CEDAR

CEVA
BY CEDAR

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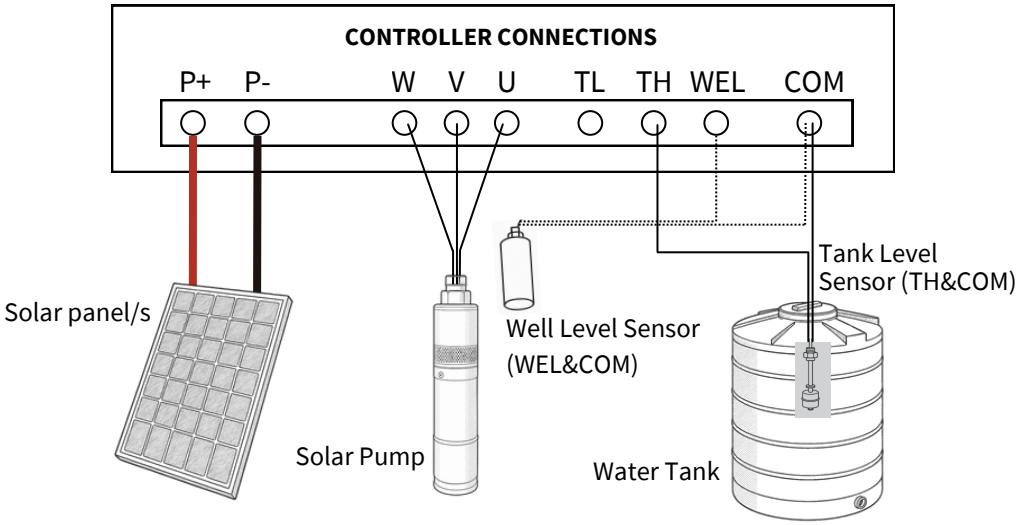
Model	Pump Rating	Max Current	Max Voc	MPPT Voltage Range	Working Temperature
Ceva 55	24 V - 120 W	17 A	**55 V**	30 - 48 V	15 - 60
Ceva 80	36 V - 210 W	17 A	**55 V**	30 - 48 V	15 - 60
Ceva 100	48 V - 500 W	17 A	**110 V**	60 - 90 V	15 - 60
Ceva 150	48 V - 750 W	17 A	**110 V**	60 - 90 V	15 - 60
Ceva 180	72 V - 1100 W	17 A	**160 V**	110 - 150 V	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



WIRING THE CONTROLLER

Connect the three wires from the pump to the controller, making sure the wires do not touch each other. Incorrect wiring can cause the pump to run in reverse, which may loosen the internal helical rotor. If this happens, you'll need to reverse the wiring and possibly re-tighten the rotor. This means extracting the pump out – which is a lot of unnecessary work.

Important Tip:

Before connecting the pump to the submersible cable, take a photo of the wire sequence. The three wires coming from the pump may have different colours or positions compared to the sub cable. This photo will help you maintain the correct sequence later when connecting to the controller.

Always test the pump and all connections in a drum of water before lowering it into the borehole. This helps to confirm if the wiring is correct.

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. Install the controller out of direct sunlight to prevent overheating.

CABLE AND VOLTAGE DROP

PUMP-TO-CONTROLLER: To reduce power loss, keep cable runs as short as possible. Use 4mm² 3-core submersible cable up to 100m and 6mm² above. For long runs, use an online voltage drop calculator or consult your reseller—thicker cable may be required.

PANELS-TO-CONTROLLER: Place solar panels close to the controller (under 40m). Use 6mm² solar cable for most connections; increase the gauge for longer distances to minimise voltage drop.

PUMP TESTING GUIDELINES

Ensure the controller is switched off before testing. Submersible pumps must be fully submerged in water at least 15 minutes before first use – water lubricates the bearings. Always test in a water-filled drum to check connections before lowering into the borehole. Never use the power cable to lower the pump.

LIGHTNING PROTECTION

Lightning can damage any borehole pump system, especially in areas with frequent storms. To reduce risk, always install surge protection, ensure proper earthing and bonding, and make use of the borehole casing as an earth electrode where possible. While these steps greatly reduce the chance of damage, we strongly recommend clients insure their equipment, as lightning is considered an act of God and is not covered under warranty.

Model	Panel Option 1	Panel Option 2
Ceva 55	1 x 400w	1 x 450w
Ceva 80	1 x 450w	
Ceva 100	2 x 400w	2 x 450w
Ceva 150	2 x 550w	2 x 550w
Ceva 180	3 x 550w	3 x 550w

SOLAR PANEL CONNECTIONS

When connecting panels in series (positive to negative), voltage adds up and current stays the same. In parallel, voltage stays the same but current increases.

These are general guidelines - you must check the voltage and current ratings of the specific panels you use, as brands and models vary.

Always use a multimeter to check total voltage before powering the system. Do not exceed the controller's maximum input voltage - this can cause permanent damage.

INSTALLATION

- Attach a strong polypropylene rope to the pump's mounting hole - never use the power cable to raise or lower the pump.
- Ensure the rope/cable is longer than the installation depth.
- Install the well sensor 30cm above the pump to ensure dry-run protection functions correctly.
- Allow epoxy cable joints to fully cure before use. Follow the splice kit instructions.
- Maximum installation depths: **Models 55, 80, 100: up to 50m below water level** and **Models 150, 180: up to 70m below water level.**
- Installing at shallower depths reduces pressure on the seals and extends motor lifespan.
- Adjust speed settings according to the borehole's water yield.
- Using the well sensor, tank sensor, and correct speed settings, the system will automatically regulate performance to ensure your tanks are refilled daily without running the borehole dry.

OPERATION GUIDELINES

- Ensure the pump is always surrounded by adequate water during operation.
- Do not run the pump out of water, even briefly—this will void the warranty.
- Position solar panels in full sun, facing true north (Southern Hemisphere) or true south (Northern Hemisphere). For fixed angles, use your latitude as a guide.
- Do not use the pump in sediment-rich or dirty water—this causes premature wear and is not covered by warranty.
  - For aggressive water, install a sacrificial anode.
  - For sediment-heavy water, use a pump sleeve to protect the motor.
- Do not install the controller in direct sunlight. It requires ventilation and proper airflow over the heatsink. Avoid placing it inside sealed boxes without airflow.

OPERATION MODE: Pump Start

- Power-on to start: When powered, the system boots by default and the pump starts immediately, without checking the water tank or other shutdown conditions.
- Button to start: In shutdown mode, press the ON/OFF button to manually start the pump.

OPERATION MODE: Pump Stop – Float Switch Mode

- While running, if the water full switch is triggered (TH terminal shorted to COM), the pump stops immediately and the Tank light turns on.
- Similarly, if the water shortage switch is triggered (WEL terminal shorted to COM), the pump stops immediately and the Tank light turns on.

PV MODE

In PV mode, the pump speed can reach up to 4000 RPM, controlled by solar input via Maximum Power Point Tracking (MPPT). As sunlight increases, pump speed rises; as it decreases, speed drops. The MPPT indicator flashes—faster flashing means closer to the optimal point. If solar power is too low, the pump slows down to 600 RPM and triggers a P46 fault after 3 seconds. A drop in solar power also causes the panel voltage to fall quickly. If voltage remains below the system's minimum for 10 seconds, a PL fault appears. The system will retry 5 times; if the fault persists, it holds for 30 minutes before trying again.

DRY-RUN PROTECTION: External Sensor Provided must be installed!

Internal dry-run sensors can be unreliable in helical rotor pumps, which is why this range uses an external well sensor for accurate water level detection. If no water is detected, the pump stops automatically and enters a 30-minute standby before checking again. If water is present, it resumes operation; if not, it shuts down again to protect the pump.

REPAIRS & WARRANTIES

Repairs and warranties are handled by the reseller or installer where the pump was purchased. If you're not satisfied with their service, email support@cedarsolar.com to open a support ticket.

Only use the controller with the recommended solar pump. Do not use it with other brands. Using mismatched equipment, opening the motor, or tampering will void the warranty. If voided, all replacement parts will be at the client's cost.

FAULT INFORMATION & TROUBLESHOOTING

- Always test the pump and all components in a water-filled drum before lowering it into the borehole. This ensures the system works correctly and avoids the hassle of retrieving the pump for minor connection issues.
- Watch troubleshooting videos (scan barcode) at www.cedarsolar.com/downloads.

Fault Code	Fault Description	Fault Cause	Solutions	Recovery Process
E12	Water dry protection	1. The customer short-circuited the WEL and COM terminals.	1. Remove the WEL and COM terminals. Except for the LDG series, other series generally do not need to connect the water dry float switch for protection.	Automatically clear 30 seconds after troubleshooting.
		2. The dry water terminal circuit is damaged.	2. Replace the inverter circuit board.	
E13	Water full protection	1. The full-water signal of the water tank is connected.	1. Confirm whether it is a normal full-water warning.	Automatically clear 300 seconds after troubleshooting.
		2. The water tank is not full but an alarm is triggered.	2. Check if the float ball and relevant sensor are normal.	
		3. The circuit of the full-water terminal is damaged.	3. Verify whether the float ball signal and the power signal are routed together, as this may lead to false alarms caused by interference.	
			4. Check if it is due to poor grounding conditions and eliminate false alarms caused by poor grounding.	
			5. Replace the inverter circuit board.	
P0	Hardware overcurrent	1. Impediment of the transmission mechanism and excessive motor load	1. Check and address issues with the transmission mechanism and motor load to ensure they operate smoothly without stalling.	Automatically clear 30 seconds after troubleshooting.
		2. Short circuit at the inverter output or three-phase voltage imbalance	2. Check the connection wires from the inverter output to the motor to ensure there are no short circuits and the three-phase voltages are balanced.	
		3. Aging of inverter devices, malfunction of current transformers or current detection ICs, etc.	3. Replace the damaged components or the entire inverter.	
		4. Inter-turn short-circuits in the motor, overheating of cables or insulation damage	4. Check and replace the damaged external devices.	
P43	Phase loss protection	1. Motor problems cause the inverter output to have a phase loss.	1. Repair or replace the motor.	Automatically clear 300 seconds after troubleshooting.
		2. An internal fault in the inverter.	2. Replace the inverter circuit board.	

P46	Stall protection	1. When the motor starts with a load, the load is too large and the motor speed drops too quickly.	1. Check and adjust the load appropriately to ensure that the motor load is within the rated range.	Automatically clear 30 seconds after troubleshooting.
		2. The motor stalls during operation, resulting in an abnormal increase in current.	2. Check if the impeller or bearing is stuck.	
		3. The grid voltage is too low. As the current increases, the motor makes the inverter falsely report stalling.	3. Check the power grid voltage.	
		4. The pump cable is too long/too small.	4. Configure the cable specifications according to the minimum allowable voltage drop; reduce the water pump cable length by extending the DC input cable.	
P48	Dry pumping protection	1. Air in the water pump or the pipeline.	1. Remove the air from the pipeline.	Automatically clear after 30 minutes or clear by powering on again.
		2. Water pool is lack of water.	2. Check the water source. It will automatically resume 30 minutes after water is available.	
		3. Valve of the inlet pipe is not opened.	3. Open the valve.	
P49	Software overcurrent	1. Motor coil short circuit or inter-phase imbalance	1. Check for short circuit phenomena and eliminate short circuit conditions.	Automatically clear 30 seconds after troubleshooting.
		2. The load suddenly increases during equipment startup or operation, and the current exceeds the set threshold.	2. Check if the impeller or bearing is stuck.	
		3. Loose wiring or damaged cables lead to abnormal current.	3. Check the current circuit to confirm if it is a wiring problem.	
		4. PCB board is damaged.	4. Replace the circuit board.	
P50	Low voltage protection	1. Insufficient input voltage	1. Check if it is within the recommended input voltage range of the inverter.	Clear immediately when the voltage returns to normal
		2. PCB board damage	2. Replace the PCB board.	
P51	High voltage protection	1. Excessive voltage input	1. Check if it is within the recommended input voltage range of the inverter.	Clear immediately when the voltage returns to normal
		2. Low temperatures	2. Check the actual input voltage and troubleshoot	
P60	High temperature protection	The temperature of the controller MCU has surpassed 90 degrees.	Add a heat dissipation system.	Automatically clear after the temperature returns to normal.
PL	Insufficient power	1. Insufficient illumination	1. Wait for better lighting conditions.	For the first 5 times, clear after 30 seconds. After that, clear after 30 minutes.
		2. Solar panel configuration issues	2. Check the solar panel configuration according to the inverter's recommended input voltage.	
		3. There are surrounding obstacles that hinder its progress.	3. Exclude the shading factor. If the shading object can't be removed, adjust the installation position of the solar panels.	
NO code	Incomplete display	1. The keyboard display panel is abnormal.	1. The display circuit of the keyboard display board has a problem. Replace the keyboard display board.	
		2. The connecting cable is loose or damaged.	2. Check and replace the connecting wire between the keyboard and the PCB circuit board.	
	Do not display anything	1. No power input.	1. Check if the input power supply is normal. Check fuse.	
		2. PCB board is damaged.	2. If the buffer circuit is burned out, the IGBT is damaged, or the switching power supply circuit is damaged, etc., professional-level repair skills are required. It is recommended to directly replace the PCB board.	