



## **Operators Manual**

**\*\* MINI MAC-950E \*\***

**USE IN CONJUNCTION WITH M2-E922 MIXER MANUAL (ENCLOSED)**

**Unit Serial No. \_\_\_\_\_**

**M2-E922 Mixer**

**Serial No. \_\_\_\_\_**

**Links relating to this Manual**

[www.stsmixers.com](http://www.stsmixers.com)

Dealer

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## Limited Warranty

### United States and Canada

Surface to Surface Inc. or its subsidiary which last sold the product, warrants new products sold by it for use in the United States and Canada to be, at the time of manufacture, free from defects in workmanship and materials. This warranty covers for a period of **Twelve (12) Months** of operation from the date of delivery for initial use, whichever comes first.

### Exclusions and Additional Limitations

1. This warranty relates to the condition of the product at the time of manufacture and does not cover parts or service as a result of:
  - (a) Normal wear and tear or required maintenance including, without limitation, adjustments or replacement of components subject to wear and tear, such as belts, hoses, seals and/or packing, fuses, bulbs, switches and ignition parts.
  - (b) Abuse including, without limitation, neglect, improper operation, misapplication, overloading, accident or alterations not approved by Surface to Surface Inc.
  - (c) Lack of maintenance, including, without limitation, failure to inspect and maintain, improper repair, use of "unapproved parts", cracked engine heads and blocks unless caused by the failure of an internally lubricated part or repair of engine valves, rings or guides.
2. The Company's warranty does not apply to purchased components manufactured by others where separate warranty is made by the manufacture of such components and will be applied as interpreted by the supplier.
3. All claims under his warranty shall be submitted in writing by the distributor to the Company, which will be the sole judge in determining the merits of the claim.
4. The company shall have the right to have all products or parts claimed to be defective returned to it and the cost of shipping such items shall be borne by the distributor.

.....

## Warranty Registration Card

In order to help us provide complete service for our product, please complete this card and return it.

**If not returned, all requests for warranty will be denied.**

Print Name: .....

Address: .....

City: .....State/Province.....Zip/PC.....

Model No. .... Serial No. ....

Date of Purchase ..... Dealer .....

**Return to: Surface to Surface Inc.  
5150 Forest Rd. RR#3  
Watford, Ontario, Canada  
N0M 2S0**



## MINI MAC-950E

# SAFETY STATEMENTS

Your personal safety and the safe operation of this unit are the concern of Surface to Surface Inc., and by reading and understanding this manual and understanding the safety statements, you will decrease the risk of personal and equipment damage.

Safety statements are listed here and throughout this manual to draw your attention to potential hazards that may be encountered while operating this piece of equipment. While reading this manual, you will notice that certain safety statements will relate directly to the operation, or maintenance of that particular part of the unit and should be followed carefully. Decals on the unit also follow the same format as the warnings in this manual, and therefore should be kept in good repair to alert the operator and others of the potential hazard.



*This safety alert symbol appears with most safety statements.*

*It means attention, become alert, your safety is involved!*

*Please read and abide by the message that follows the safety alert symbol.*

### **DANGER**

**Danger** (the word "DANGER" is in white letters with a red rectangle behind it) indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury. Danger is limited to the most extreme situations.

### **CAUTION**

**Caution** (the word "CAUTION" is in black letters with a yellow rectangle behind it) indicates an potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

### **WARNING**

**Warning** (the word "WARNING" is in black letters with an orange rectangle behind it) indicates an potentially hazardous situation which, if not avoided, could result in death or serious injury.

### **CAUTION**

**Caution** "without the safety alert symbol" indicates an potentially hazardous situation that can cause damage to the, machine, personal property and / or the environment or cause the machine to operate improperly.

## **SAFETY STATEMENTS**


*The following caution statements have been drawn from the instructions in this manual. They have been assembled here for ready reference.*

 **DANGER**

**NEVER TRANSPORT**  
the unit without the leveling jacks removed  
from the skid and stored in the holder.

 **WARNING**


**NEVER USE BODY PARTS,  
OR FOREIGN OBJECTS**  
in an attempt to unplug or clean the  
tank inlets or tank jet nozzels.  
Serious personal injury or  
damage will result.

 **DANGER**


**NEVER ATTEMPT TO PUT  
THE UNIT INTO OPERATION**  
without leveling the unit  
with the jacks.  
Serious personal injury will result.

 **WARNING**

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

 **DANGER**

**IN AN EMERGENCY**  
STOP the mixer / pumping unit  
to halt the pump, and fluid flow

 **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**

**DO NOT POSITION  
ANY PART OF YOUR BODY**  
over the under-flow or  
over-flow box while operating.

## **SAFETY STATEMENTS** *continued*

*The following caution statements have been drawn from the instructions in this manual. They have been assembled here for ready reference.*



### **CAUTION**

**WHEN THE UNIT  
IS IN OPERATION,**  
the fluid in the piping and hoses  
may reach pressures up to 50 p.s.i.

### **CAUTION**

**AVOID ALLOWING FOREIGN MATERIAL  
into the Tanks.**

### **CAUTION**

**BEFORE STARTING OR RESTARTING  
the mixer, make sure the suction valve  
on the proper tank is open, and the  
fluid level in the tank is above  
the suction port.**

### **CAUTION**

**CARE MUST BE TAKEN WHEN  
INSTALLING THE COUPLER GASKETS.  
If the gaskets are not properly lubricated  
and installed, a leak may develop.**

### **CAUTION**

**TRAPPED FLUID MAY BE PRESENT  
and will spill out when piping or  
hoses are removed.**

### **CAUTION**

**CARE MUST BE TAKEN WHEN  
CONNECTING ANY HOSE COUPLINGS.  
The faces must be clean before mating  
together and cam arms secured  
from opening.**

### **CAUTION**

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

### **CAUTION**

**DO NOT CONNECT CHAINS OR STRAPS  
to piping or other parts of the unit.  
D-Hooks are provided on the base  
structure for such use.**



## **SAFETY STATEMENTS** *continued*

*The following caution statements have been drawn from the instructions in this manual. They have been assembled here for ready reference.*

### **CAUTION**

The manufacturer should be consulted when considering alternative uses for this piece of equipment. This unit was designed for the mixing, cleaning and storing of drilling fluid. Other uses may create unforeseen safety issues and personal injury risk.



### **WARNING**

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

## MINI MAC-950E

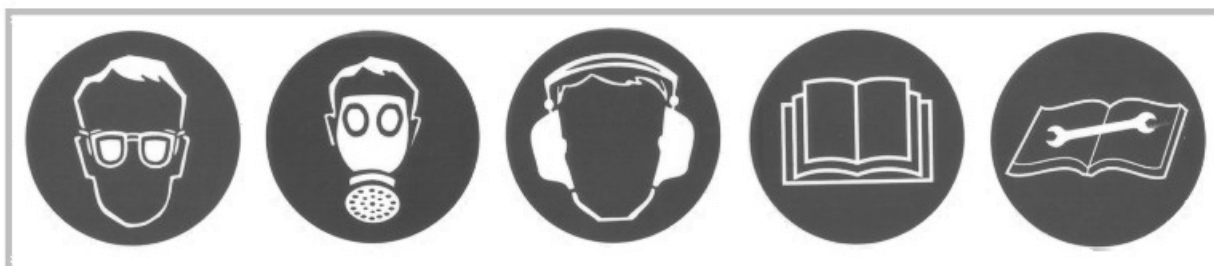
### Safety Markings

Hazard and warning markings have been placed at appropriate points on the unit. International symbols have been used, in order to ensure universal understanding of the nature of the hazard. Please comply with all warnings and markings to ensure safe use of the equipment.

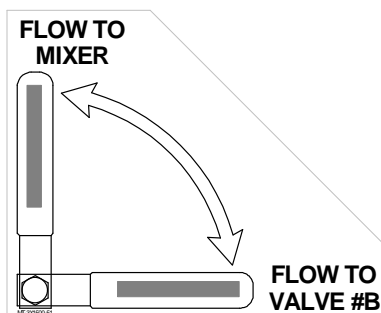
These include but are not limited to:

- |                             |  |
|-----------------------------|--|
| a) Valve Operations         | b) Valve Identification                |
| c) Outlet Descriptions      | d) Personal Protection recommendations |
| e) Personal dangers         | f) Equipment dangers                   |
| g) Maintenance instructions | h) Fluid flow direction                |

### SOME EXAMPLES FOUND ON THE EQUIPMENT



Personal Protection, Read and understand Operator's manual and Maintenance manual



Valve Operations



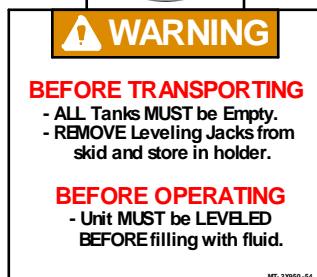
Valve Identification



Outlet Descriptions



Fluid Flow Direction



Equipment Dangers

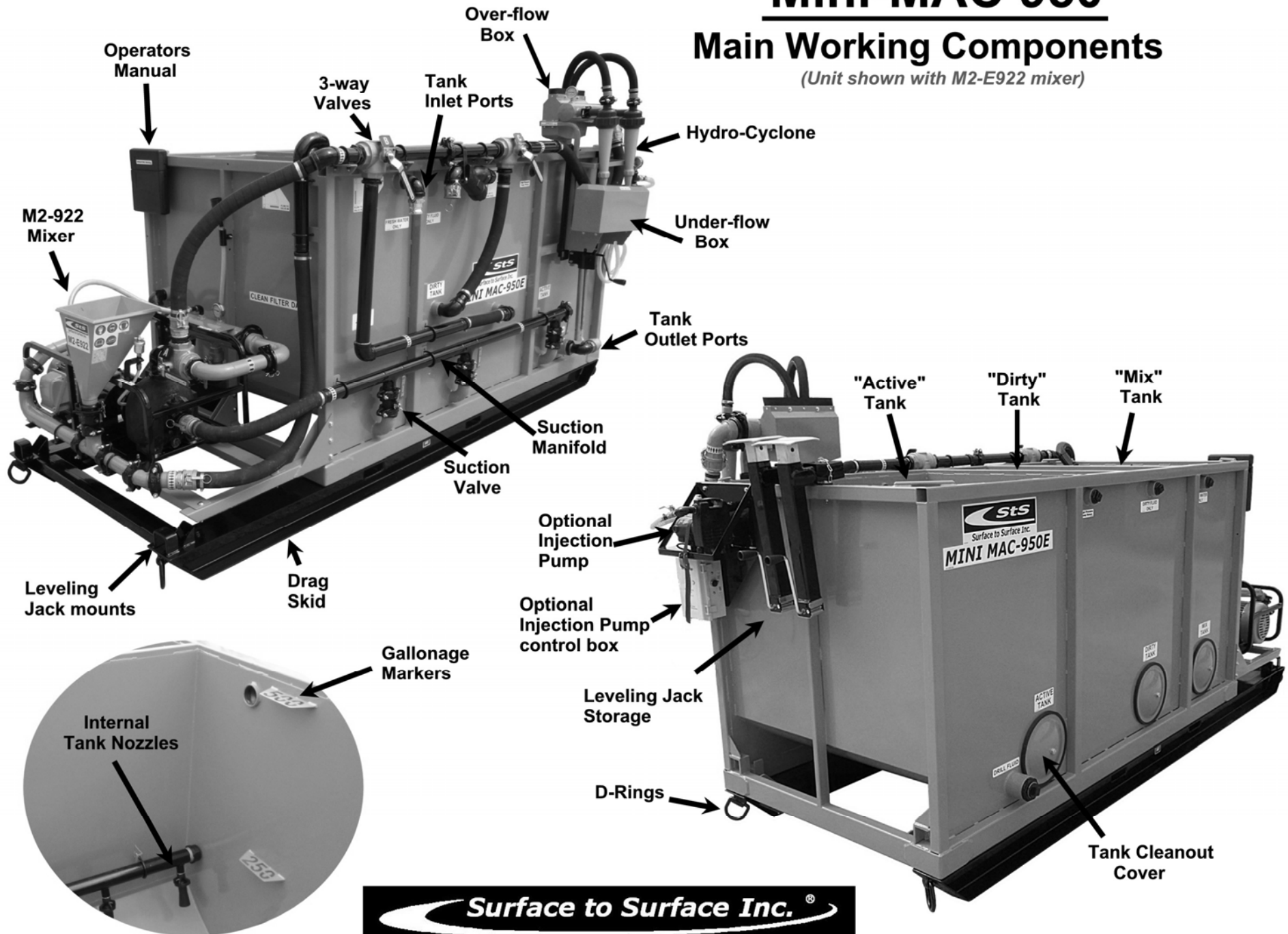


Maintenance Instructions

# Mini-MAC 950

## Main Working Components

(Unit shown with M2-E922 mixer)



Surface to Surface Inc.®



## **MINI MAC-950E**

### **Operators Manual**

*Congratulations on your acquisition of the MINI MAC-950 drill fluid mixing and recovery system. You have acquired the most efficient fluid system manufactured, for mixing bentonite drilling slurry (mud) and fluid recovery system on the market. As a manufacturer of drilling support equipment, we are well aware of the extreme conditions that drilling equipment is exposed to on a daily basis. Surface To Surface Inc. strives to overcome these conditions, with better design and manufacturing practices. Please feel free to call our toll free number (1-800-567-0978) if you have any questions or concerns about your system.*

*Thank you, for choosing the MINI MAC-950 system.*

**The MINI MAC-950 was designed to mix drilling fluid, clean and recycle used drill fluid, and maintain proper drilling fluid in an active tank for the drilling rig. The MINI MAC-950 is built as one unit that includes 3 tanks, each with injector nozzles, a manifold assembly of hydro-cyclones, a STS M2 mixer and all the valves and piping to needed to create a smooth and effortless system.**

**The mixer located at the rear of the unit is designed around the time proven M series mixers of STS.**

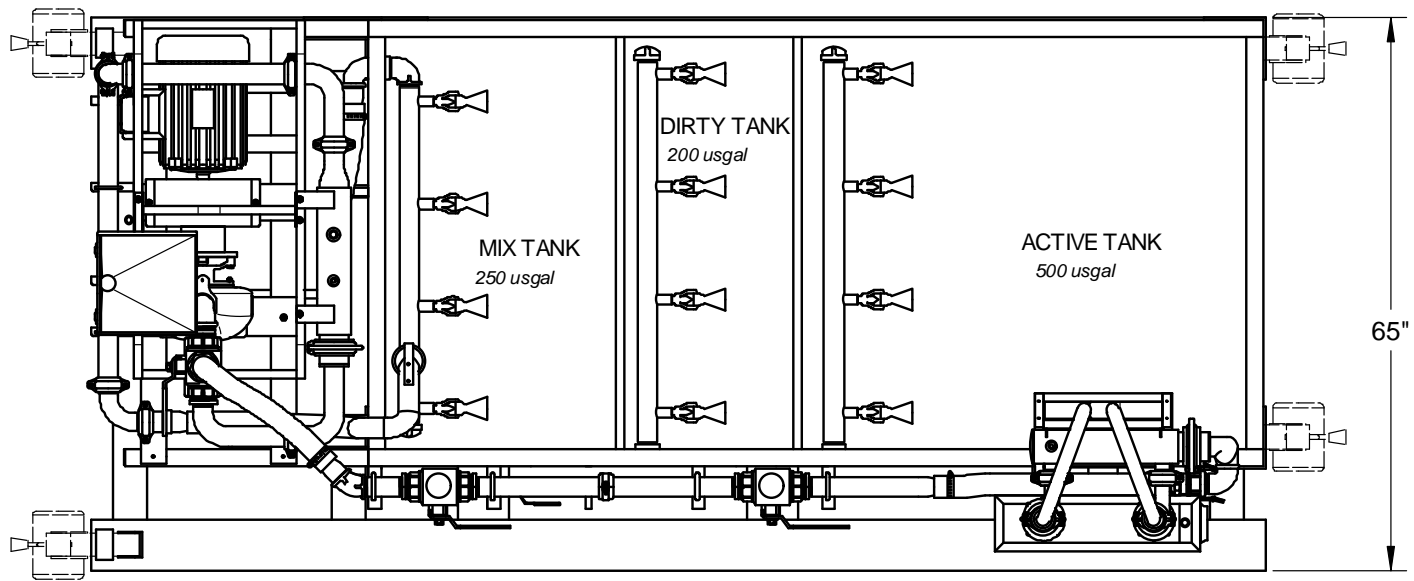
**The MINI MAC-950E consists of an electric powered centrifugal pump, filter/shear unit, venturi mixing tee assembly, dry hopper and pressure wash wand, making effective use of the world renowned 4 point mixing system.**

**The hydro-cyclones are 2 1/2" with a capacity of 16 us. gpm. each and a D-cut of 5 micron. As the fluid is processed with the hydro-cyclones, the over-flow (clean) fluid is routed into the active tank for reuse.**

**For ease of interpretation, looking at the narrow, bare end of the tank straight on will be considered looking at the front of the unit. Hence the M2 mixer will be the rear and the sides will be right or left.**

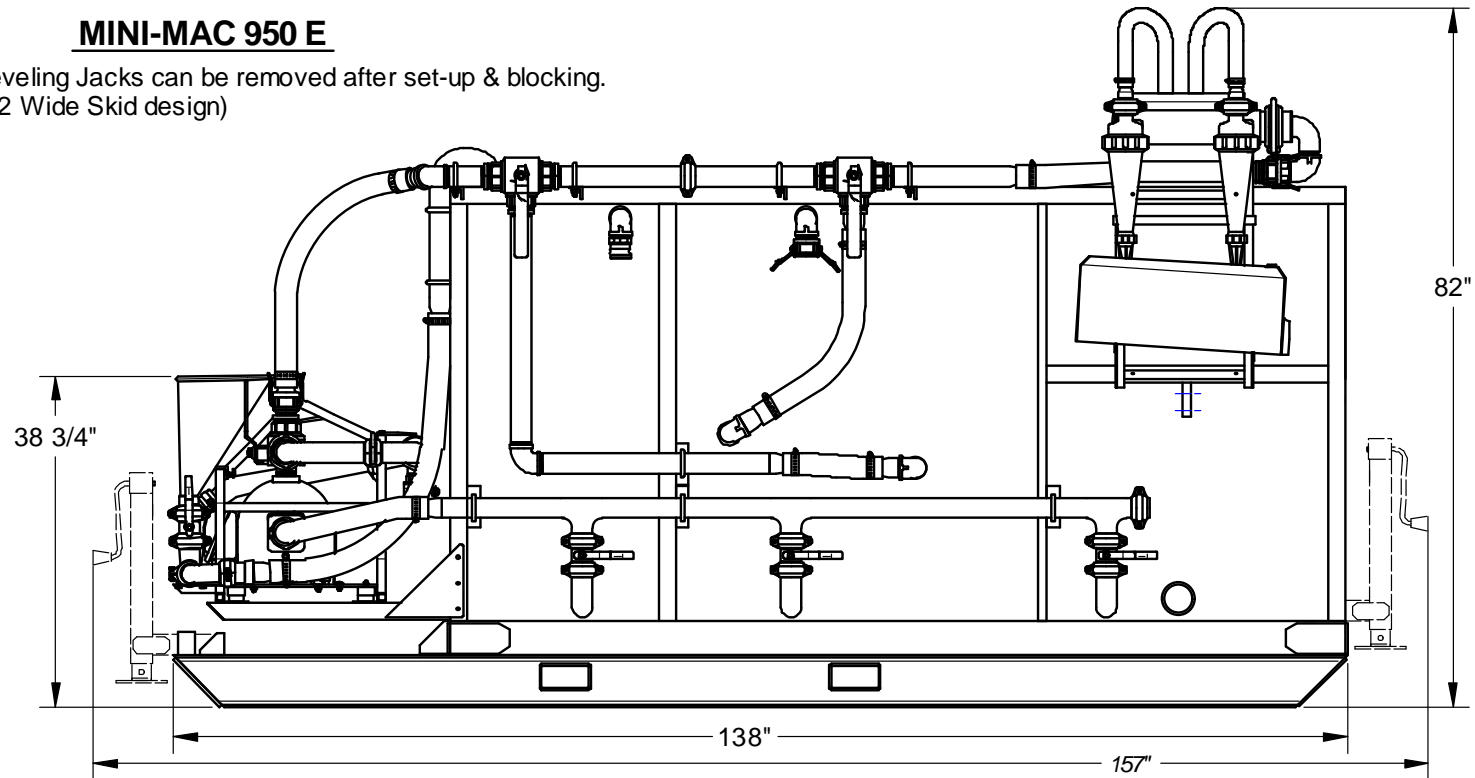
### **RECORD OF OWNERSHIP:**

- Unit Serial No. \_\_\_\_\_
- Pump Serial No: \_\_\_\_\_
- Date Purchased/Leased: \_\_\_\_\_
- Dealer Purchased/Leased From: \_\_\_\_\_
- Special Custom Features: \_\_\_\_\_



### **MINI-MAC 950 E**

Leveling Jacks can be removed after set-up & blocking.  
(V2 Wide Skid design)

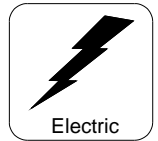


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DWR NUM	DATE	11/07/14	
Mini MAC 950EW	REV	02/05/18	



## Mix-Clean-Recover Unit Model MINI MAC-950E

**Surface to Surface Inc.**



Unit shown with a M2-E922 mixer

### Features and Benefits: **MINI MAC-950E**

The MINI MAC-950E was designed to mix drilling fluid, clean and recycle used drill fluid, and maintains proper drilling fluid in an active tank for the drilling rig. MINI MAC-950E is built as one unit that includes 3 tanks, a manifold assembly of hydro-cyclones, a STS M2 mixer and all the valves and piping to needed to create a smooth and effortless system needed to satisfy the customer's needs.

The unit is designed to be operated on ground level with a tank height of 61 inches, so the operator can over-see the process, and visually inspect inside of the tanks without ever having to climb up or down causing a safety issue. The unit is to be levelled using the removable jacks which are stored at the front of the unit. The jacks can be fitted into the front or rear jack pockets depending on where the tank needs to be leveled.

The mixer located at the rear of the unit is designed around the time proven M series mixers of STS. The MINI MAC-950E is powered by a 10HP Teco/Westinghouse electric motor, driving a 2" centrifugal pump, making effective use of the world renowned 4 point mixing system. With the proper valve selection, this one motor and pump will do all of the functions required to operate the unit effectively and efficiently, thus reducing mechanical and maintenance issues.

With a hopper height of only 38 1/2" from the ground, operator fatigue from loading bags into the hopper is reduced. The mixer blends and shears the new drilling fluid in the rear 250 us. gallon tank. A set of 5-1 injector nozzles in combination with a rolled bottom tank design keeps the fluid agitated and consistent. When the operator has the proper drill fluid made, simply rotate a valve on the mixing unit and route the fluid to the front active tank. The active tank will hold 500 us. gallons of drilling fluid for the drilling rig to draw from. This tank is also designed with a rolled bottom and a set of 5-1 injector nozzles to keep the fluid agitated and consistent.

The tank in the center of the unit has a capacity of 200 us. gallons for storing "dirty, spent" drill fluid from the drill hole. This tank is filled by a customer supplied pit pump usually of the 2" size. When the "dirty" tank is full, the pump on the mixer is used to draw "dirty" fluid from the center tank and route it to the side mounted hydro-cyclones. While routing fluid to the hydro-cyclones the pump also uses the "dirty" tank's rolled bottom and set of 5-1 injector nozzles to keep the dirty fluid agitated and consistent. The hydro-cyclones are 2 1/2" with a capacity of 16 us.gpm each and a D-cut of 5 micron. As the fluid is processed with the hydro-cyclones, the over-flow (clean) fluid is routed into the active tank for reuse. The underflow (solids) are routed out and away for customer disposal or optional secondary treatment.

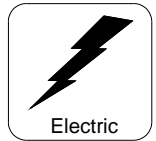
Each tank is open top and has side clean out access. The tanks are equipped with the required inlet-outlet connections on both sides of the tank to allow for better external hose routing and to eliminate hoses over the top and tied. The frame has many securing and tie-down points located in key spots.

**This unit was designed for operator safety, site safety, ease of use, portability, small footprint and maximizing drilling fluid handling efficiency.**



**Surface to Surface Inc.**

## Mix-Clean-Recover Unit Model MINI MAC-950E



### Specifications

Dimensions (Working)  
Weight w/o Mixer  
Weight including Mixer  
Hopper Height & Size  
Hydro-cyclones  
Piping  
Flow Valves  
Quick coupling connectors  
Tanks  
Tank nozzles (4 per tank)  
Threaded inlet & outlet ports  
Leveling Jacks  
Mixing System

### Mini MAC- 950E Unit

65 1/2" W x 138" L x 82" H  
2420 lbs.  
2920 lbs. (M2-E922)  
38 3/4" High Holds 1/2 of a bag  
2@ 2 1/2" 16 gpm  
2" sched. 40 Pipe  
Brass and Steel construction  
2" cam loc  
1@250, 1@200, 1@500 gal us  
Eductor Nozzles (5-1 fluid output)  
2" NPT  
2 HD screw jacks  
2" Renowned StS Mixing System

### Benefits

Small foot print operate from ground level  
Light weight for easy transportation.  
  
Low hopper height reduces back strain.  
D-cut of 5 micron  
Built tough for the construction trade.  
Withstand the abuse of daily operations  
Ease of connections and draining  
Rolled bottom with clean out  
Fast and effective rolling and mixing action.  
Safe Proper connections, no hoses over the top  
Allows for easy leveling of unit  
Fast & efficient with high shearing ability.

**An Optional Fluid Recovery from the Hydro-cyclone discharge is available.**

### Specifications

Dimensions  
Weight  
Hopper Height & Size  
Mixing System  
Flow Valves  
Skid Frame  
Motor  
Pump  
Pump / Motor Connection  
Pipe Couplers  
Pressure Wand  
Mechanical Seal  
Replaceable Wear Plate  
3-way Valves

### M2-E922 Mixer

33" W x 52" L x 26 1/2" H  
500 lbs. (227 Kg)  
26 1/2" High Holds 1/2 of a bag  
2" renowned StS Mixing System  
Brass and Steel construction  
1" steel tube with lifting bale  
10 HP Teco 230V/460V 60Hz  
2" Cast iron centrifugal trash pump  
Bearing Block to Lovejoy® Coupler  
Bolt & Snap-groove type  
Hopper maintenance wand  
Self-Pressurizing Grease Seal  
Hardened plate ahead of Impeller  
2 1/2" NPT Port, 2 position

### Benefits

Small space saving footprint.  
Light weight for easy transportation.  
Low hopper height reduces back strain.  
Fast & efficient with high shearing ability.  
Withstand the abuse of daily operations  
Built tough for the construction trade.  
Industrial rated for longer service life  
Gorman-Rupp 80 series  
Large bearings & oversized coupler (service life)  
Fast cold weather draining of system.  
Removal of build-up caused by additive.  
Greaseable seal for more rugged working conditions  
Less wear on internal pump parts and is replaceable.  
Designed for heavy duty slurry use. Large handles.

**With a 40 second viscosity, the M2 model produces 90 gpm @ 36psi through the mix nozzle and 52 gpm @ 36psi to the tank nozzles (5-1 mixing equals 260 gpm of mixing / rolling action in tank) and a discharge rate of 80 gpm @ 36psi**

**Also available in Hydraulic (MINI MAC-950H) or Diesel (MINI MAC-950D) models.**

\*\*\* All Specifications Subject to Change Without Notice \*\*\*

Check our website for the latest products and specifications

**www.stsmixers.com**

05/23/2014

**Surface to Surface Inc.**

5150 Forest Road, R.R.#3, Watford, Ontario, N0M 2S0  
Tel: 1-800-567-0978

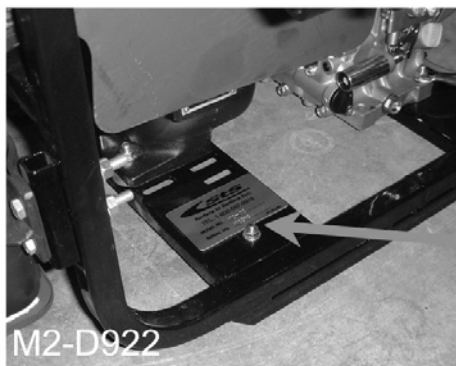
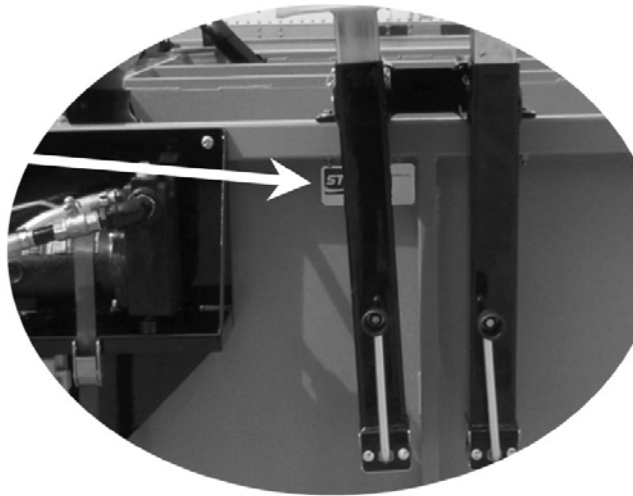


**MINI MAC-950E**

**Identifying Your Machine & Components**

**Location of Tags and PIN Plates**

Unit  
Serial Number



M2-922 Mixer  
Serial Number





# **SECTION #II**

*Description, Care and Maintenance*



## MINI MAC-950E

### Description, Care and Maintenance

#### Base Frame with Tanks

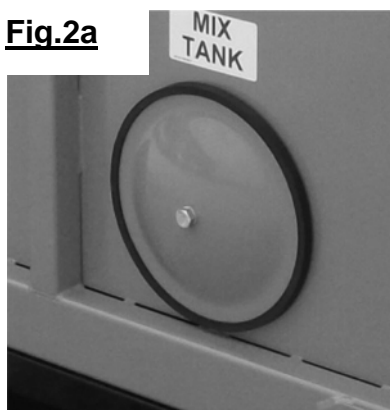
There are 3 tanks mounted together in the base frame. The front tank is 500 us. gal, and is referred to as the “active” tank. The middle tank is 200 us. gal and is referred to as the “dirty” tank. The back tank is 250 us. gal and is referred to as the “mixing” tank.

Each tank is equipped with a removable clean out cover (Fig.2a), which is easily taken off by removing the center bolt. There is a rubber gasket ring around the cover itself and this gasket should be cleaned before reinstalling the cover back on the tank. Do not over-tighten.

The tanks should be checked regularly for any debris or sediment that may have accumulated on the bottom and cleaned out before the next use.

Each tank has gallonage marker(s) (Fig.2b), mounted on the inside wall. The markers indicate US. gallons. Tanks should never be filled above the top marker of the tank.

**Fig.2a**



**Fig.2b**



### CAUTION

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

### CAUTION

AVOID ALLOWING FOREIGN MATERIAL  
into the Tanks.

### CAUTION

BEFORE STARTING OR RESTARTING  
the mixer, make sure the suction valve  
on the proper tank is open, and the  
fluid level in the tank is above  
the suction port.

## MINI MAC-950E

### Description, Care and Maintenance

#### Base Frame with Tanks *continued*

The middle and back tanks have labeled inlet ports (Fig.3a, 3b), on both sides, to receive the appropriate (labeled) fluid and should be used to make a safe and solid connection for the filling hoses. It is recommended that the inlet port of the middle “Dirty” tank be protected with a screening device such as the screening basket (supplied) (Fig.3c) to stop large debris from entering the tank, that may damage or plug the hydro-cyclones. This filtering device should be cleaned on a daily basis.

The front “Active” tank has labeled discharge ports (Fig.3d) located on both sides, where the connection for the drilling rig is to be made. A valve is mounted to this discharge port to stop the flow of fluid from the tank.

With solid port connections available, there should be no need to have hoses draped over the top of the tanks, creating an operator hazard.

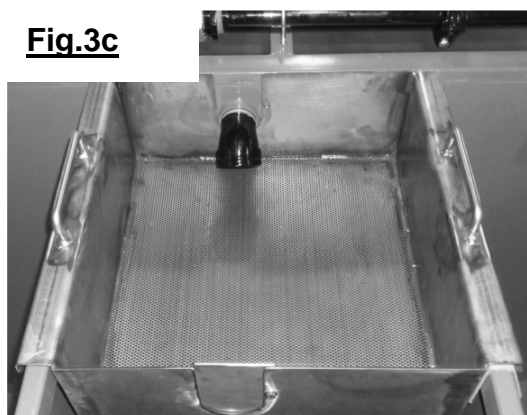
**Fig.3a**



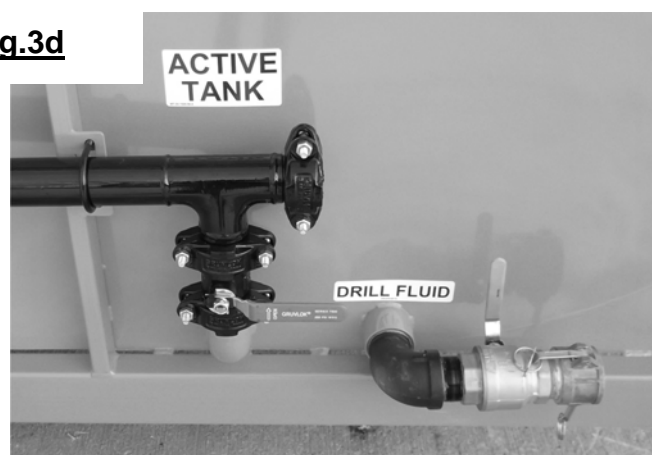
**Fig.3b**



**Fig.3c**



**Fig.3d**



### **⚠ WARNING**

**NEVER USE BODY PARTS, OR FOREIGN OBJECTS**  
in an attempt to unplug or clean the tank inlets or tank jet nozzels.  
Serious personal injury or damage will result.

### **CAUTION**

TRAPPED FLUID MAY BE PRESENT  
and will spill out when piping or hoses are removed.

### **CAUTION**

CARE MUST BE TAKEN WHEN  
CONNECTING THE HOSE COUPLINGS.  
The faces must be clean before mating together. Rotate body to engage lock.

## MINI MAC-950E

### Description, Care and Maintenance

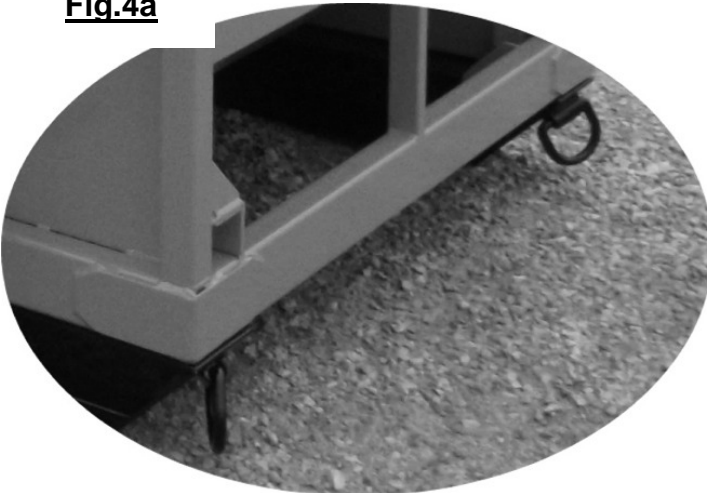
#### Drag Skid

The base frame with tanks is mounted on a simple drag skid. This drag skid is pulled around from site to site with another piece of customer supplied equipment. Connecting the drag skid to the customer supplied equipment is left to the customer's discrepancy of safety and ease of use.

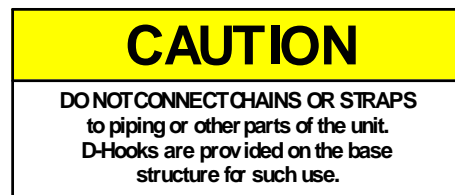
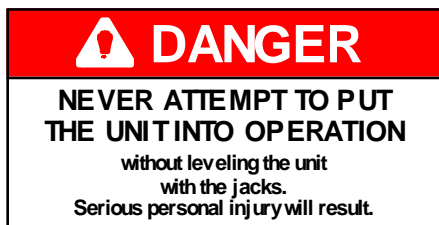
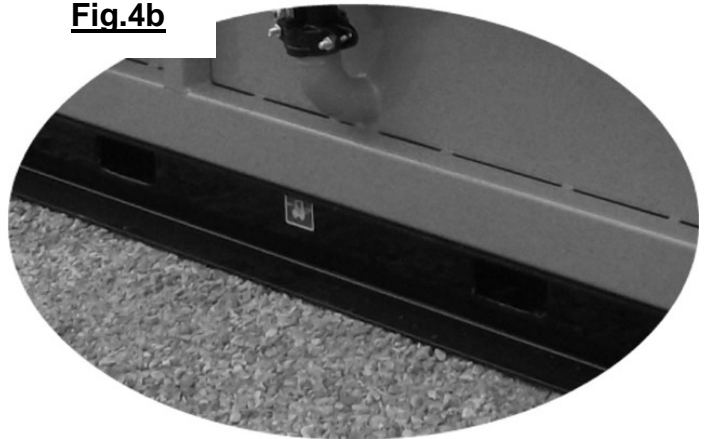
The drag skid has "D" rings (Fig.4a) located at various points for connections and fork pockets (Fig.4b) that can be utilized for moving and securing the unit safely.

The drag skid requires little or no maintenance and will only require attention if there is any indication of wear or damage.

**Fig.4a**



**Fig.4b**



## MINI MAC-950E

### Description, Care and Maintenance

#### Internal Tank Nozzles

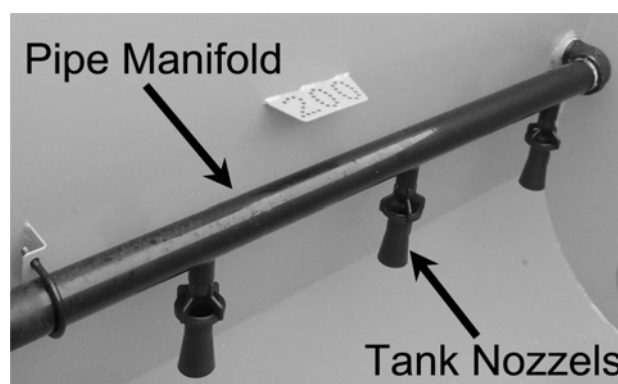
Inside each tank is a set of internal tank nozzles (Fig.5a) mounted on a pipe manifold (Fig.5b). The manifold spans the tank width and the nozzles are spaced on the manifold to achieve proper coverage of the tank bottom. The nozzles stir the fluid to achieve a rolling action which keeps the fluid and solids in suspension and a consistent mixture of fluid. The nozzles use a venturi effect to create a 5-1 fluid stream See (Fig.5c) for a detailed explanation.

The internal tank nozzles requires little or no maintenance and will only require attention if they become clogged. Flushing the entire system weekly with clear water should eliminate any problems with this piece of the system. The fluid passing through the internal tank jets is at a very high pressure and extreme caution should be used when viewing the inside of the tank.

**Fig.5a**



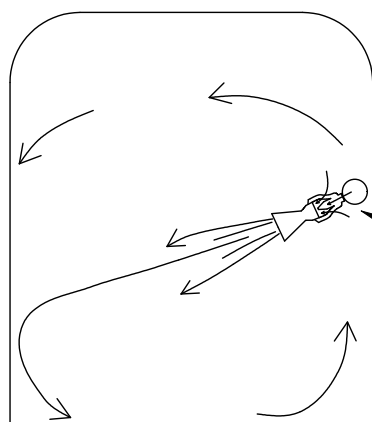
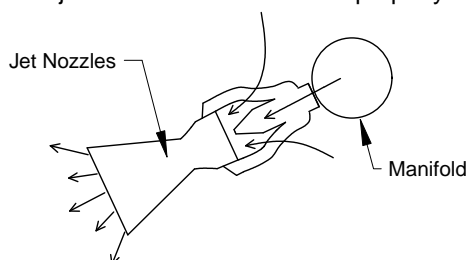
**Fig.5b**



**Fig.5c**

For every gallon of fluid passing through the jet nozzle from the manifold pipe, the jet nozzle will draw in another 4-5 gallon more from around the outside of the nozzle, creating a larger volume of fluid movement in the tank.

Connect the manifold to the outlet on the filter/shear of the STS Mixing Unit. Each unit is shipped with 2-4 jet nozzles that have been properly sized for the unit.



ALL Jet Nozzles are mounted on one side of the tank to create a rolling effect in the tank.

**⚠ DANGER**

**IN AN EMERGENCY**

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

**⚠ WARNING**

**NEVER USE BODY PARTS, OR FOREIGN OBJECTS**

in an attempt to unplug or clean the tank inlets or tank jet nozzels. Serious personal injury or damage will result.

**CAUTION**

**AVOID ALLOWING FOREIGN MATERIAL into the Tanks.**

## MINI MAC-950E

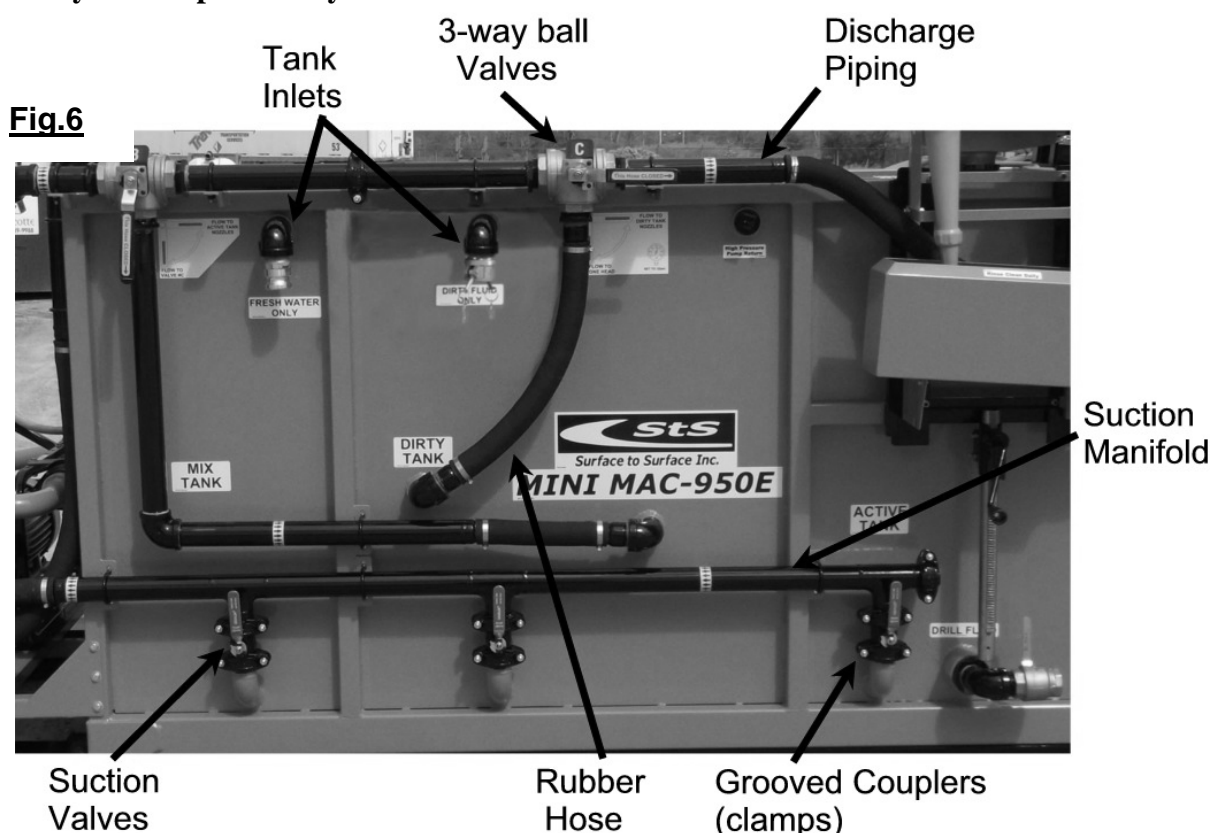
### Description, Care and Maintenance

#### External Piping

Mounted on the exterior of the tanks is a series of piping and valves (Fig.6) that allow the operator to move fluid from mixer to tanks and or tank to tank. The suction manifold is located at the bottom of the tanks and each tank has a valve installed to control the fluid flow. This suction manifold and valves are of the grooved design and a grooved coupler (clamp) is used to connect the assembly together. These clamps are explained in detail in section VII of the manual. Flushing the system with fresh water regularly will keep the pipe and valves clean and remove any build-up that may occur.

The remaining pipes are discharge piping and are made up of threaded connections, fittings, rubber hoses, and 3-way ball valves. The fluid flow direction is decaled on the pipes to aid in the operation of the unit.

When fluid is routed through the discharge pipes, it is under pressure and should be treated as such. The piping and fittings requires little maintenance. The rubber hose and clamps should be visually checked daily for cracks, holes, or damage, and the clamps should be kept tight. Flushing the system with fresh water regularly and cycling the valves open & close while flushing with water, will keep the pipes and valves clean and remove any build-up that may occur.



#### **⚠ DANGER**

#### **NEVER ATTEMPT REPAIRS OR DISASSEMBLY**

without shutting off the mixing unit  
and disconnecting any power sources.  
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.

#### **CAUTION**

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



## MINI MAC-950E

### Description, Care and Maintenance

#### Leveling Jacks

Two crank type jacks (Fig.7a) are included with the unit. These jacks are used to raise and lower the unit on uneven ground when setting up on site.

On the 4 corners of the drag skid, are specially designed mounts “pockets” (Fig.7a) to slide and secure the jacks into. The jack is then used to raise the unit to the proper height and cribbed in position. The jack can then be removed from that corner and installed into another corner mount “pocket”, if needed.

The leveling jacks are stored (and secured) in the holder located on the front of the unit (Fig.7b), when not in use.

These jacks will require little maintenance other than to keep clean of mud and debris, and should be serviced as per the service schedule.

**Fig.7a**

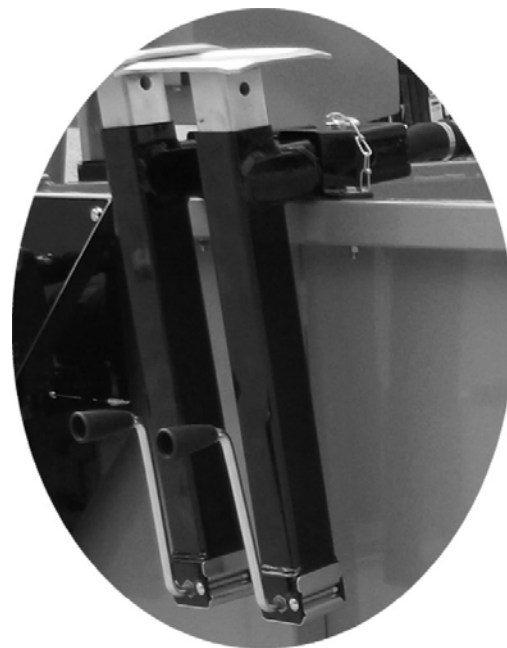


Front Jack



Rear Jack

**Fig.7b**



### **DANGER**

#### **NEVER TRANSPORT**

the unit without the leveling jacks removed from the skid and stored in the holder.



### **DANGER**

#### **NEVER ATTEMPT TO PUT THE UNIT INTO OPERATION**

without leveling the unit with the jacks.  
Serious personal injury will result.

### **CAUTION**

DO NOT CONNECT CHAINS OR STRAPS to piping or other parts of the unit. D-Hooks are provided on the base structure for such use.

## MINI MAC-950E

### Description, Care and Maintenance

#### 2 Cone Head Assembly

The 2 cone head assembly (Fig.8) is mounted on the side of the MINI MAC-950, over top of the active tank.

The head assembly consists of 4 key components that are explained in more detail in following pages. The cone manifold, equally distributes the incoming fluid to the hydro-cyclones. The Hydro-cyclones separate the drill fluid into two flow streams defined as over-flow and under-flow. The over-flow box is positioned at the back, over the active tank. The under-flow box is mounted beneath the hydro-cyclones. All of these components are mounted together on one removable bolt-on frame.

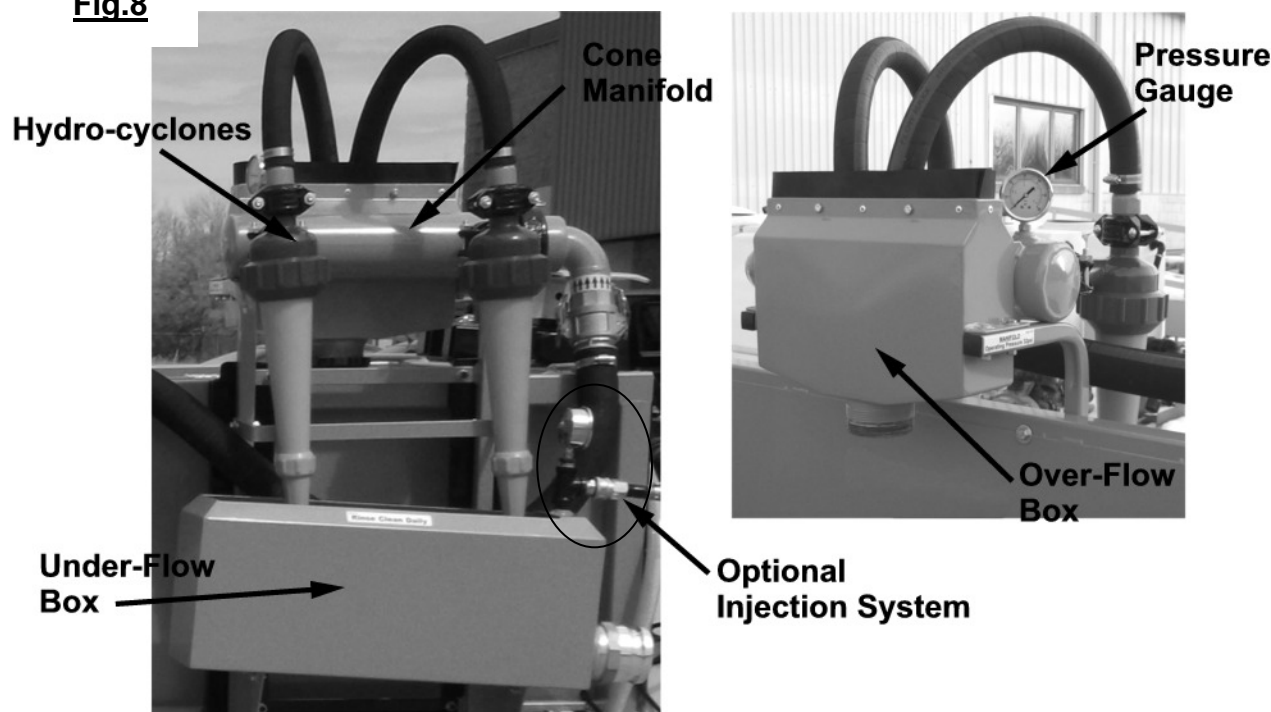
**The MINI MAC-950 must be level for the head assembly to work properly. This will allow the fluid to flow in the proper directions (out the outlet) and stop pooling of the fluid in the box.**

After transporting from site to site, and setup to work, the hydro-cyclones may rotate from vibration and should be checked and if needed, rotate back to the vertical position.

Although there is no moving parts to maintain, the head assembly should be kept clean and flushed with clean water on a daily basis.

**OPTIONAL:** This unit can be equipped with an optional water recovery injection system and therefore additional parts may be pre-mounted. These parts may include a nozzle, weir plate, pressure gauge and a small hose connection, all of which are located inside and outside of the under-flow box.

**Fig.8**



**DANGER**

**IN AN EMERGENCY**

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



**DANGER**

**NEVER ATTEMPT REPAIRS  
OR DISASSEMBLY**

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



## MINI MAC-950E

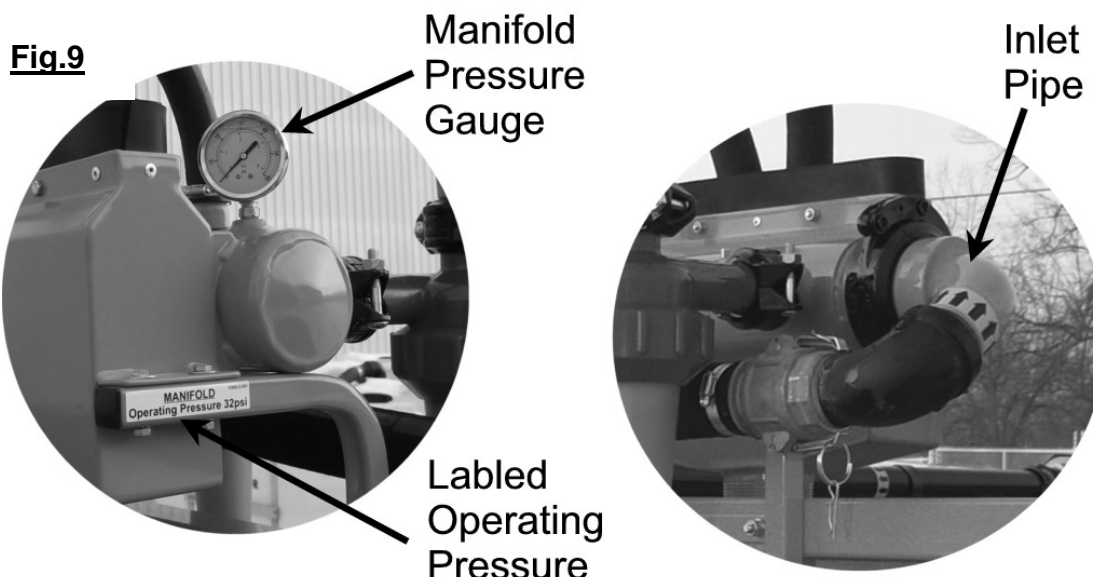
### Description, Care and Maintenance

#### Cone Manifold

The cone manifold (Fig.9) allows the oncoming fluid to be evenly distributed to the 2 hydro-cyclones. The cone manifold has a removable inlet pipe to allow for cleaning or winterizing.

The manifold has a pressure gauge mounted on top. This gauge measures the fluid pressure inside the manifold, to set and keep the hydro-cyclones at the proper operating pressure “see affixed label on unit”.

The inlet end of the manifold should be removed regularly and rinsed out to remove any solids build-up that has settled out and collected on the bottom of the manifold.



**DANGER**

#### **IN AN EMERGENCY**

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

**CAUTION**

TRAPPED FLUID MAY BE PRESENT  
and will spill out when piping or  
hoses are removed.



**DANGER**

#### **NEVER ATTEMPT REPAIRS OR DISASSEMBLY**

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

**CAUTION**

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



**CAUTION**

#### **WHEN THE UNIT IS IN OPERATION,**

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

**CAUTION**

CARE MUST BE TAKEN WHEN  
INSTALLING THE COUPLER GASKETS.  
If the gaskets are not properly lubricated  
and installed, a leak may develop.

## MINI MAC-950E

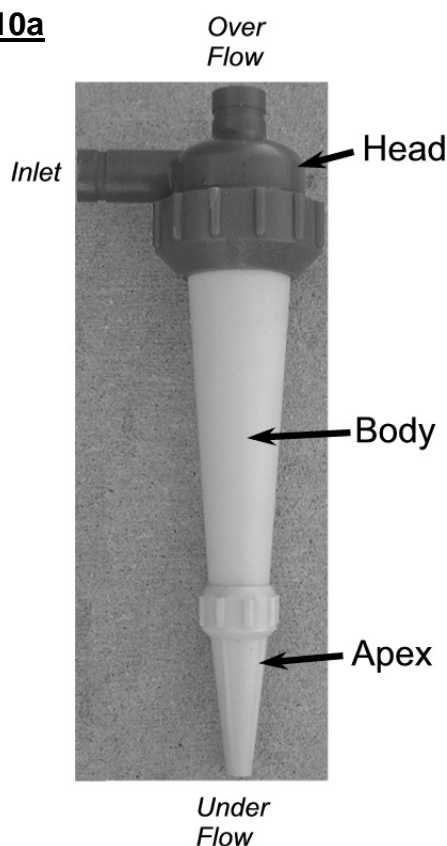
### Description, Care and Maintenance

#### Hydro-cyclones

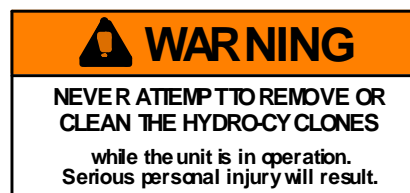
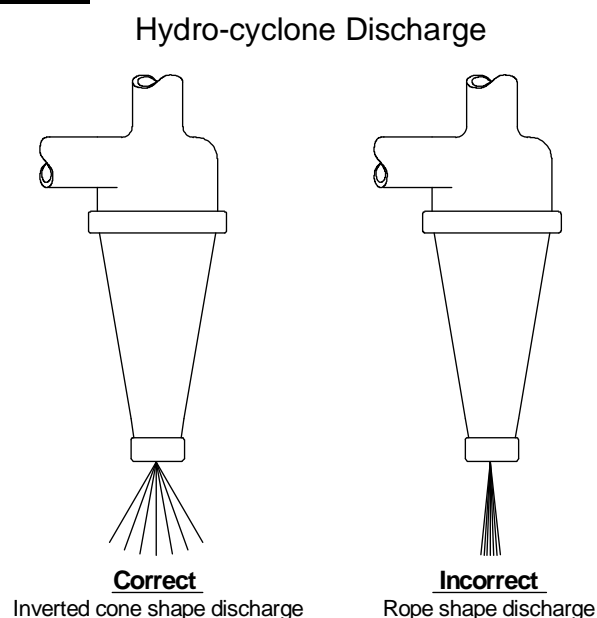
The Hydro-cyclones (cones) (Fig.10a) are the first step in cleaning process of the spent drilling fluid. The fluid enters the cones from the manifold and the flow and pressure create a spiraling effect (like a tornado) inside of the cone. This action forces the separation of heavier solids outward and downward to the bottom of the cone and exits through the apex of the cone. This is called the under-flow. As it exits the apex (Fig.10b) it will visually appear as a spray mist in the shape of an inverted hollow cone. This will indicate that the cone is working properly. If the discharge from the apex has a rope like stream coming out, then the cone is overloaded with solids and is not working properly. This usually indicated improper flow / pressure or the fluid being pumped to the manifold has a solids content that is extremely high and is too great for the cone to handle. If no fluid is discharging from the apex the cone is plugged and will require shutting off the flow to the manifold and disassembling the cone and to be cleaned.

As the fluid spirals inside the cone and separates, the lighter fluid rises upward and out the top of the hydro-cyclone. This fluid is called the over-flow and is the clean drill fluid that can be reused. It is directed by a curved hose (cane) mounted on top of the cone, and down into the over-flow box. The hydro-cyclone is made up of 3 parts (Fig.10a), head, body, and apex and has no moving parts inside. Due to the abrasive nature of the fluid entering and exiting the cone, wear is a factor with prolonged use and the cone will need to be replaced when this wear becomes excessive. Simply flushing the system with fresh water daily will keep the cones clean inside.

**Fig.10a**



**Fig.10b**



## MINI MAC-950E

### Description, Care and Maintenance

#### Over-Flow Box

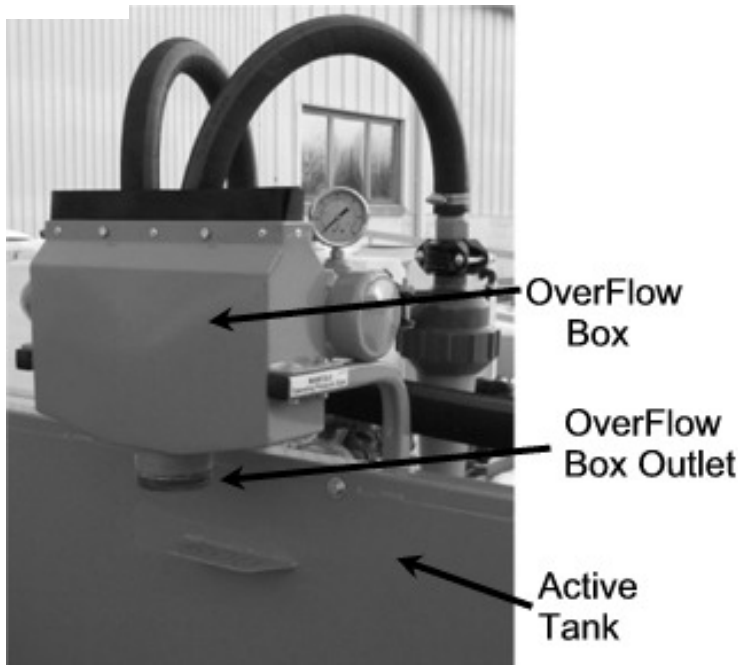
The over-flow box (Fig.11a) is located on the back side. This box collects all the over flow from the 2 hydro-cyclones.

The hydro-cyclone over flow hoses (canes) are held in place by positioning the hoses in the center of the box between the 2 spacers (Fig.11b). The over-flow box has a single 3" NPT threaded outlet to direct the gravity flow down into the active tank to be reused in the drilling process.

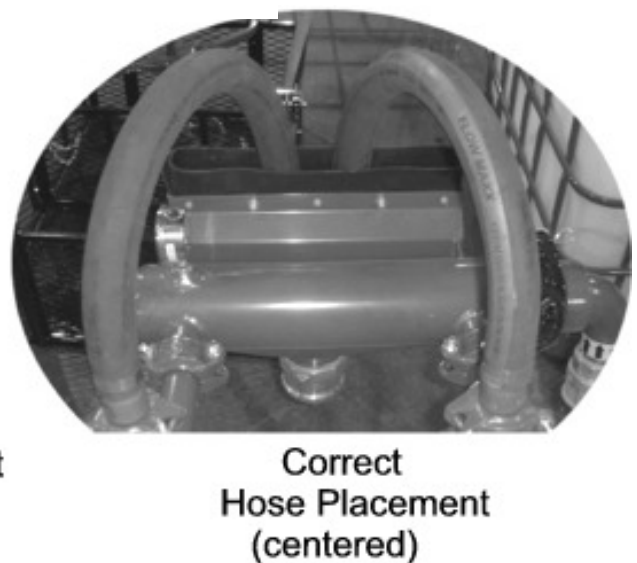
The over-flow box should be rinsed daily with fresh water to clean any residue remaining in the box.

The hydro-cyclone hoses (canes) should be checked daily and every time the unit is moved, that they are pushed down between the spacers and have not pulled out.

**Fig.11a**



**Fig.11b**



## MINI MAC-950E

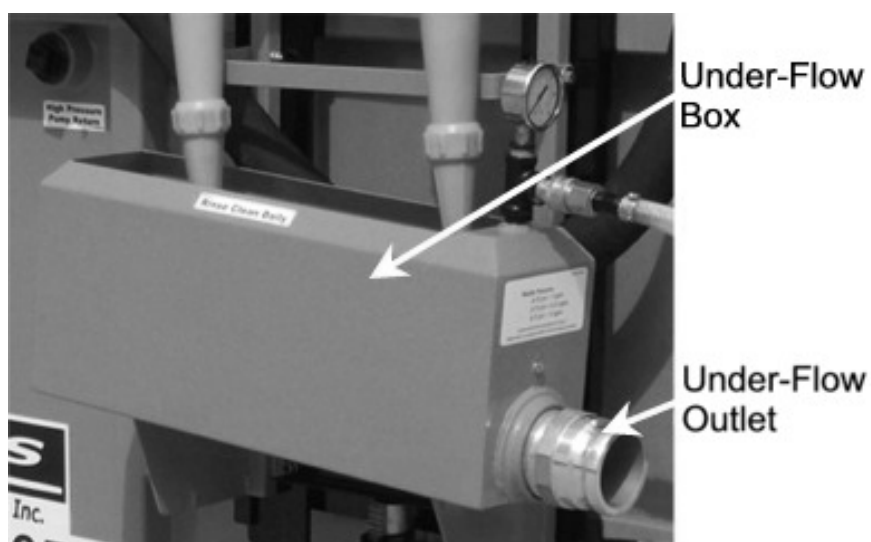
### Description, Care and Maintenance

#### Under-Flow Box

The under-flow box (Fig.12a) is mounted on the front, underneath the hydro-cyclones. The under-flow from the hydro-cyclones sprays down onto the bottom of the box and then flows out of a 3" NPT threaded outlet. It is important that the box be kept clean of build-up or foreign objects (stones, leaves, etc.) that may enter from the open top, and disrupt the fluid path. By jetting clean water into the box, 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.

The 3" NPT threaded outlet allows for a hose connection to route the discharge away from the unit for disposal. If routing the fluid away from the under-flow box and into a container for disposal, this hose must be lower than the under-flow box to prevent backing up into the under-flow box (gravity discharge).

**Fig.12a**



Picture shown with optional water recovery injection

#### **⚠ DANGER**

**NEVER ATTEMPT REPAIRS  
OR DISASSEMBLY**

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

#### **⚠ WARNING**

**DO NOT REMOVE OR MODIFY  
SAFETY COVERS OR GUARDS.**

Serious personal injury will result.

#### **⚠ CAUTION**

**DO NOT POSITION  
ANY PART OF YOUR BODY**

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

## MINI MAC-950E

### Description, Care and Maintenance

#### Valves on the M2-922 Mixer

Mounted on the M2-922 mixer are 2 valves that have been reconfigured for use with the MINI MAC-950 and are not explained properly in the enclosed M2-922 Operators Manual. The following is the correct description for their use with the MINI MAC-950 unit.

Mounted on discharge outlet of the M2-922 pump is a 3-way valve labeled “A” (Fig.13a) . This valve is used to route the fluid discharge from the centrifugal pump to flow through the piping on the M2-922 mixer or when rotated, routes the fluid flow to valve “B”.

*It should also be noted that in the M2-922 operators manual a second 3-way valve was located under this valve and attached to the pump suction inlet. This valve has been removed on the MINI MAC-950.*

Mounted on the bottom of the M2-922 mixer filter/shear is a valve used to route fluid to the “Mix” tank nozzles (Fig.13b). This valve is kept in the open position except if a system repair is needed, then it is closed to stop any fluid from the “Mix” tank siphoning back into the M2-922 mixer piping.

*It should also be noted that in the M2-922 operators manual a second valve was located beside this valve on the filter/shear. It has now been removed and the outlet capped*

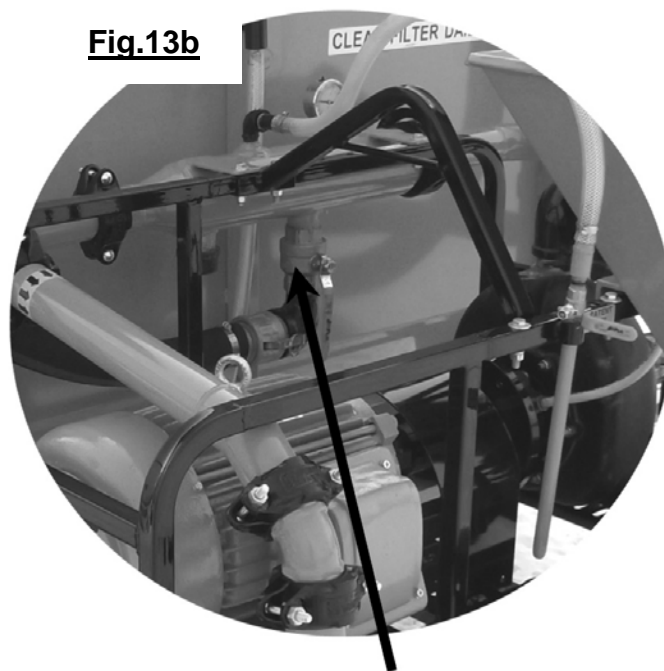
**Fig.13a**



**3-way valve  
"A"**

*(Valve shown in the Flow to Mixer position)*

**Fig.13b**



**"Mix" tank  
nozzle valve**

*(Valve shown in the open position)*

# **SECTION #III**

*Set-up and Connection of Unit in Detail*



## MINI MAC-950E

### Set-up and Connection of Unit in detail

#### Site Set-up (work mode)

A few general guidelines to follow when setting up a work site

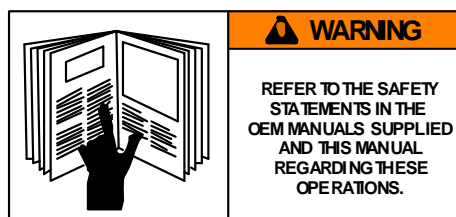
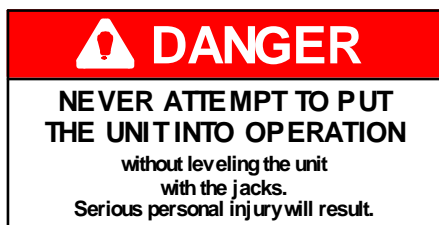
- Set all equipment on flat level solid ground.
- Allow clear access around the MINI MAC-950.
- Keep all hoses as short as possible for better fluid flow
- Keep all hoses flat on the ground to avoid tripping hazards.
- READ and understand the operators manual(s) for ALL pieces of equipment used.
- Do Not move unit with the hoses connected.

Once the MINI MAC-950 unit has been positioned on site by a towing device, the unit is to be disconnected from the towing device.

Using a level measuring device, level the unit in all directions. Keep the unit touching the ground where ever possible. **THE UNIT SHOULD HAVE CRIBBING UNDER ANY CORNER, THAT IS COMPLETELY LIFTED OFF OF THE GROUND** with the jack(s) when leveling. If not, when the unit is filled with fluid the jack(s) may collapse or the unit may sustain structural damage.

Once the unit is leveled the hose connections can be made. (Fig.14)

Hose inlets and outlets are conveniently located on both sides of the unit for the use of shorter hoses, better hose routing, and a cleaner and safer work area.



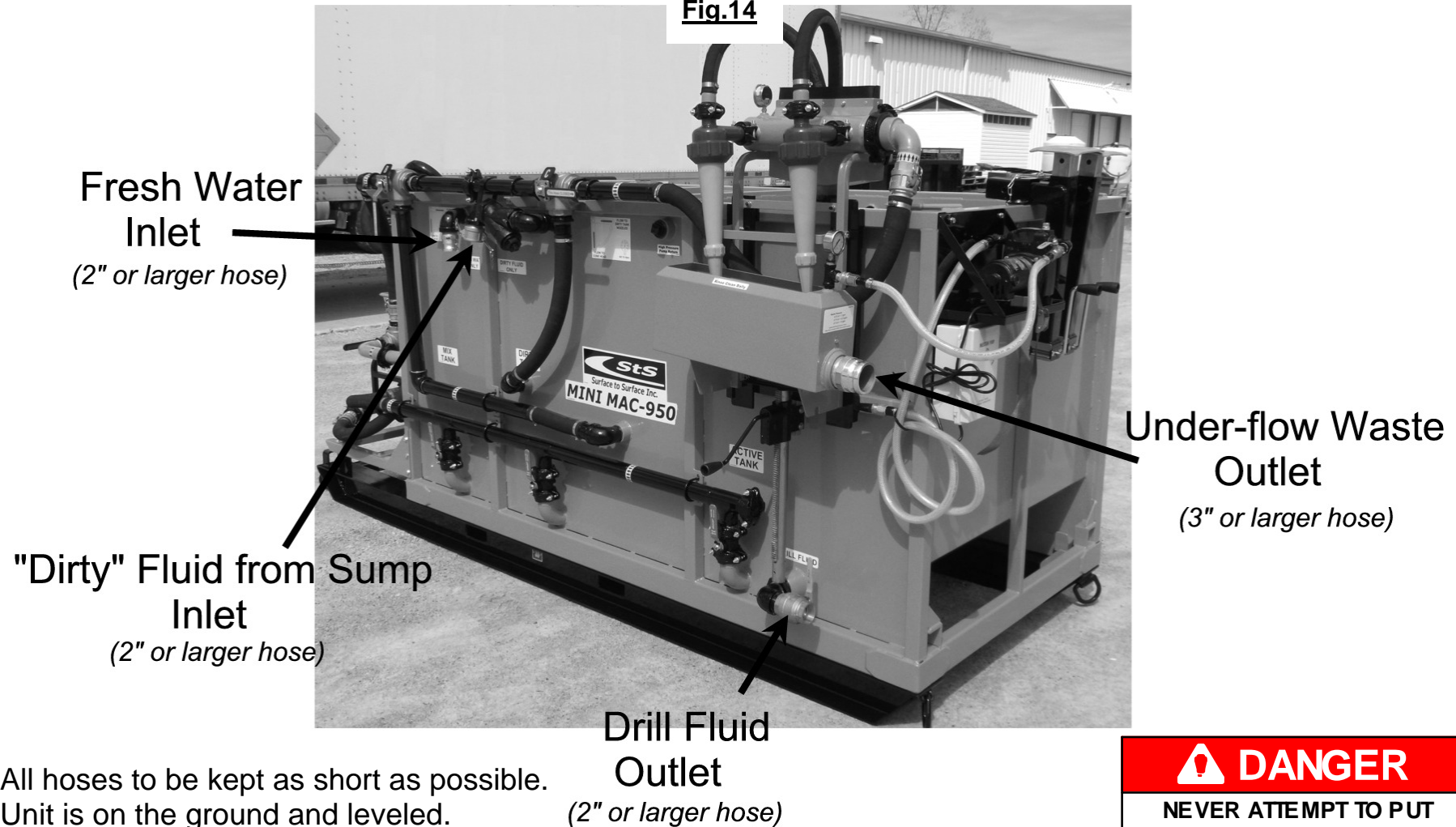





## MINI MAC 950E

### Set-up and Connection of Unit in detail

**Fig.14**



*Mini MAC shown with optional  
water recovery injection system.*

 **DANGER**

**NEVER ATTEMPT TO PUT  
THE UNIT INTO OPERATION**  
without leveling the unit  
with the jacks.  
Serious personal injury will result.



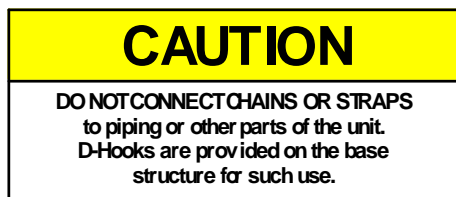


## MINI MAC-950E

### Set-up and Connection of Unit in detail

#### Site Tear Down (Transport mode)

When the Mini MAC 950E is needed to change locations, a proper towing device will be required.  
**ALL FLUID MUST BE REMOVED FROM ALL TANKS.**  
Disconnect all power sources from the M2-922 mixing unit.  
Drain and disconnect all hoses that were connected to the unit.  
Leveling jacks must be removed from the pockets on the drag skid and returned to the jack storage holder.  
*If equipped with the adjustable height 2-cone head assembly, it must be lowered down to the bottom stop.*  
The unit is now ready for transporting.



# **SECTION #IV**

*Operating the MINI MAC-950 Unit*



## MINI MAC-950E

# Operating the MINI MAC-950 Unit

### Site Setup & Pre-Check



#### SITE SETUP

- **POSITION** the unit to have a clear unobstructed working area on all 4 sides.
- **POSITION** the unit on solid level surface to avoid settling or upset.
- **DISCONNECT** from transporting device.
- **LEVEL** the unit in all directions.
- **CONNECT** and secure all hoses onto the unit according to your layout.
- **PROTECT** all hoses from possible damage or from being driven upon by a vehicle.

#### UNIT PRE-CHECK

- **READ and UNDERSTAND** the operators manual for the M2-922 mixer for proper pre-check, starting and running procedures.
- **CHECK** inside all of the tanks that they are clean and free of foreign materials.
- **CHECK** the “Mixing Tank” suction valve is open and all other suction valves are closed.
- **CHECK** to ensure there is sufficient water in the “Mixing Tank” to insure the centrifugal pump does not run dry.
- **CHECK** to ensure the ball valve on the M2-922 mixer filter shear connected to the “internal tank nozzle” is open.
- **CHECK** the 3-way valve “A” on the M2-922 is in the “Flow to mixer” position.
- **CHECK** the 3-way valve “B” is set to “Flow to active tank nozzles”.
- **CHECK** the 3-way valve “C” is set to “Flow to dirty tank nozzles”.
- **CHECK** the hydro-cyclone hoses (canes) are positioned into the over-flow box properly.
- **CHECK** the hydro-cyclones are vertical and the under-flow apex is inside of the box.
- **CHECK** that if a hose is connected to the under-flow box outlet, that the end of the hose is routed below the level of the box, for proper draining.

CAUTION
The manufacturer should be consulted when considering alternative uses for this piece of equipment. This unit was designed for the mixing, cleaning and storing of drilling fluid. Other uses may create unforeseen safety issues and personal injury risk.

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



## MINI MAC-950E

### Operating the MINI MAC-950E Unit

#### Mixing New Drill Fluid

**The M2-922 Operators Manual (included separately) must be read and understood before using this piece of equipment!**


#### Mixing Operation


With the “Mix” tank full of fresh water-

- Close the “Dirty” tank suction valve.
- Close the “Active” tank suction valve.
- Open the “Mix” tank suction valve.
- Rotate the 3-way valve “A” to position “Flow to mixer” (Fig.13a).
- Open the “Mix” tank nozzle valve located on the bottom of the M2-922 mixer filter/shear (Fig.13b).
- With the pump full of liquid (primed), switch the M2-922 mixer motor ON.
- Open the hopper valve at the bottom of hopper where it joins the venturi mixing tee.
- Introduce the dry or liquid raw material into the hopper.



*When mixing a new batch, introduce the 1<sup>st</sup> bag of dry product at a rate of 40 lbs. per minute. Once the first 40 lbs. of dry product are in the fluid stream, all dry products may be introduced as fast as the hopper will allow. This allows time for the 1<sup>st</sup> bag to be mixed well into the fluid and will now aid to suspend all remaining dry product that is added, in the fluid in the tank to achieve a better shear and stop any build-up in the tank.*

- Suction created by the venturi mixing tee will draw the raw material into the jet stream for initial mixing.
- Flush jetting tee with wash wand.
- Close the butterfly valve on the hopper to keep debris out of the system.
- Allow the mixing system to circulate the product until the desired consistency is attained.
- A sample of the mixed fluid may be taken at from the wash wand as described in the M2-922 operators manual, on the wash wand description page.

 <b>DANGER</b>
<b>IN AN EMERGENCY</b> STOP the mixer / pumping unit to halt the pump, and fluid flow

 <b>CAUTION</b>
<b>WHEN THE UNIT IS IN OPERATION,</b> the fluid in the piping and hoses may reach pressures up to 50 p.s.i.

<b>CAUTION</b>
BEFORE STARTING OR RESTARTING the mixer, make sure the suction valve on the proper tank is open, and the fluid level in the tank is above the suction port.

	 <b>WARNING</b>  REFER TO THE SAFETY STATEMENTS IN THE OEM MANUALS SUPPLIED AND THIS MANUAL REGARDING THESE OPERATIONS.
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## MINI MAC-950E

# Operating the MINI MAC-950 Unit

## Transferring New Drill Fluid to Active Tank

### Transferring New Drilling Fluid to Active Tank

- Switch the M2-922 mixer motor OFF.
- Rotate the 3-way valve “A” to position “Flow to valve B”.
- Rotate the 3-way valve “B” to position “Flow to active tank nozzles”.
- Switch the M2-922 mixer motor ON.

*The new fluid will be pumped into the “Active” tank thru the nozzles, from the “Mix” tank.*

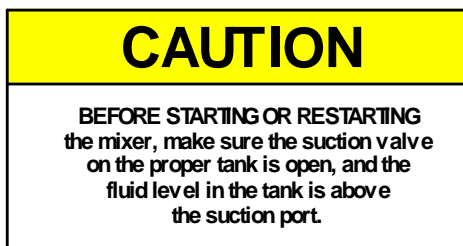
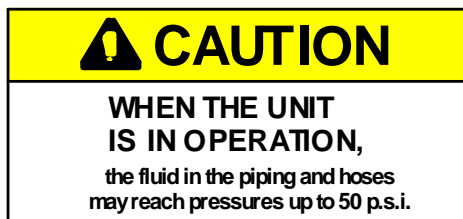
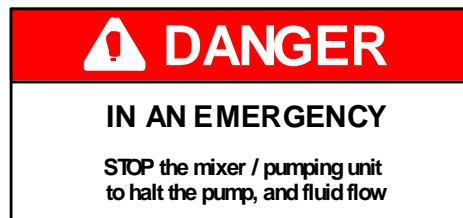
- When the “Mix” Tank is empty, or the pump sucks air (cavitation) switch the M2-922 mixer motor OFF.

Note: it is common for some fluid to remain in the “Mix” tank.

- Switch the M2-922 mixer motor OFF.
- Rotate the 3-way valve “A” to position “Flow to valve Mixer”.
- Leave the 3-way valve “B” to position “Flow to active tank nozzles”.

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

The “Active” tank will hold 2 batches of new drilling fluid and an extra batch can be made and held in the “Mix” tank until needed without interfering with the remaining operations of the MINI MAC-950 system.





## MINI MAC-950E

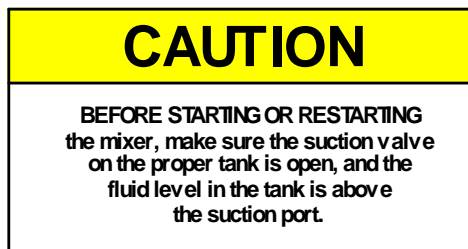
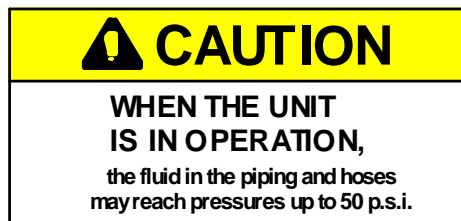
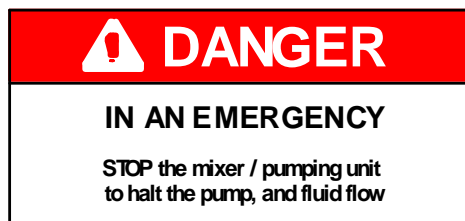
# Operating the MINI MAC-950 Unit

### Agitating the Active Tank

#### Agitating the Fluid in the Active Tank

- Switch the M2-922 mixer motor OFF.
- Close the “Mix” tank suction valve.
- Open the “Active” 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 active tank nozzles”.
- Switch the M2-922 mixer motor ON.

*The M2-922 mixer will now draw the fluid from the “Active” tank and return it back to the “Active” tank thru the nozzle keeping the fluid in the tank rolling.*





## MINI MAC-950E

### Operating the MINI MAC-950 Unit

#### Cleaning the Dirty Fluid for Reuse

#### Cleaning the “Dirty” Fluid for reuse

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 side of the MINI MAC-950, to be reused.

- Switch the M2-922 mixer motor OFF.
- 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”.
- Switch the M2-922 mixer motor ON.

*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 5 to 10 minutes.
- Watch the pressure gauge on the hydro-cyclone manifold.
- **SLOWLY** rotate the 3-way valve “C” downward toward position “Flow to cone head” and **STOP ROTATING WHEN THE PRESSURE GAUGE IS AT 32 PSI.**

**CAUTION: Excessive fluid pressure WILL damage the hydro-cyclones.**

*The M2-922 mixer is now drawing the fluid from the “Dirty” tank and routing enough fluid to create 32 psi 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.*

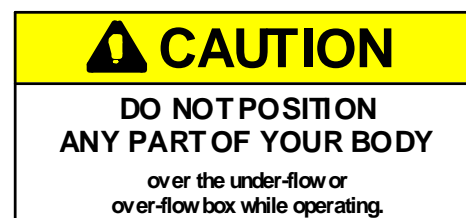
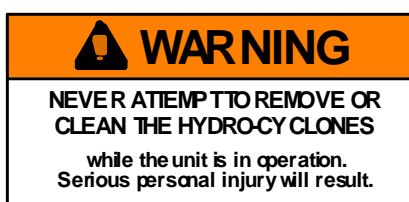
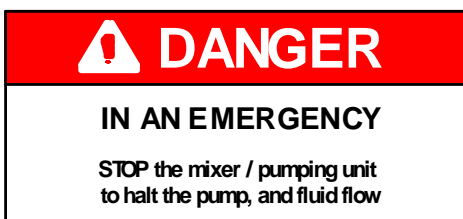
*The “Solids” from the underflow box will flow out of the discharge port of the box.*

*Refer back to section II Fig.9b about how the hydro-cyclones operate.*

- When the “Dirty” Tank is empty, or the pump sucks air (cavitation) switch the M2-922 mixer motor OFF.

**Note:** it is common for some fluid to remain in the “Dirty” tank.

- Switch the M2-922 mixer motor OFF.
- Rotate the 3-way valve “C” to position “Flow to Dirty Tank Nozzles”.





## MINI MAC-950E

# Operating the MINI MAC-950 Unit

### Warm Weather Shutdown & Storage

#### Daily Shut Down

- Follow “Daily Shut Down Instructions” in the M2-922 operators manual to shut down the mixer.
- If tanks are empty, load some fresh water (100gal) into the mix tank and pump fresh water through the piping from tank to tank then suck all water back into the mix tank for reuse.
- Close all suction valves.
- If fluid is left in the “Mix” tank, rotate the “Mix” tank nozzle valve to the closed position.
- Close the “Drill Fluid” valve on the “Active” tank.
- Remove, clean, reinstall the screening basket on the inlet port of the middle “Dirty” tank.
- Rinse out the over-flow box with clear water.
- Rinse out the under-flow box with clear water.

#### Additional Week End Shut Down

- Follow “Week End Shut Down Instructions” in the M2-922 operators manual to shut down the mixer.
- Follow “Daily Shut Down” (above).
- Remove the cone manifold removable inlet end cap and rinse the inside of the manifold. Replace end cap.

### CAUTION

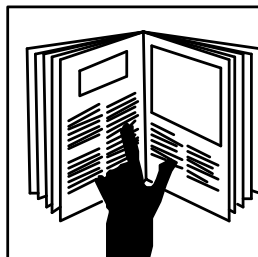
CARE MUST BE TAKEN WHEN  
CONNECTING ANY HOSE COUPLINGS.  
The faces must be clean before mating  
together and cam arms secured  
from opening.

### CAUTION

CARE MUST BE TAKEN WHEN  
INSTALLING THE COUPLER GASKETS.  
If the gaskets are not properly lubricated  
and installed, a leak may develop.

### CAUTION

TRAPPED FLUID MAY BE PRESENT  
and will spill out when piping or  
hoses are removed.



### WARNING

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





## MINI MAC-950E

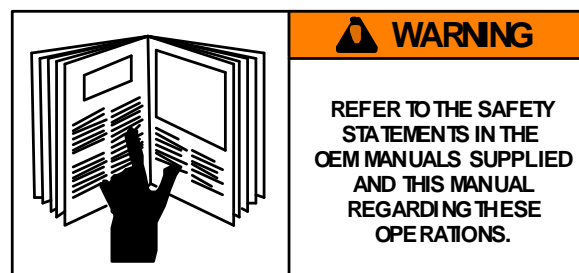
# Operating the MINI MAC-950 Unit

### Cold Weather Shutdown & Storage

#### Additional Winter and Freezing Weather Shut Down

**Note:** *all fluid is to be disposed of according to local environmental approved practices.*

- Follow “Additional Winter and Freezing Weather Shut Down Instructions” in the M2-922 operators manual.
- Drain all fluid out of the tanks.
- Rotate the “Mix” tank nozzle valve to the open position.
- Remove suction manifold end cap and drain fluid from manifold.
- Open all suction valves.
- Set 3-way valves “A”, “B”, “C” at half of rotation (1/2 way between valve handle stops).
- Disconnect all 2” hose quick couplers that connect the mixer to the 2” external piping.
- Disconnect the hose from the drilling rig to the “Drilling Fluid” valve on the “Active” tank.
- Open the “Drill Fluid” valve on the “Active” tank.
- Disconnect the 2” hose quick coupler that connect the cone manifold to the 2” external piping.
- Remove the cone manifold removable inlet end cap and rinse the inside of the manifold. Leave the end cap off.
- Rinse out the over-flow box and over-flow discharge with clear water.
- Rinse out the under-flow box with clear water.
- Disconnect the hose on the underflow box outlet.
- Disconnect any hoses connected to the “Mix” tank, and “Dirty” tank inlets.
- Remove, clean, reinstall the screening basket on the inlet port of the middle “Dirty” tank.
- If possible, raise (jack) the unit up on one side, to allow any fluid remaining in the tank to flow away from the tank suction ports.





## MINI MAC-950E

# Operating the MINI MAC-950 Unit

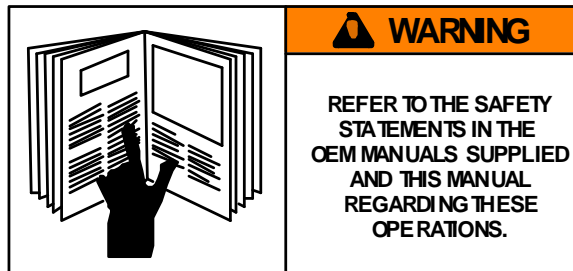
### Prolonged Periods of Storage

#### Prolonged Periods of Storage

- Follow “Prolonged Periods of Storage Instructions” in the M2-922 operators manual.

After a thorough cleaning of the internal and external components of the MINI MAC-950, the following steps should be applied to extend the life of your unit.

- Spray all valves and 2” quick couplers with an oil base lube/protectant.



# **SECTION #V**

*Troubleshooting the MINI MAC-950 Unit*



## MINI MAC-950E

### Troubleshooting the MINI MAC-950 Unit

The MINI MAC-950 is used in conjunction with the M2-922 mixer. The M2-922 mixer has its own operators manual with a trouble-shooting section and should be referred to when there is a problem with the M2-922 mixing abilities.

This section of the manual deals with the MINI MAC-950 unit on its own.

The MINI MAC-950 is made up of 3 tanks mounted on a skid, with external piping and valves. Fluid is mixed and stored in the tanks and moved from tank to tank via the external piping and valves. Mounted on the side of the unit is an assembly where the “Dirty” drill fluid is routed to and processed through the hydro-cyclones to remove cuttings, and give a suitable fluid for reuse in the drilling process.

The MINI MAC-950 unit is of a simple design with limited moving parts or consumable pieces.

The following, may aid in any problems that may arise.

*Always check that the pump on the M2-922 is primed and functioning properly*

- *No fluid to the M2-922 mixer.*  
**“Mix” tank suction valve closed. - Open suction valve.**
- *“Mix” tank does not have a rolling action of the fluid.*  
**“Mix” tank nozzle valve closed. - Open valve.**
- *Cannot transfer fluid to “Active” tank.*  
**3-way valve(s) closed or in incorrect position - Open or reposition valves (see section IV).**  
**“Mix” tank suction valve closed - Open valve.**
- *“Active” tank does not have a rolling action of the fluid.*  
**3-way valve(s) closed or in incorrect position - Open or reposition valves (see section IV).**  
**“Active” tank suction valve closed - Open valve.**
- *“Dirty” tank does not have a rolling action of the fluid.*  
**3-way valve(s) closed or in incorrect position - Open or reposition valves (see section IV).**  
**“Dirty” tank suction valve closed - Open valve.**  
**Fluid too thick to pump. - Thin fluid by adding more water.**  
**“Dirty” tank nozzles plugged – Clean manifold and nozzles.**
- *No fluid flow/ low fluid flow to the cone manifold*  
**M2-922 not pumping fluid. - See M2-922 Operators manual.**  
**3-way valve(s) closed or in incorrect position - Open or reposition valves (see section IV).**  
**“Dirty” tank suction valve closed - Open valve.**  
**Not enough fluid in the “Dirty” tank - Add fluid or shutdown.**  
**Cone manifold plugged. - Clean out manifold.**  
**Fluid too thick to pump. - Thin fluid by adding more water.**
- *No manifold pressure / low manifold pressure.*  
**No fluid flow / low fluid flow - See above solutions.**  
**Pressure gauge not working - Clean or replace pressure gauge.**  
**Hydro-cyclone(s) wore out. - Replace apex or complete cone(s).**



## MINI MAC-950E

### **Troubleshooting the MINI MAC-950 Unit *continued***

- *High manifold pressure.*  
**Valve “C” open to far. - Readjust valve.**  
**Hydro-cyclone(s) plugged. - Shutdown system and unplug cone(s).**  
**Manifold to cone outlet plugged. – Remove blockage.**
- *Hydro-cyclone discharge irregular or roping.*  
**Incorrect manifold pressure. - See previous solutions.**  
**To high of a solids content in fluid. - Add water to “Dirty” tank.**  
**Hydro-cyclone(s) wore out. - Replace apex or complete cone(s).**
- *Over-flow box has excessive overspray out of top.*  
**Cone hose (cane) not in center position. - Place hose back into proper position see Fig.7b.**
- *Over-flow box is overfilling.*  
**Over-flow box outlet is plugged. - Remove blockage.**
- *Under-flow box is overfilling.*  
**Under-flow box outlet has buildup / blockage. - Remove blockage.**  
**Under-flow box outlet has a hose attached that restricted flow. – Change routing, length, or size.**  
**MINI MAC-950 is not level. – Level unit.**
- *Over-flow fluid does not meet reduced solids spec.(too dirty)*  
**Incorrect manifold pressure. - See previous solutions.**  
**To high of a solids content in fluid. - Add water to “Dirty” tank.**  
**Hydro-cyclone(s) wore out. - Replace apex or complete cone(s).**

**For problems that cannot be solved by the above steps,  
call your local distributor or STSI (1-800-567-0978) and talk to a company representative  
who would be glad to assist you with your problem.**

# **SECTION #VI**

*Periodic Maintenance & Repair Information*



## MINI MAC-950 Periodic Maintenance Schedule

*The Maintenance Schedule for the M2-922 mixer is located in the operator's manual for the M2-922 mixer.*

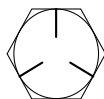
Maintenance Items	Before Use	Every 8 hours (daily)	Every 50 hours (weekly)	Every 200 hours (monthly)	Every 1000 hours	Every 2000 hours (or yearly)
<i>MINI MAC-950 Components</i>						
Visual check of base skid and structure for damage.	●	●				
Visual check of D-rings (before using).	●					
Visual check leveling jacks for damage.	●					
Check / Clean tanks for sediment or debris.	●					
Visual check of internal jetting nozzles for fluid flow	●					
Check hoses and connections for damage, wear, cracks.		●				
Check clamps are tight and safety pins installed.		●				
Clean "Y-trap" screening device.		●				
Flush piping and valves with clear water.		●				
Check hydro-cyclone body nut & apex are tight.		●				
Check hydro-cyclones are vertical.		●				
Check hydro-cyclone hoses (canes) are centered in box.		●				
Clean under-flow & over-flow box of build-up.		●				
Remove cone manifold end filter and clean.						
Check hydro-cyclones for excessive wear (internal.)					●	
Remove top of leveling jacks and grease internally.					●	
<i>If Installed</i>						
Remove weir plate in box and clean any deposits.				●		
Grease cone head lift sliders & jack head.				●		

***STSI is not to be held liable for any discrepancies or errors in the above schedule***

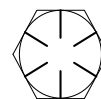


## MINI MAC-950E

# *Bolt Torque Specifications*



Grade 5



Grade 8

SAE SIZE	Lubricated *		Dry **	
	N.m	ft-lbs	N.m	ft-lbs
1/4	9.5	7	12	9
5/16	20	15	25	18
3/8	35	26	44	33
7/16	55	41	70	52
1/2	85	63	110	80
9/16	125	90	155	115
5/8	170	125	215	160
3/4	300	225	375	280
7/8	490	360	625	450
1	725	540	925	675

	Lubricated *		Dry **	
	N.m	ft-lbs	N.m	ft-lbs
	13.5	10	17	12.5
	28	21	35	26
	50	36	63	46
	80	58	100	75
	120	90	150	115
	175	130	225	160
	215	160	300	225
	425	310	550	400
	700	500	875	650
	1050	750	1300	975

\* "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings.

\*\* "Dry" means plain or zinc plated without any lubrication.

### Metric size

Thread size x pitch mm	N.m	ft-lbs
M6 X 1.0	10.8 ± 1.0	8.0 ± 0.5
M8 x 1.25	25.5 ± 2.9	19.0 ± 2.0
M10 x 1.5	49.0 ± 4.9	36.0 ± 4.0
M12 x 1.75	88.3 ± 9.8	65.0 ± 7.0
M14 x 1.5	137.0 ± 9.8	101.0 ± 7.0
M16 x 1.5	226.0 ± 9.8	167.0 ± 7.0

Apply 60% torque to bolts that are not listed.

Apply 80% torque when tightened to aluminum alloy.



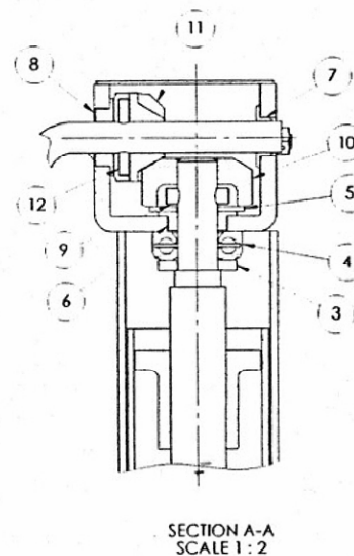
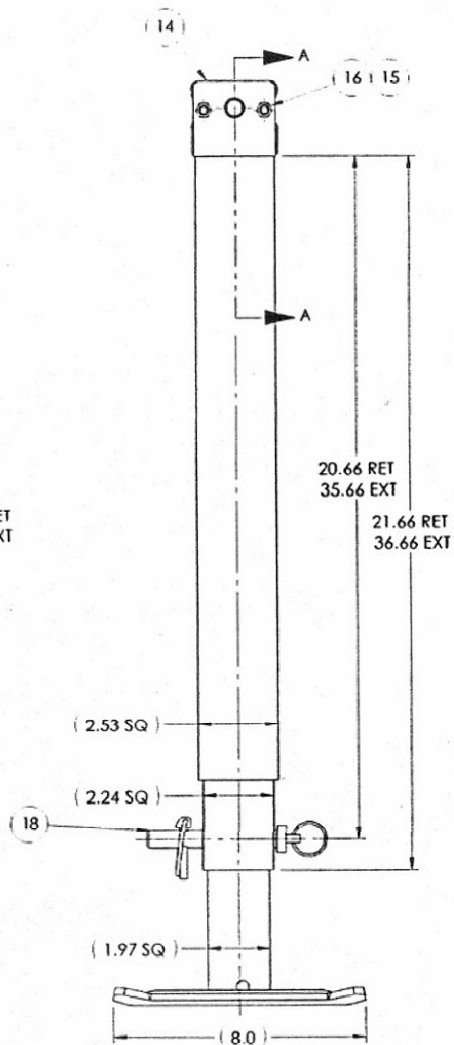
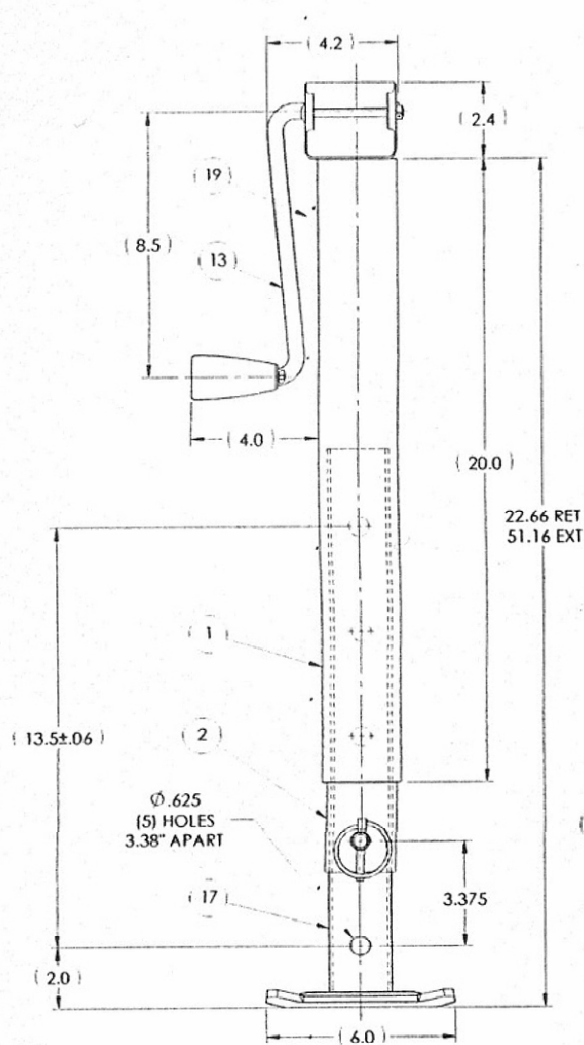
## MINI MAC-950E

NOTES:

[illegible]

# **SECTION #VII**

*OEM Repair Information*



ITEM	PART NO.	DESCRIPTION	QTY.
1	709458	OUTER TUBE & GRBX-20" WLD	1
2	710631	INNER TUBE/S&N ASSY	1
3	016146	WASHER, SUPPORT 5K SQ. .179 THK.	1
4	001020	THRUST BEARING	1
5	016135	WASHER, .08" X .631" ID - HT TRTD	1
6	021273	BUSHING, PM .630" ID, HEX	1
7	017011	BUSHING, FLANGE	1
8	021277	BUSHING, HEX	1
9	009129	DOWEL PIN, 1/4" X 1.00" LG.	1
10	020043	BEVEL GEAR	1
11	020012	PINION GEAR	1
12	009008	GROOVE PIN, 5/32"	1
13	700380	CRANK, SW ASSY - 8.5	1
14	016041	COVER, GEARBOX	1
15	002011	BOLT, 1/4-20X3.12" CARR	2
16	008002	NUT, 1/4-20 HEX LOCK	2
17	701340	DROP LEG ASSY-17.5" WLD	1
18	701472	PULL PIN ASSY	1
19	F3343	LABEL, BULLDOG CAPACITY 5/8K	1

B

OUTER TUBE - 20.0"  
FINISH -76 PRIME FINISH, GRAY SPRAY  
INNER TUBE - 21.38"  
FINISH -01 CLEAR ZINC  
DROPLEG - 17.5"  
FINISH -01 CLEAR ZINC  
SCREW - 7/8-8 X 18.72"  
TRAVEL - 15.0"  
CAPACITY  
STATIC- 8000 LBS.  
LIFT- 5000 LBS.



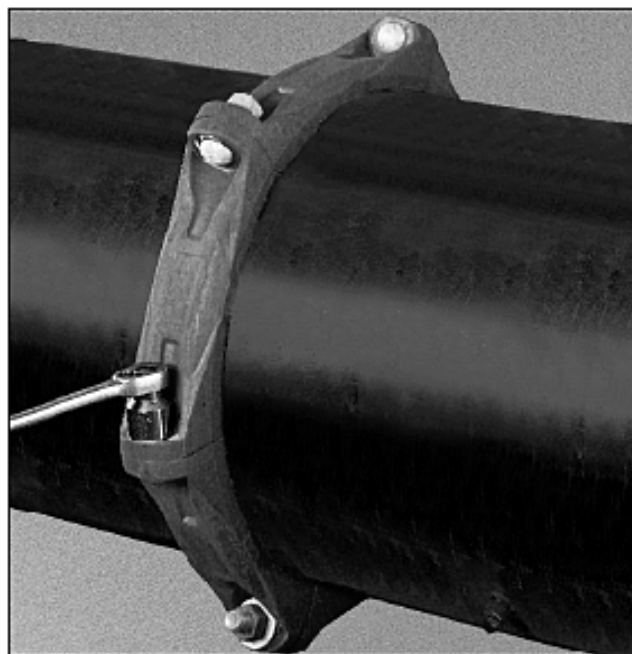
e-mail: pwestmkt@mts.net

website: www.pointswestmarketing.com

84 De Baets Street  
Winnipeg, Manitoba  
Canada R2J 3S9  
Phone: (204) 661-8111  
FAX (204) 663-9279

190754	B
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## COUPLING INSTALLATION &amp; ASSEMBLY



The instructions are based on pipe grooved in accordance with Gruzlok® grooving specifications. Check pipe ends for proper groove dimensions and to assure that the pipe ends are free of indentations and projections which would prevent proper sealing.

**ALWAYS USE A GRUVLOK® LUBRICANT FOR PROPER COUPLING ASSEMBLY.** Thorough lubrication of the external surface of the gasket is essential to prevent pinching and possible damage to the gasket. For temperatures above 150° F (65.6° C) use Gruzlok Xtreme™ Lubricant and lubricate all gasket surfaces, internal and external. See Gruzlok Lubricants in the Technical Data section of the Gruzlok catalog for additional important information.

**SPECIFIED BOLT TORQUE**

Specified bolt torque is for the oval neck track bolts used on Gruzlok® couplings and flanges. The nuts must be tightened alternately and evenly until fully tightened. Caution: Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

**CAUTION:** Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

ANSI SPECIFIED BOLT TORQUE		
Bolt Size	Wrench Size	Specified Bolt Torque *
<i>in.</i>	<i>in.</i>	<i>ft. lbs.</i>
3/8	9/16	30-45
1/2	3/4	80-140
5/8	1 1/8	100-130
3/4	1 1/4	130-180
7/8	1 5/8	180-220
1	1 3/4	200-250
1 1/8	1 7/8	225-275
1 1/4	2	250-300

\* Non-lubricated bolt torques.

METRIC SPECIFIED BOLT TORQUE		
Bolt Size	Wrench Size	Specified Bolt Torque *
<i>mm</i>	<i>mm</i>	<i>N m</i>
M10	16	40-60
M12	22	110-150
M16	24	135-175
M20	30	175-245
M22	34	245-300
M24	36	270-340

\* Non-lubricated bolt torques.

NOTE: Specified torques are to be used unless otherwise noted on product installation instructions.

**FIG. 7000****Lightweight Flexible Coupling**

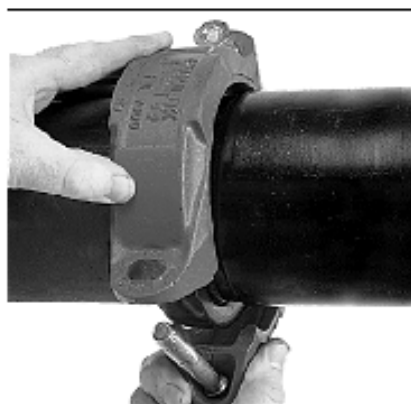
**1 CHECK & LUBRICATE GASKET**— Check gasket to be sure it is compatible for the intended service. Apply a thin coating of GUVLOK lubricant to outside and sealing lips of the gasket. Be careful that foreign particles do not adhere to lubricated surfaces.



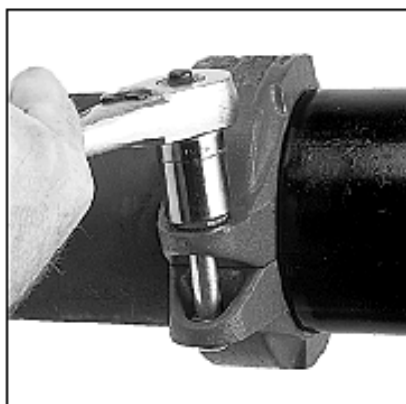
**2 GASKET INSTALLATION**— Slip the gasket over the pipe end, making sure the gasket lip does not overhang the pipe end.



**3 ALIGNMENT**— After aligning the two pipe ends together, pull the gasket into position, centering it between the grooves on each pipe. Gasket should not extend into the groove on either pipe.

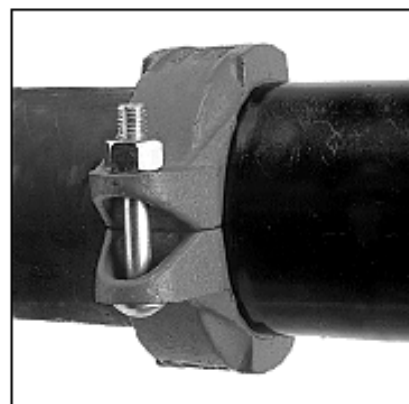


**4 HOUSINGS**— With one nut unthreaded to the end of the bolt, unthread the other nut completely and swing the coupling housing halves over the gasket, making sure the housing keys engage the grooves. Insert the bolt and turn the nuts finger tight.



**5 TIGHTEN NUTS**— Tighten the nuts alternately and equally to the specified bolt torque. The housing bolt pads must make metal-to-metal contact.

**CAUTION:** Uneven tightening may cause the gasket to pinch.



**6 ASSEMBLY IS COMPLETE**— Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves and the bolt pads are in firm even metal-to-metal contact on both sides of the coupling.

**CAUTION:** Use of an impact wrench is not recommended because the torque output can vary significantly due to many variables including air pressure supply, battery strength and operational variations.

**CAUTION:** Proper torquing of coupling bolts is required to obtain specified performance. Over torquing the bolts may result in damage to the bolt and/or casting which could result in pipe joint separation. Under torquing the bolts may result in lower pressure retention capabilities, lower bend load capabilities, joint leakage and pipe joint separation. Pipe joint separation may result in significant property damage and serious injury.

NOTE: VdS - Roll Grooving Approval Specifications, see the Technical Data/Installation Instructions section on Anvil's website - [www.anvilintl.com](http://www.anvilintl.com)

## FIG. 7003

### Hingelok™ Coupling

NOTE: Remove locking pin from handle before opening coupling.



**1 CHECK & LUBRICATE GASKET**— Check gasket to be sure it is compatible for the intended service. Apply a thin coating of GUVLOK lubricant to outside and sealing lips of the gasket. Be careful that foreign particles do not adhere to lubricated surfaces.



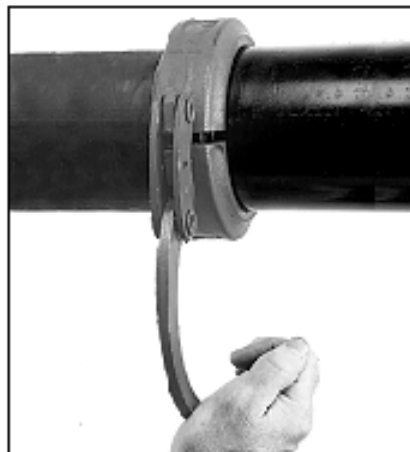
**2 GASKET INSTALLATION**— Slip the gasket over the pipe end making sure the gasket lip does not overhang the pipe end.



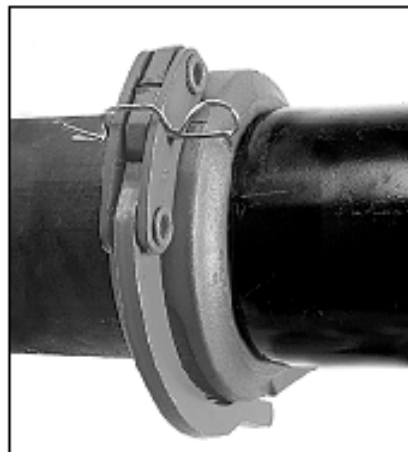
**3 ALIGNMENT**— After aligning the two pipe ends, pull the gasket into position centering it between the grooves on each pipe. Gasket should not extend into the groove on either pipe.



**4 HOUSINGS**— Put one half of the open coupling over the gasket as the coupling keys fit firmly into the grooves on each pipe end. Swing the other half of the coupling into position around the gasket and into the grooves.



**5 LOCK COUPLING**— Fit the nose of the locking handle in the notch of the opposite housing. Press firmly down on the handle until it makes contact with the coupling housing. Insert locking pin into handle linkage to secure handle in closed position. (See Caution.)



**6 ASSEMBLY IS COMPLETE**— Visually inspect the pipe joint to assure the coupling keys are fully engaged in the pipe grooves and the bolt pads are in firm even metal-to-metal contact on both sides of the coupling.

#### CAUTION:

- 1) Hammering or lancing on the handle or coupling housing could cause serious damage to the locking device and coupling assembly. The result may be an unsuitable pipe joint and unusable coupling assembly.
- 2) Care needs to be taken so that fingers do not get caught or pinched when handle is placed in locked position as a result of cam action of handle assembly.
- 3) When re-using coupling and gasket, always inspect gasket for damage and hinge/handle assembly for looseness, distortion or any other damage.



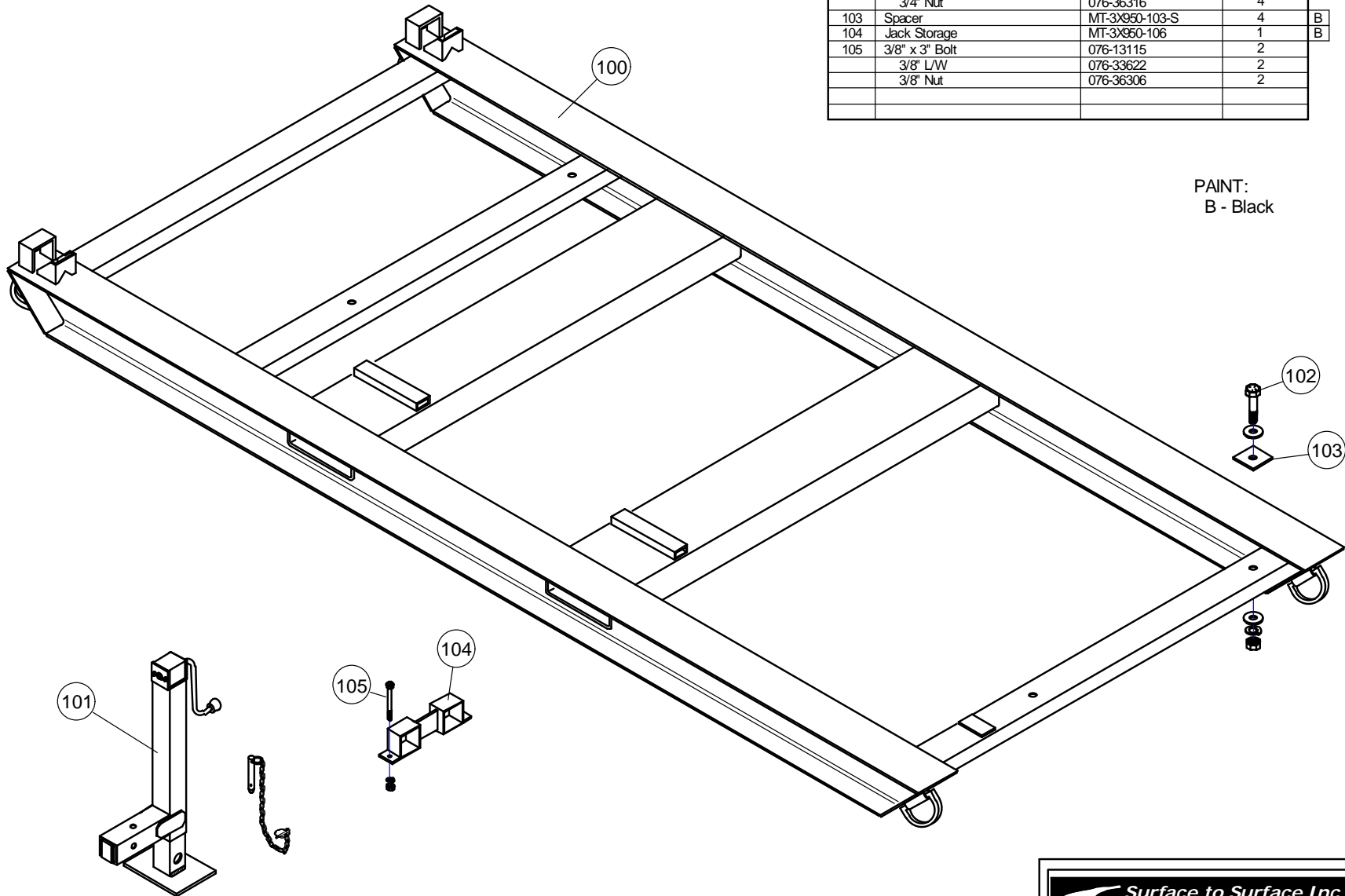
# **SECTION #VIII**


*(Parts Manual)*

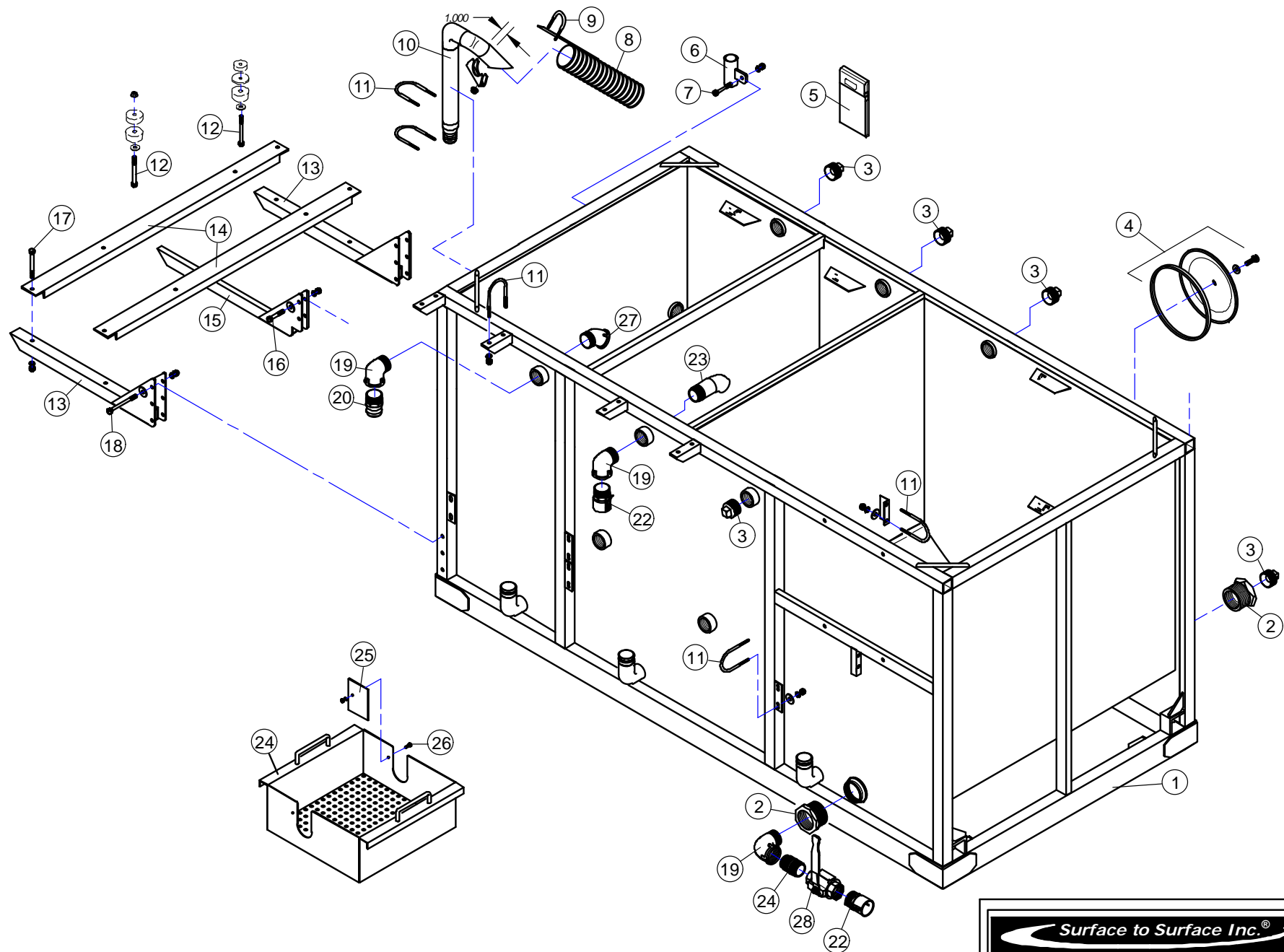
**MAC JR 950 DRAG SKID ASSEMBLY PARTS LIST  
#MT-3X950-100**

REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.	
100	Drag Skid	MT-3X950-101	1	B
101	Leveling Jack c/w pin & chain	MT-3X950-38	2	B
102	3/4" x 4" Bolt	076-13369	4	
	3/4" F/W	076-33018	8	
	3/4" L/W	076-33632	4	
	3/4" Nut	076-36316	4	
103	Spacer	MT-3X950-103-S	4	B
104	Jack Storage	MT-3X950-106	1	B
105	3/8" x 3" Bolt	076-13115	2	
	3/8" L/W	076-33622	2	
	3/8" Nut	076-36306	2	

PAINT:  
B - Black



	
DWR. NUM.	DATE. 04 / 17 / 14
MT-3X950-63	REV. 03 / 04 / 19




Surface to Surface Inc.®	
DWR. NUM.	DATE. 03/10/14
MT-3X950-60	REV. 02/02/18

## MAC JR 950 ASSEMBLY PARTS LIST

REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.	
1	Tank	MT-3X950-03	1	O
2	3" NPT x 2" NPT Pipe Bushing	018-318-90828-2	2	B
3	2" NPT Cored Pipe Plug	018-318090256-6	4	B
4	Clean-out Cover	086-TL-EC-12	3	O
	Rubber Gasket	~~~	3	
	Plastic Washer	~~~	3	
	5/8" x 1 1/2" Bolt	076-15309	3	
5	Operators Manual Holder	084-9000-07	1	
6	Additive Injector Holder	MT-3X1500-41	1	B
7	5/16" x 2" Bolt	076-13061	1	
	5/16" L/W	076-33620	1	
	5/16" F/W	076-3006	1	
	5/16" Nut	076-33006	1	
8	Return Pipe Cover Hose	MT-3X1500-43	1	B
9	2 1/2" Exhaust Clamp	031-MC 7212-050	1	B
10	Return Pipe	MT-3X1500-22	1	B
11	U-Bolt	MT-3X1500-28-A	14	B
	3/8" F/W	076-33008	14	
12	5/16" x 3" Bolt	076-13065	4	
13	Mixer Mount Arm	MT-3X1500-14	2	O
14	Mixer Mount Crossbar	MT-3X950-17	2	O
15	Mixer Mount Center Arm	MT-3X950-16	1	O
16	7/16" x 2 1/2" Bolt	076-13113	2	
	7/16" L/W	076-33624	2	
	3/8" F/W	076-33008	2	
	7/16" Nut	076-36308	2	
17	7/16" x 3" Bolt	076-13165	4	
	7/16" L/W	076-33624	4	
	7/16" Nut	076-36308	4	
18	7/16" x 3 1/2" Bolt	076-131167	6	
	7/16" L/W	076-33624	6	
	3/8" F/W	076-33008	6	
	7/16" Nut	076-36308	6	
19	2" NPT 90° Street Elbow	018-310-01720-7	3	B
20	2" Male Cam-loc x Male NPT	025-200-F-AL	1	
21				
22	2" Female Cam-loc x Male NPT	025-200-B-AL	2	
23	Dirty Tank Inlet Pipe	MT-3X1500-214	1	B
24	Pre-screen Basket	MT-3X950-115	1	
25	Pre-screen Basket Cover	MT-3X1500-211-B	1	
26	1/4" x 3/4" Bolt	076-13003	1	
	1/4" L/W	076-33618	1	
	1/4" Nut	076-36302	1	
27	2" NPT 45° Street Elbow	018-310-02820-4	2	B
28	2" NPT Ball Valve	022-423-00014-0	1	

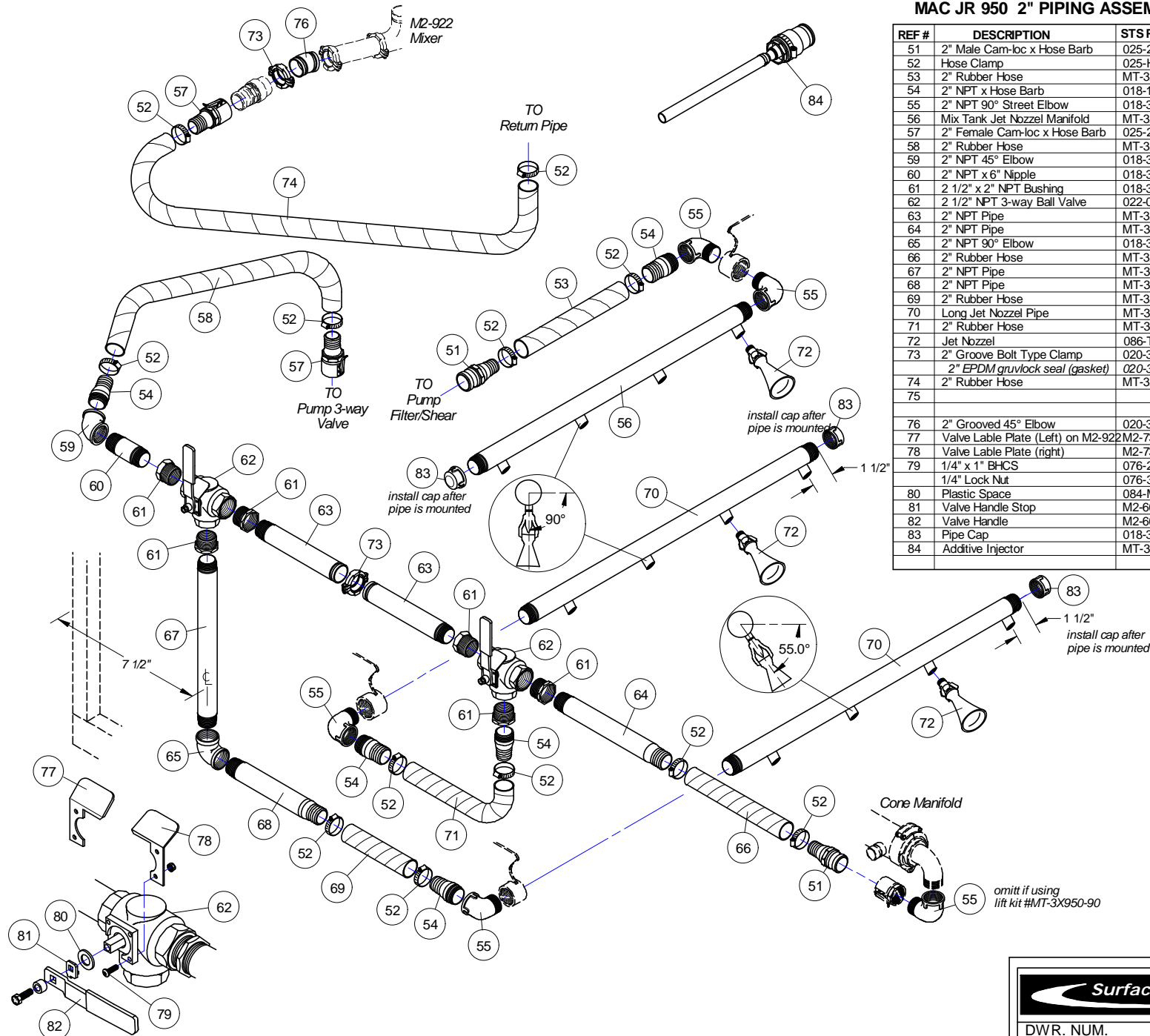
PAINT:  
B - Black  
O - Orange

	
DWR. NUM.	DATE. 03 / 10 / 14
MT-3X950-60A	REV. 08 / 30 / 16

# MAC JR 950 2" PIPING ASSEMBLY PARTS LIST

REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.
51	2" Male Cam-loc x Hose Barb	025-200-E-AL	2
52	Hose Clamp	025-HS-32	12
53	2" Rubber Hose	MT-3X950-40-E	1
54	2" NPT x Hose Barb	018-1661268241	6
55	2" NPT 90° Street Elbow	018-310-01720-7	5
56	Mix Tank Jet Nozzel Manifold	MT-3X950-24-B	1
57	2" Female Cam-loc x Hose Barb	025-200-C-AL	2
58	2" Rubber Hose	MT-3X950-40-B	1
59	2" NPT 45° Elbow	018-310-02440-1	1
60	2" NPT x 6" Nipple	018-330-03895-X	1
61	2 1/2" x 2" NPT Bushing	018-318-90785-X	6
62	2 1/2" NPT 3-way Ball Valve	022-0355N-T-KIT	2
63	2" NPT Pipe	MT-3X1500-27-C	2
64	2" NPT Pipe	MT-3X950-27	1
65	2" NPT 90° Elbow	018-310-00180-5	2
66	2" Rubber Hose	MT-3X950-40-C	1
67	2" NPT Pipe	MT-3X950-23-B	1
68	2" NPT Pipe	MT-3X950-23	1
69	2" Rubber Hose	MT-3X950-40-G	1
70	Long Jet Nozzel Pipe	MT-3X950-24-A	2
71	2" Rubber Hose	MT-3X950-40-F	1
72	Jet Nozzel	086-T2MP-L	12
73	2" Groove Bolt Type Clamp	020-390-00026-3	2
74	2" EPDM gnuvlock seal (gasket)	020-390-078640	1
75	2" Rubber Hose	MT-3X950-40-A	1
76	2" Grooved 45° Elbow	020-390-01478-6	1
77	Valve Lable Plate (Left) on M2-922	M2-738-L	1
78	Valve Lable Plate (right)	M2-738-R	2
79	1/4" x 1" BHCS	078-24053	6
80	1/4" Lock Nut	078-37018	6
81	Plastic Space	084-MFW130A	1
82	Valve Handle Stop	M2-664	1
83	Valve Handle	M2-665	1
84	Pipe Cap	018-318-90072-7	3
	Additive Injector	MT-3X1500-42	1

PAINT:  
B - Black  
O - Orange



Surface to Surface Inc.®

DWR. NUM.

MT-3X950-61

DATE.

03 / 13 / 14

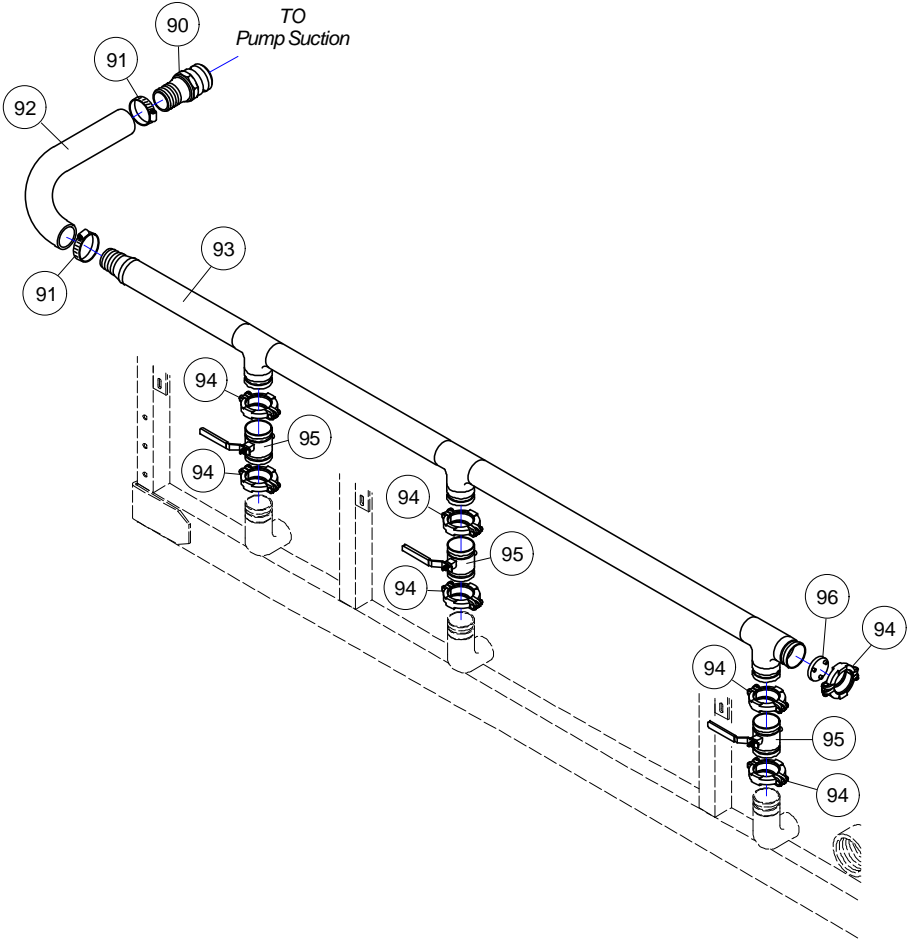
REV.


06 / 03 / 14

MAC JR 950 2" SUCTION PIPING ASSEMBLY PARTS LIST

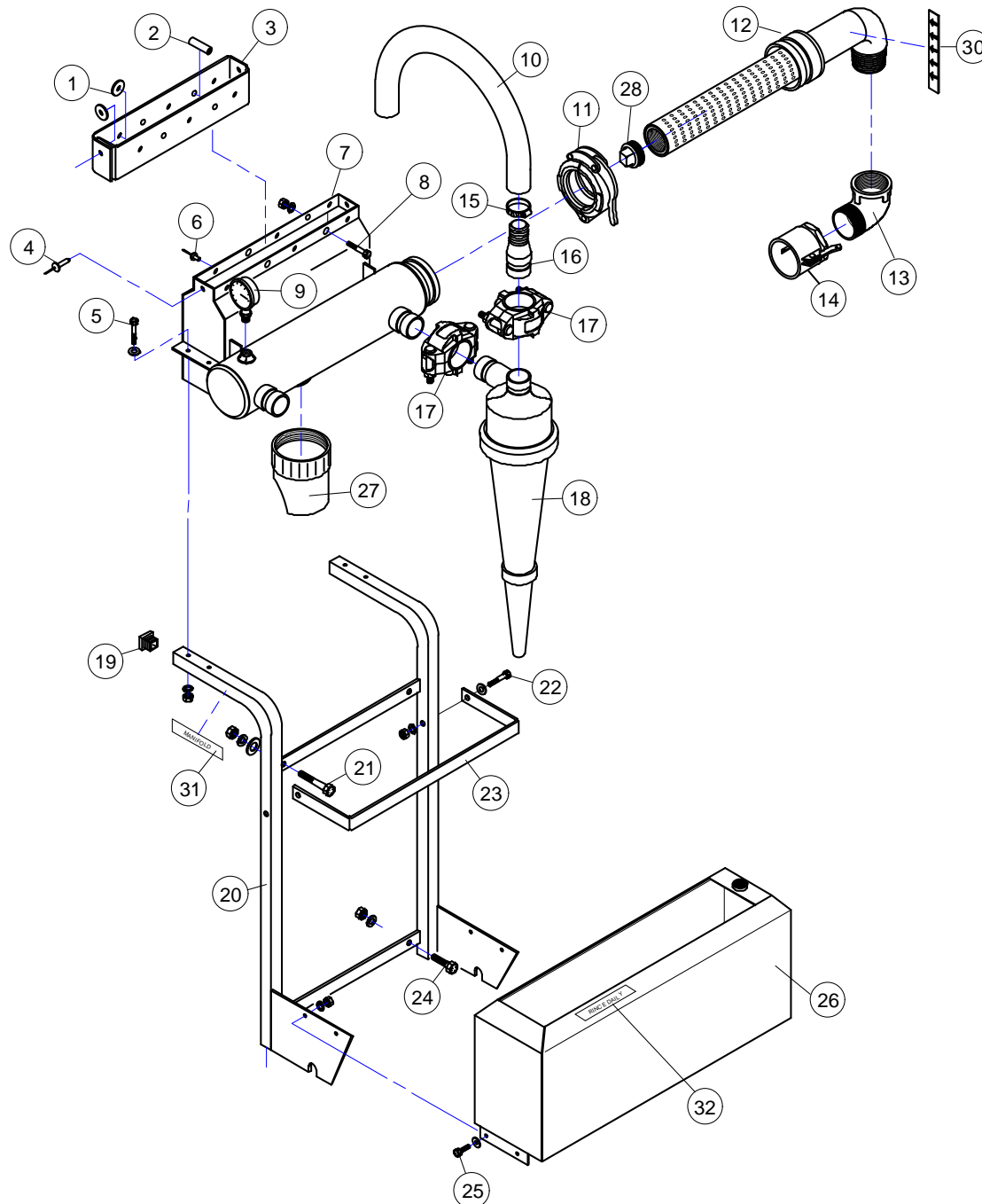
REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.	
90	2" Male Cam-loc x Hose Barb	025-200-E-AL	1	
91	Hose Clamp	025-HS-32	2	
92	2" Rubber Hose	MT-3x950-40-D	1	
93	Suction Manifold	MT-3X950-20	1	B
94	2" Groove Bolt Type Clamp	020-390-00026-3	7	B
	2" EPDM grruvlock seal (gasket)	020-390-078640		
95	2" Grooved Butterfly Valve	023-7005-011049	3	
96	2" Grooved End Cap	020-390-03014-6	1	B

PAINT:  
B - Black





DWR. NUM.      DATE. 03 / 13 / 14  
MT-3X950-62      REV. 06 / 03 / 14



# **MAC JR 1200 CONE HEAD ASSEMBLY PARTS LIST** ( P/N #MT-3X1500-87) (No Flock)

REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.	
1	3/16" Large back-up washer	076-1133202	8	
2	Shield Spacer	H360-2-014-C	2	B
3	Over-Flo Box Rubber Shield	H360-2-014-B	1	
4	Rivet 3/8" x 3/8" grip	076-41027	1	
5	1/4" x 1 1/2" Bolt	076-13009	4	
	1/4" F/W	076-33004	4	
	1/4" L/W	076-33618	4	
	1/4" Nut	076-36302	4	
6	Rivet 3/8" x 1/4" grip	076-41025	7	
7	Over-Flo Box & Manifold	H360-2-009	1	O
8	1/4" x 2 1/2" Bolt	076-13013	2	
	1/4" L/W	076-33618	2	
	1/4" Nut	076-36302	2	
9	Pressure Gauge	035-CF-1P-60-A	1	
10	Cone Hose	H360-2-014-A	2	
11	3" Hinge-Loc Coupler	020-390-20006-1	1	O
	3" Coupler EPDM Gasket	020-390-078681		
12	Manifold Removable End	H360-2-029	1	O
13	2" NPT 90° Street Elbow	018-310-01720-7	1	O
14	2" Female Can-loc x Female NPT	025-200-D-AL	1	
15	Gear Clamp	025-HS-24	2	
16	1 1/4" Groove x Hose Barb	020-D19-STV15	2	O
17	1 1/4" Groove-Loc Coupler	020-390-00022-2	4	O
	1 1/4" Coupler EPDM Gasket	020-390-078620		
18	Hydro-cyclone	088-48-0821	2	
19	1" Sq Plastic Plug	084-SQR101014A	2	
20	Top Head Legs	H360-2-005	1	O
21	3/8" x 3" Bolt	076-13115	2	
	3/8" F/W	076-33008	2	
	3/8" L/W	076-33622	2	
	3/8" Nut	076-36306	2	
22	5/16" x 1 3/4" Bolt	076-13060	2	
	5/16" F/W	076-33006	2	
	5/16" L/W	076-33620	2	
	5/16" Nut	076-36304	2	
23	Cone Support Bar	H360-2-032	1	O
24	3/8" x 1" Bolt	076-13105	2	
	3/8" L/W	076-33622	2	
	3/8" Nut	076-36306	2	
25	1/4" x 3/4" Bolt	076-13003	4	
	1/4" F/W	076-33004	4	
	1/4" L/W	076-33618	4	
	1/4" Nut	076-36302	4	
26	Under-flo Box	MT-3X1500-400	1	O
27	ABS Female NPT x Socket Adpt	MT-3X1500-218	1	
28	1 1/2" NPT Pipe Plug	018-318-90252-5	1	O
29				
30	Directional Tape	STS-PIPE MARKER	12"	
31	"Manifold" Decal	H360-2-091	1	
32	"Rince Daily" Decal	H360-6-055	1	
33				
34				
35				
36				

Paint Colors  
Black = B  
Orange = O

Surface to Surface Inc.®	
DWR. NUM.	DATE. 12/05/12
MT-3X1500-87	REV. 02/01/19



# Mini MAC 950 CONE HEAD LIFT ASSEMBLY PARTS LIST

REF #	DESCRIPTION	STS PART NUMBER	QTY REQ.	
1	Left Side Slider	#MT-3X1500-95-L	1	B
2	Right Side Slider	#MT-3X1500-95-R	1	B
3	Push Mount	#MT-3X1500-95-A	1	B
4	Slide Rail	#MT-3X1500-91	1	B
5	3/8" x 1 1/4" FHSCS	076-24287	4	
	3/8" L/W	076-33622	4	
	3/8" Nut	076-36306	4	
6	3/8" x 3" FHSCS	076-24294	2	
	3/8" L/W	076-33622	2	
	3/8" Nut	076-36306	2	
7	Lift Jack Head	#MT-3X1500-97-H	1	B
8	Lift Jack Post	#MT-3X1500-97-P	1	
9	3/8" x 2" Bolt	076-13111	2	
	3/8" L/W	076-33622	2	
	3/8" Nut	076-36306	2	
10	3" NPT 45° Elbow	018-310-02480-7	1	B
11	3" NPT x Hose Barb	018-1661268258	1	B
12	Hammer Clamp	025-H-14	1	
13	3" Layflat Hose	MT-3X950-99-B	1	
14	2" Rubber Hose	MT-3X950-99-A	1	
15	3/8" x 2" FHSCS	076-24290	2	
	3/8" L/W	076-33622	2	
	3/8" Nut	076-36306	2	
16	Top Head Legs	H360-2-005	1	
17	Tank Frame	#MT-3X1500-03	1	

PANT:  
B - Black

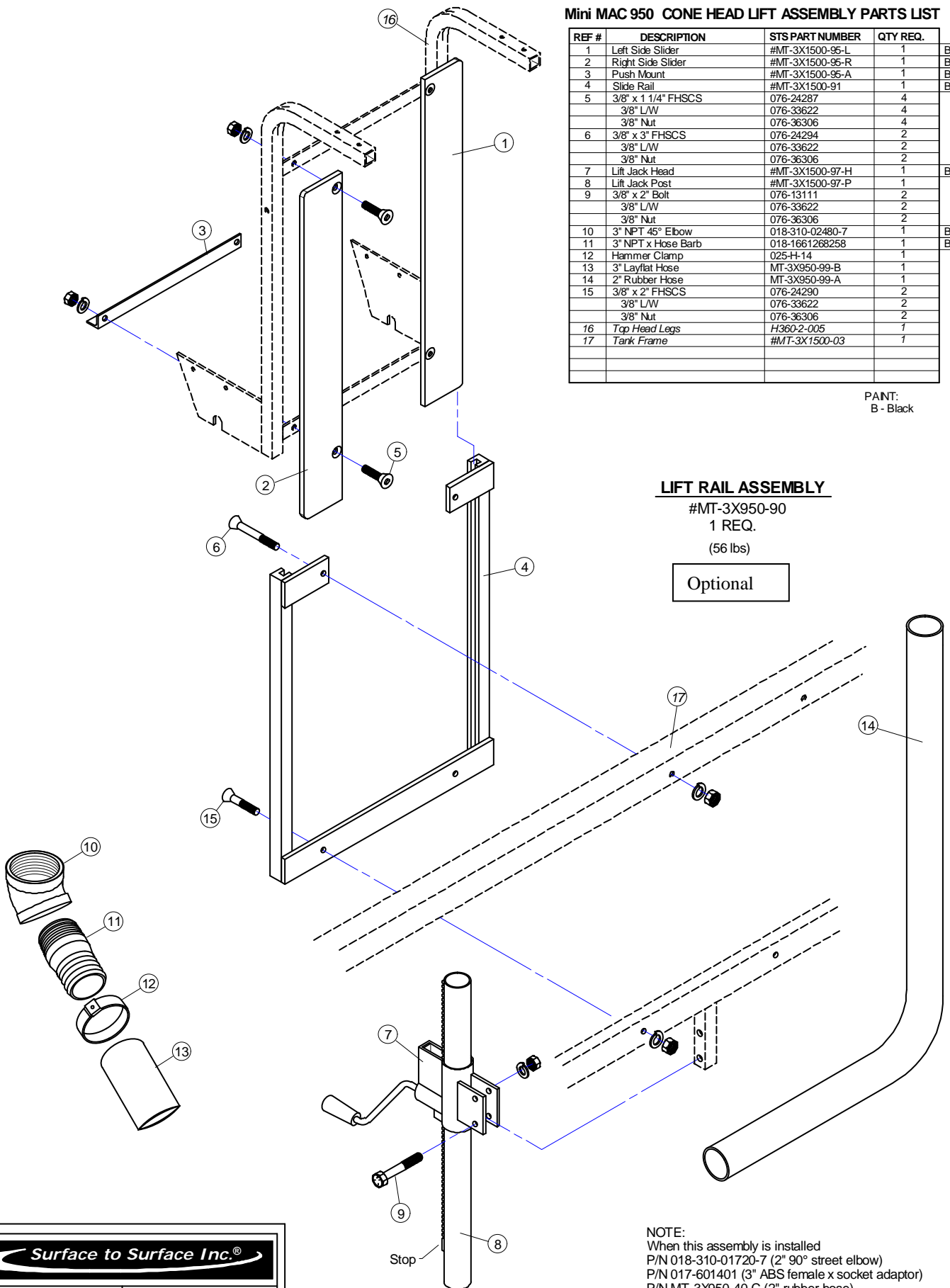
## LIFT RAIL ASSEMBLY

#MT-3X950-90

1 REQ.

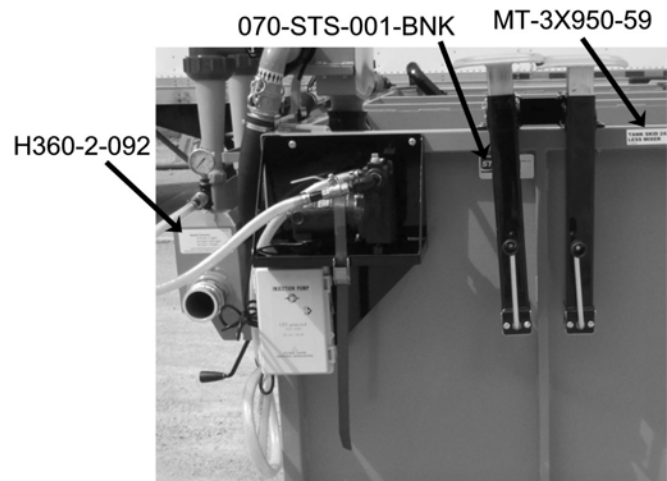
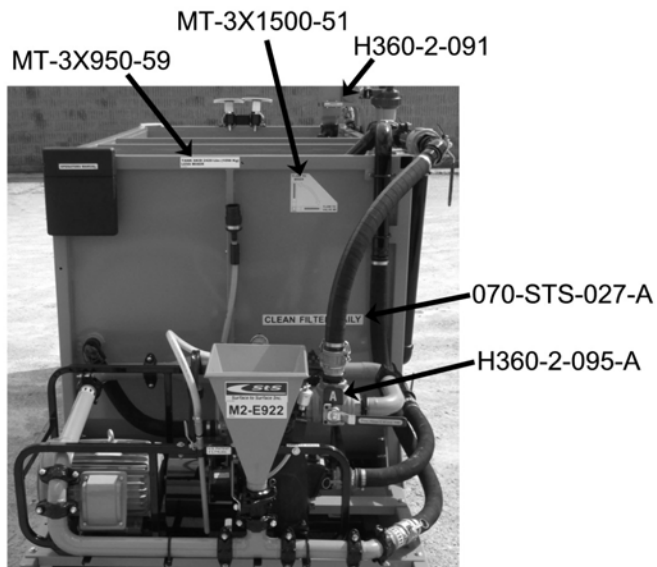
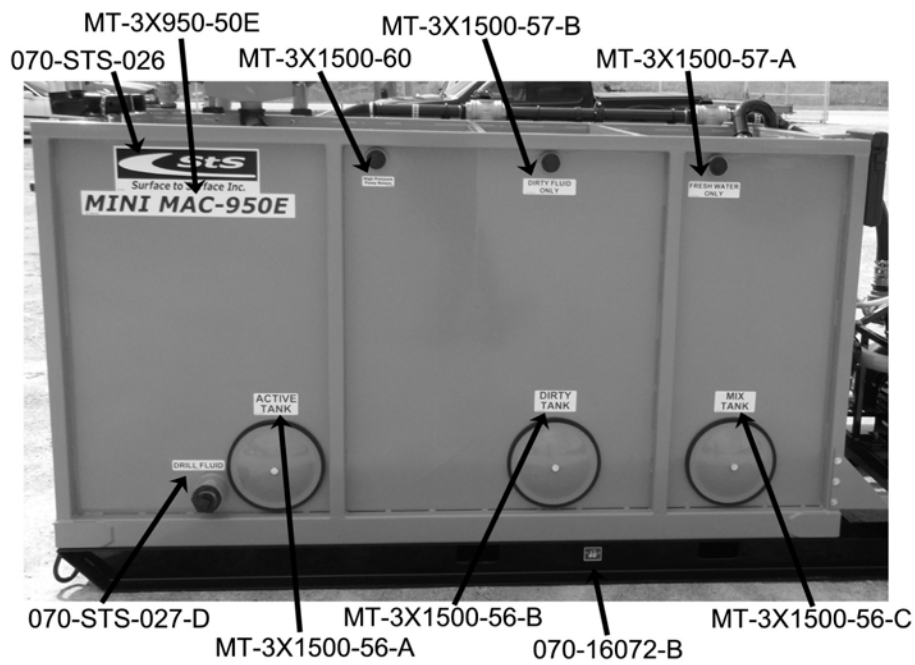
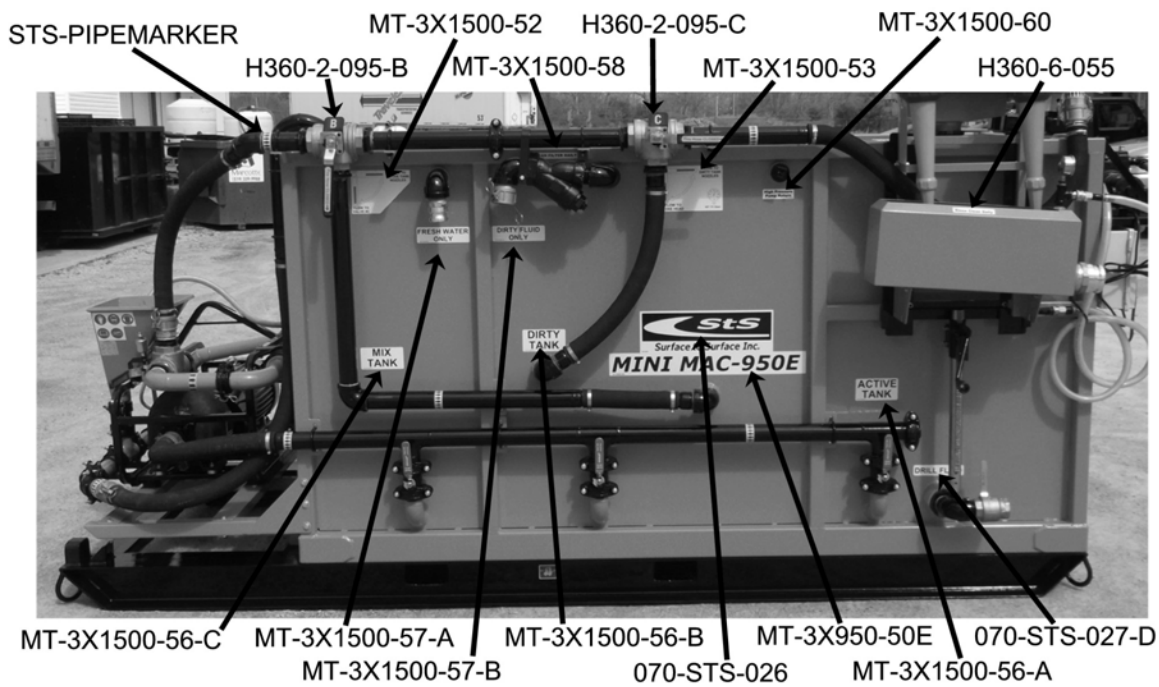
(56 lbs)

Optional



NOTE:  
When this assembly is installed  
P/N 018-310-01720-7 (2\"/>

Surface to Surface Inc.®	
DWR. NUM.	DATE. 05 / 13 / 14
MT-3X950-90	REV. 06 / 03 / 14



## Mini-MAC 950E Decals