Surface to Surface Inc. ®

Operators Manual

** MAC JR 1200 **
Fluid Recovery System

USE IN CONJUNCTION WITH M2-922 MIXER MANUAL & MAC JR-1200 SYSTEM MANUAL (ENCLOSED)

Injection Pump Serial No. _____

Links relating to this Manual

www.stsmixers.com

Dealer

TABLE OF CONTENTS

SECTION #I

Description, Care and Maintenance

Surface to Surface Inc.®

Injection System for Mac JR-1200

Description, Care and Maintenance (section I)

Under-Flow Box

The under-flow box (Fig.1a) is mounted on the front, underneath the hydro-cyclones. The under-flow box contains a weir plate with diverters (Fig.1b) and a specially designed spray injection nozzle (Fig.2a).

The nozzle injects (sprays) the premixed liquid product into the fluid stream from the underflow of the hydro-cyclones, onto the weir plate. The action of the diverters on the weir plate and the proper cone shape discharge (see Fig.2c) of the hydro-cyclones combine to produce a homogenous mixture. This mixture now flows to the open end of the weir plate (Fig.1b), and falls to the bottom level underneath the weir plate and out of the box through the outlet. The outlet has a hose (Fig.1a) connected to route the discharge fluid away from the box and into the squeeze basket (Fig.3a).

This multi-level box is considered an important part of the solids / water separating process and although simple in design, needs to be cleaned and maintained daily.

It is important that the weir plate with diverters is kept free of build-up or foreign objects (stones, leaves, etc.) that may enter from the open top, and disrupt the fluid path.

The nozzle is a self-cleaning design that requires little or no maintenance.

Since this mixture of fluid and product travel underneath the weir plate of the under-flow box to the outlet, some separation of water / solids can occur, therefore it is extremely important that the bottom level WILL need to be cleaned daily as build up will occur.

By jetting or spraying clean water through the opening at the end of the weir plate (Fig.1b), the buildup will be loosened and flow out through the outlet.

Failure to remove any build up will stop fluid flow and render the box inoperable.

If this happens, the weir plate can be removed from the box, clean the bottom level and then replaced.

Fig.1a

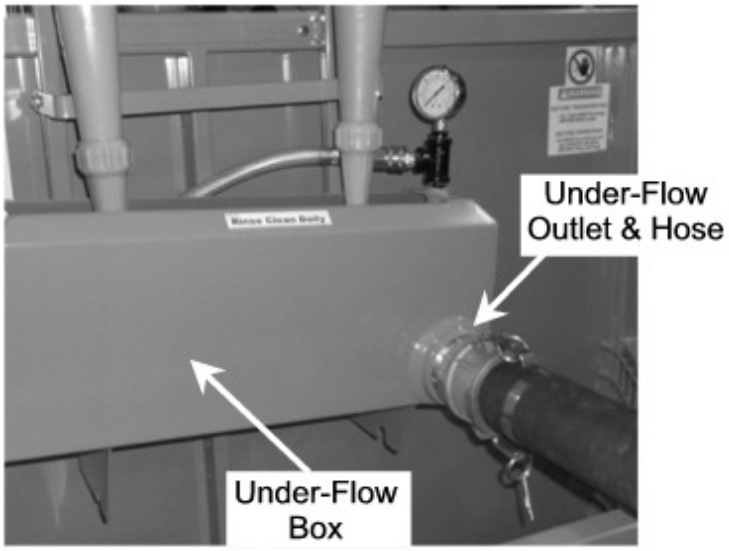
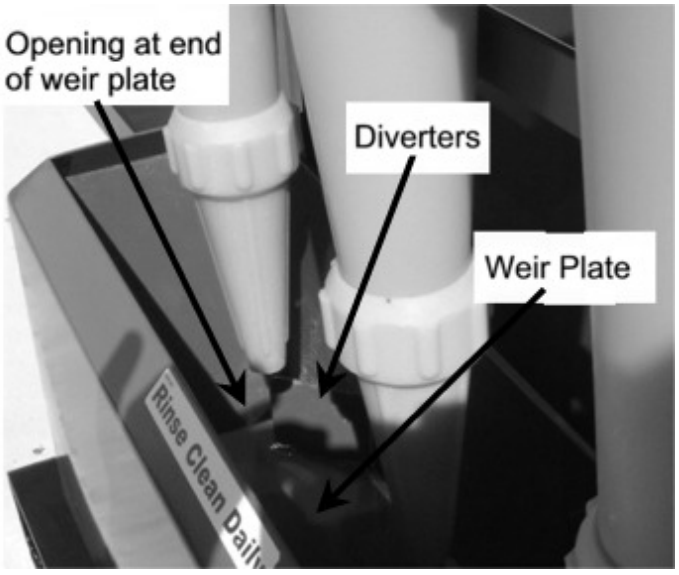


Fig.1b



Description, Care and Maintenance (section I)

Under-Flow Box *continued*

Fig.2a

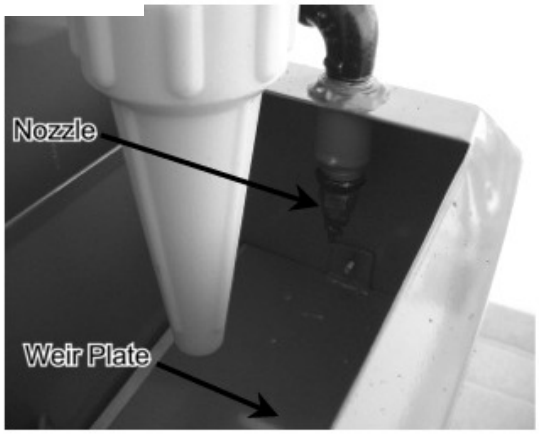
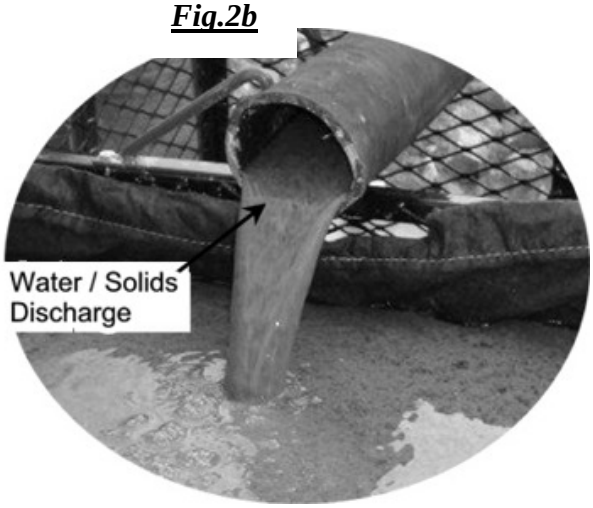
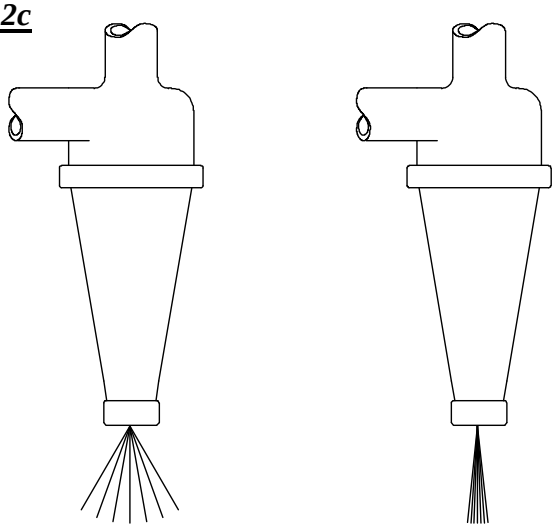


Fig.2b



Hydro-cyclone Discharge

Fig.2c



Correct
Inverted cone shape discharge

Incorrect
Rope shape discharge

CAUTION

DO NOT POSITION
ANY PART OF YOUR BODY

over the under-flow or
over-flow box while operating.

WARNING

NEVER ATTEMPT TO REMOVE OR
CLEAN THE HYDRO-CYCLONES

while the unit is in operation.
Serious personal injury will result.

DANGER

NEVER ATTEMPT REPAIRS
OR DISASSEMBLY

without shutting off the mixing unit
and disconnecting any power sources.
Serious personal injury will result.

CAUTION

TRAPPED FLUID MAY BE PRESENT
and will spill out when piping, hoses,
hydro-cyclones are removed.

Surface to Surface Inc.®

Injection System for Mac JR-1200

Description, Care and Maintenance (section I)

Squeeze Basket and Catch Tank

The squeeze basket and catch tank (Fig. 3a) are two separate pieces that attach together by placing the basket (with the fold down doors facing the front cut down side of the tank), atop of the catch tank cage. Special clips on the basket fit over the top rail of the tank frame and on the outer edges of the flat bar. This will hold the basket from sliding back and forth on the top rail of the tank cage.

The Catch Tank is a 150 us. gal. polyethylene plastic tank inside of a cage frame with fork lifting pockets on the underside. The tank has a bottom discharge 2" valve on one end for a hose hook-up or can be used as a drain.

Maintenance of this tank is required, but is simple. The tank should be cleaned and rinsed on a regular basis of any build-up or debris.

The Squeeze Basket has a folding center divider (Fig.3b) that is to be positioned in a vertical position and pinned to create two compartments in the basket. *When the unit is to be packaged for shipping, this divider is unpinned and laid back down in the horizontal position.* On the front of the basket are two fold down doors (Fig.3a) that allow for easy removal of the filter bag when it has been squeezed and dewatered. The fold down doors have spring loaded sliding latches (yellow handles) (Fig.3c) that must be locked before installing and filling the filter bags.

Mounted on top of the squeeze basket is a mechanical press that is hinged (pinned when assembled) in the center and can be rotated (flipped) from one compartment to the other. The mechanical press also has two spring loaded sliding latches (yellow handles) (Fig.3c) that must be locked in place before using.

This basket should be kept clean and the latches, pivot points and the threaded rod between the two hand wheels, is to be lubricated on a regular basis.

Fig.3a

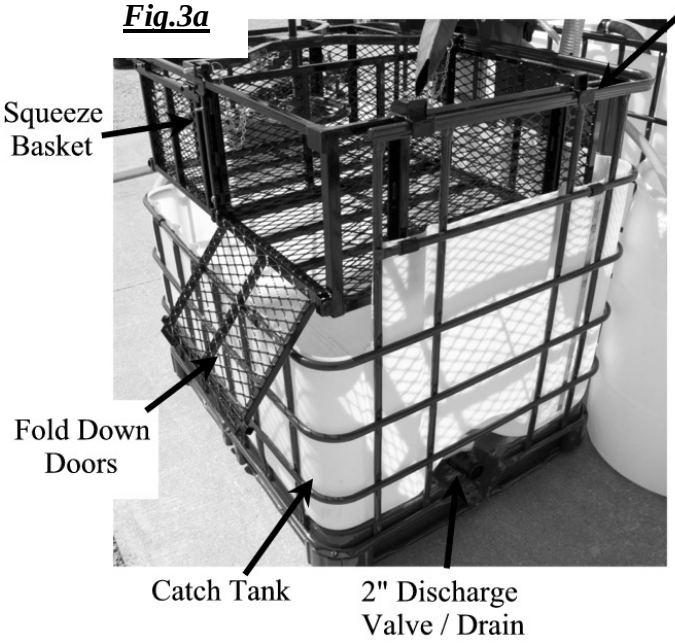


Fig.3b

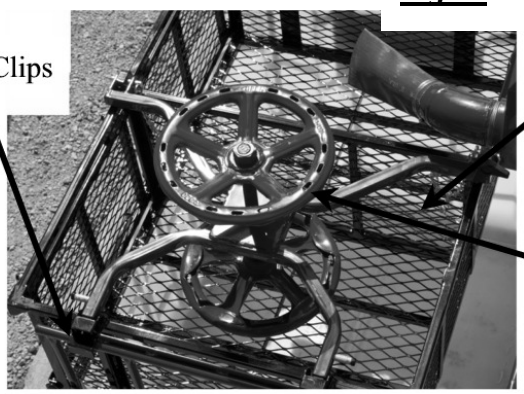


Fig.3c

Injection System for Mac JR-1200

Description, Care and Maintenance (section I)

Squeeze Basket and Catch Tank *continued*

The squeeze basket will require installing filtering bag(s) (Fig.4) to be installed in each compartment to capture the out flow from the under-flow box. The material that the bags are made of allows a filtering effect as they retain the solids, yet allow the clear "water" to pass through and fall into the catch tank.
The filter bag is unfolded in the compartment and fastened up the sides by using your finger and pushing the bag through the holes at the top of the basket. This will keep the sides from folding over.
These bags have a draw string around the top that is used to seal up the bag when full.
The bags are disposable but may also be reused if emptied and rinsed clean. Do not reuse if there are any rips, tears, or punchers, as this will allow solids to escape into the catch tank.

The squeeze basket also requires the use of the squeeze board (Fig.8) when using the manual mechanical press to distribute force on the entire bag
When the filter bag is full, use the draw string to seal the bag tight, then position the squeeze board atop of the bag, rotate the mechanical press over top of the squeeze board, lock in place with the spring loaded sliding latches. Rotate the hand wheel clockwise and apply pressure on the squeeze board to force the clear fluid out and into the catch tank
The squeeze board will need to be rinsed off if any build-up of solids starts to occur.

Fig.4

Finished Squeezing a Full Bag

DANGER

IN AN EMERGENCY

shut off the mixer and injection pump to halt fluid flow

WARNING

DO NOT REMOVE OR MODIFY SAFETY COVERS OR GUARDS.
Serious personal injury will result.

CAUTION

The manufacturer should be consulted when considering alternative uses for this piece of equipment.
This unit was designed for the pumping of liquid additive to the nozzels.
Other uses may create unforeseen safety issues and personal injury risk.

DANGER

NEVER ATTEMPT REPAIRS OR DISASSEMBLY
without shutting off the mixing / pumping unit .
Serious personal injury will result.

CAUTION

NEVER LEAVE LIQUID IN THE PIPING OR HOSES
during freezing weather conditions,
as damage will result.
Follow instruction for winterizing.

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Injection System for Mac JR-1200

Description, Care and Maintenance (section I)

Electric Injection Pump

Mounted on the front of the MAC JR-1200 is an electric injection pump (Fig.5a).The injection pump is a small centrifugal pump that is driven with an electric motor, used to draw premixed liquid product from the liquid product barrel and "inject" it into the under-flow box, using the nozzle inside.
The pump has an attached suction hose with a foot/check valve on the end (Fig. 5b), that is set into the liquid product barrel to draw fluid into the pump. The screen on the foot/check valve needs to be kept clean and free of debris.
On the pump outlet is a ball valve, and discharge hose, with a quick coupling connector attached. The discharge hose is connected to the quick coupling connector under the gauge on the underflow box. This hose allows the liquid product to travel from the pump to the nozzle.
The ball valve, and the gauge are used together to set the desired flow (explained in Section II) of liquid product to the nozzle.
The injection pump is set on a shelf with the pump's three small legs set inside of the three retainers and then fastened down by the strap and locking device to hold it securely in place. The strap should be checked on a regular basis for rips and tears and the locking device kept clean and in good working condition
The pump is powered by connecting the male 110volt plug into the receptacle (Fig.6) mounted inside of the switch box which is located under the pump shelf.
Care and maintenance of the motor / pump are covered in this manual and/or the manufacturer operator's manuals supplied and should be read and understood.
<u>The pump should never be allowed to start or run dry</u>, as this <u>WILL</u> damage the internal pump seal and render the unit inoperable until the seal is fixed.
<u>To prime the pump</u>, slowly remove the priming plug (Fig.5a) on top of the pump. Liquid product or water can be poured into this opening to fill the pump cavity, and a visual of the fluid level inside the pump can be made. The level should be approximately to the bottom of the pump discharge elbow.
The injection pump can be used to mix/stir the liquid product tank when combining the water and concentrate to make the finial liquid product (explained in Section II)

DANGER

IN AN EMERGENCY
rotate the on / off switch
to the OFF position
to halt the pump, and fluid flow.

CAUTION

WHEN THE UNIT
IS IN OPERATION,

the fluid in the hoses may reach
pressures up to 40 p.s.i.

CAUTION

BEFORE STARTING THE MOTOR,
BE SURE THE PUMP IS PRIMED!

Check the pump by slowly & carefully
opening the plug located on the top
of the centrifugal pump.
Remove the plug to view inside fluid level.
The centrifugal pump seal WILL be
damaged if allowed to cavitate or run dry.

DANGER

NEVER ATTEMPT REPAIRS
OR DISASSEMBLY
without shutting off the motor and
disconnecting/lock-out the power source.
Serious personal injury will result.

CAUTION

The manufacturer should be consulted
when considering alternative uses
for this piece of equipment.
This unit was designed for the pumping
of liquid additive to the nozzels.
Other uses may create unforeseen safety
issues and personal injury risk.

CAUTION

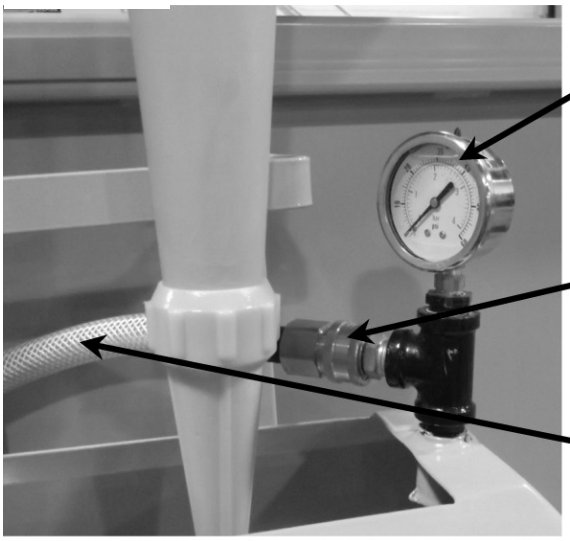
NEVER LEAVE LIQUID IN THE
PUMP CASING, PIPING, OR HOSES
during freezing weather conditions,
as damage will result.
Follow instruction for winterizing.

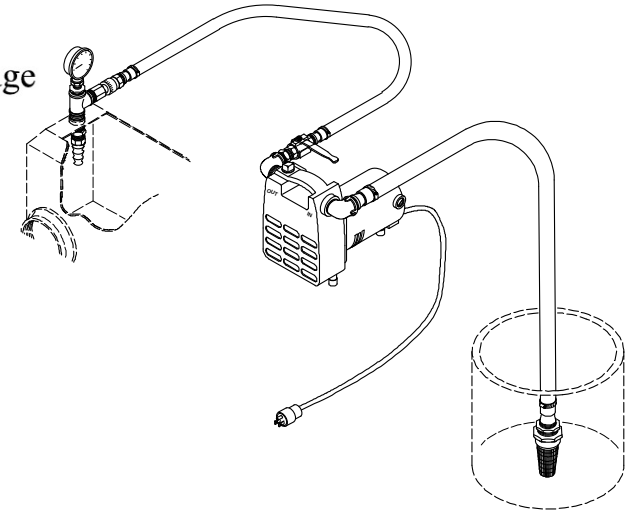
Injection System for Mac JR-1200

Description, Care and Maintenance (section I)

Electric Injection Pump *continued*

Fig.5a





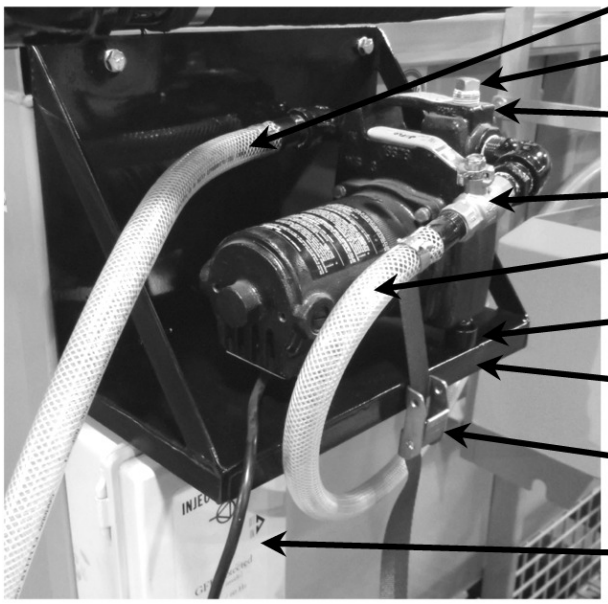
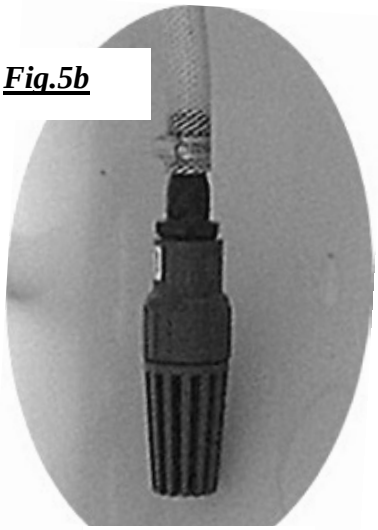


Fig.5b



Check / Foot Valve

CAUTION

Secure the pump to the mounting stand with the strap. Personal or equipment damage may occure if pump is dislodged from the stand.

WARNING

REFER TO THE SAFETY STATEMENTS IN THE OEM SUPPLIED MANUALS AND THIS MANUAL REGARDING THESE OPERATIONS.

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Injection System for Mac JR-1200

Description, Care and Maintenance (section I)

Switch Box

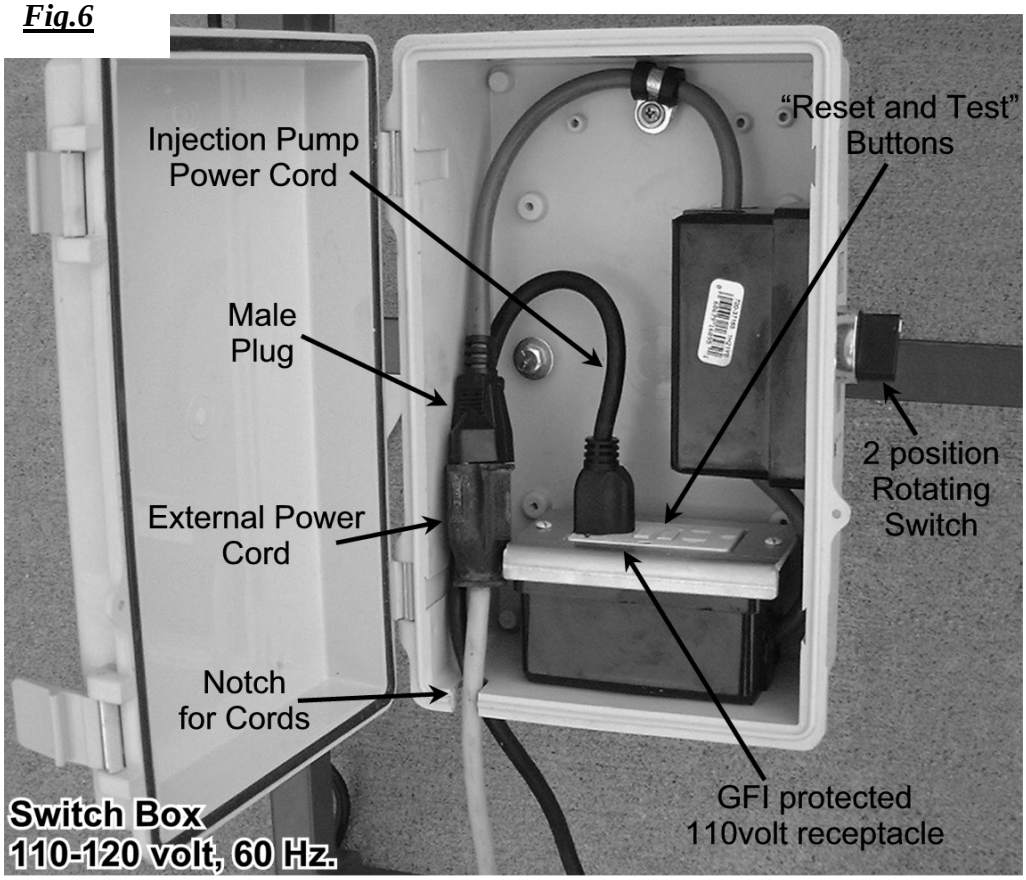
Mounted on the MAC JR-1200 under the pump shelf is a sealed switch box (Fig.6). Inside of the switch box is a GFI protected 110volt receptacle. On the face of the receptacle are "Reset and Test" buttons that trip when there is an electrical short or grounding issue. The inside of this box will need to be kept clean and moisture free and the test button will need to be tripped and reset routinely to keep it in proper working order.

The power cord from the injection pump is to be plugged into this receptacle, and the cord routed into the notch at the bottom of the switch box.

A 3 prong, grounded, power cord from an external power source (110-120 volt, 60 Hz.) is routed into the switch box via the same notch at the bottom of the switch box. The male plug that is fastened inside of the switch box and this external power cord are connected together (inside of the switch box), and the SWITCH BOX DOOR CLOSED AND LATCHED.

On the outside of the switch box is a 2 position, rotating switch. This switch can now be used to turn the injection pump on or off as desired without opening the door on the switch box.

Fig.6



DANGER

IN AN EMERGENCY

rotate the on / off switch to the OFF position to halt the pump, and fluid flow.

DANGER

NEVER ATTEMPT REPAIRS OR DISASSEMBLY

without shutting off the motor and disconnecting/lock-out the power source. Serious personal injury will result.

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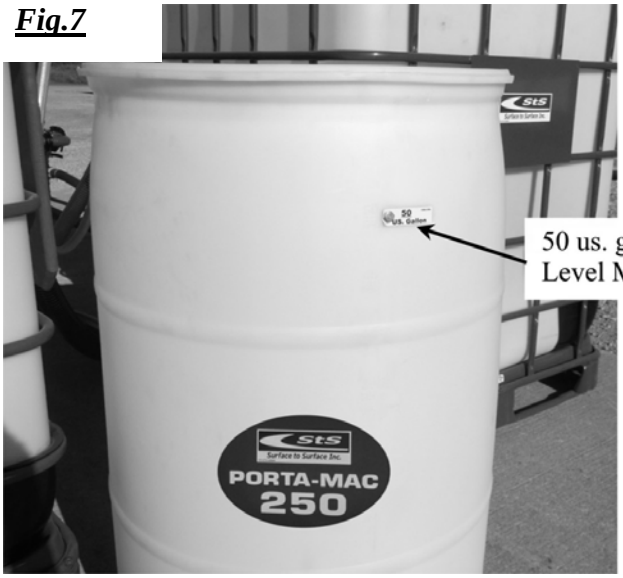
Injection System for Mac JR-120

Description, Care and Maintenance (section I)

Liquid Product Tank

The liquid product barrel (Fig.7) is a 55 us. gal. plastic barrel. This barrel is used for mixing the water and liquid product concentrate together and then act as storage for this liquid product as it is being used. The tank should not be used for any other purpose than what is was designed for, and the inside should be kept clean and free of debris that may clog the foot/check valve screen of the injection pump. On the side if the tank is a 50 us. gallon level marker that is used as a reference point when filling and mixing the liquid product.
The liquid product barrel should always be set on solid level ground, close to the injection pump assembly.

Fig.7



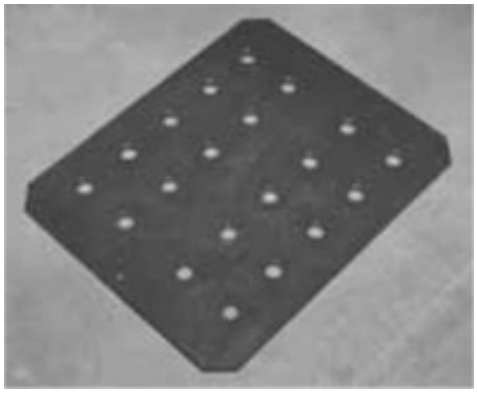
CAUTION

NEVER LEAVE LIQUID IN THE PIPING OR HOSES during freezing weather conditions, as damage will result. Follow instruction for winterizing.

Squeeze Board

The Squeeze board (Fig.8) is made of plastic with multiple holes cut into it. It is used when "squeezing" the filter bag of solids in the squeeze basket. The board is placed on top of the bag and the manual hand wheel is centered on the board. As the hand wheel id turned down the board compacts the bag and "squeezes out the fluid into the catch tank. The board needs to be kept clean of dirt and mud so as not to contaminate the clean fluid.

Fig.8



SECTION #II

Operating the Fluid Recovery Unit

Operating the Fluid Recovery Unit (section II)

Site Setup & Pre-Check

SITE SETUP

- **SET** and position the liquid product barrel on solid level surface to avoid settling or upset.
- **SET** and position the squeeze basket and catch tank on solid level surface to avoid settling or upset.
- **SET and SECURE** the injection pump

UNIT PRE-CHECK

- **CHECK** the under-flow box discharge hose is in the proper location and secured on the squeeze basket for the treated fluid to collect in the filter bag.
- **CHECK** to ensure the injection pump is fastened down with the strap.
- **CHECK** the injection pump discharge hose is connected to the quick connect fitting under the gauge on the underflow box, and the suction hose is in the liquid product barrel.
- **CHECK** the injection pump switch is in the off position.
- **CHECK** the external power cord and injection pump cord are properly connected inside of the switch box, the reset button on the receptacle is in, and the door is closed and latched.
- **CHECK** the external power cord is connected to an external (grounded) power source.
- **CHECK** to ensure the injection pump is primed.
- **CHECK** to ensure the liquid product barrel has significant fluid to operate the injection pump.
- **CHECK** to ensure the ball valve on the injection pump is fully open.
- **CHECK** the catch tank bottom valve is CLOSED

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Injection System for Mac JR-1200

Operating the Fluid Recovery Unit (section II)

Typical Fluid Recovery Operation

Preparing the Liquid Product

- **Fill the liquid product barrel with fresh clean water to the desired volume level.**
- **Add the appropriate amount of liquid product concentrate to the water (1 liter per 200 L water).**
- **The amount of concentrate used will be determined by water quantity, water quality, drill fluid make-up and content of spent drill fluid.**
- **Disconnect the liquid product discharge hose (Fig.9a) connected to the quick coupling connector mounted on the under-flow box.**
- **With the injection pump pre-primed, hold the end of the liquid product discharge hose over the liquid product barrel open top and point downward into the water (Fig.9b).**
- **With the ball valve on the injection pump in the open position, rotate the injection pump switch to the on position.**
- **With the force of the liquid product "jetting" from the end of the hose, stir the contents of the tank for approximately 1 min. This will mix the water and concentrate together and also check the injection pump is working properly.**
- **After mixing the liquid product in the tank, rotate the injection pump switch to the off position.**
- **Reconnect the liquid product discharge hose back onto the quick coupling connector mounted on the under-flow box (Fig.9a).**

Fig.9a

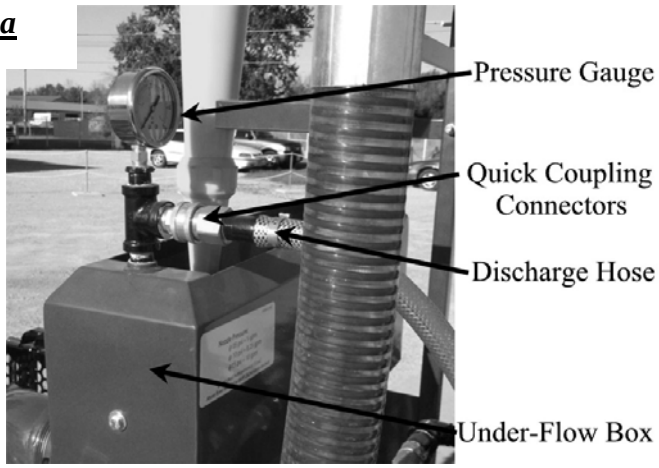
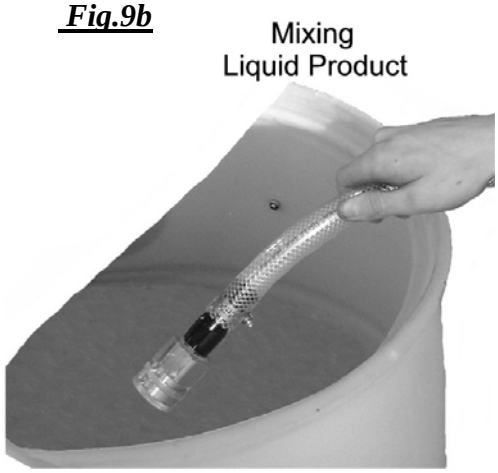


Fig.9b



DANGER

IN AN EMERGENCY

shut off the mixer and injection pump to halt fluid flow

CAUTION

BEFORE STARTING THE MOTOR, BE SURE THE PUMP IS PRIMED!

Check the pump by slowly & carefully opening the plug located on the top of the centrifugal pump. Remove the plug to view inside fluid level. The centrifugal pump seal WILL be damaged if allowed to cavitate or run dry.

CAUTION

WHEN THE UNIT IS IN OPERATION,

the fluid in the piping and hoses may reach pressures up to 50 p.s.i.

DANGER

NEVER ATTEMPT REPAIRS OR DISASSEMBLY

without shutting off the mixing / pumping unit.
Serious personal injury will result.

CAUTION

TRAPPED FLUID MAY BE PRESENT and will spill out when piping, hoses, hydro-cyclones are removed.

CAUTION

NEVER LEAVE LIQUID IN THE PIPING OR HOSES during freezing weather conditions, as damage will result. Follow instruction for winterizing.

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Injection System for Mac JR-1200

Operating the Fluid Recovery Unit (section II)

Typical Fluid Recovery Operation

Cleaning the "Dirty" Fluid for reuse and Treating the Under-Flow

NOTE:

The treatment (flocculation) is based on a 1 to 1 mixture of under-flow fluid and liquid product. The cones produce approximately 5gpm.of underflow fluid and the injection pump set at 5 psi will inject approximately 5gpm. of liquid product.

The correct combination is achieved when the solids in the filter bag have an oatmeal appearance and effluent water will be draining from the bag.

The "Dirty" fluid tank is now full of dirty fluid from your sump (customer supplied pump) and it is now ready to be "Cleaned" with the hydro-cyclones mounted at the front of the MAC JR 1200, to be reused.

- **Close the "Mix" tank suction valve.**
- **Close the "Active" tank suction valve.**
- **Open the "Dirty" tank suction valve.**
- **Rotate the 3-way valve "A" to position "Flow to valve B".**
- **Rotate the 3-way valve "B" to position "Flow to valve C".**
- **Rotate the 3-way valve "C" to position "Flow to dirty tank nozzles".**
- **Start the M2-922 mixer engine and run at maximum speed**

  The M2-922 mixer will now draw the fluid from the "Dirty" tank and return it back to the "Dirty" tank thru the nozzles keeping the dirty fluid in the tank rolling to reduce any sediment.
- **Let the dirty tank roll and mix up for 3 to 5 minutes.**
- **Switch on the injection pump and using the pressure gauge and ball valve at the pump, set the desired pressure of the liquid product going to the nozzles by opening or closing the ball valve. By adjusting the pressure with the ball valve you are increasing or decreasing the amount of liquid product being injected into the under-flow box. The amount of liquid product needed to separate the water and solids, will depend on the make-up of the under-flow fluid and how it reacts. It is better to error on the side of too much liquid product than too little. As the unit is operating, the valve (pressure) can be adjusted to match the conditions and achieve the best performance.**
- **The "Nozzle Pressure" decal (Fig.10a) mounted on the unit is used as a guideline only. Operator experience is the best knowledge. The cones produce approx. 5 gpm. of discharge into the under-flow box.**
- **Be sure the liquid product is flowing from the nozzle before using the hydro-cyclones. This will also "wet" the weir plate and help reduce any buildup or flow drag.**
- **Watch the pressure gauge on the hydro-cyclone manifold (Fig.10b).**
- **SLOWLY rotate the 3-way valve "C" downward toward position "Flow to cone head" and STOP ROTATING THE VALVE HANDLE WHEN THE PRESSURE GAUGE IS AT 32-35 PSI.**

CAUTION: ***Setting the manifold pressure above or below the stated pressure WILL DECREASE THE EFFICIENCY of the hydro-cyclone's cleaning ability and make the over-flow fluid unusable and cause harm or damage to equipment and processes reusing this fluid.***

Injection System for Mac JR-1200

Operating the Fluid Recovery Unit (section II)

Typical Fluid Recovery Operation *continued*

- **A visual inspection of the under-flow from the hydro-cyclones should be done now to assure they are all working and have the proper cone shaped discharge (Fig.11).**
- **If there is a problem with the performance of the hydro-cyclones, shut down the M2-922 mixer, wait until the fluid drains out the bottom of the cones, switch off the injection pump. Resolve the problem.**

The M2-922 mixer is now drawing the fluid from the "Dirty" tank and routing enough fluid to create 32-35psi at the cone manifold, thru the hydro-cyclones, and the remaining dirty fluid is returned back to the "Dirty" tank thru the nozzles, keeping the dirty fluid in the tank rolling to reduce any sediment.
The cleaned fluid will flow from the over-flow box down into the active tank to be reused.
The treated fluid from the underflow box will flow out of the front discharge port of the box and into the squeeze basket filter bag.

- **STOP the M2-922 mixer & pump when the "Dirty" Tank is empty, or the pump sucks air (cavitation)**

Note: it is common for some fluid to remain in the "Dirty" tank.

- **Rotate the 3-way valve "C" to position "Flow to Dirty Tank Nozzles".**
- **When the hydro-cyclones stop draining fluid from inside, switch off the injection pump.**

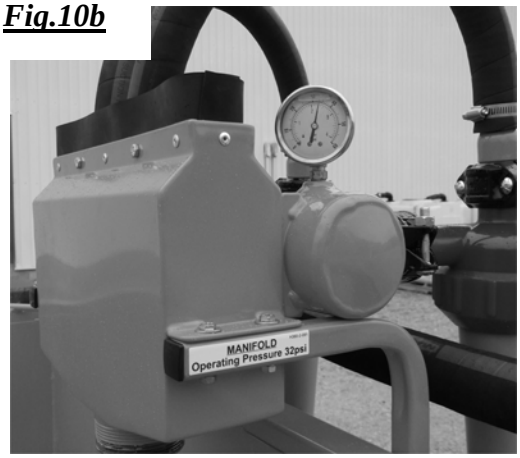
Fig.10a

H360-2-092

Nozzle Pressure:
@ 05 psi = 5 gpm
@ 10 psi = 8.25 gpm
@ 15 psi = 10 gpm

(pump dead head pressure at 35psi.)
Above flows recorded at 860ft (262m) above sea level

Fig.10b



DANGER

IN AN EMERGENCY

STOP the mixer / pumping unit
to halt the pump, and fluid flow

CAUTION

DO NOT POSITION
ANY PART OF YOUR BODY

over the under-flow or
over-flow box while operating.

CAUTION

WHEN THE UNIT
IS IN OPERATION,

the fluid in the piping and hoses
may reach pressures up to 50 p.s.i.

DANGER

IN AN EMERGENCY

shut off the mixer and injection pump
to halt fluid flow

WARNING

NEVER ATTEMPT TO REMOVE OR
CLEAN THE HYDRO-CYCLONES

while the unit is in operation.
Serious personal injury will result.

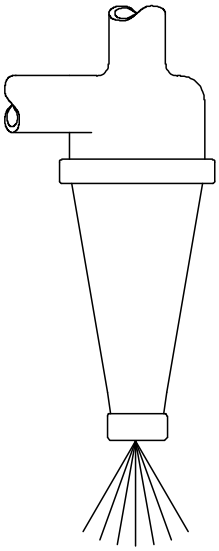
Injection System for Mac JR-1200

Operating the Fluid Recovery Unit (section II)

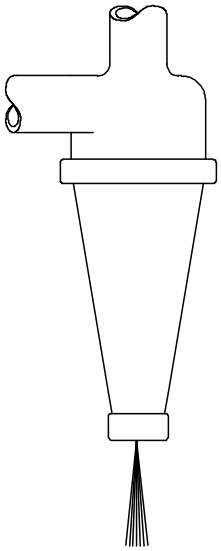
Typical Fluid Recovery Operation

Fig.11

Hydro-cyclone Discharge



Correct
Inverted cone shape discharge



Incorrect
Rope shape discharge

WARNING

NEVER ATTEMPT TO REMOVE OR CLEAN THE HYDRO-CYCLONES

while the unit is in operation.
Serious personal injury will result.

CAUTION

WHEN THE UNIT IS IN OPERATION,

the fluid in the piping and hoses may reach pressures up to 50 p.s.i.

DANGER

IN AN EMERGENCY

shut off the mixer and injection pump to halt fluid flow

CAUTION

DO NOT POSITION ANY PART OF YOUR BODY

over the under-flow or over-flow box while operating.

Operating the Fluid Recovery Unit (section II)

Typical Fluid Recovery Operation *continued*

Reusing Catch Tank Effluent for Fluid Recovery

Effluent (water) from the squeeze basket catch tank can be reused as the liquid product usually at least 1 more time as there remains enough residue in the liquid to be affective. If the fluid seems "weak" then add a little more liquid product concentrate and proceed as instructed in previous pages.

- **Remove injection pump suction hose (with foot/check valve) from liquid product barrel and place it in squeeze basket catch tank.**
- **Remove injection pump discharge hose (quick coupler) attached under the gauge on the underflow box and securely position it into the liquid product barrel.**
- **Open the ball valve on the injection pump full open.**
- **Switch on the injection pump and fill the liquid product barrel to the appropriate level.**
- **Switch injection pump off.**
- **Replace suction hose (with foot/check valve) back into the liquid product barrel.**
- **Reconnect injection pump discharge hose (quick connect) back onto the quick connect fitting mounted under the gauge on the underflow box.**

You are now ready to treat another batch of dirty fluid. Just follow the steps outlined on the previous pages.

Reusing Catch Tank Effluent for New Mud

Effluent (water) from the squeeze basket catch tank can be reused to make new drilling fluid. Since some liquid product residue remains in the fluid from the catch tank the addition of a little more bentonite will be require when make a new batch of drilling fluid. This extra bentonite will consume the remaining residue.

- **Connect a 2" hose to the valve located at the bottom of the catch tank.**
- **Close all suction valves on the MAC JR-1200**
- **Disconnect the M2-922 pump suction hose and connect the hose from the valve on the catch tank.**
- **Rotate the 3-way valve "A" to position "Flow to Mixer".**
- **Open the valve on the catch tank and start the M2-922 mixer.**
- **The fluid from the catch tank will be drawn into the pump and transferred into the "Mix tank".**
- **When catch tank is empty, turn off the M2-922 mixer.**
- **Shut the valve at the bottom of the catch tank, remove the hose from the pump suction and replace with the hose on the MAC JR-1200 that was previously connected.**
- **Open the "Mix Tank" suction valve**

You are now ready to mix a new batch of drilling fluid.

NEVER PUT THE EFFLUENT FROM THE SQUEEZE BASKET CATCH TANK DIRECTLY INTO THE "ACTIVE TANK"

Since there is remaining liquid product residue in the effluent, it will effect the drilling fluid in the "Active Tank" and cause separation or fall-out of bentonite in your drill string.

SECTION #III

OEM Repair Information

Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

WAYNE® Self-Priming Portable Utility Pump

Description

This self-priming portable utility pump is designed to be used as a transfer pump for such applications as emptying water heaters, swimming pools, livestock tanks, boats, etc. Pump can also be used for an intermittent pressure boost for applications such as washing cars, cleaning driveways, etc. The motor is air cooled; it is **not** designed to oper- ate under water.

NOTE: This pump is not intended for permanent installation or long, extend- ed periods of continuous operation.

Safety Guidelines

This manual contains information that is very important to know and understand. This information is provided for SAFETY and to PREVENT EQUIPMENT PROBLEMS. To help recognize this information, observe the following symbols.

***DANGER** Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.*

***WARNING** Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.*

***CAUTION** Caution indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.*

***NOTICE** Notice indicates important information, that if not followed, may cause damage to equipment.*

General Safety Information

***DANGER** Do not submerge motor or allow motor to be exposed to water. Personal injury and/or death could result.*

DANGER

Do not use to pump flammable or explosive fluids such as gasoline, fuel oil, kerosene, etc. Do not use in a flammable and/or explosive atmosphere. Pump should only be used to pump clear water. Personal injury and/or death could result.

***WARNING** Risk of electrical shock. All wiring must be performed by a qualified electrician.*

DANGER

Do not walk on wet areas until all power is turned off. Failure to follow this warning could result in fatal electrical shock.

1. Read all instructions before operation.
2. Disconnect power and release all pressure within the system before servicing any component.
3. Drain all liquids from system before servicing.

***WARNING** Secure the discharge line before starting the pump. An unsecured discharge line may whip. Personal injury and/or property damage could result.*

4. Periodically inspect pump and system components, checking for weak and/or worn hoses. Insure all connections are secure.
5. Provide a means of pressure relief in the case of an obstructed discharge line.
6. Protect electrical cord from sharp objects, hot surfaces, oil and chemicals. Avoid kinking the cord and replace damaged cords immediately.

Installation

DANGER

Always disconnect power source before attempting to install, service, or maintain the pump. Never handle a pump with wet hands or when standing on wet or damp surface or in water. Fatal electrical shock could occur.

1. A ground fault circuit interrupter (GFCI) is required.

DANGER

Risk of electrical shock! This pump is supplied with a grounding conduc

Specifications

Motor	Single Phase - 115V, 60 Hz, 8,000 RPM	Horsepower	1/2 HP
Motor	Series Wound (brush type) AC/DC Operation	Inlet/Outlet Openings	3/4" NPT
Impeller	SAN	Pump Housing	Cast iron
Motor Housing	Cast iron	Motor Shaft	Cold rolled steel
Shaft and Volute Seal	Buna-N	Motor Bearings	Permanently lubricated
Maximum Fluid Temperature	120˚F		

REMINDER: Keep your dated proof of purchase for warranty purposes! Attach it to this manual or file it for safekeeping.

Installation (Continued)

tor and grounding type attachment plug. A grounded receptacle in conformance with current NEC and local codes must be used (See Figure 1).

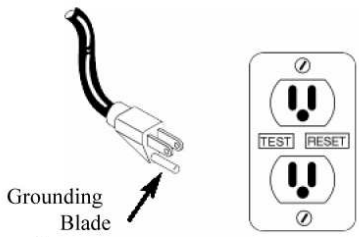


Figure 1

2. This pump operates on 115V, 60 Hz AC, single phase or 115V DC.
3. Use an extension cord only if necessary. Follow the Extension Cord Length Table for proper gage of 3-wire, grounding type extension cord.

DANGER

Risk of fatal electrical shock. Never cut off the round grounding prong. Cutting the cord or plug will void the warranty and make the pump inoperable.

4. Figure 2 shows a typical installation. Threaded adapters are furnished for attaching garden hose where conditions permit its use. In no case should the pump be more than 15 feet above or away from inlet source. Install a foot valve and when suction lift is over 10 feet or when suction line is over 10 feet.
5. The inlet line may be galvanized pipe, plastic pipe, or reinforced hose. Small leaks in suction line

EXTENSION CORD LENGTH TABLE				
Wire Size	**#18**	**#16**	**#14**	**#12**
Length	25 ft	50 ft	100 ft	150 ft

greatly reduce efficiency of pump and may prevent priming.

NOTICE ***Ordinary garden hose will collapse under suction pressure and should not be used in the inlet but for pressure boosting only.***

6. Use a strainer when pumping from a creek, pond, or source where foreign objects may be sucked into the pump. The strainer should prevent solids from entering the inlet line.
7. A regular garden hose may be used as a discharge line.

Operation

NOTICE *Pump must be filled with water before operation. Running the pump dry will cause damage to the shaft seal.*

1. This unit is **not** waterproof or weatherproof and is **not** intended to be used in showers, saunas, or other potentially wet locations. The motor is designed to be used in a clean, dry location with access to adequate cooling air. Ambient temperatures around the motor should not exceed 104˚F (40˚C).
2. Remove priming plug and fill with water. Close plug
3. Plug power cord into GFCI protected electrical outlet. The pump will prime in a few minutes depending on suction line length. Use of foot valve on suction line is recommended.
4. In the case of pressure boosting, turn water on before starting pump. This force primes the pump. Then, plug power cord into GFCI protect- ed electrical outlet.
5. Unplug cord to turn unit off.

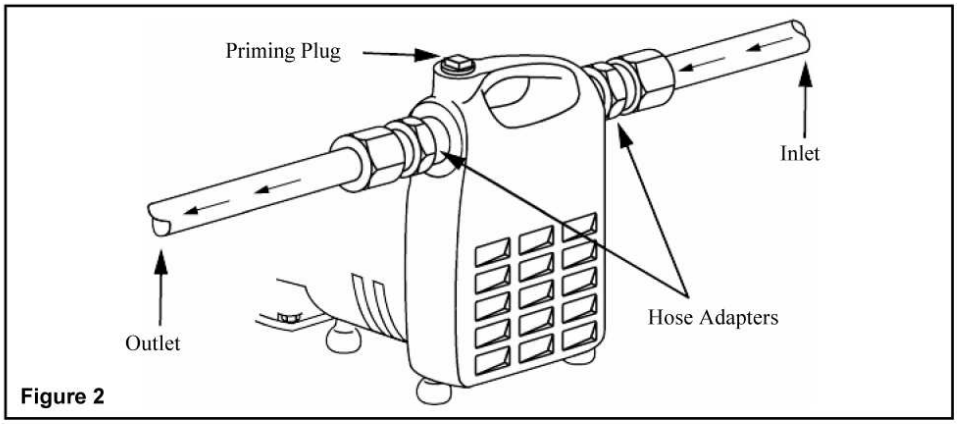


Figure 2

Maintenance

WARNING ***Let pump cool for at least 20 minutes before attempting to service. Motor may be extremely hot. Personal injury may result.***

1. Pump should be checked periodically for proper operation.

DANGER ***Always disconnect the electrical supply before attempting to install, service, or perform any maintenance. If the power source is out of sight, lock and tag in the open (off) position to prevent unexpected power application. Failure to do so could result in fatal electrical shock. Only qualified electricians should repair this unit. Improper repair could result in fatal electrical shock.***

BRUSH REPLACEMENT

NOTICE ***Brushes for this pump should be inspected after 100 hours of operation.***

Pumps with excess of 100 hours of operation may stop operating or fail to start. This could be due to worn brushes or carbon build-up. The brushes should be removed and carbon removed. Worn brushes are not covered under warran- ty. Replacement brushes may be available from Wayne Pumps. Call 1-800-237-0987 to order.

1) Disconnect electrical cord from power supply.

2) Remove brush caps with screwdriver. 3) Remove old brush assembly.

4) Insert new brush assembly. 5) Replace brush caps.

For other problems, consult troubleshooting chart.

Maintenance

(Continued)

ADDITIONAL REPAIRS

To replace bearings, shaft seal, gaskets, rotor, follow the instructions listed below.

1. Disconnect electrical cord from power supply.
2. Relieve pressure in system.
3. Disconnect inlet and outlet lines. 4. Empty water from pump housing. 5. Place pump on bench with motor end up and remove brushes as described in **BRUSH REPLACEMENT** instructions. If brushes are to be reused, mark the location from which each came. Replace brushes in original orientation upon com- pletion of repair.
6. Remove the four cap screws holding motor housing and pump hous- ing together. Motor housing is now free and can be removed. Take care not to lose commutator bearing fin- ger spring.
7. With a screwdriver, pry the rotor-backhead assembly out of the pump housing.
8. Remove the impeller by turning counter clockwise (righthand thread on shaft). Save any washers which were between impeller hub and shaft.
9. Remove backhead (the bearing is press fit into the backhead).
10. Place backhead on flat surface with impeller side down and press out shaft seal.
11. Place impeller on flat surface with vane side down and with screwdriver and hammer break ceramic seal ring into several pieces and remove. Next, remove rubber seal ring cup from impeller.
12. Remove bearings from armature shaft (press-fit on shaft).
13. Inspect the armature commutator bars. The environment in which the unit has been operating will have influence on the condition of the commutator. Airborne dust and dirt will accelerate wear. A rough or scarred appearance may dictate having commutator reconditioned before reassembly.
14. To reassemble, install new bearings on the shaft. Always press against the inner race to prevent bearing damage. Make sure bearings are tight against the shaft shoulders.
15. Press shaft seal into backhead. When pressing shaft seal into place, apply force to the cup flange. Avoid touching the polished seal surface; oil or scratches on this surface may cause premature failure of the seal.
16. Press ceramic side of seal into impeller, ceramic side out. Avoid touching ceramic with hands as oil may cause premature failure of the seal. Wipe oil off both sides of seal with a soft, lint-free cloth.
17. Reassemble unit in reverse order, beginning with step 9.
18. After reassembly check shaft for free rotation with screwdriver in fan through air exit openings.

Troubleshooting Chart

Symptom	Possible Cause(s)	Corrective Action
Pump will not start or run	1. Blown fuse 2. Low line voltage 3. Worn brushes 4. Impeller blocked 5. Defective motor	1. If blown, replace with proper sized fuse or reset breaker 2. If voltage is under 108 volts, check wiring size 3. Replace brushes 4. Remove blockage 5. Replace motor or pump
Pump will not prime or retain prime after operating	1. Air leak in suction line 2. Impeller blocked 3. Worn seal 4. Suction lift too high 5. Hose kinked or looped 6. Fittings not tight 7. Suction hose out of water 8. Clogged inlet	1. Repair or replace suction line 2. Remove blockage 3. Replace seal 4. Lower pump 5. Straighten hose 6. Tighten fittings 7. Submerge suction hose end 8. Clean inlet
Flow rate is too low	1. Piping or hose is fouled or damaged 2. Low line voltage	1. Clean or replace 2. If voltage is under 108 volts, check wiring size
Seal leaks	1. Worn seal 2. Shaft grooved 3. Pump head loose on motor	1. Replace seal 2. Replace rotor 3. Insure proper assembly and no obstruction, tighten bolts

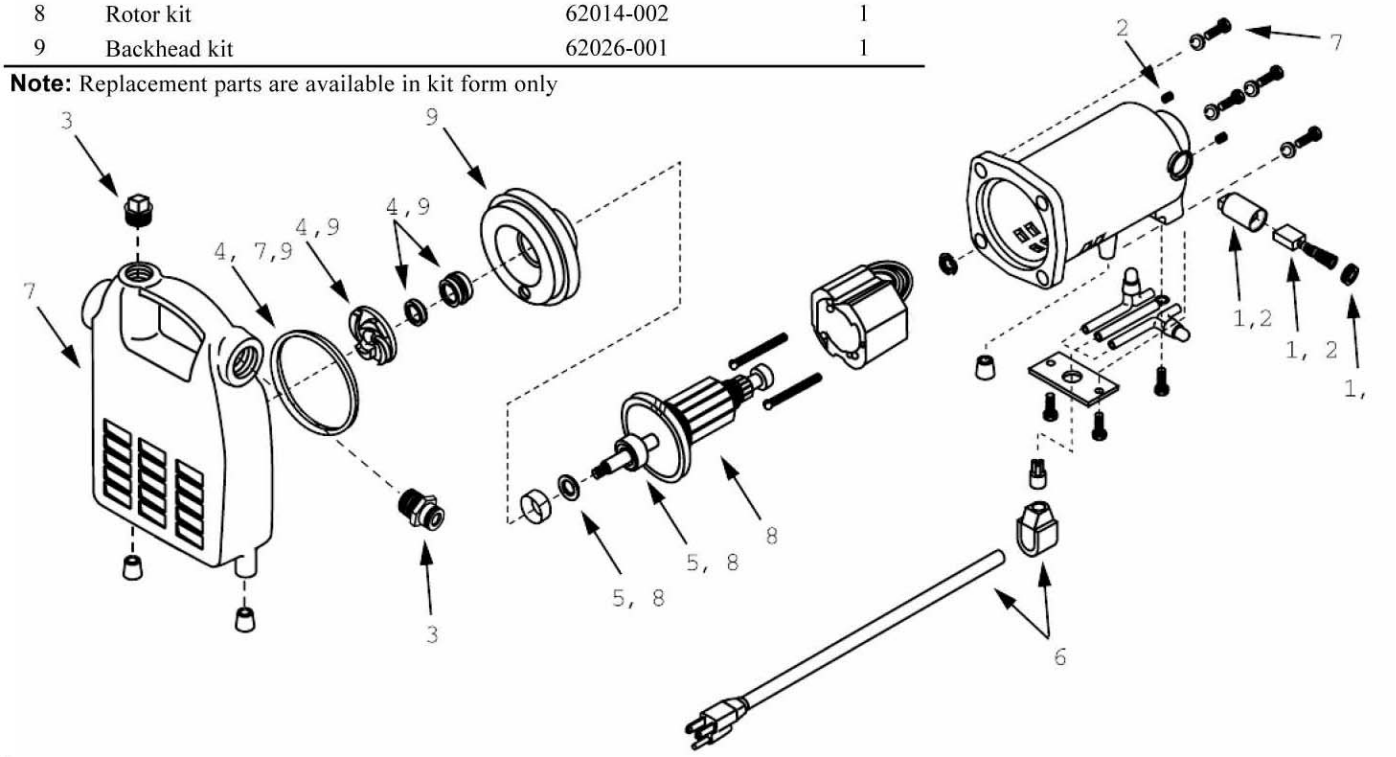
For Replacement Parts, call 1-800-237-0987

Ref. No.	Description	Part Number	Quantity
1	Brush kit	62007-002	1
2	Brush holder kit	62008-002	1
3	Fittings kit	62009-001	1
4	Impeller and seal kit	62010-001	1
5	Bearing kit	62011-002	1
6	Cord kit	62012-001	1
7	Volute kit	62013-001	1
8	Rotor kit	62014-002	1
9	Backhead kit	62026-001	1

Note: Replacement parts are available in kit form only

Please provide following information:
- Model number
- Serial number (if any)
- Part description and number as shown in parts list

Address parts correspondence to:
Wayne Home Equipment
100 Production Drive
Harrison, OH 45030 U.S.A.



Limited Warranty

For one year from the date of purchase, Wayne Home Equipment ("Wayne") will repair or replace, at its option, for the original purchaser any part or parts of its Sump Pumps or Water Pumps ("Product") found upon examination by Wayne to be defective in materials or work- manship. Please call Wayne (800-237-0987) for instructions or see your dealer. Be prepared to provide the model number when exercising this warranty. All transportation charges on Products or parts submitted for repair or replacement must be paid by purchaser.

This Limited Warranty does not cover Products which have been damaged as a result of accident, abuse, misuse, neglect, improper installa- tion, improper maintenance, or failure to operate in accordance with Wayne's written instructions.

THERE IS NO OTHER EXPRESS WARRANTY. IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO ONE YEAR FROM THE DATE OF PURCHASE. THIS IS THE EXCLUSIVE REMEDY AND ANY LIA- BILITY FOR ANY AND ALL INDIRECT OR CONSEQUENTIAL DAMAGES OR EXPENSES WHATSOEVER IS EXCLUDED.

Some states do not allow limitations on how long an implied warranty lasts, or do not allow the exclusions or limitations of incidental or consequential damages, so the above limitations might not apply to you. This limited warranty gives you specific legal rights, and you may also have other legal rights which vary from state to state.

In no event, whether as a result of breach of contract warranty, tort (including negligence) or otherwise, shall Wayne or its suppliers be liable for any special, consequential, incidental or penal damages including, but not limited to loss of profit or revenues, loss of use of the products or any associated equipment, damage to associated equipment, cost of capital, cost of substitute products, facilities, services or replacement power, downtime costs, or claims of buyer's customers for such damages.

You **MUST** retain your purchase receipt along with this form. In the event you need to exercise a warranty claim, you MUST send a copy of the purchase receipt along with the material or correspondence. Please call Wayne (800-237-0987) for return authorization and instruc- tions.

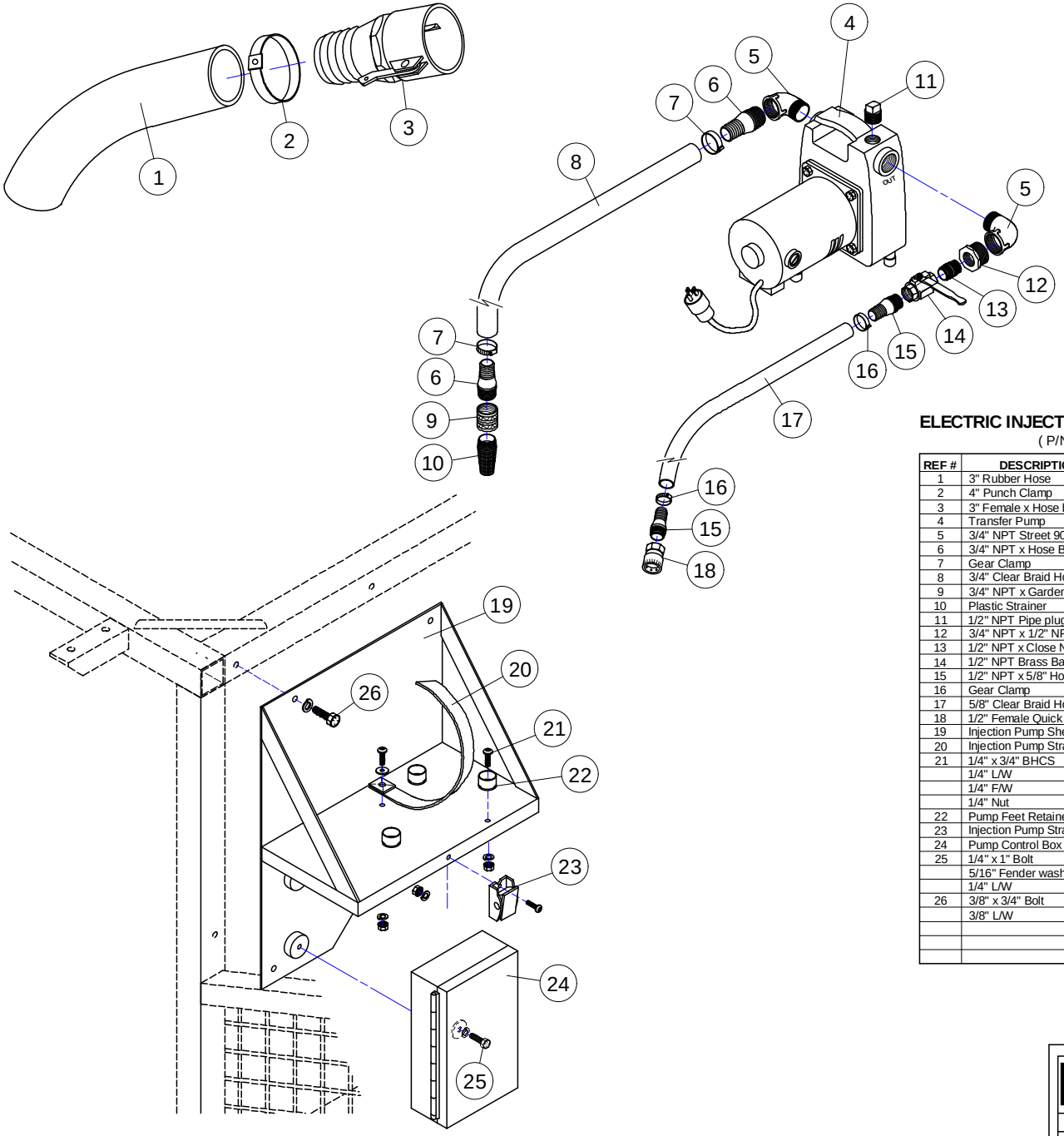
DO NOT MAIL THIS FORM TO WAYNE. Use this form only to maintain your records.

MODEL NO._____ SERIAL NO._____ INSTALLATION DATE_____

ATTACH YOUR RECEIPT HERE

SECTION #IV

(Parts Manual)



ELECTRIC INJECTION PUMP ASSEMBLY PARTS LIST

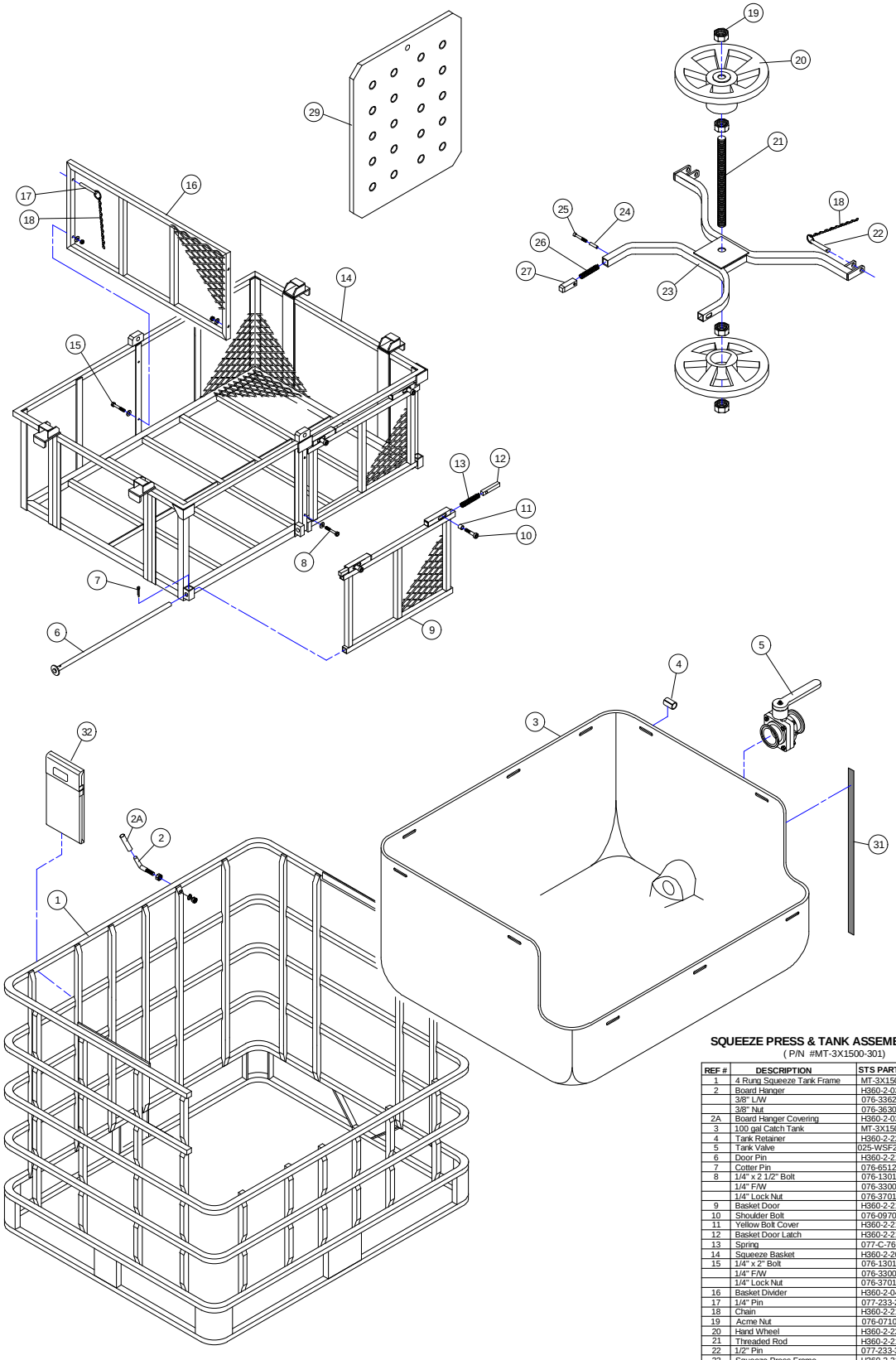
(P/N #MT-3X1500-302)

REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.	
1	3" Rubber Hose	H360-2-034	41"	
2	4" Punch Clamp	025-H-16	1	
3	3" Female x Hose barb Cam-loc	025-300-C-AL	1	
4	Transfer Pump	060-TP-500K	1	B
5	3/4" NPT Street 90° Elbow	018-310-01640-7	2	B
6	3/4" NPT x Hose Barb	018-1661268225	2	B
7	Gear Clamp	025-HS-10	2	
8	3/4" Clear Braid Hose	025-K3150-075	90"	
9	3/4" NPT x Garden Hose Adaptor	025-D19-BAS976	1	
10	Plastic Strainer	~~~	1	
11	1/2" NPT Pipe plug	018-318-90158-X	1	B
12	3/4" NPT x 1/2" NPT Bushing	018-318-90600-X	1	B
13	1/2" NPT x Close Nipple	018-330-01440-8	1	B
14	1/2" NPT Brass Ball Valve	022-423-00004-1	1	
15	1/2" NPT x 5/8" Hose Barb	018-1661268222X	2	B
16	Gear Clamp	025-HS-06	2	
17	5/8" Clear Braid Hose	025-K3150-0625	50"	
18	1/2" Female Quick Connect x NPT	025-85300153	1	
19	Injection Pump Shelf	MT-3X1500-310	1	B
20	Injection Pump Strap	H360-2-038-D	1	
21	1/4" x 3/4" BHCS	076-24051	5	
	1/4" L/W	076-33618	5	
	1/4" F/W	076-33004	1	
	1/4" Nut	076-36302	5	
22	Pump Feet Retainers	H-360-2-038-B	3	B
23	Injection Pump Strap Grip	H360-2-038-E	1	
24	Pump Control Box	H360-2-240	1	
25	1/4" x 1" Bolt	076-13005	2	
	5/16" Fender washer	076-33213	2	
	1/4" L/W	076-33618	2	
26	3/8" x 3/4" Bolt	076-13103	3	
	3/8" L/W	076-33622	3	

Paint Color
B = Black

Surface to Surface Inc.®

DWR. NUM.	DATE. 12 / 18 / 13
MT-3X1500-302	REV.



SQUEEZE PRESS & TANK ASSEMBLY PARTS LIST

(P/N #MT-3X1500-301)

REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.	
1	4 Rung Squeeze Tank Frame	MT-3X1500-321	1	O
2	Board Hanger	H360-2-038-A	1	O
	3/8" L/W	076-33622	1	
	3/8" Nut	076-36306	2	
2A	Board Hanger Covering	H360-2-038-F	1	
3	100 gal Catch Tank	MT-3X1500-320	1	
4	Tank Retainer	H360-2-226-A	10	
5	Tank Valve	025-WSF210 / 025-WSF223MR	1	
6	Door Pin	H360-2-213-A	2	B
7	Cotter Pin	076-65123	2	
8	1/4" x 2 1/2" Bolt	076-13013	1	
	1/4" F/W	076-33004	2	
	1/4" Lock Nut	076-37018	1	
9	Basket Door	H360-2-211	2	B
10	Shoulder Bolt	076-0970095	4	O
11	Yellow Bolt Cover	H360-2-214-A	4	
12	Basket Door Latch	H360-2-212-E	4	O
13	Spring	077-C-766	4	
14	Squeeze Basket	H360-2-202	1	B
15	1/4" x 2" Bolt	076-13011	1	
	1/4" F/W	076-33004	2	
	1/4" Lock Nut	076-37018	1	
16	Basket Divider	H360-2-045	1	B
17	1/4" Pin	077-233-271	2	
18	Chain	H360-2-219-C	4	
19	Acme Nut	076-0710130	4	O
20	Hand Wheel	H360-2-220	2	O
21	Threaded Rod	H360-2-219-B	1	
22	1/2" Pin	077-233-309	2	
23	Squeeze Press Frame	H360-2-215	1	O
24	Yellow Bolt Sleeve	H360-2-214-B	2	
25	Shoulder Bolt	076-0970110	2	B
26	Spring	077-C-766	2	
27	Squeeze Lock Bolt	H360-2-219-A	2	B
28				
29	Press Board	H360-2-228	1	
30	"Logo" Decal	070-STS-026	1	
31	"Gallonage" Decal	H360-2-106-B	1	
32	Operators Manual Holder	084-9000-07	1	
	3/16" Rivet	076-41228	2	

Paint Colors
Black = B
Orange = O

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