Central-Vac with Air Purge

OPERATOR'S MANUAL

Central-Vac with Air Purge

English

WALINGA®
TOUGH TO BEAT IN THE LONG RUN

00-160740-0 A
2025-12-11

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This manual contains important information regarding the safety, operation and maintenance of your Central-Vac with Air Purge.

Some illustrations and diagrams may show safety shields, guards, or covers removed for clarity. **DO NOT** operate the machine without these guards in place.

Identification of Machine

The identification of machine section outlines the applicable models included in this manual. It identifies the location of the machine serial number and serialized components and provides space for recording these numbers.

Introduction

The introduction section outlines the importance of this document and provides details for the interpretation and understanding of information presented in this manual.

Configuration

The configuration section gives an overview of the various configurations available for the specified model and identification between the different configurations.

Safety

The safety section lists important safety precautions and procedures as well as providing the meaning, location and visual representation of all safety signs and labels on the machine. Read and understand all precautions before operating, maintaining or transporting the machine.

Machine Life-Cycle Procedures

The machine life-cycle procedures section provides information on the reception, assembly and initial set-up, storage, and end of life procedures.

Operation

The operation section gives general information on the operating principles including starting, operating functions, and stopping the machine, as well as clearing any blockages. This section also provides troubleshooting information for fault diagnosis and solutions to issues that may be encountered.

Maintenance and Adjustments

The maintenance and adjustments section provides the recommended maintenance schedule and task instructions for both calendar and operation hour intervals, maintenance should be performed at the first occurrence of these two intervals.

Specifications

The specifications section details technical data of the particular model to achieve a high standard of operational performance and outlines relevant standards and regulations.

Warranty

The warranty section outlines the terms and limitations of the warranty coverage.

Accessories and Attachments

The accessories and attachments section lists available attachments for the machine.

Parts List

The parts list section provides information for the identification of replacement assemblies, subassemblies and parts.

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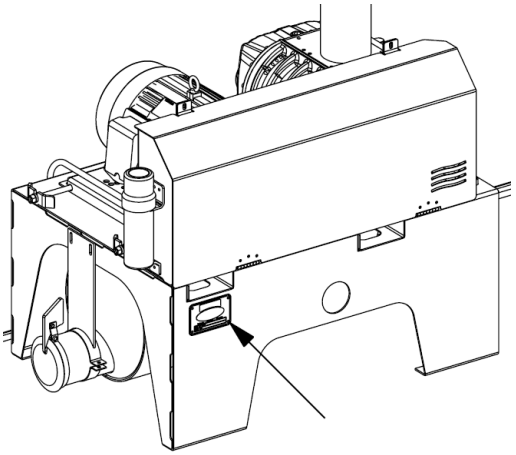
Identification of Machine

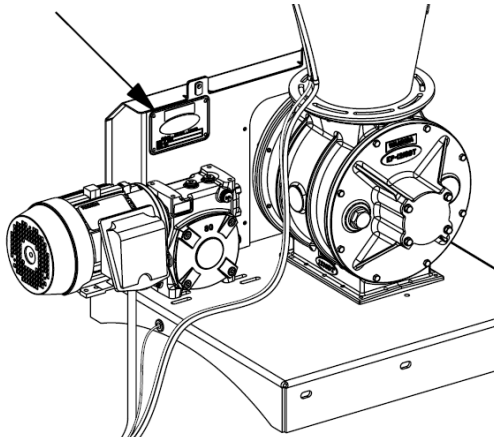
CENTRAL-VAC WITH AIR PURGE

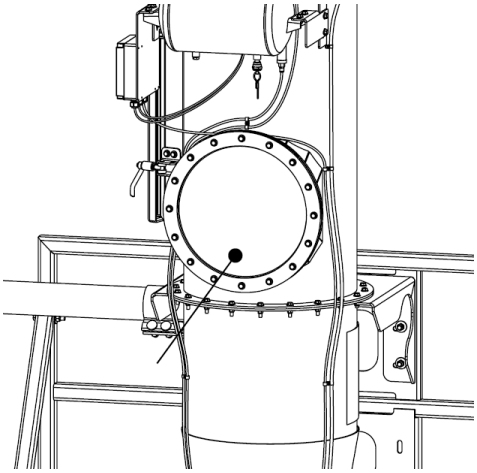
SERIAL NUMBERS

Be prepared to provide the serial number of the Central-Vac system, blower and airlock to your Walinga dealer or representative when ordering parts or requesting service or other information. For easy reference, record the required serial numbers as follows:

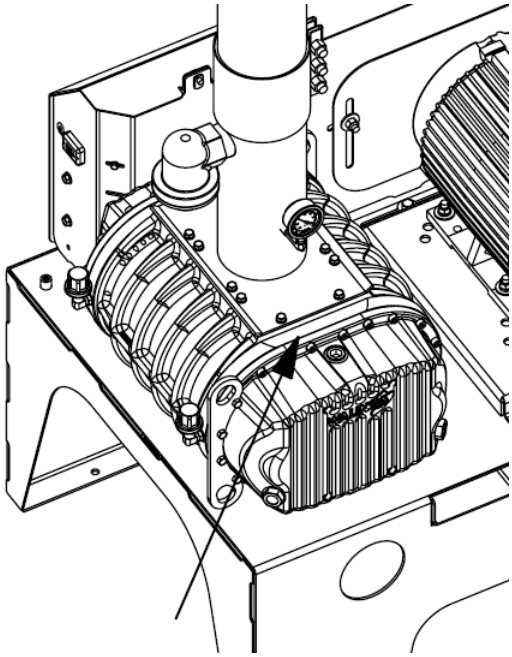


Central-Vac System Serial Number
Located on the front face of the blower package, below the drive guard and/or on the back face of the airlock package drive guard.

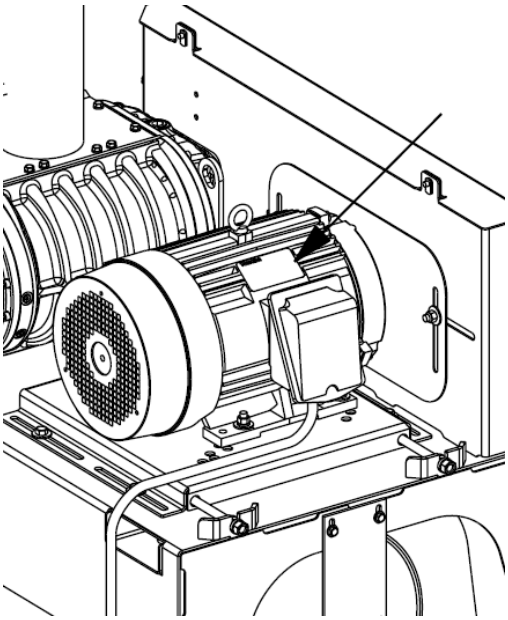




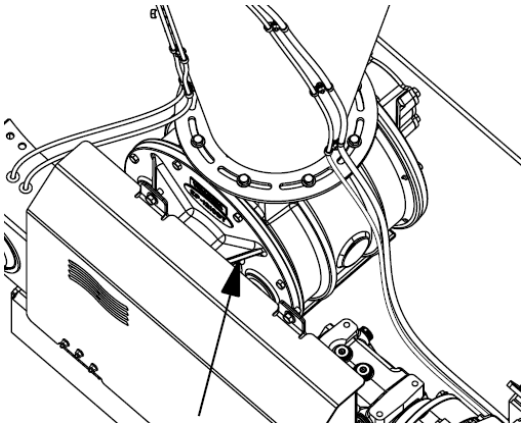
Explosion Relief Vent Lot Number (if equipped)
Location will vary with vent model.



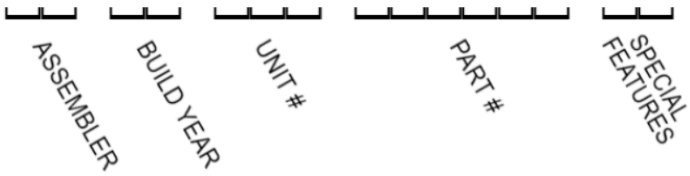
Blower Serial Number
Located on the top of the idle-end headplate of the blower.

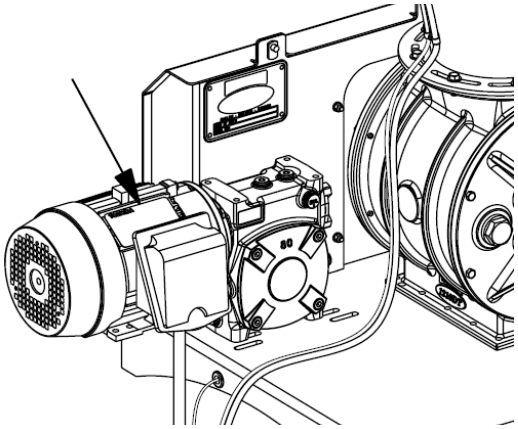


Blower Motor Serial Number
Located on the nameplate of the motor, usually positioned above the conduit box.

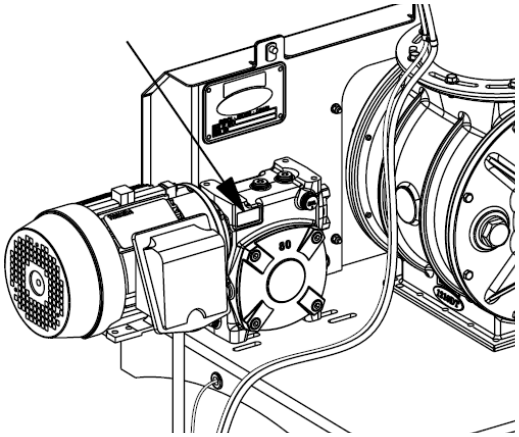


Airlock Serial Number
Located on the rib of the end plate of the airlock.





Airlock Motor Serial Number
Located on the nameplate of the motor, usually positioned above the conduit box.



Airlock Gearbox Serial Number
Located on the upper corner of the gearbox housing, closest to the C-flange.

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Introduction

CENTRAL-VAC WITH AIR PURGE

STATEMENT OF IMPORTANCE

Congratulations on your choice of a Walinga Central-Vac System with Air Purge (CVSAP) to complement your operation. This equipment has been designed, engineered and manufactured to meet the needs of the discriminating buyer for the efficient pneumatic recovery of bulk commodities.

Your safety and the performance of your CVSAP are the top priorities. This operator's manual has been created for the express purpose of keeping you safe and providing education for the efficient use of your CVSAP.

Safe, efficient and trouble-free operation of your CVSAP requires that you and any individuals operating or maintaining the machine, read and understand all sections of this operator's manual. An operator who has not familiarized themselves with the contents of this manual constitutes an untrained operator. Untrained operators are not qualified to operate the machine.

Keep this manual available for frequent reference and for provision to new operators or owners.

Your machine's appearance or structural design may differ from illustrations shown in the manual. Continuous design improvements for optimized field performance are on-going and may have been made to your machine since the publication of the manual. Specifications, descriptions and all other information in the manual are subject to change and/or correction without notice. Contact your local dealer or Walinga representative for the most current revision of your machine's manual or if you have any questions.

INTENDED USE

The Walinga CVSAP has been designed for use in manufacturing, food processing and feed milling operations for the filtered pneumatic recovery of bulk commodities. Use of the machine in any other manner is considered as contrary to the intended use. Compliance with and strict adherence to the methods of operation, maintenance, and repair, as specified by Walinga in this manual, also constitute essential elements of the intended use.

The CVSAP must be operated, maintained and serviced only by persons who are familiar with its particular characteristics and have been acquainted with the relevant safety procedures in this manual. Any individual who has not familiarized themselves with the content of this manual is considered untrained. Untrained persons are considered unqualified to operate, maintain or service a CVSAP. It is the responsibility of the owner and/or operator to train new operators and ensure they have read and understood this manual.

Accident prevention regulations, and all other generally recognized regulations on safety and occupational health and safety must be observed at all times.

Any unauthorized modifications carried out to the CVSAP may relieve Walinga of liability for any resulting damage or injury and is considered contrary to the intended use.

DIRECTIONAL REFERENCES

The following directions will be used as a standard throughout the manual:

TOP	The upper face of the AMS body
BOTTOM	The outlet side of the airlock and blower
FRONT	The outer face of the airlock and blower drive guards
REAR	The idle end of the airlock and blower
LEFT	The left face of the CVSAP as viewed from the front
RIGHT	The right face of the CVSAP as viewed from the front

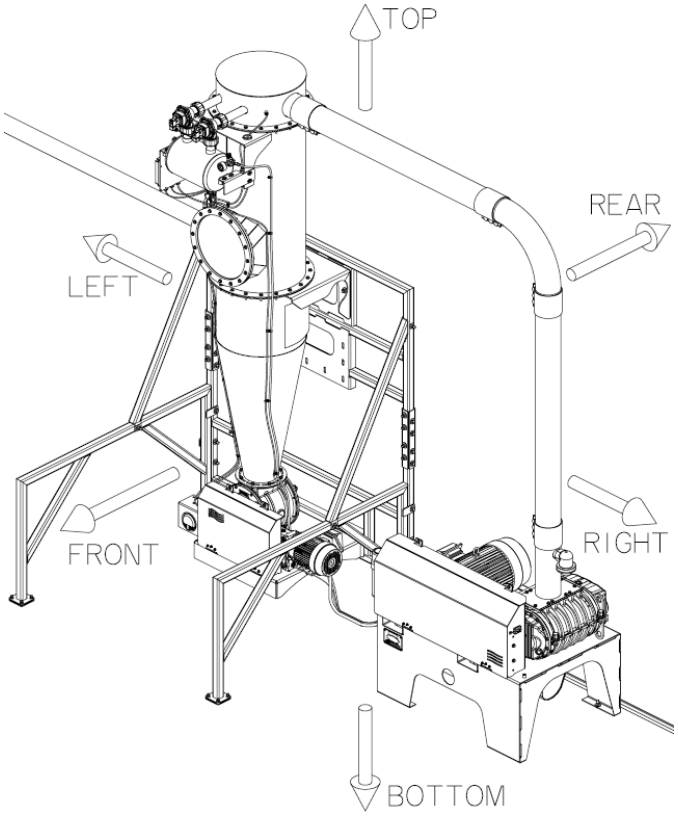

Figure 2-1: Directional references

FILTERED PNEUMATIC CONVEYING SYSTEMS

Filtered pneumatic conveying systems facilitate the efficient moving of bulk commodities with the use of air while preventing the release of particulate and dust-laden air into the surrounding environment. The CVSAP consists of nine key assemblies including the blower, airlock, air material separator (AMS), filters, purge valves, header tank, conveying lines, explosion relief system, and discharge receptacle. A simplified representation of a CVSAP can be seen in ***Figure 2-2***.

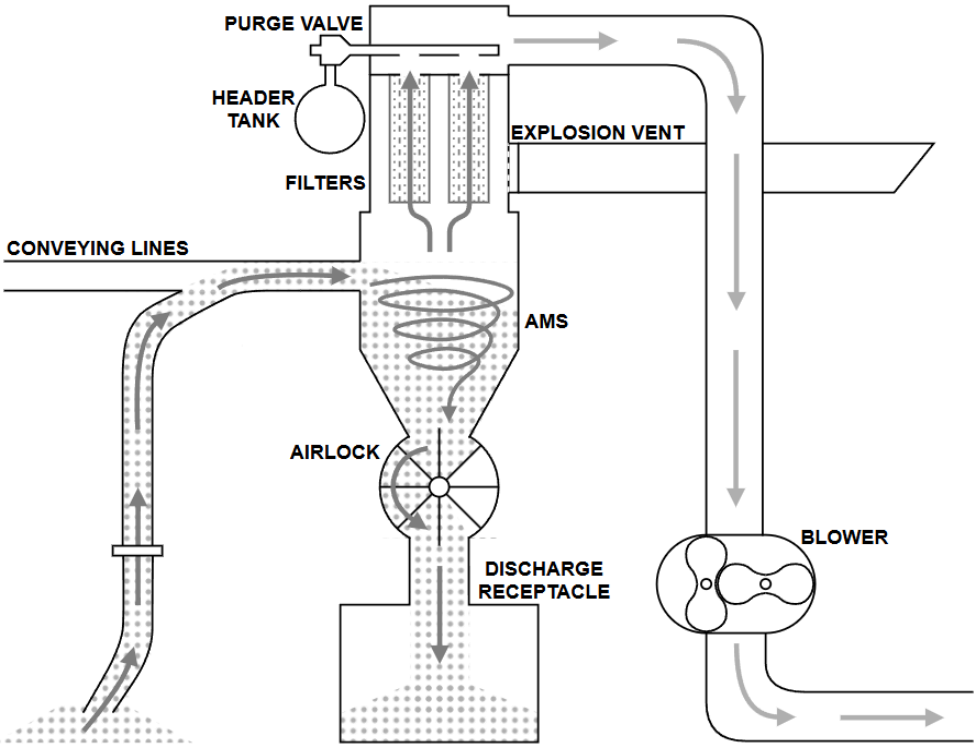

Figure 2-2: Simplified filtered pneumatic conveying system

At the heart of the system is Walinga's positive-displacement blower, sometimes referred to as an air pump. The blower unit creates a negative pressure (vacuum) in the air-material separator (AMS), also known as the receiver. This vacuum effect pulls the conveyed material and air into the AMS through the conveying lines attached to the inlet point.

As the product and air enter the AMS, they are separated through cyclonic action. The conveyed material falls downwards to a rotary airlock while the air moves upwards towards the filters. The air is drawn through the filters which removes any remaining dust, further cleaning the air before it reaches the blower and thus reducing wear on the blower.

Located at the bottom of the AMS is the airlock. It acts as a seal between the vacuum side of the system and the atmospheric pressure at the discharge. As the rotor turns, the upward facing rotor pocket fills with falling product. As the pocket rotates, material is moved to the bottom side of the airlock where it drops into the discharge receptacle.

If equipped, an explosion relief system consisting of an explosion vent and optional ducting is mounted to the filter housing. This assembly is intentionally designed to be the weakest point in the structure. In the event of a deflagration, the explosion vent will rupture, providing a rapid and unrestricted opening through which combustion gases can expand and flow, preventing personal injury and unacceptable property damage.

As dust and particulates accumulate on the surface of the filters, it must be removed to continue efficient and effective movement of air to the blower inlet to promote cyclonic action within the AMS. Therefore, a self-cleaning feature is incorporated into the design of the Walinga CVSAP. The system is equipped with a purge valve assembly to improve the function of the system and extend the filter and blower life. A simplified representation of the function of this assembly can be seen in ***Figure 2-3***.

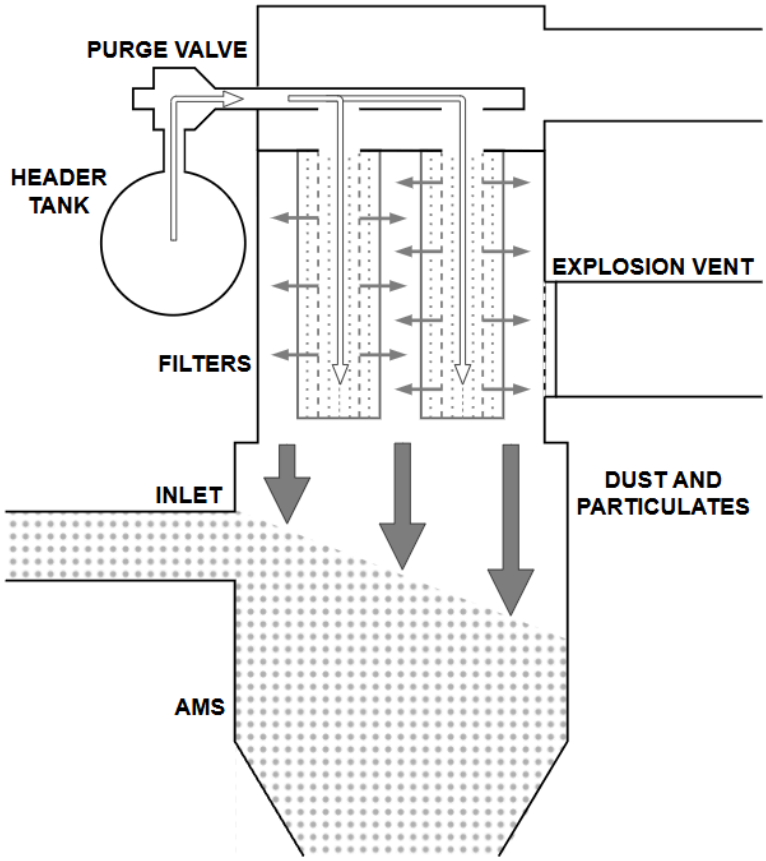

Figure 2-3: Simplified purge function

A sequential timer is used to control the operation of the purge valves, controlling both the length of time for which the purge valves are active and the period of time between the active purges. The timer also ensures that only certain filters are purged concurrently to ensure at least half of the filters are functional and capable of continuing to allow air flow from the AMS. As the purge valves are activated, a jet of pressurized air is released through the valves from the pressurized header tank. This air is directed into the center and along the axis of the specific filters, opposite to the normal direction of air flow through the filters. This pressurized, reversed jet of air forcefully releases the dust and particulates trapped and accumulated on the surface of the filters. The released dust and particulates then fall into the AMS and return to the volume of the bulk commodity and are discharged through the airlock.

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Machine Configuration

CENTRAL-VAC WITH AIR PURGE

MODEL SIZES

The CVSAP is configurable to meet the demands of custom applications. Each package size is independent of all other package sizes with the exception of the main line and AMS package; the main line must be equal to or less than the AMS inlet size. It should also be noted that 5 in (12.7 cm) and 6 in (15.2 cm) main lines are typically used in combination with 4 in (10.2 cm) main lines. The sizes of the configurable packages are identified in the following table:

Table 3-1: Configurable package sizing

Blower Package		510 Blower		614 Blower	
Airlock Package		1210 Airlock		1314 Airlock	
AMS Package		3" Inlet (4 Filters)	4" Inlet (4 Filters)	5" Inlet* (9 Filters)	6" Inlet* (9 Filters)
Conveying Lines	**Main Line**	3"	4"	5"	6"
	Drop Line	2"		3"	

* Typically installed in a CVSAP incorporated into a material handling system.

The size of the CVSAP blower package can be identified with reference to the embossed model label on the side of the blower casing.

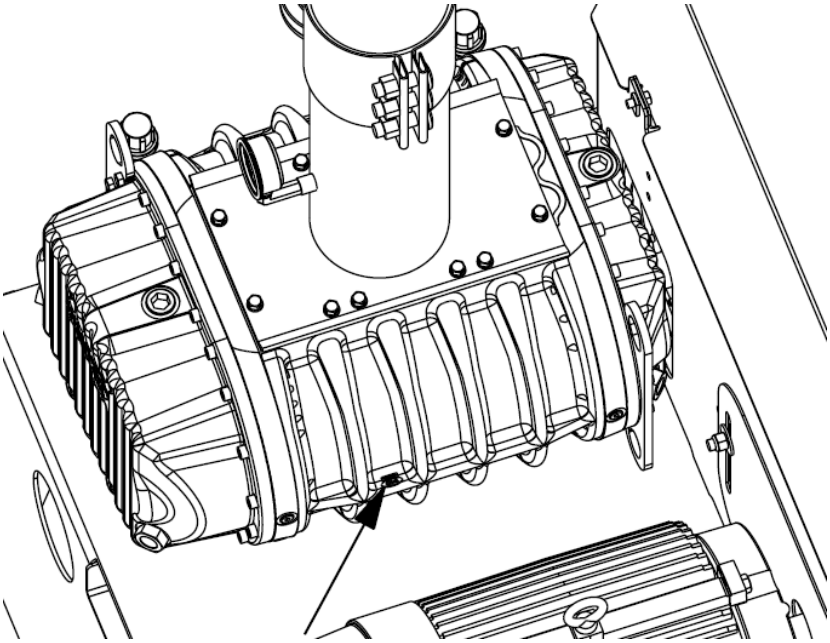

Figure 3-1: Blower package size identification

The size of the CVSAP airlock package can be identified with reference to the embossed model label on the end plate or the side of the casing.

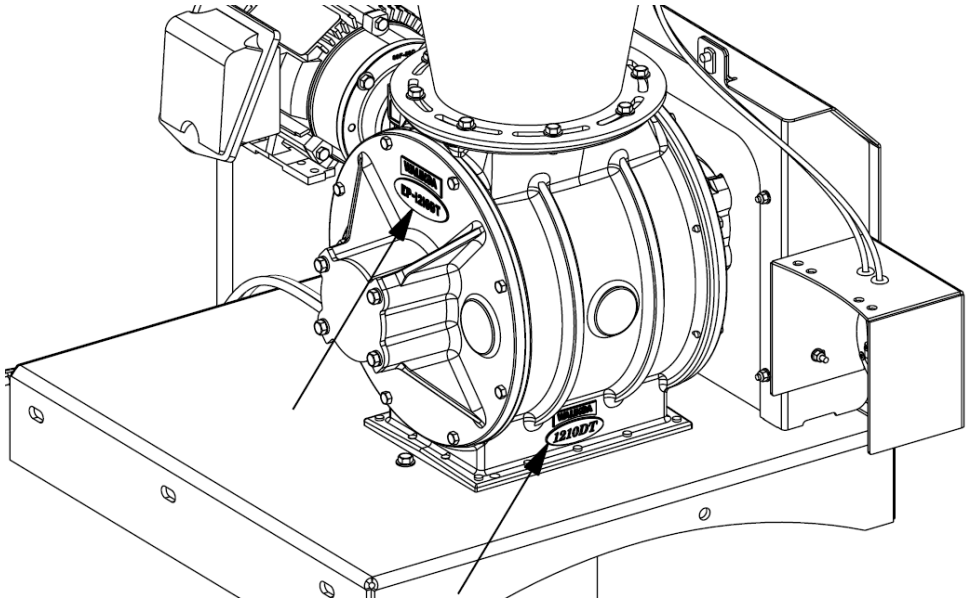

Figure 3-2: Airlock package size identification

The size of the AMS package can be identified by the diameter of the inlet and the number of filters within the assembly.

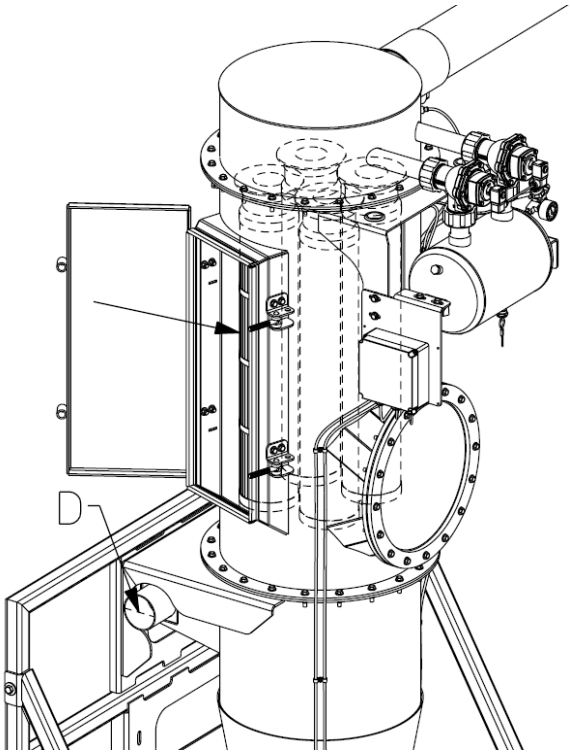

Figure 3-3: AMS package size identification

The size of the conveying lines can be identified by measuring the diameter of the main and drop lines of the system.

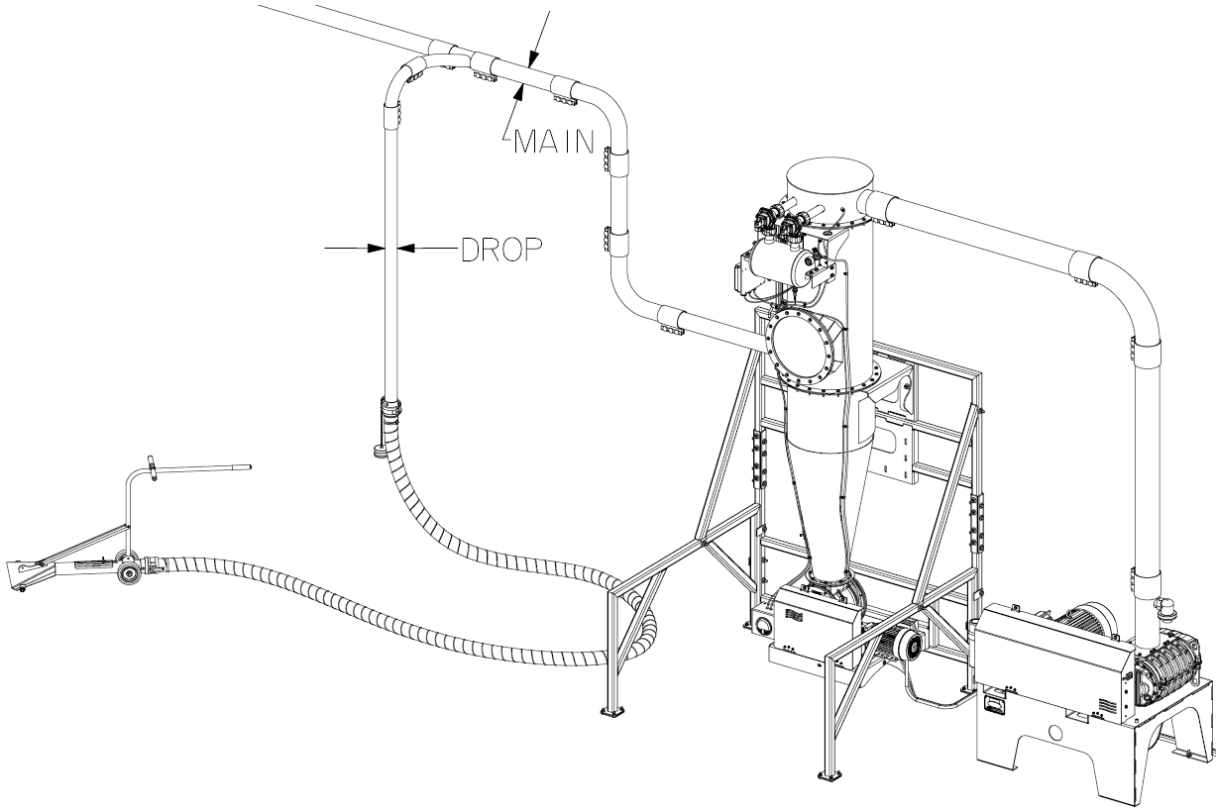

Figure 3-4: Conveying line size identification

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Safety

CENTRAL-VAC WITH AIR PURGE

SAFETY ALERT SYMBOL

This safety alert symbol means: **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**

The safety alert symbol identifies important safety messages on the Walinga CVSAP and in the operator's manual. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

Safety is one of the top priorities and should always be taken into consideration because:

- Accidents disable and kill
- Accidents cost
- Accidents can be avoided

SIGNAL WORDS

Take note of the signal words **DANGER**, **WARNING**, and **CAUTION** when used with a safety message, as well as the use of the words **IMPORTANT** and **NOTE**. The appropriate signal word for each message has been selected using the following guidelines:

DANGER	Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations, typically for machine components that, for functional purposes, cannot be guarded. The associated color is red.
WARNING	Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices. The associated color is orange.
CAUTION	Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. The associated color is yellow.
IMPORTANT	Indicates a potentially hazardous situation that, if not avoided, may result in damage to the machine. It may also be used to alert against unsafe practices. The associated color is blue or white.
NOTE	Indicates supplementary information that the operator must be aware of for the safe or proper use of the machine. The associated color is blue or white.

GENERAL SAFETY

You are responsible for the ***safe*** operation and maintenance of your CVSAP. ***You*** must ensure that you and anyone else who will operate, maintain, or work around your CVSAP is familiar with the operating and maintenance procedures and safety information contained in this manual. This manual will provide information for safety practices that must be adhered to while operating a CVSAP. Remember, ***you*** are the key to safety. Good safety practices not only protect you, but also the people around you. Make good safety practices a working part of your safety program. Be certain that ***everyone*** operating the CVSAP is familiar with the recommended procedures and follows all safety precautions. Remember, most accidents can be prevented; do not risk injury or death.

CVSAP owners must provide operating instructions to operators or employees before initially allowing them to operate the equipment, and must review this information at least annually thereafter. The most important safety feature of a CVSAP is a ***safe*** operator. It is the operator's responsibility to read and understand all aspects of this manual and to follow all safety and operational instructions. An individual who has not read, understood, and been trained to follow all operation and safety procedures is considered an untrained operator and is unqualified and unauthorized to operate a CVSAP. Untrained operators expose themselves and bystanders to potential serious injury or death.

Before servicing, adjusting, or repairing a CVSAP, place all controls in neutral, disconnect and lock-out all electrical power sources, wait 30 seconds for internal capacitors to discharge before opening electrical enclosures, disconnect the compressed air source, relieve the air pressure from the system, and wait for all moving parts to stop.

In case of emergency, keep a first-aid kit and fire extinguisher readily available and stored in a highly visible place. Be familiar with the use of each of these tools. Also keep the phone number for the emergency medical center for your area readily available.

Use appropriate personal protective equipment including, but not limited to: a hard hat, protective shoes with slip-resistant soles, protective glasses or goggles, heavy gloves, wet weather gear, and hearing protection.

Ensure all electrical equipment is properly grounded. All electrical connections made to the CVSAP must be in compliance and accordance with local electrical codes and/or the National Electric Code (NFPA 70) as required. During installation, identify and avoid overhead obstructions and power lines. Be aware that electrocution can occur without direct contact. All filters, lines, hoses, and accessories must be grounded to prevent static build-up and electrical discharge or shocks.

In order to provide a better view or visualization, certain diagrams in this manual may show an assembly or machine feature with a safety shield or guard removed. This is for illustrative purposes only. Equipment must never be operated in this condition. Keep all guards and shields in place. If it is necessary to remove a shield or guard for maintenance or adjustment, the shield or guard must be replaced prior to use.

Replace any safety sign or instructional sign that has been damaged or become illegible. The location and a reproduction of the safety signs located on the CVSAP are outlined later in this section. In addition to the design and configuration of this implement, including safety signs and safety equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence, and proper training of personnel involved in the operation and maintenance of the machine. Refer to the safety messages and operational instructions in each of the appropriate sections of any auxiliary equipment and machine manuals. Pay careful attention to the safety signs affixed to any auxiliary equipment and the machine.

Never use alcoholic beverages, narcotics, or other intoxicants which could hinder alertness or coordination while operating a CVSAP. Consult your doctor about operating this machine while taking prescription medications.

Under no circumstances should young children be allowed to work with this equipment. Do not allow children or any other individuals to climb on or play around the CVSAP at any time. This equipment is dangerous to children and individuals unfamiliar with its operation. The operator must be a responsible, properly trained, and physically able person trained in the CVSAP's operation. Do not allow any individuals to operate or assemble this machine until they have read and understood the safety precautions and operational procedures in this manual.

Never exceed the limits of a piece of machinery. If its ability to perform a task, or to do so safely, is in question, do ***not*** attempt it. Do not modify the equipment in any way. Unauthorized modification may result in serious injury or death and may impair the function, safety or life of the equipment, as well as void the warranty.

INSTALLATION SAFETY

- Ensure there is a minimum of one additional individual available for assistance with elevating, moving, or connecting other equipment.
- For any required electrical connections, ensure that sufficient amperage at the proper voltage and frequency is available before connecting power. Have a licensed electrician provide power to the unit. Always follow all local codes and regulations or ANSI/NFPA 70 standard as required when providing electrical power.
- Identify and avoid overhead obstructions and power lines. Be aware that electrocution can occur without direct contact.
- Use caution when installing the CVSAP in the presence of combustible materials to prevent injury or damage due to fire and/or explosion.
- Ensure a dust hazard analysis (DHA) is completed prior to the installation of a CVSAP as required with reference to NFPA 660.
- Ensure the installation method, location and operation of the CVSAP meets all required national and local codes and regulations for fire and/or explosion properties of combustible materials including, but not limited to the *Standards and Regulations* outlined in **Section 8: Specifications**.
- Ensure the foundation or frame on which the CVSAP will be installed and anchoring devices are capable of supporting the load of the CVSAP and the CVSAP is level.
- Be aware that the Walinga CVSAP may not be equipped with fire extinguishing protection systems, and not all models are equipped with explosion protection systems. It is the responsibility of the owner/operator to ensure these systems are adequately incorporated into the system.
- For a CVSAP equipped with an explosion relief system, it is the responsibility of the owner/operator to ensure the system complies with all local regulations and requirements and/or NFPA 68, NFPA 69 and NFPA 660. An appropriate number and configuration of explosion vents must be installed and positioned such that activation of the vent will not cause personal injury or unacceptable property damage. Explosion vents must not be adversely affected by process conditions or conditions on the non-process side of the vent. The owner/operator must follow all installation and operating procedures detailed by Walinga. Isolation canons may also be incorporated as necessary to meet local regulations.
- Use only lifting devices of sufficient capacity to lift and install the CVSAP.
- Do not stand under or near any hoists, lifting mechanism or the CVSAP while lifted.
- If the CVSAP is to be installed in a classified hazardous atmosphere, the CVSAP must meet the requirements of the classed area; this may include a rated enclosure, repositioning of the sequential timer assembly outside of the classed area, etc..
- An external power disconnect device(s) and compressed air shut-off and pressure relief valve must be installed by the owner/operator.
- Ensure all components of the CVSAP, including filters, lines, hoses, and accessories are effectively grounded to prevent static build-up and electrical discharge or shocks.

ELECTRICAL SAFETY

- For any required electrical connections, ensure that sufficient amperage at the proper voltage and frequency is available before connecting power. Have a licensed electrician provide power to the machine. Always follow ANSI/NFPA 70 standard, the National Electric Code, and all other local codes and regulations when providing electrical power.
- Ground all electrical equipment and ensure the power source is properly grounded.
- To prevent the buildup of static electricity, the filters, lines, hoses, and accessories must also be effectively grounded. When measuring the continuity between all components and couplers, the resistance must be less than 5 Ω.
- Ensure all electrical switches on the equipment are in the OFF position before connecting the CVSAP to power.
- Turn the equipment OFF, shut-down and lock-out all power supplies, and wait 30 seconds for all internal capacitors to discharge before opening any electrical enclosure, servicing, or adjusting.
- Inspect all electrical connections to ensure none are loose or damaged. Replace any damaged electrical plugs, cords, switches or components immediately.
- Disconnect power before resetting any motor or breaker overload.

PRE-OPERATION SAFETY

- Safety is a primary concern in the design and manufacturing of Walinga products. However, these efforts can be negated by a single careless act of an operator or bystander.
- It is the responsibility of the operator to read and understand all safety and operational instructions contained within the operator's manual and the manuals of any auxiliary equipment. Working with unfamiliar equipment can lead to careless injuries. Ensure you and any individual who will be working with or around the CVSAP understands the information provided in the operator's manuals and is instructed in the safe and proper use of the machine.
- Become familiar with the controls of the CVSAP and know how to stop the CVSAP and any other auxiliary equipment quickly in the event of an emergency.
- Properly train all new personnel and review instructions frequently with existing workers. Ensure only a properly trained and physically able individual will operate the machine. Any individual who has not read and understood all operating and safety procedures is not qualified to operate the machine.
- Ensure all necessary personal protective equipment including a hard hat, safety glasses or goggles, safety shoes, gloves, wet weather gear, and hearing protection are in good condition. Do not allow loose long hair, loose fitting clothing, or jewelry to be around the equipment. Prolonged exposure to loud noise may cause permanent hearing loss. Dust collection equipment can often produce enough noise to cause permanent, partial

hearing loss. It is recommended that hearing protection is always used if the noise levels at the operator's position exceeds 80 dB. Noise over 85 dB on a long-term basis can cause severe hearing loss. Noise over 90 dB in close proximity to the operator over a long-term basis may cause permanent, total hearing loss. Hearing loss from loud noise is cumulative over a lifetime without the hope of natural recovery.

- Ensure the machine is properly anchored, adjusted and in good operating condition. Check the machine over for any loose bolts, worn parts, cracks, leaks, etc., and make any necessary repairs. Always follow the maintenance schedule and instructions.
- Ensure that all safety shielding and guarding and safety signs are properly installed and secured, and are in good condition.

OPERATIONAL SAFETY

- Read and understand the operator's manual and all safety signs before use.
- Do not operate when any guards are damaged or removed. Install and secure all guards before operating.
- Do not operate the CVSAP if there are any damaged or worn components or leaks.
- Operate only in daylight or with sufficient artificial lighting.
- Do not operate the CVSAP if any power sources have been locked-out. Determine the reason for the lock-out before removal or beginning operation.
- Keep hands, feet, clothing, hair, and jewelry away from all moving and/or rotating parts.
- Do not allow any individuals to climb on the CVSAP at any time.
- Clear the area of all bystanders, especially small children, before operation.
- Ensure the CVSAP is level and securely mounted.
- Wear appropriate personal protective equipment while operating.
- Do not place the intake nozzle near your feet when standing on top of the conveyed material; the suction of the CVSAP is sufficient to pull the nozzle and operator into the pile. If the pile is deep enough, the operator can become submerged and suffocate.
- In the event of a blockage follow all procedures for clearing obstructions. Never reach into the CVSAP while in operation to clear an obstruction.

STORAGE SAFETY

- Store the CVSAP on a firm, level surface in a dry area away from human activity. If the CVSAP is to be stored outdoors, it is best practice to provide a covering to protect the CVSAP from rust and corrosion.
- Ensure all openings of the CVSAP are sufficiently covered to protect from accumulation of dust, debris and moisture within the system.
- Do not permit children to play on or around the stored machine.

MAINTENANCE SAFETY

- Read, understand and follow all operating, maintenance and safety information in the operator's manual.
- Clear the area of bystanders, especially small children, when carrying out any maintenance, repairs or making any adjustments.
- Follow good shop practices:
    - Keep the service area clean and dry.
    - Ensure electrical outlets and tools are properly grounded.
    - Use adequate lightning for the job at hand.
- Ensure a fire extinguisher and first aid kit are readily available and in good condition.
- Establish a formal Lock-Out Tag-Out program for your operation and train all operators and service personnel before allowing them to work with or around the CVSAP. Provide tags at the work site and a sign-up sheet to record tag-out details. Do not perform any service or maintenance work unless the electrical and compressed air sources are turned off and locked out. Safety lockout devices are available through your Walinga dealer parts department.
- Place all controls in neutral, disconnect and lock-out all electrical power sources, wait 30 seconds for internal capacitors to discharge before opening electrical enclosures, disconnect the compressed air source, relieve the air pressure from the system, and wait for all moving parts to stop.
- Use required personal protective equipment previously outlined.
- Use only tools, jacks and hoists of sufficient capacity for the job.
- Keep hands, feet, hair, clothing, and jewelry away from all moving and/or rotating parts.
- Never attempt to locate a leak in the compressed air system using the hands or any other part of the body. High pressure air is capable of penetrating the skin and injecting air into the bloodstream, leading to stroke or death.
- Ensure all guards are in place and properly secured and all filters, lines, hoses, and accessories are effectively grounded when maintenance work is complete.

SAFETY AROUND STORAGE STRUCTURES

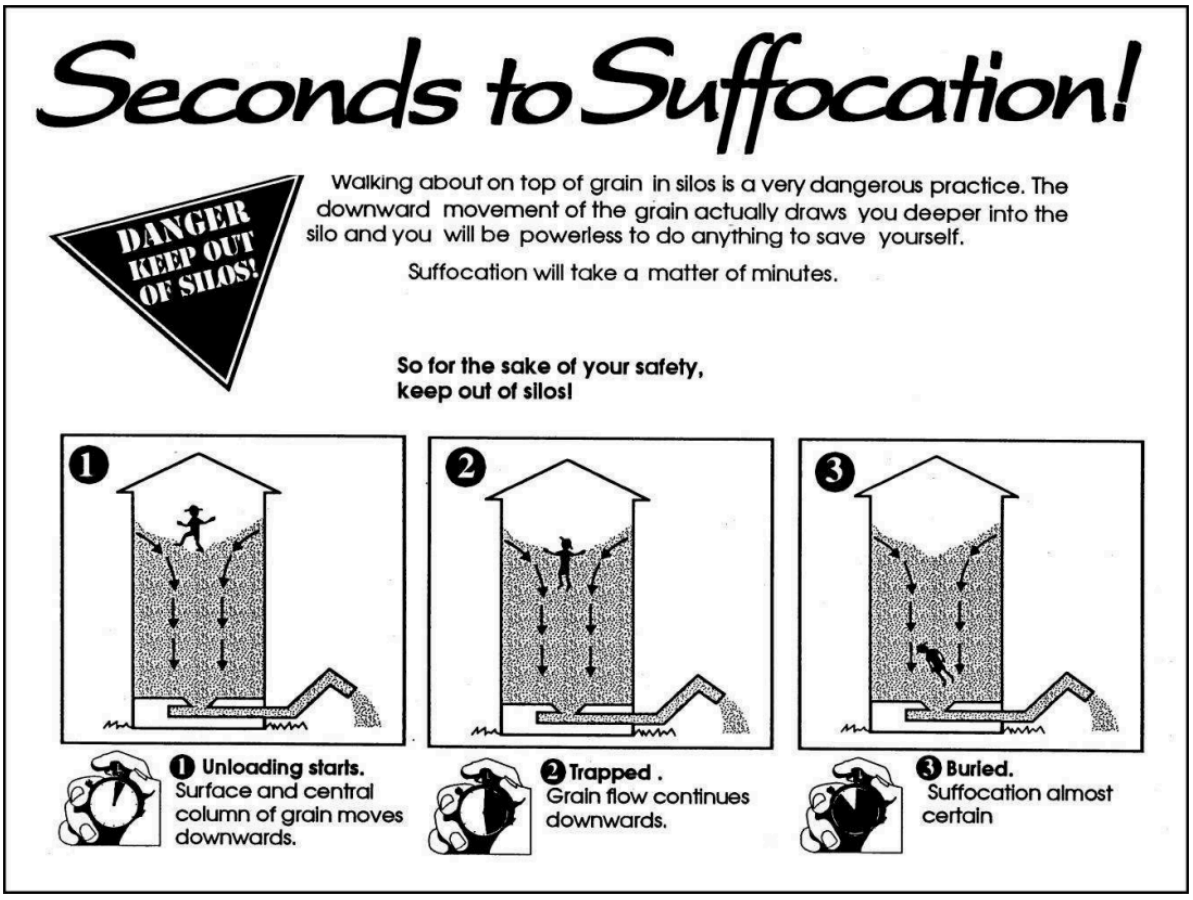
CVSAP operators and all other personnel in the vicinity or assisting with operation must strictly adhere to the procedures outlined below before entering a storage structure. For additional details regarding these procedures, reference Occupational Safety and Health Administration standards or local regulations.

Entering a bin, silo, tank, or other type of storage structure is hazardous. You can suffocate and die from the materials stored within these structures. There may also be explosive, harmful or poisonous gas or dust in the air.

The following safety procedures are adapted from the Occupational Safety and Health Administration 1910.272 standard relating to grain handling facilities:

- The machine operator(s) and all assisting personnel must be aware of the actions they will take in the event of an emergency.
- The machine operator(s) and all assisting personnel must be trained in the general procedures and safety practices for entering and working in bins, silos, tanks, or other storage structures, as well as the safety procedures for handling special tasks concerning entering and working within such structures.
- The atmosphere within a bin, silo, tank, pit, basement, or storage structure must be tested for the presence of combustible gasses, dusts, vapors, and toxic agents.
- Ventilation must be provided until any unsafe conditions are eliminated or as long as there is still a possibility of recurrence of the unsafe conditions within the bin, silo, tank, pit, basement, or storage structure while occupied by personnel.
- Any individual entering the bin, silo, tank, pit, basement, or storage structure must wear an appropriate respirator and protective clothing as long as there is the possibility of any unsafe atmospheric conditions.
- When entering bins, silos, tanks, or storage structures from the top, personnel must wear a body harness with a lifeline or use a boatswain's (bosun's) chair.
- An observer equipped to provide assistance and trained in rescue procedures, including notification methods, must be stationed outside the bin, silo, tank, or storage structure being entered. Visual, voice or signal line communications must be constantly maintained between the observer and the individual in the bin, silo, tank or storage structure.
- Equipment for rescue operations that is specifically suited to the bin, silo, tank, or storage structure being entered must be provided and readily accessible.
- Do not enter bins, silos, tanks, or storage structures under a bridging condition, or where a buildup of materials could fall and bury you. Do not walk or stand on grain or other materials where the depth is greater than waist height.

- Allow sufficient time, approximately 30 minutes, for the dust to settle within the storage structure before entry is made, or the entrance is opened. Failure to do so may result in zone entrainment leading to potential risk of fire or explosion.



MACHINE SAFETY SIGNS

The safety signs affixed to the CVSAP provide important information regarding your safety and the safe operation of the machine. Familiarize yourself with all safety signs before operation.

- Safety signs must be clean and legible at all times.
- Replace any safety signs that are missing, damaged, or have become illegible.
- Any replaced parts that previously displayed a safety sign, must display the current safety sign.
- Safety signs are available at no cost from your representative, dealer, or directly from Walinga.

If a safety sign has become damaged, illegible or a new safety sign must be installed on a replacement component, proceed as follows:

1. Ensure the installation area is clean and dry.
2. Ensure the temperature of the CVSAP is above 50 °F (10 °C).
3. Locate the correct position of the safety sign before removing the backing paper.
4. Remove the smallest portion of the split backing paper.
5. Align the safety sign over the correct position and carefully press the small portion with the exposed adhesive backing in place.
6. Slowly peel back the remaining paper and carefully smooth the remaining portions of the safety sign in place.
7. Small air pockets can be pierced with a pin and smoothed out using the backing paper.

Safety signs affixed to a CVSAP are standardized as follows:

- Danger safety signs are red in color.
- Warning safety signs are orange in color.
- Caution safety signs are yellow in color.
- Informational safety signs are white or blue in color.
- Each safety sign is printed with its respective Walinga part number located in the bottom right corner. Reference this number on the safety sign, or identified in the following reproductions, to obtain replacement safety signs.

The safety signs affixed to a CVSAP are as follows:

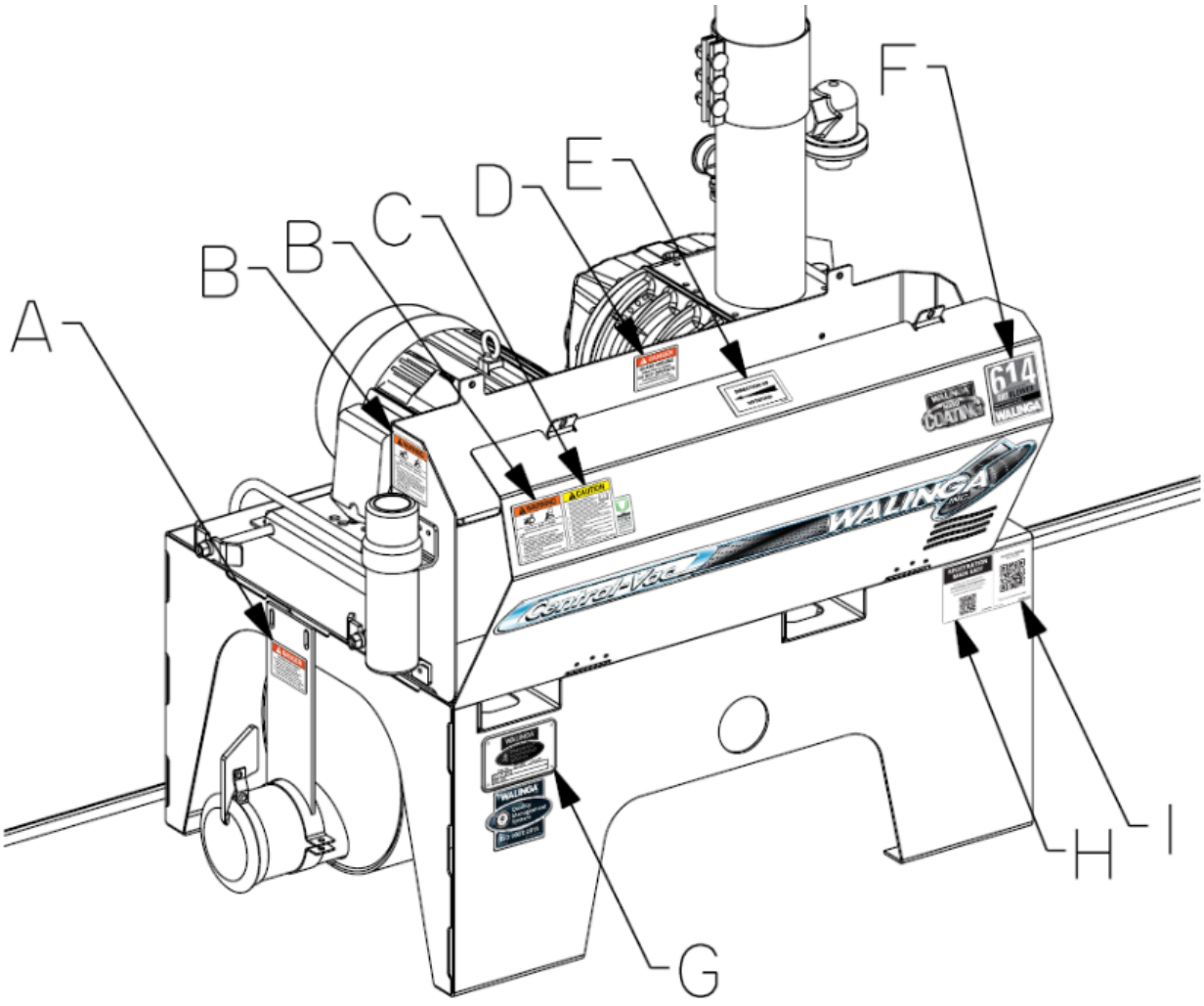


Figure 4-1: Blower package front-left

Figure 4-1 A

Part Number: 53-18290-6

Location: the left face of the blower package base above the outlet of the muffler.

Figure 4-1 B

Part Number: 53-18288-6

Location: the left and front face of the blower drive guard.

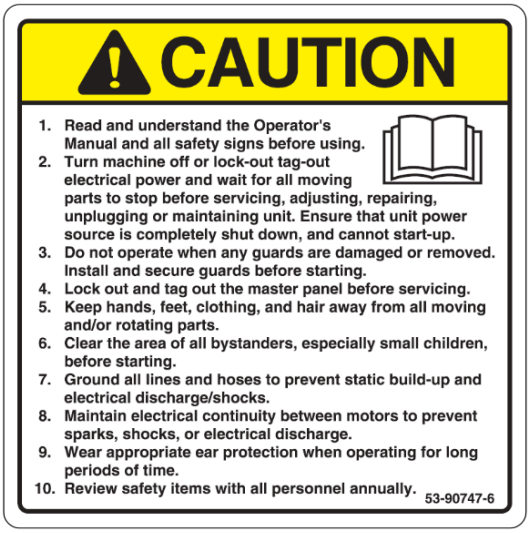


Figure 4-1 C

Part Number: 53-90747-6

Location: the front left face of the blower drive guard.

Figure 4-1 D

Part Number: 53-17704-6

Location: the inner surface of the blower drive guard, only visible when the drive guard is opened or removed.

Figure 4-1 E

Part Number: 53-04733-6

Location: the top surface of the blower drive guard, oriented with the arrow pointing left to indicate the rotation of the drive belts.

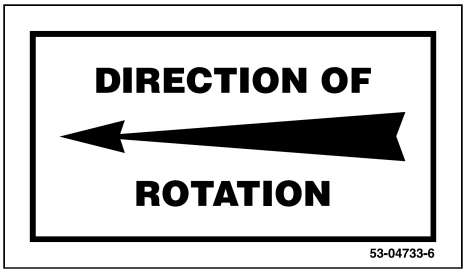
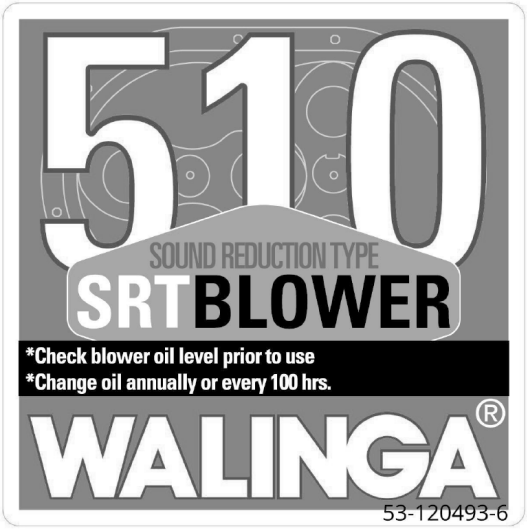


Figure 4-1 F

Part Number: 53-120493-6
OR
53-120494-6

Location: the front face right of the blower drive guard.



OR

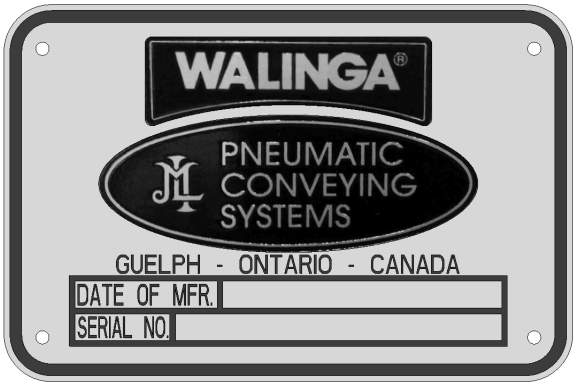


Figure 4-1 G

Part Number: 53-94818-6

Location: the front left face of the blower package base.

Figure 4-1 H

Part Number: 53-102592-6

Location: the front right face of the blower package base.

Figure 4-1 I

Part Number: 53-106783-6

Location: the front right face of the blower package base.

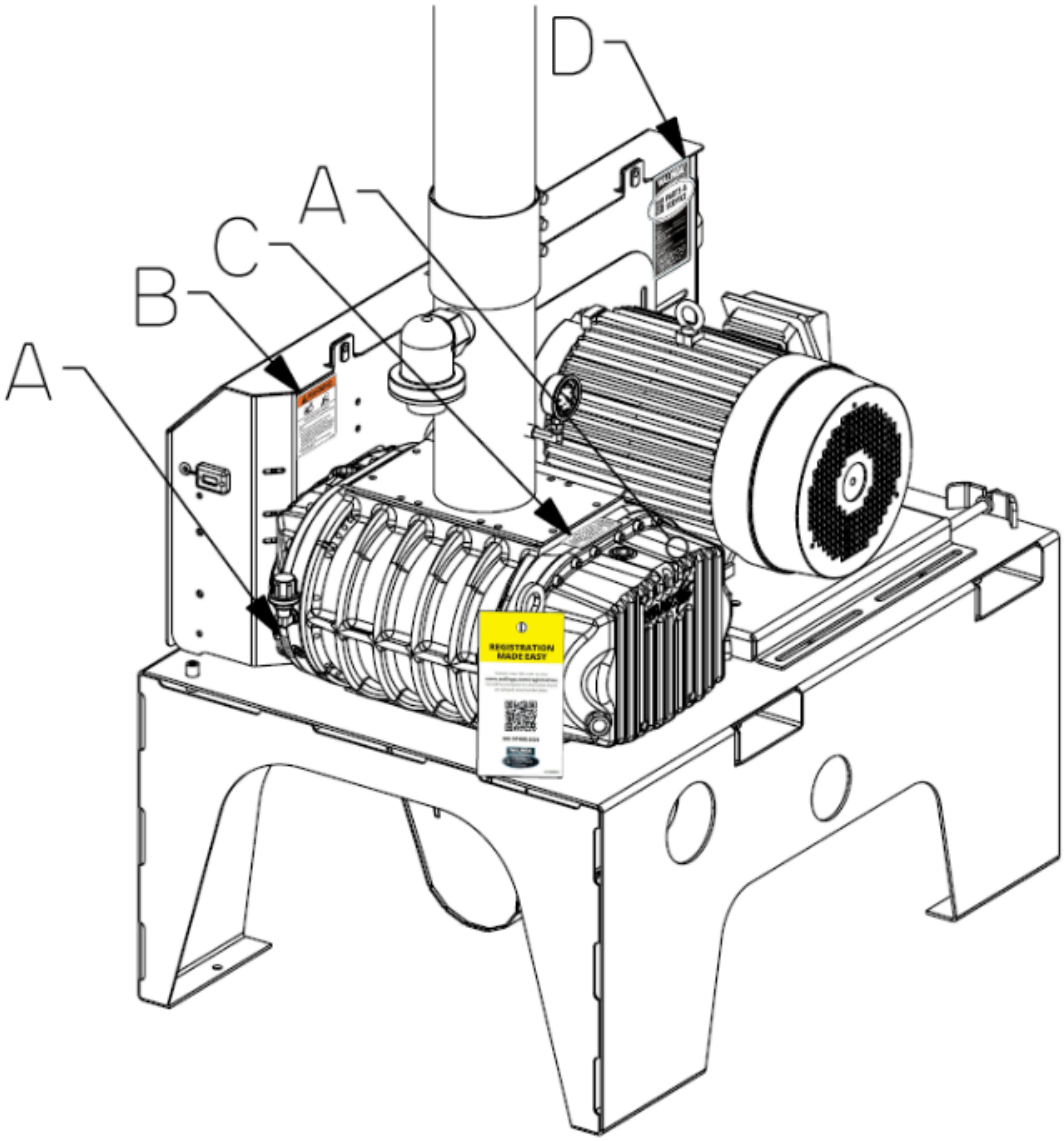


Figure 4-2: Blower package back-right

Figure 4-2 A

Part Number: 53-05647-6

Location: centered with the oil level plug on the dive and idle end of the blower.

Figure 4-2 B

Part Number: 53-18288-6

Location: the back right face of the blower drive guard.

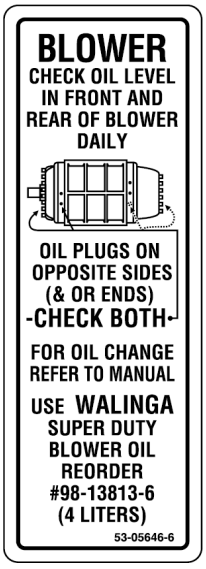


Figure 4-2 C

Part Number: 53-05646-6

Location: the top surface of the idle end headplate of the blower.

Figure 4-2 D

Part Number: 53-77858-6

Location: the back left face of the blower drive guard.

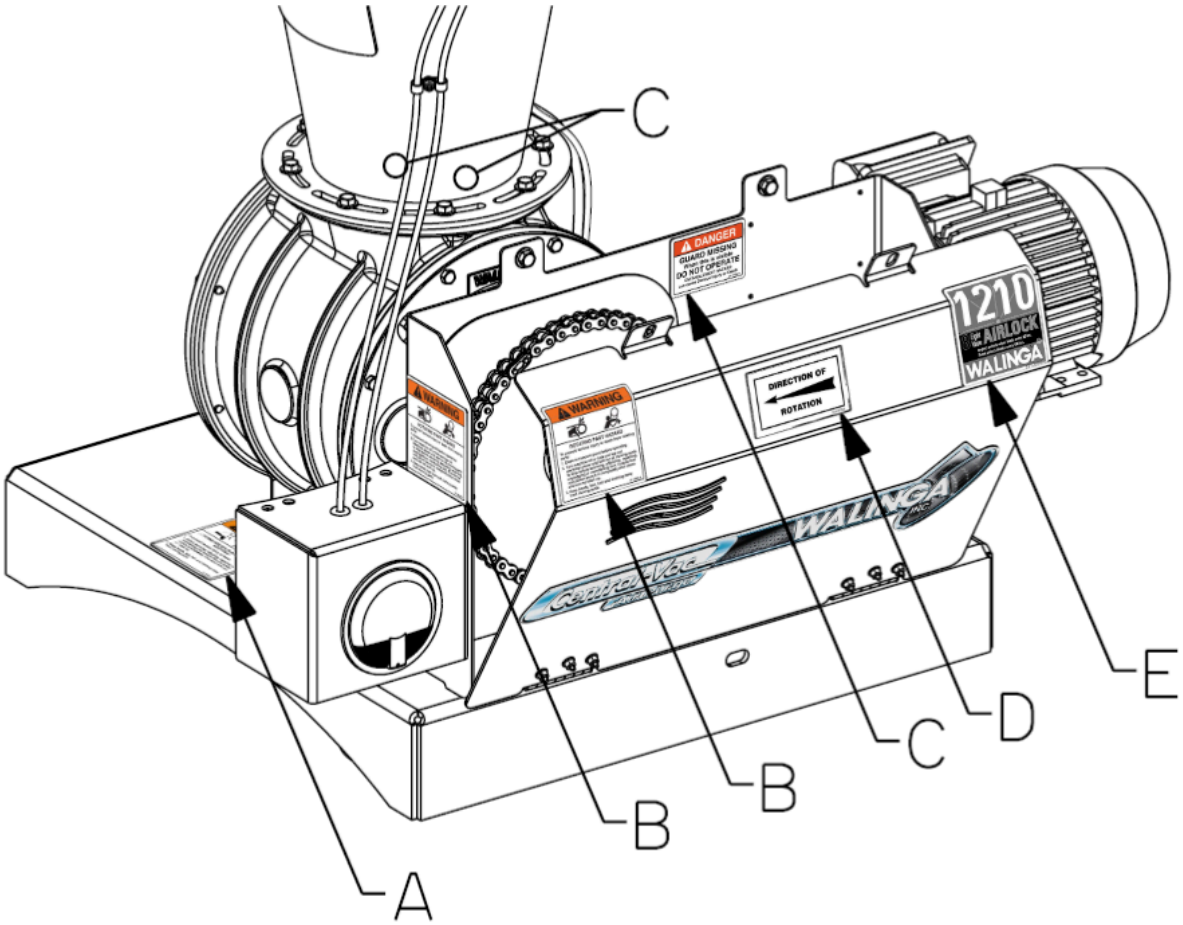


Figure 4-3: Airlock package front-left

Figure 4-3 A

Part Number: 53-18289-6

Location: the top surface of the airlock package base to the left of the airlock outlet.

Figure 4-3 B

Part Number: 53-18288-6

Location: the left and front face of the airlock drive guard.

Figure 4-3 C

Part Number: 53-17704-6

Location: the back and right inner surfaces of the airlock inlet, only visible when the AMS is removed, and the inner surface of the airlock drive guard, only visible when the airlock drive guard is opened or removed.

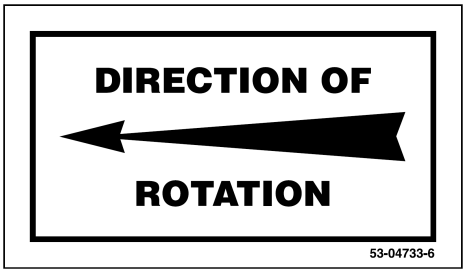


Figure 4-3 D

Part Number: 53-04733-6

Location: the front surface of the airlock drive guard, oriented with the arrow pointing left to indicate the rotation of the drive chain.

OR

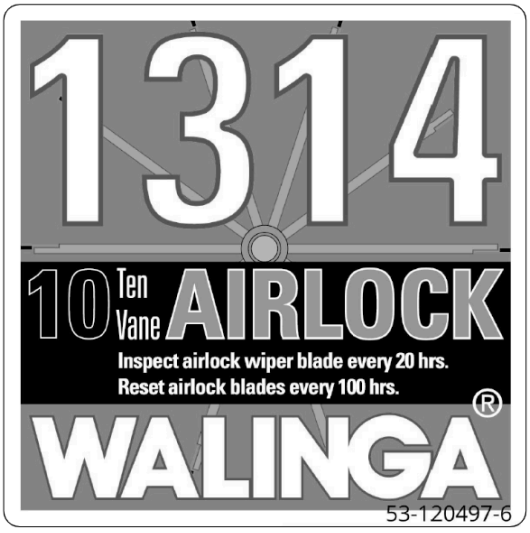


Figure 4-3 E

Part Number: 53-120496-6
OR
53-120497-6

Location: the front right face right of the airlock drive guard.

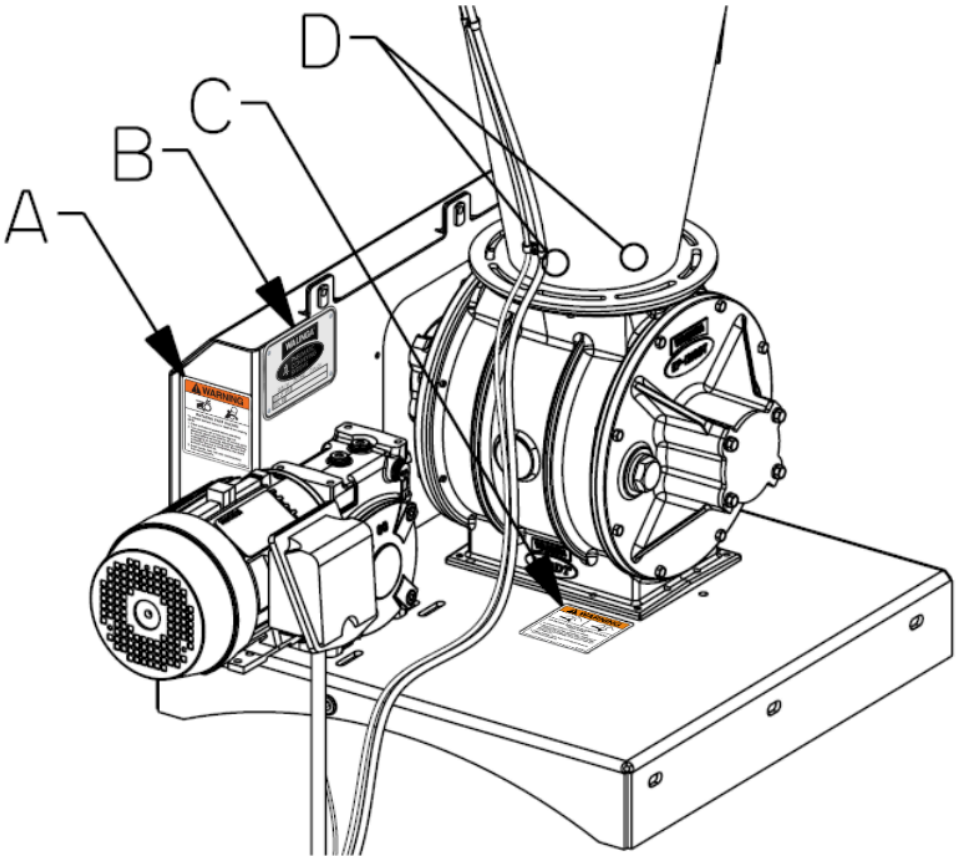


Figure 4-4: Airlock package back-right

Figure 4-4 A

Part Number: 53-18288-6

Location: the right face of the airlock drive guard.

Figure 4-4 B

Part Number: 53-94818-6

Location: the back right face of the airlock drive guard.

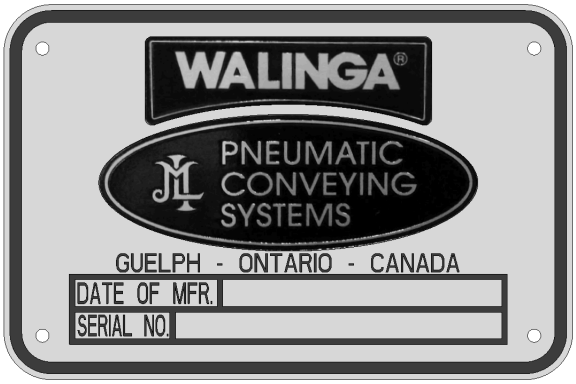


Figure 4-4 C

Part Number: 53-18289-6

Location: the top surface of the airlock package base to the right of the airlock outlet.

Figure 4-4 D

Part Number: 53-17704-6

Location: the front and left inner surfaces of the airlock inlet, only visible when the AMS is removed.

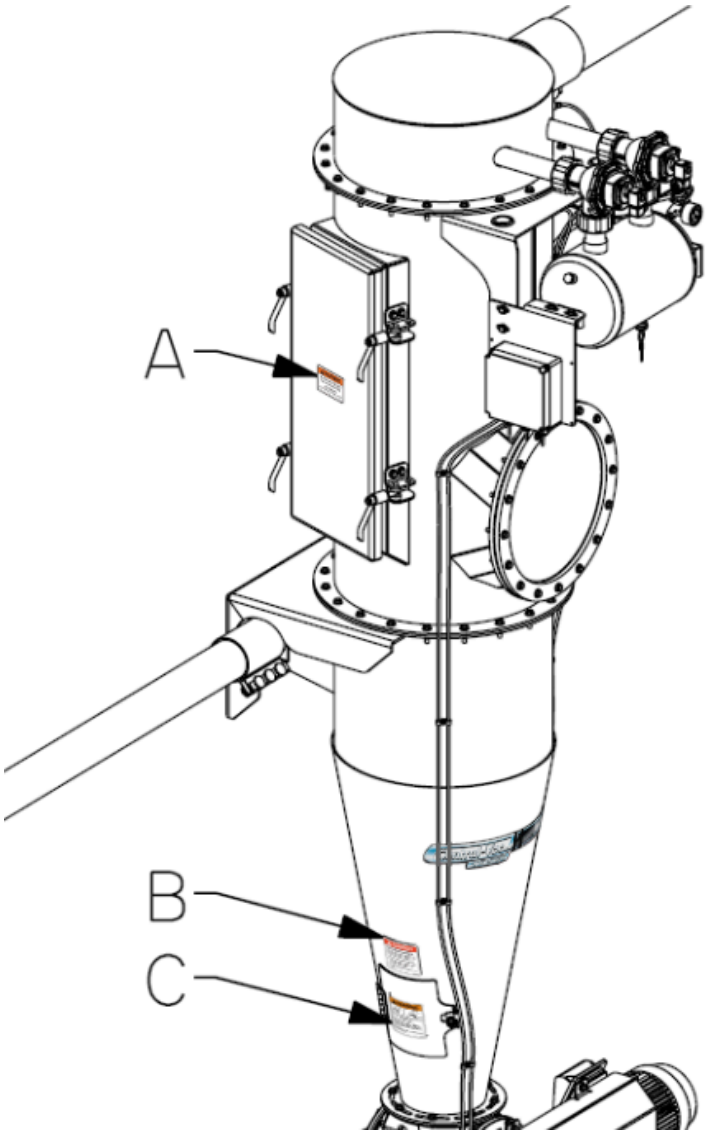


Figure 4-5: AMS package front-left

Figure 4-5 A

Part Number: 53-105036-6

Location: centered on the filter access door.

Figure 4-5 B

Part Number: 53-119771-6

Location: the surface of the AMS above the airlock access door.

Figure 4-5 C

Part Number: 53-18289-6

Location: centered on the airlock access door.

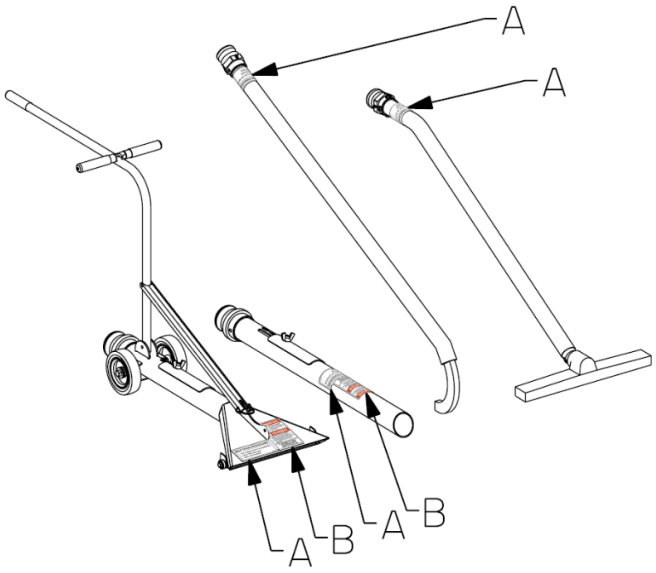


Figure 4-6: Sample of intake accessories

Figure 4-6 A

Part Number: 53-08013-6

Location: the body of intake accessories.

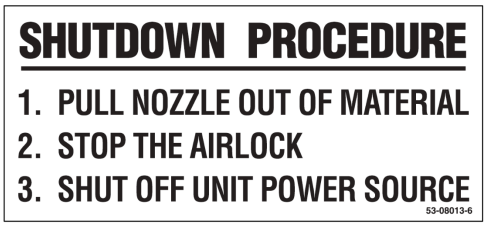
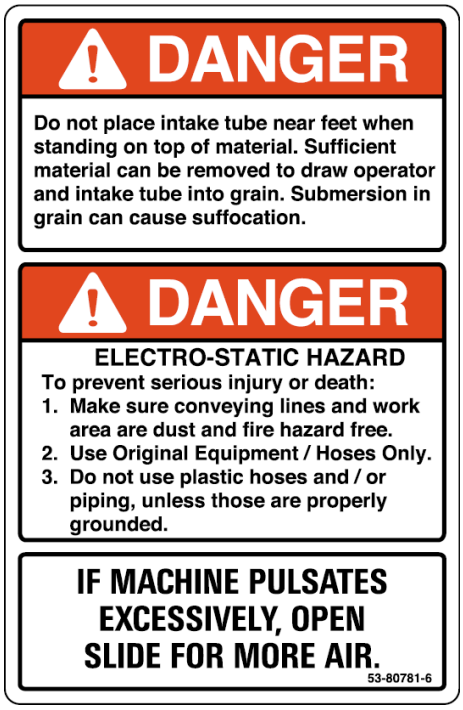


Figure 4-6 B

Part Number: 53-80781-6

Location: the body of intake accessories equipped with an air slide.



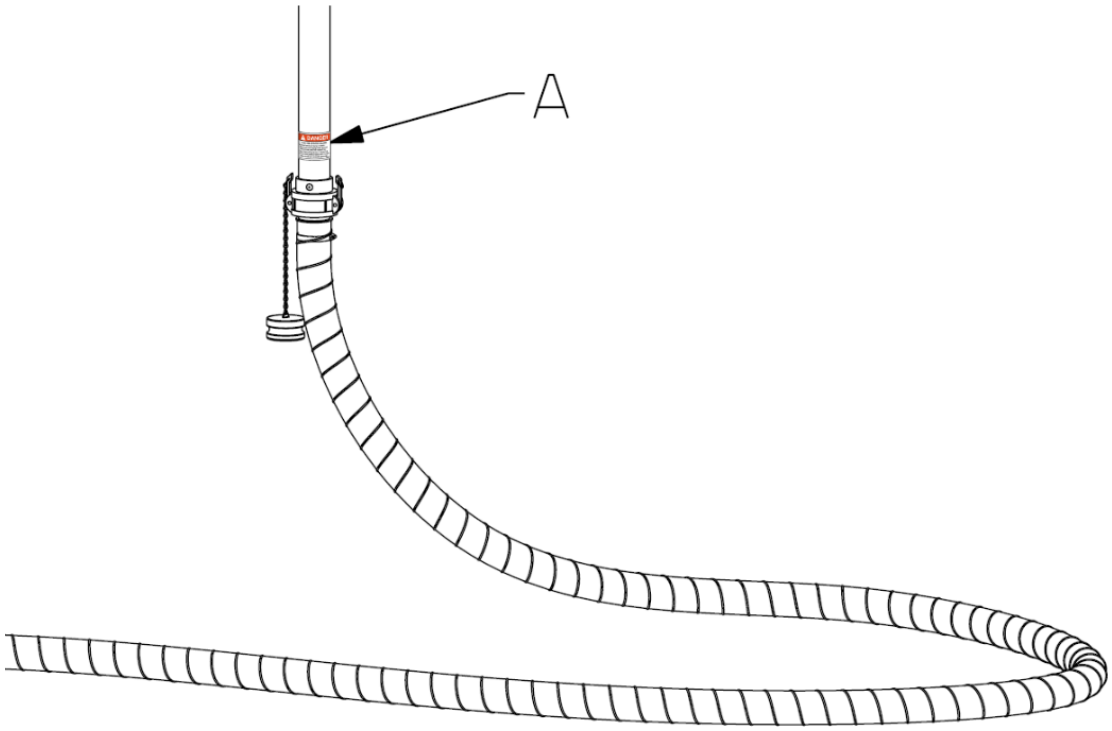


Figure 4-7: Inlet point of drop line

Figure 4-7 A

Part Number: 53-18290-6

Location: the surface of each drop line above the inlet coupler.

SAFETY TRAINING SIGN-OFF FORM

Anyone who will be operating and/or maintaining the CVSAP must read and clearly understand all safety, operating and maintenance information presented in this manual.

Do not operate or allow any other individual to operate this equipment until such information has been reviewed. Annually review this information with personnel.

Make periodic reviews of safety and operations a standard practice for all of your equipment. An untrained operator is unqualified to operate a CVSAP.

The following sign-off sheet is provided for your record keeping to show that all personnel who will be working with the equipment have read and understand the information in the operator's manual and have been instructed in the operation of the equipment.

DATE	EMPLOYEE'S NAME	EMPLOYEE'S SIGNATURE	EMPLOYER'S SIGNATURE

DATE	EMPLOYEE'S NAME	EMPLOYEE'S SIGNATURE	EMPLOYER'S SIGNATURE

WALINGA® INC.

Machine Life-Cycle Procedures

CENTRAL-VAC WITH AIR PURGE

RECEPTION, INSTALLATION AND INITIAL SET-UP

Reception

Upon initial reception of the CVSAP, proceed as follows:

- Check to ensure all components have been received with reference to the approved piping layout and system drawing. For efficient shipping the CVSAP will be partially disassembled and secured to a shipping crate frame.

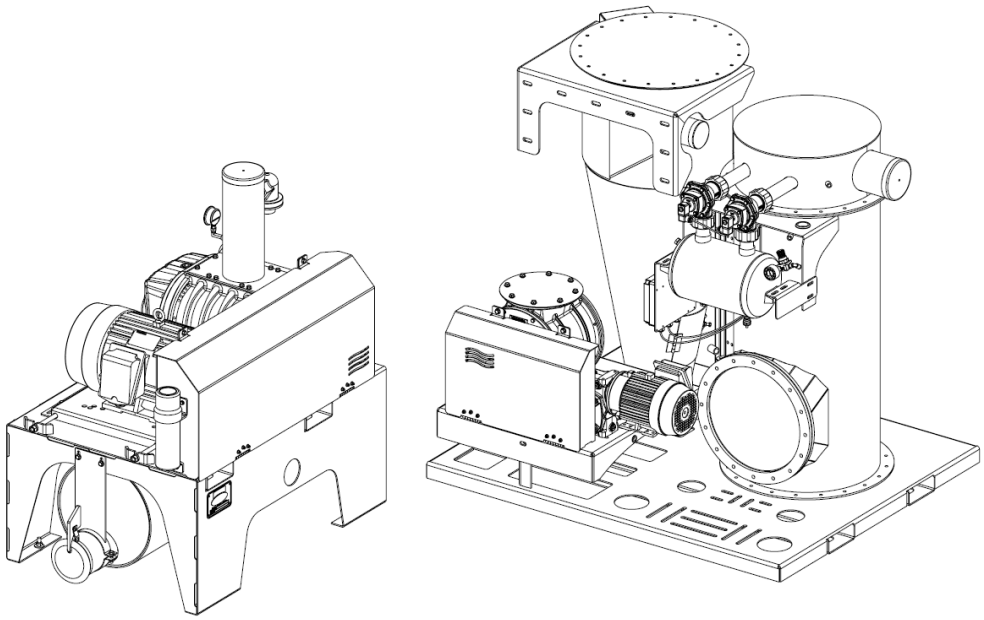


Figure 5-1: Partially disassembled CVSAP

- Inspect the condition of the CVSAP, ensure no components have been damaged. Any damaged components must be repaired or replaced.
- Check to ensure all installed fasteners are tightened to the required torque.
- Inspect the interior surfaces of the CVSAP, filters, blower, and airlock to ensure there are no signs of moisture or excessive levels of dust or debris.

Installation

To install the CVSAP, proceed as follows:

1. Ensure the area is clear of any bystanders and individuals not involved in the assembly and installation of the CVSAP, especially small children.
2. Ensure all electrical power sources and the compressed air supply are off and locked-out. Relieve any pressure from the air supply.
3. As required, ensure the dust hazard analysis as per NFPA 660 or local standards has been completed and the incorporation of the equipment complies with all relevant local standards and regulations.

4. Each CVSAP is customized for the specific customer application. Ensure the approved piping layout and system design drawings are available and referenced during installation. It should be noted that all piping of the CVSAP must be installed within 400 ft (121.9 m) of the main CVSAP packages to maintain air speed and prevent blockages.
5. If the CVSAP is to be installed indoors, it is the responsibility of the owner/operator to ensure all components of the CVSAP comply with any and all restrictions and requirements of the classed area.
6. Inspect the installation location of the CVSAP and approved piping layout path. Ensure there are no obstructions, adequate support points for the conveying lines and the mounting surface for the main CVSAP assemblies is level and capable of supporting the load. The main CVSAP assemblies should be installed in an area away from normal working areas to minimize exposure to elevated noise levels. Ensure the installation location will allow for easy access to all components of the system for maintenance.
7. Identify and avoid all overhead obstructions and powerlines, be aware that electrocution can occur without direct contact.
8. Position the mounting rack on the installation surface. Ensure the rack is level and securely anchor the rack.

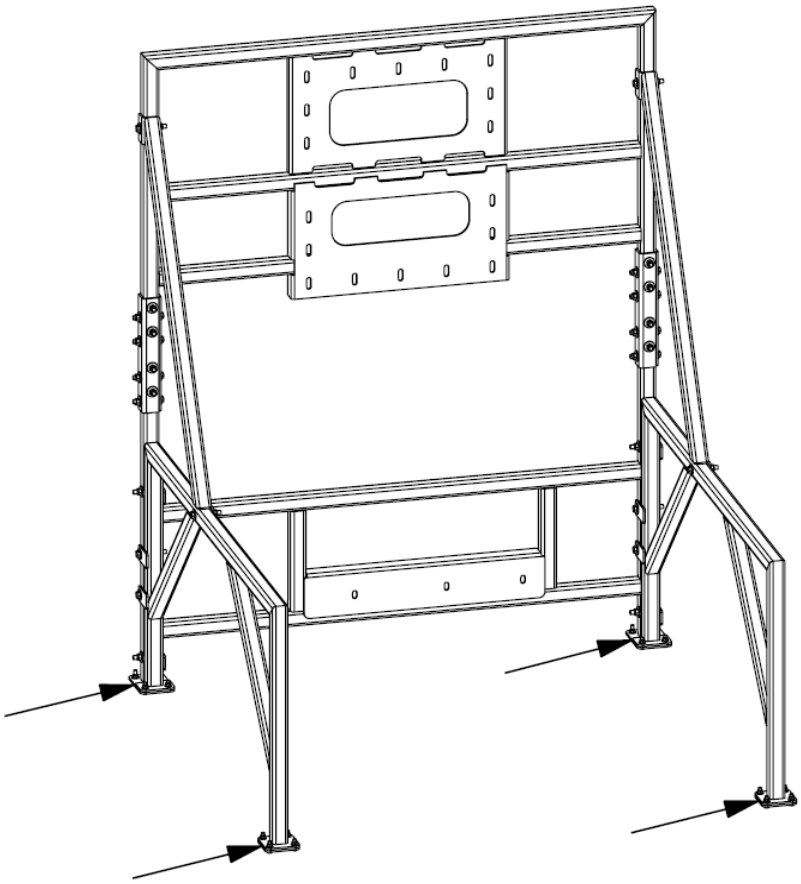


Figure 5-2: Mounting rack securement

9. Remove the airlock package from the shipping crate frame.

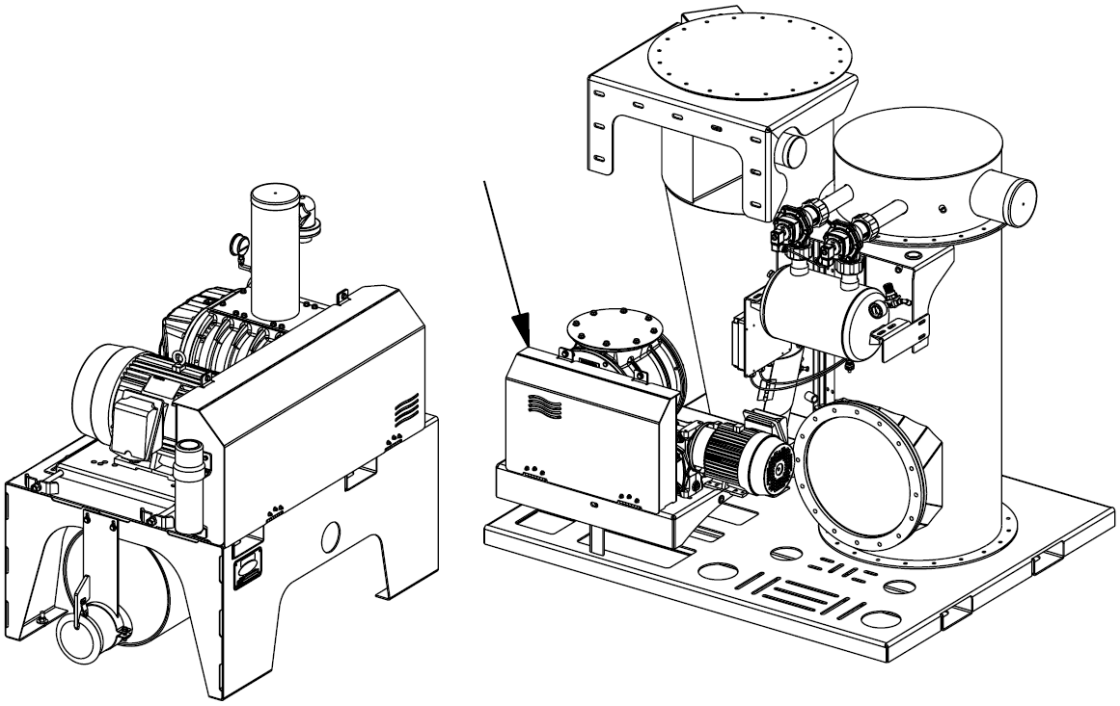


Figure 5-3: Airlock package

10. Position the airlock package on the mounting rack. Ensure the airlock package is level and secure to the mounting rack with the required fasteners. Do not fully tighten until the AMS package has been installed.

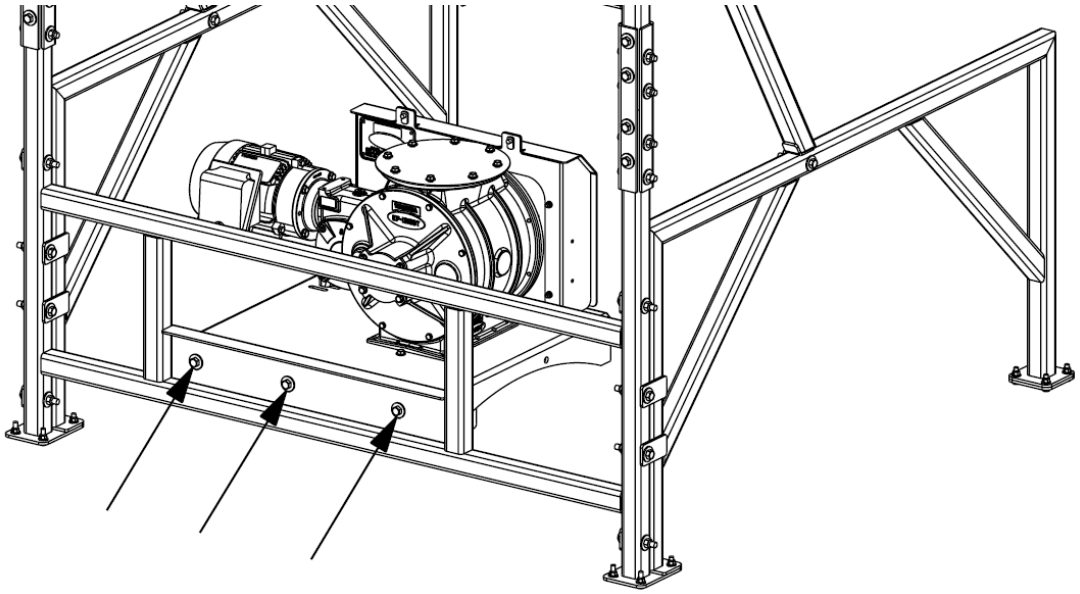


Figure 5-4: Airlock package mounting

11. Remove the inlet cover plate from the airlock.

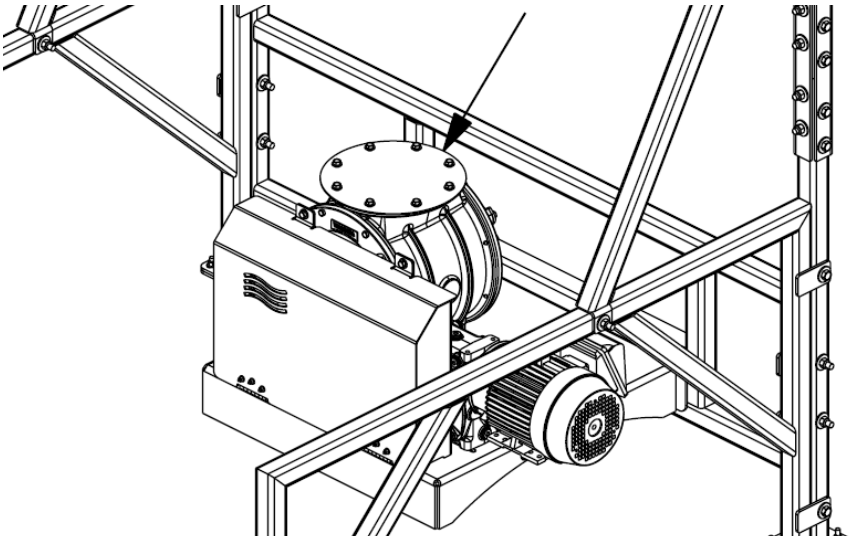


Figure 5-5: Airlock inlet cover

12. Inspect the outlet of the airlock and verify the installation of the bin level sensor. The sensor must protrude approximately 3/4 in (1.9 cm) past the port but must still be covered by the grain shedder. Ensure the sensor is secure by tightening the sensor nuts on each side of the port.

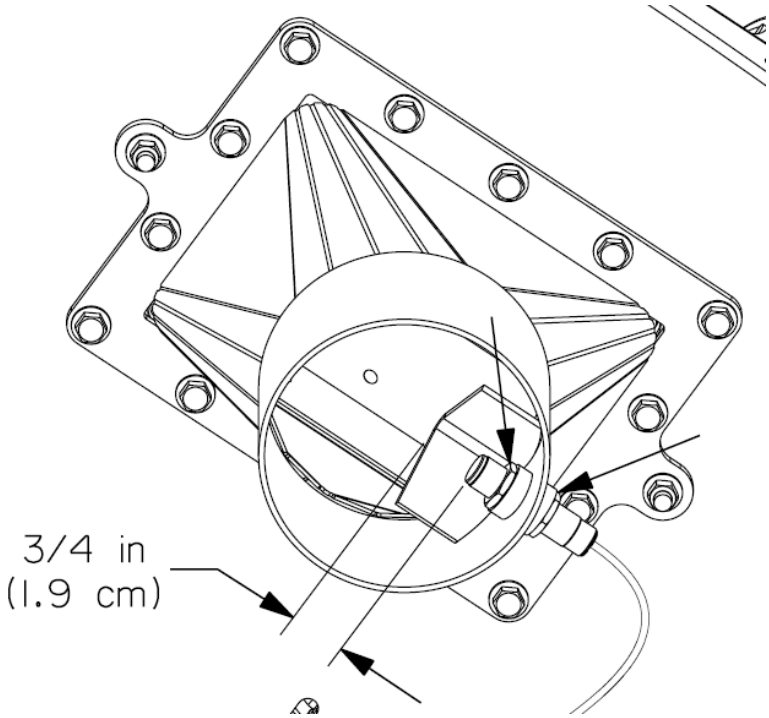


Figure 5-6: Bin level sensor positioning

13. Remove the lower cyclone body of the AMS from the shipping crate frame. Ensure the mounting bracket is positioned such that the AMS inlet is correctly oriented when secured to the mounting rack, reinstall as required.

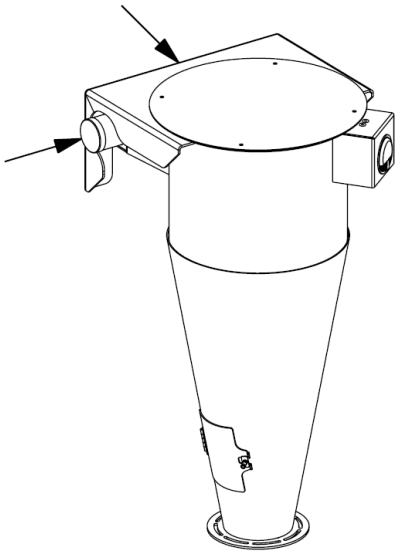


Figure 5-7: Lower cyclone component orientation

14. Apply a bead of silicone to the top surface of the airlock inlet.

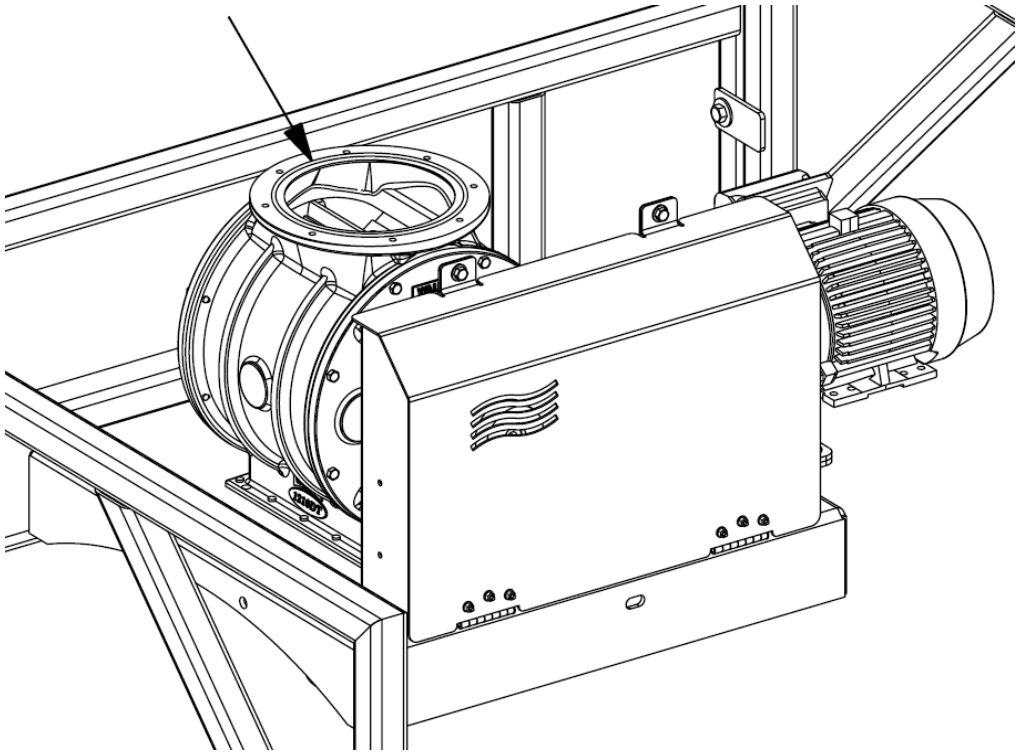


Figure 5-8: Airlock inlet silicone application

15. Position the lower cyclone body of the AMS on the airlock inlet. Ensure the inlet is correctly oriented and install the required fasteners to secure the cyclone body to the airlock and to the mounting rack.

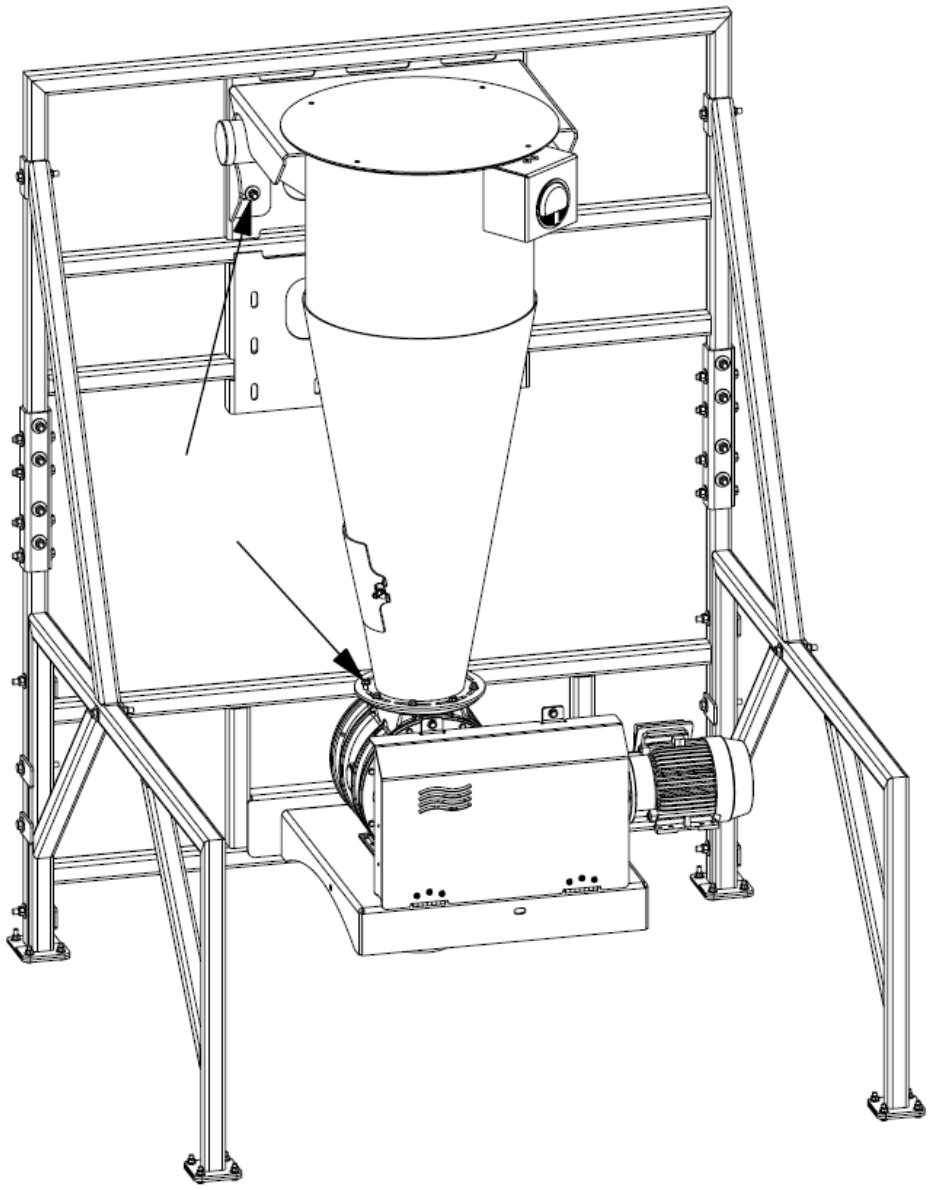


Figure 5-9: Lower cyclone body mounting

16. Make any adjustments as required to ensure the airlock package remains level. Tighten all fasteners of the airlock package and lower cyclone body to the required torque.

17. Remove the differential pressure gauge assembly from the lower cyclone body and remove any shipping covering from the top of the lower cyclone body and the inlet.

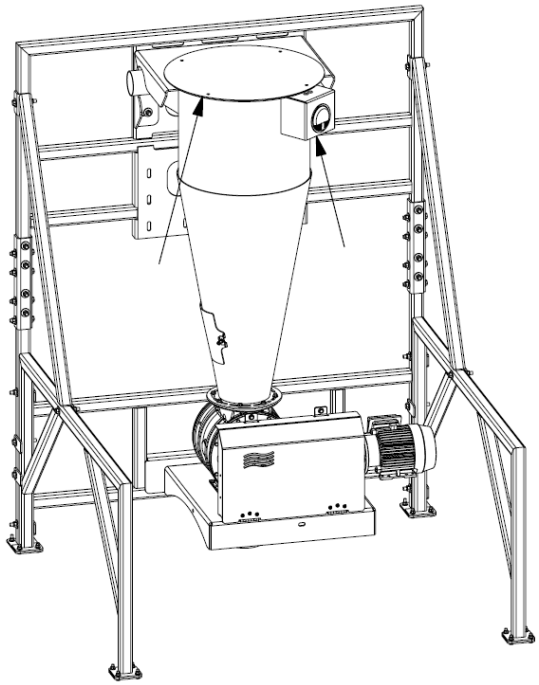


Figure 5-10: Differential pressure gauge assembly and shipping covering

18. Install the differential pressure gauge assembly onto the airlock drive guard and tighten the mounting fasteners to the required torque. Ensure the fasteners are installed such that they will not interfere or contact any component of the airlock drive system.

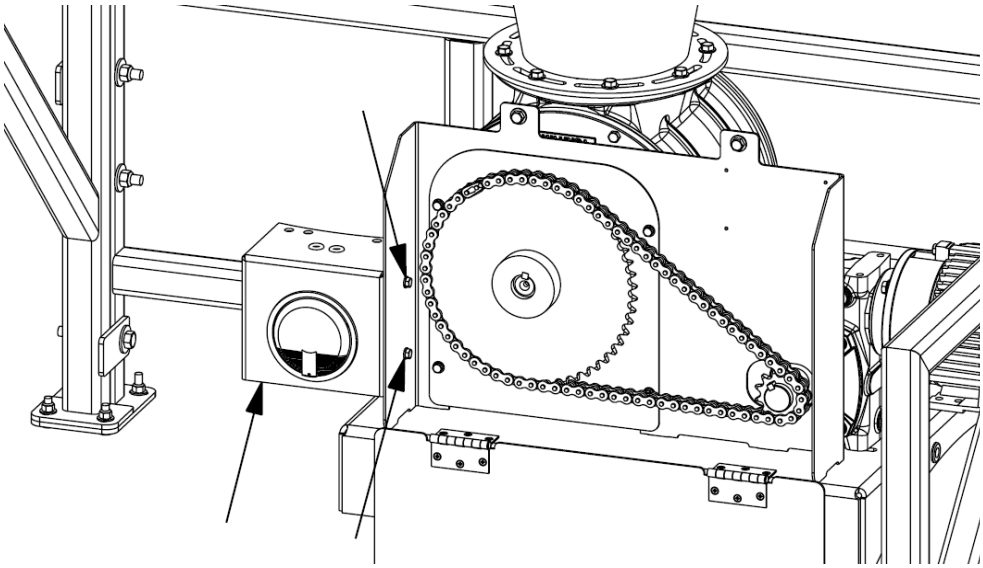


Figure 5-11: Differential pressure gauge assembly mounting

19. Remove the filter housing of the AMS from the shipping crate frame. Verify the orientation of the explosion vent, if equipped, the purge assembly and filter access door. The explosion vent must be oriented when installed such that it will direct any potential deflagration in a direction that will not cause personal injury or unacceptable property damage. The purge assembly must be oriented such that the outlet is oriented towards the intended installation location of the blower package. The filter access door must be accessible for maintenance.

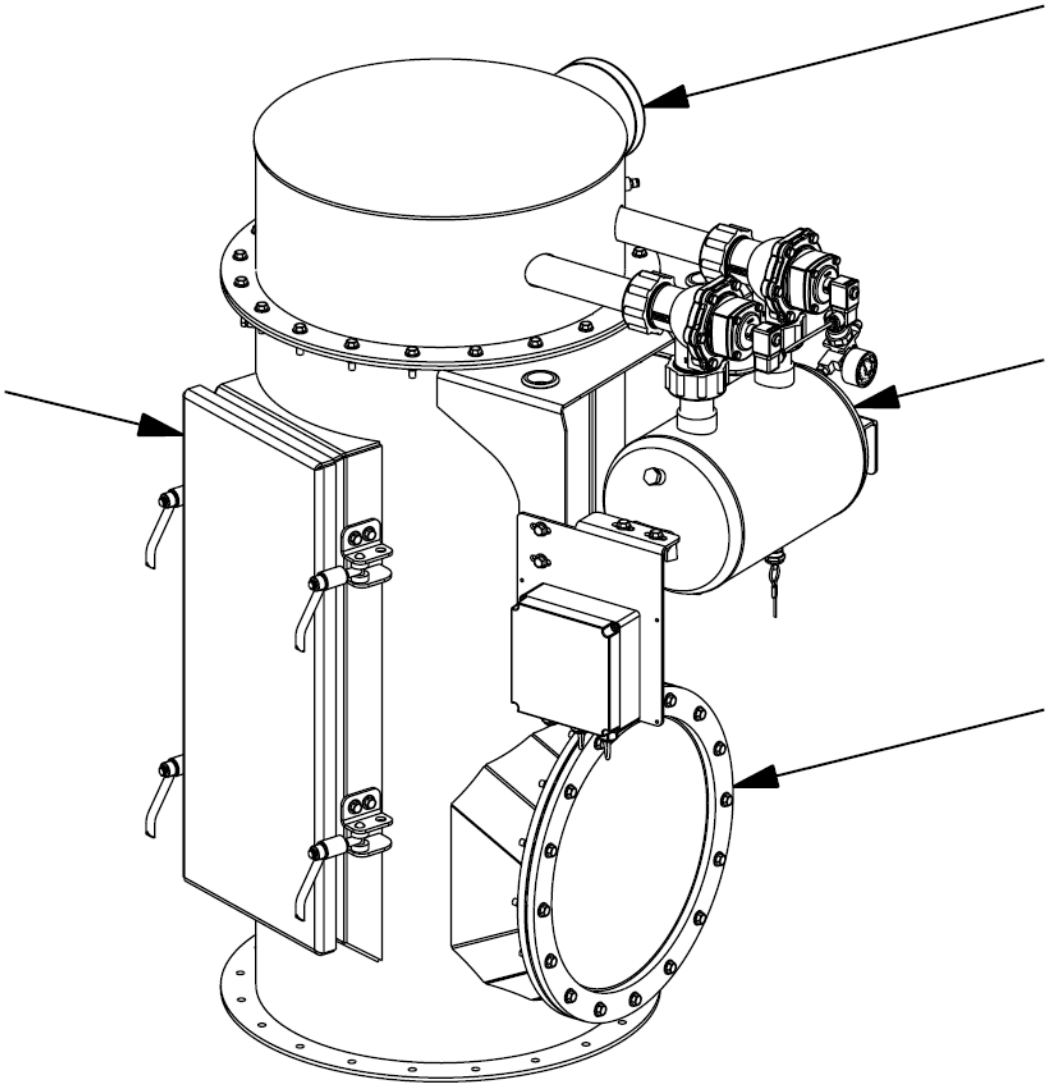


Figure 5-12: Filter housing component orientation

20. For units equipped with air piloted purge valves, ensure the pilot valve enclosure is mounted and secured such that the air line required to connect each pilot valve to each purge valve does not exceed 56 in (142 cm). Mounting of the pilot valve enclosure using a longer length of air line requires prior approval from Walinga.

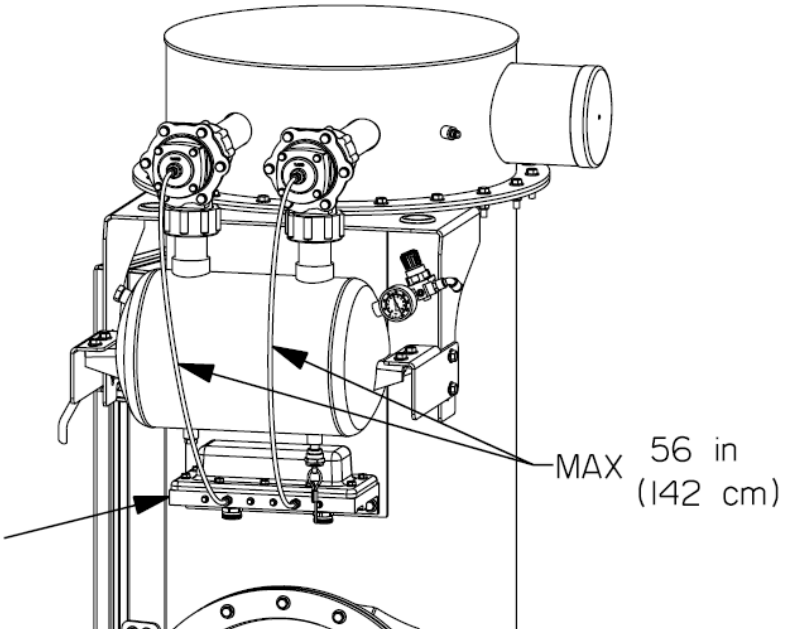


Figure 5-13: Pilot valve enclosure positioning

21. Ensure the grounding strip of each filter is connected to the center threaded connection point and all are secured in place with a nut.

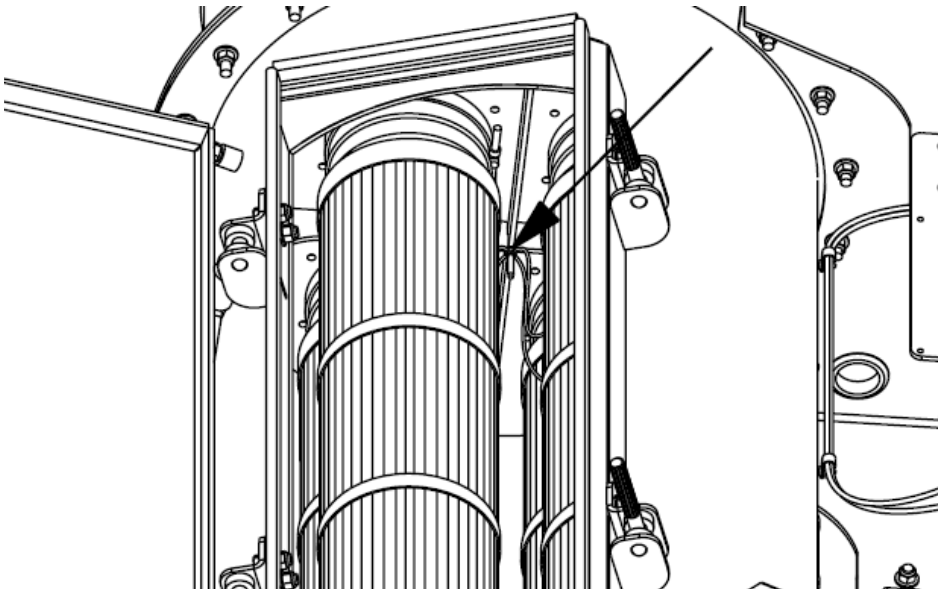


Figure 5-14: Filter grounding strip connection

22. Apply a bead of silicone to the top surface of the lower cyclone body.

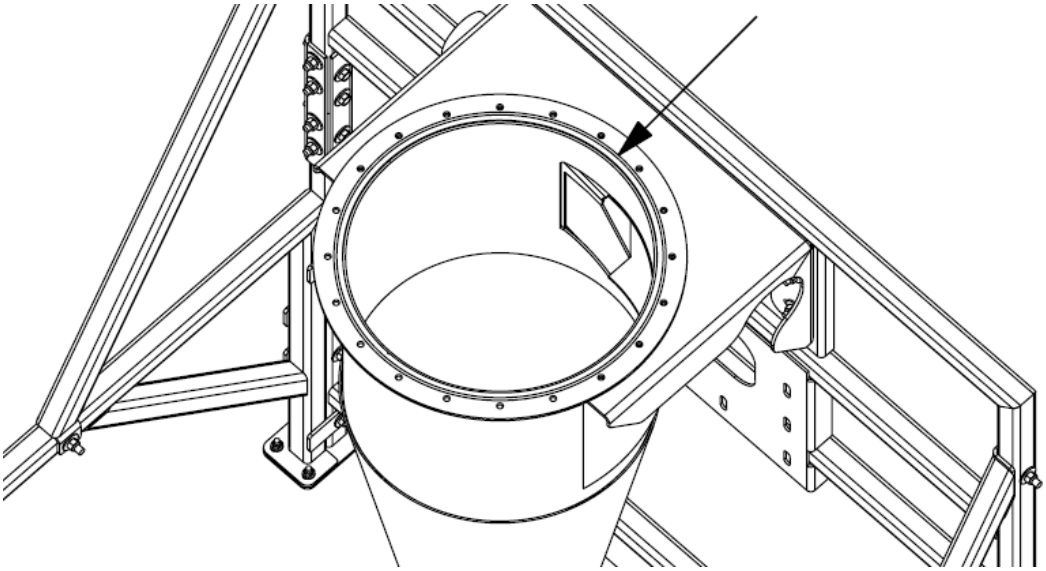


Figure 5-15: Lower cyclone silicone application

23. Position the filter housing on the lower cyclone body and ensure correct orientation. Install and tighten all fasteners to the required torque.

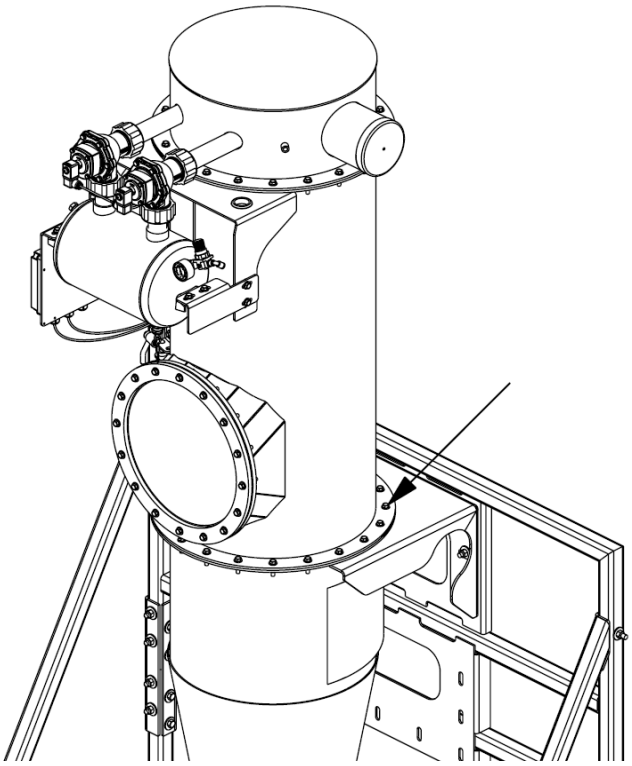


Figure 5-16: Filter housing mounting

24. Install any explosion vent ducting as required to direct any potential deflagration in a direction that will not cause personal injury or unacceptable property damage. Any installed ducting must be straight and must not exceed a length of 36 in (91 cm). All ducting must be supplied by Walinga to maintain permissible ratings.

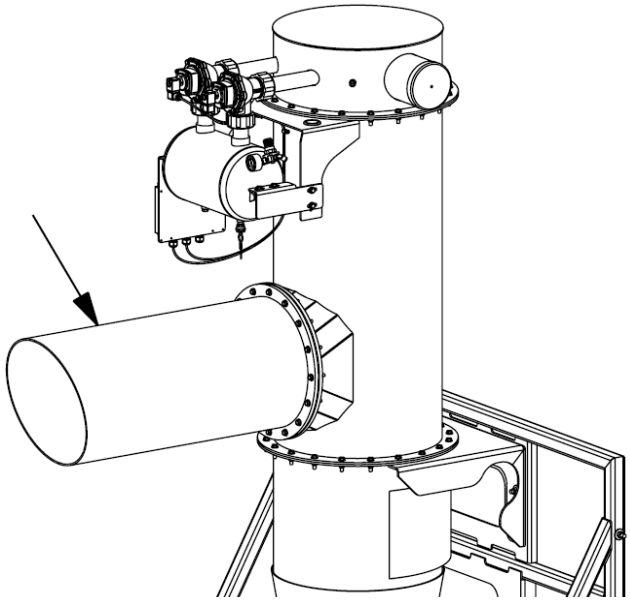


Figure 5-17: Explosion vent ducting

25. Position the blower package beside the mounting rack. The blower should be oriented such that the drive guard is easily accessible and can open unhindered for maintenance.

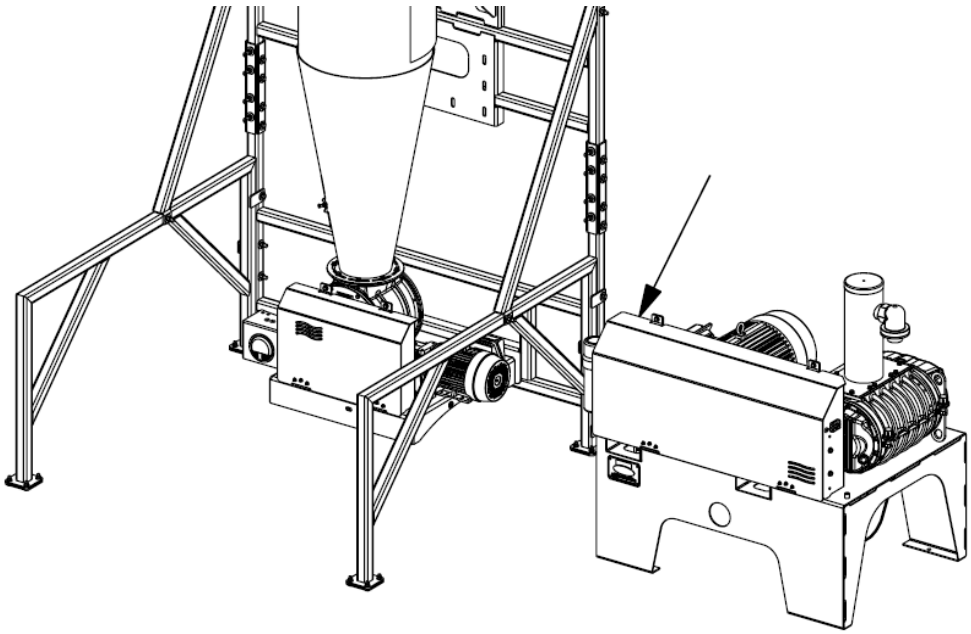


Figure 5-18: Blower package positioning

26. Remove the AMS outlet cover and the blower inlet cover.

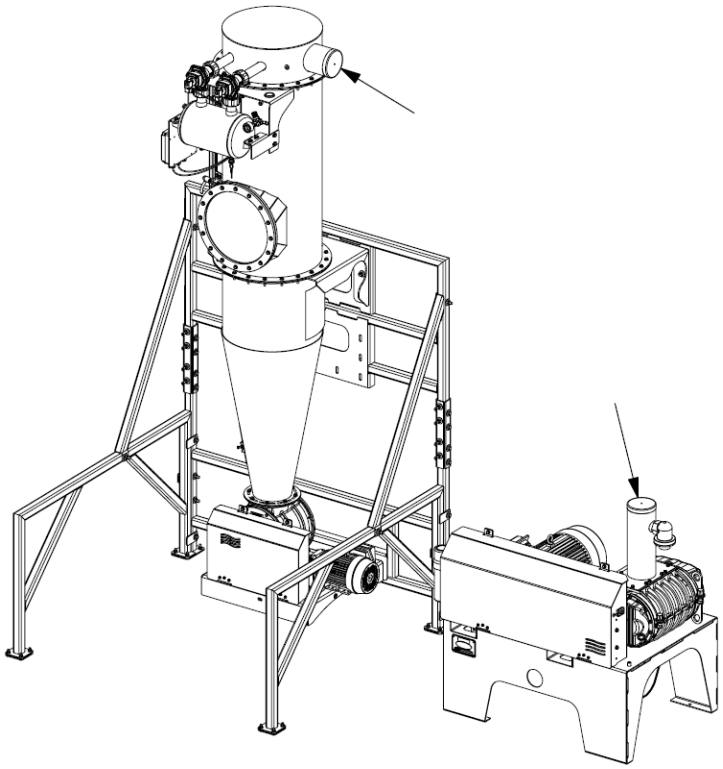


Figure 5-19: AMS and blower covers

27. Measure, cut and prepare the required sections of 6 in (15.2 cm) pipe and elbows to connect the AMS to the blower inlet.

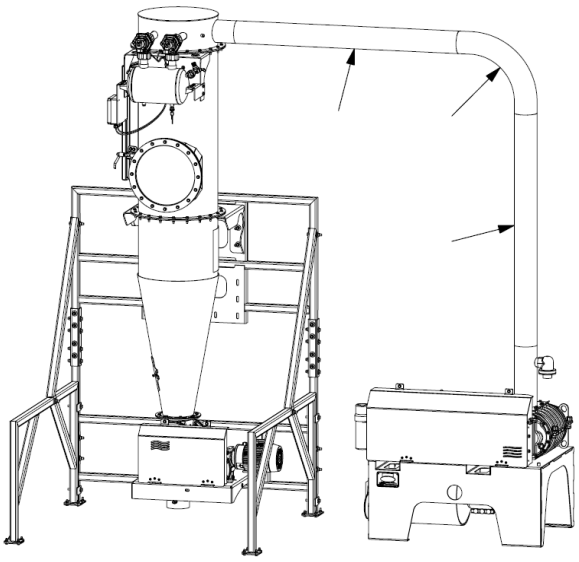


Figure 5-20: AMS to blower piping connection

28. Install the pipe and elbow using compression couplers. Ensure the end surfaces of the pipe sections and/or elbows are in contact; a gap can lead to premature wear and damage to couplers and piping and decreased system performance. Do not overtighten the compression coupler as it may result in warping of the piping, resulting in leaks and poor system performance; 6 in (15.2 cm) couplers are to be tightened to 95 ft-lbs (129 Nm). Ensure the grounding strip of the coupler makes secure contact with the surface of both pipes and/or elbow. For ease of maintenance, install all compression couplers in the same orientation.

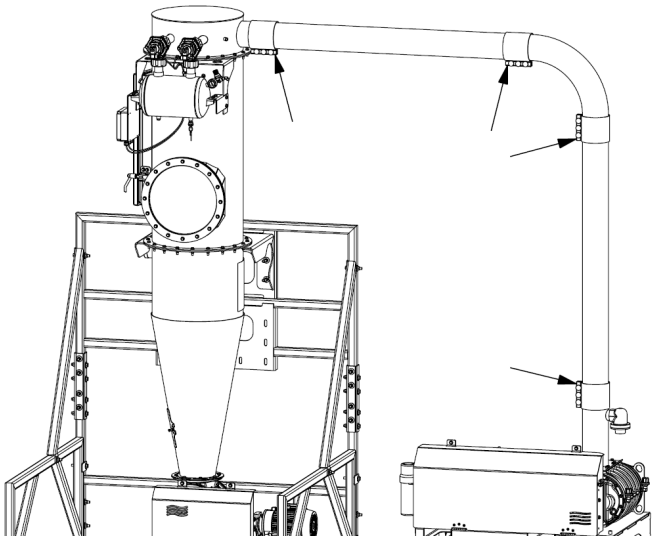


Figure 5-21: Compression coupler installation

29. Using a multimeter, measure the continuity across each compression coupler. The measured resistance must be less than 5 Ω; reinstall any compression couplers as required, ensuring the grounding strip is making secure contact.

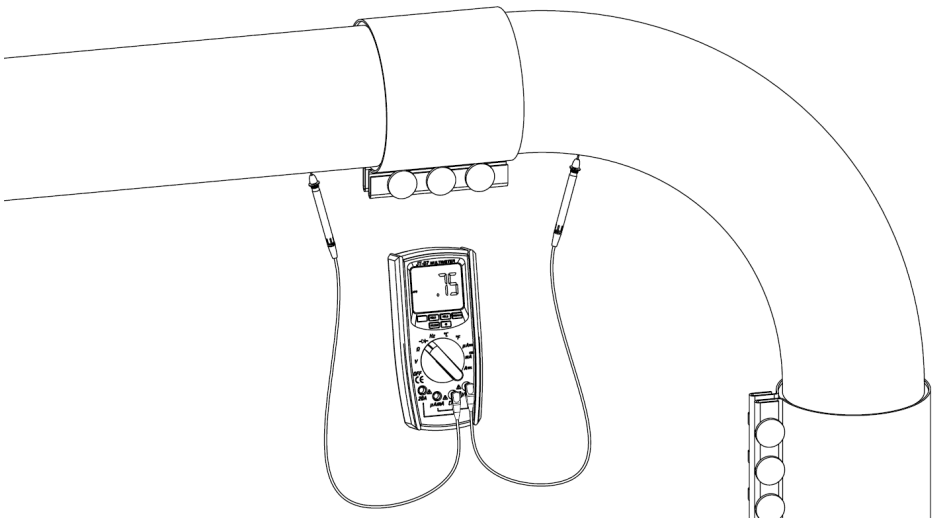


Figure 5-22: Compression coupler continuity measurement

30. Ensure the piping connection between the AMS and blower inlet is horizontal and vertical as applicable and is not twisted or strained. Adjust the position of the blower package as required.
31. Anchor the blower package to the installation surface.

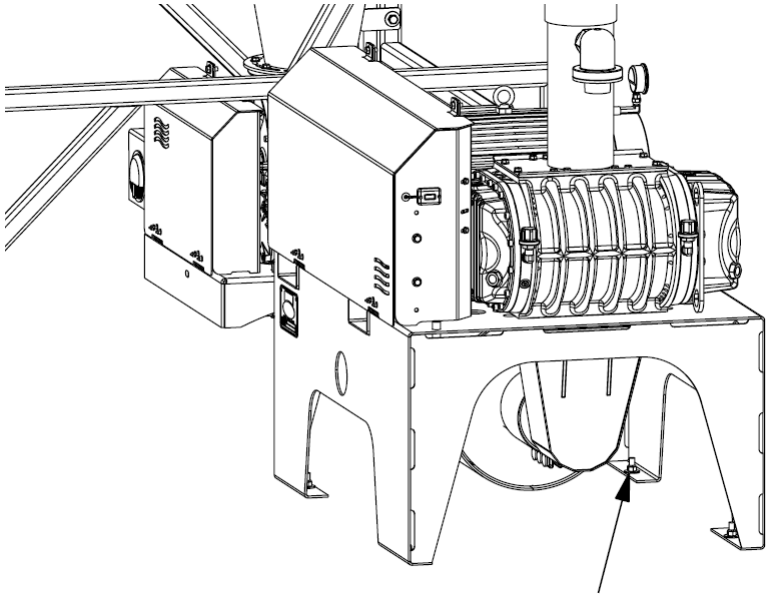


Figure 5-23: Blower package anchoring

32. As necessary, install any additional piping to vent the blower outlet in the required direction. The outlet cap must be installed on the end of the piping to protect the blower from dust, debris, water and any pests. Additional approved Walinga-manufactured mufflers may also be installed to further reduce the operational noise levels. Installation of unapproved mufflers or accessories may lead to dust accumulation and the risk of fire.

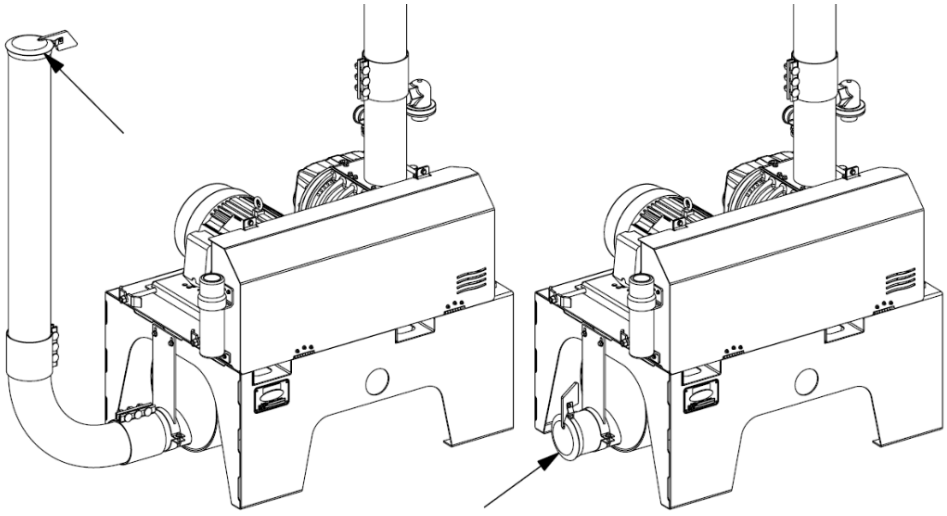


Figure 5-24: Example blower outlet venting options

33. Position and install the discharge receptacle. Any piping or attachments connected to the airlock outlet must be installed vertically with a maximum slope of 20° to ensure efficient movement to the discharge receptacle and prevent blockages.

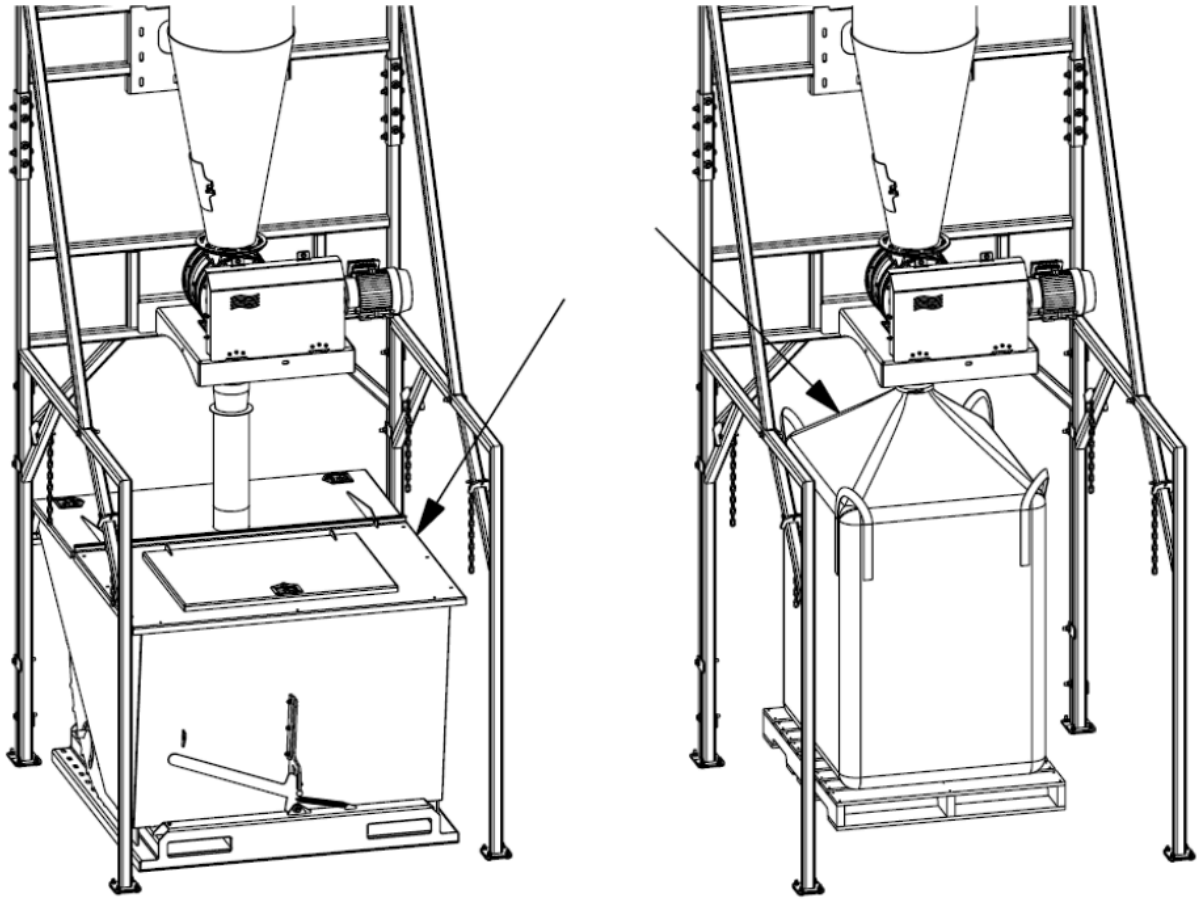


Figure 5-25: Example discharge options

34. With reference to the approved piping layout and system design, install all piping main lines and drop lines. When installing the piping, ensure the following are met:
    a. All piping must be properly secured and supported. The installed supports must be capable of supporting the weight of a full pipe line in the event of a system blockage. Typically, supports should be installed every 10 ft (3.0 m).

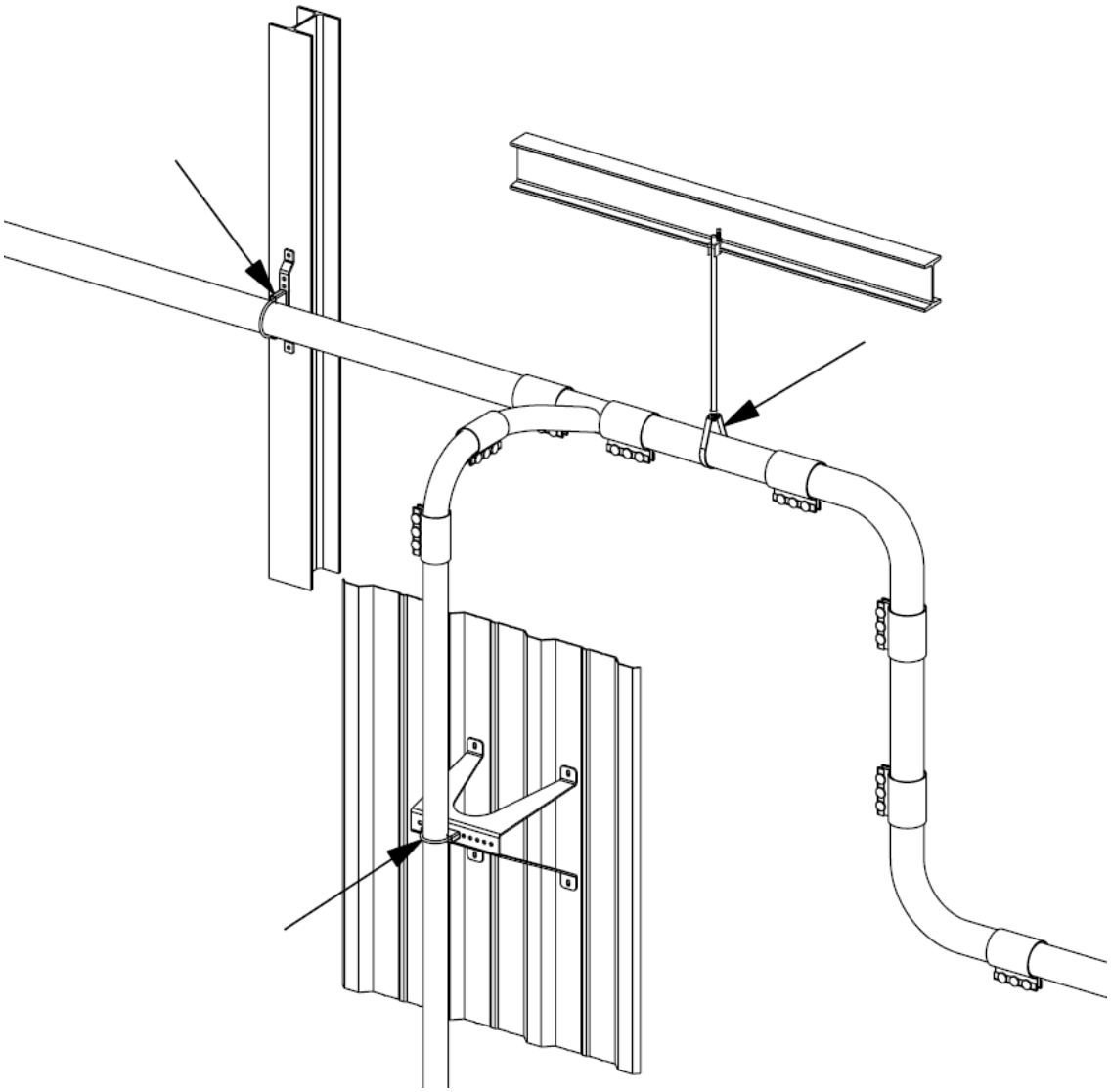


Figure 5-26: Example support methods

    b. The main line should be as straight as possible for maximum system efficiency.
    c. The drop lines should be positioned a maximum of 40 ft (12.2 m) apart, or in accordance with the approved piping layout and system design.
    d. All piping must be within 400 ft (121.9 m) of the main CVSAP packages.

e. The drop line TY elbows must be oriented such that the drop line enters the main line from the top or side and the product will enter following the flow of the air stream.

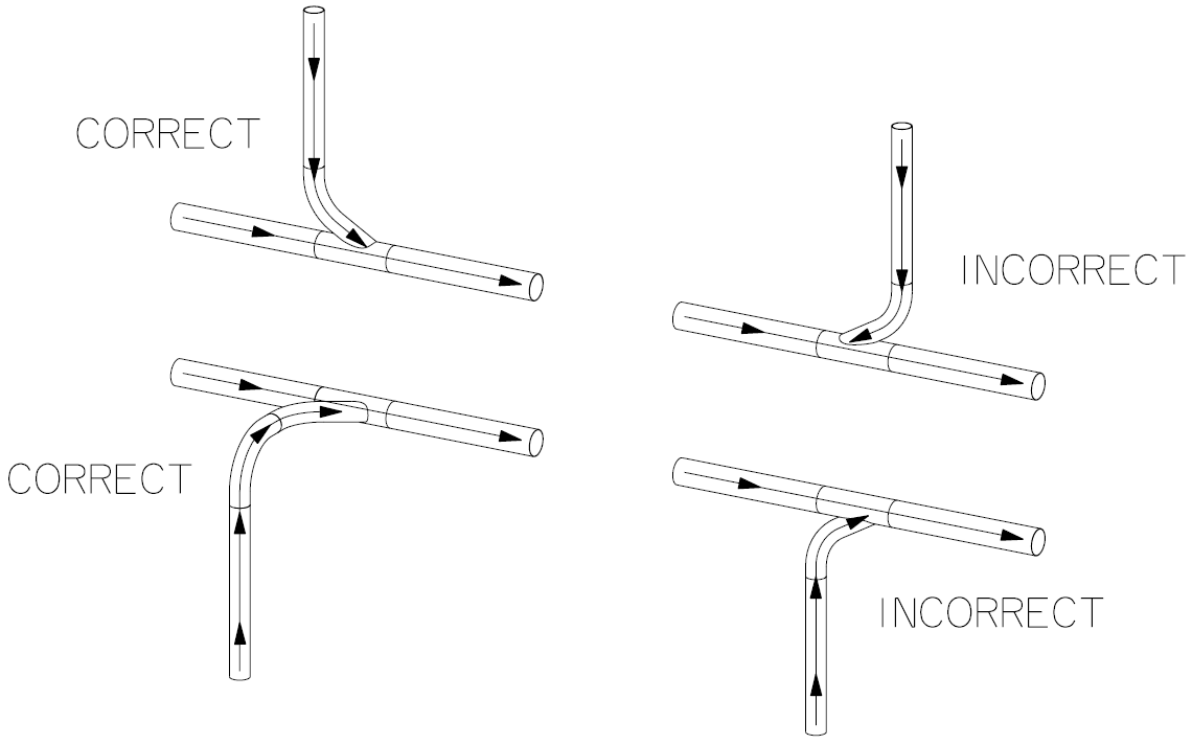


Figure 5-27: Drop line TY elbow orientation

f. All piping and elbows are to be connected using compression couplers. Ensure the end surfaces of the pipe sections and/or elbows are in contact; a gap can lead to premature wear and damage to couplers and piping and decreased system performance. For ease of maintenance, install all compression couplers in the same orientation. Do not overtighten the compression coupler as it may result in warping of the piping, resulting in leaks and poor system performance; 2 in (5.1 cm) couplers are to be tightened to 45 ft-lbs (61 Nm), all other compression couplers are to be tightened to 95 ft-lbs (129 Nm). Ensure the grounding strip of the coupler makes secure contact with the surface of both pipes and/or elbow. Using a multimeter, measure the continuity across each compression coupler. The measured resistance must be less than 5 Ω; reinstall any compression couplers as required, ensuring the grounding strip is making secure contact. An improperly grounded system can result in static electricity build-up leading to electrical discharge and shock, which has the potential to cause fire or explosion.

g. To connect intake lines, the end of each drop line must be equipped with a camlock coupler. To install a camlock coupler, proceed as follows:

   i. Ensure there is a rubber seal installed in the coupler to ensure proper connection and prevent leaking.

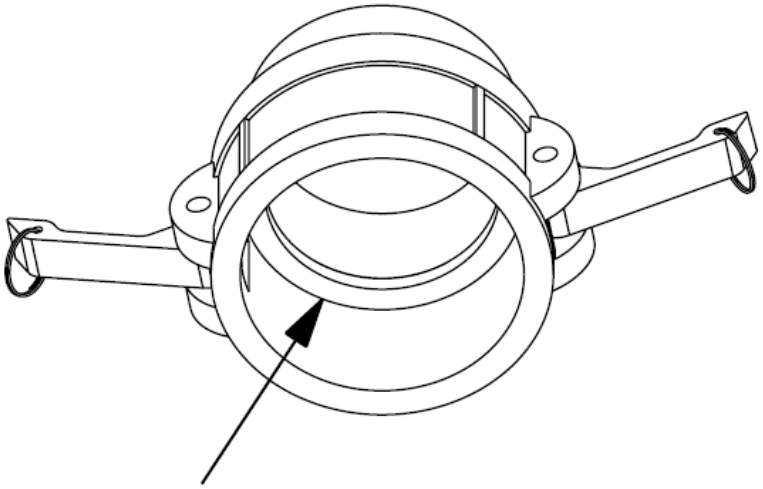


Figure 5-28: Coupler seal

   ii. Insert the dust plug into the coupler and secure it in place by locking the coupler arms into place.

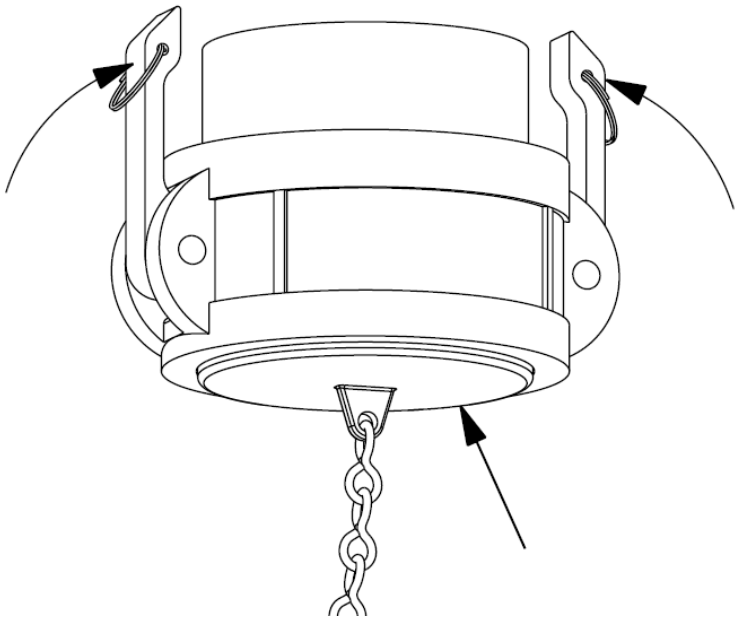


Figure 5-29: Dust plug installation

iii. Connect the retaining chain of the dust plug to the split ring of one of the camlock coupler arms.

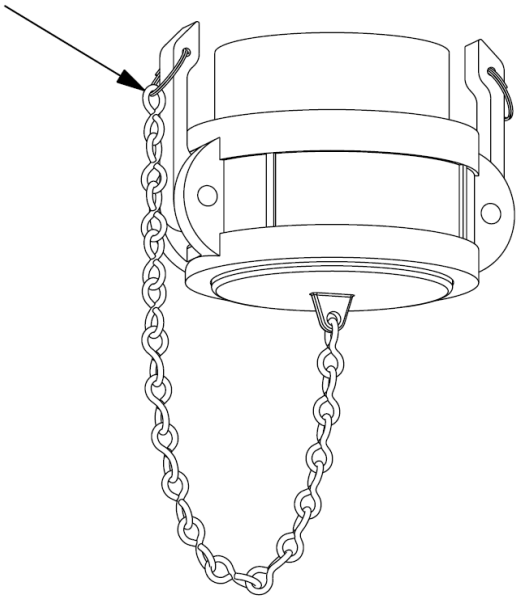


Figure 5-30: Dust plug securement

iv. Apply a bead of silicone to the end of the drop line and install the coupler. Ensure the dust plug is installed to prevent the inner seal from becoming dislodged. Secure the coupler in place with any required fasteners.

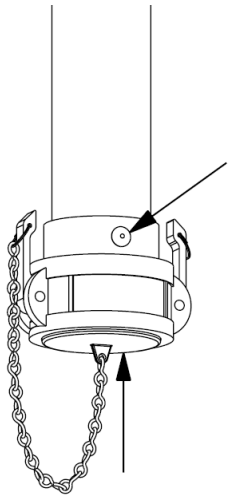


Figure 5-31: Coupler installation

v. Install an electro-static hazard safety sign (53-18290-6) on the drop line above the coupler. Refer to **Section 4: Safety**.

Initial Set-Up

To allow for safe and efficient operation, upon complete assembly of the CVSAP, the electrical and pneumatic systems must be properly connected and supplied. A licensed electrician must provide power to the CVSAP and all local standards and regulations must be followed.

To connect the differential pressure gauge to the system, proceed as follows:

1. Ensure the area is clear of any bystanders and individuals not involved in the assembly and installation of the CVSAP, especially small children.
2. Ensure the differential pressure gauge is securely mounted to the airlock drive guard.

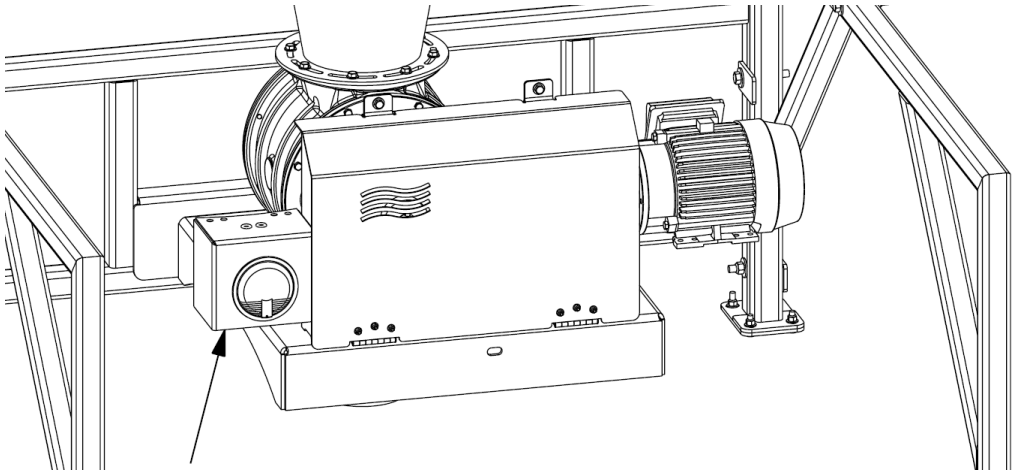


Figure 5-32: Differential pressure gauge mounted location

3. Identify the installed port locations in the clean and dirty air plenums closest to the mounting location of the differential pressure gauge and remove the plugs.

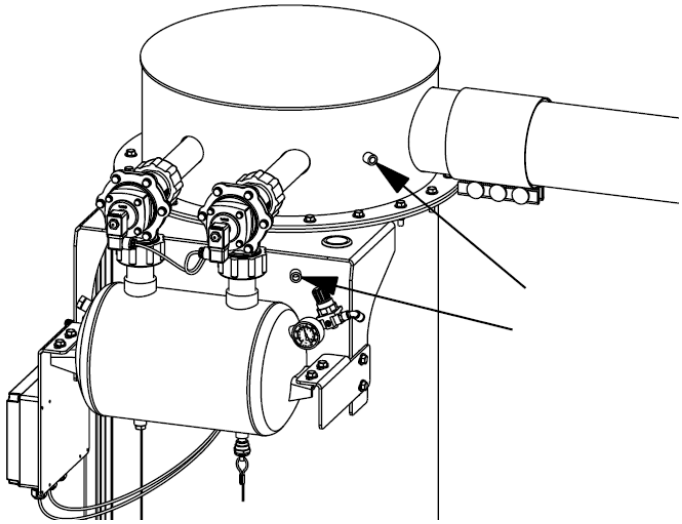


Figure 5-33: AMS port locations

4. Install a fitting into the port located in the clean air plenum.

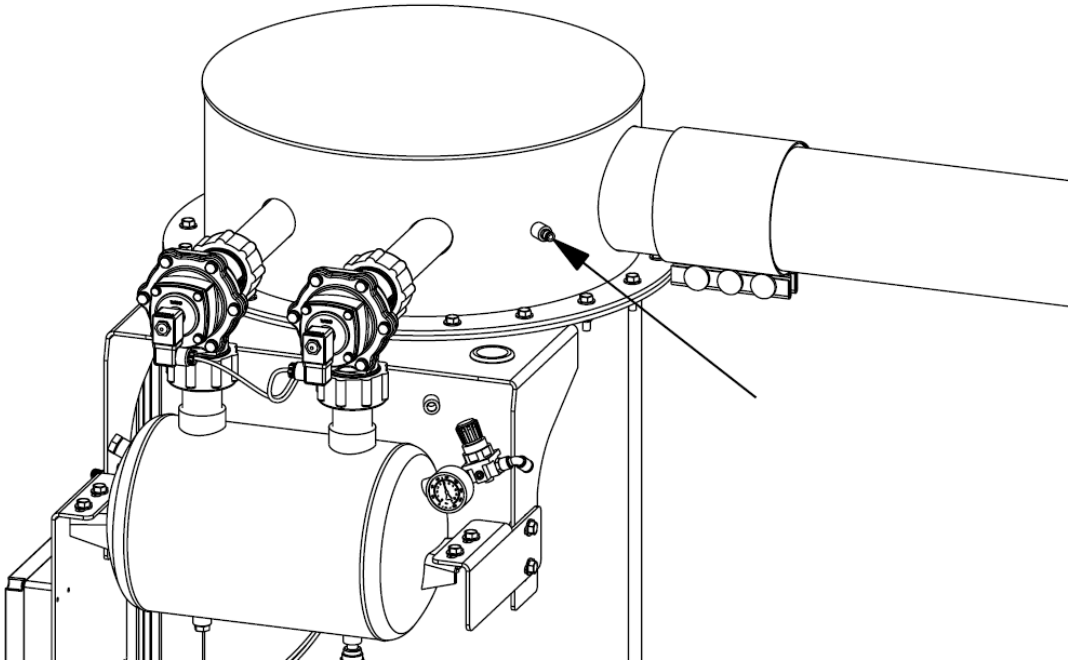


Figure 5-34: Clean air plenum fitting

5. Connect the air line installed in the lower port of the differential pressure gauge to the clean air plenum, trimming as required.

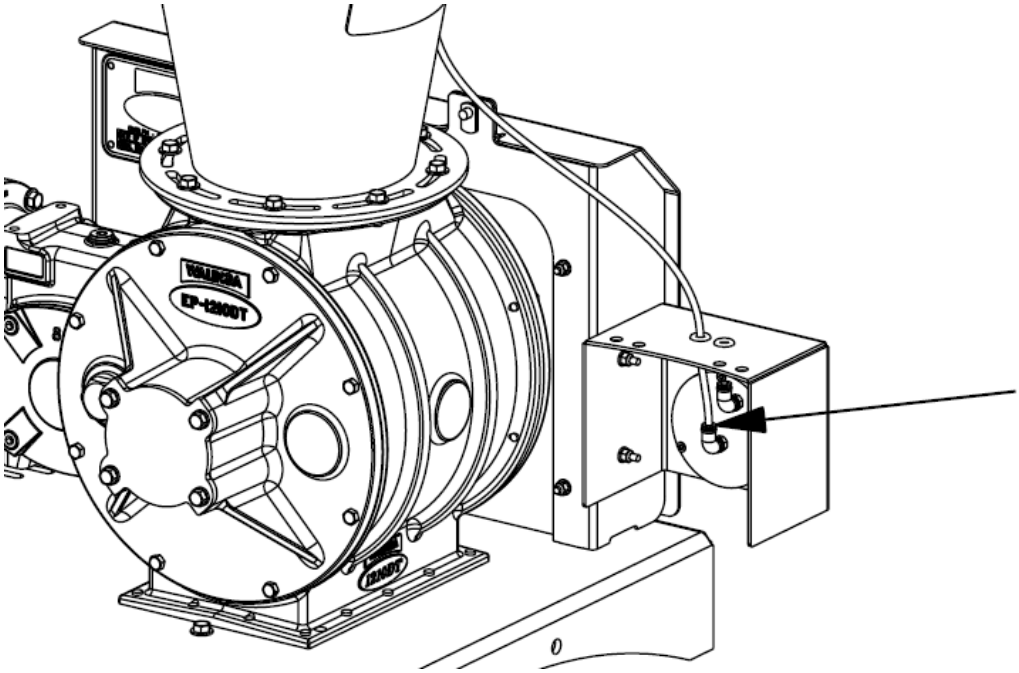


Figure 5-35: Differential pressure gauge connection point

6. Install a fitting into the port located in the dirty air plenum.

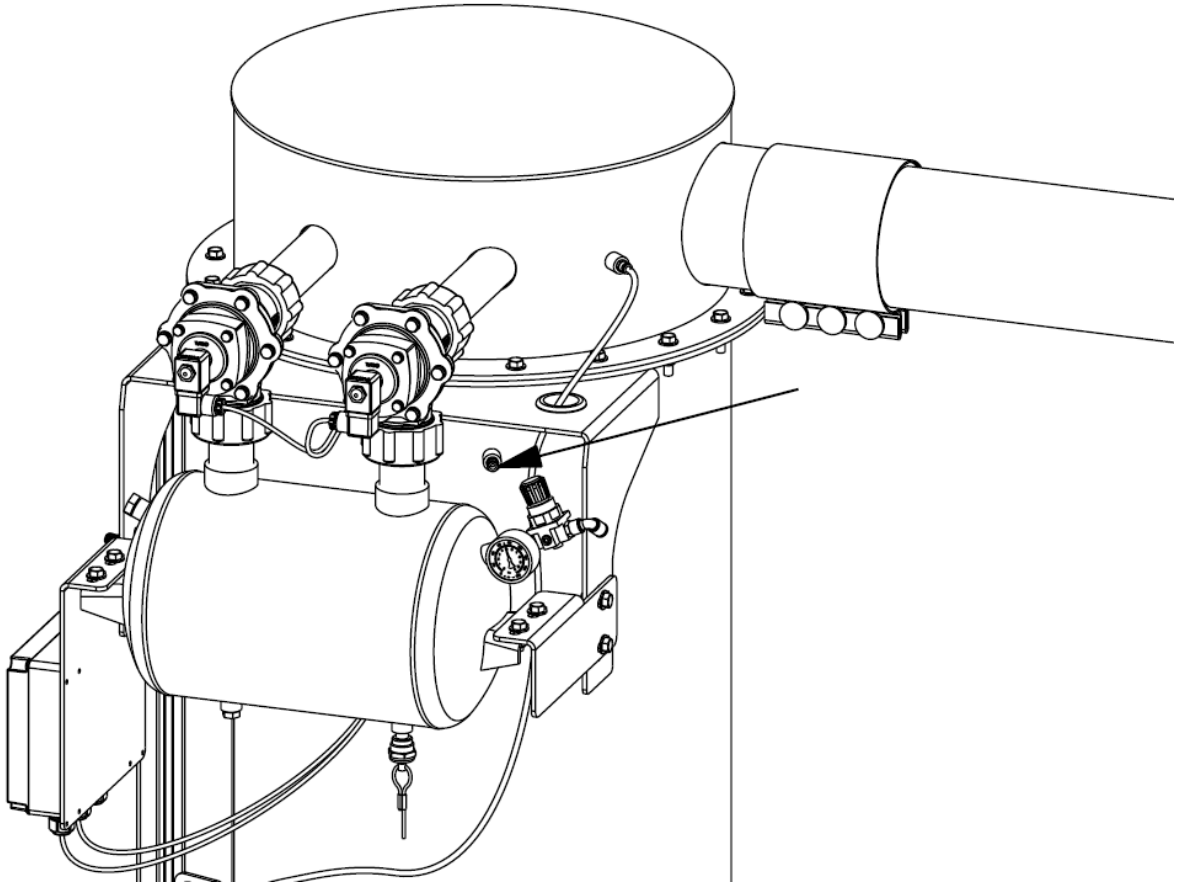


Figure 5-36: Dirty air plenum fitting

7. Prepare an inline filter with the required fittings.

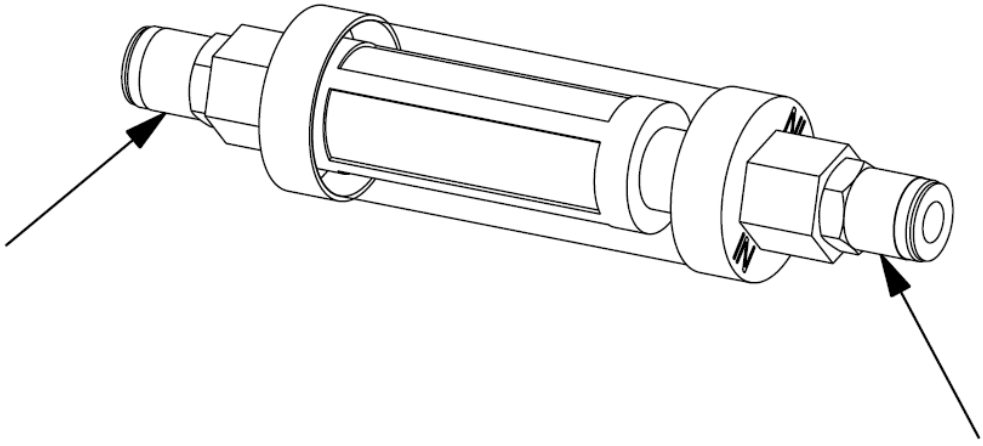


Figure 5-37: Inline filter

8. Connect the line installed in the upper port of the differential pressure gauge to the outlet of the inline filter, trimming as required. The filter protects the internals of the differential pressure gauge from dust and particulates. Failure to properly install the inline filter can lead to premature wear and damage to the differential pressure gauge.

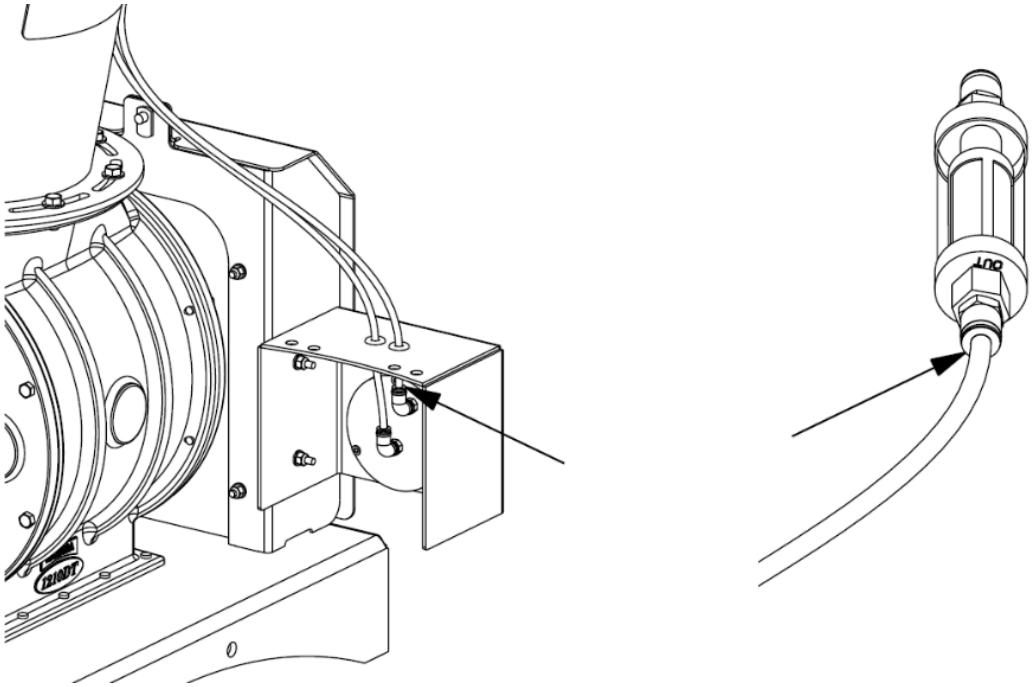


Figure 5-38: Differential pressure gauge connection to inline filter

9. Use the remaining air line to connect the inlet of the inline filter to the dirty air plenum, trimming as required.

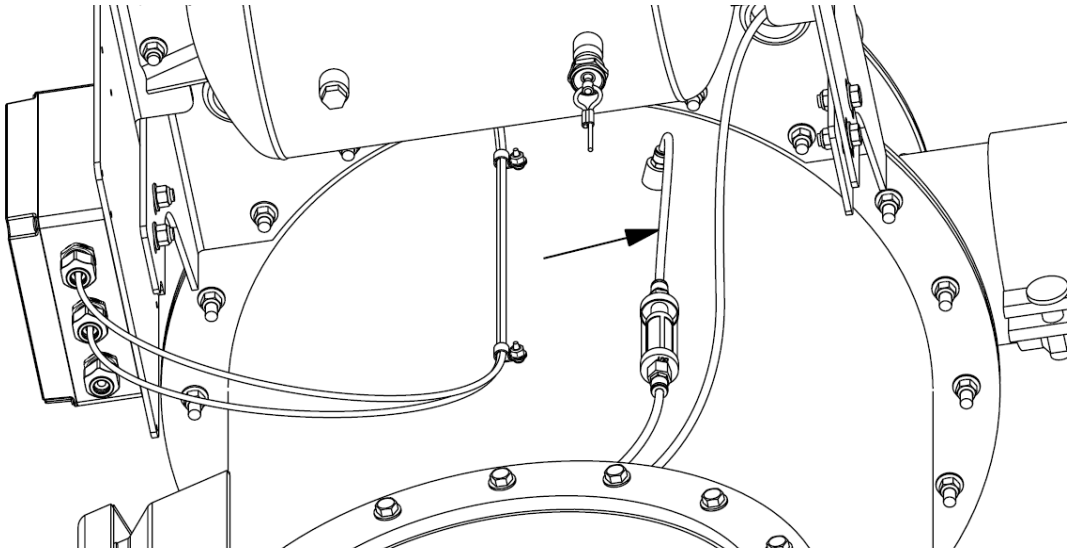


Figure 5-39: Dirty air plenum connection

10. Secure the air lines to the body of the AMS with the use of cable ties or clamps as required. Ensure the lines are routed such that they will not contact any rotating components, sharp edges, abrasive conditions, and are protected from contact with fluids and lubricants.

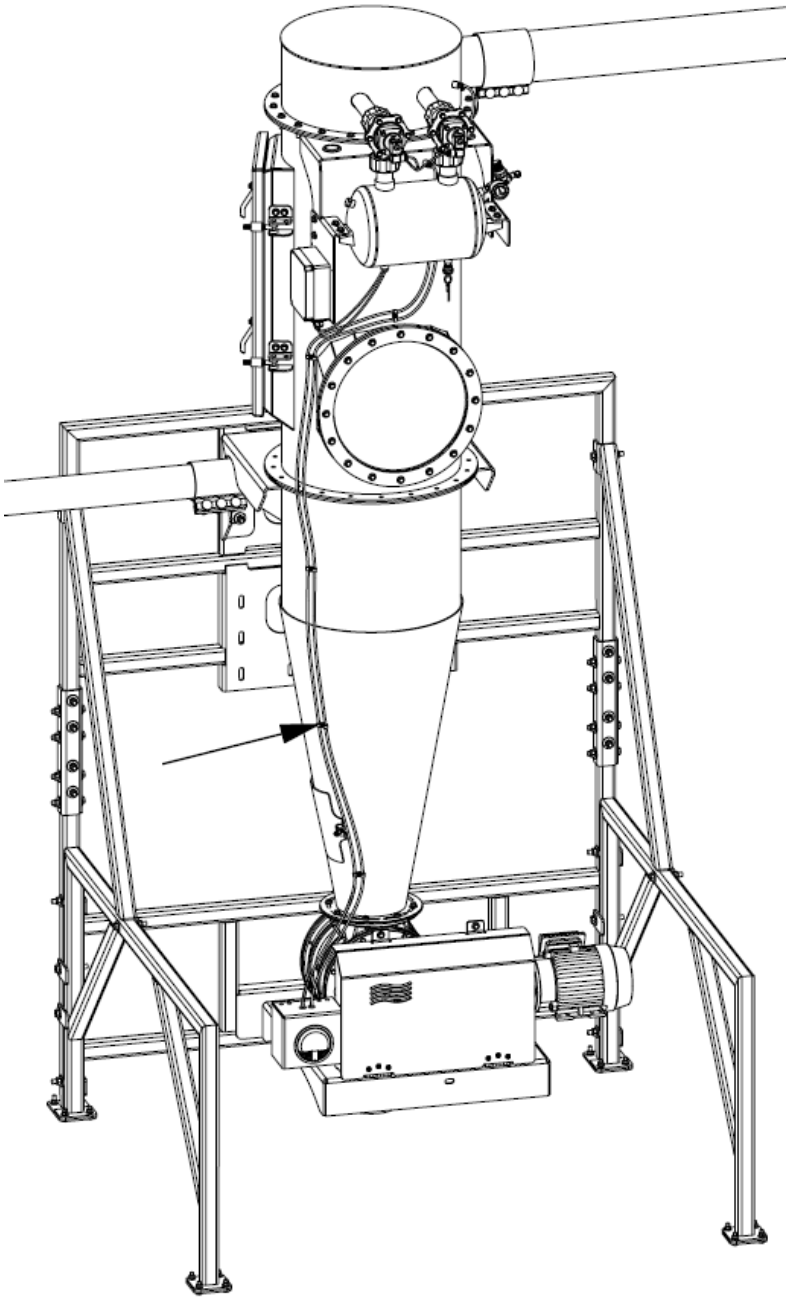


Figure 5-40: Differential pressure gauge air line routing

To establish the air supply to the CVSAP, proceed as follows:

1. Ensure the area is clear of any bystanders and individuals not involved in the assembly and installation of the CVSAP, especially small children.
2. Ensure the compressed air supply is a minimum of 80 psi (552 kPa) with a minimum flow rate of 4 cfm (113 L/min).
3. Ensure the compressed air supply is free of oil and moisture. Any contamination in the air supply can result in ineffective cleaning of the filters and potential failure of the purge valves, filters or other components. The compressed air supply must be equipped with an air dryer.
4. Install the air dryer in addition to an air filter and a lock-out shut-off pressure relief valve along the air supply line to the CVSAP. Note that these components are to be supplied by the owner/operator.
5. Safely purge the compressed air supply line to clear the line of any dust, dirt or debris before connecting to the CVSAP.
6. Open the filter access door to prevent the explosion vent from rupturing in the event of an unintentional discharge of pressure within the AMS.

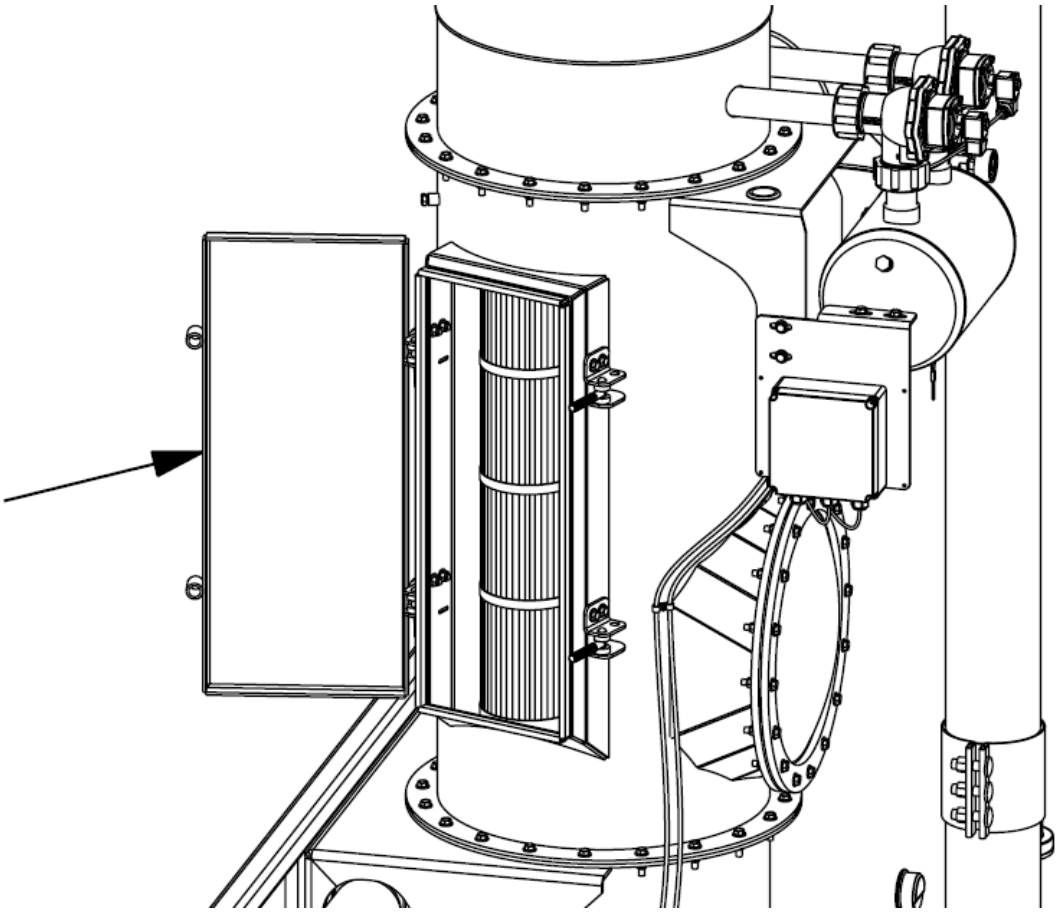


Figure 5-41: Opened filter access door

7. Connect the compressed air supply line to the pressure regulator mounted to the header tank.

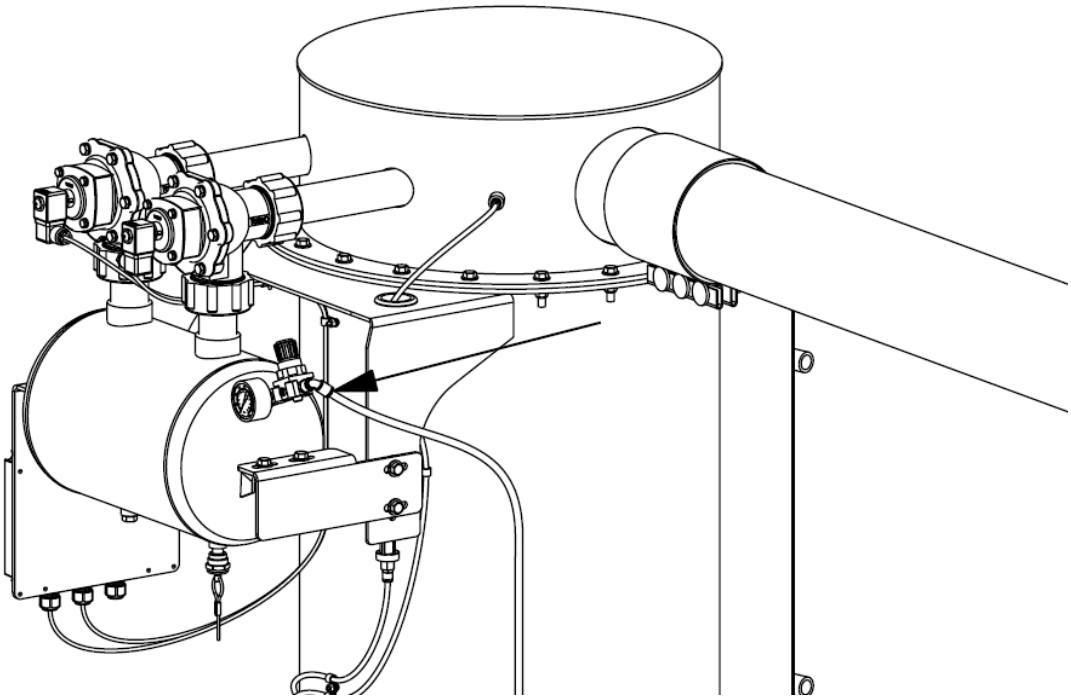


Figure 5-42: Compressed air supply connection

8. Set the pressure regulator to 70 psi (483 kPa). Be aware that a higher system pressure may rupture the explosion vent during normal operation and will void the warranty.

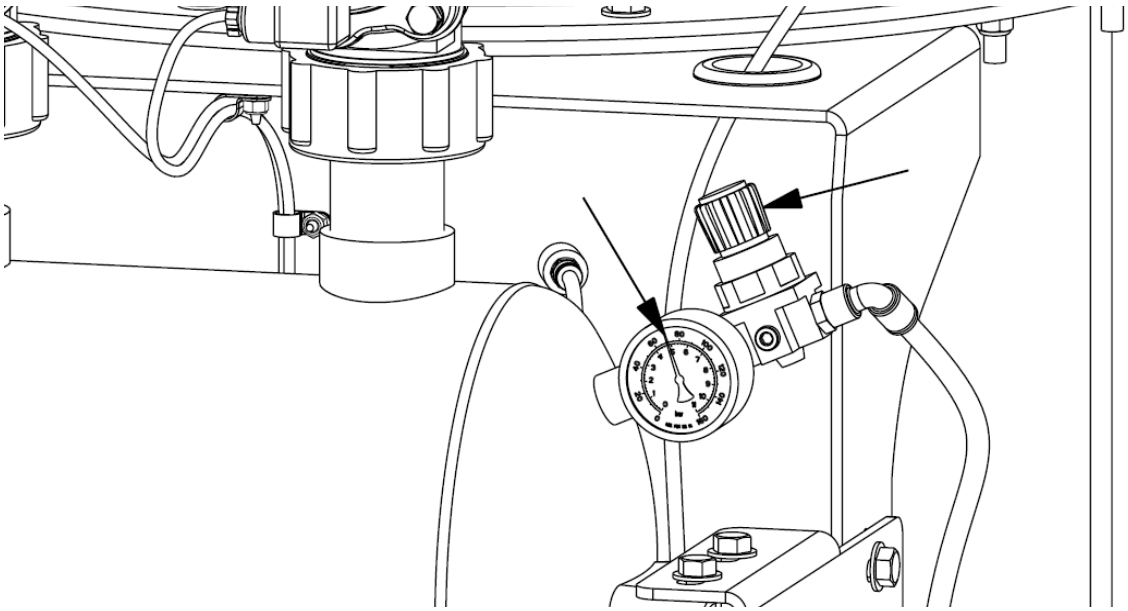


Figure 5-43: Pressure regulator adjustment

9. Secure the air line to the body of the AMS with the use of cable ties or clamps as required. Ensure the line is routed such that it will not contact any rotating components, sharp edges, abrasive conditions, and is protected from contact with fluids or lubricants.

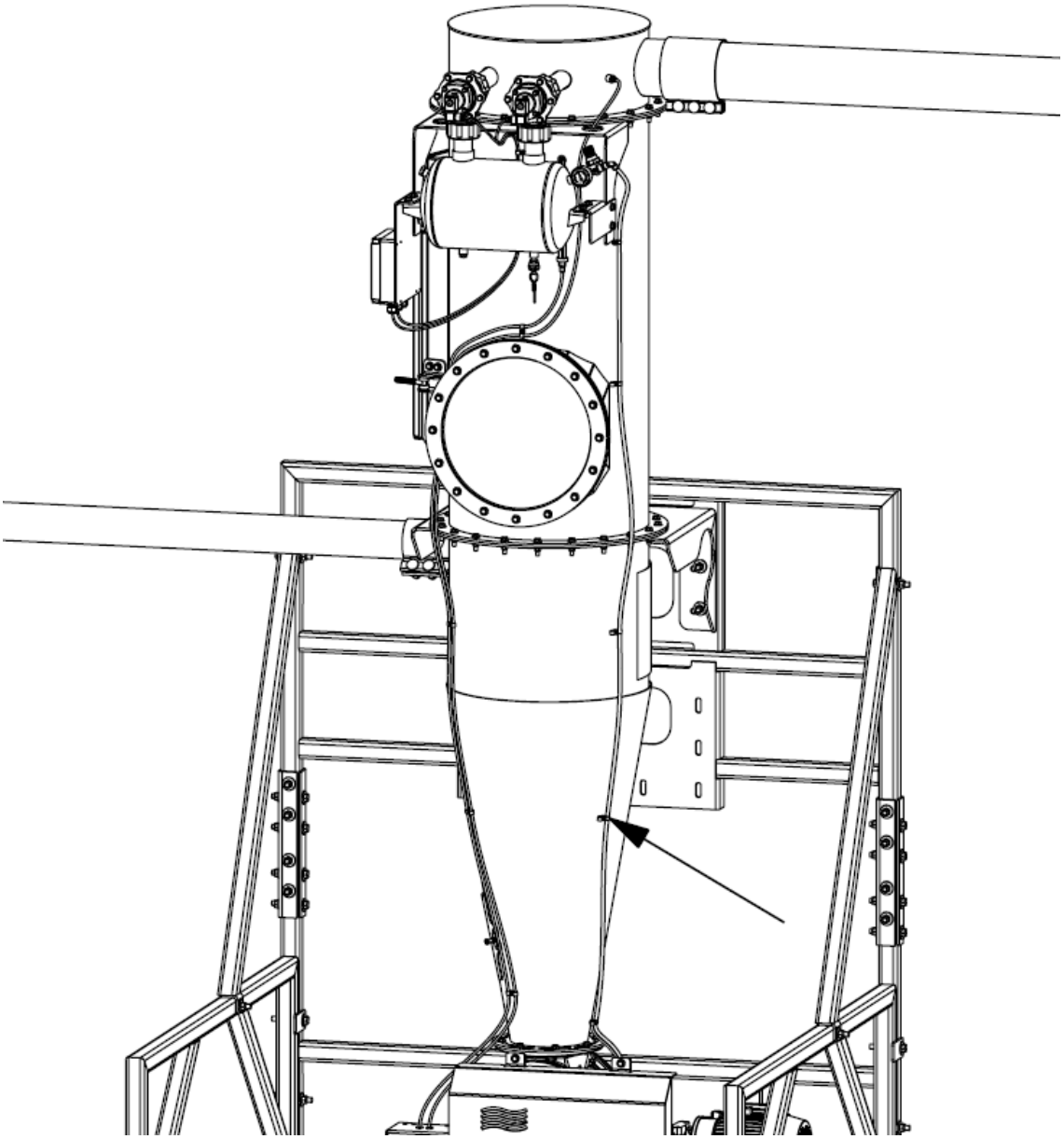


Figure 5-44: Supply air line routing

To establish the electrical power supply and configure the sequencing element, proceed as follows:

1. Ensure the area is clear of any bystanders and individuals not involved in the assembly and installation of the CVSAP, especially small children.
2. Turn the power off and lock-out all power supplies before attempting any electrical installation.
3. Ensure all electrical switches are in the OFF position.
4. Ensure all electrical installation, service and maintenance is performed by a licensed electrician in accordance with ANSI/NFPA 70 standard, the National Electric Code, and all other local codes and regulations.
5. Open the filter access door to prevent the explosion vent from rupturing in the event of an unintentional or unexpected start-up or reverse operation of the system, reference ***Figure 5-41***.
6. For units equipped with a sequential timer, proceed as follows, otherwise proceed to *Step 7*.
    a. Ensure the sequential timer is secured to the mounting position. **Note:** for systems installed in a classified area with air pilot purge valves installed, the sequential timer must be properly enclosed or located outside of the classified area, following all local regulations.
    b. Remove the cover of the sequential timer enclosure and gain access to the terminal connections.

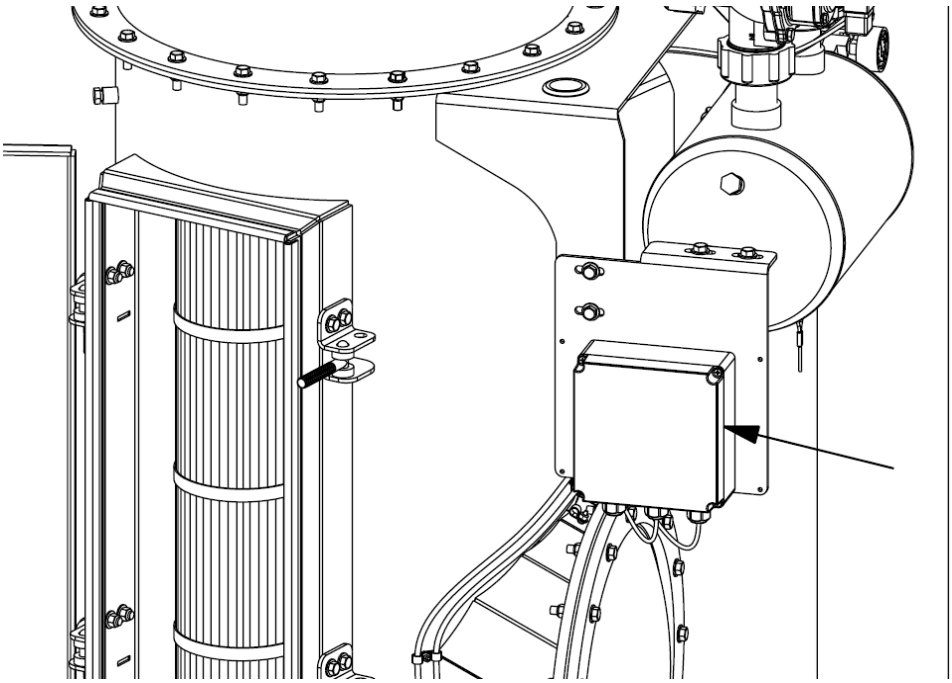


Figure 5-45: Sequential timer cover removal

c. For units equipped with the TUЯBO sequential timer, ensure the following requirements are met:

i. The input power jumpers for **JP1** and **JP4** are in the 115 VAC position, which is all the way to the right.

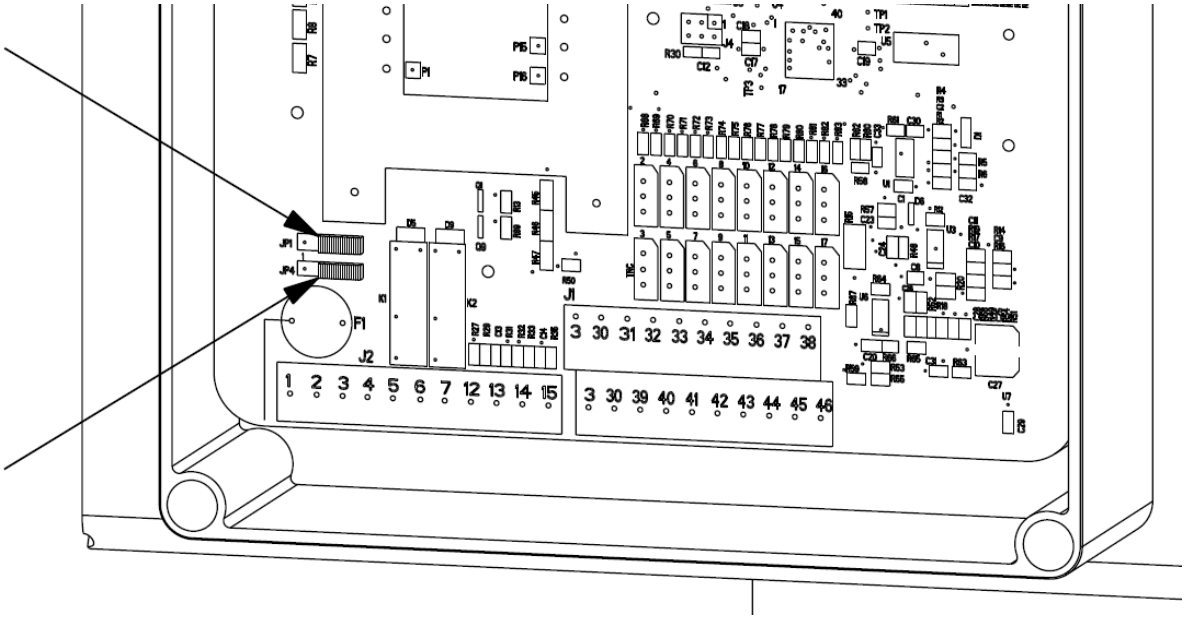


Figure 5-46: Input power jumpers

ii. The output jumpers for **JP2** and **JP6** are in the DC position, which is all the way to the right.

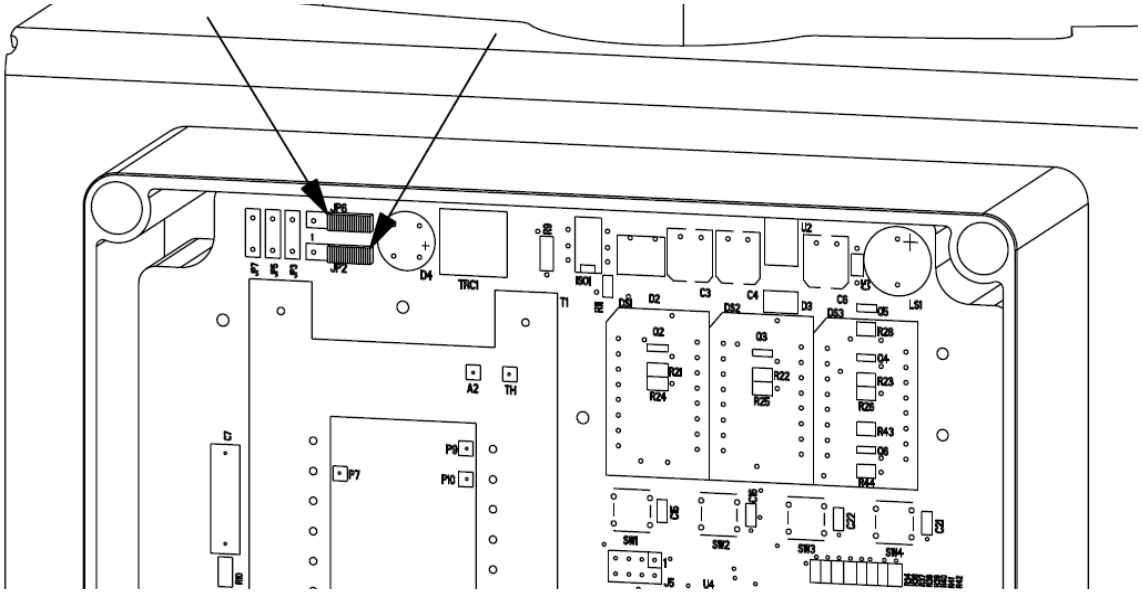


Figure 5-47: Output current jumpers

iii. The output voltage jumper is installed on the **JP3** terminal for 24 VDC.

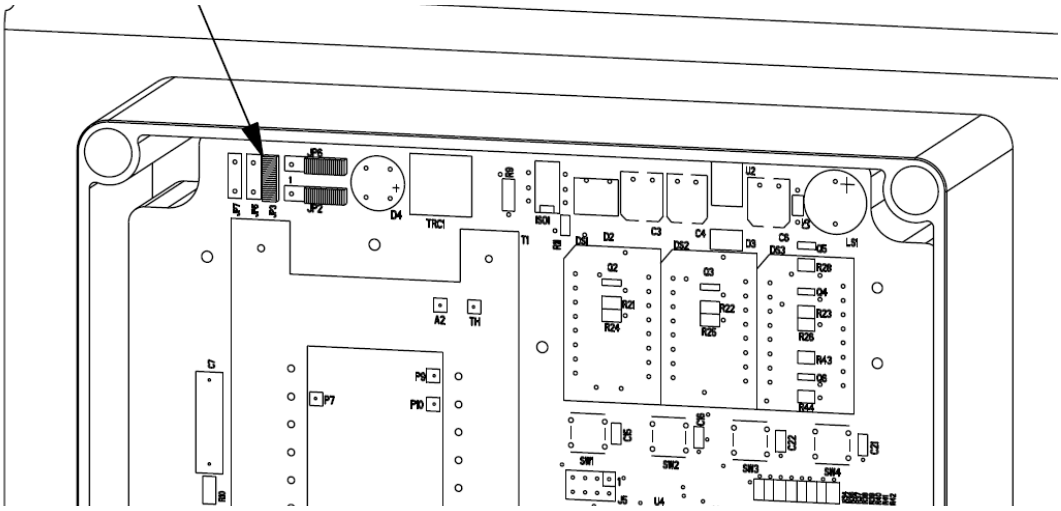


Figure 5-48: Output voltage jumper

d. For units equipped with the GOYEN sequential timer, ensure the following requirements are met:

i. Ensure the **Valve Selection Switches** are in the correct position for the application. For systems with two purge valves, the first two switches must be in the **ON** position and all other switches must be in the **OFF** position. For systems with three purge valves, the first three switches must be in the **ON** position and all other switches must be in the **OFF** position.

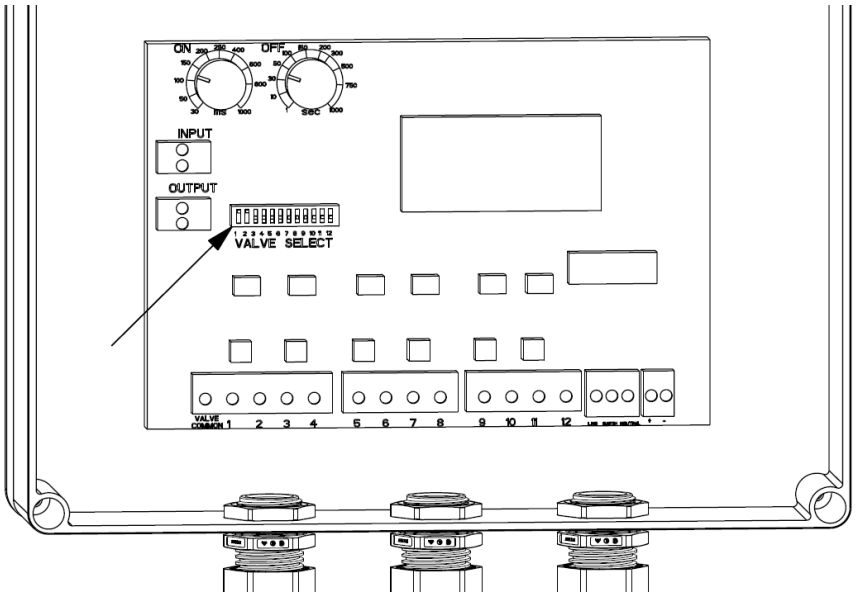


Figure 5-49: Valve selection switches

ii. Ensure the **ON Time** knob is set to **110 milliseconds**✻.

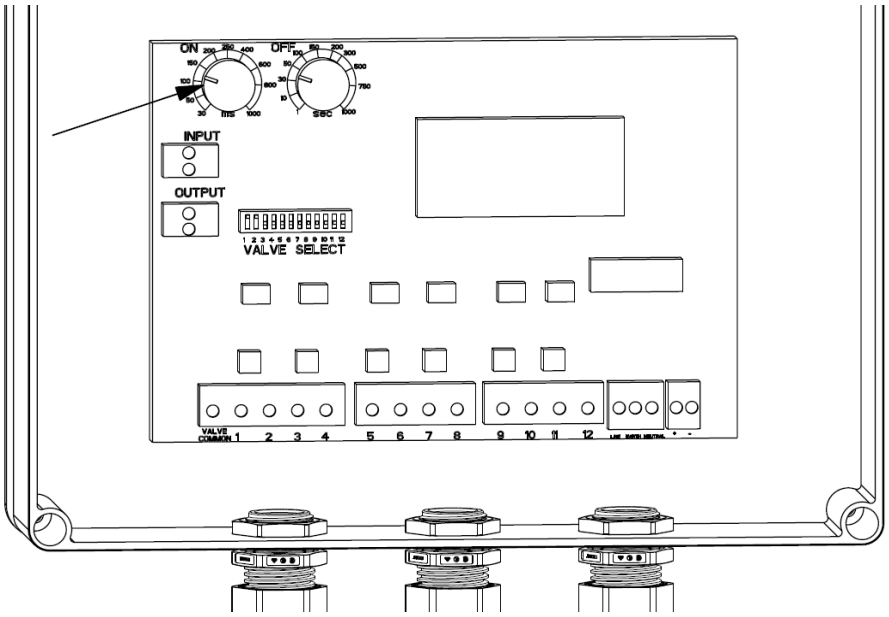


Figure 5-50: On time knob

iii. Ensure the **OFF Delay** knob is set to **30 seconds**✻.

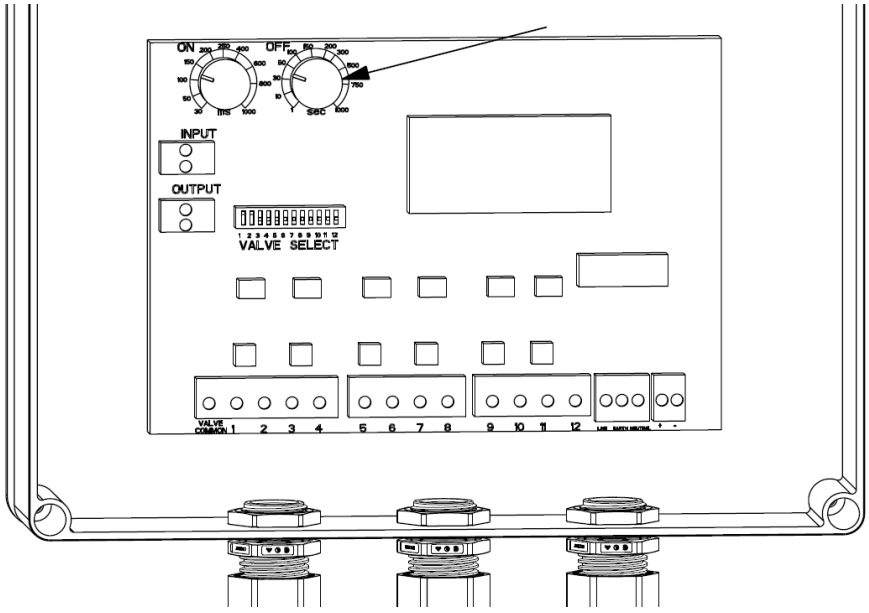


Figure 5-51: Off delay knob

✻ Each CVSAP installation is unique and may require adjustment during commissioning. Adjustment or operation of the system at any other setting without prior approval of Walinga will void the warranty.

e. Ensure the sequential timer enclosure is equipped with the required number of cable glands. One gland is required for the power supply wires, and one gland for each purge valve to ensure the enclosure remains well sealed against moisture and contaminants.

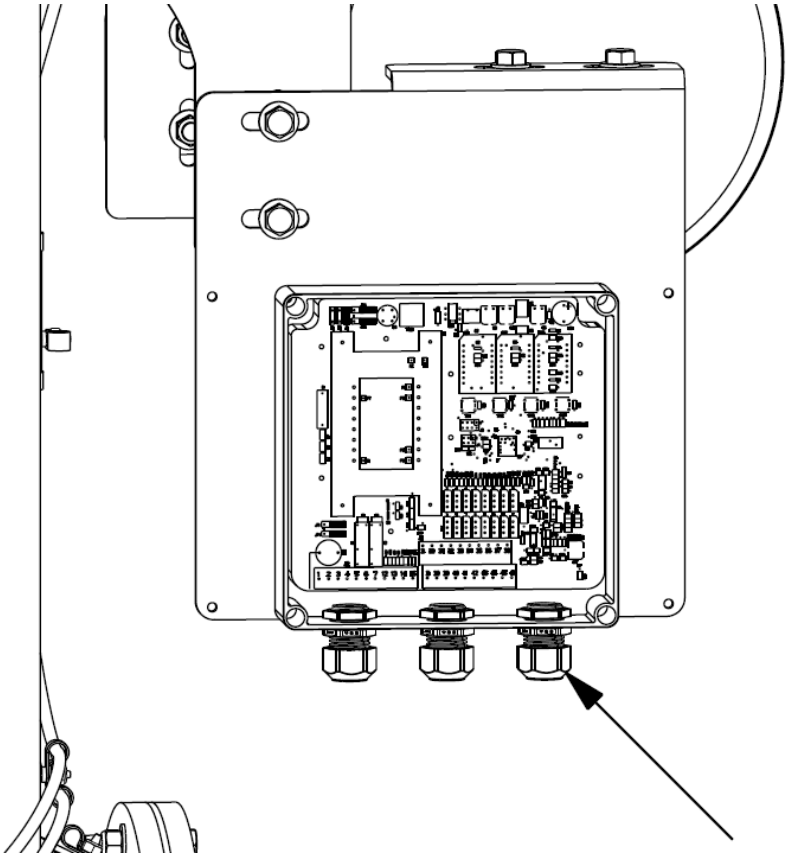


Figure 5-52: Cable gland installation

7. For units equipped with an HMI control panel, proceed as follows, otherwise proceed to *Step 8*.
   a. Ensure the HMI control panel is secured to the mounting position. **Note:** for systems installed in a classified area, ensure the mounting position of the control panel complies with all local requirements and regulations for classified areas.
   b. Ensure the system is configured such that the purge valve activation time is set to **110 milliseconds**✻ and the off delay time is set to **30 seconds**✻.

✻ Each CVSAP installation is unique and may require adjustment during commissioning. Adjustment or operation of the system at any other setting without prior approval of Walinga will void the warranty.

8. Verify the connection of the purge valves or pilot valves to the sequential timer or PLC of the HMI control panel. The connections must be as follows in ***Table 5-1***. If the valves are not connected, prepare a three-wire cable with a minimum wire cross-sectional area of 0.75 mm^2 (18 AWG), as recommended per the manufacturer or as required to comply with local regulations, for each of the valves. Ensure there is a sufficient length of wire to prevent a traction from acting on the terminals. Ensure the electrical lines are routed and secured such that they will not contact any rotating components, sharp edges, abrasive conditions, and are protected from contact with fluids or lubricants.

Table 5-1: Terminal connections to valves

Valve	TUЯBO Sequential Timer			GOYEN Sequential Timer			HMI Control Panel (M221 PLC)		
Purge Valve 1	*Ground*	*Common*	*Input*	*Ground*	*Common*	*Input*	*Ground*	*Common*	*Input*
	3	**30**	**39**	**EARTH**	**VALVE COMMON**	**1**	**GND**	**0V**	**FUQ0**
Purge Valve 2	*Ground*	*Common*	*Input*	*Ground*	*Common*	*Input*	*Ground*	*Common*	*Input*
	3	**30**	**40**	**EARTH**	**VALVE COMMON**	**2**	**GND**	**0V**	**FUQ1**
Purge Valve 3 (If equipped)	*Ground*	*Common*	*Input*	*Ground*	*Common*	*Input*	*Ground*	*Common*	*Input*
	3	**30**	**41**	**EARTH**	**VALVE COMMON**	**3**	**GND**	**0V**	**FUQ2**
Pilot Valve 1	*Common*		*Input*	*Common*		*Input*	*Common*		*Input*
	30		**39**	**VALVE COMMON**		**1**	**0V**		**FUQ0**
Pilot Valve 2	*Common*		*Input*	*Common*		*Input*	*Common*		*Input*
	30		**40**	**VALVE COMMON**		**2**	**0V**		**FUQ1**
Pilot Valve 3 (If equipped)	*Common*		*Input*	*Common*		*Input*	*Common*		*Input*
	30		**41**	**VALVE COMMON**		**3**	**0V**		**FUQ2**

9. For units equipped with a sequential timer, proceed as follows.
    a. Ensure the electrical power supply meets the requirements of the installed sequential timer as detailed in ***Table 5-2*** below.

Table 5-2: Sequential timer power supply

	Voltage	Frequency	Power
TUЯBO	24 VAC ±10%	50 / 60 Hz	25 W
GOYEN	24 VDC	—	25 W

b. Install a disconnect switch along the electrical power supply line to the sequential timer. The electrical supply to the sequential timer must be protected by an appropriately rated differential switch and bipolar magneto thermic switch, in compliance with local regulations. These components are to be supplied by the owner/operator.

c. Connect the electrical power supply to the sequential timer with reference to ***Table 5-3*** for the required terminal connections. The power supply wires must have a minimum cross-sectional area of 0.75 mm^2 (18 AWG). The ground wire must be connected first. Ensure there is a sufficient length of wire to prevent a traction from acting on the terminals.

Table 5-3: Sequential timer power supply terminal connections

	Description	Terminal
TUЯBO	Live	1
	Neutral	2
	Earth Ground (GND)	3
GOYEN	Positive	+
	Negative	-

d. Engage power to the sequential timer.

e. For the TUЯBO sequential timer, configure the settings as follows:

   i. Reinstall the sequential timer display plate.

   ii. Press **OK** to clear any codes or errors displayed.

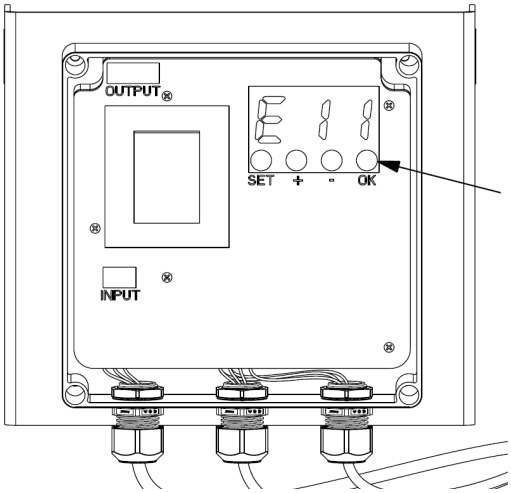


Figure 5-53: Error code clearance

iii. Ensure the sequential timer parameter functions are correctly configured as follows:

I. Press **SET** to access the programming mode. The letter **F** should flash on the display.

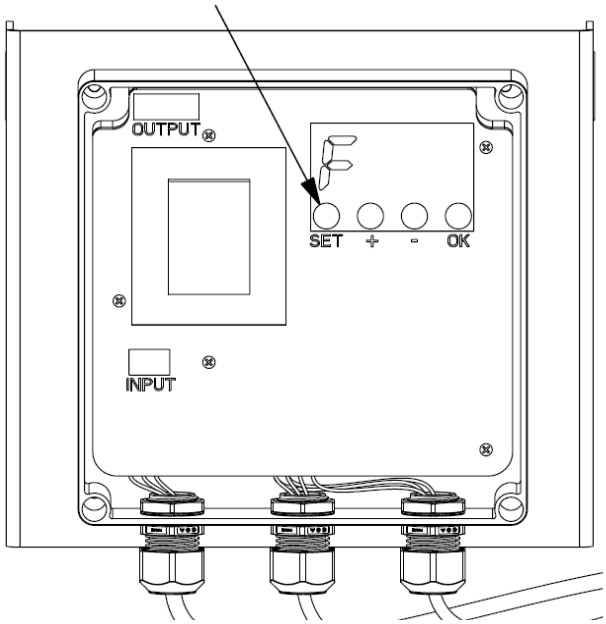


Figure 5-54: Programming mode access

II. Press **+** and **-** to scroll through the list of functions.

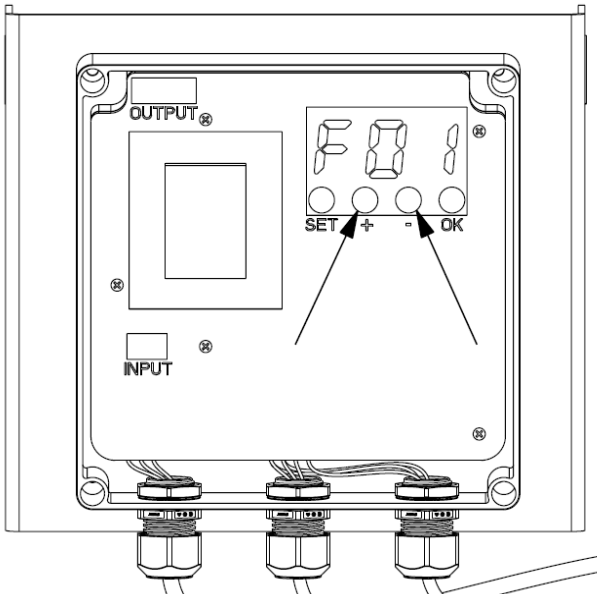


Figure 5-55: Menu navigation

III. Press **OK** to select the displayed function.

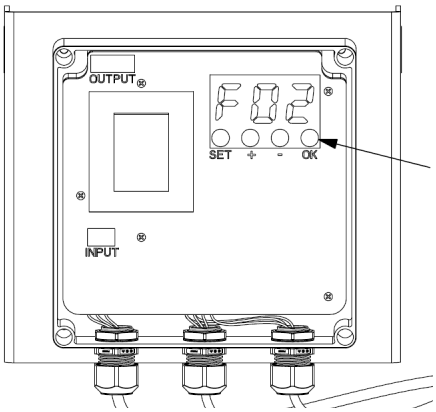


Figure 5-56: Function parameter access

IV. The value of the function will be displayed on the screen. Increase or decrease the value of the parameter using the **+** and **-** buttons with reference to ***Table 5-4*** below.

Table 5-4: Sequential timer function parameters

Function	Description	Value
F02	Solenoid valve activation time	0.11 ✻
F03	Washing pause between solenoid valves	30 ✻
F04	Number of connected outputs	2 (3" / 4" units) 3 (5" / 6" units)
F05	Output voltage setting, must agree with jumpers	d24

V. Press **OK** to confirm the value and return to the function list.

VI. Repeat **Step b** through **Step e** to confirm all required functions.

VII. Press and hold **SET** and **OK** until **— — —** is displayed.

VIII. Press **-**, press **OK**, and press **+**.

IX. Use **+** and **-** to navigate to F65 and press **OK**.

X. Set the parameter to 0 and press **OK**.

XI. Once all functions have been properly adjusted, press **SET** to exit the programming mode.

f. Reinstall the cover of the sequential timer enclosure.

✻ Each CVSAP installation is unique and may require adjustment during commissioning. Adjustment or operation of the system at any other setting without prior approval of Walinga will void the warranty.

To establish power to the system, proceed as follows:

1. Ensure the area is clear of any bystanders and individuals not involved in the assembly and installation of the CVSAP, especially small children.
2. Turn the power off and lock-out all power supplies before attempting any electrical installation.
3. Ensure all electrical switches are in the OFF position.
4. Ensure all electrical installation, service and maintenance is performed by a licensed electrician in accordance with ANSI/NFPA 70 standard, the National Electric Code, and all other local codes and regulations.
5. Open the filter access door to prevent the explosion vent from rupturing in the event of an unintentional or unexpected start-up or reverse operation of the system, reference ***Figure 5-41***.
6. Prepare the power supply for the electric motors. Refer to the name plate of both motors to ensure the power supply meets the requirements of each motor.

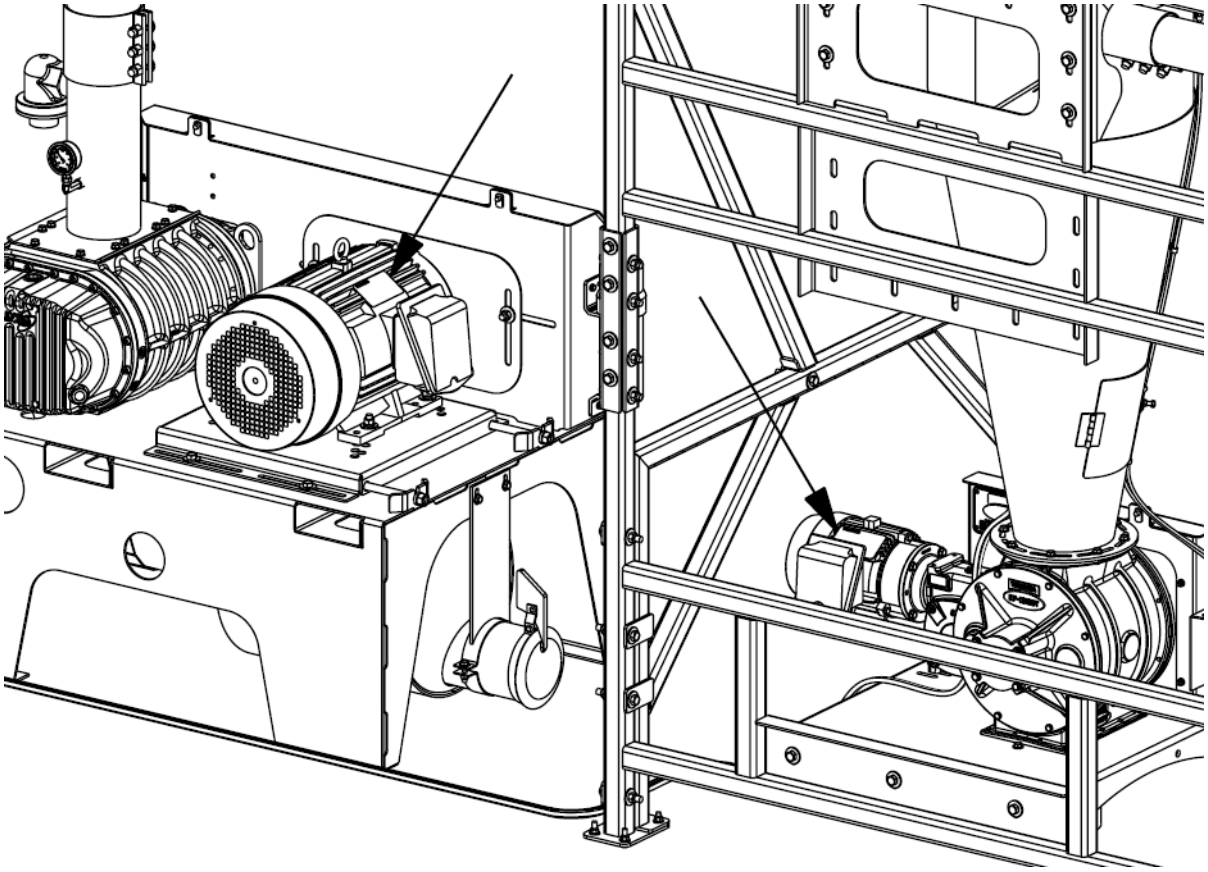


Figure 5-57: Motor name plates for power supply requirements

7. It is the responsibility of the owner/operator to supply an appropriate control panel incorporating a sufficient method of overcurrent protection, a power disconnect switch, and motor starter for each motor in addition to any remote pendant control stations. Contact your Walinga dealer or representative for available standard, advanced HMI and PLC, and custom control panels configured to the application.

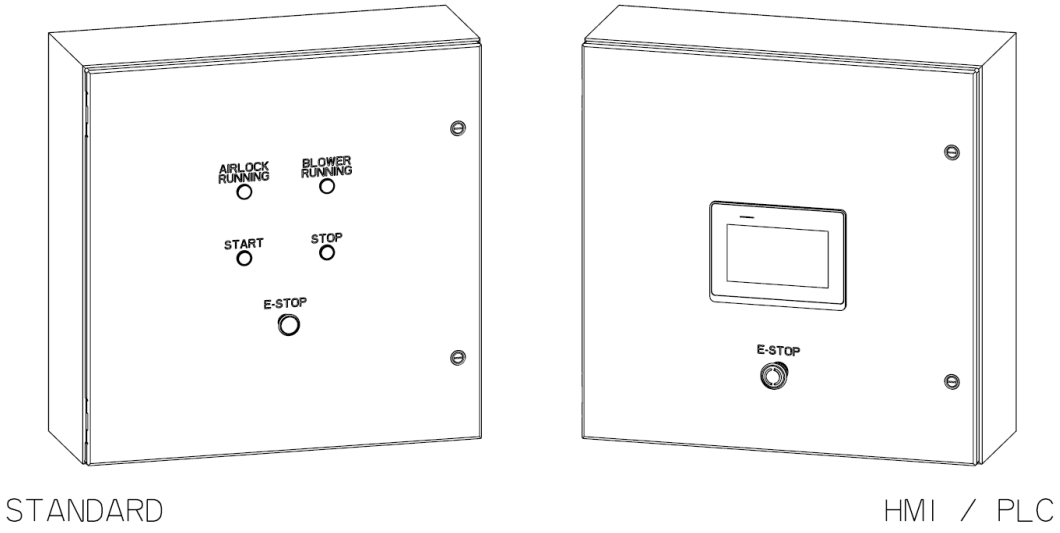


Figure 5-58: Walinga control panels

8. Connect the blower motor starter to the electric motor of the blower. Ensure the motor is properly grounded.

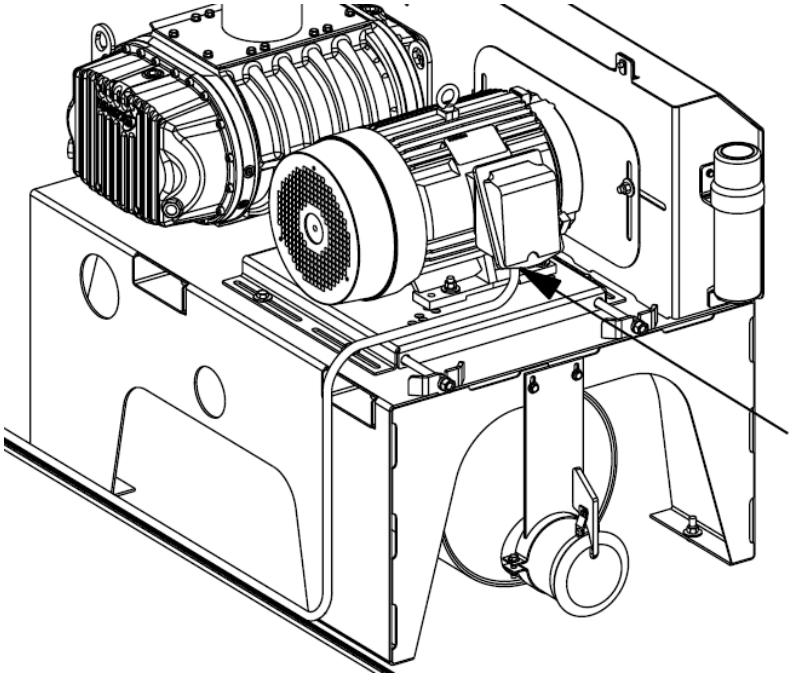


Figure 5-59: Blower motor power supply connection to conduit box

9. Connect the airlock motor starter to the electric motor of the airlock. Ensure the motor is properly grounded.

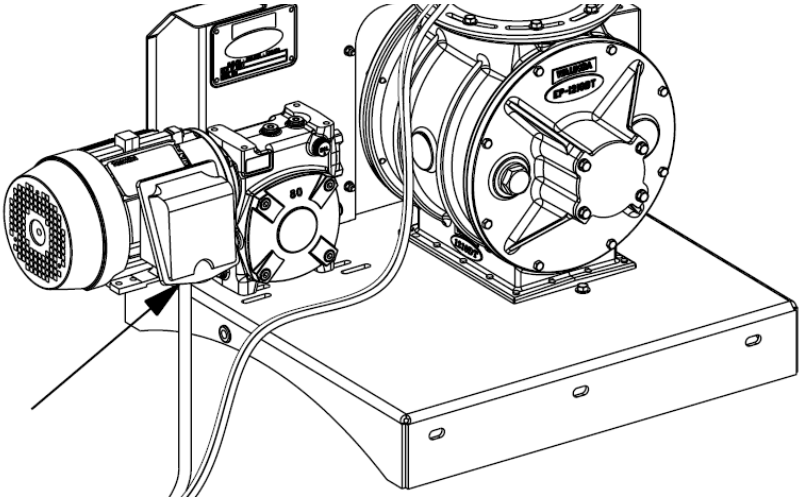


Figure 5-60: Airlock motor power supply connection to conduit box

10. Refer to any provided electrical schematic and system plans to connect any additional features and accessories as required including but not limited to:
    - Bin level sensor
        - Functions to stop the system if the level of product in the discharge receptacle reaches to the sensor.
    - Bin presence sensor
        - Functions to stop the system if the discharge receptacle is not in place or properly positioned.
    - Magnetic burst sensor
        - Functions to stop the system in the event that the explosion relief vent ruptures.
    - Pendant station controls
        - Functions to remotely start and stop the system.
    - Thermal overload protection
        - Functions to stop the system if a motor overheats.
    - Slide gate control
        - Functions to control the opening and closing of a slide gate upon start up and shut down of the system.
    - External *RUN* or *STOP* commands
        - Functions to start and stop the system from an external signal or control system.

11. Ensure all electrical lines are routed and secured such that they will not contact any rotating components, sharp edges, abrasive conditions, and are protected from contact with fluids or lubricants.
12. Ensure the filter access door is open and briefly engage power to the blower motor to perform a bump test to confirm correct direction of rotation, monitoring the drive belts through the view slots. The blower drive shaft must rotate in a counter-clockwise direction when viewed from the drive end. Ensure the rotation of the blower drive belts is as seen below. Reverse the polarity of the electric motor if necessary to achieve the correct rotational direction.

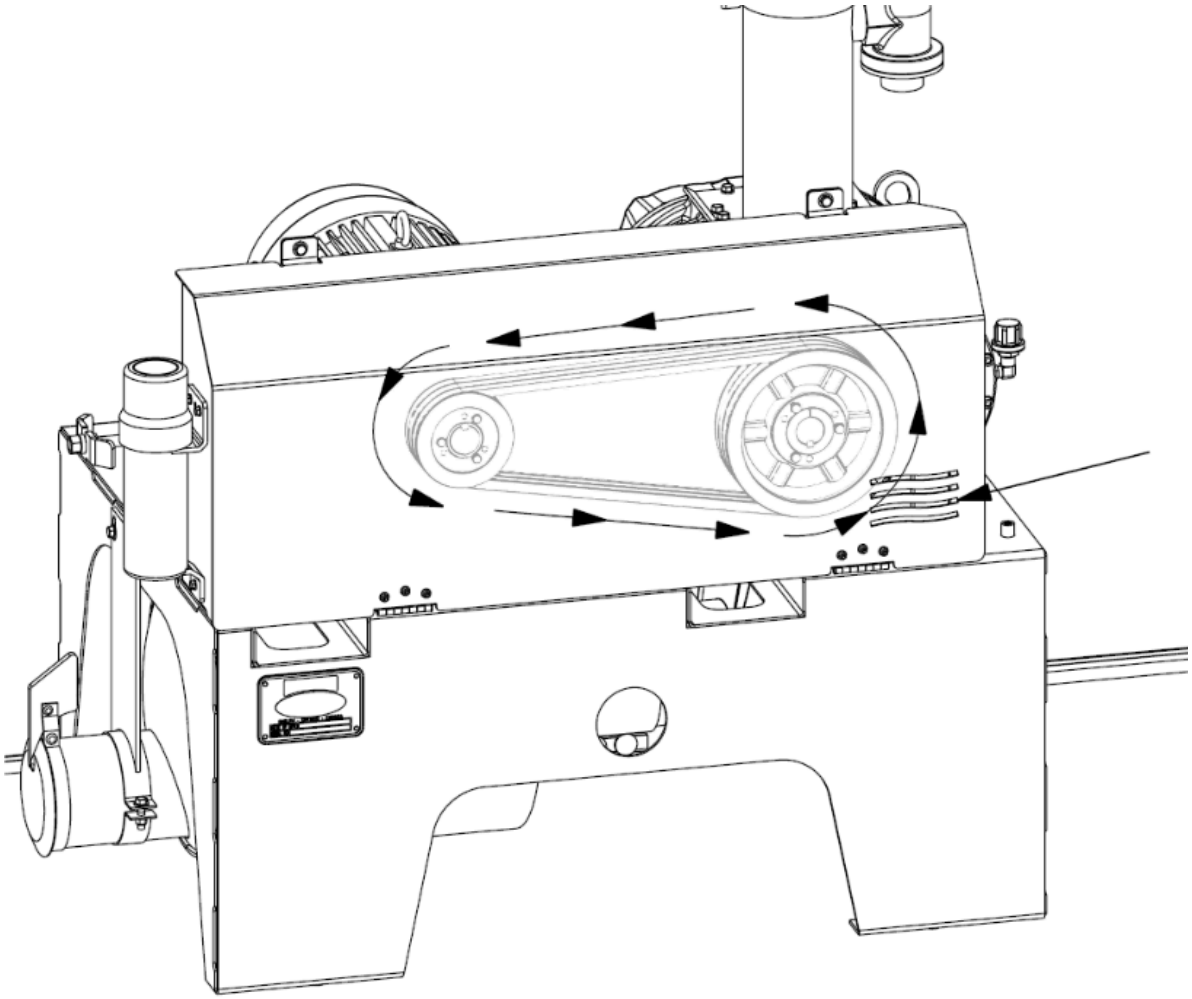


Figure 5-61: Blower drive system rotation

13. Ensure the filter access door is open and briefly engage power to the airlock motor to perform a bump test to confirm correct direction of rotation, monitoring the drive chain through the view slots. The airlock must rotate in a counter-clockwise direction when viewed from the drive end. Ensure the rotation of the airlock chain drive is as seen below. Reverse the polarity of the electric motor if necessary to achieve the correct rotational direction.

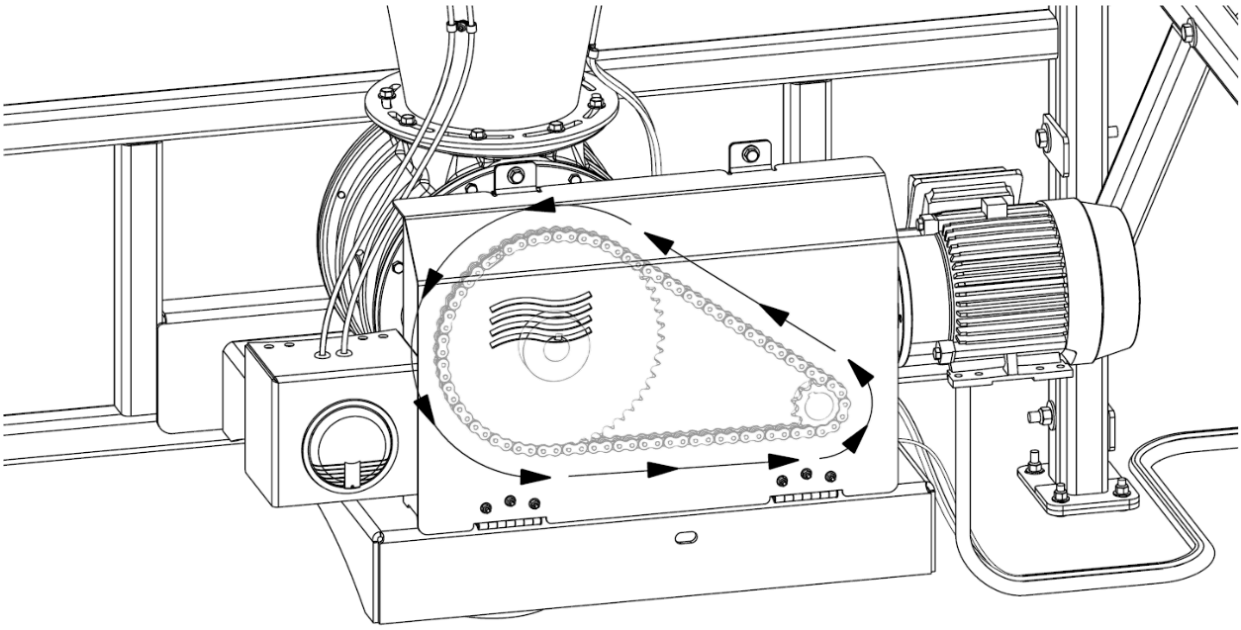


Figure 5-62: Airlock drive system rotation

14. To protect the explosion relief vent from rupture in the event of an occluded or full discharge receptacle, a bin level sensor must be installed, reference ***Figure 5-6*** for proper installation and positioning. The sensor must be calibrated to the application as follows:
    a. Ensure the power to the airlock and blower are turned off and locked out. The power supply to the bin level sensor must remain on for calibration.
    b. Verify the bin level sensor is properly connected to the *BIN SENSOR* or *BIN FULL* terminals within the control panel as detailed in the application's electrical schematic.

c. Introduce a sufficient amount of product into the airlock outlet such that the sensor is completely submerged. Alternatively, a uniform piece of dry cardboard may be held in contact with the sensing surface of the sensor.
NOTE: For the most accurate performance, the sensor should be calibrated when in contact with a dry sample of the intended conveyed material.

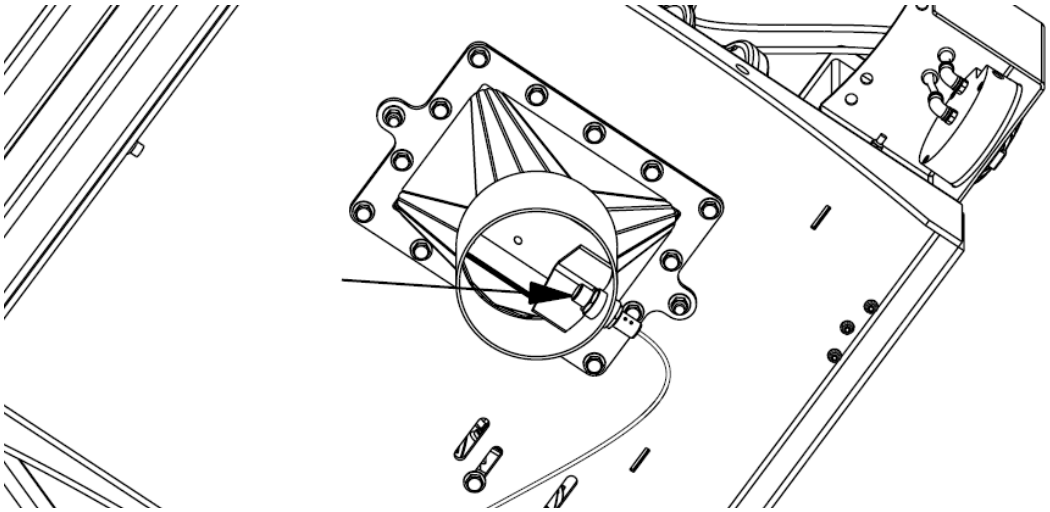


Figure 5-63: Sensor within airlock outlet

d. Using a small flat head screwdriver, turn the potentiometer of the sensor clockwise (higher sensitivity) until the sensor output signal and LED are activated.

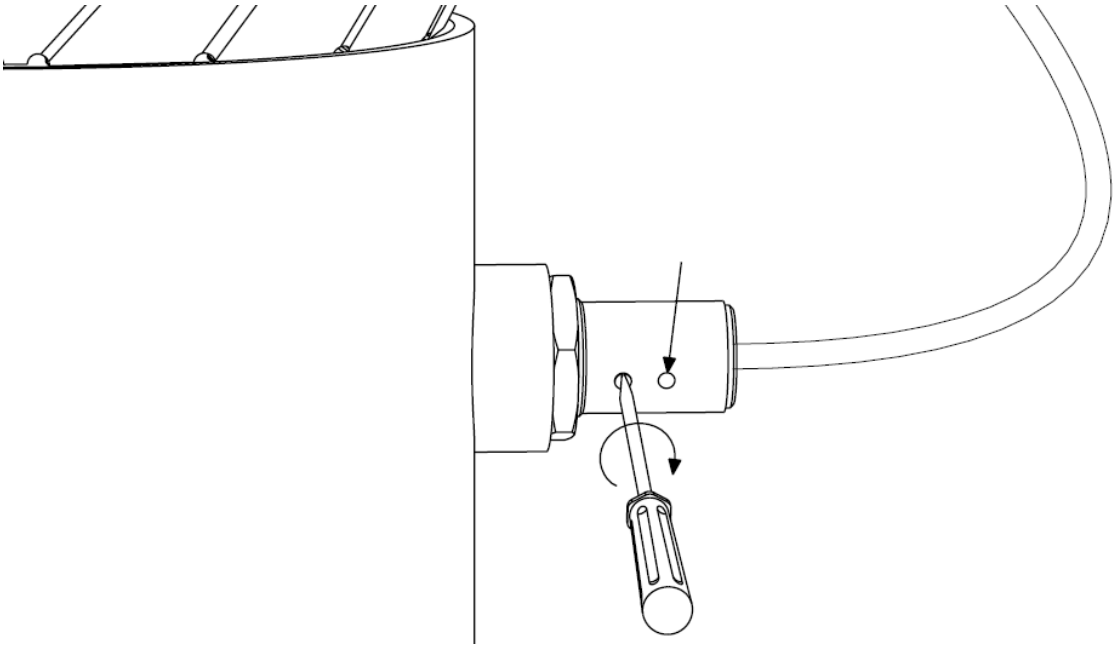


Figure 5-64: Initial potentiometer adjustment

e. Turn the potentiometer of the sensor counter-clockwise (lower sensitivity) until the output signal and LED have deactivated.

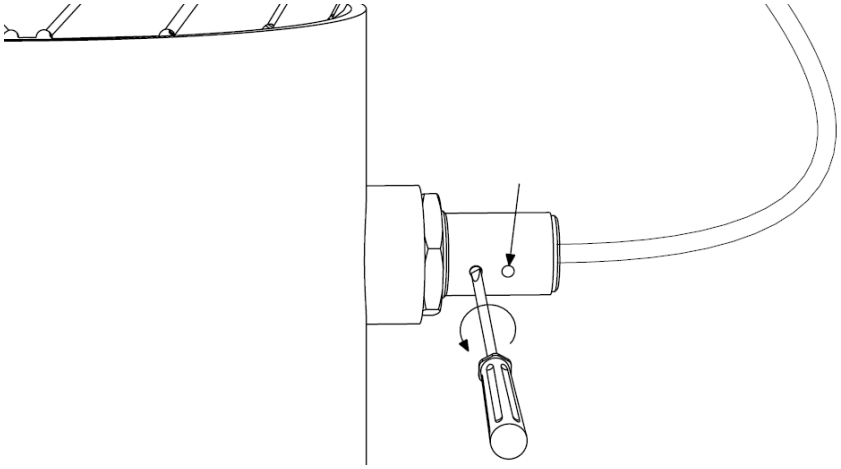


Figure 5-65: Secondary potentiometer adjustment

f. Slowly turn the potentiometer of the sensor clockwise just until the output signal and LED are re-activated, then turn an additional 1/4 turn (90°) clockwise.

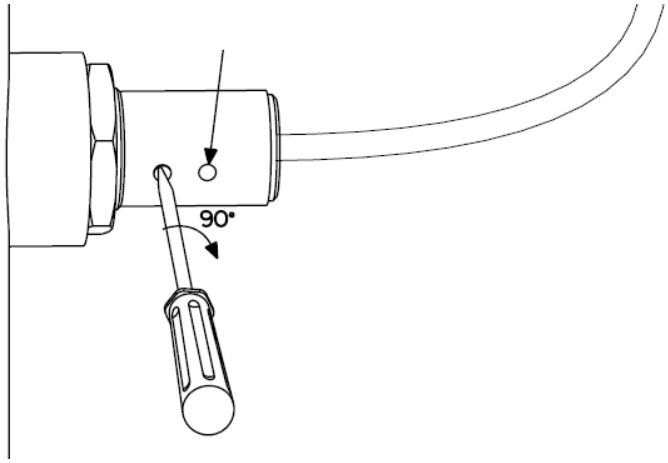


Figure 5-66: Final potentiometer adjustment

g. Clear the product from the airlock outlet.

h. After performing the pre-operation procedures detailed in **Section 6: Operation**, follow the standard operating procedures and operate the CVSAP until the sensor becomes submerged. Verify the shutdown sequence is activated when product reaches the sensor. Recalibrate as necessary, raising the sensitivity as required (clockwise rotation of the potentiometer).

15. Verify that all guards are installed and secured.

16. Proceed to the *Break-In Inspections* detailed in the following section

Break-In Inspections

There are no operational restrictions on the CVSAP when used for the first time, however, during the initial break-in period, the following features should be inspected more frequently than the recommended maintenance schedule. With reference to **Section 7: Maintenance and Adjustments**, inspect the CVSAP as follows:

Before initial operation of the CVSAP:

1. Clear the area of all bystanders, especially small children.
2. Place all controls in neutral, disconnect and lock-out all electrical power sources, disconnect the compressed air source, and relieve the air pressure from the system.
3. Inspect the interior of the blower, airlock, AMS, and conveying lines for any foreign material or debris and clean as required.
4. Check the alignment and tension of the airlock drive system and blower drive system.
5. Rotate the drive shaft of the blower by hand to ensure it turns freely.
6. Verify the oil level of the drive-end and idle-end reservoirs of the blower and the oil level of the gearbox.
7. Check the torque of all fasteners and tighten as required.
8. Ensure all guards are installed and secured.

After operating the CVSAP for **30 minutes**:

1. Clear the area of all bystanders, especially small children.
2. While in operation:
    a. Read the differential pressure gauge to ensure the filters are clean and purging correctly. The gauge should read less than 6 in WC (1.5 kPa).
    b. Ensure the header tank maintains a pressure of 70 psi (483 kPa).
    c. Listen to the blower and airlock for any excessive noise produced by the bearings, rotors or impellers.
    d. Listen and inspect the AMS, airlock, blower, and conveying lines for any air leaks.
    e. Monitor the blower outlet for any signs of dust or particulates.
3. Place all controls in the neutral or off position, disconnect and lock-out all electrical power sources, disconnect the compressed air source, and relieve the air pressure from the system.
4. Refer to the auxiliary equipment's operator's manual to measure the temperature of the blower, airlock and motors.
5. Re-torque all fasteners and hardware to the required specifications.

6. Rotate the drive shaft of the blower by hand to ensure it turns freely.
7. Inspect all air lines and fittings to ensure none are pinched, rubbing, crimped, leaking, or damaged. Re-align or replace any damaged lines or fittings as required. Measure the electrical continuity of all couplers.
8. Inspect all electrical connections, components, and wires to ensure none are loose, exposed, or damaged. Tighten any loose connections and replace any damaged wires or components.
9. Check the oil level of the blower and gearbox and adjust as required.
10. Lubricate all grease fittings.
11. Open the filter access door and ensure the filters are correctly mounted, fully seated, and show no signs of damage. Replace any damaged filters.
12. Ensure all guards and accesses are closed and secured before resuming operation.

After operating the CVSAP for **5 hours**:

1. Clear the area of all bystanders, especially small children.
2. Perform all inspections detailed for the first **30 minutes** excluding *Step 10*.
3. Ensure all guards and accesses are closed before resuming normal operation.

After operating the CVSAP for **50 hours**:

1. Clear the area of all bystanders, especially small children.
2. Perform all inspections detailed for the first **30 minutes** excluding *Step 10*.
3. Check the alignment and tension of the airlock drive chain and adjust as required.
4. Check the alignment and tension of the blower drive belts and adjust as required.
5. Ensure all guards and accesses are closed before resuming normal operation.
6. Proceed with normal operation, following the recommended maintenance schedule.

STORAGE

To prepare the CVSAP for a prolonged period of inactivity and to prevent unnecessary down-time when preparing the machine for use after storage, it is important to carefully follow the storage preparation procedures.

To prepare the CVSAP for storage, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Follow the standard operating procedures to use the CVSAP to clear any accumulated dirt, dust, debris, or residue from the surfaces of the CVSAP.
3. Shut down the blower and allow the purge system and airlock to operate without vacuum pressure to clear any accumulations from the surface of the filters.
4. Allow the airlock to continue operating for a short period, typically around 4 minutes, to ensure the AMS is clear.
5. Drain any accumulated moisture from the header tank through the use of the drain valve.

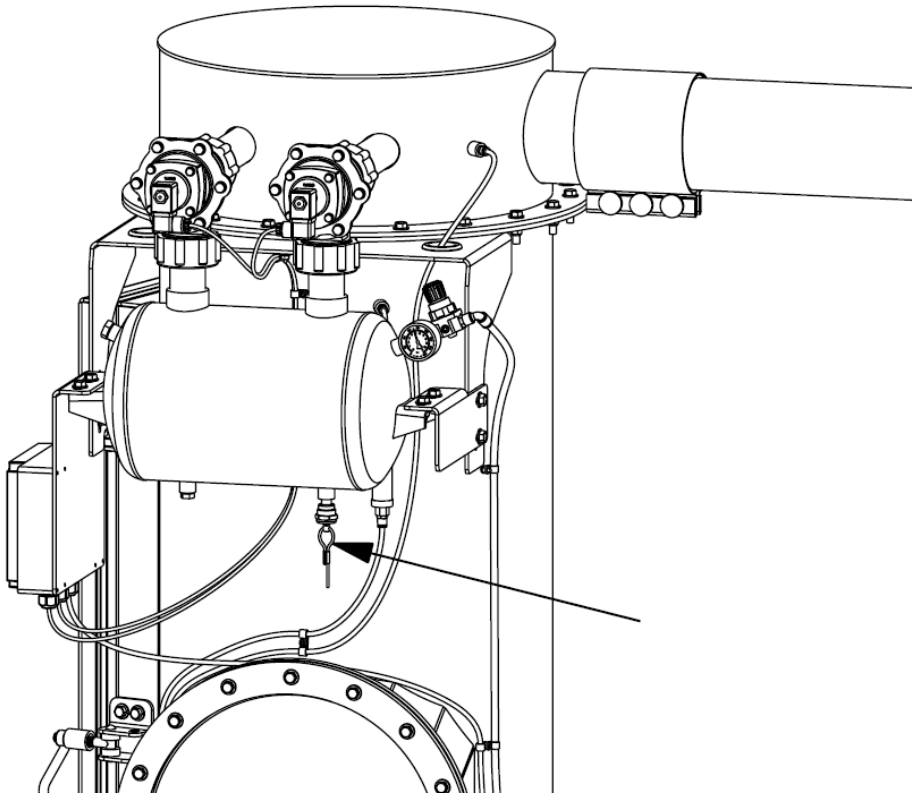


Figure 5-67: Header tank drain valve

6. Place all controls in neutral, disconnect and lock-out all electrical power sources, wait 30 seconds for internal capacitors to discharge before opening electrical enclosures, disconnect the compressed air source, and relieve the air pressure from the system.

7. Thoroughly inspect the CVSAP for any damaged or worn components; repair or replace any components as required before storage with reference to **Section 7: Maintenance and Adjustments** to prevent down-time after storage.
8. Inspect all the air lines, fittings, couplers and components. Tighten any loose fittings and replace any damaged components. Replace any hose that has been cut, nicked, or abraded.
9. Inspect all electrical connections, components, and wires to ensure none are loose, exposed, or damaged. Tighten any loose connections and replace any damaged wires or components.
10. Thoroughly clean the CVSAP and filters:
    a. Refer to **Section 7: Maintenance and Adjustments** to clean the filters.
    b. With the filters removed, wash the interior surfaces of the CVSAP housing and airlock using a combination of water, scrapers and solvent as required. Ensure any solvent used is approved for use in the application if the CVSAP is used in a material handling system, especially in food-grade applications.
    c. Wash the airlock thoroughly using a water hose or pressure washer to remove all dirt, dust, debris, and residue. The internal surfaces of the airlock can be cleaned through flushing. To flush the internal surfaces, proceed as follows:
        i. Configure the outlet to allow free discharge of water.

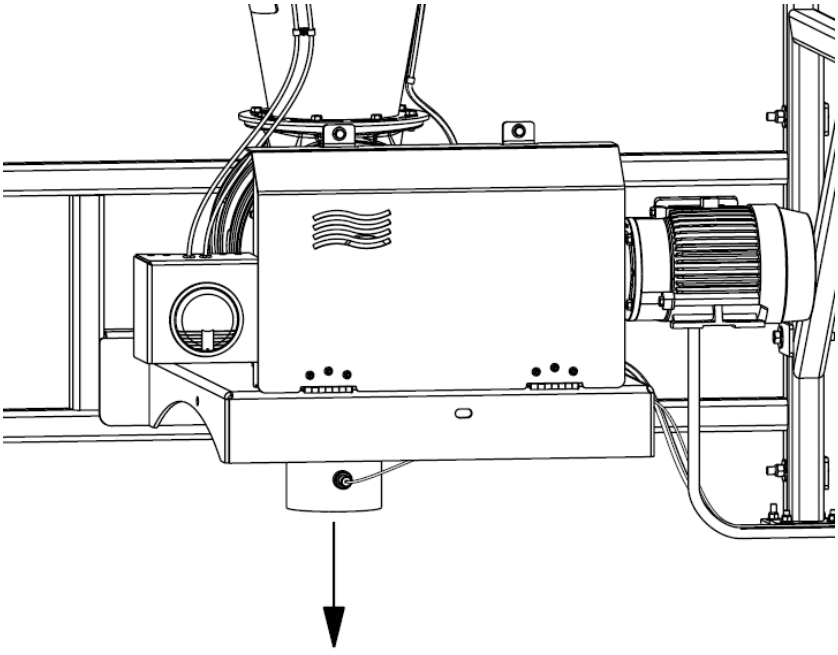


Figure 5-68: Unobstructed airlock outlet

        ii. Run the airlock at a high idle speed with the airlock rotating.

iii. Direct water through the access door or inlet of the AMS to allow water to enter the airlock inlet for several minutes, allowing time for the water to wash out the inner AMS surfaces, airlock casing interior, the rotating airlock blades, and the airlock inlet and outlet surfaces.

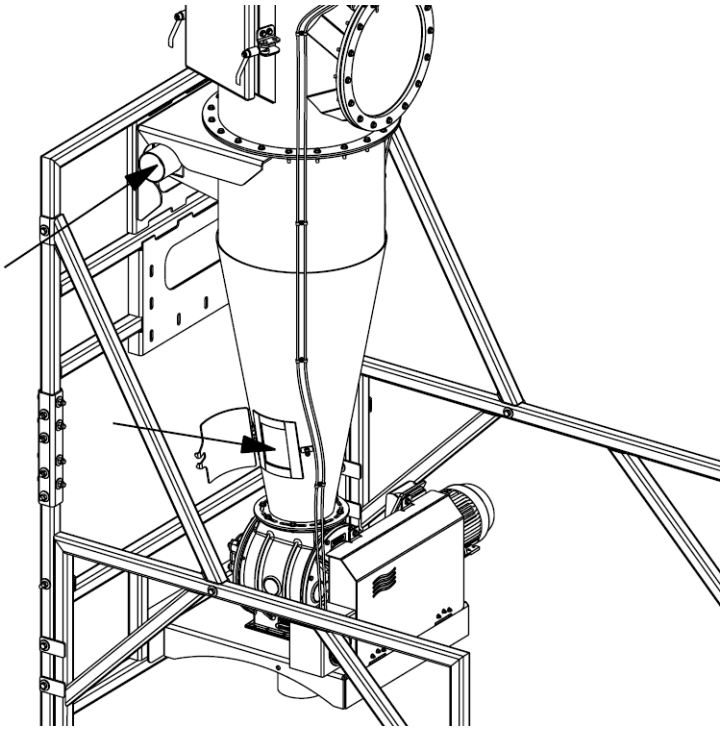


Figure 5-69: Water inlet points for airlock

iv. Stop the water flow into the inlet and continue to run the airlock for several minutes to allow all interior surfaces to completely dry.

v. When conveying materials with oily characteristics or high moisture content, including milled feeds, the airlock may need to be flushed on a more regular basis to remove residue build-up. Oily residues may require flushing and soaking with a suitable solvent to dissolve build-up. If used in a material handling system, any non-food-grade solvents must be cleaned from the machine using hot water and/or detergent flushing; ensure that any solvent used is acceptable for the intended market of the conveyed products. Alternatively, conveying a more abrasive material through the CVSAP may assist in clearing residues from the internal surfaces.

d. Wash the blower thoroughly using a water hose or pressure washer to remove all dirt, dust, debris, and residue. The internal surfaces of the blower can be cleaned through flushing. To flush the internal surfaces, proceed as follows:

i. Operate the blower at a high idle for approximately 5 minutes to allow the blower to cool. Flushing a hot blower with a cooler liquid can damage the components.

ii. Configure the blower outlet to allow water to drain freely.

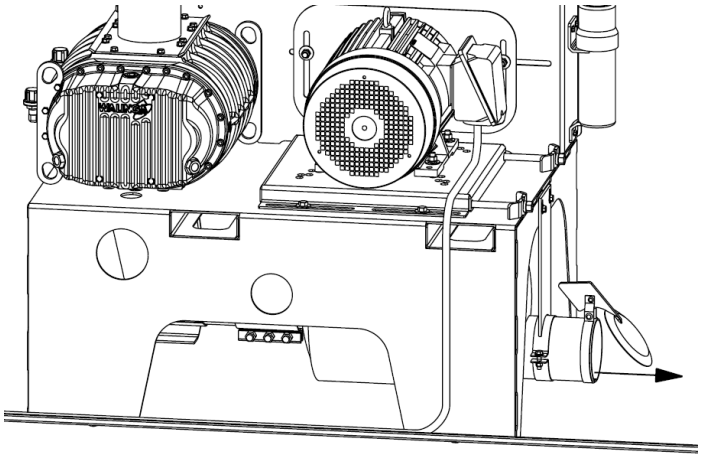


Figure 5-70: Unobstructed blower outlet

iii. Remove the connecting line from the AMS to gain access to the blower inlet.

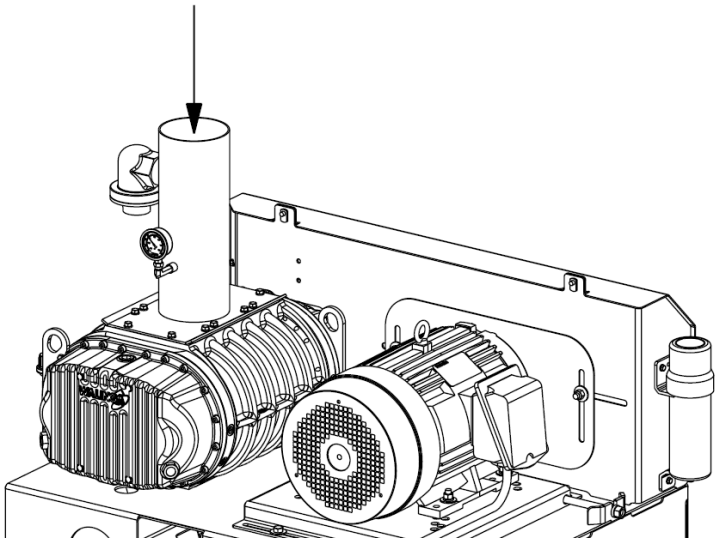


Figure 5-71: Water inlet point for blower

iv. Operate the blower at a high idle speed with the impellers rotating.

v. Allow clean water to enter the blower inlet access point for several minutes, allowing time for the water to wash out the casing interior, the impeller lobes, and the inlet and outlet assemblies. Use care to ensure water does not enter or contact the vacuum relief valve.

vi. Stop the water flow into the blower inlet and continue to run the blower for several minutes to allow all interior surfaces to completely dry.

vii. When conveying materials with oily characteristics or high moisture content, including milled feeds, the blower may need to be flushed on a more regular basis to remove residue build-up. Oily residues may require flushing and soaking with a suitable solvent to dissolve build-up. If used in a material handling system, any non-food-grade solvents must be cleaned from the machine using hot water and/or detergent flushing; ensure that any solvent used is acceptable for the intended market of the conveyed products.

e. Be sure to wash all accumulated dirt, dust, debris and residue from the surfaces of the CVSAP. Rinse any remaining solvent from the CVSAP.

f. Ensure the filters are completely dried before reinstalling within the CVSAP.

11. With reference to **Section 7: Maintenance and Adjustments**, lubricate all grease points. Ensure all grease cavities have been filled with grease to remove any water or moisture from washing.
12. Coat the internal surfaces of the airlock and blower with a rust inhibitor/anti-corrosive oil.
13. Touch up all paint nicks and scratches to prevent rusting.
14. Ensure a plug is installed and secured in every drop line coupler and the rain cap is securely positioned on the outlet assembly of the blower.

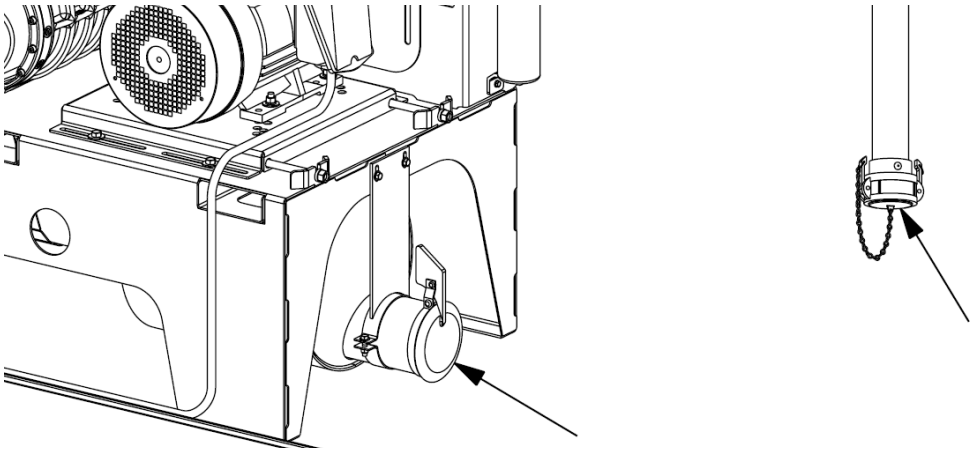


Figure 5-72: CVSAP opening closures

15. Check the oil level of the blower reservoirs and gearbox, adjust as necessary.
16. Secure all hoses and intake accessories in a storage location that is dry, free of exposure to dust, dirt and debris and does not have frequent human activity.

After storage, refer to **Section 7: Maintenance and Adjustments** to ensure all necessary maintenance tasks are completed. Once the required maintenance tasks have been completed, proceed to the standard pre-operation checks as outlined in **Section 6: Operation** and resume normal operation.

END OF LIFE

Upon completion of the functional life of the CVSAP, special care must be taken in disposal. Electronic components can release toxic elements harmful to both humans and the environment with improper disposal. Refer to your local regulations for disposal of electronic waste.

Upon completion of the functional life of the blower and/or airlock, Walinga offers a rebuilding program as a cost-effective means of keeping your blower and airlock in optimal operating condition. Contact your Walinga dealer or representative to submit your blower and/or airlock and join the rebuild program. All rebuilt and refurbished blowers and airlocks are tested to ensure ideal operation and inspected for proper tolerances and clearances to meet all requirements.

Rebuilt and refurbished blowers features:

- Complete disassembly, cleaning and inspection of all components
- Replacement of any components with excessive wear
- Re-machining and rebuilding of all components to bring to high factory standards
- New hard coating of all internal surfaces including casing, impellers, and headplates
- Dynamically re-balanced impellers
- Replacement of seals, gaskets, O-rings, and bearings as required
- Repainting of outer surfaces
- Assembly and adjustment to meet all clearance, timing and tolerance requirements

Rebuilt and refurbished airlocks feature:

- A re-machined casing to correct out-of-round wear or damage
- Re-machined end plates to correct any damage and properly aligned with the casing
- New hard coating treatments to required components
- Replacement of seals, O-rings, and bearings as required
- Replacement of rotor shafts and blades as required
- New rotor blade tips
- Repainted outer surfaces

WALINGA® INC.

Operation

CENTRAL-VAC WITH AIR PURGE

MACHINE FEATURES AND COMPONENTS

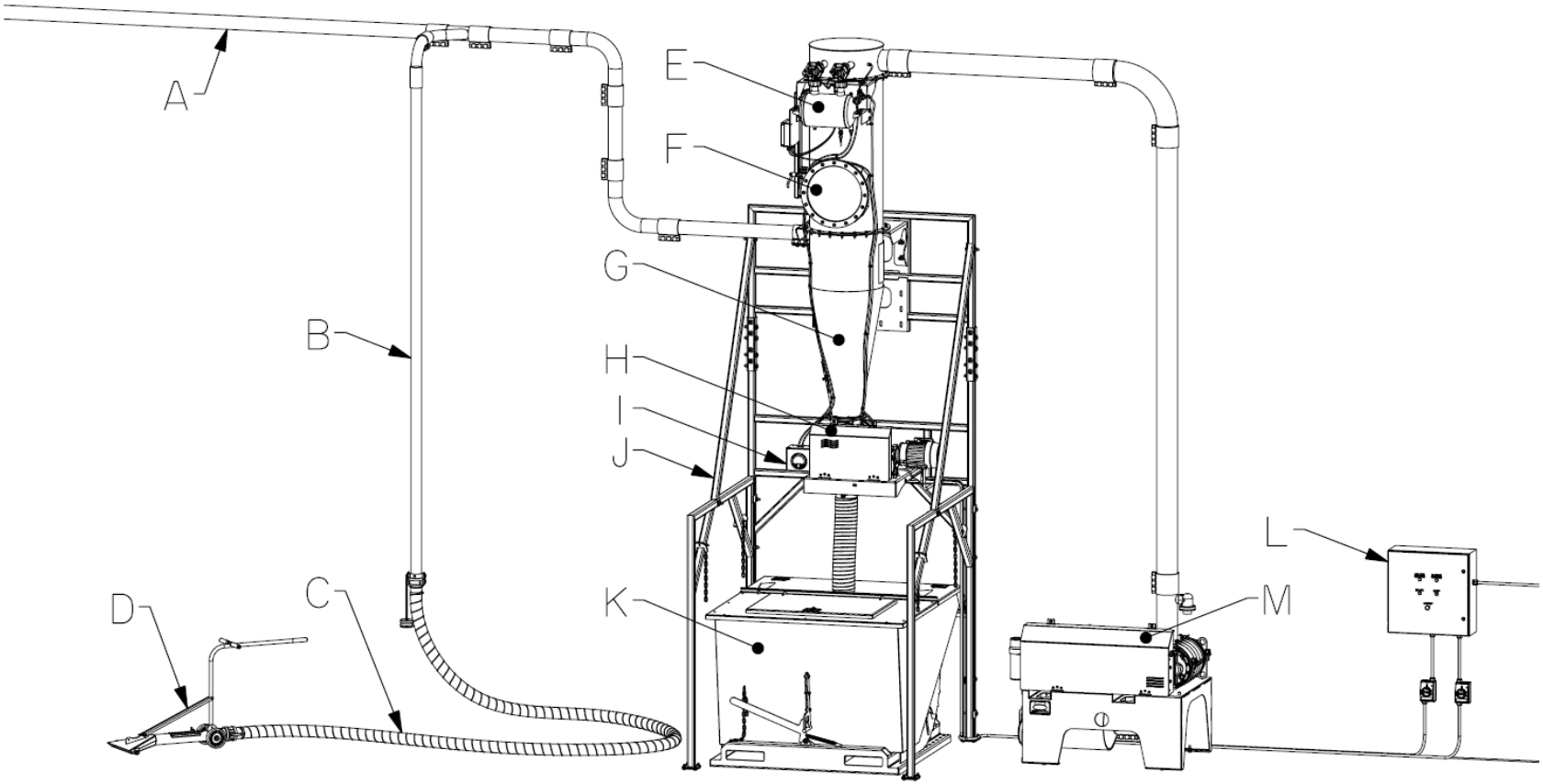


Figure 6-1: CVSAP key components

A Conveying Lines
B Drop Line
C Intake Line
D Intake Nozzle
E Purge Assembly
F Explosion Vent
G AMS Package
H Airlock Package
I Differential Pressure Gauge
J Mounting Rack
K Discharge Receptacle
L Control Panel (Reference)
M Blower Package

CONTROLS AND DISPLAYS

***Function*:** Displays the difference in pressure on either side of the filters (within the clean air plenum and dirty air plenum) to indicate the cleanliness and function of the filters.

***Range*:** The gauge is capable of measuring from 0 in WC (0 kPa) to 30 in WC (7.5 kPa). Immediately after an active purge cycle, the pressure differential will spike. After stabilization, under normal operating conditions, the pressure differential should be below 6 in WC (1.5 kPa).

***Location*:** The gauge is mounted on the left side of the airlock drive guard.

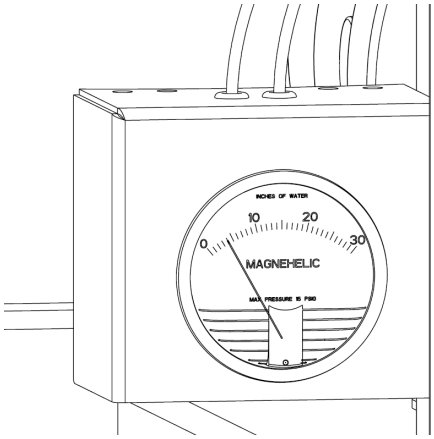


Figure 6-2: Differential pressure gauge

***Function*:** Displays the pressure within the header tank and limits the header tank pressure.

***Range*:** The pressure gauge is capable of reading from 0 psi (0 kPa) to 160 psi (1103 kPa). The pressure of the header tank must be limited to 70 psi (483 kPa).

***Location*:** The pressure regulator and gauge are mounted on the right side of the header tank.

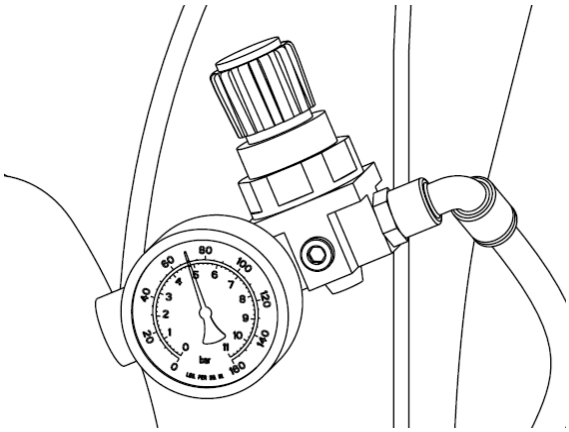


Figure 6-3: Pressure regulator and gauge

***Function*:** Displays the vacuum pressure on the intake side of the system.

***Range*:** The gauge is capable of measuring from -30 in Hg (-101.6 kPa) to 30 psi (206.8 kPa).

***Location*:** The gauge is mounted on the blower inlet assembly.

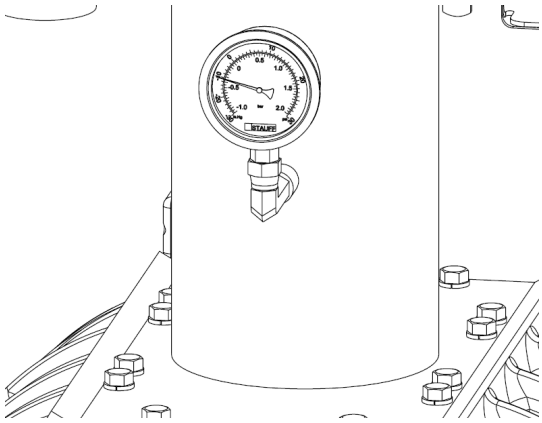


Figure 6-4: Vacuum pressure gauge

***Function*:** Displays the outlet pressure if the CVSAP is incorporated into a material handling system.

***Range*:** The gauge is capable of measuring from 0 psi (0 kPa) to 15 psi (103.4 kPa). Under normal conditions the vacuum pressure should be between 2 psi (13.8 kPa) to 6 psi (41.4 kPa).

***Location*:** The gauge is mounted on the blower package frame, connected to the outlet assembly.

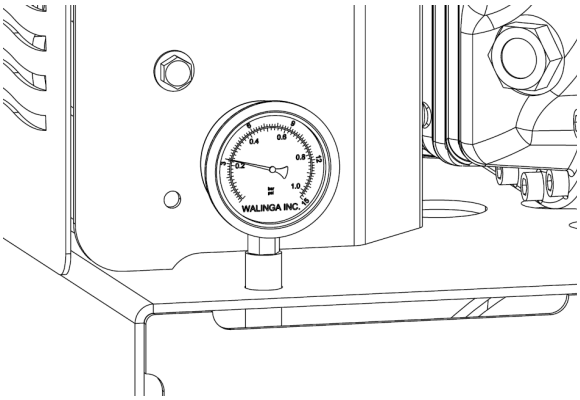


Figure 6-5: Outlet pressure gauge

***Function*:** Allows air to enter the system when the set vacuum pressure is exceeded to prevent the blower from overheating and excessive vacuum levels in situations where the intake has become restricted in some manner. The valve will automatically reseal when the excess vacuum is reduced.

***Range*:** Typical vacuum relief valve settings are -16 in Hg (-54 kPa) or -9 in Hg (-30 kPa).

***Location*:** The valve is mounted on the blower inlet assembly.

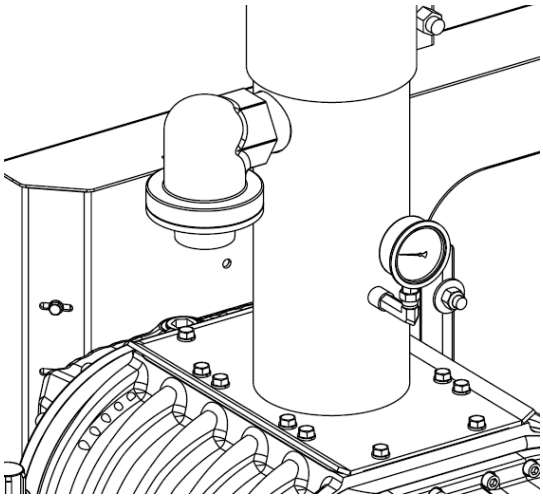


Figure 6-6: Vacuum relief valve

***Function*:** For a CVSAP installed in a material handling system, the pressure relief valve allows air to exit the discharge side of the system when the outlet pressure is exceeded to relieve the pressure buildup in situations where the discharge has become restricted in some manner. The valve will automatically reseal when the excess pressure is reduced.

***Range*:** The pressure relief valve is set to open at 15 psi (103 kPa).

***Location*:** The valve is mounted on the blower outlet assembly.

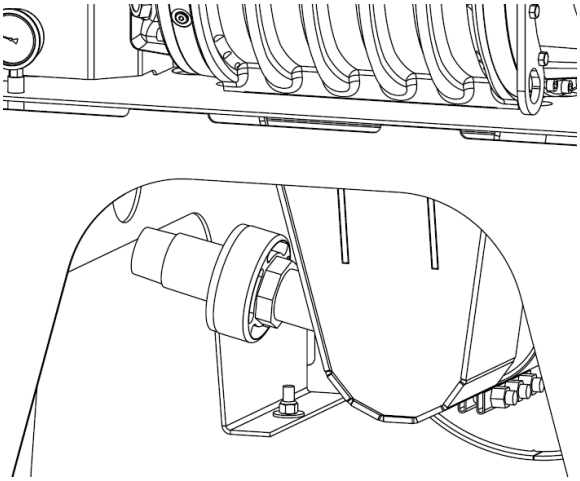


Figure 6-7: Pressure relief valve

***Function*:** Records the total running hours of the blower and can provide an instantaneous measurement of the rotational speed of the blower input shaft.

***Range*:** The meter is capable of recording total running hours from 0 to 999999 H and rotational shaft speeds from 0 to 20000 rpm.

***Location*:** The rare Earth magnet is mounted on the blower input shaft sheave with the speed pickup sensor mounted within 2 mm on the sensor bracket. The tachometer display is mounted on the right side of the blower drive guard.

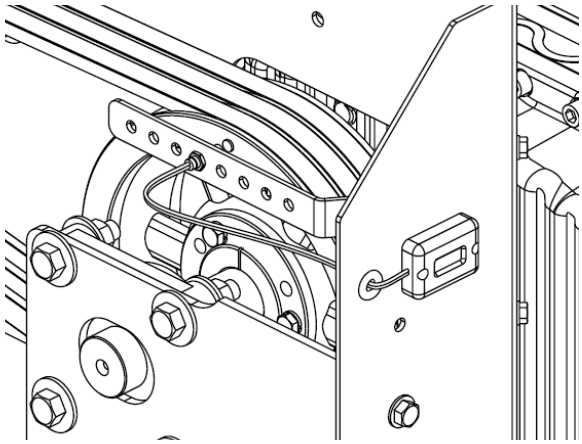


Figure 6-8: Tachometer / hour meter

***Function*:** Detects the presence of material within the airlock discharge assembly. Signals the control system to shut down the CVSAP in the event that product is detected, indicating the discharge receptacle is full or there is a blockage to protect the explosion vent from unnecessary rupture.

***Range*:** The sensitivity is adjustable for compatibility with the specific product within the system. Refer to **Section 5: Life-Cycle Procedures** to calibrate the sensor.

***Location*:** The sensor is mounted on the airlock outlet assembly.

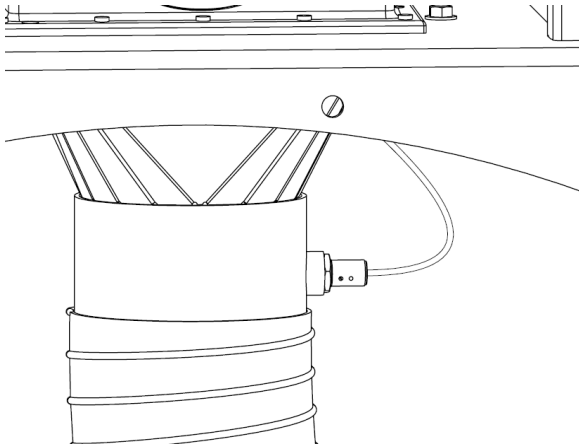


Figure 6-9: Discharge level sensor

***Function*:** Controls the activation of the purge valves, including activation time, delay time, and valve activation order. A sequential timer is not installed on units equipped with an HMI control panel.

***Range*:** The activation time must be set at 110 milliseconds*. The delay time must be set at 30 seconds*.

***Location*:** The sequential timer is typically mounted on the header tank bracket, but may be remotely mounted as required.

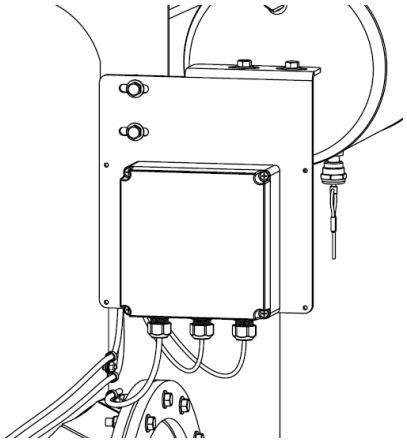


Figure 6-10: Sequential timer

* Each CVSAP installation is unique and may require adjustment during commissioning. Adjustment or operation of the system at any other setting without prior approval of Walinga will void the warranty.

✻ *The exact control panel for each CVSAP may vary, but the basic functions of the panel are as follows.*

***Function*:** The main function of the control panel is to regulate the start and shut-down sequences of the CVSAP. In some control panels, such as Walinga's HMI / PLC control panel, the control of the purge installation is also regulated, replicating the function of the sequential timer. The basic components of the control panel include the following:

- Rotary manual motor protectors
- Motor contactors
- Auxiliary motor contact blocks
- Control transformer
- Emergency stop button
- Control relays
- Multi-function timer **or** PLC
- Push buttons and status indicator lights **or** HMI

The starting sequence can be initiated by pressing the start button / icon on the control panel, pressing the start button on a pendant station or via an external run command (e.g. automation system command). Once initiated, the starting sequence will immediately start the airlock, activate the airlock running indicator and activate the purge installation. After a delay, typically 10 seconds, the blower will start, the blower running indicator will activate, and any pendant indicators will activate.

The shut-down sequence can be initiated by pressing the stop button / icon on the control panel, pressing the stop button on a pendant station, via an external stop command (e.g. automation system command), or via the activation of the bin level sensor. Once initiated, the shut-down sequence will stop the blower motor, deactivate the blower running indicator and deactivate any pendant indicator. After a delay, typically 4 minutes, the airlock motor will stop, the airlock running indicator will deactivate and the purge installation will deactivate.

An emergency stop sequence will be initiated in the event the emergency stop button on the control panel is pushed, the contact of the magnetic burst sensor is opened (indicating a rupture) or the contact of the bin presence sensor, if equipped, is opened (indicating the absence of a discharge receptacle). The emergency stop sequence will immediately stop the blower and airlock motors, deactivate the purge installation and deactivate the blower running, airlock running and pendant indicators.

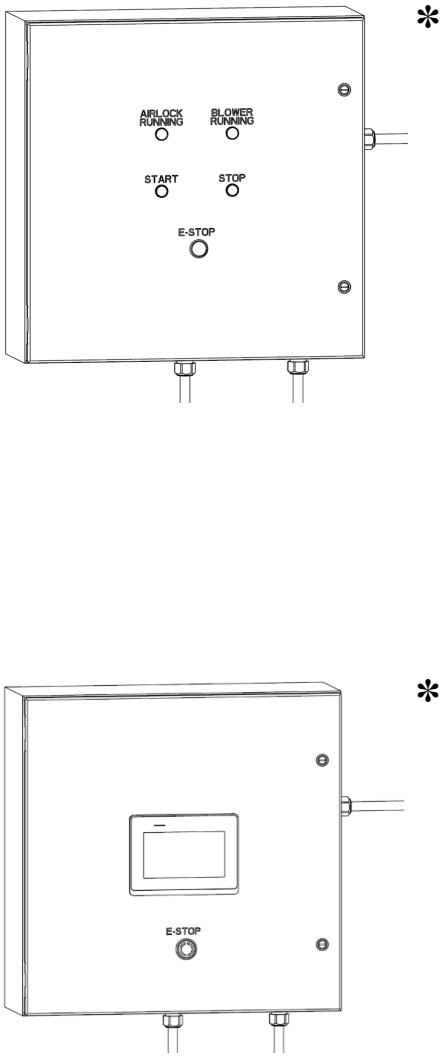


Figure 6-11: Walinga control panels

***Function*:** A CVSAP may be equipped with multiple pendant stations to control the activation of the CVSAP remotely.

***Range*:** The latched two-button switch is physically wired to the control panel of the CVSAP. Pressing the start button will initiate the start sequence. Pressing the stop button will initiate the shut-down sequence.

***Location*:** Pendant stations are typically positioned at a drop line for convenient control of the system.

✻ The appearance of the pendant station may vary.

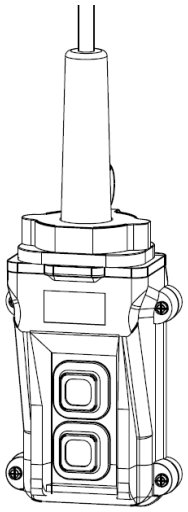


Figure 6-12: Pendant station

***Function*:** Provides a means to disconnect the electrical power source from the electrical load. The switch must be able to be locked-out. The control panel, airlock motor, blower motor, and purge installation each require an independent disconnect switch.

***Range*:** The two-position switch should be in the *ON* position while the CVSAP is in operation and in the *OFF* while the CVSAP is not in use or during maintenance and adjustments.

***Location*:** The switch must be located along the electrical power cable between the electrical power source and the electrical load.

✻ The appearance of the pendant station may vary.

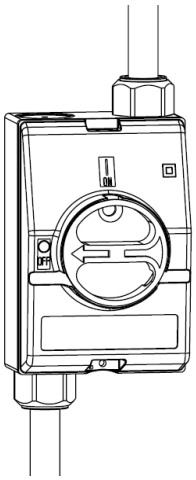


Figure 6-13: Disconnect switch

OPERATION

Pre-Operation Machine Preparation

For personal safety and to ensure the CVSAP is in good mechanical condition, the following checks must be performed before operation of the system:

1. Clear the area of bystanders, especially small children.
2. Ensure the CVSAP has been properly serviced, maintained, and lubricated as per the described methods and schedule as outlined in **Section 7: Maintenance and Adjustments**. Verify the oil level of the blower reservoirs.
3. Ensure all storage coverings and protectors that would hinder or prohibit normal function of the system have been removed. Serious damage to the machine and/or personal injury to the operator or bystanders may result from attempting to operate the system with restrictions in place. Ensure the CVSAP is clear of any entangled material and the surrounding area is clear of any entanglement hazards.
4. Empty any accumulated moisture from the header tank through the drain valve.

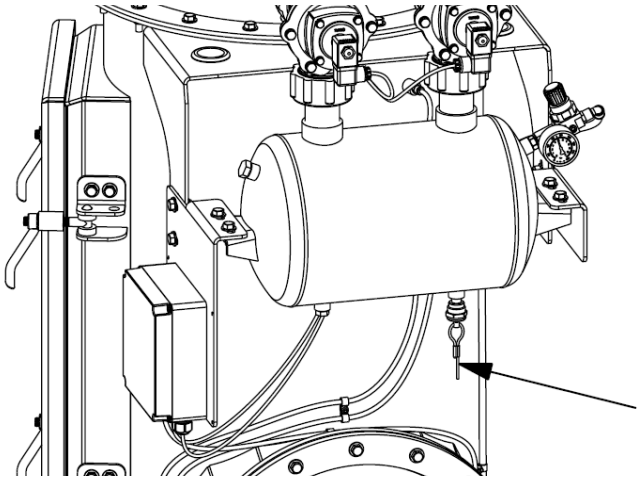


Figure 6-14: Header tank drain valve

5. Inspect the blower muffler for any foreign material and ensure any materials have been removed. Failure to remove foreign materials presents a fire hazard.
6. Rotate the blower by hand to ensure it turns freely.
7. Inspect all conveying lines, drop lines, fittings, and couplers for continuity and ensure they are well sealed.
8. Inspect all electrical lines and connections to ensure they are securely connected and are not damaged, cut or abraded.
9. Verify that no disconnect switch has been locked-out. If any power sources have been locked-out, determine the reason for the lock-out before removal or beginning operation.
10. Close and secure all guards, shields and access points.

Operation of the Machine

To operate the CVSAP, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Ensure all guards, shields and access points are closed and secured.
3. Ensure the electrical disconnect switches, compressed air shut-off valve, and any other devices or supplies have not been locked-out. If any are locked-out, identify the cause and retrieve the tag before engaging power. Ensure no electrical protections are in the tripped position. If any are tripped, refer to the auxiliary equipment's operator's manual(s) to properly reset the switch(es).
4. Ensure the discharge receptacle is installed and secured to the outlet of the airlock. Be aware that if a bin presence sensor is installed, the system will not start without a properly positioned receptacle. Ensure the discharge receptacle has sufficient capacity to accept the conveyed material; empty or install a sufficient receptacle as required.

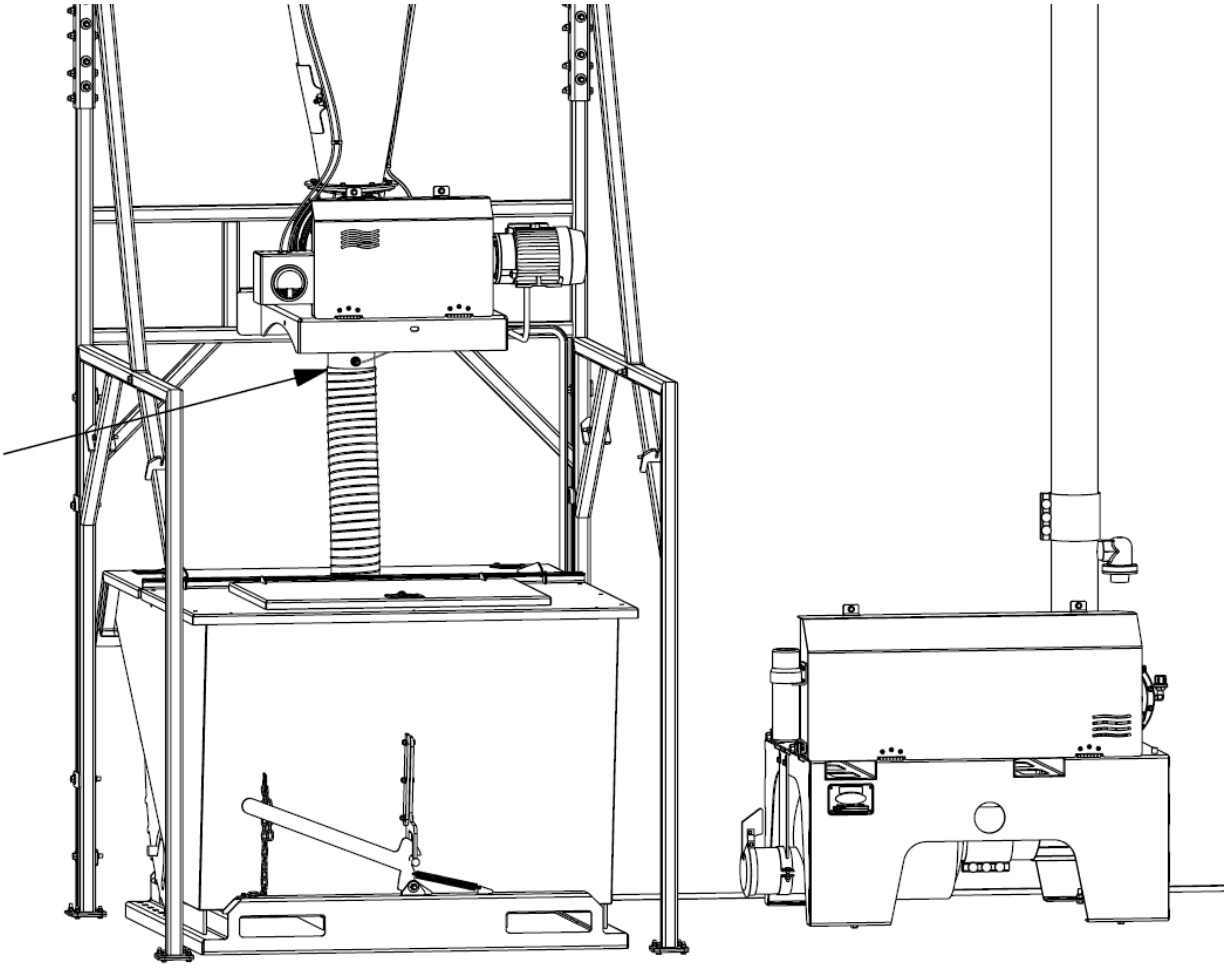


Figure 6-15: Reference installation of dumpster receptacle

5. Unlatch the coupling arms and remove the plug from the desired drop line.
   NOTE: For light duty applications, such as dust collection, **two** operators may use the CVSAP simultaneously with **2 in** (5 cm) lines and accessories only. For heavy duty applications, only **one** operator may use the CVSAP with a **3 in** (7.6 cm) line and accessory.

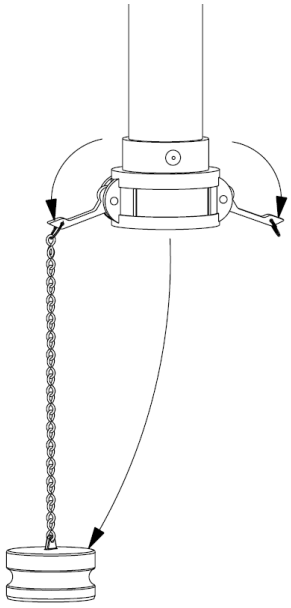


Figure 6-16: Drop line plug removal

6. Inspect the condition of the drop line coupler seal to ensure it will form an adequate seal with the intake line.

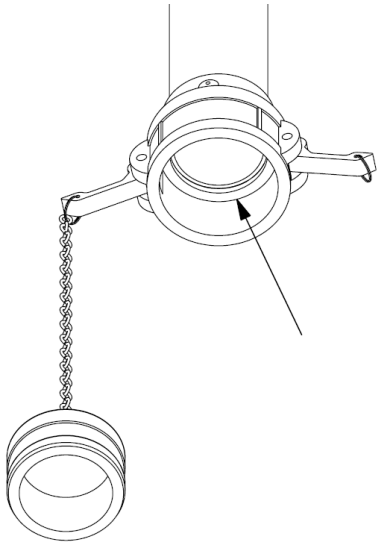


Figure 6-17: coupler seal

7. Insert the desired intake line into the drop line coupler and lock the line in place with the coupling arms. An adapter may be installed as required. Use only original equipment and lines. Do not attempt to use any plastic lines unless they are properly grounded. The flow of granular material through pipes, hoses and lines can generate an electrical charge that can cause electrical discharge, static or shocks. In the right environmental conditions, an electrical discharge can trigger an explosion.

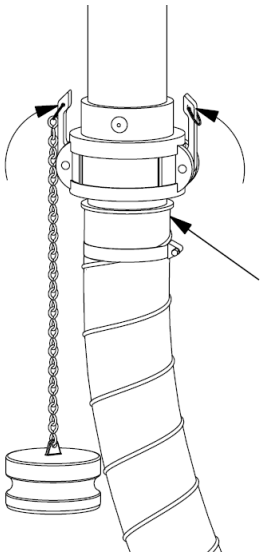


Figure 6-18: Intake line connection

8. Ensure the seal of the intake line coupler is in good condition.
9. Insert the desired intake accessory into the intake line coupler and secure in place with the coupling arms. Do not attempt to use the CVSAP without an intake accessory installed; failure to attach an intake accessory can lead to premature system wear and damage or a potential blockage.

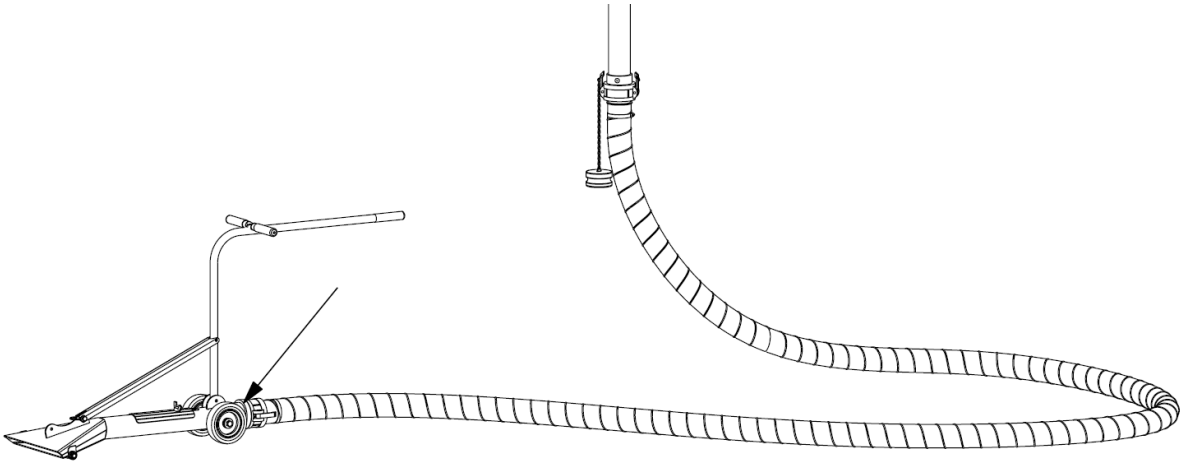


Figure 6-19: Reference intake accessory

10. Ensure all other drop line plugs are installed and secured.
11. Start the CVSAP by pressing the *START* button / icon on the master control panel, by pressing the *START* button on a pendant station, or via an external run command.
12. Wait for the airlock and blower running indicators to activate, or for the pendant station indicator to activate, typically this will take approximately 10 seconds.
13. Read the differential pressure gauge, reference ***Figure 6-2***, to ensure the filters are sufficiently clean. A differential pressure gauge reading above 6 in WC (1.5 kPa) indicates the filers must be cleaned or replaced, or may indicate the purge valves are not operating correctly. Monitor the gauge during operation to ensure the purge system is functioning efficiently.
14. Ensure the header tank pressure, reference ***Figure 6-3***, is at 70 psi (483 kPa), adjusting the pressure regulator as required.
15. Use the intake accessory to gather material, continuously moving the accessory. Do **not** place the intake nozzle near your feet when standing on top of the conveyed material; the suction of the CVSAP is sufficient to pull the nozzle and operator into the pile. If the pile is deep enough, the operator can become submerged and suffocate.
    a. Each intake accessory is designed to control the amount of air entering the CVSAP. Always move the intake accessory to ensure sufficient air is entering the system. Starving the CVSAP of air can lead to potential damage and failure of the blower due to overheating. If the vacuum pressure gauge, reference ***Figure 6-4***, drops below the activation point of the vacuum relief valve or if the vacuum relief valve is activated, allow more air to enter the system.
    b. If the accessory is equipped with an air slide the amount of air entering the system may be controlled by altering the air slide position as follows:
        i. Start with the air slide open approximately 50%.

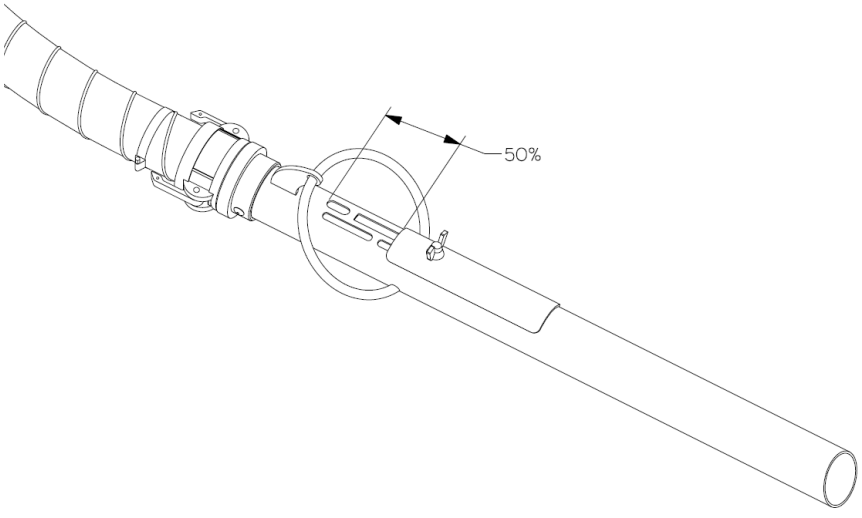


Figure 6-20: Initial air slide positioning

ii. Gradually close the air slide in 1/4 in (0.64 cm) increments until the intake line begins to pulsate.

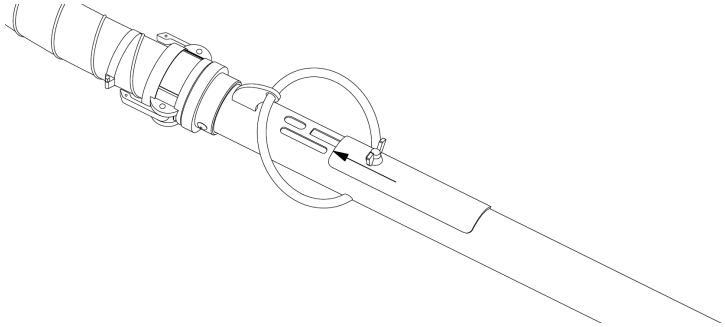


Figure 6-21: Incremental closing of air slide

iii. Gradually open the air slide in 1/4 in (0.64 cm) increments until the intake line stops pulsating.

iv. Make any adjustments as required during operation to maintain the required air intake.

16. To move to a new work area and utilize a different drop line, proceed as follows:

a. Remove the intake accessory from the product to stop any product from entering the CVSAP.

b. Disengage the coupling arms of the drop line coupler and remove the hose and intake accessory. Use the drop line to clean the intake line and accessory as required. Do **NOT** install the plug into the drop line coupler.

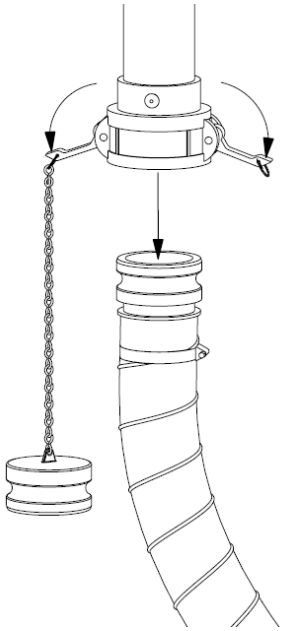


Figure 6-22: Removal of intake line

c. Place all intake lines and accessories in the storage location.

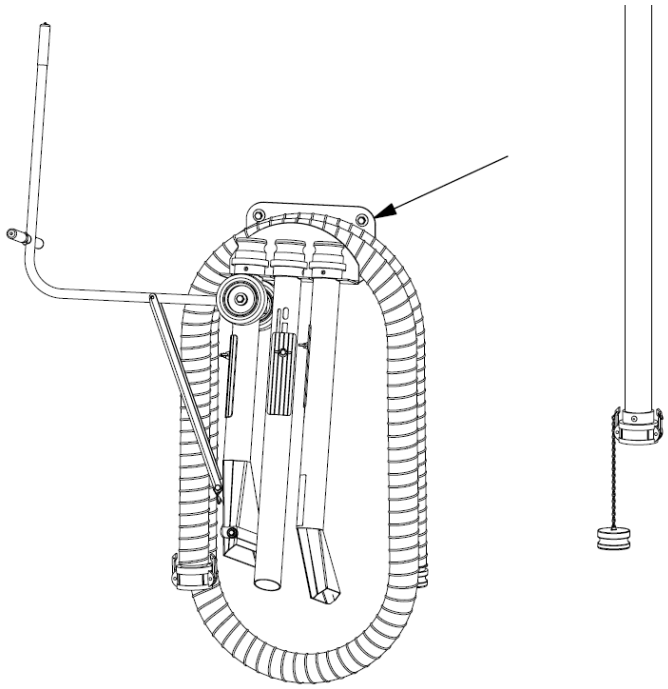


Figure 6-23: Walinga tool storage rack

d. Move to the new work area and identify the desired drop line.
e. Repeat *Step 5* to *Step 9* to connect the intake assembly.
f. Install and secure the plug into the drop line of the first work area.

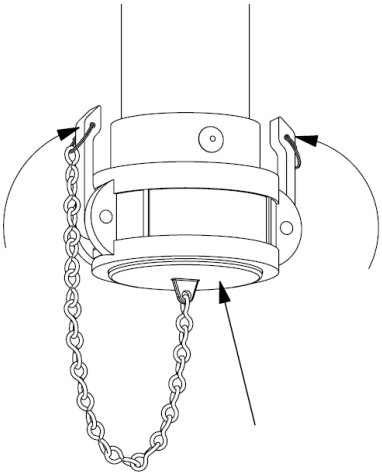


Figure 6-24: Drop line plug installation

g. Repeat *Step 15* to convey material at the new work area.

Stopping the Machine

To stop the CVSAP, proceed as follows:

1. Remove the intake accessory from any product and allow the system to continue to operate without introducing any additional material for approximately 10 seconds. This allows any material that is in the conveying lines of the CVSAP to be conveyed to the AMS before shutting down the blower.
2. Initiate the shut-down sequence by pressing the *STOP* button / icon on the master control panel, by pressing the *STOP* button on a pendant station, or via an external stop command. **NOTE:** Do not use the *E-STOP* button to shut-down the CVSAP in normal conditions. Unnecessary use of the CVSAP's emergency stop can lead to premature wear and damage.
3. Once the shut-down sequence is initiated, the blower will stop and the blower running indicator and any pendant indicators will deactivate. However, the airlock will continue to operate for approximately 4 minutes with the airlock indicator remaining activated. It is safe to proceed to *Step 4* during this phase of the shut-down sequence.
4. Remove the intake accessory from the intake line and store the accessory
5. Open the locking arms of the drop line coupler and remove the intake line, reference ***Figure 6-22***.
6. Store the intake line such that the ends are oriented downwards to prevent the accumulation of dust and debris within the line, reference ***Figure 6-23***.
7. Install and secure the plug into the drop line coupler, reference ***Figure 6-24***.
8. Verify the airlock running indicator has deactivated after the 4 minute period. Do not proceed to *Step 9* until all indicators have deactivated.
9. Lock-out the master control panel to prevent machine start-up.
10. Check the material level within the discharge receptacle. As necessary, remove the connection to the airlock outlet and empty the receptacle.
11. Refer to **Section 7: Maintenance and Adjustments** to perform any required maintenance.

In emergency situations, for example, if the safety of a person is threatened, it may be necessary to immediately shut-down the CVSAP. To avoid potential damage to the CVSAP components, the following should only be used in an emergency situation. Familiarize yourself with the emergency shut-down procedures of any auxiliary equipment. To shut-down the CVSAP in an emergency:

1. Remove the intake accessory from the material.
2. Press the *E-STOP* button on the master control panel.

   NOTE: The *STOP* button of a pendant station will immediately stop the blower; however, the airlock and purge system will continue to operate. To immediately stop the entire system the *E-STOP* must be pushed.

CLEARING BLOCKAGES

To clear a blockage from the airlock, proceed as follows:

1. Remove the intake accessory from the material to stop the conveyance of product into the CVSAP and prevent any further obstructions.
2. **DO NOT** open any access door or reach into the CVSAP to clear an obstruction while power is engaged to the system.
3. If the airlock motor is equipped with a reversible speed controller:
    a. Change the rotational direction of the airlock briefly then return to the correct direction. **DO NOT** change the direction of rotation by reversing the wiring on 3-phase electric motors, as this may cause impact damage.
    b. Repeat this alternation of directions several times to dislodge and clear the obstruction.
4. If the airlock is not equipped with a reversible speed controller, or if the obstruction does not clear after performing *Step 3*:
    a. Follow the procedures in the above section, *Stopping the Machine*, and shut down the CVSAP.
    b. Ensure the power supply is turned off, all disconnect switches are in the *OFF* position and the master control panel has been locked-out.
    c. Open the access door on the AMS. Additionally, the discharge receptacle and connection may be removed to gain access to the airlock outlet as necessary.

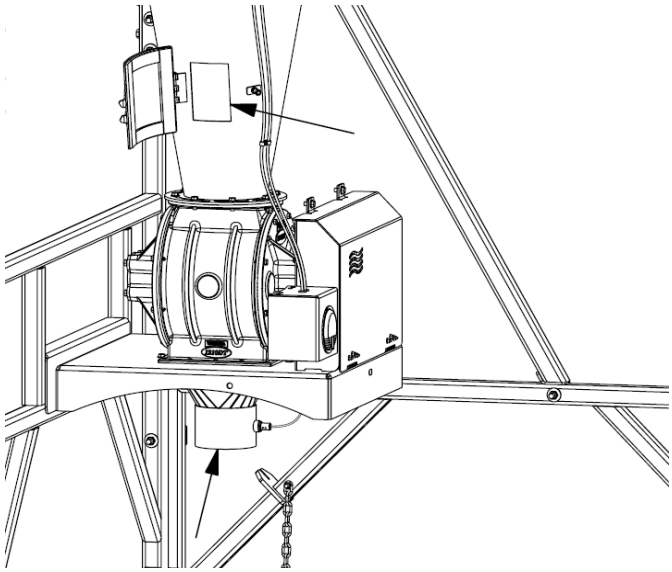


Figure 6-25: Airlock access points

    d. Manually reach into the airlock and remove the obstruction. As necessary, the airlock may be manually rotated in the reverse direction to loosen or dislodge the obstruction.

5. With the CVSAP shut down and locked-out, inspect the interior of the airlock for any signs of damage and to ensure it will rotate freely. Reference **Section 7: Maintenance and Adjustments** or the airlock operator's manual to repair or replace any components as necessary.
6. Reinstall and secure the discharge connection and receptacle if removed.
7. Close and secure the AMS access door.
8. Resume normal operation.

To clear a blockage from the blower, proceed as follows:

1. Remove the intake accessory from the material to stop the conveyance of product into the CVSAP and prevent any further obstructions.
2. **DO NOT** open any access door or reach into the CVSAP to clear an obstruction while power is engaged to the system.
3. Follow the procedures in the above section, *Stopping the Machine*, and shut down the CVSAP.
4. As necessary, access to the blower may be gained by removing the inlet assembly of the blower. Remove the fasteners and compression coupler of the inlet assembly. Ensure the connecting line from the AMS to the blower is sufficiently supported before removing the blower inlet assembly.

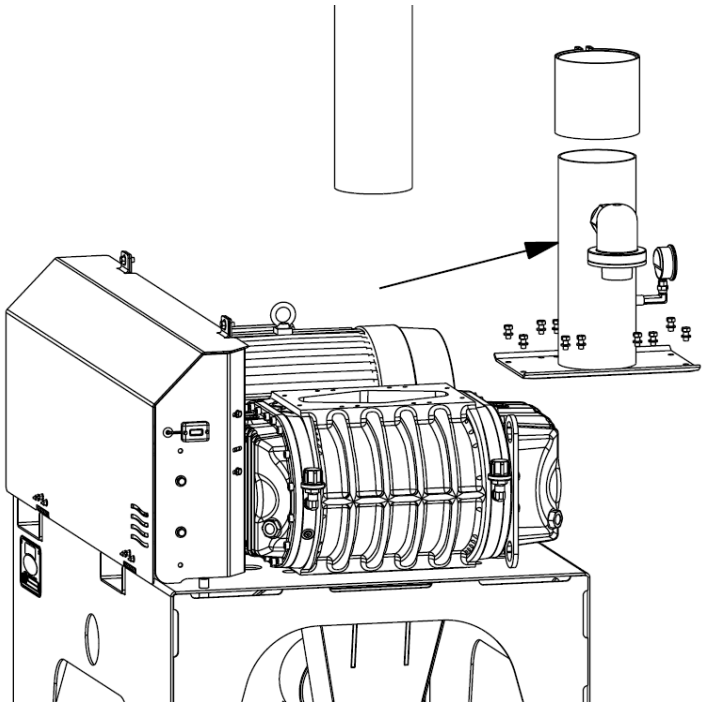


Figure 6-26: Blower inlet access

5. Refer to the blower operator's manual to clear the obstruction.
6. With the CVSAP shut down and locked-out, inspect the interior of the blower for any signs of damage and rotate the blower by hand to ensure it rotates freely. Reference **Section 7: Maintenance and Adjustments** or the blower operator's manual to repair or replace any components as necessary.
7. In a properly configured system, the blower inlet is protected from dirt, dust and debris by the filters. Open the filter access door and inspect the filters for any signs of damage and to ensure they are properly seated. Reference **Section 7: Maintenance and Adjustments** to properly seat or replace the filters.

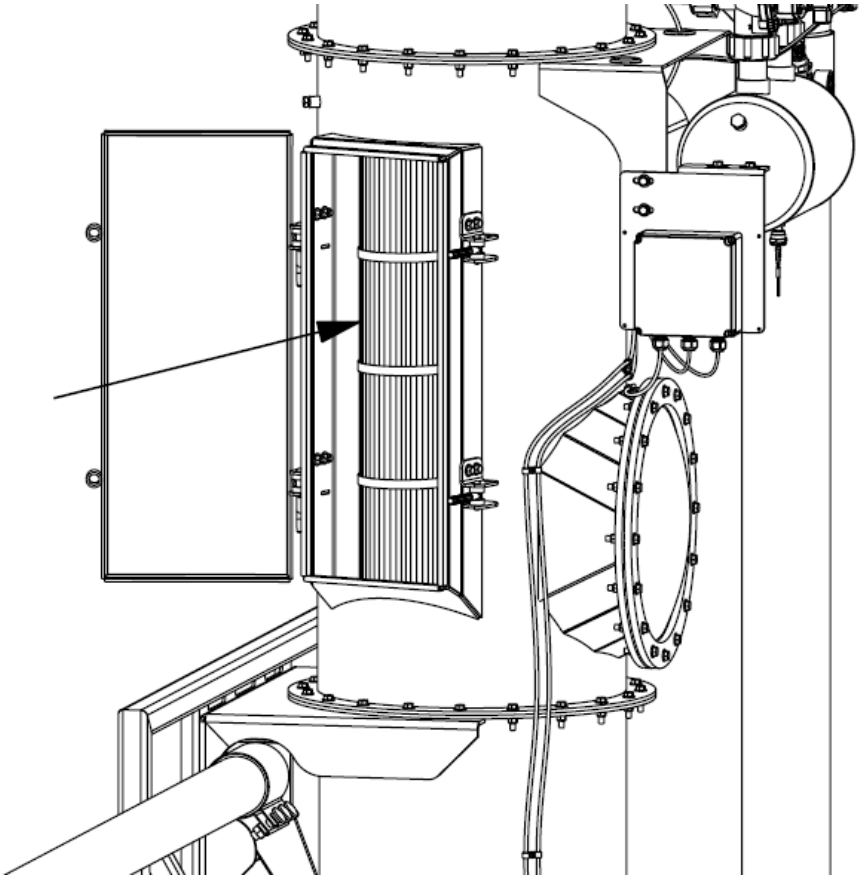


Figure 6-27: Filter access

8. Reinstall and secure all components and close and secure the filter access door. Verify the electrical continuity between all components.
9. Resume normal operation.

To clear a blockage within an intake, drop or conveying line, proceed as follows:

1. Remove the intake accessory from the material to stop the conveyance of product into the CVSAP and prevent any further obstructions.
2. **DO NOT** open any access door or reach into the CVSAP to clear an obstruction while power is engaged to the system.
3. If equipped with a manual speed control, slowly increase and then slowly decrease the speed of the blower. Repeat the speed adjustment several times.
4. If the blockage does not clear or if there is no manual speed control, the blockage may be cleared via reverse suction.
    a. Follow the procedures in the above section, *Stopping the Machine*, and shut down the CVSAP.
    b. Ensure the power supply is turned off, all disconnect switches are in the *OFF* position and the master control panel has been locked-out.
    c. Attempt to locate the position of the obstruction within the lines and determine the closest access point.
    d. Using a portable or shop vacuum, attempt to apply a reverse vacuum on the closest drop line coupler or intake line coupler to dislodge the obstruction.
5. If the blockage does not clear, the blockage must be removed manually.
    a. Ensure the power supply is turned off, all disconnect switches are in the *OFF* position and the master control panel has been locked-out.
    b. Attempt to locate the position of the obstruction within the lines and locate the couplers surrounding the obstruction.
    c. Loosen and remove any compression couplers as required to gain access to the blocked line.
    d. Insert a tool such as a plumber's snake or electrician's fish tape into the line. Once the tool meets resistance, use the tool to hook or dislodge the obstruction.
    e. If necessary, the conveying line or drop line may be cut at or close to the obstruction for physical access and removal. Do **NOT** cut an intake line.
    f. Reposition and secure any removed conveying or drop lines and reinstall any removed compression couplers. Install a new compression coupler on the joint of any cut that was made to the lines.
    g. Verify the electrical continuity of all system components.
6. Resume normal operation.

OPERATING TIPS AND HINTS

To achieve the best performance from your CVSAP keep the following in mind:

- Always follow the recommended schedule and perform the required maintenance as detailed in **Section 7: Maintenance and Adjustments**, to maximize the life of the filters and CVSAP.
- Consult your Walinga dealer or representative to adjust the purge valve activation and delay times; too short or too long of a valve activation time can damage or shorten the life of the filters, too long between valve activations can result in poor performance of the CVSAP. Unapproved modifications to the purge system will void the warranty.
- Ensure the filters and all components of the CVSAP remain properly grounded. Use only original equipment and lines. Do not attempt to use any plastic lines unless they are properly grounded. The flow of granular material through pipes, hoses and lines can generate an electrical charge that can cause electrical discharge, static or shocks. In the right environmental conditions, an electrical discharge can trigger an explosion.
- Listen to the CVSAP during operation to ensure the purge valves are activating as expected and monitor the differential pressure gauge to ensure the filters remain clean.
- Listen for the activation of the vacuum relief valve during operation. If the valve is activated, initiate the shut-down sequence and inspect the condition of the filters. Clean or replace the filters as required.
- Monitor the exhaust of the CVSAP to look for any signs of dust or particulates, as this is an indication of a failure within the system.
- To achieve maximum capacity, the airlock should be operated as slowly as possible to allow each rotor pocket to completely fill. Do not operate the airlock faster than the recommended speeds.
- For high system efficiency, ensure each female coupler and connection is equipped with a seal in good condition.
- For light-duty applications, two operators using 2 in (5 cm) lines and accessories may use the CVSAP simultaneously. For all other applications, only one operator using a 2 in (5 cm) or 3 in (7.6 cm) line and accessory may use the CVSAP.

TROUBLESHOOTING

Reference ***Table 6-1*** for assistance with some of the most common issues, causes and solutions that you may face during the operation of your CVSAP. If you encounter a problem that is difficult to solve, even after having referenced the following table, please contact your Walinga dealer or representative. Before you call, please have your Operator's Manual and your CVSAP's applicable serial number(s) ready and available.

For detailed procedures and diagrams for the proposed solutions, reference **Section 5: Machine Life-Cycle Procedures**, **Section 6: Operation**, **Section 7: Maintenance and Adjustments**, and any auxiliary equipment's operator's manual such as the blower and airlock.

Table 6-1: Troubleshooting for CVSAP

ISSUE	CAUSE	SOLUTION
Slow intake or discharge of material	Air leaks in the system	Tighten all connections of the system including all compression couplers, camlock couplers and swivel couplers.
		Inspect all coupler seals. Replace any damaged or worn seals.
		Tighten all assembly interfaces and reapply any silicone as necessary.
		Ensure the airlock access door and filter access door are tightly closed and the seals and/or gaskets are in good condition.
		Inspect the vacuum relief valve to ensure it recloses properly. Repair or replace as required.
		If equipped, verify the positioning of the air slide on the intake accessory. Adjust the position of the air slide as necessary.
	Excessive resistance in the piping	Check for and remove any blockage from the intake lines, drop lines and conveying lines.
		Straighten the intake line as much as possible.
		Too many elbows or small radius bends will negatively impact the flow in the system. Reduce the number of elbows used and/or replace with long radius elbows.
		Ensure any discharge connection does not exceed a slope of 20°.
	Defective purge system	Inspect the condition of the filters. Clean or replace the filters as required.
		Ensure the sequencing element is functioning and effectively activating the purge valves.
		Ensure the header tank is at the required pressure and is supplied with the required flow of dry air.

ISSUE	CAUSE	SOLUTION
Slow intake or discharge of material	Defective blower	Check for excessive clearances between the blower lobes and casing. Repair or replace as required.
		Check the alignment and tension of the blower belt drive system.
	Defective airlock	Check for excessive clearances between the airlock tips and casing. Repair or replace as required.
		Check for damage to the airlock rotor tips. Repair or replace as required.
		Check the alignment and tension of the airlock drive chain system.
Pulsation in the lines	Insufficient air flow	Allow more air to enter the intake accessory by opening the air slide further if equipped or increasing the movement of the accessory.
		Clean or replace the filters as necessary.
	Excessive resistance in the piping	Check for and remove any blockage from the intake/drop/conveying lines.
		Straighten the intake line as much as possible.
		Too many elbows or small radius bends will create turbulence. Reduce the number of elbows used and/or replace with long radius elbows.
Excessive filter plugging	Insufficient compressed air supply	Ensure the header tank maintains the required pressure and is supplied with air at the required flow rate.
		Ensure the air supply is equipped with an air dryer.
		Ensure the air supply lines are not frozen or plugged.
	Defective purge system	Ensure the sequencing element is functioning and effectively activating the purge valves for the required activation time and delay time.
	Air leaks	Ensure all fittings, valves and lines are secure and tight. Replace any damaged or worn components.
		Inspect the purge valves to ensure they are not seized. Repair or replace as required.
	Incorrect filters	Use only Walinga-supplied filters that meet the required specifications.

ISSUE	CAUSE	SOLUTION
Pollution released from CVSAP or blower outlet	Filters installed incorrectly	Inspect filters to ensure they are fully seated, reference proper filter installation procedures.
	Damage to filters	Inspect the filters for any signs of damage such as deformation of the end caps, damage to the mounting flanges, or holes within the filter media. Replace any damaged filters.
	Insufficient sealing of CVSAP	Inspect the joints of the CVSAP for any damage or potential leaks. Repair any damaged welds, reseal any damaged siliconed joints, and replace any worn or damaged components.
		Inspect the piping for any signs of damage due to over-tightened compression coupler(s). Repair or replace as required.
		Inspect the compression couplers to ensure they are sufficiently tightened and there are no signs of wear or damage to the inner gasket. Tighten, repair or replace the couplers as required.
Airlock is noisy	Rotor tips are rubbing the casing	Check tips for damage and proper clearances. Replace or adjust as required.
		Check rotor bearing for damage and wear. Replace as required.
	Incorrect direction of rotation	Check that the drive chain and airlock rotor shaft rotate in a counter-clockwise direction. Continuous operation in the reverse direction will cause excessive wear and may damage the rotor tips, tip wiper, casing and bearings. Rewire motor as required for correction rotational direction.
	Product build-up in airlock	Clean out any wet or sticky product or build-up within the airlock.
Airlock slows or stalls	Airlock is jammed	Check for and remove any obstruction within the airlock.
		Check for any damaged or worn tips. Replace or adjust as required.
	Product build-up in airlock	Clean out any wet or sticky product or build-up within the airlock.
	Defective airlock motor or gearbox	Replace motor or gearbox as required.
Airlock tips are breaking	Incorrect tip clearance	Refer to the airlock operator's manual to properly adjust airlock tip clearances.

ISSUE	CAUSE	SOLUTION
Blower is overheating	Insufficient air flow	Allow more air to enter the intake accessory by opening the air slide further if equipped or increasing the movement of the accessory.
		Clean or replace the filters as necessary.
		Too many elbows or small radius bends will create turbulence. Reduce the number of elbows used and/or replace with long radius elbows.
	Insufficient lubrication	Add oil to the blower reservoirs to reach the required level.
	Oil churning	Drain oil from the reservoirs to reduce to the required level.
	Internal damage to blower	Check for impeller rubbing. Contact your Walinga dealer/representative.
	Defective drive system	Check alignment and tension of the belt drive system. Adjust as required.
Blower motor overloading	Impellers are rubbing	Refer to the blower operator's manual for correct clearances. Contact your local Walinga dealer/representative.
Loss of blower drive speed	Loose drive belts	Properly tension belt drive system.
	Localized belt wear	Check belt cross-section profile. If the profile is narrow, the sheave is spinning; properly tension and align and check the sheave for damage. If the profile is swollen, the belt is failing internally; replace the belt.
	Unequal stretch on belts	Defective belts. Replace with a matching set.
	Belts overloaded	Check for wear or damage. Replace and properly tension and align.
	Belt separation	Replace belts and reduce drive system tension to required specifications.
	Belt swelling, softening or envelope seams opening	Replace belts and check for any sources of oil or rubber solvent and eliminate contamination sources.
	Abnormal envelope wear	Check for sheave misalignment, wear or slip. Replace any defective parts and properly tension and align the drive system.
	Belt hardening or cracking	Replace belts and eliminate any sources of heat.

WALINGA® INC.

Maintenance and Adjustments

CENTRAL-VAC WITH AIR PURGE

MAINTENANCE SCHEDULE

HOUR READING AT TIME OF SERVICE:														
SERVICED BY:														
Every 8 HOURS or DAILY														
Drain Moisture from Header Tank	***[7-3]***													
Check Function of Purge Cycle	***[7-4]***													
Check Differential Pressure Gauge	***[7-4]***													
Check Blower Oil Reservoir Levels	✻													
Every 40 HOURS or WEEKLY														
Check Drive Chain Tension and Alignment	***[7-5]***													
Check Gearbox Oil Level	***[7-10]***													
Check Electrical Continuity	***[7-12]***													
Lubricate Blower Drive Shaft Bearing	***[7-13]***													
Check Airlock Wiper Blade	✻													
Clean Blower Breathers and Vents	✻													
Every 200 HOURS or MONTHLY														
Check Differential Pressure Gauge Filter	***[7-14]***													
Lubricate Drive Chain	***[7-16]***													
Check Airlock Bearing/Seal Cavity	✻													
Repack Rotor Shaft Bearings with Grease	✻													
Every 400 HOURS or QUARTERLY														
Inspect Filters	***[7-17]***													
Inspect Air System	***[7-23]***													
Tighten Airlock Fasteners	✻													
Check Airlock Rotor and Tip Clearances	✻													
Check Blower / Airlock Operating Temperatures	✻													
Every 1000 HOURS or BI-ANNUALLY														
Inspect Electrical System	***[7-24]***													
Change Gearbox Oil	***[7-25]***													
Check Function of Relief Valve(s)	***[7-35]***													
Check Drive Belt Tension and Alignment	***[7-36]***													
Every 1250 HOURS														
Change Blower Oil	✻													
Every 2000 HOURS or ANNUALLY														
Grease Electric Motor	✻													
Adjust Airlock Tip Clearance	✻													

✻ Refer to the operator's manual of the blower, airlock or electric motor(s) for detailed procedures and requirements.

MAINTENANCE PROCEDURES

Header Tank Moisture Drainage

To extend the life of the system components and to prevent corrosion or sealing issues due to moisture in the air system, any accumulated moisture must be removed from the header tank.

To drain the header tank, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Pull on the cable attached to the tip of the drain valve. Keep hands clear of the exhaust area of the valve to avoid injury from the pressurized air and any discharged debris. High pressure air is capable of penetrating the skin and injecting air into the bloodstream, leading to stroke or death.

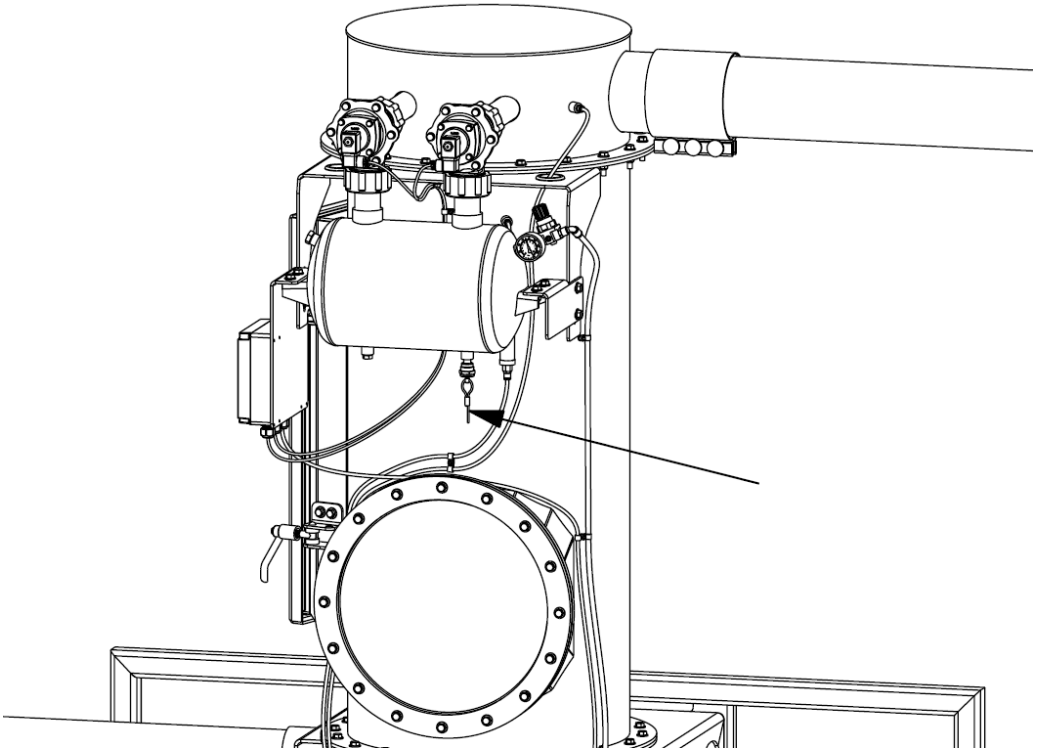


Figure 7-1: Header tank drain valve

3. Continue pulling on the cable and allow any accumulated moisture and contaminants to drain through the valve.
4. Release the cable to allow the drain valve to seal.

Inspection of Purge Cycle Function

To ensure sufficient air flows through the system to maintain the maximum capacity of the CVSAP, the purge cycle must activate properly to remove accumulated dust and particulates from the filter surfaces.

To ensure the purge cycle is functioning properly, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. During normal operation of the CVSAP, monitor the function of the purge cycle. While operating with the standard settings, the purge cycle will activate a set of purge valves once for 0.11 seconds every 30 seconds. The activation may be observed as follows:
    a. During the activation of the purge valves, and immediately afterwards, the differential pressure gauge will increase sharply. Monitor the differential pressure gauge to watch for this spike.
    b. The purge valves will produce an audible release of air when activated. Listen for the audible activation signal during operation.
3. Ensure the differential pressure stabilizes below 6 in WC (1.5 kPa) during normal operation. If the differential pressure is greater than 6 in WC (1.5 kPa), the filters must be cleaned. If the differential pressure remains above 6 in WC (1.5 kPa) after cleaning, the filters must be replaced. Refer to the section *Inspection of Filters* to clean or replace the filters.

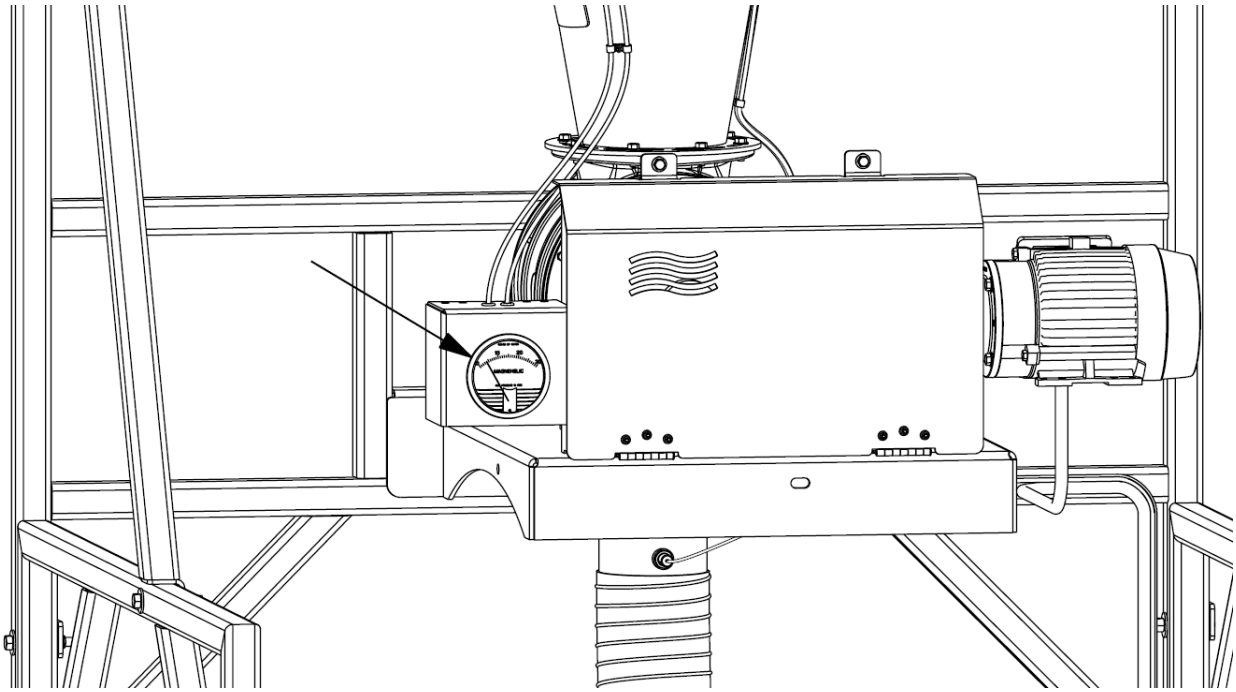


Figure 7-2: Differential pressure gauge

Drive Chain Tension and Sprocket Alignment

Rotational power is transmitted to the airlock from an electric motor using a chain drive system. To obtain efficient transmission of power and optimal chain life, the chain must be properly tensioned and the sprockets must be aligned. Chains that are too tight will stretch and wear quickly or overload the bearings. Chains that are too loose will not transmit power evenly and will wear quickly. Misaligned sprockets will rapidly wear and cause premature wear of the chain.

To check and adjust the chain tension and sprocket alignment, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, disconnect and lock-out all electrical power sources, disconnect the compressed air source, relieve the air pressure from the system, and wait for all moving parts to stop.
3. Remove the fasteners securing the chain drive cover and open the guard.

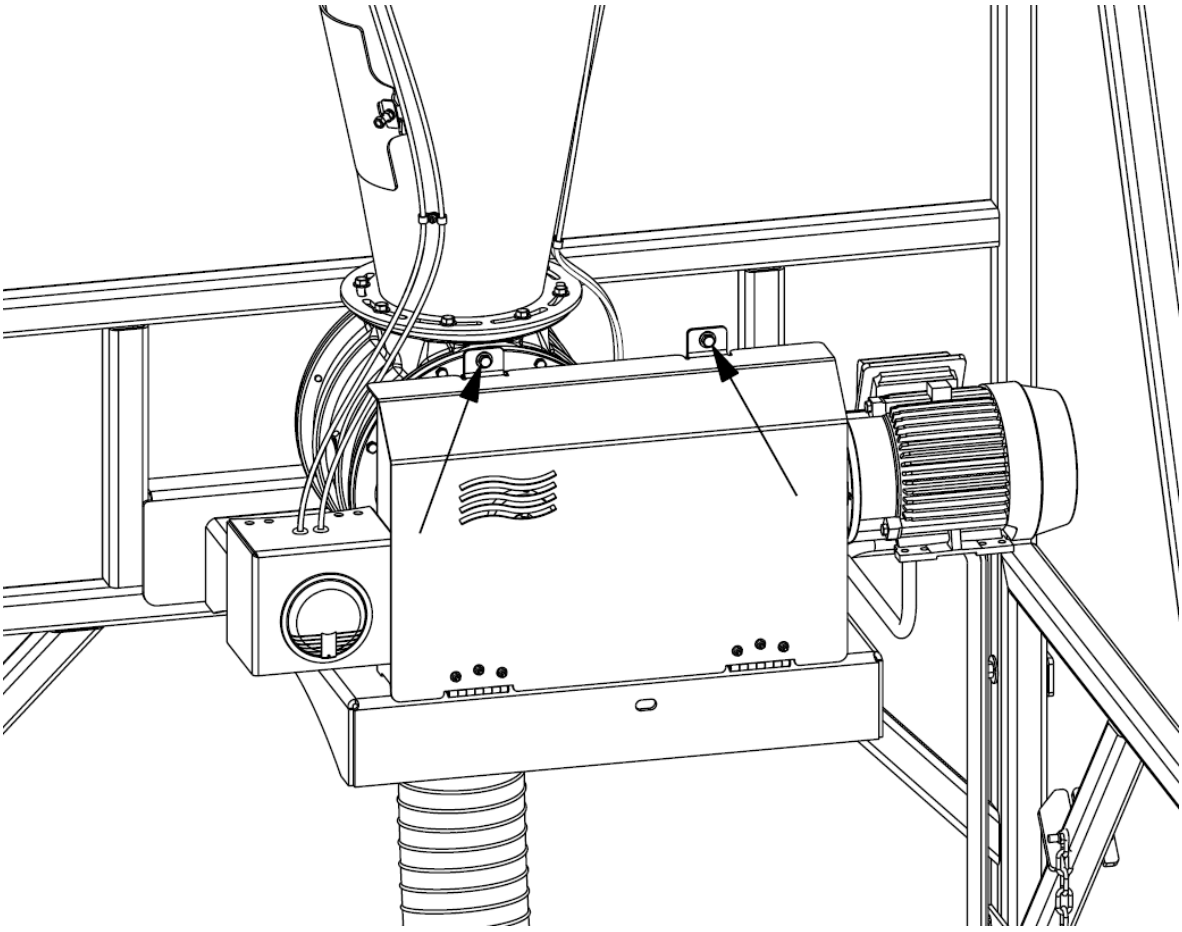


Figure 7-3: Chain guard fasteners

4. Apply an upward force to the center of the slack side of the chain between the two sprockets and measure the displacement. The chain should extend 0.25 in (6.4 mm).

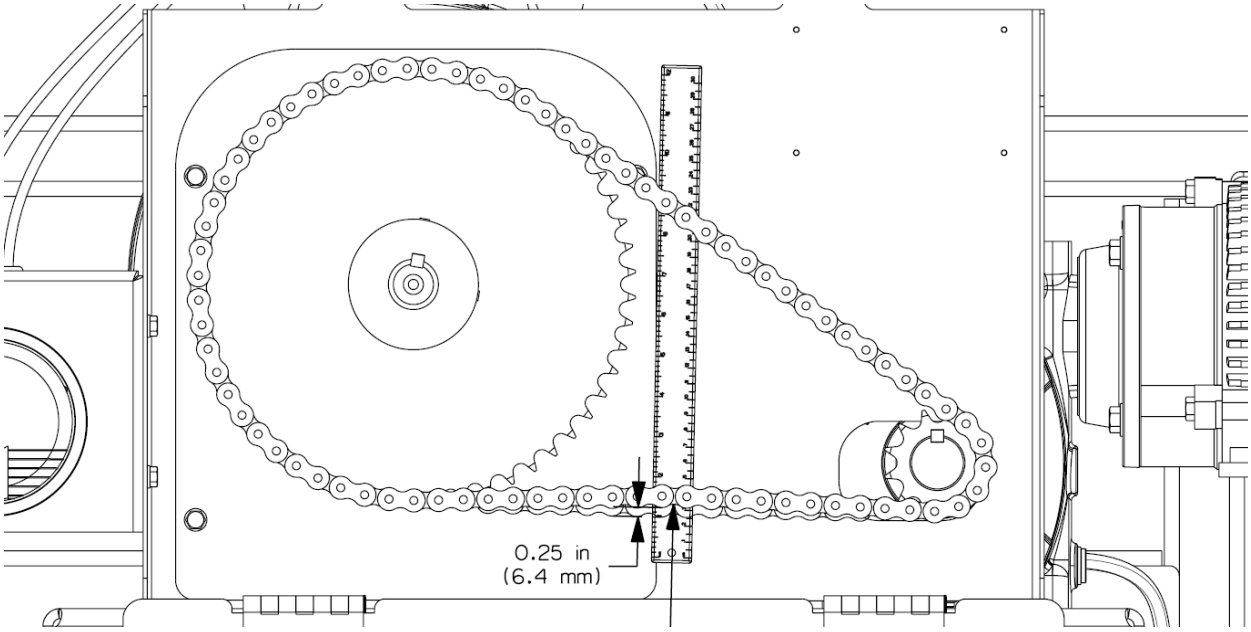


Figure 7-4: Upward chain displacement

5. Apply a downward force to the center of the slack side of the chain between the two sprockets and measure the displacement. The chain should extend 0.25 in (6.4 mm).

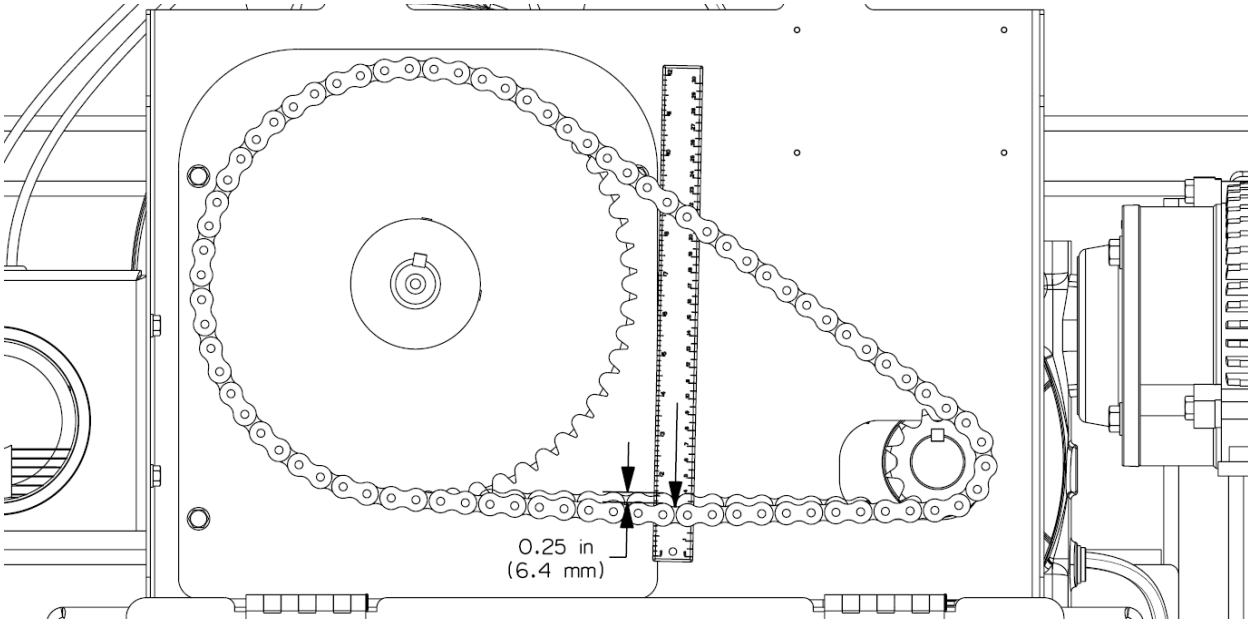


Figure 7-5: Downward chain displacement

6. To adjust the chain tension, proceed as follows:
    a. Loosen the gearbox mounting bolts.

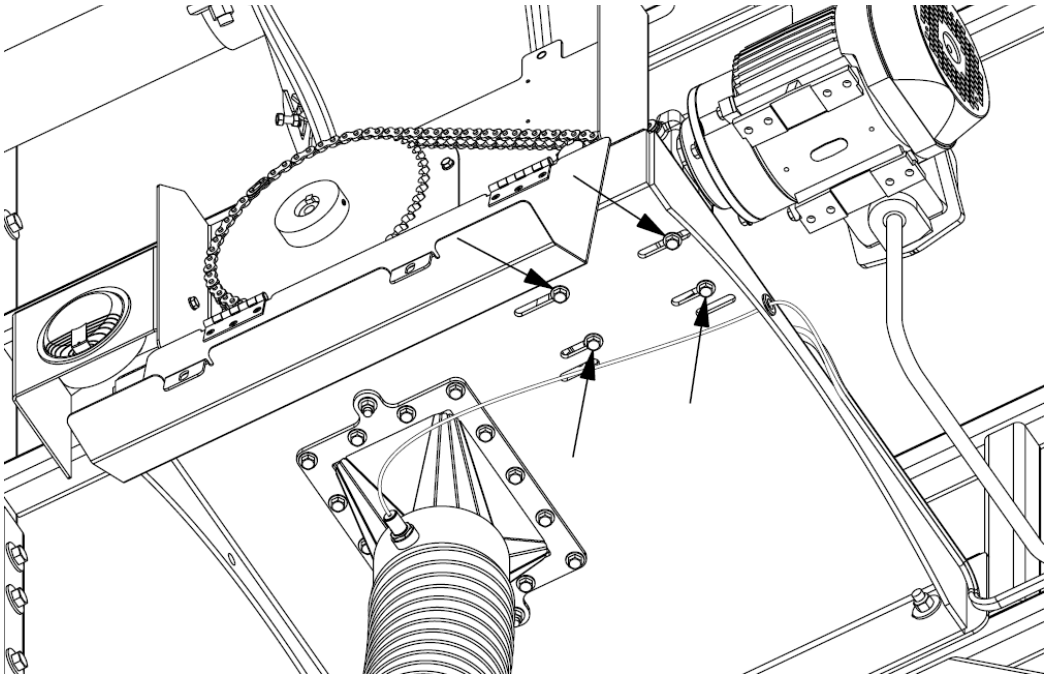


Figure 7-6: Gearbox mounting bolts

    b. Reposition the gearbox along the mounting slots to achieve the correct chain tension.

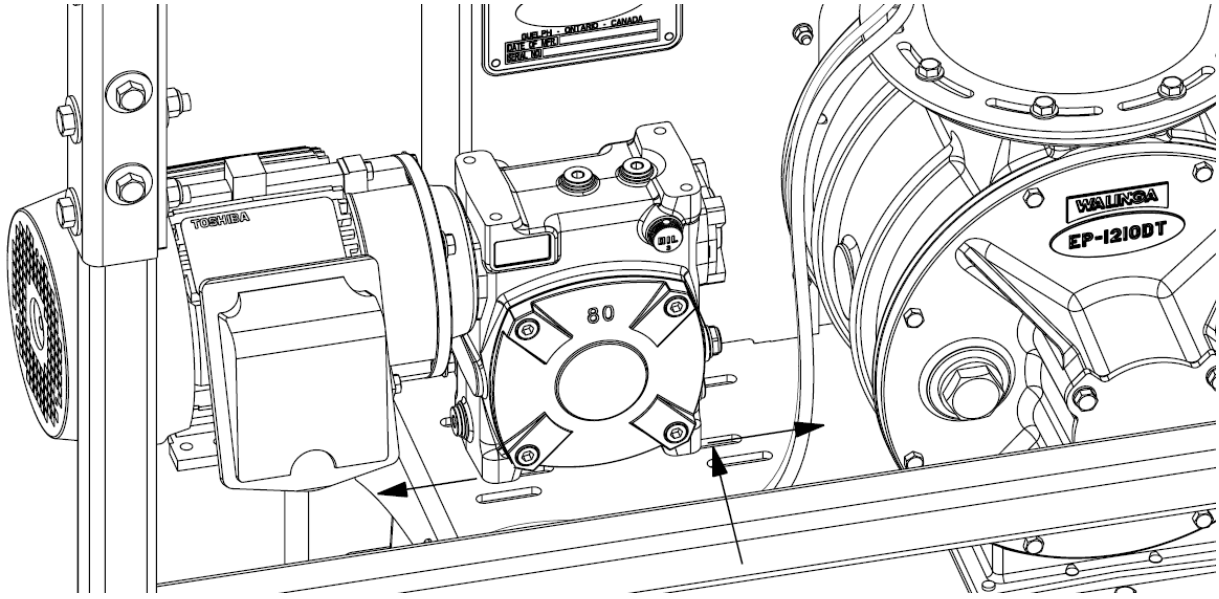


Figure 7-7: Gearbox positioning adjustment

c. Tighten the gearbox mounting bolts.

d. Check the tension and ensure the chain extends 0.25 in (6.4 mm).

7. Check the alignment of the sprockets by laying a straight edge across the faces of the two sprockets. If there is a gap of more than 1/16 in (1.6 mm) between the straight edge and the sprocket, the sprockets must be realigned.

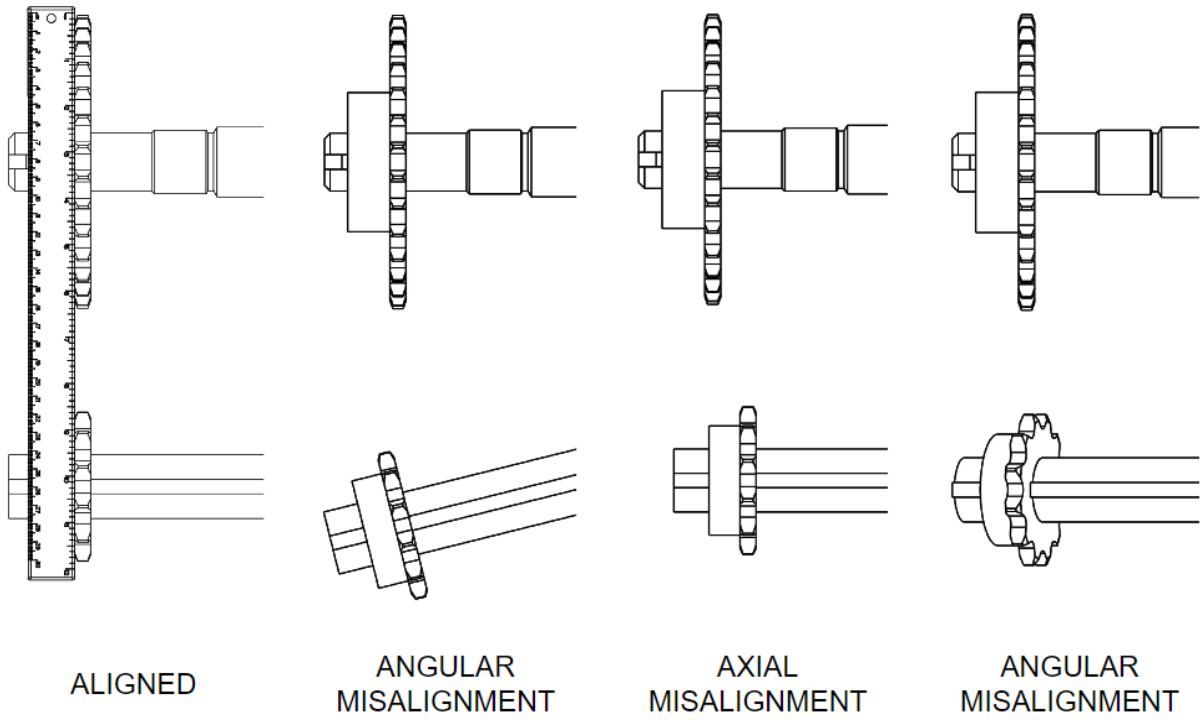


Figure 7-8: Sprocket misalignment references

8. To realign the sprockets, proceed as follows:

a. Loosen the gearbox mounting bolts.

b. Reposition the gearbox along the mounting slots to align the sprockets.

c. Tighten the gearbox mounting bolts.

d. Ensure the sprocket set screws are tightened to the required torque and the sprockets are mounted concentrically with the shafts.

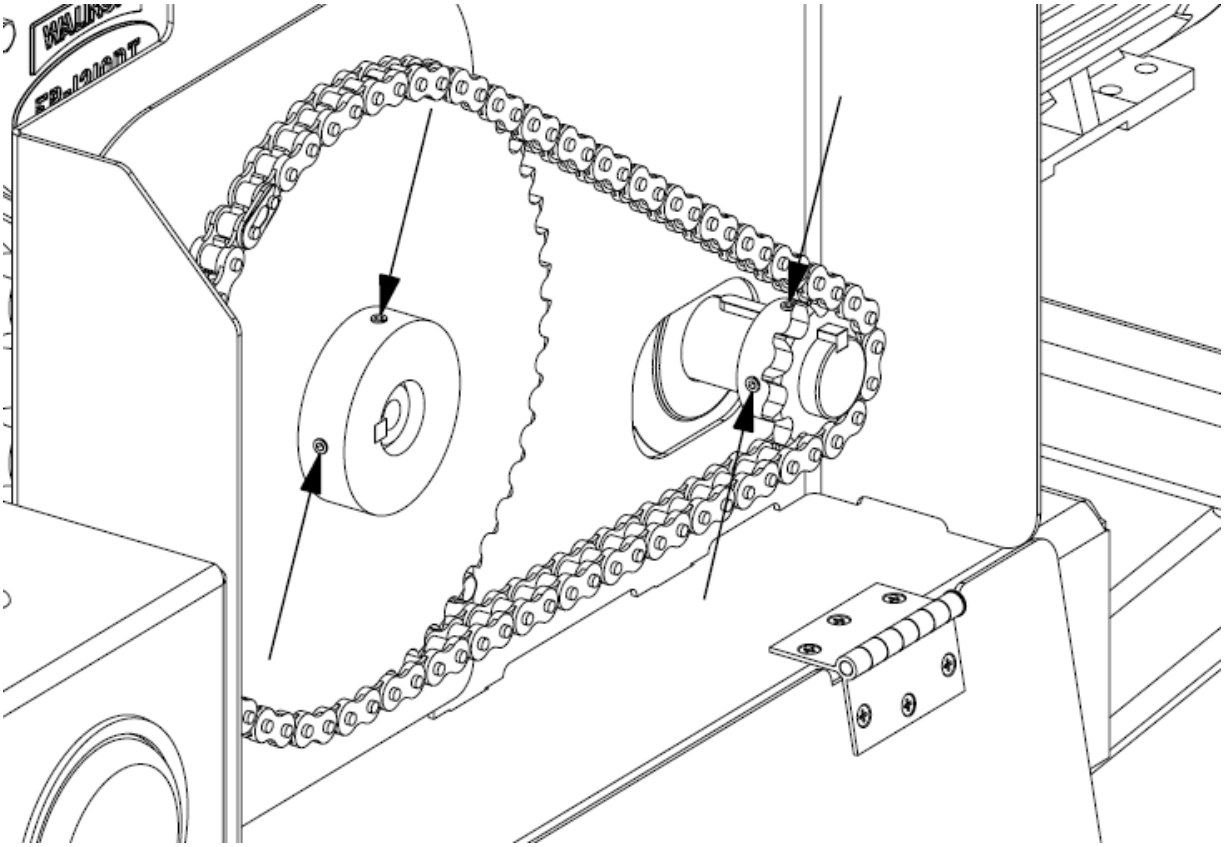


Figure 7-9: Sprocket set screws

e. Check the sprocket alignment and chain tension.

f. Make any adjustments as needed to ensure the sprockets are properly aligned and the chain is properly tensioned.

9. Close the drive chain cover and secure in place with the required fasteners.

Gearbox Oil Level

To obtain efficient transmission of power, the gearbox must remain properly lubricated.

To check and adjust the oil level of the gearbox, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, disconnect and lock-out all electrical power sources, disconnect the compressed air source, relieve the air pressure from the system, and wait for all moving parts to stop.
3. Examine the oil level sight glass on the front side of the gearbox. The oil level must clearly appear in the center of the sight glass when not in operation.

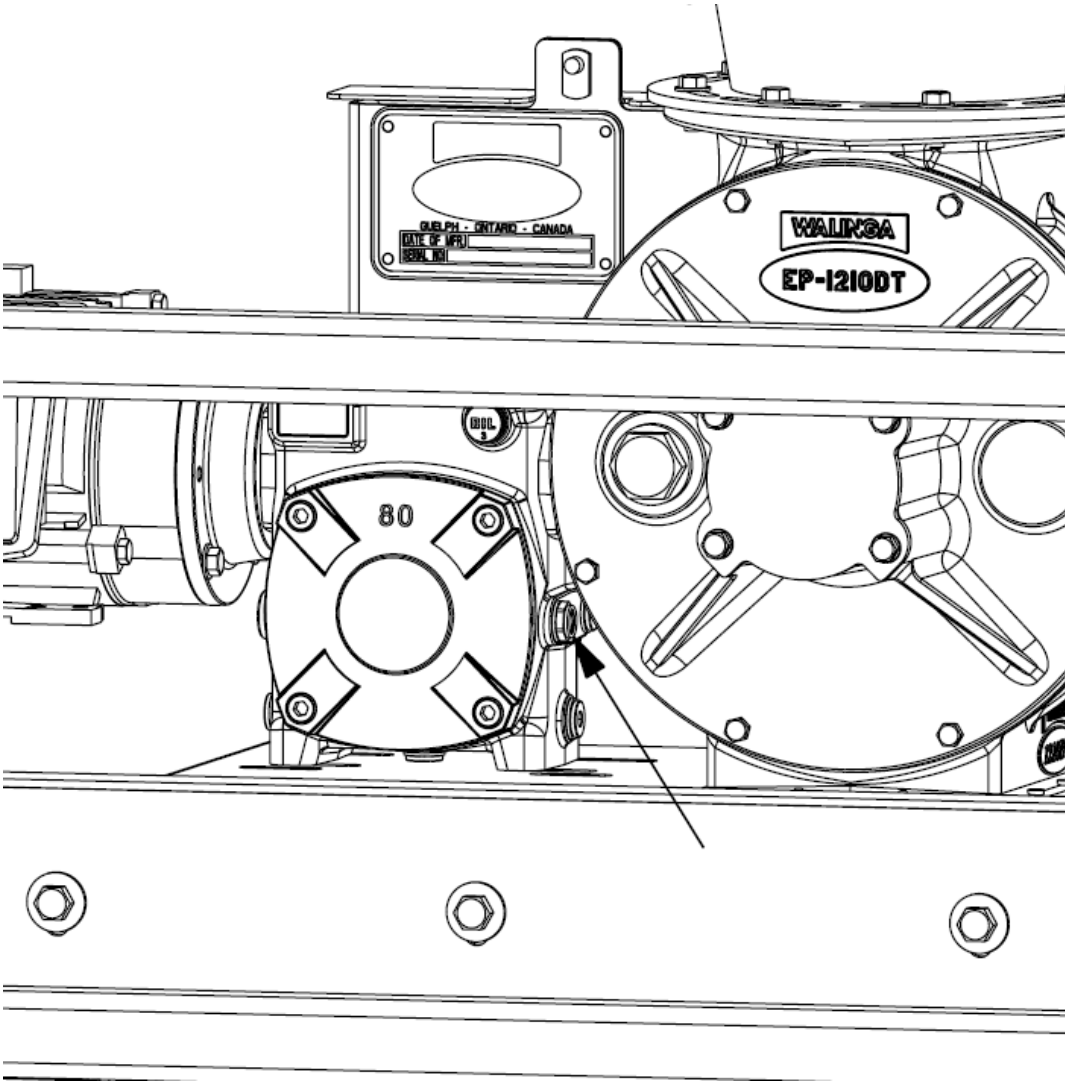


Figure 7-10: Gearbox oil level sight glass

4. To add additional oil, remove one of the fill plugs from the top of the gearbox and add oil until the oil reaches the center of the sight glass. Do not mix different types of oils, refer to *Maintenance Materials*. If it is necessary to remove the gearbox to access the fill plug, refer to *Changing of Gearbox Oil*, to remove the gearbox.

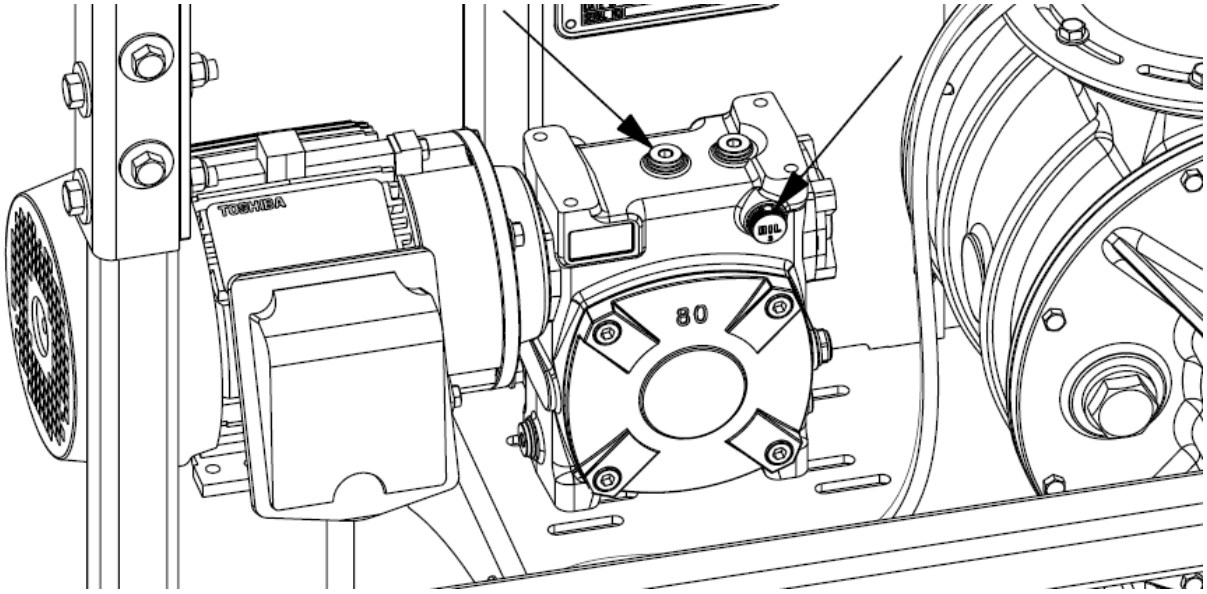


Figure 7-11: Gearbox oil fill plugs

5. Install and tighten the fill plug.
6. Check the condition of the breather; clean if necessary.

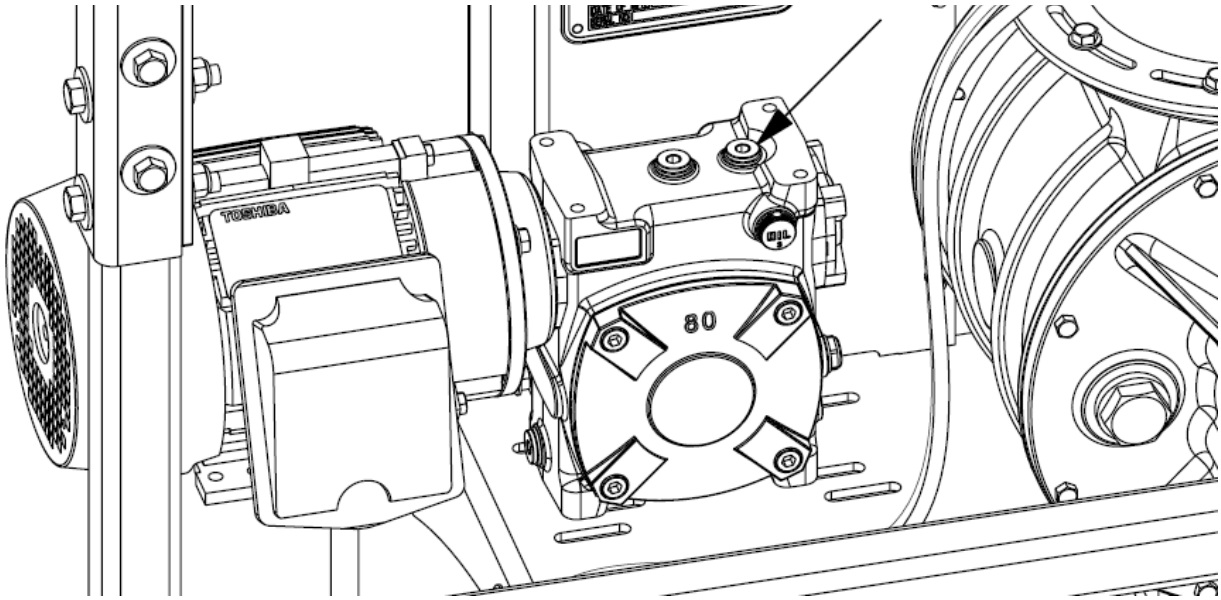


Figure 7-12: Gearbox breather

System Electrical Continuity

The flow of granular material through pipes, hoses and lines can generate an electrical charge that can cause electrical discharge, static or shocks. In the right environmental conditions, an electrical discharge can trigger an explosion. To prevent the accumulation of electrical charge, it is crucial that all components of the system remain grounded.

To check the electrical continuity of the system, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, disconnect and lock-out all electrical power sources, disconnect the compressed air source, relieve the air pressure from the system, and wait for all moving parts to stop.
3. Prepare a multimeter and ensure it is set to read continuity, if equipped, or resistance. Continuity across a component is measured by placing one multimeter lead on the surface directly beside each side of the component. Continuity may also be measured by placing the multimeter leads on the furthest extremities of the component. Ensure the leads always make good contact with a clean bare metal surface.

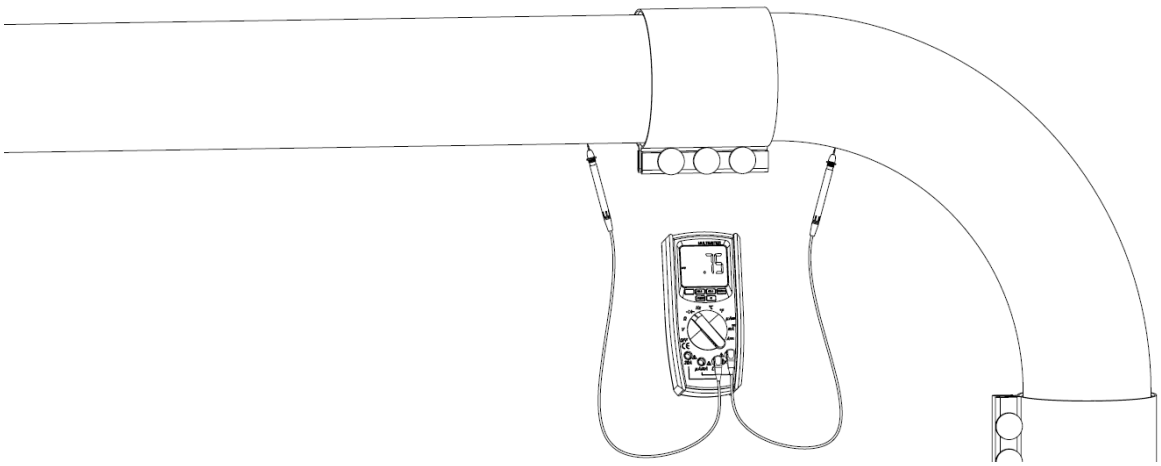


Figure 7-13: Continuity across compression coupler

4. Measure the continuity of the following components:
    a. Compression couplers
    b. Swivel couplers
    c. Camlock couplers
    d. Filters
    e. Intake accessories
    f. Intake lines
    g. Discharge receptacle connector lines
5. Repair or replace any component with a measured resistance greater than 5 Ω.

Lubrication of Blower Drive Shaft Bearing

To maintain smooth transmission of power from the drive belt to the blower, the blower drive shaft bearing must remain properly lubricated.

To lubricate the blower drive shaft bearing, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, disconnect and lock-out all electrical power sources, disconnect the compressed air source, relieve the air pressure from the system, and wait for all moving parts to stop.
3. Remove the fasteners securing the drive belt guard and open the guard.

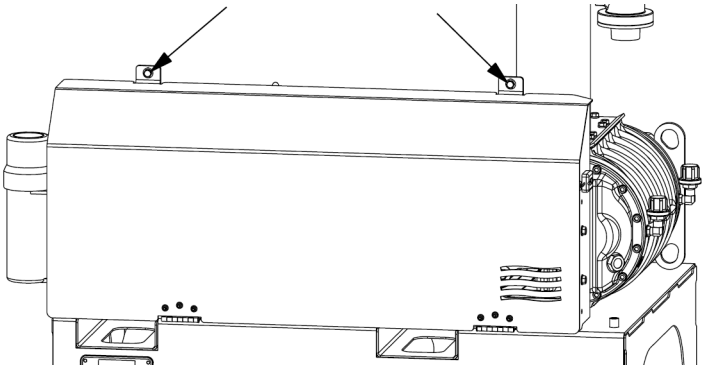


Figure 7-14: Blower drive belt guard

4. Wipe the grease fitting with a clean cloth before greasing to avoid injecting dirt and grit.
5. Check the fitting for any damage. Repair or replace a broken fitting immediately.
6. Lubricate the bearing grease fitting. Use a hand-held grease gun; air powered greasing systems can damage the seals on bearings and lead to premature failure.

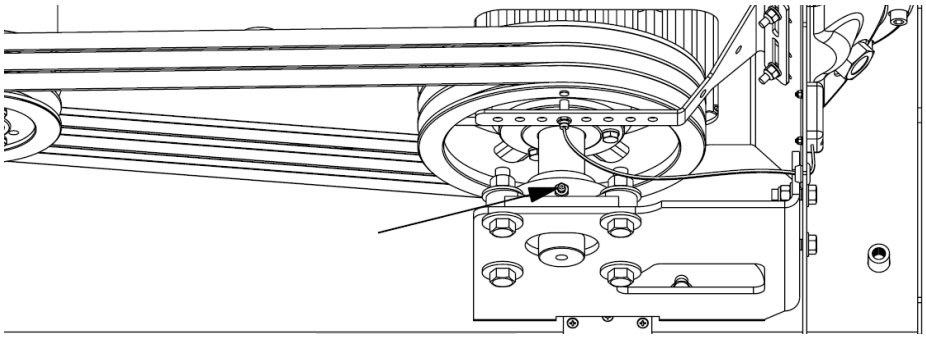


Figure 7-15: Blower drive shaft bearing grease fitting

7. If the fitting will not take grease, remove and clean thoroughly. Clean the lubricant passageway. Replace the fitting if necessary.
8. Close and secure the drive belt guard with the required fasteners. Ensure all guards are installed and secured before resuming operation.

Inspection of Differential Pressure Gauge Filter

To ensure accurate function of the differential pressure gauge, the sampled air from the dirty air plenum must be cleaned of any dust or debris before entering the differential pressure gauge. Accumulated dust and debris must be cleared from the filter for continued proper function.

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, disconnect and lock-out all electrical power sources, disconnect the compressed air source, and relieve the air pressure from the system.
3. Disconnect the airlines from the push-in fittings of the filter.

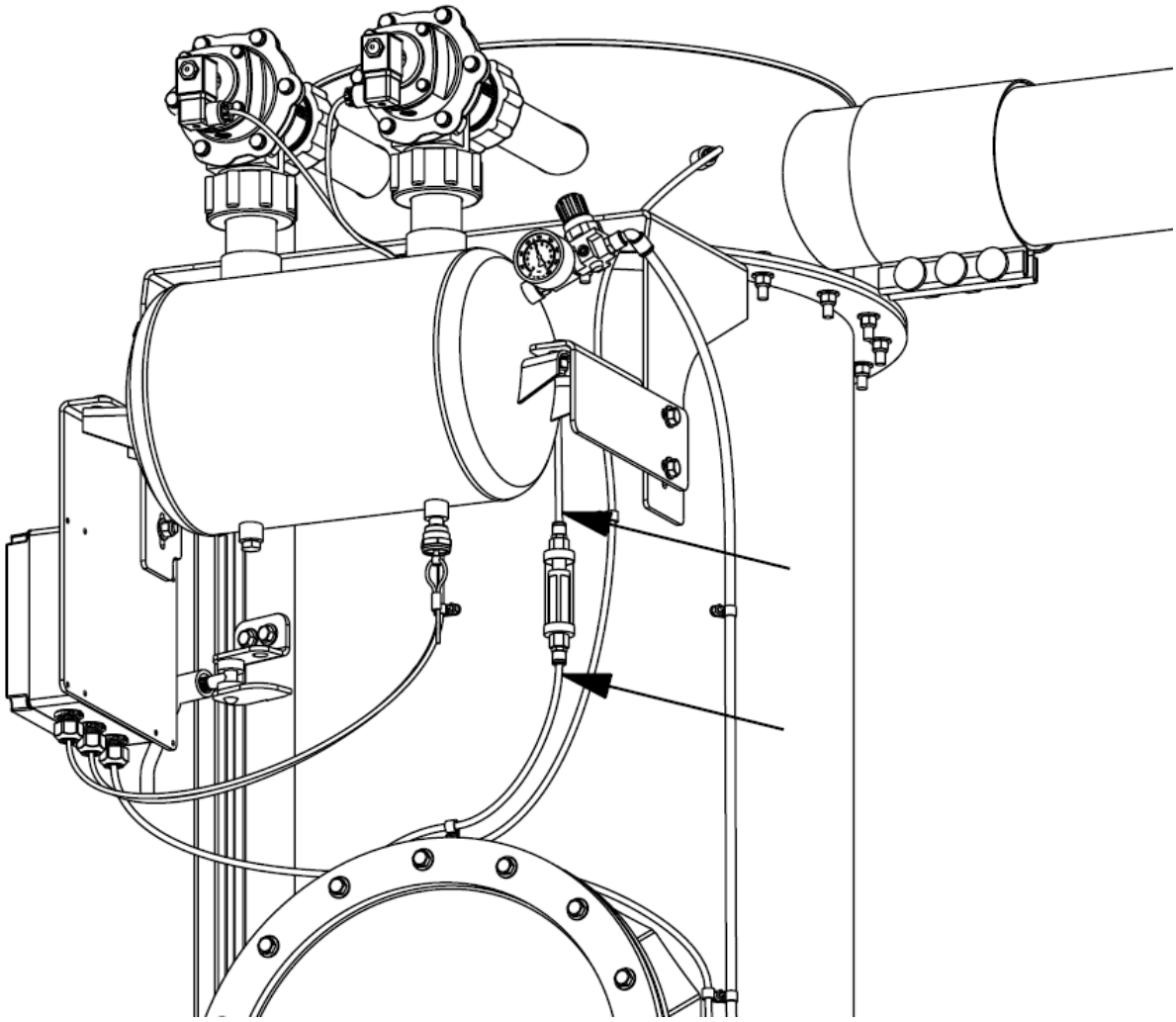


Figure 7-16: Disconnection of airlines

4. Remove the ends of the filter to access the filter element and seals.

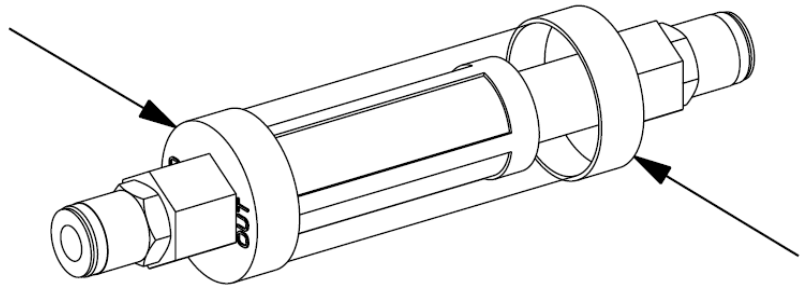


Figure 7-17: Filter element access

5. Clean the interior surfaces of the glass body and filter end caps.
6. Clean or replace the filter element and seals as required.
7. Apply Loctite Blue to the threads of the filter ends and reinstall the filter ends to the filter body. Tighten both filter ends to 13 in-lbs (1.5 Nm), ensuring there is no play between the filter ends and the glass, and the seals are properly seated.
8. Connect the airlines to the filter fittings. The line from the dirty air plenum must be connected to the filter port labelled *IN*; the line connected to the differential pressure gauge must be labelled *OUT*.

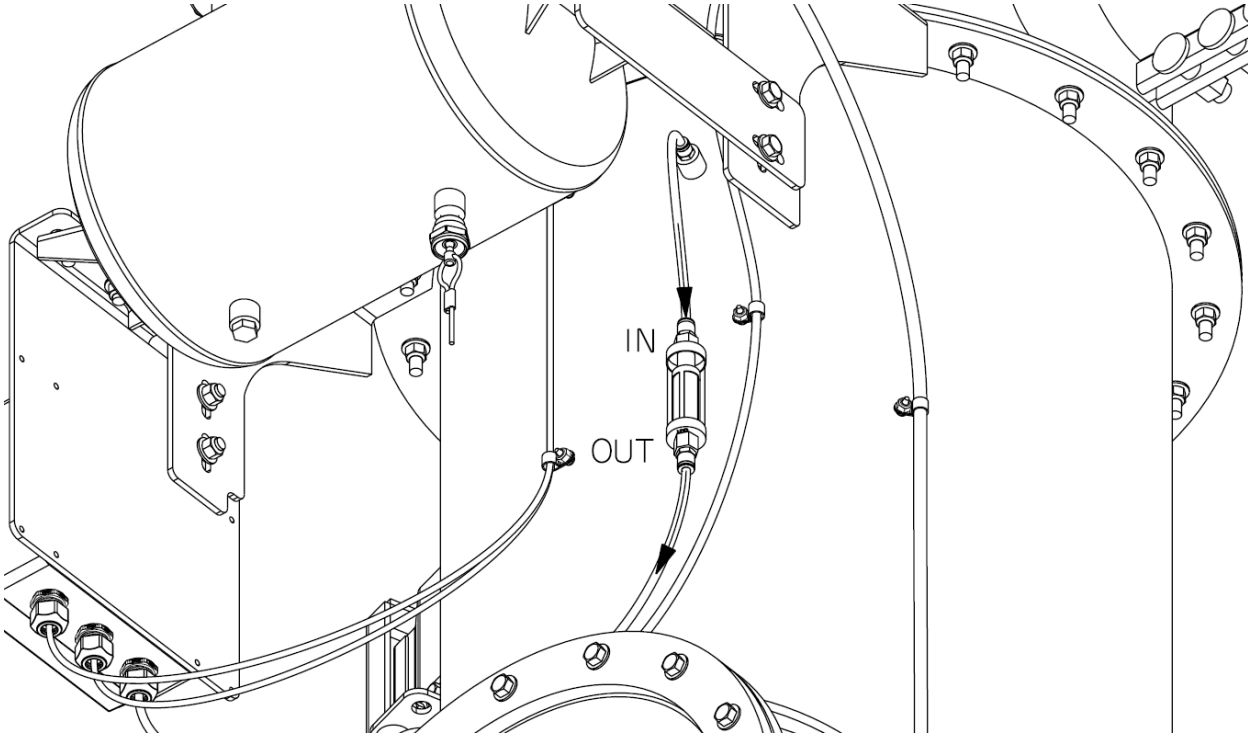


Figure 7-18: Connection of airlines to filter

Lubrication of Drive Chain

To maintain smooth transmission of power from the electric motor to the airlock and to prevent damage or failure due to corrosion, the drive chain must remain properly lubricated.

To lubricate the drive chain, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, disconnect and lock-out all electrical power sources, disconnect the compressed air source, relieve the air pressure from the system, and wait for all moving parts to stop.
3. Remove the fasteners securing the chain drive cover and open the guard, refer to ***Figure 7-3***.
4. Clean the drive chain of any accumulated dirt and ensure the chain is dry.
5. Apply a thin even coat of lubricant to the drive chain, particularly the interface of the rollers and link plates.

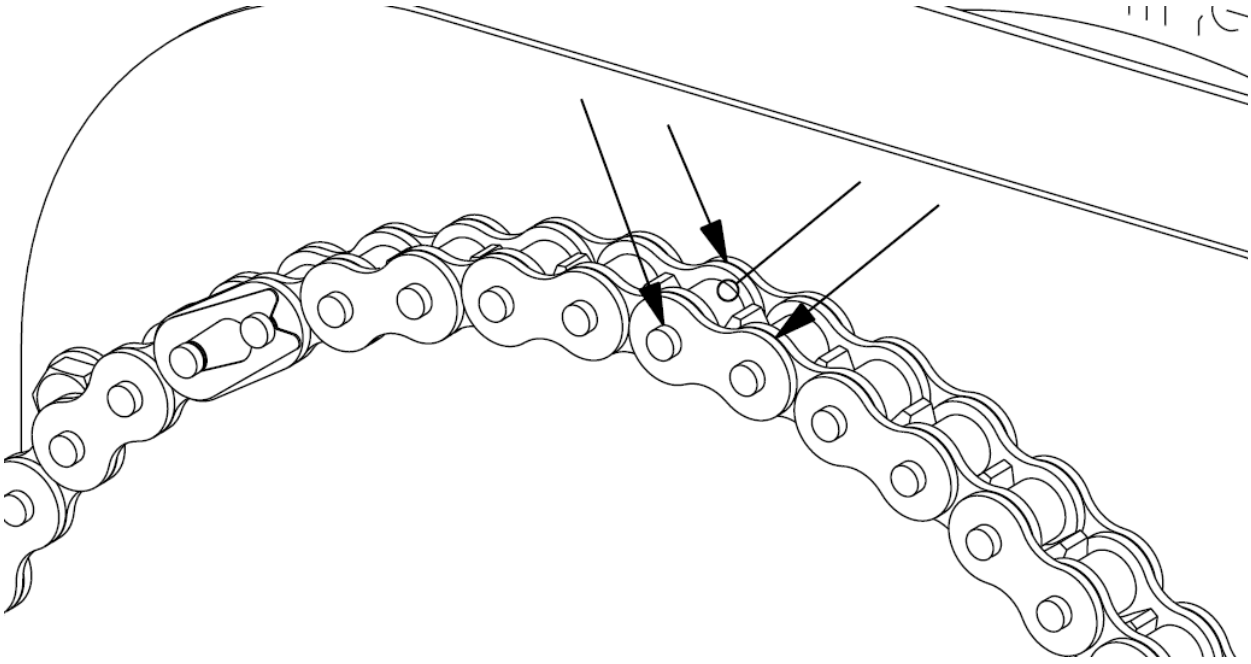


Figure 7-19: Critical application points

6. Slowly rotate the dive chain to allow the lubricant to penetrate the pin, bushing and roller interfaces.
7. Wipe any excess lubricant from the surface of the drive chain. Excessive lubricant can lead to dirt accumulation, accelerating wear on the chain.
8. Close and secure the drive chain guard with the required fasteners.

Inspection of Filters

To ensure sufficient airflow through the system to maintain the maximum capacity of the CVSAP, the filters must remain sufficiently clean. During normal operation, a differential pressure greater than 6 in WC (1.5 kPa), indicates the filters must be cleaned or replaced.

To remove the filters, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, disconnect and lock-out all electrical power sources, disconnect the compressed air source, relieve the air pressure from the system, and wait for all moving parts to stop.
3. Remove two door latch handles and open the filter access door. If necessary, all latch handles may be removed for complete removal of the filter access door.

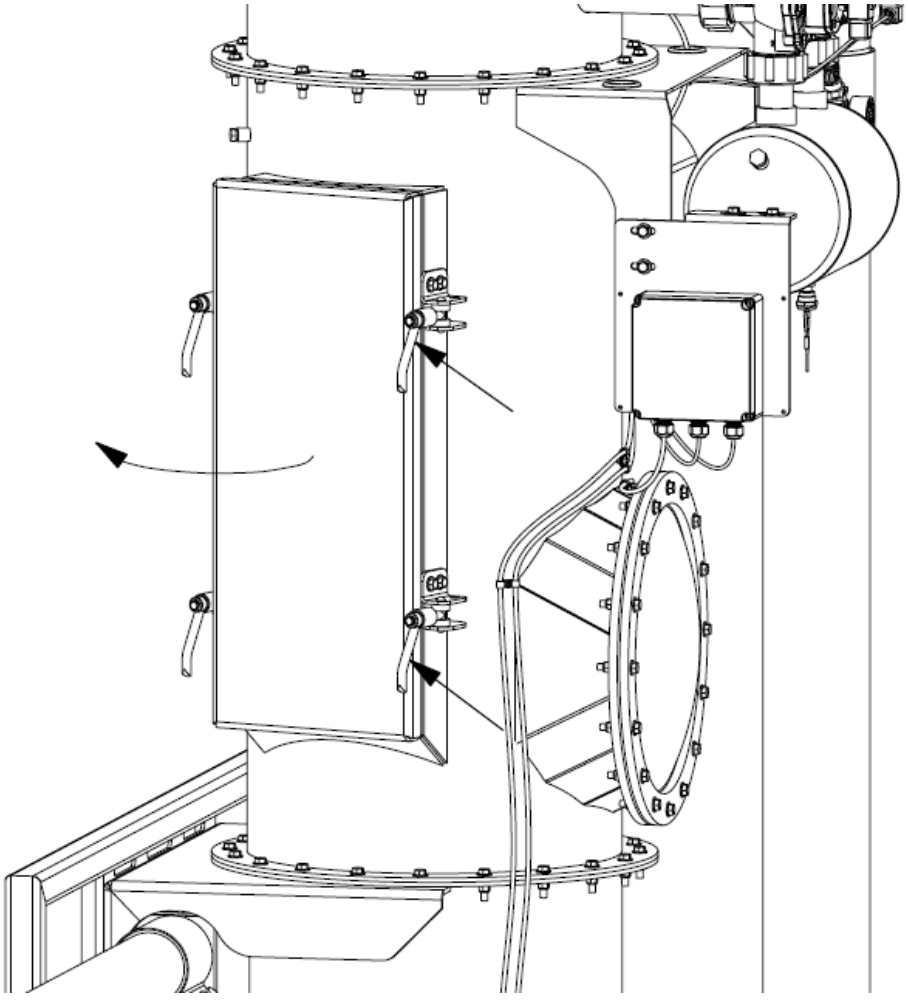


Figure 7-20: Opening of filter access door

4. Loosen and remove the nut and grounding strips of each filter from the grounding post.

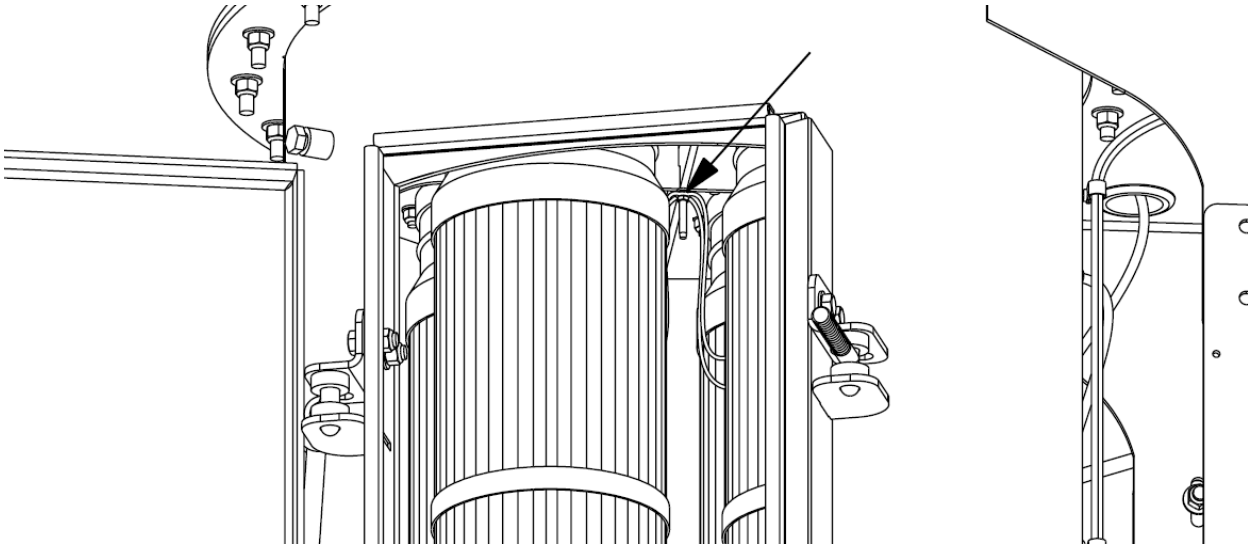


Figure 7-21: Grounding strip temporary removal

5. Loosen the T-bolt clamp of the first filter.

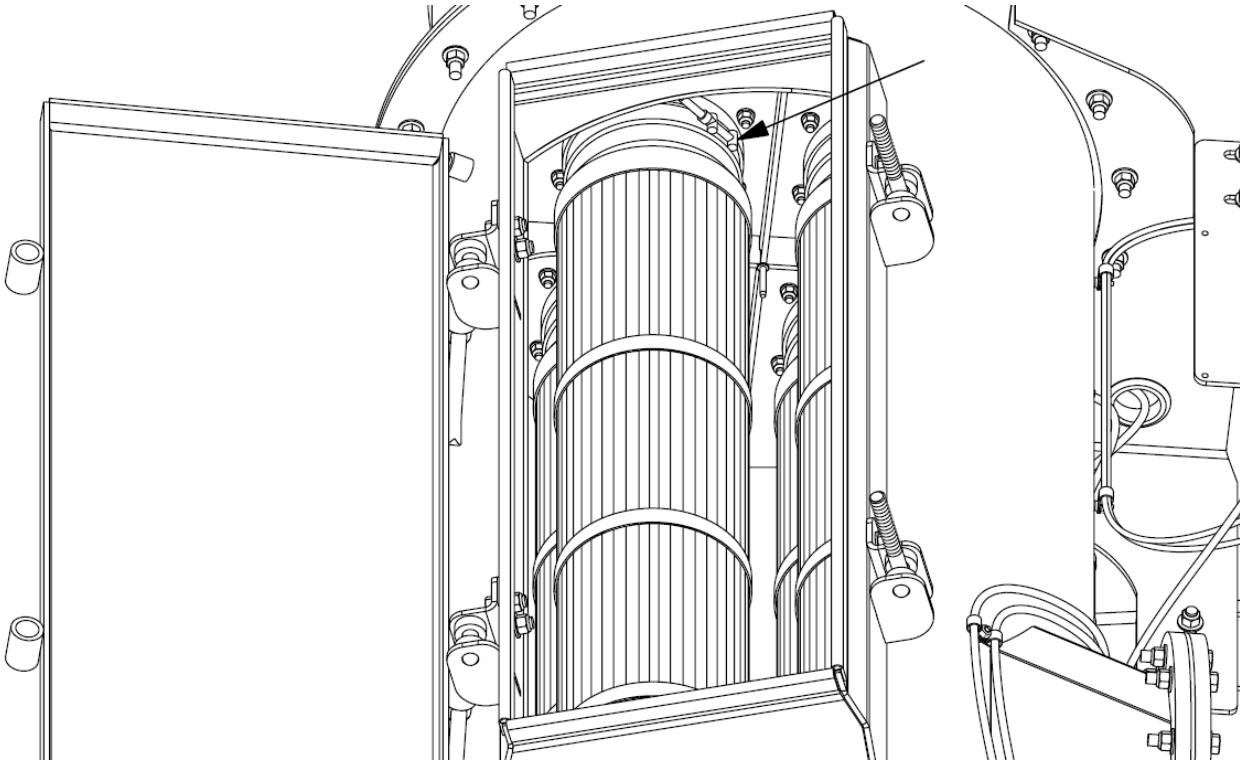


Figure 7-22: Filter T-bolt clamp

6. Unseat the filter from the filter hub, ensuring the filter surface is not damaged or deformed while removing the filter through the access point.

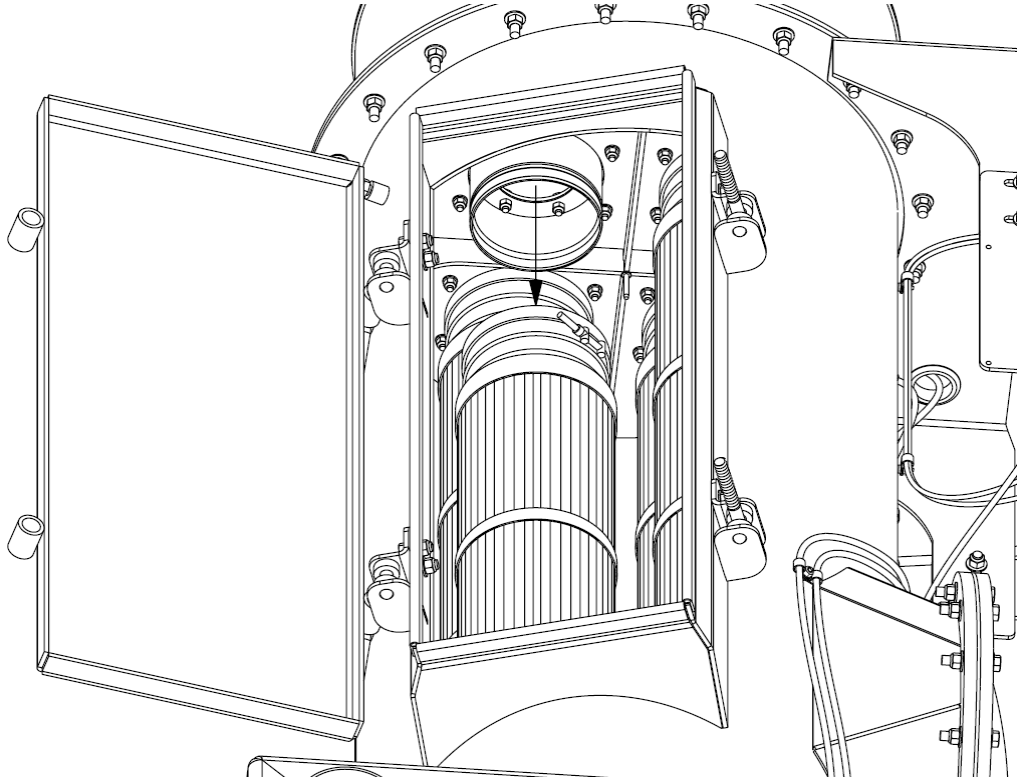


Figure 7-23: Filter removal

7. Repeat *Step 5* and *Step 6* to remove all filters.
8. Inspect the condition of the filters. If the filter is not damaged and it is not necessary to immediately replace it, the filter may be cleaned and reinstalled. If the filter shows any signs of damage, wear or degradation, it must be replaced.

To clean a filter, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Using compressed air at a maximum of 100 psi (690 kPa), blow any loose dust off of the surface of the filter, blowing from the inside of the filter towards the outside to prevent forcing dust into the filter pores.
3. Fill a clean container with hot water, at a temperature of 125 to 150 °F (52 - 66 °C), and a low sudsing, mild-washing solution. Submerge the filter in the container and allow the filter to soak for approximately 10 minutes. If necessary, the water may be gently agitated by submerging a compressed air line into the container. Use care to ensure direct contact with the water and exposed skin is not made. Water at this temperature can burn or scald.

4. Remove the filter from the container and rinse the inside and outside surfaces with a water hose, at a maximum of 40 psi (276 kPa). The outside surface must be rinsed with the water stream at a 45° angle from vertical and parallel to the pleats.

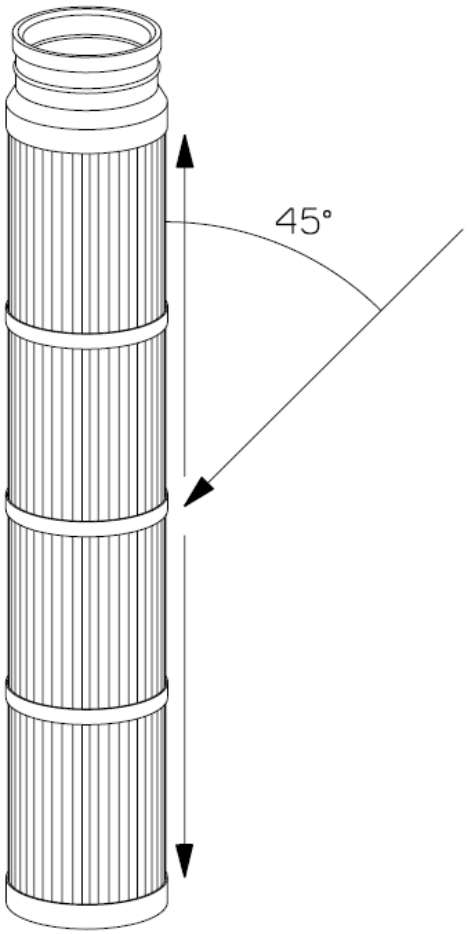


Figure 7-24: Water stream positioning

5. Using compressed air at a maximum of 50 psi (345 kPa), blow any excess water from the surface of the filter.
6. Allow the filters to dry for 24 to 48 hours, or until completely dry. Ensure the filters are protected against exposure to dust while drying.
7. Ensure the filters are completely dry before reinstalling and resuming operation; operating the CVSAP with wet or damp filters will result in poor performance and potential failure of the filter.

To install new or cleaned filters, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Ensure the electrical power source and air supply are disconnected and locked-out, and that the pressure has been relieved from the air system.
3. Ensure the filter access door is opened.
4. Ensure the filter grounding strip is positioned in a manner such that it can be easily connected to the grounding post.
5. Orient and position the filter within the AMS filter housing such that the opening of the filter is upwards and it is aligned with the furthest filter hub. Ensure the T-bolt clamp is loosely positioned on the filter.

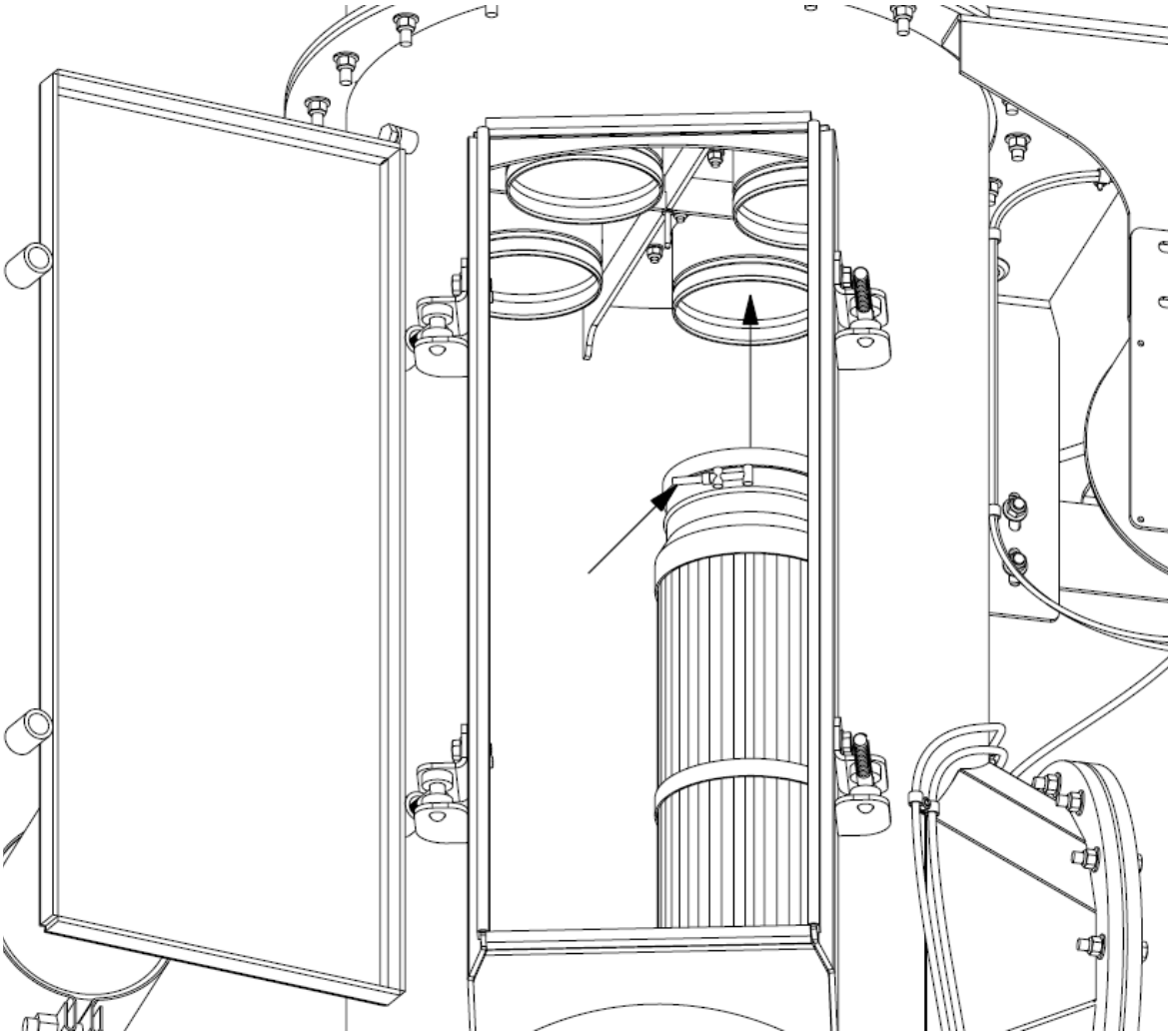


Figure 7-25: Filter positioning

6. Seat the filter onto the filter hub; when fully seated, the locating ring of the filter will snap into the locating notch of the filter hub.

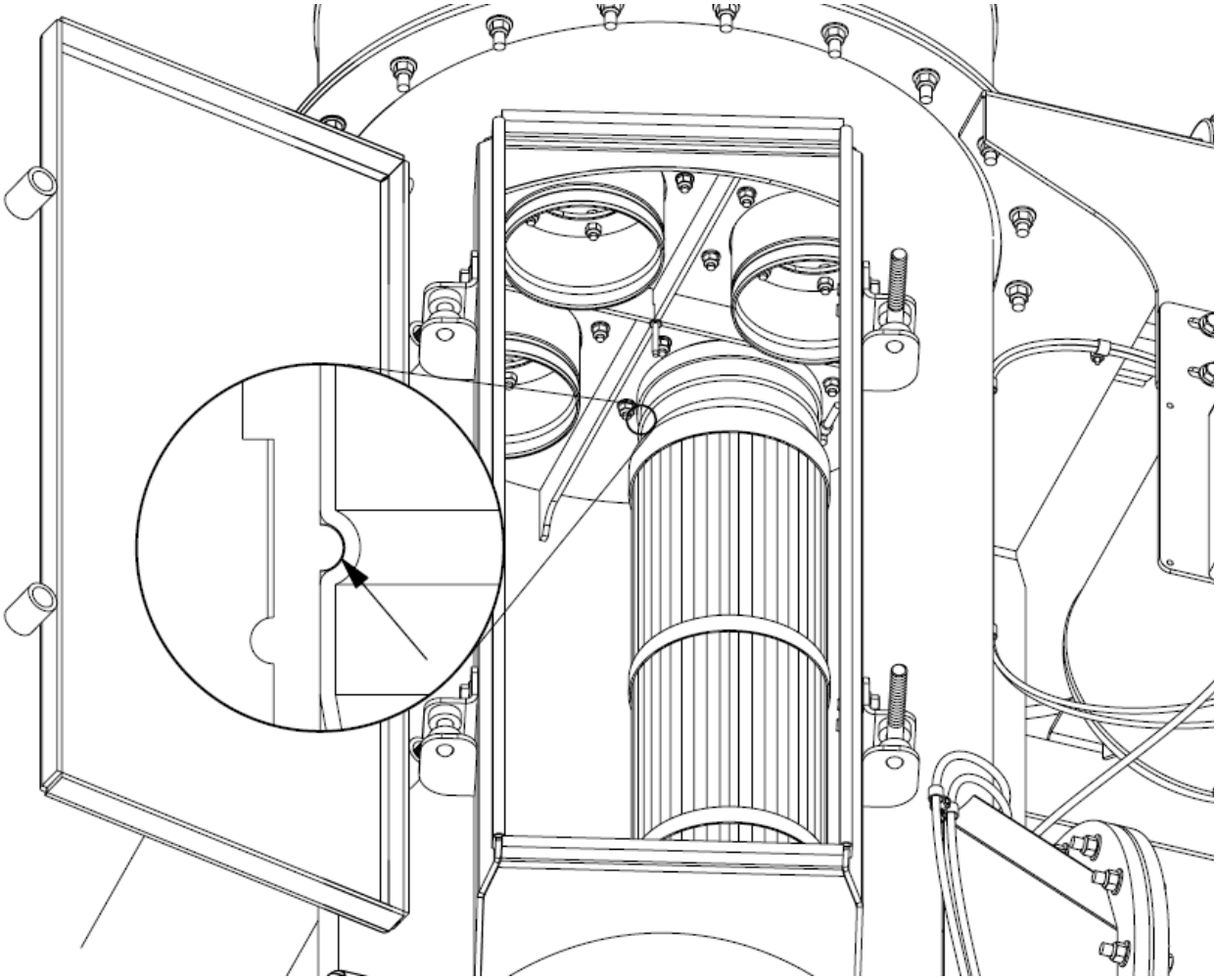


Figure 7-26: Detailed inner view of filter seating on hub

7. Secure the filter in place by tightening the T-bolt clamp, refer ***Figure 7-22***.
8. Repeat *Step 5* to *Step 7* to install all filters.
9. Position the grounding strip of each filter onto the grounding post and secure all grounding strips in place with a nut, refer to ***Figure 7-21***.
10. Check the continuity of the filters and filter housing to ensure the filters are properly grounded.
11. Close the filter access door and secure it in place by installing and tightening all locking handles, refer to ***Figure 7-20***.

Inspection of Air System

Safe and efficient operation of a CVSAP relies on a well sealed and high performance air system. Use extreme caution when working with high pressure air systems. High pressure air is capable of penetrating the skin and injecting air under the skin and into the bloodstream, leading to serious injury, stroke or death. **NEVER** attempt to locate a leak using your hand or any other part of your body.

When inspecting the air system, pay particular attention to the following:

- Always ensure the electrical power source and air supply are disconnected and locked-out, and that the pressure has been relieved from the air system before performing any maintenance.
- Inspect all couplers, fittings and joints to ensure there are no leaks and the components are in good condition. Ensure the seal of each female coupler is installed and in good condition; replace any worn or damaged seal as required. Clean any accumulated dirt or debris and replace any components that show signs of wear or damage.
- Inspect the system piping to ensure there is no damage to the structure due to over-tightening of compression couplers. Ensure the compression coupler gaskets are in good condition and the couplers are sufficiently tightened. Tighten as required and replace any coupler that shows signs of wear or damage.
- Inspect the air lines for signs of wear damage, and ensure no lines are kinked. Straighten any kinked lines and repair or replace any lines that show signs of wear or damage.
- Inspect the condition of the mounting gaskets and assembly interfaces and ensure all fasteners are tightened to the correct torque to maintain a good seal. Replace any gaskets that show signs of wear or damage and reapply silicone to any interfaces as necessary.
- Ensure the differential pressure gauge, vacuum gauge and pressure gauge, if equipped, function properly. Calibrate or replace inaccurate gauges.
- Ensure the pressure regulator is functioning properly and maintains the pressure within the header tank at 70 psi (483 kPa).
- Check the condition of any air supply filters and dryer and clean or replace as required.
- For units equipped with an explosion vent, check to ensure the fasteners are properly tightened and the vent shows no signs of wear or damage. Replace as required.

Inspection of Electrical System

Proper function of the CVSAP relies on the good working condition of the electrical system and components.

When inspecting the electrical system, pay particular attention to the following:

- Always turn off the power supply, ensure all electrical disconnect switches are in the *OFF* position and wait for 30 seconds to allow for the internal capacitors to discharge before performing any maintenance or opening any electrical enclosure.
- Inspect all electrical wiring, cables, connectors and components, looking for any signs of physical wear, damage, abrasions, or loose connections. Replace any worn or damaged components as required.
- Test the operation of all electrical switches to ensure the proper function is performed as the switch is toggled.
- Open and inspect the interior of the sequential timer enclosure, electric motor conduit boxes and control panel. Ensure there are no loose connections or signs of water within the enclosures. Clean any accumulated dirt or debris and lubricate the connections with dielectric grease.
- Clean any dirt, dust or oil from the electric motors to permit proper heat dissipation and prevent insulation breakdown. Apply a fresh coat of insulating varnish to motor surfaces as required.
- Measure the insulation resistance of the motors in accordance with IEEE Standard 43 to ensure there are no indications of moisture within the motor. The recommended minimum insulation resistance in megohms (MΩ) at 104°F (40°C) is equal to the rated motor potential in kilovolts (kV) plus one megaohm (e.g., a motor rated at 575 V ⇒ 0.575 kV, would require a limit of 0.575 + 1, resulting in a 1.575 MΩ minimum insulation resistance). If the minimum resistance is not met, the motor must be dried.

Changing of Gearbox Oil

The lubricating oil of the gearbox must be routinely changed to prevent accumulation of contaminants or debris in the oil to maintain smooth transmission of power.

To change the gearbox oil, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Run the system at normal operating speeds until the gearbox is warm. Warm oil removes more contaminants than cold, stagnant oil.
3. Follow normal operating procedures to shut down the system according to **Section 6: Operation**, *Stopping the Machine*.
4. Place all controls in neutral, disconnect and lock-out all electrical power sources, disconnect the compressed air source, relieve the air pressure from the system, and wait for all moving parts to stop.
5. Allow some time for the gearbox to cool to a safe temperature to handle. Do not contact hot oil as it can cause serious injury.
6. To remove the gearbox from the CVSAP, proceed as follows:
    a. Remove the fasteners in the C-flange and remove the electric motor.

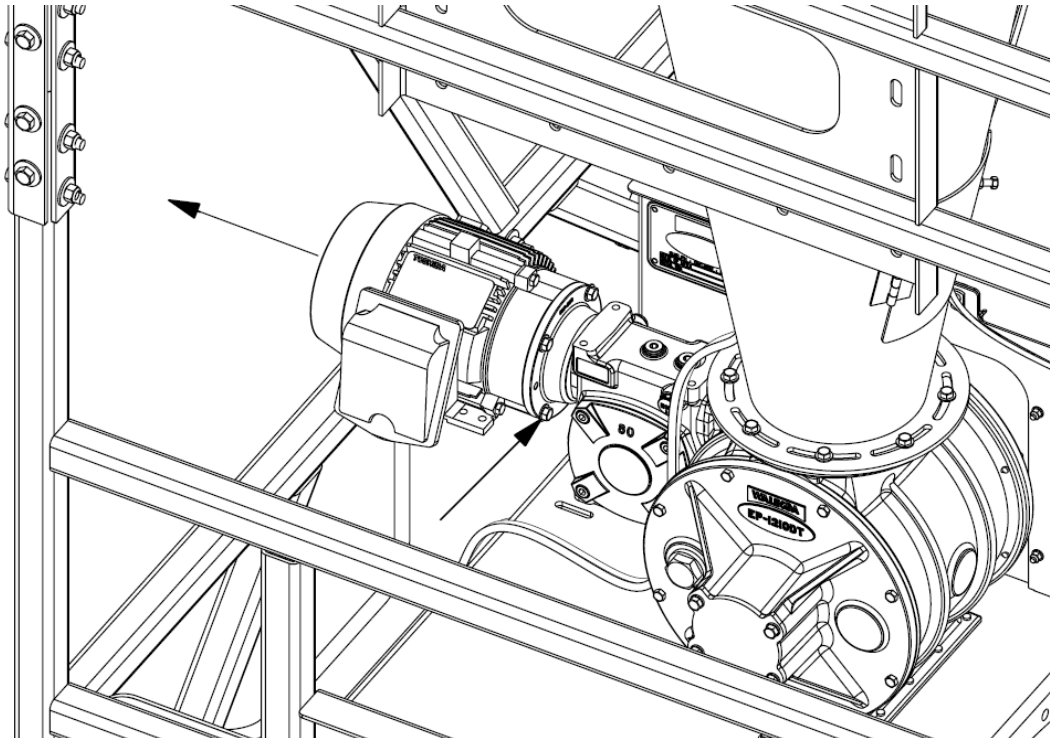


Figure 7-27: Airlock motor removal

    b. Remove the fasteners securing the drive chain cover and open the guard.

c. Locate the connecting link in the drive chain and rotate the drive chain to position the connecting link on the slack side between the two sprockets.

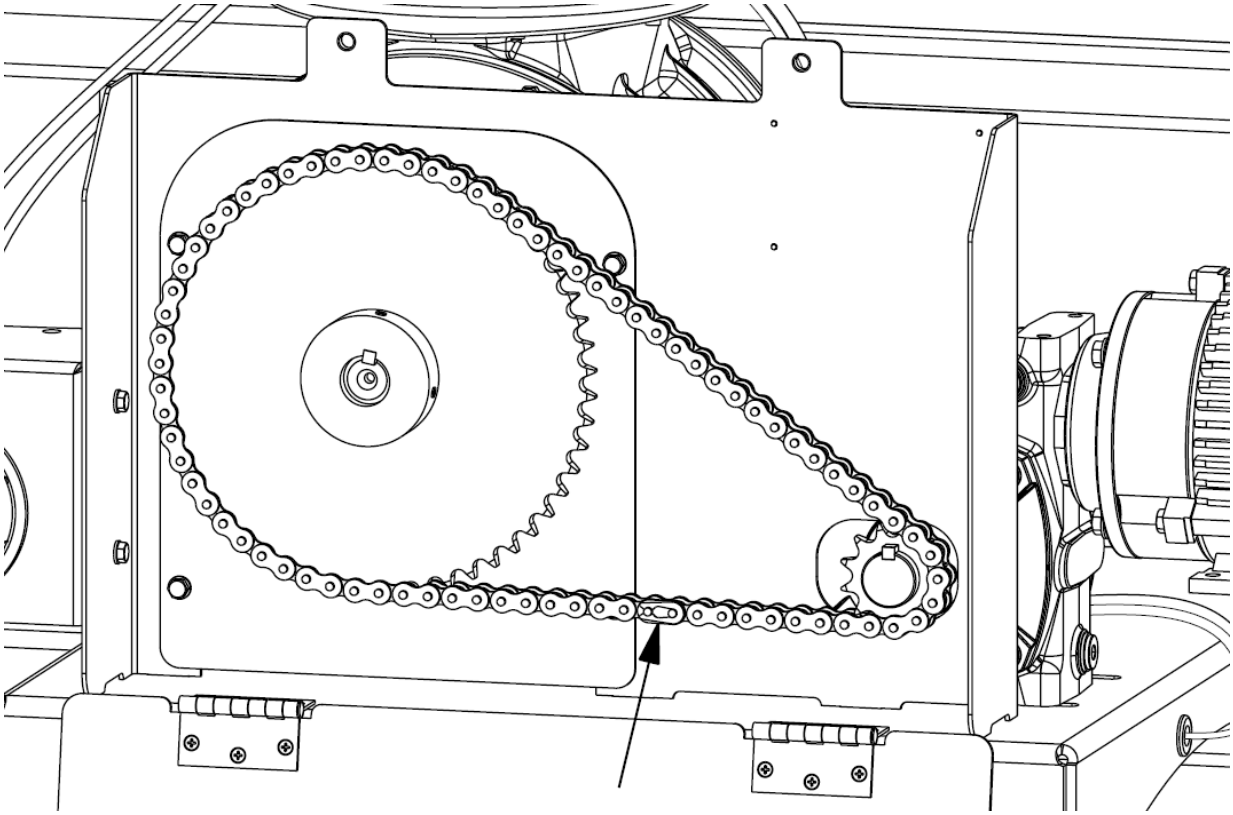


Figure 7-28: Positioning of connecting link

d. Secure the chain in place through the use of a chain vise or block and tackle assembly to prevent movement during the removal of the connecting link.

e. Remove the spring clip from the connecting link.

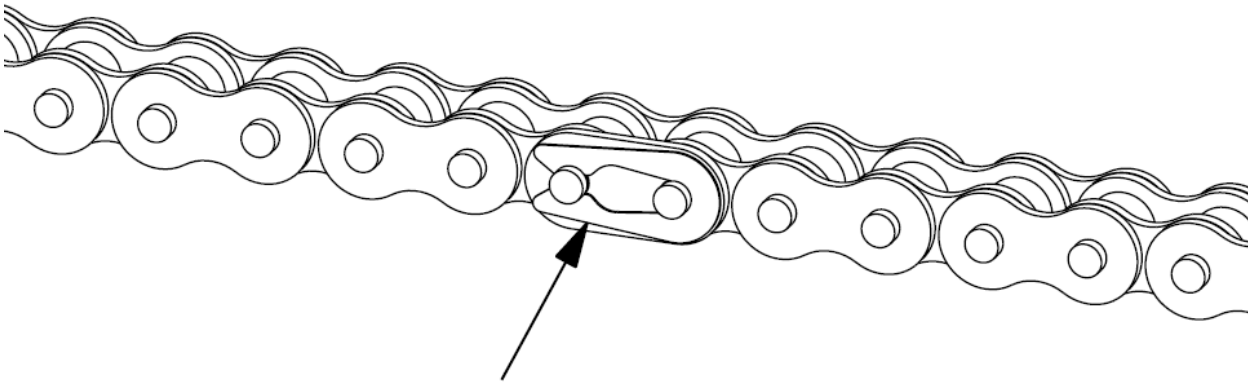


Figure 7-29: Connecting link spring clip

f. Remove the outer plate from the connecting link.

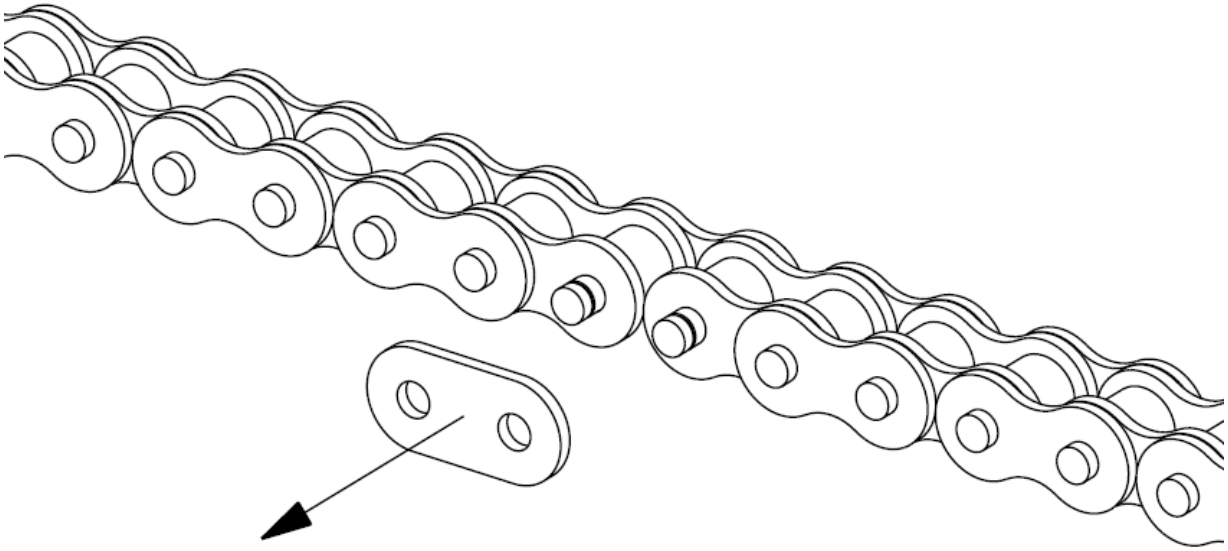


Figure 7-30: Connecting link outer plate

g. Use a chain punch to alternately strike the pins of the connecting link to evenly disengage the connecting link pins from the bushings of the chain ends.

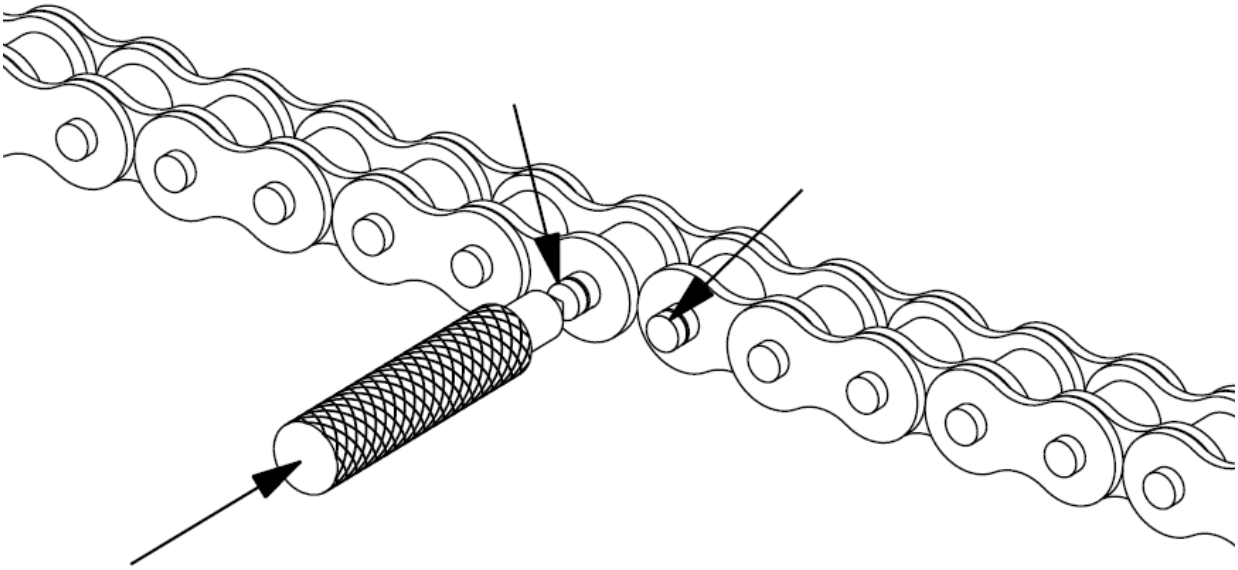


Figure 7-31: Disengagement of connecting link pins

h. Release all clamping devices used to secure the chain and remove the drive chain from the sprockets. Place the chain in an area where it will not be exposed to dirt or debris.

i. Loosen the set screws of the gearbox sprocket and remove from the gearbox output shaft.

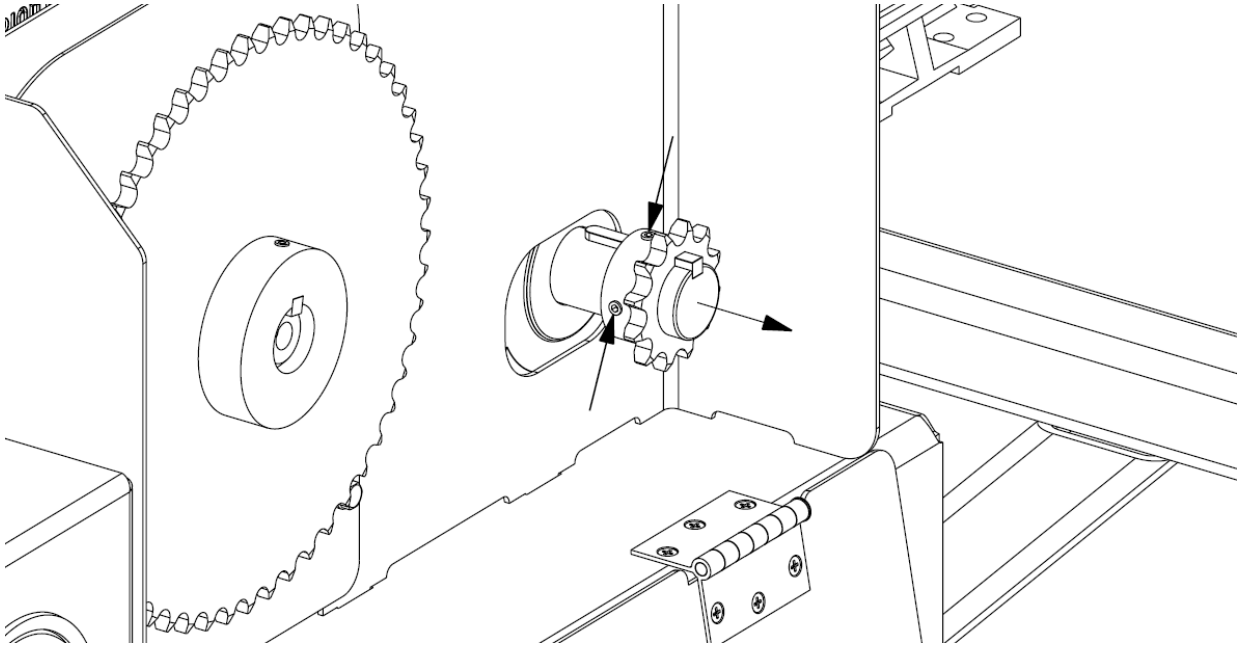


Figure 7-32: Sprocket removal

j. Remove the mounting fasteners of the gearbox and remove the gearbox from the CVSAP mounting frame.

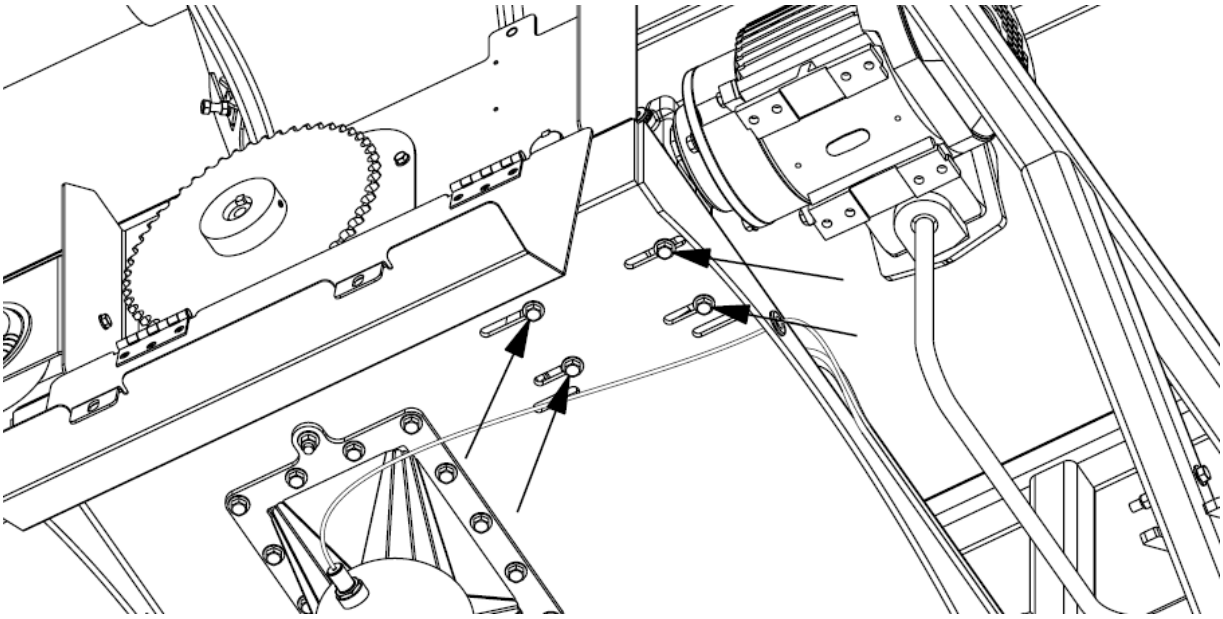


Figure 7-33: Gearbox mounting fasteners

7. Place the gearbox in a manner such that the drain plug is accessible and place a pan or other suitable receptacle under the gearbox drain plug.

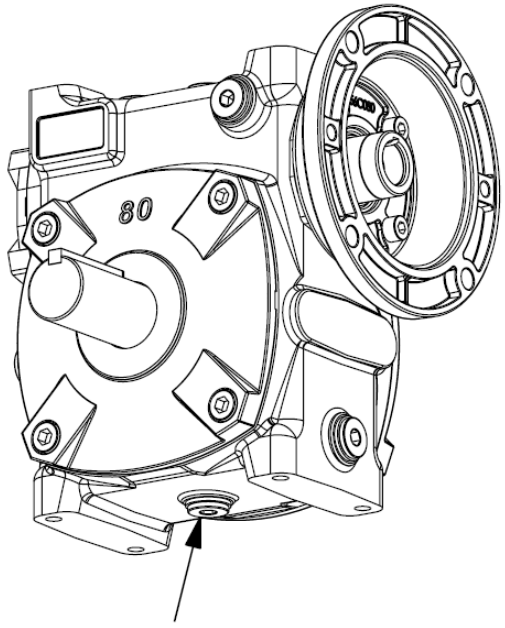


Figure 7-34: Gearbox drain plug

8. Remove the drain plug and allow the oil to drain into the pan.
9. Remove one of the fill plugs to allow air to enter the gearbox to improve the oil drainage.

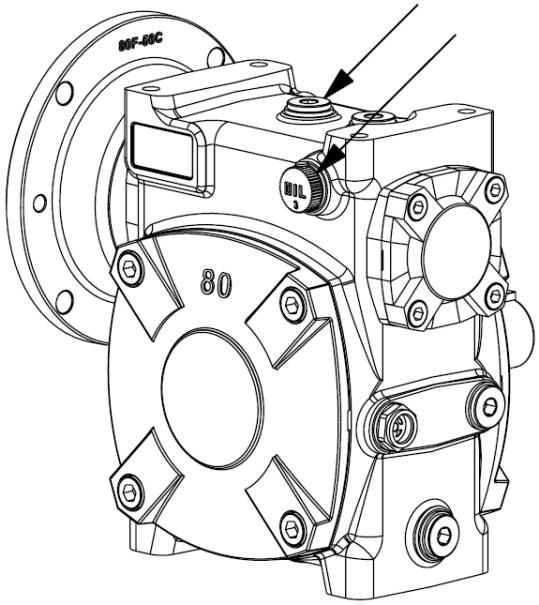


Figure 7-35: Fill plug removal

10. Allow the oil to drain completely.
11. If the oil appears especially dirty, it may be beneficial to flush the interior of the gearbox to remove any remaining contaminants. To flush the gearbox, pour clean oil into the fill hole and allow it to pass through the gearbox and drain into the pan, picking up any remaining contaminants as it passes through.
12. Check the condition of the breather and clean as required.

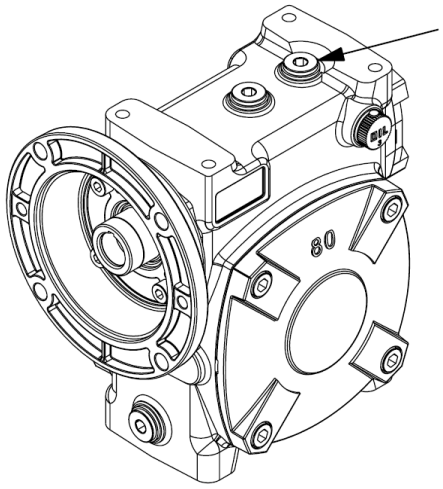


Figure 7-36: Gearbox breather

13. Once completely drained, install and tighten the drain plug.
14. Fill the gearbox with Walinga blower oil (part number 98-13813-6) until the oil reaches the center of the sight glass. Do not mix different types of oils.

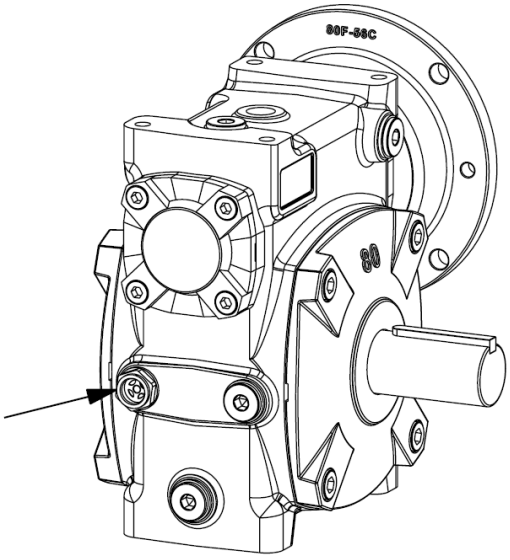


Figure 7-37: Sight glass

15. Install and tighten the fill plug(s).
16. To reinstall the gearbox, proceed as follows:
    a. Position the gearbox on the CVSAP mounting frame and secure in place by loosely installing the gearbox mounting fasteners.
    b. Apply anti-seize to the inner surface of the sprocket and place the sprocket onto the gearbox output shaft.
    c. Refer to the section *Drive Chain Tension and Sprocket Alignment* to align the shafts and sprockets of the gearbox and airlock.
    d. Once properly aligned, tighten the set screws to secure the sprocket in place.
    e. Ensure the chain end bushings are clear of any debris.
    f. Position the drive chain on the sprockets such that the two ends of the chain are separated by one sprocket tooth. Rotate the sprockets as required to ensure the chain is properly engaged on both sprockets.

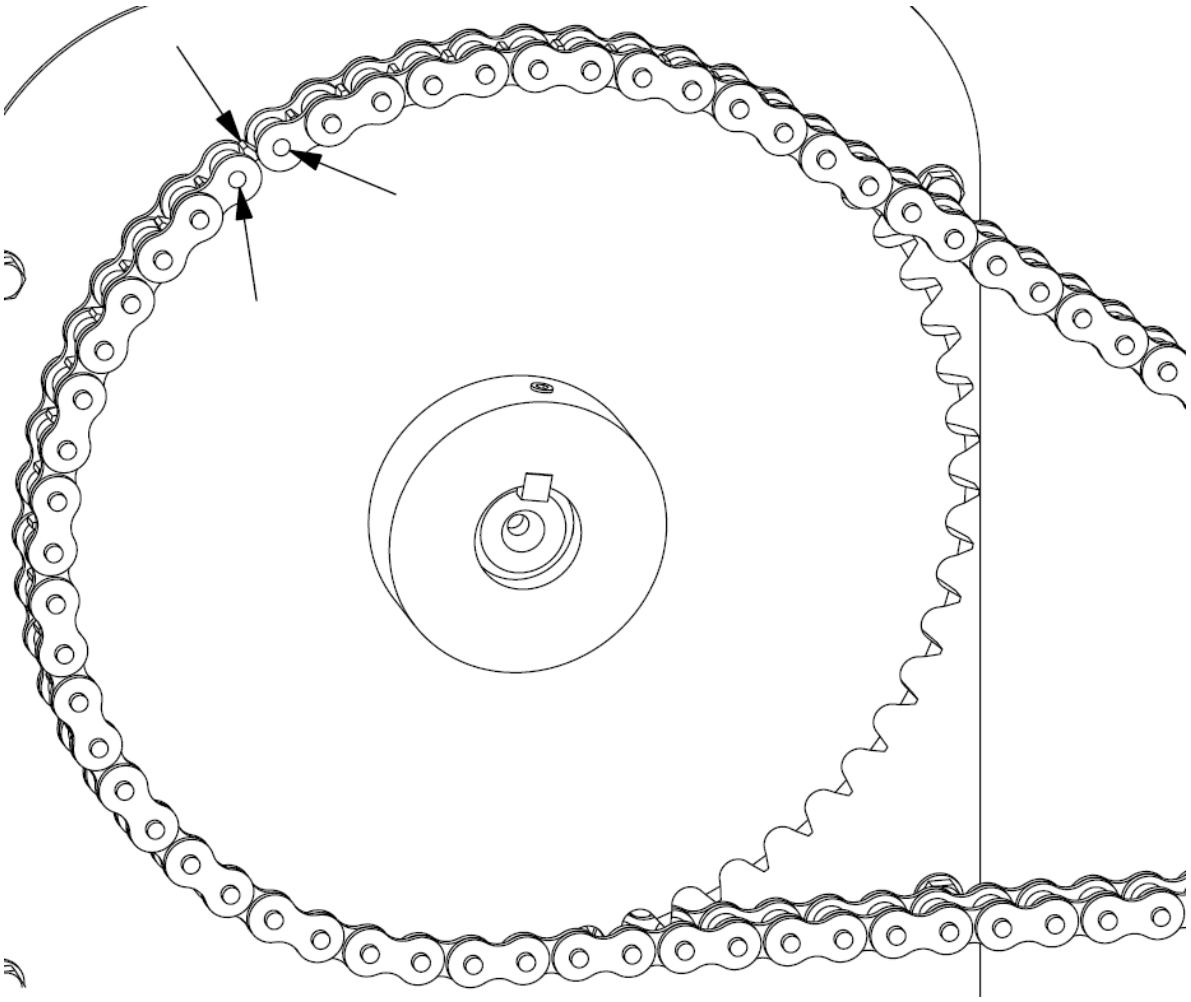


Figure 7-38: Chain end positioning

g. Insert the pins of a new connecting link through the bushings of the two chain ends.
NOTE: Do not reuse a previously removed connecting link. Damage to the pins of the connecting link occurs during the removal process. Using a link with damaged pins can cause premature wear and failure of the drive chain.

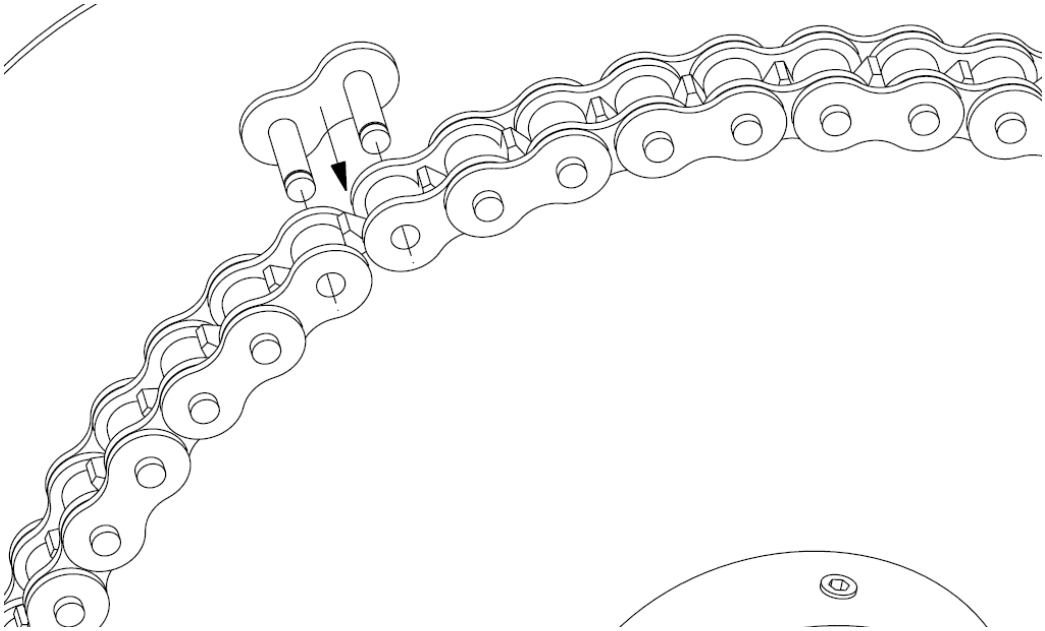


Figure 7-39: Connecting link pin insertion

h. Slide the outer plate over the pins and flush against the chain end inner plates.

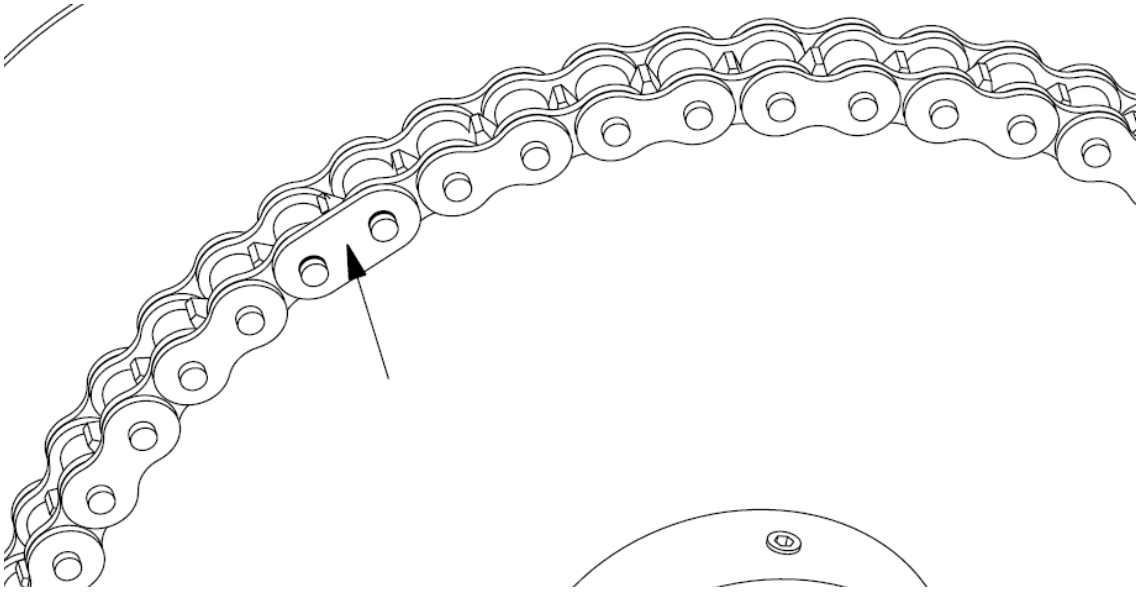


Figure 7-40: Connecting link outer plate installation

i. Secure the outer plate in place by installing the spring clip, refer to ***Figure 7-29***.

j. Use a mallet to tap the exposed ends of the connecting link pins to ensure the outer plate and spring clip of the connecting link have a snug fit to the chain ends, allowing free and smooth movement of the chain.

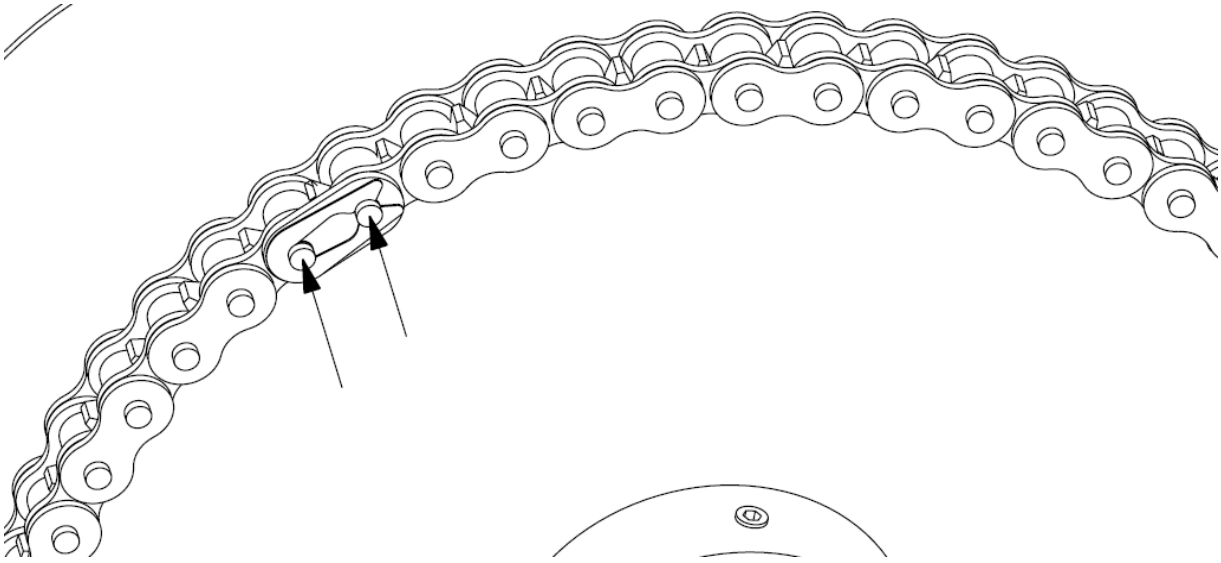


Figure 7-41: Connecting link adjustment

k. Ensure there is sufficient clearance between the drive chain and the drive chain guard and all fasteners.

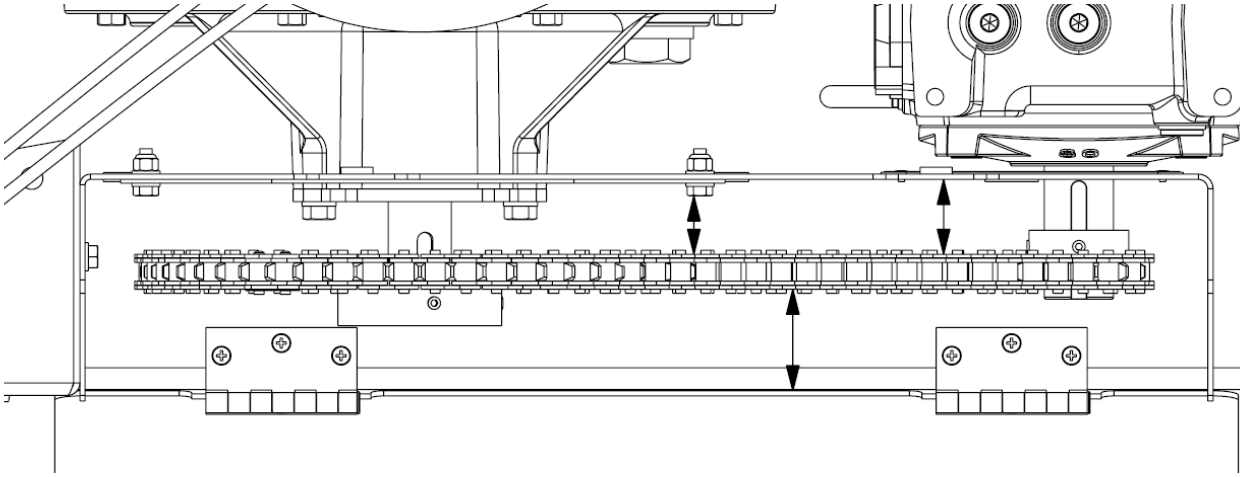


Figure 7-42: Drive chain clearance

l. Apply anti-seize to the motor shaft and reinstall the electric motor to the gearbox by aligning the motor shaft key with the gearbox keyway. Secure the motor to the C-flange of the gearbox with the required fasteners.

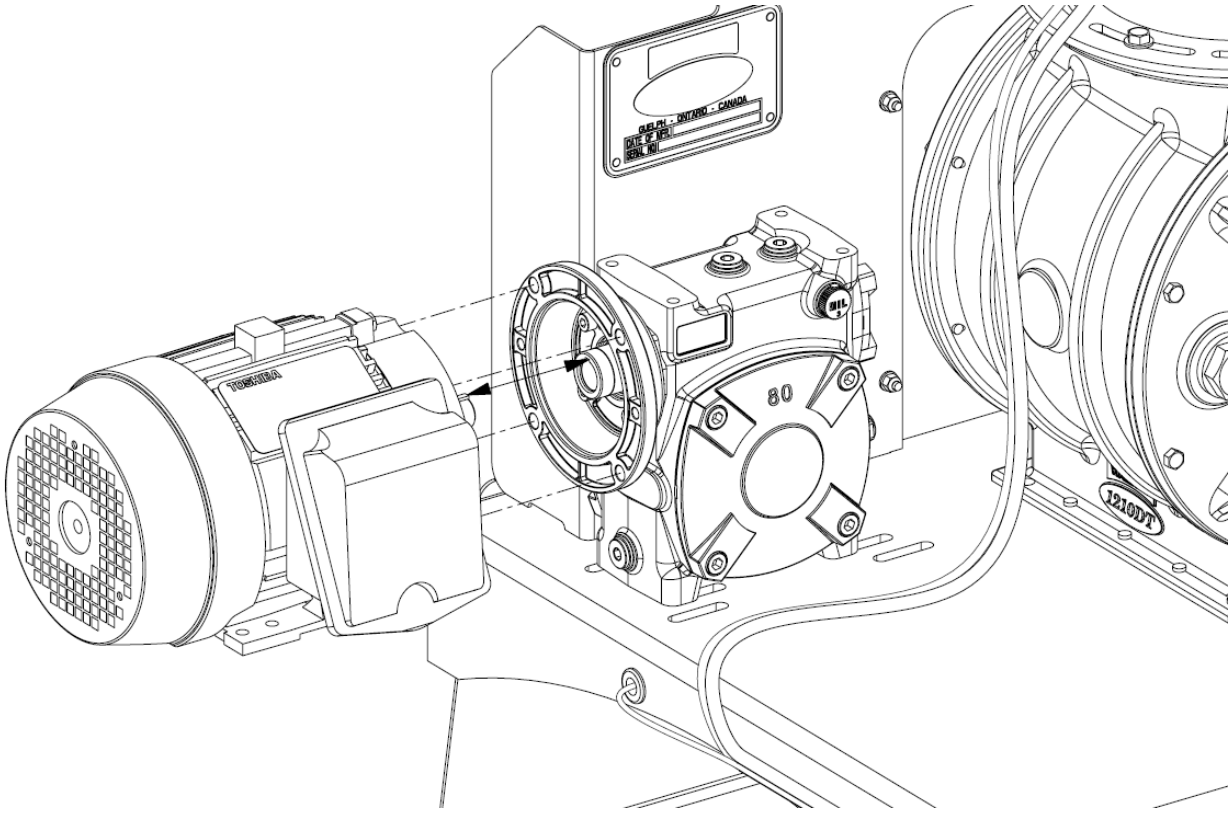


Figure 7-43: Motor and gearbox alignment

m. Refer to the section *Drive Chain Tension and Sprocket Alignment* to ensure the drive chain is properly tensioned and the sprockets are aligned.

n. Ensure the gearbox mounting fasteners have been tightened to achieve the correct chain tension and the sprocket set screws are tightened.

o. Close and secure the drive chain cover in place with the required fasteners.

17. Ensure all guards are installed and secured.

Inspection of Relief Valve(s)

As the blower operates, it creates a vacuum on the intake side of the system to draw product in, and, when incorporated into a material handling system, creates a pressurized flow on the discharge side to move the product. A vacuum relief valve is installed on the intake side of every CVSAP and a pressure relief valve is installed on the discharge side of any CVSAP incorporated into a material handling system. If flow on the intake side becomes restricted, the vacuum will build until it exceeds the setting of the vacuum relief valve of -9 in Hg (-30 kPa) or -16 in Hg (54 kPa). The valve will open to supply a flow of air into the intake side and prevent the blower from overheating. If pressure on the discharge side of a CVSAP in a material handling system becomes restricted, the pressure relief valve will open to relieve the pressure as it reaches the setting of the valve of 15 psi (103 kPa). The valve(s) must operate at pressures close to the specified level(s) for optimum performance. After prolonged use, the springs in the valve(s) that dictate the opening pressures can weaken, causing the valve to open prematurely, negatively impacting the machine performance. Dirt and debris can also contaminate or become lodged in the valve seat, affecting the performance.

To assess the function of the air system relief valve(s), proceed as follows:

1. During operation, listen for the opening of the valve(s). A popping or whistle can be heard when the valve opens.
2. Monitor the gauges on the vacuum and pressure side, if equipped, of the system to determine when the valve(s) is opening.
3. Check the operation of the vacuum relief valve by restricting the flow on the intake side of the system until the valve can be heard opening. Read the vacuum gauge and ensure it is -9 in Hg (-30 kPa) or -16 in Hg (54 kPa) at the time of opening. If the vacuum relief valve does not function properly, clean, repair or replace the valve.
4. If equipped, check the operation of the pressure relief valve by restricting the flow on the discharge side of the system until the valve can be heard opening. Read the pressure gauge and ensure it is 15 psi (103 kPa) at opening. If the relief valve does not function properly, clean, repair or replace the valve. Note the pressure relief valve may not open if the pressure lines have air leaks, ensure the system is well sealed and check all fittings.

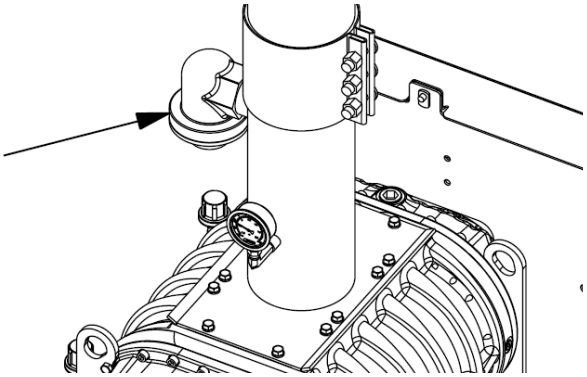


Figure 7-44: Vacuum relief valve

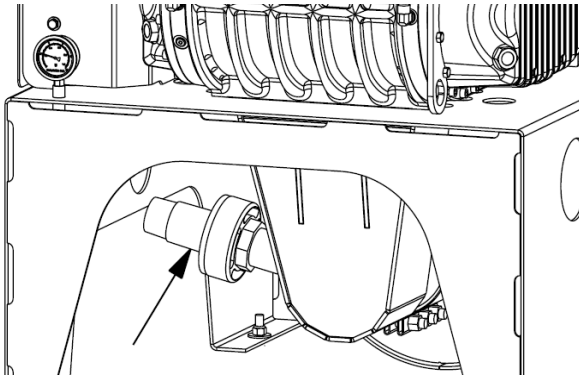


Figure 7-45: Pressure relief valve

Drive Belt Tension and Alignment

Rotational power is transmitted from the engine to the blower through the belt drive. To obtain efficient transmission of power and optimal belt life, the belts must be properly tensioned and the pulleys must be aligned. Belts that are too tight will stretch and wear quickly or overload the bearings on the input shaft of the blower. Belts that are too loose will not transmit the required power and will slip, overheat and wear out quickly. Pulleys that are not properly aligned will result in rapid belt wear.

To check and adjust the belt tension and pulley alignment, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, disconnect and lock-out all electrical power sources, disconnect the compressed air source, relieve the air pressure from the system, and wait for all moving parts to stop.
3. Remove the fasteners securing the belt guard and open the belt guard.

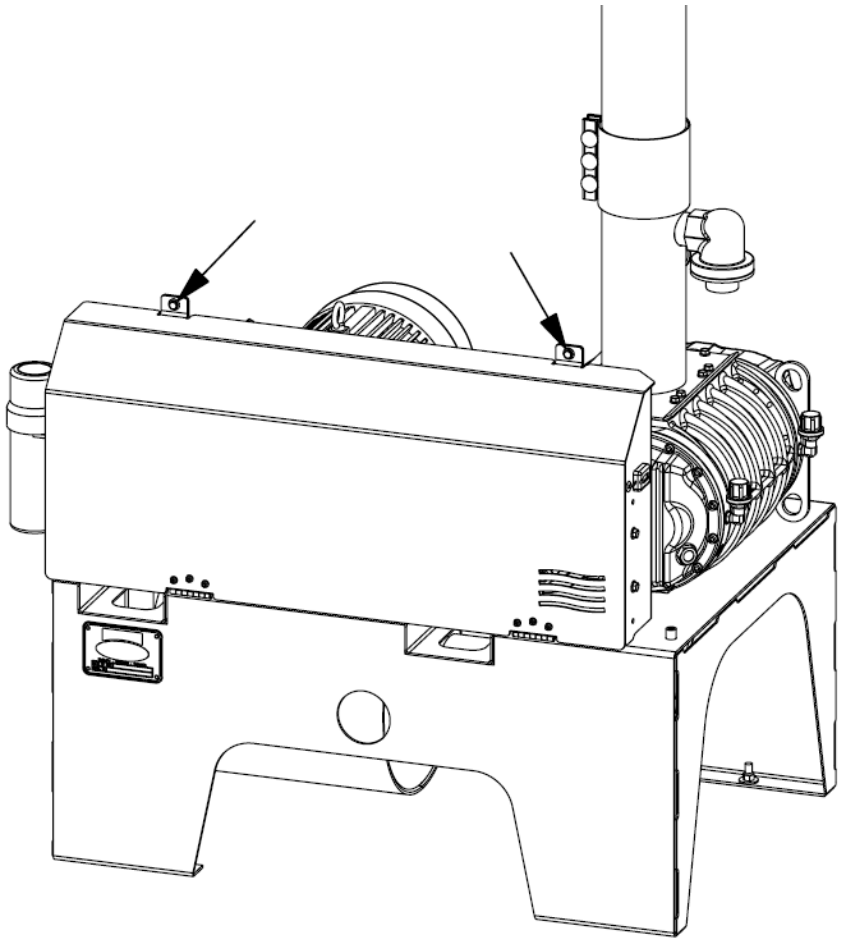


Figure 7-46: Drive belt guard fasteners

4. Use a belt tensioning tool to determine the belt deflection in a static condition. Contact your local dealer or representative for the required belt tension and deflection. Record the requirements below for future reference:

Belt Tension _____ lbs / _____ kg

Belt Deflection _____ in / _____ mm

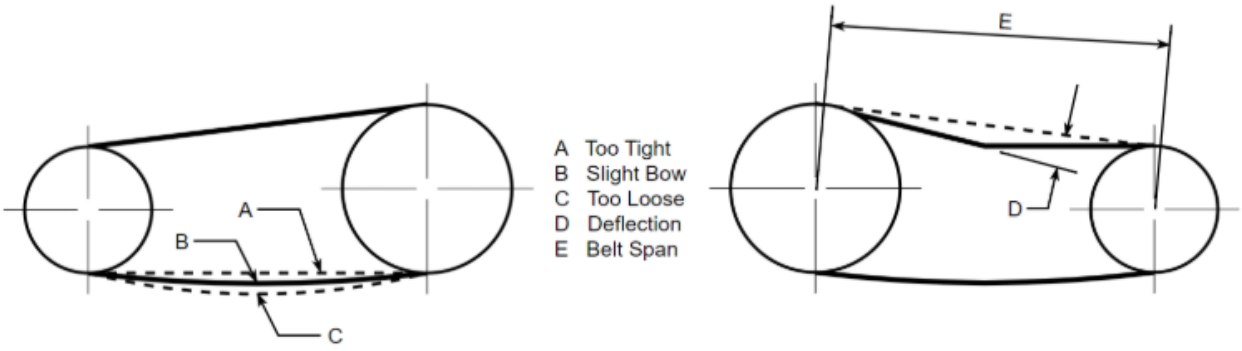


Figure 7-47: Drive belt deflection

5. To adjust the belt tension, proceed as follows:
   a. Loosen the fasteners securing the engine mount slide frame.

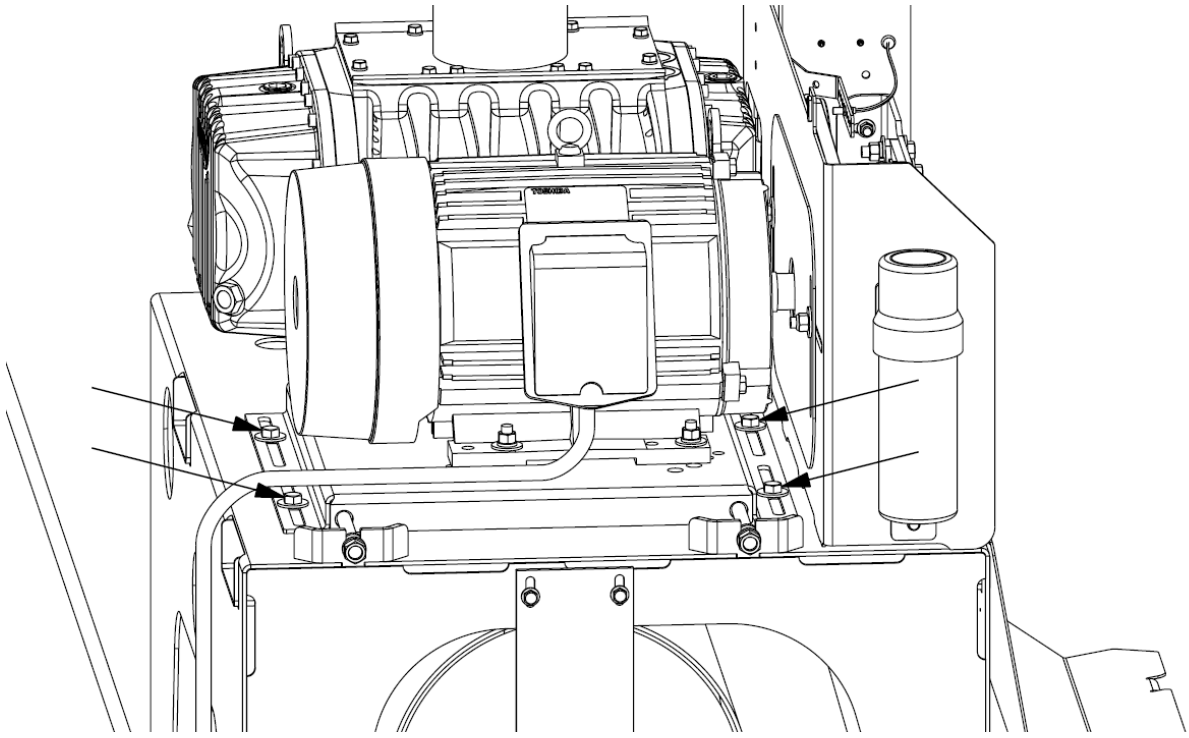


Figure 7-48: Slide frame fasteners

b. Turn the adjusting rods to achieve the correct belt tension. Turning the adjusting rods clockwise will *INCREASE* the belt tension. Turning the adjusting rods counter-clockwise will *DECREASE* the belt tension. Ensure both adjusting rods are equally turned to maintain proper alignment of the engine shaft. Unequal turning of the adjustment rods will cause the engine shaft to become misaligned.

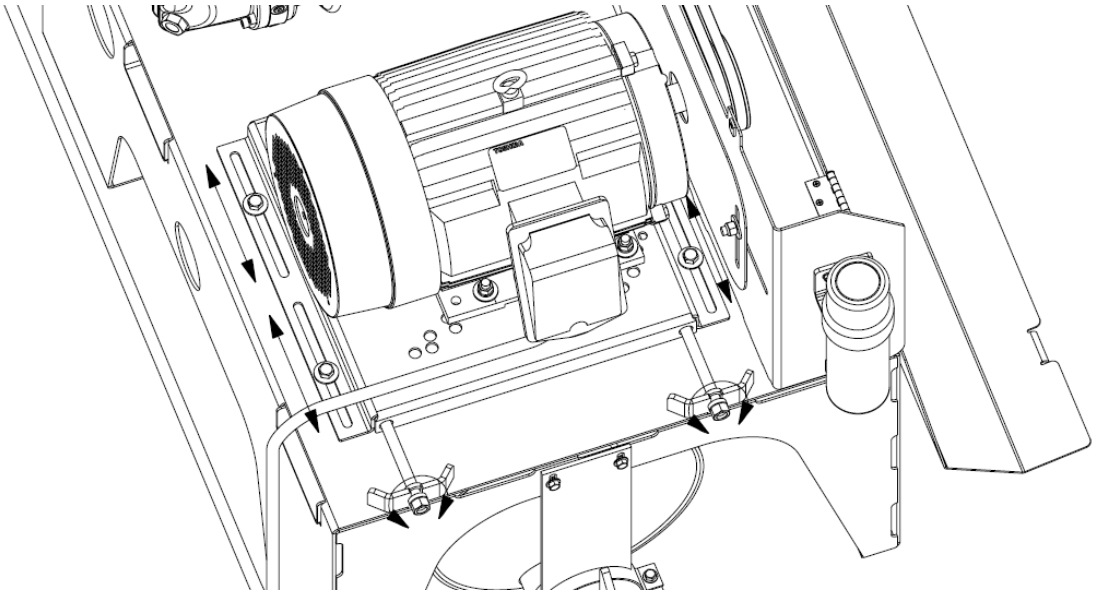


Figure 7-49: Slide frame adjusting rods

c. Check the belt tension. Over tightening will cause belt stretching and overload the bearing. Belts that are too loose will slip, tear and wear rapidly. Check the pulley alignment, reference *Step 6*.

d. Tighten the engine mount slide frame fasteners to secure the engine in place.

6. To check and adjust the pulley alignment, proceed as follows:

a. Lay a straight edge across the faces of the two pulleys.

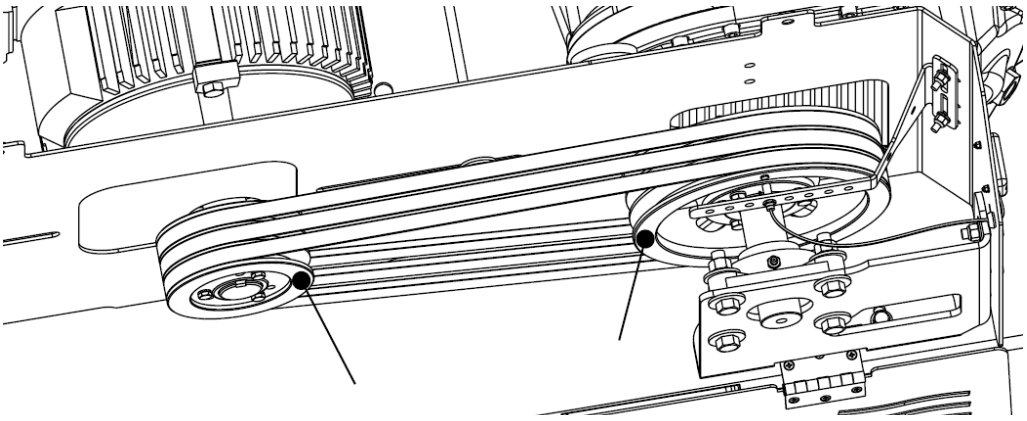


Figure 7-50: Pulley alignment

b. If the gap between the pulley and the straight edge exceeds 1/16 in (1.5 mm), the pulleys must be realigned.

c. Review ***Figure 7-51*** for the different types of alignment issues.

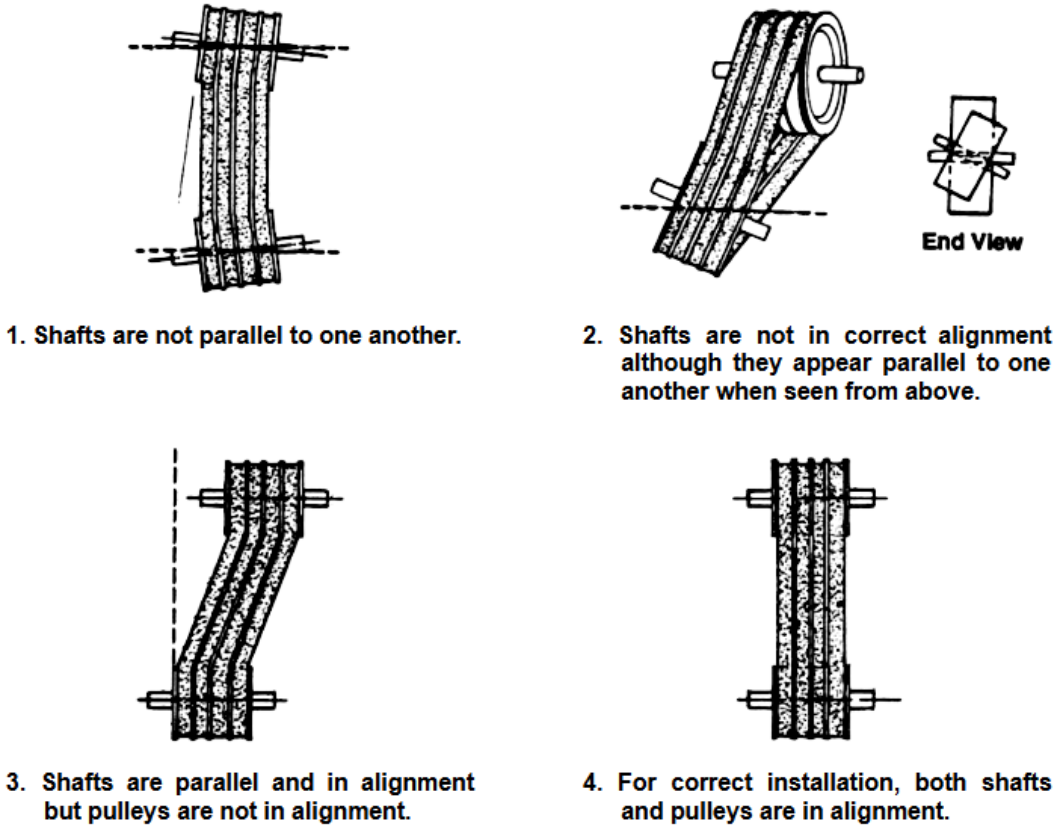


Figure 7-51: Pulley and shaft misalignment

d. If there appears to be Type 1 Misalignment, as seen in ***Figure 7-51***, use the adjusting rods of the engine mount slide frame to align the input pulley. Be aware that the position of the blower is fixed to the frame, meaning the positioning of the pulley mounted to the blower shaft can not be adjusted.

e. If there appears to be Type 2 Misalignment, as seen in ***Figure 7-51***, check to ensure the engine and blower are both level. Adjust the mounting of the engine as required to correct the misalignment.

f. If there appears to be Type 3 Misalignment, as seen in ***Figure 7-51***, loosen the set screw of the bushing and slide the bushing and pulley along the shaft until the pulleys are aligned. Tighten the set screw to secure it in place.

g. Set the belt tension with reference to *Step 5*.

7. Ensure all guards are installed and secure, and all fasteners are tightened before resuming operation.

MAINTENANCE MATERIALS

Dielectric Grease
Use a silicone-based dielectric grease to seal and protect electrical connections from corrosion (Walinga part number 37-19361-6).

Lubricating Blower Oil
Use Walinga blower oil to lubricate the gearbox and blower (Walinga part number 98-13813-6).

Lubricating Drive Chain Oil
Use a high quality, non-detergent petroleum based or synthetic oil with sufficient viscosity to penetrate the internal chain interfaces.

Lubricating Grease
Use an SAE multi-purpose high temperature grease with extreme pressure characteristics. An SAE multi-purpose lithium based grease is also acceptable. Walinga airlocks are manufactured using Unirex EP 2 (Walinga part number 98-01959-6).

Thread Sealant
Use a high performance thread sealant for pneumatic fittings. Fittings are installed using Permatex High Performance Thread Sealant (Walinga part number 92-03141-6).

Thread Locker
Use a medium-strength anaerobic adhesive on threaded metal surfaces to prevent loosening due to vibration (Walinga part number 92-53313-6).

Assembly Sealant
Use a durable and flexible silicone (Walinga part number 92-14772-6).

Rust Inhibitor
Use a water soluble rust inhibitor to prevent corrosion of the airlock during storage, such as Rust Prevent Syn 3-X (Walinga part number 85-61652-6).

Anti-Seize Lubricant
Use a copper-base lubricant to prevent seizing of moving or rotating components, such as Torque Master Anti-Seize (Waling part number 98-13491-6).

Lubricant Storage
A CVSAP can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store lubricants in an area protected from dust, moisture and other contaminants.

ADJUSTMENTS

Purge Cycle Timing Adjustments

With approval from Walinga, the purge valve activation time and off delay time may be fine tuned and adjusted to meet the demands of each unique CVSAP installation. Incorrect adjustment of the purge cycle timing can result in failure of the components or system, or severe shortening of the life-span of the components. Approval must be received from your local Walinga dealer or representative before making adjustments to the timing of the purge cycle or the warranty will be voided.

To adjust the purge cycle timing, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Shut off the compressed air supply, switch the pressure relief shut-off valve to the exhaust position and ensure the pressure is relieved from the CVSAP system.
3. To adjust the purge cycle timing, the electrical power supply to the sequential timer must remain engaged. Use caution to ensure no contact is made with any exposed electrical connections or components.
4. Refer to **Section 5: Machine Life-Cycle Procedures** *Initial Set-Up* for procedures to adjust the parameters of the sequencer element. Adjustment of the sequencing element without approval from Walinga will void the warranty. It is important to keep the following in mind:
    a. *Activation time*: The standard setting for the activation time is 110 milliseconds✻.

       NOTE: Setting the activation time too low will result in the filters not being entirely cleaned during purging, leading to a potential blockage of the filter, starving the blower of air, and leading to overheating and potential failure of the blower. Setting the activation time too high can cause damage to the filter media, leading to the potential creation of holes in the media, allowing dust to pass through the filter and be drawn into the blower leading to premature wear and damage.

    b. *Off delay time*: The standard setting for the off delay time is 30 seconds✻.

       NOTE: Setting the delay time too low can cause damage to the filter media due to over-activation of the purge valves, decreasing the filter life-span and causing potential failure of the filters. Setting the pause time too high can result in an excess of dust/particulate accumulation on the filters resulting in a blockage, starving the blower of air, and leading to overheating and potential failure of the blower.
5. Ensure all guards and covers are installed and secured and resume normal operation of the CVSAP, carefully monitoring the differential pressure gauge and performance of the CVSAP to ensure the adjustments made to the activation time and/or pause time are appropriate for the unique application.

✻ Each CVSAP installation is unique and may require adjustment during commissioning. Adjustment or operation of the system at any other setting without prior approval of Walinga will void the warranty.

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WALINGA® INC.

Specifications

CENTRAL-VAC WITH AIR PURGE

TECHNICAL DATA

Blower	**Model**	**510**	**614**
	Maximum Capacity	1100 cu ft/min (31.1 L/min)	1800 cu ft/min (51.0 L/rev)

Airlock	**Model**	**1210**	**1314**
	Maximum Capacity	0.55 cu ft/rev (15.6 L/rev)	0.92 cu ft/rev (26.1 L/rev)

AMS	**Model**	**3" Inlet**			**4" Inlet**			**5" / 6" Inlet**		
	No. Filters	4			4			9		
	No. Valves	2			2			3		
	Activation Time	110 ms*			110 ms*			110 ms*		
	Off Delay Time	30 s*			30 s*			30 s*		
	Total Filter Area	42.4 ft^2 (3.9 m^2)			80.9 ft^2 (7.5 m^2)			182.0 ft^2 (16.9 m^2)		
	Filter Type	Spunbond polyester			Spunbond polyester			Spunbond polyester		
	Filter Efficiency	**0.5 micron** 98.91%	**1 micron** 99.35%	**>2 micron** 100%	**0.5 micron** 98.91%	**1 micron** 99.35%	**>2 micron** 100%	**0.5 micron** 98.91%	**1 micron** 99.35%	**>2 micron** 100%

Dimensions	**A†**	**3" Inlet**	**4" AMS Inlet**	**5" / 6" AMS Inlet**
		152.8 in (388.1 cm)	203.7 in (517.4 cm)	205.3 in (521.5 cm)
	B†	**3" / 4" AMS Inlet**		**5" / 6" AMS Inlet**
		71.5 in (181.6 cm)		72.5 in (184.2 cm)
	C†	**3" / 4" AMS Inlet**		**5" / 6" AMS Inlet**
		69.5 in (176.5 cm)		71.5 in (181.6 cm)
	D	**510 Blower Package**		**614 Blower Package**
		32 in (81.3 cm)		34 in (86.4 cm)
	E	**510 Blower Package**		**614 Blower Package**
		49.6 in (126.0 cm)		52.8 in (134.1 cm)

✻ Each CVSAP installation is unique and may require adjustment during commissioning. Adjustment or operation of the system at any other setting without prior approval of Walinga will void the warranty.

† Installation using standard mounting rack as seen in ***Figure 8-1***.

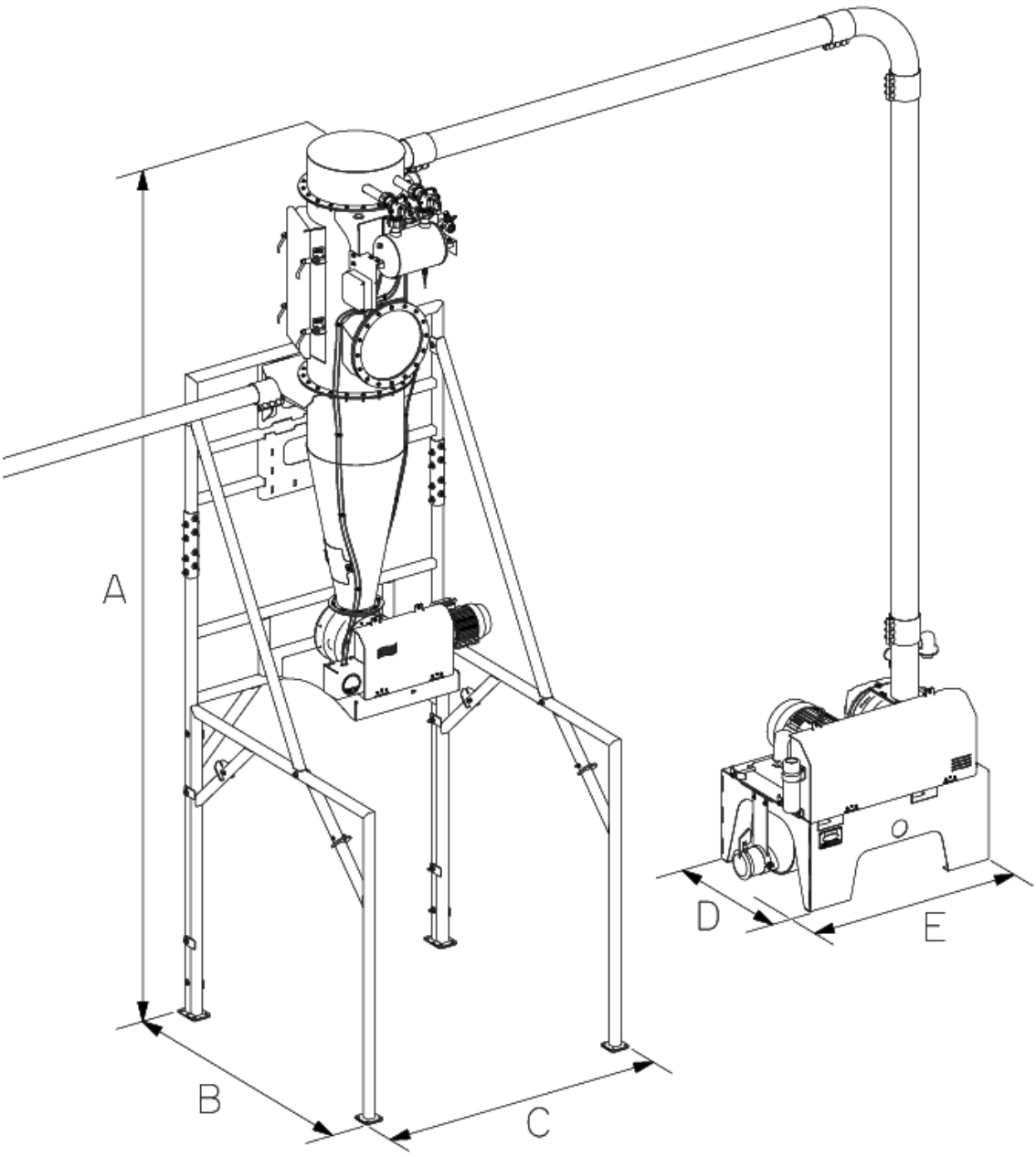


Figure 8-1: CVSAP dimensions

BOLT TORQUES

The torque values for imperial and metric bolts and cap screws are given below in ***Table 8-1*** and ***Table 8-2*** respectively. Unless otherwise noted, tighten all bolts to the torques specified in the tables below. Check the tightness of bolts periodically. Replace any damaged or lost hardware with the same strength bolt.

Torque values indicated in the following tables are valid for non-greased or non-oiled threads and heads. Unless otherwise specified, do not grease or oil bolts or cap screws. When using locking elements, increase the listed torque values by 5%. Reference ***Figure 8-2*** and ***Figure 8-3*** for proper identification of grades.

Table 8-1: Imperial torque specifications

Bolt Diameter "A" [in]	Bolt Torque					
	SAE 2		SAE 5		SAE 8	
	[Nm]	[lb-ft]	[Nm]	[lb-ft]	[Nm]	[lb-ft]
1/4	8	6	12	9	17	12
5/16	13	10	25	19	36	27
3/8	27	20	45	33	63	45
7/16	41	30	72	53	100	75
1/2	61	45	110	80	155	115
9/16	95	60	155	115	220	165
5/8	128	95	215	160	305	220
3/4	225	165	390	290	540	400
7/8	230	170	570	420	880	650
1	345	225	850	630	1320	970

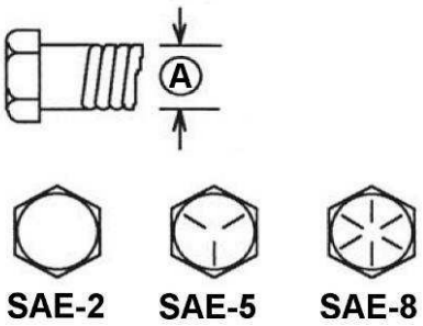


Figure 8-2: Imperial bolts

Table 8-2: Metric torque specifications

Bolt Diameter "A"	Bolt Torque			
	8.8		10.9	
	[Nm]	[lb-ft]	[Nm]	[lb-ft]
M3	.5	.4	1.8	1.3
M4	3	2.2	4.5	3.3
M5	6	4	9	7
M6	10	7	15	11
M8	25	18	35	26
M10	50	37	70	52
M12	90	66	125	92
M14	140	103	200	148
M16	225	166	310	229
M20	435	321	610	450
M24	750	553	1050	774
M30	1495	1103	2100	1550
M36	2600	1917	3675	2710

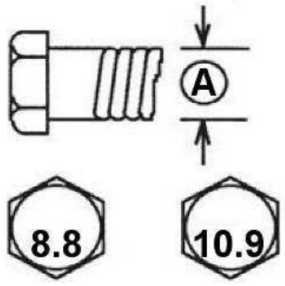


Figure 8-3: Metric bolts

STANDARDS AND REGULATIONS

Walinga follows the general safety standards specified by the American Society of Agricultural Engineers (ASAE) and the Occupational Safety and Health Administration (OSHA) with consideration of standards outlined by the National Fire Prevention Agency (NFPA), International Organization for Standardization (ISO), Occupational Health and Safety Standards (OH&S), and American National Standards Institute (ANSI). Be aware that there may be additional local or federal laws and regulations that require compliance based on operational location that are the responsibility of the owner and/or operator. For your convenience, the standards referenced in this manual and pertinent to CVSAPs are listed below.

ISO 4254-1	Agricultural Machinery - Safety - Part 1: General Requirements
NFPA 68	Standard on Explosion Protection by Deflagration Venting
NFPA 69	Standard on Explosion Prevention Systems
NFPA 70	National Electric Code
NFPA 91	Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Particulate Solids
NFPA 660	Standard for Combustible Dusts and Particulate Solids
OSHA 1910.272	Grain Handling Facilities

WALINGA® INC.

Warranty

PNEUMATIC CONVEYING SYSTEMS

Walinga Inc. is committed to providing a quality product that will meet or exceed expectations for many years to come. The warranty terms and warranty claim process have been designed to ensure that each warranty claim will be resolved in an orderly, fair and timely manner.

THE WARRANTY

Walinga Inc. ("Walinga") warrants that all new pneumatic products sold by Walinga will be free from defects in material and workmanship (the "Walinga Warranty").

WARRANTY PERIOD

The warranty period for the Walinga Warranty shall expire on the date that is the earlier of: two (2) years after the date of delivery to the original customer or upon the expiration of five hundred (500) hours of operation; whichever date comes first.

LIMITATIONS AND EXCLUSIONS OF THE WALINGA WARRANTY

- The Walinga Warranty applies to material and workmanship only.
- With respect to any component parts that are supplied or manufactured by others, the warranty coverage on such component parts will be strictly limited to the warranties of the manufacturers of such component parts.
- The Walinga Warranty shall only be for the benefit of the original purchaser of the pneumatic products.
- A Walinga Warranty may be transferable by the original purchaser to a third party for the balance of the warranty period then remaining, provided that Walinga consents in writing to such a transfer of warranty.
- The Walinga Warranty is conditional upon proper storage, installation, use, maintenance, operation, and compliance with any applicable recommendations of Walinga.

WARRANTY CLAIM PROCEDURE

Should any difficulties with a unit within its warranty period be encountered, please contact a local Walinga dealer or sales representative, the local Walinga Service Department or Walinga's Warranty Department to submit a warranty claim application. To speak with a Walinga Warranty Coordinator, contact:

Canada and International	1-888-WALINGA (ext 325) +1-519-824-8520 (ext 325) warranty.canada@walinga.com
USA	1-888-WALINGA (ext 325) warranty.usa@walinga.com
Australia	07-4634-7344 mail@customvac.com.au

REQUIRED WARRANTY CLAIM INFORMATION

The following information must be provided to Walinga for proper consideration and processing of a warranty application:

- Customer name and contact information, including email if available
- The equipment serial number and/or Vehicle Identification Number (VIN), if applicable
- Date of claimed failure
- Equipment hours of operation
- Details, description and photos (upon request) of the claimed failure and the corrective repairs attempted

WARRANTY CONDITIONS

- Equipment must be registered within thirty (30) days of being received by the buyer. It will be within the sole and unfettered discretion of Walinga as to whether it will honor its warranty on non-registered equipment.
- The buyer is responsible for promptly notifying Walinga of any defect to the equipment and making the equipment available to Walinga or its authorized facility for evaluation or repair.
- Prior to making any repairs or parts replacements, a warranty application and any estimated associated costs must be approved with the issuance of a claim number by an authorized Walinga representative. Undertaking any work prior to receiving warranty authorization may result in a partial or complete loss of warranty coverage.
- At Walinga's discretion, warranty repairs may be authorized to be completed at a repair facility convenient to the buyer. In such situations, the estimated labor time must be approved by Walinga prior to undertaking any work. Labour hours will be reimbursed at the facility's posted hourly labor rate.
- At Walinga's request, parts in question must be returned to the nearest Walinga service facility for evaluation. In such situations, a Returned Goods Authorization (RGA) number will be provided to the buyer. The returning shipment must be clearly labeled with the assigned RGA number and include a copy of the RGA form. Unless otherwise arranged, these parts are to be returned to Walinga within thirty (30) days to ensure timely processing of the warranty claim. Failure to return such parts may result in partial or complete loss of warranty coverage.
- Replacement parts provided under warranty are covered for the remainder of the original equipment warranty period.
- Walinga reserves the right to use new, remanufactured or refurbished components when performing warranty repairs and replacements.
- Walinga is entitled to a reasonable amount of time and a reasonable number of attempts to assess the claim, diagnose the problem, and perform any necessary repairs.
- The warranty offered on used or refurbished equipment is limited to that specified on the purchase contract. Where a warranty period has not been stipulated on the purchase contract, and where such equipment is "used", then such equipment is considered to be sold "as is, where is" without the Walinga Warranty. Where such equipment is refurbished, the Walinga Warranty shall apply.

WARRANTY CLAIM REJECTION

Without limitation, Walinga reserves the right to reject a warranty claim for any one or more of the following reasons:

- The warranty claim information provided is insufficient.
- The product evaluation does not substantiate the claim.
- The unit has been operated above and beyond its capacity or not maintained or serviced properly, resulting in damages incurred to major components.
- The unit was equipped with a factory installed hour meter which has been disconnected, altered or inoperative for an extended period of time; with the result being that the equipment's operating hours cannot be verified.
- It is apparent that the operator's manuals have not been followed.
- The equipment is not registered.

NOT COVERED UNDER WARRANTY

Without limitation, the Walinga Warranty does not cover:

- Damage or deterioration due to lack of reasonable care or maintenance.
- Damage caused or affected by unapproved modifications to the equipment.
- Damage caused by negligence or misuse of the equipment.
- Damage caused by using the equipment for purposes for which it was not designed or intended.

Walinga's liability under this warranty, whether in contract or tort, is limited to the repair, replacement or adjustment of defective materials and workmanship. In no event will Walinga be responsible for any direct, indirect, loss of time, incidental or consequential expenses including, but not limited to equipment rental expenses, towing, downtime, inconvenience, or any losses resulting from the inability to use the equipment. Further, Walinga shall not be liable for any damages or inconvenience caused by any delay in the supply of any equipment or component parts thereof.

The selling dealer/salesperson makes no warranty of its own and has no authority to make any representation or promise on behalf of Walinga, or to modify the terms or limitations of the Walinga Warranty in any way.

Punitive, exemplary or multiple damages may not be recovered unless applicable law prohibits their disclaimer.

Warranty related claims may not be brought forward as a class representative, a private attorney general, a member of a class of claimants or in any other representative capacity.

The Walinga Warranty and all questions regarding its enforceability and interpretation are governed by the law of the country, state or province in which the Walinga equipment was purchased. The laws of some jurisdictions limit or do not allow the disclaimer of consequential damages. If the laws of such a jurisdiction apply to any claim against Walinga, the limitations and disclaimers contained here shall be to the greatest extent permitted by law.

WALINGA® INC.

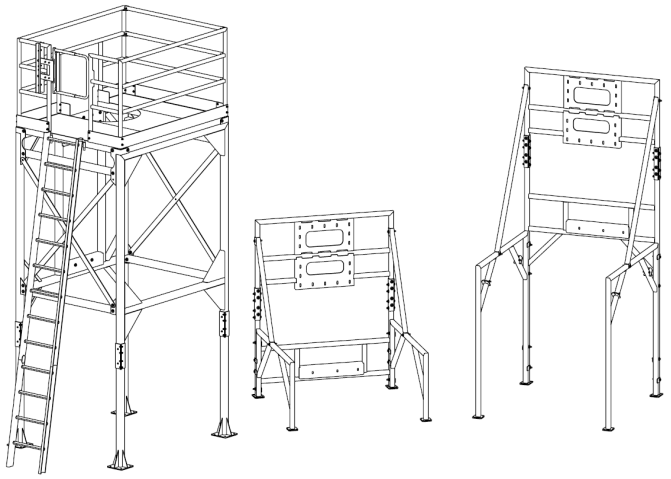
Accessories and Attachments

CENTRAL-VAC WITH AIR PURGE

A variety of accessories are available for your CVSAP model to improve your operational experience. Below are some of the available accessories and a general description of their function. Please contact your Walinga dealer or representative for accessories compatible with your specific CVSAP, availability and ordering, or if you have any questions.

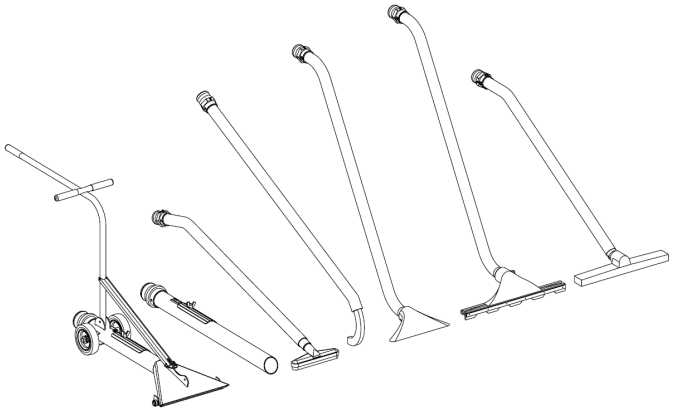
MOUNTING RACKS

To properly position and secure the CVSAP, it must be installed on a mounting rack. Several variations are available, such as the standard rack, the short rack, and the platform rack which provides safe and easy access to the filter housing.



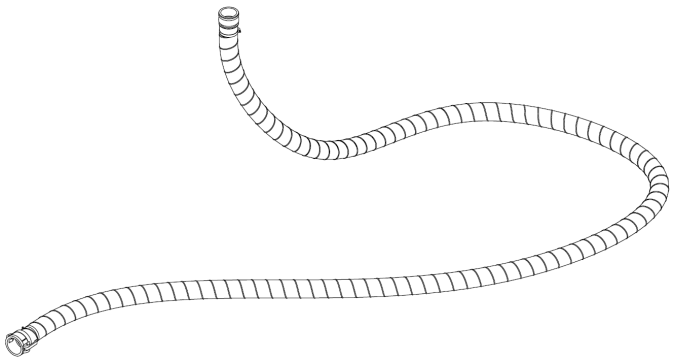
INTAKE ACCESSORIES

A wide range of intake accessories are offered to accommodate different materials and to reach into hard to access areas.



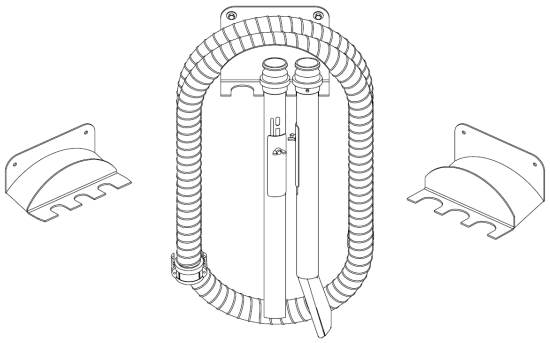
INTAKE LINES

A range of flexible hoses, all equipped with a grounding wire to prevent static build-up are available. The lines can be fitted with swivel couplings for increased maneuverability in tight areas and come in varying lengths and diameters.



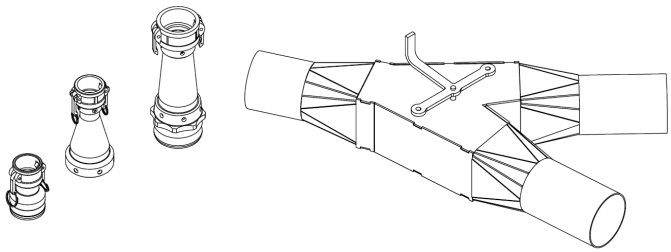
HOSE AND TOOL HOLDERS

To assist in the organization and storage of intake accessories and intake lines, several different sizes and styles of holders are available.



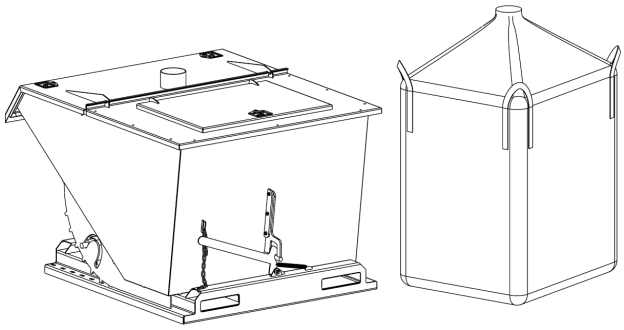
COUPLERS, ADAPTERS, REDUCERS, AND DIVERTERS

To accommodate various drop line and intake line sizes, couplers and accessories, various couplers, adapters and reducers are available for easy connection in varying styles and sizes. To allow for easy alteration of the discharge path of the airlock, diverters are available.



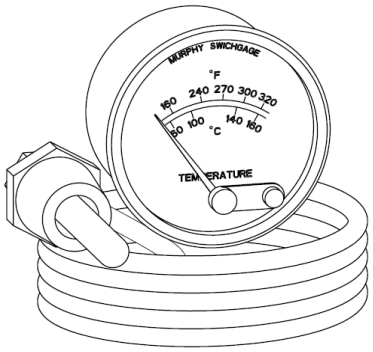
DISCHARGE RECEPTACLES

To efficiently collect and contain the discharged material from the CVSAP, a variety of discharge receptacles are available in varying sizes and configurations, including the self-dumping hopper and soft debris bag.



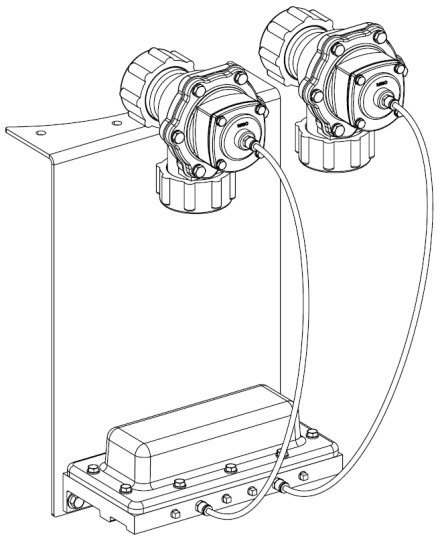
TEMPERATURE SENSOR

To monitor the temperature of the blower, a temperature sensor probe may be mounted to the outlet assembly of the blower. Monitoring the operating temperature of the blower can aid in preventing premature wear, damage and failure of the internal blower components.



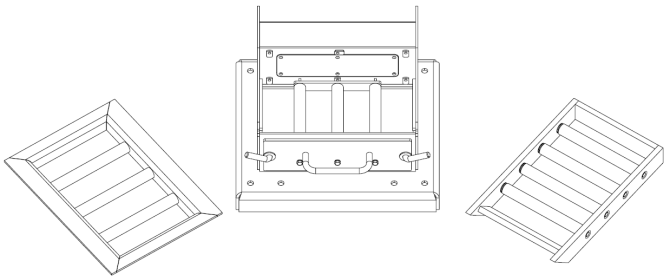
AIR PILOTED PURGE VALVES

For a CVSAP that is to be installed in a classified area, air piloted purge valves are available to eliminate the risk of a spark during the activation of the purge valves.



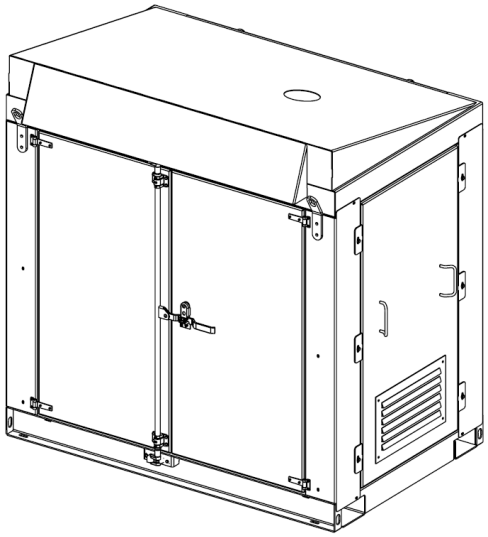
MAGNETIC INLET COVERS

For a CVSAP incorporated into a material handling system where conveyed products may be contaminated with metallic debris, magnetic airlock inlet covers are available to remove contaminants from the product.



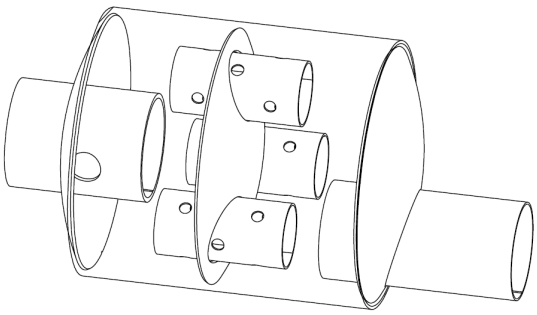
SOUND ENCLOSURE

To reduce the noise emission of the blower package, sound enclosures are available.



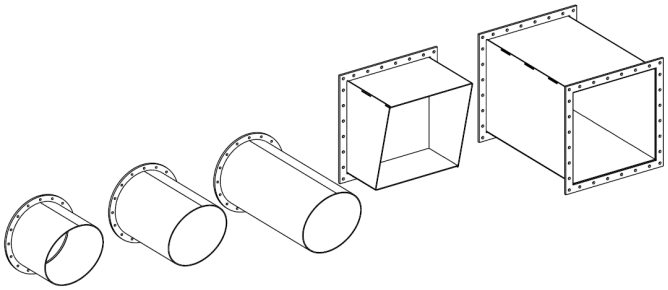
BLOWER MUFFLERS

For increased reduction of the blower package noise emissions, additional mufflers are available for installation. Walinga's mufflers have been specifically designed for use in pneumatic conveying systems to reduce internal dust accumulation.



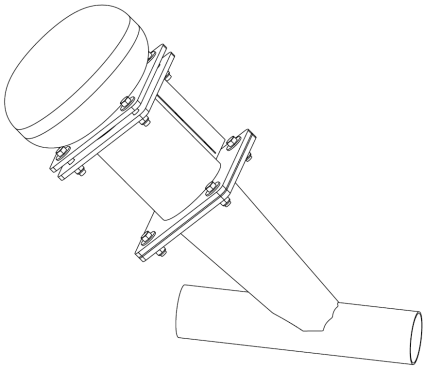
EXPLOSION VENT DUCTING

As necessary, appropriately rated explosion vent ducting is available to assist in directing any potential deflagration in a direction that will not cause personal injury or unacceptable property damage.



EXPLOSION SUPPRESSION AND ISOLATION

To assist in the prevention of a deflagration within the CVSAP, an isolation cannon equipped with sodium bicarbonate (compatible for use in food-grade applications) is available for installation into the system. Mechanical isolation valves are also available.



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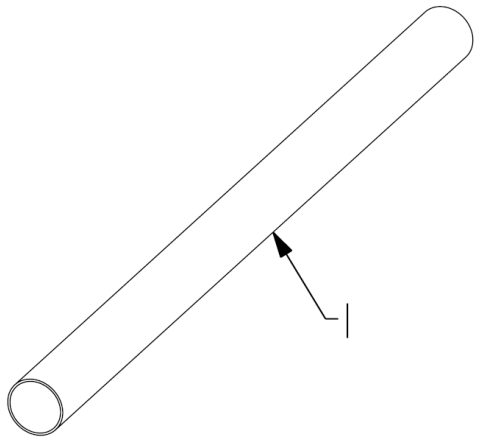
WALINGA® INC.

Parts List

CENTRAL-VAC WITH AIR PURGE

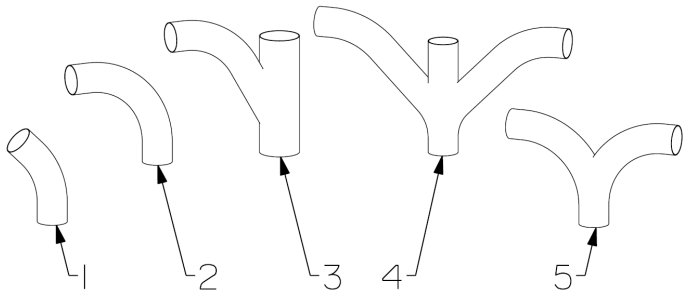
For information regarding replacement components not found listed in the following sections, contact your local Walinga dealer or representative and provide the serial number of your CVSAP, blower or airlock as required.

STRAIGHT PIPING COMPONENTS



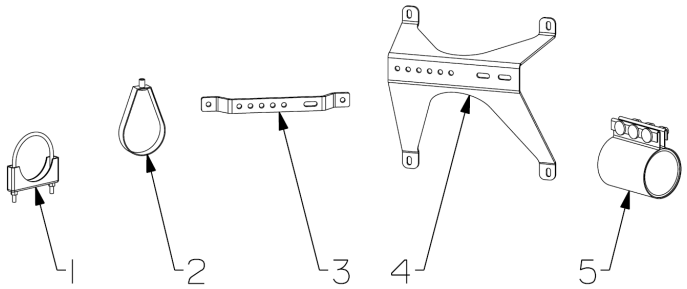
Ref.	Description	Part Number
1	TUBE, 2" OD x .065" TH, GALV	89-80295-1
	TUBE, 2" OD x .125" TH, ALUMINUM	89-16436-2
	TUBE, 3" OD x .065" TH, GALV	89-80296-1
	TUBE, 3" OD x .125" TH, ALUMINUM	89-15203-2
	TUBE, 4" OD x .063" TH, GALV	89-17452-1
	TUBE, 4" OD x .125" TH, ALUMINUM	89-00392-2
	TUBE, 5" OD x .120" TH, GALV	89-124702-1
	TUBE, 5" OD x .125" TH, ALUMINUM	89-08073-2
	TUBE, 6" OD x .120" TH, GALV	89-124703-1
	TUBE, 6" OD x .125" TH, ALUMINUM	89-16222-2

PIPING ELBOW, TY AND Y COMPONENTS



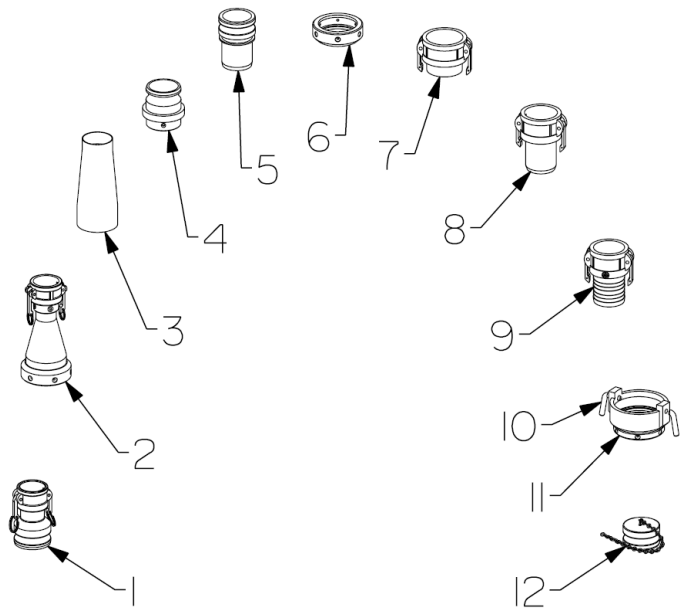
Ref.	Description	Part Number
1	ELBOW, 45°, 2" OD x .065" TH x 5" CLR, GALV	51-80287-6
	ELBOW, 45°, 3" OD x .065" TH x 7.5" CLR, GALV	51-18904-6
	ELBOW, 45°, 4" OD x .065" TH x 10" CLR, GALV	51-18905-6
	ELBOW, 45°, 5" OD x .065" TH x 12.5" CLR, GALV	51-19037-6
	ELBOW, 45°, 6" OD x .075" TH x 15" CLR, GALV	51-90134-6
2	ELBOW, 90°, 2" OD x .065" TH x 5" CLR, GALV	51-80282-6
	ELBOW, 90°, 2" OD x .065" TH x 18" CLR, GALV	51-80283-6
	ELBOW, 90°, 2" OD x .065" TH x 24" CLR, GALV	51-80284-6
	ELBOW, 90°, 3" OD x .065" TH x 7.5" CLR, GALV	51-18949-6
	ELBOW, 90°, 3" OD x .065" TH x 24" CLR, GALV	51-18956-6
	ELBOW, 90°, 3" OD x .065" TH x 30" CLR, GALV	51-18957-6
	ELBOW, 90°, 4" OD x .065" TH x 10" CLR, GALV	51-80285-6
	ELBOW, 90°, 4" OD x .065" TH x 24" CLR, GALV	51-18961-6
	ELBOW, 90°, 4" OD x .065" TH x 36" CLR, GALV	51-18963-6
	ELBOW, 90°, 5" OD x .065" TH x 12.5" CLR, GALV	51-80286-6
	ELBOW, 90°, 6" OD x .065" TH x 15" CLR, GALV	51-86503-6
3	TY, 90°, 2" STRAIGHT, 2" INLET, .065" TH, GALV	51-80290-6
	TY, 90°, 3" STRAIGHT, 2" INLET, .065" TH, GALV	51-80291-6
	TY, 90°, 3" STRAIGHT, 3" INLET, .065" TH, GALV	51-18910-6
	TY, 90°, 4" STRAIGHT, 2" INLET, .065" TH, GALV	51-80292-6
	TY, 90°, 4" STRAIGHT, 3" INLET, .065" TH, GALV	51-18901-6
	TY, 90°, 4" STRAIGHT, 4" INLET, .065" TH, GALV	51-18485-6
	TY, 90°, 5" STRAIGHT, 4" INLET, .083" TH, GALV	51-66498-6
	TY, 90°, 5" STRAIGHT, 5" INLET, .083" TH, GALV	51-61979-6
	TY, 90°, 6" STRAIGHT, 4" INLET, .083" TH, GALV	51-116626-6
	TY, 90°, 6" STRAIGHT, 6" INLET, .083" TH, GALV	51-101705-6
4	DTY, 90°, 2" STRAIGHT, 2" INLETS, .065" TH, GALV	51-80294-6
	DTY, 90°, 3" STRAIGHT, 3" INLETS, .065" TH, GALV	51-18917-6
	DTY, 90°, 4" STRAIGHT, 4" INLETS, .065" TH, GALV	51-18918-6
5	DY, 90°, 2" OD x .065" TH, GALV	51-80293-6
	DY, 90°, 3" OD x .065" TH, GALV	51-18923-6
	DY, 90°, 4" OD x .065" TH, GALV	51-18535-6
	DY, 90°, 5" OD x .083" TH, GALV	51-124838-6

PIPING INSTALLATION COMPONENTS



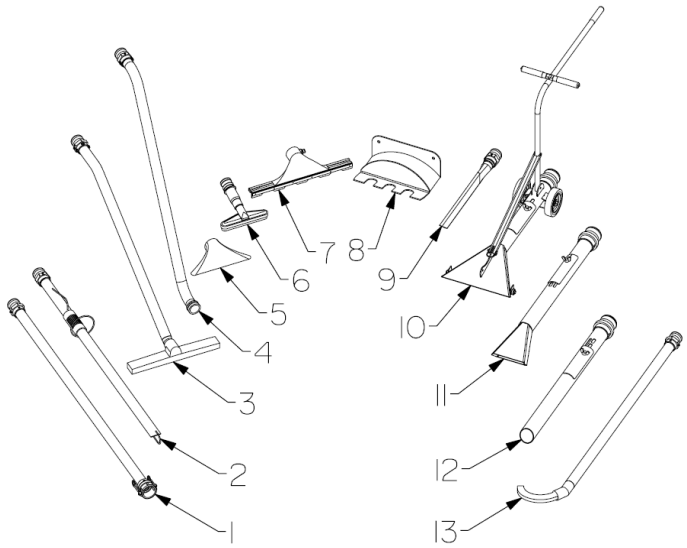
Ref.	Description	Part Number
1	SADDLE CLAMP, 2", PLTD	28-16800-6
	SADDLE CLAMP, 3", PLTD	28-04673-6
	SADDLE CLAMP, 4", PLTD	28-02074-6
	SADDLE CLAMP, 5", PLTD	28-04675-6
	SADDLE CLAMP, 6", PLTD	28-08698-6
2	TUBE HANGER, 2", GALV	28-80399-6
	TUBE HANGER, 3", GALV	28-65182-6
	TUBE HANGER, 4", GALV	28-65183-6
	TUBE HANGER, 5", GALV	28-19041-6
3	STAND OFF BRACKET, 2" - 6"	38-07612-4
4	STAND OFF BRACKET HEAVY DUTY, 3" - 6"	38-39510-4
5	COMPRESSION CPLG, 2", 3 BOLT	38-80278-6
	COMPRESSION CPLG, 3", 3 BOLT	38-80279-6
	COMPRESSION CPLG, 4", 3 BOLT	38-13084-6
	COMPRESSION CPLG, 5", 3 BOLT	38-08786-6
	COMPRESSION CPLG, 6", 3 BOLT	38-08523-6

ADAPTER, REDUCER, COUPLER, AND PLUG COMPONENTS



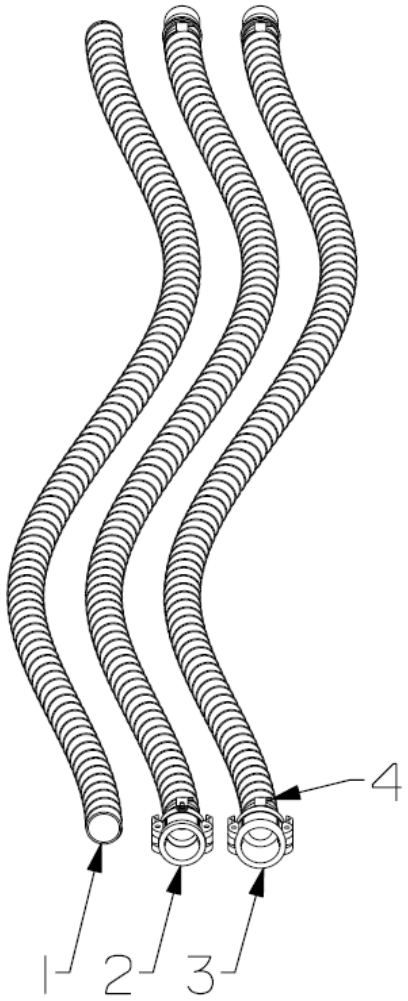
Ref.	Description	Part Number
1	ADAPTER, KM3 TO KF2	38-80297-6
2	ADAPTER, DM4 TO KF2	38-43218-5
	ADAPTER, DM4 TO KF3	38-43219-5
3	REDUCER, 3" - 2" OD, .065" TH, GALV	51-80280-6
	REDUCER, 4" - 2" OD, .065" TH, GALV	51-80281-6
	REDUCER, 4" - 3" OD, .065" TH, GALV	51-18929-6
	REDUCER, 6" - 5" OD, .065" TH, GALV	51-08755-6
4	CAMLOCK, KM2, 2" TUBE, ALUMINUM	38-18883-6
	CAMLOCK, KM3, 3" TUBE, ALUMINUM	38-18152-6
5	CAMLOCK, KM2, 2" HOSE SHANK, ALUMINUM	38-18881-6
	CAMLOCK, KM3, 3" HOSE SHANK, ALUMINUM	38-13998-6
6	WALINGA, DM4, 4" TUBE, ALUMINUM	38-00397-5
7	CAMLOCK, KF2, 2" TUBE, ALUMINUM	38-19043-6
	CAMLOCK, KF3, 3" TUBE, ALUMINUM	38-18153-6
8	CAMLOCK, KF2, 2" HOSE SHANK, ALUMINUM	38-18882-6
	CAMLOCK, KF3, 3" HOSE SHANK, ALUMINUM	38-13999-6
9	CAMLOCK, KF2 W/ SWIVEL, 2" HOSE SHANK, ALUMINUM	38-82335-6
	CAMLOCK, KF3 W/ SWIVEL, 3" HOSE SHANK, ALUMINUM	38-82379-6
10	TAILBOLT FOR DF COUPLERS, 1/2-13-1 1/4, SS	94-09185-5
11	WALINGA, DF4, 4" TUBE, ALUMINUM	38-36781-5
12	DUST PLUG, KP2, ALUMINUM	38-18880-6
	DUST PLUG, KP3, ALUMINUM	38-13204-6
	DUST PLUG, DP4, ALUMINUM	38-04465-5

INTAKE ACCESSORY COMPONENTS



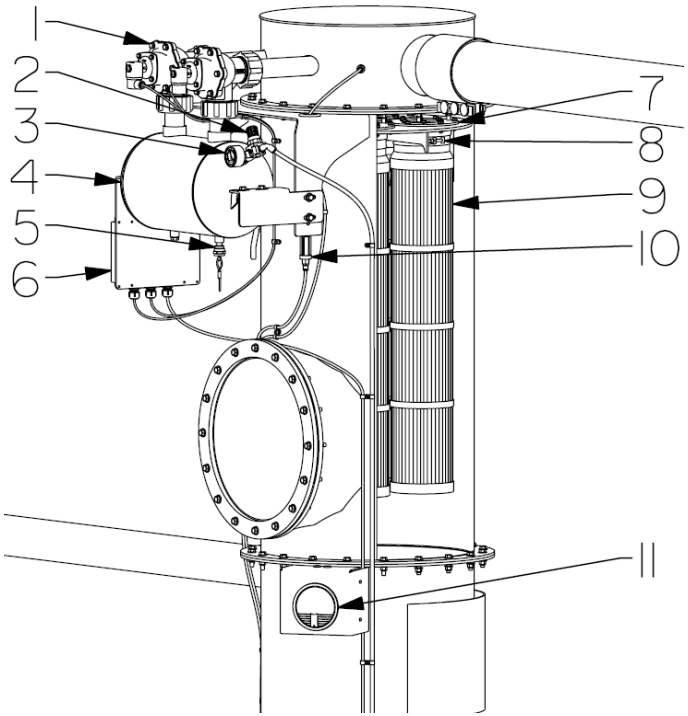
Ref.	Description	Part Number
1	WAND EXTENSION, 2" x 60", KM2 - KF2, ALUMINUM	38-92598-5
2	VACUUM WAND, KM2, ALUMINUM	38-68000-5
3	SQUEEGEE W/ NYLON BRUSH AND WAND, 20"	38-72058-5
4	WAND W/ 2" TOOL COUPLER, 56", KM2, STEEL	38-43216-5
5	GULPER, 13", WAND COMPATIBLE	38-18530-6
6	WALL BRUSH, 9", KM2	38-95604-5
7	SQUEEGEE GULPER W/ SCRAPER, 22", WAND COMPATIBLE	38-40507-5
	SQUEEGEE SCRAPER BLADE REPLACEMENT	38-19343-6
8	TOOL AND HOSE HOLDER, 2"	11-47413-5
	TOOL AND HOSE HOLDER, 3"	11-83605-5
9	CREVICE TOOL, 23", KM2	38-43217-5
10	SWEEP, 3" x 15", KM3	38-102609-5
11	SWEEP NOZZLE, 3" x 40", KM3	38-37825-5
12	NOZZLE, 3" x 39", 20°, KM3	38-37815-5
13	PIPE BRUSH, CRESCENT WAND, KM2	38-72057-5

INTAKE LINE COMPONENTS



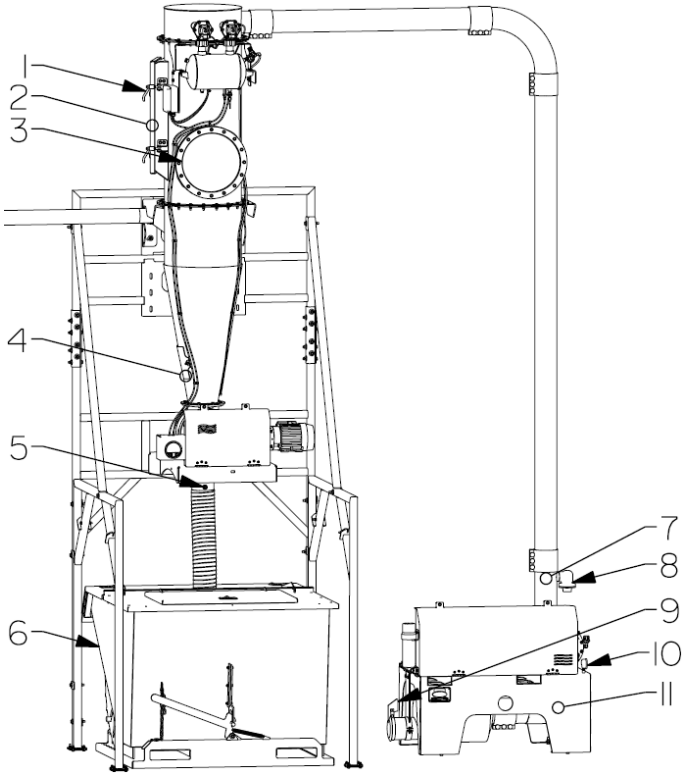
Ref.	Description	Part Number
1	HOSE, 2", BLACK RUBBER, GROUNDED	73-82311-6
	HOSE, 2", BLACK RUBBER, HD, GROUNDED	36-67481-6
	HOSE, 2", CLEAR, VHD, GROUNDED	36-75496-6
	HOSE, 3", BLACK RUBBER, GROUNDED	36-15194-6
	HOSE, 3", CLEAR, VHD, GROUNDED	36-78277-6
2	LINE, 2" x 25', BLACK, HD, KM2 - KF2 W/ SWIVEL	36-41037-5
	LINE, 2" x 25', CLEAR, VHD, KM2 - KF2 W/ SWIVEL	36-78445-5
	LINE, 2" x 50', CLEAR, VHD, KM2 - KF2 W/ SWIVEL	36-113561-5
	LINE, 3" x 25', BLACK, KM3 - KF3 W/ SWIVEL	36-84026-5
	LINE, 3" x 25', CLEAR, VHD, KM3 - KF3 W/ SWIVEL	36-91117-5
3	LINE, 2" x 25', BLACK, HD, KM2 - KF2	36-97904-5
	LINE, 2" x 25', CLEAR, VHD, KM2 - KF2	36-98302-5
	LINE, 3" x 12', BLACK, KM3 - KF3	36-40505-5
	LINE, 3" x 20', BLACK, KM3 - KF3	36-41039-5
	LINE, 3" x 50', BLACK, KM3 - KF3	36-84025-5
	LINE, 3" x 20', CLEAR, VHD, KM3 - KF3	36-78483-5
	LINE, 3" x 25', CLEAR, VHD, KM3 - KF3	36-97489-5
4	CLAMP, GEAR, 2" BLACK HOSE, HS32	28-19054-6
	CLAMP, GEAR, 2" CLEAR HOSE, HS28	28-00586-6
	CLAMP, GEAR, 3" HOSE, HS52	28-00362-6

PURGE INSTALLATION COMPONENTS



Ref.	Description	Part Number
1	PURGE VALVE, 12V, CA45T000-306	39-15287-6
	PURGE VALVE, 24V, CA45T000-305	39-117449-6
	PURGE VALVE, 24VDC, DP40	39-145402-6
	PURGE VALVE, 12VDC, DP40	39-157987-6
	PURGE VALVE, AIR PILOTED, DM40-G	39-156017-6
2	PRESSURE REGULATOR, 1/4", 80-2008	79-80574-6
3	PRESSURE GAUGE, HEADER TANK, 1/4"	32-08173A-6
4	HEADER TANK, 2 PORT	11-115376-6
	HEADER TANK, 3 PORT	11-127136-6
5	DRAIN VALVE, 1111-60	79-00979-6
6	SEQUENTIAL TIMER, 12/24V, DS-DCDC12-PC	82-15288-6
	SEQUENTIAL TIMER, 24V, DS-ACDC12-PC	82-115445-6
7	HUB, FILTER ADAPTER KIT	30-146304-5
8	T-BOLT CLAMP, 5 1/2"	28-08091-6
9	FILTER, 5.75" x 20", 40 PL, GROUNDED, 3" AMS INLET	11-130006-6
	FILTER, 7" x 34", 45 PL, GROUNDED, 4"/5"/6" AMS INLET	11-114723-6
10	IN-LINE FILTER, 1/4"	20-121830-6
11	DIFFERENTIAL PRESSURE GAUGE, 2030	27-150920-6
NOT SHOWN	AIR PILOT VALVE ENCLOSURE	39-140141-6

MISCELLANEOUS COMPONENTS



Ref.	Description	Part Number
1	FILTER ACCESS DOOR LOCKING HANDLE, 1/2-13	11-152892-6
2	FILTER ACCESS DOOR SEAL	80-03513-6
3	EXPLOSION VENT, 16", ROUND	11-114731-6
	EXPLOSION VENT, 24", SQUARE	11-127192-6
4	AMS ACCESS DOOR SEAL	80-03510-6
	LEXAN WINDOW, 3" AMS	11-39020-4
5	CAPACITIVE SENSOR, 18 mm, 20 - 250VAC	82-117086-6
6	SELF-DUMPING HOPPER, 2 CU YD	11-117149-5
7	VACUUM PRESSURE GAUGE, -30 IN HG - 30 PSI, 4MP	27-13066-6
8	VACUUM RELIEF VALVE, 2", 9 IN HG	39-78590-6
	VACUUM RELIEF VALVE, 2", 16 IN HG	39-77609-6
9	RAIN CAP, 6"	51-16367-6
10	PRESSURE GAUGE, 0 - 15 PSI, 4MP	27-00718-6
11	PRESSURE RELIEF VALVE, 15 PSI	39-00724-6

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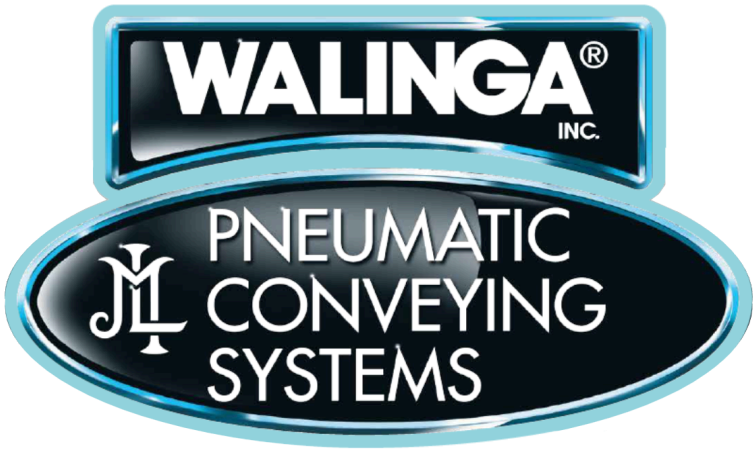

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