

# SOLARMASTER LTD

## “Combo” Hot Water Systems

### Installation Manual

#### General Description:

The “Combo” cylinder was developed as a multiple use unit for the use with Solar, wetback and electric heating, whilst operating at “Mains Pressure”. All units are designed to operate at 500 KPA. This allows for both hot and cold water to be distributed at the same pressure.

#### Materials:

The shell material is a duplex stainless steel.

The insulation is foamed 50mm of polyurethane.

The cladding is galvanised sheeting.

All elements fitted ex factory are “Incolloy” stainless steel.

All thermostats fitted ex factory are variable temperature and auto reset in the event of “over temperature”.

#### -Plumbing Connection Sizes:

Cold Water/Solar Inlet	20mm male
Relief TPR	20mm female
Wetback	25mm male
Solar	20mm male

#### Other Types:

- Solarmaster “ Combo hot water cylinders can be supplied in a horizontal as well as the standard Vertical form.
- Any of the above cylinders can be manufactured specifically to suit your exact requirements. i.e. shorter, higher, narrower or wider.
- Cylinders can be supplied with extra coils to suit underfloor heating requirements or to function with radiator panels.
- Commercial cylinders, Calorifiers, Electric only
- Are available in varying volumes and sizes up to 2000 and 3000 litres.

#### Installation

A recognised registered plumber must install the unit and the installation must comply with the NZ Building Code, Solarmaster installation instructions, AS/NZ 3000 electrical installations and all local codes and regulatory authority requirements.

#### - Plumbing – ( Refer Drg fig 1 )

Wetbacks can be set up with either a hot open vented header tank or a low-pressure 3.6mm head pressure – reducing valve. Vent pipes must be at the highest point in the thermosyphon circuit. The easiest way to achieve this is to screw a Tee into the top wetback fitting. Failing to comply will cause air pockets and primary circuit not functioning – Result no heating and a banging sound in the pipes.

Do not use a “HIGHER” rating reducing valve, than 3.6m or the primary circulating water will tend to take the less resistance and pass up through the open vent rather than go through the coil in the cylinder.

Wetback piping between cylinder and the fire should be installed with a 1-10 gradient falling towards the fire.

It is very important to set the wetback system up “correctly” as it works by thermosyphon. Try and maintain a minimum height of 330mm from the bottom of the cylinder to the centre line of the top outlet connection on the wetback element in the fire. Failure to achieve this will result in “back syphoning”

Pipes connecting the wetback to the unit **must be copper** and minimum 25 dia. Both lines to be insulated from the cylinder to the fire. If a pulse flow valve is fitted these pipes can be reduced to 20 dia. It is very important “NOT” to fit any non-return valves into the wetback system.

#### Commissioning:

1. Turn on the water supply to the unit and commence filling.
2. Allow the unit to fill entirely then switch the power on.
3. A suitable electrical meg. test should be completed to ensure the element is performing satisfactory.
4. Open all outlets in the house and open the main isolation valve to the unit to allow “FULL” pressure through the entire house piping system and to force any trapped air OUT.
5. When a full flow of water only is discharging from each tap close it.
6. Check the pipe work system for inherent leaks.
7. Re-check the electrical supply.

A non-return valve must be fitted to the cold water supply line to the unit. Pipe sizes are recommended to be either the same size as those on the unit or larger.

Check the temperature and Pressure Relief Valve ensure the temperature probe has not been bent or damaged. Apply PTFE tape to the thread and screw the valve into the socket provided, this is normally off set from the centre outlet. Fasten the valve with the appropriate spanner with flats rather than using a wrench around the body.

The open vent side from the TPR valve needs to be piped away to an open area and preferably above a gully trap outside the house.

NOTE: The first 1.2 metres of the TPR drain must be in copper.

All units to be suitably restrained to meet the seismic requirements refer NZ Building codes.

Mains incoming water pressure must not exceed stated maximum working pressure.

**Drip Trays** are required under storage water heaters where water (from the failure of the water heater) could penetrate another occupancy in the same building.

#### **Alternative Wetback set Up ( Pulse Flow Refer Drq Fig 2)**

The Pulse flow valve was developed to use where a pumped or natural thermosyphon system is not a choice.

The valve is mounted on the cold-water inlet (bottom connection) of the wood fire wetback element.

The valve traps the cold-water in the fire element until it is heated. Once heated, the water through natural expansion of 3% causes a powerful surge in the hot outlet pipe, the valve opens and allows a fresh charge of cold water into the element and the cycle repeats itself.

This **surging** will only occur while the fire is in operation.

The following guidelines must be strictly adhered to:

Only for use in a low pressure open vented pulse-pumping system.

Requires heated fluids to operate successfully.

Must be installed only in the cold-water inlet side of the heating source.

Must be installed in the correct flow direction 

Must be installed in the up position.

Must be installed only to an approved circuit configuration.

#### **-Electrical Connections:** ( refer Invensys Drq EWT 1L2S-206 Fig 3)

All electrical must comply with AS/NZ 3000. All units are designed for

Voltage – 230 V AC

Frequency – 50 HZ.

Disconnection of the fixed wiring from the main supply must be incorporated during the initial installation.

The electrical cable should be encased in 20mm plastic flexible conduit and fitted with 20mm dia plain/screwed fitting.

Connect the power supply direct to the terminal block and earth the tab connector. There should be no excess of cable inside the element box.

For details refer to wiring diagram inside the element cover.

**NOTE: Please ensure the cylinder is earthed to prevent electrolysis. There is an earth screw – terminal on every element for this purpose.**

**Element:** Hermetic 3KW 240 Volt Incolloy Code 1140 H

**Thermostat:** Robertshaw Surface mounted variable temp 50 –80 0 C  
Over temperature complete with auto reset EWTILS-206

#### **Troubleshooting**

**“Normal”** – Small amount of water from TPR or cold expansion valve draining during heating phase.

**“Not Normal”** – Excessive amount of water discharge from TPR valve drain. i.e. more than 4 litres in 24 hours. There may be a foreign particle lodged in the valve bonnet. Lift the lever gently for a few seconds and observe if water continues or stops. Repeat a few times. If water continues running, call for service. If there is a heavy continuous flow of hot water from the drain of the TPR valve and then the unit is only left with cold water. Turn off electricity supply and call service.

Owner should operate the lever on the TPR valve every 6 months to allow discharge.

Note: On releasing the valve resets it should cease discharging.

**Inlet water Pressure - High pressure may cause excessive discharge and possible premature failure of the operating relief valve. The maximum water pressure usually occurs during the night, at the time of lowest water usage.**

**In any mains pressure water heater installation, if the inlet water pressure exceeds 80% of the nominal set pressure of the operating relief valve a Pressure limiting Valve must be fitted to the cold inlet.**

If the TPR valve continually discharges during the use of the wetback then it is because of the excessive "Temperature" in the unit rather than pressure. Either turn the fire "Down" or use some hot water i.e. run a bath. If the problem persists each year, another suggestion is to look at fitting radiators to warm other areas in the house and also burn up the excess energy.

#### **Insufficient Hot Water –**

- ❖ Has power been turned off?
- ❖ Is the unit connected to the ripple electrical supply and is it currently turned off. (Can apply during winter. Authorities Conserve Power).
- ❖ Check main switchboard to see if contactor is out of position.
- ❖ Check fuses in main switch board marked "Hot Water Supply".
- ❖ Check the family usage of hot water. Normal recommended flow rate for shower 8-10 Litres/Min i.e. 4-minute shower 40 litres. Flow control valve can be fitted to limit this.
- ❖ Check thermostat setting (may have been set down for summer).
- ❖ If the Wetback is not performing very well it could be due to an incorrect installation. Check approx 330 mm from underside of cylinder to centre line of top connection on the wetback in the fire. If it is not set up like this it will lead to back syphoning ie during fire cooling down it will draw hot water out of the cylinder into the fire causing the water to cool and increase the electricity bill.

#### **Higher Power Accounts –**

- ❖ Too high family usage (mainly shower)
- ❖ Leaking hot water supply pipe, dripping tap. Replace faulty washers.
- ❖ Either expansion or TPR discharge excessive amounts of water.
- ❖ Has power tariff increased since last power account
- ❖ If a mains pressure cylinder has been fitted into an existing low-pressure system, fit new showerheads and limiting valves to facilities.
- ❖ If the Wetback is not performing very well it could be due to an incorrect installation. Check approx 330 mm from underside of cylinder to centre line of top connection on the wetback in the fire. If it is not set up like this it will lead to back syphoning i.e. during fire cooling down it will draw hot water out of the cylinder into the fire causing the water to cool and increase the electricity bill.

### **WARRANTIES:**

#### **Warranty (Domestic):**

"Combo" Domestic Water Heaters are backed by comprehensive 12-month parts and labour warranty, also a guarantee to replace or repair the internal pressure cylinder for a total of 7 years.

Solarmaster will not be liable for any loss or damage of any unit that has not been correctly installed.

#### **1<sup>st</sup> Year warranty:**

Solarmaster Ltd will replace or repair any cylinder due to faulty workmanship during the first twelve months including removal/reinstallation/Freight charges. Solarmaster will not cover any costs such as crane or roof removal where the cylinder has been located in a **non-accessible area.**

#### **2 – 7 Year Warranty**

Solarmaster will replace or repair any cylinder due to faulty workmanship during the 2<sup>nd</sup> – 7th year. Any costs incurred for removal/reinstallation are the responsibility of the owner.

Solarmaster will cover freight costs.

Solarmaster will not cover any costs such as crane or roof removal where the cylinder has been located in a **non-accessible area.**

#### **Warranty (Commercial)**

Commercial cylinders have a 12-month replacement warranty.

Any costs incurred for removal/reinstallation/freight are the responsibility of the owner.

Solarmaster will not cover any costs such as crane or roof removal where the cylinder has been located in a bad accessible area.

Solarmaster Warranties will not cover any units that have not been installed in accordance with the above criteria.

The warranty applies only to defects occurring under conditions of normal use for which the water heater has been manufactured and excludes any water damage to properties. Contaminated water may affect warranty.

### **Exclusions to Warranties**

- If cylinder has not been installed by a registered plumber or does not comply with the NZ Building code AS/NZS 3000 and local building compliances.
- Consequential loss or damage due to direct or indirect water leakage from the cylinder or the hot water system including the solar and wetback.
- Excessive heat input.
- Over pressurising the cylinder passed the relief pressure or subjecting the cylinder to a vacuum.
- Failure of the cylinder due to plumbing, valves, pumps supplied by the installer.
- Any claim made after a 30 day period of detection of the defect

### **Water Quality:**

Normal towns water supply has a Chloride content of approx 10–30 parts per million. The “Combo” is suitable for use with most town supplies however we do draw your attention to the fact that some areas in NZ where water is known to be of “Harsh quality” the supplier **must** be informed during the purchase. In general if the chloride levels are below 50 ppm at the normal operating temperature, you should enjoy an extended life expectancy. Should the levels be in excess of this figure, we recommend a sacrificial anode is fitted during manufacture and consult Solarmaster Ltd for an alternative material.

### **Alternative Water:**

Some town water, bore water, river or ground water may need to be treated, as it can be extremely corrosive.

### **SOLARMASTER ACCEPTABLE WATER QUALITY (At ambient temp.)**

PH	7.5 – 8.5
Chloride	up to 50 ppm
Iron	up to 0.01 ppm
Manganese	up to 0.01 ppm
Langelier Index	Min –1.0 Max +1.0

Figures outside the above will not be covered by Solarmaster warranties. If water is known to be of “Harsh quality” then consult “Solarmaster Ltd” for alternative materials.

### **Water Temperature:**

Because our units are manufactured from a duplex stainless steel they can operate at elevated temperatures close to “Boiling” if they have a wetback or solar system fitted.

An ideal operating temperature of the unit is normally between 60-70 Degree C, with a Minimum operating temperature as quoted by the NZ Building code as being 60 Degree C to prevent Legionella bacteria.

The electric thermostat should be set between 60 – 70 Degree C ideally or to suit your requirements.

### **Safety:**

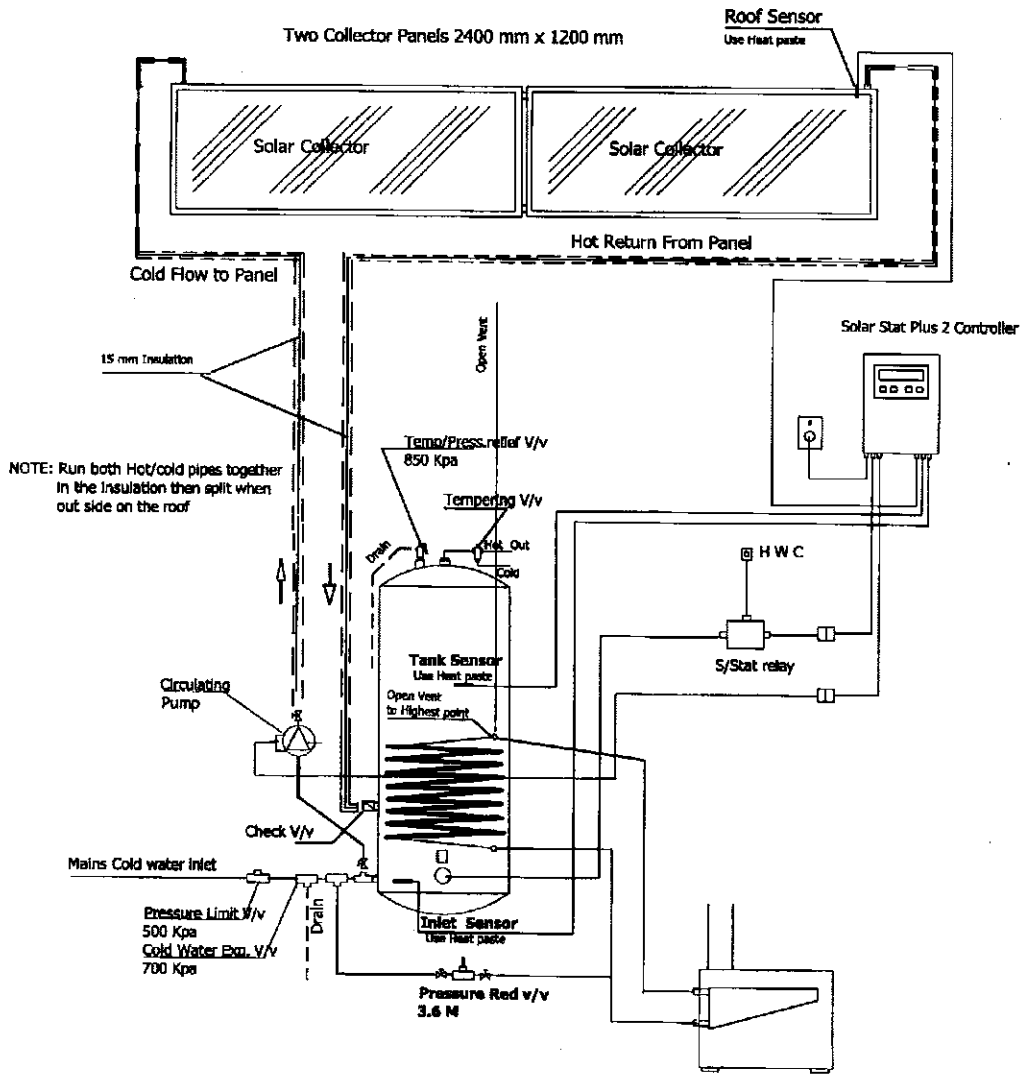
It is the responsibility of your plumber to fit the following items to the “Combo” unit.

- a) Cold Water Pressure Limiting Valve: This to be fitted to the main cold-water inlet. This sets both the limit of the hot/cold system to 500 KPA (72psig).
- b) Cold Water Expansion Valve: This is fitted to the same cold water inlet feed lines as the pressure-limiting valve. This is factory set to 700 KPA (101 psig). In the event of an over pressure in the cylinder this valve will open and release cold water only from the bottom of the cylinder.
- c) Temperature Pressure Relief Valve (TPR): This valve is fitted on top of the cylinder, is factory set to 850 Kpa (122psig) In the event that the cold water expansion valve “**fails**” then the TPR valve will open due to over pressure or over temperature and discharge water out through its own drain pipe until the water temperature in the cylinder falls to around 70 Degrees C.

Tempering Valve: This valve is fitted in the main hot water outlet on the top of the cylinder. This valve has independent cold water feed to one side of the valve. The valve is adjustable for final outlet temperature to suit, but is limited to a maximum of 55 Degree C legislated by New Zealand Building Codes.

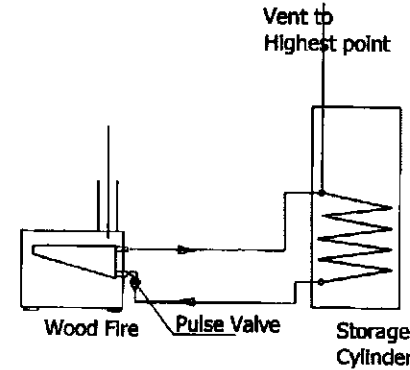
# Pumped System: Active - with wetback

A pumped system is more efficient than a Thermosyphon system comparing the same size panel and will allow for a more flexible piping layout within the dwelling constraints.

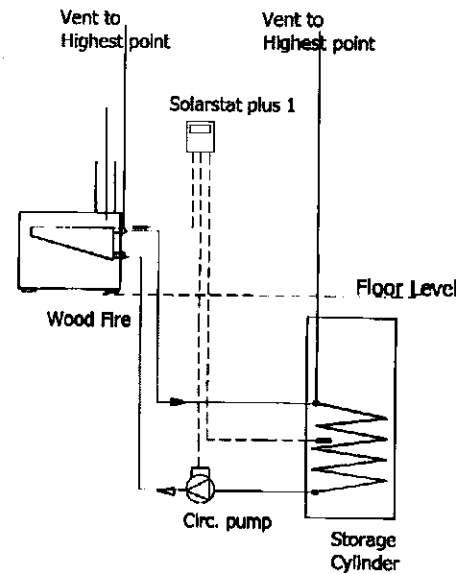


Std 280 Litre "Combo" Cylinder

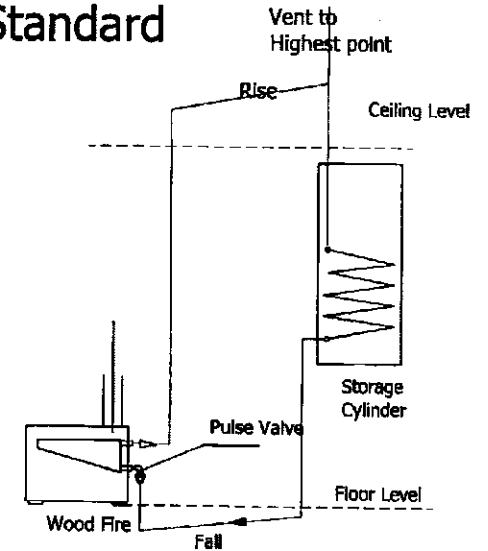
# Wetback: Alternative setup to Standard



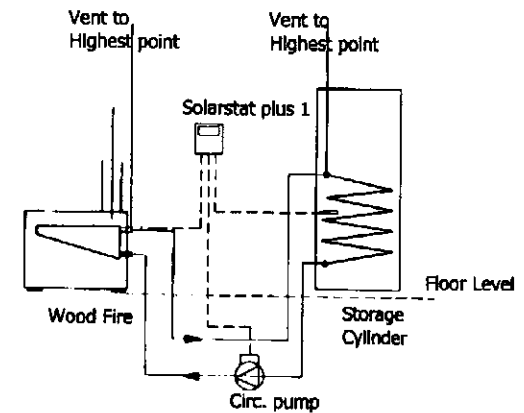
If the cylinder is located below the minimum differential height ( Refer std wetback setup -330 mm) then it is recommended to fit a pulse flow valve.



If the storage cylinder is on a lower level than the fire it is recommended to fit a pump and a control thermostat.



Under/Over system needs to be set up as above with a pulse flow valve to eliminate "back Syphoning"



If both connecting pipes are below floor level it is recommended to fit a pump and control thermostat.

