

GRIDFREE

The Back Gully Kit

Solar-Powered Water Pump Kit

Installation Manual



WARNING - READ CAREFULLY



- Please ensure you have read our resources online or spoken to a member of the team to make sure this is suitable for your application.
- All fittings are 304 Stainless Steel. Please use in appropriate environments within appropriate Ph levels.
- Ensure your water source is clean of solids that may wear down or block the pump.
- Please take precautions to avoid dry running of the pump. Dry running can permanently cause damage to the pump, requiring replacement.
- It is good practice to run the pump to flush the piping system for at least a couple minutes to clear the pipeline of any contaminants following installation.
- Ensure the piping and fittings you use are appropriate for the pressure level that the pump can produce.
- Please ensure the pump remains vertical during operation. The pump is not designed for horizontal operation.

Applicable Standards

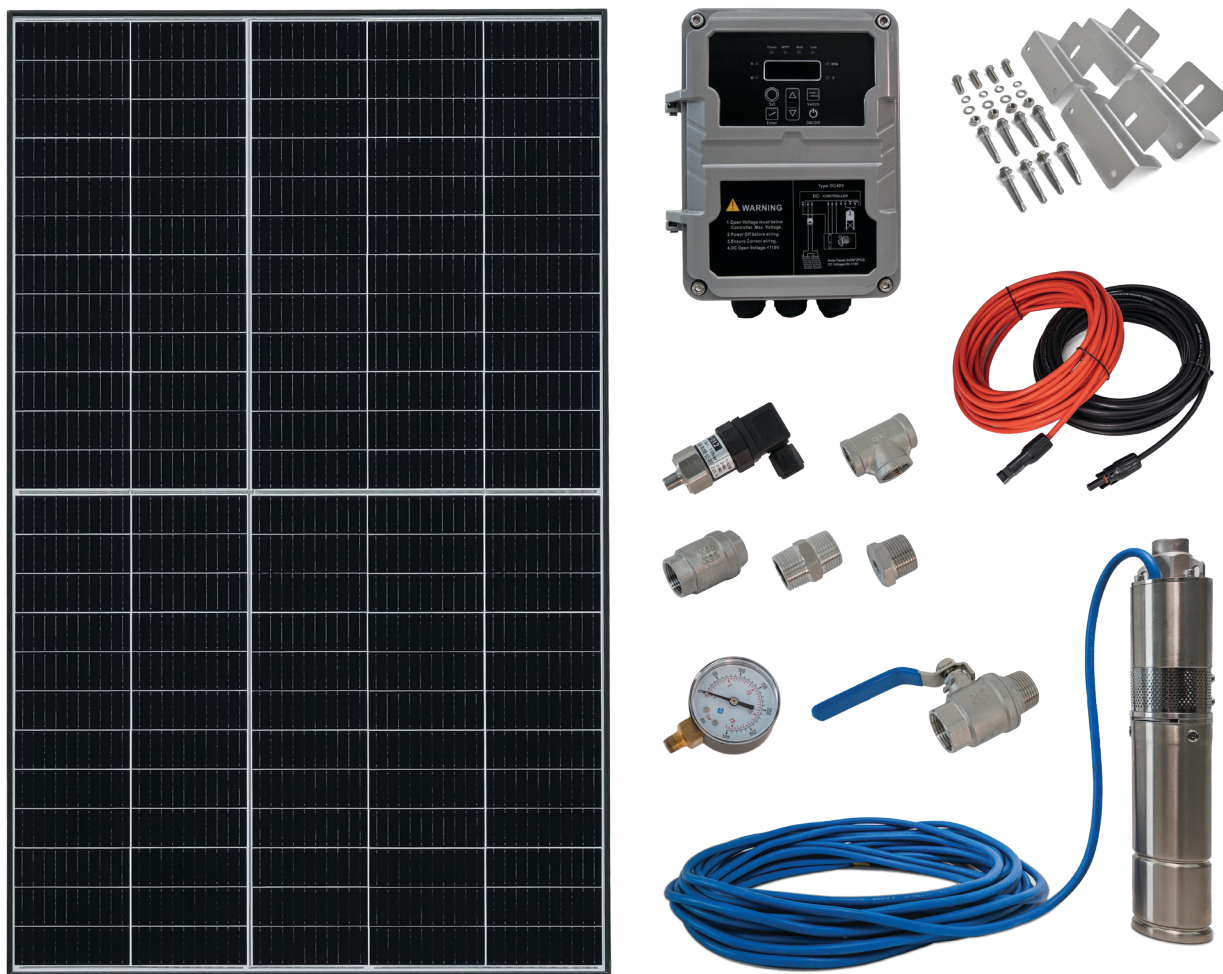
While this manual seeks to be as comprehensive as possible, some aspects are not covered due to the different requirements for each installation. We recommend consulting the applicable standards for all installations. These may include:

- AS/NZ 3000
- AS/NZ 4509
- AS/NZ 5033
- AS/NZ 5139

Contents

The Back Gully Kit	4
About This Manual	
Electrical Wiring	
Kit Contents	5-7
Required Tools	
Required Components	
Wiring Overviews	8-9
Tank to Tank Overview	
Dam to Tank Overview	
Pump Setup Tank to Tank	10
Installation Instructions Tank to Tank	11
Pump Setup Dam to Tank	17
Installation Instructions Dam to Tank	18
Solar Panel Wiring	20-25
Controller Wiring	26-30
Fittings Assembly	31-32
Pressure Switch Calibration	33-37
Additional Info	38
Contact Us	
Notes	

The Back Gully Kit



About This Manual

This manual is an installation guide for two of the most common use cases for this kit: pumping from a tank to a tank, and pumping from a dam/pond to a tank. Please take care to follow the instructions relevant to your use case. If neither of these are relevant to your use case, please contact us to discuss your installation if you are unsure.

Electrical Wiring

All wiring and voltages in this kit installation are well under the 120V DC standards for extra-low voltage (ELV). ELV is an electricity supply voltage in a range which carries a very low risk of electrical shock.

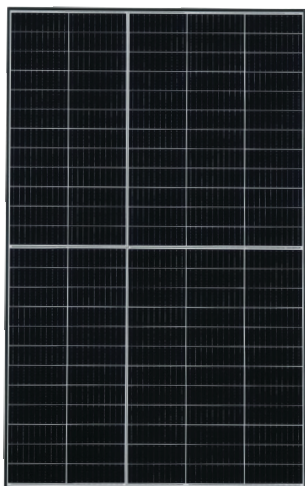


Installation of this kit does not require an electrician. However, we recommend seeking help if you are not confident in your ability at any stage.

We are always happy to help guide you through the install, troubleshoot, and answer any questions. You can contact us on **09 218 5533**, or **info@gridfree.store**.

We recommend reading these instructions in full prior to starting your install.

Kit Contents



2x PERC MONO Solar Panels



1x Water Pump Charge Controller



1x Submersible Water Pump with 20m Cable



1x Pair 6mm² Solar PV Cable 10m – Pre-Crimped MC4 (Red + Black)



2x Z-Bracket Solar Panel Mount



1x PV DC Isolator Switch



1x Pressure Switch



1x Pressure Gauge



1x Tap



2x T-Fitting



1x Check Valve



2x Male-Male Fitting



2x Thread Adapter

Required Tools



Screwdrivers



Drill



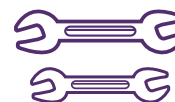
Large Spanner/Crescent



Pipe Cutters



Screws and Bolts



Spanner Set

Required Components + Design

Piping:

This kit requires that you provide and run your own piping. You will require a section between the pump and our fittings, and from these fittings up to your storage tank. All of our fittings are $\frac{3}{4}$ " female BSP thread. You will need to source at least 3 fittings that will convert from this to your pipe.



WARNING – Piping must be rated for higher than your max operating pressure to reduce the risk of leaks/burst pipe in the future. Piping should also be an appropriate diameter for the distance you are pumping (small pipe diameters over long distances will greatly reduce the amount of pumped water).

Water Tank(s):

If you are pumping to a tank, you will need a shut off valve (ballcock or leveller valve) installed in this tank to close when the tank is full. These kits include a pressure switch and gauge to allow the pump to turn off when this valve closes.

Solar Panel Mounting:

This kit comes with Z-bracket mounting sets by default. These allow you to screw each panel to a frame. This frame could be in many places such as on a roof or in a paddock. Wherever this is mounted there are several requirements:

Ensure proper panel tilt: this is usually around 30-40 degrees (to flat ground) but usually gets steeper the further south you are.

Ensure no obstructions or shadows: Any shadows will greatly reduce solar generation thus greatly reducing the pumping capacity below expected amounts. Take note of how the shadows move throughout the day, so your panels will not be in their path, and mount your panels high enough so that grass and other plants will not cast shadows on the panels.

Dam/Reservoir Mounting:

If you're mounting in a dam you will require a float to mount the pump to.

You will also require cable or rope to fix the pump to the bank in one or more places. This rope/cable should be used to pull the pump to shore rather than the power cable, as this could damage the pump. Using the power cable will potentially damage the pump.

It is also recommended to suspend the pump away from any mud, weeds, or other debris that may clog the pump. If this is unavoidable, please use something appropriate to filter the intake, preventing solids from entering the pump.

Holding Tank Mounting:

If you are mounting the pump in a holding tank, you will also require rope/cable to suspend the pump and as a means of pulling it up for maintenance. Please ensure whatever materials you use are drinking water safe if this is the purpose of your installation.

Have questions? Get in touch:



(09) 218 5533

info@gridfree.store

www.gridfree.store

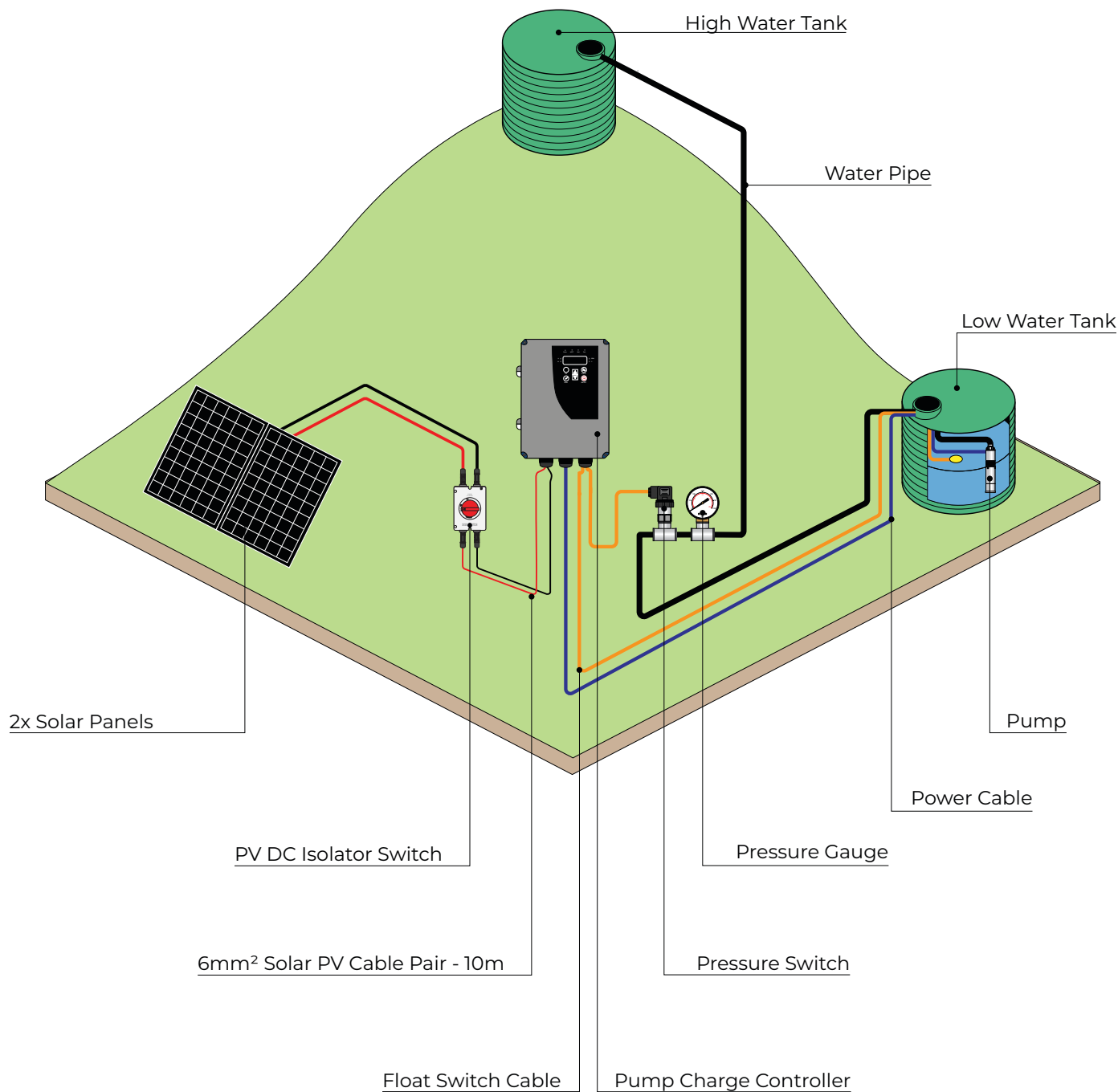


C4/27 Smales Road,
East Tāmaki, Auckland, 2013

Mon-Fri, 9am-5pm (by appointment)

GRIDFREE

Wiring Overviews

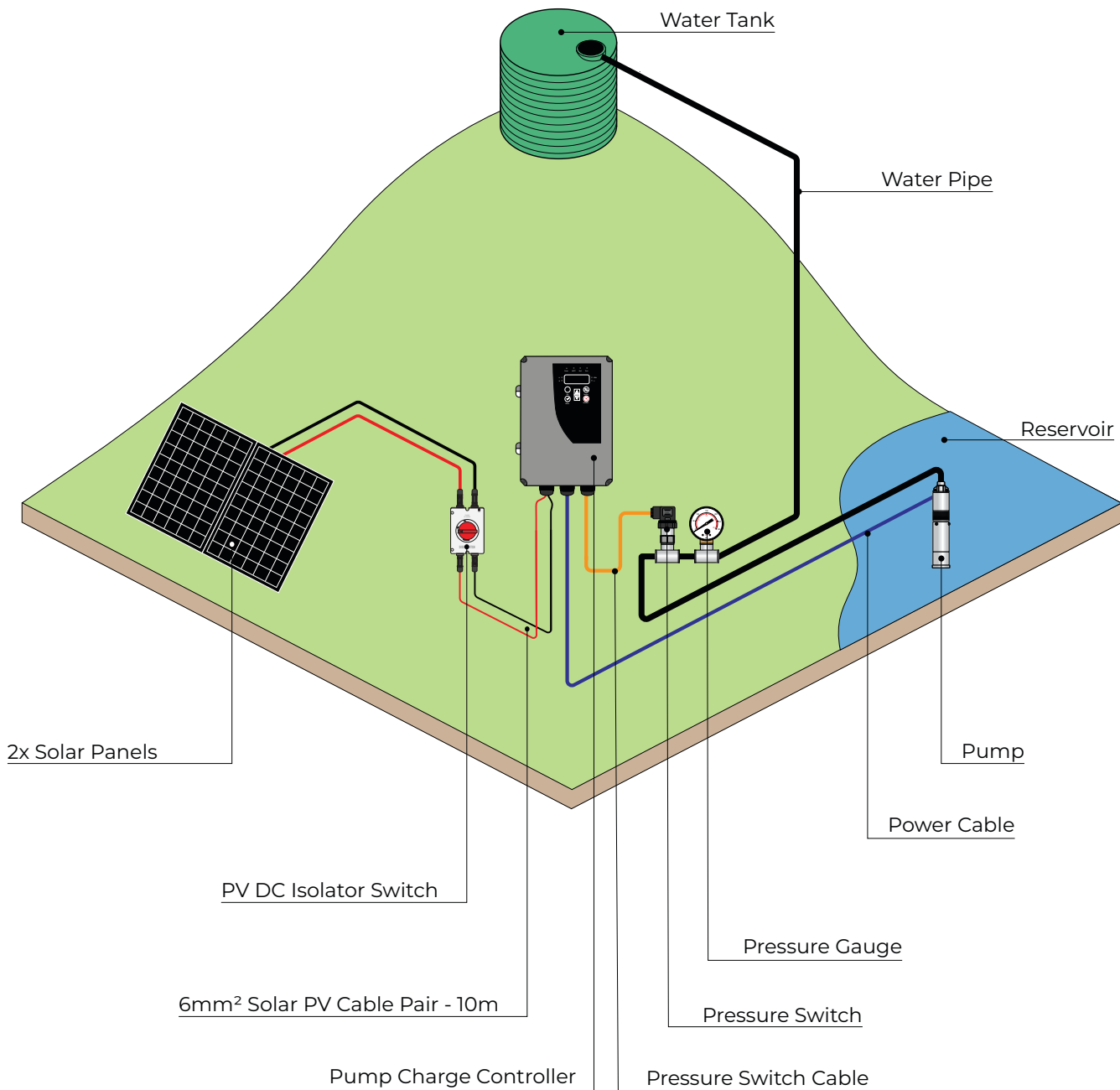


Application #1: Tank to Tank:

This is an overview for the tank-to-tank pumping application. The lower tank acts as a holding tank and the upper tank is the header tank that supplies the water to your application (e.g. to your house, troughs, garden etc...). Typically via gravity feed.



To set this up safely you will require the float switch add-on to ensure that the pump turns off before the holding tank is empty.

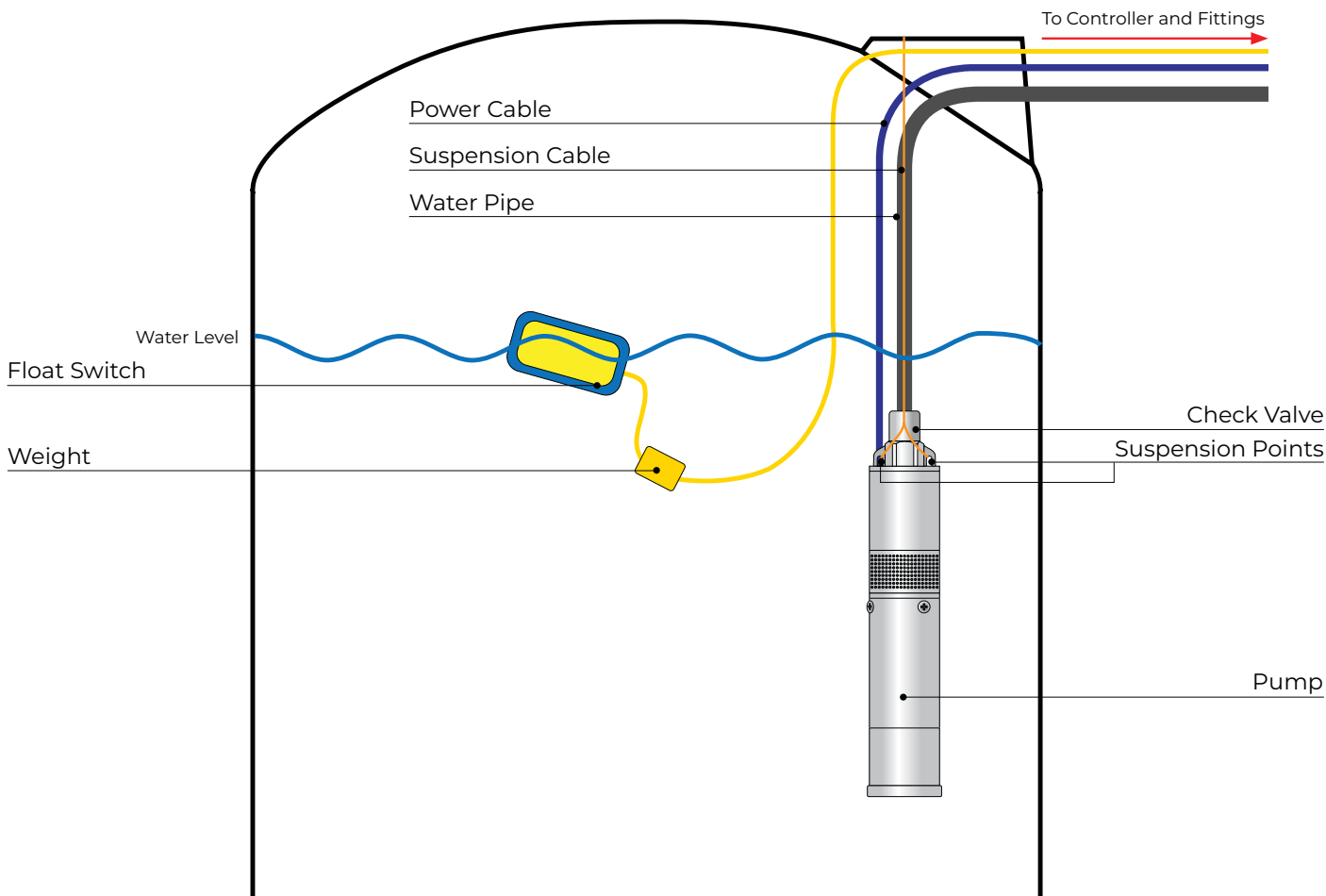


Application #2: Dam to Tank:

This is an overview of the dam-to-tank pumping application. This is when the pump is set up in the dam or reservoir to pump to a header tank.

The float switch add-on is optional for this installation (usually depending on the size of your reservoir).

Pump Setup | Tank to Tank



Application #1: Tank to Tank Overview

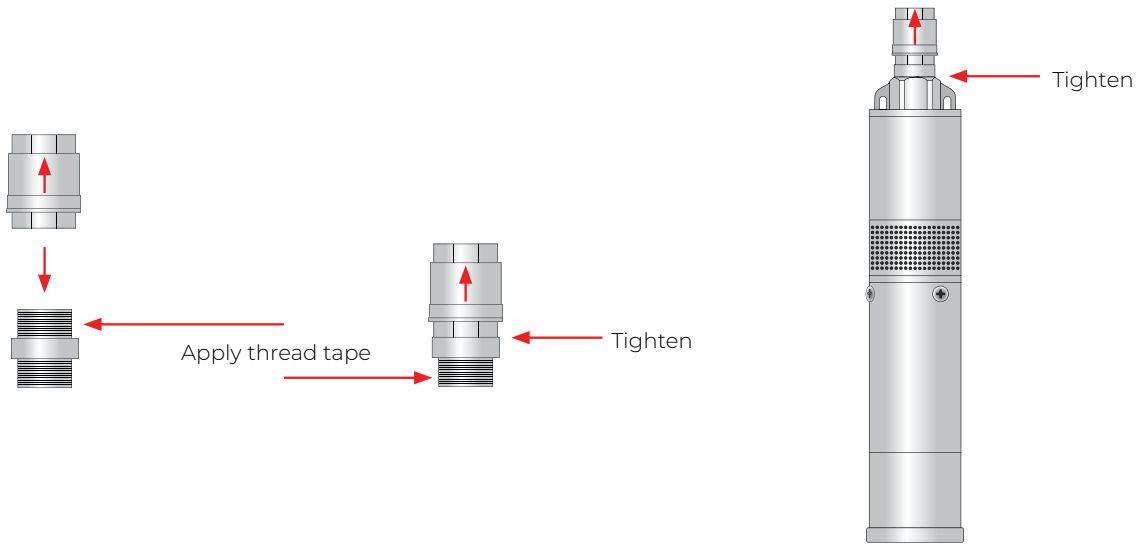
For the tank set up you will be mounting the pump directly in the tank. It must be suspended off the bottom with a cable/rope that is safe for drinking water, attaching to the suspension points in the diagram above.

The pump power cable, the float switch cable and the piping must be run through the tank wall (before connection to the controller). Usually, it is best to use a gland and waterproofing for these to make sure they stay in place.

The float switch shown in the diagram is to prevent dry running. Please follow the instructions at the end of this manual to test its operation.

If you're looking for the Dam to Tank section please skip to PAGE 17.

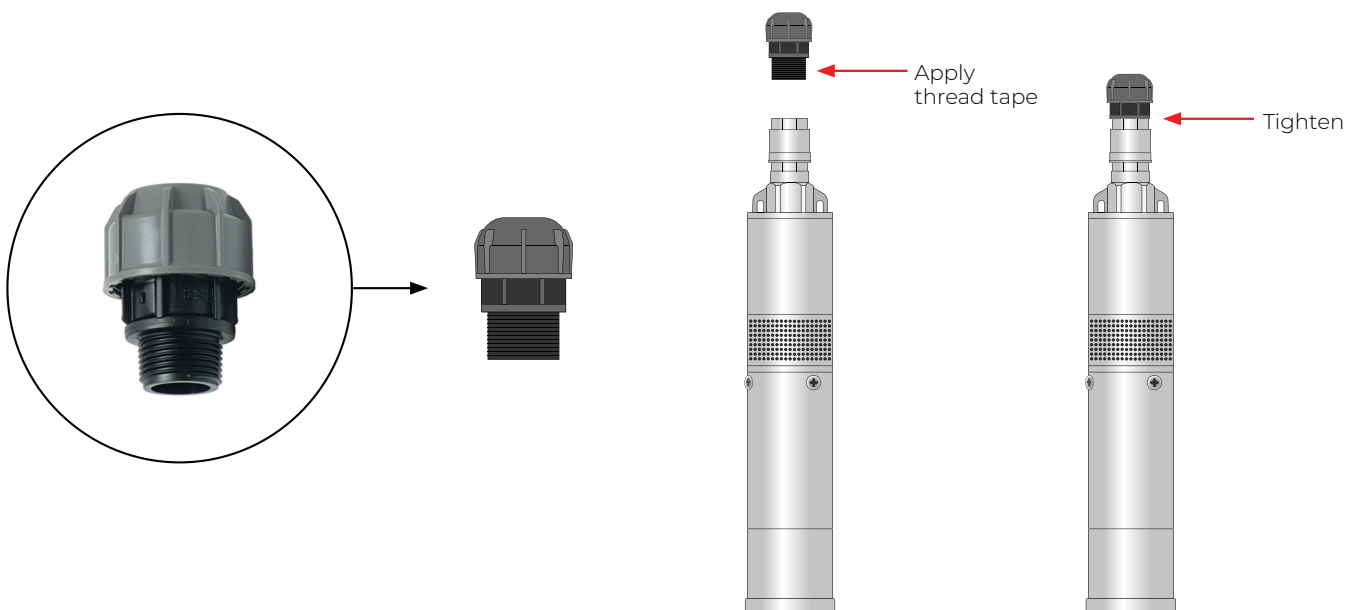
Installation Instructions | Tank to Tank



Step 1)

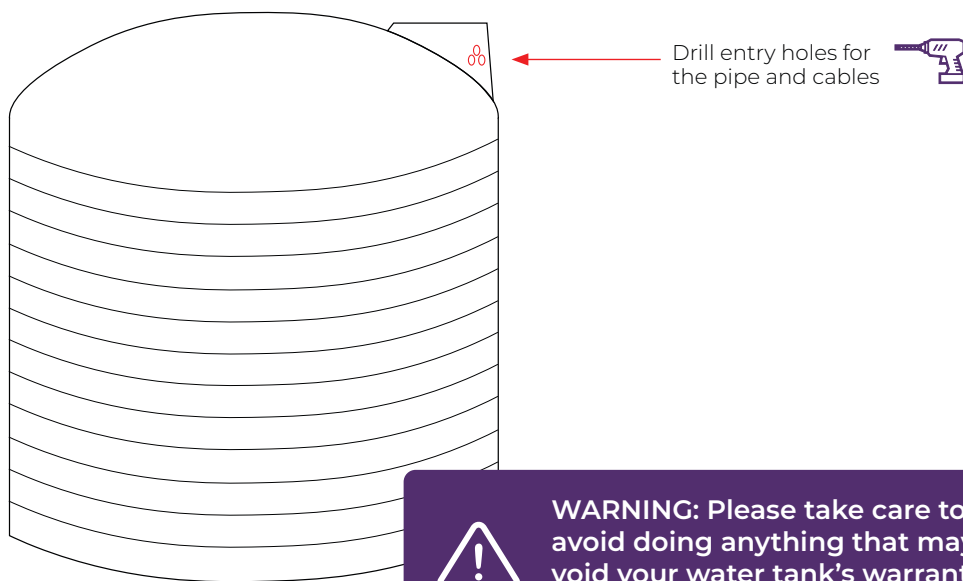
Install check valve on pump using thread tape to make a good seal. Thread tape should be wrapped in the opposite direction to the direction that you would turn the check valve to tighten it. This ensures the tape does not bunch up when tightened.

NOTE! Make sure this is in correct direction otherwise the pump will not work. The correct direction is marked by an arrow, this should be the same as the flow of water (away from the pump).



Step 2)

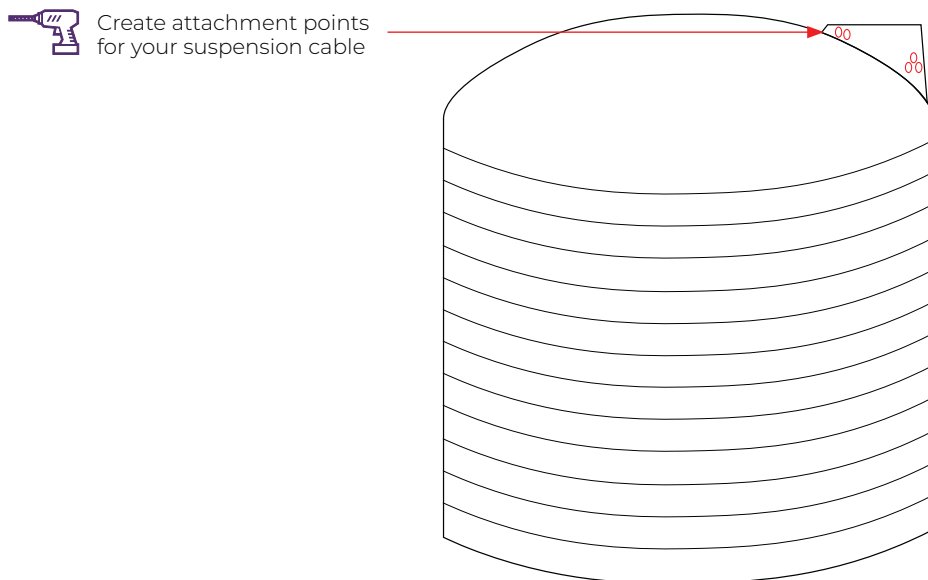
Attach your pipe fitting to the check valve but do not attach the pipe yet.



WARNING: Please take care to avoid doing anything that may void your water tank's warranty or compromise your drinking water.

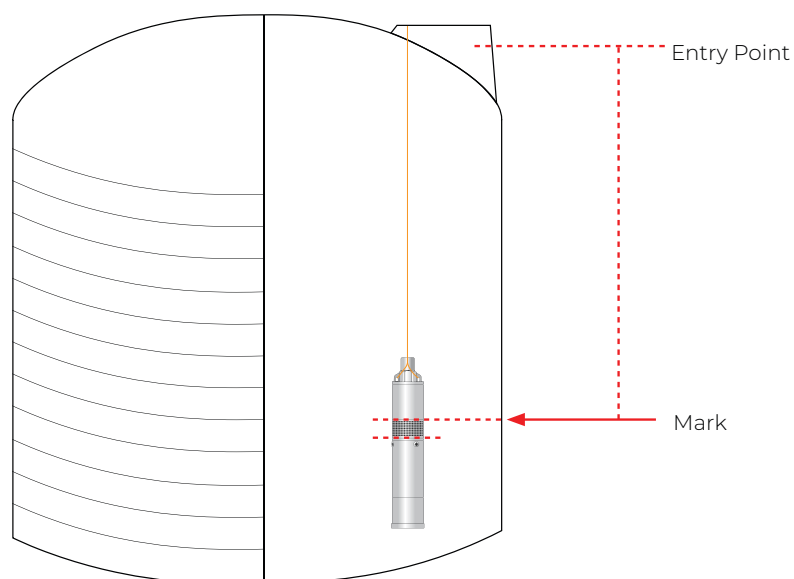
Step 3)

Make the entry holes for the pipe and the cables in an appropriate place at the top of your tank (if your tank is concrete you may need to do this differently. Please avoid anything that will void your tank warranty or will affect the quality of your water). For the cables, it is best to use something to keep them in place such a cable gland.



Step 4)

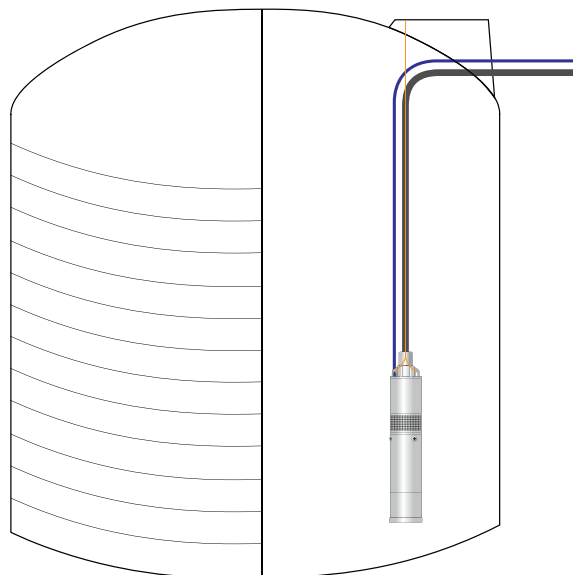
Create attachment points for your suspension cable/rope that are directly above where the pump will hang. This will be what you use to lift and lower the pump rather than the power cables and pipe.



Step 5)

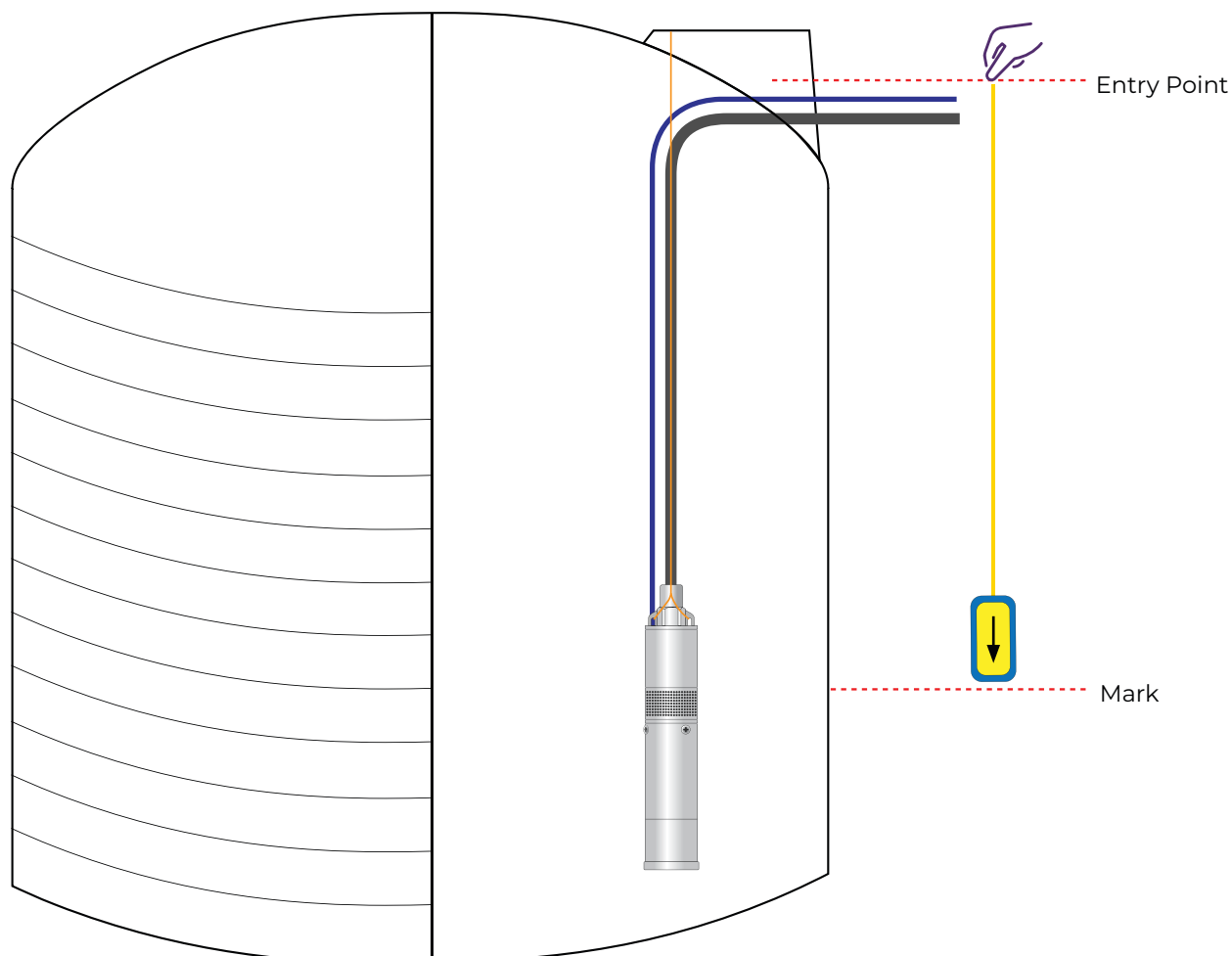
Use your cable/rope to attach the pump to the water tank. Make sure the pump hangs off the bottom but close to it, to make sure you can use most of the water in the tank.

Please note/measure the length from a reference point at the top of the tank to the intake of the pump so you can **mark the intake level on the outside of the tank.**



Step 6)

Run the pump power cable and pipe through the corresponding holes you have made in the tank and attach the pipe to your pipe fitting on the pump.



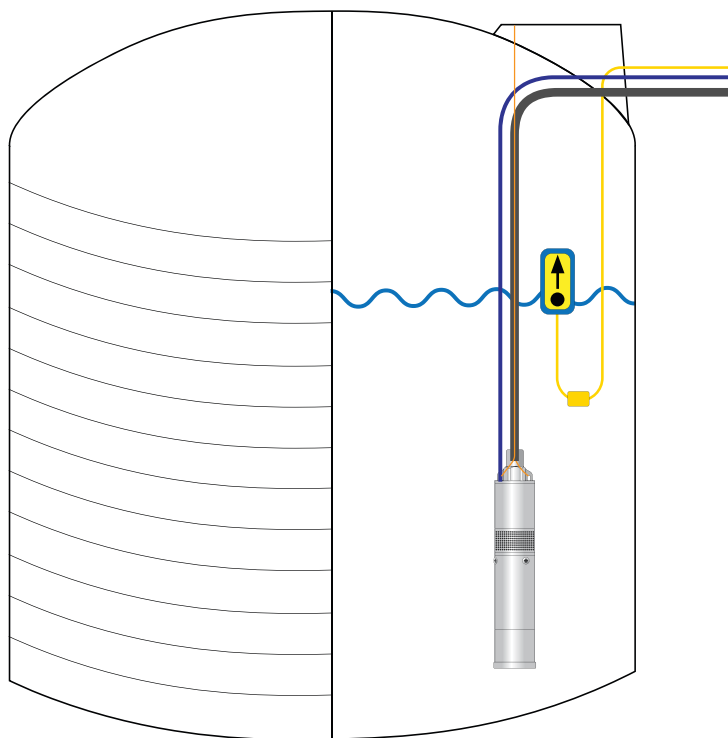
Step 7)

Install your float switch in the tank. The purpose of this is to prevent the pump from dry running. To ensure this works correctly you need to make sure the float switch is hanging with the end pointing at the ground before the pump inlet is exposed to air.

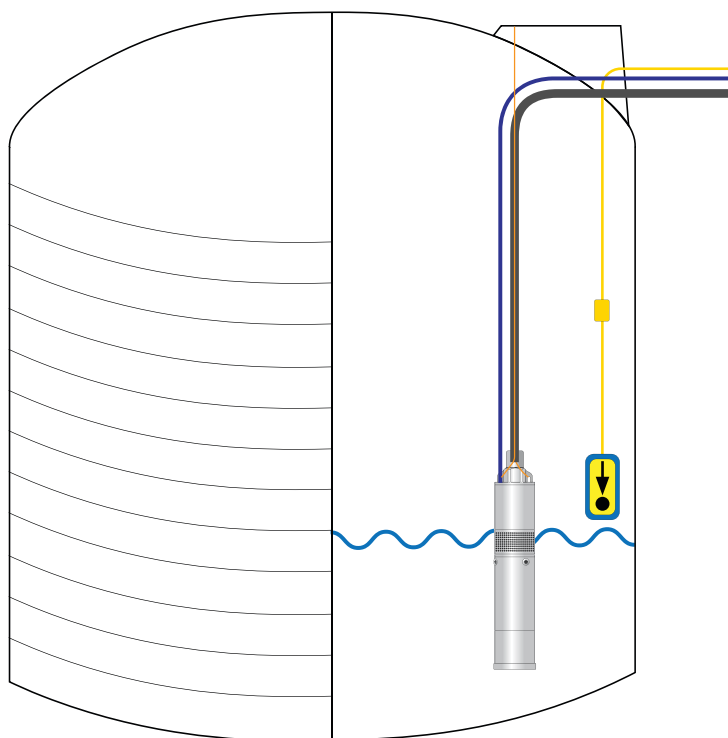
An easy way to do this is to hold the float switch cable at the level where it enters the tank and make sure that the float is above the mark you made earlier for the pump inlet. You can use this to determine an appropriate length for the float height switch cable.

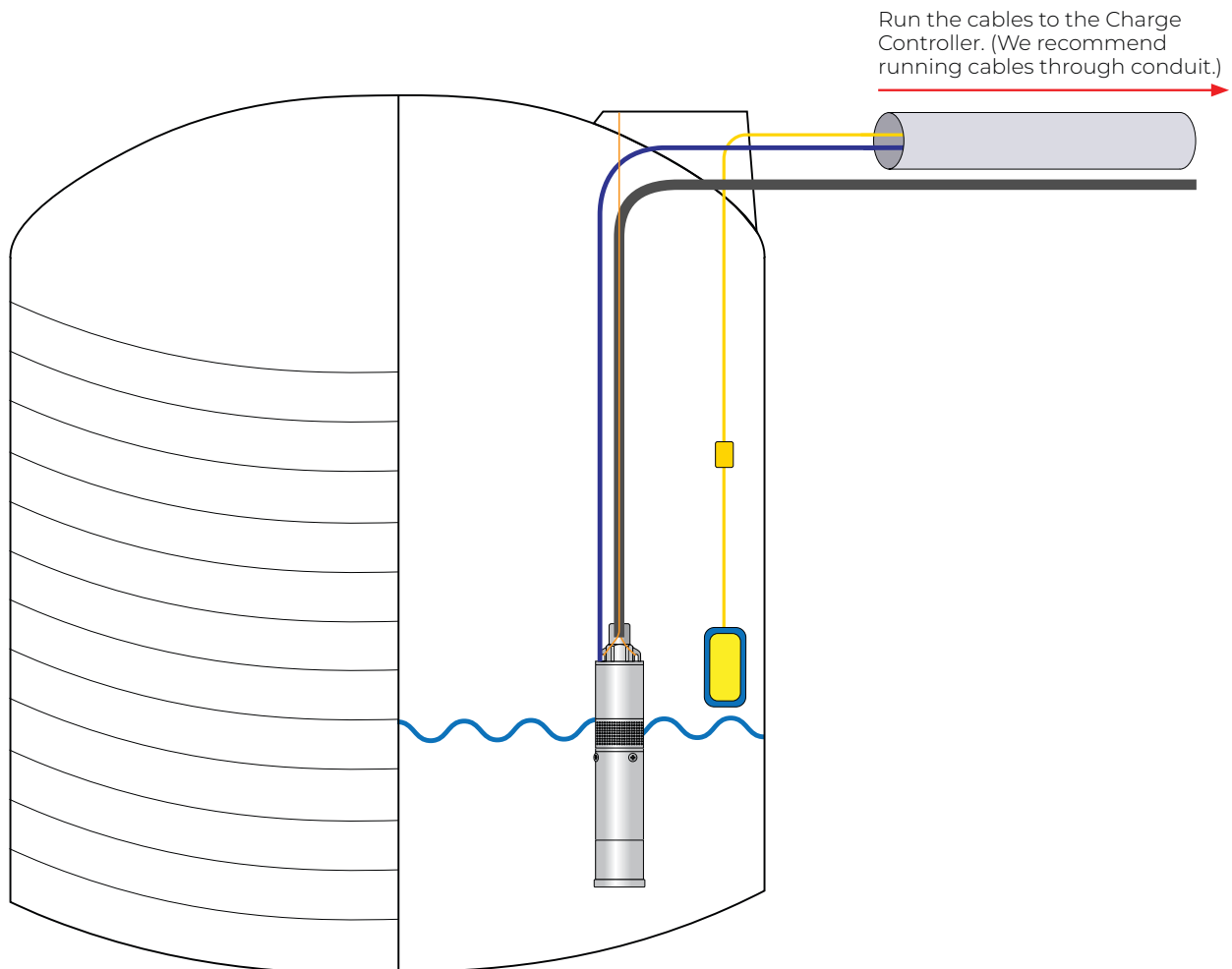
Please add the weight provided with the float switch to the float switch cable. Add this near the float itself to ensure that the float sits vertical on the water when in the ON configuration (see next page).

Pump On:



Pump Off:





Step 8)

Run the power cable, float switch cable and pipe to the area where you are installing the charge controller and pressure switch.

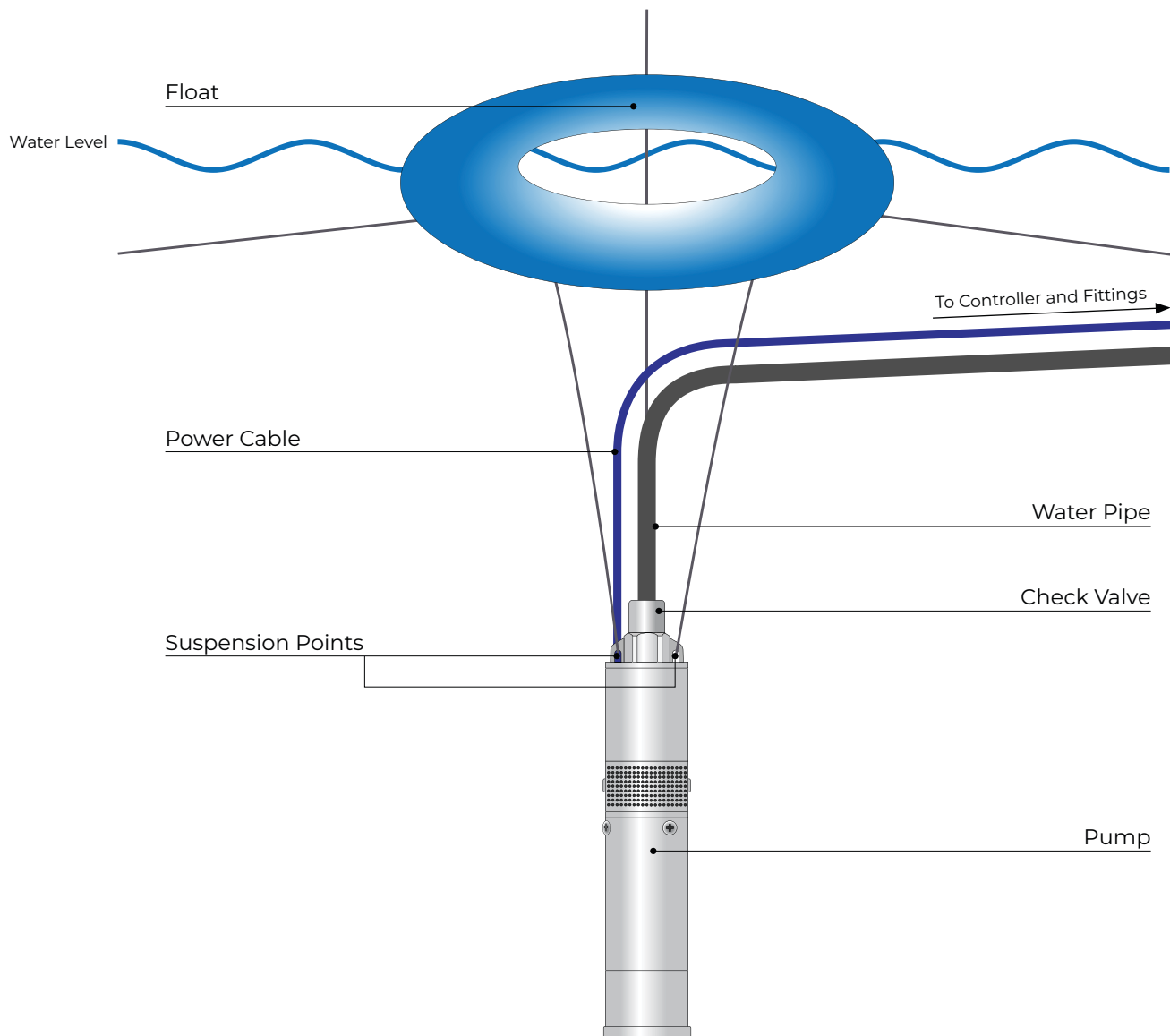
Note: It is recommended to run all cables through conduit to protect from environmental damage (such as UV) and pests.

END OF TANK-TANK SECTION. PROCEED TO PANEL WIRING, PAGE 21.

Pump Setup | Dam to Tank

Application #2: Dam to Tank Overview

(If you are installing the pump in a tank please go to page 10)

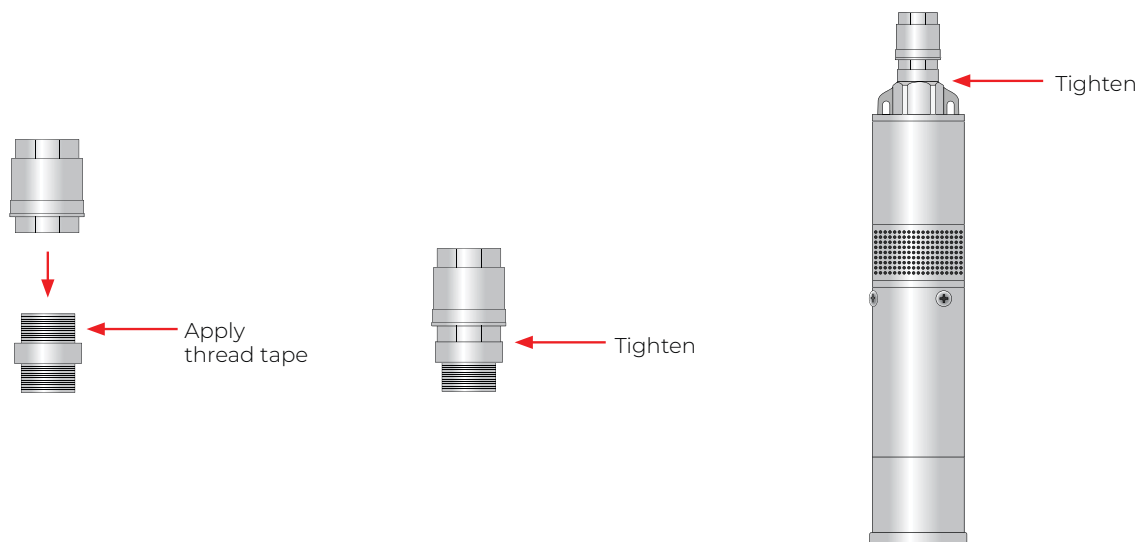


For the Dam-to-tank installation of the pump, you will be suspending the pump off the bottom using cable/rope and a float. Please ensure the pump's intake is at least 0.3m below the surface.

You will also need to attach a cable/rope to the suspension points that anchors the pump to the shore. This allows you to pull the pump in safely without using the power cable or pipe (using the power cable or pipe may cause damage to the cable and pull the pipe loose).

For dams and reservoirs, it is recommended to use something to filter any solids out, preventing them from entering the pump.

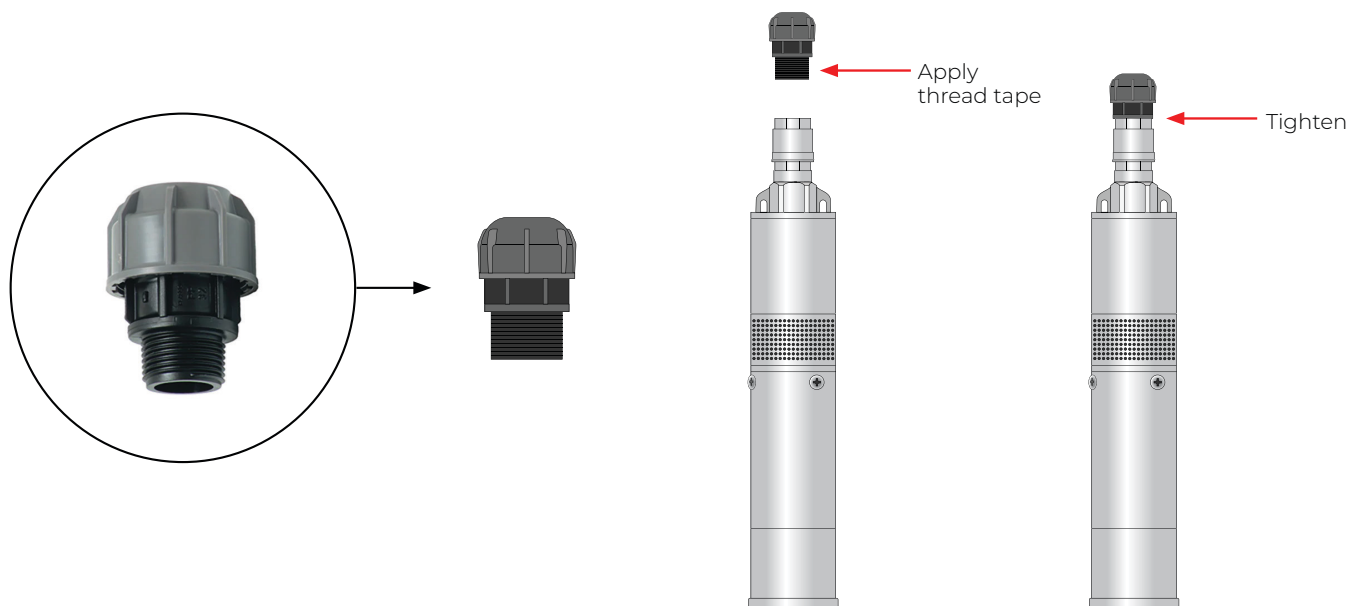
Installation Instructions | Dam to Tank



Step 1)

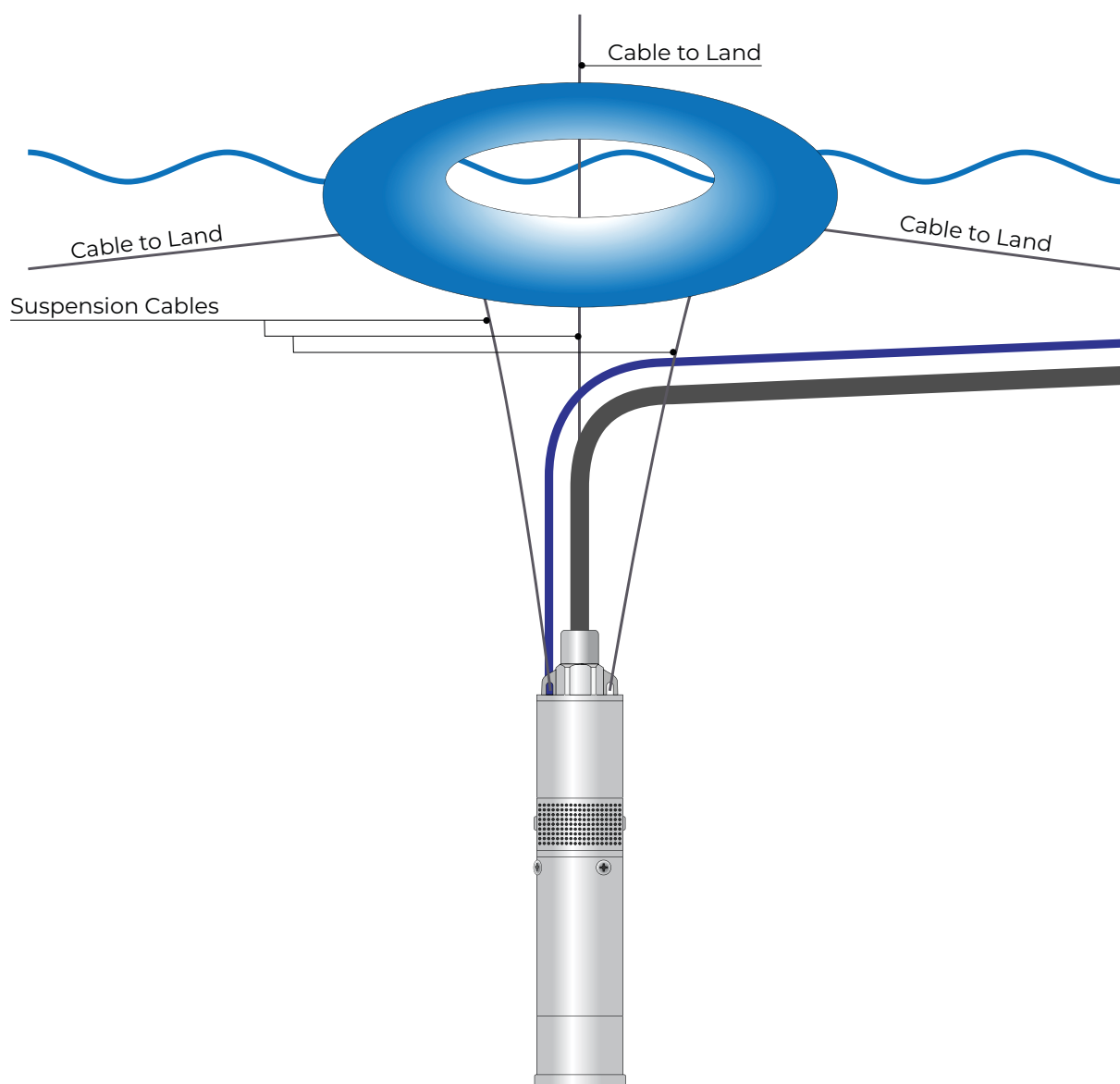
Install check valve on pump using the provided thread tape to make a good seal. Thread tape should be wrapped in the opposite direction to the direction that you would turn the check valve to tighten it. This ensures the tape does not bunch up when tightened.

NOTE! Make sure this is in correct direction otherwise the pump will not work. The correct direction is marked by an arrow, on the check valve this should be the same as the flow of water (away from the pump).



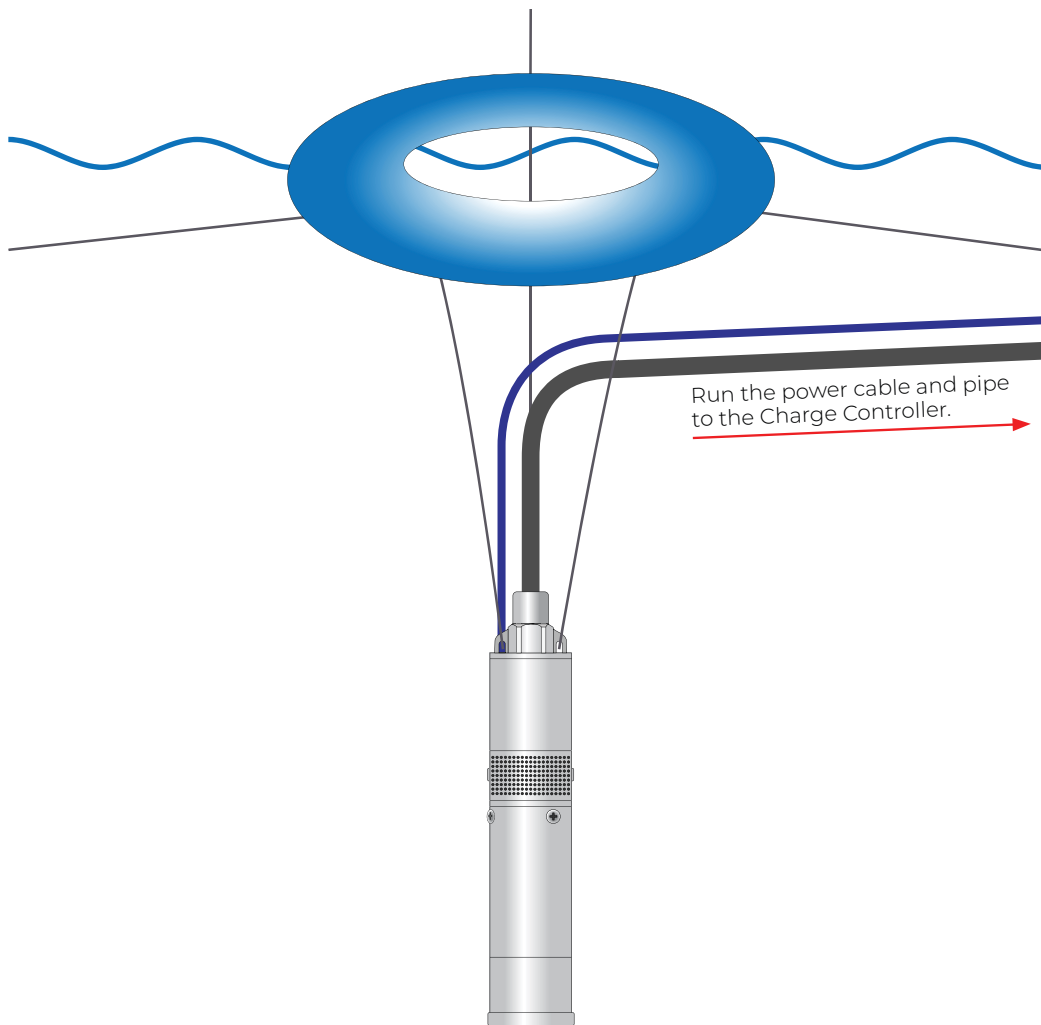
Step 2)

Attach your pipe fitting to the check valve but do not attach the pipe yet.



Step 3)

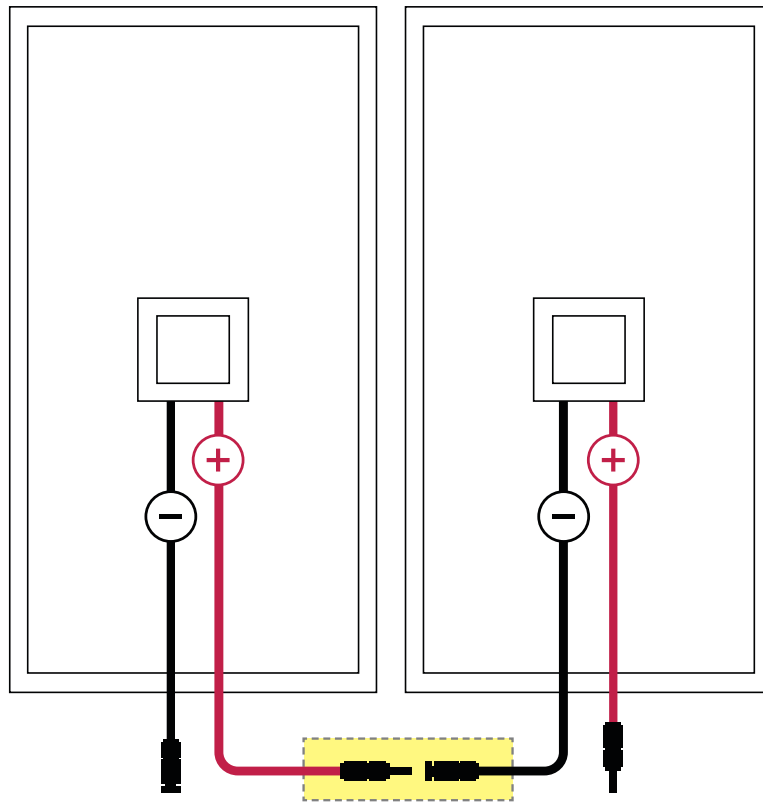
Attach your pump to your float, making sure the pump will be suspended off the bottom but adequately submerged. It is also recommended to attach a cable/rope to the float or the pump that you can reach from shore. This is what you should use to pull the pump in with rather than the power cable (this will damage the pump).



Step 4)

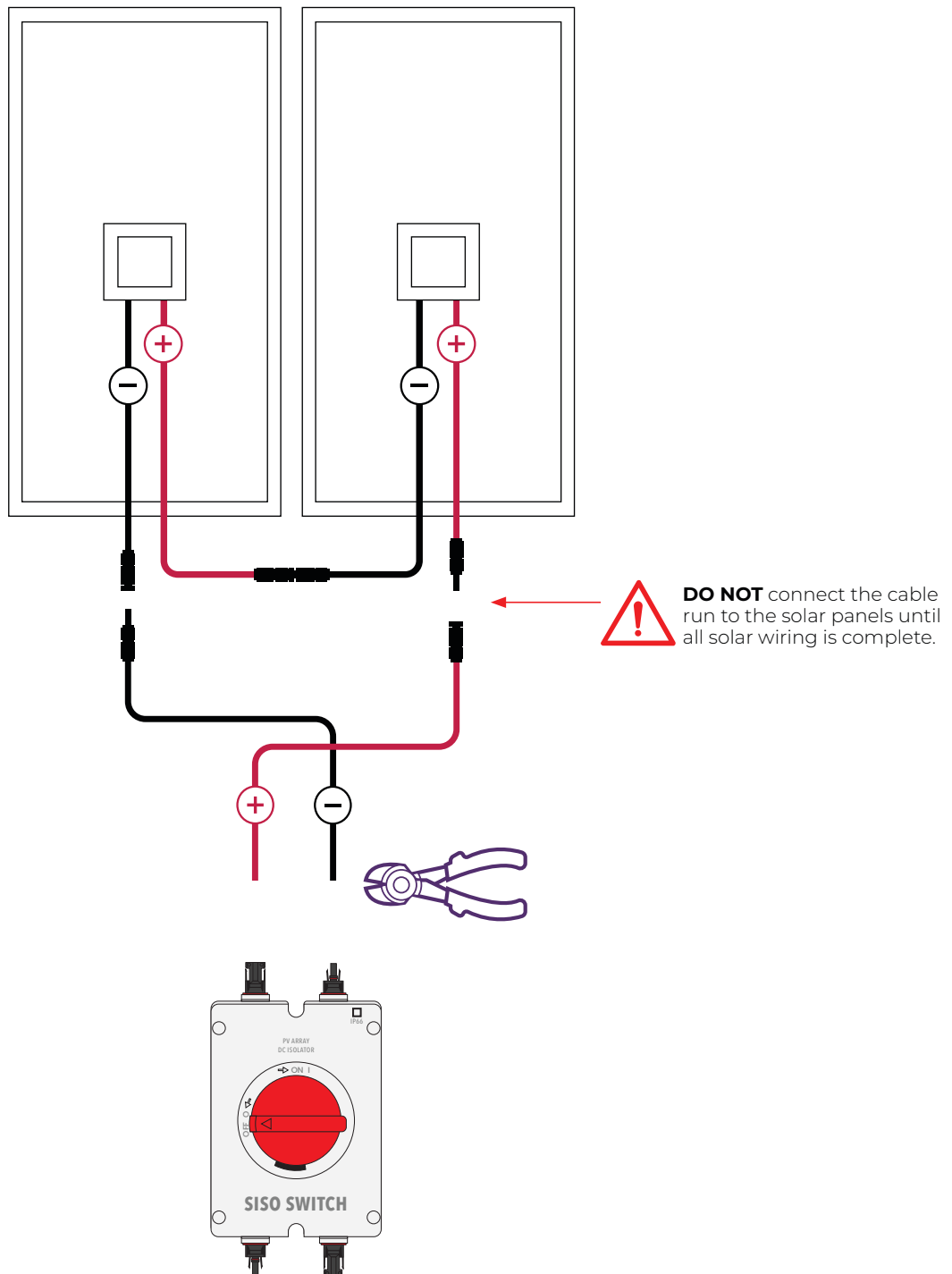
Run the power cable and pipe to the area where you are installing the charge controller and pressure switch.

Note: It is recommended to run all cables through conduit to protect from environmental damage (such as UV) and pests.



Step 1)

Wire the panels together by connecting the positive terminal of one panel to the negative terminal of another. This creates two solar array outputs: one positive (+), one negative (-).



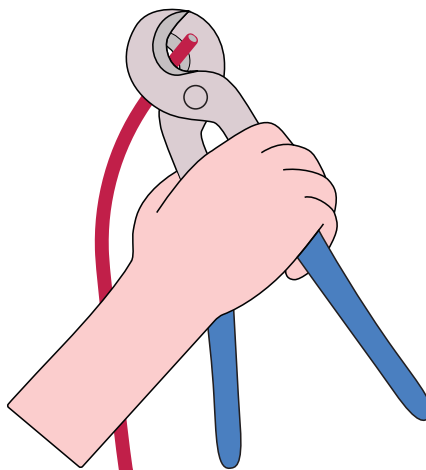
Run the 6mm² Solar Cables from the solar panels to the DC isolator, and cut it to length. Make sure you have enough to go from the isolator switch to the controller. (We recommend to run all cable through conduit.)



DO NOT connect the cable run to the solar panels as the cables will become live. Wait until all solar wiring is complete.

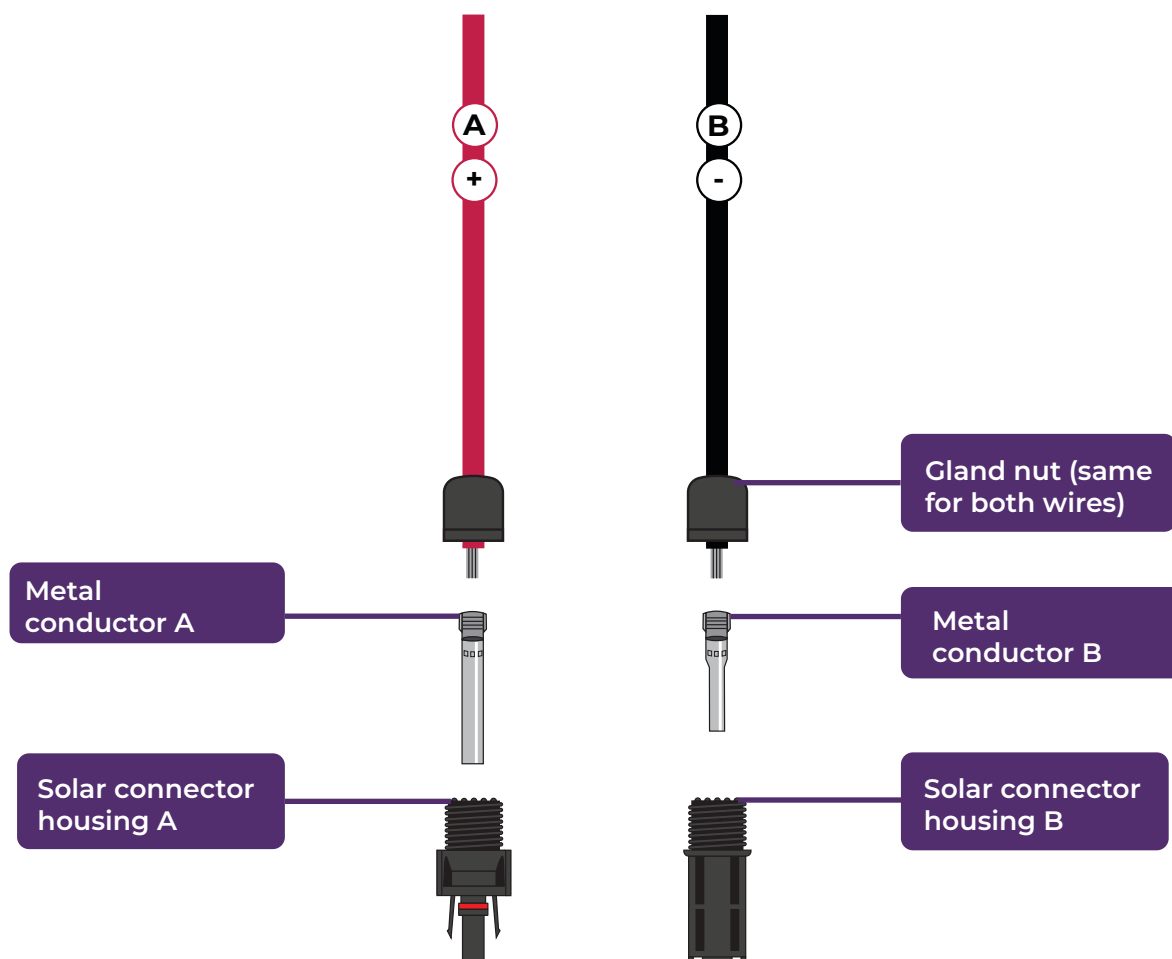


Scan the QR code to watch a demonstration video



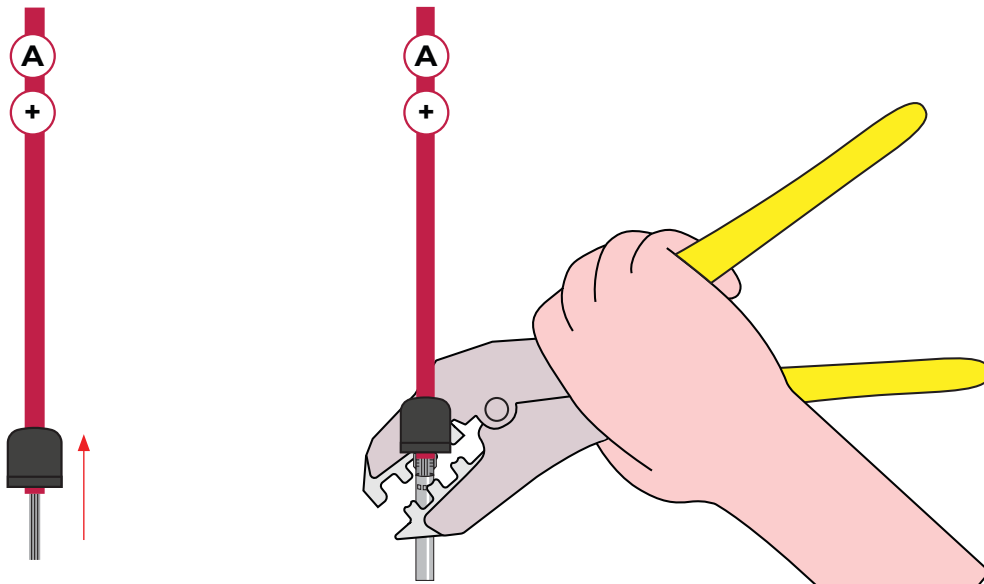
Step 2)

Use wire strippers to strip the ends off the black and red 6mm² solar cables. Strip the cables to approximately 7mm in length.



Step 3)

Ensure you use the correct metal crimp conductor, with the correct housing. Above demonstrates how each wire connects to its solar connector. The positive wire uses “Metal conductor A” and “Solar connector housing A”, and the negative wire uses “Metal conductor B” and “Solar connector housing B”.

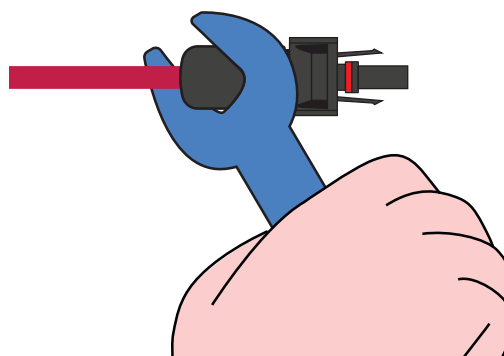


Step 4)

Starting with the red solar cable, place the silicon gland and gland nut onto the cable. Crimp “Metal Conductor A” onto the cable using the 6mm² crimping die.

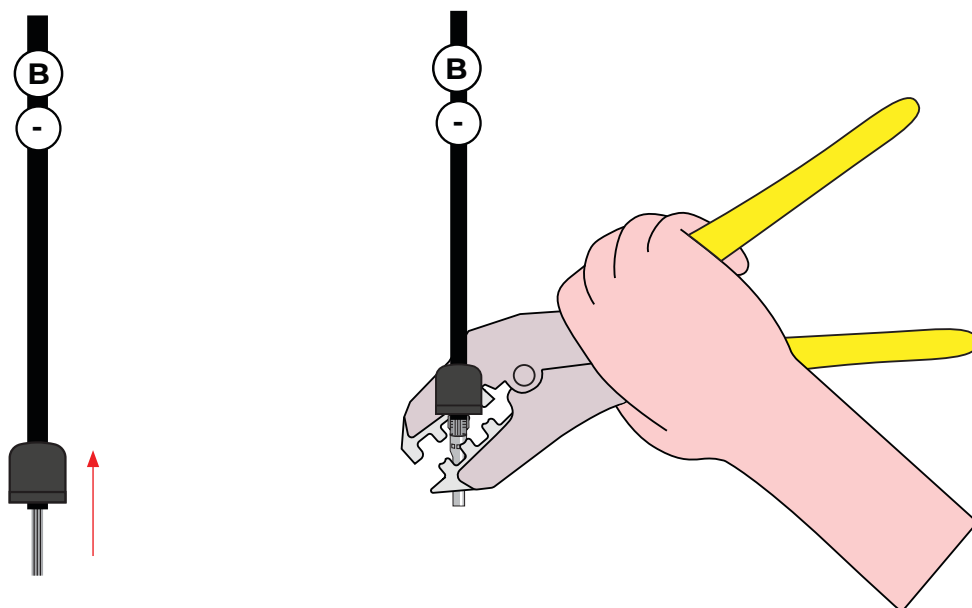


Pay extra attention to use the correct metal conductor, with the correct housing



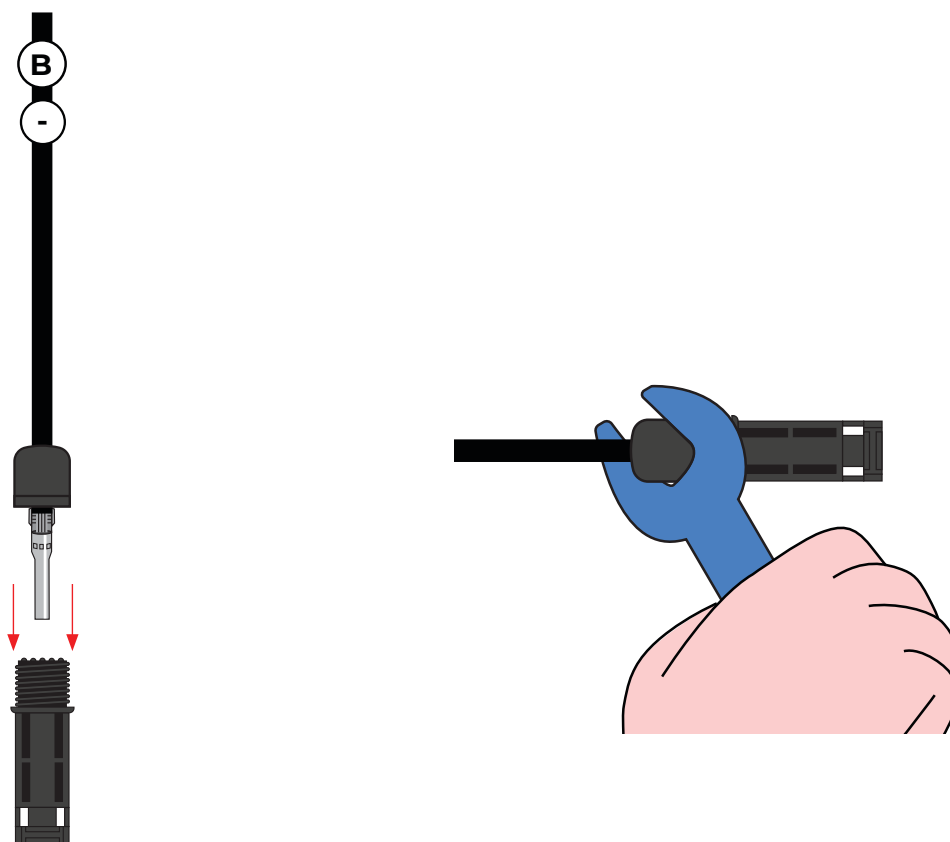
Step 5)

Insert the crimped “Metal conductor A” into the “Solar connector housing A” until it **clicks**, then tighten the gland nut using a spanner.



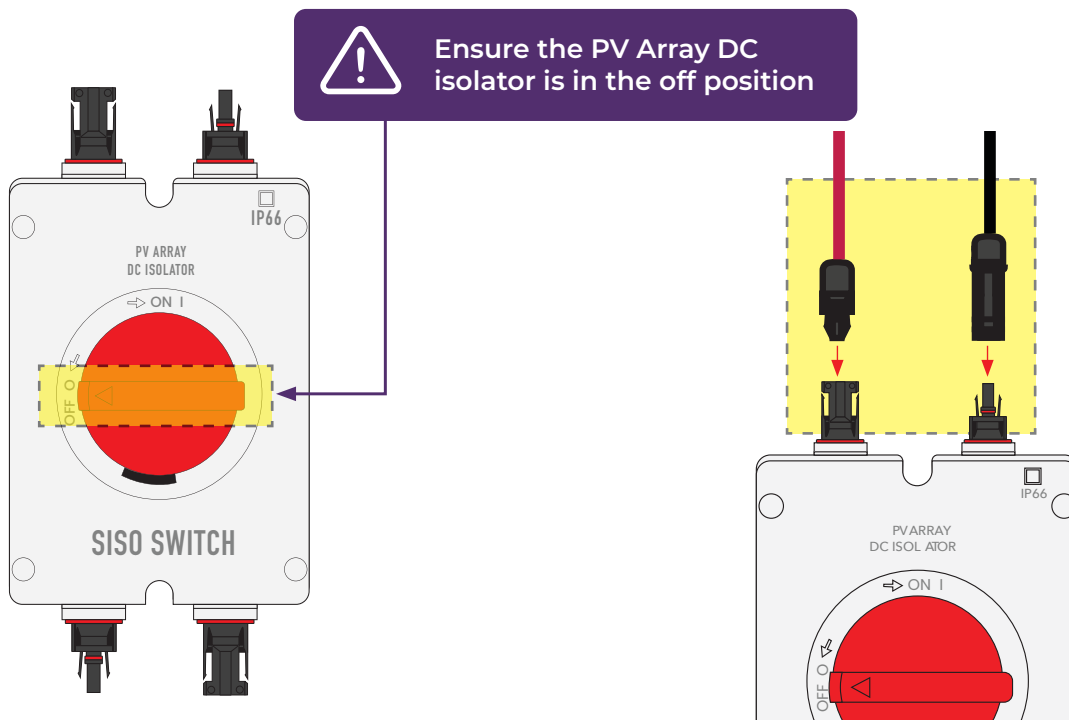
Step 6)

Move onto the black solar cable. Place the silicon gland and gland nut on to the cable. Crimp “Metal conductor B” onto the cable using the 6mm² crimping die.



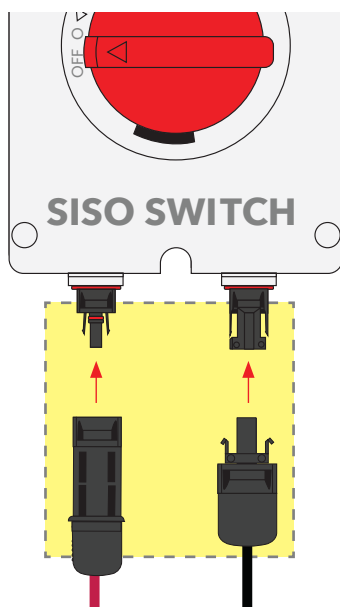
Step 7)

Insert the crimped “Metal conductor B” into the “Solar connector housing B” until it clicks, then tighten the gland nut using a spanner.



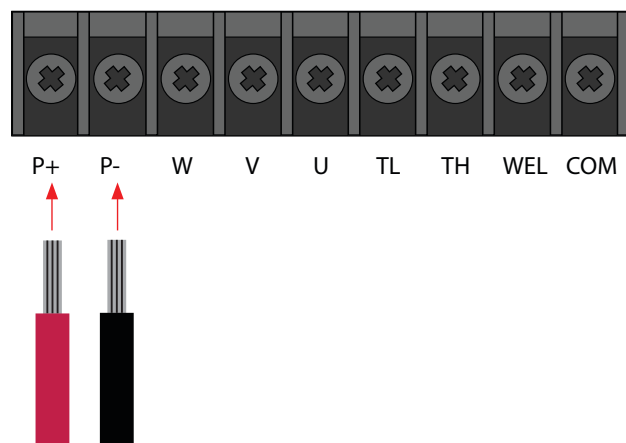
Step 8)

Ensure the PV Array DC isolator is in the off position. Then, connect the PV cable run from the solar panels. **Ensure the other end of the cables stay disconnected from the solar panels.**



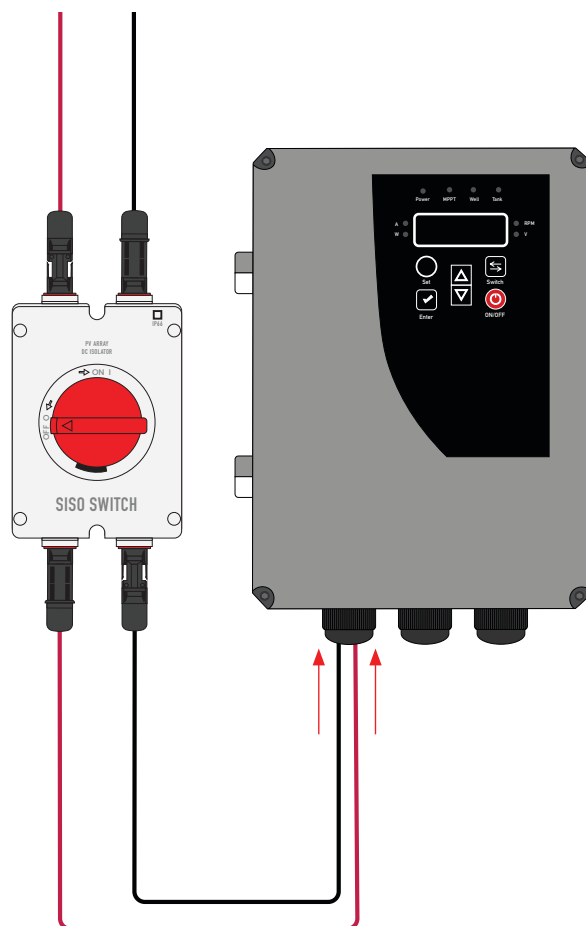
Step 9)

Repeat the same process to crimp the MC4 connectors to the remaining cable lengths of solar cable and connect them to the Switch as above.



Step 10)

Thread the other end of the cable through the cable gland and attach to the screw terminal so that it makes good contact.

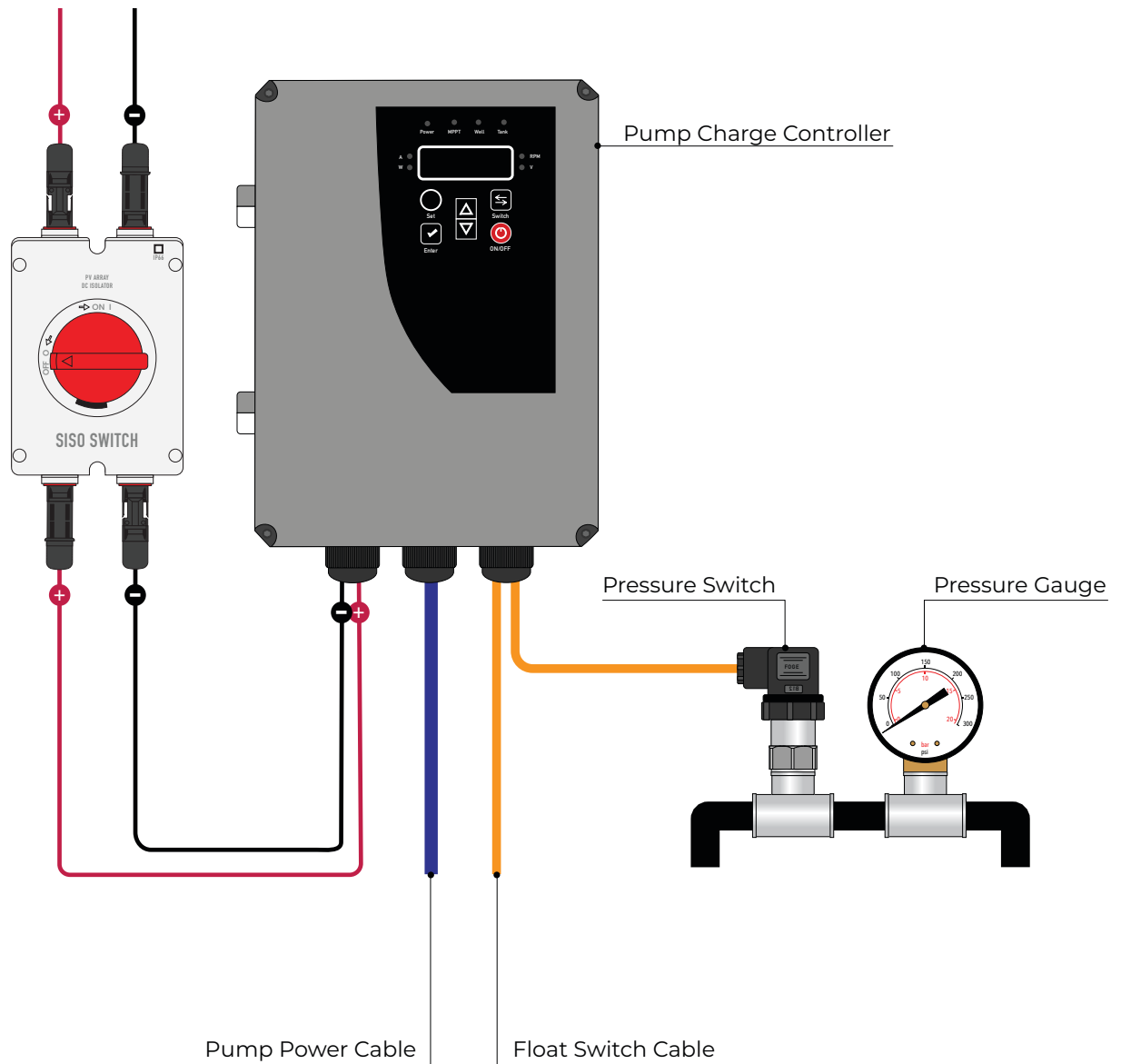


Step 11)

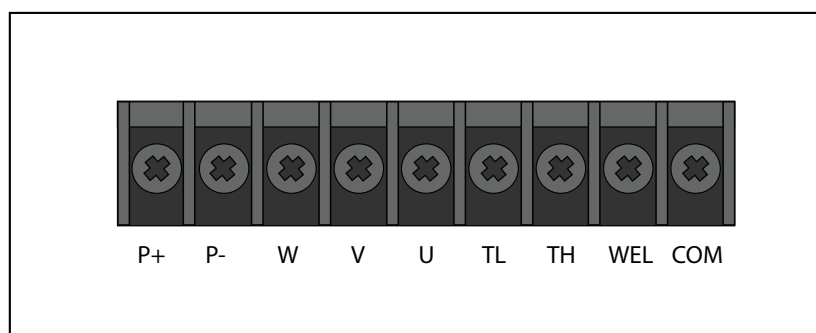
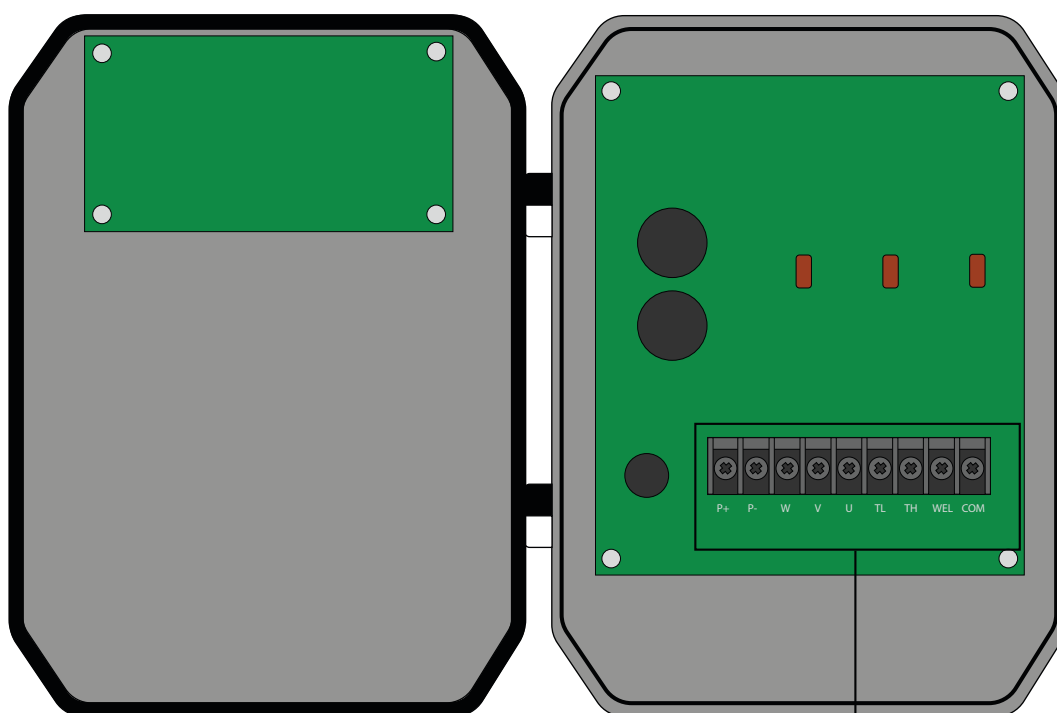
The SISO switch should now be connected to the controller as above. Please ensure that the colours match, red-red and black-black. Red is positive black is negative as per the diagram.

Once you are at this stage you may connect the solar panels. Please ensure the SISO switch remains off for now.

Controller Wiring



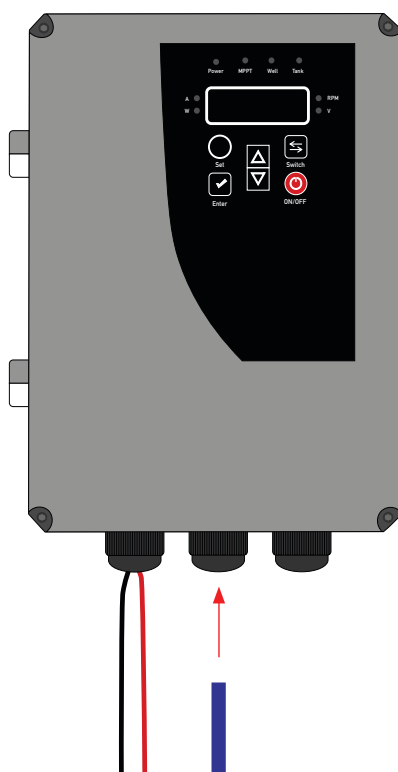
In this section you will be wiring the panels, pump, and sensors into your controller. Usually, it is best to mount the controller first so that you can run each cable to it and cut to length.



Step 1)

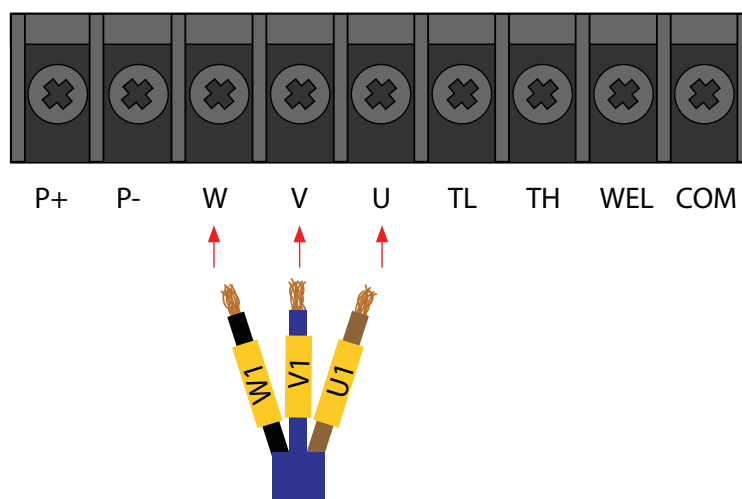
Ensure all of your cables are run to the controller. These should include: the pump power cable (3 wires), the Pressure sensor (2 wires) and optionally the float switch (2 wires).

Once all are routed to the controller and the controller is mounted, open the controller by undoing bolts on all four corners, using the allen key provided. You should see the above labelled terminals:



Step 2)

Undo the middle gland shown above and thread the pump power cable through.

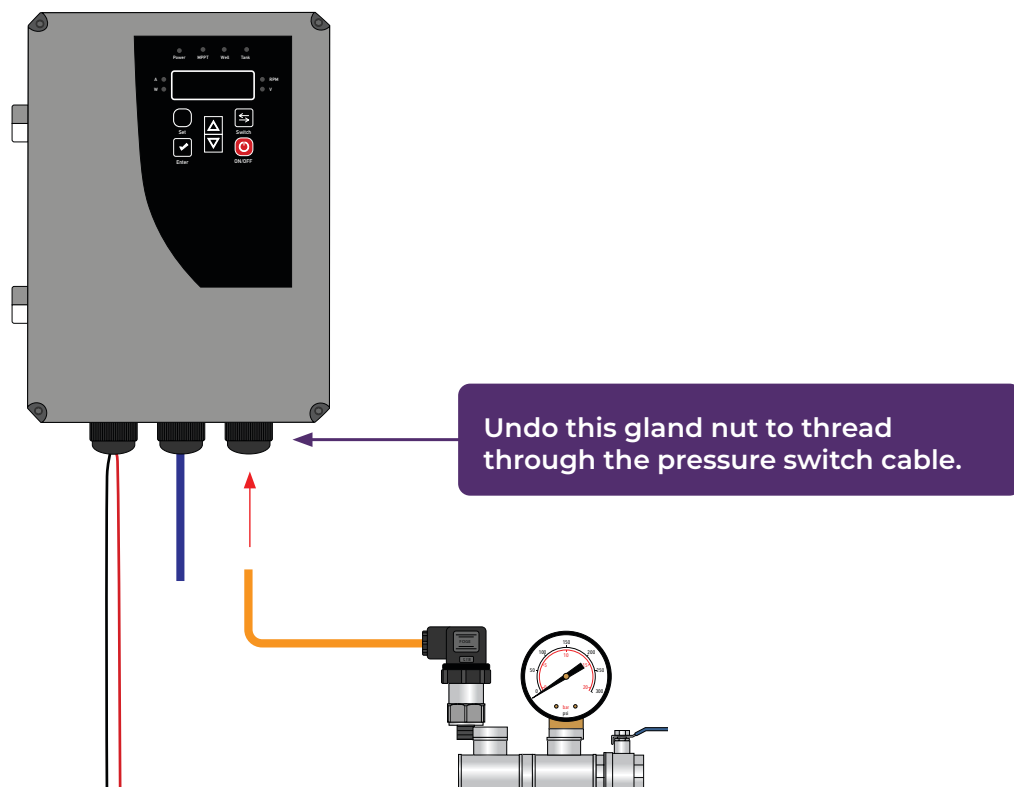


Step 3)

The pump power cable has 3 wires labelled W1, V1, and U1. Wire W1 into the W terminal, V1 to V and U1 to U. Please ensure a solid connection: no wire insulation trapped in the connector, and wires cannot be tugged out.

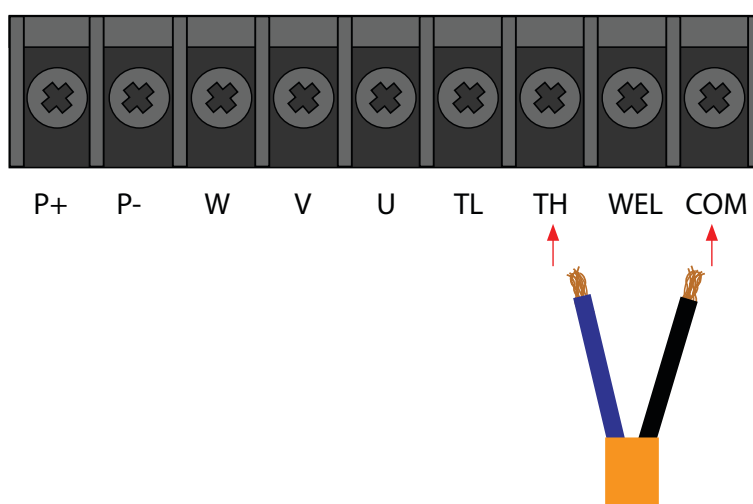
Note: if you are cutting this cable to length, please take careful note of which wire corresponds to which label. Wiring this wrong can damage the pump/controller.

Once you have done this, tighten the gland back up over the cable, ensuring a tight seal is formed around the cable.



Step 4)

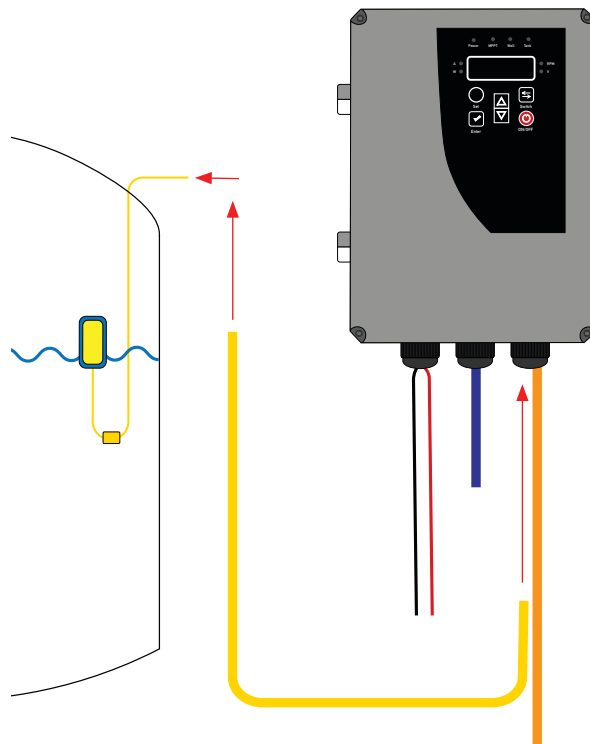
Undo the cable gland on the right side as shown above, and thread the pressure switch cable through.



Step 5)

There should be 2 wires within this cable. Wire the brown wire into the TH terminal and the blue into the COM terminal.

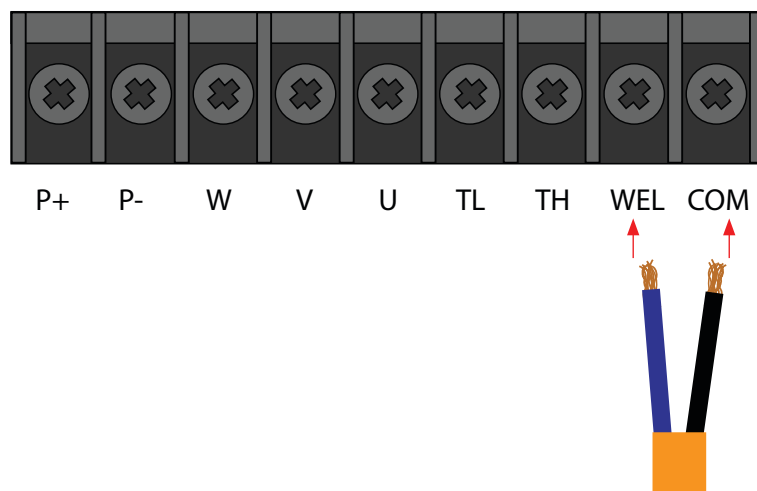
Once you have done this, tighten the gland back up over the cable, ensuring a tight seal is formed around the cable.



Step 6) Float Switch Wiring (Required for pumping from tank)

There should be 2 wires within this cable. Wire the brown wire into the TH terminal and the blue into the COM terminal.

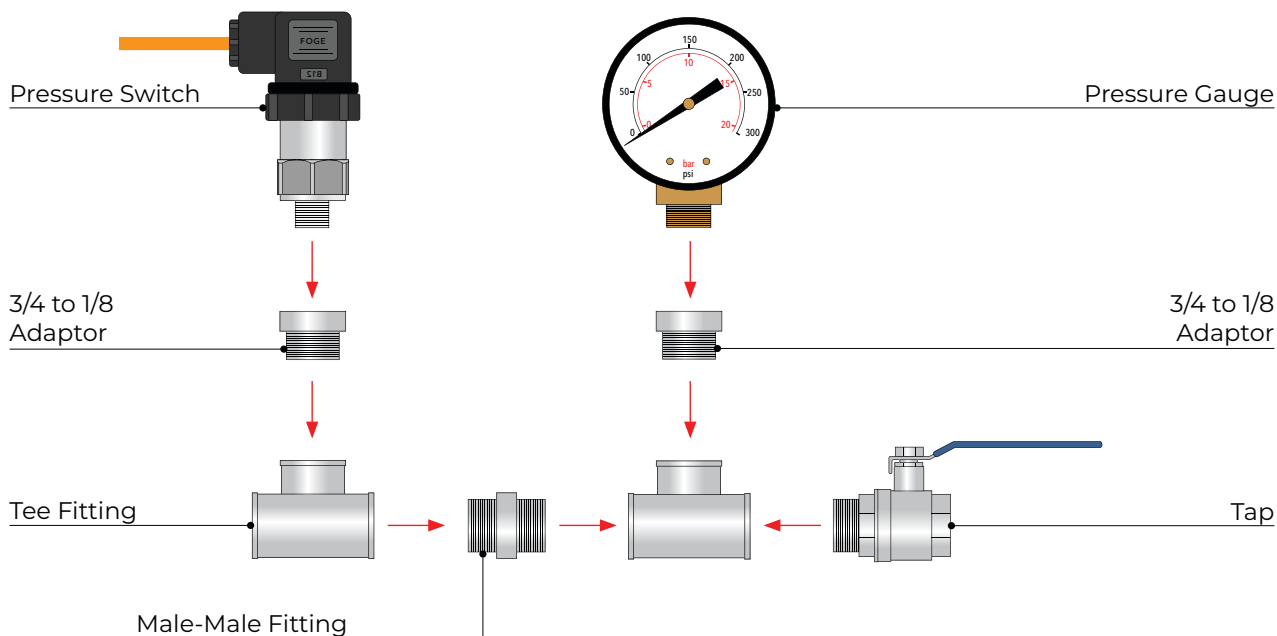
Once you have done this, tighten the gland back up over the cable, ensuring a tight seal is formed around the cable.



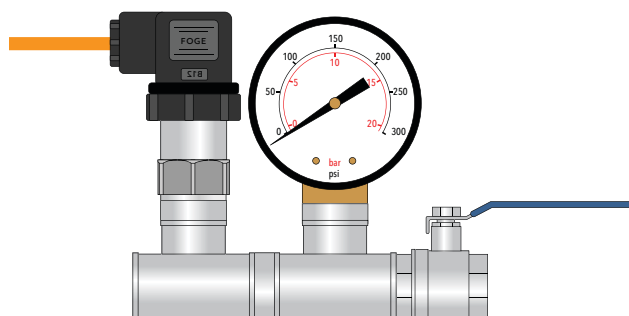
Once you have done this, wire the blue wire into the COM terminal and the brown wire into the WEL terminal. Then, tighten the gland back up over the cable, ensuring a tight seal is formed around the cable.

Fittings Assembly

In this section you will need to assemble the fittings that are supplied with the kit.



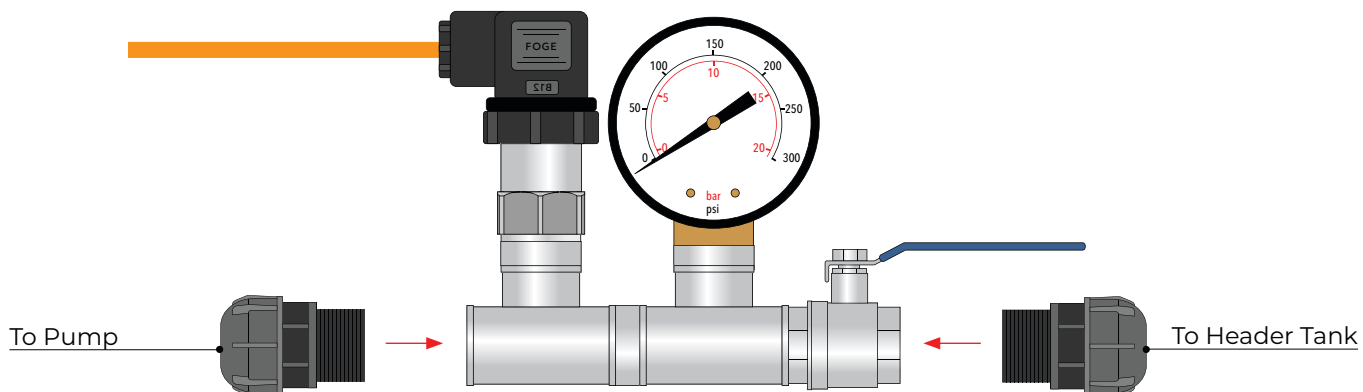
When assembling, use thread tape of the threaded port on all fitting to ensure water tight sealing.



Step 1)

Assemble each fitting as shown in the diagram above. Please ensure you apply enough thread tape to ensure the fittings are correctly sealed.

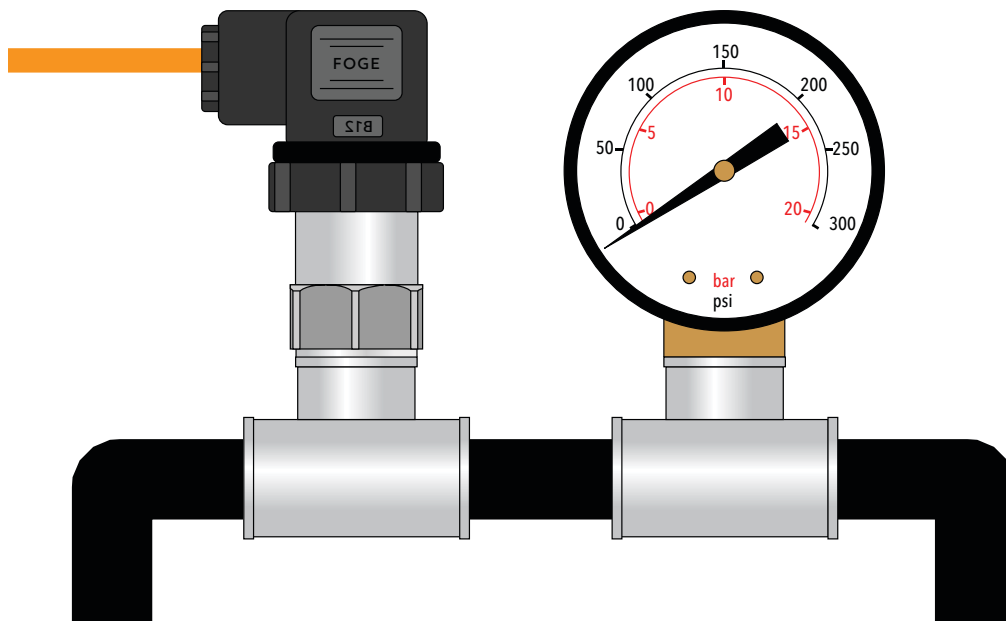
Note: take care to tighten using the metal parts of the sensor and gauge. Tightening using the body of these parts may cause them damage.



Step 2)

Attach your pipe fittings in the same way. Then attach the pipe from your pump to the sensor side of the fittings (left on diagram) and the pipe that runs to your header tank to the tap side (right on diagram).

Pressure Switch Calibration



The pressure switch can be used to turn off the pump when the tank is full. This requires a float switch/ballcock float to shut off the line to the tank when the tank is full.

When this happens the pressure in the line will increase to the pump's maximum pressure.

In this section you will tune the sensor to turn the pump off when the pressure in the line exceeds the highest flowing pressure, but under the pump's maximum pressure. Note: If your piping is rated lower than your pumps max pressure it is best to ensure the pressure switch is set well below this.

To perform this section you need to ensure everything is wired correctly into the controller and all your piping from the tank, through the kit's fittings, up to your tank is done and ready to go. You also need to ensure that the solar panels will be in full sun with no shadows during the calibration.



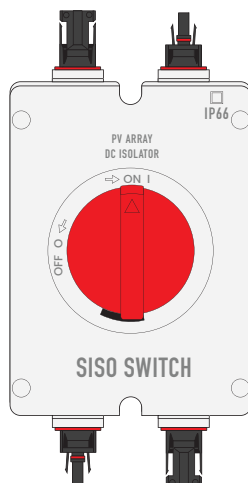
Step 1)

Ensure PV isolator is off, and panels are in full sun before starting this process so you can calibrate the pressure switch. To do this, start by undoing the bolt on the top of the pressure switch.



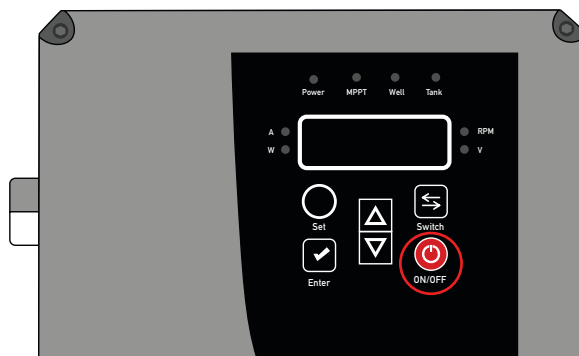
Step 2)

Insert the long end of the 2mm Allen key provided into the hole where the bolt came out of and turn the allen key **CLOCKWISE** until it will not turn anymore.



Step 3)

Turn on the PV DC Isolator Switch.



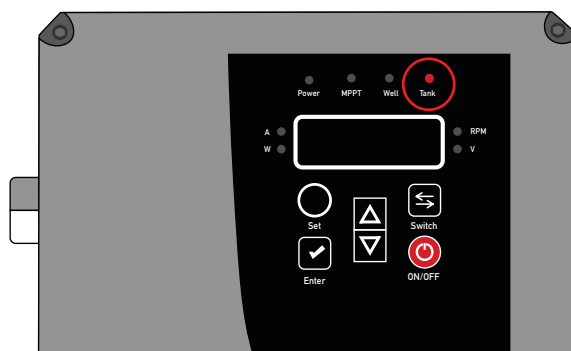
Step 4)

If the screen says “OFF” on the controller, press the on/off button. The pump should start shortly. Wait until the pump has been running for about 10 seconds and has reached full speed.



Step 5)

Then you can begin winding the allen key **counter-clockwise**.



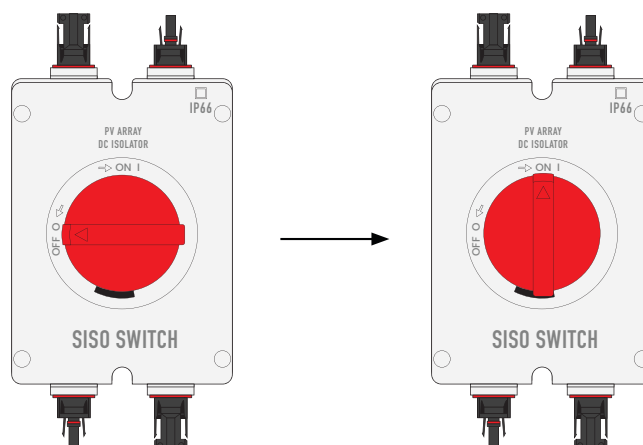
Step 6)

Do this until the pump stops and the **TANK** light turns on.



Step 7)

Now turn the Allen key **CLOCKWISE** once in a full rotation.



Step 8)

Restart the controller by turning the DC Isolator Switch off then on again. Wait for the pump to restart and come to full speed.



Step 9)

If the pump runs back up to full speed and does not turn off, then you have successfully calibrated your switch. If the pump turns off before reaching full speed from the pressure switch, turn it one more time in the **CLOCKWISE** direction and repeat from step 9.

Step 10)

You should test the operation of the pressure switch and float switch before you leave the system to run.

You can test the pressure switch by turning off your tap or ballcock on your pressure tank manually. You should see the **Well** light turn on the controller and the pump stop.

You can test the float switch by lifting it out of the water and letting it hang down (with the end facing the ground.) This should turn your pump off.

If either of these sensors do not operate as they should please, double check your wiring by going back through the steps in the corresponding sections. If this does not fix the issue, please get in touch with us. DO NOT leave this system to run without addressing these issues as you run the risk of dry running the pump, potentially damaging your piping, or overflowing your header tank.

Additional Info

Maintenance

It is best to check on the operation of the pump every couple months or so to make sure nothing is amiss. Here are a couple quick checks you can perform to ensure everything is working smoothly:

- **CHECK THE PRESSURE SWITCH:** Under full sun while the pump is running you can turn the tap provided in the kit off. This should quickly trigger the pressure sensor and turn off the pump. The pump should restart automatically after you open the tap in around 10 minutes but if you would like to restart sooner, then you can turn the controller off then on again.
- **CHECK THE FLOAT SWITCH:** While your pump is running, open the tank and lift the float switch out of the tank so that it is hanging. This should turn the pump off. Placing the float back in the water and restarting the controller should restart the pump again.
- **CHECK THE PUMP INLET:** If the pump is in a place where it can accumulate particulates then you should be using a mesh (or other filter) over it to prevent anything large from entering it. Pull up the pump and clean this mesh and the intake to ensure that it does not get blocked.
- **REPLACE SCREW:** Every 3000 hours it is recommended by the manufacturer to replace the screw in the pump. If you average around 5-6 hours of pumping per day this will be around every 1.5 years but depending on many factors this will vary. A good indication that you need a replacement screw is when the pump is outputting significantly less water than usual even in full sun.

Contact Us

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Kit viewings, demos, and pick ups at Auckland warehouse by appointment only. Please give us a call and we'll be happy to set up a time to meet you.

Get in Touch.



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