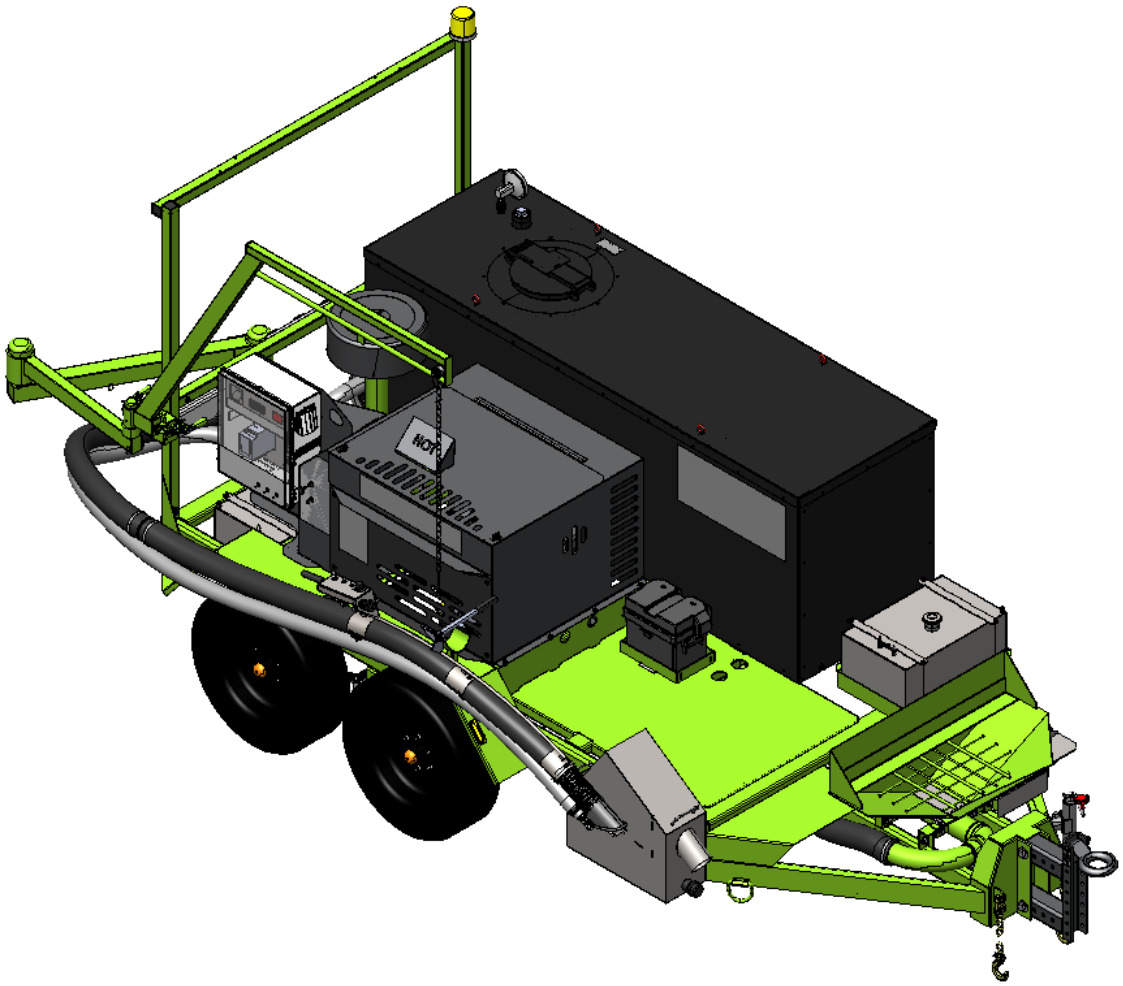
CIMLINE P1

DURAPATCHER TECHNOLOGY

Spray Injection Road Repair

Owner/Operators Manual



Due to continuous product development some of the details shown in this manual may differ from your equipment. We reserve the right to change the contents of the manual without notification.

CIMLINE.COM

2601 Niagara Lane · Plymouth, MN 55447 · (763) 557-1982 · (800) 328-3874 · Fax (763) 557-1971

Part # 305-000-000

7/12/2021 Rev C

Table of Contents

General Maintenance

Table of Contents, continued...

Parts Section

Trouble Shooting Section

Warranty

Shipping Papers and Information

A packet containing IMPORTANT INFORMATION has been enclosed with your P1. This packet contains:

1) Operation Instructions/Parts List
2) Warranty Information
3) Kohler Engine Manual, Warranty, and Keys
4) Schneider Electric Altivar 12 User Manual

Read Instruction Manual

Reading the instructions completely is the first step to safe operation. An uninformed operator can subject himself and others to death or serious injury.

This manual contains the basic information required to operate, maintain and repair the CIMLINE P1 Patcher you have purchased. The use of this manual insures accurate adjustments, operation and proper lubrication of your equipment. Please keep it handy.

NOTICE: Also read and understand the Kohler Command Pro CH752 Engine Owners Manual.

Machine Specific Information

P1 Serial Number: _____

Engine Model & HP: Kohler Command Pro 752 747cc 27hp

Engine Serial Number: _____

Electric Motor Manufacturer: _____

Electric Motor Model & HP: _____

Electric Motor Serial Number: _____

Pump Manufacture & Model _____

Pump Serial Number: _____

Blower Manufacture & Model _____

Blower Serial Number _____

Contacting Cimline

At Cimline, impressing the customer is one of our core values. We want to make sure you are covered for any general or technical questions you may have on your new Cimline equipment. Please use the following information to get the support you need if this manual does not provide the answers you are looking for.

Cimline Dealer Network:

Your local dealer is always your first point of contact when looking for parts, maintenance, technical support, warranty information or answers to your questions. No one should know you and your business better than your local dealer, and they should always be the first call you make when looking for answers to your questions.

CIMLINE Local Dealer Name: _____

CIMLINE Local Dealer Phone Number: _____

CIMLINE Sales:

Toll Free: (877) 841-0848 • Telephone: 763-694-2665 • Fax: 866-557-1971
Corporate Headquarters: 2601 Niagara Lane N, Plymouth, Minnesota 55447
www.cimline.com

Any parts orders or service problems relating to CIMLINE equipment should be directed to your local dealer FIRST.

CIMLINE Customer Care and Technical Service:

CIMLINE Technical Service is available Monday - Friday during normal business hours.
Toll Free: (877) 841-0848 • Telephone: 763-694-2665 • Fax: 866-553-7765
www.cimline.com • Email: customercareorders@plymouthind.com

CIMLINE Parts and Warranty Items:

Toll Free: (800) 328-3874 • Telephone: 763-694-2638 • Fax: 866-553-7765
www.cimline.com • Email: customercareorders@plymouthind.com

General Safety Overview

NOTICE

Read Operators Manual thoroughly before operating equipment

You are in a position to ensure the safety of yourself and those around you. Lack of attention to safety can result in: accidents, personal injury, reduction in efficiency, and worst of all - loss of life. Watch for safety hazards and correct them promptly.

Understanding the proper operation of this equipment is critical to its safe operation. In addition to following these safety guidelines, the operator(s) should follow any company specific guidelines and procedures. Consult your immediate supervisor for specific company safety guidelines and/or procedures.

The following Safety symbols are used throughout the manual to draw attention to important information. If the information is not carefully read and instructions are not followed; severe injury, death, and/or damage to property and equipment may occur.

Signal Words in Manual

The signal words **DANGER, WARNING**, **CAUTION**, and **NOTE** are used to identify levels of hazard seriousness.

DANGER

DANGER! Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING! Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION! Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE: Is used to address practices not related to personal injury.

SAFETY INSTRUCTIONS

SAFETY INSTRUCTIONS: Indicates specific safety related instructions or procedures

General Operation Safety:

1) Perform a DOT pre-trip inspection, including but not limited to:
    a) Verifying that the hitch, chains, break-away switch and lights are properly connected to the tow vehicle. Refer to the vehicle manual safe towing guide
    b) Confirm the trailer brakes are properly adjusted and in good repair.
    c) Make sure all lights are in working order and reflectors are clean.
    d) Properly secure any loose items found or stored on machine
    e) Check each tire's air pressure, tread wear, & lugnuts (see pages 12 - 13)
2) Always use pin with swivel jack
3) Never use a damaged swivel jack.
4) Never go under or on trailer with out first preforming the Trailer Stabilizing Procedure (see page 11)
5) Never touch patches while still hot
6) Do not operate without all guards or covers in place. This includes the safety cover on emulsion hose.
7) Never leave machine unattended while it is running
8) Do not touch exhaust stacks or mufflers.
9) Keep tank access closed at all times except when adding material.
10) Do not use the patcher without first providing proper traffic control measures to prevent collisions with the DuraPatcher or its workers
11) Never extend the discharge boom into unprotected or uncontrolled lanes of traffic
12) Clear the area of people before starting or operating the unit
13) Use recommended hand holds and steps with at least three points of support when getting on and off the DuraPatcher. Keep steps, floor, hand holds and controls clean and free from grease. Face the machine when climbing up and down and never jump off.
14) Never stand on any part of the patcher while in operation
15) Never transport people on the patcher.
16) DO NOT hang additional components from the discharge hose support boom. The hose support boom is not designed to be used as a means for lifting.

Personal Safety

WARNING

The emulsion used for patching is hot and steam may escape when opening the access hatch. Personal protective equipment (PPE) is to be worn by anyone checking or filling the emulsion tank.

CAUTION

The air output from the P1 will produce dust and flying debris. The operator and anyone working in close proximity to the nozzle must always wear PPE.

CAUTION

The continuous noise from the P1 engine and blower can lead to hearing loss. The operator and anyone working in close proximity to running equipment must use hearing protection

NOTICE

ALL PPE must be well maintained and in proper working order.

Required PPE includes:

• Gloves with wristlets • Heavy leather boots or shoes • Face Shield
• Long sleeve shirt with sleeves rolled down and cuffs buttoned
• Long pants with no cuffs • Respirator • Hearing Protection

Trailer Safety

WARNING

Trailer may shift position without warning. Going under or on the trailer puts a person at risk of severe injury or death. ALWAYS use pin with swivel jack. NEVER place blocking under jack. NEVER use a damaged jack or pin. ALWAYS follow trailer stabilization procedure below before going under or on the trailer

Operating this machine requires workers to perform work behind the trailer, it is critical to perform the work safely. Communication between the tow vehicle driver and worker is critical. Worker and tow vehicle driver must stay in communication, use an audible device or visual signals to communicate. A worker must never ride on the trailer or position him or herself between the tow vehicle and trailer when the tow vehicle is running. Tow vehicle driver must always be aware of workers position.

Only use a tow vehicle that is equipped with an electronic brake control system and has the appropriate towing capacity. The best means for determining the vehicle's towing capacity is to read the vehicle owner's manual. The owner's manual will provide detailed instructions and limitations, usually accompanied by tips for safe towing. If the owner's manual has been misplaced, most manufacturers provide free downloadable copies on their website.

NOTICE

Towing with an undersized tow vehicle can cause the trailer to tow improperly, potentially causing loss of control. Overloading can also cause unintended failures to tow vehicle.

The weight of your trailer listed in this manual is for the base model without any additional accessories or the weight of the sealant. The weight of your trailer will vary, weigh your machine to determining your Gross Vehicle Weight (GVW). Scales are sometimes available to use at state highway weigh stations, refuse transfer stations and commercial truck stops.

SAFETY INSTRUCTIONS

Trailer Stabilization Procedure

Method #1 Hitch to Vehicle:

Park both the tow vehicle and trailer on a flat level surface. Place tow vehicle in park and remove keys and chock the tires of both the trailer and tow vehicle.

Method #2 Unhitched:

Park trailer on a level surface. Place wheel blocks in front of and behind wheels on both sides of the trailer. Inspect your swivel jack thoroughly for damage or abnormal wear, especially if it was subjected to abnormal load or shock. [If damaged do not use, replace swivel jack.] Turn the swivel jack to the vertical position and pin in place. Use the swivel jack to decouple trailer from tow vehicle. After raising the hitch coupler, crib, block, or otherwise secure the trailer at once.

Wheels

Wheel Selection

When specifying or replacing your trailer wheels it is important that the wheels, tires, and axles are properly matched. The following characteristics are extremely important and should be thoroughly checked when replacement wheels are considered:

1. **Bolt Circle.** Wheels have many bolt circle variations and some are so close that is could be possible to attach an inappropriate wheel that does not match the axle hub.
2. **Capacity.** Wheel load capacity should match tire and trailer max. load ratings.
3. **Offset.** The relationship of the center line of the tire to the hub face of the axle should match any replacement. Failure to match offset may result in reducing the carrying capacity of your axle.
4. **Rim Contour.** Replacement wheels should be direct replacements to match the rim contour

Inspection

All the components of your suspension system should be visually inspected for signs of wear, damage, or loose fasteners at least every 6,000 miles. When replacing or tightening loose fasteners, consult the torque chart for correct torque values. Worn spring eye bushing or sagging or broken springs should be replaced.

Use only rim contours suggested by manufacturer. Failure to use correct rim contour may cause dramatic separation of tire and wheel and could cause serious injury or death.

Attempting to modify or repair a wheel can cause unsafe conditions that may result in an explosion. Air pressure on a weakened or cracked rim can cause serious injury or death.

Torque Requirements

It is extremely important to apply and maintain proper wheel mounting torque on your trailer axle. Torque wrenches assure the proper amount of torque is being applied to a fastener. Use no other method to torque fasteners.

Proper and accurate torque must be maintained to prevent wheels from loosening, studs from cracking and/or breaking or other possible hazardous breakage resulting in serious injury or death.

Be sure to use only the fasteners matched to the cone angle of your wheel (usually 60° or 90°) The proper procedure for attaching your wheels is as follows:

1. Start all bolts or nuts by hand to prevent cross threading.
2. Tighten bolts or nuts in the following sequence.
3. Tightening fasteners should be done in stages. Follow the recommended sequence, tighten fasteners per wheel torque requirements diagram (see next page).
4. Wheel nuts/bolts should be torqued before first road use and after each wheel removal. Check and re-torque after the first 50 miles and again at 100 miles. A periodic check during regular service is recommended.

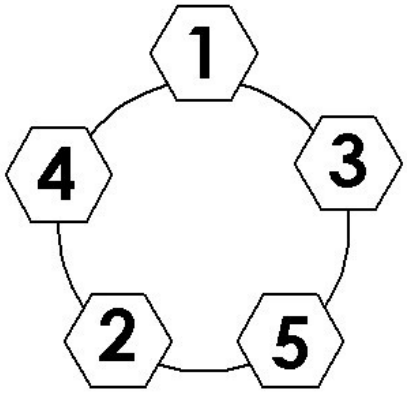
Wheels Continued...

Wheel Sizes

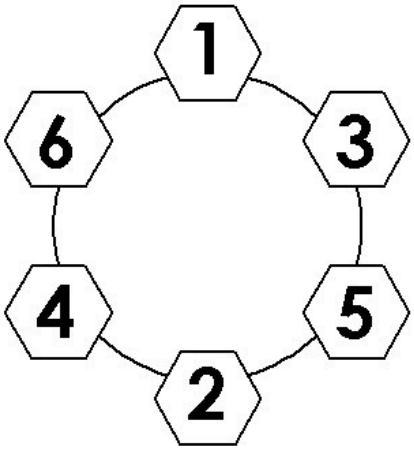
14” - 15” - 16” - 16.5” x 6.75”
NOTE: All torque in ft-lb

Torque Sequence

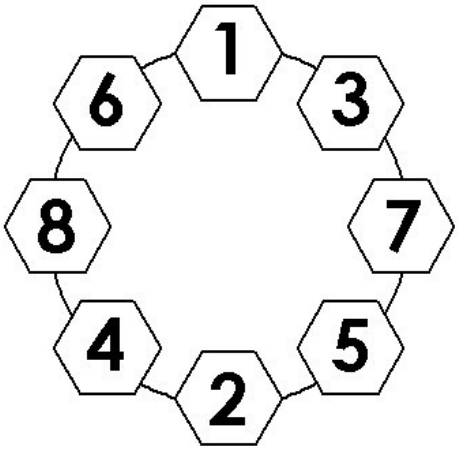
1st Stage
20-25



2nd Stage
50-80



3rd Stage
90-120



LUG TIGHTENING SEQUENCE CHART

Tires

Prior to mounting tires onto wheels, be sure the rim size and contour are approved by the Tire and Rim Association Yearbook or the Tire Manufacturers Catalog in the United States and Recreational Vehicle Running Gear Certification - CSA CAN3 in Canada. Use only Tires, Rims and Wheels complying with CMVTSS 109 and CVMTSS110; or CMBTSS 119 and CMVTSS 120. In addition, confirm that the tire will carry the rated load. If the load is not evenly distributed on all tires, use the tire rated for the heaviest wheel position. The Rubber Manufacturers Association or the tire manufacturers guidelines should be consulted for mounting procedures.

Tire inflation pressure is the most important factor in tire life. Tire pressure should always be what is recommended by the manufacturer for the load. Always check pressure cold before operation. **DO NOT** bleed air from tires when they are hot. Check inflation pressure weekly during use to insure maximum tire and tread life. The following tire wear diagnostic chart will help you pinpoint the causes and solutions of tire wear problems.

NOTE: Tire wear should be checked frequently because once a wear pattern becomes firmly established in a tire it is difficult to stop, even if the underlying cause is corrected.

	PROBABLE CAUSE	CORRECTIVE ACTION
CENTER WEAR	Over-inflation	Adjust pressure to particular load per tire catalog.
EDGE WEAR	Under-inflation	Adjust pressure to particular load per tire catalog.
SIDE WEAR	Loss of camber or overloading	Make sure load doesn't exceed axle rating. Align at alignment shop or service center.
TOE WEAR	Incorrect toe-in	Align at alignment shop or service center.
CUPPING	Out-of-balance	Checking bearing adjustment and balance tires.
FLAT SPOTS	Wheel lockup & tire skidding	Avoid sudden stops if possible and adjust brakes.

DANGER

ELECTROCUTION HAZARD

Voltage present in this equipment can kill! To prevent serious injury, death, and / or equipment damage:

NEVER operate the P1 Patcher without all covers closed and guards in place.

AVOID contact with any live terminals or connectors

ALWAYS use proper lockout / tag out procedures to prevent accidental startup when access to these areas is required. (see sheet 32)

ONLY trained professionals should preform live voltage testing

DANGER

POISONOUS GAS

Using the gas powered P1 indoors WILL KILL YOU IN MINUTES. The engine exhaust contains carbon monoxide, a poisonous gas you cannot see or smell.

NEVER use inside a home, garage, or confined space. **EVEN IF** doors and windows are open.

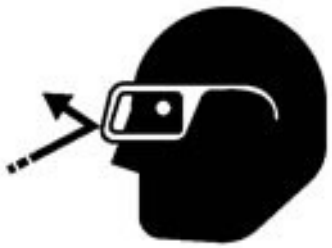
Only use **OUTSIDE** and far away from windows, doors, and vents.

WARNING

SILICA DUST HAZARD

Using a patcher to clean pavement or fill potholes may expose workers to crystalline silica dust.

Consult OSHA Standard 1926.1153 for complete details on silica dust hazards and mitagation



⚠ CAUTION

FLYING DEBRIES HAZARD

Airborne debris may cause injuries or equipment damage

ALWAYS wear eye protection such as a face shield or safety glasses to avoid eye injury from flying debris.

STAY BACK from discharge nozzle, keep all body parts out of the air stream

NEVER point discharge nozzle at a person or equipment.

⚠ CAUTION

ENTAGLEMENT HAZARD

Exposed moving parts can cause serious injury

DO NOT operate with guards removed

ALWAYS follow lockout procedures before servicing (see page 32)

⚠ WARNING

BURN HAZARD

Contact with the hot surfaces of the engine, muffler, blower, and alternator can result in burns.

NEVER reach inside the engine enclosure during or immediately after operation.

NEVER service the engine or change the blower oil when hot Allow the unit to fully cool before attempting to service.

STAY BACK a minimum of 3 feet from engine exhaust as it is extremely hot leaving the muffler.

WARNING

FIRE AND EXPLOSION HAZARD

Gasoline is an extremely flammable liquid and vapor. Negligence or improper care can cause fire.

NEVER fuel a running or hot engine.

ALWAYS fill gas tank outdoors.

DO NOT overfill tank! Fill gas tank to bottom of filler neck only. Make sure fuel cap is on tight after filling.

Clean up fuel spills immediately.

Keep sources of sparks and flames away.

ALWAYS keep a **Class ABC Fire Extinguisher** nearby and know its proper use.

WARNING

FIRE AND EXPLOSION HAZARD

Hot asphalt and its fumes are extremely flammable. Negligence or improper care can cause fire.

Keep asphalt material away from open flames, sparks, or incandescent materials

DO NOT use cutback asphalt.

DO NOT mix grades of asphalts. Hot asphalt can vaporize and ignite materials with lower a flashpoint

ALWAYS keep a Class ABC Fire Extinguisher nearby and know its proper use.

WARNING

FIRE HAZARD

Hot surfaces of the engine, muffler, blower, and alternator as well as the engine exhaust are ignition sources

Keep a **Class ABC fire extinguisher** nearby and know its proper use.

Keep running patcher at least 5 feet from buildings, other equipment or stored flammables.

DO NOT store or transport flammable materials on the Patcher . This includes spare gasoline or solvent

Remove any rags or other combustible materials from the inside and around the engine housing and emulsion tank.

Carefully clean up any gas, oil, or emulsion spills before starting the unit.

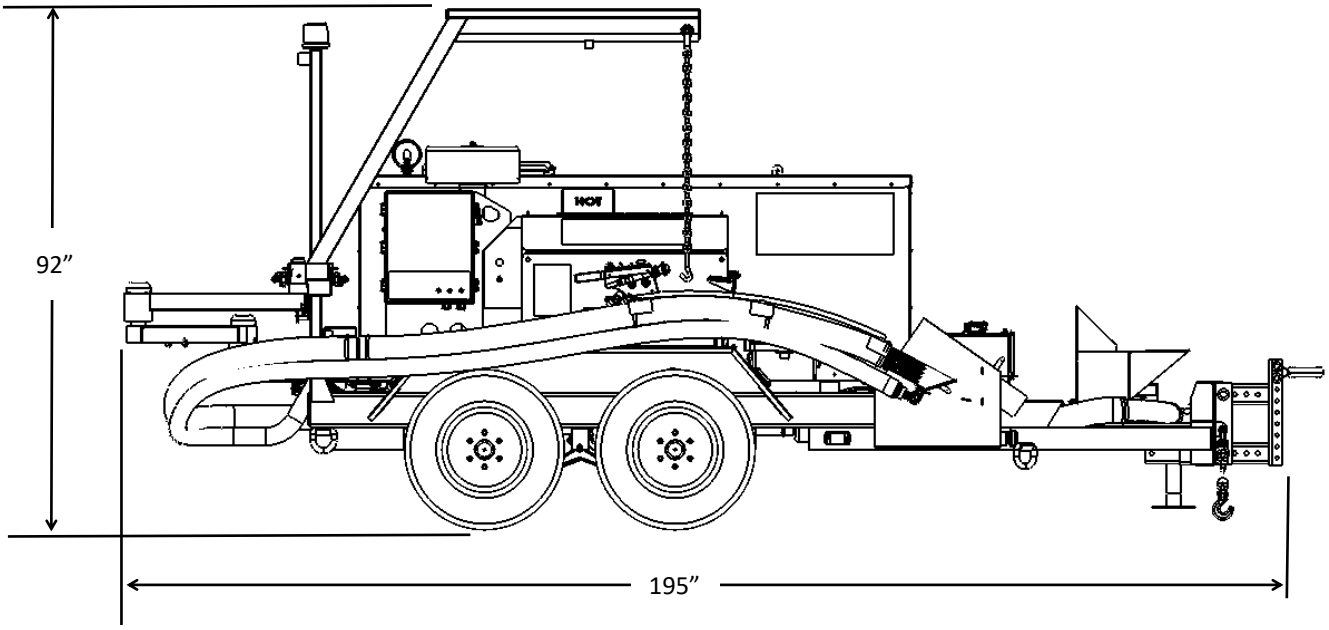
DO NOT use flammable solvents to clean the blower, engine, generator or emulsion tank

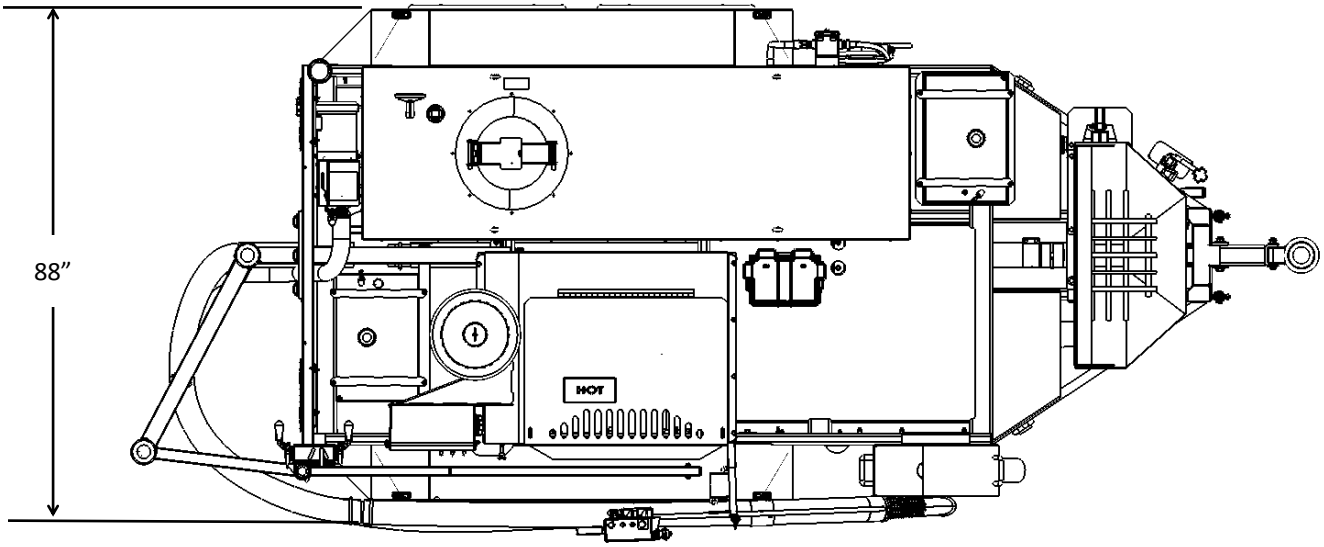
Assure adequate cooling ventilation so engine, alternator, and blower do not overheat

P1 Weight and Dimensions

Weight and Dimensions are for base unit without options

Weight listed **DOES NOT** include material





HEIGHT	WIDTH	LENGTH	BASE WEIGHT
92 INCHES (2.34 m)	88 INCHES (2.24 m)	195 INCHES (4.95 m)	4800 Lbs. (2177 kg)

Emulsion Tank Size is 300 Gallons

Maximum Safe Operational Emulsion Tank Capacity is 270 Gallons

P1 Emulsion Tank

WARNING

Prevent contact with hot material! Make sure the trailer is stabilized (page 11) and emulsion tank is level before opening the access hatch. Proper PPE must be worn when measuring or filling the tank.

CAUTION

NEVER mix Cationic or Anionic emulsions without properly cleaning the emulsion tank. Combining these emulsions will results in a hardened mass that is difficult to clean or remove

NOTICE

Hot emulsion will leak out the breather and may force the hatch open if the tank is overfilled. Leave at least 3" of expansion room from the top of the tank.

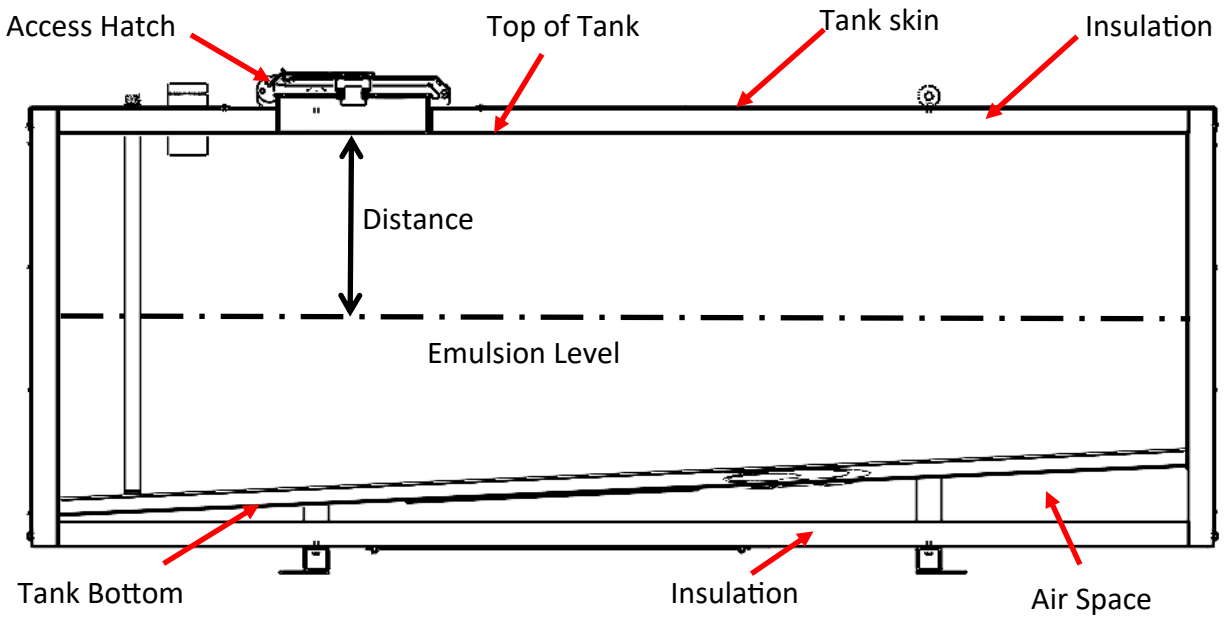
Capacity

The emulsion tank is designed to use 100% of its contents. To do this the bottom is slanted, making it hard to measure the depth. So we measure the tanks empty volume and subtract that from the tanks total volume.

- The total volume of the emulsion tank is 300 gallons.
- Every inch below the top if the tank is about 10 gallons used.

The best way to measure the empty space is to take a 4 foot stick and make a mark 28" from one end. Open the hatch and dip the stick into the tank until the mark aligns with the bottom of the access port (this is the top of the tank). Remove the stick and measure the distance between the mark and the emulsion line. Multiply that distance by 10 and subtract that from 300.

- The remaining volume = 300 - (number of inches x 10).
    - Example: If the empty space is measured to be 17" from the top of the tank you would have used 170 gallons and have about 130 gallons remaining [300- (17*10) = 130]



P1 Emulsion Tank Continued

Heating the emulsion tank

The standard P1 Patcher asphalt emulsion heating system uses a single 120 volt 13 amp (1450 watt) heater blanket that is thermostatically controlled. The blanket is designed to heat the tank and is not in direct contact with the emulsion. This indirect heating reduces the possibility of cooking the emulsion with direct heat. It also allows an empty tank to be preheated before loading it with hot emulsion. The temperature control is located on the machine frame rail near bottom of the emulsion tank.

NOTICE

Consult your emulsion supplier for the correct storage and application temperatures of the product you are using

To set the emulsion tanks temperature, use a philips head screw driver to remove the thermostat cover and set the dial to the desired temperature. Replace cover. Plug the power cord into a standard 120 volt 20 amp outlet and the thermostat will maintain the emulsion at the selected temperature for overnight heating.

NOTICE

DO NOT plug the tank heating blanket into a 15 amp circuit overnight. The amperage load is high enough to potentially trip the circuit breaker which may leave you with cold material in the morning

Estimated Tank Heating Times

Gallons to Heat	Average Air Temperature (ºF)	Starting Emulsion Temperature (ºF)	Ending Emulsion Temperature (ºF)	Elapsed Time Approx. (hours)
300	40	120	150	36
300	70	120	150	24

Note: The elapsed time is directly proportional to the total gallons

For example 1/3 of a tank (100 gallons) takes about 1/3 the time (8 hours) to heat

For faster heating times an optional second blanket can be added

Estimated Tank Cooling Rates

Gallons in Tank	Average Air Temperature (ºF)	Starting Emulsion Temperature (ºF)	Ending Emulsion Temperature (ºF)	Elapsed Time Approx. (hours)
300	40	150	139	8
100	40	150	121	8
300	70	150	142	8
100	70	150	129	8

P1 Feature Overview

NOTICE

This general outline will familiarize you with the P1. Locations and style and may vary with options installed. Read through the entire manual before putting this machine into operation.

Temperature Gauge: Indicates the temperature of the emulsion in the tank

Access Hatch: Used to fill and inspect the emulsion tank

Blower Air Cleaner: Filters the inlet air for the blower

Gasoline tank: Holds gasoline for the engine

Rock Gate Actuator: Opens and Closes the rock gate allowing aggregate into the air stream

Aggregate Hopper: Hopper for aggregate that will be mixed with emulsion to create a patch

Drip Tank: Designed to let air blow out, reducing back spray when cleaning emulsion hose

Wand Controls: Contains the Horn button, Rock ON / OFF switch, Emulsion ON / OFF switch, Emulsion flow control knob, and Throttle control knob.

Engine Ignition and Choke: Controls for starting the engine.

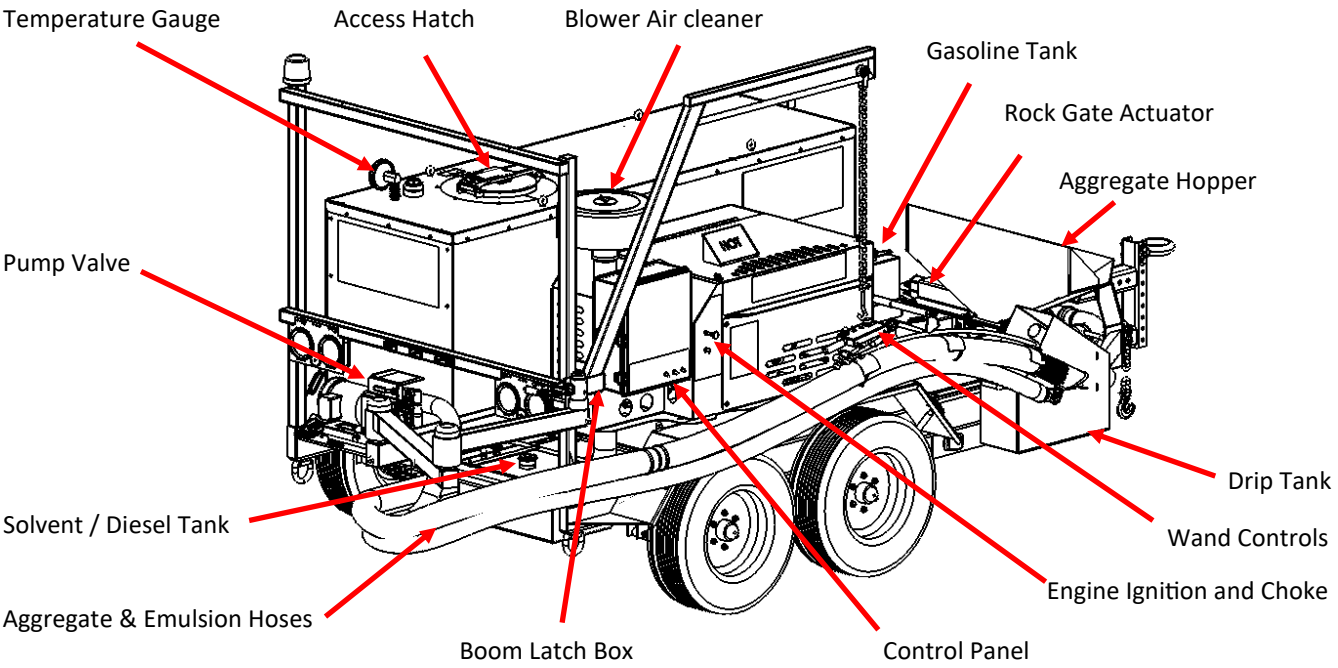
Control Panel: Contains the ON / OFF switch for main power, pump reverse switch, and traffic control lights ON / OFF switch along with the gauges for monitoring engine RPM / hours and AC Voltage. Controllers for the heated hose and pump motor are mounted inside along with electrical fuses & breakers. See page xx-xx for more information on the control panel

Boom Latch Box: Holds the boom in place during transport

Aggregate and Emulsion Hoses: Delivers the emulsion, air, and rock needed for patching

Solvent / Diesel Tank: Holds solvents for cleaning the pump and emulsion hose

Pump Valve: Allows the user to select between emulsion or solvent



P1 Operator Controls Overview

DANGER

Voltage present in the control panel can kill! DO NOT touch wiring or bare terminals without first locking out the machine (see page 32)

NOTICE

This general outline will familiarize you with the P1. Locations and style and may vary with options installed. Read through the entire manual before putting this machine into operation.

RPM / Hour Meter : Indicates RPM when engine is on and hours of use when engine is shut off

Fan Outlet: Panel cooling fan air outlet DO NOT block

Breakers: A 5 Amp 220 volt circuit breaker for the heated hose and a 10 Amp 220 volt circuit breaker for the pump motor

Controls Power Switch: This is the master switch. The pump, rock gate, heated hose, and horn will not function if set to "OFF"

Pump Reverse Switch: Hold switch to "ON" to temporarily reverse pump. Switch toggles to "OFF" automatically when released.

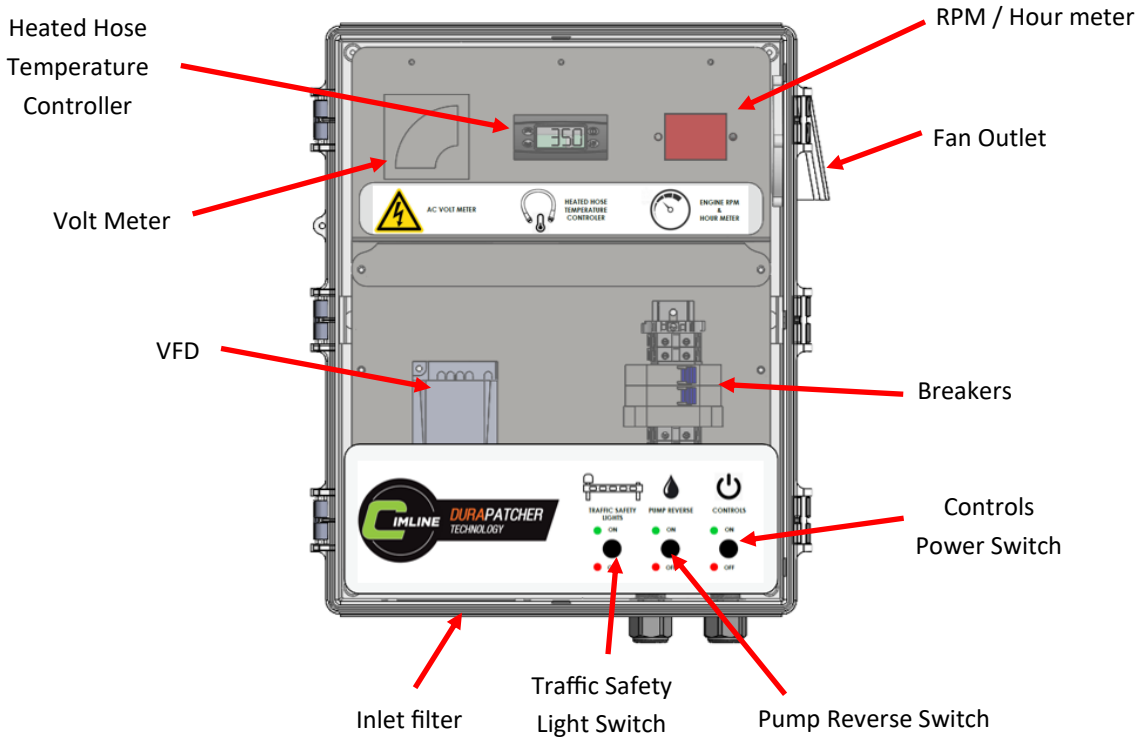
Traffic Safety Light Switch: This switch controls the amber and strobe lights on the rear on the patcher. This switch does not require the Controls Power Switch to be on in order to operate.

Inlet Filter: Filters the panel cooling air. NOTICE: keep clean and DO NOT block.

VFD: This is the pump motor controller. The screen will display diagnostic codes as faults arise.

Volt Meter: This gauge indicates the output voltage of the AC generator

Heated Hose Temperature Controller: Automatically controls the temperature of the heated hose in accordance with the user inputted temperature setting.



P1 Wand and Engine Controls Overview

NOTICE

This general outline will familiarize you with the P1. Locations and style and may vary with options installed. Read through the entire manual before putting this machine into operation.

Wand Controls

Throttle : Controls engine and blower speed.

Emulsion Flow Rate Knob: Allows the user to control the amount of emulsion sprayed

Emulsion Switch: Turns the pump “ON” and “OFF”

Rock Switch: Opens and closes the rock gate.

Horn: Press to “honk” horn

Engine Controls

Choke: Applies choke to aid in starting the engine

Ignition key: Removable key for starting the engine

Operating the P1

Before starting out

1. Read the engine hour meter and confirm no scheduled maintenance is due (see page 33)
2. Check material temperature gauge
3. Unplug the overnight heating blanket

WARNING

The trailer must be properly stabilized before going under or climbing onto machine. See page 11 for recommended procedures.

4. Clean the air cleaner for the blower
5. Make sure engine is off and key is removed then open the engine compartment:
   a. Check and clean the engine air filter
   b. Check the engine oil level adding oil as necessary
   c. Visually check the fuel filter for excessive dirt
   d. Confirm the tightness of the alternator and blower belt
   e. Grease blower bearings as required
6. Close and latch the engine compartment
7. Confirm the discharge nozzle is holstered on the drip bucket, the hoses are strapped down to the fender, and the boom is securely latched
8. Make sure all guards are secured and covers are closed on the patcher
9. Perform a DOT pre-trip inspection, including but not limited to:
   a. Verifying that the hitch, chains, break-away switch, and lights are properly connected to the tow vehicle. Refer to the vehicle manual safe towing guide.
   b. Confirm the trailer brakes are properly adjusted and in good repair
   c. Make sure all lights are in working order and reflectors are clean
   d. Properly secure any loose items found or stored on patcher
   e. Check each tire's air pressure, tread wear, & lugnuts (see pages 12 & 13)

WARNING

Fire and Explosion Hazzard! Keep ABC fire extinguisher handy. ONLY refill tanks outside. Keep sparks or open flames away during filling. DO NOT overfill tanks. Clean up any spills immediately.

10. Check the fuel level of the Gasoline tank and fill as needed
11. Check the level of the Solvent tank and fill with solvent or diesel as needed.

CAUTION

Tanks are clearly marked. DO NOT mix up the solvent and gasoline tanks, doing so will lead to equipment damage.

Operating the P1 continued...

Engine start up procedure

CAUTION

Use proper traffic control measures to prevent collisions with the P1 or its workers

1. Set up traffic control to protect workers
2. From the control panel switch the Traffic Safety Lights to “ON”
3. Remove discharge nozzle from inside the catch tank and place on the outer rest
4. On the wand controls confirm that:
   a. The throttle is turned up to about halfway
   b. Emulsion switch is set to off
   c. Rock switch is set to off

NOTICE

If either of these switches are left in “ON” material will flow upon turning controls on. This may lead to clogging of the aggregate pipe or unintentional spraying of material.

5. Apply choke by pulling knob out as needed
6. Turn engine key to start
   a. Do not engage starter for more than 10 seconds
   b. If engine fails to start make sure to allow 10 seconds for starter to cool down before retrying
7. After engine starts
   a. If choke was used, slowly push it back in.
   b. Turn throttle down to 1800 rpm

NOTICE

At RPM’s below 1800 the engine does not produce enough current to properly charge the battery. If left long enough the battery will not have power to start engine

8. Allow the engine to Idle for one (1) minute
9. Turn Control Switch to “ON”
   a. Idle engine while the heated hose controller and VFD load
   b. Adjust engines throttle upward until output voltage is above 210 volts or 1800 rpm

Operating the P1 continued...

Pump start up procedure

1. Confirm that over 210 volts are available and the VFD is powered on and ready
2. Make sure the pump valve is set to solvent

NOTICE

If valve was set to emulsion it indicates that the hose was not properly cleaned after the last work session. Allow the emulsion hose to heat up to the material application temperature before proceeding

3. Remove the discharge hose from the machine and unlatch the boom

⚠ CAUTION

DO NOT swing boom or walk into traffic. Be aware of your surroundings while operating the patcher to prevent collisions.

4. The operator should point the discharge nozzle into the catch bucket or at another appropriate target
5. From the wand control interface the operator should
   a. Set the emulsion flow dial to about half way
   b. Flip emulsion switch to “ON”
6. Visually confirm the pump is turning and solvent is flowing
   a. Pump enough fresh solvent through line to make sure the pump, hose, and tip are not blocked and the pump is primed
   b. Refer to the pump diagnostic matrix (pages 76-77) if the pump does not start or material does not flow
7. Flip emulsion switch to “OFF”
8. Switch pump valve to emulsion
9. Turn emulsion switch back, clearing the line of solvent
   If the material does not flow refer to the pump diagnostic matrix (page 76-77)

Making a patch

1. Verify traffic is routed away from your work area
2. Fill the aggregate hopper with clean crushed aggregate.
   a. Remove chain from dump truck aggregate gravity feed hose.
   b. Tilt dump truck bed as needed to cause aggregate to flow through the hose into the aggregate hopper

NOTICE

Too much dust or dirt in the aggregate can retard curing of the patch and limit adhesion of the emulsion to the aggregate.

NOTICE

Using crushed limestone or wet aggregate can clog the venturi and ag pipe

3. To begin the repair process the operator utilizes the airstream from the discharge nozzle to blow out any loose debris and water from the area to be repaired. It may be necessary to increase the rpm of the engine (up to 3600 rpm) to produce the velocity of airflow to accomplish this task.
4. After the area is cleaned, reduce the engine rpm to between 2200-3200 rpm.

Operating the P1 continued...

Making a patch continued

5. Next the operator should set the Emulsion Flow Rate dial to about half way and then flip the Emulsion switch to “ON” starting the flow of emulsion. Rotate the Emulsion Flow Rate dial until the spray coming out of the nozzle resembles the spray similar to that of a can of spray paint. Lightly coat (or tack) the area to be repaired with emulsion. Note: When tacking a non-absorptive surface use a light coat of tack to prevent bleeding of the excess emulsion. When repairing an absorptive area, such as a gravel road, use enough emulsion to reach a solid surface underneath. After you have tacked the area DO NOT turn off or adjust the Emulsion Flow Rate dial.
6. While the emulsion is still spraying from the discharge nozzle the operator should place the Rock switch (small toggle located on the wand controls) in the “ON” position. This starts the flow of aggregate. Dial in the Throttle so that the rock is spraying evenly and not clogging the hose. Further adjustments to the Emulsion Flow Rate dial imay be needed to achieve a salt and pepper looking mixture. This mixture is still black but allows you to see some of the natural color of the stone being used. Avoid using excess emulsion as this may cause the repair to “bleed” in hot weather.
7. When the repair is up to the desired level with the aggregate emulsion mixture, toggle the Emulsion switch to “OFF”. This stops the flow of emulsion so the machine is only distributing clean aggregate at this point. Cover the repair with a light coat of clean aggregate to prevent traffic from tracking any emulsion from the patch while curing. After the desired coating of dry aggregate is achieved flip the Rock toggle to the “OFF” position. The aggregate will continue to flow until the blower airstream empties any remaining aggregate left in the hose. The repair is now complete.
8. Repeat “Making a patch” steps for each repair

NOTICE

If operator throttles down the engine for any reason between repairs, clear all rock from the aggregate pipe and hose first to prevent clogging

Cleanup

1. When you are finished with the P1 Patcher and are ready to store the unit overnight or any extended time, the emulsion supply line must be purged with diesel or other solvent.

⚠ CAUTION

DO NOT use bio-diesel or any solvent containing Methyl Ester. Use of these products with the P1 Patcher will void the warranty of the hoses

2. With the engine running at about 1800 rpm place the discharge nozzle into the catch tank
3. Rotate the pump valve to “Solvent”.
4. Flip the Emulsion switch to “ON” and turn the Emulsion Flow Rate dial to about 1/2 way. The diesel / solvent will force any remaining emulsion from the pump and hose.
5. Toggle the Emulsion switch to “OFF” when only solvent is coming out of the discharge nozzle.
6. Turn the engine off and keep the pump valve set to solvent.
7. Secure boom and the discharge hose on their respective holders

⚠ CAUTION

NEVER transport the P1 Patcher without the boom latched and properly secured

⚠ WARNING

Operating, servicing, and maintaining this machine can expose you to dust containing crystalline silica and engine exhaust which contains chemicals that are known to the State of California to cause cancer, birth defects, or other reproductive harm.

For more information, go to www.P65Warnings.ca.gov.

Operating the P1 continued...

Preparing for Next Day Operation

1. Stabilize the trailer (see page 11)
2. Check the emulsion tank level (see page 19) and fill if necessary.
3. Plug the emulsion tank heater to a 120 volt, 20 amp outlet (see page 20)
4. Check hour meter and preform any required maintenance (see page 33)
5. Check drip tank level and empty as required

Short Term Storage

NOTICE

Emulsion has a shelf life. If the machine is to be parked for a week or longer with emulsion in the tank, a few simple steps will need to be followed to keep the emulsion in good condition.

Summer / Hot Weather

With the P1 Patcher parked and stabilized

1. Keep the machine unplugged to prevent over cooking the material
2. Keep the emulsion tank access port closed
    a. This prevents moisture from escaping and drying out the emulsion
    b. The breather valve is to prevent a vacuum and over pressurization of the tank during the days temperature swings
3. Once a week open the access port and gently stir the emulsion, using a clean board or pole.

    This will help prevent a skin from forming on top of the emulsion

Winter / Cold Weather

⚠ CAUTION

DO NOT allow the emulsion to freeze. If the emulsion has been frozen it will no longer make viable patches, and the tank will need to be fully drained and cleaned before reuse.

With the P1 Patcher parked and stabilized:

1. Adjust the thermostat for the blanket to about 80 degrees and plug the blanket in.

    This slows down the cooking process
2. Make sure the access port remains closed only opening it to stir the emulsion once a week.

NOTICE

If storing the material longer than 2 weeks during the winter it is recommended that you add approximately 5 gallons of diesel to the emulsion

Long Term Storage

End of season

1. Empty and clean out the emulsion tank, pump, and lines. (see page 30)
2. Start the engine and run it for 20 minutes

   Empty the aggregate hopper, pipe, and hose during this time. Close the rock gate when finished.

1. Shut engine off
2. Drain the fuel tank and lines, add fuel stabilizer to any remaining fuel.
3. Run the engine until it stalls to empty all fuel out of the carburetor.
4. Remove blower air filter, crank the engine while spraying a lubricant down the pipe for the blower.
5. Clean and replace the blower filter
6. Consult the Kohler Command Pro Owner's Manual or a Kohler service technician for proper storage preparation of the engine.
7. Disconnect the Negative (-) battery cable.
8. Open the control box vacuum out any dust and debris. **DO NOT** forget to clean off the inlet filter
9. Remove the key from the ignition and attach it to the control box to prevent losing it.
10. Grease the boom pivots.
11. Remove the guard from over the rock actuator and clean out all dust and debris from in between switches and the actuator. Replace the guard when the cleaning is finished.
12. Remove the pump guard and check the pump for leaking seals and inspect the coupling. Clean out the coupling box as needed. Replace the guard
13. Empty the drip / catch tank.
14. Thoroughly clean the unit. Make sure to remove all
15. Cover or shrink-wrap the engine housing, control panel, and the electric pump motor
16. Zip tie or lock the emulsion tank cover

Removal from storage

1. Remove the covers or shrink wrap and drain the drip tank
2. Clean and inspect the unit, check for nests in the control panel, air filters, engine area, and the exhaust.
3. Add **fresh** gas to the fuel tank. Old un-stabilized gas can cause hard starting and may damage the engine
4. Grease the blower bearings, change the old oil from the blower and engine. Refer to the "Before starting out" section on page 24 for additional items to check.
5. Clean out the aggregate hopper and open the rock gate
6. Start the engine and let it run until it is warm, and test the compressors air flow. If your engine cylinders were fogged or oil coated prior to storage, the smoky exhaust to begin with is normal.
7. Once the engine is warm close the rock gate and blow out any water that may have collected in the piping.
8. Cleanout emulsion tank before adding new (see page 30)

Emulsion tank cleanout procedure

WARNING

DO NOT under any circumstances clean out the tank using flammable solvents. This includes but is not limited to gasoline or a kerosene based products.

WARNING

The trailer must be properly stabilized before going under or climbing onto machine. See page 11 for recommended procedures.

NOTICE

Tank must be cleaned out at least once every 12 months. More often may be necessary if switching emulsion types or the emulsion is otherwise damaged and / or unusable

The Emulsion Tank on the P1 is designed to make use of its entire contents, leaving only material in the drain plumbing. Therefore before cleaning out the emulsion tank we recommend using as much of the material as possible during normal patching operations.

1. Open access port and add approximately 5 gallons of an approved solvent / diesel fuel to the tank and close the access port.
2. Adjust the tank heater thermostat to about 130 degrees (F) and plug the tank heater in. (see page 20)
3. After the tank has been heated for 10 to 12 hours, unplug the machine and carefully drive it around the yard to let the heated diesel / solvent move around in the tank to dissolve hardened emulsion.
4. Unhook the P1 Patcher from the truck, chock the wheels, and then elevate the front of the machine with the jack moving the material to the back of the tank where the drain is located.

CAUTION

Proper PPE must be worn when accessing the tank and drain valve. Operator should take care to avoid contact with hot emulsion.

5. With a catch basin set under the tank drain, slowly remove the cap and drain the material from the tank.

   NOTICE: Optional drain valve is available.

WARNING

DO NOT use a torch on the drain plug or optional drain valve. Any open flame source may ignite the hot emulsion / solvent mix as it drains from tank.

6. Once all the material has drained, start the P1 Patchers engine.
7. With the pump valve set to solvent, fill the emulsion line. Allow the solvent to heat to about 140 degrees. Turn the valve to emulsion and run the pump in reverse for 10 seconds to back flush the emulsion inlet line. Switch the valve back to solvent and back flush the emulsion inlet line two (2) more times. This will clean the emulsion line, pump, selector valve, and emulsion inlet line.
8. Switch the pump valve to solvent and refill the line one last time. Shut the machine down leaving the pump flooded with solvent.
9. Open the access port and make sure all thick or hard material has been removed from the tank. You should be able to use a stick, rod, or pole to remove any remain material. The tank is clean once only the bare metal of the tank remains.
10. Reset the thermostat to the proper temperature for your emulsion.
11. The tank is now ready for long term storage or to have fresh emulsion loaded.

General Maintenance Section

General Maintenance Safety

SAFETY INSTRUCTIONS

Suggested Lockout Procedure

1) Announce lockout to other personnel
2) Stabilize trailer (see SAFETY INSTRUCTIONS on page 11)
3) Engine must be secured
    a) Turn ignition to off
    b) Remove key and place in pocket
4) De-energize controls
    a) Traffic Control Lights to off
    b) Controls power switch to off
    c) Disconnect battery
    d) Disconnect trailer plug from tow vehicle
5) If access to thermostat or tank blanket is required
    a) Unplug the heating blanket
    b) Use plug lock to secure plug
6) When finished with maintenance
    a) Clean up any spills, debris, and all tools from the machine
    b) Replace all guards
7) Reconnect the battery cables, plug in the heating blanket, and return the key to the ignition
8) Announce equipment is ready for use to other personnel

General Maintenance Chart

	Daily	Every 100 hrs.	Every 200 hrs.	Every 250 hrs.	Every 500 hrs.	Every 1500 hrs. or Yearly
Engine Maintenance Schedule						
Check Oil	X					
Check & Clean Air Filter	X					
Change Out Oil (1)		X				
Replace Oil Filter			X			
Replace Air Filter Outer Element (1)				X		
Replace Air Filter Inner Element (1)					X	
Replace Fuel Filter			X			
Replace Spark Plugs (1)					X	
Lubricate Crankshaft Spline (2)					X	
Remove Colling Shrouds and Clean Cooling Fins		X				
Clean Oil Cooler Fins		X				
Blower Maintenance Schedule						
Grease Bearings		X				
Check Blower Oil			X			
Change Oil		**First**				X
Belts						
Inspect and Re-tension		X				
Trailer						
Break function and visual inspection	X					
Grease wheel bearings					X	
Grease boom arm pivots					X	
Rotate aggregate pipe				X		
Clean Emulsion Tank						X
Empty Drip / Catch Tank (3)		X				

(1) Service engine more frequently if used in sever, dusty, dirty conditions

(2) Have a Kohler authorized dealer preform this service

(3) Empty more frequently if required

General Maintenance of Engine

NOTICE

This section is to be used in conjunction with the Kohler Engine User Manual. Please thoroughly read the Kohler Manual and refer back to it with any questions on the engine.

We recommend that you use a authentic Kohler parts for any general maintenance.

Do not attempt to service or replace major engine components, including any items that require special timing or adjustment procedures. This work should be performed by a Kohler authorized dealer.

To find a Kohler authorized dealer visit: KohlerEngines.com or call 1-800-544-2444 (U.S. and Canada).

Engine Fuel

Use unleaded gasoline only with a pump octane rating of 87 or higher. The gasoline must not have more than 10% ethanol.

WARNING

Gasoline is extremely flammable liquid and vapor. Negligence or improper care can cause fire leading to serious personal injury.

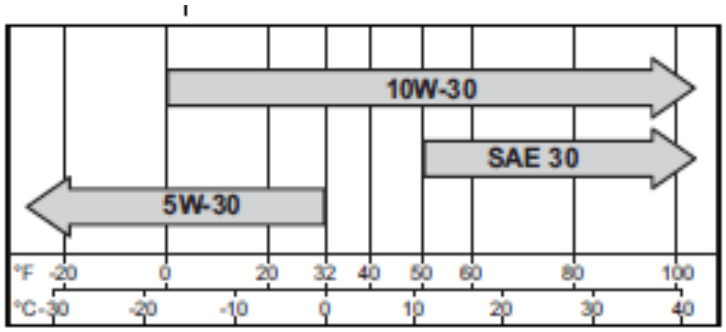
NOTICE

DO NOT use E15, E20, and E85 gasoline blends, they are not approved for use by Kohler. Also DO NOT use gasoline older than 30 days or gas that is mixed with oil. Old, stale, or contaminated fuel will adversely affect your engine.

Engine Oil

The engine requires 1.7 to 1.9 quarts of oil

We recommend use of high-quality detergent oils (including synthetic) of API (American Petroleum Institute) service class SJ or higher are acceptable. Select viscosity based on air temperature at time of operation as shown in the table to the left.



Air Cleaner

NOTICE

NEVER blow out paper element with compressed air. This will damage the element. Operating engine with loose or damaged air cleaner components could cause premature wear and failure. Replace all bent or damaged components.

1. Unhook retaining clips and remove end cap(s).
2. Check and clean inlet screen (if equipped).
3. Pull air cleaner element out of housing and replace. Check condition of inner element; replace when dirty.
4. Check all parts for wear, cracks, or damage, and that ejector area is clean.
5. Install new element(s).
6. Reinstall end cap(s) with dust ejector valve/ screen down; secure with retaining clips.

General Maintenance of Engine Continued...

Engine Cooling

1. Cleaning of engine cooling surfaces should be done at the start of the season and about every 100 hours See Maintenance Schedule and Kohler manual for more information
2. Clean dust and debris from the screens and other external surfaces of engine.
3. Remove the shrouds to access the cooling fins on the cylinders and fan blades
4. Clean the oil cooler (if equipped) using a brush or compressed air.
    a. The oil cleaner needs to be removed to clean the reverse side.

WARNING

DO NOT use flammable solvents or a vacuum to clean the engine.

NOTICE

Avoid spraying water at wiring harness or any electrical components.

General Maintenance of Material Pump

If you pump came with mechanical seals (AM):

No maintenance required

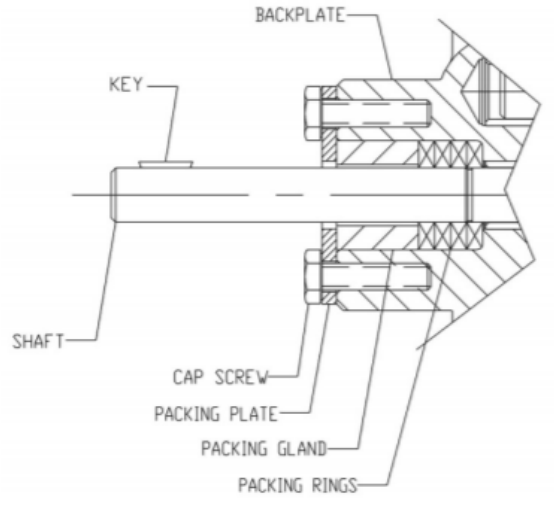
If your P1 came with a pump with packing (AP):

Examine the packing for leakage. Slight leakage with the valve on solvent (1 drip per minute) is a necessary and normal condition for packing and allows for expansion and proper seating. If leakage is excessive follow tightening instructions.

Tightening Instructions

With machine warmed up and material pump running tighten the 2 locknuts by a half turn allow pump to flow for a minute and examine for leakage. If leaking continues repeat in half turn increments until leaking stops.

If tightening does not reduce the leaking replace packing rings, contact your CIMLINE dealer for Packing Kit



General Maintenance of Blower

Blower Bearing Lubrication

⚠ CAUTION

DO NOT use an electric or pneumatic grease gun as they could force the grease in too rapidly and invert the seals.

NOTICE

Use a NLGI #2 premium grade microgel grease or aluminum complex grease with 250°F (121°C) service temperature and moisture resistance and good mechanical stability

NOTICE

Lithium based grease is not approved for any Durapatcher blower.

1. Using a hand operated grease gun, slowly force new lubricant into each drive end bearing housing until traces of clean grease comes out of the relief fitting.
    a. Hydraulic pressure relief fittings are provided to vent any excess grease and prevent pressure build-up on the seals.
    b. A restriction plug and metering orifice prevent loss of lubricant from initial surges in lubricant pressure but permit venting excess lubricant under steadily rising pressures.
    c. Clean up any grease that leaks out
2. After a long shutdown, remove the grease fittings and flush out the old grease with kerosene or #10 lubricating oil, drain thoroughly. Reinstall the grease and grease relief fittings. Then lubricate the bearings per step 1

Blower Oil

1. It is recommended that the blowers oil is to be changed after the initial 100 hours of operation and every 1500 hours after that.
    a. For average outdoor temps between 32º F and 90º F use 1 to 1.5 quarts of Roots or similar brand of ISO 220 synthetic bower oil
    b. If the average outdoor temps are above 90º F use 1 to 1.5 quarts Roots or similar brand of ISO 320 synthetic blower oil
2. To change the blower oil
    a. With the blower fully cooled, remove the breather plug, the oil overflow plug, and drain plug
    b. Allow all oil to drain out and then replace the drain plug
    c. Fill the reservoir up to the overflow hole.
    d. Replace the overflow plug and then reinstall the breather in their correct places.
3. To check blower oil level as recommended every 200 hours
    a. With the blower fully cooled, remove the overflow plug
    b. If oil drips out or the threads are wet with oil the unit is full of oil
    c. If the unit needs oil, remove the breather and add oil until it leaks out the overflow hole. Then replace the overflow plug and then reinstall the breather.

Belt Tightening Procedures

⚠ CAUTION

The drive belts are under tension. Relieving that tension may cause sudden movement and can lead to serious injury. Keep clear of the engine and generator when loosening the bolts.

NOTICE

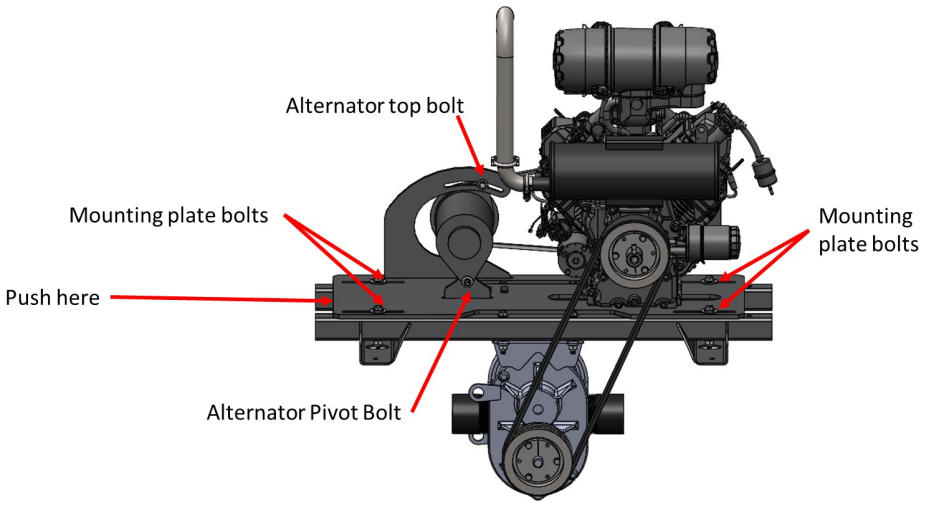
Improper tensioning on the belts can lead to power loss and premature failure of the belts and pulleys

Blower Belt

1. Loosen the four (4) bolts from the mounting plate corners. **DO NOT** remove these bolts, they are required to guide the mounting plate maintaining the alignment engine and blower pulleys.
2. Slide the mounting plate by applying force to only the mounting plate. **DO NOT** pull on the engine.
    a. To tension the belt, slide the plate to the right (machine front)
    b. To loosen the belt, slide the plate to the left (machine rear)
3. Using a gauge, confirm the belt is the proper tension; sliding the mounting plate as required.
4. Retighten the four(4) bolts for the mounting plate corners. Retest the belt tension and torque the mounting plate bolts each to 40 ft-lbs

Generator Belt

1. Loosen the Alternator top bolt and pivot bolt but **DO NOT** remove them.
2. Rotate the Generator
    a. To tension the belt, rotate the generator counter clockwise as seen from the fender
    b. To loosen the belt, rotate the generator clockwise as seen from the fender
3. Using a gauge, confirm the belt is the proper tension; rotating the generator as required.
4. Tighten the alternator top bolt. Use caution to prevent striping out the generators threads.
5. Retest the belt tension and tighten the alternator pivot bolt



Control Panel

WARNING

High voltage is present in the electrical circuits that are contained with in the control panel. Opening the cover for access will expose the worker to electrical shock

NOTICE

Modifying the Heated Hose Temperature Controller is only intended to be done by trained, experienced operators.

NOTICE

The heated hose will raise the temperature of any material left standing in the hose. DO NOT set the controller above 180°F (80°C) to prevent cooking any emulsion left in the hose and DO NOT exceed the emulsions flash point temperature.

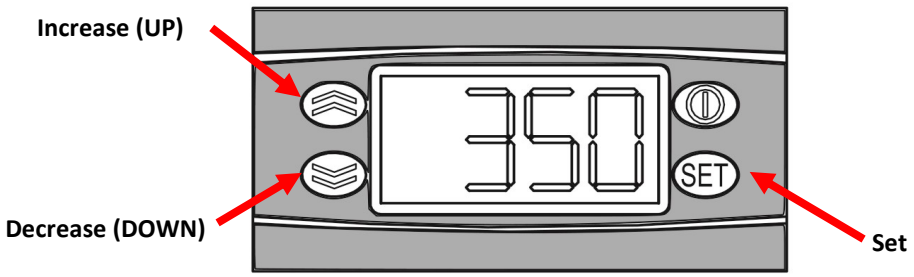
NOTICE

The heated hose DOES NOT raise the temperature of the emulsion as it is pumped through. Its purpose is to prevent the material from cooling down and thickening.

Modifying the heated hose controller settings

The Hose Temperature Control on your P1 Patcher has been factory set to run the most common types of emulsions at a temperature of 150° F (65°C). As you adjust your emulsion tank thermostat for different emulsions, you may require a change to the hose temperature controller to better match the emulsion tank temperature. To achieve this, open the control box and alter the Hose Temperature Controller by following the directions below.

1. Press the “SET” button twice.
2. “SP1” (Set Point 1) is displayed.
3. Press the “SET” button.
4. Current material temperature setting is displayed (factory default is 150°F (65°C).
5. Use the “Up / Down” arrow buttons to change to the desired temperature.
6. Press the “SET” button.
7. Let the controller time out. The controller will now be changed and the updates will be saved.



Control Panel VFD

WARNING

High voltage is present in the electrical circuits that are contained with in the control panel. Opening the cover for access will expose the worker to electrical shock

CAUTION

The VFD is preprogramed. DO NOT try to reprogram the VFD without contacting customer service first. Incorrectly altering the programing may cause the pump motor to malfunction and can led to permanent damage.

CAUTION

The VFD operates on single phase 220 volt electricity ONLY. DO NOT wire the VFD to a standard 220 outlet. This will damage the VFD

CAUTION

The generator produces single phase 220 volt electricity ONLY. DO NOT wire the generator to a standard 220 outlet or equipment. This can damage the equipment and may cause a electrical fire.

VFD (pump motor controller)

The VFD will display the letters “rdy” () when the enough voltage is present to run the pump motor

When the pump motor is turned on the display will show numbers from 0-60. These numbers indicate how many Hertz are being sent to the motor. The higher the number the faster the motor is turning and the more material is being sprayed.

Hertz	Motor RPM	Pump GPM
0	0	0
10	600	0.6
20	1200	1.2
30	1800	1.8
40	2400	2.4
50	3000	3.0
60	3600	3.6

The VFD also displays a Fault Code if the pump motor does turn or suddenly stops. Below is a list of the more common fault codes, If different code is displayed refer to pages 108-113 in the Altivar 12 user manual

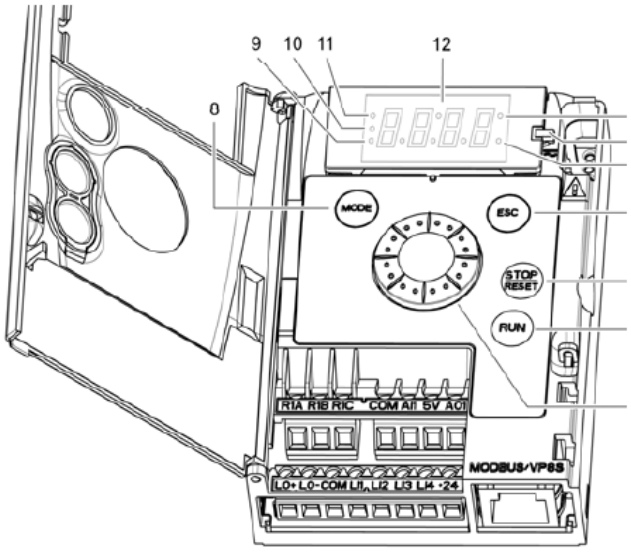
Code	Common Cause	Remedy
oHF	Drive temperature too high	Allow to cool, clean dust off VFD and inlet screen, confirm cooling fan is functional
oLF	Motor overload	Allow to cool, free up seized pump
oSF	Main overvoltage	Slow down engine, check generator regulator
uSF	Main undervoltage	Speed up engine, check generator regulator

NOTICE

These faults can be cleared once the issue has been resolved by turning off the main control power until the VFD shuts down and then turning the power back on

Control Panel VFD Controls

Functions of the display and keys



1. Value LED (a) (b).
2. Charge LED
3. Unit LED (c)
4. ESC button: Exits a menu or parameter, or aborts the displayed value to return to the previous value in the memory. In LOCAL configuration, 2 s press on ESC button switches between the control/programming modes.
5. STOP button: stops the motor (could be hidden by door if function disabled). **Note: See instructions for "RUN/STOP" cover removal.**
6. RUN button: Starts running in LOCAL configuration and in REMOTE configuration if the function is configured (could be hidden by door if function disabled).
7. Jog dial
   - Acts as a potentiometer in LOCAL configuration and in REMOTE configuration if the function is configured.
   - For navigation when turned clockwise or counterclockwise
   - and selection / validation when pushed.
   This action is represented by this symbol 

8. MODE button
   Switches between the control/programming modes. 3s press on MODE button switches between the REMOTE/LOCAL configurations.
   The MODE button is only accessible with the HMI door open.
9. CONFIGURATION mode LED (b)
10. MONITORING mode LED
11. REFERENCE mode LED
12. 4 x 7-segment displays

Note: In LOCAL configuration, the three Leds 9, 10, 11 are blinking simultaneously in programming mode and are working as a Led chaser in control mode.

(a) If illuminated, indicates that a **value** is displayed, for example, 0.5 is displayed for "0.5"
(b) When changing a value the Configuration mode LED and the value LED are on steady.
(c) If illuminated, indicates that a unit is displayed, for example, AMP is displayed for "Amps"

From page 32 of Schneider Electric Altivar 12 User Manual

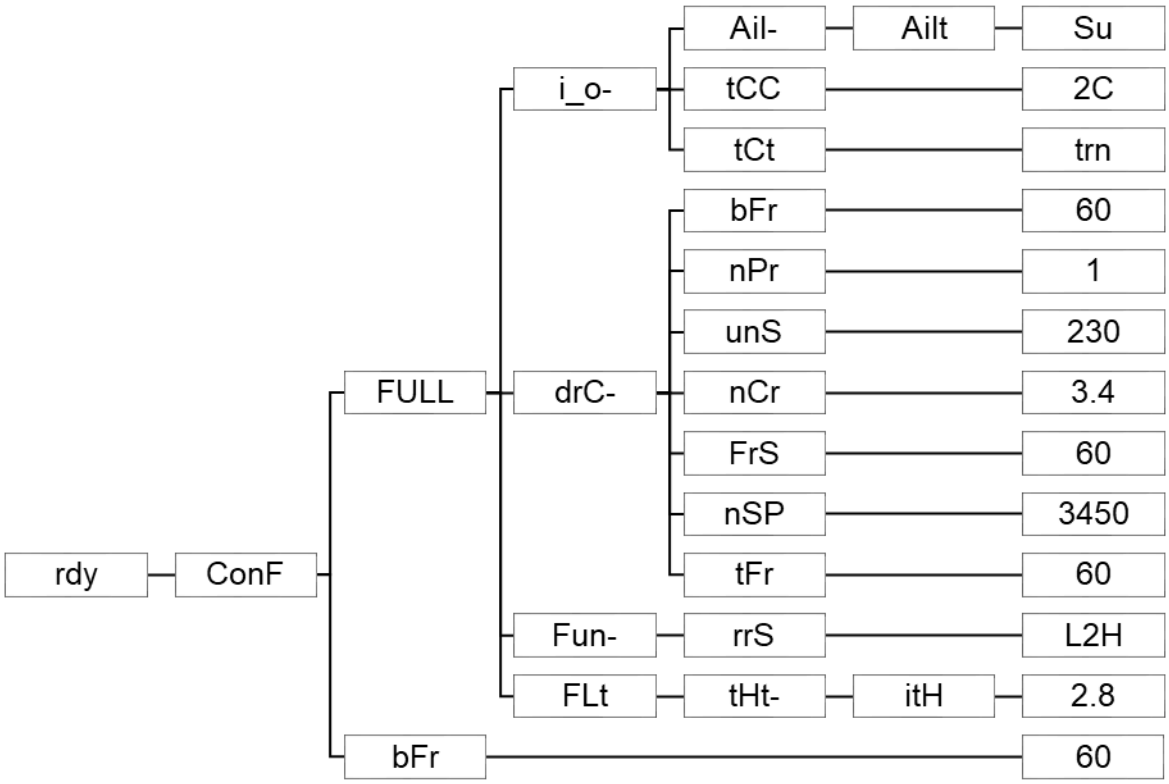
VFD programing

1. To Enter press inward on center dial (7)
   a. Enter selects that parameter and brings you to the next sub level
      Pressing enter on **ConF** will bring you to a sub menu containing **bFr** and **FULL** among others.
   b. When changing a parameter enter will save your changes and exit you to the original parameter
      Pressing enter on **bFr** and enter on 60 will save the change and return you to **bFr**
2. Pressing the ESC button (4) returns you the previous parameter
   Pressing ESC button from **Fun–** brings you back to **FULL**
3. Rotate the center dial (7) clockwise or counter clockwise to change the parameters or values
   After pressing enter on **rdy** scroll through **reF** and **Non** to get to **ConF.** Scroll through to **bFr** and enter rotate the center dial until it reads 60 and press enter again to save.

Control Panel VFD Settings

VFD Parameter flow chart

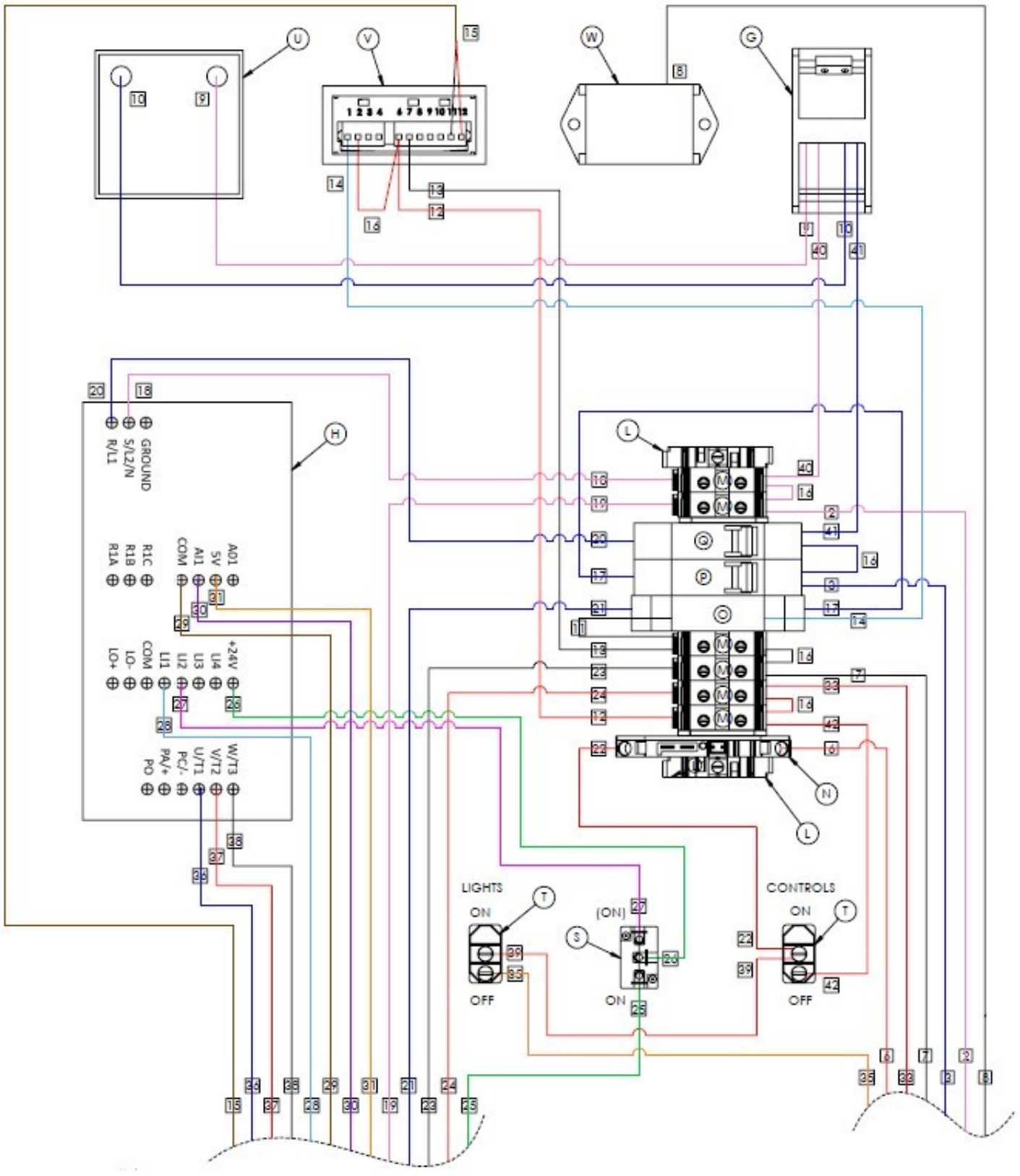
Below is a flow chart indicating the few parameters that are changed from the original factory settings. The end column indicates the proper values for the controls and electric pump motor



NOTICE

This flow chart does not contain sub menus we do not access or variables that are unedited. Please refer to the Schneider Electric Altivar 12 User Manual if you have questions on any variable not listed.

Control Panel Wiring and Parts Diagram



Motor Control Harness

Generator Harness

Control Panel (305-029-900) Wiring and Parts Diagram Continued...

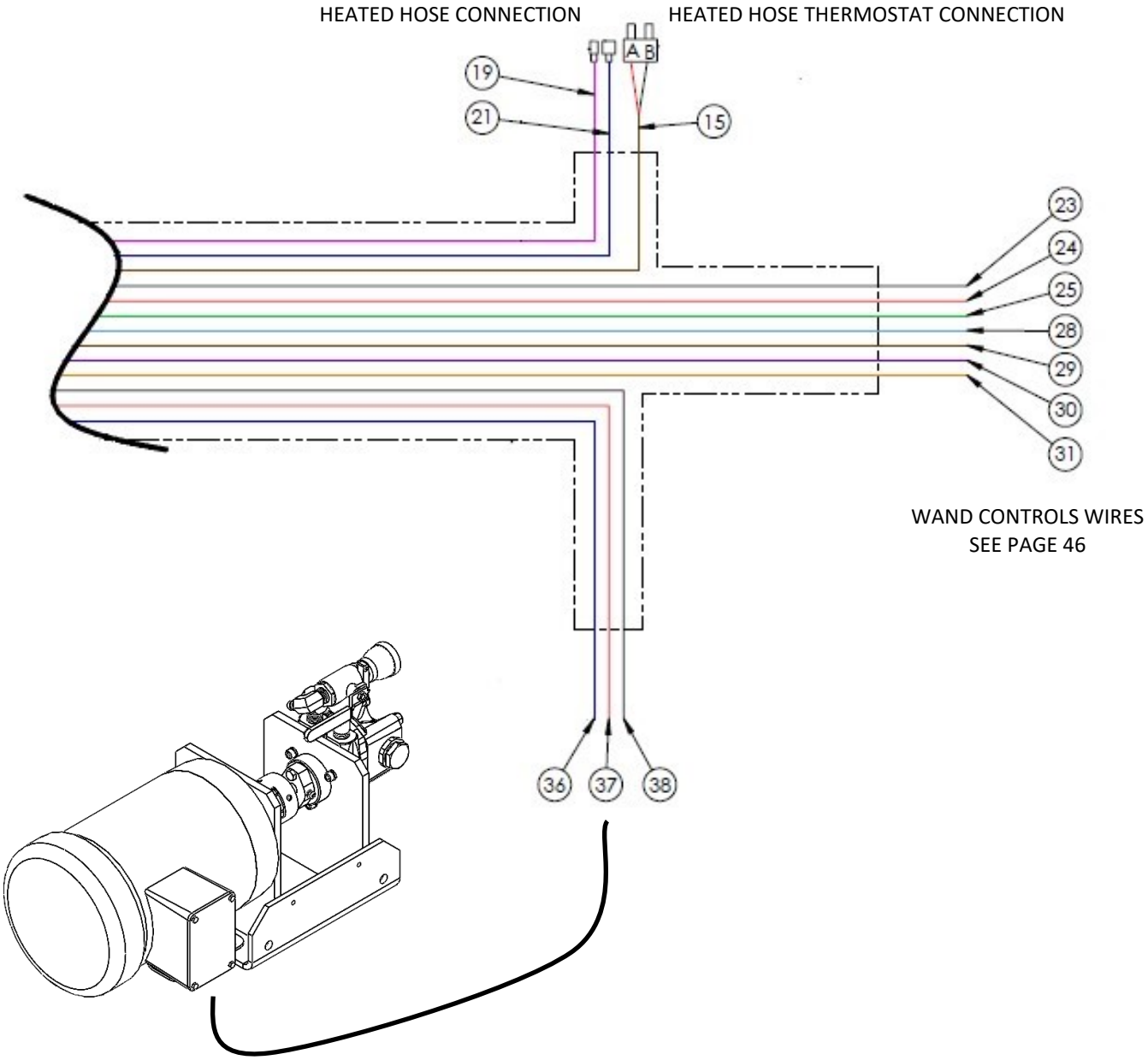
ITEM LETTER	PART #	DESCRIPTION	QTY.
A	305-181-000	ENCLOSURE – COOLING MODIFICATION	1
B	305-172-000	LABEL – P1 CONTROL PANEL	1
C	305-166-004	SHEET – GAUGE PANEL	1
D	305-165-004	SHEET – CONTROL BACK PANEL	1
E	156417	VENT – ENCLOSURE FAN MOUNT	1
F	156416	VENT – ENCLOSURE	1
G	131043	FAN – 80MM 220VAC	1
H	131042	VFD 1HP 220 VAC INPUT	1
I	131025	CORD GRIP	2
J	131024	ENDCAP —DIN RAIL FUSE TERMINAL	1
K	131023	ENDCAP —SINGLE DIN TERMINAL	2
L	131022	END CLAMP —DIN RAIL	2

ITEM LETTER	PART #	DESCRIPTION	QTY.
M	131021	TERMINAL BLOCK – SINGLE – DIN MOUNT	6
N	131020	FUSE TERMINAL – DIN MOUNT	1
O	131019	POWER RELAY – 200V - SPST NO	1
P	131018	BREAKER—5 AMP – DIN MOUNT	1
Q	131017	BREAKER— 10AMP – DIN MOUNT	1
R	131016	RAIL – DIN 35 MM	1
S	131015	REV PUMP SWITCH	1
T	131014	LIGHTS & CONTROLS SWITCH	2
U	131013	VOLTMETER – 300V ANALOG	1
V	200596	CONTROLLER OIL	1
W	130189	TACH/HOURMETER 2C	1

NUMBER	FUNCTION	COLOR	WIRE GAUGE	CONNECTION 1	CONNECTION 2
1	REGULATOR GREEN	GREEN	16	C POLE WPACK 3T	AMP CONN
2	220 NUETRAL IN	WHITE	12	B POLE WPACK 3T	220 N TERM
3	220 HOT IN	BLUE / BLACK STRIPE	12	A POLE WPACK 3T	5A BREAKER
4	REGULATOR BROWN	BROWN	16	AMP CONN	WIRE 3
5	REGULATOR BROWN	BROWN	16	AMP CONN	WIRE 2
6	BATTERY POSITIVE	RED	10	3/8" RING TERM	FUSE BLOCK
7	BATTERY NEGITIVE (GROUND)	BLACK	10	3/8" RING TERM	DC GROUND TERM
8	TINY TACH CABLES PROVIDED	-	-	-	-
9	VOLTMETER NUETRAL	WHITE	16	FAN NUETRAL	VOLTMETER NUETRAL
10	VOLTMETER HOT	BLUE / BLACK STRIPE	16	FAN HOT	VOLTMETER HOT
11	POWER RELAY (GROUND)	BLACK	16	DC GROUND TERM	RELAY TERM 4???
12	CONTROL POSITIVE	RED	16	DC POSITIVE TERM	OIL CONT PORT 6
13	CONTROL NEGITIVE (GROUND)	BLACK	16	DC GROUND TERM	OIL CONT PORT 7
14	POWER RELAY CONTROL	BLUE	16	OIL CONT PORT 1	RELAY TERM 3???
15W	THERMOCOUPLE EXTENTION WIRE	WHITE	TYPE J	OIL CONT PORT 11	B POLE WPACK 2T
15R	THERMOCOUPLE EXTENSION WIRE	RED	TYPE J	OIL CONT PORT 12	A POLE WPACK 2T
16	JUMPERS	-	-	-	-
17	POWER RELAY HOT	BLUE / BLACK STRIPE	12	5A BREAKER	RELAY TERM 1???
18	VFD 220 NUETRAL	WHITE	12	220 N TERM	VFD S/L2/N
19	HEATED HOSE NUETRAL	WHITE	12	220 N TERM	1/4" FEMALE Q-CONN
20	VFD 220 HOT	BLUE	12	10A BREAKER	VFD R/L1
21	HEATED HOSE 220 HOT	BLUE / BLACK STRIPE	12	RELAY TERM 2	1/4" MALE Q-CONN
22	DC POWER SWITCH TO FUSE	RED	12	FUSE BLOCK	POWER SWITCH
23	WAND NEGITIVE (GROUND)	BLACK	12	DC GROUND TERM	-
24	WAND POSITIVE	RED	12	DC POSITIVE TERM	-
25	FORWARD WAND CONTROL	YELLOW	16	ON TERM (ON)-ON SW	-
26	VFD CONTROL VOLTAGE	YELLOW	16	COMMON (ON)-ON SW	VFD +24V
27	REVERSE CONTROL	PINK	16	(ON) TERM (ON)-ON SW	VFD LI2
28	VFD FORDARD FROM WAND	LIGHT BLUE	16	VFD LI1	-
29	SPEED POT 1	BROWN	16	VFD COM	-
30	SPEED POT 2	PURPLE	16	VFD AI1	-
31	SPEED POT 3	ORANGE	16	VFD +5V	-
32	REGULATOR NEGITIVE (GROUND)	BLACK	14	AMP CONN	WIRE 7
33	REGULATOR POSITIVE	RED / WHITE STRIPE	14	AMP CONN	DC POSITIVE TERM
34	BRAKES POSITIVE	BLUE / WHITE STRIPE	16	1/4" MALE Q-CONN	WIRE 6
35	LIGHTS POSITIVE	ORANGE	16	1/4" MALE Q-CONN	LIGHTS SWITCH
36	MOTOR PHASE 1	BLUE / BLACK STRIPE	12	VFD U/T1	-
37	MOTOR PHASE 2	RED / BLACK STRIPE	12	VFD V/T2	-
38	MOTOR PHASE 3	BLACK / WHITE STRIPE	12	VFD W/T3	-
39	LIGHT SWITCH POSITIVE	RED	16	POWER SWITCH	LIGHTS SWITCH
40	FAN 220 NUETRAL	WHITE	16	220 N TERM	FAN NUETRAL
41	FAN 220 HOT	BLUE / BLACK STRIPE	16	10A BREAKER	FAN HOT
42	CONTROL POWER ON (POSITIVE)	RED	12	POWER SWITCH	DC POSITIVE TERM

Control Panel Motor Harness Diagram

* REFER TO PAGE 43 FOR WIRE NUMBER DETAILS

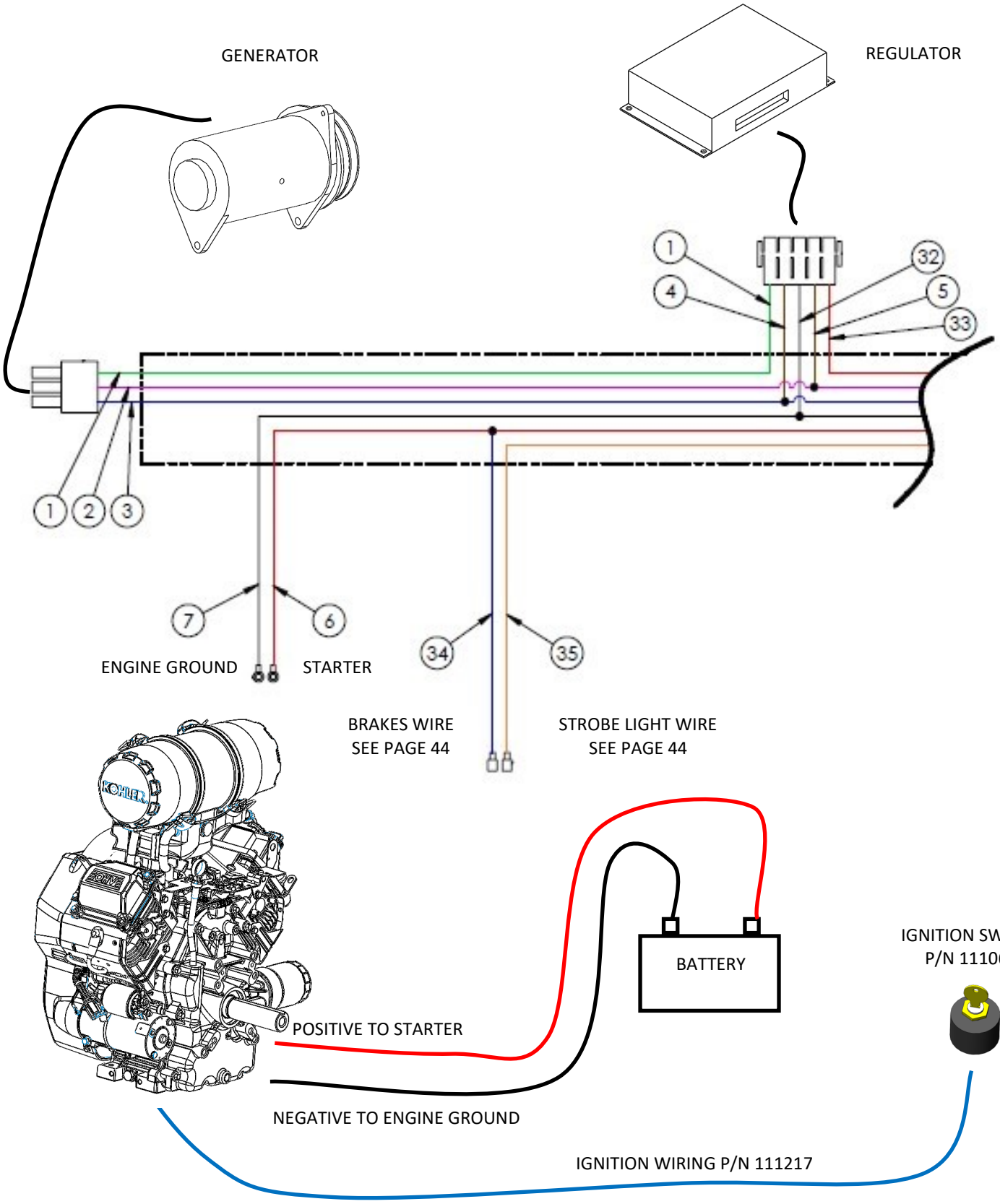


WAND CONTROLS WIRES
SEE PAGE 46

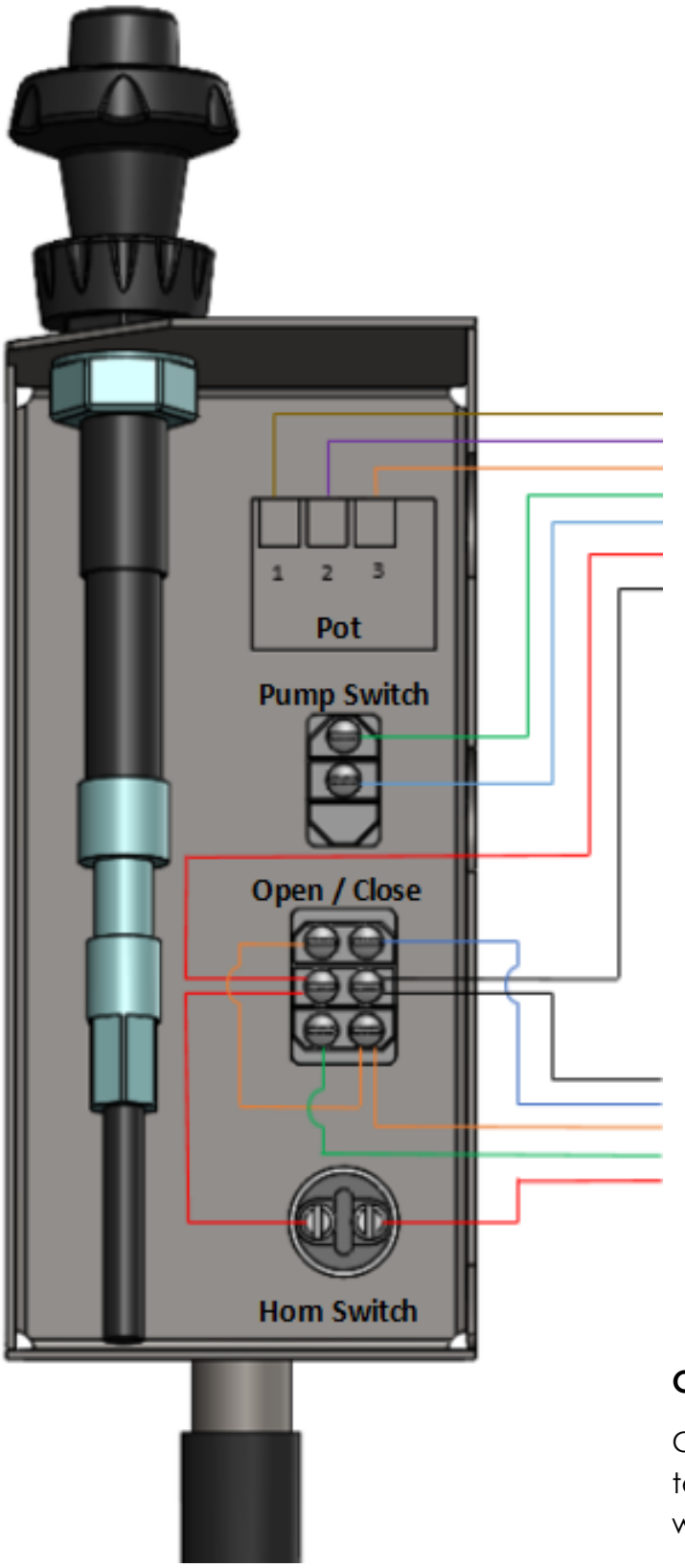
PUMP MOTOR

Control Panel Generator Harness Diagram

* REFER TO PAGE 43 FOR WIRE NUMBER DETAILS



Wand Wiring Diagram



29
30
31
25
28
24
23

Wire bundle from control panel

(see page 44 for wire information)

Where routes to:
Horn Ground
Retraction Limit Switch
Actuator Black Wire
Extension Limit Switch
Horn Positive

Actuator Wire bundle

305-163-000

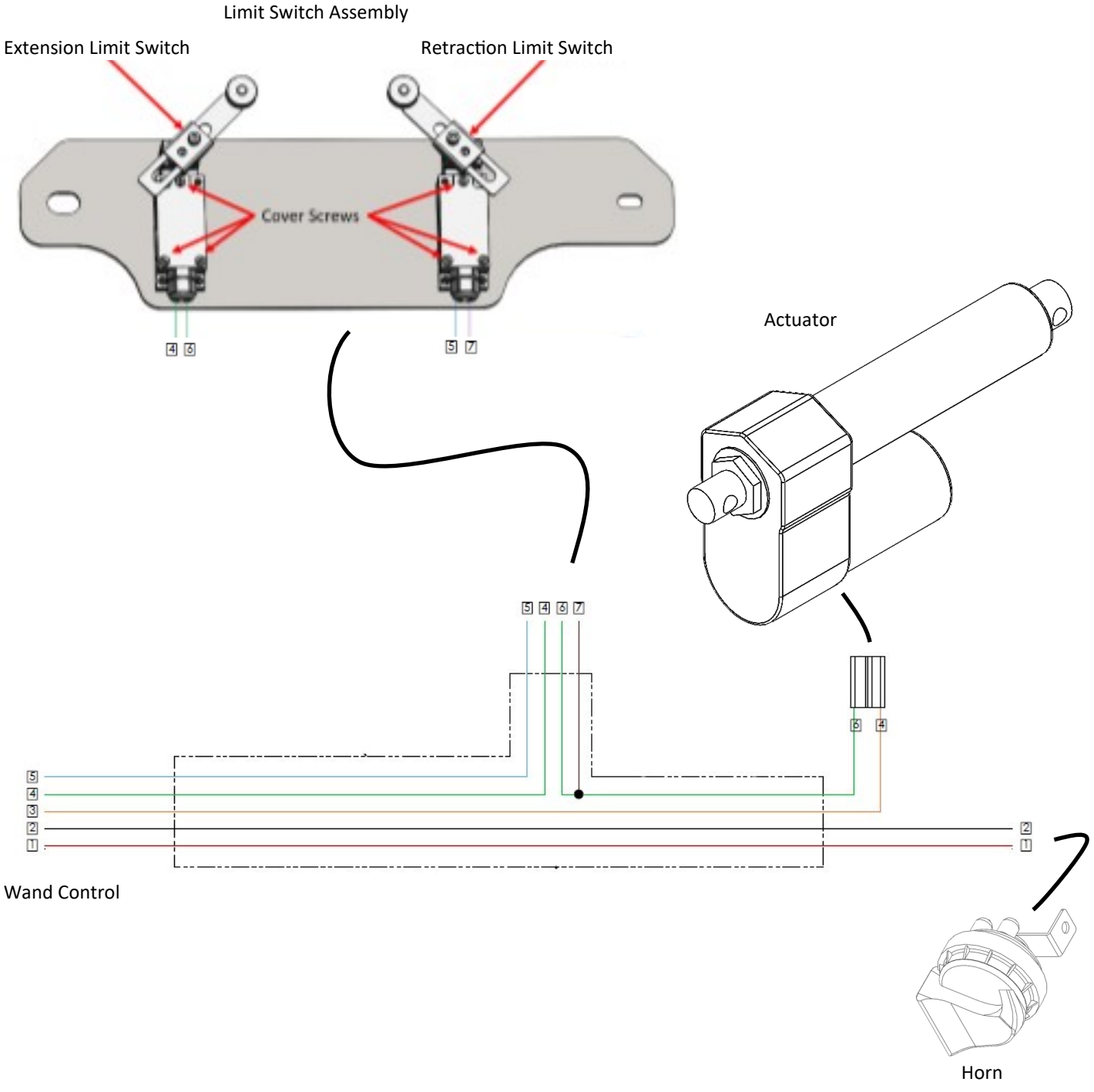
(See page 47 for wire information)

Optional Nozzle Heater

Connect the optional nozzle heater wires to the terminals on the Open / Closed switch where wires 24 & 25 are connected.

Actuator Wiring Diagram

Part Number 305-163-000



NUMBER	FUNCTION	COLOR	AWG WIRE GAUGE	CONNECTION 1	CONNECTION 2
1	HORN POSITIVE	RED	16	HORN SWITCH	HORN POSITIVE
2	HORN NEGITIVE	BLACK	16	OPEN / CLOSE SWITCH	HORN NEGITIVE
3	ACTUATOR COMMON	ORANGE	16	OPEN / CLOSE SWITCH	ACTUATOR RED WIRE
4	GATE OPEN LIMIT SWITCH	GREEN	16	OPEN / CLOSE SWITCH	EXTENSION LIMIT SWITCH
5	GATE CLOSED LIMIT SWITCH	BLUE	16	OPEN / CLOSE SWITCH	RETRACTION LIMIT SWITCH
6	GATE OPEN LIMIT SWITCH TO ACTUATOR	GREEN / YELLOW STRIPE	16	EXTENSION LIMIT SWITCH	ACTUATOR BLACK WIRE
7	GATE CLOSED LIMIT SWITCH TO ACTUATOR	BROWN	16	RETRACTION LIMIT SWITCH	WIRE 6

General Maintenance of the Rock Gate

NOTICE

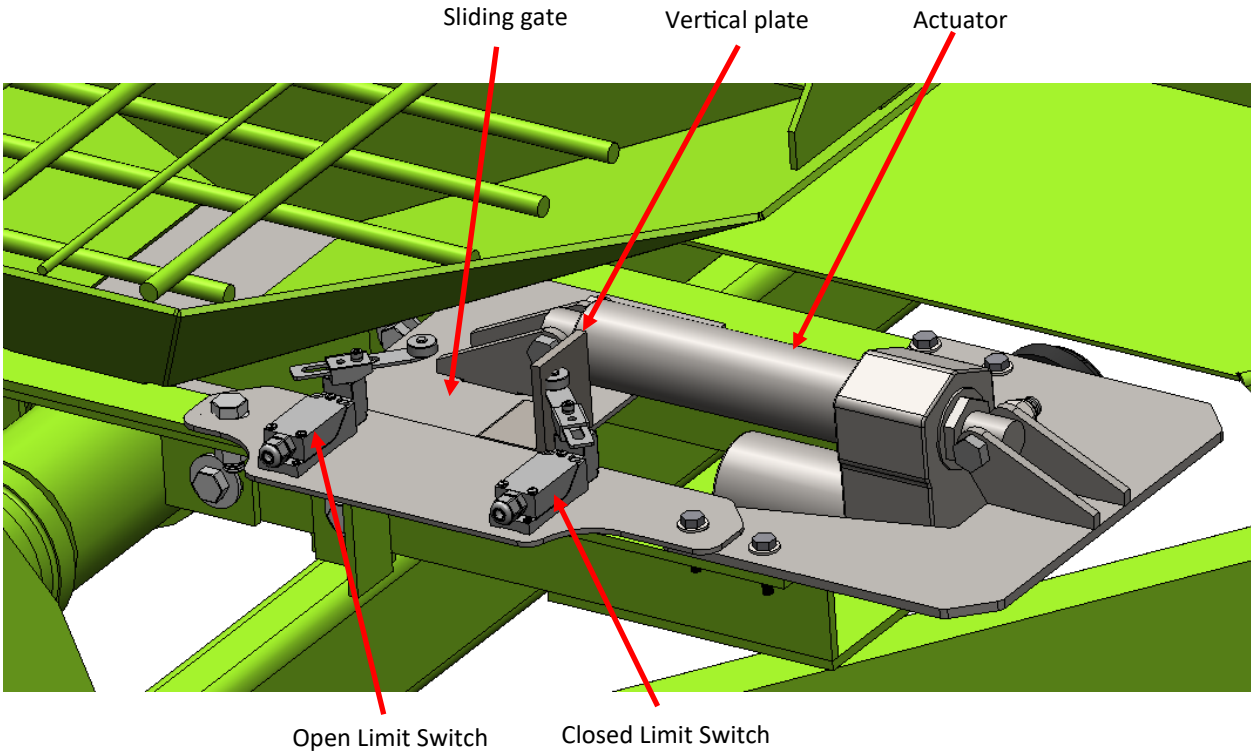
No maintenance is required on the actuator. DO NOT attempt to repair or service the actuator as this will void the manufactures warranty.

NOTICE

The "clicking" sound from the actuator is the overload clutch protecting it from damage. Constant engagement of the overload clutch will shorten the life of the actuator.

Rock Gate Inspection

1. With an empty hopper and the guard in place, close the gate.
    a. Check if the opening to the venturi is full blocked
    b. Check the surface to see if it is wearing through in any spots
    c. Listen for repeated "clicking"
2. Open the gate
    a. Check for over or under travel
    b. Check the thickness and straightness of the closing edge
    c. Listen for repeated "clicking"



* Guard not shown for clarity purposes

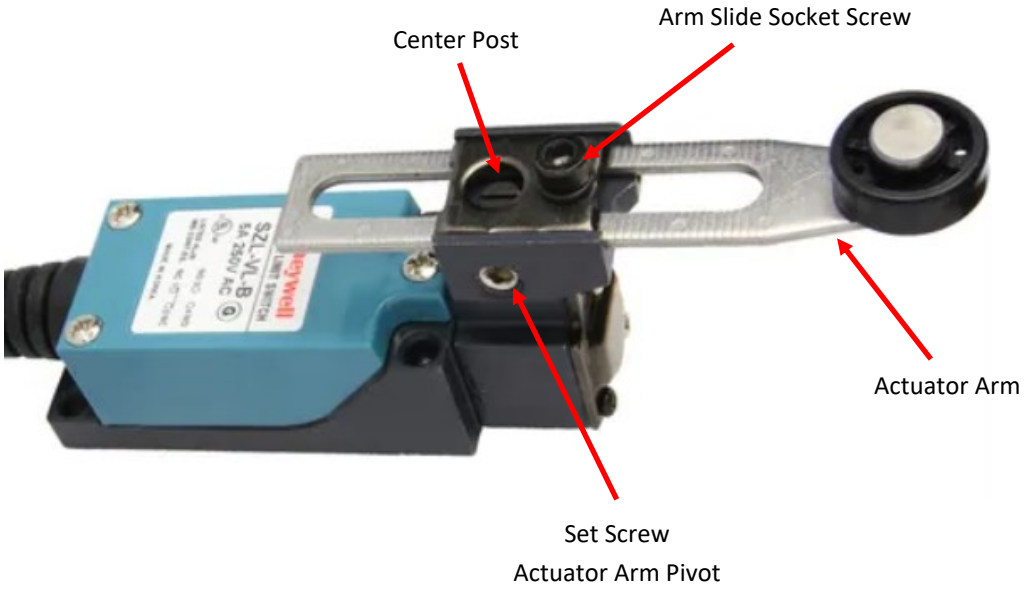
General Maintenance of the Rock Gate, Continued…

Setting the limit switches

WARNING

The rock gate moves quickly with a lot of force. Use extreme caution and keep clear of the sliding gate when preforming maintenance that requires the actuator to be active.

1. Leave actuator plugged in and powered on
2. Remove guard covering the limit switches and clean out all dust and debris
3. Open the rock gate
    a. Using a 3mm Allen wrench loosen the set screw on the actuator arm pivot
    b. Using a screw driver rotate the center post until you hear / feel a click. This is the activation point of the switch.
    c. Rotate the actuator arm until its wheel is against the vertical plate on the sliding gate
    d. Tighten the set screw on the actuator arm pivot
4. Close the rock gate and repeat steps 3a - 3d for that limit switch
5. Open and close the gate a couple of times to determine if more adjustment needed
    a. Use a 3mm Allen wrench and loosen the arm slide socket screw on the actuator arm
    b. Slide the arm inward for more travel and outward for less travel.
    c. If the actuator is clicking, it has reached the end of its travel in that direction and you need to extend that actuator arm.
6. Reinstall guard when finished



General Maintenance of the Rock Gate, Continued…

Actuator Circuit Design

The design of the circuit allows the actuator to only move in the opposite direction of an switched “Off” limit switch

Actuator Function

a. Apply positive 12 VDC to red wire on actuator for extension (closes gate)

b. Apply negative 12 VDC to red wire on actuator for retraction (opens gate)

c. Clutched to prevent damage if jammed

Open / Close Switch

a. Double pole double throw (DPDT) switch to flip-flop actuation direction

b. On - On function only no center off position

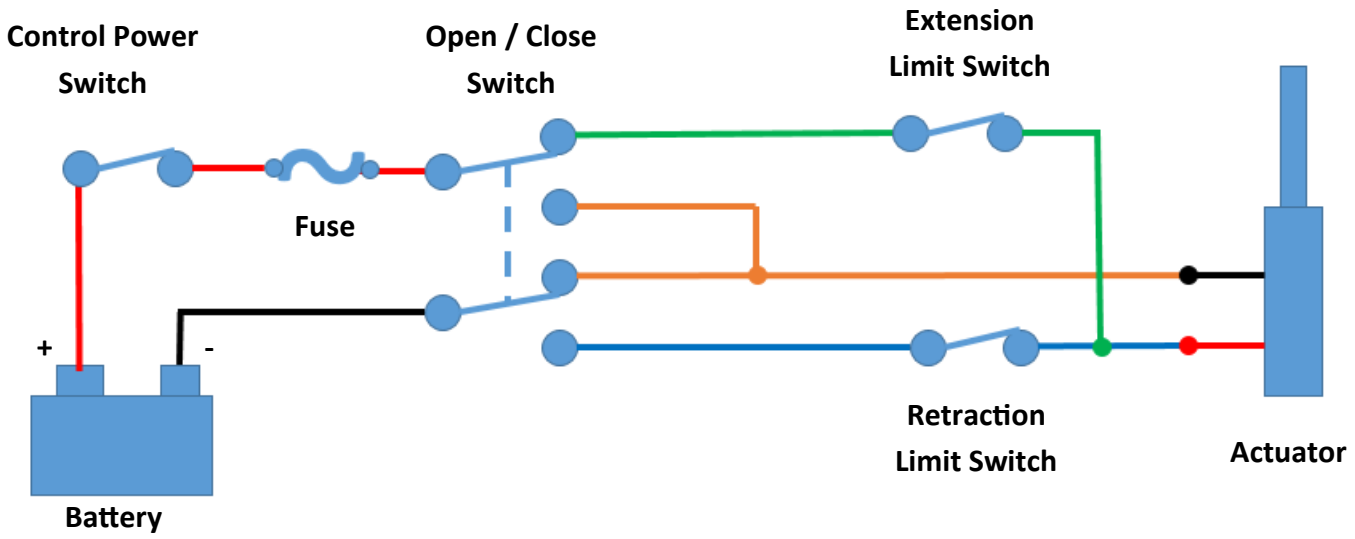
c. Gate either opens 100% or closes 100%

Limit Switches

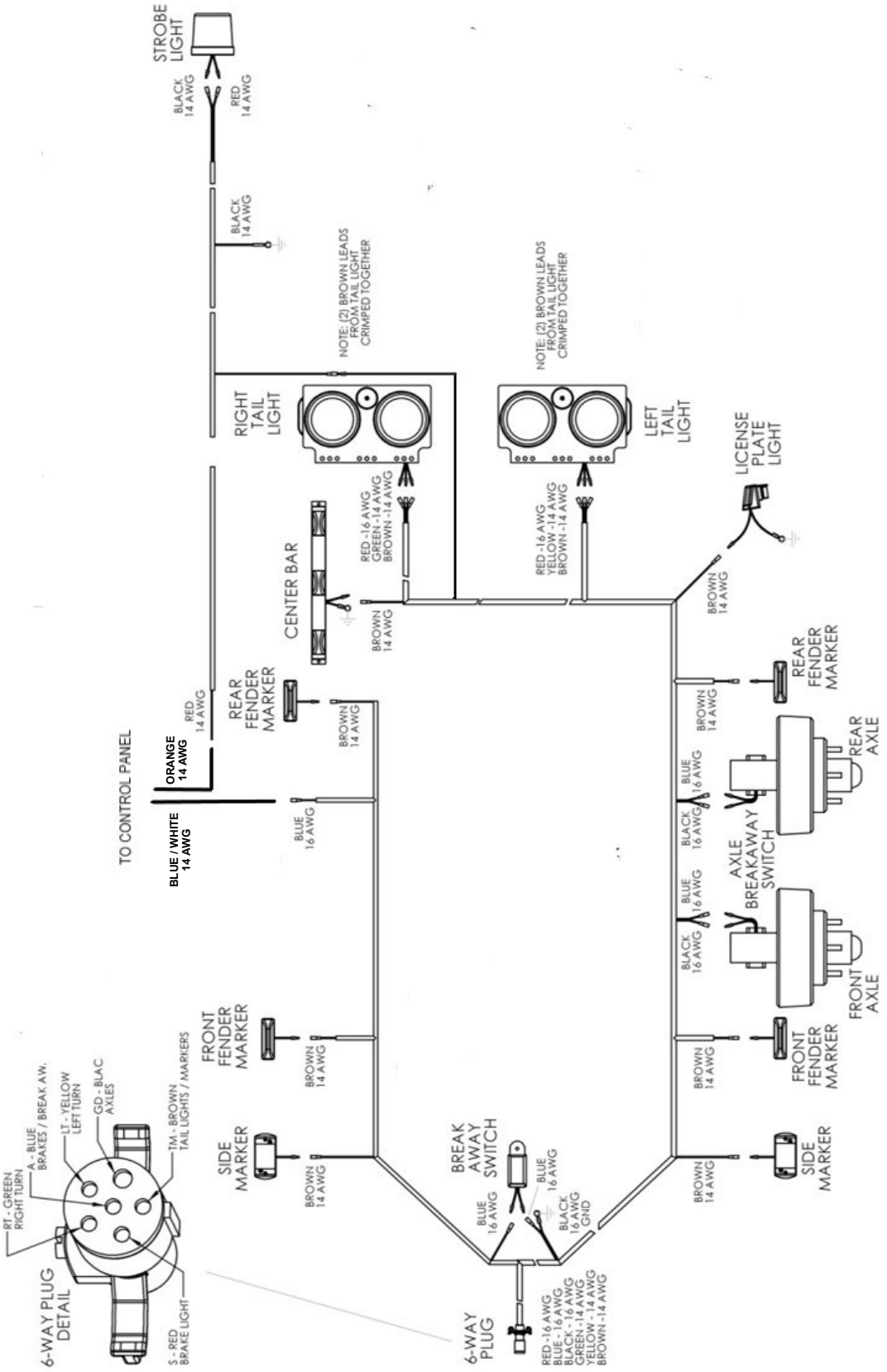
a. Normally “On” turn actuator “Off” to prevent clutching at end of actuator travel

b. One switch cuts positive current at full extension the other switch cuts negative current when fully retracted

Simplified Actuator Circuit Diagram



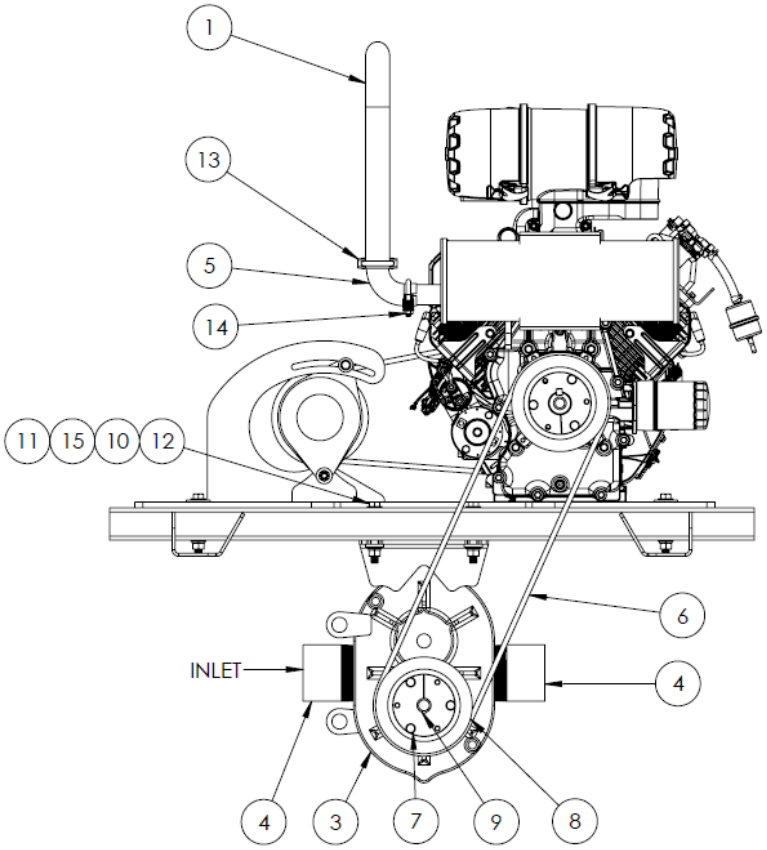
Trailer Wiring for Brakes and Lights



Parts Section

Engine Parts

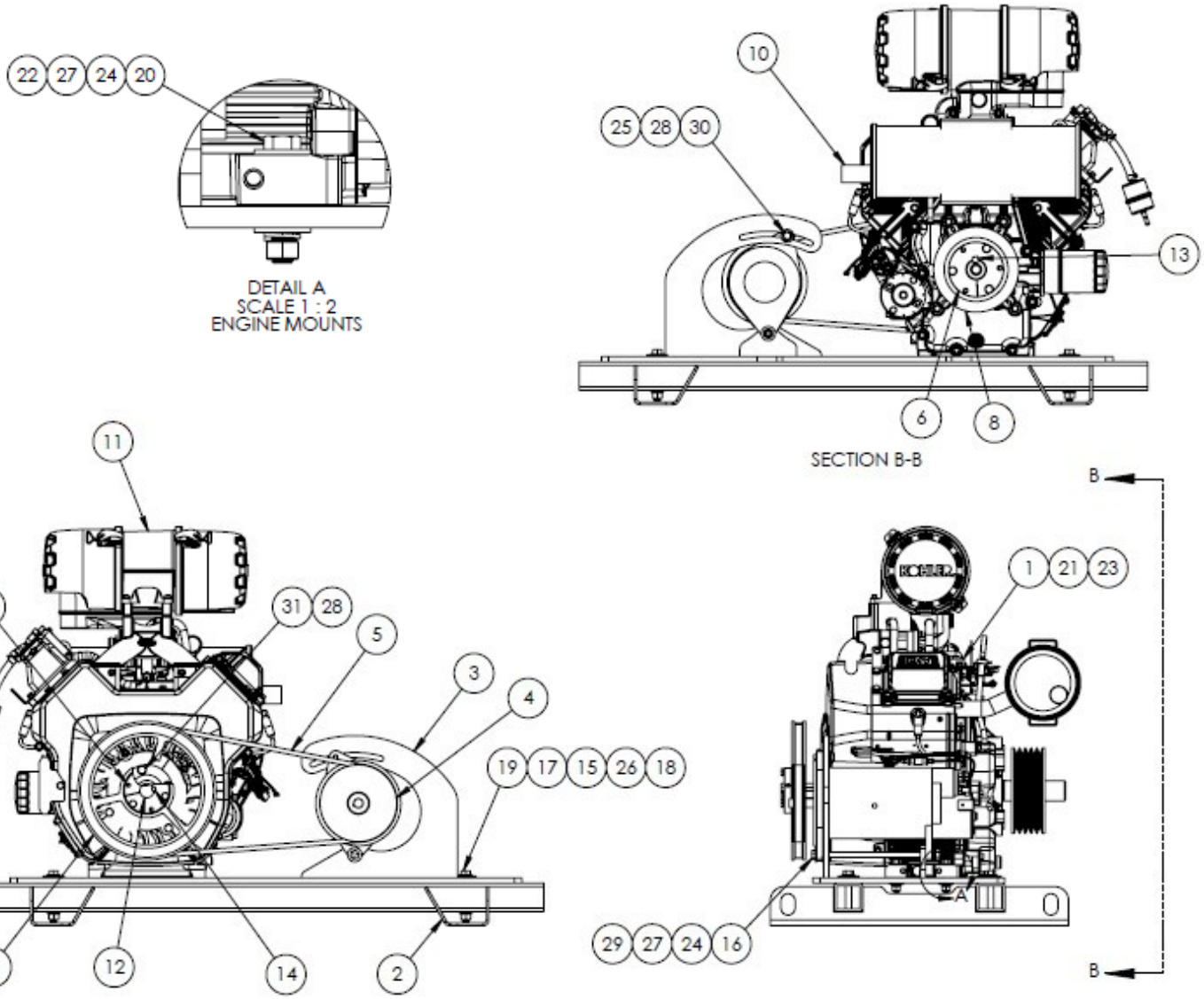
Top Level 305-015-004



#	PART #	DESCRIPTION	QTY.
1	305-140-000	TUBE - EXHAUST STACK	1
2	305-028-004	P1 ENGINE ASSEMBLY	1
3	156346	BLOWER - URAI 47	1
4	121145	PIPE - NIPPLE - TOE - 3 X 4.00	2
5	111928	EXHAUST ELBOW	1
6	111926	BELT - 5/3VX 60"	1
7	111925	BUSHING - SK 0.88	1
8	111922	SHEAVE - 5/3V/6	1
9	110091	KEY .19 X 2.00 LG	1
10	101266	WASHER - FLAT - SAE .44	8
11	101265	NUT - HEX 7/16-20 UNF GR8	4
12	101264	HHCS .44 X 3.50 GR8 PLATED	4
13	101263	UBOLT - 1.50 ID CLAMPING	1
14	101262	UBOLT - 1.38 ID CLAMPING	1
15	100094	WASHER-SPLITLOCK .44	4

Engine Parts, continued…

Sub Assembly 305-028-004



Engine Parts, continued…

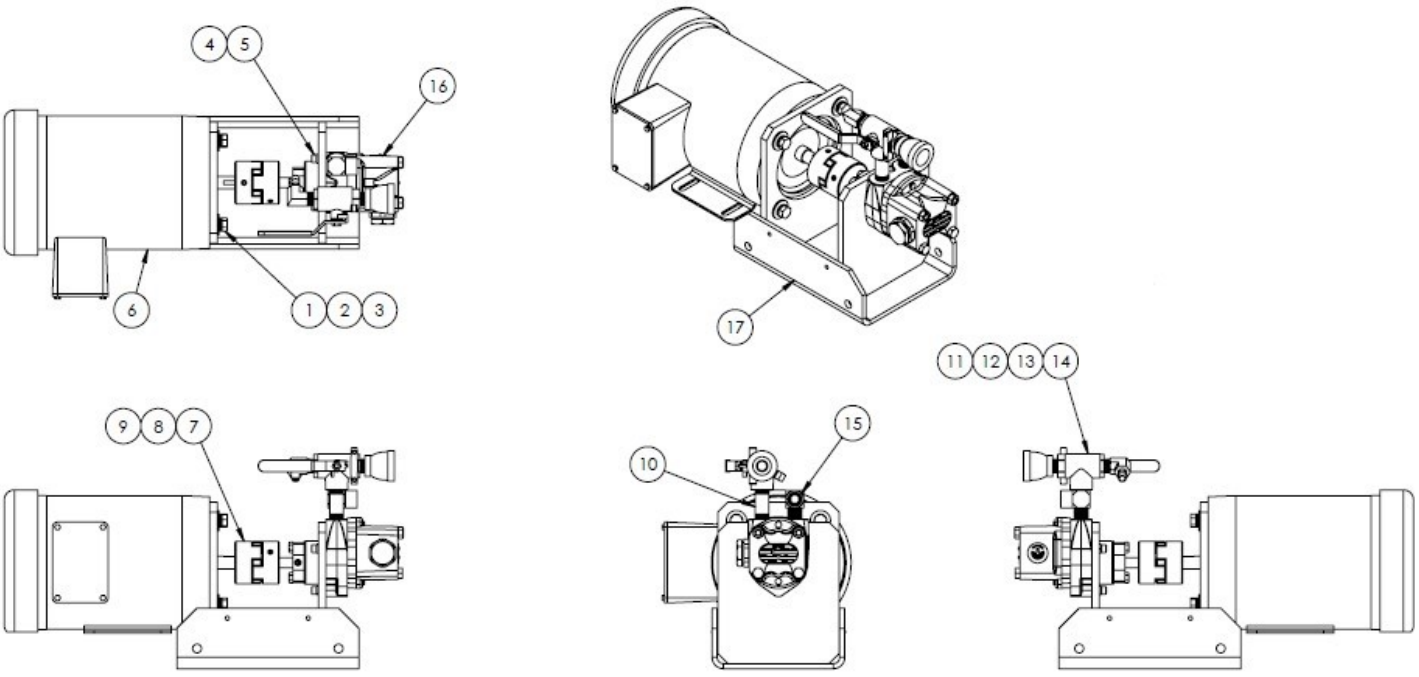
Sub Assembly 305-028-004

#	PART #	DESCRIPTION	QTY.
1	305-173-000	SQUARE - CABLE CLAMP	1
2	305-017-004	WELDMENT - BLOWER MOUNT	1
3	305-016-004	WELDMENT - ENGINE MOUNT	1
4	111929	GENERATOR - 220V 15A	1
5	111927	BELT A-52	1
6	111924	BUSHING - SK 1.44	1
7	111923	BUSHING - SDS 1.00	1
8	111922	SHEAVE - 5/3V/6	1
9	111921	SHEAVE - 9.75	1
10	111919	MUFFLER - STARTER SIDE	1
11	111918	ENGINE-KOHLER 30HP	1
12	111226	FAN SIDE PTO	1
13	110294	KEY .38 X 2.00 LG	1
14	110096	KEY .25 X 1.50 LG	1
15	101272	WASHER - TYPE B 7/16 X 1.50 ZP	4
16	101267	HHCS .38 X 9.00 GR5 ZP	1
17	101266	WASHER - FLAT - SAE .44	8
18	101265	NUT - HEX 7/16-20 UNF GR8	4
19	101264	HHCS .44 X 3.50 GR8 PLATED	4
20	100954	HHCS .38 X 2 UNF GR8	4
21	100907	SHCS 10-32 X 1.00	1
22	100242	NUT-HEX .38-24 UNF	4
23	100142	WASHER-SPLITLOCK NO.10	1
24	100126	WASHER-FLAT .38	11
25	100125	WASHER-FLAT .31	2
26	100094	WASHER-SPLITLOCK .44	4
27	100093	WASHER-SPLIT LOCK .38	5
28	100092	WASHER-SPLITLOCK .31	5
29	100069	NUT-HEX .38	1
30	100007	HHCS .31 X 1.25 GR5 ZP	1
31	100005	HHCS .31 X .75	4

Engine Service Parts

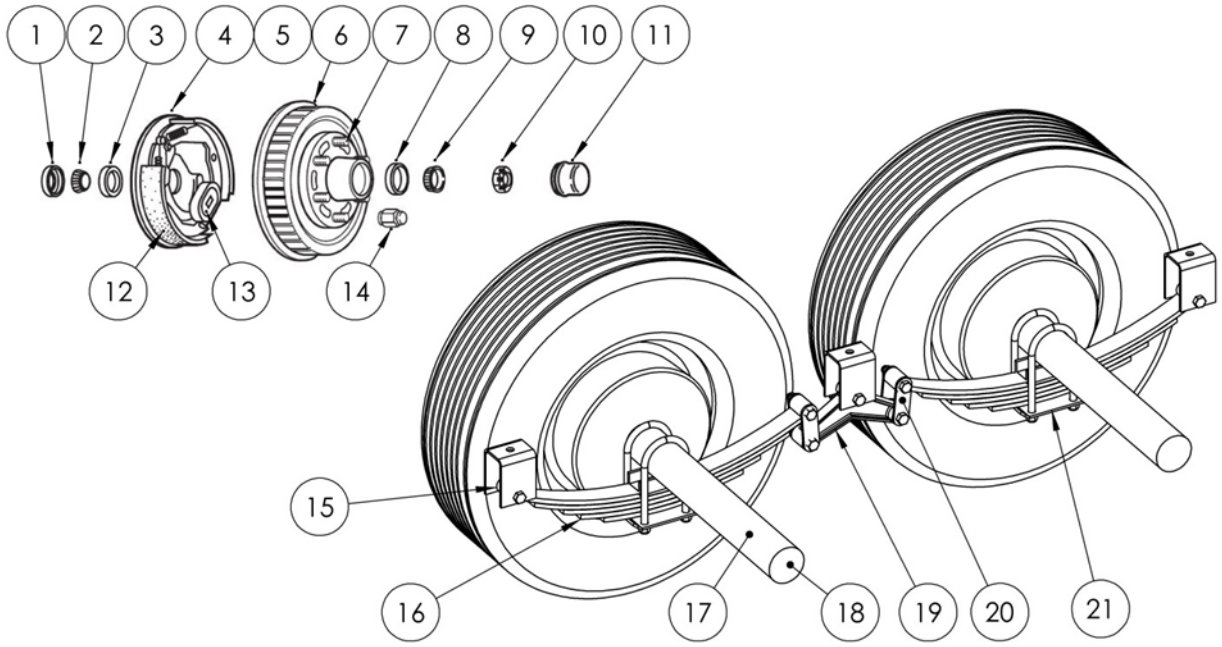
Engine Service Parts		
PART #	**DESCRIPTION**	**QTY.**
110889	OIL FILTER	1
301-910-000	FUEL FILTER	1
111001	AIR FILTER OUTER ELEMENT	1
111002	AIR FILTER INNER ELEMENT	1
111068	IGNITION SWITCH	1
111217	IGNITION WIRING	1
152090	CHOKE CABLE	1

Pump Assembly 305-018-004



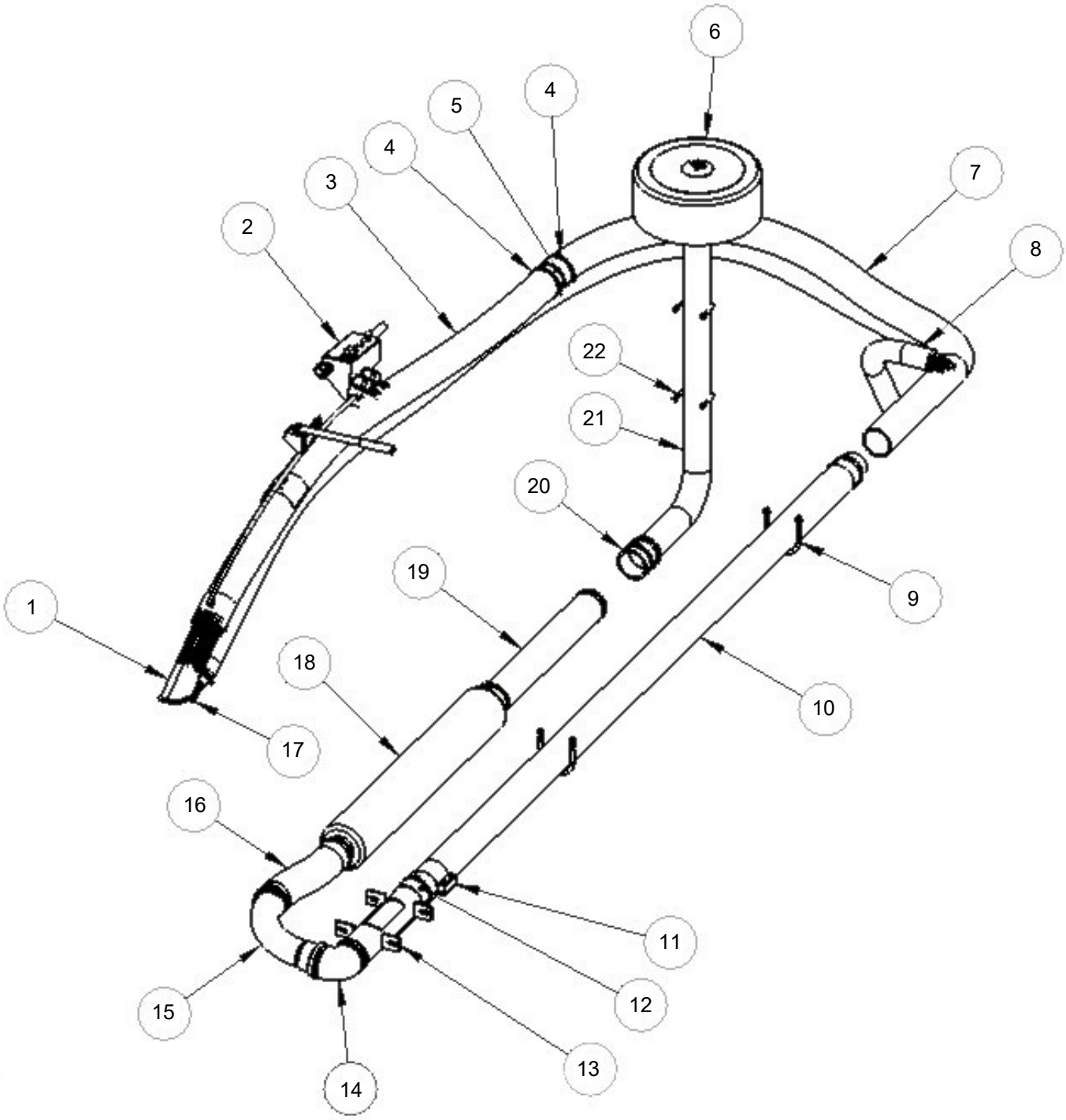
#	PART #	DESCRIPTION	QTY.
1	100016	HHCS .38 X 1.00	4
2	100093	WASHER-SPLIT LOCK .38	4
3	100126	WASHER-FLAT .38	4
4	100203	WASHER-SPLITLOCK .25	3
5	100340	SHCS .25 X 1.0	3
6	111930	MOTOR - 1 HP NEMA 56 C-FACE	1
7	111931	HALF COUPLING - 5/8" SHAFT	1
8	111932	HALF COUPLING - 1/2" SHAFT	1
9	111933	HALF COUPLING - SPIDER	1
10	120007	3/8 X 3 PIPE NIPPLE	1
11	120222	3/8 CLOSE PIPE NIPPLE	1
12	120567	PIPE-REDUCER-BELL-.75 X .38	1
13	120751	1/4NPT X 3/8 BRASS BARB	1
14	121143	VALVE - 3/8 NPT 3WAY FULL PORT	1
15	170086	ELBOW-6MP-6PF-90	1
16	172678	PUMP - EMULSION	1
17	305-019-004	PUMP FRAME	1

Axle Assembly



#	PART #	DESCRIPTION	QTY.
1	140622	SEAL	4
2	140623	INNER BEARINGS	4
3	140624	INNER RACE	4
4	140625	BACKING PLATE ASM L.H.	2
5	140626	BACKING PLATE ASM R.H.	2
6	140627	BRAKE DRUM	4
7	140628	STUD	24
8	140629	OUTER RACE	4
9	140630	OUTER BEARING	4
10	140631	SPINDLE NUT	4
11	140632	DUST COVER	4
12	140633	REPLACEMENT SHOE & LINING	4
13	140634	REPLACMENT MAGNET	4
14	104567	1/2-20 NF- LUG NUT	24
15	100966	9/16-18 X 3.0 SHOULDER BOLT	14
16	140564	LEAF SPRING	4
17		AXLE BEAM ONLY	
18	EXPORT	AXLE ASSEMBLY, DURAPATCHER EXPORT UNIT	2
19	140565	EQUALIZER BAR	2
20	140566	SHACKLE STRAP	8
21	140569	U BOLT	8
22	140570	U BOLT PLATE	4

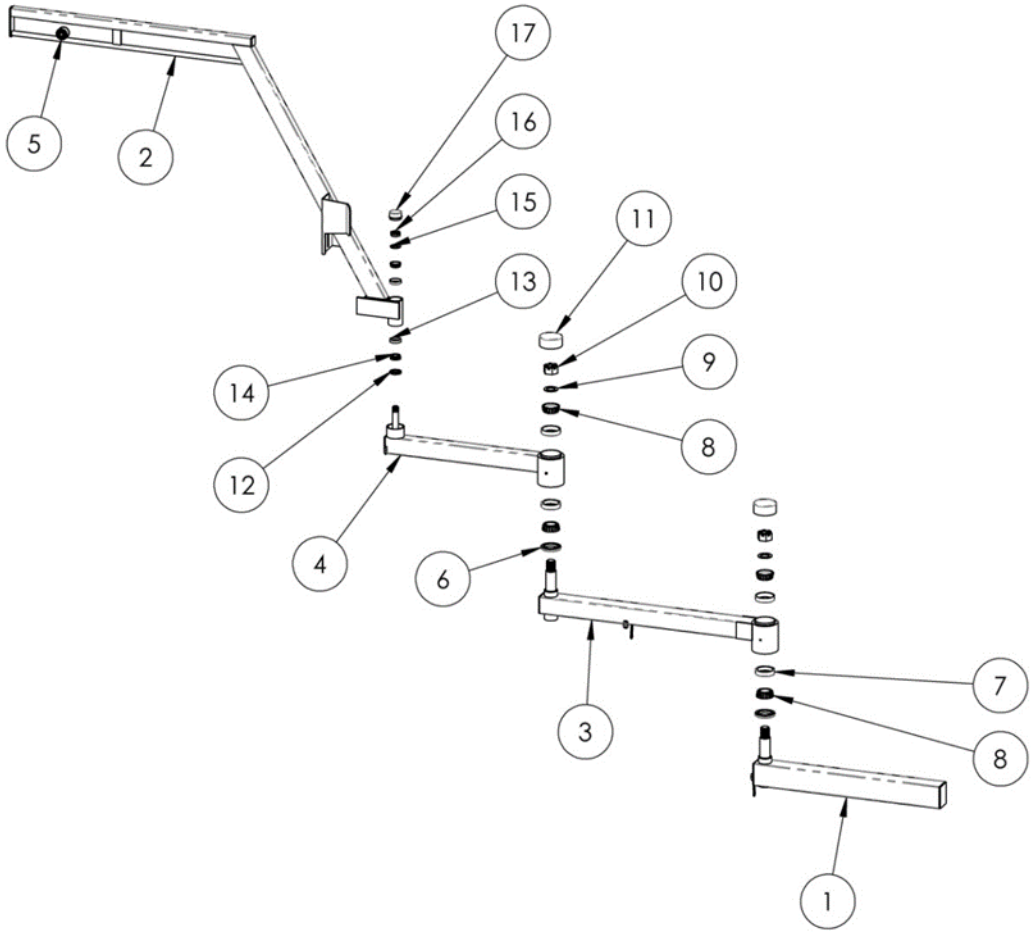
Aggregate Plumbing Assembly



Aggregate Plumbing Assembly

#	PART #	DESCRIPTION	QTY.
1	407832	NOZZLE WELDMENT	1
2	305-026-004	WAND ASSEMBLY	1
3	155218	HOSE "A" SECTION	1
4	120862	CLAMP 3-1/2 TO 4-1/2	16
5	426760	TUBE, CONNECTOR	1
6	155340	BLOWER FILTER ASSEMBLY	1
	155339	BLOWER AIR FILTER	1
	155341	PREFILTER - BLOWER	1
7	155219	HOSE "B" SECTION	1
8	305-025-000	HEATED EMULSION HOSE	1
9	101261	U BOLT - 4" ID GALVANIZED	2
10	405609	AGREGATE TRANSFER PIPE	1
11	120865	EXHAUST CLAMP	1
12	407846	VENTURI ACCESS COVER	1
13	405608	VENTURI WELDMENT	1
14	120861	90º ELBOW	1
15	120963	90º ELBOW LARGE RADIOUS	1
16	172377	HOSE, BLOWER PIPE TO VENTURI, 24"	1
17	172683	ELBOW 12MJ -12FJX-90	1
18	155314	SILENCER	1
19	172681	HOSE - BLOWER TO SILENCER 28"	1
20	172379	HOSE, BLOWER PIPE TO BLOWER	2
21	305-153-003	TUBE - INLET SNORKLE	1
22	101271	U BOLT - 3.5" ID GALVANIZED	1

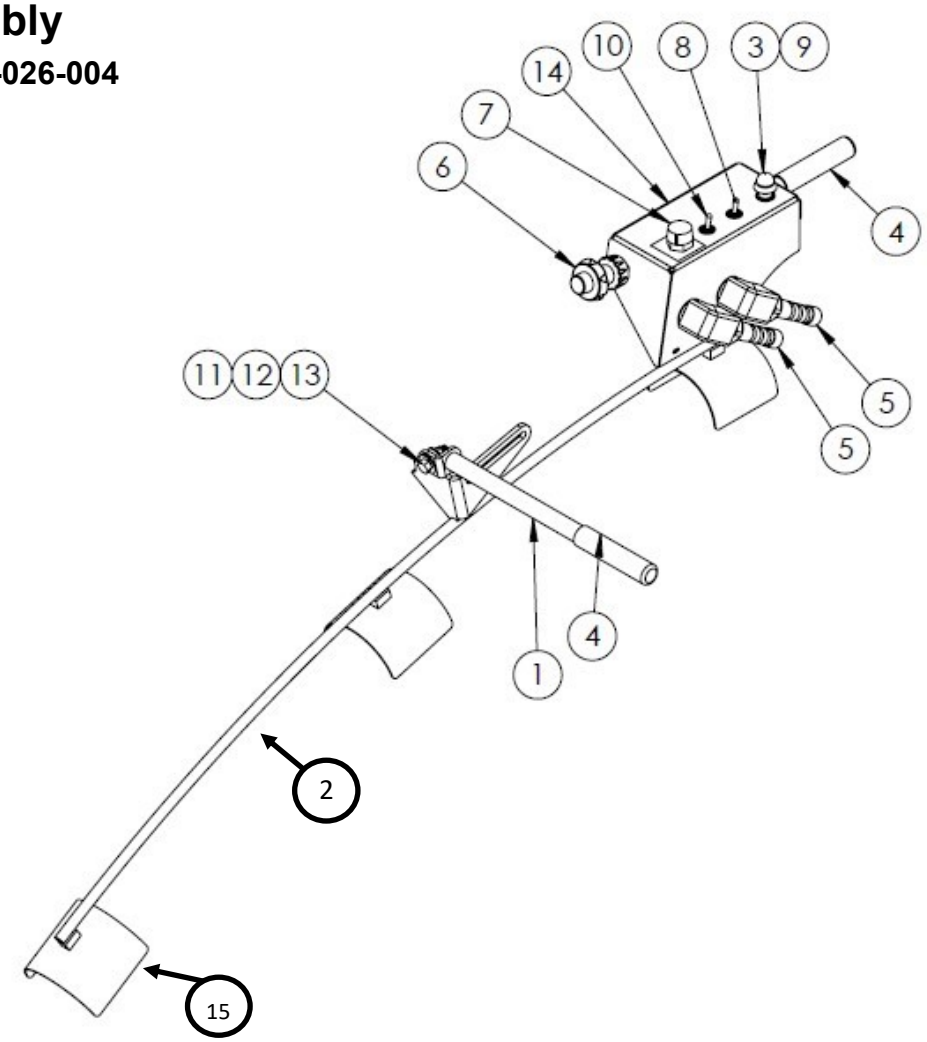
Boom Arm Assembly



ITEM NO	PART NUMBER	DESCRIPTION	QTY
1	408411	BOOM ARM, FIRST SECTION	1
2	408430	BOOM ARM, FORTH SECTION	1
3	405623	BOOM ARM, SECOND SECTION	1
4	405624	BOOM ARM, THIRD SECTION	1
5	155446	ROLLER, YOKE	1
6	172079	SEAL, 3-3/8 OD X 2.01 ID	2
7	154433	2" RACE	4
8	111511	ROLLER BEARING 1.75 ID	4
9	423444	WASHER	2
10	100971	CASTLE NUT 1.50	2
11	140576	BEARING CAP 3.875	2
12	172078	BOOM SEAL	1
13	154434	1" RACE	2
14	111512	ROLLER BEARING 1.00 ID	2
15	100347D	WASHER	1
16	100972	CASTLE NUT 1"	1
17	140577	BEARING CAP 2"	1

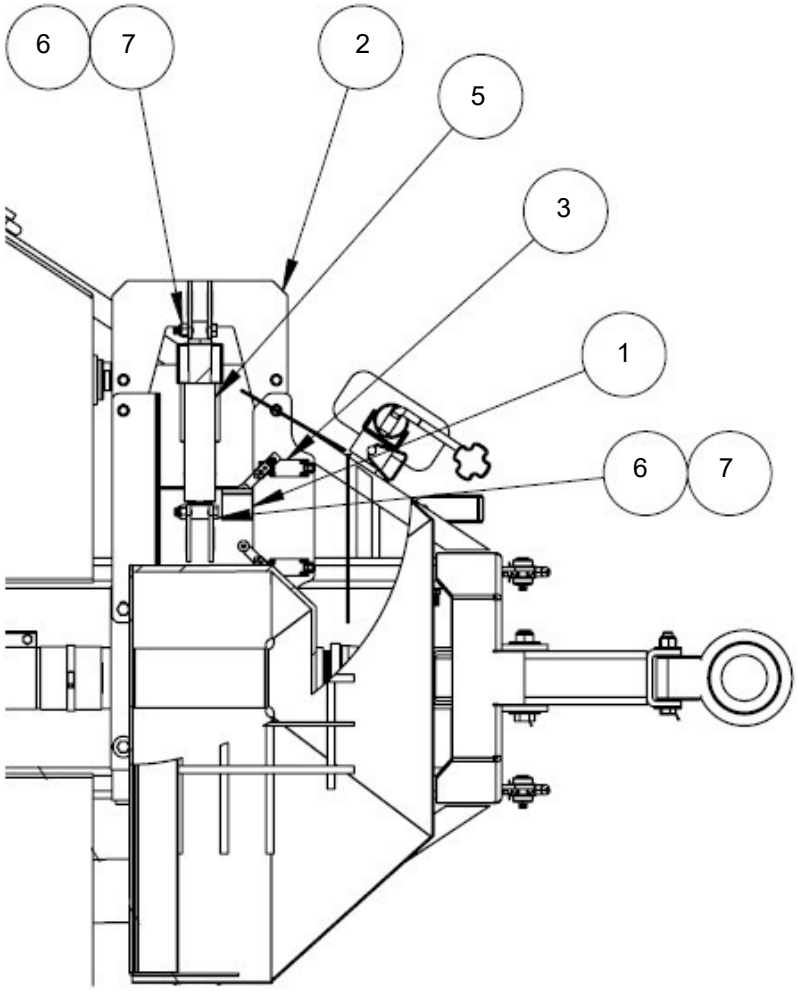
Wand Assembly

Part Number 305-026-004



#	PART #	DESCRIPTION	QTY.
1	409739	OPERATOR HANDLE ASSEMBLY	1
2	305-027-004	HOSE HOLDER	1
3	155318	COVER, SWITCH	1
4	155309	GRIP-HANDLE	2
5	131012	CORD GRIP – 90 ELBOW	2
6	131011	THROTTLE CABLE - SOLID CORE	1
7	131010	POTENTIOMETER – 10K	1
8	131009	ROCK SWITCH	1
9	130561	HORN SWITCH	1
10	131014	EMULSION SWITCH	1
11	100169	NUT-PLASTIC LOCK .38	1
12	100126	WASHER - FLAT .38	2
13	100017	HHCS .38 X 1.25	1
14	100017	P1 WAND CONTROLS LABEL	1
15	161861	CLAMPS	2

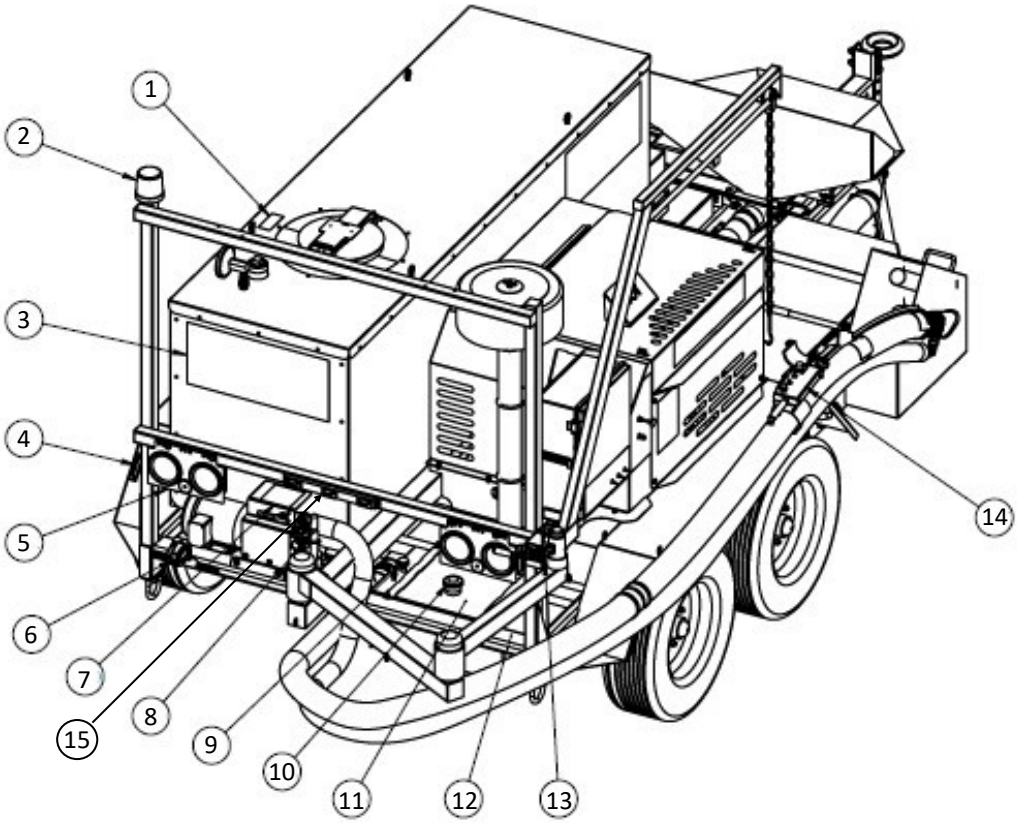
Rock Gate Actuator Assembly



#	PART #	DESCRIPTION	QTY.
1	305-022-004	SLIDE GATE - ELECTRIC ACTUATOR	1
2	305-023-004	MOUNT - ELECTRIC ACTUATOR	1
3	131008	LIMIT SWITCH	2
4*	305-159-004	GATE GUARD	1
5	111936	ACTUATOR - 4" STROKE 1000 LBF	1
6	100170	1/2 PLASTIC LOCK NUT	2
7	100036	HHCS 1/2 X 2-1/2 2	2

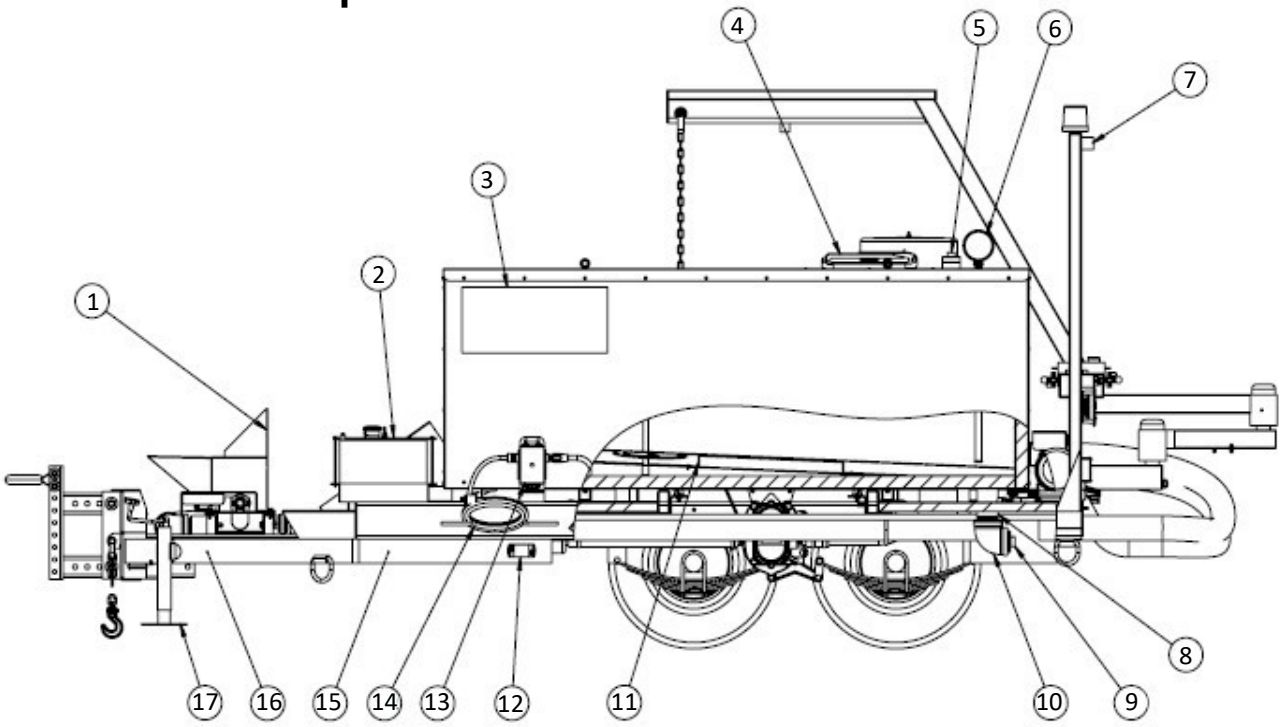
* Gate Guard 305-159-004 not shown for clarity purposes

Miscellaneous Components and Parts



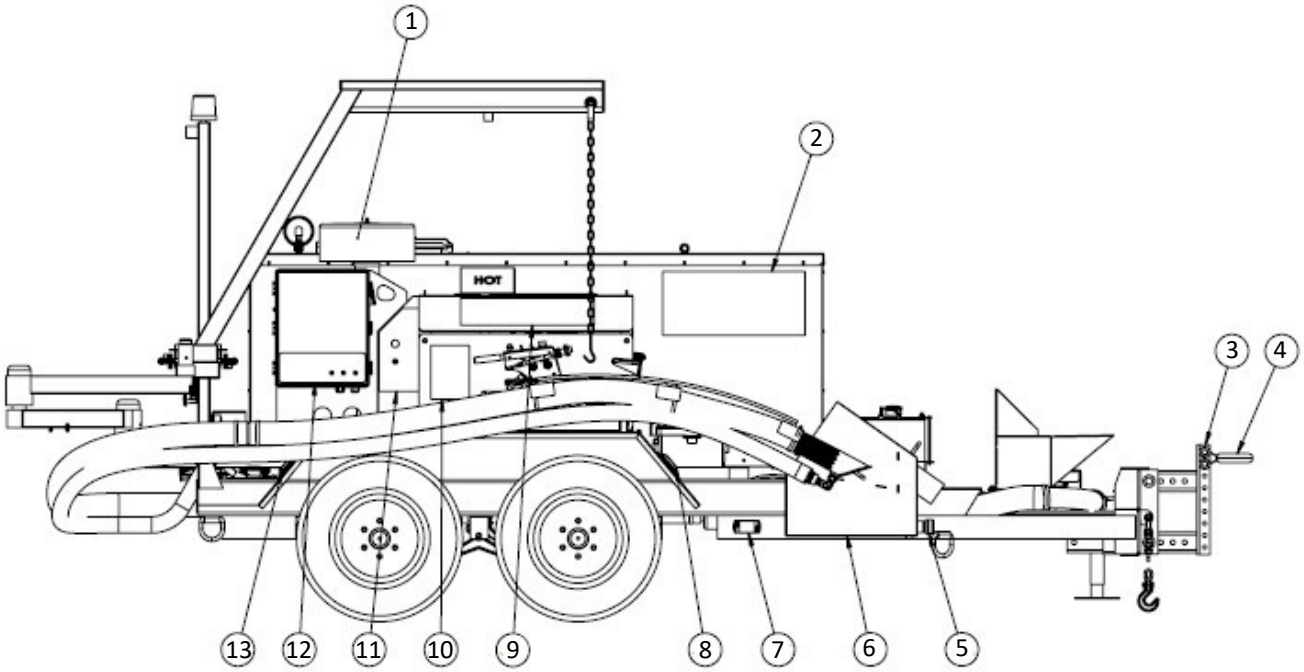
#	PART #	DESCRIPTION	QTY.
1	305-180-000	SPLASH AND BURN HAZARD LABEL	1
2	103677	AMBER LED STROBE LIGHT	1
3	161860	P1 BRAND DECAL	1
4	140654	LED MARKER LIGHT RED	2
5L	140663	LED LH TAIL LIGHT MODULE	1
5R	140664	LED RH TAIL LIGHT MODULE	1
6	140620	LICENSE PLATE LIGHT ASSEMBLY	1
7	305-178-000	PUMP VALVE DECAL	1
8	305-160-000	EMULSION INLET HOSE	1
9	172680	SOLVENT TANK BREATHER	1
10	155652	FUEL CAP	1
11	305-179-000	SOLVENT / DIESEL DECAL	1
12		CRUSH HAZARD DECAL	1
13	154327	BOOM LATCH	2
14	161861	WAND CONTROL DECAL	
15	140651	LED LIGHT BAR	1

Miscellaneous Components and Parts



ITEM #	PART #	DESCRIPTION	QTY.
1		KEEP HANDS OFF WARNING LABEL	1
2	409722	FUEL TANK	1
	305-179-000	UNLEADED FUEL ONLY DECAL	1
3	161860	P1 BRAND DECAL	1
4		MANHOLE BREATHER VENT	1
5	120971	2" PIPE PLUG	1
6	130592	THERMOMETER WITH 5" FACE	1
7	131001	FLAT MOUNT AMBER LED STROBE LIGHT	3
		FLAT MOUNT WHITE LED STROBE LIGHT	2
8	305-021-004	TANK OUTLET	1
9	120861	90 DEGREE ELBOW	1
10	120983	PIPE PLUG	1
11	305-119-000	HEATING BLANKET	1
12	131000	LED SIDE MARKER LIGHT ASSEMBLY	2
13	130595	THERMOSTAT W/ BOX	1
14	130607	THERMOSTAT POWER CORD	1
	130608	15A MALE S/O PLUG	1
15		CRUSH HAZARD DECAL	1
16		CRUSH HAZARD JACK DECAL	1
17	140753	JACK	1

Miscellaneous Components and Parts



#	PART #	DESCRIPTION	QTY.
1		CLEAN AIR FILTER LABEL	1
2	161860	P1 BRAND DECAL	1
3	406760	HITCH WELDMENT - DURAPATCHER	1
4	140617	PINTLE HITCH	1
5	172410	PIPE CAP	1
6	305-030-004	BLOWOUT TANK	1
7	131000	LED SIDE MARKER LIGHT ASSEMBLY	2
8	140655	LED MARKER LIGHT AMBER	2
9	305-171-000	P1 WARNING DECAL	1
10	305-170-000	P1 NOTICE DECAL	1
11	305-177-000	START UP DECAL	1
12	305-172-000	CONTROL PANEL DECAL	1
13	140654	LED MARKER LIGHT RED	1

Replacement Safety Labels

Inspect your labels and replace any damaged. Safety labels replaced free of charge. Contact your dealer to order replacement labels.

Operators Protection Decal

305-170-000

Splash and Burn Warning Decal

305-180-000

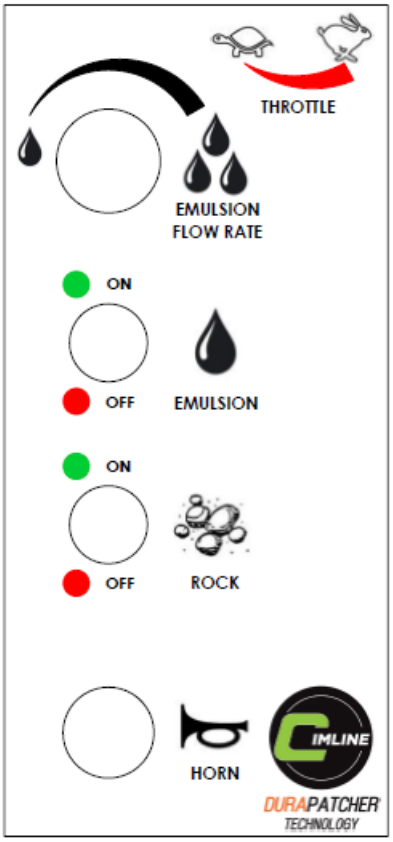
Dangerous Hazard Decal

305-171-000

Replacement Labels

Inspect your labels and replace any damaged. Contact your dealer to order replacement labels.

Wand Control Label 161861



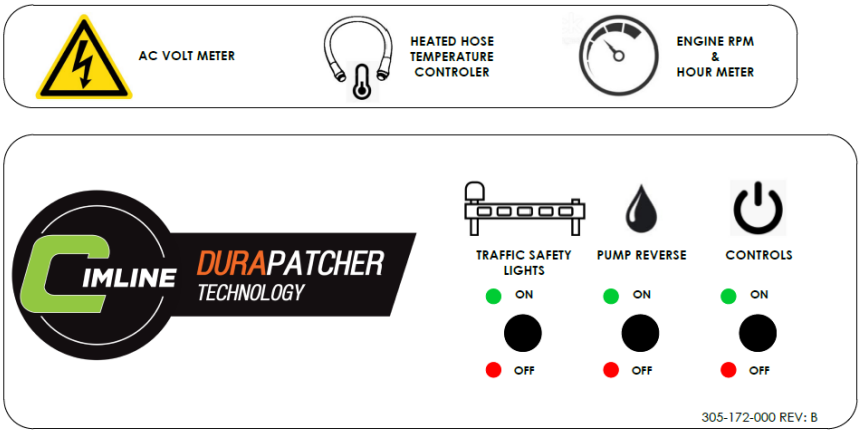
P1 Decal 161860

Replacement Labels

Inspect your labels and replace any damaged. Contact your dealer to order replacement labels.

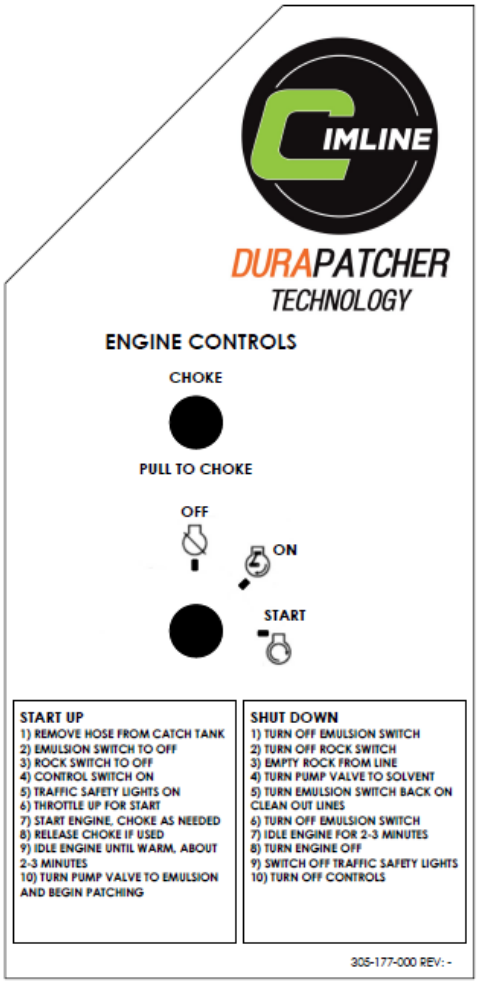
Control Panel Decals

305-170-000



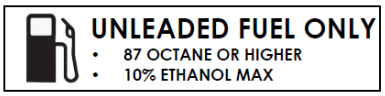
Engine Controls Decal

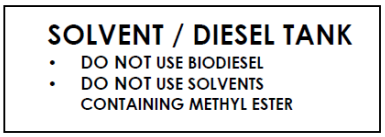
305-178-000



Fuel Type Labels

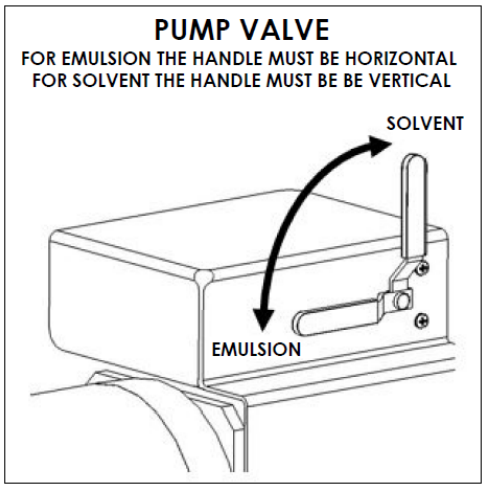
305-179-000



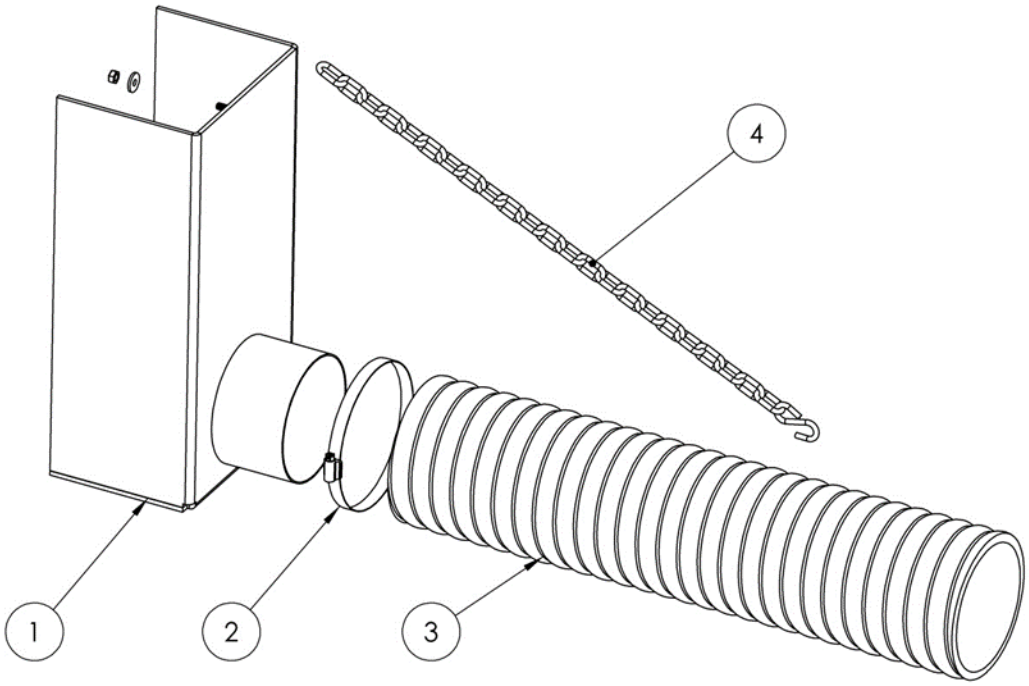


Pump Valve Decal

305-178-000



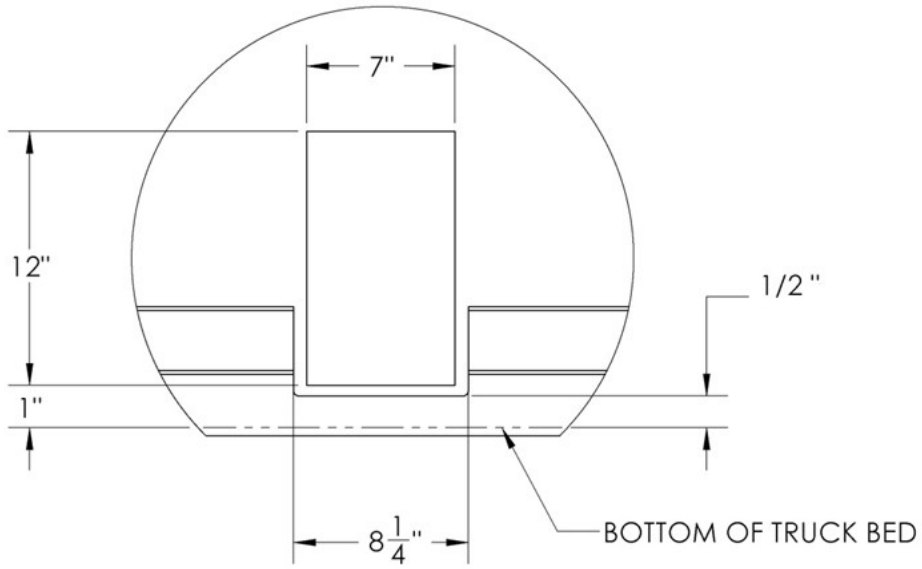
Tailgate Discharge Box Assembly



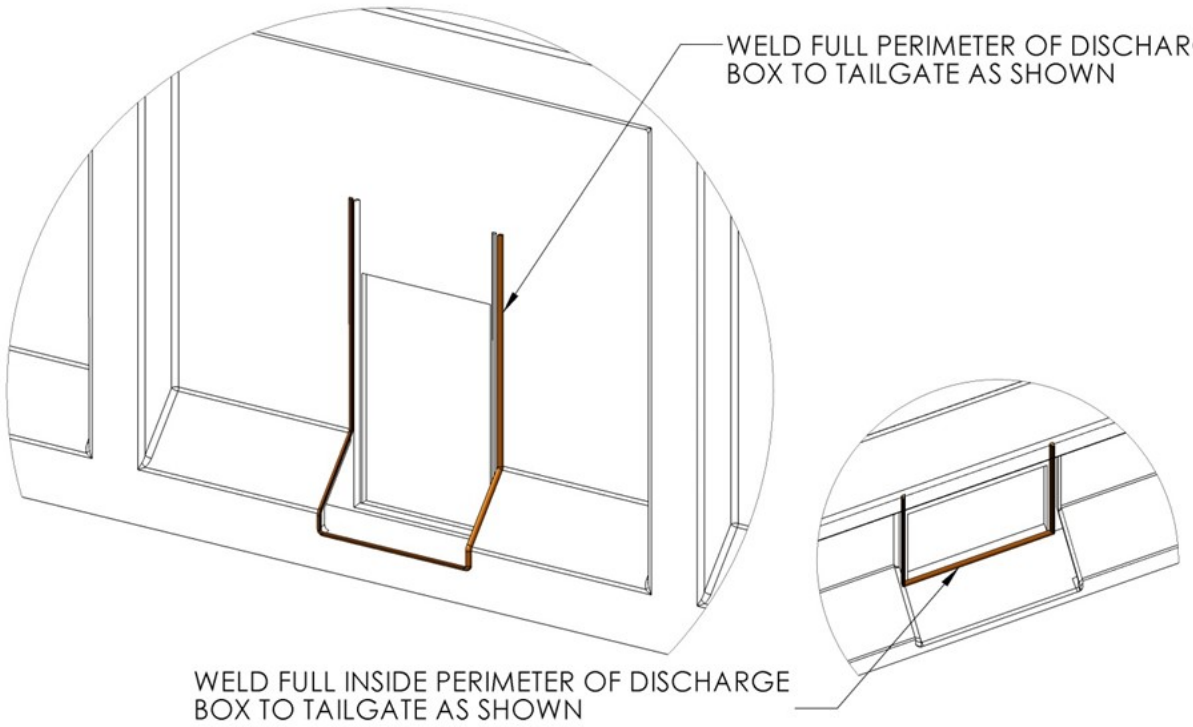
ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	407976	WELDMENT: TAILGATE BOX	1
2	101060	CLAMP, 3-1/8" TO 6"	1
3	155473	HOSE: TAILGATE	1
4	407977	ASM: TAILGATE BOX CHAIN	1

Tailgate Mounting Instructions

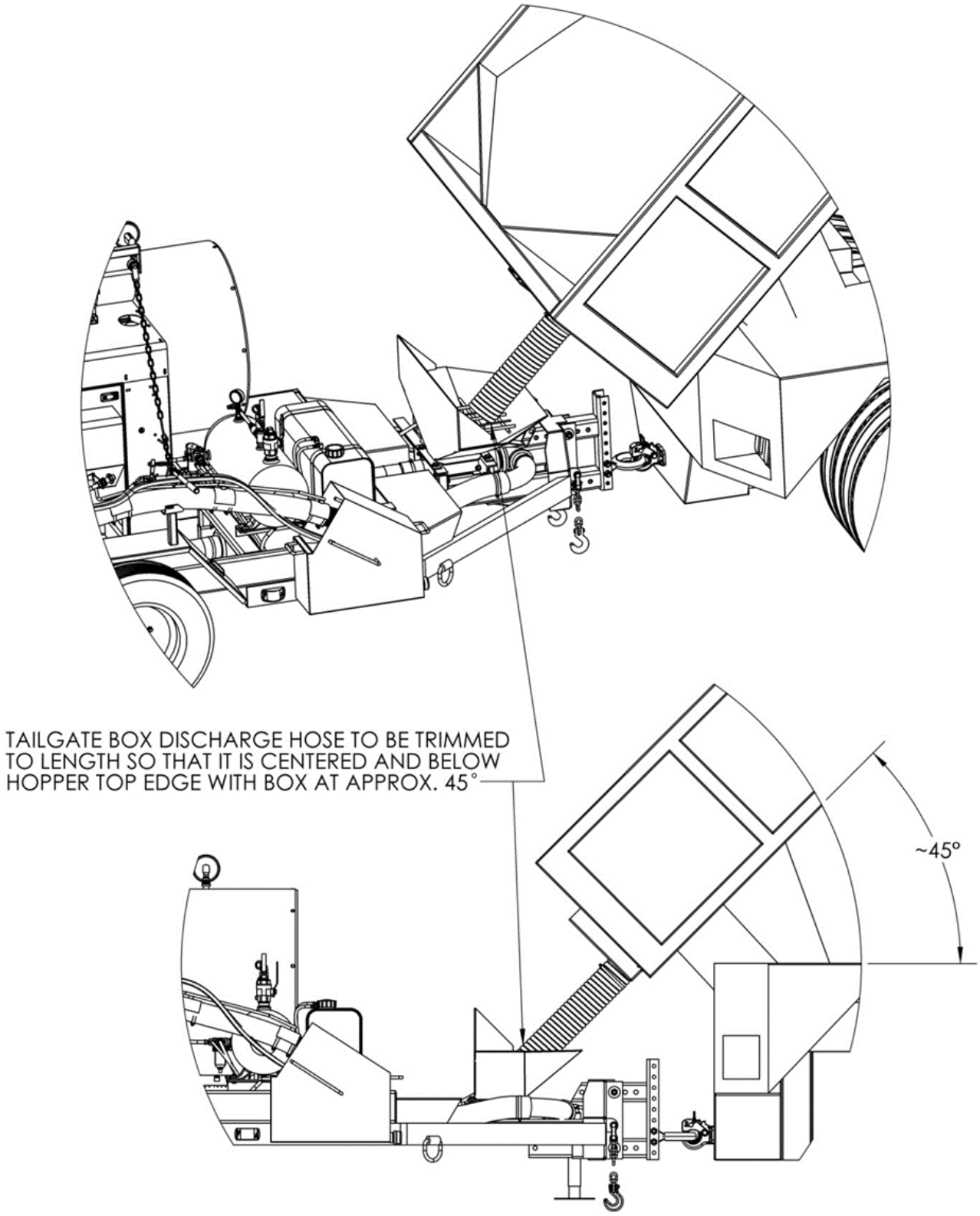
TAILGATE CUTOUT DETAIL



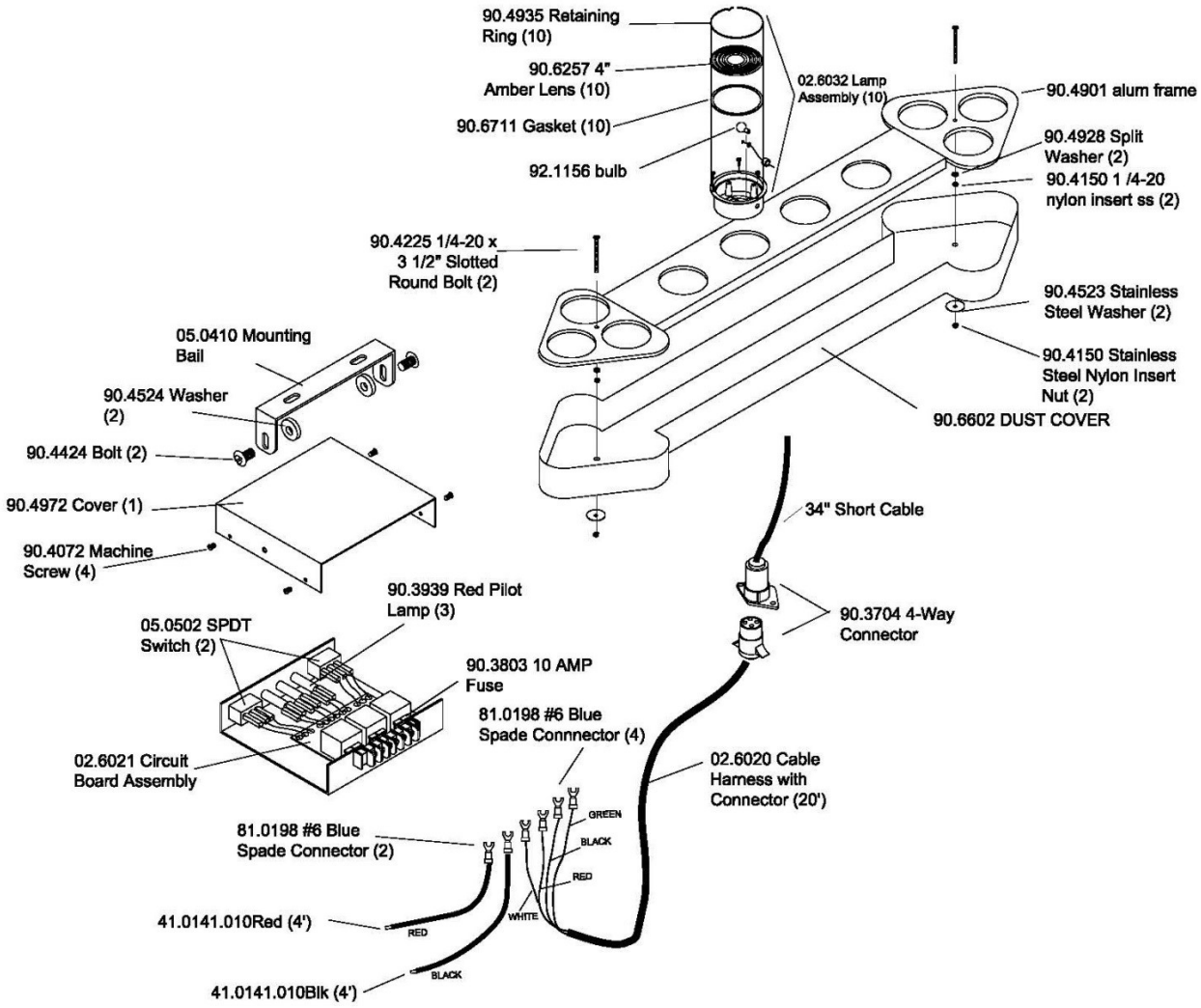
TAILGATE BOX WELDING DETAIL

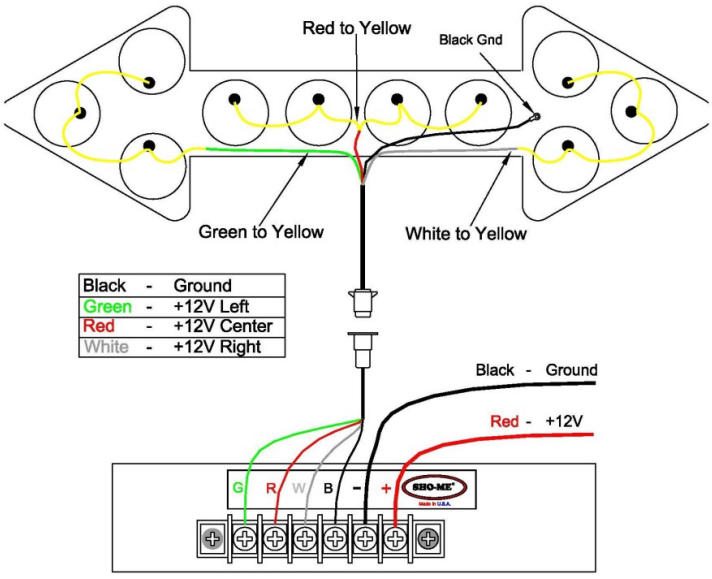


Tailgate Hose Length and Alignment



Optional Arrow Board Assembly





Trouble Shooting Section

Trouble Shooting the Engine

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

Trouble Shooting the Rock Gate

Issue	Causes	Solution
No Movement	No power to actuator	1. Confirm control panel power switch is “ON” 2. Check 30 amp fuse in the control panel box 3. Check to see if the battery is dead / dying 4. Make sure limit switches freely rotate (see solution for limit switch stuck in “OFF” position)
Moved in one direction with no further movement	Limit switch stuck in “OFF” position	1. Unplug the actuator to prevent any motion 2. Remove guard covering the switches 3. Clean out all dust an debris 4. Manually rotate the limit switch arms and confirm they spring back 5. Replace the guard and plug the actuator back in
	Jammed Gate	See solution for “Actuator “clicking” no movement”
	Toggle switch not making connections NOTICE: This can be an intermittent problem as a switch wears out	1. With control panel power on use a DC voltage tester and measure the voltage in both the open and closed toggle positions (see page 46) a. Green and Orange wires b. Blue and Orange wires c. Red and Black wires 2. If no voltage is present when measuring red and black wires see solution for “No Movement” 3. Replace switch if Blue & Orange or Green & Orange wires have no power in both positions
Actuator “clicking” at end of motion	Limit Switch(s) not properly aligned	See “Setting the Limit Switches” on Page 33
Actuator “clicking” no movement	Jammed Gate	1. Unplug the actuator to prevent any motion 2. Loosen the aggregate hopper 3. Remove the guard covering the switches 4. Remove all debris from the sliding gate tracks 5. Remove any large rocks from the aggregate hopper 6. Retighten aggregate hopper, replace the guard, and plug the actuator back in.

Trouble shooting pump start up

Issue	Causes	Solution
Pump motor does not turn at all	VFD not sending power to pump motor	Make sure Control is switched to “ON” Voltage is reading over 210 volts on the gauge Check that the breakers are ON and not tripped. • Red means live current (on) • Green indicated safe (off) Check VFD for error codes • See page 39 of this manual or refer to pages 108-113 of the Altivar 12 user manual Shut off the control panel and engine, removing the key from the ignition. Then manually attempt to rotate the pump in both directions to confirm the that the pump is not seized
Pump motor turns slightly then stops	Blockage in pump	To free the pump 1. Set pump valve to “Solution” 2. Allow emulsion hose to heat up to the material application temperature 3. Jog the pump motor forward and reverse a. Turn emulsion flow rate to max b. Turn on the emulsion switch c. After 5 seconds hold down the reverse switch for a 5 count and release d. Check to see if the pump frees up if not repeat step “c” as necessary. Turning off the emulsion switch after 60 seconds to prevent over heating motor and VFD. If after several attempts to free the pump have failed: Shut off the control panel and engine, removing the key from the ignition. Manually attempt to rotate the pump a few times in both directions to confirm pump is not seized

NOTICE

Running the pump in reverse or back flushing the lines may draw air into pump and inlet lines. This lowers the pumps suction and creates a void that needs to be cleared before material will flow

Trouble shooting pump start up, continued...

Issue	Causes	Solution
Pump freely turns but no material flowing out	Blocked / restricted flow through hose	1. Confirm solvent tank is full and lines are connected 2. Switch pump valve to solvent 3. Heat hose to material application temp 4. Turn the emulsion flow rate to max and run the pump for 30 seconds 5. If material is still not flowing try: a. reversing the pump for a count of 5, to see if back flushing the pump valve helps b. Keep the hose at material temp for about 10 minutes before retrying c. Turning off the pump and disconnect the emulsion hose from the discharge nozzle. Place the hose end in the drip bucket and turn the pump back on to see if the spray nozzle is plugged. If no flow is coming through the hose during step “5c” the functionality of the pump needs to be tested. Please contact customer service for assistance.
Pump only operates when set to solvent	Blocked / restricted flow through the inlet hose	1. Confirm emulsion tank is: a. Full enough for the days work b. Warm enough for the material freely flow c. Material is not cooked or otherwise solidified 2. Turn the pump valve to solvent and fill emulsion hose with solvent 3. Heat the solvent in the emulsion hose to the materials application temperature 4. Turn the pump valve to emulsion. Set the emulsion flow rate to about 1/4 and reverse the pump for a count of 5. 5. Let the solvent sit for about a minute and then turn the emulsion switch on. Repeat as needed.
Pump turns freely material only flows when in reverse	Pump motor wired backwards	1. Shut off the machine, remove the key from the ignition and open the control panel 2. Remove the terminal cover at the bottom of the VFD. 3. Swap the red and blue wire only! 4. Recover the terminals, close the control panel, and try again

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Cimline, Inc.
P1 Spray Patcher Product Warranty

1. Limited Warranty: For one (1) year from the purchase date Cimline warrants to the original purchaser that the goods purchased are free from defects in material or workmanship with the following exceptions:
2. The following items have a two (2) year limited warranty from the orginal purchased date:
    a. Heat Blanket and Thermostat
    b. Air Feed system EXCLUDING the feed pipe system of 11’8” discharge metal pipe and 16’4” discharge hose and nozzle, which is one (1) year.
    c. Blower
3. The following items have a three (3) year limited warranty from the orginal purchase date:
    a. Kohler 27hp engine
4. This Warranty does not apply to any part of the goods, which has been subject to improper or abnormal use, negligence, alteration, accident, or damage due to lack of maintenance.
5. Cimline will replace for the purchaser any part or parts found upon examination at the factory, to be defective under normal use and service due to the defects in material or workmanship.
6. Except as provided herein, no employer, agent, dealer, or other person is authorized to give any warranties of any nature on behalf of Cimline.

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