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INTRODUCTION

For more than forty years Pneu-Con (Pneumatic Conveying, Inc., located in Ontario, California) has been providing innovative, economical equipment and products for the bulk-material-handling market. From ancillary components to a complete turn-key Central-Powered Vacuum Conveying System Pneu-Con provides an entire array of components, coupled with high-quality installations & customer service and support. Our staff represents well over 100 years of experience in the bulk material handling and processing industry. Thank you for choosing Pneu-Con to solve your bulk material handling requirements.

Pneu-Con’s Mission: To Meet Dry Bulk Material Handling Challenges with Smart-Engineered Pneumatic Conveying Systems; to exceed our customer’s expectations with equipment that is efficient, simple & economical to operate and maintain.

These instructions give routine maintenance & service information to keep the system operating at peak performance, reducing downtime to an absolute minimum; system components should provide years of trouble-free service. Additionally, along with this manual, supplemental OEM-specific equipment manuals may be supplied either inclusively, or under separate cover.

At Pneu-Con your satisfaction is our priority. Complete System Installation & Start-Up Assistance is available; please contact our Service Department to schedule service. Local, Southern California, customers can take advantage of while-you-wait equipment repair & servicing, as well as convenient Will Call order pick-up or same-day messenger delivery service.

To enable prompt quality customer support Pneu-Con employs dedicated craftsmen consisting of fabricators, welders, machinists and field-service technicians. Contact our Sales Department to discuss how Pneu-Con can provide PLC Logic-Relay Controllers, Expansion Modules & complete controller upgrades, or to establish a preventative-maintenance program. We look forward to serving your needs in the years to come.

DESCRIPTION

Pneu-Con Central-Powered Vacuum Conveying System are complete vacuum conveying systems and can be supplied with a Main System-Control Panel and/or auxiliary panels including: Motor Disconnect Panel(s), Silo and/or Station-select Panels, or Alarm Panels. Optionally, field wiring & compressed-air supply lines (performed by Pneu-Con Field Service Technicians) can be provided.

CP Systems range from simple single-station, up & over, fill type to elaborate multiple-station systems – powered by a single Blower Package. Larger systems may be configured as dedicated line, multiple line, or grouped, powered by two or more Blower Packages. Many options are available for various conveying needs, including system expansion as your production capacity grows.

Typical Central-Powered System consist of, but are not limited to, four major components:

1) Centrally located Vacuum Blower Package (Pressure-type optional)
2) Air & Material Conveying Lines
3) Material Loaders, Receivers and/or Surge Hoppers
4) Main System Control Panel and Motor Starter/Disconnects
Operating Principle
CP Systems operate on a BATCH principle. The duration of independently adjusted PLC relay timers control conveying & dump cycles for each station within the system; each station requires a conveying-cycle duration timer. The dump timer is a single, centrally located ON-DEMAND timer, and will continue cycling through each station until required material level in all receiving hoppers has been achieved.

Basic Components
Central-Powered Vacuum Conveying Systems may include the following items (Refer to Fig. 1-1):

- Blower Package (Vacuum Pump)
- Central Filter Unit or Static Blower-protection Filter
- Vacuum Breaker Valve & Vacuum Control Valves
- Receiver/Loader Body with High-level Proximity Switch
- Vacuum Air Conveying Lines
- Material Conveying Lines
- Pick-up Probe(s) and Flex Hose
- Expansion Hoppers & Storage Bins
- NEMA-rated Control Panel (Expansion Board(s) optional)

Basic Components – Central-Powered Vacuum Conveying System
Figure 1-1
Installation

Welcome! This is your Installation Operation and Maintenance Manual for a Central-Powered Vacuum-Conveying System. This document includes basic set-up procedures, Safety and Warnings precautions and equipment engineering drawings, to assist Plant and Maintenance Supervisors and Facilities Managers & Engineers. Please ensure this manual remains readily available for quick reference. Store a copy in a secure location.

VACUUM BLOWER

Choose a suitable, centrally located site for the Blower Package, ideally indoors, or outdoors/covered, in an isolated area, near a receiving point (process station). Blower Packages are noisy, typically 85dB or more, therefore careful consideration is to be given when selecting the location. This location shall have a mounting area with level surface and of sound mechanical condition. If outdoors, providing suitable protection from inclement weather conditions is warranted. For specific blower model installation, operating & maintenance instructions please refer to OEM literature. Refer to Appendix A, page 20, for Blower Start-Up procedure and end of this section relating to noise control.

WARNING! PRIOR TO INITIAL START-UP: CHECK BLOWER FOR OIL LEVEL AND THAT OIL TYPE IS CORRECT (RE-CHECK PERIODICALLY DURING ROUTINE MAINTENANCE), PLEASE REFER TO ‘TOE TAG’ BLOWER (RED) & GAUGE (YELLOW). ENSURE THAT THE VENT PLUG ON GAUGE REMAINS VENTED DURING USE.

FILTRATION SYSTEM

The Pneu-Con Central-Powered Vacuum Conveying System is supplied with either, and in some cases both, type Filter Assemblies: Self-Cleaning Central (for pellet systems), or Static Blower-Protection (powder).

Pellet CP Systems have Self-Cleaning Central Filter (CF) which require a level mounting surface such as a wall bracket or floor-stand support on which to mount. The Dump Valve (material discharge flapper) MUST be slightly open (approximate gap of \(\frac{1}{4}''\)) when no vacuum is applied. The Dump Arm Counterweight is factory adjusted to provide the required opening (See Fig. 1-2) and should require no further adjustment. Ensure swing-clearance is allowed for proper Flapper/Arm function.

The Central Filter’s Vibra-pulse™ (VP) Self-Cleaning System is controlled by a pneumatic Poppet Valve, that is controlled by an electric Solenoid; connect yellow Solenoid Cord to a local junction box that ties into the main Control Panel. Refer to system wiring diagram.

Powder CP Systems typically have Static Blower Protection Filter (BPF), are connected in-line with Vacuum Air Line, requiring no special installation. Orientation of the BPF is non-critical; primarily located for convenience of maintenance & cleaning only.
Systems with Static Blower-Protection Filters, which are manually cleaned, require no additional electrical-controls or compressed-air connections, however optional Delta-P fittings can be supplied to monitor filter condition with a differential-pressure gauge. Whether your system utilizes the CF or BPF type, check that Inlet/Outlet Flex Hoses and/or Tube connections are properly fitted & secure prior to system start-up.

**RECEIVERS/LOADERS**

Vacuum Receivers and Loaders require similar installation as described in Central Filter section above, with unit mounted on level machine-surface (floor support stand or wall bracket). As described above, the Counterweight is factory adjusted and should require no adjustment at this time; ensure Dump Valve is not restricted in movement, with full swing-clearance allowed for proper Flapper/Arm function, as a restricted or stuck flapper will impede performance, or completely halt system operation.

For systems designed to convey powdered material, or product having greater surface area, the system Receivers/Loaders are normally equipped with *Vibra-Pulse™* Assembly (optional feature, identified as model code VP), this feature automatic filter-cleaning system is integrated onto the Cover Assembly.

Following successful mounting of each Receiver/Loader, connect VP air supply Poly-Flo™ Service-Loop (Tubing & Fitting) to local compressed-air source (80-100psi) and ,for each of the VP Solenoids, connect yellow Solenoid Cord to a local 120VAC electrical junction box. The Control Panel signal energizes VP solenoid(s) which in turn cycles the Poppet Valve(s) diaphragm to open & close, providing compressed-air micro-bursts (pulses) at timed intervals during conveying cycles. Refer to wiring diagram to select pulse cycle function as ON-LINE or OFF-LINE (jumper terminals) on the Control Panel's PLC module/board.

The next order of business is to make Flex-hose connections; for Material-conveying run(s) attach one end of each Flex-hose to Receiving Hopper/Loader Inlet and the other end to the adjacent material-conveying line (rigid tube/pipe) or material pick-up point. For the Vacuum (air) run(s) attach one Flex-hose end to Receiver/Loader Cover Outlet and other end to adjacent Vacuum Control Valve (VCV) on multi-station system, or directly to vacuum-air line TEE or elbow. Make sure Flex Hose routing is as direct and straight as possible; **avoid sharp bends.** Tight bends & kinks impede, or possibly restrict air flow completely. Finally, secure each of the hose ends using supplied hose clamps.

The metallic vacuum-air and material-conveying lines shall be predominately orientated in either horizontal ‘runs’ or vertical ‘drops’ while keeping change-of-direction sweeps/bends to a minimum. For the vacuum-air lines the Sweep’s centerline radius (CLR) can be rather small (typically 6 times tube diameter). The rigid material-conveying line should have generous CLR Sweeps/Bends (12 times tube diameter suggested, or as required to fit installation) ultimately determined by the product conveyed and/or system/product flow characteristics. Bear in mind that the material-conveying lines size (inside diameter) and sweep/bend radii are critical to the system’s overall performance – consult with our engineering staff prior to selection and set up. All connected joints must be airtight, with butted tube-ends making full contact and clamped with split-sleeve, 3-Bolt or 4-Bolt, compression type Couplings. Precise right-angle ‘square’ cuts at tube ends are crucial, ensuring all burrs & nicks are removed prior to making final connections.

Care should be exercised when installing the vacuum and/or material-conveying lines for central-powered systems. Pneu-Con recommends the use of aluminum or steel tubing. To make handling easier, during installation, Aluminum tubing is the preferred choice primarily for its light weight and its’ non-corrosive characteristics. Short flex-joint connections aside, the use of PVC or other non-metallic material over extended lengths is not recommended due to static charge build-up which can greatly reduce the system’s conveying rate. Abrasive type materials, exhibiting heavy wear characteristics, can destroy PVC hose fairly quick, thus requiring metallic (carbon steel or stainless), heavy-wall or, internally coated tubing/elbows.
Please refer to Coupling Installation Instructions, see Appendix A, on page 23, for information on making tube/pipe connections with compression-type couplings. When properly fitted and installed there should be no joint gaps, should a gap exist it is possible - and probable - the coupling’s gasket material will be drawn into the air or material stream thus affecting air/material flow resulting in a system vacuum leak. To prevent such an occurrence Gasket-protector Sleeves are recommended (contact parts department).

For short-length material pick-up applications Flexible Hose may be used, see Appendix A, page 24; AVOID tight bends and kinking of flex hose. When using Flex Hose Pneu-Con highly recommends using a ground wire (either integral to the hose or wrapped around the hose at each end) in permanent type installations. Optionally, to control static charges, Static Eliminators can be incorporated into the tubes. Regarding ‘Railroad Unload’ or ‘Bulk Pick-up’ applications excessive lengths of flex hose are discouraged.

Pick-up Lances, an optional accessory, provide a convenient simple method of material pick-up at the source point(s). Flex Hose is connected between each Receiver/Loader Inlet and Pick-Up Lance. Pneu-Con Standard Flex Hose features integral Copper Ground Wire (embedded in PVC wall) to control static build-up in the conveying lines; at each hose end expose an adequate length of wire and then connect to the system’s ground circuit or nearest metallic grounded component (tube, frame, etc.). During regular scheduled maintenance, inspect Flex-hose condition, focusing on bends (being natural wear points), remedy any kinks tight bends, as premature hose failure or damage may result.

Proximity Switches, either Inductive (at Dump Valve) or Capacitance (High-Level) type. For Proximity Switch sensitivity adjustments and/or mounting instructions refer to applicable OEM instructions provided herein. If your receiver has an adjustable-sensitivity, capacitance-type, proximity switch (as the high-level sensor), it may require an initial adjustment during set-up. Adjust sensor by slowly turning adjustment screw in clockwise direction until indicator light illuminates, then turn back counterclockwise about 1-½ turns; the goal is to have the sensor stop product being conveyed as soon as material is sensed (to keep product in material-convey line from backing-up, or overfilling the receiver).

Many options to level sensors are available, consult Pneu-Con Sales for additional information.

For a Single-station System it is necessary to electrically connect the Receiver/Loader’s Level Indicator Proximity Switch – which is attached to the material discharge (Dump) valve - to the Control Panel.

For a Multiple-station System utilizing Single (common) Material-convey Line for more than one station, the Receiver must have optional Check-Valve (CV model code) Inlet; the Check Valve Flap prevents short-circuiting from one Receiver chamber to other in the circuit, preventing material from being conveyed from the designated supply point to the desired station.

For Multiple-station System with multiple (dedicated) Material-convey Lines feeding multiple Receiver Stations the Check-valve option for the Receiver is not required. Most multi-station systems utilize Vacuum-Control Valves (VCV), or some form of Diverter Valve on the Vacuum-convey (air) circuit. A VCV is required at each station and is controlled by a pneumatic Actuator Assembly with an electric 120VAC Control Solenoid to Open & Close Valve.
Noise Control – Blower Package

To reduce and/or control operating noise levels of Blower Package installations there are a few steps to be considered when choosing a location, including incorporating additional noise-control methods.

Typically, overall blower package noise is composed of three noise-generating sources: air, mechanical, and vibration. Measurement of sound is from distance of about three feet (1 meter being the standard for normal noise measurement); each source of noise is mostly indistinguishable from one another as the sound waves blend. The first line of defense is the Silencer(s) being fitted to the blower Intake and/or Exhaust ports, which will remove majority of air noise. Ultimately, what is heard are mechanical and vibration noise that produce residual noise. Now we are faced with removing, or at least reducing, the level of noise from these remaining sources. To that end it is necessary to apply noise-abating treatments up to and including treating the silencer, enclosing complete package within a sound enclosure, or incorporating an alternate Blower Package design. Consult factory for available options, which commonly include, but are not limited to:

a) Lagging at flex-joint connectors (if used)
b) Installing Sound Panel kit (designated by model code SP), and/or applying sound absorbing material to the belt guard, gear-end of blower or shroud around any rotating component not already treated
c) Enclosing blower package within a sound enclosure, or locate unit away from personnel, even outdoors
d) Utilize a quiet line motor (rated at 80dBA or operate at less than full load)
e) Mechanically isolating all components, add isolation pads at support frame/base mounting feet

Start Up

After successfully installing the System components double-check the Blower for proper oil type and levels and the gauge’s vent plug has been snipped, refer to Appendix A, page 20, for complete Blower Package start-up routine. For convenience red (on blower) & yellow (on gauge) toe tags are affixed to each component. Now it is time to perform a test run.

Initially, the conveying timers should be set with very short cycles. A recommended starting time would be 10-second Convey time for each station, and a DUMP time of 5-seconds.

The correct solids-to-air ratio is critical to obtain optimum system performance. The suggested method is to adjust the solids-to-air ratio with the pick-up probe, railcar lance or take-off box, while conveying to the furthest point, or the longest conveying run. It is important to make these air adjustments on the LONGEST conveying run. Note that too rich of a mixture (solids-to-air) will result in surging or slugging, thus hampering material-convey rates. Generally, the material mixture is enriched to the point of slight surging and then reduced to a smooth flow; this will provide the optimum conveying rate. At this point, the vacuum gauge should be observed to insure you are operating within the designated parameters of your system. Most Pneu-Con vacuum systems are designed to operate at 11”Hg up through 14”Hg. Please refer to the Blower Package Data Sheet for your System’s setting.
Sequence of Operations

Single-station Systems:
When the system is turned ON, the pump (Blower Package motor) is energized and the conveying cycle starts and continues for the pre-determined conveying-time cycle.

When the CONVEY (run) timer has elapsed the DUMP timer allows the Receiver/Loader’s Dump Valve to open and discharge material, simultaneously the convey cycle ceases. The Dump Valve remains open when material interferes with its closure and no vacuum source is applied.

When the material level falls below the reach of the Dump Valve Flapper – permitting it to close – the Pivot Arm is then sensed by the Proximity Switch, automatically restarting the conveying cycle. On CP systems equipped with a Vacuum Breaker Valve (VBV) the Blower Package (motor) continues running during the Pump’s OFF-Delay Time. This affords a smoother transition from the motor’s load/no-load condition which saves energy usage and increases the life of the moving parts. If no VBV is present, on systems having minimal or intermittent use, the motor starts & stops at each conveying cycle. Direct-Drive Blower Packages are supplied with a VBV as standard equipment, optional on Belt-Drive systems. If your conveying system is to be run for short/intermittent periods, as opposed to throughout the day/multiple shifts, a VBV is not mandatory and can be switched (cycled) ON/OFF as required.

Multi-Station Systems
When the system is ON and stations within the system, or controlled bank, demand (call for) material, the Vacuum Control Valve (VCV) control solenoid, at Station No. 1, will open – permitting air to be drawn into the Receiver/Loader’s air plenum (cover) – material is then conveyed (vacuumed) into receiver body. After its’ elapsed conveying time the system will automatically index to the No. 2 Station. This process repeats for each station within the system or controlled bank. When the terminus station’s conveying cycle is complete the DUMP timer energizes. During DUMP cycles, the Blower Package VBV (if so equipped) will switch to the “Vent” mode. Otherwise the Motor, with no VBV present, shuts off; the Blower will ‘Rest’ until end of Dump-Time or until a station “Calls” for material; thus, restarting conveying cycle.

At this point the system convey cycle starts again, sequentially indexing through each station that demands (Calls) for material. When a station is satisfied (material interfering with the closing of the dump valve), or a particular station has been turned OFF, that station will be skipped and the control will sequence to the next station demanding material, repeating until all stations are satisfied.

On systems equipped with a Self-cleaning Central Filter, the Vibra-Pulse™ (VP) cleaning cycle commences, during either the dump cycle (OFF line pulsing) or run cycle (ON line pulsing). Conveying sequence restarts.

After initial start-up and the appropriate solids-to-air ratio has been achieved and set, conveying time for each station can then be fine-tuned. Care should be taken to prevent overfilling of the Receiver/Loader. You may find, due to large discrepancies in the distances between pick-up points and the terminus (final use) point, substantial time differences may be required to achieve a satisfactory fill. A two-thirds fill is recommended (under-filling of the Hopper does not appreciably detract from the conveying rate).

NOTE: Material density, flow characteristics, moisture content and other environmental factors each play a part in your system’s overall conveying efficiency. Therefore, it may become necessary to make further adjustments due to changes in humidity and other factors. Make notations in your maintenance records and incorporate these findings into your scheduled maintenance routine.
Component Description

**Receiver/Loader**
A vessel having a cylindrical body & conical transition adjoining the mounting flange (or other type interface). Standard Receivers/Loaders are equipped with a Dump Valve mechanism below the mounting flange, for automated discharge/loading cycles. The flapper is held closed against the discharge spout (during RUN cycle) or swings open (DUMP cycle) – automatically – as required. Material is conveyed (during RUN cycle) into the Receiver/Loader inlet from a material source/pick-up point line, after timed RUN period the Dump Valve opens and discharges into a receiving Hopper or Machine.

Many Inlet options are available to suit specific applications: Standard Stub with Deflector Plate; Semi-Tangential Entry (TE); Boxed Full-Tangential (BT); Wear-Resistant Impact-resistant Stub (WR); Replaceable Wear-Resistant Impact-resistant Stub (RW); Check-Valve Inlet Stub (CV). TE inlets are designed to reduce, or even eliminate, damage to fragile product being conveyed and provides protection to the body inlet and/or surrounding surfaces. Depending upon the conveyed-material the action of impacting onto itself may produce “angel hair” fines & dust; the TE inlet addresses those issues.

**Pick-up Lance**
The Lance (wand) is attached to one end of PVC Flex Hose, which is connected to the Inlet of a Receiver/Loader’s; the wand placed into a material source (Feed-Bin Hopper, Gaylord or Day bin). Hose Clamps are provided as standard. Flex Hose features an integral Copper Grounding Wire to reduce/eliminate static charges built up in the conveyed material/lines. Refer to Flex Hose addendum, Appendix A, page 24.

**Filtration System**
Each system is equipped with a blower protection filter (Static type for powder systems or Self-Cleaning Central Filter Assembly for pellets) to provide protection to the blower's impellers and gears, caused by induction of foreign objects. Systems utilizing Central Filters with the Vibra-pulse™ filter cleaning system are considered virtually self-cleaning; however periodic manual cleanings are required, based on level of service duty, see Maintenance section for details. Worn or damaged filters must be replaced.

**Blower Package (Vacuum Pump)**
The Blower Package assembly is a self-contained vacuum pump. Typically supplied with a Totally-Enclosed-Fan-Cooled (TEFC) Premium-efficiency type motor. A Positive-displacement Blower with Silencer and flexible-joint connection (to blower) is incorporated for quietest possible operation. For safety the belt-drive components are enclosed within a Safety Guard. A Quick-disconnect/Motor Starter is available for system interconnects to your facility. A Vacuum Gauge & Vacuum-Relief Valve are provided for monitoring performance.


**Vacuum Breaker Valve**
The optional Vacuum Breaker Valve (VBV) allows for automatic switching from vacuum (conveying mode) to atmospheric conditions; allowing the blower to run continuously, preventing repeated starts and stops at the end of each conveying cycle. Direct-Drive Systems incorporate a VBV as standard.

**Control Panel**
CP System Control Panels, typically with Keypad HMI terminal on the panel door, are housed in a NEMA-rated enclosure with terminal strips (for field wiring). Field components may be either 120VAC, 24VDC or 24VAC. CP System Control Panels can be configured for single station or up to 100 or more Stations.
Maintenance

DANGER! Prior to performing any electrical service, system maintenance or repairs, implement LOCK OUT and TAG OUT procedures. Bleed compressed-air lines prior to disconnecting tubing/fittings.

Blower

IMPORTANT!

1. Check the Blower oil level on a weekly basis or every 100 hours of operation, whichever occurs first, add or replace oil as required. At this time also check and/or add grease to the bearings as described in the manufacturer’s manual. Following the initial one-hundred hours of operation the oil must be changed. Thereafter, a complete oil change is recommended every 1000 hours of operation, depending on operating conditions.

2. On Belt-driven systems a belt break-in period MUST be observed during initial 50 hours of operation. Check belt tension every month or after 100 hours of operation, whichever occurs first, remedy as required. Should belts show signs of extensive wear or damage remedy any mechanical problems affecting belts; or replace Belts immediately.

3. On Direct-drive systems check drive coupling weekly, or more frequently under severe operating conditions. Motor-to-Blower Shaft alignment is extremely critical on direct-drive units.

4. Refer to the OEM-provided Blower Manual for complete maintenance and operating procedures.

Filters

Vacuum Receivers are equipped with one of the following filter types:

Perforated Plates require little maintenance, with an occasional visual inspection, checking for clogged holes.

Nylon Di-Ac Filter (325 mesh media) requires periodic maintenance. It may be cleaned (removed from unit) utilizing compressed air or washed as described in Filter Maintenance section. Do not substitute filter media on units with special PTFE membrane as system damage may result.

Polyester-Felt Di-AC Filter (for dusty-material & regrind applications). Cleaning method same as Nylon filter and/or utilizing the unit’s integral Vibra-Pulse™ system.

Pleated Cartridge Filter Elements (cylindrical shape) in Powder Receivers & Central Filter Assemblies are automatically cleaned by a periodic compressed-air pulsing action of the Vibra-Pulse™ filter-cleaning system. See Filter Maintenance section for optional cleaning instructions and warnings.

Regularly check Filter for evidence of excessive ‘Loading’ (build-up) or ‘Blinding’ (complete blockage of air). Such loading can cause Blower overload and loss of conveying power. It may also be an indicator that the compressed-air supply pressure is too low, possible leakage at the Filter/Tubesheet interface, or the Vibra-Pulse™ timing requires adjustment.

Pleated Cartridge Filters are available in several styles:

1) Stud-mounted bolt-thru design with End Cap having two mounting studs and Mounting Gasket (sandwiched between end cap & Tubesheet).

2) Bottom-Load with Band Clamp mounted onto a Cup from below Tubesheet without having to remove Cover and/or Filter/Tubesheet Assembly from Receiver. Receiver bodies are supplied with a Filter Access Door. Access Door and Body are sized according to length of Cartridges.

3) Top-Load installed from above Tubesheet (pressed into filter gasket). Receiver Cover Assembly removal required to gain access.
Filter Maintenance

Inspection of the Vacuum Receiver Filter(s) on a regular basis should be performed as dictated by the service load. Clean and/or replace filter cartridge(s) as required by service usage. Take this opportunity to check Tubesheet/Filter Gaskets. Gaskets may also be cleaned, replace well-worn or damaged gaskets to ensure a good seal and maintain system performance.

**CAUTION:**
- **Do not** use high-pressure air or water
- **Do not** use stiff-bristle brushes or similar devices
- **Do not** use oils, solvents or harsh detergents as cleaning agents
- **Do not** use direct pressure on the dust-side of the filter
- **DO** Wear appropriate protective gear for the contaminant you are cleaning
- **DO** Properly dispose of any residue generated

**Non-woven, Spun-bond Filter Element**
- Commonly used in plastics applications.

If your Receiver is shipped with cylindrical nylon-media pleated cartridges they are cleanable; however, you must use care and follow the procedures as outlined below. When cleaning the Filter take precautions so as not to cause abrasions to the filter media’s surface as this adversely affects filtering performance and ultimately the entire system-filtering capabilities.

**CLEANING: DRY METHOD**

1. With the Blower (Vacuum Pump) **OFF** clean the element off-line for a period of approximately 5-10 minutes PRIOR TO REMOVING the Filter(s) from the Receiver. The pulse-frequency settings are to be 2 to 5-second intervals at 40-60psi – or as close as possible to these levels – considering particular equipment components and system design. The pulse duration should be set at 1 second.

2. Next, remove Filter/Tubesheet assembly from the Receiver to gain un-obstructed access to the element(s). It may be necessary to remove element(s) from the Tubesheet. Use a wand with Ø3/8-inch or larger opening (to protect the Filter from damage) and a maximum of 60-psig compressed-air to blow debris away from the filter surfaces.

3. Pass the wand over the cartridge’s inside-pleat surfaces, moving up and down the length, covering the entire area of the Filter. If contaminant is still visible on the dust-side (outside) of the Filter, clean the outside with the air wand – moving parallel to the surface mesh and holding the wand at a 45˚ angle from the surface. **DO NOT** point the air nozzle directly towards (perpendicular to) the surfaces which may force the debris deep into the media pores. Next, pass wand, once again, over inside to ensure removal of as much debris as possible. Another ‘flush’ pass on outer surfaces may be required.

4. Follow-up vacuuming with a dust-brush head or similar device or brushing with a soft-bristle (painters type brush) to protect the Filter, to help loosen remaining contaminants. **DO NOT** use brushes with stiff bristles as damage may result.

5. After thorough vacuuming & brushing, reinstall the Filter into the Receiver. If manual cleaning of the filter becomes more frequent or if ‘blinding’ occurs please review your specific operating conditions with our engineering department, or area representative.

**CLEANING: WET METHOD**

1. **Pre-clean:** Clean using the ‘DRY’ method outlined in the previous section.

2. **Wash:** After dry-cleaning, place the element in a 2%-3% solution (about 4 oz. per gallon) of mild dish soap (Joy, Ivory, Palmolive, etc.) and let soak for approximately 10 minutes. Additionally, extra-dirty filters may require some agitation prior to rinsing to help dislodge debris within the pleat crevices.
3. **Rinse:** Thoroughly rinse element surfaces from the inside out, with a hose-fed stream of water – Do Not exceed 50-70psi pressure at any time as damage may result. Next, rinse the outside with the water’s stream held at a 45° angle from the surface, running parallel to the pleated-surface mesh (as explained in the previous Dry Method). A final ‘flush’ rinsing of exterior may be called for.

4. **Dry:** Allow the Filter to dry completely (about 24-48 hours at 70° F). **DO NOT** fan-dry the Filter element within the Receiver.

After thoroughly washing & drying, reinstall the Filter into the Receiver. When manually cleaning filter becomes more frequent, or ‘blinding’ of conveyed material in the filter’s media becomes apparent, review your specific operating conditions with our engineering department, or area representative to remedy prior to placing back into service.

**PTFE Membrane Filter Element**

– Filter media commonly used with sticky, ultra-small (micron-sized) or carbon black (toner) material applications.

**Warning!** – You are working with a filter media having a membrane coating thickness of only 1 to 1-½ mills (about 1/8 the thickness of plumber’s tape) laminated onto a non-woven, spun-bonded polyester substrate. Inspection of the filter on a regular basis should be performed as predicated by the service load. Clean and/or replace as recommended.

PTFE-Membrane Filters are cleanable; exercise caution and follow procedures as outlined. When cleaning the Filter take precautions so as not to cause abrasions to the surface which adversely affect the element’s filtering performance and possibly the entire system.

**CLEANING: DRY METHOD**

1. With the Blower (Vacuum Pump) OFF clean the element off-line for a period of approximately 5-10 minutes PRIOR TO REMOVING the Filter(s) from the Receiver. The pulse-frequency settings are to be 2 to 5-second intervals at 40-60psi – or as close as possible to these levels – given component and system design.

2. Remove Filter/Tubesheet assembly from the Receiver to gain un-obstructed access to the element(s). It may be necessary to remove element(s) from the Tubesheet. Use a wand with Ø3/8-inch or larger opening (to protect the Filter from damage) and a maximum of 60-psig compressed-air to blow debris away from the filter surfaces.

3. Pass wand over the cartridge’s inside-pleat surfaces, moving up and down the length, covering the entire area of the Filter. If contaminant is still visible on the dust-side (outside) of the Filter, clean the outside with the air wand – moving parallel to the surface mesh and holding the wand at a 45° angle from the surface. **DO NOT** point the air nozzle directly towards (perpendicular to) the surfaces which may force the debris deep into the media pores. When finished, move the back to the inside and go over the interior once more to ensure removal of as much debris as possible or may have been forced back into the pores from outside cleaning. Try removing the contaminant without forcing it into the filter pores.

4. Follow-up vacuuming with a dust-brush head or similar device or brushing with a soft-bristle brush (painters’ type to protect the Filter) will help loosen remaining contaminants. **DO NOT** use brushes with stiff bristles as damage may result.

5. After thorough vacuuming & brushing, reinstall the Filter into the Receiver. If manual cleaning of the filter becomes more frequent or if ‘blinding’ occurs please review your specific operating conditions with our engineering department, or area representative.
**CLEANING: WET METHOD**

1. **Pre-clean**: Clean using the ‘DRY’ method outlined in the previous section.

2. **Wash**: After dry-cleaning, place the element in a 2%-3% solution (about 4 oz. per gallon) of mild dish soap (Joy, Ivory, Palmolive, etc.) and let soak for approximately 10 minutes. Additionally, extra-dirty filters may require some agitation prior to rinsing to help dislodge debris within the pleat crevices.

3. **Rinse**: Thoroughly rinse the element’s surfaces from the inside out with a hose-fed stream of water – Do Not exceed 50-70psi pressure at any time as damage may result. Next, rinse the outside with the water’s stream held at a 45˚ angle from the surface, running parallel to the pleated-surface mesh (as explained in the previous Dry Method).

4. **Dry**: Allow the Filter to dry completely (about 24-48 hours at 70˚ F). **DO NOT** fan-dry the Filter element within the Receiver.

After thoroughly washing & drying, reinstall the Filter into the Receiver. Should manual cleaning of the filter become more frequent or ‘blinding’ of your conveyed material in the filter’s media becomes apparent, review your specific operating conditions with our engineering department, or area representative to remedy prior to placing back into service.

**Filter Mounting**

**Stud-Mount**

Standard Pneu-Con Cartridges have 2 each ¼-20UNC mounting studs on the Upper End Cap for attachment to the Tubesheet. A Gasket is placed between the Cartridge & Tubesheet and mounted to underside of Tubesheet. Refer to **Stud-mount Filter** addendum, Appendix A, page 25, for additional information & mounting instructions.

**Bottom-Load**

For Receivers having to fit in aera with restricted, or minimal headroom clearance to service filters, Pneu-Con offers optional Bottom-Load, cup-mounted type Cartridges which are attached to underside Tubesheet fitted with Bag Cups and secured in place with clamps. The Receiver body design incorporates a Filter Access Door mounted to a gasketed bulkhead for tool-less filter access, refer to the **Bottom-Load** specific addendum, Appendix A, page 26, for detailed mounting & servicing instructions.

**Top-Load**

Another fixed Tubesheet application is the optional Top-load, Tool-Less type, where the Cartridge is attached onto Tubesheet by pressing Filter into a Mounting Ring/Gasket, see **Top Load** specific addendum, Appendix A, page 28, for mounting instructions.
**Troubleshooting**

The following table outlines typical situations which could occur while operating during operation.

Please contact Pneu-Con Customer Service should attempts to remedy fail solving the problem.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Probable Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material is not being conveyed</td>
<td>a. Filter is clogged</td>
<td>a. Remove and clean</td>
</tr>
<tr>
<td></td>
<td>b. Dump Valve not sealing</td>
<td>b. Check for foreign objects</td>
</tr>
<tr>
<td></td>
<td>c. Vacuum leak</td>
<td>c. Check for loose fittings, couplings &amp; connections</td>
</tr>
<tr>
<td>Material “percolates” in Receiver</td>
<td>Air leakage at Receiver’s Mounting Flange</td>
<td>Check Seal at machine base</td>
</tr>
<tr>
<td>(JIT type Sight Glass)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material is not being conveyed; no material in Receiver</td>
<td>Proximity Switch out of adjustment</td>
<td>Adjust Proximity Switch</td>
</tr>
<tr>
<td>Power light does not operate</td>
<td>a. Electrical supply not available</td>
<td>a. Check for power, reset Circuit Breaker</td>
</tr>
<tr>
<td></td>
<td>b. Tripped Circuit Breaker or Blown Fuse</td>
<td>b. Replace Circuit Breaker or Replace Fuse</td>
</tr>
<tr>
<td>Blower Overloading</td>
<td>a. Filter loading</td>
<td>a. Clean or replace Filters, wrong filter type</td>
</tr>
<tr>
<td></td>
<td>b. Air leakage</td>
<td>b. Check Receiver Body/Filter Gaskets</td>
</tr>
<tr>
<td></td>
<td>c. Low compressed-air pressure at point of use</td>
<td>c. Check air lines &amp; connections for leakage, or compressed-air source</td>
</tr>
<tr>
<td>Noisy Blower</td>
<td>a. Low oil level</td>
<td>a–c. Please refer to the OEM’s Blower Manual for complete detailed steps to remedy</td>
</tr>
<tr>
<td></td>
<td>b. Wrong oil type</td>
<td>d. Check for damaged or missing filters at the Inlet, BPF or Central Filter</td>
</tr>
<tr>
<td></td>
<td>c. Damaged bearings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>d. Debris in, or passing thru Blower Housing</td>
<td></td>
</tr>
</tbody>
</table>
Notes
This page provided for supplemental notations and/or recording of equipment service records.
Appendixes

The following Instructions and Procedures cover several System Components & Hardware referenced above.

A Spare & Replacements Parts list can be found on page 33, showing basic items within a typical Central Powered Conveying System. As each system’s requirements vary, so does the equipment & parts, contact Pneu-Con Parts department for assistance with specialty parts & equipment not listed.

Components such as Blowers & Motors, Drive Belts and System Controls are quite unique, please refer to the equipment drawings and wiring diagrams provided for reference.
**Instructions: Blower Package Start-Up Procedure**

The following Start-Up Procedures apply during Initial Installation or after Shut-Down periods, or whenever unit is worked on or moved to new location.

1. **Important!** Proper oil level is crucial to the safe and efficient operation of your Blower. Check to make sure the Blower is properly lubricated. Pneu-Con ships units with full complement of OEM-designated Gear Oil Lubricant. Low oil levels will cause damage to the internals, namely the Gears & Bearings. Too much oil will cause overheating of the lubricant, thus leading to serious damage and/or Blower failure.

2. Confirm Oil Sump Breather(s) are installed in their proper location; if not, leakage will occur.

3. Check the Blower and connected piping to ensure no foreign materials are present. Clean as required.

4. Ensure Inlet, Inlet Filter and connected piping is clear and free of restrictions that could lead to dangerous conditions or subsequent damage to the system.

5. During shipping and handling it is possible the Blower and/or Motor could shift. Check that Blower and Motor remained secure. If necessary, check Shaft & Sheave alignment before energizing unit, as improperly aligned Sheaves can induce excessive overhung loading of Shafts, leading to bearing damage and premature failure. Ensure that the Blower Mounting Feet are not binding/twisted, causing distortion in the housing and rubbing of/internal parts.

6. Check Belt Tension. Proper Belt Tension is essential to efficient and safe operation. Consult applicable addendum for further instructions.

7. Manually turn the unit over to ensure no evidence of internal binding or rubbing of internal parts. As Blowers utilize Special Wear-In Type Seals, initial turning by hand will be more difficult as opposed to a unit that has been in operation for a few hours - turning by hand will get easier over time.

8. Caution: Risk of SEVERE PERSONAL INJURY! Check that Safety Drive Guards are securely in place.

9. Using Motor, “Jog” Blower, while paying close attention to any abnormal noises, check for correct rotation and airflow of the system. Upon cutting of Motor, the Blower should coast to a stop, if abrupt stopping encountered there may be alignment issues. Review steps above and remedy before continuing.

10. With all above concerns in proper order, Re-start the unit and run – WITH BREAKER VALVE OPEN, NO LOAD – for about fifteen minutes. Feel for any “Hot Spots” on the End Plates or noise emitting from unit, which are indications of interference. After unit has cooled, returning to ambient/room temperature, re-check oil level, top-off as required. **DO NOT OVERFILL UNIT.**

11. Upon operation check that Blower is operating within specified/allowable limits.

12. Apply load – WITH BREAKER VALVE CLOSED – closely observe unit over the first hour of operation, checking pressure & discharge air temperature:
   a. Blower must operate with the manufacturer's specified pressure or vacuum rating
   b. Discharge air temperature (when measured at silencer exhaust) should not exceed maximum allowable specifications.

13. After a few hours of operation check belt for proper tension. **DO NOT OVER-TENSION.**

14. Should mechanical problems arise during Installation or Start-Up, immediately notify Pneu-Con. **DO NOT** continue operating unit once a malfunction or out-of-specification condition is discovered, as serious damage or personnel injury could result.

15. Non-Authorized internal repairs to Blower or Package Assembly (unit) will render Warranty VOID.
Instructions: Blower Package Sheave Replacement

Disconnect, Lock-Out & Tag-Out Power Source

Warning! Do Not use any form of Lubricants or Anti-seize Compounds on Screw Threads or Bushing/Sheave Tapered Surfaces as Breakage may result. Excessive Cap Screw torque can cause Bushing and/or Sheave Breakage.

System Maintenance or Re-sizing Procedure for SH, SDS, SD, SK or SF Series and E Sheaves & Bushings

1. If applicable de-energize either Pressure or Vacuum Lines connected to Blower.
2. Remove Belt Guard Cover to gain access to Belt-Drive components.
3. Lower Motor Adjustment Shelf:
   a. Temporarily hold Motor’s “Dead” weight/Shelf in place by means of an engine hoist or similar device to hold during next step.
   b. Locate the Two (2) Jack-Bolts, loosen Locking Nuts on bottom side of plate.
   c. Incrementally lower Motor enough, so that Drive Belts can be removed from Motor Sheave.
   d. Inspect Belts for damage or wear; setting Belts aside or replace with new.
4. Sheave Removal:
   a. Loosen and remove all mounting Cap Screws & Lock Washers.
   b. Install Cap Screws in ALL available threaded Jackscrew holes.
   c. Starting with the Jackscrews located furthest from slot in Bushing, tighten each Jackscrew alternatively and in SMALL equal increments.
   d. Continue tightening Jackscrews until Tapered mating surfaces have disengaged.
   e. Remove Sheave. Set aside (if putting same back into service due to routine maintenance) or Replace (if performing equipment repair or re-sizing).
   f. Do Not disturb Bushing placement/location.
5. Sheave Installation:
   a. Ensure that ALL mating/Tapered surfaces of the Bushing & Sheave are clean and free of all foreign matter, lubricants, dirt, paint, metal ships, etc.
   b. Starting with Motor in lowered position place Sheave onto Bushing, with large-end of Taper first; line up the Sheave’s mounting (non-threaded) holes with Bushing’s threaded mounting holes.
   c. Insert Cap Screws & Lock Washers engaging two or three threads.
   d. Replace Drive Belts onto Blower & Motor Sheaves. Check Belts for rough alignment, Belt tension will be performed later.
   e. Carefully tighten Cap Screws alternatively and progressively in SMALL equal increments (at approximately half the recommended torque).
   f. Check alignment of Belts/Sheaves for Runout (wobble), Re-seat Sheave and remedy as required before proceeding.
   g. Carefully continue tightening Cap Screws in small progressive increments up to the recommended torque value shown in Torque Table.
      **Maximum wrench torque should be achieved only two times during tightening.**
   h. When properly mounted and Cap Screws fully tightened, there will be a gap between the Bushing’s Flange and Sheave. If provided, tighten Key Set Screw – Before placing unit into service.
   i. Set Belt tension by raising Motor Adjustment Shelf, reversing steps 3a and 3b.
      For proper Drive Belt Tension setting refer to the information located in Section ‘B’ of the Operation & Maintenance Manual (OMM).
   j. Replace Drive-Belt Guard Cover.
   k. Re-establish Electrical Power. Unit is ready for operation.

   **Recommended Bolt Torque Values:**

<table>
<thead>
<tr>
<th>Series</th>
<th>Screw Size</th>
<th>Wrench Torque (ft-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SH</td>
<td>¼-20</td>
<td>6</td>
</tr>
<tr>
<td>SDS</td>
<td>¼-20</td>
<td>6</td>
</tr>
<tr>
<td>SD</td>
<td>¼-20</td>
<td>6</td>
</tr>
<tr>
<td>SK</td>
<td>5/16-18</td>
<td>10</td>
</tr>
<tr>
<td>SF</td>
<td>3/16-18</td>
<td>20</td>
</tr>
<tr>
<td>E</td>
<td>½-13</td>
<td>40</td>
</tr>
</tbody>
</table>
Instructions: Compression Coupling Installation

HANDLING COUPLINGS
When handling the Coupling assembly, grasp either end with thumb on outer shell and fingers inside. Normally Coupling assemblies are shipped ready-to-use, Do Not disassemble.

INSTALLATION

PREPARATION
1) Check Coupling’s code number to ensure proper type coupling is utilized on the installation.
2) Check that coupling is clean and free of grease, dirt or other contaminants which would affect proper installation.
3) Check Tube/Pipe to ensure no burrs or jagged edges are present as these will damage coupling’s gasket.
4) Clean outside Tube/Pipe surfaces to remove grease and dirt which could cause slippage of the coupling on the tube/pipe. Outer Tube/Pipe surface MUST be dry.
5) Check that the Gasket and Gasket-protector (if present) are aligned such that their partings are aligned (clocked) approximately 30° on either side of sleeve flanges gap.
6) Check that Gasket and Gasket-protector interlocking teeth are properly meshed with no over lapping edges.

SET-UP
1) Slide Coupling assembly over one end of Tube/Pipe until end is exposed.
2) Bring Tube/Pipe end up to next Tube/Pipe so that ends are aligned and butt squarely with no apparent gap.
3) Slide Coupling assembly over this joint until it is centered, ensuring that Gasket is not wrinkled, and that the complete assembly stays together as one unit. All Gasket, Gasket-protector and internal Coupling Sleeve surfaces must be in full contact prior to tightening bolts.
4) If your installation requires the dissipation of static build-up, a Coupling Grounding Strap MUST be incorporated into the Coupling assemblies.

TIGHTENING
1) Proper Gasket/Sleeve seating requires bolts to be tightened in a gradual and uniform manner.
2) Gradually tighten bolts in an alternating fashion until the specified torque has been reached
   a. Recommended torque values:

<table>
<thead>
<tr>
<th>Bolt Size</th>
<th>Torque (Ft-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/16”</td>
<td>12</td>
</tr>
<tr>
<td>1/2”</td>
<td>45</td>
</tr>
<tr>
<td>5/8”</td>
<td>65</td>
</tr>
<tr>
<td>3/4”</td>
<td>95</td>
</tr>
</tbody>
</table>

Note: Where 5/8” Grade 5 Bolts are specified, torque to 95 ft-lb on Steel Coupling and to 40 ft-lb on Aluminum Couplings with inner sleeve.
Instructions: Flex Hose Installation

SITE PREPARATION:
Survey the installation area(s) to make sure the Flex Hose can be installed without causing undue tight bends or binding. Every attempt should be made to route the hose in a gentle transition. Provide additional support for the hose, when loaded with product, to avoid stress at the connection points. Typically Flex Hose connections are within 10 feet of Receiver/Loader connection to nearby rigid tube/pipe connection.

SPECIAL CIRCUMSTANCES:
Some applications, with various products being conveyed, require multiple hoses to make quick change between various products runs easier to manage by eliminating the need to clean flex hose each time.

Special Fittings can be provided to accommodate this type of ‘Quick Change’ arrangement. Please contact a Parts Specialist to obtain these items.

CONNECTIONS:
Once you have an idea of how the Flex Hose(s) will be routed, start making connections at the Rigid point(s), then working to the Receiver/Loader ends. Slide the hose end onto the tube/pipe and secure with provided Hose Clamp, tighten to secure in place. Repeat process for each station.

GROUNDING:
To reduce static charges from building up during conveying cycles, Standard PVC Flex Hose, provided by Pneu-Con, has Copper Grounding Wire embedded into the raised coil section of the spiral. It will be necessary to expose a portion of Grounding Wire. Using a utility knife, carefully cut away at the outer layer of PVC until enough wire is accessible. Secure wire ends to a metallic grounding point at hose end.
**Instructions: Standard Stud-mount Filter Installation**

**Pneu-Con Powder Receiver & Loader – Filter Cartridges**
(System maintenance and/or replacement)

**CAUTION:** Use care to not damage the Filter media during removal and installation, paying special attention to PTFE-coated Filters as the membrane is very thin and can be scraped from the parent surface. If a Cartridge is damaged it MUST be replaced prior to placing unit back into service.

1) Check that Filter’s Gasket (‘donut’ shape White EPDM with 2-Holes) is in place.
2) Insert Filter mounting studs thru mounting holes; ensure Filter Endcap/Gasket are firmly against face of Tubesheet.
3) If Stainless steel Studs/Hardware used, apply Anti-seize to each mounting stud. Otherwise place Flat Washer over stud and thread Ny-Lock Hex Nut onto studs.
4) Torque nuts 10-12 ft-lb Maximum. **Do Not** over-tighten.
5) Repeat steps 2 thru 5 for each Cartridge.
Instructions: Bottom-Load Filter Installation

INTRODUCTION

Pneu-Con Bottom-Load style Pleated Filter Cartridges feature the latest technological advances in filter design and materials. The aerodynamic design of the Filter-Mounting Cup (acting as cartridge intake orifice) produces efficient cleaning energy (airflow in rush). Bottom-Load Filter, with Cup, fit on Pneu-Con Standard-sized Tubesheet plates having Ø3.50” thru holes and a thickness of 1/8” to ¼” range. Please refer to Filter Cup Installation as detailed on Drawing number 7005682.

a. **Standard Filter Media:** 8-oz/yd² (260g/m²) weight Spun bond Polyester (SBPE) cloth exhibiting a filtration efficiency of 99.9% for particle sizes ranging from 0.2µ to 2.0µ. – holding a BGIA Dust Class “M” rating. Air permeability is 15-30acfm @ 0.5”Hg dP (Frazier method test). Mullen burst strength is at 350psi.

b. **Optional PTFE Filter Media:** Same media as described above, except with the addition of a PTFE membrane coating. This option affords optimal self-cleaning efficiency increasing its’ ability to “shed” product during automatic Vibra-Pulse™ cleaning, minimizing material “Blinding” of the cartridge. Also eases manual-cleaning effort (when cleaning outside of the housing). Use extreme care when handling & cleaning PTFE coated filters.

c. **Carttridge Removal** (In-Place):

   a. Gain access to the Cartridges by opening the Receiver’s Filter Access Door. Loosen Handles (on Left or Right hand side of door) just enough to allow the Handle/Bolt Assembly to swing away. It may be necessary to completely remove Handle from Bolt – should this be the case, use caution, so as not to drop the hardware into or onto personnel and/or equipment below.

   b. Working from nearest Cartridge(s) adjacent to Door, loosen Band Clamp enough to slide away from Tubesheet, allowing Upper Boot of Filter to slide off Cup. Carefully lower Filter downward until Boot clears Cup and then maneuver Cartridge out through Receiver opening. Work from nearest Filter(s) to those furthest away, repeat until all Filters have been removed

      i. Filters with the PTFE coated media require extra care in handling and staging. Use pieces of smooth material (i.e. cardboard) to protect pleats from sharp/hard edges in and around work area and when installing Filters back into Tubesheet. PTFE coating is very thin and fragile, use care when handling, stacking or storing cartridges to prevent damage.

      ii. If required clean Filter-Mounting Cups for corrosion or material build-up, using wire brush or scouring pad. Electrically-conductive applications require special attention, ensuring surfaces of Cup is free from corrosion, paint, insulating coating or other material affect continuity, as this is the electrical grounding area/pathway. To ease cleaning, the Tubesheet/Cups Assembly can be removed from the Receiver.

   c. Clean Filters as specified in the “Important Filter Service Information” pages at back of OMM.

8. **Cartridge Installation** (In-Place):

   a. Working from furthest Cup location, carefully maneuver Cartridge in through Receiver opening, position Filter at desired Cup, raising upward until Boot is completely engaged (there may be a faint “pop” sensation as the Filter Boot finds ridge of Cup). Position and tighten Band Clamp onto Upper Boot securing to Cup. Apply slight downward tug on Cartridge Upper Boot to check if secure. Working from Filter(s) furthest from door to the nearest, repeat until all Filters have been installed.

   b. When all Cartridges have been installed, close Filter Access Door of Receiver. Replace and/or tighten Handles, previously loosened and/or removed. DO NOT over-tighten. It may be necessary to adjust the rear “Stop” (jam) nut on Hinge Bolt – ensure all stop nuts are aligned to ensure proper sealing of Door gasket, yet not allow warping door/straps.

   c. Return Receiver to operating status, check for signs of leakage at Door. Remedy as required.
Reverse above procedures to remove Cartridge from Tubesheet/Cups.

Note: It may take moderate to considerable force applied upon the Filter Boot to obtain a full seat into Cup, especially when reaching Cartridges furthest from the door.

The following method requires removal of the Tubesheet/Cartridge Assembly from Receiver. Disengage Cover Latches to allow removal of Receiver Cover, set Cover aside. Some models have Bolt-On Cover design, remove hardware and set aside, then break sealed Tubesheet surfaces before proceeding.

Mark orientation of Tubesheet relative to Receiver Body for proper realignment during installation. Lift out Tubesheet/Cartridge Assembly from Receiver. Remove to work area taking proper care of Filters as outlined above.
**Instructions: Top-Load Filters**

Pneu-Con’s optional Top-Load style Pleated Filter Cartridges feature the latest technological advances in filter design and materials. The aerodynamic design of the High-flow Intake orifice produces 30% more cleaning energy (air-flow in rush) versus other standard designs. Pneu-Con Top-Load Filter with Gasket fit into Tubesheet with thickness from \( \frac{1}{8} \)” to \( \frac{1}{4} \)” and Ø6.25” mounting holes.

a. Standard media: Pleated 8-oz/yd\(^2\) (260g/m\(^2\)) weight Spun-bonded Polyester (SBPE) cloth exhibiting a filtration efficiency of 99.9% for particle sizes ranging from 0.2\( \mu \) to 2.0\( \mu \) - holding a BGIA Dust Class “M” rating. Air permeability is 15-30acfm @ 0.5”Hg dP (Frazier method test). Mullen burst strength is at 350psi.

b. Optional media: filter cartridges may be ordered with optional PTFE coating to minimize material “Blinding”, increasing self-cleaning efficiency with its’ ability of “shedding” product during automatic Vibra-Pulse™ receiver/dust collector cleaning or with manual methods. Use extreme care when handling & cleaning PTFE coated filters.

1. For Filter cleaning procedures and tips please refer to “Important Filter Service Information” page located at the back of your Operation & Maintenance Manual (OMM).

2. The following steps shall be adhered during installation, removal and/or maintenance of Pneu-Con Top-Load style Filter Cartridges. Please refer to Filter & Gasket diagrams and descriptions below.

a. Preparation for Installation:
   i. Remove old filters (if any) from Receiver/Dust Collector Tubesheet
   ii. If required clean Tubesheet holes for corrosion or material build-up, using wire brush or scouring pad to ensure proper seal, paying special attention to electrically-conductive applications, ensuring inside edge of hole is free from paint or other insulating coating as this is the electrical grounding area.
   iii. Filters with the PTFE coated media require extra care in handling and staging. Use pieces of smooth material (i.e. cardboard) to protect pleats from sharp/hard edges in and around work area and when installing into Tubesheet. PTFE coating is very thin and fragile, use care when handling, stacking or storing cartridges to prevent coating damage.

b. Installation:
   i. Place iSeal™ Gasket into Tubesheet hole leading with the beveled bottom lip (J) – imprinted surface (I) will be facing upward. By hand gently press Gasket into hole, it will self-center & seat. When fully seated the bottom surface of Upper Flange (H) will be flush to the Tubesheet. Inspect bottom lip (J) at bottom-side of Tubesheet to ensure there are no deformations on lip or inside diameter of Gasket.
   ii. While holding Filter Top Boot (A) position Cartridge above desired Tubesheet location and insert bottom-end “puck” (G) inside iSeal™ Gasket and lower Cartridge through – keeping as straight (plumb) as possible.
   iii. The Top Boot Lip (B) will rest on Gasket. A complete seating of Cartridge into Gasket/Tubesheet requires applying firm, steady pressure to fully engage Top Boot Ribs (C) into Gasket. When done the Gasket’s bottom Ring (J) will be pushed outward by the Cartridge’s Boot Ribs (C) and kick out (area K) – effectively gripping the Tubesheet; mating surfaces of the Filter Boot (B) and Gasket will have no apparent gaps.
Figure 1  Filter Cartridge: constructed from the following materials; Bright-white Soft Polyurethane, Bright-white Polypropylene and Deep-pleated (29mm deep, 45-count) Spun bond Polyester as noted below.
A  Upper Boot: Polyurethane  
B  Upper-Boot Flange  
C  Upper-Boot Ribs  
D  Filter Pleats: Polyester  
E  Inner Core: Polypropylene  
F  Belly Band: Polyurethane  
G  Bottom Puck: Polyurethane

Figure 2  Filter Gasket: constructed completely from Flexible Gray EPDM Rubber
H  Upper Flange  
I  Top Surface, Imprinted  
J  Beveled Bottom Lip  
K  Bottom-Lip deflection zone

Note: It may take considerable pressure applied upon the Filter to obtain a full seat into Gasket, therefore it may be necessary to apply more pressure than achievable by hand pressure only. It is acceptable to stand on Filter as long as care is taken to not damage Filter, Gasket or Tubesheet. Additional localized support of Tubesheet bottom-side may be required to prevent excessive bending.

Reverse above procedures to remove Cartridge and Gasket from Tubesheet.
Instructions: Bin-Vent Filter Installation

PREPARATION
1) Check that Hopper Cover, Riser Spool Section and/or Transition Hopper have proper mounting pattern of 6 holes located on Ø15” bolt circle.
2) Transition Hoppers constructed from Stainless steel will have a Slip-Ring Flange that needs to be held in place during the installation process, assistance may be required.
3) Some Hopper Cover designs incorporate a double pattern Flange; installing the Filter requires only the six locations corresponding to the Loader/Receiver mounting flange pattern.
4) Check that top & bottom filter surfaces (mounting faces) are clean, as debris could adversely affect sealing function and/or proper installation.
5) Before installing, check if Stainless steel Hardware is being utilized. If so, apply Anti-seize compound onto Bolt threads, to prevent galling or binding.

PRELIMINARY SET-UP
1) Until instructed DO NOT tighten screws.
2) Starting at location #1, place Screw/Stand-off & start threading screw into flange.
3) Add Screw/Stand-off at location #3, start threading screw.
4) Place Filter against the Stand-offs, centering location. The Filter’s outside diameter will be pushing slightly against Stand-offs (this is an intentional interference-fit design).
5) Add Screw/Stand-off at location #5, start threading screw.
6) Add Screw/Stand-off at locations #2, #4 & #6, start threading screws.

FINAL INSTALLATION STEPS
1) Sequentially tighten all screws, in an alternating fashion, until uniform compression against Filter’s Top & Bottom (rubber gasket surfaces) achieved. DO NOT overtighten.
2) Check that NO gaps appear, Stand-off ends should be touching each flange surface.
Instructions: Dust Boot Replacement

CAUTION! Before you begin, ensure that the Vacuum System is de-energized. Use industry standards, lock-out procedures & precautions when working on equipment to ensure the safety of personnel and to prevent damage to equipment.

Tools required: 1/8” Hex Key Wrench, Putty Knife and RTV Silicon Sealant.

The following steps are for removal of the Dust Boot:

1) Using Hex wrench, remove Counterweight from Pivot Arm and set aside
2) Using Putty Knife (or similar tool) cut away Sealant at base of Boot
3) Pull lip of Boot out from under Pivot Plate Slide Boot, remove Boot from Arm
4) Remove residual sealant at Pivot Plate

To install the Dust Boot, do the following steps:

1) Slide Boot, Base-end (large opening) first, onto Arm until about 1” from Pivot Pin
2) Insert lip of Boot Base under perimeter of Pivot Plate, keeping Boot well aligned - not twisted - about Plate
3) Adjust upper end of Boot, on Arm, as required so that Boot is not excessively deformed, or restricts Pivot Arm travel (from Fully Open through Fully Closed position)
4) Once properly located, apply a bead of Silicone at Boot perimeter. Allow sealant to cure per manufacturer’s directions
5) Replace Counterweight and tighten Set Screw. At rest the Flapper should be about ¼” from Spout, adjust Counterweight accordingly

Your Whisper Loader or Receiver Unit(s) is ready to return to service.
Instructions: H.D. Latch Adjustment

Warning! Disconnect, Lock-Out & Tag-Out Power Source of connected equipment

COVER REMOVAL/FILTER ACCESS

1. De-energize either Pressure or Vacuum Lines connected to the Receiver.
2. Disconnect Vacuum Outlet Connection.
   a. Rigid-metallic Tubing/Pipe: Loosen Band-type Compression Coupling bolts until coupling is able to move freely, slide coupling along tube/pipe away from Receiver until outlet stub fully exposed, allowing Cover removal and (if servicing unit) to gain access to Tubesheet/Filter Assembly.
   b. Flexible-Hose: Depending on work requirement, the Flex Hose can remain attached to the Cover's outlet – or – if required loosen Worm-drive Hose Clamp so that it moves freely, then either slide clamp off end of hose or back along hose away from Receiver. Slip hose end off of outlet stub to allow lifting of Cover for removal and access to Tubesheet/Filter Assembly.
3. Disengage each Latch by lifting Red Handle until tension is released, allowing U-Bolt/Hook End to move away from Cover’s Outer Lip, Latch Pawl or Strike Plate.
4. When safe to do so, if so equipped, disconnect Grounding Strap (Optional) from Body to Cover.
5. Upon lifting Cover make note of its’ orientation with respect to Tubesheet Alignment Pin & Notch in Cover’s Alignment Ring – as EXACT replacement orientation is required. Again, when safe to do so, if present, remove Grounding Strap connection between Cover and Tubesheet.
6. Set Cover aside, being careful to not damage or disturb Pulse Bottle/Valve/Solenoid Assembly(ies), for convenience the Cover may be placed upside down.
7. Lift out Tubesheet/Filter Assembly. CAUTION: Use care so as to not damage the Filter media during removal and installation, especially PTFE-coated Filters as the membrane is very thin and can be scraped from the parent surface. If a Cartridge is damaged it MUST be replaced prior to placing unit back in service.
8. Perform required service.

COVER/FILTER REPLACEMENT

1. Lower Tubesheet/Filter Assembly into Receiver Body: Refer to Caution Statement in Step 6 above.
2. Check that the Tubesheet/Gasket is centered on the Upper Flange of the Receiver Body.
3. If applicable make Grounding Strap connection between Tubesheet and Cover.
4. Place Cover Assembly so that Notch in Cover’s Ring is engaged with Alignment Pin on Tubesheet, ensuring Cover is uniformly encircling the Tubesheet/Gasket and that no gaps are present. Depending on the Installation and/or Receiver design, it may be necessary to rotate Cover & Tubesheet/Filter Assemblies – as a unit – to achieve proper orientation with respect to Material Inlet (Receiver Body) and/or Vacuum-Air Line.
5. If applicable make Ground Strap connection between Body and Cover.
6. Swing Toggle U-Bolt/Hook End up and over Lip or onto Pawl/Strike Plate until fully engaged.
7. Pull Toggle Handle downward until it comes to a stop. The Cover should exhibit a small amount of downward travel as it compresses the Gasket. Should adjustment to Latch tension be necessary, do the following:
   Using a 5/16” Nut Driver tighten each Ny-Lok Nut on each Toggle U-Bolt leg, tighten each nut evenly and incrementally until the Cover is secure and cannot be freely moved by hand. Repeat this step for each Latch. As the Cover may exhibit a slight amount of additional compression when Receiver is placed under vacuum condition, it may be necessary for additional adjustments to compensate.
## Spare & Replacement Parts

(Common, basic items shown)

<table>
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<tr>
<th>Item Description</th>
<th>Model/Specification</th>
<th>Part Number</th>
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<tr>
<td>Assembly, Small Pulse Bottle &amp; Adapter</td>
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