RPS Solar Pumps
Tankless Pressure™ & Eco-Steady Booster™

RPS SOLAR PUMPS

RPS Solar Pumps
40250 County Road 27
Woodland CA 95776

Videos & FAQs
RPSsolarpumps.com/help
Call or Text: 530-240-3825
Email: service@ruralpowersystems.com

Our Pledge to You

Dear Customers,

In an effort to shape the way our company does business, our mission statement includes a series of pledges to you, our customers.

- **We pledge to give you the power!** Controlling your own ability to pump water out of the ground, whether in the field or at home, allows you to be more resilient. Freeing your water source from the grid is a major step towards self-sufficiency. You just bring the DIY spirit! Our engineers will be on the other end to offer specialized knowledge and answer questions, so you can install our solar pumps confidently and gain total control over your water supply.

- **We pledge to be a company our grandfathers would have trusted.** The all-too-common practice of outsourcing customer support after the sale is one we wholeheartedly oppose. We are an American, family-run company and our USA engineers, who will support you before and after the sale, are the best in the industry. We gain most of our business from word-of-mouth as a result of treating customers with respect and standing by our products.

- **No Pressure. Ever.** Our sales team is not on commission—we think this is important. Their role is to match you with the right pump for your well. If we don't have a pump that will suit your needs, we'll help you find a solution elsewhere. Our job is to help get you water, not sell you something that isn't a good fit.

- **We pledge to bring you reliable water!** All manufactured products have occasional issues and we can't claim to be perfect. Well water varies in pH, iron level, and sand content. With that said, we are extremely proud of our 100% track record in getting our customers water. That's right, every single one of our customers is now successfully pumping water with an RPS system. This starts with making sure we supply you with the right pump for your land, and if issues do arise, we will immediately provide technical support and replacement parts so you can get up and pumping again as quickly as possible.

Sincerely,

The RPS Family

DIY INSTALLATION WARNING; ASSUMPTION OF RISK

RPS Solar Pumps (“RPS Products”) come with an easy to install Do-It-Yourself (“DIY”) kit intended for the consumer to install themselves or with the help of others. **THE RISK OF INJURY AND ELECTRIC SHOCK EXISTS AND COULD RESULT IN SERIOUS BODILY INJURY OR DEATH. You are the best judge of your own capacity and qualifications to determine whether you can install the RPS Products or if you require assistance. Only qualified persons should install the products. Turn off power before installing. By purchasing an RPS Product, you acknowledge the potential risks and agree to assume all such risks of injury, including death.**

In some cases, you may decide to hire a professional to complete some or all of the installation. Whether self-installed or professionally installed, RPS Solar Pumps is unable to guarantee or offer any compensation for troubleshooting, replacing parts, pulling pumps or anything else involved in the troubleshooting/ replacement process, regardless of the reason for the warranty claim.

But never fear, RPS Solar Pumps has tens of thousands of customers across the USA who have successfully installed and, in those rare cases, troubleshoot their system with the help of our dedicated RPS Solar Pumps support engineers!

Solar panels and batteries can produce a significant amount of energy, which can cause electric shock. Please exercise caution when installing your well pump and follow the step-by-step instructions in this manual for your safety. Whenever you’re working with electrical wiring or connections, make sure:

- power is set to OFF, other power sources are disconnected
- to remove exposed jewelry or other metallic items
- to ground the system for safety and to prevent damage to equipment

LIMITATION OF LIABILITY

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT SHALL RPS SOLAR PUMPS BE LIABLE FOR ANY CONSEQUENTIAL, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, PUNITIVE, OR ENHANCED DAMAGES, LOST PROFITS OR REVENUES OR DIMINUTION IN VALUE, ARISING OUT OF, OR RELATING TO, AND/OR IN CONNECTION WITH ANY BREACH OF THIS AGREEMENT, REGARDLESS OF (A) WHETHER SUCH DAMAGES WERE FORESEEABLE, (B) WHETHER OR NOT RPS SOLAR PUMPS WAS ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, (C) THE LEGAL OR EQUITABLE THEORY (CONTRACT, TORT OR OTHERWISE) UPON WHICH THE CLAIM IS BASED, AND (D) THE FAILURE OF ANY AGREED OR OTHER REMEDY OF ITS ESSENTIAL PURPOSE.

IN NO EVENT SHALL RPS SOLAR PUMPS’ AGGREGATE LIABILITY ARISING OUT OF OR RELATED TO THIS AGREEMENT OF THE RPS PRODUCTS, EXCEED THE TOTAL OF THE AMOUNTS PAID TO RPS SOLAR PUMPS FOR THE PRODUCTS PURCHASED BY CUSTOMER.

WARNING

- **Ground the system before turning on.** Improper grounding may cause shock, burns, damage to property or death
- Abide by local electrical and building codes or ordinances when installing. Follow the **National Electrical Code (NEC) and Canadian Electrical Code as required.**
- Do not use motor in swimming areas without proper grounding
- **Disconnect power to the pump system before installing or performing service**
- Do not overpressurize pump system components like the pressure tank or piping. Overpressurizing may result in a serious risk of injury
- Ensure that the **electrical supply voltage matches the equipment specifications**
- Only use this pump with clear water free of excess sediments. Fine gravel and precipitates from TDS levels exceeding 2000ppm may affect operation
- Install a disconnect switch where required by code
- If powering the pump with a generator you should use a manual or automatic transfer switch. Failure to do so may result in injury.

TABLE OF CONTENTS

This manual will...

- Answer your questions before you have them!
- Enable you to have the tools and equipment you need on the day of installation to help everything proceed quickly and enjoyably
- Ensure that you install safely and avoid any damage to your equipment
- Make sure you don't miss anything with highlighted KEY STEPS sections
- Give you a resource for troubleshooting in the field, even without cell reception

As always, we are here to help if you still have questions after working through the manual:
Support@ruralpowersystems.com

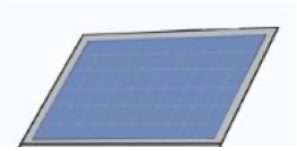
Text Or Call
530.240.3825

Did you purchase just the pump? No solar panels, batteries or Controller for now? You can skip all pages from Mounting Your Solar Panels (pg 22) to Controller Overview (pg 27) along with Controller Troubleshooting (pg 39).

SYSTEM COMPONENTS

1. **PUMP** — Your system will come with one of our seven pressure pumps. This pump is designed to produce the required pressure when called for. Make sure to remove the orange cap before proceeding with plumbing. *Appearance Varies

2. **SOLAR CONTROLLER** — This large sturdy Controller is the brains of the system. It arrives pre-programmed for your pressure pump. The pump Controller is not waterproof so protecting it from direct sun and weather is required.



3. **SOLAR PANELS** — Our monocrystalline solar panels have been designed for the optimal voltage of your Controller. Sturdy aluminum frames are designed to clamp to any mounting material of your choice.

4. **BATTERIES** — Your battery bank consists of either GEL or AGM batteries, 55ah or 160 ah. They come with cables to connect to each other and to the provided battery breaker. Batteries should be stored in a dry location protected from the elements. Keep them out of freezing conditions for maximum performance.

5. **SOLAR CONNECTOR WIRES —** Two 20’ lengths of solar wire will connect your solar panels to your Controller with MC4 connectors, making your panel wiring safe and easy.

6. **DC BREAKER -**100A or 300A DC Breaker comes included for connection between batteries and Controller. They come with wires to connect to your battery bank and Controller.

QUICK INSTALL CHECKLIST

1. Find a suitable install location for pump that is protected from the elements (small well or pump house is a good idea), no more than 20 feet from your storage tank/body of water location. If you're in a frost/ freeze location, ensure that there is proper insulation in the pump house, especially for the 2HP and 3HP models as the inlet face plates are susceptible to cracking if frozen. Ideally, the pump inlet is located as close as possible to the storage tank.

2. Install Solar Panels

3. Install Batteries

4. Connect Solar Panels and Batteries to the Controller

5. Plumb Inlet

6. Plumb Outlet

7. Prime Pump

8. Once you have your pump primed and connected to power, your pump will automatically turn on!

9. Set Pressure by pushing the plus and/or minus, make sure shut off valves are open if you plan on turning on and immediately testing!

10. Allow the pump to run for a bit, check for leaks in plumbing connections and re-seal as needed

11. You're all set!

INSTALLATION DETAILS

RPS SOLAR PANELS — Solar panels should be mounted on a secure structure. Several ideas can be found at www.RPSSolarPumps.com. Panels should face true South and at an angle appropriate for your latitude. If you are mounting your panels on an already built structure, try to get as close to the correct angle as possible.

Ensure there are no shadows or other obstructions on the solar panels. While shadowing a small corner of a single panel may not seem like a big deal, since the panels are connected in series, a small shadow can limit the power output from all other panels connected in series! This means a small shadow on a single panel could reduce system power by hundreds of watts. Time to get out that chainsaw and trim some trees!

TPP and BP PUMP CONTROLLER — Your Controller is not waterproof and should be located in a **dry dust-free location**, protected from the sun, freezing temps, the elements and pests such as mice and bugs. Mice love to chew wires and spiders and moths will build nests wherever they can find room. While we understand you cannot eliminate all pests, it might be time to spray some insecticides around your shed and set some mousetraps! There is nothing worse than finding insulation chewed off your electrical wires. **The fan remains running in low power mode at all times to protect the equipment. This fan uses very little power and increases the lifetime of the system.*

TPP and BP PUMP - Your pump is designed for use out of the direct elements: sun, rain and snow. Covering or building a small enclosure around it off the ground is ideal. Since water does expand when it freezes, care should be taken to winterize the system if being used in a climate that experiences hard freezing. If a foot valve is being used, care should be taken in plumbing the intake to ensure tight connections to avoid the loss of prime.

BATTERIES - Unless you already bought a Pressure Pump system that included the appropriate number of RPS 55Ah 12V Deep Cycle GEL batteries, customers will need to supply their own battery bank. RPS recommends 12V AGM / sealed lead acid batteries that are designed for maintenance free operation. More common flooded deep cycle marine or RV batteries can also be used. Batteries should be stored in a dry location protected from the elements.They operate best at room temperature and it is best to keep them out of freezing conditions for maximum performance.

With the RPS Tankless Pressure Pump™ or Eco-Steady Booster Pump™ system, you'll get smooth continuous steady reliable water pressure without the need for AC power or the utility grid.

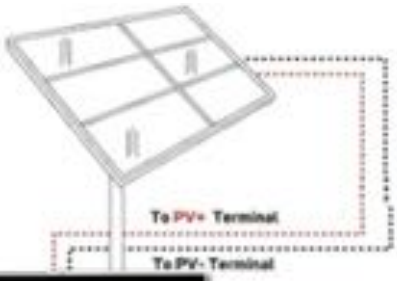
The solar charged battery bank powers your centrifugal booster pump through your Controller. The pump varies its speed and power based on your demand for water at the exact pressure you set.

Warning: Risk of Electric Shock
Solar panels and batteries can produce a significant amount of energy, which can cause electric shock.
Whenever you're working with wiring or connections, make sure:

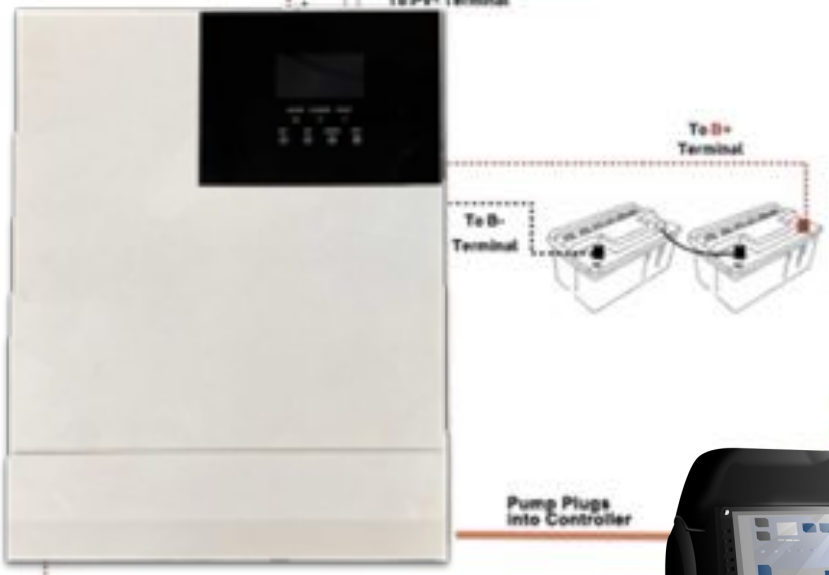
- Solar panels are at least partially covered
- There are no exposed wires

Be sure to ground the system for safety and to prevent damage to equipment.

Remember, safety first! RPS is not liable for damage or injuries that result from improper installation technique. If you're unsure about the safety of any step in this manual, please call an RPS Engineer.



Quick Connect MC4 clips and 20' of solar wire allow for the connection of your solar array to your Controller



Pre-attached (+) and (-) wires connect the Controller to your 24V or 48v* battery bank (required to operate)

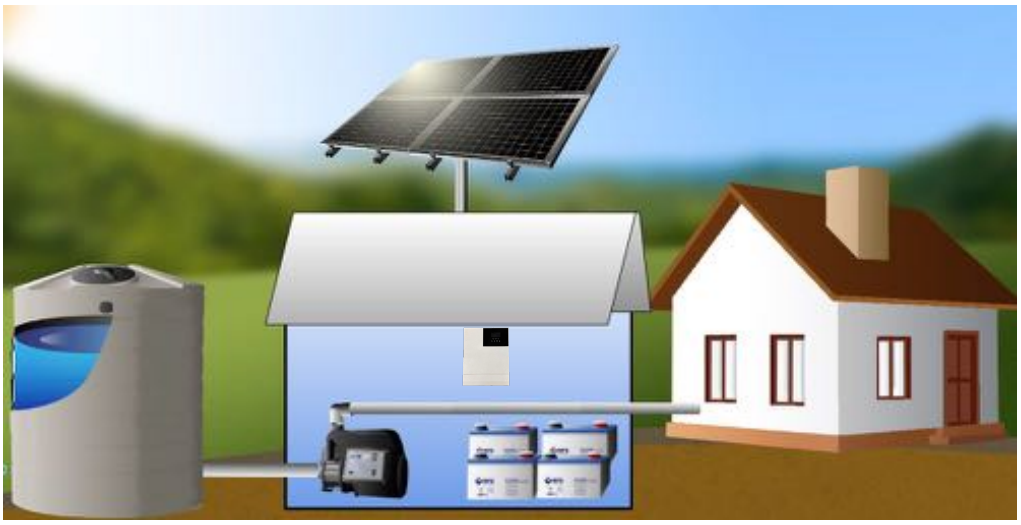
(Optional) 110v or 220V* power from a generator or the grid can supplement solar in charging the battery bank.

Once the pump is ready for power and primed with water, the pump's 3-prong male plug can be inserted directly into the outlet of the Controller.

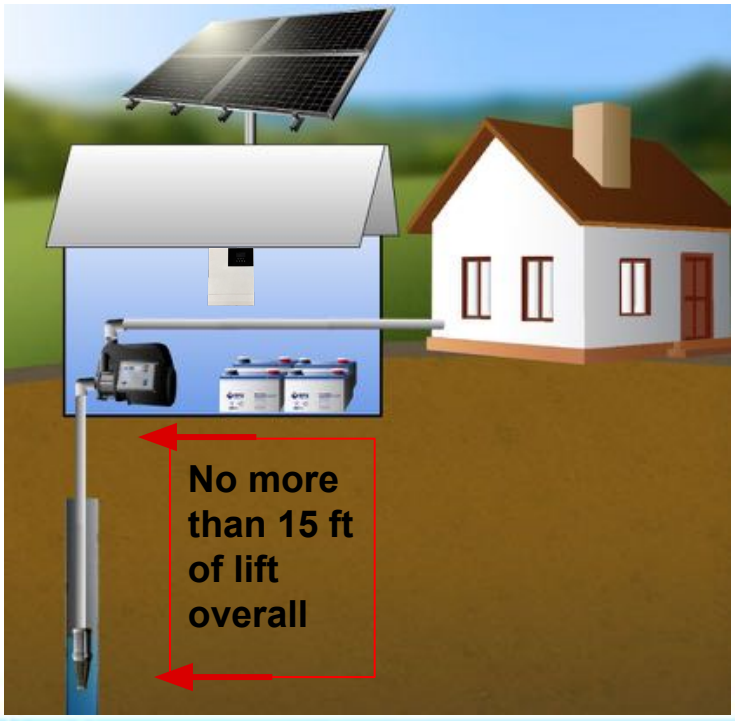
*Your pump may look different and require different power depending on the model!

PLUMBING OPTIONS

Your pressure pump can plumb directly from your storage tank to your main line, no more than 20 ft. The pump will auto-adjust speed to maintain pressure.



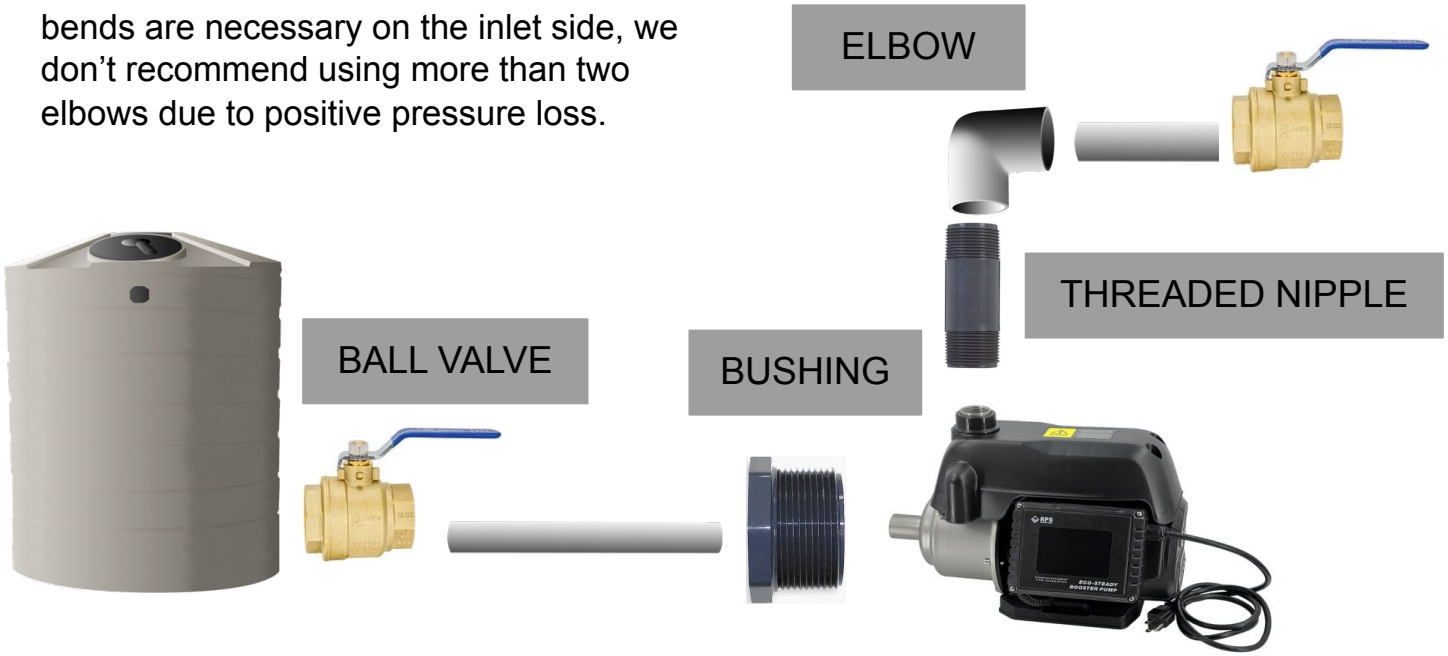
*** Important:** Care should be taken when plumbing to ensure tight connections and maintain prime. We recommend teflon tape and/or pipe DOPE on all connections. Using pipe cement can make it difficult to access the plumbing. . Minor leaks or seepage will cause the pump to cycle and deplete the batteries.



You can also draw water up from a pond, shallow well or cistern (up to 15ft) but you **must maintain prime with a foot-valve** and tight connections. The foot valve should placed in the body of water the pump is drawing from.

Remember to remove the orange cap on the outlet before plumbing.

Straight piping from tank to pump without elbow bends is recommended. If elbow bends are necessary on the inlet side, we don't recommend using more than two elbows due to positive pressure loss.



There are a variety of ways to plumb Pressure Pumps, here's an example of what you could use.

When plumbing into the inlet of the pump, use a MNPT threaded bushing. A bushing makes it easier if the pump is needed to be worked on down the line. There are bushings with threads on the inside, and other without threads: either type of bushing works and you can adapt the plumbing to what's available locally! Threaded PVC fittings are tighter and will be less likely to leak air or water. For PVC, use minimum Schedule 40 rating.

Install a shut off valve (ball valve, hose bib etc) close to the storage tank. This will allow you to shut off incoming water and troubleshoot the pump if necessary.

For the outlet side, plumb a threaded nipple to the outlet. Within a few feet of the outlet we recommend installing a second shut off valve, that way you can control flow for troubleshooting if needed, or for emergencies.

NOTE: Do not install any sudden rises (like a small hump or hill) near the inlet or outlet, as the shape will cause the pump's pressure sensor to malfunction and may cause surging or low pressure. **If suctioning from a body of water, no more than one elbow on the inlet side is recommended and you MUST use a foot valve to maintain prime.**

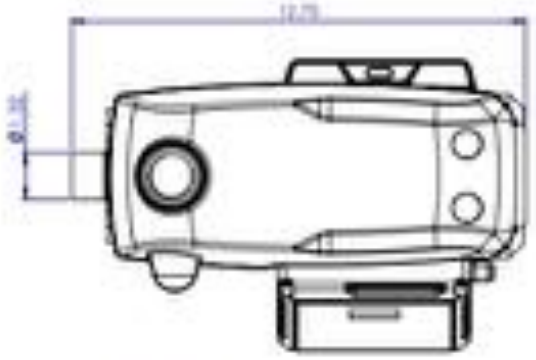
WHICH PUMP DO I HAVE?

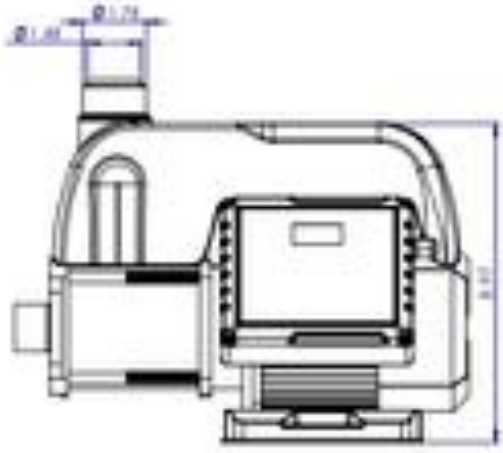
We have a total of 7 different pressure pumps each with their own characteristics, shown below in the table. Each pump has an assigned color, which will show up in the top right corner throughout this manual. Once you know which color matches your pump, keep an eye out for any pages with that color as it will pertain to your setup.

Pressure Pump	Color	Max Pressure	Suggested GPM	Inlet Size (inches)	Outlet Size (inches)	Controller	Battery Bank
TP-750		40psi	15-25	1.25” FNPT	1” FNPT	VC3.22	24v
TP-HP		55psi	5-20	1” FNPT	1” FNPT	VC3.22	24v
BP05		30psi	5-15	1” FNPT	1” FNPT	VC3.11	24v
BP1		40psi	15-25	1.25” FNPT	1” FNPT	VC3.11	24v
BP1-HP		55psi	5-20	1” FNPT	1” FNPT	VC3.11	24v
BP2		60psi	10-30	1.25” FNPT	1” FNPT	VC5.22	48v
BP3		70psi	20-50	1.5” FNPT	1.5” FNPT	VC5.22	48v

TPP-750 PUMP SPECS

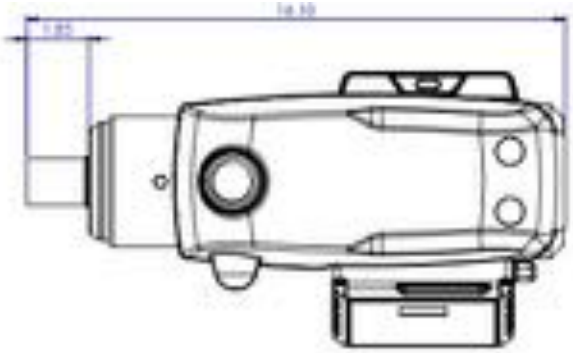
Inlet	1.25" FNPT
Outlet	1" FNPT
Acceptable pH	5 - 8, Water (No Fuel)
Temp. Range	10 - 40°C, 50 - 113°F
Max Liquid Temp	60°C, 140°F
Power Range	750 - 1300w
Suction	Up to 4M, 15ft (wetted)
Max Current	8 Amps
Pump Dims **Box Size**	12in x 8in x 10in 16in x 10in x 13in
Weight	8.6kg, 19lbs

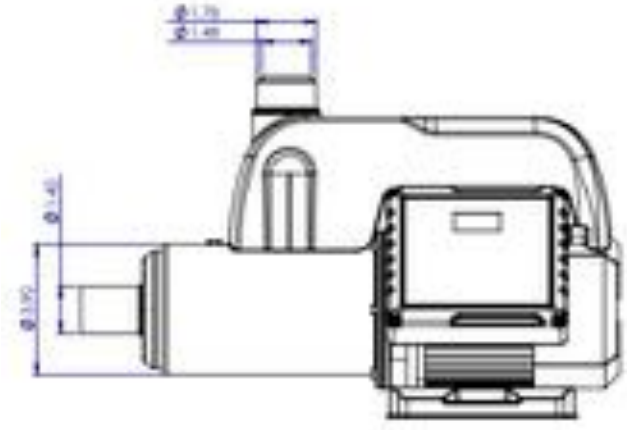




TP-HP PUMP SPECS

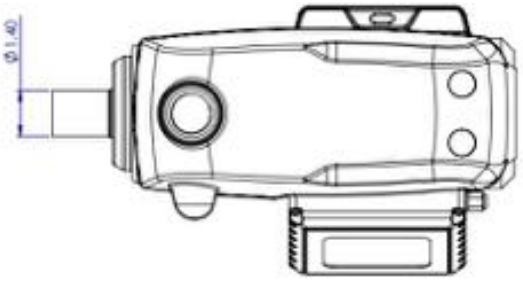
Inlet	1" FNPT
Outlet	1" FNPT
Acceptable pH	5 - 8, Water (No Fuel)
Temp. Range	10 - 40°C, 50- 113°F
Max Liquid Temp	60°C, 140°F
Power Range	750 - 1300w
Suction	Up to 4M, 15ft (wetted)
Max Current	8 Amps
Pump Dims. **Box Size**	15in x 8in x 11in 19in x 10in x 13in
Weight	9.5kg, 21lbs

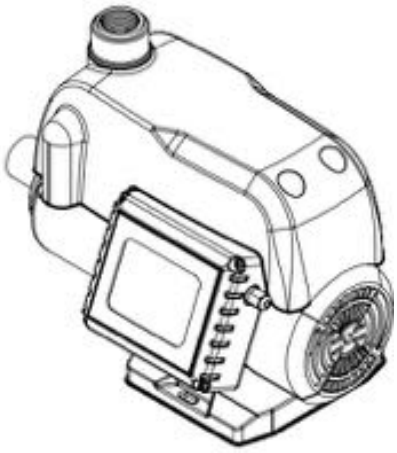


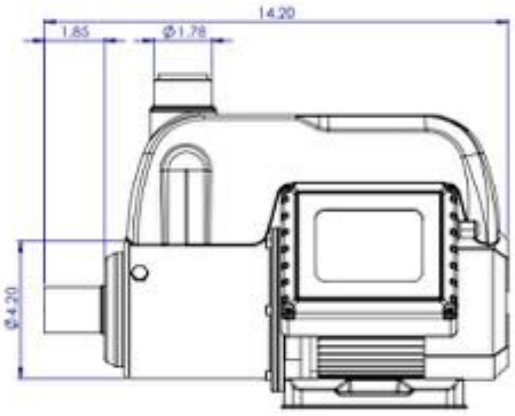


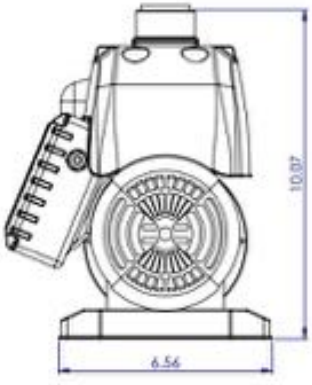
BP05 PUMP SPECS

Inlet	1" FNPT
Outlet	1" FNPT
Acceptable pH	5 - 8, Water (No Fuel)
Temp. Range	10 - 40°C, 50 - 113°F
Max Liquid Temp	60°C, 140°F
Power Range	350-750W
Suction	Up to 4M, 15ft (wetted)
Max Current	6 Amps
Pump Dims **Box Size**	13in x 6in x 11in 16in x 10in x 13in
Weight	8.2kg, 18bs



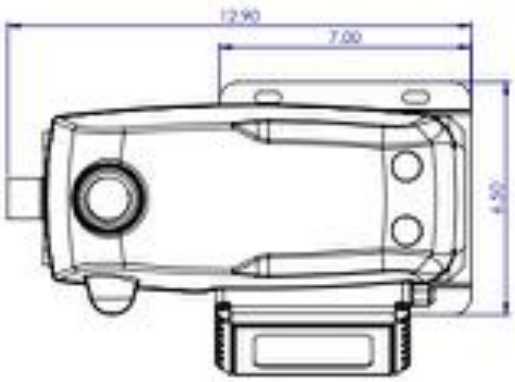


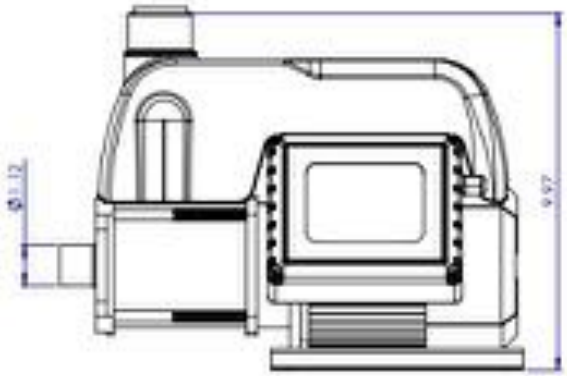




BP1 PUMP SPECS

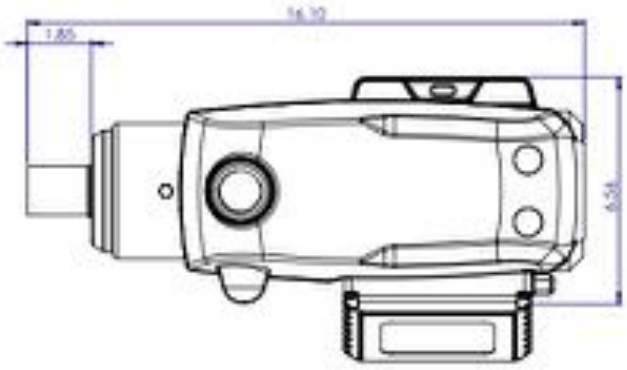
Inlet	1" FNPT
Outlet	1" FNPT
Acceptable pH	5 - 8, Water (No Fuel)
Temp. Range	10 - 40°C, 50 - 113°F
Max Liquid Temp	60°C, 140°F
Power Range	750 - 1500w
Suction	Up to 4M, 15ft (wetted)
Max Current	12 Amps
Pump Dims **Box Size**	12.5in x 6.5in x 11.5in 16in x 10in x 13in
Weight	8.6kg, 19lbs

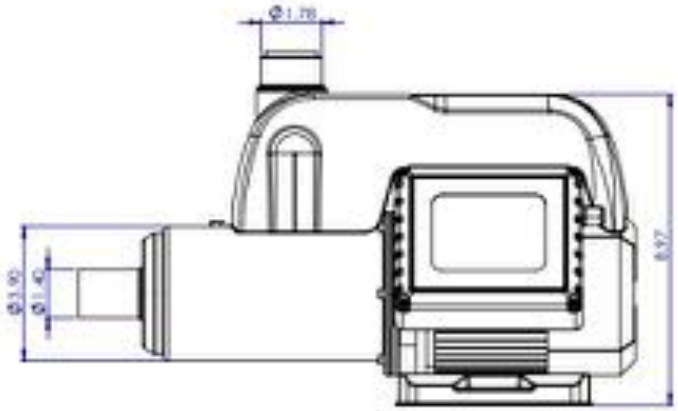




BP-HP PUMP SPECS

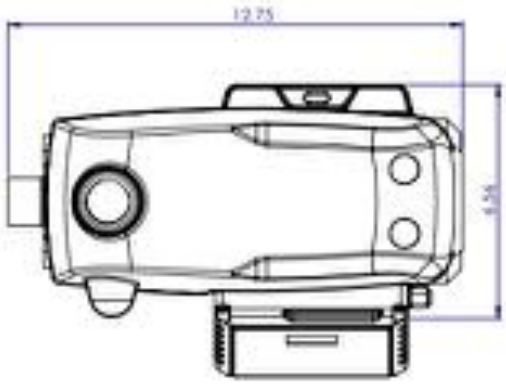
Inlet	1" FNPT
Outlet	1" FNPT
Acceptable pH	5 - 8, Water (No Fuel)
Temp. Range	10 - 40°C, 50 - 113°F
Max Liquid Temp	60°C, 140°F
Power Range	750-1500W
Suction	Up to 4M, 15ft (wetted)
Max Current	8 Amps
Pump Dims **Box Size**	16in x 6in x 11in 18in x 13in x 16in
Weight	8.6kg, 19lbs

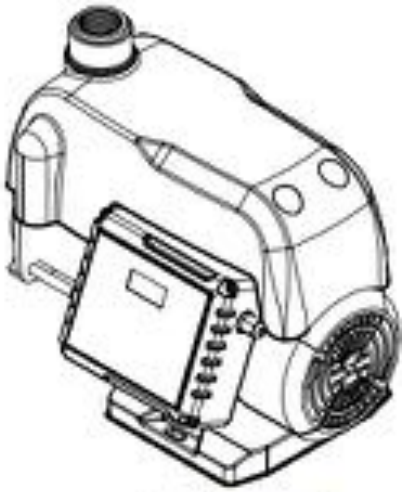


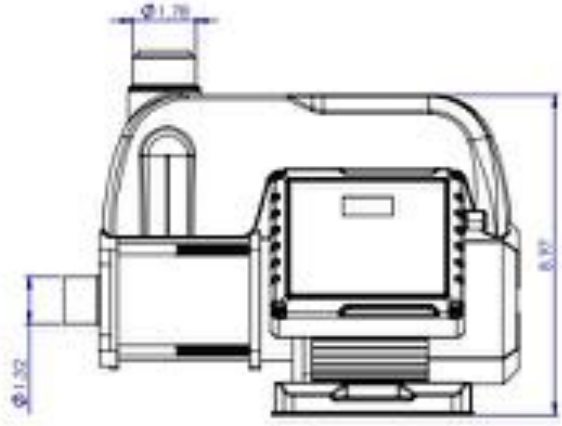


BP2 PUMP SPECS

Inlet	1.25" FNPT
Outlet	1" FNPT
Acceptable pH	5 - 8, Water (No Fuel)
Temp. Range	10 - 40°C, 50 - 113°F
Max Liquid Temp	60°C, 140°F
Power Range	1200 - 2000w
Suction	Up to 4M, 15ft (wetted)
Max Current	12 Amps
Pump Dimensions **Box Size**	14in x 6in x 11in 17in x 10in x 13in
Weight	11kg, 24lbs

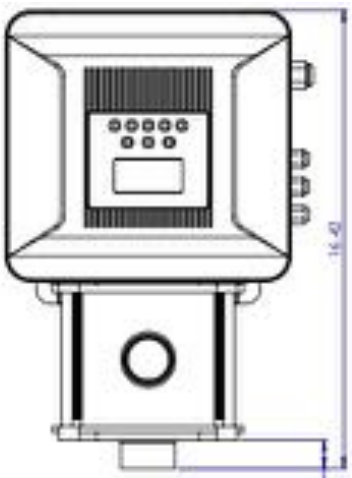


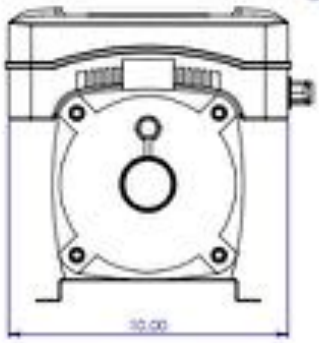


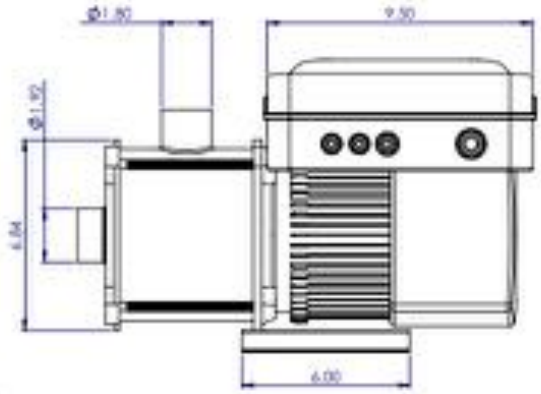


BP3 PUMP SPECS

Inlet	1.5" FNPT
Outlet	1.5" FNPT
Acceptable pH	5 - 8, Water (No Fuel)
Temp. Range	0 - 40°C, 32 - 104°F
Max Liquid Temp	60°C, 140°F
Power Range	1500-3000 w
Suction	Up to 4M, 15ft (wetted)
Max Current	16 Amps
Pump Dimensions **Box Size**	16in x 9in x 10in 24n x 18in x 10in
Weight	19kg, 42 lbs



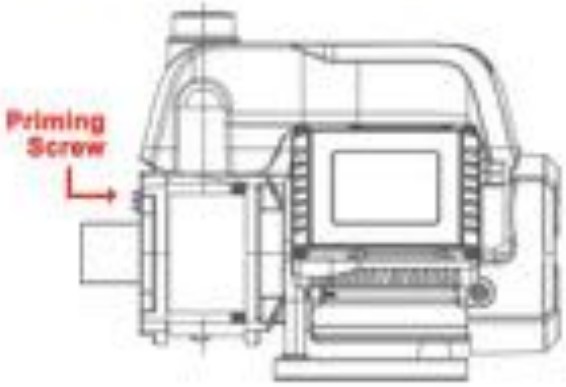




PRIMING YOUR PUMP

Priming your pressure pump is essential before operation. If you have access to 110vac or 220vac, you can test the pump before hooking up the panels, batteries, and Controller- just be sure to prime it first. Otherwise, prime the pump after hooking everything up to the Controller except for the pump.

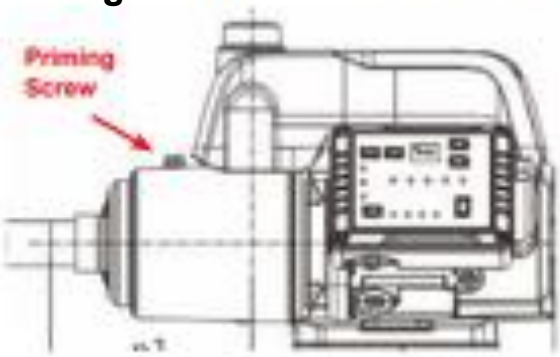
TP-750,

TPP-750, BP1 and BP2 Priming  	1. Loosen Priming Screw. 2. Create positive pressure in supply line to push water into pump inlet or fill line with water 3. Once air is completely purged, power on the pump to purge air completely before fully tightening Priming Screw again 4. Adjust Pressure Setting with controls. Pump will adjust speed and smoothly cycle on & off to maintain desired setting.
NEW: Wire Priming 'hook' in the kit allows you to reach into the top outlet of the pump and pull up the small ring on the check valve so you can pour water in the top and fill the chamber easily.	**PRIMING VIDEO for TP750** *http://www.youtube.com/c/RPSSolarPumps*

PRIMING YOUR PUMP

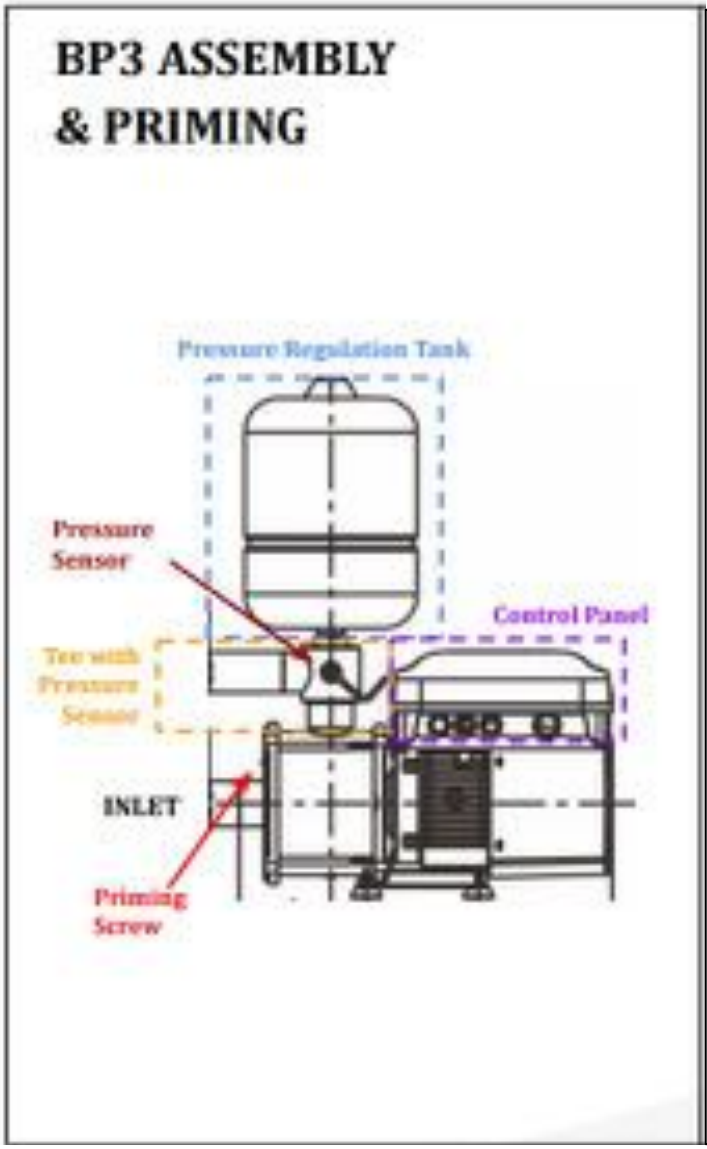
Priming your pressure pump is essential before operation! If you have access to 110vac or 220vac, you can test the pump before hooking up the panels, batteries, and Controller - just be sure to prime it first. Otherwise, prime the pump after hooking everything up to the Controller except for the pump.

TP-HP, BP-05, and BP-HP Priming



1. Loosen Priming Screw.
2. Create positive pressure in supply line to push water into pump inlet or fill line with water
3. Once air is completely purged, power on the pump to purge air completely before fully tightening Priming Screw again
4. Adjust Pressure Setting with controls. Pump will adjust speed and smoothly cycle on & off to maintain desired setting.

PRIMING YOUR PUMP



ASSEMBLY

**With stainless steel connections, we recommend Thread Sealant and large wrenches.

1) Thread your Tee with Pressure Sensor to the upper outlet of the pump chamber using ample pipe dope/thread sealant.

2) On the left and right sides of the Tee are two openings for small fittings. On one side goes the closed fitting. On the other side you remove the sensor from the small metal fitting, screw the fitting tight, and then reattach the sensor plug to the pump control panel interface.

3) The top of the tee is where the tank will go. Spin on the tank until tight using ample pipe dope/thread sealant.

4) The tank is assembled and ready for you to add your inlet and outlet connections. Remember to use adequate pipe dope to ensure a tight, leak proof connection between fittings.

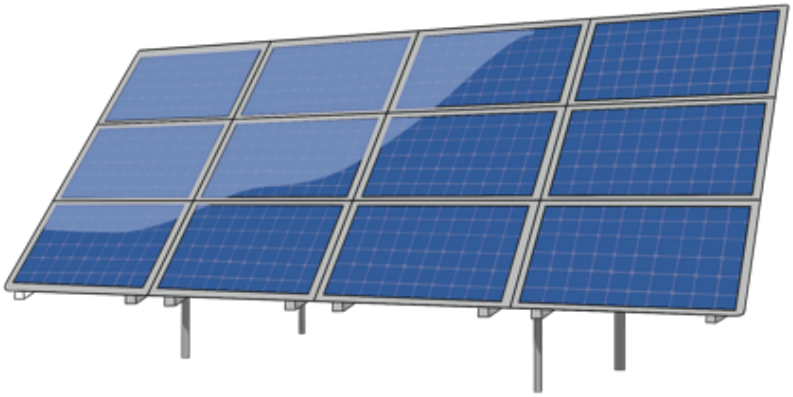
PRIMING

1. Loosen Priming Screw.
2. Create positive pressure in supply line to push water into pump inlet or fill line with water.
3. Once air is completely purged, power on the pump to purge air completely before fully tightening Priming Screw again
4. Adjust Pressure Setting with controls. Pump will adjust speed and smoothly cycle on & off to maintain desired setting.

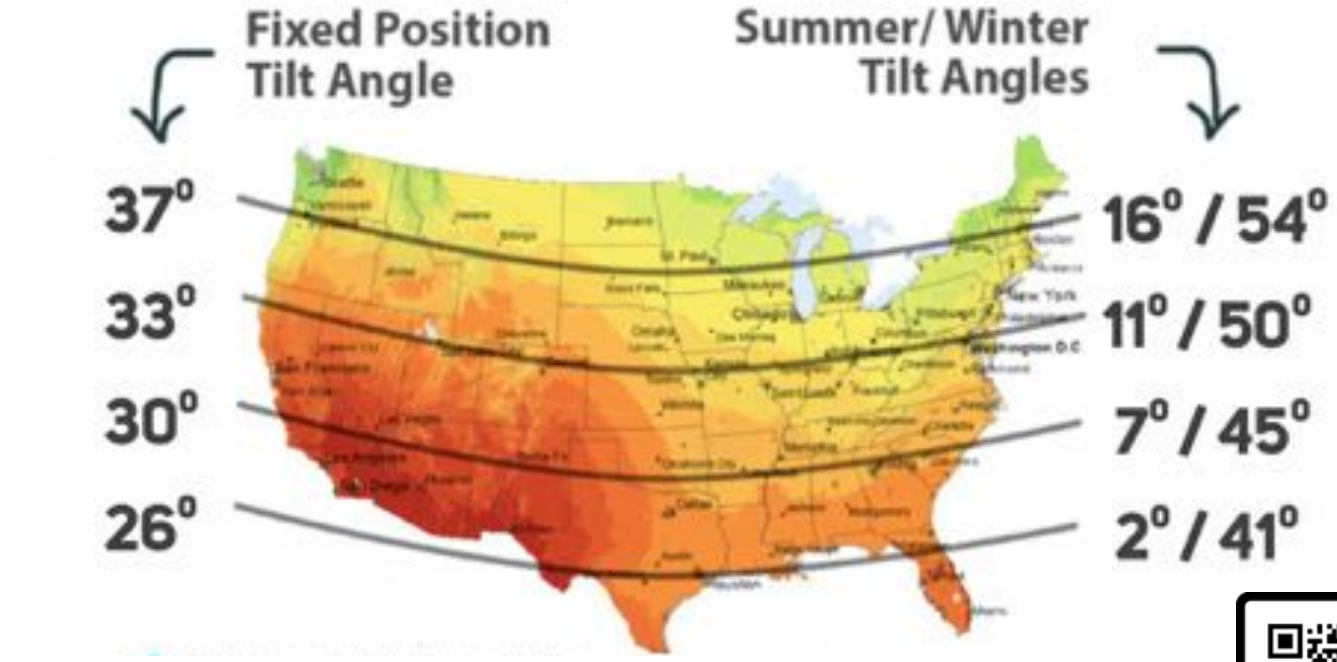
MOUNTING YOUR SOLAR PANELS

Solar panels should be mounted on a secure structure. Several ideas can be found at RPSsolarpumps.com/mounting

Panels should face true South and at an angle appropriate for your latitude. If you are mounting your panels on an already built structure, try to get as close to the correct angle as possible.



Ensure there are no shadows or other obstructions on the solar panels. While shadowing a small corner of a single panel may not seem like a big deal, since the panels are connected in series, a small shadow can limit the power output from all other panels connected in series! This means a small shadow on a single panel could reduce system power by hundreds of watts. Time to get out that chainsaw and trim some trees!



If you're not using steel as part of your mounting, ground those panels! You can wrap some copper through the frame holes of the panels.

Scan here to use our tilt angle calculator tool!

SCAN ME

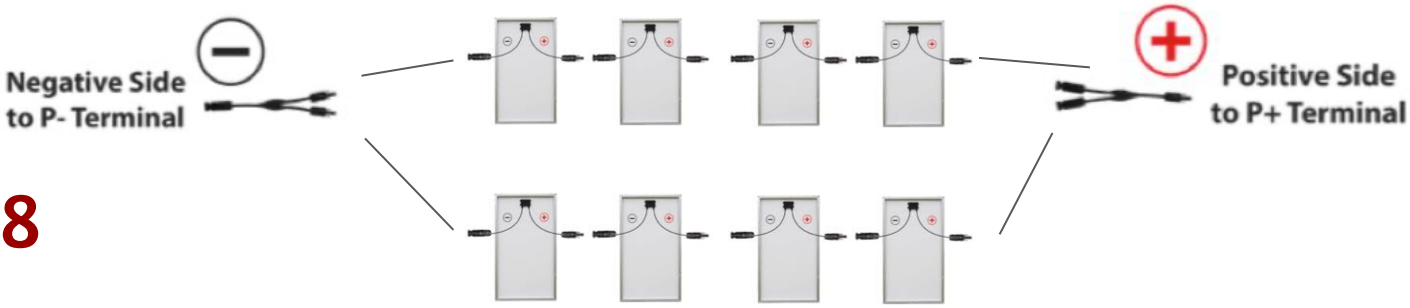
WIRING YOUR SOLAR PANELS - 100W Panels

When using 100W panels, connect the panels in series and parallel based on the diagrams below. For 375w panels, refer to the next page. Link your solar panels together and connect to the Controller by clipping MC4 connectors together. Each MC4 connector is either a male end or female end. They simply snap together to make safe and easy connections.

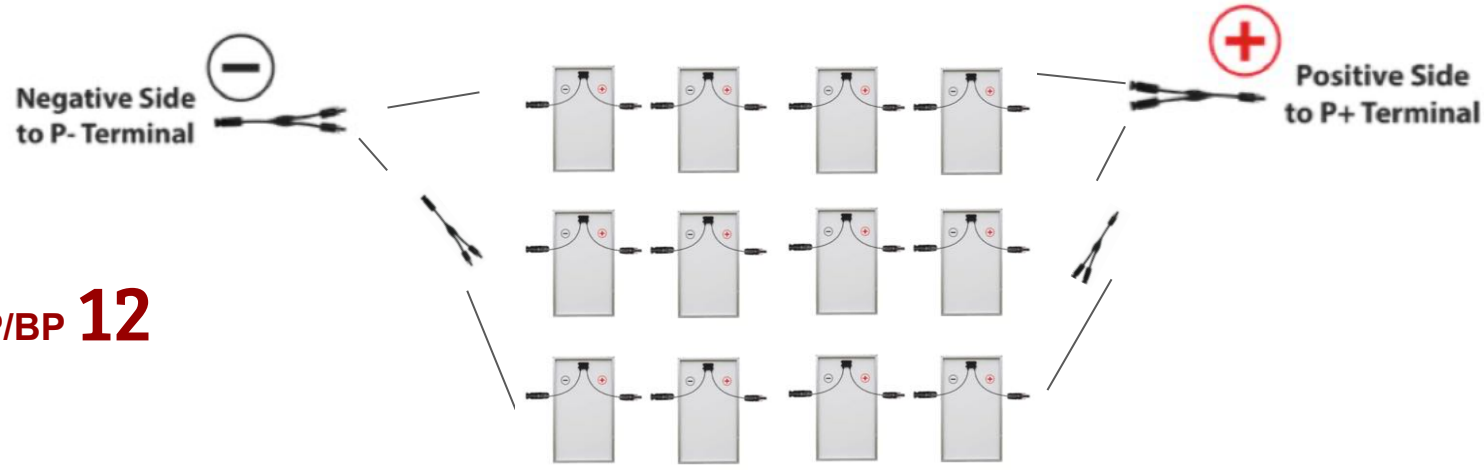
Note: If using your own solar panels do not exceed 90Voc input! Ask an RPS Engineer how to wire if you're unsure!

TP/BP 4

TP/BP 8



TP/BP 12

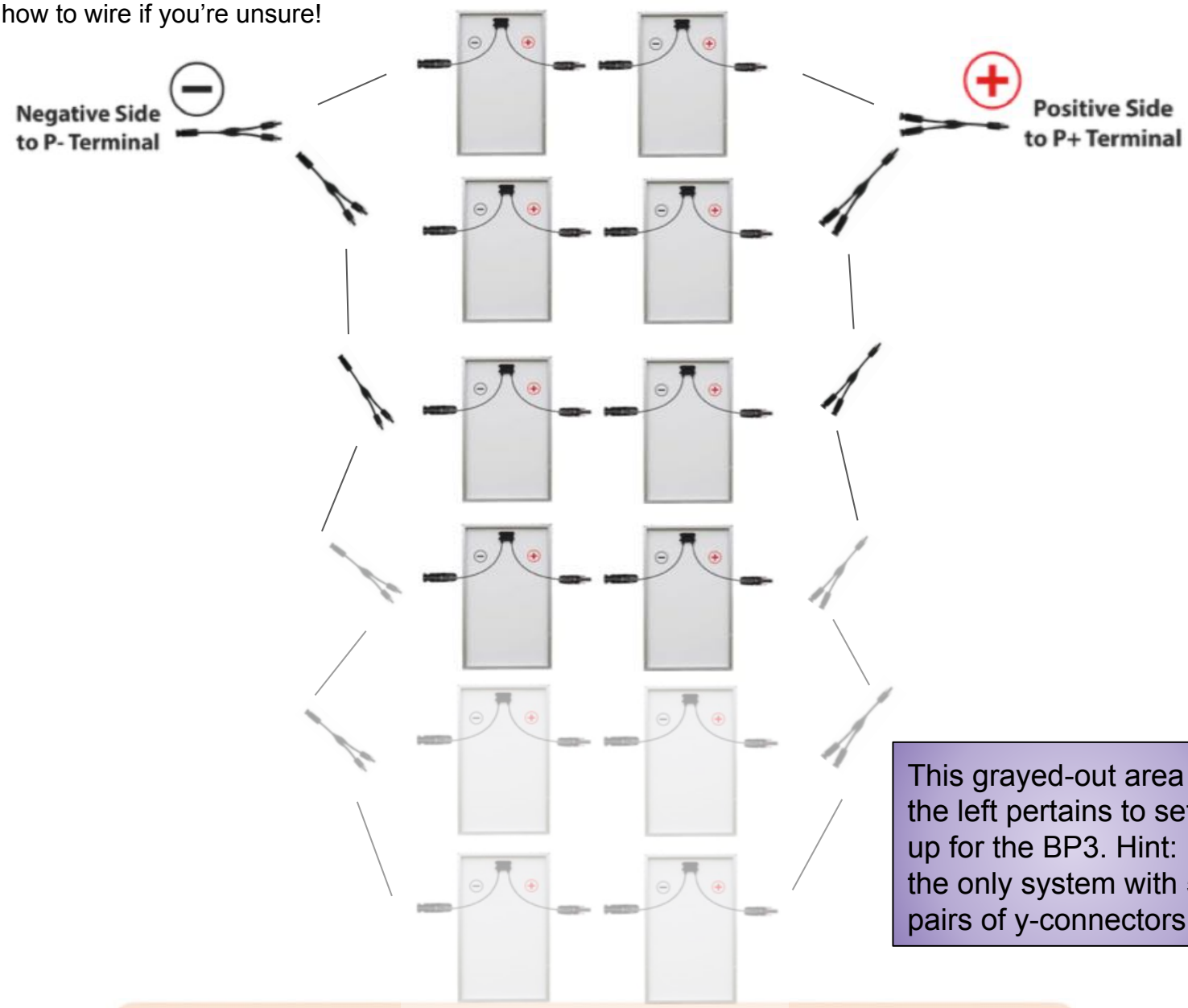


WARNING: RISK OF SHOCK! Solar panels, especially when connected in series and parallel, can produce a significant amount of energy, which can cause electric shock. Cover the solar panels with a cloth or tarp when you're working with the wires.

WIRING YOUR SOLAR PANELS - 375W Panels

When using 375W panels, connect the panels in series and parallel based on the diagrams below. Link your solar panels together and connect to the Controller by clipping MC4 connectors together. Each MC4 connector is either a male end or female end. They simply snap together to make safe and easy connections.

Note: If using your own solar panels do not exceed 145Voc input! Ask an RPS Engineer how to wire if you're unsure!



This grayed-out area to the left pertains to set up for the BP3. Hint: It's the only system with 5 pairs of y-connectors.

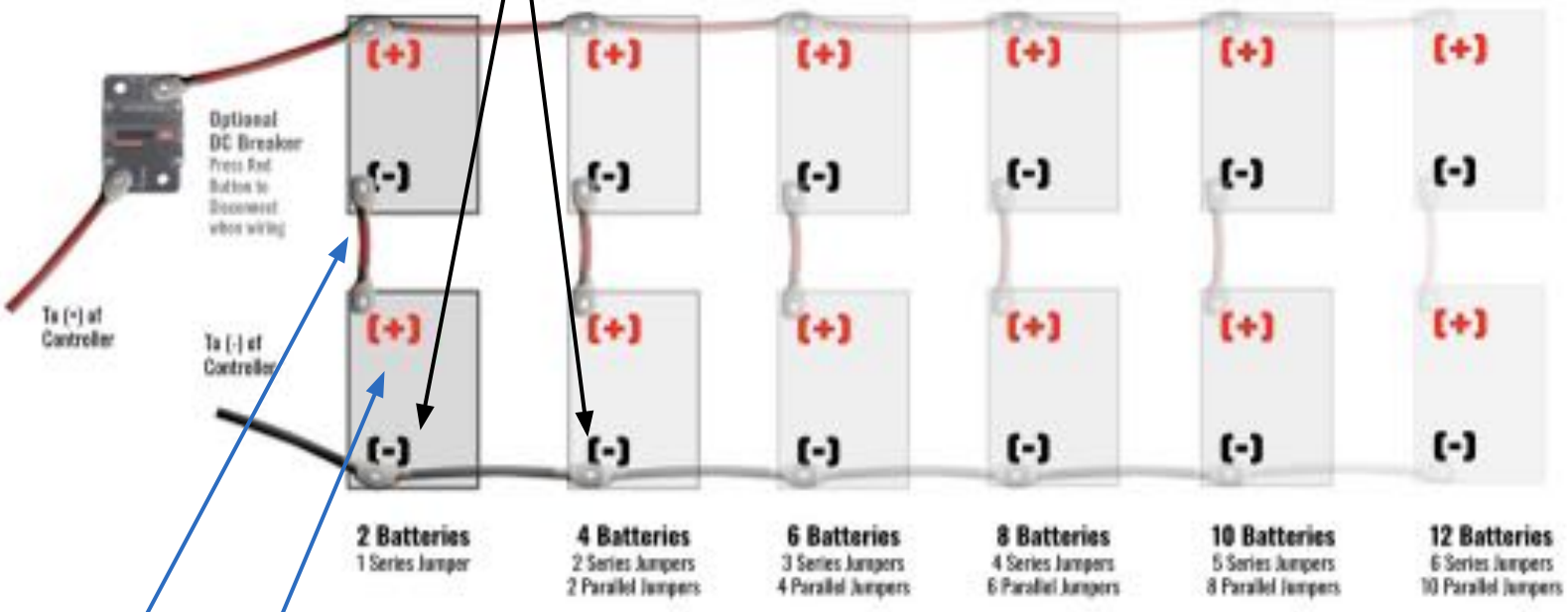
WARNING: RISK OF SHOCK! Solar panels, especially when connected in series and parallel, can produce a significant amount of energy, which can cause electric shock. Cover the solar panels with a cloth or tarp when you're working with the wires.

BATTERY WIRING 24V ONLY

RPS recommends AGM / sealed lead acid batteries that are designed for several maintenance-free years of operation. They should also be stored in a dry location protected from the elements. The batteries operate best at room temperature and it is best to keep them out of freezing conditions for maximum performance. To prevent significant voltage drop, the batteries should be located as close to the Controller as possible. Within 3 feet is ideal. If further than 3ft is required, the wires may be extended using appropriate gauge cables.

For a 24v battery bank, refer to the diagram below to know how many series and parallel connections are needed. Most common is two 12V batteries in series, rest in parallel.

In a **parallel** configuration, batteries are connected side by side, with the positive terminals connected to each other and the negative terminals likewise.



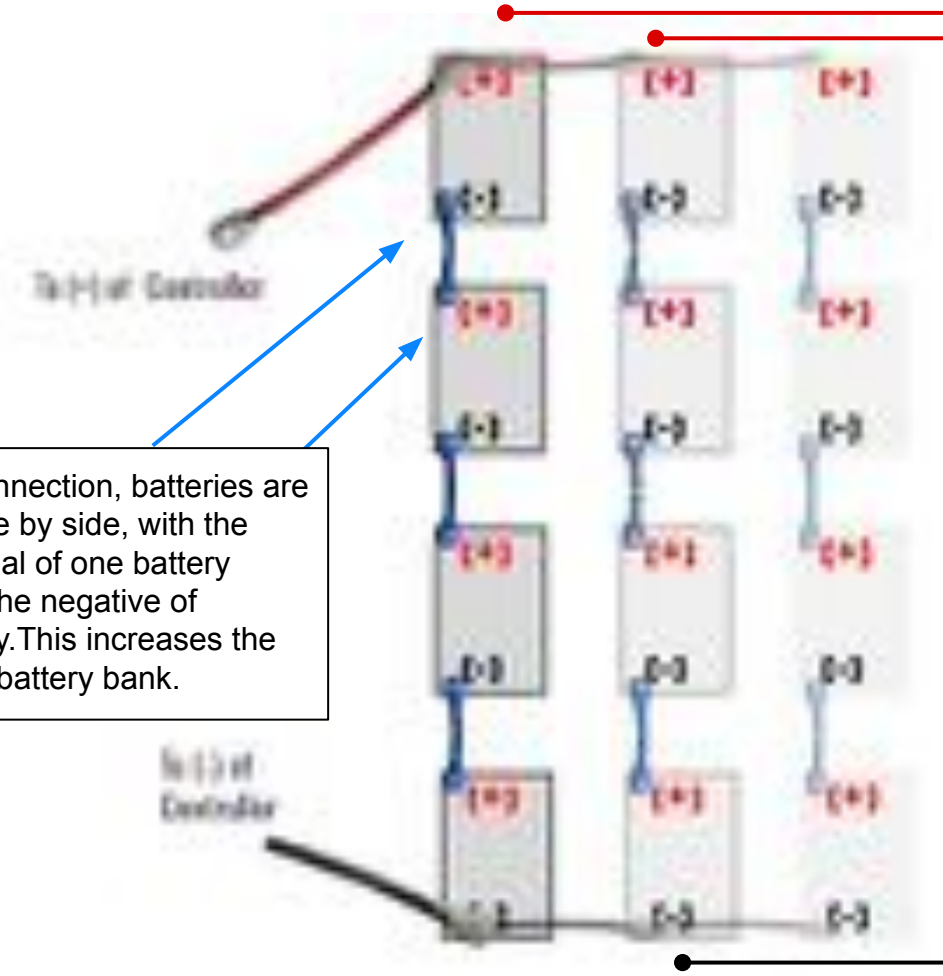
In a **series** connection, batteries are connected side by side, with the positive terminal of one battery connected to the negative of another battery.This increases the voltage of the battery bank.

Note: Do not exceed two 12V batteries in series or four 6V batteries in series. For extra battery capacity, add sets in parallel.

BATTERY WIRING 48V ONLY

RPS recommends AGM / sealed lead acid batteries that are designed for several maintenance-free years of operation. They should also be stored in a dry location protected from the elements. The batteries operate best at room temperature and it is best to keep them out of freezing conditions for maximum performance. To prevent significant voltage drop, the batteries should be located as close to the Controller as possible. Within 3 feet is ideal. If further than 3ft is required, the wires may be extended using appropriate gauge cables.

For a 48v battery bank, refer to the diagram below to know how many series and parallel connections are needed. Most common is four 12V batteries in series, rest in parallel.



In a **series** connection, batteries are connected side by side, with the positive terminal of one battery connected to the negative of another battery.This increases the voltage of the battery bank.

In a **parallel** configuration, batteries are connected side by side, with the positive terminals connected to each other and the negative terminals likewise.

4 Batteries	8 Batteries	12 Batteries
3 Series Jumpers	6 Series Jumpers 2 Parallel Jumpers	9 Series Jumpers 4 Parallel Jumpers

Note: Do not exceed four 12V batteries in series or eight 6V batteries in series. For extra battery capacity add sets in parallel.

Controller Overview

Now that solar panels and batteries are set up, it's time to connect them to the Controller! The model of pressure pump you have determines which model of Controller came with it. Knowing which model you have will help you know how to wire your batteries and solar panels, as well as what kind if backup power it can take.

Controller Model	Battery Bank Needed	PV Array (Solar Panel)	AC Input (optional*)	Which Pump?
VC3.11	24v	Less than 90voc	110v	
VC3.22	24v	Less than 90voc	240v	
VC5.22	48v	Less than 145voc	240v	

*110V AC or 220V AC INPUT (BACKUP)

Your Controller is designed to take solar power and charge your 24v or 48v battery bank. As an optional backup, it is also set-up to accept 110V AC or 220V AC, depending on the model, to both charge your batteries and run your pump directly if desired. AC input can be wired directly into the screw terminals of your Controller, by removing the front cover plate.If your Controller demands 220, you will use the Neutral (N) line for the second Active (L) line. *Wiring 110v or 220v is only for certified professionals or those familiar with 220v power.*

Have a system from before 2023? Give us a call!

Wiring Your Controller

Optional:You can wire in AC here to help charge the batteries. Wiring shown in previous page.

The plug to connect to your pump is located here.

The wires from your solar panels will connect to the wires coming out of here

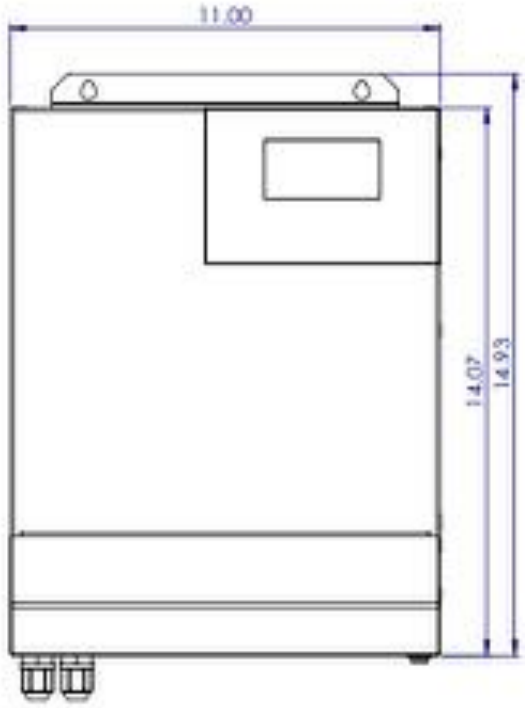
A dedicated grounding screw for the Controller.

The battery cables from your battery bank will connect to wires coming out of here

This ON/OFF switch controls when the Controller can output power, meaning lights can still show even if turned off - it just won't output any power so the pump won't turn on .

*The larger model known as the VC5 has the on/off switch and grounding screw on the left side.

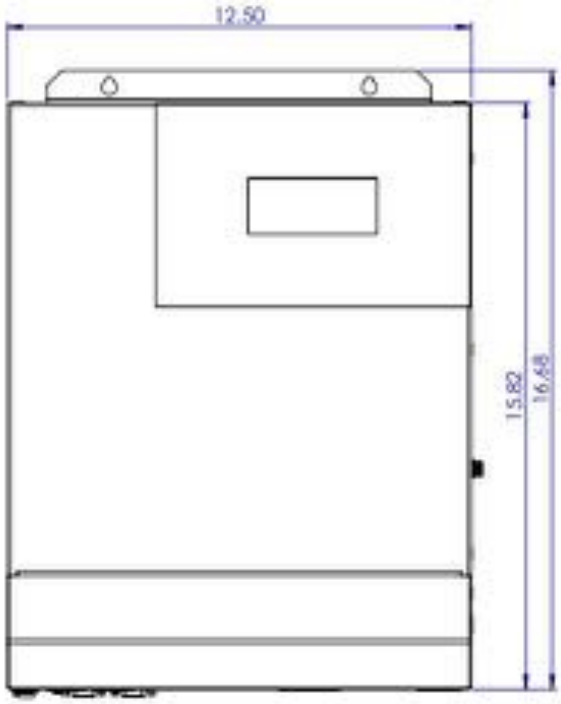
VC3 Series Solar Power Train™



Compatible Pump	VC3.11 - BP05, BP1, BP-HP VC3.22 - TP-750, TP-HP
Battery Voltage	24 VDC Only
Battery Wiring	8AWG or Thicker
Dimensions	15in x 11in x 4in 378mm x 280mm x 103mm
Temp. Range	0 - 40°C, 32 - 104°F
OPTIONAL AC INPUT	VC3.11 - 110 VAC VC3.22 - 220 VAC
Weight	13.7bs
Recommended Clearance	Mount with 8 inches of space in all directions

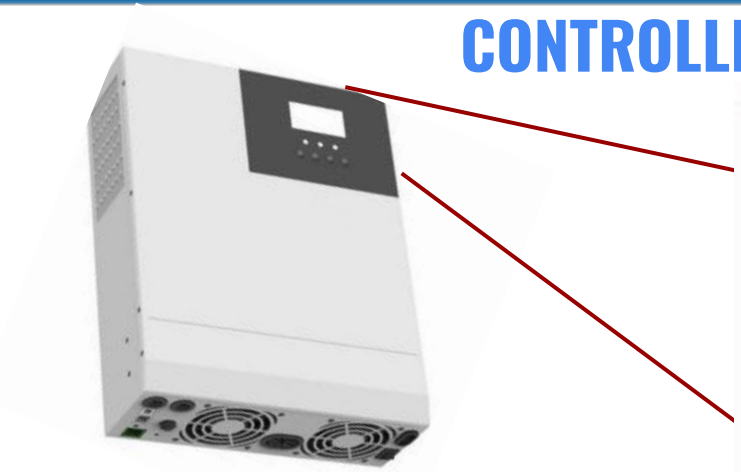
Specs of the Controller can be found on a gray sticker located on the right side.

VC5 Series Solar Power Train™



Compatible Pump	BP2, BP3
Battery Voltage	48 VDC Only
Battery Wiring	8AWG or Thicker
Dimensions	17in x 11in x 4in 426mm*322mm*126mm
Temp. Range	0 - 40°C, 32 - 104°F
OPTIONAL AC INPUT	220 VAC Only
Weight	24lbs
Recommended Clearance	Mount with 8 inches of space in all directions

CONTROLLER DISPLAY



Now that panels and batteries are connected, the display on the top right part of the Controller will turn on. The factory settings of the Controller accommodate almost every install scenario of a Pressure Pump. RPS Engineers recommend leaving them at their default settings to ensure proper operation.

Lights	Colors	Description
AC/INV	Yellow	Flashing - AC power is being outputted Steady - only seen in bypass battery mode (AC power is the only input)
CHARGE	Green	Steady light - charging of batteries completed Flashing -batteries are charging
FAULT	Red	Steady light - Fault has been detected
These lights can be on even if Controller's power switch is turned off. Display will go dark after standing by for some time. Press the up or down button for the screen to come back on.		

Buttons	Description
SET	Enter/Exit Settings
UP	Previous Choice
DOWN	Next Choice
ENT	Confirm/Enter Options under current settings menu

ICON BREAKDOWN

Icons	Functions	Icons	Functions
	Indicates that the AC input terminal has been connected to the grid		Indicates that the inverter circuit is working
	Indicates that the AC input mode in APL mode (wide voltage range)		Indicates that the machine is in the Mains Bypass mode
	Indicates that the PV input terminal has been connected to the solar panel		Indicates that the AC output is in an overload state
	Indicates that the machine has been connected to the battery:  indicates that the remaining battery is 0%~24%;  indicates that the remaining battery is 25%~49%;  indicates that the remaining battery is 50%~74%;  indicates that the remaining battery is 75%~100%.		Indicates the percentage of AC output loads:  indicates that the load percentage is 0%~24%;  indicates that the load percentage is 25%~49%,  indicates that the load percentage is 50%~74%,  indicates that the load percentage is ≥75%.
	Indicates that the battery type of the machine is a lithium battery		Indicates that the buzzer is not enabled
	Indicates that the current battery type of the machine is a lead-acid battery		Indicates that the machine has an alarm
	Indicates that the battery is in charging state		Indicates that the machine is in a fault condition
	Indicates that the AC/PV charging circuit is working		Indicates that the machine is in setup mode
	Indicates that the AC output terminal has an AC voltage output		The parameters displayed in the middle of the screen: 1. In the non setup mode, the alarm or fault code is displayed. 2. In the setup mode, the currently set parameter item code is displayed.

ICON BREAKDOWN CONTINUED

Parameters display on the left side of the screen: input parameters			
AC	Indicates AC input		
PV	Indicates PV input		
INV	Indicates inverter circuit		
WP	This icon is not displayed		
	Display battery voltage, battery charge total current, mains charge power, AC input voltage, AC input frequency, PV input voltage, internal heat sink temperature, software version		
Parameters display on the right side of the screen: Output parameters			
	Indicates output voltage, output current, output active power, output apparent power, battery discharge current, software version; in setup mode, displays the set parameters under the currently set parameter item code		
Arrow display			
①	The arrow is not displayed	⑤	Indicates the charging circuit charging the battery terminal
②	Indicates the grid supplying power to the load	⑥	The arrow is not displayed
③	Indicates grid supplying power to the charging circuit	⑦	Indicates the battery terminal supplying power to the inverter circuit
④	Indicates PV module supplying power to the charging circuit	⑧	Indicates the inverter circuit supplying power to the load

As the system operates, you will see multiple data points flash on the screen. You can press the up and down buttons to scroll through all these to view real time data.

Parameters on the left side of the screen
INPUT BATT V (Battery input voltage)
PV TEMP ℃ (PV charger heatsink temperature)
PV INPUT V (PV input voltage)
INPUT BATT A (Input battery current)
INPUT BATT KW (Battery input power)
AC INPUT Hz (AC input frequency)
AC INPUT V (AC input voltage)
INPUT V (For maintain)
INV TEMP ℃ (AC charge or battery discharge heatsink temperature)
APP software version
Model PV Voltage Rating
Model Battery Voltage Rating

Parameters on the right side of the screen
OUTPUT LOAD V (Output load voltage)
PV OUTPUT KW (PV output power)
PV OUTPUT A (PV output current)
OUTPUT BATT A (Battery output current)
OUTPUT BATT KW (Battery output power)
AC OUTPUT LOAD Hz (AC output frequency)
AC OUTPUT LOAD A (AC output load current)
OUTPUT LOAD KVA (Load apparent power)
INV OUTPUT LOAD KW (Load active power)
Bootloader software version
Model PV Current Rating
Model Output Power Rating

PUMP OPERATION

Once you have your pump primed and connected to power, it will automatically turn on! Depending on the model, your pump will either have a LED touch screen or physical buttons to press. (The BP3 looks slightly different from both, check pg 34 for that)

A number will appear on the screen - this is the pressure your pump is currently set to (**Set pressure**). If set to anything other than 0, the pump will start to pressurize and the number on the screen will change to the **working pressure**. The set pressure can be increased with the **(+)** button, and can be decreased with the **(-)** button which change working pressure accordingly.

Note: the pressure unit is *1 kg/cm² or 1 BAR which is equal to 14.5 psi* so change accordingly.
Ex) Setting the pump to 3.0 BAR would mean 3.0 x 14.5 = 43.5 PSI

Your pump will be set to **Booster Down/Normal Mode** on startup. Press Mode to change if needed.

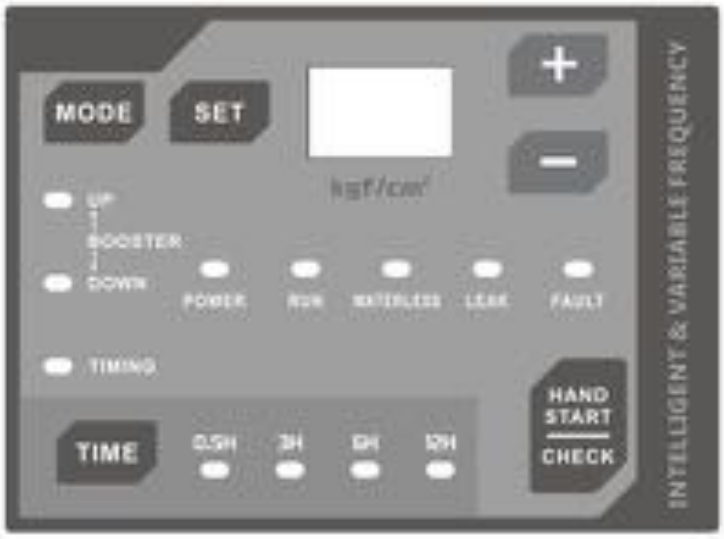
BOOSTER DOWN/NORMAL:
Used for setups where there is positive pressure aka water is being pushed into the pump.

BOOSTER UP/BOOST:
Used for setups where water is being pulled into the pump aka suction rod into a tank/pond with a foot valve.

FILLING THE TANK/TIMER:
Operates the pump for the specified amount of time and then stops the pump. Most often used for irrigation and filling tanks. Has to be set each day.

Note: Pump shutoff will become unstable if pressure is set too high. If pump will not shut-off, reduce pressure setting.

BUTTONS BREAKDOWN



Button	Function	Button	Function
MODE MODE	Selects the working mode; selects time intervals	POWER POWER	Illuminated when power is on
UP BOOSTER DOWN TIMING — BOOSTER UP / BOOSTER DOWN / FILLING THE TANK	The different modes the pump can operate; the selected mode will be illuminated	RUN OPERATING	**Solid**: pump is running and working pressure = set pressure **Flashing**: pump is running but working pressure ≠ set pressure **Light off**: pump is not running
TIME TIME	If Filling the Tank is selected mode, press to select the time interval the pump will run each day.	0.5 H 3 H 6 H 12 H 0.5H 3H 6H 12H	For Filling the Tank Mode, these are the possible intervals to select. **Light on**: selected run time **Light off**: not in this mode
+ −	Press to set and adjust working pressure of pump. **Can also lock/unlock the screen by pressing both at the same time.**	WATERLESS LACK OF WATER	Illuminated when pump detects no water running through. Pump will shut off and will restart automatically with proper water supply.
HAND START CHECK	Press to manually turn pump on and off.	FAULT ERROR	Abnormal behavior detected; code will appear on display
SETTING SET	Enter setting menu and select settings (rarely used)	LEAK LEAKAGE	Illuminated when leak in outlet pipe is detected

BP3 PUMP OPERATION

Once you have your pump primed and connected to power, it will automatically turn on!

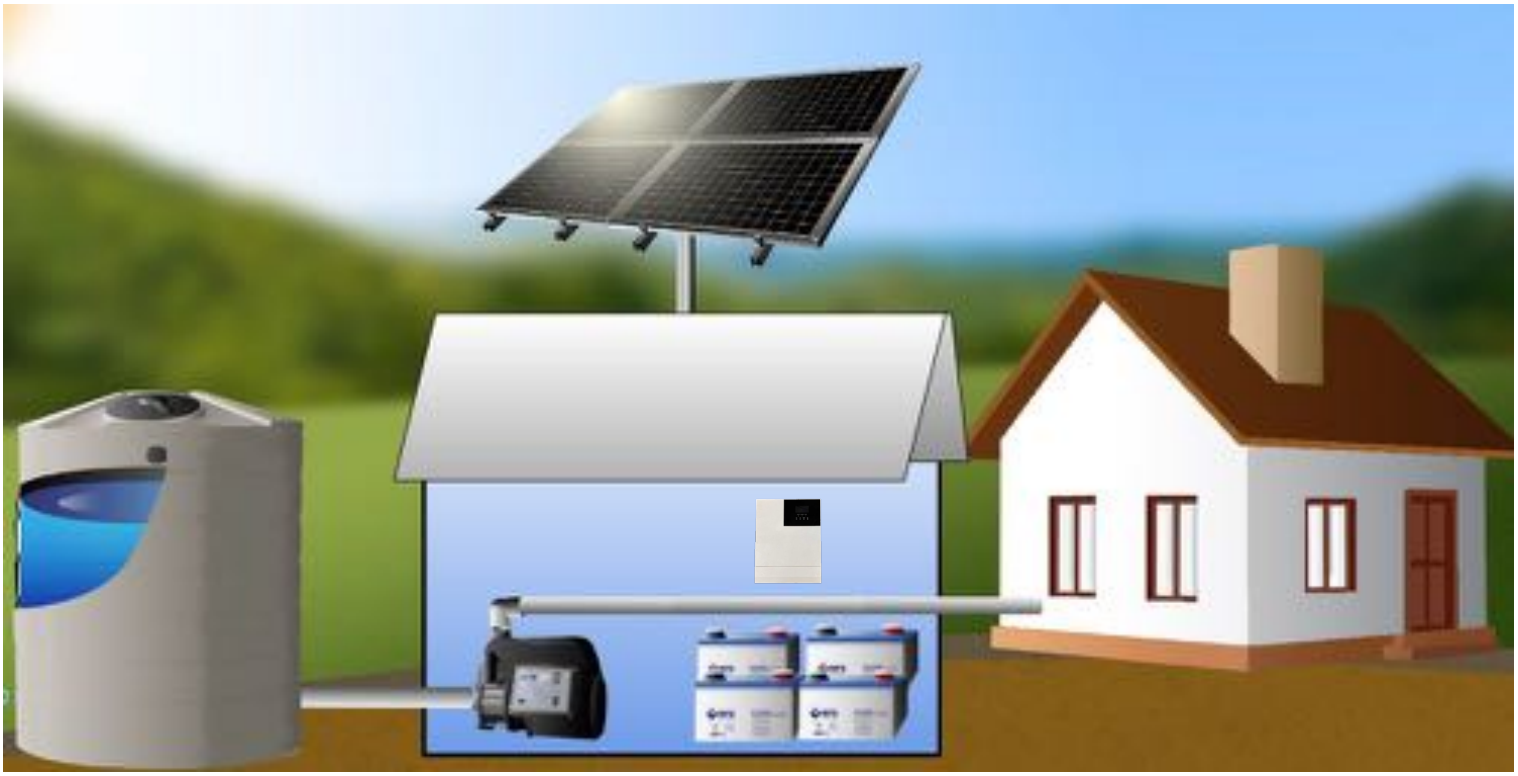
A number will appear on the screen. This is the pressure your pump is currently set to (Set pressure). If set to anything other than 0, the pump will start to pressurize and the number on the screen will change to the working pressure. The set pressure can be increased with the **(+)** button, and can be decreased with the **(-)** button which will change working pressure accordingly. You can manually turn the pump on and off with the middle power button.

BUTTON			
MODE	Select desired working mode	SETTINGS	Enter setting menu (not advisable)
TOGGLE	View real time pumping data 1) kg/cm^2 = pressure setting 2) m = meters of head 3) r/min = rotations per minute 4) kw = kilowatts, power consumption	OVERRIDE	RPM based control/bypass the transducer sensor. PSI setting will turn pump to max speed. Recommended only in case of sensor failure while waiting for a replacement part.
LIGHTS			
BOOSTING	Illuminates depending on selected mode	TIME	Illuminated when running pump at intervals is selected mode of operation
RUN	**Solid**: pump is running and working pressure = set pressure **Flashing**: pump is running but working pressure ≠ set pressure **Light off**: pump is not running	MULTI-P	Multi-pump. Used exclusively in situations that call for multiple, parallel pumps to achieve higher volumes . Very rare, call RPS for help if you plan on using this feature!
POWER	Illuminated when power is on	WATER LESS	Illuminated when pump detects no water running through. Pump will shut off and will restart automatically with proper water supply.
EMERGENCY	Abnormal behavior detected; code will appear on display		

Winter Operation

If you don't plan on using the system during the winter season, there are some tips to follow. Your surface pump should be unplumbed, unplugged, and stored in a dry environment much like your Controller and batteries. As for the solar panels, you are able to leave them in place, preferably covered. If you have an adjustable mount, tilt the panels to achieve a steeper angle so snow doesn't collect on the panels. If not, and you get heavy snowfall, you will want to clear off excess snow from the panels from time to time.

If you're using the system during the winter, there aren't many changes to be made. If you're able to change the tilt angle of your solar panels, change it to a more optimal angle for winter. Make sure the plumbing is kept insulated to prevent freezing. The Controller and batteries should already be in a dry environment but it might be a good idea to add some insulation to add extra protection from cold temperatures. With wintertime, batteries may take a little longer to recharge due to there being less sun - for those urgent moments of operation, you can hook up 110/220 VAC to the Controller or directly to your pump!



CONTROLLER TROUBLESHOOTING

Your Controller is **not waterproof and should be located in a dry dust-free location**, protected from the sun and the elements and pests such as mice, moths and bugs.

**The fan remains running in low power mode at most times to protect the equipment. This fan uses very little power and when running, increases the lifetime of the system.*

If the fault light is turned on, there should be a 2 digit number showing in the top-center of your screen. Below are some common alarms and how to proceed. For those rare instances where a code not listed below comes up or if the error still persists, give a RPS Engineer a call/text at 530-240-3825!

01,04 Battery Undervoltage	Make sure wiring matches requirement of Controller (24v or 48v). Do a voltage check of batteries. Allow time for batteries to recharge and have Controller power switch set to off so no output is being generated.
03 Battery not connected	Make sure wiring matches requirement of Controller (24v or 48v). Do a voltage check of batteries. Check if battery breaker has tripped.
09 PV OverVoltage	Check DC voltage of solar panels, make sure VDC is not higher than Controller requirements (found on pages 17/18)
21 Fan Failure	Check if the fan is not turning or if it's blocked by foreign object.

VOLTAGE CHECK
Take a DC Voltage Reading of each battery. Battery voltages range from 11.5VDC (dangerously low) to 14.4VDC (fully charged) depending on the state of charge. Low voltages? Charge for 8 hours in full sun.

SOFT RESET
Press and Release Power Switch. Turn back on after 60 seconds.

HARD RESET
Disconnect Batteries and Solar Panels for 60 seconds. Reconnect.

PUMP TROUBLESHOOTING

The pressure pumps have their own set of faults that can appear on the screen and will always start with the letter E.

Hard Reset
Unplug pump, wait 60 seconds, plug pump back in.

Run Light is Flashing: pump is running but working pressure ≠ set pressure

No Lights On Pump	Low or no power To pump	Check Connections, Soft Reset of Controller, Check batteries for low voltage
Pump Doesn't Start	Pipe is blocked	Ensure valves are open to clear airlocks
Pump Doesn't Stop Leak Light is on	Check for leaks, Turn down pressure	Small leaks in plumbing are the most common, check around outlet cover, Turn down pressure setting
Pump Sputters	Pump not properly primed or air entering system	Prime pump and remove all air from system, check inlet pipes for leaks, Install foot valve for suction applications
Settings may have been changed	Reset to factory defaults	Press and hold "MODE" for three seconds
E01	Low input voltage	Check input voltage, Check battery voltage
E02	Over voltage input	Ensure input voltage is less than 280V AC
E03	Pressure sensor error	Hard Reset, Replace pressure sensor
E04	Pump over temperature	Remove pump from direct sun, Improve ventilation
E05	Pump Overload	Ensure water is fairly clear (no mud or large debris)
E06	Display over temperature or sensor failure	Remove from direct sun, Improve ventilation, Hard reset, Contact RPS
E07	Not Used	n/a, Hard Reset
E08, E09	Motor phase mismatch, Over current	Motor not operating at commanded speed, check for obstructions, check for stuck impellers
E10	Startup fault	Hard Reset, Contact RPS to check for impeller obstructions
E11	Motor communication error	Check for damage to motor wires, Hard Reset, Contact RPS
E12	Not used	n/a, Hard Reset
E13	Display communication error	Hard Reset, Contact RPS

SUPPORT

Need additional help getting your system running?

We're here to help!

If you're having issues getting your system operating we have videos on each section of the setup. Find us at **youtube.com/rpssolarpumps**

WATCH ON YOUTUBE

NEW
Text our Engineers!

We're committed to making sure you get water. Our Engineers are standing by to help with any issues.

Call or **TEXT** (questions, notes, observations & photos encouraged!)

530–240–3825

SYSTEM WARRANTY

Product Warranty: 2-Year System Warranty

Rural Power Systems Inc. (RPS Solar Pumps) warrants to the owner for a period of twenty-four (24) months from the date of purchase ("Warranty Period") such RPS Products will be free from material defects in material and workmanship. During the Warranty Period, RPS Solar Pumps will repair or replace any defective part(s) at no cost to the owner.

During the Warranty Period, in the event of a malfunction, the purchaser must return the defective product to receive a replacement. The warranty is limited to the repair or replacement of the defective product purchased from RPS Solar Pumps. **YOUR USE OF THE SERVICES AND RPS PRODUCTS IS AT YOUR OWN RISK. RPS SOLAR PUMPS DISCLAIMS ALL WARRANTIES UNLESS EXPRESSLY PROVIDED IN THESE TERMS, INCLUDING BUT NOT LIMITED TO ANY WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE.** The above remedies shall be the sole and exclusive remedies and RPS Solar Pumps' sole liability for any breach of the limited warranty set forth above.

This warranty does not apply when the RPS Product has not been installed according to the instructions or damage has occurred through abuse, carelessness, negligence, improper installation, connecting to an improper voltage (most commonly, connecting too many panels in series for your controller) or degraded wells. Your warranty is linked to your product's serial number, which is on record at RPS Solar Pumps. RPS Solar Pumps will quote all replacements not covered by warranty or outside the warranty period.

For a complete list of other available warranties and guarantees visit: www.rpssolarpumps.com/terms/

RETURNS AND REFUNDS

Return Policy: 30 days

Customer shall inspect the RPS Product within 30 days of receipt and will be deemed to have accepted the RPS Product unless you notify RPS Solar Pumps of your intent to return the product. You may return the RPS Products purchased, for any reason, for a full refund up to thirty (30) days after the date of purchase. The RPS Products must be ***unused***, in new condition, and you must pay the return shipping or return the product to RPS Solar Pumps in person. For your convenience, we are happy to email printable return shipping labels and deduct the cost (often a discounted rate vs. the retail store rate) from your refund amount.

After 30 days and up to sixty (60) days after purchase, a full refund is not available, but transferrable store credit is available for returned product. We do not accept returns past 60 days and are unavailable to offer refunds; however, your product warranty is transferable in event the system is sold during the Warranty Period.

NOTES

RPS Solar Pumps
40250 County Rd 27
Woodland CA 95776

530-240-3825
Call or Text