



User Manual

For: NASS 10, 12, 14

SOLAR DEEP WELL PUMPS

FOR: NASS #10 & #12 & #14

TOTAL OPEN CIRCUIT VOLTAGE GREATER THAN 150 VDC WILL VOID WARRANTY.

Introduction

Congratulations on the purchase of your Solar Deep Well Pump from North American Solar Solutions.

Solar powered products are environmentally friendly, self-sufficient as well financial benefit to reduce rising electrical cost. Our product range is designed with durability and reliability in mind to provide trouble free service throughout the life of the product.

Our Solar DC Pumps can be used for:

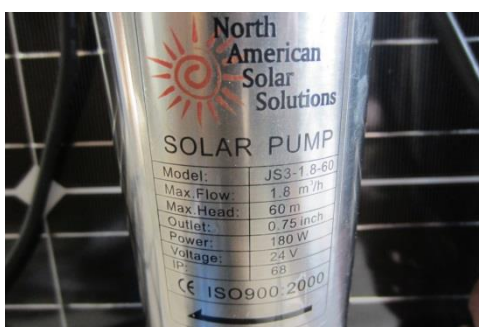
- Deep well pumping
- Agriculture
- Transfer of liquids
- Water Fountains

Care and disclaimer

It's recommended that you familiarize yourself with these important instructions. Read the complete manual before commencing the installation.

Although the solar panel connections are considered low voltage, there is still a possibility of electrical shock. During the connection stage of the solar panels, it is recommended that the panels be covered with a thick dark cloth or cardboard until connections are complete and you are ready to carry out voltage tests.

Do not switch the power on unless all connections and voltage readings are correct. The pump must be submersed in water before attempting to start the system.



Notes For Safe Operation

■ Before Installation

WARNING

Do not install or operate the controller that is damaged or has missing parts. Otherwise, it may result in equipment damage or injury.

■ Installation

CAUTION

⦿ Install the controller on non-flammable material. Otherwise damage may occur.

WARNING

- ⦿ Ensure only qualified personnel to operate. Otherwise it can cause an electrical shock or damage to the controller and pump.
- ⦿ Make sure the controller is isolated from power supply by the circuit breaker. Otherwise damage may occur
- ⦿ Do not touch the power input terminals of the controller and the pump's terminals. Otherwise it may cause an electrical shock.

■ Operation

CAUTION

- ⦿ Do not open or remove the front cover when in operation. Otherwise it may cause an electrical shock.
- ⦿ Before testing the pump it must be installed or at least submerged;
 - > DO NOT allow the pump dry-run for a long time.
 - > Maximum dry-run time is not more than 15s!
- ⦿ If the pump is turning in reverse, you must change any two lines of the pump's three power lines U-V-W. If the pump ran in reverse make sure the rotor is still threaded onto the base.
- ⦿ When the water pump has low power due to shadowing or battery power, it will try to restart the

operation after 10s.

☉ If a water level probe is installed in the well, when the water level is below the level of water shortage; the water pump will stop, and will attempt to start up again after 20-30 minutes. If there is no water level probe installed, the connection between TL-TH-COM must be OPEN.

■ Maintenance and check

WARNING

☉ Only qualified or authorized professional personnel can maintain, replace and inspect the controller otherwise it may cause damage and injury.

☉ Wait at least 10 minutes after the power is off, or make sure that no residual voltage before carrying out maintenance and inspection, otherwise it may cause damage or harm.

■ Others

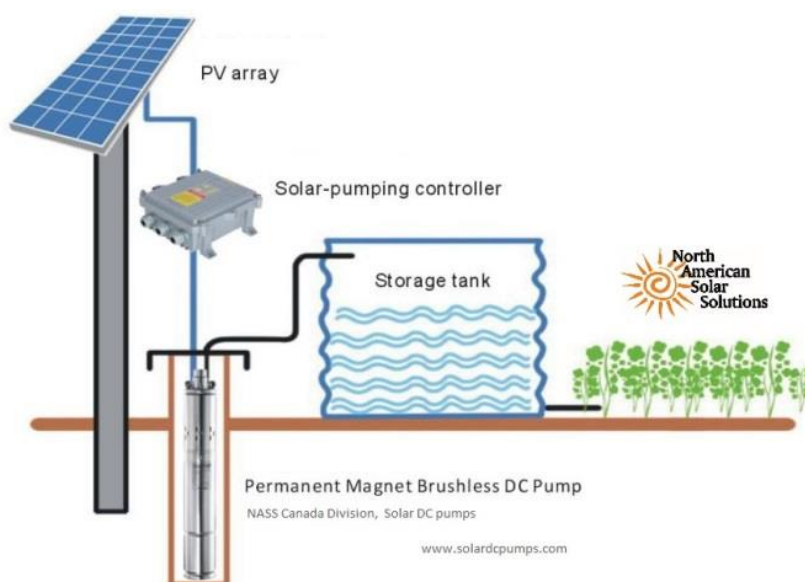
WARNING

☉ If failing to follow these instructions it could result in damage to the controller and pump. This will void warranty of the pump and controller.

1. How It Works

NASS solar pumping system serves to provide water in remote applications where electrical grid power is either unreliable, unavailable or too expensive. NASS solar pump controller can be directly used from DC power or from PV array to drive the brushless pump. In sunny days, the pumping system can be used to continuously pump water. For systems without batteries and other energy storage devices, it is recommended to take water pumped to a reservoir for later use. Water sources are those natural or special such as river, lake, well or waterway, etc. A float switch can be installed in the water tower to control the pump operation. Also install a low-level probe in well to detect the well water so that when a water shortage occurs the pump is stopped. Figure 1 shows a typical diagram of the pumping system. The major parts and components in the system.

Figure 1. NASS Solar pumping system



NASS solar pumping system is designed which consists of:

- PV Array
- Pump Controller
- Solar Power Submersible Pump
- Water Source Level Switches
- Tank Level Switches

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2. NASS #10, #12, #14 Technical Specifications

2.1 Pump Model Details

Pump Details										
Model	Screw	Well Diameter	Pump Power (W)	Rated Voltage (VDC)	Voltage Range To Pump From Controller	Max Voltage To Controller	Max Flow Cubic Liter/Hr Gallons/Hr	Max Head (Meter) Feet	Max Flow Rate L/min Gallons/min	Outline (mm)
NASS #10	Centrifugal	4"	950	72	46V-100V	150	3.6/947	138/446	60/15.8	100
NASS #12		4"	1200	72	46V-100V	150	5.0/1,315	128/419	83/21.9	100
NASS #14		4"	1200	72	46V-100V	150	23/6052	21/68	383/100	100

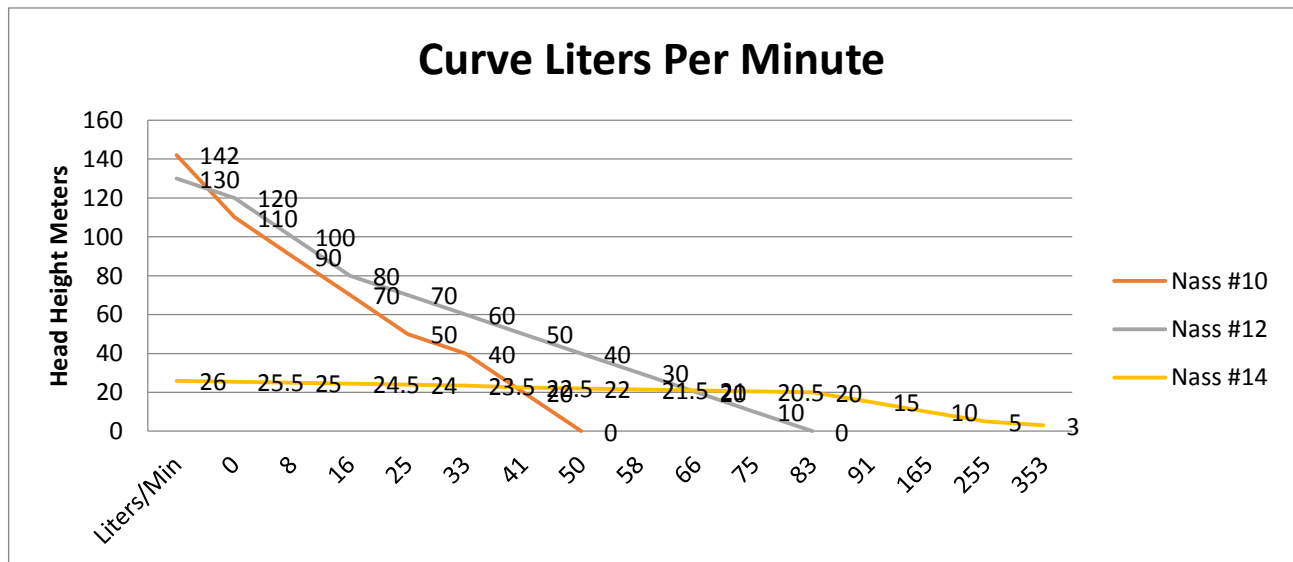
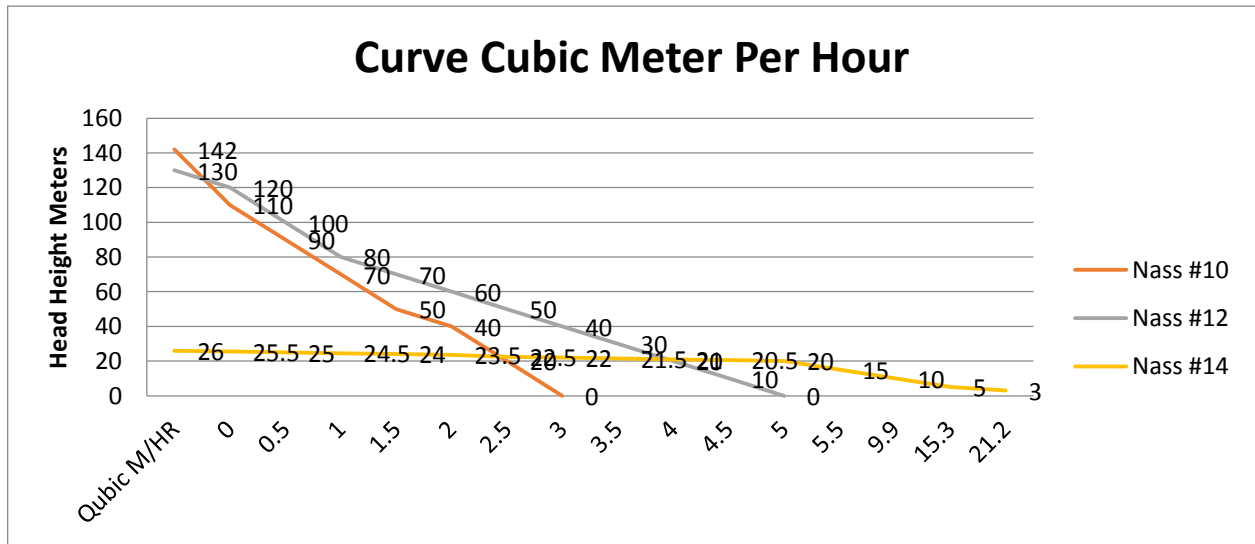
2.2 Material of Parts

Parts of Pump	Description of Material
Motor	Full Oil Permanent Magnet Brushless Motor (Without Hall)
Controller	32bit MCU / FOC / Sine Wave Current / MPPT
Controller Shell	Die-cast Aluminum(IP67)
Outlet	Stainless Steel
Pump Body	Stainless Steel
Motor Body	Stainless Steel
Bear	NSK
Helical Rotor	316 Stainless Steel
Screw	316 Stainless Steel
Cable	3 Meters / Three-core copper cable /1.5mm ³

2.3 Performance Chart Metric

Metric :

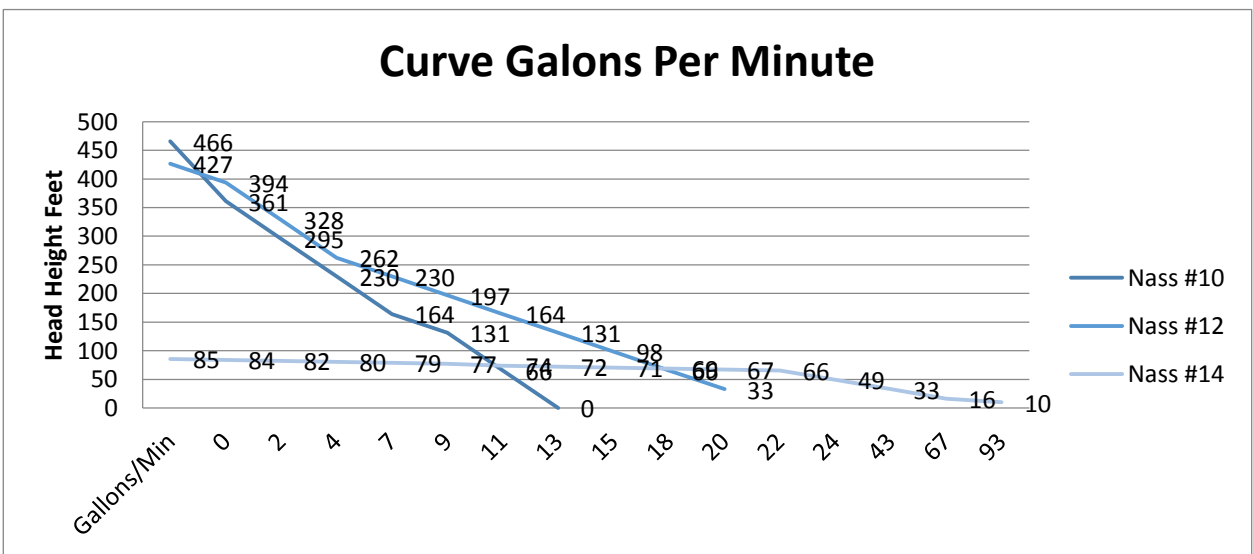
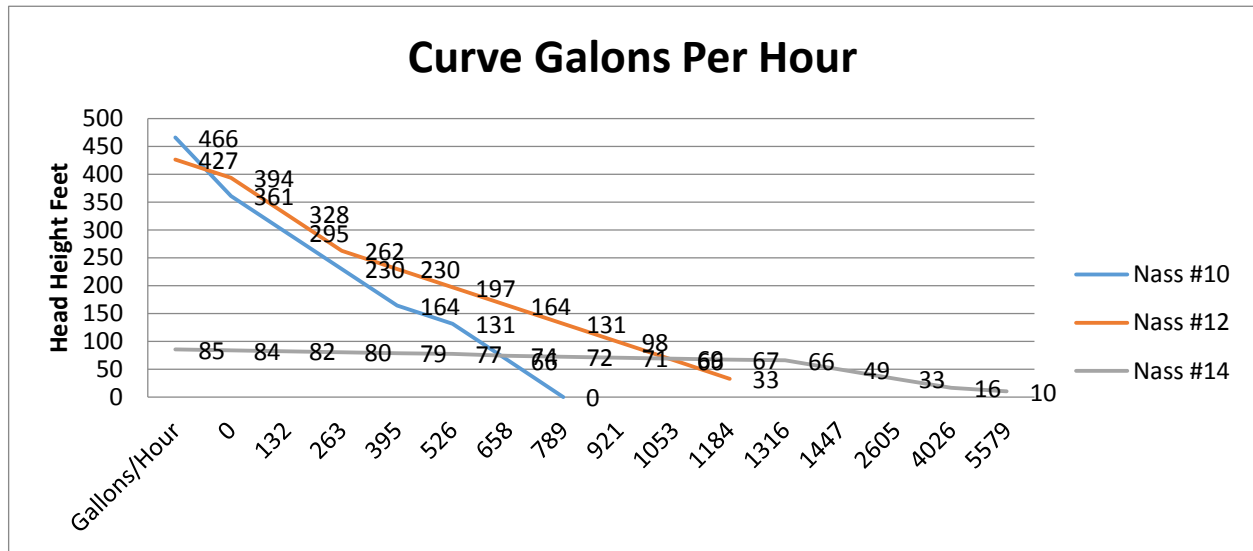
- Cubic Meter Per Hour
- Liter Per Minute



2.4 Performance Chart Imperial

Imperial:

- Gallons Per Hour
- Gallons Per Minute



2.5 The Technical Parameters of The NASS #10-12 & 14 Solar Controller

Item		Technical Parameters		
Voltage	Rate Voltage	72 VDC		
	Max Open Voltage	150 VDC		
	Under Protection Voltage	46 VDC		
	Over Protection Voltage	100 VDC		
Current	Rate Current	12 A		
	Over Protection Current	15 A		
	Peak Protection Current	18 A		
MCU and Controller Mode		32bit MCU / FOC / Sine Wave Current / MPPT		
Shell		Die-cast Aluminum (IP67)		
Dimension		197mm*190mm*98mm		
Weight		2.1kg		
Cooling Mode		Natural Heat Dissipation		
Operating temperature		-20℃ - +50℃		
Storage conditions		-20℃ - +80℃/5~85%RH(No condensation)		
Operating mode		S1 (Continuous working)		
Adaptive Solar Panel	The Solar Panel of VMP	17~18V	29~30V	35~36V
	The Solar Panel of VOC	21~22V	35~37V	43~44V

2.6 Pumps Outline Dimension

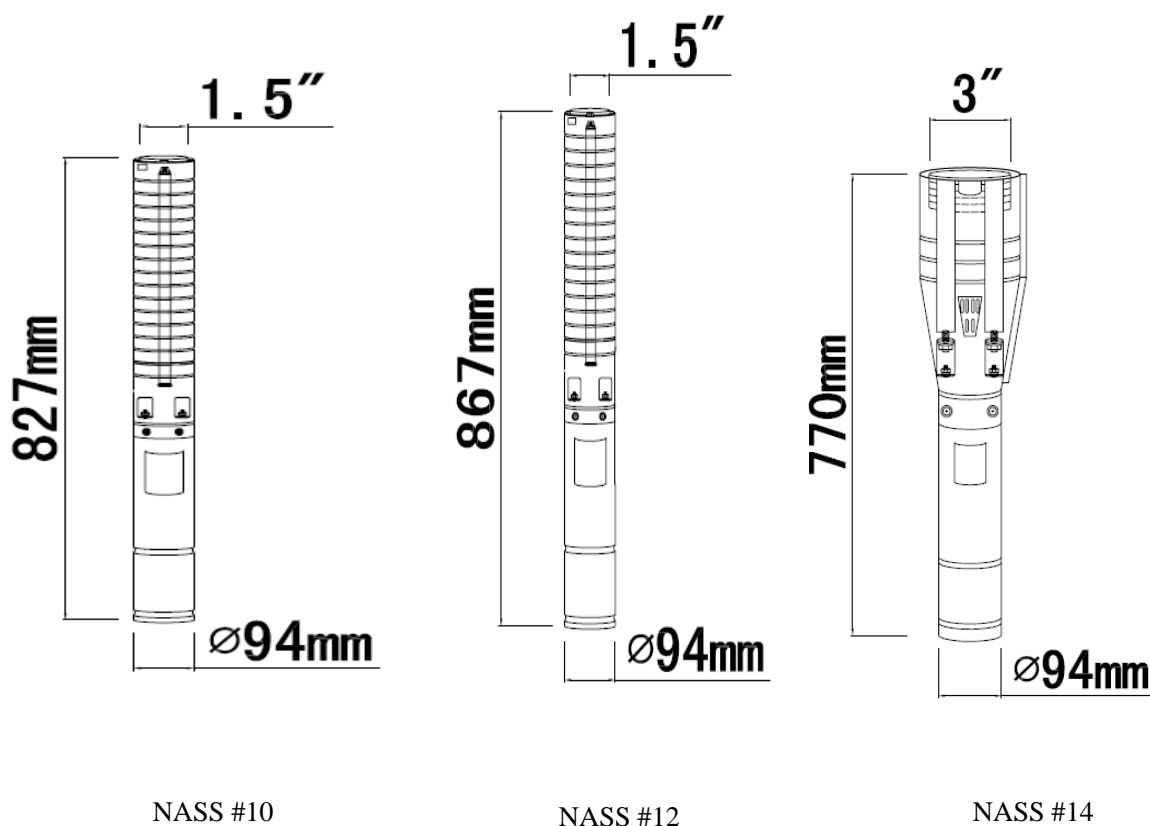


Figure 3. Outline Dimension

3. Controller General Information

3.1 Features

The solar pump controller is designed with a high standard of reliability expected from our products. The controller attempts to drive the pump and motor to deliver water even under adverse conditions, reducing output as necessary to protect the system components from damage, and only shutting down in extreme cases. Full operation is restored automatically whenever abnormal conditions subside.

Inspection:

Before you begin, receive and inspect the solar pump controller unit. Verify that no damage has occurred during transit.

NOTE: The solar pump controller is one component of your pump system which has other two optional components, solar array and brushless motor pump.

Pump Controller Protection Features:

Electronic monitoring gives the controller the capability to monitor the system and automatically shut down in the event of:

- Dry well conditions – with low level switch
- Bound pump – with auto-reversing torque.
- High voltage surge
- Low input voltage
- Open motor circuit
- Short circuit
- Overheat

NOTE: This controller provides motor overload protection by preventing motor current from exceeding rating current and by limiting the duty cycle in the event of low water level. This controller does not provide over temperature sensing of the motor.

System Diagnostics:

The solar pump controller continuously monitors system performance and detects a variety of abnormal conditions. In many cases, the controller will compensate as needed to maintain continuous system operation; however, if there's high risk of equipment damage, the controller will try to protect the system. If possible, the controller will try to restart itself when the fault condition subsides.

Motor Soft-Start:

Normally, when there is a demand for water and power is available, the solar pump controller will be operating. Whenever the solar pump controller detects a need for water, the controller always “ramps up” the motor speed while gradually increasing motor voltage, resulting in a cooler motor and lower start-up current compared to conventional water systems. Due to the controller’s soft-start feature this will not harm the motor.

Over Temperature Protection:










The solar pump controller is designed for full power operation from a solar array in ambient temperatures up to 45°C. In excess of 45°C temperature conditions, the controller will reduce output power in an attempt to avoid shutdown. Full pump output is restored when the controller temperature cools to a safe level.

Level Control Switch:

The NASS solar pump controller can maintain water levels by using two water level switches/sensors that controls the pump automatically and can be used for low water level warning.

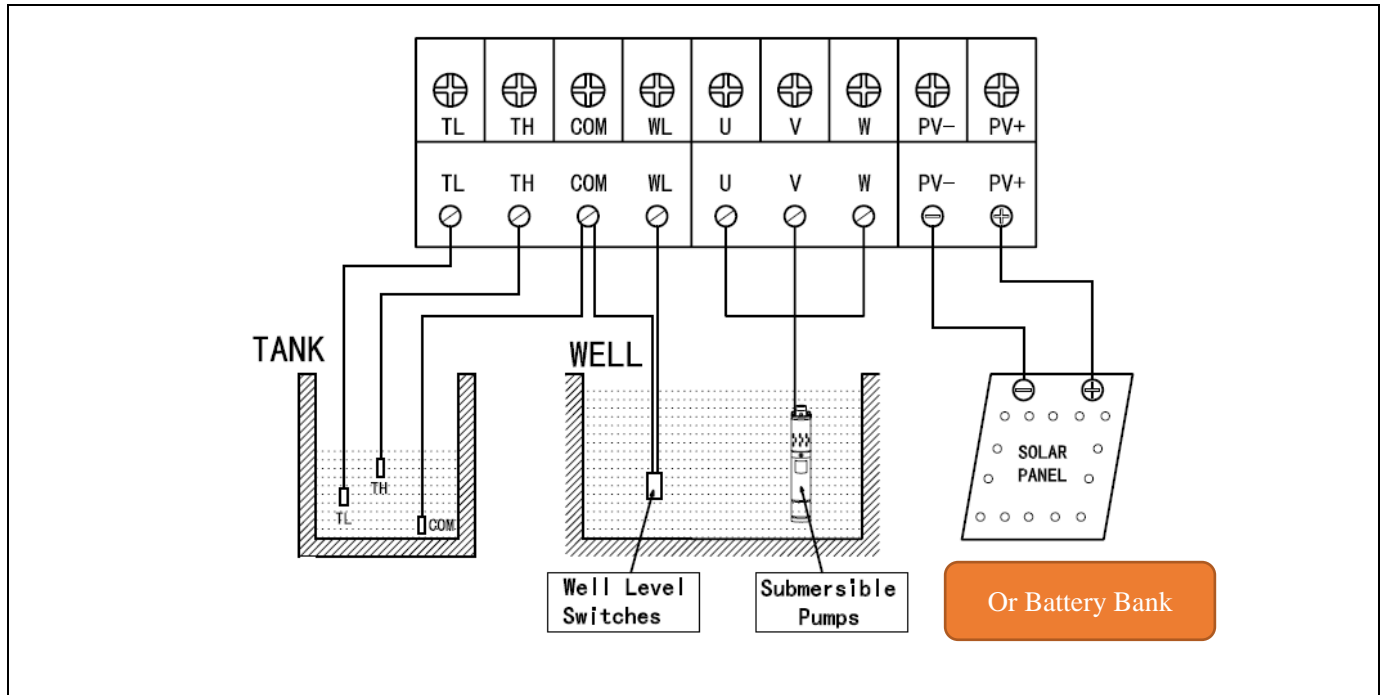


3.2 Operation mode Solar Controller

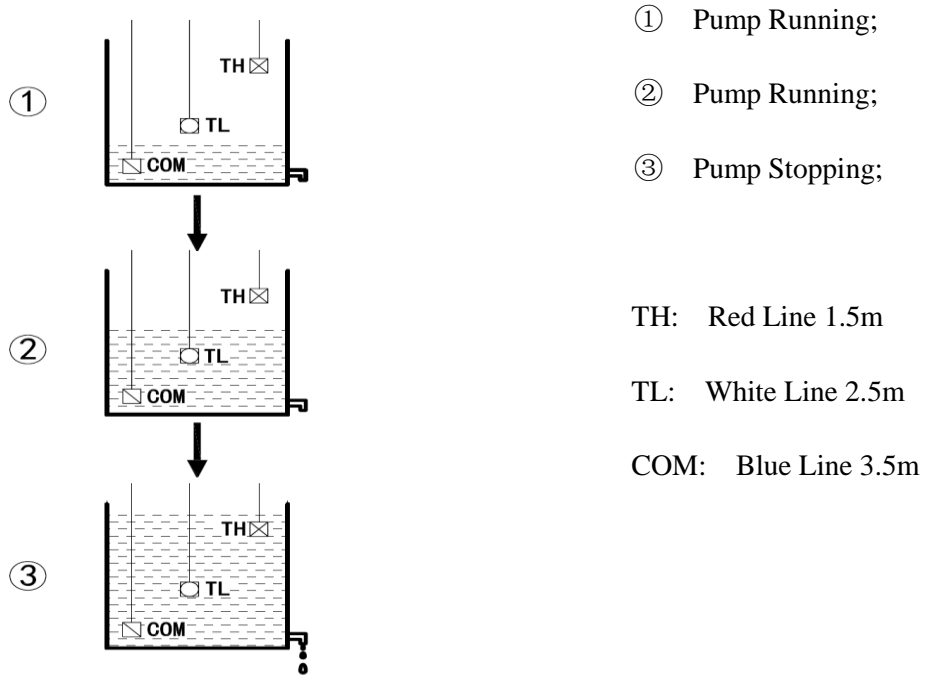
Push-Button Function Description	
	Push to Add the Speed
	Push to Reduce the speed
	Push to control Run and Stop
Indicator light function Description	
	<p>The Speed of the pump display</p> <p>Nate: the controller control the pump run with 5 sets.</p> <p>The 1  display, the run with the lowest speed.</p> <p>The 5  display, the run with the highest speed.</p>
<p>Power Running MPPT Well Tank</p>	<p>Power: Connect to Power display</p> <p>Running: Pump is Running display</p> <p>MPPT: Controller running with MPPT Function display</p> <p>Well: Without water in the well display</p> <p>Tank: Pull water in the Tank display</p>
 <p>MPPT</p>	<p>MPPT: Maximum Power Point Tracking</p> <p>When the controller Power ON, The system auto work with MPPT</p> <p>MPPT FUNCTION SETTING:</p> <p>When the 5  light, Push th  again,the MPPT indicator will light</p>

3.3 Solar Controller Connections

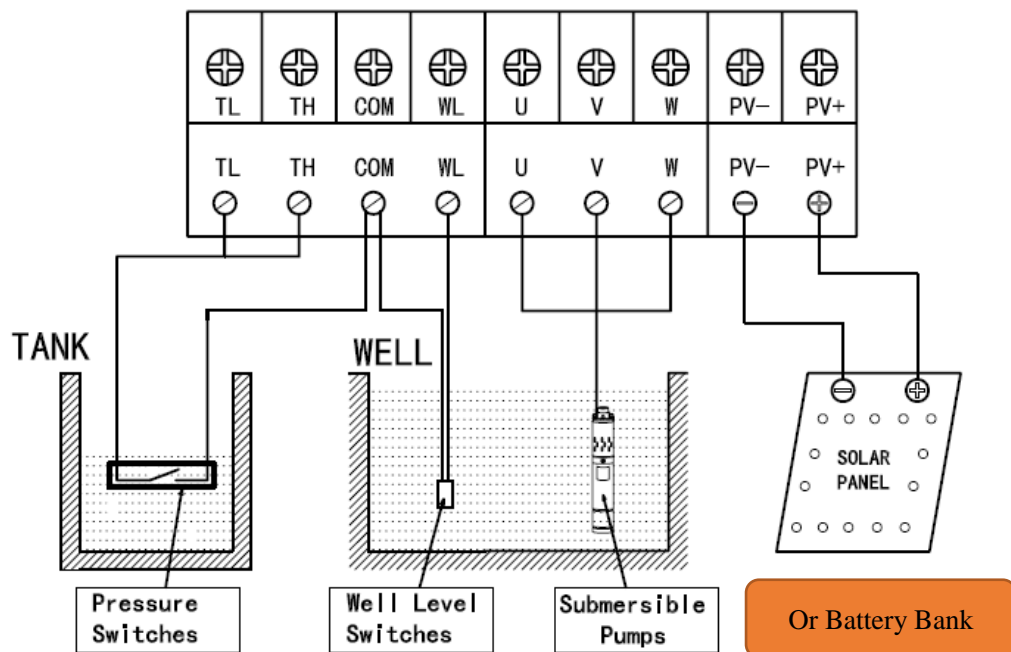
3.3.1 Connection Sensors and Level Switches



3.3.2 Operation of The Tank Level Switches



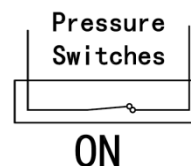
3.3.3 Connection with Pressure Switches



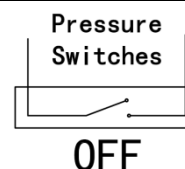
3.3.3 Connection with Pressure Switches (Continue)

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- ◆ The Pressure Switches ON: The pump STOP

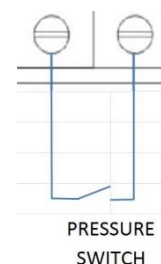


- ◆ The Pressure Switches OFF: The pump RUNNING

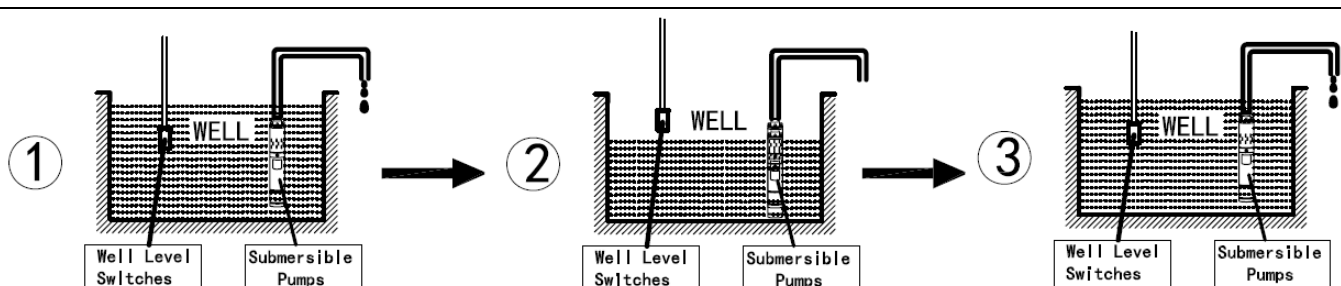


When using pressurized system (NO OPEN TANK USED) standard home system

- Install reverse pressure switch
- Means contact closes when pressure is made
- Connect pressure switch to TL/TH-COM Contact, SQUARE D, PUMPTROLL 9013FRG2J23



3.3.4 The operation of Well Level Switches



- ① The pumps RUNNING (the Switches OFF)
- ② The pumps STOPS RUNNING (the Switches ON)
- ③ The pumps will delay 10min to RUNNING (the Switches from ON to OFF)

NOTE: USE FLOAT SWITCH

- WHEN THE CONTACT IS “CLOSED” THE WELL IS DRY > AND THE PUMP STOPS

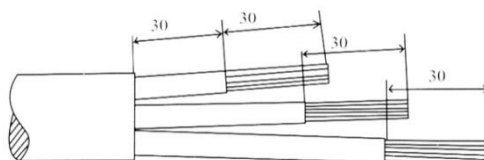


5. INSTALLATION

5.1 Wiring the pump

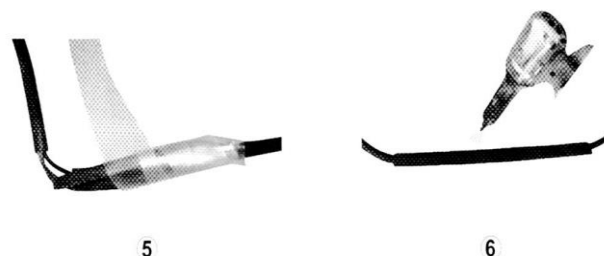
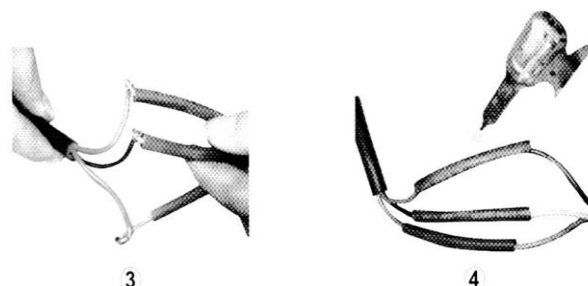
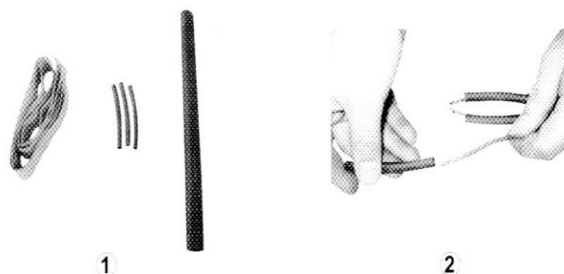
Connecting a longer cable to the pump you must verify the voltage drop, generally we want to keep the voltage drop below 2% maximum.

Distance in Feet					
50'	100'	150'	200'	250'	300'
10	8				
10	6	6			
10	10	8	6	6	4



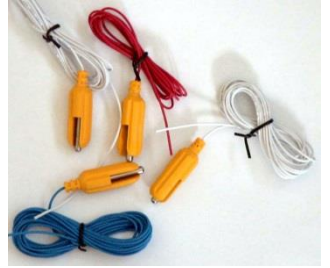
Use the parts contained in the cable connector kit (heat-shrink tube) to connect a longer supply wire to the pump. If you don't have a heat gun to shrink the tube, the barrel of your soldering iron will also work.

1. Strip both wires as per detailed sketch above
2. Layout the components needed to make the connection.
3. Put the large diameter piece of heat-shrink over the main cable Fig 1
4. Next use smaller heat shrink pieces over the individual wires. Fig 2
5. Slide the small heat-shrink over the soldered joints and heat using a heat gun or alternative heat source to shrink the sleeve down over the wires.
6. Solder all 3 connections, Fig 3
 - Note: Remember the colour connected to your wire. (So, the pump doesn't run in the wrong direction)
 - Note: Keep the heat-shrink back away from the joints as you solder them. Any heat transfer will prematurely shrink the heat-shrink.
7. Heat shrink the 3 wires, Fig 4
8. Wrap vulcanized tape over the sealed joints. Fig 5
 - Note: Use vulcanized tape to wrap wires; electrical tape is not made for years of service under water
9. Finally slide the large diameter heat-shrink over the completed joint and apply the heat gun to shrink the heat shrink. Fig 6
10. Place the pump in water before you start wiring the controller box. This will allow the pump to go through the pre-conditioning required.
 - Note: Do not put the pump in its final position until you have tested it, unless it is easy to see and remove. (Use Pail to test pump)
 - After testing install the deep well pump to its final location



2/ It is important that the water sensors are connected properly.

- The water low (WL) and water common (COM) are very important because they protect the pump from running dry.
- Do not link out WH under any circumstances. (the only exception is for troubleshooting or that they well never runs dry).
- The sensor probes are all the same, just different colored wiring.



5.2 TESTING THE PUMP

Before you test the pump, the controller box switch must be in the off position.

The pump must be under water at all times and should have been pre-conditioned for at least 15 minutes. Water is the lubrication for the pump and if it is not “preconditioned” properly the bearings will not be adequately lubricated.

- Do not attempt to test the pump if even for a moment without it being submerged, or permanent damage will occur. When testing you will need a large container so the pump does not pump it dry in seconds.

1. Attach a durable rope or stainless steel cable to the top of the pump using the mounting hole. Make sure the rope or cable is longer than the depth at which you want to install the pump. This is used to raise and lower the pump.

- Never use the power cable to do this.

2. Attach the WL sensor with a tie wrap to the pump cable so it will be at least 0.5 meters above the pump body when it is installed, the higher the better. The COM sensor needs to be placed below the WL sensor. (Float sensor can be used and connected to WL & COM)

3. Connect the water line and lower the pump into the bore hole, well, stream lake etc.

- Please note the pump must be operated vertically so the bearings have no excess side thrust on them and the water should be clean with no corrosive materials in it.

4. The PV panels need to be in full sun. Turn on the control switch. The pump has a “soft start function” and will start after 6 seconds and then spin up to full speed in the next 6 seconds. If the wiring is correct the pump will restart and the pump will run continuously. If the pump does not pump water it is possible the wiring of the pump is incorrect and it is running backwards. To correct this switch off the control box and reverse the wires to terminals U and V. Switch the controller on again and the pump should now be working correctly after self-diagnostics.

- If this does not happen see the trouble shooting guide.

5. Test the sensors one at a time. Pull the sensor connected to WL out of the water, the pump should stop immediately. Put the sensor back under water, the pump should start after 30mins delay. To test TH start the pump with COM in the water and pull TH. The pump should run. Lower the TH sensor back in the water and the pump should stop. Pull the TH sensor out of the water and the pump should start again.

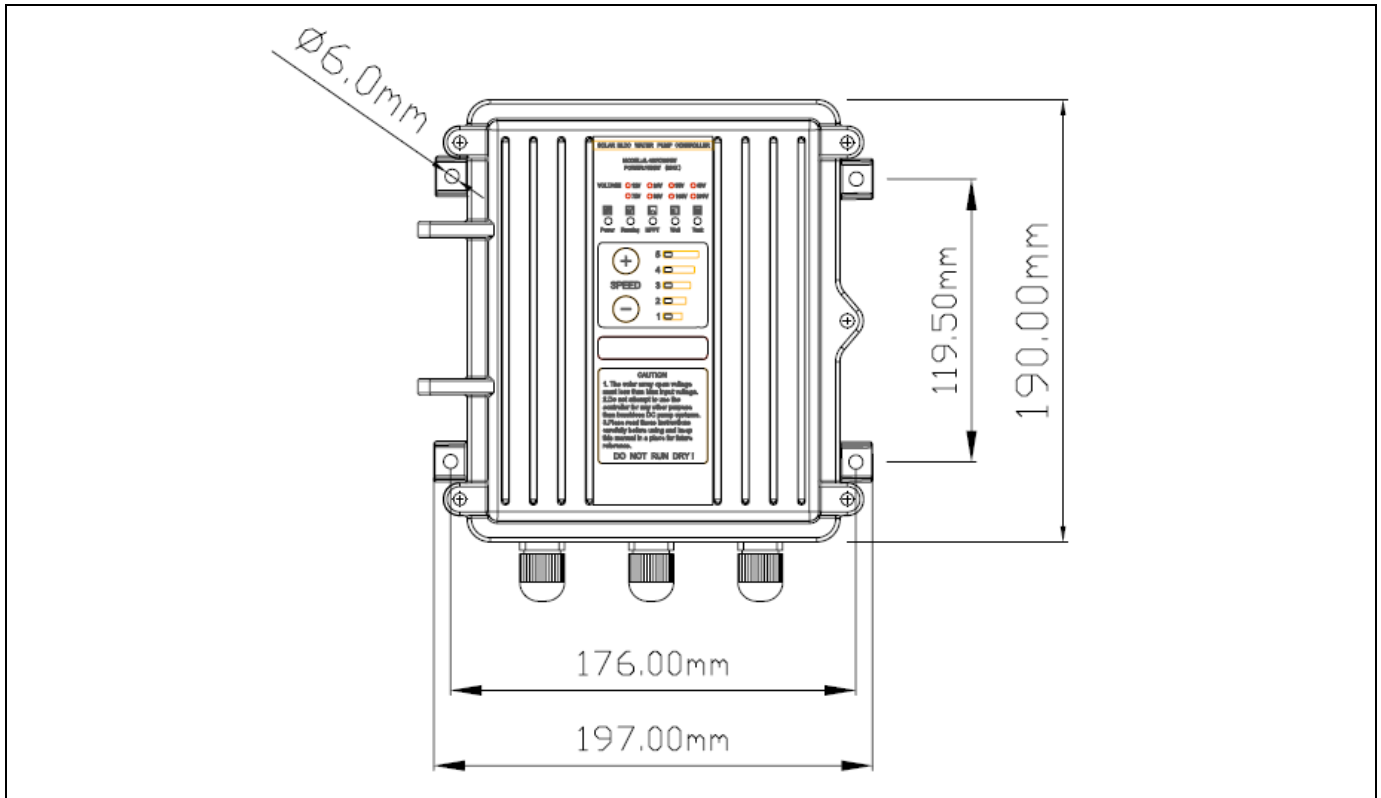
Please Note: If the water is lower than WL-COM (WELL) sensor, the pump won't work.

- **There will be 30mins delay before restart.**
- **During this 30mins, the power lights are off.**

- **If you want the pump works immediately, you need put WL sensor in water and restart the switch on controller.**

6. Mechanical and Electrical Installation

6.1 Outline & installation dimensions diagram



5.2 Mechanical Installation

6.2 Overheat protection

The protection level of NASS Series solar pump controller reached IP67; if installed in the outdoor, the controllers should be installed in a well-ventilated place, and avoid direct sunlight and rain. The best installation location is below the solar array, which can prevent the equipment from overheating and performance degradation. In extremely high temperatures, high temperature may cause the controller stop to protect itself.

6.3 Location Selection

The NASS Series solar pump controller is intended for operation in ambient temperatures up to 60°C, but in order to avoid overheating caused by the failure, it is recommended to install the controller in the shadow position.

The NASS Series solar pump controller must be installed into a control box which has a tight enclosure to avoid direct sunshine, rain, dust, moisture, animals, plants, etc. The control box should have a bottom gland plate for installing wire cord or conduit. To decide the size of control box, Please refer to the following Figure 4.

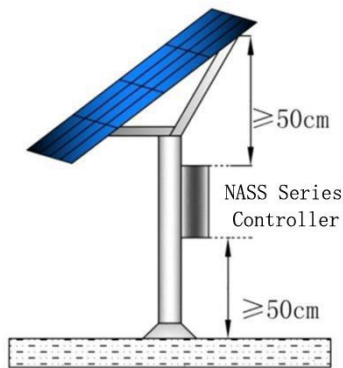


Figure 4. Control Box Location

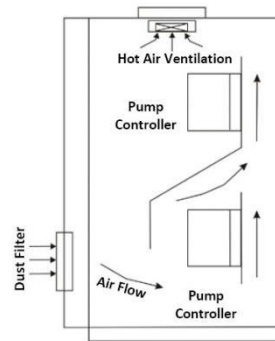







Figure 5. Ventilation Arrangement and Required Distances

7. PAKING LIST

Open the package and check all the parts have been supplied.

Product List		
Solar pump	1pc	
Controller	1pc	
Cable Connector	4pcs	
Water Level Sensor	2 plus float or 4 sensors	
Rope	1pc	
Manual	1pc	

Note products and manuals may vary due to continuous R&D, if you have any questions regarding this manual or any of our products please call us at 705 999 2105 or email to info@nasolarsolutions.com



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Customer record card

Name _____

Address _____

Tel _____

Email _____

Model number _____

Date of purchase _____

SEND COMPLETED WARRANTY CARD BY EMAIL TO SOLARSOLUTIONS@BMTS.COM

Limited 3-year Warranty

1. The manufacturer extends only to the original consumer purchaser a limited warranty against defects in material and workmanship for a period of three years from the date of purchase. This warranty covers the pump and sensors.
2. Electrical controller 1 Year Limited warranty, customer card to be received for warranty.
3. The manufacturer or authorized factory representative will repair, or at its option replace any defective part or parts of the product free of charge. In the event of a malfunction the purchaser must return the product to an authorized dealer/agent at their expense. The warranty is limited to the repair or replacement of the product and the manufacturer or its dealers disclaim all liability for indirect and or consequential damages such as any installation charges.
4. The warranty does not apply when the equipment has not been installed as per the instructions or damage has occurred through abuse, carelessness, improper installation, accident or mishandling during shipment, connecting to an improper voltage or it has been serviced by anyone other than an authorized factory representative.
5. A purchase receipt or invoice for proof of purchase must be presented to claim warranty.
6. All repairs not covered by warranty or outside the warranty period will be charged at normal rates.
7. **Note: For warranty purpose "Customer record card must be sent to Solarsolutions@bmts.com"**

NASS Canada (North American Solar Solutions)
Attention: Warranty Service Records Department
Grey Rd 2 #496773
Clarksburg, Ontario N0H- 1J0, Canada