Tuhorse User Manual

DC Solar Submersible Pumps

Document Control & Revision History

Document Information	
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Document Control Statement

This document is controlled and maintained in accordance with Tuhorse's quality management system. It is the responsibility of the user to ensure they are referencing the current revision. Updates and changes are recorded in the revision history.

For the latest version, please contact admin@tuhorse.com.au.

Revision History

Rev #	Date	Description of Change	Approved By
2.0	01.06.2025	First release of new UM	EC

Accreditation/Certification

Tuhorse is a Responsible Supplier registered under the EESS in Australia. Our pumps are manufactured in facilities accredited with ISO-9001 quality management systems, ensuring each product is rigorously tested to meet stringent safety and performance standards.

Contents

1.0 - Introduction

Thank you for choosing Tuhorse!

Tuhorse solar pumps are designed to deliver high-quality, reliable, and efficient water pumping solutions, built to withstand the demanding conditions of Australian agriculture. Our advanced technology ensures ease of installation and operation while maintaining exceptional performance and durability.

To get the most out of your Tuhorse pump, it is essential to understand its capabilities and installation requirements. This manual provides all the necessary details on system setup, operation, and maintenance to ensure safe and efficient use.

We strongly recommend reading this manual carefully to ensure you get the best performance from your system.

If you require further assistance, please contact our support team below.

Support Team Contact Number

(02) 8005 2823

Monday to Friday 9am to 5pm AEST.

2.0 - Precautions before Installation

- **Read all instructions before installation.**
- **Always disconnect power before servicing.**
- **Solar panels generate live DC current when exposed to sunlight**

> ⚠ **WARNING:** Treat all solar wiring as live. This poses a serious shock or fire hazard. Use caution when handling solar connections and avoid working in direct sunlight when wiring solar arrays.

- **Install your Solar Array and validate the correct voltage** before connection to Pump Controller (Section 6.0-6.6)
- **Do not exceed Open Circuit Voltage (Voc) of the Pump Controller** when connecting to solar panels (Section 6.0 – 6.6)
  - Max Voc of 36-48V Control Box = 100V (DC)
  - Max Voc of 96-110V Control Box = 200V (DC)
- **Always use a Stainless-Steel safety cable** to support and raise/lower the pump
- **Set the pump 2-5m from the bottom of the bore.** The higher the sediment content, the higher the pump should sit
- **Recommended max submersion depth** for:
  - Non-Hybrid Solar Pumps (Oil-filled motor): 40m
  - Hybrid Solar Pumps (Water-filled motor): 100m
- **A non-return valve installation is always recommended** on:
  - Right above the pump
  - On top of the bore
- **Do not run the pump dry** and always test in a bucket of water
- **The low well sensor (when used)** must be installed a minimum of 300mm above the water inlet of the pump. (Section 9)
- **When servicing your Helical Screw Rotors** (screw pumps), do not screw any fittings too tight as this can restrict the pump stator (Section 10)
- **Check your water quality** to assess whether any additional provisions need to be made to protect the pump long-term
- **Do not use your Tuhorse pump** to clean out a dirty bore/well
- **Ensure the concentration of suspended solids** in the pumped water is below 0.1% by volume to prevent blockages or damage to the pump
- **Do not disassemble the pump motor** unless approved by Tuhorse as the motor oil will leak out, causing damage to the bearing and voiding your warranty

Failure to follow these installation precautions may result in pump damage and will void the Tuhorse warranty.

3.0 - System Components

Your Tuhorse solar pump system includes:

1. **Submersible Pump + Pump Power Cable**

   Designed for high-efficiency water pumping.

2. **Solar Pump Control Box**

   Manages power distribution and pump operation.

3. **Solar Panels (not included in some packages)**

   Converts sunlight into DC power.

4. **Water Level Sensor**

   Pump Protection Sensor (low bore level)

   Water Tank-full Sensor (high tank level)

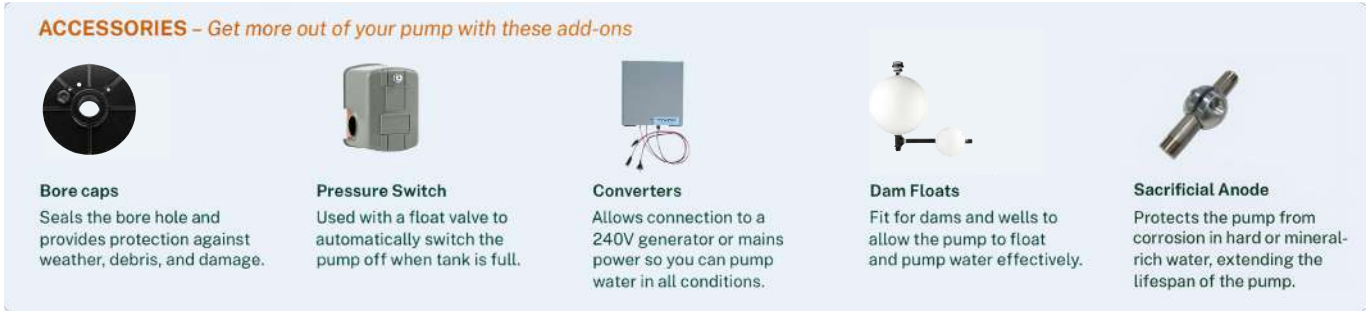
Accessories - Complimentary kit inclusions

Helical Screw Rotor & Stator (screw pump packages only)

Accessories - Complimentary kit inclusions

MC4 cables

You may be interested in these additional accessories to supplement your pump – Call us on (02) 8005 2823 if any of these items interest you



4.0 - Quick Installation Guide (Step-by-step)

Follow the below steps in chronological order to complete the full installation of your Tuhorse Solar Submersible pump.

1. Start with the Installation pre-check to ensure you have everything you need (Section 5)
2. Select your site and set up your Solar Array (Section 6.0)
3. Confirm the voltage of your Solar Array with a multimeter (Section 6.2)
4. Install the Control box and complete the cable connections (Section 8)
5. **TEST YOUR PUMP** (Section 5.2)
6. **TEST YOUR WELL SENSOR** (Section 5.3)
7. Assemble your pump setup + level sensor (Section 7.4)
8. Complete the full installation of your pump into your water source
9. Complete all necessary additional connections like a Pressure Switch
10. Turn on the pump and enjoy your solar powered Tuhorse pump!
11. If you've purchased a screw pump, make sure to keep the spare helical rotor

5.0 - Installation pre-check

5.1 - Additional items required for installation

1. **Poly delivery pipe**
   General recommendation is 1.5” (40mm) or higher, high pressure/blue line poly

2. **Stainless Steel Safety Cable/Wire**

3. **Non-return valve**
   Installed right above the pump or on top of the bore

4. **Dam float**
   - if pumping from a dam/river (Available on Tuhorse website)

5. **Bore Cap**
   - if pumping from a bore (Available on Tuhorse website)

6. **Pressure switch**
   - if tank is far away (Available on Tuhorse website)

7. **Double acting float valve**
   - if using a Pressure Switch

8. **Flex conduit**
   - to bury your cables

9. **Poly pipe connector/joiner + elbow + thread tape**

5.2 - Testing your pump

1. Complete installation and connection of your solar array and control box FIRST
2. Prepare a 30-50L bucket of water to submerge your pump
3. Unroll the power cable from your Tuhorse pump
4. Cut a small piece of poly pipe (long enough to create a small loop back to pump)
5. Assemble pump and the cut poly pipe using the pipe connector
6. Submerge the pump inside the bucket of water and ensure the other end of the delivery pipe feeds back into the bucket of water
7. Connect the pump power cables into the Control Box
8. Turn the Control Box on and your pump should start shortly
9. Once pump operation has been verified, turn the pump Control Box off
10. At this point, if you're using a water sensor you should also test this now

5.3 - Testing your well sensor (if being used)

1. Keep the pump and the looped poly pipe in the bucket of water
2. Unroll your low water level sensor
3. Turn the 'Timer Dial' in your Control Box down to 0
4. Remove the bridging wire between COM1 & WH on your Control Box
5. Connect the 2 wires from your water level sensor into COM1 & WH (There is no polarity, so orientation of wire does not matter)
6. Drop the water sensor into the bucket of water with your pump
7. Turn the Control Box on and the pump should now be operating.
8. Take the water sensor out of the water to see the pump stop and pop it back in to see it turn back on
9. When you've verified it's all in working condition, you're good to proceed to installation

6.0 - Solar Panel Array

6.1 - Site selection and setting up your Solar Array

In most parts of Australia, the sun's position in the sky changes throughout the year, which can impact the performance of your solar pump system. However, for simplicity and reliability, we recommend installing the solar array in a fixed position.

For installations in the southern hemisphere, including all of Australia, solar panels should face true north for optimal exposure to sunlight year-round.

To achieve the best overall performance throughout the year, mount the panels at a fixed tilt angle equal to the **LATITUDE** of the installation site. This setup offers a good balance between summer and winter solar gain, without requiring any manual adjustments.

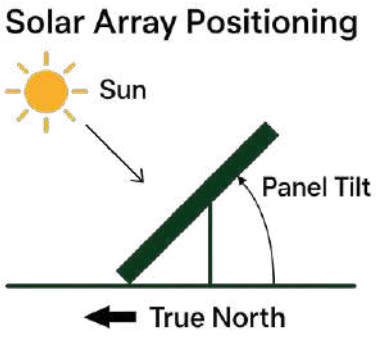
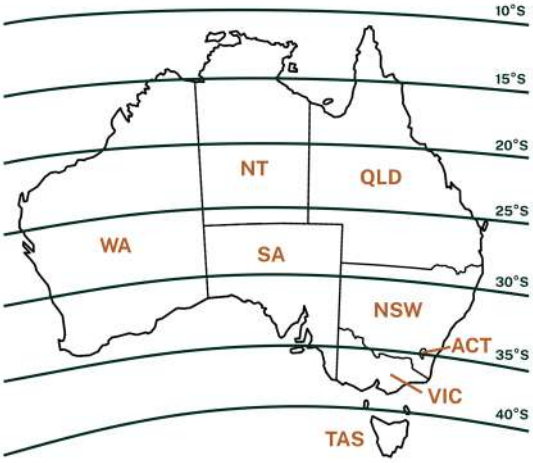


Figure: Panel installation diagram in Australia

Location	Latitude (°S)
Darwin	12°
Brisbane	27°
Sydney	34°
Canberra	35°
Melbourne	38°
Hobart	43°
Adelaide	35°
Perth	32°



Recommended Fixed Tilt Angles by Location in Australia
You can refer to Google Maps on your phone for your specific location's Latitude.

6.2 - Understanding your Solar Array

⚠ WARNING: ELECTRICAL HAZARD

Please be aware that solar panels are a live power source and can seriously hurt or kill if the system is not handled correctly. Whenever you're working with solar panel wiring or connections, make sure:

1. Solar Pump Control Box is turned off
2. Solar panels are covered
3. The MC4 connections are secure, and no wires are exposed

IMPORTANT:

The way panels are connected is critical to the safe and efficient operation of your solar pump system. Incorrect wiring can damage your control box. Below, we explain the two main types of connection — **series** and **parallel** — and provide recommended wiring diagrams for panel arrays from 400W to 1600W. If in doubt, use a multimeter to check your voltage before proceeding, or contact our staff at 02 8005 2823 for assistance.

Note: This guide does not cover our AC/DC (hybrid) solar panel setups. Please contact our staff if you need assistance with our AC/DC panel configurations.

6.3 - Types of Solar Connections: Series vs. Parallel

Series Connection

In a series connection, the positive terminal of one panel is connected to the negative terminal of the next panel, and so on.

1. The **voltage adds up** across all panels.
2. The **current stays the same** as one panel.
3. The **wattage adds up** across all panels.

Parallel Connection

In a parallel connection, all positive terminals between each string are connected together, and all the negative terminals between each string are connected together.

1. The **current adds up** across all panels.
2. The **voltage remains the same** as one string.
3. The **wattage adds up** across all panels.

Example of a connection and diagram available next page.

EXAMPLE:

Farmer Joe purchased our **3-inch 500W** pump with an **800W** system (4x 200W panels) running on a 36-48V control box. This control box has a **Maximum Voc of 100VDC.**

- Each 200W panel has a Voc of 45V
- Total panel array Voc must be **UNDER** 100VDC
- Maximum of 2 panels **PER** string of **Series Connection** (45V + 45V = 90V)
- Connect 2 strings of **Series Connection** by joining in **Parallel Connection**
  - Voc = Series String 1 (90V) + Series String 2 (90V) = 90V array
  - Wattage = Series String 1 (400W) + Series String 2 (400W) = 800W array
  - Current = Series String 1 (9A) + Series String 2 (9A) = 9A array
- Joe now has 4 solar panels that is producing 800W with a voltage of 90VDC

⚠

WRONG connection for the 36-48V Pump Control Box (Max Voc of 100VDC):

This configuration will generate a Voc of 180VDC = **BAD**

Will result in damage to 36-48V Control Box

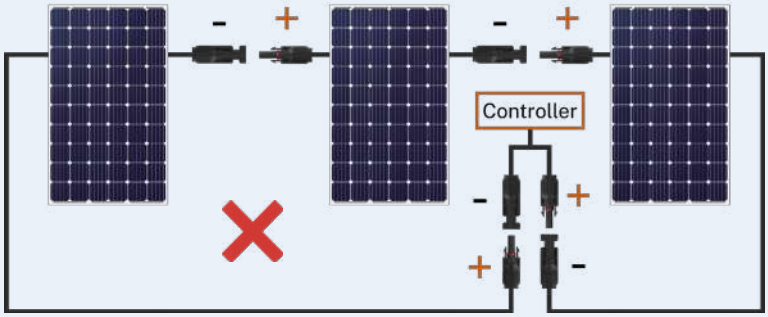
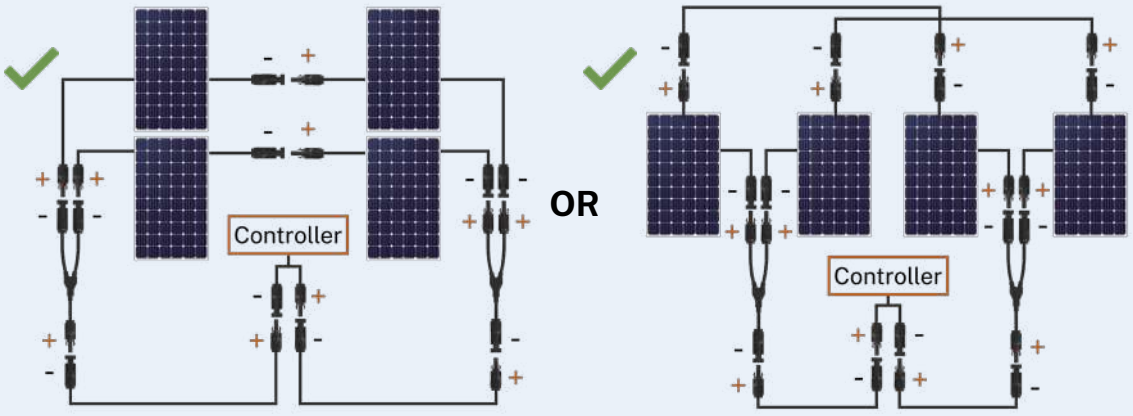


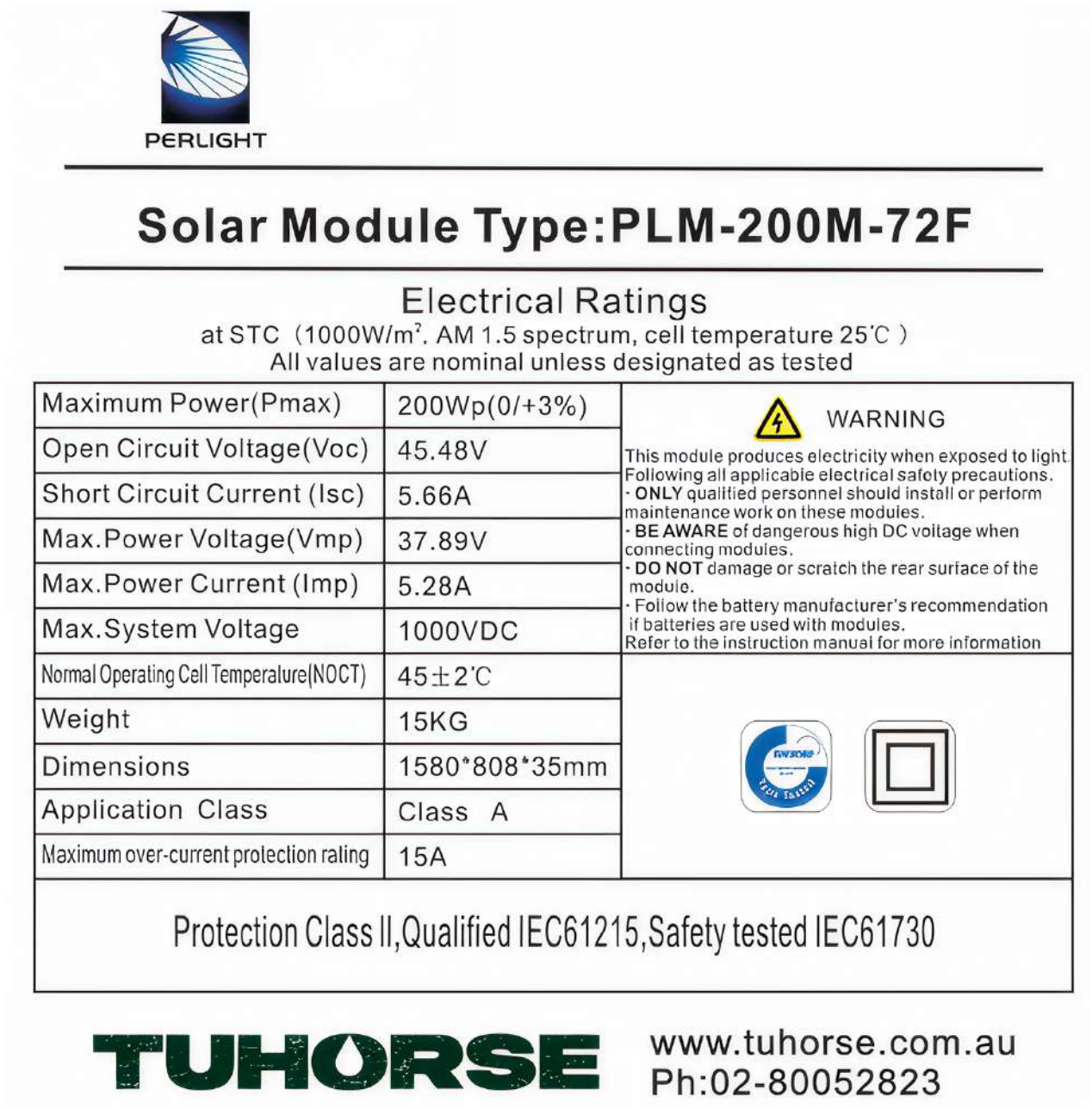
Figure: Incorrect panel connection for 48V control box

CORRECT connection for the 36-48V Pump Control Box:
This configuration will generate a Voc of 90VDC = **GOOD**



Note: Y-adaptor is required to complete a **Parallel Connection**

6.4 - Tuhorse 200W Solar Panel



PERLIGHT

Solar Module Type:PLM-200M-72F

Electrical Ratings

at STC (1000W/m², AM 1.5 spectrum, cell temperature 25℃)
All values are nominal unless designated as tested

Maximum Power(Pmax)	200Wp(0/+3%)
Open Circuit Voltage(Voc)	45.48V
Short Circuit Current (Isc)	5.66A
Max.Power Voltage(Vmp)	37.89V
Max.Power Current (Imp)	5.28A
Max.System Voltage	1000VDC
Normal Operating Cell Temperalure(NOCT)	45±2℃
Weight	15KG
Dimensions	1580*808*35mm
Application Class	Class A
Maximum over-current protection rating	15A

WARNING

This module produces electricity when exposed to light.
Following all applicable electrical safety precautions.
- **ONLY** qualified personnel should install or perform maintenance work on these modules.
- **BE AWARE** of dangerous high DC voltage when connecting modules.
- **DO NOT** damage or scratch the rear surface of the module.
- Follow the battery manufacturer's recommendation if batteries are used with modules.

Refer to the instruction manual for more information

Protection Class II,Qualified IEC61215,Safety tested IEC61730

TUHORSE

www.tuhorse.com.au
Ph:02-80052823

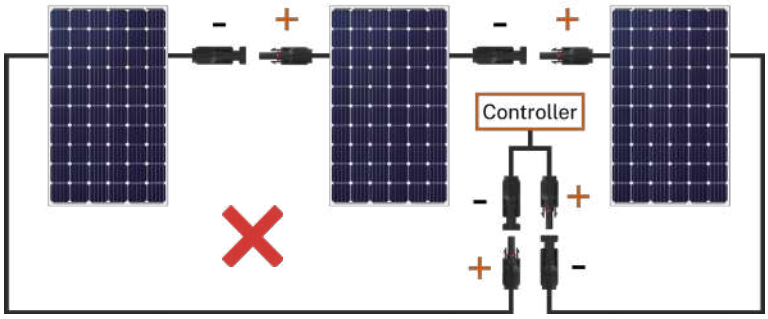
Figure: Tuhorse 200W solar panel specification

6.5 - Solar panel wiring diagram – 36-48V Control Box

36-48V Pump Control Box = Maximum Voc of 100VDC

⚠ **WARNING:**
Do not connect more than **2** x 200W solar panels **IN SERIES**

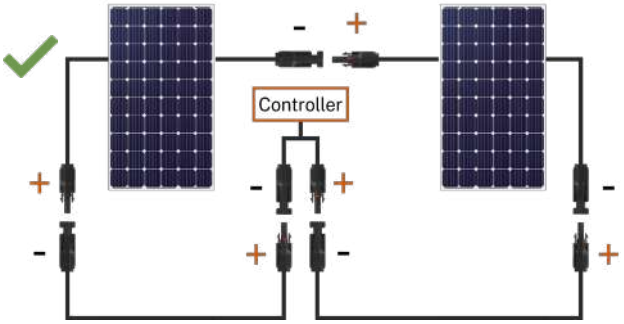
EXPECTED VOLTAGE = GREATER THAN 100VDC (BAD)



Incorrect panel connection for 48V control box

400W solar array (2x200W)

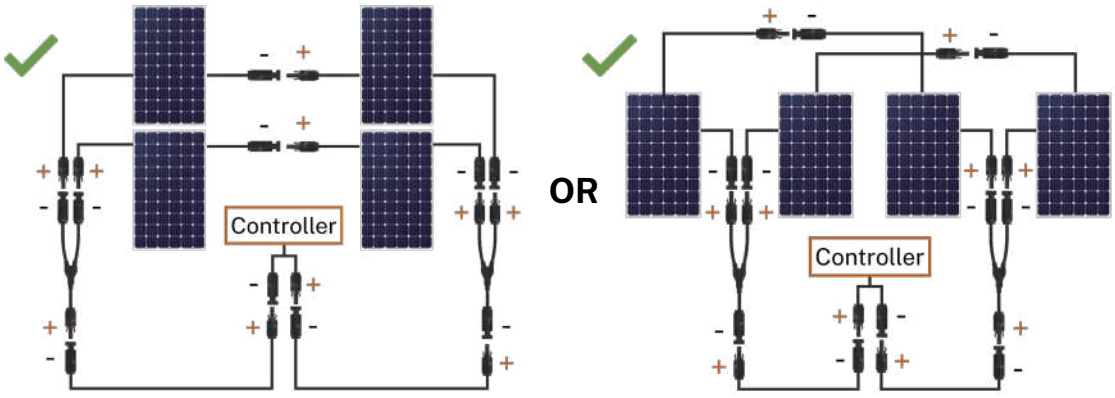
1 string of 2 panels in **Series Connection**
EXPECTED VOLTAGE = **80-92VDC** (disclaimer: only at full sunlight)



1 string of 2 panel in Series Connection

800W solar array (4x200W)

2 Strings of 2 panels in Series **JOINED in Parallel Connection** via Y-adaptor
EXPECTED VOLTAGE = **80-92VDC** (disclaimer: only at full sunlight)

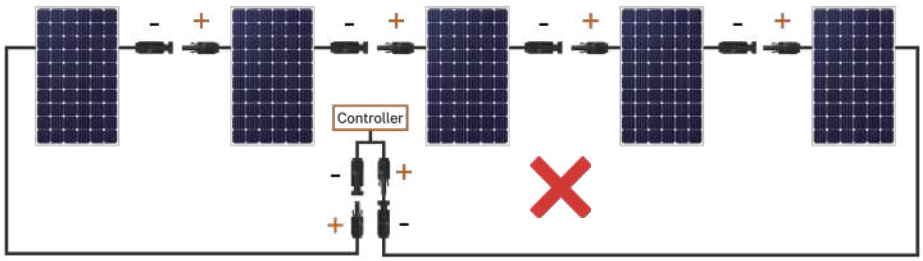


2 strings of 2 panels in Series joined in Parallel to make 800W and under 100VDC (Voc)

6.6 - Solar panel wiring diagram – 110V Control Box

110V Control Box = Maximum Voc of 200VDC

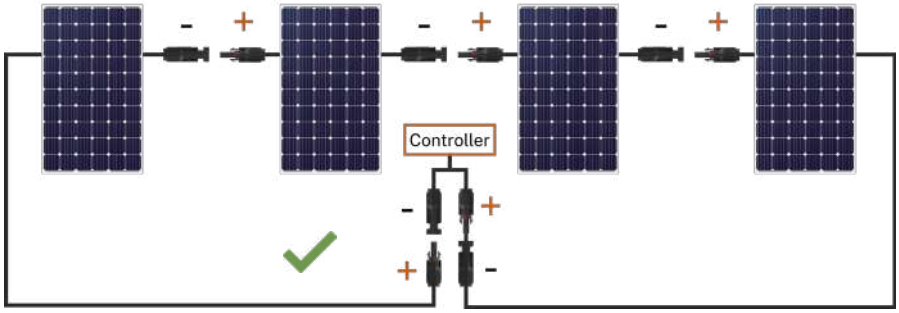
⚠ **WARNING:** Do not connect more than **4** x 200W solar panels **IN SERIES** for the **110V Control Box.**



Incorrect panel connection for 110V Control Box

800W solar panel system (4x200W)

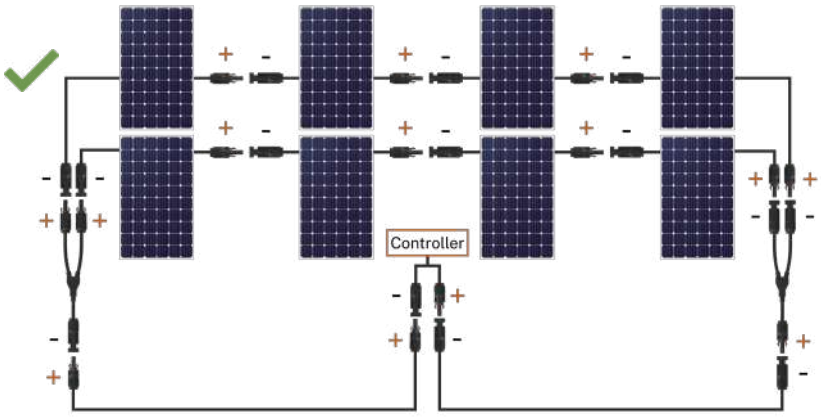
1 string of 4 panels in **Series Connection**
EXPECTED VOLTAGE = **170-190VDC** (disclaimer: only at full sunlight)



1 string of 4 panels in Series Connection

1600W solar panel system (8x200W)

2 Strings of 4 panels in Series **JOINED in Parallel Connection** via Y-adaptor
EXPECTED VOLTAGE = **170-190VDC** (disclaimer: only at full sunlight)

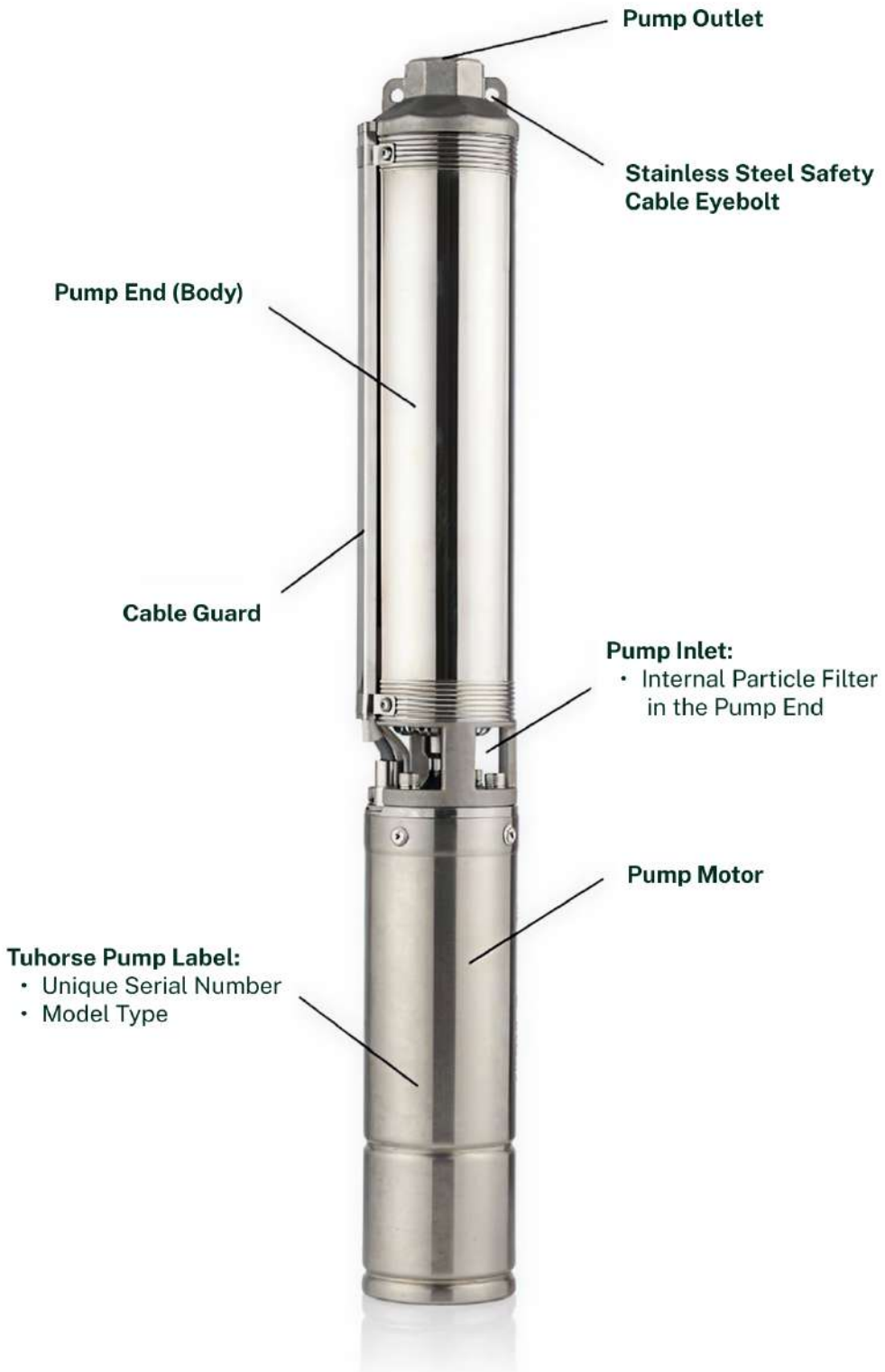


2 strings of 4 panels in Series joined in Parallel to make 1600W and under 200VDC (Voc)

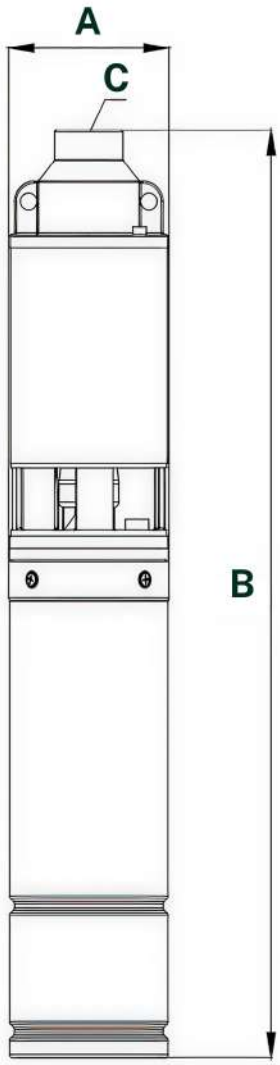
7.0 - Submersible Pump

7.1 - Pump Diagram (Helical Screw Pump)

7.2 - Pump diagram (Centrifugal Pump)



7.3 - Pump dimensions



Pumps	A (mm)	B (mm)	C (inch
2”370W	52	580	1/2″
3”210W	79.5	425	3/4″
3”500W	79.5	430	3/4″
4”500W	102	503	1″
4”1000W	105	555	1″
4”1000W-C	105	1190	1.25”

7.4 - Setting up your pump

1. Unroll and lay the poly delivery pipe out at length (It is very important that you don't bend or kink the pipe as this can result in a burst leak when under pressure).
2. Inside your Tuhorse box, you'll find - Pump with power cable, the control box and a bag of accessories
3. Lay the pump gently, close to the water source and unroll the power cable and low water level probe (if required) next to the delivery pipe
4. Assemble the bore cap to the pipe connector/joiner (if used)
5. Connect the pump to the delivery pipe and then the bore cap using a pipe connector/joiner.
6. Connect a 316 Stainless Steel safety cable between the Bore Cap and the eyebolt of the pump end (If pumping from a bore)
7. Align the low water probe around 500mm above the pump water inlet level and secure to the delivery pipe in a vertical position, with the cable out the top
8. Secure the pump power cable and probe cable to the delivery pipe every 2 meters with strong tape and allow for some slack between each taped point as the cables will stretch over time.

⚠ **IMPORTANT:** When installing your pump in a bore or suspended in a well, you must use a 316 Stainless-Steel safety cable to hold the weight of the pump. Your pump must not be free hanging from ONLY the delivery pipe or the power cables as this will not support the weight of the pump.

Refer to the below as a guide to choose the size of your stainless-steel cable.

Bore depth	Recommended safety cable size (mm)
Less than 50m	3mm
50-100m	4mm
Greater than 100m	5mm

Other applications:

Dam – Tuhorse can supply a Dam Float to hold the pump up and allow a direct connection to the delivery pipe from the float – just ask us

Creek, soak, river, lake – Call us and let us know your proposed application and our team can assist with some recommendations.

8.0 - Solar Pump Controller (Control Box)

The wiring inside the control box must be connected properly for safe operation. Please install your Control Box under shade and close to your solar panel array. The control boxes typically get installed right underneath the solar panel array.

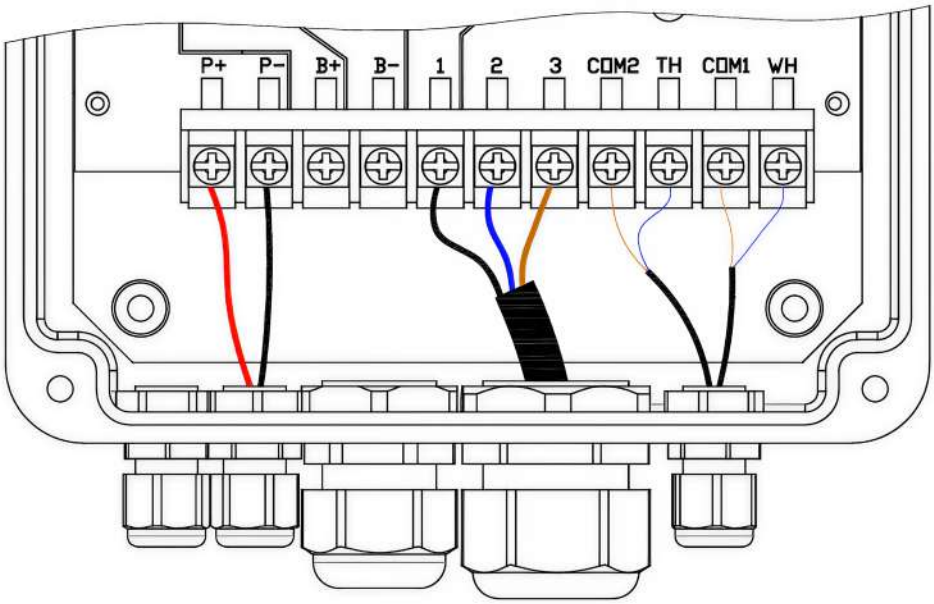
8.1 - Know the voltage of your Solar panel array

⚠ **WARNING:** This step is critical to prevent equipment damage and ensure safe operation.

Before connecting your solar panels to the Tuhorse Solar Pump Control Box, verify the voltage of your panels using a Multimeter. Ensure that the measured voltage from your solar panel array does not exceed the Pump Control Box's maximum Open Circuit Voltage (Voc). (Refer to section 4.3)

8.2 - Connection into the control box

- **Solar Panel Input** = P+/P-
- **Battery Input** = B+/B-(Only available on 36-48V control box)
- **Pump Cable Connection** – 1 (Black), 2 (Blue) and 3 (Brown)
- **COM2 + TH** = Tank full sensor for automatic pump power cutoff
  - Normally **open**, turns the pump off when the circuit is closed
- **COM1 + WH** = Low water level sensor for automatic pump power cutoff
  - Comes from the factory with a bridging wire
  - Normally **closed**, turns the pump off where the circuit is open



8.3 - Control Box lights and indicators

For more information on the below lights and common troubleshooting light indicators, please refer to the Troubleshooting guide (Section 10).

Light indicator	Light colour	What does this mean?
SYS (Power)	**Green**	Controller is receiving power and is operational
Pump	**Green**	Indicates the system is attempting to run the pump; LED turns on around 15-20 seconds after startup
MPPT	**Green** (flashing)	Light is always flashing and indicates the Maximum Power Point Tracking (MPPT) function is active, optimizing solar power output
ERR_L	**Red** (Not normal)	Indicates the system current has exceeded the safe limit - **overcurrent condition detected.** • Short circuit or wiring fault • Overloaded output or connected panels drawing too much current • Faulty component in the control box or converter • Potential locked rotor
LOW POWER	**Yellow** (Not normal)	Indicates that the system is receiving insufficient power • Low solar panel output (e.g. shading, poor sunlight, dirty panels or bad connection) • Potential issues with the Rotor & Stator (if not new) • Low battery voltage if pump is running through battery • Speed dial turned down too low
TANK_F (Tank Full Light)	**Red** (Normal)	Indicates that the **tank sensor** is submerged in water or COM2 & TH terminals have been bridged
WELL_L (Well Low)	**Red** (solid) (Normal)	Indicates that the **well sensor** is no longer submerged in water or the COM1 & WH terminal is not bridged
	Red (flashing) (Normal)	Indicates that the pump is under the influence of time delay for pump restart

8.4 - Pump Controller Specifications

For more information on the below lights and common troubleshooting light indicators, please refer to the Troubleshooting guide (Section 10).

	36-48V Control Box	110V Control Box
Compatible Tuhorse Solar Pumps	2S370 3S210 3S500 4S500	4S1000 4S1000-C
Max Solar Input Voltage (Voc)	100V	200V
Power Switch*	Solar Off Battery	ON OFF
Battery Function	In-built	Custom fitment required
MC4 Connectors	1 set (1 Positive + 1 Negative)	1 set (1 Positive + 1 Negative)
Motor Compatibility	36V – 48V (DC)	96-110V (DC)
Temp Range	-20° to 50°	-20° to 50°
Weight	2kg	2.5kg
Dimensions (LxWxH)	25x15x3cm	25x15x3cm

* Which Pump Control Box you have can be distinguished by the power switch

8.5 - Timer for automatic pump restart

The timer function is directly correlated to the automatic pump cutoff/restart when utilizing a water sensor and/or a pressure switch ONLY.

The timer can be set to up to 30 minutes.

The timer dictates how long the control box will wait BEFORE turning the pump back on when the necessary requirements of pump restart are met.

Time dial is located on the right side of the circuit board and is indicated by TIMER.

E.g the pump will automatically switch off when the water level drops below the water sensor in the bore. When the water level reaches back up to the water sensor, the timer for automatic pump restart will commence.

For troubleshooting: If you're trying to troubleshoot your pump or the water sensor, adjust the dial to 0 to ensure quick feedback. The timer delay at the lowest setting could take up to a few minutes.

8.6 - Adjustable pump speed dial

The adjustable dial is located on the right side of the circuit board and is indicated by SPEED.

Speed dial is available for all Tuhorse solar pumps. This function allows the customer to adjust the pump flow output depending on their specific requirements.

The speed will be set to max as default from factory.

9 - Level sensors & Pressure Switch for automatic pump shutdown

9.1 - Well sensor

For every purchase of a Tuhorse complete pump package, you will receive 2 complimentary level sensors. 1x 40m lead and 1x 10m lead. **The level sensor is a 2-wire stainless steel probe.**

1st sensor is intended to be used as a Pump Protection Sensor – allowing automatic pump shutoff to protect your pump from running dry.

2nd sensor is intended to be used as a Water tank-full sensor – allowing automatic pump shutoff to avoid water wastage

Installation suggestions:

- Drop it down the bore using a separate poly pipe so that the sensor is isolated from the pump (useful if diagnosing well sensor issue)
- Attach it to the delivery pipe 300mm above the outlet of the pump

Using it to detect low water level in your bore:

1. Remove the existing bridging wire on COM1 + WH in your Control Box
2. Connect the 2 wires from the sensor into your Control Box at **COM1 + WH** terminals. (There is no polarity)
3. The pump will operate ONLY when the probe is submerged in water and a connection is made between COM1 + WH port
4. When the water level drops below the water sensor, the pump will automatically cut off
5. When the water level rises and the probe gets submerged, the pump restart timer will commence

Using it to detect high water level in your tank:

1. Connect the 2 wires from the water sensor into your Control Box at **COM2 + TH** terminals
2. The pump will NOT operate when the water sensor gets submerged under water
3. When the water level drops in your tank, connection will be cut on the COM2 + TH terminals.

9.2 - Pressure Switch

If your tank sits far from your bore and is impractical to use the supplied well sensor, a Pressure Switch is a practical and effective way to ensure you can still turn your pump off automatically when your tank level rises too high.

How does it work?

Every pressure switch will need to work in conjunction with a Float Valve. The Pressure Switch is typically installed on the delivery line (close to where the control box is located) and connected to the Control Box via 2 wires. Additionally, a float valve is installed on the delivery pipe outlet inside the tank.

Float valve

When the water level in the tank rises, the float valve will close the delivery pipe. This will cause the pressure to build up in the delivery pipe causing the Pressure Switch to trip. Once the Pressure Switch trips, a connection is made or lost (depending on the type of Pressure Switch being used) and turn the pump off automatically.

When the water level in the tank drops, the valve will open the delivery pipe allowing the pipe to de-pressurize. Once enough pressure has dropped, the Pressure Switch will re-trip allowing the Pump to restart back again.

Pressure switch

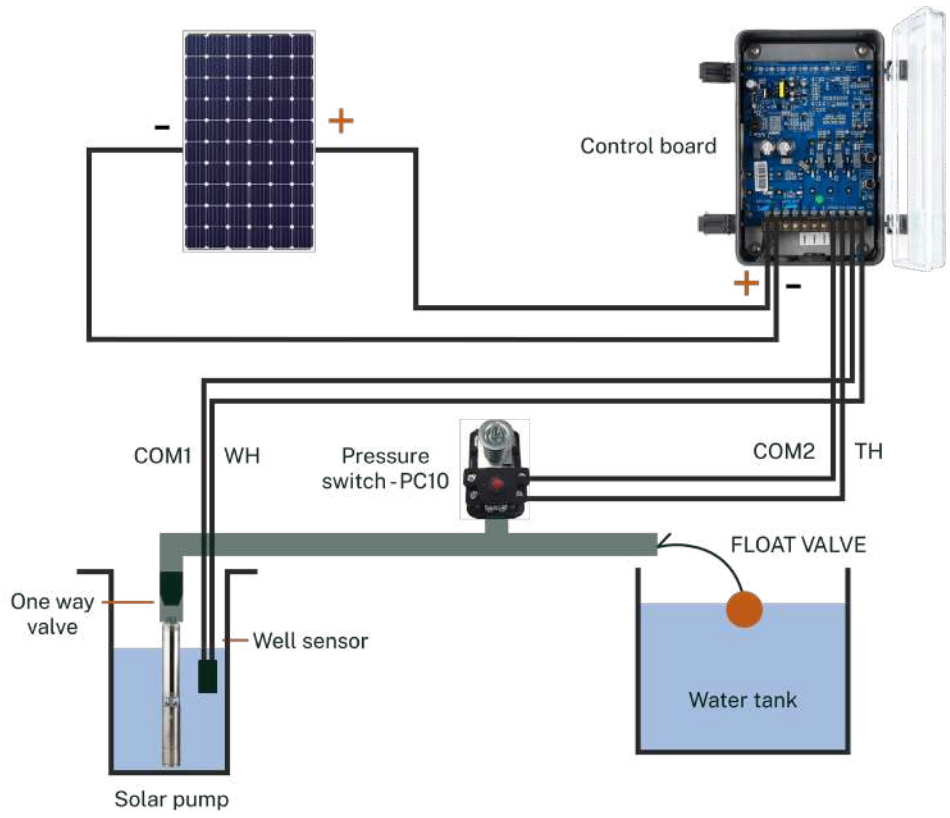
Using it to detect high water level in your tank:

Connect the 2 wires from the Pressure Switch into your Control Box at:

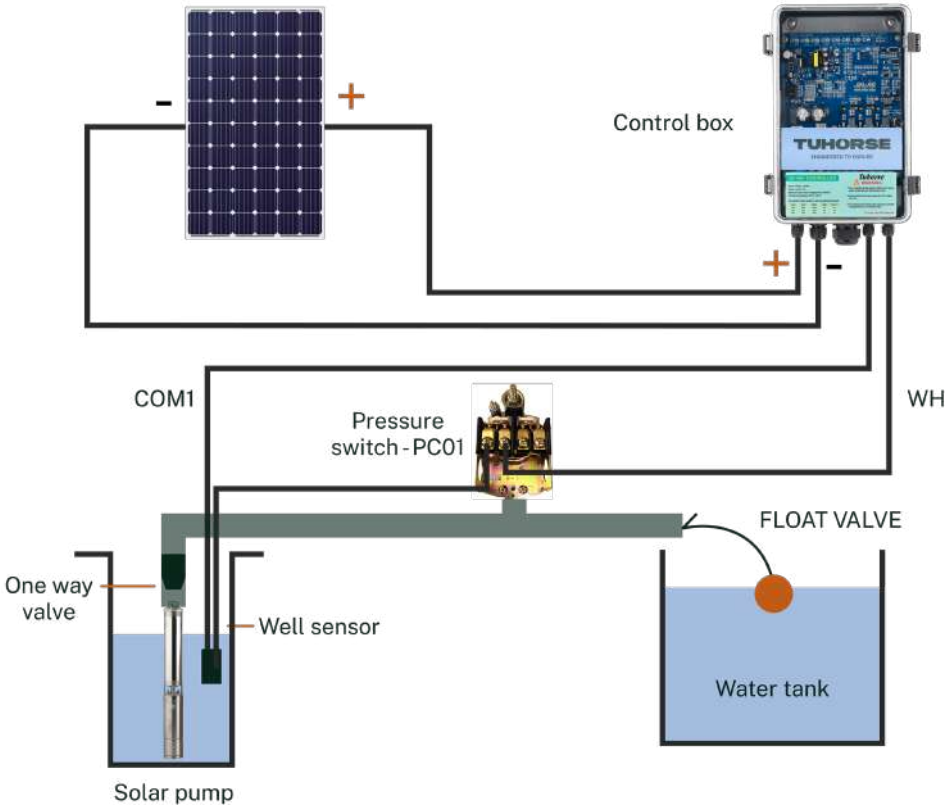
1. **COM1 + WH** for Normally Closed Pressure Switch = **Tuhorse PC01**
2. **COM2 + TH** for Normally Open Pressure Switch = **Tuhorse PC10 (Reverse PS)**

If you're confused about which Pressure Switch you have purchased or how to set this up, please give us a call!

9.3 - Pressure Switch Diagrams



PC10 (Normally Open) Installation



PC01 (Normally Closed) Installation

10.0 - Replacing the Rotor & Stator (Screw pumps only)

A complimentary spare rotor and stator set is included with every Tuhorse screw pump package. If you do not have a spare set, please contact us or purchase one through our website.

Over time, the rotor and stator in your Tuhorse helical screw pump may wear out. Signs of wear may include reduced water flow on clear days or the low power light illuminating on the control box. If you notice these signs, please inspect the rotor and stator for scoring/wear.

Steps to inspect/replace the rotor & stator:

1. Prepare a set of Allen keys, spanner/shifter and screwdriver
2. Turn off and disconnect the solar and pump power cables from the Control Box
3. Pull the pump up from your water source
4. Dismantle the pump assembly by following the below steps

Steps to remove and replace the Rotor & Stator set

1. Tools required

2. Remove the top cover

3. Remove the rubber stator

4. Change both the Stator below and the replacement Rotor as they only fit as a pair.

5. Remove the mesh plate

6. Separate pump from motor

7. Remove grub screw *

8. To remove the rotor, rotate the rotor clockwise.

The rotor attachment is a **REVERSE** thread. Rotate the rotor clockwise to unscrew.

9. Reassemble as per this photo. Both nuts inside the rubber must fit tightly.

IMPORTANT NOTE:

When replacing the rotor from Step 9, **do NOT overtighten** it as it could prevent the rotor from turning properly.

* Grub screws in the flexible shaft serve as a safeguard against the rotor unthreading if the pump is accidentally operated in reverse. However, when the pump is running in the correct direction, the rotor naturally tightens itself during operation — meaning grub screws are not required under normal conditions.

For this reason, replacement rotor and stator assemblies are supplied without grub screws. If your pump has been working reliably up to now, it's already operating in the correct rotation. If needed, you can reuse the original grub screws from your existing setup.

Once all steps have been completed, assemble the pump back together and test the pump in a bucket of water first

11.0 -Troubleshooting Guide

NORMAL LIGHT BEHAVIOUR: Refer to Installation Manual for more normal light behaviour information:

- Power and Pump light will be solid green, and MPPT light will flash while the pump is active
- Well Low light will illuminate when the sensor is no longer submerged in water or if the COM1 and WH terminals are NOT bridged
- Tank Full light will illuminate when the sensor is submerged in water or if the COM2 and TH terminals becomes bridged
- When in BATTERY mode, all 3 lights (Power, Pump and MPPT) will flash in unison
- Low Power light can illuminate for MULTIPLE reasons, but the usual ones are when there is low solar power, low battery power, worn Rotor & Stator OR if there is another issue with the pump requiring troubleshooting

Type of Defect	Main Cause	Correction
Power light and SYS light not turning ON	Not switched on	For both Control Boxes, flick the power switch on
	No power in control box	Check your solar panel connection. The MC4 cables from the panels must be connected to P+/P- in the Control box. Verify the voltage going into the Control box via P+/ P- using a Multimeter. If you can see voltage going into the Control box, but there are still no lights, your controller is potentially damaged and may need replacing – contact support
TANK FULL light on when tank is not full	Damaged tank sensor or pressure switch	Remove tank sensor or pressure switch wiring from controller, this will bypass and allow the pump to run. Replace the switch if the pump now runs. Note: *Please remove float valve on the tank if working with a pressure switch.*
Power light and SYS on but pump not clicking over	Rotor is jammed	Check the motor is running without the pump end. If it is, replace rotor and test
	Bearing is gone in the motor	If there is power going to the motor, and it still doesn't run without the pump end attached which is just by motor itself, then the motor needs replacing.

WELL_L light on	Water is below the well sensor	Run Dry Protection feature has been triggered; water has dropped below well sensor. Once well has replenished, pump should start again based on the time delay.
WELL_L light on when bore is not dry	Water sensor is either stuck or damaged, repair or replace sensor	Try and repair or replace the probe to see if that is the issue. Bridge the low water sensor contacts in the controller between Com1 and WH to bypass.
WELL_L flashing	Time delay has started due to water level below sensor	Turn power off and on again or reduce the time delay.
Normal SYS & MPPT but pump is not working	Something is jammed in the pump	Remove the pump from the water source and inspect for debris and damage to Rotor & Stator. Clean the pump, replace Rotor & Stator if required and test in a bucket of water.
	Wrong cable connection	Check the pump power cables have been connected properly. 1 = Black. 2 = Blue. 3 = Brown.
Normal SYS & MPPT Motor is turning in reverse	Wrong cable connection	Swap blue and brown pump power cables and check the fitment of your rotor & stator as it may have been unscrewed due to the reverse thread.
Normal SYS & MPPT Pump is not pumping efficiently	Motor is on low-speed setting	Turn pump speed dial clockwise to maximum in the Control Box.
ERR_L	Loose cable connection	Check your panel MC4 connections to ensure connections are tight and secure. Additionally verify the voltage going into the Control Box.
	Current leakage	Power cable or the splice join could be compromised/damaged. Inspect both to check for any cuts, damage and/or water ingress.
	Motor locked due to rotor	Remove the pump from the water source and inspect for debris and damage to Rotor & Stator. Clean the pump, replace Rotor & Stator if required and test in a bucket of water.

LOW POWER	Motor speed set too low	Make sure the speed dial is turned to maximum pumping power.
	Not enough power from the panels	Not enough power from the panels or voltage to control box. Panels are sensitive to shading, overcast days, poor sunlight, and dirty panels. If you used your own solar panels, ensure the specification matches Tuhorse recommendations.
	Rotor and stator impeded or damaged	Remove the pump from the water source and inspect for debris and damage to Rotor & Stator. Clean the pump, replace Rotor & Stator if required and test in a bucket of water.
	Power cable is too long	If you've used your own power cable, contact support to verify correct specifications of cable utilized.
	Motor not spinning/working	Check the bearing of your motor. You can do this by removing the pump end from the motor and testing the motor directly with the control box. – Contact support if you require assistance If you've replaced the rotor & stator and are still encountering ERR_L or LOW POWER lights, please verify that the rotor and stator have been correctly installed. Inspect the motor bearing by spinning to motor spigot and run the motor for 30 seconds in a bucket of water to ensure the motor is functioning properly.

We understand how important a reliable pump is to your operations. If you're still experiencing issues with your Tuhorse solar pump setup after following the steps above, please don't hesitate to call us on 02 8005 2823. Our team is ready to assist you.

12.0 - Maintenance and Care

To ensure optimal performance and long service life of your solar pump system, follow the recommended maintenance schedule below.

Monthly Maintenance

- Clean solar panels using a soft cloth and plain water only. Do not use chemicals or abrasive materials.
- Ensure solar panels are unobstructed, clean, and not shaded during peak sunlight hours.
- Inspect pipes and fittings for visible leaks or signs of wear.

Quarterly Maintenance

- Check all electrical connections for signs of corrosion, looseness, or damage.

Every 6 Months or After Extended Inactivity

- Test safety features, including dry-run protection and overcurrent cutoffs, to verify proper operation.
- If the solar screw pump has been turned off in the bore for more than 2–3 months, raise the pump for inspection.
- Inspect and clean the helical rotor and stator, removing any sediment or mineral buildup. Replace parts if visibly worn.
- Clean the mesh screens and filters thoroughly to prevent flow restriction or pump damage.

13.0 - Warranty and Support

- All Tuhorse Solar Submersible pumps come with a standard 2-year (24 months) manufacturer warranty
- You will receive lifetime support for your Tuhorse pumps.
- Warranty does not cover improper installation, improper use, failure to follow the instructions contained in this manual, natural weather events and external damage.
- Please contact us at 02 8005 2823 for troubleshooting assistance and any queries related to your pump Monday to Friday, 9am to 5pm AEST.