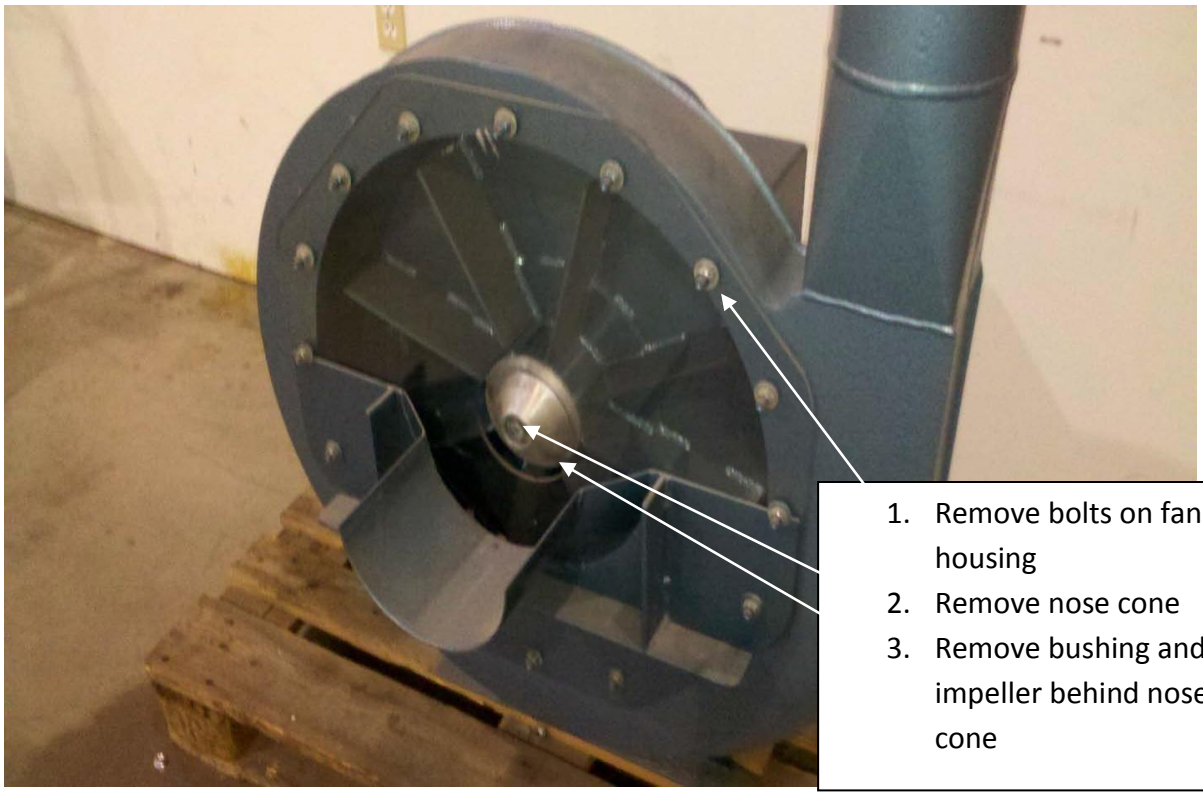
DRIVE SHAFT – length and diameter

REPLACEMENT INSTRUCTIONS

Fan Impeller

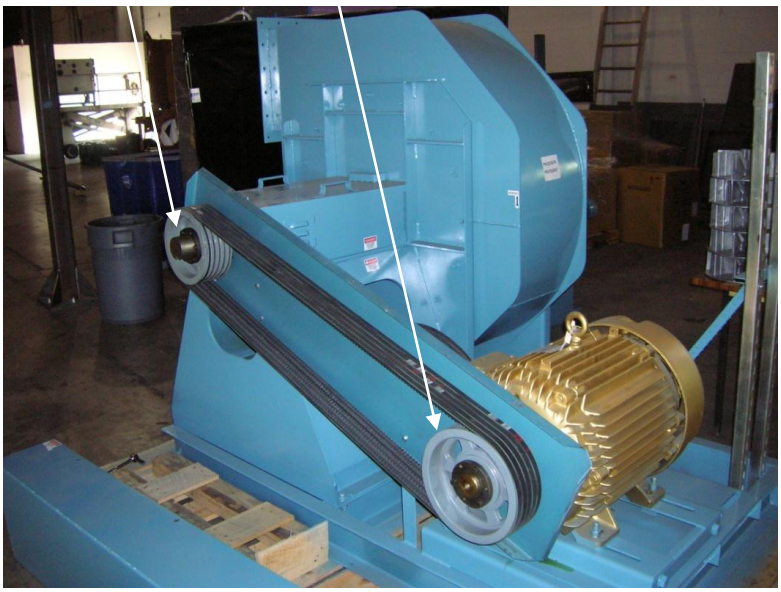
IMPORTANT: Please ensure that the system is completely shut down and locked out before completing any service to the fan or its components. (For assistance with locking out please see the safety section)

1. Remove bolts on fan housing
2. Remove nose cone
3. Remove bushing and impeller behind nose cone
4. Replace impeller and be sure that the impeller is facing the same direction
5. Replace the bushing and nose cone once the impeller is in place
6. Replace all of the bolts on the housing



Motor Replacement – Arrangement 1

1. Unhook wiring from motor
2. Remove belt guard cover
3. Loosen, do not completely remove the 4 bolts on the motor
    a. This will take the tension off of the belt
    b. Move the motor around so that the belts can be removed
4. Remove belts
5. Remove the taper lock bushing and sheave (pulley) from both the fan and the motor



6. Remove the back plate
7. Remove the motor from the carriage after removing all of the bolts
8. Once the motor has been removed, place the new motor on the carriage with the bolts loosely secured to it
9. Secure the back plate
10. Replace the sheave and taper lock bushing on to the motor and fan
    a. Be sure to use a straight edge when aligning the sheave to prevent any problems when the V-belts are put back on
    b. Do not tighten any bolts until the V-belts have been placed back on the tightened sheaves.
11. Replace the V-belts
12. Adjust motor so that there in tension in the V-belts again
13. Tighten the 4 bolts
14. Replace the belt guard
15. Rewire the motor

Motor Replacement – Arrangement 9

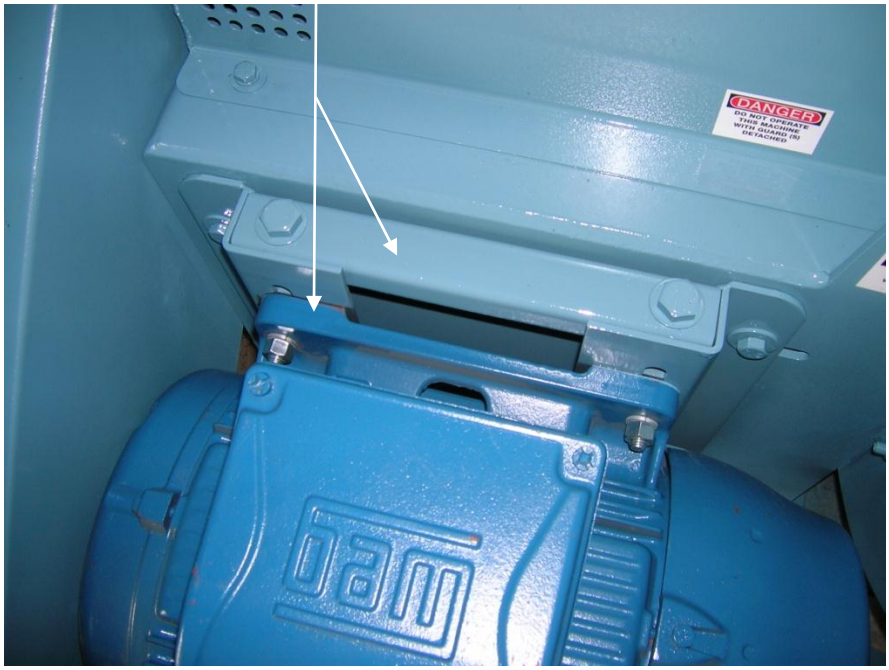
1. Unhook wiring from motor
2. Remove belt guard cover

3. Loosen, do not completely remove the 4 bolts on the motor

   a. This will take the tension off of the belt
   b. Move the motor around so that the belts can be removed
4. Remove belts
5. Remove the taper lock bushing and sheave (pulley) from both the fan and the motor

6. Remove the back plate

7. Remove the whole motor carriage assembly



   a. This will make it easier to remount the new motor
8. Once the old motor has been removed, place the carriage on the new motor with the bolts loosely secured to it
9. Secure the carriage back to the unit
10. Secure the back plate
11. Replace the sheave and taper lock bushing on to the motor and fan
    a. Be sure to use a straight edge when aligning the sheave to prevent any problems when the V-belts are put back on
    b. Do not tighten any bolts until the V-belts have been placed back on the tightened sheaves.
12. Replace the V-belts
13. Adjust motor so that there in tension in the V-belts again
14. Tighten the 4 bolts
15. Replace the belt guard
16. Rewire the motor

Replace V-Belt – Arrangement 1 & 9

1. Disconnect the motor from any power source
2. Remove belt guard cover
3. Loosen, do not completely remove the 4 bolts on the motor
    a. This will take the tension off of the belt
    b. Move the motor around so that the belts can be removed

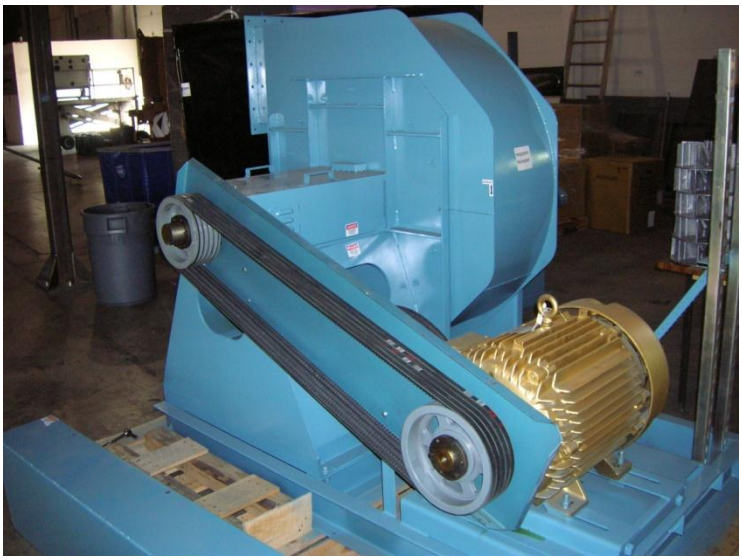
4. Remove belts
5. Replace the belts
    a. Do not tighten any bolts until the V-belts have been placed back on the tightened sheaves.
6. Adjust motor so that there in tension in the V-belts again
7. Tighten the 4 bolts
8. Replace the belt guard

Replace the bearings – Arrangement 1 & 9

NOTE: When replacing one bearing, it is strongly recommended to replace both bearings at the same time.

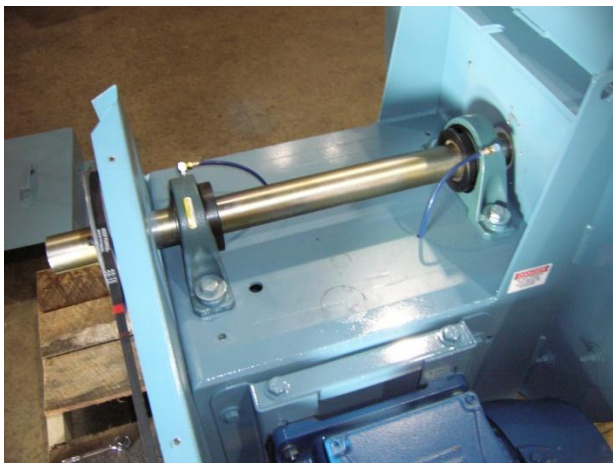
1. Disconnect the motor from any power source
2. Remove fan inlet and front plate
    a. May have to pry off gently because of caulk
3. Remove nose cone
4. Remove taper lock bushing
5. Remove impeller
6. Remove belt guard cover
7. Loosen, do not completely remove the 4 bolts on the motor
    a. This will take the tension off of the belt
    b. Move the motor around so that the belts can be removed
8. Remove belts
9. Remove the taper lock bushing and sheave (pulley) from both the fan and the motor
10. Remove the back plate
11. Remove the housing covering the bearings

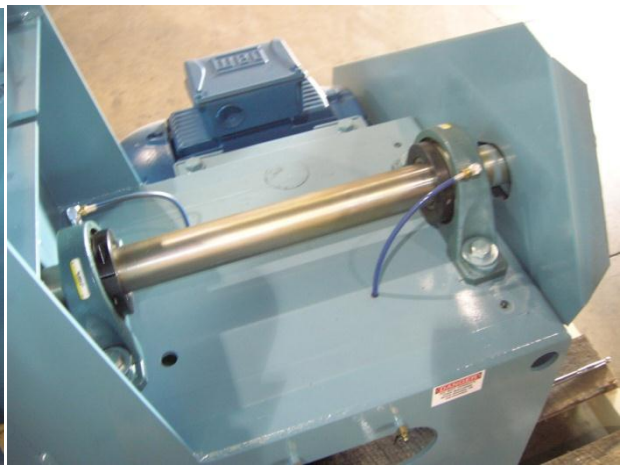
Arrangement 9



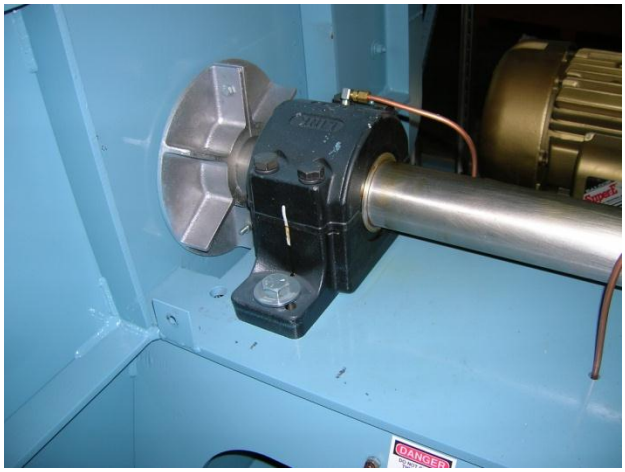
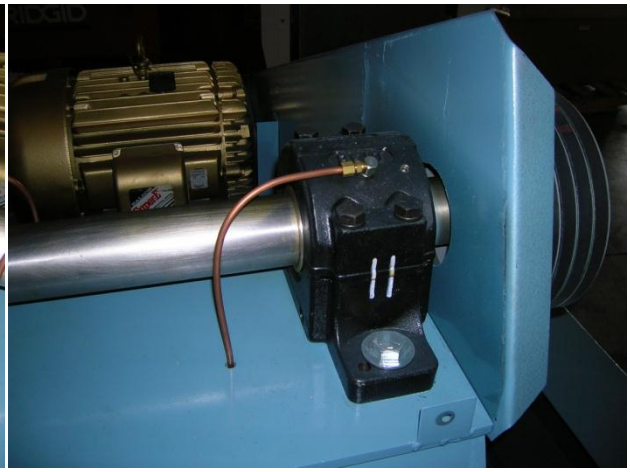
Arrangement 1

12. Unscrew the bolts securing bearings to the unit
    a. Remove both bearings at the same time (as one unit





Arrangement 9 Pictured Above – Arrangement 1 Pictured Below

NOTE: Eccentric Lock Collar Bearings are not pictured; however, this is essentially what it would look like

13. Take bearings off of shaft
    a. For help, refer to 'Replacement of Eccentric Locking Collar'
14. Once the bearings have been replaced, place pair of bearings back on the unit
    a. Re-secure
15. Replace the back plate
16. Replace the sheave and taper lock bushing to the fan and motor
    a. Be sure to use a straight edge when aligning the sheave to prevent any problems when the V-belts are put back on
    b. Do not tighten any bolts until the V-belts have been placed back on the tightened sheaves.
17. Replace the V-belts
18. Adjust motor so that there in tension in the V-belts again
19. Tighten the 4 bolts
20. Replace the belt guard
21. Place the impeller back on the shaft
22. Secure the taper lock bushing back onto the fan
23. Secure the nose cone back now
24. Place the front plate and fan inlet back on the housing
    a. Be sure to caulk the front plate so that there is an airtight seal

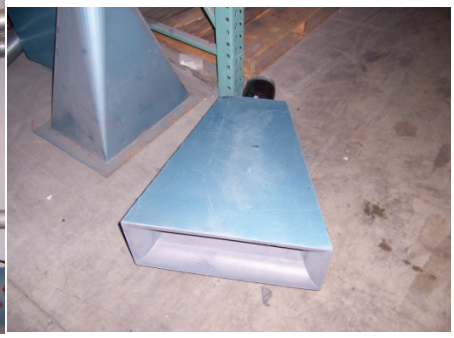
Replace the drive shaft – Arrangement 1 & 9

1. Disconnect the motor from any power source
2. Remove fan inlet and front plate
    a. May have to pry off gently because of caulk
3. Remove nose cone if necessary

4. Remove taper lock
5. Remove impeller
6. Remove belt guard cover
7. Loosen, do not completely remove the 4 bolts on the motor
    a. This will take the tension off of the belt
    b. Move the motor around so that the belts can be removed
8. Remove belts
9. Remove the taper lock bushing and sheave (pulley) from both the fan and the motor
10. Remove the back plate
11. Remove the housing covering the bearings

"We Convey Solutions"





Silencers

Installation, Operating and Maintenance Manual

PAC Silencers Manual (October 2012)

Printed in USA

For service inquiries or additional information on this or any other Precision AirConvey solution, please visit **www.airconvey.com.**

Or contact us via one of the following:

Telephone: 302-999-8000

Fax: 302-999-8510

Email: get-facts@airconvey.com

Precision AirConvey
Pencader Corporate Center
465 Corporate Boulevard
Newark, DE 19702

Contents

INTRODUCTION

There are a variety of silencers that PAC offers for multiple applications. Silencers are positioned closest to the area of sound generation in order to be the most efficient at sound attenuation.

Inlet (In-feed) Silencers

An inlet silencer is a specially designed piece of equipment that goes at the intake of the trim system. It eliminates sound created by the air and material entering the intake.

Inline (Blow-Through) Silencers

Inline silencers are designed to remove noise generated by both the rotating equipment and the airstream moving through the pipe system. This unit prevents noise from traveling throughout the system.

Box Silencers

These silencers are used in systems when production space is limited and there is no room for a longer inline silencer. These silencers are designed to reduce or eliminate noise generated by the cutter or granulator in the system. They are attached to the cutter inlet.

Weight: 78 Box Silencer – 34 lbs
811 Box Silencer – 67 lbs

Orifice Silencers

An orifice silencer is placed in a system as a cap for a future system. If a company plans on expanding the system, an orifice silencer will be installed to simulate an additional press in the system. Once the addition on the system is installed, the orifice silencer is removed.

Silenced Elbows

Silenced elbows perform the same task as blow-through silencers, attenuating sound in a system. However they have better sound attenuation than an inline silencer because the curve attenuates more sound. These elbows can occur in round or square sections.

To ensure optimum performance and safe operation of the unit, everyone who installs, uses or maintains it must read and carefully follow the instructions in this manual.

Throughout this manual, the Silencer is also referred to as the unit.

SAFETY

Always follow the general safety and accident prevention rules in addition to those set forth in this manual.

The silencer is designed and built with safety as a prime consideration. Each unit is checked at the factory for safety and operation.

Follow the maintenance schedules outlined in this manual for good performance and safe operation. Maintenance should be done only by qualified personnel and only with proper tools.

Carefully read the following safety rules before proceeding with installation, operation or maintenance. The rules are essential to ensure safe operation of the unit. Failure to follow these rules may void the warranty and/or result in damage to the unit or personal injury.

Safety Instructions

Safety instructions in this manual are boldfaced for emphasis. The signal words **DANGER**, **WARNING** and **CAUTION** are used to indicate hazard seriousness levels as follows:

DANGER – Immediate hazard which WILL result in severe injury or death.

WARNING – Hazard or unsafe practice which COULD result in severe injury or death.

CAUTION – Hazard or unsafe practice which COULD result in minor injury or in product or property damage.

Safety Labels

Safety labels on the unit provide important safety information. If any label is missing or damaged, contact the manufacturer, request a new label and apply it to the unit.

RECEIVING AND INSPECTION

Upon receipt, inspect the unit closely for damage. Record any indication of damage on the delivery receipt, especially if the unit will not be immediately installed. Obtain the delivery person's signed agreement to recorded damages to facilitate future insurance claims.

Since the unit is shipped F.O.B. Factory, the manufacturer's responsibility for the shipment ceases when the carrier signs the bill of lading.

If the unit is received short or in damaged condition, notify the carrier and insist on a notation of the loss or damage across the face of the freight bill. Otherwise no claim can be enforced against the carrier.

If concealed loss or damage is discovered, you must notify your carrier at once and request an inspection. If you do not request an inspection, the carrier will not consider any claim for loss

or damage. The carrier will conduct an inspection and may grant a concealed damage notation. If you give the carrier a clear receipt for goods that have been damaged or lost in transit, you do so at your own risk and expense.

THEORY OF OPERATION

Silencers can typically attenuate noise in a range from 95 to 105 decibels. This sound can be attenuated down to a target value of about 85 decibels. Attenuation can vary depending on environment, room geometry and other factors.

Inlet Silencer

An inlet silencer has a perforated baffle design that attenuates noise generated when air and trim are pulled into the material handling system.

Inline Silencer

Inline silencers are constructed of a rolled and welded sheet metal shell. The interior of the shell houses acoustical absorption material system surrounding a perforated tube. Inline Silencers can be packed one of two ways: repackable with foam or acoustical insulation. Silencers with insulation are not directional. Repackable silencers are directional, follow the arrow that indicates material flow on the shell. Repackable silencers are used in all oil mist applications, otherwise a regular inline silencer is used.

Box Silencer

The Box Silencer reduces/eliminates sound from the cutter or granulator through its perforated baffle system. It absorbs noise that would otherwise reverberate throughout the trim system. This silencer is packaged with insulation to help with sound attenuation.

Orifice Silencer

Orifice silencers are packed with insulation and are perforated to reduce the noise of suction that is coming in through the silencer.

Silenced Elbows

Silenced elbows are packed with insulation and are perforated to reduce noise in a curved section of the system.

INSTALLATION INSTRUCTIONS

Most silencers are installed in the system using compression couplings. The size of the couplings will vary with the size of the silencers. The only silencer not secured to the system via compression coupling is the box silencer; it is bolted to the cutter inlet.

Silencer Repacking

Silencer Separation

- Remove nuts and screws securing the shell and perforated piece
- Remove the perforated piece to use for foam cutting

Perforated Piece

Silencer Shell

Foam Cutting

- Place perforated piece on roll of foam
- Wrap foam around silencer once and make a mark with a utility or filet knife to distinguish the needed width of the foam.
- Use a T-square to cut the piece of foam the entire length of the roll

- Once a piece has been cut, place the perforated piece on the foam so that the flange is flush against the edge of the foam
- Make a cut approximately 1 inch from the end of the perforated section
    - This will give the desired piece of foam for wrapping

Foam Orientation

- All silencers require two wrappings of foam for packaging, except the largest model, 12 inch (this requires 3 foam wrappings)
- Double Wrapped Silencers
    - When packaging silencers that require 2 foam wrappings, the shiny side must face the perforated side during the first wrapping.
    - The 2nd wrapping will have the shiny side of the foam facing up the shell of the silencer.
- Triple Wrapped Silencers
    - When wrapping the 12 inch silencer, the shiny side of the 1st wrap will face the perforated part.
    - The 2nd and 3rd wrappings will have the shiny side facing the shell.

Foam Wrapping

- With the foam still flush against the flange, begin taping the foam around the perforated piece using duct tape.
- When taping, make sure the duct tape lines up because it is not very adhesive to the foam:
    - Taping should begin at the middle of the piece
    - Continue wrapping duct tape around the foam working towards the flanged end
    - Sections of tape should be about 6-8 inches apart
    - Tape around the ends of the foam roll will be closer together
    - Once one end of the foam has been reached, work towards the other end

- After applying the 1st wrapping, repeat the 'Foam Cutting' procedure on page 2 to cut the piece for the second wrapping.
    - If a 3rd wrapping is required, do the same thing once the 2nd piece has been wrapped.

- When applying the 2nd wrapping of foam (and 3rd if needed), make sure that the seams of the foam pieces are in line.

Silencer Reassembly

- Before inserting the perforated section into the shell, a thin layer of Dow 111 must be applied to the flange end of the shell that mates with the perforated section.
    - Use finger to smear over the surface, not covering the holes

Dow 111 Ring

Drain Plug Hole(one located on other end as well)

- When inserting the perforated section into the shell, the seam should be 180 degrees away from the drain plug
- Before completely securing pieces, the holes on the flanges must be in line and the foam opposite the flange must be completely tucked in
- Secure the shell and perforated piece with ¼-20X1" Hex screws and a flat washer
- They will be secured to ¼-20 flange nuts
    - The number of screws, washers and flange nuts required will vary based on the silencer size
- Wipe off excess Dow 111 around the flange
- Once the silencer has been reassembled, the 2 drain plugs must be inserted into the silencer
- Use Lock Tite 554 around the thread of the drain plugs when installing to the silencer

MAINTENANCE

Maintenance on the silencer must be carried out by suitably qualified technicians, and local safety standards must be maintained.

Work should not be performed on the machine components without the Electrical Supply being securely isolated.

Silencers are typically maintenance free pieces of equipment. Repackable inline silencers are the only silencers that require maintenance. On a weekly basis, the silencer should be drained of oil. It is evident that drainage is needed when the sound attenuation begins to decrease in the system. If the foam needs to be replaced, please follow the repacking instructions on page 7.

REPLACEMENT PARTS

Service and Parts:

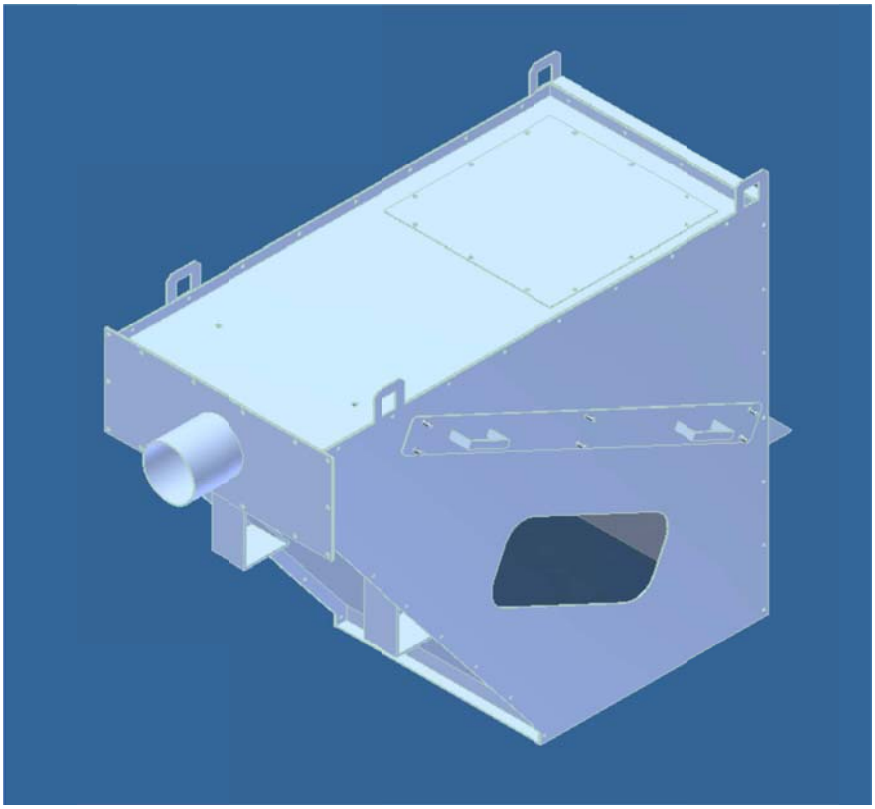
Phone: 302-999-8000

Fax: 302-999-8510

Please provide the part description when ordering replacement parts

Foam – Contact PAC

"We Convey Solutions"



Slant Screen Separators

Installation, Operating and Maintenance Manual

PAC Slant Separators Manual (November 2012)

Printed in USA

For service inquiries or additional information on this or any other Precision AirConvey product, please visit **www.airconvey.com.**

or contact us via one of the following:

Telephone: 302-999-8000

Fax: 302-999-8510

Email: get-facts@airconvey.com

Precision AirConvey
Pencader Corporate Center
465 Corporate Boulevard
Newark, DE 19702

Contents

INTRODUCTION

To ensure optimum performance and safe operation of the unit, anyone who installs, uses or maintains it must read and carefully follow the instructions in this manual.

Our slant screen separators feature a proprietary design that directs the conveying air towards the screen at the ideal angle to eliminate air pressure, allowing waste material to fall gravimetrically from the unit without contacting the screen. Potentially dangerous air pressure in drop chutes, balers, granulators, compactors and other downstream equipment is eliminated. Up to 100% of the waste material is gently deposited into a baler, collector bag, box, compactor or other waster container.

Separators can be mounted directly on a baler, compactor, EcoPAC or other material collection device or hung from the ceiling where material exits through a fabric discharge chute or custom discharge into a collection bag.

The balance fan should be equipped with a VFD to help balance the separator during operation. PAC control panels purchased with the separator have a built in VFD. If a control panel was not purchased, the customer must supply a VFD for the balance fan.

Features:

- Large viewing window for safe, easy flow monitoring
- Oversized access panel for quick maintenance
- Puncture-resistant, stainless steel screen
- Anti-rust, enamel finish for long-term outdoor operation
- Optional side chute loading without dust blow-back

Throughout this manual, the Slant Screen Separator is also referred to as the Separator or the unit.

Precision AirConvey
Slant Screen Separators

Specifications

SLANT SCREEN SEPARATOR MODEL:	24	36	48
DIMENSIONS:	74-5/8”L x 24”W x 57-1/16”H	74-5/8”L x 36”W x 57-1/16”H	74-5/8”L x 48”W x 57-1/16”H
TRANSPORTATION:	Forklift – From the rear of the unit		
WEIGHT (LBS.):*	417	500	583
SCHEMATICS:	See Page 10		

*Weights are all estimated values, without transitions or balancing fans

SLANT SCREEN SEPARATOR MODEL:	60	72	96	108
DIMENSIONS:	74-5/8”L x 60”W x 57-1/16”H	74-5/8”L x 72”W x 57-1/16”H	74-5/8”L x 96”W x 57-1/16”H	74-5/8”L x 108”W x 57-1/16”H
TRANSPORTATION:	Forklift – From the rear of the unit			
WEIGHT:*	667	750	917	1000
SCHEMATICS:	See Page 10			

*Weights are all estimated values, without transitions or balancing fans

SLANT SCREEN SEPARATOR MODEL:	Slant Sep. 2
DIMENSIONS:	52-1/16”L x 26-1/2”W x 45-3/8”H
TRANSPORTATION:	Forklift – From the rear of the unit
WEIGHT:*	400
SCHEMATICS:	See Page 11

*Weights are all estimated values, without transitions or balancing fans

***NOTE*: Due to our commitment to continuous product improvement, we reserve the right to change the specification without notice.**

SAFETY

Always follow general safety and accident prevention rules in addition to those set forth in this manual.

The Slant Screen Separator is designed and built with safety as a prime consideration. Each unit is checked at the factory for safety and operation.

Follow the maintenance schedules outlined in this manual for good performance and safe operation. Maintenance should only be done by qualified personnel and only with proper tools.

Carefully read the following safety rules before proceeding with installation, operation or maintenance. The rules are essential to ensure safe operation of the unit. Failure to follow these rules may void the warranty or result in damage to the unit or personal injury.

1. Do not install or attempt to repair a unit that has been damaged in shipment. See Receiving and Inspection for instructions.
2. Electrical components have the potential to cause personal injury or equipment damage. Before doing any work on the unit, ensure the electrical supply has been locked and tagged.
3. Combustible materials, such as buffing lint, paper, wood, aluminum or steel dust, weld fumes, or flammable solvents represent fire or explosion hazards. Use special care when selecting and operating all dust or fume collection equipment when combustible materials are present. Consult and comply with National and Local Codes relating to fire or explosion and all other appropriate codes when determining the location and operation of dust or fume collection equipment.
4. Always supply electrical power that complies with the voltage shown on the data plate and/or electrical schematic.
5. Personal Protective Equipment should always be used when performing any maintenance. Protective equipment includes but is not limited to: Safety Glasses, Respirator, Gloves, Hard Hat, Protective Clothing, and Safety Harness.
6. Consult the MSDS (Material Safety Data Sheet) for the particular material and dust that will be present in the separator. Follow all recommended safety precautions.

Safety Instructions

Safety instructions in this manual are boldfaced for emphasis. The signal words **DANGER**, **WARNING** and **CAUTION** are used to indicate hazard seriousness levels as follows:

DANGER – Immediate hazard which WILL result in severe injury or death.

WARNING – Hazard or unsafe practice which COULD result in severe injury or death.

CAUTION – Hazard or unsafe practice which COULD result in minor injury or in product or property damage.

Safety Labels

Safety labels on the unit provide important safety information. If any label is missing or damaged, contact the manufacturer, request a new label and apply it to the unit.

Use only manufacturer's genuine replacement parts. The manufacturer bears no responsibility for hazards caused by the use of unauthorized parts.

RECEIVING AND INSPECTION

Upon receipt, inspect the Slant Screen Separator closely for damage. Record any indication of damage on the delivery receipt, especially if the unit will not be immediately installed. Obtain the delivery person's signed agreement to recorded damages to facilitate future insurance claims.

Since the Slant Separator is shipped F.O.B. Factory, the manufacturer's responsibility for the shipment ceases when the carrier signs the bill of lading.

If the unit is received short or in damaged condition, notify the carrier and insist on a notation of the loss or damage across the face of the freight bill. Otherwise no claim can be enforced against the carrier.

If concealed loss or damage is discovered, you must notify your carrier at once and request an inspection. Unless you do this, the carrier will not consider any claim for loss or damage. The carrier will make an inspection and may grant a concealed damage notation. If you give the carrier a clear receipt for goods that have been damaged or lost in transit, you do so at your own risk and expense.

THEORY OF OPERATION

The precise design of the Separator virtually eliminates screen blinding along with the dangerous pressure in drop chutes and downstream equipment. The screen and balance fan cause the pressure drop to allow materials to be gravity fed into an appropriate container. Typical applications are a baler, EcoPAC, Gaylord, collector bag, box, compactor or other waste container. Trim carryover is eliminated. This unit includes a balance fan with the speed set during the initial start-up and requires no further adjustments.

INSTALLATION INSTRUCTIONS

All flange connections of the slant separator should be assembled with the proper hardware:

- 3/8" nuts, bolts, washers and lock washers

All flanges should be caulked with silicone to prevent dust or trim material from escaping from the system. Allow for enough room on the side of the separator to remove the screen when installing. Refer to 'Dimension "C"' on the drawing in the appendix for required clearance.

MAINTENANCE

Maintenance on the Slant Separator must be carried out by suitably qualified technicians and local safety standards must be maintained.

Securely isolate the electrical supply before performing work on the machine components.

Task	Maintenance intervals according to use			
	Daily	Weekly	Monthly	Yearly
Clean Slant Screen*			X	
Clean Balance Fan*			X	

*Interval can be changed to meet user needs. It is material dependent.

With some applications a buildup of material or dust may occur on the screen. This buildup of material can affect the separator's performance and airflow balance. Routinely check for material or dust that may have become stuck to the inside of the separator and to the screen. Clear this material as needed to retain maximum performance. The screen can be cleaned with a horsehair or wire brush. It is also acceptable to power wash the screens, however, the screen should not be reinserted into the separator while wet. Check for any damage to the screen such as dents or tears. Replace as needed.

The balance fan (either HDBI or PF) is important to the proper operation of the separator and can also collect dust or other debris. To minimize the buildup of dust and debris please refer to the manual for the relevant fan.

TROUBLESHOOTING

The equipment fitted in Slant Separator is of superior quality, supplied by recognized manufacturers. However, as with all machinery, components do occasionally fail or require adjustment. The following troubleshooting list is as fully detailed as possible to ensure that

should any faults occur, machine downtime is reduced to a minimum, and should not be regarded as a potential list of machine faults. It should be noted that any checks must be carried out by qualified personnel. All checks carried out on the electrical circuitry must be carried out by a suitably qualified technician or engineer. Similarly, any checks carried out on hydraulic components must be carried out by a suitably qualified technician or engineer.

TROUBLESHOOTING TABLE

Problem	Check
Material is shooting out of discharge chute (Slant separator is pressurized)	Is the screen clear
	Is the balance fan running, then verify that it is running in the right direction
	VFD settings
	Is there a change of airflow characteristics on the front of the system
	Check cleanliness of dust filtration*
Material is sticking to the screen	VFD settings
	Verify no changes in trim material
	Verify static elimination is working*
Material entering balance fan and/or dust collection after slant separator	Check screen for holes
	Inspect hardware securing screen and separator
	If dealing with thin films/small particles, apply weather stripping to perimeter and reinstall screen
No material discharge (bridging in separator)	Material build up in separator
	Balance fan is operating properly
	Verify static elimination is working*
	Ensure oil mist in pressure sensitive adhesive (PSA) is working properly*
	Verify baler/compactor ram is operating properly*

*If Applicable

REPLACEMENT PARTS

Service and Parts:

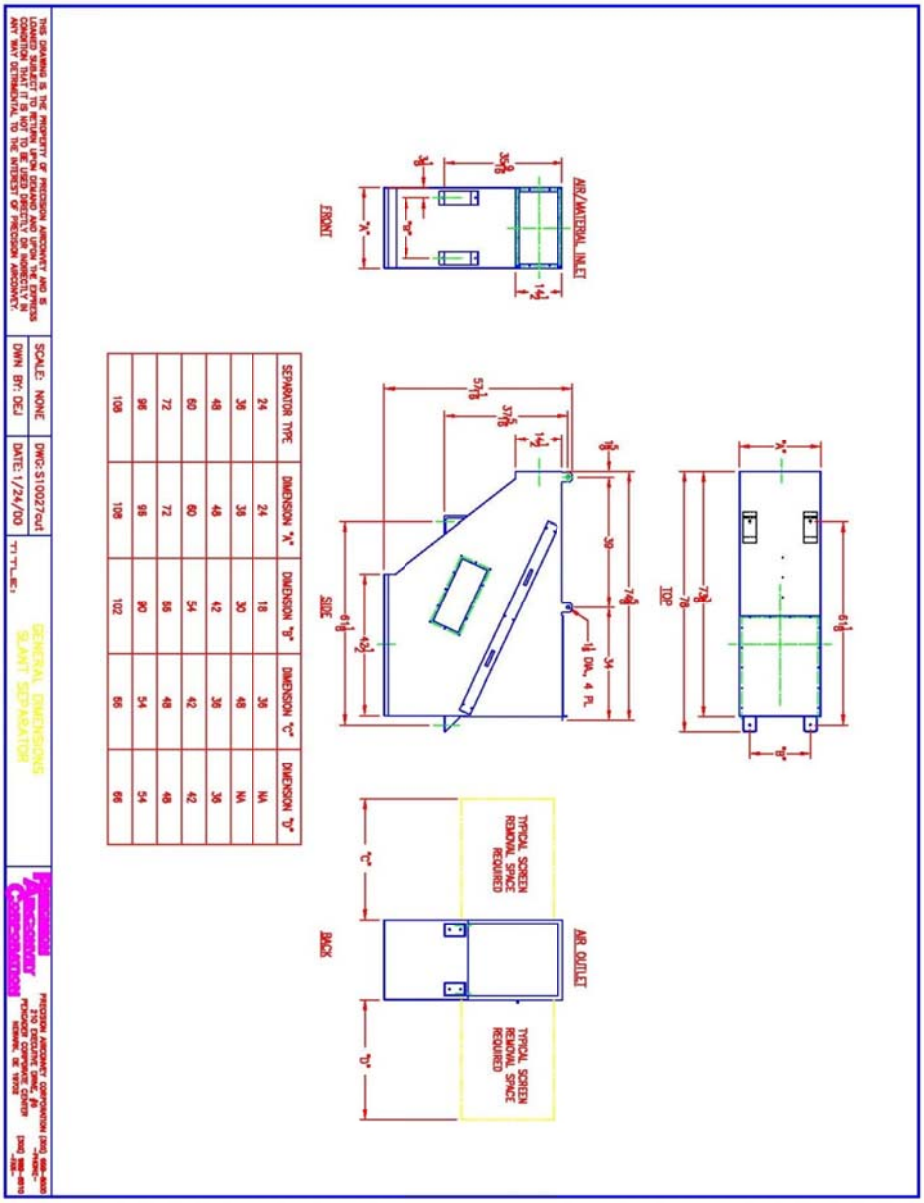
Phone: 302-999-8000

Fax: 302-999-8510

Please provide the Part Description and part number when ordering replacement parts.

Slant Separator Screen (Size depends on size of separator) – Contact PAC with Slant Separator Model Number

SCHEMATICS



SEPARATOR TYPE	DIMENSION "A"	DIMENSION "B"	DIMENSION "C"	DIMENSION "D"
24	24	18	36	NA
36	36	30	48	NA
48	48	42	36	36
60	60	54	42	42
72	72	66	48	48
96	96	90	54	54
108	108	102	66	66

Best Practice for use of PAC in-line static elimination:

- utilize static bars with unshielded high voltage cable, trim cable length as necessary for most direct route to power supply and / or 4-way connector

- utilize new 'Top Hat' static bar cover which eliminates the need for a small radius cable turn as the high voltage cable exits the housing

- keep all high voltage cable within plastic conduit and maximize the bend radius of the cable when required. Do NOT pinch, kink, or force the cable and conduit through tight areas

- Proper grounding is required; ensure a daisy chain of ground wire exists from a housing stud on each bar to a main ground wire run along outside of the plastic conduit back to the grounding lug on the power supply. The main ground can be connected to an earth ground as well but electrically grounding it as previously described is preferred.

- utilize the most current power supplies offered 101290 - TSN75E. These power supplies have an internal protection circuit which reduces output in the event of unfavorable conditions prolonging the life of the power supply. These power supplies are interchangeable with pervious models (TSN70).

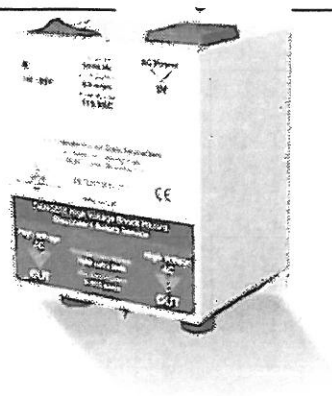
- the power supplies should be located in cool dry environment when ever possible. If outdoor power supply mounting is required, please place them within a vented NEMA enclosure with all electrical box penetrations at the bottom

- when the PAC in-line static eliminator assembly is installed outside, utilize RTV silicone in place of the typical gasket to seal out as much moisture as possible, and rotate the housing to ensure a static bar is not the lowest point of the assembly to prevent pooling of moisture on the static bar.

- PAC in-line static eliminator assembly should be placed at the inlet of the material / air separator. It is preferred to have a short length of straight tube, between 5 and 10ft, after the static eliminator and before the separator. NOTE: placement of a duct bend after the static eliminator and before the separator inlet should always be avoided.

SNPS Specifications

Static Neutralizing Power Supply



General Description

The *PAC* System consists of two parts:

- A high impedance, high voltage, lower power, constant voltage, Power Supply
- An "Applicator" (Air Ionizer in the form of a bar or rod, air blower, air gun, air nozzle, or air knife).

The system is designed to create an abundance of bipolar air ions in a "field" which tends to neutralize electrically charged materials (paper, plastic, glass, wood, etc.) that pass through it.

The Static Neutralizing Power Supply

The SNPS Neutralizing Power Supply is a low power, high impedance, step-up transformer, potted with internal current limits to provide appropriate power to the "Applicator," and safety to the user. This unique power supply features a constant voltage transformer, which provides constant, stable output voltage despite line voltage fluctuations.

Inspect the Power Supply for visible damage that may have occurred during shipment. If the unit was damaged in shipment, please report it to your Receiver and contact us so that we may promptly send a replacement.

Locating the Static Neutralizing Power Supply

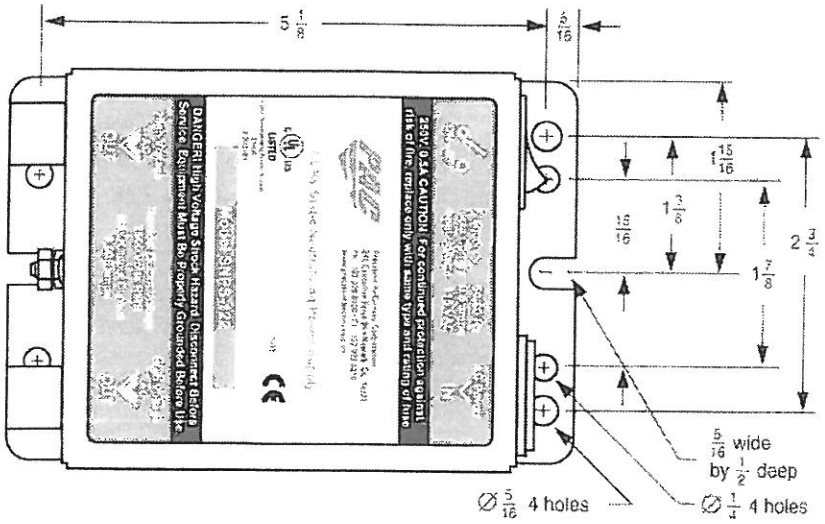
Locate the Power Supply as close as possible to the static bar using its mounting plate to securely fasten the unit in place. Choose a location free of oil, water and gross contamination. Avoid areas where ambient temperature is continuously in excess of 120°F. Mount the Power Supply so that the High Voltage Output Ports are facing down or to either side to prevent entry of foreign material. Unless specified differently on the order, each static bar is equipped with a standard 72 inch length of high voltage cable inside a metal braid Alpha shield. This length of cable allows the installation of two static bars approximately 10 feet apart connected to one, centrally located power supply. If the high voltage cable is too long, you may coil it and secure it neatly out of harm's way. Because the cable is shielded, there will be no adverse effects such as excessive flux fields or noise that can result from unshielded cable.

Caution: It is important that only qualified personnel familiar with handling high voltage electrical equipment be trusted to install, service, and troubleshoot this equipment. Feel free to consult the factory if you have any questions.

Precision AirConvey Corporation • 210 Executive Drive #6 • Newark, DE 19702
Phone: 302-999-8000 • Fax: 302-999-8510 • www.precisionairconvey.com

12/05

Model SNPS Specifications



Power-Line Voltage 115Volts 50/60HZ (Optional 230Volts 50/60HZ)

The SNPS is available in 115 and 230volts 50/60HZ. The dash numbers distinguishes them. SNPS-122 operates on 115volts 50/60HZ and the SNPS-242 on 230volts 50/60HZ.

Both versions are equipped with a detachable (from the power supply) three-conductor line cord and a three-prong plug. When using the 115 volts unit, be sure to plug it into a grounded three-prong receptacle. When using the 230 volts version, you will likely be required to cut off the plug supplied and hard wire from the pigtail or change the plug to match your particular receptacle.

Remember: proper grounding of the Static Neutralizing Power Supply is essential to the safety of the user and proper operation of the equipment.

For added convenience and safety, these Power Supplies come equipped with a fuse and a lighted on/off switch.

Grounding the Static Neutralizing Power Supply

If the machine itself is properly grounded, securing the Power Supply tightly to the metal machine frame with metal screws will automatically ground the power supply.

If you elect to mount the Power Supply to a wall or any other non-metal, non-grounded surface, you must attach an external ground wire. Attach one end to the ground stud located above and between the High Voltage Output Ports, and the other end to a suitable, confirmed good, electrical "ground".

Mounting the Static Neutralizing Power Supply

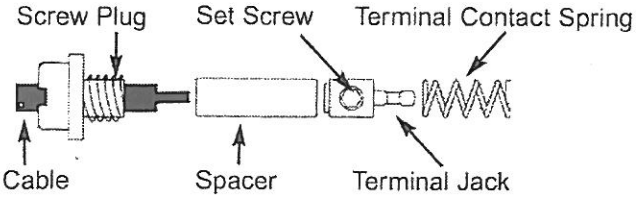
The base of the Power Supply contains four mounting holes and one slot on each end. Using the dimensions herein provided, drill and tap two or four holes (10-32 or 1/4-20 are adequate to secure the Power Supply in place) into the metal machine frame.

Mount the Power Supply so that the High Voltage Output Ports are facing down. The second best mount would be to face the ports right or left...not up. This will prevent contamination from traveling down the cable and into the high voltage port and possibly causing a high voltage "short" circuit.

Attaching the Connector Kit to the High Voltage Cable (non-shielded cable only)

After you have determined the locations of the "Applicator" and Power Supply and cut the cable to the shortest length between them, attach the High Voltage Cable Connector as follows:

1. Slide the retaining nut over the end of the cable with threads facing the cable end.
2. Slide the spacer onto the cable.
3. Carefully strip approximately 3/8" of insulation from the end of the high voltage cable exposing the conductors.
4. Twist the conductor strands and insert them into the hole in the end of spring retainer.



5. Tighten the set screw in the retainer until the conductors are held firmly in place.

Note: the connector kit is factory installed on static bars with alpha shielded high voltage cables.

6. Remove the dust cover from the high voltage output port and insert the high voltage cable connector firmly in place.
7. While pushing to compress the spring, thread the retaining nut into the threaded output port and finger tighten firmly.
8. Secure ring terminal on green grounding lead to grounding stud between output ports on power supply.
9. After the static bar and power supply have been properly installed, positioned and grounded, plug the power supply line cord into a properly grounded 3-wire AC electrical outlet. Be sure the line voltage and frequency supplied matches that specified on the NPS nameplate. Do not remove the ground prong from the line plug or use a three to two prong adapter.

Note: For convenience, you may elect to hard wire the power supply directly to the machines' on and off controls.

Connecting to the Static Neutralizing Power Supply

The SNPS Power Supply is equipped with two High Voltage Ports internally threaded to accept the *PAC* High Voltage Connector Kit as well as most other manufacturer's similar high voltage connector kits.

These connectors consist of a Screw Plug, Plastic Spacer, Terminal Jack, and Terminal Contact Spring. Remove the dust cap from the High Voltage Output Port and fully insert the cable and connector assembly. Tighten the Screw cap (finger tight and secure) into the High Voltage Output Port.

Operation

Before turning the power on, be sure the Power Supply is secure in its mounting, all grounds and connections are proper and secure, line voltages and frequency are appropriate and that the "Applicator" is clean and correctly installed. Apply the line voltage and push the switch to the "on" position.

Specifications: SNPS-122 or SNPS-242

Type:	High voltage, ferro resonant, AC, constant output transformer.	**Line Cord:**	.....72" detachable
		Weight:	.....4.75lbs
Input Voltage/Frequency:	.....115 v (230 available) 50/60 HZ	**Dimensions:**	width: .....4 "
			height: .....3.5"
Output Voltage:	.....7.5 Kv		length: .....5.75"
Input Current:	.....0.5 amp	**Certifications:**	CE c UL us
Output Current:	.....0.005 amp		

SNPS Specifications

Static Neutralizing Power Supply

Maintenance

Both the Power Supply and the "Applicator" must be kept clean and free of water, oil, grease, solvents and other contaminants that would cause short circuits to them or any electrical device. Although this Power Supply is made with reliable, high quality components and great care, a contaminated, arcing, sparking, "Applicator" will shorten the life of both "Applicator" and Power Supply.

Troubleshooting

Only a qualified person familiar with handling high voltage equipment should attempt to troubleshoot and service this equipment.

- Turn the power off and disconnect all "Applicators".
- Confirm that grounds are proper and secure
- Confirm line voltage and frequency are appropriate and applied
- Confirm good fuse
- Confirm On Switch is "ON"
- Use an appropriate High Voltage Instrument and Test Probe to test voltage inside Output Port. Following the manufacturer's instructions, attach one cable of the test instrument to ground and insert the high voltage test "probe" into one followed by the other output port. Note and record the output voltage. It should be 7500 volts (±5%).

Please also note that some high voltage test probes give inaccurate readings when testing high impedance, low power, power supplies. For further assistance, please consult us at our factory. Phone:302-999-8000

SNPS Agency Listings

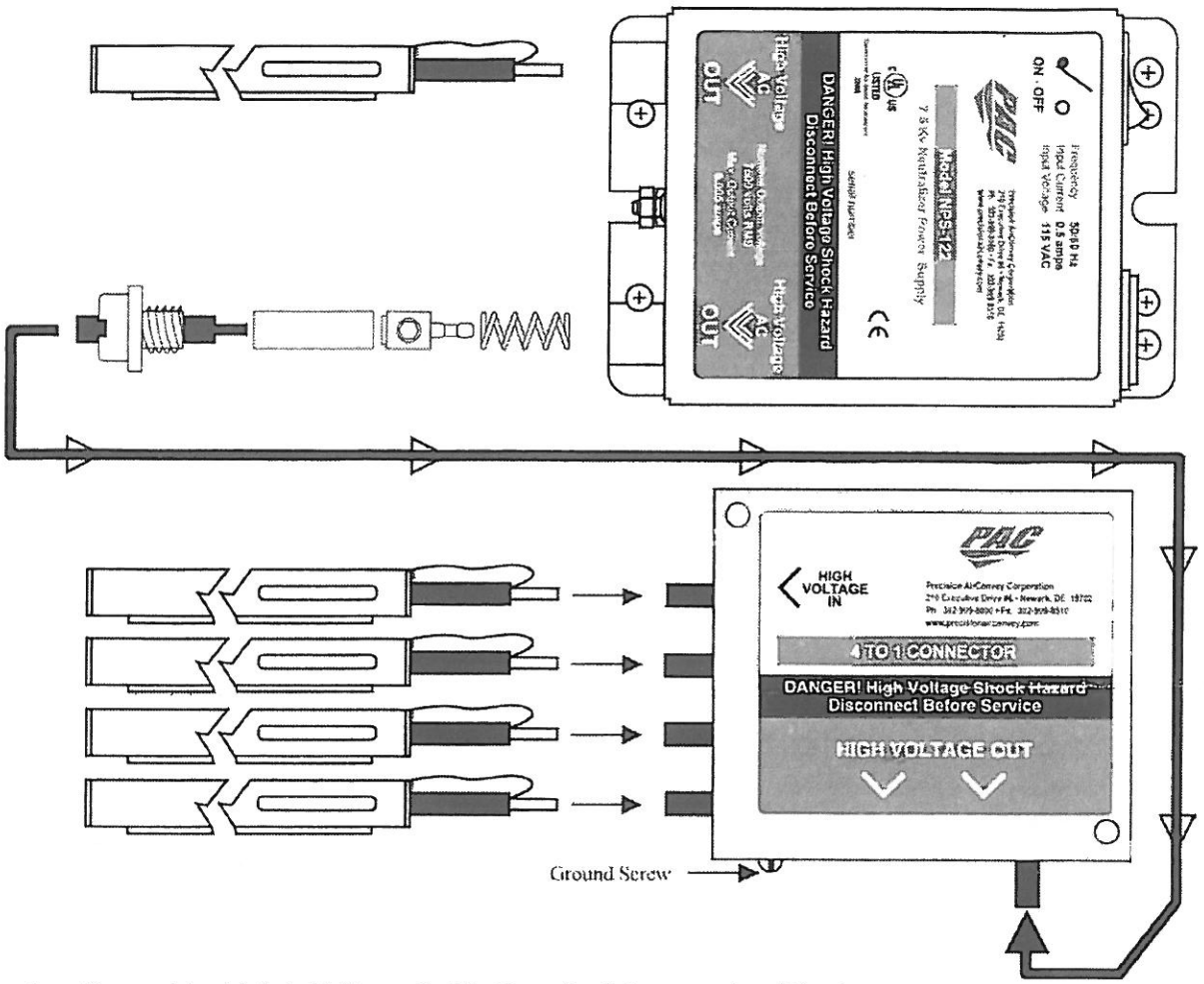
UL - Listed for United States and Canada, Static Neutralizing Power Supply, Control Number 72WA

CE - To standards EN55011 & EN50082-2. Note: To meet CE requirements, the "Applicator" Air Ionizer in the form of a bar or rod, air blower, air gun, air nozzle, or knife must utilize a shielded cable to reduce high voltage interference with sensitive electronic control systems.

Precision AirConvey Corporation • 210 Executive Drive #6 • Newark, DE 19702
Phone: 302-999-8000 • Fax: 302-999-8510 • www.precisionairconvey.com

4-1 Connector Block

High Voltage Cable Terminal Connection Block



Instructions: 4 to 1 High Voltage Cable Terminal Connection Block

Pictured above are sketches of components, which make up a Static Bar "System". The illustration shows that one static bar can be connected to one high voltage output port in the power supply while the second output port feeds a multiple connection block that can supply power to up to four additional static bars.

The standard *PAC* Static Neutralizing Bars are supplied with a six (6) feet length of high voltage cable encased in a braided metal shield and with a spring loaded high voltage connector attached. There is a short length of green ground wire with a ring terminal attached to both ends of the braided metal shield. The high voltage cable is "shielded" against electromagnetic radiation and conforms to UL and CE standards.

Like the static bars, the 4 to 1 Terminal Connection Block is supplied with a six (6) feet length of high voltage cable attached and with a spring loaded connector also attached; the cable is shielded and has the short length of green ground wire as described above.

Precision AirConvey Corporation • 210 Executive Drive #6 • Newark, DE 19702
Phone: 302-999-8000 • Fax: 302-999-8510 • www.precisionairconvey.com

12/05

4-1 Connector Block

High Voltage Cable Terminal Connection Block

To connect the high voltage static bar cable to the multiple terminal connection block:

Caution: This is high voltage. Be sure the Terminal Block is disconnected or the power is off before making any connections to or from the Terminal Block!!!

Attached and secured to the inside of the 4 to 1 Terminal Connection Block is one end of a six foot length of shielded high voltage cable which includes a six inch length of green ground wire secured under the "ground screw" on the edge of the Terminal Block. On the other end of the six ft. length of high voltage cable is a spring-loaded connector and another six-inch long, green, ground wire attached to the cable shield.

- Attach and secure the terminal lug, on the end of the green ground wire, to the ground screw on the Power Supply.
- Insert the spring-loaded connector into an open output port in the power supply and secure it finger tight.
- Insert the spring-loaded connector(s) from the static bar(s) into an open port in the Terminal Block and secure it finger tight.
- Attach and secure the terminal lug, on the end of the green ground wire, to the ground screw on the edge of the Terminal Block.

After all connections, high voltage and ground have been properly made and secure,
If you have any questions or problems with this product, please contact us by phone, fax, or e-mail. We're here to help.

PAC

Precision AirConvey Corporation • 210 Executive Drive #6 • Newark, DE 19702
Phone: 302-999-8000 • Fax: 302-999-8510 • www.precisionairconvey.com

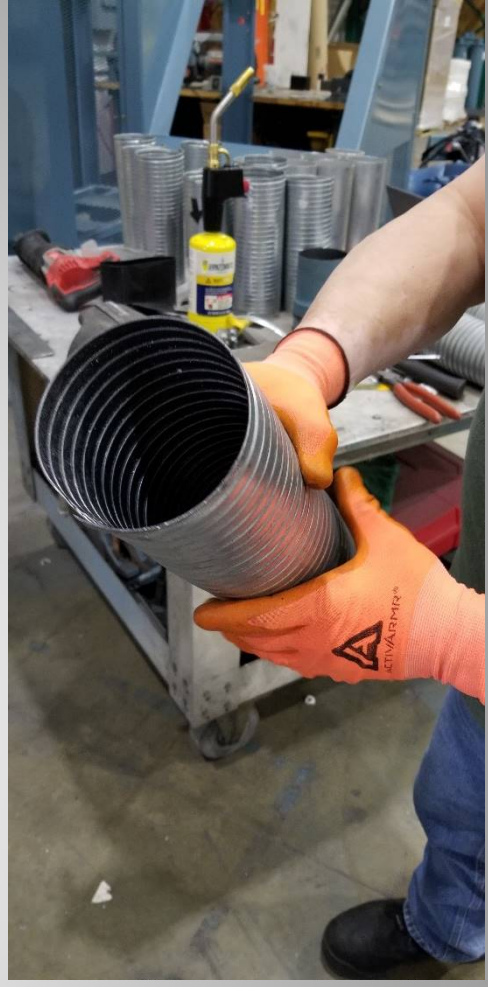
Shrink Sleeve Training

PAC
PRECISION AIRCONVEY

Cut Flex hose with Sawzall with bi-metal blade

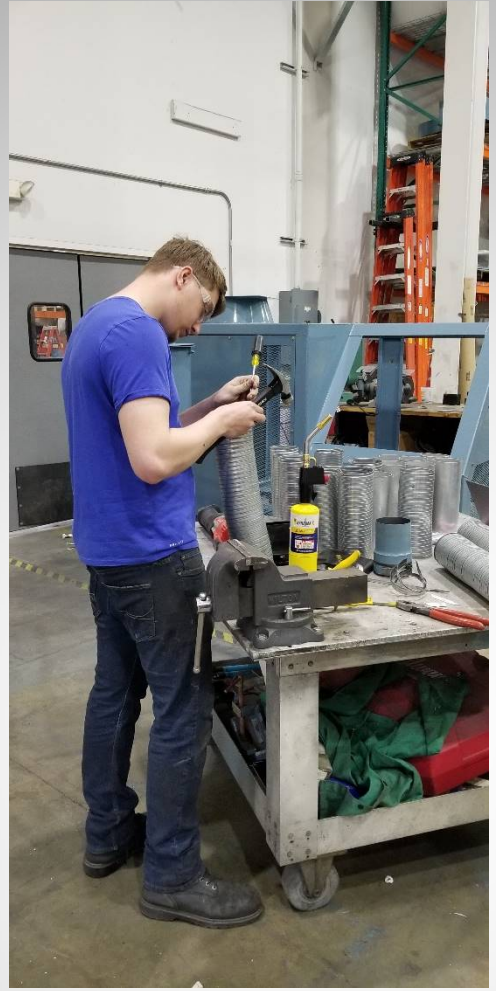
Piece should be ½-1” longer than needed

Flex is directional, according to the spiral wrap. Flow of material should go with the inlet with inner lip, to outlet with outer lip



Outlet - Peel off outer layer, with screwdriver and hammer until you get to a clean continuous end, cut edge off at 45 degree angle with tin snips.

This will create an outer lip. Outlet goes inside flex nipple.



Inlet - Repeat on opposite end of flex, by peeling inside to reveal clear edge.

This will create an inner lip (so material does not get hung up in flex) Tubing will goes inside the inlet of the flex.

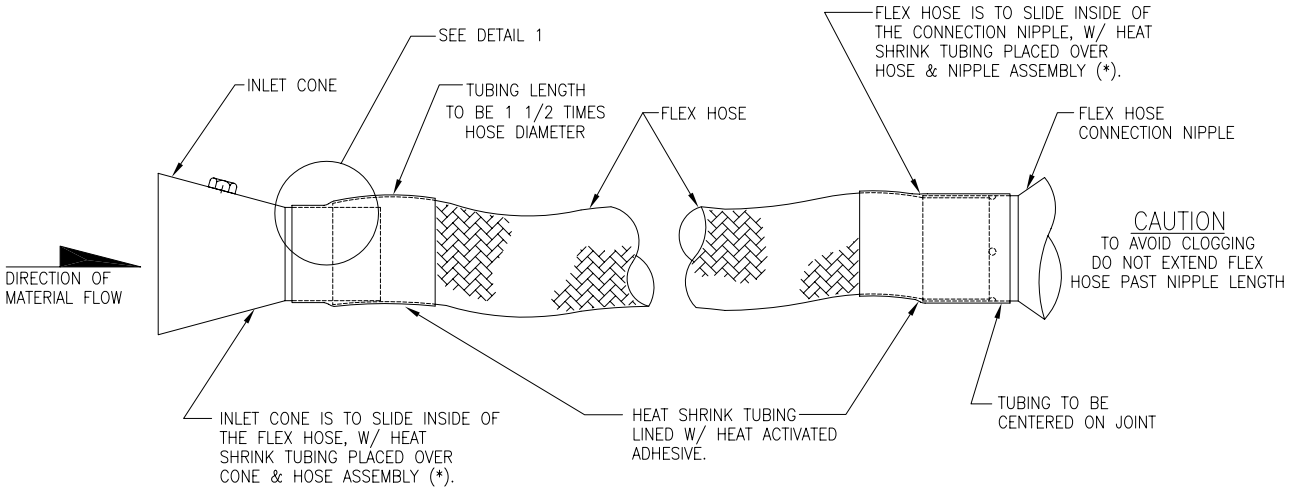
On a flat surface, connect infeed into inlet of flex, leave enough tangent exposed (about 2” or more) to ensure you have enough sealing surface for the shrink sleeve. Have section being worked on, hanging but well supported and straight, with 360 access for torch around shrink sleeve.

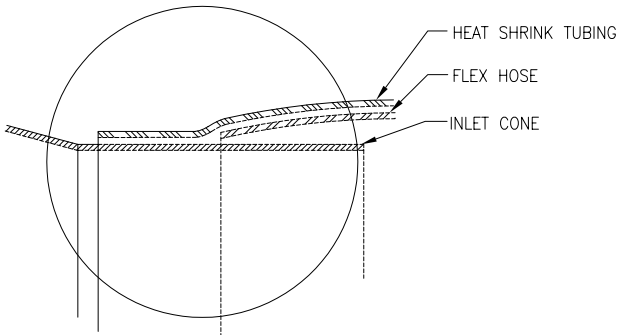
Peel protective plastic sleeve off inside of shrink. Slide shrink sleeve on, seam side up centered over the joint.

Use torch to shrink, go over sleeve nice and evenly. Slow and steady is best practice. Trick is to keep the flame moving. Be sure to not concentrate on one area for too long as holes will form. Once a hole is formed, the shrink sleeve is no longer usable.

Heat until you see the sleeve has shrunk, and you begin to see seepage of rubber around edges.

Must be completely dry and cool before use. Approx. 20-30 minutes





DETAIL 1

(*) HEAT SHRINK TUBING IS TO BE HEATED WITH A STANDARD HEAT GUN. STARTING IN THE MIDDLE OF THE TUBING WORKING TO THE ENDS.

NOTES:
1. THE FLEX HOSE MUST BE CUT CLEANLY WITH NO SHARP EDGES ON THE INSIDE.
2. THE INSIDE OF THE ASSEMBLY MUST BE SNAG FREE.

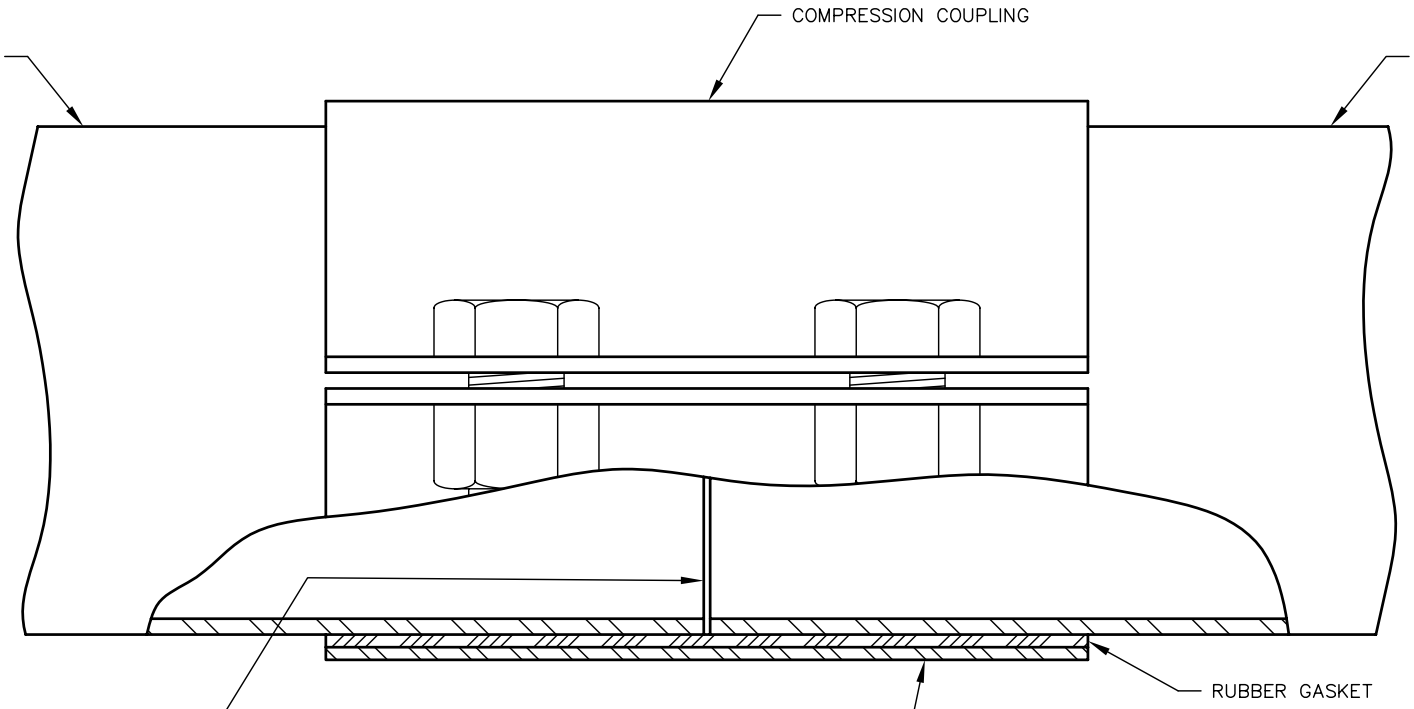
1	BORDER CHANG	DEJ	1/13/00
REV No.	REVISION	BY	DATE

PRECISION AIRCONVEY CORPORATION
23 SOUTHGATE BOULEVARD, #102
SOUTHGATE INDUSTRIAL PARK
NEW CASTLE, DE 19720
(302) 999-8000 -PHONE-
(302) 999-8510 -FAX-

NTS	DEJ	KDB	9/8/98	
SCALE:	DWN BY:	CHKD BY:	DATE:	APPRVD:

STANDARD FLEX HOSE CONNECTION
PAC STANDARD
TITLE

MODEL	10026 DWG NO.	1 REV



CUT TUBES TO LENGTH AS REQUIRED. CUTS MUST BE MADE PERPENDICULAR TO OD OF TUBING. ENDS OF TUBE MUST BE DEBURRED AND SNAG FREE. FIELD DRESS TO ASSURE MINIMUM GAP WHEN TUBING IS BUTTED TOGETHER.

TO INSTALL COUPLING: SLIDE COUPLING OVER END OF (1) TUBE UNTIL END OF TUBING IS EXPOSED. BUTT TUBING TOGETHER, ALIGNING OD's AND ASSURING MINIMUM GAP BETWEEN TUBES. SECURE TUBES FROM MOVING. SLIDE COUPLING OVER TUBING UNTIL CENTERED OVER JOINT, ASSURING RUBBER GASKET IS NOT DEFORMED OR DEFLECTED. TIGHTEN COUPLING BOLTS TO SECURE COUPLING.

~	~	~
REV No.	REVISION	DATE

PAC PRECISION AIRCONVEY
"We Convey Solutions"
Precision AirConvey
210 EXECUTIVE DRIVE #6
PENCADER CORPORATE CENTER
NEWARK, DE 19702
www.precisionairconvey.com
(302) 999-8000 -PHONE-
(302) 999-8510 -FAX-
get-facts@airconvey.com

NONE	PD	ELA	3/1/02	ADAMS
SCALE:	DWN BY:	CHKD BY:	DATE:	APPRVD:

TITLE: TYPICAL TUBE AND COMPRESSION COUPLING ASSEMBLY

MODEL	0763M160	~
	DWG NO.	REV