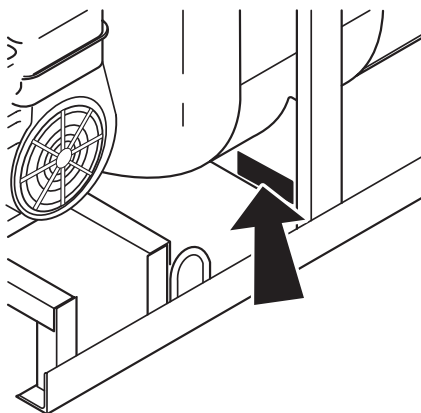


SERVICE

SERIAL NUMBER

Record the serial numbers and date of purchase of your equipment in the spaces below.



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Date of Manufacture:	
Serial Number:	
Date of Purchase:	

SUPPORT PROCEDURE

Notify your dealer immediately of any malfunction or failure of Ditch Witch equipment.

Always give model, serial number, and approximate date of your equipment purchase. This information should be recorded and placed on file by the owner at the time of purchase.

Return damaged parts to dealer for inspection and warranty consideration if in warranty time frame.

Order genuine Ditch Witch replacement or repair parts from your authorized Ditch Witch dealer. Use of another manufacturer's parts may void warranty consideration.

RESOURCES

Publications

Contact your Ditch Witch dealer for publications covering the operation, service, and repair of your equipment.

Ditch Witch Training

For information about on-site, individualized training, contact your Ditch Witch dealer.

FOREWORD

This manual is an important part of your equipment. It provides safety information and operation instructions to help you use and maintain your Ditch Witch equipment.

Read this manual before using your equipment. Keep it with the equipment at all times for future reference. If you sell your equipment, be sure to give this manual to the new owner.

If you need a replacement copy, contact your Ditch Witch dealer. If you need assistance in locating a dealer, visit our website at **www.ditchwitch.com** or write to the following address:

The Charles Machine Works, Inc.
Attn: Marketing Department
PO Box 66
Perry, OK 73077-0066
USA

The descriptions and specifications in this manual are subject to change. The Charles Machine Works, Inc. reserves the right to improve equipment. Some product improvements may have taken place after this manual was published. For the latest information on Ditch Witch equipment, see your Ditch Witch dealer.

Thank you for buying and using Ditch Witch equipment.

**Operator's Manual
FT5**

Issue No.1.0/OP-3/99
Part Number 054-058

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Perry, Oklahoma



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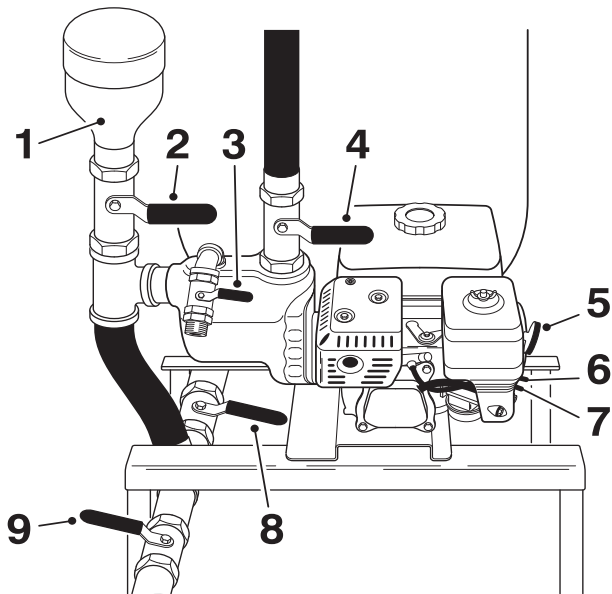
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CONTROLS

OVERVIEW



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1. Filler neck
2. Mixing valve
3. Discharge valve
4. Circulation valve
5. Rope start
6. Throttle
7. Choke
8. Tank discharge valve
9. Drain valve

DESCRIPTIONS

Filler Neck

Remove cap to add additives to drilling fluid mixture. Replace cap when finished.

Mixing Valve

Controls flow from filler neck to pump. Open only when pouring additives into filler neck for mixing. Close when finished.

IMPORTANT: Do not open valve unless pump is running.

Discharge Valve

Controls flow from FT5 to fluid pump on boring unit.

Circulation Valve

Controls flow from pump to tank. Open to circulate fluid between pump and tank while mixing.

Rope Start

Cranks engine for starting. Pull to start engine.

Throttle

Controls engine speed. Increasing engine speed also increases pump flow.

Choke

Regulates air/fuel mixture in engine.

Tank Discharge Valve

This valve must be open while unit is running.

Open this valve and the drain valve to drain fluid from tank. If drawing water into tank from an external source, open the drain valve and close this valve.

Drain Valve

Open this valve and tank discharge valve to drain fluid from tank. If drawing water into tank from an external source, open this valve and close tank discharge valve.

SAFETY

For additional precautions and guidelines, consult boring unit operator's manual before beginning bore. In addition, follow these guidelines before operating any jobsite equipment:

- Do not operate any equipment unless you have completed proper training and read the operator's manual.
- Wear personal protective equipment.
- Replace missing or damaged safety shields and safety signs.
- Do not operate unit where flammable gas is present.
- Use equipment carefully. Stop operation and investigate anything that does not look or feel right.
- Contact your Ditch Witch dealer if you have any question about operation, maintenance, or equipment use.

SAFETY ALERT CLASSIFICATIONS

These classifications and the icons defined on the following pages work together to alert you to situations which could be harmful to you, jobsite bystanders or your equipment. When you see these words and icons in the book or on the machine, carefully read and follow all instructions. **YOUR SAFETY IS AT STAKE.**

Watch for the three safety alert levels: **DANGER**, **WARNING** and **CAUTION**. Learn what each level means.



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



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



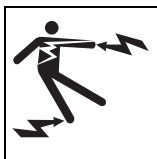
CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Watch for two other words: **NOTICE** and **IMPORTANT**.

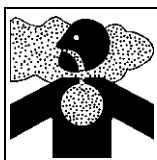
NOTICE can keep you from doing something that might damage the machine or someone's property. It can also alert you against unsafe practices.

IMPORTANT can help you do a better job or make your job easier in some way.

SAFETY ALERTS AND NOTICES



⚠ DANGER Electric shock. Contacting electric lines will cause death or serious injury. Know location of lines and stay away.



⚠ DANGER Deadly gases. Lack of oxygen or presence of gas will cause sickness or death. Provide ventilation.



⚠ WARNING Fire or explosion possible. Fumes could ignite and cause burns. No smoking, no flame, no spark.

**⚠ CAUTION**

Improper handling or use of chemicals may result in illness, injury, or equipment damage. Follow instructions on labels and in material safety data sheets (MSDS).

**⚠ CAUTION**

Fall possible. Slips or trips may result in injury. Keep area clean.

**⚠ CAUTION**

Hot parts may cause burns. Do not touch until cool.

LIFT



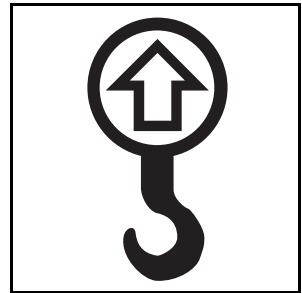
⚠ WARNING

Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

POINTS

Lifting Points

Lifting points are identified by lifting decals. Lifting at any other point is unsafe and can damage machinery.

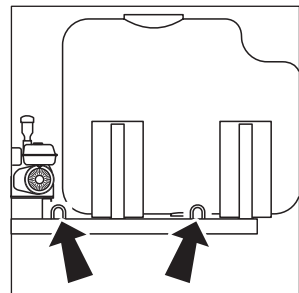


PROCEDURE

Lifting Skid

Lift skid by attaching chains to designated lift points on sides of skid.

IMPORTANT: Empty tank before lifting.



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SETUP

CHECK EQUIPMENT

Check the following before each day's work. Refer to **LUBRICATION AND MAINTENANCE** for additional information and locations.

- General appearance of equipment.
- Safety sign location and readability.
- All guard and shield locations. Replace if missing or worn.
- Condition of all wear items such as filters, hoses, and clamps.
- Drilling fluid hoses and electric cables for signs of leakage, wear, or other damage.
- Engine crankcase oil level. Keep oil level at the highest line on dipstick. Do not overfill.
- Fuel level. Fuel tank should be filled at the end of the day to reduce condensation.
- All nuts and bolts. Tighten if necessary.

SELECT DRILLING FLUID

For productive boring and equipment protection, use these recommended Baroid® products, available from your Ditch Witch dealer.

- Quik-Gel™ dry powder bentonite (P/N 259-804)
- E-Z Mud™ liquid polymer (P/N 259-805)
- Liqui-Trol™ liquid polymer suspension (P/N 259-808)
- Quik-Trol™ dry powder polymer (P/N 259-809)
- Bore-Gel™ drilling fluid (P/N 259-807)
- Con-Det™ water-soluble cleaning solution (P/N 259-810)
- Poly-Bore™ borehole stabilizing agent (P/N 259-820)

Guidelines

Match drilling fluid to soil type. Although specific conditions at each jobsite vary, use the following guidelines when selecting a drilling fluid.

If soil is . . .	use . . .
smooth, flowing sand	bentonite + medium-chain polymer
coarse sand or light soil	bentonite
heavy clay	long-chain polymer
swelling clay	long-chain polymer

For recommended mixture to reach desired drilling fluid viscosity or thickness, contact your Ditch Witch dealer.

Bentonite

IMPORTANT: Before adding bentonite to drilling fluid, be sure boring unit is equipped to use a bentonite mixture.

Bentonite is a dry powder. When properly mixed with water, it cakes on bore walls, lubricating the bore, keeping it open, and holding fluid in the bore.

Some things to remember when mixing bentonite:

- Use clean water free of salt, calcium, or excessive chlorine.
- Use water with a pH level between 7.5 and 10.
- Do not use bentonite containing sand.
- Mix bentonite thoroughly or it will settle in tank.
- Do not mix bentonite to a funnel viscosity of over 50.

For information on measuring funnel viscosity, read "Measuring Funnel Viscosity" in **OPERATION**.

Polymer

This drilling fluid additive provides excellent lubrication and increases viscosity. In swelling clay, polymer can reduce swelling that traps pipe in the bore.

There are two types of polymer:

- long-chain such as Baroid E-Z Mud.
- medium-chain such as Baroid Quik Trol.

Mixtures

Bentonite does not mix well in water containing polymer. To use both, mix bentonite first, then add polymer.

Bore-Gel contains premixed bentonite, polymer, and soda ash. Use 15 lb/100 gal (6.8 kg/378.5 L) in normal boring conditions and up to 45 lb/100 gal (20.4 kg/378.5 L) in sand or gravel.

PLAN DRILLING FLUID REQUIREMENTS

1. Determine boring conditions and choose appropriate drilling fluid mix.
2. Estimate amounts of supplies needed and check availability:
 - drilling fluid
 - water supply. If more water than can be carried with the unit will be needed, arrange to transport additional water.
 - bentonite and/or polymer
3. Check water quality.
 - Using litmus paper, perform a pH test on water.
 - If pH is below 5.0, add 1 cup (.25 L) soda ash per tank.
 - Test and repeat until pH is between 7.5 and 10.

OPERATION



WARNING

Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

NOTICES:

- Wear personal protective equipment including hard hat, safety eye wear, and hearing protection.
- Do not wear jewelry or loose clothing.

MIX DRILLING FLUID

1. Fill fluid tank with water. Allow room for additives.
2. Open circulation valve and tank discharge valve.
3. Start engine and run at half throttle or higher.
4. Open mixing valve.
5. Remove filler neck cap and pour bentonite, polymer and other additives into filler neck.

IMPORTANT: Before adding bentonite to drilling fluid, be sure boring unit is equipped to use a bentonite mixture.

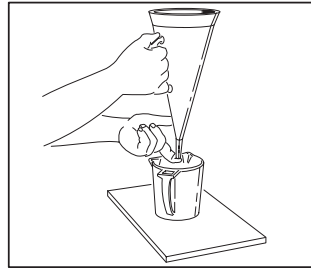
6. Close mixing valve and replace filler neck cap.
7. Mix well.

Measuring Funnel Viscosity

Fluid thickness is called viscosity. The higher the viscosity, the harder the fluid is to push through the system.

To determine viscosity, you will need a viscosity funnel and a measuring cup, available from your Ditch Witch dealer.

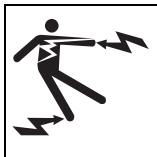
1. Take a fresh sample from the drilling fluid tank. The sample must be more than 1 qt (.95 L).
2. Hold funnel over 1-qt (.95-L) measuring cup and place a finger over the outlet.
3. Pour test sample into top of funnel. Fill to screen.
4. Remove finger and time flow. Count the number of seconds it takes for 1 qt (.95 L) of liquid to pass through the funnel. The number of seconds is the viscosity.



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See your Ditch Witch dealer for information on matching viscosity to soil type.

PUMP FLUID TO BORING UNIT



⚠ DANGER

Electric shock. Contacting electric lines will cause death or serious injury. Know location of lines and stay away.

NOTICE: If electrical strike occurs while fluid hose is connected to boring unit, fluid system also will become electrified.

1. Connect hose from mixing pump to boring unit.
2. Open discharge valve and adjust engine throttle to give desired flow rate to boring unit (approximately half throttle).

IMPORTANT: If using bentonite in fluid mixture, leave circulation valve approximately half open to allow continuous mixing while boring.

A higher throttle setting is necessary if recirculating fluid through the pump.

OPERATE IN COLD WEATHER

For successful operation in cold weather, follow these procedures.

- Use pump to keep drilling fluid circulating at all times, even when traveling to and from the jobsite.
- If possible, use all drilling fluid in tank before transporting the unit away from the jobsite.
- To prepare unit for storage in cold weather, open all valves and drain tank. Open drain valve on pump and drain pump.

LUBRICATION AND MAINTENANCE

LUBRICATION

Check oil level in engine daily. Fill as needed with SAE 10W40 engine oil. See manufacturer's manual for lubrication schedule.

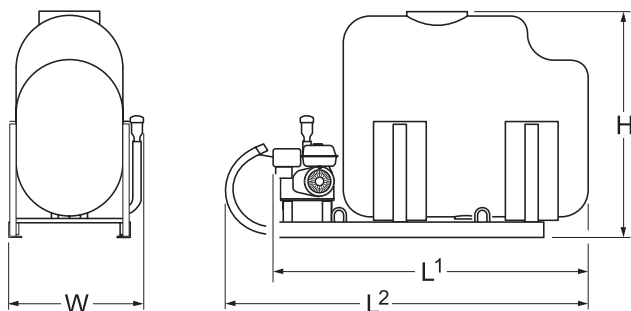
MAINTENANCE

Check filler neck daily. Filler neck should be clean and free of obstructions.

TROUBLESHOOTING

Problem	Possible solutions
poor drilling fluid mix characteristics	Test water pH and treat if necessary (see OPERATION for instructions).
	Residual polymer may be present in tank. Drain tank and remix fluid, adding bentonite first.
low yield properties	Test water pH.
	Try a different brand of drilling fluid additive.
	Add polymer to drilling fluid tank only after bentonite has been yielded out.

SPECIFICATIONS



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Dimensions	U.S.	Metric
L1, length (without hose and valve)	73 in	1.85 m
L2, length (with hose and valve)	84 in	2.13 m
W, width	32 in	0.81 m
H, height	53.5 in	1.36 m
Weight with empty fluid tank	402 lb	182 kg
Weight with full fluid tank	2071 lb	939 kg
Fluid System	U.S.	Metric
Fluid tank	200 gal	757 L
Fluid Capacities	U.S.	Metric
Fuel tank	1 gal	3.6 L
Engine oil with filter	0.63 qt	0.6 L
Engine	U.S.	Metric
Honda GX160, gasoline		
Flywheel power @ 3600 rpm	5.4 hp	4.0 kW

