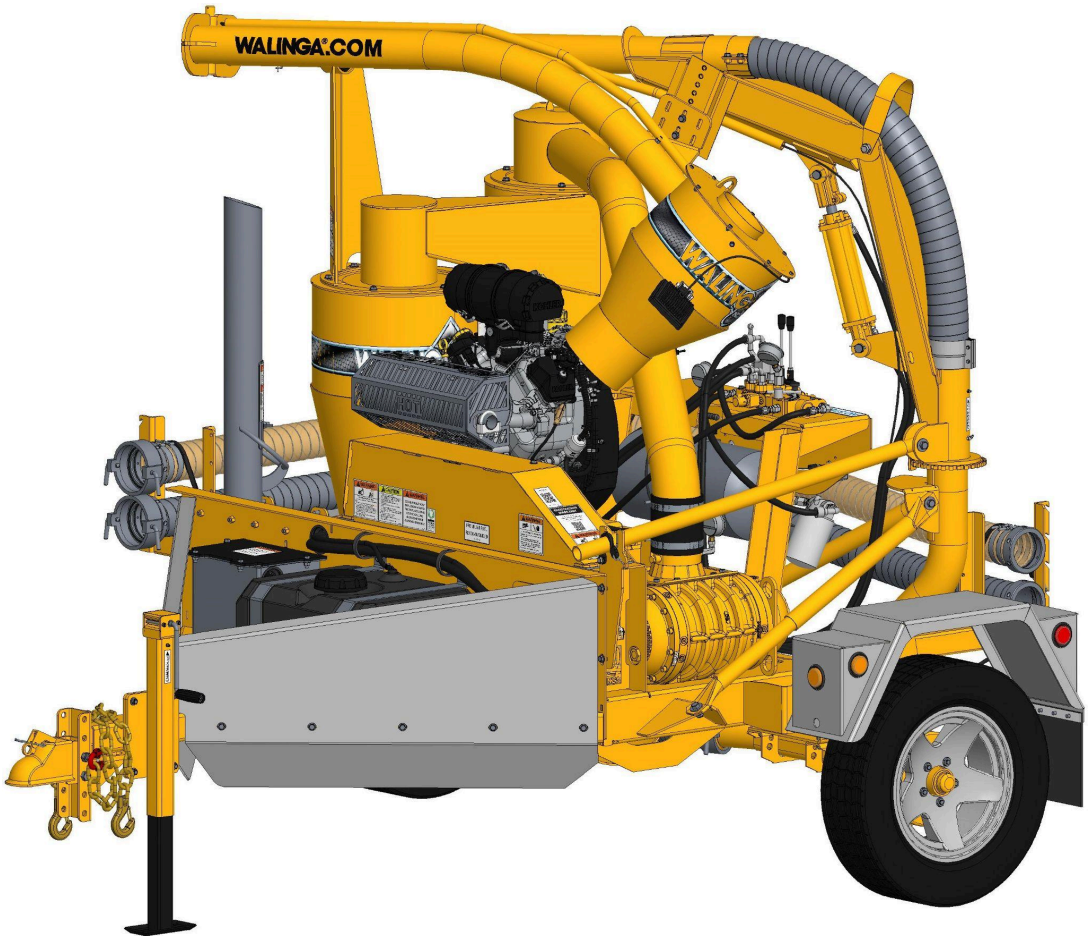
Ultra-Vac



OPERATOR'S MANUAL

Ultra-Vac 4510G

English

WALINGA®
TOUGH TO BEAT IN THE LONG RUN

00-154740-0 A
2025-03-31

TO OUR VALUED CUSTOMERS:

The Walinga network of distribution centers and authorized dealers are dedicated to providing worldwide coverage of original parts and accessories for Walinga Pneumatic Conveying Systems. Our parts reflect Walinga's continued commitment to provide our customers with the highest quality parts and service.

For your convenience, should you require any information related to technical support, warranty, service, parts, or sales, please contact one of the following Walinga personnel:

TECHNICAL SUPPORT

	1-833-233-8227	pcs.techsupport@walinga.com

WALINGA WARRANTY COORDINATORS

Canada and International	1-888-WALINGA (ext 258)	warranty.canada@walinga.com
USA	1-800-466-1197 (ext 8)	warranty.usa@walinga.com
Australia	07-4634-7344	mail@customvac.com.au

SERVICE

Guelph, ON, Canada	1-888-WALINGA (ext 228)	guelph.service@walinga.com
Carman, MB, Canada	1-800-668-6344 (ext 418)	carman.service@walinga.com
Barrhead, AB, Canada	1-780-572-6082 (ext 1001)	todd.swaving@walinga.com
Wayland, MI, USA	1-800-466-1197 (ext 508)	wayland.service@walinga.com
Sioux Center, IA, USA	1-800-845-5589 (ext 804)	siouxcenter.service@walinga.com
Toowoomba, QLD, Australia	07-4634-7344	mail@customvac.com.au

ORIGINAL PARTS SALES

Eastern Canada and International	1-888-WALINGA (ext 224)	parts.canada@walinga.com
Western Canada	1-800-668-6344 (ext 421)	parts.carmen@walinga.com
Eastern USA	1-800-466-1197 (ext 507)	parts.usa@walinga.com
Western USA	1-800-845-5589 (ext 802)	parts.siouxcenter@walinga.com
Australia	07-4634-7344	parts.australia@walinga.com

SALES MANAGER

Tim Linde	1-519-787-8227 (ext 109)	tim.linde@walinga.com

CORPORATE HEAD OFFICE

5656 Highway 6N
RR#5, Guelph, Ontario, N1H 6J2
Tel: 888-925-4642 Fax: 519-824-5651
www.walinga.com

FACTORY DISTRIBUTION AND SERVICE CENTERS

938 Glengarry Crescent, Fergus
Ontario, Canada N1M 2W7
Tel: 519-787-8227 Fax: 519-787-8210

70 3rd Ave. NE Box 1790, Carmen
Manitoba, Canada R0G 0J0
Tel: 204-745-2951 Fax: 204-745-6309

6116 46 St., Bloomsbury
Alberta, Canada T0G 0J0
Tel: 780-572-6082

1190 Electric Avenue, Wayland
Michigan, USA 49348
Tel: 800-466-1197 Fax: 616-877-3474

579 4th St. NW, Sioux Center
Iowa, USA 51250
Tel: 800-845-5589 Fax: 712-722-1128

24 Molloy St., Toowoomba
Queensland, Australia 4350
Tel: 07-4634-7344 Email: mail@customvac.com.au

Table of Contents

This manual contains important information regarding the safety, operation and maintenance of your Walinga Ultra-Vac.

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, transportation, storage, and end of life procedures.

Operation

The operation section gives detailed information on the controls and displays of the machine, specific operating instructions including starting, operating all 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.

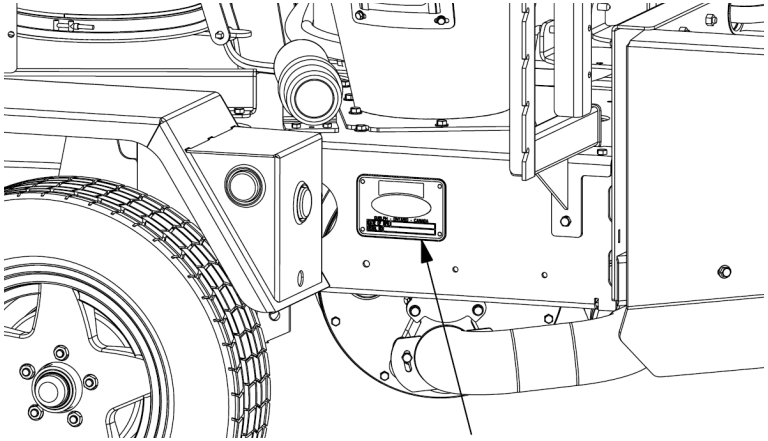
WALINGA® INC.

Identification of Machine

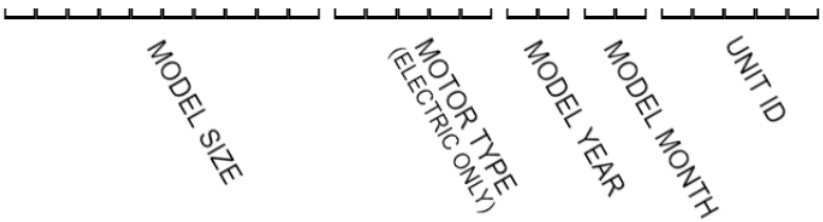
ULTRA-VAC MODEL 4510G

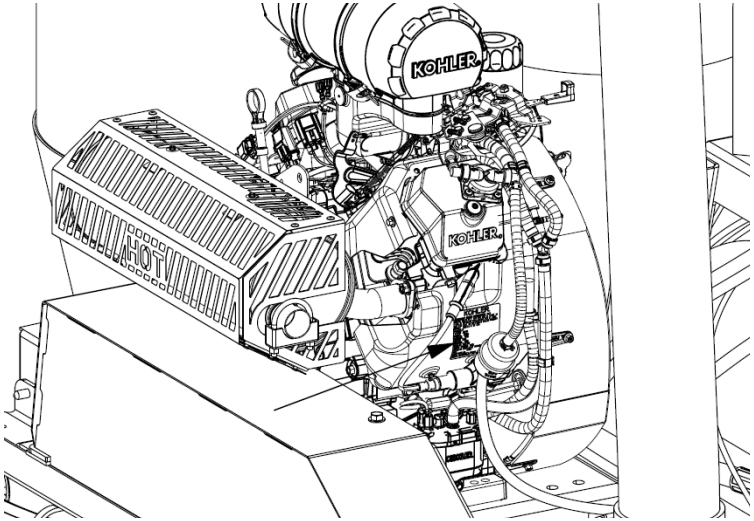
SERIAL NUMBERS

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

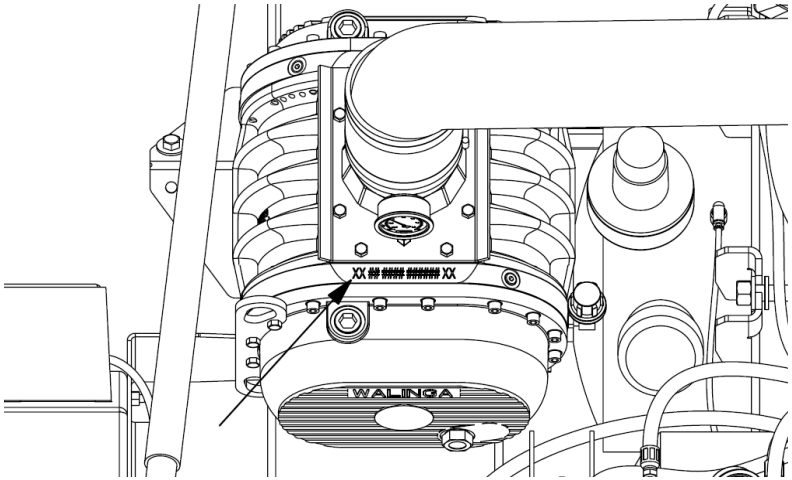


Machine Serial Number
Located on the right side of the frame.

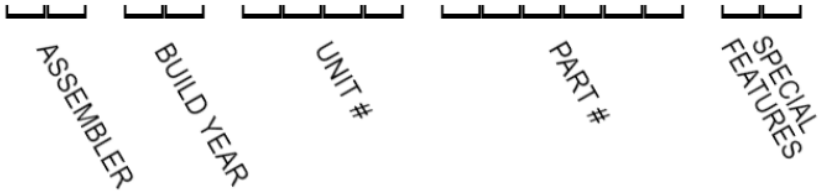


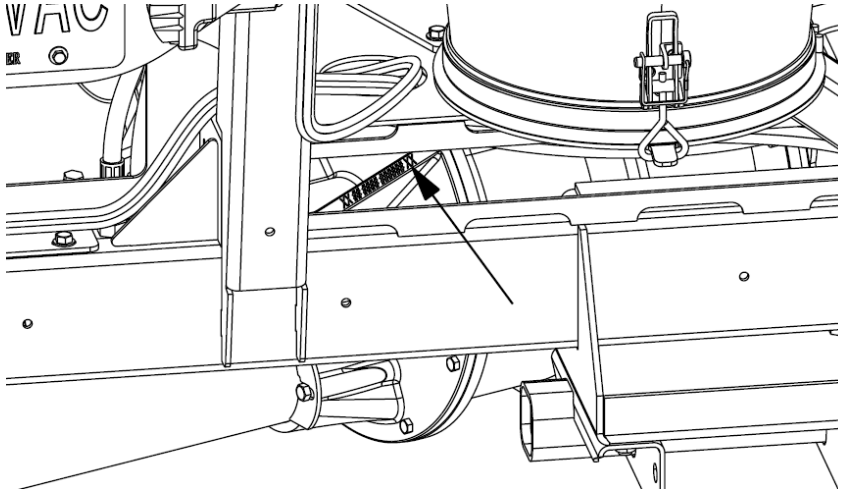


Engine Serial Number
Located on the left side of the engine.

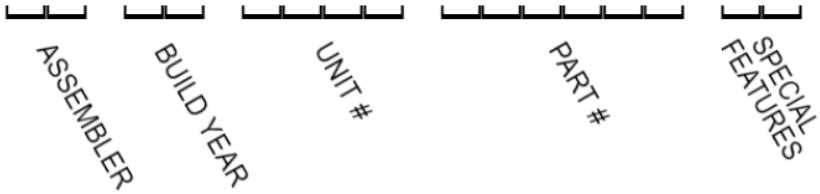


Blower Serial Number
Located on the top of the rear headplate of the blower.





Airlock Serial Number
Located on the outer rib of the endplate of the airlock.



WALINGA
Start-Up/Commissioning Form

This form must be filled out by the sales representative and/or dealer, and signed by both the sales representative and/or dealer and the customer at the time of delivery.	
Delivery Date: MM/DD/YYYY	
Owner Operator Name	Sales Representative / Dealer Name
Phone	Phone
Email	Email
Address	Address
City Prov/State	City Prov/State
Postal/ZIP Code Country	Postal/ZIP Code Country
Unit Serial Number	
Blower Serial Number	Airlock Serial Number

	CONFIRMATION OF ACTIONS COMPLETED
	All items and features accounted for
	Pre-delivery inspection
	Review of warranty terms
	Review of standard notes and terms
	Review of operating and safety instructions
	Operator manual supplied
	Supplemental documents supplied
	Guards installed and secured
	All safety signs identified and reviewed
	Discussion regarding applicable standards (see statement on reverse)

WALINGA
Start-Up/Commissioning Form

It is the responsibility of the Owner Operator to review and determine compliance to local and federal regulations. These regulations include, but are not limited to, local and federal laws as well as standards published by the NFPA (National Fire Protection Agency), ISO (International Organization for Standardization), OSHA (Occupational Safety and Health Administration) or OH&S (Occupational Health and Safety Standards), and ANSI (American National Standards Institute). *Please note: It is a requirement in NFPA 652 that the final operator completes a dust hazard analysis (DHA) of their facility and the products and processes it contains*. Based on this, Walinga understands that a DHA is required to be completed by the owner/operator prior to start-up/commissioning. In the event that a DHA is not available at start-up/commissioning, the owner/operator must provide written acknowledgement of their responsibility and intention to complete a DHA. The owner/operator also agrees that they shall be solely responsible for ensuring that any applicable NFPA standards and regulations shall be satisfied in conjunction with the incorporation of Walinga's equipment into the buyer's specific system of operations.

Date: _____ Owner Operator's Signature: _____

The above equipment has been received by me and I confirm that the sales representative / dealer has completed the start-up/commissioning process.

Date: _____ Owner Operator's Signature: _____

I have completed the actions listed above and confirm that the owner operator has completed the start-up/commissioning process.

Date: _____ Dealer Representative's Signature: _____

I have completed the actions listed above and confirm that the owner operator has completed the start-up/commissioning process.

Date: _____ Manufacturer Representative's Signature: _____

Additional Notes:

PAGE INTENTIONALLY LEFT BLANK

WALINGA® INC.

Introduction

ULTRA-VAC MODEL 4510G

STATEMENT OF IMPORTANCE

Congratulations on your choice of a Walinga Ultra-Vac to complement your operation. This equipment has been designed, engineered and manufactured to meet the needs of the discriminating buyer for the efficient moving of select free-flowing granular materials.

Your safety and the performance of your Ultra-Vac 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 Ultra-Vac.

Safe, efficient and trouble-free operation of your Ultra-Vac 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 Ultra-Vac has been designed for use in agricultural or similar operations in an outdoor environment for the moving of select granular 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.

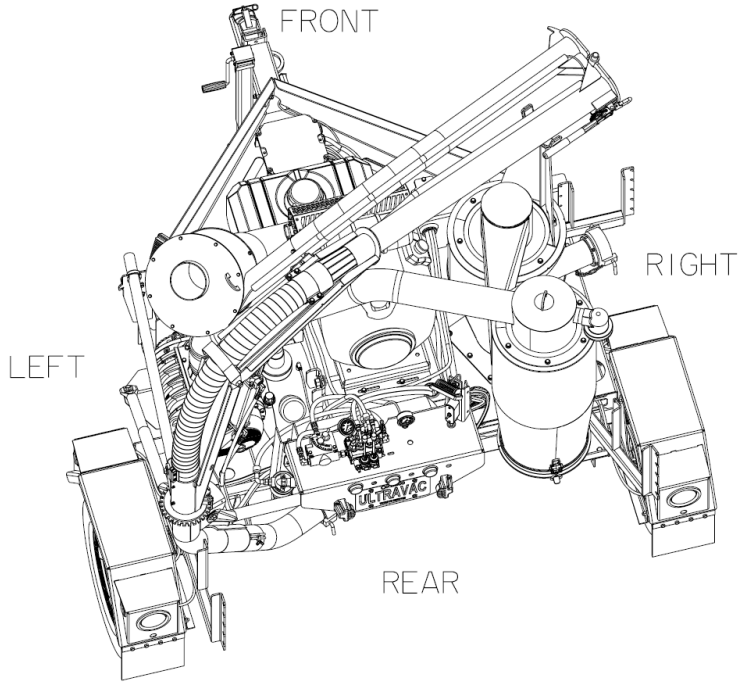
The Ultra-Vac must be operated, maintained and serviced only by persons who are familiar with its particular characteristics and have been acquainted with the relevant safety procedures in this manual. Any individual who has not familiarized themselves with the content of this manual is considered untrained. Untrained persons are considered unqualified to operate, maintain or service an Ultra-Vac. 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, all other generally recognized regulations on safety and occupational health and safety, and all road traffic regulations must be observed at all times.

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

DIRECTIONAL REFERENCES

To avoid confusion, the directions shown in ***Figure 2-1*** are used as the standard throughout the manual:



FRONT	The hitch end of the Ultra-Vac
REAR	The hydraulic controls end of the Ultra-Vac
LEFT	The left-hand side as viewed from the REAR of the Ultra-Vac
RIGHT	The right-hand side as viewed from the REAR of the Ultra-Vac

Figure 2-1: Directional references

PNEUMATIC CONVEYING SYSTEMS

Pneumatic conveying systems use air to move materials and work best with powdered or granular materials like cereal grains. The efficient operation depends on many factors including air flows, line sizes, engine power, operating methods, and suction and discharge line arrangements, among others. Pneumatic conveying systems enhance safety, as there are no moving parts at the intake point; improve cleanliness, producing less dust in the grain removal area; and increase versatility, unrestricted by changes in direction, as compared to traditional auger conveying systems.

A simplified representation of a pneumatic conveying system can be seen in ***Figure 2-2***. At the heart of the Walinga system is a positive-displacement blower, sometimes referred to as an air pump. The blower unit creates a negative pressure (vacuum) in the primary air material separator (AMS), also known as the intake cyclone. This vacuum effect pulls the material and air into the intake cyclone through lines attached to its intake point(s).

As grain and air enter the primary AMS, they are separated through cyclonic action. The conveyed material falls downwards to a rotary airlock while the air moves upwards and out to the blower. The air may move through a secondary AMS before it reaches the blower. This secondary cleaning action further reduces wear on the blower by removing abrasive dust from the air-stream.

Located at the bottom of the primary AMS is the airlock. It acts as a seal between the vacuum and pressure sides of the system. As the airlock rotor turns, the upward facing rotor pocket fills with falling material. As the pocket rotates, material is moved to the bottom of the airlock where it enters the pressurized air-stream.

Pressurized air from the blower moves through a discharge line past the bottom of the rotary airlock feeder. The conveyed material and pressurized air are then moved to a discharge point. Most systems use a discharge cyclone at the delivery end of the line to efficiently separate the material from the air and drop it directly downwards.

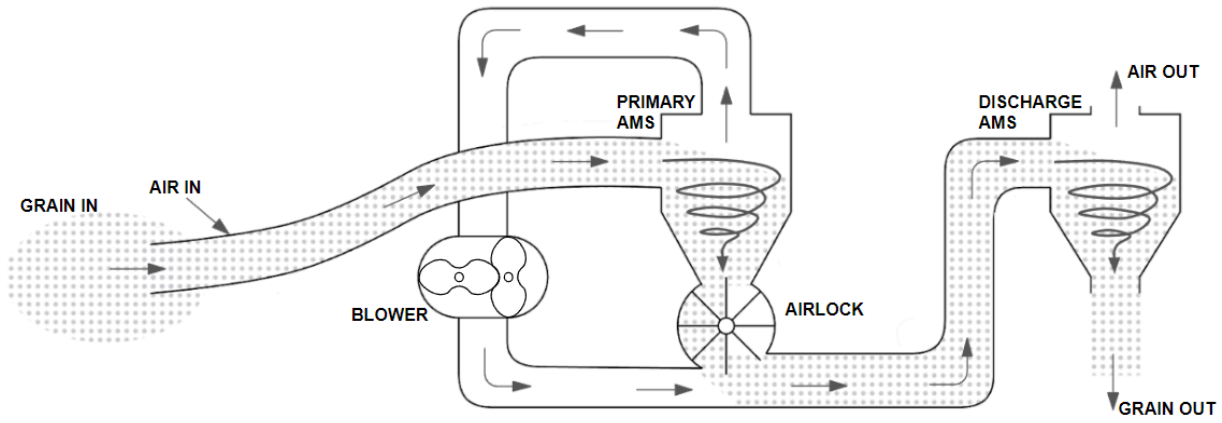


Figure 2-2: Simplified Walinga pneumatic conveying system

Standard Walinga systems function under suck/blow operation, meaning the machine lifts and moves product into the machine under vacuum (sucks) and then transfers it in a stream of pressurized air (blows) to the discharge point. However, there are some units that can function under blow-only operation. On these units, the primary and secondary AMS assemblies are removed and the airlock is fitted with an intake guard as well as a muffler attached to the blower inlet. A purpose-built intake hopper equipped with a sufficient guard is required. In blow-only operation, material drops directly into the intake hopper and the airlock meters it into the pressurized discharge line. Be advised that standard units are not supplied with blow-only kits. Walinga does not authorize the use of standard machines in blow-only operation without additional operational and safety hardware installed. If a standard unit is modified for blow-only operation, it is the responsibility of the owner and/or operator to ensure that all moving parts and inlets are adequately guarded.

WALINGA® INC.

Machine Configuration

ULTRA-VAC MODEL 4510G

MODEL VARIATIONS

STANDARD

The standard 4510G Ultra-Vac model provides full functionality of a pneumatic conveying system featuring 4 in (10.16 cm) lines, a 510 Walinga Sound Reduction Technology blower, a 1314 airlock, Rhino Hyde lining, a self-contained hydraulic system, and a 37 horsepower gasoline engine.

AUS

The Australian 4510G model incorporates the features of the Standard model with slight modifications to achieve compliance with the Australian Design Rules with particular attention to maximum trailer width, trailer suspension requirements, trailer braking requirements, hitch standards and requirements, and electrical and lighting system requirements.

WALINGA® INC.

Safety

ULTRA-VAC MODEL 4510G

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 Ultra-Vac 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 Ultra-Vac. You must ensure that you and anyone else who will operate, maintain, or work around your Ultra-Vac 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 an Ultra-Vac. 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 Ultra-Vac is familiar with the recommended procedures and follows all safety precautions. Remember, most accidents can be prevented; do not risk injury or death.

Ultra-Vac 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 an Ultra-Vac 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 an Ultra-Vac. Untrained operators expose themselves and bystanders to potential serious injury or death.

Before servicing, adjusting, repairing, or unplugging an Ultra-Vac, place all controls in neutral, stop the engine, disconnect all electrical sources, set the parking brake on any connected towing vehicle, remove all ignition keys 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. Long hair and loose clothing must be secured to avoid potential injury as a result of coming into contact with moving or rotating components of the Ultra-Vac. Hands and feet must also be kept clear of any moving or rotating components.

Ensure all electrical equipment is properly grounded. All electrical connections made to the Ultra-Vac must be in compliance and accordance with the National Electric Code (NFPA 70). During set-up, operation and transportation, identify and avoid overhead obstructions and power lines. Be aware that electrocution can occur without direct contact.

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 reinstalled and secured 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 Ultra-Vac 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, transport, maintenance, and storage of the machine. Refer to the safety messages and operational instructions in each of the appropriate sections of the auxiliary equipment and machine manuals. Pay careful attention to the safety signs affixed to the auxiliary equipment and the machine.

Never use alcoholic beverages, narcotics, or other intoxicants which could hinder alertness or coordination while operating an Ultra-Vac. 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, play around, or ride on the Ultra-Vac 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 familiar with farm machinery and trained in the Ultra-Vac's operation. If there are elderly individuals assisting with farm work, their physical limitations must be recognized and accommodated. 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.

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 Ultra-Vac 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 Ultra-Vac and know how to stop the Ultra-Vac 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. Engines or attached 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.
- Clear the working area of debris, trash or hidden obstacles that may be hooked or snagged, causing injury, damage or tripping hazards.
- Operate only in daylight or with sufficient artificial lighting.
- Ensure the machine is properly anchored, adjusted and in good operating condition. Check the machine over for any loose bolts, worn parts, cracks, leaks, frayed belts, etc., and make any necessary repairs. Always follow the maintenance instructions.
- Disconnect and remove all mechanical locks, anchor chains and any other transport or storage devices that would hinder or prohibit the normal function of the Ultra-Vac upon start-up. Serious damage to the equipment and/or personal injury to the operator or bystanders may result from attempting to operate the equipment while mechanical locking devices are still attached and secured.
- Ensure the Ultra-Vac is positioned on a firm, level surface. Ensure the frame is level and the Ultra-Vac is properly anchored to the attached towing vehicle. Operation of the equipment on soft or uneven terrain can result in tipping of the frame and unit.
- Keep clear of all overhead power lines. Electrocution can occur without direct contact.
- Inspect the Ultra-Vac for any loose, worn or damaged components including all mechanical, structural, electrical, fuel system, and hydraulic components. Ensure all required maintenance as detailed in **Section 7: Maintenance and Adjustments** is completed.
- Ensure that all safety shielding and guarding and safety signs are properly installed and secured, and are in good condition.

INSTALLATION SAFETY

- Disconnect and remove all mechanical locks, anchor chains and any other transport devices that would hinder or prohibit the normal function of the Ultra-Vac upon start-up. Serious damage to the machine and/or personal injury to the operator or bystanders may result from attempting to operate the machine while mechanical locking devices are still attached and secured.
- Ensure the Ultra-Vac is positioned on a firm, level surface. Ensure the frame is level and the Ultra-Vac is properly anchored to the attached towing vehicle. Positioning of the equipment on soft or uneven terrain can result in tipping of the frame and unit.
- 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 machine. Always follow ANSI/NFPA 70 standard and all local codes and regulations when providing electrical power.
- Ensure all fasteners are installed and tightened to the required torque.
- Ensure all safety shielding and guarding and safety signs are 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 if any guards are damaged or removed. Install and secure all guards before operating. Do not remove any guards or open any access points while the unit is in operation.
- Keep hands, feet, clothing, hair, and jewelry away from all moving and/or rotating parts.
- Do not allow any individuals to climb or ride on the Ultra-Vac at any time.
- Clear the area of all bystanders, especially small children, before operation.
- Ensure the Ultra-Vac is attached securely to the towing vehicle by using a retainer on the hitch assembly and safety chains.
- Keep clear of overhead obstructions and electrical lines when extending and positioning the boom. Be aware that electrocution can occur without direct contact.
- Keep clear of the discharge boom when moving, adjusting, or setting.
- Keep all safety signs, reflectors, and lights clean and unobstructed.
- Wear appropriate personal protective equipment while operating.
- Do not operate the Ultra-Vac if there are any leaks in the hydraulic, air, or fuel systems. Ensure all hydraulic system components are tight and that all lines, hoses and couplings are in good condition before applying pressure to the system.

- Do not place the intake nozzle near your feet when standing on top of the conveyed material; the suction of the Ultra-Vac is sufficient to pull the nozzle and operator into the pile. If the pile is deep enough, the operator can become submerged in the material and suffocate.
- 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 Ultra-Vac. 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 engine is OFF and the power is locked out. Safety lockout devices are available through your Walinga dealer parts department.
- In the event of a blockage in the system, follow the procedures outlined in **Section 6: Operation**. Do NOT open any access door or remove any guard to clear a blockage manually while the unit is in operation. The engine and all power sources must be off and locked-out and hydraulic pressure must be relieved before any blockage is manually cleared.

TRANSPORTATION SAFETY

- Be aware of any specific local regulations regarding transporting agricultural equipment on public roads and highways and ensure your Ultra-Vac is in compliance.
- Be aware that the standard Ultra-Vac is not a slow moving implement and must not display a slow moving vehicle emblem if the towing speed exceeds 25 mph (40 km/h).
- Ensure all lights and reflectors required by local highway and transport authorities are in place, are clean and can be seen clearly by all overtaking, oncoming and cross traffic.
- Ensure the discharge boom is placed and secured in the transport position and is resting in the boom saddle, and ensure all other components are also in their transport position.
- Attach the Ultra-Vac securely to the towing vehicle using a retainer on the hitch assembly and safety chains and ensure the breakaway switch is properly attached to the towing vehicle to ensure the electric brakes of the Ultra-Vac will engage in the event of a separation between the Ultra-Vac and towing vehicle.
- Ensure the electrical connection between the Ultra-Vac and towing vehicle is securely connected and all lights and the braking system of the Ultra-Vac function properly.
- Do not allow any individuals to ride on the Ultra-Vac or towing vehicle during transport.
- Reduce speed on rough roads and surfaces.
- Keep clear of overhead obstructions and power lines. Be aware that electrocution can occur without direct contact.
- Reference ANSI/ASAE S279.17 July, 2013 as a minimum standard for lighting and marking of agricultural equipment on highways whether towing the Ultra-Vac during the day or night.

STORAGE SAFETY

- Store the Ultra-Vac on a firm, level surface in a dry area away from human activity.
- Secure the Ultra-Vac in place with wheel chocks if necessary.
- Support the hitch jack with an additional footing support if required, especially on softer surfaces.
- Do not permit children to play on or around the stored machine.
- Ensure all components have been placed in their storage position with reference to **Section 5: Machine Life-Cycle Procedures**, and ensure all mechanical locks are safely and positively connected.
- Lock-out all power sources to prevent unintentional start-up.

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 or 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.
- Place all controls in neutral, stop the engine, disconnect all electrical sources, disconnect and ground the engine spark plug leads, disconnect the negative (—) engine battery cable, set the parking brake on the towing vehicle, remove ignition keys and wait for all moving parts to stop before servicing, adjusting or maintaining.
- Use wheel chocks or another suitable device to secure the wheels in place before disconnecting from the towing vehicle.
- Use required personal protective equipment previously outlined.
- Support the machine with blocks or safety stands when changing tires or working beneath the machine.
- 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.
- Before applying pressure to a hydraulic system, ensure all lines, fittings and couplers are tight and in good condition.
- Relieve pressure from the hydraulic circuit before servicing.
- Ensure all guards are in place and secured when maintenance work is complete.

HYDRAULIC SAFETY

- The hydraulic system must only be operated in accordance with the system's intended purpose. Do not modify or alter the hydraulic system in any manner.
- Ensure all components in the hydraulic system are kept in good condition and are clean.
- Before applying pressure to the hydraulic system, ensure all components are tight and that lines, hoses and couplings are not damaged. Do not apply pressure or use the system if there is any fluid dripping or accumulating while the system is off.
- Replace any worn, cut, cracked, abraded, flattened, or kinked hydraulic line immediately.
- Relieve pressure before working on the hydraulic system.
- Do not attempt makeshift repairs to the hydraulic fittings or hoses by using tape, clamps or cements. The hydraulic system operates under extremely high pressure and such attempts will fail suddenly and create hazardous and unsafe conditions.
- Wear proper hand and eye protection when searching for a high pressure hydraulic leak. Use a piece of wood or cardboard as a backstop to identify and isolate a leak, never use the hands, fingers, or any other part of the body to identify a potential leak
- If injured by a concentrated, high pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reactions can develop from hydraulic fluid piercing the skin's surface.

ELECTRICAL SAFETY

- Have only a qualified, licensed electrician supply power to the system, following the ANSI/NFPA 70 standard and all relevant local regulations.
- Ensure external electrical systems are properly grounded.
- Ensure all electrical switches are in the *OFF* position before engaging power.
- Never open any electrical enclosure or the battery enclosure while in operation.
- Replace any damaged electrical plugs, cords, switches, or components immediately. Ensure any replacement components meet the specifications of the original equipment.
- Keep sparks, lighted matches, and open flames away from batteries.

TIRE SAFETY

- Failure to follow proper procedures when mounting a tire on a wheel or rim can result in a tire blow-out which may cause serious injury or death. Do not attempt to mount a tire unless you have the proper equipment, training and experience. Have a qualified tire dealer or repair service perform any required maintenance.
- Ensure all tires are kept inflated to the proper pressure.
- When replacing worn tires, ensure the replacements meet the original tire specifications. Never undersize a replacement tire.

COMBUSTION ENGINE AND FUEL SAFETY

- Use only the supplied or approved engine.
- Read and understand the operator's manual of the engine.
- Always keep the equipment clear of accumulated dirt, dust, debris, and grease to prevent fire.
- Keep hands, feet loose clothing and hair away from all rotating parts.
- Do not operate the engine in an enclosed area. Exhaust gasses contain carbon monoxide, an odorless and colorless gas that can cause poisoning and death.
- Do not operate the engine above the rated speed and do not tamper with the engine speed selected by the original equipment manufacturer.
- Do not tamper with governor springs, governor links or any other components which may increase the governor speed.
- Ensure the air intake filters are clean and are replaced as required.
- Do not operate the engine without a muffler. Inspect the muffler regularly and clean or replace if necessary. Keep the muffler clear of any accumulated dirt, dust, debris, and combustible material.
- Keep clear of the muffler and engine during operation. The operating temperatures can be extremely hot and can cause severe burns and injuries.
- Disconnect the ground (—) cable from the battery before servicing or maintaining.
- Regularly inspect fuel lines, fittings and tanks for damage, cracks and leaks. Replace as necessary.
- Allow the engine to cool for a minimum of five minutes before refueling. Do not refuel while the engine is running.
- Fill fuel tanks outdoors or in areas with sufficient ventilation.
- Handle fuel with care. It is highly flammable. Do not refuel while smoking or while near open flames or sparks. Do not store, spill or use fuel near an open flame, devices that use a pilot light, or devices that can create a spark.
- Clean up any spilled fuel before starting the engine.
- Use only fresh fuel. Stale fuel can result in blockages in the fuel system and leakage.

SAFETY AROUND STORAGE STRUCTURES

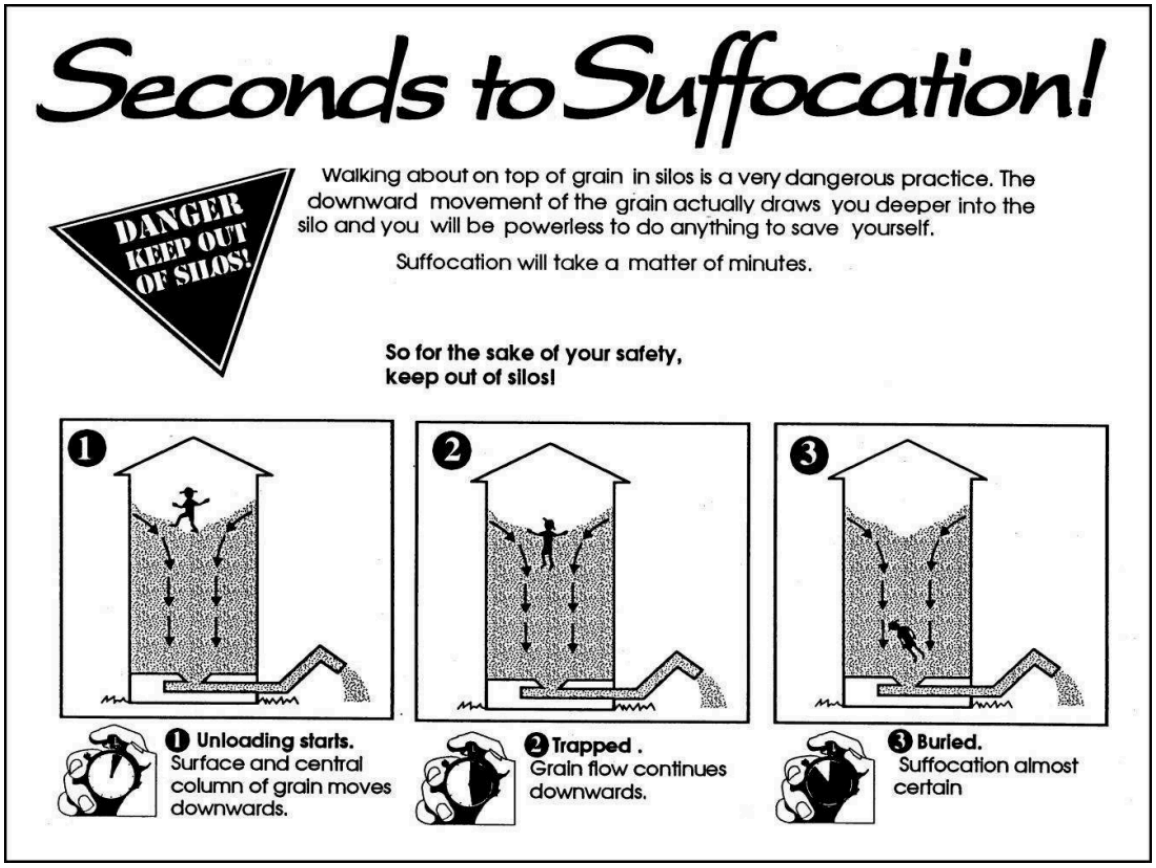
Ultra-Vac operators and all other personnel in the vicinity or assisting with operation must strictly adhere to the procedures outlined below before entering a storage structure. For additional details regarding these procedures, reference Occupational Safety and Health Administration standards, or your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

- Be aware of the extremely high suction at the intake nozzle of the Ultra-Vac. Keep clear of the nozzle intake area and never place the intake nozzle into material near your feet.
- Always check with the bin manufacturer before starting to unload a bin from the side. Side unloading may cause bin collapse.
- Do not enter silo bags. Always slice the sides of the silo bags open and roll back the sides before removing the grain.



MACHINE SAFETY SIGNS

The safety signs affixed to the Ultra-Vac 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 Ultra-Vac is above 50 °F (10 °C).
3. Locate the correct position of the safety sign before removing the backing paper. Reference ***Figure 4-1*** through ***Figure 4-9*** for the correct location of each sign.
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 an Ultra-Vac 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 an Ultra-Vac are as follows:

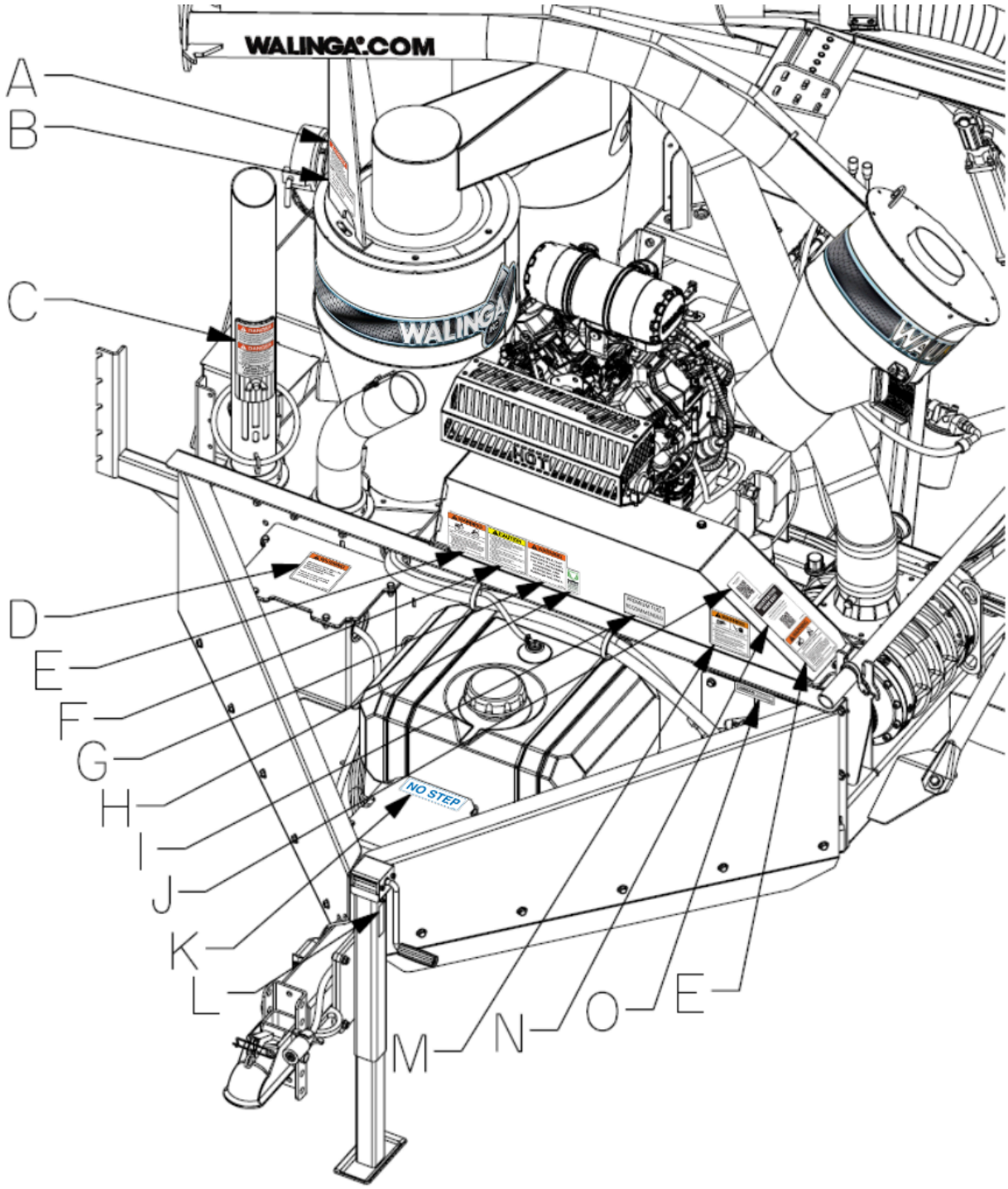


Figure 4-1: Front side of Ultra-Vac safety signs

Figure 4-1 A

Part Number: 53-18290-6

Location: positioned on the lower right surface of the boom saddle.

Figure 4-1 B

Part Number: 53-08013-6

Location: positioned on the lower right surface of the boom saddle.

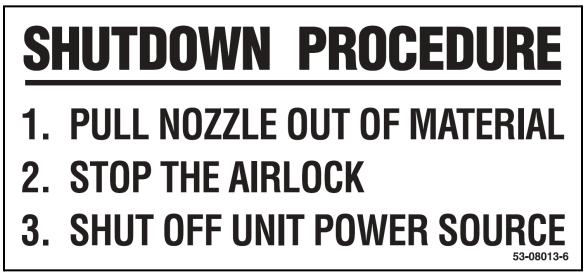


Figure 4-1 C

Part Number: 53-80781-6

Location: positioned on the air slide of all intake nozzles.

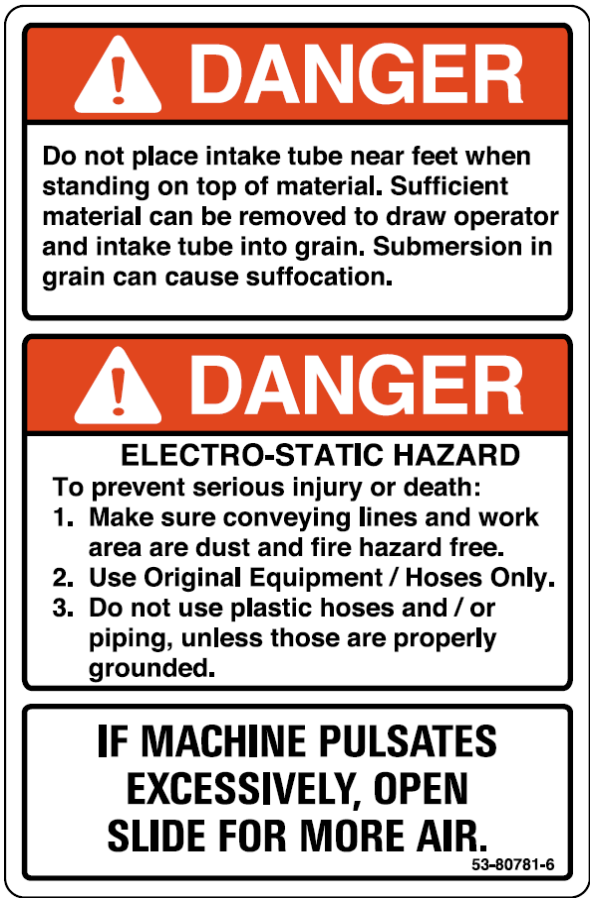


Figure 4-1 D

Part Number: 53-100397-6

Location: positioned on the front surface of the frame next to the battery enclosure.

Figure 4-1 E

Part Number: 53-18288-6

Location: positioned on the lower right corner of the front surface of the drive belt guard and the left angled surface of the drive belt guard.

Figure 4-1 F

Part Number: 53-15633-6

Location: positioned on the lower right corner of the front face of the drive belt guard.

Figure 4-1 G

Part Number: 53-135151-6

Location: positioned on the lower right corner of the front face of the drive belt guard.

Figure 4-1 H

Part Number: 53-98505-6

Location: positioned on the lower right corner of the front face of the drive belt guard.

Figure 4-1 I

Part Number: 53-129365-6

Location: positioned on the front face of the drive belt guard above the fuel tank.

Figure 4-1 J

Part Number: 53-106800-6

Location: positioned on the left angled surface of the drive belt guard.

Figure 4-1 K

Part Number: 53-16131-6

Location: positioned on the top surface of the electrical enclosure.

Figure 4-1 L

Part Number: 53-08560-6

Location: positioned on the left surface of the jack, indicating the grease fitting.

Figure 4-1 M

Part Number: 53-15638-6

Location: positioned on the lower left corner of the front face of the drive belt guard above the hydraulic pump.

Figure 4-1 N

Part Number: 53-102592-6

Location: positioned on the left angled surface of the drive belt guard.

Figure 4-1 O

Part Number: 53-77753-6

Location: positioned on the front surface of the frame above the hydraulic pump and blower shaft coupling.

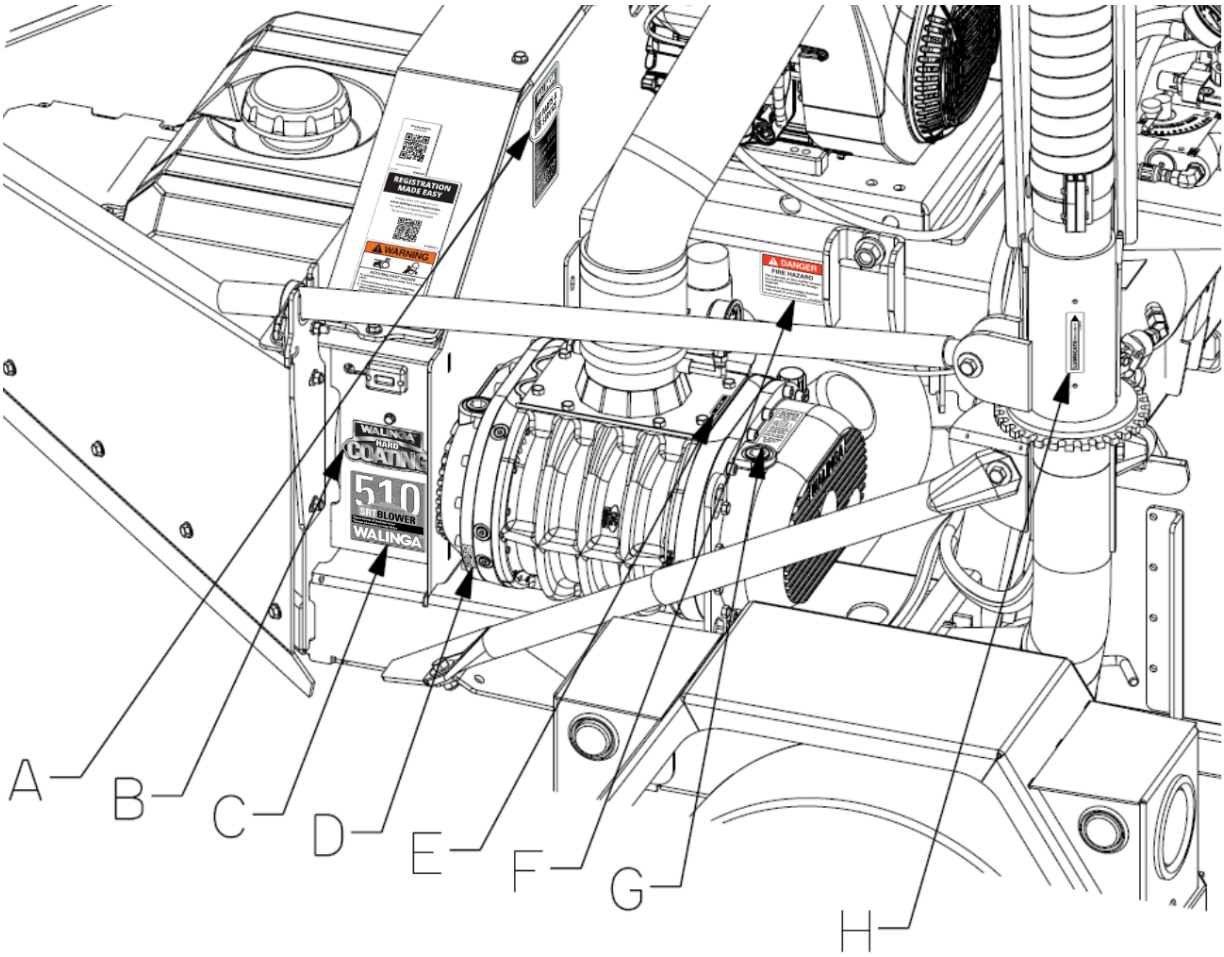


Figure 4-2: Left side of Ultra-Vac safety signs

Figure 4-2 A

Part Number: 53-77858-6

Location: positioned on the upper left side of the rear surface of the drive belt guard.

Figure 4-2 B

Part Number: 53-120857-6

Location: positioned on the left surface of the drive belt guard.

Figure 4-2 C

Part Number: 53-120493-6

Location: positioned on the left surface of the drive belt guard.

Figure 4-2 D

Part Number: 53-05647-6

Location: positioned on the front left and rear right sides of the blower to indicate the front and rear oil level plugs.

Figure 4-2 E

Part Number: 53-05649-6

Location: positioned on the top surface of the blower inlet, below the vacuum pressure gauge.

Figure 4-2 F

Part Number: 53-129804-6

Location: positioned on the lower left side of the rear surface of the drive belt guard.

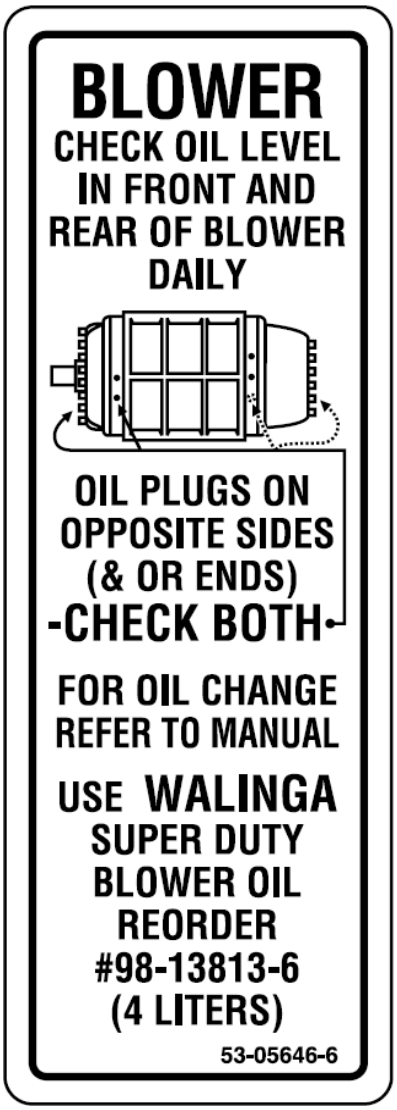


Figure 4-2 G

Part Number: 53-05646-6

Location: positioned on the top surface of the rear headplate of the blower.

Figure 4-2 H

Part Number: 53-08560-6

Location: positioned on the left surface of the boom swivel tube, centered between the two grease fittings.

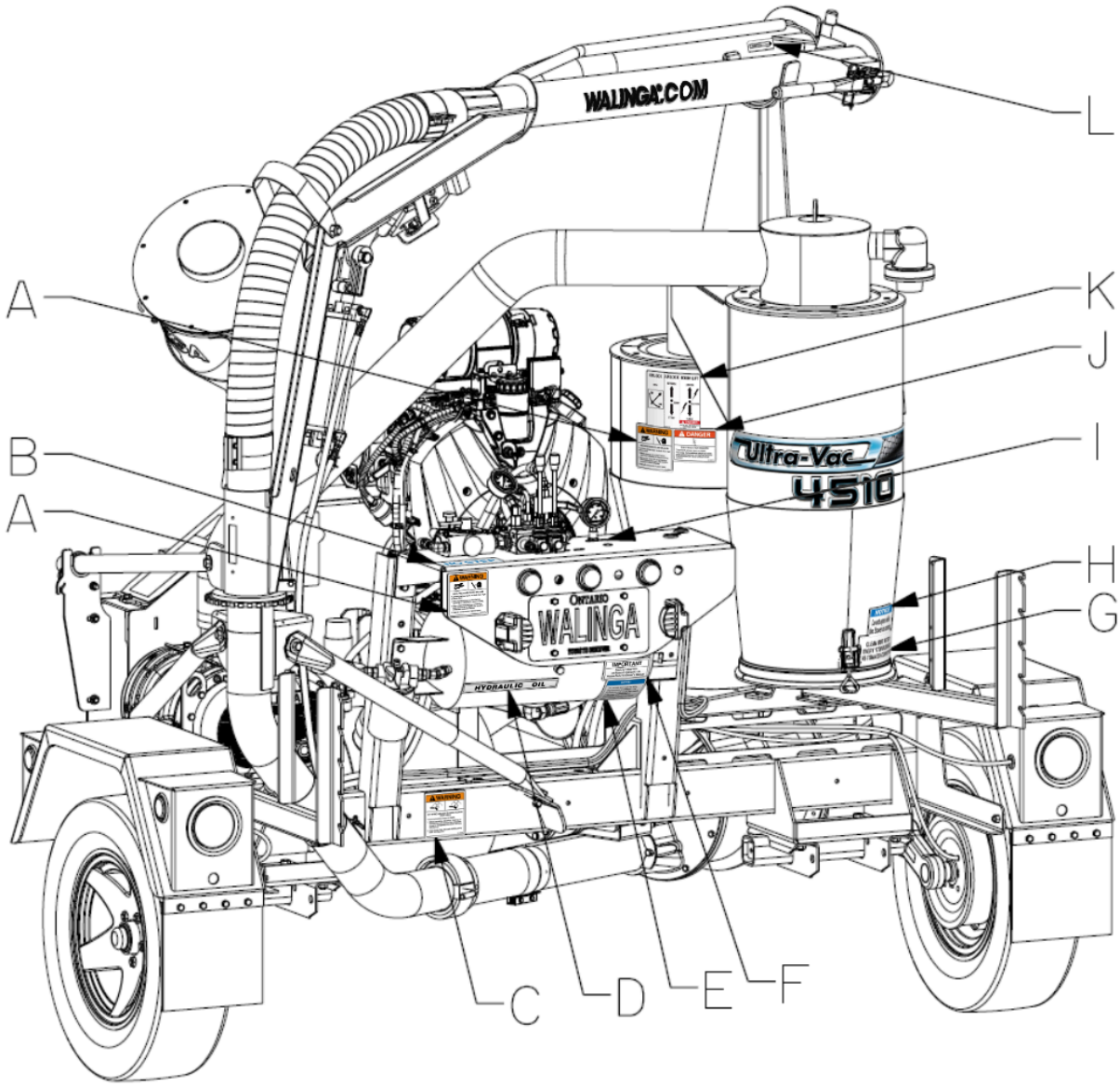


Figure 4-3: Rear side of Ultra-Vac safety signs

Figure 4-3 A

Part Number: 53-15638-6

Location: positioned on the rear left surface of the primary AMS and the rear surface of the hydraulic controls mounting frame.

Figure 4-3 B

Part Number: 53-16131-6

Location: positioned on the top surface of the hydraulic controls mounting frame.

Figure 4-3 C

Part Number: 53-18289-6

Location: positioned on the lower rear surface of the frame above the airlock outlet coupler.

Figure 4-3 D

Part Number: 53-04707-6

Location: positioned on the rear surface of the hydraulic reservoir.

Figure 4-3 E

Part Number: 53-98396-6

Location: positioned on the rear surface of the hydraulic reservoir.

Figure 4-3 F

Part Number: 53-18057-6

Location: positioned on the rear surface of the hydraulic reservoir.

Figure 4-3 G

Part Number: 53-18291-6

Location: positioned on the lower rear surface of the secondary AMS.

Figure 4-3 H

Part Number: 53-137791-6

Location: positioned on the lower rear surface of the secondary AMS.

Figure 4-3 I

Part Number: 53-05650-6

Location: positioned on the top surface of the hydraulic controls mounting frame below the discharge pressure gauge.

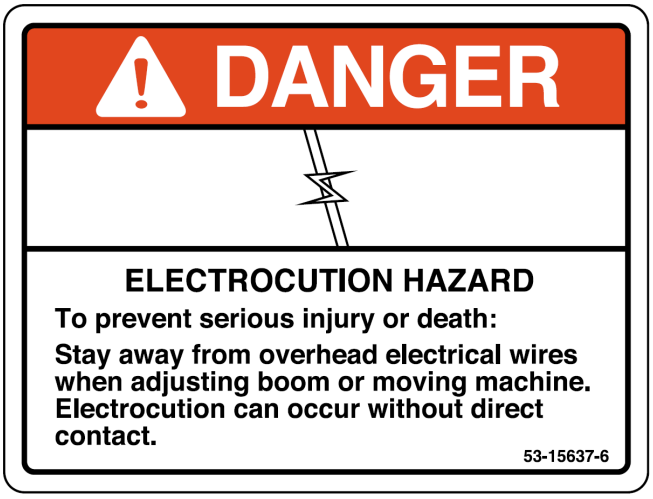


Figure 4-3 J

Part Number: 53-15637-6

Location: positioned on the rear left surface of the primary AMS.

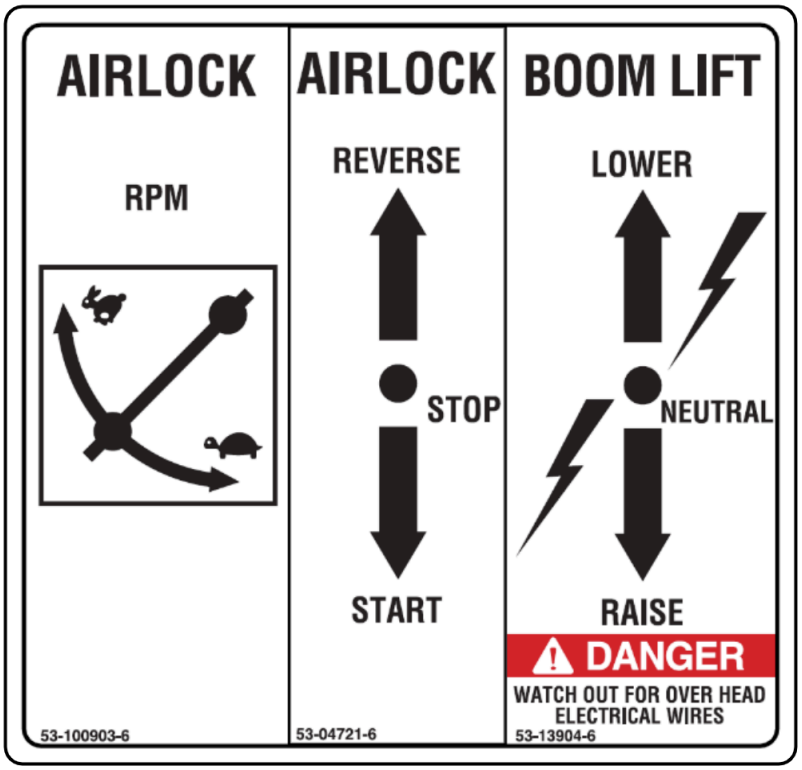


Figure 4-3 K

Part Number: 53-82114-6

Location: positioned on the upper rear left surface of the primary AMS.

Figure 4-3 L

Part Number: 53-08560-6

Location: positioned on the rear surface of the discharge cyclone section of the boom to indicate the grease fitting of the boom hinge.

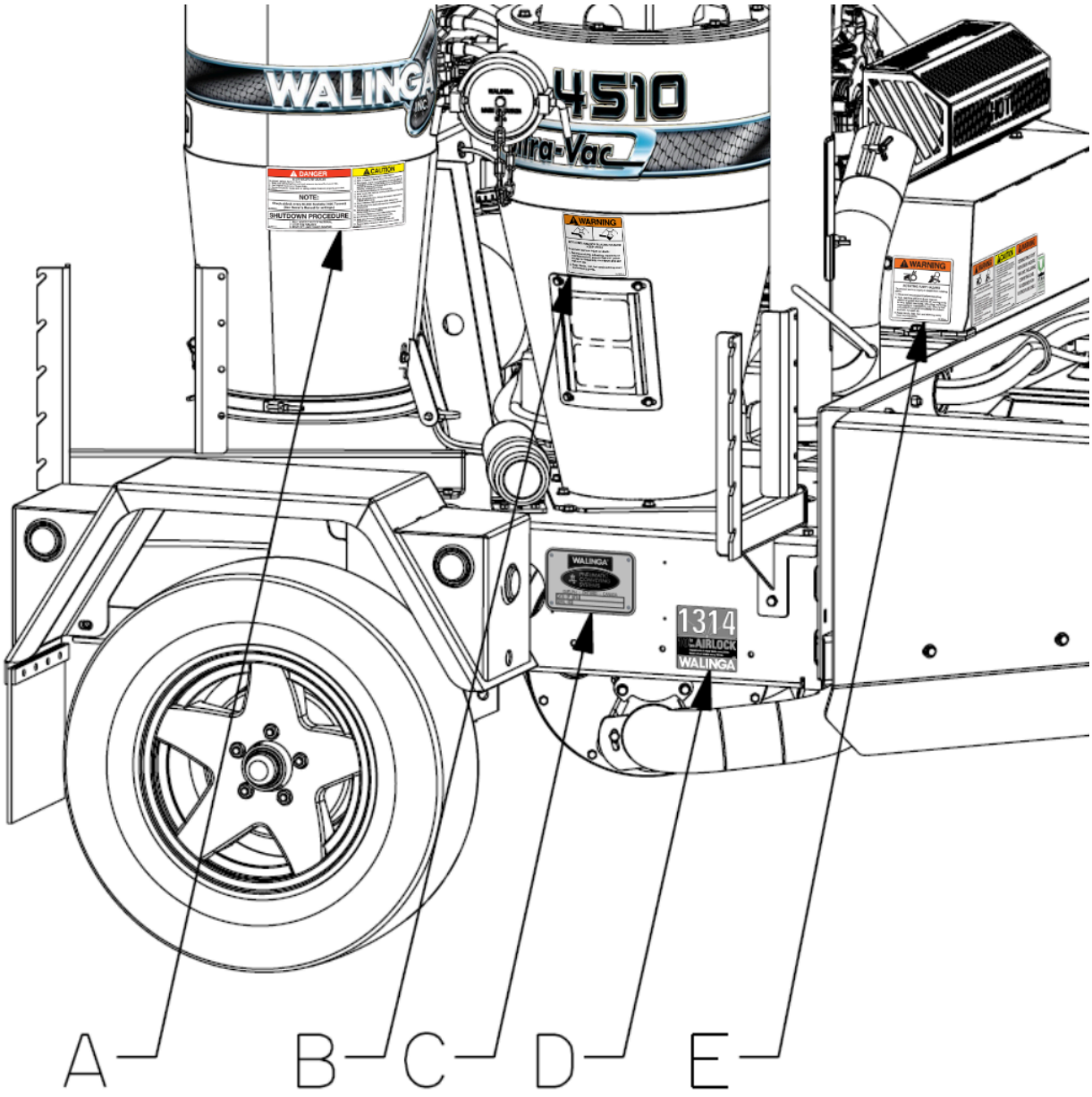


Figure 4-4: Right side of Ultra-Vac safety signs

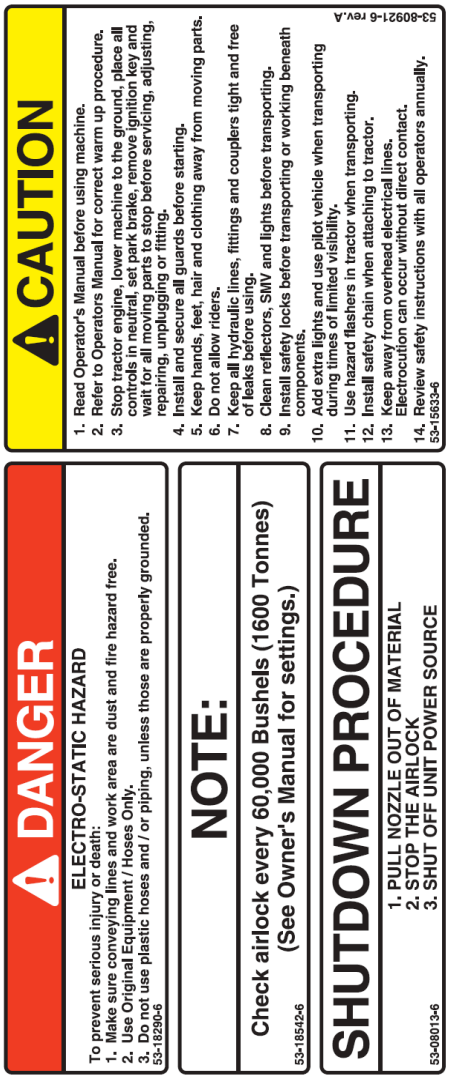


Figure 4-4 A

Part Number: 53-80921-6

Location: positioned on the upper right surface of the secondary AMS.

Figure 4-4 B

Part Number: 53-18289-6

Location: positioned on the right surface of the primary AMS above the access door.

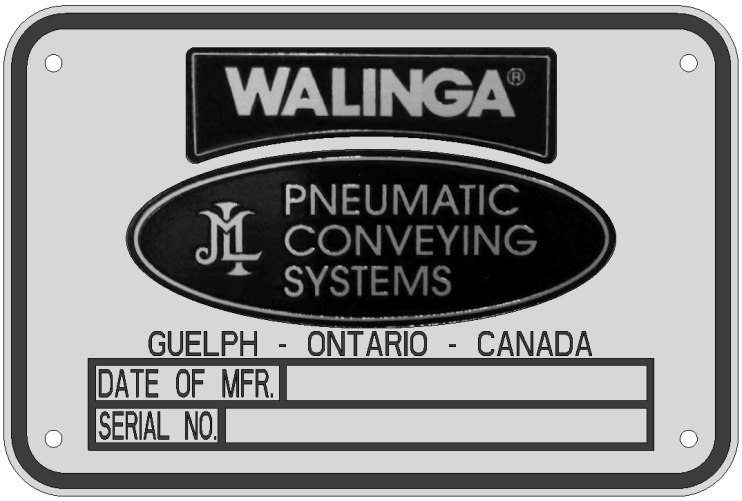


Figure 4-4 C

Part Number: 53-94818-6

Location: positioned on the right surface of the frame.

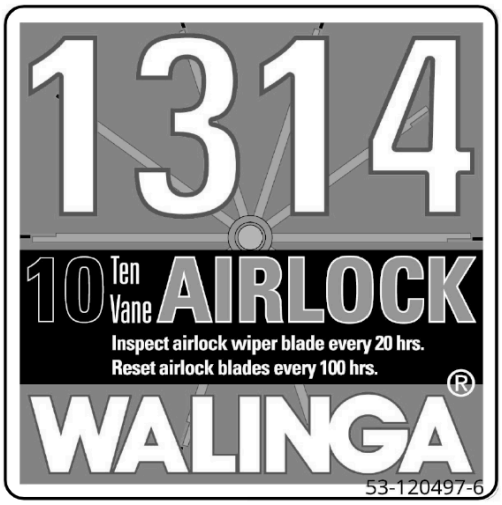


Figure 4-4 D

Part Number: 53-120497-6

Location: positioned on the right surface of the frame above the airlock inlet.

Figure 4-4 E

Part Number: 53-18288-6

Location: positioned on the right surface of the drive belt guard.

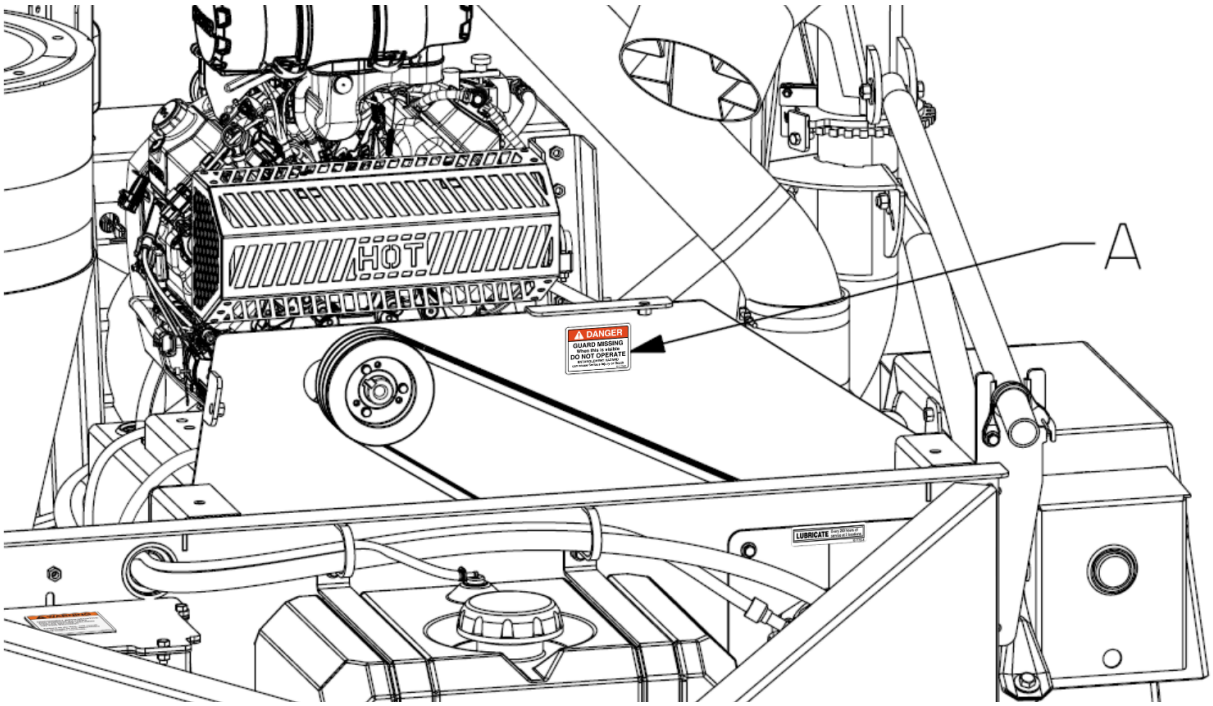


Figure 4-5: Front of Ultra-Vac with belt guard removed safety signs

Figure 4-5 A

Part Number: 53-17704-6

Location: positioned on the front surface of the rear drive belt guard panel, only visible when the guard is removed.

SAFETY TRAINING SIGN-OFF FORM

Walinga Inc. follows the general safety standards specified by the American Society of Agricultural Engineers (ASAE) and the Occupational Safety and Health Administration (OSHA). Anyone who will be operating and/or maintaining the Ultra-Vac 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 an Ultra-Vac.

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

ULTRA-VAC MODEL 4510G

RECEPTION, ASSEMBLY AND INITIAL SET-UP

Reception

Upon initial reception of the Ultra-Vac, proceed as follows:

- Inspect the condition of the Ultra-Vac and all components. Ensure no components have been damaged; any damaged components must be repaired or replaced.
- Ensure all loose or disassembled components, accessories and/or attachments have been received.
- Check to ensure all installed fasteners are tightened to the required torque.
- Register your Ultra-Vac by scanning the QR code affixed to the drive belt guard or visit:

  www.walinga.com/registration

- Register your engine as follows:
  - For Kohler engines:
    - To register your engine, visit:

      https://kohler.mizecx.com/cc/myProduct.html#sblox=none

      - In the first section, *Business Access Code*, choose *Engines* from the drop-down menu and proceed with the registration.
    - For local support and maintenance, visit:

      https://kohlerpower.com/en/engines/dealers

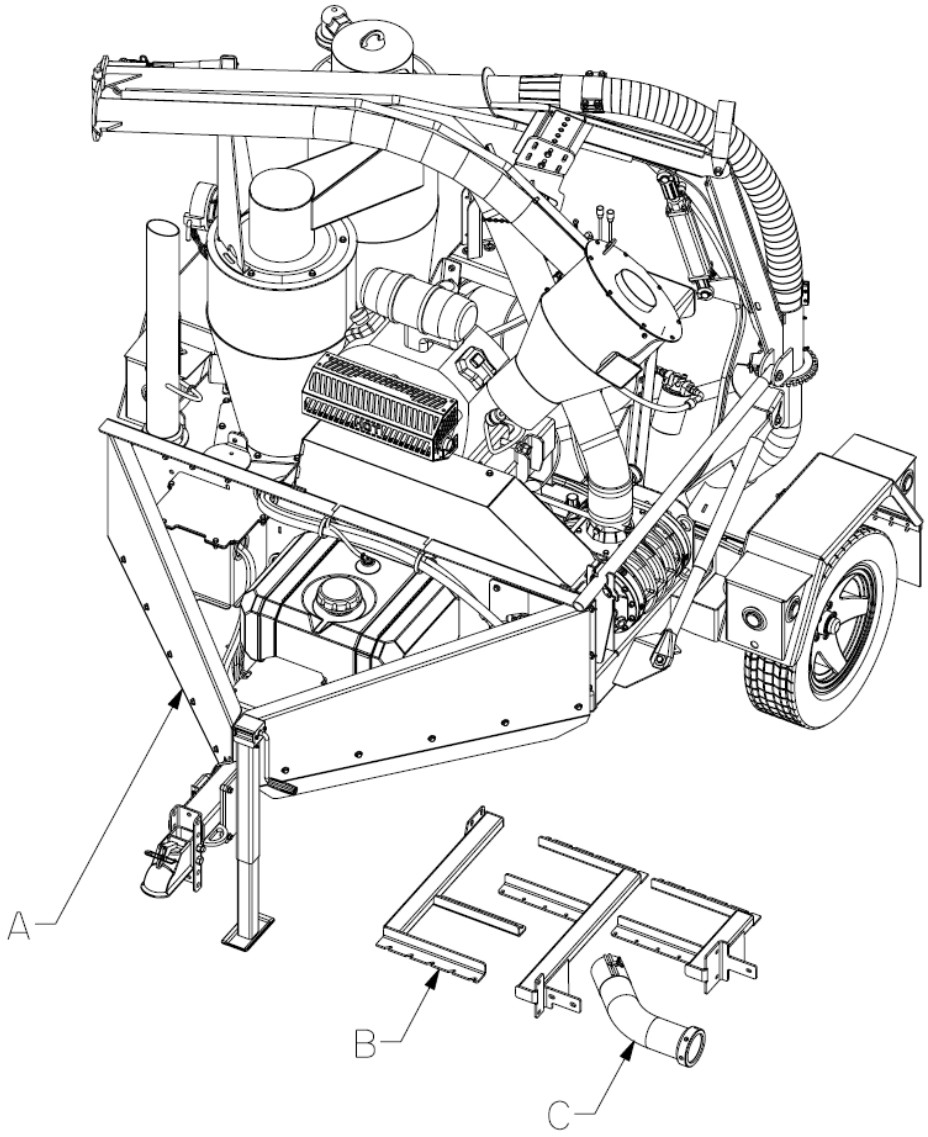
      - Select *Gasoline Engines* and find the most convenient dealer, the engine should also be registered with the local dealer.
  - For Honda engines:
    - To register your engine, visit:

      https://engines.honda.com/support-and-service/registration
    - For local support and maintenance, visit:

      https://engines.honda.com/dealer-locator

Assembly

To allow for efficient shipping, the Ultra-Vac may arrive partially disassembled. ***Figure 5-1*** identifies the disassembled components of the Ultra-Vac upon initial reception.



A Main assembly

B Hose carrier brackets

C Lower boom elbow

Figure 5-1: Disassembled components

To assemble the Ultra-Vac, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Position the machine on a solid, dry and flat surface that is clear of obstructions. Secure the machine by placing wheel chocks and ensuring the tongue jack is extended.

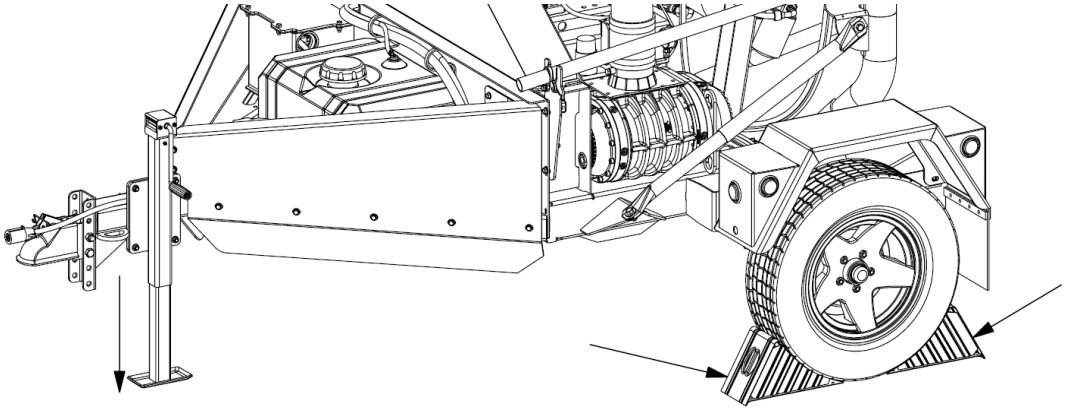


Figure 5-2: Wheel chock and jack securement

3. Remove all plastic wrap and strapping from the unit.
4. Using an approved solvent for the application of your machine, especially in food-grade applications, wash off the protective coating that has been applied to the non-painted areas of the unit. Ensure any non-food-grade solvents have been cleaned from the machine if necessary.
5. Install the lower boom elbow as follows:
    a. Align the DM coupler of the lower boom elbow with the DF coupler of the airlock outlet, and align the quick coupler with the lower boom.

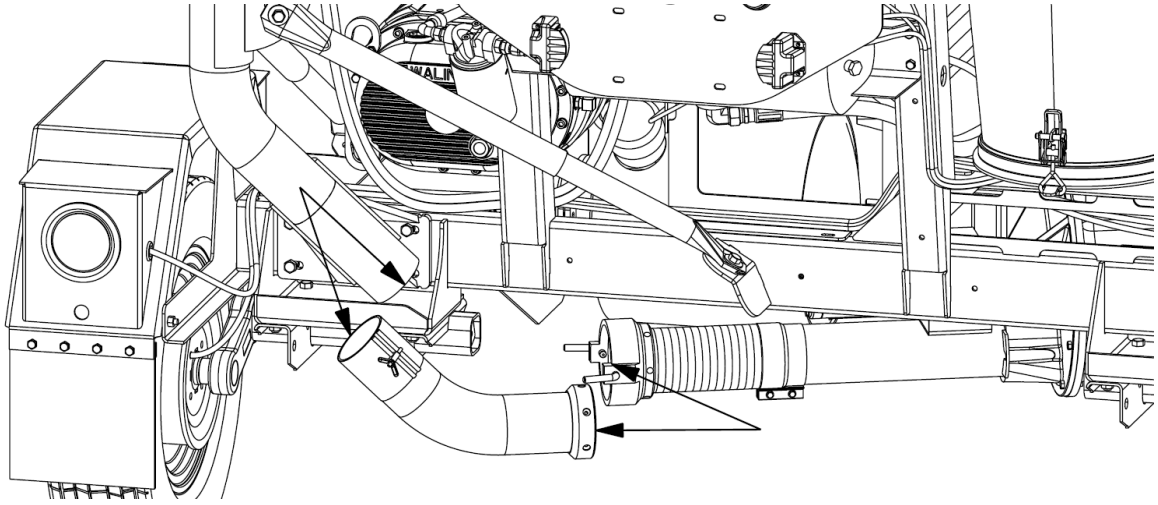


Figure 5-3: Lower boom elbow alignment

b. Fully insert the lower boom elbow into the DF coupler of the airlock outlet and tighten the tail bolts to secure it in place.

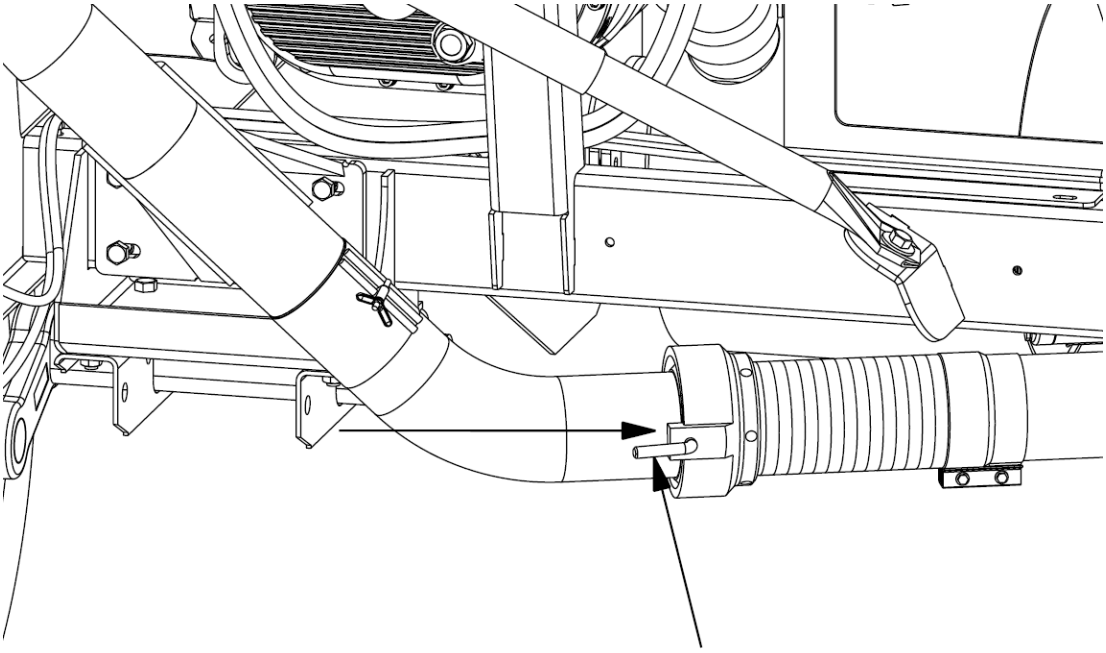


Figure 5-4: Elbow coupler securement

c. Position the quick coupler such that it is centered over the joint of the lower boom and the elbow. Secure it in place by tightening the wingnut of the quick coupler.

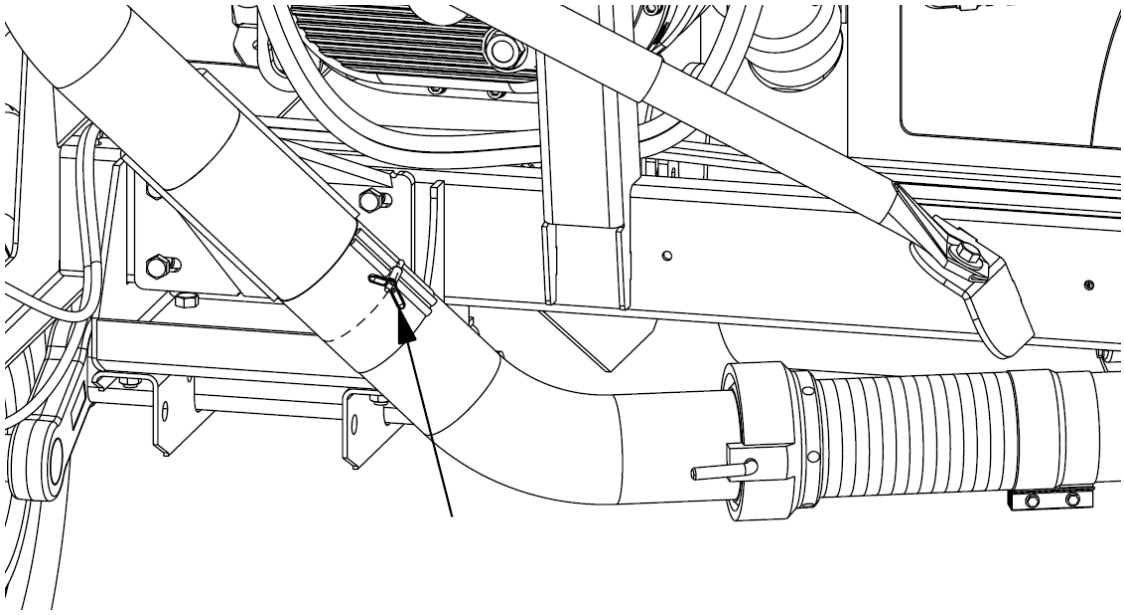


Figure 5-5: Quick coupler positioning

6. Install the hose carrier brackets as follows:
    a. Align the slots in the base of the hose carrier brackets with the holes and weld nuts on the Ultra-Vac frame. The hose carrier brackets are located as follows:
        - The bracket with the base with a 90° bend and long arm is to be mounted near the rear left corner of the frame, under the lower boom.
        - The bracket with the flat base and the longer arm is to be mounted near the rear right corner of the frame.
        - The bracket with the base with a 90° bend and short arm is to be mounted near the front right corner of the frame.

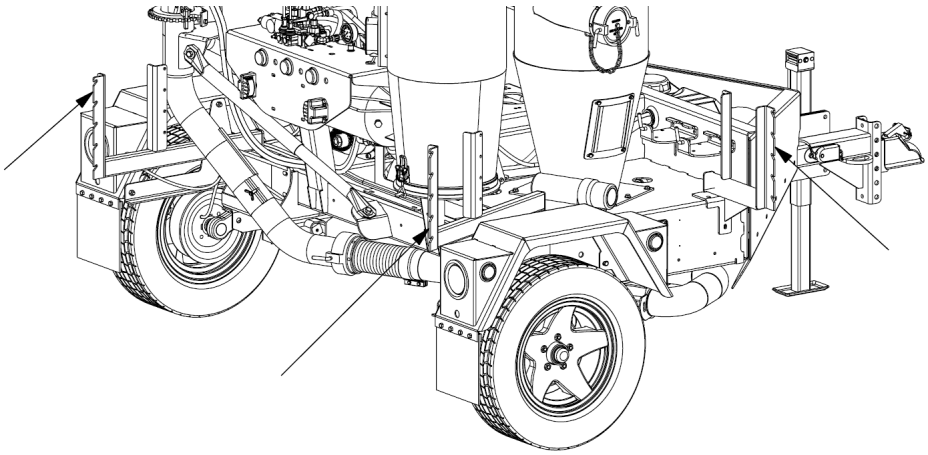


Figure 5-6: Hose carrier bracket alignments

    b. Secure the brackets with the required hardware.
7. As required by local regulations, ensure your Ultra-Vac has been properly registered and install and secure the proper license plate or registration.

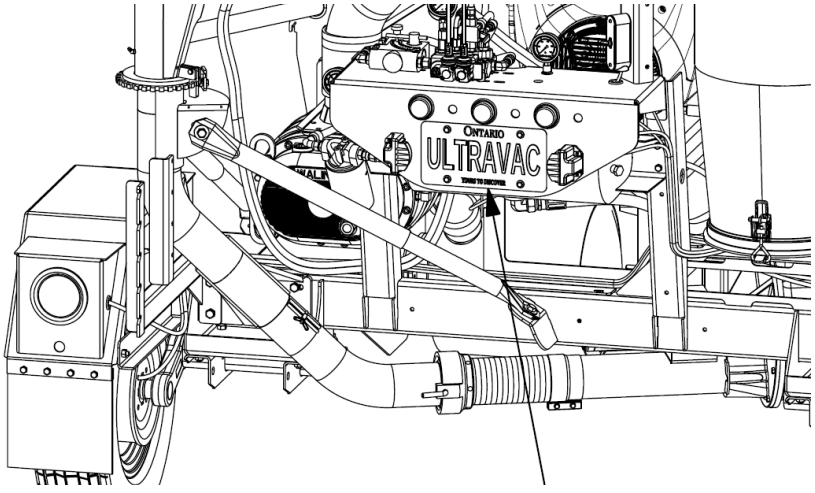


Figure 5-7: License plate mounting

Initial Set-Up

To ensure safe and efficient operation, upon complete assembly and before initial use of the machine, perform the following inspections:

- Ensure the dust hazard analysis as required by NFPA 652 has been completed and the incorporation of the Walinga equipment complies with all relevant standards and regulations.
- Ensure the area is clear of any bystanders and individuals not involved in the operation of the machine, especially small children.
- To maintain proper stability, locate the machine on a flat surface that is solid, dry and clear of any other equipment. Engage the holding brake (if fitted), place wheel chocks as necessary and lower the jack if disconnected from the towing vehicle.
- Ensure that any individuals involved in the operation of the machine or in close proximity to the machine are equipped with the required personal protective equipment as outlined in **Section 4: Safety**, 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. Long hair and loose clothing must be secured and jewelry should be removed to avoid personal injury as a result of coming into contact with moving or rotating components.
- Ensure that tires are fastened securely and are inflated to the correct pressure as detailed in **Section 8: Specifications**.
- Check to ensure all lubrication and grease points have been properly lubricated. Reference **Section 7: Maintenance and Adjustments** for detailed lubrication procedures and the required lubrication frequency.
- Inspect the drive system to ensure the drive belts are in good condition and there are no obstructions lodged in the belts, pulleys or bearings. With reference to **Section 7: Maintenance and Adjustments**, check the pulley alignment and belt tension.
- Ensure the blower rotates freely by placing the flat of the hand only on the top surface of the drive belts and pushing to gently and slowly rotate the blower input shaft. Take extreme care to not place fingers or hands between the drive belts and the sheaves or pulleys. With reference to **Section 7: Maintenance and Adjustments**, check the oil level and condition in the reservoirs at both ends of the blower. Improper lubrication of the blower can lead to significant damage.
- Ensure the secondary AMS is free of any dust or foreign materials by opening the lower door and clearing out any materials. Ensure the secondary AMS door is securely shut and secured with a mechanical retainer before operation and at all times during operation to prevent significant damage to the blower.
- Inspect the muffler for any foreign material and ensure any materials have been removed with reference to **Section 7: Maintenance and Adjustments**. The internals of the muffler should be routinely inspected for foreign materials. Failure to remove any foreign material may result in a fire hazard.

- Inspect the hydraulic system to ensure the hydraulic reservoir is filled to the required level with reference to **Section 8: Specifications**. Inspect all fittings and couplings to ensure they are free of dirt and debris and clean if necessary. Ensure there are no pinched, kinked or otherwise obstructed hydraulic lines. Inspect the system for any leaks.
- Ensure the fuel tank is filled with clean, fresh, unleaded, premium gasoline.
- Check to ensure all guards are correctly positioned, closed and secured before operation to prevent any personal injury or damage. All guards must be closed and secured with the required fasteners or retainers before any operation.
- Proceed to the pre-operation checks as outlined in **Section 6: Operation** with reference to the additional break-in operational checks required as outlined below.

Break-In Inspections

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

After operating the Ultra-Vac for half an hour:

1. Clear the area of all bystanders, especially small children.
2. Place all controls in neutral, stop the engine, disconnect all electrical sources, remove the ignition keys and wait for all moving parts to stop.
3. Re-torque all wheel bolts to the required specifications.
4. Re-torque all fasteners and hardware of the Ultra-Vac to the required torque.
5. Check the alignment of the drive belt and adjust as required.
6. Rotate the drive belts by hand to ensure the blower turns freely.
7. Open and clean the secondary AMS door and tank.
8. Inspect the hydraulic and fuel systems and ensure no hoses are pinched, rubbing or crimped and adjust as required. Check for any leaks and repair before continuing.
9. Check the oil level of the blower reservoirs and add oil as required.
10. Check the level of the fuel tank and add fuel as required.
11. Lubricate all grease fittings.
12. Ensure all guards have been installed and secured before resuming operation.

After operating the Ultra-Vac for 5 hours:

1. Clear the area of all bystanders, especially small children.
2. Place all controls in neutral, stop the engine, disconnect all electrical sources, remove the ignition keys and wait for all moving parts to stop.
3. Re-torque all wheel bolts, fasteners and hardware.
4. Check the drive belt tension and adjust as required.
5. Inspect the hydraulic and fuel systems and ensure no hoses are pinched, rubbing or crimped and adjust as required. Check for any leaks and repair before continuing.
6. Rotate the drive belts by hand to ensure the blower turns freely.
7. Open and clean the secondary AMS door and tank.
8. Check the oil level of the blower reservoirs and add oil as required.
9. Check the level of the fuel tank and add fuel as required.
10. Ensure all guards have been installed and secured before resuming operation.

After operating the Ultra-Vac for 10 hours:

1. Clear the area of all bystanders, especially small children.
2. Place all controls in neutral, stop the engine, disconnect all electrical sources, remove the ignition keys and wait for all moving parts to stop.
3. Re-torque all wheel bolts, fasteners and hardware.
4. Check the drive belt tension and adjust as required.
5. Inspect the hydraulic and fuel systems and ensure no hoses are pinched, rubbing or crimped and adjust as required. Check for any leaks and repair before continuing.
6. Rotate the drive belts by hand to ensure the blower turns freely.
7. Open and clean the secondary AMS door and tank.
8. Check the oil level of the blower reservoirs and add oil as required.
9. Check the level of the fuel tank and add fuel as required.
10. Ensure all guards have been installed and secured before resuming operation.
11. Resume the normal recommended maintenance schedule as specified in **Section 7: Maintenance and Adjustments**.

TRANSPORTATION

The Ultra-Vac has been designed for easy, safe and convenient transport between working locations. Refer to **Section 4: Safety** for specific transportation safety requirements.

To prepare the Ultra-Vac for transport, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Ensure the Ultra-Vac is properly connected to the tractor/towing machinery. Reference **Section 6: Operation** for hitching instructions. Check to ensure the retainer is installed in the ball coupler, the hitch ball is secured to the towing vehicle with a pin and retainer, the safety chains and breakaway switch are connected to the Ultra-Vac and towing vehicle, and the electrical connection is secure.

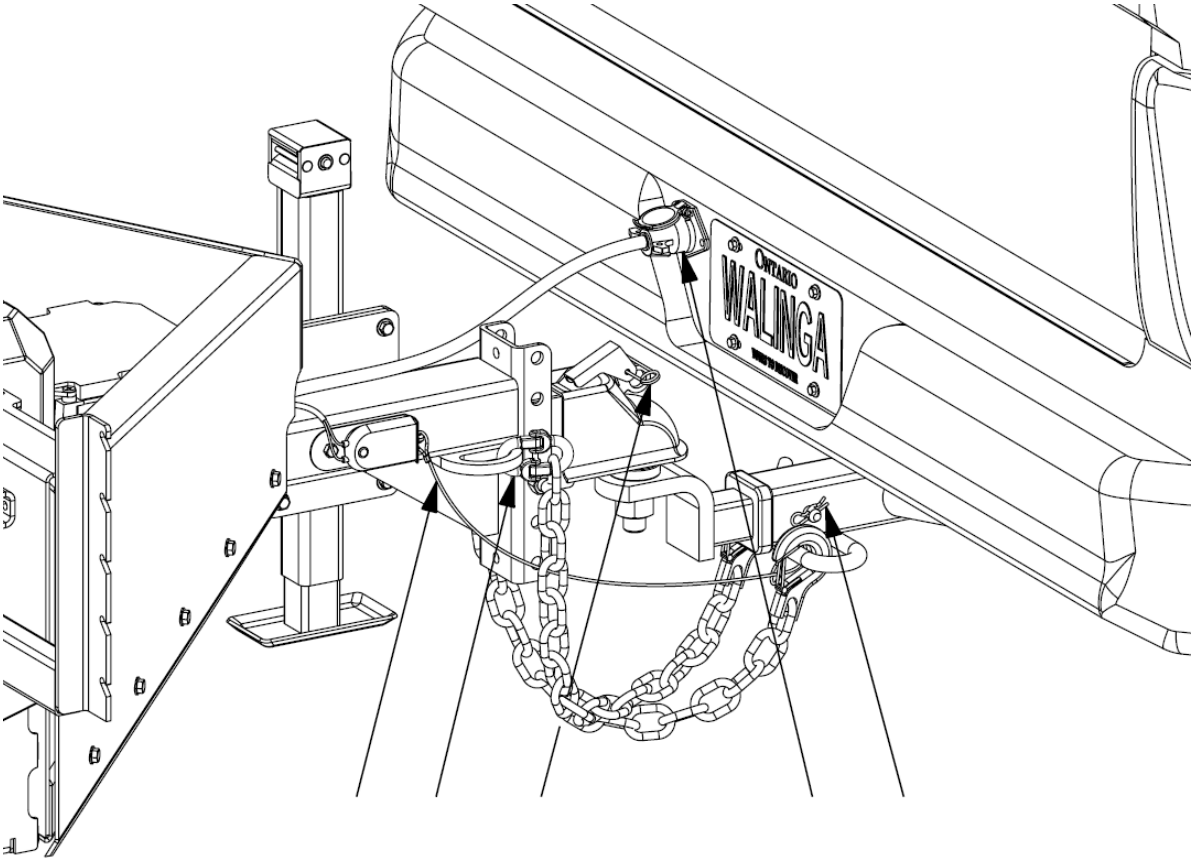


Figure 5-8: Required attachments to towing vehicle

3. Secure the boom in the transport position as follows:
    a. Ensure the area around the Ultra-Vac is clear of any overhead obstructions or electrical lines. Be aware that electrocution can occur without direct contact.
    b. Follow the operational procedures in **Section 6: Operation** to ensure the engine is running to operate the hydraulic pump and controls.

c. Ensure the boom lift ball valve is in the open position.

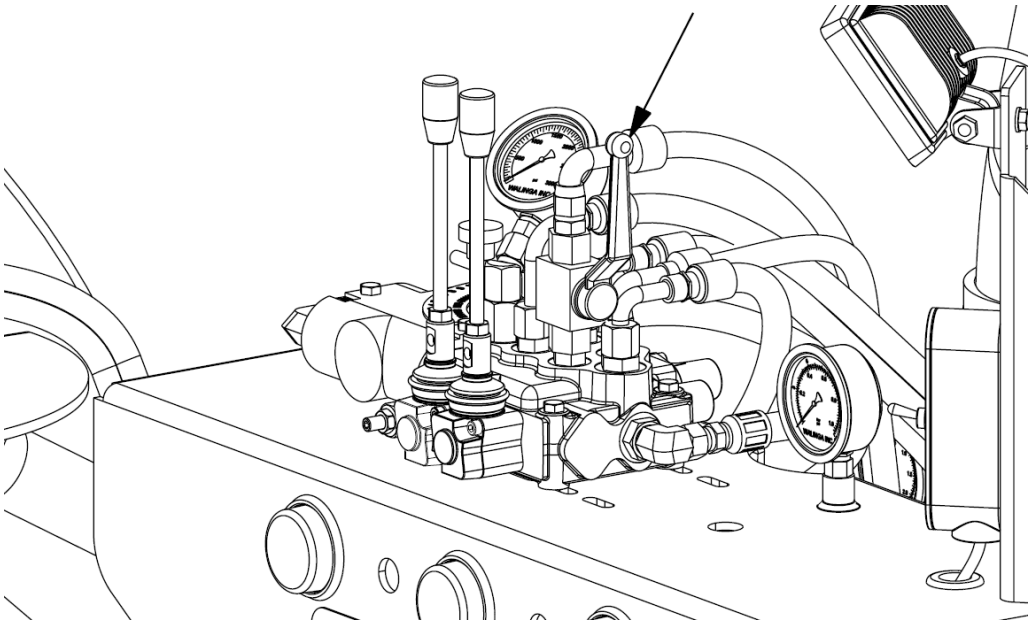


Figure 5-9: Boom lift ball valve open position

d. Using the boom lift hydraulic control, lower the boom from the working position.

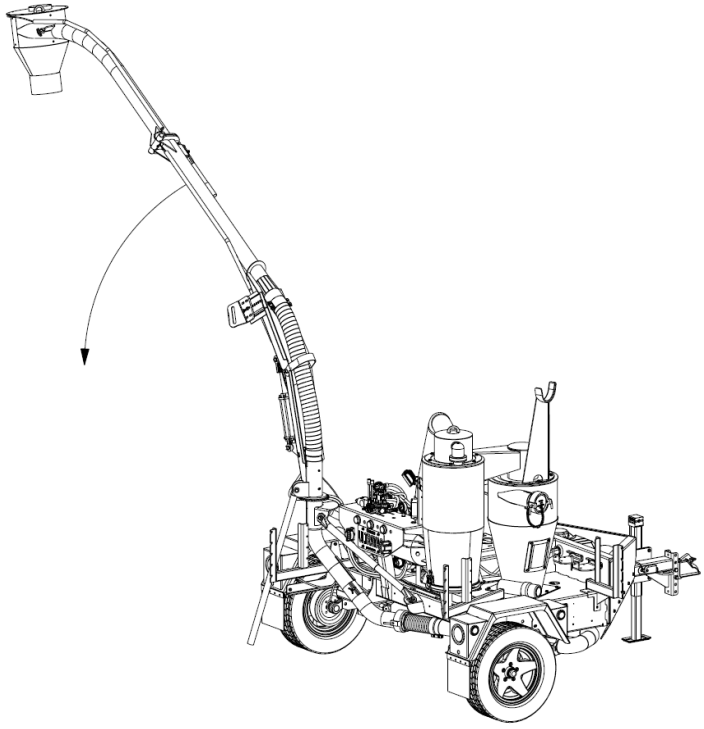


Figure 5-10: Boom lowering

e. Remove the security pin in the latch handle and release the latch eye from the hook at the boom extension joint.

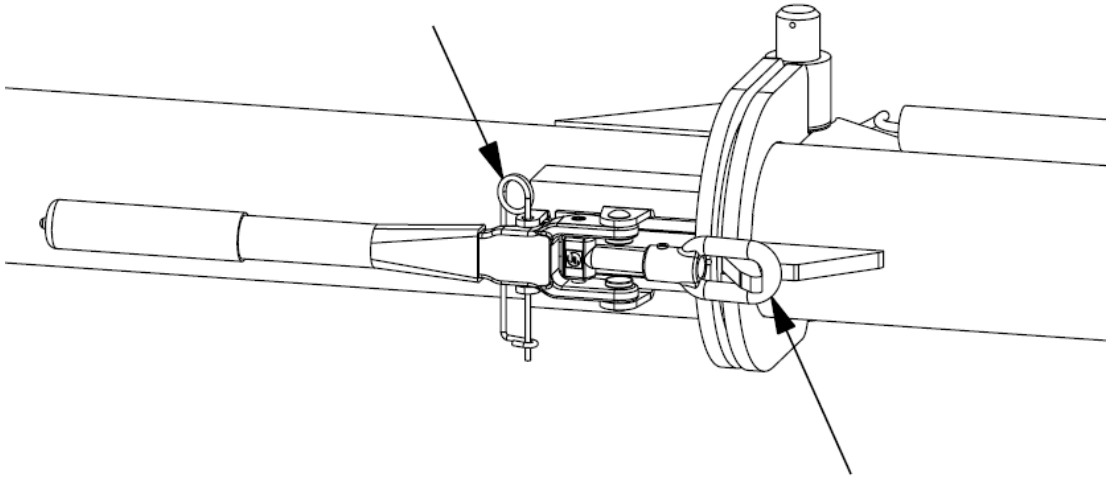


Figure 5-11: Split boom joint

f. Fold the extension to the transport position, aligning the boom latch plates, and secure the extension to the main boom using the attached lynch pin. If necessary, the position of the latch plate may be adjusted to accommodate the positioning of the extension.

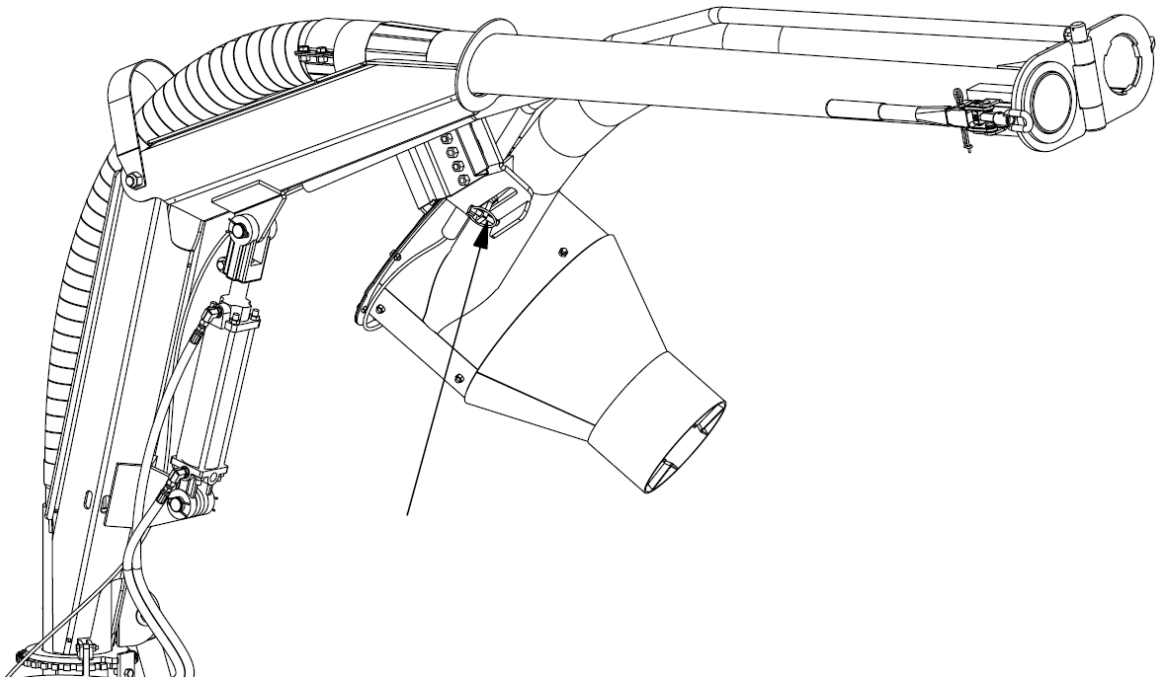


Figure 5-12: Boom extension transport position

g. Secure the split boom security latch.

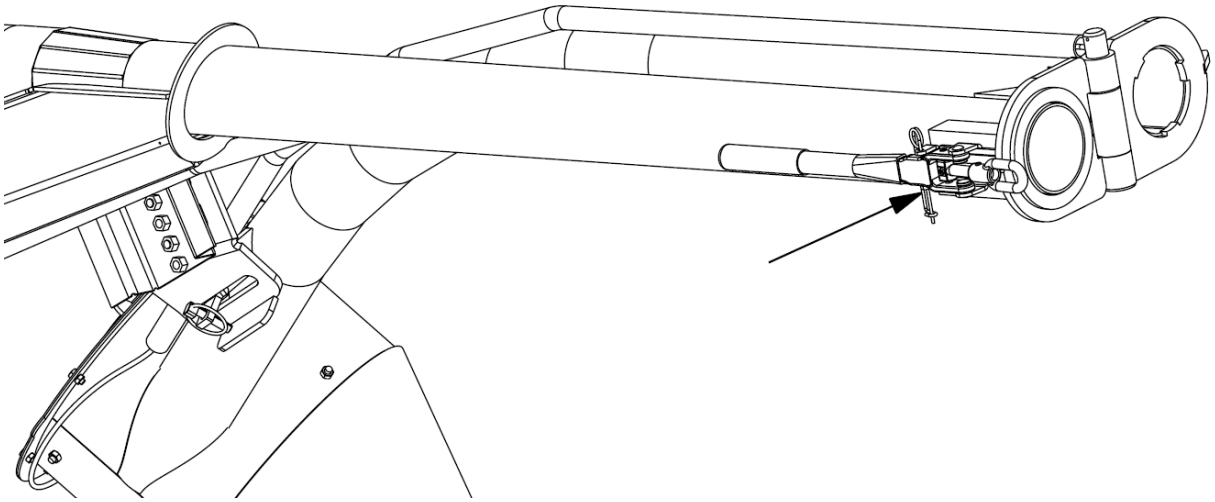


Figure 5-13: Boom security latch

h. Raise and disengage the boom rotation locking tab

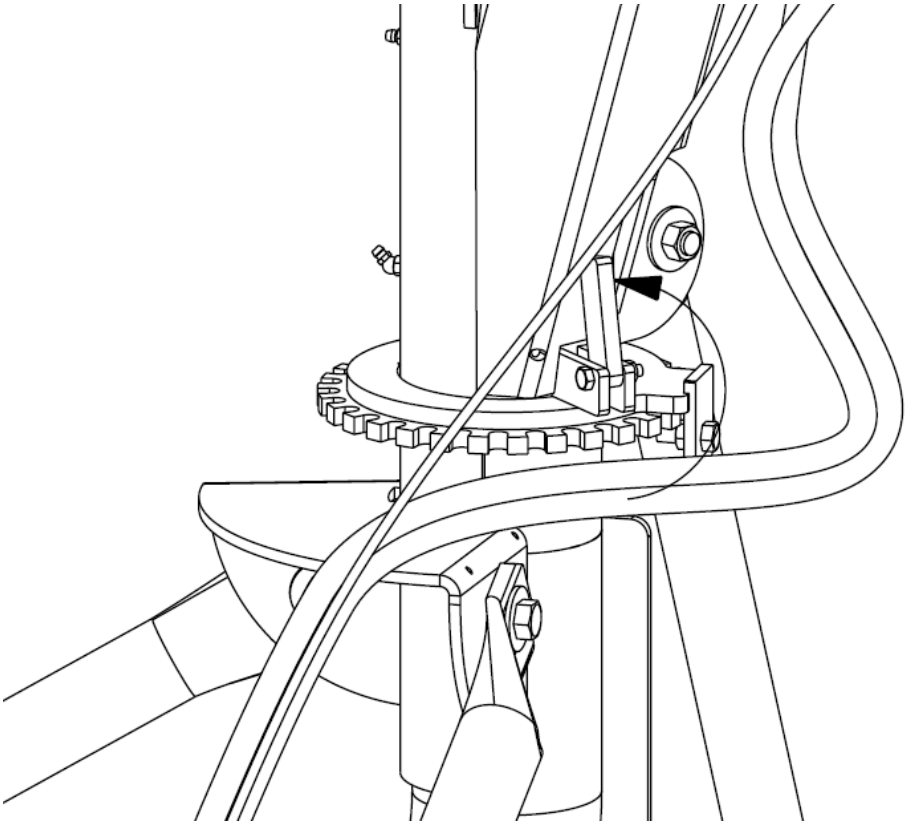


Figure 5-14: Disengaged rotation locking tab

i. Rotate the boom from the working position to the transport position so the boom is aligned with the boom saddle on the primary AMS by using the rotation arm. Use care to ensure no hydraulic or electrical lines become entangled or pinched.

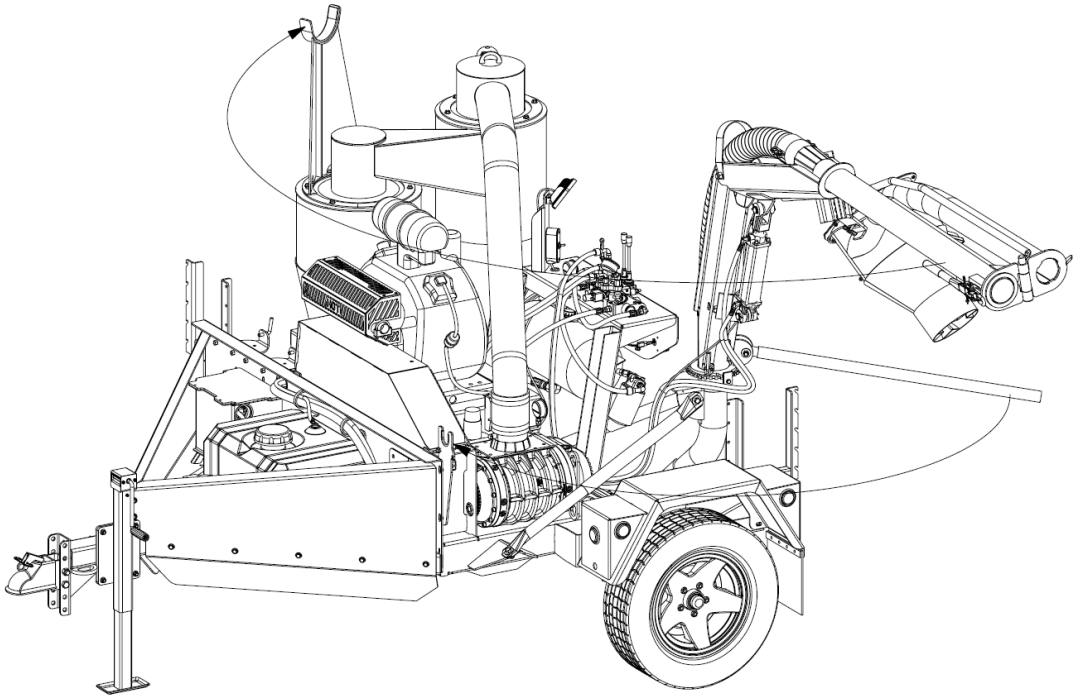


Figure 5-15: Boom rotation

j. Lower and engage the boom rotation locking tab.

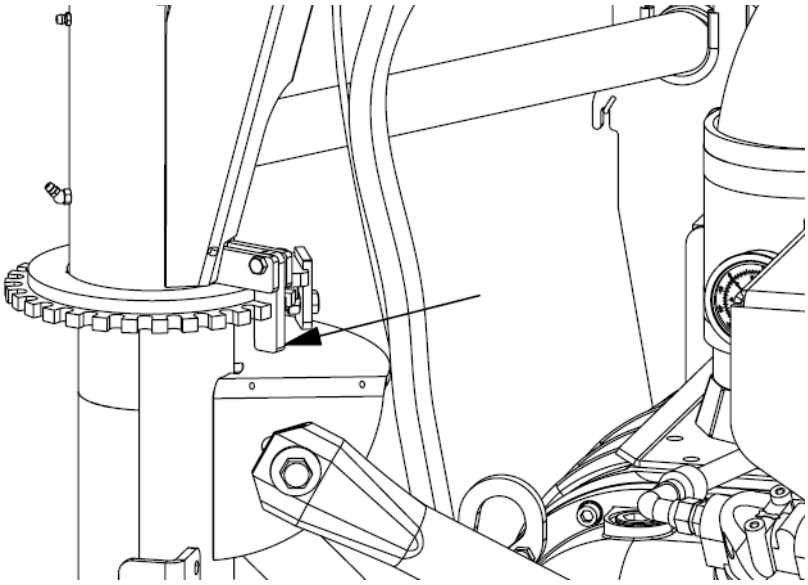


Figure 5-16: Engaged rotation locking tab

k. Secure the boom rotation arm in the holder with the attached strap.

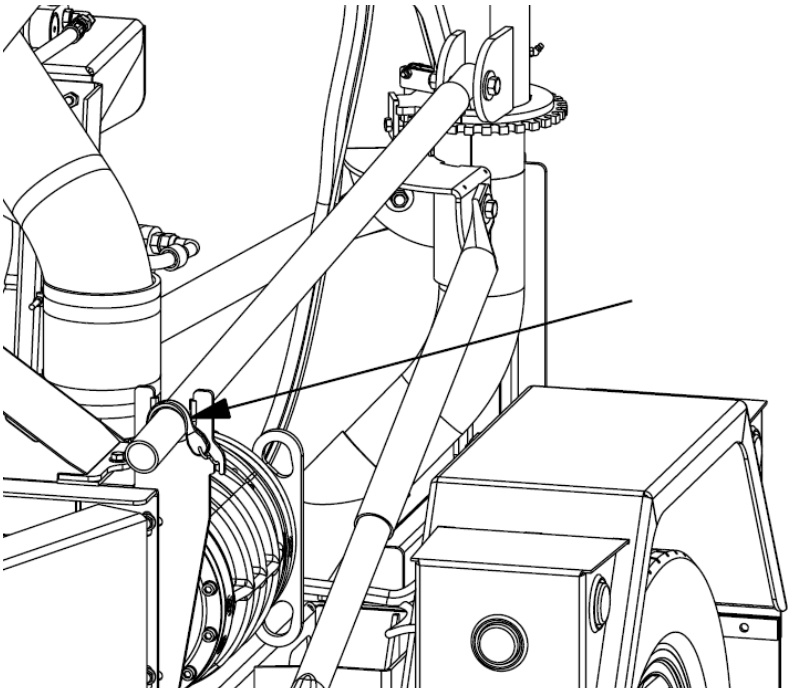


Figure 5-17: Boom rotation arm strap

l. Ensure the saddle and boom are aligned and lower the boom until it is resting securely in the saddle.

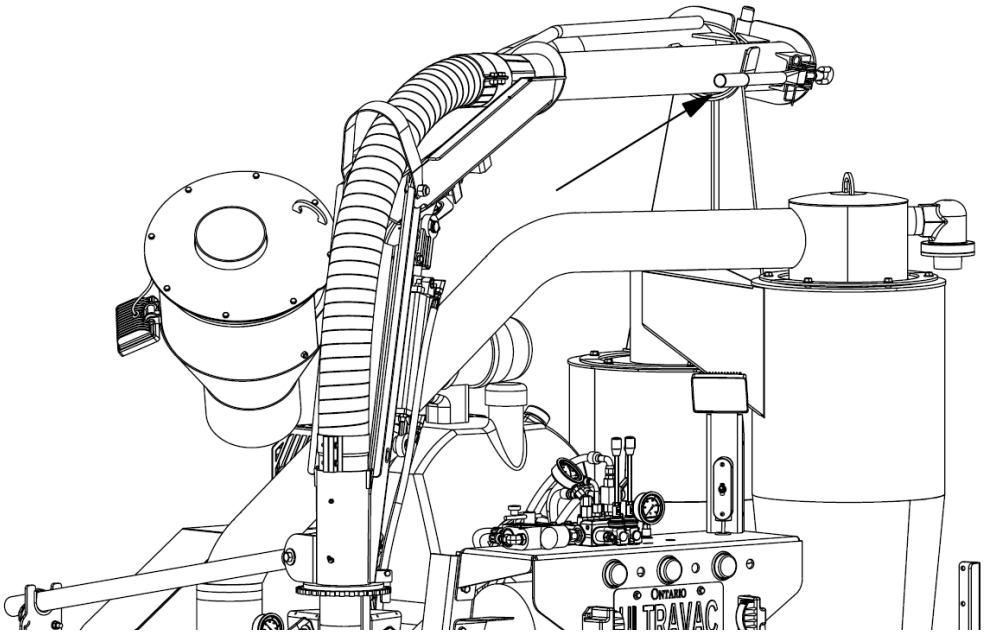


Figure 5-18: Boom transport position

4. Secure the secondary AMS door in the transport position as follows:
    a. Ensure the secondary AMS and rubber p-extrusion seal are clear of any dirt and debris and firmly shut the door against the seal.

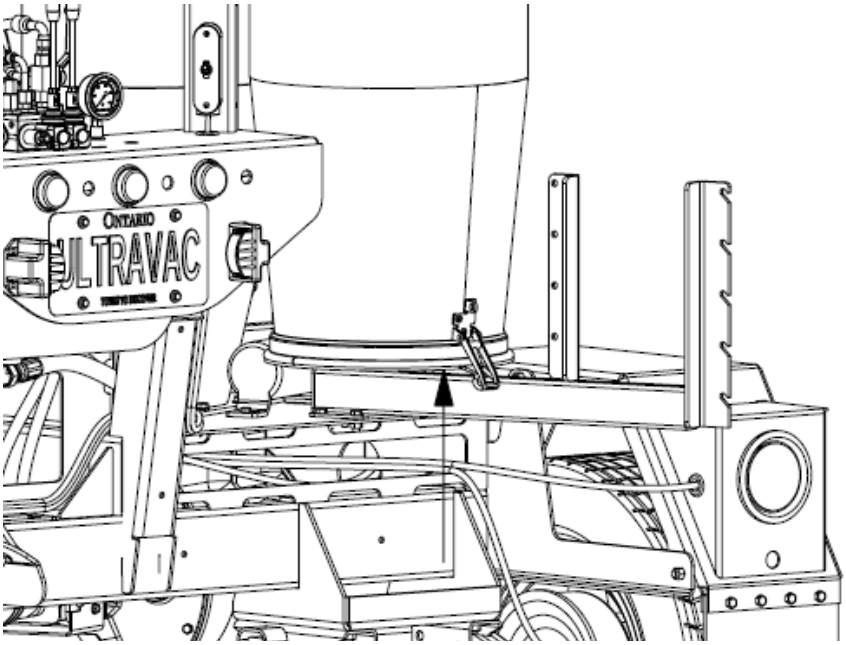


Figure 5-19: Secondary AMS door

    b. Secure the door in the transport position by fastening the latch over the tab of the door, raising the drawbar and insert a locking pin or other mechanical retainer to secure it in place.

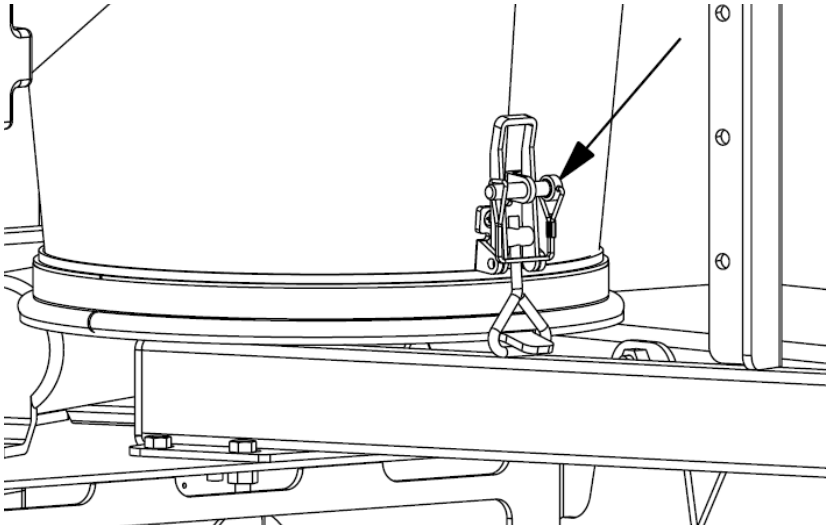


Figure 5-20: Securing secondary AMS door in transport position

5. Secure the plug in the primary AMS inlet as follows:
    a. Loosen the tail bolt of the primary AMS inlet and remove any intake hose or tubing attached.

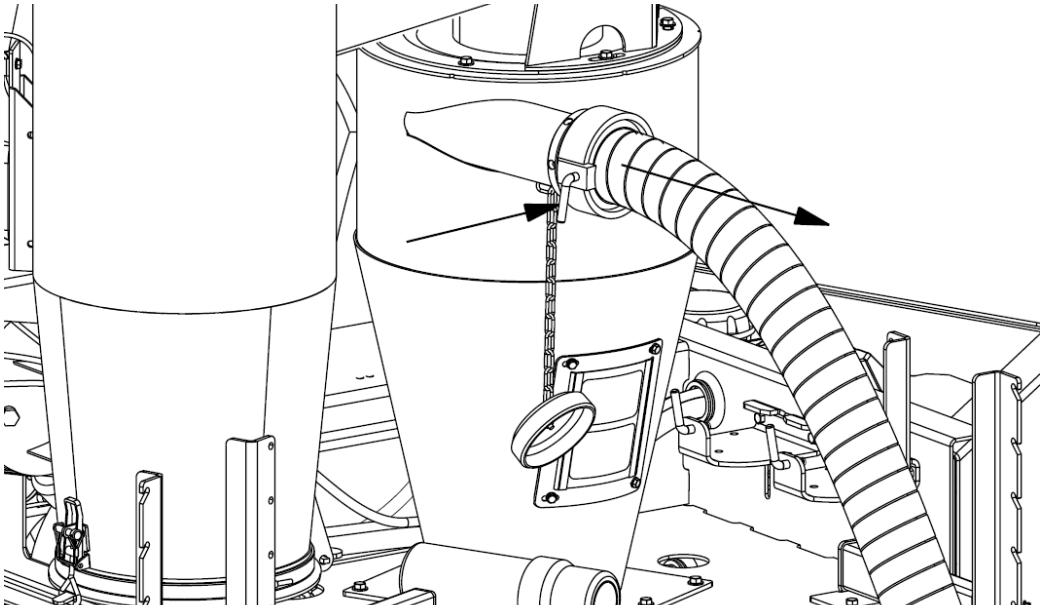


Figure 5-21: Intake line disconnection

    b. Ensure the inlet is clear of any dirt or debris.
    c. Insert the attached plug into the primary AMS inlet. Secure the plug by tightening the tail bolts.

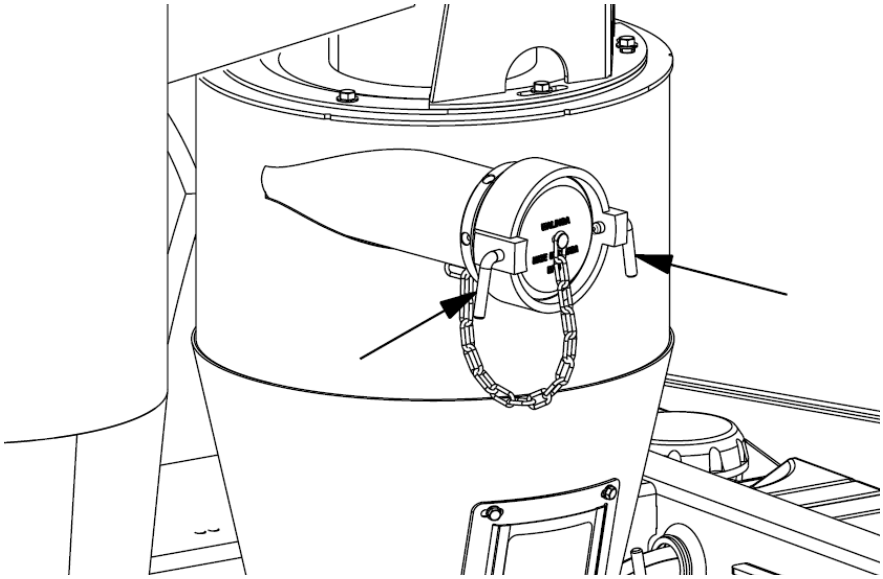


Figure 5-22: Primary AMS inlet plug insertion

6. Secure all nozzles and adapters in the transport position as follows:
    a. Prepare the individual components for transportation by tightening all tail bolts and wingnuts of the couplers. For sweep nozzles, the pin of the handle brace may be removed and moved to the appropriate hole to angle the handle as necessary.

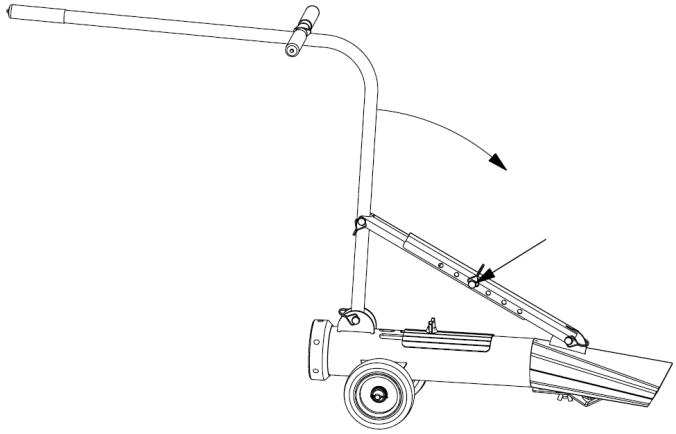


Figure 5-23: Sweep nozzle handle modification

    b. Place intake nozzles and adapters in the provided storage brackets on the unit. Note that the size of the brackets matches the size of the coupling at the base of each attachment.

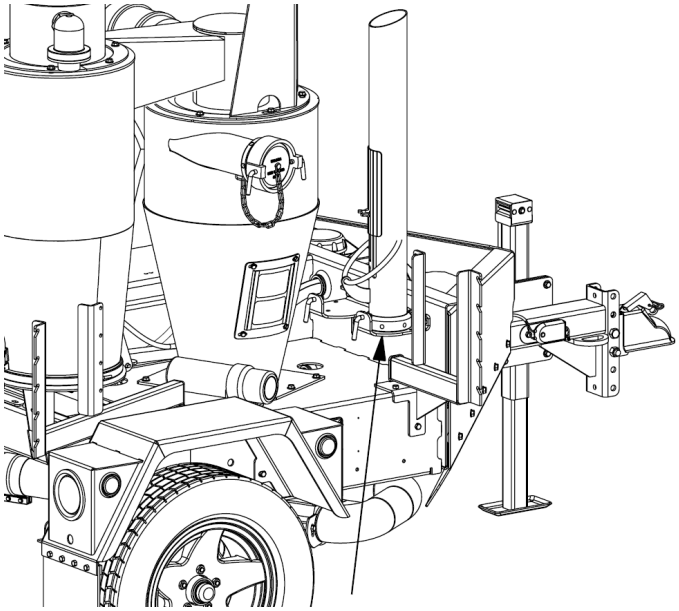


Figure 5-24: Nozzle and adapter placement

    c. Secure all attachments by tightening the tail bolts on the brackets.

7. Secure all intake lines in the transport position as follows:
    a. Lay all intake hoses and lines in the hose carrier brackets.

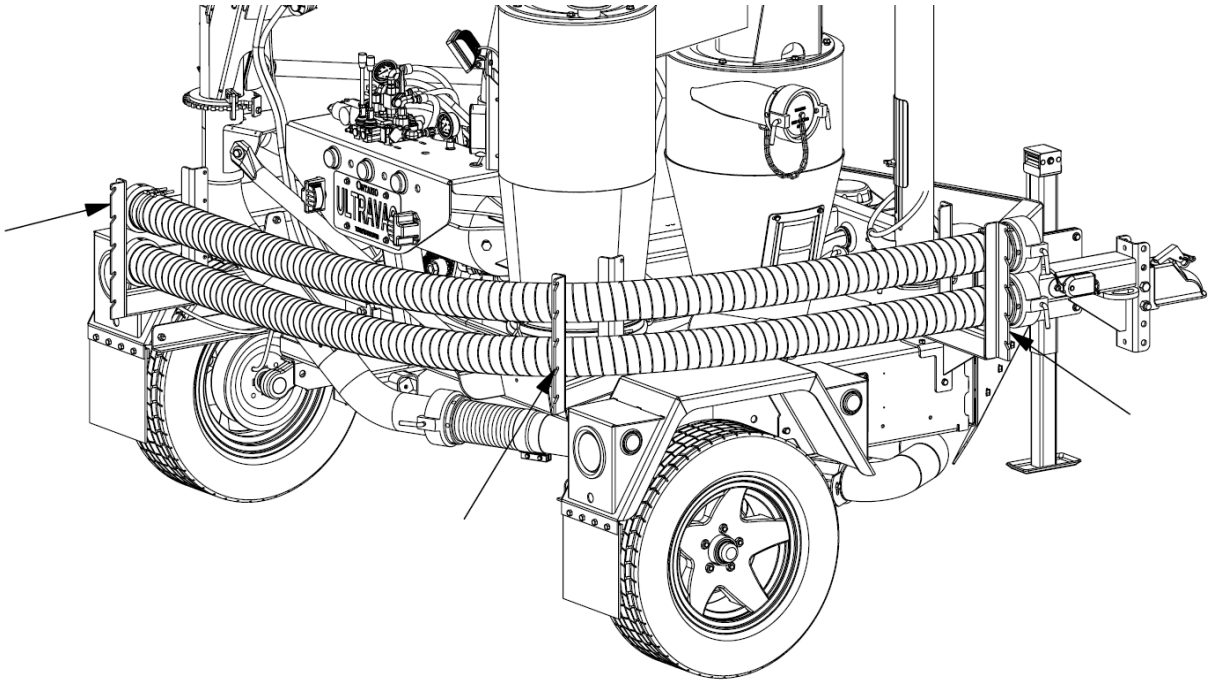


Figure 5-25: Intake hose positioning

    b. Secure the lines with the provided straps.

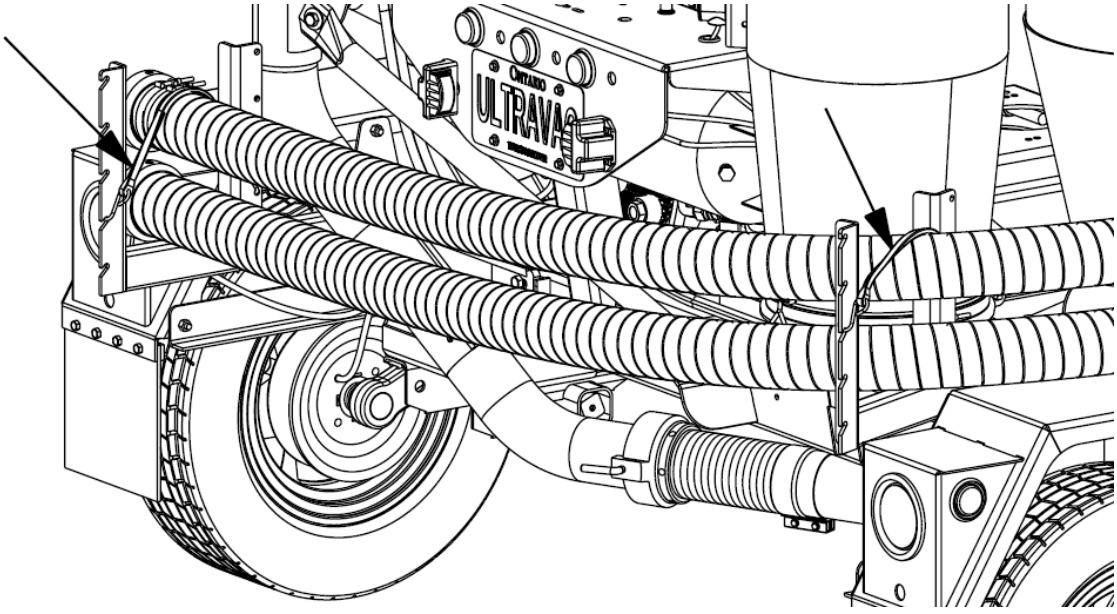


Figure 5-26: Hose carrier bracket straps

8. Secure the jack in the transport position as follows:
    a. With the Ultra-Vac securely attached to the towing vehicle, completely raise the foot of the jack to achieve maximum ground clearance to prevent contact during transport.

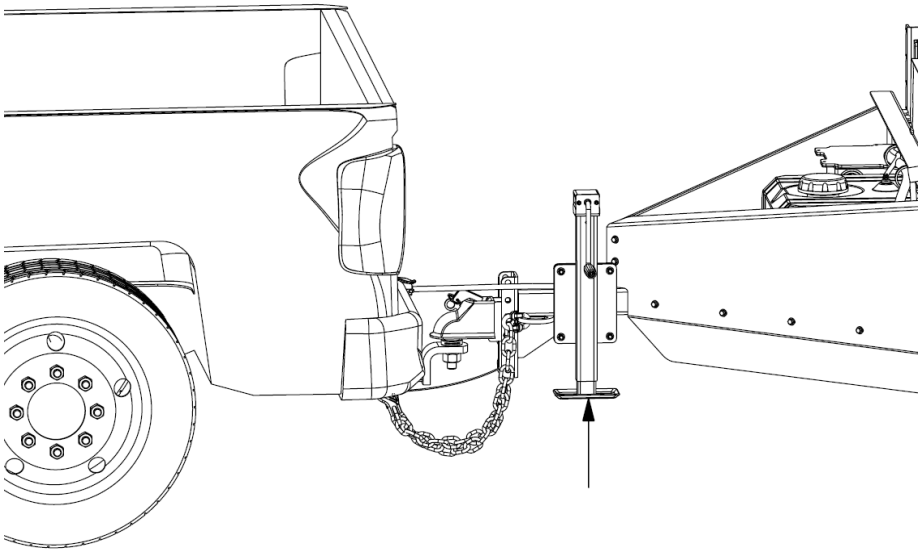


Figure 5-27: Raising the jack foot

9. Ensure the hydraulic system is prepared for transport as follows:
    a. Place all hydraulic controls in the neutral position. The boom lift control and airlock direction control should be in the center position. The flow divider for the airlock speed can remain at the operational position.

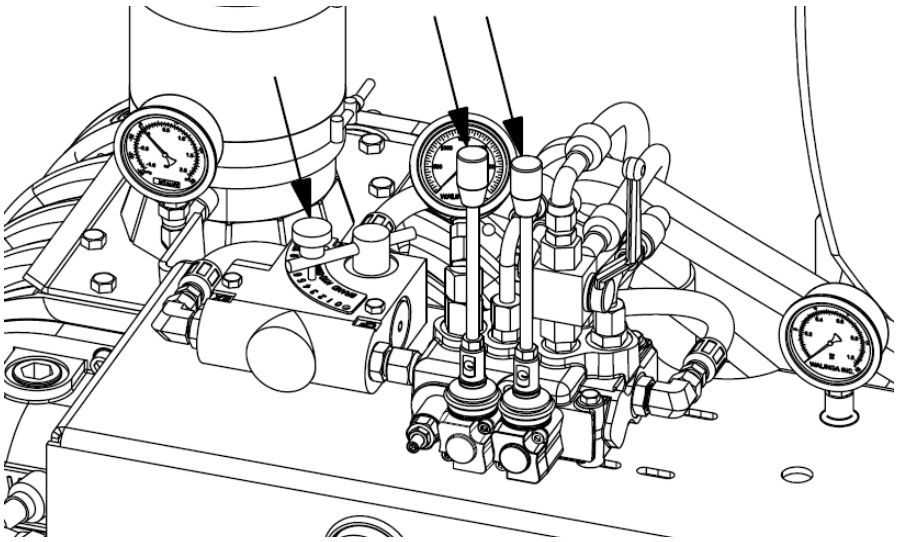


Figure 5-28: Hydraulic control positions

10. Ensure the ignition key is removed from the engine.
11. Ensure your Ultra-Vac is in compliance with all local regulations regarding transporting agricultural equipment on public roads and highways.
    - Use ANSI/ASAE S279.17 July 2013 as a minimum standard for lighting and marking of agricultural equipment on highways whether towing the Ultra-Vac during the day or night.
    - While in the transport position, if the Ultra-Vac obstructs any lights or reflectors on the towing vehicle, the lights or reflectors that are obstructed must be installed on the Ultra-Vac with reference to the ANSI/ASAE S279.17 July 2013 standard.
    - Be aware that your local regulations may require or disallow certain lamps, such as beacons, and/or operating modes, such as flashing red lamps. Any such regulations take precedence in their area of jurisdiction over the requirements of ANSI/ASAE S279.17 July 2013.
12. Check the condition of the required transport safety features installed on the Ultra-Vac such as lights and reflectors, and ensure that all features are in place, clean and are clearly visible to all overtaking and oncoming traffic. While connected to the towing vehicle, perform a check of all lights, including tail, brake, turn signal, clearance, and license plate lights, to ensure they illuminate as required.

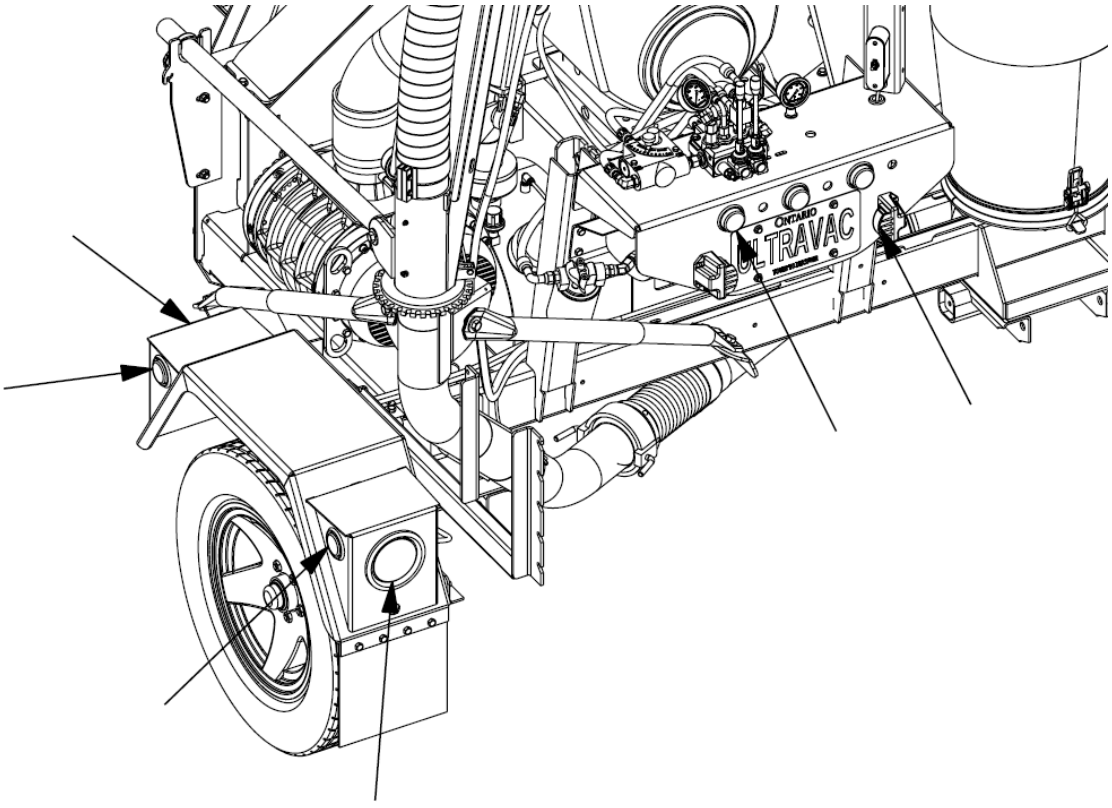


Figure 5-29: Ultra-Vac transport safety features

13. During transport, remain aware of potential overhead obstructions and maintain a safe distance for clearance. Be aware that electrocution can occur from overhead power lines without direct contact.
14. Do not allow any individuals to ride on the Ultra-Vac or tractor during transport.
15. Ensure the towing capacity of the towing vehicle is greater than the total weight of the fully equipped and loaded Ultra-Vac. Do not attempt to tow the Ultra-Vac if the weight exceeds the towing capacity of the vehicle.
16. Always drive according to road and weather conditions. Do not put your safety or the safety of others at risk.

To prepare the Ultra-Vac for use after transportation, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Check the Ultra-Vac for any damage that may have occurred during transport, paying careful attention for any loose components or damage to any hydraulic or fuel lines or fittings. Repair or replace any loose or damaged components as necessary.
3. Check for any accumulation of dirt or debris and clean or clear as necessary.
4. Refer to **Section 6: Operation** and proceed with normal operating procedures.

STORAGE

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 Ultra-Vac for storage, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Thoroughly inspect the Ultra-Vac 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 at the beginning of the next season.
3. Inspect all the fuel and hydraulic hoses, fittings, lines, couplers, and valves. Tighten any loose fittings and replace any damaged components. Replace any hose that has been cut, nicked, abraded, or shows signs of separation at the crimped end of the fitting.

4. Empty and clean out the secondary AMS with reference to **Section 7: Maintenance and Adjustments**.

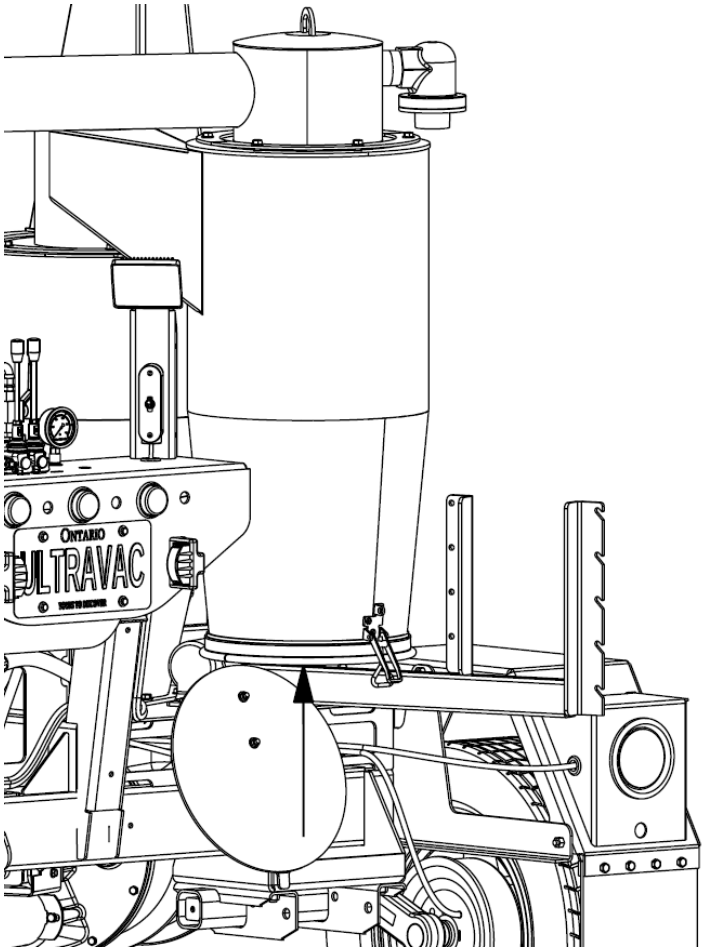


Figure 5-30: Secondary AMS preparation

5. Wash the entire machine thoroughly using a water hose or pressure washer to remove all dirt, dust, debris, and residue. The internal surfaces of the Ultra-Vac can be cleaned through flushing. To flush the internal surfaces, proceed as follows:
    a. Position the boom to allow free discharge of water.
    b. Run the system, including the blower, at a high idle speed with the airlock rotating.
    c. Suck clean water into the machine through an inlet port on the primary AMS or through a suction hose for several minutes, allowing time for the water to wash out the primary AMS interior, the rotating airlock blades, and the discharge area.
    d. Stop the water flow into the machine and continue to run the Ultra-Vac for several minutes to allow all interior surfaces to completely dry.

e. When conveying materials with oily characteristics or high moisture content, including milled feeds, the Ultra-Vac 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. 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.

6. Retract and secure all accessories and components of the Ultra-Vac into their transport position. Reference the above *Transportation* section for specific procedures.
7. 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 residue from washing.
8. With reference to **Section 7: Maintenance and Adjustments**, check the oil level of the blower reservoirs and adjust the oil levels as necessary.
9. Install the plug into the primary AMS inlet and secure in place by tightening the tail bolts.

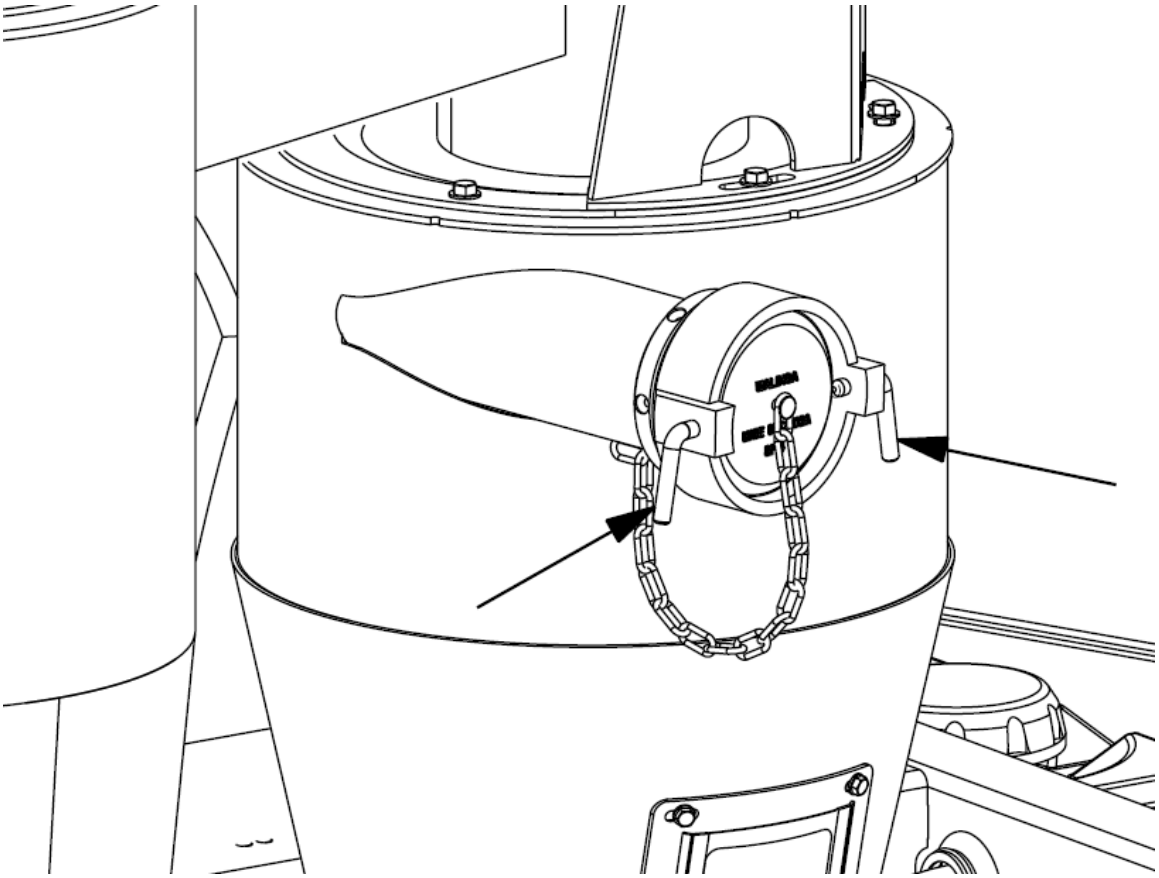


Figure 5-31: Primary AMS inlet plug installation

10. Inspect the interior of the primary AMS to ensure it is empty.

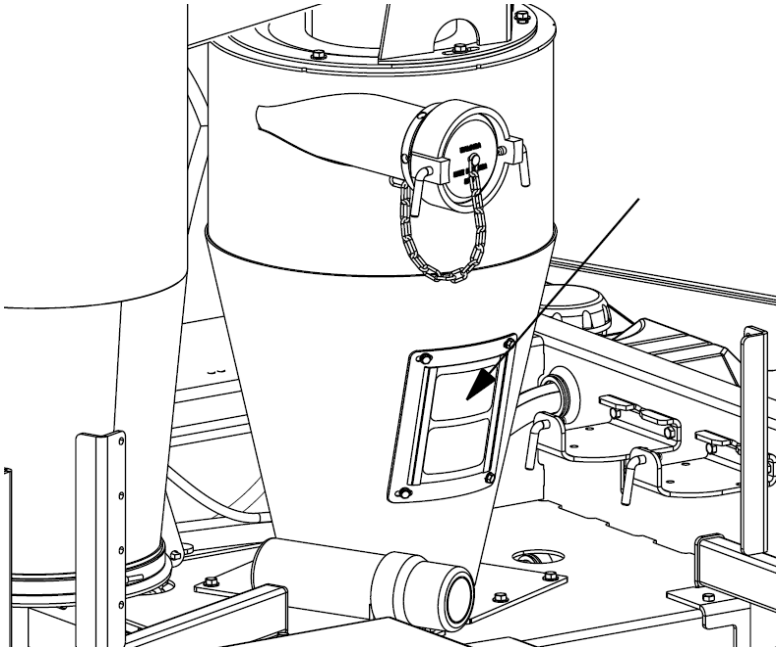


Figure 5-32: Primary AMS inspection

11. Apply never seize to the boom cylinder rod.

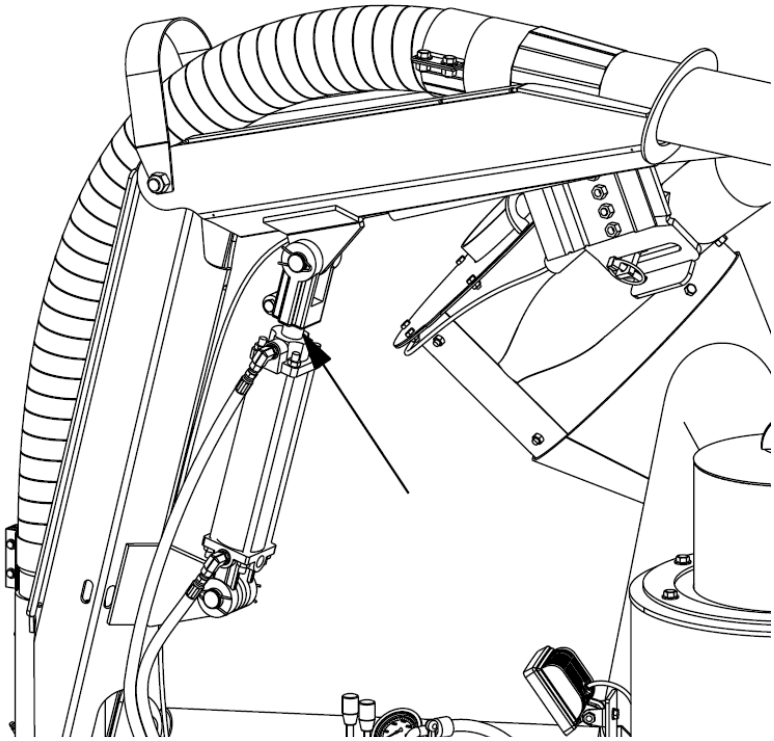


Figure 5-33: Boom cylinder rod

12. If the Ultra-Vac is to be stored for longer than two months, prepare the engine as follows:
    a. Add a fuel treatment to the fuel tank and run the engine for approximately three minutes to allow the stabilized fuel to disperse through the entire system.

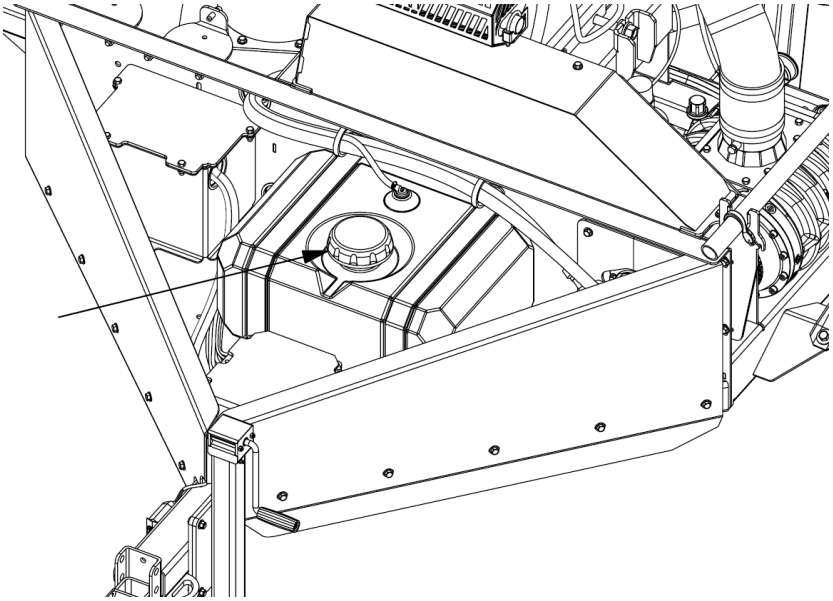


Figure 5-34: Fuel tank access

    b. Change the oil while the engine is still warm from operation.

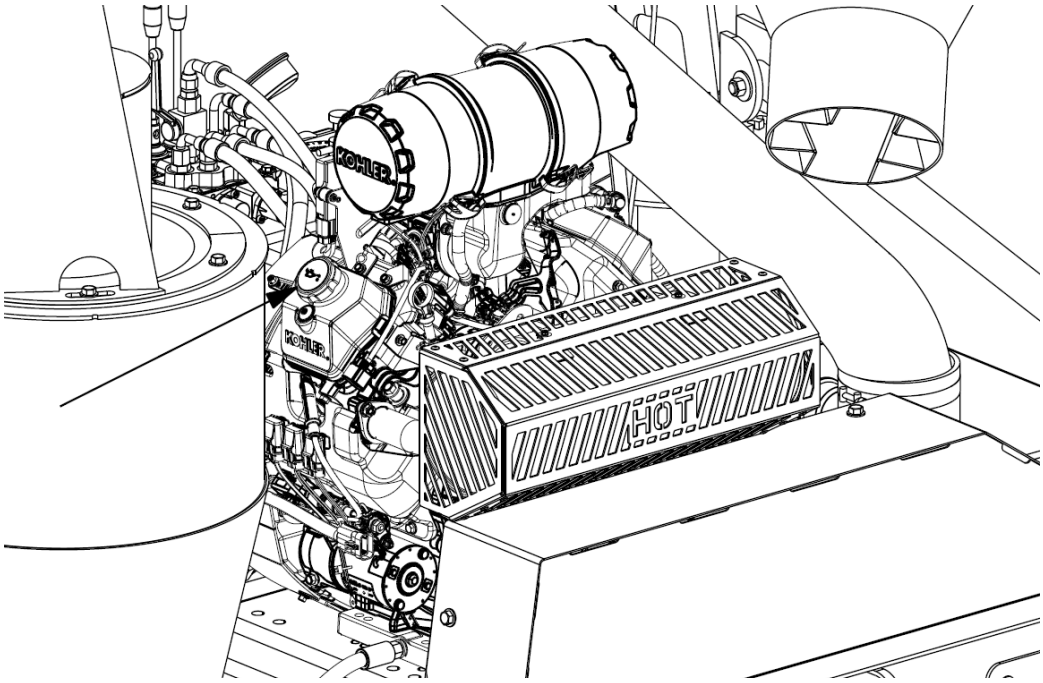


Figure 5-35: Engine oil cap

c. Remove the two spark plugs and pour approximately 1 oz (30 mL) of engine oil into the cylinders. Reinstall the spark plugs and crank the engine slowly to distribute the oil.

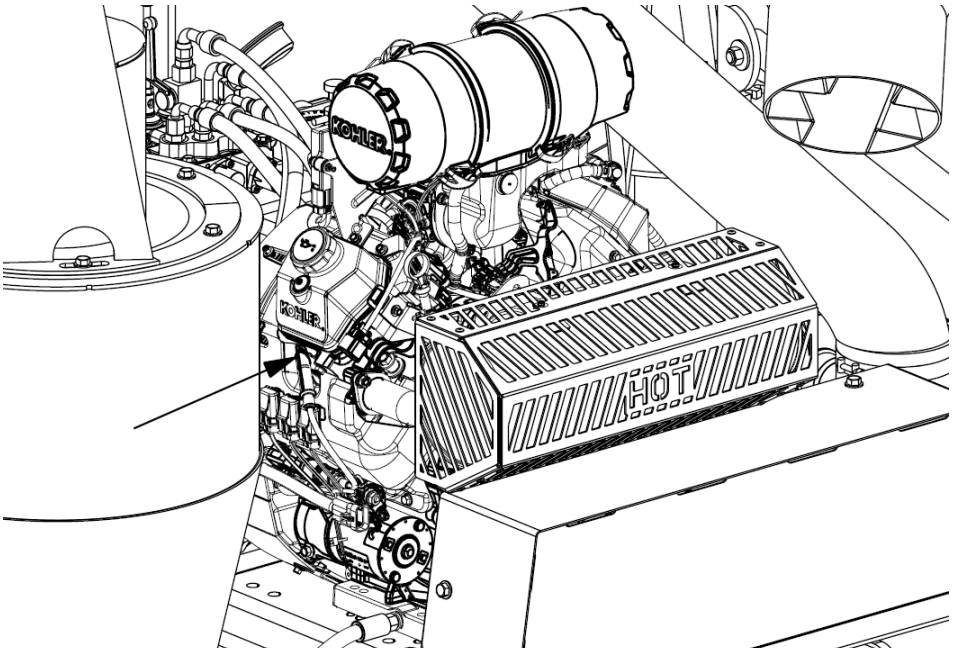


Figure 5-36: Engine spark plug

d. Remove the ignition keys.

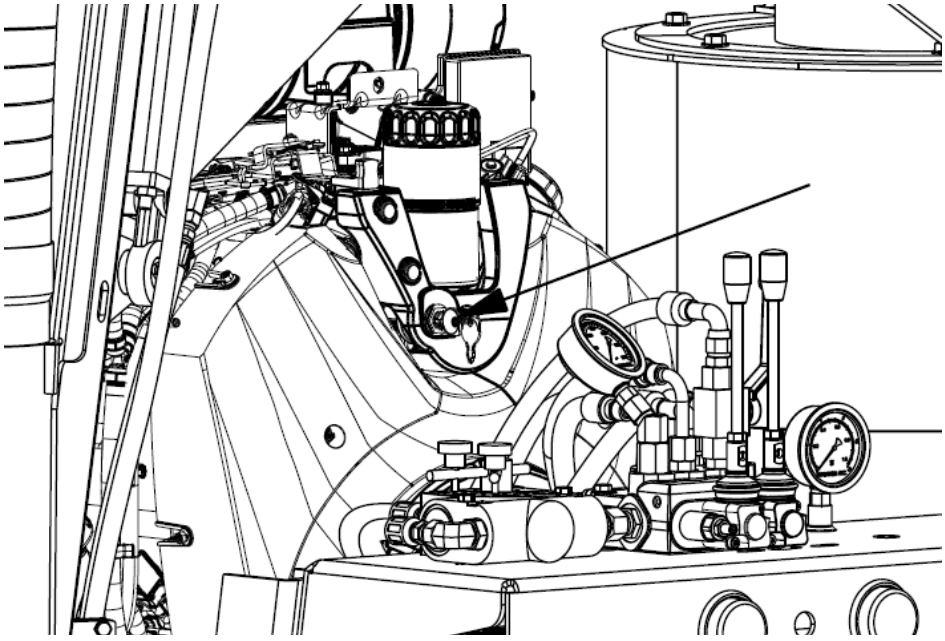


Figure 5-37: Engine ignition key

e. Disconnect the negative (—) engine battery cable.

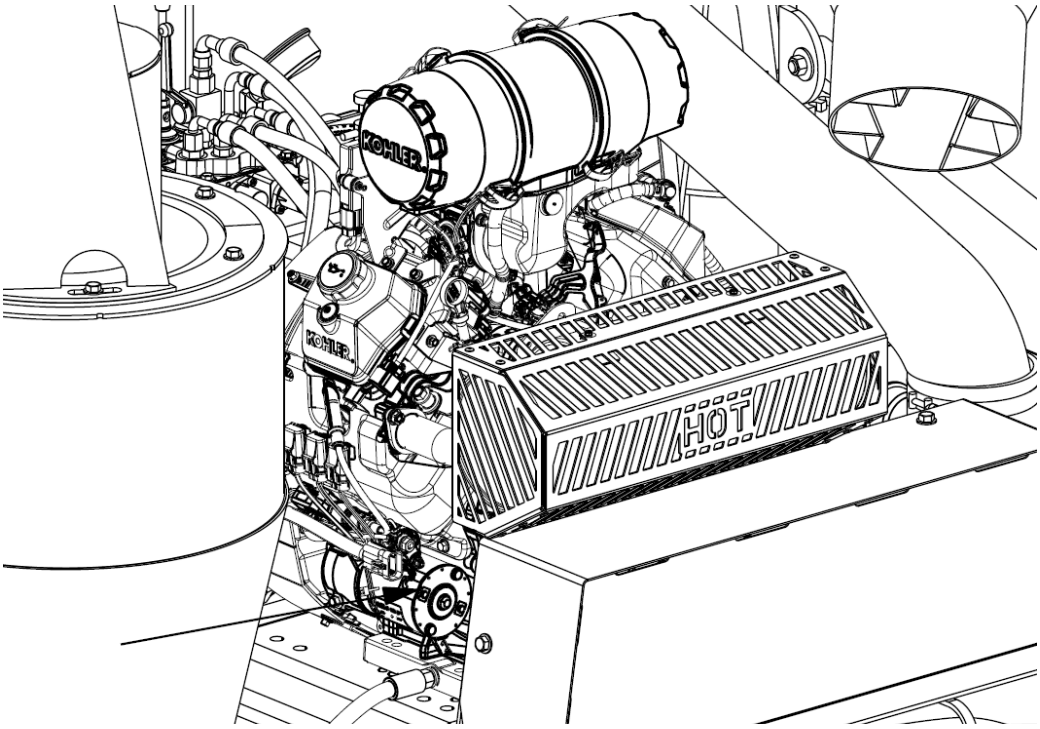


Figure 5-38: Engine starter and battery assembly

13. Disconnect the negative (—) unit battery cable.

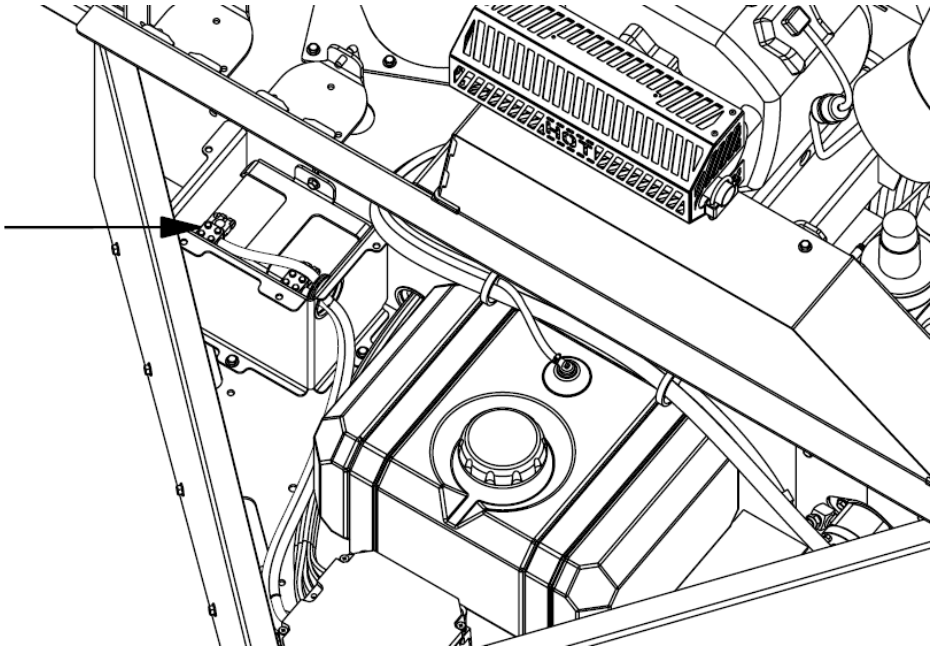


Figure 5-39: Unit negative battery cable

14. Touch up all paint nicks and scratches to prevent rusting.
15. Store all hoses inside or under a shelter in a dry and secure area.
16. Move the Ultra-Vac to its storage position. The storage position should be chosen as a location that is dry, level and free of debris, and does not have frequent human activity in the vicinity.
17. Secure the Ultra-Vac in place with wheel chocks if necessary.
18. Support the hitch jack with an additional footing support if required, especially on softer surfaces.
19. Unhook the machine from the towing vehicle with reference to **Section 6: Operation**.

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.

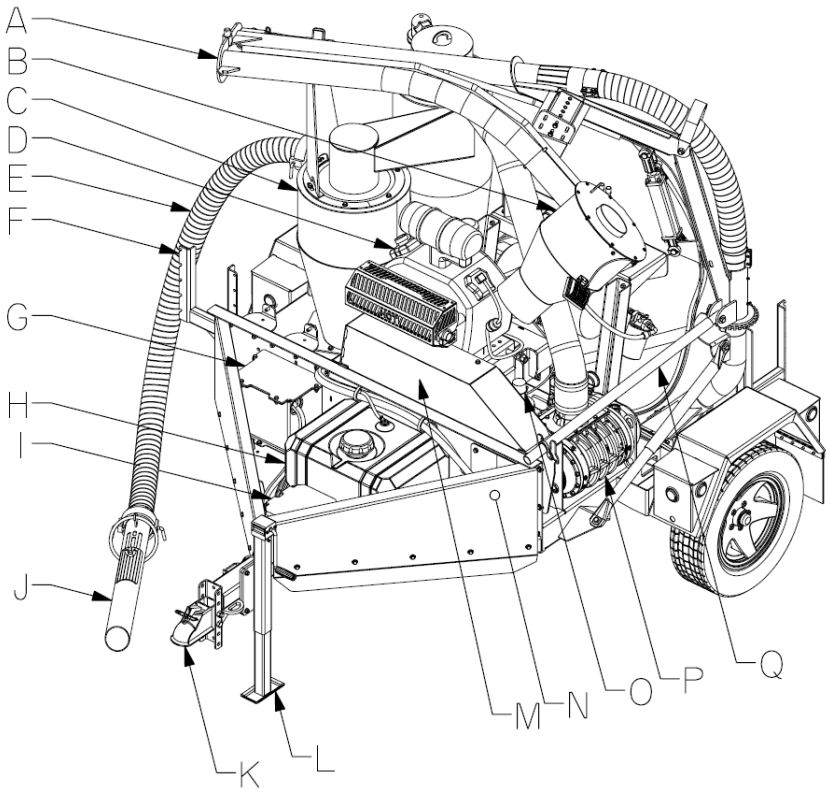
PAGE INTENTIONALLY LEFT BLANK

WALINGA® INC.

Operation

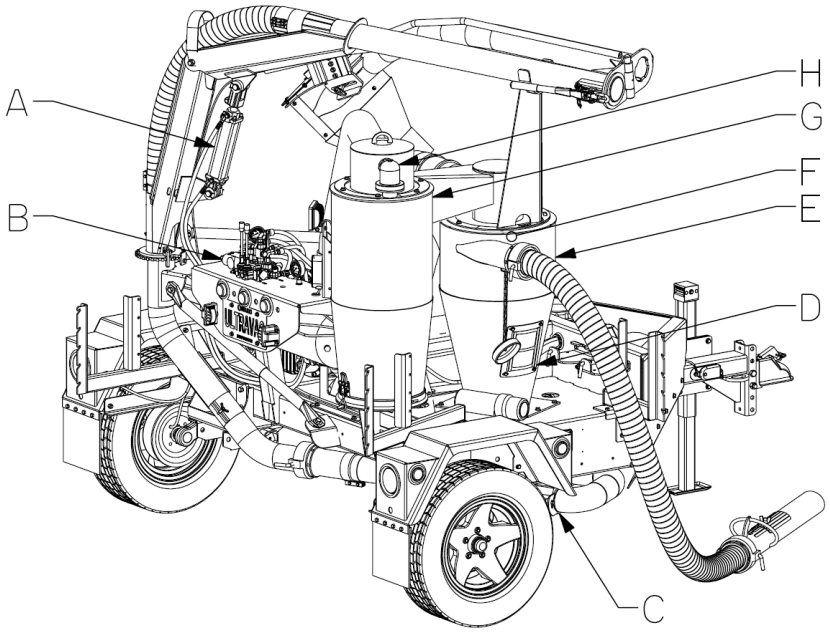
ULTRA-VAC MODEL 4510G

MACHINE FEATURES AND COMPONENTS



A Boom
B Discharge Cyclone
C Primary AMS
D Engine
E Intake Line
F Hose Carrier
G Battery Enclosure
H Fuel Tank
I Electrical Enclosure
J Intake Nozzle
K Ball Coupler
L Jack
M Belt Drive
N Hydraulic Pump
O Pressure Protection Valve
P Blower
Q Boom Rotation Arm

Figure 6-1: Ultra-Vac key components (front)



A Boom Lift Cylinder
B Hydraulic Controls
C Airlock
D AMS Window
E Primary AMS
F Safety Choke
G Secondary AMS
H Vacuum Relief Valve

Figure 6-2: Ultra-Vac key components (rear)

CONTROLS AND DISPLAYS

***Function*:** The speed of the airlock is controlled by the flow divider. The speed is set by moving the knob along the arc path.

***Range*:** The flow divider allows the speed to be set from no rotation at the 0 position to maximum rotation at the 10 position.

Location: The speed control is mounted to the control table at the rear of the unit.

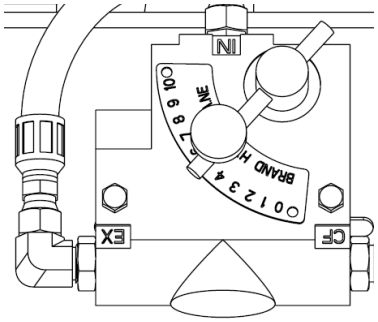


Figure 6-3: Airlock speed control

***Function*:** The left lever of the hydraulic control bank controls the direction of the airlock motor.

***Range*:** The lever is spring-loaded to return to the neutral center position with a detent in position two. When the lever is pushed towards the front of the unit, the airlock motor is set to the reverse direction. When the lever is in the center it is in the neutral position and will stop the airlock motor. When the lever is pulled towards the rear of the unit (position two), the airlock motor is set to the normal operational direction, this position has a detent and does not need to be held in place to run the airlock, push the lever back the the center position to stop the airlock.

Location: The lever is fixed to the control bank mounted on the control table at the rear of the unit.

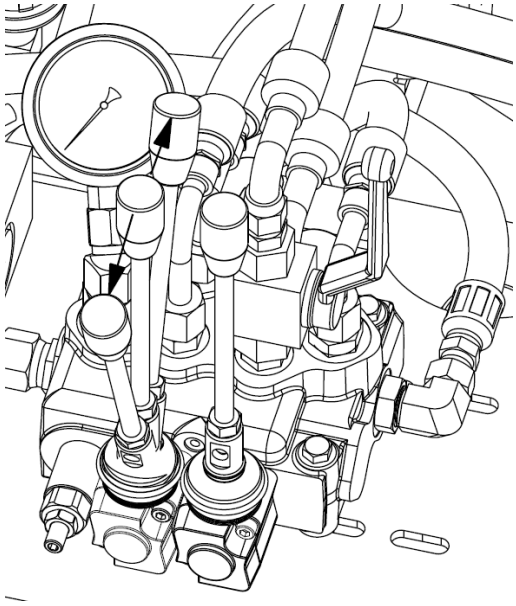


Figure 6-4: Airlock direction control

Function: The airlock indicator wheel shows the direction of the rotation of the airlock and can also be used to determine the rotational speed of the airlock.

Range: The arrow cut-out on the wheel indicates the normal operational direction of the airlock. Under normal conditions, the airlock should be run at speeds between 10 to 35 rpm.

Location: The indicator wheel is mounted on the airlock motor bracket and connected to the airlock coupling by the indicator belt.

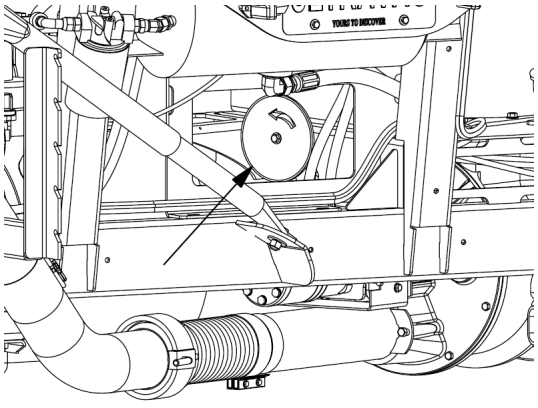


Figure 6-5: Airlock indicator wheel

***Function*:** The right lever of the hydraulic control bank controls the raising and lowering of the boom.

***Range*:** The lever is spring-loaded to return to the neutral center position. When the lever is pushed towards the front of the unit, the boom will lower. When the lever is pulled towards the back of the unit, the boom will raise.

Location: The lever is fixed to the control bank mounted on the control table at the rear of the unit.

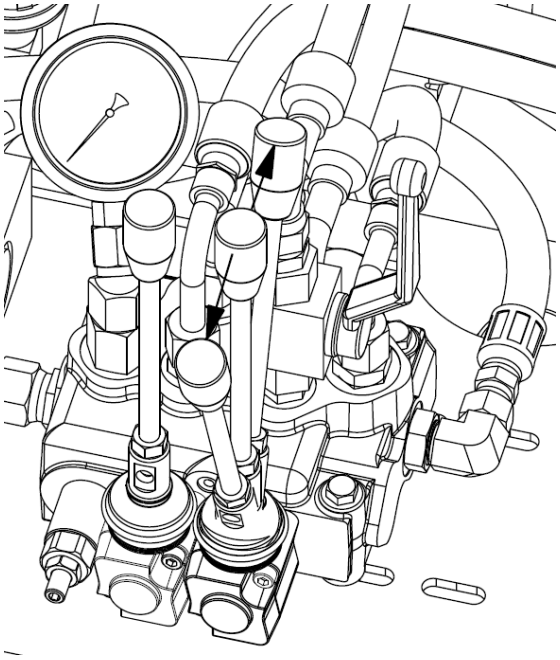


Figure 6-6: Boom lift control

***Function*:** The ball valve locks the boom in a raised position to prevent hydraulic bleeding to ensure a fully loaded boom does not unintentionally lower.

***Range*:** The ball valve should be in the open position (handle pointing upwards) when changing the position of the boom and set in the closed position (handle pointing towards the rear of the unit) when the boom has been raised.

Location: The valve is mounted to the port of the boom lift control connected to the extension port of the boom cylinder.

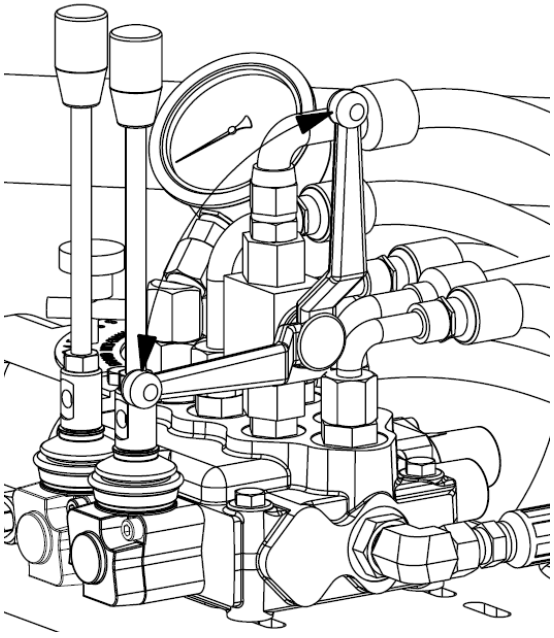


Figure 6-7: Boom lift lock valve

Function: The ignition key switch provides a means to start, run and stop the engine.

Range: The three position switch has a detent in the *OFF* and *RUN* positions and is spring-loaded to return to the *RUN* position from the *START* position. The switch should be held in the *START* position to engage the engine starter and begin operation of the engine. The switch should be in the *RUN* position while the unit is in operation and the switch should be in the *OFF* position when the unit is not in use.

Location: The switch is located on the rear face of the engine.

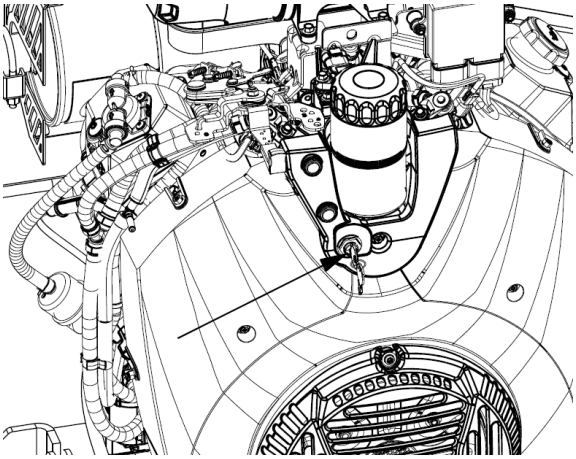


Figure 6-8: Engine ignition key switch

Function: Provides a means to control the rotational speed of the engine.

Range: The throttle control may be positioned along a continuous adjustment path from the slowest (🐢) rotational speed to the fastest (🐇) rotational speed.

Location: The throttle control is mounted on the upper rear surface of the engine.

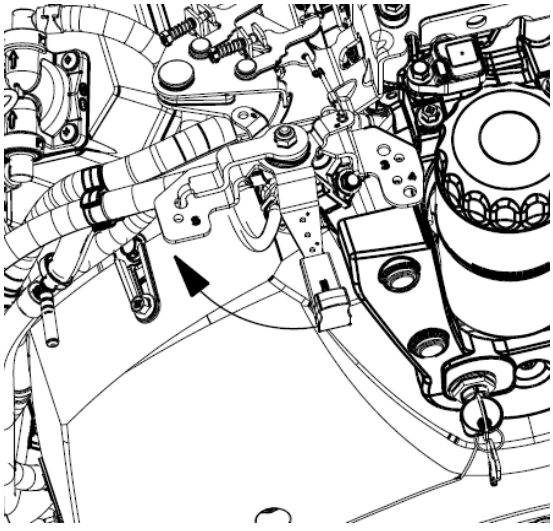


Figure 6-9: Engine throttle control

***Function*:** The vacuum relief valve allows air to enter the intake side of 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 pressure is reduced.

***Range*:** The vacuum relief valve is set to open at 16 in Hg (54 kPa).

Location: The valve is mounted to the top of the secondary AMS.

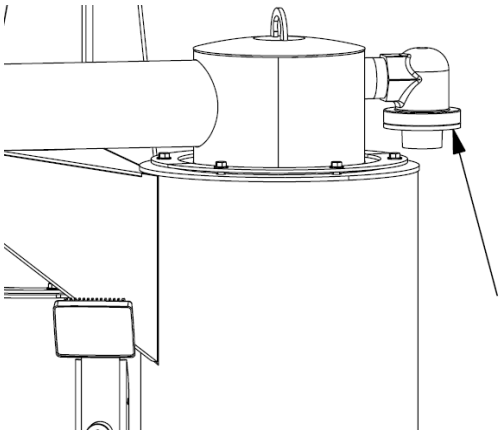


Figure 6-10: Vacuum relief valve

***Function*:** The pressure relief valve allows air to exit the discharge side of the system when the set 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 top side of the muffler body.

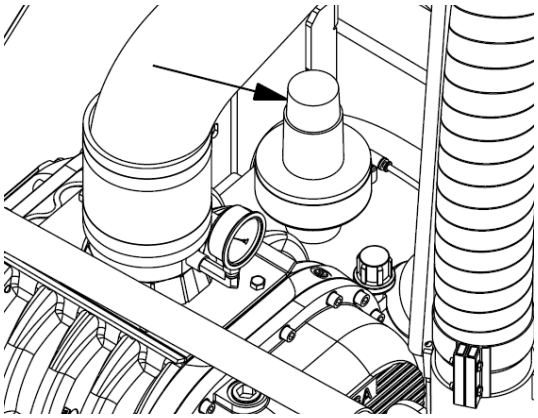


Figure 6-11: Pressure relief valve

***Function*:** The tachometer/hour meter records the total running hours of the Ultra-Vac. As well as providing a measurement for the current 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 sheave with the speed pickup sensor of the tachometer mounted within 2 mm on the sensor bracket. The tachometer display is mounted on the left face of the drive belt housing.

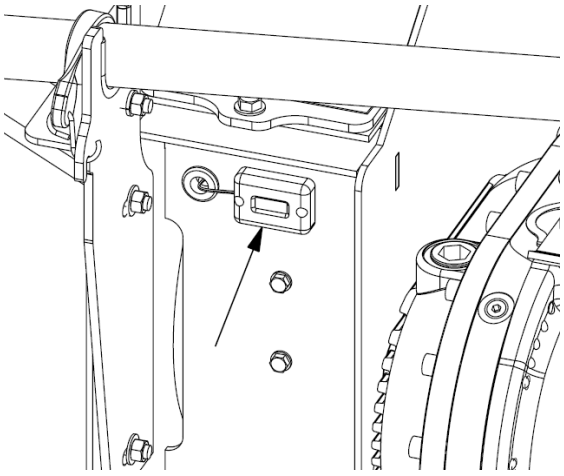


Figure 6-12: Tachometer/hour meter

***Function*:** The vacuum pressure gauge measures the 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). Under normal conditions, the vacuum pressure should be between -10 in Hg (-33.8 kPa) and -15 in Hg (-50.8 kPa).

Location: The gauge is mounted on the blower inlet.

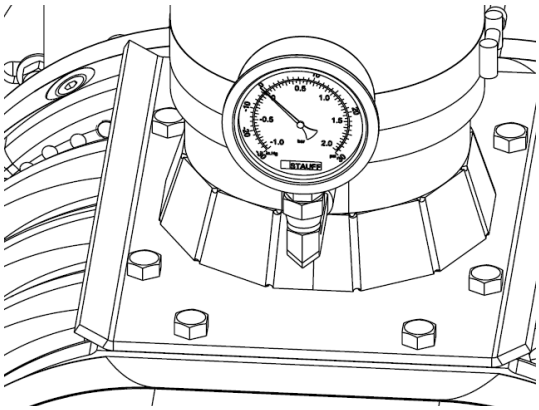


Figure 6-13: Vacuum pressure gauge

***Function*:** The outlet pressure gauge measures the pressure on the discharge side of the system.

***Range*:** The gauge is capable of measuring from 0 psi (0 kPa) to 15 psi (103.4 kPa). Under normal conditions, the outlet pressure should be between 7 psi (48.2 kPa) and 13 psi (89.6 kPa) while bin loading and between 3 psi (20.7 kPa) and 6 psi (40.4 kPa) when loading with the boom.

Location: The gauge is mounted on the hydraulic control table and connected to the muffler body.

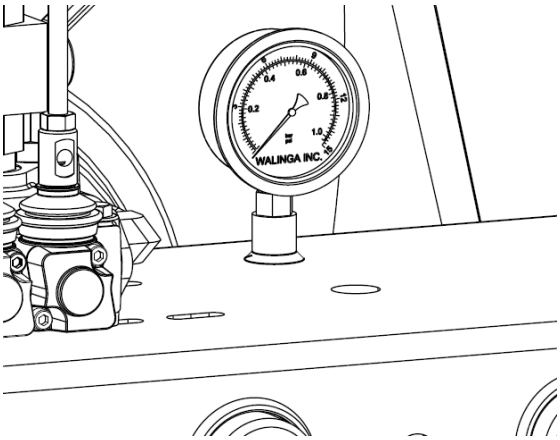


Figure 6-14: Outlet pressure gauge

***Function*:** The hydraulic pressure gauge measures the pressure of the Ultra-Vac's hydraulic system.

***Range*:** The gauge is capable of measuring from 0 psi (0 MPa) to 3000 psi (20.7 MPa). Under normal conditions, the hydraulic pressure should be between 500 psi (3.4 MPa) and 1900 psi (13.1 MPa).

***Location*:** The gauge is mounted on the hydraulic control bank.

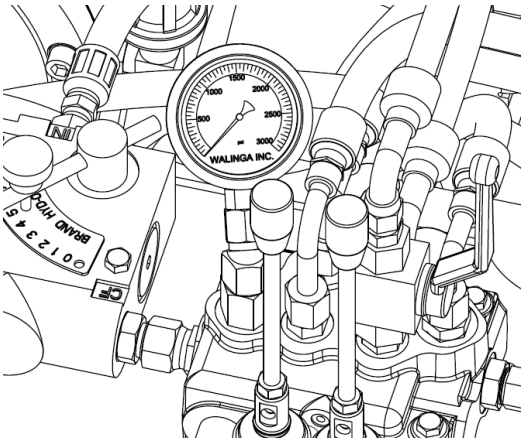


Figure 6-15: Hydraulic pressure gauge

OPERATION

Pre-Operation

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

1. Ensure the Ultra-Vac has been properly lubricated as per the described methods and schedule as outlined in **Section 7: Maintenance and Adjustments**.
2. Ensure the fuel tank is sufficiently filled with clean, fresh, unleaded, premium gasoline. Inspect the fuel lines to ensure there are no pinched, kinked or otherwise obstructed lines and the attachment points and fasteners are secure. Inspect the system for any leaks and ensure the fuel filter is in good condition.
3. Ensure the fuel system is not dry. If the system is dry it must be primed as follows:
    a. Turn the ignition key to the *RUN* position. Do not turn to the *START* position.
    b. Allow the key to remain in the *RUN* position for approximately one minute to allow the fuel pump to properly cycle and prime the entire system.
    c. Turn the ignition key to the *OFF* position.
4. Check the oil level of the engine, and add oil if required. Do not overfill.
5. Inspect the air intake of the engine to ensure the filters are in good condition and all shrouds, guards and covers are in place and secured.
6. Ensure the Ultra-Vac is properly secured in position through one of the following methods:
    a. Secure the Ultra-Vac to the towing vehicle through the use of a mechanical retainer in the ball coupler, a pin and retainer in the hitch ball, and safety chains.

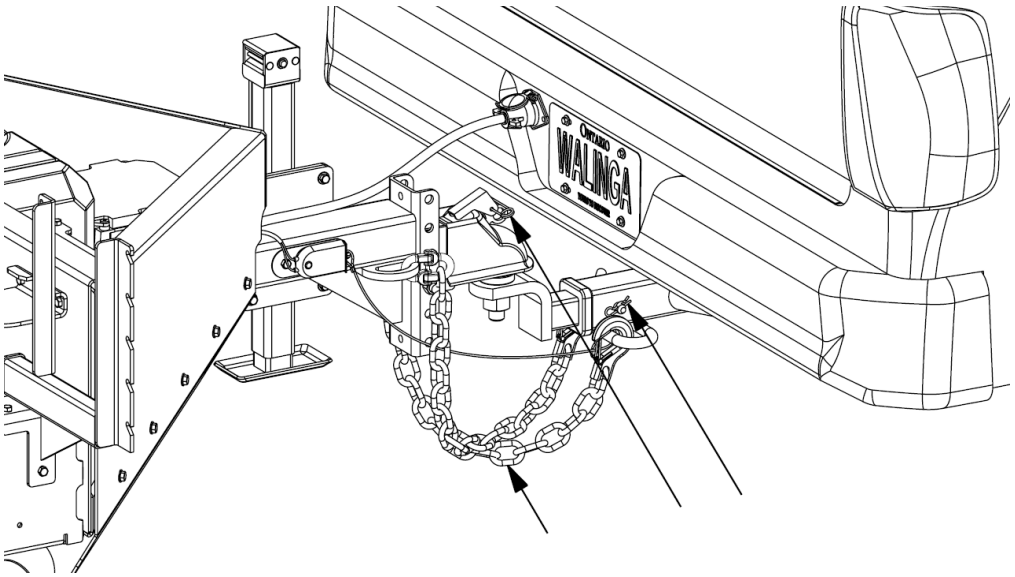


Figure 6-16: Attachment to towing vehicle

b. Secure the Ultra-Vac independently by extending the jack, ensuring the frame of the Ultra-Vac is level, and restricting the wheels with the use of wheel chocks.

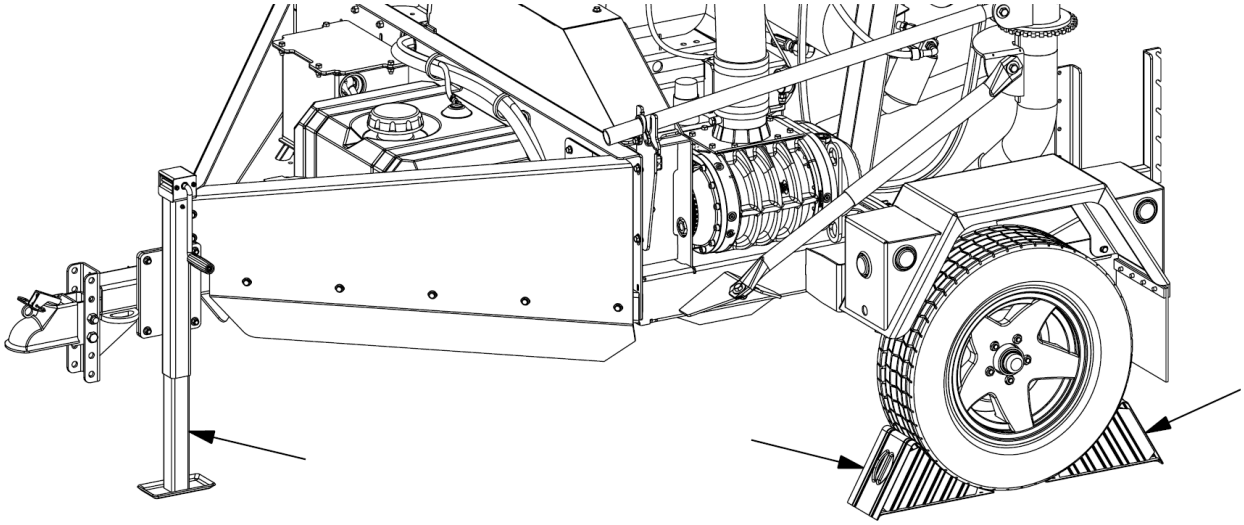


Figure 6-17: Independent securement

7. Check the oil level in the blower reservoirs and adjust as necessary with reference to **Section 7: Maintenance and Adjustments**.
8. Inspect the hydraulic system to ensure the hydraulic reservoir is filled to the required level with reference to **Section 8: Specifications**. Inspect all fittings and couplings to ensure they are free of dirt and debris and clean if necessary. Ensure there are no pinched, kinked or otherwise obstructed hydraulic lines. Inspect the system for any leaks.
9. Check the tires and ensure they are inflated to the specified pressure as outlined in **Section 8: Specifications**.
10. Ensure that the blower turns freely.
11. Open and clean the secondary AMS door and tank with reference to **Section 7: Maintenance and Adjustments**.
12. Check for and remove any entangled material.
13. Inspect the blower and engine mufflers for any foreign material and ensure any materials have been removed with reference to **Section 7: Maintenance and Adjustments**. Failure to remove any foreign materials may result in a fire hazard.
14. Close and secure all guards.

Attaching and Unhooking

To connect the Ultra-Vac to a towing vehicle, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Clear the area of any foreign objects or debris, and ensure the area is level and dry.
3. Ensure there is sufficient clearance to back the towing vehicle up to the hitch point of the Ultra-Vac.

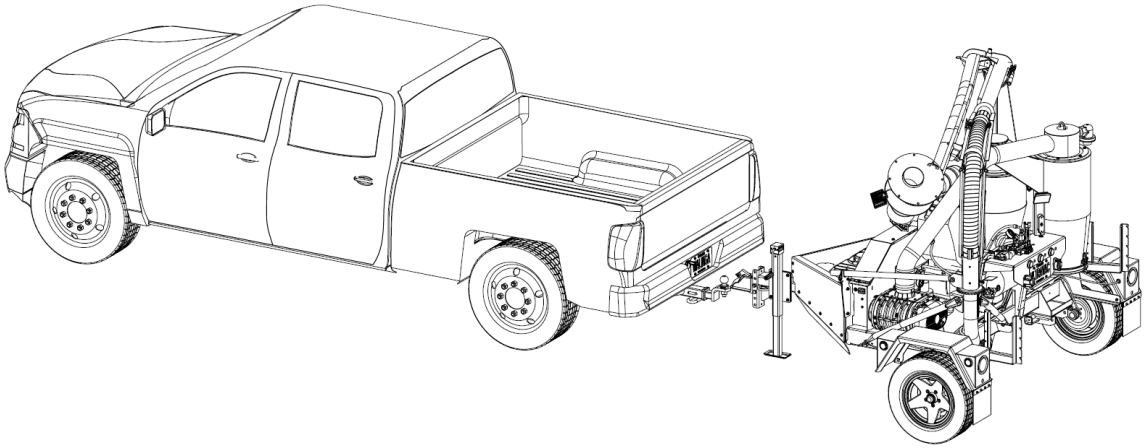


Figure 6-18: Vehicle and Ultra-Vac positioning

4. Start the towing vehicle and slowly back it up to the hitch point of the Ultra-Vac.
5. Stop the towing vehicle, set the parking brake, and remove the ignition key before dismounting.
6. Install an appropriately sized and rated hitch ball assembly into the hitch of the towing vehicle with reference to **Section 8: Specifications**. Secure the assembly in place using a pin and retainer.

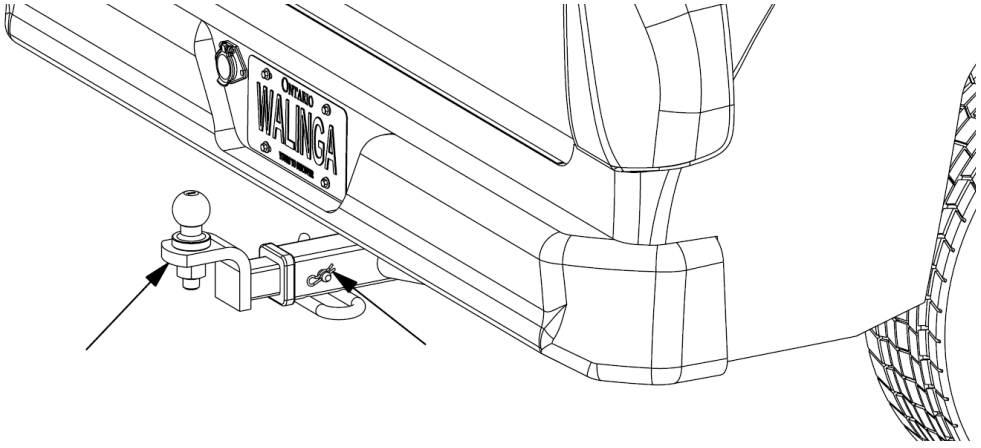


Figure 6-19: Hitch ball installation and securement

7. Use the jack to raise or lower the Ultra-Vac hitch to provide sufficient clearance to position the hitch ball below the coupler.

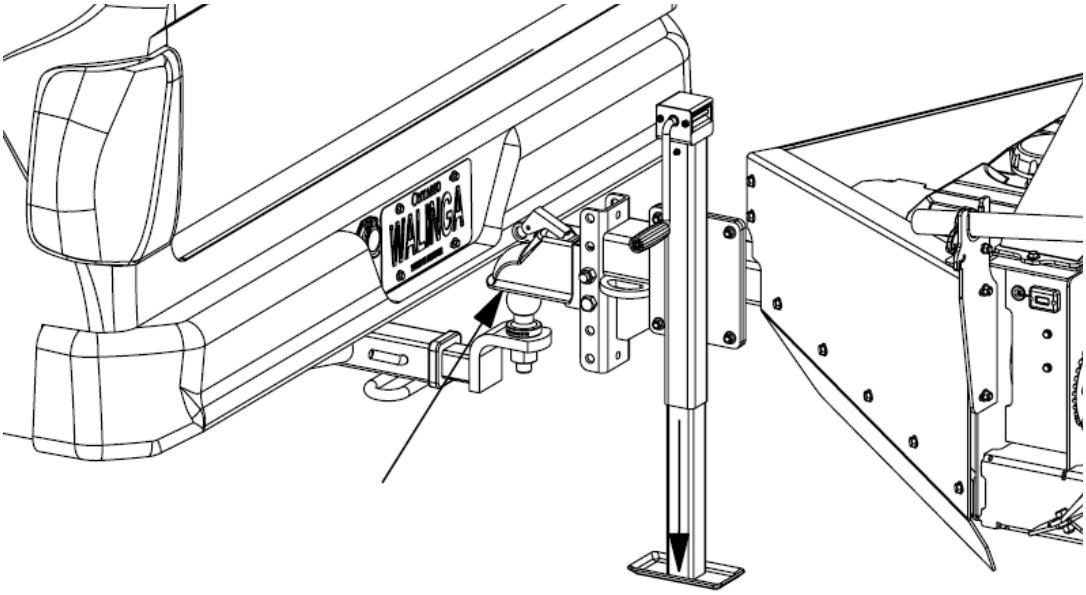


Figure 6-20: Hitch positioning

8. Position the towing vehicle such that the hitch ball is aligned with the coupler, as seen in ***Figure 6-20***.
9. Lower the jack to allow the hitch ball to seat within the coupler. Lock the hitch ball within the coupler and secure the coupler with the use of a retainer.

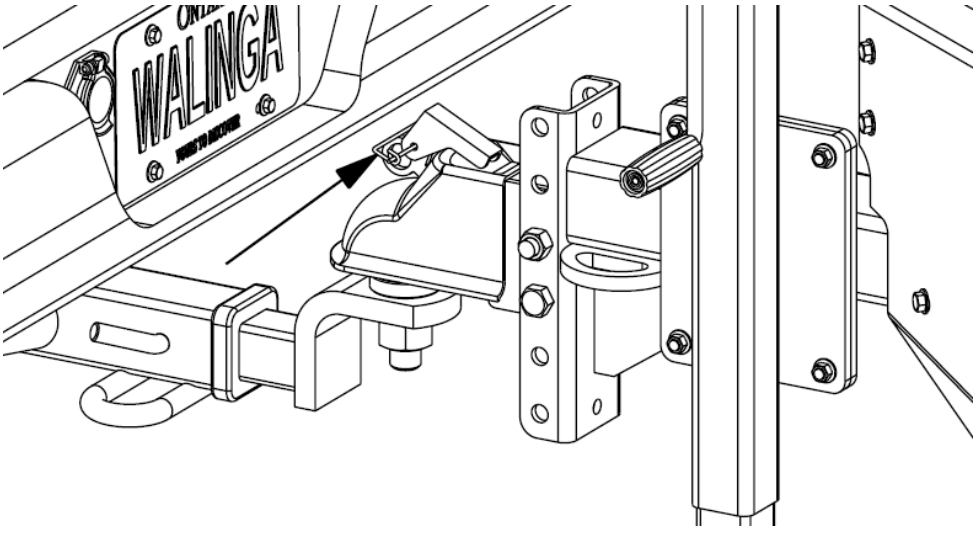


Figure 6-21: Coupler retainer

10. Raise the jack completely to the transport position.

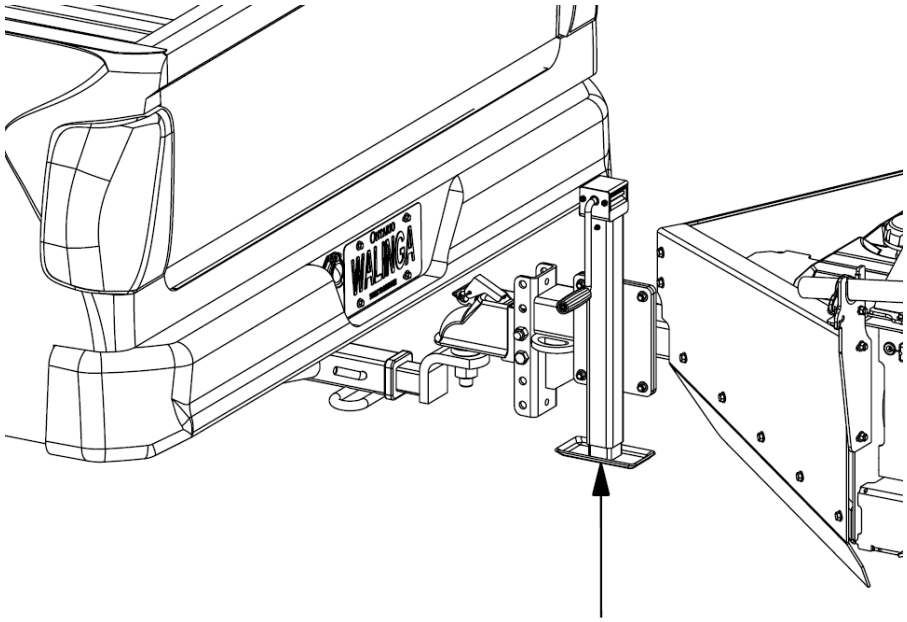


Figure 6-22: Jack transport position

11. Ensure the frame of the Ultra-Vac is level. If the frame is not level, lower the jack, disconnect the coupler from the hitch ball and adjust the position of the coupler within the mounting bracket. Ensure the coupler fasteners are tightened to the required torque. Repeat **Step 7** through **Step 10** to connect the hitch assemblies.

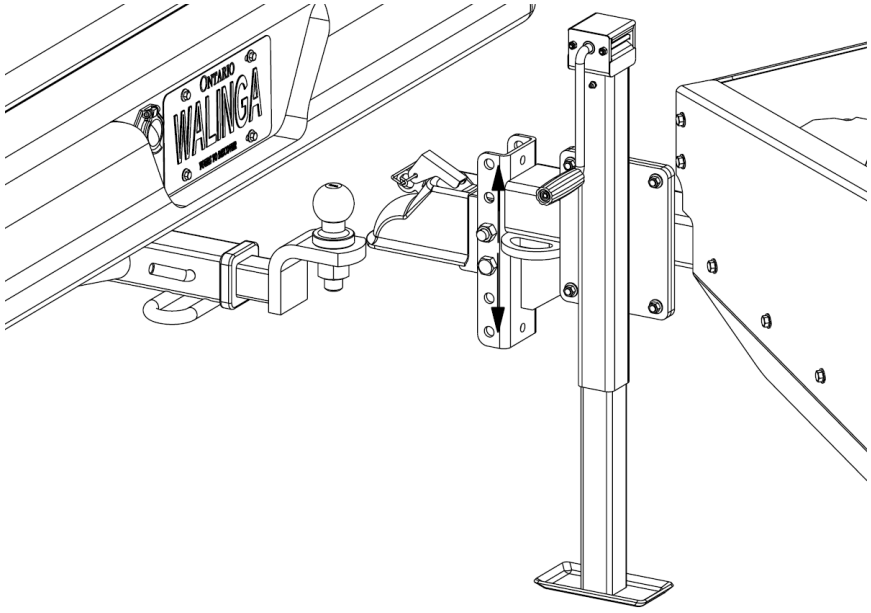


Figure 6-23: Coupler height adjustment

12. Loop the breakaway switch connection around a fixed point on the towing vehicle and seat the plug into the switch. Ensure the connection is securely positioned within the body of the switch and around the point of the towing vehicle.

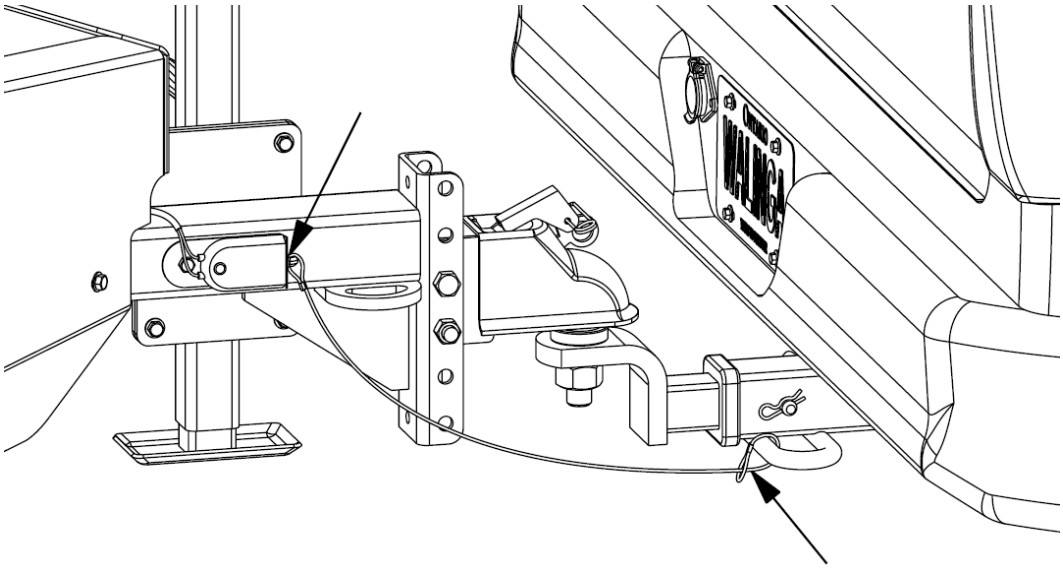


Figure 6-24: Breakaway switch connection

13. Secure the safety chains from the Ultra-Vac to the towing vehicle. The safety chains must be crossed underneath the coupler, such that in the event of a separation, the crossed chains will support the coupler and prevent it from contacting the ground.

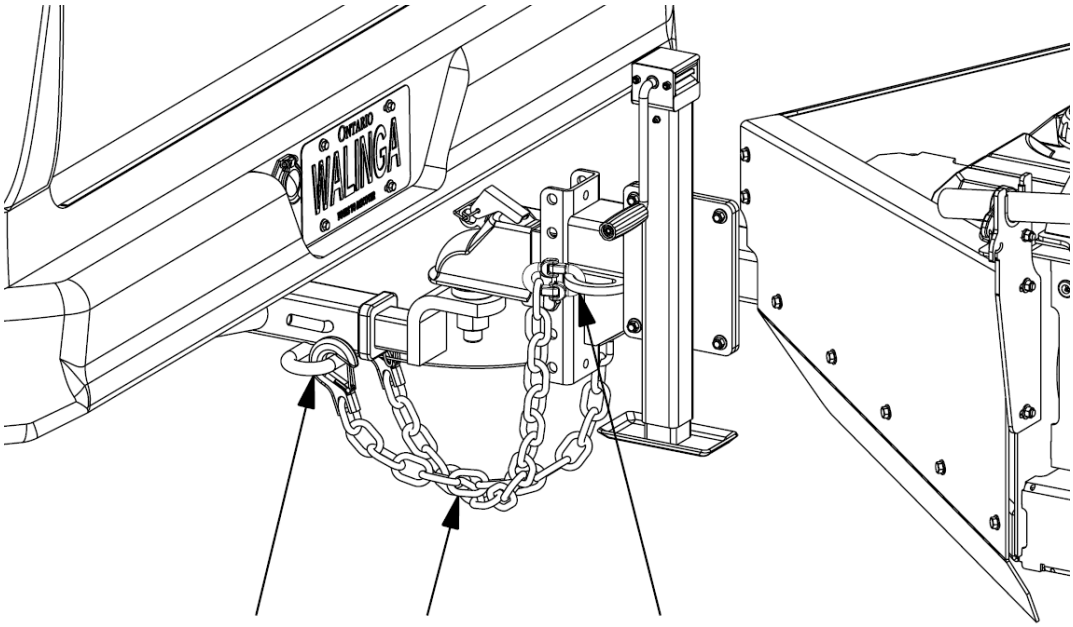


Figure 6-25: Safety chain connection

14. Connect the 7-wire plug of the Ultra-Vac to the receptacle on the towing vehicle. Ensure the electrical connection is secure and the cable will not become entangled.

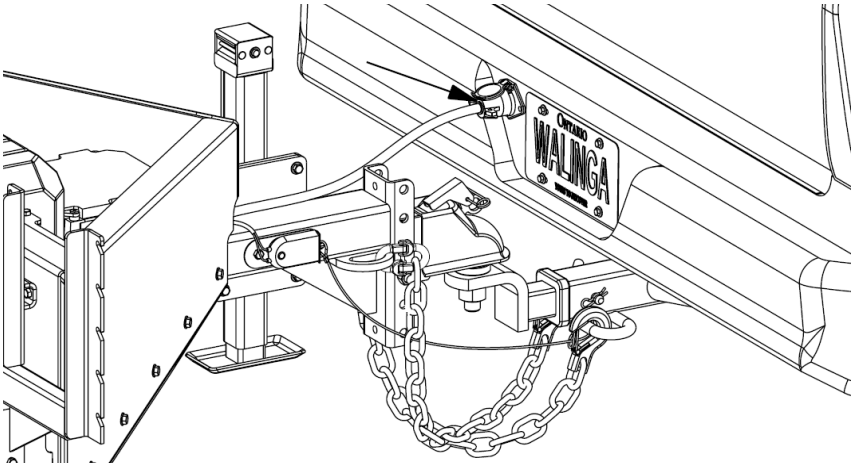


Figure 6-26: Electrical connection

15. Remove the wheel chocks and ensure there are no loose components or debris on or around the Ultra-Vac.

To disconnect the Ultra-Vac from a towing vehicle, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Clear the area of any foreign objects or debris, and ensure the area is level and dry.
3. Ensure there is sufficient clearance to pull the towing vehicle away from the hitch point of the Ultra-Vac.
4. Ensure the towing vehicle has been turned off, the ignition key has been removed, and that all moving components have come to a complete stop.
5. Place wheel chocks on both tires to secure the Ultra-Vac in position.

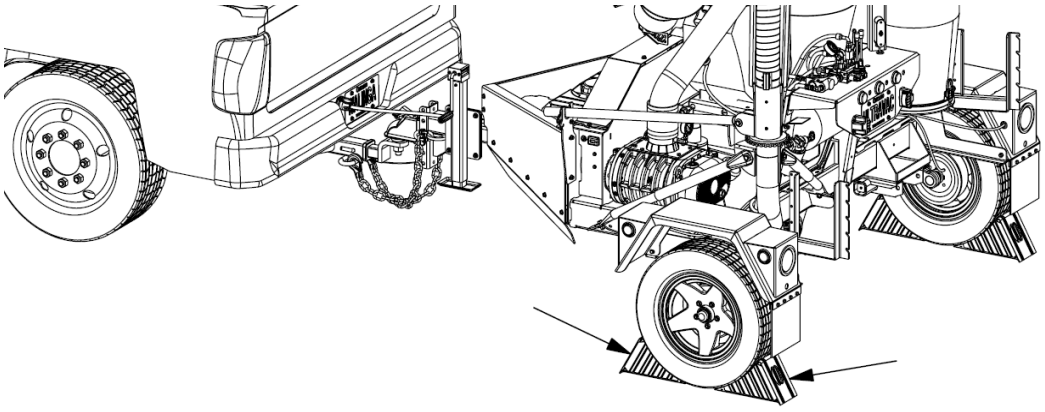


Figure 6-27: Wheel chock placement

6. Disconnect the 7-wire cable from the towing vehicle. Ensure the plug and cable are positioned in a way such that they will not become entangled or pose a tripping hazard.
7. Disconnect the safety chains from the towing vehicle. Ensure the chains are positioned such that they will not become entangled or pose a tripping hazard.
8. Disconnect the breakaway switch from the towing vehicle. Ensure the cable is positioned such that it will not become entangled or pose a tripping hazard.
9. Lower the jack until the footing is resting securely on the ground. If necessary, an additional footing support may be used to prevent sinking on soft or wet surfaces.

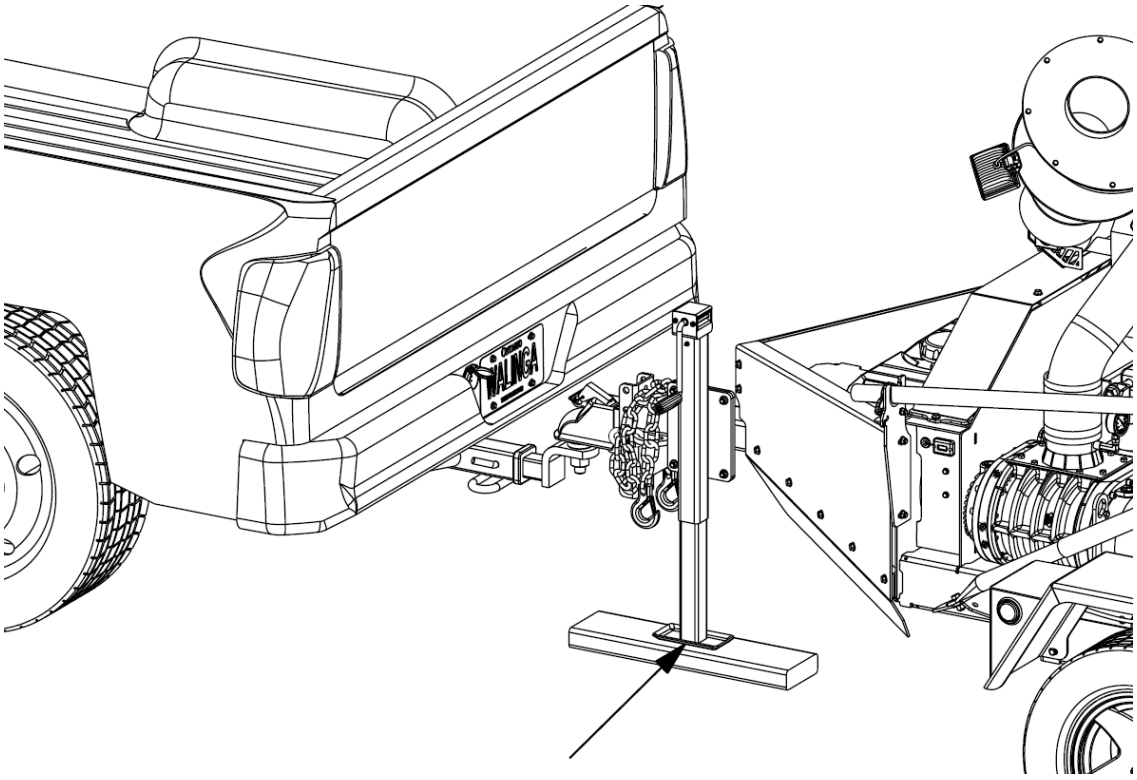


Figure 6-28: Lowered jack with footing support

10. Remove the retainer from the coupler and unlock the hitch ball from the coupler.
11. Extend the jack until there is sufficient clearance between the coupler and hitch ball.
12. Start the towing vehicle and slowly pull it away from the Ultra-Vac.
13. Use the jack to raise/lower the frame so the Ultra-Vac is level.
14. Remove the pin and retainer from the hitch ball and remove the assembly from the receiver of the towing vehicle. Store the hitch ball in a location protected from moisture where it will not be damaged.

Machine Preparation

To prepare the Ultra-Vac for operation, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Ensure the Ultra-Vac is properly attached to the towing vehicle as detailed in the previous section, *Attaching and Unhooking*, or has been secured in position independently with the use of wheel chocks and the jack.
3. Position the Ultra-Vac approximately 12 ft (4 m) from the storage structure access point. Ensure the desired operational position has sufficient space to locate the Ultra-Vac as well as sufficient clearance to allow trucks to drive under the discharge cyclone if required. The inlet of the primary AMS should be closely aligned to the storage structure access point to minimize the numbers of bends in the intake line.

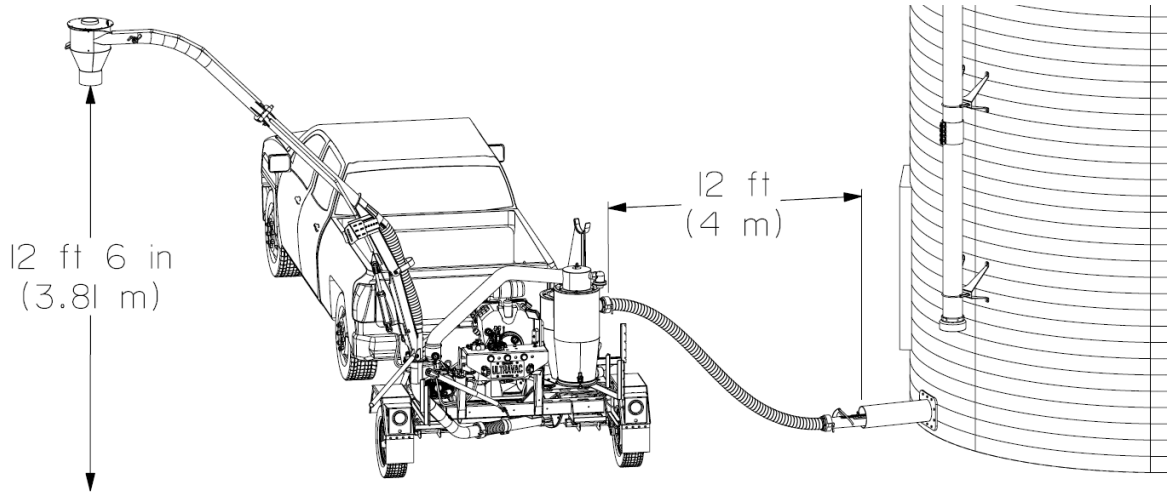


Figure 6-29: Operational positioning and clearance

4. Remove the plug from the primary AMS inlet by loosening the tail bolts.

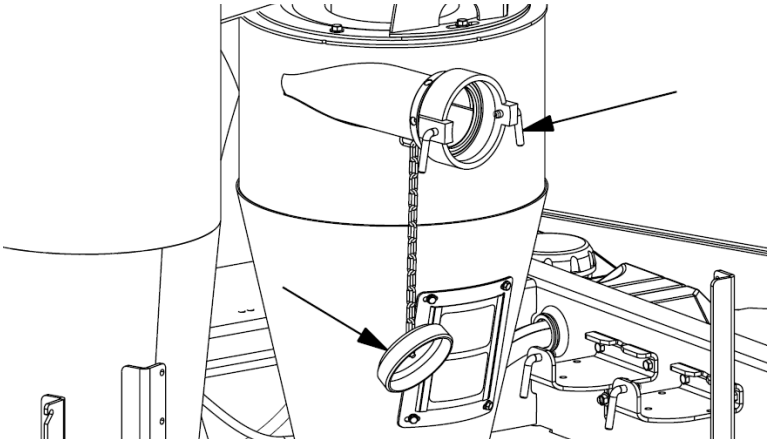


Figure 6-30: Primary AMS inlet plug removal

5. Remove the intake nozzle from the storage bracket on the Ultra-Vac and the steel flex tube from the hose carrier. Install the nozzle into the female coupling of the hose. Secure the nozzle in position by tightening the coupling tail bolts.

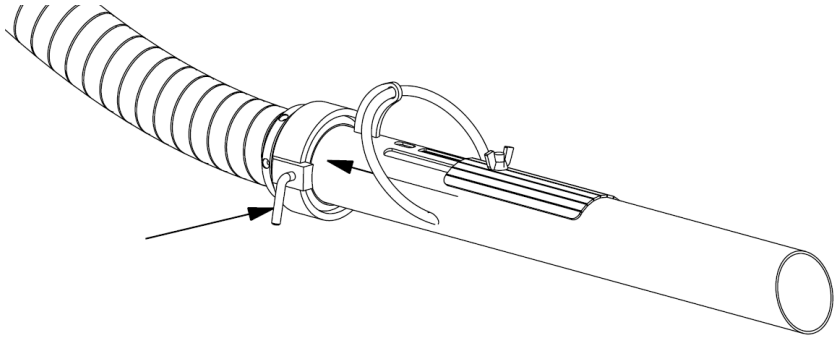


Figure 6-31: Intake nozzle attachment

6. Connect the male coupling end of the steel flex tube to the primary AMS inlet and secure it in place by tightening the tail bolts of the inlet coupling.

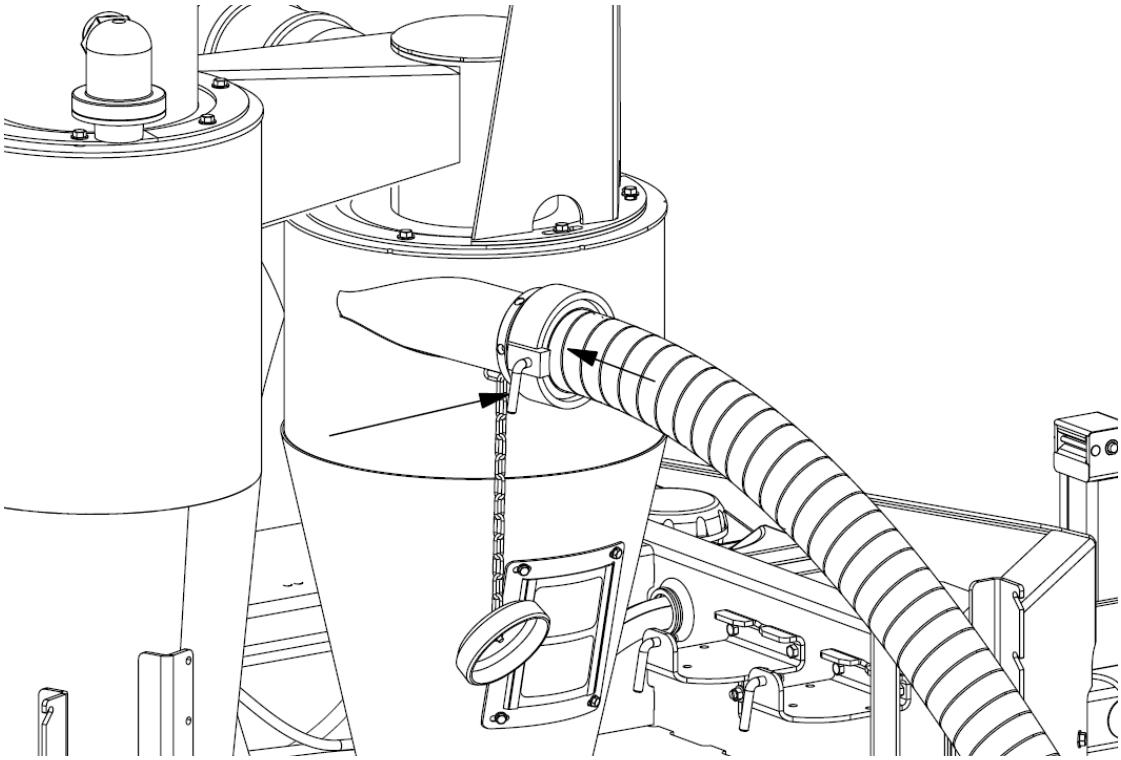


Figure 6-32: Steel flex tube attachment

7. Ensure that the intake line is as straight as possible. Small radius bends in the intake line will significantly decrease the capacity and efficiency of the Ultra-Vac.

Starting the Machine

To start the Ultra-Vac, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Ensure all steps of the previous sections, *Pre-Operation* and *Machine Preparation*, have been completed.
3. Ensure the suction nozzle is not in the product before start-up. Start-up under heavy suction may overload the drive belts and blower, causing significant damage.
4. Ensure all controls are in the neutral or off position and the boom lift ball valve is in the closed position.
5. Start the engine of the Ultra-Vac as follows:
    a. Place the throttle control midway between the slow and fast positions.

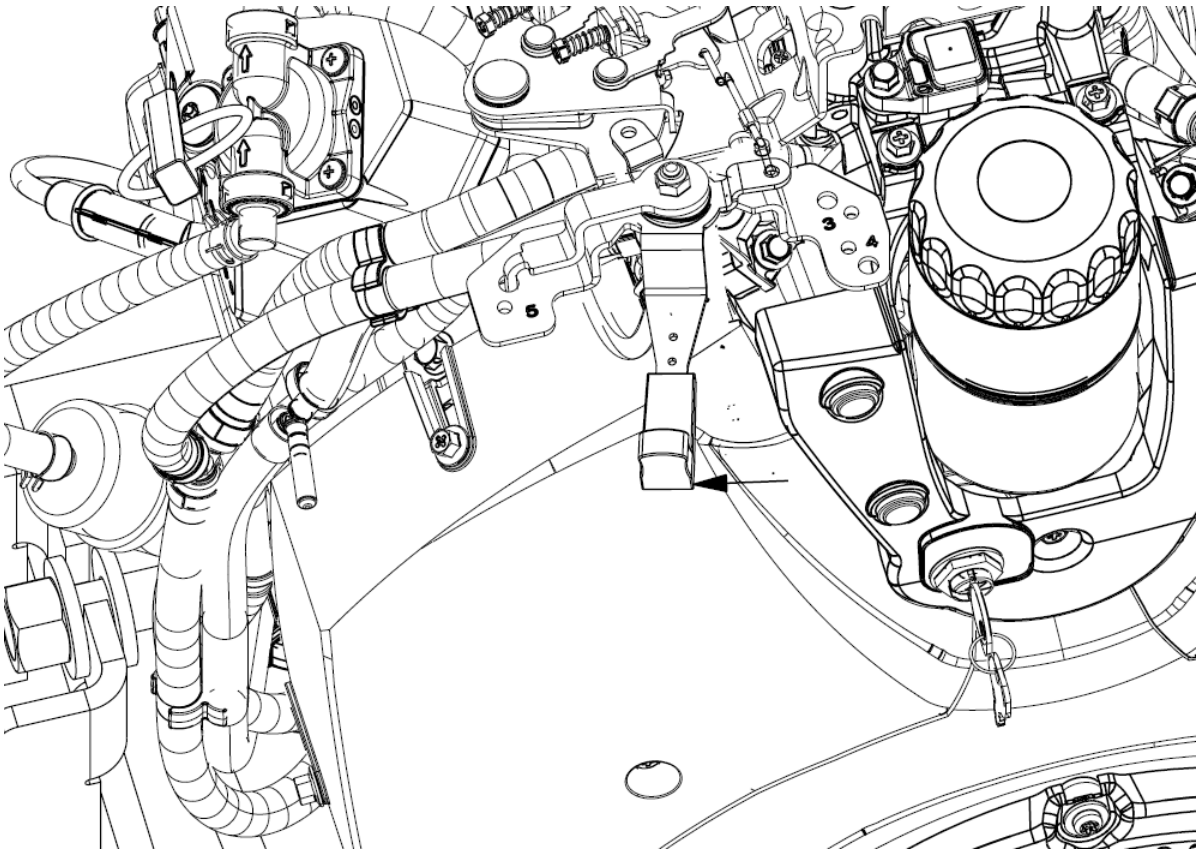


Figure 6-33: Engine 1/2 throttle position

b. Turn and hold the ignition key in the *START* position. Release the key as soon as the engine starts, allowing it to move to the *RUN* position. If the starter does not turn the engine over, move the key to the *OFF* position immediately.

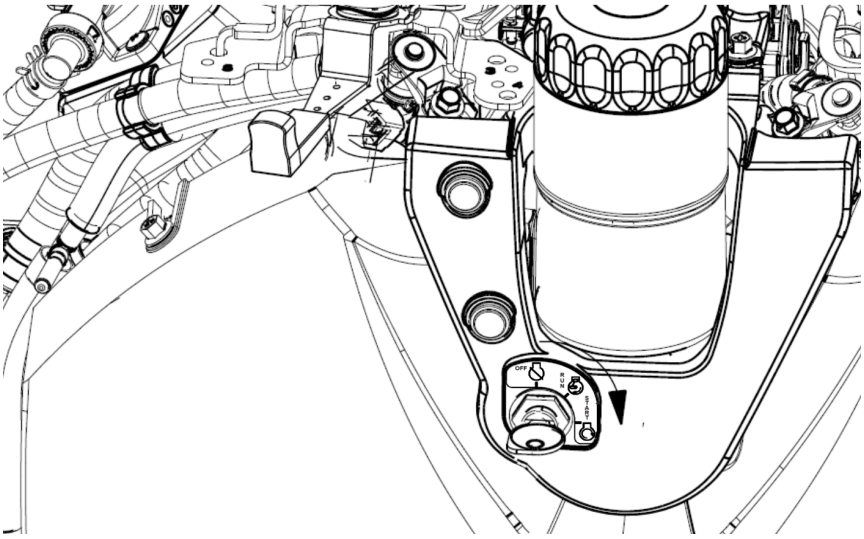


Figure 6-34: Engine ignition key START position

c. Allow the engine to run at a low idle for a few minutes, listening for any abnormal noises.

6. Position the boom and discharge cyclone as follows:
   a. Be aware of any overhead obstructions or electrical wires and ensure there is sufficient clearance before raising the boom. Electrocution can occur without direct contact.
   b. Move the boom lift ball valve to the open position.

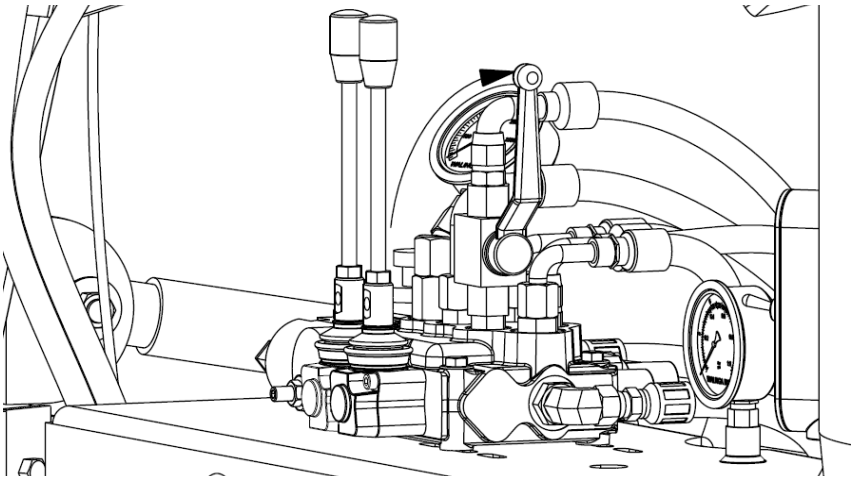


Figure 6-35: Boom lift ball valve in OPEN position

c. Use the boom lift control lever to lift the boom out of the saddle. Ensure the boom will have clearance above other components of the Ultra-Vac while rotating.

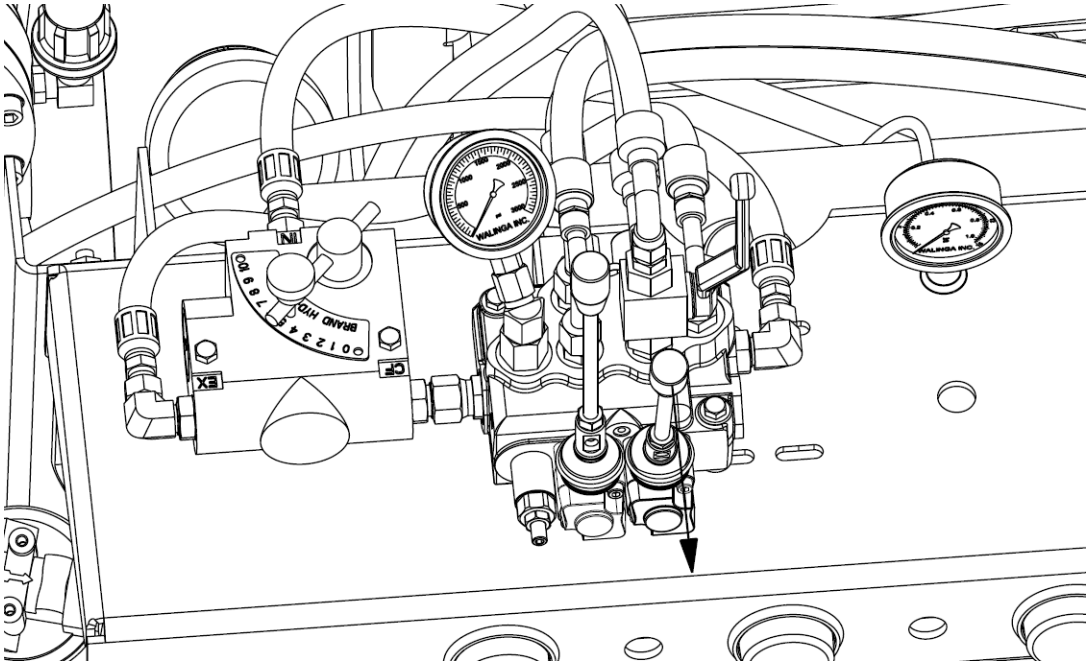


Figure 6-36: Boom lift control raising

d. Disengage the boom rotation locking tab.

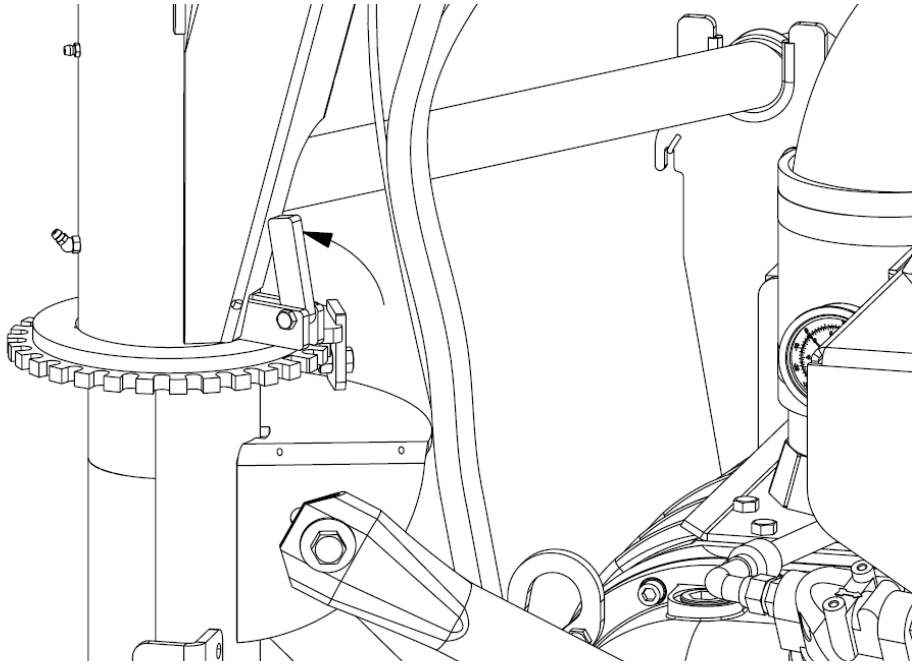


Figure 6-37: Disengaged boom rotation locking tab

e. Release the strap securing the manual boom rotation arm and use the arm to rotate the boom to the desired operational position. Ensure no hydraulic or electrical lines become entangled, pinched or disconnected during rotation.

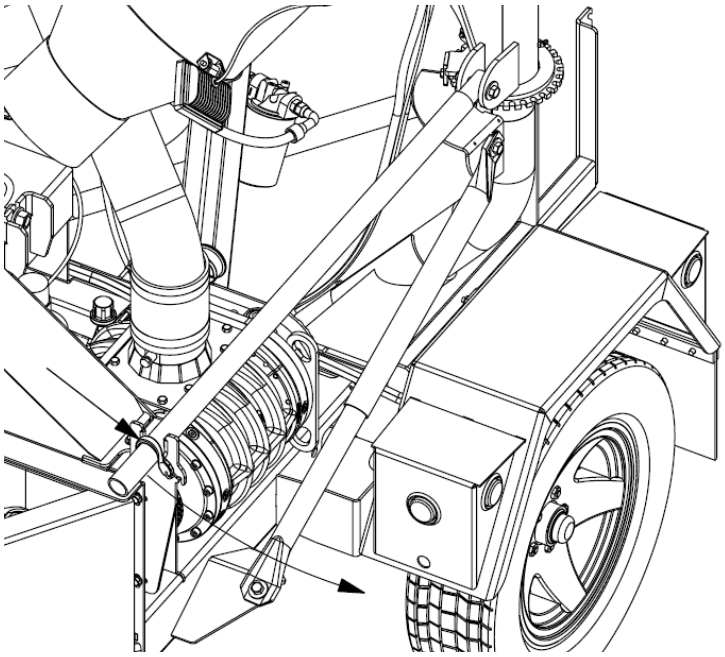


Figure 6-38: Manual boom rotation arm

f. If necessary, the boom may be lowered slightly to improve ease of access.

g. Remove the retainer and release the split boom security latch.

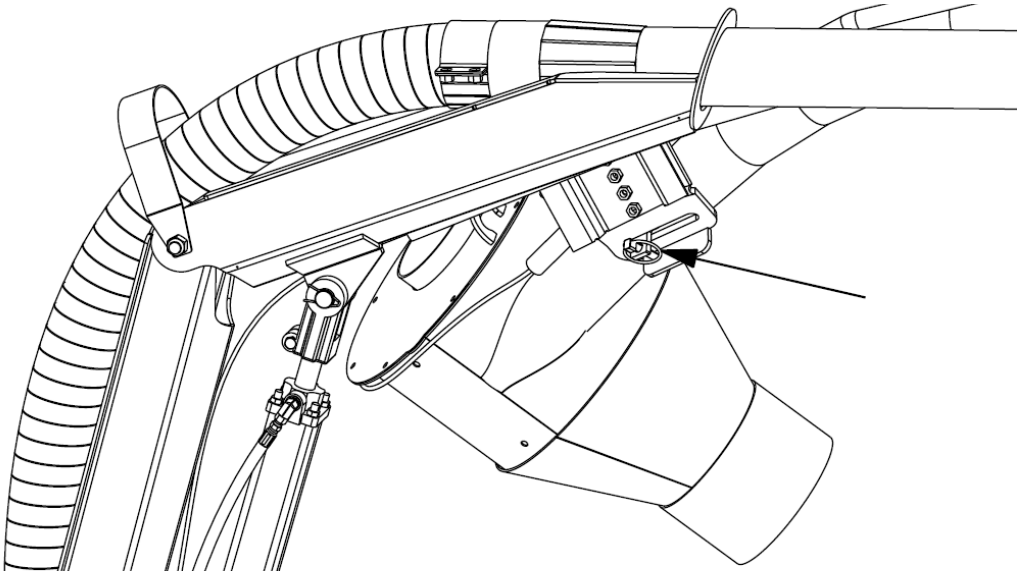


Figure 6-39: Split boom security latch

h. Open the boom extension completely until the boom is straight.

i. Secure the boom extension in place by clamping the security latch eye over the hook. Ensure there is a tight seal to prevent air leakage; adjust the latch if necessary. Insert the retainer to secure the boom in the operational position.

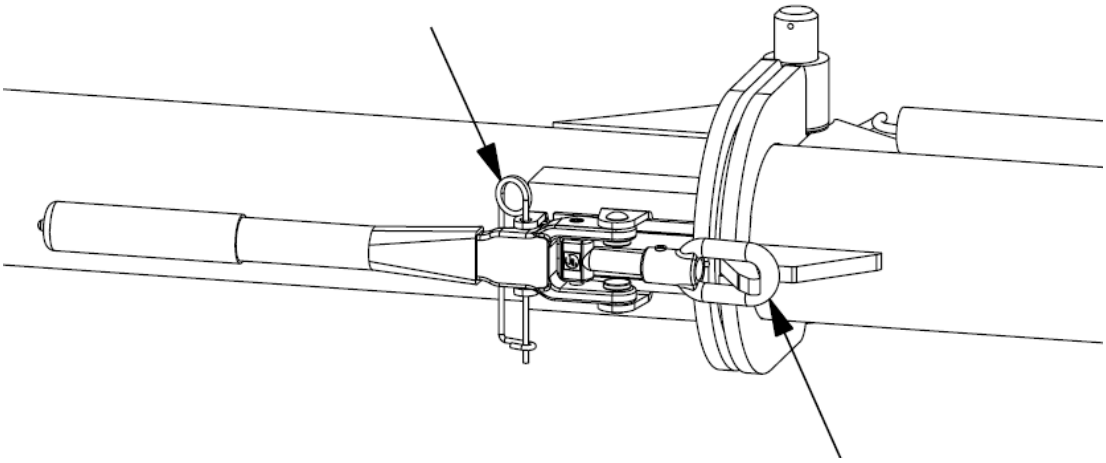


Figure 6-40: Securing boom extension in operational position

j. Use the boom lift control lever to lift the boom, reference ***Figure 6-36***, to the desired operational position, ensuring there is sufficient clearance beneath the discharge cyclone and boom structure.

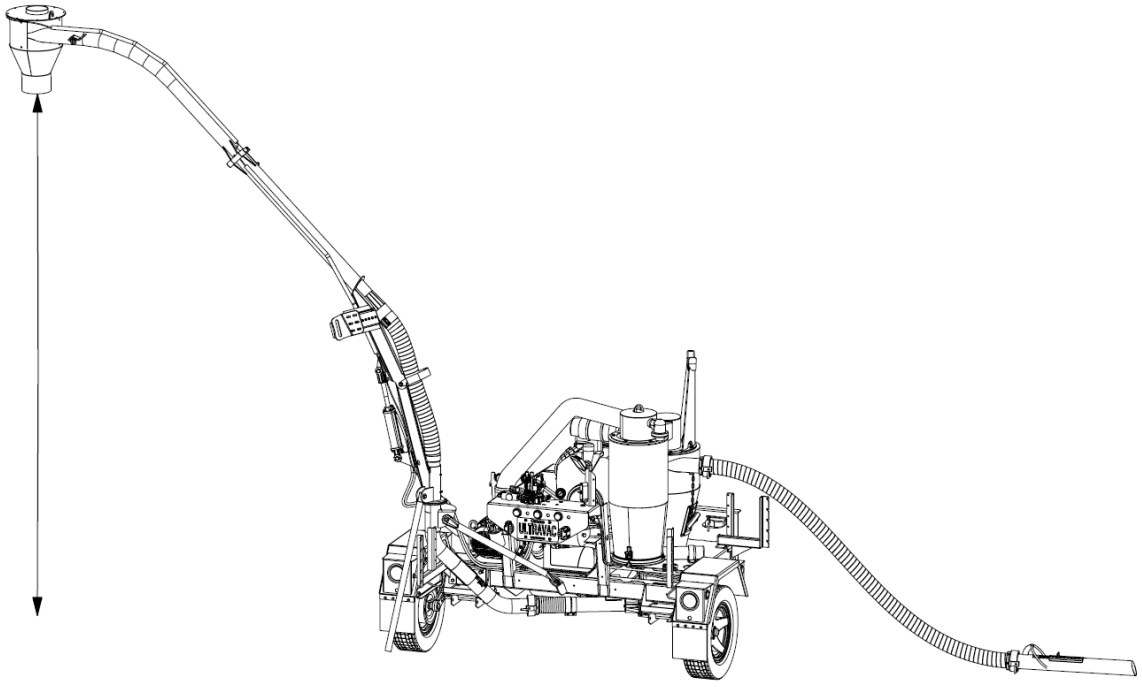


Figure 6-41: Boom operational position

k. Once at the desired height, move the boom lift ball valve to the closed position to prevent hydraulic bleed-back resulting in inadvertent lowering of a loaded boom.

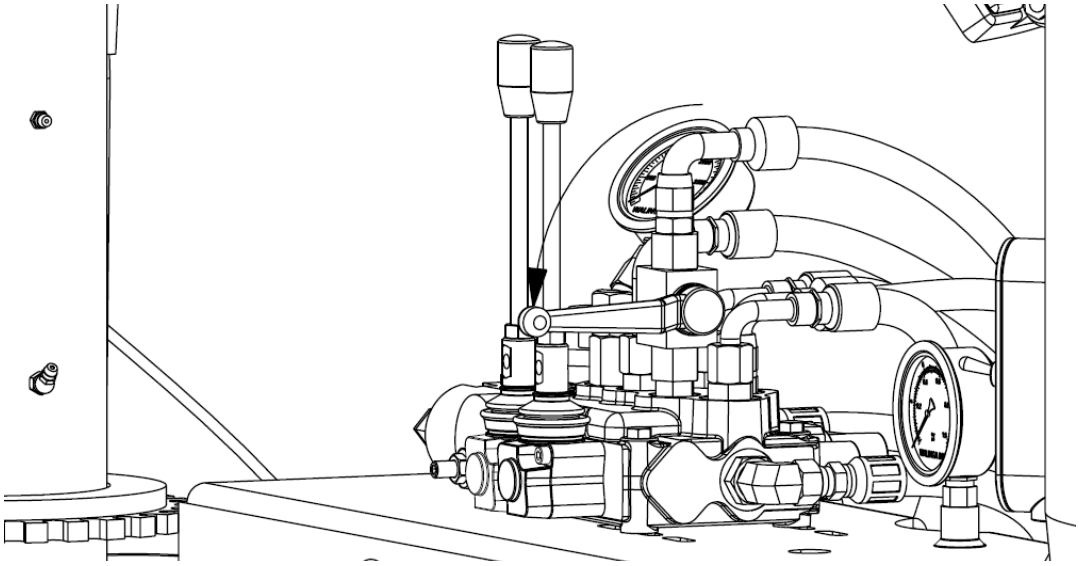


Figure 6-42: Boom lift ball valve CLOSED position

l. If necessary, use the rotation arm to adjust the position of the boom. Once the desired operational position is achieved, engage the boom rotation locking tab.

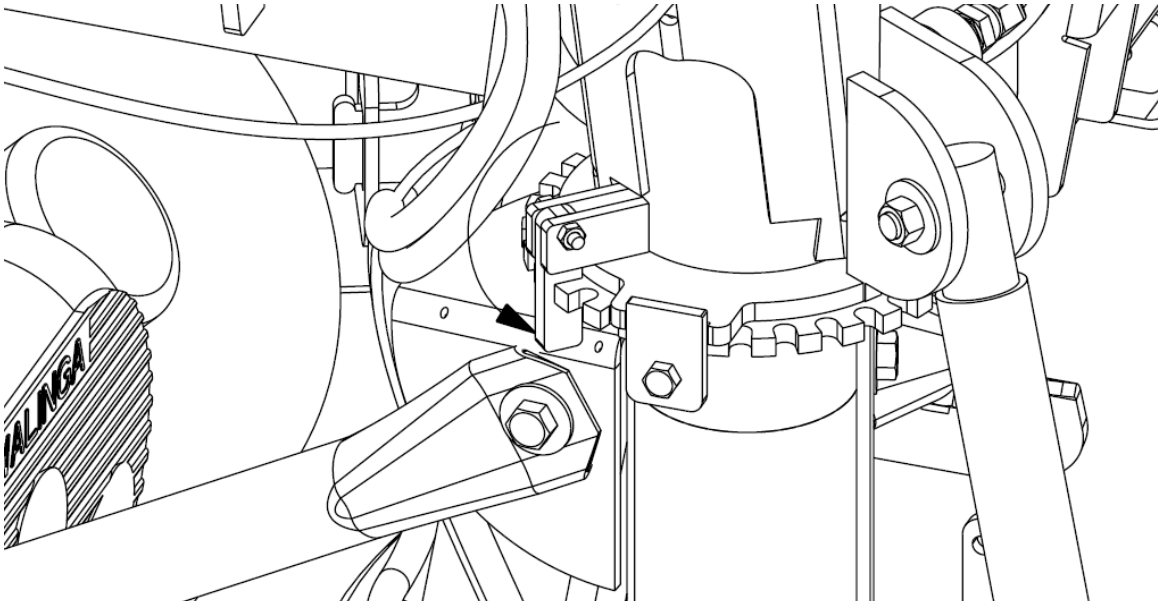


Figure 6-43: Engaged boom rotation locking tab

m. Check to ensure there is sufficient clearance for any other equipment that may be driving under the discharge cyclone and beside the Ultra-Vac.

7. Set the preliminary airlock settings as follows:
    a. Pull on the airlock direction control lever to place it in the *START* detent position to start the airlock.

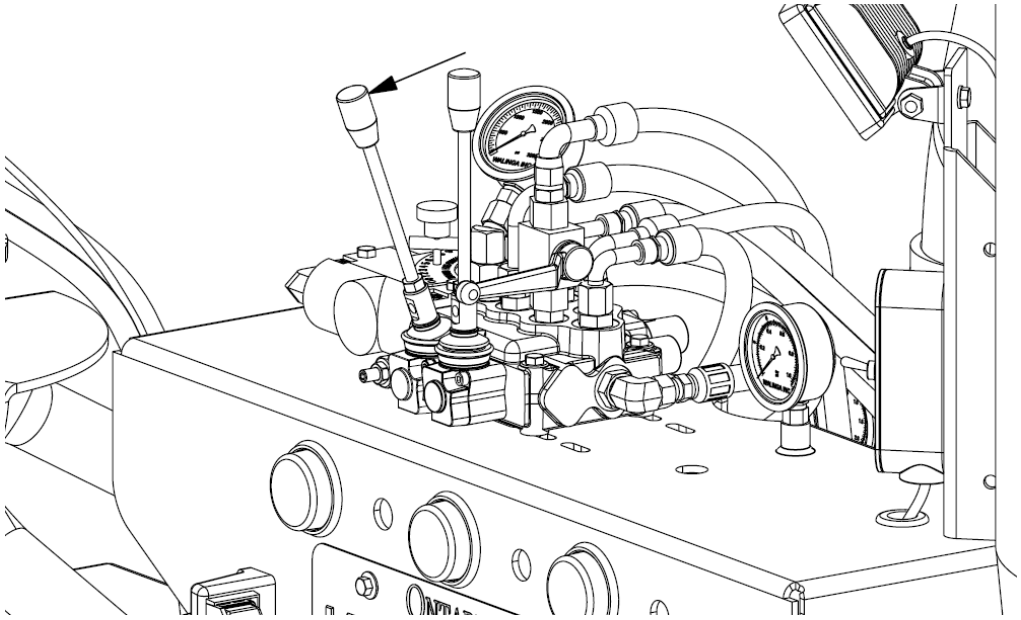


Figure 6-44: Airlock direction control lever in operational position

    b. Check the arrow on the indicator wheel to ensure the airlock is turning in the correct direction.

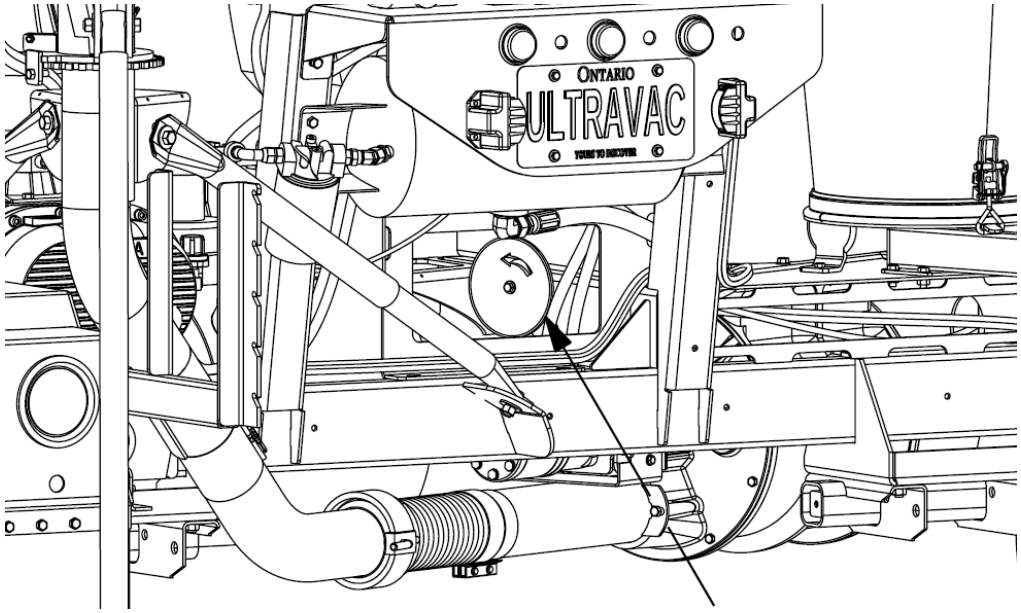


Figure 6-45: Airlock indicator wheel operational rotation

c. Use the engine throttle control to increase the engine speed to approximately 3/4 throttle.

d. Adjust the flow divider to set the airlock speed slightly slower than the recommended speed outlined in ***Table 6-1: Recommended airlock operational speeds*** found in the following section, *Operation of the Machine*. Increase the airlock speed by moving the flow divider control towards 10, decrease the airlock speed by moving the flow divider control towards 0. The speed of the airlock can be determined by counting the revolutions of the airlock indicator wheel.

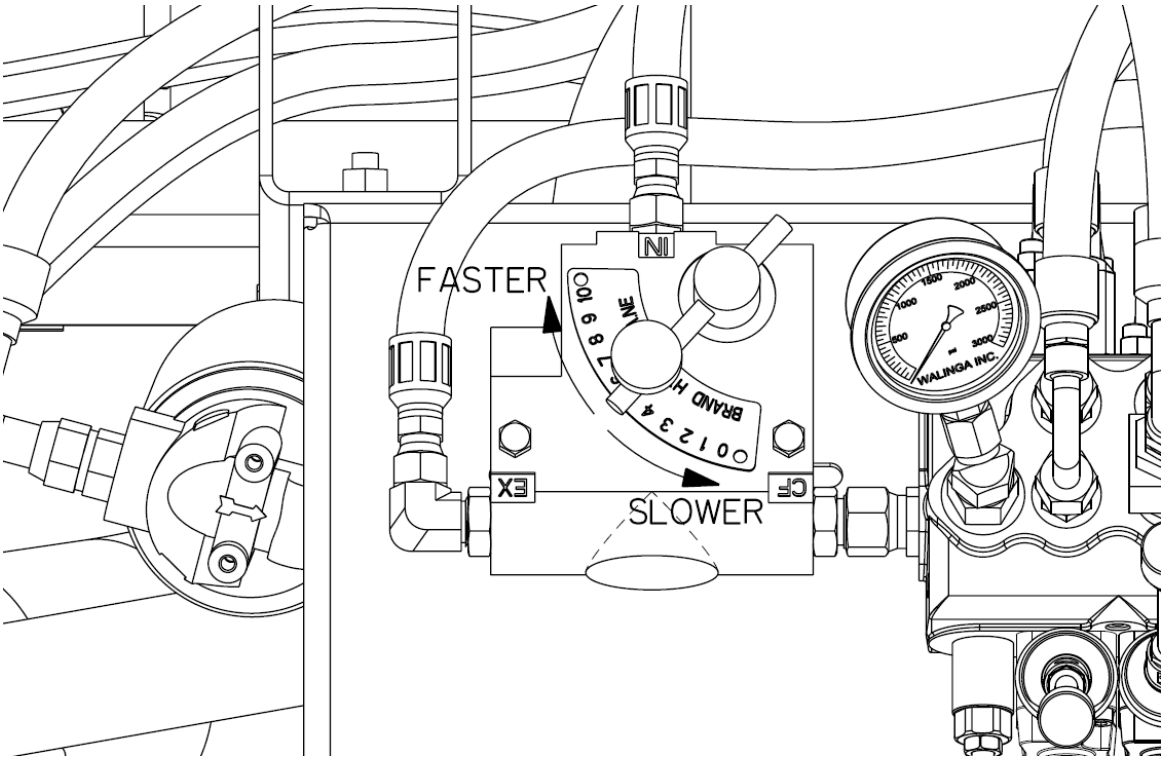


Figure 6-46: Flow divider airlock speed control

e. Return the engine to a low idle speed and stop the airlock by returning the airlock direction control lever to the center neutral position.

Operation of the Machine

To operate the Ultra-Vac, proceed as follows:

1. Ensure all steps of the above section *Starting the Machine* have been completed.
2. Increase the engine speed to approximately 3/4 throttle.

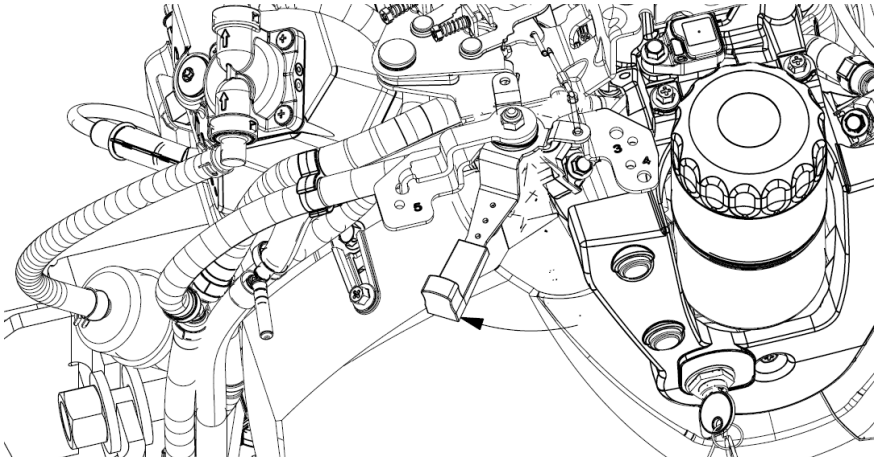


Figure 6-47: Engine 3/4 throttle position

3. Engage the airlock by setting the airlock direction control lever in the *START* position. Check the indicator wheel to ensure the airlock is turning in the forward direction.
4. Operate the Ultra-Vac at 3/4 speed for the first 10 minutes to warm the system before operating at full capacity.

   IMPORTANT: The hydraulic system must be warmed before operating at full capacity. The blower will not warm-up unless product is being conveyed.

   WARNING: Do **NOT** open the secondary AMS while the machine is running. Opening the secondary AMS can cause severe damage to the blower.
5. Align the intake line and nozzle with the storage structure access point and straighten the line as much as possible. Ensure any necessary bends have a large radius.

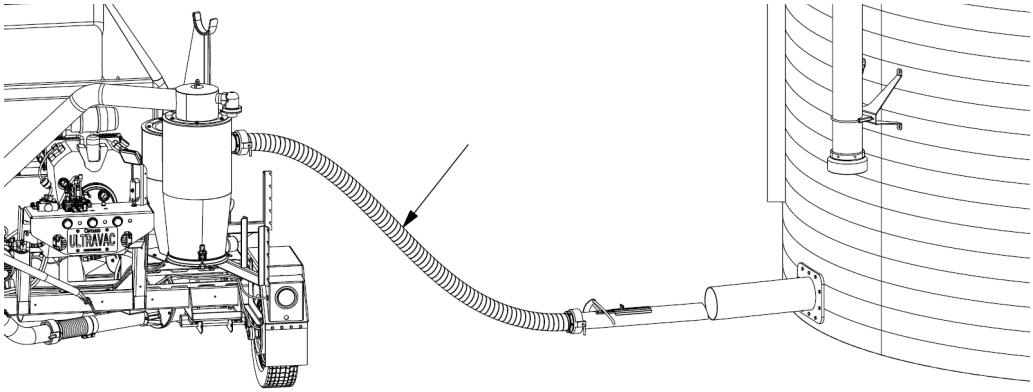


Figure 6-48: Intake line positioning

6. Open the air slide on the intake nozzle approximately 2 in (5 cm) and insert the end of the nozzle into the product. The nozzle inlet should be submerged below the surface of the product, but with the air slide above the surface. Operate at these settings until the Ultra-Vac is warmed (approximately 10 minutes).

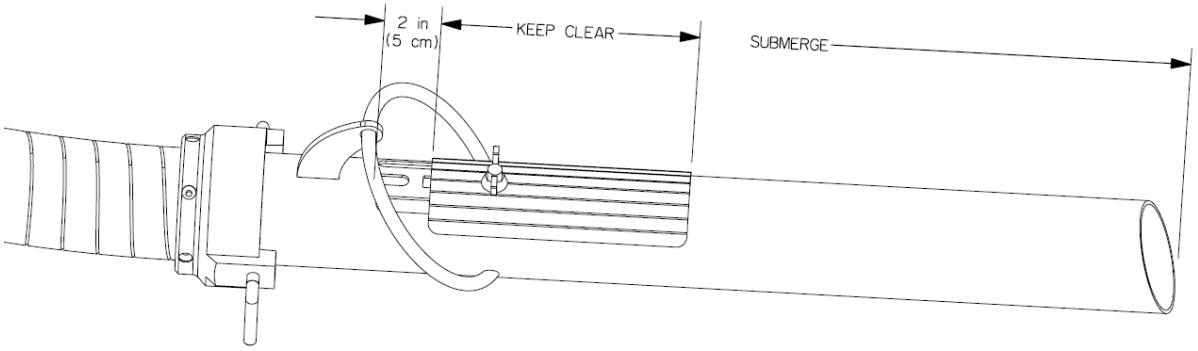


Figure 6-49: Initial intake nozzle positioning

7. After the warm-up period, bring the machine to full operating capacity as follows:
    a. Increase the engine speed to the rated rpm by moving the throttle to the full throttle position.

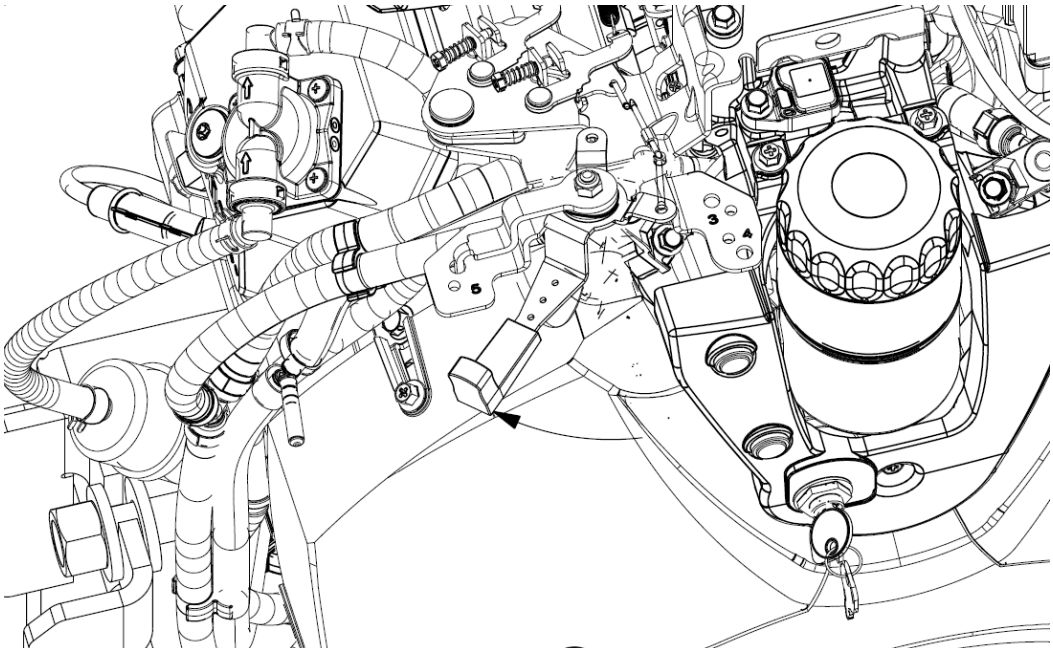


Figure 6-50: Engine full throttle position

    b. Slowly close the air slide until the intake line starts to pulsate. Open the air slide slightly until the pulsing stops.

c. Set the airlock speed for maximum capacity as follows:

i. Airlock speeds depend on the product and the distance being conveyed; the longer the suction distance, the slower the airlock should turn.

ii. For maximum capacity, the airlock pockets should be as full of the conveyed product as possible. To completely fill each pocket, the airlock should be run as slow as possible. The airlock can be run too fast, not allowing the product to fill each pocket. Do not exceed the recommended speeds.

iii. The recommended speeds can be found below:

Table 6-1: Recommended airlock operational speeds

Barley / Wheat	Corn / Oats / Beans	Specialty Crops *Pulses / Oilseeds*
20 - 35 rpm	15 - 30 rpm	10 - 15 rpm

iv. To determine the optimal speed for a given operational set-up, the airlock should be started slower than the recommended speed.

v. Watch the window of the primary AMS to assess the product movement through the Ultra-Vac. The window can be covered by the product, but the product must not be stationary. As the product against the window becomes stationary, slowly increase the airlock speed until there is no stationary product.

NOTE: For maximum capacity, the airlock should always be run as slow as possible. Do not operate the airlock above the recommended speeds.

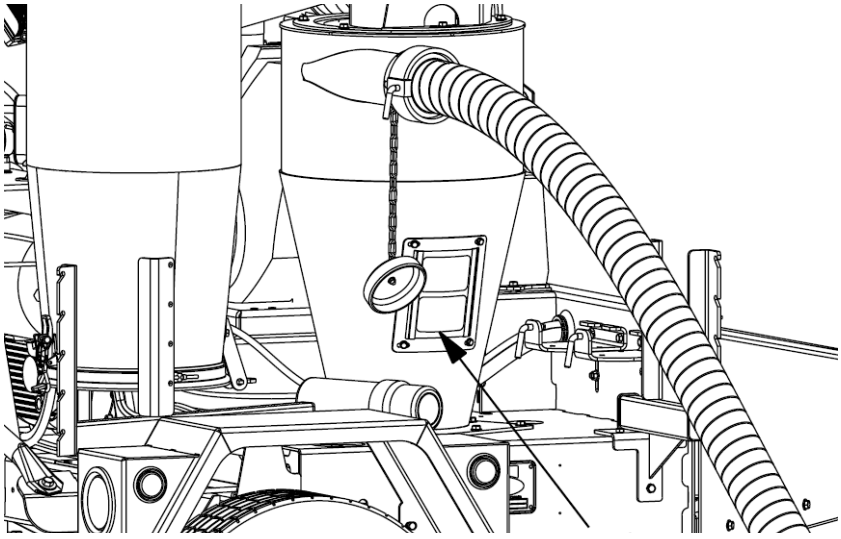


Figure 6-51: Observation window

d. Adjust the opening of the air slide as necessary. For maximum capacity, the air slide should be opened as little as possible. If the Ultra-Vac begins to pulsate, open the air slide slightly until the pulsing stops to achieve the ideal balance of product and air flow.

e. Monitor the flow of product through the Ultra-Vac and experiment with the following to achieve the optimal performance of your Ultra-Vac with your specific operating conditions:

   i. Increase or decrease the amount of product entering the nozzle.

   ii. Increase or decrease the airflow by opening or closing the air slide.

   iii. Increase or decrease the airlock speed.

f. For specialty crops, such as sunflower seeds, lentils among others, it is necessary to slow the airlock speed to allow more time for the product to enter the rotating pockets. Use the above adjustment methods to achieve the optimal capacity. The engine speed should also be reduced by 1/4 to 1/2 the rated rpm to give a gentler action through the Ultra-Vac.

8. Run the Ultra-Vac at the maximum capacity until there is approximately 12 in (30 cm) of grain in the storage structure. Exchange the straight intake nozzle for a clean-up nozzle and rubber intake line, refer to **Section 7: Maintenance and Adjustments** for instructions on exchanging nozzles. Resume operation and convey any remaining grain.

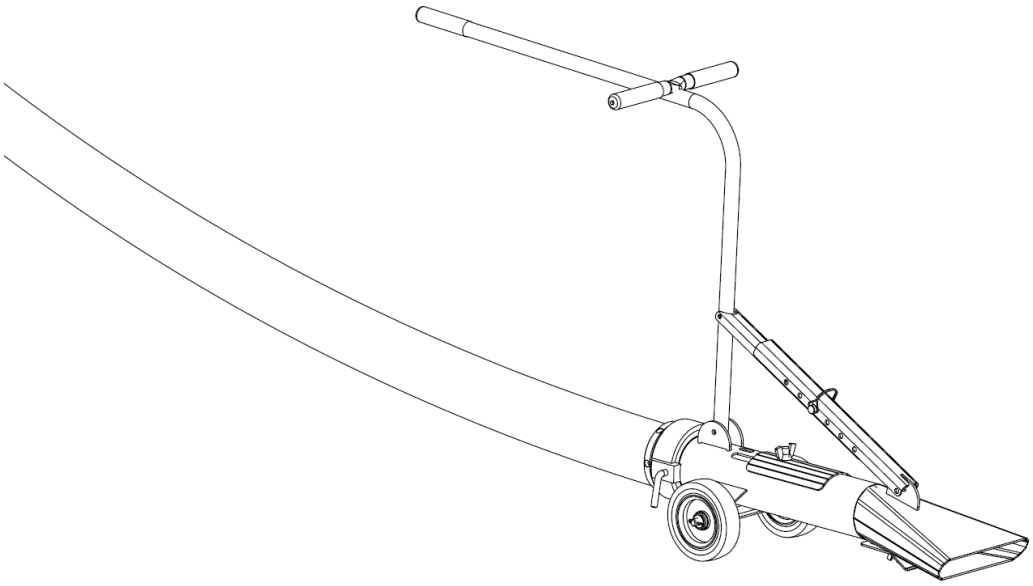


Figure 6-52: Clean-up nozzle and hose

a. Familiarize yourself with the safety hazards and requirements regarding storage structures as detailed in **Section 4: Safety**.

b. When entering bins, silos, or tanks, ensure the structure is properly vented.

c. Only enter a storage structure when the grain level is less than 12 in (30 cm) above solid footing.

d. Do not enter the storage structure if there is grain stuck on the walls. Avalanching grain can cause suffocation.

e. Do not enter silo bags. Always slice the sides of the silo bags. Open and roll back the sides of the silo bag before removing the grain.

f. Ensure there is a second capable person monitoring any time someone has entered a storage structure in case of emergencies.

The configuration of the Ultra-Vac can be altered to allow for unloading directly into a bin instead of through the boom and discharge cyclone, as well as for use in blow-only operations. To change the configuration of your Ultra-Vac, refer to **Section 7: Maintenance and Adjustments** for detailed instructions.

Stopping the Machine

To stop the Ultra-Vac during normal operation, proceed as follows:

1. Remove the intake nozzle from the product.
2. Allow the unit to continue running until there is no longer product being discharged from the cyclone.
3. Stop the airlock by moving the control lever to the center neutral position.

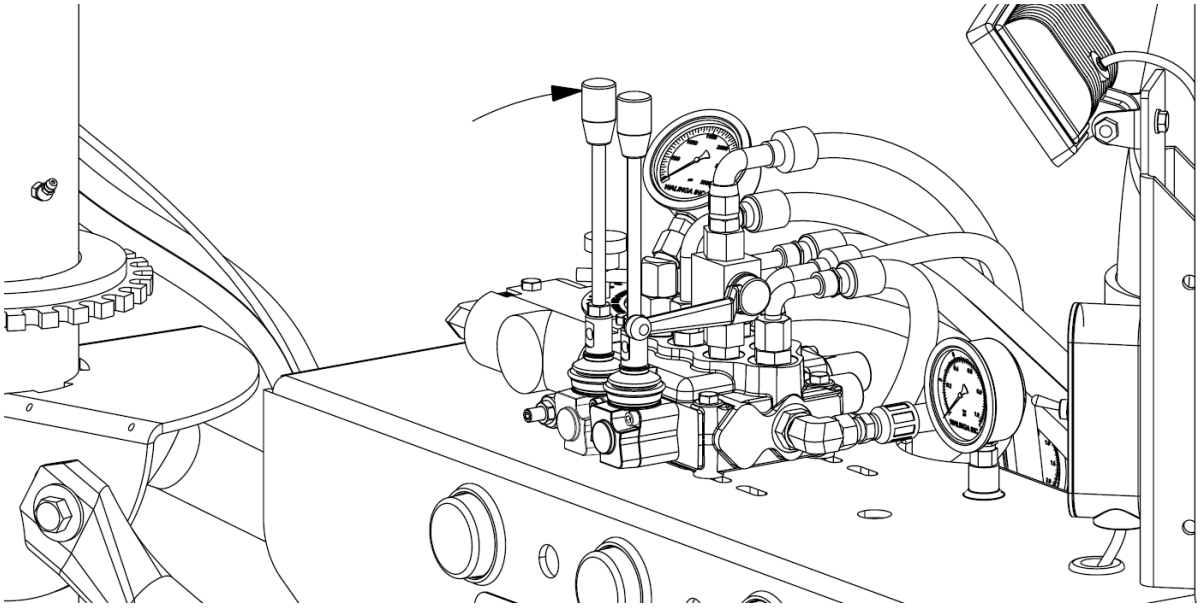


Figure 6-53: Airlock control lever stopping position

4. Adjust the engine speed to 3/4 throttle. Stopping the engine at a lower speed may cause the engine to backfire, potentially causing damage to or failure of the internal components of the engine.

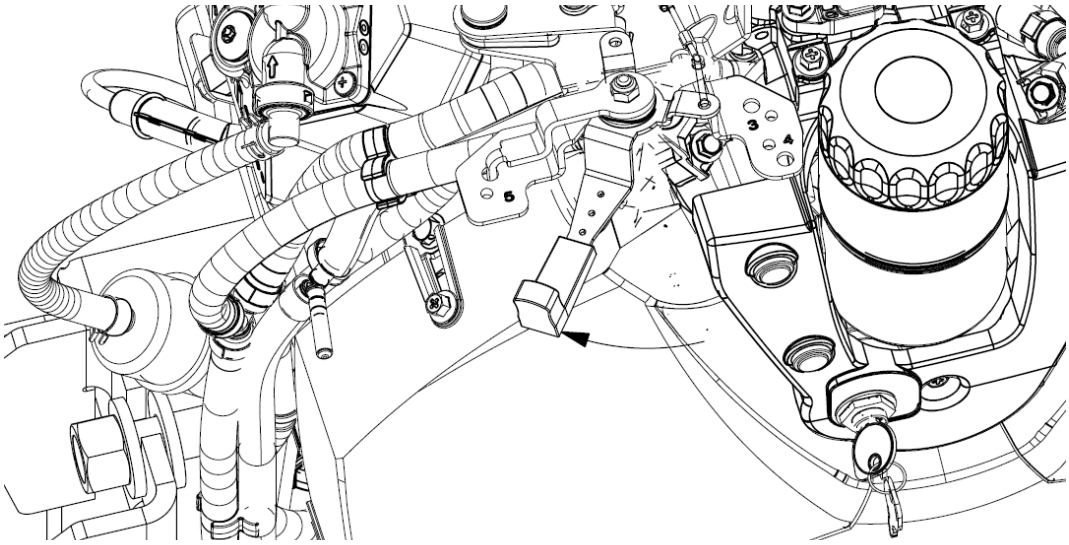


Figure 6-54: Engine 3/4 throttle position

5. Stop the engine by moving the ignition key to the *OFF* position.

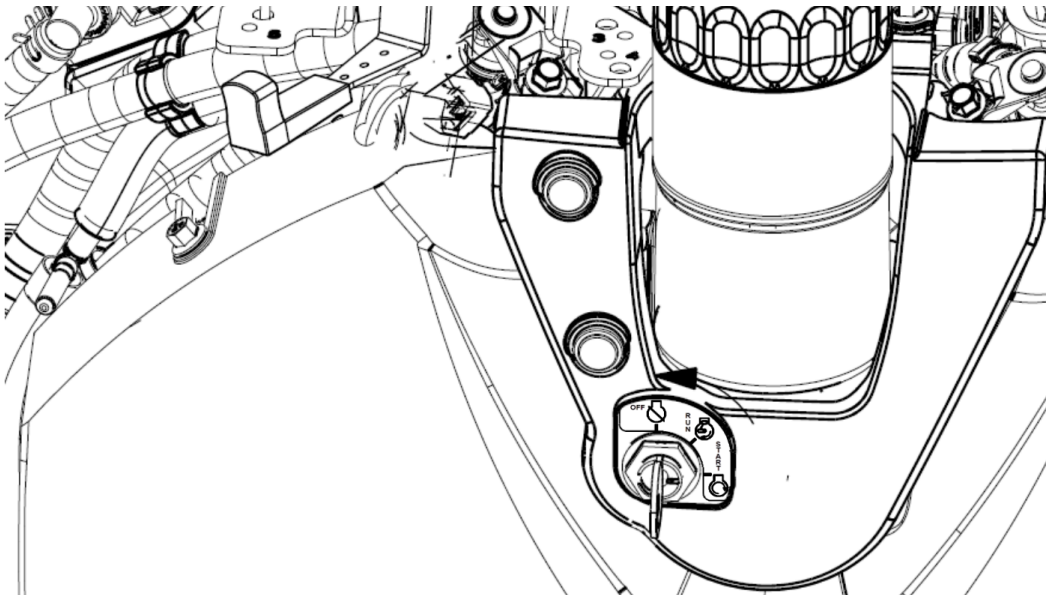


Figure 6-55: Ignition key in OFF position

6. Empty and clean the secondary AMS tank with reference to **Section 7: Maintenance and Adjustments**. In dirty or dusty conditions, it may be necessary to empty and clean the secondary AMS more frequently to prevent significant damage to the blower.

7. With reference to **Section 7: Maintenance and Adjustments**, review the maintenance schedule and perform any required maintenance on the Ultra-Vac.
8. Proceed to prepare the Ultra-Vac for storage or transportation with reference to **Section 5: Machine Life-Cycle Procedures**.

In emergency situations, for example, if the safety of a person is threatened, it may be necessary to immediately shut-down the Ultra-Vac. To avoid potential damage to the blower and other Ultra-Vac components, the following should only be used in an emergency situation.

To shut-down the Ultra-Vac in an emergency:

1. Pull the nozzle out of the grain.
2. Stop the airlock by moving the control lever to the center neutral position.
3. Move the engine ignition key to the *OFF* position.

Clearing Blockages

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

1. Remove the intake nozzle from the product to prevent any further obstructions.
2. **DO NOT** open any access point or reach into the airlock to clear an obstruction.
3. Attempt to dislodge the obstruction by momentarily moving the airlock control lever to the *REVERSE* position.

   NOTE: Operating the airlock in the reverse direction for extended periods can cause damage and potential failure of the airlock and its components.

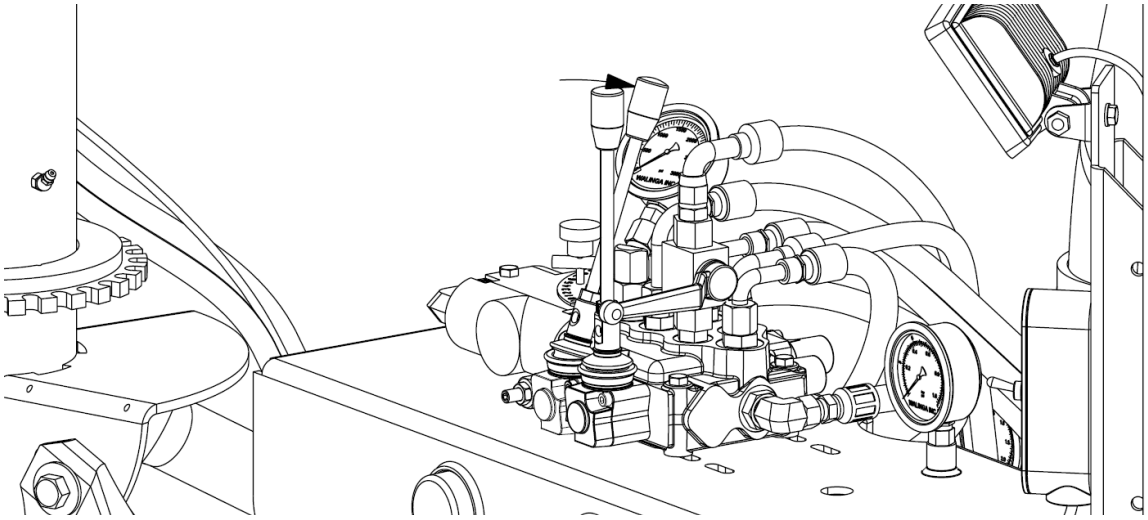


Figure 6-56: Airlock control lever REVERSE position

4. If the blockage does not clear, alternate several times between the forward and reverse directions to loosen and dislodge the obstruction.
5. If the blockage does not clear, the blockage must be removed manually as follows:
    a. Refer to the above section, *Stopping the Machine*, to completely shut down the Ultra-Vac.
    b. Lock-out all power sources, and remove the ignition key from the engine.
    c. With the engine stopped, shift the airlock control lever from the forward to reverse direction 3 - 4 times to relieve any stored (potential) energy within the hydraulic system.
    d. Remove the observation window and/or the airlock outlet assembly to gain access to the airlock and the obstruction.

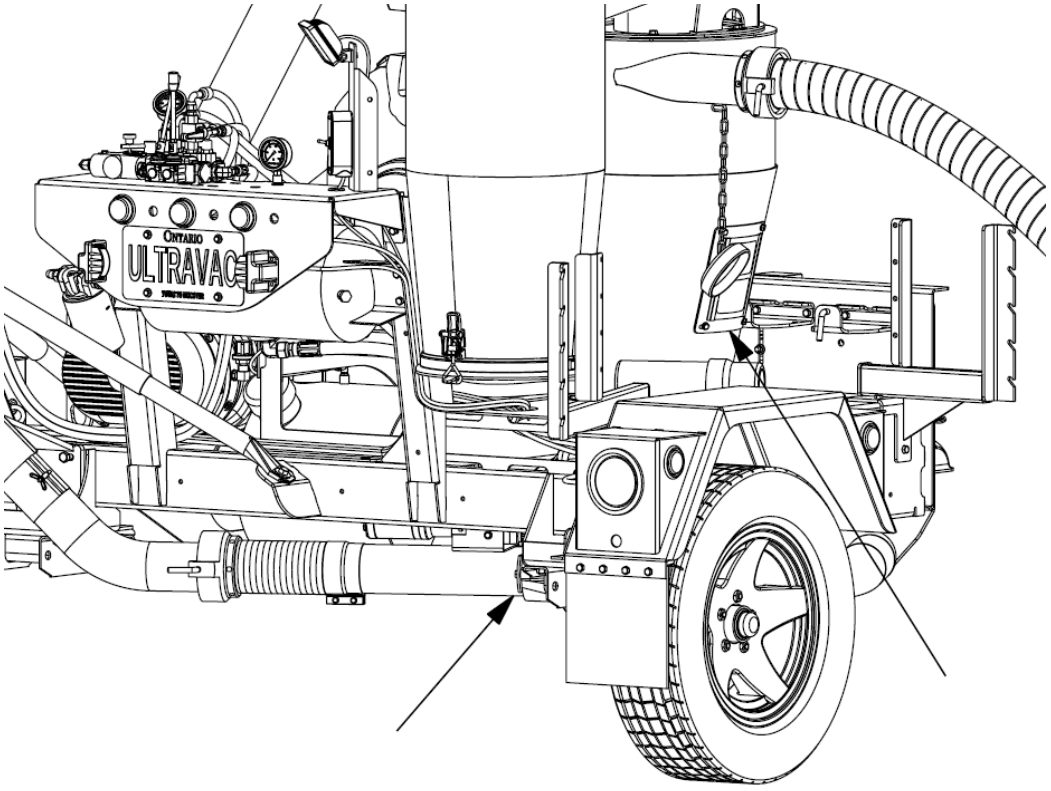


Figure 6-57: Airlock obstruction access

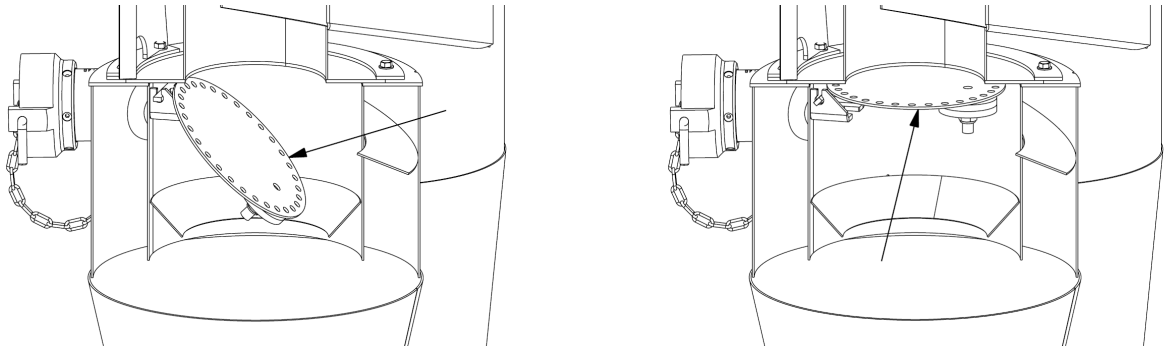
    e. Manually remove the obstruction.
    f. Inspect the airlock for any signs of damage. Repair or replace any components as necessary with reference to **Section 7: Maintenance and Adjustments**.
    g. Reinstall and secure the observation window and/or the lower boom elbow.
6. Once the obstruction has been cleared, ensure the primary AMS safety choke is disengaged and resume normal operation.

To clear a blockage from the intake or discharge line, proceed as follows:

1. With the Ultra-Vac still in operation and the airlock rotating, remove the intake nozzle from the material supply.
2. Slowly decrease and then slowly increase the engine speed.
3. Repeat the engine speed adjustments several times.
4. If the blockage does not clear, the blockage must be manually cleared.
    a. Decrease the engine speed to an idle and allow the system to operate at idle speed for approximately one minute.
    b. Follow the standard shut-down procedures and stop the machine.
    c. Disconnect the line from the coupler of the Ultra-Vac.
    d. Manually clear the blockage from the line.
        i. Blockages may be cleared from intake lines by connecting the line to the discharge coupler of the airlock and operating the machine following standard operating procedures for a short period of time.
        ii. Blockages may be cleared from discharge lines by connecting the line to the intake coupler of the primary AMS and operating the machine following standard operating procedures for a short period of time.

    NOTE: the inner surfaces of the lines are designed for product flow in one direction only. Using an intake line for discharge or a discharge line for intake will result in product damage.
5. Once the obstruction has cleared, ensure the primary AMS safety choke is disengaged and resume normal operation.

To protect the Ultra-Vac and its components, a safety choke is installed in the primary AMS. In the event of a blockage, the safety choke may become engaged. Before resuming normal operation, the safety choke must be disengaged. Follow normal shut-down procedures to stop the Ultra-Vac. Once the machine is stopped, the safety choke will disengage and return to its neutral position. With the safety choke disengaged, normal operation may be resumed.



Disengaged *Engaged*

Figure 6-58: Primary AMS safety choke

OPERATING TIPS AND HINTS

To achieve the best performance from your Ultra-Vac keep the following in mind:

- Keep the hoses as full as possible for maximum capacity.
- Pull the intake nozzle out of the grain and empty the machine before changing trucks or containers that are being loaded to prevent product spillage.
- Maximum capacity is achieved when using large diameter steel intake lines. Only use rubber or polyurethane lines for final clean-up.
- Position the Ultra-Vac and route the lines to minimize the number of bends and corners. If a corner is necessary, use a large radius elbow, or position the flex hose to create a large radius bend.
- Operate only at the rated speeds and never tamper with the engine governor.
- Keep the lines as short as possible to minimize friction losses.
- If long distance moving is required, use solid metal tubing whenever possible.
- When standing on top of a pile of grain, do not push the intake nozzle into the pile at your feet. The suction of the Ultra-Vac is sufficient to pull the nozzle and operator into the pile. If the pile is deep enough, the operator can become submerged in the grain and be suffocated.

TROUBLESHOOTING

Reference ***Table 6-2*** through ***Table 6-6*** for assistance with some of the most common issues, causes and solutions that you may face during the operation of your Ultra-Vac. If you encounter a problem that is difficult to solve, even after having referenced the following tables, please contact your Walinga dealer or representative. Before you call, please have your Operator's Manual and your Ultra-Vac's serial number ready and available.

For detailed procedures and diagrams for the proposed solutions, reference **Section 6: Operation** and **Section 7: Maintenance and Adjustments**.

Table 6-2: Troubleshooting for mobile transfer unit

ISSUE	CAUSE	SOLUTION
Slow pick up of material	Power source	Check the engine RPM.
	Air leaks	Tighten all vacuum connections. Ensure all seals are in good condition.
		Tighten primary AMS to base. Check seal on secondary AMS bottom door. Close and secure.
		Ensure the primary AMS window is tight and well sealed.
		Check the vacuum relief valve. Clean or replace as required.
		Check the pressure relief valve. Clean or replace as required.
		Check for leaking vacuum hoses or fittings.
	Defective blower	Check the clearance between the lobes and the casing. Excessive clearance will decrease the air flow. Consult your dealer.
	Defective airlock	Check that the tip clearance matches the specifications. Adjust or replace tips as required.
	Improper sealing of air slide	Reset air slide.
	Hose and pipe bends	Sharp bends in the intake hoses or pipes can significantly reduce capacity. Keep all intake lines as straight as possible.
	Intake line blockage	Clear the blockage from the intake line and ensure the safety choke is not engaged.
	Primary AMS choke activated	Follow the shut-down procedures to stop the machine. Allow the choke to drop down into the disengaged position. Resume operation.

ISSUE	CAUSE	SOLUTION
Slow discharge of material	Power source	Check the engine RPM.
	Air leaks	Tighten all pressure connections. Ensure seals are in good condition.
		Check the pressure relief valve. Clean or replace as required.
	Defective blower	Check the clearance between the lobes and the casing. Excessive clearance will decrease the air flow. Consult your dealer.
	Defective airlock	Check that the tip clearance matches the specifications. Adjust or replace tips as required.
	Incorrect airlock speed	Reset flow control so the airlock runs at the recommended speed for the conveyed material.
		Check for leaking hydraulic hoses or fittings.
	Hose and pipe bends	Sharp bends in the discharge hoses or pipes can significantly reduce capacity. Keep all discharge lines as straight as possible.
	Discharge line blockage	With the airlock still rotating, pull the nozzle from the material supply. Decrease the speed slowly and then increase slowly. Repeat the speed adjustments several times. If the blockage does not clear, decrease the speed to idle. Allow the system to idle for 1 minute then disengage the blower and shut down the system. Manually clear the lines. Discharge lines may be cleared by connecting to a suction inlet.
Pulsation	Insufficient air flow	Open the air slide on the nozzle to provide more air.
		Increase the blower speed.
		Decrease the diameter of the intake piping.
	Too many bends	Straighten the intake and discharge lines.

ISSUE	CAUSE	SOLUTION
Material damage	Liners worn out	Replace wear liners in the discharge cyclone or the primary AMS as required.
	Poor connections	Tighten and seal all connections.
	Lines wearing	Eliminate elbows. Keep lines as straight as possible and provide a large radius for any necessary bends.
	Excessive speed	Decrease the air flow by slowing the blower.
		Increase the material quantity by closing the air slide.
		Increase the diameter of the intake piping.
		Check the speed of the airlock.
Blower bogging down	Dirt from secondary AMS going through blower	Clean the interior surfaces of the blower. Clean more frequently in dirty conditions. Clean the secondary AMS.
Hydraulics overheating	Low oil level	Check the oil level in the Ultra-Vac. Add oil as required.
	Poor oil quality	Replace with oil of required specifications as identified in **Section 7: Maintenance and Adjustments**.
	Defective hoses or tubes	Check the hoses, lines and couplers. Repair or replace as required.
	Blocked filter	Check the filter for blockages and repair or replace as required.
	Incorrect airlock speed	Check the speed control valve. If oil flow continues at the 0 setting, repair or replace the valve.
	Airlock clearances too tight	Check and adjust airlock tip clearances.

Table 6-3: Troubleshooting for blower

ISSUE	CAUSE	SOLUTION
Low air volume	Slow speed	Check the blower speed with a tachometer. Increase the speed.
		Check for slipping belts. Adjust the belt tension as required.
	Piping blocked	Check the inlet and outlet piping. Remove any obstructions.
		Check the relief valves. Clean, repair or replace as required.
	Excessive pressure rise	Check the inlet vacuum and discharge pressure and compare with recommended conditions. Determine the cause before continuing.
	Worn components	Check the blower clearances and replace the defective components. Consult your Walinga dealer or representative.
Overheating	Inadequate lubrication	Check the oil level in the reservoirs. Add oil as required.
	Excessive lubrication	Check the oil level in the reservoirs. Drain excess oil as required.
	Excessive pressure rise	Adjust operating conditions to reduce the pressure rise to below 10 psi (70 kPa).
	Coupling misalignment	Check and realign the coupling.
	Insufficient air flow	Open the air slide on the intake nozzle.
	Incorrect line size	Use larger diameter intake or discharge lines
Engine overloading	Speed too high	Check and decrease the speed to the recommended RPM.
	Pressure too high	Adjust the operating conditions to set the pressure rise to below 10 psi (70 kPa). Add more air by opening the air slide.
	Blower impellers rubbing	Consult your Walinga dealer or representative.

Table 6-4: Troubleshooting for airlock

ISSUE	CAUSE	SOLUTION
Noisy airlock	Tips hitting casing	A light grinding noise is normal for some time after adjustment of the airlock tip clearances. The noise will disappear after the tips seat fully on the casing. If the noise is excessive or does not decrease, re-adjust the tips where applicable.
	Incorrect direction of rotation	The airlock operates continuously in one direction only. Check that the shaft rotates in a counter-clockwise direction when viewed from the driven end of the unit. Continuous operation in reverse will cause excessive wear and may damage the rotor tips, tip wiper, casing, and bearings.
	Bearing failure	Remove the cover plate(s) and replace the bearing(s). Re-pack with grease. Check the clearances between the rotor blades and end plates after replacing the bearing(s).
Airlock stalls	Obstruction in airlock preventing blade rotation	Refer to procedures detailed in *Clearing Blockages* to remove the obstruction.
	Insufficient oil flow	Check the couplings and lines.
		Check for defective hydraulic pump. Repair or replace as required.
	Prolonged operation in reverse direction	The airlock operates in a counter-clockwise direction when viewed from the driven end. Operation in the incorrect direction for extended periods damages the rotor blades and tips and may cause jamming. Check and repair as required.
	Insufficient rotor or tip clearance with casing or end plates	Check the tips and rotor clearances and adjust to the correct specifications as required.
	Faulty hydraulic motor, flow divider or relief valve	Service the motor, flow divider and pressure relief valve and repair, adjust or replace as required.
	Airlock hydraulic drive out of alignment	Check the hydraulic motor position and realign if necessary.

Air loss through airlock	Excessive clearance between blade tips and casing	Adjust the tips to decrease the clearance to the required specifications. Excessive clearance causes operating problems including bridging and erratic flow. Prolonged operation with excessive clearances will cause uneven casing wear, resulting in lower performance even after tip adjustment.
Airlock blade tip or flexible wiper breakage	Prolonged operation in reverse direction	The airlock must operate in a counter-clockwise direction when viewed from the driven end. Change the rotational direction and repair or replace the tips or wiper as required.
	Wiper fouling blade tips	Re-adjust the clearance of the wiper blade on the blade tips.

Table 6-5: Troubleshooting for belt drive

ISSUE	CAUSE	SOLUTION
Loss in drive speed	Belts slipping	Tighten belts as required.
	Localized belt wear	Check the cross-sectional dimension. If it is too narrow, the pulley is spinning. If it is too wide, the belt is failing internally. Replace with a matched set and tighten to required specifications.
	Unequal stretch on belts	Defective belts. Replace with a matched set.
	Belts overloaded	Belts failed or worn out. Replace belts with a matched set.
	Belt separation	Belts too tight. Replace belts and tighten to required specifications.
	Envelope seams opening	Check for oil or rubber solvent. Eliminate any contamination and replace belts.
	Abnormal envelope wear	Check for worn sheave, misalignment or slip. Replace any defective parts, adjust properly, and replace the belt.
	Belt softening or swelling	Eliminate oil or rubber solvent and replace the belt.
	Belt hardening or cracking	Eliminate heat or chemical contamination and replace the belt.

Table 6-6: Troubleshooting for engine*

	Possible Cause								
Problem	No Fuel	Improper Fuel	Dirt in Fuel Line	Broken Fusible Link	Dirty Debris Screen	Incorrect Oil Level	Engine Overloaded	Dirty Air Cleaner	Faulty Spark Plug
Will Not Start	X	X	X	X		X	X	X	X
Hard Starting		X	X			X	X	X	X
Stops Suddenly	X		X		X	X	X	X	X
Lacks Power		X	X		X	X	X	X	X
Operates Erratically		X	X		X		X	X	X
Knocks or Pings		X			X		X		X
Skips or Misfires		X	X		X			X	X
Backfires			X				X	X	X
Overheats			X		X	X	X	X	
High Fuel Consumption							X	X	X

✻ For a complete list of troubleshooting issues, causes and detailed solutions, please refer to the operator's manual of your engine.

WALINGA® INC.

Maintenance and Adjustments

ULTRA-VAC MODEL 4510G

MAINTENANCE SCHEDULE

HOUR READING AT TIME OF SERVICE:														
SERVICED BY:														
Every 8 HOURS or DAILY or 500 TONNES (18 750 BUSHELS)														
Check Drive Belt Tension and Alignment	***[7-4]***													
Clean Secondary AMS	***[7-8]***													
Inspect Muffler	***[7-11]***													
Check Blower Reservoir Oil Level	✻													
Clean Blower Breathers	✻													
Every 20 HOURS or WEEKLY or 1000 TONNES (37 500 BUSHELS)														
Check Discharge Cyclone Wear Liner	***[7-15]***													
Lubricate Blower Drive Shaft	***[7-15]***													
Lubricate Airlock Motor Coupling	***[7-17]***													
Lubricate Boom Swivel	***[7-19]***													
Check Airlock Wiper Blade	✻													
Check Engine Air Filter Minder	✻													
Every 1600 TONNES (60 000 BUSHELS)														
Reset Airlock	✻													
Every 40 HOURS or MONTHLY or 2500 TONNES (93 750 BUSHELS)														
Lubricate Rod End of Boom Lift Cylinder	***[7-20]***													
Lubricate Boom Hinge	***[7-21]***													
Lubricate Swivel Couplings	***[7-22]***													
Every 100 HOURS or ANNUALLY or 5000 TONNES (187 500 BUSHELS)														
Check Vacuum and Pressure Relief Valves	***[7-24]***													
Check Airline Seals	***[7-25]***													
Change Blower Reservoir Oil	✻													
Reset Airlock Blades (If Required)	✻													
Change Engine Oil and Filter	✻													
Clean Engine Cooling Areas and Surfaces	✻													
Replace Engine Spark Plugs and Set Gap	✻													
Every 150 HOURS														
Check Engine Air Cleaner Element	✻													
Replace Engine Electronic Fuel Injection Fuel Filter	✻													
Clean Engine Oil Cooler Fins	✻													
Every 300 HOURS														
Replace Engine Air Cleaner Element	✻													
Every 600 HOURS														
Replace Engine Inner Air Cleaner Element	✻													

✻ Refer to the blower, airlock or engine operator's manuals for detailed procedures and requirements.

MAINTENANCE SAFETY

Unsafe workshop and servicing practices increase the risk of injury around machinery. Review the following safety guidelines for important information regarding safety involved with maintenance operations.

- 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 or repairs or making any adjustments.
- Place all controls in neutral, stop the engine, disconnect all electrical sources, disconnect and ground the engine spark plug leads, disconnect the negative (—) engine battery cable, set the parking brake on the towing vehicle, remove ignition keys and wait for all moving parts to stop before servicing, adjusting or maintaining.
- Support the machine with blocks or safety stands when changing tires or working beneath the machine.
- Follow good shop practices:
    a. Keep the service area clean and dry.
    b. Ensure electrical outlets and tools are properly grounded.
    c. Use adequate lighting for the job at hand.
- Use only tools, jacks and hoists of sufficient capacity for the job.
- Keep hands, feet, hair, and clothing away from all moving and/or rotating parts.
- Before applying pressure to a hydraulic system, ensure all lines, fittings and couplers are tight and in good condition.
- Relieve pressure from the hydraulic circuit before servicing.
- Ensure all guards are in place and properly secured upon completion of maintenance.

MAINTENANCE PROCEDURES

Greasing

1. Use a hand-held grease gun for all greasing. Air powered greasing systems can damage the seals on bearings and lead to premature failure.
2. Wipe the grease fitting with a clean cloth before greasing to avoid injecting dirt and grit.
3. Replace or repair broken fittings immediately.
4. If the fitting will not take grease, remove and clean thoroughly. Clean the lubricant passageway. Replace the fitting if necessary.

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, stop the engine/power source, remove the ignition key, disconnect and ground the engine spark plug leads, disconnect the negative (—) engine battery cable, and wait for all moving parts to stop.
3. Remove the fasteners securing the belt guard and remove the belt guard.

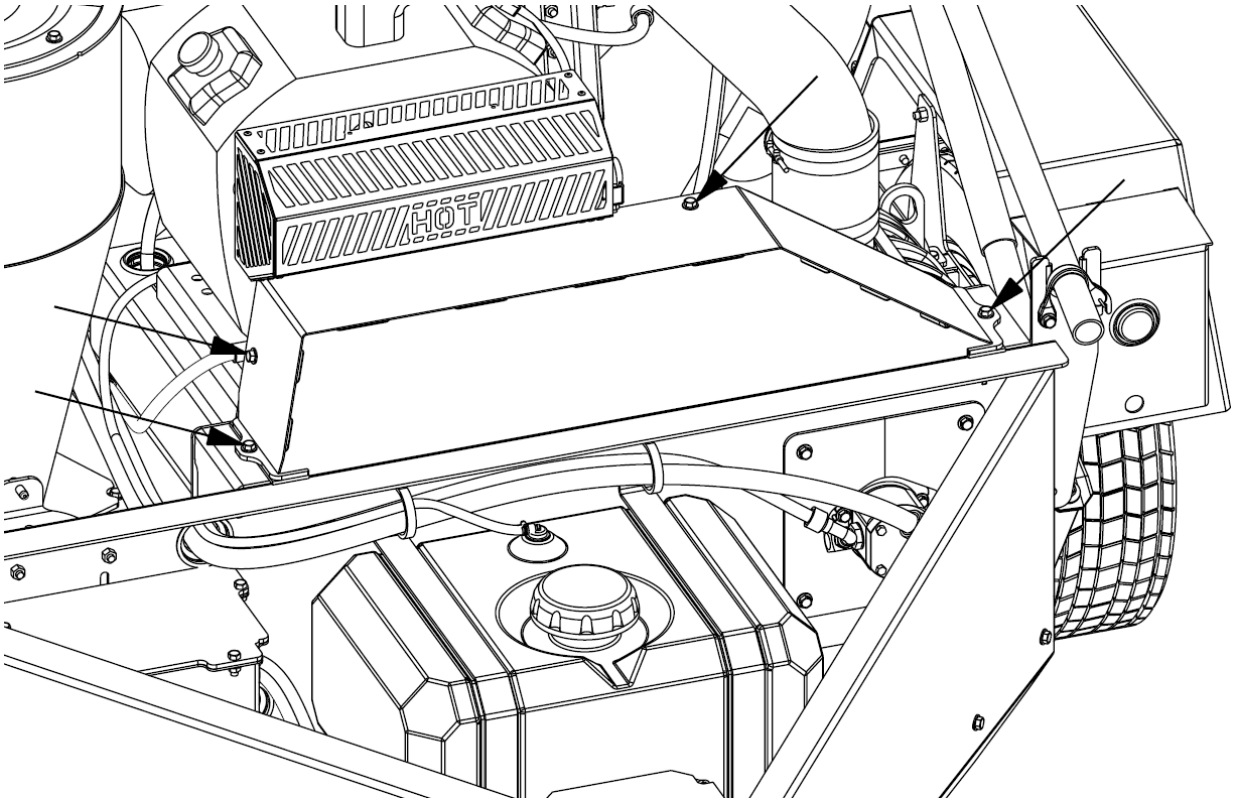


Figure 7-1: Drive belt guard fasteners

4. Use a belt tensioning tool to determine the belt deflection in a static condition. Reference ***Figure 7-2*** and ***Table 7-1*** for requirements.

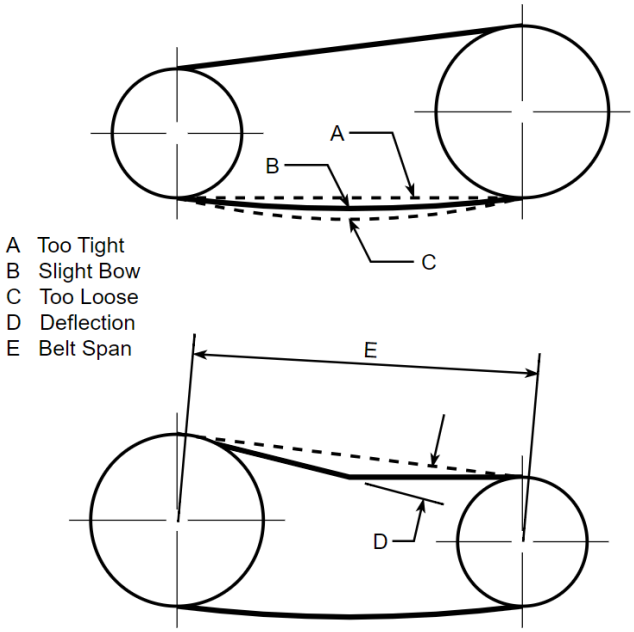


Figure 7-2: Drive belt deflection

Table 7-1: Drive belt requirements

Belt Tension	Belt Deflection
6.30 lbs (2.86 kg)	0.40 in (10.16 mm)

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

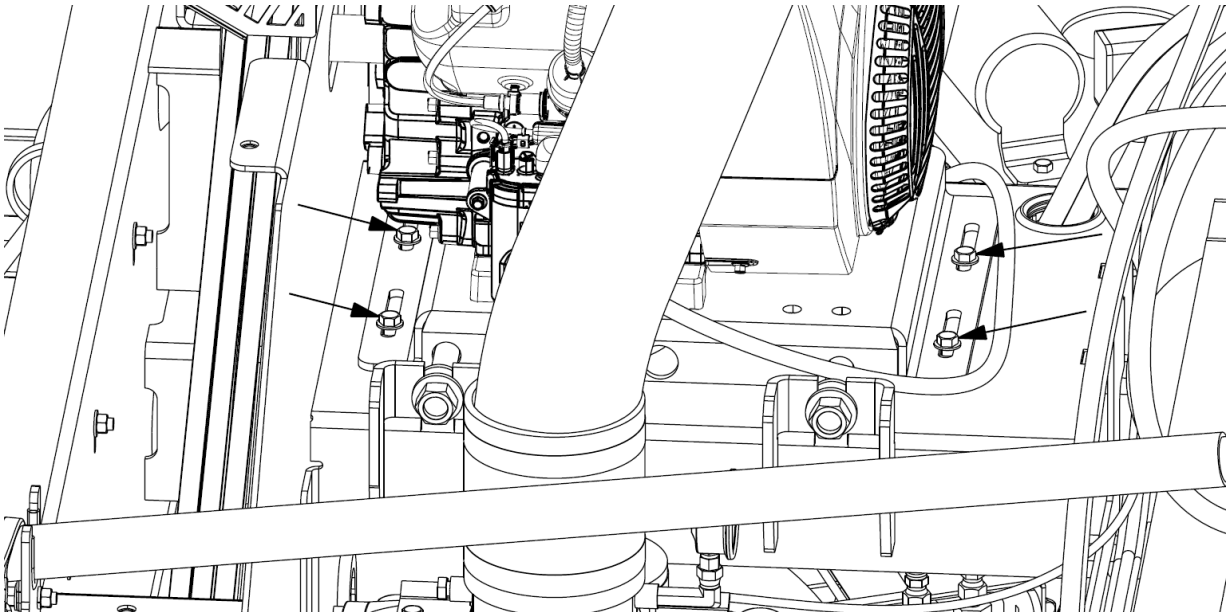


Figure 7-3: Slide frame fasteners

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.

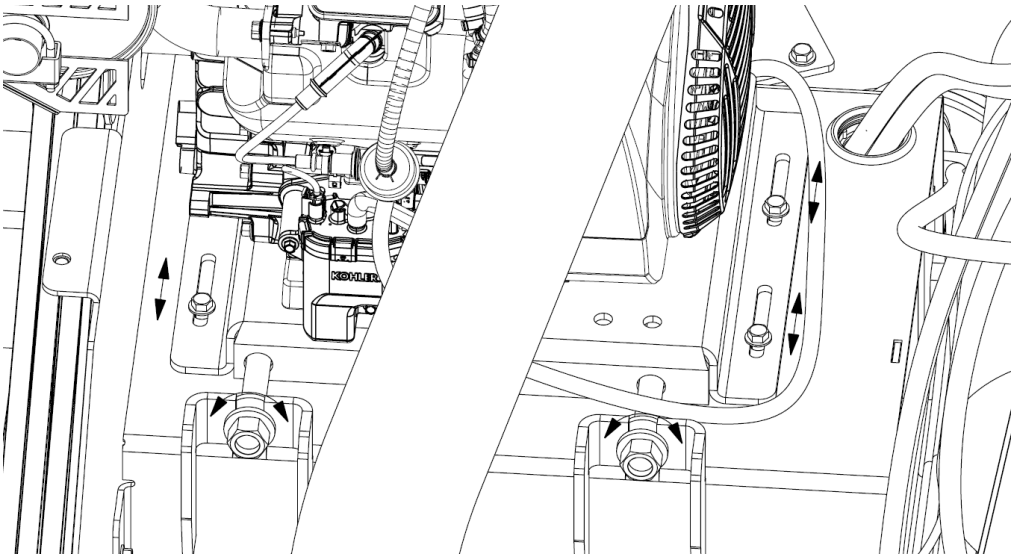


Figure 7-4: Slide frame adjusting rods

c. 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.

d. 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**.

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

f. Install and secure the belt guard and belt guard bolts.

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

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

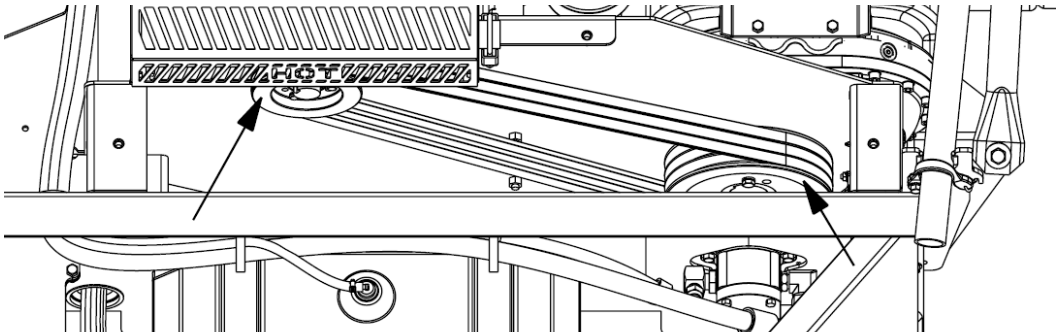


Figure 7-5: Pulley alignment

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 7-6*** for the different types of alignment issues.

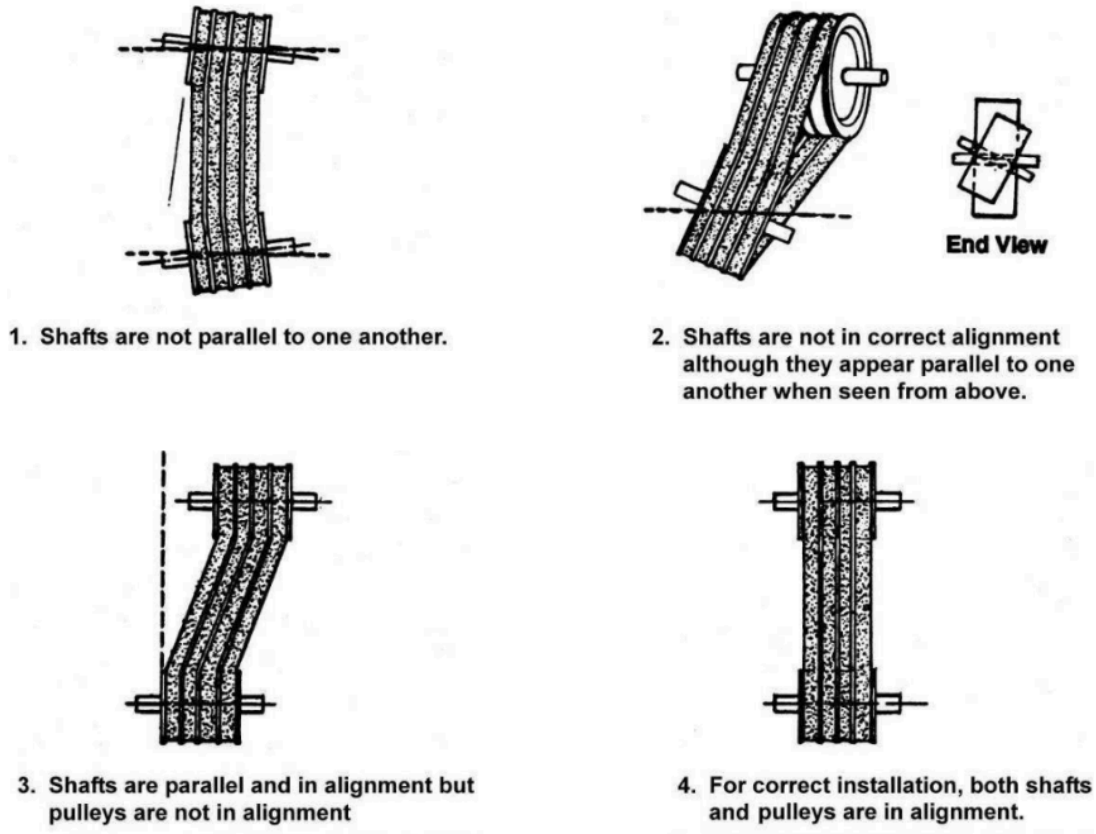


Figure 7-6: Pulley and shaft misalignment

d. If there appears to be Type 1 Misalignment, as seen in ***Figure 7-6***, 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 7-6***, 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 7-6***, 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.

Cleaning of Secondary AMS

The secondary AMS prevents dust, dirt, and contaminants from entering the blower. To maintain proper function, and to prevent significant damage to the blower, the secondary AMS must be regularly emptied and cleaned. The secondary AMS may need to be more frequently emptied if the Ultra-Vac is operated in dirty or dusty conditions.

To clean the secondary AMS, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, stop the engine/power source, remove the ignition key, disconnect and ground the engine spark plug leads, disconnect the negative (—) engine battery cable, and wait for all moving parts to stop.
3. Ensure the blower is stopped. Opening the secondary AMS door while the blower is running can cause the accumulated dirt, dust and debris to be drawn into the blower, causing significant damage.
4. Position a receptacle below the secondary AMS to catch the dirt, dust, and debris.

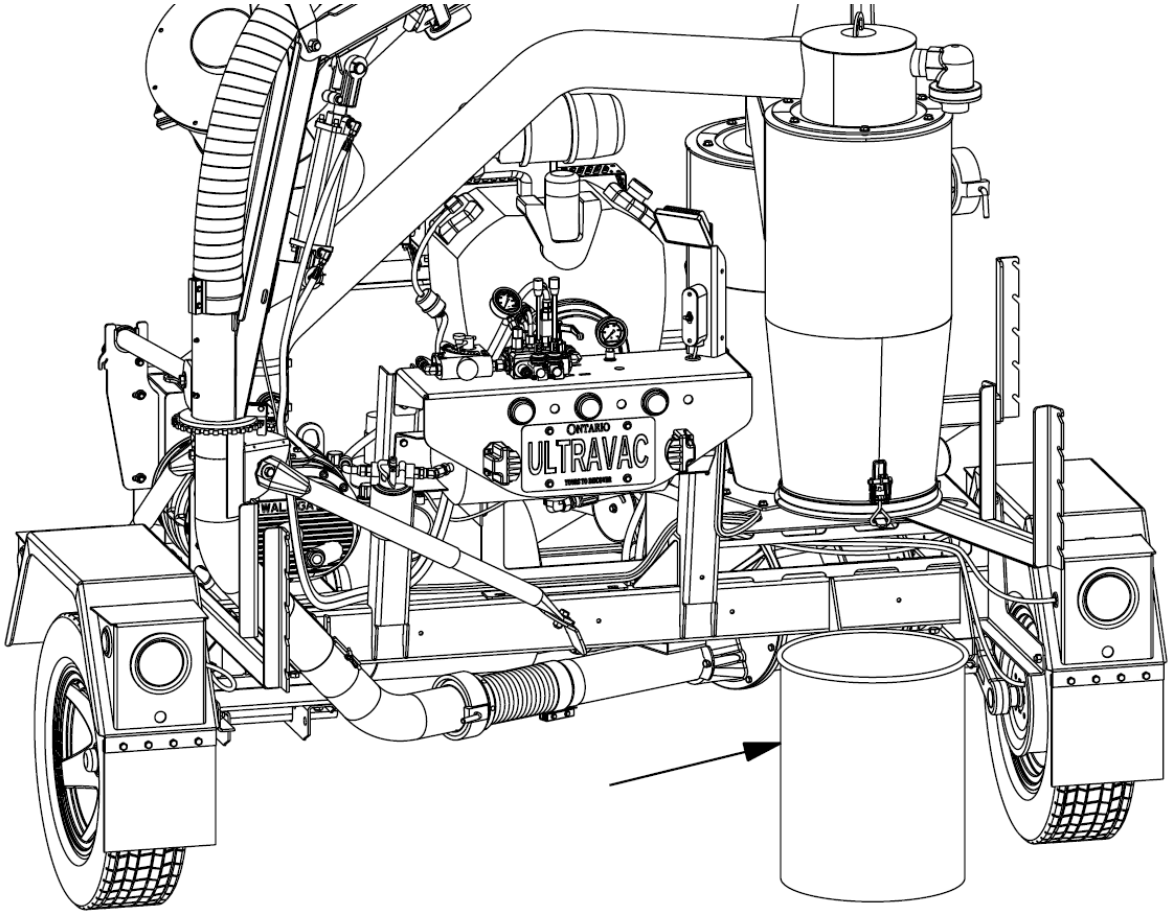


Figure 7-7: Receptacle positioning

5. Remove the retainer and open the latch securing the secondary AMS door.

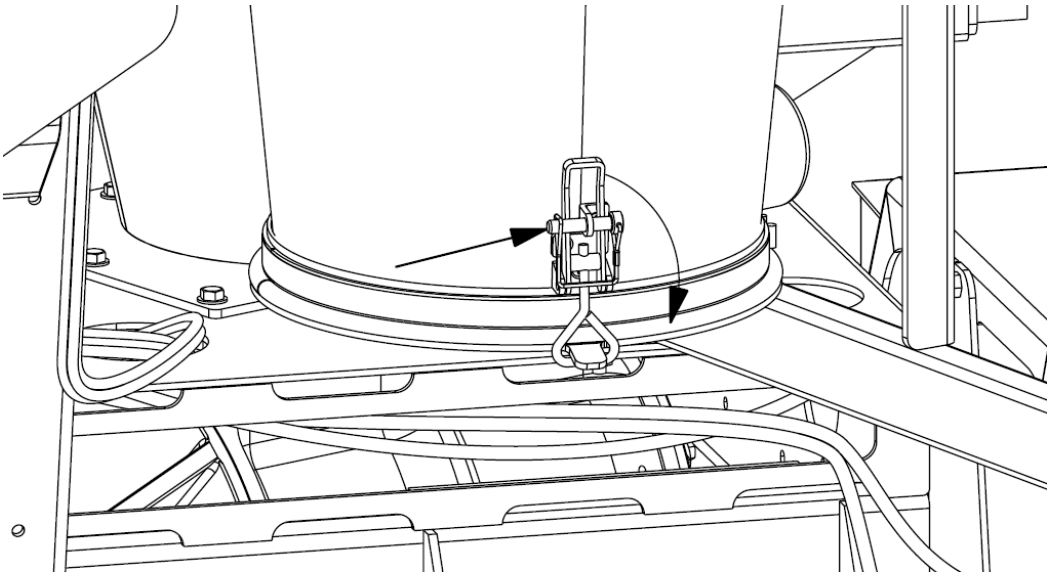


Figure 7-8: Release of latch

6. Open the secondary AMS door and allow the accumulated dirt, dust, and debris to empty into the receptacle.

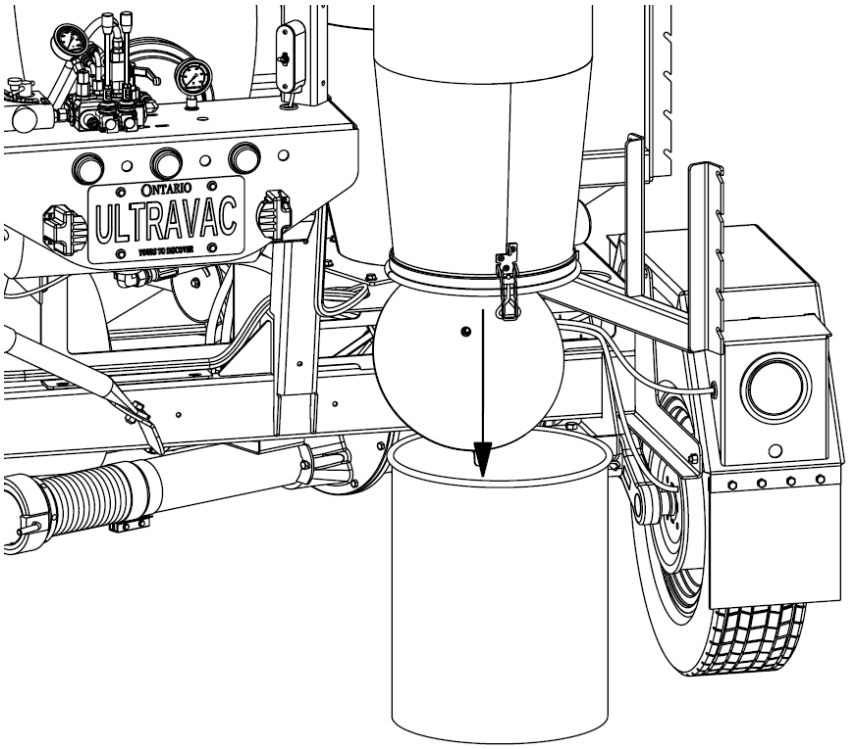


Figure 7-9: Emptying secondary AMS

7. Inspect the interior of the secondary AMS door. Ensure there is no contaminant build-up on the surfaces, paying careful attention to the surface where the seal meets the door. If necessary, scrape any contaminants off of the surfaces.

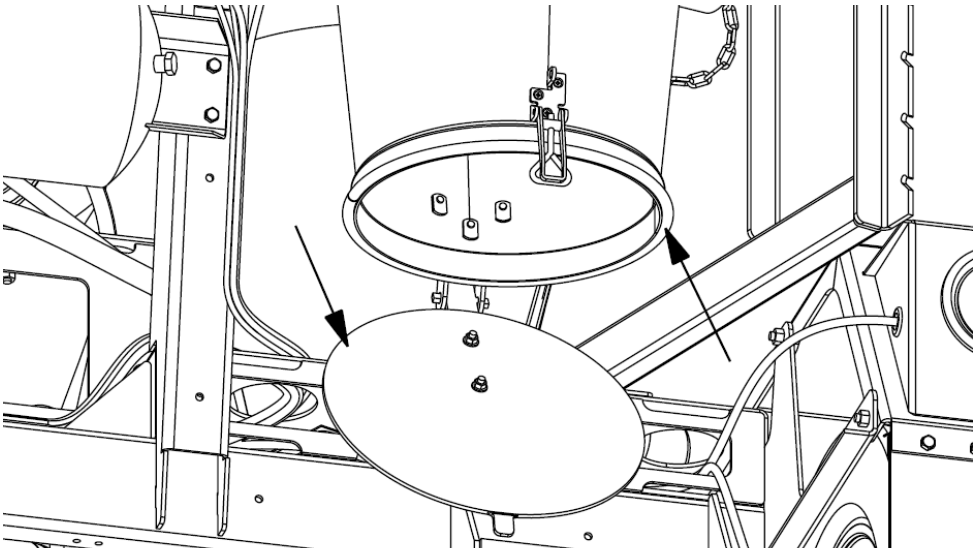


Figure 7-10: Door – seal interface surface

8. Inspect the inside of the secondary AMS and remove any remaining contaminants. If there is significant accumulation on the interior surfaces, the secondary AMS can be rinsed out using an approved solvent for the application of your machine. Ensure any non-food-grade solvents have been cleaned from the machine if applicable.
9. When the secondary AMS has fully dried, close the secondary AMS door, secure the latch over the door tab, and secure the latch in place with the retainer.

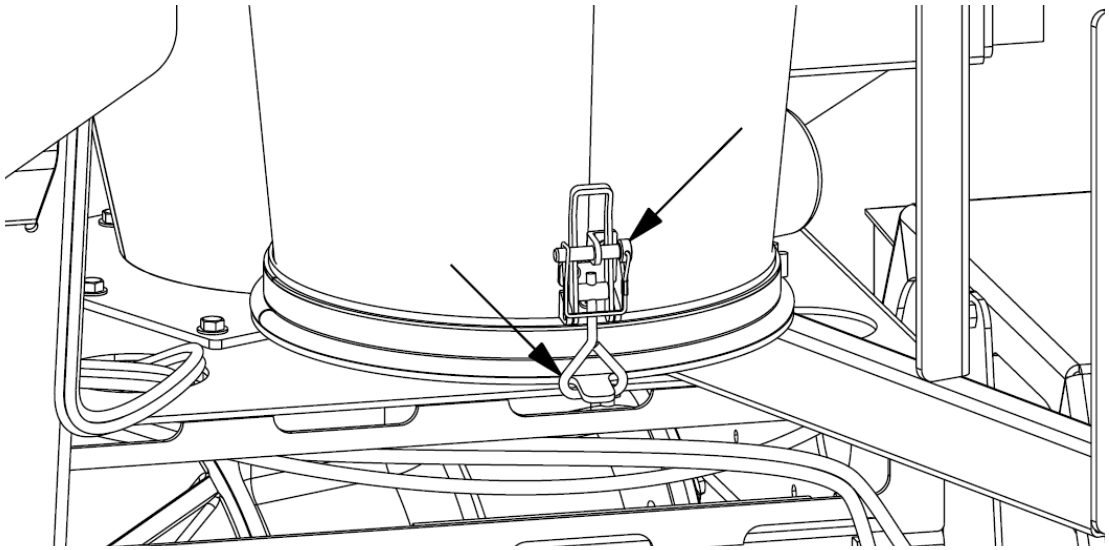


Figure 7-11: Securing latch

Inspection of Muffler

The muffler serves to decrease the noise level of the Ultra-Vac. It has been designed to be self-cleaning, however, it is possible during operation, transport, or storage for dirt, dust, or debris to accumulate in the muffler. Due to the high temperatures the muffler can reach during operation, any foreign material can result in a fire hazard. To maintain safe operating conditions, the muffler must be regularly inspected and cleaned.

To inspect and clean the muffler, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, stop the engine/power source, remove the ignition key, disconnect and ground the engine spark plug leads, disconnect the negative (—) engine battery cable, and wait for all moving parts to stop.
3. Ensure the muffler is at a safe temperature to handle.
4. Remove the cap from the muffler wash-out port.

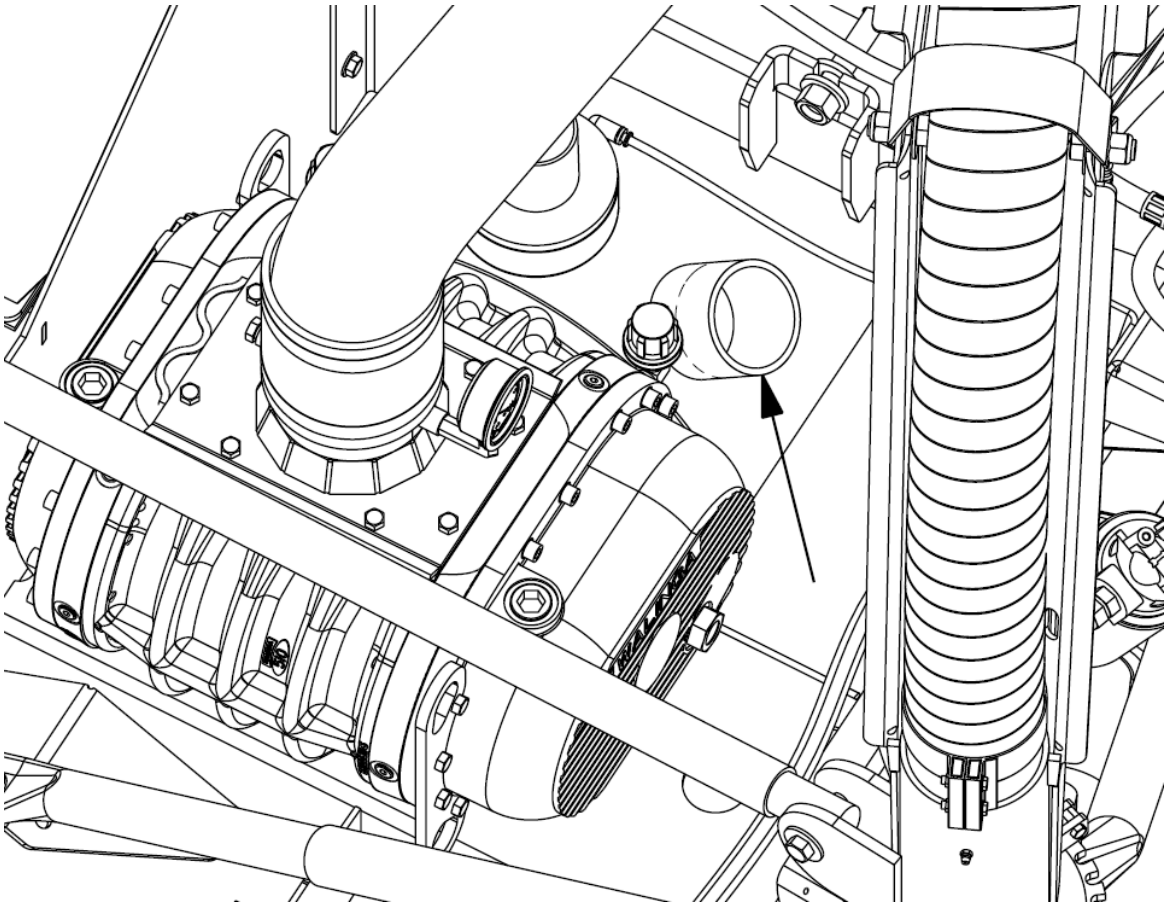


Figure 7-12: Wash-out port access

5. Visually inspect the interior of the muffler for any foreign materials.

6. If there are accumulated materials, clean the muffler as follows:
    a. Loosen the t-bolt clamps securing the muffler and airlock inlet elbow connecting hose.

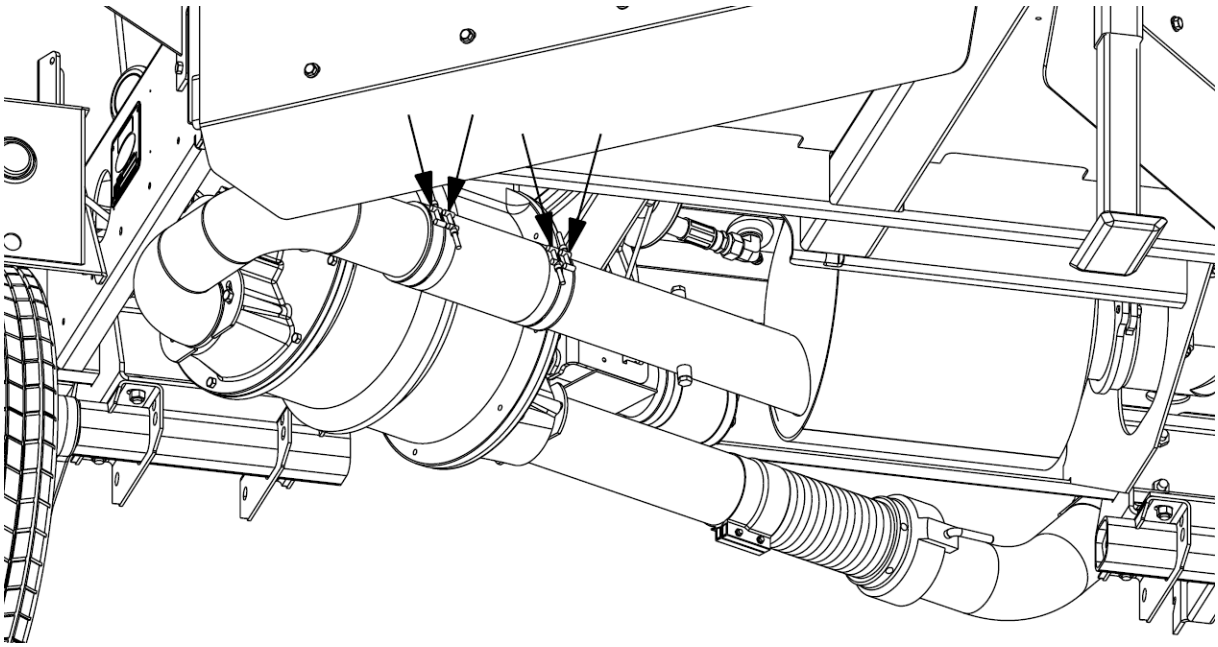


Figure 7-13: Removal of t-bolt clamps

    b. Remove the connecting hose.

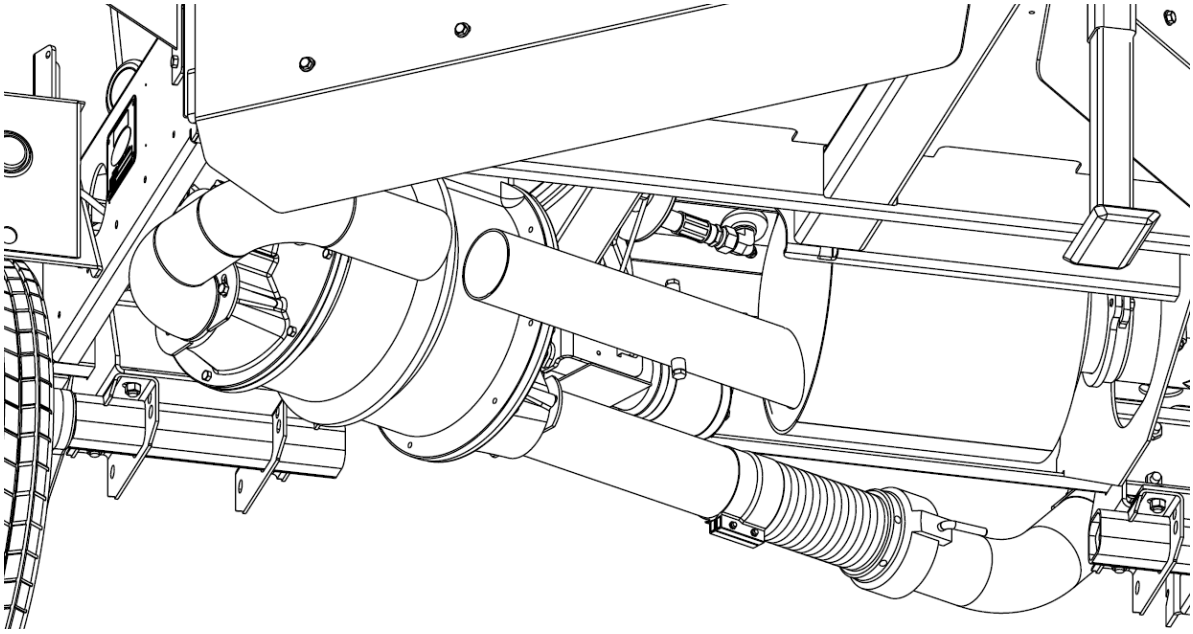


Figure 7-14: Removal of connecting hose

c. Use the wash-out port as an access point to flush the muffler with clean water.

d. Allow the water and dirt, dust, and debris to drain from the muffler through the outlet pipe.

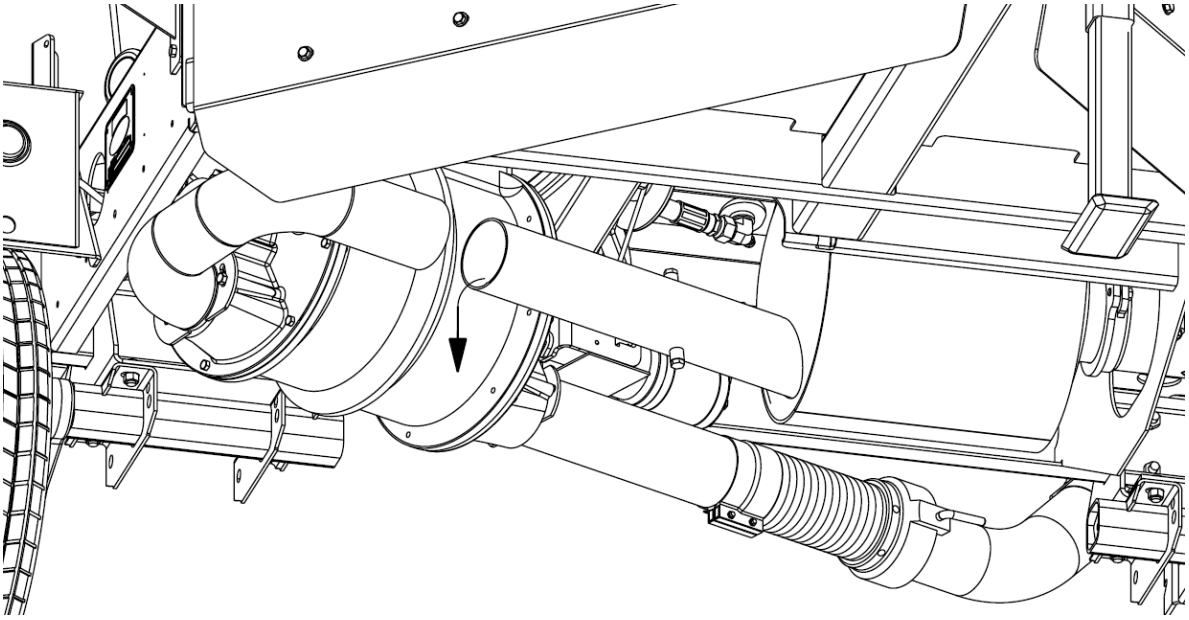


Figure 7-15: Drainage of water and accumulated material

e. Ensure no loosened material has accumulated against the check valve. Clear if necessary.

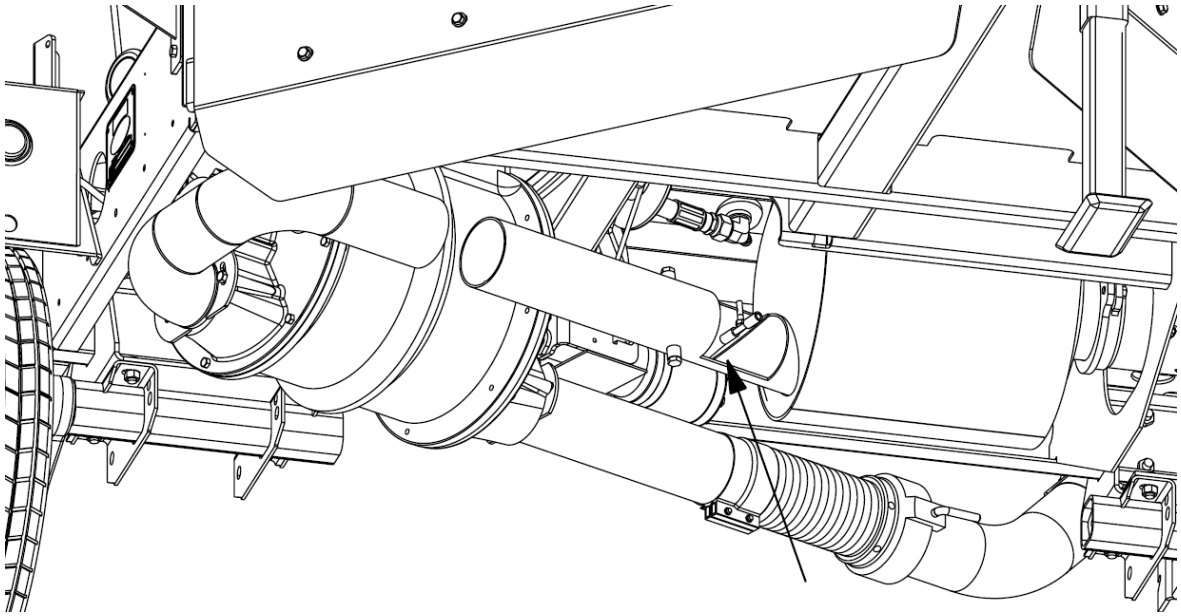


Figure 7-16: Muffler outlet pipe check valve

f. Once the muffler has been thoroughly cleaned, allow the assembly to dry. The blower can be run to assist the drying process.

g. Replace the connecting hose and secure it in place by tightening the t-bolt clamps.

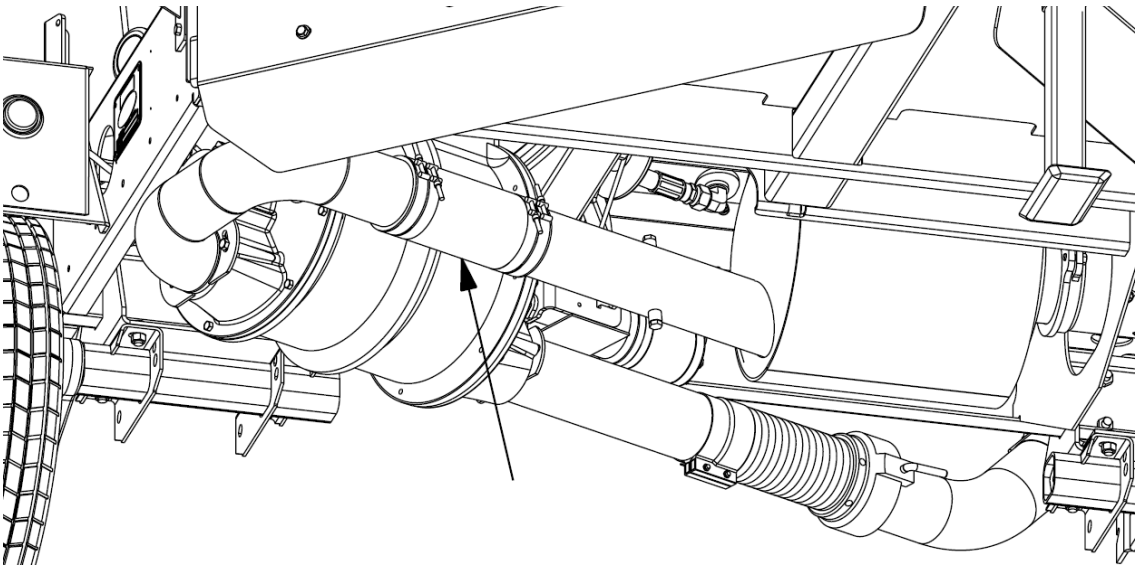


Figure 7-17: Secured connecting hose

7. Replace the wash-out port cap and tighten to secure in place.

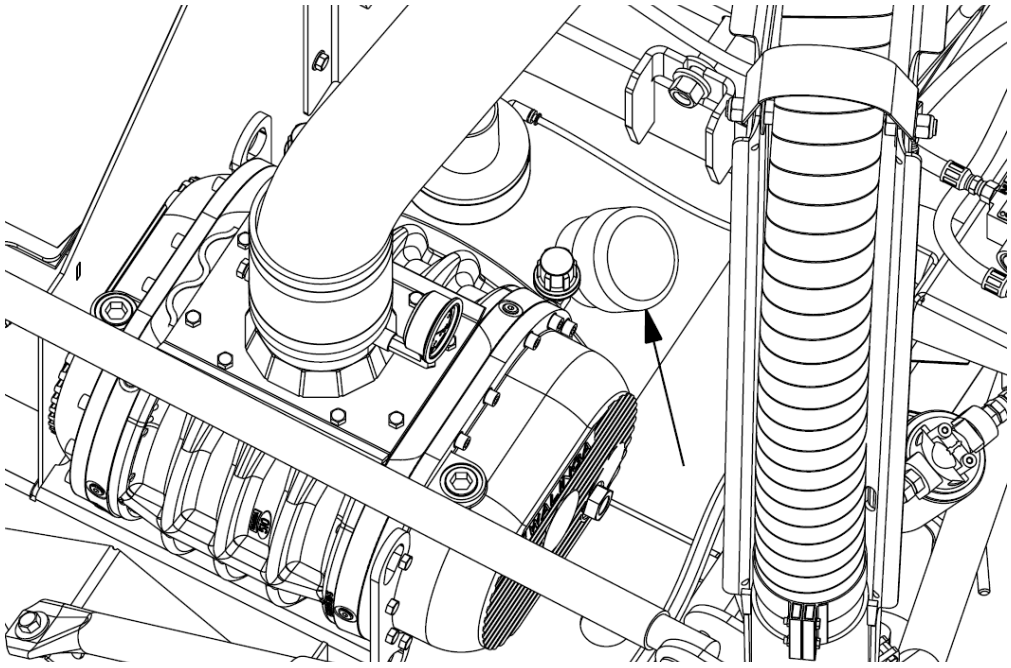


Figure 7-18: Secured wash-out port cap

Discharge Cyclone Wear Liner

The Rhino Hyde lining of the discharge cyclone provides increased abrasion and wear resistance as well as noise reduction. Visually inspect the condition of the wear liner in the discharge cyclone. Check for any pitting, nicks, damage, wrinkling, bulging, or excessive wear and replace the liner as required.

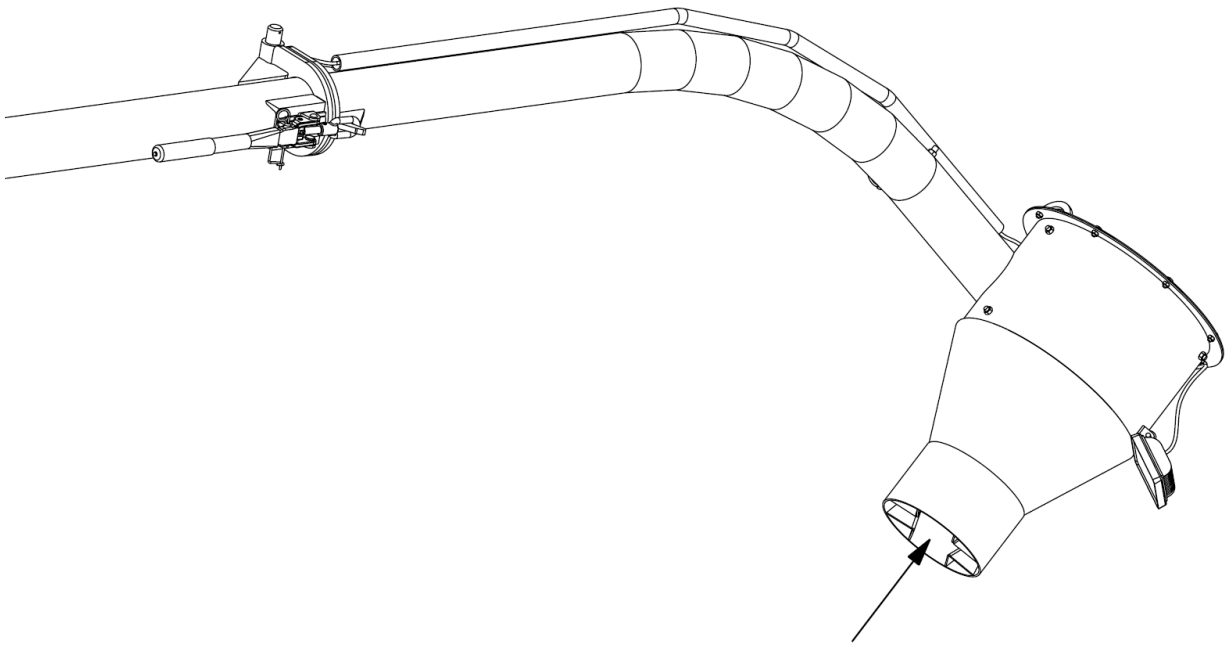


Figure 7-19: Discharge cyclone wear liner

Lubrication of Blower Drive Shaft

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

To lubricate the blower drive shaft, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, stop the engine/power source, remove the ignition key, disconnect and ground the engine spark plug leads, disconnect the negative (—) engine battery cable, and wait for all moving parts to stop.

3. Remove the fasteners securing the drive belt guard and remove the guard.

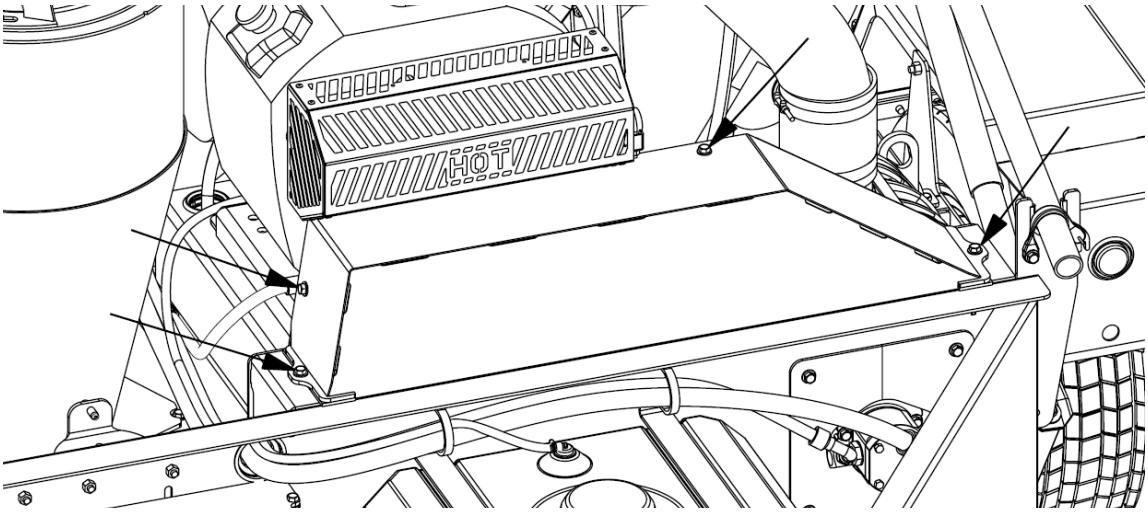


Figure 7-20: Drive belt guard fasteners

4. Rotate the blower by hand as necessary to gain access to the grease fitting.
5. Wipe the grease fitting with a clean cloth before greasing to avoid injecting dirt and grit.
6. Check the fitting for any damage. Repair or replace any broken fitting immediately.
7. Lubricate the blower drive shaft grease fitting.

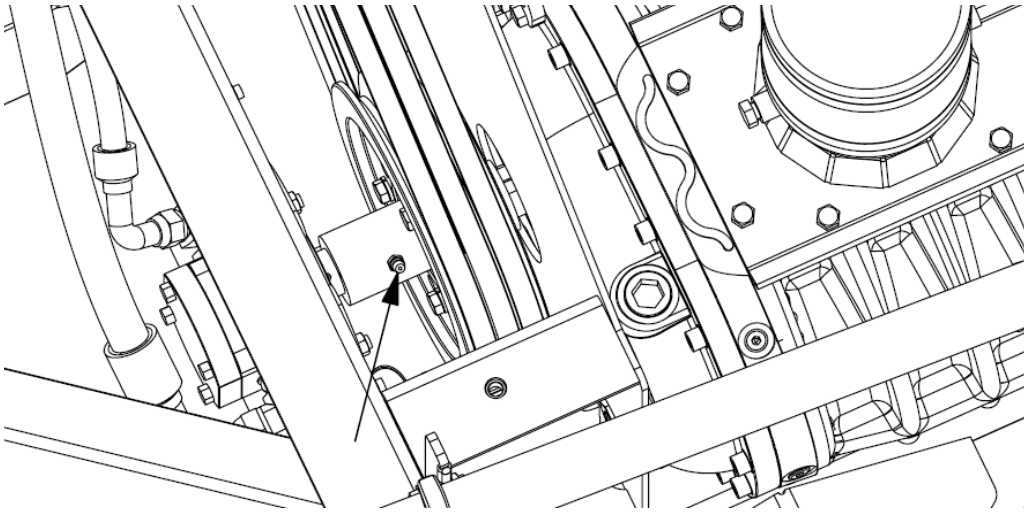


Figure 7-21: Blower drive shaft lubrication location

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

Lubrication of Airlock Motor Coupling

To maintain smooth transmission of power from the airlock hydraulic motor to the airlock, the motor coupling must remain properly lubricated.

To lubricate the motor coupling, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, stop the engine/power source, remove the ignition key, disconnect and ground the engine spark plug leads, disconnect the negative (—) engine battery cable, disconnect the hydraulic lines, and wait for all moving parts to stop.
3. Remove the bolts securing the airlock motor guard.

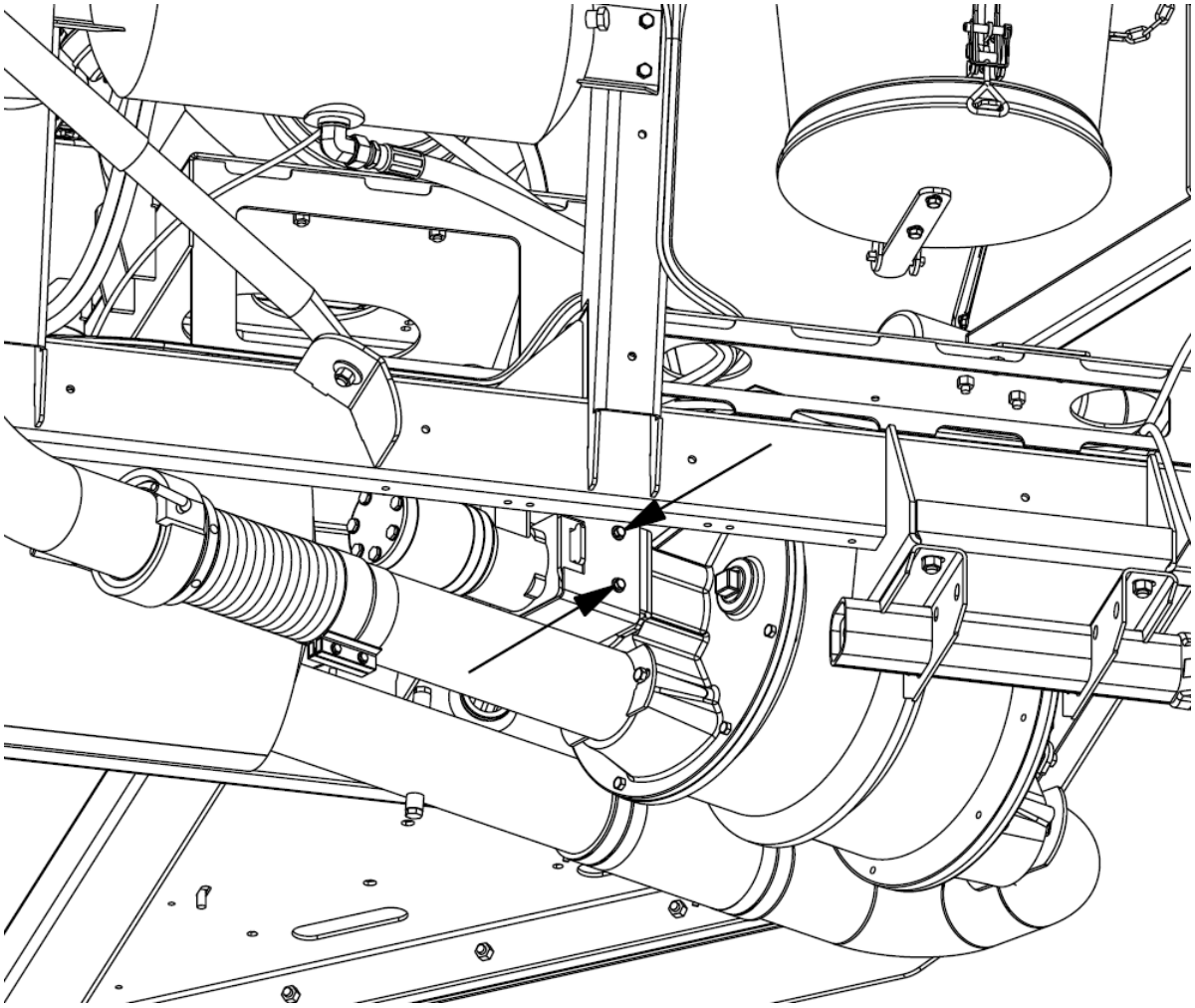


Figure 7-22: Airlock motor guard

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 any broken fitting immediately.

6. Lubricate the airlock motor coupling grease fitting.

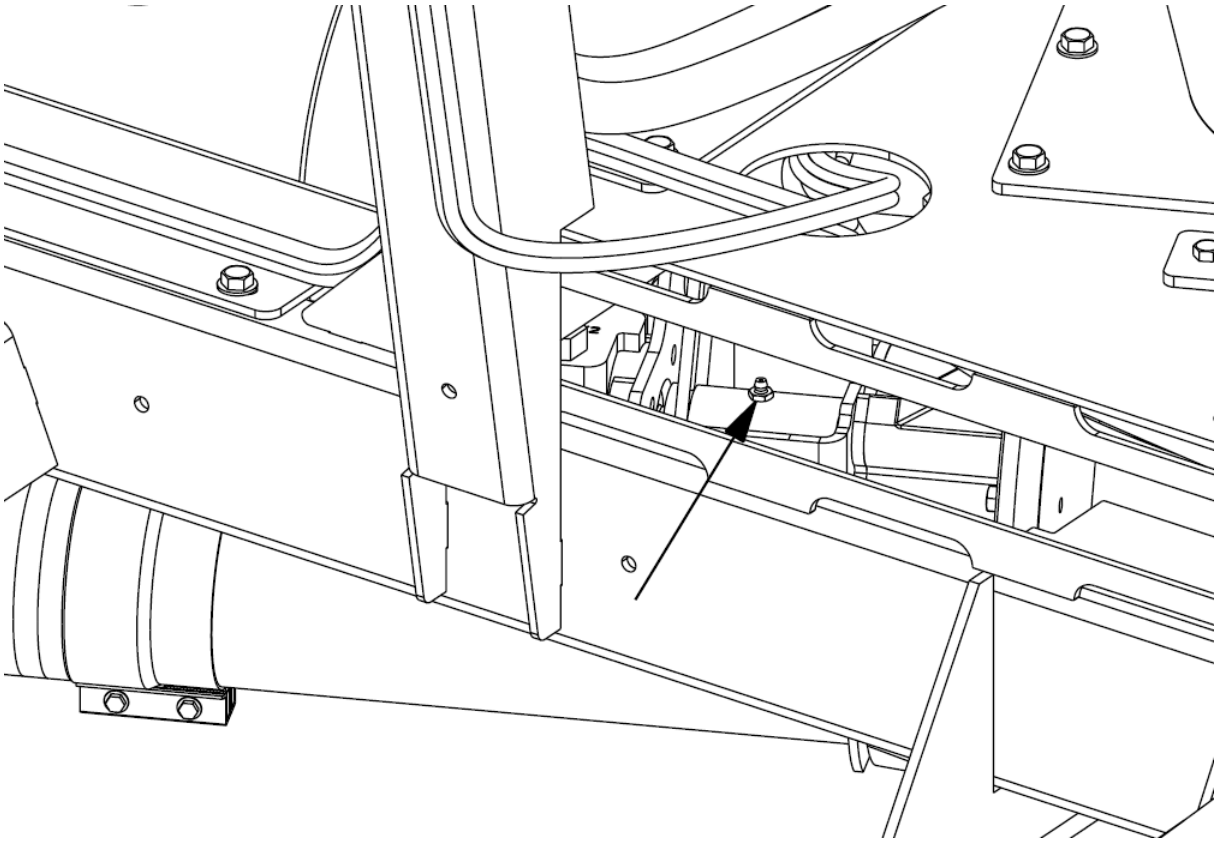


Figure 7-23: Airlock motor coupling lubrication location

7. If the fitting will not take grease, remove and clean thoroughly. Clean the lubricant passageway. Replace the fitting if necessary.
8. Install and secure the airlock motor guard and bolts. Ensure all guards are installed and secure before resuming operation.

Lubrication of Boom Swivel

To ensure smooth rotation of the boom, the boom swivel must be properly lubricated.

To lubricate the boom swivel, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, stop the engine/power source, remove the ignition key, disconnect and ground the engine spark plug leads, disconnect the negative (—) engine battery cable, and wait for all moving parts to stop.
3. Wipe the grease fitting with a clean cloth before greasing to avoid injecting dirt and grit.
4. Check the fittings for any damage. Repair or replace any broken fittings immediately.
5. Lubricate the boom swivel at the two locations shown below.

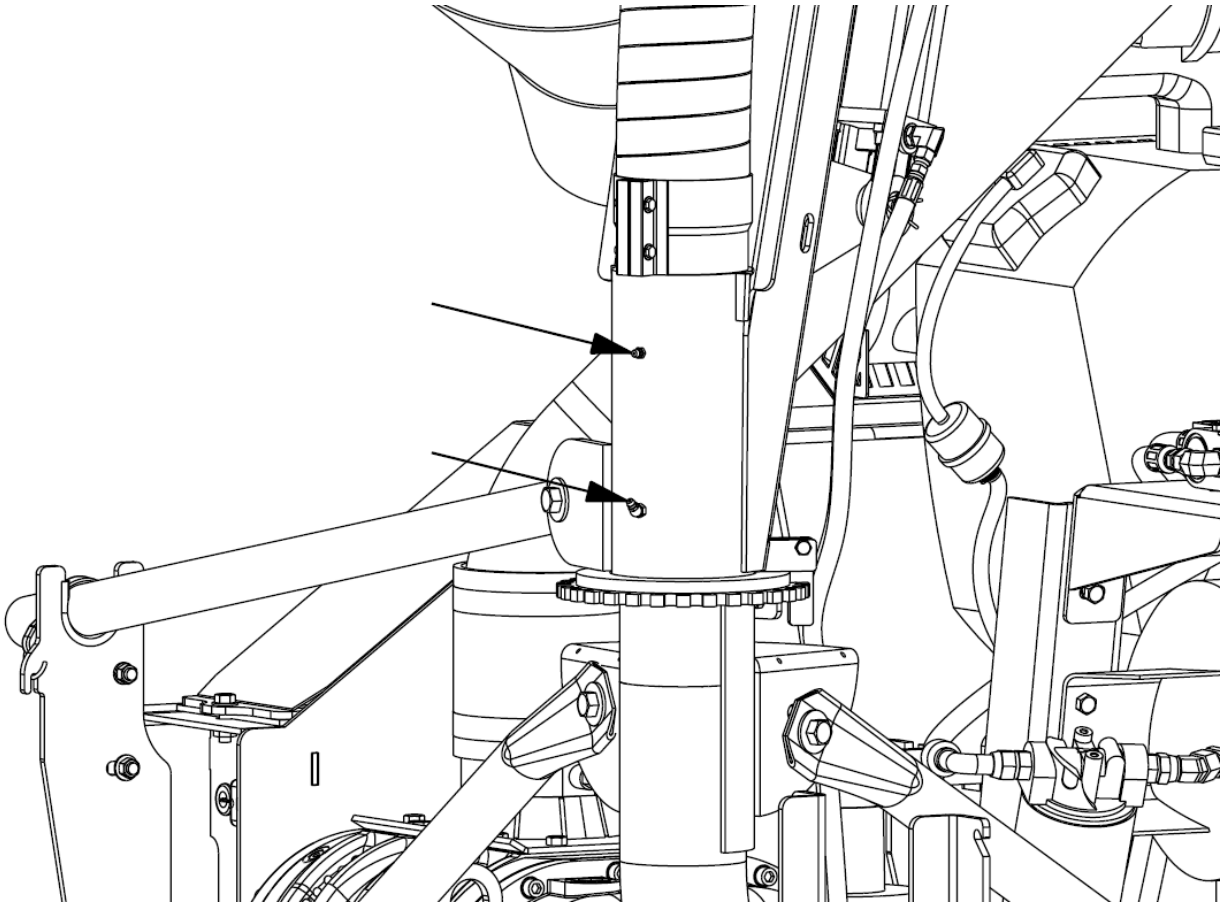


Figure 7-24: Boom swivel lubrication locations

6. If the fitting will not take grease, remove and clean thoroughly. Clean the lubricant passageway. Replace the fitting if necessary.

Lubrication of Rod End of Boom Lift Cylinder

The boom lift cylinder functions to raise and lower the boom to position the discharge cyclone. For smooth and efficient operation, the cylinder must remain properly lubricated.

To lubricate the rod end of the boom lift cylinder, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, stop the engine/power source, remove the ignition key, disconnect and ground the engine spark plug leads, disconnect the negative (—) engine battery cable, and wait for all moving parts to stop.
3. Lubricate the exposed rod end of the cylinder with anti-seize or an equivalent lubricant.

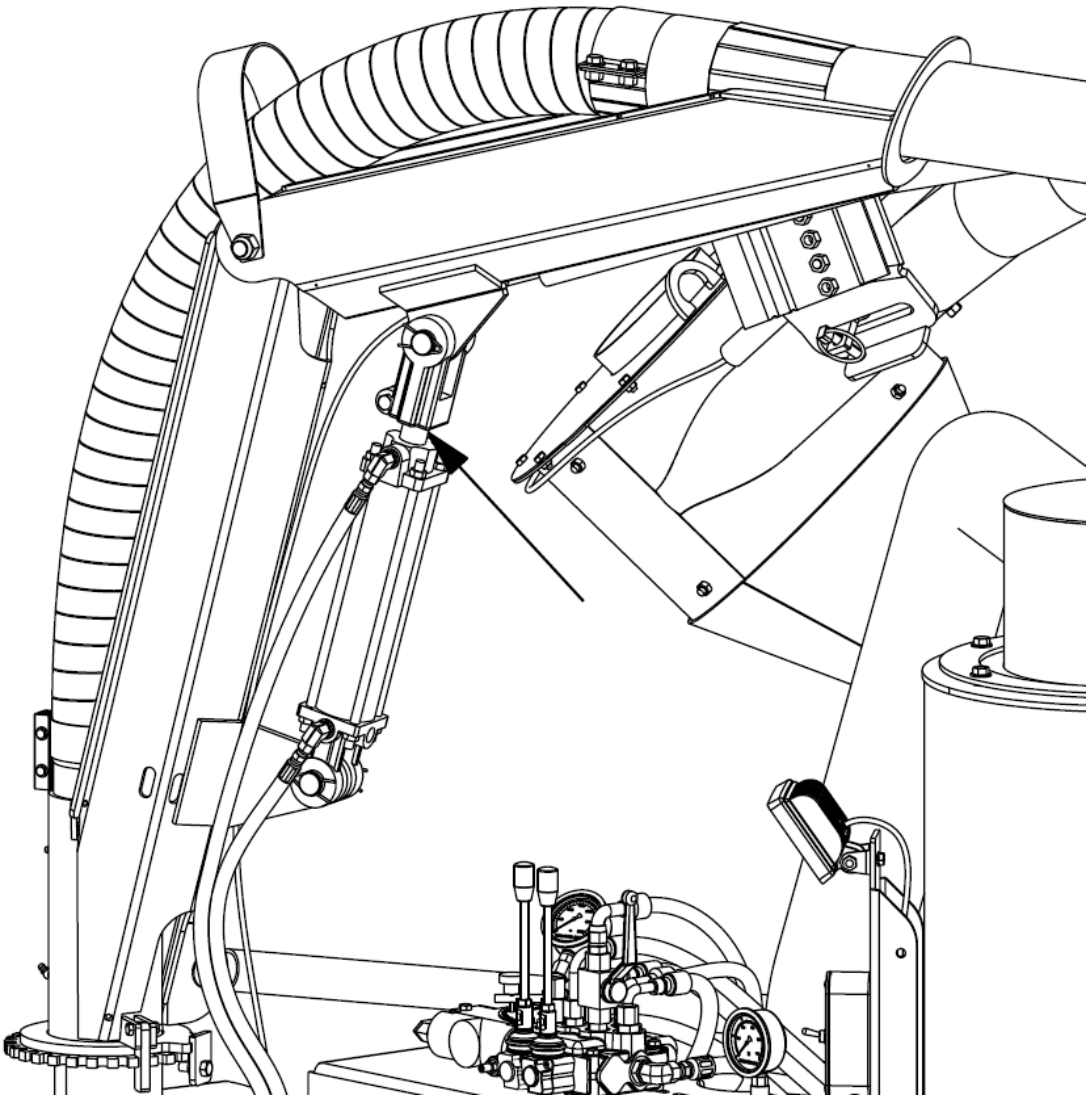


Figure 7-25: Boom lift cylinder exposed rod end

Lubrication of Boom Hinge

To ensure smooth movement of the discharge cyclone end of the split boom from the transport to operational position, the boom hinge must remain properly lubricated.

To lubricate the boom hinge, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, stop the engine/power source, remove the ignition key, disconnect and ground the engine spark plug leads, disconnect the negative (—) engine battery cable, and wait for all moving parts to stop.
3. Position the boom extension as required to gain access to the grease fitting.
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 any broken fittings immediately.
6. Lubricate the boom hinge.

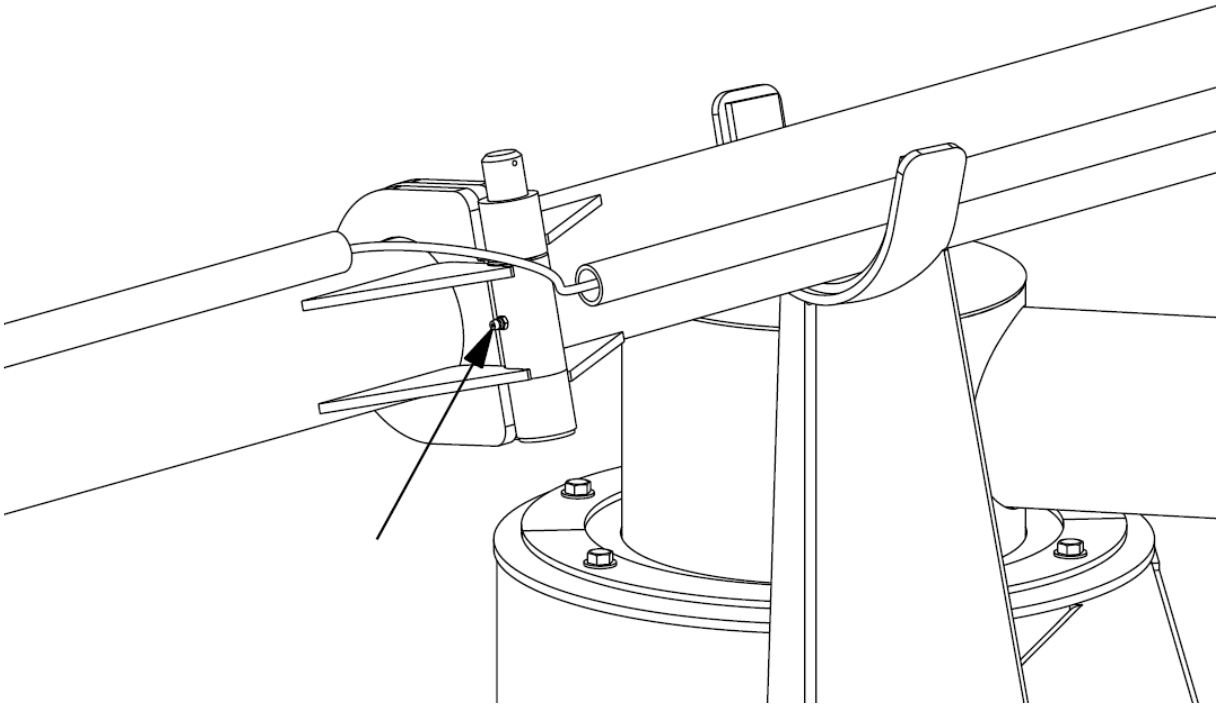


Figure 7-26: Split boom hinge grease fitting

7. If the fitting will not take grease, remove and clean thoroughly. Clean the lubricant passageway.Replace the fitting if necessary.
8. Return the boom extension to the transport position and fasten the security latch.

Lubrication of Swivel Coupling

For ease of use, some clean-up intake line couplings may be equipped with a swivel coupling. To ensure smooth movement of the swivel coupling, it must remain properly lubricated.

To lubricate the swivel coupling, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, stop the engine/power source, remove the ignition key, disconnect and ground the engine spark plug leads, disconnect the negative (—) engine battery cable, and wait for all moving parts to stop.
3. Wipe the grease fitting with a clean cloth before greasing to avoid injecting dirt and grit.

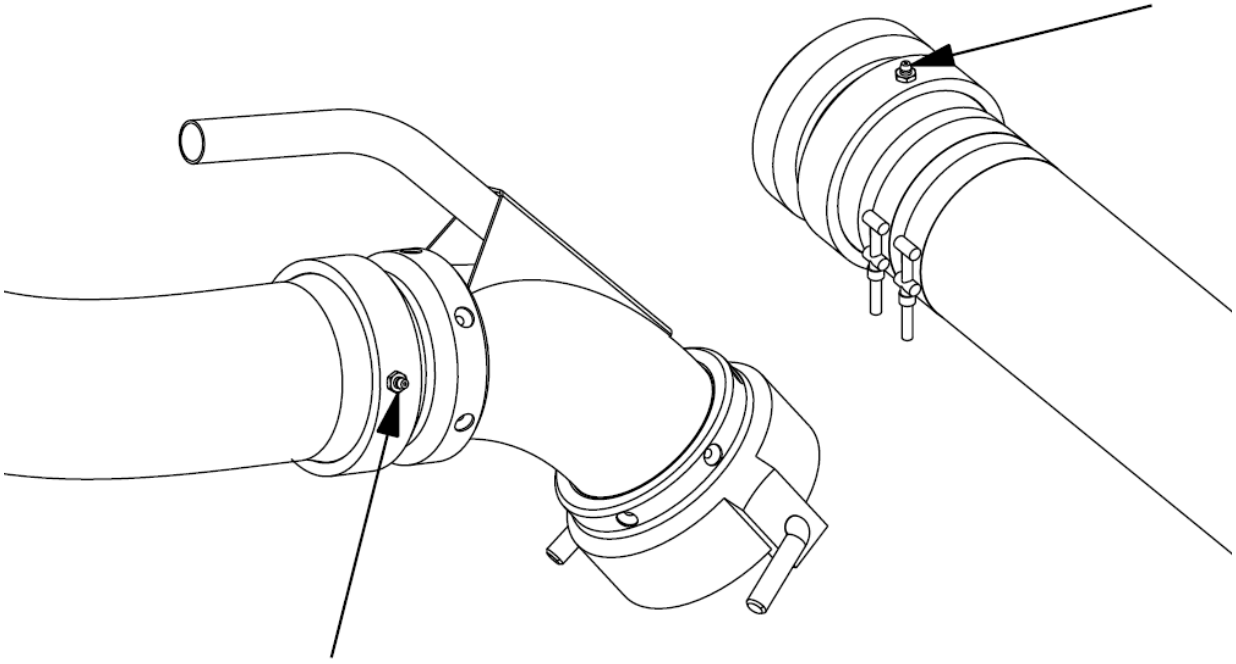


Figure 7-27: Swivel coupling grease fitting

4. Check the fitting for any damage. Repair or replace any broken fittings immediately.

5. Lubricate the swivel coupling until grease pushes out of the seam between the coupling and the shank.

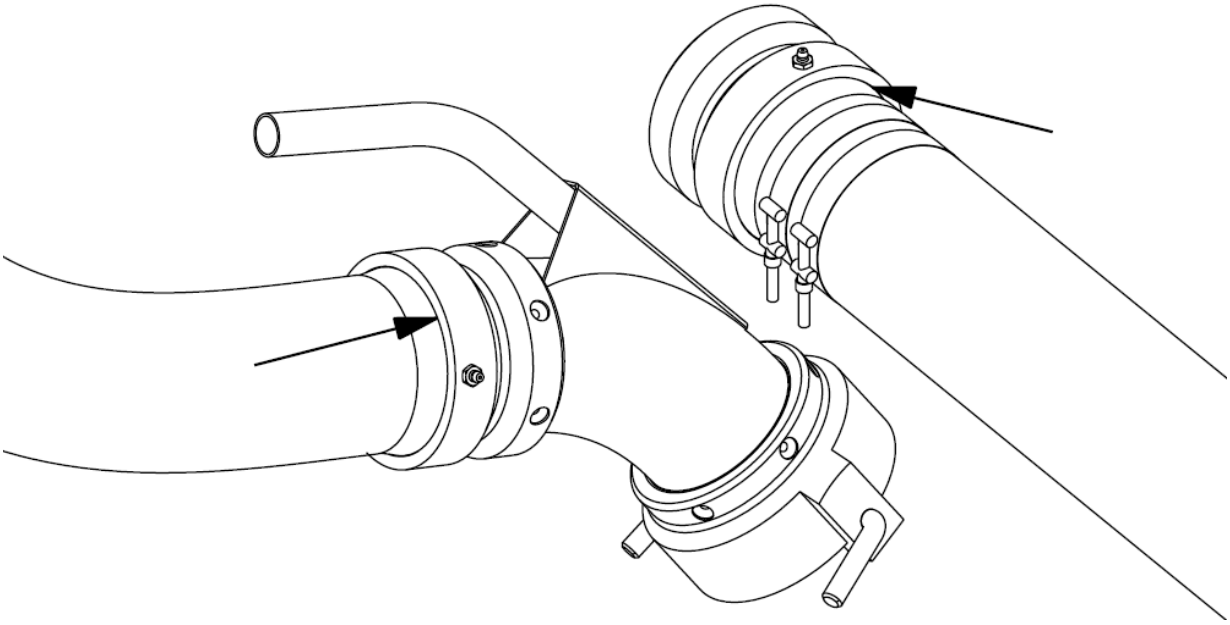


Figure 7-28: Seam grease ejection

6. If the fitting will not take grease, remove and clean thoroughly. Clean the lubricant passageway.Replace the fitting if necessary.
7. Rotate the shank.
8. Repeat **Step 5** and **Step 7** until grease is pushed out around the entire seam.
9. Remove excess grease.
10. Quickly spin the shank several times until grease is pushed out of the seam.
11. Repeat **Step 8** and **Step 9** until grease is no longer pushed out of the seam.
12. Using an ohmmeter or multimeter, measure the electrical continuity between the shank and the coupling. The resistance must be between 0 – 5 Ω.
13. If the resistance is greater than 5 Ω, repeat **Step 7** through **Step 12** until the resistance is within the permissible range.

Inspection of Vacuum and Pressure Relief Valves

As the blower operates, it creates a vacuum on the intake side of the system to draw product in, and creates a pressurized flow on the discharge side to move the product from the airlock to the discharge cyclone. A vacuum relief valve is installed on the intake side of the system and a pressure relief valve is installed on the discharge side. If flow on the intake side becomes restricted, the vacuum will build until it exceeds the setting of the vacuum relief valve of 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 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). Both valves must operate at pressures close to these specified levels for optimum performance. After prolonged use, the springs in the valves 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 seats, affecting their performance.

To assess the function of the air system relief valves, proceed as follows:

1. During operation, listen for the opening of the valves. A popping or whistle can be heard when the valves open.
2. Monitor the gauges on the vacuum and pressure sides of the system to determine when the valves are 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 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. 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.

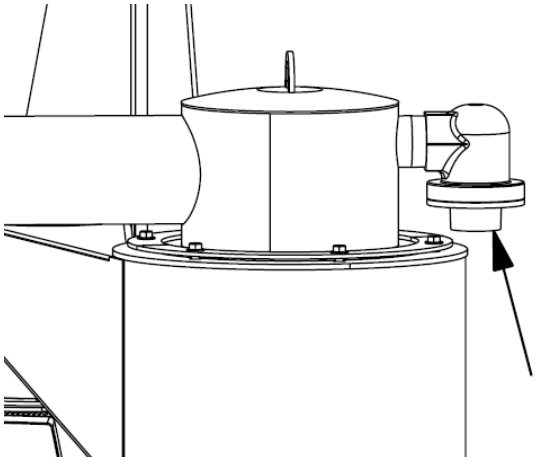


Figure 7-29: Vacuum relief valve

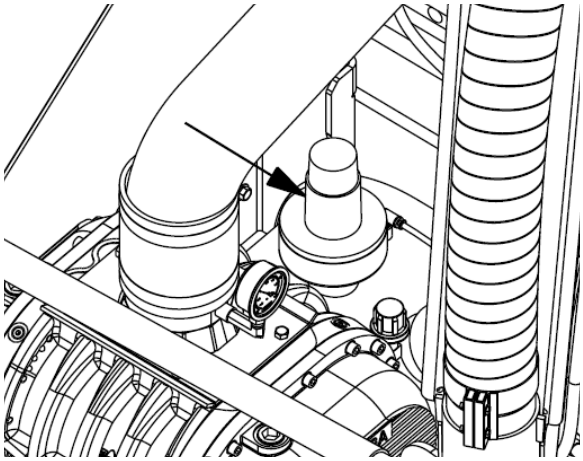


Figure 7-30: Pressure relief valve

Inspection of Airline Seals

To maintain a sufficient vacuum and pressurized state on each side of the system, the air system must be well sealed. Each joint of the system has a seal, and these must remain in good condition for optimum performance.

To check the condition of the air line seals, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, stop the engine/power source, remove the ignition key, disconnect and ground the engine spark plug leads, disconnect the negative (—) engine battery cable, and wait for all moving parts to stop.
3. Check the condition of the discharge cyclone boom seal as follows:
    a. With the boom in the transport position, ensure the split boom security latch is engaged and the boom is resting securely in the saddle.
    b. Visually inspect the seal, looking out for any nicks, tears, abraded areas, or any excessive wear.

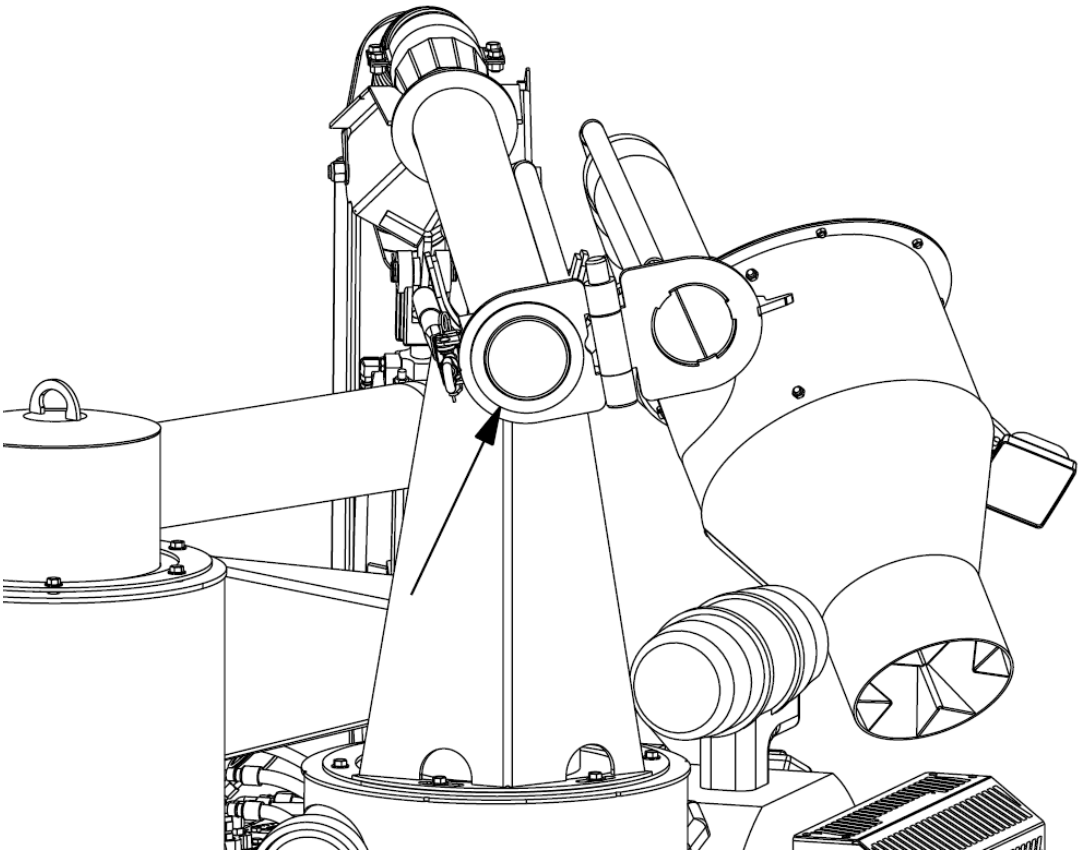


Figure 7-31: Discharge cyclone boom seal

    c. Clean or replace any worn seals as required.

4. Check the condition of the primary AMS inlet seal as follows:
    a. Remove the plug from the primary AMS inlet.
    b. Visually inspect the seal, looking out for any nicks, tears, abraded areas, or any excessive wear.

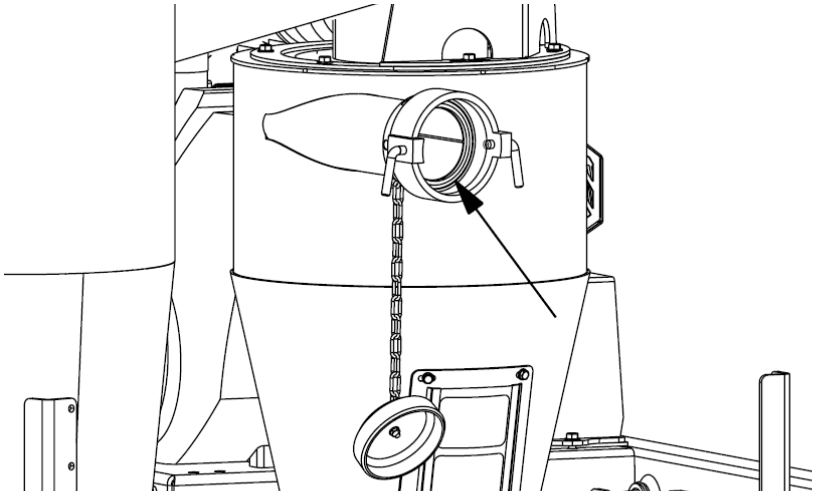


Figure 7-32: Primary AMS inlet seal

    c. Clean or replace any worn seals as required.
    d. Reinstall and secure the plug in the inlet.
5. Check the condition of the primary AMS window seals as follows:
    a. Remove the fasteners securing the window to the AMS body.

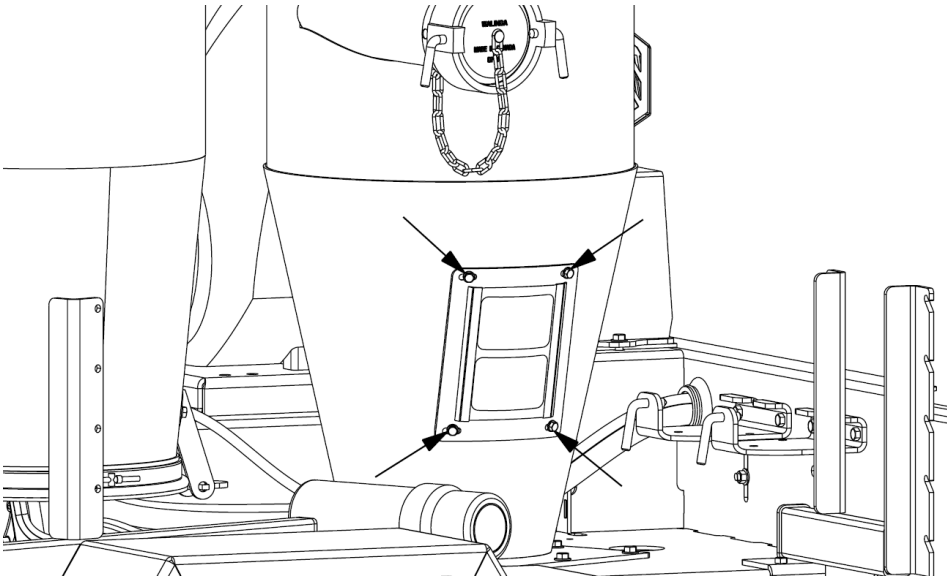


Figure 7-33: Primary AMS window fasteners

b. Visually inspect the interior foam seals, looking for any nicks, tears, abraded areas, or any excessive wear.

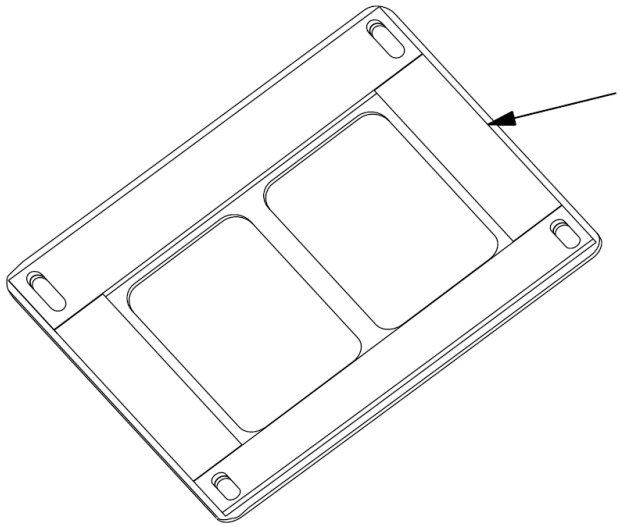


Figure 7-34: Primary AMS access door seal

c. Clean or replace any worn seals as required.

d. Inspect the condition of the silicone seal between the exterior surface of the clear window and the window frame. Apply silicone as required.

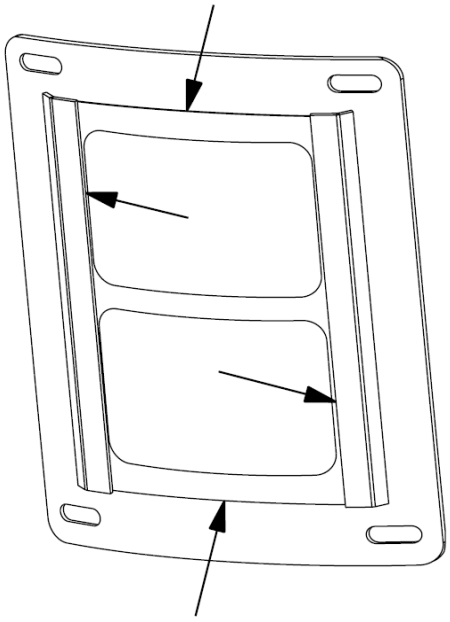


Figure 7-35: Primary AMS access door seal

e. Reinstall and secure the window to the primary AMS body.

6. Check the condition of the secondary AMS door seal as follows:
    a. Open and lower the secondary AMS door.
    b. Visually inspect the seal, looking for any nicks, tears, abraded areas, or any excessive wear.

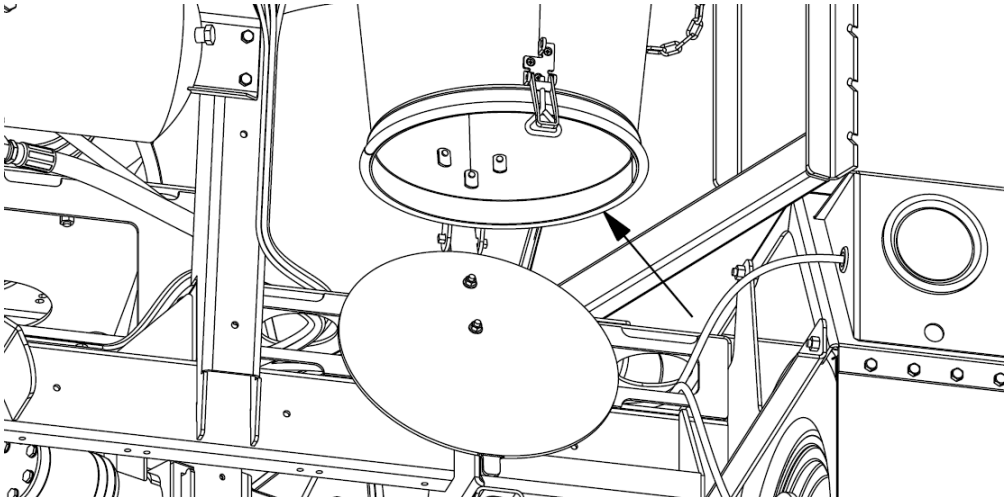


Figure 7-36: Secondary AMS door seal

    c. Clean or replace any worn seals as required.
    d. Close and secure the secondary AMS door.
7. Check the condition of the airlock outlet coupler as follows:
    a. Loosen the tail bolts of the airlock outlet coupler and the wingnut of the quick coupler and remove the lower boom elbow.

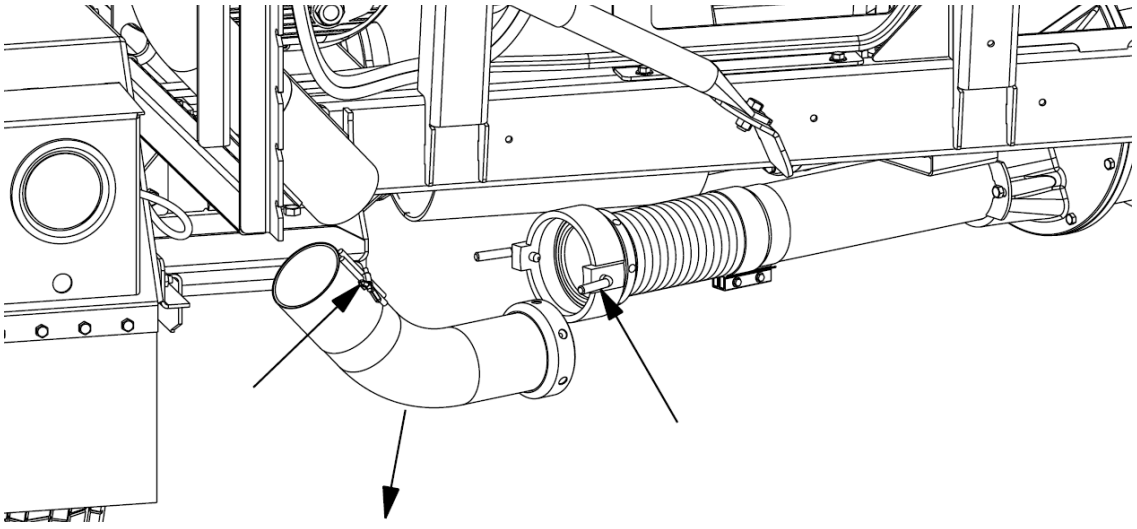


Figure 7-37: Lower boom elbow removal

b. Visually inspect the seal of the airlock outlet coupler, looking for any nicks, tears, abraded areas, or any excessive wear.

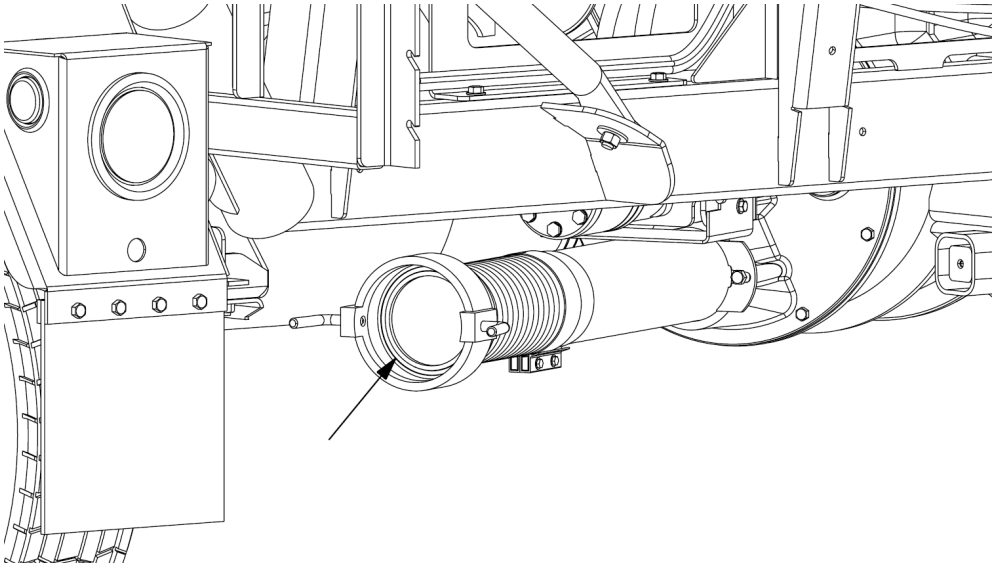


Figure 7-38: Airlock outlet coupler seal

c. Clean or replace any worn seals as required.

d. Reinstall and secure the lower boom elbow.

8. Check the condition of all female air line couplings as follows:

a. Loosen the tail bolts to disconnect the male and female couplings.

b. Visually inspect the seals, looking for any nicks, tears, abraded areas, or any excessive wear.

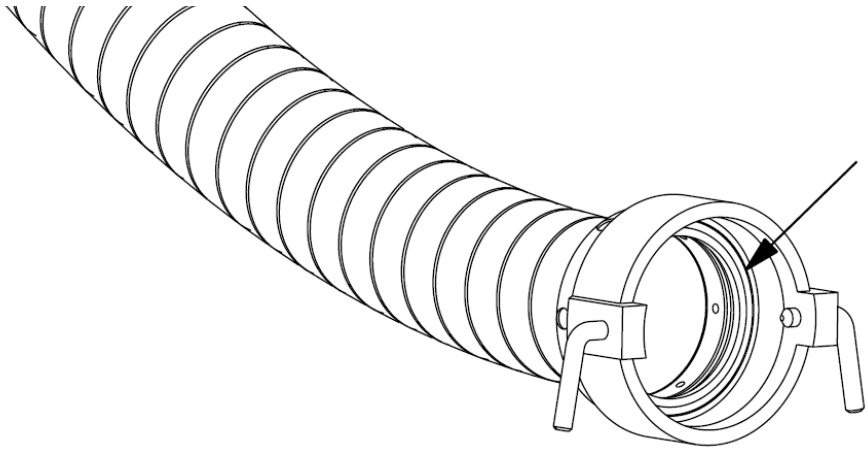


Figure 7-39: Flex hose female coupling seal

c. Clean or replace any worn seals as required.

MAINTENANCE MATERIALS

Grease
Use an SAE multi-purpose high temperature grease with extreme pressure (EP) characteristics. An SAE multi-purpose lithium-based grease is also acceptable.

Silicone
Use a durable and flexible silicone, part number 92-14772-6.

Blower Oil
Use Walinga super duty blower oil, part number 98-13813-6. Refer to ***Table 7-2*** for blower oil capacities.

Table 7-2: Blower oil capacity

Front (Drive)	Rear (Idle)	Total
0.84 L	1.25 L	2.09 L

Hydraulic Oil
Use a heavy duty, all season hydraulic fluid, part number 98-17740-6 (HYDREX XV).

Fuel
Use only premium gasoline. The fuel must meet the following requirements:

- Clean, fresh (must not be older than 30 days), unleaded gasoline
- Octane rating of 87 (R+M)/2 or higher
- Research Octane Number (RON) 90 octane minimum
- Gasoline up to 10% ethyl alcohol, 90% unleaded is acceptable
- Methyl Tertiary Butyl Ether (MTBE) and unleaded gasoline blend (max 15% MTBE by volume) are approved

Fuel Treatment
Use Kohler PRO Series fuel treatment to protect the engine and fuel system during extended storage periods.

Engine Oil
Use high-performance engine oil, part number 98-16084-6 (Total Quartz 5000 20W-50).

Lubricant Storage
An Ultra-Vac 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

Changing Intake Nozzles

The Ultra-Vac can be equipped with several different intake nozzles to best suit the required function. During normal operation, the standard straight nozzle should be used in combination with the steel flex hose intake line. However, for easier clean up, the straight nozzle can be exchanged for a clean-up nozzle in addition to a rubber intake hose for decreased weight and increased ease of movement. The straight nozzle should only be replaced with the clean-up nozzle when there is less than 12 in (30 cm) of grain left in the bin.

To change the intake nozzle, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, stop the engine/power source, remove the ignition key, disconnect and ground the engine spark plug leads, disconnect the negative (—) engine battery cable, and wait for all moving parts to stop.
3. Loosen the tailbolts of the flex hose coupler connected to the straight nozzle.

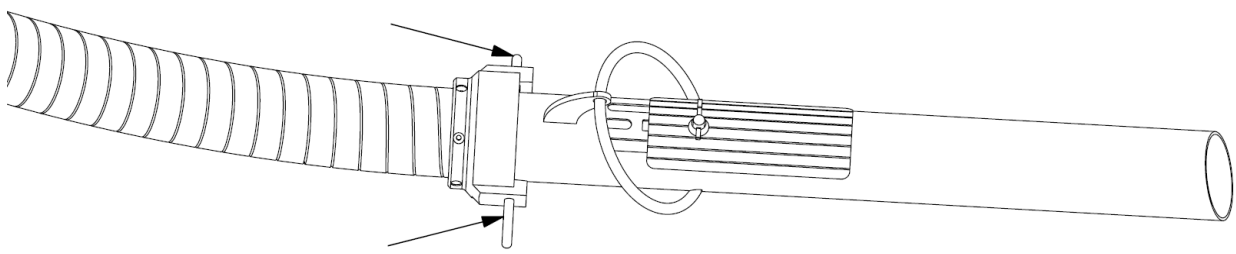


Figure 7-40: Steel flex hose with straight nozzle

4. Remove the straight nozzle.
5. Insert the coupler of the rubber intake hose into the coupler of the steel flex hose intake line and tighten the tail bolts to secure.

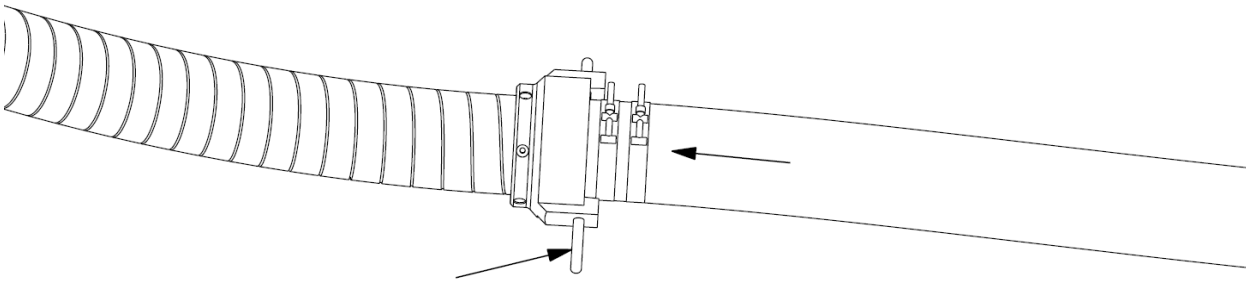


Figure 7-41: Rubber intake hose connection

6. Insert the clean-up sweep nozzle into the rubber intake hose coupler and tighten the tail bolts to secure.

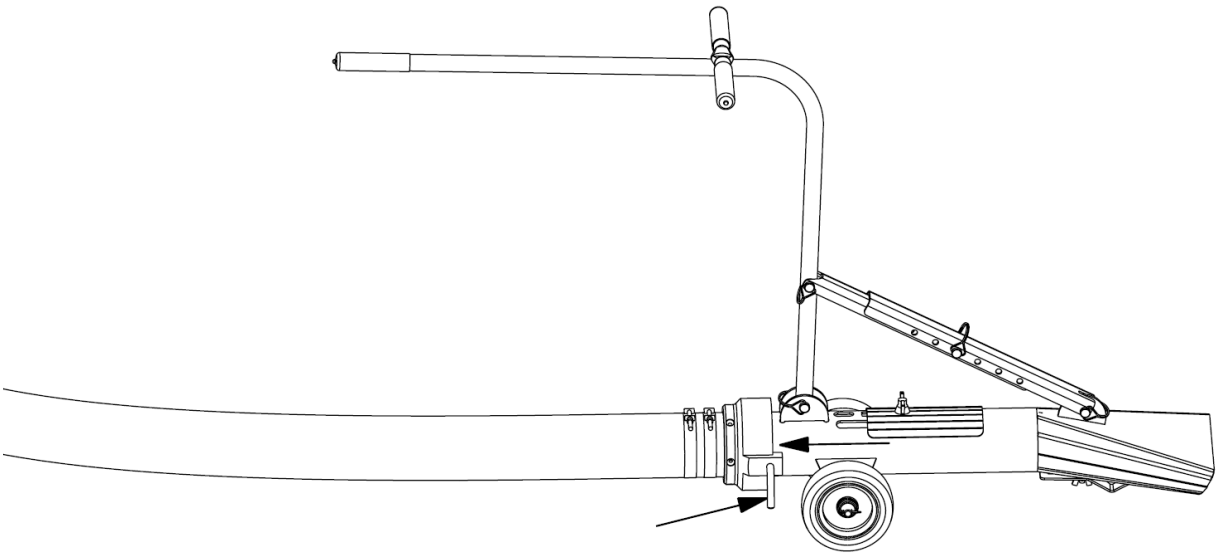


Figure 7-42: Clean-up nozzle connection

7. Follow the standard operating procedures to convey the remaining grain using the clean-up nozzle.

Bin Loading

In addition to using the discharge boom for unloading, the Ultra-Vac is also capable of loading directly into storage structures equipped with a discharge cyclone.

To load a storage structure, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, stop the engine/power source, remove the ignition key, disconnect and ground the engine spark plug leads, disconnect the negative (—) engine battery cable, and wait for all moving parts to stop.
3. Loosen the tailbolts of the airlock outlet coupler and the wingnut of the quick coupler.

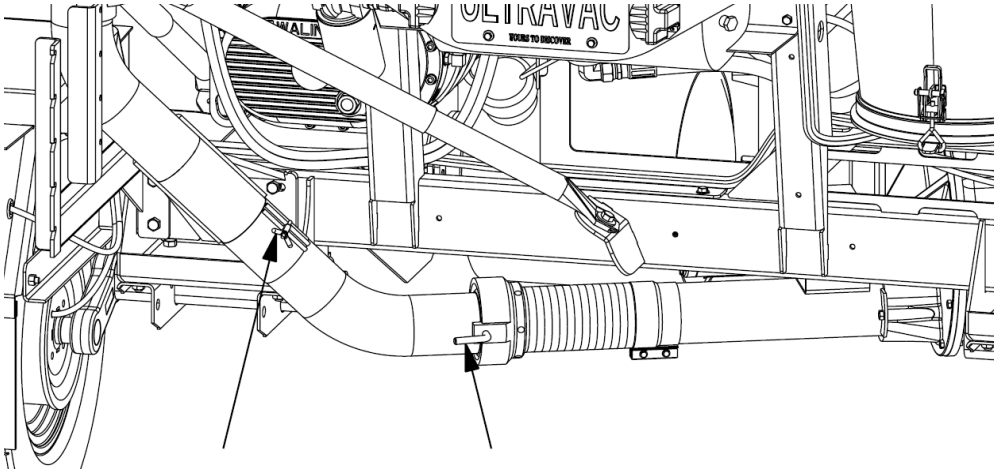


Figure 7-43: Airlock coupler and quick coupler

4. Remove the lower boom elbow.

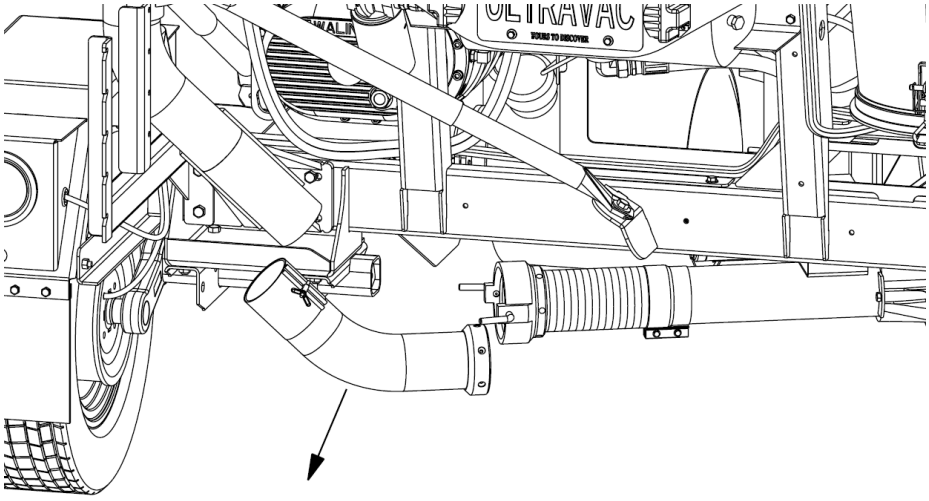


Figure 7-44: Lower boom elbow removal

5. Attach the steel flex discharge hose to the airlock outlet coupler.
   NOTE: The steel flex hose is designed for material flow in one direction. A *discharge* hose must be used for bin loading. Do not connect an *intake* hose to the airlock outlet.

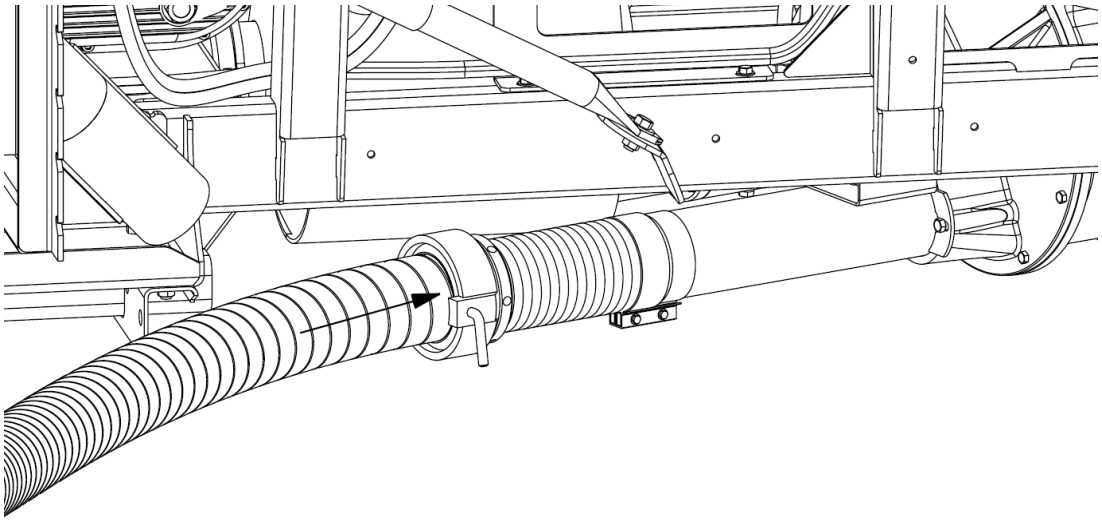


Figure 7-45: Ultra-Vac bin loading connection

6. Install any required adapters as necessary to the coupler of the storage structure piping system and connect the discharge hose to the piping system. Ensure the hose remains as straight as possible for maximum capacity, adjust the position of the Ultra-Vac if needed to straighten the hose.

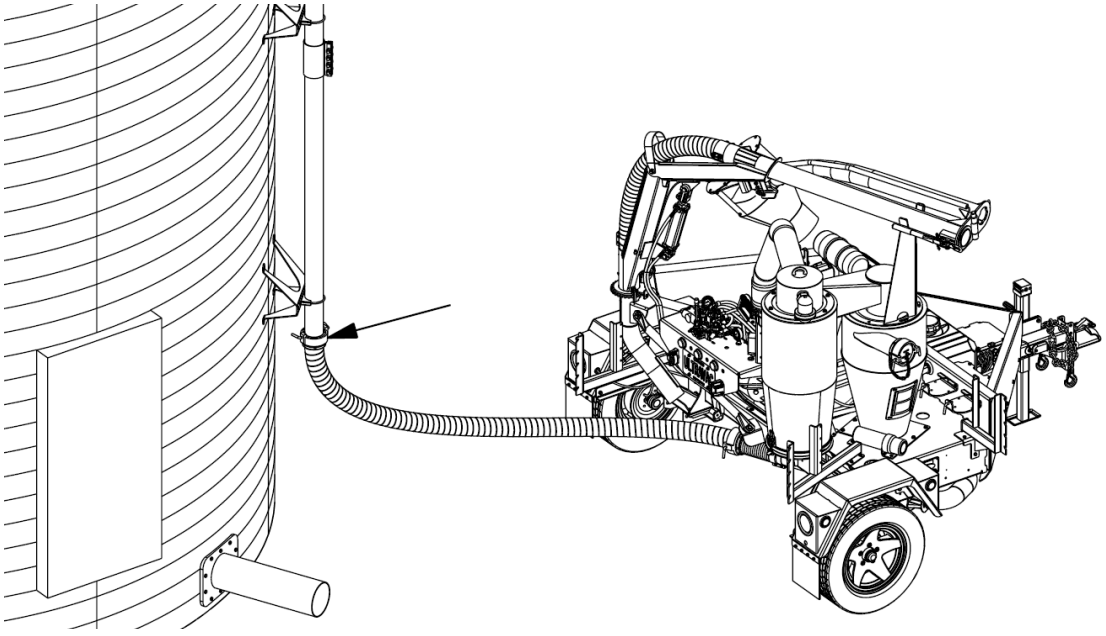


Figure 7-46: Ultra-Vac bin loading connection

7. Ensure the tail bolts or other fastening methods of any adapters are tightened to secure the discharge hose in position.
8. Follow the standard operating procedures. Monitor the machine to ensure the airlock and blower do not become overloaded.
9. Upon completion of the bin loading, the lower boom elbow must be reinstalled to use the discharge boom again. During bin loading, the flex hose connected directly to the airlock outlet coupler can result in a slight stretching of the joints, resulting in potential difficulty in reinstalling the lower boom elbow. To correct the position of the airlock outlet coupler, it may be necessary to place a planar surface against the coupling and tap the coupling back to its original position to allow the lower boom elbow to be properly installed.

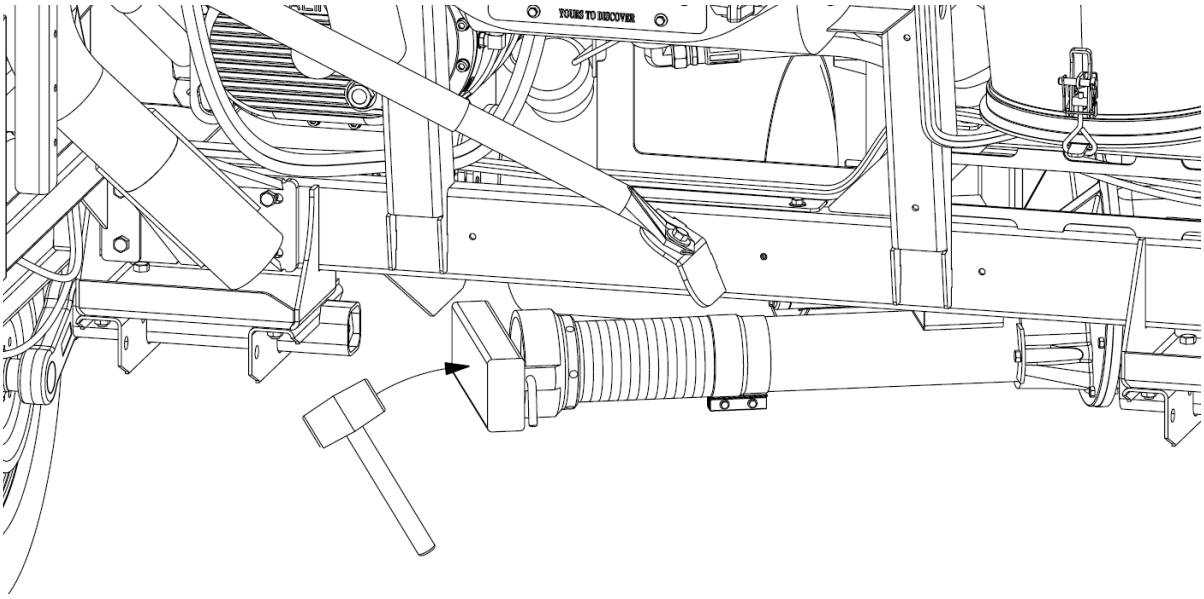


Figure 7-47: Airlock outlet coupling readjustment

Blow-Only Operation

A standard Ultra-Vac unit operates as a 'suck/blow' unit, drawing air and grain into the primary AMS under vacuum and discharging the material under pressure. However, some units may be used in blow-only operation by having material drop directly into an intake hopper positioned above the airlock. To adjust a unit to blow-only operation, the primary AMS must be removed and a purpose-built intake hopper installed, as well as fitting an airlock intake guard and attaching a muffler to the blower intake.

Warning: Standard Ultra-Vac units are not supplied with blow-only kits. Standard machines must not be used in blow-only operation unless additional operational and safety hardware is installed. It is the responsibility of the owner/operator to ensure that all moving parts and inlets are adequately guarded if standard machines are used in blow-only operation. The blades of the rotating airlock and lobes of the rotating blower are dangerous and **MUST** be properly guarded at all times during operation. Do **NOT** operate the machine without all guards in place.

To adjust a unit for blow-only operation, proceed as follows:

1. Remove the primary AMS and secondary AMS as follows:
    a. Follow the standard operating procedures to rotate the boom to ensure it does not interfere in the removal of the AMS assemblies.

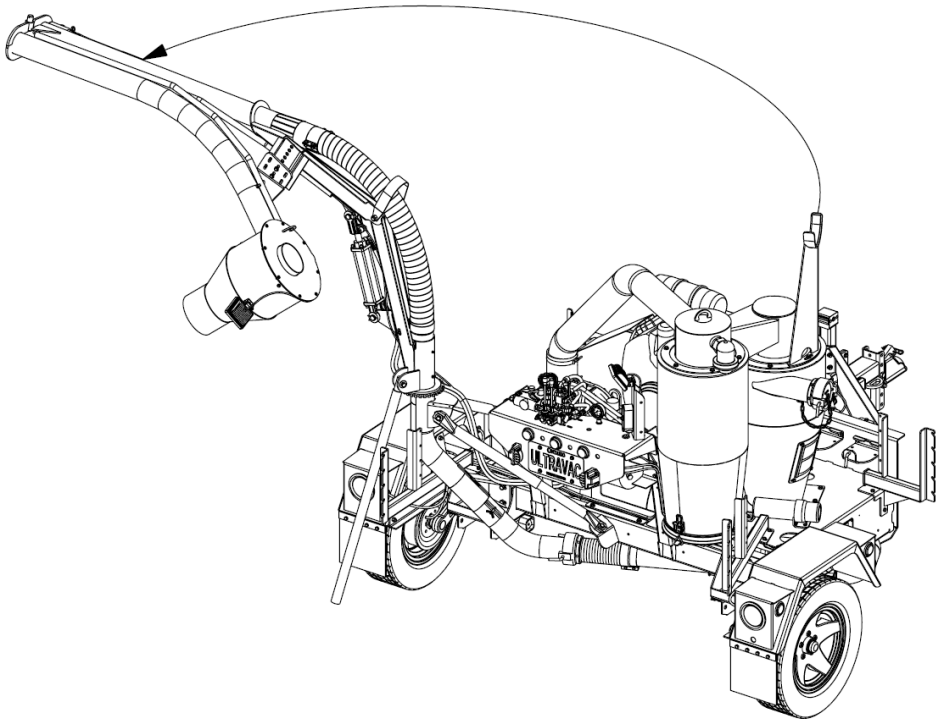


Figure 7-48: Boom clearance

b. Secure an appropriately rated lifting mechanism to the lifting eye of the secondary AMS.

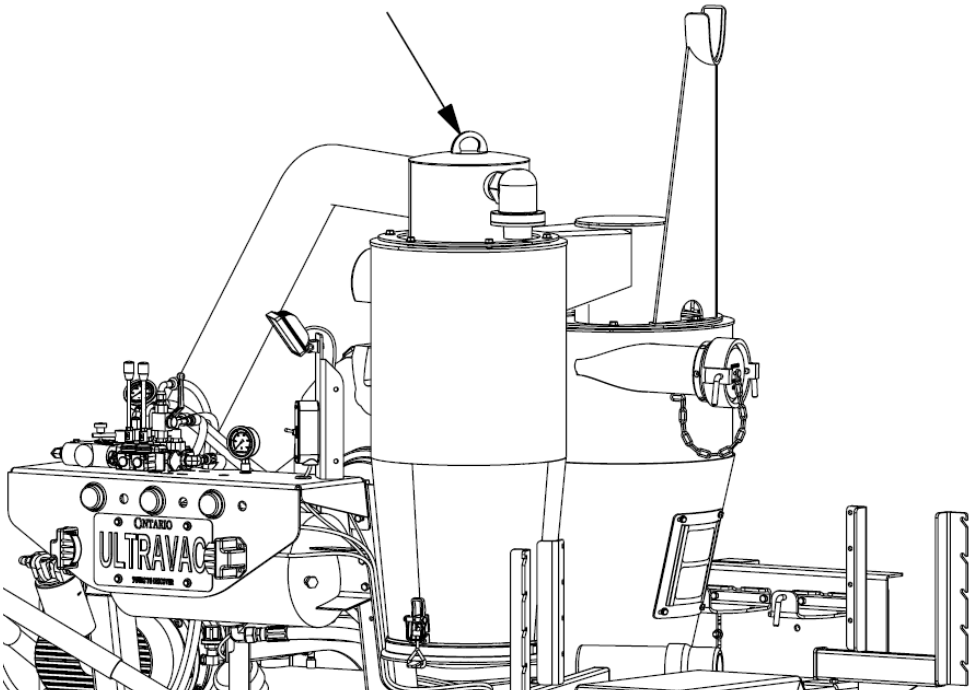


Figure 7-49: Secondary AMS lifting eye

c. Loosen the t-bolt clamps and remove the hose from the secondary AMS outlet pipe.

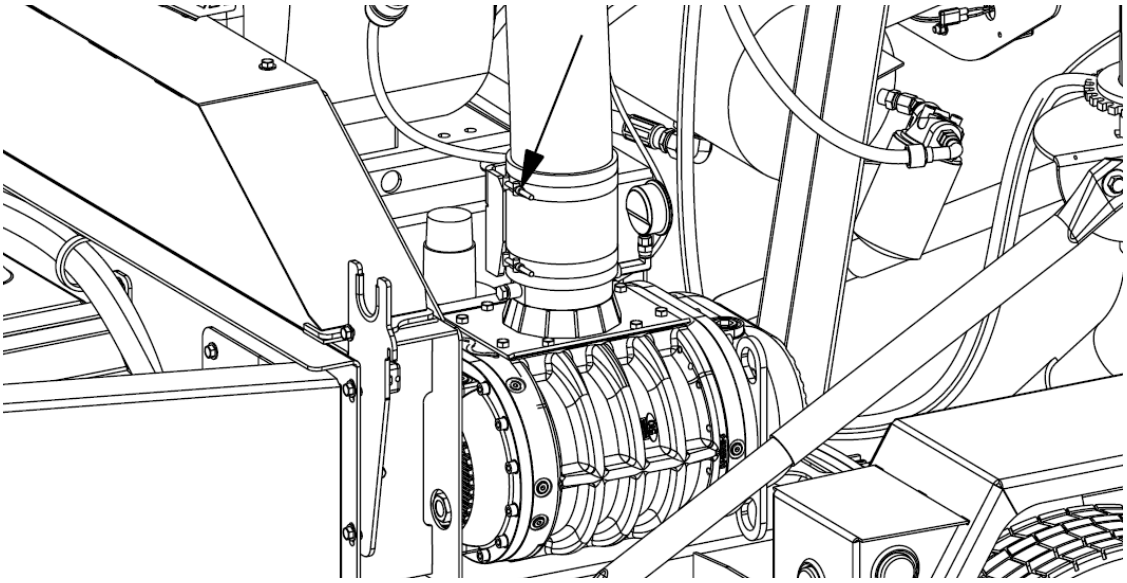


Figure 7-50: Blower connecting hose removal

d. Loosen and remove the fasteners securing the primary AMS to the frame.

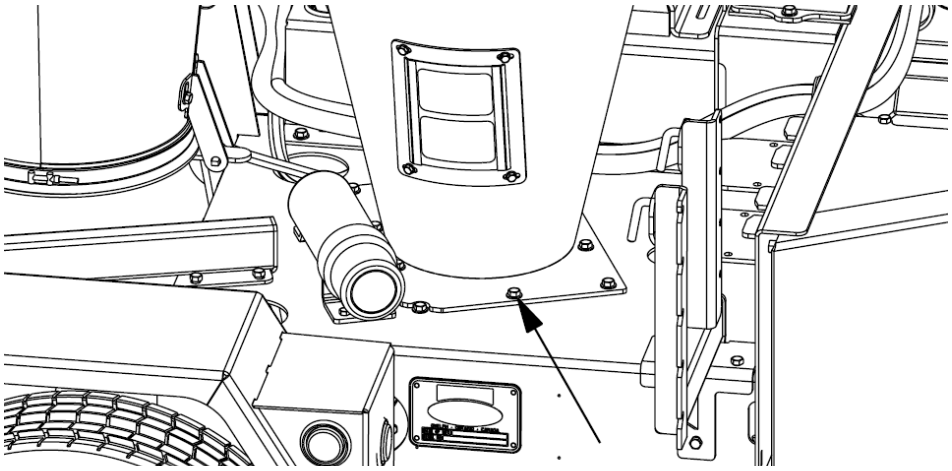


Figure 7-51: Primary AMS frame fasteners

e. Lift and remove the AMS assemblies.

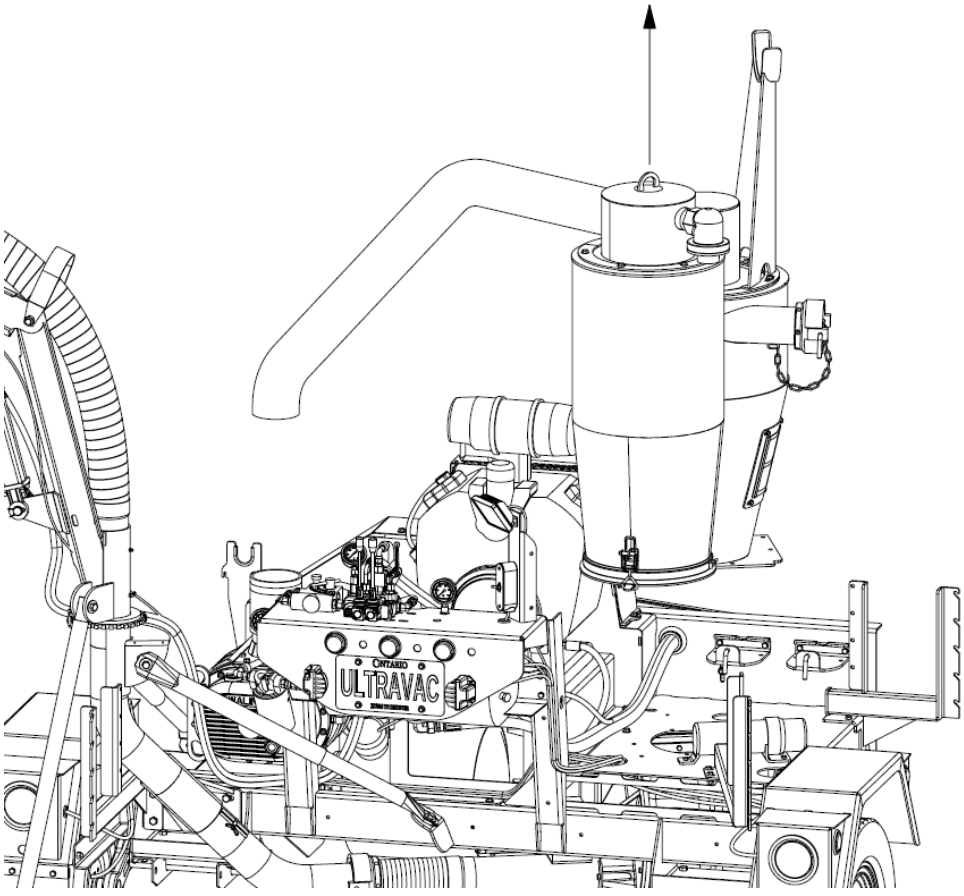


Figure 7-52: Removal of AMS assemblies

2. Mount and secure an intake hopper to the frame above the airlock inlet.

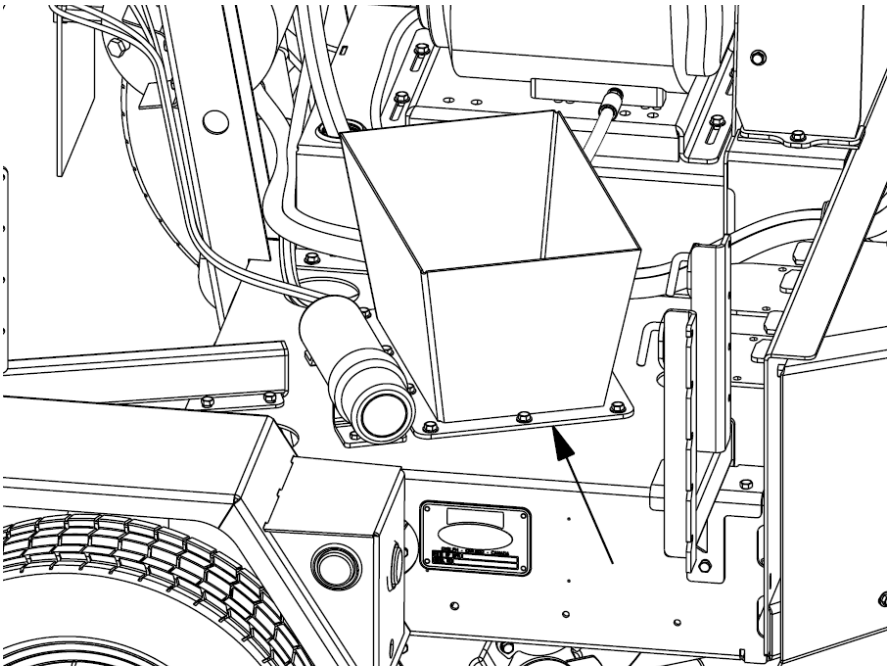


Figure 7-53: Airlock intake hopper

3. Fit a mesh or slotted guard over the product entry area of the airlock. The guard must be capable of supporting a minimum load of 270 lbs (123 kg) without permanent deformation with opening sizes in compliance with local or international guarding standards.

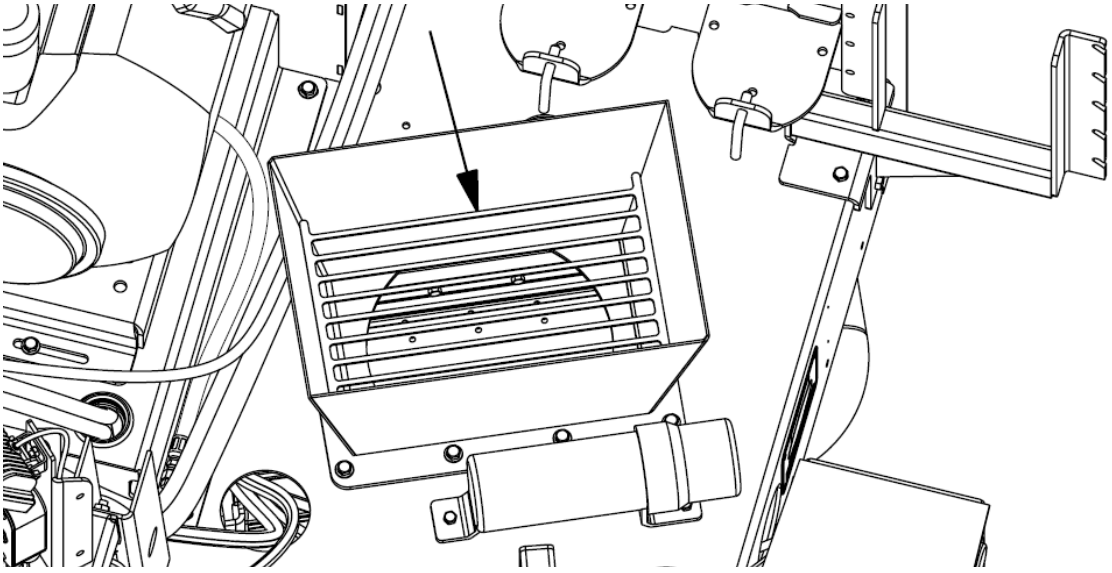


Figure 7-54: Airlock intake hopper guard

4. Remove the blower intake assembly.
5. Attach an inlet screen or muffler to the blower inlet. This must be done to reduce blower noise and shield the rotating lobes of the blower.

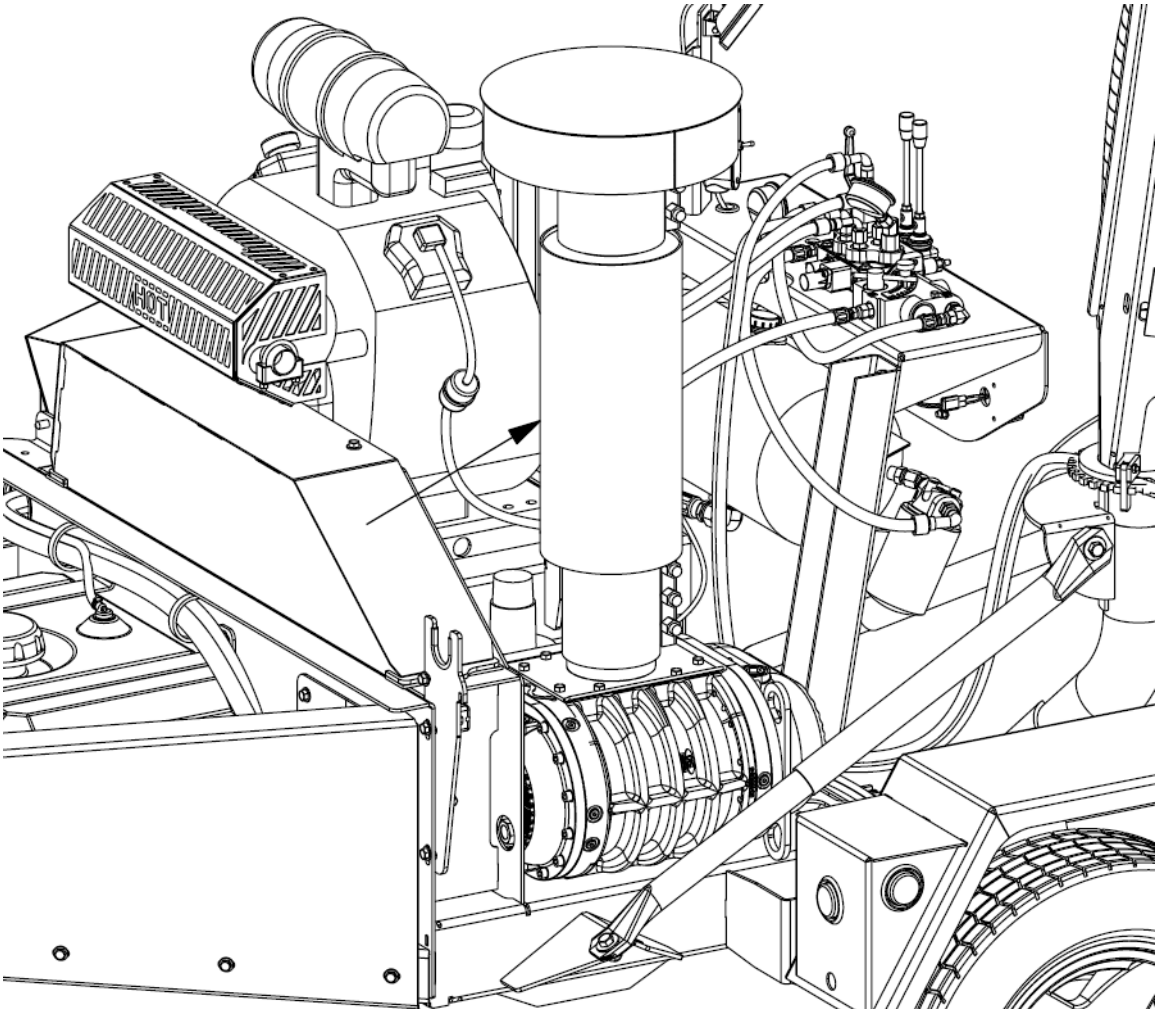


Figure 7-55: Inlet muffler assembly

6. During operation, ensure there is a continuous flow of product into the intake hopper.
7. Gradually adjust the airlock speed to find the ideal balance between air and product for maximum capacity. Ensure the discharge air pressure does not exceed 10 psi (70 kPa). For set-ups with discharge lines greater than 100 ft (30 m), the pressure will need to be reduced further to prevent blower overloading.
8. Some pressurized air will 'blow-back' through the airlock. This may cause bridging in the primary AMS/intake hopper above the airlock. If the bridging disrupts the flow of product, either reduce the depth of product in the primary AMS/intake hopper or install a vent pipe to release the air trapped in the rotor pockets.

Installation of Boom Flex Hose

In the event the boom flex hose is removed or must be replaced, it is important that it is properly installed to ensure the joints are sealed and it can smoothly move through all operational positions.

To install the boom flex hose, proceed as follows:

1. Clear the area of bystanders, especially small children.
2. Place all controls in neutral, stop the engine/power source, remove the ignition key, disconnect and ground the engine spark plug leads, disconnect the negative (—) engine battery cable, and wait for all moving parts to stop.
3. With the boom lowered to the transport position for easy access, ensure any old silicone or sealant has been removed and the surfaces are clean. Apply silicone to the inner surface of the upper boom clamp.

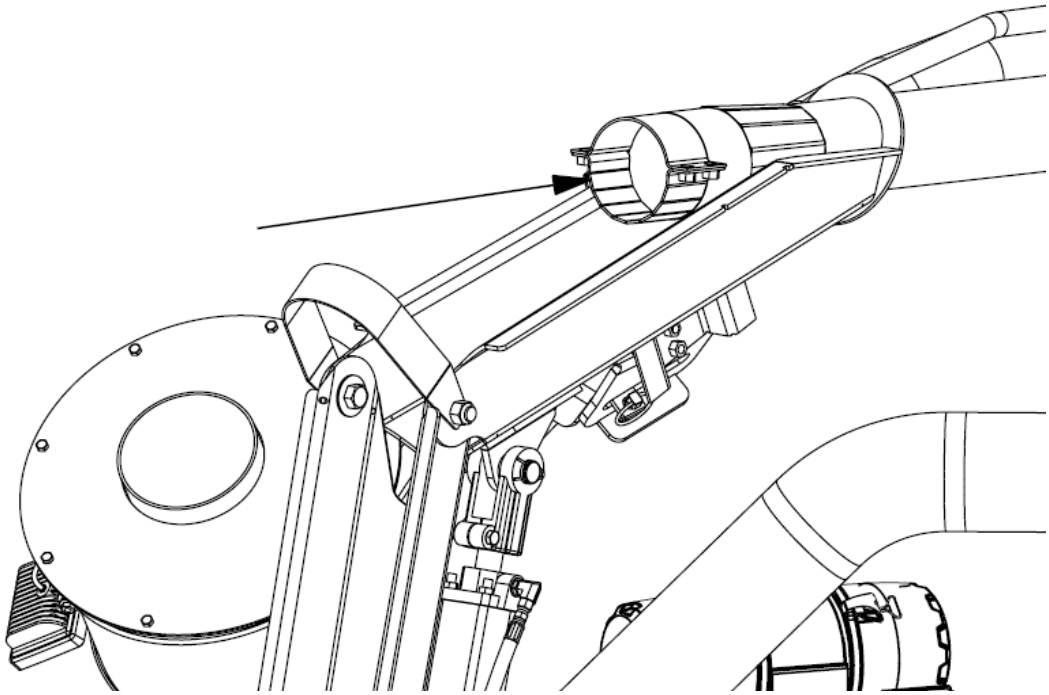


FIgure 7-56: Upper boom clamp silicone application

4. Insert one end of the flex hose into the upper boom clamp and secure it in place by installing and tightening the hardware.

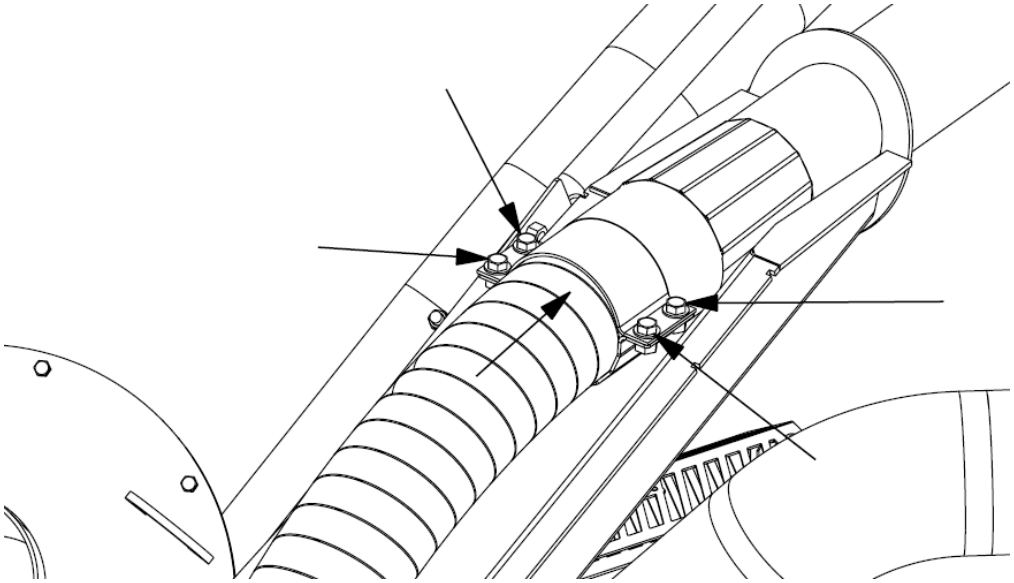


FIgure 7-57: Upper flex hose positioning

5. Apply silicone to the inner surface of the bottom end of the flex hose.

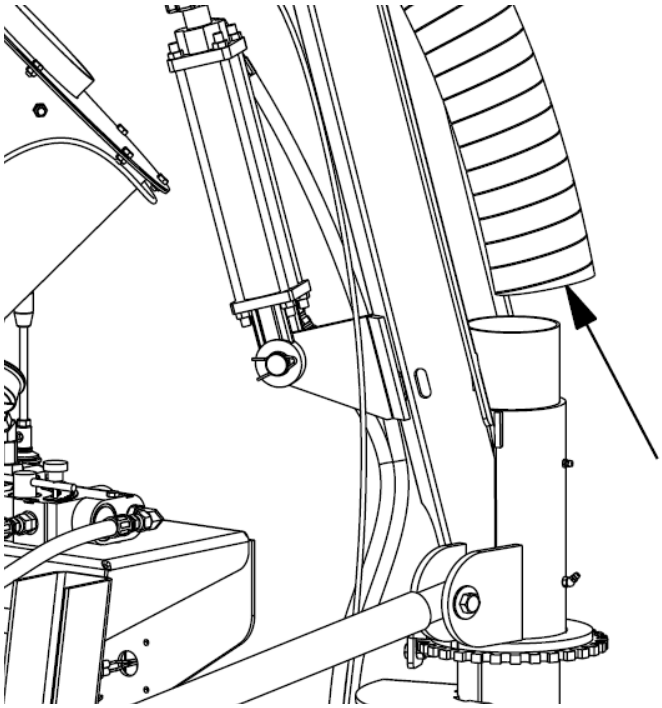


FIgure 7-58: Flex hose base silicone application

6. Position and install the bottom of the flex hose onto the boom swivel tube. If necessary, the boom may be raised slowly to assist with correct positioning.

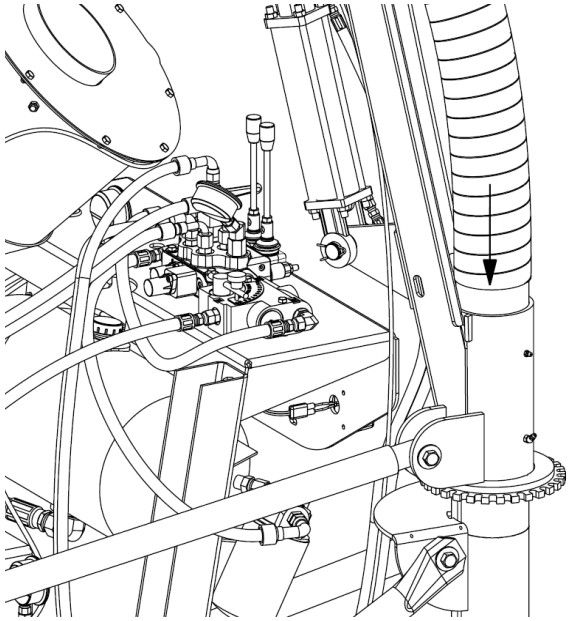


FIgure 7-59: Flex hose base positioning

7. Assemble the lap joint clamp at the base of the flex hose.

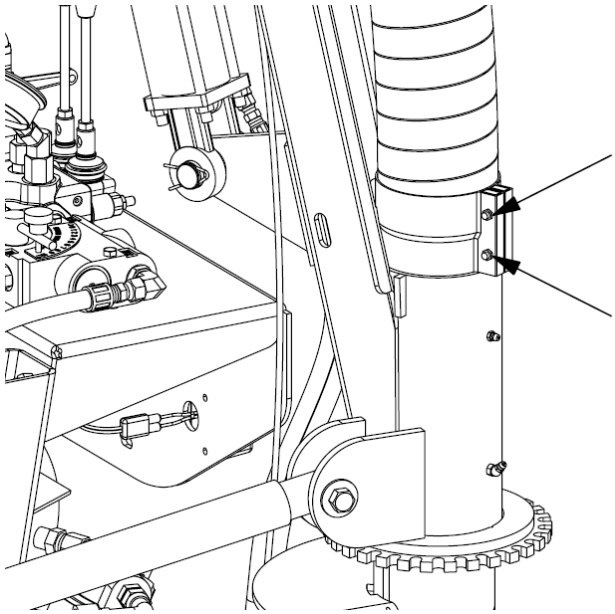


FIgure 7-60: Flex hose clamp hardware

8. Ensure the clamps at both ends of the flex hose have all the required hardware installed and tightened.

PAGE INTENTIONALLY LEFT BLANK

WALINGA® INC.

Specifications

ULTRA-VAC MODEL 4510G

TECHNICAL DATA

Dimensions	**Height** (Transport Position)	**Standard** 89 in (2.26 m)	**AUS** 89.9 in (2.29 m)	
	Discharge Height	**Standard** 12.5 ft (3.81 m)	**AUS** 13.9 ft (4.23 m)	
	Length (Transport Position)	**Standard** 115 in (292 cm)	**AUS** 125 in (317 cm)	
	Width	**Standard** 96 in (244 cm)	**AUS** 96 in (244 cm)	
	Weight	**Standard** 2710 lbs (1230 kg)	**AUS** 2790 lbs (1266 kg)	
	Line Size	4 in (10.2 cm)		
	Primary AMS	18 in dia. (46 cm), one piece, single inlet		
	Secondary AMS	18 in dia. (46 cm)		
	Axle Rating	3500 lbs (1588 kg)		
	Hitch Assembly	**Standard** 2 5/16 in (5.87 cm) Ball	**AUS** 50 mm (2 in) Ball	
Capacity*		**Corn & Barley** 850 Bu/h (22 tonnes/h)	**Wheat** 750 Bu/h (19 tonnes/h)	**Beans** 650 Bu/h (17 tonnes/h)
Pneumatic Pressures		**Maximum Vacuum** 16 in Hg (54 kPa)	**Maximum Discharge** 15 psi (103 kPa)	
Tires	**Type**	Radial Highway		
	Size	ST205/75R15 5 x 4.5		
	Pressure	50 psi (344 kPa)		
	Brakes	Two Wheel Electric		

Hydraulic	**System**	Self-contained		
	Flow Rate	2.35 gpm (8.9 lpm)		
	Pressure	1500 psi (10 300 kPa)		
	Oil Capacity	24 L		
	Oil Type	HYDREX XV (98-17740-6)		
Blower	**Model**	510 Walinga Super Chrome, positive displacement blower		
	Oil Capacity	**FRONT (Drive)** 0.84 L	**REAR (Idle)** 1.25 L	
	Oil Type	Walinga Super Duty Blower Oil (98-13813-6)		
Airlock	**Model**	1314 cast iron shell, precision machined housing, 10 vane rotor, Hardox steel tips, hydraulically driven, reversible rotation		
	Operational Speed	10 - 35 rpm		
	Tip Clearance	**TOP** 0.005 in (0.13 mm)	**BOTTOM** 0.004 in (0.10 mm)	**ENDPLATE** 0.005 in (0.13 mm)
Drive System	**Type**	NACD Clutch, V-type groove sheaves and belts		
	Belt Tension	6.3 lbs (2.86 kg)		
	Belt Deflection	0.4 in (10.16 mm)		
	Engine	KOHLER ECH980		
	Horsepower	37 hp (27.6 kW)		
	Fuel	Gasoline		
	Max. Engine Speed	3000 rpm		

✻ Capacities based on using 12ft (3.65m) suction line and truck loading kit. Capacity will vary with product condition.

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 8-1*** and ***Figure 8-2*** 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

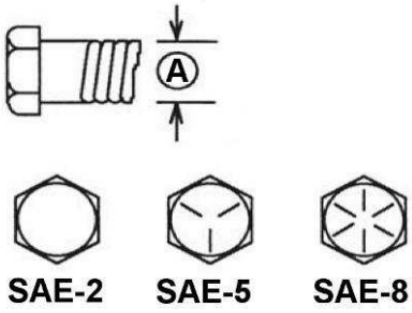


Figure 8-1: Imperial bolts

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

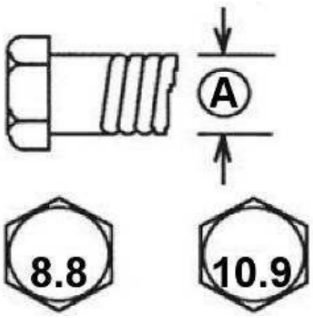


Figure 8-2: Metric bolts

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 Ultra-Vacs are listed below.

ANSI/ASAE S279.17 July 2013	Lighting and Marking of Agricultural Equipment on Highways
NFPA 652	Standard on the Fundamentals of Combustible Dust
ISO 4254-1	Agricultural Machinery - Safety - Part 1: General Requirements
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 273) +1-519-824-8520 (ext 273) warranty.canada@walinga.com
USA	1-800-466-1197 (ext 8) 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.

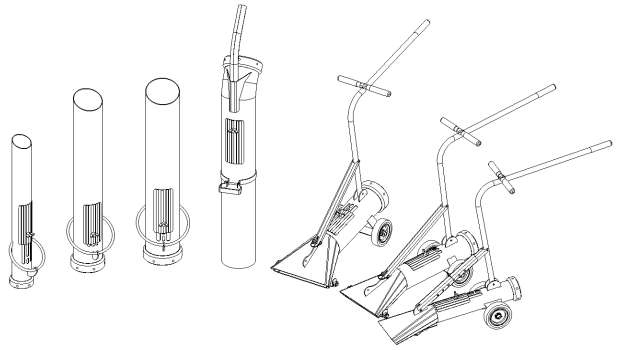
Accessories and Attachments

ULTRA-VAC

A wide variety of accessories are available for your Ultra-Vac 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 Ultra-Vac, availability and ordering, or if you have any questions.

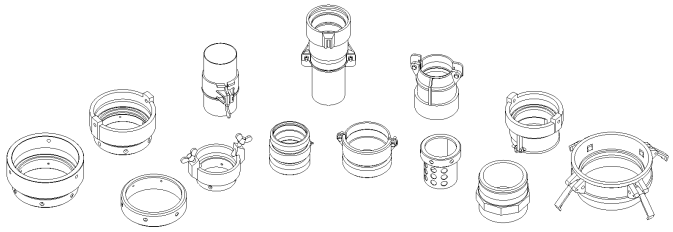
NOZZLES

To improve the ease of material intake, nozzles of varying diameter are available as well as angled nozzles and sweep nozzles for clean-up applications.



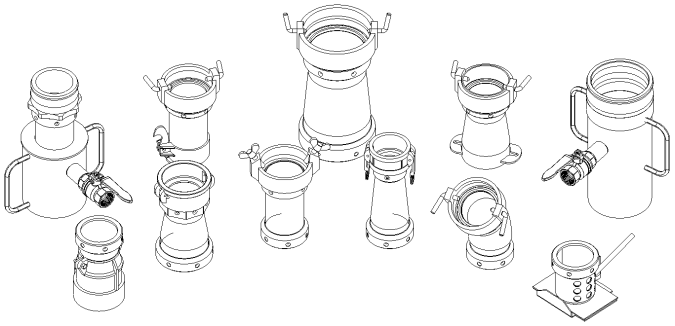
COUPLERS

To accommodate the different coupling styles of various industries and applications, a range of couplers are available in different styles and sizes.



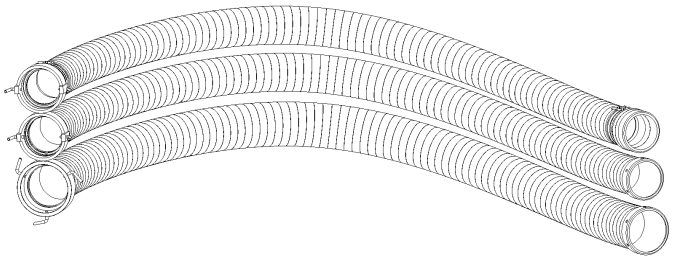
ADAPTERS AND REDUCERS

To accommodate the different coupling styles of various industries as well as the couplings of different hoses, lines and nozzles, various adapters and reducers are available for easy connection in varying styles and sizes.



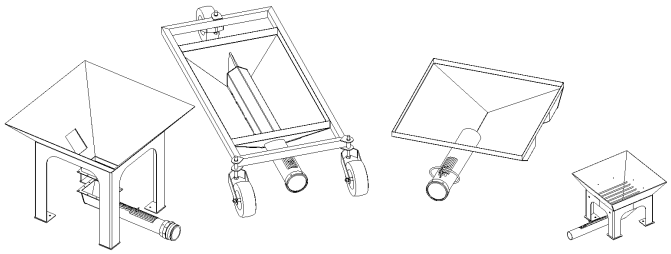
HOSES AND LINES

To improve intake and discharge capacities, as well as ease of movement during clean-up applications, steel flex hoses and rubber intake lines of various lengths and diameters are available.



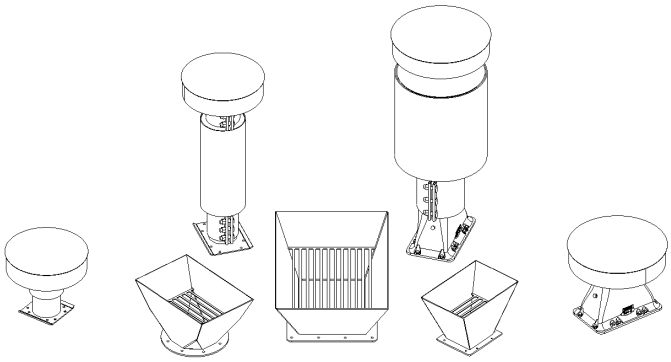
HOPPER INTAKE

For applications where an alternate intake method is required, there are several different styles of hoppers available.



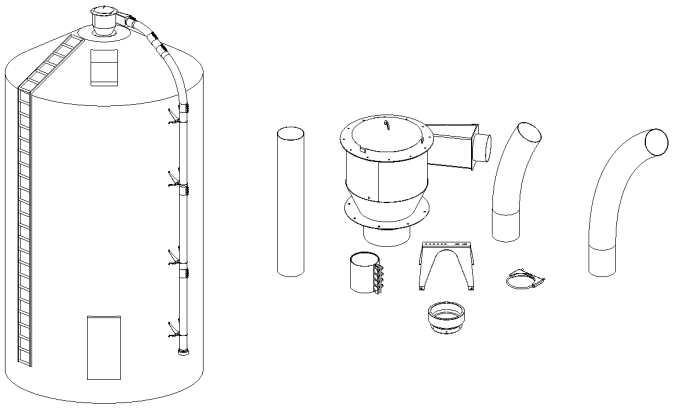
BLOW-ONLY OPERATION ACCESSORIES

For blow-only applications, intake hoppers matched to each airlock model are available as well as blower inlet assemblies for each blower model with and without mufflers.



BIN LOADING SYSTEMS

Walinga offers all of the required components to allow for the Ultra-Vac to discharge directly into a grain storage bin, with systems of varying sizes for unique applications. Components include weather proof discharge cyclones, large radius 30° and 60° elbows, compression clamps, bin stand-off brackets, saddle clamps, aluminum piping and couplers. Walinga also offers a range of Dustless Bin Vents and Dustless Cyclones equipped with Air Purge systems to reduce emitted dust and particulates during bin loading operations.



PAGE INTENTIONALLY LEFT BLANK

WALINGA® INC.

Parts List

ULTRA-VAC MODEL 4510G

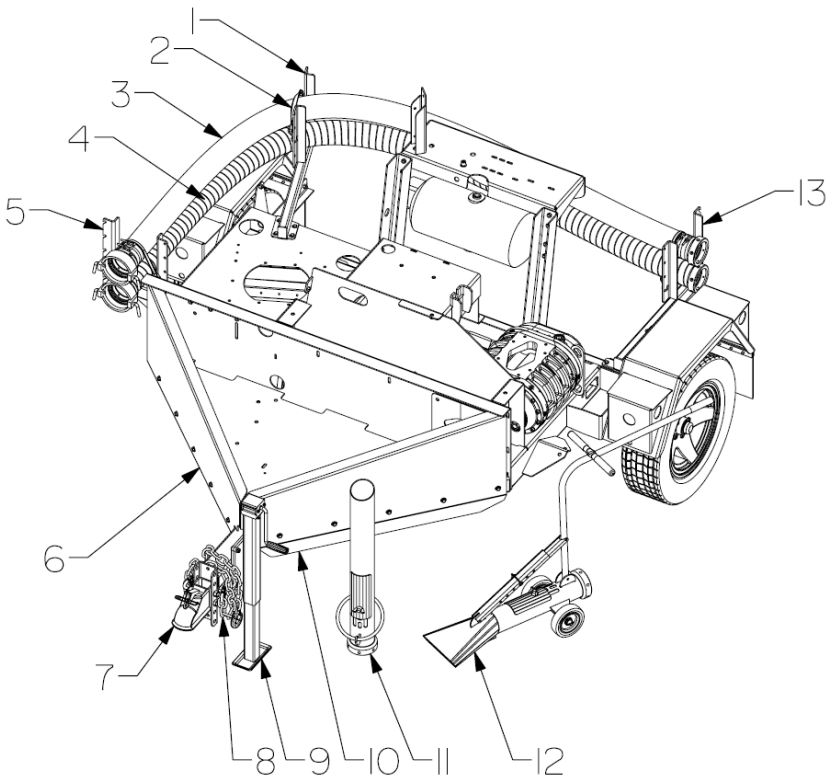
MODEL REFERENCES

Table 11-1: Top-level model assemblies

Reference Code	Assembly Number	Features	
		Standard	AUS
A	11-144488-5	✕	

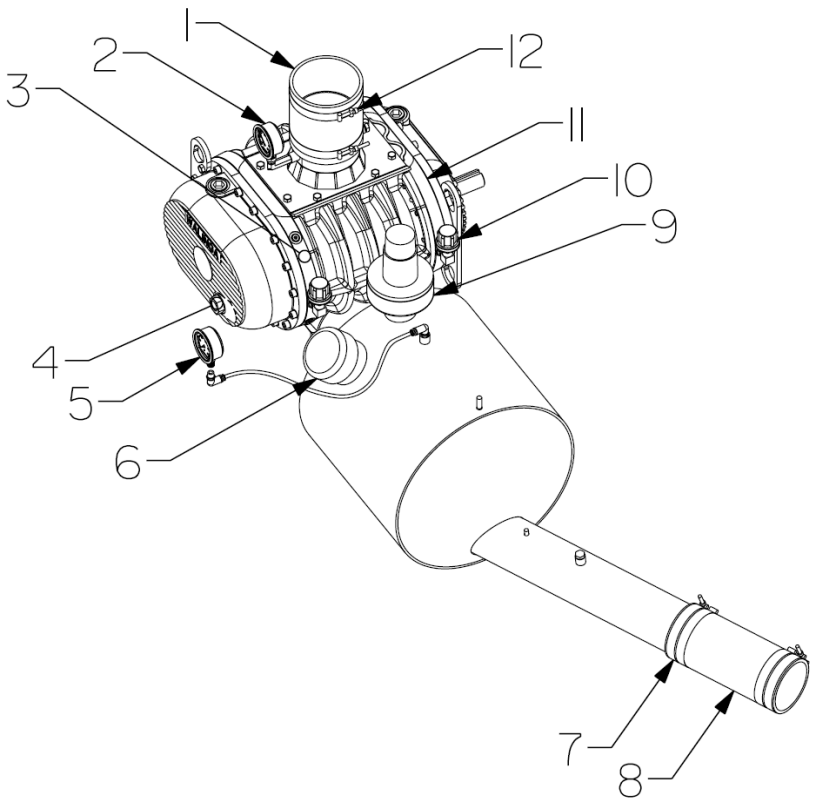
NOTE: Please be aware that the part numbers listed are for the unpainted version of the parts. Please specify if you require the parts/assemblies to be painted.

STRUCTURAL COMPONENTS



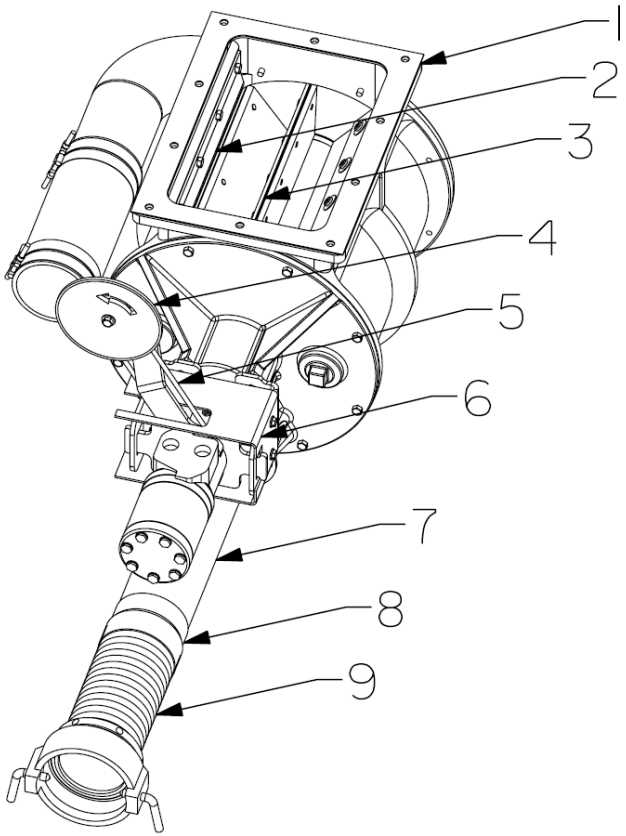
Model		Description	Part Number
A	1	HOSE CARRIER, 4510, CORNER	11-123434-5
	2	STRAP, 15", SNAPPI HOOKER	80-87238-6
	3	CLEAN-UP LINE, 412, DM4X-DF4, VHD	36-84890-5
	4	INTAKE LINE, 412, DF4-DM4, SS POLY	36-09696-5
	5	HOSE CARRIER, 4510, FRONT	11-123435-5
	6	STONE GUARD, 4510, CS, ALM	11-122347-4
	7	COUPLER, BALL 2 5/16", ADJ	11-17908-6
	8	SAFETY CHAIN, 3/8" x 38L	11-86231-6
	9	JACK, SIDEWIND, 8000# 8SW-13(TM)	11-14697-6
	10	STONE GUARD, 4510, DS, ALM	11-123302-4
	11	INTAKE NOZZLE, 4" x 34"	38-03737-5
	12	PUSH SWEEP NOZZLE, 4" x 11"	38-72433-5
	13	HOSE CARRIER, 4510, REAR	11-123433-5

BLOWER COMPONENTS



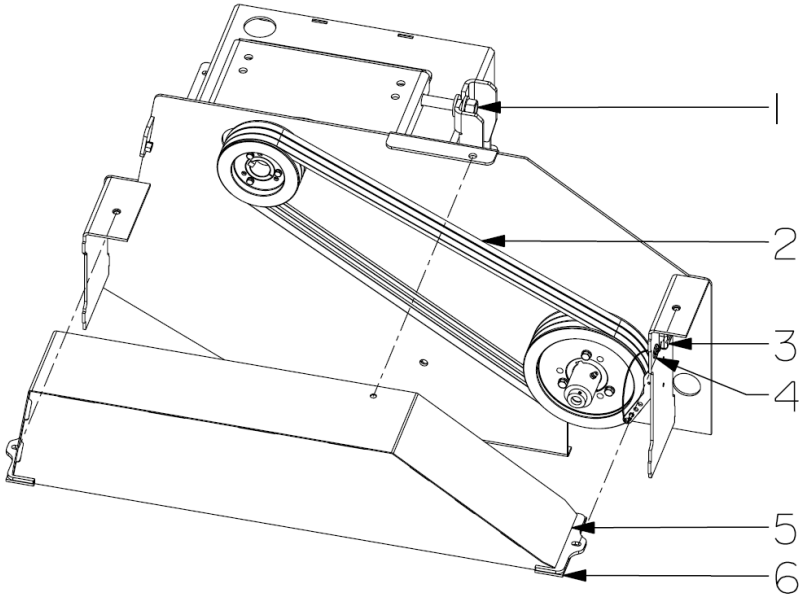
Model		Description	Part Number
A		BLOWER, 510, CHR, 3.25"	43-09877-5
	1	INLET HOSE, 5" DIA, 6" LG	73-08092-6
	2	VACUUM GAUGE INST, BLOWER	11-116243-5
	3	MOUNT GASKET, 510 BLOWER	96-00535-6
	4	SUPER DUTY BLOWER OIL	98-13813-6
	5	OUTLET PRESSURE GAUGE INST	11-116244-5
	6	WASH-OUT CAP, 48FP	58-132775-6
	7	T-BOLT CLAMP, 4-1/2"	28-03823-6
	8	CONNECTOR HOSE, 4" DIA, 10" LG	11-64887-6
	9	PRESSURE RELIEF VALVE, 2", 15 PSI	39-00724-6
	10	BREATHER VENT ASSY, SAE	40-42958-5
	11	OIL COVER GASKET, 510	96-02149-6
	12	T-BOLT CLAMP, 5-1/2"	28-08091-6

AIRLOCK COMPONENTS



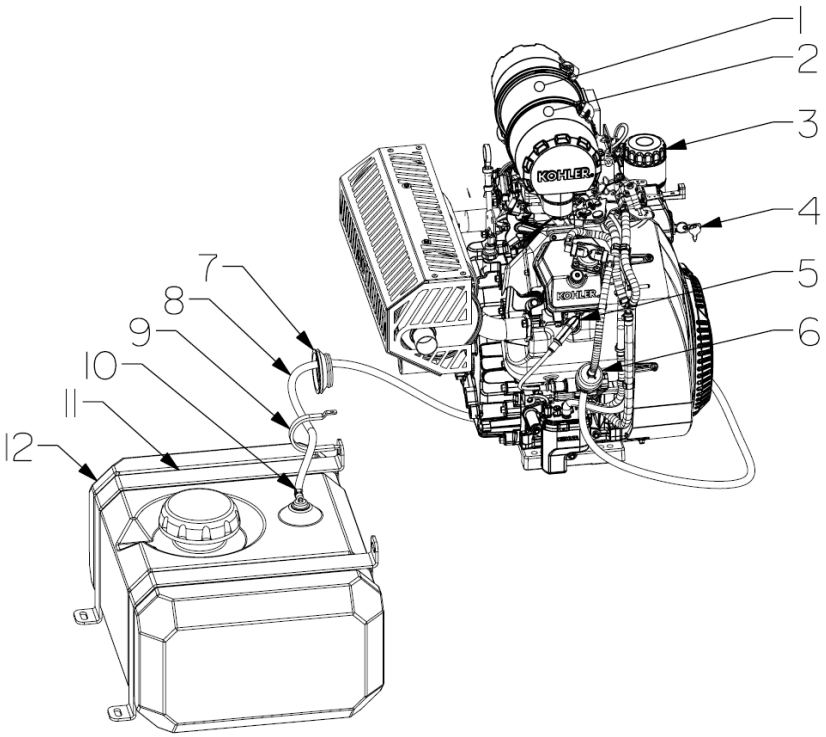
Model		Description	Part Number
A		AIRLOCK, 1314-4A, CHR, HXS	30-37902-5
	1	AIRLOCK MOUNT GASKET, 1314	80-63946-6
	2	TIP WIPER BLADE, 1314	30-20471-4
	3	ROTOR TIP, HARDOX, 1314	30-65702-4
	4	DIRECTION INDICATOR WHEEL	11-36973-4
	5	INDICATOR BELT, 6MM x 25"	96-13967-6
	6	AIRLOCK DRIVE GUARD	11-56059-4
	7	OUTLET PIPE, 14" LG	11-123301-5
	8	CLAMP, LAP JOINT, 4", SS	28-14704-6
	9	ACCELERATION HOSE, 10" LG	11-72834-5

DRIVE COMPONENTS



Model		Description	Part Number
A		DRIVE INST, 4510G, 37HP	11-122283-5
	1	TENSION ROD INST, 3/4-10 x 8" LG	11-114401-5
	2	V-BELT, 5VX780	11-74673-6
	3	TACHOMETER / HOUR METER	11-82616-6
	4	GROMMET, 1/2", RB237	94-14945-6
	5	BELT GUARD ASSY, 4510G, 2023	11-144520-5
	6	VIBRATION MOUNT, 3/16" x 2"	80-13160-6

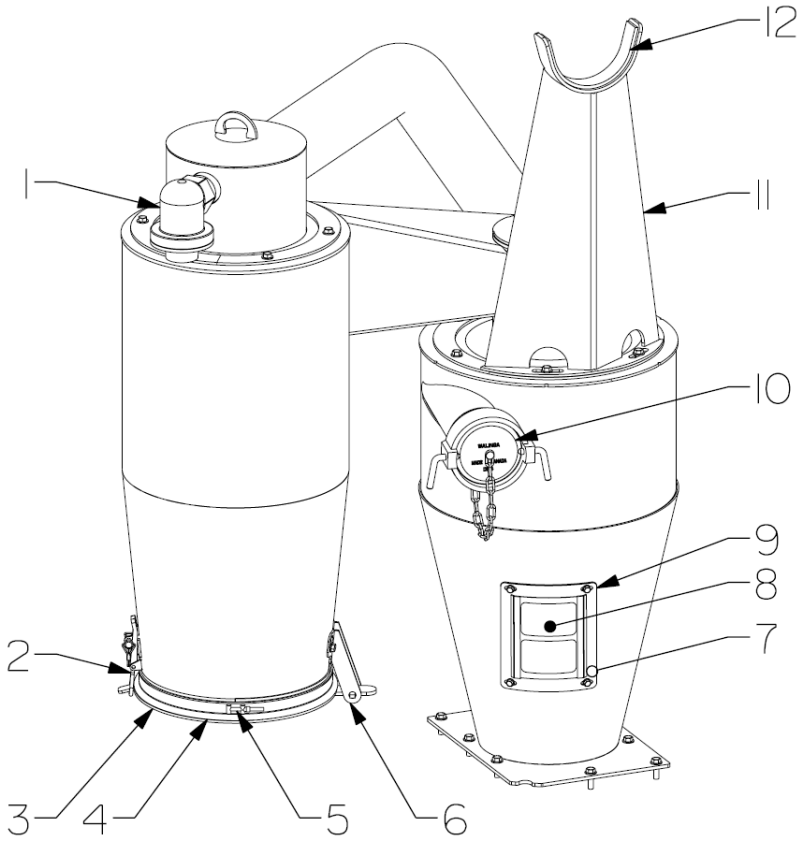
ENGINE COMPONENTS



Model		Description	Part Number
A		ENGINE, KOHLER, EKECH980-3000, 37HP	11-135904-6
		ENGINE OIL, 20W50	98-16084-6
	1	AIR FILTER, INNER SAFETY ELEMENT	25 083 04-S*
	2	AIR FILTER, PRIMARY ELEMENT	25 083 01-S*
	3	OIL FILTER	52 050 02-S*
	4	IGNITION KEY, SET OF 2	48 340 01-S*
	5	IGNITION COIL, EFI (RFI/EMC)	25 519 04-S*
	6	FUEL FILTER	24 050 13-S*
	7	GROMMET, 2-1/2", OPEN	82-14371-6
	8	FUEL LINE, 1/4", SAE 30R14	73-92619-6
	9	HOSE HOLDER, 3" DIA, #900R–48	82-17513-6
	10	GEAR CLAMP, MH4, 7/32" - 5/8" DIA	28-03672-6
	11	FUEL TANK BRACKET, 12 GAL	11-122348-4
	12	FUEL TANK, 12 GAL, EPA, 071588A-FL	11-122351-6

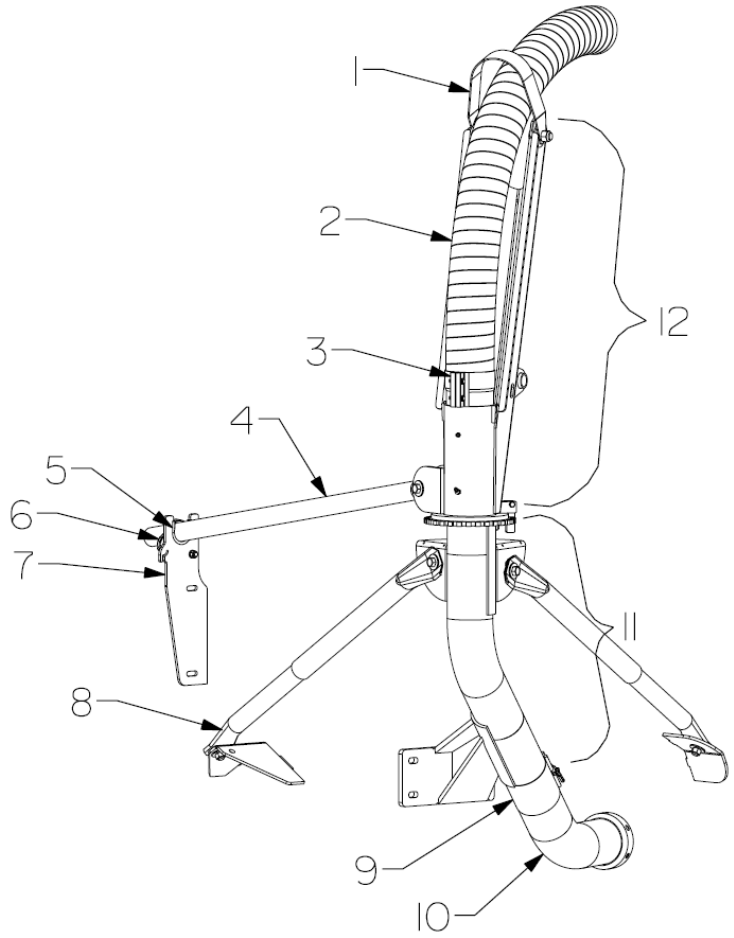
*Contact your local Kohler retailer to order genuine Kohler replacement parts

PRIMARY AND SECONDARY AMS COMPONENTS



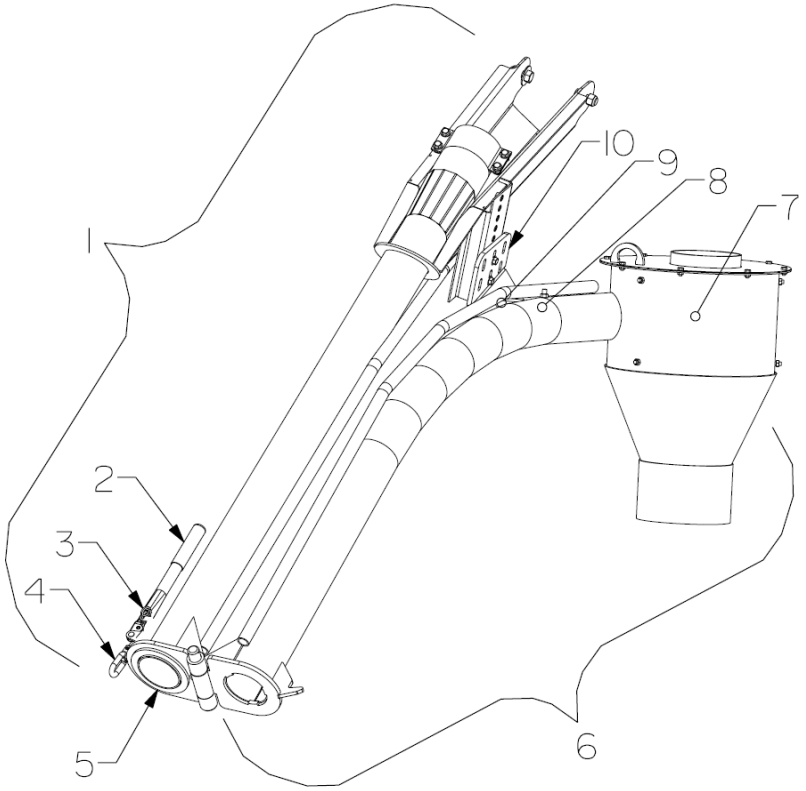
Model		Description	Part Number
A	1	VACUUM RELIEF VALVE, 2", 16 Hg	39-77609-6
	2	DRAW LATCH, GALV, 1100 lbs	28-80927-6
	3	SECONDARY AMS DOOR, LATCHED	11-104329-4
	4	DOOR SEAL, P-EXTRUSION	11-36769-4
	5	T-BOLT CLAMP, 13-7/8"	28-80466-6
	6	DOOR HINGE AND BAR	11-20252-5
	7	WINDOW SPONGE SEAL, #R421A/B	80-03510-6
	8	WINDOW LEXAN, 1/8", 5" x 7"	11-03729-6
	9	WINDOW FRAME	11-54306-5
	10	INLET PLUG WITH CHAIN, DP4	38-04465-5
	11	BOOM SADDLE ASSY, 4510	11-122303-5
	12	SADDLE LINING, 1/4" x 1-1/2", EPDM	80-18431-6

LOWER BOOM COMPONENTS



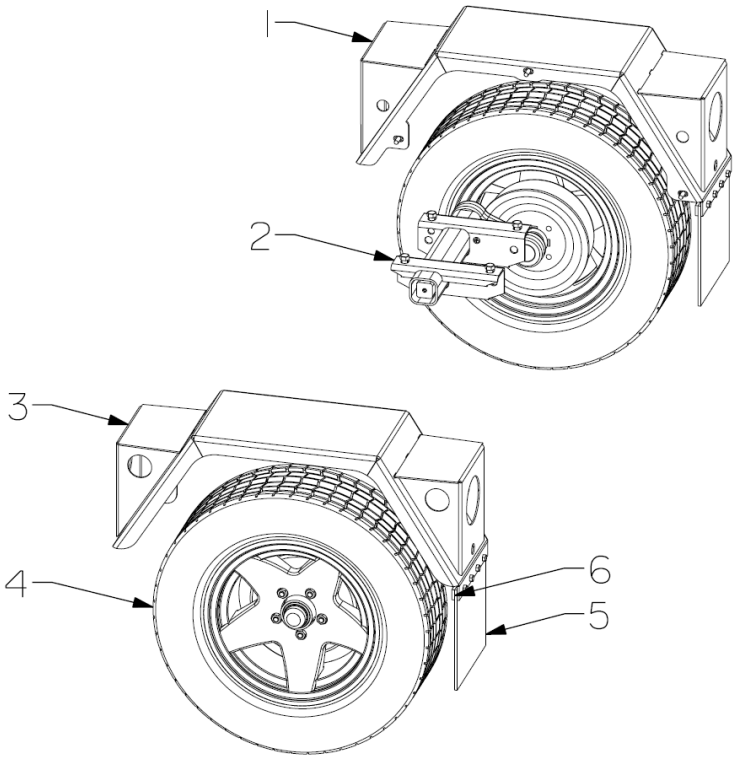
Model		Description	Part Number
A	1	BOOM FLEX HOSE SUPPORT, 4510	11-124588-4
	2	FLEX HOSE, 4", SS, POLY	36-17087-6
	3	CLAMP, LAP JOINT, 4", SS	28-14704-6
	4	MANUAL BOOM ROTATION ARM	11-38222-5
	5	ROT ARM HOLDER RUBBER	11-43640-4
	6	STRAP, 9", SNAPPI HOOKER	80-87237-6
	7	ROT ARM REST, BOLT-ON, 4510	11-123283-4
	8	BOOM BRACE, CLOSED END, 34"	11-122271-5
	9	QUICK COUPLER, 4" DIA, 4" LG, SS	38-18223-6
	10	LOWER BOOM ELBOW, 4"	11-29648-5
	11	LOWER BOOM ASSY, 4510	11-122285-5
	12	BOOM SWIVEL, BOTTOM ASSY, 4510	11-122287-5

UPPER BOOM COMPONENTS



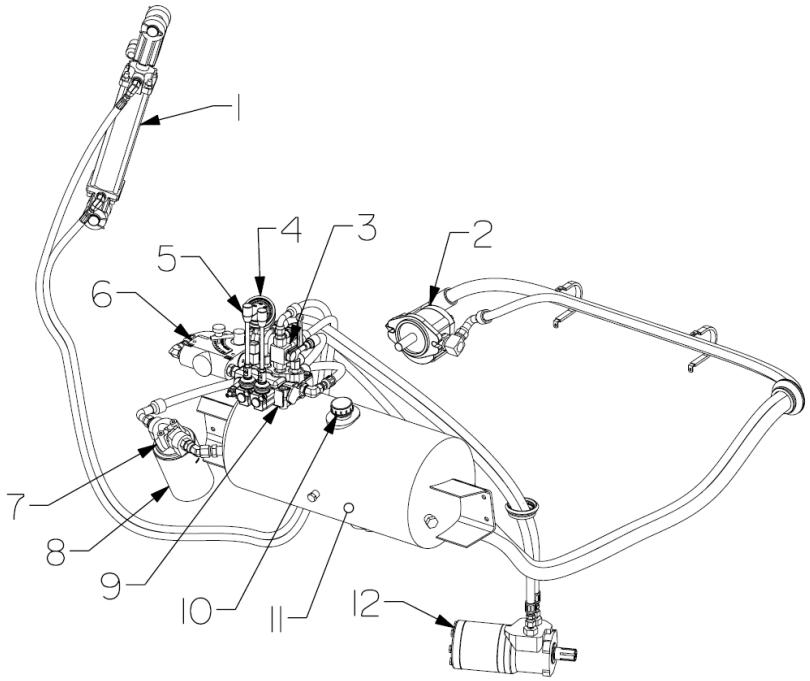
Model		Description	Part Number
A	1	BOOM SWIVEL, TOP ASSY, 4510	11-122293-5
	2	LATCH FINGER GRIP, 1" DIA	11-14632-6
	3	LATCH RETAINER PIN, 142-156	94-19544-6
	4	BOOM LATCH, W/ EXTENSION	11-37464-5
	5	FLAT SEAL RING, 5.370 x 4.125 x .250	96-13344-6
	6	CYCLONE BOOM END ASSY, 4"	11-122281-5
	7	LINER, CYCLONE, 4"	38-128620-4
	8	LINER ASSY, CYCLONE ELBOW, 4"	11-122275-5
	9	LYNCH PIN WITH CHAIN, 7/16"	28-05671-5
	10	BOOM LATCH PLATE ASSY	11-152694-5

AXLE COMPONENTS



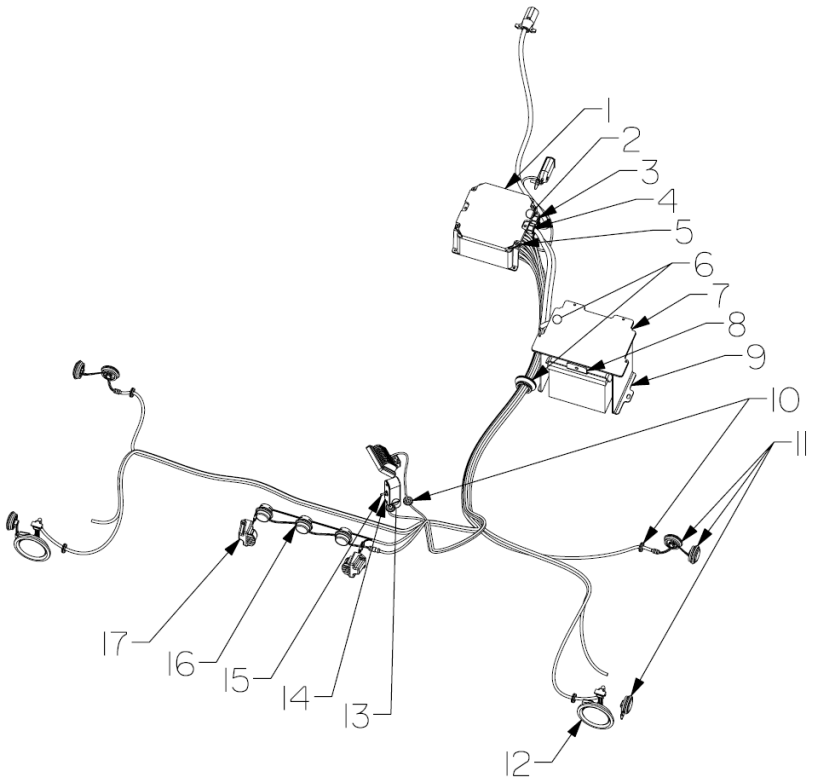
Model		Description	Part Number
A	1	FENDER ASSY, CS, 4510, ALM	11-134351-5
	2	STUB AXLE SUSP, 3500 lbs, ELEC BRAKE	11-85954-6
	3	FENDER ASSY, DS, 4510, ALM	11-134350-5
	4	TIRE/RIM, ST205/75R15 5 ON 4.5	11-81170-6
	5	MUDFLAP, 4510	20-123402-4
	6	MUDFLAP WASHER PLATE, 4510	11-123401-4

HYDRAULIC COMPONENTS



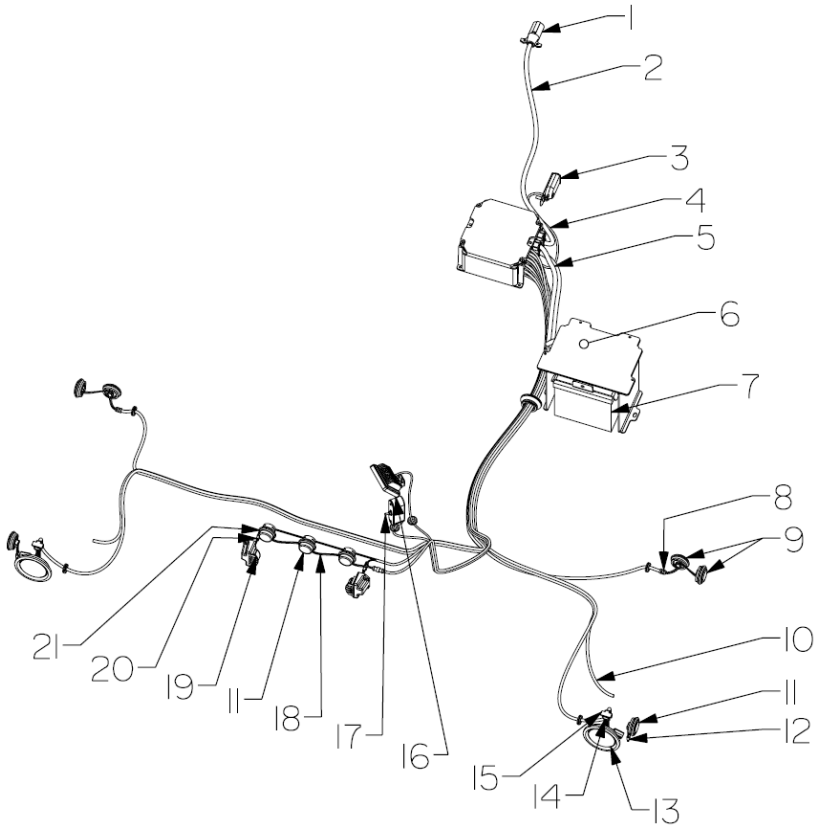
Model		Description	Part Number
A	1	CYLINDER, 2" x 8", HYS20SPE08-929	11-17572-6
		CYLINDER SEAL KIT	11-18476-6
	2	PUMP, PLP20.4D0-49S1-LOc/OC-N-EL-FS-AV	54-124047-6
	3	BALL VALVE, 3/8", SAE 6, 7000 PSI	59-19548-6
	4	HYDRAULIC PRESSURE GAUGE INST	11-116245-5
	5	CONTROL LEVER, AL01/M8X200	59-60336-6
	6	FLOW CTRL VALVE, 0 - 8 GPM, FC51	59-81791-6
	7	HYD FILTER HEAD, SAF06-25-0	61-74993-6
	8	HYD FILTER CANISTER, SAF06-25-0	61-74992-6
	9	HYD CTRL 2 VALVE BANK, SD5	59-96398-6
	10	BREATHER CAP, 3/4", #NY-12	38-82486-6
	11	HYD OIL, HYDREX XV, ALL SEASON	98-17740-6
	12	A/L MOTOR, WR, 255400F3102AAAAA	62-75736-6
		A/L MOTOR SEAL KIT	62-136049-6

ELECTRICAL — HARDWARE COMPONENTS



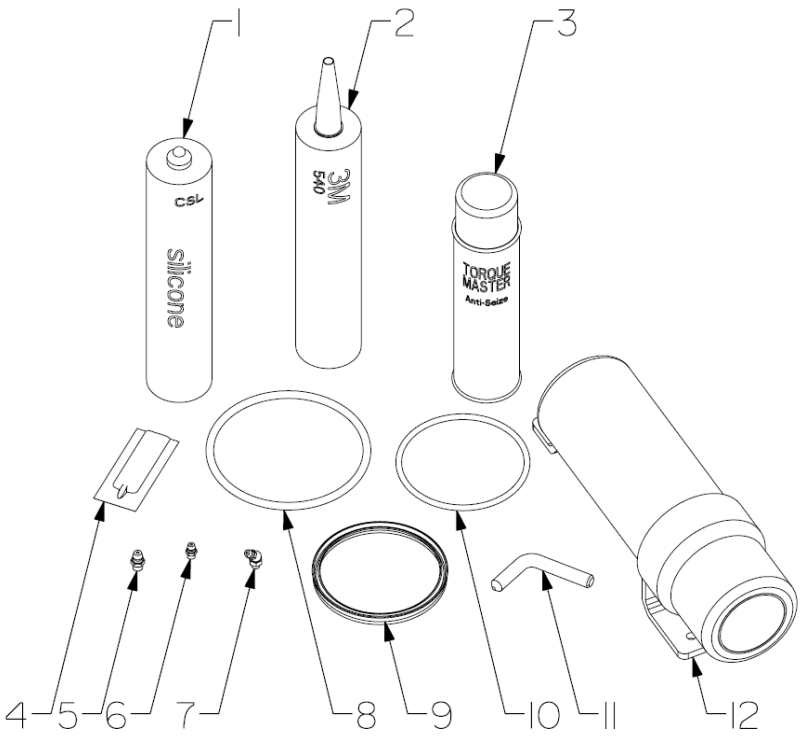
Model		Description	Part Number
A	1	JUNCTION BOX, 8" x 8" x 4"	82-18198-6
	2	JAM NUT, 50845	82-17455
	3	FITTING, 1/2", HOLE CRIMP	82-17485-6
	4	FITTING, 11/16", HOLE CRIMP	82-17487-6
	5	PUSH-IN CHOKE SEAL, 920413	82-17789-6
	6	GROMMET, 2-1/2", OPEN	82-14371-6
	7	BATTERY ENCLOSURE LID	11-154636-6
	8	BATTERY HOLD DOWN	11-154631-4
	9	BATTERY ENCLOSURE BOX	11-154635-4
	10	GROMMET, 3/4", RB248	94-14965-6
	11	GROMMET, 2", OPEN	82-16392-6
	12	GROMMET, 4", OPEN	82-06279-6
	13	GROMMET, 5/16", RB225	94-14137-6
	14	SWITCH BOX, IPEX E	82-80154-6
	15	TOGGLE BOOT SEAL, 19-1022	82-15030-6
	16	GROMMET, 2", CLOSED	82-16422-6
	17	LICENSE PLATE LIGHT BRACKET	82-81149-6

ELECTRICAL — ACTIVE COMPONENTS



Model		Description	Part Number
A	1	PLUG, 7-WIRE MALE, FLAT SPADE	82-18844-6
	2	CABLE, 7 WIRE, 4/12, 2/10, 1/8	82-18026-6
	3	BREAKAWAY SWITCH	11-18746-6
	4	CABLE, 2 WIRE, 2/14	82-17424-6
	5	CABLE, BATTERY, 1/0	82-123035-6
	6	BATTERY TERMINAL, 3-WAY, 2-4/0	82-80438-6
	7	BATTERY, 540 CCA, 12V	82-154630-6
	8	HARNESS, 2 PLUG, M/C BULB	82-19092-6
	9	LAMP, 2", AMBER, LED, SIGNAL STAT	82-82246-6
	10	ELECTRIC BRAKE WIRE KIT	82-134469-5
	11	LAMP, 2", RED, LED, SIGNAL STAT	82-82245-6
	12	PIGTAIL, SEALED MARKER LAMP, 6"	82-19756-6
	13	LAMP, 4", RED, LED, SIGNAL STAT	82-82242-6
	14	ADAPTER, Y, S/T/T AUX PLUG, 6"	82-80702-6
	15	HARNESS, 1 PLUG, L/H T/T BULB	82-19441-6
	16	WORK LAMP, LED, 9 DIODE	82-79469-6
	17	TOGGLE SWITCH, SPST, 19-1029	82-15028-6
	18	HARNESS, 3 PLUG, UPR ID BULB	82-18528-6
	19	LAMP, 2.5", CLEAR, SEAL BEAM	82-06282-6
	20	HARNESS, 1 PLUG, LIC BULB	82-18363-6
	21	JUMPER, MARKER LAMP, 120"	82-106665-6

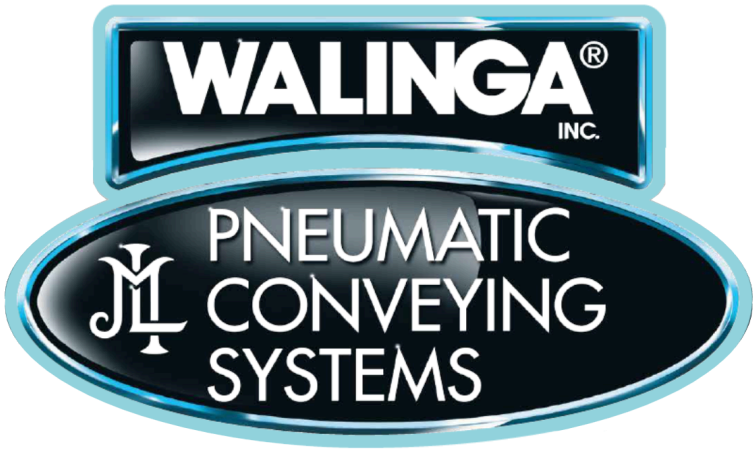
MISCELLANEOUS COMPONENTS



Model		Description	Part Number
A	1	SILICONE, CLEAR, 366 NU FLEX	92-14772-6
	2	SEALANT, WHITE, 3M 540 URETHANE	92-13573-6
	3	ANTI-SEIZE, AEROSOL, TORQUE MASTER	98-13491-6
	4	COUPLING GREASE, SILVER STREAK	98-17473-6
	5	GREASE FITTING, 3/8-18, 0°	57-120729-6
	6	GREASE FITTING, 1/4-28, 0°	57-00625-6
	7	GREASE FITTING, 1/4-28, 45°	57-06084-6
	8	O-RING, 5", 2-428 N70	96-03851-6
	9	SEAL, U-CUP, 4"	96-03146-6
	10	O-RING, 4", 2-345 N70	96-01013-6
	11	TAIL BOLT, 1/2-13-1 1/4 SS	94-09185-5
	12	DOCUMENT HOLDER, 3.5" x 12"	11-67390-6

PAGE INTENTIONALLY LEFT BLANK

PAGE INTENTIONALLY LEFT BLANK



WALINGA®
INC.

CORPORATE HEAD OFFICE:

5656 Highway 6N RR#5
Guelph, Ontario, N1H 6J2
PHONE (519) 824-8520
FAX (519) 824-5651
www.walinga.com

FACTORY DISTRIBUTION AND SERVICE CENTERS:

938 Glengarry Crescent
Fergus, ON, Canada, N1M 2W7
PHONE (519) 787-8227
FAX (519) 787-8210

70 3rd Avenue N.E. Box 1790
Carman, MB, Canada, R0G 0J0
PHONE (204) 745-2951
FAX (204) 745-6309

6116 46 St.
Bloomsbury, AB, Canada, T0G 0G0
PHONE (780) 572-6082

1190 Electric Avenue
Wayland, MI, USA, 49348
PHONE (800) 466-1197
FAX (616) 877-3474

579 4th St. NW
Sioux Center, IA, USA, 51250
PHONE (800) 845-5589
FAX (712) 722-1128

24 Molloy St.
Toowoomba, Qld, Australia, 4350
PHONE 07-4636-7344
EMAIL mail@customvac.com.au

PRINTED IN CANADA