OPERATING GUIDE
MODEL 5100
ELECTRONIC CONTROLLER

Manufacturer and Source of Replacement Parts:

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User / Safety Warnings

1. Compressed air can be dangerous. If an air line were to rupture, immediately turn off the air supply.

2. Use common sense. Maintain your equipment.

3. If using a bottled gas supply, follow DOT regulations. Always use a two-stage regulator on the tank.

4. GeoPump recommends using an oil-less (i.e. instrument grade) air compressor. It is the operators responsibility to use a coalescing air filter to clean up oily air.

5. Follow the instructions contained within this manual. Please contact the factory for additional information or assistance.

Model 5100 Electronic Pump Cycle Controller

The GeoPump Model 5100 controller provides a highly portable and convenient means to cycle compressed air to a bladder or gas-drive pump. It is a fully self-contained unit supplied in a lightweight and rugged carrying case. The unit includes a panel mounted pressure gauge that indicates the air pressure being delivered to the pump, a flow control adjustment to increase or decrease the air pressure, as well as independent pump discharge and refill timers.

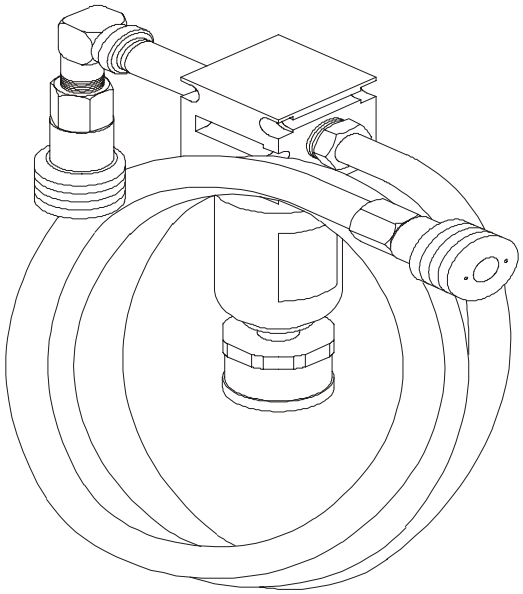
The controller is powered by a 7 amp-hour, 12-volt rechargeable battery. It can operate for up to 40 hours of continuous usage on a fully charged battery. A mechanical manual override is also provided to allow the unit to actuate a pump without battery power.

The controller is equipped with the following accessories:

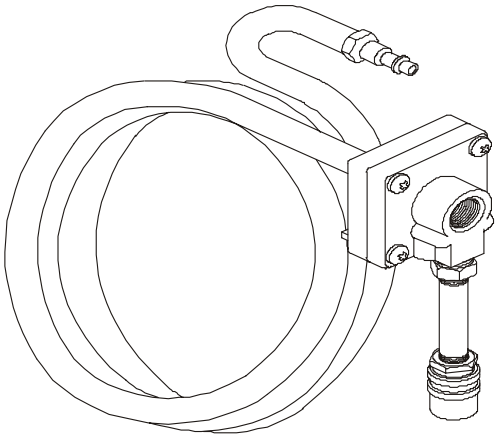
* Rechargeable battery
* Wall mounted battery charger (for 115 volt, single phase outlets)
* 25 foot air supply with integrated filter for attachment to air supply
* 10 foot air hose with quick exhaust valve for attachment to pump

The controller is rated for a maximum incoming air supply of 125 psi. An internal safety overpressure valve is provided for protection. When supplied with 125 psi, pumps can be operated when wells as deep as 250 feet.

<u>Air Lines</u> – Two air line assemblies are provided with the controller



25 Foot Long Controller To Air Supply – Includes Moisture Trap Filter



10 Foot Long Controller To Pump – Includes Quick Exhaust Valve

Controller Operation

Timing Control The controller is designed to regulate the flow of compressed air to the pump. It includes two operating systems. One system controls the timing control of the supply air pressure to the pump. When the timers are optimally set, the controller will automatically cycle air to (discharge cycle) and from (exhaust cycle) the pump. The timers are located on the left side of the controller panel.

The left knob, labeled "Pressure Time", controls the time that compressed air is delivered to the pump. Rotating the knob clockwise increases the value, while counter-clockwise rotation decreases the value. The timer operates in a range between 7-O'clock (1 second) and 4-O'clock (45 seconds).

The right knob, labeled "Exhaust Time", controls the time that compressed air is vented from the pump back to atmosphere. This is the amount of time that the pump is allowed to refill. Rotating the knob clockwise increases the value, while counter-clockwise rotation decreases the value. The timer operates in a range between 7-O'clock (1 second) and 4-O'clock (45 seconds).

Flow Control The second system of the controller deals with the pressure adjustment. This is located on the right side of the controller panel. At the top right there is a pressure gauge that provides an indication of the pressure being supplied to the pump. **This gauge can be supplied with ranges of 15, 30, 60, 100, or 160 psi. It is specific to the well** depths of the site to be monitored. The pressure regulator located immediately below the gauge adjusts the supply pressure. Rotating the knob clockwise increases the pressure, while counter-clockwise rotation decreases the pressure.

To operate the pump from specific depths, the supply pressure must be high enough to overcome the pressure requirement. A minimum of 0.5 psi is required for every foot of installation depth below ground surface. Therefore, if the pump is located at the bottom of a 100-foot deep well, then a minimum of 50 psi is required to develop flow. Increasing the pressure above this minimum value will cause the pump to discharge faster.

Automatic Operation

Optimum performance of the pump is achieved by proper adjustment of the pressure (discharge) and exhaust (refill) timers. When properly adjusted, the controller will switch from the discharge cycle to refill at the precise moment that the pump stops discharging water. This is relatively easy to do, as it is down by observation. Likewise, the controller will switch from the refill cycle to the discharge cycle when the pump is completely full. This adjustment is somewhat more difficult, but it can be optimized will the aid of a volumetric measuring device such as a graduated cylinder.

In the field this adjustment procedure should only take a few pump cycles to complete and be optimum based on the depth setting of the pump and the model utilized. With practice this will be accomplished routinely.

Using The Complete Pumping System

* Connect the tubing to the pump and lower into the well.
* Make sure the 12-volt battery is charged and connected to the controller panel.
* Attach the 10-foot airline from the controller to the pump tubing (or well closure).
* Attach the 25-foot air hose from the controller to the air supply.

Note: If using bottled gas cylinders as the drive air supply, use a two-stage regulator on the tank. This will prevent personal injury and possible equipment damage.

* Set the discharge-timing knob to the 9-O'clock position. This position corresponds to approximately 10 seconds.
* Set the refill-timing knob to the 9-O'clock position. This position corresponds to approximately 10 seconds.
* Turn on the drive air source (compressor or gas bottle cylinder).
* Move the toggle switch to the "on" position.
* Let the controller go through several full cycles before attempting to re-adjust the timers. Once the pump tubing is primed with water and begins to discharge at the surface then the timers can be reset for optimum operation.

Note: Verify that the pressure setting is at or above the minimum value of 0.5 psi per foot of depth to allow the pump to discharge properly to the surface.

Pressure Time Adjustment
As water is discharged from the pump tubing, watch the flow relative to the time setting. One of the following will occur:

A) If the controller switches to the refill mode before water stops flowing from the discharge tubing, **increase** the discharge time value by rotating the knob slightly clockwise. Allow the controller to go through at least 1 complete cycle. Continue to rotate clockwise (allowing at least 1 cycle between adjustments) until the controller switches to refill just as water stops flowing from the discharge tube.

B) If water stops flowing from the discharge tube before the controller switches to refill, **decrease** the discharge time value by rotating the knob slightly counter-clockwise. Allow the controller to go through at least 1 complete cycle. Continue to rotate counter-clockwise (allowing at least 1 cycle between adjustments) until the controller switches to refill just as water stops flowing from the discharge tube.

Exhaust Time Adjustment
The exhaust mode adjustment is similar to the discharge mode adjustment. This procedure controls the vent time required by the pump so it can completely refill. This procedure should follow the discharge adjustment procedure.

For maximum pumping efficiency, the refill time should be as minimal as possible, to the point of not reducing the discharge capacity of the pump. If a graduated cylinder is available, measure the volume of the pump. The refill time can be reduced until the measurable capacity of the pump begins to decrease. This will maximize the pumping capacity by increasing the overall number of complete pumping cycles per unit time.

If a graduated cylinder is not utilized, observe water discharging from the tubing. If the time value is shortened to the point that the pump is not completely full, then the water will stop discharging before the controller switches from discharge to refill. If this occurs, **increase** the refill time by rotating the knob slightly clockwise to allow the pump to completely refill.

Note: If the pumping rate exceeds the recharge rate of the well, then the water level will drop. As this occurs, the submergence over the pump will decrease, and more time may be required to allow the pump to completely refill. Monitor the static water level and / or the volumetric output of the pump to insure maximum efficiency.

Flow Rate Adjustment (Pressure Control)
The large black knob on the lower right corner of the controller panel is used to control the drive air pressure supplied to the pump. Increasing the pressure above the minimum value of 0.5 psi per foot of pumping depth will increase the flow rate of the pump.

For maximum flow, rotate the knob clockwise to increase the pressure to the maximum range of the pressure gauge. The indication on the gauge occurs only during the discharge mode. Rotate this knob counter-clockwise to decrease the pressure.

Mechanical Manual Override
Under certain conditions it may be necessary to apply pressure to the pump for a longer duration than allowed by the timers (maximum of 45 seconds). Examples could be when using a flow through cell when very low flow is desired, or when using in-line filters.

The push-button labeled “Manual” is located directly below the “Refill Time” knob on the center of the controller panel. This button allows the controller to be actuated manually. Manual operation does not require battery power, and can be useful in the event of a low-battery condition.

Charging the battery
A new, fully charged battery could provide up to 40 hours of service. When the battery has been drained to approximately 10 volts, a 16-hour charging period is required. By periodically charging the battery after a day or two of usage, an overnight charge will generally be sufficient.

The charger supplied is a constant voltage, limited current type. Therefore it will not cause the battery to be overcharged. Please note that the charger is rated for indoor use only and it is of an ungrounded configuration (two-prong).