



Model	Pump Rating	Max Input Current (A)	Max Open Circuit Voltage (V)	MPPT Voltage Range (V)	Working Temperature (Celsius)
Ceva 55	24V - 120W	15	55	30 - 48	15 - 60
Ceva 80	36V - 210W	15	55	30 - 48	15 - 60
Ceva 100	48V - 500W	15	105	60 - 90	15 - 60
Ceva 150	48V - 750W	15	105	90 - 120	15 - 60
Ceva 180	72V - 1100W	15	160	110 - 150	15 - 60



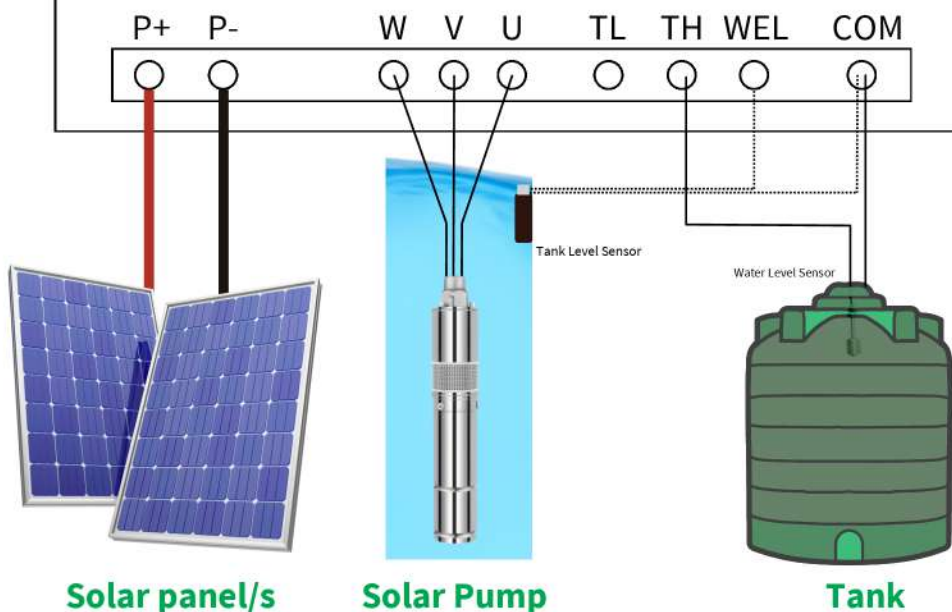
When setting up a solar controller for a water pump, always ensure that the open circuit voltage (VOC) of your panels does not exceed the controller's voltage limit. Verify the panel VOC on the specification sheet, calculate to ensure it stays within the limits, and confirm with a multimeter before connecting. **Exceeding this limit will damage the controller and void the warranty.**

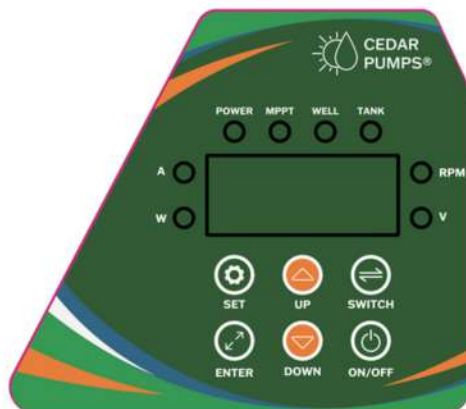


LED Indicator Lights

- Voltage (V): Voltage indicator light
- Speed (RPM): Speed indicator light
- Current (A): Current indicator light
- Power (W): Power indicator light
- Tank: Light on when tank is full
- Well: Light indicates no water in well
- MPPT: Solar energy incoming (blinking)
- Power: Blinking in downtime, solid while running

Controller Connections





Key Type	Function
Set Key	Manufacturer parameter setting, not opened.
Enter	Manufacturer parameter setting, not opened.
Up	RPM setting key. Each time you press, the RPM will increase for one grade. In fault state, turn off/on the fault display.
Down	RPM setting key. Each time you press, the RPM will decrease for one grade.
Switch	In the operation status, you can circularly switch the display mode in voltage (V) -> speed (RPM) -> current (A) -> power (W).
On/Off	In the running state, you can turn it off. In the stop state, you can turn it on.

Please connect the three wires from the pump to the controller, ensuring they do not touch each other. **Incorrect wiring may cause the pump to run backwards during testing**, which can loosen the helical rotor inside the pump. If this occurs, you will need to swap the wires to correct the direction. The helical rotor might also need to be tightened again.

We advise against using batteries with these pumps; the correct solar panels are sufficient. Ensure you do not reverse the positive and negative wires from the solar panels, as this will prevent the pump from working. Always make sure the controller box is switched off before wiring.

Test Run

Before testing the pump, ensure the controller box switch is turned off. The submersible pumps must always be submerged in water, including at least 15 minutes before the initial run. Water acts as a lubricant for the pump bearings; without proper pre-conditioning, the bearings will not be adequately lubricated, which can cause damage. Always test the pump in a drum filled with water before submerging it into the borehole to check all connections. Never use the power cable to lower the pump.

Warning

Ensure the controller matches the recommended solar pump and do not use it with pumps from other brands. Using mismatched pumps and controllers from different brands, or opening the motor or tampering with it, will void your warranty. In cases where the warranty is voided, replacement parts will need to be purchased at the client's expense.

To enhance performance, keep the controller protected from lightning strikes and direct sunlight, as excessive heat can cause it to overheat. To minimize power loss due to DC voltage drop in copper cables, keep cable runs as short as possible. Use a 4mm 3-core submersible cable. For long cable runs, perform a voltage drop calculation online (or speak to your reseller), as a thicker gauge might be needed.

Place your solar panels close to the controller to minimize cable length and enhance efficiency. Use 6mm² cable for most connections, but consider thicker cables for longer distances to prevent power loss.

Model	Panel Option 1	Panel Option 2	Panel Option 3
Ceva 55	1 x 330w	1 x 400w	
Ceva 80	1 x 400w		
Ceva 100	2 x 330w	2 x 400w	
Ceva 120	3 x 330w	3 x 400w	
Ceva 150	4 x 330w	4 x 400w	

When solar panels are connected in series (positive of one panel to the negative of another), the voltage of the panels will add up while the current remains the same. If you connect the panels in parallel, the voltage remains the same but the current will increase. It's crucial to use a multimeter to check the voltage before powering the system to ensure it does not exceed the maximum input voltage of the controller. Exceeding this voltage can cause irreversible damage to the controller.

Installation

Attach a durable rope or stainless steel cable to the top of the pump using the mounting hole. Make sure the rope or cable is longer than the depth at which you want to install the pump. This is used to raise and lower the pump. Never use the power cable to do this.

- Do keep the pump underwater at all times when operating.
- Do be careful with wiring. Wait the required time to ensure your cable joint epoxy is properly set.
- Do remove the pump if not used for a long time, and wipe the screw and body with vegetable oil.
- Installing oil-filled pumps deeper than 30m underwater will increase pressure on the mechanical seals, reducing motor lifespan. For best results, install at 25m - 30m underwater. Adjust speed settings based on the borehole's strength.

- Do make sure the pump has adequate water around it during pumping.
- Don't run without water.
- Do put your solar PV panels in a sunny position facing **true north (Southern Hemisphere)** or true south (Northern Hemisphere). If the panel angle is fixed, then an angle equal to your latitude will be a good compromise.
- Don't run the pump out of the water, even momentarily. It will void the warranty.
- Do not use the pump in water with sediment (dirty water). Premature wear will not be covered by the warranty.
- Do not install the controller in direct sunlight; it requires ventilation for cooling. Ensure proper airflow over the heatsink. Installing the controller inside another enclosure without adequate ventilation may cause issues.

Operation Mode

Pump Start

- Power on to start. Every time connect with electricity, the system boots by default, and pump starts immediately without testing water tank (without any Shutdown conditions).
- Button to start. In shutdown state, press the ON/OFF button to turn on the pump.

Pump Stop

- Float Switch Mode. In running state, when the water full switch is closed, the pump immediately stops. (TH signal terminal of the main control board is shorted to the COM terminal, and the Tank light is on). In running state, when the water shortage switch is closed, the pump immediately stops. (WEL signal terminal of the main control board is shorted to the COM terminal, and the Tank light is on)

PV Mode

In PV mode, the pump speed can reach up to 4000 RPM and is determined by the current solar power through Maximum Power Point Tracking (MPPT). As solar light increases, so does the pump speed, and vice versa. The MPPT indicator flashes to show proximity to the maximum working point; faster flashing indicates closer proximity. If solar power is insufficient, the pump speed drops, stopping at 600 RPM, and reports P46 faults after 3 seconds. Insufficient solar power causes the solar panel output voltage to drop rapidly. When the minimum voltage drops to the lowest voltage of the system and lasts for 10s, it will report "PL" fault. Try consecutively 5 times to restart, if it still appears "PL" fault, hold this state for 30 min, then try to start again.

Dry-run protection

This function refers to the pump pumps out water in the well, the system can automatically detect the anhydrous (without water) state, pump will stop working automatically by set program. Dry-run protection is effective in all working modes. The pump will stand by for 30 minutes to restart (if it meets the starting condition). Start to detect again whether there is water or not, if no water, the pump will stop working automatically; if there is water, it will keep working.

Repairs and Warranties

Repairs and warranties are handled by the reseller or installer from whom you purchased the pump. If you are not satisfied with their service, please contact support@cedarsolar.com to open a support ticket.

Fault Information & Troubleshooting

Always connect the pump and all components and test them in a water-filled drum to ensure the entire system functions properly. Perform this test before submerging the pump down the borehole, as retrieving it for a minor connection error can be frustrating. Troubleshooting videos available at www.cedarsolar.com/downloads

Code	Fault	Causes & Solution
P0	Hardware Overcurrent	Please rewire the U, V, W three-phase short-circuit connection to ensure proper installation. If the wiring and cable joint is correct, the error will be resolved.
P43	Phase-lack Protection	Please rewire the U, V, W three-phase open circuit to ensure reliable contact. If the wiring is correct, the error will be resolved.
P46	Stall Protection	<ul style="list-style-type: none"> Extension cable is too long or the wrong gauge; please adjust accordingly. Power is too low; increase the power supply. Pump bearing is stuck; please clean the pump.
P49	Hardware Overcurrent	<ul style="list-style-type: none"> Water pump bearing is stuck; clean the pump bearings. UVW three-phase short-circuit connection; please rewire to ensure proper installation.
P50	Low Voltage Protection	The input voltage is too low. Check total panel voltage and acceptable ranges.
P51	High Voltage Protection	The input voltage is too high. Check total panel voltage and acceptable ranges.
P48	Dry Run Protection	<ul style="list-style-type: none"> Not all air in the pump is exhausted; cut off the power, re-power, and start the pump drainage after 30 seconds. There is no water in the tank; it will restart when water is available. Error will clear after 30 minutes to allow the borehole time to recover, or disconnect power to remove the error.
P60	High Temperature Protection	The temperature of the controller MCU is over 90°C. Ensure the controller is not in direct sunlight or in an enclosure without adequate ventilation.
E8	Current Sampling Failure	-Cut off the power and restart after 30 second
PL	Power Shortage	<ul style="list-style-type: none"> Not enough sunlight; wait for sunlight to restart. Solar panel matching error; refer to the recommendations for correct matching. For the first 5 instances, the error will clear after 30 seconds, then after 30 minutes.
Alarm	Polarity Protection	Exchange the positive and negative from the solar array, then restart the power.
	Permanent Speed Setting Change	<ul style="list-style-type: none"> From the OFF position, press the SET button. Scroll down to C88 and press ENTER. Use the UP and DOWN buttons to set the desired RPMs and press ENTER. Press the SET button until it displays OFF. Normal operations can now resume.