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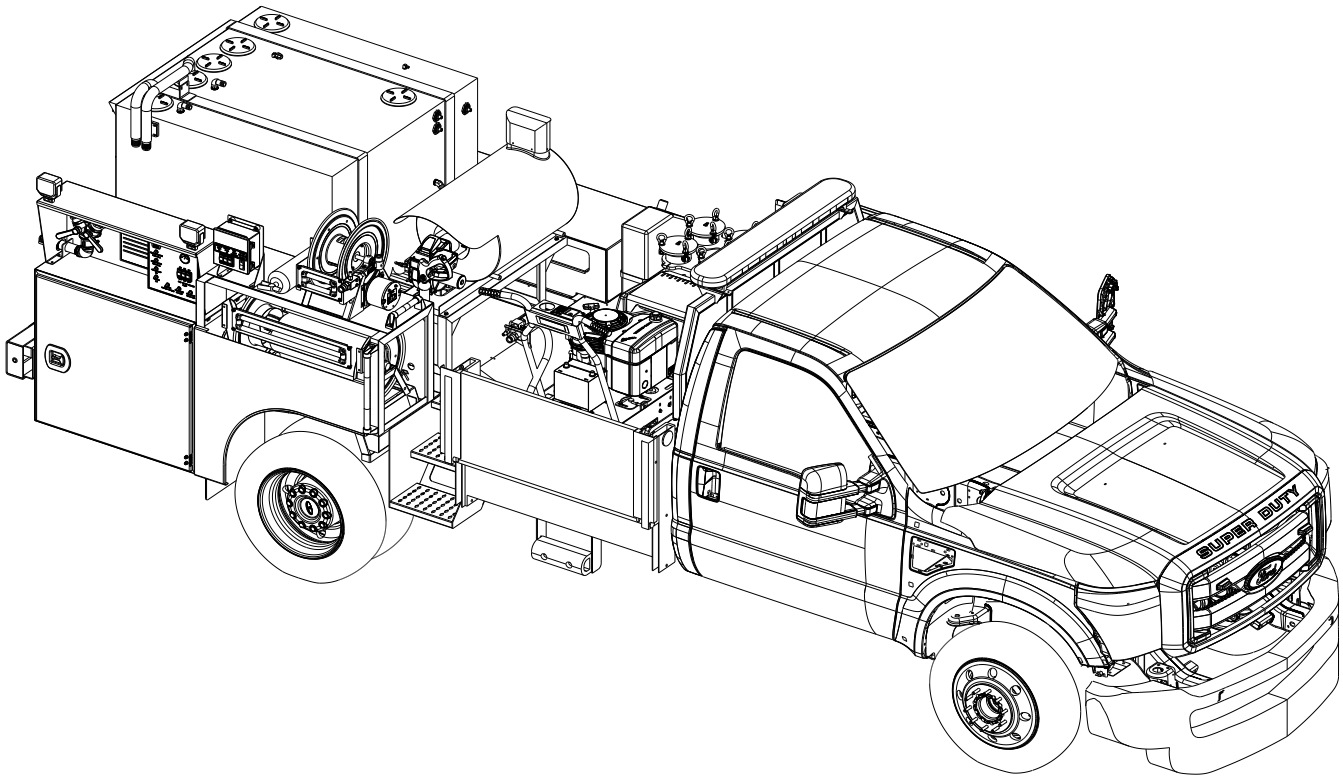
Bortek® INDUSTRIES, INC.

FIRST IN POWER CLEANING EQUIPMENT®



Cyclone CY5500SK

SERVICE MANUAL

Table of Contents

I. INTRODUCTION

SERVICE MANUAL PURPOSE

This manual contains the necessary information to properly service a CY5500SK. If while servicing, you experience technical difficulties a call to Cyclone Technology technical support may be needed to alert the factory to potential issues and/or provide the customer with an acceptable level of service. Contact Cyclone Technology Technical Support at **1-800-335-9695** or **info@cycloneclean**.

GENERAL MACHINE DESCRIPTION

The CY5500SK is a truck mounted hard surface cleaning system intended to work in conjunction with a CY210. The CY210 is a high-pressure walk behind Cyclone cleaning head with dual spray tips and instant water recovery. The CY5500SK uses the truck engine with hydrostatic capabilities and a high-pressure pump as well as the multistage water recycling system. It is fitted with a deck to both transport the CY210 and contain all the necessary components for the CY210 to operate.

WARNING!

The CY5500SK uses a combination of high pressure water and heat, to achieve a deep, long lasting clean. To avoid premature wear of critical components, such as the pressure pump and water recycling system, the CY5500SK should never be used in combination with any acids, alkalines, or abrasive fluids. The use of acids, alkalines, or abrasive fluids within the CY5500SK may result in permanent damage to critical components and could void the manufacturer's warranty. Before introducing any chemicals to the CY5500SK contact your local Cyclone Technology authorized dealer for further information.

PARTS AND SERVICE

Repairs should be performed by an Authorized Cyclone Technology Service Center that employs factory-trained service personnel and maintains an inventory of Cyclone Technology original replacement parts and accessories.

II. UNIT IDENTIFICATION

The Model Number and Serial Number of the machine are shown on the nameplate, see pictures below.

Copy the model number as well as the serial number in the provided space to reference when ordering parts through Cyclone Technology Technical Support.

CY5500SK SERIAL NUMBER _____

CY210 SERIAL NUMBER _____

This information is required when ordering repair parts for the machine or contacting Cyclone Technology Technical Support.

III. GENERAL INFORMATION

RECEIVING THE MACHINE

Upon receiving the CY5500SK, inspect the machine and all components for damages caused by transit. If damage has occurred, please contact Cyclone Technology customer service department.

GENERAL SAFETY INSTRUCTIONS

Specific Cautions and Warnings are included to warn you of potential danger of machine damage or bodily harm.

READ ALL INSTRUCTIONS BEFORE SERVICING

It is important that all instructions are read and understood to ensure not only the longevity of your CY5500SK but also to ensure your own safety when servicing your machine.

WARNING SYMBOLS

Cyclone Technology uses the symbols below to signal potentially dangerous conditions. Always read this information carefully and take the necessary steps to protect personnel and property.

DANGER!

THIS SYMBOL IS USED TO WARN OF IMMEDIATE HAZARDS THAT CAN CAUSE SEVERE PERSONAL INJURY OR DEATH.

- This machine emits exhaust gases (carbon monoxide) that can cause serious injury or death; always provide adequate ventilation when using machine.

WARNING!

THIS SYMBOL IS USED TO CALL ATTENTION TO A SITUATION THAT COULD CAUSE SEVERE PERSONAL INJURY.

- This machine shall be used only by properly trained and authorized persons.
- High speed operation is designed only for use on level surfaces.
- Turn the key switch off (O) and disconnect the batteries before servicing electrical components.
- Never work under a machine without safety blocks or stands to support the machine.
- Do not dispense flammable cleaning agents, operate the machine on or near these agents, or operate in areas where flammable liquids exist.
- Ear plugs, or other hearing protection devices are mandatory to avoid hearing damage or loss.

CAUTION!

THIS SYMBOL IS USED TO CALL ATTENTION TO A SITUTION THAT COULD CAUSE MINOR PERSONAL INJURY OR DAMAGE TO THE MACHINE OR OTHER PROPERTY.

- This machine is only approved for hard surface use.
- When operating this machine, ensure that third parties are not endangered.
- Before performing any service function, carefully read all instructions pertaining to that function.
- Do not leave the machine unattended without first turning the key switch off (O), removing the key and chocking the wheels.
- Turn the key switch off (O) and remove the key before opening the electrical control box.
- Take precautions to prevent hair, jewelry, or loose clothing from becoming caught in moving parts.
- Before use, all hoses and drain plugs must be secure.

NOTES:

- Pay attention to all decals and labels on this machine.
- If you have any questions, contact your supervisor or your local Cyclone Technology Dealer.
- Should your machine malfunction, do not attempt to correct the problem without proper authorization. Only a trained company mechanic or an authorized Cyclone Technology dealer service person shall make repairs to this equipment.
- Reference the separately provided engine manufacturer's maintenance and operator manuals for more detailed engine specification and service data.

IV. SAFETY RECOMENDATIONS

STANDARD PRACTICES AND PROCEDURES

This information was prepared to aid in the identification of potentially unsafe conditions when servicing high-pressure washing equipment. These practices describe how to service high-pressure water jets for cleaning hard surfaces. These practices do NOT replace the training necessary to operate and maintain high-pressure water jet systems. It should be noted that other potential hazards might exist which have not been mentioned in this manual.

BEFORE OPERATING EQUIPMENT

Before operation of this equipment, it is important that you read the Operator's/ Owner's Manual for each of the component parts installed in your machine. It is especially important to read and understand the safety information included in the manuals. Failure to do so could result in damage to the equipment, serious injury or death to the operator and may void all warranties associated with this equipment.

WARNING!

This equipment has:
MOVING PARTS at HIGH RATES OF SPEED
VERY HOT WATER
HIGH PRESSURE WATER
DIESEL FUEL
PINCH POINTS
HIGH PRESSURE HYDRAULICS

In all cases, Cyclone Technology products are sold with the understanding that the purchaser agrees to thoroughly train all operating and maintenance personnel in the correct and safe operation and maintenance of the cyclone system.

Do **NOT** attempt to change Original Equipment Manufacturer (OEM) parts or equipment. Use of non-OEM parts could result in damage to the equipment, serious injury or death to the operator and may void all warranties associated with this equipment.

EQUIPMENT & CLOTHING

1. Ear plugs, or other hearing protection devices are mandatory. The engines, pumps, and Cyclone Cleaning Head all produce noise levels high enough to cause hearing damage or loss.
2. Leather gloves should always be worn during operation. The water heater components of the Cyclone system use 160°F water. High-pressure and return hoses and couplings can get hot enough to burn you.
3. Safety glasses should be worn when operating the Cyclone System.
4. Long pants are recommended when operating the Cyclone System.

STANDARD PRACTICES AND PROCEDURES

1. Never leave the CY5500SK/CY210 engine running unattended.
2. A strong vacuum is formed from the rotation of the Cyclone cleaning head. Therefore, all surface plates such as manhole covers, utility access covers and large debris must be secured, removed or avoided during the cleaning process.
3. All surfaces should be swept of loose debris prior to operating the CY210, hard surface cleaner, the CY210 is not designed to pick up particulates.

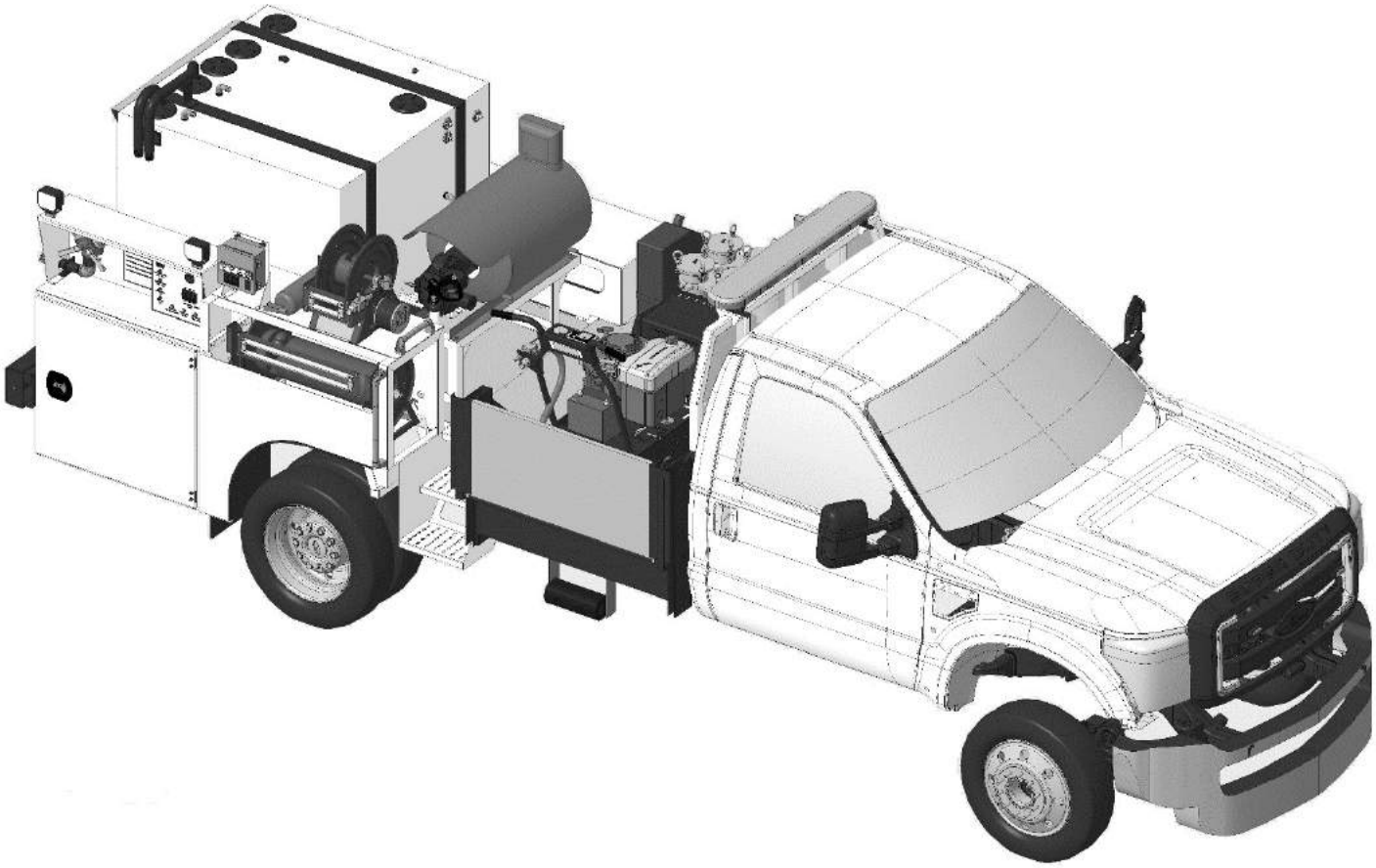
WARNING!

Ingestion of large foreign objects into the CY210 may cause extensive and costly damage to the blades and spray bars and serious injury or death to the operator.

4. Always turn off the engine before fueling.
5. Never point the hand-held spray gun at yourself or another person. Water coming out of the gun is at a high enough pressure to cause injury or death.
6. This equipment should not be used without consulting all applicable standards, guidelines, or recommendations of the United States Occupational Safety and Health Administration (OSHA), the American Society of Testing Materials (ATSM), the National Standards Institute (ANSI), and the instructions, recommendations and standards of Cyclone Technology. Cyclone Technology does not guarantee that the practices and recommendations contained in this manual will prevent harm or injury, even when such equipment is properly used in conformity with the recommended practices. In the event of bodily injury, nothing in this manual should substitute for proper medical care.

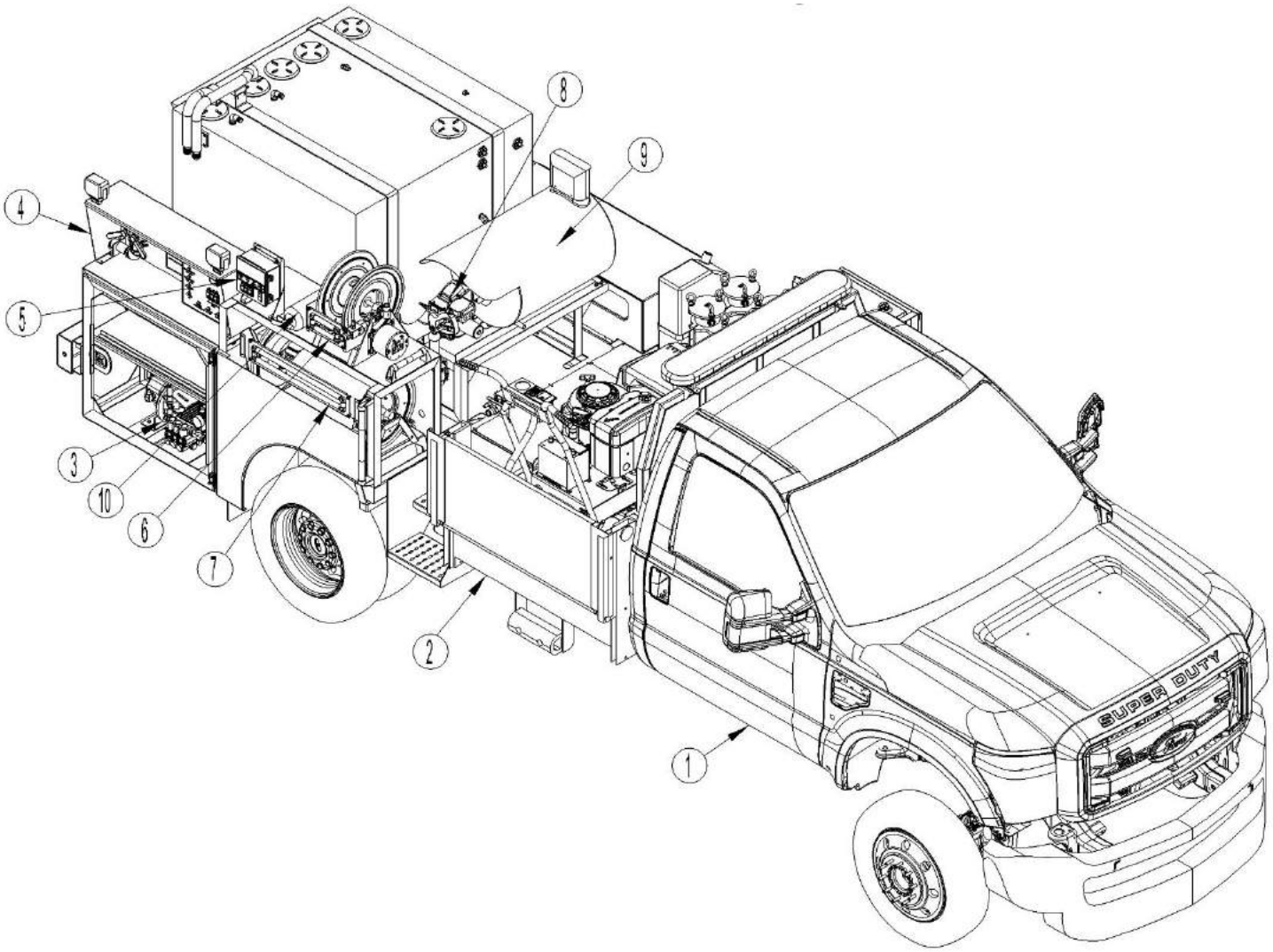
V. KNOW YOUR MACHINE

As you read through this manual, you will occasionally run across a bold number or letter in parenthesis, i.e. **(2)**. These numbers refer to an item shown on these pages unless otherwise noted. Refer to these pages whenever necessary to pinpoint the location of an item mentioned in the text. **NOTE:** Refer to the service section of this manual for detailed explanations of each item illustrated on these pages.



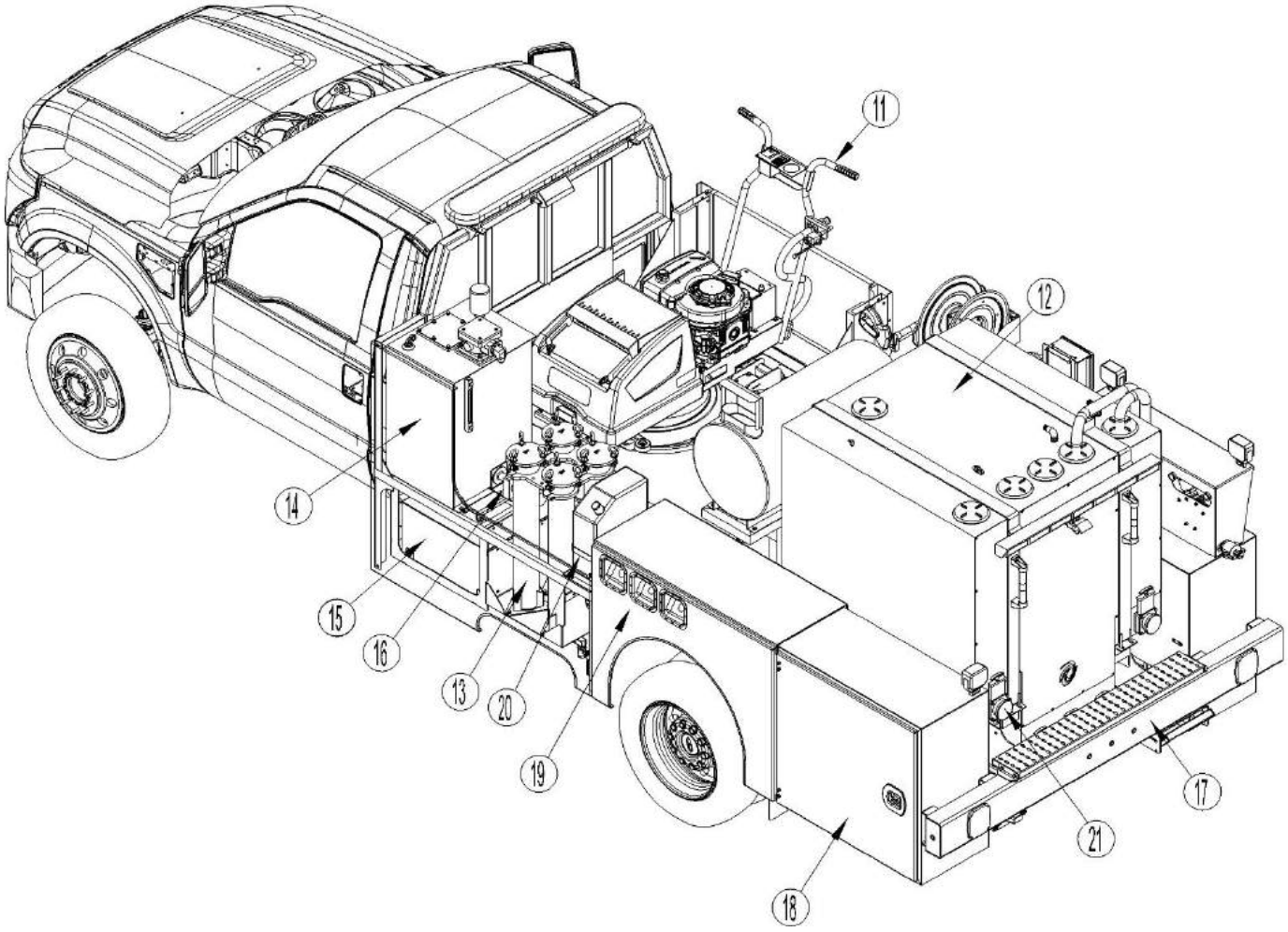
i. Curbside Overview

1. Ford F-450
2. Liftgate Ramp
3. Water Pump Assembly
4. Main Operation Controls
5. Auxiliary Controls
6. High Pressure Supply Hose Reel
7. Low Pressure Return Hose Reel
8. Diesel Fired Burner
9. Burner Coil
10. Fire Extinguisher



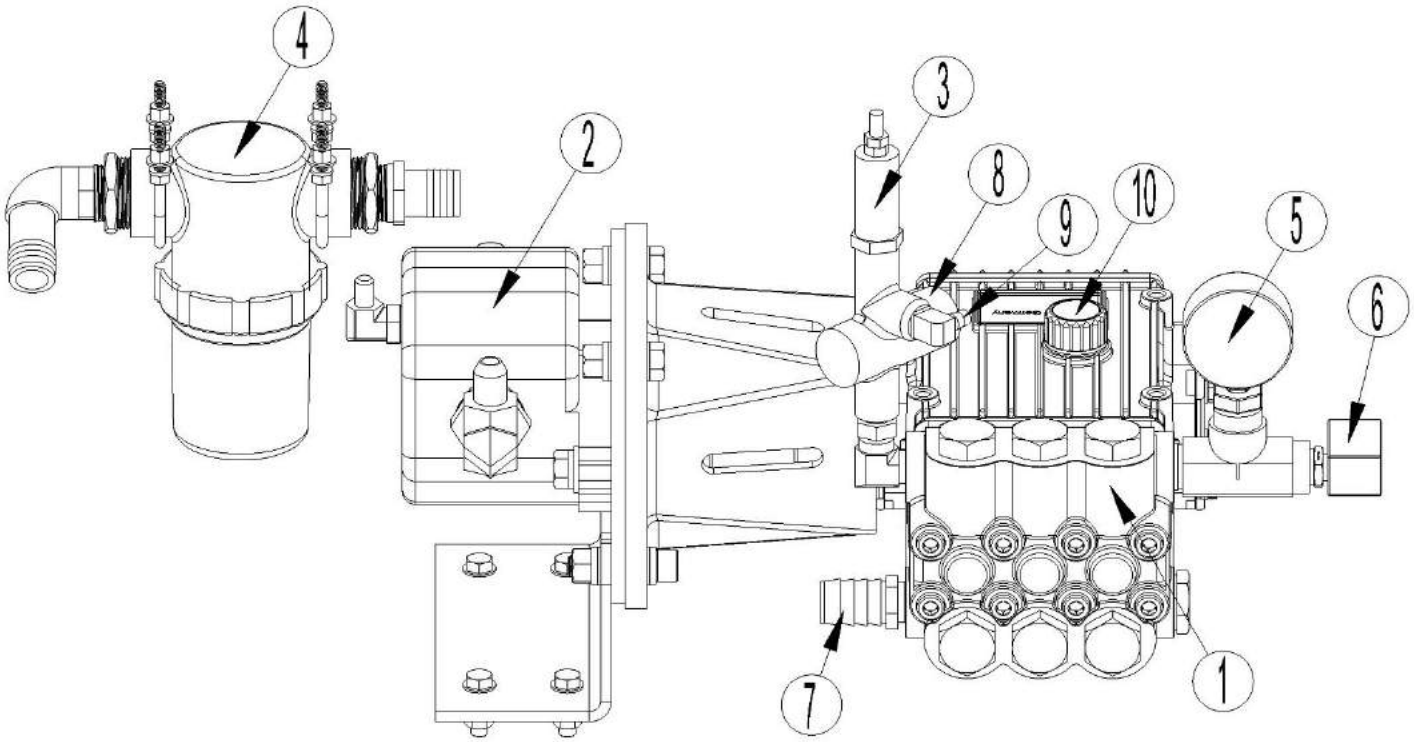
ii. Roadside overview

11. CY210 Walk Behind Cleaning Unit
12. Fresh/ Reclaim Water Tank
13. 30/75 Micron Filter Array
14. Hydraulic Tank
15. Auxiliary Diesel Fuel Tank
16. Cable Winch
17. Rear Bumper
18. Roadside Storage Box
19. Fuel Fill Location
20. Portable Diesel Fuel Tank
21. Drain Valves



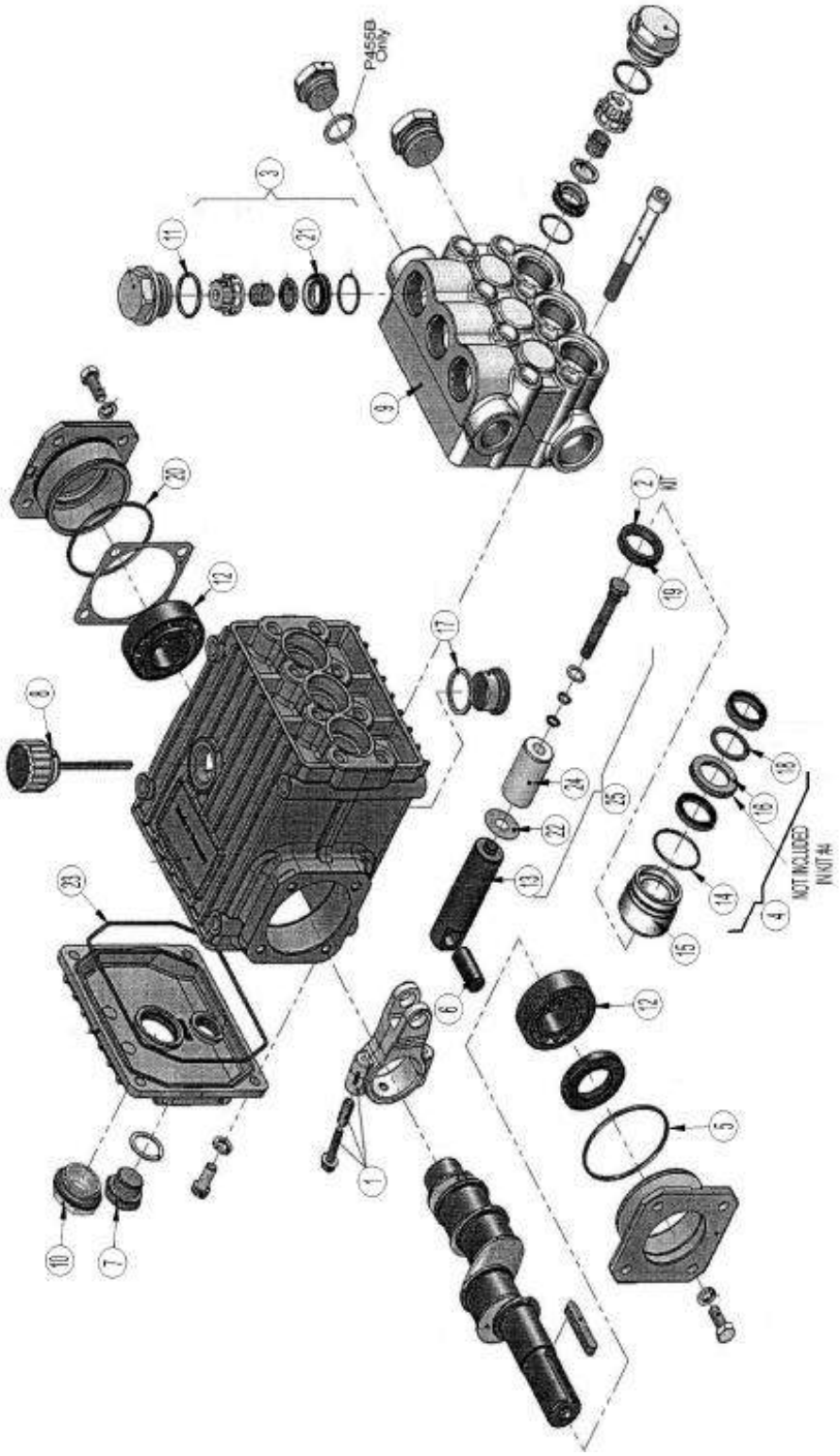
iii. Water Pump Assembly

1. High Pressure Water Pump
2. Hydraulic Motor
3. Unloader Valve
4. Pre-Filter Assembly
5. Analog Pressure Gauge
6. Pressure Switch for Heater Control
7. Low Pressure Supply Line Input
8. High Pressure Output
9. Unloader Bypass Outlet
10. Oil Fill Cap/Dip Stick



VI. WATER PUMP

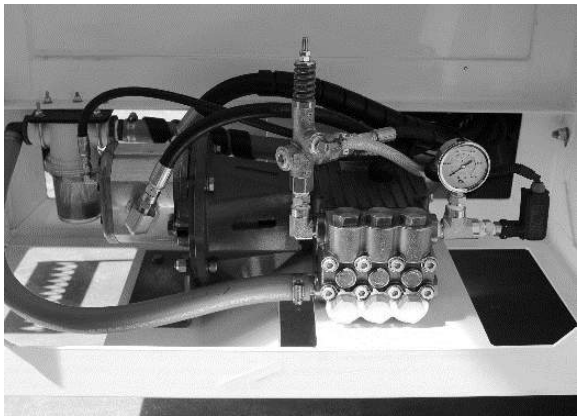
The high-pressure water pump on the CY5500SK is a hydraulically driven, triple-piston style pump. This pump is rated at 3600 psi (250 bar) at 6.6 GPM (25 LPM). Knowledge of operation and maintenance of this pump are critical to ensure proper operation and long pump life.



Item	Ref. No.	Qty.	Description
1	112-0701001-01	3	Connecting Rod
2	116-4500016-01	1	Kit, Oil Seal
3	116-4500017-01	1	Discharge Valve Kit
4	116-4500018-01	1	Plunger Packing Kit
5	116-4506009-0	1	Seal, Radial Shaft Seal
6	204-2500022-01	3	Crosshead Pin
7	216-0802016-04	1	Oil Drain Plug
8	216-0814003-01	1	Plug, Oil Fill W/Gasket, Pump
9	226-0600003-01	1	Pump Pressure Manifold
10	228-0100039-01	1	Oil Sight Glass W/ Gasket
11	228-0100058-01	6	O-Ring
12	228-0100058-02	2	Tapered Roller Bearing
13	228-0100059-02	3	Plunger, Base
14	228-0100069-01	3	O-Ring
15	228-1800001-01	3	Seal Casing
16	228-2000007-04	3	Seal, Weep Return Ring
17	228-2000010-01	1	Oil Drain Plug Gasket
18	228-2000012-01	3	Pressure Ring
19	228-2000017-01	3	Seal, Oil, Casing
20	228-2000033-01	2	O-Ring, Bearing Cover
21	228-2000034-01	6	Valve, Seat
22	228-2400003-01	3	Oil Slinger
23	228-2500005-01	1	O-Ring, Rear Oil Cover
24	242-0226006-01	3	Plunger Assy., 18mm
25	242-0413001-01	3	Plunger Pipe, Ceramic

i. Pump Pressure

The CY5500SK's pump drive is operated at a fixed speed, between 1100-1200 rpm. In turn, the output flow of the water pump is fixed. At this fixed flow rate, the size of the spray tips on the CY210 head and/or hand wand will determine the resulting system pressure. These tips can be exchanged to change the operational pressure of the pump to suit the user's desired pressure goal, however only discretely. It is important to know how tips of different sizes can affect the pressure output of the machine when conducting a service analysis. In the following tables, expected values of pressure are given for various sizes of spray tips:



CY210 (two of each tip)		Wand Tip (single tip)	
Tip Size (GPM)	Approx. Resulting Pressure (psi)	Tips Size (GPM)	Approx. Resulting Pressure (psi)
3.0	3600	6	3600
3.5	2700	6.5	3100
4.0	2000	7	2700
4.5	1600	7.5	2300
5.0	1300	8	2000
5.5	1100	8.5	1800
6	900	9	1600

Please remember that the pressure values given here are approximated. Many parameters can affect the output pressure of the system.

ii. Pump Control:

The high-pressure pump is primarily controlled by a hydraulic valve on the valve manifold under the machine. A control signal must make it to the manifold for the pump to turn on. If the pump is not turning on with the pump switch on the main control box, check the following:

1. *The machine is in PTO mode*. Remember that the parking brake and the "Clean Mode" switch in the cab of the truck must be on. In addition, the "PTO" and "Water Pump" switches must be thrown on the main control panel. When the PTO is successfully running the truck's engine idle will increase to at least 1100 rpm.
2. *The machine has water in the fresh water tanks.* A water level sensor is used to monitor this in Fresh #2. When the water level is sufficient for the pump to run, there will be electrical continuity through the sensor. Note that when the water level is below the required level, the "Service Water/Filters" light on the main control panel will illuminate.
3. *The high-water level sensor is not activated.* When the machine cannot recycle water faster than it is reclaiming it (i.e. the filters are dirty) a sensor in Reclaim #3 (second sensor from the top) will shut the water pump down. This sensor will show no continuity when the water level is too high. When this happens the "Service Water/Filters" light on the main control panel will illuminate.
4. *There is a problem with the hydraulics.* If there is a problem with the hydraulic system, the pump will be affected. Any in-depth hydraulic diagnosis should be done by a qualified Cyclone repair technician.

WARNING!

Changing or bypassing any of the automatic shutoffs, will void all manufacturer warranties.

iii. Pressure Pump Quick Reference Trouble Shooting

DROP IN OUTPUT PRESSURE: If the CY5500SK experiences a drop in its desired operational pressure, check/do the following:

1. Change the spray tips. Make sure that the spray tip sizes match the table above for the desired system pressure.
2. Inspect the rotating union for any leaks, replace seals if necessary (see CY210 Service Manual).
3. Inspect all the high-pressure lines, fittings and connections, looking for any water leakage.

Once you have ruled out the pressure tips, rotating union, and pressure lines you may begin to inspect the pressure pump. The pressure pump is made up of a series of chambers containing seals, check valves and plungers. The damage to, or failure of, any one of these components could result in a pressure drop.

WATER LEAKING FROM PUMP: Water tightness is paramount for the proper performance of the pressure system; even a small water leak can result in a significant drop in pressure. If there is water leaking from in-between the brass head of the pump and the case, it is most likely the result of a failure in the pump seals.

SPIKE IN PRESSURE: The CY5500SK is designed to operate up to a maximum of 3600psi. If a spike in the output pressure above this range occurs, it is most commonly the result of a blockage in the spray tips. Remove the spray tips from the head and replace. When replacing tips, be sure to wrap the threads of the spray tip with a minimum of 5 wraps of Teflon tape. Tips should be installed so that the fan pattern in the tip lines up with the spray bar.

WARNING!

The CY5500SK should never be used in combination with any acids, alkalines, or abrasive fluids. The use of acids, alkalines, or abrasive fluids within the CY5500SKmay result in permanent damage to critical components and may void the manufacturer's warranty. Before introducing any chemicals to the CY5500SK contact your local Cyclone Technology authorized dealer for further information.

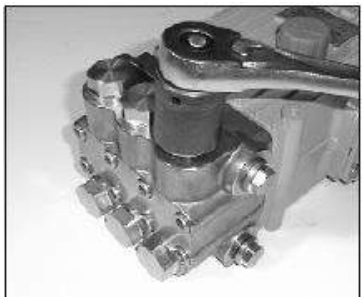
iv. Pressure Pump Maintenance

PUMP OIL: The pressure pump oil should be changed at **50 hours** and at every **500 hours** thereafter. Only use **fully synthetic 20W50** oil in the high-pressure pump, and never overfill the case. The oil level should always be maintained within the red dot on the sight glass. Estimated capacity is 0.95 quarts/ 0.9L.

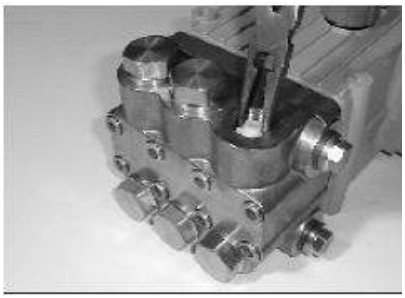
Preventative Maintenance Check List

Check	Daily	Weekly	50 hrs	Every 500 hrs	Every 1500 hrs	Every 3000 hrs
Oil Level/Quality	X					
Oil Leaks	X					
Water Leaks	X					
Belts, Pulley		X				
Plumbing					X	
Oil Change (1 quart) SAE 20W-50 (253-0200003-01)			X	X		
Seal Spare Parts (1 kit/pump)				X	X	
Oil Seal Kit (1 kit/pump)					X	
Valve Spare Parts (1 kit/pump)				X		

v. General Water Pump Repair Instructions

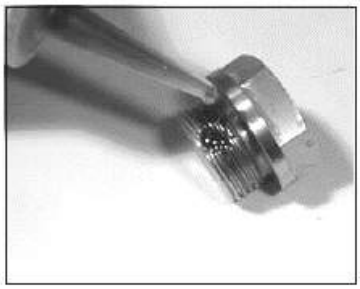


1) With a socket wrench, remove the three discharge valve plugs and three inlet valve plugs. Inspect the O-ring for wear and replace if damaged.

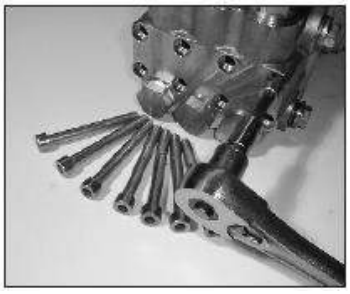


2) Using needle nose pliers, remove the inlet and discharge valve assemblies. Note: It may become necessary to remove the valve seat from the valve casing using a slide hammer.

3) By inserting a small screwdriver between the valve seat and the valve spring retainer, the valve assembly can be separated.



4) Remove the O-ring. Inspect all parts for wear and replace as necessary. Apply one drop of Loctite 243 to the valve plugs and tighten to 107 ft. lbs. (145 Nm).



5) Use an 8mm Allen wrench to remove the 8 socket head cap screws. Carefully slide the valve casing out over the plungers.

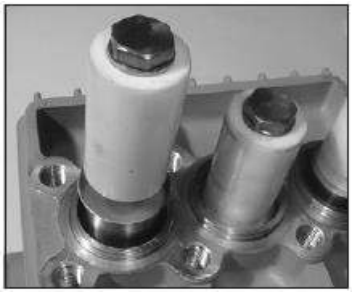
6) Remove seal adaptors and weep return rings from the valve casing.

7) Remove the pressure rings and v-sleeves from the valve casing.

8) Remove the weep grooved seal out of the seal adaptor. Check O-rings.

CAUTION!

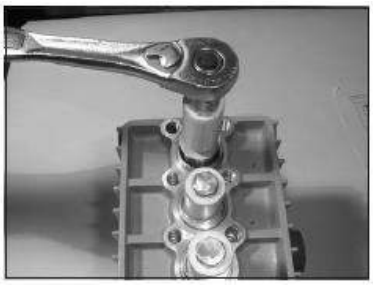
The grooved seal. On the high-pressure side is to be fitted carefully into the valve casing using a screwdriver. Under no circumstances must the seal surface in the valve casing or the seal lip be damaged.



9) Check surfaces of plunger. Damaged surfaces cause accelerated seal wear. Deposits of all kinds must be removed from the plungers.

IMPORTANT! Plunger surfaces are not to be damaged. If there are lime deposits in the pump, care must be taken that the drip-return bore in parts and ensure trouble-free drip-return.

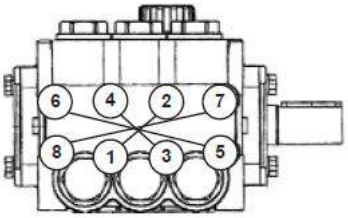
11) After installation of high pressure seals, place seal adaptor with weep seals & pressure ring installed, weep return ring and high-pressure weep return ring over plungers. Slide valve casing over plungers and seat firmly. Replace the 8 socket head cap screws and tighten to 30 ft.-lbs. (40 Nm) in a crossing pattern (as shown to the right).



10) If the plunger pipe is worn, remove tension screw and remove along with plunger pipe. Check and clean plunger surface, check oil scraper. Cover thread of tension screw with a thin film of Loctite and tighten carefully to 21 ft.-lbs. (28 Nm).

CAUTION!

IMPORTANT! Care must be taken that glue does not get between the plunger pipe and centering sleeve. The plunger pipe should not be strained by eccentric tightening of the tension screw or through damage to front surface of plunger, otherwise it is liable to fracture.



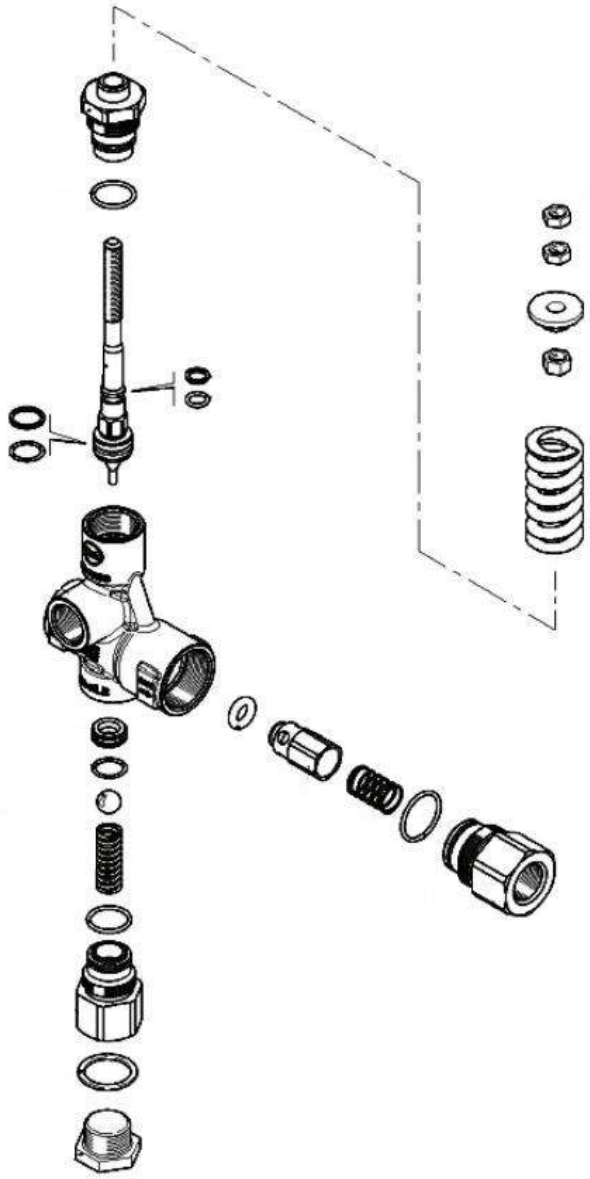
TORQUE SPECIFICATIONS

Description	U.S.	Metric
Connecting Rod Screw	97 in.-lbs.	11 Nm
Plunger Tension Screw	248 in.-lbs.	28 Nm
Plug	107 ft.-lbs.	145 Nm
Cap Screw	30 ft.-lbs.	40 Nm

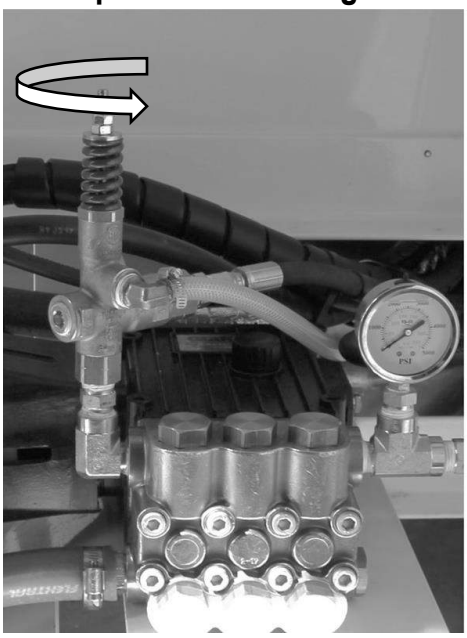
vi. Troubleshooting

Symptom	Possible Causes	Recommended Action
The Pressure and/or the Delivery Drops	• Worn packing seals • Broken valve spring • Worn or Damaged nozzle(s) • Fouled discharge valve • Fouled inlet Strainer • Worn or damaged hose • Worn or Plugged relief valve pump • Cavitation • Unloader malfunction	• Replace packing seals • Replace spring • Replace nozzle(s) • Clean valve assembly • Clean strainer • Repair/Replace hose • Clean, Reset, and Replace worn parts • Check suction lines on inlet pump for restrictions • Check for proper operation
Water in crankcase	• High humidity • Worn seals	• Increase oil change interval • Replace seals
Noisy Operation	• Worn bearings • Cavitation	• Replace bearings, Refill crankcase oil with recommended lubricant • Check inlet lines for restrictions and/or proper sizing
Rough/Pulsating Operation with Pressure Drop	• Worn packing • Inlet restriction • Unloader • Cavitation • Valves • Worn/ Cracked Plunger	• Replace packing • Check system for stoppage, air leaks, correctly sized inlet plumbing to pump • Check for proper unloader operation • Check inlet lines for restrictions
Excessive Leakage	• Worn/Cracked plungers • Worn packing/seals • Excessive vacuum	• Replace plungers • Adjust or Replace packing seals
High Crankcase Temperature	• Wrong Grade of oil • Improper amount of oil in crankcase	• SAE 20W-50 is recommended (PN:253-0200003-01) • Adjust oil level to proper amount

VII. UNLOADER VALVE



i. Operation & Setting



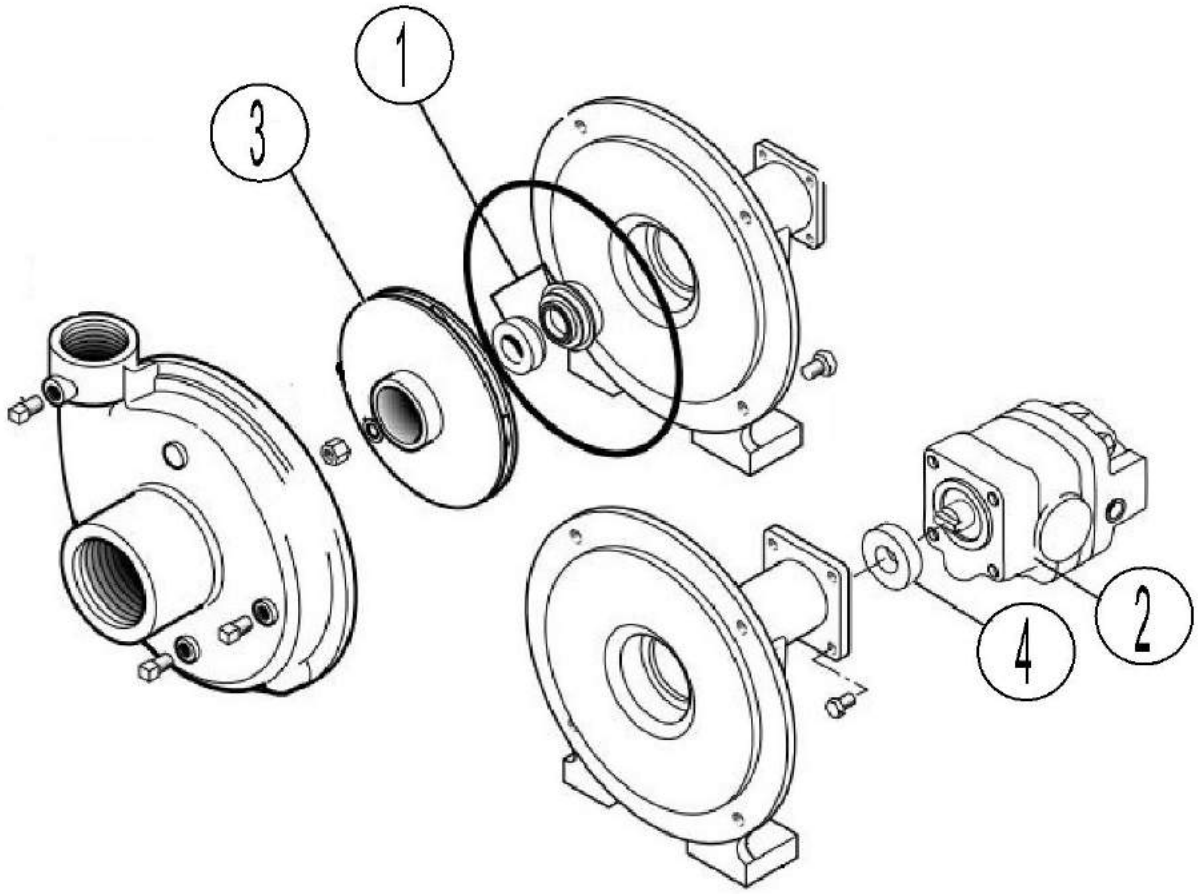
The unloader valve functions as a safety valve/pressure regulator for the high-pressure pump. When the system pressure exceeds the pre-set value of the unloader valve, water is redirected at a safe pressure to prevent the buildup of excessive pressure within the system. This process of bypassing water is referred to as "cycling".

The unloader valve is preset to manufacturer specifications to function at the maximum possible pump pressure. If a lower cycling pressure is desired, you must turn the jam nut on top of the unloader counterclockwise. It should be noted that continually cycling water through the unloader valve will decrease the life expectancy of the part. A properly set unloader will be set at a pressure approximately 10% above the highest desired system pressure of the machine (3600 psi max possible for CY5500SK). To set the unloader valve:

1. Determine highest desired system pressure and ensure proper spray tips are installed. Ex: 3600 psi
2. Determine target unloader cycling pressure. Ex: 10% higher than 3600 psi ~ 4000psi.
3. Turn unloader adjustment nut counterclockwise to back off the cycling pressure.
4. Start machine and turn on water pump.
5. Turn unloader adjustment nut clockwise to increase cycling pressure. Notice how much the pressure is increased on the water pump pressure gauge per turn of the adjustment nut.
6. Adjust the unloader until the desired system pressure is achieved.
7. Once desired pressure is achieved, turn the adjustment nut a bit more to target the cycling pressure using the adjustment/pressure increase ratio observed in Step 5.
8. Lock the setting of the unloader by tightening the jam nut against the adjustment nut. Be sure to hold the adjustment nut in place when doing this so that the cycling pressure setting is not altered.

Please note that lowering the continuous output pressure of the system must be achieved by matching the proper spray tips, not by adjusting the unloader. For a list of expected output system pressures vs. spray tip size, please consult the tables in the "Water Pump" Section on page 15.

VIII. FILTER PUMP



Item	Ref. No.	Qty.	Description
1	116-0000037-01	1	Kit, Shaft Seal
2	214-0400028-01	1	Motor-Hyd
3	266-0100004-01	1	Impeller-Valox, Keyway
4	228-2000027-01	1	Seal Support Spacer

i. Operation

The filter pump is driven by a hydraulic motor which engages and disengages as the water level in the reclaim tanks rises and falls. This process is controlled by a float switch located in reclaim tank #3. As the level of reclaimed water reaches a predetermined height, the float switch commands a hydraulic valve to activate this pump. Upon activation, the filter pump will pull water from the reclaim tanks, pump it through the 75 and 30-micron filters and then deposits the filtered water into Fresh #1. The described action is automatic. It requires no input from the operator during the normal cleaning procedure.

ii. Trouble Shooting the Filter Pump

To turn the filter pump on:

1. Fill the reclaim tanks to the top.
2. Set the parking brake.
3. Turn on the "CLEAN MODE" switch in the cab.
4. Turn on the "PTO" switch on the main control box.

Once these conditions are met, the filter pump should start moving water from Reclaim #3, through the filters and into the top of Fresh #1 until the float switch shuts it off. Note that the truck's engine should be in high rpm mode at this point (~1300rpm) and the green "Filter Pump ON" light is illuminated on the main control panel.

If the filter pump still does not move any water into Fresh #1 check the following:

1. Check filters to see if they are clean. If the filters are too dirty, the filter pump will not be able to move any water through them.
2. Check for continuity through the float switch when Reclaim #3 has a high level of water inside. If there is no continuity when the float switch is towards the top of the tank, the switch may need to be replaced
3. Check to see if the blue connector on the hydraulic manifold for SV2 has its internal LED illuminated. If the LED is not illuminated, the hydraulics are not being commanded to turn on the filter pump circuit.
4. Look at the actual shaft between the filter pump and its drive motor to see if it is spinning. If the shaft is not spinning (or not spinning fast enough) the pump will not be able to move water.
5. Make sure that the filter vessels have not accumulated any air. If air is present in the filter vessels after they were first purged, the filter pump may be sucking air from somewhere.

If no issue can be detected, the pump must be analyzed for mechanical issues. Please use the information on the next page to trouble shoot the mechanical issues with the filter pump itself. Subsequent pages will assist in rebuilding operations. Your Cyclone dealer can assist in sourcing common rebuild kits/parts for components in this pump.

Symptom	Recommended Action
Will Not Pump Water	1. Check if the shaft is turning, if it is not follow steps 2 and 3. If the shaft is turning skip to step 4. 2. If the shaft is not turning. With the truck off, reach inside the suction port of the volute with your fingers and see if the impeller can easily be turned by hand. If not, there may be corrosion between the impeller and the volute or in the seal area. 3. If the shaft can be turned by hand, check the needle valve to assure that it is set appropriately. If the needle valve is backed out, oil will by-pass the gears and fail to turn the shaft. Trapped pressure in the hydraulic couplers may also prevent flow across the hydraulic motor. Reverse the hydraulic control lever to momentarily pressurize the return hose. This action will open the quick coupler valve and relieve the trapped pressure. 4. If the shaft is turning, ensure that the pump is primed. The pump will not operate unless the volute cavity is completely full of liquid when started. Remove the top pipe plug on the volute to verify that only liquid comes out
Will Not Develop Pressure	1. Check the shut-off pressure by closing the boom, agitation, and any by-pass valves and inserting a pressure gauge between the pump discharge and the shut off valves. This value should not exceed 105. 2. If the Shut-off Pressure is per the specifications, then the pressure drop is due to restrictions in the plumbing. If the shut-off pressure is below the specifications, it could be due to insufficient shaft speed or internal leakage in the pump. 3. If the Shut-off Pressure is per the specifications, check for clogged strainers, collapsed hoses, standard port valves, and undersized plumbing. 4. If the shut-off pressure is below the specifications, check for internal leakage in the pump. If there is significant play when the eye of the impeller fits into the inlet port of the volute, replace the impeller and/or volute. 5. If there is no internal leakage, then there may be insufficient shaft speed. A tractor dealership can use a hydraulic flow meter to verify the GPM of oil flow going to the hydraulic motor.
Seal Leaks	Replace seals
Loses Pressure Gradually Over Several Hours	When a pump starts out at the correct pressure and then gradually loses pressure over a period of several hours, the likely cause is due to the hydraulic oil heating up. As hydraulic oil heats up from 90 degrees Fahrenheit to 150 degrees, the pump performance will decrease 30%. Typically, the heat added to the system is due to energy losses caused by large bypass flows and restriction.

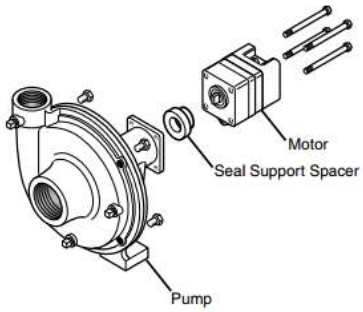
Common Filter Pump Replacement Components

1.	Impeller	266-0100004-01
2.	Shaft Seal Kit	116-0000037-01
3.	Hydraulic Motor Repair Kit	116-0000029-01

iii. Filter Pump Rebuild

Disassembly Instructions

1. Remove four 5/16” socket head cap screws from rear of motor.
2. Remove motor and seal support spacer.
3. Remove rear internal bearing snap ring.
4. Remove four 3/8” X 3/4” hex head cap screws from mounting frame.
5. Remove volute.
6. Remove 3/8” lock nut from shaft. Insert a flat file into impeller vane to hold stationary. Caution: Excess torque may cause damage to plastic impellers.

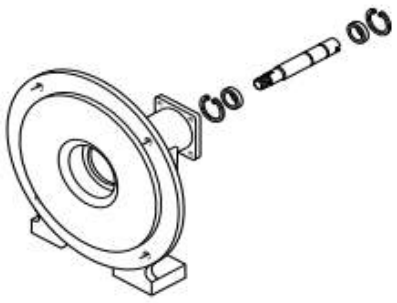


Disassembly Steps 1-5

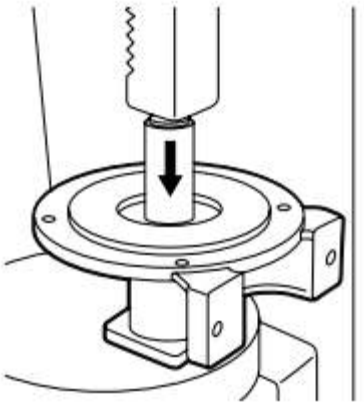
7. Press shaft out of impeller using one 5/16” socket head cap screw from step #1.
8. Remove impeller, key, and rotating seal member.
9. Press shaft/bearing assembly out of frame.
10. Remove stationary seal member by prying out with a screwdriver or pressing out from motor end of pump housing.
11. Remove O-ring from shaft groove.
12. Note: If you are only replacing the pump seal: 1) press the shaft/bearing assembly into the frame, 2) reinstall the rear internal bearing snap ring, and 3) skip to Assembly Step #8.
13. Press bearings off of shaft.
14. Remove forward internal bearing snap ring.

Assembly Instructions

1. Install forward internal bearing snap ring in mounting frame.
2. Press in forward bearing from rear side of mounting frame to snap ring.
3. Install two external shaft retainer rings with spacer between on shaft.
4. Press shaft assembly through forward bearing until forward shaft snap ring rests against inner face of forward bearing.
5. Press rear bearing over shaft and into housing.
6. Insert rear internal bearing snap ring.
7. Slide rubber slinger over shaft and push back to front bearing.


Assembly Steps 1-6

8. Clean old sealant from mounting frame seal bore.
9. Install O-ring in shaft groove.
10. Apply non-hardening Type 2 Permatex or similar under stationary seal flange.
11. Place stationary portion of seal over shaft and press into seal bore cavity. Use a 1-3/8" ID pipe or PTO adapter to press seal flange evenly on all sides.
12. Install rotating portion of seal over shaft and O-ring by hand. The two polished seal faces should face each other. Avoid contacting the polished seal faces.
13. Apply anti seize compound to impeller seat area on the shaft and key.
14. Insert key in keyway and install impeller on shaft.
15. Place lock washer and 3/8" lock nut on shaft and tighten nut.
16. Replace volute O-ring, volute, and four 3/8" x 3/4" cap screws.
17. Position seal support spacer in the cavity behind the pump bearing and snap ring. The smaller diameter of the 200 series spacer faces the motor. Fill the spacer hole halfway with coupling grease.
18. Install motor by aligning motor tang and coupler slot. Rotate motor to proper orientation.
19. Install four 5/16" socket head cap screws and tighten to 15 ft. lb. torque.



Assembly Step 11

iv. iv. Hydraulic Motor Repair

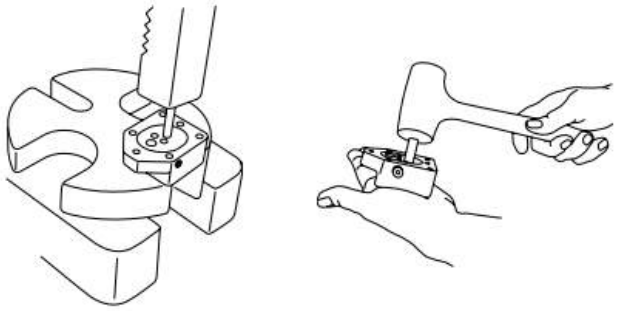
The hydraulic motor repair kit (Cyclone Ref. No. 116-0000029-01) includes all O-rings and seals necessary to rebuild the motor.

Disassembly:

1. Remove motor from pump by removing four cap screws.
2. Remove seal retaining ring from drive plate if installed and discard.
3. Remove two 1/4" cap screws (200 series) or four 3/8" cap screws (300 series).
4. Draw or scribe a line on motor casing (end plate, drive plate, housing), note orientation, and pull apart.
5. Remove idler gear/shaft assembly, drive gear, and drive shaft dowel pin.

Note: Failure to remove dowel pin will result in bushing damage.

6. Press or tap (non-marring hammer) drive shaft/bearing assembly, and seal cartridge out of drive plate.
7. Remove and discard old "O" rings and seal cartridge. Check shaft for wear or grooving under seal and replace if damaged.



Disassembly Step 6

Assembly:

1. Place drive shaft/bearing assembly in drive plate.
2. Apply a thin film of hydraulic oil to the seal bullet. Insert seal/bullet assembly over shaft tang. Press seal by hand over the installation bullet until the seal casing touches the drive plate.
3. Place a 3/4" (200 Series) or 15/16" (300 Series) deep socket over seal and press or tap into seal cavity until seated.

Assembly Step 3

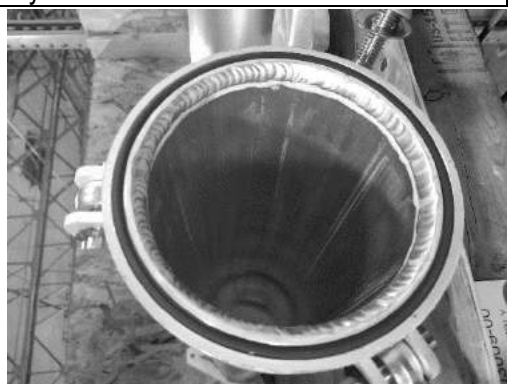
4. Remove the installation bullet.
   Note: Do not install the seal retaining ring with the seal support spacer.
5. Lightly grease large "O" rings and insert in plate grooves. (300 series grooves in gear housing)
6. Place dowel pin and drive gear on drive shaft.
7. Place idler gear/shaft assembly in drive plate bushing.
8. Assemble the drive, center, and end plates aligning scribe marks.
9. Install two 1/4" cap screws - torque 6-8 ft-lbs. (200 series) or four cap screws - torque 24 ft-lbs. (300 series).
   Caution: Do not over tighten.
10. Remove needle valve, replace thread seal (metal washer with rubber insert) by screwing it onto the needle and reassemble.
    Note: Forcing the thread seal of the needle threads may damage the seal.
11. Remove seal check cap from drive plate with 5/32" allen wrench (200 series) or 7/8" wrench (300 series), replace seal check cap "O" ring, and reassemble.
12. Position seal support spacer in the cavity behind the pump bearing and snap ring. Fill the spacer hole halfway with coupling grease.
    Note: The smaller diameter of the 200 series spacer must face the hydraulic motor.
13. Install motor by aligning motor tang and pump shaft slot. Rotate motor to proper orientation.
14. Install four 5/16" socket head cap screws and tighten to 15 ft.lb. torque.

IX. FILTERS

i. Seals

WARNING!

All seals in the filtration system are vital to the operation of the CY5500SK. Any leak not properly fixed may cause the machine to not function to its full capacity.



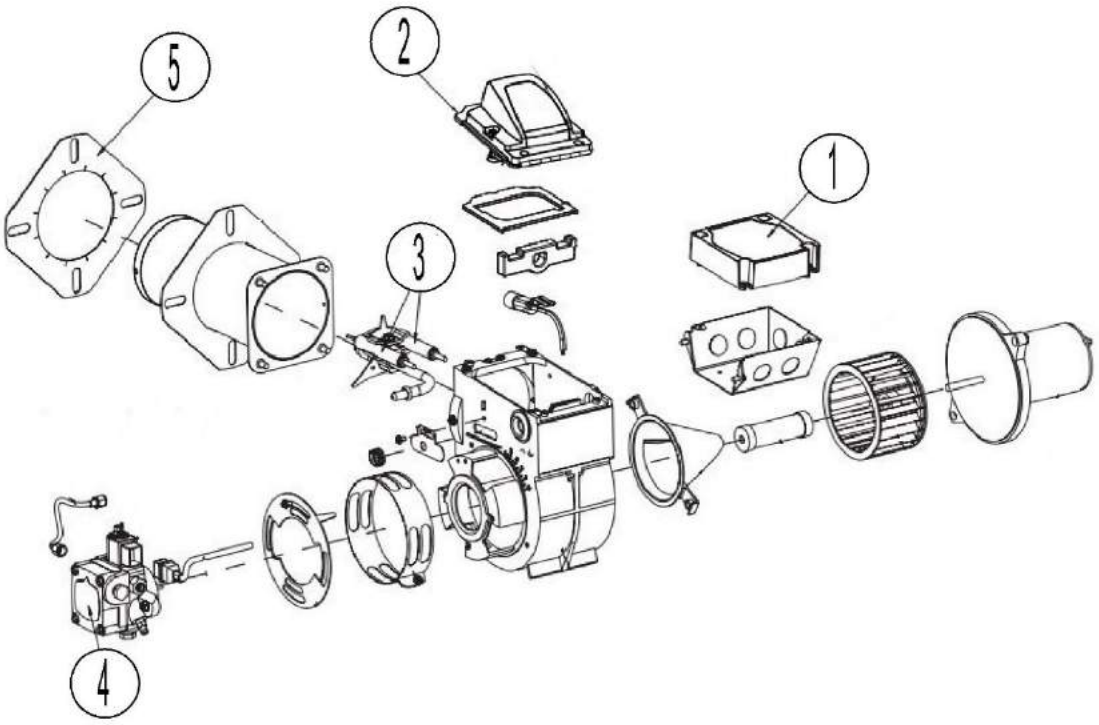
O-rings

Located at the top of each filter housing under the filter housing lid there is an O-ring (PN: 228-0100064-01). This O-ring is to prevent water from leaking out the top of the filter housing. If water starts to leak from the top of the filter housing this O-ring should be replaced. The O-ring should also be lubricated with petroleum jelly or swimming pool silicon lubricant.

Bottom Seal

Located at the bottom of the filter is a large donut seal that separates the inlet and outlet water flow. If this seal leaks, the filtered water and the unfiltered water will mix. The mixing of the filtered and unfiltered water will cause unclean water to enter the high-pressure pump, vastly reducing the life of both the high-pressure pump and rotating union.

X. BURNER



Item	Ref. No.	Qty.	Description
1	218-2300014-01	1	Control Package
2	218-2300036-01	1	Igniter Assy.
3	218-3100003-01	1	Electrode Kit
4	226-0100006-01	1	Pump
5	228-2000023-01	1	Gasket, Flange Mounting

i. Fuel Specification

The burner manufacturer recommends the use of No. 1 or No. 2 diesel fuel or kerosene; No.1 or No.2 heating oil (ASTM D396)

WARNING!

Do not use gasoline, crankcase oil, or any oil containing gasoline. Use of gasoline will cause a fire and could result in catastrophic machine damage and risk to operator(s) and bystanders.

ii. Service and Maintenance

The area around the burner should be checked daily for the following:

- Nothing is blocking the burner inlet air openings
- Air ventilation openings are clean and unobstructed, and the exhaust is not crusted
- No combustible materials are stored near the equipment
- There are no signs of oil or water leakage around the burner or equipment
- Check both send and return lines to ensure there are no signs of wear

The burner should also be serviced annually by a qualified service agency. The following should be checked on a regular basis and adjusted or replaced as needed:

- Replace the oil supply line filter if applicable. The line filter cartridge must be replaced to avoid contamination of the pump and nozzle.
- Inspect the oil supply system. All fittings should be leak-tight. The supply lines should be free of water, sludge and other restrictions.
- Remove and clean the pump strainer.
- Verify the nozzle is the one originally specified by the appliance manufacturer and replace the nozzle with one having the exact specifications from the same manufacturer.
- Clean and inspect the electrodes for damage, replacing any that are cracked or chipped.
- Check electrode tip settings. Replace electrodes if tips are rounded.
- Inspect the igniter spring contacts. Clean or replace if corroded.
- Clean the cad cell, if applicable.
- Make sure Low Firing Rate Baffle is in place, if required, for the burner application. Omitting the baffle can result in unacceptable burner combustion.
- Inspect all gasket including the igniter base plate gasket. Replace any that are damaged or missing.
- Clean the blower wheel, air inlet, air guide, retention head and static plate of any dirt, asphalt or other material.
- Check motor current. The amp draw should not exceed the nameplate rating. Check all wiring for loose connections or damaged insulation.
- Check the pump pressure and cutoff function.
- Check primary control safety lockout timing if applicable. Refer to the information supplied by the control manufacturer for procedures.
- Check ignition system for proper operation.
- Inspect the exhaust system for soot accumulation or other restriction.
- Clean the equipment thoroughly according to the manufacturer's recommendations.
- Check the burner performance using test instruments.
- It is good practice to make a record of the service performed and the combustion test results.

iii. Burner Troubleshooting Chart

Symptom	Possible Cause
Oil Not Igniting	**If the burner is not igniting, the burner motor, drive coupling, and oil pump are operating, and oil is flowing to the nozzle through the solenoid valve, check the following possibilities.** 1. Check the air shutter adjustment. If the air shutter is opened too far, the flow of air may prevent the arc from reaching the oil spray. This may appear as a white vapor exhaust from the heater. 2. The ignition system may have failed to supply an adequate arc to ignite the oil. Check the battery and charging system to insure a continuous supply of 11 to 16 volts DC (15 amps). 3. Check the electrodes for wear and damage. Insure that the electrodes are adjusted properly.
No Flame	**If there is no flame, the burner motor and igniter operate continuously, and the oil solenoid valve is functional, check the following possibilities.** 1. Check for a plugged oil nozzle. 2. If the coil on the solenoid valve is actuating, insure that the valve is opening or closing properly. 3. Check for sufficient fuel pressure. Pressure is 100 psig with valve energized, unless otherwise noted. 4. Check the pump pressure. Check for air in fuel lines. 5. Check burner for broken motor coupling. If the coupling is broken check pump rotation prior to replacing the coupling. 6. Check for contaminated fuel and/or partially plugged fuel filter.
Motor Not Operating	**If the blower motor is not operating, check the following possibilities.** 1. Check voltage at the motor to ensure that switches and relays, in line with the motor, are operating properly. 2. Check pump and motor shaft operation. They should work freely without binding.
No Oil Spray	**If the blower motor is operating, there is fuel in the tank, but oil does not spray out the end of the nozzle, check the following possibilities.** 1. Check for a broken or stripped coupling between the pump and the motor. 2. Check the pump output for oil. 3. Check operation of the oil valve. 4. Check for a plugged nozzle. 5. Check for air in the oil line. 6. Check for fuel contamination or plugged filter.
Fluctuating or No Pump Pressure	**If the pump pressure, as determined by a pressure gauge, is erratic or does not exist, check the following possibilities.** 1. Check motor rotational speed. Low rpm can cause erratic or no pump pressure. 2. Check for a broken or worn motor coupling. 3. Check that the pump turns freely. 4. Check for air leaks in the lines. 5. Check for oil froth at the bleed point. 6. Check voltage at the motor. 7. Check for fuel contamination or partially plugged filter.
Slow Motor Rotation	**If the blower motor is not operating at the rpm's listed on the nameplate, check the following.** 1. Check the supply voltage to the motor. 2. Check for free operation of the motor shaft and pump assembly.

iv. Descaling the Burner Coil

It is recommended to descale the burner annually or every 1000 operating hours to ensure that the burner is running as efficiently as possible. If there are any questions regarding the descaling process of the burner coil, please contact Cyclone Technology Technical Support at **1-800-335-9695** or **info@cycloneclean.**

1. Mix a commercial coil cleaner in a 5-gallon bucket.
2. Attach hoses to the inlet and outlet of the coil.
3. Place the outlet hose into the bucket and the inlet hose to an auxiliary water pump.
4. Let the auxiliary water pump run the cleaning solution through for 30 minutes to an hour.
5. Dispose of the cleaning solution where it is not harmful to animals or the environment.
6. Flush with fresh water when finished.

WARNING!

Do not run the burner while descaling.

WARNING!

Do not use the CY5500SK water pump to run the cleaning solution through the burner coil.

v. Troubleshooting the Burner Circuit

For the burner to turn on, two control conditions must be met:

1. The water pump's output to the coil must be pressurized. This is controlled by a pressure switch located on the water pump outlet plumbing (See page 12). The pressure switch is a normally open switch that closes when it sees pressure allowing the burner to turn on.
2. The water leaving the burner coil must be below 160°. This is determined by a temperature sensor located on the outlet pressure hose from the burner coil. The 160° switch is a normally closed switch that opens when the water temperature exceeds 160°, breaking the circuit, and turning the burner off. Additionally, there is a redundant safety switch also located on the outlet from the coil that will shut off the burner if the water temperature exceeds 200° (SHUTS PUMP CIRCUIT OFF, NOT JUST THE BURNER). This is also a normally closed switch that operates in the same way as the 160° switch.

Testing the Temperature Switches

To test both either the 160° or 200° temperature switches, with the water pump running, disconnect the weather pack and insert a multimeter into the circuit to test for continuity.

Testing the Pressure Switch

To test the pressure switch located on the water pump first make sure the pump is on and the water temperature is below 160°. Next use a multimeter to check the continuity of this switch.

XI. WINCH

i. Maintenance

1. Always inspect winch installation and winch cable condition before performing a winching operation. Never operate your winch if it is loose or damaged or when the winch cable is frayed, kinked, or damaged. Inspect the winch installation, mounting bolts and electrical connections on a regular basis. Remove any dirt or corrosion that may have accumulated on the electrical connections, and ensure you have a clean, tight and secure electrical contact. Inspect the electrical wiring along its route and make sure that it is not damaged and is still secured with appropriate fasteners. Also make sure the electrical wiring is in a location clear of hot or moving parts, road debris or any possibility of being damaged by operation or maintenance of the vehicle.

⚠ WARNING!

Always wear eye protection, heavy gloves and remove all jewelry, loose clothing, or anything that may get caught in the vehicle's moving parts prior to inspecting your winch.

2. Inspect the winch cable before and after each winching operation is performed. Make sure it is in good condition and is attached properly. If the cable has been kinked, frayed, or is abnormally stiff, the winch should not be used. The winch cable should be lubricated periodically with a light penetrating oil to improve the life of the cable. Be sure to also inspect the winch hook for signs of wear or damage. If the winch hook is damaged do not use the winch.
3. Always keep your winch, winch cable, and remote control and its cord free from dirt or other contamination. Use a clean towel to remove any dirt or debris. It may be necessary to unwind the winch

cable (leaving a minimum of five turns on the winch drum), wipe, clean, oil with light penetrating oil, and properly rewind the winch cable.

4. Inspect your vehicle's battery because operating a winch for long periods of time places an extra burden on the battery. Be sure to check and maintain your battery and battery cables according to manufacturer guidelines. Inspect all electrical connections on the winch to ensure they are clean and tight fitting.

⚠ WARNING!

Always wear eye protection when working around a battery. Do not lean over the battery while inspecting connections. Remove all jewelry, loose clothing, or anything that may get caught in the motor's moving parts prior to inspecting the battery.

5. Inspect the controls and wires for wear and/or damage. If the control system is damaged do not use the winch.
6. If damage or wear to any component of your winch is observed, do not use the winch and never attempt to repair it yourself. Always have a qualified technician perform all repairs on your winch.

ii. Troubleshooting

Symptom	Possible Causes	Recommended Action
Motor will not operate or only in one direction	1. Switch inoperative 2. Broken wires or bad connection 3. Damaged motor	1. Replace switch 2. Check for poor connections 3. Replace or repair motor
Motor runs extremely hot	1. Long period of operation 2. Failed or removed overload 3. Damaged motor	1. Allow to cool 2. Replace or repair overload 3. Replace or repair motor
Motor runs, but with insufficient power or line speed	1. Weak battery 2. Battery to winch wire too long 3. Poor battery connection 4. Poor ground 5. Damaged motor	1. Recharge or replace battery and check charging system 2. Keep winch within distance allowed by lead wires 3. Check battery terminals for corrosion and clean as required 4. Check and clean connections 5. Replace or repair motor
Motor runs but drum doesn't turn	Clutch not engaged	Engage clutch
Winch runs backwards	1. Motor wires reversed 2. Switch wires reversed 3. Battery switch installed incorrectly	1. Recheck wiring 2. Recheck wiring 3. Check battery connections
Winch coasts	Excessive load	Reduce load or double line
Motor operates but stops	Excessive load/overload	Allow to cool

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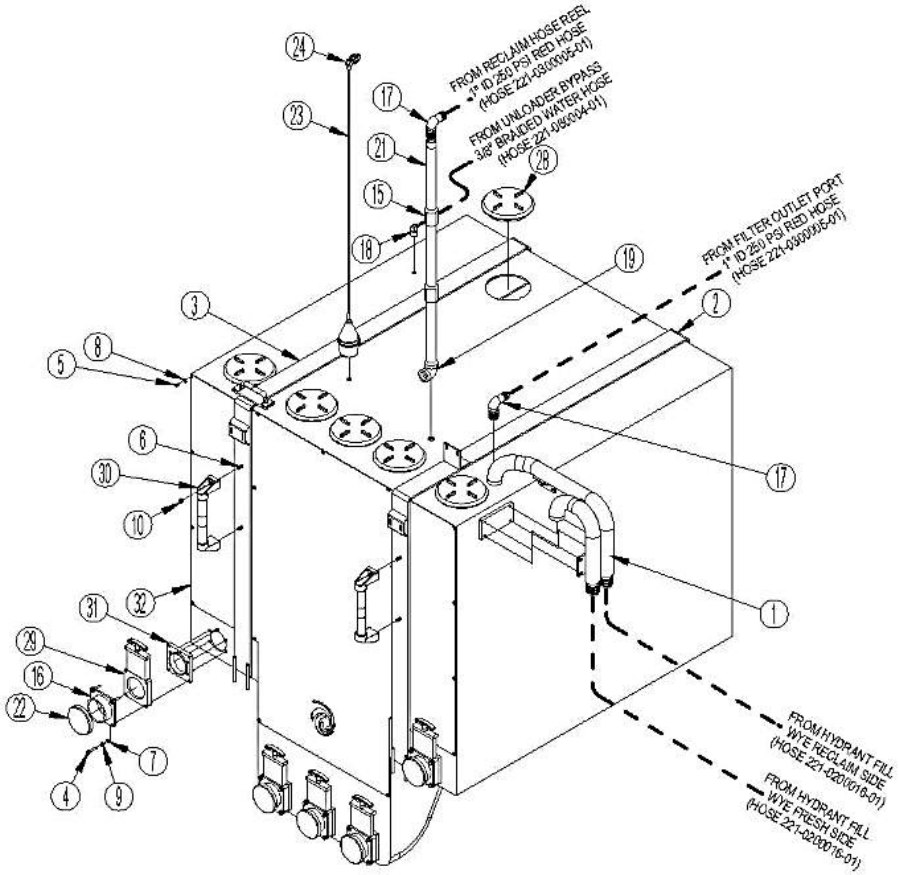
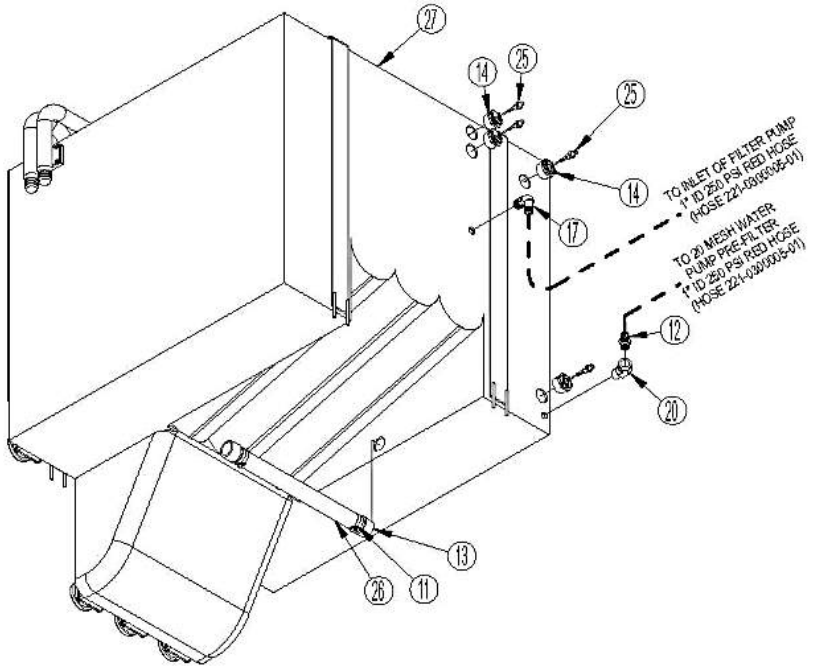
XII. WATER TANK





Item	Ref. No.	Qty.	Description
1	128-3606205-01	1	Weldt, Water Fill Tank ASSY, SK
2	128-5500004-01	1	Weldt, Water Tank Strap 1
3	128-5500005-01	1	Weldt, Water Tank Strap 2
4	204-0101006-07	20	Bolt, 1/4-20 X 1.5", Cap, G8, Zinc
5	204-0101165-07	17	Screw, Self-Tapping, #10-14 X .5" L
6	204-0105036-01	4	Bolt, 5/16-18 X 1", FH, Cap, Zinc
7	204-0603002-07	20	Washer, 1/4" Flat Hardened SAE Zinc
8	204-0603019-07	17	Washer, #10, Flat, SAE, Zinc
9	204-0604001-07	20	Washer, 1/4" Lock, Zinc
10	204-0704003-07	4	Nut, Hex 5/16-18 Lock, Nylon, Zinc
11	204-1005014-01	2	Clamp, Worm-Drive #36
12	216-0101014-05	1	Fitting, St, 1" MPT X 1" Hose Barb, SCH80, PVC
13	216-0101023-05	2	Fitting, St, 2" MPT X 2"ID, Barb, SCH80, PVC
14	216-0102084-05	4	Fitting, St, 1/2" FPT X 2" MPT Bushing, SCH80, PVC
15	216-0102085-05	2	Fitting, St, 1" FPT X 1" FPT Coupling, SCH80, PVC
16	216-0129003-10	5	Fitting, St, 3" 4-Bolt Flange X SOC, Plastic
17	216-0201006-05	3	Fitting, 90, 1" MPT X 1"ID, Barb, PVC SCH80
18	216-0201017-04	1	Fitting, 90, 1/2" MPT X 3/8"ID Barb Brass
19	216-0202048-05	1	Fitting, 90, 1" FPT X 1" FPT, SCH 80, PVC
20	216-0302013-01	1	Fitting, 45, 1" MPT X 1" FPT, Steel
21	216-1000110-05	3	Fitting, St, Nipple, 1"ID X 12" L, SCH80, PVC
22	216-1216001-10	5	3 Inch Unthreaded Cap
23	218-1017002-01	1	Float Switch, Cable Suspended
24	218-1901008-01	1	Connector, Strain Relief, 90 Deg
25	218-2500006-02	4	Switch, Liquid Level 1/2" MP, Horz. - Plastic
26	221-0300006-01	1	Hose, Water, 2"ID 100 PSI Green
27	231-0300031-01	1	CY5500SK Water Recycling Tank
28	231-9900002-10	6	Water Tank Lid Assembly
29	235-2000004-10	5	3 Inch Bladex Waste Valve
30	240-0900003-02	2	Pull Handle, Modified Length
31	304-0603018-01	5	Dump Valve Front Plate
32	320-0101898-01	1	Water Tank Fascia Panel MKII

Common Replacement Parts	Ref. No.	Description
1	235-2000003-10	Drain Valve Gasket Kit

i. General Maintenance

- Never allow water in the any of the tanks to freeze
- All reclaim tanks should be rinsed of all residual debris after use
- All tanks should be drained before storage

ii. Switches

1. Level Switches

The CY5500SK is equipped with four water level switches, one low water level switch in the Fresh 2 water tank and three high level water switches, two in Reclaim 3 tank and one in Fresh 2 water tank. All water level switches are vital to the functionality of the entire pressure washing system and should be replaced immediately if there are any issues. If replacing a water level switch, there is an arrow located on the switch to indicate the direction of installation. See table below for correct installation direction.

(PN: 218-2500006-02- Switch, Liquid Level, 1/2" MPT, Horz. -Plastic)

(a) Checking for Continuity:

Using a digital multimeter (DMM) you may check the continuity of any of the switches in water tank.

The low water level switch is a normally open switch

The high-water level switch in Fresh Tank 2 is normally open.

The high-water level switch in Reclaim Tank 3 is normally open.

The highest high-water level switch in Reclaim Tank 3 is normally closed.

2. Float Switch

The CY5500SK is equipped with a float switch located in reclaim water tank 3. This switch is used to turn the filter pump on and off. (PN: 218-1017002-01- Float Switch, Cable Suspended)

(a) Checking for Continuity:

Using a digital multimeter (DMM) you may check the continuity of the float switch in water tank.

The float switch is a normally open switch.

For more information on switch wiring see wiring diagram on page 55

Water Level Switch Installation		
Location	**Arrow Direction**	**Switch Purpose**
Low Level-Fresh Tank 2	Up	Turns off machine if water is too low
High Level-Fresh 2	Up	Turns on "Fresh Water Tank Full" Light
High Level-Reclaim 3	Up	Turns on "Reclaim Water Tank Full" Light
Highest Level-Reclaim 3	Down	Turns off machine if water is too high

iii. Valves

The CY5500SK comes equipped with five waste valves to drain each of the five tanks. General maintenance for these valves includes regularly applying petroleum jelly to allow the valve to slide easily, and regularly inspecting the seals for leaks. If valves become worn and start to leak, contact Cyclone Technology Technical Support at **1-800-335-9695** or **info@cycloneclean** for information on replacement seals.

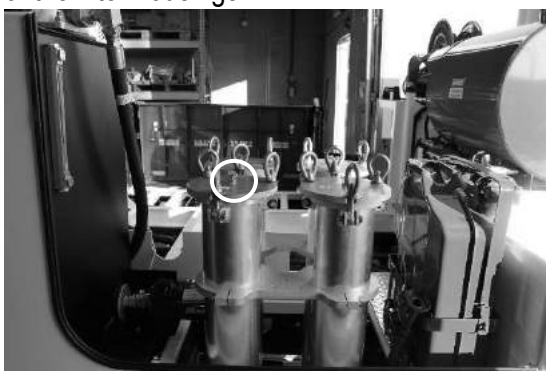
CAUTION

Never shut the valves while a strong stream of water is flowing through as this may cause damage to the seal.

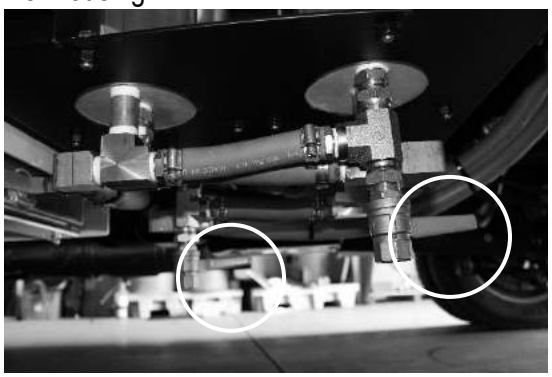
XIII. Winterizing Instruction

1. First empty all 5 water tanks by opening the 5 drain valves.

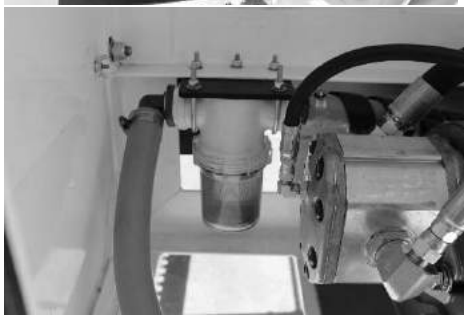
2. Open the 4 bleeder valves located at the top of the filter housings.



3. Open the valves located at the bottom of the filer housing.



4. Remove the filter cap on the filter pump and high-pressure pump. Dump water



5. Remove the water inlet hose from the water pump.
6. Using a spare length of 1" ID hose connect to water inlet with a funnel on the opposite end.

7. Pour in -50° PG/RV anti-Freeze until funnel fills.
8. Turn on water pump switch until the funnel empties, turn off the water pump switch. Repeat this process until 5 gallons have passed through the pump. **Note:** Water will be coming out the high-pressure hose line.

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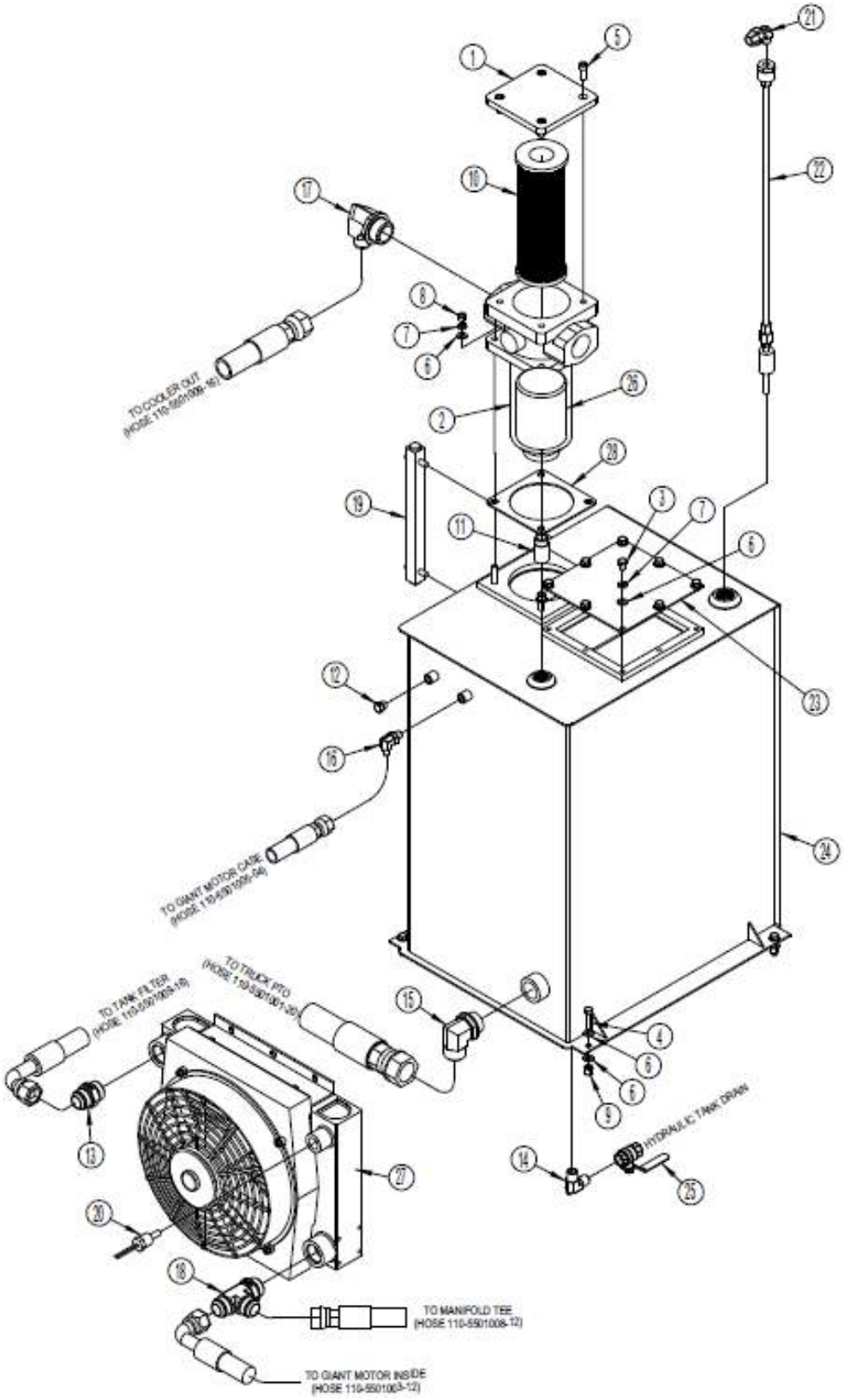
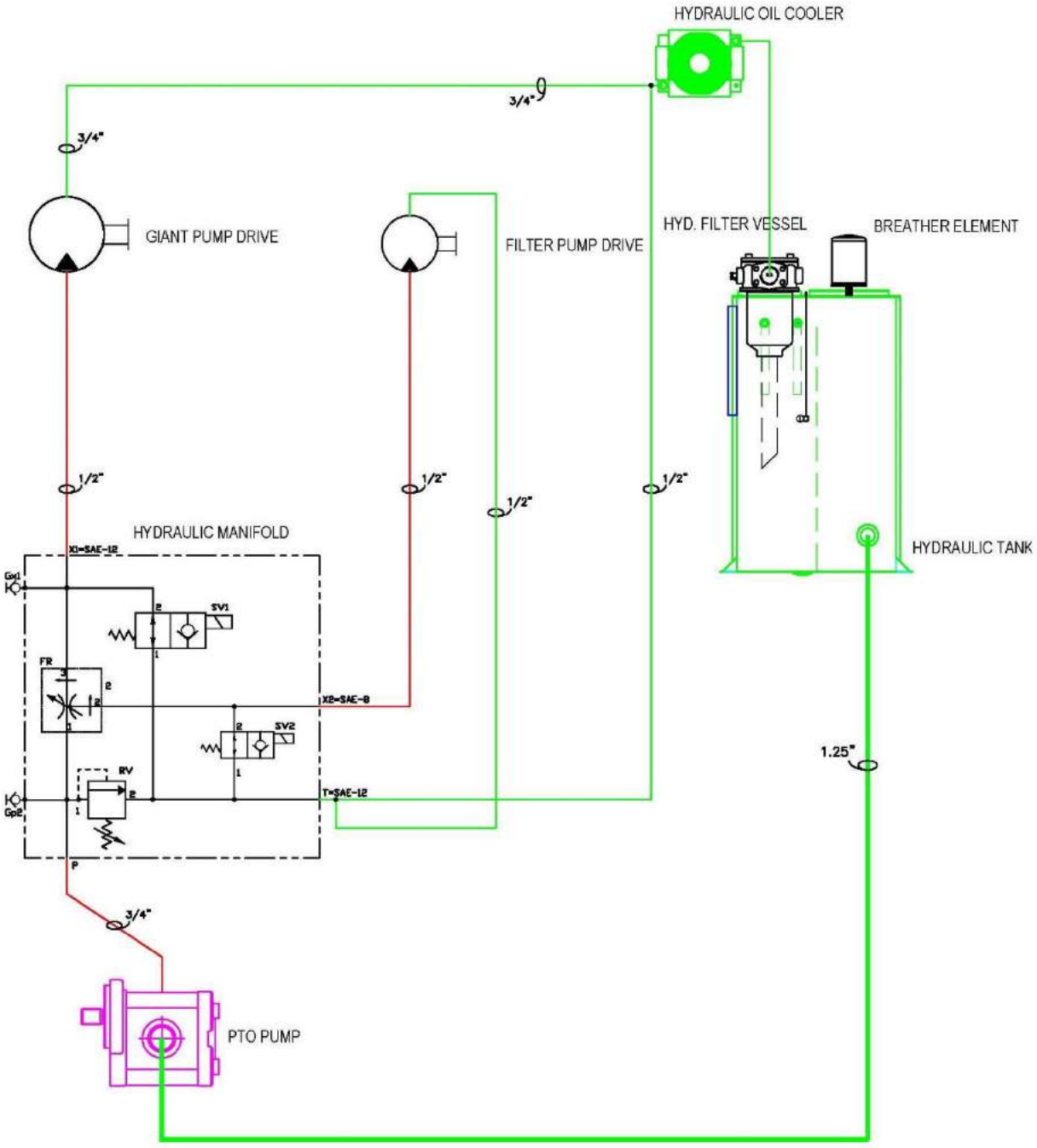
XIV. HYDRAULIC SYSTEM



Item	Ref. No.	Qty.	Description
1	108-02LP4500-01	1	Hydraulic Filter Cap
2	108-02lp4500-01	1	Hydraulic Return Filter ASSY
3	204-0101026-07	8	Bolt, 3/8-16 X .5 Cap, G8, Zinc
4	204-0101030-07	4	Bolt, 3/8-16 X 1.5 Cap, G8, Zinc
5	204-0104040-01	4	Bolt, 3/8-24 X 1", SH, SS
6	204-0603006-07	20	Washer, 3/8" Flat, Hardened, SAE, Zinc
7	204-0604003-07	12	Washer, 3/8" Lock, Zinc
8	204-0703004-07	4	Nut, Hex, 3/8-16, Zinc
9	204-0704004-07	4	Nut, 3/8-16, Lock, Nylon, Zinc
10	215-0100037-01	1	Filter Element, Return, 10mic
11	216-0104005-01	1	Adapter, 3/4" X 3/4", MPT, W/O-Ring
12	216-0113014-01	1	Fitting, St, #6MSAE Plug, Steel
13	216-0108006-01	1	Fitting, St, #16MSAE X #16MJIC, Steel
14	216-0202012-01	1	Fitting, 90, 1/2" MPT X 1/2" MPT, Steel
15	216-0208018-01	1	Fitting, 90, #20MSAE X #20MJIC, Steel
16	216-0208022-01	1	Fitting, 90, #6MSAE X #4MJIC, Steel
17	216-0208023-01	1	Fitting, 90, #24MSAE X #16MJIC, Steel
18	216-0408008-01	1	Fitting, Tee, Run, #16MSAE X (2) #16MJIC
19	217-0300004-01	1	Gauge, Level 10" Hyd Fluid W/Thermometer
20	218-1018002-01	1	Switch, Temp, 120 Degrees, Uhpod
21	218-1901008-01	1	Connector, Strain Relief, 90 Deg
22	218-2500019-01	1	Sensor, Hyd Fluid Level & Temp
23	231-0203011-01	1	Hydraulic Tank Inspection Plate
24	231-0203011-01	1	Hydraulic Tank Weldment
25	235-0100008-01	1	Valve, Ball, 1/2" FPT, Brass
26	273-0202002-01	1	Breather Element
27	279-0100007-01	1	Heat Exchanger, 12v, Side Mounted
28	501-0101250-01	1	CY Hydraulic Filter Gasket

i. Hydraulic Schematic



ii. PTO Drive Maintenance

Periodic PTO maintenance is required by the operator to ensure proper, safe and trouble-free operation.

Daily: Check all hydraulic and working mechanisms before operating PTO. Perform maintenance as required.

Monthly: Inspect for possible leaks and tighten all hydraulic and mounting hardware if necessary. Torque all bolts, nuts, etc. to specifications. Ensure that splines are properly lubricated, if applicable. Perform maintenance as required.

iii. Filter Element

It is recommended to replace the hydraulic oil filter element annually. Additionally, the hydraulic oil return filter has an indicator button that will pop out when it is necessary to change the filter.

1. To change filter element
   (a) Remove the four filter cap bolts
   (b) Remove hydraulic filter cap
   (c) Remove Filter element and replace with new filter element

iv. Breather

It is recommended that the breather element is changed annually.

1. To change breather
   (a) Unscrew breather element from adapter
   (b) Replace with new breather element

v. Oil

The CY5500SK hydraulic oil tank has a 45-gallon capacity. The hydraulic oil tank should only be filled with AW-46 grade oil. AW-46 grade oil is rated for 5000 hours but it is recommended to have the hydraulic oil tested first at 2000 hours and every 1000 following hours.

1. **Changing the Hydraulic Oil**
   The CY5500SK hydraulic oil tank is equipped with a drain valve located at the bottom of the tank. However, if possible it is recommended to drain the oil from a component lower on the CY5500SK to ensure that all hoses are drained of hydraulic oil as well.
   When refilling the hydraulic system, it is important that the new hydraulic oil is put into the tank in a clean manner as not to introduce any contaminants to the oil. It is also important to ensure that all pumps are primed before operation.
2. **Level and Temperature Sensor**
   Located in the CY5500SK hydraulic oil tank are two sensors, one for the oil level and one for the oil temperature. The indicator lights are located on the main control panel for both sensors. When either switch is faulted its circuit is closed. See wiring diagram on page 55. If either sensor is closed, the machine will not pump water to protect the hydraulic components of the machine.
3. **Inspection Plate**
   It is important to note that there is an inspection plate located on the CY5500SK hydraulic oil tank. This plate is easily removable and allows access to the inside of the hydraulic oil tank. This allows for the cleaning of the inside of the tank and easy access for maintenance needed.

When replacing the access cover insure the rubber gasket is properly seated. Also, use silicone sealant around the flange studs to further protect against contamination.

vi. Heat Exchanger

The CY5500SK hydraulic system is equipped with a heat exchanger to prevent the hydraulic oil from overheating during operation. It is important that the heat exchanger work properly as hydraulic oil can become very hot when operating within the system. When the hydraulic oil temperature reaches 120˚F the fan will activate and begin the cooling process.

1. **Thermal Switch**
   If the hydraulic oil is getting hot, above 120˚F and the heat exchanger fan is not turning on the first check is the thermal switch. (PN: 218-1018002-01- Switch, Temp, 120 Degrees)

2. **Fan**
   If the thermal switch is working properly but the fan is still not working properly, first check the circuit breaker located in the main control box. If the issue is still not resolved the fan may need replacement.

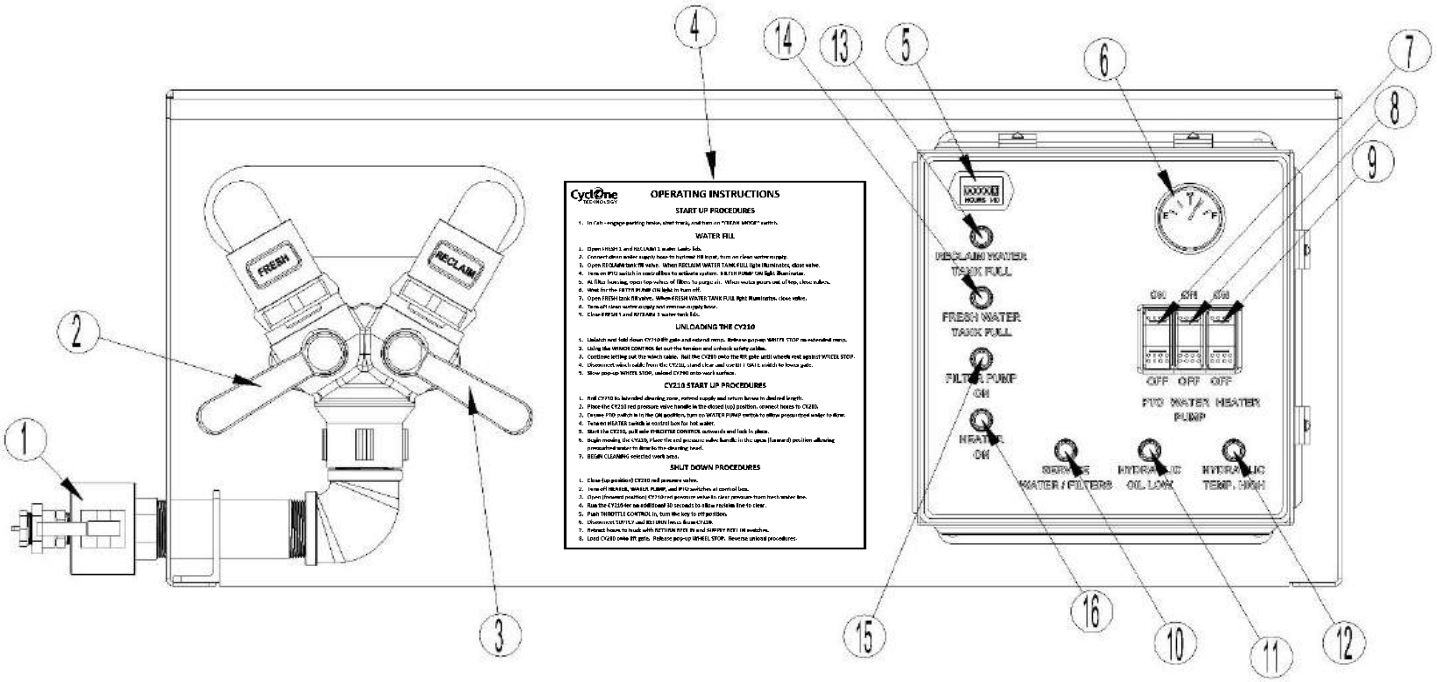
CAUTION

All service on the hydraulic system should be carried out by a skilled technician. If while operating the CY5500SK you experience any trouble with the hydraulic system not covered in this manual contact Cyclone Technology Technical Support at **1-800-335-9695** or **info@cycloneclean**.

XV. MAIN OPERATION CONTROLS

The main control console box located on the curbside rear if the truck is the location for controlling and monitoring the CY5500SK. The water fill valve, control panel assembly and operating instructions are all housed here. An itemized list of the fictional components and their purpose/use is as follows:

1. Water Inlet Port
2. Fresh Fill Valve
3. Reclaim Fill Valve
4. Operating Instructions
5. Hour Meter
6. Auxiliary Fuel Tank Level
7. PTO Control Switch
8. Water Pump Control Switch
9. Heater Control Switch
10. Service Water/ Filters Light
11. Hydraulic Oil Low Light
12. Hydraulic Temperature High Light
13. Reclaim Water Tank Full Light
14. Fresh Water Tank Full Light
15. Filter Pump ON Light
16. Heater ON Light



1. **Water Inlet Port**
   The water inlet port is located at the rear of the truck and is used to attach an external water source to fill the CY5500SK. The Water Inlet Port can be hooked up to a standard garden hose or a 2-inch female cam.

2. **Fresh Fill Valve**
   The Fresh Fill Valve is the valve is used to fill the fresh water tanks. When the lever is turned towards the upper position water can flow through the Water Inlet Port, up through the Water Fill Tank Assembly, and into the Fresh Water Tank 1.

3. **Reclaim Fill Valve**
   The Reclaim Fill Valve is the valve is used to fill the three reclaim tanks. When the lever is turned towards the upper position water can flow through the Water Inlet Port, up through the Water Fill Tank Assembly, and into the Reclaim Water Tank 1.

4. **Operating Instructions**
   The Operating Instructions are located between the wye valve and the control panel. These instructions are a simplistic step by step guide on how to fill, operate and shut down the machine.

5. **Hour Meter**
   The Hour Meter is located at the top right of the control panel. The hour meter is intended to inform the operator how long the CY5500SK has been operating. The hour meter will start counting once the PTO switch on the control panel has been turned on.

6. **Auxiliary Fuel Tank Level**
   The Auxiliary Fuel Tank Level gauge is used to inform the operator of the fuel level in the Auxiliary Fuel Tank. The Auxiliary Fuel Tank is used to supply fuel for the burner.

7. **PTO Control Switch**
   The PTO Control Switch is used to put the CY5500SK into PTO mode. The operating instructions and operator's manual have more information on when this switch should be engaged.

8. **Water Pump Control Switch**
   The Water Pump Control Switch is used to turn on or off the Water Pump. The operating instructions and operator's manual have more information on when this switch should be engaged.

9. **Heater Control Switch**
   The Heater Control Switch is used to turn on or off the Heater. The operating instructions and operator's manual have more information on when this switch should be engaged.

10. **Service Water/ Filters Light**

    The Service Water/Filters indicator light is intended to alert the operator that the water and/or the filters need service and will shut off the machine. This light is activated in one of two ways. First the water has gone below the low water level switch in Fresh Water Tank #2. If this is the case the CY5500SK is using more water than it is recycling and has reached a point that it no longer has enough water to safely operate. The second way this light is activated is if the water has passed the first high water level switch located in Reclaim Tank #3 and has reached the second-high water level switch in Reclaim Tank #3. If this is the case, then the filter elements are clogged, or the filter pump is not operating properly. If this light is activated in either of these cases, then the machine will turn off to prevent damage.

11. **Hydraulic Oil Low Light**

    The Hydraulic Oil Low indicator light is intended to alert the operator that the hydraulic oil level has gone below a safe point for operation. This light is activated by the oil level sensor in the hydraulic oil tank and when the oil is low enough to activate the indicator light the CY5500SK will stop pumping water. See page 46 for more information on the hydraulic oil sensor.

12. **Hydraulic Temperature High Light**

    The Hydraulic Temp. High indicator light is intended to alert the operator that the temperature of the hydraulic fluid has become too high. This light is controlled by the temperature sensor in the hydraulic oil tank. If this light is activated the CY5500SK will stop pumping water.

13. **Reclaim Water Tank Full Light**

    The reclaim water tank full light is a fill indicator intended to alert the operator that the reclaim tanks have been filled. The light should come on when the lower of the two high water level switches in Reclaim Tank #3 has been reached. See page 39 for information on the water level switches.

14. **Fresh Water Tank Full Light**

    The Fresh Water Tank Full light is a fill indicator intended to alert the operator that the water in the two Fresh Water Tanks have been filled. This light is activated by the high-water level switch located in Fresh Tank #2.

15. **Filter Pump ON Light**

    The Filter Pump On indicator light is intended to cycle on and off as the filter pump turns on and off during operation of the CY5500SK. This light is activated by the float switch that turns the filter pump on and off when the water reaches a set level.

16. **Heater ON Light**

    The Heater On light is intended to alert the operator that the heater is on.

XVI. LIFTGATE RAMP

i. Maintenance

1. Quarterly or 1250 Cycles

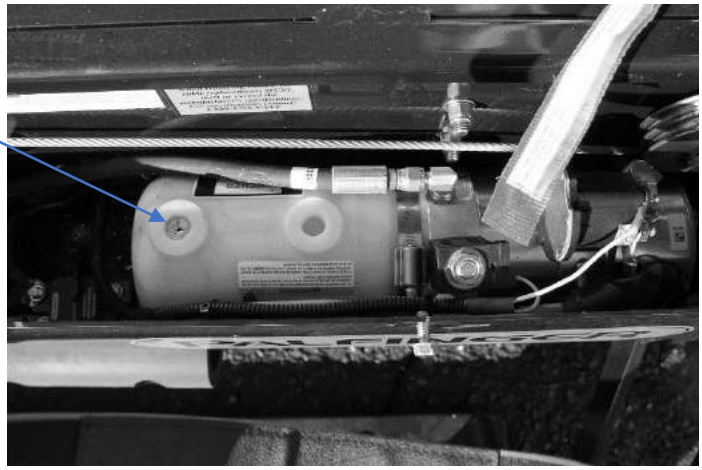
- Check the hydraulic fluid level in the pump reservoir.
- Change hydraulic fluid if hydraulic fluid appears contaminated.
- Use AW-46 hydraulic oil to fill the pump reservoir ONLY. Never mix different grades of fluid.
- Check all hoses and fittings for chafing and fluid leaks. Tighten loose fittings or replace parts as required.
- Check liftgate cables for wear and slack, service as needed.
- Check electrical wiring for chafing and make sure wiring connections are tight and free of corrosion. Use dielectric grease to protect electrical connections.
- Check that all bolts, nuts, and roll pins are in place. Make sure roll pins protrude evenly from both sides of hinge pin collar. Replace fasteners and roll pins if necessary.
- Check for rust and oily surfaces on liftgate. If there is rust or oil on liftgate, clean it off. Touch up paint where bare metal is showing.

2. Semi-annually or 2500 Cycles

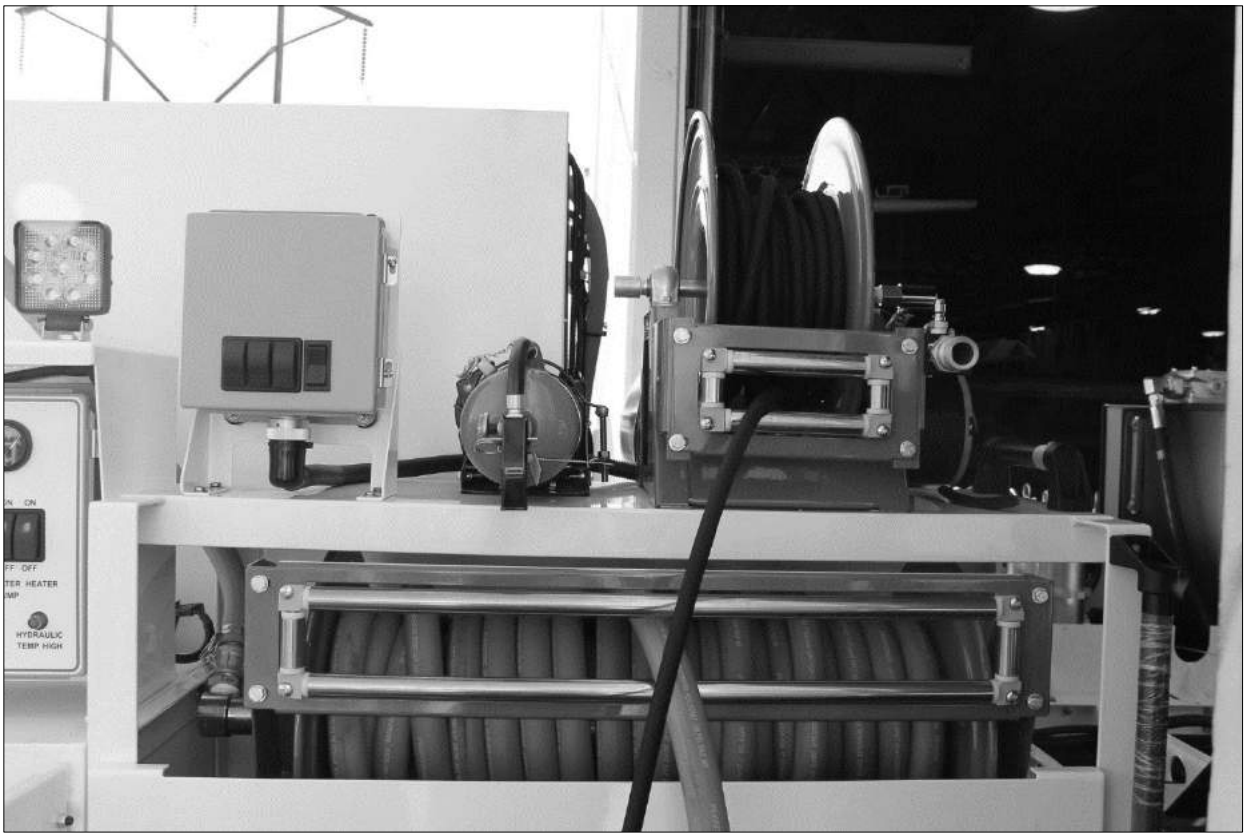
- Visually check the platform hinge pins for excessive wear and broken welds.
- Perform the **Quarterly or 1250 Cycles** maintenance checks

3. Filling the Hydraulic Oil

(a) Lower liftgate ramp
(b) Remove fill plug
(c) Fill hydraulic oil



XVII. HOSE REELS



i. Standard hosing

The CY5500SK comes standard with 100 feet of both 3/8” pressure hose and 1” return hose. If these hoses become torn or damaged in any way replace them immediately. Replace the pressure line with PN: 111-3606014-01- Hose ASSY, 3/8"ID X 100', 6kpsi Press. Washing. The CY5500SK is equipped with a heater therefore it is important that any replacement pressure lines are capable of handling temperatures up to 180 degrees F. In addition, if the quick connect coupler used to attach the pressure line to the CY210 becomes damaged a replacement part must be rated to handle both the pressure and temperature stated above.

The return hosing replacement part number PN: 112-3606011-01, Hose, Return, FEM TO FEM CAM, 1"ID X 100' the water return line is equipped with female cam lock fittings on both ends.

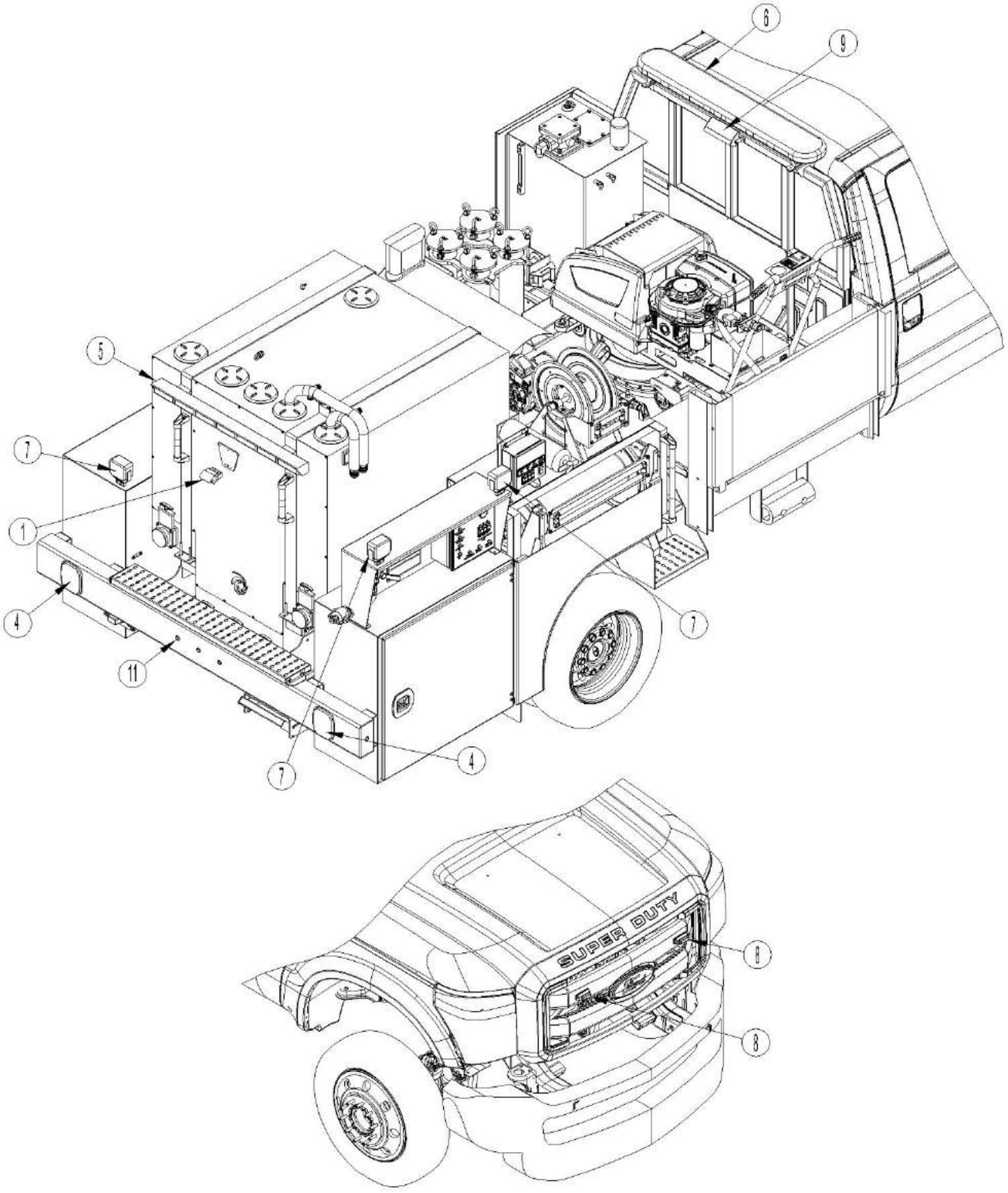
ii. Hose Reels

The CY5500SK is equipped with a hose reel for the supply and the return hose. These hose reels can be automatically retracted with the controls on the auxiliary control panel. For more information on replacement parts and hose reels, contact Cyclone Technology Technical Support at **1-800-335-9695** or **info@cycloneclean**.

Supply PN: 248-5500SK1-01

Return PN: 248-5500SK2-01

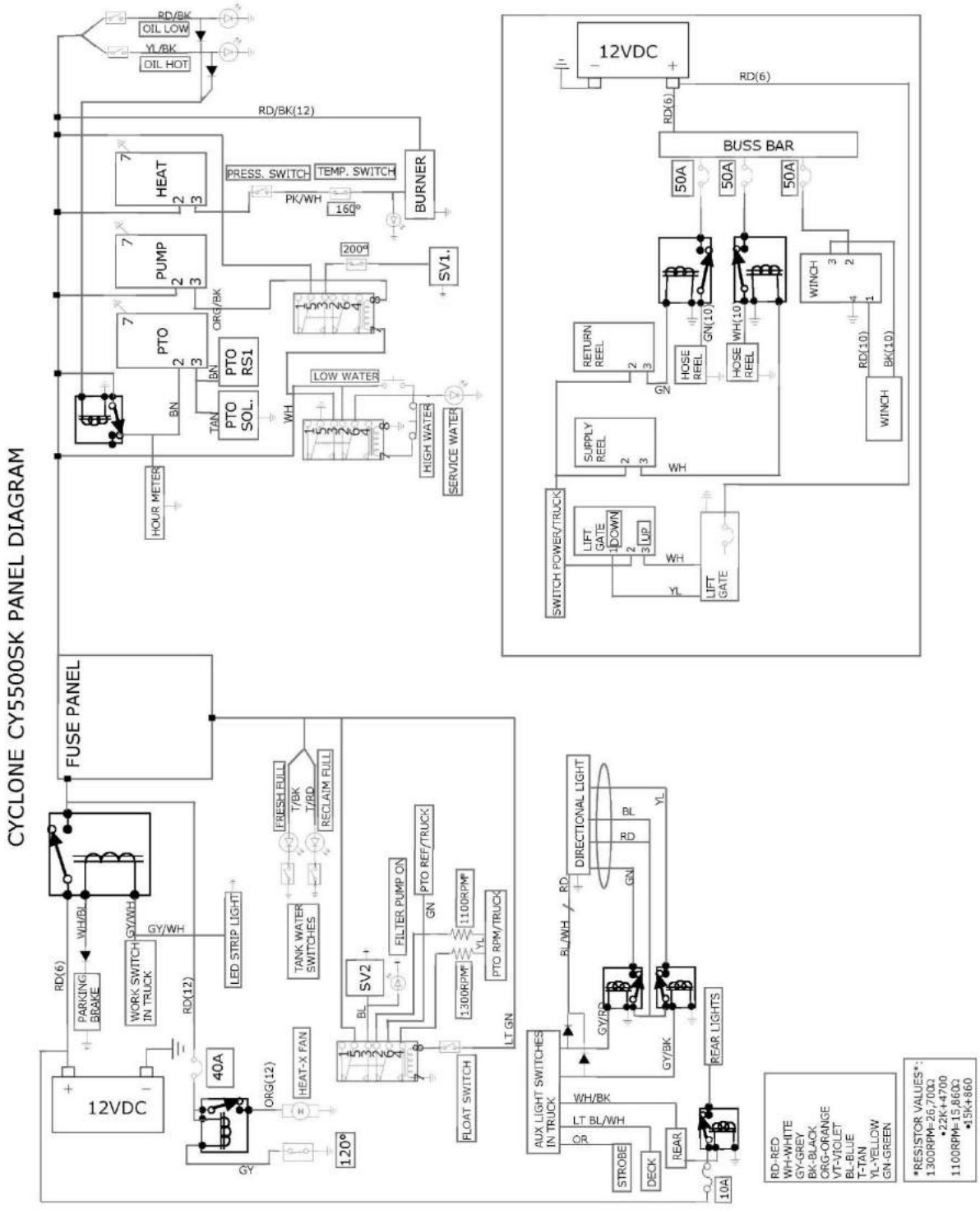
XVIII. LIGHTING



Item	Ref. No.	Qty.	Description
1	217-0700001-01	1	Camera, Color, Nite-Vision, 18LED, Sunshade
2	218-0701015-01	4	Light, Led, Green*
3	218-0701016-01	3	Light, Led, Amber*
4	218-0701017-01	4	Light, Led Taillight Replacement
5	218-0704007-03	1	Light, Traffic Arrow, Led
6	218-0704011-01	1	Beacon, Lightbar, 50"
7	218-0712013-01	3	Light, Square Led Flood Light, 1250 Lm
8	218-0712014-01	2	Light, Front Grill Traffic Light
9	218-0712015-01	1	Light, Skid Deck Light, Led Flood
10	218-0712016-01	1	Led Strip Light, White, 18"L*
11	218-0796003-01	5	Light, Marker, Led, Red, 3606

*Not shown

XIX. WIRING DIAGRAM



XX. WATER FLOW CHART