



Operators Manual

**** MAC JR 1200D ****

USE IN CONJUNCTION WITH M2-922 MIXER MANUAL (ENCLOSED)

Unit Serial No. _____

M2-922 Mixer

Serial No. _____

Links relating to this Manual

www.stsmixers.com

Dealer

TABLE OF CONTENTS

| | PAGE |
|--|--------------|
| STS Inc. Warranty..... | 5 |
| Safety Statements..... | 6-9 |
| Safety Markings..... | 10 |
| Main Working Components (<i>Photo</i>)..... | 11 |
| Introduction to the MAC JR 1200D | 12 |
| MAC JR 1200D Foot Print (<i>top view</i>)..... | 13 |
| MAC JR 1200D General Data Sheet | 14-15 |
| Identifying Your Machine & Components | 16 |
| <u>SECTION II</u> (<i>Description, Care and Maintenance</i>) | |
| Base Skid with Tanks | 18-20 |
| Internal Tank Nozzles | 21 |
| External Piping | 22 |
| Leveling Jacks | 23 |
| 2 Cone Head Assembly | 24 |
| Cone Manifold | 25 |
| Hydro-Cyclones | 26 |
| Over-Flow Box | 27 |
| Under-Flow Box | 28 |
| Valves on the M2-922 Mixer | 29 |
| Optional: Engine Throttle / Stop & Key Switch | 30 |

TABLE OF CONTENTS

| | PAGE |
|---|-------------|
| <u>SECTION III</u> <i>(Set-up and Connection of unit in Detail)</i> | |
| Site Set-up (work mode) | 32 |
| Hose Connections | 33 |
| Site Tear-down (transport mode) | 34 |
| <u>SECTION IV</u> <i>(Operating the MAC JR 1200D Unit.)</i> | |
| Site set-up and pre-check | 36 |
| Mixing New Drilling Fluid | 37-39 |
| Transferring New Drill Fluid to Active Tank | 40 |
| Agitating the Active Tank | 41 |
| Cleaning the Dirty Fluid for Re-use | 42 |
| Shutdown, cleanup & storage | |
| Warm weather | 43 |
| Cold/ freezing weather | 44 |
| Prolonged Periods of Storage | 45 |
| <u>SECTION V</u> <i>(Trouble shooting)</i> | |
| Trouble Shooting the MAC JR 1200D | 47-48 |
| <u>SECTION VI</u> <i>(Periodic Maintenance & Repair Information)</i> | |
| Maintenance Schedule | 50 |
| Bolt torque Specifications | 51 |
| Notes | 52 |

TABLE OF CONTENTS

| | PAGE |
|---|-------|
| <u>SECTION VII</u> (<i>OEM Repair / Information</i>) | |
| Leveling Jack Breakdown | 54 |
| Gruvloc® Pipe Couplings | 55-57 |
| Auto Engine Overspeed Shut Down Valve | 58-65 |
| <u>SECTION VIII</u> (<i>Parts Manual</i>) | |
| MAC JR 1200D PARTS MANUAL | 67-76 |



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**



MAC JR 1200D

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 wheel locks
engaged in the transport position,
the tongue extended and pinned
and the leveling jacks fully retracted.



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 lowering the unit to the ground
and leveling 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 THE HOSE COUPLINGS.
The faces must be clean before mating
together. Rotate body to engage lock.**

CAUTION

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

CAUTION

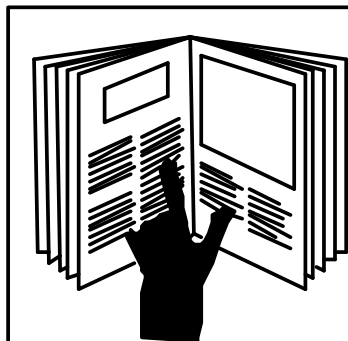
**DO NOT CONNECT CHAINS OR STRAPS
to piping or other parts of the unit.
D-Hooks are provided on the base
structure for such use.**

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.

MAC JR 1200D

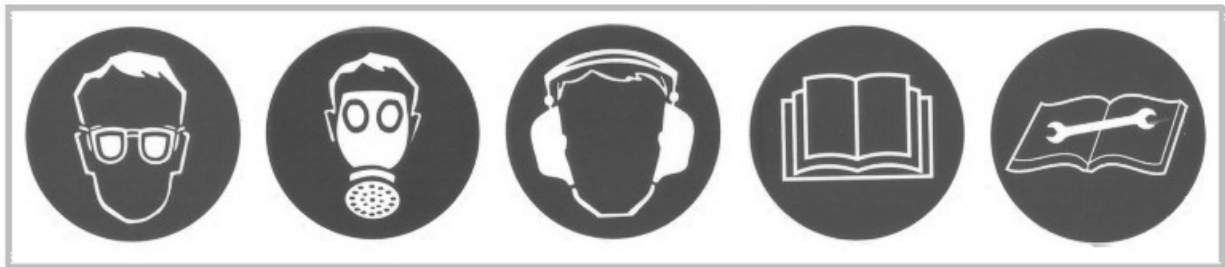
Safety Markings

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.

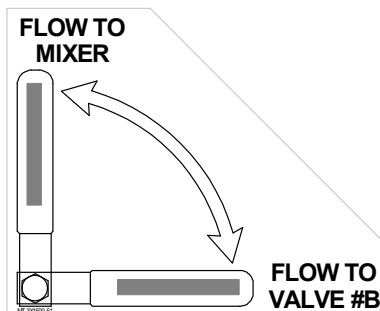
These include but are not limited to:

- | | |
|-----------------------------|--|
| 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



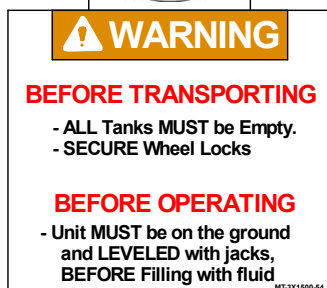
Valve Operations



Valve Identification



Outlet Descriptions



Equipment Dangers



Fluid Flow Direction

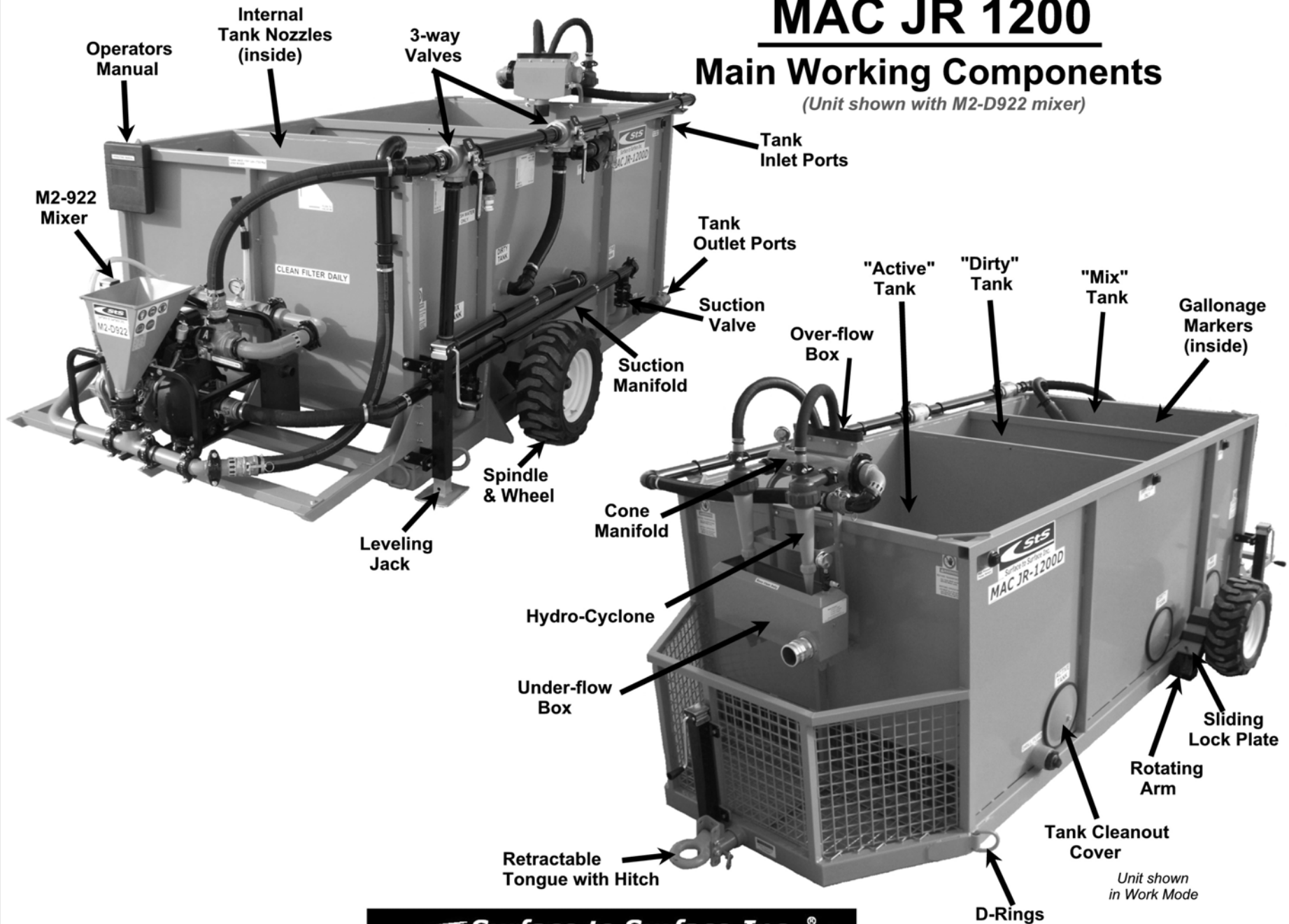


Maintenance Instructions

MAC JR 1200

Main Working Components

(Unit shown with M2-D922 mixer)



Surface to Surface Inc.®



MAC JR 1200D

Operators Manual

Congratulations on your acquisition of the MAC JR 1200 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 MAC JR 1200 system.

The MAC Junior 1200 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 MAC Junior 1200 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 unit is designed to be operated on ground level. When the unit is to be transported it is jacked up, letting the wheels rotate down and into position, were they are secured and locked in place, creating 12” of ground clearance for transporting over uneven terrain. Once on location, lower jacks and take the weight off of the wheels, release the locks and lower to ground level.

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

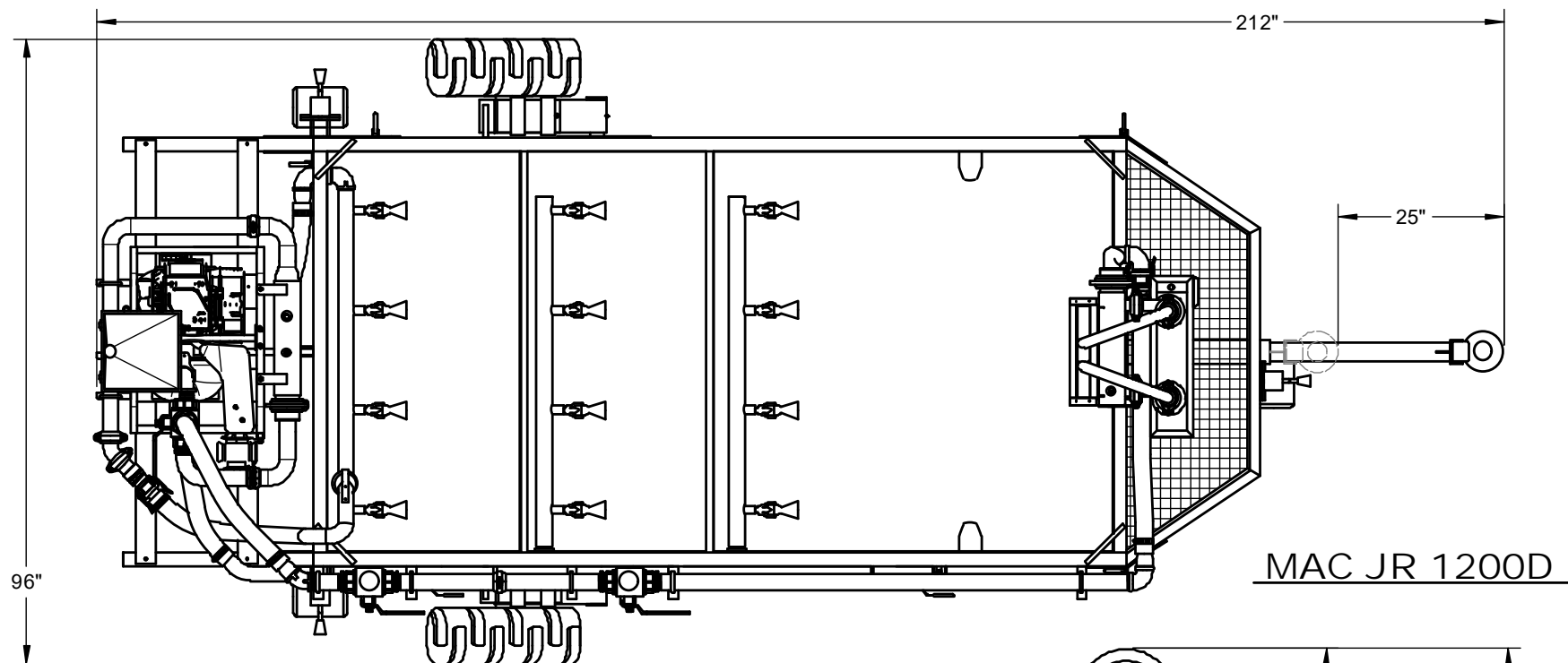
The MAC Junior 1200D consists of a diesel powered centrifugal pump, filter/shear unit, venturi mixing tee assembly, dry hopper and pressure wash wand, making effective use of the proprietary 4 point mixing system.

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 tongue (hitch) 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.

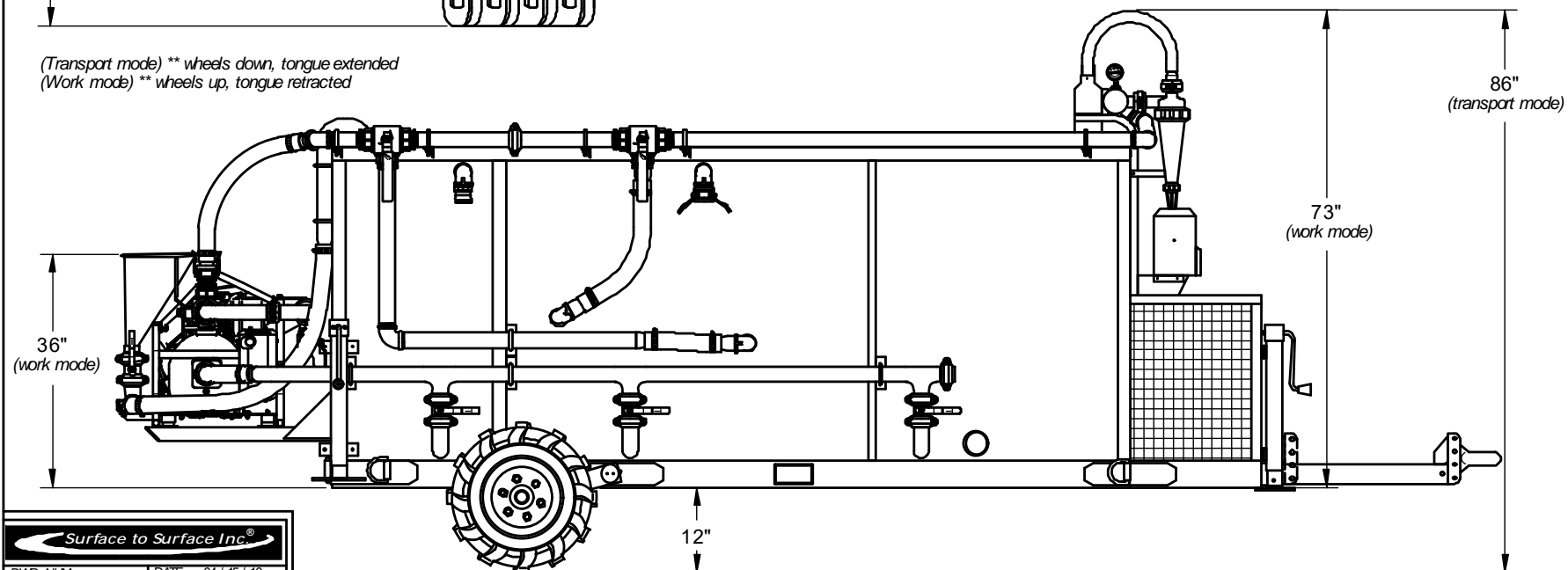
RECORD OF OWNERSHIP:

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



MAC JR 1200D

(Transport mode) ** wheels down, tongue extended
 (Work mode) ** wheels up, tongue retracted



| | |
|--------------------------|-------------------|
| Surface to Surface Inc.® | |
| DWR. NUM. | DATE 04 / 15 / 13 |
| MAC JR1200D | REV. 03 / 15 / 19 |



Mix-Clean-Recover Unit Model MAC Junior 1200D

Surface to Surface Inc.



Features and Benefits: **MAC Junior 1200D**

The MAC Junior 1200D 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 MAC Junior 1200 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 52 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. When the unit is to be transported from location to location, the unit is jacked up with the 3 onboard jacks letting the wheels rotate down and into position, where they are secured and locked in place. This creates 12" of ground clearance for transporting over uneven terrain. Once on location, lower jacks and take the weight off of the wheels, release the locks and lower to ground level.

The mixer located at the rear of the unit is designed around the time proven M series mixers of STS. The MAC Junior 1200D is powered by a 9hp air cooled diesel engine, driving a 2" centrifugal pump, making effective use of the renowned 4 point mixing system. With the proper valve selection, this one engine 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 36" 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 300 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 600 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 300us. 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 front 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.



Mix-Clean-Recover Unit Model MAC Junior 1200D

Surface to Surface Inc.



Specifications

Dimensions (Working)
Dimensions (Transporting)
Weight without 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
Tires
Retractable tongue
Large storage area
Mixing System

MAC Junior 1200D Unit

96" W x 187" L x 73" H
96" W x 212" L x 86" H
2500 lbs.
3000 lbs. (M2-D922)
36" High Holds ½ of a bag
2 @ 2 1/2" 16 gpm
2" sched. 40 Pipe
Brass and Steel construction
2" cam loc
2 @ 300us gal, 1 @ 600us gal
Eductor Nozzles (5-1 fluid output)
2" NPT
3 HD screw jacks
23 / 8.5 x 12 x 6 ply
Retracts 24" under unit
Caged with open top
2" StS Mixing System

Benefits

Small foot print operate from ground level
12" of ground clearance
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 3-point leveling of unit
Stand up to rugged terrain
Smaller working footprint. Avoids tripping hazard.
Keep hoses & accessories all in one place
Fast & efficient with high shearing ability.

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

Specifications

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

M2-D922 Mixer

33" W x 43" L x 26 1/2" H
400 lbs. (182 Kg)
26 1/2" High Holds ½ of a bag
2" Proprietary StS Mixing System
Brass and Steel construction
1" steel tube with lifting bale
9.0 hp air-cooled, man/ elect start
2" Cast iron centrifugal trash pump
Direct coupled engine & pump
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
No expensive couplers or inserts to replace.
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 (MAC Junior 1200H), Electric (MAC Junior 1200E) and Gasoline (MAC Junior 1200G) models.

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

Check our website for the latest products and specifications

www.stsmixers.com

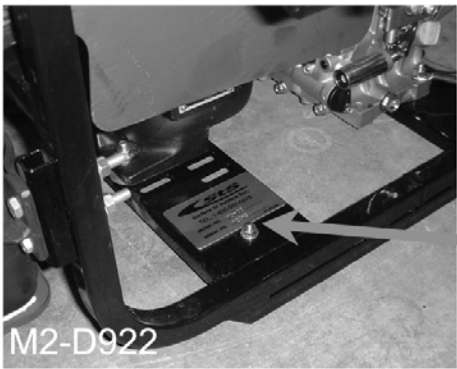
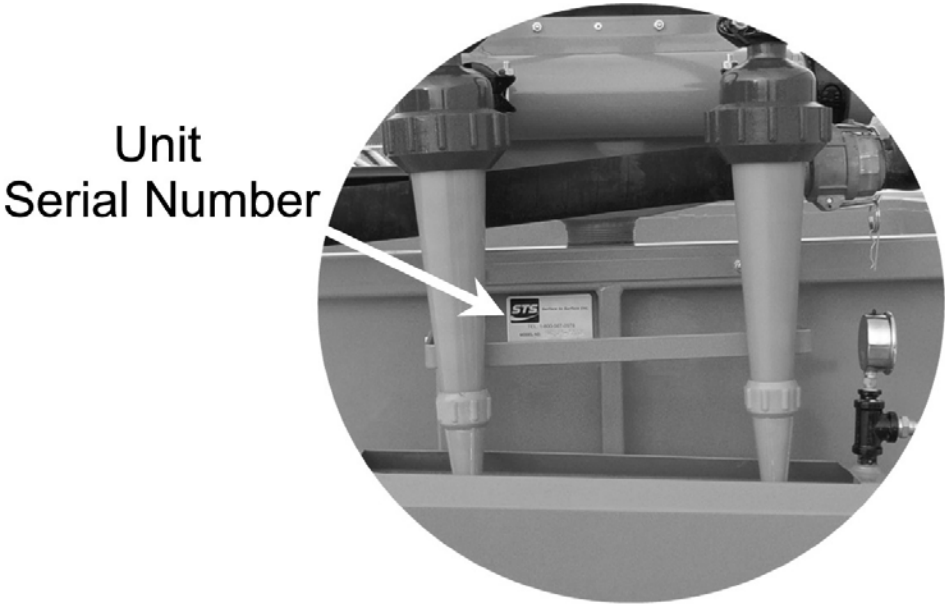
Surface to Surface Inc.

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

MAC JR 1200D

Identifying Your Machine & Components

Location of Tags and PIN Plates



M2-922 Mixer
Serial Number



SECTION #II

Description, Care and Maintenance

MAC JR 1200D

Description, Care and Maintenance

Base Skid with Tanks

The base skid is built to support the 3 tanks and allow the unit to be transported from work site to work site with a unique set of wheels that can be raised or lowered (Fig.1a) and a retractable tongue (Fig.1b) for connecting to a transporting device. The base skid has various connecting points (D-rings) to attach a chain, cable or strap, if the need arises. Maintenance of the base itself is minimal. It should be kept clean and a visual inspection of the welds and tubing structure should be done on a daily bases. Connecting points (D-rings) should also be checked for wear or damage before using. The retractable tongue should also be kept clean to enable it to “retract” into the base skid. The hitch on the tongue will need to be checked for any wear or damage that would render it un-safe for towing.

Mounted on each side of the base skid, is a rotating arm (Fig.1a) with a spindle hub and a rubber tire. On top of the rotating arm is a sliding lock plate that stops the arm assembly from rotating while in the transporting position. There is a grease fitting located on the end of each arm that should be greased on a monthly basis. The sliding lock plate should be kept clean and free of debris to allow easy movement of the plate back and forth.

The lug bolts that attach the wheel to the spindle should be checked daily and tightened if needed.

The air pressure in the tires should be checked regularly and maintained at the manufactures recommended pressure, which is stated on the side wall of the tire. The bearings inside of the spindle should be serviced as per the service schedule.

Fig.1a

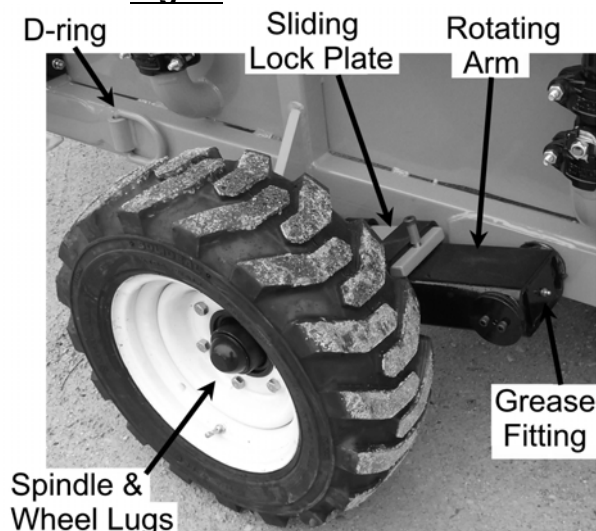
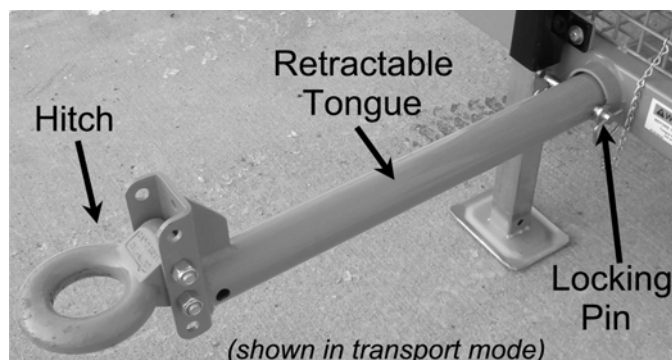


Fig.1b



DANGER

NEVER TRANSPORT
the unit without the wheel locks
engauged in the transport position,
the tongue extended and pinned
and the leveling jacks fully retracted.

DANGER

**NEVER ATTEMPT TO PUT
THE UNIT INTO OPERATION**
without lowering the unit to the ground
and leveling 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.

MAC JR 1200D

Description, Care and Maintenance

Base Skid with Tanks

There are 3 tanks atop of the base skid. The front tank is 600us. gal, and is referred to as the “active” tank. The middle tank is 300us. gal and is referred to as the “dirty” tank. The back tank is also 300us. 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.

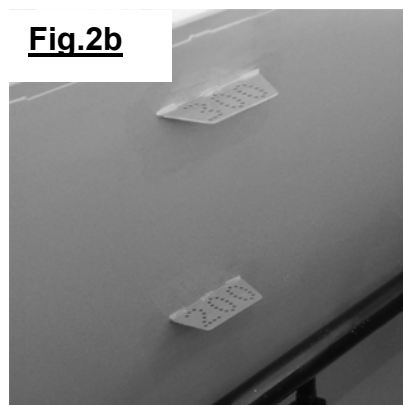
The tanks should be checked regularly for any debris or sediment that may have accumulated on the bottom and cleaned out before the next use.

Each tank has a 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

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

AVOID ALLOWING FOREIGN MATERIAL
into the Tanks.

MAC JR 1200D

Description, Care and Maintenance

Base Skid with Tanks

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 equipped with a screening device such as a Y- trap (Fig.3b) 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.3c) 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

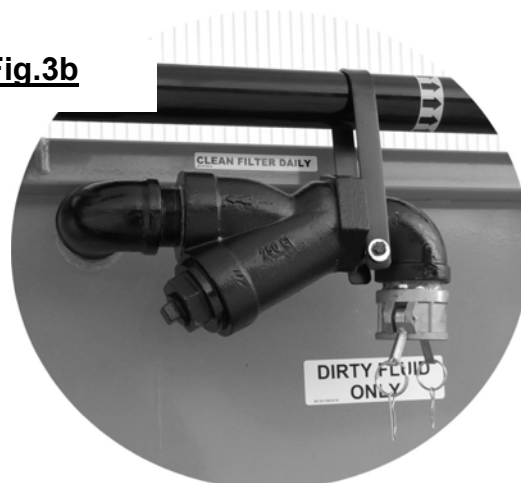
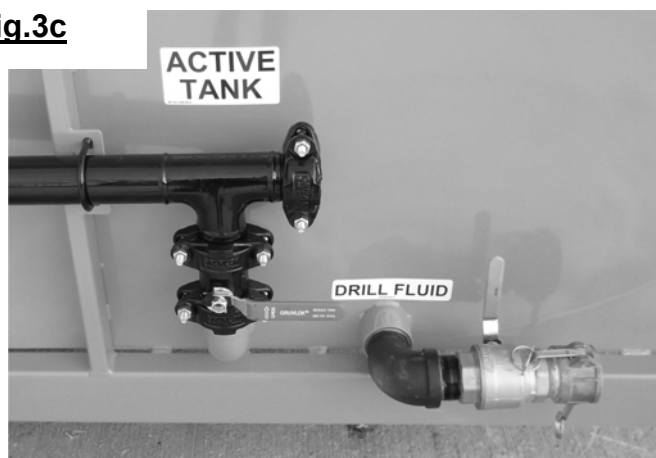


Fig.3c



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.

MAC JR 1200D

Description, Care and Maintenance

Internal Tank Nozzles

Inside each tank is a set of internal tank nozzles (Fig.4a) mounted on a pipe manifold (Fig.4b). 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.4c) 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.4a



Fig.4b

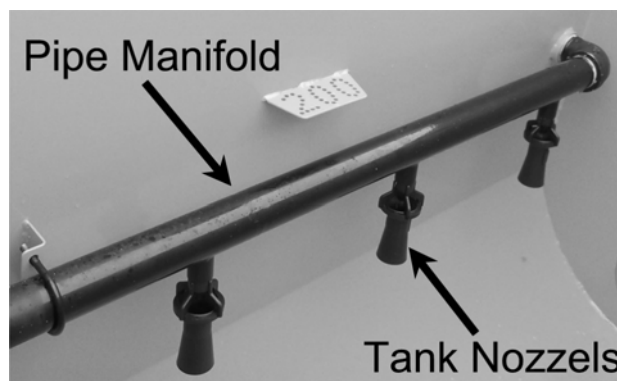
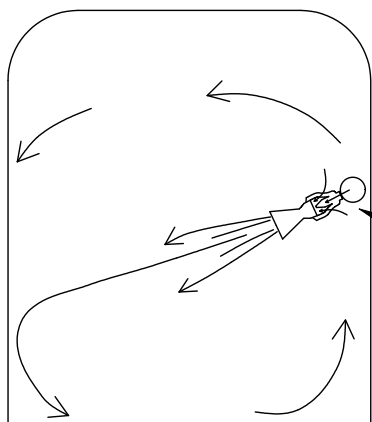
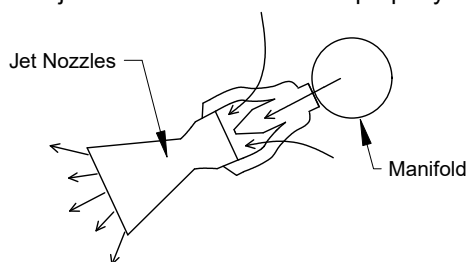


Fig.4c

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.

MAC JR 1200D

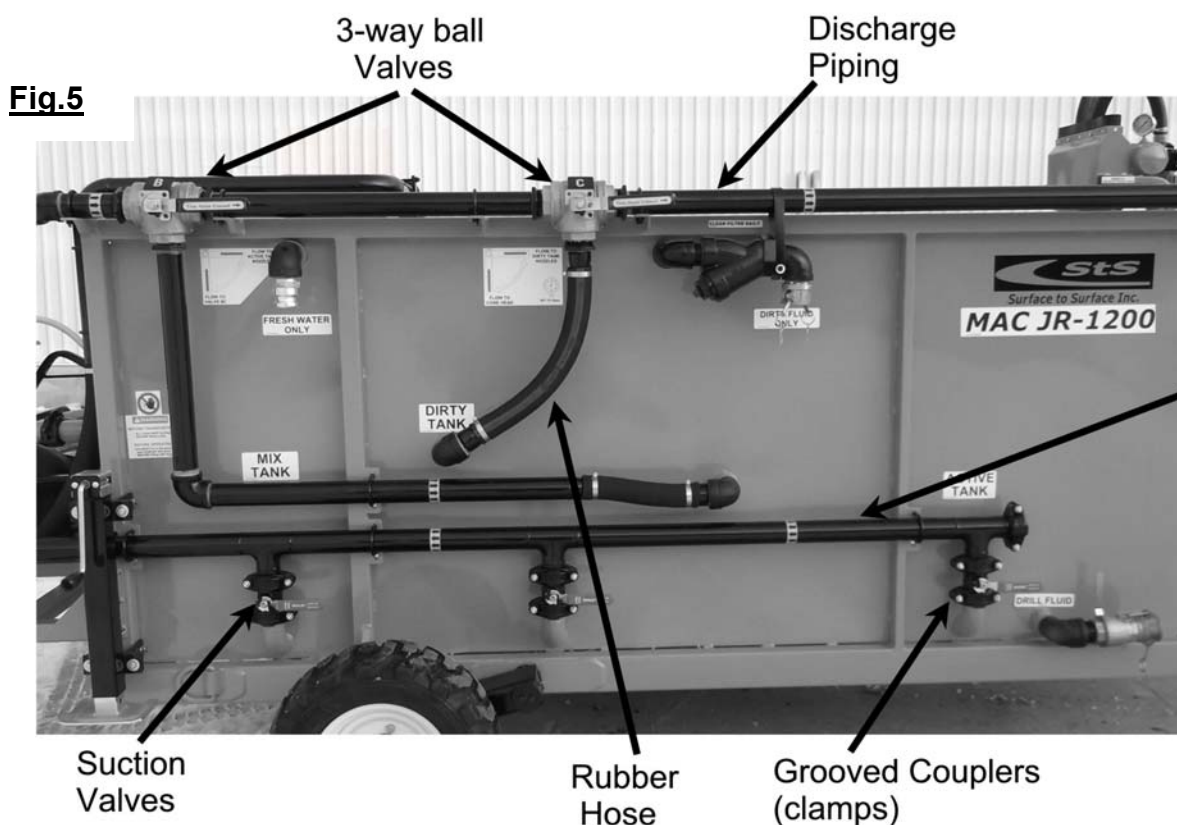
Description, Care and Maintenance

External Piping

Mounted on the exterior of the tanks is a series of piping and valves (Fig.5) 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 decal'd 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.

MAC JR 1200D

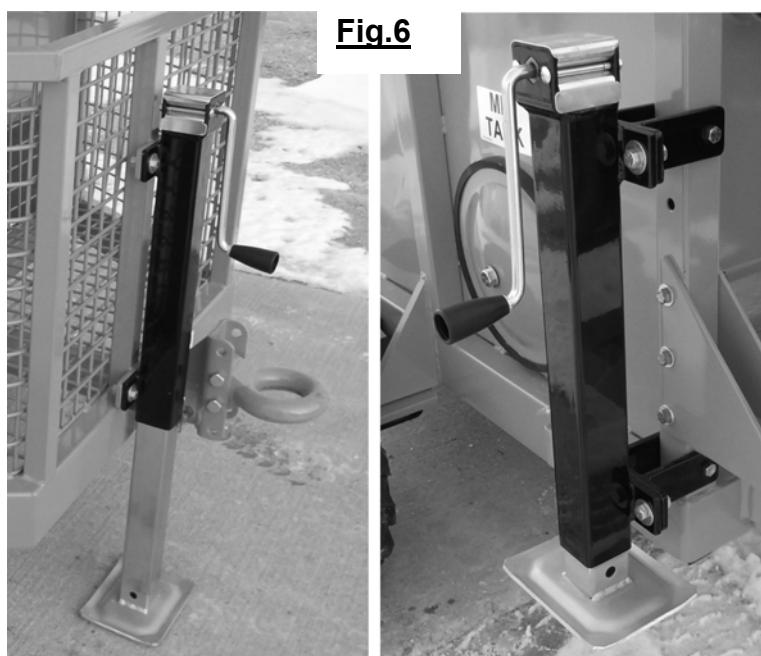
Description, Care and Maintenance

Leveling Jacks

Mounted on the back corners and on the front of the MAC JR 1200 are crank type leveling jacks (Fig.6). These jacks are used to raise and lower the unit for transporting, and when setting up on site, to level the unit on uneven ground.

CAUTION: the jacks must be fully retracted when in the transport mode to avoid being bent.

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



Front Jack
(Extended)

Rear Corner Jacks
(Retracted)

| |
|---|
|  DANGER |
| NEVER ATTEMPT TO PUT THE UNIT INTO OPERATION without lowering the unit to the ground and leveling with the jacks. Serious personal injury will result. |

| |
|--|
|  DANGER |
| NEVER TRANSPORT the unit without the wheel locks engaged in the transport position, the tongue extended and pinned and the leveling jacks fully retracted. |

MAC JR 1200D

Description, Care and Maintenance

2 Cone Head Assembly

The 2 cone head assembly (Fig.7) is mounted on the front of the MAC JR 1200, 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 at the front, mounted beneath the hydro-cyclones. All of these components are mounted together on one removable bolt-on frame.

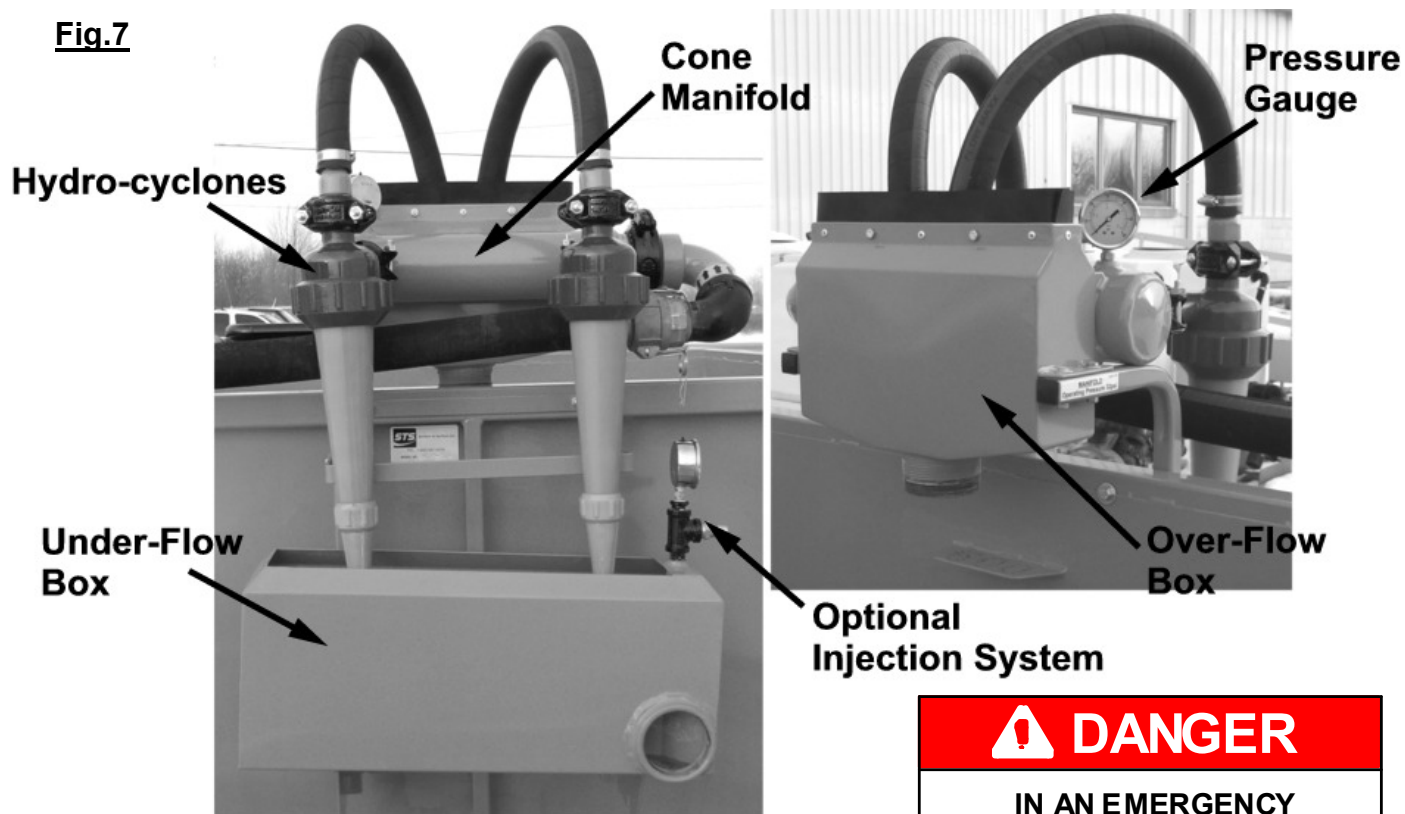
The MAC JR 1200 must be in the work mode (wheels up) and level for the head assembly to work properly. This will allow the fluid to flow in the proper directions (out the outlets) and stop pooling of the fluid in the boxes.

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.7



DANGER

IN AN EMERGENCY

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

MAC JR-1200

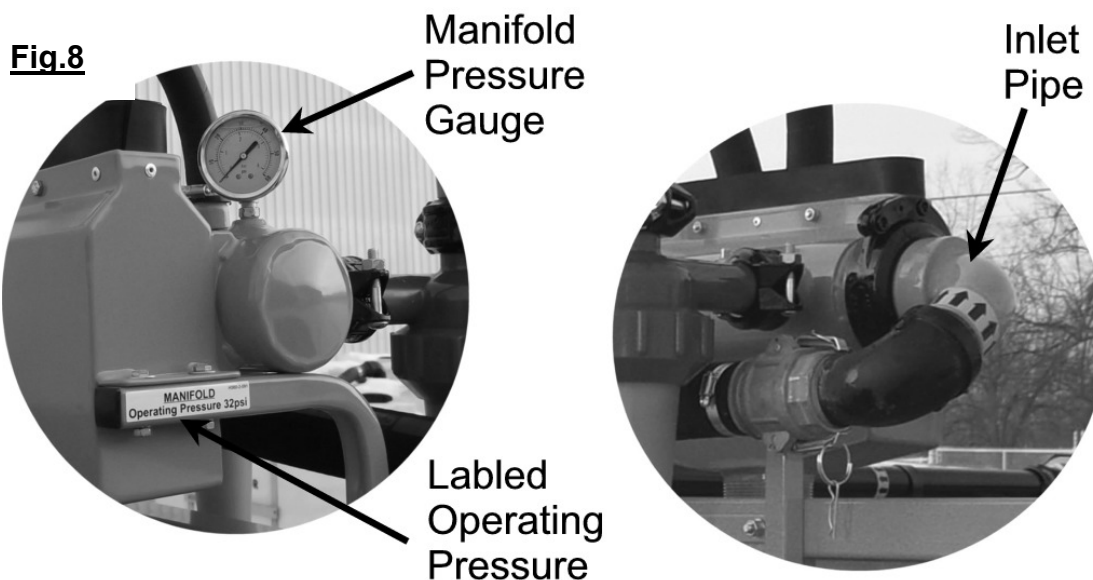
Description, Care and Maintenance

Cone Manifold

The cone manifold (Fig.8) 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.

Description, Care and Maintenance

Hydro-cyclones

The Hydro-cyclones (cones) (Fig.9a) 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.9b) 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.9a), 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.9a

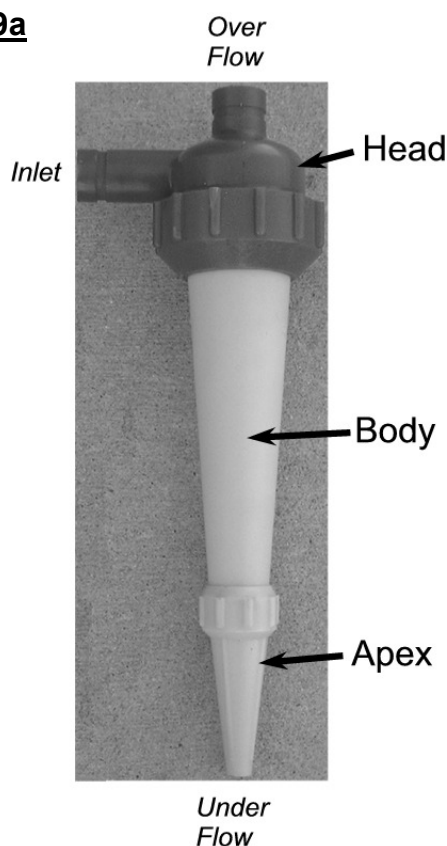
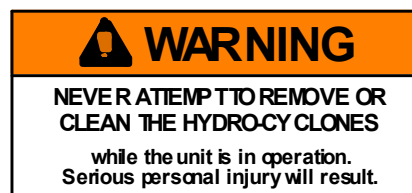
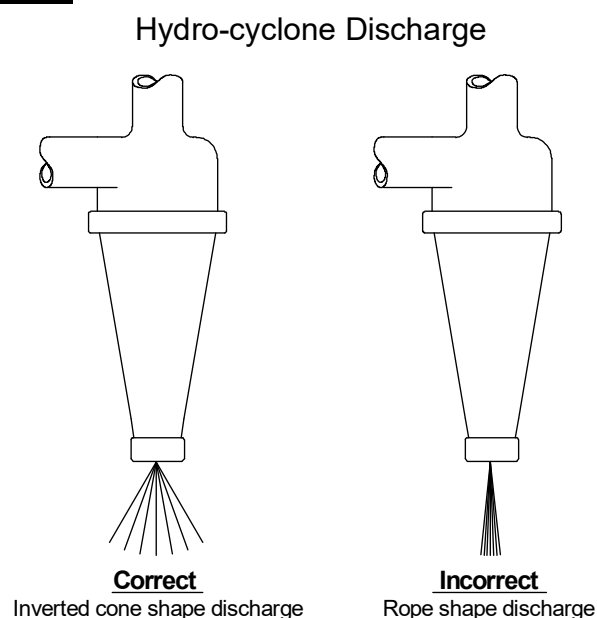


Fig.9b



MAC JR 1200D

Description, Care and Maintenance

Over-Flow Box

The over-flow box (Fig.10a) 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.10b). 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.10a

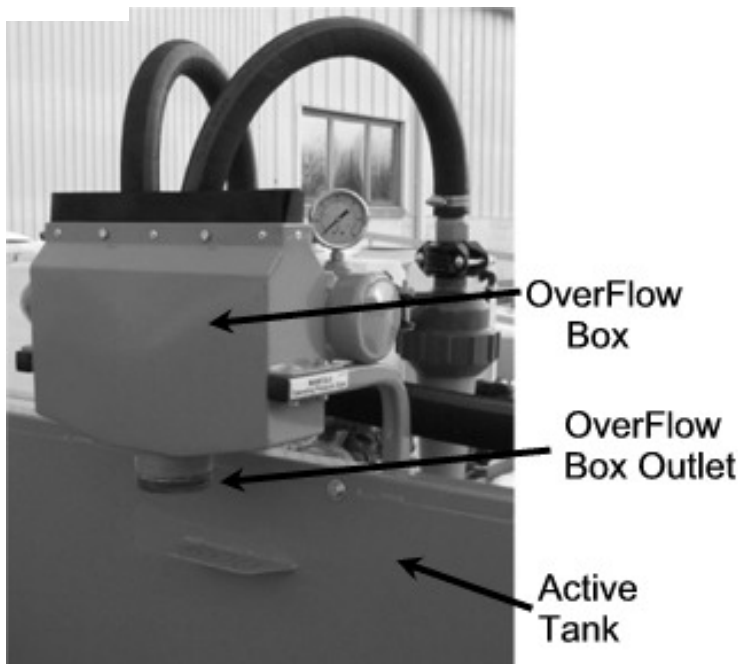
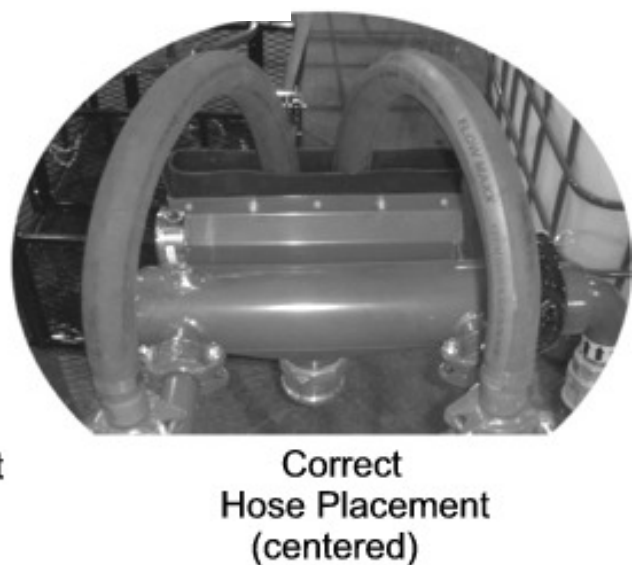


Fig.10b



MAC JR 1200D

Description, Care and Maintenance

Under-Flow Box

The under-flow box (Fig.11a) is mounted on the front, underneath the hydro-cyclones.

This multi-level box is considered an important part of the solids / water separating process and although simple in design, need to be cleaned and maintained daily. The under-flow from the hydro-cyclones sprays down onto the first level which is called a weir plate. The weir plate has diverters positioned in the top face to move the fluid in a specific fluid path. It is important that this face and the diverters are kept free of build-up or foreign objects (stones, leaves, etc.) that may enter from the open top, and disrupt the fluid path. As the under-flow fluid flows along the top face it will fall down to the next level via an opening at the end of the weir plate (Fig.11b). The fluid will pass under the weir plate and out of the box through a 3" NPT threaded outlet. This bottom level WILL need to be cleaned daily as build up will occur. By jetting clean water through the opening at the end of the weir plate, 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.

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.11a

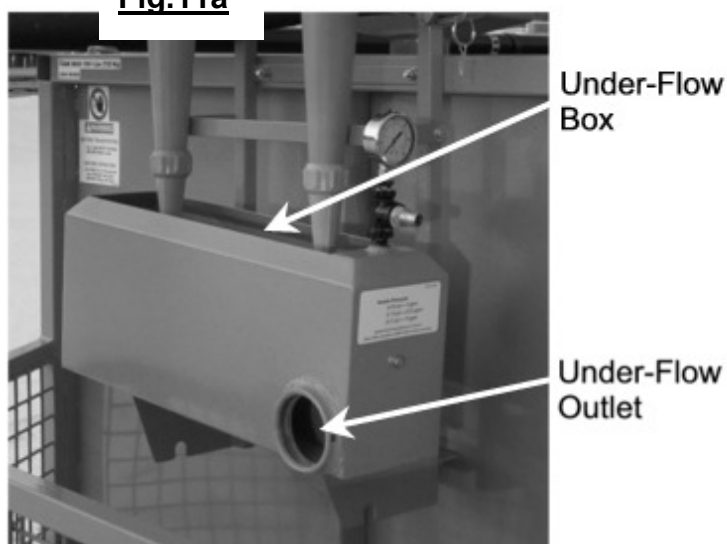
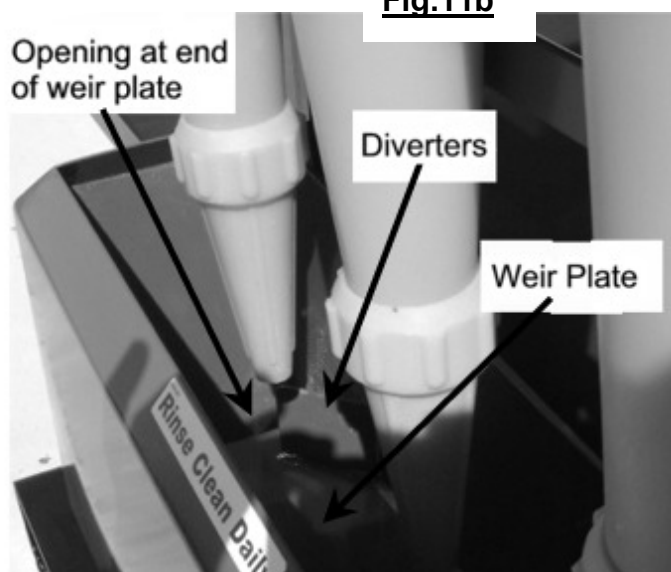


Fig.11b



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.

MAC JR 1200D

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 MAC JR 1200 and are not explained properly in the enclosed M2-922 Operators Manual. The following is the correct description for their use with the MAC JR 1200 unit.

Mounted on discharge outlet of the M2-922 pump is a 3-way valve labeled “A” (Fig.12a) . 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 MAC JR 1200.

Mounted on the bottom of the M2-922 mixer filter/shear is a valve used to route fluid to the “Mix” tank nozzles (Fig.12b). 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

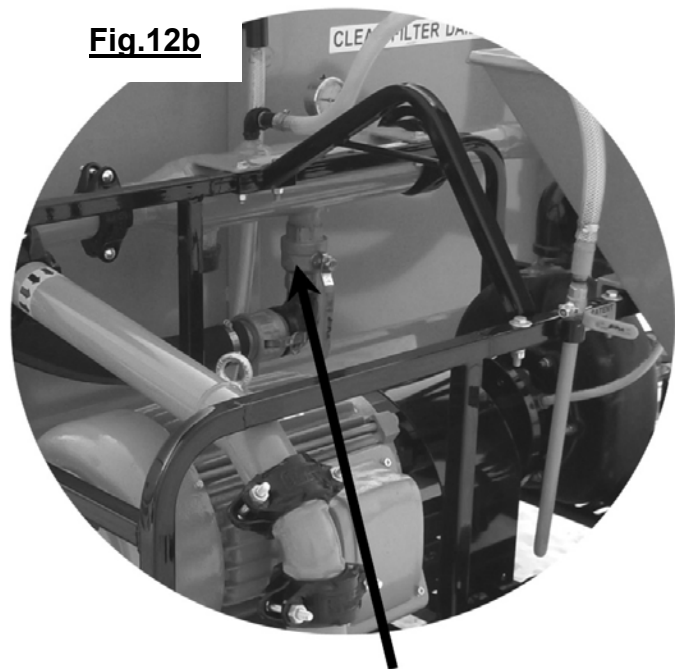
Fig.12a



**3-way valve
"A"**

(Valve shown in the Flow to Mixer position)

Fig.12b



**"Mix" tank
nozzle valve**

*(Valve shown in the open position)
"An electric mixing unit is shown for clarity"*



MAC JR 1200D

Description, Care and Maintenance

OPTIONAL: Engine Throttle / Stop and Key Switch

The throttle / stop and key switch are located to the left of the hopper.

The key switch (described in the OEM Engine manual) is used to engage the starter motor to start the engine and pump, and to start & stop the charging system of the engine. **THE KEY SWITCH DOES NOT STOP THE ENGINE.** The switch requires no maintenance other than keeping it clean and free of dust and moisture.

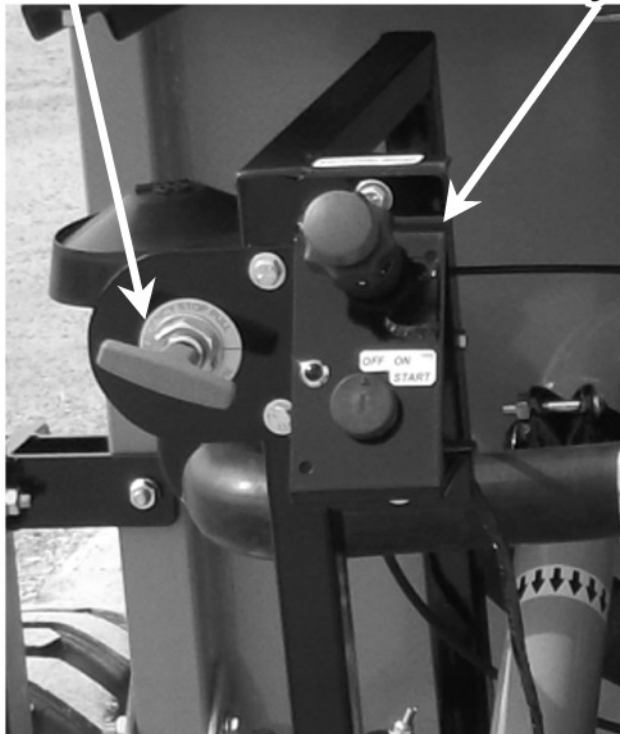
The throttle / stop knob is connected to the engine speed control located down on the back side of the engine. The engine speed control is described in detail in the OEM engine manual included with this unit. The throttle / stop knob is rotated counterclockwise to speed up the engine and clockwise to slow the engine down. If the button in the center of the knob is pushed in the knob will travel in and out without having to rotate the knob.

The knob will have to be rotated out approximately 1/2 of the stroke for the engine to start and stay running as anything less will stop the flow of fuel to the engine. To stop the engine, screw the knob clockwise all the way in or push the center button of the knob and push the knob all the way in to stop the fuel flow to the engine.

There is no maintenance required of the throttle / stop knob other than setting the resistance of the twisting and sliding action of the knob. This is achieved by tightening the plastic “nut” behind the knob close to the mount (labeled on plastic nut)

EMERGENCY
Air Intake Stop

Throttle / Stop
& Key Switch



DANGER

IN AN EMERGENCY

push the throttle control knob completely
in to the STOP position
to halt engine, pump, and fluid flow

SECTION #III

Set-up and Connection of Unit in Detail



MAC JR 1200D

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 MAC JR 1200.
- 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 MAC JR 1200 unit has been positioned on site by a towing device, the unit is to be disconnected from the towing device, by blocking the wheels to stop any movement, and lowering the front jack to take the weight off of the hitch. The hitch can now be uncoupled, and the towing device can be moved away.

The transport locking pin in the tongue is removed, and the tongue is slid back into the skid frame. The transport locking pin can be stored in the hole in the tongue closest to the hitch.

Lower the back corner jacks to the ground and then, using both jacks, raise the unit approx. 2" higher. This will take the weight off of the wheel's rotating arm and sliding lock plate. The sliding lock plate can be slid back onto the rotating arm thus disengaging the plate from under the skid frame gusset.

Using the back corner jacks, lower the unit to the ground. Go to the front jack and lower the unit to the ground.

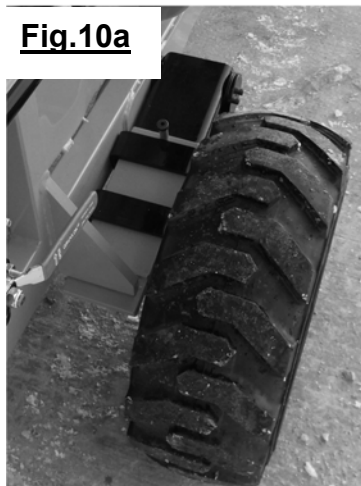
Using a level measuring device, level the unit in all directions. Keep the unit touching the ground were ever possible by using only 2 jacks to level. **THE UNIT SHOULD NEVER BE COMPLETELY LIFTED OFF OF THE GROUND** with all 3 jacks when leveling. When the unit is filled with fluid the jacks may collapse or the unit may sustain structural damage.

Once the unit is leveled the hose connections can be made. (Fig.11)

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.

TRANSPORT MODE

Fig.10a




Rotating arm down.
Sliding lock plate fully
under base frame gusset.


WORK MODE

Fig.10b



Rotating arm up.
Sliding lock plate removed
from under base frame gusset.

| | |
|--|--|
|  DANGER | |
| NEVER ATTEMPT TO PUT THE UNIT INTO OPERATION without lowering the unit to the ground and leveling with the jacks. Serious personal injury will result. | |

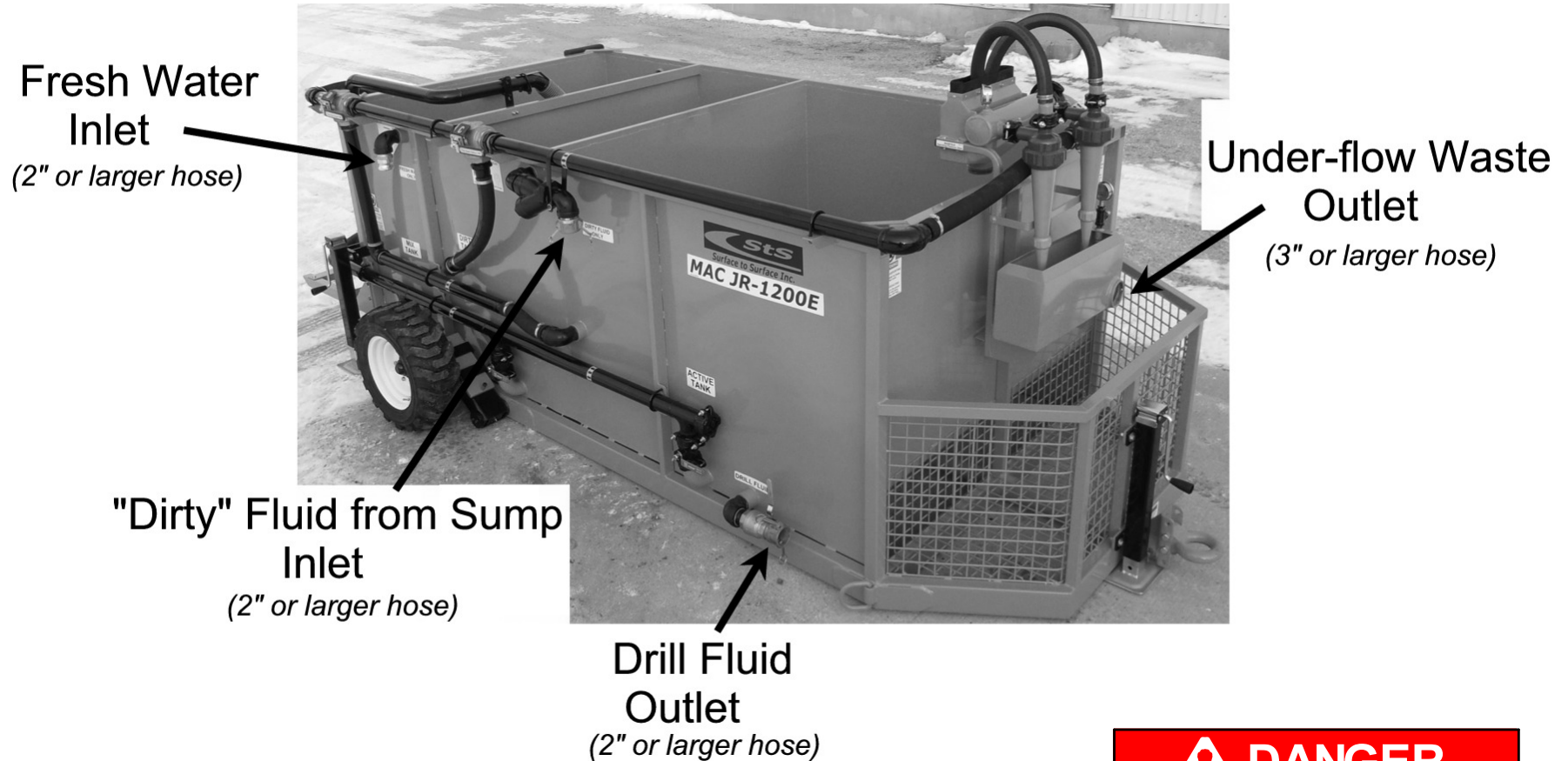
| | |
|--|---|
|  WARNING | REFER TO THE SAFETY STATEMENTS IN THE OEM MANUALS SUPPLIED AND THIS MANUAL REGARDING THESE OPERATIONS. |
|--|---|



MAC JR 1200D

Set-up and Connection of Unit in detail

Fig.11



MAC JR 1200 Shown in Work Mode

*All hoses to be kept as short as possible
Unit is on the ground and leveled.*

**DANGER**

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

Set-up and Connection of Unit in detail

Site Tear Down (Transport mode)

When the MAC JR 1200 is needed to change locations, a towing device will be required.

ALL FLUID MUST BE REMOVED FROM ALL TANKS.

Drain and disconnect all hoses that were connected to the unit.

Using both back corner jacks, raise the unit up (approx. 12”), until the rotating arm and sliding lock plate are below the base frame gusset . The sliding lock plate can now be slid under the base frame gusset. The end of the sliding lock plate will extend beyond the base frame gusset when properly engaged (Fig.10a). Lower the rear corner jacks until the base frame gusset rests on top of the sliding lock plate. Now raise the rear corner jacks all the way to the top position where they will not get caught or bent while traveling.

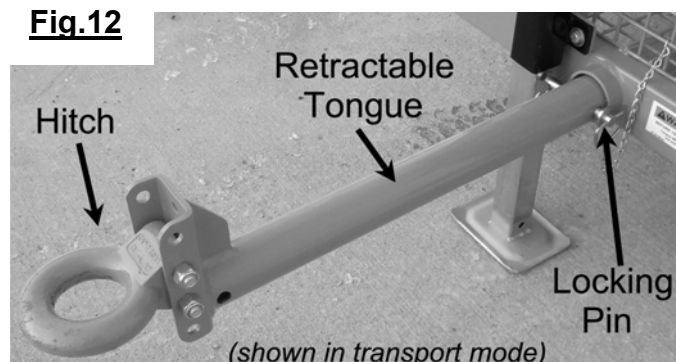
Go to the front jack and raise the unit up to the height required for the towing device.

Pull (extend) the tongue all the way forward until the hole in the tongue is past the base skid. Install the transport locking pin into the hole and use the safety clip on the pin so it can not fall out (Fig.12).

Connect the towing device to the tongue hitch and raise the front jack all the way to the top position where they will not get caught or bent while traveling.

The unit is now ready for transporting.

Fig.12



! WARNING

BEFORE TRANSPORTING

- ALL Tanks **MUST** be Empty.
- **SECURE** Wheel Locks

BEFORE OPERATING

- Unit **MUST** be on the ground and **LEVELED** with jacks, **BEFORE** Filling with fluid

MT-3X1500-54

SECTION #IV

Operating the MAC JR 1200 Unit



MAC JR 1200D

Operating the MAC JR 1200 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.
- **BLOCK** wheels to prevent movement.
- **DISCONNECT** from transporting device.
- **LOWER** the unit to ground level.
- **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 nozzles” 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** the under-flow box hose is routed below the under-flow box outlet.

| |
|---|
| 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. |
|--|--|



MAC JR 1200D

Operating the MAC JR 1200 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: Dry Products

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”.
- Open the “Mix” tank nozzle valve located on the bottom of the M2-922 mixer filter/shear (Fig.9b).
- With the pump full of liquid (primed), start the M2-922 mixer engine.
- Operate the engine at high speed.
- Open the hopper valve at the bottom of hopper where it joins the venturi mixing tee.
- Introduce the dry raw material into the hopper.

When mixing a new batch, introduce the 1st 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 1st 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.



DANGER

IN AN EMERGENCY

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



CAUTION

WHEN THE UNIT IS IN OPERATION,

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

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.



WARNING

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

MAC JR 1200D

Operating the MAC JR 1200 Unit

Mixing New Drill Fluid

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

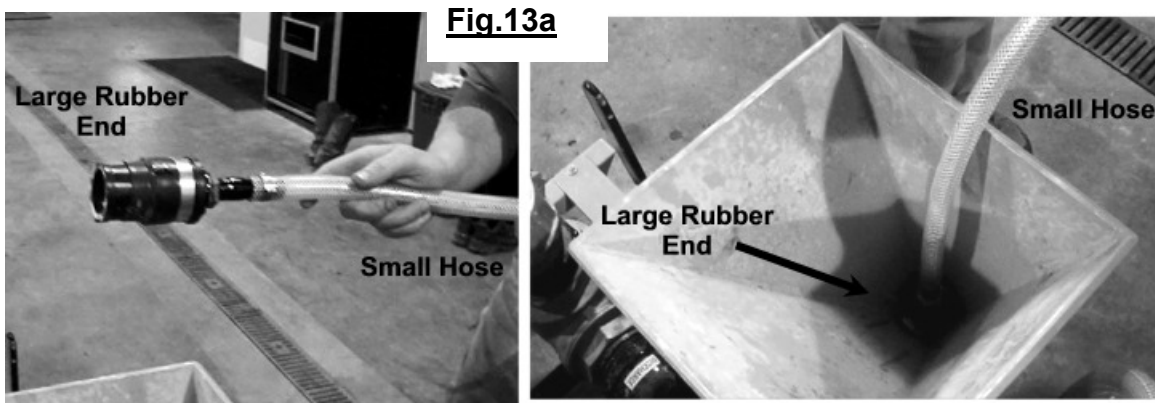
Mixing Operation: Dry Polymers

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”.
- Open the “Mix” tank nozzle valve located on the bottom of the M2-922 mixer filter/shear (Fig.9b).
- With the pump full of liquid (primed), start the M2-922 mixer engine.
- Operate the engine at high speed.
- Open the hopper valve at the bottom of hopper where it joins the venturi mixing tee.
- Introduce the dry polymer into the hopper using the polymer injection tool (Fig.13a)
 - insert the large rubber end down into the throat of the hopper to create a tight seal.
 - use the hose to “suck” the polymers from the measuring container. **DO NOT** push the hose into the polymers but draw from the top until all of the polymers are gone. (Fig.13b)

By drawing the polymers from the top, you will be introducing the polymers into the fluid stream of the nozzle, at approximately the desired 2 lbs. per minute as suggested by the manufacture to achieve a better shear and reduce any build-up in the “mixing tank.”

- Suction created by the venturi mixing tee will draw the polymers into the jet stream for initial mixing.
- Remove the polymer injection tool from the hopper and store in the holder mounted on the unit (Fig.13c)
- 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 operator’s manual, on the wash wand description page.



MAC JR 1200D

Operating the MAC JR 1200 Unit

Mixing New Drill Fluid

Fig.13b

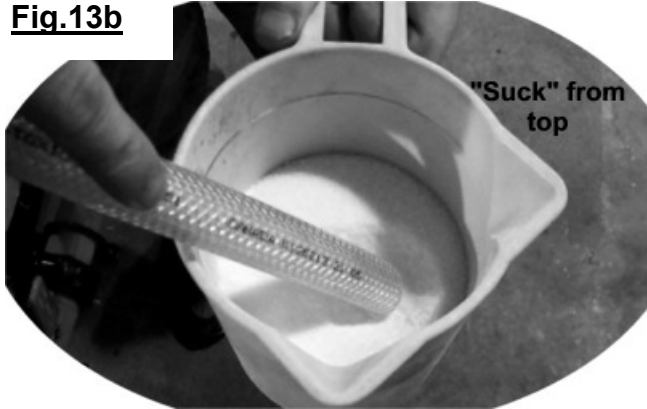
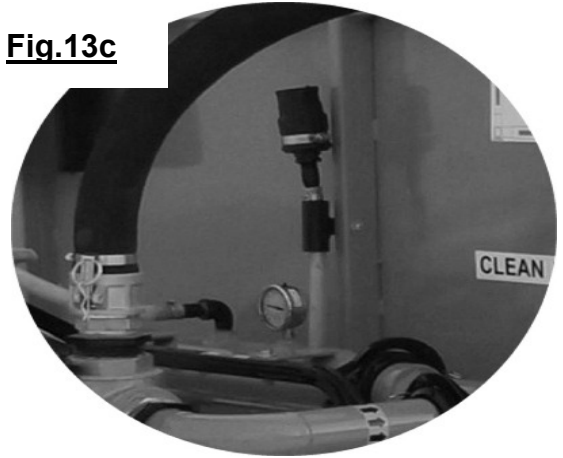


Fig.13c



DANGER

IN AN EMERGENCY

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



CAUTION

**WHEN THE UNIT
IS IN OPERATION,**

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

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.



WARNING

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



MAC JR 1200D

Operating the MAC JR 1200 Unit

Transferring New Drill Fluid to Active Tank

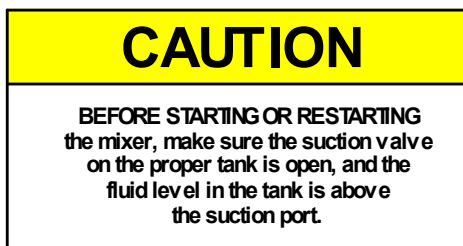
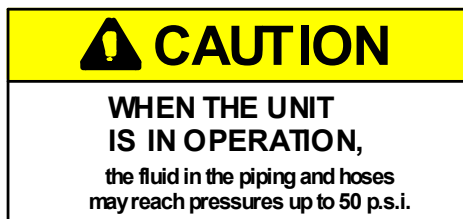
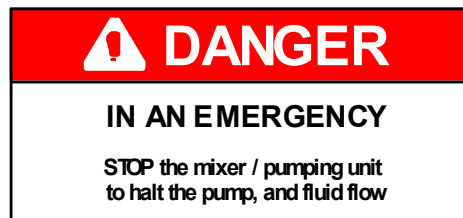
Transferring New Drilling Fluid to Active Tank

- Operate the M2-922 engine & pump at half speed.
- 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”.
- Increase the Speed of the M2-922 engine & pump to maximum for transferring fluid.
The new fluid will be pumped into the “Active” tank thru the nozzles, from the “Mix” tank.
- The speed and pressure of the fluid flow is determined by the engine speed.
- STOP the M2-922 mixer & pump. When the “Mix” Tank is empty, or the pump sucks air (cavitation)

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

- 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 MAC JR 1200 system.





MAC JR 1200D

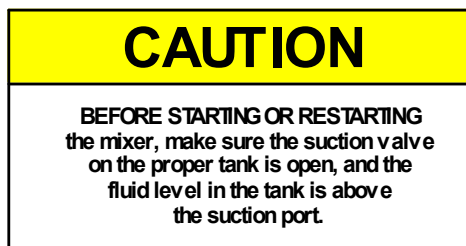
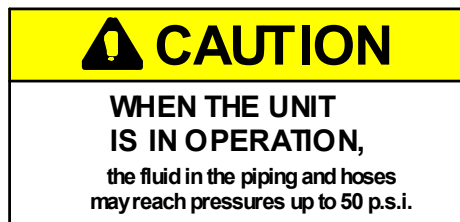
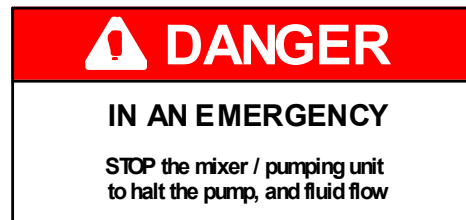
Operating the MAC JR 1200 Unit

Agitating the Active Tank

Agitating the Fluid in the Active Tank

- Open the “Active” tank suction valve.
- Close the “Mix” 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”.
- Start the M2-922 mixer engine and run at maximum speed.

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.





MAC JR 1200D

Operating the MAC JR 1200 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 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 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 THE VALVE HANDLE WHEN THE PRESSURE GAUGE IS AT 32PSI.

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 32psi 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 front discharge port of the box.

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

- 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”.

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

| |
|--|
|  WARNING |
| NEVER ATTEMPT TO REMOVE OR CLEAN THE HYDROCYCLONES |
| while the unit is in operation. Serious personal injury will result. |

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



MAC JR 1200D

Operating the MAC JR 1200 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 device (Y-trap) on the inlet port of the middle “Dirty” tank.
- Rinse out the over-flow box with clear water.
- Rinse out the under-flow boxes with clear water making sure to rinse UNDER the weir plates.

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

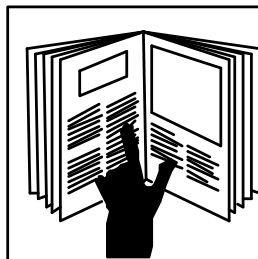
CARE MUST BE TAKEN WHEN
CONNECTING THE HOSE COUPLINGS.
The faces must be clean before mating
together. Rotate body to engage lock.

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.



MAC JR 1200D

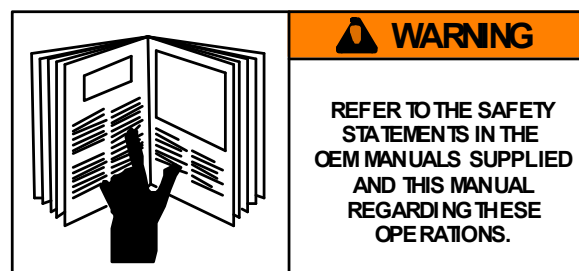
Operating the MAC JR 1200 Unit

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 boxes with clear water making sure to rinse UNDER the weir plates.
- Disconnect the hose on the underflow box outlet.
- Disconnect any hoses connected to the “Mix” tank, and “Dirty” tank inlets.
- Remove and clean the screening device (Y-trap) on the inlet port of the middle “Dirty” tank. Leave the screening device out.
- 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.





MAC JR 1200D

Operating the MAC JR 1200 Unit

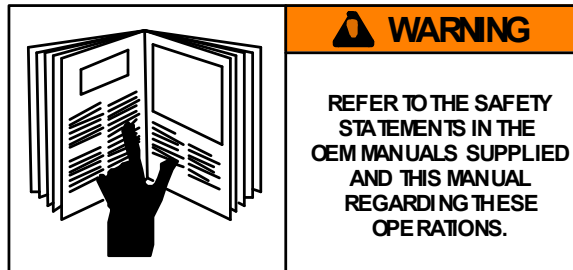
Prolonged Periods of Storage

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 MAC JR 1200, 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.
- Grease & lubricate the rotating arm (with spindle hub & wheel) and sliding lock plate



SECTION #V

Troubleshooting the MAC JR 1200 Unit



MAC JR 1200D

Troubleshooting the MAC JR 1200 Unit

The MAC JR 1200 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 MAC JR 1200 unit on its own.

The MAC JR 1200 is made up of 3 tanks mounted onto a portable 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 front 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 MAC JR 1200 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).



MAC JR 1200D

Troubleshooting the MAC JR 1200 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.
Too 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 under weir plate.. - Remove blockage.
Under-flow box outlet has a hose attached that restricted flow. – Change routing, length, or size.
MAC JR 1200 is not level. – Level unit.
- *Over-flow fluid does not meet reduced solids spec.(too dirty)*
Incorrect manifold pressure. - See previous solutions.
Too 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

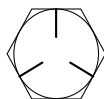


MAC JR 1200D Diesel Periodic Maintenance Schedule
(Follow M2-922 Maintenance Schedule for the Mixer)

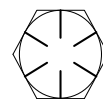
| Maintenance Items <i>MAC JR 1200 Components</i> | Before Use | Every 8 hours (daily) | Every 50 hours (weekly) | Every 200 hours (monthly) | Every 1000 hours | Every 2000 hours (or yearly) |
|--|------------|--------------------------|----------------------------|------------------------------|------------------|---------------------------------|
| Visual check of base skid and structure for damage. | | ● | | | | |
| Visual check of D-rings (before using). | ● | | | | | |
| Visual check leveling jacks for damage. | ● | | | | | |
| Check wheel lug bolts loose, broken, or missing. | ● | | | | | |
| Check tongue hitch for damage or wear. | ● | | | | | |
| Check sliding lock plate for damage or wear. | | ● | | | | |
| Check / Clean tanks for sediment or debris. | ● | | | | | |
| | | | | | | |
| 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 boxes of build-up. | | ● | | | | |
| Remove end cap from cone manifold and clean. | | | | ● | | |
| Remove weir plate in box and clean any deposits. | | | | | ● | |
| Check Hydro-cyclones for excessive wear (internal.) | | | | | ● | |
| | | | | | | |
| Check air pressure in tires. | | | ● | | | |
| Grease rotating arms. | | | | ● | | |
| Check wheel bearings. | | | | | | ● |
| Remove top of leveling jacks and grease internally. | | | | | ● | |
| | | | | | | |
| | | | | | | |

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

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

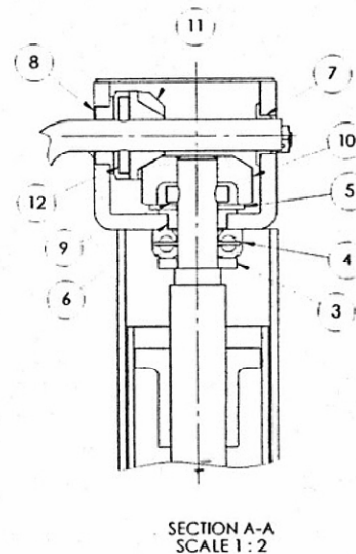
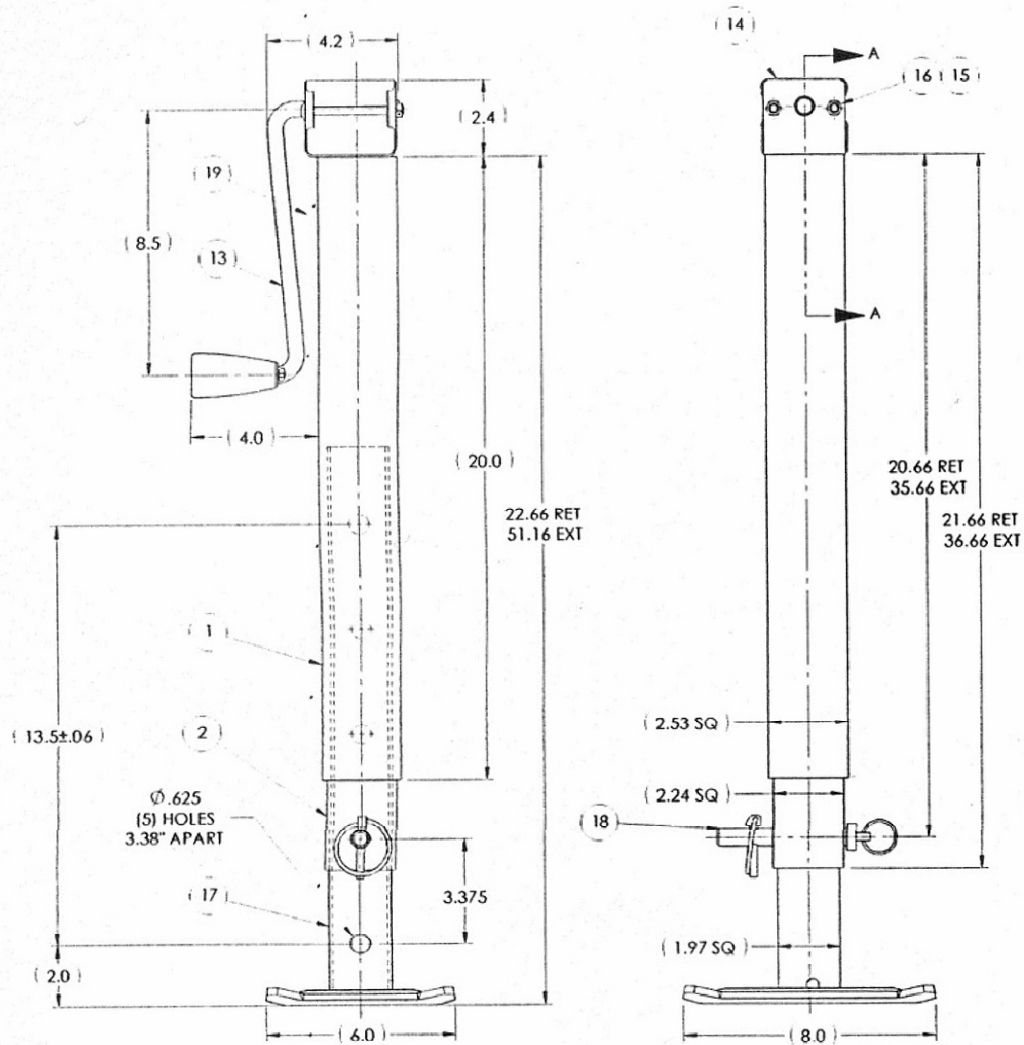
| Thread size x pitch mm | N.m | ft-lbs |
|------------------------|-------------|-------------|
| M6 X 1.0 | 10.8 ± 1.0 | 8.0 ± 0.5 |
| M8 x 1.25 | 25.5 ± 2.9 | 19.0 ± 2.0 |
| M10 x 1.5 | 49.0 ± 4.9 | 36.0 ± 4.0 |
| M12 x 1.75 | 88.3 ± 9.8 | 65.0 ± 7.0 |
| M14 x 1.5 | 137.0 ± 9.8 | 101.0 ± 7.0 |
| M16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

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.



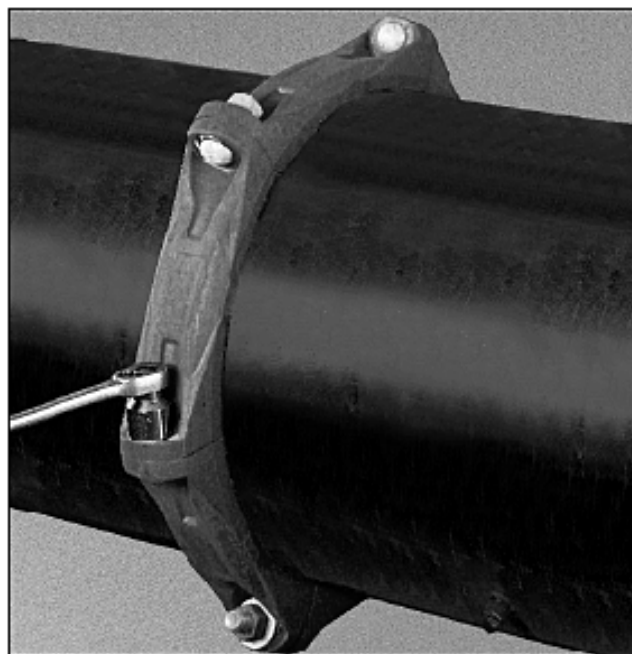
e-mail: pwestmkt@mts.net

website: www.pointswestmarketing.com

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

| REVISION | DATE |
|----------|------|
| 190754 | B |

COUPLING INSTALLATION & 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**

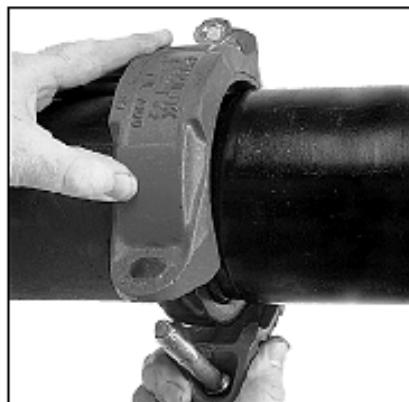
1 CHECK & LUBRICATE GASKET— Check gasket to be sure it is compatible for the intended service. Apply a thin coating of GUVLOK lubricant to outside and sealing lips of the gasket. Be careful that foreign particles do not adhere to lubricated surfaces.



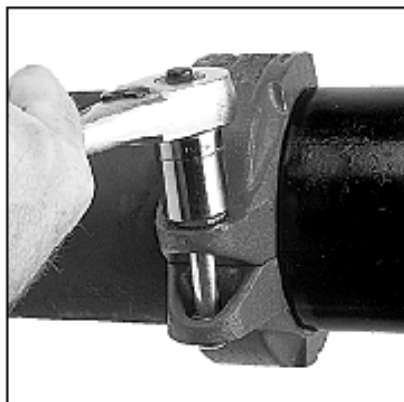
2 GASKET INSTALLATION— Slip the gasket over the pipe end, making sure the gasket lip does not overhang the pipe end.



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.

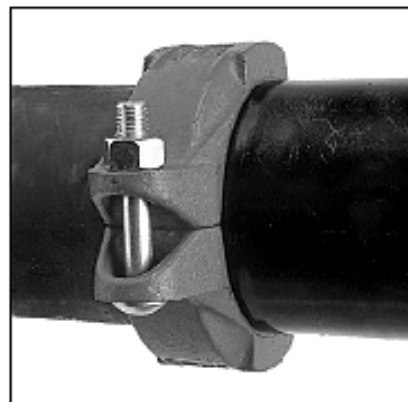


4 HOUSINGS— With one nut unthreaded to the end of the bolt, unthread the other nut completely and swing the coupling housing halves over the gasket, making sure the housing keys engage the grooves. Insert the bolt and turn the nuts finger tight.



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 web site - 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.



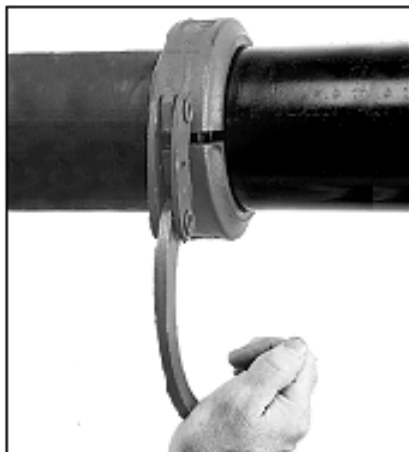
2 GASKET INSTALLATION— Slip the gasket over the pipe end making sure the gasket lip does not overhang the pipe end.



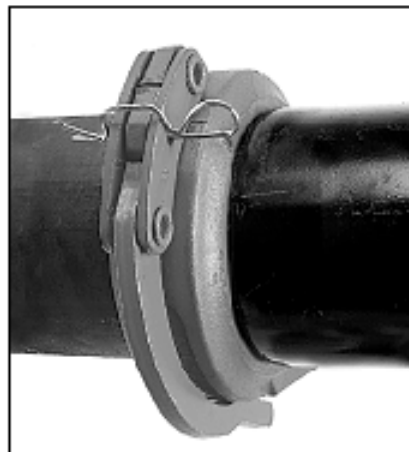
3 ALIGNMENT— After aligning the two pipe ends, pull the gasket into position centering it between the grooves on each pipe. Gasket should not extend into the groove on either pipe.



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.

D-Series Automatic Engine Overspeed Shut Down Valves

(Mini Range)

Selection, Application and Maintenance

Valve Numbers

D29, D30, D41,
D34BF, D35B, D39BF,
D29-AM, D30-AM, D41-AM
D34BF-AM, D35BF-AM,
D39BF-AM

DESCRIPTION

A range of small spring loaded poppet valves designed to automatically stop an engine by closing down the air intake should excessive overspeeding occur.







The closing force on the valve is provided by the intake air flow passing through. As the air flow increases, the closing force builds up. This is resisted by a spring, the pre-load of which is adjustable such that at a given air flow the resulting force overcomes the spring resistance and causes the valve to close. Once closed the valve will not reset to the open condition until the engine stops.

This type of valve may be fitted to either naturally aspirated or turbocharged engines. It should be noted however that for a given valve setting the repeatability of the actual automatic shut down speed has a greater scatter in the case of a turbocharged engine. However, unless for special reasons a precisely repeatable shut down speed is required, adequate protection from excessive overspeed and potential resulting damage is still achieved.

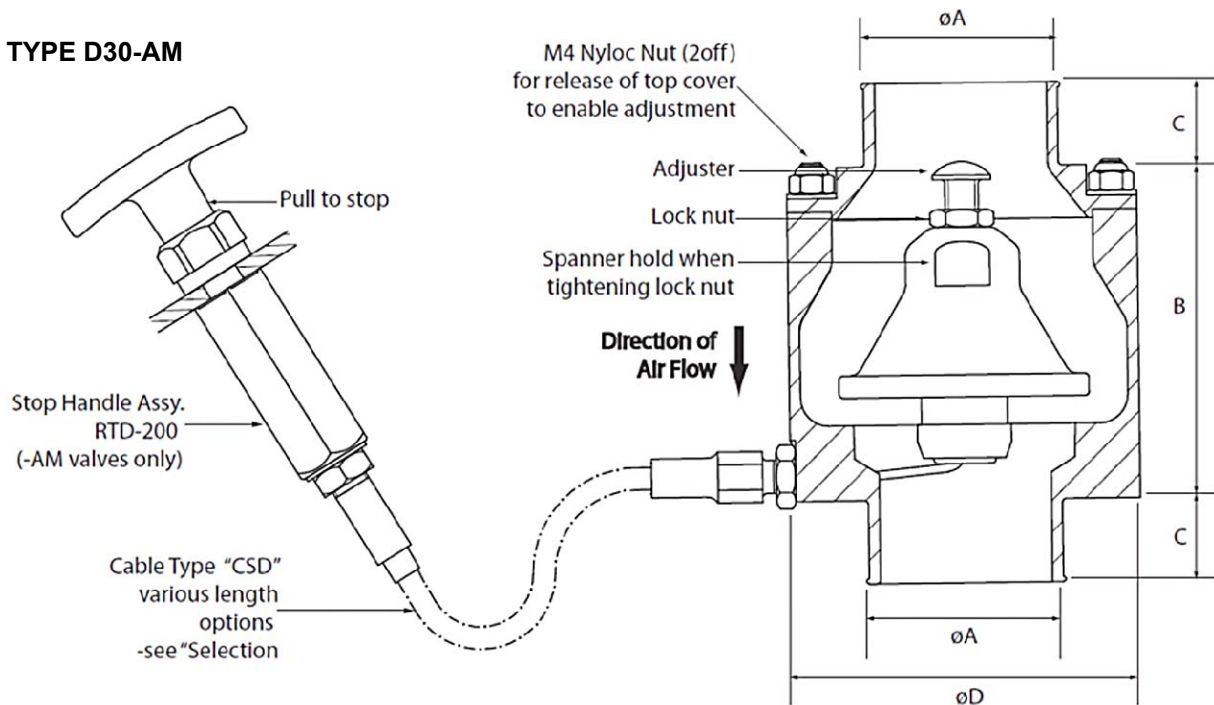
Types D34BF, D34BFS, D35BF, D35BFS, D39BF and D39BFS all include an integral engine air cleaner. Types D29, D30 and D41 are not available with an integral air cleaner.

A manual shut down option is available for all types.















Basic Dimensions: D29, D30 and D41

| Valve type | Auto Overspeed only | Auto Overspeed and Manual Shut Down | Outside Diameter 'A' (Size range in mm) | | 'B' (mm) | 'C' (mm) | Ø 'D' (mm) | Approximate Weight (Kg) |
|---------------|---|---|--|--------------------|-------------|-------------|---------------|-------------------------------|
| | | | Minimum | Maximum | | | | |
| D29 |  | | 25mm (1") | 34mm (1 11/32") | 60 | 15 | 63 | 0.3 |
| D29-AM | |  | | | | | | |
| D30 |  | | 35mm (1 3/8") | 45mm (1 3/4") | 60 | 15 | 63 | 0.3 |
| D30-AM | |  | | | | | | |
| D41 |  | | 38mm (1 1/2") | 58mm (2 1/4") | 60 | 17 | 76 | 0.4 |
| D41-AM | |  | | | | | | |

VALVE TYPE D30-AM

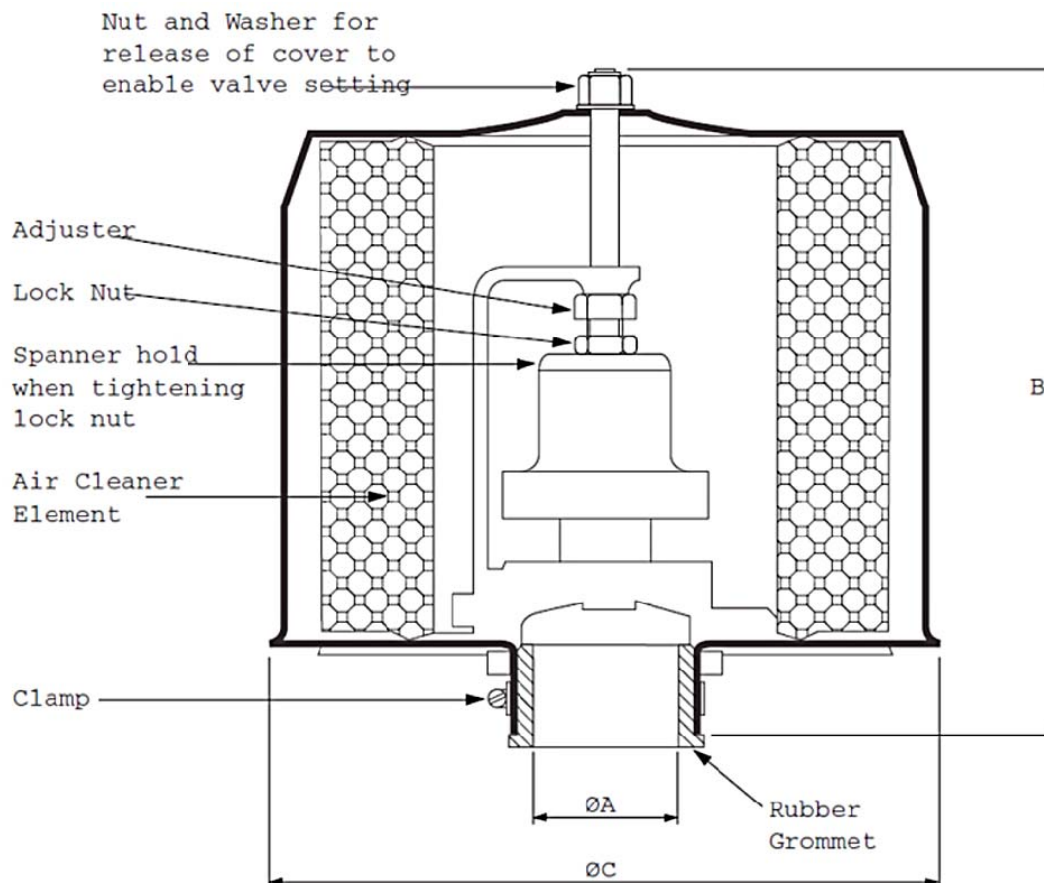


Basic Dimensions: D34BF, D35BF and D39BF Valves.

| Valve | Auto Overspeed Only | Auto Overspeed and Manual Shut Down | Ø 'A' (mm) | 'B' (mm) | Ø 'C' (mm) | Weight (Kg) |
|-------------|---|---|---------------|-------------|---------------|----------------|
| D34BF-35 |  | | 35 | 164 | 158 | 1.2 |
| D34BF-AM-35 | |  | 35 | 186 | 158 | 1.3 |
| D34BF-38 |  | | 38 | 164 | 158 | 1.2 |
| D34BF-AM-38 | |  | 38 | 186 | 158 | 1.3 |
| D35BF-35 |  | | 35 | 164 | 158 | 1.2 |
| D35BF-AM-35 | |  | 35 | 186 | 158 | 1.3 |
| D35BF-38 |  | | 38 | 164 | 158 | 1.2 |
| D35BF-AM-38 | |  | 38 | 186 | 158 | 1.3 |
| D39BF-40 |  | | 40 | 164 | 158 | 1.2 |
| D39BF-AM-40 | |  | 40 | 186 | 158 | 1.3 |
| D39BF-42 |  | | 42 | 164 | 158 | 1.2 |
| D39BF-AM-42 | |  | 42 | 186 | 158 | 1.3 |
| D39BF-44 |  | | 44 | 164 | 158 | 1.2 |
| D39BF-AM-44 | |  | 44 | 186 | 158 | 1.3 |

The same basic dimensions apply to the equivalent D34BFS, D35BFS and D39BFS types

VALVE TYPE D35BF-38



SELECTION

1. From the table below, select the valve type to suit the power output of the engine.

| Valve type | Engine power at Rated Speed | |
|------------------|-----------------------------|--------------|
| D29 | 1.5 to 8kW | (2 to 11hp) |
| D30 | 3 to 18kW | (4 to 24hp) |
| D41 | 4 to 27 kW | (6 to 36hp) |
| D34BF | 1 to 2kW | (1 to 3hp) |
| D35BF D39BF | 3 to 11kW | (4 to 15hp) |
| D35BFS D39BFS | 12 to 20kW | (16 to 27hp) |

Note: Above recommended power ranges are applicable to all variants of each valve type.

2. For the valve type identified in 1, select the required diameter $\varnothing A$ - see pages 2 or 3. Note the end tubes of the D29, D30 and D41 valves are designed to fit into the bore of the engine air intake hose. The rubber grommets of the D34, D35 and D39 types are designed to push over the outside diameter of a metal air intake pipe.

3. When the manual shut down option is specified, select the length of shut down cable required from the table below. Note, other lengths may be available on request.

| Cables for D29, D30 and D41 Valves | Cables for D34BF, D35BF & D39BF Range Valves | length (metres) |
|---------------------------------------|---|-----------------|
| CSD-100 | CLD-100 | 1.0 |
| CSD-150 | CLD-150 | 1.5 |
| CSD-200 | CLD-200 | 2.0 |
| CSD-300 | CLD-300 | 3.0 |

Note: For Larger sizes of 'D' valves see Chalwyn data sheets CE204, CE205 and CE231.

Important Note.

Where incorporated the Chalwyn valve manual shut down is intended for emergency use and for system checking only. ALWAYS retain the engine fuel stop system for routine engine shut down

FITTING

1. Valves with the manual shut down option are supplied complete with the manual stop cable and 'T' handle fitted and adjusted. Do not separate cable from handle or valve.
(See paragraph 5 and 6)
2. It is recommended that D29 and D34BF valves are fitted with the air flow direction towards the engine between horizontal and vertically downwards. All other Chalwyn Mini Valves can be fitted at any attitude subject to correct functioning as established during adjustment - see page 6. For D29, D30 and D41 range valves also ensure that:-

- a) The engine intake air flow direction is as marked on the valve.
- b) If an intake flametrap is fitted, the valve is installed between the air cleaner and flametrap.
- c) The hose into which the valve is fitted provides adequate support and prevents excessive vibration. If necessary support brackets should be considered taking into account relative movement between the valve and engine.

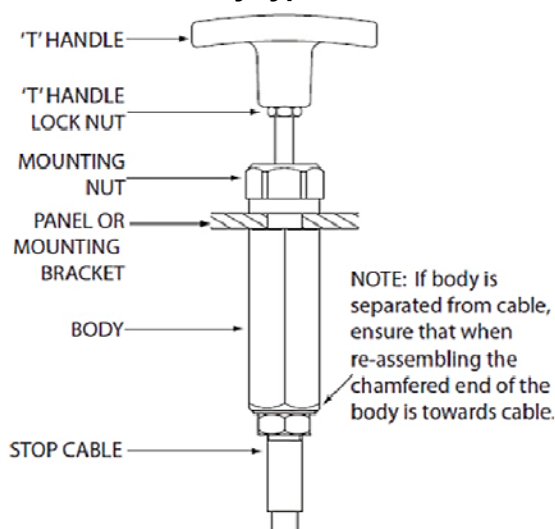
3. Particular care must be taken to ensure the integrity of the pipework between the Chalwyn valve and engine intake manifold. Ideally metal pipework should be used. Where unavoidable, gaps in the metal pipework should be as short as possible, (taking into account any relative movement) and connected by re-inforced rubber hose. The possibility of hose collapse on closure of the valve must be avoided.

4. Any engine crankcase breather connections into intake system between the Chalwyn valve and engine, or any internal crankcase breather arrangement venting directly into the engine intake ports, must be sealed and replaced by a external breather system venting either to atmosphere or to the intake system upstream of the shut down valve. External breather system kits for various engine types are available from Chalwyn.

5. Valves fitted with manual shut down handle assembly RTD-200. Prepare a Ø10mm ($\frac{3}{8}$ ") hole in the panel/bracket to which the stop control is to be mounted. Release the handle locknut. Remove the handle, handle lock nut and mounting nut. Offer up the RTD-200 body to the back face of the

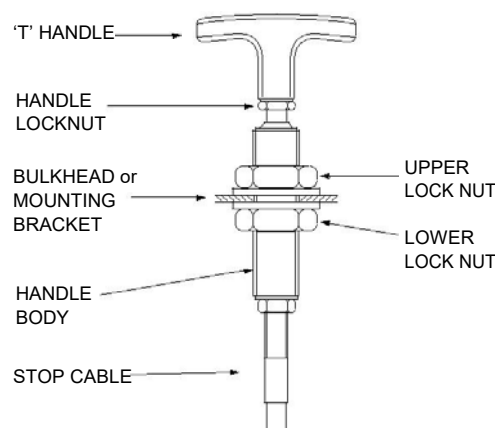
panel/bracket allowing the internal rod of the RTD-200 to project through the prepared hole. Refit the mounting nut and fully tighten. Refit handle locknut winding as far as possible onto the threaded rod. Refit handle winding hard down onto the locknut and then tightening locknut onto the handle. Note during this operation the handle and locknut will need to be held out against the valve spring return load.

Handle assembly type RTD-200



6. Valves fitted with the manual shut down handle assembly RTD-100. Fit through a suitable Ø20mm ($\frac{3}{4}$ ") hole in a bulkhead or mounting bracket as follows. Release the handle locknut. Remove the handle, handle locknut and upper locknut and washer. Thread handle body through the bulkhead/bracket. Refit upper locknut and washer. Adjust lower and upper locknuts to position handle and tighten. Refit handle locknut and handle. Tighten locknut.

Handle assembly type RTD-100



ADJUSTMENT

Once the Chalwyn valve is installed, adjustment of the overspeed trip setting is carried out using the adjuster and locknut (refer to diagrams). Basically rotating the adjuster clockwise will increase the engine speed at which automatic shut down occurs.

As supplied, the valve will be adjusted such that shut down will generally occur well below the engine high idle speed. To increase the speed at which automatic shut down occurs, proceed as follows:

1. If the manual shut down option is fitted check that the shut down cable is set to the run position ('T' handle pushed in) throughout the adjustment procedure.
2. Start engine. Slowly accelerate. Note speed at which shut down occurs.
3. In the case of D29, D30 and D41 range valves remove the inlet hose and top cover. For D34/D35/D39 valves remove the air cleaner cover and filter element.
4. Release adjuster lock nut. Turn adjuster one turn clockwise. Tighten locknut.
5. Refit all parts (including the inlet hose from the air cleaner in the case of D29, D30 and D41 range valves).
6. Start engine - Slowly accelerate. Note speed at which shut down occurs.
7. Repeat steps '3' to '6' until the first setting at which the engine does not shut down at high idle speed (i.e. maximum throttle, no load).

Then either:

- a) *Use the results of shut down speed versus adjuster setting as a calibration check to make a final adjustment to give the required setting (typically 10% to 15% over high idle).*

or

- b) *If a very precise setting is not required, turn the adjuster a further one turn clockwise to take the shut down above high idle speed by a suitable margin. When using this setting procedure it may be found that the engine occasionally shuts down during the normal operation. If so, turn the adjuster clockwise by a further one half turn.*
8. Finally ensure the adjuster locknut is fully tightened. (Use a thread lock adhesive on the locknut threads).
9. For valves with manual shut down re-start engine and check the manual shut down functions correctly. **IMPORTANT.** After operation of the manual shut down control, always ensure that, before re-starting the engine, the 'T' handle is fully pushed into the run position.

Notes:

Turbocharged Engines.

When setting a valve fitted to a turbocharged engine using the preceding method, it may be found that at high engine power outputs, the engine will shut down at a lower speed than required. If this occurs, further small adjustments in steps of one half turn clockwise should be made until the problem is eliminated.

Insufficient Adjustment.

Should there be insufficient adjustment to set the shut down speed at the required level contact your Chalwyn Distributor to check for correct valve spring selection.

Jammed Valve.

If in the course of adjusting the valve it jams on its seat, release by turning **CLOCKWISE** viewed from adjuster end

MAINTENANCE

Routine maintenance should be undertaken as below. Note that not all builds include an integral engine air cleaner.

Daily: “-AM” types only. Check satisfactory shut down occurs when the stop handle is operated.

Three Monthly

1. Disconnect intake pipework and release the valve from any support brackets etc. to allow it to be removed.
2. Inspect the valve internally for cleanliness. If necessary clean in paraffin or white spirit taking normal precautions. Dry the valve thoroughly.
3. Check there is no excessive wear and that the valve moves smoothly over its complete operating stroke. **DO NOT LUBRICATE.**
4. Refit valve. Check valve setting based on the “Adjustment” instructions given herein. Note it is important that the final adjustment is checked with the complete intake system fully in place. e.g. hoses, air cleaner etc.
5. For all “-AM” types operate the manual stop control and check that the engine stops within a few seconds.

IMPORTANT: Before operating the engine check that the manual stop handle is fully pushed into the engine run position.

Integral Engine Air Cleaner (where fitted)

Replace air cleaner element at the periods recommended by the engine manufacturer. (Spare elements are available from Chalwyn.)

Important Notes:

The three monthly routine maintenance period requirement is dependent on the operating conditions to which the equipment is exposed and, by experience, may need to be varied.

Any maintenance problems not covered by the routine maintenance schedule should be discussed with your Chalwyn Distributor before any repair work is undertaken.



Chalwyn by AMOT

sales@chalwyn.co.uk
www.chalwyn.com

A division of Roper Industries Limited

UK

Western Way
Bury St Edmunds
Suffolk, IP33 3SZ
Tel: +44 (0)1264 715739
Fax: +44 (0)1264 715747

USA

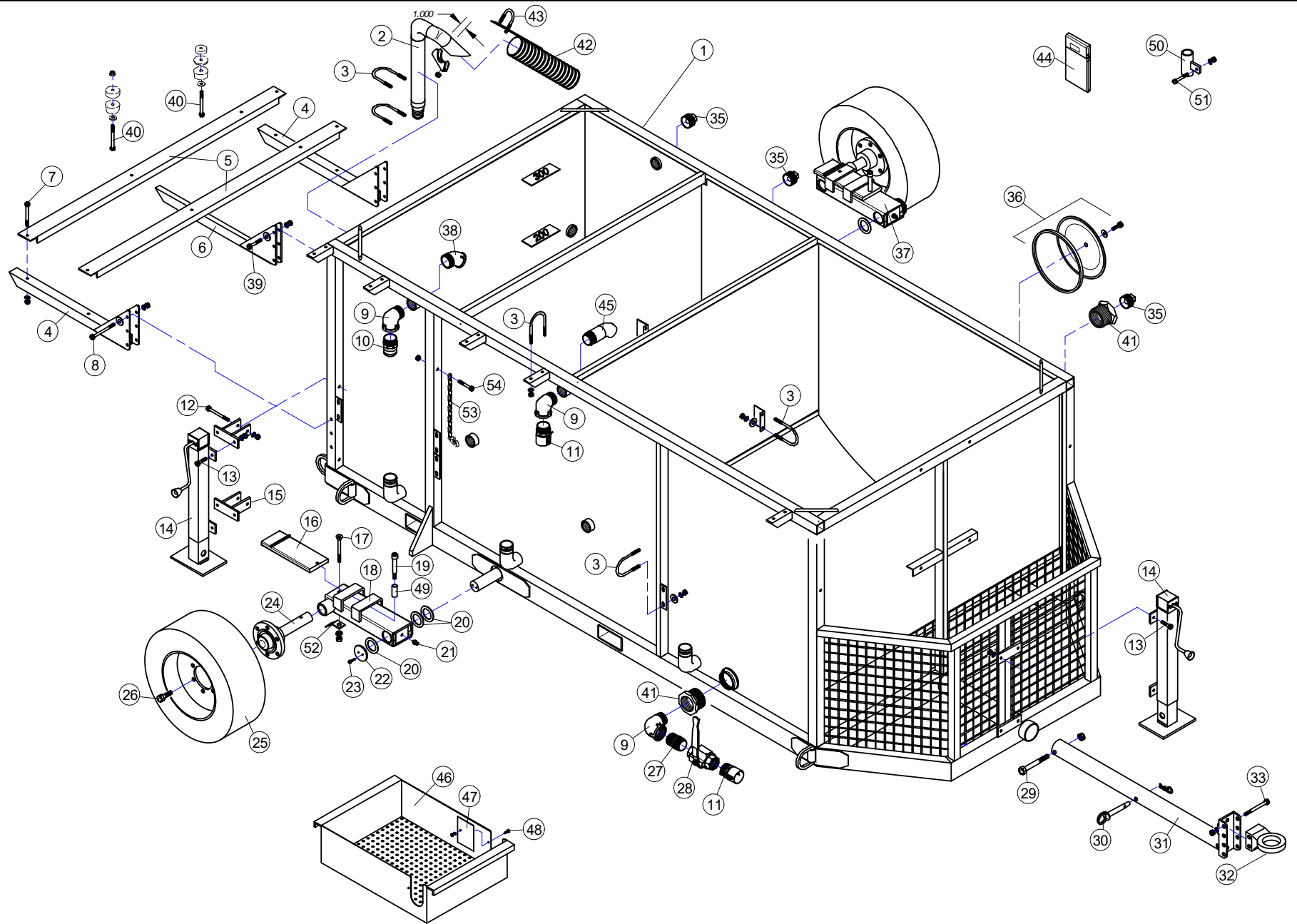
8824 Fallbrook Drive
Houston
TX 77064
Tel: +1 (281) 940 1800
Fax: +1 (713) 559 9419

CHALWYN RESERVES THE RIGHT TO UPDATE THIS PRODUCT SPECIFICATION WITHOUT PRIOR NOTICE



SECTION #VIII

(Parts Manual)



Total Weight without Mixer and NO options = 2500 lbs (March 11 2019)

Basket replaces "Y" strainer

| Surface to Surface Inc.® | |
|--------------------------|--------------------|
| DWR. NUM. | DATE. 11 / 23 / 12 |
| MT3X1500-84 | REV. 03 / 07 / 19 |

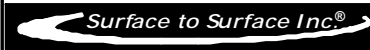
MAC JR 1200 ASSEMBLY PARTS LIST

| REF # | DESCRIPTION | STS PART NUMBER | QTY REQ. | |
|-------|---------------------------------|-----------------|----------|---|
| 1 | Tank | MT-3X1500-03 | 1 | O |
| 2 | Return Pipe | MT-3X1500-22 | 1 | B |
| 4 | Mixer Mount Arm | MT-3X1500-14 | 2 | O |
| 5 | Mixer Mount Crossbar | MT-3X1500-17-A | 2 | O |
| 6 | Mixer Mount Arm | MT-3X1500-16 | 1 | O |
| 7 | 7/16" x 3" Bolt | 076-13165 | 4 | |
| | 7/16" L/W | 076-33624 | 4 | |
| | 7/16" Nut | 076-36308 | 4 | |
| 8 | 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 | |
| 9 | 2" NPT 90° Street Elbow | 018-310-01720-7 | 3 | B |
| 10 | 2" Male Cam-loc x Male NPT | 025-200-F-AL | 1 | |
| 11 | 2" Female Cam-loc x Male NPT | 025-200-B-AL | 2 | |
| 12 | 7/16" x 3 1/2" Bolt | 076-13167 | 4 | |
| | 7/16" L/W | 076-33624 | 4 | |
| | 7/16" Nut | 076-36308 | 4 | |
| 13 | 7/16" x 1 1/2" Bolt | 076-13159 | 12 | |
| | 7/16" L/W | 076-33624 | 12 | |
| | 7/16" Nut | 076-36308 | 12 | |
| 14 | Leveling Jack | MT-3X1500-38 | 3 | B |
| 15 | Leveling Jack Mount | MT-3X1500-39 | 4 | B |
| 16 | Slide Lock | MT-3X1500-35 | 2 | O |
| 17 | 1/2" FHCS X 4" bolt | 076-24371 | 2 | |
| | 1/2" L/W | 076-33626 | 2 | |
| | 1/2" Nut | 076-36310 | 2 | |
| 18 | Wheel Link | MT-3X1500-30 | 1 | B |
| 19 | 1/2" x 1 1/2" Shoulder Bolt | 076-74117 | 2 | B |
| 20 | Spindle Spacer Washer | 076-33496 | 6 | B |
| 21 | 1/8" NPT Grease Zert | 036-60102 | 2 | |
| 22 | Spindle Cap | MT-3X1500-12-E | 2 | B |
| 23 | 5/16" NC x 3/4" SHCS | 076-23255 | 4 | |
| | 5/16" high collar L/W | 076-13159 | 4 | |
| 24 | Wheel Spindle | MT-3X1500-36 | 2 | B |
| 25 | TIRE (23/8.5 x 12 x 6 FLY) | 085-23-8.5-12 | 2 | |
| | RIM (6 x 12/6 on 6"BC) | 085-W612-6 | 2 | |
| 26 | Lug Bolt | c/w Spindle | 12 | |
| 27 | 2" NPT x Close Nipple | 018-033-037003 | 1 | B |
| 28 | 2" NPT Ball Valve | 022-423-00014-0 | 1 | |
| 29 | 3/4" x 4" Bolt | 076-13369 | 1 | |
| | 3/4" Stover Loc Nut | 076-37274 | 1 | |
| 30 | 3/4" x 4 1/4" Draw Pin c/w Clip | 076-0157184 | 1 | |
| 31 | Removable Tongue | MT-3X1500-07 | 1 | O |
| 32 | Pinto Hitch Ring | 085-4200130-BRK | 1 | O |
| 33 | 5/8" x 4 1/2" Bolt | 076-13321 | 2 | |
| | 5/8" Stover Loc Nut | 076-37272 | 2 | |
| 34 | | | | |

| | | | | |
|----|------------------------------|-----------------|--------|---|
| 35 | 2" NPT Cored Pipe Plug | 018-318090256-6 | 5 | B |
| 36 | Clean-out Cover | 086-TL-EC-12 | 3 | O |
| | Rubber Gasket | ~~~ | 3 | |
| | Plastic Washer | ~~~ | 3 | |
| | 5/8" x 1 1/2" Bolt | 076-13309 | 3 | |
| 37 | Wheel Link | MT-3X1500-32 | 1 | B |
| 38 | 2" NPT 45° Street Elbow | 018-310-02820-4 | 2 | B |
| 39 | 7/16" x 2 1/2" Bolt | 076-13113 | 3 | |
| | 7/16" L/W | 076-33624 | 3 | |
| | 3/8" F/W | 076-33008 | 3 | |
| | 7/16" Nut | 076-36308 | 3 | |
| 40 | 5/16" x 3" Bolt | 076-13065 | 4 | |
| 41 | 3" NPT x 2" NPT Pipe Bushing | 018-318-90828-2 | 2 | B |
| 42 | Return Pipe Cover Hose | #MT-3X1500-43 | 1 | B |
| 43 | 2 1/2" Exhaust Clamp | 031-MC 7212-050 | 1 | B |
| 44 | Operators Manual Holder | 084-9000-07 | 1 | |
| 45 | Dirty Tank Inlet Pipe | MT-3X1500-214 | 1 | B |
| 46 | Pre-Screen Basket | MT-3X1500-210 | 1 | |
| 47 | Pre-Screen Basket Cover | MT-3X1500-211-B | 1 | |
| 48 | 1/4" x 3/4" Bolt | 076-13003 | 1 | |
| | 1/4" L/W | 076-33618 | 1 | |
| | 1/4" Nut | 076-36302 | 1 | |
| 49 | Red Heat Swrink 1/2" ID | 089-669985 | 1 1/2" | |
| 50 | Additive Injector Holder | MT-3X1500-41 | 1 | B |
| 51 | 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 | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Basket replaces "Y" strainer

PAINT:
B - Black
O - Orange


| | |
|---|-------------------|
|  | |
| DWR. NUM | DATE 12 / 14 / 12 |
| MT-3X1500-84A | REV. 12 / 07 / 16 |

MAC JR 1200 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-3X1500-40-E | 1 |
| 54 | 2" NPT x Hose Barb | 018-1661268241 | 6 |
| 55 | 2" NPT 90° Street Elbow | 018-310-01720-7 | 5 |
| 56 | Short Jet Nozzel Manifold | MT-3X150024-B | 1 |
| 57 | 2" Female Cam-loc x Hose Barb | 025-200-C-AL | 2 |
| 58 | 2" Rubber Hose | MT-3X1500-40-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-3X1500-27-A | 1 |
| 65 | 2" NPT 90° Elbow | 018-310-00180-5 | 2 |
| 66 | 2" Rubber Hose | MT-3X1500-40-C | 1 |
| 67 | 2" NPT Pipe | MT-3X1500-23-B | 1 |
| 68 | 2" NPT Pipe | MT-3X1500-23 | 1 |
| 69 | 2" Rubber Hose | MT-3X1500-40-G | 1 |
| 70 | Long Jet Nozzel Pipe | MT-3X1500-24-A | 2 |
| 71 | 2" Rubber Hose | MT-3X1500-40-F | 1 |
| 72 | Jet Nozzel | 086-T2MPL | 12 |
| 73 | 2" Groove Bolt Type Clamp | 020-390-00026-3 | 1 |
| 74 | 2" EPDM gromLock seal (gasket) | 020-390-078640 | 1 |
| 75 | 2" Groove Bolt Type Clamp | 020-390-00026-3 | 1 |
| 76 | 2" EPDM gromLock seal (gasket) | 020-390-078640 | 1 |
| 77 | 2" Grooved 45° Elbow | 020-390-01478-6 | 1 |
| 78 | Valve Lable Plate (Left) on M2-922 | M2-738-L | 1 |
| 79 | Valve Lable Plate (right) | M2-738-R | 2 |
| 80 | 1/4" x 1" BHCS | 076-24053 | 6 |
| 81 | 1/4" Lock Nut | 076-37018 | 6 |
| 82 | Plastic Space | 084-MFW130A | 1 |
| 83 | Valve Handle Stop | M2-664 | 1 |
| 84 | Valve Handle | M2-665 | 1 |
| 85 | Additive Injector | MT-3X1500-42 | 1 |

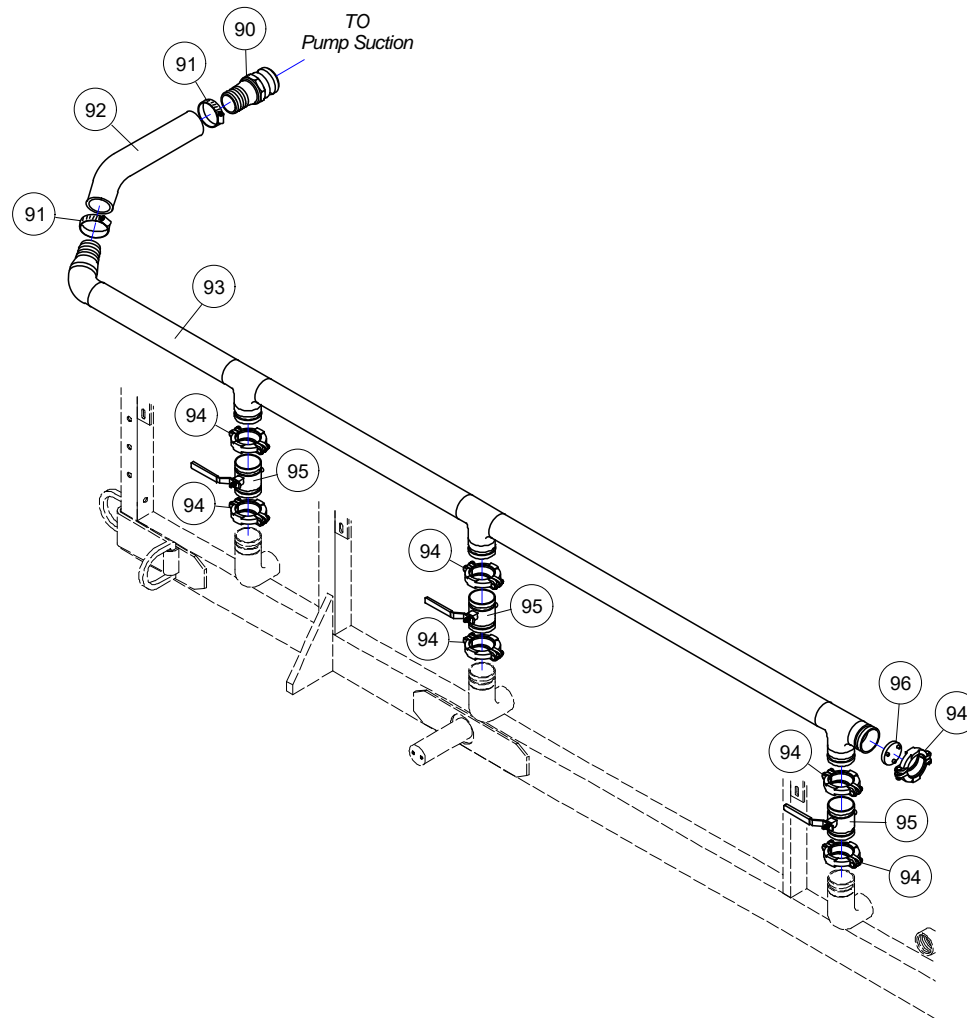
PAINT:
B - Black
O - Orange

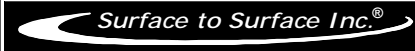
Cone Manifold

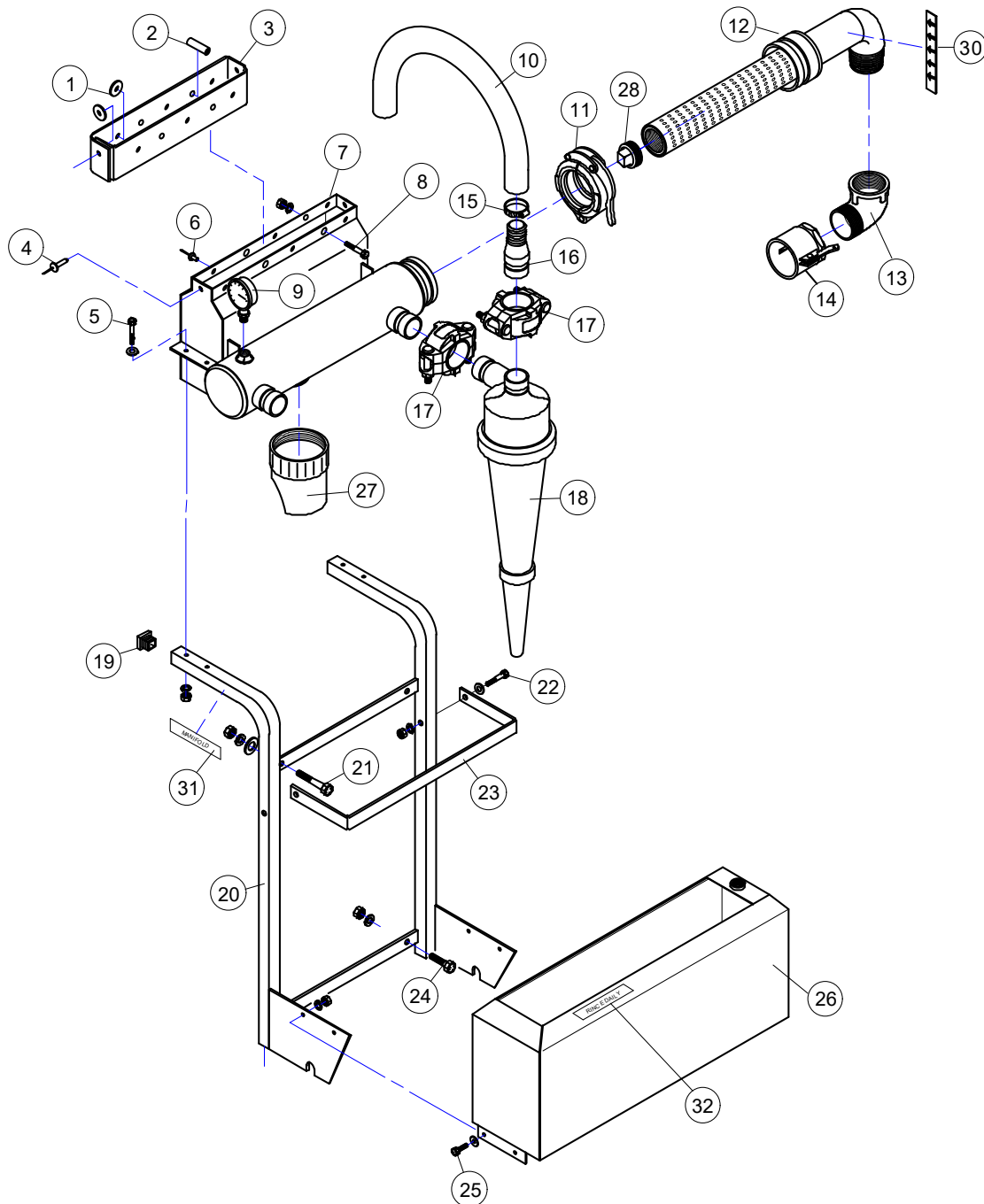
| | |
|---|--------------------|
|  | |
| DWR. NUM. | DATE. 11 / 08 / 12 |
| MT-3X1500-85 | REV. 01 / 13 / 14 |

MAC JR 1200 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-3X1500-40-D | 1 | |
| 93 | Suction Manifold | MT-3X1500-20 | 1 | B |
| 94 | 2" Groove Bolt Type Clamp | 020-390-00026-3 | 7 | B |
| | 2" EPDM gromlock 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 |
| | | | | |



| | |
|---|--------------------|
|  | |
| DWR. NUM. | DATE. 11 / 22 / 12 |
| MT-3X1500-86 | REV. 01 / 30 / 13 |

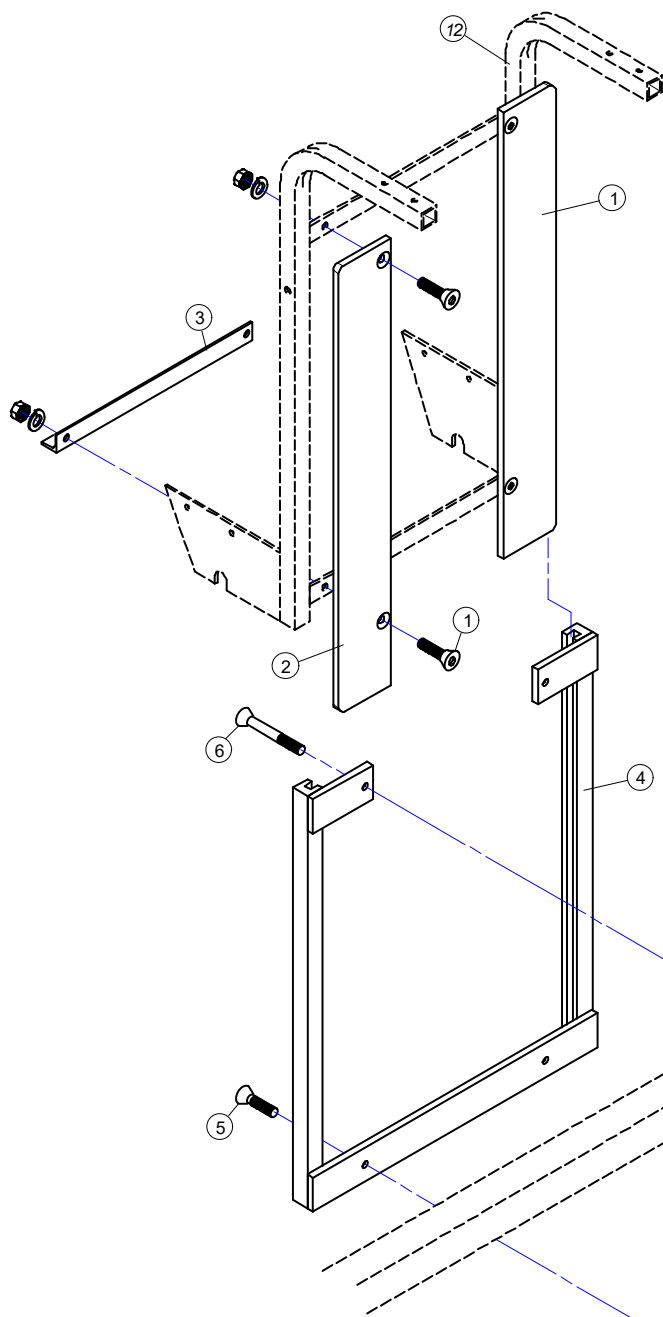


MAC JR 1200 CONE HEAD ASSEMBLY PARTS LIST (P/N #MT-3X1500-87) (No Flock)

| 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 | "Rinse 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 |



MAC JR 1200 CONE HEAD LIFT ASSEMBLY PARTS LIST

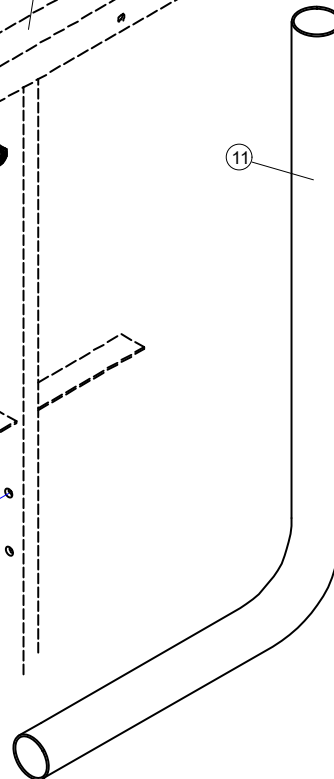
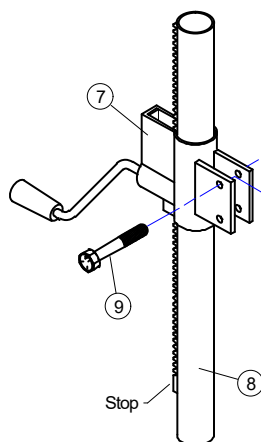
| REF # | DESCRIPTION | STS PART NUMBER | QTY REQ. | |
|-------|---------------------|-----------------|----------|---|
| 1 | Left Side Slider | #MT-3X1500-95-L | 1 | B |
| 2 | Right Side Slider | #MT-3X1500-95-R | 1 | B |
| 3 | Push Mount | #MT-3X1500-95-A | 1 | B |
| 4 | Slide Rail | #MT-3X1500-91 | 1 | B |
| 5 | 3/8" x 1 1/4" FHSCS | 076-24287 | 6 | |
| | 3/8" L/W | 076-33622 | 6 | |
| | 3/8" Nut | 076-36306 | 6 | |
| 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 Elbow | 018-310-00220-9 | 1 | B |
| 11 | 2" Rubber Hose | MT-3X1500-99-A | 1 | |
| 12 | Top Head Legs | H3602-005 | 1 | |
| 13 | Tank Frame | #MT-3X 1500-03 | 1 | |

PAINT:
B - Black

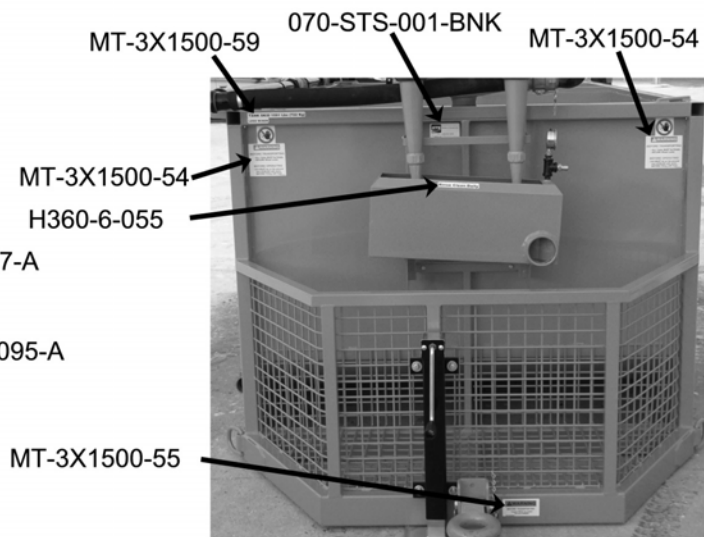
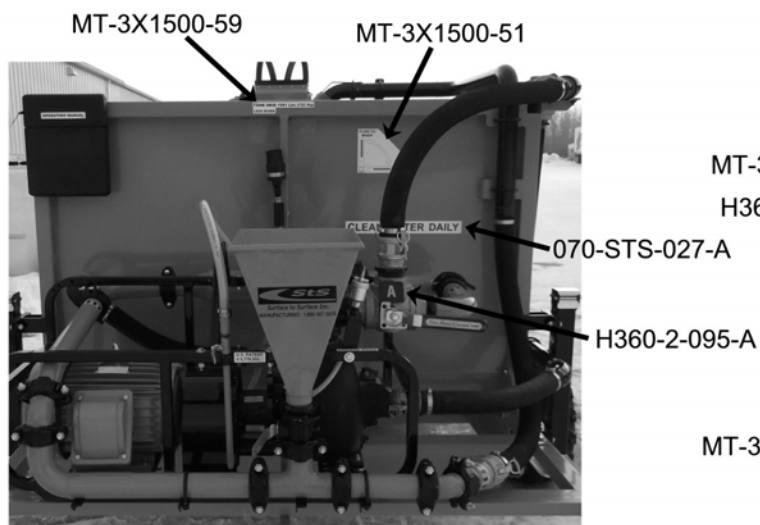
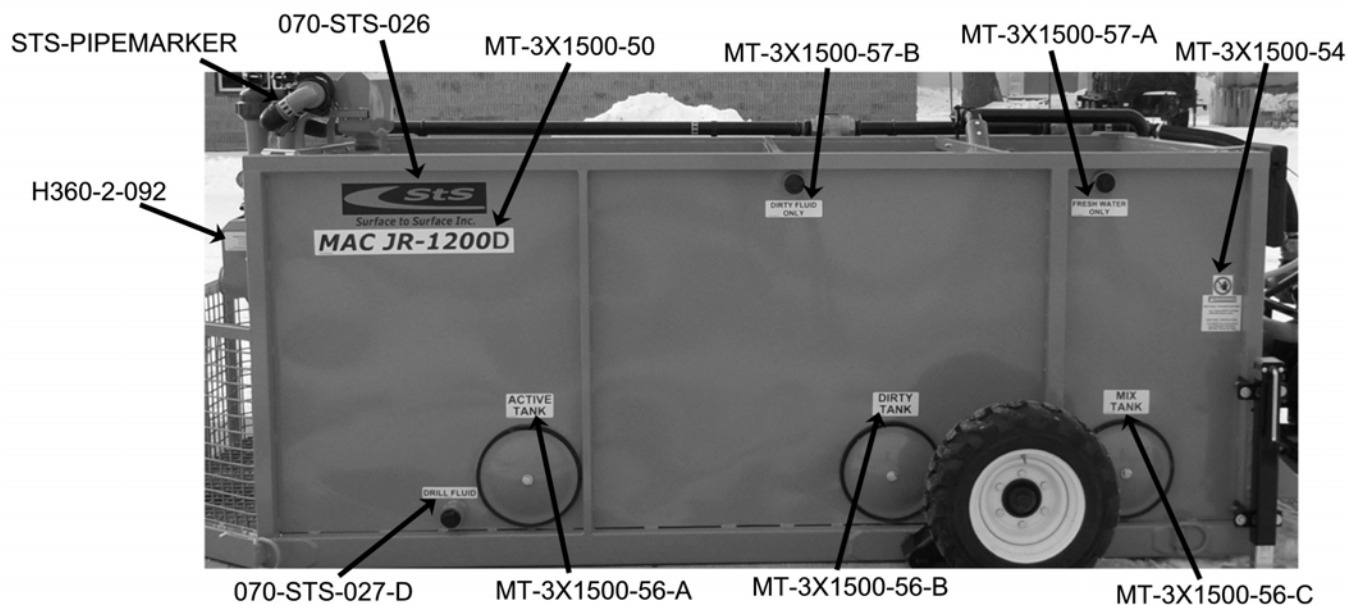
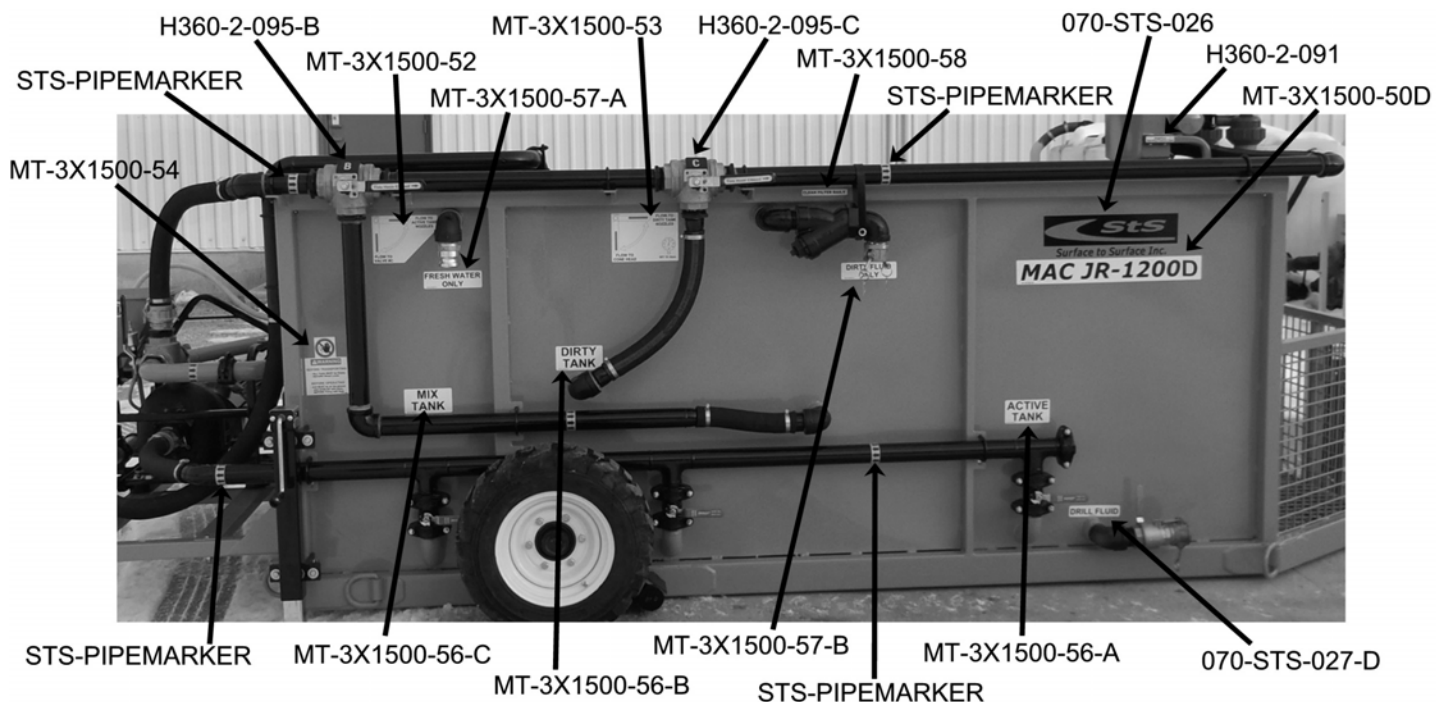


LIFT RAIL ASSEMBLY

#MT-3X1500-90
1 REQ.



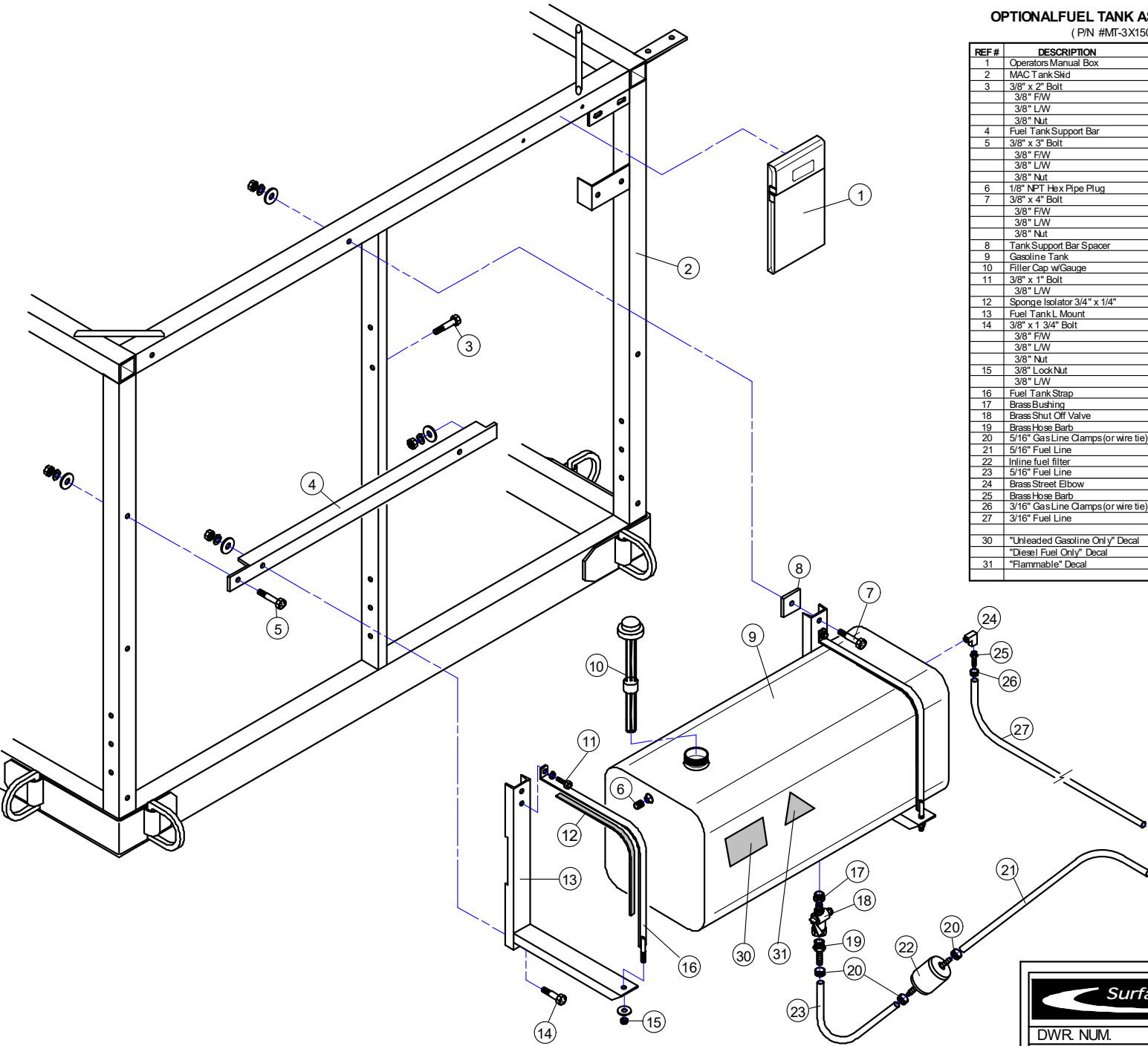
DWR. NUM. DATE. 05/06/13
MT-3X1500-90 REV.



MAC JR 1200D Decals

OPTIONAL FUEL TANK ASSEMBLY PARTS LIST
(P/N #MT-3X1500-100)

| REF # | DESCRIPTION | STS PART NUMBER | QTY REQ. |
|-------|-------------------------------------|------------------|----------|
| 1 | Operators Manual Box | 084-9000-07 | 1 |
| 2 | MAC Tank Skid | MT-3X1500-02 | 1 |
| 3 | 3/8" x 2" Bolt | 076-13111 | 1 |
| 3 | 3/8" FW | 076-33008 | 1 |
| 3 | 3/8" LW | 076-33622 | 1 |
| 3 | 3/8" Nut | 076-36306 | 1 |
| 4 | Fuel Tank Support Bar | MT-3X1500-101 | 1 |
| 5 | 3/8" x 3" Bolt | 076-13115 | 1 |
| 5 | 3/8" FW | 076-33008 | 1 |
| 5 | 3/8" LW | 076-33622 | 1 |
| 5 | 3/8" Nut | 076-36306 | 1 |
| 6 | 1/8" NPT Hex Pipe Plug | 018-318-90352-3 | 1 |
| 7 | 3/8" x 4" Bolt | 076-13119 | 2 |
| 7 | 3/8" FW | 076-33008 | 2 |
| 7 | 3/8" LW | 076-33622 | 2 |
| 7 | 3/8" Nut | 076-36306 | 2 |
| 8 | Tank Support Bar Spacer | MT-3X1500-103 | 2 |
| 9 | Gasoline Tank | SR-75040-P | 1 |
| 10 | Filler Cap w/Gauge | 062-203417 | 1 |
| 11 | 3/8" x 1" Bolt | 076-13105 | 2 |
| 11 | 3/8" LW | 076-33622 | 2 |
| 12 | Sponge Isolator 3/4" x 1/4" | 062-SCE 41 FSI | 2@ 18" |
| 13 | Fuel Tank L Mount | SR-75044 | 2 |
| 14 | 3/8" x 1 3/4" Bolt | 076-13110 | 2 |
| 14 | 3/8" FW | 076-33008 | 2 |
| 14 | 3/8" LW | 076-33622 | 2 |
| 14 | 3/8" Nut | 076-36306 | 2 |
| 15 | 3/8" Lock Nut | 076-37264 | 2 |
| 15 | 3/8" LW | 076-33622 | 2 |
| 16 | Fuel Tank Strap | SR-75041 | 2 |
| 17 | Brass Bushing | 019-WEA 3220X6x4 | 1 |
| 18 | Brass Shut Off Valve | 019-WEA 6829 | 1 |
| 19 | Brass Hose Barb | 019-SCR 6363-D | 1 |
| 20 | 5/16" Gas Line Clamps (or wire tie) | 025-PAP 307-562 | 3 |
| 21 | 5/16" Fuel Line | 024-3225-5002 | 17" |
| 22 | Inline fuel filter | 045-CFI 86002 | 1 |
| 23 | 5/16" Fuel Line | 024-3225-5002 | 4" |
| 24 | Brass Street Elbow | 019-WEA 3400X2 | 1 |
| 25 | Brass Hose Barb | 019-WEA-05703 | 1 |
| 26 | 3/16" Gas Line Clamps (or wire tie) | --- | 1 |
| 27 | 3/16" Fuel Line | 024-FBR 27001 | 45" |
| 30 | "Unleaded Gasoline Only" Decal | STS-030-C | 1 |
| 31 | "Diesel Fuel Only" Decal | STS-030-A | 1 |
| 31 | "Flammable" Decal | 070-16020-A | 1 |

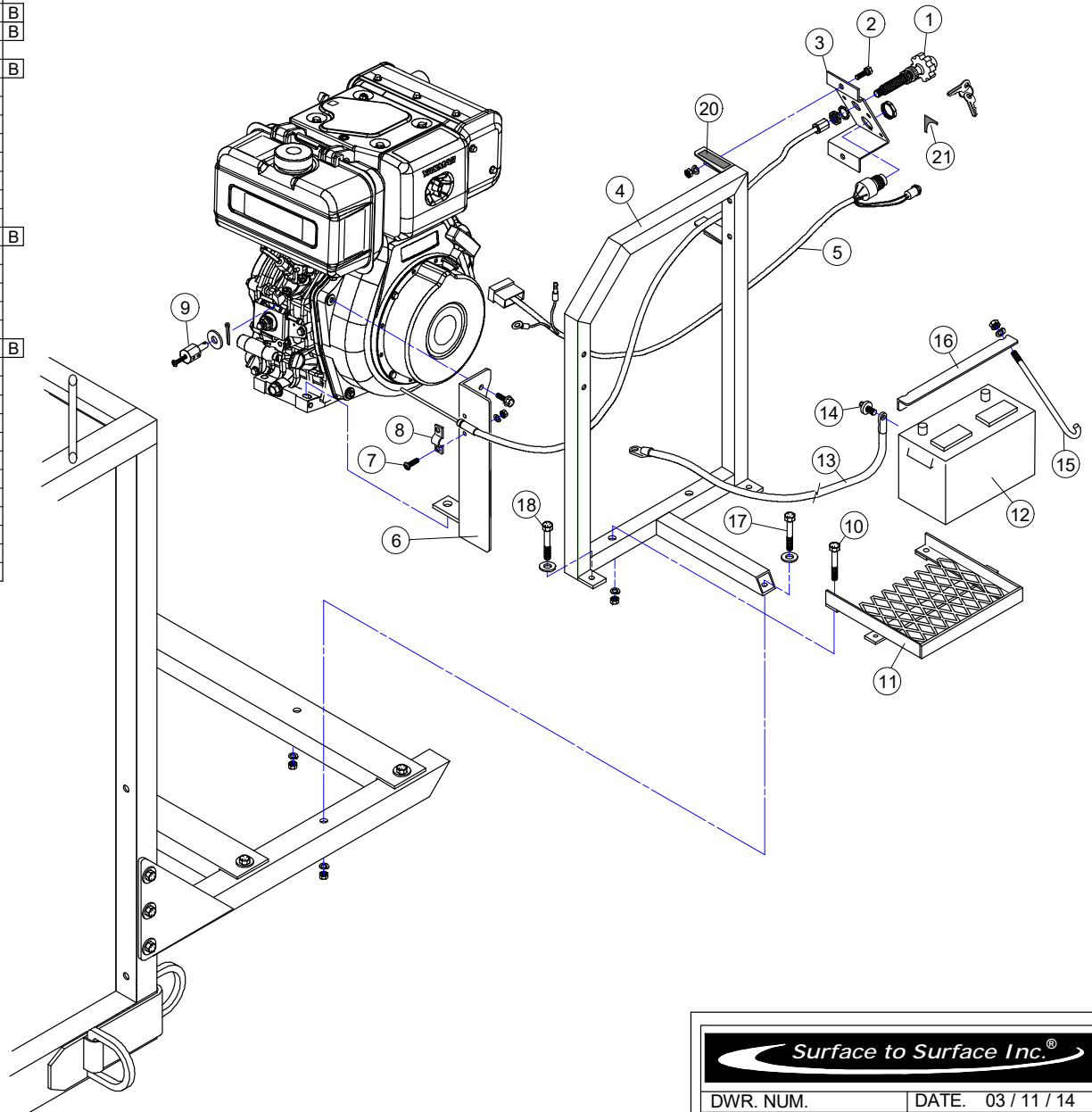



| | |
|---------------|--------------------|
| | |
| DWR. NUM. | DATE. 03 / 10 / 14 |
| MT-3X1500-100 | REV. |

MAC JR-1200D Throttle Kit with E start
 (#MT-3X1500-110)

| REF # | DESCRIPTION | STS PART NUMBER | QTY REQ. |
|-------|--------------------------|-----------------|----------|
| 1 | Throttle Cable | MT-3X1500-116 | 1 |
| 2 | 1/4" x 3/4" Bolt | 076-13003 | 2 |
| | 1/4" L/W | 076-33618 | 2 |
| | 1/4" Nut | 076-36302 | 2 |
| 3 | Switch Mount | MT-3X1500-115 | 1 |
| 4 | Key & Throttle Mount | MT-3X1500-111 | 1 |
| 5 | Key Switch with Harness | MT-3X1500-120 | 1 |
| 6 | Throttle Cable Mount | MT-3X1500-114 | 1 |
| 7 | 10-32 x 1/2" Bolt | 076-29880 | 2 |
| | 10-32 LW | ~~~ | 2 |
| | 10-32 Nut | 076-36029 | 2 |
| 8 | Cable Retaining Clamp | 032-161-011-001 | 1 |
| 9 | Brass Throttle Pull | 032-39011-2 | 1 |
| 10 | 5/16" x 2" Bolt | 076-13061 | 2 |
| | 5/16" LW | 076-33620 | 2 |
| | 5/16" Nut | 076-36304 | 2 |
| 11 | Battery Box | SR-D75088 | 1 |
| 12 | 12V Battery | 087-750DT | 1 |
| 13 | Battery Cable (black) | 087-EC-A34-6L | 1 |
| | Battery Cable (red) | M2-728-A | 1 |
| 14 | Battery Bolt | 087-EC BP78 | 2 |
| 15 | "J" Style Hold Down Bolt | 087-EC HD61C | 2 |
| 16 | Battery Hold Down | SR-75046 | 1 |
| 17 | 3/8" x 3" Bolt | 076-13115 | 1 |
| | 3/8" LW | 076-33622 | 1 |
| | 3/8" FW | 076-33008 | 1 |
| | 3/8" Nut | 076-36306 | 1 |
| 18 | 3/8" x 1 1/4" Bolt | 076-13107 | 2 |
| | 3/8" LW | 076-33622 | 2 |
| | 3/8" FW | 076-33008 | 2 |
| | 3/8" Nut | 076-36306 | 2 |
| 20 | "Throttle/Stop" Decal | MT-3X1500-123 | 1 |
| 21 | "Stop, On, Start" Decal | MT-3X1500-122 | 1 |

Paint:
 B = Black

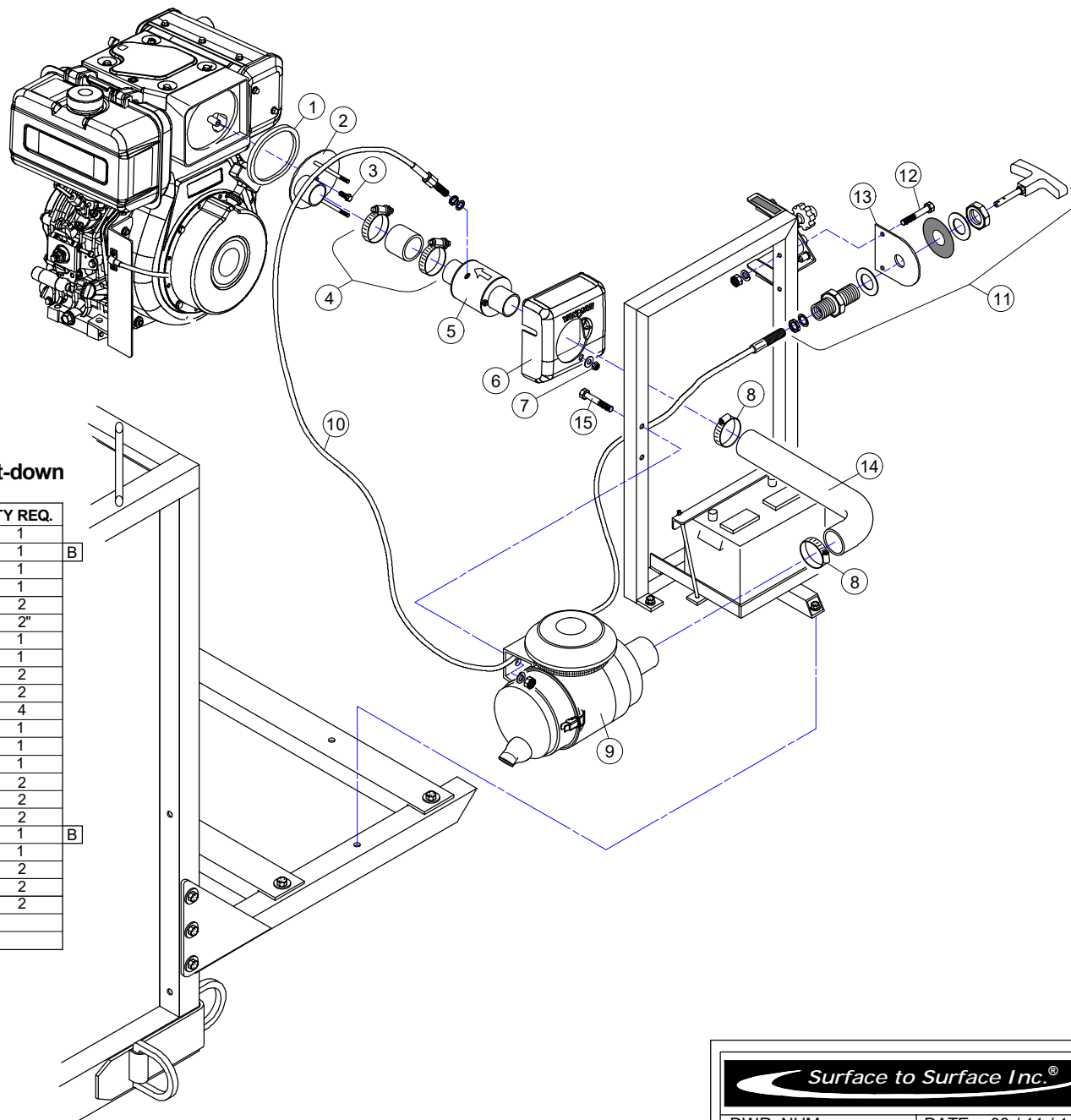


| | |
|---|--------------------|
|  | |
| DWR. NUM. | DATE. 03 / 11 / 14 |
| MT-3X1500-110 | REV. 10 / 10 / 17 |

MAC JR-1200D Air Intake Emergency Shut-down (#MT-3X1500-117)

| REF # | DESCRIPTION | STS PART NUMBER | QTY REQ. |
|-------|----------------------------|-----------------|----------|
| 1 | Gasket | M2-751 | 1 |
| 2 | Air Intake Shut-down Plate | M2-752 | 1 |
| 3 | M6 x 1.0 x 20mm Bolt | ---- | 1 |
| 4 | Hose Kit with Clamps | 033-IK-1750H-01 | 1 |
| | Torq Clamps | 025-CT 9432 | 2 |
| | 4 ply Silicone Hose | 025-2705 | 2" |
| 5 | Auto/Manual Shut down | 033-D30-AM-44 | 1 |
| 6 | Air Intake Modified Cover | M2-753 | 1 |
| 7 | 1/4" Nylock Nut | 076-37018 | 2 |
| | 1/4" F/W | 076-33004 | 2 |
| 8 | Gear Clamp | 025-HS-28 | 4 |
| 9 | Air Filter/Breather Kit | 033-KAC1 | 1 |
| 10 | Manual Shut-off Cable (1m) | 033-CSD-150 | 1 |
| 11 | Manual Handle | 033-RTD-100 | 1 |
| 12 | 5/16" x 2" Bolt | 076-13061 | 2 |
| | 5/16" LW | 076-33620 | 2 |
| | 5/16" Nut | 076-36304 | 2 |
| 13 | Shut-off Handle Mount | M2-754 | 1 |
| 14 | Rubber Elbow | MT-3X1500-118 | 1 |
| 15 | 5/16" x 1 3/4" Bolt | 076-13060 | 2 |
| | 5/16" LW | 076-33620 | 2 |
| | 5/16" Nut | 076-36304 | 2 |

Paint:
 B = Black



| Surface to Surface Inc.® | |
|--------------------------|--------------------|
| DWR. NUM. | DATE. 03 / 11 / 14 |
| MT-3X1500-117 | REV. 03 / 10 / 17 |