



# **PERFORMIX<sup>®</sup> PM365**

## ***Bentonite Mixing System***

# **OWNERS MANUAL**





CONTENTS

Contents	1
Safety	2
Dimensions	3
StraightLine HDD® Model PM365 Mixer Operation Instructions	4
Safety Decals / Branding	5 - 6
Engine and Pump Mount Assembly	7 - 8
6 Gallon Fuel Tank	9 - 10
10 Gallon Fuel Tank	11 - 12
Antifreeze Tank Mount	13 - 14
Hopper and Venturi Assembly	15 - 16
Pump	17 - 18
SL1000 Assembly / Parts List	19 - 20
Hose Assemblies	21 - 22
Maintenance Schedule	23
Maintenance	24
Troubleshooting	25
Warranty	26 - 29
Warranty (John Blue Company)	30
Seal Replacement Instructions for MP Pumps	31 - 38




SAFETY


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.

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.

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.

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.

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.

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.


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.

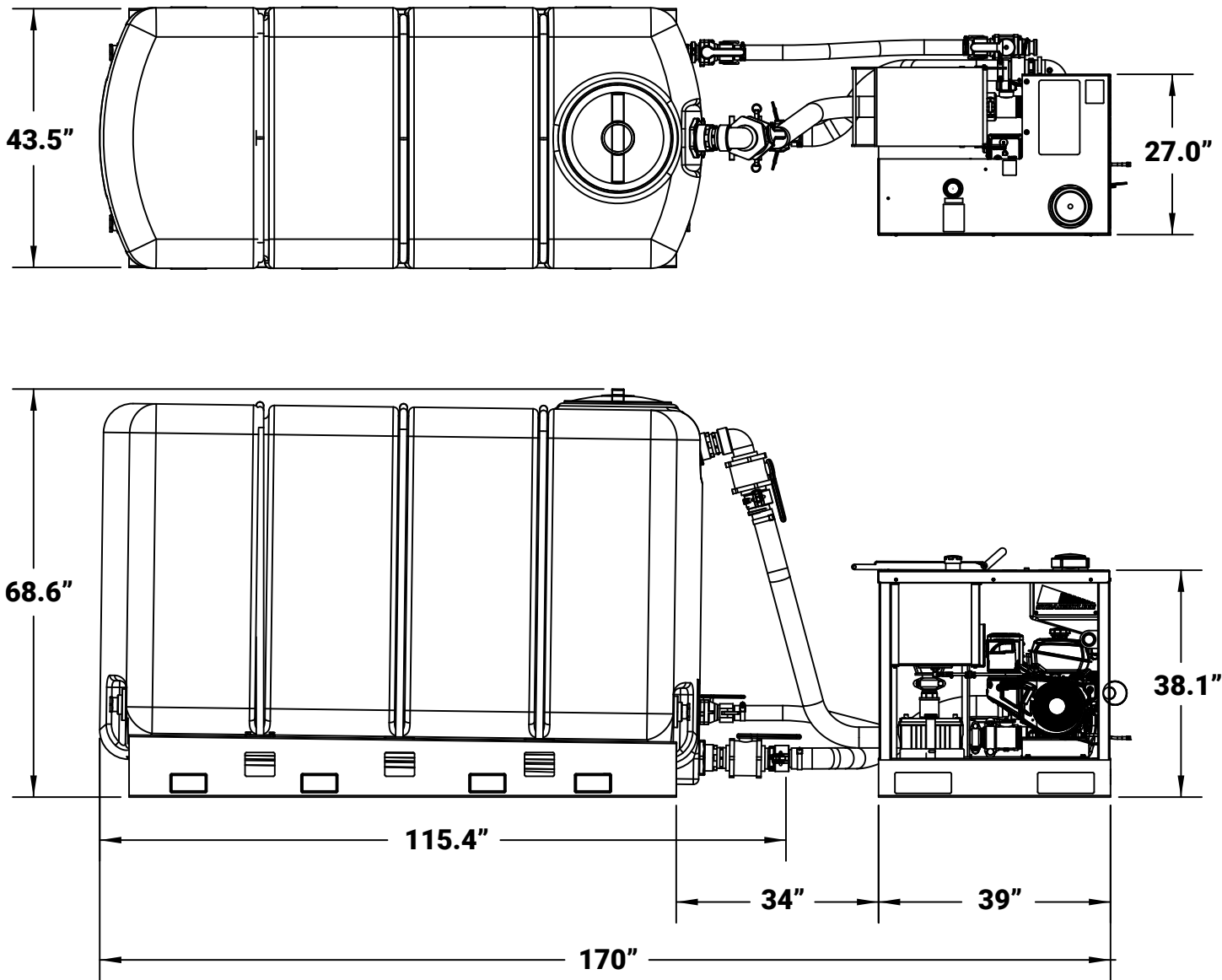
Fuel and fumes can catch fire or explode and cause serious burns or death.

120285



DIMENSIONS

PM365 MIXER & SL1000 TANK  
ARE DESIGNED TO SIT 34" APART.



STRAIGHTLINEHDD.COM

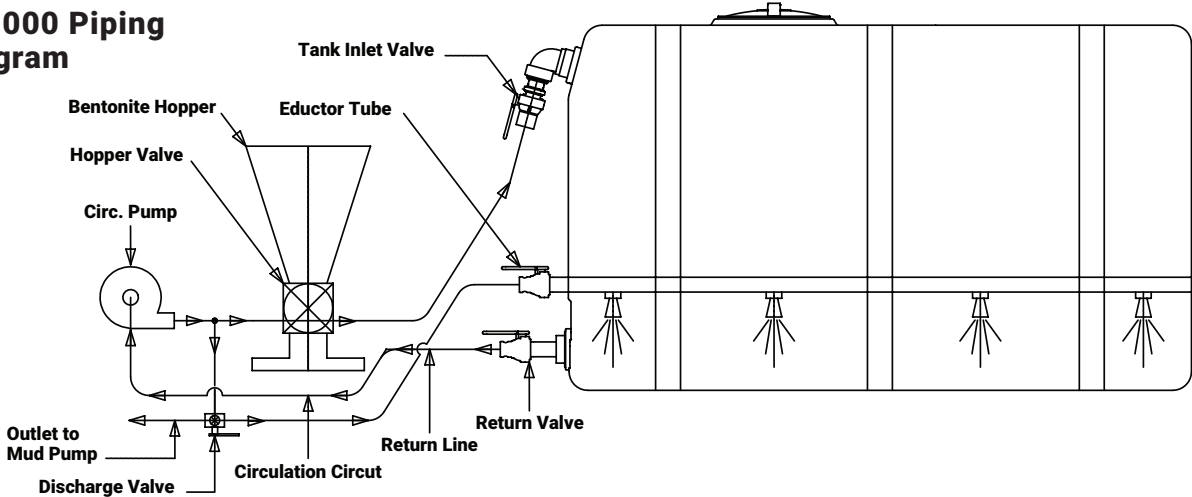
620-802-0200 | SLSALES@STRAIGHTLINEHDD.COM

Straightline® Model PM365 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.**

PM365 SL1000 Piping  
Circuit Diagram



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, ½ 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

Prestart Fluid Line Valve Settings

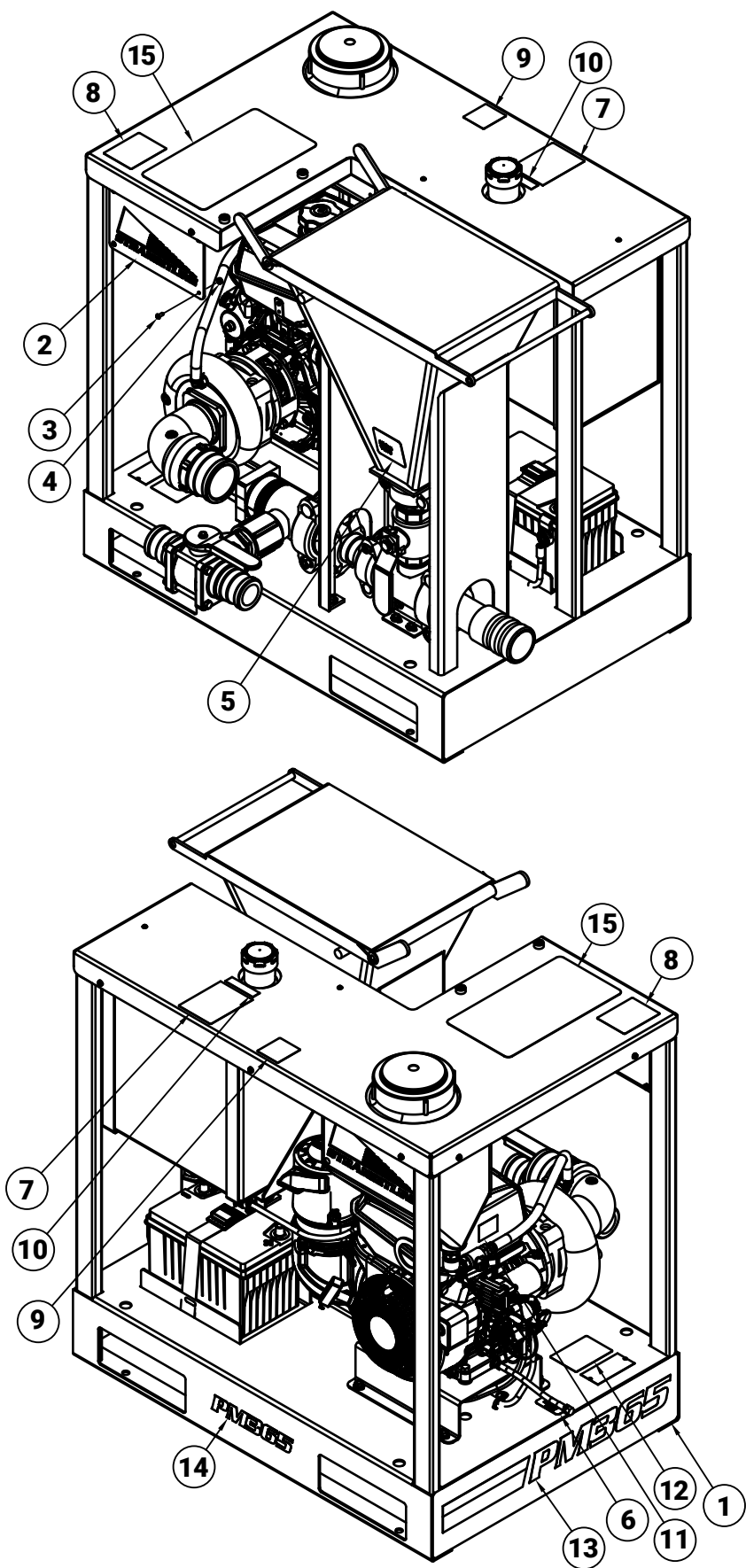
- Discharge Valve on outlet line: **Closed**
- Return Valve on return line: **Open**
- Tank Inlet Valve on mixing line: **Open**
- Hopper Valve on hopper: **Closed**
- Antifreeze Tank Valve: **Closed**

Throttle Settings

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



SAFETY DECALS / BRANDING

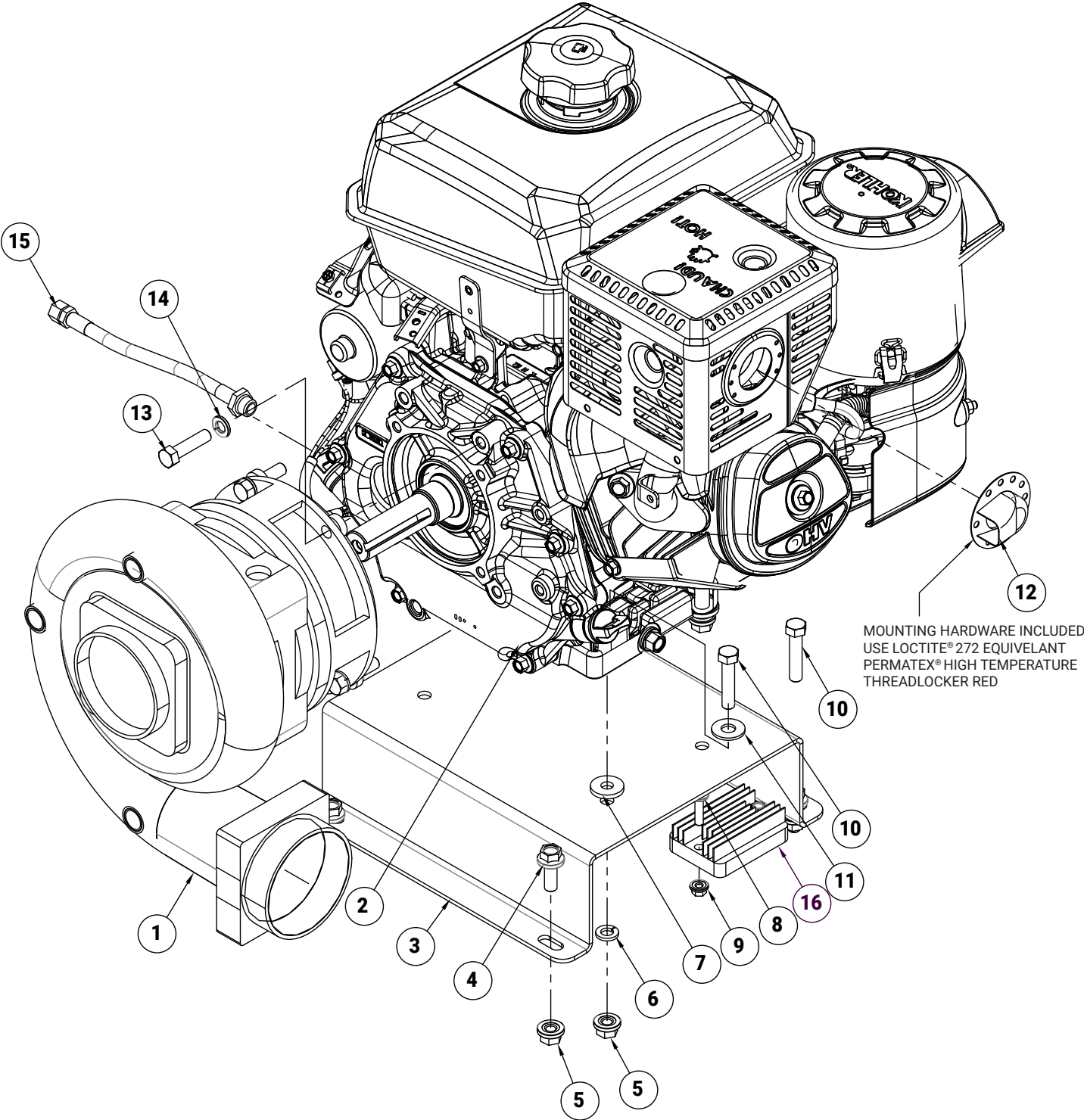


SAFETY DECALS / BRANDING

ITEM	PART #	DESCRIPTION	QTY
1	71830	MAIN FRAME WELDMENT	1
2	68945	PERFORMIX, SS BACKER PLATE, SL WEDGE GUSSET PLATE	1
3	1024X12BHCSSS	SCREW, CAP, BUTTON HEAD, 10-24 X ½", STAINLESS	4
4	1024HNNL	NUT, HEX, NYLOCK, 10-24, GR5, ZN	4
5	120271	DECAL, MIXING VALVE	1
6	120279	DECAL, SYNTHETIC OIL	1
7	120285	DECAL, DANGER, AVOID FUEL FIRE	1
8	120286	DECAL, WARNING_AVOID BREATHING DUST	1
9	120344	DECAL, WARNING, HOT MUFFLER	1
10	23269	DECAL, USE UNLEADED GASOLINE ONLY	1
11	25065	DECAL, NOTICE, FUEL TANK INOPERABLE	1
12	750-114-02	DECAL, FLAG	1
13	25122	DECAL, PM365 W/STRIPE	1
14	25123	DECAL, PM365	1
15	25124	DECAL, OPERATING INSTRUCTIONS PM365	1



ENGINE AND PUMP MOUNT ASSEMBLY

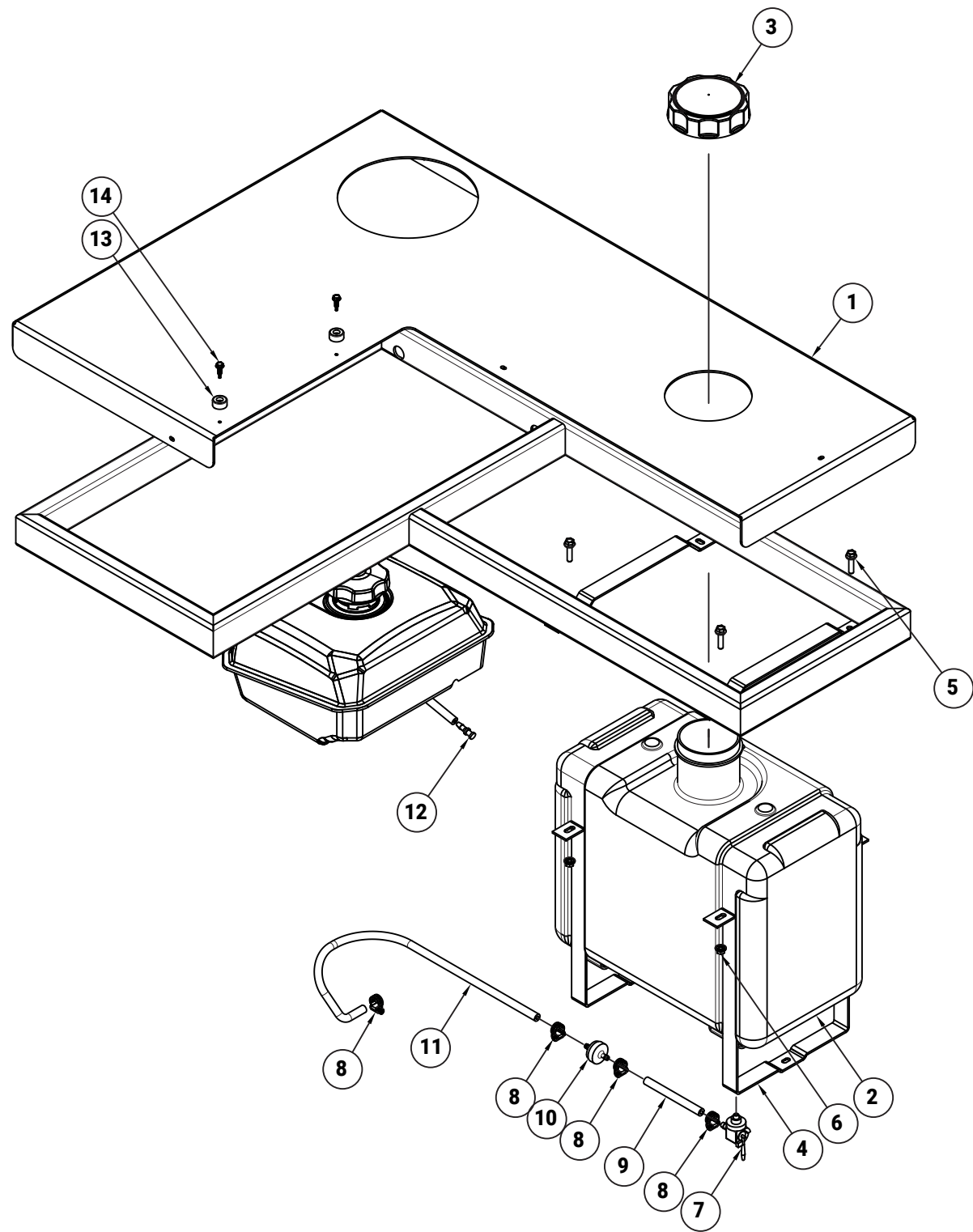


ENGINE AND PUMP MOUNT ASSEMBLY

ITEM	PART #	DESCRIPTION	QTY
1	22002	PUMP, CENTRIFUGAL, 3.00IN	1
2	23745	ENGINE, KOHLER, 14 HP, CH440	1
3	69001	PLATE, MOTOR MOUNT, PM365	1
4	3816X1WHB	BOLT, WHIZ, 3/8-16 X 1" LONG	4
5	3816WHN	NUT, WHIZ, 3/8-16	8
6	38LW	WASHER, LOCK, 3/8	4
7	25125	WASHER-3/8-ABRASION-RESISTANT CUSHIONING	4
8	1420X1WHB	BOLT, WHIZ, 1/4-20 X 1" LONG	2
9	1420WHN	NUT, WHIZ, 1/4-20	2
10	3816X134HB	BOLT, HEX, 3/8-16 X 1 3/4" LONG	4
11	38FW	WASHER, FLAT, 3/8"	2
12	24333	DEFLECTOR, EXHAUST, 14 HP KOHLER ENGINE	1
13	3816X112HB	BOLT, HEX, 3/8-16 X 1 1/2" LONG	4
14	38LW	WASHER, LOCK, 3/8"	4
15	25227	DRAIN EXTENSION, OIL	1
16	25448	RECTIFIER, KOHLER, CH440	1



6 GALLON FUEL TANK - MODEL CHANGE - NOV. 2022 AND LATER



6 GALLON FUEL TANK - MODEL CHANGE  
\*EFFECTIVE NOVEMBER 2022 AND LATER

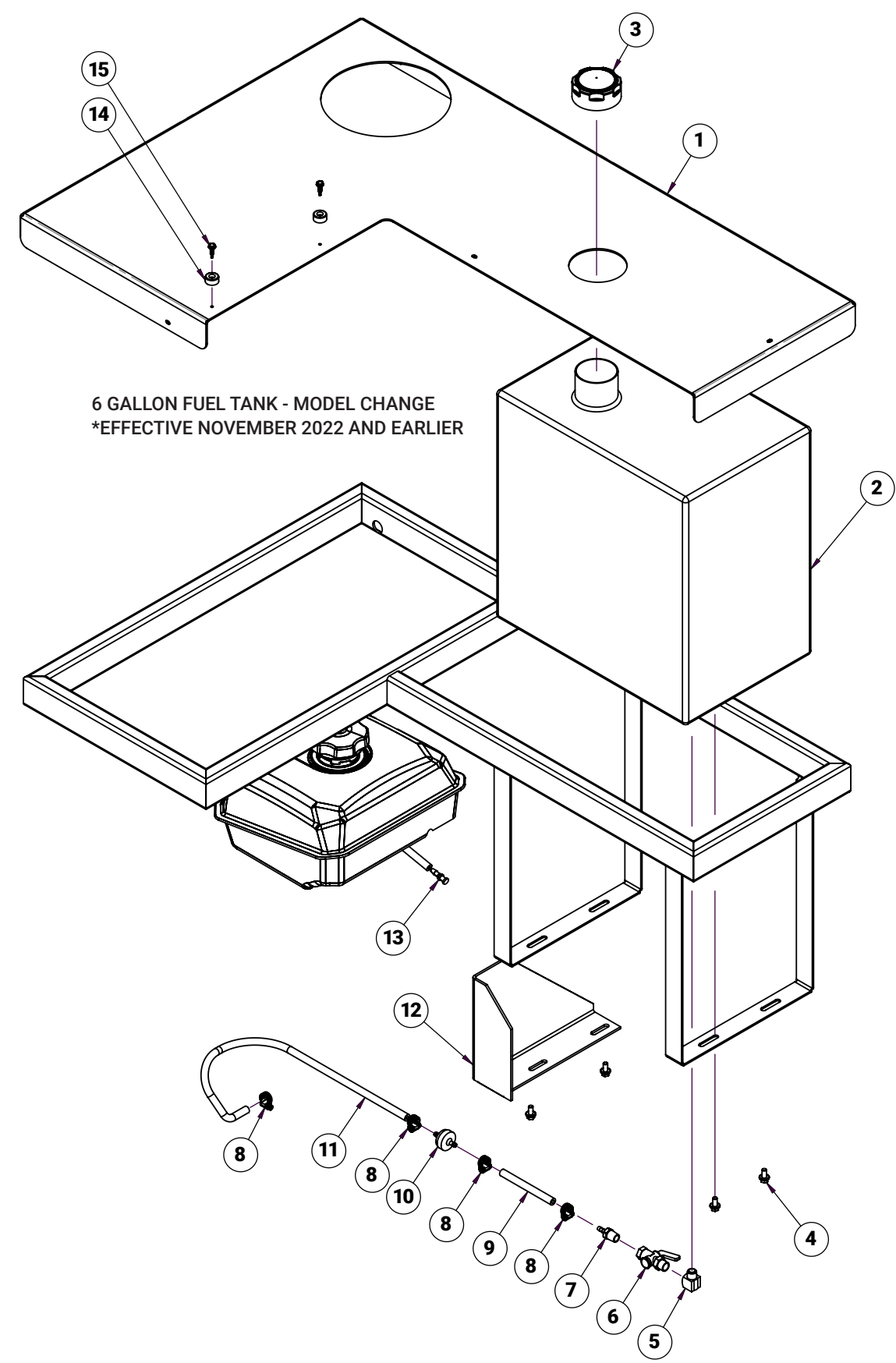
6 GALLON FUEL TANK - MODEL CHANGE - NOV. 2022 AND LATER

ITEM	PART #	DESCRIPTION	QTY
1	71854	WELDMENT, SKID LID, PM365	1
2	25290	TANK, 6 GALLON, EPA	1
3	25312	FUEL CAP, 3.5" NECK	1
4	69106	6 GALLON FUEL TANK ATTACHMENT BRACKET, LOWER	2
5	1420X1WHB	BOLT, WHIZ, 1/4-20 X 1" LONG	4
6	1420WHN	NUT, WHIZ, 1/4-20	4
7	25311	FUEL TANK VALVE 90 DEGREE WITH GROMMET	1
8	46942	CLAMP, HOSE, 5/16 ~ 5/8", #4, IDEAL	4
9	706-106-02	HOSE, FUEL, 3/16 ID, QTY IN FT	2
10	23921	FILTER, FUEL, 3/16 INLINE, 315-1920	1
11	706-106-02	HOSE, FUEL, 3/16 ID, QTY IN FT	2
12	24971	FITTING, PLUG FOR 3/16" TUBE ID TIGHT-SEAL PLASTIC BARB	1
13	24712	YS, COUNTERWEIGHT BUMPER	2
14	10X34HHSDS	SCREW, HEX HEAD, SELF DRILLING, 10 X 3/4	2





10 GALLON FUEL TANK - MODEL CHANGE - NOV. 2022 AND EARLIER

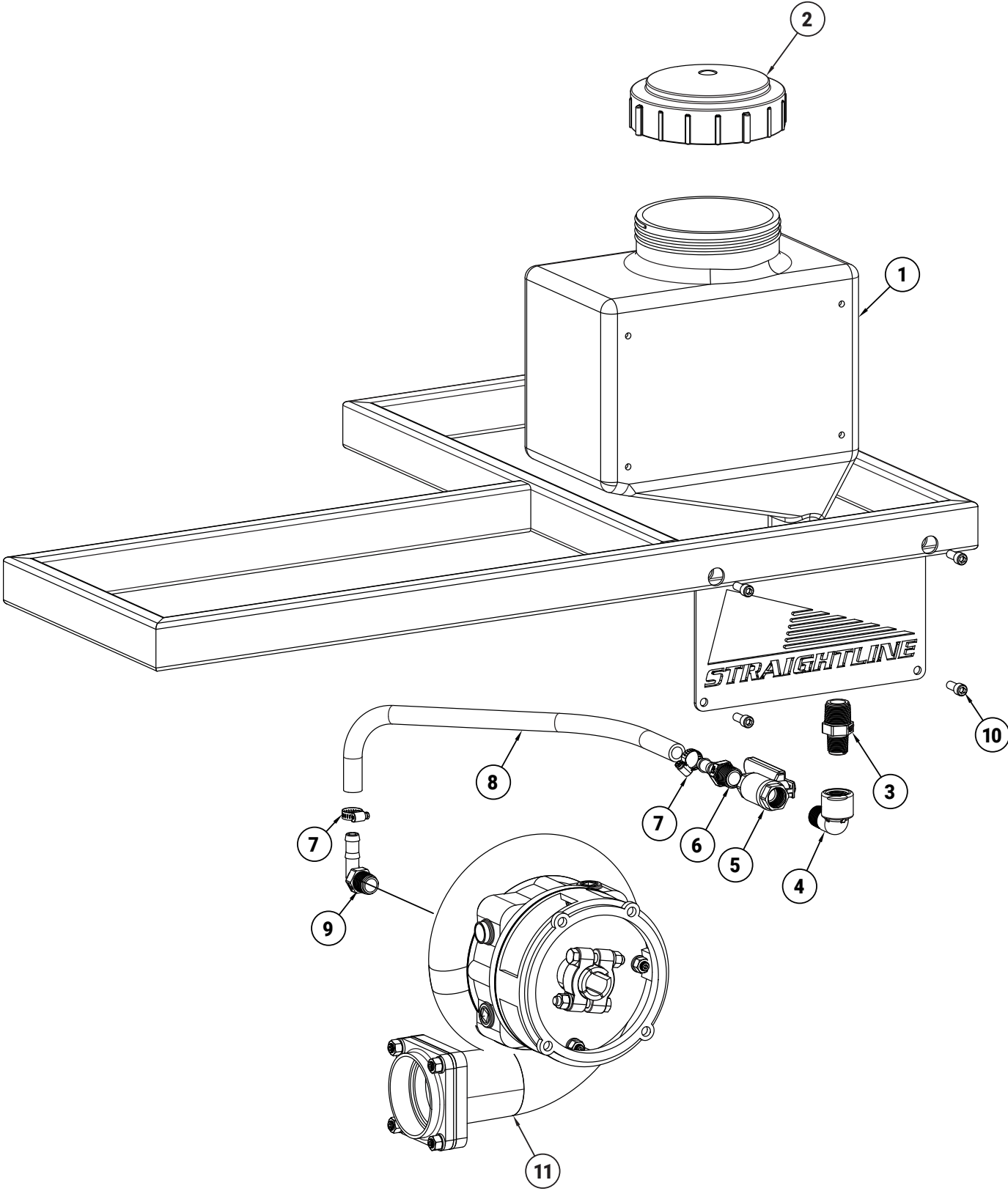


10 GALLON FUEL TANK - MODEL CHANGE - NOV. 2022 AND EARLIER

ITEM	PART #	DESCRIPTION	QTY
1	71831	WELDMENT, SKID LID, PM365	1
2	23250	TANK, FUEL 10 GALLON	1
3	25447	CAP, FUEL, 2 1/4 BUTTRESS	1
4	1420X12WHB	BOLT, WHIZ, 1/4-20 X 1/2" LONG	4
5	24166	FITTING, BRASS, STREET ELBOW, 1/4", 1000PSI	1
6	22169	VALVE-SHUTOFF, 0.250	1
7	23815	FITTING, 1/4 MP X 3/16 BARB, BRASS	1
8	46942	CLAMP, HOSE, 5/16 ~ 5/8", #4, IDEAL	4
9	705-106-02	HOSE, FUEL, 1/4 ID, QTY IN FT	2
10	23921	FILTER, FUEL, 3/16 INLINE, 315-1920	1
11	706-106-02	HOSE, FUEL, 3/16 ID, QTY IN FT	2
12	69063	HEAT SHIELD, PM365	1
13	24971	FITTING, PLUG FOR 3/16" TUBE ID TIGHT-SEAL PLASTIC BARB	1
14	24712	YS, COUNTERWEIGHT BUMPER	2
15	10X34HHSDS	SCREW, HEX HEAD, SELF DRILLING, 10 X 3/4	2



ANTIFREEZE TANK MOUNT

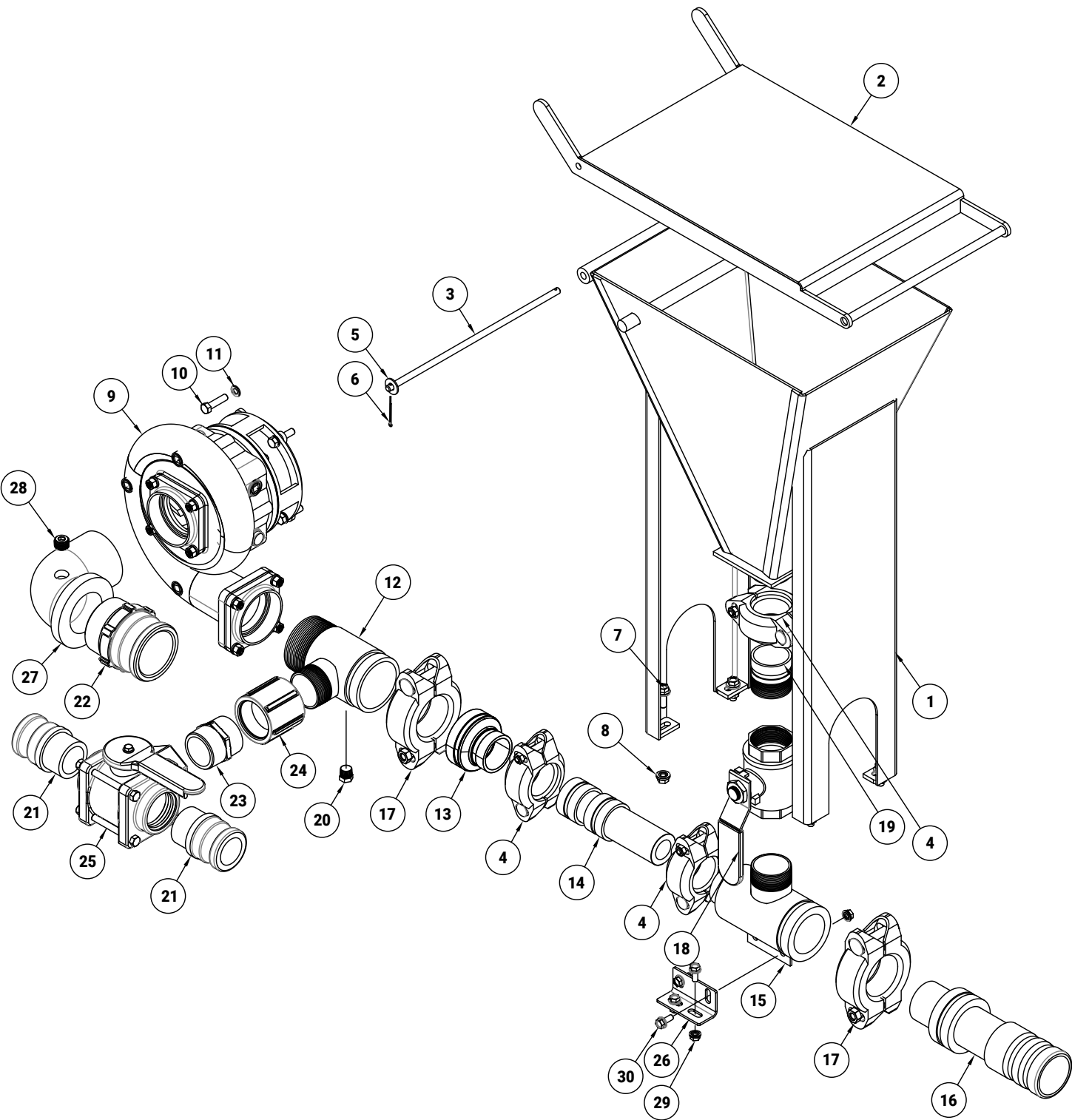


ANTIFREEZE TANK MOUNT

ITEM	PART #	DESCRIPTION	QTY
1	22548	TANK, POLY, ANTIFREEZE	1
2	25426	LID, ANTIFREEZE	1
3	24975	REDUCING NIPPLE, 3/4 X 1/2 MALE	1
4	24969	STREET ELBOW, 90DEG, 1/2"	1
5	22931	VALVE, BALL, BRASS, 1/2" NPT	1
6	23650	HOSE BARB, 1/2"	1
7	46943	CLAMP, HOSE, 5/16 ~ 7/8", #6	2
8	46938	HOSE, CLEAR PVC, BRAIDED, 1/2" ID, QTY IN FT	1.58
9	23651	HOSE BARB, 1/2" MPT X 1/2"	1
10	51618X34SHCS	SCREW, CAP, SOCKET HEAD, 5/16-18 X 3/4	4
11	22002	PUMP, 3", 1" SHAFT	1



HOPPER AND VENTURI ASSEMBLY

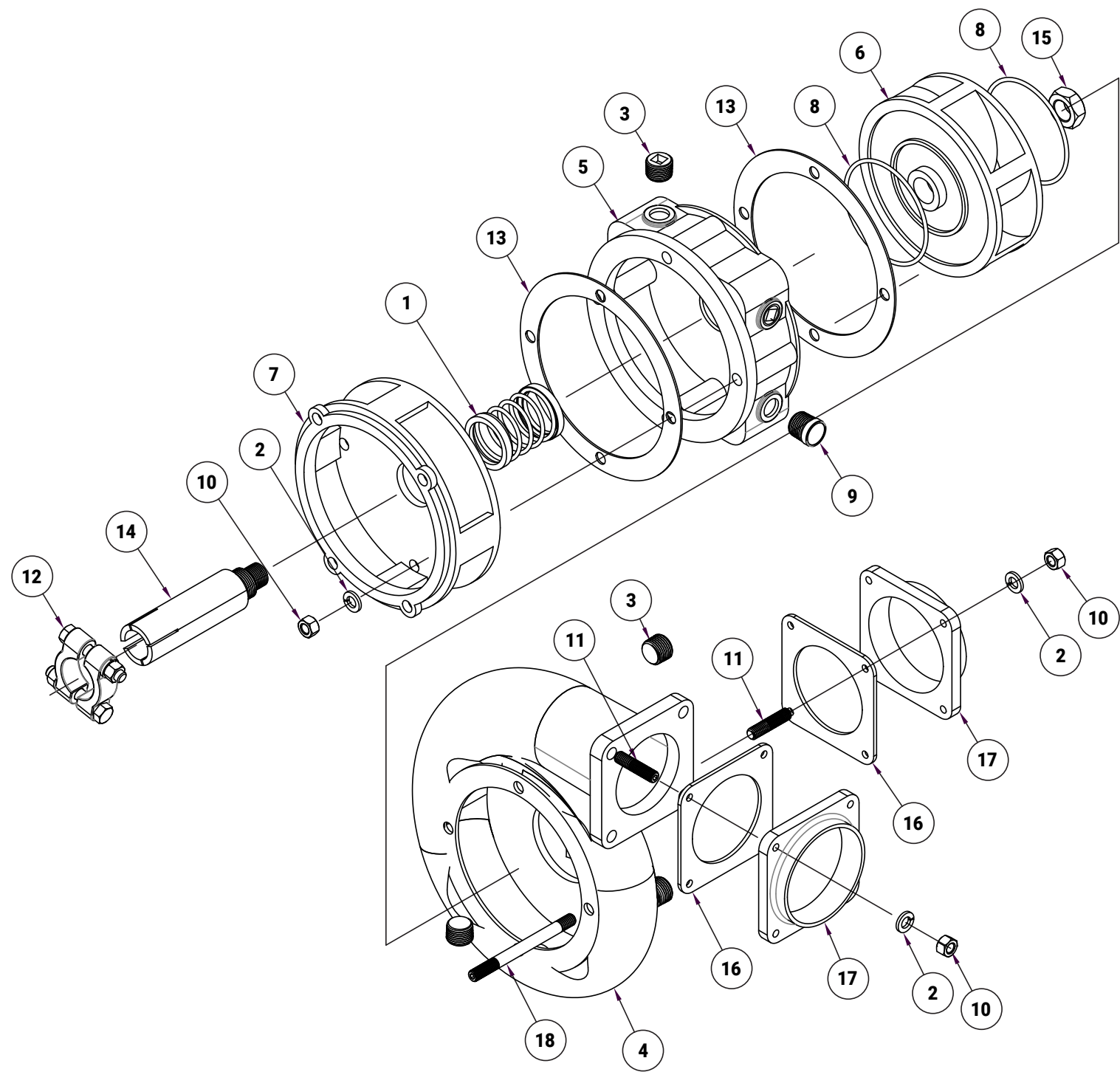


HOPPER AND VENTURI ASSEMBLY

ITEM	PART #	DESCRIPTION	QTY
1	70887	HOPPER	1
2	70883	LID HOPPER	1
3	63935	ROD LID	1
4	120957	COUPLER, FLEX, VICTAULIC FIRELOCK W/GASKET, 2"	3
5	38FW	WASHER, FLAT, 3/8"	2
6	236-2978-02	COTTER PIN-.125 X 1.250	2
7	3816X1WHB	BOLT, WHIZ, 3/8-16 X 1" LONG	4
8	3816WHN	NUT, WHIZ, 3/8-16	4
9	22002	PUMP, CENTRIFUGAL, 3" IN	1
10	3816X112HB	BOLT, HEX, 3/8-16 X 1 1/2" LONG	4
11	38LW	WASHER, LOCK, 3/8"	4
12	70822	TEE, 3" NPT X 3" GROOVLOK X 2" NPT	1
13	120991	REDUCER FITTING-2" X 3" GRUVLOK	1
14	70819	MUD MIXER JET	1
15	70499	TEE, WELDMENT	1
16	70885	VENTURI OUTLET, WELDMENT	1
17	120958	COUPLING, 3" GRUVLOK	2
18	236-7978-02	BALL VALVE, 2" NPT, BRASS	1
19	64015	TUBE, 2" NPT X 2" GROOVLOK	1
20	6MPPLUG	PLUG-PIPE, 5/8 NPT	1
21	236-3757-02	QUICK CONNECT-2.00 M X 2.00 MNPT	2
22	22036	ADAPTOR, 3" MALE PIPE X 3" MALE CAM LOCK	1
23	22458	NIPPLE, SHORT, 2"	1
24	22459	COUPLING, 2"	1
25	22583	3-WAY VALVE	1
26	63939	SHEET L BRACKET	1
27	67296	STREET ELBOW 3" WITH 1/2 NPT PORT	1
28	120138	PIPE PLUG 1/2 " COUNTERSUNK SOCKET	1
29	51618WHN	NUT, WHIZ, 5/16-18	4
30	51618X34WHB	BOLT, WHIZ, 5/16-18 X 3/4" LONG	4



PUMP



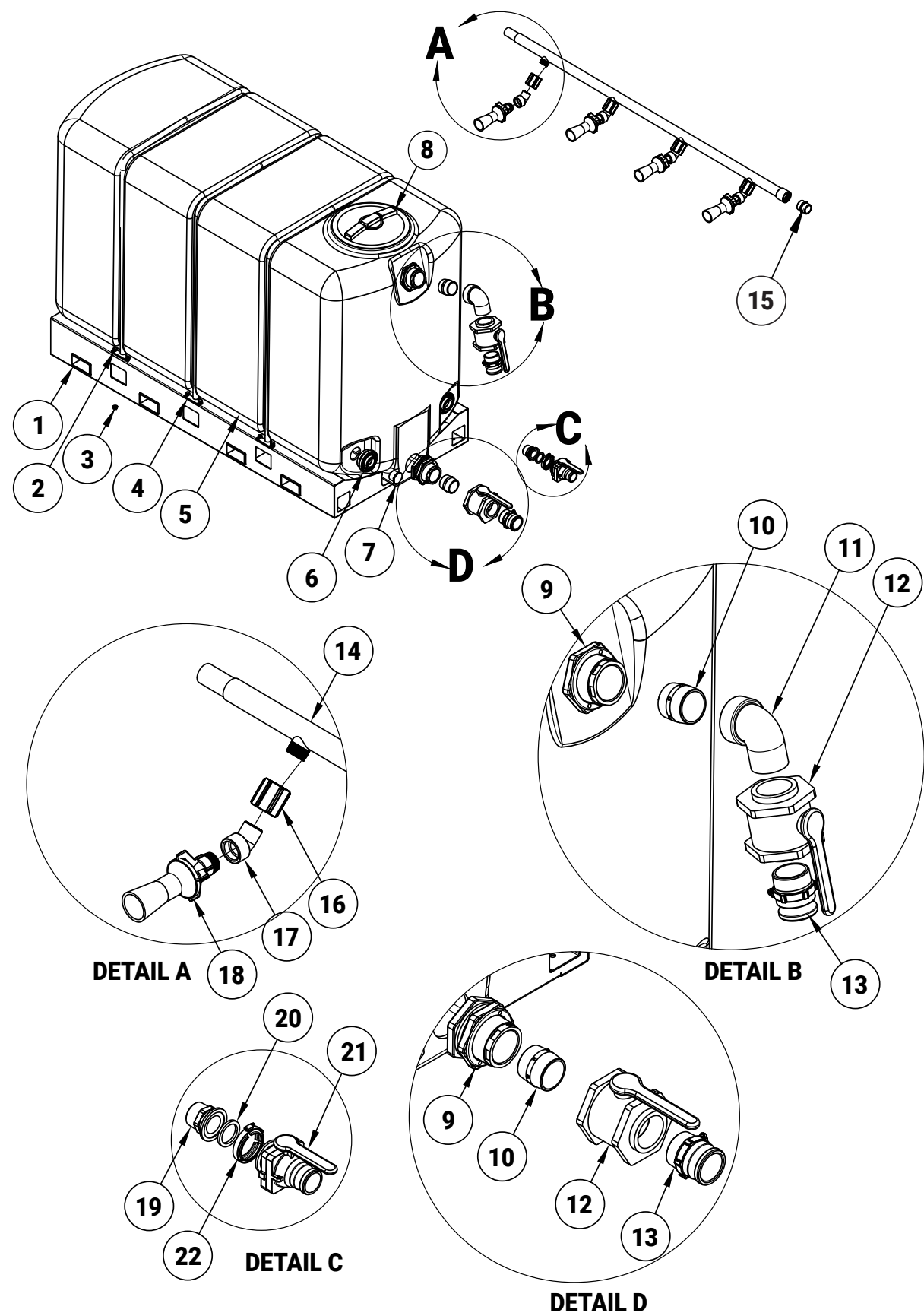
PUMP

ITEM	PART #	DESCRIPTION	QTY
1	22434	DOUBLE SEAL, CARBIDE	1
2	93025	WASHER, LOCK, 3/8, STAINLESS	12
3	120138	PIPE PLUG, 1/2" W/ 3/8 SQ SOCKET	6
4	22437	VOLUTE HOUSING	1
5	22438	RESERVOIR	1
6	22421	IMPELLER	1
7	25362	ENGINE ADAPTER	1
8	22420	ANNULAR SEAL	2
9	25301	WINDOW VIEW RESEVIOR	1
10	24592	HEX NUT, 3/8-24 - STAINLESS	12
11	24591	STUD, 3/8-24 X 1-5/8 STAINLESS	8
12	25363	CLAMP ASSY (SMOOTH)	1
13	22435	GASKET SEAL	2
14	22850	SHAFT, IMPELLER	1
15	22422	LOCKNUT, JAM, 3/4-16 LEFT HAND	1
16	22436	FLANGE GASKET	2
17	24973	OUTLET FLANGE, 3"	2
18	24590	STUD, 3/8 X 3 1/2 SS	4





SL1000 ASSEMBLY / PARTS LIST

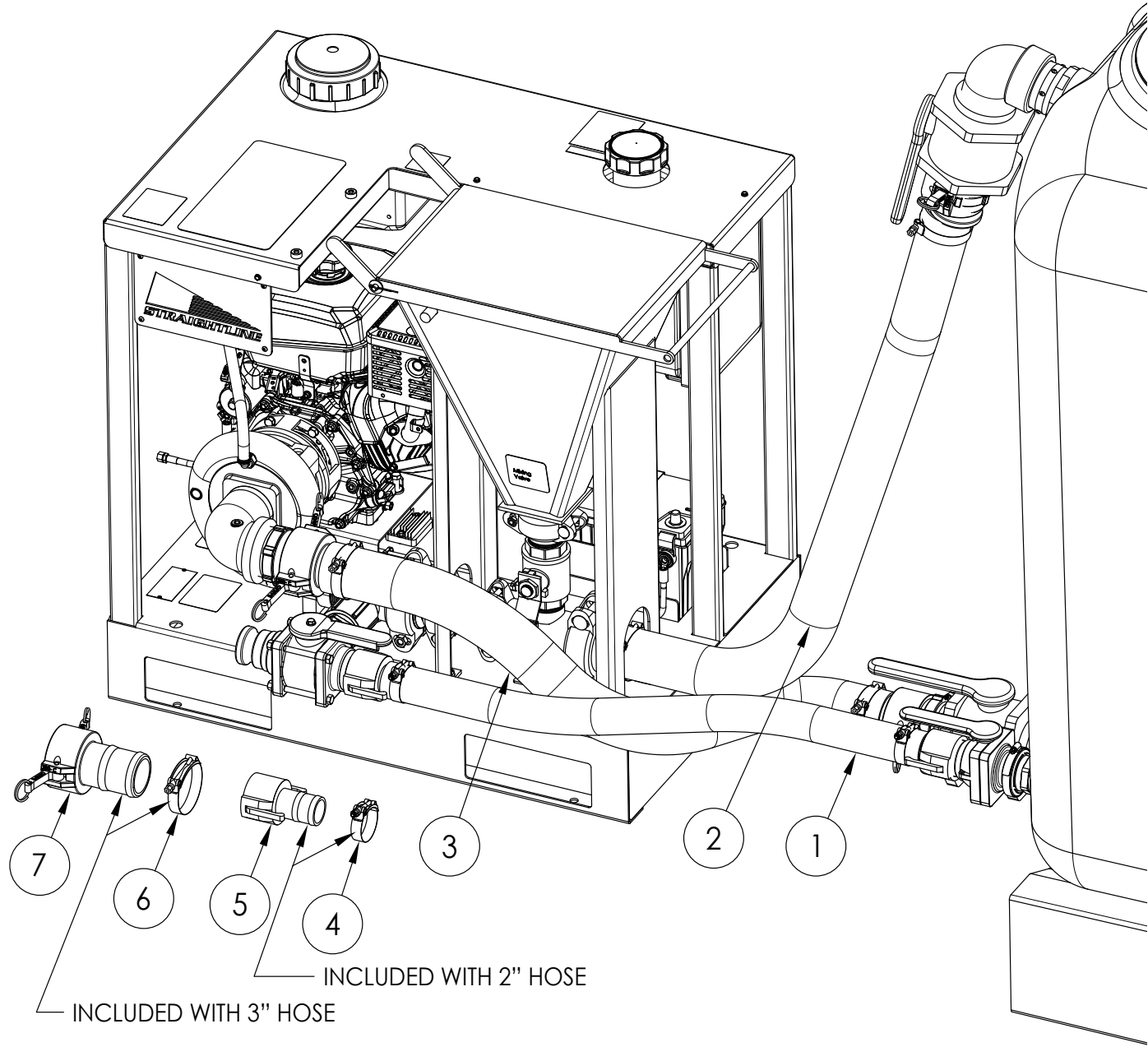


SL1000 ASSEMBLY / PARTS LIST

ITEM	PART #	DESCRIPTION	QTY
1	71450	TANK SKID WELDMENT, 1000 GALLON	1
2	1213X114HB	BOLT, HEX, 1/2-13 X 1 1/4" LONG	12
3	1213WHN	NUT, WHIZ, 1/2-13	12
4	71451	TANK HOOP WELDMENT, 1000 GALLON	3
5	23193	TANK, POLY, SQUARED, 1000 GALLON	1
6	22533	TANK BUNG, 2"	4
7	22536	PLUG, 2"	3
8	23748	TANK LID, 16" , RING AND 4" CENTER LID / VENT	1
9	22529	TANK BUNG, 3"	2
10	120644	NIPPLE, 3"	2
11	22527	STREET ELBOW, 3"	1
12	22526	BALL VALVE, 3"	2
13	22036	ADAPTER 3" MALE PIPE X 3" MALE CAM LOCK	2
14	71460	EDUCTOR TUBE, WELDMENT, SQUARED, 1000 GALLON TANK	1
15	22458	NIPPLE, 2", SHORT	1
16	22531	COUPLER, 1.5"	4
17	22532	STREET ELBOW, 1.5", 45 DEG	4
18	22008	EDUCTOR, 1 1/2"	4
19	22534	ADAPTER, MANIFOLD, 2" X 2" FULL PORT	1
20	22535	GASKET, 2" BUNA	1
21	22537	BALL VALVE, 2" FULL PORT FLANGE X 2" MALE CAM	1
22	22543	CLAMP, 2" FULL PORT MANIFOLD	1




HOSE ASSEMBLIES



HOSE ASSEMBLIES

ITEM	PART #	DESCRIPTION	QTY
1	80701	HOSE ASSEMBLY, 2" X 52", FEMALE, FEMALE	1
2	80700	HOSE ASSEMBLY, 3" X 60", FEMALE ONE END	1
3	80699	HOSE ASSEMBLY, 3" X 60", FEMALE, FEMALE	1
4	22612	HOSE CLAMP, 2"	2
5	236-3760-02	COUPLER, 2" CAM LOCK, FEMALE X HOSE BARB	2
6	25498	HOSE CLAMP, 3"	4
7	22580	COUPLER, 3" CAM LOCK, FEMALE X HOSE BARB	3



	<b>⚠ WARNING</b>	
	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; however, warranty repairs must be performed by a Kohler authorized dealer.

MAINTENANCE SCHEDULE

Weekly

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

Every 25 Hours or Annually<sup>1</sup>

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

Every 100 Hours or Annually<sup>1</sup>

- 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 filter. .... LUBRICATION SYSTEM
- Replace fuel filter.

Every 250 Hours<sup>1</sup>

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

Every 300 Hours<sup>3</sup>

- Change oil and filter (KOHLER PRO 10W-50 oil and KOHLER PRO filter only). .... LUBRICATION SYSTEM

Every 500 Hours<sup>1</sup>

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

Every 500 Hours<sup>2</sup>

- Have crankshaft spline lubricated.
- 1. Perform these procedures more frequently under severe, dusty, dirty conditions.
- 2. Have a Kohler authorized dealer perform this service.
- 3. Option only if using KOHLER® PRO oil and PRO filter.

REPAIRS/SERVICE PARTS

Kohler genuine service parts can be purchased from Kohler authorized dealers. To find a local Kohler authorized dealer visit KohlerEngines.com or call 1-800-544-2444 (U.S. and Canada).



STRAIGHTLINEHDD.COM

620-802-0200 | SLSALES@STRAIGHTLINEHDD.COM

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.

300-Hour oil and oil filter change intervals are exclusive to and only authorized on KOHLER engines that utilize both the KOHLER PRO 10W-50 Synthetic Oil and KOHLER PRO Extended Life Oil Filter. Alternative engine oils and oil filters may be used with KOHLER engines but require 100-Hour oil and 200-Hour oil filter change intervals for proper maintenance. Oil must be API (American Petroleum Institute) service class SJ or higher. Select viscosity based on air temperature at time of operation as shown below.

STORAGE

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

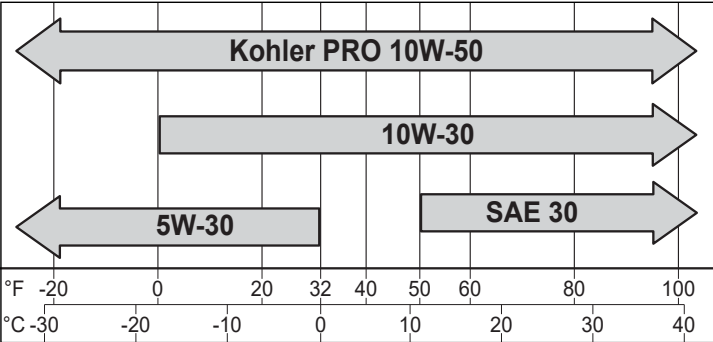
1. Add Kohler PRO Series fuel treatment or equivalent to fuel tank. Run engine 2-3 minutes to get stabilized fuel into fuel system (failures due to untreated fuel are not warrantable).
2. Change oil while engine is still warm from operation (NOT required if using KOHLER PRO 10W-50 full-synthetic oil). 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.



## TROUBLESHOOTING

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	<ul style="list-style-type: none"><li>• Clogged impeller or inlet piping (including strainer)</li><li>• Leaks in suction line or at inlet gasket</li><li>• Collapsed suction line</li><li>• Trapped air in sections of suction line</li><li>• Suction lift is too great – flooded inlet recommended</li><li>• Worn or damaged parts (impeller or volute)</li></ul>
Pump fails to prime or slow prime	<ul style="list-style-type: none"><li>• Leaks in suction line or at inlet gasket</li><li>• Suction lift is too great – flooded inlet recommended</li><li>• Collapsed suction line</li></ul>
Seal reservoir fluid changes level	<ul style="list-style-type: none"><li>• Leak at the input shaft seal if level is low</li><li>• Leak at the impeller side seal if level is high</li></ul>

### 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: \_\_\_\_\_



STRAIGHTLINEHDD.COM

620-802-0200 | SLSALES@STRAIGHTLINEHDD.COM

## WARRANTY

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.

## WARRANTY LIMITED WARRANTY, COMMAND PRO

Kohler Co. warrants to the original retail consumer that each new engine will be free from manufacturing defects in materials or workmanship for the applicable coverage period as set forth below, beginning on date of purchase; provided the engine is operated and maintained in accordance with Kohler Co.'s instructions and manuals.

Type of use:

Residential - 3 Years

Commercial/Rental - 3 Years

Our obligation under this warranty is expressly limited, at our option, to the replacement or repair of such part or parts as inspection shall disclose to be defective at Kohler Co., Kohler, Wisconsin 53044, or at a service facility designated by Kohler Co.

### EXCLUSIONS:

Mufflers on engines used commercially (non-residential) are warranted for one (1) year from date of purchase, except catalytic mufflers, which are warranted for two (2) years. The following items are not covered by this warranty.

- Damage caused as a result of an accident or casualty.
- Failures caused by faulty repairs made by others.
- Failures caused by use of non-Kohler replacement service parts.
- Transportation charges in connection with the repair or replacement of defective parts.
- Repairs caused from improper storage, old or contaminated fuel left within the fuel system (tanks, fuel lines or carburetor).
- Damage caused from unreasonable use or neglect, normal wear, or premature wear from improper maintenance.
- Engine accessories such as fuel tanks, clutches, transmissions, power drive assemblies, and batteries, unless supplied or installed by Kohler Co. These are subject to the warranties, if any, of their manufacturers.

**IMPLIED OR STATUTORY WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY LIMITED TO THE DURATION OF THIS WRITTEN WARRANTY. WE MAKE NO OTHER EXPRESS WARRANTY, OR IS ANYONE AUTHORIZED TO MAKE ANY ON OUR BEHALF. KOHLER CO. AND/OR THE SELLER SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND.**

Some states or countries do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from country to country, or state to state within U.S.A.



## WARRANTY

### TO OBTAIN WARRANTY SERVICE:

Original retail consumer must bring the engine to an authorized Kohler dealer found by visiting [www.KohlerEngines.com](http://www.KohlerEngines.com) or telephone 1-800-544-2444 (U.S.A. and Canada).

### Warranty Conditions-Australia

The benefits given to you under this warranty are in addition to other rights and remedies that you have under Australian law in relation to the goods. All costs associated with claiming under this warranty must be borne by the consumer, including transport costs incurred in the repair or replacement of any defective part. Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

Kohler Co. Service Agent in Australia:  
EPG Engines  
31 Powers Road  
Seven Hills, NSW, 2147  
61 2 9830 2295  
61 1800 069 399  
[www.epgengines.com.au](http://www.epgengines.com.au)  
ENGINE DIVISION, Kohler Co., Kohler Wisconsin

### B) CALIFORNIA AND FEDERAL EXHAUST AND EVAPORATIVE EMISSIONS CONTROL WARRANTY STATEMENT YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board, US Environmental Protection Agency ("US EPA") and Kohler Co. are pleased to explain the exhaust and evaporative emissions control systems warranty on your 2020-2022 Small Off-Road Engine ("SORE") and engine powered equipment as applicable. In California and the USA, new equipment that use SORE must be designed, built and equipped to meet California and US EPA stringent anti-smog standards. Kohler Co. must warrant the emission control systems on your SORE and engine powered equipment for the period listed below provided there has been no abuse, neglect or improper maintenance of your SORE or engine powered equipment leading to the failure of the emission control systems. Your exhaust emission control systems may include parts such as carburetors, fuel-injection systems, the ignition system, and catalytic converters. Also included may be an evaporative emission control system which may include parts such as fuel tanks, fuel lines (for liquid fuel and vapors), fuel caps, valves, carbon canisters, clamps, connectors, and other associated components.

### MANUFACTURER'S WARRANTY COVERAGE:

The 1995 and later SORE exhaust and evaporative emission control systems are warranted for three years. If any exhaust or evaporative emission-related part on your SORE or engine powered equipment is defective, the part will be repaired or replaced by Kohler Co.

### OWNER'S WARRANTY RESPONSIBILITIES:

As the SORE or engine powered equipment owner, you are responsible for the performance of the required maintenance listed in your owner's manual. Kohler Co. recommends that you retain all receipts covering maintenance on your SORE or engine powered equipment, but Kohler Co. cannot deny warranty coverage solely for the lack of receipts. As the SORE or engine powered equipment owner, you should however be aware that Kohler Co. may deny you warranty coverage if your SORE or engine powered equipment or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications. You are responsible for presenting your SORE or engine powered equipment to a Kohler Co. distribution or service center as soon as a problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days. If you have a question regarding your warranty coverage, you should contact a Kohler Dealer at 1-800-544-2444 or visit [www.kohlerengines.com](http://www.kohlerengines.com).

### GENERAL EMISSIONS WARRANTY COVERAGE

The warranty period begins on the date the engine or equipment is delivered to an ultimate purchaser. Kohler Co. warrants to the ultimate purchaser and each subsequent purchaser that the engine is: Designed, built, and equipped so as to conform with all applicable regulations adopted by the Air Resources Board and US EPA; and free from defects in materials and workmanship that cause the failure of a warranted part to be identical in all material respects to the part as described in the engine manufacturer's application for certification for the warranty period stated above.

### THE WARRANTY ON EMISSIONS-RELATED PARTS IS AS FOLLOWS

- Any warranted part that is not scheduled for replacement as required maintenance in the owner's manual supplied, is warranted for the warranty period stated above. If any such part fails during the period of warranty coverage, the part will be repaired or replaced by Kohler Co. at no charge to the owner. Any such part repaired or replaced under the warranty will be warranted for the remaining warranty period.
- Any warranted part that is scheduled only for regular inspection in the owner's manual supplied, is warranted for the warranty period stated above. Any such part repaired or replaced under warranty will be warranted for the remaining warranty period.
- Any warranted part that is scheduled for replacement as required maintenance in the owner's manual supplied, is warranted for the period of time prior to the first scheduled replacement point for that part. If the part fails prior to the first scheduled replacement, the part will be repaired or replaced by Kohler Co. at no charge to the owner. Any such part repaired or replaced under warranty will be warranted for the remainder of the period prior to the first scheduled replacement point for the part.
- Add-on or modified parts that are not exempted by the Air Resources Board may not be used. The use of any non-exempted add-on or modified parts by the ultimate purchaser will be grounds for disallowing a warranty claim. The manufacturer will not be liable to warrant failures of warranted parts caused by the use of a non-exempted add-on or modified part.



STRAIGHTLINEHDD.COM

620-802-0200 | [SLSALES@STRAIGHTLINEHDD.COM](mailto:SLSALES@STRAIGHTLINEHDD.COM)

## WARRANTY

### PARTS COVERED BY WARRANTY

Listed below are the parts (if equipped) covered by the Federal and California Emission Control Systems Warranty. Some parts listed below may require scheduled maintenance and are warranted up to the first scheduled replacement point for that part.

- Oxygen sensor
- Intake manifold
- Exhaust manifold
- Catalytic muffler
- Thermal reactor muffler
- Spark advance module
- Crankcase breather
- Air Injection System
  - Air pump or pulse valve assembly
  - Control/distribution valve
  - Distribution manifold
  - Air hoses
  - Vacuum lines
- Ignition module(s) with high tension lead
- Gaseous fuel regulator
- Electronic control unit
- Carburetor or fuel injection system
- Fuel metering valve
- Air filter, fuel filter, and spark plugs (only to first scheduled replacement point)
- Evaporative System
  - Carbon canister and carbon canister mounting bracket
  - Carbon canister filter
  - Purge port/orifice connector
  - Fuel tank
  - Fuel cap and fuel cap gasket
  - Primer bulb canister
  - Fuel line (for liquid fuel and fuel vapors), fuel line fittings and clamps
  - Carburetor purge port connector

### LIMITATIONS

This Emission Control Systems Warranty shall not cover any of the following:

- Consequential damages such as loss of time, inconvenience, loss of use of the engine or equipment, etc
- Diagnosis and inspection fees that do not result in eligible warranty service being performed

### C) CALIFORNIA AND FEDERAL EXHAUST EMISSION CONTROL WARRANTY STATEMENT YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board, US Environmental Protection Agency ("US EPA") and Kohler Co. are pleased to explain the exhaust emission control systems warranty on your 2020-2022 Off-Road Large Spark-Ignition engine displacing less than 1 liter ("LSI <1L") and engine powered equipment as applicable. In California and the USA, LSI <1L must be designed, built and equipped to meet California and US EPA stringent anti-smog standards. Kohler Co. must warrant the emission control systems on your LSI <1L for the period listed below provided there has been no abuse, neglect or improper maintenance of your LSI <1L. Your exhaust emission control systems may include parts such as carburetors, fuel-injection systems, the ignition system, and catalytic converters.

### MANUFACTURER'S WARRANTY COVERAGE:

The 1995 and later LSI <1L exhaust emission control system is warranted for three years. If any exhaust emission-related part on your LSI <1L is defective, the part will be repaired or replaced by Kohler Co.

### OWNER'S WARRANTY RESPONSIBILITIES:

As the LSI <1L owner, you are responsible for the performance of the required maintenance listed in your owner's manual. Kohler Co. recommends that you retain all receipts covering maintenance on your LSI <1L, but Kohler Co. cannot deny warranty solely for the lack of receipts. As the LSI <1L owner, you should however be aware that Kohler Co. may deny you warranty coverage if your LSI <1L or a part has failed due to abuse, neglect, improper maintenance, or unapproved modifications. The California Air Resources Board, US Environmental Protection Agency ("US EPA") and Kohler Co. are pleased to explain the exhaust emission control systems warranty on your 2020-2022 Off-Road Large Spark-Ignition engine displacing less than 1 liter ("LSI <1L") and engine powered equipment as applicable. In California and the USA, LSI <1L must be designed, built and equipped to meet California and US EPA stringent anti-smog standards. Kohler Co. must warrant the emission control systems on your LSI <1L for the period listed below provided there has been no abuse, neglect or improper maintenance of your LSI <1L. Your exhaust emission control systems may include parts such as carburetors, fuel-injection systems, the ignition system, and catalytic converters.

### MANUFACTURER'S WARRANTY COVERAGE

The 1995 and later LSI <1L exhaust emission control system is warranted for three years. If any exhaust emission-related part on your LSI <1L is defective, the part will be repaired or replaced by Kohler Co.



# WARRANTY

## OWNER’S WARRANTY RESPONSIBILITIES:

As the LSI <1L owner, you are responsible for the performance of the required maintenance listed in your owner’s manual. Kohler Co. recommends that you retain all receipts covering maintenance on your LSI <1L, but Kohler Co. cannot deny warranty solely for the lack of receipts. As the LSI <1L owner, you should however be aware that Kohler Co. may deny you warranty coverage if your LSI <1L or a part has failed due to abuse, neglect, improper maintenance, or unapproved modifications.

You are responsible for presenting your LSI <1L to a Kohler Co. distribution or service center as soon as a problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days. If you have a question regarding your warranty coverage, you should contact Kohler Dealer at 1-800-544-2444or visit www.KohlerEngines.com.

## GENERAL EMISSIONS WARRANTY COVERAGE

The warranty period begins on the date the engine or equipment is delivered to an ultimate purchaser. Kohler Co. warrants to the ultimate purchaser and each subsequent purchaser that the engine is: Designed, built, and equipped so as to conform with all applicable regulations adopted by the Air Resources Board and US EPA; and Free from defects in materials and workmanship that cause the failure of a warranted part to be identical in all material respects to the part as described in the engine manufacturer’s application for certification.

### The warranty on emissions-related parts is as follows:

- Any warranted part that is not scheduled for replacement as required maintenance in the owner’s manual supplied, is warranted for the warranty period stated above. If any such part fails during the period of warranty coverage, the part will be repaired or replaced by Kohler Co. at no charge to the owner. Any such part repaired or replaced under the warranty will be warranted for the remaining warranty period.
- Any warranted part that is scheduled only for regular inspection in the owner’s manual supplied, is warranted for the warranty period stated above. Any such part repaired or replaced under warranty will be warranted for the remaining warranty period.
- Any warranted part that is scheduled for replacement as required maintenance in the owner’s manual supplied, is warranted for the period of time prior to the first scheduled replacement point for that part. If the part fails prior to the first scheduled replacement, the part will be repaired or replaced by Kohler Co. at no charge to the owner. Any such part repaired or replaced under warranty will be warranted for the remainder of the period prior to the first scheduled replacement point for the part.
- Add-on or modified parts that are not exempted by the Air Resources Board may not be used. The use of any non-exempted add-on or modified parts by the ultimate purchaser will be grounds for disallowing a warranty claim. The manufacturer will not be liable to warrant failures of warranted parts caused by the use of a non-exempted add-on or modified part.

## PARTS COVERED BY WARRANTY

Listed below are the parts (if equipped) covered by the Federal and California Emission Control Systems Warranty. Some parts listed below may require scheduled maintenance and are warranted up to the first scheduled replacement point for that part.

- Oxygen sensor
- Intake manifold
- Exhaust manifoldCatalytic muffle
- Thermal reactor muffler
- Fuel line, fuel line fittings and clamps
- Spark advance module
- Crankcase breather
  - Air Injection System
  - Air pump or pulse valve assembly
  - Control/distribution valve
  - Distribution manifold
  - Air hoses
  - Vacuum lines
- Ignition module(s) with high tension lead
- Gaseous fuel regulator
- Electronic control unit
- Carburetor or fuel injection system
- Fuel metering valve
- Air filter, fuel filter, and spark plugs (only to first scheduled replacement point)

## LIMITATIONS

This emission control systems warranty7 shall not cover any of the following:

- Consequential damages such as loss of time, inconvenience, loss of use of the engine or equipment, etc.
- Diagnosis and inspection fees that do not result in eligible warranty service being performed.

## LIMITED WARRANTY, JOHN BLUE COMPANY

**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.**

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

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.



STRAIGHTLINEHDD.COM

620-802-0200 | SLSALES@STRAIGHTLINEHDD.COM



1816 E. Wasp Rd. Hutchinson KS 67501  
620-802-0200 | slsales@straightlinehdd.com  
www.straightlinehdd.com

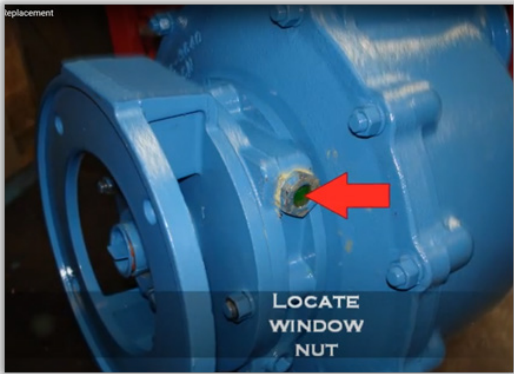


# SEAL REPLACEMENT INSTRUCTIONS FOR MP PUMPS

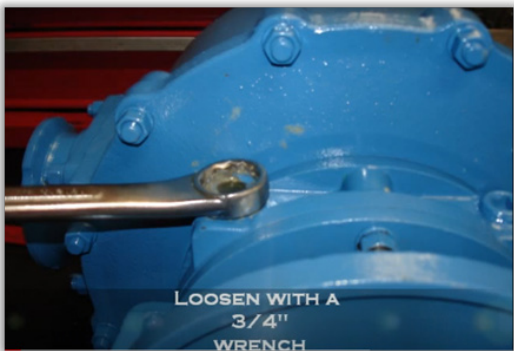
Disassemble pump carefully. For models with the hollow impeller shafts clamped over motor or pedestal shafts, carefully pull the impeller shaft in line with motor shaft. Do not work up and down or side to side or the impeller shaft will be sprung open and will not run true again. Grease motor or pedestal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

## Empty the remaining antifreeze from the reservoir.

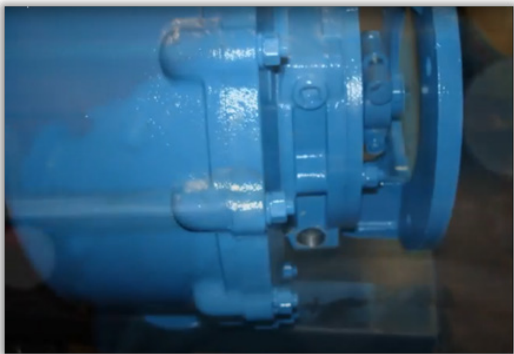
1. Locate window nut.



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

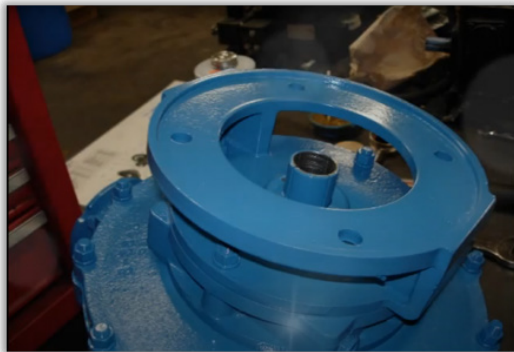


3. Tilt pump and dispose of any remining antifreeze into an appropriate container.



## Remove pump adapter to gain access to seal

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



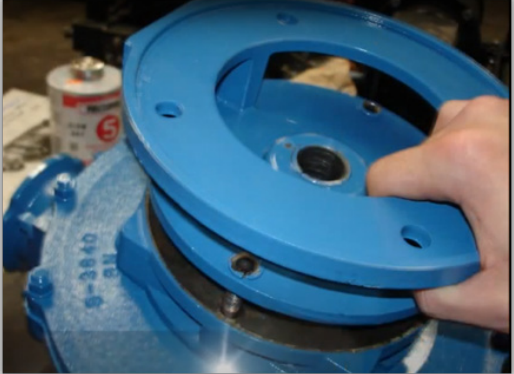
2. Remove the four nuts on the adapter.



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



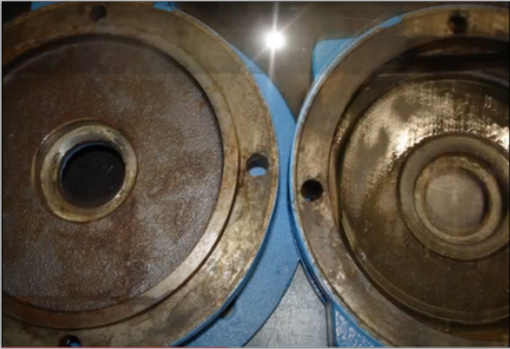
4. The stationary seats are show in the both the adapter and reservoir.



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.



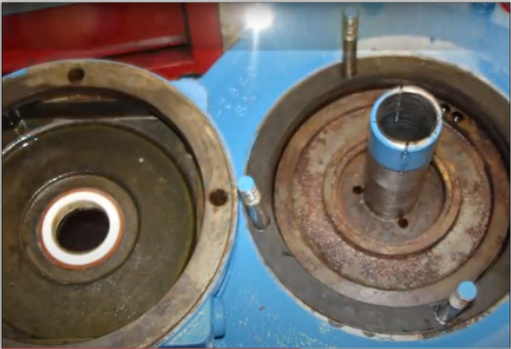
2. Apply pipe sealant thoroughly in bores. Coat the seat with a good grade of pipe compound such as Rector Seal. This will lubricate the seat for installation of the stationary element and will prevent corrosion under the rubber cup.



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.



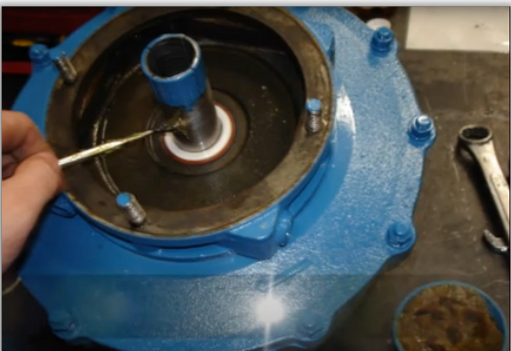
4. Install new rubber gasket if the used gasket is damaged.



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.

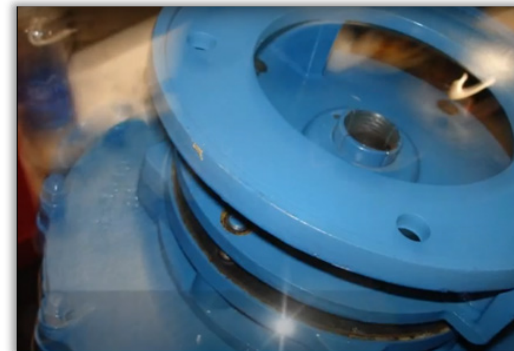


10. Place new rubber gasket on reservoir if used gasket is damaged.



## 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.



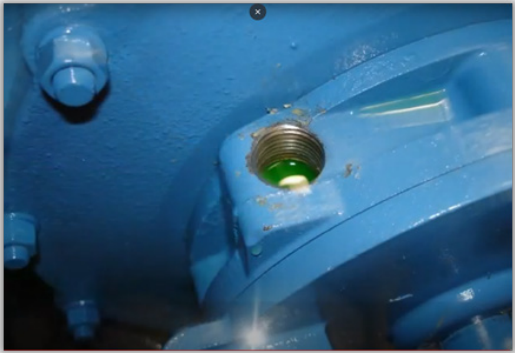


**Refill reservoir with 50/50 antifreeze**

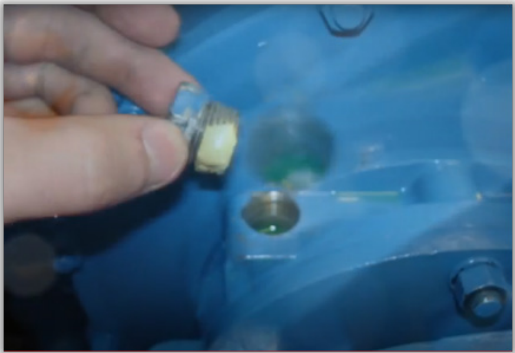
1. Pour in 50/50 antifreeze where window nut was removed.



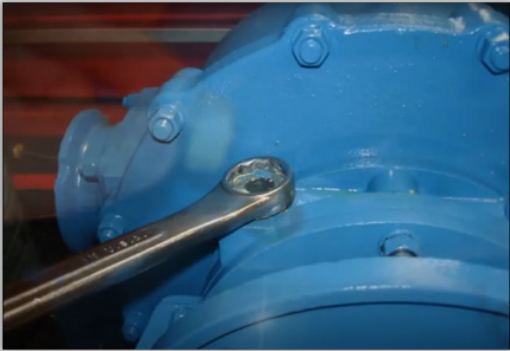
2. Fill reservoir until full.



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.





