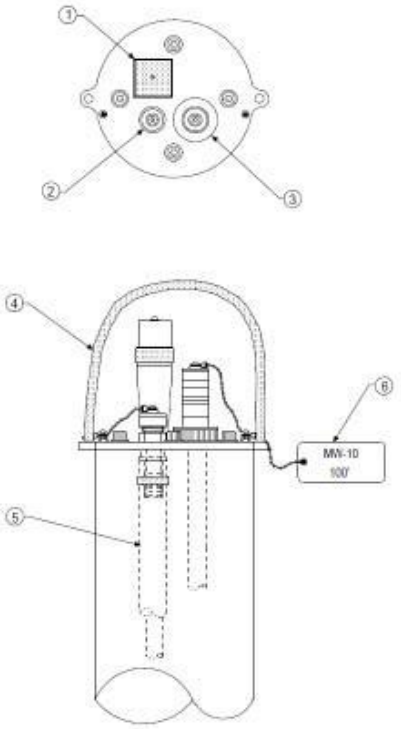
geotech

DEDICATOR

Groundwater Sampling System

Installation and Operation Manual



Rev 7/2/14 Part # 11410190

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DOCUMENTATION CONVENTIONS

This document 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.

Section 1: System Description

The *DEDICATOR* dedicated sampling system has been especially designed for the Grundfos Redi-Flo2 electric submersible pump. The *DEDICATOR* makes installation, operation, and sampling with the Redi-Flo2 simple and easy. Please take time to carefully read this manual if you are not familiar with this product.

This manual is specified for the *DEDICATOR* system with HAPPY HOSE! This manual applies to both the outside diameter well seal "OD" and the inside diameter seal "ID" versions of the *DEDICATOR*. The drawings used in this manual show the "ID" version, but apply to both versions. The difference between the two versions is that the "OD" was designed to fit and seal against the outside diameter of your well head and the "ID" was designed to fit and seal against the inside diameter of your well head.

Initial Inspection and Handling

Upon receipt of your new system, inspect the shipping package and contents for damage. If any damage is apparent, contact the carrier and note the signs of damage on the appropriate shipping form. If any damage is found, immediately file a claim with the carrier. Check the cable length information attached to the well seal to make sure the appropriate amount of cable is included and that a sample tube assembly is included.

Do's and Don'ts

THIS SECTION IS VERY IMPORTANT. PLEASE READ BEFORE PROCEEDING WITH OPERATION OF YOUR SYSTEM.

Do lower the system slowly down the well.
Do tighten all the bolts before operating the system.
Do remove the sample fitting from the storage port and install it on the purge port before operating.
Do check the length on the *DEDICATOR* identification tag before installing.
Do leave the access port open during operation to vent the well.

Don't over-torque the sample hose fitting when installing it in the access hole for storage. It is only necessary to tighten until the O-ring is seated on the seal.
Don't allow water to build up inside well seal connector. If water build-up does occur, dry COMPLETELY before operation. The electrical connector is splash-proof but not submersible.

Features

1. Splash-resistant electrical connector with cap for connecting the *DEDICATOR* converter cable (P/N 3P150) to the converter (P/N 3P850 or P/N 3P855; required for operation).

2. Storage/access port for sample hose storage and access for using a water level indicator or other down-hole de- vice with less than 0.5" O.D.

3. Discharge port for connection to sample tube. Stainless steel discharge fitting for 0.5" I.D. tubing.

4. Rope handle for installation.

5. HAPPY HOSE! - bonded wire, safety cable and discharge hose.

6. Identification tag states well number, system length, model number and serial number.

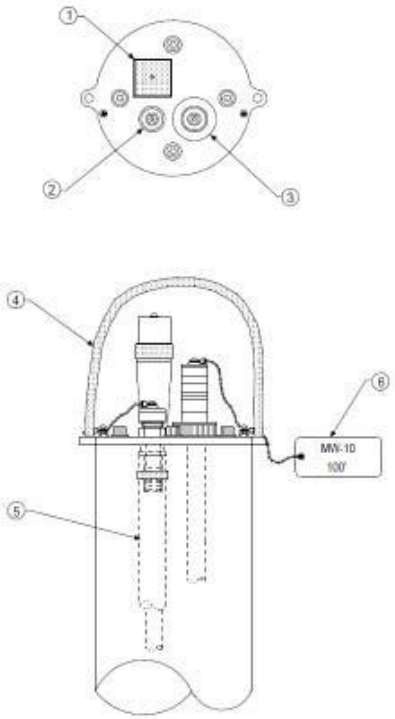


Figure 1: DEDICATOR

Section 2: System Installation & Operation

The *DEDICATOR* Dedicated Sampling System was designed to be installed by lowering the pump and HAPPY HOSE! into the well then tightening the bolts on the well seal to accomplish a water-tight seal.

Installation

Note: A 3/16" long-arm hex key is provided for installation.

Step 1
Check the water level and total depth of the well to verify the correct installation elevation. HAPPY HOSE! lengths ("A") are referenced from the bottom of the pump to the bottom of the well seal plate (see Figure 2; dimension "A" on following page). The well seal plate sits flush against the top of the well casing.

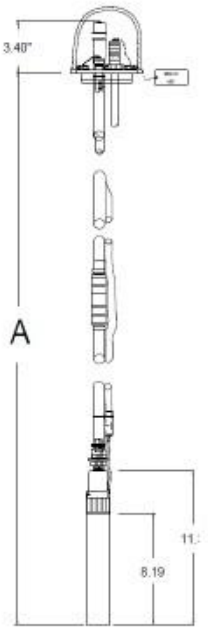


Figure 1: Reference Points

Step 2
Position the *DEDICATOR* assembly over the well opening and lower the pump and HAPPY HOSE! slowly into the well. Be sure not to scrape the HAPPY HOSE! on the edge of the well casing.

Step 3

Once the system is lowered, position the well seal onto the well casing until seated. Tighten all the bolts on the well seal. The sample tube was designed to be stored in the well when not in use, as shown in Figure 3. The sample tube is included loose in the shipping box. To store the sample tube, feed the sample tube down into the well through the access port. Thread and tighten the sample tube end fitting into the port — DO NOT OVER-TORQUE THE FITTING — it is only necessary to tighten the fitting until the O-ring is seated on the seal. Thread and tighten the access port plug into the top of the sample tube fitting (see Figure 3).

Note: THE *DEDICATOR* WILL OPERATE ONLY WHEN USED WITH THE GRUNDFOS BMI, BTI OR VFD CONVERTER.

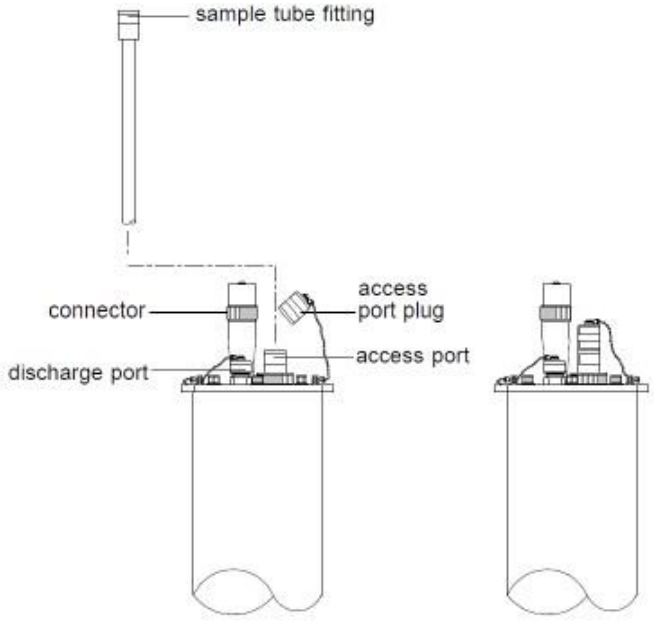


Figure 1: Reference Points

Operation

Step 1
Remove top plug from access port. Remove the sample tube from the access port, and then remove the discharge port cap. Attach the sample tube fitting to the discharge port fitting and tighten. Do not re-install access port top plug. Port must be open during operation to vent the well. It is okay for the top plug to rest in the access port, but DO NOT tighten it.

Step 2
Remove connector hood. Attach the converter cable to the well seal connector. Attach the other end of the converter cable to the Grundfos converter.

Step 3
Operate the pump and Grundfos converter per the pump and converter specifications found in Section 6. **To start the pump**:

A. Start the power source (i.e., generator) — if the generator has a circuit breaker, switch it on.
B. Check the frequency display on the front of the converter. It should read "0" (zero). If it doesn't, refer to the Troubleshooting section.
C. If this is the first time the converter is being used, or if it has not been used for more than six months, leave the converter on for at least 15 minutes before proceeding to the next step.
D. Set the converter speed dial near the middle of the dial (12 o'clock position).
E. Start the pump by pressing the **Start/Stop** switch to the "Start" position.
F. Adjust the pump performance by turning the speed dial.

The pump may become clogged if pumping suspended solids. Refer to the trouble-shooting section to dismantle the pump end.

Step 4
When sampling is complete, turn off the converter by moving the **Start/Stop** switch to the "Stop" position. TURN THE POWER OFF AT THE GENERATOR before disconnecting the *DEDICATOR* converter cable from both the well seal and the converter. Disconnect the sample tube from the discharge port fitting and store the sample tube as shown in Figure 3.

Step 5
Replace and tighten the discharge port cap and the access port top plug. Replace the hood on the well seal connector.

Operating Conditions

- The electrical voltage to the converter must always be + or - 10% of the specified power supply voltage. For the 230V converter - between 207 and 253 volts, single phase AC; or between 104 and 126 volts for 115V converter.
- The motor and pump must be completely submerged in fluid to ensure lubrication of the shaft seal and cooling of the motor.
- The pump is capable of producing a total head equivalent to 270 feet of water. Total head includes the distance from the ground level to the pumping level of the water in the well and all friction losses.
- If the pump is used in a well larger than 4" in diameter, a shroud should be used around it to ensure proper motor cooling — call INW for details
- The temperature of the water being pumped should be between 34°F and 86°F (1°C and 30°C).
- If the temperature drops below freezing and your pump is frozen so the motor shaft cannot rotate, pull the pump out and lower it into water and start it at the slowest speed possible. Continue to operate the pump at this speed for about 10 minutes, at which time it should thaw and operate properly.

Section 3: Maintenance & Storage

The *DEDICATOR* requires minimal maintenance due to the specially designed features.

To properly care for the *DEDICATOR:*

1. Replace all caps, plugs, and hoods on the well seal when wear is apparent to prevent contamination and corrosion of electrical connections.
2. Store the extension cable in a dry place with the converter.
3. Make sure the well seal connector is completely dry before operating.

There is no recommended preventative maintenance for pump components. Reduced pump performance may be indicative of wear, especially if pumping suspended solids. See page 8 - “Checking the impellers for wear”. Disassemble the pump end impeller assembly (see figure 5, page 9) and examine for wear according to the following:

Impellers --- should show no visible wear Guide
vane --- should show no visible wear
Wear ring -- minimum thickness should never be less than 1.0mm

Replace any worn components using either a pump-end replacement kit (P/N 3P105) or a PTFE pump-end replacement kit (P/N 3P120).

Section 4: Troubleshooting

If you are experiencing other problems than mentioned below, please call Geotech Technical Support for immediate assistance, (800) 833-7958.

If the pump is operating at a decreased capacity and the impeller assembly components (impellers, guide, vanes, etc.) do not appear to be the cause, the motor should be checked. A checklist of things to examine includes:

- Check the fluid level inside the motor. Replace and refill as necessary — see "Replacing Motor Fluid" section on page 9.
- Inspect the outside of the motor for cracks, dents, etc.
- Remove the Inlet Screen, Pump Housing, and the impeller assembly (see Figure 5). Try to spin the motor shaft by hand. It should spin freely. If it does not, the motor must be replaced.

Motor Winding Test

This test checks for a short or open circuit in the pump and/or the motor leads. Place the pump in water. Using an Ohm meter, measure resistance between any two power leads (see test below). The measurement should be 3 to 7 ohms depending on system length. The readings should be the same between any set of power leads. If the readings are zero, there is a short circuit in the pump or there is a set of nicked power lead wires. If the readings are greater, there is a cut motor lead.

- Details of this test are as follows:

A. Turn off the power and unplug the *DEDICATOR* from the converter.
B. Using an Ohm meter, set the scale to R X 1. Zero-adjust the meter and measure the resistance between any two power conducting leads (prongs on the motor lead plug). Compare the obtained reading to the value in the following table:

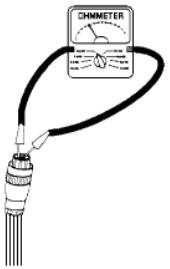


Figure 3A

Lead Length	Ohm Value	Lead Length	Ohm Value
0 Feet	3.0 - 3.5	150 ft.	4.8 - 5.3
50 ft.	3.6 - 4.1	175 ft.	5.1 - 5.6
75 ft.	3.9 - 4.4	200 ft.	5.4 - 5.9
100 ft.	4.2 - 4.7	250 ft.	6.0 - 6.5
125 ft.	4.5 - 5.0	300 ft.	6.6 - 7.1

C. If the Ohm valve is too low, the motor may be shorted. If too high, the motor windings or the leads may be open.

Insulation Resistance Test

This test checks for a short to ground in the pump and/or the motor leads. Place the pump in water. Using an Ohm meter, measure the resistance between the ground lead and each power lead (see figure 4). The resistance to each power lead should be greater than 2 meg ohms. If the resistance is less than 2 meg ohms, the pump is defective or there is a nicked/cut motor lead.

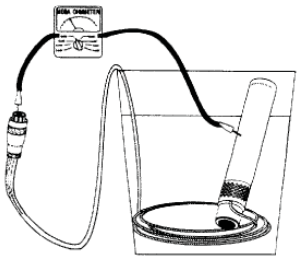


Figure 4: Using an Ohm meter

Checking the Impellers for Wear

If pump performance decreases, the impellers may need to be replaced or cleaned. The Redi-Flo2 can be dismantled and reassembled quickly and easily by referring to the diagram to the right.

1. **Dismantling** -- Periodically, it will be necessary to check the pump for impeller wear.
   A. Disconnect all power to the *DEDICATOR*.
   B. Remove the discharge hose.
   C. Remove the Intake Screen Screw.
   D. Carefully pull the screen up. Take care not to nick any motor leads.
   E. Unscrew the pump housing.
   F. The impeller components can now be inspected.

There is no recommended preventative maintenance for pump components. Reduced pump performance may be indicative of wear, especially if pumping suspended solids. Disassemble the pump end impeller assembly (see figure 5) and examine for wear according to the following:

Impellers --- should show no visible wear
Guide vane --- should show no visible wear
Wear ring -- minimum thickness should never be less than 1.0mm

Replace any worn components using either a pump-end replacement kit (P/N 3P105) or a PTFE pump-end replacement kit (P/N 3P120).

1. **Re-assembly** (refer to figure 5)
   A. Make sure the *DEDICATOR* system is not connected to the converter.
   B. Return the impeller assembly to the shaft in the proper order.
   C. Screw the Pump Housing back onto the top of the pump. If all the impellers and chambers were re- placed correctly, the Pump Housing should screw on easily. Hand tighten.
   D. Slip the Inlet Screen back over the Pump Housing. Screw the Set Screw back into the Inlet Screen.

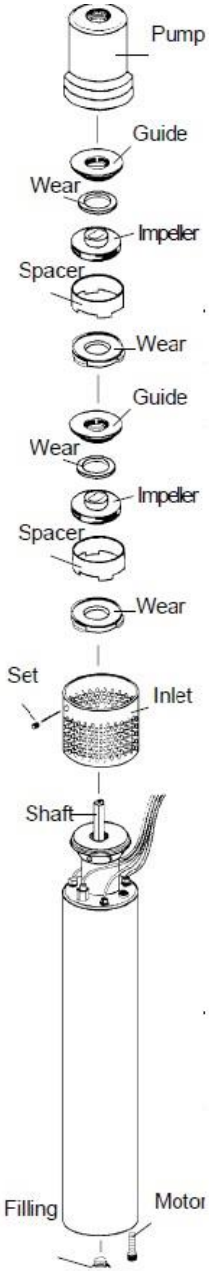


Figure 5: Pump Assembly

Replacing Motor Fluid

Whenever any maintenance is done on the pump, the motor fluid should be replaced. If the pump is moved from well-to-well, it should be thoroughly decontaminated prior to being installed in the next well. In addition to cleaning the individual components inside and outside, the water in the pump motor should be replaced using the syringe that came with your pump. Follow these steps:

1. Disconnect *DEDICATOR* system and converter from power source.
2. Turn the pump and motor upside down.
3. Use a flathead screwdriver to remove the filling screw on the bottom of the motor.
4. Empty the water from the motor and refill the reservoir using contaminant-free water and the syringe that came with your *DEDICATOR*. The water level should be even with the bottom edge of the screw hole.
5. Replace and tighten the filling screw.
6. Turn the pump over several times, then remove the filling screw again to let any trapped air escape (if air is left inside the motor, the life of the motor will be shortened). Add more water, if necessary. Repeat steps 4, 5, & 6 if necessary.
7. Replace and tighten the filling screw.

Checking the Converter Cable

To test the converter cable, use an Ohm meter and check for continuity between connectors for each wire. To do this, select any one wire in the connector at one end of the cable and connect it to the Ohm meter. Connect the other end of the Ohm meter to the same wire at the other end of the cable. Do this for all four wires. The Ohm meter will show if there is a short in any of the wires - (see Figure 6).

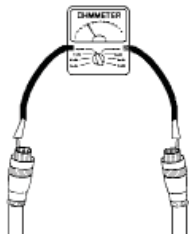


Figure 6: Checking the Converter Cable

Section 5: Redi-Flo Variable Frequency Drive

Operating Conditions

To ensure the Redi-Flo Variable Performance Pumping system operates properly, follow these guidelines:

- The Redi-Flo2® or Redi-Flo4™ pump must be installed vertically with the discharge end pointed upwards.
- The electrical voltage supply to the Redi-Flo VFD must always be within + or - 10% of the specified power supply (103.5 - 126.5 VAC at 115V connection or 207 - 253 VAC at 230V).
- For best performance when operating on a generator, 115V generators should be set at 120V without load and 230V generators should be set at 240V without load. Use a separate meter to set voltage; do not rely on built-in meters found on generators. Verify generator voltage stays within tolerance at full load.
- **WARNING: DO not let the generator run out of gas while powering up the VFD. If it surges and creates excessive voltage, internal VFD damage could result.**
- The pump and motor must always be completely submerged in fluid to ensure lubrication and cooling of the motor.
- The temperature of the fluid being pumped should be according to the technical specifications shown in the motor specifications.
- The installation depth of the pump should always be at least three feet below the maximum drawdown level of the well.
- Redi-Flo pumps are not recommended for well development or pumping fluid containing abrasives.
- Redi-Flo2® pumps are not recommended for continuous operation applications.
- The warranty of the Redi-Flo pumps will be void if other than the Redi-Flo VFD is used or if corrosive fluids are pumped.
- The service life of dedicated Redi-Flo pumps may be compromised if the ambient water quality exceeds one or more of the following values:

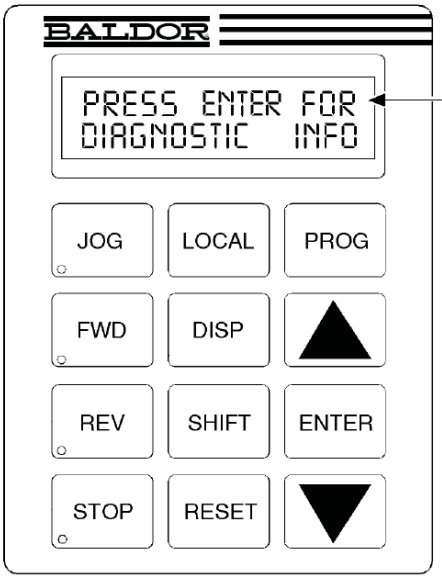
pH<5
DO>2 ppm
H2S>1 ppm
CL->500 ppm
TDS>1000 ppm

Overview

The keypad is used to program the control parameters, to operate the motor and to monitor the status and outputs of the control by accessing the display options, diagnostic menus and the fault log.:

Indicator Lights

JOG - (Green) lights when Jog is active.
FWD - (Green) lights when FWD direction is commanded.
REV - (Green) lights when REV direction is commanded.
STOP - (Red) lights when motor STOP is commanded.



Keypad Display - Displays status information during Local or Remote operation. It also displays information during parameter setup and fault or Diagnostic Information.

Motor Selection - The VFD defaults to Redi-Flo2 operation, to change to Redi-Flo4, press the key sequence “Shift - ▼- Shift.” Use the sequence “Shift - ▲ - Shift.” to return to Redi-Flo2.

JOG - Press JOG to select the preprogrammed jog speed. After the jog key has been pressed, use the FWD or REV keys to run the motor in the direction that is needed. The JOG key is only active in the local mode.

FWD - Press FWD to initiate forward rotation of the motor. (Active in Local and Jog modes).

REV - Press REV to initiate reverse rotation of the motor. (Active in Local and Jog modes).

STOP - Press STOP to initiate a stop sequence. Depending on the setup of the control, the motor will either regen or coast to a stop. This key is operational in all modes of operation unless it has been disabled by the Keypad Stop parameter in the Keypad (programming) Setup Block.

LOCAL - Press LOCAL to change between the local (keypad) and remote operation.

DISP - Press DISP to return to display mode from programming mode. Provides operational status and advances to the next display menu item.

SHIFT - Press SHIFT in the program mode to control cursor movement. Pressing the SHIFT key once moves the blinking cursor one character position to the right. While in program mode, a parameter value may be reset to the factory preset value by pressing the SHIFT key until the arrow symbols at the far left of the keypad display are flashing, then press an arrow key. In the display mode the SHIFT key is used to adjust the keypad contrast.

RESET - Press RESET to clear all fault messages (in local mode). RESET can also be used to return to the top of the block programming menu without saving any parameter value changes.

PROG - Press PROG to enter the program mode. While in the program mode the PROG key is used to edit a parameter setting.

▲ **(UP Arrow)** - Press ▲ to change the value of the parameter being displayed. Pressing ▲ increments the value to the next greater value. Also, when the fault log or parameter list is displayed, the ▲ key will scroll upward through the list. In the local mode pressing the ▲ key will increase motor speed to the next greater value.

ENTER - Press ENTER to save parameter value changes and move back to the previous level in the programming menu. In the display mode the ENTER key is used to directly set the local speed reference. It is also used to select other operations when prompted by the keypad display.

▼ **(Down Arrow)** - Press ▼ to change the value of the parameter being displayed. Pressing ▼ decrements the value to the next lesser value. Also, when the fault log or parameter list is displayed, the ▼ key will scroll downward through the list. In the local mode pressing the ▼ key will decrease motor speed to the next lesser value.

The Redi-Flo VFD can operate the motor in three (3) different ways from the keypad.

1. Speed adjustment using the Keypad arrow keys
2. Speed adjustment with Keypad entered values
3. JOG Command

1) Keypad arrow speed control

Press FWD or REV to select desired direction of motor rotation, then press or hold the up arrow key ▲ to increase speed or use the down arrow key ▼ to reduce motor speed. Continuously holding the arrow key will cause the speed to change in larger increments. The minimum speed increment produced by the arrow keys is defined in PROG/Keypad Setup/Keypad Speed INC. Default value of 0.10 Hz can be changed by the user.

2) Keypad speed entered value

Press the ENTER key and use the ▲ and ▼ arrow keys to adjust digits and the SHIFT key to cursor to the desired digit. Press ENTER when finished selecting desired motor speed to return to the display mode. Press the FWD or REV key to run the motor in the desired direction at the programmed speed.

3) JOG Command

The JOG key can be used to ramp the pump up to a predetermined speed in the forward or reverse direction. Press the JOG key then hold the FWD or REV key, and the pump will ramp to the speed set in PROG/Jog Settings/Jog Speed. Acceleration and deceleration times for Jog can also be set in this programming menu.

DISP Key

The DISP key can be used for accessing diagnostic and troubleshooting screens as shown below:

Action	Description	Display	Comments
Apply Power	Display mode showing mode, voltage, current & frequency status.	STP 0V REDIFL2 LOC 0.0A 0.0HZ	No faults present. Local keypad mode. If in remote mode, press local for this display.
Press DISP key	Scroll to fault log block.	PRESS ENTER FOR FAULT LOG	Press **ENTER** to view the fault log if desired.
Press DISP key	Scroll to diagnostic info block.	PRESS ENTER FOR DIAGNOSTIC INFO	Press **ENTER** to view diagnostic information if desired.
Press DISP key	Scroll to local speed ref. block.	PRESS ENTER FOR LOCAL SPEED REF	Press **ENTER** to change motor speed.
Press DISP key	Display mode showing output frequency.	STOP FREQUENCY LOCAL 0.00HZ	
Press DISP key	Display mode showing motor speed (based on output frequency).	STOP MOTOR SPEED LOCAL 0RPM	
Press DISP key	Display mode showing output current.	STOP CURRENT OUT LOCAL 0.00A	
Press DISP key	Display mode showing output voltage.	STOP VOLTAGE OUT LOCAL 0V	

Troubleshooting Guide to Error Messages

Indication	Possible Cause	Corrective Action
Command Select	Incorrect operating mode programmed.	Change Operating Mode in the Level 1 Input block to one that does not require the expansion board.
	Need expansion board.	Install the correct expansion board for selected operating mode.
Bus Overvoltage Trip or HW Overvoltage	DECEL Rate set too low a value	Lengthen DECEL time. Add external dynamic braking resistors or module.
	Input voltage too high.	Verify proper AC line voltage. Use step down transformer if needed. Use line reactor to minimize spikes.
Bus Undervoltage	Input voltage too low.	Verify proper AC line voltage. Use step up transformer if needed. Check power line disturbances (sags caused by startup of other equipment). Monitor power line fluctuations with date and time imprint to isolate power problem.
External Trip	Motor draws excessive current	Check motor for overloading. Verify proper sizing of control and motor.
	External trip parameter incorrect	Verify connection of external trip circuit at J4-16. Set external trip parameter to “OFF” if no connection made at J4-16.
Hardware Protect	Fault duration too short to be identified.	Reset control. Check for proper grounding of power wiring and shielding of signal wiring. Replace control board.

Indication	Possible Cause	Corrective Action
Heatsink Temp	Motor Overloaded.	Correct motor loading. Verify proper sizing of control and motor.
	Ambient temperature too high.	Relocate control to cooler operating area. Add cooling fans or air conditioner to control cabinet.
	Built-in fans are ineffective or inoperative.	Verify fan operation. Remove debris from fan and heatsink surfaces. Replace fan or check fan wiring.
HW Desaturation	Accel/Decel rate set too short. Torque Boost set too high. Electrical noise in logic circuits. Motor overload.	Lengthen Accel/Decel rate. Reduce torque boost value. Check for proper grounding of power wiring and shielding of signal wiring. Verify proper sizing of control and motor or reduce motor load.
HW Power Supply	Power supply malfunctioned.	Check internal connections. Replace logic power board.
HW Ground Fault	Output current (motor current) leakage to ground.	Disconnect wiring between control and motor. Retry test. If GND FLT is cleared, reconnect motor leads and retry the test. Repair motor if internally shorted. Replace motor lead wire with low capacitance cable. If GND FLT remains, contract your dealer.
3 Sec Overload	Peak output current exceeded 3 sec rating.	Check PK Current Limit parameter in the Level 2 Output Limits block. Check motor for overloading. Increase ACCEL time. Reduce motor load. Verify proper sizing of control and motor.

Indication	Possible Cause	Corrective Action
1 Min Overload	Peak output current exceeded 1 minute rating	Check PK Current Limit parameter in Level 2 Output Limits block. Check motor for overloading. Increase ACCEL/DECEL times. Reduce motor load. Verify proper sizing of control and motor.
Unstable Speed	Oscillating load. Unstable input power. Slip compensation too high.	Correct motor lead. Correct input power. Adjust slip compensation.

CAUTION!
Safety Issue Using the VFD Pump Controller

Potential Issue:
Three-phase motors controlled by Variable Frequency Drives (VFD) inherently cause inductive feedback - often more than 4mA - thus tripping the 5mA ±1mA GFCI breaker on many generators. Accordingly, if disabling the GFCI in a generator you should follow manufacturer's recommendations and applicable safety and electrical codes.

Precautions:
If you are using a generator without a GFCI breaker, be aware that this can pose additional serious safety hazards.

If you continue to use a generator without a GFCI breaker, **IT IS IMPERATIVE** that you contact your safety personnel, OSHA, and the National Electrical Code applicable and/or an electrical engineer with experience in grounding issues before installing your system! If using without a GFCI breaker, you may need to implement an OSHA approved cord inspection program.

For further details and employer responsibilities, refer to https://www.osha.gov/doc/outreachtraining/htmlfiles/gfcicon.html.

Section 6: Technical Specifications

Pump Specifications

Input Power:	1.5 kW (2 Horsepower)
Voltage:	3 Phase, 220 volts at 400 Hz
Maximum Current:	5.5 amps
Motor Protection:	Thermal overload - Thermik Geratebau, Series SY6
Disconnect Temperature:	176 F (80 C)
Rate Current:	5 amps
Current Overload:	incorporated into converter

Connections

Discharge port:	1/2" Female NPT

Operating Conditions

Maximum Fluid Temp:	86 F (30 C)
Minimum Fluid Temp:	34 F (1 C)

Dimensions and Weight

Dimensions:	11.3" x 1.81" diameter
Net Weight:	5.5 lbs. (2.5kg)

2" and 4" *DEDICATOR* Specifications

2" OD *DEDICATOR* outside diameter:	3.90" (9.9cm)
4" OD *DEDICATOR* outside diameter:	5.96" (15.1cm)
2" ID *DEDICATOR* outside diameter:	2.38" (6cm)
4" ID *DEDICATOR* outside diameter:	4.50" (11.4cm)
Minimum height clearance required:	3.41" (8.7cm)

HAPPY HOSE! Cable Specifications

PVC HAPPY HOSE!

HAPPY HOSE! I.D.:	1/2” (1.3cm)
HAPPY HOSE! O.D.:	3/4” (1.9cm)
Hose Materials:	PVC clear, nylon reinforced
Cable Materials:	Yellow, PVC jacketed
Cable O.D.	0.42” (1.1cm)

PTFE-lined Polyethylene HAPPY HOSE!

HAPPY HOSE! I.D.:	1/2” (1.3cm)
HAPPY HOSE! O.D.:	5/8” (1.6cm)
Hose Materials:	Polyethylene, PTFE-lined
Cable Materials:	Red, Polyethylene jacketed
Cable O.D.:	0.42” (1.1cm)

All HAPPY HOSE! Cable Specifications:

Cable Construction:	includes: 4 each 16 EWG PVC jacketed, color-coated conductors, and 1 each of 0.062” (0.15cm) dia., 7 x 7 stainless steel wire rope - PVC or PE jacketed to 0.125” (.32cm) dia.
Breaking Strength:	480 lbs. (218kg)
Weight:	0.22 lbs per foot (0.33 kg per meter)

VFD Technical Specifications

DESCRIPTION	RF2	RF4
Part I	**Rated Power & Markings**	
Input Voltage	1 X 115V +/- 10% or 1 X 230V +/- 10%	
	Single Phase Input	
Output Voltage	3 X 220V	3 X 230V
Continuous Output Current (230V input)	6.05A	8.25A
Continuous Output Current (115V input)	6.05A	6.50A
Part II	**Fundamental Parameters**	
Control System	PWM	
Output Voltage	Clamp @ 220V	Clamp @ 230V
Carrier Freq.	Selectable: 1-5 KHz	
Freq. Resolution	0.1Hz*	
Input Freq. Range	48 - 62 Hz	
Maximum Output Frequency (230V input)	400 Hz	100 Hz
Maximum Output Frequency (115V input)	400 Hz	80 Hz
Base Frequency	400 Hz	100 Hz
Torque Boost	0-15% Nominal Voltage	
V/F Pattern	Selectable Linear/Square Law	
Accel Time	0.5-3600 Seconds	
Decel Time	0.5-3600 Seconds	
Accel/Decel Pattern	Linear	
Part III	**Protective Functions**	
Ground Fault	Ground Fault detection for Equipment Protection	
Overcurrent	Output Short Circuit Locked Rotor	
Over Voltage	400VDC	
Under Voltage	200VDC	
Motor Overload	1^2 x T Characteristic	
Line Start Lock Out	VFD will not start upon input power application	
Line Transient Rating	860 VAV, 810J MOV Between any power input terminal & Ground 360 VAC, 380 J MOV Between any two power input terminals	

DESCRIPTION	RF2	RF4
Part IV	**Ambient Operating Conditions**	
Operating Temp.	-10 to 40 degree C	
Storage Temp.	-30 to 65 degree C	
Vibration	0.5G, Max / 57-150 Hz	
Elevation	3300 ft. without de-rating	
Max source fault current	5 Kamps	
Enclosure rating	UL Type 4, No Direct Sunlight	

Section 7: Replacement Parts List

DEDICATOR Replacement Parts

81410010	SAMPLE HOSE, PE, DEDICATOR, 8'
81410011	SAMPLE HOSE, TLPE, DEDICATOR, 8'
81410014	CABLE, RF2 WELL SEAL TO VFD, 12'
11410149	CHECK VALVE, 1/2", WITH 1/4" SIDE OUTLET

NOTES

DOCUMENT REVISIONS		
EDCF#	DESCRIPTION	REV/DATE
Project #1432	Initial Release, SP	7/2/14

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 our 800 number for appropriate location. A 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.

Model Number: _____

Serial Number: _____

Date of Purchase: _____

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 the equipment for a fee, which will be applied to the repair order invoice.

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