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# Flat Panels Operations Manual



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## INTRODUCTION

The JetSolar JetNim 25-270 system is a highly efficient, cost-effective, reliable and “green” means to heat your hot water using only the rays of the sun. The system is hydronic, meaning that the heat transfer fluid is circulated through the collectors and into the storage tank. This method can provide up to 70% of the energy needed for water heating.

JetSolar uses a method called “indirect closed loop”. Closed loop refers to the loop of plumbing that is filled with propylene glycol, which is a heat transfer fluid. “Indirect” refers to the method in which the heat is transferred to the domestic water – through a heat exchange loop in a solar storage tank.

The household domestic water supply is fed to the solar storage tank first and then transferred to the existing hot water heater. By keeping the existing hot water tank, we ensure that when there is not enough solar energy to heat the storage tank, we maintain uninterrupted hot water using the original heating method.

## JetSolar Operations Manual

Thank you for purchasing a JetSolar thermal solar system. This manual will go through the steps necessary to commission and maintain the system.

Use this manual to COMMISSION the system. Instructions in this manual assume that you have completed the mechanical installation of all components as per the JetSolar Installation Manual.



**Attention-** Check all plumbing connections for possible leaks. After the system has been charged, it should hold pressure; systems that fail to hold pressure are indicating leaks. These leaks will have to be addressed to prevent possible property damage and equipment failures.



**Danger-** Risk of Burns and Scalding- The plumbing, valves and fittings can heat to temperatures of more than 212°F. Therefore, do not clean or fill the system with the collectors heated; wait for the system to cool before performing any plumbing or system maintenance.



**Alert-** The glycol transfer fluid is under pressure. Ensure that the temperature and pressure relief valves and their drain pipes are installed properly. Before making any changes to the system, you should relieve the pressure through an appropriately terminated drain line.



**Attention-** Risk of Freeze- Improper plumbing will prevent the solar system from draining properly. There will be a risk of freeze damage when flushing with water. Therefore, only flush the system with the solar fluid that will be used later to fill the solar system.



**Attention-** Use a water and propylene glycol mixture with max 50% propylene glycol as solar fluid because other mixtures could damage the components.

## Table of Contents

<b>Materials needed.....</b>	<b>5</b>
<b>Components.....</b>	<b>6-10</b>
<b>Preparation of the glycol.....</b>	<b>10-11</b>
<b>Filling the system .....</b>	<b>12-13</b>
<b>Setting the pump speed.....</b>	<b>14</b>
<b>Controller setup and commissioning.....</b>	<b>15</b>
<b>Mixing valve setup .....</b>	<b>16-17</b>
<b>Maintenance .....</b>	<b>18-19</b>
<b>Warranty.....</b>	<b>20-21</b>

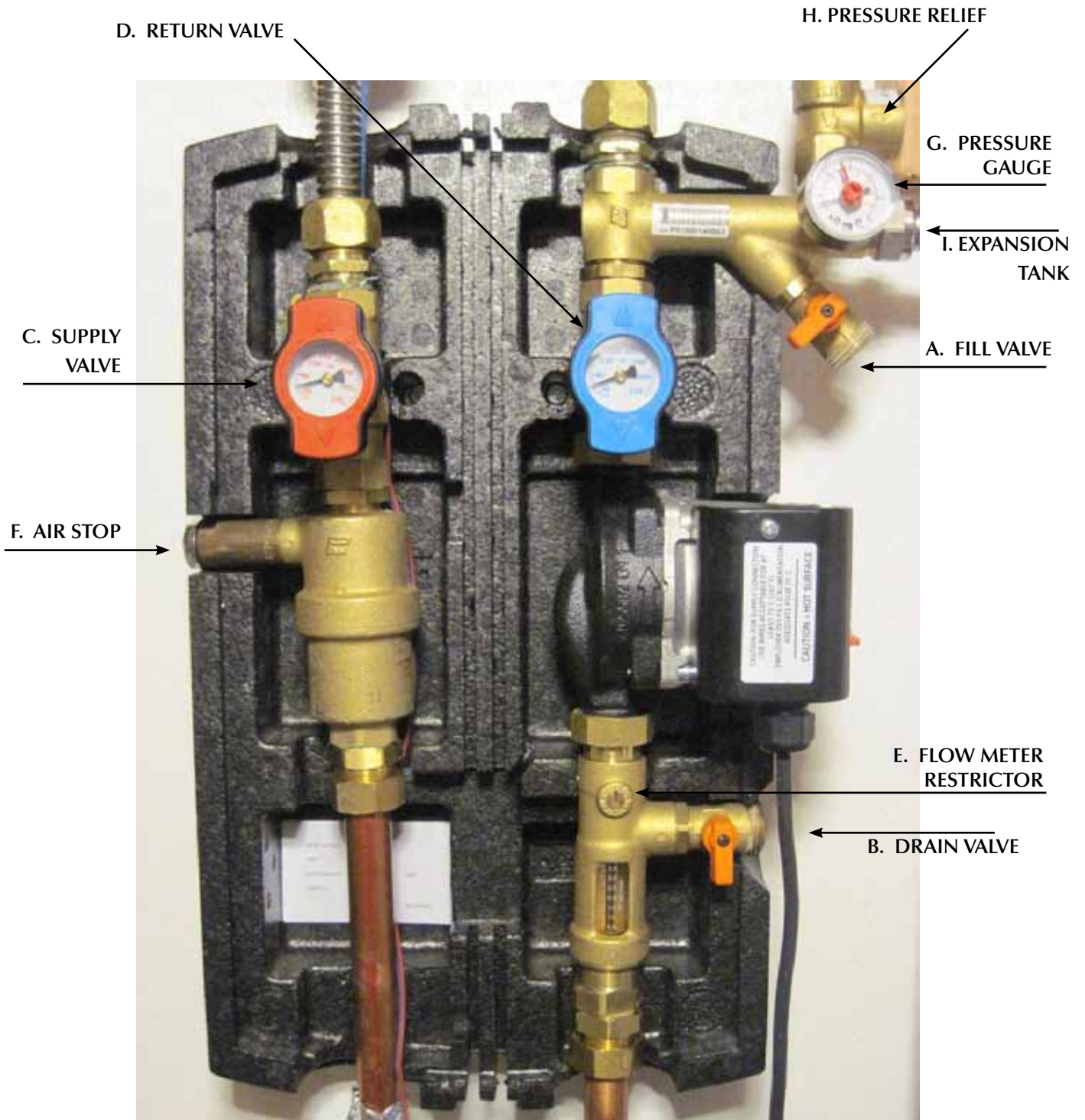


## Materials needed to flush and charge a solar circuit

- 3 washing machine hoses with gaskets ( $\frac{3}{4}$  hose threads)
- Electric transfer pump with appropriate  $\frac{3}{4}$  hose thread connections
- Fine filter to prevent debris entering solar circuit
- Vat or unused trash can to mix 50% glycol solution

# Introduction to the individual components of the pumping station

FIGURE 1.



## Introduction to the individual components of the pumping station

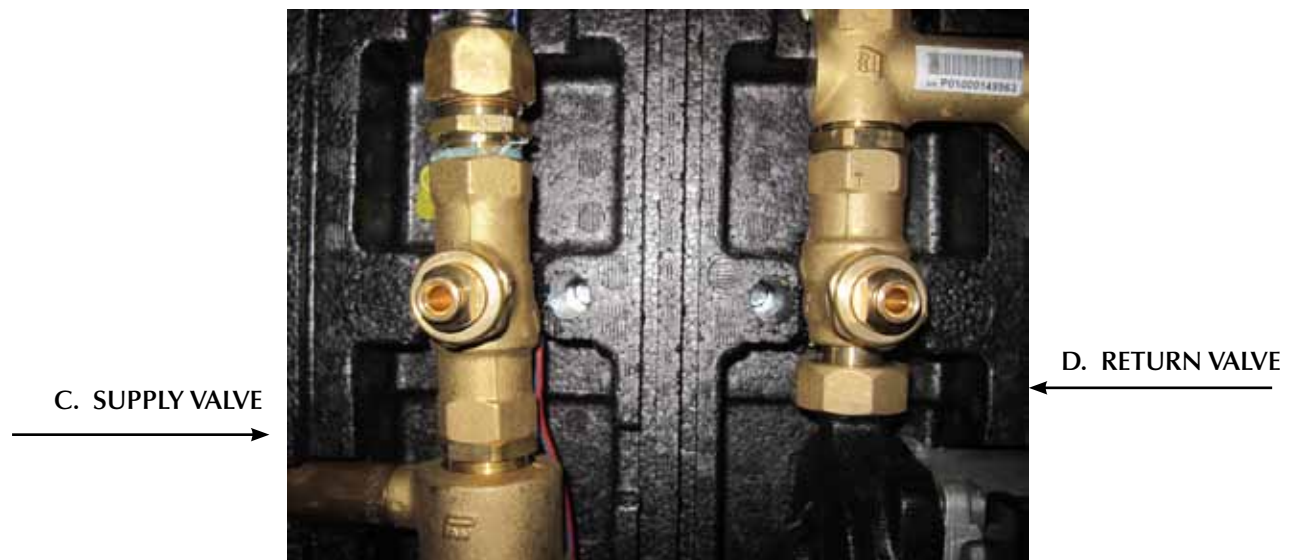
### Fill and drain valves “(Fig 1A)” “(Fig 1B)”

The fill and drain valves required to flush and fill with glycol solution are integrated in the solar station. Understanding these integrated valves is important to easily allow you to charge the system.

To flush the dirt particles out of the installation, only use a pump with a fine filter to ensure the removal of the fine debris.

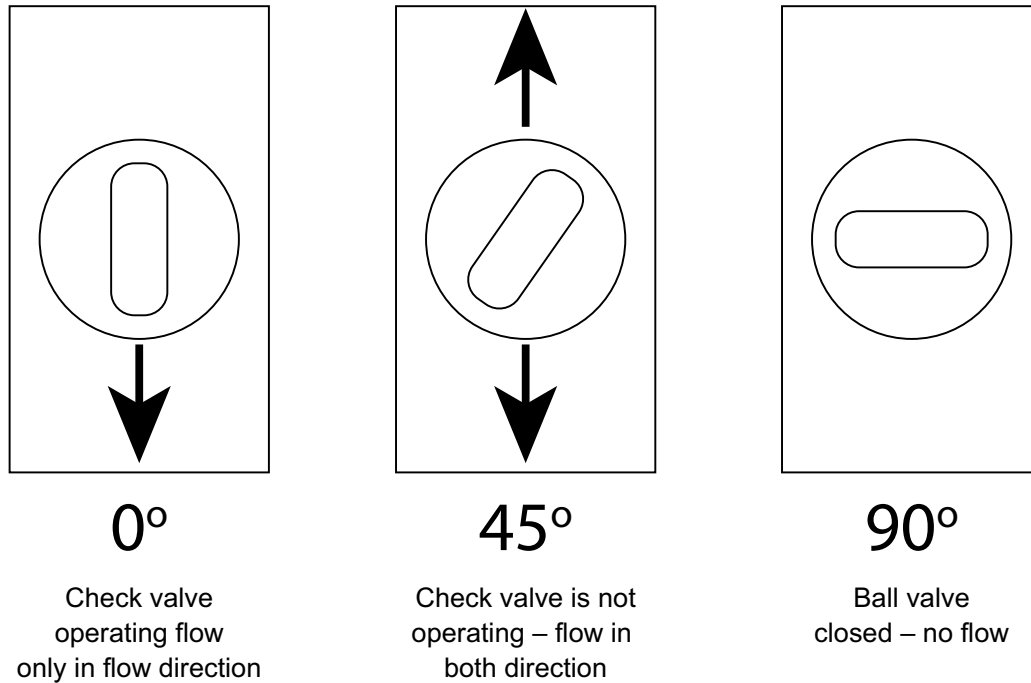
### Supply and return ball valves

FIGURE 2.



### Ball valve with integrated check valve diagram

FIGURE 3.



### Operating instructions for the flow meter

The flow meter is a flow rate measuring device with an integrated and adjustable flow rate restrictor. The system is designed to operate at a flow rate of .26 – 3.43 gallons per minute per panel. The JetSolar system is designed to operate at .5 gallons per minute per panel.

FIGURE 4.



## Air stop

The air stop with manual vent valve is used to vent air bubbles from the solar system. When the air is trapped in the upper area of the air stop, it can be released at the vent plug.

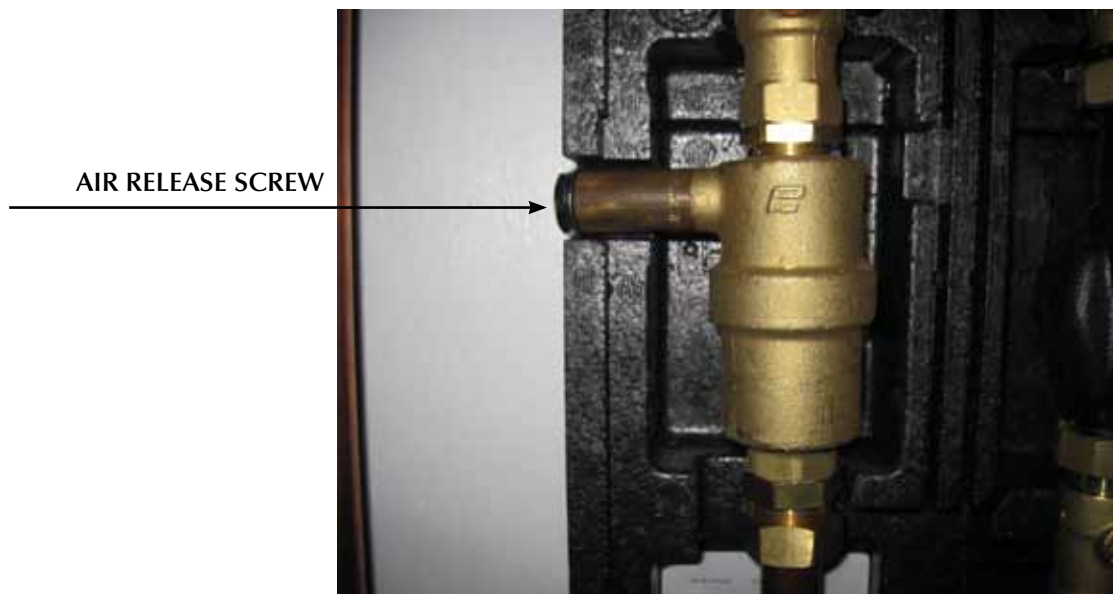


**Warning-** Danger of scalding due to vapor escape! The escaping air and fluid can have a temperature of more than 212°F.



**Attention-** To start, vent the solar system daily and then weekly or monthly, depending on the vented air quantity. Check the system pressure after venting and increase it to the specified operating pressure by pumping more glycol solution into the system.

FIGURE 5.



The air stop with manual vent valve is used to vent the solar system. The air liberated from the solar fluid is collected in the upper area of the air stop and can be released at the vent plug.



**Danger-** The escaping air vapor can have a temperature of more than 212°F and can cause scalding.



**Attention-** After venting, check the system pressure “(Fig 1G)”, and increase it to the specified operating pressure.

## Preparation of the glycol



**Attention-** Only pure nontoxic propylene glycol is to be used (Dow Frost).

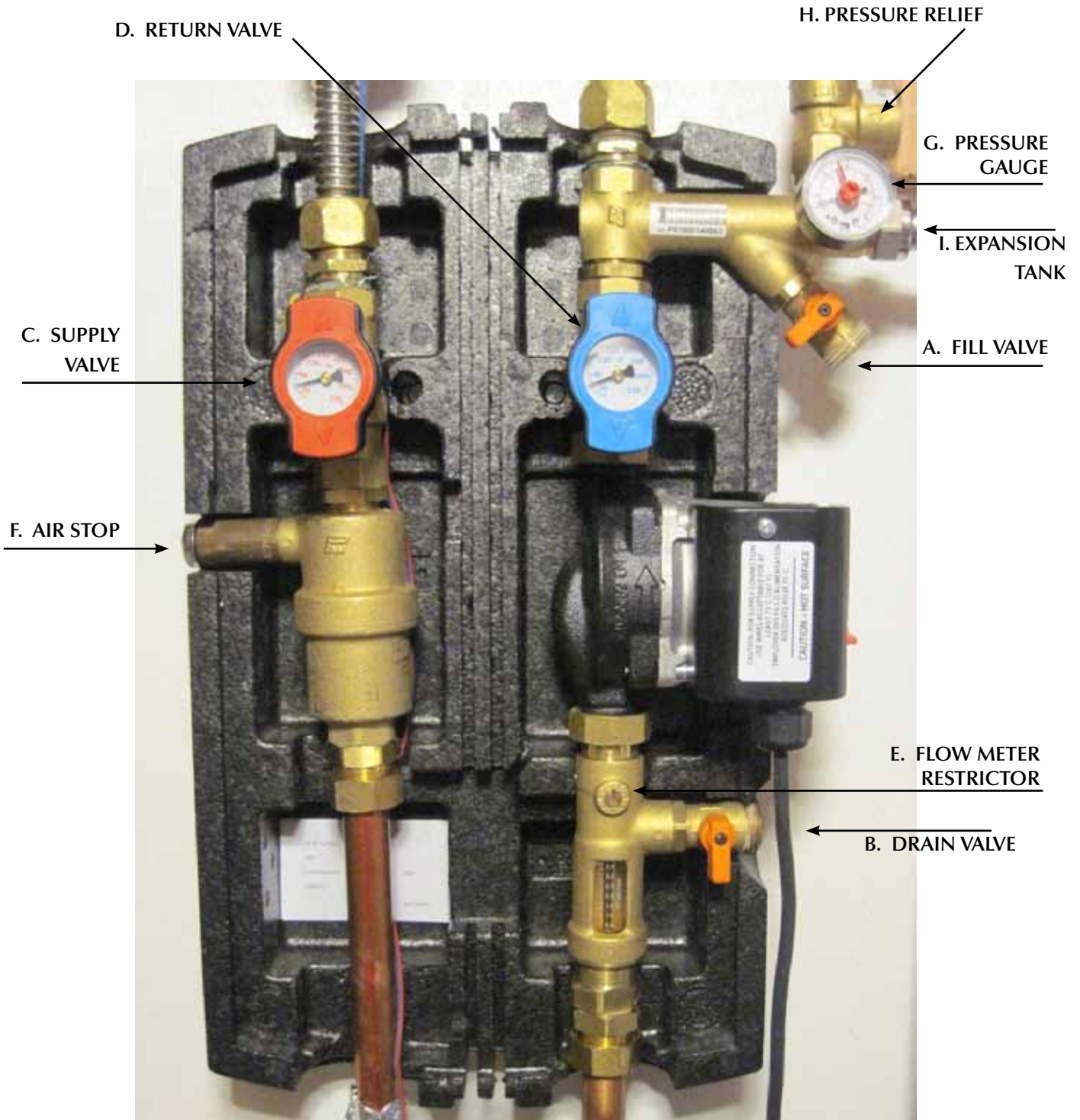
Glycol is mixed with water to be used as the heat transfer fluid. Glycol increases the temperature range of this heat transfer fluid to temperatures that water alone cannot achieve. Glycol in the correct percentage mixture will not freeze in subzero temperatures at times when the system is not operating.

### There are two methods to fill the solar loop

1. Use a solar charging station with a suitable container filled with the glycol mixture.
2. Use a charge pump and a large vat or unused trash can or other suitable vessel able to handle a capacity in excess of 10 gallons. Ensure that either to be used is new or clean.

A 50% glycol-to-water mixture is recommended. This 50% mixture will provide freeze protection in temperatures down to  $-20^{\circ}\text{F}$ . (Please contact JetSolar in colder climates.) JetSolar provides 5 gallons of UN mixed pure glycol; empty the contents of the glycol container into the mixture vessel. Using the empty glycol container, fill it with water; this will allow for a mixture of equal parts glycol and water giving a total of 10 gallons of 50% mixed solar heating fluid. The system size will determine the total amount of solar heating fluid required; each panel's volume is 1.2 gallons. The second factor is the length and size of the plumbing. Most 2-panel configurations will require 4–7 gallons of solar heating fluid.

FIGURE 1.



## Filling the system

1. Turn the check valve in the supply ball valve “(Fig 1C)” to operating position (0°, see Fig 3).
2. Close the return ball valve “(Fig 1D)” (90°, see Fig 3).
3. Close the restrictor of the flow meter “(Fig 1E)” (horizontal position, see Fig 3).
4. Using a washer machine hose, connect one side of the hose to the fill valve “(Fig 1A)” and connect the other end to the charge pump.
5. Lower the pump suction line into the vessel filled with glycol water mix.
6. Connect a washer machine hose to the drain valve “(Fig 1B)” and secure the other end to the mix vessel.
7. Ensure that all hose connections are tight and that the drain hose is secured to the bottom of the bucket so as to not allow it to fall out. Upon filling, this hose will try to whip around.



**Warning-** Be aware that if the panels are in the sun, they will be hot and any uncontrolled water returning from the panels will cause severe burns.

8. Open the fill and drain valves “(Fig 1A,B)”.
9. Put the charge pump into operation and flush the installation until the solar fluid exits without bubbles. Vent the solar system several times at the vent plug of the air stop “(Fig 1F)” until the solar fluid exits without bubbles.
10. Slowly open the return ball valve “(Fig 1D)” (0°, see Fig 3) and the flow meter restrictor “(Fig 1E)” (vertical position).
11. Close the drain valve “(Fig 1B)” with the charge pump running and increase the system pressure to approximately 40 psi. The system pressure can be read on the pressure gauge. Close the fill valve “(Fig 1A)” and switch off the charge pump.
12. Observe the pressure gauge to see whether the system pressure reduces. The entire system should be inspected for leaks at this time. Eliminate leaks where necessary.
13. Inspect the collector air release assembly, drain off any remaining air and close the manual valve.

14. Reduce the pressure on the drain valve “(Fig 1B)” to an operating pressure of 20 psi.
15. Close the fill and drain valves “(Fig 1A,B)”.
16. Turn the check valve in the return ball valve “(Fig 1D)” to the operating position 0° “(Fig 3)”.
17. Plug in the solar controller and set the pump to ON in the manual mode. Press and hold down the Button (-); the SET icon will appear on the right hand side of the screen. Release Button (-) then press Button (-) again repeatedly until MAN1 is on the screen. Press Button (OK); the SET icon will flash. Press Button (+) and the unit will go from AUTO to OFF. At this time the pump will be running at 100%. Let the pump run for 15 minutes. This will get any remaining air in the system to the air release and the air stop. Following the same steps, set the MAN1 to AUTO.
18. Vent the air several times until solar fluid exits without bubbles.
19. Check the operating pressure; if necessary, increase the system pressure to the operating pressure 20 psi. This can be achieved by turning on the charge pump and slowly opening only the fill valve “(Fig 1A)” until the operating pressure has been met.
20. Close the fill valve.
21. Remove the hoses from the fill and drain valves. Screw the sealing caps on the fill and drain valves. The sealing caps serve to protect the valves against dirt.

FIGURE 6.



## Setting the pump speed

1. JetSolar panels are designed to operate most efficiently at a flow rate of .5 gallon per minute per panel. Due to each system being unique as to the overall length of pipe and height differences between the panels, pumping station and storage tank, pump adjustment will set to each individual application.
2. Set the desired flow rate by adjusting the rotation speed level between 1, 2 and 3 at the red adjusting knob of the solar pump “(Fig 6)”.
3. Set the pump to speed 2 as a starting point.
4. Observe the flow meter. Two-panel’s configurations will require a working flow of 1 gallon per minute.
5. At this point, if the flow “(Fig 4)” is below 1 gallon per minute, adjust the red speed control knob “(Fig 6)” to position 3; this will increase the flow rate. If the flow “(Fig 4)” is above 1 gallon per minute, adjust the red speed control knob “(Fig 6)” to position 1, this will decrease the flow rate.
6. These adjustments will get the flow rate very close to the desired 1 gallon per minute. If necessary, the flow can be very closely adjusted at the flow restrictor plate “(Fig 1E)”.

FIGURE 7.



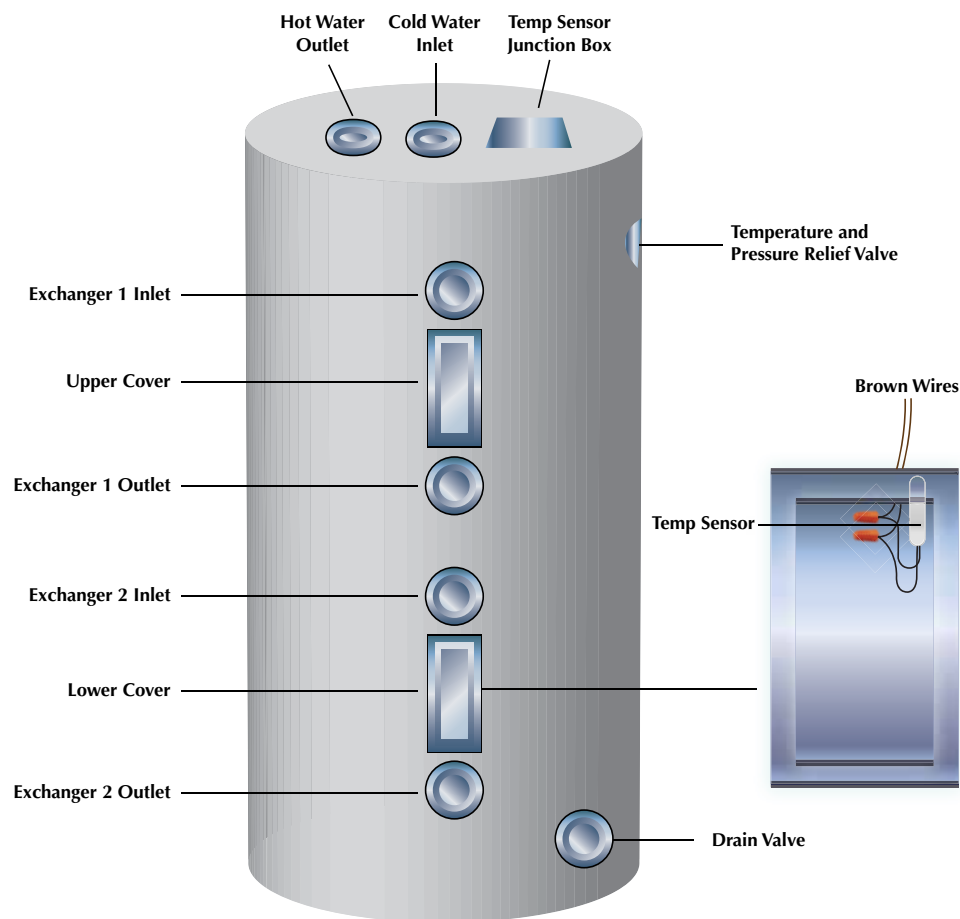
7. Mount the front shell of the insulation to the solar station.
8. Insert the valve handle/temperature gauges. Red belongs on the left to operate the high temperature supply from the panels. Blue belongs on the right to operate the low temperature return to the panels.
9. Set the control to automatic.

## Controller setup and commissioning

The JetSolar system uses a Delta Sol BS Plus by Resol solar control “(Fig 7)”.

1. Unscrew the Phillips crosshead screw from the cover and remove it along with the cover from the housing.
2. Check the temperature sensors connection to ensure the correct operation. Location S1, terminals 1 and 2, should be connected to the temperature sensor located on the collectors. Location S2, terminals 3 and 4, should be connected to the temperature sensor located on the storage tank “(Fig 8)”.

FIGURE 8.



3. The control is operated via three push buttons below the display. Button (+) is used for scrolling forward through the indication menu or to increase the adjustment values. Button (–) is used for scrolling backward and reducing values. Button (OK) is used for selecting channels and confirming adjustments.
4. When the unit is commissioned for the first time or after reset, it will run a commissioning menu. The commissioning menu leads the user through the most important adjustment channels needed for operating the system.
5. Operating the commissioning menu:
  - a. Enter the channel by pressing the Button (OK). The SET symbol flashes.
  - b. Adjust the value by pressing the Button (+) and (–).
  - c. Save the adjustment by pressing the Button (OK) again. The SET symbol stops flashing.
  - d. Press the Button (+) and (–) to switch to the next or previous channel.
6. The first channel is the language selection. Select the desired language and press the Button (OK).
7. The second channel is the unit of temperature desired (F or C). Select the desired unit and press the Button (OK).
8. The third channel is the time of day. The hour and minutes are adjusted separately, first hour then minutes. Select the desired hour and press the Button (OK) and then select the minute and press the Button (OK).
9. The fourth channel is the system layout selection. The JetSolar system is designed to operate on arrangement 1. The control is designed to meet various systems and designs. Press the Button (OK).
10. The fifth channel is the security enquiry. This is a back-up to ensure that you have picked the correct layout. Confirm YES by pressing the Button (OK).
11. The sixth channel is the maximum tank temperature. JetSolar systems are designed to operate at a maximum tank temperature of 150°F. The control is also equipped with a non-adjustable emergency shutdown function, which will shut the system down if the tank reaches 200°F.
12. The seventh channel is the minimum pump speed. The JetSolar system pump is a variable speed pump. The control has the ability to slow the pump gallons-per-minute rate to maintain an efficient delta T. Delta T is the difference between the collector temperature and the tank temperature. As outside factors change, such as

cloud cover or the sun beginning to set, the pump has the ability to slow the rate of flow to maintain the correct difference between the collectors and the tank. Adjust the minimum speed to 50%.

13. The eighth channel is the confirmation enquiry. Press the Button (OK) to confirm that you have completed the commissioning.

## Mixing valve set up



**Danger-** Hotter water increases the risk of scalding injury. Water temperatures over 125°F can cause burns or death from scalds. Children, disabled and the elderly are at the highest risks of being scalded. Please feel the water before bathing or showering.

1. JetSolar storage tanks come supplied with a mixing valve. If the tank does not have a mixing valve installed, contact the installer. This water heater can deliver scalding temperature water at any faucet in the system. By setting the thermostat on the solar controller to 150°F, you may create the potential for scald injury. To protect against injury, a mixing valve is used to mix hot and cold water supply, therefore reducing the point of discharge temperature in the branch supply lines. The mixing valve should be set at 120°F or lower.
2. Setting the valve requires the solar storage to be hot, above 125°F. Turn the hot water on at one of the faucets in the house. Using the thermo strip that was supplied or a surface-mounted thermometer located on the mixed water discharge pipe of the solar storage tank, adjust the mixing valve to 120°F or lower. The mixing valve is factory set at 120°F when the arrow on the hand wheel and the arrow on the casting are aligned. This process may take a few minutes to ensure that the hot water in the discharge line is 120°F or less.

## Maintenance

### Draining the solar system

1. Open the check valves in the supply and return ball valves “(Fig 1C,D)” by turning them to position 45° “(Fig 3)”.
2. Connect a heat-resistant washer machine hose to the lowest drain valve “(Fig 1B)” of the solar system.



**Danger-** The escaping medium may be very hot. Place the collecting vessel so that people standing nearby are not endangered when the solar circuit is being emptied. Make sure that the hose is fixed to the container to prevent injuries.

3. Make sure that the solar fluid is collected in a heat-resistant vessel.
4. Open the drain valve “(Fig 1B)” of the solar system.
5. Dispose of the solar fluid, observing the local regulations.

### Annual inspection and testing

1. System and domestic water piping- Check all piping for signs of leakage at joints, unions and shutoff valves. Repair as needed.
2. Collectors- The collectors should be inspected visually for physical damage and leaks. The glazing should be inspected for excessive buildup of dirt or debris. The collector’s glass is designed to shed dirt during periods of rain, but excessive buildup caused by things like pine tree sap may need to be removed.
3. Circulator pump- The pump is designed for many years of trouble-free service. It is recommended once a year to increase the speed to the highest setting of 3 for a period of five minutes. This will prevent any buildup from occurring in the veins of the impeller.
4. Temperature-pressure relief valve- The temperature-pressure relief valve should be checked to ensure that it is in operating condition.



**Caution-** Before manually operating the valve, make sure that a drain line has been attached to the valve to direct the discharge from the valve during this checking operation.

To check the relief valve, lift the lever at the end of the valve several times. The valve should seat properly and operate freely. If water does not flow, remove and inspect the valve for obstructions or corrosion. Replace with a new valve of recommended capacity as necessary.

## Parts List

PAW Parts List

Eco Tank Parts List

JetSolar Parts List from Catalog

Dow Frost Spec Sheet

Armacell Spec sheet

## JET LINE PRODUCTS, INC.

### Limited Warranty

Jet Line Products, Inc. ("Jet") warrants all JetSolar brand products to be free from manufacturing defects in materials and workmanship for a period of ten (10) years on solar panels and five (5) years on solar storage tanks from the date of retail purchase, as provided by its manufacturer, with the following exceptions:

1. Antifreeze and other expendables are not warranted.
2. Replacement products, or parts, provided at no charge are warranted only until the original finished good's warranty has expired. Purchased replacement parts are warranted for ninety (90) days from the date of retail purchase.
3. Ancillary items of hardware are warranted by their original equipment manufacturer.

This warranty applies only to products purchased and utilized in the 50 United States and Canada, is limited to the first retail purchaser, is not transferable, and does not apply to products that have been moved from their original installation sites. The liability of Jet shall not exceed the replacement of the defective product or its parts, and does not include transportation costs, costs for labor to service or repair the defective product, or any items or materials required to make the repair including, but not limited to, antifreeze and other expendables. Jet is not responsible for charges or delays incurred when a servicer is unable to perform service due to lock outs, animals, service refusals, etc. No reimbursements will be made for loss and/or usage of water or other resources resulting from product defect. A third party service provider may charge the end-user customer for parts and/or labor required to resolve any issue not covered under warranty, such as improper installation. Jet is not responsible for these charges. Product discoloration, or any other cosmetic or superficial damage or deterioration, regardless of its cause, is not covered by this warranty. This warranty does not cover failures, defects, malfunctions or complaints resulting from any of the following:

1. Failure to properly install, operate or maintain the product in accordance with Jet's published installation, operation and/or maintenance manuals.
2. The workmanship of any installer of the product.
3. Use of non-factory authorized parts or accessories in conjunction with the product(s).
4. Product modifications or adjustments that are not in accordance with Jet's published installation, operation and/or maintenance manuals.
5. Abuse, damage during transit or installation, mis-handling, tampering, vandalism, alterations, accidents, fires, floods, storms, earthquakes, power surges, lightning, pets or other animals, insects and/or their hives or nests, negligence, or acts of God.

6. Not grounding and/or bonding as specified, mis-wiring, loose wiring, cut or kinked wires, loose cable connections, incorrect wire runs, incorrect plumbing, inadequate size of pipe and/or fittings, cross-threading, over-tightening, under-tightening, glue drips or residue, improperly secured covers, improper valve placement or usage, unsynchronized valve actuators, valve actuators in “off” position or loss of liquid pressure in closed loop systems.
7. Freezing, corrosion, cracking, overheating, warping, flooding, moisture intrusion or any other condition caused by or related to weather, climate, improper winterization, improper equipment placement, inadequate ventilation, inadequate water circulation or roof run-off.
8. Operating the product at waterflow rates below minimum, or above maximum, specifications.
9. Improper equipment sizing, or product mis-applications.
10. Dirty, clogged, blocked, covered or obstructed plumbing
11. Collateral damage caused by failure of any non Jet component including O-rings, pump strainer baskets, pumps, filters, pipe, fittings, etc.

This is the only warranty given by Jet. No one is authorized to make any other warranties on behalf of Jet. IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO THE EXPRESS WARRANTIES LISTED ABOVE. Some states and/or provinces do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Jet expressly disclaims and excludes any liability for consequential, incidental, indirect, or punitive damages for breach of any expressed or implied warranty. In no event shall Jet be liable for incidental or consequential damages of any nature, including damage to vinyl liners, plaster, aggregate-based pool surfaces, tile, stone, coping, fixtures, skimmers or skimmer covers, plumbing, drains, equipment covers or shelters, landscaping, animals, plants, or dwellings. Some states and/or provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you.

This warranty gives you specific legal rights. You may also have other rights that vary by state and/or province. For warranty consideration, contact the original dealer and provide the following information: proof of purchase, model number, date of retail purchase, and date of installation. The dealer will contact the Jet to obtain instructions regarding the claim and to determine the location of the nearest independent service company. If the dealer is not available, you can locate an independent service company in your area by visiting [www.jetsolarpanels.com](http://www.jetsolarpanels.com), or by emailing our Technical Support department at [support@jetsolarpanels.com](mailto:support@jetsolarpanels.com) or by calling our Technical Support department at 888-820-0999. All returned components must have a Returned Material Authorization number to be evaluated under the terms of this warranty.

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