

# PicoCell2000

## Manual



**SunTechDrive**

Revision 6.2

# Before you get started

## IMPORTANT:

This manual contains important instructions that should be followed during installation, operation, and maintenance of the PicoCell controller. Carefully read and follow all safety instructions in this manual. Make sure that safety labels are always in good condition and replace missing or damaged safety labels.



### WARNING

**Risk of Electric Shock**  
**Disconnect Power Before Removing Door Cover!**

### CAUTION

**Risk of Electric Shock**

Before performing any service or maintenance inside the controller, or when connecting or disconnecting any wires, **DISCONNECT the power and WAIT 90 seconds** to allow the capacitor bank inside the controller to discharge to a level below 50Vdc.

- **DO NOT** turn on the power to the controller before terminating all wiring connections and closing the cover door.
- **DO NOT** connect power wiring to the controller before mounting the box.
- **DO NOT** service the device if your hands are wet or damp. Always make sure hands are dry before working on the controller.
- **DO NOT** modify equipment inside the controller.
- **DO NOT** remove any parts of the controller unless instructed by this manual.
- **DO NOT** ground the positive or negative leads of the PV modules. Only ground the mounting frames of the PV modules.

The controller should be **installed and inspected by technically qualified personnel**, and if the controller is not installed in compliance with national and local electrical codes and SunTech Drive recommendations, the controller can be damaged and fail to operate.

**FOLLOW** instructions in this manual and labels inside the controller for proper and successful installation.

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### NOTICE

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# PicoCell at a Glance

The PicoCell 2000 is an off-grid solar controller that can operate most alternating current (AC) motor loads up to 1HP single-phase/1.5HP three-phase from solar photovoltaic (PV) power. The PicoCell has a unique functionality that enables users to match an AC load with Solar PV power. By using commercially and locally available AC pumps, the PicoCell makes solar water pumping and other solar-powered applications more affordable.

To size the solar PV array to your specific motor, please consult with your local dealer or SunTech Drive. A typical diagram for a PicoCell-operated solar water pumping system is shown in Figure 1. The solar PV array should be connected to the PicoCell controller via the DC Disconnect. The PicoCell controller should be installed in the shade (potentially mounted under the PV array) and away from the direct sun.

The PicoCell can accept up to two digital sensor inputs. For example, in solar water pumping applications, an optional float switch can be connected to the PicoCell to monitor when a water tank is full, or a pressure switch can be used in combination with a pressure tank.

The PicoCell off-grid solar controller is unique because it can run most single or three phase AC motors, 115 or 230V, and 50 or 60Hz.

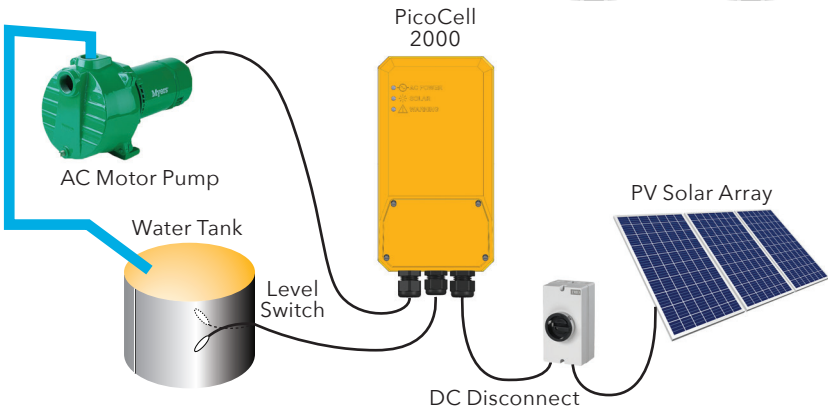
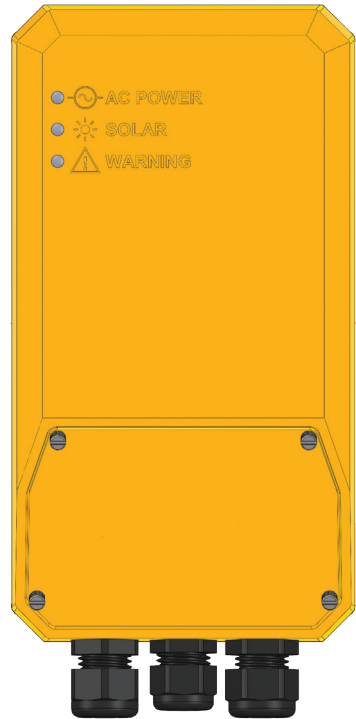


Figure 1: Solar Water Pumping System Diagram with PicoCell 2000

# PicoCell Product Description

The PicoCell solar controller is a universal, high performance, variable speed motor controller for solar applications using single-phase and three-phase AC loads in a power range from 1/3 HP to 1.5 HP.

The PicoCell controller is suitable for a variety of applications:

- Livestock water supply
- Small scale irrigation
- Industrial farming ventilation
- Water transfer and evaporation
- Village water supply
- Aquaculture and aeration
- Swimming pool filtration

As a standalone AC motor/pump/compressor/fan solar controller, the PicoCell enables free solar power for a vast number of AC devices.

The PicoCell can power new and previously installed (retrofit) AC motors. Please consult with a dealer to size the solar arrays when using the PicoCell.

For new installations, motor selection can also optimize the system economics. 230V 3-phase motors are the most electrically efficient and require the least amount of solar, followed by 115V 3-phase, 230V 1-phase and 115V 1-phase in descending order of efficiency.

**NOTE:** Motors controlled by the PicoCell do *not* require separate motor controls. The PicoCell was designed to be universal for most inductive motors while being mindful of some basic design limitations:

The PicoCell may not operate 2-wire, single-phase motors that use switching devices to start. This includes, but is not limited to, 2-wire starting capacitors, both centrifugally switched and BIAC switched.

Ask about SunTech Drive's Accessory Power Cable to retrofit 2-wire surface motors with starting caps.

- The PicoCell can run motors with Service Factor Amps of 9 Amps or less for 1-phase motors, and 7 Amps or less for 3-phase motors. Please contact SunTech Drive for more information on particular motors.
- Generally, 1-phase motors up to 1 HP will operate well.
- Generally, 3-phase motors up to 1.5 HP will operate well.
- The PicoCell does not power Direct Current (DC) permanent magnet or Brushless DC (BLDC) motors.
- The PicoCell will replace the manufacturer's motor controller when installed on a Variable Speed Drive (VSD) or a Variable Frequency Drive (VFD) submersible pump motor.
- The PicoCell will replace the control box for 3-wire motors.
- The PicoCell will operate 2-wire motors with Permanent Split Capacitors (PSC).
- The PicoCell will not operate submersible motors with 2-wire starting capacitors, including Franklin Electric 2-wire submersibles and Grundfos 2-wire submersibles. SunTech Drive offers accessory cables to retrofit most 2-wire starting capacitor surface motors.

# PicoCell Specifications

## Input Specification:

- Minimum Operating Voltage : **100 Vdc (for 115 Vac)  
150 Vdc (for 230 Vac)**
- Maximum Solar Open Circuit Voltage: **400Vdc**
- Maximum Solar PV Current in Series: **9Amps**
- Earth-ground connected to chassis

## Output Specification:

- Maximum Output Current: **9Arms (1-phase motors)**
- Maximum Output Current: **7Arms (3-phase motors)**
- Maximum Power Sustained: **2000W**

## Protections:

- Short-circuit, ground-fault, over-temperature, over-load, over-voltage, over-current, and solar input reverse polarity protection
- Automatic dry well protection and pump locked rotor protection

Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.

| ELECTRICAL                         |               |
|------------------------------------|---------------|
| Solar PV open circuit voltage:     | 400V          |
| Max PV panel current in series:    | 9A            |
| Max Single phase AC motor current: | 9A            |
| Max Three phase AC motor current:  | 7A            |
| Degree of protection:              | TYPE 4        |
| Enclosure material:                | Aluminum      |
| MECHANICAL                         |               |
| Operating temperature:             | -40°C to 50°C |
| Dimensions:                        | 10"x5.5"x4"   |
| AC Source Terminals:               | AWG #10-16    |
| Solar Terminals:                   | AWG #10-16    |
| Motor terminal:                    | AWG #8-16     |
| Float Sensor terminals:            | AWG #14-20    |



### WARNING:

Carefully check the motor load specifications and solar PV array maximum power point voltage to setup the system properly using this manual!

## Environmental - Compliance with IEC 60068

IEC 60068-2-2 - Cold  
IEC 60068-2-14 - Change of Temperature

IEC 60068-2-2 - Dry Heat  
IEC 60068-2-30 - Damp Heat

# PicoCell Installation Requirements

The PicoCell must be installed in a shaded location, away from any source of heat and moisture, and in an area free of vegetation. Measures must also be made to protect the unit from damage by unauthorized persons, large animals, overgrowth, flooding, or other harm.



## WARNING

The PicoCell has voltages capable of causing severe injury or death by electrical shock. It should only be installed and serviced by a SunTech Drive authorized suppliers, dealers and installers.

Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.

- Contact your SunTech Drive Supplier/Dealer for any service or warranty claims
- NEC codes take precedence over suggestions in this manual
- We strongly recommend that the installation data be recorded into the "Installation Notes" section on page 18 and that the manual is stored near the unit

The PicoCell should be mounted at least 2 feet (60cm) above the ground when possible. A minimum of 10 inches (25cm) of clearance above the PicoCell is required for internal access. There must be no obstruction of air flow to the heat sink. A typical installation on an array structure is shown in Figure 2, below.

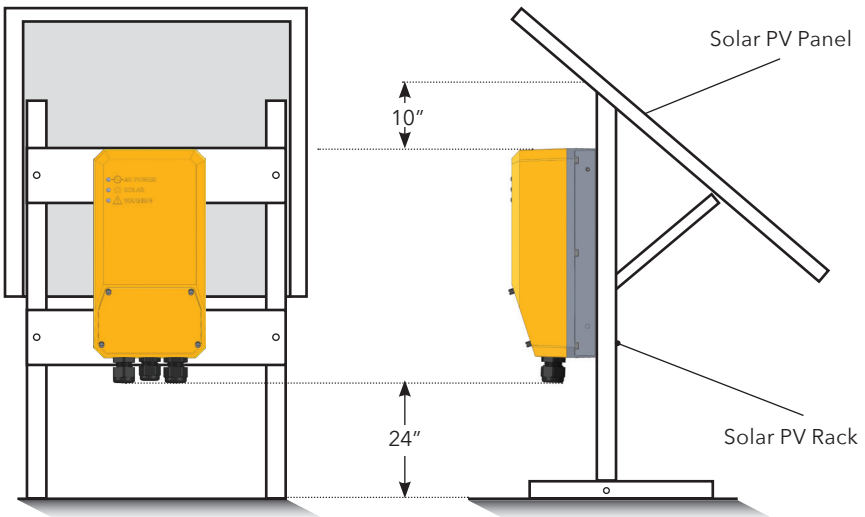


Figure 2: PicoCell Mounting

Once the PicoCell is installed in a shaded location (see Figure 2), it can be wired to DC (solar) sources. Maximum cable lengths for 115 and 230Vac for different motor load currents are shown in Figure 3 below.

This unit was evaluated for temperature rating of 60/75°C (140/167°F) on power field wiring terminals.

| Motor Load [A] | Nominal Voltage [V] | AWG Copper Wire Sizes<br>90°C (194°F) insulation [ft] |     |     |     |      |
|----------------|---------------------|-------------------------------------------------------|-----|-----|-----|------|
|                |                     | 16                                                    | 14  | 12  | 10  | 8    |
| 4              | 115                 | 110                                                   | 165 | 270 | 400 | 600  |
|                | 230                 | 220                                                   | 330 | 540 | 800 | 1200 |
| 6              | 115                 | 70                                                    | 110 | 175 | 275 | 400  |
|                | 230                 | 140                                                   | 220 | 350 | 550 | 800  |
| 8              | 115                 | 55                                                    | 85  | 135 | 200 | 300  |
|                | 230                 | 110                                                   | 170 | 270 | 400 | 600  |

**IMPORTANT: Use copper conductors only!**

Figure 3: Maximum Input Cable Lengths in Feet (based on 3% voltage drop)

Dimensions of the PicoCell and back panel are shown in Figure 4, with additional details on how to mount the unit on page 7.

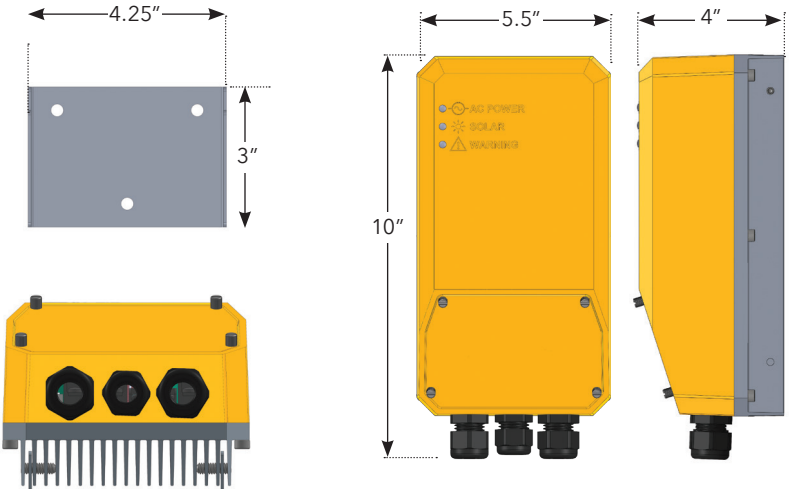


Figure 4: PicoCell Dimensions

# PicoCell Hardware

The PicoCell controller consists of several components, as shown in Figure 5. The unit has three wire glands: two large glands for a motor cable (left) and for solar PV array (right), and one gland for data cables (middle), for a float switch sensor or other optional sensor. There is direct access to the power and signal terminals on the circuit board once the enclosure door is removed.

The PicoCell controller should be mounted on a wall or other vertical surface using the back bracket (see Figure 5 below). On the back side of the unit there are two set screws used to hang the unit on the back bracket. More detailed mounting instructions are shown on page 7.

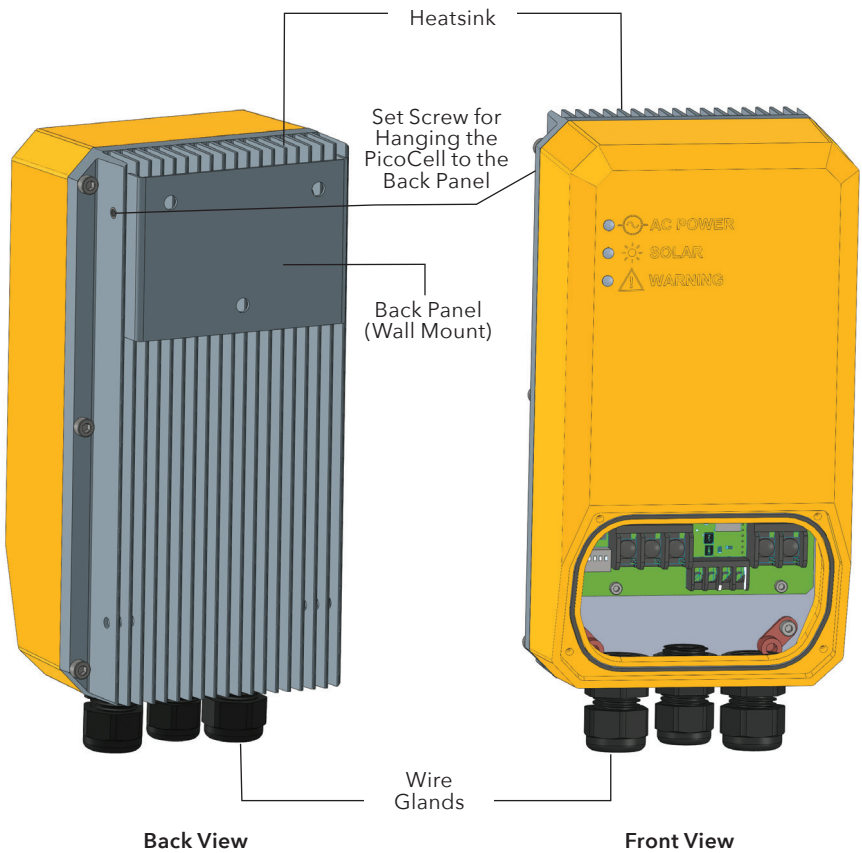
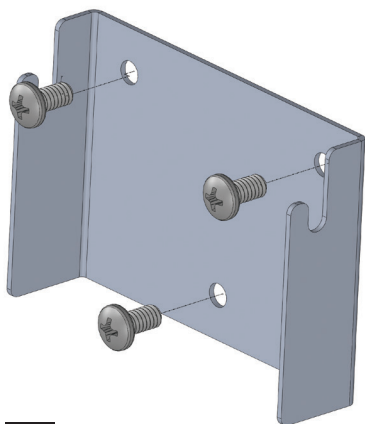


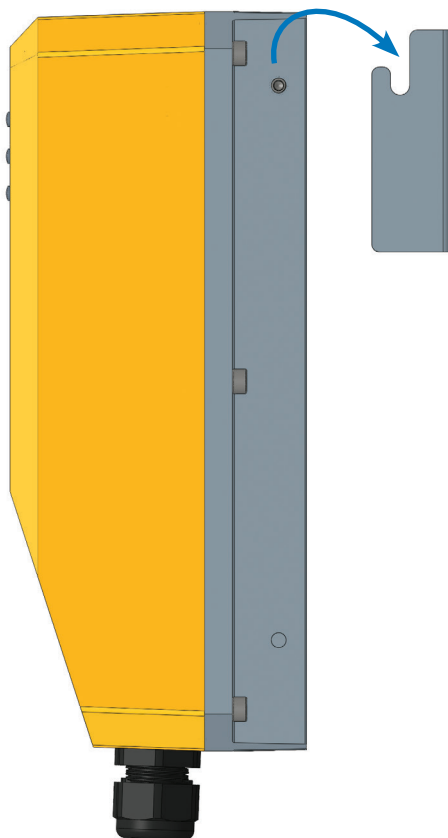
Figure 5: PicoCell Hardware

# Mounting the PicoCell



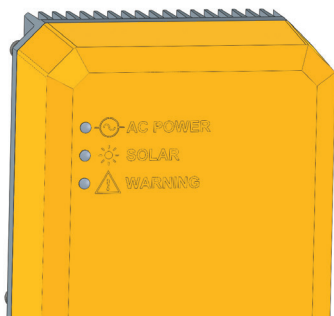
1

Fix the back bracket to the support surface by inserting three screws (not included) through the 3 holes in the back bracket



2

Make sure both set screws are used to hang the PicoCell onto the back bracket



3

Mounted!

# PicoCell Overview

The features of the PicoCell controller are shown in Figure 6. The unit has three wire glands: solar PV inputs, motor output, and one gland for the external sensors. Further details about wiring the unit are provided on page 11.

Three LEDs are used to indicate the PicoCell controller's operation (more details provided on page 19).

Once the door of the enclosure is open, there are three terminal blocks:

- 1** Solar PV wires
- 2** Motor/pump wires
- 3** Pump or tank sensor wires. More information about sensor wiring and DIP switches is provided on pages 11-12.

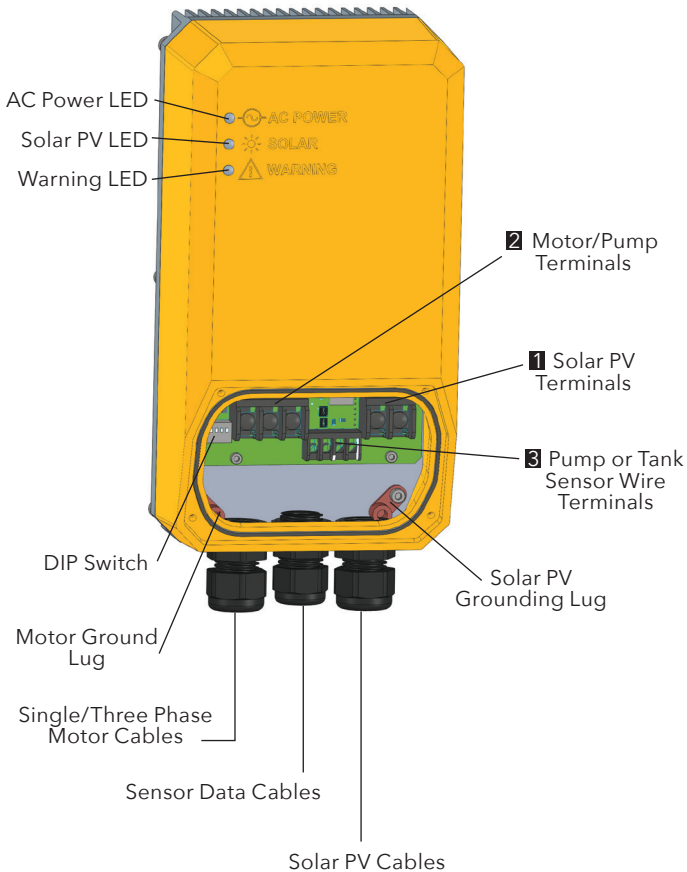


Figure 6: PicoCell Features Overview

The features of a PicoCell's DIP Switches are shown in Figure 7. The installer needs access to the DIP Switches when configuring the PicoCell DIP to **match** the AC motor load (described in greater detail on page 12).

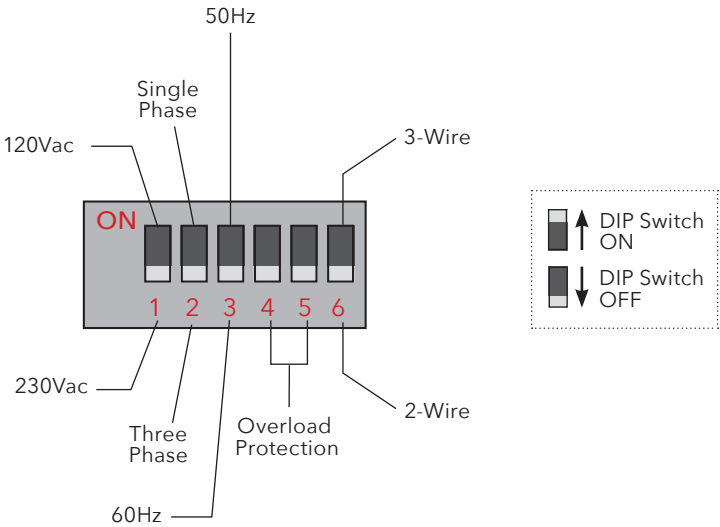


Figure 7: PicoCell DIP Switches Features Overview



**WARNING**

Do not modify DIP switch settings until power has been turned off and after 90 seconds have passed for internal voltages to discharge below voltage of 50Vdc! Power must be removed for DIP switch settings to take effect.

# PicoCell Wiring Instructions

## Installation Requirements:

- All electrical installations must be carried out in accordance with local standards and the National Electrical Code.
- Conductor rated current, temperatures, operating conditions and its power loss must be made in accordance with local standards and the National Electrical Code.

After being properly installed, the PicoCell can be wired to the solar DC source with voltage and current levels defined on page 3. Please refer to maximum cable lengths from Figure 3.

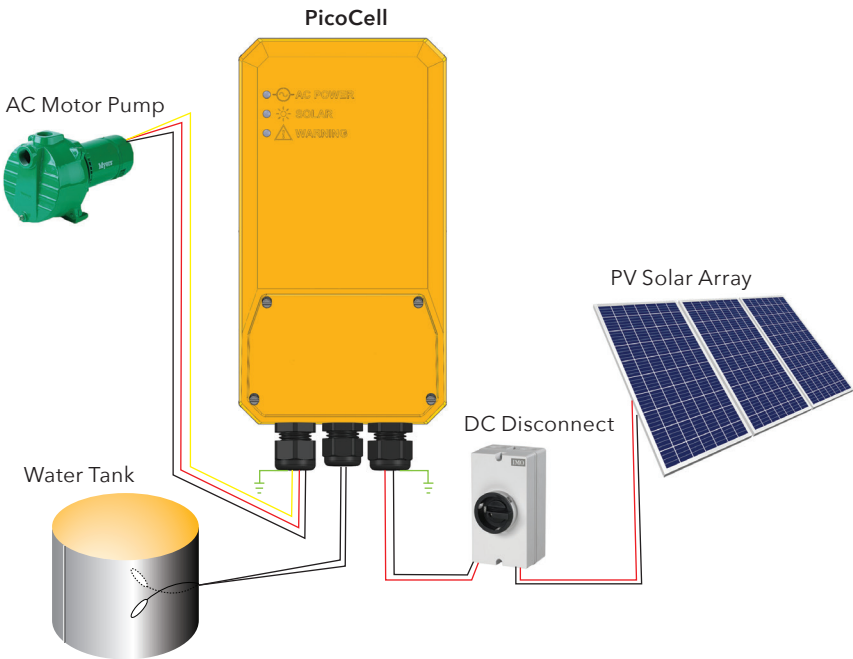


Figure 8: PicoCell System Wiring Diagram



### WARNING

**Do not ground the positive or negative leads of the PV modules!**

Only ground the mounting frames of the PV modules.

**Never run the PicoCell controller when the AC pump is not connected!**

It might cause damage to the controller.

**If an installed 3-phase pump does not start pumping water, switch the positions of any two of the three motor wires.** It will change the direction of rotation and it should start pumping water!

Once the system is wired (per Figure 9), the power conductors wired to the terminals blocks inside the PicoCell should be tightened with torque values of:

- Power solar PV and motor load conductors: 10 lb-in
- Float switch signal conductors: 8 lb-in

The cable glands (cord grips) on the bottom of the enclosure should be used as shown on Figure 9 below. Solar power wires feed through the right gland, float switch/signal wires feed through the middle gland, and motor load wires feed through the left gland.

When all conductors are wired into the controller, the cover (enclosure door) should be replaced and tightened using the cover screws to 2-3 in-lb or equivalent.

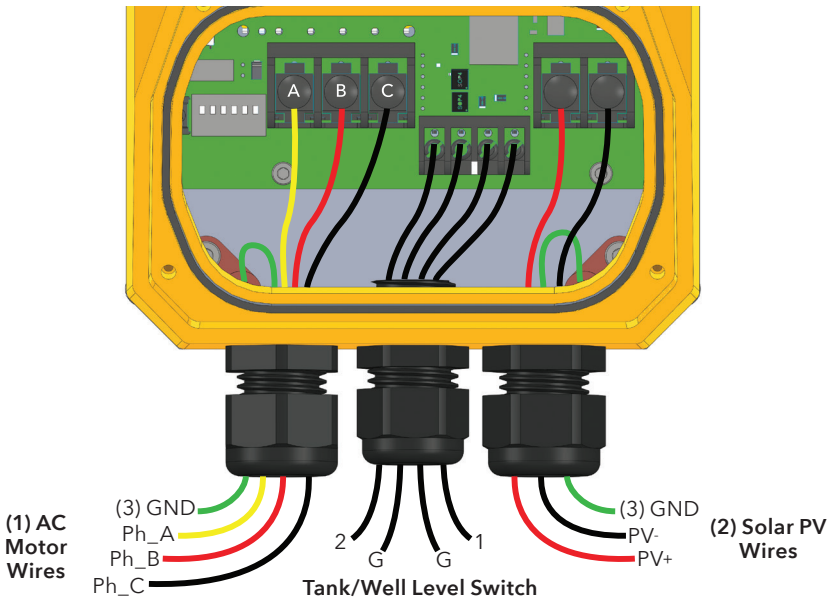


Figure 9: Wiring Inside the PicoCell

Single phase motor loads should be wired as shown below. Single phase 2-wire motors should be connected to Phase A and C, while 3-wire motors should be wired so that the Common Lead is wired to Phase A, Starting Winding to Phase B and Main Winding to Phase C.

**IMPORTANT:**

|                                  |                                                                                                                                       |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Single phase 2-wire motor pumps: | Connect to A and C motor terminals of PicoCell                                                                                        |
| Single phase 3-wire motor pumps: | Ph_A: <b>YELLOW</b> wire - common motor lead<br>Ph_B: <b>RED</b> wire - start motor lead<br>Ph_C: <b>BLACK</b> wire - main motor lead |

# PicoCell DIP Switch Settings

The PicoCell controller can operate most AC motors up to the power limits of the controller: single or three-phase; 50 or 60Hz; 120Vac or 230Vac. In order for the PicoCell to match the motor specifications, the first three DIP switches on the left are used for motor selection (see Figure 10).

**DIP Switch 1 - 120/230Vac:** If switched ON (up), the unit is configured for 120Vac pump operation; if switched OFF (down), the unit is configured for 230Vac.

**DIP Switch 2 - 1/3 phase:** If switched ON (up), the unit is configured for single-phase motor operation; if switched OFF (down), the unit is configured for three-phase motor operation.

**DIP Switch 3 - 50/60Hz:** If switched ON (up), the unit is configured for 50Hz motors; if switched OFF (down), the unit is configured for 60Hz motors.

**DIP Switches 4 and 5 - Overcurrent Protection:** See Figure 11. The PicoCell can set overcurrent protection based on the motor pump and controller combination being used. The default value of RMS current (when both switches are OFF) is 9A for single phase, and 7A for three phase. DIP switches 4 and 5 are to be used to match or exceed the motor nameplate's SFAMPS in order to protect from overcurrent. For example, if a single phase motor has SFAMPS: 7A then DIP switches 4 and 5 have to be set for 8A, as this is the next highest protection current for this motor. Configuring Overcurrent Protection also configures automatic **Dry Well Protection**. The PicoCell monitors motor amperage for dry well protection, and no other dry well sensor input is needed unless desired.

**DIP Switch 6 - Single Phase 2-wire/3-wire:** See Figure 12. Used for setting up the proper mode for single phase operation, relevant only when DIP switch 2 is set for single phase operation. The default setting is for single phase 2-wire motors, when DIP switch 6 is OFF (down). For 3-wire single phase motors DIP switch 6 should be ON (up).

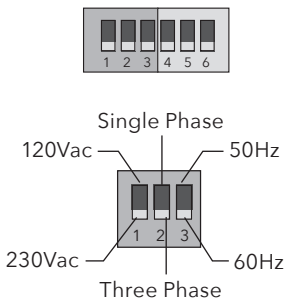


Figure 10: DIP Switches

| DIP Switches<br>4 and 5 | Overcurrent Protection |             |
|-------------------------|------------------------|-------------|
|                         | Single Phase           | Three Phase |
|                         | 9A                     | 7A          |
|                         | 8A                     | 5.5A        |
|                         | 6.5A                   | 4.5A        |
|                         | 5.5A                   | 3.5A        |

Figure 11: Overcurrent Protection

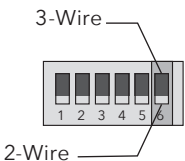


Figure 12: 2 or 3-wire Single Phase Option

# PicoCell Sensor Settings

The PicoCell controller can be turned ON or OFF remotely by using a digital input or by using a standard float switch. There is a float switch terminal block (Figure 6) where digital signal wires are connected.

If Digital Inputs 1 and COM experience a short circuit, the PicoCell automatically turns off. Similarly, if Digital Input 2 and COM experience an open circuit, the PicoCell automatically turns off. There are numerous remote sensors that can be used: float switch, pressure switch, flow switch, water level sensor, dry run protection, etc. Ask your dealer about configuring sensors and switches for your application.

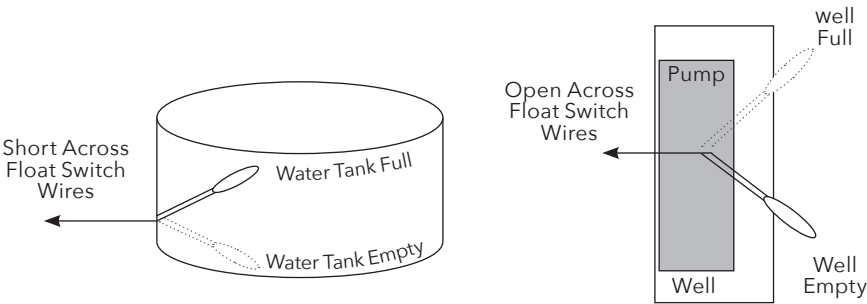


Figure 13: “Water Tank Full” and “Well Empty”

A typical example of how tank and well switch signals can be used with a digital input port is shown in Figure 13. For a tank application, if the active wire is connected to Position 1 and the return wire (usually black) is connected to Position COM, then the PicoCell will stop the pump when the tank gets full because Terminals 1 and COM will be “shorted” (active short). This turns off the PicoCell. See Figure 14.

For a well application, if the active wire is connected to Position 2 and the return wire (usually black) is connected to Position COM, then the PicoCell will stop the pump when the well runs out of water because Terminals 2 and COM will be “open” (active open). This turns off the PicoCell.

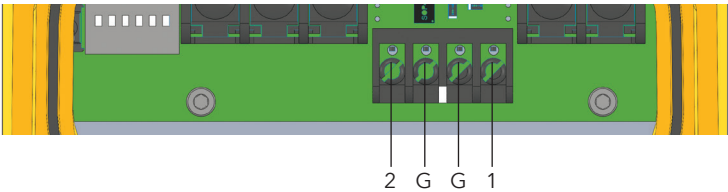


Figure 14: Tank/Well Float Switch

\*PicoCell devices with A4 production code and older will have opposite logic for the second digital input (2 and G) float switch input channel, so it is active short, not active open. PicoCells shipped with A4 production code and older do not include a jumper wire. Check for the actual code revision on the Spec label on the right side of the PicoCell.

# PicoCell Configuration and Setup

Sizing the solar system to power the PicoCell and a given motor load (pump, compressor, fan, etc.) is based on the power requirement of the motor load, motor phase, daily duty cycle of the system and installation location. Motor load requirements can be obtained from the motor nameplate, look for SFAMPS.

Three-phase motor loads will typically require less solar PV capacity than single-phase loads, due to higher electrical efficiency. Hence, 3-phase pumps are more cost effective because they require less solar PV power. 1-phase motor loads with running capacitors (also called split-phase), will also require higher solar PV power at startup than their 3-phase counterparts. Service Factor (SF) can also vary between motor manufactures. A higher SF may require more PV solar power.

For off-grid solar pumping applications, the main requirement is either total daily pumped water, or the total amount of time the pump will operate from solar power. Figure 15 shows how three different solar capacities (solar power wattage) are affecting total daily pumping duration. If Solar Size 1 results in Time 1, for a given pump power, then by adding solar power to Solar Size 2, the pumping time increases significantly. However, the same solar power addition to Solar Size 2 results in Solar Size 3, but incremental time between Time 3 and 2 is not the same as between Time 2 and 1. Therefore, a linear solar power capacity increase **does not** result in a linear daily pumping time increase. Additional solar capacity results in decreasing returns for increased pumping time. Additionally, it is important to note the minimum and maximum solar PV array requirements when sizing solar for a given pump using the PicoCell. Configuring solar PV capacity will vary based on location of the installation (i.e. different solar irradiances at different latitudes).

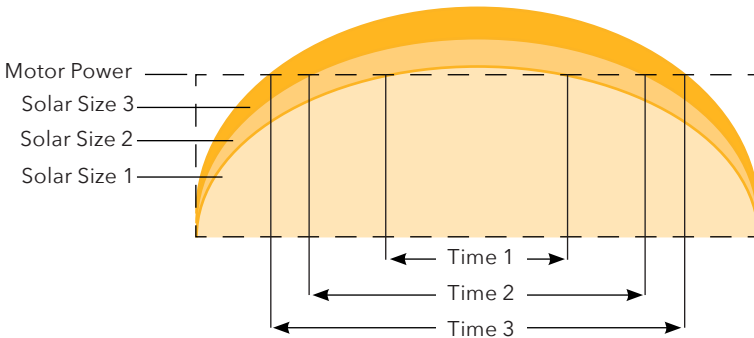
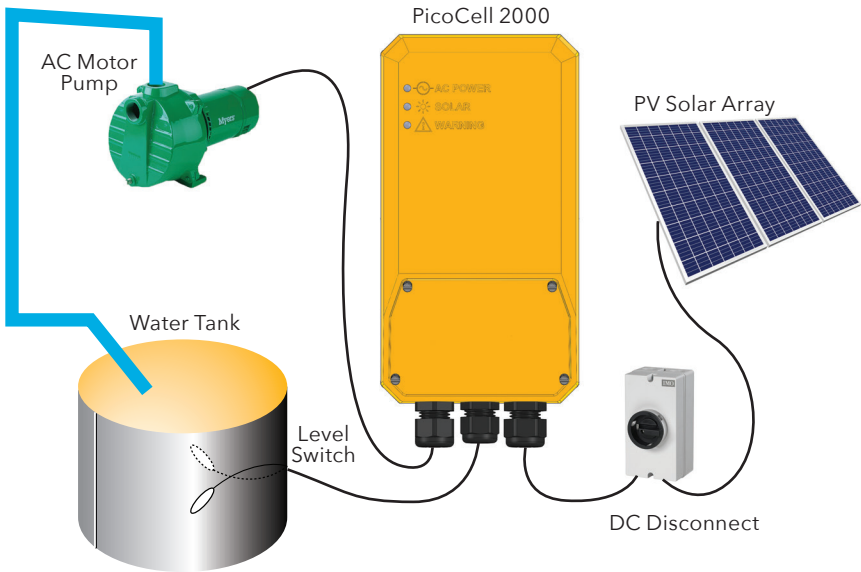


Figure 15: Sizing Solar PV Power with the PicoCell Controller

For a more detailed solar PV configuration, please contact the SunTech Drive sales team or your local dealer. Be ready to provide the motor load nameplate information, as well as installation site location and application requirements of the desired daily duty cycle.

# PicoCell Operation

Once the PicoCell controller is wired to the solar source and a motor load, and the DIP switches settings are configured to match the motor specification, then the PicoCell is ready for operation.



**Figure 16: Solar Water Pumping System Diagram**

When starting the PicoCell for the first time:

1. While the PicoCell is still de-energized, configure the DIP switches per the AC motor load of the connected device (see DIP switch details on page 12).
2. After DIP switches are configured, turn ON the toggle switch, and replace the door. Make sure you properly tighten all four captive door screws so that the door seals.
3. Power up the PicoCell from solar PV by switching the solar DC disconnect to the ON position. All LEDs will light up, and after a few seconds the PicoCell will try to start the pump, indicated by a blinking green light, and upon starting the green LED will remain ON.
4. If there is not enough solar power available, the middle LED will blink yellow, indicating insufficient solar power to start the motor load.

During start-up mode, the PicoCell soft starts a 60Hz motor/pump from a standstill to 40Hz operation in 1 second, and then the Maximum Power Point Tracking (MPPT) algorithm takes over, increasing the motor to 60Hz operation during full sunlight. This optimizes the motor/pump speed to match available power from the solar PV source. For 50 Hz motors, the PicoCell soft starts to 35Hz within one second, and then switches to MPPT control.

# PicoCell Operation

If the motor is properly connected, the PicoCell will begin the startup procedure. The green AC LOAD LED (Figure 17) will have a solid green light, and the motor will start running. Additionally, the PicoCell will immediately start performing MPPT operation over the solar PV source. The MPPT operating range is 45 to 60Hz for 60Hz rated motors, or 40 to 50Hz for 50Hz rated motors.

The PicoCell has built-in overload protection, so if a connected motor has a power level higher than the PicoCell limitations, it first slows down and tries to run the motor at a lower power level. If the motor power continues to be outside the power range of the PicoCell, it will shut off the motor operation. If there is not enough solar power, the unit's SOLAR LED light will blink yellow, as shown in Figure 18. This usually happens in the early morning or late evening, or during overcast weather. The PicoCell controller will try to start the motor once every minute. Each attempt will be indicated by the blinking green LED. If there is not enough solar production from the solar panels, the yellow LED will start blinking again.

## Shutdown:

To stop the PicoCell's operation, the DC Disconnect should be used. Once in the OFF position, the PicoCell will automatically stop the motor's operation.

However, if a tank or well float switch is used when the tank becomes full or the well becomes empty, the PicoCell will stop its operation, and the WARNING LED will blink red.

The WARNING LED will be solid red if the temperature of the PicoCell rises above 80°C (176°), at which point the PicoCell will stop operating and wait until the temperature drops. This can happen if the unit is exposed to direct sunlight, which should be avoided.

If the PicoCell gets too hot during normal operation, it will switch to Power Deration mode, limiting the maximum power that is transferred to the motor load. During that time, the AC LOAD LED will be solid green and the WARNING LED will be solid red. If the unit cools down to a regular operating temperature, it will automatically continue operation without the thermal deration. If the temperature of the PicoCell continues to increase, it will eventually stop operating, at which point the WARNING LED will be solid red.

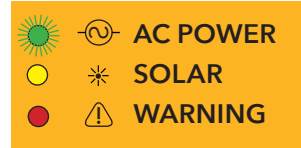


Figure 17:  
LED 1 - AC LOAD is ON

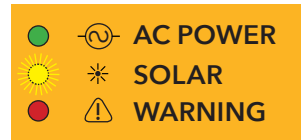


Figure 18:  
LED 2 - SOLAR is ON

# SunTech Drive Accessories

**Float Switch** - Commonly used with the PicoCell and PicoBlender as a switch to indicate full tank conditions for water pumping applications. It is wired to the float switch connectors 1-com or 2-com. The Float Switch comes with 20ft of cable.



**DC Disconnect** - A necessary disconnect switch that connects the solar PV array with an input terminal of the PicoCell 2000 and PicoBlender. This is a 2 Pole (Single String) Enclosed DC Switch with an IP66 rating. Dimensions: 180x98x107mm. Electrical specs: 16A 800 VDC.

**AC Backup** - Many pumps, compressors, fans, and other AC motors need to run when solar power is unavailable. Whether for nighttime operation or extended overcast and cloudy skies, the AC Backup unit works in tandem with the PicoCell 2000 controller to integrate a single-phase AC genset to power your application. The AC Backup unit will automatically switch from genset to solar, if no AC power is present, providing ongoing power for your application.



**PicoFilter** - This device is commonly used for PicoCell 2000 installations with motor cable length longer than 300ft. The PicoFilter is connected to the output of the PicoCell or PicoBlender on one side, and the motor leads on the other. The PicoFilter is rated for 10Aac current and up to 1000V peak phase voltage.

**New for 2019!**

Contact your local dealer for solutions for single phase, 2-wire starting capacitor surface pumps.

# Installation Notes:

Date Installed: \_\_\_\_\_

Serial No. (Spec Label): \_\_\_\_\_

Installer: \_\_\_\_\_

Phone: \_\_\_\_\_

Location of Installation: \_\_\_\_\_

Pump Manufacturer / Model No: \_\_\_\_\_

Motor: HP, Vac, Ph, SF Amps \_\_\_\_\_

Well Depth: (m/ft) \_\_\_\_\_

Flow Rate: (lpd/gpd) \_\_\_\_\_

PV Panel Manufacturer/Model Number: \_\_\_\_\_

No. of Solar PV Panels in Series: \_\_\_\_\_

We strongly recommend that the installation notes above are filled out with valid data and that the manual remains accessible and located close to the unit. Also, if you are calling our technical support, please have this installation data available for a faster and more accurate troubleshooting process.

**Tech support hotline: 877-230-7501**

# Maintenance:

The PicoCell is designed to operate autonomously, however it is suggested to be inspected every 3 months. If there are any external obstructions that prevent proper cooling of the heat sink, please remove them to make sure nothing blocks the air flow from the bottom of the device.

If the PicoCell operates in the area where the pump experiences freezing temperatures, make sure to turn OFF the device so it does not try to run the water pump in icy conditions. This may lead to dead heading on the pump.

Check external sensors every 3 months: float switch, pressure switch, etc.

# Troubleshooting - Indicator Lights

There are three LED lights on the PicoCell. The indicator lights and their definitions are listed below.

| AC POWER | SOLAR    | WARNING  | MODE                  |
|----------|----------|----------|-----------------------|
| ON       | ON       | ON       | - Unit is OFF         |
| FLASHING | OFF      | OFF      | - Startup             |
| ON       | OFF      | OFF      | - Running             |
| OFF      | FLASHING | OFF      | - Standby             |
| OFF      | OFF      | FLASHING | - Float Switch        |
| OFF      | OFF      | ON       | - Over Temperature    |
| ON       | OFF      | ON       | - Power Deration      |
| FLASHING | OFF      | FLASHING | - Over Current        |
| OFF      | FLASHING | FLASHING | - Short/Open Circuit  |
| FLASHING | FLASHING | FLASHING | - Dry Well Protection |

|                              |                                                                                                                                                                                                                                     |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>OFF Mode</b>              | PicoCell toggle switch is in the OFF position.                                                                                                                                                                                      |
| <b>Startup Mode</b>          | PicoCell is in the process of starting the motor pump.                                                                                                                                                                              |
| <b>Running Mode</b>          | PicoCell is running the motor pump.                                                                                                                                                                                                 |
| <b>Standby Mode</b>          | There is not enough power from the solar PV panels for PicoCell to start the motor.                                                                                                                                                 |
| <b>Float Switch Mode</b>     | PicoCell is turned OFF as a result of input from one or more external sensors that are connected to the digital input.                                                                                                              |
| <b>Over Temperature Mode</b> | PicoCell stops operation when the temperature inside the unit exceeds 80°C/176°F.                                                                                                                                                   |
| <b>Power Deration Mode</b>   | PicoCell still operates but with reduced power throughput due to increased operating temperature, or if a load is connected with current higher <b>Over Current Protection</b> DIP Switches 4 and 5.                                |
| <b>Over Current Mode</b>     | PicoCell stops operation when it detects high current on the motor terminals. This can also be due to a short circuit event if the unit is mis-wired. Requires manual restart by cycling power to the unit.                         |
| <b>Open Circuit Mode</b>     | PicoCell will not start operation if the motor wiring does not align with DIP switch configuration.                                                                                                                                 |
| <b>Dry Well Protection</b>   | PicoCell detects dry well condition, and ceases pump operation, which is restored after 30 minutes. If dry well indication appears faulty, check that <b>Over Current Protection</b> DIP Switches 4 and 5 are configured correctly. |

Notes:

## Warranty:

SUNTECH DRIVE warrants to the original consumer purchaser ("Purchaser" or "You") of a PicoCell 2000 Solar Controller, PicoCell 3500 Solar Controller, PicoBlender 2500 Solar Controller, SolSwitch or SunTech Drive Wi-Fi Communication Module, that they will be free from defects in materials and workmanship for 12 months from the date of original installation or 18 months from the date of manufacture, whichever comes first.

Warranty will not apply to any product that, in our sole judgment has been subject to negligence, misapplication, improper installation, or improper maintenance.

You must pay all labor and shipping charges associated with this warranty and must request warranty service through the installing dealer as soon as a problem is discovered. No request for service will be accepted if received after the Warranty Period has expired. This warranty is not transferable.

SUNTECH DRIVE IS NOT LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, OR CONTINGENT DAMAGES WHATSOEVER.

THE FOREGOING LIMITED WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE FOREGOING LIMITED WARRANTIES SHALL NOT EXTEND BEYOND THE DURATION PROVIDED HEREIN.

Some states do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts, so the above limitations or exclusions may not apply to You. This warranty gives You specific legal rights and You may also have other rights which vary from state to state.

This limited Warranty is effective Jan 10, 2019 and replaces all undated warranties and warranties dated before Jan 10, 2019.

**SunTechDrive**

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For further information - scan this code:



Pat. Pending: US Patent Application Number: 62/536,161