

LORENTZ TROUBLESHOOTING – The PS Pump Controller Lights

	No lights	System on only	Pump on, then off	Overload	Accessory lights	All lights flash
System On	○	●	●	●	●	●
Pump On	○	○ ●	○ ● ○	○ ● ● or ○ ● ●	○	● ●
Source Low	○	○	○	○	●	●
Tank Full	○	○	○	○	●	●
Battery Low	○	○	○	○	○	●
Explanation:	- Controller does not turn on	- Controller does not try to start pump - Controller does not sense the pump connection - Pump or motor are seized	- Controller tries to start pump, but stops after several seconds - Pump or motor is hard to turn, or not turning properly	- Pump is running and stops suddenly - Pump turns slightly but with great resistance	- Switches in pump to wiring configuration - One or both accessory lights indicating	- Broken connection of pump cable to controller continually flashes itself
Inspect:	- Confirm voltage input - Confirm input polarity - Inspect circuit board visually for burning or contamination	- Pump cable is properly connected - Pump or motor is not completely seized	- Solar irradiation is adequate - Pump cable is properly connected	- Water level - Possible debris caused obstruction	- Switches are connected and in correct position - Jumper wires are connected when needed	- Connection - Cable for damage - Splice

LORENTZ TROUBLESHOOTING – The PS Pump Controller Lights

Cause:	<ul style="list-style-type: none"> - Incorrect installation - Excessive voltage input - Surge damage - Short circuit by contamination - Faulty component of controller 	<ul style="list-style-type: none"> - No connection to pump - Induced surge to motor cable - Faulty component of controller 	<ul style="list-style-type: none"> - Energy is too low - Loose wire connection - Damaged cable - Faulty cable splice - Pump or motor is stuck or hard to turn - Faulty component of controller - Controller output is out of sync 	<ul style="list-style-type: none"> - Pump runs briefly and stops suddenly -Obstruction - Dry run pump damage - Faulty component of controller - Pump rotor stuck - Motor rotor stuck 	<ul style="list-style-type: none"> - No connection - Accessory switch fault - Induced surge through accessory cable - Damaged controller 	<ul style="list-style-type: none"> - Connection problem on output terminals
Tips:	<ul style="list-style-type: none"> - Overvoltage damage may cause strong burning odor - Visually inspect circuit board for obvious damage 	<ul style="list-style-type: none"> - Voltage should be present on output lines (meter AC setting) within three seconds of turning on. If no reading, controller is faulty 	<ul style="list-style-type: none"> - Test again when energy has improved - Connect a different motor to test controller 	<ul style="list-style-type: none"> - If pump runs before stopping, pump damage is likely - If overload indicates the instant the pump switch is turned on, controller has fault - Disconnect pump cable 	<ul style="list-style-type: none"> - Install jumper wires: terminals 1+2 and/or 4+5. If this resolves, accessory wire or switch is at fault. If red lights still indicate with jumper(s) in place, controller has fault, 	<ul style="list-style-type: none"> - Continuity checks of motor cable may reveal fault but may not prove no fault. Each wire should have same continuity / ohms

LORENTZ TROUBLESHOOTING – The PS Pump Controller Lights

				completely. If indication is same, controller has fault	possibly due to surge.	
Notes:	- Controller is either "dead" or the LED board is not working	Output voltage during first seconds after turning on is the action of the controller to align the magnet motor rotor. The reading will fluctuate, often from 30 - 110v (depending on model and solar input). Meter speed and sensitivity may vary results. Low voltage readings may indicate the controller fault.	-Pump-on-then-off and Overload indications are based on similar causes, depending on input power vs resistance of the pump. Overload will only indicate if power input is adequate. -Attempt to identify if the fault is in the controller or the pump. The surest way to do this is to connect any working Lorentz motor to the controller and see if it runs. A motor does not need to be submerged during operation, unless a pump is attached. Alternatively swap the controller (the model) to the installed pump to check the fault. -If spare parts are not available, the description of lights indication and electrical testing on the output line will need to be relied on. -When in doubt, the pump may need to be pulled for a physical examination.		-Accessory wire surge damage can be reduced by using shielded wire, reducing length, and using the accessory surge protector. -A wireless tank full pressure switch assembly is preferred for long distances controller to tank.	-Lights behave in the initial flash way as the power is first applied. -Poor connections on the output may stress the controller resulting in eventual failure of the phase.

Pump Inspection

HR Models:

The pump end (stator) should slide off the helical rotor with ease. Often the weight of the motor is enough to separate; but bear in mind hot temperatures will increase the tightness. If there is any challenge in separating the stator from the rotor, this indicates excessive tightness. Water pumps use NBR rubber as the stator compound.

Stator tightness is normally caused by higher temperatures than its rating, but also occurs from high acid or alkaline of the water source, or possibly a variety of water contaminants which may include chemicals (pesticides, fertilizers, oil, etc.) A very small percentage of HR pumps may have a defective rubber compound, reducing the life of the pump (average 8 years). Only a detailed water analysis may be able to identify potential contamination. If feasible, a looser fitting pump end (higher temperature class) should be used. If the fault repeats, a second warranty may not be acceptable. If water is known to be contaminated, a Viton stator should be used.

Centrifugal (C) models:

Centrifugal pumps contain no vital rubber components and are less vulnerable to contaminants or water temperature. The pump must be removed from the motor in order to inspect the rotation of the pump rotor. If the rotor will not turn by hand, or has a feeling of internal obstruction, this indicates the pump fault by obstruction or other damage.

Motor Inspection:

With the pump end removed the motor can be inspected for rotation. This can be done by connecting to the PS controller, or by physically feeling the rotation of the motor rotor. With the controller turned off it can remain connected. If the motor cable is

LORENTZ TROUBLESHOOTING – The PS Pump Controller Lights

disconnected, it is necessary to keep the ends of each of the three wires from touching each other; when the wires are in contact it will create additional resistance in the motor. Normally the rotor can be turned by hand. It is normal to feel the resistance of the magnets inside, and the rotation should be consistent in feel for the full rotation. If the motor cannot turn by hand, use a wrench or pliers to attempt to turn (take care not to damage the thread or spline). If it will not turn at all, the motor has seized. If it turns but is very hard to turn with a tool, it is partially seized.

A new, unused motor occasionally the rotor is partly stuck to the slide bearing. In this case, if the power of the motor is not enough to overcome this sticking, a manual action will release it, and it is not likely to recur. This check should be done when the motor and pump end are assembled.

In most cases a motor fault is associated with a physical difficulty in rotation