



ULTRASUN UFD

Flatplate Solar Systems



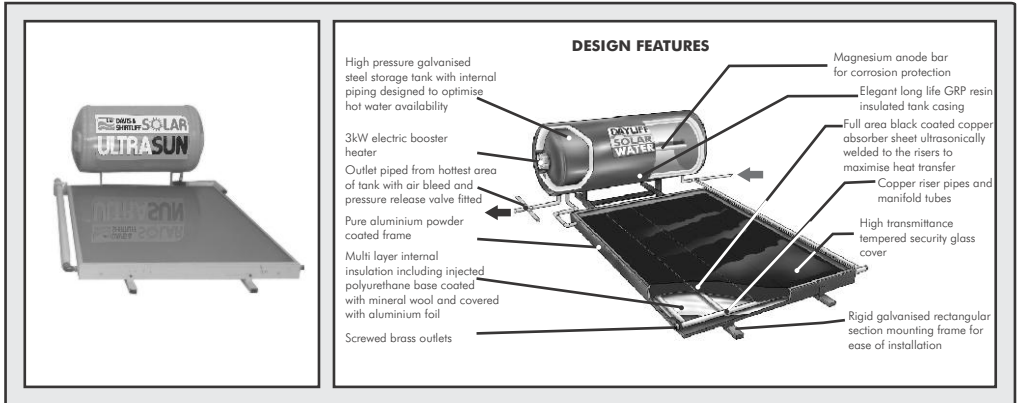
Installation & Operating Manual

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Congratulations on selecting a Ultrason UFD Flatplate Solar Hot Water System. They are manufactured to the highest standards and if installed and operated correctly will give many years of efficient and trouble free service. Careful reading of this Installation Manual is therefore important, though should there be any queries they should be referred to the equipment supplier.

1. SPECIFICATIONS



Ultrason UFD Flatplate solar hot water systems are established and effective heaters that provide excellent performance, good value and guaranteed long life. They are of Open Loop thermosyphon type with the water flow circulating through the collectors and being stored in the tank ready for use. Features include:-

- Heavy duty tank that features a resin insulated totally weather proof GRP casing, a heavy duty galvanised cylinder internally piped to optimise hot water availability and magnesium sacrificial anode for cathodic corrosion protection. An in-built 3kW electric water heater with thermostat is included as standard.
- Solar collectors that incorporate full area copper absorption plates ultrasonically welded to copper circulation tubes, high specification insulation and tempered security glass to provide energy absorption of up to 95%.
- Low thermal conductivity high specification plastic collector tank connection piping with silver foil coated polystyrene insulation jackets.
- Connection piping that includes an incoming non-return valve, a thermosyphon diverter valve controlling max water temperature to 60°C to avoid scalding on hot days, pressure release valve and drain cock. All fittings are provided from the inlet to the outlet for simple installation.
- Galvanised mounting frame.

Ultrason UFD Flatplate solar water systems are available in various tank sizes and collector configurations to suit domestic and small scale institutional applications. They are effective and robust products designed for many years of trouble free operation with a 5 year guarantee to demonstrate the product quality. With the benefits of progressive design and high quality components they are the ideal solution for all solar water heating applications.

OPERATING CONDITIONS

Water Quality: Water outside the following limits should be appropriately pre-treated:

Direct: Clarity: Clear, **TDS:** <600mg/l, **Hardness:** <200mg/l CaCO₃, **Saturation Index:** >0.8<1.0

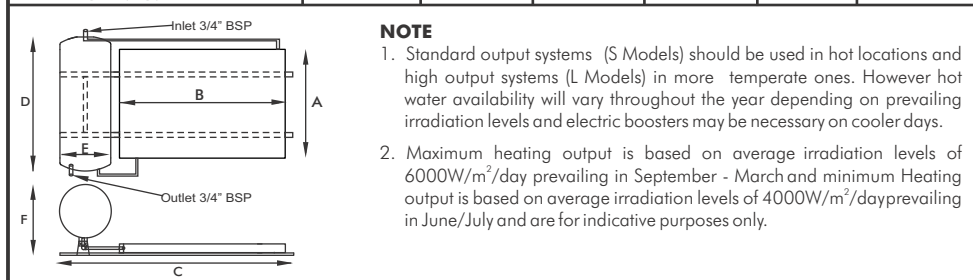
Test Pressure: Tank - 5Bar, Collector -10Bar

Max Operating Pressure - 3.5Bar

Max Flow Rate - 2m³/hr

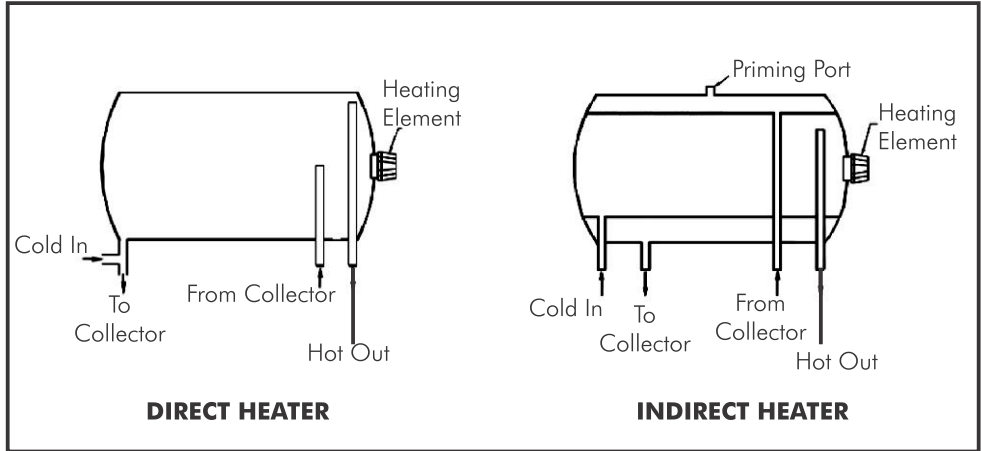
SPECIFICATIONS

Model	UFD160DS	UFD160DL	UFD220DS	UFD220DL	UFD320DS	UFD320DL	
System Tank Size (Litres)	160		220		320		
Typical Household (People)	5		7		10		
Collector Model	1 X FCP1.7	1 X FCP2.4	1 X FCP2.4	2 X FCP1.7	1 X FCP3.0	2 X FCP2.4	
Collector Area (m²)	1.7	2.4	2.4	3.4	3.0	4.8	
Collector Weight (kg)	25	38	38	50	48	76	
Collector Fluid Capacity (litres)	1.2	1.5	1.5	2.4	1.7	3.0	
Max Heat Output/Day (kWhrs)	9	14	14	20	18	29	
Min Heat Output/Day (kWhrs)	6	10	10	14	12	19	
Dimensions (mm)	A	800	800	800	1760	800	1760
	B	1920	1890	1890	1920	2440	1890
	C	2620	2590	2590	2620	3140	2590
	D	2780	2780	2780	2780	2780	2780
	E	600	600	600	600	600	600
	F	700	700	700	700	700	700
Empty Weight (kg)	93	110	135	156	180	214	
Full Weight (kg)	253	270	355	376	490	534	



2. EQUIPMENT SPECIFICATIONS

The equipment supplied comprises of two principal components, the tank and the collectors which are mounted together on a frame. The units work on the thermosyphon principal whereby the temperature differential between the top and bottom of the system creates water circulation thus facilitating the heating process. Two tank specifications are available offering direct or indirect heating. Indirect heating uses a separate flow of pure water through the collector which transfers heat to the service water through a jacket around the storage tank. Indirect heating tanks are slightly less efficient though should be used when the service water is highly mineralised. Tank layouts are shown below:-



Tanks are manufactured from galvanised steel plate and all have an in-built electric booster heater and magnesium anode to prevent corrosion. They are encased in an insulated fibreglass housing.

Collectors incorporate full area copper absorption plates ultrasonically welded to copper circulation tubes which are enclosed in an insulated glass covered housing.

Heater systems are supplied complete with all piping connections including a bleed cock and a pressure release valve at the tank outlet.

3. WARNING AND SYMBOLS



The installation of the solar system must be in accordance with the relevant requirements of the local authority building regulations as well as regulations for the prevention of accidents when carrying out works such as solar installation. It is necessary to do so in a safe and workman like manner, taking due care of any aspects of the works that could result in injuries to person in or about the building as well as workers, passers by and the general public at large.



Work should be preceded by a risk assessment covering all aspects of health and safety risks, or training requirements that can reasonably be foreseen to be associated with the work.



These instructions describe mounting and installation of thermosiphon solar water heaters. All installations must be done by authorised people.



Installers must adhere to the valid work protection regulations, in particular when working on the roof. Anti-fall protection must be employed whenever there is a risk of falling.



To avoid the risk of being burned or scalded by hot components, Installation and replacement of collectors or parts should be done on cloudy days. Installation work on sunny days should be carried out only in the morning or evening or with the collector covered.



To avoid the risk of being burned or scalded by hot solar fluid or components, fill and flush the solar system when the collectors are cold. The collectors should be covered while doing so.



Steam can escape from the expansion relief valve of the solar pump unit if the system is shut down. To avoid injuries an expansion relief valve must be connected to a collecting container with a hose line



In order to ensure a seamless operation of the product, the safety valve should be cleaned periodically and checked for proper functions. In areas with very calcareous water the calk residuals on the valve should frequently be cleaned off.



Immersion heater is intended as standby device for water heating and should not be used continuously.



In areas with hard water hot water temperature should not exceed 45°C to avoid calcification.



The product shall be installed in an area where children cannot access.



This product is designed for water heating purposes using solar energy and it may not be changed or modified in any way. It should be installed by a qualified person, who should observe the applicable local regulations and the building code.



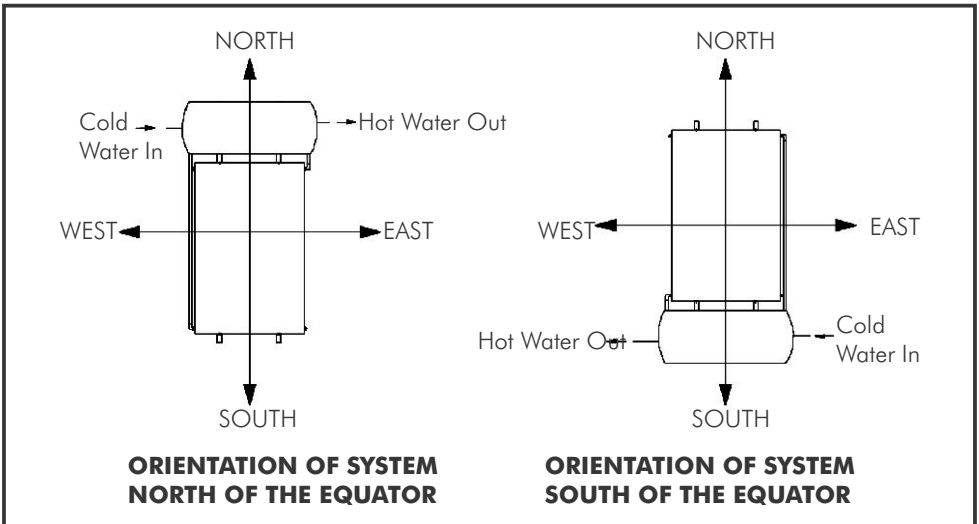
After the expiry of the guarantee period, if the magnesium anode rod is worn out, the anode rod shall be replaced by a new one in accordance with the instructions in the users' manual.

4. SITING

Correct siting is critical for the effective operating of a solar water heater, the following being important guidelines:-

- Orientate the principal axis of the units in a North/South direction, with the collector facing the equator. This orientation is important to maximise sun exposure on the collector as it tracks on its East /West axis throughout the day.
- Tilt at approx 15° . This is important as it optimises irradiation and also assists in the thermosyphon process. Heater units should never be laid flat.
- Avoid any shade, especially between 10am and 4pm. Shade hugely reduces system efficiency.

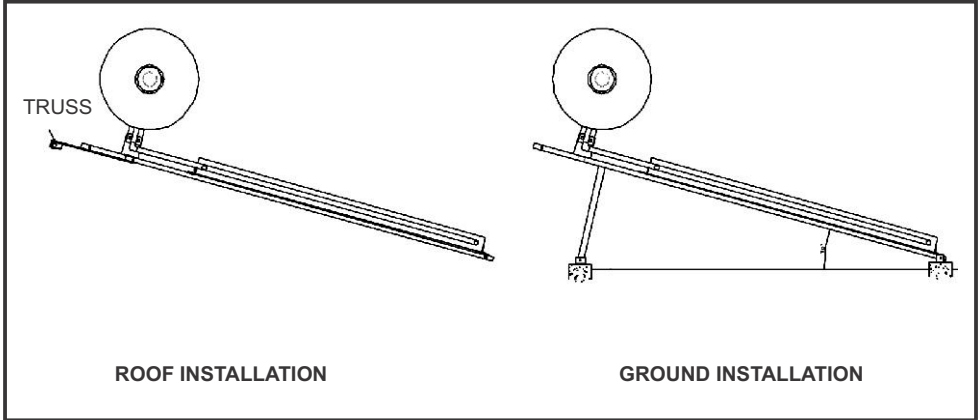
Preferably, solar panels should be installed on roofs where solar irradiation is highest and they are also less exposed to damage. If this is not possible a protected ground siting is acceptable.



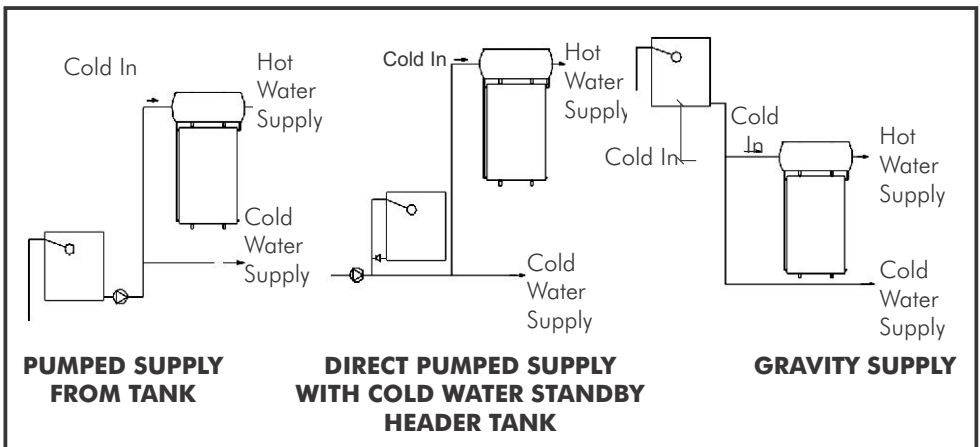
5. INSTALLATION

Ultrason UFD solar heaters are provided with drilled frames incorporating a support cross bar. On roofs the preferable mounting arrangement is by means of hooks affixed to the cross bar and secured to an appropriate mounting point on the roof beams. Suspension from the hooks is generally sufficient and fixed location is not necessary.

For ground installation rear support legs are available which should be mounted on small concrete feet as shown below:-



The units can be installed using a gravity system or pressurised supply. Pressurised systems are preferable as they give higher line pressures up to a maximum of 3.5 Bar. Note that in the case of pressurised supply hot and cold lines must be pressurised at the same pressure to ensure even temperature control. The systems are easy to plumb being provided with two piping connections only, the inlet and outlet. It is important to fit a non-return valve and isolating valve on the inlet line. Suggested installation layout arrangements are shown below:-



All units are fitted with 3kW electric booster heaters which should be connected to the mains supply via 20A fuse or MCB by a qualified electrician. Manual control is suggested with the switch mounted in a convenient place.

6. SYSTEM COMMISSIONING

a) **Direct Systems**

On installation or after service it is important that the system is primed. This is carried out by first opening the incoming feed followed by the bleed cock and then observing when all air is expended from the bleed outlet. Proper priming is important or else the unit will not operate at full efficiency

b) **Indirect Systems**

As well as priming the service water as indicated above, it is important to fill the heating system with pure water. Ordinary lowly mineralised tap or drinking water is suitable and care must be taken to completely fill the collector and tank jacket. This is done using the priming plug on top of the tank and carefully filling the unit until all air is expended. It is also important to open the top collector bleed plug to ensure air pockets are eliminated in the collection capillaries. Once primed, it is vital to ensure that the system is properly sealed as fluid loss will render the system ineffective. The system must therefore be thoroughly checked for leaks when operating and they must be sealed accordingly.

7. USAGE

It is important that the hot water availability is properly managed as solar energy heating only occurs between the hours of 9:00am - 4:00pm. This effectively means that hot water is available in the evening as any draw off will result in temperature reduction from the replacement cold water. If hot water is required in the morning there should either be no night time draw off or the booster heater should be used. Users should plan hot water usage accordingly.

8. MAINTENANCE

a) **Direct Systems**

Direct hot water system have no moving parts and are essentially maintenance free, though periodically the collector glass cover should be cleaned as a dust layer will reduce efficiency.

b) **Indirect Systems**

Indirect systems rely on the small volume of circulated heating water in the sealed system and full efficiency is obtained only when it is fully charged with water. The units must therefore be regularly checked, recommended on a monthly basis and any leaked water replaced.

Periodically, recommended every three months a general inspection should be made and the following items checked:-

- Collector condition, leaking unions, dirty or broken glass, damaged water seals.
- Tank condition including casing damage, piping leaks and valve operation.
- Electric heater power connections.
- Replace worn out magnesium anode periodically.
- Booster pump and pressure tank settings (if applicable).
- Check shading of collectors

Once a year, it is recommended to flush the collectors to remove any settled sediments that may affect the thermosyphon flow.

9. TROUBLE SHOOTING

DIRECT SYSTEMS

PROBLEM	POSSIBLE CAUSE	SOLUTION
Insufficient hot water	High hot water usage at night	Rotation use or replace with a larger system
	Prevailing weather conditions	Incorporate complimentary electric heater to be used when irradiation is low
	Non-operation of electric booster	Replace the electric heater
	Air locks in the collectors	Ensure tank connections are higher than collectors connection
	Slow leaks by system or pipe work	Pressure test the pipes Visually inspect for leaks. Raise top right hand corner on the system
	Blockage in the connection pipes	Unblock then pipes Replace the blocked pipes
	Collectors blocked with sediments	Flush collectors with clean water to clear the sediments Incorporate a filter in the pipework

INDIRECT SYSTEMS

PROBLEM	POSSIBLE CAUSE	SOLUTION
Heated water loss	Leaking water pipes	Check regularly for leaks and repair
Inoperative electric heater	Power supply or booster switch off	Switch on power or booster switch
	Blown fuse	Replace fuse
	Tripped circuit breaker	Switch on the breaker
	Thermostat failure	Replace the thermostat
	Low thermostat setting	Adjust the thermostat
	Faulty electric element	Check element circuit continuity and replace the element if faulty
Water discharge from pressure release valve	Pressure above 3 bar	Lift valve hand lever and reset valve
	High mains pressure	Use a pressure tank to regulate and reduce pressure levels
	Pressure is below specification settings	Replace the valve if discharge continues
	Pressure feedback from another device	Check that there is no feedback pressure from another device connected to hot reticulation circuit
Insufficient pressure	Inlet water strainer blocked	Unblock the strainer
	Unit supply pipework blocked or undersized	Unblock the pipe work Replace with correct pipework
	Mains supply pressure below 1 bar	Consult supply authority for modifications to the system
	Pressure control valve flow insufficient for user's requirements	Install a large valve but should not exceed rated tank pressure of 3.5 bar

10. TERMS OF WARRANTY

i) General Liability

- In lieu of any warranty, condition or liability implied by law, the liability of Davis & Shirliff (hereafter called the Company) in respect of any defect or failure of equipment supplied **is limited to making good by replacement or repair** (at the Company's discretion) defects which under proper use appear therein and arise solely from faulty design, materials or workmanship within a specified period. This period commences **immediately after the equipment has been delivered to the customer** and at its termination all liability ceases. Also the warranty period will be assessed **on the basis of the date that the Company is informed of the failure.**
- This warranty applies solely to equipment supplied and **no claim for consequential damages**, however arising, will be entertained. Also the warranty specifically excludes defects caused by fair wear and tear, the effects of careless handling, lack of maintenance, faulty installation, incompetence on the part of the equipment user, Acts of God or any other cause beyond the Company's reasonable control. Also, any repair or attempt at repair carried out by any other party **invalidates all warranties.**

ii) Standard Warranty

General Terms

If equipment failure occurs in the normal course of service having been competently installed and when operating within its specified duty limits warranty will be provided as follows:-

- **Up to three years - The item will be replaced or repaired at no charge.**
- **Over three years, less than five years - The item will be replaced or repaired at a cost to the customer of 50% of the Davis & Shirliff market price.**

The warranty on equipment supplied or installed by others is conditional upon the defective unit **being promptly returned free to a Davis & Shirliff office** and collected thereafter when repaired. No element of site repair is included in the warranty and any site attendance costs will be payable in full at standard chargeout rates.

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