

**Supercharge the performance** of your Shurflo 9300 Solar Water Pump by up to 30% with the LCB-G Linear Current Booster. The LCB-G optimizes your solar water pumping system by acting as a kind of “DC transformer” which matches the output of your solar panels to the needs of your Shurflo pump. This Linear Current Booster will also protect your solar water pump by preventing overvoltage and turning off power to the pump if there’s not enough voltage. It also has terminals where you can connect a float switch which will turn the pump off when your tank gets full. As an added feature, this pump controller also comes with optional Well Level Sensors, which will turn off the pump if the water drops too low in the well. The LCB-G Model 902-200 thus becomes an essential accessory for your solar submersible water pumping system.



## Features:

- Switchable for 12 or 24VDC operation
- Increases daily output by up to 30%,
- Pumps water earlier in the morning and keeps going later in the afternoon
- Gives better performance on cloudy days
- Protects pump from too much voltage coming from the solar panels
- Protects pump from running when there’s not enough voltage
- Has terminals for float switch operation (make on rise style float switch)
- On/Off switch for winter shutdown
- Water tight cable connections
- Well Water Level Sensor Probes and Cables are included
- LED Pump Status indicator lights
- One Year Warranty

## Installation:

1. Bracket and screws are included for installation on a post
2. Cover the PV panels to prevent generation of electricity
3. Connect the cables from the solar panels. Correct connection is shown by a Green LED.
4. Connect the Hi Water - Low Water- Ground Sensor wires. If you are not using the sensors, you must connect all three H - L - G terminals with wires or the pump won’t operate.
5. Connect the pump cables
6. Connect the Float Switch cables.
7. Tighten all the gland nuts so the cables can’t slip. You may need to wrap some tape around the cables if they are thin.

## LED Functions:

- Green Light: this LED is inside the controller. If the polarity of the connections (+/-) is correct, the LED will light up when power is applied.
- Red Light: this LED is on the front of the controller. It comes on when:
  - a. You are using a float switch, the tank is full, and the pump has stopped.
  - b. You are using the well level sensors, the well is too low, and the pump has stopped.



# Shurflo 9300 Pump Controller LCB-G 902-200 Instructions

## Float Switch:

Use a "Reverse Action" float switch that "Makes" the connection when the tank is full. Typical gauge for the cables is 18 gauge. Generally you can locate the float switch several hundred feet or more away from the controller, but the total line resistance must not be greater than 250 ohms.

## Battery Use:

You can use a battery in the system. See the "Wiring Diagram for Small Submersible Pumps". To prevent dangerous short circuits, use a 10 amp fuse on one of the cables from the battery. If you are only using solar panels with no batteries, you don't need a fuse because solar panels are "current limited" devices.

## Water Sensors:

- High Water Sensor turns the pump on
- Low Water Sensor turns the pump off
- All sensors must be mounted above the pump.
- The Ground Sensor must be underwater at all times. Mount it 1 foot above the pump.
- The Ground sensor is the lowest, the Low Water Sensor is in the middle, then the High Water Sensor is the highest.
- The High Water Sensor should generally not be higher than two feet above the Ground Sensor, it depends on the condition of the water, you can get more distance with cloudy water. You can try putting them farther apart if needed, but if they don't operate reliably, they will need to be closer together.
- Sensor wires should not exceed 300 feet in length.

**Cable Gauge:** Use minimum 10 gauge wires for the solar panel and pump connections. The best gauge to use depends on how far the solar panels and pump are from the controller. See the Wire Gauge Calculator for details.

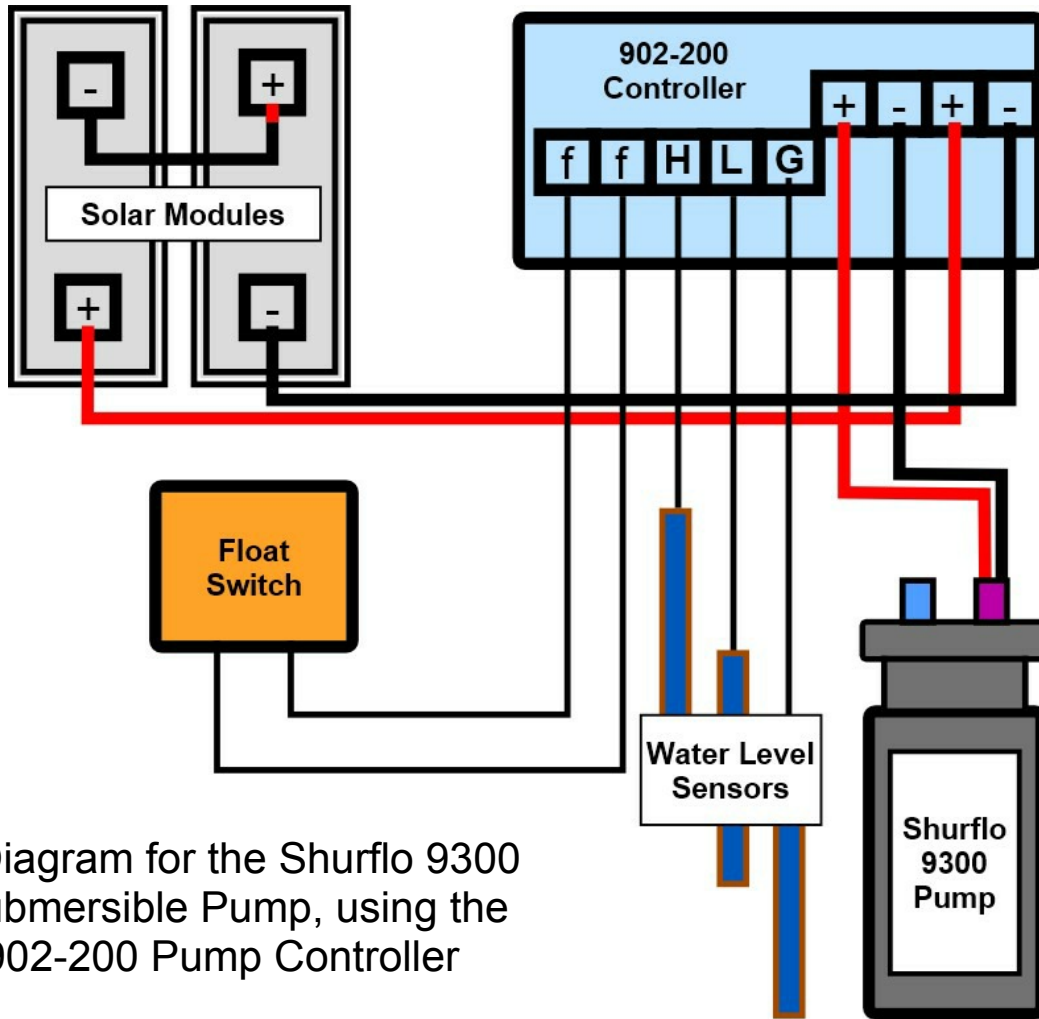
## Terminals on the LCB-G 902-200 Controller:

- PV- (IN) Negative wire from the solar panels. Use a black wire.
- PV+ (IN) Positive wire from the solar panels. Use a red wire.
- PUMP- (OUT) Negative wire from the pump. Use a black wire
- PUMP+ (OUT) Positive wire from the pump. Use a red wire.

**ON/OFF switch** manually controls the operation of the pump.

**There are four switches inside the controller.** If you are running the pump on two 12 volt solar panels with no batteries, you don't have to make any changes in the switches. Otherwise, use the table below to make changes as needed. The pump runs on a slightly higher voltage when it is configured for solar panels.

SYSTEM VOLTAGE SELECTION SWITCH TABLE					
Switch no.		1	2	3	4
<b>25V Solar Array</b>	Two solar panels in series	ON	OFF	OFF	OFF
<b>24V Battery Bank</b>	Two batteries in series	OFF	ON	OFF	OFF
<b>12.5V Solar Panel</b>	One solar panel	OFF	OFF	ON	OFF
<b>12V Battery</b>	One battery	OFF	OFF	OFF	ON



Wiring Diagram for the Shurflo 9300 Solar Submersible Pump, using the LCB-G 902-200 Pump Controller

Specifications of the LCB-G 902-200 Pump Controller	
Maximum Input Voltage	45 Volts
Minimum Startup Voltage with one panel	12.5 Volts
Minimum Startup Voltage with two panels	25.0 Volts
Maximum Output Voltage	29 Volts
Maximum Output Power	150 Watts
Maximum Output Current	5 Amps
Power Consumption of LCB-G	25 Milliamps
Recommended fuse for battery operation	10 Amps
Ambient Temperature Range	14° F to 79°F
Short circuit protection for pump	Yes