

 **PEBCO**®

MANUAL

DUSTLESS LOADING

&

**SELF-CONTAINED DUSTLESS
LOADING SPOUTS**

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1 MANUAL OVERVIEW

1.0 MANUAL CONTENTS

This Section of the manual will familiarize you with the contents of the other manual sections. This manual is general in approach and may not include everything you want to know about the specifics of your particular application. Specific technical information can be found on the drawings which are a part of this manual.

If you have any questions, which cannot be answered by the written material provided, call **PEBCO®** (270) 442-1996 or FAX (270) 442-5214.

2.0 PRODUCT OVERVIEW

Section 2 details both standard and optional components for **PEBCO®** Dustless Loading Spout (DLS) and Self-Contained Dustless Loading Spout (SCDLS) units.

3.0 STORAGE RECOMMENDATIONS

Section 3 covers recommendations for proper storage. In some cases, scheduling requirements or construction delays result in the equipment being stored prior to installation. The guidelines suggested in this section are to aid the installer in selection of proper storage conditions. Because of variability in site conditions/facilities, proper equipment storage/protection is the responsibility of the purchaser or his agent.

PEBCO® is not responsible for any equipment damage which results from inadequate storage/protection efforts.

4.0 GENERAL INSTALLATION

Section 4 covers installation and start-up procedures. Pay special attention to the **!!! WARNING !!!** in **Section 4.2**. Generally, installation of DLS systems requires working aloft, and may require applying power to the unit to move between the retracted and extended positions of the spout. Extreme care and good safety procedures should be used whenever working at height or around moving equipment.

5.0 OPERATION

Section 5 is designed to familiarize you with the operation of the **PEBCO®** Dustless Loading Spout.

6.0 MAINTENANCE RECOMMENDATIONS

Section 6 covers recommendations for maintenance procedures. Information is presented on lubrication, rotary limit switch adjustment, internal cone inspection, cable inspection, and outer sleeve replacement. Maintenance specific to SCDLS units is also presented.

7.0 WARRANTY

Section 7 is PEBCO®'s Warranty to the purchaser of Dustless Loading/Self-Contained Dustless Loading Spouts.

2 PRODUCT OVERVIEW

The **PEBCO®** Dustless Loading Spout (DLS) is a device of two or more conical sections that bridges the gap between a load-out controls device such as a cutoff gate, conveyor, etc. and a hopper, truck, railcar or barge. The DLS is retracted to allow the moveable transport device to be positioned and then it is lowered to facilitate dust-free loading of the bulk solid product. Product is dropped into the inlet cone and travels down the cone assembly, out of the outlet cone, and into the container being loaded. As product moves down the spout, dust is contained in the dust sleeve encasing the cone assembly, and routed to a dust collection system through an outlet in the tub.

2.1 STANDARD COMPONENTS

The following components can be found on all **PEBCO®** DLS units:

DRIVE MOTOR AND GEAR REDUCER

The motor and gear reducer are mounted to the outside of the housing assembly to provide easy access. The motor is powered by a three phase power source and is engaged by a command from the operator. Motor and gear reducer combinations vary depending on the application; see the manufacturer's component data in the associated cut sheet for detailed manufacturer data.

DRIVE SHAFT AND LIFT CABLES

The drive shaft is supported by flange bearings mounted on either side of the housing assembly and raises and lowers the spout by way of three lifting cables which run from cable drums on the shaft to the outlet assembly. For lifting cable inspection and replacement, refer to **Section 6.9.1**.

ROTARY LIMIT SWITCH

The rotary limit switch is connected to the shaft by a chain drive. The rotary limit switch dictates the limits of travel for the DLS by dropping out the motor contactor to stop the motor when the adjustable cams within the switch reach positions which correspond to the upper and lower limits of travel. These limits can be changed as desired by adjusting the switch; for more information on rotary limit switch adjustment, see **Section 6.7**. Refer to the associated cut sheet for manufacturer data.

INLET CONE

The inlet cone is contained within the housing, and connects the spout to the equipment above by way of a sealed flange. Material enters through the inlet cone and is passed down either to the outlet assembly or an intermediate cone assembly.

CONE SUPPORT CABLES

The cone support cables ensure that each cone is suspended level and at the correct height. The cable runs from the housing assembly to the outlet assembly with intermediate cones connected to the cable via U-bolt cable clamps. For cone suspension cable inspection and replacement, see **Section 6.9.2**.

OUTLET ASSEMBLY

The outlet assembly is held at the desired height by the lifting cables, and consists of a housing, outlet cone, a hatch adapter for loading sealed containers or an outlet skirt for loading open containers, along with optional equipment.

FABRIC REINFORCED DUST SLEEVE AND RINGS

The fabric reinforced dust sleeve serves to contain dust and connects from the housing assembly to the outlet assembly. Depending on the application, it may be constructed from Coverlight, neoprene coated nylon, or silicone coated fiberglass. Reinforcing rings are spaced along the sleeve, allowing it to maintain shape. For dust sleeve replacement, see **Section 6.10**.

DUST COLLECTOR OUTLET

The dust collector outlet may be located on the side or the top of the housing assembly, and serves to route dust from the spout to a dust collection system.

2.2 OPTIONAL COMPONENTS

In addition to the standard components mentioned in **Section 2.1**, PEBCO® DLS units are also available with the following:

INTERMEDIATE CONE ASSEMBLY

Depending on the length of travel, the DLS unit may contain an intermediate cone assembly between the inlet and outlet cones. Intermediate cones are attached to the cone support cables using U-bolt cable clamps. When the spout is retracted, these cones compactly nest inside one another. When the spout is extended, the cones telescope to direct the product into the container being loaded. For cone inspection and replacement, refer to **Section 6.8**.

SLACK CABLE SWITCHES

Slack cable switches are mounted inside the housing assembly and are held in a closed position when the cable is taut. When the cable becomes loose due to the outlet assembly hitting an obstruction, the slack cable switch will move to an open position, which will either stop the motor or send a signal to the operator. See the associated cut sheet for manufacturer data.

AIR VIBRATOR

An air vibrator may be installed on the outlet assembly to assist in material flow. Air vibrators must be connected to filtered, regulated, and lubricated air with pressure not to exceed 80 psi. Air is supplied via a coil hose which stretches between the housing assembly and the outlet assembly. **DO NOT** connect air vibrators to the same air supply as SCDLS headers; vibrator air must be lubricated, while header air must be dry. For more information, see the manufacturer's data provided in the associated cut sheet.

TILT SWITCH AND JUNCTION BOX

Tilt switches are used to indicate the height of the material or a choked loading condition, and are mounted on a chain beneath the outlet assembly. When the switch is pushed away from the vertical position by the material pile, the switch sends a signal to the operator, indicating the spout should be raised until the switch resets. Tilt switches are available in carbon steel, stainless steel, and PVC, with an optional float ball for liquid applications. For specific manufacturer data, see the associated cut sheet.

PENDANT CONTROL (WIRED OR UNWIRED)

PEBCO® can provide a pendant control for the unit if desired. Controls are engineered to meet the needs of the customer, and vary in configuration depending on the application. See the associated cut sheet for specific manufacturer data.

MOTOR BRAKE

Motor brakes are used to assist in stopping of the spout. DLS units without motor breaks rely on friction in the gear reducer to stop the spout. If more precision is required, motor brakes are used so that when the motor is not receiving a signal to operate, the brake engages.

2.3 SCDLS SYSTEMS

Unlike standard DLS systems, Self-Contained Dustless Loading System (SCDLS) are manufactured with a dust collection system installed directly onto the housing assembly. This eliminates the need for a stand-alone dust collection system, and also provides an easy way to put material back into the product stream.

During the loading process, the dust filters, which are positioned within the spout, are periodically and automatically purged by air blasts from the diaphragm valves. This forces product collected on the filters back into the product stream and into the vehicle or container being loaded.

In addition to the components of the standard DLS system, the SCDLS contains the following:

AIR PLENUM

The Air plenum is a sealed chamber located directly above the housing assembly. Air is drawn into the plenum through the filters, and expelled through the exhaust fan. The plenum also contains inspection panels for easy access to the filters for inspection and replacement.

HEADERS FOR COMPRESSED AIR

The headers on an SCDLS serve as an air reservoir for the diaphragm valves. Air is supplied to the headers through one of the fittings located on each header. Use 70-80 psi of clean dry air to charge the headers.

DIAPHRAGM VALVES

Diaphragm valves pulse air onto the filters during operation to remove product buildup and force it back into the product stream. The valves are located on top of the plenum to allow for easy access,

and are pulsed automatically by the dust collector timer controller during operation. For more information on diaphragm valves, refer to the manufacturer data in the associated cut sheet. For maintenance, see **Section 6.14.1**.

MULTI PLEATED DUST COLLECTION FILTER PACK

The dust collection filters are mounted between the tub and the plenum and can be reached via the access panels on the plenum. Filters remove product from the airstream before it enters the plenum, allowing air to be routed directly out of the plenum into the atmosphere without further need for processing. Each filter can accommodate a volume flow rate of 500 CFM. Manufacturer data can be found in the associated cut sheet; for filter inspection and replacement, see **Section 6.13**.

ENCLOSURE CONTAINING THE DUST COLLECTOR TIMER CONTROLLER

The dust collector timer controller is located inside an enclosure on the side of the unit. The timer controller regulates the purge sequence by signaling the pilot valve connected to each diaphragm valve, controlling both the time between each purge and the duration of each purge. The controller also monitors the pressure differential across the filters for maintenance purposes. Manufacturer data can be found in the associated cut sheet.

SOLENOID DRAIN VALVE

The drain valve is connected to each header and serves to remove condensation accumulated in the headers. After each purge cycle, the dust collector timer controller opens the drain valve, which evacuates the water from the system. Manufacturer data can be found in the associated cut sheet. For maintenance, see **Section 6.14.3**.

EXHAUST FAN

The exhaust fan is mounted to the top of the plenum and serves to drive air from the spout and the container being loaded through the filters and out into the atmosphere. In some cases, air may be ducted from the outlet of the exhaust fan; however, this is usually not necessary. Do not duct the outlet air unless the system was originally designed with this specification in mind, as ducting the outlet air induces a higher load on the exhaust fan. The volume flow rate is controlled by means of a damper on the outlet of the fan. Use care when adjusting the volume flow rate to ensure that the maximum flow rate for the filters and the maximum load on the exhaust fan motor is not exceeded. See the manufacturer's component data in the associated cut sheet for more information; for exhaust fan burn-in instructions, see **Section 4.3.4**.

3 STORAGE RECOMMENDATIONS

3.1 GENERAL REQUIREMENTS

If PEBCO® equipment is to be stored for a period of time longer than three weeks prior to installation, the following procedures are recommended:

- Equipment should be stored in enclosed areas. Indoor storage area should be clean and dry. Storage should be off of the floor, preferably on skids or pallets.
- Storage area should be free from rapid temperature changes. If necessary, an additional heat source should be used.
- Storage area should not subject equipment to vibration.
- All interior and exterior surfaces of the spout must be thoroughly coated with Cosmoline. Any unpainted surfaces, such as shafts, rollers, bearings, and pins should be given special attention to ensure a thorough covering of Cosmoline.
- Storage must be above any possible water or snow line.
- All bearings must be fully charged with grease.
- Periodic inspections should be made, checking the covering, any moisture present, cleanliness and general appearance to ensure the absence of corrosion and the integrity of the Cosmoline coating.
- If outdoor storage is necessary, the equipment should be fully covered with weather-proof material, vented so as not to trap moisture, but drip-proof so the water cannot enter or splash up into it.

3.2 ELECTRICAL EQUIPMENT

- All electrical device enclosures must be opened and coated with CRC Stor & Lube.
- All electrical connections (terminations) must be coated with CRC Stor & Lube.
- All electrical openings must be capped or plugged as necessary to be sealed to atmosphere.
- Minimum Field Wiring 16ga AWG.
- Electrical junction boxes included with the equipment should be opened and any exposed wire and terminations should be coated with CRC Stor & Lube. Open conduit connections should be plugged or capped to atmosphere and the enclosure door should be securely tightened to ensure sealing integrity.

3.3 SCDLS SPECIFIC EQUIPMENT

- Headers should be sealed from the environment, and inspected for rust or corrosion prior to installation if stored for a period longer than six months. If rust is found, it must be removed before the unit is installed.
- Filters should be stored in an area protected from pests and excess humidity. Temperature should not exceed 100°F (38°C). Do not stack. Storing filters mounted inside the assembly is acceptable so long as all these conditions are satisfied by the storage area for the assembly.
- Hose assemblies must be removed & capped/plugged.

3.4 ADDITIONAL REQUIREMENTS

Prior to long-term storage, and start-up after storage, please refer to any and all applicable instructions published by individual component manufacturers.

4 GENERAL INSTALLATION

4.1 RECEIVING INSPECTION

Upon receipt of the equipment, a thorough inspection of the equipment should be made. The following points should be noted:

- Condition of the shipping crate/skid that would indicate rough handling or possible equipment damage
- Condition of the equipment itself; obvious dents, bent flanges, loose or broken accessories, oil leaks, etc.
- Check packing list to see if any parts were shipped loose, and if they are packed with the equipment.

REPORT ANY DAMAGE OR MISSING COMPONENTS TO THE DELIVERING CARRIER.

4.2 INSTALLATION WARNING

!!! WARNING !!!

Installation requires that the unit be moved between its retracted and extended positions. Before repositioning the unit, ensure that all personnel are standing clear of the unit. After repositioning of the unit, fully isolate the unit from all power sources.

Follow all local fall protection/falling object protection requirements whenever working aloft. Anchor all large equipment that is to be installed BEFORE lifting. If a Loading Spout Positioner system is present, this system should be fully isolated from all power sources before any lifting systems are positioned. Moving the unit while lifting systems are in place may result in equipment damage or tipping of the lifting system.

4.3 MOUNTING AND INSTALLATION

PEBCO® Dustless Loading Spouts (DLS) are normally shipped in a nearly retracted position and suspended from a wooden frame. Larger units, however, are often shipped with subassemblies on separate skids. **Section 4.3.1** covers installation for assembled units. For large units, see **Section 4.3.2**.

SCDLS units mount in the same way as DLS units; however, some additional steps will be required. These steps can be found in **Section 4.3.3**.

4.3.1 Installation of Assembled Units

1. Remove the bolts and straps holding the DLS in the shipping frame.

NOTE: Do not remove packing or skid until the spout has been bolted in place, with provided bolts, nuts, and lock-washers secure tightly.

2. Check the alignment of the bolt holes on both the mating flange and the support steel to determine if the bolt holes will match correctly with the unit. Do not attempt to correct alignment by drilling through the flange, as this will possibly weaken the flange and result in a poor seal. Check the mating flange for level.
3. Install the appropriate gasket material or sealant on the top flange surface of the housing.
4. Using a fork truck or other appropriate equipment, lift the spout to the mating flange.
5. Install nuts and washers. Use only a high grade hex head bolt with an equal grade of nut, flat and lock washer. Lock washers and/or a thread locking material should be used. Angle supports on top of the housing assembly must be utilized for additional support to the hopper or other rigid steel structure to ensure that the housing assembly is installed securely; the unit CANNOT be supported solely by the flange.
6. The skid and packing can now be removed.
7. Install the dust collection hose/pipe to the side outlet of the housing using an appropriate gasket material. (Not necessary for SCDLS units)
8. Electrical connections to the drive motor, rotary limit switch, and optional equipment can now be made. Refer to the provided wiring diagrams for more information.

!!! WARNING !!!

Until the Rotary Limit Switch has been checked to ensure proper adjustment, DO NOT FULLY RETRACT THE SPOUT, as over retracting may cause damage to the unit. PEBCO® DLS systems are shipped extended approximately 4 inches from the fully retracted position to protect against over retracting during installation.

9. Check the motor for correct rotation.
10. Continue to **Section 6.7** for rotary limit switch adjustment.
11. If the DLS contains automatic-raise or level switches, they should be tested by manually tilting the sensing probe. Make sure that this activates the spout motor or relays a signal to the operator.
12. For SCDLS units, continue to **Section 4.3.3**.

NOTE: After one week of service, it is recommended that a complete check of all fasteners be made to ensure tightness.

4.3.2 Installation of Unassembled Units

Large DLS units are generally shipped with subassemblies on separate skids as follows:

- Housing assembly, including drive assembly and lift cables wound on single-groove lift pulleys
- Outlet assembly

- Cone assembly, including cone support cable harness
- Outer flexible sleeve
- Miscellaneous parts including: fasteners, cable fittings, and other items as identified on the parts list or packing list.

Installation and assembly of the unit is completed as follows:

1. Remove the bolts and straps holding the DLS in the shipping frame.
2. Check the alignment of the bolt holes on the housing assembly to determine if the bolt holes will match correctly. Do not attempt to correct alignment by drilling through the flange, as this will possibly weaken the flange and result in a poor seal. Check the mating flange for level.
3. Install the appropriate gasket material or sealant on the top flange surface of the housing assembly.
4. Using a fork truck or other appropriate equipment, lift the housing assembly to the mating flange.
5. Install nuts and washers. Use only a high grade hex head bolt with an equal grade of nut, flat and lock washer. Lock washers and/or a thread locking material should be used. Angle supports on top of the housing assembly must be utilized for additional support to the hopper or other rigid steel structure to ensure that the housing assembly is installed securely; the unit CANNOT be supported solely by the flange.
6. Install the dust collection hose/pipe to the side outlet of the housing using an appropriate gasket material. (Not necessary for SCDLS units)
7. Position the outlet assembly beneath the housing assembly at the published extended length. The junction box for the product sensor probes, if provided, should be aligned with the junction box for that purpose on the housing assembly. Align the lift cable attachment points on discharge with the sheaves in the housing assembly.
8. Place the cone assembly in the discharge cone as shown in **Figure 1**, aligning the cone support tabs with tabs on discharge cone. Attach the cone support cables to the discharge cone.

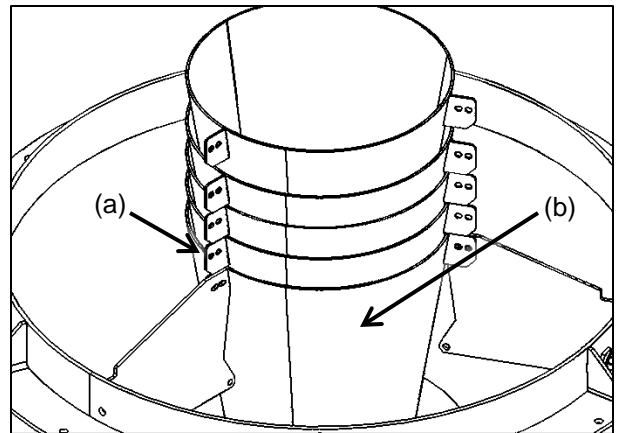


Figure 1: Cone Assembly Placement
 (a) Cone Support Tabs
 (b) Discharge Cone

9. Place the flexible sleeve over the cone stack and onto outlet assembly. Do not connect to discharge at this time. The sleeve should be aligned such that the cable guides on the sleeve are aligned with the lift cable attachment points on the outlet assembly.
10. Electrical connections can now be made to the drive motor, rotary limit switch, and optional equipment. Refer to the provided wiring diagrams for more information.
 - a. If the pre-wire option has been purchased, all components on a sub-assembly, with the exception of the motor and brake, are wired to a common junction box on the sub-assembly. Components located on the outlet assembly are to be connected to appropriate terminals in the junction box on the housing assembly. This is to be done via the multiple-conductor cable festoon on the flexible sleeve or the cable reel provided for this purpose. All other control terminations are made in the junction box located on the housing assembly.
 - b. If the pre-wire option has not been purchased, the customer or his representative is responsible for terminations at the various components, according to the drawing provided. Connections for the tilt switch are located within a small terminal box located on the outlet assembly. The rotary limit switch and slack cable limit switch are located on the housing assembly, and should be wired through conduit suitable for the expected environment. The motor and brake should be wired through a separate conduit, as these are high-voltage, three-phase components.
11. Check the motor for correct rotation.

!!! WARNING !!!

Until the Rotary Limit Switch has been checked to ensure proper adjustment, DO NOT FULLY RETRACT THE SPOUT, as over retracting may cause damage to the unit.

12. Lower the lift cables a minimum of 6 inches past the attachment points on the outlet assembly, threading each cable as seen in **Figure 2**: (a) through the slack cable limit switch arm (if provided), and (b) through the cable guides on the flexible sleeve.
13. Attach the lift cables to the outlet assembly using the lifting eyebolts, making necessary adjustments to ensure the discharge will hang level.
14. Continue to **Section 6.7** for rotary limit switch adjustment before proceeding to step 15.
15. Using the drive assembly, raise the outlet assembly until the cone support cable harness can be connected to the housing assembly using the quick-links provided. Lower the discharge to

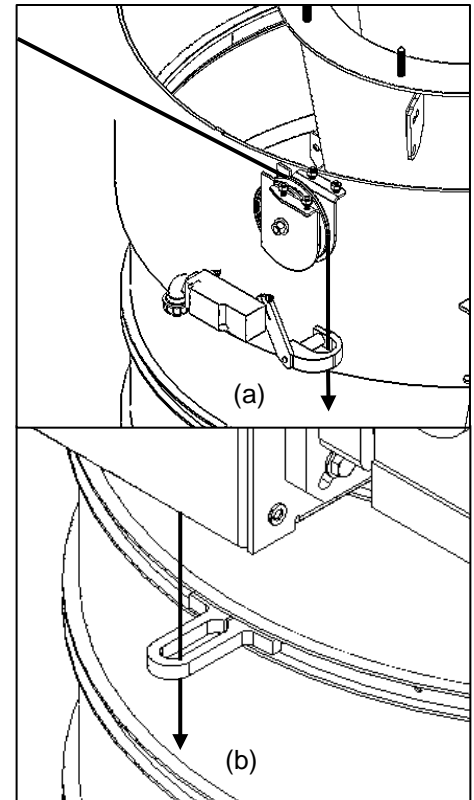


Figure 2: Cable Threading
 (a) Slack Cable Limit Switch
 (b) Cable Guides

the fully extended position to ensure the cone assembly will hang straight.

16. Raise the outlet assembly until the outer flexible sleeve can be connected to the housing assembly. Insert the top ring into the tub on the housing assembly and tighten the retaining bolts.

NOTE: It may be necessary to push the seal material in with a flathead screwdriver or similar tool, as it has a tendency to bulge out of the tub.

17. Once the sleeve is secure, lower the assembly to the fully extended position. Connect the sleeve to the outlet assembly, making sure there are no twists.
18. Raise and lower the spout several times to test the operation of the spout. If the outer sleeve develops a twist, loosen the lower connection and straighten the sleeve while extended. Make any necessary adjustments to the lift cable to level the outlet assembly.
19. If the DLS contains automatic-raise or level switches, they should be tested by manually tilting the sensing probe. Make sure that this activates the spout motor or relays a signal to the operator.
20. For SCDLS units, continue to **Section 4.3.3**.

NOTE: After one week of service, it is recommended that a complete check of all fasteners be made to ensure tightness.

4.3.3 Installation of Dust Collection Systems on SCDLS Units

1. Check all air tubing for any signs of damage, and tool check each connection to ensure tightness. Connections are tightened at the factory, but can become loose during shipping.
2. Connect the Dust Collector Timer Controller to power according to the provided wiring diagrams.
3. The air supplied to the dust collection system should be clean and dry, as moisture and contaminants can severely damage the filters and valves.
4. Connect the air supply to the header. Headers should be pressurized at 70 to 80 psi; over-pressurizing could cause the filters to fail. It is recommended that a cutoff valve be installed immediately before the header for maintenance purposes.

NOTE: Although each header contains an inlet for compressed air, it is only necessary to connect the air supply to one header

4.3.4 SCDLS Fan Motor Burn-in Instructions

Before beginning the burn-in procedure, review the electrical connections to make sure the unit has been wired properly. Check each connection for snugness and placement, and ensure that overloads are properly set.

Burn-in should take place with the damper closed; this will ensure minimum amp draw and reduce the risk of damaged equipment. If for any reason it is required that the damper be opened, **DO NOT** open the damper more than 25% of the way from the fully closed position. **Fully opening the damper will cause overload and may damage the system.**

Once burn in is complete, the damper may be adjusted as necessary to obtain the desired volume flow rate by measuring the static pressure at the outlet and referencing that measurement to the fan curve provided in the manufacturer's component data. Use care when adjusting the volume flow rate to ensure that the maximum flow rate for the filters and the maximum load on the exhaust fan motor is not exceeded.

5 OPERATION

!!! WARNING !!!

Before beginning a loading operation, make sure the area around the spout is clear of personnel. As direct exposure to the product stream can result in seriously injury or death.

1. After the vehicle/container has been positioned with its hatch directly below the spout, open the vehicle/container hatch.
2. Once the hatch has been opened, begin lowering the loading spout to the vehicle or container opening.
3. The dust extractor should be turned on at this point.
4. Continue to lower the outlet assembly until it is firmly seated in the vehicle/container hatch.
5. Start the product feed. The vehicle or container should be properly filled with little or no visible dust.
6. When the vehicle is full, raise the spout completely and turn off the dust extractor. This completes the loading cycle.

6 MAINTENANCE RECOMMENDATIONS

6.1 MAINTENANCE PROGRAM IMPORTANCE

An inspection and maintenance program should be established to ensure the successful operation of the equipment during its working life.

One of the most important aspects of any maintenance program lies in establishing a good set of operating records. Daily log sheets should be set up to record all important operating parameters of the equipment. Inspection at predetermined intervals is essential. The frequency of inspections may vary with operating conditions and the environment of operation. Complete records will also indicate spare parts used and on-hand, and the historical details of any maintenance or overhaul which takes place.

The purpose of a good maintenance program is to achieve maximum operating performance while holding down maintenance costs.

6.2 WEAR PARTS

Parts exposed to high frictional forces, whether due to the sliding of two parts against each other, or due to exposure to the product flow, are expected to wear and may need to be replaced. **PEBCO®** does not consider the wearing of Seals, Cones, Lift Cables, Cone Suspension Cables, Dust Sleeves or SCDLS Filters due to friction to be a defect as covered under the product warranty, and replacement of said parts is considered to be the responsibility of the purchaser.

6.3 MAINTENANCE SCHEDULE

Scheduled inspection of equipment and active preventive maintenance are essential for optimum performance and long equipment life. This section lists suggested schedules for maintenance. However, actual service conditions and environment greatly affect equipment reliability and such schedules should be adjusted as necessary to suit the specific requirements of the installation. Additional maintenance may be required for components not manufactured by **PEBCO®**; see the manufacturer's component data for manufacturer recommendations.

6.3.1 Suggested Maintenance Schedule

Weekly		Monthly		Quarterly		Yearly	
Visually Check for Loose Hardware	<input type="checkbox"/>	Grease Flange Bearings	<input type="checkbox"/>	Tool Check for Loose Hardware	<input type="checkbox"/>	Check all Wiring for Fraying or Damage	<input type="checkbox"/>
Check Air Pressure (Air Vibrator)	<input type="checkbox"/>	Tool Check Air Vibrator Mounting Bolts	<input type="checkbox"/>	Check Gear Reducer Oil Level	<input type="checkbox"/>	Inspect Mounting Bolts	<input type="checkbox"/>
	<input type="checkbox"/>		<input type="checkbox"/>	Check Chains	<input type="checkbox"/>		<input type="checkbox"/>
	<input type="checkbox"/>		<input type="checkbox"/>	Grease Drive Bearings	<input type="checkbox"/>		<input type="checkbox"/>
	<input type="checkbox"/>		<input type="checkbox"/>	Check Electric Motors	<input type="checkbox"/>		<input type="checkbox"/>
	<input type="checkbox"/>		<input type="checkbox"/>	Check Limit Switch(es)	<input type="checkbox"/>		<input type="checkbox"/>

6.3.2 Spare Part Installation Log

Date	Part	Qty.	Comments

6.4 SAFETY PRECAUTIONS

!!! WARNING !!!

Before conducting any maintenance on or around the system, it should be fully isolated from all power sources. Failure to do so may result in injury or death.

Follow all local fall protection/falling object protection requirements whenever working aloft. Anchor all large equipment that is to be removed/installed BEFORE removing/lifting. If a Loading Spout

Positioner system is present, this system should be fully isolated from all power sources before any lifting systems are positioned. Moving the unit while lifting systems are in place may result in equipment damage or tipping of the lifting system.

6.5 GENERAL INSPECTION

In order to ensure maximum operating efficiency and to prevent excessive down-time and costly replacements, it is recommended that an inspection of the systems and sub-systems of the unit be conducted every 90 days.

- Electrical motors, and limit switches, both rotating and/or lever type, should be checked and tested to ensure they are in good working order.
- Drive coupling, shaft keys, lifting pulleys, and set screws should be tool checked for loose connections.
- Lifting cables should be inspected for fraying of cable, which could cause damage to equipment or injury to operating personnel during loading.

6.6 LUBRICATION

General recommendation is for lubrication:

6.6.1 Flange Bearings

Flange bearing(s) that support the drive shaft(s) and idler shaft(s) should be greased every 100 hours of operation using NLGI #2 Lithium based grease, if the particular bearing has a grease fitting.

6.6.2 Gear reducer

Gear reducer lubrication level must be visually inspected every 90 days on non-sealed units to ensure that proper level is maintained. Gear reducers are filled to the proper level at the factory with AGMA No. 7 compounded oil. After installation of the breather plug, unit is ready for use. Before installing the breather plug, refer to instruction tag and determine the proper position according to reducer mounting.

Consult the component data sheets for additional recommendations on gear reducer lubrication from the manufacturer.

6.6.3 Drive Motor

Refer to the manufacturer's recommendations listed in the specific component data sheet(s).

6.6.4 Drive Bearings

Drive bearings should be lubricated with NLGI #2 Lithium based grease every 90 days.

6.6.5 Lifting Cables

Lifting cable transfer sheaves located under housing assembly have non-lubricated bearings. These bearings should remain dry and are not to be lubricated.

6.7 ROTARY LIMIT SWITCH ADJUSTMENT

Rotary limit switches are preset at the factory; however, they can become misaligned during shipping or after long periods of operation and should be checked during installation and periodically thereafter.

1. Remove the cover on the rotary limit switch, so that the limit switch cams can be observed.
2. With a person observing the limit switch cams, jog the motor to raise the DLS.
3. Raise the unit until the published retract height for the unit is reached. Refer to the customer certified drawing accompanying this manual.
4. At this point, one of the limit switch cams should have actuated one of the micro switches or be just ready to actuate:
 - a. If a micro switch has been actuated, this action should have stopped the drive motor. **If not, recheck the limit switch circuitry to determine if it is properly wired to the motor starter.**
 - b. If a micro switch has **not** been actuated but is just about to, continue the operation of the drive unit until the sequence described in (a) occurs. If this causes the retracted height of the DLS to be different than specified on the certified drawing, this condition is acceptable if the difference in height is no more than plus or minus 1-1/2 inches.
 - c. If at the retracted position a limit switch cam is not near the activation point - the particular limit point must be reset. See instructions inside cover of switch enclosures.
5. Lower the DLS assembly to its full extended length listed on the customer certified drawing accompanying this manual.
6. At this point, observe and confirm the following:
 - a. The outlet assembly is suspended in a level position. (If not, adjust the lifting eyebolts on the outlet assembly).
 - b. The dust sleeve is suspended uniformly with no twists in the fabric. (Also check for hidden tears.)
 - c. The **other** rotary limit switch either stopped the drive motor at this position or the observed cam is just ready to actuate.
7. It is important that the rotary limit switch stop the DLS in the lower position **just before the lift cables become slack.** This condition is preset at the factory, but may have shifted during transit or operation.

8. If the rotary limit switch stopped the drive unit in step 6 then the checkout of the limit switch is complete.
9. If the limit switch cam has not quite activated at this point, continue to lower the DLS until the cam actuates the lower level switch.
10. If this point occurs within 1-1/2 inches of the published extension height on the customer certified drawing and the lift cables are still in tension, no further adjustment is necessary.
11. Raise and lower the spout several times to ensure it is performing properly and stopping at its upper and lower rotary limit switch set points.
12. If the lift cables are slack or the extended position is lower than desired, the switch point must be reset.

6.8 INTERNAL CONE INSPECTION AND REPLACEMENT

Internal cones should be inspected to ensure that product flow into the vehicle/container, or air flow up through the spout, is not restricted due to damaged components. If bent, damaged, or worn components are discovered, these components can be easily and economically replaced.

Special attention should be paid when loading hygroscopic or sticky material through loading spout. Periodically check internal cones for product build-up; if build-up is found, strike or scrape each cone to eliminate it.

6.8.1 Intermediate Cone Replacement/Inspection (Lower Half)

!!! WARNING !!!

Prior to performing cone inspection or replacement, the system must be isolated from all external power sources. If work is being done on the cone assembly and the drive motor engages, it could result in personal injury or death.

1. With the unit in its full extended position, loosen the bolts on the lower end of the dust sleeve.
2. Raise the sleeve up as far as necessary to inspect the lower cones. Secure the sleeve in a raised position by tying it off or other appropriate means.
3. To replace a cone, disconnect the U-bolt cable clamps from the cone (**Figure 3**) and remove the cone. Leave the clamps attached to the cables.

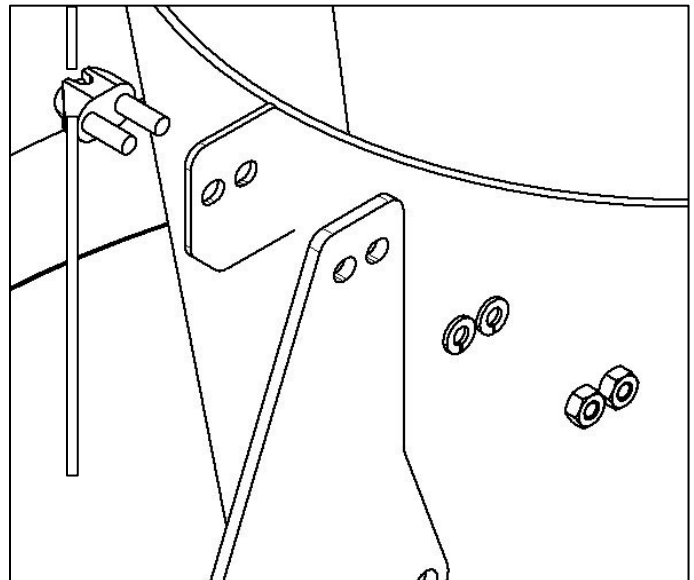


Figure 3: Cone U-bolt Cable Clamps

4. Attach the new cone to the cable clamps. Apply Loctite 243 (567 for stainless steel applications) to the threads before tightening the nuts.
5. Lower the dust sleeve into position and replace and tighten the bolts, applying Loctite 243 (567 for stainless steel applications).

6.8.2 Intermediate Cone Replacement/Inspection (Upper Half)

!!! WARNING !!!

This procedure requires that the unit be moved between its retracted and extended positions. Before repositioning the unit, ensure that all personnel are standing clear of the unit. After repositioning of the unit, fully isolate the unit from all power sources.

Take all appropriate precautions for working on equipment suspended from overhead. Failure to take prudent safety measures can result in serious injury or death.

On dustless loading spout units with lengths greater than 8 feet, the dust sleeve becomes quite heavy. Special handling consideration must be given to the dust sleeve when performing this maintenance.

1. Raise the spout to its retracted (full-up) position. Loosen the bolts retaining the dust sleeve.

NOTE: AT THIS POINT THE DUST SLEEVE AND STIFFENING RINGS WILL DROP. IT IS IMPORTANT THAT DUE CONSIDERATION BE GIVEN TO THIS FOR SAFETY!!

2. Lower the spout to expose the cones in the upper section of the DLS.
3. To replace a cone, disconnect the U-bolt cable clamps from the cone(s) and remove the cone(s). Leave the clamps attached to the cables.
4. Attach the new cone to the cable clamps. Apply Loctite 243 (567 for stainless steel applications) to the threads before tightening the nuts.
5. Raise the outlet assembly until the sleeve can be connected to the housing assembly. Insert the top ring into the tub on the housing assembly. Apply Loctite 243 (567 for stainless steel applications) to the retaining bolts and tighten.

NOTE: It may be necessary to push the seal material in with a flathead screwdriver or similar tool, as it has a tendency to bulge out of the tub.

6.9 CABLE INSPECTION AND REPLACEMENT

An inspection of the lift cables and cone support cables should take place every 90 days to minimize maintenance costs and ensure safe operation.

6.9.1 Lift Cable Inspection and Replacement

!!! WARNING !!!

This procedure requires that the unit be moved between its retracted and extended positions. Before repositioning the unit, ensure that all personnel are standing clear of the unit. After repositioning of the unit, fully isolate the unit from all power sources.

Take all appropriate precautions for working on equipment suspended from overhead. Failure to take prudent safety measures can result in serious injury or death.

1. Lower the spout to the extended position.
2. Visually inspect the entire length of the cable, including the portion of the cable remaining inside the housing assembly. If any signs of corrosion or fraying are present, the cable must be replaced.
3. To replace the cable, lift the spout so that a work platform can be placed under the outlet assembly.
4. Lower the outlet assembly onto the platform.
5. Disconnect the cable from the outlet assembly by unscrewing the lifting eyebolt.
6. Remove the cable from the drum by loosening the retention bolt (**Figure 4**)
7. Thread the new cable through the turning sheave (**Figure 2**).
8. Attach the cable to the drum by threading it through the hole in the retention bolt (**Figure 4**). The loose end of the cable should be short enough to fit completely inside the slot.
9. Tighten the retention bolt.
10. Tightly wrap the cable around the drum twice and thread the cable through the cable guides
11. Connect the cable to the outlet assembly using the lifting eyebolt.
12. Raise the spout so that the outlet no longer rests on the work platform. Adjust the lifting eyebolt until the outlet assembly sits level.

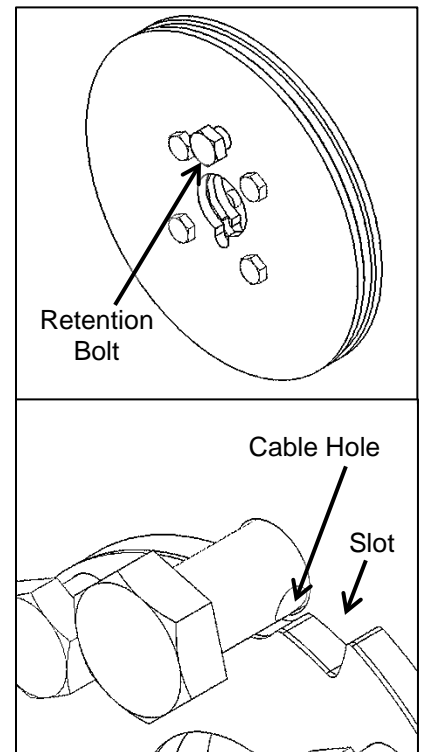


Figure 4: Cable Retention Bolt

6.9.2 Cone Support Cable Inspection and Replacement

!!! WARNING !!!

This procedure requires that the unit be moved between its retracted and extended positions. Before repositioning the unit, ensure that all personnel are standing clear of the unit. After repositioning of the unit, fully isolate the unit from all power sources.

Take all appropriate precautions for working on equipment suspended from overhead. Failure to take prudent safety measures can result in serious injury or death.

1. In the retracted position, loosen the sleeve retaining bolts at the top end of the sleeve, and remove the top of the sleeve from the tub.

!!! WARNING !!!

On dustless loading spout units with lengths greater than 8 feet, the dust sleeve becomes quite heavy. Special handling consideration must be given to the dust sleeve when performing this maintenance.

2. Lower the spout to the full extended position.
3. Inspect the full length of each cable for signs of corrosion or fraying. If any corrosion or fraying is found, the cable must be replaced.
4. To replace the cable, raise the spout to a position about 12 inches from fully retracted, and disconnect cone support cables from the attachment points inside the tub. Allow the cones to nest within the outlet assembly.
5. Lower the outlet assembly to a position that allows easy access to the cone assembly.
6. Disconnect the cable from the outlet assembly.
7. Mark the cable at each U-bolt cable clamp, and remove the clamps from the cable. (See **Figure 3**.)
8. Transfer the marks from the old cable to the new cable.
9. Attach the new cable to the outlet assembly.
10. Attach each cone to the cable using the U-bolt cable clamps and the marks transferred from the old cable, applying Loctite 243 (567 for stainless steel applications).
11. Lift the outlet assembly to a position at which the cables can be reattached to the housing assembly, and reconnect the cables.
12. Lower and raise the outlet assembly, observing the cones. Each cone should nest within the next without hanging or skewing. Each cone should suspend in a level position. If this is not the case, adjust the cones by repositioning the U-bolt cable clamps.
13. Once each cone has been fully adjusted, fully retract the spout.
14. Push the top of the sleeve back into the tub and tighten the retaining bolts.

6.10 DUST SLEEVE REPLACEMENT

Dust sleeves on DLS units do wear out over time and must be replaced. Use the following procedure to replace the dust sleeve whenever holes or tears become evident.

!!! WARNING !!!

This procedure requires that the unit be moved between its retracted and extended positions. Before repositioning the unit, ensure that all personnel are standing clear of the unit. After repositioning of the unit, fully isolate the unit from all power sources.

Take all appropriate precautions for working on equipment suspended from overhead. Failure to take prudent safety measures can result in serious injury or death.

1. In the retracted position, loosen the sleeve retaining bolts at the top end of the sleeve, and remove the top of the sleeve from the tub.

!!! WARNING !!!

On dustless loading spout units with lengths greater than 8 feet, the dust sleeve becomes quite heavy. Special handling consideration must be given to the dust sleeve when performing this maintenance.

2. Lower the spout about 12 inches and disconnect the three cone support cables from the attachment points inside the tub. Allow the cones to nest within the outlet assembly.
3. Lower the spout until it rests on a work platform or some type of support, approximately halfway through its travel. Do not work on the spout while the weight of the unit is supported on the three lift cables. Also, do not lower the spout to its full extended position while making these changes.
4. At this time, disconnect the three outside lift cables from the outlet assembly. This will allow the outlet assembly, stacking cones, and outer sleeve to be lowered without unbolting the housing assembly.
5. Loosen the sleeve retaining bolts at the bottom of the sleeve, and lift the sleeve off the spout.
6. Lift the new sleeve over the cone stack, and seat it in the outlet assembly. Align the sleeve with the spout lifting cables such that the bolts will capture the cables without severe rubbing. Do not tighten the lower sleeve retaining bolts at this time.
7. Attach the lifting cables to the outlet assembly.
8. Raise the spout to within 12 inches of the full-up position, and reconnect the cone support cables.
9. Install the top ring of the sleeve inside the tub. Tighten the upper sleeve retaining bolts, applying Loctite 243 (567 for stainless steel applications).

10. Lower the spout to the extended position, and verify the sleeve is straight. It is particularly important that the sleeve have no twists. Tighten the lower sleeve retaining bolts, applying Loctite 243 (567 for stainless steel applications).

6.11 SHORTENING OF TRAVEL

!!! WARNING !!!

This procedure requires that the unit be moved between its retracted and extended positions. Before repositioning the unit, ensure that all personnel are standing clear of the unit. After repositioning of the unit, fully isolate the unit from all power sources.

Take all appropriate precautions for working on equipment suspended from overhead. Failure to take prudent safety measures can result in serious injury or death.

GENERAL NOTE: Typically, removing each cone decreases the retracted height by 2 inches and reduces the extended height by 14 inches; however, this is not true of all models. Refer to the provided drawings for detailed information.

1. Raise the spout to its retracted position. Loosen the screws that hold the outer sleeve assembly into the upper housing assembly. Disconnect the sleeve from the housing assembly by loosening the retaining bolts and let it rest on the outlet assembly.

!!! WARNING !!!

On dustless loading spout units with lengths greater than 8 feet, the dust sleeve becomes quite heavy. Special handling consideration must be given to the dust sleeve when performing this maintenance.

2. Reach inside the housing assembly and remove the three cone support cables by disconnecting the cone shackle from the lug. This will allow the cones to rest on the outlet assembly.
3. Lower the spout until it rests on a work platform or some type of support, approximately halfway through its travel. Do not work on the spout while the weight of the unit is supported on the three lift cables. Also, do not lower the spout to its full extended position while making these changes.
4. At this time, disconnect the three outside lift cables from the outlet assembly. This will allow the outlet assembly, stacking cones, and outer sleeve to be lowered without unbolting the housing assembly.
5. Remove the stacking cone assembly from the outlet assembly by loosening the cable clamps that hold the cone support cables to the outlet assembly. Be sure to make a note of how much cable is extended past the last stacking cone tab to the outlet cone. This is important so that when you start removing cones and cutting cables, you have enough left over to reattach to the outlet cone.
6. Remove the required number of stacking cones from the bottom of the stack to get the desired travel.
7. The outer sleeve must also be shortened. To do this, loosen the screws that hold the outer sleeve assembly into the outlet assembly. Remove the sleeve from the outlet assembly noting its orientation. Cut off two sections from the bottom for every cone that is removed. For example, if you removed one cone, you would stretch the outer sleeve assembly and cut the sleeve at the

second ring up from the bottom of the outer sleeve assembly. **IT IS IMPORTANT TO CUT FROM THE BOTTOM UP!** After cutting, there should always be a ring at the end of the sleeve.

8. Place the outer sleeve assembly into the outlet assembly. Do not tighten any attachment bolts at this time.
9. Place the stacking cone assembly back into the outlet assembly and attach the lifting cables to the outlet assembly.
10. Raise the assembly up into a position where you can reattach the cone support cables to the lug at the top of the inlet. Lower the spout until the cones hang freely, and attach the cone support cables to the outlet assembly.
11. Raise the spout until the top of the sleeve can be attached to the inlet assembly. Once attached, lower the spout until the sleeve hangs freely. When the sleeve is straight (no twists), attach the sleeve to the outlet assembly.
12. After everything is reassembled, check to see if the outlet assembly is level. This can be adjusted by using the lifting eyebolts.
13. Readjust the rotary limit switch full-up/full-down positions as needed. (Refer to **Section 6.7** for rotary limit switch adjustment.)

6.12 MOUNTING BOLT INSPECTION

Check the mounting bolts. Replace and/or tighten any loose or missing bolts. Use the same quality of bolts used in installation. This should be done annually.

6.13 SCDLS FILTER INSPECTION AND REPLACEMENT

Filters on SCDLS units should be inspected monthly to insure they are in good working condition. Filters should be replaced when the static pressure as measured by the Dust Collector Timer Controller exceeds 4 in (w.c.). The timer controller is contained within an enclosure on the unit. (Some systems may be configured such that the Dust Collector Timer Controller is connected to a computer terminal. If this is the case, the pressure can be read directly from the terminal.) So long as the pressure module is installed, the unit will display the current pressure by default; if this is not the case, see the manufacturer's data.

!!! WARNING !!!

Prior to performing any maintenance inside the unit, the system must be isolated from all external power sources. If work is being done on the system and the drive motor engages, it could result in personal injury or death.

If the static pressure exceeds 4 in (w.c.), the filters can be replaced by removing the access panels on the plenum (**Figure 5**).

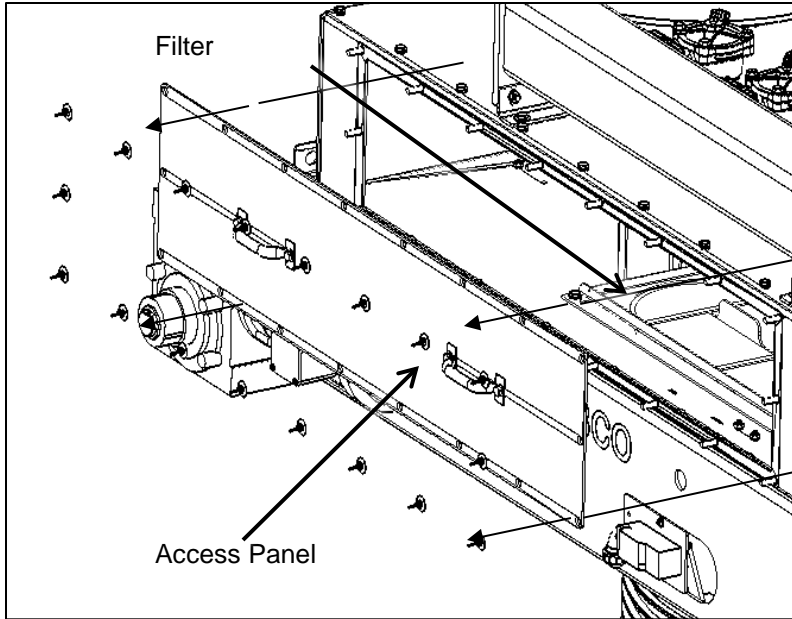


Figure 5: Filter Access

6.14 SCDLS VALVE INSPECTION

Diaphragm, pilot, and drain valves should be inspected annually to ensure maximum operating life of the valves and to minimize maintenance costs.

!!! WARNING !!!

Take all appropriate precautions for working on equipment suspended from overhead. Failure to take prudent safety measures can result in serious injury or death.

6.14.1 Diaphragm Valve Inspection

1. Unbolt the diaphragm valve from the header and remove the valve from the SCDLS by sliding it up off the blow tube.
2. Open the valve casing by removing the bolts from the top of the valve.
3. Look for signs of moisture in the valve, which could indicate that the drain valve is faulty or that the supply air is not being properly conditioned. The presence of moisture can drastically reduce performance and life of the diaphragm valves, filters, and headers.
4. Visually inspect all interior surfaces of the valve and clean using a brush or damp cloth. Remove any remaining debris using compressed air.
5. Inspect the diaphragm. If torn, punctured, or worn, it should be replaced. (For replacement parts contact **PEBCO®** at (800)707-3226).
6. Inspect the inlet and outlet seals and replace if necessary.
7. Reassemble the valve.

8. Slide the valve back onto the blow tube.

NOTE: Insert the inlet seal into the diaphragm valve BEFORE sliding the valve into position, as the narrow clearance between the inlet and the header will make this difficult to do after the valve has been positioned.

9. Bolt the valve onto the header, reconnecting the tubing from the pilot.
10. After each valve has been inspected and reinstalled, reconnect the electrical and air supplies.

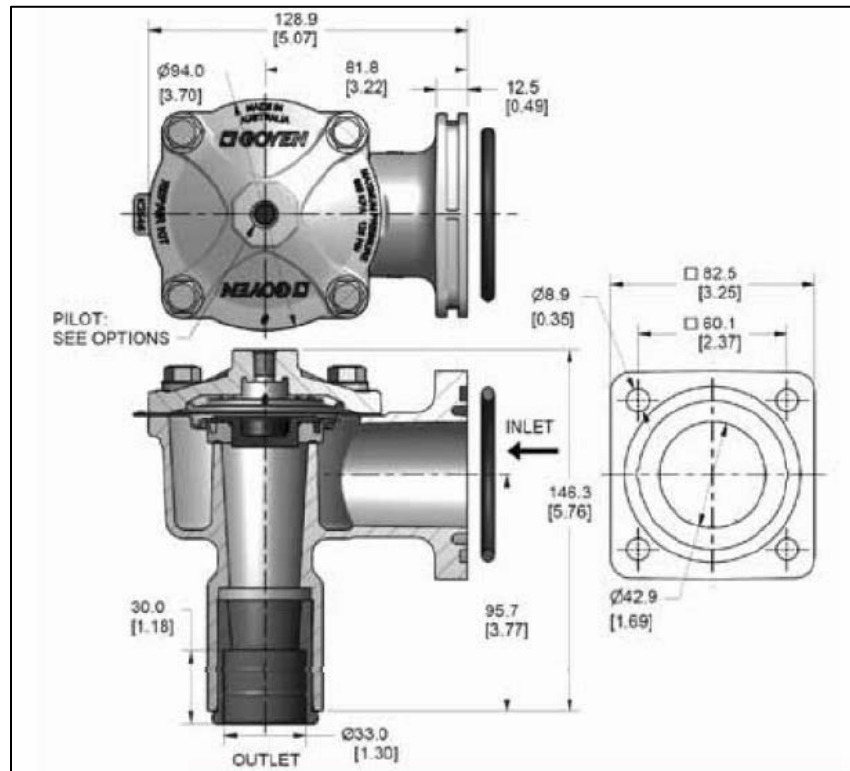


Figure 6: Diaphragm Valve Cutaway. (Illustrative purposes only. Goyen model RCAC25FS4 depicted, if different model is installed, see the manufacturer's component data in the associated cut sheet for manufacturer details.)

6.14.2 Pilot Valve Inspection

1. Disconnect the unit from all air and electrical sources.
2. Purge the remaining air from the headers. This can be done by activating the solenoid drain valve attached to the headers.
3. Remove the valve from its housing by removing the screws from the valve.
4. Look for signs of moisture in the valve, which could indicate that the drain valve is faulty or that the supply air is not being properly conditioned. The presence of

moisture can drastically reduce performance and life of the diaphragm valves, filters, and headers.

5. Visually inspect all interior surfaces of the valve and clean using a brush or damp cloth. Remove any remaining debris using compressed air.
6. Inspect the internal workings of the valve; if any damaged or worn components are found, they should be replaced. (For replacement parts contact **PEBCO®** at 1 (800) 707-3226)
7. Reassemble the valve.
8. Inspect the air tubing and electrical wiring connected to the valve. If any damage or wear is found, replace the tubing/wiring.
9. Once all valves have been inspected, reconnect power and charge the headers with 70-80 psi of air.

6.14.3 Drain Valve Inspection

1. Disconnect the unit from all air and electrical sources.
2. Purge the remaining air from the headers by activating the drain valve.
3. Disconnect all tubing and electrical connections
4. Remove the valve and inspect all interior surfaces of the valve. Clean using a brush or damp cloth, and remove any remaining debris using compressed air.
5. Inspect the internal workings of the valve; if any damaged or worn components are found, the valve should be replaced. (For replacement parts contact **PEBCO®** at 1 (800) 707-3226)
6. Inspect the air tubing and electrical wiring connected to the valve. If any damage or wear is found, replace the tubing/wiring.
7. Reconnect the valve.
8. Reconnect power and charge the headers with 70-80 psi of air.

6.15 TROUBLESHOOTING

Spout discharges slowly or does not discharge:

- Gate/conveyor above the spout is not operating properly
- Product buildup in the cones
- Cones misaligned
- Damaged cones

Spout does not extend:

- Motor not connected to power
- Wiring frayed or loose
- Lower limit of the rotary limit switch set too high
- Slack cable switch misaligned (should be held closed by the cable)
- Rotary limit switch not operational
- Motor not operational

Spout does not retract:

- Motor not connected to power
- Wiring frayed or loose
- Upper limit of the rotary limit switch set too low
- Rotary limit switch not operational
- Motor not operational

Spout over extends:

- Lower limit of the rotary limit switch set too low
- Rotary limit switch not operational
- Motor break not operational

Dust in exhaust (SCDLS):

- Torn filters
- Worn inlet cone

Dust coming from the outlet (SCDLS):

- Fan dampener improperly adjusted
- Clogged filters
- Fan not operating correctly
- Dust Collector Timer Control not receiving power
- Dust Collector Timer Control improperly set
- Dust Collector Timer Control not operational

- Wiring frayed or loose
- Damaged or loose air hose
- Headers not properly charged with air (should be at 70-80 psi)
- Diaphragm valves damaged or incorrectly connected
- Pilot valves damaged or incorrectly connected

6.16 HYDRAULIC SYSTEMS

Refer to manufacturer's data sheets on items furnished on this order.

If Hydraulic Power Unit is supplied on this order by **PEBCO®**, refer to the Hydraulic System Manual for detailed operation.

7 WARRANTY

WARRANTY: PEBCO® DUSTLESS LOADING/SELF-CONTAINED DUSTLESS LOADING SPOUTS

WARRANTY

PEBCO® warrants to purchaser, upon the terms set forth, that the equipment purchased, so far as the same is of PEBCO®'s manufacture, is free from defects in material and workmanship under normal use and service for a period of twelve (12) months from the date of shipment. All equipment, including motors, manufactured by others, is warranted solely and exclusively by their manufacturers and not by PEBCO®, and PEBCO® hereby assigns to purchaser without recourse to PEBCO® such warranty as is given by the manufacturer.

TERMS

PEBCO®'s obligation under this warranty is limited to and shall be fully discharged by PEBCO® repairing or at its option replacing f.o.b. point of manufacturer any part which is shown to PEBCO®'s satisfaction to have been defective as to material or workmanship, provided that written notice of defect is delivered to PEBCO®'s office in Paducah, Kentucky, within sixty (60) days after defect is discovered, and in no event more than twelve (12) months and sixty (60) days after shipment.

PURCHASER'S ACTS VOIDING WARRANTY

The warranty furnished by PEBCO® herein will be rendered void by improper erection or installation, if executed by other than PEBCO®, misuse, unauthorized alteration, substitutions, repairs or modifications, neglect or accident, or damage to the equipment caused by improper storage, abrasion, corrosion, and/or operation outside the rated load limitations for use of the equipment. PEBCO® shall not be liable for any repairs, replacements or adjustments to the equipment or any cost of labor performed by the purchaser or others without PEBCO®'s prior written approval.

EXCLUSION OF ALL OTHER WARRANTIES AND LIMITATION OF CONSEQUENTIAL AND INCIDENTAL DAMAGES.

1. THE WARRANTY FURNISHED BY PEBCO® AS EXPRESSLY INCLUDED HEREIN IS IN LIEU OF ANY OTHER WARRANTIES OR GUARANTIES EXPRESSED OR IMPLIED. PEBCO® MAKES NO OTHER WARRANTY OR REPRESENTATION OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF DESIGN, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED.
2. IN NO EVENT, BE IT DUE TO A BREACH OF WARRANTY OR ANY OTHER CAUSE ARISING OUT OF PERFORMANCE OR NONPERFORMANCE OF THIS PROPOSAL OR CONTRACT, SHALL PEBCO® BE LIABLE FOR (1) CONSEQUENTIAL OR INDIRECT LOSS OR DAMAGE INCLUDING BUT NOT LIMITED TO LOSS OF PROFITS, COSTS TO PURCHASE SUBSTITUTE POWER, PLANT DOWNTIME, PRODUCTION, INCREASED COSTS OF OPERATION, OR SPOILAGE OF MATERIAL, OR (2) LOSS OR DAMAGE ARISING OUT OF THE NEGLIGENCE OF THE PURCHASER, ITS EMPLOYEES, AGENTS, ENGINEERS OR ARCHITECT.