BENTONITE TANK

B300 AND B500

OPERATION, PARTS AND MAINTENANCE

Final: October 10, 2015

Corporate Philosophy and Mission

Barbco, Inc. and its president, Jim Barbera are dedicated to not only the success of the organization but also to the growth and fulfillment of its employees and the surrounding community. To do both requires the company to be the “best that it can possibly be”. To achieve this end, Barbco recognizes that all members of the company must be focused on a common mission and set of shared goals. Thus in September 1990 the company established the following Mission Statement and Goals

Mission Statement

Barbco, Inc. is dedicated to instilling in all segments of its organization a commitment to the production of high quality earth boring equipment and accessories. We seek to be recognized as the leader in our industry in terms of quality products, customer service, innovation, and serving the needs of earth boring contractors throughout the world supported by a management philosophy which seeks employee satisfaction and involvement, customer loyalty, and maximization of productivity and profitability.

Goal 1 **A Commitment to Quality which**
Develops a quality focus to consistently provide our customers with products and services which meet or exceed their expectations as to reliability, construction, precision and aesthetics.

Goal 2 **A Commitment to Service which**
Develops an organizational philosophy which is based on the concept that “We will Do whatever it takes” to provide quality service to our customers in the most efficient and effective manner.

Goal 3 **A Commitment to Innovation which**
Provides an organizational focus on creativity, encouraging the development of procedures and process which add value to our products and services.

Goal 4 **A Commitment to Related Activities which**
Expands into areas which complement our basic operations and strengthen our communities.

Goal 5 **A Commitment to Employee Development which**
Creates an organizational culture that recognizes the value of the individual employee, regardless of function, in the overall success of the company, and to provide all employees with opportunities for career development and education.

Goal 6 **A Commitment to Profitability and Growth which**
Expands the company in a controlled manner, enabling it to build earnings and a strong capital base so as to maximize its value to shareholders.

Barbco

Table of Contents

Manufacturer's Statement

The information contained in this operation manual is necessary for the safe and proper setup, operation, maintenance, and servicing of your Barbco Bentonite Tank. Barbco, Inc. has a long tradition of offering the best quality and most efficient to operate underground installation equipment in the world. Read and understand this manual completely before you use the Barbco Bentonite Tank and keep it with the unit at all times for quick reference.

The equipment described in this manual is subject to change. Barbco, Inc. reserves the right to change equipment at any time as part of normal product improvement. Some improvements may have been made after this manual was printed. For the latest information on your equipment, contact Barbco, Inc.

The illustrations contained in this manual are intended to clarify explanations in the text. The illustrations may look slightly different from your unit, but this has been allowed only if it does not fundamentally change the factual information. Some optional equipment may be illustrated that your machine is not equipped with.

How to Reach Us

If you encounter a circumstance that is not covered in this manual, Barbco's service department will be happy to assist you. Barbco's office hours are 8:00 AM–5:00 PM, Monday through Friday. Barbco's office is located in East Canton, Ohio.

Barbco Corporate Headquarters, East Canton, Ohio

- Main Office ..... (330) 488 - 9400
- Toll Free .....(800) 448 - 8934

How to Order Parts

To place an order for spare parts, you can call either of the above numbers. Parts department hours are Monday through Friday, 8:00 AM– 5:00 PM (Eastern Time). Orders can also be accepted via fax, 24 hours a day. Next day service must be called in by 3:00 PM.

- Spare Parts (fax) .....(330) 488 - 2022

When you call the factory for spare parts or service, have the model number and serial number of the machine. See ID tag located on the side of your tank unit.

Your Machine Serial Number

SAFE OPERATION OF EQUIPMENT

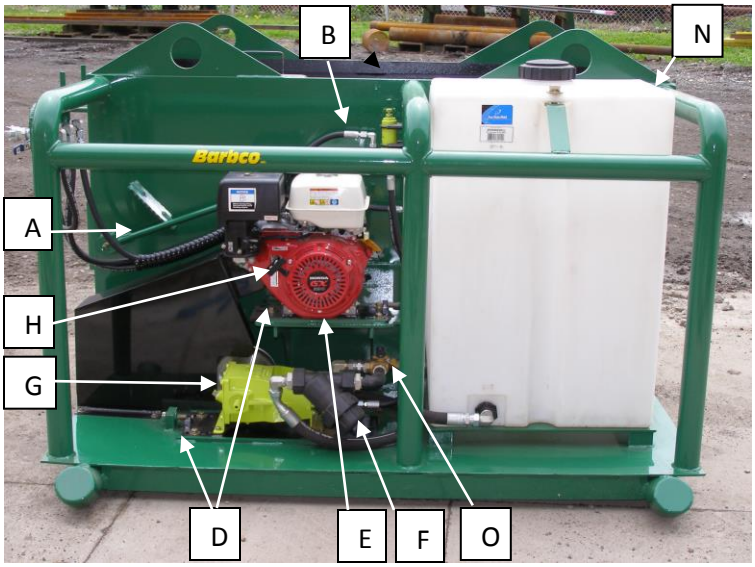
The operator is responsible for the operation of the machine. An operator is never to neglect safety. The operator is the only person on site who has the authority to ensure a safe setup.

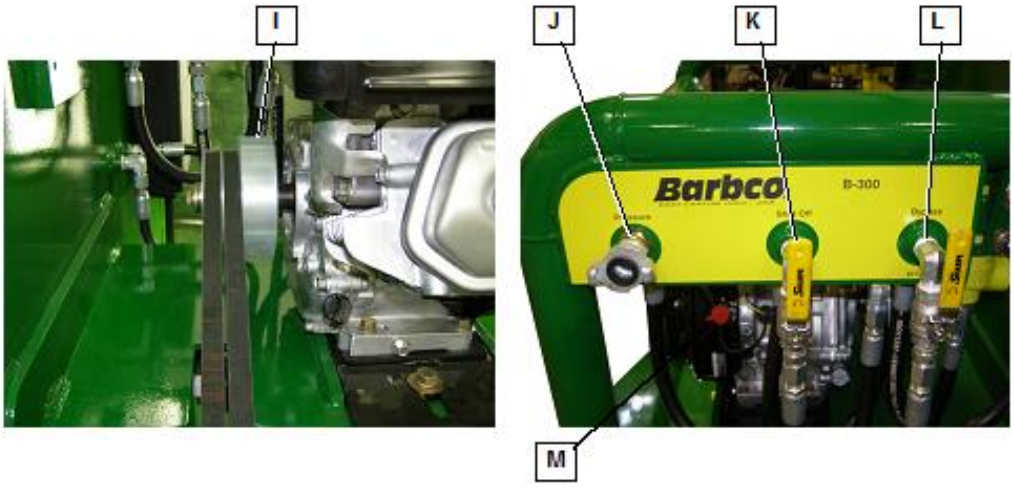
QUALIFIED OPERATORS ONLY ARE PERMITTED TO OPERATE THE UNIT

1. Must be at least 18 years old
2. Is physically and mentally capable
3. Has been trained in the operation and maintenance of the equipment
4. Has demonstrated capabilities (to a supervisor) to operate and maintain the equipment
5. Understands the controls and functions of this unit

Bentonite Tank Components

Bentonite Tank Operation





DESCRIPTION OF BENTONITE TANK COMPONENTS

A - DROP GATE HANDLE: Closes off prop flow from the back of the hopper, forcing fluid to flow into hopper through side slot. Closed during pumping, forcing non-mixed, floating material into hopper to be remixed.

B - PRESSURE RELIEF VALVE: Adjustable valve that sets the maximum pumping pressure.

C - WAND: Hose extension wand used to apply tank mixture or for wash down.(Not Shown)

D - ADJUSTMENTS: One for tightening pump belt and one for tightening mixing prop belts.

E - ENGINE: Power source, 13 HP.

F - "Y" STRAINER: Washable suction strainer keeps larger unwanted material from pump.

G - PUMP: High pressure piston pump.

H - ENGINE PULL CORD: Pull to start engine.

I - CLUTCH: Centrifugal clutch allows prop and pump drive at high idle.

J - PRESSURE CHARGED FITTING: Quick disconnect, fluid output. 35’ x 3/4 hose, supplies flow to desired location.

K - SHUTOFF VALVE: Turns fluid on and off to the pressure output port.

L - BYPASS VALVE: Allows pump fluid to bypass the output port and flow back to tank unrestricted. Commonly used when mixing.

M - ENGINE ON/OFF SWITCH: Master On-Off.

N – FRESH WATER TANK: 80 Gallon tank

O – SUCTION BALL VALVE: Pulls from tank.

Engine Operation

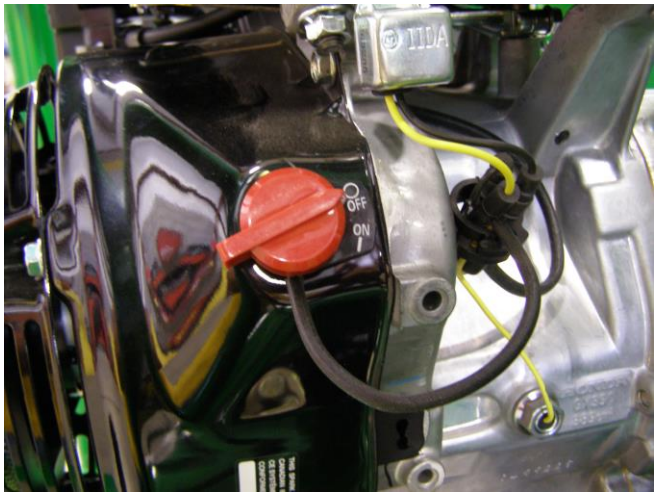
This section outlines basic procedures that apply to the operation of the engine.

Be sure that the throttle is in the IDLE POSITION prior to starting the engine. This unit is equipped with a Centrifugal Clutch (item I), which allows the engine to be started and run at idle speed during non-pumping conditions. When pumping operations are to begin, INCREASE the engine speed, and the clutch will engage to power the mixing propeller and pump.

It is important to INCREASE and DECREASE the engine speed with some care to extend the life of the unit. RAPID throttle control will only wear on the individual components.

Reading of the enclosed engine and pump manuals is of primary importance. Failure to be completely familiar with all components of this unit, can result in serious personal injury or damage to the machine.

1. Select the ON position on the master switch on the right side of the engine assembly.

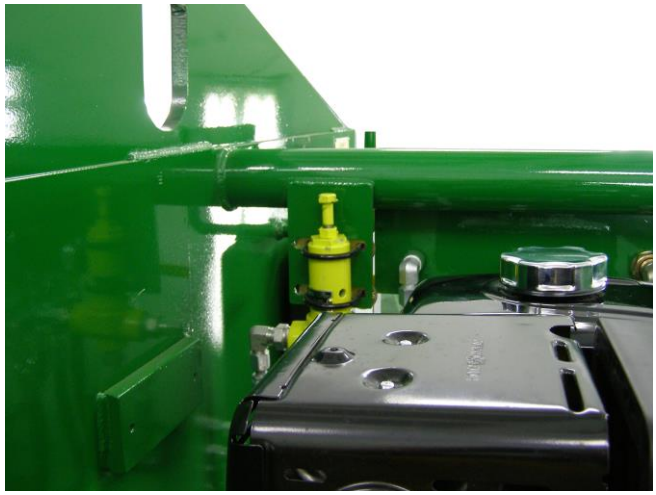


2. The engine is supplied with a fuel shut off lever, be sure it is in the open (ON) position before start up. Engine choke may be needed in colder start up conditions.

3. Pull the spring loaded PULL CORD (Item H) to START engine. Allow to warm up.

Pump Operation

This setting can be adjusted by turning the bolt on top of the PRESSURE RELIEF VALVE (item B).



When MIXING your drilling fluid, the SHUTOFF VALVE (item K), should be closed and the BYPASS VALVE (item L), should be open, allowing the mixture to be pumped back into the tank. For PUMPING, the BYPASS VALVE should be closed and the SHUTOFF VALVE should be open to allow the drilling fluid to flow through the hose and/or wand.

During pumping, the DROP GATE HANDLE (item A) can be lowered to shut down the fluid feeding the prop, forcing fluid through the slot in the side of hopper assembly. This allows unmixed material to be remixed.

DANGER! The engine produces exhaust gases that can cause illness or death if inhaled. Always ventilate indoor areas if you run the engine for maintenance.

WARNING! EXPLOSION HAZARD! Fumes can catch fire or explode causing serious burns. DO NOT SMOKE OR ALLOW OPEN FLAMES OR SPARKS AROUND AN OPERATING ENGINE.

WARNING! ROTATING BELTS! KEEP HANDS AND FEET AWAY FROM MOVING PARTS.

WARNING! The engine will become very HOT when running. Do not touch any engine parts until cool.

Mixing Drilling Fluids

In the underground boring industry, there are times when operators will need to utilize drilling mixtures instead of water. On those occasions the following procedures should be followed for best results.

When mixing, it is important to know if your water is too hard or salty, it will not mix well with bentonite and the bentonite will settle to the bottom of the tank. Proper pH balance is important.

Consult your local industrial drilling product provider for all required information.

Procedures for mixing dry powders

1. Fill tank with water.
2. Open bypass.
3. Ensure throttle is set low, and fuel shut off is in the ON position.
4. Start the engine and run on low idle, allowing engine to warm up.
5. Set bag of powder on tray and open.
6. Slowly push the powder down the center tube, feeding the prop as it mixes the dry material with the water.
7. Allow the prop to mix the solution for about 15 minutes after the last bag of powder has been added.

NOTE:

- Under good conditions, you can mix a full tank (300 GAL.) in 20 minutes.
- Many dry powders take up to 20 minutes to fully absorb the water.
- Slowly add additional water or powder to obtain desired volume and viscosity.

Drilling fluids are used to:

1. Reduce torque while drilling and back reaming to reduce sliding friction while pulling in utility.
2. To aid in carrying spoils from the drilled hole.
3. To help stabilize the soil and reinforce the sides of the hole.
4. Reduce friction while jacking casing.

How much and what to mix:

Polymer

Polymers are designed to provide lubrication and whole stability. Polymers may be purchased in liquid form or dry form and are sensitive to hard and/or salty water. Polymers are recommended when drilling clay-type soils to reduce their "sticky" and "balling" tendencies.

Bentonite
A powdered "beneficiated" bentonite is recommended for most drilling and back-reaming. Bentonite will reduce skin friction and help hold the hole open. Different soils and ground conditions require different additives. You will need a marsh funnel to measure the viscosities of the various mixtures. Consult your local drilling fluid supplier for the best mixtures for the soil types you will be drilling in.

Operation of Fresh Water Tank

Purpose of the fresh water tank is for clean up after the job is finished. Clean the inside of chamber and flush mud pump from drilling media.

1. Position the Suction ball valve (item O) selector to divert from the fresh water tank.
2. Start engine. (See Engine Operation)
3. Operate pump. (See Pump Operation)

ATTENTION! – YOU MUST FLUSH THE PUMP WITH FRESH WATER AFTER EACH USE. If you do not flush with fresh water, the longevity of the pump will be reduced.

MAINTENANCE SCHEDULE CHART - RECOMMENDED SERVICE INTERVALS

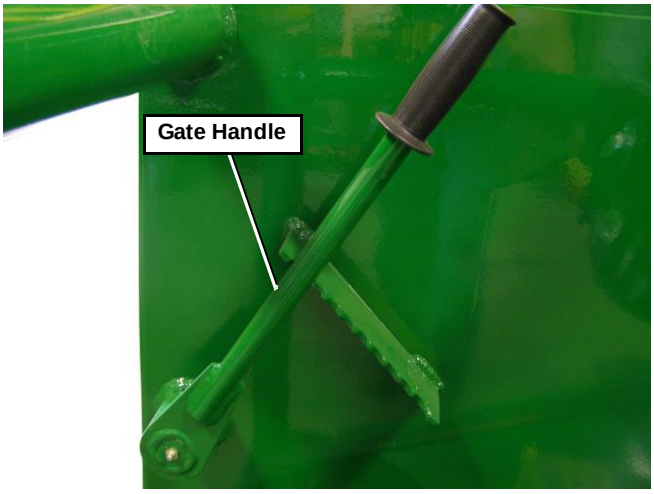
Service Item	Daily	Weekly	Monthly	Every 100 Hours	500 Hours	Every Use
Power Pack						
• Engine Oil				R		C
• Mixing System:						F
• Proper Assembly (OHLA)			V,G,P			
• Mud Pump			C,V	R		
• Suction Strainer						F

V - Visual Inspection: Structure Failure, Loose Hardware, Any Defects, Wear or Fatigue.
L - Leaks: Oil or Hydraulic.
G - Grease: Refer to Lubrication Chart
P - Check Pressure
C - Check Fluid Levels
F - Flush with Water
R - Replace Fluid

Lubrication Points

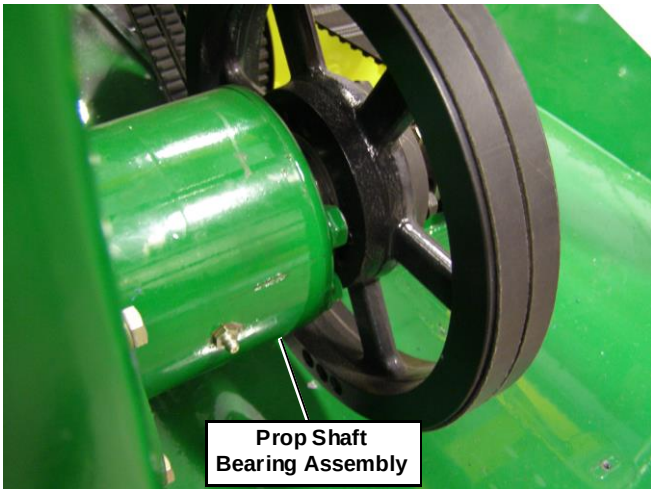
GATE HANDLE ASSEMBLY:

Grease gate handle assembly.



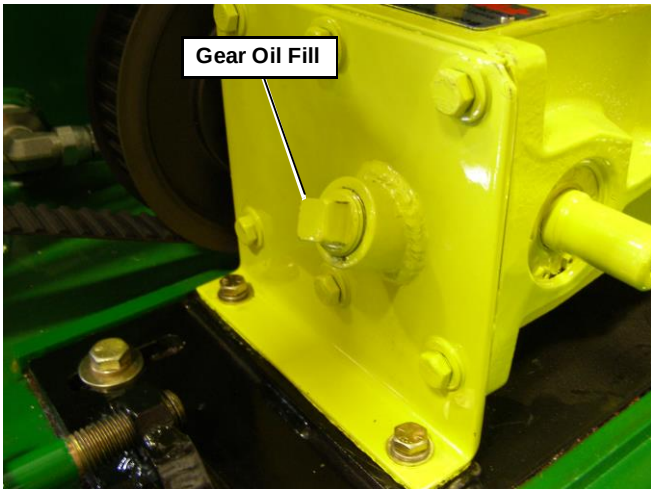
PROP SHAFT BEARING ASSEMBLY:

Grease prop shaft bearing assembly.



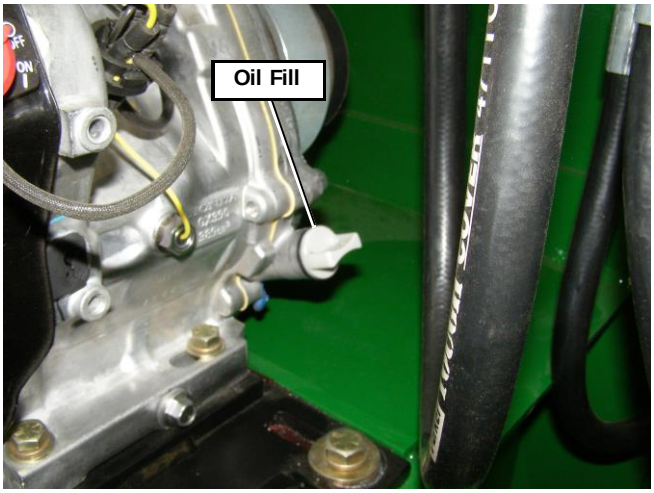
HIGH PRESSURE PISTON PUMP:

Fill with Spirax HD SAE 85W-140

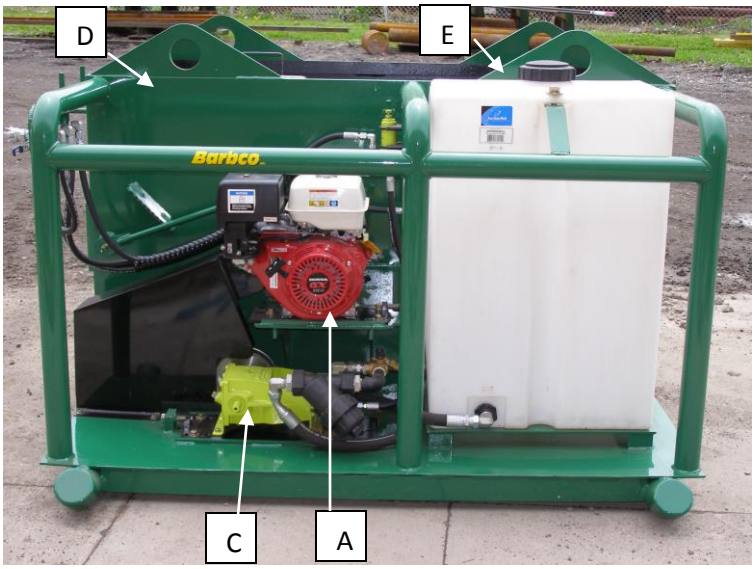


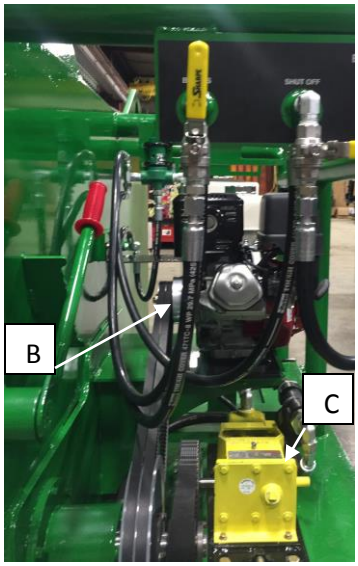
ENGINE:

Fill with SAE10W-30.



Parts List: Specifications





A. ENGINE: (Optional)

Honda 13 HP GX390K1QA2 Pull Start

B. CENTRIFUGAL CLUTCH:

1800 RPM Engage / 3600 RPM Max.
1" DIA. Shaft 4" O.D. Double Pulley

C. PUMP:

Beam I0413 Max. GPM 9.0 Max.
Pressure 750 psi

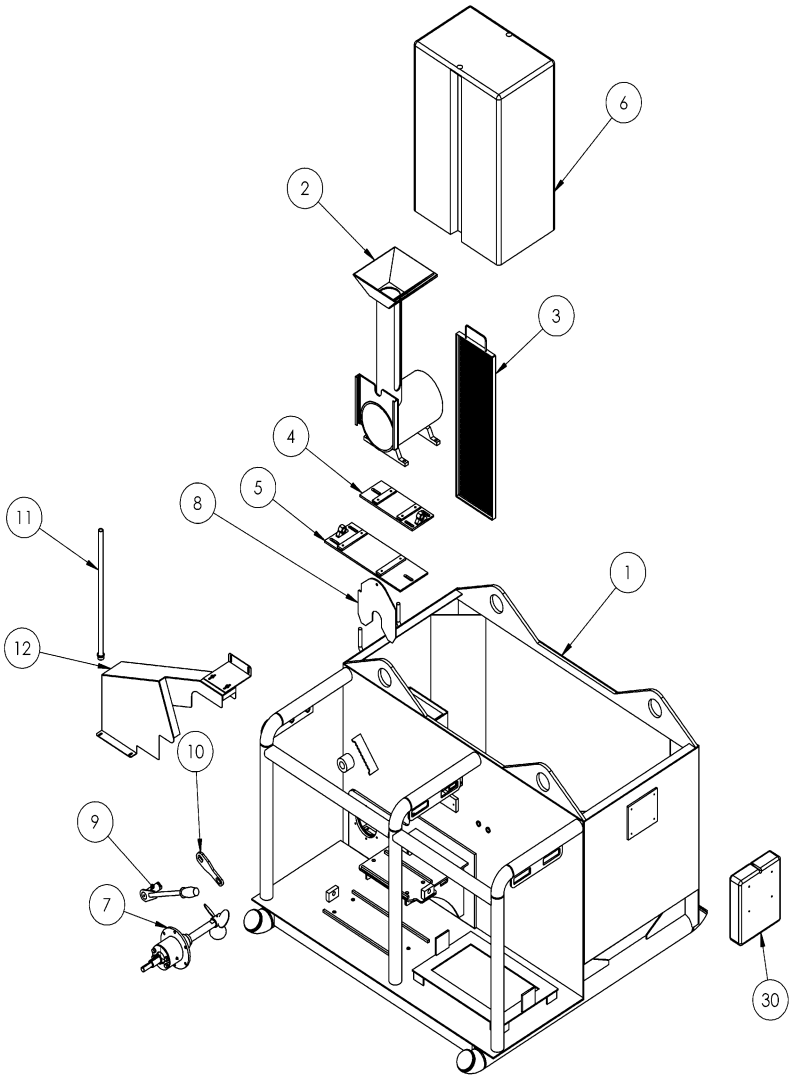
D. MAIN TANK:

300 or 500 gallon option

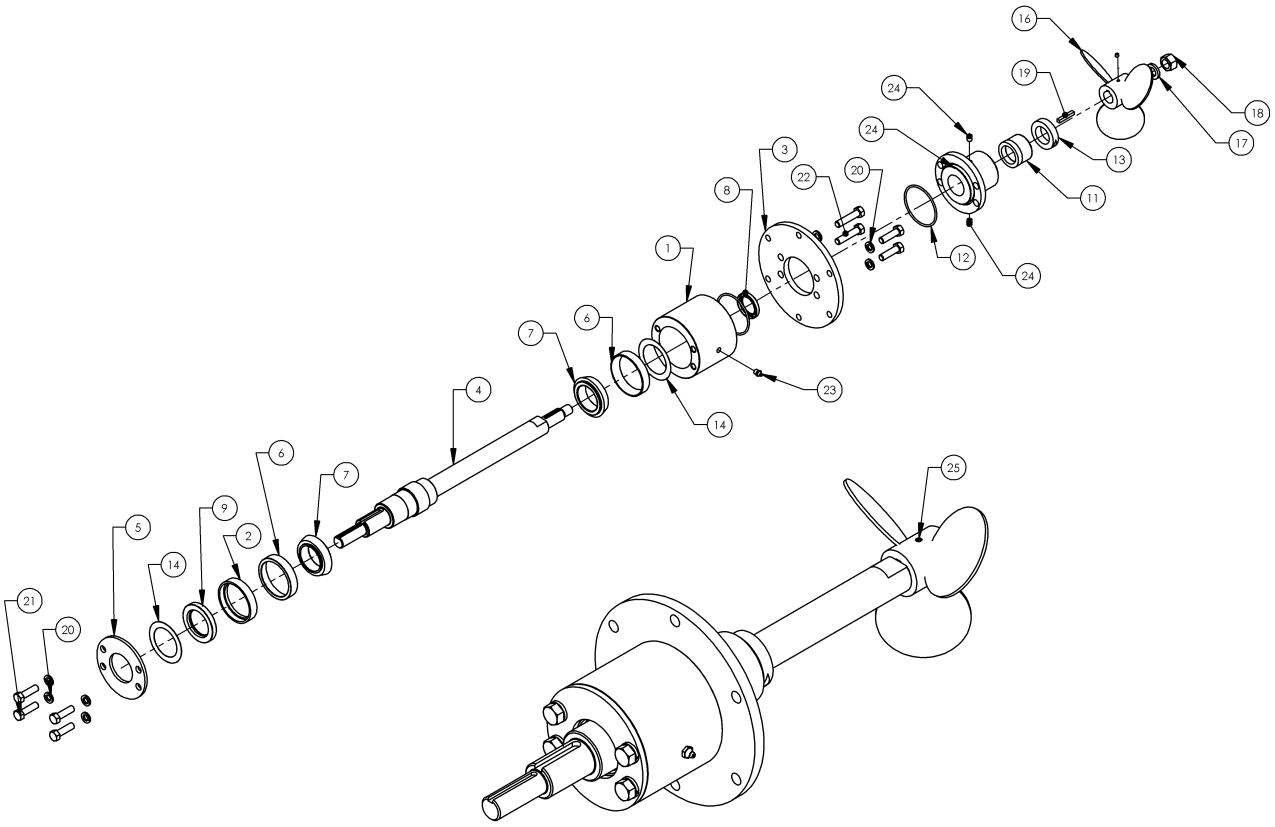
E. FRESH WATER TANK:

80 gallon

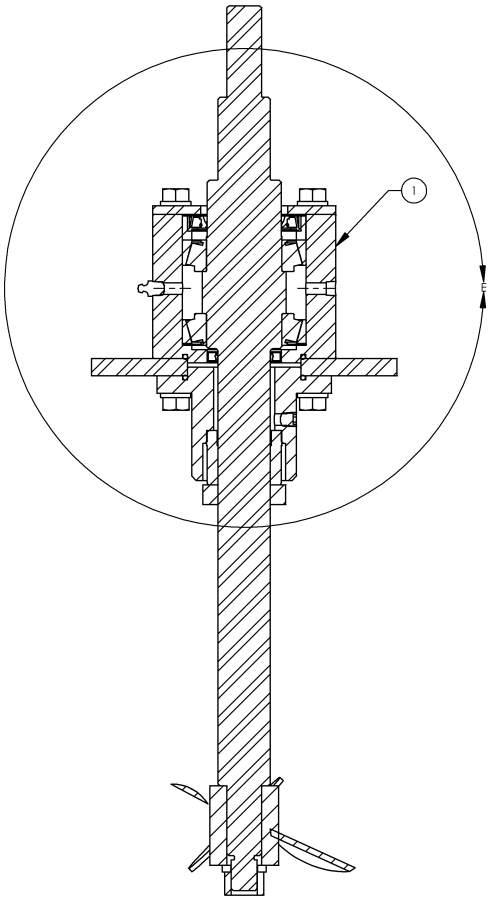
Specifications subject to change.


6
2
3
4
5
8
11
1
12
10
9
7
30

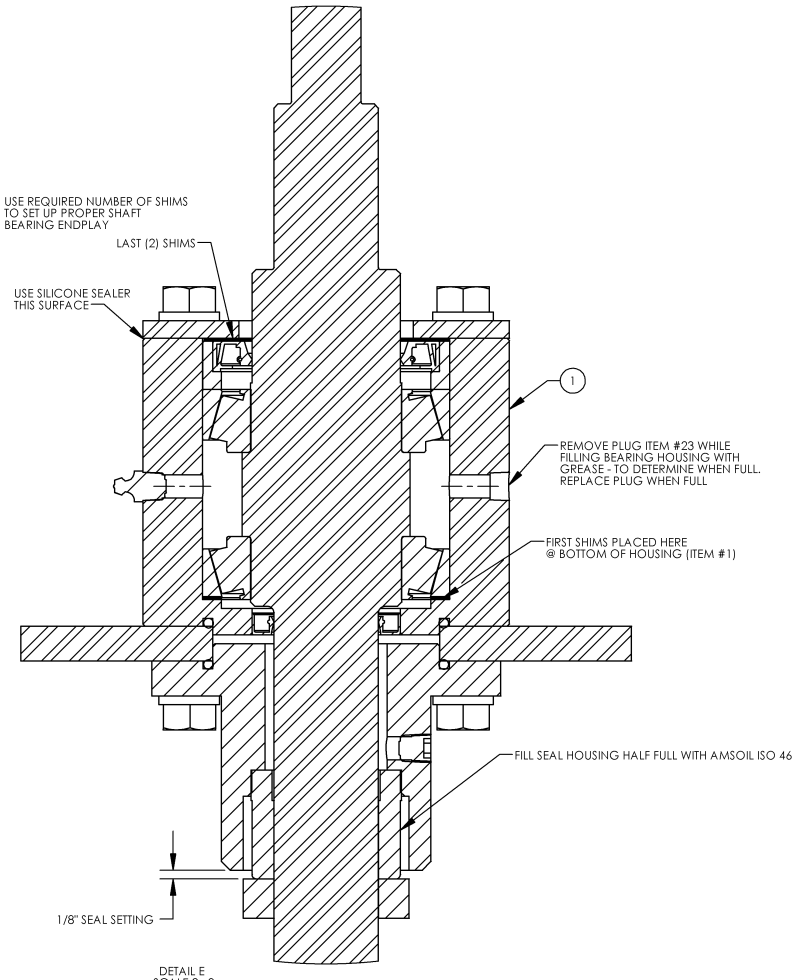
30	7920034	MANUAL PAK	1
29	7050010	SPLIT TAPER BUSHING (NOT SHOWN)	1
28	7050005	VBELT BX75 (NOT SHOWN)	2
27	7050007	BELT SHEAVE (NOT SHOWN)	1
26	7050008	SPLIT TAPER BUSHING (NOT SHOWN)	1
25	7050009	BELT SHEAVE (NOT SHOWN)	1
24	7050006	BELT (NOT SHOWN)	1
23	7050003	2 GROOVE SHEAVE (NOT SHOWN)	1
22	7050004	SPLIT TAPER BUSHING (NOT SHOWN)	1
21	1900107-01	BALL VALVE 3-WAY, 1" NPT (NOT SHOWN)	1
20	1900107-02	BULKHEAD FITTING FOR TANK, 1" (NOT SHOWN)	1
19	9100055	Y-STRAINER, 1 1/2" NPT, 6 MESH SCREEN (NOT SHOWN)	1
18	7120026	BALL VALVE, 1/2" NPT (NOT SHOWN)	2
17	7010031	2 1/2" MUFFLER CLAMP	2
16	7050001	CENTRIFUGAL CLUTCH (NOT SHOWN)	1
15	7120001	PRESSURE REGULATOR (NOT SHOWN)	1
14	7100001	MUD PUMP (NOT SHOWN)	1
13	7000001	13HP GAS ENGINE, RECOIL START, (NOT SHOWN)	1
12	1900005	BELT GUARD	1
11	1900044	WAND ASSEMBLY	1
10	2000044	GATE ARM	1
9	1900043	HANDLE & SHAFT ASSEMBLY	1
8	2000297	GATE - HOPPER	1
7	1900109	LOAD ADAPTER ASSY	1
6	14278	80 GALLON PLASTIC TANK	1
5	1900008	MOUNTING PLATE - PUMP	1
4	1900007	MOUNTING PLATE - ENGINE	1
3	1900105	FILTER WELDMENT	1
2	1900106	HOPPER WELDMENT	1
1	1900103	FINAL WELDMENT	1
ITEM NO.	**PART NUMBER**	**DESCRIPTION**	**QTY.**


16
19
24
18
24
17
13
3
22
20
11
8
12
1
24
6
7
23
4
14
6
7
9
5
2
14
21
20
25

24	9116019	SET SCREW 1/4-20 X 1/4"L KNURLED CUP	1
23	9100211	PIPE PLUG SOC HEAD 1/8" NPT	3
22	9100207	1/8" NPT GREASE FITTING x 11/16" Lg.	1
21		HBOLT 0.5000-13X2.25X1.25-N	2
20		HBOLT 0.5000-13X1.75X1.25-N	6
19	2180486	KEY 1/4" X 1-5/8"L	1
18	9117001	HEX NUT 3/4"-10	1
17	Regular LW 0.5	1/2" LOCKWASHER	8
16	Regular LW 0.75	3/4" LOCKWASHER	1
15	7050002	PROPELLER; MIXING, 9"dia, 14” pitch	1
14	7020207	SHIM 3-1/2" OD X 2-1/2"ID X .005" THK	10
13	7050219	SHAFT COLLAR 1-1/2"	1
12	90189-001	O-RING	2
11	7030193	SEAL MECHANICAL 2.125"OD X 1.500"ID	1
10	2170584	SEAL HOUSING	1
9	7030016	OIL SEAL	1
8	7030012	OIL SEAL	1
7	7020090	BEARING; CONE	2
6	7020089	BEARING; CUP	2
5	2000149	FLANGE - OVERHUNG BEARING RETAINER	1
4	4000010	SHAFT - PROPELLER	1
3	2000296	FLANGE - LOAD ADAPTER	1
2	2200651	SEAL RETAINER	1
1	4050163	OVERHUNG LOAD ADAPTER HOUSING	1
ITEM NO.	**PART NUMBER**	**DESCRIPTION**	**QTY.**



SECTION C-C



DETAIL E
SCALE 2 : 3

GLOSSARY

Backreamer A tool attached to the end of the drill string and pulled through the bore to shape and enlarge the hole.

Bentonite An absorbent aluminum silicate clay formed from volcanic ash. When thoroughly mixed with water, bentonite breaks down into small particles called platelets. The platelets plaster or shingle of the wall of the hole and form a filter cake that cuts off the flow of water into the surrounding sand or gravel.

Bore A hole made in the ground by drilling or pushing.

BORE-GEL A single-sack boring fluid system, which consists of bentonite, polymer and soda ash, specially formulated by Baroid Drilling Fluids, Inc., for use in trenchless technology construction applications. Processed from premium grade Wyoming sodium bentonite with an extra high yield, enhanced to provide superior hole stabilizing properties and cuttings support with improved lubrication and torque reduction.

CON-DET A clear amber liquid blend of water soluble anionic surfactant manufactured by Baroid Drilling Fluids, Inc. It can be used in conjunction with Quick-Gel® to aid in reducing the tendency of the whole boring tools being stuck by adhesive.

Cuttings Soil particles, also known as drilling spoils, created during the boring process. Use of the proper drilling fluid will help to suspend the cuttings which reduces the risk of getting stuck while boring and back reaming.

Entrance Pit The area where the drill rod enters the ground after the drill machine is set up.

EZ-MUD A premium grade, high molecular weight PHPA polymer manufactured by Baroid Company. When this is added to bentonite in the drilling fluid, it provides extended high viscosity and gel strength. It also lowers the filtration rate and increases lubrication. It is an excellent shale/clay stabilizer which minimizes swelling.

Marsh Funnel A device used to calibrate the viscosity of drilling fluid.

Mud Drilling fluid.

Platelet A minute, disk like cytoplasmic body found in bentonite that plasters or shingles off the wall of the hole to form a filter cake that cuts off the flow of water into the surrounding sand or gravel. When broken down to its smallest dimension, there are enough platelets in one cubic inch of high quality sodium bentonite to cover 66 football fields.

Polymer Any of numerous natural and synthetic compounds of usually high molecular weight consisting of up to millions of repeated linked units, each a relatively light and simple molecule. Polymer, when used in conjunction with bentonite in the drilling fluid, enhances viscosity and gel strength, lowers filtration rate, and increases lubricity. The use of a polymer is recommended when boring in clay or shale.

PH The measure of activity of water.

QUICK-GEL Highest grade sodium bentonite manufactured by Baroid Drilling Fluids, Inc. This drilling fluid mix develops a cost effective low solids slurry with high viscosity, high gel strength, and controlled filtration rate to provide formation and whole stabilization.

QUIK-TROL® A white granular pure grade polymer manufactured by Baroid Drilling Fluids, Inc. When added to a premixed bentonite slurry, it improves clay/shale stabilization and enhances all properties of a bentonite slurry used in boring.

Rack The actual boring machine which includes drive head, controls, vise, etc.

Rod Wiper A donut shaped neoprene disk that fits around the drill rod to help clean it during the pullback.

Saturated Zone The water table. Usually a fine sand or gravel that allows the flow of groundwater. Can also be limestone or sandstone. Very susceptible to contamination by V.O.C.'s.

Soda Ash Sodium carbonate in powdery white form used to increase the pH level of hard water. This makes the mixing of bentonite and polymers into the drill fluid much easier.

Torque The rotational force applied to the drill rod joints.

Viscosity Resistance of a fluid to flow. This resistance acts against the motion of any solid object through the fluid, and also against motion of the fluid itself past stationary obstacles. Viscosity also acts internally on the fluid between slower and faster moving adjacent layers. All fluids exhibit viscosity to some degree.

Barbco INC.

Manufacturing Horizontal Earth Boring Machines
Tunnel Equipment • Directional Drills • Tooling

315 Pekin Road, S.E. • East Canton, Ohio 44730-9462
Phone: 330-488-9400 • Toll Free 1-800-448-8934 • Fax 330-488-2022
email: info@barbco.com • Web Site: www.barbco.com