

Installation and Operation Manual

ITS pump kit 2D



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OVERVIEW

Pump kit 2C is a simplistic pump kit for ITS evacuated and flat plate collectors. It runs off a solar electric panel and provides temperature differential pumping, tank over temperature protection freeze protection and power backup. ITS's patented 1Sense technology enables differential temperature control using only a collector temperature sensor. This drastically simplifies the installation and reduces the installation time significantly.

Where to use: This kit is ideal for clients looking for a cost effective installation. It features easy installation, high performance, trouble free operation, freeze protection and immunity to power outages. **Please note that due to the low flow rate that the 12V dc pump delivers this kit will malfunction on installations where the solar collector is bigger than an ITS 24 tube collector or an ITS 4m² flat plate or where the pressure drop in the piping is such that the collector will not be able to properly cool down. For bigger installations we recommend the use of our 220V 1Sense controller connected to a ITS 220V pump.**

This kit consists of:

1. ITS-12Vdc pump with integrated 1Sense controller
2. 15mm spring type non-return (check) valve
3. Solar battery charge controller
4. 10W PV solar electric panel



Fig 1. Pump with non return valve connected, 1Sense controller, charge controller and battery



Fig 2. 10W PV panel

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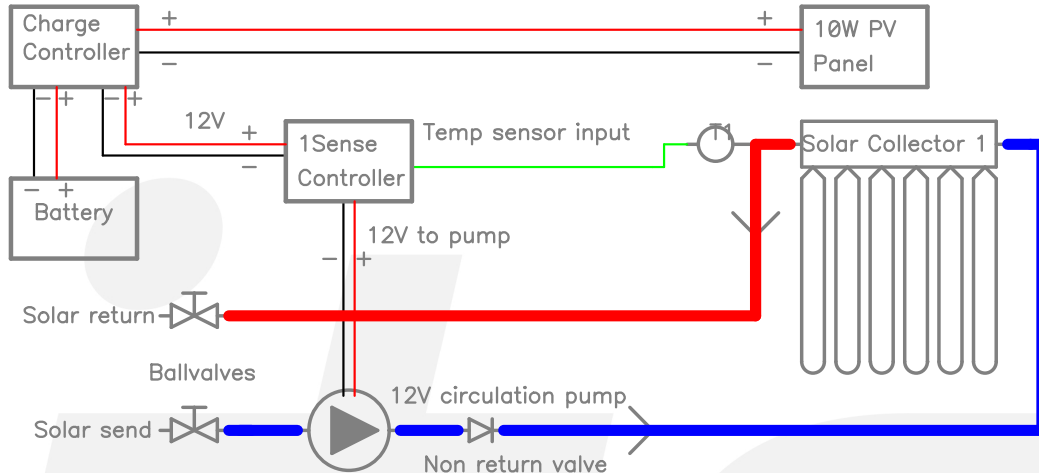
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INSTALLATION

Below is shown the system diagram of a typical installation using this pump kit. ITS recommends the use of a lever ball valve before the pump for easy servicing of the solar system. The pump must always be installed on the solar send (cold solar port) as close to the geyser as possible. The pump must also be under the water level of the geyser so that if the water supply to the geyser falls away the pump will not run dry. Always install anti-siphoning traps at the geyser to prevent heat from siphoning away from the geyser at night. Always install a non-return valve (check valve) after the pump to prevent superheated water from pushing back past the pump during collector stagnation.

Install the PV panel so that it has the same solar facing as the solar thermal collector (directly above the solar collector is normally the easiest). Also ensure that there is no form of shading on the PV panel. The power connection from the PV panel must be connected to the charge controller's "panel" terminals. The battery must be connected to charge controller's "batt" terminals and the 1Sense controller's 12V supply to the charge controller's "load" terminals. All these connections can be made with standard 1.5mm ripcord. Please note that it is a 12Vdc system and therefore there is a positive (red) and negative (black) connection. If the polarity is connected the wrong way around it might result in the pump being damaged.

The cable from the 1Sense controller to temperature sensor T1 can be extended using standard 0.75 mm ripcord. Please ensure that temperature sensor T1 is inserted properly into the solar collector temperature sensor pocket. Placing the sensor anywhere else (like tying it to the copper pipe outside the collector) will result in malfunctioning.



COMMISSIONING

Only connect the power to the 1Sense controller once the whole solar system has been installed, pressurised and the trapped air has been bled from the solar loop and geyser. When all the connections have been made and verified the power from the charge controller to the 1Sense controller may be connected.

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After about 10 second the controlled will pulse the pump with the current temperature reading in tens of degrees (this will only happen the first 10 time the controller is powered since this function is only serving as a quick commissioning test). In other words, if the sensor measures 56 deg when the controller is switched on the pump with give 5 short pump pulses with about 10 seconds pause in between the pulses to inform the installer that the temperature being sensed is in the fifties. Thereafter the controller will wait for 1 min and then turn on the circulation pump for 3 minutes if the solar collector temperature is more than 50 deg C – this is part of the controller’s way of determining the geyser temperature. ITS 1Sense Technology mathematically determines the geyser temperature. Now the startup sequence is complete.

The 1Sense controller does not control the geyser element. The geyser element is controlled by the thermostat supplied with the geyser. ITS Solar recommends that the geyser thermostat temperature be set to the minimum required hot water temperature (usually 50°C) in order to minimize the use of electricity. ITS recommends the use of a geyser element timer.

FAULTFINDING

Should a fault be suspected with the controller the following steps can be taken:

1. Verify the supply to the controller as well as the pump and temperature sensor connections.
2. If the pump is not running then use a voltmeter to verify the supply to the controller and also to check if there is power on the pump terminals. Also check the polarity of the supply (a basic multimeter can do all this).
3. If the pump comes on for about 3 minutes after power up but a operational fault is suspected please verify that the sensor connections are ok. The temperature sensor can also be checked by disconnecting the sensor from the controller and measuring the sensor resistance using an ohm meter. Resistance versus temperature values are given in the table below.

ITS CtrlLite OneSense sensor resistance values:

°C	0	10	20	30	40	50	60	70	80	90	100	110	120
Ω	33620	20174	12535	8037	5301	3588	2486	1759	1270	933	697	529	407

BASIC TECHNICAL SPECS

Product name	ITS 12Vdc pump
Power	±6W
Voltage	12Vdc
Max Temp	90°C
Max Pressure	600kPa
Head	2m
Flow rate	4 – 8 L/min
Port connections	15mm male



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Product name	ITS 1 Sense controller
Power	±0.1W
Voltage range	7Vdc – 20Vdc
Temperature measuring range	0 ~ 100°C
Available power from pump output	< 12W
Differential on/off temperature	8°C/4°C
Geysers maximum temperature protection	± 70°C
Collector freeze protection	5°C on / 8°C off

Product name	10W PV panel
Type	Poly crystalline
Voltage (Vmp)	16.5Vdc
Power	10 Wp
Current (Isc)	0.78A

Product name	Non return valve
Type	Spring loaded
Pressure drop	
Port connections	15mm female
Max Temp	90°C

LIABILITY WAIVER

The manufacturer cannot monitor the compliance with these instructions or the circumstances and methods used for installation, operation and utilization of this controller. Improper installation can cause damage to the solar system and personal injury. For this reason we do not take responsibility and liability for losses, damages or cost that might arise due to improper installation, operation or wrong utilization and maintenance or that occur in some connection with the aforementioned. The manufacturer preserves the right to make changes to the product, or installation and operation instructions without prior notice. As soon as it becomes evident that safe operation is no longer possible (e.g. visible damage), please immediately take the device out of operation.



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