



English

# Installation, Operation and Maintenance Instructions

## Solar Pressure Systems

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# Warranty

1. The Solar Water Pumping System manufactured by Mono Pumps are covered by warranty for a period not exceeding twenty-four months from purchase.
  - (f) Damage to the motor if the motor is found to have been disassembled before being returned to Mono Pumps.
  - (g) Damage caused by running the pump dry.
2. Mono Pumps will make good by repair, or at their option, the replacement of faulty parts under warranty, providing always that:
  - (a) The equipment was correctly installed and properly used in accordance with Mono Pumps Installations and Operating instruction and accepted codes of good engineering practice.
  - (b) The claim for goods under warranty arises solely from faulty design, material or workmanship.
  - (c) The repair is carried out in the Mono factory or by an authorised agent or distributor appointed by Mono Pumps.
  - (d) All freight costs to and from the factory or repair agent are to be paid by the purchaser.
3. In the case of equipment or components which are not of Mono manufacture, but supplied by them, the warranty is limited to that extended by the suppliers or manufacturers of such equipment.
4. Mono Pumps warranty does not cover any of the following:
  - (a) Claims for third party liability of damage caused by failure of any of the company's products.
  - (b) Damage caused by abnormal operating conditions, war, violence, storm cataclysm or any other force.
  - (c) Damage caused by the equipment being used for an application for which it is not recommended.
  - (d) Damage caused by sand or abrasive materials, corrosion due to salt water or electrolytic action.
  - (e) Damage to the SMC if the SMC has been opened by removal of the back plate before being returned to Mono Pumps.
5. The decision of Mono Pumps in relation to any claims or disputes over warranty is final.
6. The warranty is in lieu of all other warranties and conditions expressed or implied, written or oral, statutory or otherwise, which are hereby negated and excluded.
7. This express warranty does not exclude any conditions or warranty implied by the Trade Practices Act 1974 or separate State laws and in addition to any other right, that the original purchasers or any subsequent purchaser may have at law.

In case of claim please contact your Authorised Mono Dealer or contact Mono Pumps (Australia) Pty. Ltd.

# Introduction

## System Overview

Mono® Solar Pressure Systems are comprised of 5 main components:

- 1 Pressure tank
- 2 Pressure switch, cable and plug
- 3 Pressure gauge
- 4 Mounting bracket
- 5 Pipe and fittings

Two types of Solar Pressure Kits are available. Both kits use the same steel pressure tank and switch (shown on the right), but differ due to the connection method to the controller. The SUN S0884 uses a two pin plug suitable for connecting to a Mono Mini MPPT controller (as used on CP25 Sun-Ray Systems). The second kit, SWP-10065, is fitted with a four pin plug suitable for connection to controllers used on Sun-Sub, Sun-Downer or Large Sun-Ray (other than the CP25) systems. The maximum pressure rating of the metal tank is 70m (pressure is also restricted by the pump used).

## Intended Use

The solar pressure kits are designed for use with Mono Solar Water Pumping Systems. The kits are intended to be used to automatically stop the pump when a remote tank is full of water and restart the pump when the water level in the tank drops. When the tank is in close proximity to the solar pump it is usually more convenient to install a float switch in the tank to control the pump rather than use a pressure kit. Pressure kits should be used when the distance between the pump and tank make it difficult to run electrical cables to a float switch.



## Warnings

**Do not use a normal float valve with this pressure kit. Only double acting float valves should be used. Using a normal float valve will prevent the system from functioning correctly.**



**This pressure is wired to suit a Mono Solar Water Pumping System. The electrical voltages on the float switch outlet of the solar controller is 24 V nominal. This system is not intended to be used with 240 applications. Consult a qualified electrician if modifying this system to use with high voltage applications.**



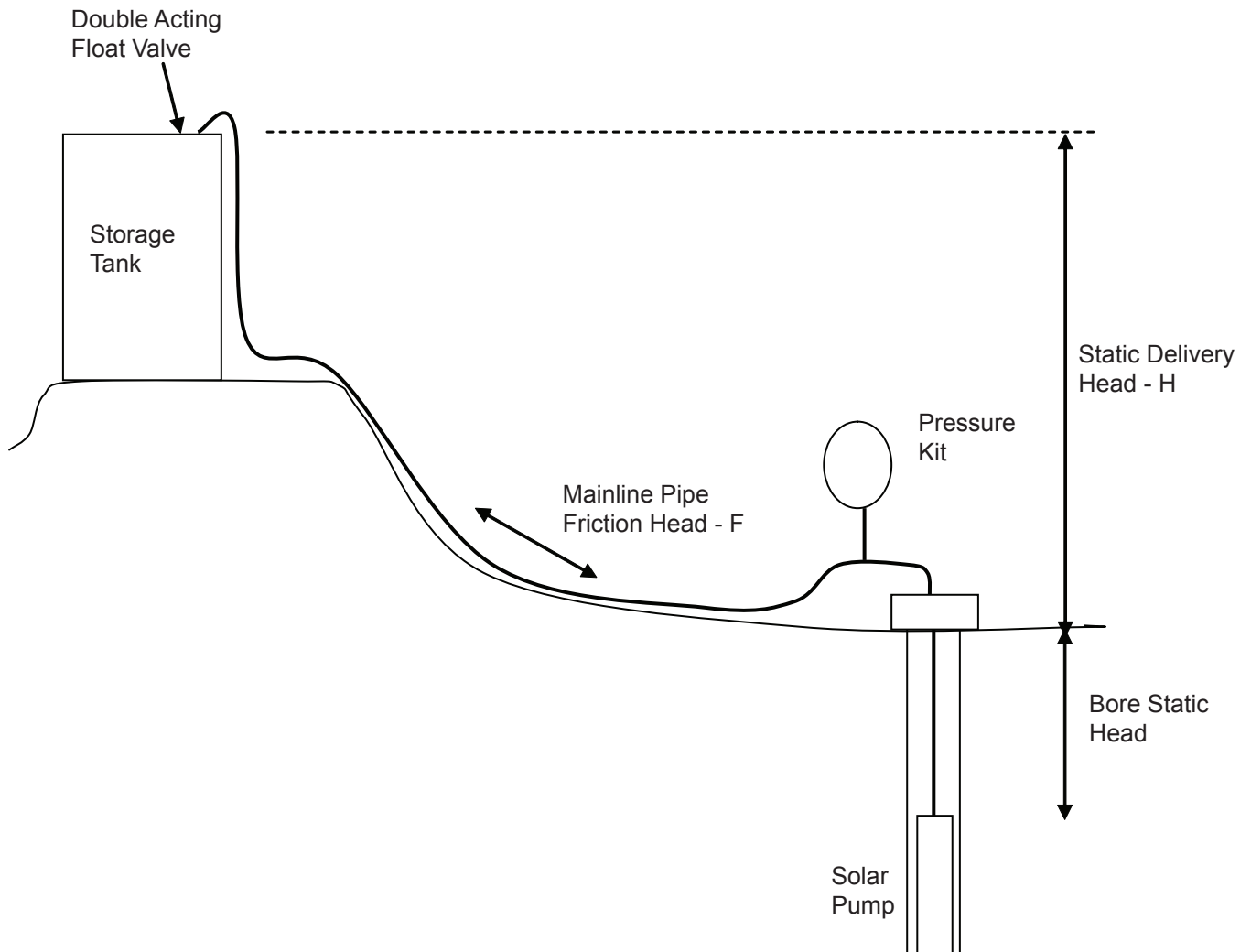
**To prevent damage to the discharge pipework or the pressure tank, the pressure switch must be set correctly to turn off the pump at a safe working pressure. Do not bypass the pressure switch if the pipework is fitted with a float valve.**



# Selection

## Selecting a Pressure System

1. Before purchasing a Pressure System it is necessary to determine the Static Head (H) and Friction Head (F) at the maximum pump flow rate. Convert H and F to kPa by multiplying by 10.
2. The pressure tank must have a pressure rating greater than the  $H + F + 50$  kPa
3. The pressure switch must have adjustable settings for both on pressure and pressure differential.



# Specifications

## Mini MPPT Pressure Kit

(For use with CP25 Sun-Ray systems only)

### Mono Part Number

SUN S0884

### Maximum Pressure

30 metres or 300 kPa (maximum pressure of pump)

### Mounting Brackets

Galvernised Steel angle with U-bolts to suit 100 mm or 125 mm post (post not included in kit)

### Pipe Connections

1 inch BSP male thread

### Pressure Switch

XMP 0 to 120 m with separate on and differential pressure adjustment, IP54

### Pressure Gauge

0 to 800 kPa oil filled

### Electrical Connection

Two pin IP68 plug

## SMC & Power Master Pressure Kit

(For use with Sun-Sub, Sun-Downer and Sun-Ray systems other than the CP25 Sun-Ray.)

### Mono Part Number

SWP-10065

### Maximum Pressure

70 metres or 700 kPa (pressure rating of the steel pressure tank)

### Mounting Brackets

Galvernised Steel angle with U-bolts to suit 100 mm or 125 mm post (post not included in kit)

### Pipe Connections

1 inch BSP female thread

### Pressure Switch

XMP 0 to 120 m with separate on and differential pressure adjustment, IP54

### Pressure Gauge

0 to 800 kPa oil filled

### Electrical Connection

Four pin IP68 plug



# Assembly

## Assembly of the Pressure Kit

Assemble the pressure kit as shown in the pictures on the previous page. Teflon tape should be used on all connections to ensure that the joints are water tight.



**The pressure switch must be installed in the vertical positions as shown. If the switch is not vertical, water may enter the switch causing premature corrosion.**

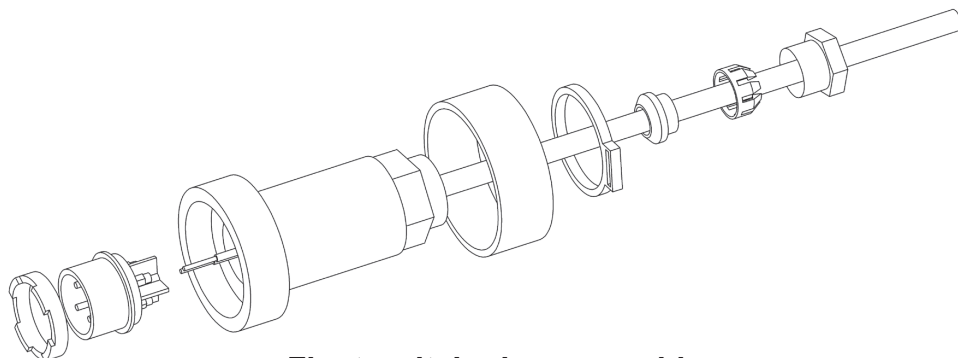
Mount the pressure kit on the array post using the supplied U-bolts. If the array frame does not have a suitable pole, mount the pressure kit on a steel or wooden post.

The jumper plug that is supplied with the SMC, Power Master or Mini MPPT can be used to wire into a pressure kit however it is better to keep the Jumper Plug and use a separate plug with the pressure kit. The jumper plug is useful for fault finding the system and bypassing the pressure kit.

The float switch plug is assembled as shown below. A wiring diagram for the pressure switch and plug is found at the end of this manual.

### Jumper Plug

(For operation without pressure switch)



**Float switch plug assembly**

# Installation

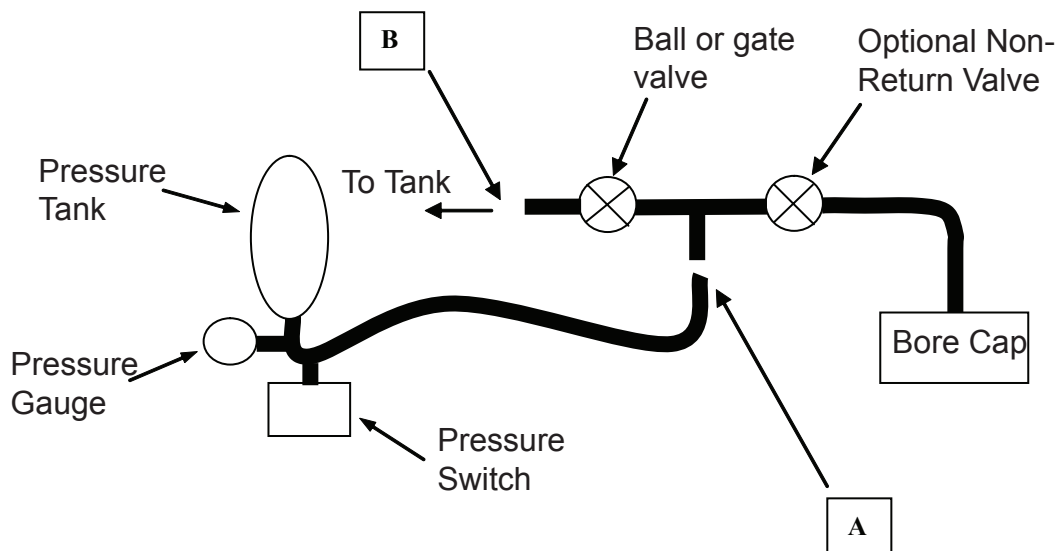
## Setting up the Pressure System

- 1 Connect the pressure system to the discharge pipework. Refer to the diagram below.
- 2 Install the four-pin jumper plug in the SMC socket labelled 'FLOAT SWITCH'. This will allow the system to start regardless of the pressure switch settings. (If a jumper plug is not available, plug the pressure switch plug into the SMC. It may be necessary to make adjustments to the pressure switch to make the system start.)
- 3 If the Double Acting Float Valve is already fitted at the end of the discharge pipe, make sure it is in the open position. If the Double Acting Ball Valve has not been fitted leave it disconnected until the pressure switch has been correctly set.
- 4 Turn on the system. The switch will need to be set at midday to ensure that the flow rate is at its peak.
- 5 When water is flowing out of the discharge end of the pipework, record the pressure from the gauge at the pressure tank. This will be the Total Pressure  $H + F$ .

- 6 Turn off the system and record the pressure on the pressure gauge. This is the Static Pressure,  $H$ .
- 7 Empty the discharge pipe by unscrewing connection A.
- 8 Set the pressure in the air tank to the Static Head pressure,  $H + 50$  kPa. The air pressure must be adjusted with pipe A disconnected.

## Summary of Pressure Settings

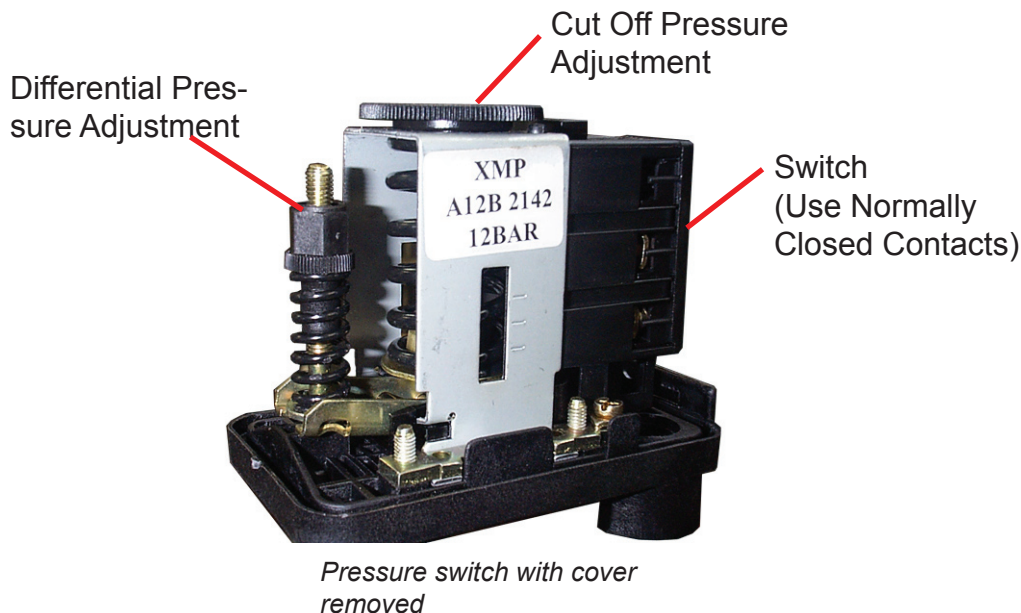
On Pressure =  $H + 50$  kPa (5 m).  
Off Pressure =  $H + F + 50$  kPa (5 m).  
Tank Air Pressure = On Pressure.  
Off Pressure must be lower than the pressure rating of the tank.  
*Note:* 1 metre = 10 kPa





# Installation

- 9 Remove the jumper plug from the SMC and plug the pressure switch into the SMC. Reconnect pipe A.
- 10 Disconnect the discharge pipe after the ball valve at point B.
- 11 Open the ball valve and turn on the pump.
- 12 Close the ball valve until the pressure gauge reads the total pressure  $H + F + 50$  kPa as found in step 5. Adjust the Cut Off pressure screw on the pressure switch so that the pump turns off at  $H + F + 50$  kPa. (It may be necessary to increase the Cut On pressure setting). Note: Each turn of the screw equals approximately 5 kPa.
- 13 Open the ball valve and allow the system to restart, test the cut off setting by closing the ball valve. The pump should stop.
- 14 Open the ball valve slightly so that the pressure falls slowly. Note the pressure at which the pump turns on. Adjust the Cut On screw on the pressure switch so that the system restarts at  $H + 50$  kPa.
- 15 Re-check that the system is turning off at the correct pressure.
- 16 The pressure switch is now set. Turn off the system and reconnect the discharge pipe. Fit the Double Acting Ball Valve at the tank.
- 17 Open the ball valve and turn the system on.
- 18 Check for correct operation of the system by manually opening and closing the Double Acting Ball Valve at the tank.



# Maintenance

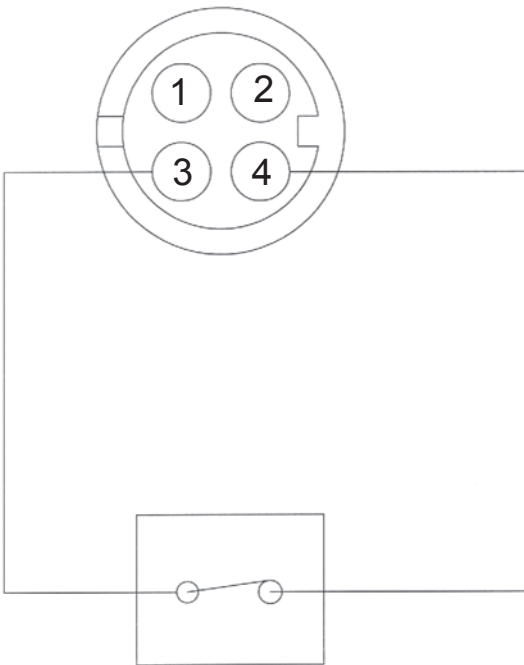
## Wiring Diagram for Solar Pressure Kits



**Note incorrect connection of float switch plug will damage the solar motor controller electronics**

**Float switch plug. Viewed from top of pins**

**Note:**  
**Some systems are fitted with two pin float switch plugs.**



*Normally Closed Contact Of The Pressure Switch*

## Maintenance Schedule

### Every 3 Months:

Check the air pressure in the tank. The air pressure must be checked with the pipe A disconnected and the system off.

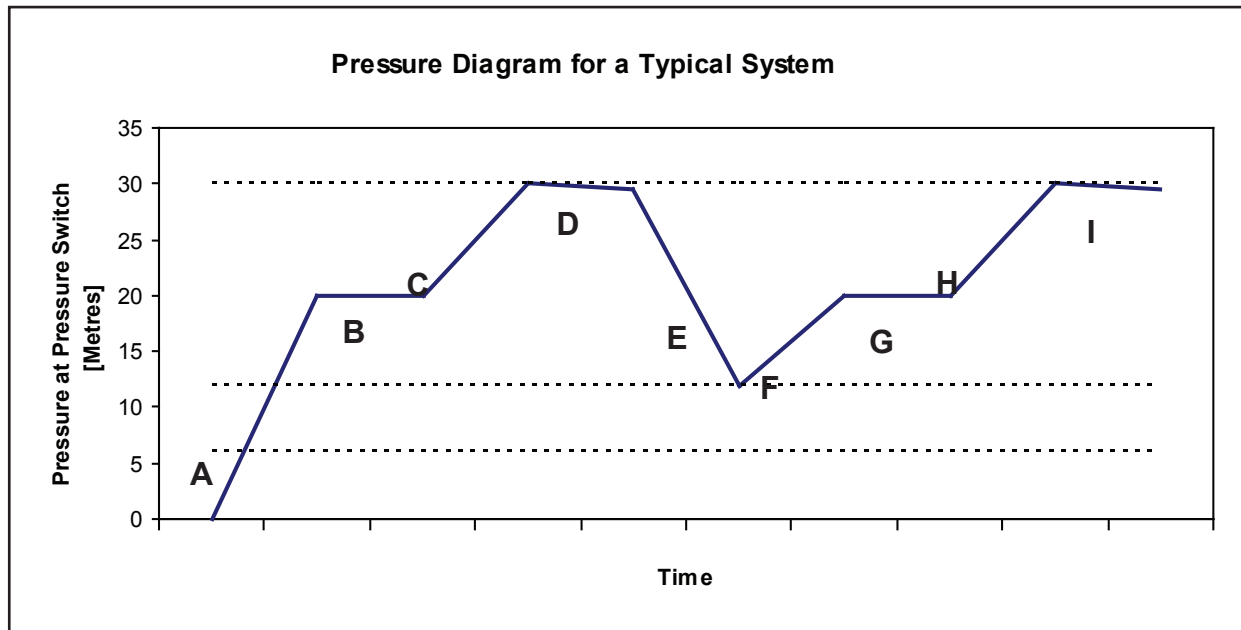
Check for correct operation of the pressure switch by manually operating the Double Acting Ball Valve.

### Every 12 Months:

With the system off and the pipe A disconnected from the pump discharge pipework, remove the pressure switch and check the hole in the base of the switch for obstructions.

Clean out the switch and pipework to ensure trouble free operation of the switch.

# Maintenance



## How the System Works

- A. When the pump is turned on for the first time the discharge pipe is empty. The pressure rises as water fills the pipe due to the Static Head and Friction Losses.
- B. Once the pipe is full and water is flowing into the tank the pressure stabilizes. The system will operate in this condition until the tank is full. Because the flow rate changes on a solar system throughout the day the Friction Head will also change. When setting up a pressure system the maximum daily flow rate should be used for the friction loss calculations.
- C. Once the tank is full the Double Acting Ball Valve will close. Water will then flow into the pressure tank. As the pressure tank fills the pressure rises until the pressure switch cuts out. This occurs at the Off Pressure, which is 30 meters in the example above.
- D. The system pressure will remain at the Off Pressure until the tank empties and the Double Acting Ball Valve opens or the pressure falls due to leaks in the valve or pipe-fittings.
- E. When the Double Acting Ball Valve opens the pressure will fall as water flows out of the pressure tank. When the pressure falls to the On Pressure of the Pressure Switch the pump will restart.
- F. The pressure will quickly rise again to the Static Head Pressure + the Friction Loss Pressure.
- G. The cycle repeats. See B above.
- H. See C above.
- I. See D above.

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