

# Cusco Duravac

REVISED JUNE 6, 2014. SEE LAST SLIDE FOR CHANGE LOG.



# Product Overview

- Cusco's Duravac series is the ideal unit for use in extreme weather conditions. With heated valves and sturdy construction, you can depend on this unit for superior performance and reliability, even in the harshest of environments.
- Available in 3600 USG or 4400 USG tank sizes.
- Available in DOT 407/412 and Transport Canada configurations.
- The standard Duravac will include:
  - Hibon VTB 820 Blower, 1400 CFM.
  - Heated rear valve assembly for 4" and 6" valves.
  - Stand up locker and tool boxes.
  - Side Tray dirt shields.
  - Two slide out chain hangers.
- Options available: Stainless steel tank, wash system, various pump and blower sizes, isolation valve, high capacity cyclone drain, hot water system, accessories, etc.

**SAFETY  
PROVISIONS**

**COMPONENTS**

**OPERATING  
INSTRUCTIONS**

**MAINTENANCE**



# SAFETY PROVISIONS



**Static Line**



**Fire Extinguisher**



**REAR DOOR STAND**



**TANK STAND**

NOTICE: PLEASE REFER TO INFORMATION BULLETIN DATED JUNE 6, 2014. IT CONTAINS INFORMATION REGARDING THE SAFE USE OF THE TANK STAND AND THE REAR DOOR STAND. YOU CAN FIND THE BULLETIN ON PAGE 11, AND YOU CAN FIND IT ON THE CUSCO WEBSITE.

# Static Line

- Electrostatic discharge (ESD).
- Static lines are used when combustible materials are transferred between carriers.
- They are ideally used when a discharge of static (ESD) could cause a spark and subsequent explosion.



# Fire Extinguisher

- **A-Rated** extinguishers are used on ordinary combustible materials e.g. wood, paper, cloth, rubber and many plastics.
- **B-Rated** extinguishers are used on flammable liquids and gases e.g. motor oil, paint thinner, gasoline, propane and natural gas.
- **C-Rated** extinguishers are used when live electrical is involved.



# REAR DOOR STAND

- Make sure the PTO is disengaged before lowering the rear door onto the prop.
- Do not use the door stand on its own at any time, especially while personnel are performing work inside the tank, or around the rear door. **Always use rear door stand in conjunction with the rear door hydraulic cylinder.**

Note: Prior to each use, the condition and operation of the stand and hydraulic cylinders should be inspected to ensure they are in proper working condition.



**DANGER: FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN HAZARDOUS WORKING CONDITIONS WHICH COULD INCREASE THE RISK OF PROPERTY DAMAGE, SERIOUS PERSONAL INJURY OR DEATH. IMPORTANT: REFER TO INFORMATION BULLETIN DATED JUNE 6, 2014 FOR INFORMATION. SEE PAGE 11.**



# TANK STAND

- The tank must be emptied before it can be lowered onto the safety stand.
- Do not use the tank stand on its own at any time, especially while personnel are performing work under or around the tank. **Always use the tank stand in conjunction with its respective hydraulic cylinders.**

Note: Prior to each use, the condition and operation of the stand and hydraulic cylinders should be inspected to ensure they are in proper working condition.



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# **DANGER**

**DO NOT ENTER VESSEL WITHOUT  
PROPER BREATHING APPARATUS**

**RELEASE PRESSURE OR VACUUM  
FROM VESSEL BEFORE OPENING  
INLETS AND OUTLETS**



**! DANGER**

**! PELIGRO**

**NEVER GET  
UNDER THIS  
TRUCK IF  
THE ENGINE  
IS RUNNING!**



***You may be  
hurt or killed.***

**¡NUNCA SE  
META DEBAJO  
DEL CAMIÓN  
CUANDA EL  
MOTOR ESTÉ  
EN MARCHA!**

Part No. 36M35644 (Rev. 9-06)  
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**DANGER**

**HIGH VELOCITY AIR INTAKE**

**KEEP CLEAR OF NOZZLES  
DURING OPERATION**



## INFORMATION BULLETIN

Date: June 6, 2014

From: Cusco Fabricators LLC.

To: All Customers of Cusco Fabricators LLC. and all users of Cusco trucks

**Subject:** This bulletin is intended to provide you with information regarding the safe use of the tank stand and the rear door stand on all Cusco trucks (except for low profile trucks). The door stand and tank stand are depicted pictorially in figure 1 below.

The tank stand is designed to assist in positioning the tank in the elevated position and the door stand is designed to assist in positioning the rear door in the open position. These stands are designed and constructed to be used in conjunction with the other mechanisms on the tanks, in particular the hydraulic cylinders.

Always use the tank stand and rear door stand in conjunction with their respective hydraulic cylinders, see figure 2 (items 1 and 2).

**Do not** use the tank stand on its own at any time, especially while personnel are performing work under or around the tank.

**Do not** use the door stand on its own at any time, especially while personnel are performing work inside the tank, or around the rear door.

Prior to each use, the condition and operation of the stands and hydraulic cylinders should be inspected to ensure they are in proper working condition.

**DANGER:** Failure to follow these instructions may result in hazardous working conditions which could increase the risk of property damage, serious personal injury or death.



Door stand

Tank stand

Figure 1

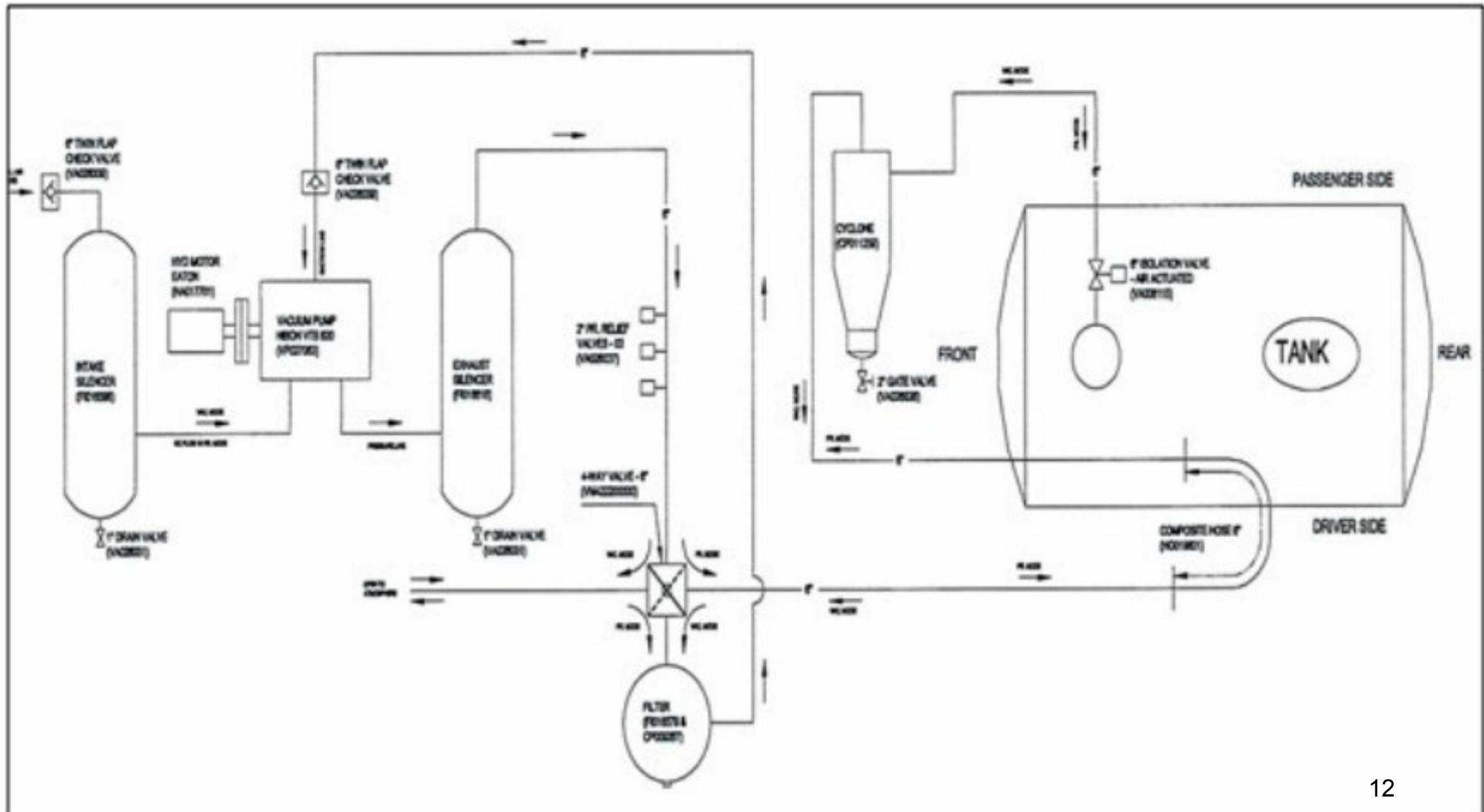


Figure 2

**THIS BULLETIN CAN ALSO BE FOUND IN THE CUSCO WEBSITE UNDER BULLETINS**



# Vacuum System Airflow



# Rear Door Valves

- The valves are “air-opened” and “spring-closed”.
- The valves are operated from the air switch, located at each valve.
- The master emergency switch is located on the driver’s side and at the front of the hose tray.
- The 4” valves are used for loading product.
- The 6” valve is used for discharge and can also be controlled from inside the cab.





# Sand Pipe

- The sand pipe is located on the load nozzle, found on the inside of the rear door.
- It is designed to carry solids that are being loaded, and direct them to the front of the tank.
- The sand pipe has a deflector plate at the end of the pipe.
- *Note: The deflector plate and the pipe must be inspected for holes and signs of wear. Failure to do so may cause damage to the top of the tank.*





# Primary Internal Shut-Off

- The internal shut-off is located at the top of the vacuum tank and is responsible for preventing fluids from entering the vacuum pump.
- It consists of a 12" stainless steel float ball and a 6" rubber seat.
- The float ball, rubber seat and cage should be checked periodically.
- Check the ball for dents or holes, the rubber seat for sludge build-up and nicks as well as the cage for wear and loose fasteners.



# Rotary Float Gauge



- The rotary float gage is located on the driver's side, at the front of the tank shell.
- To adjust packing, tighten the top and bottom packing gland adjuster nuts, with a  $\frac{1}{4}$  of a turn, alternating from top to bottom to top, etc., until the leak has stopped.
- *Note: If the leak will not stop, the graphite packing can be replaced by removing the packing gland and installing new packing.*

# Isolation Valve

- A 4" isolation valve is located at the front, top half of the tank, between the primary and secondary shut-off.
- This valve will open when the PTO shifter is engaged, and will close when disengaged.
- It will isolate the tank when traveling on the highway.





# Hydraulic Vibrator

- The vibrator system on your unit is operated hydraulically. This hydraulic system incorporates a relief valve set at 2500 psi and a fixed flow control valve. The vibrator is usually located at the front of the unit, on the belly of the vacuum tank, and bolted to a mounting channel/reinforcing pad assembly.
- *Note: The vibrator is driven by a hydraulic motor. Which has been engineered to operate intermittently, up to pressures of up to 2500 psi, and with an oil flow of 0.2 – 2.5 gpm.*



# Tank Pressure Relief Valve

- The pressure relief valve is located on the front, top half of the waste tank.
- This valve is pre-set and cannot be changed.
- The pressure is set to 25 psi.

## **CAUTION**

- The vent is spring loaded. Consult your vacuum truck Owner's Manual before servicing.





# Cyclone

- High capacity cyclone assembly with a 12" diameter drop box, bottom mounted door, 2" brass gate valve, Kamlok and cap.
- The cyclone is designed to remove heavy material from the airflow, that is passing through the piping to the final filter.
- *Note: Cyclones should be drained and cleaned. Failing to do so will flood the blower and clog the filter.*





# System Pressure Relief Valve



- This is a direct operated poppet and spring type valve. Where the spring constantly opposes the pressure inlet port from the outlet port, at the valve seat.
- The desired set pressure or relief is achieved by turning the adjustment shaft in, for more pressure and out, for less pressure.
- *Note: The maximum pressure for this system is 15 psi.*

# 4 – Way Valve

- The 4-Way valve is used to change the airflow direction from the blower to the product tank and back to the blower.
- It has three positions; Neutral , Vacuum and Pressure.
- The Neutral position is used for venting the product tank on startup and shutdown.



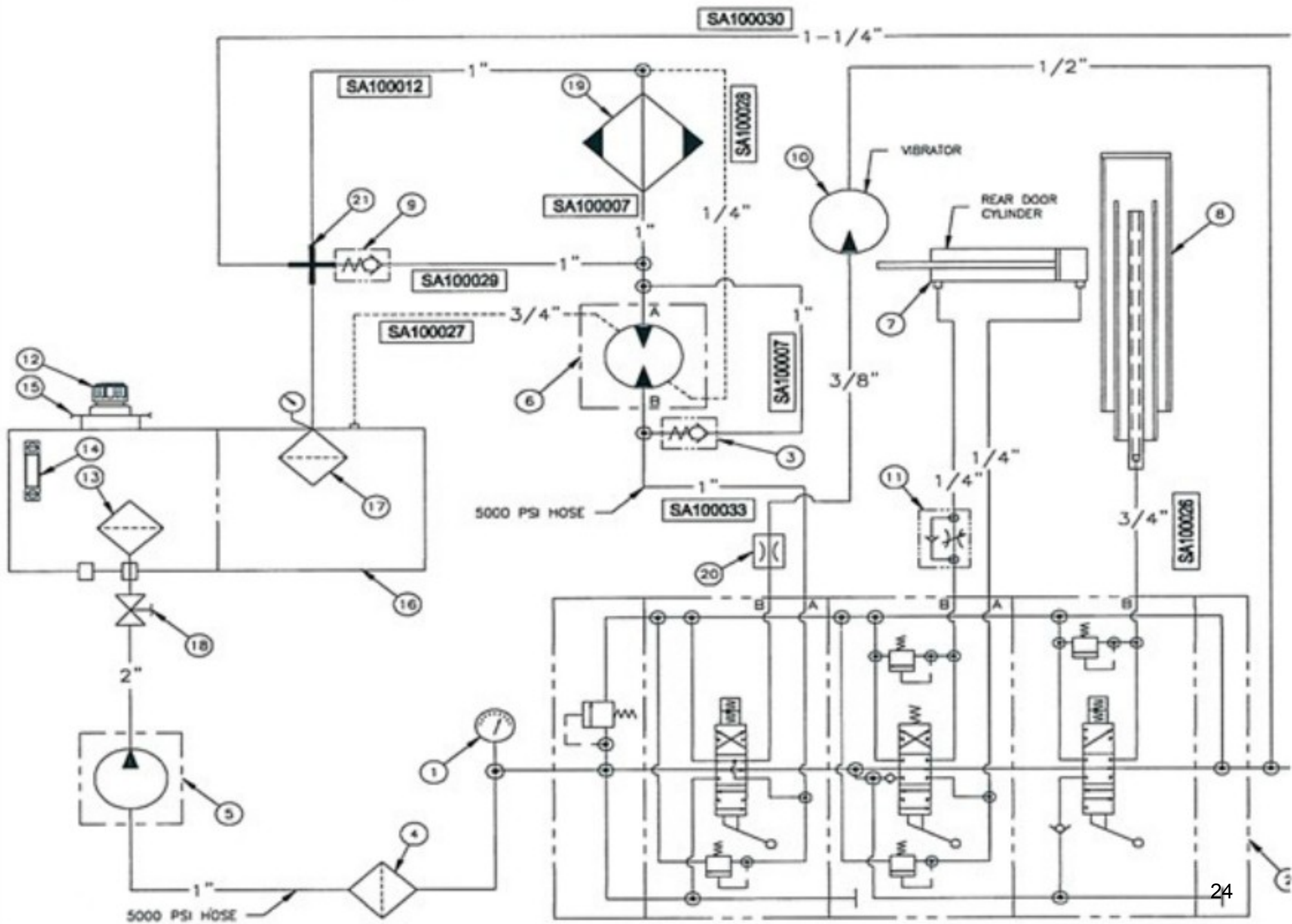


# Hydraulic Control Valve

- The hydraulic control valve is located on the driver's side.
- The standard control has three valve spools (one spool is a double acting spool):
  1. Vacuum pump/vibrator
  2. Rear door
  3. Dump cylinder
- The vacuum pump is controlled by airflow over hydraulics from the inside control panel and the outside panel.







# Hibon 820 Blower

## **Blower specifications:**

- Hibon VTB-820.
- Flow rate of 1400 CFM.
- From 18" Hg to a maximum vacuum of 27" Hg.

## **Drive:**

- Hydraulically driven from air shift PTO that is mounted on the transmission with hydraulic pump, motor and oil cooler.

## **Silencers:**

- 6" Intake and exhaust, with exhaust line to curbside of unit.





# Control Panel

- The control panel is located on the drivers side of unit and will control the following :
- Blower engage/disengage
  - Tank isolation valve
  - Emergency shutdown for rear air valves
  - Cooler fan override
  - Blower flush
  - Blower temperature gage
  - Product tank gage
  - Before and after filter gages
  - Tachometer and speed control







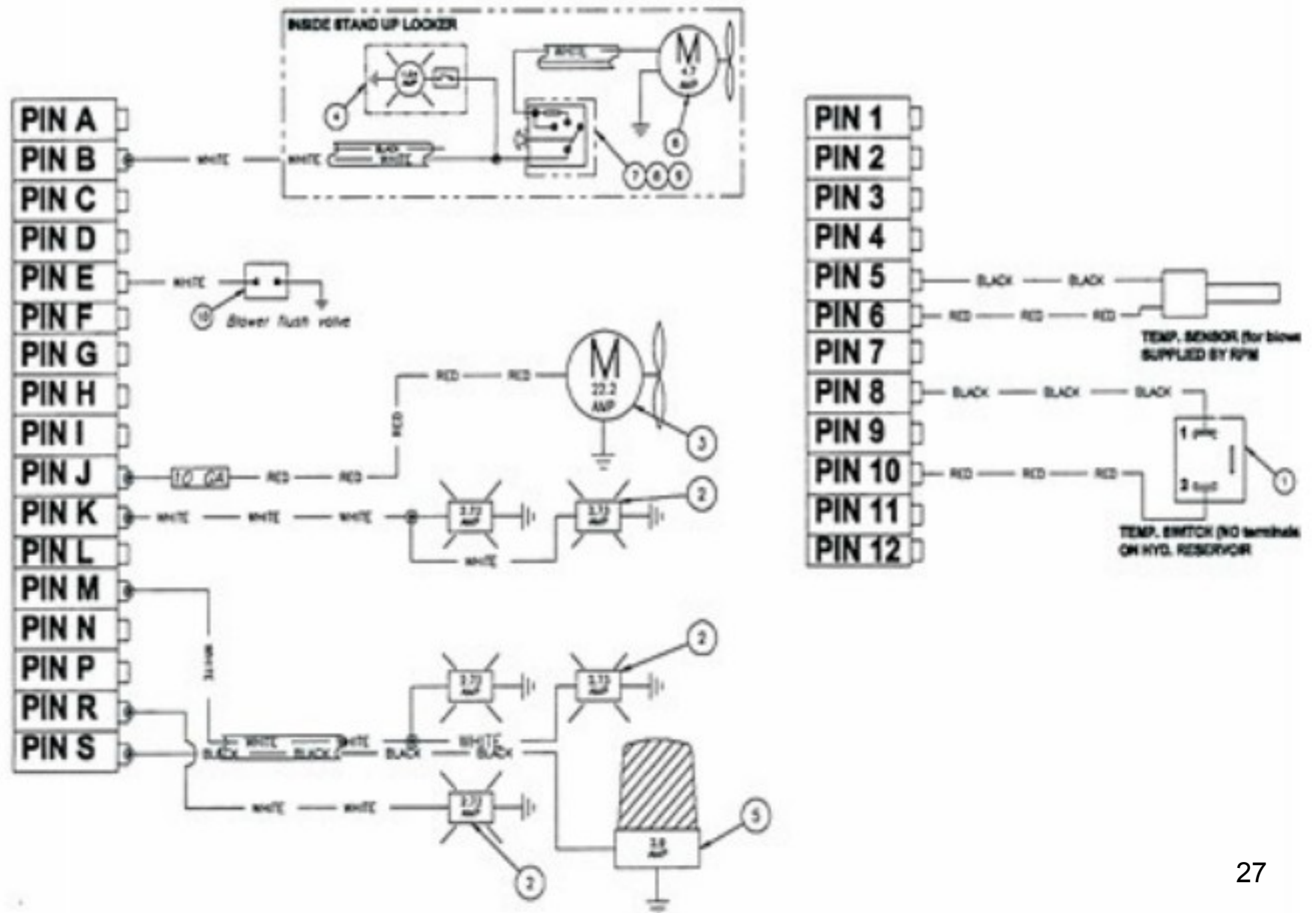
### POWER OUT PUT 16 PIN ROUND CONNECTOR

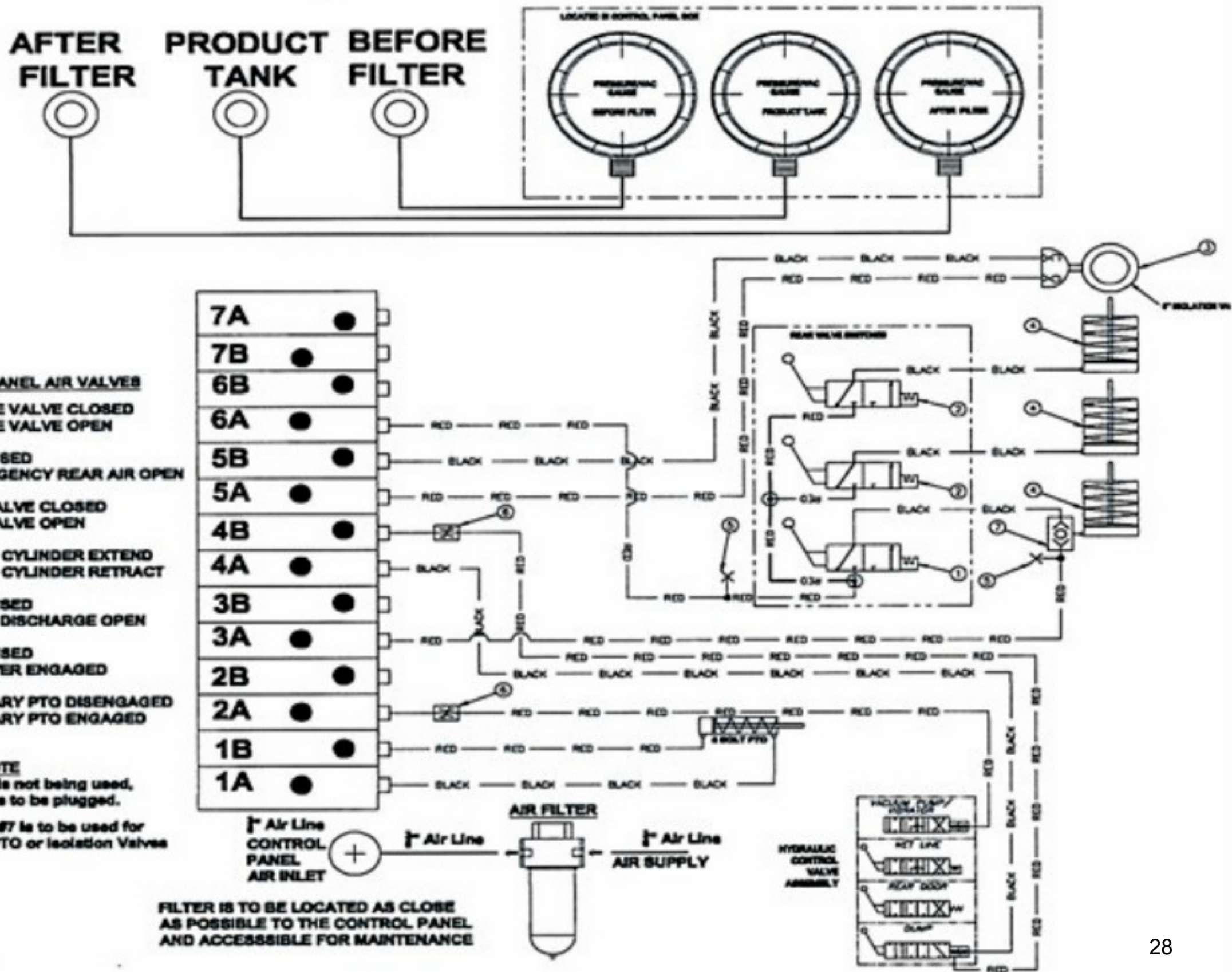
- A = PTO 12V @ 15 AMPS
- B = KEY SWITCH 12V @15AMPS
- C = KEY SWITCH 12V @15AMPS
- D = KEY SWITCH 12V @15AMPS
- E = SPARE PANEL SWITCH 12V @15AMPS
- F = Not Used
- G = KEY SWITCH 12V @10AMPS
- H = KEY SWITCH 12V @10AMPS

- J = COOLER FAN MOTOR @25AMPS
- K = DRIVER SIDE SPOT LIGHT @10AMPS
- L = PASSENGER SIDE SPOT LIGHT @10AMPS
- M = REAR SPOT LIGHT @10AMPS
- N = REAR SPOT LIGHT @10AMPS
- P = BLOWER SPOT LIGHT @10AMPS
- R = BLOWER SPOT LIGHT @10AMPS
- S = STROBE LIGHT @10AMPS

### 12 PIN INPUT CONNECTOR

- 1 = CANBUS HIGH
- 2 = INCAB FEED PWR
- 3 = SPARE KEYSWITCH PWR
- 4 = J1339 HIGH
- 5 = TEMP SENSOR
- 6 = TEMP SENSOR
- 7 = NOT USED
- 8 = COOLER FAN SENSOR
- 9 = J1339 LOW
- 10 = COOLER FAN SENSOR
- 11 = INCAB GROUND FEED
- 12 = CANBUS LOW





**CONTROL PANEL AIR VALVES**

- 7B - SPARE VALVE CLOSED
- 7A - SPARE VALVE OPEN
- 6B - NOT USED
- 6A - EMERGENCY REAR AIR OPEN
- 5B - ISO VALVE CLOSED
- 5A - ISO VALVE OPEN
- 4B - DUMP CYLINDER EXTEND
- 4A - DUMP CYLINDER RETRACT
- 3B - NOT USED
- 3A - REAR DISCHARGE OPEN
- 2B - NOT USED
- 2A - BLOWER ENGAGED
- 1B - PRIMARY PTO DISENGAGED
- 1A - PRIMARY PTO ENGAGED

**NOTE**

1. If a outlet is not being used, port will have to be plugged.
2. Air valve #7 is to be used for secondary PTO or isolation Valves if required

**FILTER IS TO BE LOCATED AS CLOSE AS POSSIBLE TO THE CONTROL PANEL AND ACCESSIBLE FOR MAINTENANCE**



# Cab Controls

- Tab controls are located on the cab floor and will operate the following:
  - Primary PTO
  - Secondary PTO
  - Blower
  - Rear discharge valve
  - Dump cylinder (extend / retract)
  - Drivers side and passenger side spot lights
  - Rear spot lights
  - Blower spot light
  - Strobe light





# Power Take-Off



## **Mechanical Transmissions:**

- The power take-off is an integral part of the main transmission.
- Before shifting the Power Take-Off into or out of gear, disengage the clutch and wait for the transmission or PTO gears to stop rotating.

# Vacuum Loading

## **To vacuum load using a blower system:**

- Enter truck cab and start engine.
- *Note: The blower runs at a maximum of 3400 rpm and should not run below 3000 rpm, at full vacuum. The truck engine rpm is factory set and is established based on the transmission/PTO configurations. The engine rpm setting is shown on the truck dash or PTO switch-mounting bracket.*
- Depress the clutch pedal and allow the transmission gears to stop rotating before engaging the PTO. Wait until the indicator light comes on and all air venting sounds have ceased. Slowly release the clutch pedal.
- *Note: Releasing the clutch pedal too quickly can damage the blower drive system.*
- *Note: For Mack trucks, you must engage the electrical system by turning the electrical auxiliary switch to "On".*



# Vacuum Loading

(continued)

- Turn the cab's cruise control/speed control to "On".
- *Note: Do not increase the engine speed before engaging the blower.*
- Engage the blower using the switch labeled "Blower", found in the control panel box. The control panel box is located on the driver's side, behind the cab. If the vehicle is equipped with in-cab controls, then the blower can be engaged using the switch labeled "Blower", located on the panel and in between the seats.
- Bring the engine rpm to the required speed.
- Turn the 4-way valve to "V". Proceed to the rear of the vehicle, open the product loading valve and load the product as required.
- To start the hydraulic oil cooler in hot working conditions (> 35°C), turn the hydraulic oil cooler override switch to "On". This will protect the hydraulic system and prevent it from overheating.



# Pressure Discharge

## **To pressure discharge using a blower system:**

- Turn the 4-way valve to “P”. Wait until the pressure builds up in the tank. When the maximum pressure is achieved, air will be vented from the pressure relief valve. Proceed to the rear of the vehicle, open the product discharging valve and discharge product as required.
- To start the hydraulic oil cooler in hot working conditions (>35°C), turn the hydraulic oil cooler override switch to “On”. This will protect the hydraulic system and prevent it from overheating.

# Blower System Shut-Down

## **To shut down the blower system after loading:**

- Close product-loading valve.
- Move the 4-way valve to neutral, to remove excess vacuum from the tank. Run the blower at “0” (zero) vacuum for one minute to allow the blower to cool down.
- *Note: Failure to do so may cause the blower to run backwards at high speeds and may damage the blower and driveline. The blower is equipped with a check valve to minimize this occurrence.*
- Reduce engine speed to engine idle and disengage the cruise control from the dash.
- Disengage the blower using the hydraulic control switch, labeled “blower”.
- Enter the truck cab and switch the blower PTO to the disengage position. Wait until the red indicator light goes out and all air venting sounds have ceased. Slowly release the clutch pedal.

# Hydraulic Dump System





# Hydraulic Dump System

- The dump system on your unit has a rated lifting capacity of 20 tons, but should never be used for lifting when the tank is fully loaded. All liquids must be drained prior to lifting the tank.
- To lift the tank, proceed as follows:
  1. Drain all liquid products from the tank.
  2. Position the truck or trailer on level and firm ground. Failure to do so will create excessive stress on the dump pivot points, hydraulic reservoir and hydraulic dump cylinder brackets. It can also cause the truck to tip over.
- *Note: Never lift the tank when a strong wind is present, as this may cause the truck to tip over.*

# Hydraulic Dump System

(continued)

3. Make sure all the load and discharge connection hoses have been disconnected and the rear area of the truck or trailer is clear of all personnel and obstructions.
4. Unscrew all the wing nuts on the rear door.
5. **Slowly** pull the rear door hydraulic valve body handle. Do not open too fast, as this will cause damage to the rear door cylinder and cause structural damage to the brackets.
6. Operate lever marked “dump” and slowly raise the tank. If the tank is raised with the rear door closed, make sure the bottom wing clamps are positioned so as not to interfere with the rear frame. Full extension of the dump cylinder, with the door closed may not be possible.

# Hydraulic Dump System

(continued)

7. After product has been dumped from the tank, lower the tank slowly. Never allow it to drop quickly, as this will damage the dump cylinder sleeves.
  8. When the dump cylinder has a spongy consistency or operates in a jerking motion, it is an indication that there is trapped air. To remove the air, raise the cylinder 12" and using the bleeder screw (located at the top of the cylinder), bleed off air pressure until a solid stream of oil flows out.
- *Note: You must grease the rear dump pivots and hydraulic dump cylinder pivot points every week.*



# Rear Door

- All areas must be clear from personnel and obstructions when closing the rear door.
- The door gasket and mating surface must be clean, or damage could occur to the gasket.
- Go to the Hydraulic control and slowly push the lever in. This will power the rear door down.



# Rear Door

(continued)

- Engage both side wing bolts and begin tightening the rear door.
- For ease of closing, the vacuum system can be run to help pull the door in. The remaining clamps can now be tightened. Grease and lubricate the swivel hubs periodically.
- *Note: If work is to be done under the door or on the inside of the tank, the rear door must first be extended and then lowered onto the safety prop.*

# Regular Maintenance Check

## Daily:

- Check the float ball in tank to ensure the ball has not been punctured or dented, as this will prevent it from working properly.
- Check the float cage for proper operation, and the rubber seat is clean.
- Check the cyclone drop box. To prevent liquids from entering the blower, the cyclone drop box, must be cleaned and drained of all liquids, after each operation.
- Open the filter housing door and check the stainless steel filter canister for excessive debris or damage. Clean or replace it, if required.



# Regular Maintenance Check

(continued)

## **Weekly:**

- Completely remove the stainless steel filter canister and clean out the body, if dirt build up exists. (Refer to the Filter Care and Cleaning Instructions section of this manual). Failure to completely remove the stainless steel filter canister once a week, will result in the build up of deposits in the bottom of body and make it difficult to remove the filter canister.
- Using the sight glass, located at the bottom of the housing, check the oil levels in the ends of blower. The oil level is correct when it reaches the top of the red point in the sight glass. The oil level can only be checked once the machine has stopped, and the oil has settled. Do not overfill. Oil should be clear in color. If the oil is white or murky, contamination has occurred and the oil should be changed immediately.

# Hydraulic System Oil Change Intervals

- The maintenance operations shall be limited to the routine inspections of oil level and to periodical oil changes. The drain and filling plugs must be cleaned and sealed using Teflon tape or similar, at every oil change.
- The first oil change must be performed after 200 hours of operation.
- Further oil changes shall be conducted every 2000 hours of operation, or every six months in case of intermittent operation.

# Blower Flush

- If at any time materials or liquids are believed to have entered the blower during operation, the blower must be flushed. This is done by using the blower flush system.
- Engage blower
- Proceed to blower flush switch located in panel box on the driver side of tank.
- With blower turning in vacuum mode – “V”, press and hold the switch for 30 seconds.
- Run the blower for 1 minute, at 0” of vacuum. Which can be achieved by moving the 4-Way valve handle to the neutral position – “N”.
- Shut down the blower.



# Hydraulic System

- The 140 micron suction strainer is located under the oil tank filler tube. This should be checked on a yearly basis. Especially during cold weather, or if oil starvation to the hydraulic pump is evident.
- To check the suction strainer for cleanliness, first remove the 6" pipe cap/hydraulic fill assembly and reach inside the reservoir to access the suction strainer. Then unscrew the filter counter-clockwise.
- *Note: The filter is reusable and may be cleaned. To remove hydraulic oil, clean the filter with compressed air from the inside, out. Then wash the filter in cleaning solvent.*
- The return line filter is located on top of the hydraulic oil tank. The filter should be changed after the first 10 hours and every 2000 hours, thereafter.
- *Note: Replacement filters can be purchase from Cusco.*

# Hydraulic System

(continued)

- The pressure relief for the hydraulic system is an integral part of the valve body. It is factory set, therefore do not attempt to gain higher pressures by tampering with the settings. This type of system requires the hydraulic oil to be changed every 2000 hours.
- There is a sight gauge located on the reservoir to indicate hydraulic oil level. When refilling or when the hydraulic oil needs topping up, use an AW32 weight oil or equivalent.



# High Pressure Filter Assembly





# High Pressure Filter Assembly

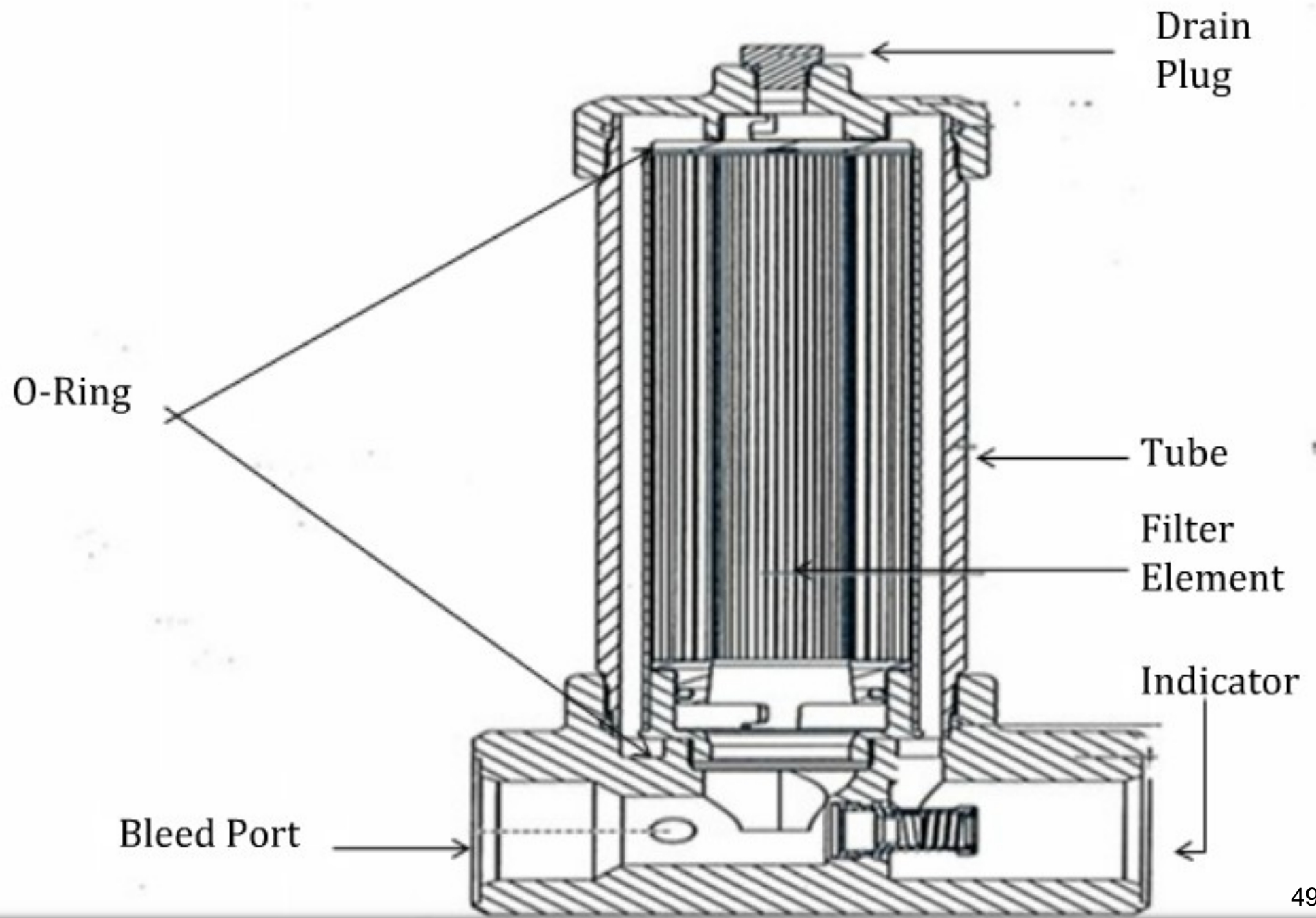
- Filters do not normally require special attention. However, periodic monitoring of the differential pressure warning device is required.
- The filter element must be replaced every six months or sooner. Therefore, an ample supply of spare elements is highly recommended.
- The differential pressure device actuates when the element needs changing or when high fluid viscosity occurs in cold startup conditions.
- If the visual indicator actuates during a cold startup (red button extends 5mm, 3/16"), reset it by depressing the button, once the normal operating temperature is reached. If the indicator actuates after resetting it, replace element.
- After replacing the element you must bleed the filter by opening the vent (located at the top of the filter) 1 1/2 turns. Jog the system and fill the filter until all air bleeds through the plug.

# UH219

HIGH PRESSURE FILTER ASSEMBLIES

**UH219 Series**  
service instructions

Figure 2





# Low Pressure Filter Assembly





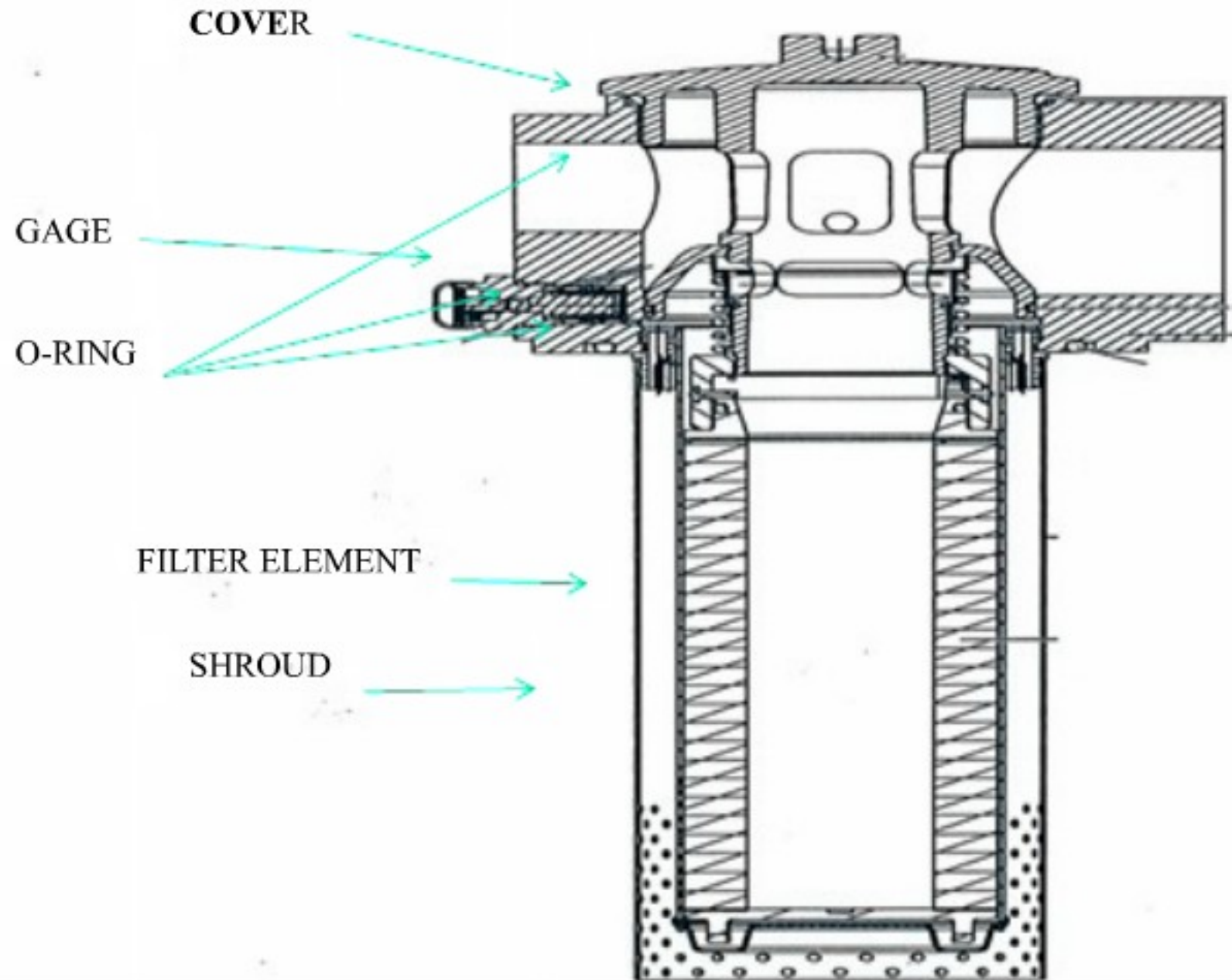
# Low Pressure Filter Assembly

- Filters do not normally require special attention except for periodic monitoring of the pressure gage.
- The filter element must be replaced every six months or sooner. Therefore, an ample supply of spare elements is highly recommended.
- The pressure gage will allow you to know when the element needs changing or when high fluid viscosity occurs in cold startup conditions.
- If the pressure gage shows high pressure during a cold startup, check that the pressure returns back to a normal reading, once operating temperature is reached. If the gage continues to show high pressure after the system has warmed up, then the element must be replaced.

# UT319

MEDIUM PRESSURE FILTER ASSEMBLIES

**UT319 Series**  
service instructions



# Hydraulic Dump System

- The following items must be checked every week:
  1. Rear dump pivots – Check for signs of wear on the pin/bushing and cracks in the pivot bracket.
  2. Lower dump cylinder bracket – Check for signs of wear on the pin/bushing and cracks in the bracket.
  3. Upper dump cylinder brackets – Check for signs of wear on the pin/bushing, cracks in the mounting bracket, and loose fastenings.
- *Note: Never drive the truck with the tank in a raised position. When working underneath a raised tank, ensure the safety brace is engaged to prevent injury. Do not rely on the hydraulic cylinder to hold up the tank.*



# Power Take-Off

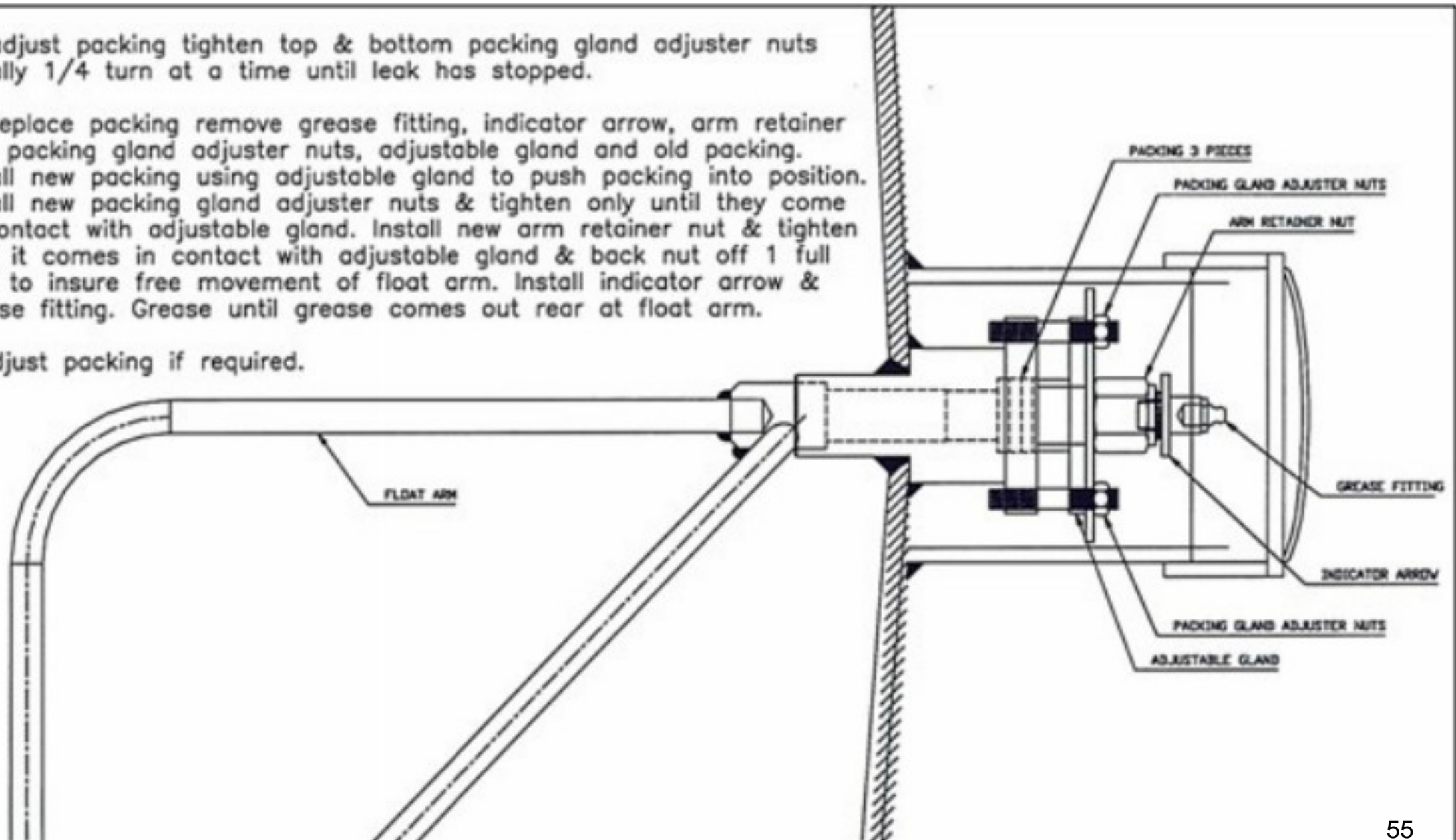
- The power take-off, being an integral part of the transmission, should follow the same service schedule as the transmission. Transmission fluid changes should follow the manufacture specifications. It is very important to check the PTO for leaks and to ensure the transmission oil is at the proper level.
- If the PTO system includes the activation of control parts (such as drive shafts, belts, or hydraulic pump), the system will require periodic checks and service every time the chassis is lubricated or a mechanic is under the vehicle.

# Rotary Float Gauge

To adjust packing tighten top & bottom packing gland adjuster nuts equally 1/4 turn at a time until leak has stopped.

To replace packing remove grease fitting, indicator arrow, arm retainer nut, packing gland adjuster nuts, adjustable gland and old packing. Install new packing using adjustable gland to push packing into position. Install new packing gland adjuster nuts & tighten only until they come in contact with adjustable gland. Install new arm retainer nut & tighten until it comes in contact with adjustable gland & back nut off 1 full turn to insure free movement of float arm. Install indicator arrow & grease fitting. Grease until grease comes out rear at float arm.

Readjust packing if required.



# Valve Adjustment

- When a valve or the air pot needs to be changed, the valve clevis must be adjusted to ensure the valve is not damaged.
- When the air pot is fully extended, the knife gate, inside the valve, must be adjusted until it is fully opened. This will stop damage from occurring, when the product is entering through the valve.
- The clevis must also be adjusted to ensure the valve does not leak.





# Blower Filter



# Filter Care and Cleaning

- You may wish to clean an element and return it to service several times before replacing it.
- Filters can usually be cleaned by soaking, and then agitating them in a bath of neutral detergent mixed in hot water, 100°F-160°F. Carpet shampoo may be used and is widely available in supermarkets and retail stores.
- Rinse with clean water and immediately air dry the element in a warm place. Customers have reported excellent success with industry spray wand cleaners. However, if the spray is directed from inside the filter, outward and is at a 90 degree angle, the force of the spray may push the filter media away from the deck wire underneath. Spray directed from outside of the filter, inward, tends to drive some dirt into the media. A spray directed at a downward angle, from the outside is usually best. Compressed air can also work well. However, while using the air gun, you must be careful not to blow apart the fragile fibers (i.e. filters made of felts).



# Filter Care and Cleaning

(continued)

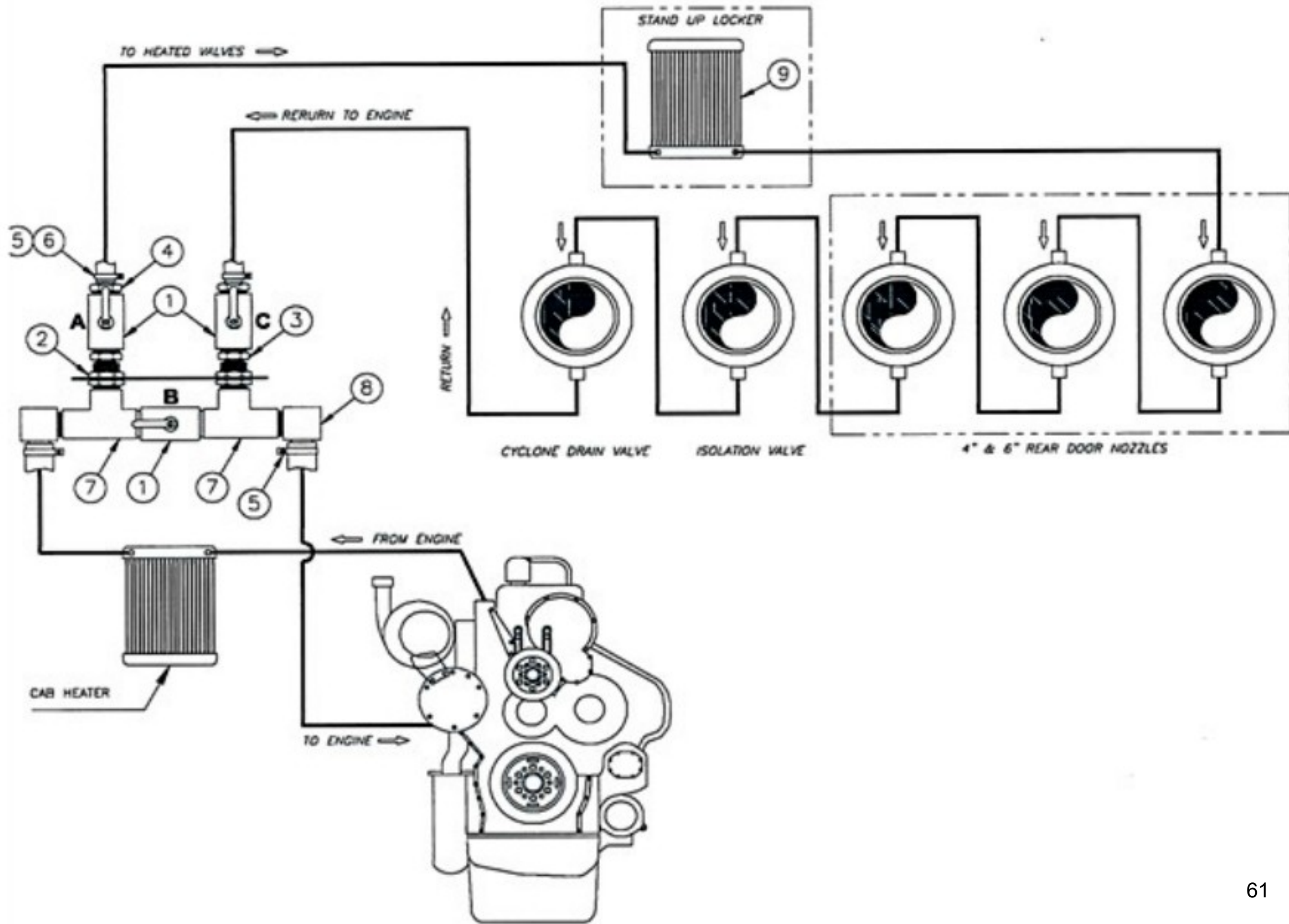
- Filter elements have a short service life, and must be replaced once signs of wear are visible.
- Always keep a spare element on hand. To avoid downtime, you can temporarily use the spare element, while cleaning the original filter element.



# Heated Valves

- The heated valve manifold is located in the engine compartment.
- Valves are labeled A, B, and C.
- To heat the rear valves:
  - Open both A and C valves.
  - Close the B valve.
  - Heater in cab must be on
  - Close both A and C valves.
  - Open the B valve.





# Lubrication Recommendations

## **Moro vacuum pumps:**

- VTB 820 Blower Oil  
Mobil Gear SHC 630 when ambient temperature is lower than 0 degrees Celsius.
- Shell Omala 220
- Iso 150 EP SYN EP
- Texaco Meropa ISO220
- Castrol Alpha SP220  
Hydraulic Oil
- AW32 Grease
- All Purpose



## June 6, 2014 Revisions:

This manual has been updated with the following changes:

1. Content update in “Product Overview” slide: “Safety Provisions” was “Safety Instruction”
2. Slide renamed: “Safety Provisions” was “Safety components”
3. Slide renamed: New “Rear Door Stand” was “Rear Door Safety Stand”
4. Slide renamed: New “Tank Stand” was “Tank Safety Stand”
5. June 6, 2014 Bulletin added as a slide