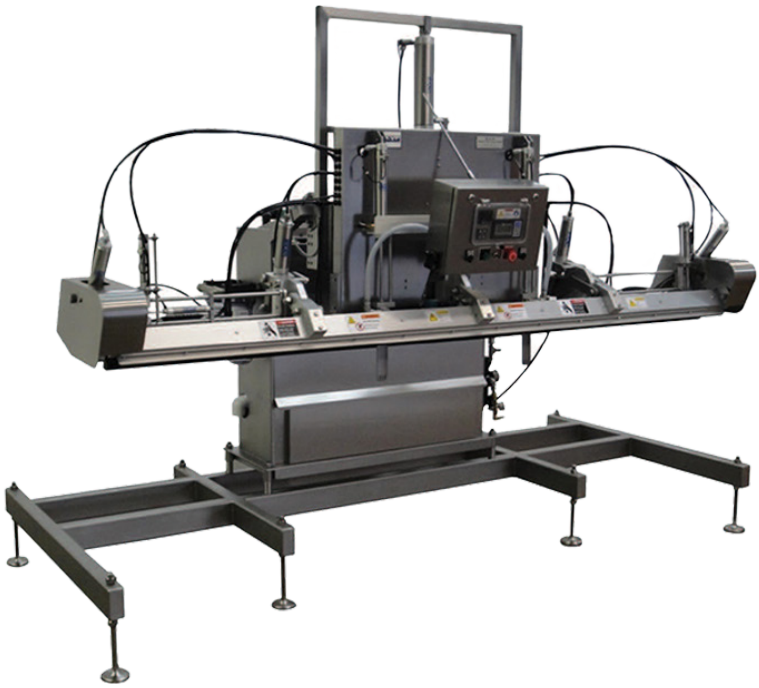
CV·TEK

Cutting edge technology from the leader in modified atmosphere packaging



FreshVac®

MODEL A-200
100" (2540 mm)
FLOOR BIN

CV·TEK

MIDERA FOOD PROCESSING
440 S McLean Blvd ELGIN, IL, 60123

parts@cv-tek.com
TELEPHONE: 847-741-3500
FAX: 847-741-3569

MIDERA™
FORMERLY MIDDLEBY FOOD PROCESSING

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OVERVIEW

FOREWORD

This manual contains information which is vital to the proper installation, operation, and maintenance of the A-200 FRESH VAC® Modified Atmosphere Packaging Machine (MAP).

Failure to follow the procedures herein outlined shall void the limited warranty.

Additions, modifications, or deletions from the procedures herein outlined may be made by CV-Tek, at its sole option, without liability of any sort accruing to CV-Tek.

This manual shall be considered current as of the date of any such addition, modification or deletion.

Photos, drawings, and illustrations used in this manual are representative and may vary from your equipment.

CUSTOMER SERVICE

When calling, either for parts or service, have the model and serial numbers available for our customer service representative. This will allow us to more accurately assist you with your machine.

The serial number tag for the A-200 is located inside of the main electrical enclosure door.

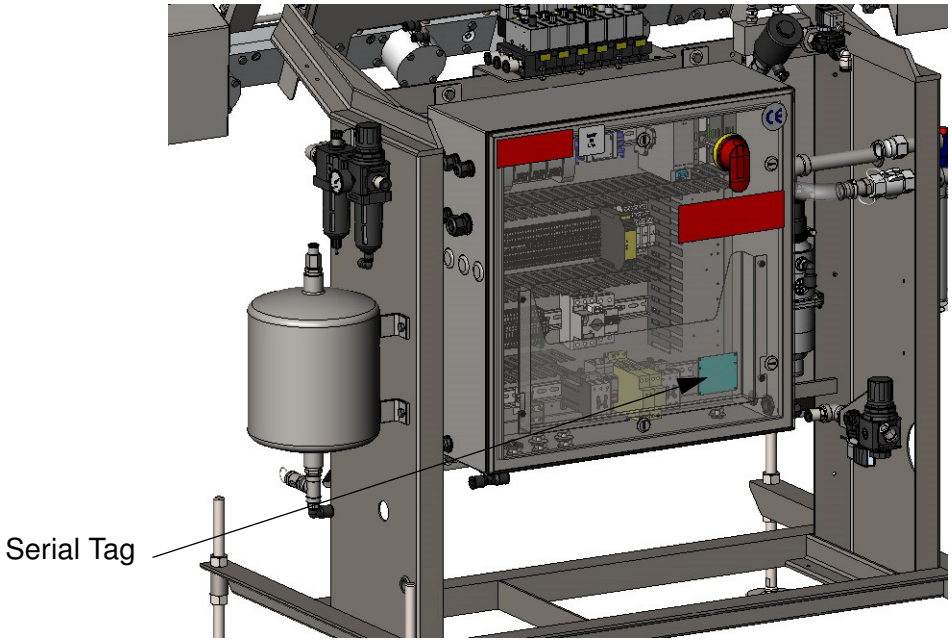


Figure 1-1. Serial Tag Location

Ordering Parts

Ordering parts from CV-Tek can be accomplished in three different ways; by phone, fax or e-mail. Please include model and serial numbers in all correspondents to CV-Tek.

Phone: 847-741-3500

Fax: 847-741-3569

E-Mail: spareparts@cv-tek.com

USING THE MANUAL

The following sections of this manual provide an overview for your A-200 PLC machine installation. They describe the requirements for site installation and provide basic installation instructions.

Information about basic A-200 PLC operation and maintenance is also provided. It is recommended that anyone involved with the operational mechanics of this machine read the manual before operating or servicing the unit.

The prints and manuals included with the machine contain information which is important to service the unit. They should be stored in a cool, dry location away from the machine so that they are not exposed to high humidity and harsh chemicals.

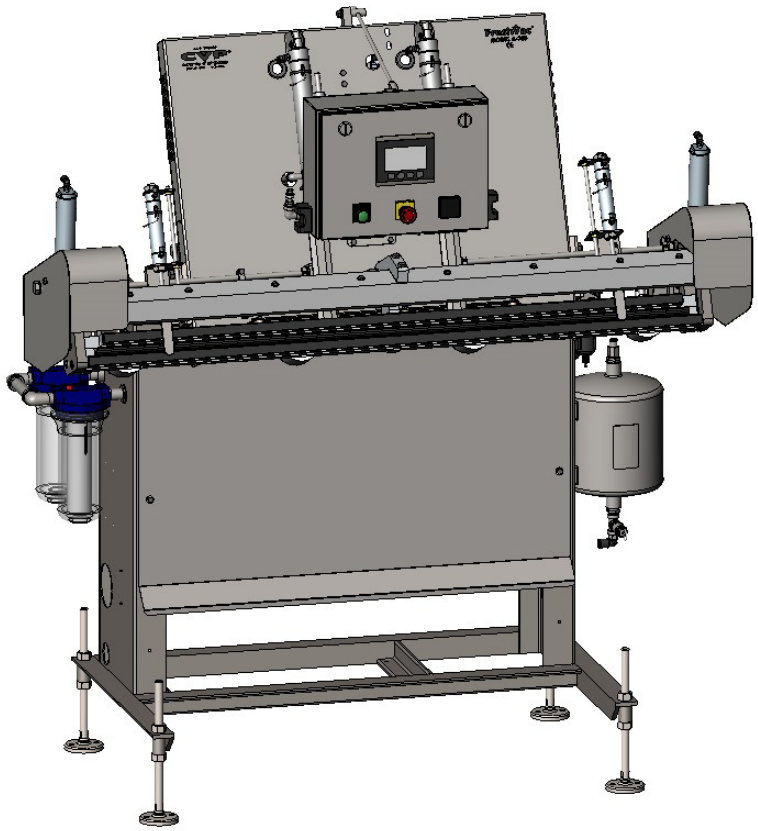


Figure 1-2. Front View of the A-200 PLC Machine

SAFETY

Safety Precautions

It is important that all SAFETY PRECAUTIONS are followed closely when working with machinery. The A-200 PLC machine is simple and safe to use when properly operated.

Get acquainted with all of the warning labels and safety features of the machine. They are provided for your safety and benefit.

- ONLY ONE OPERATOR MAY USE THIS MACHINE AT ANY ONE TIME.
- THE RED BUTTON IS THE EMERGENCY STOP.
- DO NOT PUT HANDS INTO ANY PINCH POINTS, (areas where two or more parts intersect), SUCH AS THE MANIFOLDS.
- IN CASE OF EMERGENCY DO NOT DISCONNECT AIR.
- DO NOT OPERATE EQUIPMENT WITH BROKEN AND/OR MISSING PARTS.
- DO NOT WORK ON MACHINE WHILE POWER IS ON, UNLESS INSTRUCTED TO DO SO BY OUTLINED PROCEDURES WITHIN THIS MANUAL, OR BY QUALIFIED CV-TEK SERVICE PERSONNEL.

  SERIOUS INJURY OR DEATH COULD RESULT IF THE POWER SUPPLY IS NOT TURNED OFF BEFORE WORKING WITH CERTAIN COMPONENTS SUCH AS HIGH VOLTAGE LEADS!!!
- DO NOT BYPASS OR ALTER ANY SAFETY COMPONENT.
- DO NOT LEAN ON OR OTHERWISE PLACE BODY PARTS NEAR, ANY MOVING PARTS OF THE EQUIPMENT.
- AVOID HOT SURFACES. THE HEAT SEAL BAR BECOMES VERY HOT DURING OPERATION. SERIOUS BURNS CAN OCCUR ON CONTACT.
- WHEN POSSIBLE, USE RECOMMENDED TOOLS FOR REPAIR AND ADJUSTMENT.

Operational Safety

It is important to develop good safety habits to ensure a safe and efficient packaging process. Please adhere to the following:

- USE MACHINE AS DIRECTED BY THIS MANUAL AND CV-TEK PERSONNEL.
- KEEP SURROUNDING AREA FREE OF CLUTTER AND HIGH VOLUMES OF TRAFFIC.
- ONLY USE MACHINE FOR PURPOSE INTENDED.
- FOR APPLICATIONS OTHER THAN PACKAGING, PLEASE CONSULT WITH YOUR CV-TEK SALES REPRESENTATIVE.

MSDS SHEETS

A Material Safety Data Sheet (MSDS) is an instructional sheet concerning a specific chemical that explains hazards and emergency procedures.

CV-Tek provides MSDS sheets for vacuum pump oils we sell upon request.

Before using vacuum pump oil or any other chemical supplied by CV-Tek, read its MSDS sheet to learn the following:

Physical and Chemical Changes

- Normal appearance and odor
- Temperature, boiling or melting point, at which its form changes
- How fast it evaporates and rises in air
- Solubility in water

Fire and Explosion Risks

- Lowest temperature at which vapors catch fire
- Highest and lowest vapor concentrations that can catch fire or explode
- Fire fighting instructions

Reactivity Risks

- Chance of chemical change or disintegration
- Dangerous reactions to air, water, or specific chemicals
- Decomposition by-products

Exposure Health Risks

- Hazards and symptoms of inhaling, swallowing, skin, or eye contact
- Fast (acute) or gradual (chronic) appearance of health problems
- Cancer hazard
- Health conditions exposure could make worse
- First aid until medical help arrives

Precautions to Reduce Risks

- Controls such as ventilation and hygiene
- Respirators, gloves, or other personal protective equipment (PPE)
- Handling spills, leaks, or accidental release

FEATURES

Front of Machine The figure below shows several of the major assemblies of your A-200 machine as viewed from the front.

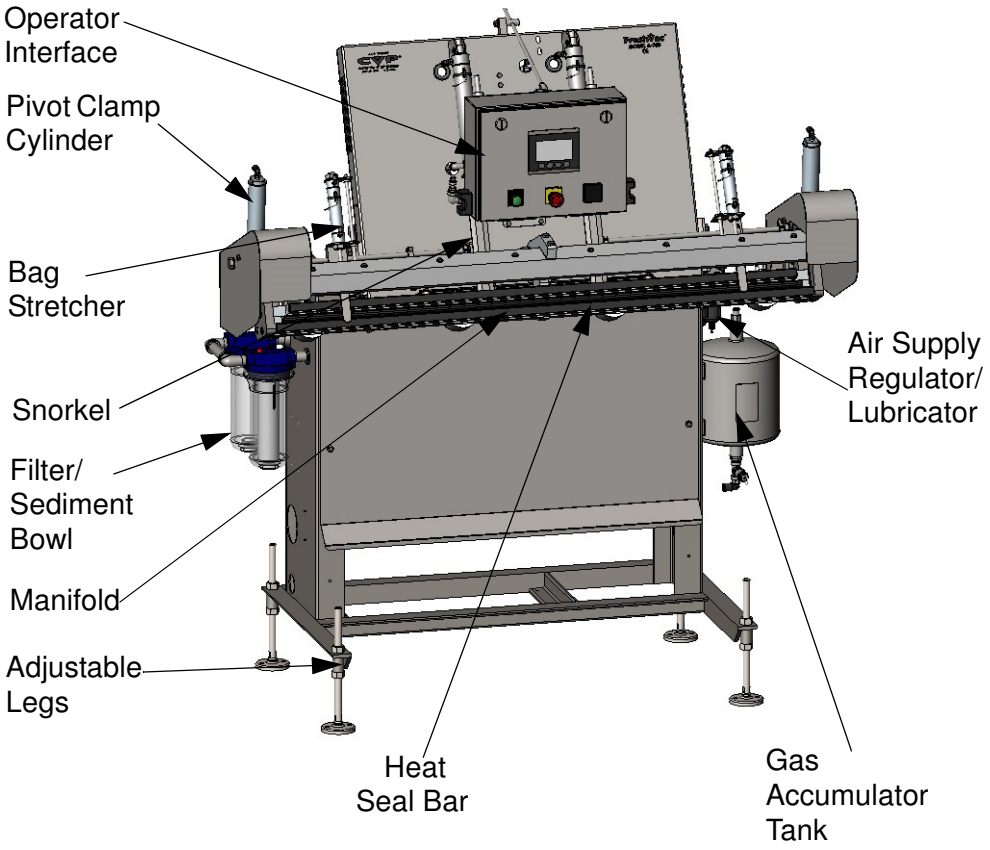


Figure 1-3. A-200 PLC Machine Front View

The figure below shows some of the major components of your A-200 PLC machine as viewed from the rear.

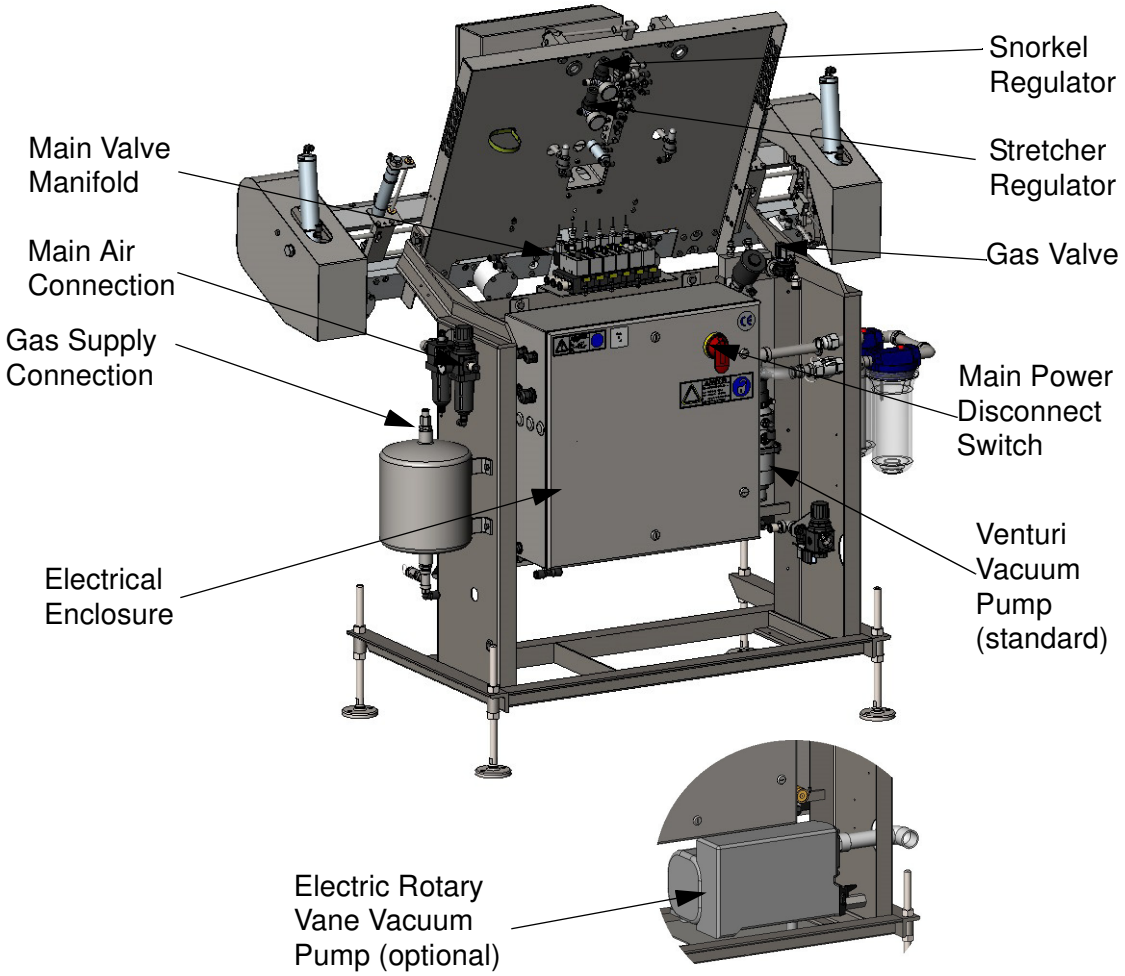


Figure 1-4. A-200 PLC Machine Rear View

The figure below shows the components of the A-200 PLC Machine's Electrical Enclosure.

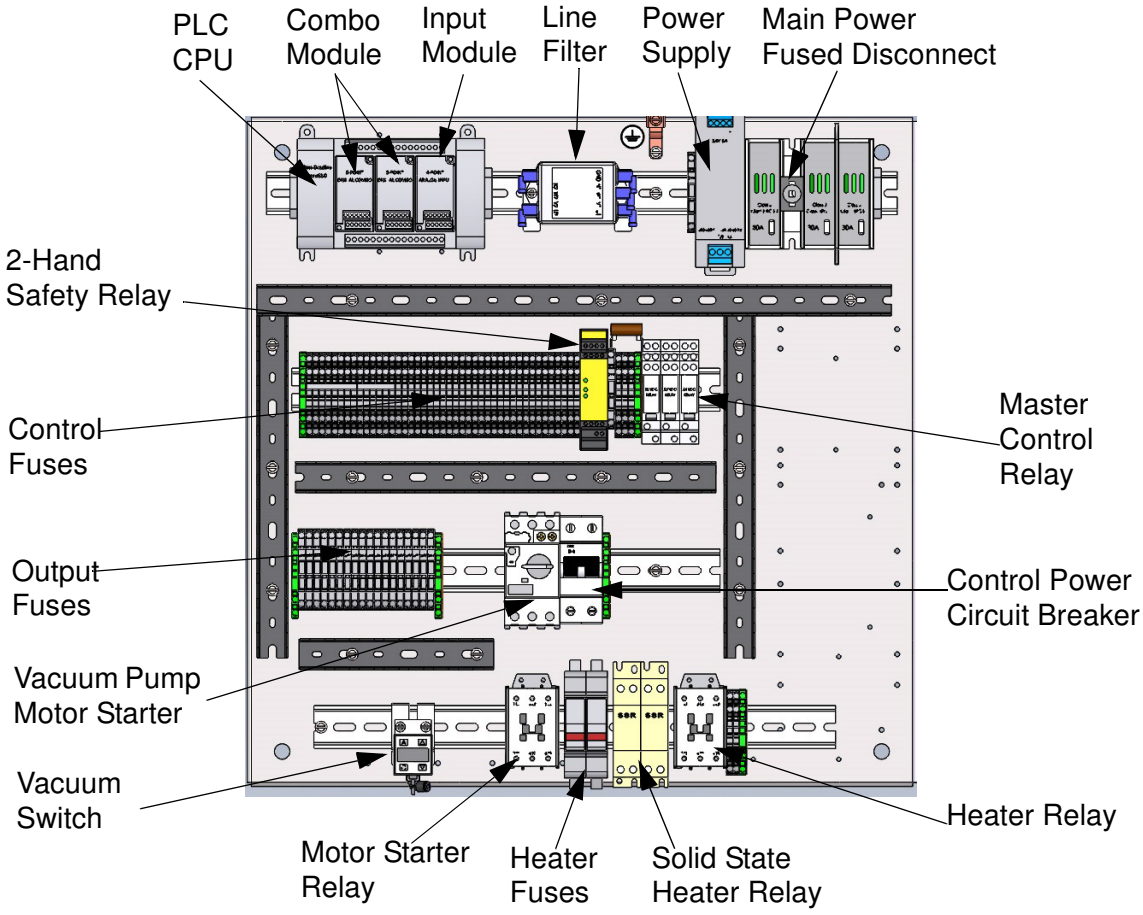


Figure 1-5. Electrical Enclosure

MACHINE UTILITIES

Electrical

The site should have power as indicated on the serial number plate. The A-200 requires a dedicated service.

The supply line can be connected via rigid conduit, or flexible cord, depending on local codes and/or plant procedures. Three phase power supply should be four-wire cord with one wire (usually green) used as a ground.Your supply and conductors must be capable of delivering the specified power to the A-200. If you choose to use a flexible cord with a plug, make sure the plug ends are waterproof. This type of connection will make your machine more convenient to move and adjust when necessary.

Power Requirements are as follows

- 208/220 Volts, 3 Phase, 20 Amps
- 460 Volts, 3 Phase, 15 Amps

Note: The A-200 is not dual voltage. The electrical power utilities must match the power requirements as specified on the machine's serial tag.

Compressed Air

A supply of clean, dry compressed air is required for proper functioning of the A-200 machine. The air supply regulator, located on the right hand side of the machine, is factory preset to the recommended 80 PSI (5.4 bar). Machines equipped with a venturi vacuum pump have a second regulator located on the left hand side of the machine. This regulator has been factory preset to the recommended 87 PSI (5.9 bar).

The size of the air supply line is critical to the performance of the machine. Before connecting air to the A-200 make sure the supply line can supply adequate air pressure to the machine. The supply lines noted below in the air requirements are based on a main supply line running within 50 feet (15.2 m) of the machine.

Air consumption of the A-200 varies depending on the type of vacuum pump being used. Standard machines using an electric vacuum pump or no pump use approximately 1 CF (28.3 L) of compressed air per cycle. Machines with a venturi vacuum pump will use, in addition to the 1 CF (28.3 L)/cycle, 1/2 CFM (14.2 L/min) every second the vacuum pump is operating.

Estimated compressed air requirements are as follows:

- Standard machines - 80 PSI* (5.4 bar), 4 CFM (113.2 L/min), 3/8" (9.5 mm) supply line
- Venturi pump machines - 87 PSI* (5.9 bar), 12 CFM (340 L/min), 3/4" (19 mm) supply line

*The recommended air pressure supplied to the machine is 100 PSI (6.8 bar), the indicated air pressure is the regulator setting.

Warning:

USE COMPRESSED AIR ONLY ON VENTURI VACUUM PUMP MACHINES!

Gas Supply

Your machine is equipped to back flush gas into the bag. Gases, such as Nitrogen or Carbon Dioxide, can be supplied from a gas cylinder near the A-200 or from a central distribution system. 10 feet (3 m) of 1/2" (12.7 mm) OD polyflo tubing is provided to connect to the gas regulator. Use a 2-stage gas regulator on a gas cylinder or a single-stage gas regulator from a bulk source.

CV-Tek recommends 80 PSI (5.4 bar) minimum pressure into the regulator within 10 feet (3 m) of the machine. A ball type shut off valve should be used ahead of the gas regulator when using a bulk gas system.

For more information on the gas system see section 6 "GAS SYSTEM".

Recommended supply line size from a bulk source to the regulator should be as follows:

- 100 to 299 feet (30.5 m to 91.1 m) of run = 3/4" (19 mm) nominal pipe
- 300 to 499 feet (91.4 m to 152.1 m) of run = 1" (25.4 mm) nominal pipe
- Over 500 feet (152.4 m) of run = 1-1/4" (31.8 mm) nominal pipe

Contact CV-Tek for information on the type and amount of gas to be used with your product. As an example, CV-Tek recommends 100% CO2 gas for pack-aging fresh poultry at 15 standard cubic inches per pound (0.5 L/kg). A rough method of determining the cubic inches of gas is to vacuum then gas an empty bag, and measure it's height x length x width in inches while pressing the bag slightly between two flat surfaces. Adjust the gas time to change the cubic inches and achieve 15 cubic inches per pound of chicken that will be in the bag.

Water Connection

A permanent hot water connection can be connected to the machine if desired. Hot water is used only to back flush the machine's vacuum lines. The machine must be in CLEAN mode and the vacuum hose moved to the CLEAN position (see Section 9).

PRODUCTION LAYOUT

Planning the Layout

The A-200 requires some type of product support during operation. You can use either a conveyor or smooth top table placed in front of the unit. This support must hold product at a suitable height in relation to operator and machine height. You will have a greater range of height adjustment if your existing conveyor is an adjustable type.

The ideal conveyor system will bring product to the A-200 in such a way that it can be processed and moved to the next station. The operator should not have to sort product to be packaged. The use of automatic conveyors with operator controlled brakes have been used successfully in many applications.

When preparing your existing transfer system to accommodate the A-200, you may find it helpful to look at some of the current designs that several food plants are using.

Suggested Layouts

These designs have been proven to be efficient in their applications.

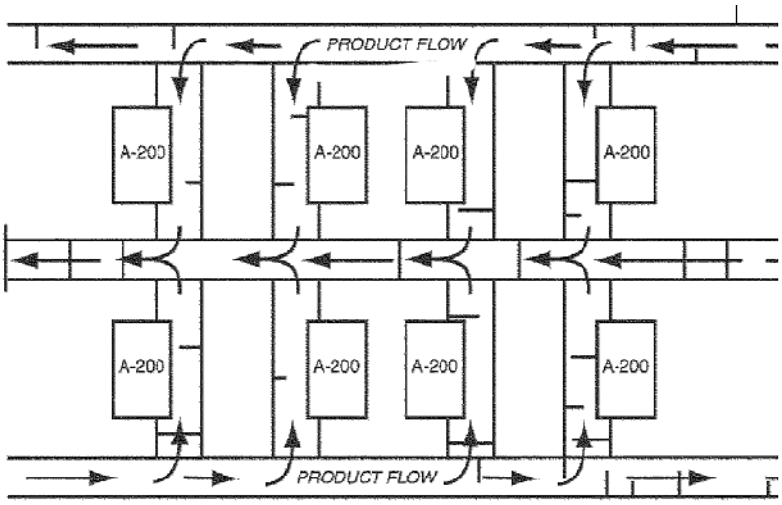


Figure 1-6. Conveyor Design (Part 1)

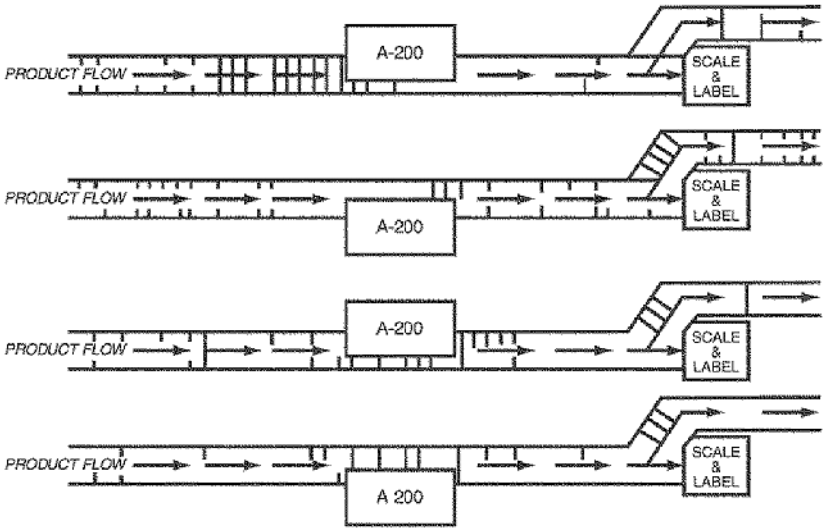


Figure 1-7. Conveyor Design (Part 2)

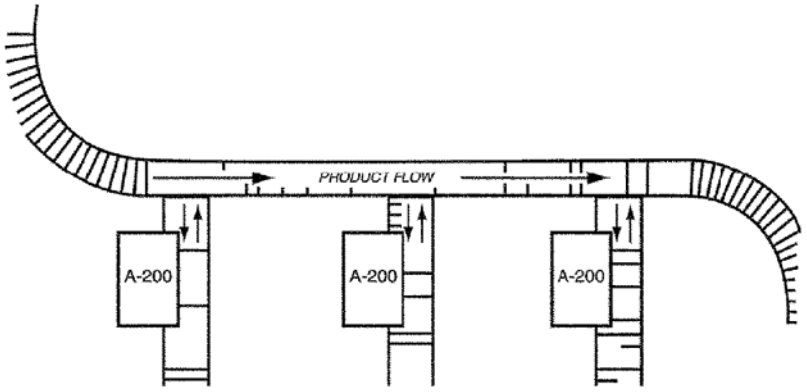


Figure 1-8. Conveyor Design (Part 3)

BAG AND BOX INFORMATION

Bag and Box Sizes

When a box is on the conveyor, there should be some clearance between top of box, (with flaps down, if your box has flaps), and lowest point of the unit.

If the unit came equipped with the optional adjustable head, make your initial height adjustments with head in the extreme “UP” position and your tallest box in position. After this adjustment has been set, check clearance of head in lower positions with smaller boxes.

The correct bag size is important for packaging products. There are 4 factors to determine the size of a bag:

- Width of Box
- Length of Box
- Height of Box
- Box or Tote Style (End or Top Load)

The following explains how to compute bag size for an end loaded box and a top loaded box.

End Loaded Bag Formula

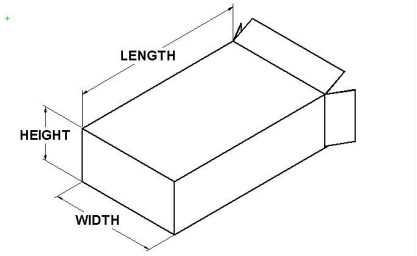


Figure 1-9. End Loaded Box Dimension Reference

Bag Width (Opening) = Width (Box) + Height (Box) + 2” (50.8mm)

Bag Length = Length (Box) + Height (Box) + 6” (152.4mm)

EXAMPLE:

Using the formula a bag size will be determined based on an end loaded box with the following dimensions:

Length = 21” (533.4mm)
Width = 15” (381mm)
Height = 10” (254mm)

Bag Width (Opening) = 15 (Box Width) + 10 (Box Height) + 2 = 27 inches

Bag Length = 21 (Box Length) + 10 (Box Height) + 6 = 37 inches

BAG SIZE = 27 inch (W) X 37 inches (L)

With the bag in the box, check to see that the end of the bag will reach above the heat seal bar. The bag should extend a short distance above the top surface of the rear manifold rubber support.

Top Loaded Bag Formula

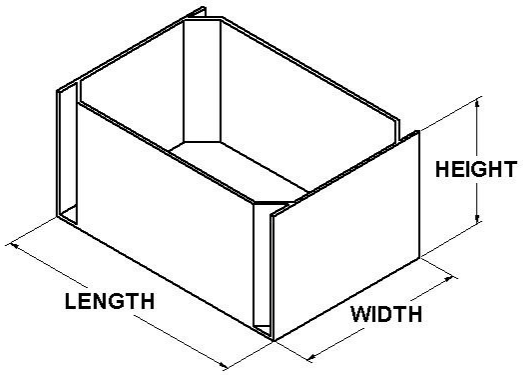


Figure 1-10. Top Loaded Box Dimension Reference

Bag Width (Opening) = Width (Box) + Length (Box) + 2”

Bag Length = Width (Box) + Height (Box) + 6”

EXAMPLE:

Using the formula a bag size will be determined based on an end loaded box with the following dimensions:

Length = 21 inches
Width = 15 inches
Height = 10 inches

Bag Width (Opening) = 15 (Box Width) + 21 (Box Length) + 2 = 38 inches

Bag Length = 15 (Box Width) + 10 (Box Height) + 6 = 31 inches

BAG SIZE = 38 inch (W) X 31 inches (L)

With the bag in the box, check to see that the end of the bag will reach above the heat seal bar. The bag should extend a short distance above the top surface of the rear manifold rubber support.

SECTION: 2

INSTALLATION

A-200 INSTALLATION PREPARATION AND REQUIREMENTS

To ensure a successful installation, it is important to adhere to the requirements for installation. Be sure that you can meet all of these requirements so that your installation will go as smooth as possible.

Work Area

The area used to setup the A-200 machine should be open and clear for you to work, allowing room for a fork truck to lift the machine. If you are not able to setup the machine where it will be used, make sure you can get the machine to that location after it is assembled.

Required Equipment

Below is a list of equipment and tools needed to uncrate and install the A-200:

- **FORK LIFT** (To lift the machine off the crate and move in place)
- **C-CLAMP** (To clamp machine to forks)
- **ADJUSTABLE WRENCH** (10 or 12 inch).
- **COMBINATION WRENCH** (3/4 inch).
- **PLIERS** (standard or channel lock).
- **SCREWDRIVERS** (large standard tip & #2 Phillips)
- **SIDE CUTTERS** (to cut wire ties)

Utilities

Run the utilities to the operating location prior to setting the machine in place. Refer to Section 1 for details.

UNPACKING THE A-200

Note: There is a “Tip Indicator” on the outside of the shipping container. Upon receiving your machine, if you find that the indicator shows that the container has been mishandled, please make note of any visible damage to the box, or equipment and contact CV-Tek at 1-847-741-3500.

Uncrating the A-200

In most cases this step has already been completed by the time you are reading this manual. However in the event you received the manual prior to the machine follow the next steps to uncrate the machine:

1. Cut the steel band wrapped around the corrugated container.
2. Remove the screws holding the bottom of the corrugated container to the pallet base and lift the corrugated box off the machine.
3. Unscrew the four lag bolts holding the A-200 to the crate. These are located at the four corners of the base.

Contents of the Crate

Before continuing inspect the contents of the crate and the condition they are in. Below is a list of what you will find with the machine:

1. Electrical schematic and Pneumatic drawings for the machine. (Located inside the electrical enclosure in the rear of the machine.)
2. Parts Box

Before continuing, check the contents of the parts box. You should find the following items:

1. Adjustable Legs (Qty - 4): Position in to base of the A-200 to adjust the height of the machine.
2. Spare fuses (5 commonly): One for each used on the A-200.
3. Polyflo tubing (10 ft; 3 m): Supplied to connect gas supply to the gas accumulator tank on the right hand side of the machine.

There may be additional items inside the crate depending on the options purchased with the machine.

Spare Parts

In addition to the spare fuses an optional New Customer Spare Parts Kit is also available. A list of these parts is available upon request.

ASSEMBLING THE A-200

Lifting/ Transporting

When lifting and/or transporting the A-200, it is recommended to lift the machine from the rear when possible.

Note: For equipment with a standard machine frame, lift from underneath the frame as shown in Figure 2-1. Do not lift under the electrical enclosure. Use C-clamps to secure the machine frame to the forks to prevent the machine shifting or tipping.

For equipment with an extended base, use the forklift points provided as shown in Figure 2-2.

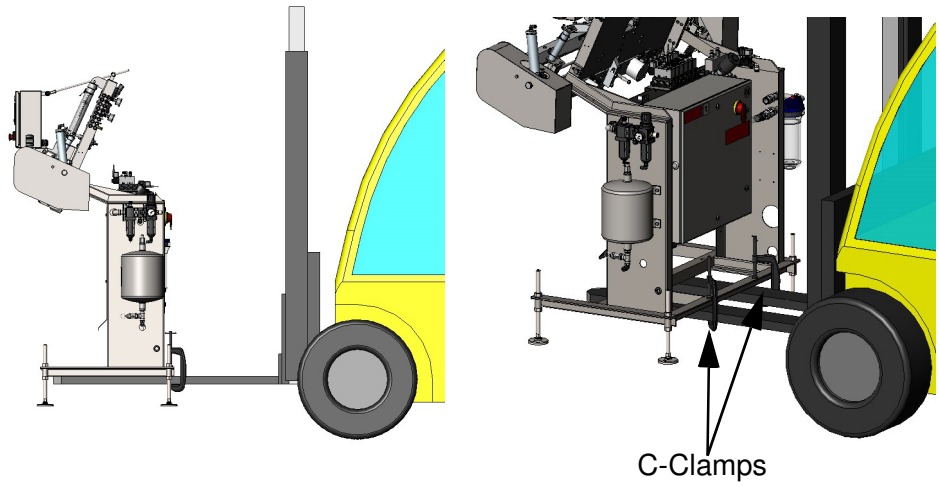


Figure 2-1. Lifting/Transport - Standard Machine Frame

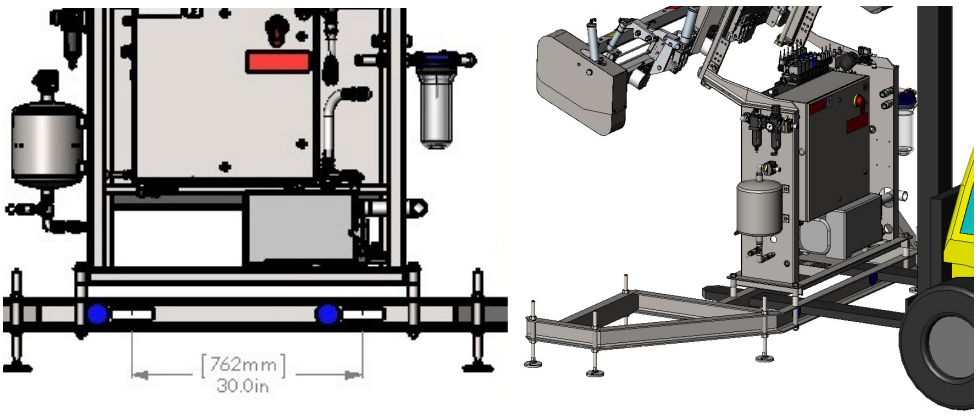


Figure 2-2. Lifting/Transport - Expanded Base

Mounting and Adjusting the Legs

Follow these steps to safely mount the adjustable legs

1. Use a forklift to raise the machine as shown in Figure 2-1.
2. While the machine is raised, place the four adjustable legs through the base and thread the nut on to the adjusting rod
3. Set the machine back down on the floor
4. Level and adjust the machine to the desired height.

Removing Shipping Material

The A-200 was shipped with several tie downs and shipping blocks. The manifold has two wood blocks in the pivot clamp assembly keeping the upper manifold in the open position. The snorkels are tied in the up position. Be sure all blocks and ties are removed before operating the A-200.

Upper Frame Adjustment

If the product is being presented to the machine inside a container then the position of the upper frame in relation to the container is critical to the quality of the product. There are two adjustments to be made to achieve this; the angle of the head and the height above the product.

The A-200 is available with three types of heads, they are as follows:

1. Fixed Head: The upper frame is attached to the base frame. This type of head has no height adjustment other than with the legs, but it does allow the head angle to be adjusted.
2. Two Position Head: The upper frame is mounted to an adjustable frame with a single cylinder to raise or lower the head into the two positions. A two position selector switch on the push-button station controls the cylinder.
3. Floating Head: The upper frame is mounted similar to the two position head. The floating head allows the head to be adjusted to any height within the length of the cylinder. Located on the upper frame is an air regulator that controls the air pressure to the cylinder. On the face of the operator control panel is a toggle switch that the operator uses to position the head to the desired height.
4. When adjusting the height of the machine place the container under the manifold and adjust the height as close to the top of the box as possible. If you are using a corrugated box with flaps fold the flaps down to the outside of the box before adjusting the height. When using a two or three position head have each container size available. Place the tallest container under the manifold and adjust the head to the highest position. Adjust the head, using the legs on the machine, to the required height. Lower the head to the next lower position and place the next shorter box size under the manifold. If adjustment is required raise the head to the needed height. Do not lower the head as that will prevent the larger containers from fitting. Repeat this with the shorter container and head height.

The head angle can be adjusted by loosening the bolts which hold the upper mainframe to the “ears” on the lower mainframe. Loosen the bolts and tilt the upper frame to the desired angle. Once in position tighten the bolts.

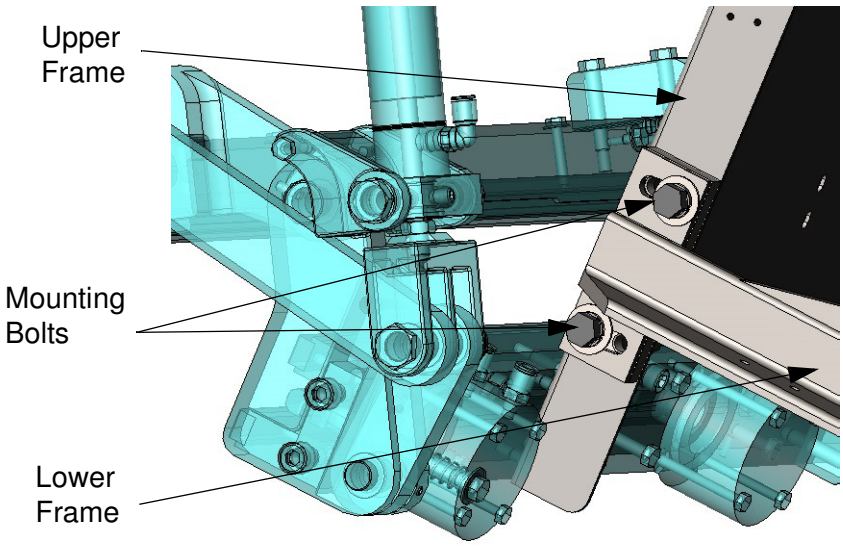


Figure 2-3. Upper Frame Mount (pivot guard removed for clarity)

Operator Control Panel Position

Once the height and angle of the machine is set, the operator control panel will need to be adjusted. On the bottom of the enclosure is a pivot link. Loosen the bolt in the pivot. Mounted to the top of the enclosure and attached to the top of the upper frame is an adjustable rod. Loosen the bolt on the side of the square mounting block. This will allow the rod to slide through the mounting block. Pivot the enclosure to the desired angle and retighten the bolts.

CONNECTING UTILITIES

Electrical Connections

Warning:

HIGH VOLTAGE! WHEN WORKING ON THE A-200, THE POWER SUPPLY MUST BE OFF. SERIOUS INJURY OR DEATH CAN RESULT FROM ELECTRICAL SHOCK.

1. Insert the SO cord through the cord connector and tighten. Rigid conduit may also be attached to the enclosure with the wire to connect to the machine.
2. Strip approximately 1/2” (13 mm) of insulation off of all 4 conductors.
3. Place the green ground wire in the ground terminal and tighten securely.
4. Place the remaining three wires in the terminals at the top of the main disconnect fuse holder and tighten securely.

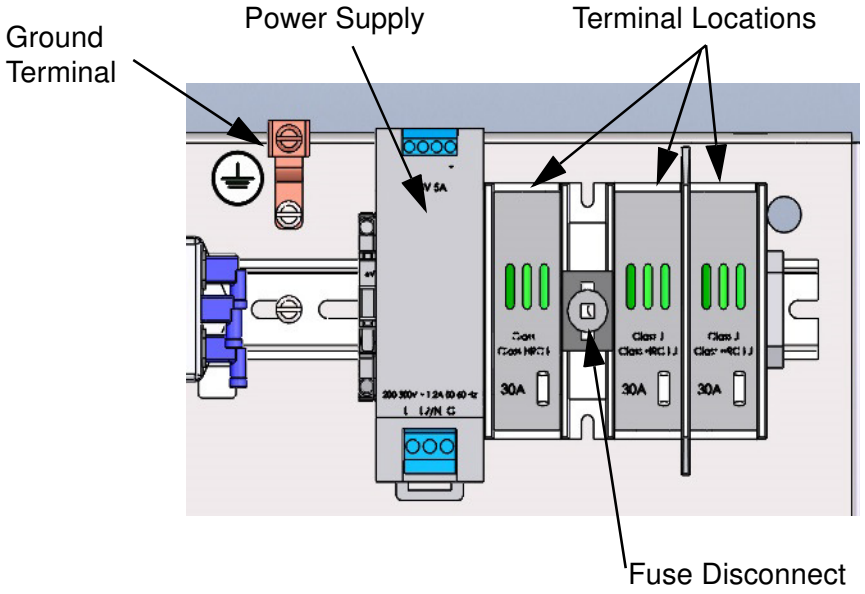


Figure 2-4. Fuse Block

5. Verify that the power supply is properly grounded to the ground lug at the top of the electrical panel.
6. Turn on the electrical power to the unit.
7. Check the position of the “EMERGENCY OPEN” switch, located on the push-button station at the front of the unit. For testing purposes keep this switch pushed in, “POWER OFF” position.

8. With the enclosure door open, turn the MAIN DISCONNECT to the “ON” position by turning the square shaft on the fuse disconnect block 1/4-turn clockwise.
9. Remove the clear sediment bowl on the side of the unit to allow air flow into the vacuum pump.
10. Find the “MSP1” VACUUM PUMP STARTER/OVERLOAD, located on the electrical panel to the lower left of the three main fuses. Turn the manual switch on the overload to the “I” position.

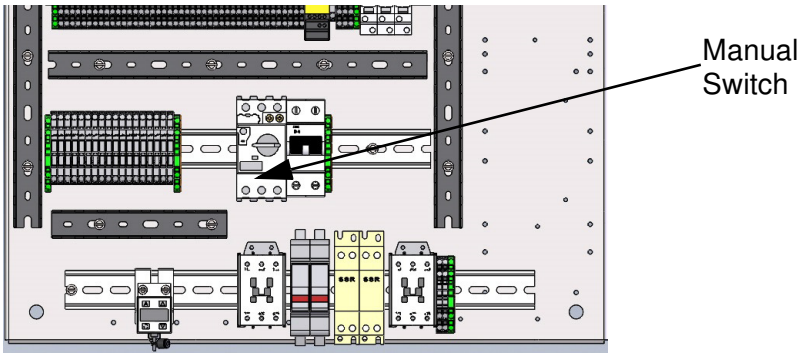


Figure 2-5. MSP1 Vacuum Pump Starter/Overload

11. Check VACUUM PUMP ROTATION by quickly depressing and releasing the recessed button on the lower portion of the overload.
12. Feel the PUMP EXHAUST. If the pump rotation is correct, you will notice warm air expelling from the pump exhaust. If rotation is reversed, you will notice a suction at the pump exhaust and the pump will be very noisy.

Warning:

DO NOT RUN VACUUM PUMP IN REVERSE! SERIOUS DAMAGE CAN OCCUR FROM A REVERSED PUMP. THE PUMP SHOULD ROTATE IN THE DIRECTION INDICATED ON THE PUMP HOUSING. IF THE PUMP IS REVERSED, SIMPLY SWITCH THE LOCATION OF ANY TWO OF THE THREE ELECTRICAL SUPPLY LEADS.

Main Air Supply

Connect your air supply line to the air adapter on the filter regulator assembly on the right side of the machine. The A-200 is provided with a fitting for 1/2” diameter tubing, but any fitting with a 1/2” NPT male thread may be substituted. Turn the air supply line “ON” and check regulator. It must read a minimum of 80 PSI (5.6 bar) for the machine to operate correctly.

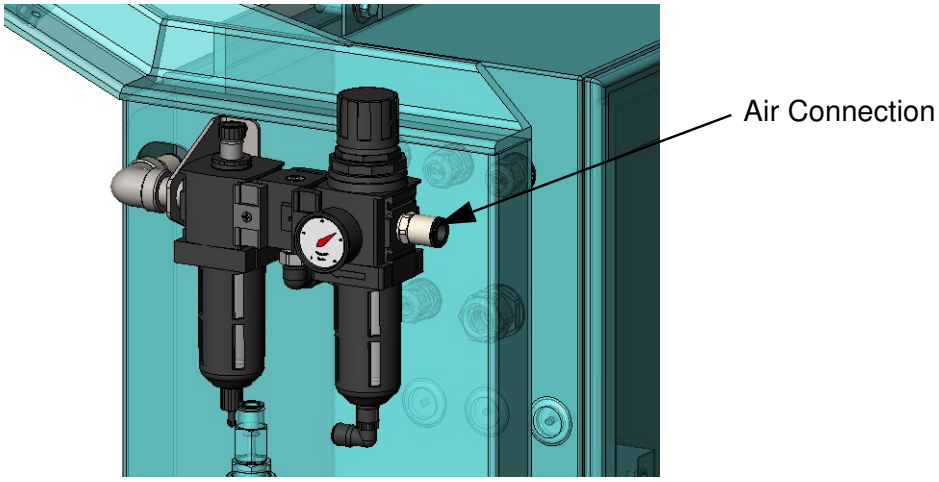


Figure 2-6. Air Connection on Regulator

Warning:

USE COMPRESSED AIR ONLY ON VENTURI VACUUM PUMP MACHINES!

Gas Supply

1. Install a high flow gas regulator to your gas supply line or gas cylinder
2. Connect the supplied tubing from the gas regulator to the 1/2” tube fitting located at the top of the accumulator tank on the right side of the A-200.
3. Turn the gas supply “ON”. Set gas regulator from 60 to 80 PSI (4.0 to 5.4 bar).
4. Check to see if gas is filling the accumulator tank (if equipped) by pulling the ring on the pressure relief valve. Gas will expel through the valve if the tank is pressurized.

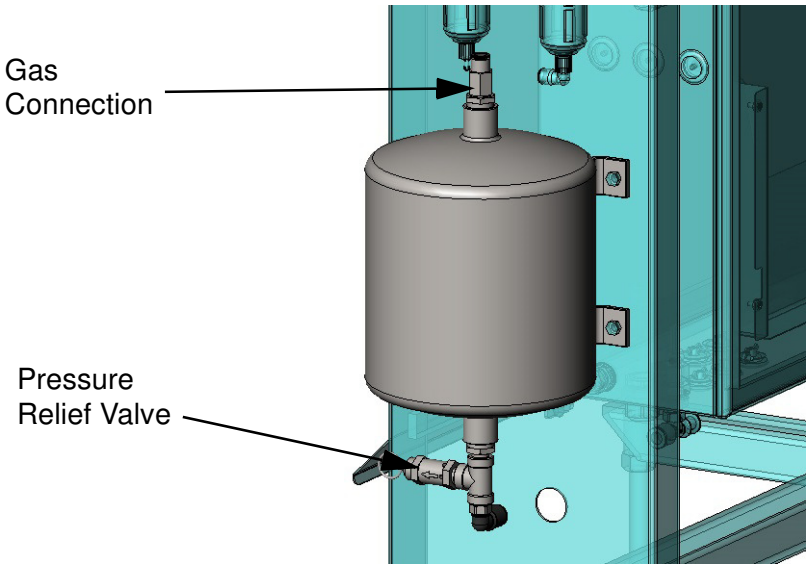


Figure 2-7. Gas Accumulator Tank

Warning:

DO NOT CONNECT COMPRESSED AIR TO THE ACCUMULATOR TANK. THIS MAY CONTAMINATE THE PRODUCT IN THE BAG

SECTION: 3

OPERATION

MACHINE OPERATION

Machine Cycle

Below are step by step instructions to cycle the A-200 machine once. The instructions are made with the assumption that all the timers and presets have been set. The timers and presets will have to be set before operating the A-200 for the first time. Understanding how the machine operates first will help in selecting the proper settings for your machine. Refer to section Four (4). Air is hooked up but the Emergency-Open switch is applied (air dumped from machine). Machine must be in RUN mode. RUN touchscreen button on main screen must be pressed and green.

1. To put air back on the machine, pull E-Open switch and press the START/ RESET button. Screen will say “Hold Swipes to Apply Air”.
2. Hold both swipe switches and air is applied through the Main Air Valve. Alarm horn sounds warning of impending motion of the jaw and adustable head. When the horn goes silent, screen will say “Hold Swipes to Reset”.
3. Hold both swipe switches and snorkels and stretchers will return to the UP (Start) position.
4. Screen says “Hold Swipes to Reset”. Release and hold both swipe switches and snorkels and stretchers will drop to start the cycle. Screen will say “Press Stretcher Bar”.
5. Load the bag. With the bag stretchers in the down position, bring the bag around stretchers. Make sure that the snorkels are inside the bag and not outside of it. Press the left bag stretcher (stretcher expands, pulling bag tight).

Note: If the bag stretcher expands without the bag in place, the machine can move back a step by pressing the green “START/ RESET” button. This will return the bag stretchers to their unstretched position.

6. Press both “CYCLE START” optical swipe switches simultaneously.
7. Jaw closes. Pressing the Start/ Reset button after the jaw is closed will abort the cycle and jaw opens. Abort back to step 3.
8. Bag stretchers return to UP position when the Stretcher RAISE pack setting is ENABLED.
9. Snorkels draw vacuum.
   - *Vacuum Time:* The vacuum is drawn for a preset time that can be adjusted through the operator interface pack.
   - *Vacuum Switch:* The vacuum is drawn to an adjustable setpoint from the operator interface pack.
10. Once required vacuum level and/ or time is reached, vacuum stops.

11. Snorkels dispense gas for preset time as set using the touchscreen. Snorkels return to “up” position. Bag stretchers return to UP position when the Stretcher RAISE pack setting is DISABLED.
12. Heat seal bar extends for preset time set on the operator interface.
13. Heat seal bar releases.
14. Jaw opens releasing bag.
15. Cycle is complete and goes to step 4 to repeat. Cycle goes to step 1 whenever the E-Open switch is applied.

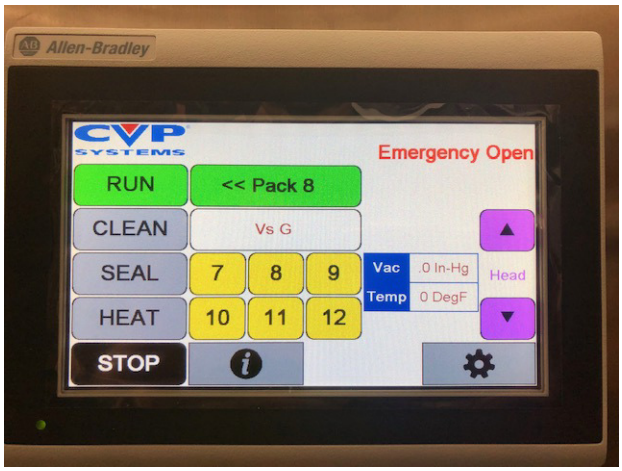


Figure 3-1. Emergency-Open switch is applied

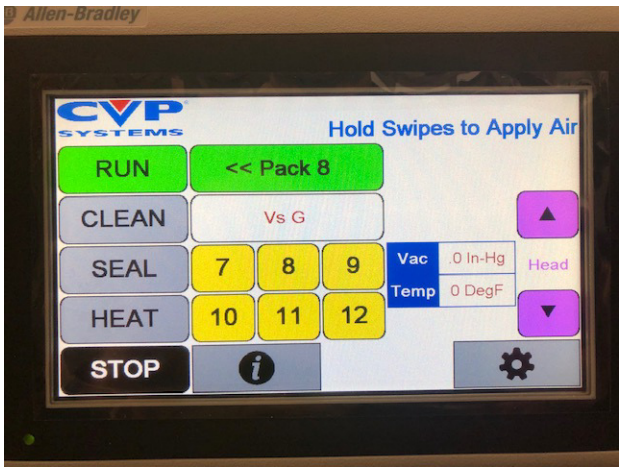


Figure 3-2. Sequence of operation flowchart step 1

Figure 3-3. Sequence of operation flowchart step 5

Clean Cycle

Machine must be in CLEAN mode. CLEAN touchscreen button on main screen must be pressed and green. Mode changes can be made on the A200 at any time. When switching from RUN to CLEAN (or any other Mode change), cycle aborts. Snorkels, stretchers, Adjustable head and shelf (if any) remain in their last position.

1. Screen will say “Hold Swipes to Reset”. Hold both swipe switches. Snorkels will drop (unless already down) and bag stetchers will go up.
2. Hook up water to prepare for Cleaning. See section nine(9). Screen will say “Hold Swipes to Start Clean”.
3. Release and hold swipes switches and the clean cycle will start. Snorkel vacuum valve cycles on and off, pulsing water through the snorkels. Shelf, if any, drops.
4. Pulsing action lasts for the CLEAN time set in operator interface. At which time it stops. Snorkel vacuum valve remains open so water continues to flow until manually shut off.

Figure 3-4. Clean Sequence of operation Step 1

Seal Only Cycle

Machine must be in SEAL mode. Mode changes can be made on the A200 at any time. When switching from RUN to SEAL (or any other Mode change), cycle aborts. Snorkels, stretchers, Adjustable head and shelf (if any) remain in their last position.

1. Screen will say “Hold Swipes to Reset”. Hold both swipe switches and snorkels and stretchers will return to the UP (Start) position.
2. Screen still says “Hold Swipes to Reset”. Release and hold both swipe switches and stretchers will drop to start the cycle. Screen will say “Press Stretcher Bar”.
3. All parameters of the pack program you are in will be remembered but the vacuum and gassing steps will be skipped. Snorkel will always be retracted. Load bag and expand stretcher to hold bag tight.

Note: If the bag stretcher expands without the bag in place, the machine can move back a step by pressing the green “START/ RESET” button. This will return the bag stretchers to their unstretched position.

4. Press both “CYCLE START” optical swipe switches simultaneously.
5. Jaw closes. Pressing the Start/ Reset button after the jaw is closed will abort the cycle and jaw opens. Abort back to step 1.
6. *Bag stretcher models:* Bag stretchers return to “up” position.
7. Heat seal bar extends for preset time set on the operator interface.
8. Heat seal bar releases.
9. Jaw opens releasing bag.
10. Cycle is complete. Back to step 2 to repeat.

Heat Only Cycle

Machine must be in HEAT mode. Mode changes can be made on the A200 at any time. When switching from RUN to HEAT (or any other Mode change), cycle aborts. Snorkels, stretchers, Adjustable head and shelf (if any) remain in their last position.

1. Screen will say “Hold Swipes to Reset”. Heat Only stays on until swiping. Hold both swipe switches. Snorkels and bag stetchers will go up to the START position. Vacuum pump will now also come on to warm up.

Figure 3-5. Heat Only Mode

STOP Cycle

Machine must be in STOP mode. Mode changes can be made on the A200 at any time. When switching from RUN to STOP (or any other Mode change), cycle aborts. Snorkels, stretchers, Adjustable head and shelf (if any) remain in their last position. All machine motion is disabled. Heat and Vacuum pump remain ON.

1. Screen will say “Hold Swipes to Reset”. Hold both swipe switches. Snorkels and bag stetchers will go up to the START position.

Figure 3-6. STOP Mode

OPERATOR CONTROLS

Controls Overview

Figure 3-7 shows the controls located on the front panel of the machine.

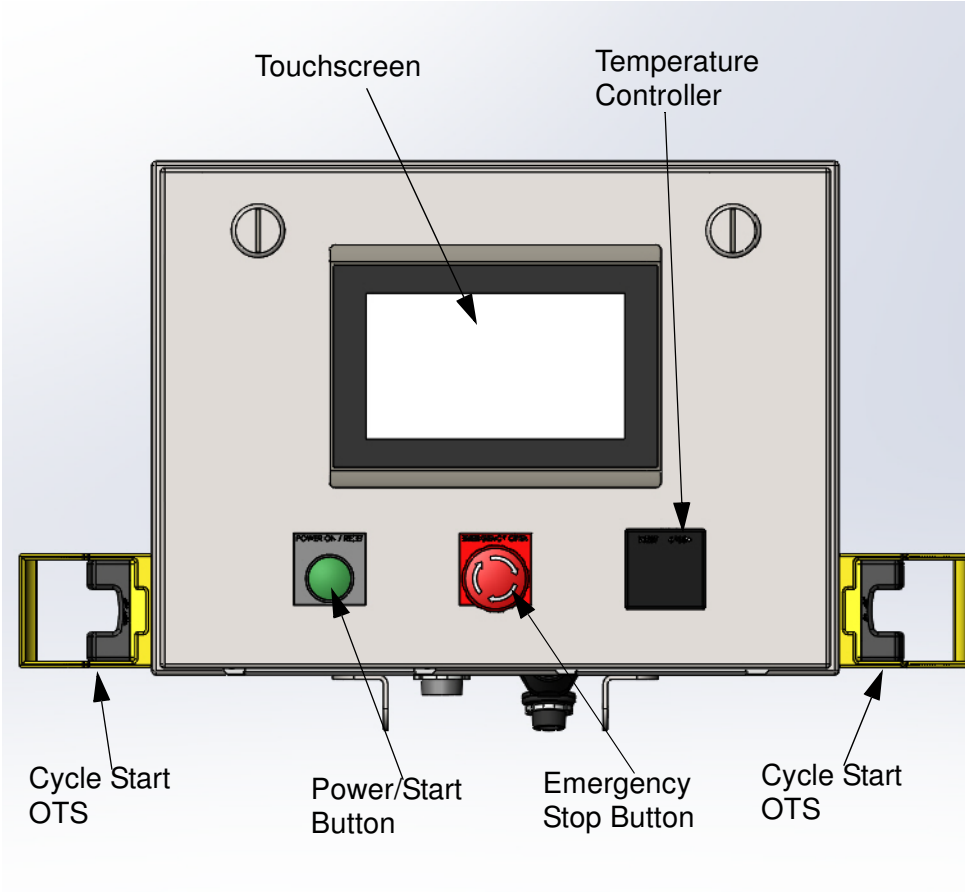


Figure 3-7. Operator Control Panel

The operator control panel is the single access point for all the functions of the A-200. Selecting the mode and pack setting, adjusting the seal bar temperature and adjusting the vacuum level are all done from this location. By using the touchscreen the operator can change vacuum, gas and seal timers. During initial setup certain machine settings are configured using the touchscreen. The touchscreen also informs the operator at which step of the cycle the machine is and if there are any faults to report.

Familiarize yourself with the location of the operator controls, each controller and switch are covered in full detail throughout this manual.

Figure 3-7 shows the controls located on the front panel of the machine.

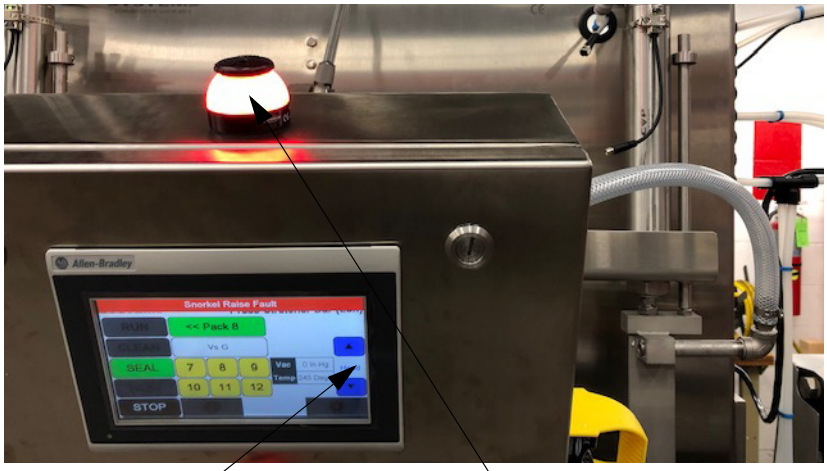


Figure 3-8. Operator Control Panel Beacon

Floating Head Movement Alert

Figure 3-8 shows touchscreen buttons for moving the adjustable head UP and DOWN. After pressing either button, there is a 1 second delay before head movement. The alarm horn will sound during this 1 second, warning of the impending motion. This horn is on top of the beacon. It has adjustable volume by opening or closing off the speaker window.

Beacon Light

Figure 3-8 shows the beacon light/ horn on top of the Operator Control Panel. Color Codes for machine state conditions are:

OFF: No power or Emergency Open is active.

RED: Machine Fault

AMBER: Warning - Machine in Operator Control and Motion expected

GREEN: Normal Machine Operation

HORN: Imminent motion or alarm alert

When alarms occur, red beacon light comes on immediately and the cycle aborts. There will be a brief alarm alert from the horn. Snorkels, stretchers, Adjustable head and shelf (if any) remain in their last position.

Check the alarm condition on the touchscreen. There should be a red banner on top. Correct the fault. Refer to sections Four (4) and Eleven (11) in the manual. Press the START/ RESET button to clear the alarm banner. Screen will say “Hold Swipes to Reset”. Hold both swipe switches and snorkels and stretchers will return to the UP (Start) position. Resume operation.

OPERATION PRECAUTIONS

Safe Operating Practices

It is important to know and understand the safety precautions before operating the A-200 packaging machine. Improper and unsafe operating habits will cause injury to the operator.

- **One operator at a time.** The A-200 is equipped with anti-tie down two hand start buttons. This assures that the operators hands are clear of the manifolds while they close. Bag loading devices are used to hold the bag in place while the operator starts the machine cycle.
- **Do not lean on or near areas of the machine that move.** Loose clothing or parts of your body may become pinched in the machine. The machine is equipped with a jaws closed sensor to open the manifold in the event it closes on someone's hand. As long as the previous precaution is followed this should not happen.
- **Avoid contact with the heat seal bar.** The heat seal bar becomes very hot during operation. Serious burns can occur upon contact.
- **Do not operate with loose or damaged parts.** This will only cause harm to the operator and/or additional damage to the machine. Repair or replace faulty parts before operating the machine.
- **Use the machine in the manner for which it was designed.** Operate the machine as directed in this manual or as instructed by a CV-Tek repre-sentative. Again, improper use of this machine will result in injury or cause additional damage to the machine.

MACHINE PERFORMANCE

The A-200 Fresh Vac® machine will perform satisfactorily providing that proper safety and maintenance procedures are followed.

What to Expect

The average cycle time is approximately 8-12 seconds (for a single cycle), depending on specific product and condition of machine. Cycle times will be higher on machines running double and triple cycles or large bins.

Shelf life of any given product should increase. However, the length of time will vary depending upon certain aspects of product processing.

Some of these aspects are:

the **freshness** of the product,

the **sanitation level** of the processing facility

the **temperature** of the product

the **oxygen level** inside package,

the **quality** of the bag and

the **quality** of the bag seal.

Maintaining Performance

When a satisfactory level of performance is achieved take note of the operating procedure. Maintaining that procedure consistently along with routine maintenance of the machine will insure satisfactory performance of the machine and increased shelf life of your product.

Increasing Performance

If you need to increase the performance of your machine, contact your CV-Tek Representative. There may be an option available or a different configura-tion to the machine that will increase the performance of the machine.

SECTION: 4

PACK/MODE SETTING

MAIN MESSAGE SCREEN

General Information

The touchscreen is located on the front panel. The display prompts the operator through each step of the vacuum, gas and sealing cycle. The following messages will appear:

1. MACHINE READY
2. PRESS STRETCHER BAR (LEFT)
3. PRESS START BUTTONS
4. VACUUM 1, GAS 1
5. BAG SEAL HEAT
6. LOWER SHELF

The touchscreen communicates with the PLC via a serial cable running from the side of the touchscreen to the serial port on the PLC. The cable has a 9 pin DIN female connector on the interface end and an 8 pin mini DIN male 90 deg. angled connector on the PLC end. For communication to take place, the mode switch on the PLC must be in the REMOTE or RUN position and the RUN indicator must be lit. When the PLC mode switch is in REMOTE or RUN position, program presets and timers may be changed via the interface.

When the mode switch is in the RUN position, the PLC program is protected from being changed remotely.

Screen Icons

The following icons are used to navigate between the various functions of the touchscreen:

	Home	Return to Home screen
	Config	Accesses the “Config” sub-menu
	Pack Edit	Accesses the “Pack Settings” sub-menu
	Status	Displays the “Status” screen
	Reset	Resets the “Current Seal Count”
	Alarm History	Displays fault conditions.
	Maintenance	Displays the Maintenance screens

↵	Enter	Confirms user inputs on the numeric keypad
◀	Back	Navigate to previous screen
▶	Next	Navigate to next screen
⚙	Factory Setting	Factory settings are not accessible by users

Display Areas

The boxed display area shows operator messages and prompts. Each Pack sequence prompts the operator through each step. For example, at the start of a new Pack sequence, the “MACHINE READY” message will appear until a box is pushed onto the shelf. Then the operator will be prompted to “PRESS STRETCHER BAR” followed by “PRESS START BUTTONS”, etc.

In the center of the screen on the right (blue box) is the actual vacuum level read at the snorkels in “inHg” units. On the Status screen the units can be changed to “metric” to read out in mBar.

In the center of the screen in the yellow box is the currently selected Pack number to run. There are 12 programmable pack settings.

The lower display line shows the menus that can be jumped into by pressing that menu button or their function keys below.

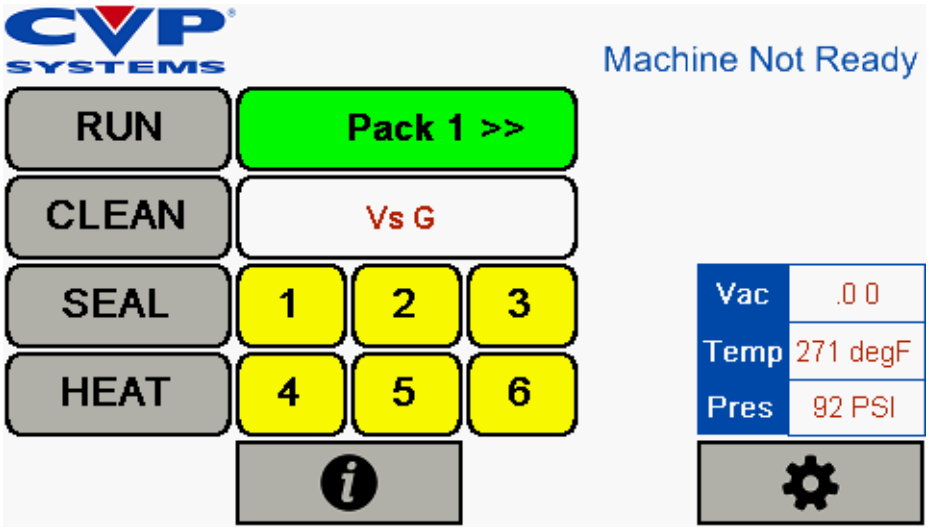


Figure 4-1. Main Message Screen in RUN mode

Left Sidebar Keys

Press the RUN key to enter RUN mode.

Press the CLEAN key and the display jumps to the CLEAN menu.

Press the SEAL key to enter SEAL ONLY mode.

Press the HEAT key to enter HEAT ONLY mode.

Floating Head

When equipped with the optional Floating Head feature, the head may be raised and lowered by pressing the ▲ or ▼ buttons on the 🏠 screen.

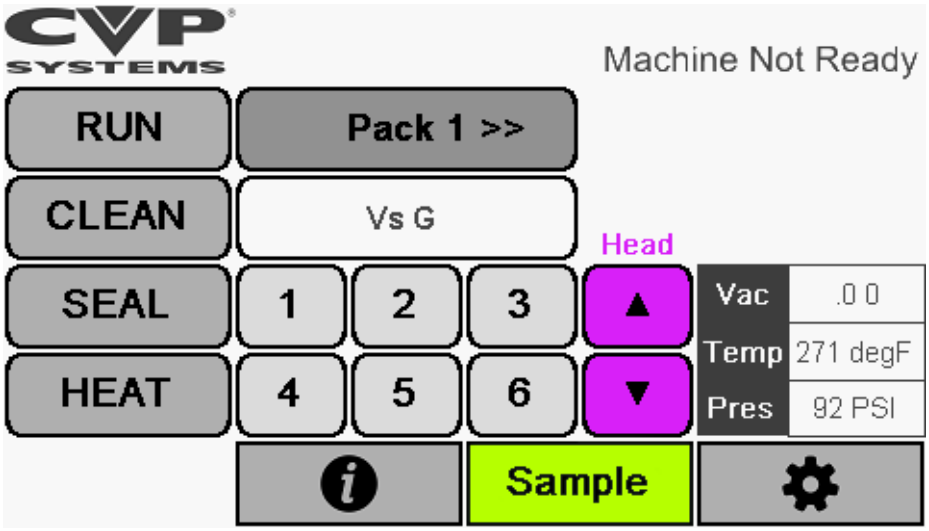


Figure 4-2. Main Screen with Floating Head and O2 Sample Option

Pack Selector

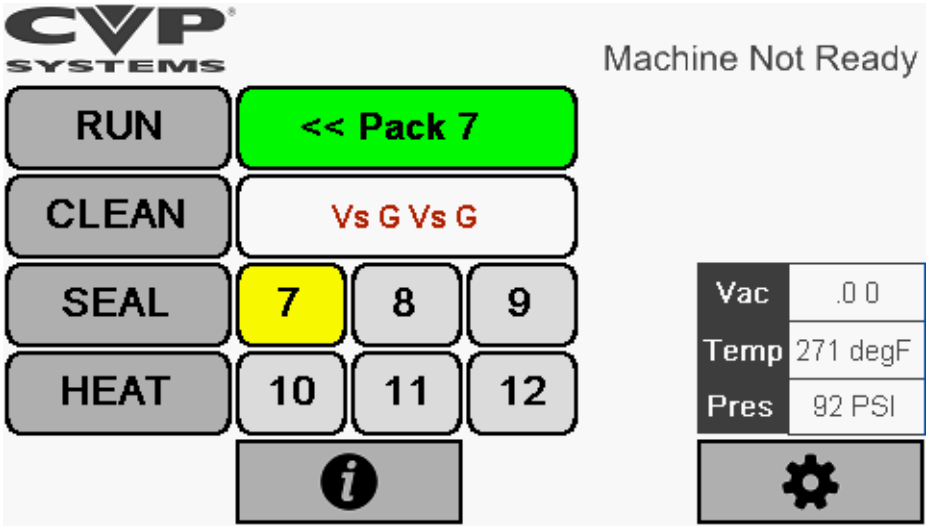


Figure 4-3. Pack Select to 12

Press the yellow PACK key to bring up a popup keypad to change the pack number. Enter 1-12 and press the ↵ key on the lower right.

Clean Mode

Clean mode allows the machines Clean in Place System to be flushed with water. See Section 9 for details on using Clean Mode.

Bypass Mode

For Multiline only. When BYPASS is selected, the machine is in BYPASS mode. Select BYPASS mode to automatically dump all loaded boxes to the lower conveyor as soon as they are seen on the shelf and the exit is clear.

Only use BYPASS mode if ALL incoming packages need to be bypassed. If only select boxes need to be bypassed, use the DUMP button on the front panel.

Seal Only Mode

Press the SEAL key to enter SEAL ONLY mode. All parameters of the pack program you are in will be remembered but the vacuum and gassing steps will be skipped. Snorkel will be retracted.

Use this mode for testing seals on bags or for packing items not requiring modified atmosphere. This mode is also useful to put a double seal on a finished bag. Press the RUN key to return to regular RUN mode for your pack setting.

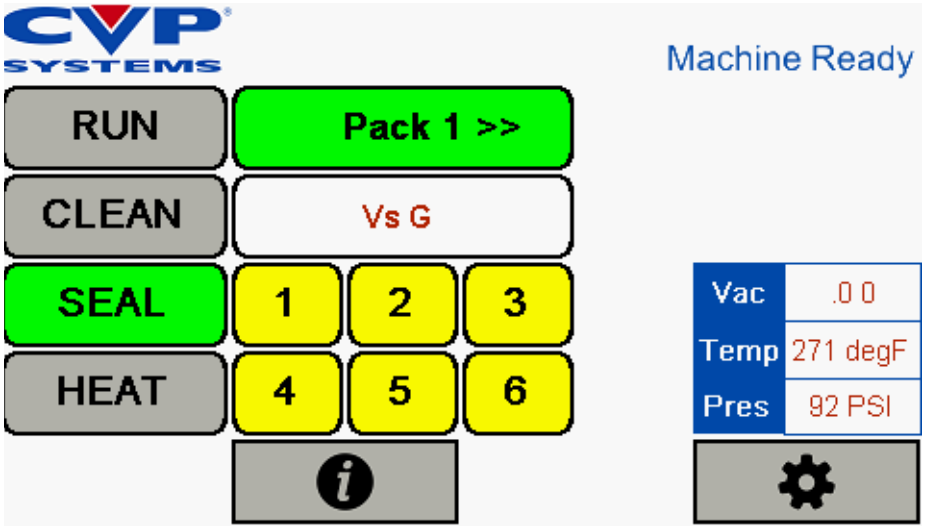


Figure 4-4. Seal Only Mode

PACK EDIT Mode

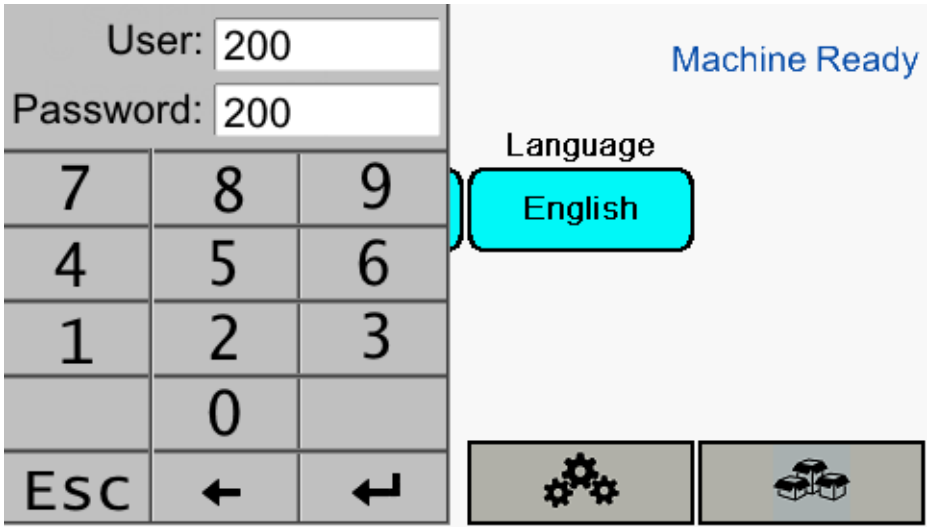


Figure 4-5. Enter Password Popup Screen

Enter the PACK EDIT menu by pressing the ⚙ key in the main menu (lower right). Now press the 🚚 key in the lower right of the CONFIG menu.

The PASSWORD popup menu appears. The User and Password are “200”. The cursor should be in the User box. Enter “200” then touch the box next to Password. Enter “200” again. Press the ↵ key at the lower right to enter both and advance to the 🚚 menu.

There are MANY presets for each Pack setting. The top preset item is STRETCHER ENABLE. There are 4 presets per page. Press the ◀ and ▶ keys to move through the pages of the 🚚 menu.

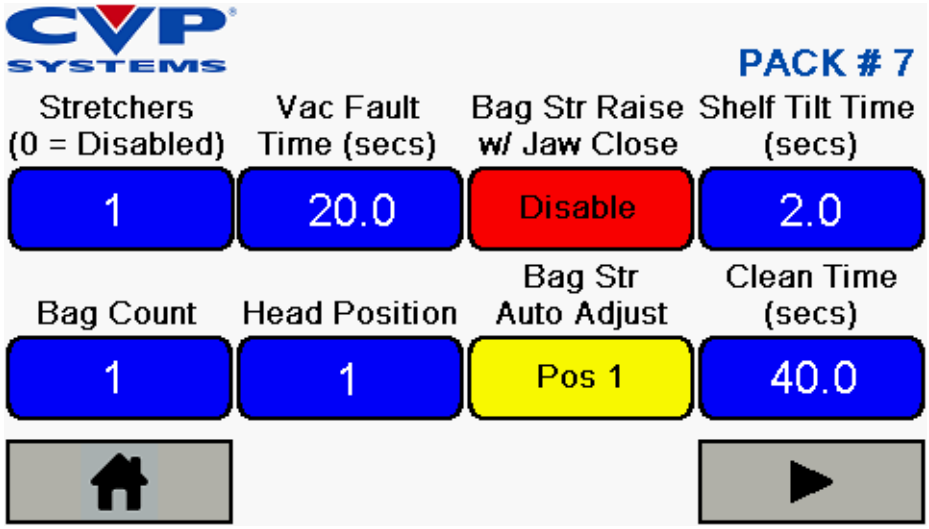


Figure 4-6. Pack Edit menu (Pack 7, page 1)

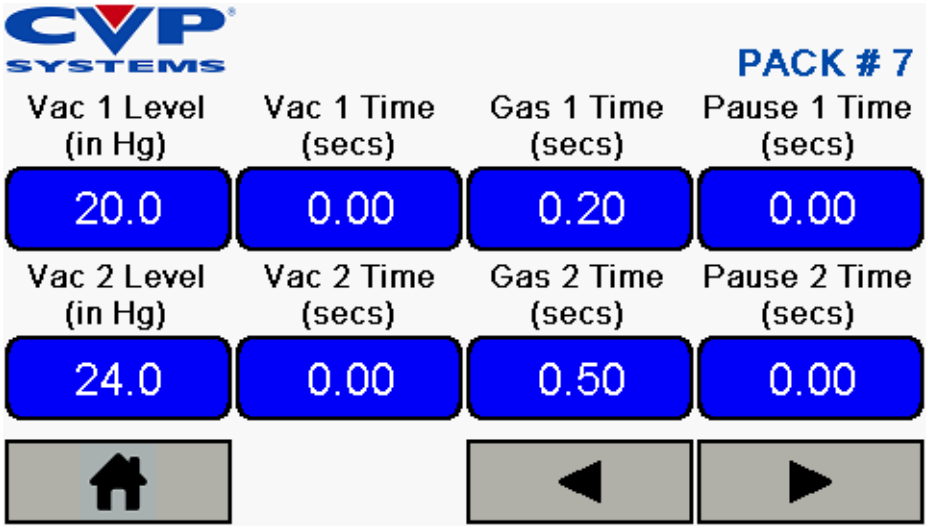


Figure 4-7. Pack Edit menu (Pack 7, page 2)

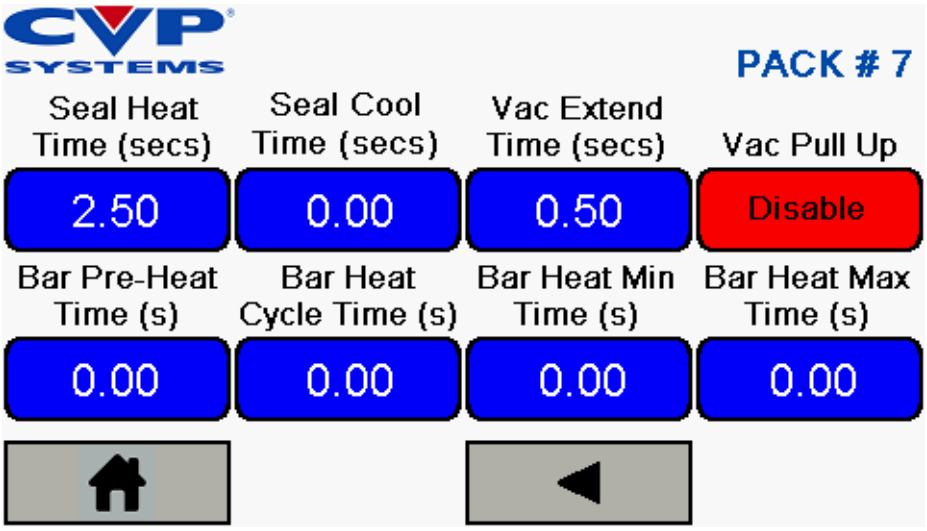


Figure 4-8. Pack Edit menu (Pack 7, page 5)

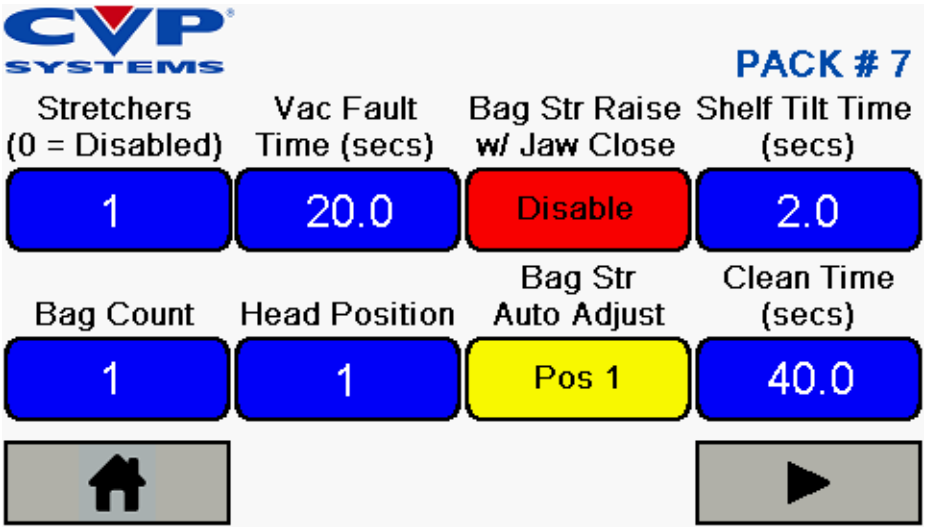


Figure 4-9. Pack Edit menu (Pack 7, page 6)

The top line shows the Pack # that we are adjusting Presets for. Each box, up to 4 per page shows the current value of the preset.

To change preset values using the numeric keypad, touch the value you want to change on the touchscreen. The popup keypad will appear. Type the new value in and press ↵ . You will see the new value appear immediately.

Preset Functions Preset functions are described below in their order on the menu:

TOP OF MENU

1. **STRETCHER MODE SET**: When set to 0, stretchers are disabled. When set to 1, stretchers drop and operate for a single bag by depressing the left bag stretcher. When set to 2, stretchers drop and operate for two bags. Snorkels drop separately when depressing the corresponding left/ right stretcher. Stretchers should be enabled to pull a bag tight before the seal cycle. Stretchers can be disabled on smaller bags that lie flat without stretching. If your machine is not equipped with double stretchers, you cannot set to 2. Factory setting:1 = single bag enabled
2. **VAC FAULT TIME**: Vacuum Fault Time is how long the machine may draw a vacuum through the snorkel in a Vacuum Switch Pack mode to try to reach the Vacuum Level Setting. If this time is exceeded, the machine cycle aborts with a fault message. This is done to alert the operator of a problem such as a tear in the bag. NOTE: On very large bags, the timer value may need to be increased to allow the machine to finish drawing a vacuum. (0-99 sec. adjustment range)
3. **STRETCHER RAISE AT JAW CLOSE**: When the Stretcher RAISE enable bit is set to 1, stretchers immediately retract when the jaw is proven closed. When set to 0, stretchers retract just before the seal cycle starts. Set to 1 to reduce vacuum leakage around the stretchers on high vacuum, light load applications. Set to 1 for normal load applications. Factory setting: 0 = normal stretcher operation
4. **SHELF TILT**: This is the time the drop shelf will remain in the down position before resetting to the up or load position upon completion of a cycle. If the machine was not supplied with a drop shelf or you wish to disable the drop shelf, set this to zero. (0-10.0 sec. adjustment range). Factory Setting: 2.0 sec.
5. **VAC-TIME #1**: Sets the first vacuum cycle extend time (0-99.99 sec. adjustment range)
6. **VAC-LEVEL #1**: Sets the first vacuum cycle level target (5-29.9 in.Hg adjustment range)
7. **GAS-TIME #1**: Sets the first gas cycle time (0-99.99 sec. adjustment range)
8. **PAUSE-TIME #1**: Sets the pause time after the first cycle (0-99.99 sec. adjustment range)
9. **VAC-TIME #2**: Sets the second vacuum cycle extend time (0-99.99 sec. adjustment range)
10. **VAC-LEVEL #2**: Sets the second vacuum cycle level target (5-29.9 in.Hg adjustment range)
11. **GAS-LEVEL #2**: Sets the second gas cycle time (0-99.99 sec. adjustment range)
12. **PAUSE-TIME #2**: Sets the pause time after the second cycle (0-99.99 sec. adjustment range)
13. **VAC-TIME #3**: Sets the third vacuum cycle extend time (0-99.99 sec. adjustment range)

14. **VAC-LEVEL #3**: Sets the third vacuum cycle level target (5-29.9 in.Hg adjustment range)
15. **GAS-TIME #3**: Sets the third gas cycle time (0-99.99 sec. adjustment range)
16. **PAUSE-TIME #3**: Sets the pause time after the third cycle (0-99.99 sec. adjustment range)
17. **SEAL TIME**: This is the heat time for the seal cycle. It is the time the heat seal bar is pressed to the bag to make a seal. (0-99.99 sec. adjustment range)
18. **COOL TIME**: This is the time that the heat seal bar is removed from the bag before the jaws open and the bag drops. (0-99.99 sec. adjustment range)
19. **VACUUM EXTEND TIME**: This extend time is added to the Vacuum #1, 2 and 3 extend times so in effect it is a minimum vacuum extend time. time. Delay is to ignore the initial vacuum spike when the valve opens to the vacuum pump. Minimum setting of 0.5 seconds is recommended. (0-99.99 sec. adjustment range)
20. **HEAD POSITION**: When equipped with the optional Adjustable Head feature, if this setting is 1, the head will be in the up position for the selected PACK. When set to 0, the head will be in the down position for the selected PACK. Factory setting: 0 = down.
21. **BAG STRETCHER AUTO ADJUST**: USED ONLY WHEN A MACHINE IS BUILT WITH AUTO ADJUST. When enabled, AUXILIARY STRETCHER is in the EXPANDED position for this pack. When disabled, AUXILIARY STRETCHER is in the RETRACTED position for this pack. Factory setting:0 = disabled
22. **CLEAN TIME**: When in CLEAN mode, this is the time that the vacuum valve cycles ON and OFF to pulse water through the snorkels. (0-99.99 sec. adjustment range)

BOTTOM OF MENU

Hint: Zeroes may be entered for vacuum, gassing or pause timers to skip a step in any sequence. If values are entered for vacuum level and time, vacuum level will first reach the target and then continue vacuuming for the extend time setting. Zero entered for vacuum level and a value entered for vacuum time in the same cycle is the way to vacuum only by time. Zero entered for vacuum time and a value entered for vacuum level in the same cycle is the way to vacuum only by switch.

Current Pack Setting

Often the question comes up, “What is the Vac - Gas sequence for this Pack?” Check the Pack number (1-12) on the Main menu top line. To check what vacuum - gas sequence is currently programmed for this pack, press the STATUS key (F2). The STATUS screen appears.

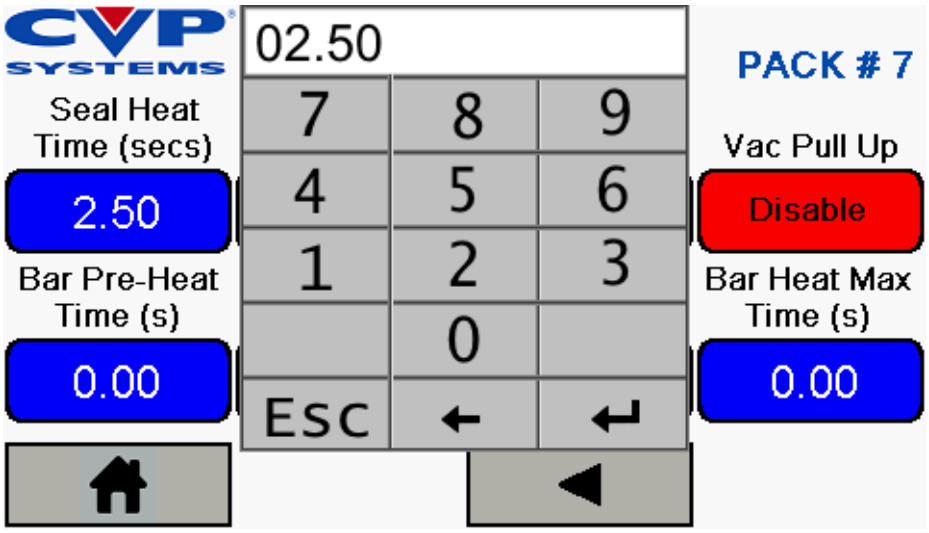


Figure 4-10. Current Pack Setting screen

Check the PACK PRESET line: Suppose it shows only “Vt”. This indicates only one vacuum sequence by time. This would have a value in the first preset (Vacuum Time #1) and the next 11 presets = 0.

The next simplest pack is one vacuum sequence only by switch. This would have a 0 in the first preset, a value in the second preset (Vacuum level #1) and the next 10 presets = 0. The middle line of the Current Pack Setting screen would show only “Vs”.

In the figure above, pack 7 is set up for a Vacuum gas cycle where the vacuum sequences finishes when it reaches the switch level.

If there are values in all Vac -Gas -Pause presets, the sequence will be Vac - Gas - Pause - Vac - Gas - Pause - Vac - Gas - Pause and each vacuum step will have a level target and extend time. If the Vacuum Pull up preset is set to 1, vacuum will also be on as the snorkels pull up. The CURRENT PACK SETTING screen would then show “Vs Vt G P Vs Vt G P Vs Vt G P Vu”. “P” indicates PAUSE. “G” indicates GAS. “Vu” indicates VACUUM on snorkel coming UP.

Seal Count

One non-resettable counter increments every time the heat seal bar actuates. It is on the top line of the ⓘ screen. At 99999999, it wraps around to zero again. One resettable counter increments every time the seal bar actuates. Press ⟳ to reset this counter. Press 🏠 (F1) to return to the home screen.

Bag Count

When sealing multiple bags per box, this counter will show the number of bags yet to be sealed. When equal to zero (0), the shelf will discharge.

Status Screen

Also on the ⓘ screen is the LAST VACUUM (vacuum level achieved on the last bag) and the current SEAL BAR TEMPERATURE. There are buttons at the bottom of the ⓘ screen to access the 🔔 screen and the 🔧 screen where you can check PLC inputs and outputs.

Factory Settings

Factory default pack settings are described as follows:

- Pack 1 is set for a single vacuum by time (3s).
- Pack 2 is set for a single vacuum by time (5s).
- Pack 3 is set for a single vacuum by switch (-17.0 inches Hg).
- Pack 4 is set for a single vacuum by switch (-20 inches Hg) with vacuum on snorkel pull up.
- Pack 5 is set for vacuum by time (3s) and gas by time (0.5s).
- Pack 6 is set for vacuum by time (5s) and gas by time (1.0s).
- Pack 7 is set for vacuum by switch (-17.0 inches Hg) and gas by time (0.5s).
- Pack 8 is set for vacuum by switch (-20.0 inches Hg) and gas by time (1.0s).
- Pack 9 is set to vacuum by time (3S), gas (.5S), pause (1s), vacuum by time (3s), gas (.5s) (double cycle).
- Pack 10 is set for vacuum by switch (-17.0 inches Hg), gas (.5s), pause (1s), vacuum by switch (-17.0 inches Hg), gas (.5s) (double cycle).
- Pack 11 is set to vacuum by time (3s), gas (.5s), pause (1s), vacuum by time (3s), gas (.5s), pause (1s), vacuum by time (3s), gas (.5s) (triple cycle).
- Pack 12 is set for vacuum by switch (-17.0 inches Hg), gas (.5s), pause (1s), vacuum by switch (-17.0 inches Hg), gas (.5s), pause (1s)vacuum by switch (-17.0 inches Hg), gas (.5s) (triple cycle).

The tables on the following pages list the factory default settings and has space to write your adjusted settings.

Table 1: CV-Tek Factory Settings for Pack 1& 2 = Vac-Time

Parameter	Pack 1 Factory Default	Pack 1 User Defined	Pack 2 Factory Default	Pack 2 User Defined
Stretcher Preset	1 (enabled)		1 (enabled)	
Vacuum Fault Timer	20.0 sec.		20.0 sec.	
Stretcher Retract Mode	0		0	
Shelf tilt time	0		0	
Vacuum Time #1	3.0 sec.		5.0 sec.	
Vacuum Level #1	0		0	
Gas Time #1	0		0	
Pause Time #1	0		0	
Vacuum Time #2	0		0	
Vacuum Level #2	0		0	
Gas Time #2	0		0	
Pause Time #2	0		0	
Vacuum Time #3	0		0	
Vacuum Level #3	0		0	
Gas Time #3	0		0	
Pause Time #3	0		0	
Seal Time	3.0 sec.		3.0 sec.	
Cool Time	0		0	
Vacuum Extend Time	0.5 sec.		0.5 sec.	
Vac during Snorkel Pull up	0		0	
Head Position	0		0	
Bag Stretcher Auto Adjust	0		0	
Clean Time	40.0 sec.		40.0 sec.	

Table 2: CV-Tek Factory Settings for Pack 3 & 4= Vac-Switch

Parameter	Pack 3 Factory Default	Pack 3 User Defined	Pack 4 Factory Default	Pack 4 User Defined
Stretcher Preset	1 (enabled)		1 (enabled)	
Vacuum Fault Timer	20.0 sec.		20.0 sec.	
Stretcher Retract Mode	0		0	
Shelf tilt time	0		0	
Vacuum Time #1	0		0	
Vacuum Level #1	-17.0 inHg		-20.0 inHg	
Gas Time #1	0		0	
Pause Time #1	0		0	
Vacuum Time #2	0		0	
Vacuum Level #2	0		0	
Gas Time #2	0		0	
Pause Time #2	0		0	
Vacuum Time #3	0		0	
Vacuum Level #3	0		0	
Gas Time #3	0		0	
Pause Time #3	0		0	
Seal Time	3.0 sec.		3.0 sec.	
Cool Time	0		0	
Vacuum Extend Time	0.5 sec.		0.5 sec.	
Vac during Snorkel Pull up	0		1 (enabled)	
Head Position	0		0	
Bag Stretcher Auto Adjust	0		0	
Clean Time	40.0 sec.		40.0 sec.	

Table 3: CV-Tek Factory Settings for Pack 5 & 6= Vac-Gas-Time

Parameter	Pack 5 Factory Default	Pack 5 User Defined	Pack 6 Factory Default	Pack 6 User Defined
Stretcher Preset	1 (enabled)		1 (enabled)	
Vacuum Fault Timer	20.0 sec.		20.0 sec.	
Stretcher Retract Mode	0		0	
Shelf tilt time	0		0	
Vacuum Time #1	3.0 sec.		5.0 sec.	
Vacuum Level #1	0		0	
Gas Time #1	0.5 sec.		1.0 sec.	
Pause Time #1	0		0	
Vacuum Time #2	0		0	
Vacuum Level #2	0		0	
Gas Time #2	0		0	
Pause Time #2	0		0	
Vacuum Time #3	0		0	
Vacuum Level #3	0		0	
Gas Time #3	0		0	
Pause Time #3	0		0	
Seal Time	3.0 sec.		3.0 sec.	
Cool Time	0		0	
Vacuum Extend Time	0.5 sec.		0.5 sec.	
Vac during Snorkel Pull up	0		0	
Head Position	0		0	
Bag Stretcher Auto Adjust	0		0	
Clean Time	40.0 sec.		40.0 sec.	

Table 4: CV-Tek Factory Settings for Pack 7 & 8 = Vac-Gas-Switch

Parameter	Pack 7 Factory Default	Pack 7 User Defined	Pack 8 Factory Default	Pack 8 User Defined
Stretcher Preset	1 (enabled)		1 (enabled)	
Vacuum Fault Timer	20.0 sec.		20.0 sec.	
Stretcher Retract Mode	0		0	
Shelf tilt time	0		0	
Vacuum Time #1	0		0	
Vacuum Level #1	-17 inHg		-20 inHg	
Gas Time #1	0.5 sec.		1.0 sec.	
Pause Time #1	0		0	
Vacuum Time #2	0		0	
Vacuum Level #2	0		0	
Gas Time #2	0		0	
Pause Time #2	0		0	
Vacuum Time #3	0		0	
Vacuum Level #3	0		0	
Gas Time #3	0		0	
Pause Time #3	0		0	
Seal Time	3.0 sec.		3.0 sec.	
Cool Time	0		0	
Vacuum Extend Time	0.5 sec.		0.5 sec.	
Vac during Snorkel Pull up	0		0	
Head Position	0		0	
Bag Stretcher Auto Adjust	0		0	
Clean Time	40.0 sec.		40.0 sec.	

Table 5: CV-Tek Factory Settings for Pack 9 & 10 = VGVG-Time

Parameter	Pack 9 Factory Default	Pack 9 User Defined	Pack 10 Factory Default	Pack 10 User Defined
Stretcher Preset	1 (enabled)		1 (enabled)	
Vacuum Fault Timer	20.0 sec.		20.0 sec.	
Stretcher Retract Mode	0		0	
Shelf tilt time	0		0	
Vacuum Time #1	3.0 sec.		0	
Vacuum Level #1	0		-17 inHg	
Gas Time #1	0.5 sec.		0.5 sec.	
Pause Time #1	1.0 sec.		1.0 sec.	
Vacuum Time #2	3.0 sec.		0	
Vacuum Level #2	0		-17 inHg	
Gas Time #2	0.5 sec.		0.5 sec.	
Pause Time #2	0		0	
Vacuum Time #3	0		0	
Vacuum Level #3	0		0	
Gas Time #3	0		0	
Pause Time #3	0		0	
Seal Time	3.0 sec.		3.0 sec.	
Cool Time	0		0	
Vacuum Extend Time	0.5 sec.		0.5 sec.	
Vac during Snorkel Pull up	0		0	
Head Position	0		0	
Bag Stretcher Auto Adjust	0		0	
Clean Time	40.0 sec.		40.0 sec.	

Table 6: CV-Tek Factory Settings for Pack 11 & 12 = VGVGVG-Time

Parameter	Pack 11 Factory Default	Pack 11 User Defined	Pack 12 Factory Default	Pack 12 User Defined
Stretcher Preset	1 (enabled)		1 (enabled)	
Vacuum Fault Timer	20.0 sec.		20.0 sec.	
Stretcher Retract Mode	0		0	
Shelf tilt time	0		0	
Vacuum Time #1	3.0 sec.		0	
Vacuum Level #1	0		-17 inHg	
Gas Time #1	0.5 sec.		0.5 sec.	
Pause Time #1	1.0 sec.		1.0 sec.	
Vacuum Time #2	3.0 sec.		0	
Vacuum Level #2	0		-17 inHg	
Gas Time #2	0.5 sec.		0.5 sec.	
Pause Time #2	1.0 sec.		1.0 sec.	
Vacuum Time #3	3.0 sec.		0	
Vacuum Level #3	0		-17 inHg	
Gas Time #3	0.5 sec.		0.5 sec.	
Pause Time #3	0		0	
Seal Time	3.0 sec.		3.0 sec.	
Cool Time	0		0	
Vacuum Extend Time	0.5 sec.		0.5 sec.	
Vac during Snorkel Pull up	0		0	
Head Position	0		0	
Bag Stretcher Auto Adjust	0		0	
Clean Time	40.0 sec.		40.0 sec.	

CONFIG screen

Pressing ⚙ (F4) from the 🏠 screen allows the user to select IMPERIAL or METRIC units for the display. Imperial displays temperature in DegF and vacuum level in units of inHg. Metric displays temperature in DegC and vacuum level in units of mBar.

You can also select ENGLISH or SPANISH language messaging.

There are also buttons on the bottom to jump to password protected menus. The ⚙⚙ menu need only ever be accessed if you are adding a machine feature such as gas sampling, O2 logging, 2 position or auto adjust bag stretchers, Safety Edge, gas alarm, etc.

The 📦 menu button is the gateway to change pack settings from those set up at the factory. A popup menu will appear when pressed and you must enter ”200” for the username and password.

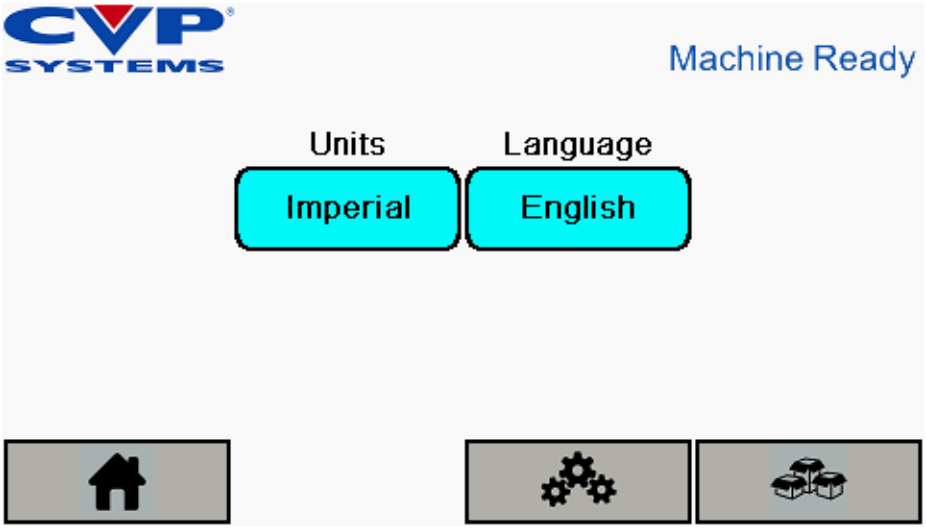


Figure 4-11. CONFIG screen

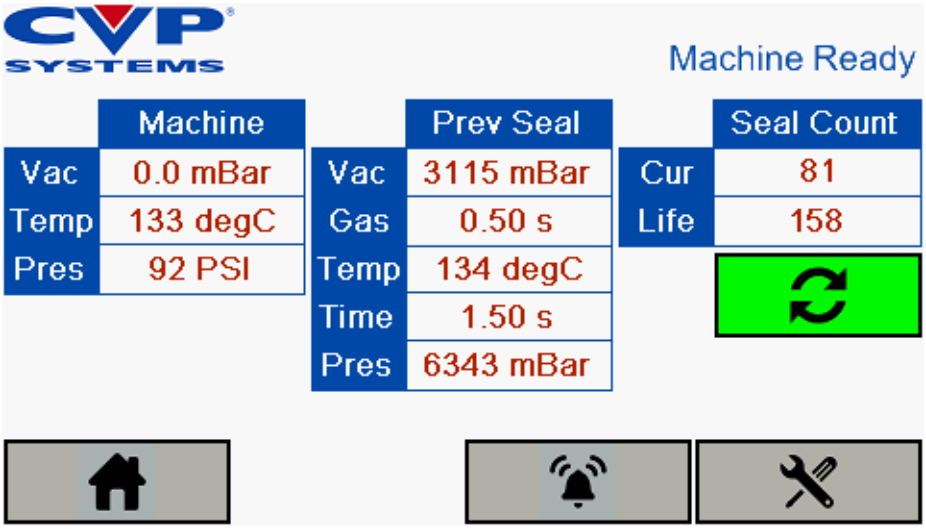


Figure 4-12. Metric Units selected

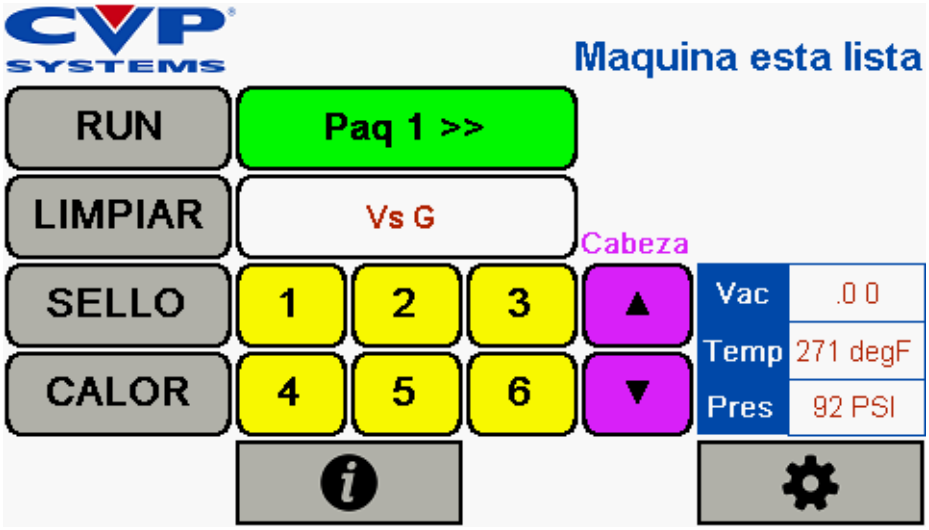


Figure 4-13. Spanish messaging selected

Alarms

Alarms that occur during operation of the A-200 vacuum packaging machine must be acknowledged. When alarms occur, an alarm popup message appears on the interface top line. The background color of the alarm text is in RED to alert the operator.

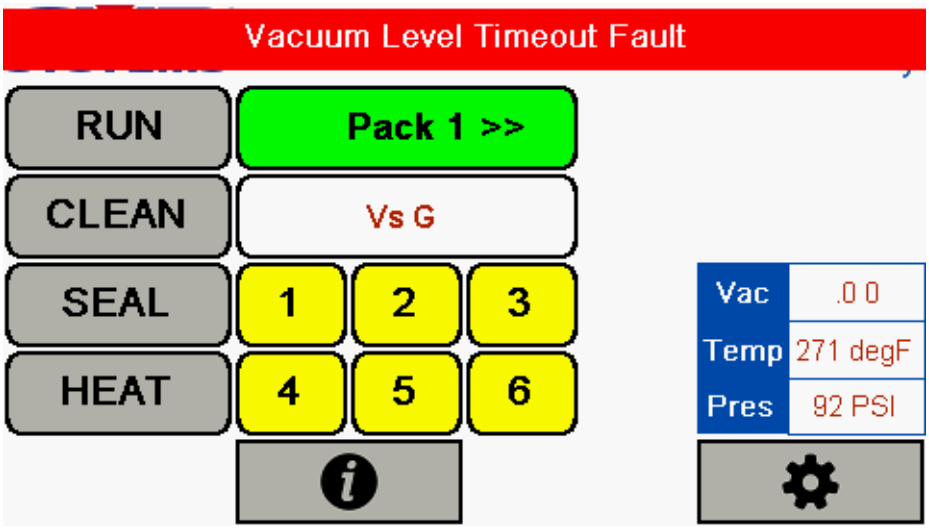


Figure 4-14. Alarm condition - Vacuum Fault

The above figure shows a typical alarm popup screen. When the fault condition is corrected, press the START/ RESET button to acknowledge the alarm and return to the screen. In this case, vacuum level could not reach the target level programmed in the pack by the vacuum fault time. Any one of seven alarm messages may appear:

1. Vacuum Fault: Occurs if the actual vacuum time exceeds the vacuum fault time.
2. Snorkel Fault: Occurs if the program expects the snorkel to be in the retracted position and the Snorkel retracted PLC input is not ON.
3. Jaw Close Fault: The program commanded the jaw to close and the Jaw Close input was not received within one second.
4. Low Gas Fault: In Gas Pack settings, the fault occurs when the Gas Pressure PLC input is not received. Jumper if not used.
5. Temperature Fault: The temperature has remained below the controller setpoint for one minute and the analog temperature reading has not gone up. Power to the heater is removed until reset.
6. Vacuum Sensor Fault: Occurs when the 0-5VDC signal is not received from the vacuum sensor.
7. Jaw Open Fault: The Jaw Closed Cylinder switch is ON when the program is commanding the Jaw to be open.
8. High O2 Alarm: The Actual O2 reading at the end of the sample time is higher than the maximum set and the cycle is aborted.

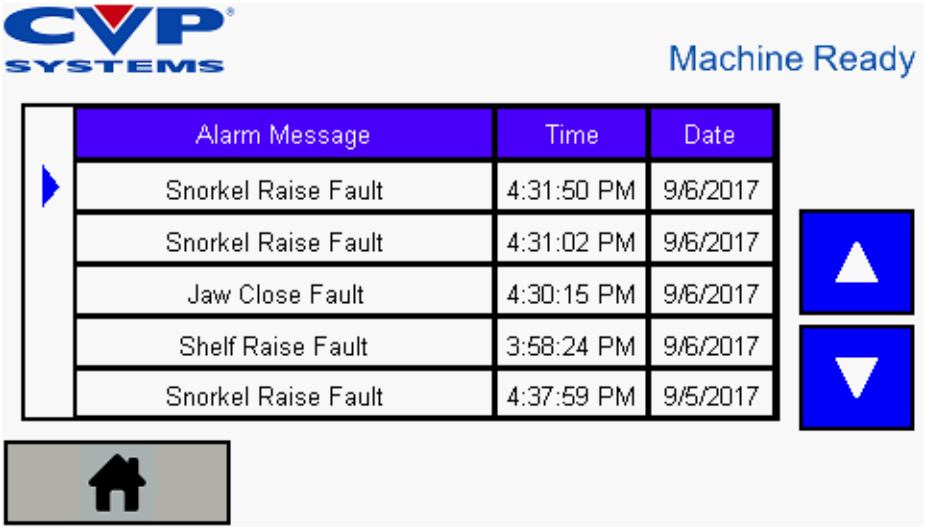


Figure 4-15. Alarm History

Alarm History

Access the menu shown above from the Status Screen. Alarms that occur on the A-200 are time and date stamped. 50 alarms are stored and can be scrolled through using the screen buttons. After 51 alarms, the oldest alarms are purged from screen storage.

Maintenance Screen

Access the maintenance screens shown below from the screen by pressing the key. First, the PLC inputs screen appears showing all current inputs that are energized in GREEN and those off in RED. Press and the PLC outputs screen appears showing all current outputs that are energized in GREEN and those off in RED.

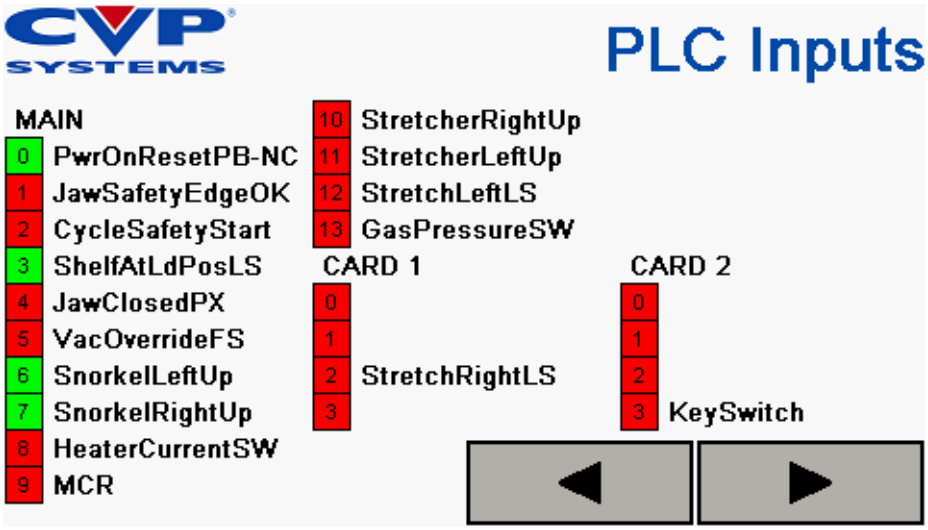


Figure 4-16. Maintenance screen - PLC Inputs

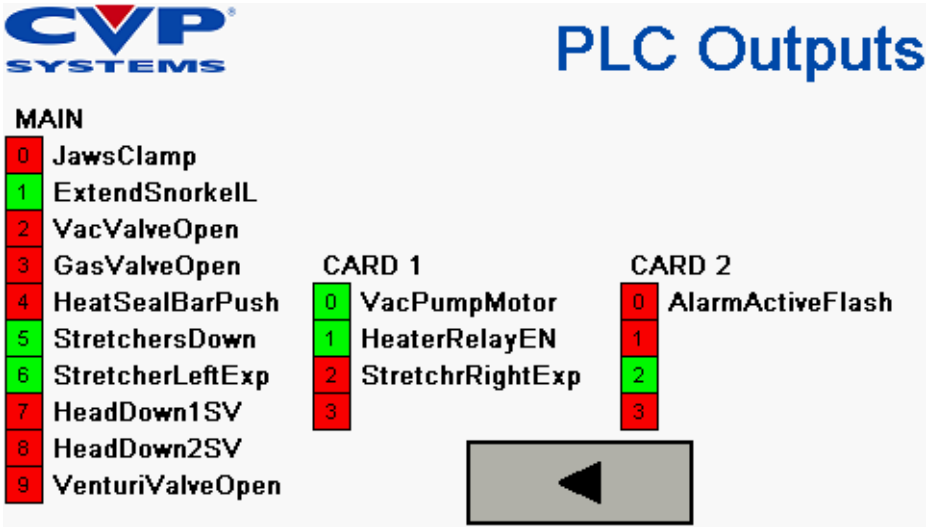


Figure 4-17. Maintenance screen - PLC Outputs

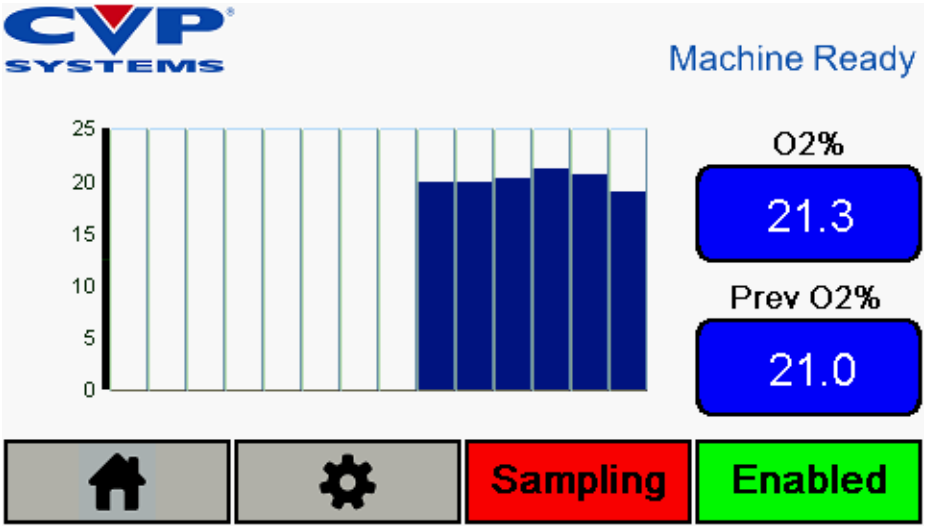


Figure 4-18. Gas Sample Chart

Gas Sample Chart Button

Pressing the SAMPLE button from the screen brings up the screen above. The chart shows the percent oxygen level (O2) after the Gas Sample time in each pack for the last 14 packages. Most recent chart value is on the right. Gas Sampling must be enabled using the button on the lower right to log a sample point. When enabled, after the last pausing step, a sample pump will run for the gas sample time programmed on the lower right. The current O2 reading displays in the top box on the right. At the end of the time, the O2 reading will be added to the chart. It will also display in the second box on the right marked “Last O2 Level %”. At the end of the Gas Sample Time, the actual O2 reading is compared to the MAX O2 % set in the O2 CONFIG screen. If the O2 reading is less than that value, the cycle will continue and the bag will seal. If the O2 reading is greater or equal to the MAX O2 % value, a popup will alert the operator of the HI O2 ALARM and abort the cycle without sealing the bag.

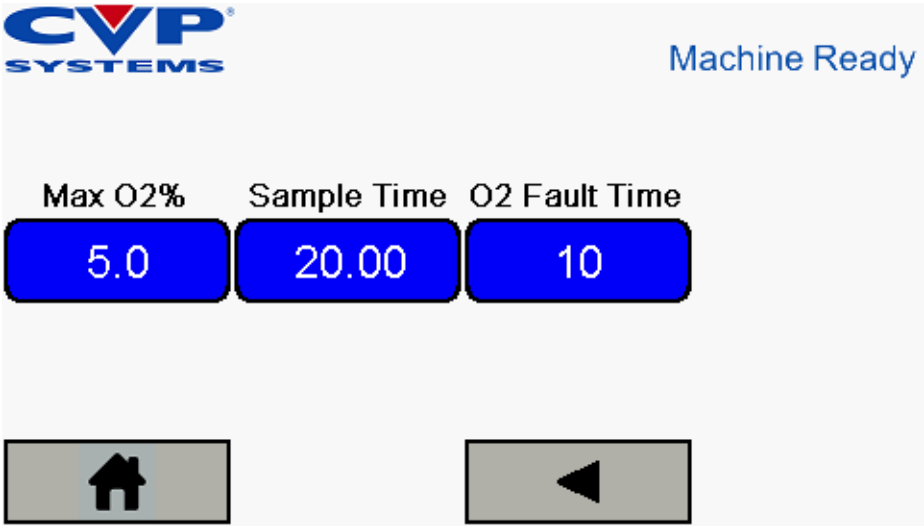


Figure 4-19. Gas Sample Configuration Screen

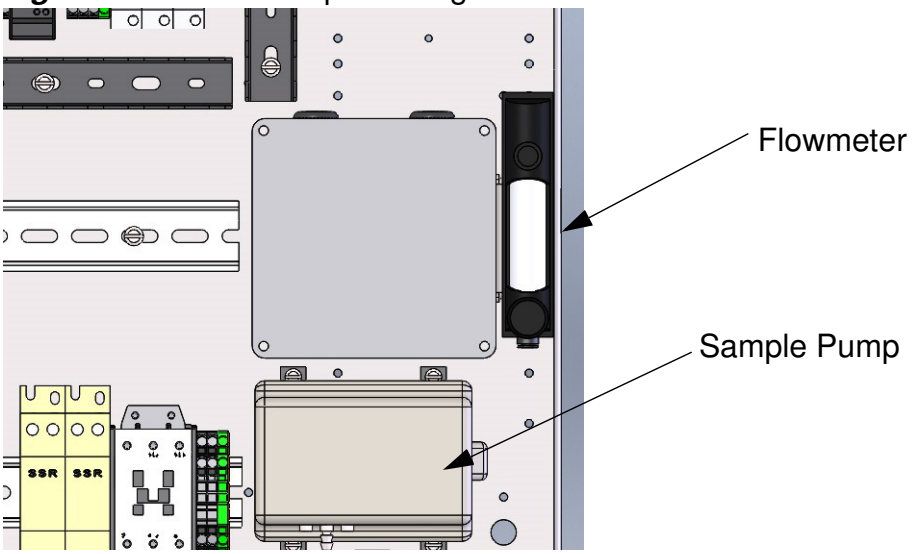


Figure 4-20. Gas Analyzer

Disable Gas sampling when running production. Enable for testing bags or in cases where 100% inspection is required. When each sample is logged, it is time/ date stamped and saved to a file called TRENDCHART.CSV on the USB flash drive. A flash drive must be installed in the USB host port for data logging.

When the gas sample pump runs, the flowmeter should indicate 0.5 to 1.0 liter per minute flow. Adjust the valve on the flowmeter as required. There is a micron filter before the sample inlet to protect the analyzer. Check the O2 transmitter instruction manual for calibration and maintenance procedures.

Touchscreen ports

The touchscreen communicates to the PLC through the 9 pin D-Sub serial communication port on back. The other end of the communication cable plugs to the 8 pin mini-DIN Serial port on the PLC. Defaults communications are 9600 baud, 1 stop bit, odd parity.

The panel is powered by 24 VDC. DO NOT reverse polarity on the DC power supply terminals or you risk damage to the screen.

Data Logging

For data logging, a USB flash drive must be plugged into the USB host port on the rear of the touchscreen as shown in Figure 4-21. If a flash drive is not plugged in, the A-200 machine will still operate normally but no data logging can occur. The message “LOGGING ERROR” will always appear in the upper screen, as shown in Figure 4-22.

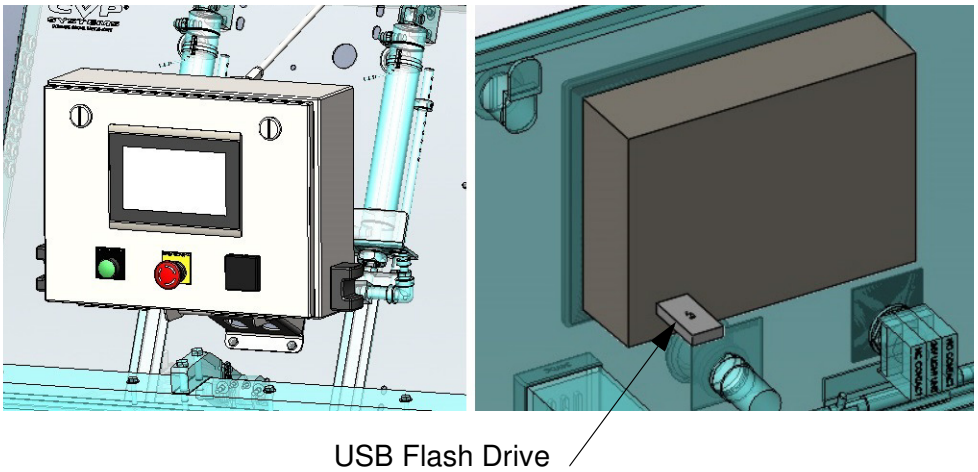


Figure 4-21. USB Flash Drive Location

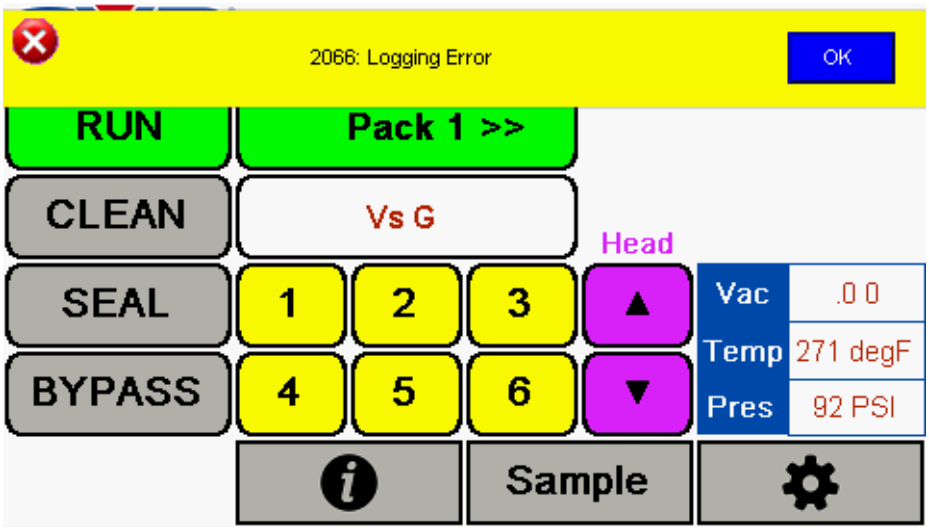


Figure 4-22. Data Logging Error

If a card is plugged in, every time O2 data is logged, data will be written to files on the flash drive. The O2 data file is named TRENDCHART.CSV.

USB Eject

It is good practice to remove/ insert the flash drive to the touchscreen with power removed. Otherwise you risk losing data from the card.

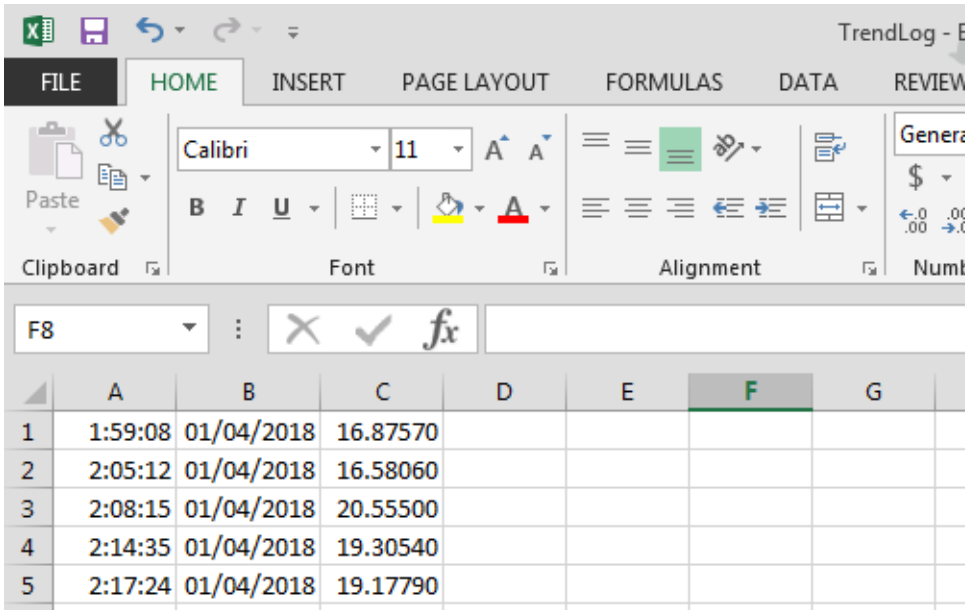


Figure 4-23. TRENDCHART.CSV

With the flash drive removed, the files can be read from Microsoft Excel on any computer. Note that files of type TEXT or ALL must be selected in the OPEN FILE popup for the files to appear in the selection list. It is recom-

mended one deletes the TRENDCHART.CSV files from the flash drive after you have copied them. They will be recreated when the flash drive is re-inserted in the touchscreen.

In the %O2 sampling shown above, 4 sample points were logged. O2 levels were 21.64%, 21.75%, 21.72% and 21.67% respectively.

Other Controls

Power/Start Button

Pressing and holding down the Power/Start button resets the machine to the point of placing the bag in the manifold or on the bag stretchers. It is also required to press the Power/Start button to acknowledge alarm conditions. If not using bag stretchers, pressing the Power/Start button drops the snorkels.

Emergency Open

When the emergency open button is pressed, the machine ceases operation, the jaws open and the drop shelf lowers. The machine can not be turned on until the emergency open button is reset. Pull the button out to reset. Shelf will come back up when green START button pressed.

Operator Interface

The LCD screen and it's associated buttons allow the operator to change the preset timers within the pack settings as well as the seal timers. During operation the screen provides the operator with prompts at each stage of the operating cycle, as well as troubleshooting and programming information discussed in the troubleshooting section of this manual. The buttons are provided for programing and troubleshooting proposes and are not needed to run the machine.

Cycle Start Optical Touch Switch (OTS)

The Cycle Start OTSs are located on both sides of the control panel. After placing the bag either on the bag stretchers or in the manifold, activate both Cycle Start OTSs to initiate the cycle. *Both Start Buttons must be pressed simultaneously in order for the A-200 jaws to close and seal the bag.*

SECTION: 5

VACUUM PUMPS

GENERAL INFORMATION

Pump Description

Selecting the correct pump for your application is determined by the level of vacuum needed, speed of the vacuum flow, type of MAP gases used and environment which the pump is to be used. There are two types of vacuum pumps available on the A-200.

The rotary vane style pump uses an electric motor that runs a pump to generate a vacuum. These pumps require oil to aid in the vacuum process, however the pumping speed and vacuum level are higher on this type of pump.

The venturi pump uses compressed air to generate a vacuum. Oil is not used in this pump, decreasing maintenance requirements. For every second this pump runs, 1/2 cubic foot (14.2L) of air is used. The larger the volume of air to evacuate, the more air is used.

Pumps Used

The A-200 is available with two different pumps.

1. The air operated venturi vacuum pump. This is the standard vacuum pump with a free flow pumping speed of 30 CFM (0.8 cubic meters) and a vacuum level of 27 in hg (686 mm hg). This pump works well in applications with incidental moisture and moderate vacuum levels. This pump is also recommended for high oxygen applications
2. The high capacity pump is a rotary vacuum pump. This is the optional high capacity vacuum pump with a pumping speed of over 30 CFM (849 L/min) and vacuum level of 29 in hg (736.6 mm hg). This pump is used in most applications but does not tolerate water entering the pump. For wet product an auto drain filtration system is available.

Pump Maintenance

The rotary pumps use oil to form a seal in the vacuum chamber. This oil and oil filter will need to be replaced periodically. The venturi pump has no moving parts. This pump only requires a periodic, thorough cleaning. See the “Maintenance” section of the manual for more maintenance details.

Filters

The vacuum system is equipped with filters to protect the pumps from debris. The standard filter has a clear acrylic bowl allowing the operator to see the contents and empty when needed. A red button on the top of the filter relieves the vacuum in the sediment bowl when pressed.

Important: There is an O-ring inside the acrylic bowl for a seal. Without this O-ring the machine will not achieve the vacuum levels as specified.

An optional auto dump sediment filter is also available. The auto dump has a pneumatically operated ball valve that will open between cycles and allow the contents to drain. This option is also available with an “Air Assist” auto dump. While the valve is open, compressed gas is released into the vacuum system to rapidly drain the sediment bowl. This option is recommended for applications where high fluid content is common. The air assist is recommended when a thick, slow flowing, fluid is present.

VENTURI VACUUM PUMP OPERATION

Start up

The venturi vacuum pump requires no specific start up procedure. However check for debris and water in the sediment bowl and the filter regulator unit before running the vacuum pump.

Operation

During operation of the A-200 machine, the vacuum pump only runs during the vacuum cycle. When the vacuum cycle begins, the vacuum valve opens to make a clear passage from the snorkels to the vacuum pump. At the same time, an electric solenoid valve opens, feeding compressed air to the venturi pump. This generates the vacuum. The vacuum level that is displayed on the vacuum switch is taken directly from the vacuum pump. Air used to generate the venturi vacuum exhausts at the bottom of the pump.

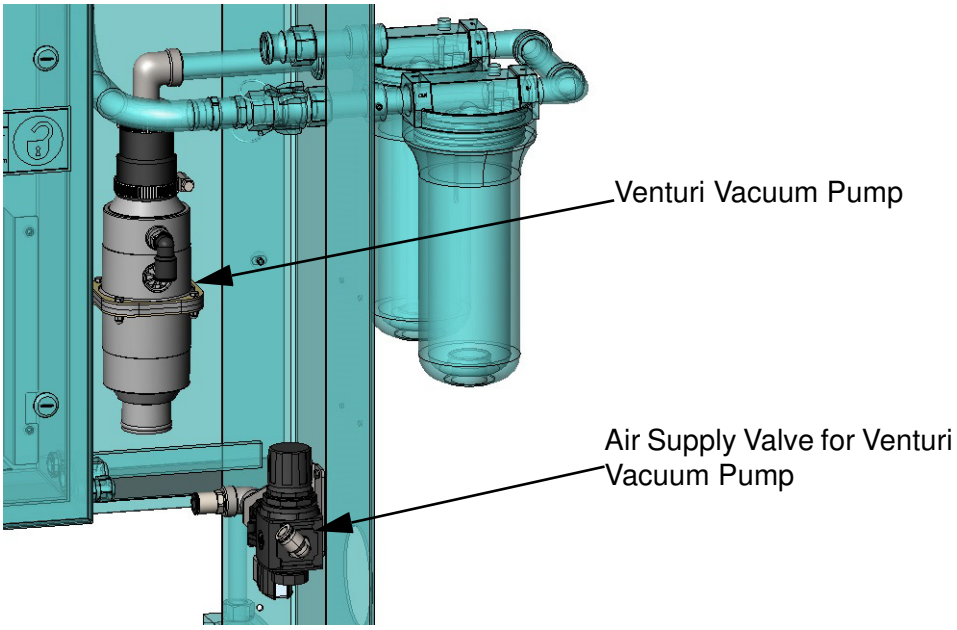


Figure 5-1. Venturi Vacuum Pump

Air Supply Valve

An air operated valve on the air supply line, is actuated at the beginning of the vacuum cycle. At the end of the vacuum cycle the air operated valve closes, stopping the air flow to the vacuum pump.

Note: In cold rooms where water is present in the air supply, icing may occur in the pump. Use clean, dry air when using this pump in cold areas.

Warning:

USE COMPRESSED AIR ONLY WITH THE VENTURI VACUUM PUMP! ASPHYXIATION HAZARD EXISTS IF OTHER GASSES ARE EXHAUSTED INTO THE MACHINE AREA.

HIGH CAPACITY VACUUM PUMP OPERATION

Start up

To start the machine, turn the Mode selector switch to Heat. This will allow the seal bar to heat and turn on the vacuum pump. The pump needs to run for fifteen to thirty minutes to warm up, this allows the pump to operate efficiently. Once the pump has been brought up to temperature the warm up period will not be necessary if shut down momentarily.

Operation

The high capacity pump can pump gases and vapors, provided that the gas ballast valve is open and the pump has reached its operating temperature. However if the environment and/or product is dry and dusty, the gas ballast should be closed to minimize contamination of the pump.

Note: All high capacity pumps are shipped with the gas ballast in the open position.

Contact CV-Tek, Inc. for important safety instructions before pumping greater than atmospheric concentrations of oxygen or other highly reactive gases.

Pumping of Non-Condensable Gases

If your process uses primarily permanent gases, the high capacity pumps can be operated with the gas ballast closed, provided that the condensation or any other form of moisture will not form.

If you do not know the composition of the gases to be pumped and if you can't rule out the possibility of condensation, run the pump with the gas ballast valve open.

Pumping of Condensable Gases and Vapors

With the gas ballast valve open and at operating temperature, the high capacity pumps can tolerate minimal condensation as indicated in the Technical Data. The pump's water vapor tolerance can be increased by raising the operation temperature.

Use a screwdriver to open the gas ballast valve. The pump is slightly louder when the gas ballast valve is open. Before opening the pump to vapors, ensure that the gas ballast valve is open and that the pump has been warmed up.

Important: Do not open the pump to condensable vapors until it has warmed to operating temperature; pumping process gas with a cold pump causes vapors to condense in the oil.

For processes with a high proportion of condensable vapors, close the intake line until operating temperature has been reached. This will prevent excessive quantities of vapor entering the pump.

One sign of vapor condensation in the pump is a rise in the oil level during operation of the pump. During pumping, vapors may dissolve in the oil. This changes the oil properties and risks corrosion of the pump. Therefore, do not switch off the pump immediately after completion of the process. Instead, allow the pump to continue operation with the gas ballast valve open and the intake line closed until the oil is free of condensed vapors. We strongly recommend operating the pump in this mode for about 30 minutes after completion of the process.

Note: In cyclic process operation, the pump should not be switched off during the intervals between the individual working phases, but should continue to run with the gas ballast valve open and the intake port closed (using a valve if possible). Power consumption is minimal when the pump is operating at ultimate pressure.

Once all the vapors have been pumped off from a process (e.g. during drying), close the gas ballast valve to improve the attainable ultimate pressure.

Shutdown

The intake port of the high capacity pump contains an anti-backflow valve, which closes the intake port when the pump is shut down, thus maintaining the vacuum in the connected system and preventing oil from being drawn back into the system. The valve's functioning is not impaired by gas ballasting.

When pumping condensable media, let the pump continue to operate with the gas ballast valve open and the intake line closed before switching off. (See "Pumping of Non-Condensable Gases" on page 75.)

When pumping aggressive or corrosive media, let the pump continue to operate even during long non-working intervals (e.g. overnight) with the intake line closed and the gas ballast valve open. This prevents corrosion during idle periods.

If the pump is to be shut down for an extended period after pumping aggressive or corrosive media or if the pump has to be stored, proceed as follows:

1. Drain the oil (See section 10 "Maintenance" for additional information.).
2. Pour in clean oil up to the bottom edge of the oil level glass (See section 10 "Maintenance" for additional information.) and let the pump run for a few minutes.

3. Then drain the oil and pour in clean oil up to the top edge of the oil-level glass (See section 10 “Maintenance” for additional information.).
4. Seal the connection ports. Special preservation or slushing oils are not necessary.

Warning:

WHEN PUMPING HARMFUL SUBSTANCES, TAKE ADEQUATE SAFETY PRECAUTIONS.

VACUUM VALVE

General Information

The vacuum valve closes off the vacuum and gas chamber from the vacuum pump and sediment bowls. The valve is an air operated valve requiring a minimum pressure of 60 PSI (4.0 bar).

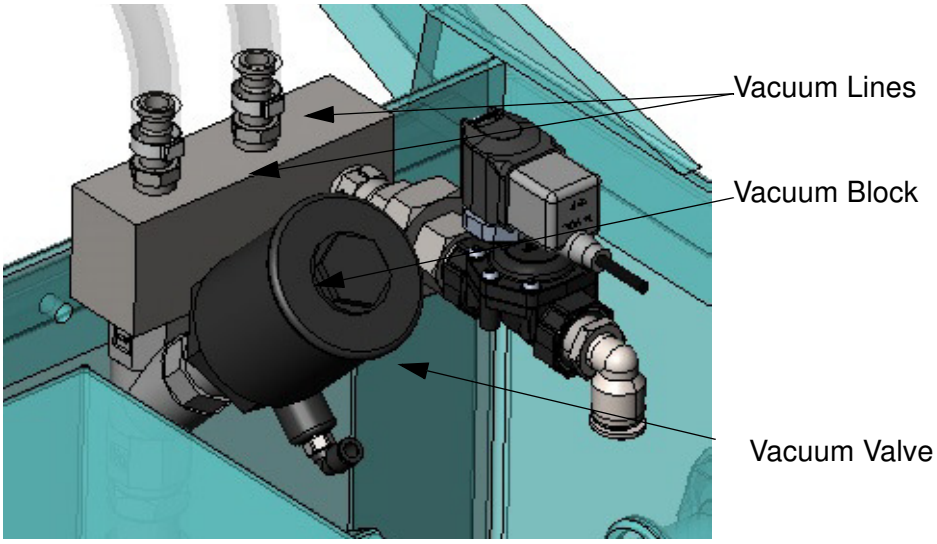


Figure 5-1. Vacuum Valve

DIGITAL VACUUM SWITCH

The vacuum switch measures the amount of vacuum being drawn. When the display changes color from green to red, the vacuum set-point has been reached.

Adjustment of the vacuum switch set points are made using the touch screen (See Section 4: Pack/Mode settings). The information below is provided to aid in trouble shooting vacuum problems or to set-up the vacuum switch in the event that replacement is necessary.

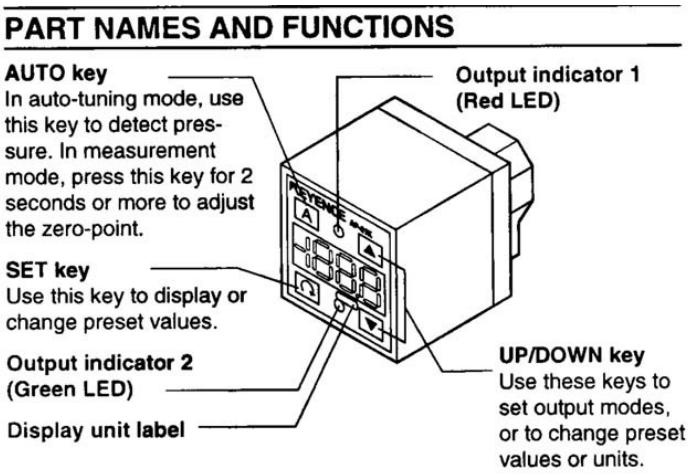


Figure 5-2. Vacuum Switch Part Names & Functions

Vacuum Switch Set-Up

1. Pressing the SET key once will display the “A” vacuum setpoint. “A” will flash alternatively with the vacuum setpoint as set through the touchscreen. It is not necessary to adjust this value.
2. Press the SET key again and “B” will flash alternatively with the switch reset vacuum value. This value is set at the factory to -5 inHg or -127 mmHg.
3. Press the SET key to return to the operating display.

Important: B must be set to a lower vacuum level than A

Note: The LOW vacuum switch setting (B) is only used for the final vacuum step in the VAC-GAS-VAC pack mode. The HIGH vacuum switch setting (A) is used for all other vacuum switch pack settings.

Important: If after setting “B” and pressing the SET key “C” flashes on the display, the factory presets are incorrectly set. Program the factory presets to correct this issue.

Factory Presets

Hold the SET key for 5 seconds to display factory preset values. These settings determine display and control properties for the vacuum switch. Tap the SET key to scroll through the five parameters. To change the parameters press the UP or DOWN keys.

Note: The first setting to appear is the “UNIT” setting. This could be set to one of four presets. In the United States the machines default setting is “inch” for inHg. Outside the U.S. the default is “Std” for mmHg. Other available units are “PA” for kPa and “bAr” for Bar.

The factory settings are as follows:

1. INCH or STD (kPa or bAr)
2. F-3
3. NO
4. 2.5
5. 2-C

Vacuum Switch Relief Valve

On A-200 machines with rotary vacuum pumps, a vacuum relief valve is used. This valve opens to atmosphere to relieve the vacuum pressure in the vacuum line running to the switch, allowing the vacuum switch to reset. This valve is typically mounted near the vacuum pump intake port.

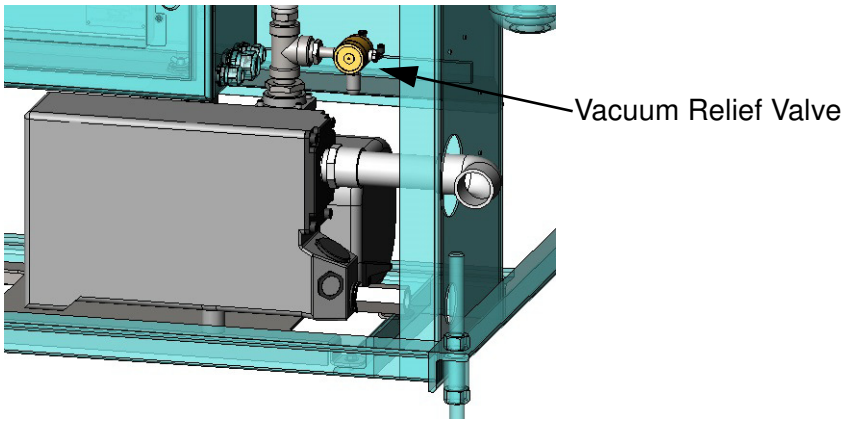


Figure 5-3. Vacuum Switch Relief Valve in Standard Configuration

Machines with a venturi vacuum pump do not have a relief valve. The vacuum line to the vacuum switch connects directly to the venturi vacuum pump, automatically relieving the vacuum pressure when the pump is shut off between cycles.

FILTER SYSTEM

General Information

The A-200 is equipped with a sediment/ filter bowl system to prevent debris and fluids from entering the vacuum pump. Three types of filter systems are used.

1. Standard Filter
2. Prefilter System
3. Auto Dump System

Standard Filter

The standard filter system on the A-200 consists of a single sediment bowl and a single filter bowl mounted on the left side of the stand. The sediment bowl captures liquid while the second bowl traps solid particles. The filter bowl contains a 5 micron FDA-compliant polypropylene cartridge (P/N 165K421). A 1 micron filter (P/N 5165K21) is available upon request.

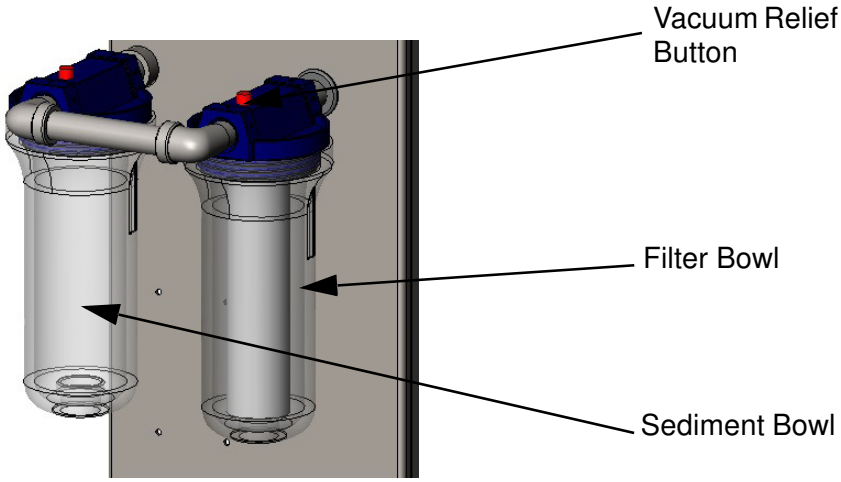


Figure 5-4. Standard Filter Sediment Bowl

To empty either bowl on the A-200, turn the machine off to stop the vacuum pump. Press the red vacuum relief button on top of the sediment/ filter bowl cap. Turn the bowl to the counter-clockwise to remove

the bowl, empty the contents and remount the bowl. Make sure the O-ring is in place on the sediment bowl.

Warning:

DO NOT LOSE THE O-RING ON THE SEDIMENT BOWL! WITHOUT THE O-RING THE MACHINE WILL NOT PRODUCE ADEQUATE VACUUM.

Prefilter System

The prefilter option provides an additional set of filter bowls upstream of the vacuum block. This prevents debris from entering the vacuum valve. This type of configuration is ideal for applications packaging powder or any small particle product.

The prefilter system uses the same sediment bowls as the standard filter system. Follow the instructions from the standard filter system to empty the contents of the sediment bowl.

Auto Dump System

The auto dump system uses two sediment bowls in series. This type of configuration is ideal for applications in a wet environment and packaging products containing liquid or marinades.

The first sediment bowl has an air operated ball valve mounted to the bottom of the bowl. This valve opens during the seal cycle allowing the contents to empty from the bowl every cycle. The second sediment bowl contains a filter cartridge.

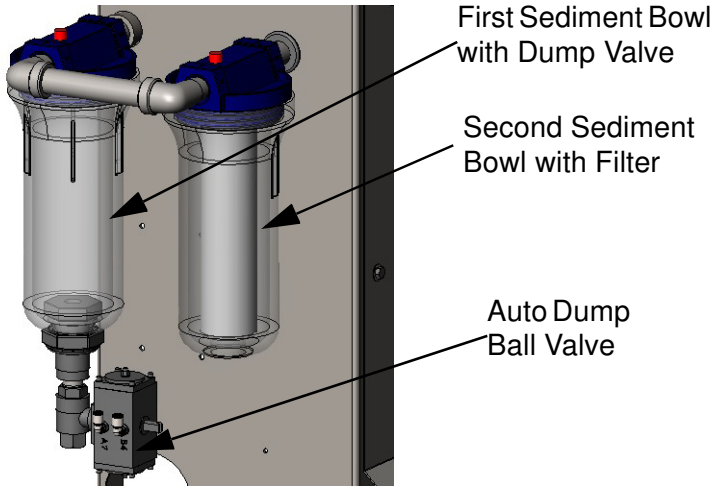


Figure 5-5. Auto Dump System

When packaging slow flowing liquids, such as salad dressings, an air assist auto dump is available in this same configuration. The air assist releases compressed air into the filter system, pressurizing the sediment bowl rapidly expelling the liquid.

SECTION: 6

GAS SYSTEM

GAS FLUSH SYSTEM

Important: Do not connect compressed air to the accumulator tank. Compressed air may be contaminated and is not a modified atmosphere gas.

Warning:

APPLICATIONS USING OXYGEN REQUIRES SPECIAL "OXYGEN CLEAN" COMPONENTS. CONSULT WITH YOUR CV-TEK REPRESENTATIVE FOR FURTHER DETAILS.

General Information

The gas system utilizes an accumulator tank, gas sensor and gas valve. Gas is supplied to the machine and controlled by timers in the PLC program. These timers can be adjusted through the operator interface. See section 4 "Mode and Pack Settings" for additional information on adjusting the timers.

Determining Gas Time

For each pound of product a certain amount of gas, in cubic inches, is required to backflush into the bag. After determining the type of cycle the machine will run, cycle an empty bag and check the final gas amount in the bag. Adjust the timers accordingly. If more gas is needed, increase the gas timers. If less is needed, decrease the timers.

To check the amount of gas, follow the instructions below:

1. Place the bag on a flat surface and place another flat object on top of the bag, i.e. a sheet of card board, parallel to the lower flat surface. This will sandwich the bag.
2. Measure the distance between the two flat objects, the length and width of the bag.
3. Multiply these dimensions to determine the volume in the bag.
4. Compare this amount to the amount required.

Consult a CV-Tek representative for the amount of gas per pound required for your application.

Accumulator Tank

The standard accumulator tank has a 2-1/2 gallon (9.5 L) capacity. The accumulator tank provides for a quicker flow of gas into the bag. Gas supply lines feeding several machines or supply lines travelling long distances may have inconsistent gas flows.

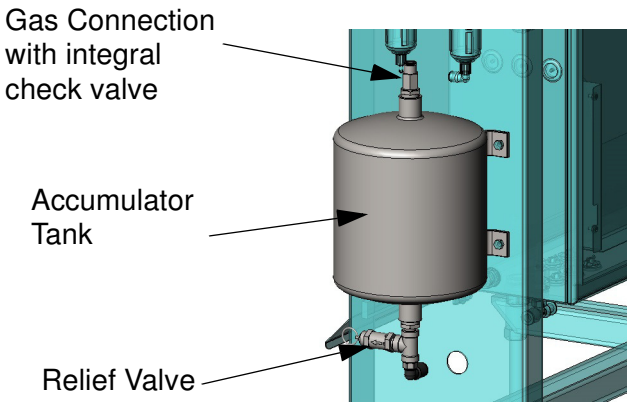


Figure 6-1. Accumulator tank

The gas supply is attached to the top of the accumulator tank where there is a check valve. A pressure relief valve is located on the bottom of the tank. The relief valve will open when the gas pressure exceeds 150 PSI (10.2 bar).

To service the gas system, shut off or disconnect the supply hose and bleed the gas from the tank by pulling the ring on the relief valve.

Gas Pressure Sensor

The gas pressure sensor is located in the bottom of the electrical enclosure, on the rear of the machine. The gas line runs from the accumulator tank through a tee fitting on the gas pressure sensor. The purpose of this sensor is to prevent the cycling of the machine when there is inadequate gas pressure. The sensor only functions when the selected pack setting requires gas. Input from the gas sensor is ignored when pack settings do not require gas.

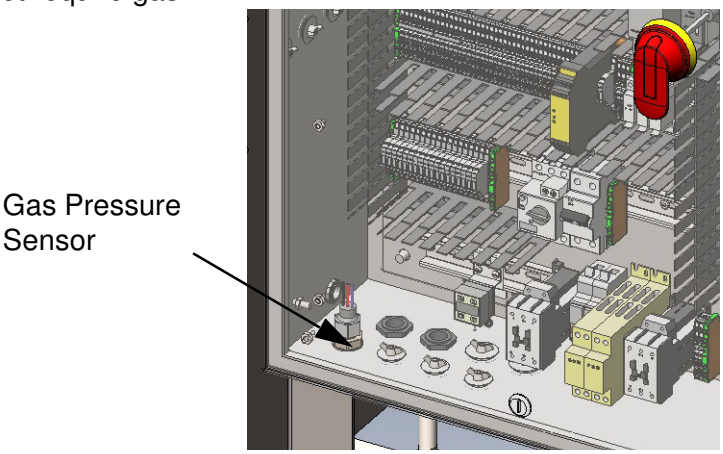


Figure 6-2. Gas Sensor Location

Gas Valve

The gas valve is an electric solenoid valve on the back of the machine next to the vacuum valve. This valve does not have any form of mechanical override. The gas valve assembly may appear different than shown in Figure 6-3 due to the many options available on the A-200. The gas valve is located in the same area in all cases.

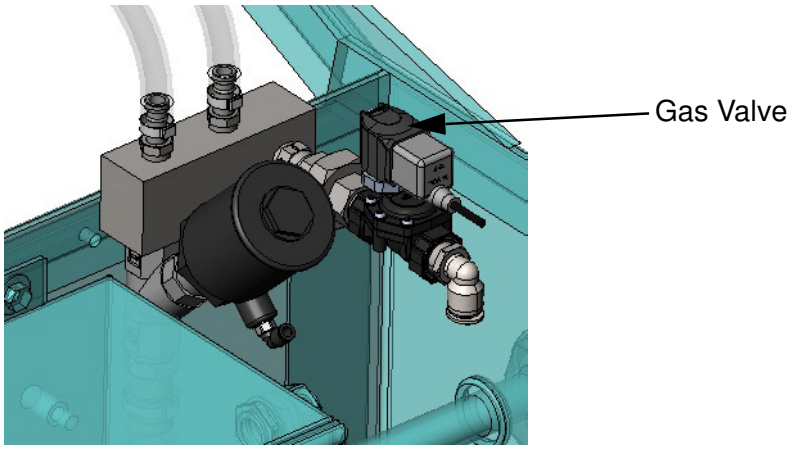


Figure 6-3. Gas Valve

SECTION: 7

SEAL SYSTEM

HEAT SEAL ADJUSTMENTS

Heat Sealing Plastic Film is a function of:

1. Pressure
2. Dwell
3. Temperature
4. Flatness of Film

Pressure

The air pressure is controlled by the main regulator. The pressure should be set at 80 PSI (5.4 bar). As the machine is cycled, the pressure should not drop by more than 5 PSI (0.3 bar). Should the gauge show a greater pressure drop than this, check your air supply.

Dwell

The heat seal dwell is controlled by the SEAL TIME preset in the operator interface. See Section 4 for more information on adjusting the timer. It is important to adjust this time to at least 2.50 seconds for most films as this allows for heat penetration through wrinkles and contamination. It is more desirable to increase the dwell time before increasing the temperature set-point on the controller to get the desired seal integrity.

Temperature

Temperature of the heat seal bar is controlled by the temperature controller. Temperature should be set between 250 and 300° F (121 and 149° C) depending on the film. See the Temperature Controller instructions in this section for more information on adjusting the setpoint temperature.

Warning:

THE HEAT SEAL BAR BECOMES VERY HOT DURING OPERATION. AVOID CONTACT OR SERIOUS BURNS WILL OCCUR.

Flatness of Film

It is important to place the bag on the manifold as wrinkle free as possible to minimize leaks. The more wrinkles, the more potential for leaks. Use bag stretchers whenever possible. Check that the box and bag do not move after positioning the bag on the manifold. Be sure the load conveyor is level.

Setpoint Adjustment

To adjust temperature setpoint, press the ↩ key (4th key on bottom). Now tap the △ or ▽ keys until the desired setpoint is reached. Press ↩ again to return to the operation display.

By adjusting the setpoint up or down, seal quality can change dramatically. We recommend that any adjustments be made in 5° F increments. After altering the temperature setpoint (green value on display), let the temperature process value (red value on display) stabilize before attempting to seal bags and test seals. The SP ^ output LED on the temperature controller is

on whenever power is supplied to the heating element. The LED flickers as temperature approaches setpoint.

Note: Initially set temperature at 270° F for testing. Satisfactory seals usually occur between 250° F and 300° F (121 and 149° C).

6100 TEMP CONTROL SETUP AND ADJUSTING

Operation Display

- Upper Display: Actual Temperature (red)
- Lower Display: Setpoint Temperature (green)
- Lower Display: “OPEN” indicates thermocouple break
- Lower Display: “[HH]” indicates input sensor fault (overrange)
- Lower Display: “[LL]” indicates input sensor fault (underrange)

Note: When actual temperature is 5 deg. F or more below setpoint, the low temperature alarm is on. For input sensor fault, check that the thermocouple is type K (red =+, yellow = -). Red to terminal 1, yellow to terminal 2.

Figure 7-1. 6100+ TEMP. CONTROLLER

As factory-configured by CV-Tek, the red △ LED to the right of the lower dis-play will light when the controller calls for heat. The ALM LED in the lower display will light when the actual heater temperature (upper display) is lower than the setpoint by 5 deg. F or more.

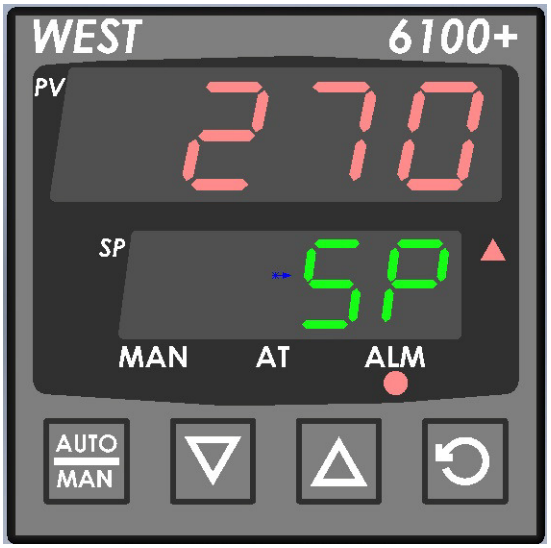


Figure 7-2. 6100+ SETPOINT ADJUSTED TO 270 DEG. F

Program Menu Entry

From the operation screen, hold the ↩ key and press the △ key to enter the operator menu. From the operator menu, press the ↩ key to return to the operation screen, or from the operator menu, press the △ or ▽ key to scroll through 9 other menus before wrapping back around to the operator menu.

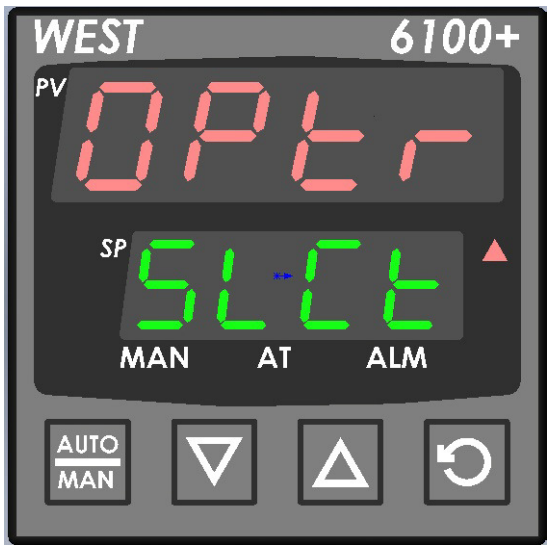


Figure 7-3. 6100+ Operator Menu

Figure 7-4. 6100+ Configuration Menu

Configuration Menu Unlock Code

Several of the program menus require an “Unlock Code” to be entered before access is given to view/ change the parameters. The Configuration Menu unlock code is “20”. So with the Configuration Menu entry screen showing, press the ↵ key to select entry and enter “20” for the unlock code “ULoc”.

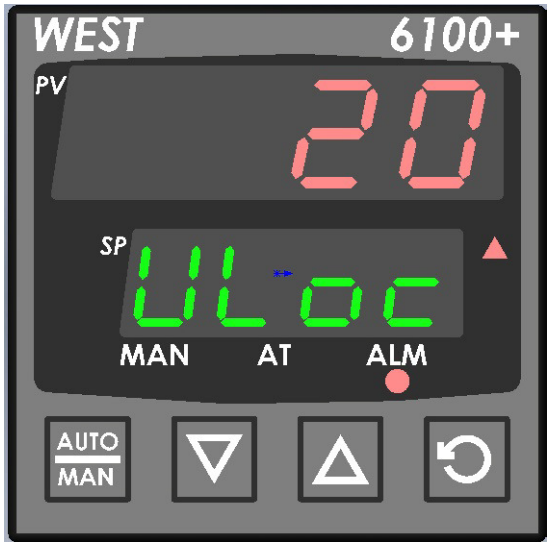


Figure 7-5. 6100+ Configuration Menu Unlock Code

Configuration Menu Parameter Access

Pressing the ↩ key after the Unlock code 20 is entered will get you into the Configuration mode parameter list. With an unconfigured controller, Configuration menu parameters must be set before all other menus. Each parameter is in green on the lower display. The current setting is in red on the upper display. Press the ↩ key to scroll through the list. You can only scroll from top to bottom through the list. Pressing ↩ again at the end of the list wraps around to the first display parameter.

Press the ▽ or △ keys to change parameter settings. Hold the ↩ key and press △ to return to the program menu.

Table 7: Configuration Mode Parameters

Parameter	lower display	Description	CV-Tek setting
Input type	InPt	type K thermocouple, deg. F	kF
Scale Range Upper Limit	ruL	hi limit 400 deg. F	400
Scale Range Lower Limit	rLL	low limit 32 deg. F	32
Control Type	CtyP	primary only	SnGL
Control Action	CtrL	reverse acting	rEv
Alarm 1 type	ALA1	NA	nonE
Alarm 2 type	ALA2	deviation alarm	dE
Deviation alarm 2	dAL2	low temp. 5 deg. F below SP	-5
alarm 2 hysteresis	AHY2	1 deg. F	1
Loop alarm	LAEn	disabled	diSA
Alarm inhibit	Inhi	no alarms inhibited	nonE
Output 1 usage	USE1	primary power	Pri
Output 2 usage	USE2	alarm2 - direct acting	A2_d
Output 3 usage	USE3	recorder process value	rEtP
Linear output 3 range	typ3	0-5 volts DC	0_5
Linear output 3 scale max	ro3H	420 deg. F = 5 VDC	420
Linear output 3 scale min	ro3L	0 deg. F = 0 VDC	0
Display Strategy	diSP	adjustable PV & SP	1
Configuration Lock code	CLoc	lock code	20

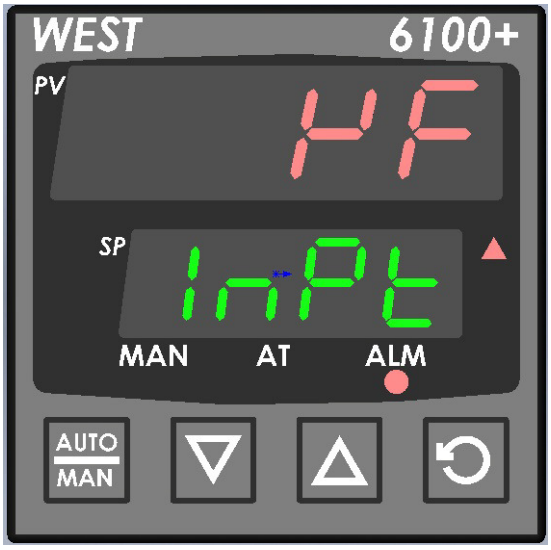


Figure 7-6. 6100+ Configuration Menu first parameter (type K thermocouple input)

Setup Menu Unlock Code

Several of the program menus require an “Unlock Code” to be entered before access is given to view/ change the parameters. The Setup Menu unlock code is “10”. So with the Setup Menu entry screen showing, press the ↵ key to select entry and enter “10” for the unlock code “ULoc”.

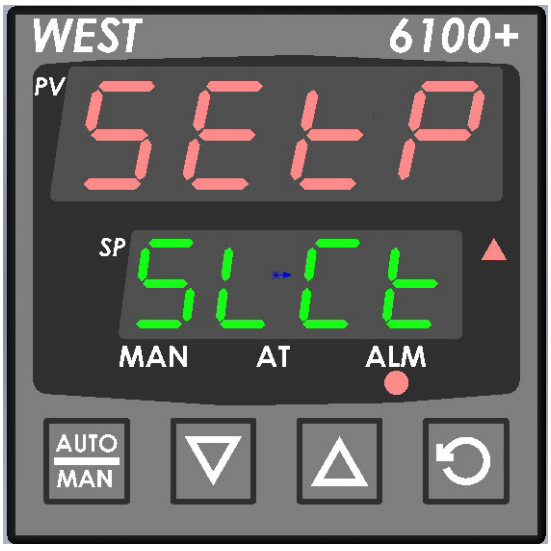


Figure 7-7. 6100+ Setup Menu

Setup Menu Parameter Access

Pressing the ↵ key after the Unlock code 10 is entered will get you into the Setup mode parameter list. Each parameter is in green on the lower display. The current setting is in red on the upper display. Press the ↵ key to

scroll through the list. You can only scroll from top to bottom through the list. Pressing ↵ again at the end of the list returns to the operation display.

Press the ▽ or △ keys to change parameter settings. Hold the ↵ key and press △ to return to the program menu.

Table 8: Setup Mode Parameters

Parameter	lower display	Description	CV-Tek setting
Input Filter Time Constant	Filt	2.0 seconds	2.0
Offset	OFFS	none	0
Power Level	PPjj	read only	NA
Primary Proportional Band	Pb_P	Band (deg. F)	8.0
Automatic Reset	ArSt	Integral time (s)	5.00
Rate	rAtE	Derivative time (s)	1.15
Manual Reset	biAS	25%	25
Setpoint Upper Limit	SPuL	400 deg. F	400
Setpoint Lower Limit	SPLL	32 deg. F	32
Power Limit	OPuL	100%	100
Output 1 Cycle time	Ct1	0.5 seconds	0.5
Deviation alarm 2	dAL2	low temp. 5 deg. F below SP	-5
alarm 2 hysteresis	AHY2	1 deg. F	1
Autopretune	APt	disabled	diSA
Manual Control	PoEn	disabled	diSA
Setpoint Ramping	SPr	disabled	diSA
ramp value	rP	NA	OFF
setpoint value	SP	270 deg. F or as required	270
Setup menu lock code	SLoc	lock code	10

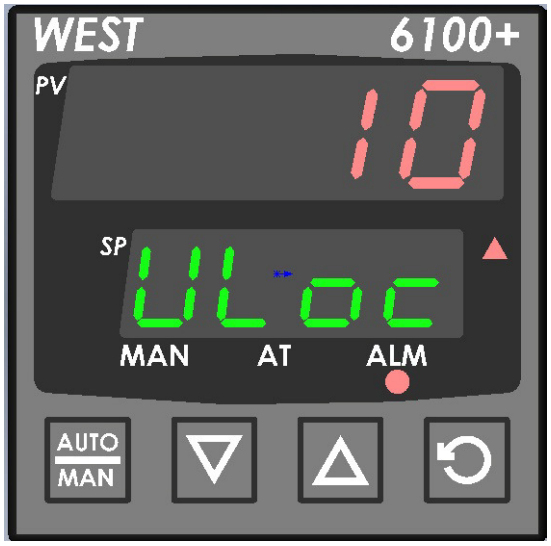


Figure 7-8. 6100+ Setup Menu Unlock Code

Table 9: Program Menus Select

Program Menu	upper display	Description	Unlock code
Operator	OPtr	select to return to Oper. screen	none
Setup	SEtP	Setup and PID parameters	10
Configuration	ConF	Configuration parameters	20
Product Information	info	All read only	none
Autotuning	Atun	Autotune start	0

Other Program Menus

From the operation screen, hold the ↩ key and press the △ key to enter the operator menu. From the operator menu, press the ↩ key to return to the operation screen, or from the operator menu, press the △ or ▽ key to scroll through 9 other menus before wrapping back around to the operator menu.

Autotuning

Due to the different characteristics of heater elements, the temperature controller may “overshoot” the temperature setpoint. If the temperature repeatedly overshoots the setpoint and affects the quality of the seal an “Autotune” may be necessary.

Autotune ‘teaches’ the controller the main characteristics of the process and ‘learns’ by cycling the output on and off. The results are measured and are automatically programmed in the controller memory.

Pretuning starts with the heater element cold, tuning occurs during warm-up, preventing overshoot.

Autotune Instructions

With the heater element cold, power up the machine. From the operation screen, hold the ↺ key and press the △ key to enter the operator menu. From the operator menu, press the △ or ▽ key to scroll to the Autotune menu.

From the display “Atun” press the ↺ key. With “Ptun” shown in the lower display, tap the △ key to turn autotune ON.

Note: Autotune will not engage if actual temperature is within 5% of the input range span or 20 deg. F or less from the setpoint. CV-Tek recommends tuning at SP = 270 deg. F

The tune program will now start. As long as the “Ptun” parameter is set to ON, autotune is still running. When the tune program is complete, new PID values are automatically entered in the Setup menu. The process temperature will rise to the setpoint and control should be stable. “Ptun” will reset to OFF after a successful autotune.

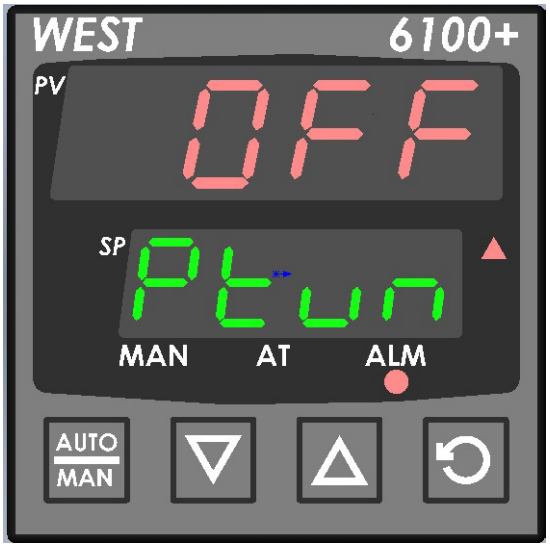


Figure 7-9. 6100+ Autotune DISABLED or DONE

Cycle Time

The CV-Tek heater control device is a solid state relay and a 0.5 sec-ond cycle time is pre-configured. Cycle time (Ct1) preset in the Setup menu is set to 0.5 in the factory settings list.

A cycle time of 0.5 means that the minimum time the solid state relays can cycle on, off, then back to on is 0.5 seconds. When connected properly, the RELAY ON LED on each solid state relay will light whenever the SP ^ output LED of the controller is on.

Factory Settings

The controller has two modes, program mode and operating mode. When in program mode the controller can be programmed with settings and functions to suit the application. When in operating mode the controller uses the settings and functions entered in the program mode to control the application and also displays the process variable and setpoint temperatures. The 6100+ temperature controller is set up for the main setpoint output (SP1) to be a solid state relay driver. The SP1 output is 10 VDC, actuating the solid state heater relays whenever the controller is calling for heat.

Menu parameters outside the Configuration and Setup menus should never need to be changed.

A complete manual can be downloaded off the Web at www.west-cs.com for the type 6100+ (59300-4) temperature/ Process Controller.

Changes to Factory Settings

Factory settings allow the operator to change the temperature setpoint. To lock the setpoint, change the diSP setting in the Configuration menu from 1 to 6. Use the ⏶ key to increase the parameter from 1 to 6. With the 6 flashing, press the AUTO MAN key to accept the change. Now all setpoint changes must be made in the Configuration menu via the SP parameter.

Factory settings also show temperature units in deg. F. To show deg. C, change your inPt setting in the Configuration menu from kF to kC. Press the ⏷ key once to change kF to kC. With kC flashing, press the AUTO MAN key to accept the change. New scale limits must also be entered in the Config. menu. Change the rUL setting to 204 and the rLL setting to 0. A new low temperature alarm deviation must also be entered in the Config. menu. Change the dAL2 setting to -3. New retransmit limits must also be entered. Change the ro3H setting to 215 and the ro3L setting to -18.

As factory-configured by CV-Tek, the SP ^ to the right of the lower display will light when the controller calls for heat. The red ALM LED in the lower dis-play will light when the actual heater temperature (upper display) is more than five (5) F from reaching the setpoint.

HEAT SEAL TESTING

Seal quality is a function of time, pressure and the bar temperature. The seal time parameter located on the operator interface controls the length of time the seal bar applies pressure to the bag. This parameter can be different for pack 1, 2, 3 and 4.

With the sealing manifold at the setpoint temperature, load an empty bag on the machine and start a cycle in SEAL mode. After the cycle is complete, inspect the seal. If the seal is weak, increase the dwell time. If the seal appears to be burning through or distorting the film, but the seal is bonded, decrease the time. Repeat this procedure until the optimum setting is achieved. Satisfactory seals usually occur at 2.5 to 3.5 seconds seal time. If this cannot be achieved, you may increase the temperature setpoint and repeat the test.

Start the controller setting at 250◦ F and slowly raise the setpoint in 5 degree increments as you examine the seals. When seals start to bubble or burn through, back off the temperature, allowing time for cool down before testing another seal.

After your machine has completed its cycle, check the quality of the heat seal. It is essential that you allow the seal to cool completely before testing it.

BEGIN BY INSPECTING THE SEAL VISUALLY. Does the seal appear to be uniform? Does it have a texture similar to that of the Teflon Tape? Does the seal appear to be “hot enough” (sealed well enough to bond both sides of bag securely)? Look for signs of cold spots (sections where seal is visibly inferior in comparison to majority of seal). Look for “hot spots” (sections where seal is visibly burned in comparison to majority of seal). If isolated hot spots or burns are visible in the bag, inspect the seal bar for damage to the teflon tape.

GIVE SEAL A “TUG TEST”. Pull on both sides of bag, starting at one end and working your way to the other, with a moderate amount of force, trying to separate seal. Is the seal strong and uniform from end to end?

Look for weak areas, where the bag seal separates, due to lack of heat. Look for fold overs and wrinkles. Look for weak areas where the bag tears at the seal caused by too much heat.

TEST SEAL AT BOTH ENDS IN CORNERS. Use a dull pointed tool, like a pen or pencil to probe at the seal. Does the tool break through the side, or edges of the bag before it penetrates the corners of the seal?

MOST OF YOUR SEALING PROBLEMS CAN BE CORRECTED BY ADJUSTING TEMPERATURE AND/OR HEAT SEAL DWELL TIME.

For more information on heat seal problems, causes and corrections, see the TROUBLESHOOTING section of this manual.

HEAT BAR COMPONENTS

Heater Element

A tubular resistance type heating element inside of the seal bar is continuously cycled to maintain a constant seal bar temperature. The power is connected to the elements with quick disconnects. The disconnects are water tight to prevent water from entering and shorting out the element. Always disconnect the main power supply to the machine before disconnecting the heater connections. Also note that elements are stamped with the voltage matching the voltage listed on the serial tag of your machine. This stamp is located on one end of the element tube between the bend and the power cable.

Thermocouple

The thermocouple senses the heat seal bar temperature and sends a signal back to the temperature controller. The connection is accessible through a cutout just off-center of the rear manifold. A bayonet cap is wound on a spring at the sensing end of the thermocouple. The cap should be wound back on the spring at least 2” (50.8mm) so when the cap is screwed into the adapter connection on the bar, the thermocouple makes positive contact with metal.

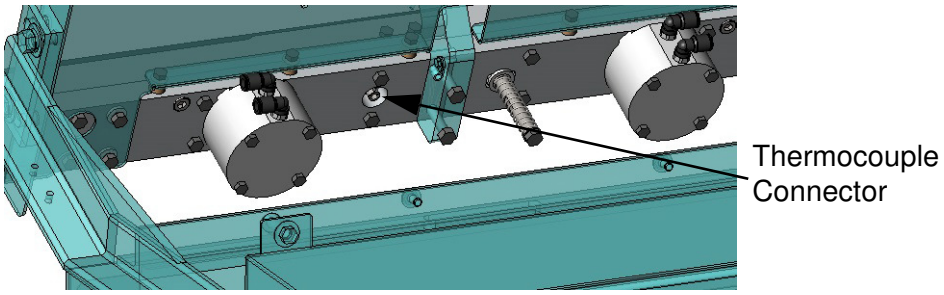


Figure 7-10. Thermocouple Connection

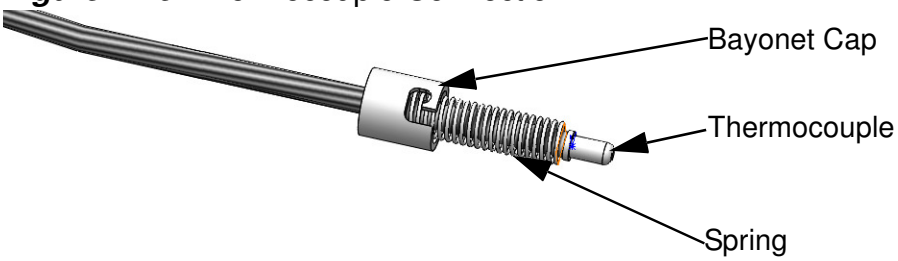


Figure 7-11. Thermocouple Removed from Seal Bar

Without the thermocouple positive connection in place, the controller cannot sense the actual bar temperature. The controller will heat the bar constantly and to extreme temperatures.This will warp the heat seal bar causing uneven sealing of bags and requiring bar replacement.

The thermocouple wire is type K. Yellow is considered positive and red is negative. The controller is configured to accept the type K thermocouple signal.

Teflon Tape

One layer of Teflon tape is required on the heat seal bar to prevent film from sticking. Tape is usually black in color and should not have any visible damaged areas. Damaged tape will adversely affect the sealing performance of the A-200.

Important: More than one layer of teflon tape will affect the quality of the seal.

Some bars are plasma coated with teflon at the factory and do not require taping. If the coating on these bars becomes damaged, the bar needs to be recoated or taped over the plasma coating. Plasma coated bars can be sent back to CV-Tek for recoating.

Pancake Cylinders and Pushers

The heat seal bar floats in the lower manifold between an upper and lower sponge rubber that grips the film. When the heat seal bar extends, it pushes out farther than these sponge rubbers and sandwiches the film between the hot bar and the backup rubber in the upper manifold, forming a seal.

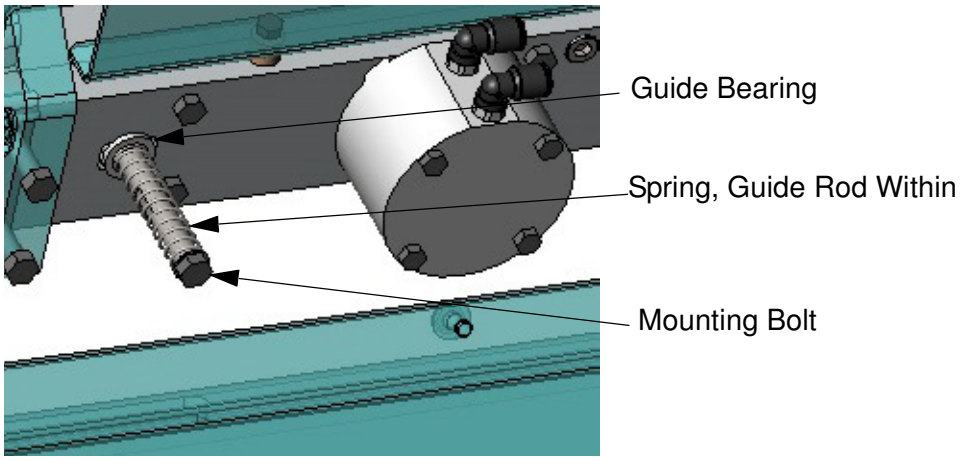


Figure 7-12. Seal Bar Guide Rod

The guide rods, bolts and springs that hold the heat seal bar are accessible from the backside of the lower manifold. The bushings that go through the manifold openings act as bearings for the guide rods and must be in place so the bar stays centered in the manifold opening. The springs keep the bar in the retracted position until the pancake cylinders push out on the back of the bar, extending it and compressing the springs.

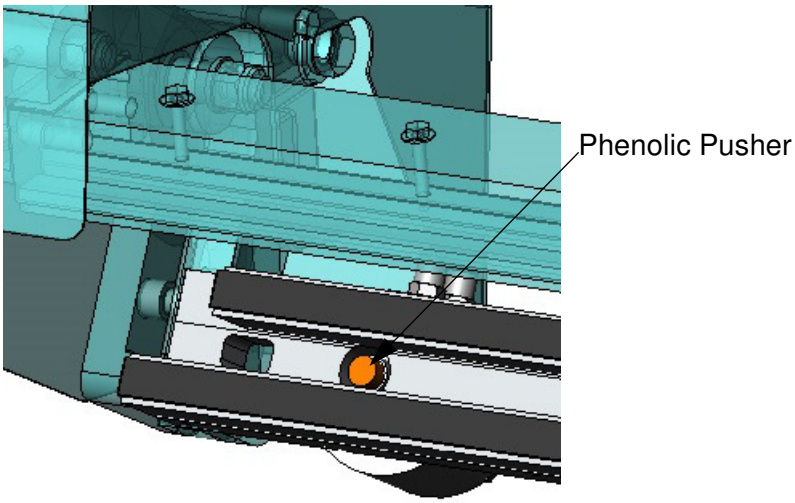


Figure 7-13. Pancake Cylinder Pusher (Heat Bar removed)

The pancake cylinders are actuated only for the heat seal dwell time. Valve 5 in the pneumatic valve bank actuates the cylinders. Phenolic pushers are inserted on the pancake cylinder rod ends that push against the heat seal bar. There should be a 1/8” (3.2 mm) gap between the back of the heat seal bar and the inside face of the rear manifold. Replace worn pushers when this gap is less than 3/32” (2.4 mm).

Severely worn pushers will cause the heat bar to transfer heat to the manifold and the bar will be cooler in that area.

SECTION: 8

BAG STRETCHERS

BAG STRETCHER CONFIGURATIONS

General Information

Bag stretchers are used to hold the bag in the manifold while the operator starts the cycle. A straight and wrinkle free seal is produced due to the manner in which the bag is held.

Standard Bag Stretcher

The standard bag stretcher holds one bag at a time during a cycle. The left hand stretcher expands the distance between the stretcher fingers holding the bag in place. Both bag stretcher fingers are adjustable to accommodate various bag widths.

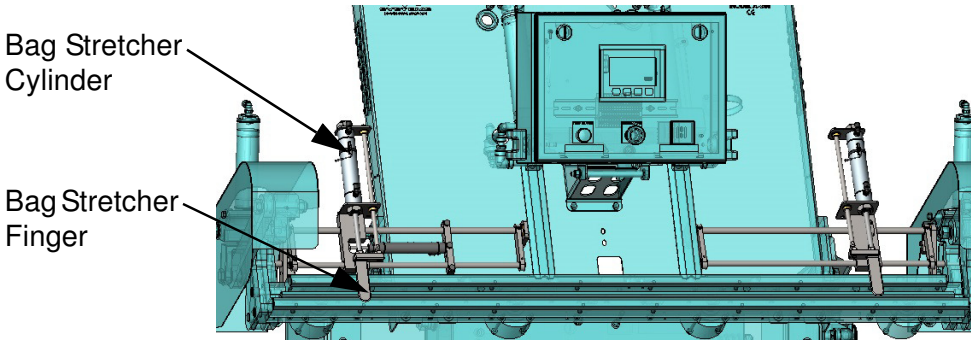


Figure 8-1. Standard Bag Stretchers (Front Manifold removed for clarity)

Double Bag Stretcher

The double bag stretcher option can be used for bag sizes too small to be accommodated by the standard bag stretcher. The double bag stretcher allows two packages to be run simultaneously. On the double bag stretcher, both the left and right outboard bag stretcher assemblies expand. These work in conjunction with inboard “fixed fingers” near the center pivot. The inboard fixed fingers do not extend and retract as the outboard fingers do.

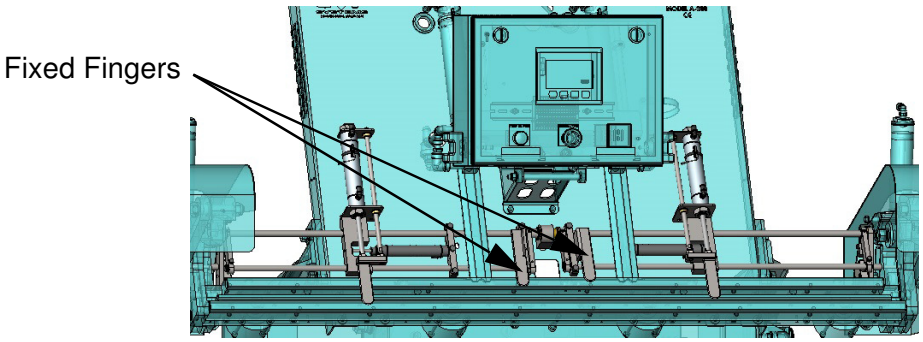


Figure 8-2. Double Bag Stretchers (Front Manifold removed for clarity)

Multiple Bag Sizes

Should it be necessary to run multiple size bags, CV-Tek offers an adjustable bag stretcher adapter (p/n B-7707-3266). This adapter may be mounted to the left, right, or both bag stretcher assemblies. Multiple mounting options offer a high degree of flexibility to accommodate most bag size combinations.

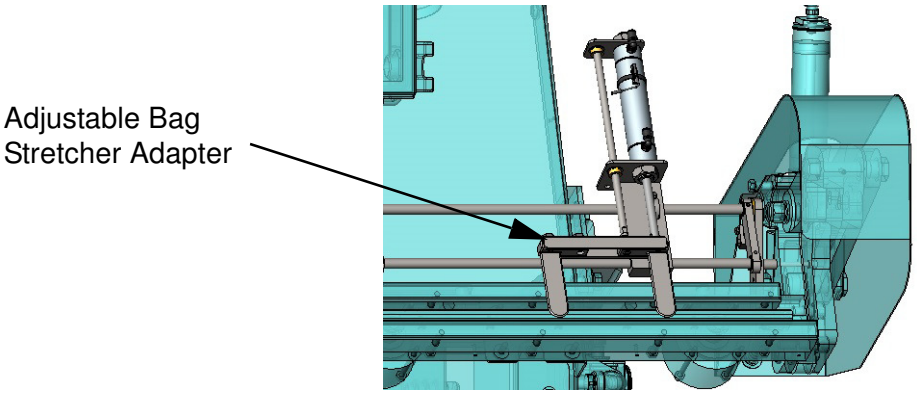


Figure 8-3. Adjustable Bag Stretcher Adapter

ADJUSTING THE BAG STRETCHERS

Adjusting For Bag Width

The width of the single and double bag stretchers are easily adjusted. The stretcher mechanisms are mounted to two rods that allow linear movement when the stretchers expand. To expand and hold the bag a cylinder mounted to a fixed block extends, sliding the left hand bag stretcher mechanism. The right hand bag stretcher mechanism is adjustable, but is locked in a fixed position during operation. The following explains how to adjust the bag stretchers to different bag sizes.

1. On the left hand mechanism loosen the two (2) hex screws on the fixed block that the expanding cylinder is attached to. This will require a 7/16” wrench or socket.

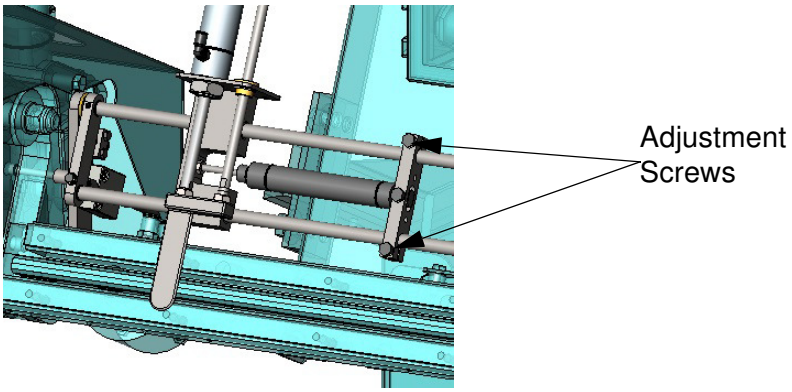


Figure 8-4. Adjusting the Left Hand Bag Stretcher

2. On the right hand mechanism, using a 9/64” allen wrench, loosen the socket head screw on the collar mounted to the top rod within the slide block.

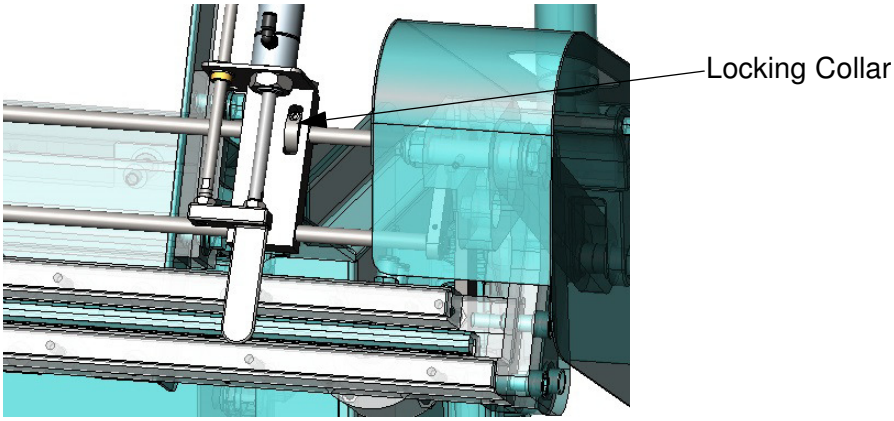


Figure 8-5. Right Hand Bag Stretcher

3. Press the left hand stretcher finger to expand the stretcher.
4. Hold the bag up to the stretchers and slide the stretchers to hold the bag. With the bag being held by the stretcher fingers center the bag to the manifold. Remove the bag and expand the fingers 1/2” (12.7 mm) wider than the bag opening. This will accommodate tolerances in the bag width.
5. Tighten the two hex screws and the shaft collar to lock the stretcher mechanisms in place.
6. Reset the machine and test the bag stretchers.

Adjusting the Spring Plunger

The bag stretchers are held off the manifold rubber by spring loaded spring plungers. There are two pins total on a machine with bag stretchers. The pins are located on the pivot bars mounted to the pivot clamps. In time, this pin will need to be replaced.

To remove the worn spring plunger, loosen the jam nut with a 1/2” wrench and back the spring plunger out of the block. Thread a new pin into the block until the bag stretcher bars are approximately 1/2” (12.7 mm), or a fingers width, above the manifold. Once adjusted, tighten the jam nut on the spring plunger to hold in position. Test the bag stretchers for proper activation.

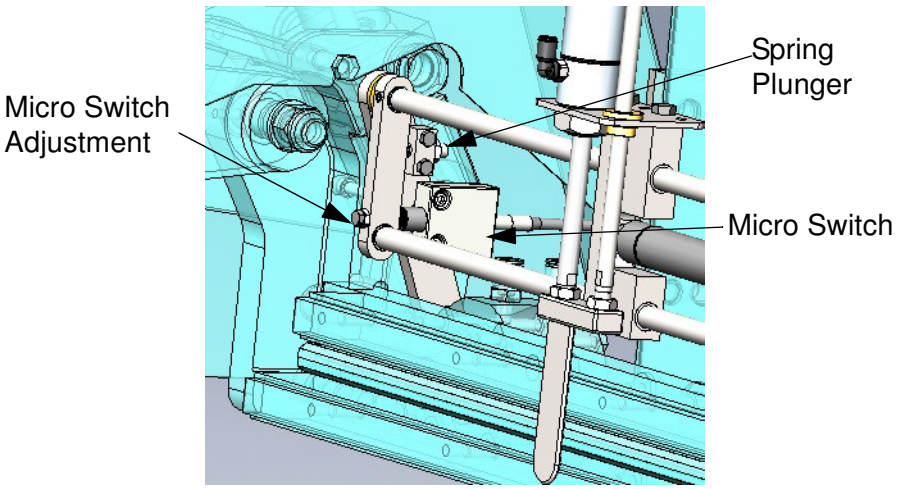


Figure 8-6. Spring Plunger and Micro Switch

Adjusting the Micro Switch

The micro switch is mounted next to the spring plunger on the left hand pivot bar. Single Bag Stretchers have one micro switch located next to the left hand spring plunger and double bag stretchers have two micro switches, one next to each spring plunger. A screw mounted in the swing arm above the micro switch actuates the switch to expand the bag stretchers.

To adjust the screw, loosen the jam nut with a 7/16” wrench. The screw should be easily turned by hand, but if not a wrench can be used. The screw should be adjusted to actuate the micro switch as the stretcher bars touch the rubber on the manifold. Improper adjustment will cause the stretchers to expand prematurely, or not at all. Retighten the jam nut to lock the screw in place.

Adjusting the Cylinder Position Switches

The cylinder position switches are located near the top of the bag stretcher cylinders and are activated when the bag stretcher bars are retracted. A red LED illuminates when the switches are activated. The cylinder position switches on both bag stretchers cylinders must be activated for the machine to proceed to the seal stage of the cycle, otherwise a STRETCHER FAULT will occur.

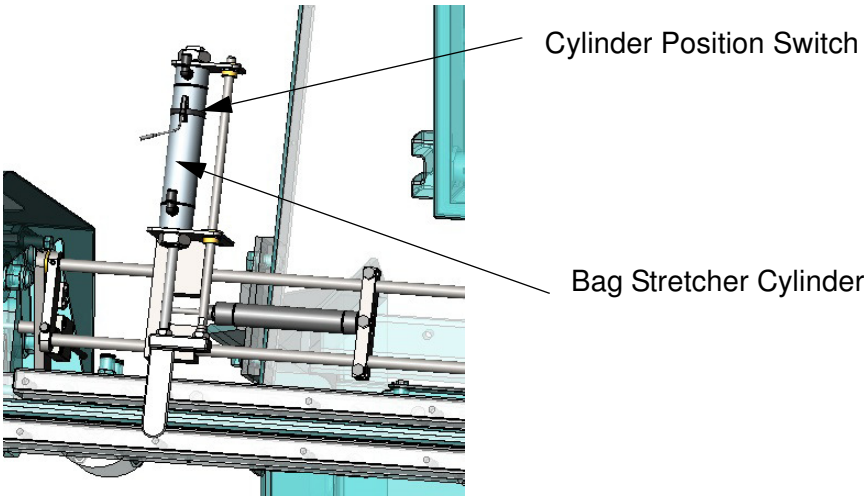


Figure 8-7. Bag Stretcher Cylinder Position Switch

The bag stretcher cylinder position switches are wired in series, requiring both to be activated and the LED to illuminate.

To adjust the cylinder position switches, retract the bag stretchers. Loosen the band around the cylinder using a small straight blade screwdriver. Slide the cylinder position switches evenly from the top end of the cylinder down until both LED’s illuminate. Tighten the band around the cylinder to hold switches in position.

OPERATING BAG STRETCHERS

Bag Stretcher Operation

The following is a step by step sequence of operation for single bag stretchers.

1. When the touchscreen is in the RUN menu, this will drop the bag stretchers down into the manifold area after the manifold opens.
2. As an option, pressing RESET will manually drop the snorkels. The operator lifts the bag up and slides the bag around the snorkels.
3. The operator lifts the bag up and slides the bag around the stretcher bars.
4. The operator, while holding the bag, presses down on the left stretcher bar actuating a micro switch mounted to the bag stretcher assembly. This will cause the left bag stretcher bar to slide to the left expanding the distance between stretcher fingers holding the bag tight. The snorkels will drop automatically into the bag at this point if not already down.
5. The operator activates the machine cycle by swiping the opto touch switches.
6. The manifold closes and the machine starts the vacuum gas cycles.
7. At the end of the vacuum gas cycle the bag stretcher bars and snorkels retract from the manifold. The bag is then sealed.
8. The manifold opens allowing the bag to be taken away from the machine ending the cycle.

SECTION: 9

CLEANING

CLEANING INFORMATION

The A-200 product line is equipped with a CIP (Clean in Place) system to assist in the sanitation process.

Selection of appropriate and effective cleaning solutions will depend on individual plant needs, sanitation procedures and industry regulatory requirements and are the customer's responsibility.

All cleaners should be checked for their corrosive properties which can have a potential negative impact on the following materials which are used in our product line:

- 303/304/316 Stainless Steel
- Viton
- Teflon
- Polypropylene
- SAN
- PVC

Clean-In-Place Vacuum System

The A200 is designed so that hot water can be flushed through the vacuum system.

Important: The machine should be covered if the area around the A200 PLC machine is foamed as part of your cleaning procedures.

Water Connection

Connect a hot water source to the 3/4" NPT pipe coupling on the left side of the machine, above the sediment/filter bowls.

Note: Connect a standard facility hot water supply (typically 40-50 PSI). Do not connect a high pressure water source.

Figure 9-1. Water Connection (as viewed from rear)

CLEANING INSTRUCTIONS

1. Place a barrel or other container beneath the snorkels.

2. Move the position of the cam-lock fitting from the sediment/filter bowl, to the hot water connection (See Figure 9-2 and Figure 9-3).

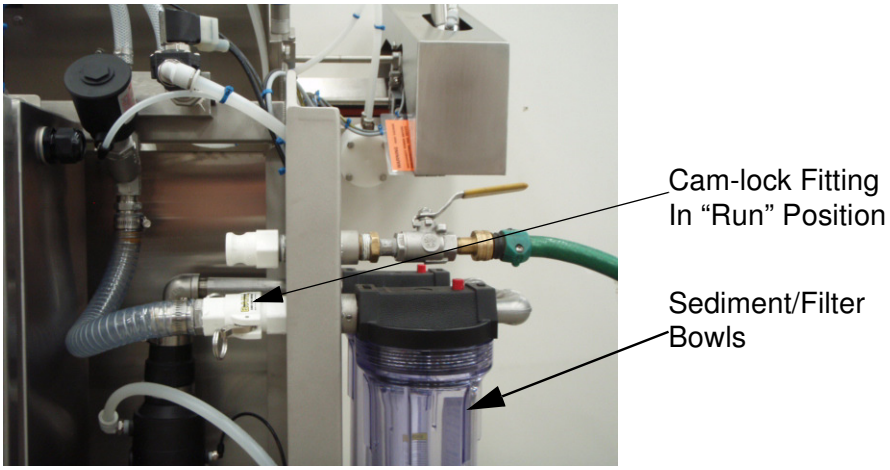


Figure 9-2. Style B Normal “Run” Configuration

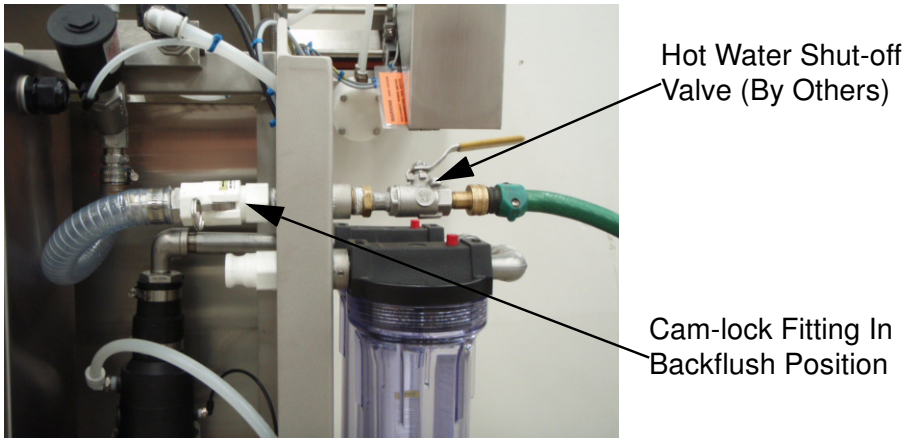


Figure 9-3. Style B Backflush Configuration

3. Press the “CLEAN” button on the touchscreen.

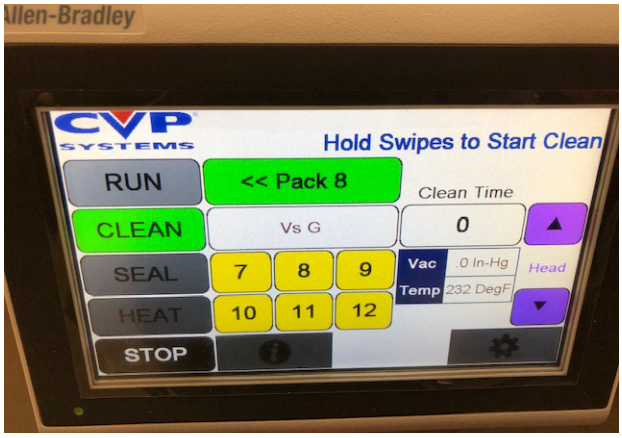


Figure 9-4. Clean Mode Display

4. Open the hot water supply valve.
5. Swiping both start buttons on either side of the front panel si multan iou sly will start a pulsing action (vacuum valve on 3 seconds - off 3 seconds) until the end of clean time. This pulsing action helps dislodge debris that may have built up in the system. On bag stretcher machines, water will go on 3 seconds then off 3 seconds through the snorkels. On vacuum manifold machines, water flow will shift from the snorkels to the manifold holes and back every 6 seconds through the cycle.

Warning:

HOT WATER EMITTED FROM THE SNORKELS AND/OR MANIFOLD HOLES MAY BE DANGEROUS TO PERSONNEL IN THE AREA. IT IS BEST TO PERFORM A CLEAN CYCLE WITH NO ONE AROUND THE MACHINE.

6. At the end of the clean cycle, the pulsing action will stop. Water flow through the snorkels will continue until it is manually shut off.
7. Shut off the hot water supply valve.

8. Press the GAS button to dispense gas through the hoses and snorkels to flush the remaining water form the system.

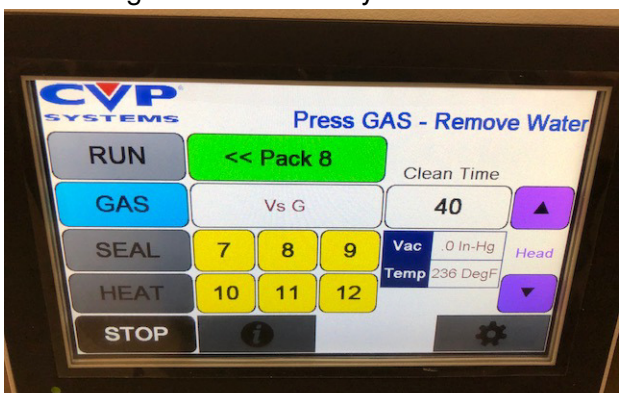


Figure 9-5. End of Clean Cycle Display

9. Return the cam-lock fitting to it's normal position, connected to the sediment/filer bowls (See Figure 9-2).
10. Unscrew the clear Sediment/filter Bowl(s), empty any water, then put back in place.

Note: When remounting the clear Primary Sediment Bowl(s), make sure that the O-ring is in place before tightening.

11. Press the "RUN" button on the touchscreen. This turns on the vacuum pump and pulls any remaining water in the system back to the Primary Sediment Bowl.
12. Cycle the machine once. Gas will blow any remaining water out of the snorkels.
13. Press E-stop and empty any water which may have accumulated from Primary Sediment Bowl.

Important: Make it standard practice to empty all filter and sediment bowls of water before starting the machine.

SECTION: 10

MAINTENANCE

A-200 MAINTENANCE SCHEDULE

Items to Check on a Daily Basis	
ITEM	DONE
SEAL QUALITY	
AIR PRESSURE	
SEDIMENT BOWL CONDITION	
OVERALL CONDITION OF MACHINE	
MANIFOLD SPONGE RUBBER CONDITION	
OIL AND LUBRICANT LEVELS	
FILTER/REGULATOR CONDITION	
VACUUM HOSE CONDITION	
GAS PRESSURE	
POSITION OF BALL VALVE BEFORE RUNNING	
TEFLON TAPE CONDITION	
OXYGEN LEVEL OF PACKAGED PRODUCT	

Maintenance Functions to Perform on a Daily Basis	
FUNCTION	DONE
CLEAN & BACKFLUSH VACUUM SYSTEM	
CHECK FOR SMOOTH MOTION OF ADJUSTABLE HEAD	
GREASE FITTINGS ON ADJUSTABLE HEAD BEARINGS	

Figure 10-1. Daily Routine

Maintenance to Perform Twice a Year or as Needed		
ITEM	ACTIONS	DONE
HIGH CAPACITY VACUUM PUMP	CHANGE OIL, DEMISTER FILTER, AND OIL FILTER	
SNORKELS	REMOVE AND CLEAN INTERALLY WITH CLEANER, HIGH PRESSURE WATER AND COMPRESSED AIR	
SNORKEL QUICK EXHAUSTS	REBUILD	
HEAT SEAL BAR	REPLACE TEFLON TAPE	
THERMOCOUPLE	CHECK CONNECTION	
LIGHT BULBS	REPLACE	
SECONDARY SEDIMENT BOWL & FILTER	CHANGE FILTER	
HEAT SEAL BAR PUSHERS	REPLACE	
VALVE BANK EXHAUST MUFFLERS	REPLACE	
SILICONE BACK-UP RUBBER	REPLACE	
HEAT SEAL GUIDE ROD BUSHINGS	REPLACE	
MANIFOLD SPONGE RUBBERS	REPLACE	

Figure 10-2. Maintenance to Perform Twice a Year or as Needed

REGULAR MAINTENANCE

Regular maintenance is the key to product longevity with the A-200 PLC machine or any other machine. When a preventive maintenance schedule is followed, the operating efficiency of the machine is maintained and breakdowns are reduced. This section of the manual will take you through an extensive routine check of the unit. This is the same type of inspection used by CV-Tek Service personnel to evaluate the condition of older equipment.

Items which need regular attention and/or service are brought to your attention below.

Visual Inspection

1. Check overall appearance of the machine. Look for things which obviously need attention, such as broken or missing parts, worn out parts, etc.
2. Observe the machine while it is running.
3. Determine if the machine is operating satisfactorily. Get input from the operators and area supervisors. They can readily inform you of any recent malfunctions.
4. Cycle the machine.
5. Try any of the optional features, such as multiple Gas Levels, Adjustable Head Positions, Auto Clean, etc.

Air Supply Regulator / Lubricator

Check air pressure:

- Air supply regulator: 80 PSI (5.4 bar)
- Venturi Vacuum Pump Air Supply: 87PSI (5.9 bar)
- Snorkel Regulator: 7-15 PSI (0.5 to 1.0 bar)
- Stretcher Regulator: 15-25 PSI (1.0 to 1.7 bar)
- Check oil level in lubricator DAILY

Oil can be added to the lubricator prior to pressurization or while under pressure through the fill port. Remove the fill plug and fill with CV-Tek Vacuoil, mineral oil, or 10W oil through the fill port. The rate of oil delivery is con-trolled by turning the adjusting screw CCW for more or CW for less oil deliv-ered. CV-Tek sets the oil rate at one drop of oil every 17-20 cycles of the heat seal cylinders (V5). V5 valve is manually actuated by pressing the yellow manual override button while there is no other air consumption.

Remove air pressure from the system whenever removing the oil bowl to check contents. This can be accomplished by either removing the air supply line or by turning regulator pressure down to zero. Periodically inspect the bowl to detect damage. Replace if cracked or deteriorated. When bowl becomes dirty, wipe only with a clean dry cloth.

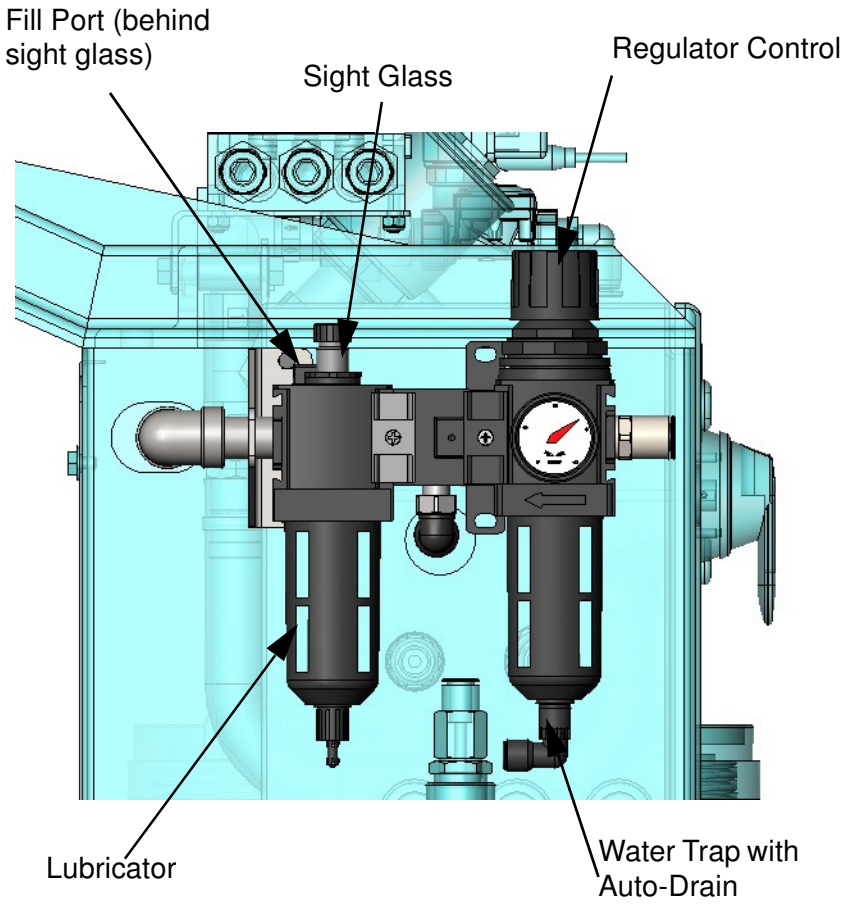


Figure 10-3. Checking Regulator and Lubricator

Gas Supply

Check gas pressure on regulated gas supply to the machine. Recommended pressure is 60 to 80 PSI (4.0 to 5.4 bar).

Important: Inspect supply line for kinks, leaks, or any other physical damage which may adversely affect gas flow.

VACUUM PUMP MAINTENANCE

In addition to monitoring the pump's oil level, it is also important that you change the oil periodically. Initial oil change should take place before the first 500 hours of operation. Oil changes after that, should be performed on a regular schedule, as indicated in the Preventative Maintenance Schedule.

Vacuum Pump Oil Level

Check vacuum pump oil level:

Warning:

VACUUM PUMPS WILL BE NOISY AND HOT WHEN OIL LEVEL IS LOW OR WHEN OIL CONDITION IS POOR. FILL OR REPLACE THE OIL IMMEDIATELY.

Important: Each time oil is added to the reservoir, be sure to empty the oil from the exhaust can.

- **High Capacity Pumps:** The oil level must be maintained between the "MIN" and "MAX" indicators near the sight glass. Notice the color of the oil. Oil will range in color from almost clear when new, to brown. Change oil and exhaust filter when color is darkened. Use only recommended oils, such as CV-Tek Vacuoil III (P/N 7707-VO3). Do not use detergent type oils, like hydraulic oil, motor oil, penetrating oil, etc.

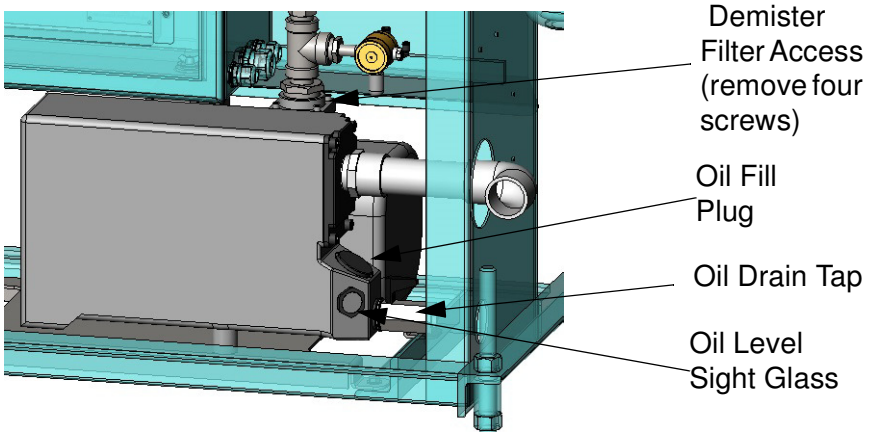


Figure 10-4. High Capacity Pump

Primary Sediment Bowl

Check primary sediment bowl: Any water or other foreign particles should be emptied from the bowl. Turn the vacuum pump off. Press the red button on top of the filter cap to relieve the vacuum pressure. Make sure to replace black O-ring after emptying. Vacuum loss will occur if the O-ring is missing or improperly installed.

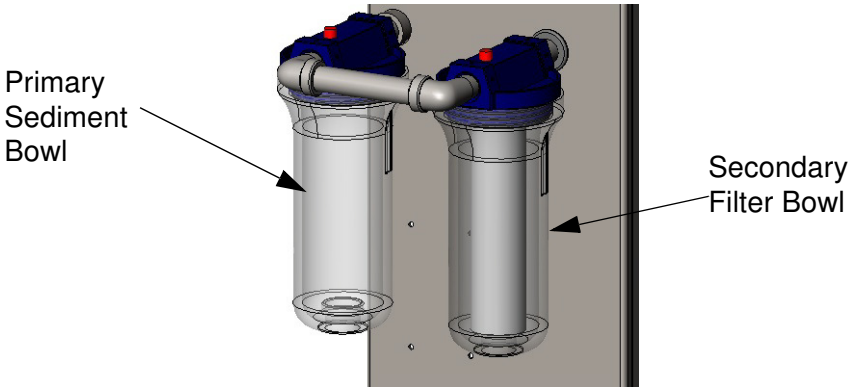


Figure 10-5. Primary Sediment Bowl

Note: Use a pleated paper or spun fiber filter element for powdered products.

Auto Dump

The auto dump system uses two clear acrylic sediment bowls. The first sediment bowl is equipped with a dual acting, pneumatic actuated, ball valve mounted to the drain port. Minimum air pressure of 80 PSI (5.4 bar) is required to operate the valve. If the actuator no longer operates at 80 PSI (5.4 bar), the seals will need to be replaced. The second sediment bowl is a standard sediment bowl with a filter inside. The filter should be replaced when needed to prevent poor vacuum speeds.

Secondary Filter Bowl

Check the secondary filter bowl: Empty any water or other foreign particles. Check condition of filter. Replace the filter if it is noticeably dirty or damaged. Vacuum loss, pump overheating, or pump failure can result from operating pump without adequate filtration. These filters are relatively inexpensive and should be kept in stock for immediate replacement.

Vacuum Exhaust System

High Capacity Pump: Located inside the exhaust port is a demister filter. This filter removes the oil mist from the air circulating inside the pump. This filter needs to be replaced periodically. A plugged demister filter will cause the pump to expel smoke from the exhaust port.

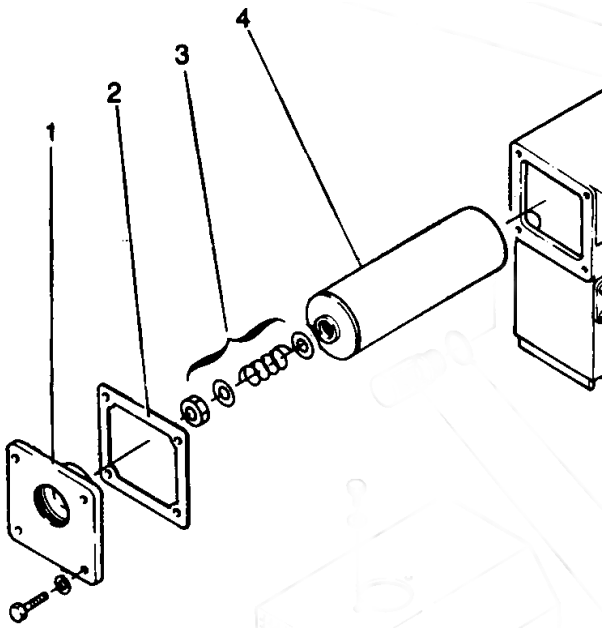


Figure 10-6. Demister Filter Assembly

The figure “Demister Filter Assembly” has four items called out. These items are as follows:

1. Exhaust flange
2. Gasket
3. Nylon stop nut with washers and spring
4. Exhaust demister filter element (P/N 7707-2099)

SEAL BAR AND MANIFOLD MAINTENANCE

Heat Seal Bar

Warning:

THE HEAT SEAL BAR BECOMES VERY HOT DURING OPERATION. AVOID CONTACT OR SERIOUS BURNS WILL OCCUR. ALLOW THE HEAT SEAL BAR TO COOL BEFORE PERFORMING MAINTENANCE.

Check straightness of heat seal bar by observing this bar in the rear manifold. Bar must be straight for best results. Warped heat seal bars will create an uneven seal resulting in poor seal quality.

1. To correct a warped bar, the bar must be removed. Turn power off before disconnecting the rubber plugs that supply electrical power to the bar. Remove the mounting bolts and springs holding the bar that are accessed from the backside of the rear manifold. Do not lose the white or green colored bushings as these act as bearings for the guide rods. Remove thermocouple and ground wire as well.
2. Place the heat seal bar on a flat rigid surface and check for high areas. With moderate force, push the high points into the flat surface to straighten.
3. Remount into the rear manifold.

Important: If this procedure does not correct the problem, replace the heat seal bar or return it to CV-Tek to be reworked.

Teflon Tape

Check teflon tape on heat seal bar (black in color): Tape should not have any visible damaged areas. If it does, replace with high quality teflon tape, which is available from CV-Tek. Replace any teflon tape that has poor adhesion. Remove old adhesive with solvent and dry completely. Wipe the bar off with alcohol before applying new tape. Apply tape evenly and in line to avoid wrinkles.

Important: Damaged teflon tape will adversely affect the sealing performance of the A-200 PLC machine.

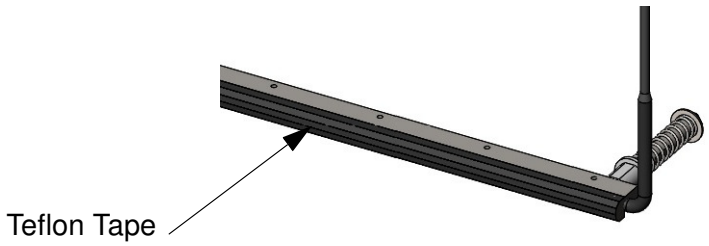


Figure 10-7. Teflon Tape on the Heat Seal Bar

Thermocouple

Check the thermocouple connection: The thermocouple is accessible through the cutout of the rear manifold. It is a very critical part of the temperature control system. If the thermocouple is broken or has a bad connection, the temperature controller cannot sense the actual heat seal bar temperature. Without the thermocouple in place, the heat seal bar will heat to temperatures out of specification and possibly warp the heat seal bar.

Note: On thermocouple wires, white or yellow is considered positive and red negative.

Changing the thermocouple: This is accomplished by loosening the terminal screws which hold the two thermocouple wires in place inside the electrical enclosure. Remove cord connector from electrical enclosure, loosen the knurled lock collar and slip old thermocouple wire out. Reverse this order to install a new one. It is recommended that some type of “anti-seize” compound be applied to the thermocouple adapter before locking down.

Important: When replacing the thermocouple, it will be necessary to adjust the bayonet nut on the spring to ensure that the thermocouple tip makes firm contact with the heat seal bar. CV-Tek recommends the cap be wound down on the spring at least 2” (50.8 mm).

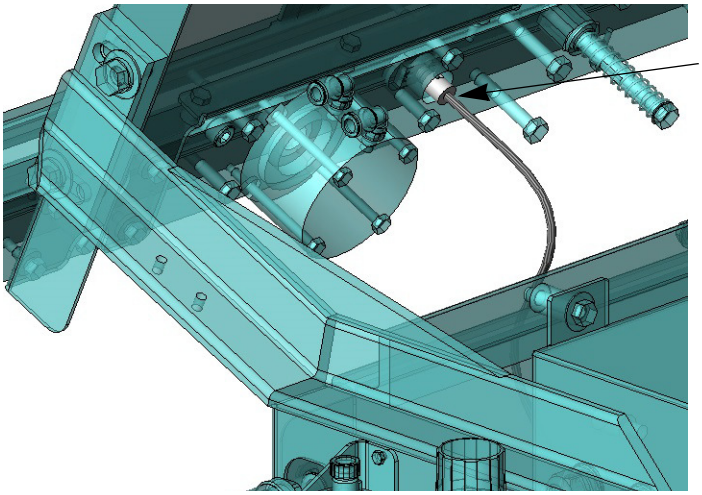


Figure 10-8. Thermocouple

Warning:

IF THE THERMOCOUPLE IS NOT ATTACHED TO THE HEAT SEAL BAR YOU WILL LOSE CONTROL OF YOUR BAR TEMPERATURE. THIS IS A SERIOUS SAFETY HAZARD.

Ground Wire

The ground wire should be attached to the rear manifold after completing the installation of the thermocouple.

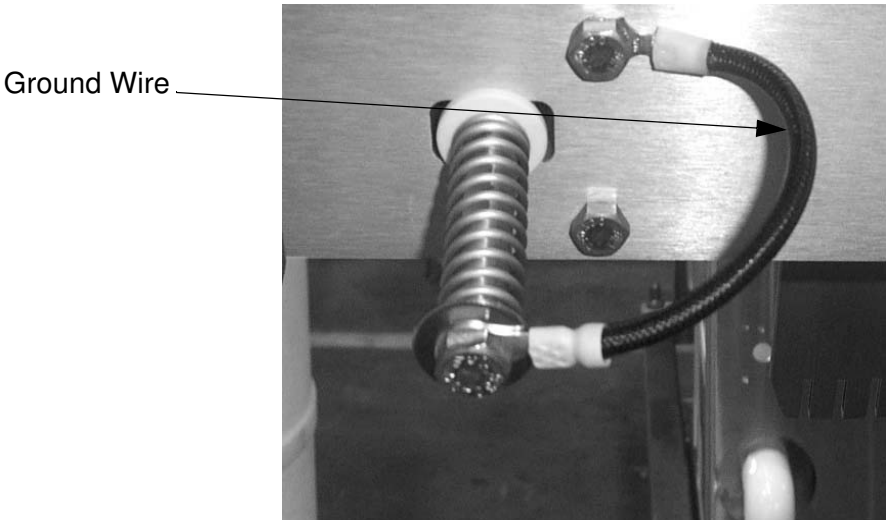


Figure 10-9. Ground Wire

Warning:

RE-ATTACH THE GROUND WIRE TO GUIDE ROD TO AVOID ELECTRICAL SHOCK.

Seal Bar Back Up Rubber

The seal bar back up rubber, located in the upper manifold, will need to be replaced if the rubber becomes damaged or the surface is uneven. In time the silicon rubber will become too hard to form around the profile of the seal bar causing the seal to look faded along the edge of the seal in the bag.

To replace perform the following:

1. Remove the eight (8) 1/4-20 hex head screws in the upper manifold holding the back up bar in position.
2. Remove the silicone rubber from the bar using a razor blade.

Important: When removing the rubber from the bar be careful not to scratch the aluminum bar. This could cause damage to the protective anodized coating.

3. Clean residue from the bar using adhesive remover. When all the adhesive is removed, clean the bar a final time with a clean rag and isopropyl alcohol.
4. Wipe the rubber clean with a clean rag and alcohol.
5. Apply an even layer of RTV. “GE” brand RTV 157 is recommended and is available at most industrial supply companies.
6. Lay the silicone rubber on the back up bar and align the edges of the bar and rubber.
7. Turn the bar over and clamp to a straight surface with the rubber facing down. RTV 157 sets in one hour and will cure in 24 hours.
8. Mount the bar back in the manifold.

Hint: An alternative clamping method is to mount the back up bar in the manifold, close the manifold, and extend the seal bar by pressing and locking the manual overide button on the V5 valve. This will clamp the rubber in place.

Manifold Sponge Rubber

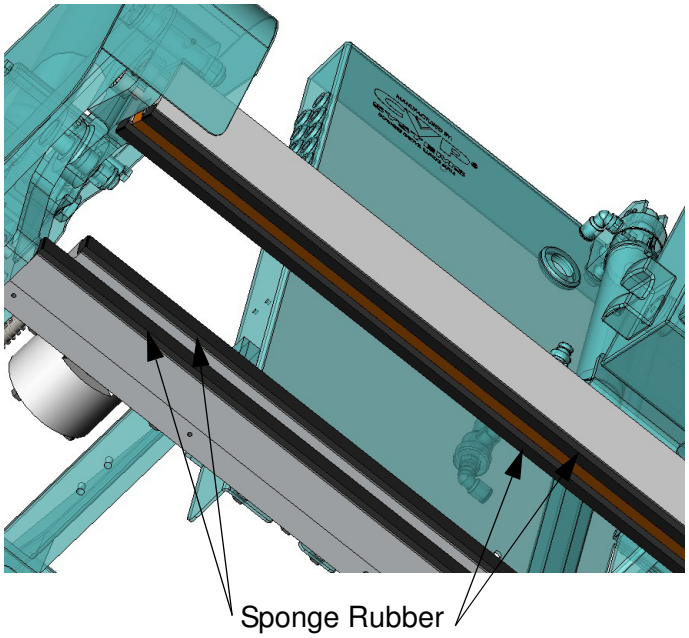


Figure 10-10. Sponge Rubber

The black sponge rubber on the front and rear manifolds hold the bag tight during each cycle and prevent loss of vacuum during snorkel pullout. When these sponge rubbers become damaged or worn, they should be replaced. Worn sponge rubber will cause poor vacuum performance due to leaks.

To change sponge rubber, pull off old rubber, clean and dry mounting surface, and stick new sponge rubber in place. Degrease manifold groove with solvent to remove residues and old adhesive before applying new rubber.

SNORKEL MAINTENANCE

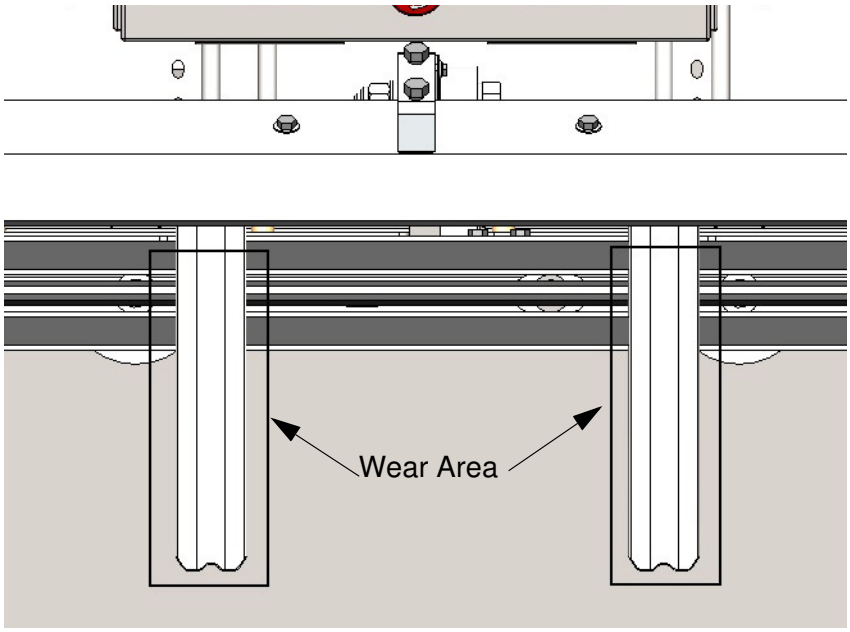


Figure 10-11. Snorkel Wear Area

Snorkel Wear

1. Keep the exterior of the snorkels clean for best heat sealing results. They can be cleaned with a mild solution of chlorine and water, or other cleaners that evaporate quickly and are approved for use by the USDA. Do not use soap or any other cleaners which will leave a residue behind.
2. Inspect snorkels for wear or sharp edges around the tips. Replace worn and/or damaged snorkels. It is recommended that you keep a spare set of snorkels on hand at all times.

Important: If the finish of the snorkels becomes polished, it may cause the bags to stick to the snorkels (especially if moisture is present). The snorkels can be bead blasted or replaced as needed.

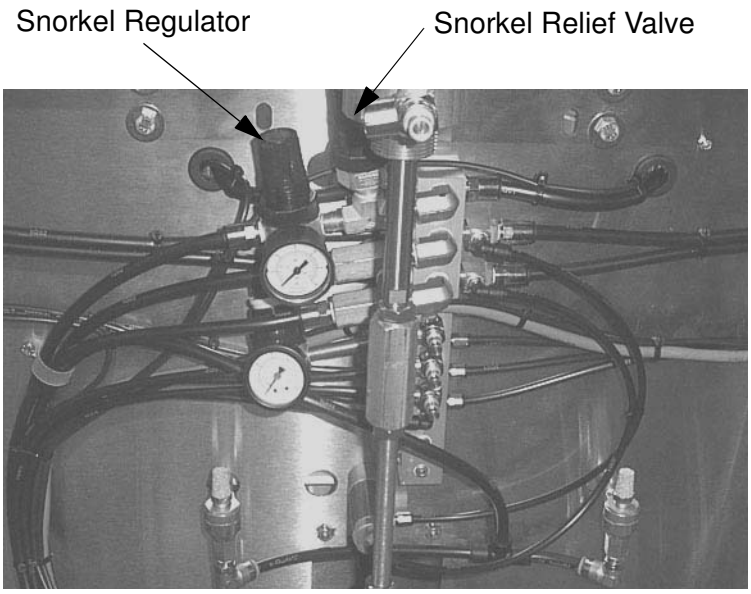


Figure 10-12. Snorkel Regulator

Snorkel Regulator

The snorkel regulator should be set between 7 to 15 PSI (0.5 to 1.0 bar). Adjust so the force of the extending snorkels does not damage product in the bag.

1. To adjust, unlock knob, then turn clockwise to increase pressure, counterclockwise to lower it.
2. Adjust while snorkels are extended.
3. Cycle the machine and observe the speed at which the snorkels retract. If the snorkel retracts too slow or not at all, the air pressure may be set too high. Readjust and cycle again.

Snorkel Relief Valve

Adjust for least resistance during snorkel retraction.

To adjust, unlock knob, then turn clockwise to increase pressure, counterclockwise to decrease resistance. When turning knob counterclockwise expect to hear air hissing from relief port. Turn knob just slightly clockwise until hissing stops. This is the point of least resistance. Adjust after the Snorkel Regulator has been set.

Snorkel Depth

Adjust within 1” (25.4 mm) proximity of product.

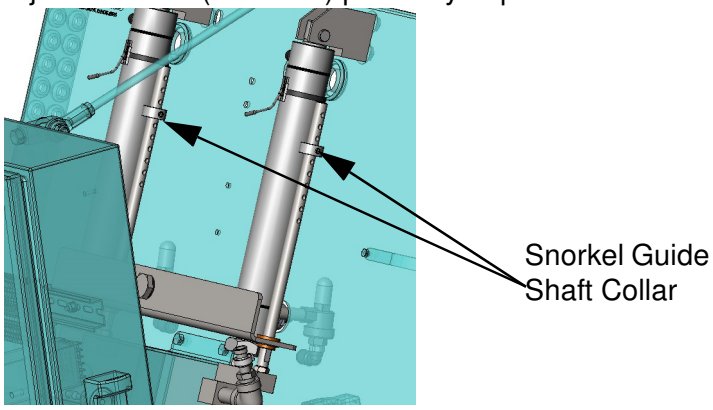


Figure 10-13. Snorkel Depth

To adjust, loosen set screws on snorkel guide rod shaft collars. Move shaft collars down to limit the amount of snorkel extension. Move shaft collars upward to increase the amount of snorkel extension.

Snorkel Space Position

1. Lower the snorkels by pressing the override button on the snorkel down valve (commonly V1).
2. The snorkel centering rod consists of four parts. The centering cylinder, the cylinder rod extension, the snorkel post and a shaft collar. The cylinder rod extension is attached to the end of the centering cylinder. The snorkel post is threaded half way onto the male thread end of the rod extension. Once in position, lock the jam nut to lock the two pieces.
3. Loosen the collar on the snorkel post and slide until there is 1/2” (12.7 mm) space between the black sponge rubber and the back of the snorkel.

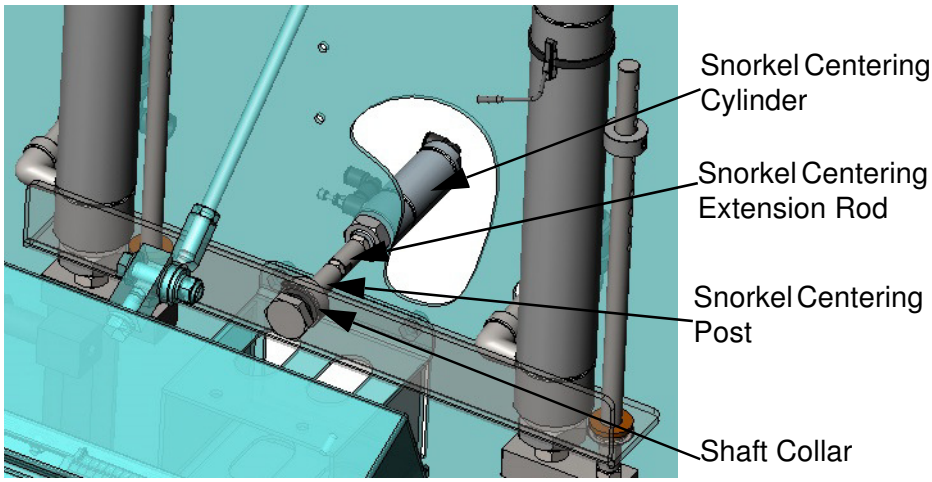


Figure 10-14. Snorkel Centering Rod

MANIFOLD MAINTENANCE

Adjusting Manifold Clamp Speed

Flow controls are used to close the manifold simultaneously. The flow controls on the back of the upper frame control the opening and closing speed of all five pivot clamps. The three center pivots each have an additional flow control mounted to them to control the closing speed.

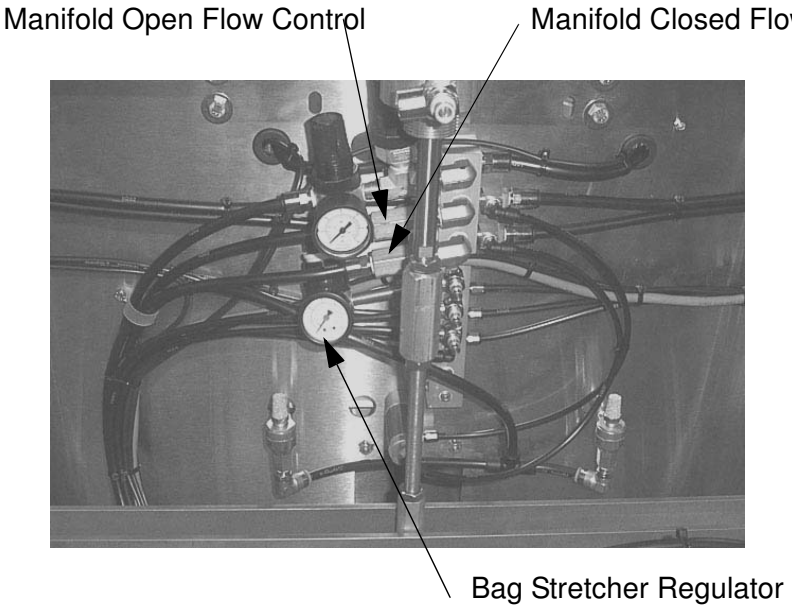


Figure 10-15. Adjust Clamping Speed

Perform the following steps to adjust the manifold clamp speed.

1. To adjust clamping speed, loosen the knurled wheel locknuts on the pivot clamp flow controls.
2. Start with the flow controls on the back of the upper frame. Opening the top valve will increase the opening speed of the clamp (turn knurled wheel clockwise). Turning it counterclockwise will decrease the opening speed of the clamp.
3. Opening the bottom valve will increase the closing speed of the clamp (turn knurled wheel clockwise). Turning it counterclockwise will decrease the closing speed of the clamp.
4. Once the pivot speeds are adjusted properly tighten the locknuts on the knurled wheels of the flow controls.

BAG STRETCHERS

Bag Stretcher Regulator

Unlock knob, then turn clockwise to increase pressure, counterclockwise to lower it. Set at 15 to 25 PSI (1.0 to 1.7 bar) when left bag stretcher is extended**.**

Important: When pressure is set too high, heat seals will appear to be stretched and wrinkled. When pressure is too low**,** bags will not stay secured to stretcher bars.

Bag Stretcher Flow Controls

The bag stretcher flow control is adjusted at full counterclockwise position for greatest speed.

LS6, Bag Stretcher Expand

When properly adjusted, the microswitch adjustment screw will actuate the microswitch just as the bag stretcher finger makes contact with the sponge rubber, causing the bag stretcher expand cylinder to extend.

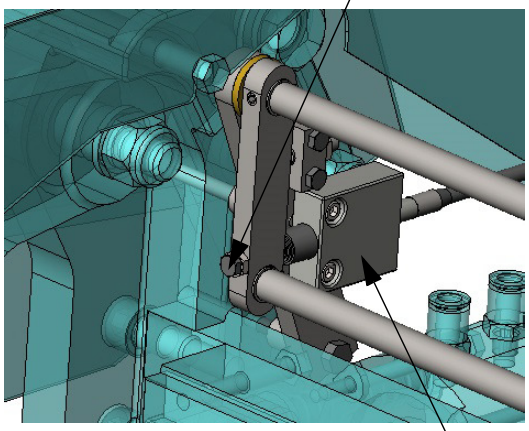


Figure 10-16. LS6 Microswitch

To adjust, loosen locknut on the adjustment screw. Turn screw clockwise to activate sooner, or counterclockwise to delay activation. Tighten locknut once adjustment is complete.

FLOATING HEAD

Lubricating Upper Frame

There are four (4) linear bearings on each adjustable head assembly, an upper and lower on the left and right side guide shafts. These should be greased daily or each time the machine is washed down. Use an FDA approved food-grade type grease. If not properly lubricated the head will seize and no longer raise and lower.

SWITCHES

PS1, Gas Pressure Switch

The PS1 Gas Pressure Switch is actuated when gas pressure falls below 20 PSI (1.4 bar). If gas pressure drops below 20 PSI when running a cycle requiring gas, a “LOW GAS PRESSURE” alarm will appear on the operator interface.

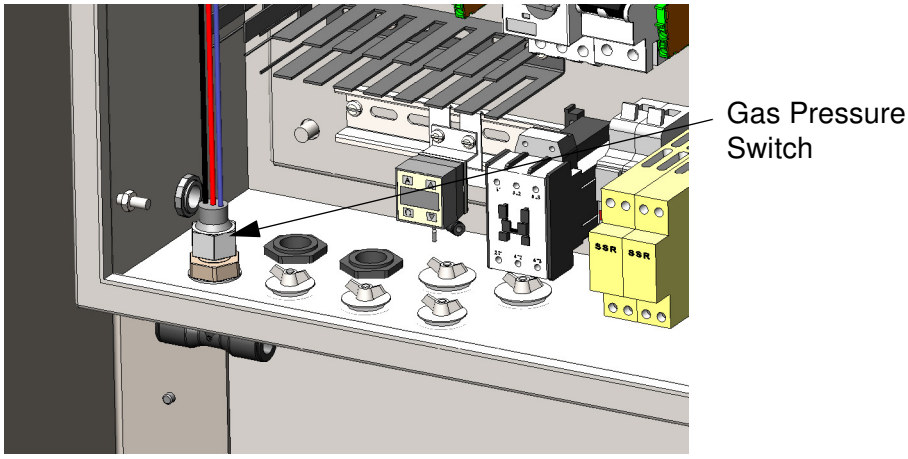


Figure 10-17. Gas Pressure Switch

Note: The pressure switch (pictured) is preset to 20 PSI (1.4 bar) and does not require further adjustment.

VS2, Snorkel Vacuum Switch

The VS2 digital vacuum switch is used to measure the vacuum level inside the bag. It is mounted on the front operator panel. The vacuum switch indicates the amount of vacuum being drawn in inches of mercury (inches Hg). When the display changes color from green to red, the vacuum setpoint has been reached.

Adjusting the Vacuum Switch Setpoint

1. To change the vacuum switch set point, press the SET key once to display the vacuum setting (input mode). “A” will flash alternatively with the vacuum set point reading in inches of Hg. Press the SET key again and “B” will flash alternatively with the switch reset vacuum value. Factory setting is -5 inches of Hg.
2. Press the UP or DOWN keys to change either the “A” or “B” vacuum setpoint as they are flashing. Normally, you only need to change “A”.
3. Press the SET key again and return to the operating display (measurement mode).

In measurement mode and with the vacuum pump off, press the “A” key for 2 seconds or more to adjust the zero point of the switch.

Also from measurement mode, holding the SET key for 5 seconds will display factory preset values (operation mode). These settings determine display and control properties for the vacuum switch. Tap the SET key to scroll through the five parameters. They should be set as follows:

1. INCH
2. F-3
3. NO
4. 2.5
5. 2-C

Use the UP or DOWN keys to change preset values to match the above. Tapping the set key after the last preset returns to measurement mode.

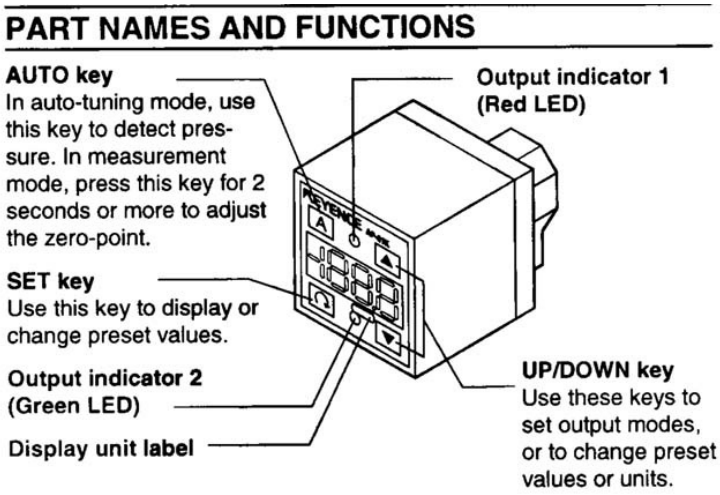


Figure 10-18. Vacuum Switch Part Names and Functions

Adjusting LS1/ PRX1

Machines with 48” (1219mm) or 57” (1448mm) manifolds are equipped with a proximity switch at the center jaw pivot (Figure 10-19). Machines with 70” (1778mm) or 100” (2540mm) manifolds are equipped with a lever style limit switch at the center jaw pivot (Figure 10-20).

The purpose of the proximity/limit switch is to confirm the position of the jaw and prevent damage in the event that jaw movement is obstructed. When properly adjusted, the proximity/limit switch is activated when the jaw is fully closed. If the proximity/limit switch is not activated within a short time after the cycle begins, a “JAW CLOSED FAULT” will occur.

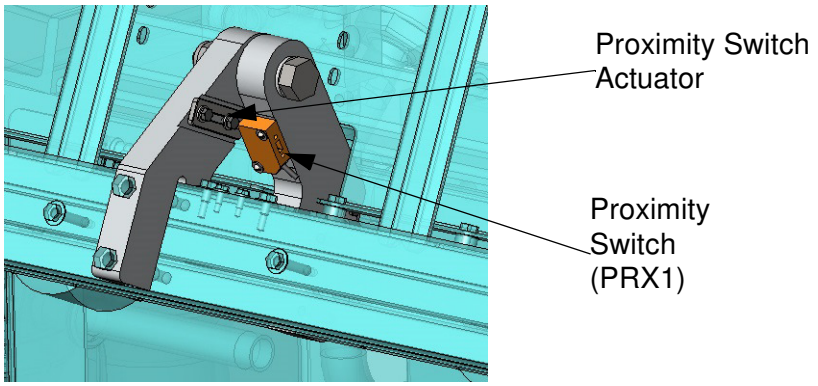


Figure 10-19. Proximity Switch

To adjust the proximity switch:

1. Power and compressed air must be tuned on.
2. Insure that no one else is in the area of the machine to avoid injury from moving parts.
3. Press the manual override and lock V1 on the valve bank to extend the snorkels.
4. Press the manual override and lock V3 on the valve bank to close the jaw.
5. Observe the LED indicator on the proximity switch. Adjust the proximity switch actuator so that the LED indicator is lit when the jaw is closed.
6. Unlock the manual override on V3 to open the jaw.
7. Unlock the manual override on V1 to retract the snorkels

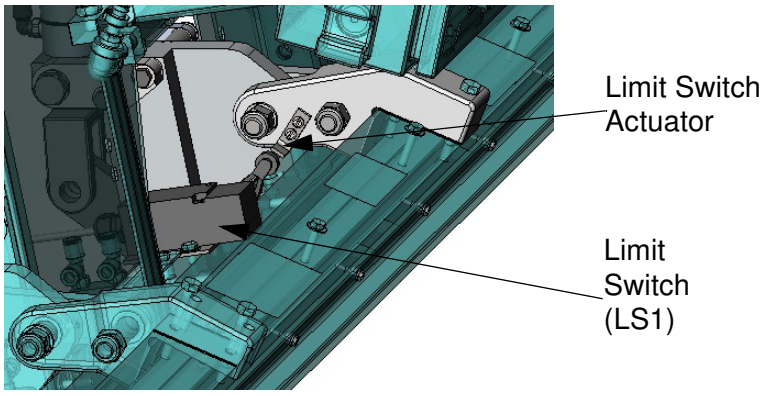


Figure 10-20. Limit Switch

1. Adjust the limit switch until the surface of the switch facing the operator is even with the sponge rubber lip of the lower manifold.
2. Press the left bag stretcher (if equipped) and swipe the start switches.

3. The manifold will close and the vacuum cycle should start. If the vacuum starts, the switch is set correctly. If not, proceed to step 4.
4. Press the “POWER ON/RESET” button to abort the cycle.
5. Using a 9/32” allen wrench loosen the lock screw on the limit switch pivot arm.
6. Insert a flat blade screw driver into the end of the switch’s shaft and rotate the pivot arm away from the machine 1/8” (3.2mm).
7. Tighten the pivot arm screw and cycle the machine.

If the vacuum came on when the manifold closed, the switch is set correctly. If not, repeat steps 4 through 7 until the vacuum starts when the manifold closes.

Warning:

FAILURE TO PROPERLY ADJUST THIS SWITCH CAN CAUSE INJURY IF A BODY PART IS IN THE MANIFOLD AS IT CLOSES. DAMAGE TO THE MACHINE CAN ALSO OCCUR.

Jaw Safety Edge Adjustment

Machines equipped with 70” (1778mm) or 100” (2540mm) manifolds feature a jaw safety edge along the bottom of the rear manifold, with a mating sponge rubber strip along the bottom of the front manifold. The purpose of the jaw safety edge is to detect objects in the manifold before the jaw locks closed.

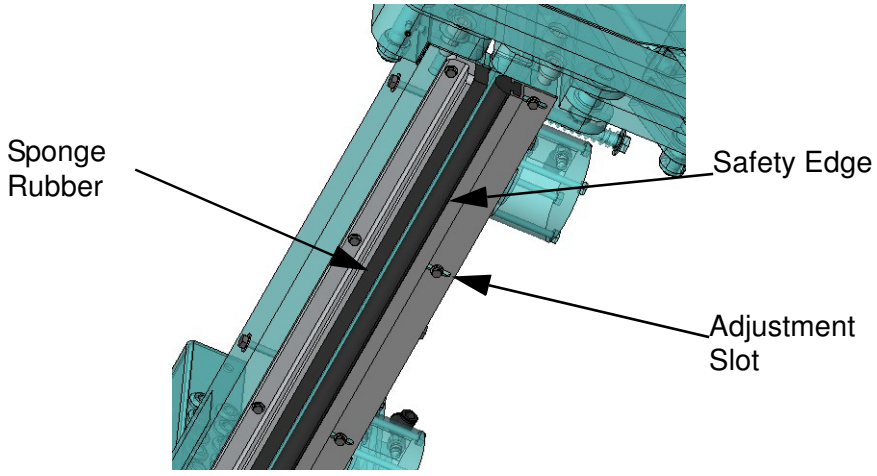


Figure 10-21. Jaw Safety Edge

The jaw safety edge is designed to be activated when an object approximately 1/2” (13mm) thick or larger is present within the lower area of the

manifold. In such a case, the machine cycle is aborted and a “JAW CLOSED FAULT” is dispalyed.

Adjust the jaw safety edge as necessary by moving forward or backward in the slotted holes. A properly adjusted jaw safety edge may occasionally result in a false “JAW CLOSED FAULT” due to the weight of the product activating the safety edge.

If the jaw safety edge is defective, “JAW CLOSED FAULT” will be displayed and machine operation is not possible.

If the mating sponge rubber strip is missing or torn, the jaw safety edge may not operate as intended. Discontinue machine use and replace the sponge rubber strip.

Note: The jaw safety edge is designed to detect objects at the bottom of the manifold only. It does not provide protection for other areas.

CONSUMABLE ITEMS

The items in the following tables are considered to be wear components and should be stocked at your facility in the recommended quantities to insure optimal performance of your equipment while minimizing down time.

Table 10 contains parts applicable for all manifold sizes and some optional equipment such as rotary vane vacuum pumps and gas analyzers.Tables 11-14 contain parts that are specific to manifold size.

Table 10: General Consumables

Part Number	Description	Quantity	Use
BLK5451-3M-1-1/2	Teflon Tape	1 (20 foot roll)	Heat Seal Bar
7707-2917	Silicone Adhesive	1 tube	Alternate to B-7707-3170-5
1151120	O-Ring	2 pieces	Replacement O-ring for Primary Sediment Bowl
7707-3107	Filter Element	1 piece	Replacement filter element for the Air Pressure Filter/Regulator unit
7707-3106	O-ring	1 piece	Replacement O-ring for the Air Pressure Filter/Regulator bowl
0550-1321-1	Cylinder Position Switch	2 pieces	Snorkel Cylinder and Bag Stretcher Cylinder(s)
SSS-D56	Spring Plunger	2 pieces	Bag Stretcher
B-7707-925	Insert Pusher	4 pieces	Heat Seal Air Cylinders
44-W	1/4” O.D. Tubing	25 feet	Air/gas Tubing
66-W	3/8” O.D Tubing	25 feet	Air/gas Tubing
88-W	1/2” O.D. Tubing	25 feet	Air/gas Tubing

Table 10: General Consumables

Part Number	Description	Quantity	Use
5238K85	1/2” I.D. Clear Braided Hose	10 feet	Vacuum/Gas Hose
7707-VO3	Vacuum/ Pneumatic Oil	1 gallon	Pump Oil for optionally equipped rotary vane vacuum pump and pneumatic lubrication oil for optionally equipped Air Pressure Filter/ Regulator/Lubricator units
7707-2954	Repair kit	1 piece	Repair kit for 7707-2489 (Heat Seal Air Cylinder)
7707-2099	Exhaust Filter	1 piece	Replacement exhaust filter for optionally equipped rotary vane vacuum pump
7707-2103	Repair kit	1 piece	Repair kit for optionally equipped rotary vane vacuum pump
0210-2540	Oxygen Sensor	1 piece	Replacement oxygen sensor for optionally equipped Gas Analyzer

Table 11: 48 Inch Manifold

Part Number	Description	Quantity	Use
B-7707-57	Sponge Rubber	4 pieces	Front and Rear Manifolds
B-7707-119	Silicone Rubber	1 piece	Seal Bar Back-up
B-7707-3170-4	Double Sided Tape	1 piece	Attaches B-7707-119 to Front Manifold

Table 12: 57 Inch Manifold

Part Number	Description	Quantity	Use
B-7707-187	Sponge Rubber	4 pieces	Front and Rear Manifolds

Table 12: 57 Inch Manifold

Part Number	Description	Quantity	Use
B-7707-182	Silicone Rubber	1 piece	Seal Bar Back-up
B-7707-3170-5	Double Sided Tape	1 piece	Attaches B-7707-182 to Front Manifold

Table 13: 70 Inch Manifold

Part Number	Description	Quantity	Use
B-7707-420	Sponge Rubber	4 pieces	Front and Rear Manifolds
B-7707-424	Silicone Rubber	1 piece	Seal Bar Back-up
B-7707-3170-7	Double Sided Tape	1 piece	Attaches B-7707-424 to Front Manifold

Table 14: 100 Inch Manifold

Part Number	Description	Quantity	Use
B-7707-1069	Sponge Rubber	4 pieces	Front and Rear Manifolds
B-7707-182	Silicone Rubber	1 piece	Seal Bar Back-up
B-7707-3170-9	Double Sided Tape	1 piece	Attaches B-7707-182 to Front Manifold

SECTION: 11

TROUBLESHOOTING

COMMON PROBLEMS

Not creating enough vacuum in the bag:

Increase the vacuum level:

- Vacuum switch

  On the operator interface increase the vacuum level setpoint. You must be in the pack you want to change the setting for then press CONFIG, PACK EDIT.

- Vacuum Timer

  On the operator interface increase the vacuum time setpoint. You must be in the pack you want to change the setting for then press CONFIG, PACK EDIT. For more information on the touchscreen interface please refer to section 4.

Check the foam rubber.

- The foam rubber that clamps the bag in position for each cycle may begin to form a memory over time. Examine the four pieces of rubber, two on the front manifold and two on the rear manifold for deformations or tears. If both pieces of foam rubber do not seal tightly against each other, air may leak into the bag limiting the level of vacuum that may be reached.

Pump Problems.

- For air operated pumps, check the air supply is sufficient. Make sure that the pump holds a constant air pressure during operation If pressure drops more than 5-psi during each cycle, the supply line needs to be larger. The optimal working pressure is 80-psi and at that pressure air usage will be 30-scfm whenever drawing vacuum.
- For electric high capacity vane pumps, first visually inspect the pump. Check the level and condition of the oil. Check the pump exhaust for smoke. If smoke is present, the demister filter may need to be changed, or there may be too much oil in the pump. Check the inlet screen for debris. For more detailed information, refer to Section 5: Vacuum Pumps.

Vacuum lines.

- Examine the main vacuum hoses connected to the snorkels for any holes or cracks in the line. Check the hose clamps on the ends of the hose line connected to the hose barbs. Check that the hose clamps are tight to eliminate any leaks.
- Check the tubing connected to the vacuum switch. Over time the tubing may have unseated itself allowing a small vacuum leak. There are two locations to check. First check the rear of the vacuum switch in the operator interface panel. Next check at its connection to the main vacuum

line. This tubing is connected to the vacuum switch relief valve (See Section 5: Vacuum Pumps). Inspect the snorkels for debris inside or damage.

Sediment Bowl.

- Check o-ring is in place in the groove on top of the clear bowl. If not in place, there will be a vacuum leak. Also check all filters for any debris.
- If there is an auto dump valve on the bowl, check it is not stuck open or connected backwards. The actuator should close the valve during the vacuum cycle.

Problems with inconsistent gas levels

Supply Line.

- Verify there is a consistent supply of gas. If there are multiple machines with the same supply confirm that the lines can supply them simultaneously. A gas accumulator tank may be necessary.

Gas Regulator.

- Check that the gas regulator is sized appropriately for the required flow. The gas regulator must be a high-flow type, or freezing will occur.

Gas Valve.

- Check the gas valve on the machine to make sure that it is operating consistently, meaning that it is seated and opening properly.
- There is a spring-loaded check valve at the outlet of the gas valve that may be clogged.
- An electric solenoid valve (V9) opens the gas supply to the vacuum block. Output O:2/4 actuates V9 whenever the program calls for gas. If the O:2/4 output light illuminates and the fuse is good, check solenoid valve operation. Verify 24 VDC at fuse 4.

Bag Placement.

- Control the placement of the bag to insure consistent volumes in each bag. If the bag is not placed in the same position every time there will be a different volume of bag to fill, and thus a different amount of gas in each bag causing inconsistency between packs.

Problems with seals:

Check heat timer.

- Adjust seal timer in the preset menu of the interface. See the Heat Sealing section of this manual.

Check bar temperature.

- Adjust setpoint temperature on the CAL 9400 temperature controller. See the Heat Sealing section of this manual.

Check seal bar.

- Teflon taped bar

  Check teflon tape covering bar for bare spots or wrinkles. If tape is not smooth and consistent across the bar, replace the tape.

- Plasma coated bar

  Examine the leading edge of the seal bar for nicks, scratches or other wear marks which may cause poor seals. If your bar has these problems, replace the bar.

- Check heater power plug-in connections.
- Check that the thermocouple sensor is making good contact with the manifold. Verify that the thermocouple is a type K and that the temperature controller is configured for a K thermocouple input. If the thermocouple fails or is not connected, the temperature controller display will flash a fault message. See “Temperature Fault” on page 159.

Check manifold rubbers.

- Inspect foam rubbers (black) and silicone backup rubber (red). They should be pliable and show no signs of damage.

Check Pancake cylinders.

- Confirm that all pancake cylinders are extending properly. If not, bar pressure will be uneven.

OPERATOR INTERFACE FAULT DISPLAY

Snorkel or Stretcher fault:

Description: During each machine cycle, the snorkels and bag stretchers (if equipped) must be retracted before the seal bar activates so that they are not crushed by the seal bar. If the snorkel/bag stretcher cylinder sensors do not detect the snorkels/bag stretchers in the up position, the machine will stop and display a “SNORKEL FAULT” or “STRETCHER FAULT”. Similarly, if the program commands the snorkels or stretchers to extend and still receives the signal that they are retracted, the fault message will appear.

Response: Check to see that the snorkels and bag stretchers are in fact fully retracted and in the up position. If not, one of the actuating cylinders may have been damaged.

If the snorkel and bag stretchers are in the fully retracted position and a snorkel/stretcher fault is displayed, loosen the mounting strap for the cylinder position switch and slide them up or down the cylinders until they light. The magnet that actuates the cylinder sensor is near the top when it is in the retracted position.

Note: The two snorkel cylinder position switches are wired to inputs I:6 and I:7. Both inputs should light up when snorkels are UP. Similarly, the bag stretcher sensors are wired to inputs I:10 and I:11. Both inputs should light up when stretchers are UP.

If the cylinder position switches still do not light then a switch may have failed.

Vacuum fault:

Description: When the machine is running in “Vacuum Switch” mode it will keep the pump running until the vacuum switch reaches a preset value. If this value is not achieved the machine will stop and display a “VACUUM FAULT”

Response: Check to see if there is a hole in the bag, or if one of the snorkels is outside the bag (sometimes the snorkel will be under, not inside the bag).

Determine whether or not the vacuum level is set to a reasonable level. Normal values for a machine that has been in the field for some time are as follows: Piab, 20-22”Hg, SV-40 23-25”Hg. If the value is too high, set it to a lower value or run in vacuum time mode. If the set vacuum level is appropriate to your machine configuration, troubleshoot as a vacuum level problem.

Jaw closed fault:

Description: After the start buttons have been activated the jaw is given one second to close. If it has not closed completely after this time it will open and the machine will display a “JAW CLOSED FAULT”. The jaw will open and the machine will have to be restarted.

Response: Open the pivot clamp cylinder flow controls located on the rear of the upper frame slightly. This will allow the jaw to close more quickly.

Manually close the manifold by using the yellow manual override button on V1. Check the input light 4-main on the PLC to verify the proximity switch has been made. If it does not light, check to see if the proximity switch located on the center pivot has come out of adjustment. To check, loosen the proximity trip bar mounting screws and move until it is “seen” by the switch. The red indicator light will be on when it senses the trip bar.

If you are not able to get the proximity switch to make by the above steps the switch is defective and should be replaced.

Low Gas Pressure Fault

Description: If gas pressure drops below 20 psig, the operator interface will display a “LOW GAS FAULT”. The machines will still run through a cycle with this message displayed.

Response: Check gas connection and your gas supply. When there is sufficient gas pressure, alarm light will go OFF.

Safety Edge Fault (Optional)

Description: Whenever the safety edge pad is pressed hard, the safety circuit is broken and input I:1 will go off. If input I:1 goes off when the jaw is commanded to close, the jaws will immediately open and the cycle will abort. The operator interface will display “SAFETY EDGE FLT”. This prevents a hard object such as a finger from getting clamped in the jaw. Usually, the safety edge is provided only on machines with a 70 inch or 100 inch manifold.

Response: If there is no pressure on the safety edge pad, the safety edge relay and I:1 should be energized. Check that the 12VDC relay is lit. There is a 250 ohm resistor that must be in series with the coil for the safety circuit to function. If the pad is shorted, the relay will never light and the safety edge will need to be replaced. If the relay drops out as soon as the manifold closes, the pad may need to be adjusted back slightly. Adjust so that a 1/2 inch thick bar clamped any where along the length of the manifold trips the relay.

Temperature Fault

Description: The temperature has not increased toward the controller setpoint for over 1 minute. Power to the heater relay is removed until reset. The controller Alarm LED on the lower display will be lit.

Response: If element is cold, check power connections at heater. Check for power at fuse FU12. If the #1 LED on the temperature controller is ON, then the indicator light on the solid state relay should also be ON. Check heater element with main power disconnected. Check that the temperature in the operator interface STATUS screen is changing along with that of the temp. controller display. Check temp. controller analog output to card 3. 0-5VDC = 0-420 deg F. Check heater fuses.

If the element is warm, just not heating in time, check for proper voltage at the heater element. Check that the thermocouple is seated tightly in the bayonet fitting in the manifold.

Vacuum Sensor Fault

Description: Occurs when the 1-5VDC signal is not received from the vacuum sensor.

Response: The analog voltage from the vacuum switch in the panel is 1 to 5 volts DC according the vacuum value measured 0-29.9 inchHg. Check this voltage between wires 68+ (pink wire) and 2-. If you have voltage, check all wiring to the analog card in the PLC. The voltage output should be 1 VDC at atmospheric pressure. If 0VDC is measured, the vacuum switch may need to be replaced.

Jaw Safety Fault

Description: The Jaw Closed Cylinder switch is ON when the program is commanding the Jaw to be open.

Response: Check the position of the reed switch on the snorkel as described for a Jaw Close Fault. Manually actuate the jaw and observe the reed switch indicator and input X4 going ON and OFF. Replace reed switch if it is not changing state.

TEMP. CONTROLLER ERROR MESSAGES

Thermocouple fault

Upper Display shows "**OPEN**" indicating that the thermocouple is open or unconnected. Check wiring and connection.

Upper display shows "**HH**" indicating that the thermocouple reading is > 5% over-range. Check that the thermocouple is type K and polarity is correct. Type K wire colors are yellow + and red-.

Upper display shows "**LL**" indicating that the thermocouple reading is > 5% under-range. Check that the thermocouple is type K and polarity is correct.

Default Condition

When the controller is first powered up, the upper display will show "**Goto**" and the lower display "**ConF**". This indicates that Configuration and setup are required. Press the Q key to enter Configuration mode on the controller. Press ^ or v keys to enter the unlock code number (20). Press the Q key to proceed to the Configuration menu. Enter the CV-Tek default parameters from chapter 7 in all menus as a starting point.

VACUUM SWITCH ERROR CODES

Zero Point fault Display shows “**E**” indicating that a zero point adjustment was executed at a vacuum level +-5% of full scale. Only perform a zero point adjustment at atmospheric pressure. Hold the A key for 2 seconds to zero the display with no pressure or vacuum applied to the switch.

Over current fault Display shows “**Ec**” indicating there was an over current condition on output 1 or output 2. Power down the unit. Most likely there is short to ground on the white or black vacuum switch wires.

Range Fault Display shows “**FFF**” indicating that the applied pressure or vacuum was outside of the display range. The display range is 0 to -29.9 inchHg. Most likely there is a positive pressure being applied to the switch. This could be caused by the gas valve sticking open or a malfunctioning Humphrey valve. If the error occurs during vacuum, most likely the transducer in the switch has come out of calibration.

TROUBLESHOOTING THE PLC

I/O Status Lights

The I/O status lights on the PLC, I/O cards and valve bank are important tools used in troubleshooting the A-200 PLC machine. There are 14 inputs and 10 outputs on the main PLC. Input terminals are on top and output terminals are on the bottom. The main status lights for inputs 0-13 are to the left of the main input terminal block. The main status lights for outputs 0-9 are to the left of the main output terminal block. The main input and output blocks are removable with the 2 screws on the outside.

There is a combo card in top slot 1 and 2 that also has 4 inputs and 4 outputs each. Each card has it's own status lights in the upper left corner. There is an analog input card in slot 3 for 0-10VDC signals. All top mount cards can be removed by depressing the tab on top and pulling straight out.

Figure 11-1. Status Lights on the PLC

The interface communicates with the PLC via a serial cable running from the comm. port on the PLC to the comm. port on the side of the interface. The cable has an 8-pin mini-DIN connector on the PLC end and a 9 pin female DSUB connector on the interface end. For communication to take place, the POWER and RUN indicators on the PLC must be lit.

The PLC requires a 24 VDC power source. Check for DC power at the +DC24 and -DC24 terminals (left most terminals on the lower main terminal) if the POWER status indicator is not lit. If you wish to check the status

of an input or output, determine which input or output is used. Check the electrical schematic included with your machine. Make a note of the input or output you wish to check.

Other Status Indicators

1. MS (Module Status) - Should be on (solid) GREEN when module cards are operational.
2. NS (Network Status) - Should be on (solid) or flashing GREEN when transmitting through the ethernet port. This should be the case when a network cable is connected to the PLC for programming.
3. POWER - Should be solid GREEN when input power to the PLC is ON.
4. RUN - If OFF, user program not being executed. Flashing GREEN indicates program transfer in progress. Solid GREEN indicates user program is executing.
5. FAULT - When RED a fault condition exists that requires power cycle.
6. FORCE - Should always be off. Lights AMBER when forces are active.
7. COMM - Should be on (solid) or flashing when transmitting through the RS232 port. This should be the case when the interface cable is connected to the touchscreen.

The lower left corner of the PLC has a MODE SWITCH. It must be in the REMOTE or RUN position for normal operation. For programming, the switch must be in REMOTE. Switch to RUN to disable program changes over the network.

Terminal Configuration

Figure 11-2. Terminal Config File Manager screen

Normally, the terminal is executing the program as loaded by CV-Tek. A terminal in configuration mode is shown above. This is the screen you would want to be in if a new screen program were to be loaded from a flash drive. Where it says SOURCE in the upper left, select USB. If there is an appro-priate *.cha file on the flash drive it will appear. Select it and press COPY. It will ask if you want to unload the current application. YES. Then switch the source back to Internal and the new program should appear. Select SET AS STARTUP so it appears on the bottom of the screen. Hit RUN to run the new application.

Or hitting the MAIN button on the right will jump to the main menu where you can adjust date/ time, calibrate the screen and more

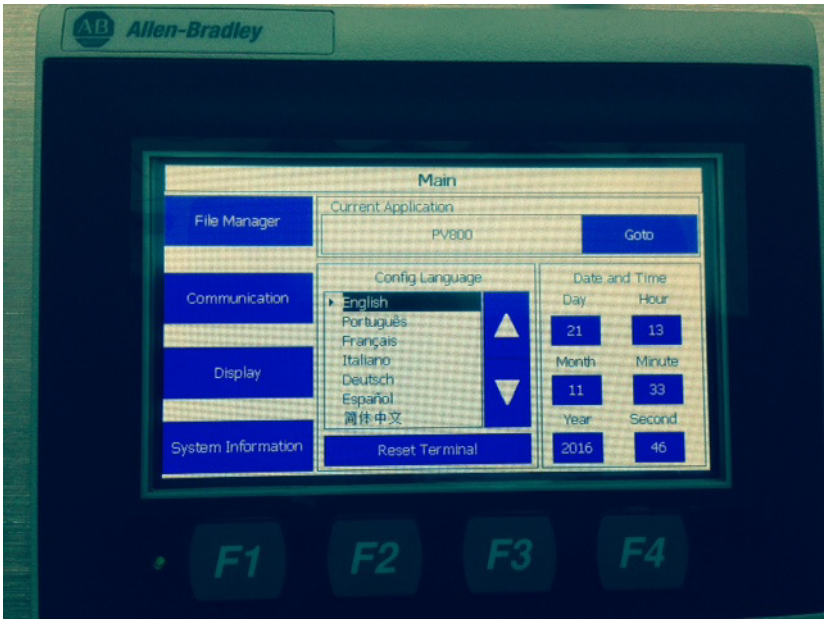


Figure 11-3. Main Config screen

When done, jump back to the FILE MANAGER SCREEN and select RUN.

Troubleshooting Using the I/O Status Lights

The exact point in the machine's sequence of operations where a problem is occurring can be pinpointed by monitoring the status lights.

- Determine where in the sequence of operation the machine is failing to function. For example, "the heat seal is not coming on"; or "the jaw should open at this point, but it doesn't".
- Consult the electrical schematic and note which output controls the action that is at issue. For example, O-1 extends the snorkels; or O-0 controls the jaw.

- Check to see if the input is in the proper state. For example, do I-6 and I-7 come on when the snorkels are up? Does I-4 come on when the jaw closes?
- If the output is correct, then check the output's fuse (if fused), solenoid, valve, and relay (if any). The goal is to examine each component between the PLC and the activating component, and discover which is not functioning.
- If the output is not being activated then most likely the machine is waiting for an input. Determine from the schematic which inputs must be made before the required output will trigger.

Maintenance Screen

View the current state of the PLC inputs and outputs without opening the control panel by using the Maintenance screens. Access the Maintenance screen shown below from the Status Screen by pressing the MAINT key. First the PLC inputs screen appears showing all current inputs that are energized in GREEN and those off in RED. Press NEXT and the PLC outputs screen appears showing all current outputs that are energized in GREEN and those off in RED.

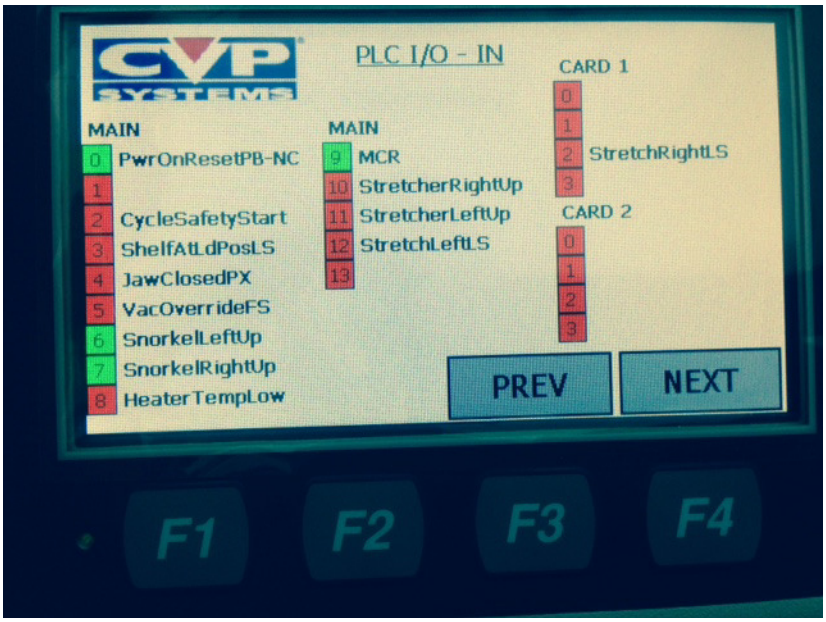


Figure 11-4. Maintenance screen - PLC Inputs

TROUBLESHOOTING SPECIFIC PROBLEMS

Jaw Won't Close.

- Check the light inside each start button to see if it lights when the button is activated.
- Check input I-2 to see if it lights when the start buttons are activated.
- When the operator interface display reads "PRESS START BUTTONS", check output O-0. It should light along with relay JR when the start buttons are swiped simultaneously. If the jaw closes but doesn't latch, suspect JR.
- Check fuse FU1, replace if needed.
- If your machine has a 2 hand safety relay, it should activate when both start buttons are pressed. IN1 and IN2 lights on the relay should both light green when the swipes are made. If not, it may be defective. Check all wiring including jumper between Y1 and Y2 terminals.
- Verify valve V1 operates manually by pressing the manual override. If no operation, troubleshoot as a pneumatic problem.
- Verify that solenoid V1 operates electrically by applying 24 VDC directly to fuse FU1. If no operation, replace solenoid.
- Replace valve V1.

The Machine is Not Working At All.

- Confirm that the machine has power.
- Check the MCR relay for power. If there is no power, check fuse FU101.
- Verify that the emergency stop button is pulled out.
- Check the operator interface for error messages. If there is an error message, troubleshoot as shown in the error messages section.
- Verify that the "POWER" and "RUN" lights on the PLC are lit. If not, check fuse FU2. Confirm that there is DC power to the PLC.
- If the "POWER" indicator light is lit but the "RUN" light is not, see if cycling power will bring it back into RUN mode. Cycle the MODE switch from program back to RUN. If the PLC is powered and the "POWER" or "RUN" lights are unlit then the PLC may need to be replaced.
- Confirm there is 24 VDC power between terminals 2 and 3 in the main panel and at the interface terminal connector in the front panel. If not, check fuse FU101.

The Machine Does Not Seal

- If the heat bar extends and the machine pauses in the seal stage for an appropriate amount of time, troubleshoot as a seal quality problem. Try adjusting heat seal settings in the operator interface.

- If the heat seal settings are OK, check the SP1 power output light on the temperature controller. When it lights, the SSR relay indicator lights should also light. Check heater element and both heater power fuses. Always check heater element with main power disconnected.

CV-Tek Part #	Nominal Size (in.)	Volts	Watts	Approx. Ohms
A-C-7707-141-B	48	440	1800	108
B-C-7707-141-B	48	220	1800	27
C-C-7707-141-B	57	440	2160	90
D-C-7707-141-B	57	220	2160	22
E-C-7707-141-B	70	220	2800	17
F-C-7707-141-B	70	440	2800	69
G-C-7707-141-B	100	220	3900	12
H-C-7707-141-B	100	440	3900	50
I-C-7707-141-B	48	120	1800	8
J-C-7707-141-B	57	120	1800	8

Figure 11-5. Heater Element Part Numbers and Information

- If the seal bar does not extend, check output O-4. If the output does not activate, the problem is not a seal problem. It might be a stretchers or snorkel up fault. Heat bar will not push until all snorkels and stretchers are in the UP position.
- Examine fuse FU5, Solenoid V5 and valve V5, in that order.

ASSISTANCE

When calling, for technical assistance or service, have the model (A-200) and serial number available for our customer service representative. This will allow us to more accurately assist you with your machine.

The serial number tag for the A-200 is located inside the main electrical enclosure door on the print pocket.

Contacting CV-Tek can be accomplished in three different ways; by phone, fax or e-mail. Please include model and serial numbers in all correspondents to CV-Tek.

Phone: +1 847 741-3500

Sales: Ext 1 sales@cv-tek.com
Parts: Ext 2 spareparts@cv-tek.com
Service: Ext 4 service@cv-tek.com

Fax: 847-741-3569

SECTION: 12

ASSEMBLIES

A-200MACHINE ASSEMBLIES

Customer Service

This section contains subassemblies for the A-200 Machine. By using the subassembly drawings you will be able to find the part(s) needed to repair the A-200 Machine. If you can not find the part(s) needed, contact CV-Tek customer service for assistance. When calling for parts or service, have the model and serial numbers available for our customer service representative to more accurately assist you:

The serial number for the A-200 is located on the document holder inside the electrical enclosure on the rear of the machine. (See Figure 12-1)

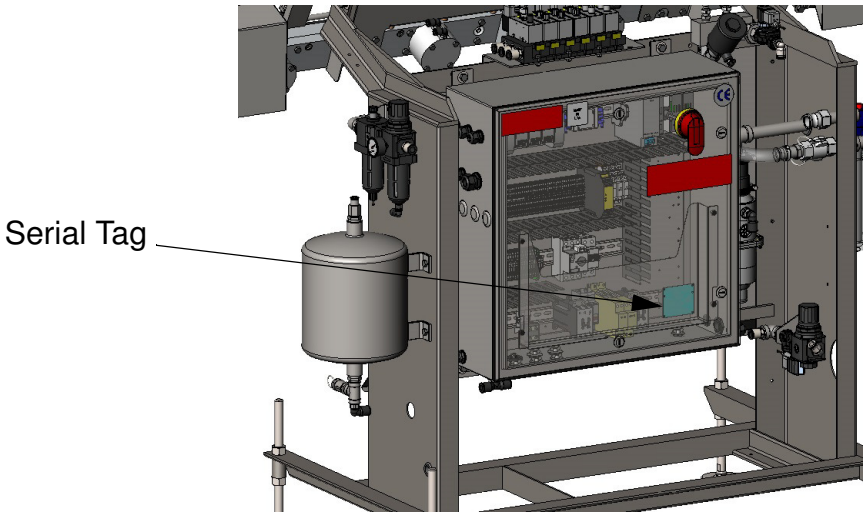


Figure 12-1. Serial Tag Location

Ordering Parts

Ordering parts from CV-Tek can be done by phone, fax or e-mail. Please include model and serial numbers in all correspondents to CV-Tek.

Phone: 847-741-3500 Ext 2

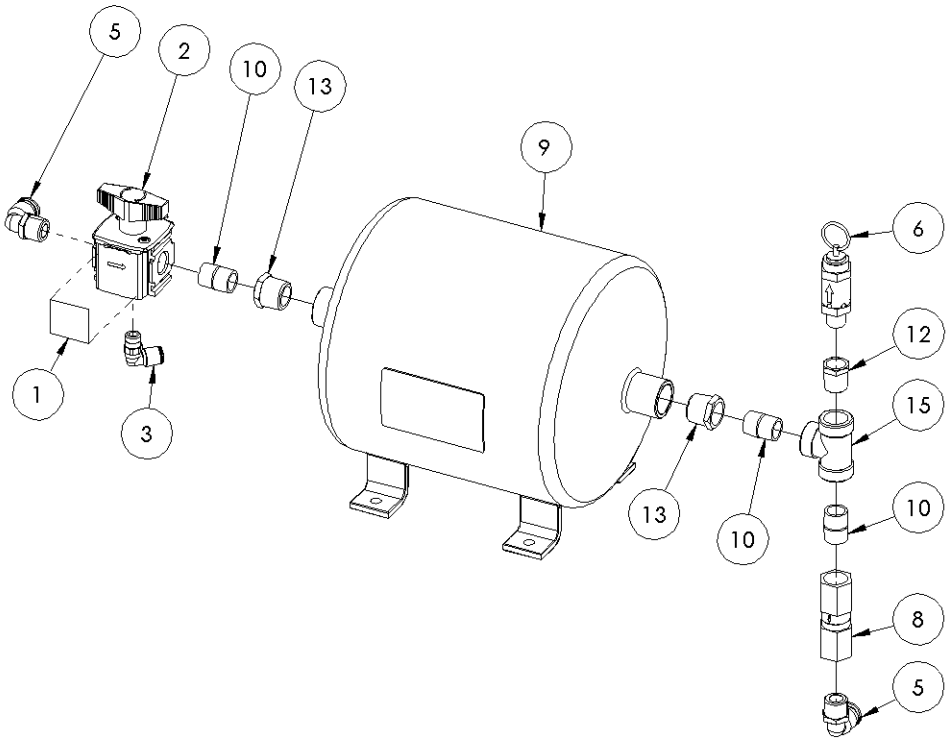
Fax: 847-741-3569

E-Mail: spareparts@cv-tek.com

ACCUMULATOR TANK ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	0210-1033	WARNING LABEL, COMPRESSED AIR
2	1	0651-1531	1/2 NPT LOCKOUT VALVE
3	1	269P-06-04	FITTING.TBG.ELB.3/8OD X 1/4NPT
5	2	269P-08-08	FITTING.ELB.1/2 NPT TO 1/2 OD
6	1	7707-2515	SAFETY RELIEF VALVE, 3/8" NPT, 125 PSI
8	1	7707-3168	EXCESS FLOW VALVE
9	1	C-7707-306	ACCUMULATOR TANK
10	3	SN1/2NPT	NIPPLE, 1/2" NPT X 1-1/8"
12	1	SSB1/2NPTX3/8	HEX BUSHING, 1/2"NPT X 3/8" NPT
13	2	SSB3/4NPTX1/2	HEX BUSHING, 3/4"NPT X 1/2" NPT
15	1	SST1/2NPT	TEE, 1/2" NPT

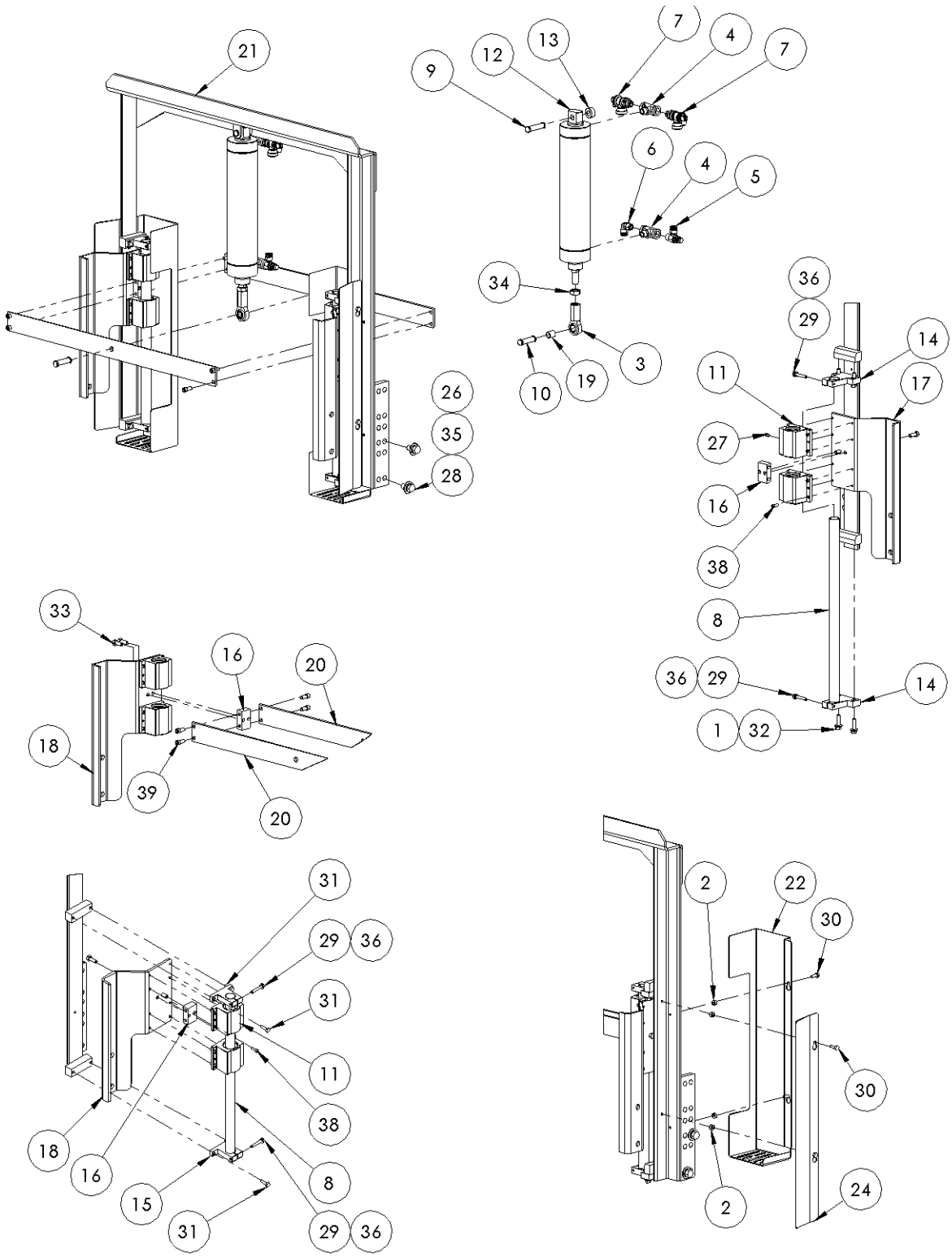
ASSEMBLY NUMBER: B-1110-0055-1



FLOATING HEAD ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	4	0210-1130	WASHER 5/16 ID X 3/4 OD X 1/16 THK.
2	8	1110-0086	SPACER, 1/4 ID X 1/2 OD X 1/4L
3	1	59915K47	BALL JOINT ROD END
4	2	7707-2367	STEM TEE, 3/8" NPT
5	1	7707-2368	FLOW CONTROL, 3/8NPT TO 3/8OD
6	1	7707-2369	FITTING, ELBOW, 3/8NPT TO 3/8 OD
7	2	7707-2528	LOCKOUT VALVE, 3/8OD x 3/8NPT
8	2	7707-321-1	SHAFT, GUIDE, ARMOLOY COATED
9	1	7707-3315	CLEVIS PIN, 1/2" X 2 1/16"
10	1	7707-3316	CLEVIS PIN, 1/2" X 1 13/16"
11	4	7707-462	BEARING-LINEAR
12	1	7707-502	CYLINDER, AIR, 10" STROKE
13	1	B-0210-2037	SPACER, 1/2" ID X 1" OD X 1/2"
14	2	B-1110-0152	SHAFT SUPPORT, 1"
15	2	B-7707-2685	SHAFT SUPPORT, 1"
16	2	B-7707-3236	SPACER BLOCK
17	1	B-7707-3261	UPPER FRAME CONNECTOR, RIGHT
18	1	B-7707-3262	UPPER FRAME CONNECTOR, LEFT
19	1	B810-6	BEARING, 1/2ID X 5/8OD X 3/4OAL
20	2	C-7707-3237	CROSS BAR
21	1	D-7707-3234	FLOATING HEAD WELDMENT
22	1	D-7707-3377L	ADJ HEAD SHAFT REAR GUARD
23	1	D-7707-3377R	ADJ HEAD SHAFT REAR GUARD
24	1	D-7707-3378L	ADJ HEAD SHAFT SIDE GUARD
25	1	D-7707-3378R	ADJ HEAD SHAFT SIDE GUARD
26	4	FW1/2-D	WASHER, FLAT
27	4	GF 1/4-28	FITTING, GREASE, STR. THREAD
28	4	HH1/2-13X1	SCREW, HEX HEAD
29	4	HH1/4-20X1-1/2	SCREW, HEX HEAD
30	8	HH1/4-20X3/4	SCREW, HEX HEAD
31	4	HH1/4-20X7/8	SCREW, HEX HEAD
32	4	HH5/16-18X1-1/4	SCREW, HEX HEAD
33	4	HH5/16-18X7/8	SCREW, HEX HEAD
34	1	JN5/8-18	NUT, JAM
35	4	LW1/2	WASHER, LOCK
36	4	LW1/4	WASHER, LOCK
37	4	LW5/16	WASHER, LOCK
38	16	SH10-32X5/8	SCREW, SOCKET HEAD
39	8	SH5/16-18X3/4	SCREW, SOCKET HEAD

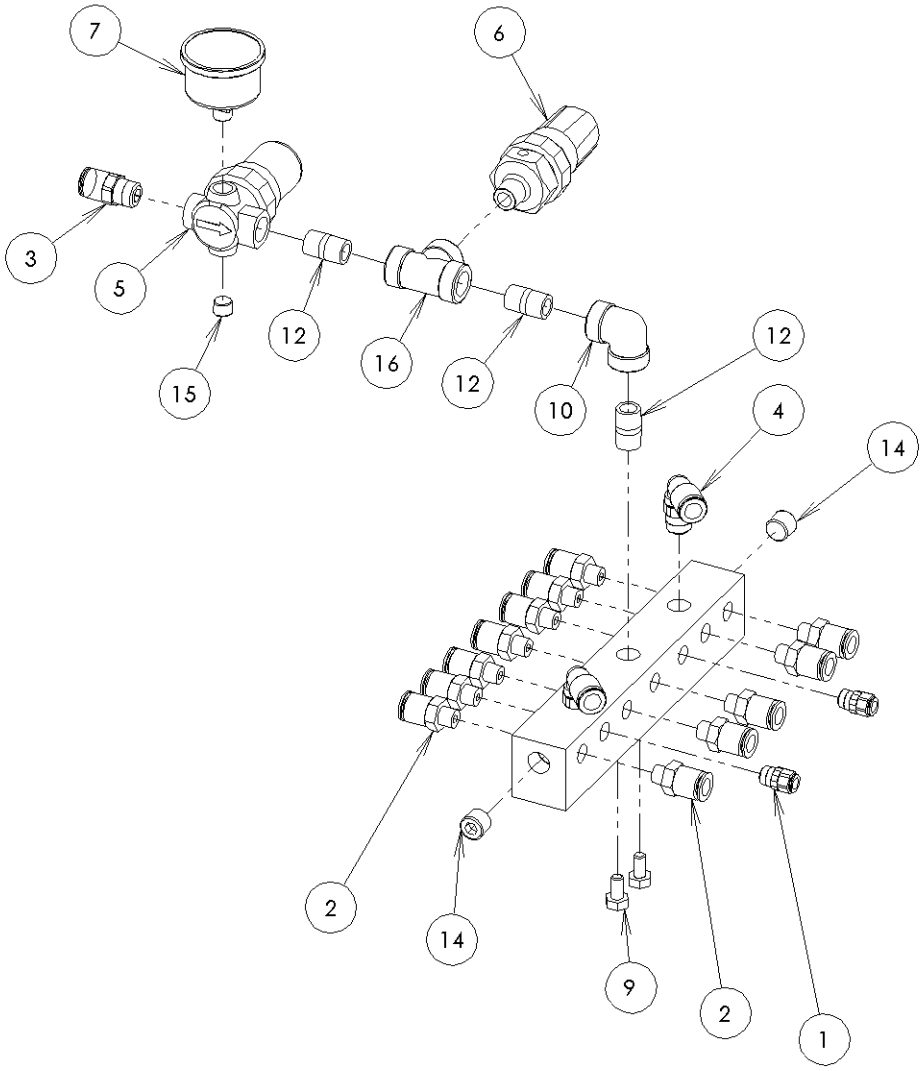
ASSEMBLY NUMBER: D-7707-3241



AIR MANIFOLD ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	268P-04-02	FITTING.TBG.STR.1/4OD X 1/8NPT
2	12	268P-06-02	FITTING.TBG.STR.3/8OD X 1/8NPT
3	1	268P-06-04	FITTING.TBG.STR.3/8OD X 1/4NPT
4	2	269P-06-04	FITTING.TBG.ELB.3/8OD X 1/4NPT
5	1	7707-118	REGULATOR, 1/4NPT 45PSI MAX.
6	1	7707-252	VALVE, RELIEF 1/4 NPT
7	1	7707-489	PRESSURE GAUGE
8	1	C-7707-1010	BLOCK TEE
9	2	HH1/4-20X1/2	SCREW, HEX HEAD
10	1	SE1/4NPT	90 DEG ELBOW, 1/4" NPT
12	3	SN1/4NPT	NIPPLE, 1/4" NPT X 7/8"
14	2	SRP1/4NPT	HEX PLUG, 1/4" NPT, RECESSED
15	1	SRP1/8NPT	HEX PLUG, 1/8" NPT, RECESSED
16	1	SST1/4NPT	TEE, 1/4" NPT

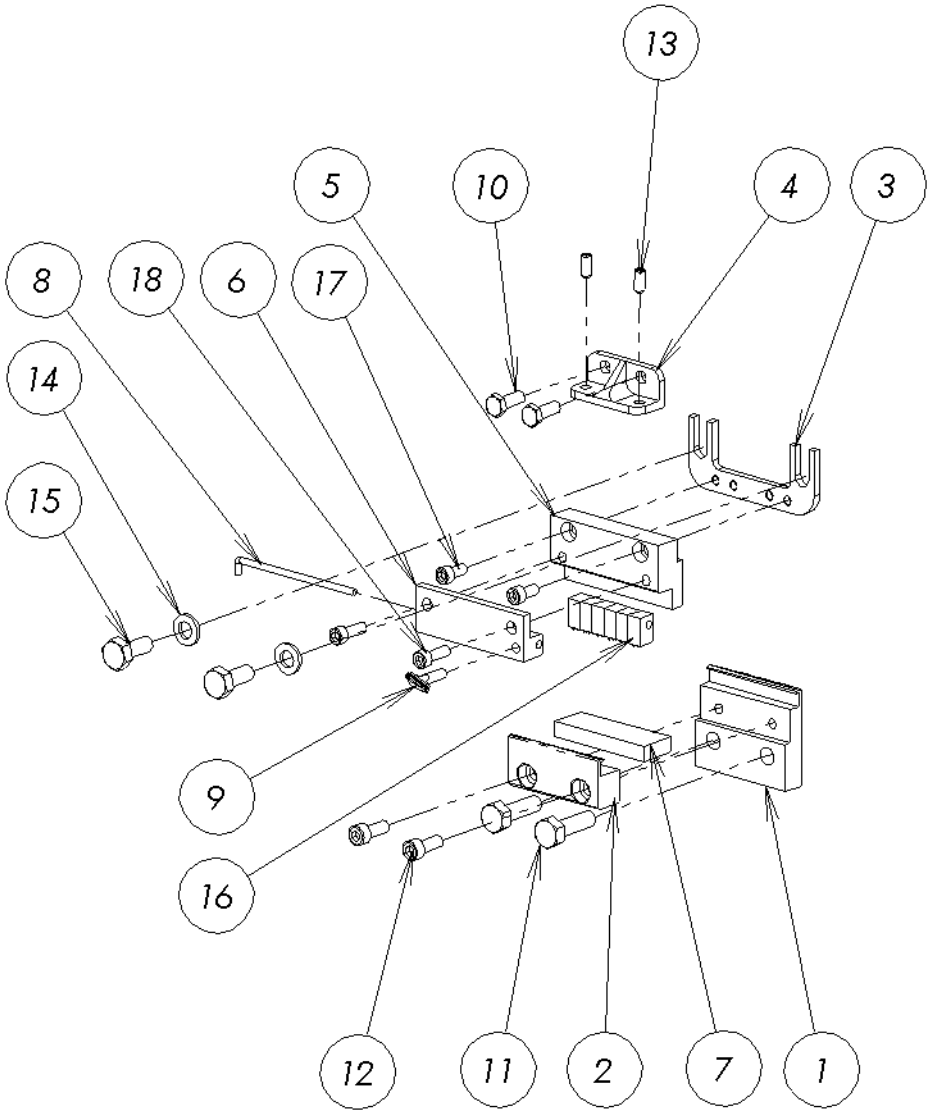
ASSEMBLY NUMBER: C-7707-1065



DATE CODER ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	B-7707-1053	CLAMP, BOTTOM DATE CODER
2	1	B-7707-1052	CLAMP, TOP DATE CODER
3	1	B-8013-380	BRACKET, MOUNTING DATE CODER
4	1	B-8013-381	BRACKET, ADJUSTING
5	1	B-8013-727	HOLDER, TYPE
6	1	B-8013-728	RETAINER, TYPE
7	1	B-8013-732	RUBBER, DATE CODER
8	1	B-9537-1588	PIN, RETAINING
9	1	91745A194	THUMBSCREW
10	2	HH10-32X1/2	SCREW, HEX HEAD
11	2	HH1/4-20X7/8	SCREW, HEX HEAD
12	2	SH10-32X1/2	SCREW, SOCKET HEAD
13	2	ST8-32X3/8	SCREW, SET, CUP POINT
14	2	FW 1/4-B	FLAT WASHER
15	2	HH1/4-20X5/8	SCREW, HEX HEAD
16	6	N/A	NUMBER, DATE CODER
17	2	SH8-32X3/8	SCREW, SOCKET HEAD
18	2	SH8-32X1/2	SCREW, SOCKET HEAD

ASSEMBLY NUMBER: C-7707-1060

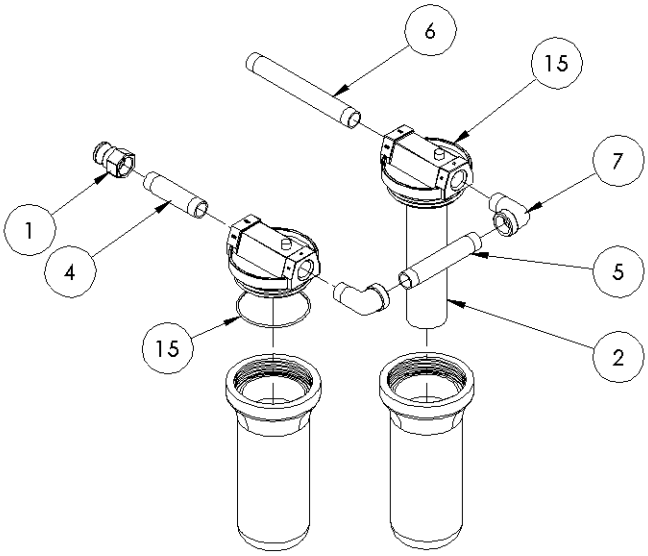


FILTER/SEDIMENT BOWL ASSEMBLY, DOUBLE

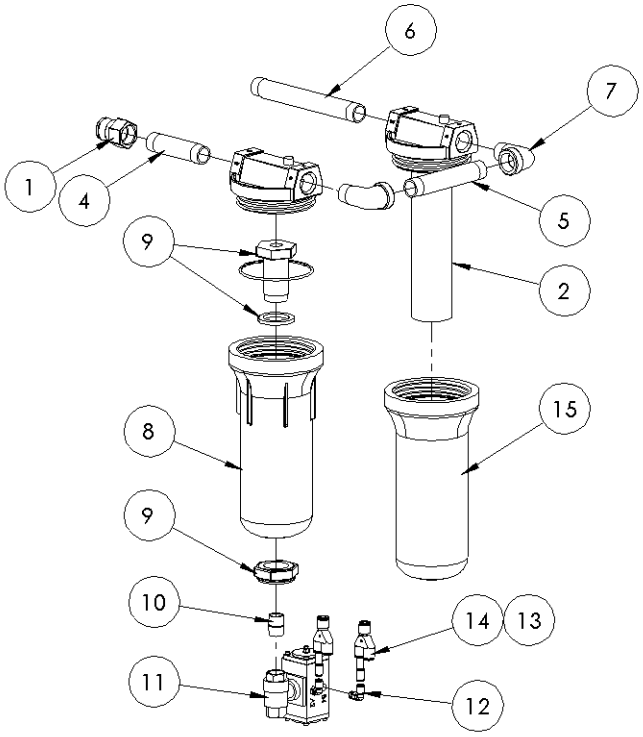
ITEM NO.	-0/QTY.	-1/QTY.	PART NUMBER	DESCRIPTION
1	1	1	1110-0090	MALE ADAPTER, 3/4 NPT
2	1	1	5165K421	FILTER, 5 MICRON CARTRIDGE
3	2	1	7707-156	SEDIMENT BOWL
4	1	1	SN3/4NPTX4	NIPPLE, 3/4" NPT X 4"
5	1	1	SN3/4NPTX5-1/2	NIPPLE, 3/4" NPT X 5-1/2"
6	1	1	SN3/4NPTX8	NIPPLE, 3/4" NPT X 8"
7	2	2	SSE3/4NPT	90 DEG ST ELBOW, 3/4" NPT
8	-	1	B-7504-545	SEDIMENT BOWL W/ DRAIN
9	-	1	7707-902	BULKHEAD, 1/2" NPT
10	-	1	SN1/2NPT	NIPPLE, 1/2" NPT X 1-1/8"
11	-	1	7707-2208	BALL VALVE, PNEUMATIC
12	-	2	269P-04-02	FITTING, TBG, ELBOW, 1/4 OD X 1/4 NPT
13	-	2	3166-56-60	FITTING,TBG,RED,3/8X1/4
14	-	2	3140-60-00	TBG WYE.3/8OD.
15	2	2	151120	REPLACEMENT O-RING

OPTIONS:
-0: STANDARD
-1: AUTO DUMP

ASSEMBLY NUMBER: C-7707-3180



OPTION -0

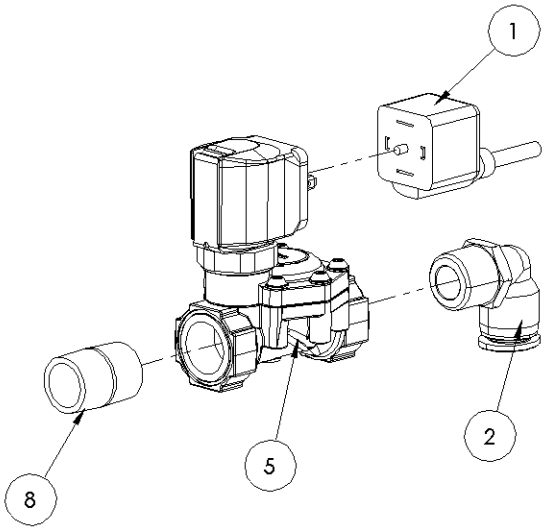


OPTION -1

GAS VALVE ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	1110-0164	ISO DIN CONNECTOR, 24VDC, 6FT
2	1	269P-08-08	FTG.TBG.ELB.1/2ODX1/2NPT
5	1	7707-3149	VALVE, 2-WAY, 24VDC
8	1	SN1/2NPT	NIPPLE, 1/2" NPT X 1-1/8"

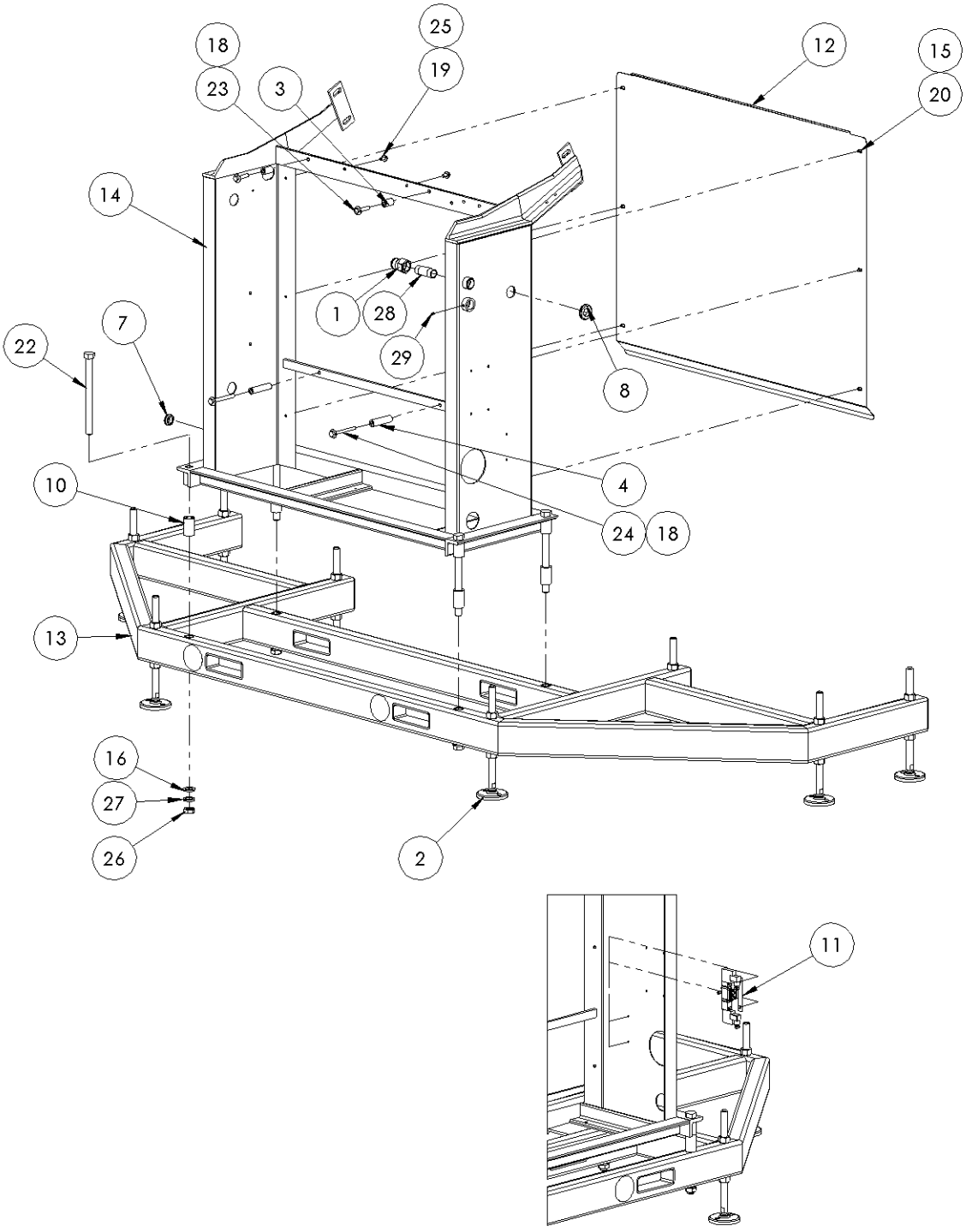
ASSEMBLY NUMBER: C-7707-1840-3



MAIN FRAME ASSEMBLY, LOWER

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	1110-0090	MALE ADAPTER, 3/4 NPT
2	8	7707-1925	ASSEMBLY DROP LEG
3	2	7707-2937	SPACER, ENCLOSURE
4	2	7707-2938	SPACER, ENCLOSURE (LOWER)
5	4	7707-3156	LABEL, FORK LIFT POINT
6	25	88-W	TUBE, POLYFLO, 1/2" OD
7	1	9602K12	GROMMET, RUBBER, 23/32" I.D.
8	1	9602K14	GROMMET, RUBBER, 1" I.D.
9	1	B-7707-2132	SPACER, BIN FRAME
10	4	B-7707-2858	SPACER, BIN FRAME, SHORT
11	1	B-7707-3139	ASSY, FLOAT HD SOL VALVE
12	1	D-7707-2980	COVER, FRAME
13	1	D-7707-3152	BASE WELDMENT, COMBO BIN
14	1	D-7707-3221	FRAME WELDMENT
15	6	FW1/4-A	WASHER, FLAT
16	3	FW3/4-A	WASHER FLAT
17	1	FW3/4-A	WASHER, FLAT
18	4	FW3/8-A	WASHER, FLAT
19	2	FW5/16-A	WASHER, FLAT
20	6	HH1/4-20X3/8	SCREW, HEX HEAD
21	1	HH3/4-10X14	SCREW, HEX HEAD
22	4	HH3/4-10X9	SCREW, HEX HEAD
23	2	HH3/8-16X1-3/4	SCREW, HEX HEAD
24	2	HH3/8-16X3-1/2	SCREW, HEX HEAD
25	2	HH5/16-18X5/8	SCREW, HEX HEAD
26	4	JN3/4-10	NUT, JAM
27	4	LW3/4	WASHER, LOCK
28	1	SN3/4NPTX2-1/2	NIPPLE, 3/4" NPT X 2-1/2"
29	1	ST1/4-20X1/4	SCREW, SET, SOCKET
30	100	44-W	TUBING, POLY-FLO, 1/4"
31	100	66-W	TUBING, POLY-FLO, 3/8"

ASSEMBLY NUMBER: D-7707-3246



SNORKEL ASSEMBLY

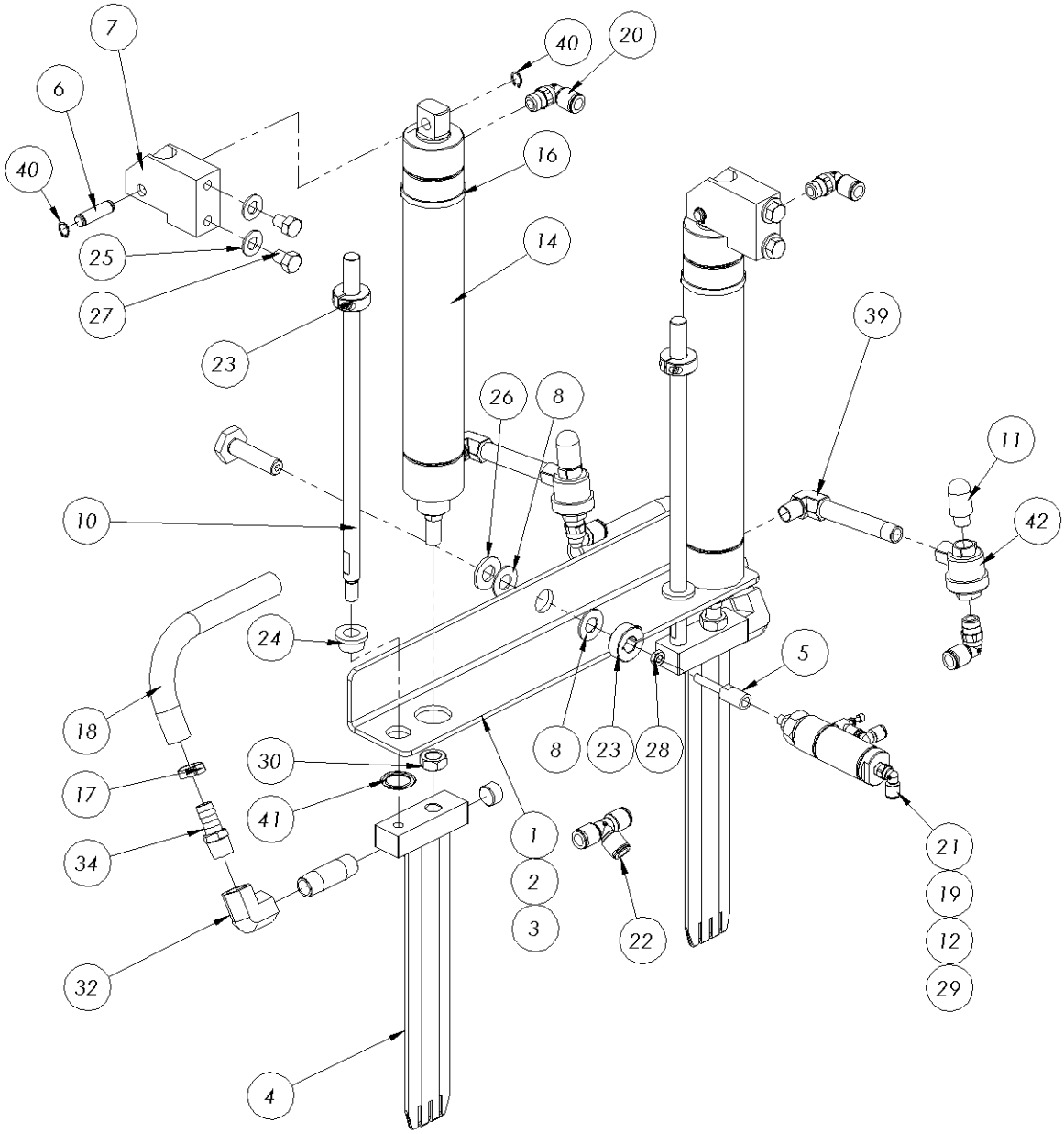
ITEM NO.	-1/QTY.	-3/QTY.	-5/QTY.	PART NUMBER	DESCRIPTION
1	-	-	1	C-7707-2427	ANGLE, CYL MTG, 26" CENTERS
1	1	-	-	C-7707-2426	ANGLE, CYL MTG, 12" CENTERS
3	-	1	-	C-7707-2425	ANGLE, CYL MTG, 8" CENTERS
4	2	2	2	C-7707-1037	SNORKEL.A200
5	1	1	1	B-7707-1168	EXTENTION, PISTON ROD
6	2	2	2	B-7707-1152	PIN CLEVIS
7	2	2	2	B-7707-1151	BRACKET, CYLINDER
8	2	2	2	B-7707-149	RUBBER GASKET
9	1	1	1	B-7707-0041	POST, SNORKELS
10	2	2	2	B-7707-20	GUIDE ROD, SNORKELS
11	2	2	2	9537-1258	MUFFLER.POLY.0.25NPT
12	1	1	1	9537-1184	FLOW CONTROL
13	-	1	-	7707-2406	FITTING, ELBOW, EXTENDED
14	2	2	2	7707-1181	CYLINDER, AIR
15	1	1	1	7707-1165	CYLINDER, AIR
16	2	2	2	0550-1321	CYLINDER POSITION SWITCH
17	2	2	2	52545K72	CLAMP.CRIMP.0.50ID HOSE
18	10'	10'	10'	5238K75	HOSE, CLEAR, 1/2" I.D.
19	1	1	1	3182-56-00	ELBOW, PLUG-IN, 1/4OD
20	4	3	4	269P-06-04	FITTING.TBG.ELB.3/8OD X 1/4NPT
21	1	1	1	269P-04-02	FITTING.TBG.ELB.1/4OD X 1/8NPT
22	1	1	1	264P-06	FITTING.TBG.TEE.3/8OD
23	3	3	3	15414	COLLAR, 1/2" SHAFT
24	2	2	2	FB912-4	BEARING, FLANGE
25	4	4	4	FW3/8-A	WASHER, FLAT
26	1	1	1	FW1/2-A	WASHER, FLAT
27	4	4	4	HH3/8-16X1/2	HEX HEAD 3/8-16-1/2 STAINLESS STEEL
28	1	1	1	JN1/4-28	NUT, JAM
29	1	1	1	JN5/16-24	NUT, JAM
30	2	2	2	JN1/2-20	NUT, JAM
31	-	1	-	SE 1/4 NPT	ELBOW 1/4 NPT
32	2	2	2	SE 3/8 NPT	ELBOW, FEMALE, 3/8 NPT
33	2	2	2	SRP3/8NPT	HEX PLUG, 3/8 NPT
34	2	2	2	SSH1/2X3/8NPT	HOSE BARB
35	-	1	-	SN 1/4 NPT 1-1/2 LG	NIPPLE 1/4 NPT
36	2	2	2	SN 1/4 NPT 3-1/2 LG	NIPPLE 1/4 NPT
37	2	2	-	SN 3/8 NPT 2 LG	NIPPLE 3/8 NPT
38	-	-	2	SN3/8NPTX3-1/2LG	NIPPLE 3/8 NPT
39	2	1	2	SSE 1/4 NPT	STREET ELBOW 1/4 NPT
40	4	4	4	5100-37H	CLIP, RETAINER S.S.
41	2	2	2	7707-160	RING, RETAINING, 3/4"OD, LOCKING
42	2	2	2	0243-420	VALVE, QUICK EXHAUST
OPTIONAL	2	2	2	C-7707-1289	SNORKEL, POWDER
OPTIONAL	2	2	2	C-7707-1166	SNORKEL, PEANUT

OPTIONS- -1: 12” SNORKEL CENTERS

-3: 8” SNORKEL CENTERS

-5: 26” SNORKEL CENTERS

ASSEMBLY NUMBER: D-7707-1183



SNORKEL ASSEMBLY, EXTENDED

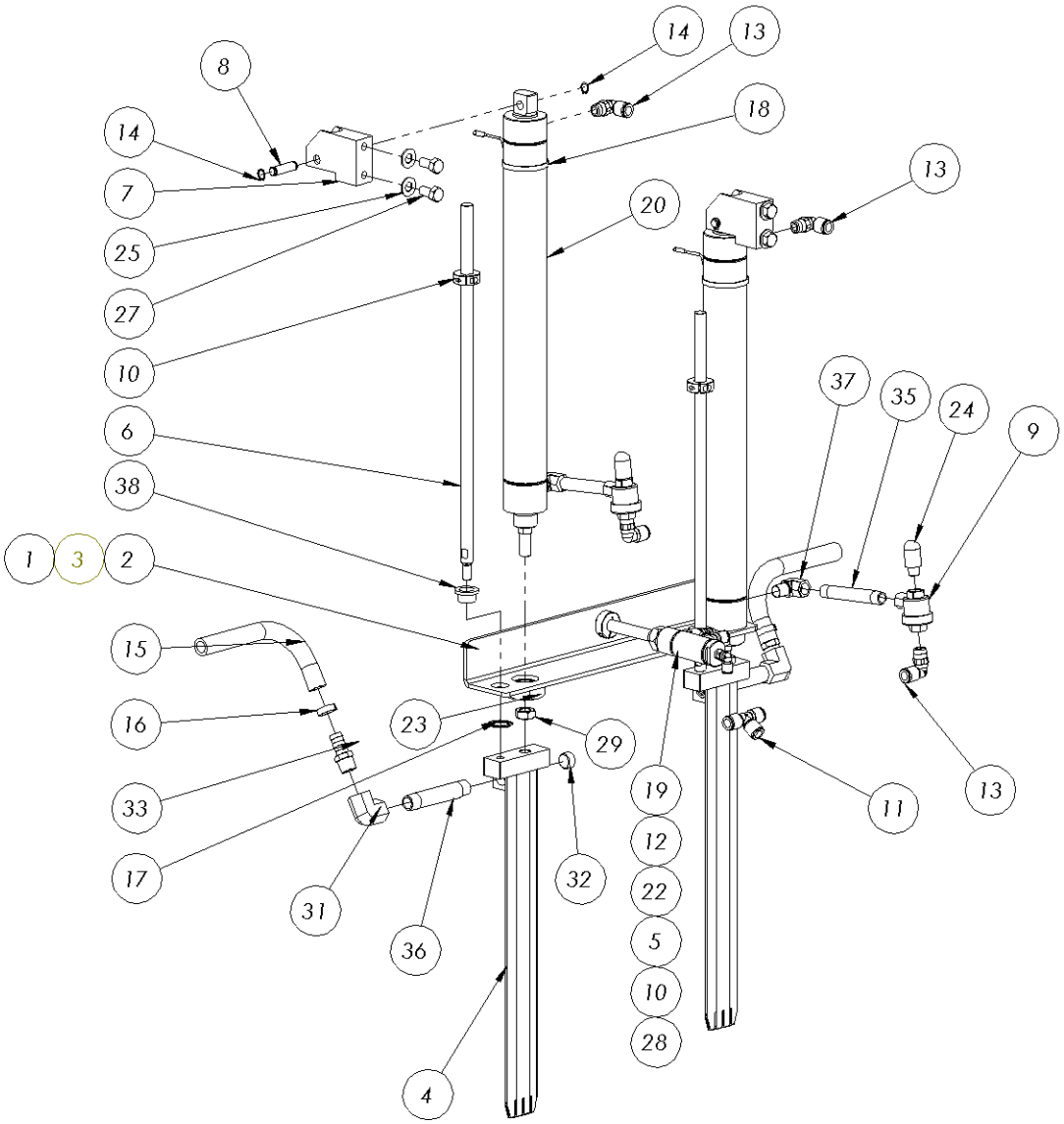
ITEM NO.	-0/QTY.	-1/QTY.	-2/QTY.	PART NUMBER	DESCRIPTION
1	-	-	1	C-7707-2427	ANGLE, CYL MTG, 26" CENTERS
2	-	1	-	C-7707-2426	ANGLE, CYL MTG, 12" CENTERS
3	1	-	-	C-7707-2425	ANGLE, CYL MTG, 8" CENTERS
4	2	2	2	C-7707-1409	EXTENDED SNORKEL, RH
5	1	1	1	B-7707-2405	SNORKEL POST
6	2	2	2	B-7707-1407	GUIDE ROD, EXT STROKE SNORKEL
7	2	2	2	B-7707-1151	BRACKET, CYLINDER
8	2	2	2	B-7707-1152	PIN CLEVIS
9	2	2	2	0243-420	VALVE, QUICK EXHAUST
10	3	3	3	15414	COLLAR, 1/2" SHAFT
11	1	1	1	264P-06	FITTING.TBG.TEE.3/8OD
12	1	1	1	269P-04-02	FITTING.TBG.ELB.1/4OD X 1/8NPT
13	3	4	4	269P-06-04	FITTING.TBG.ELB.3/8OD X 1/4NPT
14	4	4	4	5100-37H	CLIP, RETAINER S.S.
15	10'	10'	10'	5238K75	HOSE, CLEAR, 1/2" I.D.
16	2	2	2	52545K72	CLAMP.CRIMP.0.50ID HOSE
17	2	2	1	7707-160	RING, RETAINING, 3/4"OD, LOCKING
18	2	2	2	0550-1321	CYLINDER POSITION SWITCH
19	1	1	1	7707-1165	CYLINDER, AIR
20	2	2	2	7707-1428	CYLINDER, AIR
21	1	-	-	7707-2406	FITTING, ELBOW, EXTENDED
22	1	1	1	7707-2407	FLOW CONTROL, 1/4OD TO 1/8NPT
23	2	2	2	7707-2772	NUT, 1-1/8-12
24	2	2	2	9537-1258	MUFFLER.POLY.0.25NPT
25	4	4	4	FW3/8-A	WASHER, FLAT
26	1	1	1	FW1/2-A	WASHER, FLAT
27	4	4	4	HH3/8-16X3/4	SCREW, HEX HEAD
28	1	1	1	JN5/16-24	NUT, JAM
29	2	2	2	JN1/2-20	NUT, JAM
30	1	-	-	SE 1/4 NPT	ELBOW 1/4 NPT
31	2	2	2	SE 3/8 NPT	ELBOW, FEMALE, 3/8 NPT
32	2	2	2	SRP3/8NPT	HEX PLUG, 3/8 NPT
33	2	2	2	SSH1/2X3/8NPT	HOSE BARB
34	1	-	-	SN1/4 NPT 1-1/2 LG	NIPPLE 1/4 NPT
35	2	2	2	SN1/4 NPT 3-1/2 LG	NIPPLE 1/4 NPT
36	2	2	2	SN3/8NPTX3-1/2LG	NIPPLE 3/8 NPT
37	1	2	2	SSE1/4 NPT	STREET ELBOW 1/4 NPT
38	2	2	2	FB912-4	BEARING, FLANGE
OPTIONAL	2	2	2	C-7707-1509	EXTENDED SNORKEL, POWDER

OPTIONS- 0: 8” SNORKEL CENTERS

1: 12” SNORKEL CENTERS

2: 26” SNORKEL SPACING

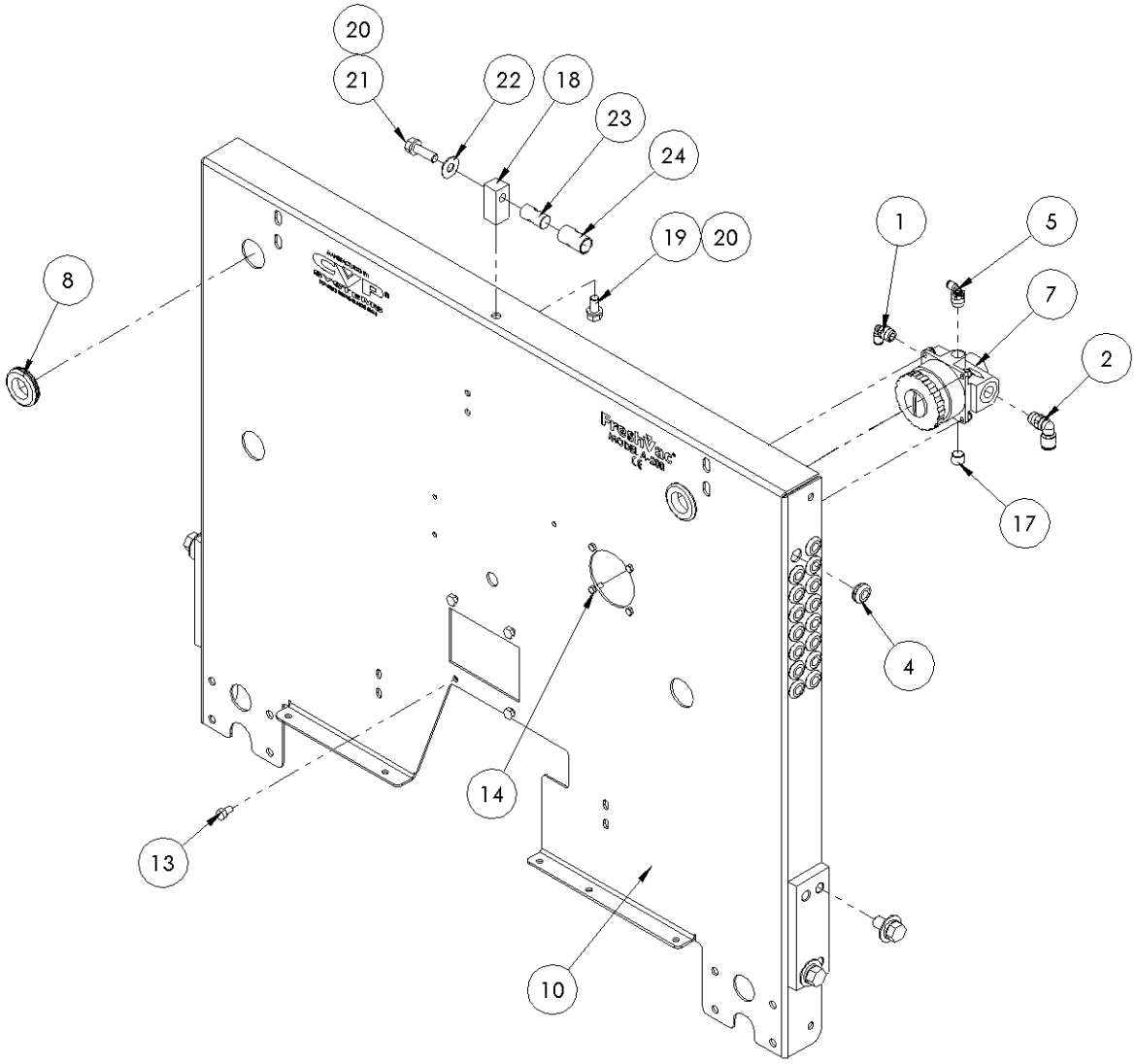
ASSEMBLY NUMBER: D-7707-2025



UPPER FRAME ASSEMBLY, 100”

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	269P-04-04	FITTING.TBG.ELB.1/4OD X 1/4NPT
2	1	269P-06-04	FITTING.TBG.ELB.3/8OD X 1/4NPT
4	32	2858	GROMMET, RUBBER, 25/64" I.D.
5	1	4/14/3109	FITTING.TBG.ELB.5/32OD X 1/4NPT
7	1	7707-493	REGULATOR
8	2	9602K14	GROMMET, RUBBER, 1" I.D.
10	1	D-7707-2130-1	UPPER FRAME, 26" CENTERS, FLOAT HD, PLC
11	4	FW1/2-D	WASHER, FLAT
12	4	HH1/2-13X1	SCREW, HEX HEAD
13	4	HH1/4-20X1/2	SCREW, HEX HEAD
14	4	HH10-32X1/2	SCREW, HEX HEAD
15	4	LN10-32	NUT, LOCK
16	4	LW1/2	WASHER, LOCK
17	1	SRP1/4NPT	HEX PLUG, 1/4" NPT, RECESSED
18	1	B-8013-1796	CLEVIS
19	1	HH3/8-24X3/4	SCREW, HEX HEAD
20	2	LW3/8	WASHER, LOCK
21	1	HH3/8-16X1-1/4	SCREW, HEX HEAD
22	1	FW3/8-A	WASHER, FLAT
23	1	B-7707-1575	ROD CLAMP PIN, CONTROL BOX
24	1	B-7707-1574	ROD CLAMP TUBE

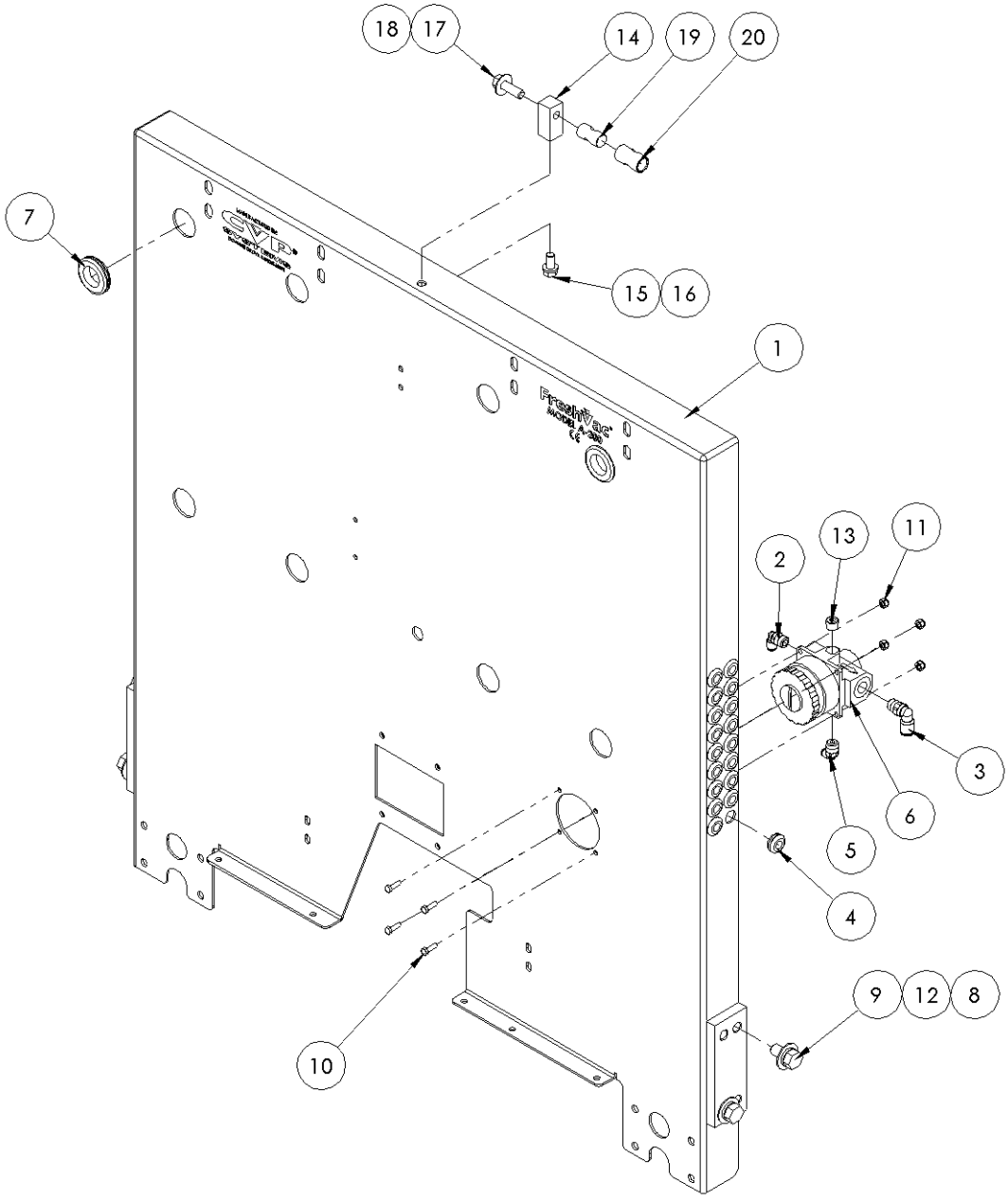
ASSEMBLY NUMBER: D-7707-2131-1



UPPER FRAME ASS'Y, EXTENDED SNORKELS

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	269P-04-04	FITTING.TBG.ELB.1/4OD X 1/4NPT
2	1	269P-06-04	FITTING.TBG.ELB.3/8OD X 1/4NPT
3	36	2858	GROMMET, RUBBER, 25/64" I.D.
4	1	4/14/3109	FITTING.TBG.ELB.5/32OD X 1/4NPT
5	1	7707-493	REGULATOR
6	2	9602K14	GROMMET, RUBBER, 1" I.D.
7	1	B-7707-1574	ROD CLAMP TUBE
8	1	B-7707-1575	ROD CLAMP PIN, CONTROL BOX
9	1	B-8013-1796	CLEVIS
10	1	D-7707-1902-1	UPPER FRAME, 12"/26" SNORK, 70"/100" FLOOR, PLC
11	4	FW1/2-D	WASHER, FLAT
12	1	FW3/8-A	WASHER, FLAT
13	4	HH1/2-13X1	SCREW, HEX HEAD
14	4	HH10-32X5/8	SCREW, HEX HEAD
15	1	HH3/8-16X1-1/4	SCREW, HEX HEAD
16	1	HH3/8-24X3/4	SCREW, HEX HEAD
17	4	LN10-32	NUT, LOCK
18	4	LW1/2	WASHER, LOCK
19	2	LW3/8	WASHER, LOCK
20	1	SRP1/4NPT	HEX PLUG, 1/4" NPT, RECESSED

ASSEMBLY NUMBER: D-7707-1918-1



VACUUM PUMP ASSEMBLY, HIGH CAPACITY

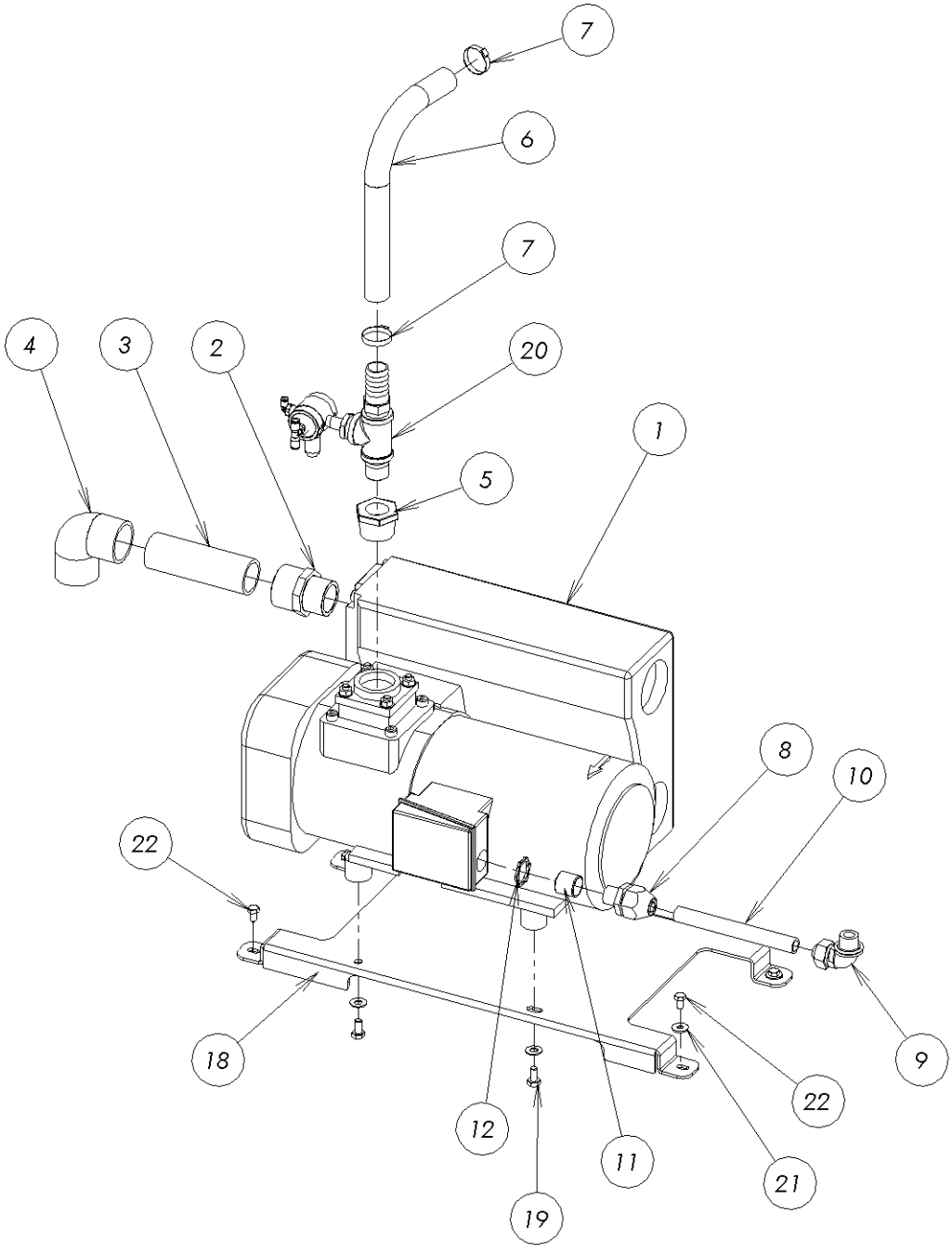
ITEM NO.	-0/QTY.	-1/QTY.	PART NUMBER	DESCRIPTION
1	1	1	7707-2083	PUMP.VACUUM.HIGH CAPACITY
2	1	1	MA1-1/4	ADAPTER.PVC.1-1/4NPT X 1-1/4 PIPE.MALE
3	1	1	PP1-1/4X5	PIPE.PVC.1.25 X 5.00LG
4	1	1	PE1-1/4	ELBOW.PVC.1.25PIPE X 90DEG
5	1	1	SSB1-1/4X3/4NPT	BUSHING.HEX.SS.1.25NPT X 0.75NPT
6	1	1	9537-1432	HOSE, HIGH FLOW
7	2	2	52545K58	CLAMP, GAPLESS HOSE
8	1	1	ST38	CONNECTOR, SEALTITE, 3/8
9	1	1	ST9038	CONNECTOR.SEALTITE.1/2NPT X 3/8
10	1	1	LA10	SEALTITE, 3/8"
11	1	1	RE21	BUSHING, REDUCER
12	1	1	BL75	LOCKNUT CONDUIT
13	6	6	30-073	WIRE NUT
14	1	1	PN10-10R-L	RING TERMINAL
15	1	1	WG 14-AWG	WIRE, GREEN/YELLOW MTW, 48"
16	1	1	MLW14-AWG	WIRE, BLACK, TYPE M
17	3	3	FW5/16-A	WASHER, FLAT
18	1	1	C-7707-2377	PLATE, PUMP MOUNTING
19	3	3	HH8MMX16MM	SCREW, HEX HEAD, METRIC
20	1	-	D-7707-2019	ASSY.VAC SWITCH VENT.STD
21	2	2	FW1/4-B	FLAT WASHER
22	4	4	HH1/4-20X1/2	SCREW, HEX HEAD
23	-	1	D-7707-2001	ASSY.VAC SWITCH VENT.AUTO DUMP

OPTIONS- -0: STANDARD

-1: AUTO DUMP

Note: For additional information on the vacuum pump see Section 5. For detailed information on the vacuum pump see the pump manufacturer's "Operating Instructions" manual that accompanied the machine.

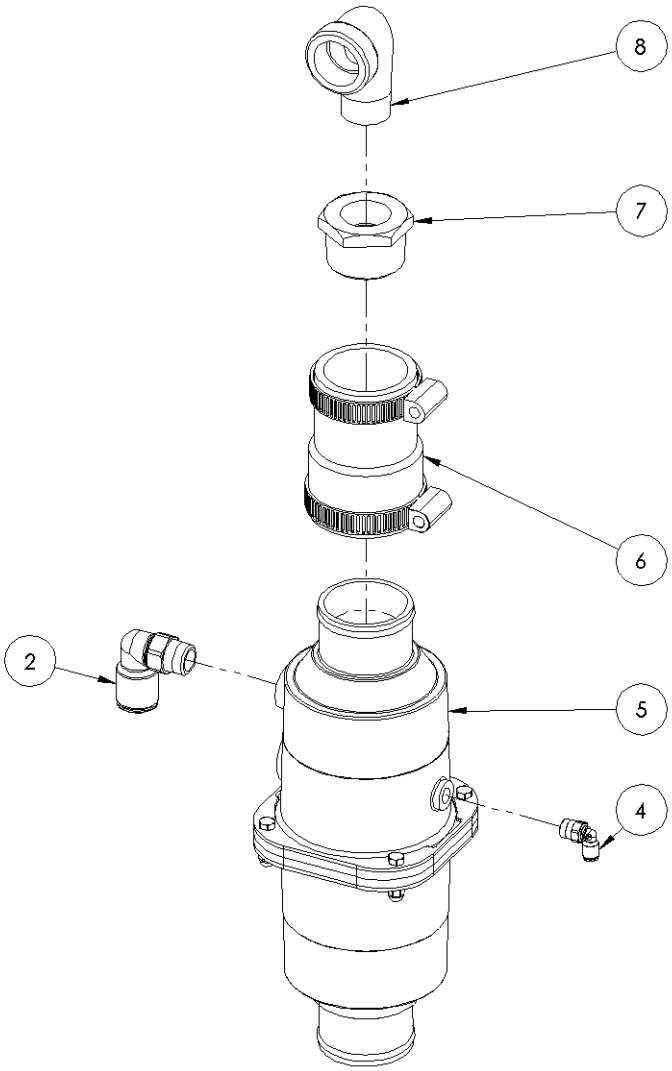
ASSEMBLY NUMBER: C-7707-2084



VACUUM PUMP ASSEMBLY, VENTURI

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
2	1	269P-08-06	FITTING.TBG.ELB, 1/2OD X 3/8NPT
3	1	272P-04-02	FITTING.TBG.TEE.1/4OD X 1/8NPT
4	1	4/11/3109	FITTING.TBG.ELB.5/32OD X 1/8NPT
5	1	7707-1798	PUMP, VACUUM, VENTURI
6	1	7707-2688	COUPLING, FLEX, 1.5PIPE X 1.25PIPE
7	1	SSB1-1/4X3/4NPT	HEX BUSHING, 1-1/4"NPT X 3/4" NPT
8	1	SSE3/4NPT	90 DEG ST ELBOW, 3/4" NPT

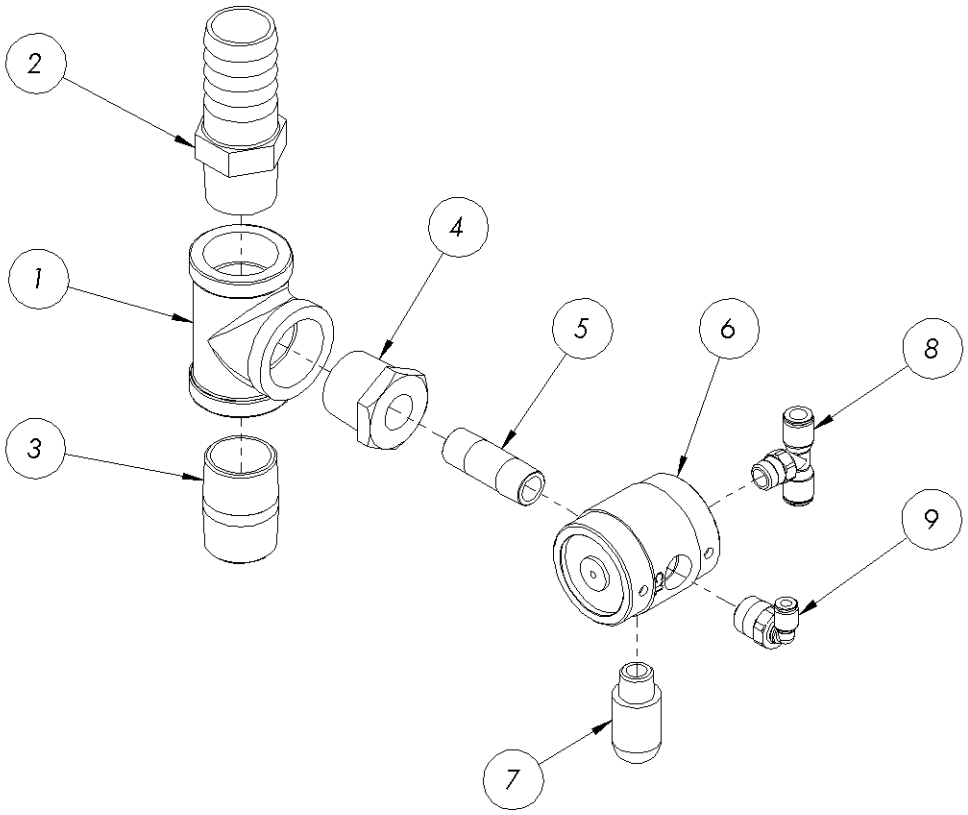
ASSEMBLY NUMBER: D-7707-1808-1



VACUUM RELIEF SWITCH ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	SST3/4NPT	NPB TEE 3/4 NPT
2	1	SSH1X3/4NPT	BARB, HOSE, 1"ID X 3/4NPT
3	1	SN 3/4 NPT	NIPPLE, LG BRASS
4	1	SB3/4NPTX1/4NPT	NPB BUSHING, 3/4NPT TO 1/4NPT
5	1	SN1/4 NPT 1-1/2 LG	NPB NIPPLE 1/4 NPT
6	1	7707-251	VALVE.2-WAY.NC.VAC.HUMPHREY
7	1	9537-1258	MUFFLER.POLY.0.25NPT
8	1	272P-04-02	FITTING.TBG.TEE.1/4OD X 1/8NPT
9	1	3109-04-14	FITTING.TBG.ELB.5/32OD X 1/4NPT

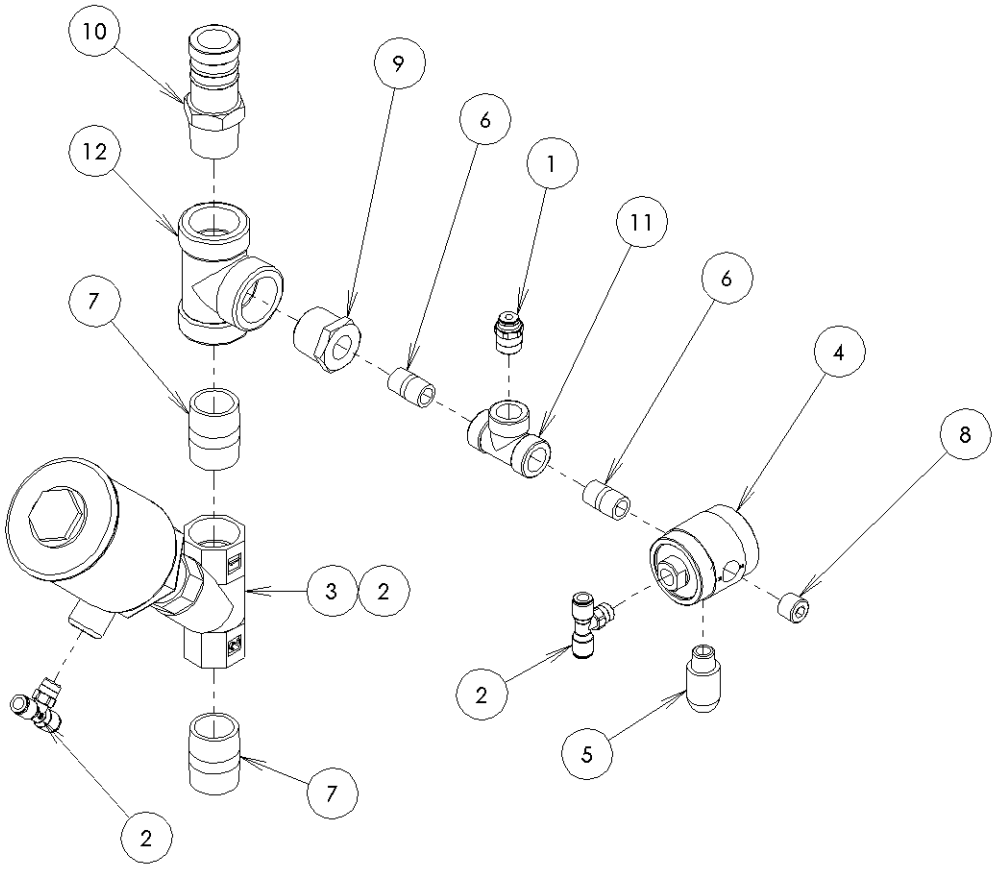
ASSEMBLY NUMBER: D-7707-2019



VACUUM VALVE/RELIEF ASSEMBLY, AUTO DUMP

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	268P-03-04	FITTING.TBG.STR.5/32OD X 1/4NPT
2	2	272P-04-02	FITTING.TBG.TEE.1/4OD X 1/8NPT
3	1	7707-2372	VALVE.PISTON.SS.0.75NPT.50MM.NC
4	1	7707-496	VALVE, 2-WAY, NC (PRESSURE)
5	1	9537-1258	MUFFLER.POLY.0.25NPT
6	2	SN1/4NPT	NIPPLE, 1/4" NPT X 7/8"
7	2	SN3/4NPT	NIPPLE, 3/4" NPT X 1-3/8"
8	1	SRP1/4NPT	HEX PLUG, 1/4" NPT, RECESSED
9	1	SSB3/4NPTX1/4	HEX BUSHING, 3/4"NPT X 1/4" NPT
10	1	SSH1X3/4NPT	HOSE BARB, 1" OD X 3/4" NPT
11	1	SST1/4NPT	TEE, 1/4" NPT
12	1	SST3/4NPT	TEE, 3/4" NPT

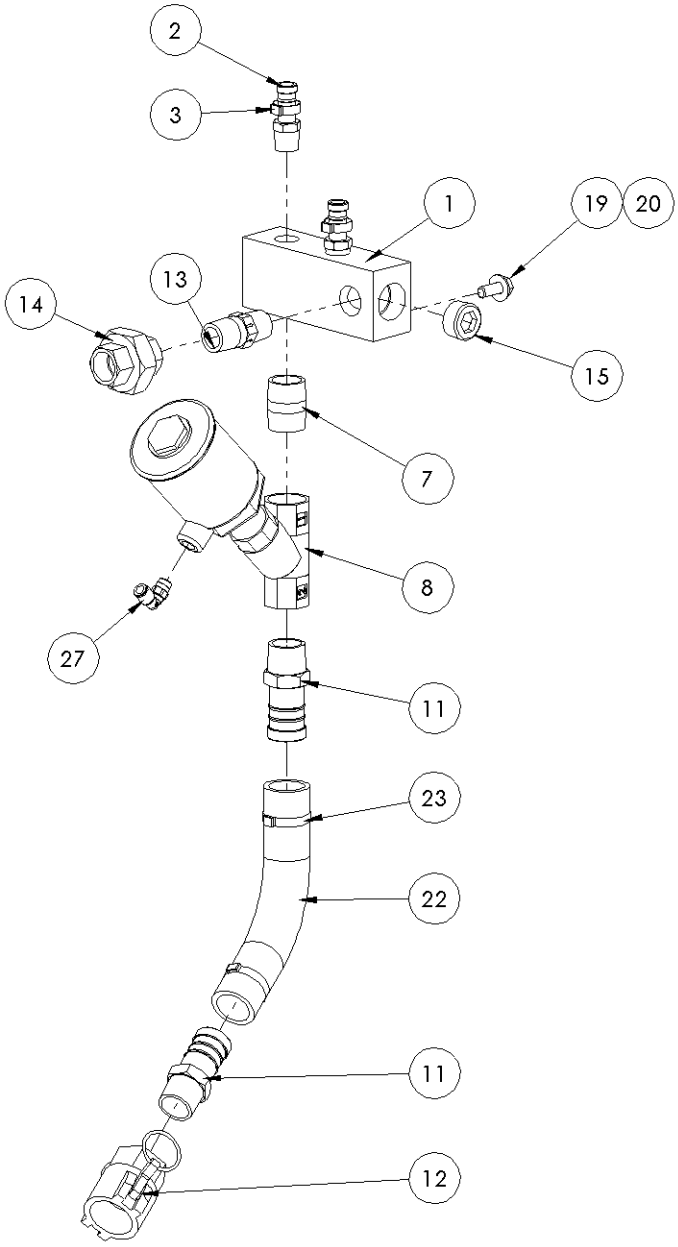
ASSEMBLY NUMBER: D-7707-2001



VACUUM VALVE ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	C-7707-1119	VACUUM BLOCK
2	2	SSH1/2X3/8NPT	HOSE BARB, 1/2" OD X 3/8" NPT
3	2	52545K72	CLAMP.CRIMP.0.50ID HOSE
7	1	SN3/4NPT	NIPPLE, 3/4" NPT X 1-3/8"
8	1	7707-2372	VALVE.PISTON.SS.0.75NPT.50MM.NC
9	1	272P-04-02	FITTING.TBG.TEE.1/4OD X 1/8NPT
11	2	SSH1X3/4NPT	HOSE BARB, 1" OD X 3/4" NPT
12	1	1110-0089	FEMALE COUPLER, 3/4 NPT
13	1	7707-1164	VALVE.CHECK.SS.0.50NPT
14	1	SSU1/2NPT	UNION, 1/2" NPT
15	1	SRP3/4NPT	HEX PLUG, 3/4" NPT, RECESSED
19	2	HH5/16-18X3/4	SCREW, HEX HEAD
20	2	FW5/16-A	WASHER, FLAT
22	1	9537-1432	HOSE, HIGH FLOW, 4'
23	2	52545K58	CLAMP, GAPLESS HOSE
27	1	269P-04-02	FITTING, TBG, ELBOW, 1/4 OD X 1/4 NPT

ASSEMBLY NUMBER: D-7707-3181

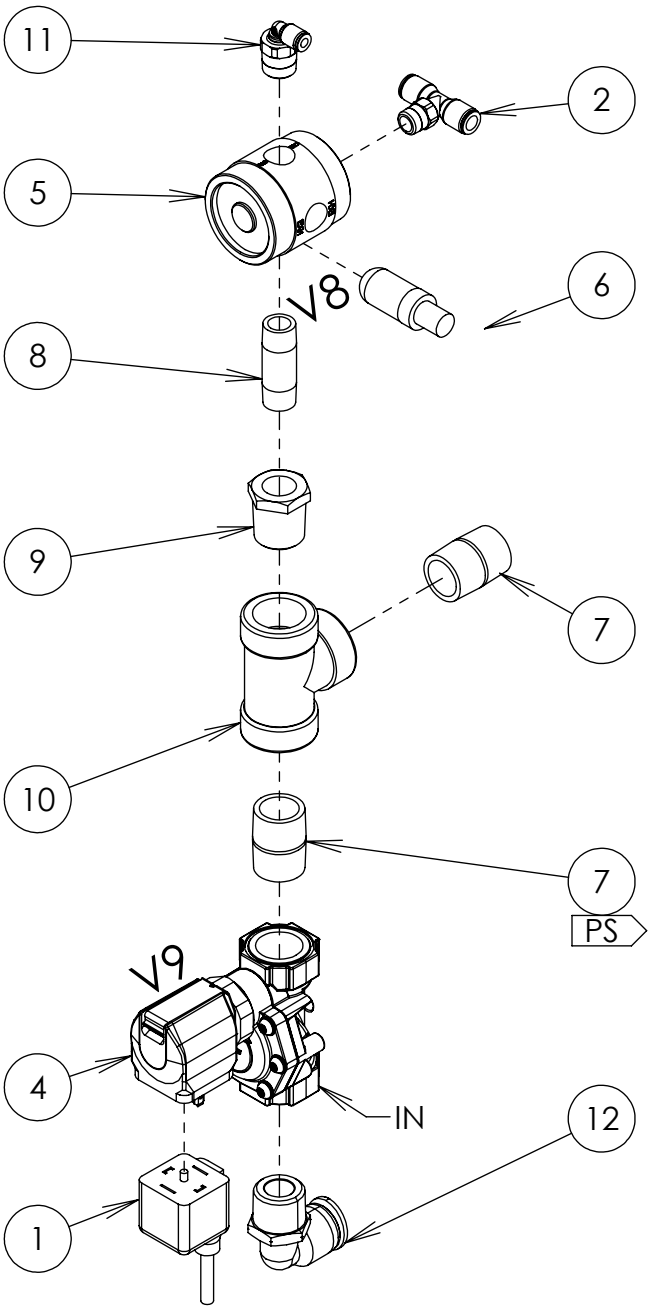


ASSY, GAS VALVE, STANDARD, DAIRY
C-7707-3269

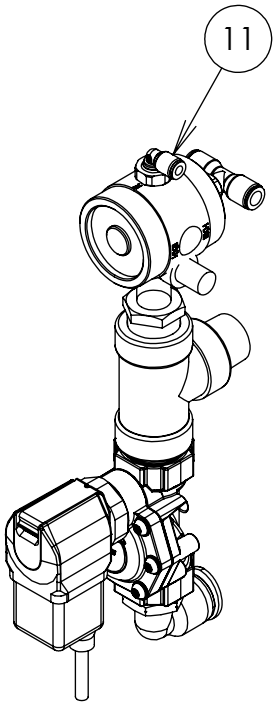
ITEM NO.	-0/QTY.	-1/QTY.	-2/QTY.	PART NUMBER	DESCRIPTION
1	1	1	1	1110-0276	ISO DIN CONNECTOR, 24VDC, 15FT
2	1	1	1	272P-04-02	FITTING.TBG.TEE.1/4OD X 1/8NPT
3	-	-	1	272P-04-04	FITTING.TBG.TEE.1/4OD X 1/4NPT
4	1	1	1	7707-3149	2-WAY VALVE, 24VDC, 5-150 PSI
5	1	1	1	7707-496	VALVE, 2-WAY, NC (PRESSURE)
6	1	1	1	9537-1258	FILTER SILENCER
7	2	2	2	SN1/2NPT	NIPPLE, 1/2" NPT X 1-1/8"
8	1	1	1	SN1/4NPT	NIPPLE, 1/4" NPT X 7/8"
9	1	1	1	SSB1/2NPTX1/4	HEX BUSHING, 1/2"NPT X 1/4" NPT
10	1	1	1	SST1/2NPT	TEE, 1/2" NPT
11	1	1	-	3109-04-14	FITTING, TBG, ELBOW, 5/32OD X 1/4NPT
12	1	1	1	269P-08-08	ELBOW MALE BRASS

OPTIONS:
-0: STD
-1: W/O VS2
-2: OVERHEAD

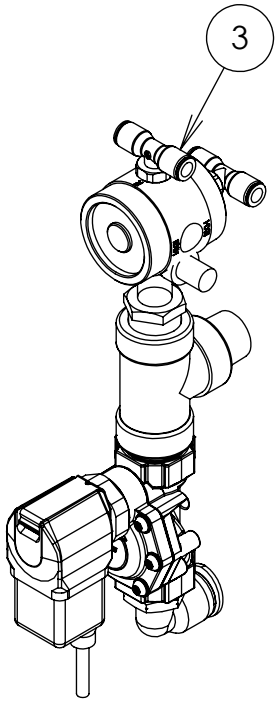
ASSY, GAS VALVE, STANDARD, DAIRY
C-7707-3269



OPTION -0



OPTION -1

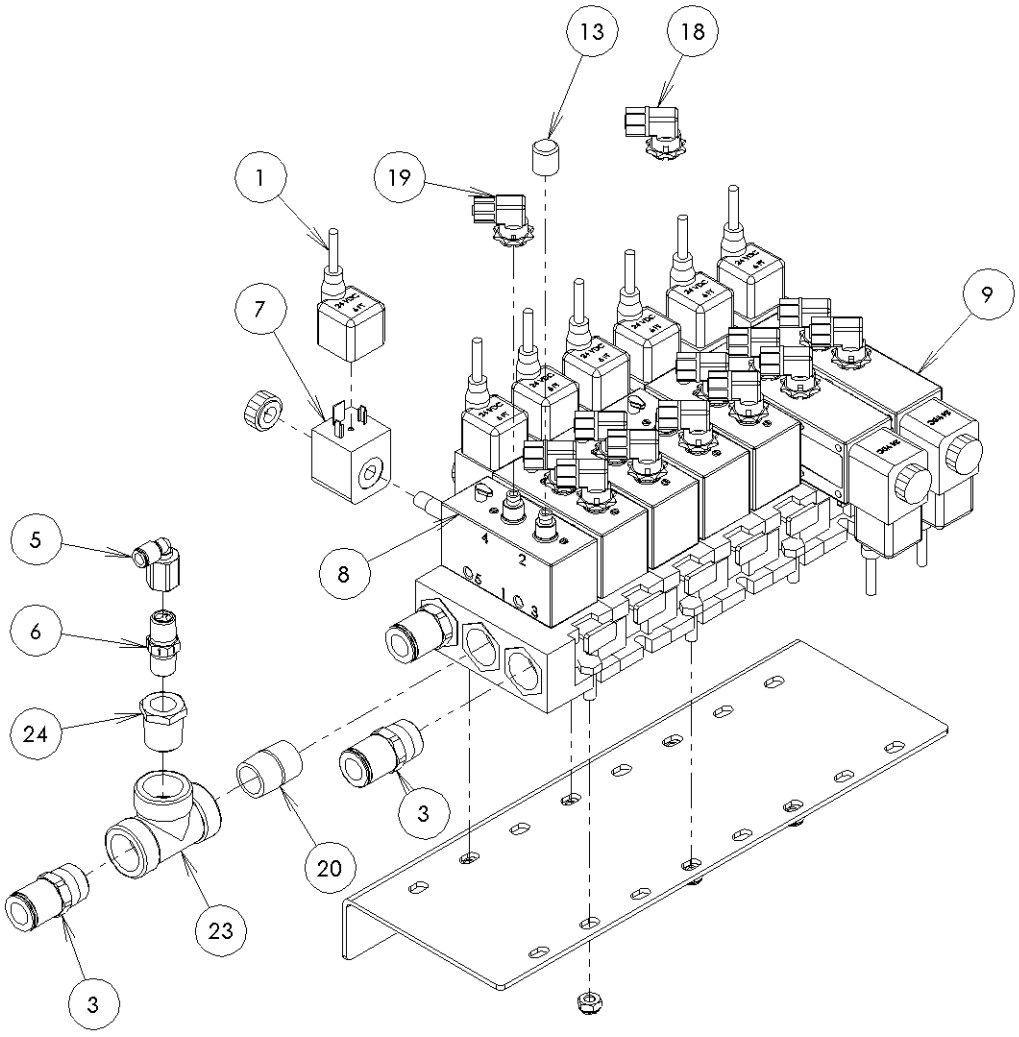


OPTION -2

VALVE MANIFOLD ASSEMBLY, STANDARD

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	9	1110-0164	ISO DIN CONNECTOR, 24VDC, 6FT
3	3	268P-08-08	FITTING.TBG.STR.1/2NPT.1/2OD
5	1	270P-04-04	ELBOW FEMALE1/4 NPT X 1/4 OD
6	1	7707-1163	VALVE, CHECK, 1/4NPT
7	9	7707-3248	SOLENOID VALVE COIL, 24 VDC
8	5	7707-3260	VALVE W/ COIL CAP, 30-145 PSI
9	2	7707-3401	3-POS DBL VALVE, 24VDC, CLOSED CENTER
10	1	9130-399	INLET SEGMENT
11	1	9130-400	END SEGMENT
12	5	9130-401	STATION SEGMENT
13	2	9130-886	VALVE BANK CAP
14	1	C-7707-1188	MTG PLATE, VALVE BANK
15	8	HH1/4-20X3/4	SCREW, HEX HEAD
16	8	LN1/4-20	NUT, LOCK
18	12	P68392	VALVE ADAPT ELB, 3/8" TUBE
19	2	P68949	VALVE ADAPT ELB, 1/4" TUBE
20	1	SN1/2NPT	NIPPLE, 1/2" NPT X 1-1/8"
23	1	SST1/2NPT	TEE, 1/2" NPT
24	1	SSB1/2NPTX1/4	HEX BUSHING, 1/2"NPT X 1/4" NPT

ASSEMBLY NUMBER: D-7707-3416-1

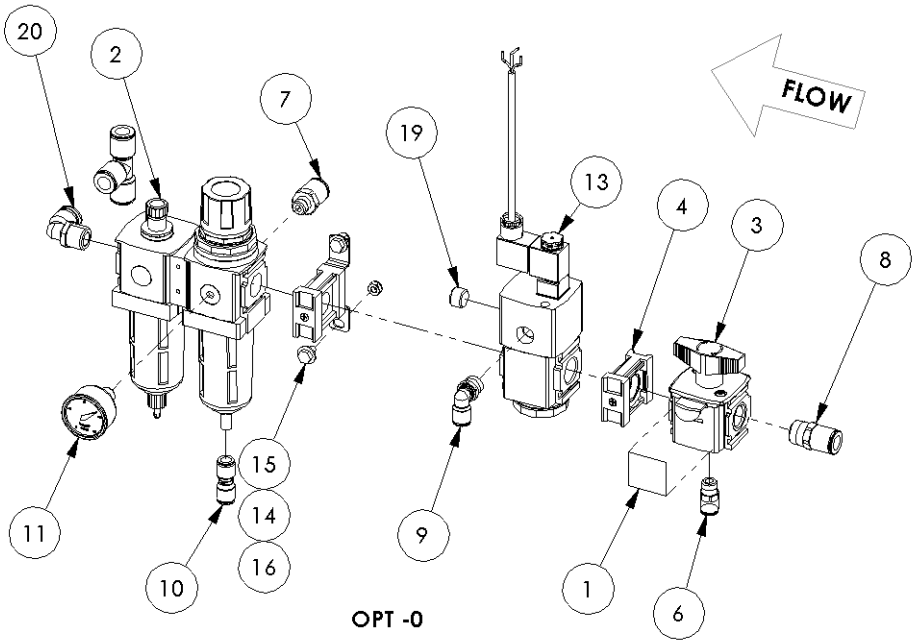


FILTER/REG/LUBRICATOR ASSEMBLY

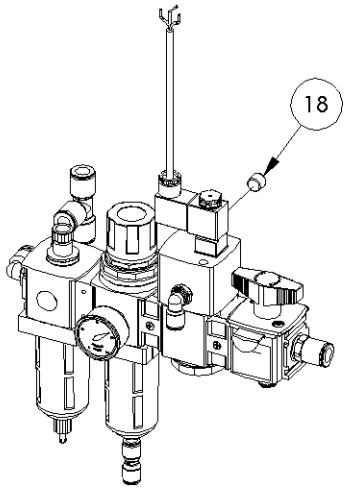
ITEM NO.	-0/QTY.	-1/QTY.	PART NUMBER	DESCRIPTION
1	1	1	0210-1033	WARNING LABEL, COMPRESSED AIR
2	1	1	0243-376	FILTER/ REGULATOR/ LUBRICATOR
3	1	1	0651-1531	1/2 NPT LOCKOUT VALVE
4	1	1	0651-1534	JOINER.REGULATOR
5	1	1	264P-08	FITTING, TUBING, ELBOW, 1/2OD
6	1	1	268P-06-04	FITTING, TBG, STR, 3/8OD X 1/4NPT
7	1	-	268P-08-04	FITTING.TBG.STR.1/2ODX1/4NPT
8	1	1	268P-08-08	FITTING.TBG.STR.1/2NPT.1/2OD
9	1	1	269P-06-06	FITTING.COMP TBG.ELB.3/8OD X 3/8NPT
10	1	1	3106-60-00	FITTING, UNION, 3/8"
11	1	1	7501-162	GAUGE.PRESSURE.0.25NPT
12	1	1	7707-2646	JOINER SET W/ T-BRACKET
13	1	1	7707-3387	SLOW-START, QUICK-DUMP VALVE
14	2	2	FW1/4-A	WASHER, FLAT
15	2	2	HH1/4-20X1/2	SCREW, HEX HEAD
16	2	2	LN1/4-20	NUT, LOCK
17	12	12	RC18-3	WIRE, BLACK CORD SJO
18	-	1	SRP1/4NPT	HEX PLUG, 1/4" NPT, RECESSED
19	1	1	SRP3/8NPT	HEX PLUG, 3/8" NPT, RECESSED
20	1	1	269P-08-08	FTG.TBG.ELB.1/2ODX1/2NPT

OPTIONS
-0: VENTURI PUMP
-1: ELECTRIC PUMP

ASSEMBLY NUMBER: D-7707-3420



OPT -0

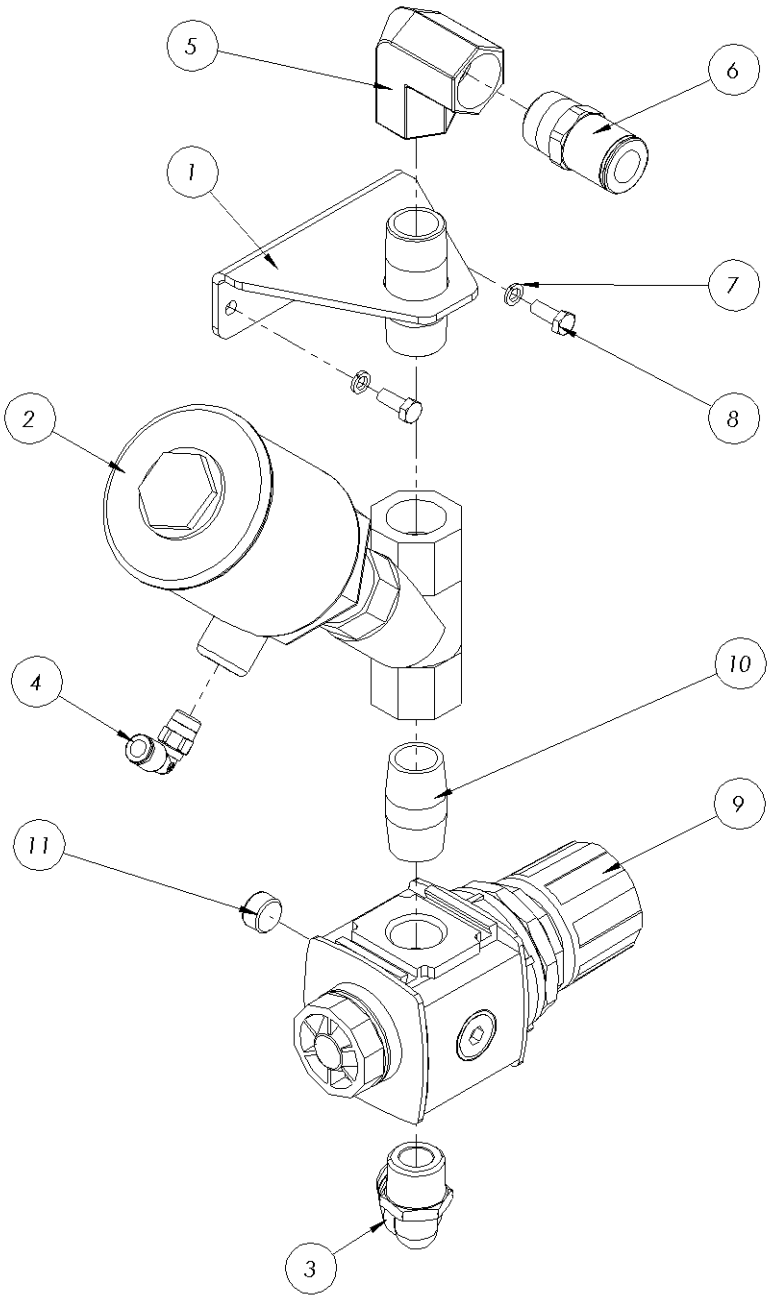


OPT -1

PIAB VACUUM VALVE ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	B-7707-2911	WELDMENT, PIAB VAC VALVE BRKT
2	1	7707-2371	VALVE.PISTON.SS.0.50NPT.50MM.NC
3	1	269P-08-08	FITTING.ELB.1/2 NPT TO 1/2 OD
4	1	269P-04-02	FITTING.TBG.ELB.1/4OD X 1/8NPT
5	1	SE1/2NPT	ELBOW, 1/2NPT
6	1	268P-08-08	FITTING.TBG.STR.1/2OD X 1/2NPT
7	2	LW10	WASHER, LOCK
8	2	HH10-32X1/2	SCREW, HEX HEAD
9	1	7707-2974	REGULATOR, 1/2 NPT
10	1	SN1/2 NPT	NPB CLOSED NIPPLE 1/2 NPT
11	1	SP1/4NPT	PLUG, HEX 1/4NPT

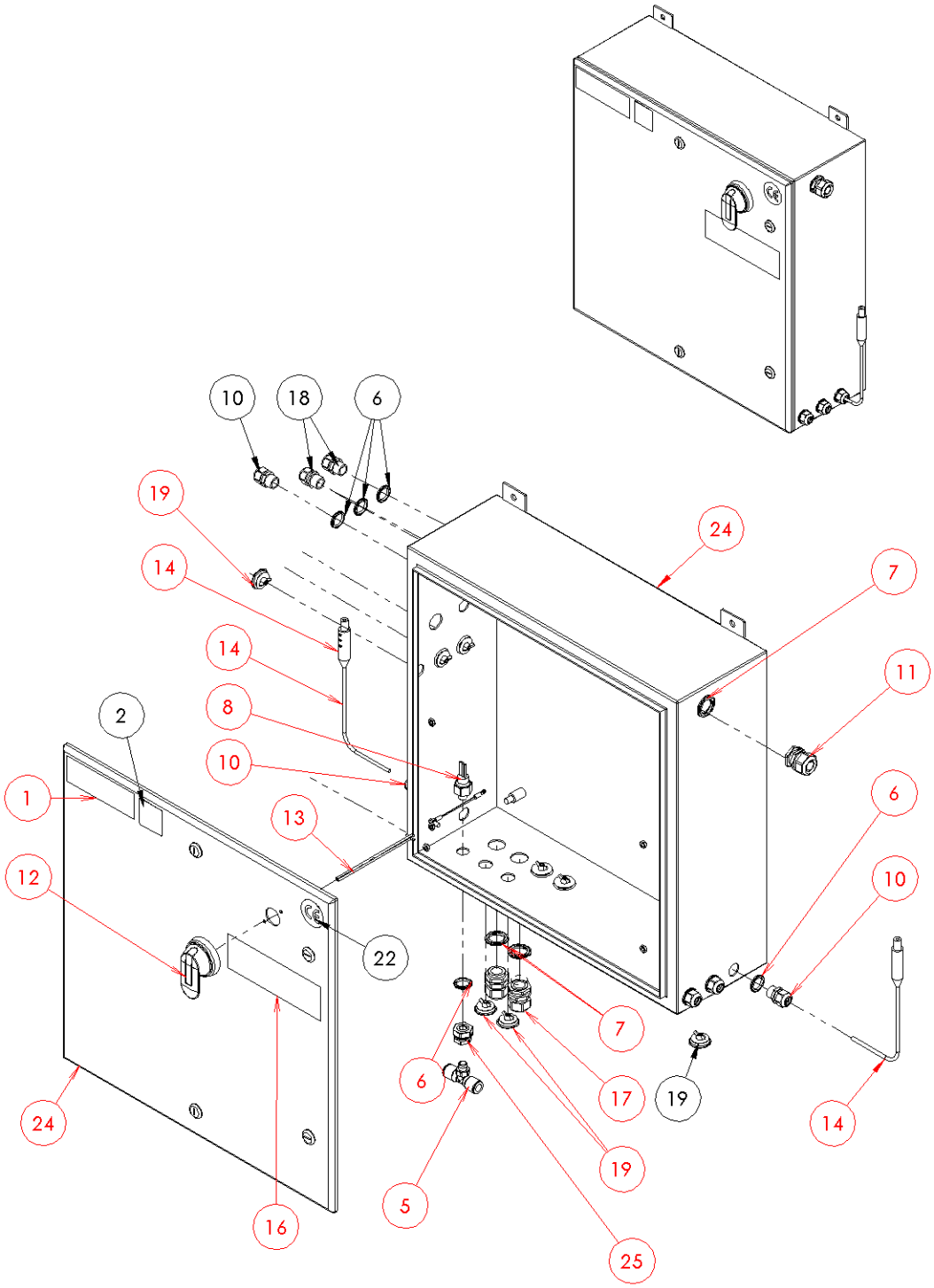
ASSEMBLY NUMBER: B-7707-2910



ELECTRICAL ENCLOSURE ASSEMBLY

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	0210-1034	WARNING LABEL, READ MANUAL
2	1	1110-0078	LABEL, MADE IN USA
5	1	3108-62-14	FITTING.TBG.TEE.1/20D X 1/4NPT
6	9	5262	1/2" SEAL RING
7	3	5263	3/4" SEAL RING
8	1	7707-1504	SWITCH, PRESSURE
9	1	7707-1633	3/4" CORD GRIP, 4 HOLE
10	5	7707-1634	1/2" CORD GRIP, 1 HOLE
11	1	7707-1655	3/4" CORD GRIP, 1 HOLE
12	1	7707-2744	HANDLE, DISCONNECT
13	1	7707-2745	SHAFT DISC. HANDLE
14	2	7707-443	CONNECTOR, FEMALE
16	1	7707-532	LABEL, DANGER HIGH VOLTGE
17	1	9537-1193	3/4" CORD GRIP, 3 HOLE
18	3	9537-1194	1/2" CORD GRIP, 2 HOLE
19	7	AS050SS	HOLE SEAL.1/2NPT
20	2	AS075SS	HOLE SEAL.3/4NPT
22	1	B-7707-1901	LABEL, CE
23	1	B-7707-241	SERIAL AND MODEL TAG
24	1	D-7707-1653	ELEC ENCL, A-200 PLC
25	1	NPBBH 1/4 NPT-15/16 LG	NPB BULKHEAD ADAPT 1/4 NPT
27	2	PN12-10HDR	TERMINAL RING, INSULATED
28	1	WG14-AWG	WIRE, 14AWG, GREEN

ASSEMBLY NUMBER: D-7707-1652-1



ELECTRICAL PANEL ASEMBLY

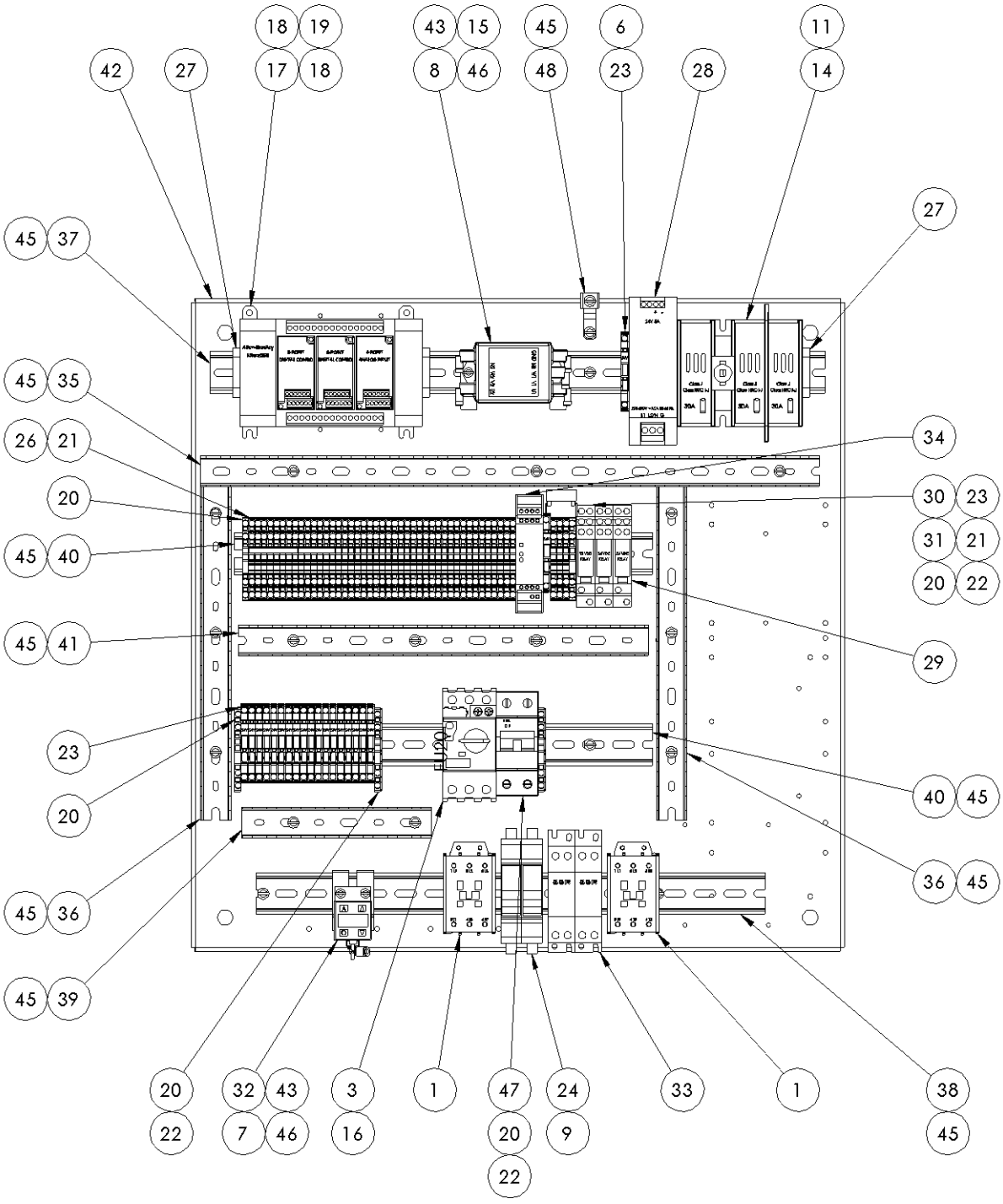
ITEM NO.	-0/QTY.	-1/QTY.	PART NUMBER	DESCRIPTION
1	2	2	0550-1209	CONTACTOR 24 VDC
2	-	1	0550-1210	MANUAL MOTOR STARTER 6.3-10 FLA
3	1	-	0550-1471	MANUAL MOTOR STARTER 2.5 - 4.0 A
4	18	18	217.315	FUSE.5 X 20MM.0.315A
5	1	1	217.5	FUSE.5 X 20MM.0.50A
6	1	1	218004	FUSE.5 X 20MM.4.00A
7	1	1	4/11/3109	FITTING.TBG.ELB.5/32OD X 1/8NPT
8	1	1	7707-1463	LINE FILTER
9	2	-	7707-1619	SEMI FUSE 8 AMP, 600V
10	-	2	7707-1620	SEMI FUSE 15 AMP, 600V
11	3	-	7707-1886	FUSE.600V.15A
12	-	3	7707-1887	FUSE.600V.20A
13	-	1	7707-2098	CIRCUIT BREAKER.2-POLE.2.0A
14	1	1	7707-2743	DISCONNECT SWITCH
15	7	7	7707-2953	DISCONNECT, FEMALE, FLAG
16	1	1	7707-3148	AUX CONTACT, NO, MANUAL MS
17	1	1	7707-3190-P	PLC, ALLEN-BRADLEY MICRO850
18	2	2	7707-3191	8-PT DIGITAL COMBO CARD
19	1	1	7707-3192	4-PT ANALOG INPUT CARD
20	5	5	7707-3224	4-PT GROUND TERM BLOCK
21	46	46	7707-3225	4-PT CLAMPING TERM BLOCK
22	3	3	7707-3227	END PLATE, TERM BLOCK
23	20	20	7707-3228	FUSE TERM BLOCK W/ LED, 24V
24	2	2	7707-3230	1-POLE MIDGET FUSE HOLDER W/ LED
25	1	1	7707-3232-6	JUMPER BAR, 6-POLE
26	1	1	7707-3232-8	JUMPER BAR, 8-POLE
27	3	3	7707-3233	END STOP
28	1	1	7707-3245	POWER SUPPLY, 120W
29	2	2	9537-1023	RELAY OMRON, 24VDC
30	1	1	9537-1025	RELAY OMRON, 12VDC-2
31	1	1	9537-1212	RESISTOR, 250 OHM
32	1	1	9537-1217-1	SWITCH.VACUUM.DIGITAL.0-29Hg.PNP
33	2	2	9537-1323	SOLID STATE RELAY
34	1	1	9537-1426	RELAY, 2 HAND SAFETY
35	1	1	B-0210-2715	WIREWAY, 1" W, 20 3/8" LG, 0" CUT
36	2	2	B-1110-0228	WIREWAY, 1" W, 11" LG, 1" CUT
37	1	1	B-7707-1646	DIN RAIL, 20 1/4", 1/2" CUT
38	1	1	B-7707-1648	DIN RAIL, 16 3/4", 1/2" CUT
39	1	1	B-7707-2063	WIREWAY, 1" W, 6 1/4" LG, 3/4" CUT
40	2	2	B-7707-3090	DIN RAIL, 13 3/4", 0" CUT
41	1	1	B-7707-3091	WIREWAY, 1" W, 13 1/2" LG
42	1	1	D-7707-1459	ELEC SUB PANEL, A-200
43	4	4	FM4	DIN CLIP
44	12	12	MLW14AWG	WIRE, 14AWG, BLACK, TYPE M
45	26	26	PH10-32X5/16	SCREW, PAN HEAD
46	4	4	PHM4X0.7X8MM	PAN HEAD SCREW METRIC SLOTTED
47	1	-	S272-K1	CIRCUIT BREAKER, 2-POLE, 1.0A
48	1	1	SLU-35	GROUND LUG
49	10	10	WBL18-AWG	WIRE, 18AWG, BLUE
50	22	22	WBR18-AWG	WIRE, 18AWG, BROWN
51	3	3	WG18-AWG	WIRE, 18AWG, GREEN
52	22	22	WR18-AWG	WIRE, 18AWG, RED
53	10	10	WW18-AWG	WIRE, 18AWG, WHITE

OPTIONS:

-0: 440VAC

-1: 220 VAC

ASSEMBLY NUMBER: D-7707-3217



ELECTRICAL PANEL ASSEMBLY, GAS ANALYZER

ITEM NO.	-0/QTY.	-1/QTY.	PART NUMBER	DESCRIPTION
1	2	2	0210-2459	1/4-20 COUPLING NUT
2	1	1	0210-2539-1	GAS ANALYZER ASS'Y
3	1	1	0210-2541	PUMP, 24VDC, O2 ANALYZER
4	1	1	0210-2549	FILTER, 1/4" NPT, 2-5 MICRON
5	1	1	0210-2551	FLOWMETER, AIR, 1.2LPM
6	2	2	0550-1209	CONTACTOR 24 VDC
7	-	1	0550-1210	MANUAL MOTOR STARTER 6.3-10 FLA
8	1	-	0550-1471	MANUAL MOTOR STARTER 2.5 - 4.0 A
9	18	18	217.315	FUSE.5 X 20MM.0.315A
10	1	1	217.5	FUSE.5 X 20MM.0.50A
11	1	1	218004	FUSE.5 X 20MM.4.00A
12	1	1	268P-04-04	FITTING.TBG.1/4NPT.1/4OD
13	2	2	269P-04-02	FITTING.TBG.ELB, 1/4OD X 1/8NPT
14	1	1	269P-04-04	FITTING.TBG.ELB.1/4OD X 1/4NPT
15	2	2	2858	GROMMET, RUBBER, 25/64" I.D.
16	1	1	4/11/3109	FITTING.TBG.ELB.5/32OD X 1/8NPT
17	1	1	44-W	TUBING, POLY-FLO, 1/4"
18	1	1	5263	3/4" SEAL RING
19	1	1	7707-1463	LINE FILTER
20	2	-	7707-1619	SEMI FUSE 8 AMP, 600V
21	-	2	7707-1620	SEMI FUSE 15 AMP, 600V
22	3	-	7707-1886	FUSE.600V.15A
23	-	3	7707-1887	FUSE.600V.20A
24	-	1	7707-2098	CIRCUIT BREAKER.2-POLE.2.0A
25	1	1	7707-2743	DISCONNECT SWITCH
26	7	7	7707-2953	DISCONNECT, FEMALE, FLAG
27	1	1	7707-3148	AUX CONTACT, NO, MANUAL MS
28	1	1	7707-3190-P	PLC, ALLEN-BRADLEY MICRO850
29	2	2	7707-3191	8-PT DIGITAL COMBO CARD
30	1	1	7707-3192	4-PT ANALOG INPUT CARD
31	5	5	7707-3224	4-PT GROUND TERM BLOCK
32	46	46	7707-3225	4-PT CLAMPING TERM BLOCK
33	3	3	7707-3227	END PLATE, TERM BLOCK
34	20	20	7707-3228	FUSE TERM BLOCK W/ LED, 24V

OPTIONS:

-0: 440 VAC

-1: 220 VAC

ASSEMBLY NUMBER: D-7707-3298

ITEM NO.	-0/QTY.	-1/QTY.	PART NUMBER	DESCRIPTION
35	2	2	7707-3230	1-POLE MIDGET FUSE HOLDER W/ LED
36	1	1	7707-3232-6	JUMPER BAR, 6-POLE
37	1	1	7707-3232-8	JUMPER BAR, 8-POLE
38	3	3	7707-3233	END STOP
39	1	1	7707-3245	POWER SUPPLY, 120W
40	2	2	9537-1023	RELAY OMRON, 24VDC
41	1	1	9537-1025	RELAY OMRON, 12VDC-2
42	1	1	9537-1212	RESISTOR, 250 OHM
43	1	1	9537-1217-1	SWITCH.VACUUM.DIGITAL.0-29Hg.PNP
44	2	2	9537-1323	SOLID STATE RELAY
45	1	1	9537-1426	RELAY, 2 HAND SAFETY
46	1	1	B-0210-2715	WIREWAY, 1" W, 20 3/8" LG, 0" CUT
47	1	1	B-1110-0228	WIREWAY, 1" W, 11" LG, 1" CUT
48	1	1	B-7707-1646	DIN RAIL, 20 1/4", 1/2" CUT
49	1	1	B-7707-2063	WIREWAY, 1" W, 6 1/4" LG, 3/4" CUT
50	3	3	B-7707-3090	DIN RAIL, 13 3/4", 0" CUT
51	1	1	B-7707-3091	WIREWAY, 1" W, 13 1/2" LG
52	1	1	B-7707-3104	WIREWAY, 1" W, 5 1/2" LG, 3/4" CUT
53	1	1	D-7707-1459	ELEC SUB PANEL, A-200
54	4	4	FM4	DIN CLIP
55	2	2	FW1/4-B	WASHER, FLAT
56	12	12	MLW14AWG	WIRE, 14AWG, BLACK, TYPE M
57	1	1	NPBBH 1/4 NPT-15/16 LG	NPB BULKHEAD ADAPT 1/4 NPT
58	4	4	PH1/4-20X1/2	SCREW, PAN HEAD
59	24	24	PH10-32X5/16	SCREW, PAN HEAD
60	8	8	PH8-32X3/8	SCREW, PAN HEAD
61	4	4	PHM4X0.7X8MM	PAN HEAD SCREW METRIC SLOTTED
62	1	-	S272-K1	CIRCUIT BREAKER, 2-POLE, 1.0A
63	1	1	SLU-35	GROUND LUG
64	1	1	SN1/4NPT	NIPPLE, 1/4" NPT X 7/8"
65	1	1	SSE1/4NPT	90 DEG ST ELBOW, 1/4" NPT
66	10	10	WBL18-AWG	WIRE, 18AWG, BLUE
67	22	22	WBR18-AWG	WIRE, 18AWG, BROWN
68	3	3	WG18-AWG	WIRE, 18AWG, GREEN
69	22	22	WR18-AWG	WIRE, 18AWG, RED
70	10	10	WW18-AWG	WIRE, 18AWG, WHITE

ELECTRICAL PANEL ASSEMBLY, GAS ANALYZER

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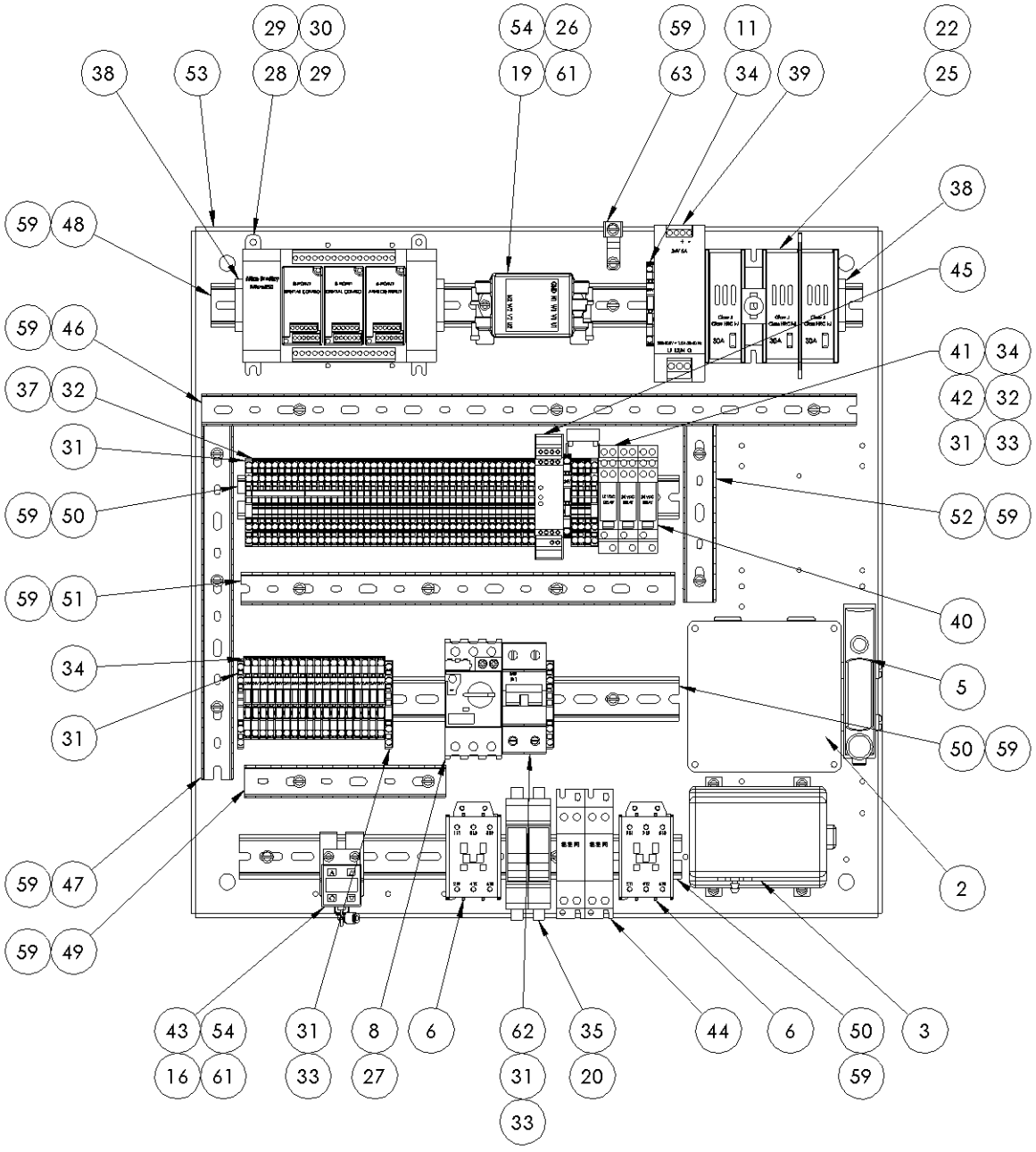
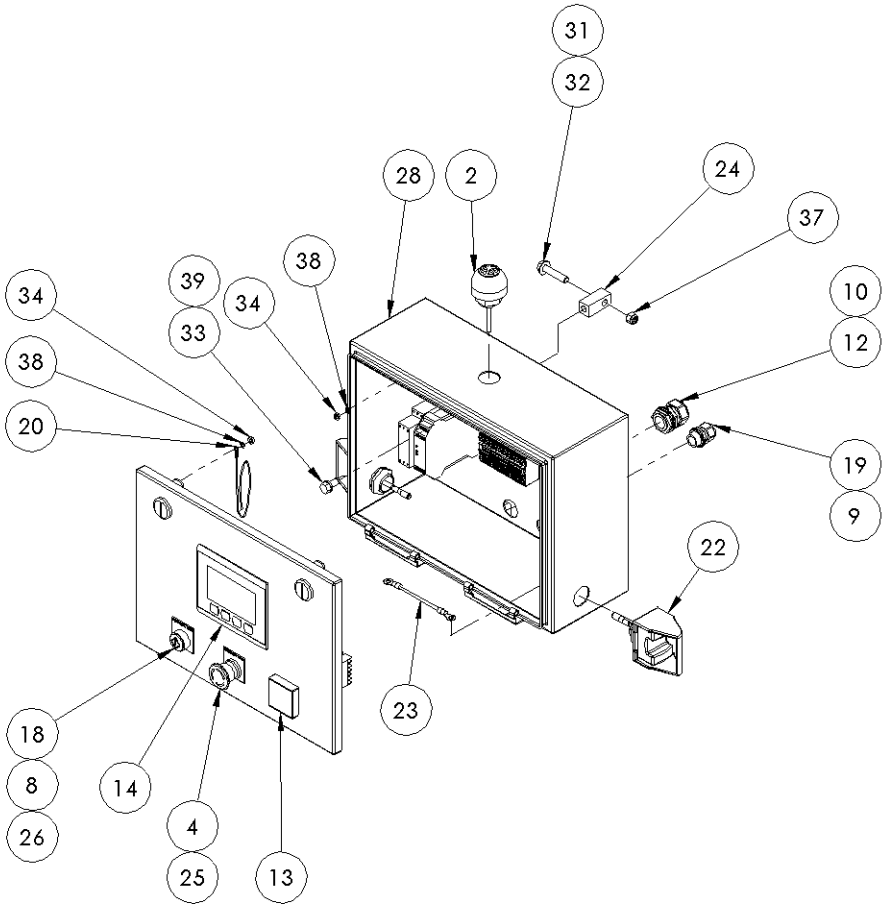
ASSEMBLY NUMBER: D-7707-3217



OPERATOR INTERFACE ASSEMBLY, 4”

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	0210-1992	RELAY, ESTOP SAFETY
2	1	0210-3172	INDICATOR LIGHT W/SOUNDER
3	1	0210-3472	RJ45 CABLE 20 FT
4	1	0550-1154	EMERGENCY STOP
5	1	0651-1516-1	24V LIGHT UNIT
6	1	0651-1519-1	NC CONTACT
7	1	0651-1520-1	NO CONTACT
8	1	1110-0326	PUSH BUTTON, BUTTONLESS, LED
9	1	5262	1/2" SEAL RING
10	1	5263	3/4" SEAL RING
11	1	7707-1189	THERMOCOUPLE, TYPE K, 53"
12	1	7707-1655	3/4" CORD GRIP, 1 HOLE
13	1	7707-2892-1	TEMP CONTROLLER, 24VDC
14	1	7707-3189-P	HMI TERMINAL, PV800 HMI, 4.3"
15	2	7707-3224	4-PT GROUND TERM BLOCK
16	15	7707-3225	4-PT CLAMPING TERM BLOCK
17	1	7707-3227	END PLATE, TERM BLOCK
18	1	7707-3370	BUTTON, ETCHED, START SYMBOL
19	1	9537-1194	1/2" CORD GRIP, 2 HOLE
20	1	9537-1355	DOOR CABLE
21	1	9537-1426	RELAY, 2 HAND SAFETY
22	2	9537-1428-1	OPTO TOUCH SWITCH 5-PIN
23	1	B-7707-3277	GROUND WIRE ASSEMBLY
24	1	B-8013-1796	CLEVIS
25	1	B-9537-1101	LEGEND PLATE, EMERGENCY OPEN
26	1	B-9537-1456	LEGEND PLATE, POWER ON / RESET
28	1	D-7707-3219-2	ENCLOSURE, PV800, 4" W/ TEMP CONT
29	1	DIN RAIL	DIN RAIL, 11 3/4", 1/2" CUT
30	2	FW10-A	WASHER, FLAT
31	1	FW3/8-C	WASHER, FLAT
32	1	HH3/8-16X1-3/4	SCREW, HEX HEAD
33	1	HH3/8-24X3/4	SCREW, HEX HEAD
34	2	HN10-32	NUT, HEX
35	3	JZ12C20-AWG	CABLE
36	2	LN10-32	NUT, LOCK
37	1	LN3/8-16	NUT, LOCK
38	2	LW10	WASHER, LOCK
39	1	LW3/8	WASHER, LOCK
40	3	WBL18-AWG	WIRE, 18AWG, BLUE
41	5	WBR18-AWG	WIRE, 18AWG, BROWN

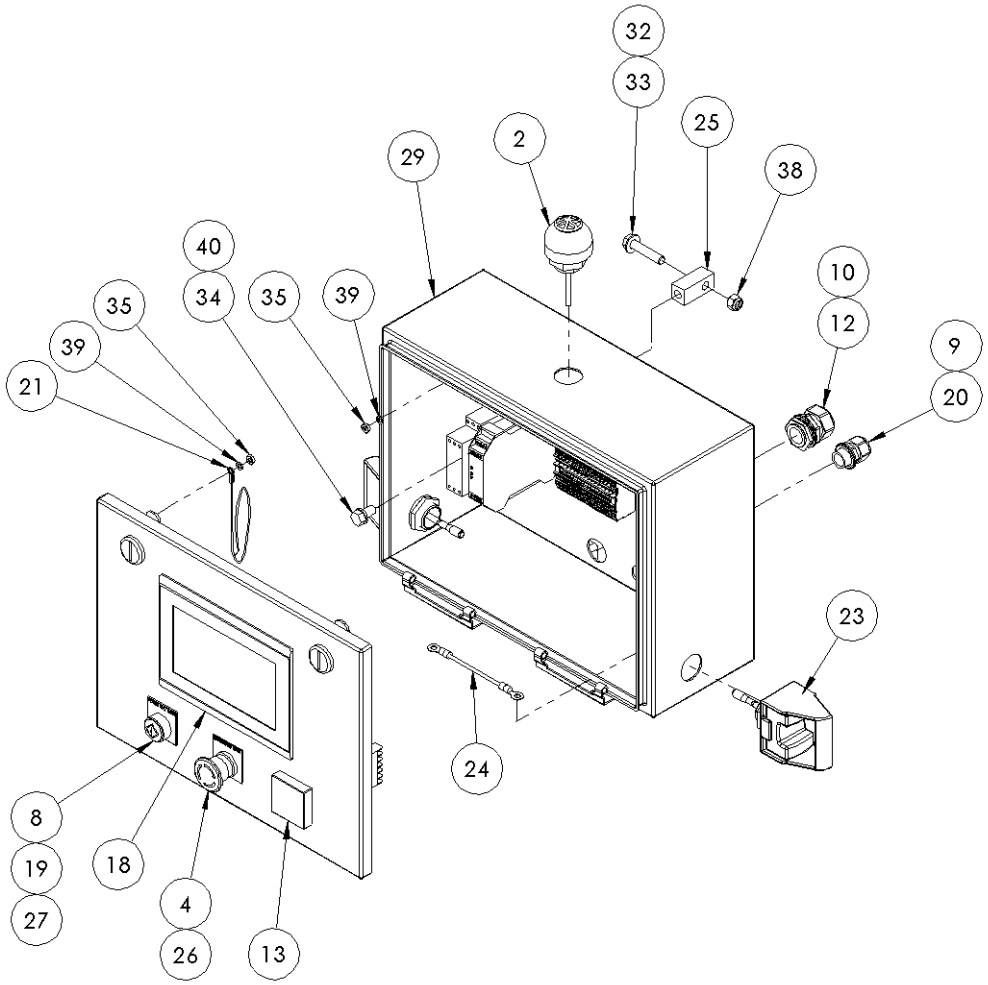
ASSEMBLY NUMBER: D-7707-3218



OPREATOR INTERFACE ASSEMBLY, 7”

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	0210-1992	RELAY, ESTOP SAFETY
2	1	0210-3172	INDICATOR LIGHT W/SOUNDER
3	1	0210-3472	RJ45 CABLE 20 FT
4	1	0550-1154	EMERGENCY STOP
5	1	0651-1516-1	24V LIGHT UNIT
6	1	0651-1519-1	NC CONTACT
7	1	0651-1520-1	NO CONTACT
8	1	1110-0326	PUSH BUTTON, BUTTONLESS, LED
9	1	5262	1/2" SEAL RING
10	1	5263	3/4" SEAL RING
11	1	7707-1189	THERMOCOUPLE, TYPE K, 53"
12	1	7707-1655	3/4" CORD GRIP, 1 HOLE
13	1	7707-2892-1	TEMP CONTROLLER, 24VDC
14	1	7707-3121	USB FLASH DRIVE, 2GB
15	2	7707-3224	4-PT GROUND TERM BLOCK
16	15	7707-3225	4-PT CLAMPING TERM BLOCK
17	1	7707-3227	END PLATE, TERM BLOCK
18	1	7707-3240-P	HMI TERMINAL, PV800 HMI, 7"
19	1	7707-3370	BUTTON, ETCHED, START SYMBOL
20	1	9537-1194	1/2" CORD GRIP, 2 HOLE
21	1	9537-1355	DOOR CABLE
22	1	9537-1426	RELAY, 2 HAND SAFETY
23	2	9537-1428-1	OPTO TOUCH SWITCH 5-PIN
24	1	B-7707-3277	GROUND WIRE ASSEMBLY
25	1	B-8013-1796	CLEVIS
26	1	B-9537-1101	LEGEND PLATE, EMERGENCY OPEN
27	1	B-9537-1456	LEGEND PLATE, POWER ON / RESET
29	1	D-7707-3219-4	ENCLOSURE, PV800, 7" W/ TEMP CONT
30	1	DIN RAIL	DIN RAIL, 11 3/4", 1/2" CUT
31	2	FW10-A	WASHER, FLAT
32	1	FW3/8-C	WASHER, FLAT
33	1	HH3/8-16X1-3/4	SCREW, HEX HEAD
34	1	HH3/8-24X3/4	SCREW, HEX HEAD
35	2	HN10-32	NUT, HEX
36	3	JZ12C20-AWG	CABLE
37	2	LN10-32	NUT, LOCK
38	1	LN3/8-16	NUT, LOCK
39	2	LW10	WASHER, LOCK
40	1	LW3/8	WASHER, LOCK
41	3	WBL18-AWG	WIRE, 18AWG, BLUE
42	5	WBR18-AWG	WIRE, 18AWG, BROWN

ASSEMBLY NUMBER: D-7707-3242

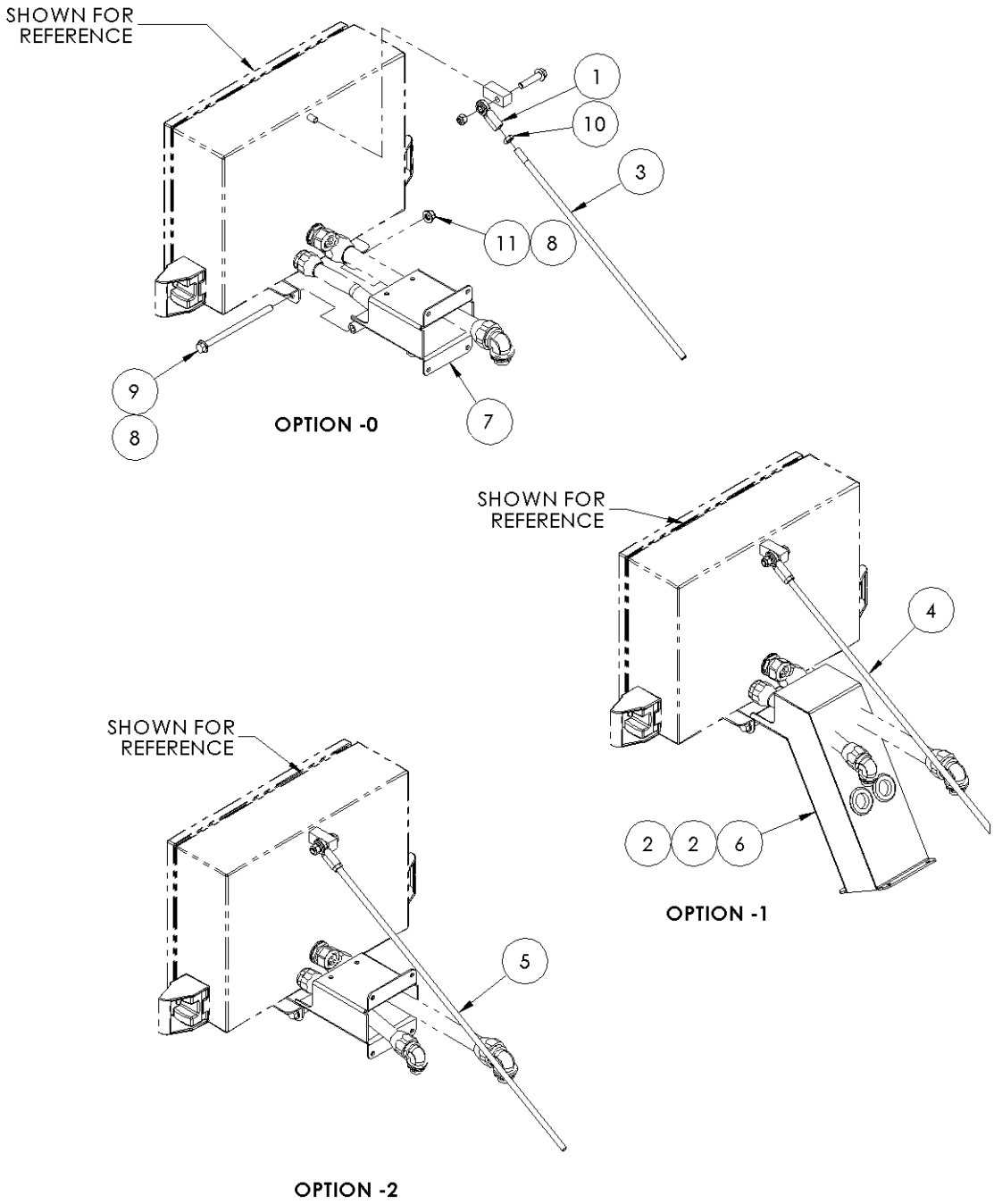


INTERFACE MOUNT ASSEMBLY

ITEM NO.	-0/QTY.	-1/QTY.	-2/QTY.	PART NUMBER	DESCRIPTION
1	1	1	1	7707-1583	ROD END
2	-	2	-	9602K14	GROMMET, RUBBER, 1" I.D.
3	1	-	-	B-7707-1576	ROD, CONTROL BOX, SUPPORT
4	-	1	-	B-7707-1788	SUPPORT ROD, CONTROL BOX
5	-	-	1	B-7707-2933	ROD, CONTROL BOX, SUPPORT
6	-	1	-	C-7707-1821	GOOSENECK SUPPORT
7	1	-	1	D-7707-1572	MOUNTING BRACKET
8	2	2	2	FW3/8-C	WASHER, FLAT
9	1	1	1	HH3/8-16x6	SCREW, HEX HEAD
10	1	1	1	JN3/8-24	NUT, JAM
11	1	1	1	LN3/8-16	NUT, LOCK

OPTIONS:
-0: STANDARD
-1: LAYBACK
-2: EXTENDED SNORKELS

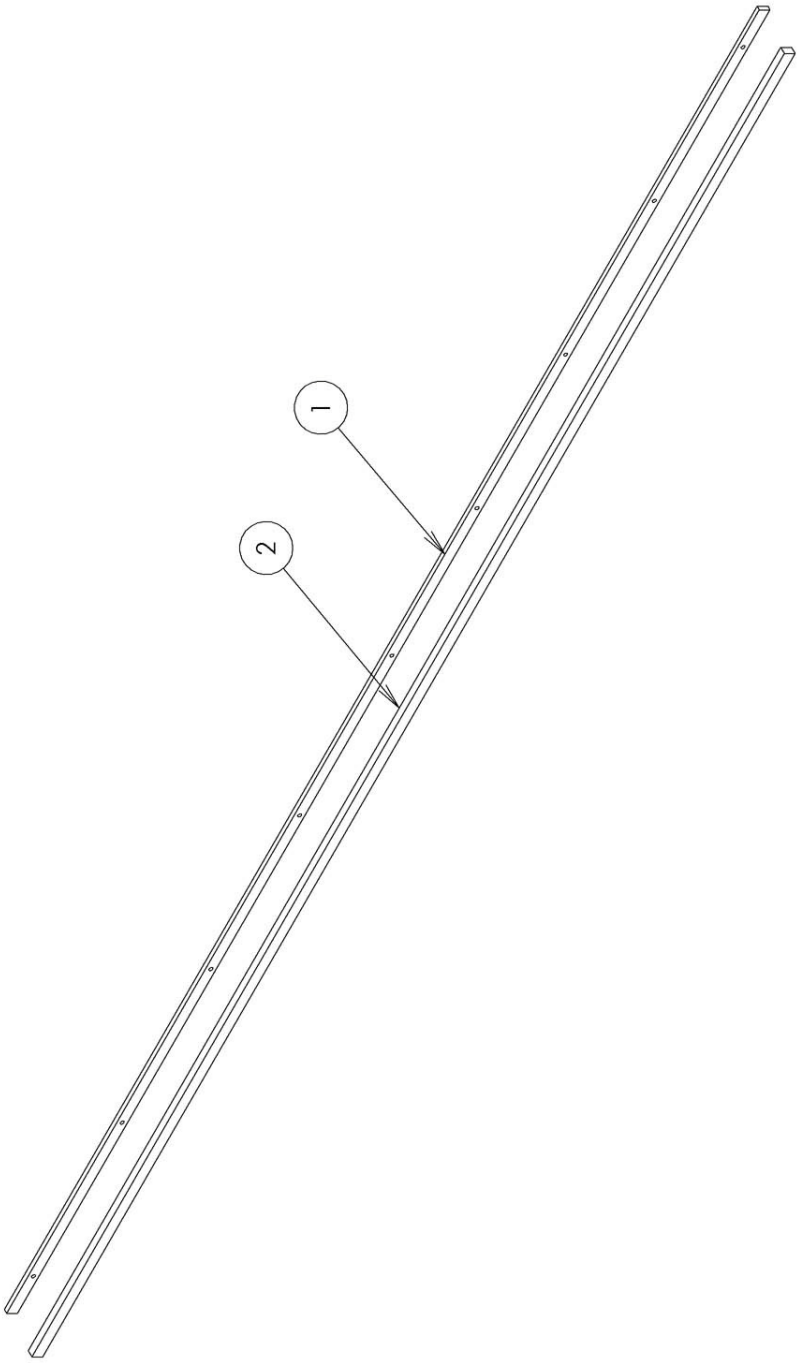
ASSEMBLY NUMBER: C-7707-3247



BACK-UP BAR ASSEMBLY

ITEM NO.	-0/QTY.	-1/QTY.	PART NUMBER	DESCRIPTION
1	1	-	B-7707-1001	BAR, SILICONE MTG. 100"
2	1	1	B-7707-1067	RUBBER, SILICONE, ORANGE
3	-	1	B-7707-1437	BAR, SILICONE MTG., SS, 100"

ASSEMBLY NUMBER: B-7707-1068



BAG STRETCHER AIR BLOCK ASSEMBLY

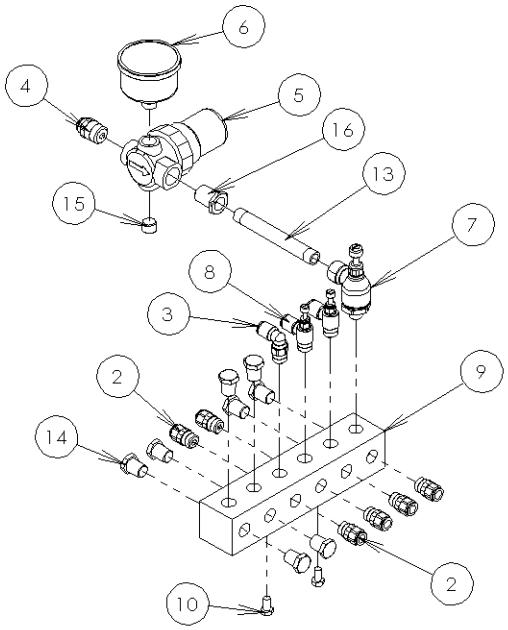
ITEM NO.	-0/QTY.	-2/QTY.	PART NUMBER	DESCRIPTION
2	6	4	268P-04-02	FITTING.TBG.STR.1/4OD X 1/8NPT
3	1	3	269P-04-02	FITTING, TBG, ELBOW, 1/4 OD X 1/4 NPT
4	1	1	268P-04-04	FITTING.TBG.1/4NPT.1/4OD
5	1	1	7707-118	REGULATOR, 1/4NPT 45PSI MAX.
6	1	1	7707-489	PRESSURE GAUGE
7	1	1	8013-416	FLOW CONTROL, 1/8NPT
8	2	2	9537-1184	FLOW CONTROL
9	1	1	B-7707-981	BLOCK, AIR, BAG STRETCHER
10	2	2	HH10-32X3/8	SCREW, HEX HEAD
13	1	1	SN1/8NPTX3	NIPPLE, 1/8" NPT X 3"
14	8	8	SP1/8NPT	HEX PLUG, 1/8" NPT
15	1	1	SRP1/8NPT	HEX PLUG, 1/8" NPT, RECESSED
16	1	1	SSB1/4NPTX1/8	HEX BUSHING, 1/4"NPT X 1/8" NPT

OPTIONS:

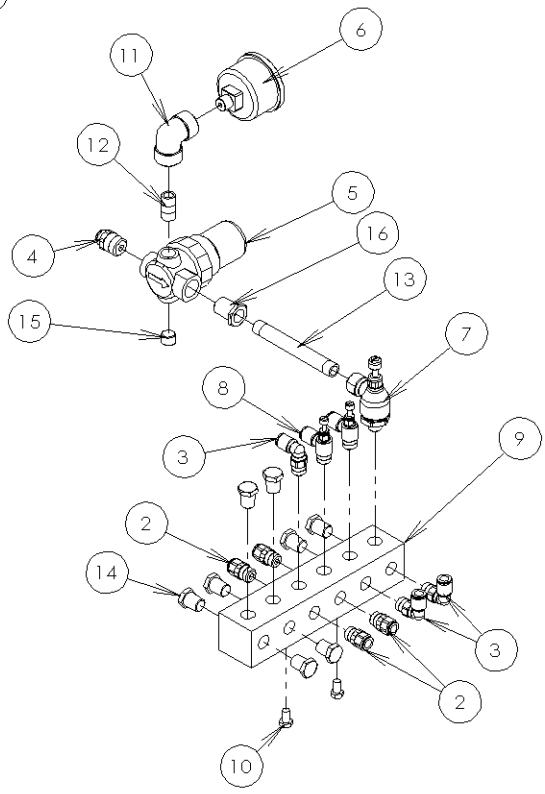
-0: STANDARD FLOOR BIN

-2: OVERHEAD

ASSEMBLY NUMBER: C-7707-1022



OPTION -0 SHOWN

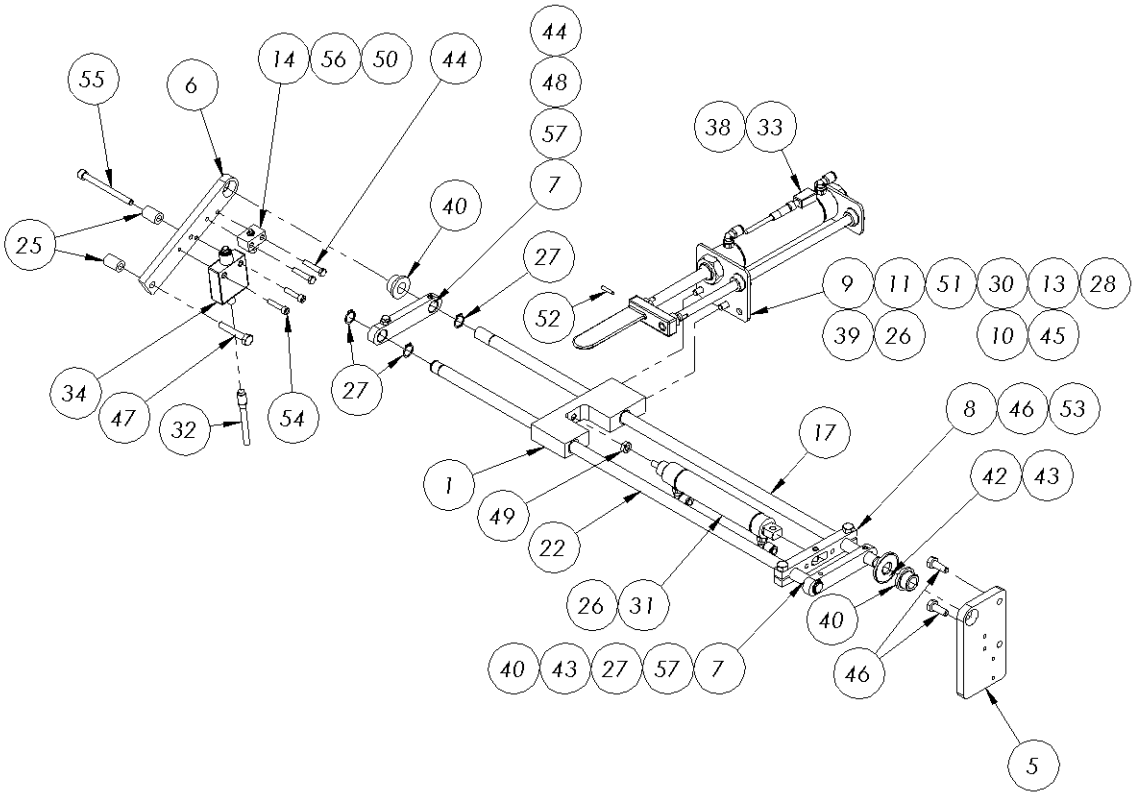


OPTION -2 SHOWN

BAG STRETCHER ASSEMBLY, LEFT HAND

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	B-7707-2226	ASS'Y, SLIDE BLOCK, BAG STRETCHER
5	1	B-7707-1009	PIVOT BLOCK 100"
6	1	B-7707-952	BRACKET, BAG STRETCHER SUPPORT
7	2	B-7707-953	ARM, PIVOT
8	1	B-7707-955	BAR, ADJUST
9	1	B-7707-956	BRACKET, CYLINDER
10	1	B-7707-957	PLATE, GUIDE
11	1	B-7707-958	BAR, STRETCHER
13	1	B-7707-964	ROD, GUIDE
14	1	B-7707-965	SPACER, VLIER PIN BLOCK
17	1	B-7707-971-2	SHAFT, GUIDE TOP
22	1	B-7707-972-2	SHAFT, GUIDE BOTTOM
25	2	B-7707-975	SPACER
26	4	269P-04-02	FITTING.TBG.ELB.1/4OD X 1/8NPT
27	6	5100-50H	RETAINING RING
28	2	5555-62H	RING, RETAINING
30	1	7707-979	CYLINDER, AIR
31	1	7707-980	CYLINDER, AIR
32	1	7707-1741	CABLE, 5-PIN, 10M
33	1	0550-1321	CYLINDER POSITION SWITCH
34	1	7707-2692	LIMIT SWITCH, NO CABLE
38	1	9743-1276	CORDSET, 8mm
39	2	FB610-4	BEARING, FLANGE
40	2	FP812-4	BEARING, FLANGED
42	1	FW1/2-A	WASHER, FLAT
43	1	FW1/2-B	WASHER, FLAT
44	3	HH10-32X1	SCREW, HEX HEAD
45	2	HH1/4-20X1/2	SCREW, HEX HEAD
46	4	HH1/4-20X3/4	SCREW, HEX HEAD
47	1	HH1/4-20X1-1/2	SCREW, HEX HEAD
48	1	HN10-32	HN 10-32
49	1	JN1/4-28	NUT, JAM
50	1	JN5/16-18	NUT, JAM
51	2	JN3/8-24	NUT, JAM
52	1	RP1/8X5/8	ROLL PIN, 1/8" X 5/8"
53	1	RP1/4X3/4	PIN, ROLL
54	2	SH10-32X7/8	SCREW, SOCKET HEAD
55	1	SH1/4-20X2-3/4	SCREW, SOCKET HEAD
56	1	SSS-D56	PIN, VLIER
57	2	ST1/4-20X3/16	SCREW, SET

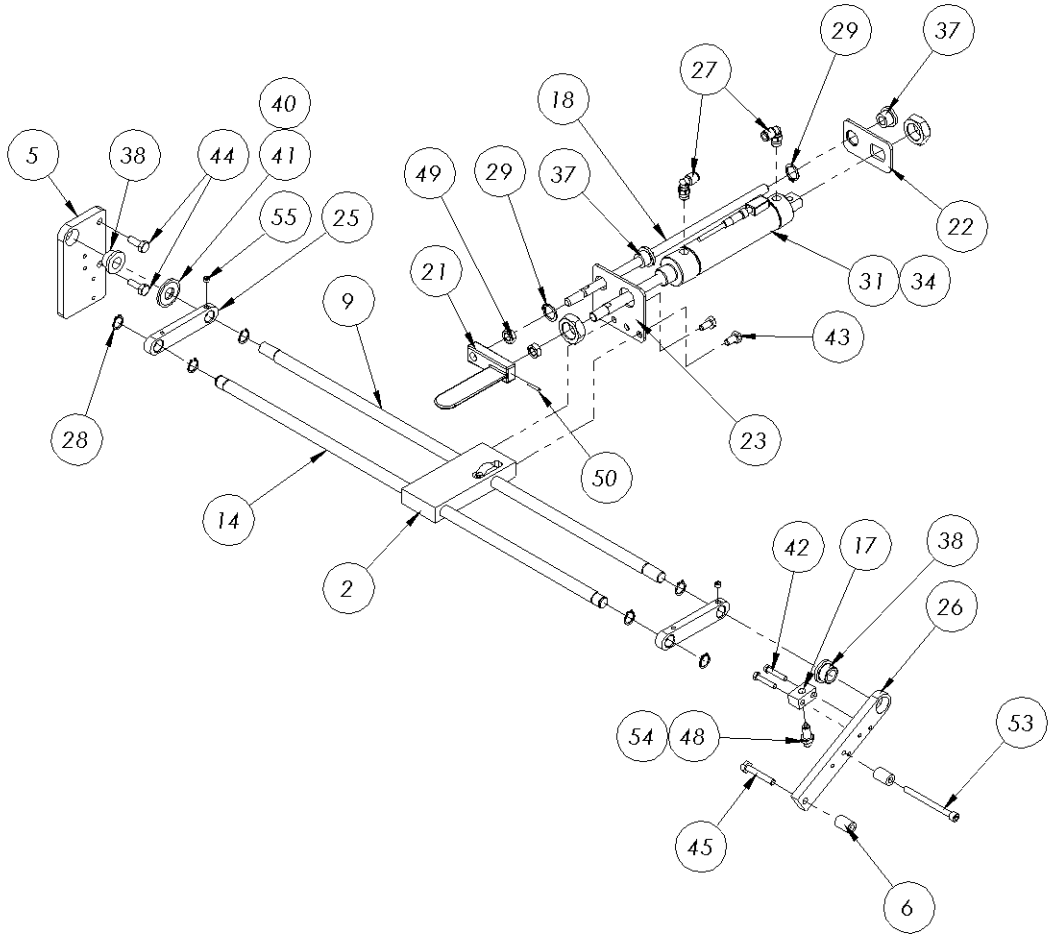
ASSEMBLY NUMBER: D-7707-950L-3



BAG STRETCHER ASSEMBLY, RIGHT HAND

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
2	1	B-7707-2225	BLOCK, FIXED, BAG STRETCHER
5	1	B-7707-1009	PIVOT BLOCK 100"
6	2	B-7707-975	SPACER
9	1	B-7707-971-2	SHAFT, GUIDE TOP
14	1	B-7707-972-2	SHAFT, GUIDE BOTTOM
17	1	B-7707-965	SPACER, VLIER PIN BLOCK
18	1	B-7707-964	ROD, GUIDE
19	1	B-7707-963	CLAMP, COLLAR
21	1	B-7707-958	BAR, STRETCHER
22	1	B-7707-957	PLATE, GUIDE
23	1	B-7707-956	BRACKET, CYLINDER
25	2	B-7707-953	ARM, PIVOT
26	1	B-7707-952	BRACKET, BAG STRETCHER SUPPORT
27	2	269P-04-02	FITTING.TBG.ELB.1/4OD X 1/8NPT
28	6	5100-50H	CLIP, RETAINER
29	2	5555-62H	RING, RETAINING
31	1	7707-979	CYLINDER, AIR
34	1	0550-1321	CYLINDER POSITION SWITCH
36	1	9743-1276	CORDSET, 8mm
37	2	FB610-4	BEARING, FLANGE
38	2	FP812-4	BEARING, FLANGED
40	1	FW1/2-A	WASHER, FLAT
41	1	FW1/2-B	WASHER, FLAT
42	2	HH10-32X1	SCREW, HEX HEAD
43	2	HH1/4-20X1/2	SCREW, HEX HEAD
44	2	HH1/4-20X3/4	SCREW, HEX HEAD
45	1	HH1/4-20X1-1/2	SCREW, HEX HEAD
48	1	JN5/16-18	NUT, JAM
49	2	JN3/8-24	NUT, JAM
50	1	RP1/8X5/8	ROLL PIN, 1/8" X 5/8"
53	1	SH1/4-20X2-3/4	SCREW, SOCKET HEAD
54	1	SSS-D56	PIN, VLIER
55	2	ST1/4-20X3/16	SCREW, SET

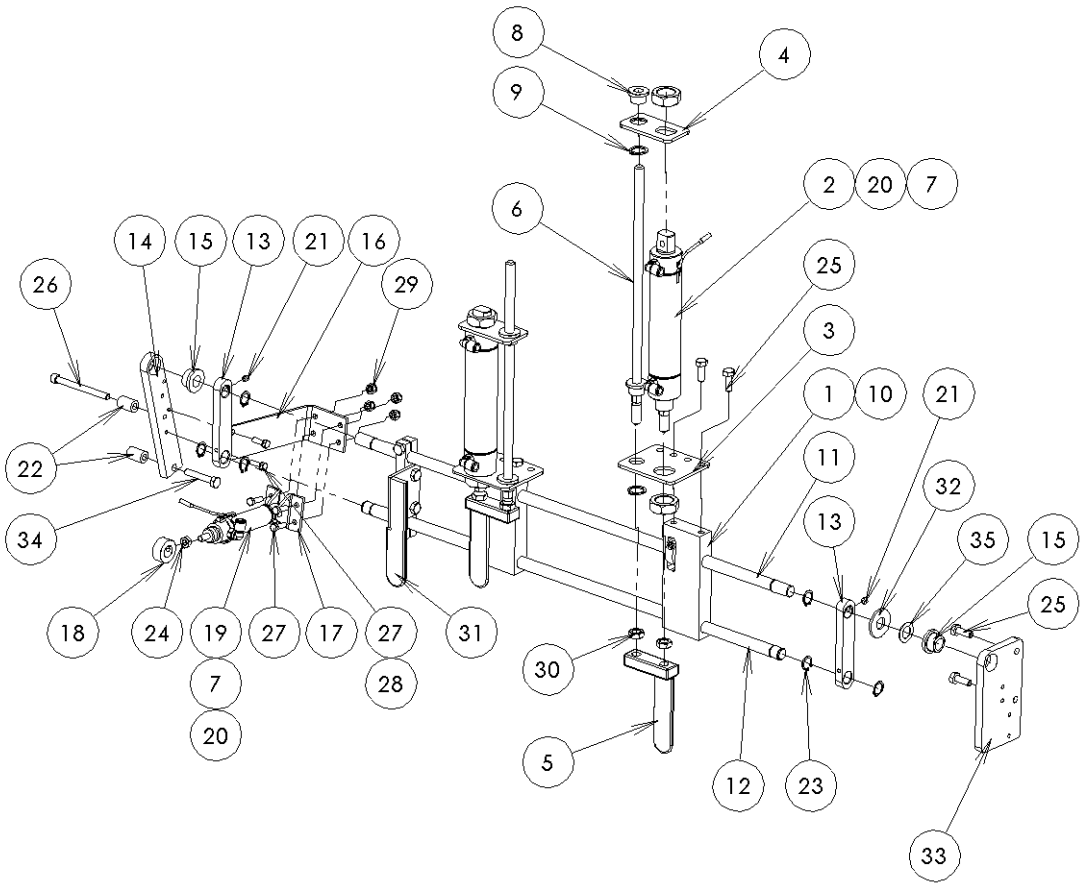
ASSEMBLY NUMBER: D-7707-950R-3



BAG CLAMP ASSEMBLY, LEFT

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	B-7707-962	BLOCK, SLIDE FIXED
2	2	7707-979	CYLINDER, AIR
3	2	B-7707-956	BRACKET, CYLINDER
4	2	B-7707-957	PLATE, GUIDE
5	2	B-7707-958	BAR, STRETCHER
6	2	B-7707-964	ROD, GUIDE
7	5	269P-04-02	FITTING.TBG.ELB.1/4OD X 1/8NPT
8	4	FB610-4	BEARING, FLANGE
9	4	5555-62H	RING, RETAINING
10	2	B-7707-963	CLAMP, COLLAR
11	1	B-7707-971-2	SHAFT, GUIDE TOP
12	1	B-7707-972-2	SHAFT, GUIDE BOTTOM
13	2	B-7707-953	ARM, PIVOT
14	1	B-7707-952	BRACKET, BAG STRETCHER SUPPORT
15	2	FP812-4	BEARING, FLANGED
16	1	B-7707-1577	BRACKET, CLAMP CYLINDER
17	2	B-7707-1578	PIVOT BRACKET
18	1	B-7707-1581	COLLAR, PIVOT
19	1	7707-1843	CYLINDER, AIR
20	3	0550-1321	CYLINDER POSITION SWITCH
21	2	ST 1/4-20 X 3/16	SCREW, SET
22	2	B-7707-975	SPACER
23	6	5100-50H	CLIP, RETAINER
24	1	JN1/4-28	NUT, JAM
25	6	HH1/4-20X3/4	SCREW, HEX HEAD
26	1	SH1/4-20X2-3/4	SCREW, SOCKET HEAD
27	6	HH10-32X5/8	SCREW, HEX HEAD
28	2	LW10	WASHER, LOCK
29	4	LN10-32	NUT, LOCK
30	4	JN3/8-24	NUT, JAM
31	1	B-7707-1738R	ASS'Y, FIXED FINGER BAG STRETCHER
32	1	FW1/2-B	WASHER, FLAT
33	1	B-7707-1009	PIVOT BLOCK 100''
34	1	HH1/4-20X1-1/2	SCREW, HEX HEAD
35	1	FW1/2-A	FLAT WASHER

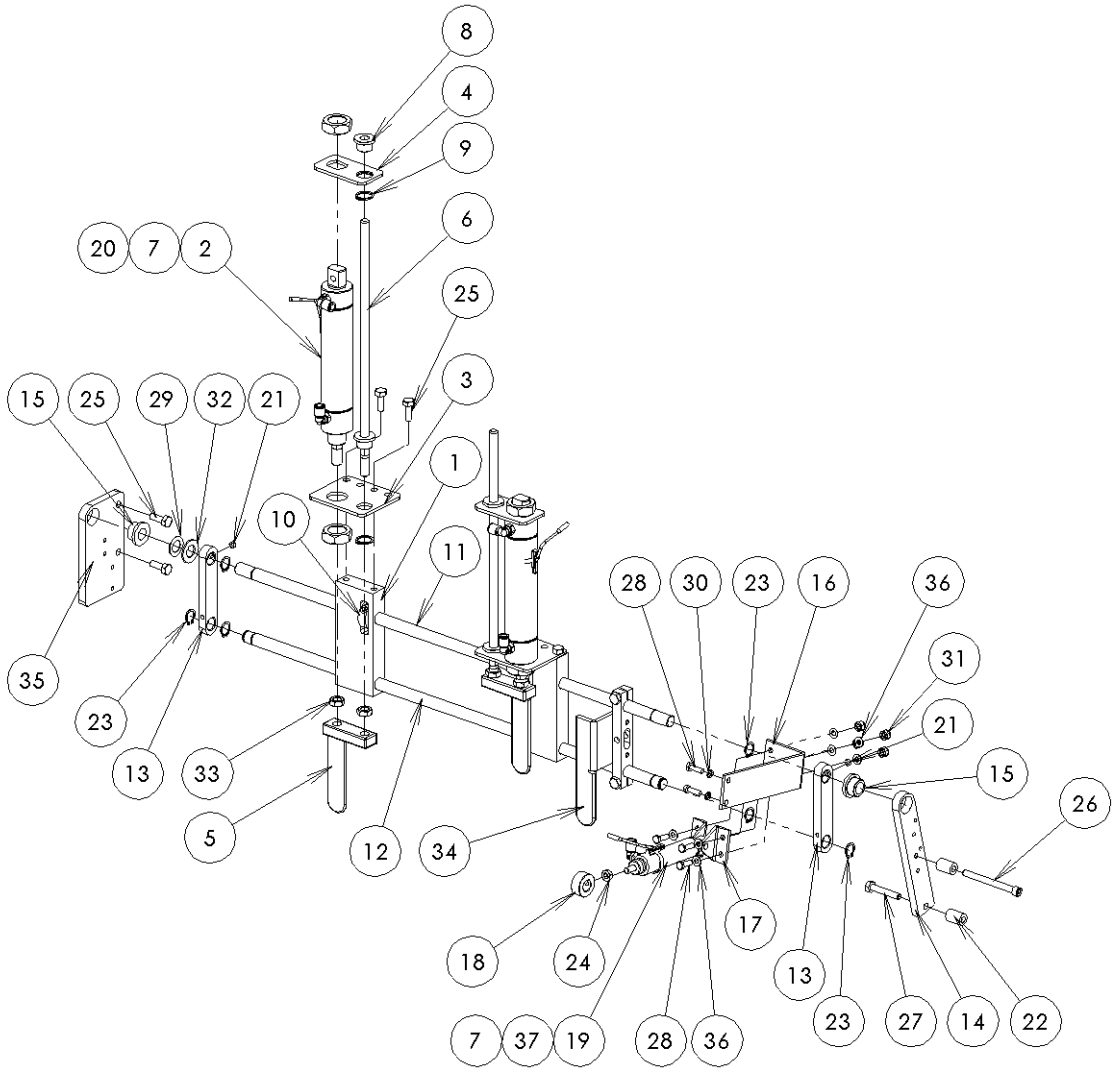
ASSEMBLY NUMBER: D-7707-3033L



BAG CLAMP ASSEMBLY, RIGHT

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	B-7707-962	BLOCK, SLIDE FIXED
2	2	7707-979	CYLINDER, AIR
3	2	B-7707-956	BRACKET, CYLINDER
4	2	B-7707-957	PLATE, GUIDE
5	2	B-7707-958	BAR, STRETCHER
6	2	B-7707-964	ROD, GUIDE
7	5	269P-04-02	FITTING.TBG.ELB.1/4OD X 1/8NPT
8	4	FB610-4	BEARING, FLANGE
9	4	5555-62H	RING, RETAINING
10	2	B-7707-963	CLAMP, COLLAR
11	1	B-7707-971-2	SHAFT, GUIDE TOP
12	1	B-7707-972-2	SHAFT, GUIDE BOTTOM
13	2	B-7707-953	ARM, PIVOT
14	1	B-7707-952	BRACKET, BAG STRETCHER SUPPORT
15	2	FP812-4	BEARING, FLANGED
16	1	B-7707-1577	BRACKET, CLAMP CYLINDER
17	2	B-7707-1578	PIVOT BRACKET
18	1	B-7707-1581	COLLAR, PIVOT
19	1	7707-1843	CYLINDER, AIR
20	2	0550-1321	CYLINDER POSITION SWITCH
21	2	ST 1/4-20 X 3/16	SCREW, SET
22	2	B-7707-975	SPACER
23	6	5100-50H	CLIP, RETAINER
24	1	JN1/4-28	NUT, JAM
25	6	HH1/4-20X3/4	SCREW, HEX HEAD
26	1	SH1/4-20X2-3/4	SCREW, SOCKET HEAD
27	1	HH1/4-20X1-1/2	SCREW, HEX HEAD
28	6	HH10-32X5/8	SCREW, HEX HEAD
29	1	FW1/2-A	FLAT WASHER
30	2	LW10	WASHER, LOCK
31	4	LN10-32	NUT, LOCK
32	1	FW1/2-B	WASHER, FLAT
33	4	JN3/8-24	NUT, JAM
34	1	B-7707-1738L	ASS'Y, FIXED FINGER BAG STRETCHER
35	1	B-7707-1009	PIVOT BLOCK 100"
36	8	FW10-D	WASHER, FLAT
37	1	0550-1321	CYLINDER POSITION SWITCH

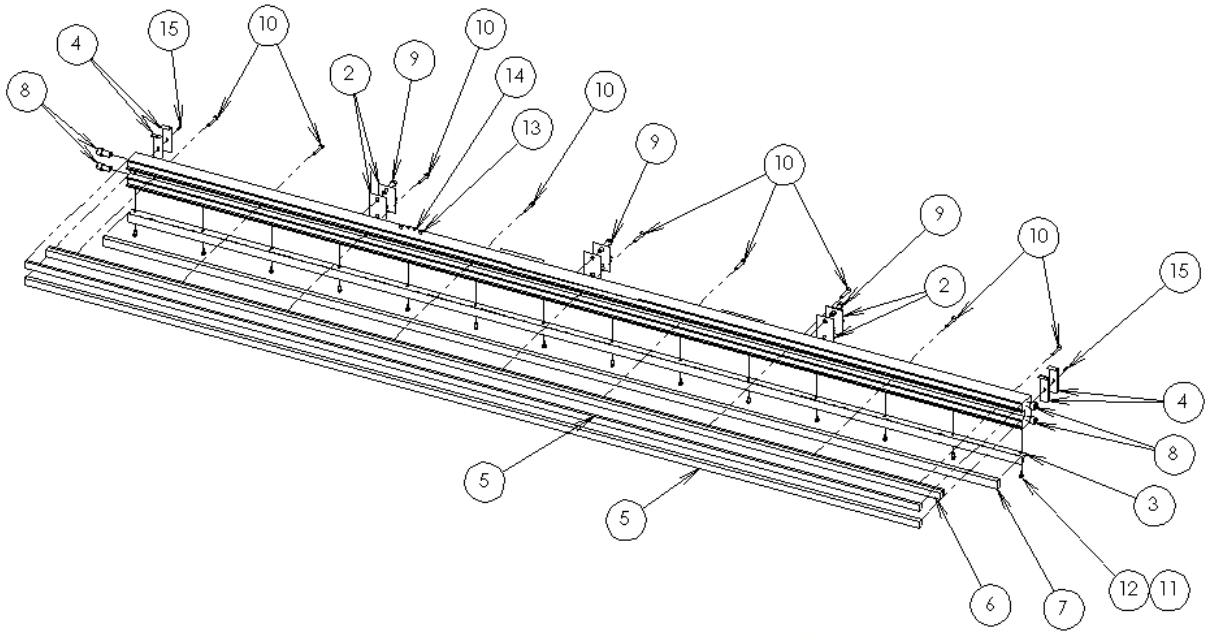
ASSEMBLY NUMBER: D-7707-3033R



FRONT MANIFOLD ASSEMBLY

ITEM NO.	-0/QTY.	PART NUMBER	DESCRIPTION
1	1	D-7707-1000	MANIFOLD, FRONT, 100" BAG STRETCHER
2	6	B-7707-1706	SHIM, FRONT MANIFOLD, CENTER
3	1	B-7707-1371	MOUNTING, FRONT SAFETY EDGE, 100"
4	4	B-7707-98	SHIM, FRONT MANIFOLD
5	2	B-7707-1069	RUBBER, SPONGE, 105"
6	1	B-7707-1068	ASS'Y, BACK-UP BAR, 100"
7	1	7707-1400	RUBBER, SPONGE, 100" SAFETY
8	4	SH1/2-13X1	SCREW, SOCKET HEAD
9	6	HH3/8-16X2	SCREW, HEX HEAD
10	9	HH1/4-20X1-1/2	SCREW, HEX HEAD
11	14	FW10-A	WASHER, FLAT
12	14	HH10-32X1/2	SCREW, HEX HEAD
13	2	HH1/4-20X3/8	SCREW, HEX HEAD
14	2	HH10-32X3/8	SCREW, HEX HEAD
15	2	RP1/8X5/8	ROLL PIN
16	2	7707-2359	LABEL, DANGER - HOT
17	2	7707-2360	LABEL, DANGER - MANIFOLD
18	2	7707-2361	LABEL, CAUTION - ONE OPERATOR

ASSEMBLY NUMBER: D-7707-2117



HEAT SEAL BAR ASSEMBLY

ITEM NO.	0/QTY.	-1/QTY.	-2/QTY.	-3/QTY.	PART NUMBER	DESCRIPTION
1	1	1	-	-	D-7707-1025-1	BAR HEAT SEAL 100"
2	1	-	1	-	H-C-7707-0141-B	HEATER ELEMENT, 440V, 100"
3	2	2	2	2	B-7707-1027	PLATE RETAINER END
4	1	1	1	1	B-7707-1028	PLATE RETAINER CENTER LEFT
5	5	5	5	5	B-7707-196	BRG. - HEAT SEAL BAR
6	5	5	5	5	7707-132	SPRING
7	5	5	5	5	B-7707-282	ROD, HEAT SEAL BAR
8	5	5	5	5	FW 3/8-A	WASHER, FLAT
9	5	5	5	5	HH 3/8-16 x 1/2	SCREW, HEX HEAD
10	1	1	1	1	B-7707-281	PLATE THERMOCOUPLE MTG.
11	1	1	1	1	7707-139	ADAPTER, THERMOCOUPLE
12	2	2	2	2	FH 8-32 X 1/2	SCREW, FLAT HEAD
13	30	30	30	30	FH 10-32 X 1/2	SCREW, FLAT HEAD
14	1	1	1	1	B-7707-1029	PLATE RETAINER CENTER RIGHT
15	1	1	-	-	BLK 5451-3M-1-1/2	TEFLON TAPE W/BACKING BLACK
16	-	1	-	1	G-C-7707-141-B	HEATER ELEMENT, 220V, 100"
17	-	-	1	1	D-7707-1025-2	BAR HEAT SEAL 100" PLASMA

OPTIONS:

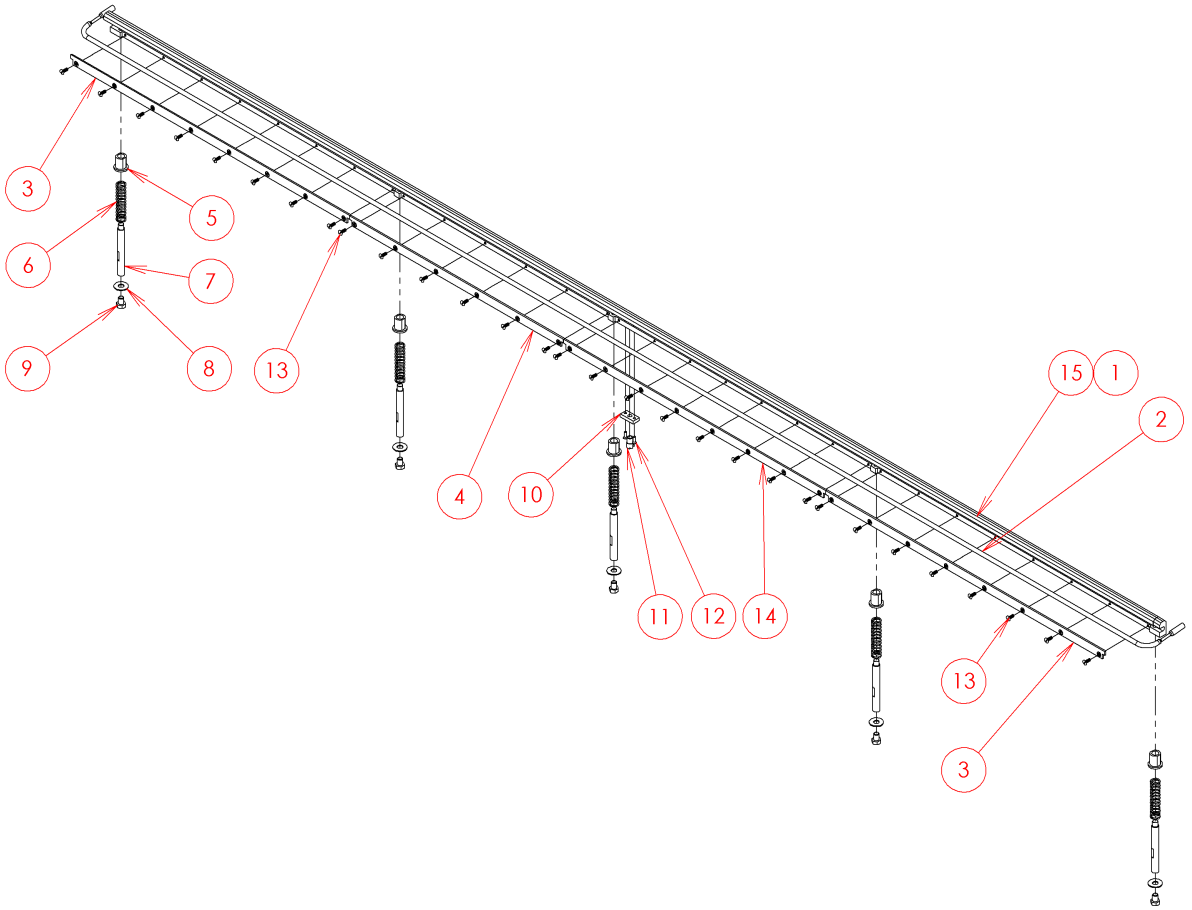
-0: 440V

-1: 220V

-2: 440V, PLASMA COATED

-3: 220V, PLASMA COATED

ASSEMBLY NUMBER: D-7707-1075



CENTER PIVOT ASSEMBLY

ITEM NO.	-3/QTY.	-4/QTY.	-5/QTY.	PART NUMBER	DESCRIPTION
1	1	1	1	268P-06-04	FITTING, TBG, STR, 3/8OD X 1/4NPT
2	2	2	2	269P-06-04	FITTING.TBG.ELB.3/8OD X 1/4NPT
3	12	12	12	703-01009-016	BEARING, FLANGE 3/4 X 7/8 X 1/2
4	1	1	1	7504-291	AIR CYLINDER, 2" X 4" STROKE
5	1	1	1	7707-161	RETAINING RING
6	1	1	1	7707-2765	NYLON BALL, 3/16"
7	1	-	-	B-7707-100	ACTUATOR, LIMIT SWITCH
8	2	2	2	B-7707-407	PLATE, PIVOT MOUNTING
9	2	2	2	B-7707-408	SPACER
10	1	1	1	B-7707-439	BLOCK, CYLINDER MOUNTING
11	2	2	2	B-7707-610	SHOULDER BOLT, 2"
12	1	1	1	B-7707-611	SHOULDER BOLT, 4-3/8"
13	1	1	1	B-7707-612	SHOULDER BOLT, 4-5/8"
14	1	1	1	B-7707-87	LINK, TOGGLE
15	1	1	1	B-7707-89	CLEVIS
16	1	1	1	B-7707-91	POST
17	1	1	1	B-7707-95	STUD, PIVOT
18	1	-	-	C-7707-409	PLATE, PIVOT FRT (100" SEAL)
19	1	1	1	C-7707-410	LINK, PIVOT, 70" & 100"
20	-	-	1	C-7707-999L	LEFT PLATE PIVOT FRT (100" SEAL)
21	-	1	-	C-7707-999R	FRONT PLATE, PIVOT FRT RIGHT, 100" H.S.
22	1	-	-	D-7707-0406	PIVOT BLOCK, CENTER REAR
23	-	-	1	D-7707-0998L	PIVOT BLOCK, LEFT CENTER REAR
24	-	1	-	D-7707-0998R	PIVOT BLOCK, RIGHT CENTER REAR
25	2	2	2	HH1/4-20X1/2	SCREW, HEX HEAD
26	2	2	2	HH3/8-16X1	SCREW, HEX HEAD
27	2	2	2	HH3/8-16X2-3/4	SCREW, HEX HEAD
28	1	1	1	JN1/2-20	NUT, JAM
29	3	3	3	LN5/8-11	NUT, LOCK
30	2	-	-	PH10-32X5/16	SCREW, PAN HEAD
31	3	3	3	ST1/4-20X1/2	SCREW, SET, CUP POINT
32	2	2	2	ST1/4-20X3/16	SCREW, SET, CUP POINT
33	1	1	1	ST3/8-16X3/8	SCREW, SET, CUP POINT
34	1	1	1	D-7707-3375	CENTER PIVOT GUARD

OPTIONS:
-3: CENTER PIVOT
-4: RIGHT CENTER PIVOT
-5: LEFT CENTER PIVOT

ASSEMBLY NUMBER: D-7707-646

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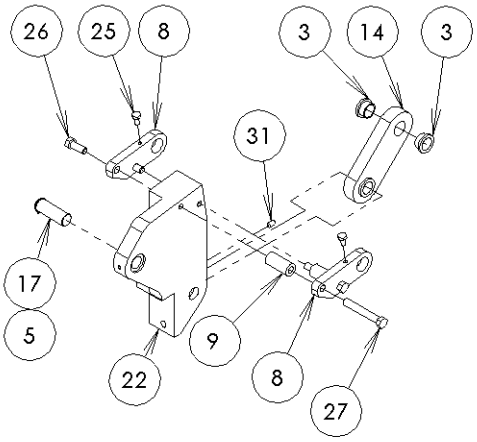
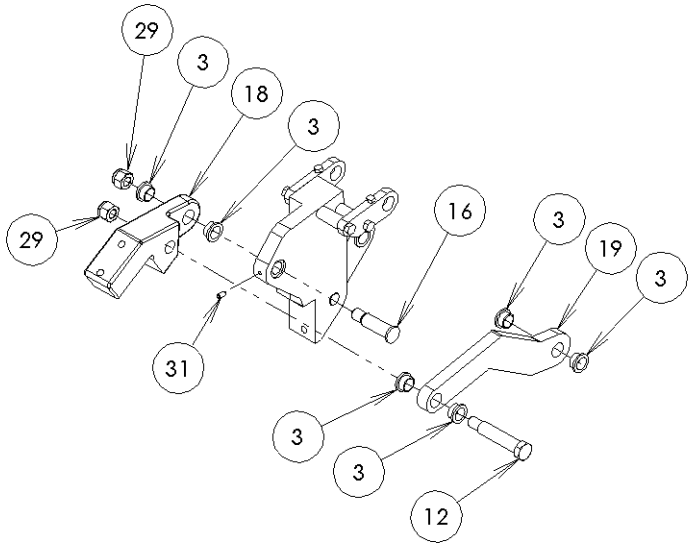
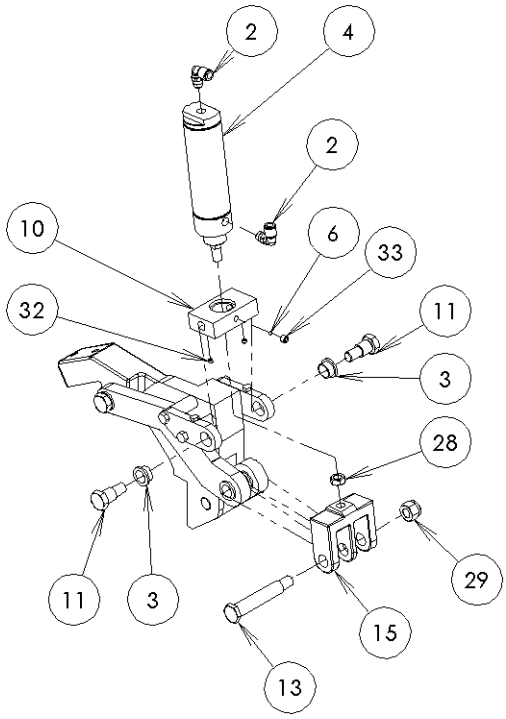
CENTER PIVOT ASSEMBLY



STAGE 1
OPTION -3 & -5

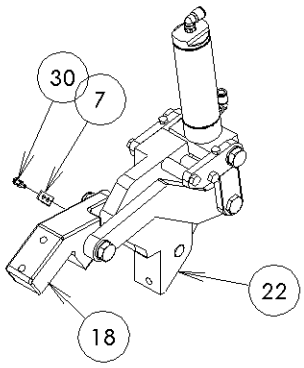


STAGE 2
OPTION -3 & -5

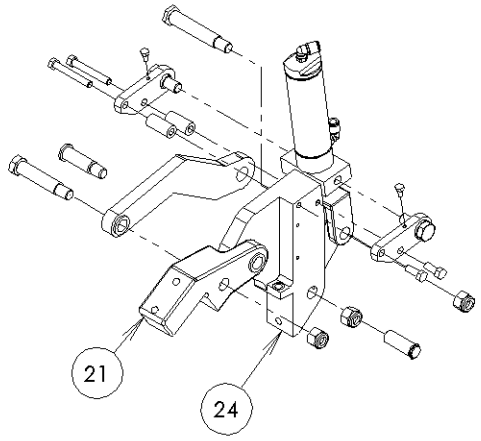


STAGE 3
OPTION -3 & -5

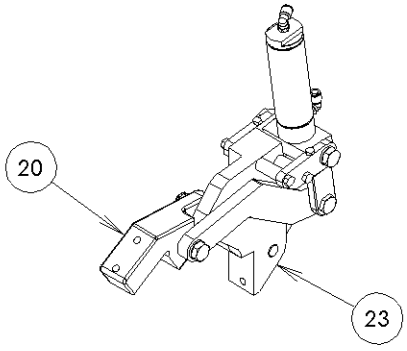
ASSEMBLY NUMBER: D-7707-646



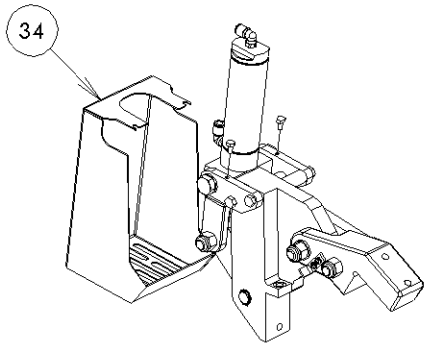
OPTION -3



OPTION -4



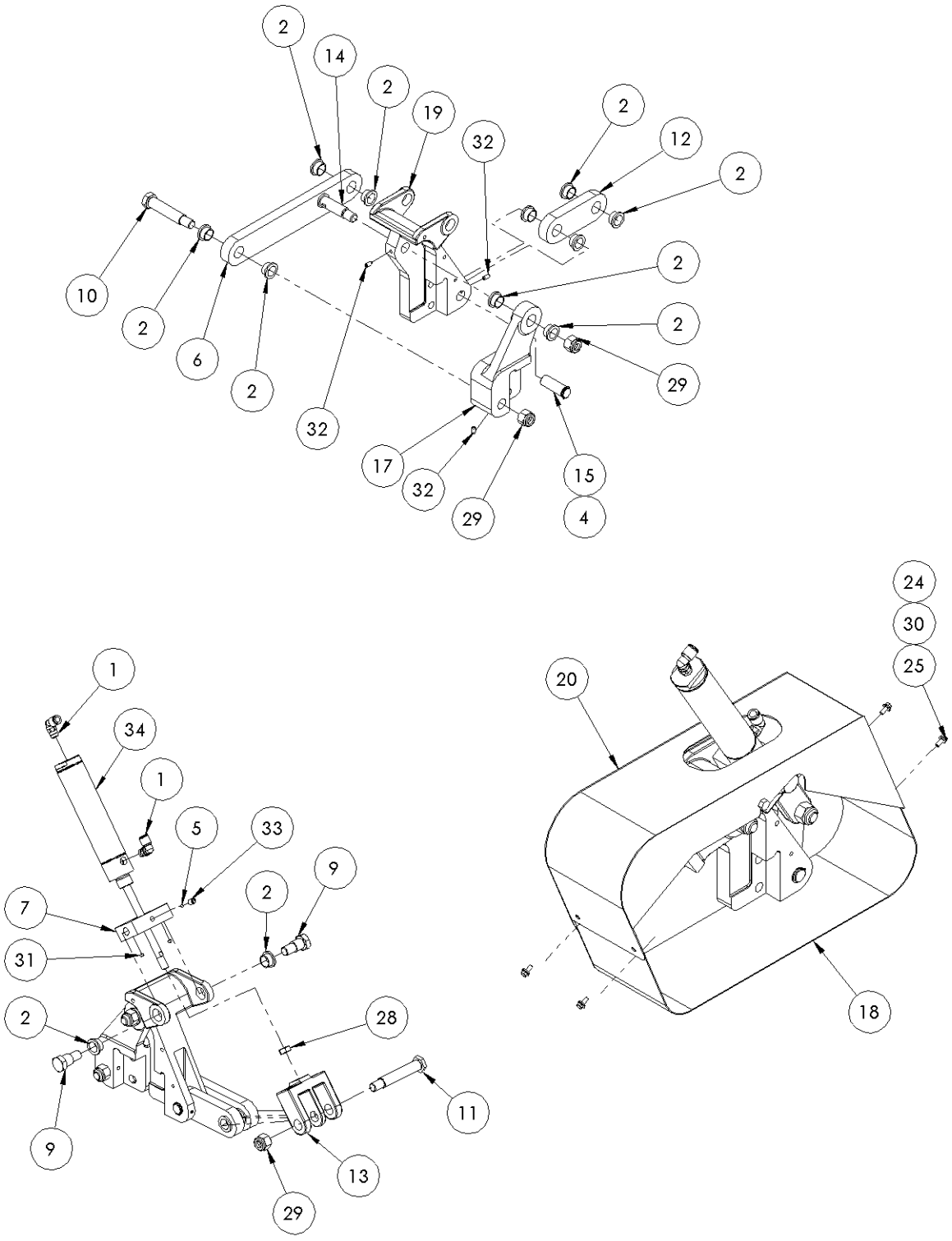
OPTION -5



PIVOT CLAMP ASSEMBLY, LEFT HAND

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	269P-06-04	FITTING.TBG.ELB.3/8OD X 1/4NPT
2	12	703-01009-016	BEARING, FLANGE 3/4 X 7/8 X 1/2
3	1	7707-0112	AIR CYLINDER, 1.75" X 5"
4	1	7707-161	RETAINING RING
5	1	7707-2765	NYLON BALL, 3/16"
6	1	B-7707-0088	LINK ARM
7	1	B-7707-0092	BLOCK, CYLINDER MOUNTING
8	1	B-7707-1064	SPACER
9	2	B-7707-610	SHOULDER BOLT, 2"
10	1	B-7707-611	SHOULDER BOLT, 4-3/8"
11	1	B-7707-612	SHOULDER BOLT, 4-5/8"
12	1	B-7707-87	LINK, TOGGLE
13	1	B-7707-89	CLEVIS
14	1	B-7707-91	POST
15	1	B-7707-95	STUD, PIVOT
17	1	C-7707-172L	BLOCK, PIVOT MTG, FRONT L.H.
18	1	C-7707-3343L	PIVOT GUARD, BTM COVER, LONG LH
19	1	D-7707-171L	PIVOT BLOCK, LEFT REAR
20	1	D-7707-2440L-1	PIVOT GUARD, TOP COVER, LONG LH
24	4	FW10-A	WASHER, FLAT
25	4	HH10-32X1/2	SCREW, HEX HEAD
26	1	HH5/16-18X1-1/4	SCREW, HEX HEAD
27	1	HH5/16-18X3/8	SCREW, HEX HEAD
28	1	JN1/2-20	NUT, JAM
29	3	LN5/8-11	NUT, LOCK
30	4	LW10	WASHER, LOCK
31	2	ST 1/4-20 X 3/16	SCREW, SET
32	3	ST1/4-20X1/2	SCREW, SET, CUP POINT
33	1	ST3/8-16X1/2	SCREW, SET, CUP POINT

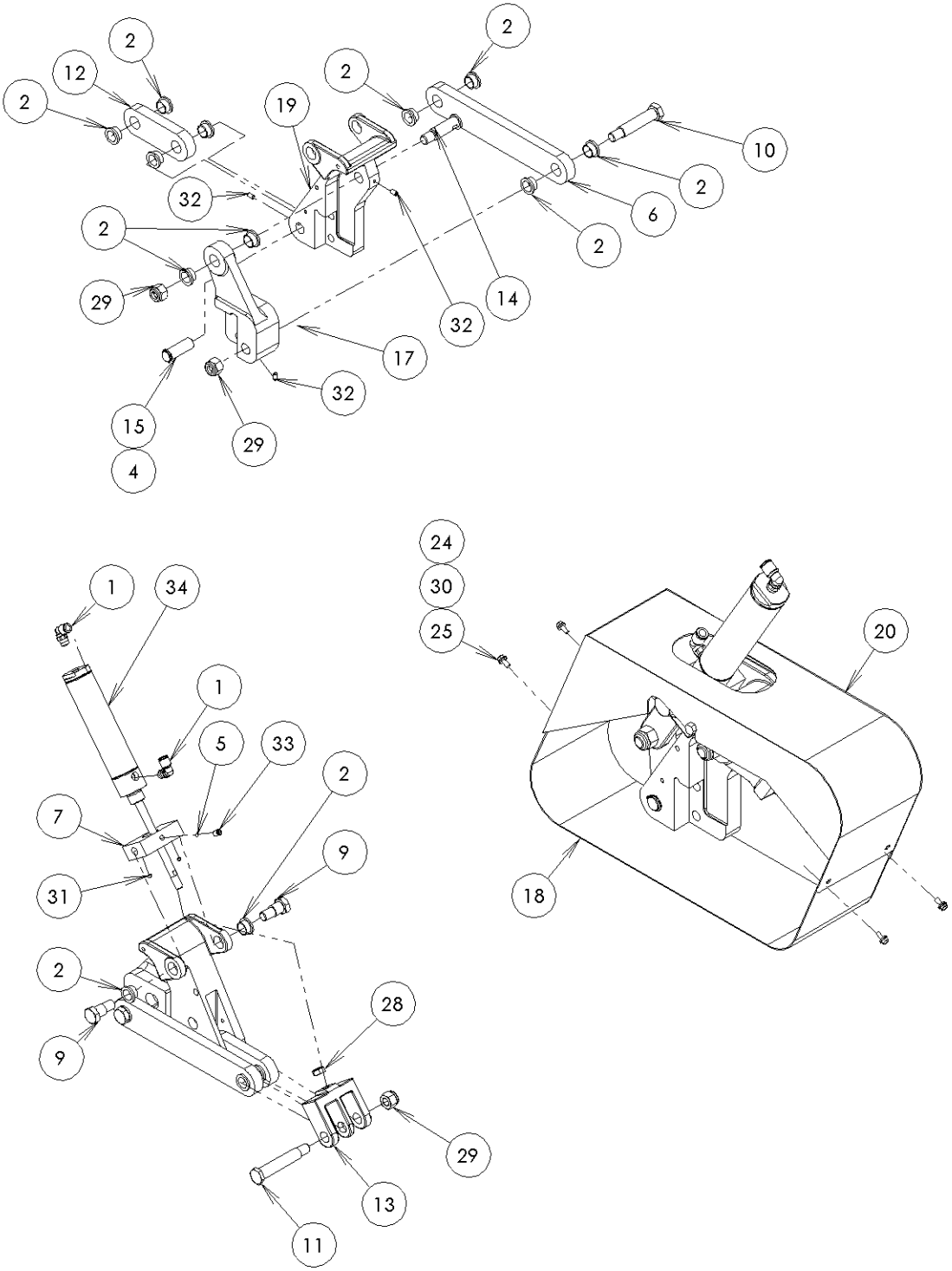
ASSEMBLY NUMBER: D-7707-559L-9



PIVOT CLAMP ASSEMBLY, RIGHT HAND

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	2	269P-06-04	FITTING.TBG.ELB.3/8OD X 1/4NPT
2	12	703-01009-016	BEARING, FLANGE 3/4 X 7/8 X 1/2
3	1	7707-0112	AIR CYLINDER, 1.75" X 5"
4	1	7707-161	RETAINING RING
5	1	7707-2765	NYLON BALL, 3/16"
6	1	B-7707-0088	LINK ARM
7	1	B-7707-0092	BLOCK, CYLINDER MOUNTING
8	1	B-7707-1064	SPACER
9	2	B-7707-610	SHOULDER BOLT, 2"
10	1	B-7707-611	SHOULDER BOLT, 4-3/8"
11	1	B-7707-612	SHOULDER BOLT, 4-5/8"
12	1	B-7707-87	LINK, TOGGLE
13	1	B-7707-89	CLEVIS
14	1	B-7707-91	POST
15	1	B-7707-95	STUD, PIVOT
17	1	C-7707-172R	BLOCK, PIVOT MTG, FRONT R.H.
18	1	C-7707-3343R	PIVOT GUARD, BTM COVER, LONG RH
19	1	D-7707-171R	PIVOT BLOCK, RIGHT REAR
20	1	D-7707-2440R-1	PIVOT GUARD, TOP COVER, LONG RH
24	4	FW10-A	WASHER, FLAT
25	4	HH10-32X1/2	SCREW, HEX HEAD
26	1	HH5/16-18X1-1/4	SCREW, HEX HEAD
27	1	HH5/16-18X3/8	SCREW, HEX HEAD
28	1	JN1/2-20	NUT, JAM
29	3	LN5/8-11	NUT, LOCK
30	4	LW10	WASHER, LOCK
31	2	ST 1/4-20 X 3/16	SCREW, SET
32	3	ST1/4-20X1/2	SCREW, SET, CUP POINT
33	1	ST3/8-16X1/2	SCREW, SET, CUP POINT

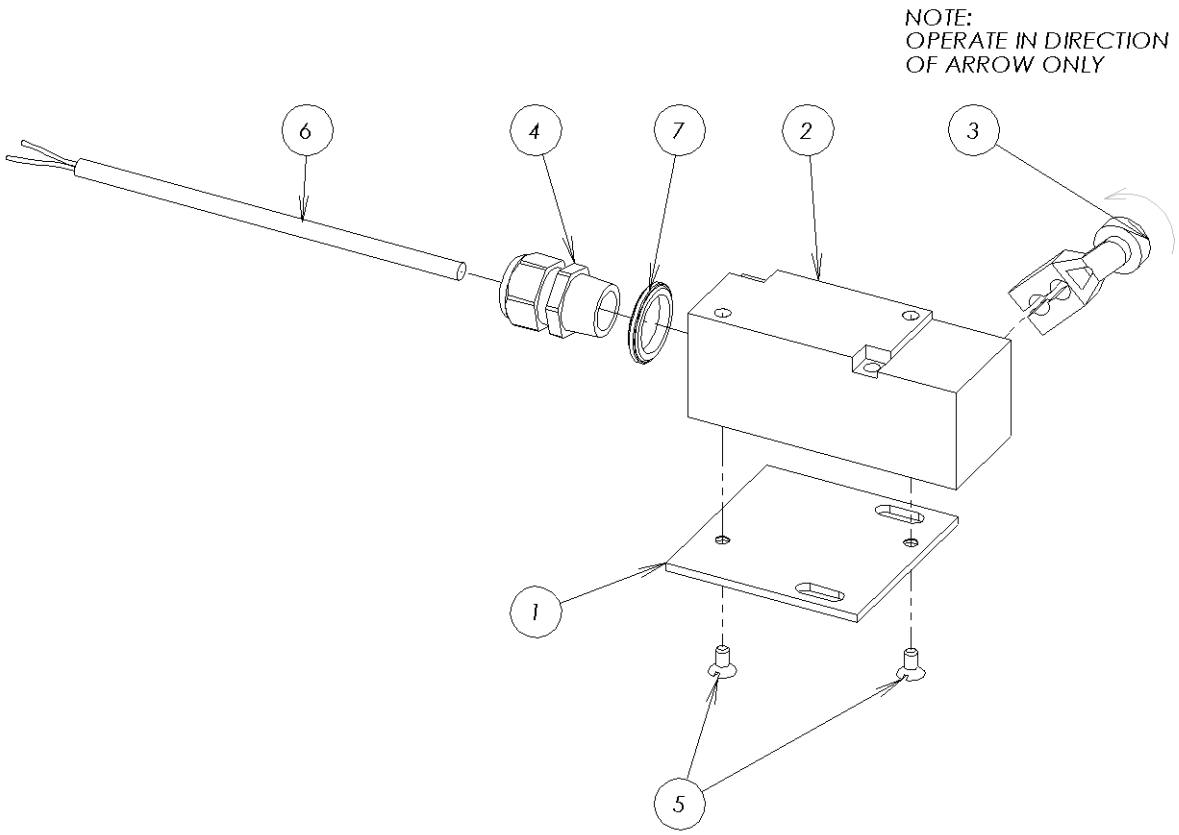
ASSEMBLY NUMBER: D-7707-559R-9



LIMIT SWITCH ASSEMBLY, JAW CLAMP

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	B-7707-99	SWITCH MOUNTING PLATE
2	1	7501-181	SWITCH LIMIT, MICRO
3	1	7707-148	ARM ACTUATOR, MICRO LS
4	1	7707-1634	CORD GRIP, 1/2", 1 HOLE DOME
5	2	FH10-32X3/8	SCREW, SLOTTED FLAT HEAD
6	9	RC 18-2	WIRE, BLACK CORD TYPE SJD
7	1	5262	SEALRING

ASSEMBLY NUMBER: B-7707-680-1

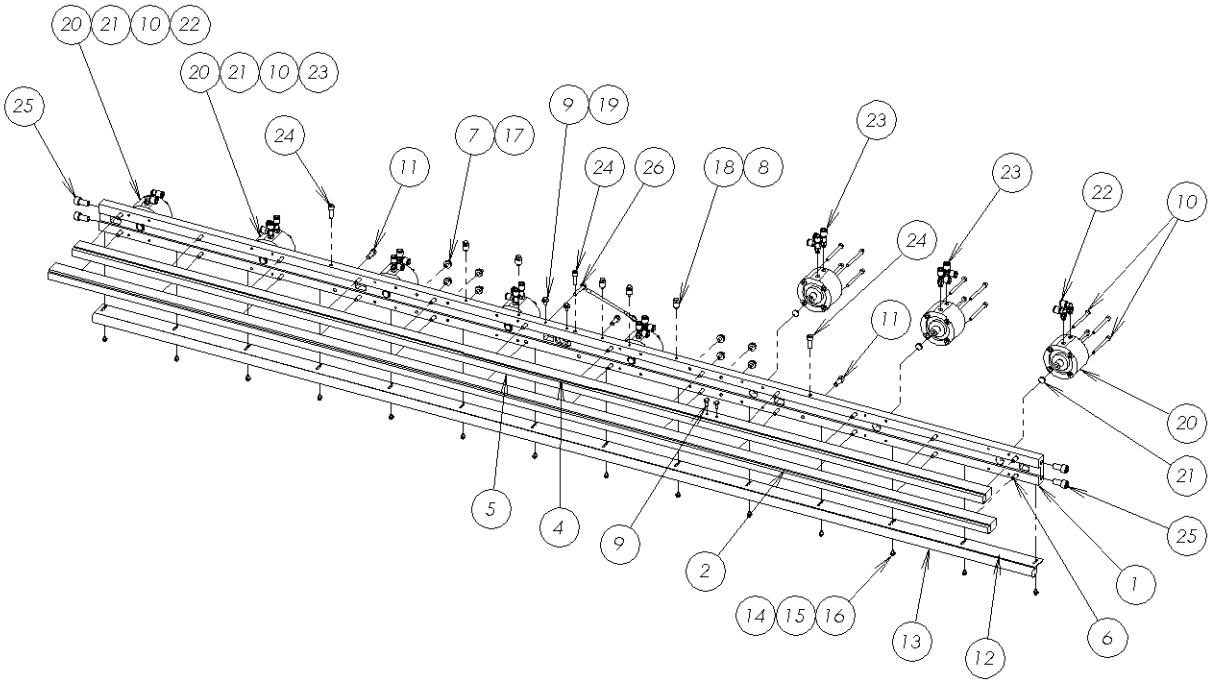


REAR MANIFOLD ASSEMBLY

ITEM NO.	-0/QTY.	-2/QTY.	PART NUMBER	DESCRIPTION
1	1	1	D-7707-1018	REAR MANIFOLD, 100" H.S., BAG STR
2	1	1	D-7707-1023	RUBBER SUPPORT, R.B., 100" H.S.
3	1	1	B-7707-1069	RUBBER, SPONGE, 105"
4	1	1	D-7707-1024	RUBBER SUPPORT, RT, 100" HS
5	1	1	B-7707-1070	RUBBER, SPONGE, REAR TOP
6	24	24	HH5/16-18X1-3/4	SCREW, HEX HEAD
7	8	8	HH5/16-18X5/8	SCREW, HEX HEAD
8	5	5	HH1/4-20X7/8	SCREW, HEX HEAD
9	4	4	HH1/4-20X1/2	SCREW, HEX HEAD
10	32	32	HH1/4-20X3	SCREW, HEX HEAD
11	3	3	HH3/8-16X1	SCREW, HEX HEAD
12	1	1	B-7707-1369	REAR SAFETY MOUNT, 100" H.S.
13	1	1	B-7707-1348	EDGE SAFETY 100" RB MANIFOLD
14	14	14	FW10-A	WASHER, FLAT
15	14	14	LW10	WASHER, LOCK
16	14	14	HH10-32X3/8	SCREW, HEX HEAD
17	8	8	B-7707-1158	SPACER, MANIFOLD
18	5	5	B-7707-1279	WASHER, 1/4ID X 1/2
19	2	2	FW1/4-A	WASHER, FLAT
20	8	8	7707-2489	CYLINDER, AIR, 1" STROKE
21	8	8	B-7707-1336	PUSHER INSERT, 1/8"
22	4	4	87110-06-02	FITTING.TBG.ELB.3/8OD X 1/8NPT
23	12	8	IN-116-308-020	FITTING.TBG.TEE.RUN.3/8OD X 1/8NPT
24	3	3	SH3/8-16X1	SCREW, SOCKET HEAD
25	4	4	SH1/2-13X1	SCREW, SOCKET HEAD
26	1	1	B-7707-715	ASS'Y, GROUND WIRE, HEAT SEAL BAR
27	2	6	264P-06	FITTING.TBG.TEE.3/8OD
28	-	4	268P-06-02	FITTING.TBG.STR.3/8OD X 1/8NPT

OPTIONS:
-0: OVERHEAD
-2: FLOOR BIN

ASSEMBLY NUMBER: D-7707-2109

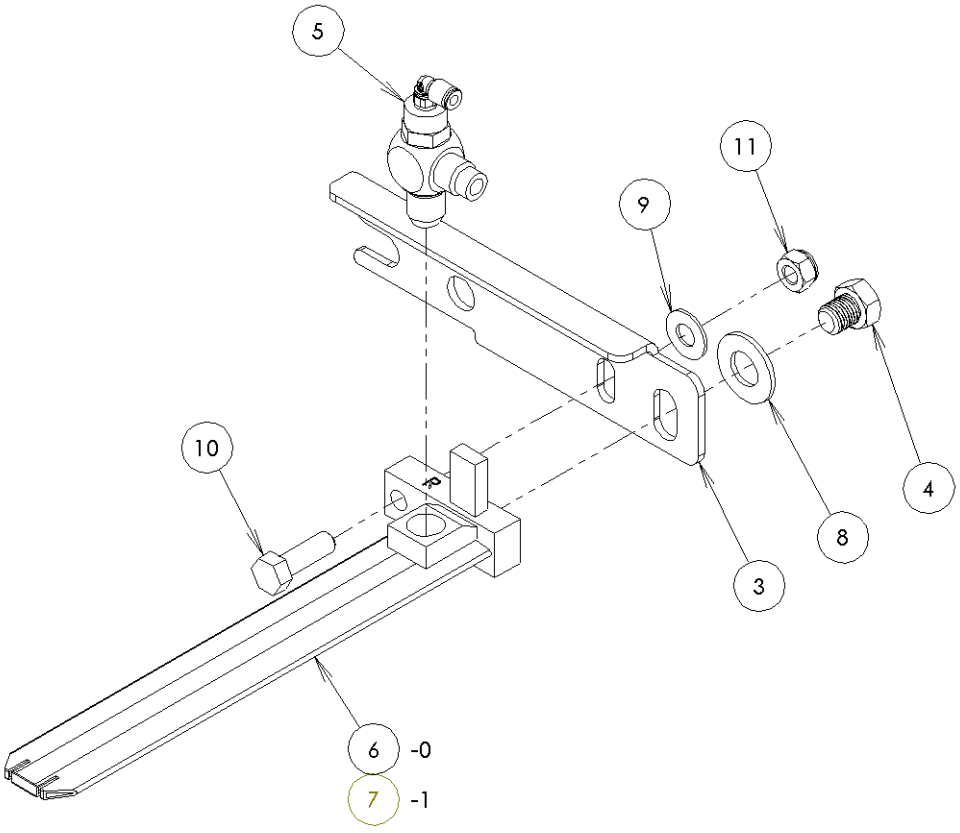


GAS ANALYZER PROBE ASSEMBLY

ITEM NO.	-0/QTY.	-1/QTY.	PART NUMBER	DESCRIPTION
1	1	1	44-W	TUBING, POLY-FLO, 1/4"
2	1	1	9537-1752	REDUCER UNION 1/4 X 5/32
3	1	1	B-7707-2940	SNORKEL TIE PLATE
4	1	1	B-7707-2941	TIE BRACKET SCREW ALTERATION
5	1	1	B-7707-3112	ASS'Y, LOCKOUT VALVE
6	1	-	C-8013-19R	SNORKEL WELDMENT
7	1	1	FW1/2-B	WASHER, FLAT
8	1	1	FW5/16-A	WASHER, FLAT
9	1	1	HH5/16-18X1	SCREW, HEX HEAD
10	1	1	LN5/16-18	NUT, LOCK
11	10	10	NC-242	BLACK TUBING
12	1	1	P68949	VALVE ADAPT ELB, 1/4" TUBE

OPTIONS:
-0: STANDARD
-1: EXTENDED SNORKEL

ASSEMBLY NUMBER: C-7707-2939



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1675 Todd Farm Dr.
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Phone: **(847) 741-3500**
Sales: Ext 1
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Fax: **(847) 741-3569**

Website: **www.cv-tek.com**

sales@cv-tek.com

service@cv-tek.com

spareparts@cv-tek.com