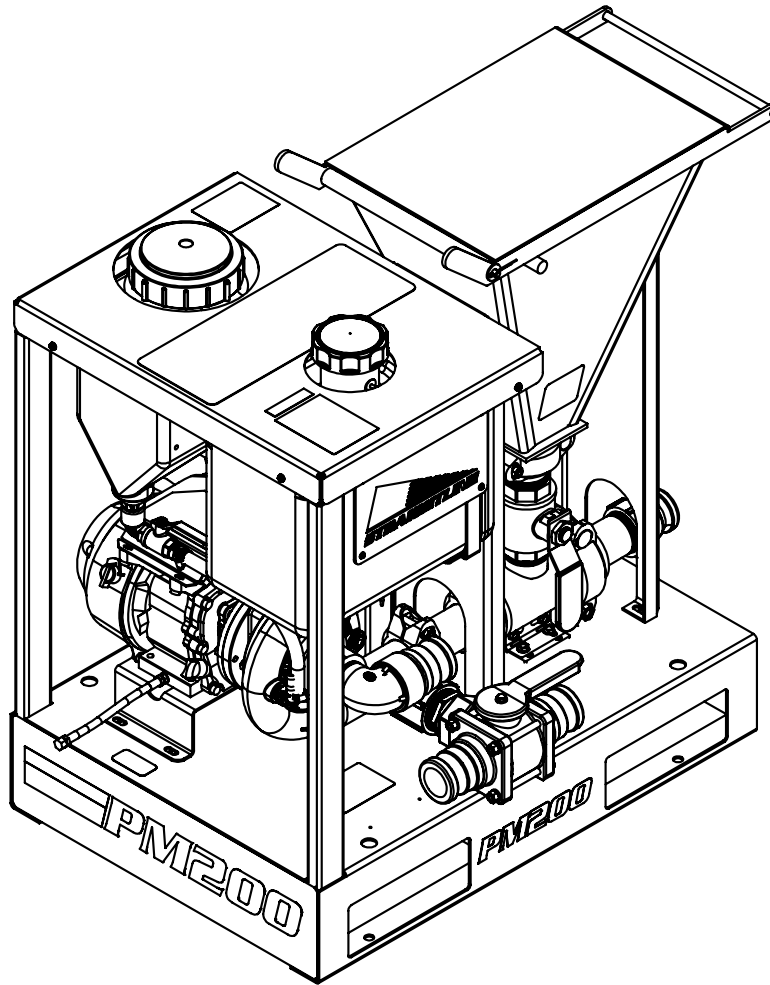




PERFORMIX® PM200

Bentonite Mixing System

OWNERS MANUAL

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SAFETY PRECAUTIONS

**WARNING**

A hazard that could result in death, serious injury, or substantial property damage.

**CAUTION**

A hazard that could result in minor personal injury or property damage.

NOTE: is used to notify people of important installation, operation, or maintenance information.

**WARNING**

Avoid Inhalation of Dust When Mixing Dry Drilling Clays!



Work In Ventilated Areal Wear Breathing Protection!

Prolonged breathing of dust particles can cause serious respiratory illnesses.

120286

**WARNING**



Accidental Starts can cause severe injury or death.

Disconnect and ground spark plug lead(s) before servicing.

**WARNING**

Before working on engine or equipment, disable engine as follows: 1) Disconnect spark plug lead(s). 2) Disconnect negative (-) battery cable from battery.

**WARNING**



Hot Parts can cause severe burns.

Do not touch engine while operating or just after stopping.

**WARNING**

Never operate engine with heat shields or guards removed.

**WARNING**



Cleaning Solvents can cause severe injury or death.

Use only in well ventilated areas away from ignition sources.

**WARNING**

Carburetor cleaners and solvents are extremely flammable. Follow cleaner manufacturer's warnings and instructions on its proper and safe use. Never use gasoline as a cleaning agent.

**WARNING**



Explosive Fuel can cause fires and severe burns.

Do not fill fuel tank while engine is hot or running.

**WARNING**

Gasoline is extremely flammable and its vapors can explode if ignited. Store gasoline only in approved containers, in well ventilated, unoccupied buildings, away from sparks or flames. Spilled fuel could ignite if it comes in contact with hot parts or sparks from ignition. Never use gasoline as a cleaning agent.

**WARNING**



Rotating Parts can cause severe injury.

Stay away while engine is in operation.

**WARNING**

Keep hands, feet, hair, and clothing away from all moving parts to prevent injury. Never operate engine with covers, shrouds, or guards removed.

**WARNING**



Carbon Monoxide can cause severe nausea, fainting or death.

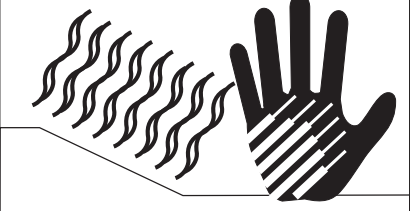
Avoid inhaling exhaust fumes. Never run engine indoors or in enclosed spaces.

**WARNING**

Engine exhaust gases contain poisonous carbon monoxide. Carbon monoxide is odorless, colorless, and can cause death if inhaled.

**WARNING**

Hot Muffler! Don't Touch!



Skin contact with hot muffler may cause a serious burn.

**CAUTION**



Electrical Shock can cause injury.

Do not touch wires while engine is running.

**CAUTION**



Damaging Crankshaft and Flywheel can cause personal injury.

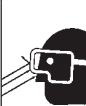
Using improper procedures can lead to broken fragments. Broken fragments could be thrown from engine. Always observe and use precautions and procedures when installing flywheel.

**CAUTION**



Failure to utilize or reassemble debris screen as designed could result in debris screen failure and serious personal injury.

**WARNING**



Uncoiling Spring can cause severe injury.

Wear safety goggles or face protection when servicing retractable starter.

Retractable starters contain a powerful, recoil spring that is under tension. Always wear safety goggles when servicing retractable starters and carefully follow instructions in Retractable Starter for relieving spring tension.

**DANGER**

Avoid Fuel Fire or Explosion!

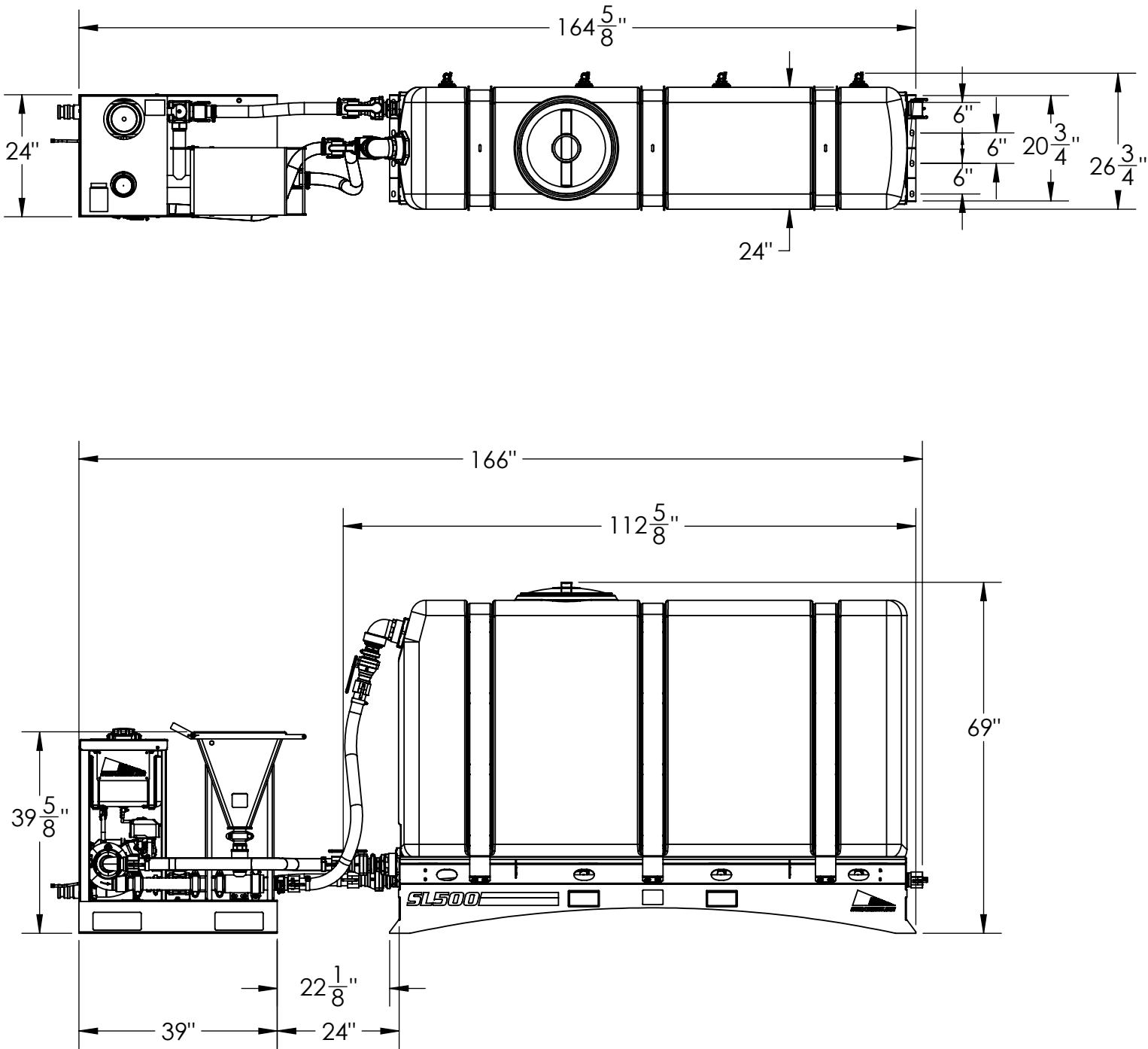


No smoking or open flames! Shut off engine before fueling! Wipe up all spills.

Fuel and fumes can catch fire or explode and cause serious burns or death.

120285

DIMENSIONS



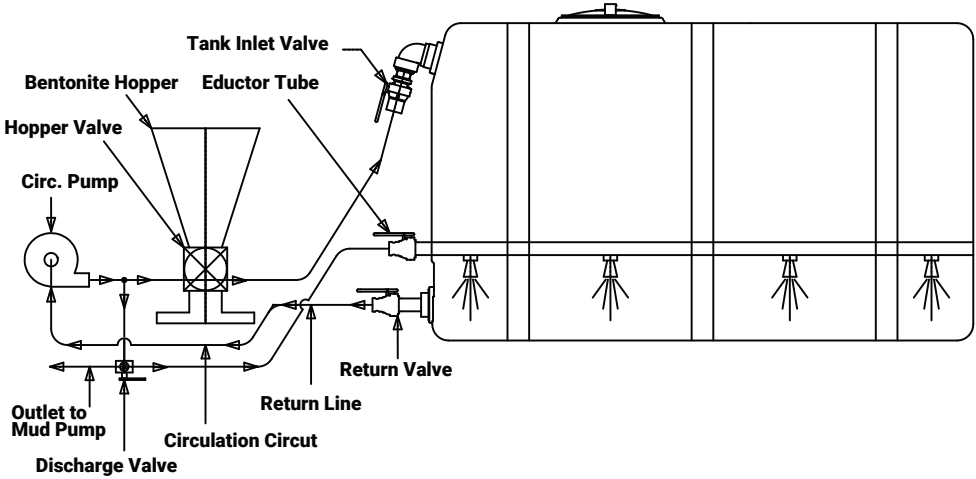
Straightline® Model PM200 Mixer Operation Instructions

1. Safety DANGER - WARNING - CAUTION

This safety alert symbol (with associated alert message) appears on decals at various locations on this equipment. Carefully read and understand the cause of possible injury that each of these messages contain, then **HEED THE WARNING!**

- Do not operate this equipment unless you have been properly trained.
- Wear personal protective equipment and clothing, including safety glasses, hard hat, electrical insulating gloves, and boots to guard against possible contact with hazardous underground utilities, such as high voltage electric lines. Always shut this equipment down when performing maintenance.
- This unit must be mounted to a firm, stable structure.
- Avoid touching hot muffler with bare skin.
- Avoid inhalation of dust when mixing dry drilling clays. Wear a dust mask.
- Fuel and fumes can explode and cause serious burns or death. No smoking or open flames around fuel tank area. Avoid spilling fuel on hot muffler. Clean up all fuel spills as soon as they occur. **Turn the engine off while refueling.**

PM200 SL500 Piping Circuit Diagram



Prestart Fluid Line Valve Settings

- Discharge Valve on outlet line: **Closed**
- Return Valve on return line: **Open**
- Tank Inlet Valve on mixing line: **Open**
- Hopper Valve on hopper: **Closed**
- Antifreeze Tank Valve: **Closed**

Throttle Settings

- For mixing: **HIGH**
- For circulating to jets: **MID RANGE**
- For transferring to mud pump: **LOW**

2. Operation

Before attempting to operate this equipment, study the diagram (shown) and become familiar with all the components and fluid circuits. Read the engine manual that is included with this unit and become familiar with all controls, fluid level checkpoints, filters, startup procedures and safety related instructions.

Filling

Remove top lid of mixing tank and fill to capacity with clean potable water. Ensure that the Circulating Pump casing is allowed to fill with water in order to maintain a prime.

Engine Start

Ensure auxiliary fuel tank is full (E0-E10 87 octane unleaded gasoline). Open the fuel valve before starting the engine. Follow startup & run procedure as outlined in your engine manual.

- Engine fuel tank is plugged off and inoperable.

Mixing

- Start the engine and set to high throttle position
- Three-way valve set to mixing circuit (to hopper) position
- With hopper valve closed, fill the hopper with dry bentonite material
- Open hopper valve and introduce bentonite into the mixing circuit line. After all material has cleared the hopper, close the hopper valve. Allow the mixing circuit to run as required to thoroughly mix the fluid and bring it to full "yield". Further mixing and yielding may be accomplished by moving the three-way valve to the circulation (to jets) setting.

Shut Down

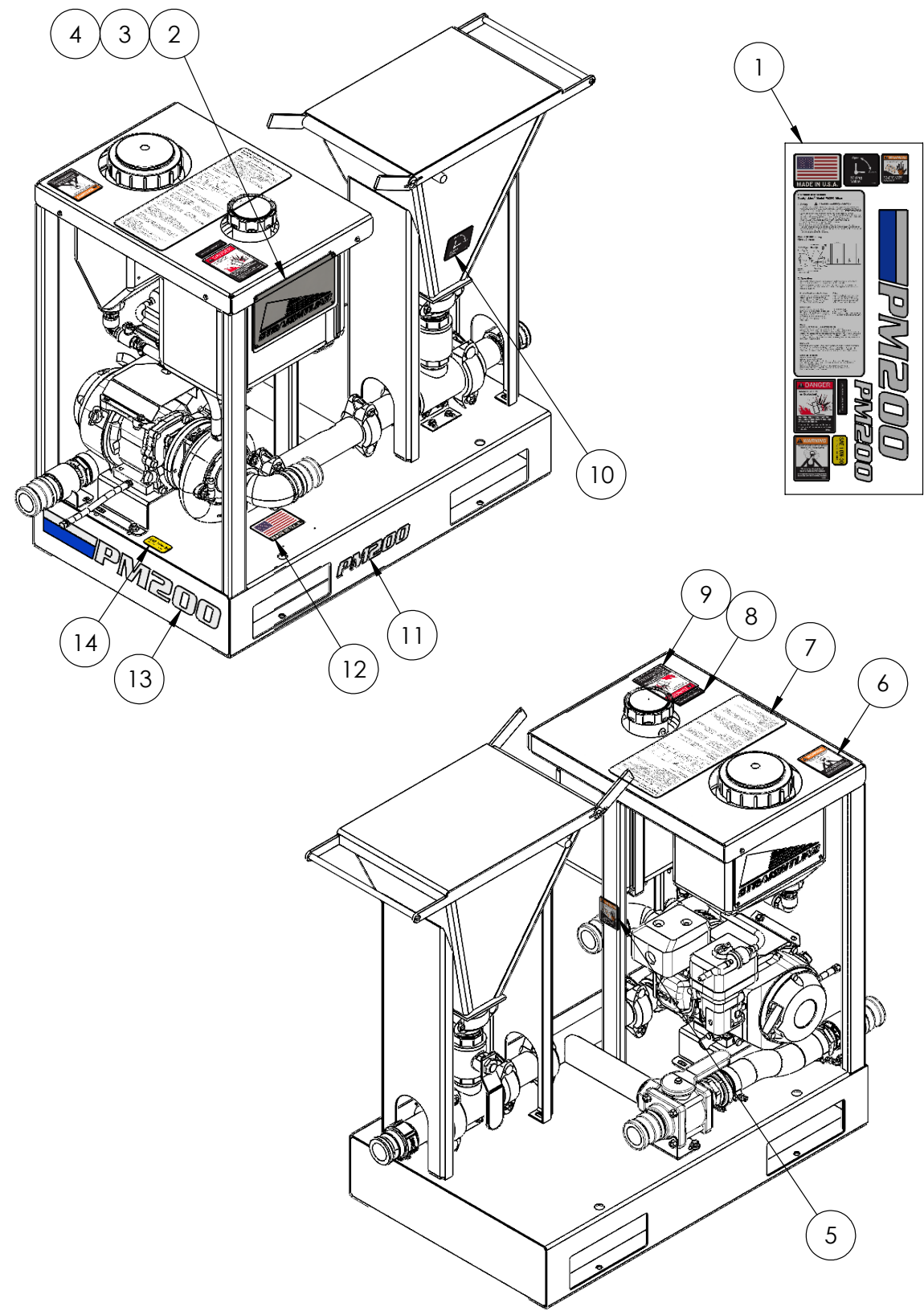
Set engine On/Off switch to **OFF**. Turn fuel tank valve off. If the unit is through working for the day, the drilling fluid must be off-loaded and the entire fluid system flushed with clean water (if under freezing conditions, 1/2 gallon of antifreeze must be added to the antifreeze tank and circulated to the pump).

Antifreeze Procedure

- With the engine **OFF**,
- Open all valves on the mixer
- Unhook all hoses from the tank using the quick connect fittings and drain
- Remove the drain plug on the front lower section of the pump and drain
- Install drain plug in the pump
- Open valve under the anti-freeze tank that drains into the pump
- After the tank is empty, close the valve under the anti-freeze tank. Re-connect hoses to tank if desired.



SAFETY DECALS / BRANDING

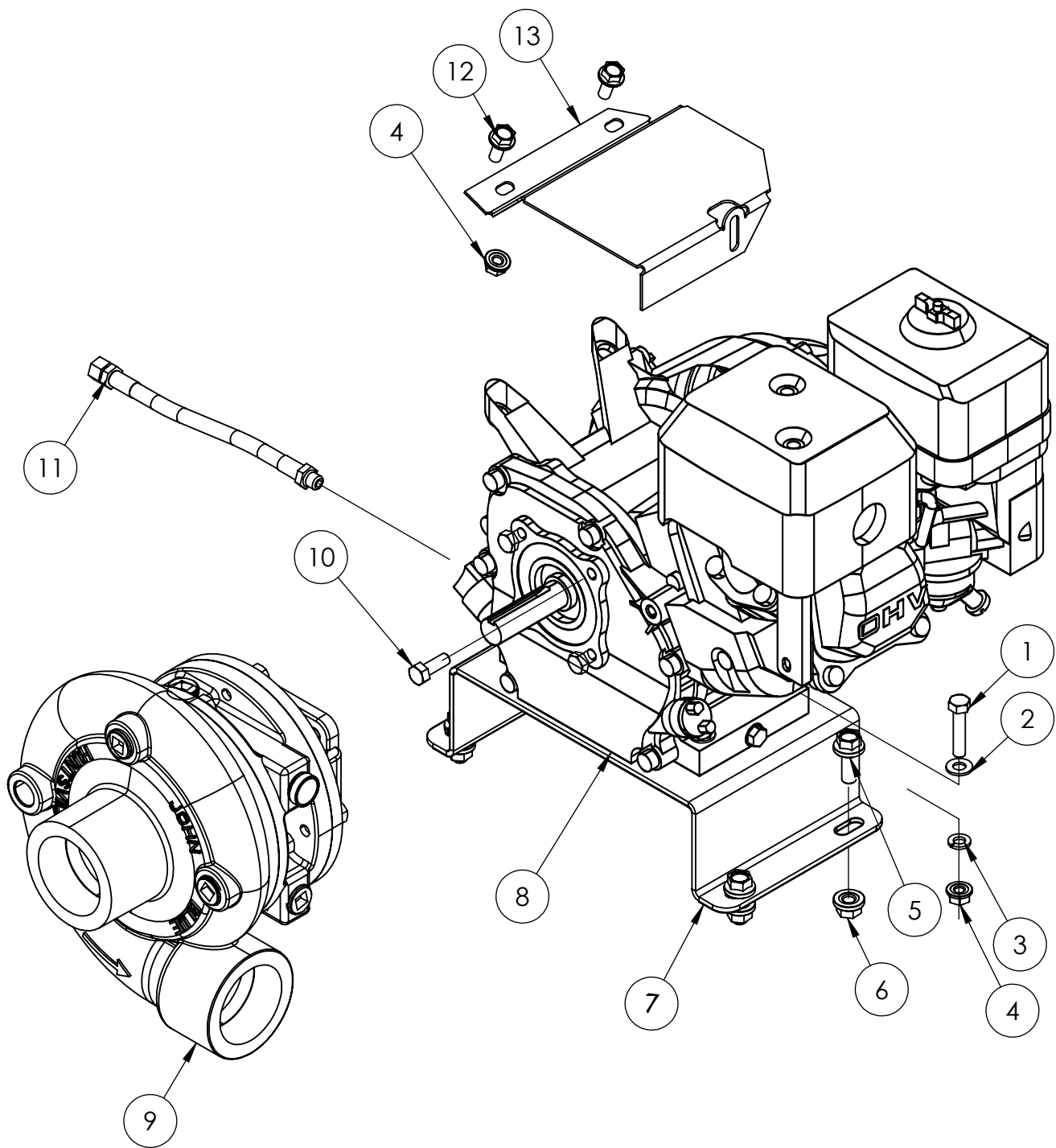


DECALS NOT SOLD SEPARATELY.
INCLUDED IN DECAL SET.

SAFETY DECALS / BRANDING

ITEM	PART #	DESCRIPTION	QTY
1	25668	DECAL SET, PM200	1
2	68945	PERFORMIX, SS BACKER PLATE, SL WEDGE GUSSET PLATE	1
3	1024X12BHCSSS	SCREW, CAP, BUTTON HEAD, 10-24 x ½", STAINLESS	1
4	1024LNN	NUT, HEX, NYLOCK, 10-24, GR5, ZN	1
5	120344	DECAL, WARNING, HOT MUFFLER	0.01
6	120286	DECAL, WARNING_AVOID BREATHING DUST	0.01
7	25669	DECAL, OPERATING INSTRUCTIONS PM200	1
8	23269	DECAL, USE UNLEADED GASOLINE ONLY	0.01
9	120285	DECAL, DANGER, AVOID FUEL FIRE	0.01
10	120271	DECAL, MIXING VALVE	0.01
11	25671	DECAL, PM200	1
12	750-114-02	DECAL, FLAG	0.01
13	25670	DECAL, PM200 W STRIPE	1
14	25369	DECAL, OPERATION, SYNTHETIC, 10W-30 ONLY	0.01

ENGINE AND PUMP MOUNT ASSEMBLY

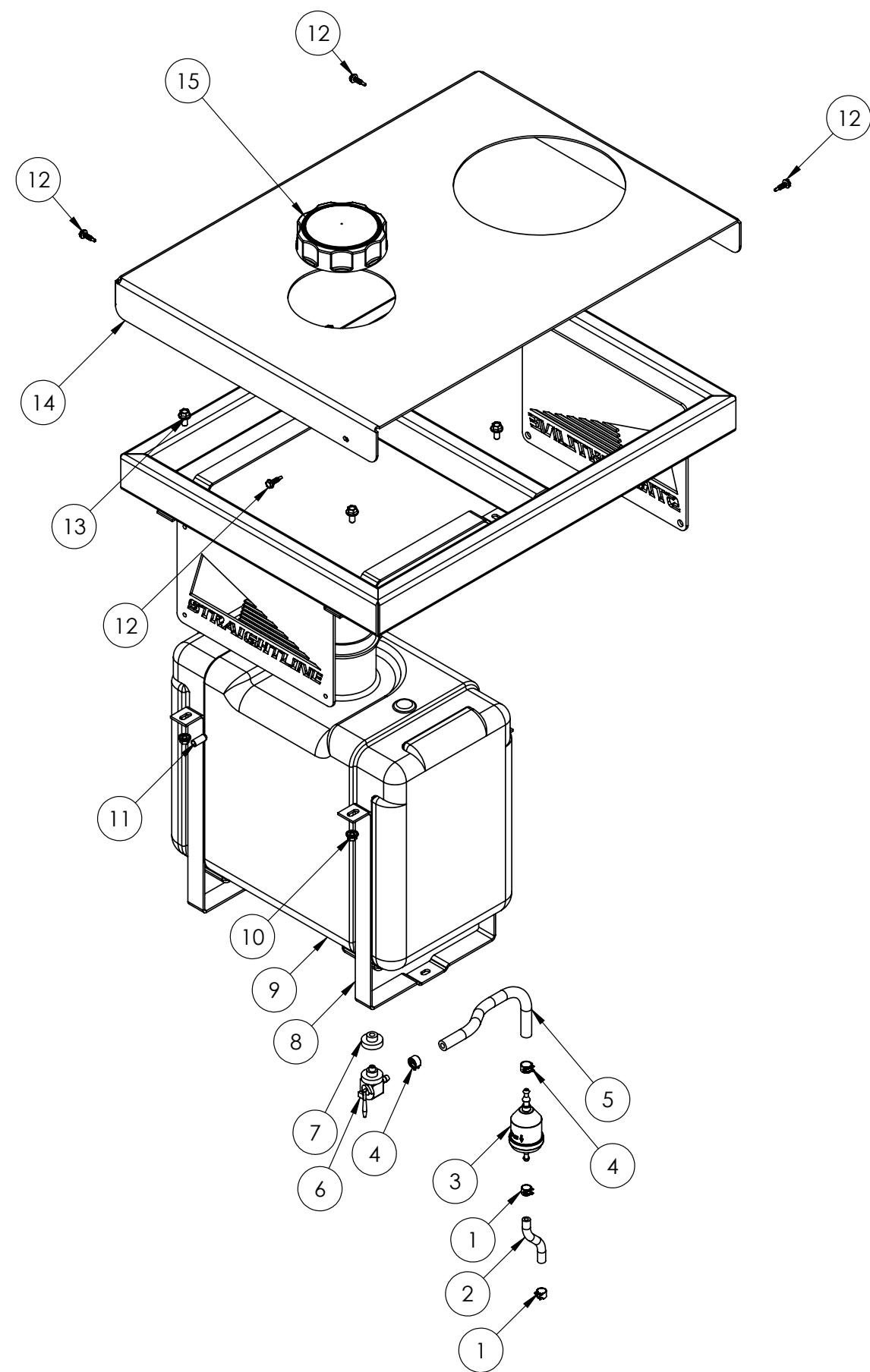


ENGINE AND PUMP MOUNT ASSEMBLY

ITEM	PART #	DESCRIPTION	QTY
1	51618X112HB	BOLT, HEX, 5/16-18 X 1 1/2"	4
2	516FW	WASHER, FLAT, 5/16	4
3	516LW	WASHER, LOCK, 5/16	4
4	51618WHN	NUT, WHIZ, 5/16-18	6
5	3816X1WHB	BOLT, WHIZ, 3/8-16 X 1"	4
6	3816WHN	NUT, WHIZ, 3/8-16	4
7	69611	PM200, PLATE, MOTOR MOUNT	1
8	25639	HONDA, 5.5 HP	1
9	25128	PUMP, 2", 1" SHAFT	1
10	51618X78HB	BOLT, HEX, 5/16-18 X 7/8"	4
11	24993	DRAIN EXTENSION, OIL	1
12	51618X34WHB	BOLT, WHIZ, 5/16-18 X 3/4"	2
13	69483	PLATE COVER, HONDA ENGINE, SS	1



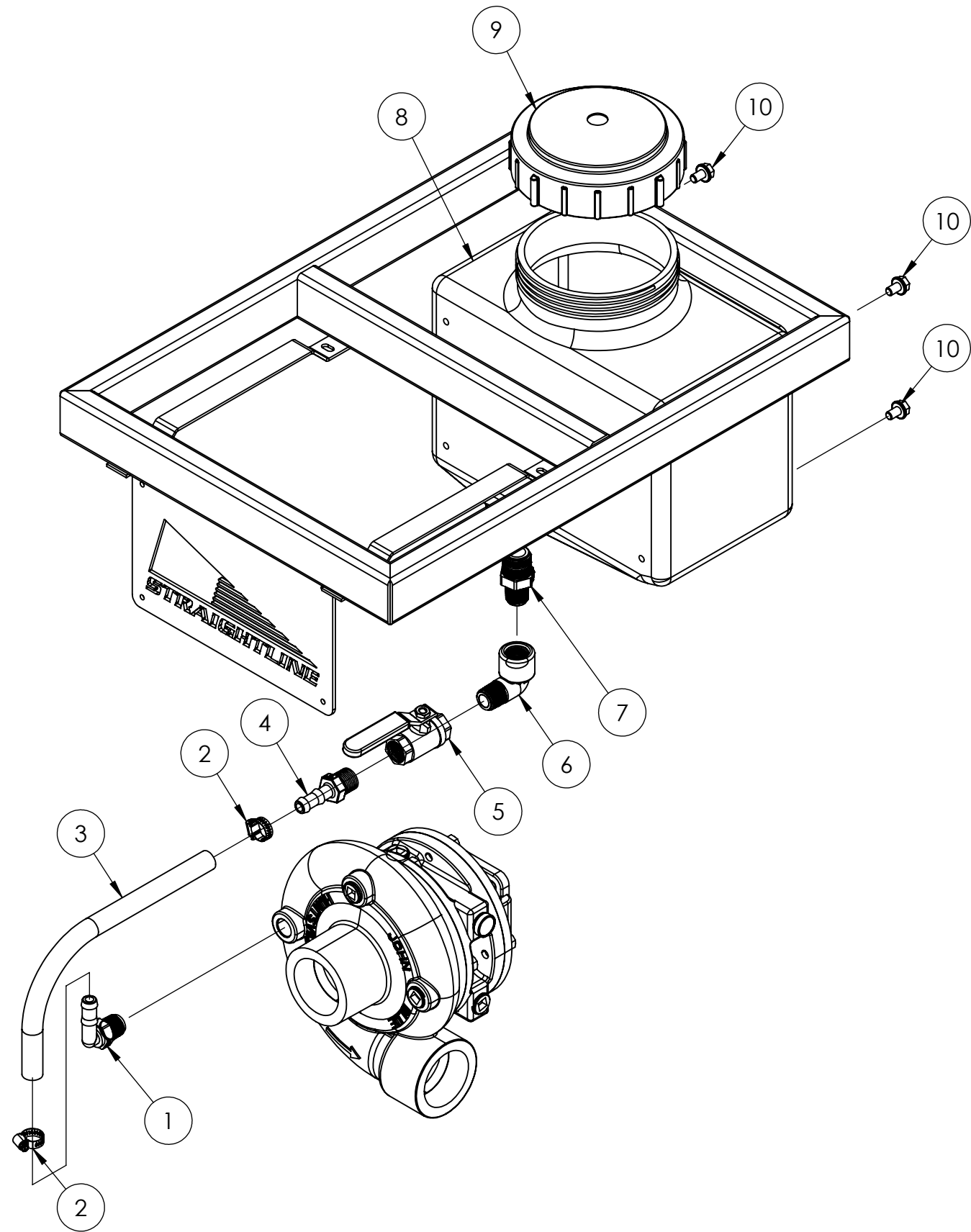
6 GALLON FUEL TANK



6 GALLON FUEL TANK

ITEM	PART #	DESCRIPTION	QTY
1	25389	CLAMP, HOSE, SPRING, 7/16" OD HOSE	2
2	706-106-02	HOSE, FUEL, 3/16" I.D. X 1/2 FT	1
3	22617	FUEL FILTER	1
4	25390	CLAMP, HOSE, SPRING, 1/2"	2
5	706-105-02	HOSE, FUEL, 1/4" I.D. X 2 FT	1
6	25311	VALVE 90 DEG WITH GROMMET	1
7	25592	GROMMET, VALVE	1
8	69106	BRACKET, TANK ATTACHMENT	2
9	25290	FUEL TANK, 6-GAL	1
10	1420WHN	NUT, WHIZ, 1/4-20	4
11	25406	RUBBER END CAPS, 1/4"	1
12	10X34HHSDS	SCREW, HEX HEAD, SELF DRILLING, 10 X 3/4"	4
13	1420X12WHB	BOLT, WHIZ, 1/4-20 X 1/2"	4
14	72023	PM200 TOP LID	1
15	25312	FUEL CAP, WITH TETHER	1

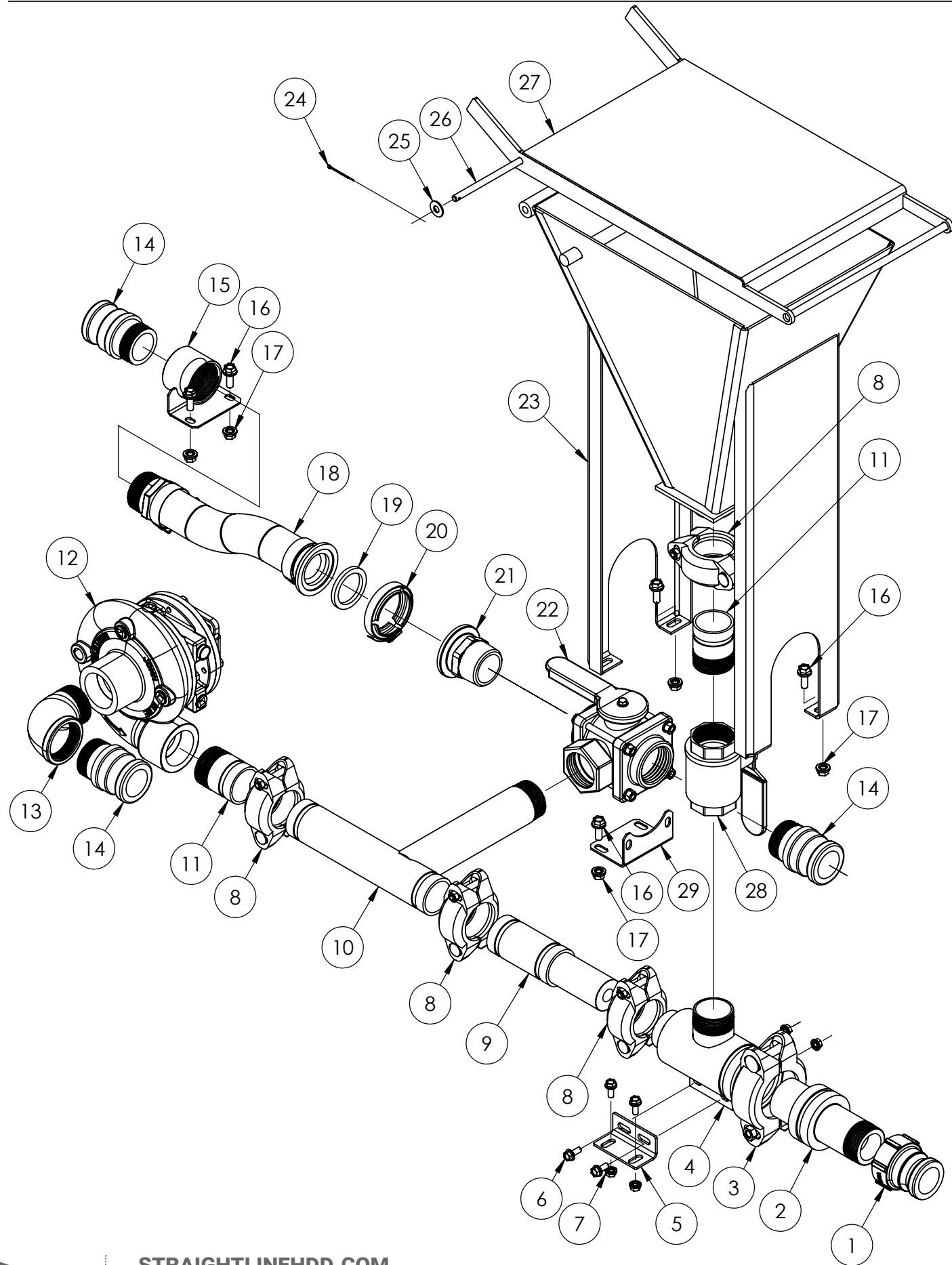
ANTIFREEZE TANK MOUNT



ANTIFREEZE TANK MOUNT

ITEM	PART #	DESCRIPTION	QTY
1	23651	ELBOW, POLY, 1/2" MPT X 1/2" HB	1
2	46943	CLAMP, HOSE, 5/16" - 7/8"	2
3	22632	HOSE, CLEAR PVC, BRAIDED, 1/2" LENGTH	1
4	23650	HOSE BARB, POLY, 1/2"	1
5	22931	VALVE, BALL, BRASS, 1/2" NPT	1
6	24969	STREET ELBOW, POLY, 1/2", 90 DEG	1
7	24975	NIPPLE, REDUCING, 3/4" X 1/2"	1
8	22548	TANK POLY, ANTIFREEZE	1
9	25426	LID, ANTIFREEZE	1
10	51618X12WHB	BOLT, WHIZ, 5/16-18 X 1/2"	4

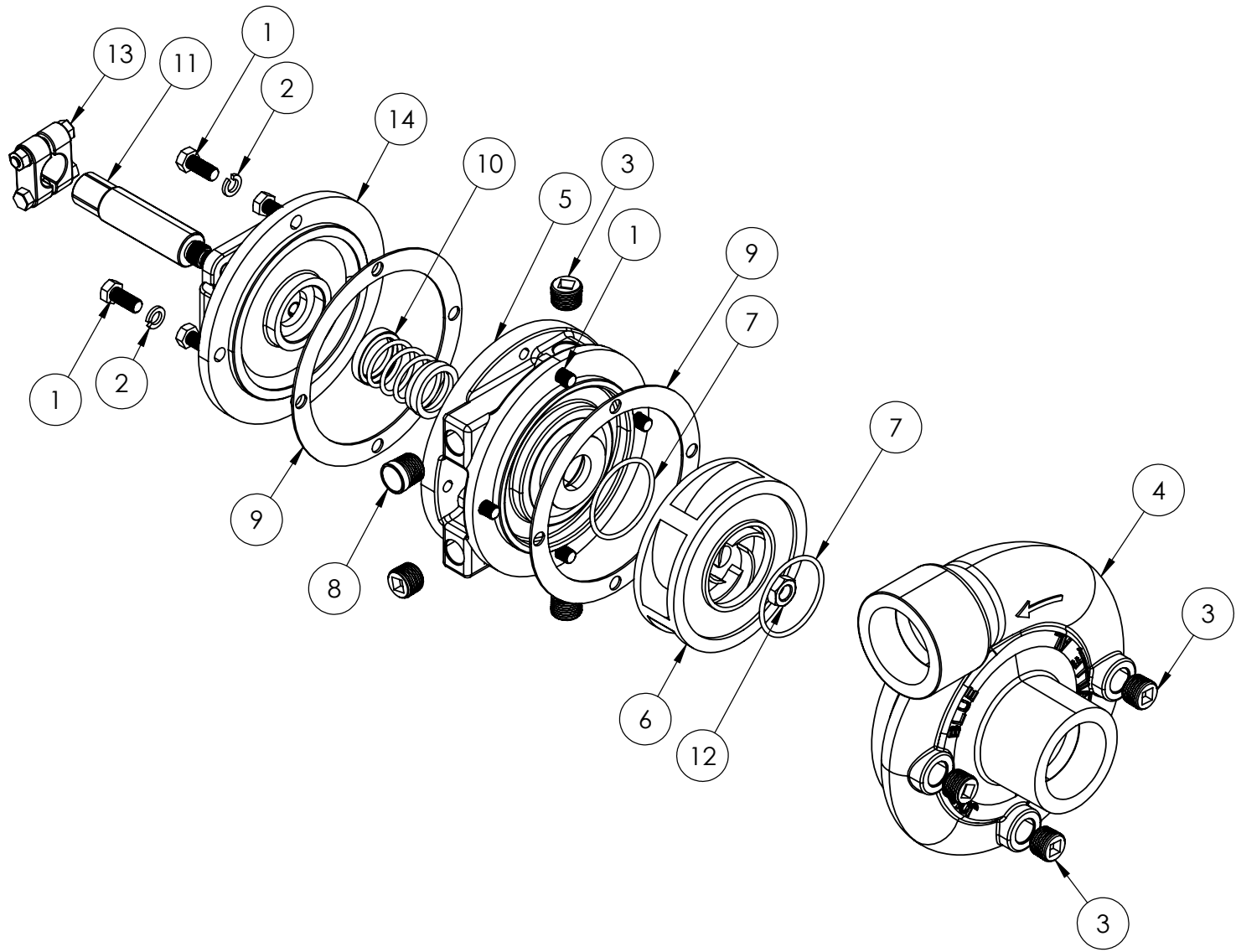
HOPPER AND VENTURI ASSEMBLY



HOPPER AND VENTURI ASSEMBLY

ITEM	PART #	DESCRIPTION	QTY
1	25658	ADAPTER, 2" MALE CAMLOCK X 2" NPTF	1
2	69613	VENTURI, MIXING TUBE, PM200	1
3	120958	COUPLER, FLEX, W/GASKET, 3"	1
4	70499	TEE, VENTURI - HOPPER	1
5	63939	BRACKET, SUPPORT	1
6	51618X34WHB	BOLT, WHIZ, 5/16-18 X 3/4" LONG	4
7	51618WHN	NUT, WHIZ, 5/16-18	4
8	120957	COUPLER, FLEX, W/GASKET, 2"	4
9	69658	VENTURI, JET, PM200	1
10	72026	TEE, CROSSOVER, PM200	1
11	64015	TUBE 2" GROOVLOK X 2" NPT	2
12	25128	PUMP, 2" STRAIGHT, 1" SHFT, CARBIDE SEAL	1
13	23487	ELBOW, PIPE, 2"	1
14	236-3757-02	ADAPTER, 2" MALE CAMLOCK X 2" NPTM	3
15	72042	BRACKET, HOSE MOUNT	1
16	3816X1WHB	BOLT, WHIZ, 3/8-16 X 1" LONG	8
17	3816WHN	NUT, WHIZ, 3/8-16	8
18	81468	HOSE, PM200, 2"	1
19	22535	GASKET, 2"	1
20	22543	HOSE CLAMP, 2"	1
21	22534	ADAPTER, 2" NPTM X 2" MANIFOLD	1
22	22583	VALVE, 3 WAY, 2"	1
*23	70887	HOPPER	1
*24	236-2978-02	COTTER PIN-.125 X 1.250	2
*25	38FW	WASHER, FLAT, 3/8"	2
*26	63935	ROD, LID HINGE	1
*27	71863	HOPPER LID	1
28	236-7978-02	VALVE, BRASS, BALL, 2" NPT	1
29	69674	BRACKET, VALVE MOUNT	1
30	81465	HOPPER ASSEMBLY (INCLUDES ITEMS *)	1

PUMP

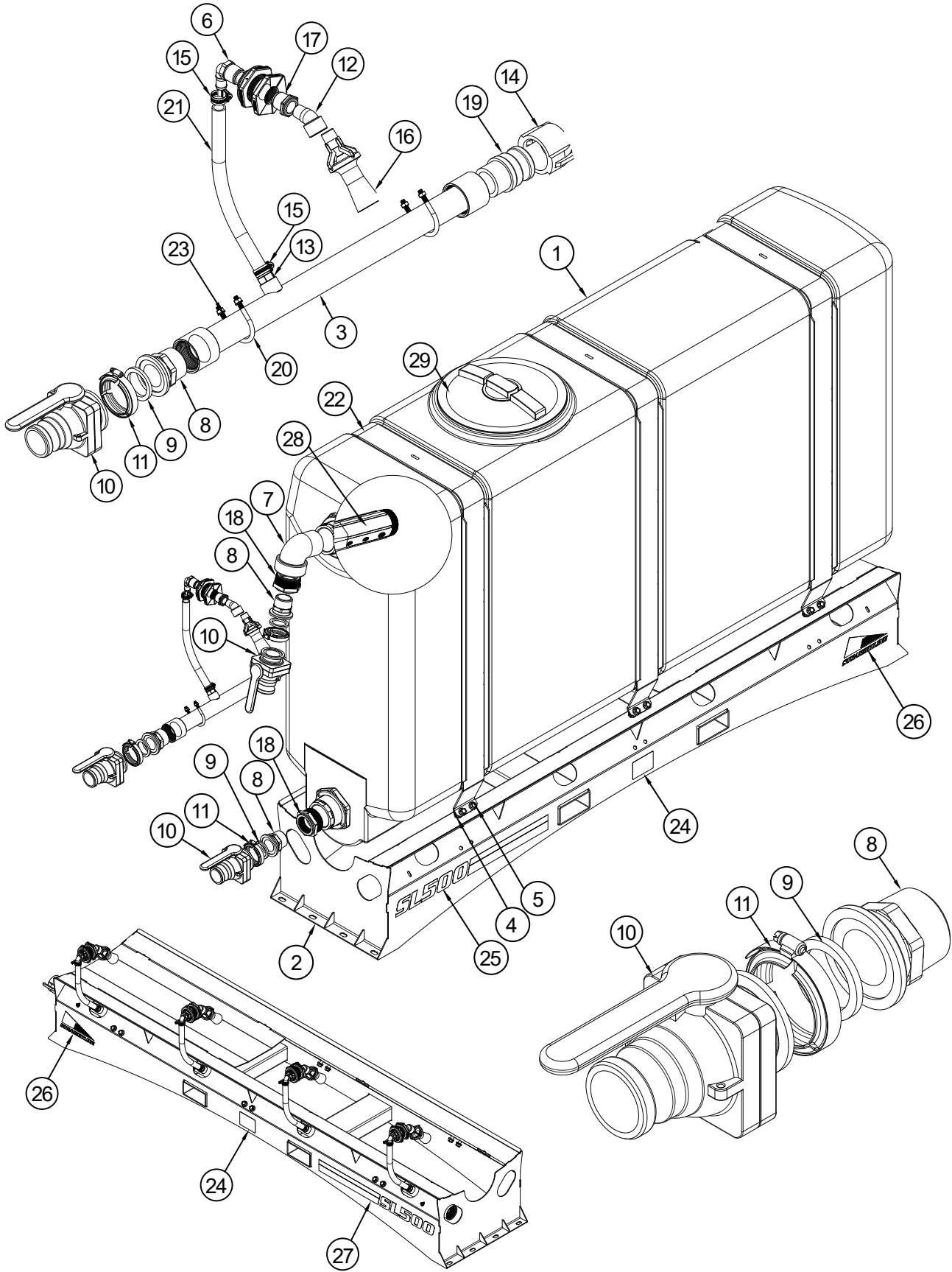


PUMP

ITEM	PART #	DESCRIPTION	QTY
1	25674	3/8 24NT X 7/8" IIIICS, STAINLESS	8
2	25675	3/8" LOCKWASHER, STAINLESS	8
3	25676	LOW-PRESSURE PIPE FITTING	6
4	25677	VOLUTE MACH. - 2" CENTRIFUGE	1
5	25678	RESERVOIR	1
6	25679	IMPELLER	1
7	25680	ANNULAR SEAL	2
8	25301	SIGHT GLASS, WINDOW VIEWER	1
9	25681	FLANGE ADAPTER GASKET	2
10	25682	SEAL, DOUBLE, CARBIDE	1
11	25683	IMPELLER SHAFT	1
12	25684	IMPELLER NUT	1
13	25685	2" PUMP, S.S. CLAMP AS SEMBLY	1
14	25686	ADAPTER - GAS ENGINE & PEDESTAL	1

SL500 ASSEMBLY / PARTS LIST

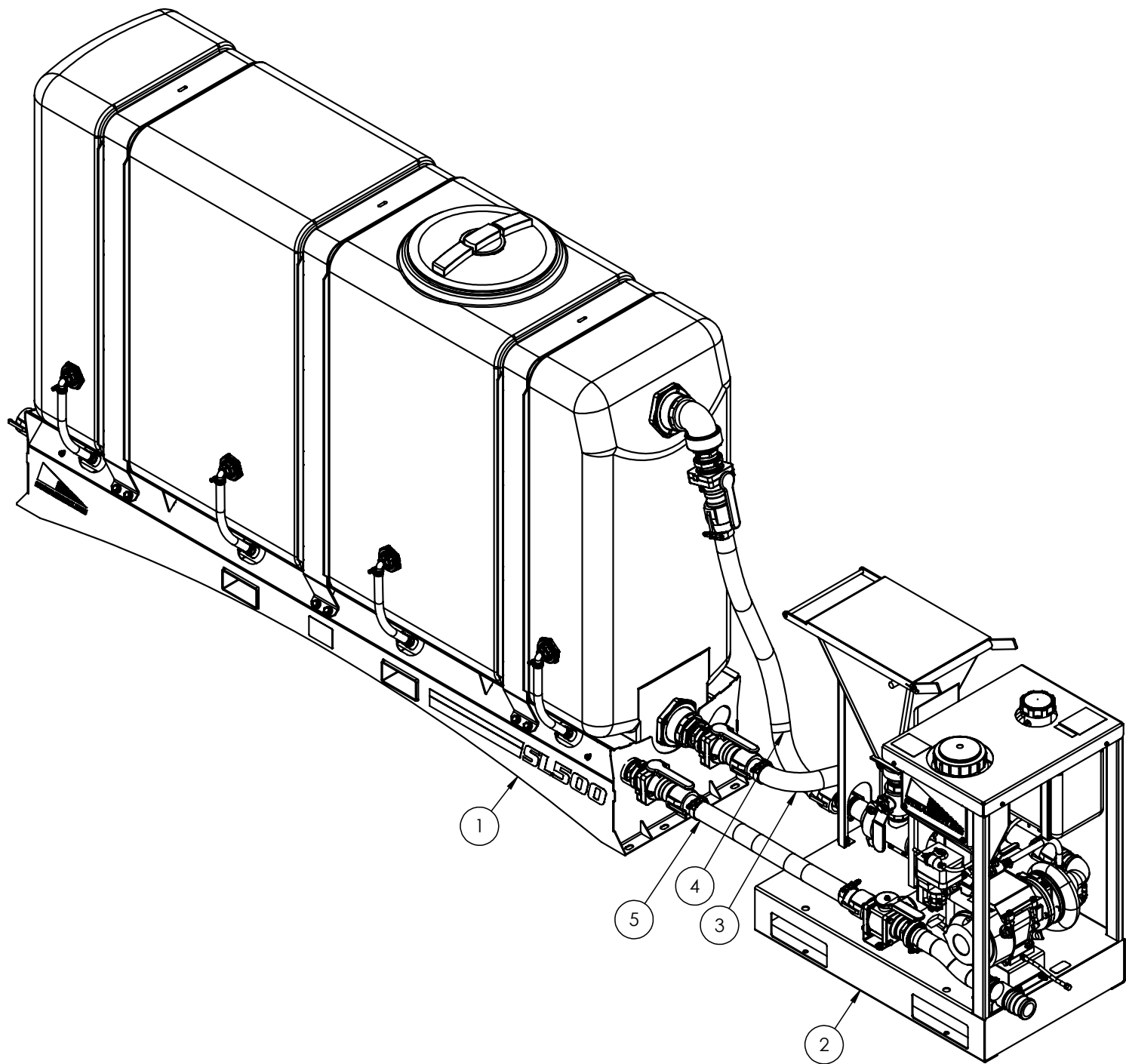
SL500 ASSEMBLY / PARTS LIST



ITEM	PART #	DESCRIPTION	QTY
1	24835	TANK ASSEMBLY, POLY, SL, SQUARED, 500 GAL	1
2	71759	CRADLE FRAME, PERFORMIX, ULTRA MIX SYSTEM PUMP, 500 GAL	1
3	71794	SL, PERFORMIX, 500 SQ. TANK, EDUCTOR TUBE WELDMENT	1
4	1213WHN	NUT, WHIZ, 1/2-13	12
5	1213X112WHB	BOLT, WHIZ, 1/2-13 X 1 1/2" LONG	12
6	203-169-02	FITTING, POLY, BANJO, HB10007590	4
7	22527	BANJO - 3" STREET ELBOW	1
8	22534	BANJO - 2" MANIFOLD X 2" FULL PORT	3
9	22535	BANJO - 2" BUNA GASKET	3
10	22537	BANJO - 2" FULL PORT FLANGE X 2" MALE CAM	3
11	22543	BANJO - 2" FULL PORT MANIFOLD HOSE CLAMP	3
12	22549	FITTING, POLY, STREET ELBOW, 3/4" 45DEG	4
13	22550	FITTING, POLY, HOSE BARB, 3/4" MPT x 3/4" HOSE BARB	4
14	22554	FITTING, POLY, CAMLOCK CAP, 2"	1
15	22556	HOSE CLAMP, 3/4" TO 1-3/4"	8
16	22610	TANK GUN - POLY - 3/4 MPT	4
17	22611	FITTING, POLY, BANJO, RB 100-075	4
18	23057	Fitting, Poly, Banjo, Bushing, RB300200	2
19	236-3757-02	QUICK CONNECT-2.00 M X 2.00 MNPT	1
20	24921	U-Bolt, 5/16 x 2 1/8" ID MMC#(3042T89)	2
21	24972	HOSE, CLEAR PVC, BRAIDED,3/4" ID	4
22	71808	STRAP WELDMENT	3
23	516LW	WASHER, LOCK, 5/16, (33620)	4
24	750-114-02	DECAL, FLAG	2
25	25067	DECAL, SL500 W/STRIPE, LH	1
26	236-9443-02	STRAIGHTLINE LOGO - 4" X 8.5"	2
27	25061	DECAL, SL500 W/STRIPE, RH	1
28	25139	Fitting, Poly, Banjo, Nipple, 3 NPT x 12, NIP300-12	1
29	23748	16" Tank Lid, Ring and 4" Center Lid / Vent	1



HOSE ASSEMBLIES



HOSE ASSEMBLIES

ITEM	PART #	DESCRIPTION	QTY
1	81239	SL500 TANK ASSEMBLY	1
2	81442	PM200 MIXER ASSY, HONDA	1
3	81462	HOSE ASSY, PM200-SL500, TANK - PUMP, 47"	1
4	81463	HOSE ASSY, PM200-SL500, HOPPER -TANK, 47"	1
5	81464	HOSE ASSY, PM200-SL500, PUMP - EDUCTORS, 29"	1

MAINTENANCE SCHEDULE

	⚠ WARNING	
	Accidental Starts can cause severe injury or death. Disconnect and ground spark plug lead(s) before servicing.	Before working on engine or equipment, disable engine as follows: 1) Disconnect spark plug lead(s). 2) Disconnect negative (-) battery cable from battery.

Normal maintenance, replacement or repair of emission control devices and systems may be performed by any repair establishment or individual.

MAINTENANCE SCHEDULE

Weekly

- Check heavy-duty air cleaner. AIR CLEANER / INTAKE

Every 25 Hours or Annually

- Service/replace low-profile pre-cleaner. AIR CLEANER / INTAKE

Every 100 Hours or Annually

- Replace low-profile air cleaner element. AIR CLEANER / INTAKE
- Change oil. LUBRICATION SYSTEM / CLUTCH
- Remove cooling shrouds and clean cooling areas. AIR CLEANER / INTAKE
- Check oil cooler fins, clean as necessary (if equipped). LUBRICATION SYSTEM
- 50/50 glycol antifreeze and water PUMP

Every 200 Hours

- Change oil and filter. LUBRICATION SYSTEM

Every 250 Hours

- Replace heavy-duty air cleaner element and check inner element. AIR CLEANER / INTAKE

Every 500 Hours

- Replace heavy-duty inner air cleaner element. AIR CLEANER / INTAKE
- Replace spark plugs and set gap. ELECTRICAL SYSTEM

Every 500 Hours

- Have crankshaft spline lubricated.
- 1. Perform these procedures more frequently under severe, dusty, dirty conditions.

MAINTENANCE

OIL RECOMMENDATIONS

This unit is supplied by StraightLine HDD with **10W-30 Synthetic Oil**.
100-Hour oil and 200-Hour oil filter change intervals for proper maintenance.

STORAGE

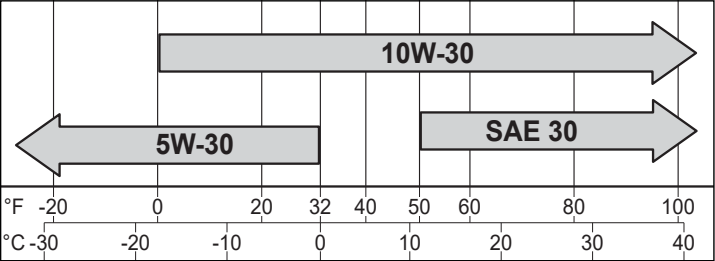
If engine will be out of service for 2 months or more follow procedure below.

1. Add fuel treatment or equivalent to fuel tank. Run engine 2-3 minutes to get stabilized fuel into fuel system (failures due to untreated fuel are not warrantable).
2. Change oil while engine is still warm from operation. Remove spark plug(s) and pour about 1 oz. of engine oil into cylinder(s). Replace spark plug(s) and crank engine slowly to distribute oil.
3. Disconnect negative (-) battery cable.
4. Store engine in a clean, dry place.



⚠ WARNING
Explosive Fuel can cause fires and severe burns.
Do not fill fuel tank while engine is hot or running.

Gasoline is extremely flammable and its vapors can explode if ignited. Store gasoline only in approved containers, in well ventilated, unoccupied buildings, away from sparks or flames. Spilled fuel could ignite if it comes in contact with hot parts or sparks from ignition. Never use gasoline as a cleaning agent.



NOTE: E15, E20 AND E85 are NOT approved and should NOT be used; effects of old or contaminated fuel are not warrantable.

Fuel must meet these requirements:

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



PUMP TROUBLESHOOTING	
ISSUE	PROBABLE CAUSE
Pump makes rattling noise while running	Cavitation or pump starvation (suction lift is too high or the inlet line is too restrictive)
Reduced pump output or pressure	• Clogged impeller or inlet piping (including strainer) • Leaks in suction line or at inlet gasket • Collapsed suction line • Trapped air in sections of suction line • Suction lift is too great – flooded inlet recommended • Worn or damaged parts (impeller or volute)
Pump fails to prime or slow prime	• Leaks in suction line or at inlet gasket • Suction lift is too great – flooded inlet recommended • Collapsed suction line
Seal reservoir fluid changes level	• Leak at the input shaft seal if level is low • Leak at the impeller side seal if level is high

NOTE TO OWNER

The pump should be inspected annually for any wear or damage to any of the components in order to ensure proper operation. Enter the date of installation in the space provided for future reference. This information will be required for ordering replacement parts or servicing your pump. Our engineering department constantly improves its products. We reserve the right to make design and specification changes without notice.

DATE OF INSTALLATION: _____

StraightLine HDD, Inc. (Company) warrants this equipment for 12 months or 1000 hours to be free from defects in material and workmanship, under normal use. Equipment and components not manufactured by StraightLine HDD are covered to the extent of the original manufacturer’s warranty and subject to their allowance only if found defective by such manufacturer.

This Limited Warranty covers parts deemed defective by StraightLine HDD, Inc. which aren’t covered under original manufactures warranty, only and does not cover any labor costs for diagnosis, troubleshooting, removal, installation, export duties, shipping, freight, or other transportation to or from the company.

Exclusion of Warranties: Except for warranties expressly made herein. StraughtLine HDD makes no other warranties, and liability hereunder is in lieu of all other merchantability or fitness for a particular purpose. StraightLine HDD reserve the right to modify, alter and improve any product without incurring any obligation to replace any product previously sold with such modification. No person is authorized to give any other warranty, or assume any additional obligation on StraightLine HDD’s behalf.

THIS WARRANTY IS IN LIEU OF ALL OTHER WRITTEN OR EXPRESS WARRANTIES AND REPRESENTATIONS. ANY IMPLIED WARRANTIES INCLUDING MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE ARE EXPRESSLY LIMITED TO THIS WRITTEN WARRANTY. StraightLine HDD SHALL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES.

Use of this product for any purpose other than its original intent, abuse of the product, and/or any modification to the original product is strictly prohibited by the manufacturer, StraightLine HDD. Any modification to the product should be approved by StraightLine HDD prior to use. StraightLine HDD will deny Warranty claims and liability in any situation involving misuse, abuse or modification.

Each new machine or component manufactured by StraightLine HDD through original buyer is warranted by StraightLine HDD to buyer and to any party or parties to whom buyer may resell, lease or lend the equipment to be free from defects in material and workmanship under normal use and service. This obligation of StraightLine HDD under this warranty is limited to the repair or replacement of defective parts or correction of improper workmanship of any parts of such equipment which shall within one year from the date of StraightLine HDD’s original delivery thereof, be returned to StraightLine HDD’s factory, transportation charges prepaid and which StraightLine HDD shall determine to its satisfaction upon examination thereof to have been thus defective. When it is impractical to return the defective parts of such equipment to StraightLine HDD’s factory, then StraightLine HDD shall have no liability for the labor cost involved in repairing or replacing any such parts and shall be liable solely for supplying the material necessary to replace or repair the defective parts, provided that prior there to StraightLine HDD shall have determined to its satisfaction that any such parts are thus defective.

This warranty shall not apply to any equipment which shall have been repaired or altered outside StraightLine HDD’s factory in any way so as to affect its durability, nor which has been subjected to misuse, abuse, negligence or accident, or operated in any manner other than in accordance with operating instructions provided by StraightLine HDD.

This warranty does not extend to repairs made necessary by the use of inferior or unsuitable parts or accessories, or parts or accessories not recommended by StraightLine HDD. StraightLine HDD makes no warranties in respect to parts, accessories or components not manufactured by StraightLine HDD, same ordinarily being warranted separately by their respective manufacturers.

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THIS WARRANTY IS IN LIEU OF ALL OTHER WRITTEN OR EXPRESS WARRANTIES AND REPRESENTATIONS. ANY IMPLIED WARRANTIES INCLUDING MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE ARE EXPRESSLY LIMITED TO THIS WRITTEN WARRANTY. JOHN BLUE COMPANY SHALL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES.

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Each new machine or component manufactured by John Blue Company through original buyer is warranted by John Blue Company to buyer and to any party or parties to whom buyer may resell, lease or lend the equipment to be free from defects in material and workmanship under normal use and service. This obligation of John Blue Company under this warranty is limited to the repair or replacement of defective parts or correction of improper workmanship of any parts of such equipment which shall within two years from the date of John Blue’s original delivery thereof, be returned to John Blue’s factory, transportation charges prepaid and which John Blue Company shall determine to its satisfaction upon examination thereof to have been thus defective. When it is impractical to return the defective parts of such equipment to John Blue’s factory, then John Blue shall have no liability for the labor cost involved in repairing or replacing any such parts and shall be liable solely for supplying the material necessary to replace or repair the defective parts, provided that prior thereto John Blue Company shall have determined to its satisfaction that any such parts are thus defective.

This warranty shall not apply to any equipment which shall have been repaired or altered outside John Blue’s factory in any way so as to affect its durability, nor which has been subjected to misuse, abuse, negligence or accident, or operated in any manner other than in accordance with operating instructions provided by John Blue Company. This warranty does not extend to repairs made necessary by the use of inferior or unsuitable parts or accessories, or parts or accessories not recommended by John Blue Company. John Blue Company makes no warranties in respect to parts, accessories or components not manufactured by John Blue Company, same ordinarily being warranted separately by their respective manufacturers.



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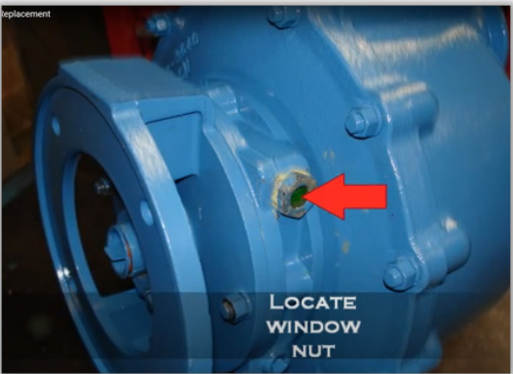
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SEAL REPLACEMENT INSTRUCTIONS FOR JOHN BLUE PUMPS

Disassemble pump carefully. For models with the hollow impeller shafts clamped over motor or pedestal shafts, carefully pull the impeller shaft in line with motor shaft. Do not work up and down or side to side or the impeller shaft will be sprung open and will not run true again. Grease motor or pedestal shaft before reinstallation.

Empty the remaining antifreeze from the reservoir.

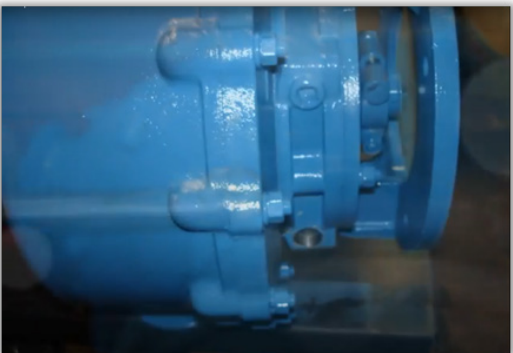
1. Locate window nut.



2. Remove with 3/4" wrench and keep.



3. Tilt pump and dispose of any remining antifreeze into an appropriate container.



Remove pump adapter to gain access to seal

1. Place pump so that the shaft is facing up.



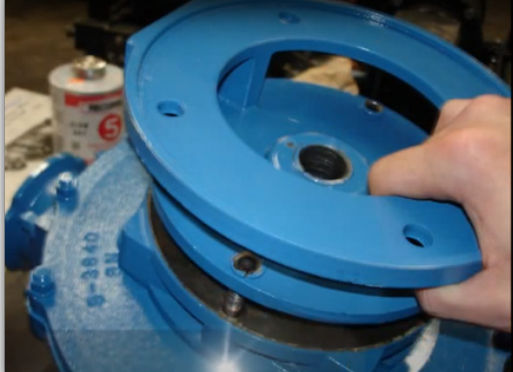
2. Remove the four nuts on the adapter.



3. Once all four nuts are removed, lightly jar the adapter loose with a rubber mallet.



4. Pull the adapter off of the reservoir.



Remove old seal rotary shaft elements, ceramic stationary element, and rubber cup.

1. Slide half of the seal along with spring off the shaft



2. Slide the other half off the shaft



3. Remove the reservoir from the pump



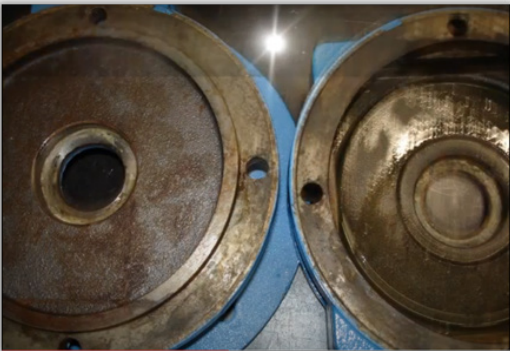
4. The stationary seats are show in the both the adapter and reservoir.



5. Wedge under the seat with a flat head screwdriver.



6. Remove the other seat from the adapter Carefully scrape clean the seat for the stationary ceramic.



Install new seal and stationary seats.

1. Clean the bore to prep for pipe sealant. element.



2. Apply pipe sealant thoroughly in bores. Coat the seat with a good grade of pipe compound such as Rector Seal. This will lubricate the seat for installation of the stationary element and will prevent corrosion under the rubber cup.



3. As shown, place the new seats into the bores. Push the ceramic stationary element into the seat firmly. Be sure it is seated all the way down in the seat and not further down on one side than the other. **It must be dead square with the shaft.** A clean nylon or polyethylene plastic tube may be used against the seat, using a small hammer to gently tap the seat home.



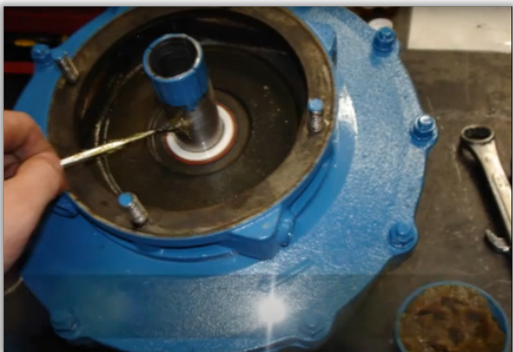
4. Install new rubber gasket if the used gasket is damaged.



5. Carefully place the reservoir onto the pump without cracking the seat face.



6. Thoroughly clean the shaft, removing any burrs or rough spots. Lubricate the shaft with light oil. Wipe the faces of the ceramic and rotary elements with a clean white cloth to be certain they are clean. Prep the shaft with grease before installing the new seal.



7. Slide the rotary element on the shaft and without delay assemble the pump so that the seal will be accurately located in the running position. This is important because the inner surface of the rotary element is coated with a special cement that begins to adhere to the shaft shortly after the rotary element is installed. Once the cement sets on the shaft, the rotary element cannot be repositioned without breaking the cement bond. If the bond is broken, the shaft may turn inside of the rotary element, which will rapidly wear the seal and cause leakage. Slide half of the seal down to the seat face.



8. Continue to slide other half and spring onto the shaft.



9. Compress seal several times to confirm that it slides easily on shaft. Regrease if necessary.

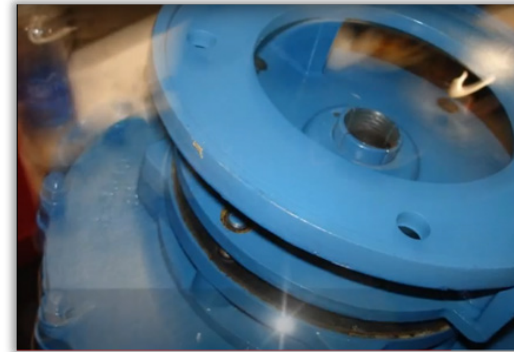


10. Place new rubber gasket on reservoir if used gasket is damaged.



Place adapter back on pump and secure

1. Place adapter on top of the reservoir.



2. Make sure orientation is correct as shown.



3. Place washers and nuts on studs. Hand-tighten in a cross pattern prior to torquing.



Refill reservoir with 50/50 antifreeze

1. Pour in 50/50 antifreeze where window nut was removed.



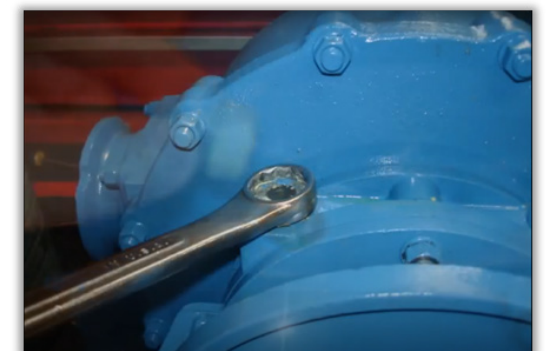
2. Fill reservoir until full.



3. Apply pipe sealant to window nut.



4. Important hand tighten nut. Too much torque can crack window.



After installation

After installation of the seal, do not operate the pump for 45 to 60 minutes in order to allow the cement to thoroughly set to make certain the rotary element turns with the shaft.

