

READ THESE WARNINGS BEFORE INSTALLING OR OPERATING THE EQUIPMENT!

- ⚠ WARNING:** Risk of electric shock. More than one disconnect switch is required to de-energize the equipment before servicing.
- ⚠ WARNING:** Risk of electric shock. De-energize the unit by disconnecting all incoming sources of power, then wait 30 minutes for internal charges to dissipate before servicing the equipment.
- ⚠ HIGH VOLTAGE:** This equipment is connected to line voltages that can create a potentially hazardous situation. Electric shock could result in serious injury or death. This device should be installed only by trained, licensed and qualified personnel. Follow instructions carefully and observe all warnings.
- ⚠ WARNING:** This equipment should be installed and serviced by qualified personnel familiar with the type of equipment and experienced in working with dangerous voltages.
- ⚠ WARNING:** Installation of this equipment must comply with the National Electrical Code (NEC) and all applicable local codes. Failure to observe and comply with these codes could result in risk of electric shock, fire or damage to the equipment.

1 MOUNT THE CONVERTER AND CONNECT TO INPUT POWER

1. Attach the unit securely to the mounting surface
 2. Allow clearance of 2" on sides and 6" top and bottom to ensure proper cooling
 3. Connect the unit's input terminals to an appropriate power source with appropriately rated fuses or circuit breaker
- ⚠ CAUTION:** Before the motor is connected to the output terminals, check all output lines for line-to-ground faults using a megger. There is a direct path through the drive circuitry for ground fault currents that can be triggered when power is applied to the input terminals, even though the output switches are not activated. These currents can cause serious damage to drive circuitry and are not covered under warranty.
- ⚠ CAUTION:** An output line filter must be used for motor leads greater than 50 ft. Leads greater than 100 ft. require a dV/dT filter or sine wave filter.
4. Connect an appropriately rated motor to the output terminals

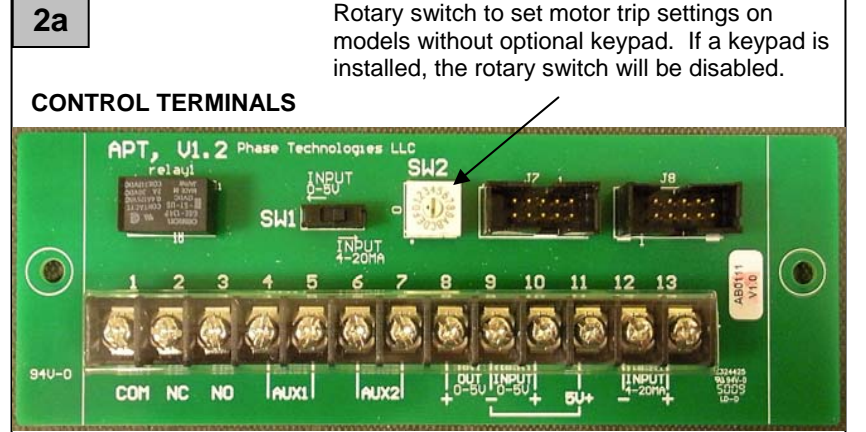
INSTRUCTIONS FOR MODELS WITHOUT KEYPAD & DISPLAY (instructions for models with keypad on Page 2)

2 CONNECT EXTERNAL CONTROL SIGNALS TO THE CONTROL TERMINALS

⚠ CAUTION: The AUX1 and AUX2 terminals are galvanically isolated, with approximately 5V potential between them. DO NOT apply a voltage to the terminals. Use dry contacts only. Factory supplied shielded cable is required if AUX1/AUX2 switch leads exceed 20 ft.

1. For models without a keypad and display, the motor will not run unless there is a contact closure between both Control Terminals AUX1 and AUX2
2. Connect a remote ON/OFF switch to AUX1 terminals. An additional remote switch or jumper wire must be connected to the AUX2 terminals.
3. Set the appropriate motor overload current setting on the rotary dial located on the Control Terminal panel. See the table on the Control Terminal panel for the amp values of each switch position.

Refer to the Manual for instructions on Constant Pressure Water Systems and other Control Terminal functions

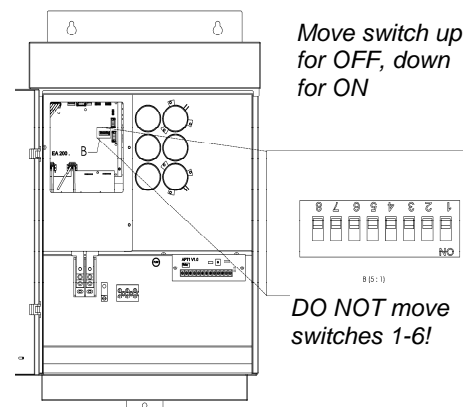


3 SELECT MINIMUM FREQUENCY AND SYSTEM CONFIGURATION

For units without the keypad, DIP switches 7 and 8 on the main printed circuit board are used to select minimum frequency and to set system configuration. Factory defaults are set for minimum frequency of 30 Hz (for protecting submersible motor bearings) and for simple ON/OFF operation. If the defaults are acceptable, setting the DIP switches is not required.

1. **⚠ WARNING:** Disconnect input power and wait for internal charges to dissipate
2. Remove the plastic panel to gain access to the main control printed wiring board.
3. Locate DIP switches 7 and 8 on the array of DIP switches
4. Select minimum frequency with DIP switch 7:
OFF = 0 Hz, ON = 30 Hz
5. Select system configuration with DIP switch 8:
OFF = simple ON/OFF control through AUX1/AUX2
ON = digital constant pressure water system
6. Replace the plastic panel before energizing the unit.

⚠ CAUTION: Before touching any printed circuit board, place a hand on a bare metal surface of the unit to discharge any static electricity.



4 ENERGIZE THE CONVERTER

1. Apply power to the input terminals of the unit by turning on the input circuit breaker or disconnect switch.
2. Confirm that the Status LED on the main printed wiring board behind the clear panel is steady green
3. Close the remote switch connected to AUX1 and/or AUX2 to start the motor.
4. If the motor does not start, refer to the troubleshooting section in Manual.
5. Confirm that the motor rotation is correct. Swapping any two of the output leads will reverse the motor rotation.

1 SET PARAMETERS THROUGH KEYPAD

- ⚠ WARNING:** Be sure to observe the warnings and installation instructions through Step 1 on previous Page 1 before proceeding.
- If remote or automatic ON/OFF function is required, connect remote switch leads to the AUX1 terminals. An additional remote switch or jumper wire must be connected to the AUX2 terminals.
- If a Constant Pressure (CP) water system will be operated, connect the pressure sensors to the appropriate Control Terminals. Refer to the Manual for CP system details.
- Apply power to the input terminals of the drive by turning on the input circuit breaker or disconnect switch.
- The LCD text display will scroll through several start-up sequence messages.
- In order to prevent the motor from running at start-up, immediately after initialization, press the OFF or MAN key.
- Confirm that the unit has properly energized, and the display indicates the OFF or MAN mode.
- Using the keypad and display, navigate to the Main Menu item, **CHANGE PARAMETER VAULES**, to set the following parameters (refer to the Manual section, *Adjustable Parameters*):
 - SYSTEM CONFIG** - This parameter is critical to the operation of the system:
 - 0 = Simple ON/OFF control through AUX1/AUX2 (default setting)
 - 1 = Proportional motor speed control based on analog input
 - 2 = Analog constant pressure system
 - 3 = Digital constant pressure system
 - RATED HORSEPOWER** - Enter the rated HP of the motor load. This parameter helps control deceleration and is critical to proper operation of CP water systems.
 - OVERCURRENT LMT** - This parameter sets the motor overload protection.
- Push MAN on the keypad for manual mode, then push RUN to start the motor. In manual mode, the RUN key will override an open AUX terminal. Push the STOP key to stop the motor in manual mode.
- ⚠ CAUTION:** In manual mode, pushing the RUN key will override all external control signals, including constant pressure sensors. Dangerous pressure rise in closed systems is possible.
- Confirm that the motor rotation is correct. Swapping any two of the output leads will reverse the motor rotation.
- After initial power-up, use the keypad and display to navigate to **CHANGE PARAMETER VALUES** to set any other adjustable parameters you wish to be different from the factory defaults.

1a OPTIONAL KEYPAD & TEXT DISPLAY

MENU Key scrolls Main Menu items

ENTER key selects menu items and parameter values after scrolling to desired setting

Up and Down keys scroll through menu items and parameter values

TIP: Setting the Rotary Switch on the Control Terminal Panel at "0" locks the keypad

Backlit LCD displays operating status, menu items for programming, and fault codes

AUTO, OFF and MAN Keys similar to HOA pump controls

RUN and STOP keys to control motor in manual mode

DIGITAL CONSTANT PRESSURE SYSTEM

⚠ CAUTION: Special shielded cables provided by the factory must be used. Regular wire will induce capacitance in the line and corrupt the signals from the switches.

- Install the digital pressure switches in the water line
- Remove protective rubber boot from each switch, insert factory provided duplex cable through the boot, and connect a twisted pair of wires to the normally closed (NC) and common (C) terminals of the emergency over-pressure switch
- Attach the cable shield to the Control Terminal Ground post located in the AquaPhase enclosure below the Control Terminal strip
- Connect the emergency over-pressure limit switch to the AUX2 Control Terminals
- Navigate through the keypad Main Menu item **CHANGE PARAMETER VALUES > SYSTEM CONFIG**. Select 3 to set the system configuration for a digital CP system. For units without the keypad, see refer to the previous page, Item 3, setting System Configuration with DIP switches.

6. To set the emergency over-pressure limit switch, remove the rubber boot from the switch, pry the plastic plug from the top of the switch housing to access the pressure adjustment screw. Use an Allen wrench to adjust the pressure setting of the switch – jumper the AUX1 terminals and run the pump in the AUTO mode on the keypad, and observe the pressure gauge, turning the Allen screw to adjust the pressure shut-off point. **The emergency over-pressure limit switch should be set at least 10 PSI higher than the desired constant pressure set point.**

7. Connect the remaining twisted pair of wires in the shielded cable to the normally closed (NC) and common (C) terminals of the control pressure switch. Remove the jumper and connect the switch leads to the AUX1 Control Terminals, and adjust the constant pressure set point using the same procedure as the emergency over-pressure limit switch.

8. Set the keypad to AUTO mode to operate the system

ANALOG CONSTANT PRESSURE SYSTEM

⚠ CAUTION: Special shielded cables provided by the factory must be used. Regular wire will induce capacitance in the line and corrupt the signals from the pressure switches.

- Follow Steps 1-4 from the Digital Constant Pressure instructions above.
- Navigate through the keypad Main Menu item **CHANGE PARAMETER VALUES > SYSTEM CONFIG**. Select 2 to set the system configuration for an analog CP system
- To set the emergency over-pressure limit switch, remove the rubber boot from the switch, pry the plastic plug from the top of the switch housing to access the pressure adjustment screw. Use an Allen wrench to adjust the pressure setting of the switch – jumper the AUX1 terminals and run the pump in the AUTO mode on the keypad, and observe the pressure gauge, turning the Allen screw to adjust the pressure shut-off point. **The emergency over-pressure limit switch should be set at least 10 PSI higher than the desired constant pressure set point.**

4. Connect the remaining twisted pair of wires to the + and – terminals of the transducer

5. Connect the + terminal of the transducer to the +4-20mA Control Terminal, and the – terminal to the – 4-20mA Control Terminal

⚠ CAUTION: It is critical that the + terminal of the transducer is connected to the + terminal of the 4-20mA Control Terminal, and likewise for the – terminals.

6. Set the **TRANSDUCER SETPT** on the keypad (refer to the Manual Section 5.3 CHANGING PARAMETER VALUES for details)

7. Set the keypad to AUTO mode to operate the system