

ORS Shallow Well Probe Scavenger™ (Single E-XP)

Installation and Operation Manual

TABLE OF CONTENTS

Chapter 1: System Description	P. 03
Function and Theory	P. 03
System Components	P. 05
Chapter 2: System Installation	P. 06
Chapter 3: System Operation	P. 08
Chapter 4: System Maintenance	P. 10
Chapter 5: System Troubleshooting	P. 11
Chapter 6: System Specifications	P. 13
Chapter 7: System Schematic	P. 14
Chapter 8: Replacement Parts List	P. 15
The Warranty	P. 17

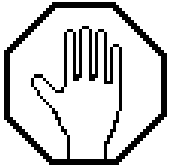
DOCUMENTATION CONVENTIONS

This manual uses the following conventions to present information:



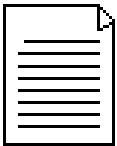
WARNING

An exclamation point icon indicates a **WARNING** of a situation or condition that could lead to personal injury or death. You should not proceed until you read and thoroughly understand the **WARNING** message.



CAUTION

A raised hand icon indicates **CAUTION** information that relates to a situation or condition that could lead to equipment malfunction or damage. You should not proceed until you read and thoroughly understand the **CAUTION** message.



NOTE

A note icon indicates **NOTE** information. Notes provide additional or supplementary information about an activity or concept.

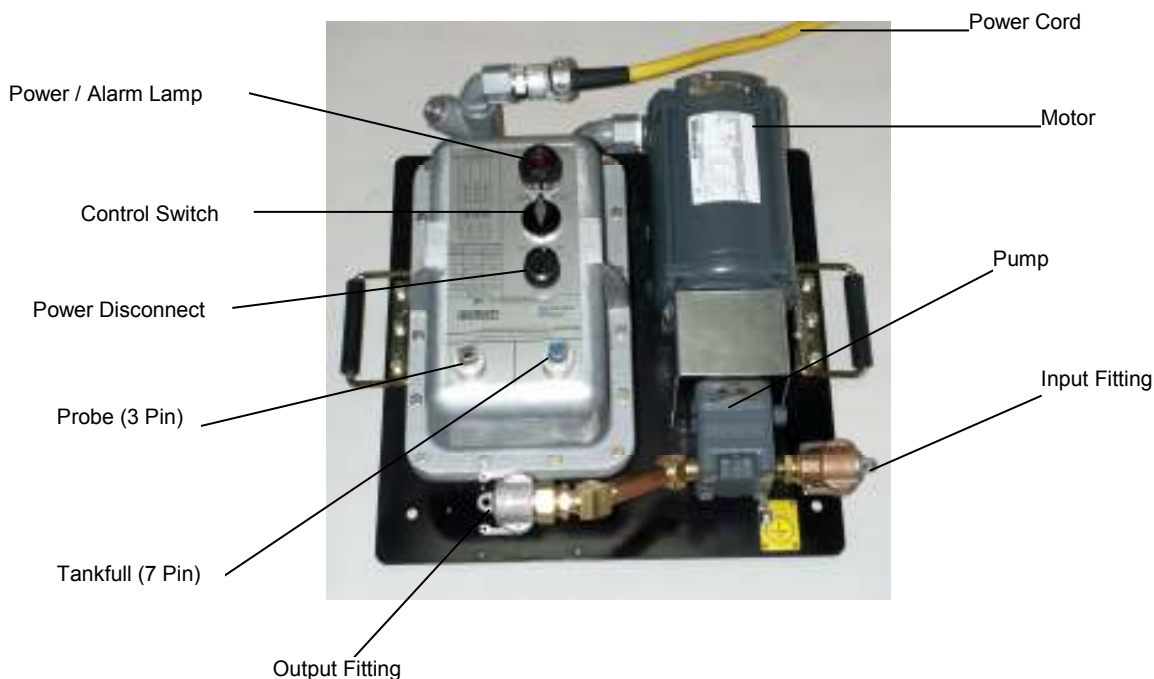
Chapter 1: System Description

Function and Theory

ORS Shallow Well Probe Scavenger™ Product Pump is an explosion proof pumping system for removing hazardous hydrocarbons from the surface of water in wells. Used with its product probe, the system pumps only hydrocarbons from wells 2" in diameter or larger.

The system is flexible: The pump and probe may be placed at any depth within the suction lift capabilities of the pump, and where there is at least 3 ft. of product and/or water in the well. All hazardous electrical parts are in explosion proof containers and the probe itself is intrinsically safe.

The system consists of a pump control module (Figure 1), a product probe (Figure 2), an intake (Figure 3), and a tank full probe (Figure 4). The standard unit is a 1/4HP, 4gpm, 115/230V, single phase gasoline pump. The suction line is 20' long and the pump will lift 20' if properly primed.



**Figure 1 - ORS Filter Scavenger™
Control Module Assembly**

The pump control module consists of the pump/motor, and the control box which contains the pumps electronics. The probe connects to the top of the control box.

With the control switch in the AUTO position, the product probe controls the pump. The HAND position overrides the probe and directly powers the pump. A red light indicates float status and tank full override conditions.

The standard probe (Figure 2) consists of a 1" diameter hydrocarbon float and a 1" diameter water float. When the hydrocarbon float rises, it activates a time delay which turns on the system **after a user set period**. This time may be varied by adjusting a potentiometer in the control box. This delay prevents the pump from turning on and off too frequently. The water float prevents the pump from running when the intake is in water.

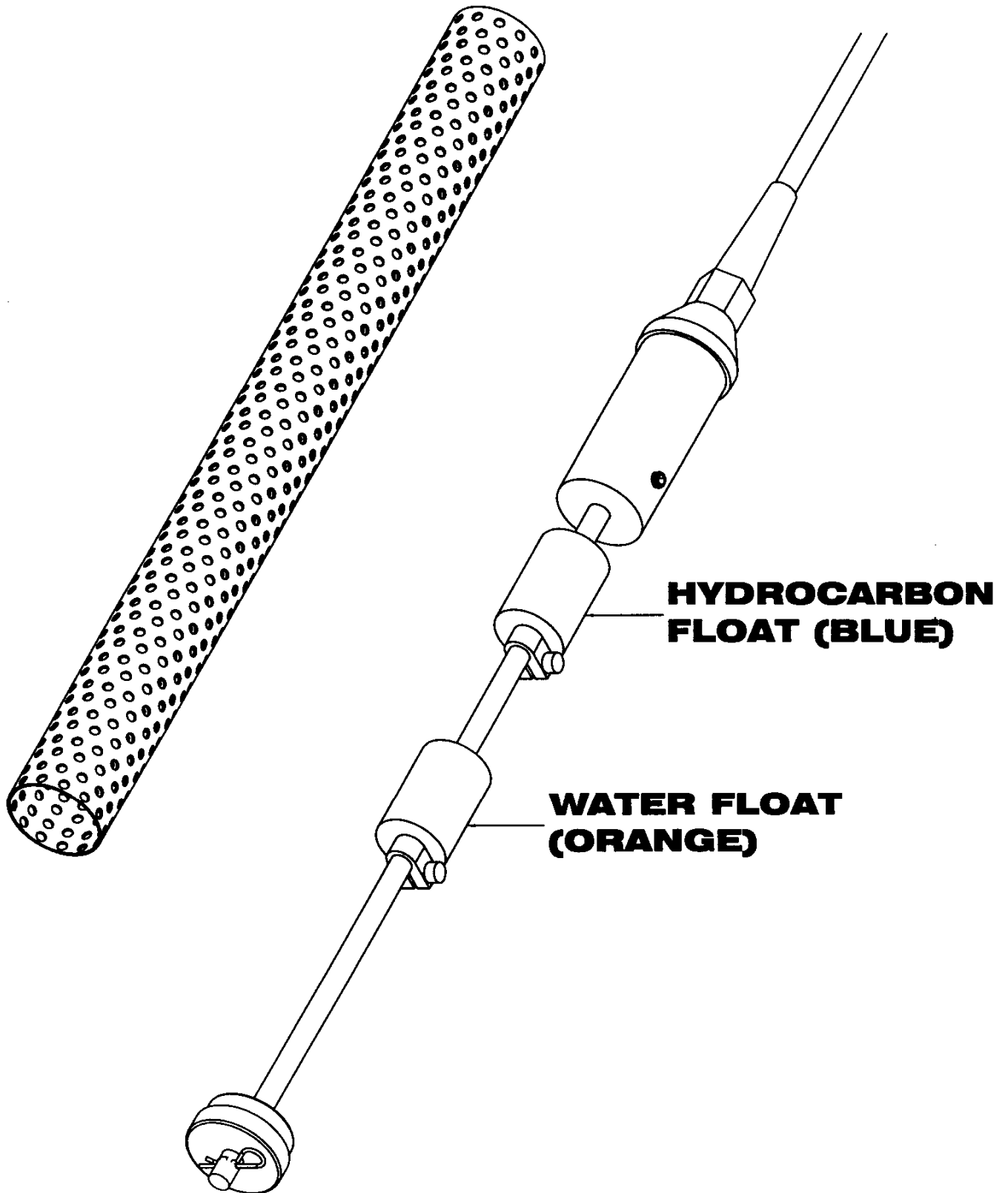


Figure 2 – Probe float assembly

System Components

Control Module Subassembly Functions

Power Fuses: Power fuses are found in the explosion proof box (two fuses for 115VAC and three fuses for 230VAC).

Solid State Relay (SSR): Located in the bottom of the explosion proof box, switching the black power line. This SSR provides arc less, highly reliable on and off switching of the ORS Shallow Well Probe Scavenger™. Pins 1 & 2 with 8-32 screws and terminals are the main power contacts to the motor. Pins 1 & 2 are interchangeable. Pins 3 & 4 with 6-32 screws are on the control side. An AC voltage between 3 & 4 will switch the AC line. The label on the relay indicates the necessary AC voltage.

Solid state relays leak when off. This leakage is about 10 -15 mA. Thus a voltmeter cannot be used to tell if a relay is off, unless the relay is connected to a low resistance load.

Seal Off: Potted conduit which isolates the explosion proof part of the system and allows the use of non-explosion proof control box, switch and receptacles.

Control Box: Contains the HAND-OFF-AUTO selector switch. It contains a red light on its cover.

Motor: The motor is a 1/4 HP, 1725RPM, explosion proof unit with capacitor start and dual voltage AC. It is not waterproof and, like the other components of the pump control module, should not be submerged. It is wired for clockwise rotation (from lead end of motor) and has thermal overload protection. It is not grounded internally. Should the pump "freeze up", the thermal overload will cycle continuously.

Pump: The pump is a Viking 4 GPM hydraulic pump with carbon bearings and Viton seals.

The pump is mated to the motor with a spider coupling. 1/4-20 socket set screws make the shaft to shaft connection. Some non-detergent oil should be squirted into the pump occasionally, especially if it has been pumping gasoline or solvents or if it is going into storage. Water left in the pump can only damage it.

Chapter 2: System Installation

Probe scavenger control system

The ORS Shallow Well Probe Scavenger™ Controls consist of the electronics in the control module, the product pump and motor, the product probe and the tank full probe.

The control system provides the user with many options to best suit his/her recovery needs. It is rated explosion proof for class I, division I, Group D hazardous locations and meets with intrinsic safety standards.

The controls on the control box are described below:

Control Switch: 3 position HAND-OFF-AUTO

HAND - Pump is on regardless of probe sensing conditions. The tank full will override.

OFF - Pump is off regardless of sensing conditions.

AUTO - Pump is on only when the Hydrocarbon float is up and the water float and Tank Full float is down.

Red Indicator:

When illuminated it either indicates that the recovery tank is full or the intake is in the water. This signal is received from the tank full probe. When the float on the tank full rises, the pump will not operate and thus avoids overfilling the recovery tank.

Float Time Delay Potentiometer:

(Inside control box): Sets time delay to turn on pump. When hydrocarbon float rises. Range from 2 sec. – 8 min. A LOW-TIME delay setting is appropriate for situations in which product builds up rapidly, while the HI-TIME DELAY setting is designed for pumping thin product layers.

Tank full Receptacle:

7-pin receptacle for tank full probe

Product Probe Receptacle:

3 pin receptacle on top of control box for the following sensing elements

HI Sensor:

This density float when in water, sends a signal to the control module which prevents the product pump from running.

Product Float:

A small blue cylinder with embedded magnet which activates the AUTO reed switch to run the pump. The AUTO reed switch is 2" above the water float. The float will rise in either product or water.

Tankfull Probe:

The tank full override probe is designed to be mounted on the recovery tank. It has both a 3/4" NPT bushing for a 55 gallon drum and a 2" NPT bushing for larger tanks. A groove has been cut into the bushings for venting purposes. The tank full probe is wired in such a way that a broken wire will disable the pump. When the recovery tank is full, the float on the tank full rises, and sends an override signal to the control module. This prevents the pump from running and steadily illuminates the red LED on the control box.

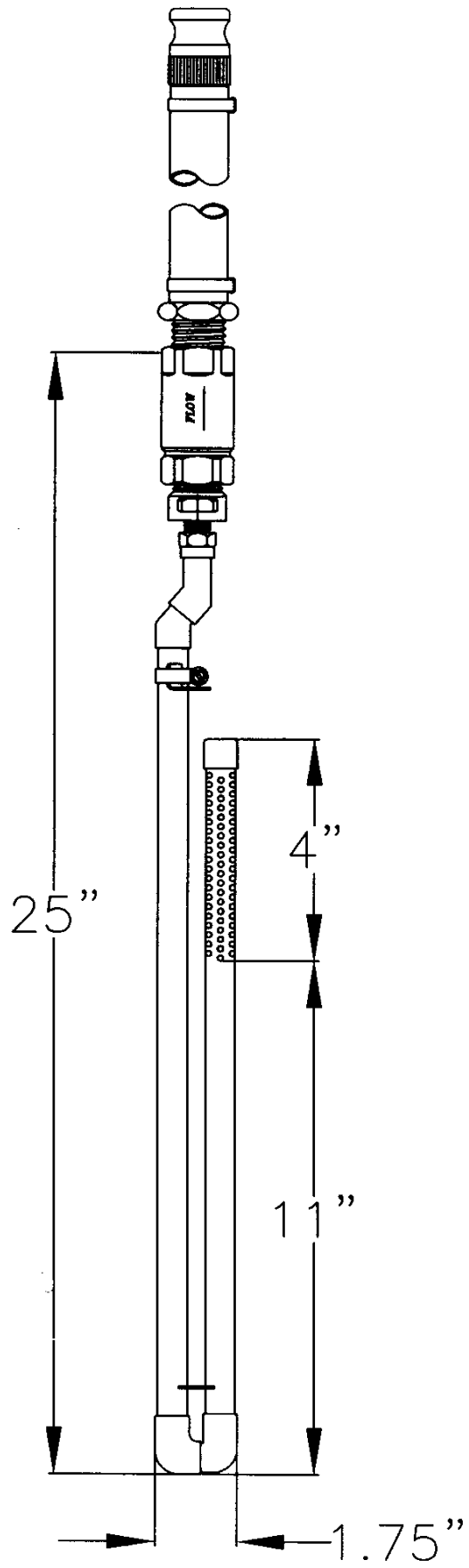
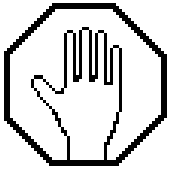


Figure 3 – Product Intake

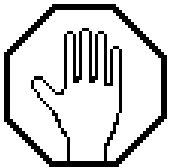
Chapter 3: System Operation



THIS SYSTEM IS EXPLOSION PROOF. DISCONNECT POWER BEFORE OPENING ANY ENCLOSURE.

Before the ORS Shallow Well Probe Scavenger™ is deployed it should be set up and tested. It is best to first familiarize yourself with the controls:

1. Set the control module near the well.
2. Connect the tank full probe. The tank full cable connector fits into the 7-pin receptacle on the top of the control box. There is a slot on this receptacle at its top. Line up the plug, push the connector and tighten it clockwise until it locks into position.
3. Connect the product probe. The probe cable connector fits into the 3-pin receptacle on the top of the control box.
4. Insert the control module power plug into an appropriate single phase power source. (If your unit operates on 115VAC, connect to an 115V source; if your unit operates on 230VAC, connect to a 230V source).
5. Refer to Chapter 2 and go through, HAND, OFF and AUTO selections. A bucket of water 12" deep can be used for testing purposes. Turning the probe upside down in air (while holding the water float down) simulates product.



Do not run the pump dry for more than 5 seconds as this will damage the gears beyond repair.

6. To check the pump, briefly turn the control switch to HAND. The pump should start. Turn the switch to OFF.
7. Turn the selector switch to AUTO and turn the product probe upside down in air (while holding the water float down). This simulates a situation in which the product float has risen and the probe is in product only. The pump should start.
8. Now, lift the float on the tank full probe to simulate a full recovery tank. The pump should stop and the red indicator should be steadily illuminated.
9. Drop the tank full float and turn the product probe right side up in air. The pump will not start because the product float will be down. Now, start the pump by lifting the product float and dip the probe in water until the water float is submerged, which should stop the pump.

The control functions are summarized below:

HAND - Pump is on regardless of probe sensing conditions. The tank full will override.

OFF - Pump is off regardless of sensing conditions.

AUTO - Pump is on only when the probe is in contact with the product, no water alarm is present, and the tankfull probe float is down.

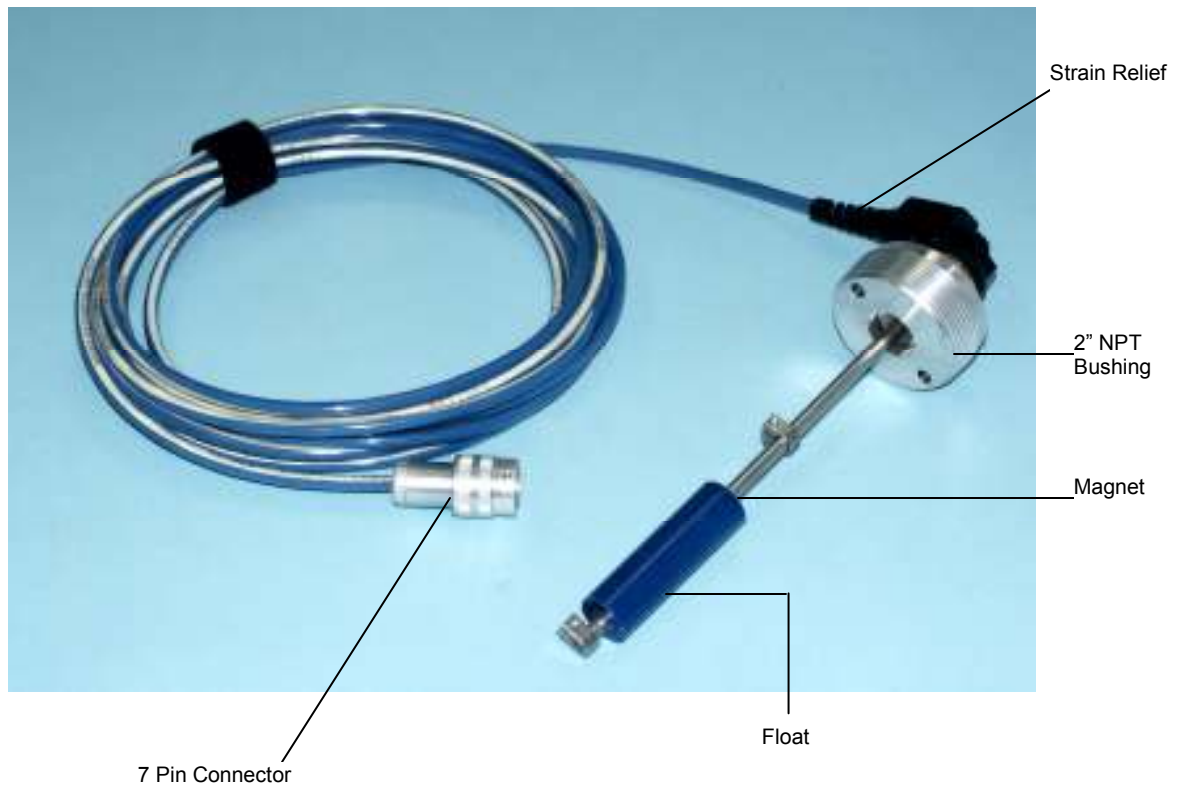


Figure 4 – Tankfull Probe

The ORS Shallow Well Probe Scavenger™ System can be deployed in two different configurations.

- A. With no water pump.
- B. With independent water pump.

Option A: With no water pump:

This situation will produce very slow recovery rates unless there is considerable product layer. The best location for the probe is slightly below the middle of the product layer.

To deploy and start the system, simply lower intake/probe assembly into the well, confirm that the output hose is secured at the recovery tank and turn the control switch to AUTO. Assuming that sufficient product is present in the well, the ORS Shallow Well Probe Scavenger™ will begin pumping.

Option B: With independent water pump:

In this option, the water pump is used to depress the water table and thereby concentrate product in the well. Since the water and product pumps are operating independently, any change in the level of the water table will require readjustment of the pumps intakes in the well.

The water alarm indicator is useful in determining when readjustment of the intake is necessary. When the intake assembly is set too deep, the red light will illuminate indicating that the water float is under water. If set too shallow, there will be no signal.

When using a water pump with the ORS Shallow Well Probe Scavenger™, the water pump must be deployed first. Follow the instructions in the Water Table Depression Pump manual. After the water pump has been deployed and a pumping level established, deploy the ORS Shallow Well Probe Scavenger™ as described in option A.

Chapter 4: System Maintenance

The ORS Shallow Well Probe Scavenger™ pump/motor and control electronics are factory sealed and require no maintenance. The only regular maintenance required is periodic cleaning of the system probes. Every week, or more often as necessary, rinse both probes in clean fuel and/or hot water. This procedure will prevent fouling of the probes and sticking of the floats. Also while the intake is out of the well, check to ensure no accumulation of debris has occurred on the intake strainer.

Check to ensure there are no obstructive kinks or holes in the intake hose.

Chapter 5: System Troubleshooting



Disconnect power before opening any enclosure. Carry out troubleshooting procedures in a non-hazardous location.

In the following section, possible malfunctions are listed along with suggested procedures for determining their causes. In many cases, these troubleshooting procedures can be simplified by using the three relay LED's as diagnostic indicators of system status.

LED	ON	OFF
A	<ol style="list-style-type: none"> 1. Water float in probe up 2. Short between "A" & "C" on probe, probe connector, or in wiring 3. Defective relay 	<ol style="list-style-type: none"> 1. Water float in probe down 2. No connection between "A" & "C" on probe, probe connector, or in wiring 3. Defective relay
B	<ol style="list-style-type: none"> 1. Oil float in probe up 2. Short between "A" & "B" on probe, probe connector, or in wiring 3. Defective relay 	<ol style="list-style-type: none"> 1. Oil float in probe down 2. No connection between "A" & "B" on probe, probe connector, or in wiring. 3. Defective relay
C	<ol style="list-style-type: none"> 1. Tankfull float down 2. Short between "A" & "B" on tankfull, tankfull connector, or in wiring 3. Defective relay 	<ol style="list-style-type: none"> 1. Tankfull float up 2. No connection between "A" & "B" on tankfull, tankfull connector, or in wiring 3. Defective relay

**Table 1 – ORS Filter Scavenger™
System status as indicated by LED's on Intrinsically Safe relay**

The LED's, located on the relay inside the pump control module relay box (see System Schematic), indicate the positions of the oil and water floats inside the probe, as well as the tankfull float in the recovery tank. An illuminated LED indicates a closed switch. The table above summarizes the conditions which cause each of the LED's to be either ON or OFF.

PROBLEM: Motor does not run on HAND or AUTO.

1. Check power source.
2. Check recovery tank. If full, check for defective alarm indicator bulb on control switch box.
3. Check tankfull probe. Disconnect tankfull cable connector from connector box and jumper sockets A & B in the receptacle. If motor runs, the problem is in the tankfull itself. Confirm that the tankfull float is free on its shaft.
4. Move system to a non-hazardous location. Open the XP box, plug in the PCM and turn the power disconnect switch to the ON position. Jumper sockets A & B in the tankfull receptacle. The red LED (marked "C") on the top of the relay should be illuminated. If the LED is not illuminated, disconnect power and check the continuity between #4 & #5 on the relay. If this continuity check reveals an open circuit, call Geotech Environmental Equipment, Inc. for assistance.
5. If no open circuit is found and the motor still does not run, disconnect power, open the control switch box and check fuses. In 115 V systems, the switch box contains one 20 AMP fuse and one 1 AMP fuse. All 230 V systems have two 8 AMP fuses and 1 AMP fuse. Replace fuses if necessary and reseal box.



When resealing any explosion proof box, clean the cover flange and coat with LUB-G Flame Joint Grease (ORS part no. PPC-016-002).

6. If the fuses are good, transport the system to a non-hazardous location and use the following procedure to test the mechanical relay in the control switch box. The ORS Part No. for the relay is PPE-014-091 (230VAC) or PPE-014-090 (115VAC). Referring to Figure 5, run a jumper from the Normally Open contact to the Common on the plastic relay receptacle. Be careful not to short the switch contacts to the explosion proof box. Apply power to the system. If the motor runs with the control switch in the HAND position the mechanical relay must be replaced.
7. If the motor does not run, disconnect power, remove the jumper attached in step #6 and open the power disconnect box. Now with the control switch in the HAND position, check the resistance between the Normally Open contact on the mechanical relay receptacle (in the control switch box) and pin 4 on the solid state relay (ORS Part No. PPE-014-092) inside the power disconnect box.

If the meter indicates a short circuit, replace the relay. If the meter indicates an open circuit, check for loose or broken wires. If none are found, call Geotech Environmental Equipment, Inc. for assistance.

PROBLEM: Motor runs on HAND but not on AUTO.

Most problems on the AUTO setting can be traced to float malfunctions. Examine the center (oil) float and confirm that it is not filled with oil and that it is free to move up and down throughout its normal travel.

Also check to see that the smaller (water) float is not stuck in the up position and that there are no obstructions between the float and its seat. If a float malfunction is not the problem, examine the control cable for cuts and breaks. Finally, use an ohmmeter to test the probe control circuit (refer to System Schematic, page 14). In the probe cable receptacle are three small pin receptacles labeled A, B, and C. With the meter on the R x 1 scale, these receptacles should read electrically as follows:

- A-C Open when water float is down.
- A-C Closed when water float is up.
- A-B Open when the oil float is down.
- A-B Closed when the oil float is up.

PROBLEM: Motor runs continuously on AUTO.

1. Disconnect the probe to determine if the oil float is stuck in the up position.
2. If the motor continues to run, the problem is not in the probe. Disconnect the tankfull to check for a fault in this unit.
3. If neither the oil float nor the tankfull is found to be faulty, check for a solid state relay failure. Unplug the pump control module from its power source, move to a non-hazardous area and open the control switch box. Lift off the box cover being careful not to short the switch to the explosion proof box. Remove the 1 AMP fuse and apply power to the system. If the pump runs, the SSR is faulty and must be replaced.
4. If the SSR is not faulty, replace the fuse and check the resistance across the HAND-OFF-AUTO switch. (See System Schematic on page 14). Move the switch from HAND to OFF. The meter should show a change from a short circuit to an open circuit. If the switch cannot be made to operate properly, call Geotech Environmental Equipment, Inc. for assistance.
5. If the control switch is not at fault, check the Intrinsically Safe relay inside the relay box. Disconnect power and open the box. Check the resistance between pins 11 and 12 on the relay. If the meter indicates a short circuit, check for shorted wires. If none are found, call Geotech Environmental Equipment, Inc. for assistance.

PROBLEM: System runs normally but alarm indicator remains on.

1. Disconnect power, move the system to a non-hazardous location and open the Intrinsically Safe relay box. Check the resistance between pins 9 and 10 on the relay. If the meter indicates a short circuit, check for shorted wires. If no shorts are found, the relay must be replaced. Call Geotech for assistance.

PROBLEM: Pump runs but loses prime

1. Check for a stuck or cracked check valve. Replace if necessary
2. Check for damaged hoses. Replace if necessary.

Chapter 6: System Specifications

System Type:

- Standard Deep Well
- Small Diameter Deep Well
- Surface Mounted Shallow Well
- Chlorinated
- Viscous Oil

Power Requirements:

___ HP

___ Voltage

___ Phase

___ Amps

Fuses:

_____ F1, _____ F2, _____ F3

Lengths & Dimensions:

Fits in _____ inch diameter wells

___ ft. Sensor Cable

___ ft. Start Cord

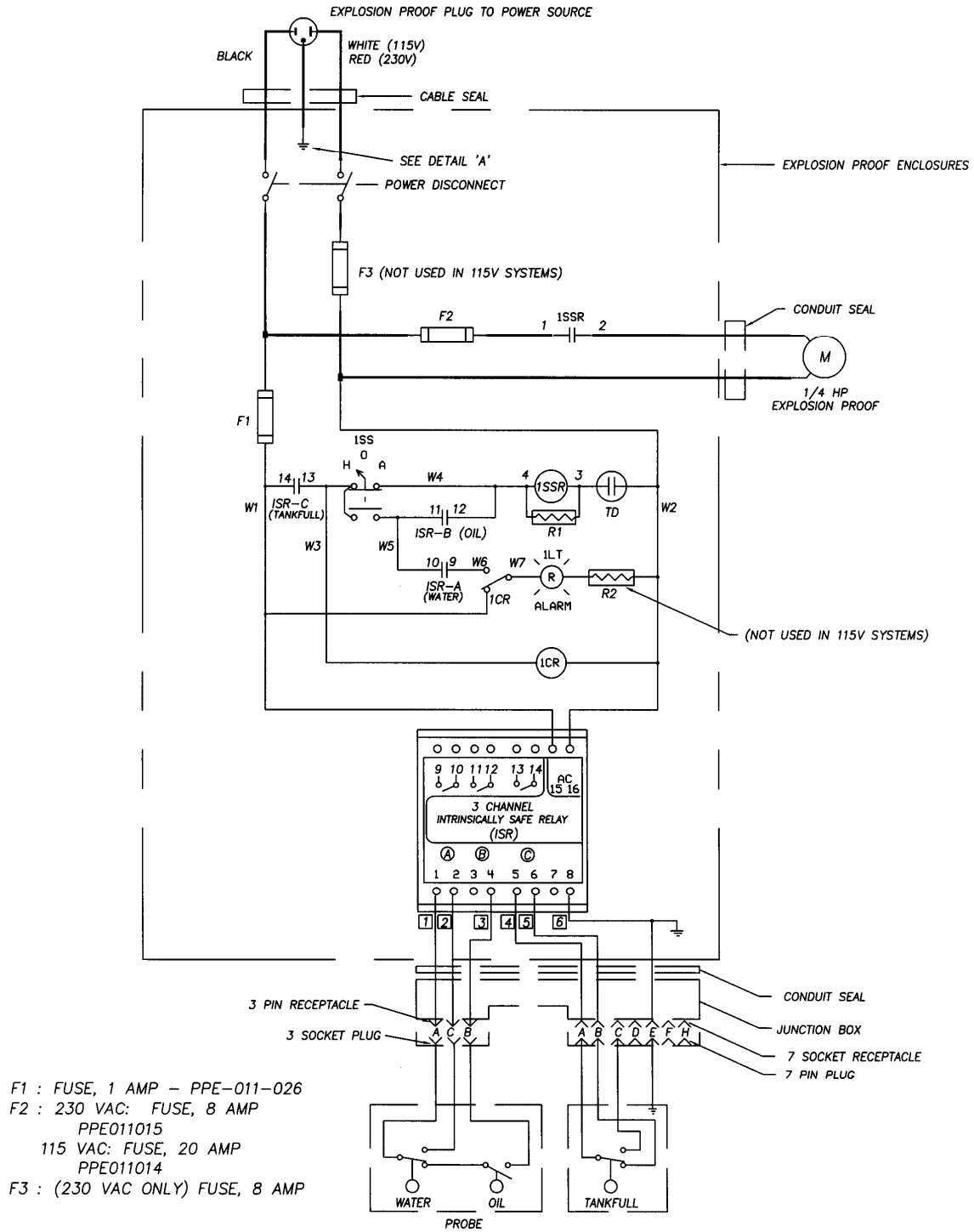
___ ft. Tank full Cable

Serial No _____

P.I.D. No. _____

Inspected by: _____

Chapter 7: System Schematic



Chapter 8: Replacement Parts List

Part Number

Part Description

PROBE

2010045
2010013

Kamlock dust cap assembly
Dust cap for Amphenol connector

PUMP CONTROL MODULE

ORS026004
ORS026005
PPF028001
ORS036002
2010044
PPE014090
PPE014091
PPE014092
PPP005017
PPE018004
PPM024005
2011036-25
2012006
PPE017001
PPE017003

Plastic case
Drain screen
Case foot
Portal barrier
Portal cover
Mechanical relay (115VAC)
Mechanical relay (230VAC)
Solid state relay
Pump only
Motor only
Pump/motor coupling
Power cord assembly (115VAC)
Power cord assembly (230VAC)
Power plug (115VAC)
Power plug (230VAC)

TANKFULL

PN 2010014
PN 2010023

Standard Tankfull Assembly
Tankfull float assembly

OUTPUT HOSE

ORS037001
ORS037002

Hose, with grounding clip
Hose, w/o grounding clip

INTAKE

2020007
ORS330004
ORS698005
ORS698006
PPF029005
PPF057012
PPP001023
PPP002025
PPP006039
PPP007003
PPP012049

Intake Assembly
Intake
Top probe bracket
Bottom probe bracket
Hose clamp
Worm clamp
Gas hose
Hosebarb
Check valve
Quick disconnect
Bushing

PRODUCT PROBE

PN 56030003
PN 00221
PN 00229
PN 2010037
PN 2020102
ORS231004
PN 2020101

Product probe assembly
Probe bottom
Hairpin
Collar
Product float assembly
Probe casing
Water float assembly

SPARE PARTS

201002
2012068
PN 16030005

Spare parts bag (115VAC)
Spare parts bag (230VAC)
Operation Manual

Notes

The Warranty

For a period of one (1) year from date of first sale, product is warranted to be free from defects in materials and workmanship. Geotech agrees to repair or replace, at Geotech's option, the portion proving defective, or at our option to refund the purchase price thereof. Geotech will have no warranty obligation if the product is subjected to abnormal operating conditions, accident, abuse, misuse, unauthorized modification, alteration, repair, or replacement of wear parts. User assumes all other risk, if any, including the risk of injury, loss, or damage, direct or consequential, arising out of the use, misuse, or inability to use this product. User agrees to use, maintain and install product in accordance with recommendations and instructions. User is responsible for transportation charges connected to the repair or replacement of product under this warranty.

Equipment Return Policy

A Return Material Authorization number (RMA #) is required prior to return of any equipment to our facilities, please call 800 number for appropriate location. An RMA # will be issued upon receipt of your request to return equipment, which should include reasons for the return. Your return shipment to us must have this RMA # clearly marked on the outside of the package. Proof of date of purchase is required for processing of all warranty requests.

This policy applies to both equipment sales and repair orders.

FOR A RETURN MATERIAL AUTHORIZATION, PLEASE CALL OUR SERVICE DEPARTMENT AT 1-800-833-7958 OR 1-800-275-5325.

Model Number: _____

Serial Number: _____

Date: _____

Equipment Decontamination

Prior to return, all equipment must be thoroughly cleaned and decontaminated. Please make note on RMA form, the use of equipment, contaminants equipment was exposed to, and decontamination solutions/methods used.

Geotech reserves the right to refuse any equipment not properly decontaminated. Geotech may also choose to decontaminate equipment for a fee, which will be applied to the repair order invoice.

Geotech Environmental Equipment, Inc
2650 East 40th Avenue Denver, Colorado 80205
(303) 320-4764 • **(800) 833-7958** • FAX (303) 322-7242
email: sales@geotechenv.com website: www.geotechenv.com