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NOTICE

This manual is intended to be used as a quick installation and operation manual. The information in this document is subject to change without notice. No part of this document may be reproduced in any form or by any means without the express written permission of SunTech Drive LLC.

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PicoCell™ at Glance

PicoCell is an off-grid solar controller that can operate any alternating current (AC) motor load up to 1.5 HP single-phase/2HP three-phase from solar photovoltaic (PV) power. PicoCell has unique functionality that enables users to match AC load with Solar PV power, in order to make solar water pumping and other solar-powered applications affordable using commercially and locally available AC pumps.

For sizing the solar PV panels when using a using PicoCell controller, please use the Configuration Table on page 2 for the selected motor, or consult with your local dealer or contact SunTech Drive.

A typical diagram for a solar water pumping system that uses a PicoCell controller is shown in Figure 1. The solar PV array should be connected to the PicoCell controller via the DC Disconnect, as shown in Figure 1. **PicoCell controllers should be installed in the shade (potentially mounted under PV array) and away from the direct sun.**

When connecting the Solar PV or motor/pump wires to the PicoCell controller, ensure the DC Disconnect is **OFF**. Ensure that the grounding wires from the DC Disconnect (PV Array) **and** the motor/pump are connected to the dedicated grounding lug of the PicoCell controller. An optional water level switch can be connected to the PicoCell. Inside the PicoCell there is a dedicated terminal next to the motor terminal block for two water level switches (tank or well). One water level switch indicates when the tank is full. The other indicates when the well is empty.

The PicoCell off-grid solar controller is unique because it is universal and can run single **or** three phase AC solar water pumps, 115 or 230V, and 50 or 60Hz. Consult with your dealer in order to make sure the solar PV array is properly sized for your application.

---

Figure 1: Solar water pumping system diagram
Sizing the Solar Pumping System

Sizing the solar system to power 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.

Three-phase motor loads will typically require less solar PV capacity than single-phase loads, due to higher electrical efficiency. 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 3-phase counterparts. Service Factor (SF) can also vary between motor manufacturers. Higher SF may require more PV solar power.

Daily duty cycle dictates how long the motor load has to run when powered, by solar, which directly affects the amount of solar PV required. The longer the run time, the greater the Solar PV capacity is needed, but it is not a linear relationship.

Table 1 below provides recommended solar PV requirement for different 1-phase and 3-phase motor loads, based on the nominal power and current. When sizing the solar PV capacity for using PicoCell, always look at service factor current and power, also called: SF Amps.

Table 1: Solar PV configurator table for PicoCell

<table>
<thead>
<tr>
<th>S.F. AMPS</th>
<th>Recommended Solar PV Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>1-ph; 120Vac</td>
<td>1-ph; 230Vac</td>
</tr>
<tr>
<td>Amps</td>
<td>Amps</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>4 - 6</td>
<td>2 - 4</td>
</tr>
<tr>
<td>6 - 8</td>
<td>4 - 5</td>
</tr>
<tr>
<td>8 - 10</td>
<td>5 - 6</td>
</tr>
<tr>
<td>-</td>
<td>6 - 8</td>
</tr>
<tr>
<td>-</td>
<td>8 - 10</td>
</tr>
</tbody>
</table>

* Higher min Vmpp voltage is for 230Vac rated motor loads

The table above provides a general rule for sizing the solar PV capacity when using the PicoCell controller. Different motor manufacturers specify their HP ratings differently, so the table is providing informative value, rather than strict solar PV capacity for a given application. Furthermore, configuring solar PV capacity will vary based on location of the installation (i.e. different solar irradiances at different latitudes).

For more detailed solar PV configuration, please contact the SunTech Drive sales team or your local dealer. Be ready to provide the motor load’s nameplate information, as well as installation site location and application requirements of desired daily duty cycle.
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. Provisions must also be made to protect the unit from damage by unauthorized persons, large animals, overgrowth, flooding, or other harm.

**WARNING**

HIGH VOLTAGES

PicoCell unit has voltages capable of causing severe injury or death by electrical shock, and it should only be installed or serviced by a SunTech Drive authorized supplier or dealer familiar with the PicoCell.

- Contact the 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 Installation Notes section of this manual (pp 17) and that the manual is stored near the unit

Whenever possible, the unit should be mounted at least 2 feet (60cm) above the ground. A minimum of 10 inches (25cm) clearance above the PicoCell is required for internal access. There must not be any obstruction to air flow at the heat sink. A typical installation on an array structure is shown below.
PicoCell Description

A PicoCell off-grid solar controller is a universal, high performance, variable speed motor controller for solar water pumping and other applications using single-phase and three-phase AC loads in a power range from 1/3 HP to 2 HP.

The PicoCell off-grid solar controller is suitable for a variety of applications:

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

PicoCell Off-Grid

The PicoCell is the core, patented, solar off-grid controller common to all of our current and future products. As a standalone AC motor/pump/compressor/fan solar controller, the PicoCell enables free solar power for a vast number of AC devices. Both installed (retrofit) and new motors can be powered by the PicoCell. SunTech suggests sizing the solar arrays for the shortest day of the year to ensure optimum year-round system performance. 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 then 115V 1-phase. More efficient motors require fewer panels and/or allow for higher power motors. 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:

PicoCell may not operate a 2-wire single-phase motor which uses switching devices for the start, including but not limited to 2 wire starting capacitors, centrifugally switched and BIAC switched.

Ask about SunTech’s accessory power cable to retrofit 2 wire surface motors with starting caps.

- PicoCell can run motors with Service Factor Amps of 10 Amps or less for 1-phase motors, and 8 Amps or less for 3-phase motors. Please contact us for more information on particular motors.
- Generally 1-phase motors up to 1.5 HP will operate well
- Generally 3-phase motors up to 2 HP will operate well
- PicoCell does not power Direct Current (DC) permanent magnet or Brushless DC (BLDC) motors
- 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
- PicoCell will replace the control box for 3-wire motors
- PicoCell will operate 2-wire motors with Permanent Split Capacitors (PSC)
- PicoCell will not operate submersible motors with 2-wire starting capacitors (caps), including Franklin Electric 2-wire submersibles, and Grundfos 2-wire submersibles. SunTech offers accessory cables to retrofit most 2 wire starting capacitor surface motors.
PicoCell Specification

**Input Specification**
- Minimum Operating Voltage:
  - **100 Vdc** (for 115 Vac, 60 Hz, 1-phase motors)
  - **150 Vdc** (for 230/240 Vac, 50/60 Hz, 1/3-phase motors)
- Maximum Open Circuit Voltage: **400Vdc**
- Maximum Solar PV Current: **9 Amps**
- Earth-ground connected to chassis

**Output Specification**
- Maximum Output Current: **10Arms** (1-phase motors)
- Maximum Output Current: **8Arms** (3-phase motors)
- Maximum Power Sustained: **2500 W**
- Efficiency: **97%** (3-phase) and **95%** (1-phase)
- Selectable Nom. Freq. **50, 60 Hz**
- Float switch - shuts off PicoCell

<table>
<thead>
<tr>
<th><strong>ELECTRICAL</strong></th>
<th><strong>MECHANICAL</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>MPPT operating voltage: <strong>100-380V</strong></td>
<td>Degree of protection: <strong>NEMA4/IP66</strong></td>
</tr>
<tr>
<td>Solar PV open circuit voltage: <strong>400V</strong></td>
<td>Enclosure material: <strong>Aluminum</strong></td>
</tr>
<tr>
<td>Minimum operating PV voltage: <strong>100V</strong></td>
<td>Operating temperature: <strong>-40°C to 50°C</strong></td>
</tr>
<tr>
<td>Maximum PV panel current: <strong>9A</strong></td>
<td>Dimensions: <strong>10”x5.5”x4”</strong></td>
</tr>
<tr>
<td>Maximum AC motor current: <strong>10A</strong></td>
<td>Solar terminals: <strong>AWG#10-14</strong></td>
</tr>
<tr>
<td>Single phase AC motor power: <strong>1.5HP</strong></td>
<td>Motor terminals: <strong>AWG#10-14</strong></td>
</tr>
<tr>
<td>Three phase AC motor power: <strong>2HP</strong></td>
<td>Float Sensor terminals: <strong>AWG#14-18</strong></td>
</tr>
<tr>
<td>Cooling: Passive/no fan</td>
<td></td>
</tr>
</tbody>
</table>

**Protections:**
Overcurrent, overvoltage, short circuit, overload, temperature, open circuit.

**Optional:**
WiFi and cellular communication modules

**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
A PicoCell controller consists of several components, as shown in Figure 2. The unit has three wire glands: two large glands for motor and solar PV cables, and one smaller gland for data cables (float switch sensor or other optional sensors). There is direct access to the power and signal terminals of the PicoCell once the enclosure door is removed.

The PicoCell controller should be mounted on the wall or other vertical surface using the back bracket (see Figure 2 below). On a back side of the unit, in the upper corners of the heatsink, are two pins used to hang the unit on the back panel. More detailed mounting instructions are shown on page 4.
Mounting PicoCell

1. Fix the back plate to the support surface through 3 holes using screws (not included).

2. Once the back plate is fixed to the wall, hang the PicoCell onto the back plate using the screw pins on the heatsink.

3. Make sure both screw pins are used to hang the PicoCell onto the back bracket.

4. Mounted!
PicoCell Overview

The features of a PicoCell controller are shown in Figure 3. The unit has two wire glands (right and left, for motor and solar PV power cables), and one wire gland (in the middle, for the data cables for outside sensors). Further details about wiring the unit are provided on page 9.

Three LEDs are used to indicate the PicoCell controller's operation. More details about the unit's operation and how to understand PicoCell's LEDs are provided on pages 13 and 17.

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 signal wiring and how to use the toggle ON/OFF switch and DIP switches is provided on page 11.

![Figure 3: PicoCell features overview](image-url)
PicoCell Wiring Diagram

A typical wiring scenario of the PicoCell controller is shown in Figure 4 below.

1) The AC motor pump wires should be brought inside the PicoCell controller through the left gland.
2) The PV solar wires should be brought inside through the right gland.
3) The ground wires should be brought inside the PicoCell controller through the right and left glands from the AC load and PV panels, and connected to the grounding lugs.

**CAUTION:** When connecting the wires between the DC Disconnect and the PicoCell controller, make sure the **DC Disconnect is turned OFF**. Make sure the toggle switch of the PicoCell is in the **OFF position as well!**

**IMPORTANT:**

The PicoCell unit should be grounded using separate grounding wires: one for the PV panels, and one for the AC motor or pump, as shown in Figure 4.

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 three motor wires. It will change direction of rotation and start pumping water!

---

**Figure 4: PicoCell wiring details**

---

**IMPORTANT:**

Single phase 2-wire motor pumps: Connect to A and C motor terminals of PicoCell

Single phase 3-wire motor pumps:  
- Ph_A: **YELLOW** wire – common motor lead  
- Ph_B: **RED** wire – start motor lead  
- Ph_C: **BLACK** wire – main motor lead
PicoCell Settings

The PicoCell controller can be remotely turned ON or OFF by using digital inputs, or by using a standard float switch. There is a 4-position terminal block used for wiring float switches to the PicoCell, as shown on the Figure 5 below.

If Digital Inputs 1 and G experience a short circuit, the PicoCell automatically turns off. Similarly, if Digital Inputs 2 and G experience an open* circuit, the PicoCell automatically turns off. The PicoCell comes shipped with a jumper cable across pins G and 2 on the float switch terminal. There are numerous remote sensors of a “dry switch” type that can be used with PicoCell: float switch, pressure switch, flow switch, water level sensor, dry run protection, etc. Ask your dealer about configuring your sensors and switches for your application.

A typical example of how tank and well switch signals can be used with a digital input port is shown in Figure 6. For a tank application, if the active wire is connected to Position 1, and the return wire (usually black) is connected to Position G, then the PicoCell will stop the pump when the tank gets full, because terminals 1 and G will be “shorted” (active short), which turns off the PicoCell.

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

The same digital terminal block can be used for other remote control operations of the PicoCell controller if the above logic is applied.

* 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 Settings

The PicoCell controller has a **RESET** button, positioned on the left side, next to the motor power terminal block, as shown in Figure 7.

The Reset button can be pressed briefly to reboot the software if the PicoCell controller is not performing correctly. **The RESET button should be used whenever the dip switch settings are changed (for example, if the pump is changed) and for trouble shooting scenarios.**

![Figure 7: Reset Button](image)

The PicoCell controller has an internal **toggle switch** for turning the unit ON and OFF. This switch is not a power switch. It is signal switch (Figure 8). **When it is in the OFF position, the PicoCell controller is NOT de-energized from the solar PV array.** It is in OFF mode, not running the pump. When the toggle switch is OFF, all three LEDs are ON.

When the toggle switch is in the ON position, the PicoCell controller is in regular RUN mode, controlling the AC water pump and pumping the water. During RUN mode, the green PUMP LED is ON (page 8).

![Figure 8: ON/OFF Toggle switch](image)

The PicoCell controller can operate most AC water pumps: single or three phase; 50 or 60Hz; 120Vac or 230Vac rated. In order for the PicoCell to match the correct pump, DIP switches are used:

- **DIP switch 1** – if pulled up (ON – as on Figure 9), the unit is configured for 120Vac pump operation; if pulled down (OFF), the unit is configured for 230Vac.

- **DIP switch 2** – if pulled up (ON – as in Figure 9), the unit is configured for single phase pump operation; if pulled down (OFF), the unit is configured for three phase operation of pump.

- **DIP switch 3** – if pulled up (ON – as on Figure 9), the unit is configured for 50Hz pump; if pulled down (OFF), the unit is configured for 60Hz pump.

![Figure 9: DIP switches](image)
PicoCell Operation

Once the PicoCell controller is connected to the solar water pumping system as shown (Figure 1, page 1), and wired per instructions shown (Figure 5, page 5), and DIP switch settings are put in the correct position to match the motor specification (Figure 4, page 9), then the PicoCell controller is ready for operation.

**Startup:**

If the PicoCell unit is powered, all three LEDs will be solid ON. Once the toggle switch (Figure 8, page 11) is turned ON, the PicoCell checks its motor connections. The PicoCell has built in open and short circuit protections, so if one of the motor leads is not connected, or there is a short in the motor connections, The PicoCell will show a warning message using indication LEDs (see page 17 for LED Indicators).

If the motor is properly connected, the PicoCell will move to it’s startup procedure, and the green **AC POWER LED** (Figure 10) will start blinking, indicating that the PicoCell controller is trying to start the pump. If there is enough solar power available, the pump will start running, at which point the green **AC POWER LED** will turn solid green.

During start-up mode, the PicoCell controls the motor/pump so that it starts from standstill to 30Hz of operation in 1 second, and then the Maximum Power Point Tracking (MPPT) algorithm takes over, optimizing the motor/pump’s speed to match available power from the solar PV source.

The PicoCell has built in overload protection, so it first slows down, and then shuts off the motor/pump if the overload condition continues. Toward the end of the day, as solar intensity weakens, the PicoCell will slow down the operation of the motor/pump until there is not enough solar available, and will shut off the pump if the speed drops below 30Hz.

<table>
<thead>
<tr>
<th>Built-in protections:</th>
</tr>
</thead>
<tbody>
<tr>
<td>open circuit</td>
</tr>
<tr>
<td>short circuit</td>
</tr>
<tr>
<td>over load</td>
</tr>
<tr>
<td>overcurrent</td>
</tr>
<tr>
<td>overvoltage</td>
</tr>
<tr>
<td>over temperature</td>
</tr>
</tbody>
</table>
PicoCell Operation

If there is not enough solar power to start the pump, the yellow SOLAR LED (Figure 11) will start blinking, indicating there is not enough solar PV power. The yellow SOLAR LED will blink for about 30-60 seconds, indicating that the unit is in idling mode. During this time, there is no activity and the PicoCell controller is getting ready for another attempt to start the pump. Low Solar PV can be due to cloudy weather, or can happen in the early morning or late evening, when solar PV panels do not generate enough power for running the pump.

Shutdown:

The best way to shutdown the unit is to disconnect the Solar PV array using the external DC Disconnect.

However, if a tank or well float switch are used (Figures 6 and 7), then when the tank becomes full or the well becomes empty, the PicoCell controller will stop its operation, and the WARNING LED will be blinking red. The same outcome can be achieved by shorting any one of two float switches, so it is possible to use any remote switch (Figure 12). The WARNING LED will also be solid red if the temperature of the PicoCell gets above 80° C, at which point the unit will cease its operation, and wait until the temperature drops. This can happen if the unit is directly exposed to the Sun, which should be avoided.

If the PicoCell unit during its normal operation gets too hot, it will switch to power deration mode, limiting maximum power transferred to the motor load. During that time, the AC POWER LED is solid green, while WARNING LED is solid red (Figure 13).

If the unit cools down to regular operating temperature it will continue its normal operation without the thermal deration.

Otherwise, if the temperature of PicoCell continues to increase, the unit will eventually cease its operation, at which point the WARNING LED is solid red.
PicoCell Accessories

Grid Power Blender - seamlessly blends energy between a solar array and the power grid. It is ideally suited for applications that require 24/7 or some night time operation, particularly in areas with high power costs. The combination of the PicoCell controller and Power Blender represents a very cost effective way to supplement solar power with controllable night time operation without the expense of adding a bank of batteries.

If there is a full solar irradiance, the PicoCell and Power Blender will draw maximum power from the PV array. As cloud cover or impending darkness reduce the level of solar irradiance, the system automatically makes up the difference by drawing from the grid. As full darkness descends the system draws all of its power from the grid. In high energy cost areas this allows for both power firming during the day and full nighttime operation while consuming as little power from the grid as possible.

- Intelligently blends energy input from solar PV and power grid
- Maintains full power 24/7 while minimizing power costs
- Provides Power Factor Correction for AC loads from the AC grid
- Universal compatibility – use single/three phase, 50 or 60Hz, 120Vac or 230Vac electrical loads powered off single phase electrical grid
- Operating status conditions indicated by multicolor LEDs
- Phase decoupling – allows for the use of three phase motors on single phase grids
PicoCell Accessories

**Float Switch** - Commonly used with the PicoCell as a switch to indicate full tank conditions for water pumping applications. It is wired to the float switch connectors 1G or 2G of PicoCell™. The FLOAT SWITCH comes with 10ft of cable.

**DC Disconnect** – A necessary disconnect switch that connects the Solar PV array with an input terminal of the PicoCell. This is 2 Pole (Single String) Enclosed DC Switch IP66 rated, with dimensions: 180x98x107mm. Electrical specs: 16A 800 VDC.

**SolSwitch** – A transfer box used for switching between solar power or grid power. The SolSwitch is connected to the PicoCell as well as to the AC grid/generator and has a simple and safe panel switch between two modes: solar or AC power. The unit also has an integrated DC disconnect switch.

The SolSwitch is suitable for single and three phase AC motors and AC grid, 120 and 230Vac, 50 and 60Hz and is rated for 10Aac.

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

New for 2018! Contact your local dealer for solutions for single phase 2-wire starting capacitor surface pumps.
1. Securely screw the enclosed mounting bracket onto a solid vertical surface. Hang the PicoCell unit on the bracket, using the heatsink screw pins as shown on the picture to the right.

2. Turn the DC Disconnect OFF, and ensure that there is no voltage on the solar PV wires!

3. Remove the enclosure door and make sure that the toggle switch is in the OFF position before doing any wiring!

4. With the enclosure door removed, connect the motor or pump connections first. Pass the wire leads through the wiring glands and connect to the left side connectors and left-bottom ground lug. These connectors are clearly labeled A, B and C. The ground lugs are located directly below the circuit board.
   - Connect phases A and C for a single phase pump
   - Connect phases A, B and C for a three phase pump

5. While the DC disconnect is still OFF, connect the solar PV wires. Pass the PV+ and PV-wires through the right cable gland and connect them to the right side connectors. Also connect the solar ground to the right-bottom grounding lug. The connectors on the board are labeled PV+ and PV-.

6. Set up the DIP switches to match the phase, voltage and frequency of the motor or pump that the PicoCell is connected to.

7. After passing the wires through the middle cable gland, connect the remote tank or well float switch to the terminal block next to the motor connector.

8. Once all of the power and signal connections are made, and the pump settings are adjusted on the DIP switch, energize the circuit by switching the DC Disconnect ON!

9. Once the PicoCell is powered up, all three LED lights will light up. Flip the toggle switch to the ON position. This will start the pump.

10. Replace the enclosure door using the slotted screws, and tighten them with a screwdriver to seal properly.

See Figure 4, Page 9 for detailed wiring diagram.
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) ____________________
Pumping Rate Required: (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 remain accessible and kept close to the unit. Also, if you are calling our technical support, please have this installation data available for a more accurate and faster troubleshooting process.

Maintenance:

The PicoCell unit 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 heat sink area, please remove them to make sure nothing blocks the air flow from bottom of the device.

If the PicoCell operates in the area where the pump experiences freezing temperatures, make sure to turn OFF device so it does not try to run the water pump in icy conditions, or it will experience dead heading on the pump!

Check external sensors every 3 months: float switch, pressure switch etc. if used as a part of the PicoCell Solar installation.
Troubleshooting - Indicator Lights

There are three LED indicator lights which indicate various system fault conditions. These lights are visible through light piper on the front cover. A list of these indicator lights and recommended corrective actions are listed below.

<table>
<thead>
<tr>
<th>Green LED</th>
<th>Orange LED</th>
<th>Red LED</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>- OFF mode</td>
</tr>
<tr>
<td>FLASHING</td>
<td>OFF</td>
<td>OFF</td>
<td>- Startup mode</td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>- Running mode</td>
</tr>
<tr>
<td>OFF</td>
<td>FLASHING</td>
<td>OFF</td>
<td>- Standby mode</td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>FLASHING</td>
<td>- Float switch mode</td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>- Over temperature mode</td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>- Power deration mode</td>
</tr>
<tr>
<td>FLASHING</td>
<td>OFF</td>
<td>FLASHING</td>
<td>- High current mode</td>
</tr>
<tr>
<td>OFF</td>
<td>FLASHING</td>
<td>FLASHING</td>
<td>- Open circuit mode</td>
</tr>
</tbody>
</table>

- OFF Mode: when PicoCell toggle switch is turned OFF
- Startup Mode: when PicoCell is in process of starting the motor pump
- Running Mode: when PicoCell is running the motor pump
- Standby Mode: when there is not enough power from the Solar PV panels for PicoCell to start motor pump
- Float Switch Mode: when PicoCell is turned OFF as a result of input from one or more external sensors that are connected to the digital input of PicoCell
- Over Temperature Mode: PicoCell stops operation as a result of an over temperature event when the temperature inside the unit exceeds 80°C
- Power Deration Mode: PicoCell still operates but with reduced power throughput due to increased operating temperature. If the temperature of the unit does not decrease, the unit will stop and go into Over temperature mode.
- Short Circuit/Over-Current Mode: PicoCell stops operation as a result of detected high current on motor terminals. This can also be due to the short circuit event if the unit is mis-wired.
- Open Circuit Mode: PicoCell can not start operation if the motor wiring does not align with DIP switch selection.