

Installation Manual
SolarBloc 0100
Version 1.13

The logo for HBX, consisting of the letters 'HBX' in a bold, black, sans-serif font. The letters are centered between two horizontal red bars. The background of the entire page features a light beige color with a pattern of thin, curved lines that create a sense of depth and perspective, resembling a grid or a series of concentric arcs.

SOL-0100

HBX Control Systems Inc.



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HBX SOL-0100 SOLAR CONTROLLER

This manual will guide you through the installation, parameter setting, troubleshooting and general maintenance requirements for the SolarBloc. To guarantee the safe and reliable operation of this SolarBloc, you must first read this manual in detail and take particular note of any and all warnings or caution directives prior to connecting to AC power.



Only suitably qualified individuals with formal training in electrical and HVAC controls should attempt the installation of this equipment. Incorrect wiring and installation will affect the warranty provided with this unit. Wiring must be completed in accordance with the codes and practices applicable to the jurisdiction for the actual installation.



The HBX SOL-0100 is a microprocessor based controller and as such is not to be regarded as a safety (limit) control. Please consult and install the heating or cooling appliance in accordance with the manufacturer's recommendations.

SAFETY SYMBOLS & WARNINGS



Extreme Hazard

This action poses a serious threat that could result in personal injury or death, as well as permanent damage to the equipment. Proceed with caution.



Moderate Hazard

This action may cause personal injury or have adverse effects on the installation process if handled incorrectly.



Disconnect Power Source

The presence of low voltage (24VAC) or high voltage (120VAC) could result in personal injury or permanent damage to components or equipment.



Point of Interest

This point clarifies pertinent information, or brings your attention to an action that may have adverse effects on the installation process.



Drawing Reference

Refer to the specified electrical or mechanical drawing at the back of the manual.

RECEIPT, INSPECTION & NAME PLATE INFORMATION

This SOL-0100 has gone through rigorous quality control tests at the factory before shipment. After receipt and before installation perform the following checks:

Receipt

After receiving, inspect the unit for any possible physical damage that may have occurred during transportation.

Inspection

After unpacking the unit make sure the box contains:

- 1 SOL-0100 SolarBloc
- 1 Terminal Block
- 3 Brass Fittings
 - One with check valve inserted
- 1 Flow Sensor with Flow Pipe
- 2 Flow Pipe O-rings
- 1 Flow Sensor Clip
- 5 Unions
- 3 O-rings
- 3 Stainless Steel Fitting Clips
- Stainless Steel Back Plate
- 2 Universal Sensors
- 1 Screwdriver
- 2 Cable Ties

Make sure the part number on the unit corresponds to the part number on the original box.

Nameplate Information:

The exterior label contains specific information unique to your HBX SolarBloc and identifies some of the basic features. The label displays the serial number which will match the serial number on your actual SolarBloc, the lot number, the bar code and the products ETL number.



GENERAL TECHNICAL DATA

Input Voltage:

120 VAC, $\pm 10\%$, 60Hz, 2A

2 x Thermistor Inputs:

Tank/Collector

1 x Backup Output Relays:

125VAC 2A

1 x Flow/Temperature Sensor:

System Sensor

Microprocessor:

16Bit, 20MHz

Languages:

English

Weight:

4.53 KG (10 lbs)

Dimensions:

309mm (12.180") W x 255mm (10.039") H x

169mm (6.661") D

ETL Listings:

Meets CSA C22.2 No. 24

Meets UL Standard 873

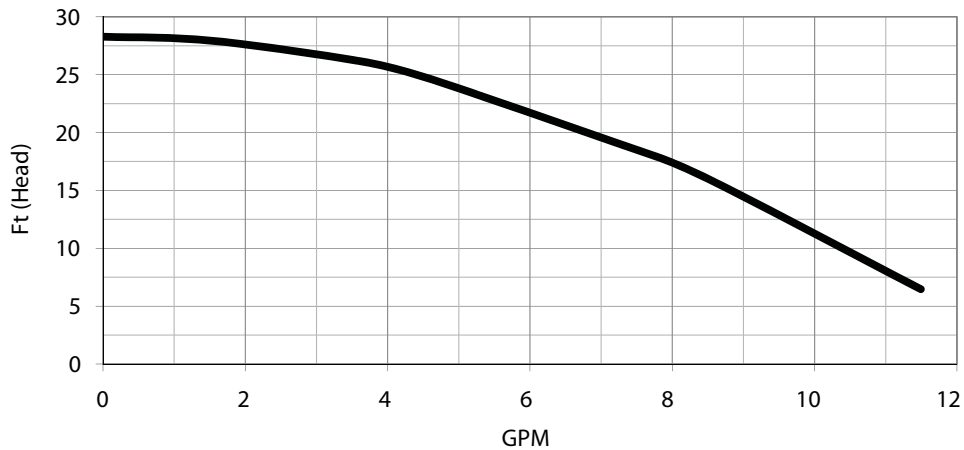
ETL Control No. 3068143

Storage:

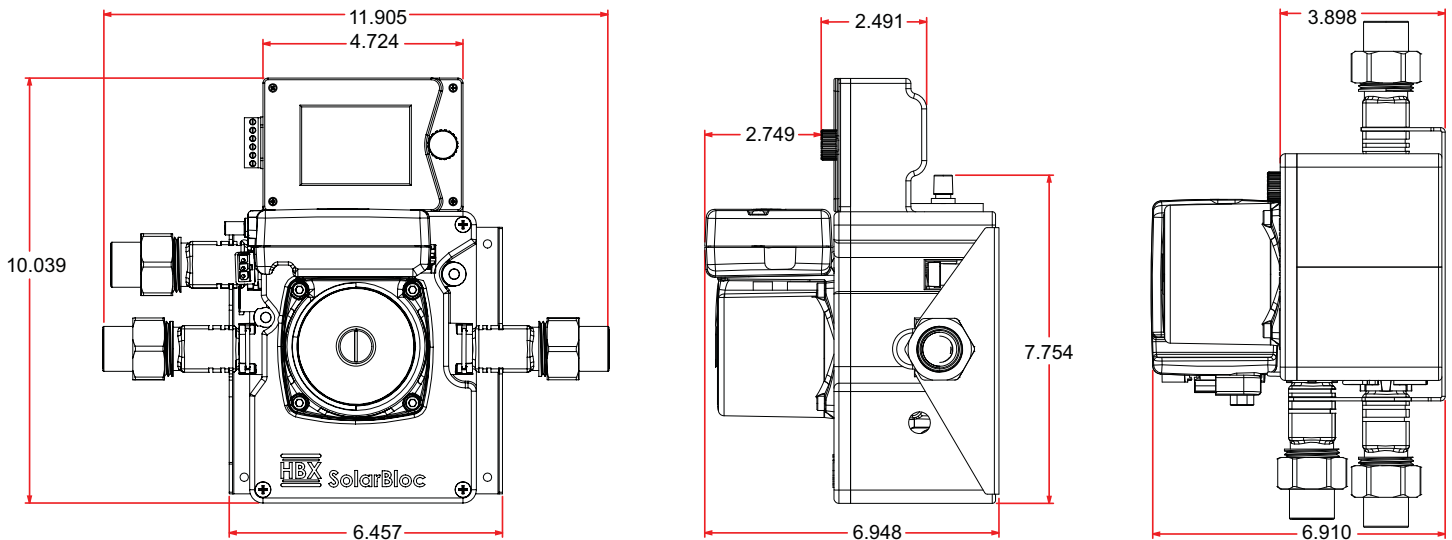
+10°C to +40°C

PUMP CURVE

Max Performance Curve - UPER 15-78 HB



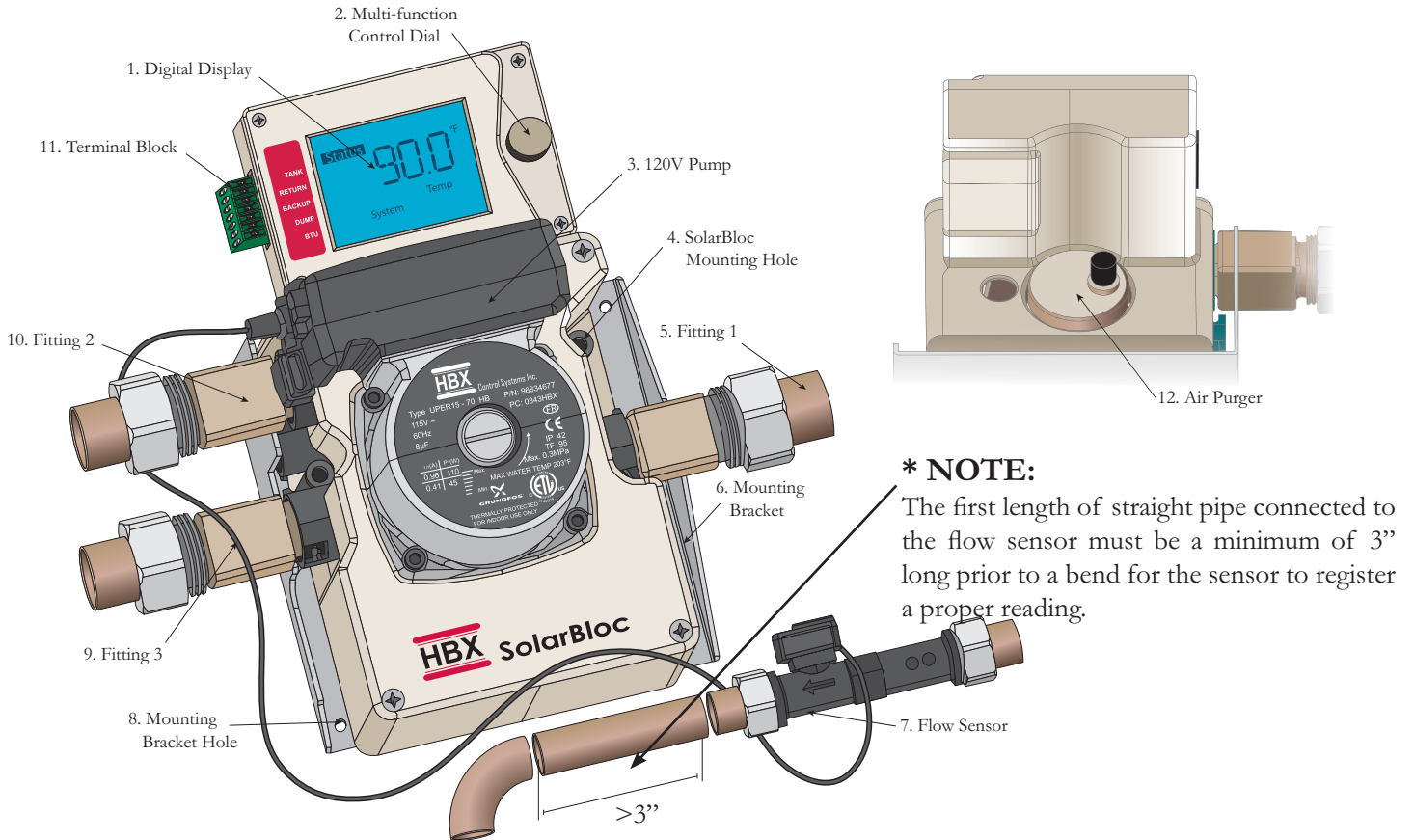
DIMENSIONS



DESCRIPTION & MAIN PARTS

The HBX SolarBloc is a control designed for multiple solar applications. It can be used with either solar panel or solar tube installations.


The SolarBloc will automatically control the system differential using a variable speed pump and floor sensor. Built in features control the boiler back up or provide capabilities for heat pump applications.



*** NOTE:**
The first length of straight pipe connected to the flow sensor must be a minimum of 3” long prior to a bend for the sensor to register a proper reading.

Viewing from top left and moving right in a clockwise direction:

- 1. Digital Display:**
Multi-colour backlight that indicates all parameters.
- 2. Multi-function Control Dial:**
Turn left, turn right, and enter when pressed.
- 3. 120V Pump:**
Variable speed pump.
- 4. SolarBloc Mounting Hole**
- 5. Fitting 1**
- 6. Mounting Bracket:**
Stainless steel bracket that is used to fix fitting positions and help with wall mounting.

- 7. Flow Sensor**
Take special note of flow sensor installation location (see drawings in back of manual).
- 8. Mounting Bracket Hole**
- 9. Fitting 3**
- 10. Fitting 2:**
 Make sure to use the fitting with check valve already inserted.
- 11. Terminal Block:**
Seven pin terminal block used to hook up sensor inputs, Backup/Dump demand.
- 12. Air Purger:**
Purges air from the hydronic system.

WIRING AND INSTALLATION

WIRING

Terminal 1 and 2: No Connection

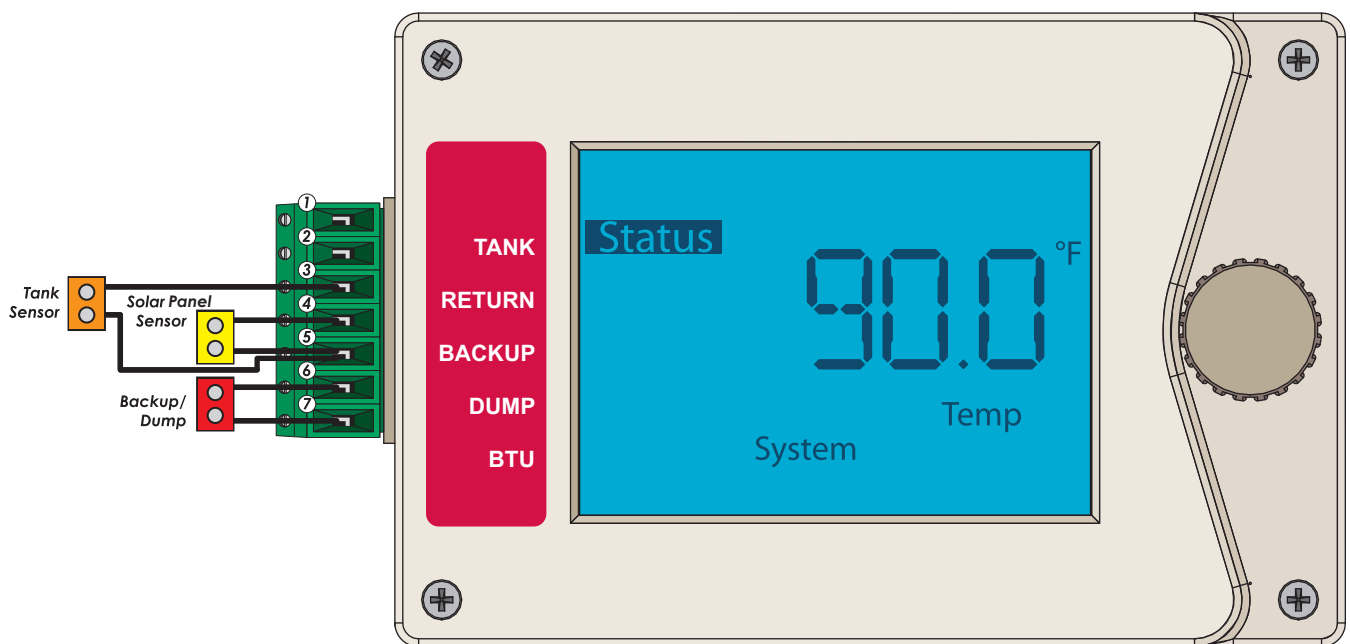
Terminal 3 and 5: Solar tank sensor.

Terminal 4 and 5: Solar collector sensor.

Terminal 6 and 7: Backup / Dump contacts (24 VAC MAX)



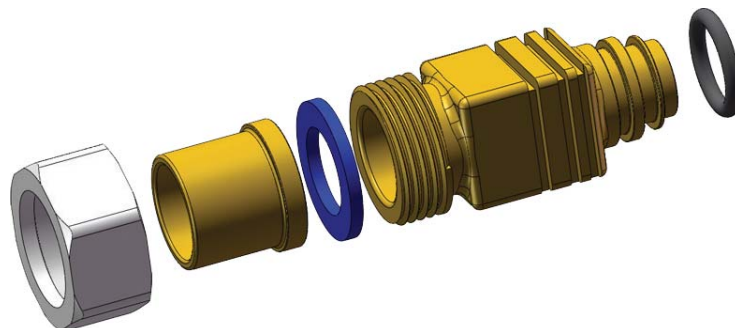
No pump can be directly connected to these terminals. If you are going to connect a pump use a 24 VAC relay to activate the pump.



INSTALLATION

FITTING

To place each fitting into the port on the SolarBloc, first place the O-ring over the fitting. Once the O-ring is in place, firmly twist and press the fitting into its appropriate position as shown in the diagram below.



SOLARBLOC ASSEMBLY

A. Back Plate


Installed on a wall to mount the SolarBloc.

B. Fitting 1

This fitting is to be installed on the lower right hand side of the SolarBloc, when facing the unit.

C. Fitting 2

This fitting is to be installed on the top left hand side of the SolarBloc closest to the front of the unit.

 Ensure that you use the fitting with the check valve inserted in this location.

D. Fitting 3

This fitting is to be installed on the lower left hand side of the SolarBloc.

E. Fitting Clip

The fitting clips are used to secure the fittings to the SolarBloc.

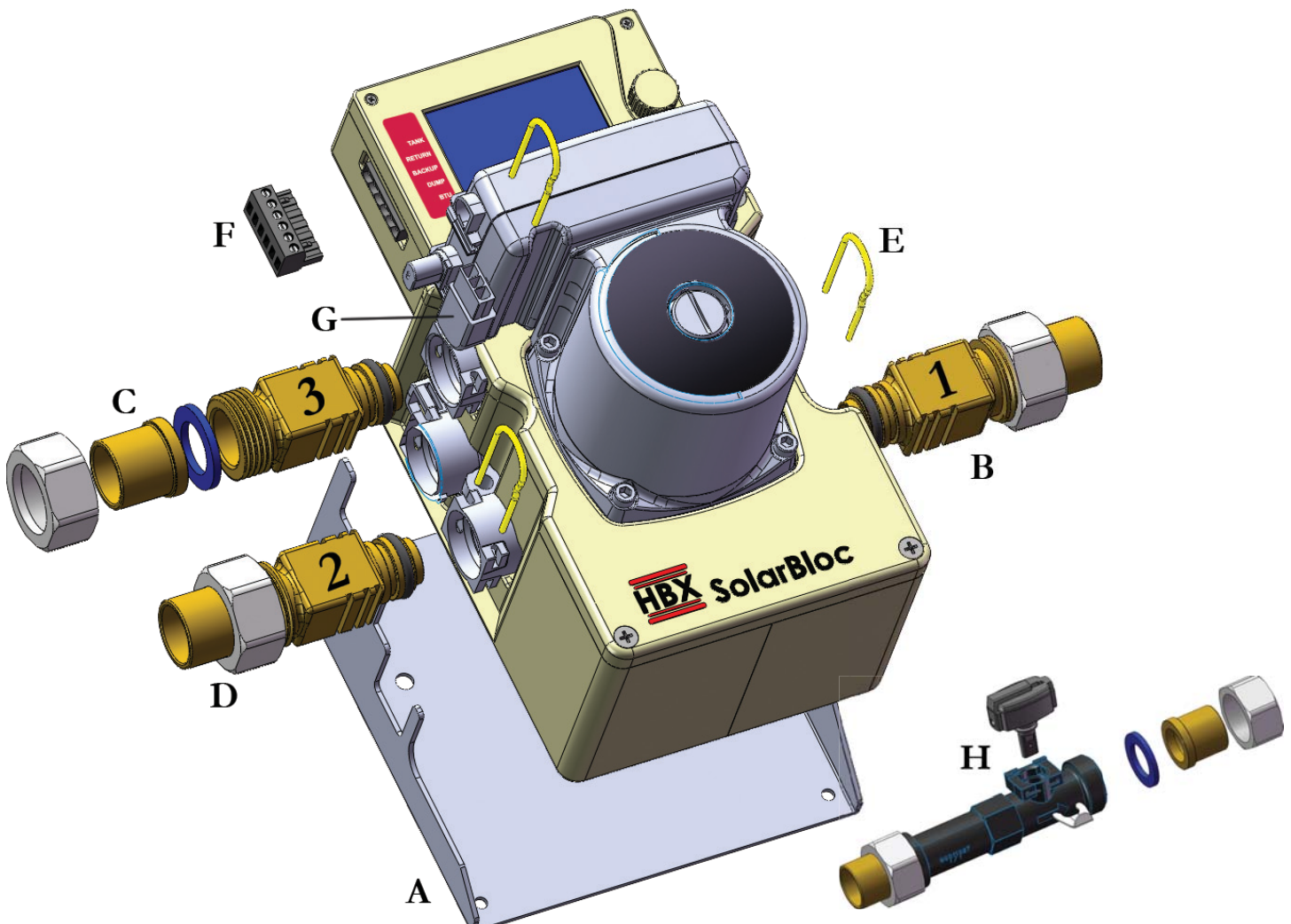
F. Terminal Block

Seven pin terminal used to connect sensor inputs, backup / dump demand.

G. Pre-Plugged Cable (Required for variable speed pump)

H. Flow and Temperature Sensor

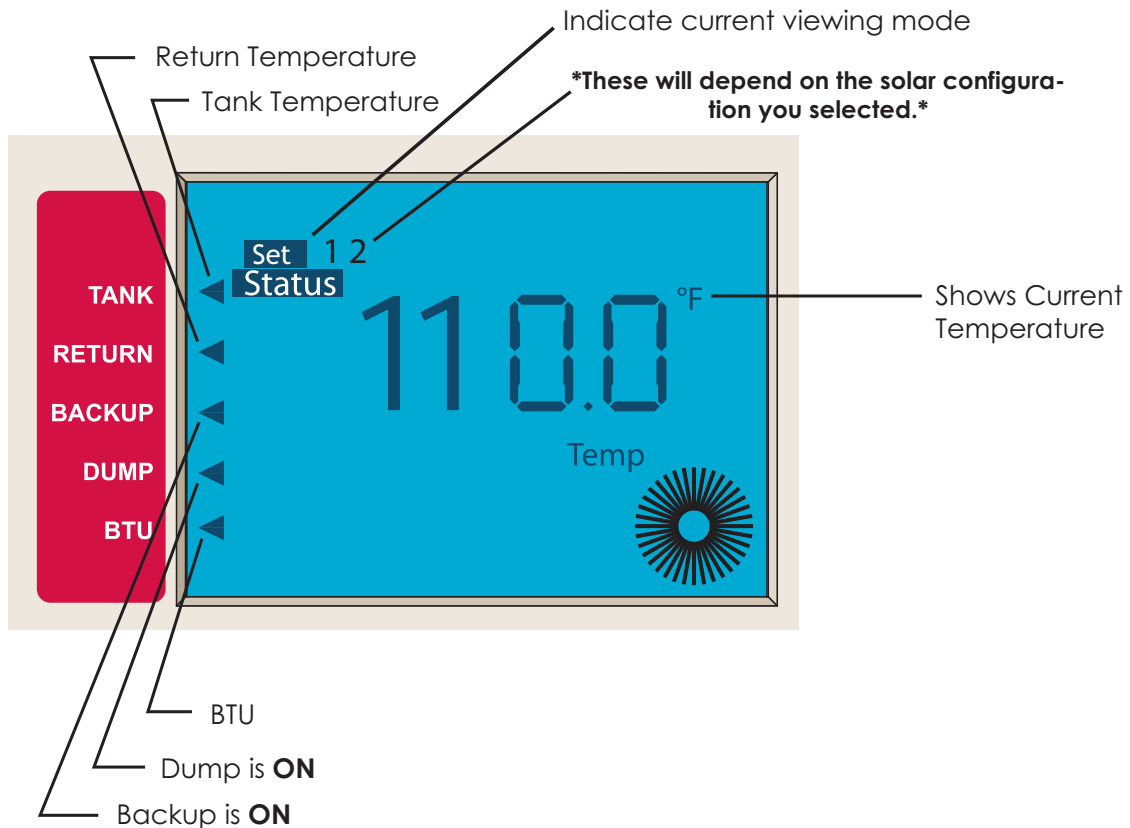
 Pump head must be removed prior to placing the upper connection fitting clip



PROGRAMMING HBX SOL-0100

MULTICOLOR BACKLIT DISPLAY

The Multicolor backlit display is one of the key features of the HBX control SOL-0100. Depending on which mode of operation is selected the screen color will change to indicate information about the status of the system.



SCREEN COLOURS

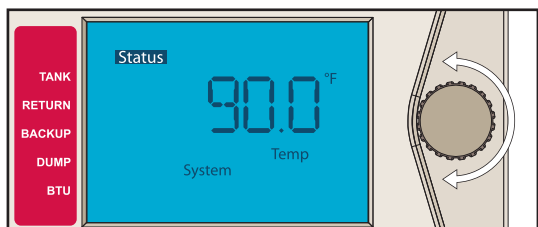
Light Blue - No solar demand.

Red - Backup/dump for solar running.

Yellow - Solar on and pump running.

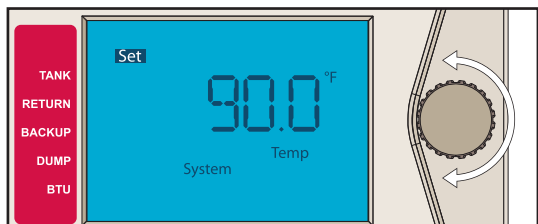
Dark Blue - Vacation mode "ON".

DIAL OPERATION



Status Screen Scroll Mode

In this mode turning the dial left or right will show the different status screens on the control.

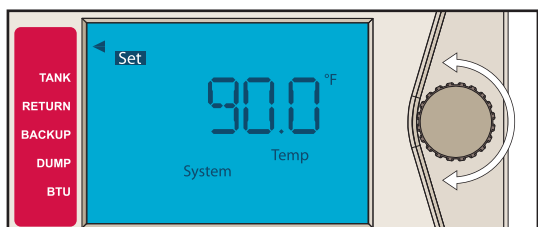


Programming Scroll Mode

To enter this mode the dial must be pressed in for more than 1 second. When the SET indicator comes on release the button, you will now be in programming scroll mode.

In this mode turning the dial to the left or right will scroll through the programming options on the control. Each setting will be indicated by the icons around the screen as well as the temperature of that setting. There are 9 settings to be set in the programming scroll mode.

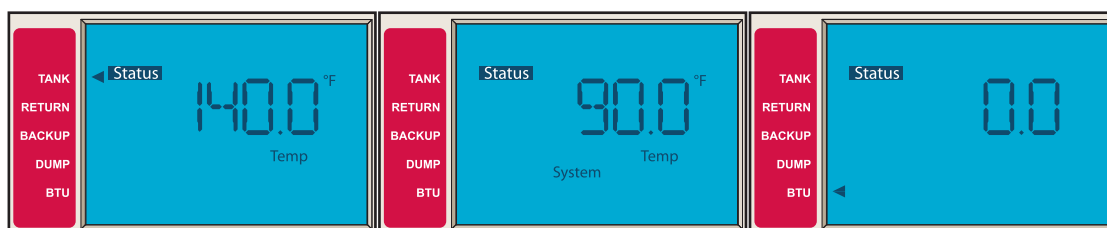
If you allow the control to idle in Programming Scroll Mode for thirty seconds the control will automatically return to status mode.



Programming Change Mode

To change a setting you must press the dial in momentarily and an arrow will appear in the top left corner of the screen. This will indicate the control is in the programming change mode. While in the change mode the user will be able to change the setting of that selection by turning the dial to the left to decrease the setting and to the right to increase the setting. Once you have finished changing the setting, press the dial momentarily and the arrow in the top left corner will disappear. This will indicate that the user is no longer in programming change mode.

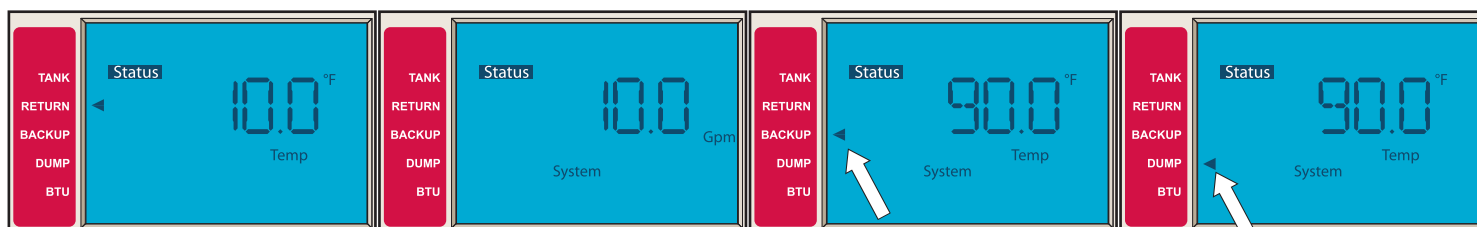
STATUS SCREENS



Tank Temperature

Solar Panel Temperature

BTU Output x 1000



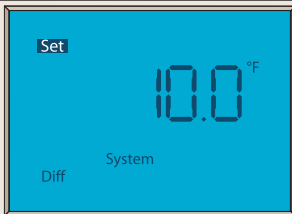
Return Temperature

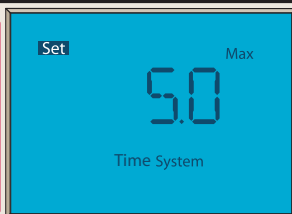

System Flow

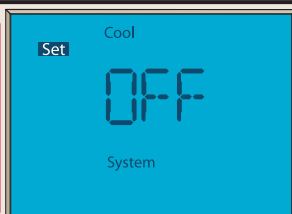
Blinking = Backup

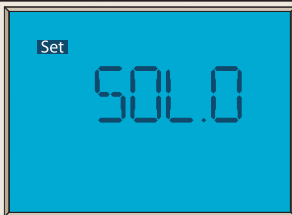

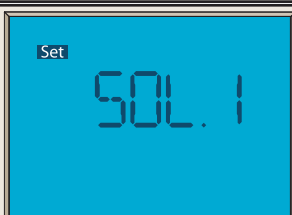

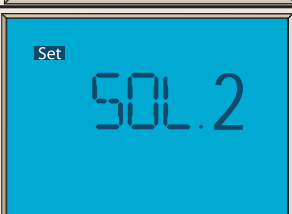

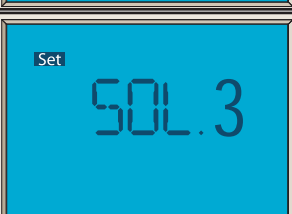

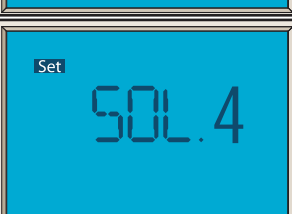

Blinking = Dump

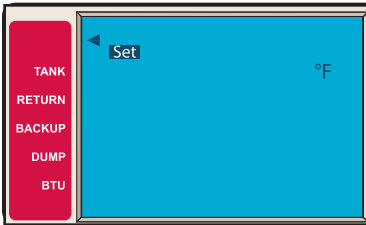
PROGRAMMING SCREENS

<p>TANK RETURN BACKUP DUMP BTU</p>		<h3>System Differential</h3> <p>Adjust this setting to the desired temperature differential that you would like the solar system to run at. This is the differential between the solar panel and the tank. Keep in mind that this is the starting point to turn on the pump, it will run until the actual differential is 2°F.</p> <p>2°F-200°F, Default: 10°F</p>
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<p>TANK RETURN BACKUP DUMP BTU</p>		<h3>Priming Time</h3> <p> This option is visible in SOL.3 and SOL.4, the control must be set to SOL.3 and SOL.4 to function correctly.</p>
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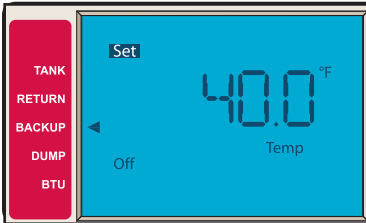
<p>TANK RETURN BACKUP DUMP BTU</p>		<h3>Vacation Mode</h3> <p>This setting is used when the user will be away for extended periods. When activated the pump will run any time the tank temp is above 130°F cooling the tank by moving water through the cold solar collector.</p>
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<p>TANK RETURN BACKUP DUMP BTU</p>		<h3>Solar Configuration</h3> <p>SOL.0 This configuration allows the SolarBloc to run when a backup system is needed. The pump will run and contacts 6 & 7 will close. The flow will switch to the backup side.</p> <p> Must follow diagram 1 for piping.</p> <p>Default: SOL.0</p>
<p>TANK RETURN BACKUP DUMP BTU</p>		<p>SOL.1 This configuration allows for a system dump. When there is an over-temperature situation the pump will run and contacts 6 & 7 will close. The flow will switch to the dump side.</p> <p> Must follow diagram 2 for piping.</p>
<p>TANK RETURN BACKUP DUMP BTU</p>		<p>SOL.2 This configuration allows the SolarBloc to use the extra contact 1&2 to act as heat exchanger pump contact when the pump comes on for the solar, the contact for the heat exchanger pump 1&2 will close. If the unit goes into dump, the contact will be open.</p> <p> Must follow diagram 3 for piping.</p>
<p>TANK RETURN BACKUP DUMP BTU</p>		<p>SOL.3 This setting is used in drainback piping situations requiring a priming pump. The extra contact will come on for the user defined time each time the system starts up. The priming pump is used if the SolarBloc pump does not have enough capacity to start the flow in the system. When this system goes into dump the valve will move to the dump position.</p> <p> Must follow diagram 4 for piping.</p>
<p>TANK RETURN BACKUP DUMP BTU</p>		<p>SOL.4 This setting is used in drainback piping situations NOT requiring a priming pump. The extra contact will come when the system goes into dump. When this system goes into dump the valve will move to the dump position. There is NO priming pump option with SOL.4.</p> <p> Must follow diagram 4 for piping.</p>



Celsius or Fahrenheit

This setting changes the display to either Celsius or Fahrenheit.
(°C/°F) Default: °F

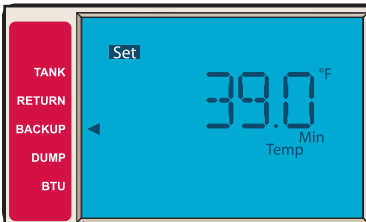


Backup Off Temperature

This option is used to set the backup off temperature. Once the backup has reached this temperature the backup sequence will stop. 0°F-200°F, Default = 40.0°F



Although this option is visible in all modes, the control must be set to SOL.0 to function correctly.

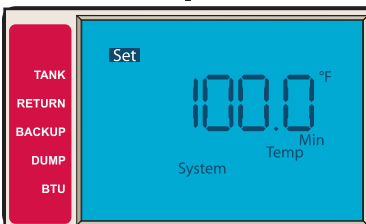


Backup On Temperature

This setting is used to set the backup on temperature. If the temperature in the tank falls below this setting the backup will turn on. 0°F-200°F, Default = 39.0°F

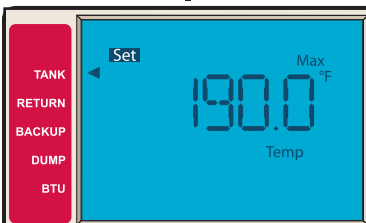


Although this option is visible in all modes, the control must be set to SOL.0 to function correctly.



Min Solar Panel Temperature

This is the minimum temperature the Solar Panel must reach to turn the pump on. 0°F-200°F, Default = 100°F

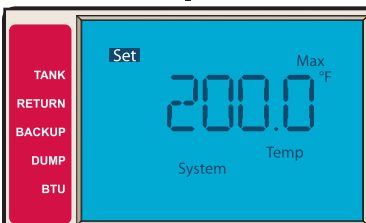


Maximum Tank Temperature

This setting is used to set the maximum tank temperature. If the tank exceeds this temperature the dump sequence will be initiated. This sequence will stop when the tank temp falls 2°F below this setting. 0°F-200°F, Default = 190°F



Although this option is visible in all modes, the control must be set to SOL.1 to function correctly.



Maximum Solar Panel Temperature

This setting is used to set the maximum solar temperature. If the temperature in the collector(s) exceeds this setting the dump sequence will be initiated. This sequence will stop when the solar panel temperature falls 10°F below this setting. 0°F-240°F, Default = 200°F



Although this option is visible in all modes, the control must be set to SOL.1 to function correctly.

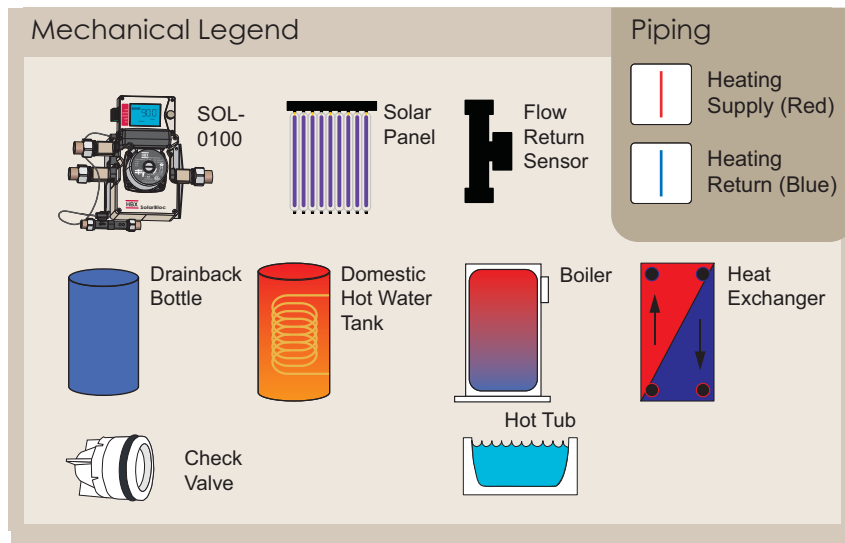
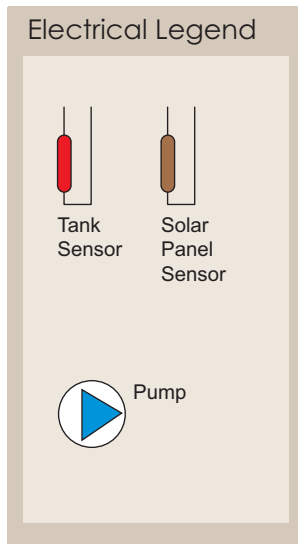
APPLICATION DRAWINGS

The following application drawings are intended to be a guide for a number of mechanical installations, and the corresponding electrical wiring schematic to control the applications. Please note the disclaimer below as to the accuracy, reliability and suitability of any particular installation the installer is attempting. The installer, as a professional, is ultimately responsible for their installation.

HBX Controls hopes that these illustrations will assist you in gaining confidence to tackle a multitude of Solar applications with our control.

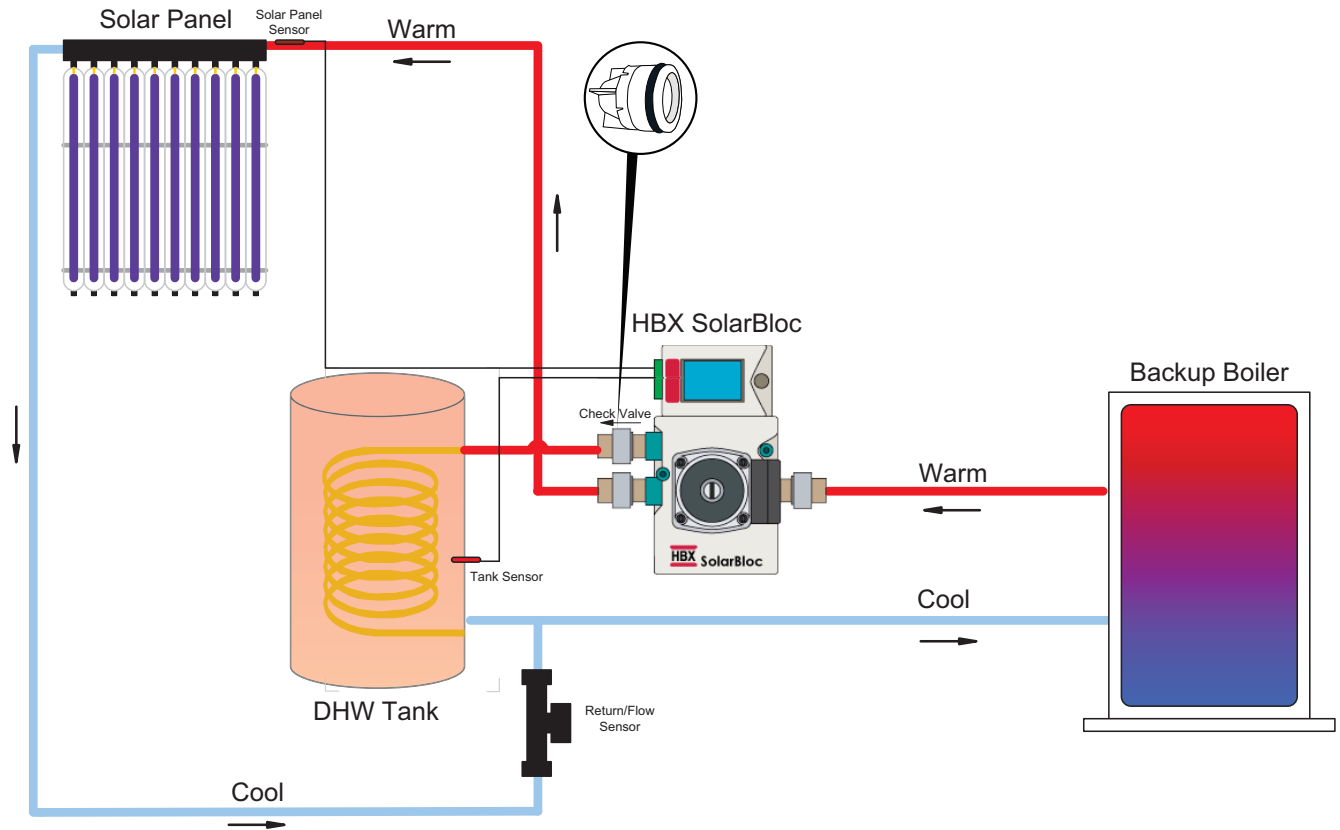


These are not engineered drawings and do not necessarily include all the components for an entire system. They are intended as representations of how the Control may be wired for a sample application. It is the responsibility of the installer to seek professional advice and/or install the system to meet all necessary codes for the jurisdiction of the actual installation.



Application Drawings

SOL-0100-01 DRAWING: BACKUP SYSTEM



Description:

This is an example of a solar system utilizing a back up heat source, a boiler in this case, to supplement the heat provided by the collector. When the storage tank temperature falls below a user defined temperature, the SolarBloc will switch flow directions and enable the boiler to bring the tank up to temperature. The SolarBloc must be set to SOL.0 (see programming screens) to control a backup heat source.

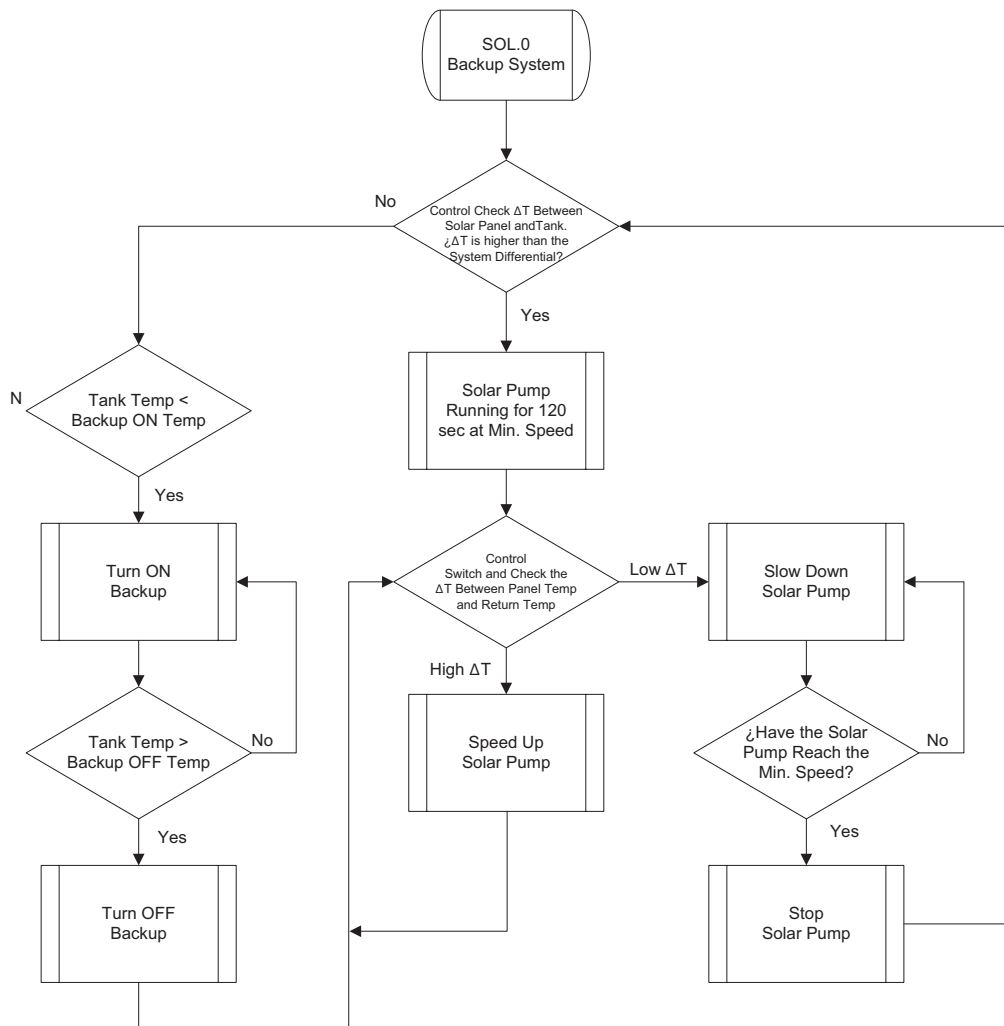


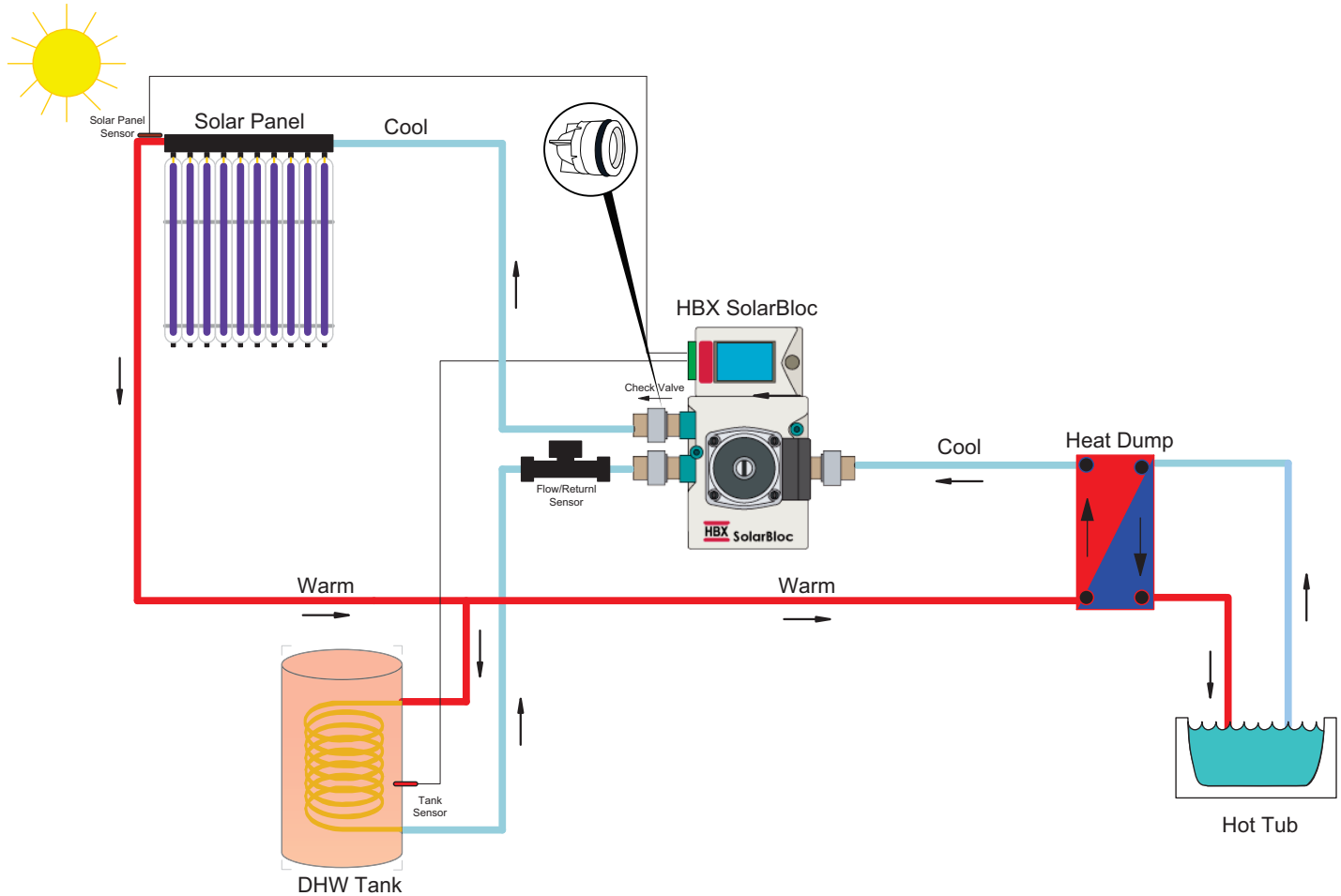
Note that in this system setup the boiler water will mix with the solar/tank water. If you do not wish for that to happen, ensure that a heat exchanger is installed between the boiler and the SolarBloc.



Example Mechanical drawing only! Does not depict all components required for complete installation/application.

SOL-0100-01 FLOWCHART: BACKUP SYSTEM



SOL-0100-02 DRAWING: DUMP SYSTEM**Description:**

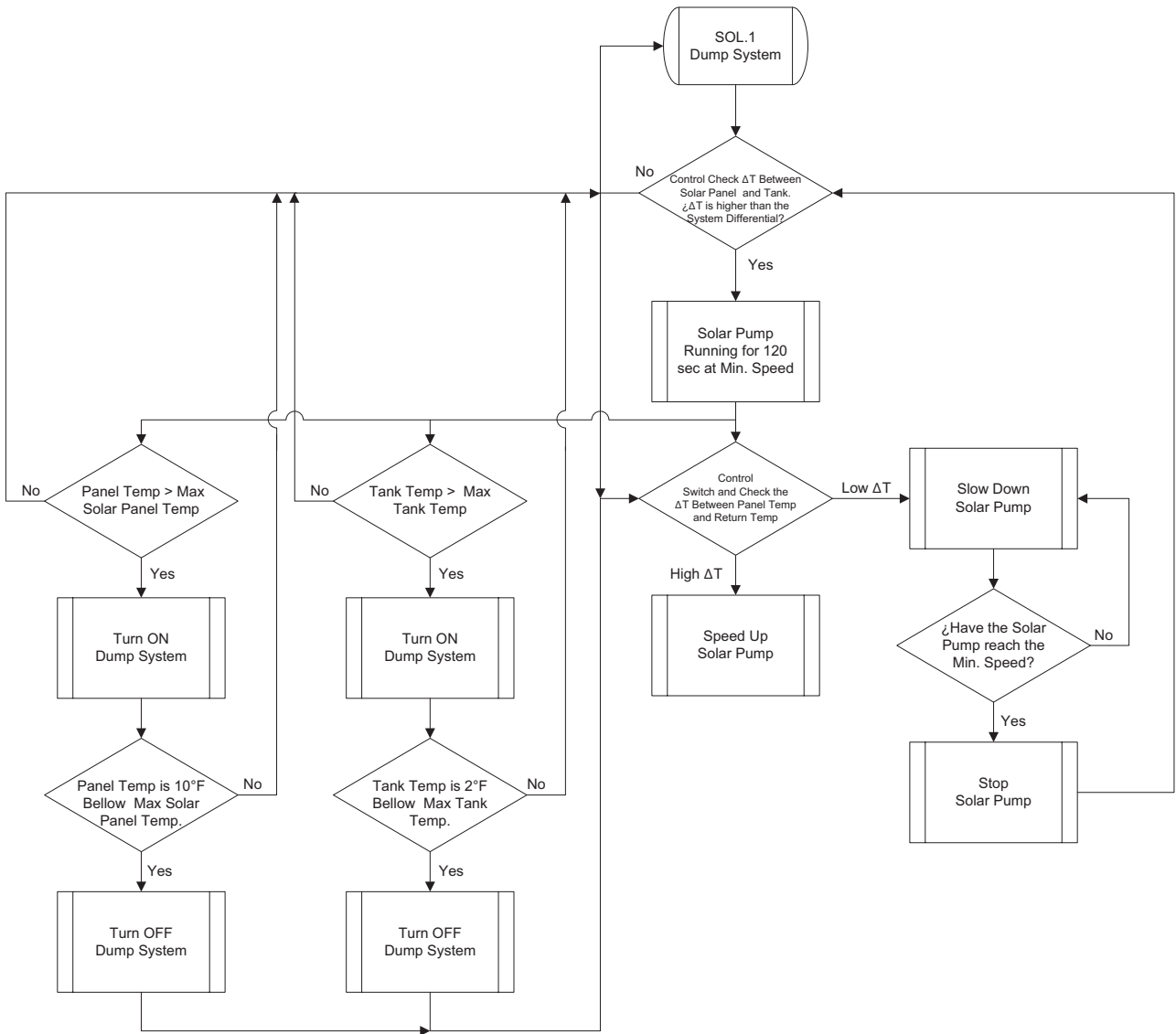
This is an example of a solar system utilizing a heat dump. When the collector or storage tank temperature rises above a user defined temperature the SolarBloc will switch flow directions to allow circulation through the collector and a heat dump to reduce the system temperature. The SolarBloc must be set to SOL.1 (see programming screens) to control a heat dump.



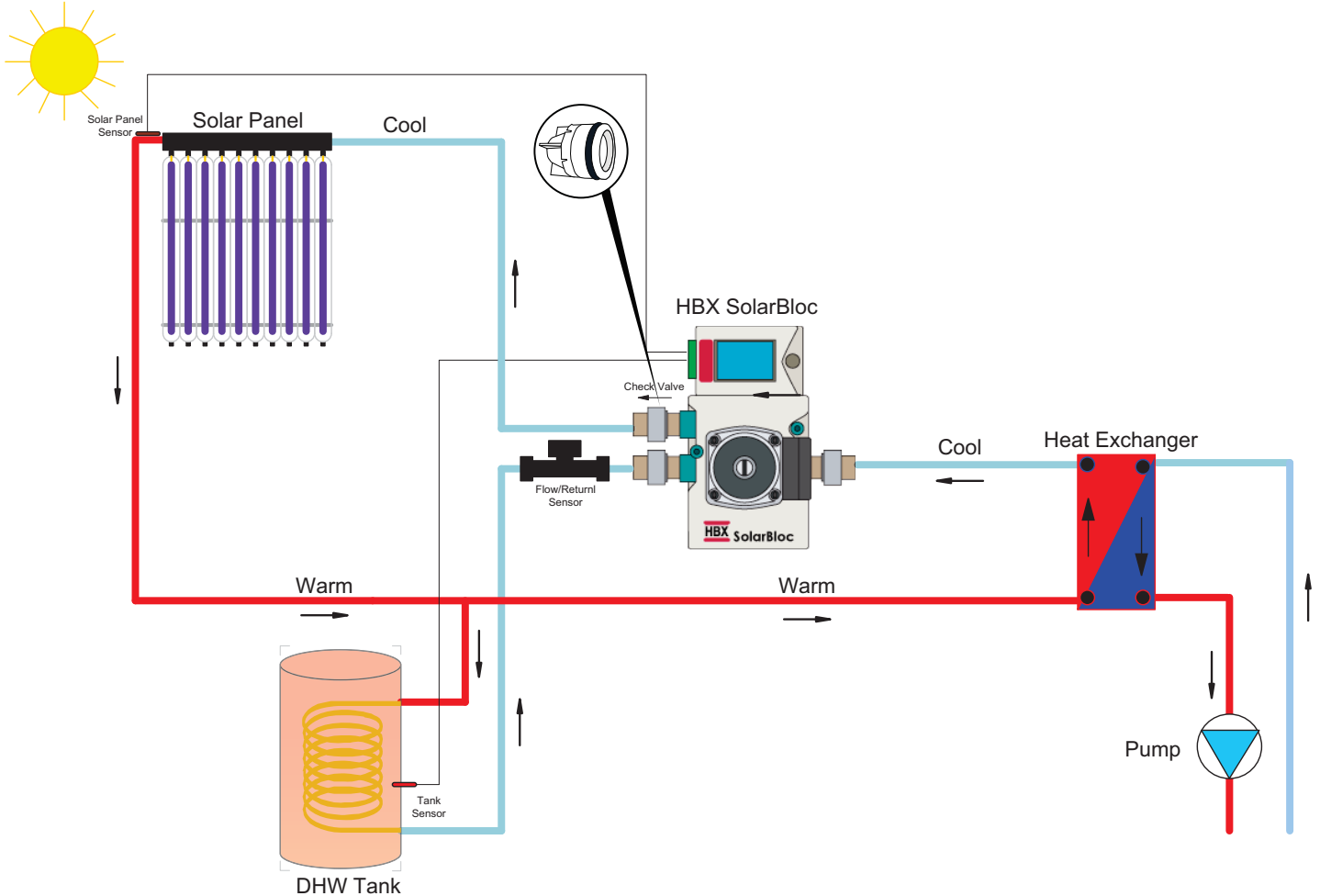
Example Mechanical drawing only! Does not depict all components required for complete installation/application.



SOL-0100-02 FLOWCHART: DUMP SYSTEM



SOL-0100-03 DRAWING: HEAT EXCHANGER PUMP



Description:

This is an example of a Solar System utilizing a heat exchanger pump. When the collector or storage tank temperature rises above a user define temperature, the SolarBloc will switch flow directions to allow circulation through the collector and a heat exchanger to reduce the system temperature.

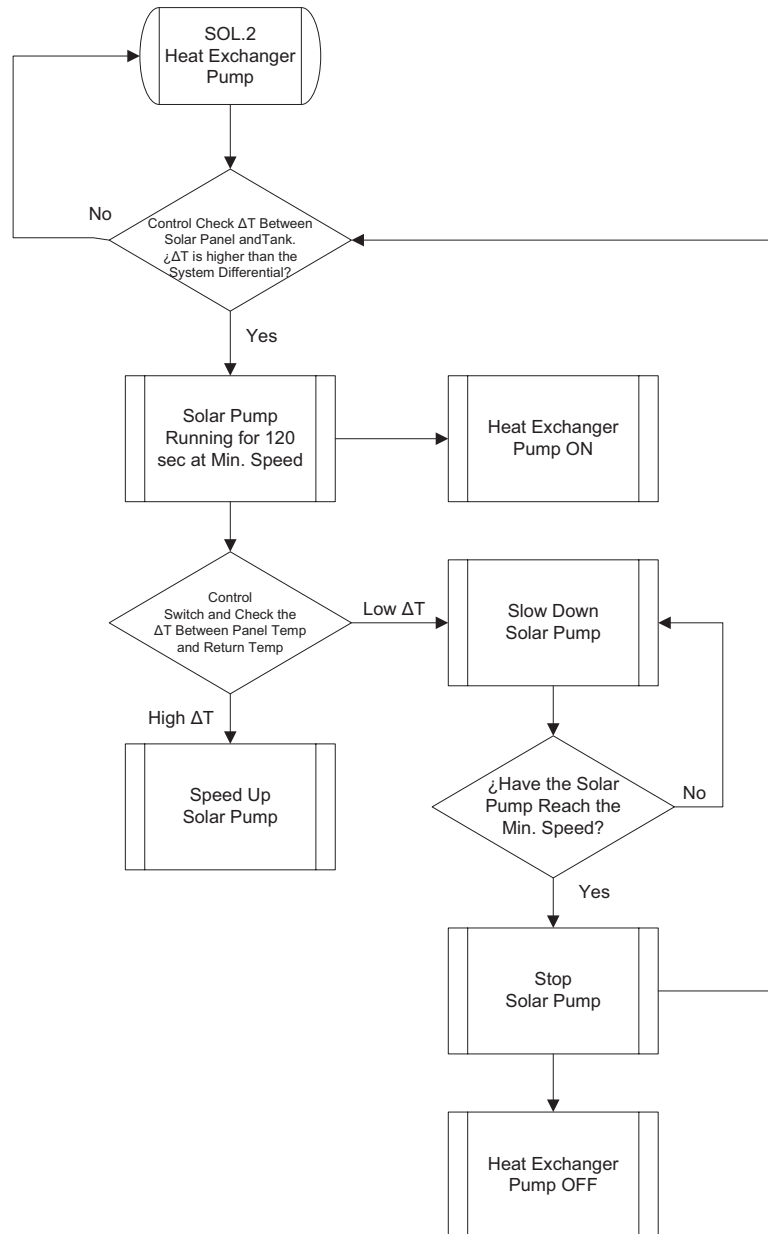


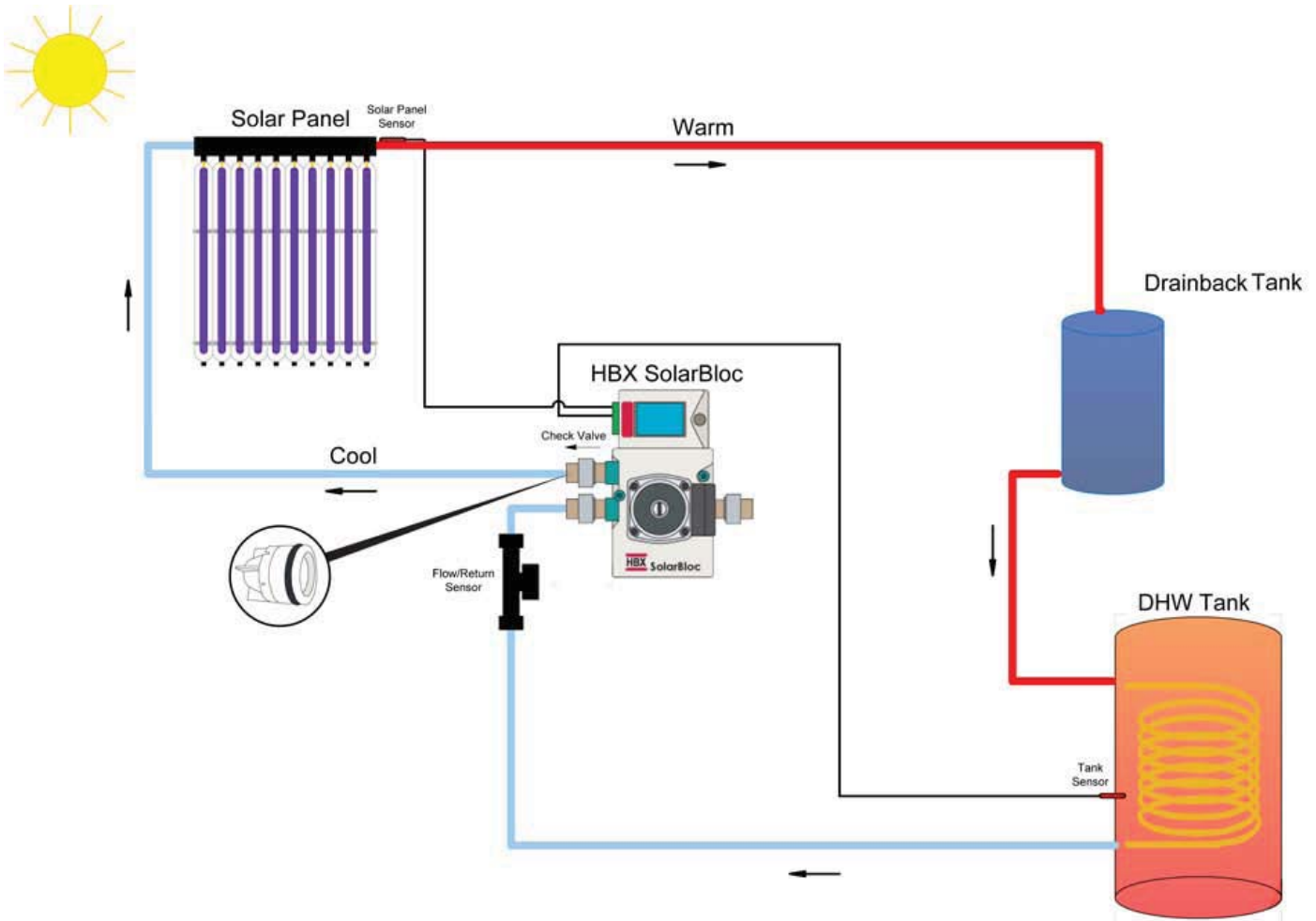
Example Mechanical Drawing only! Does not depict all components required for complete installation/applications.



Contacts 6 and 7 are 24 VAC MAX. Use relay to run a pump.

SOL-0100-03 FLOWCHART: HEAT EXCHANGER PUMP



SOL-0100-04 DRAWING: DRAINBACK SYSTEM**Description:**

This is an example of a Solar System utilizing a drainback system. This configuration allows the water to drain back to a drainback tank when heat is not required from the solar panel. Once the demand for heat returns, the SolarBloc operates the pump to fill the loop and collect heat.

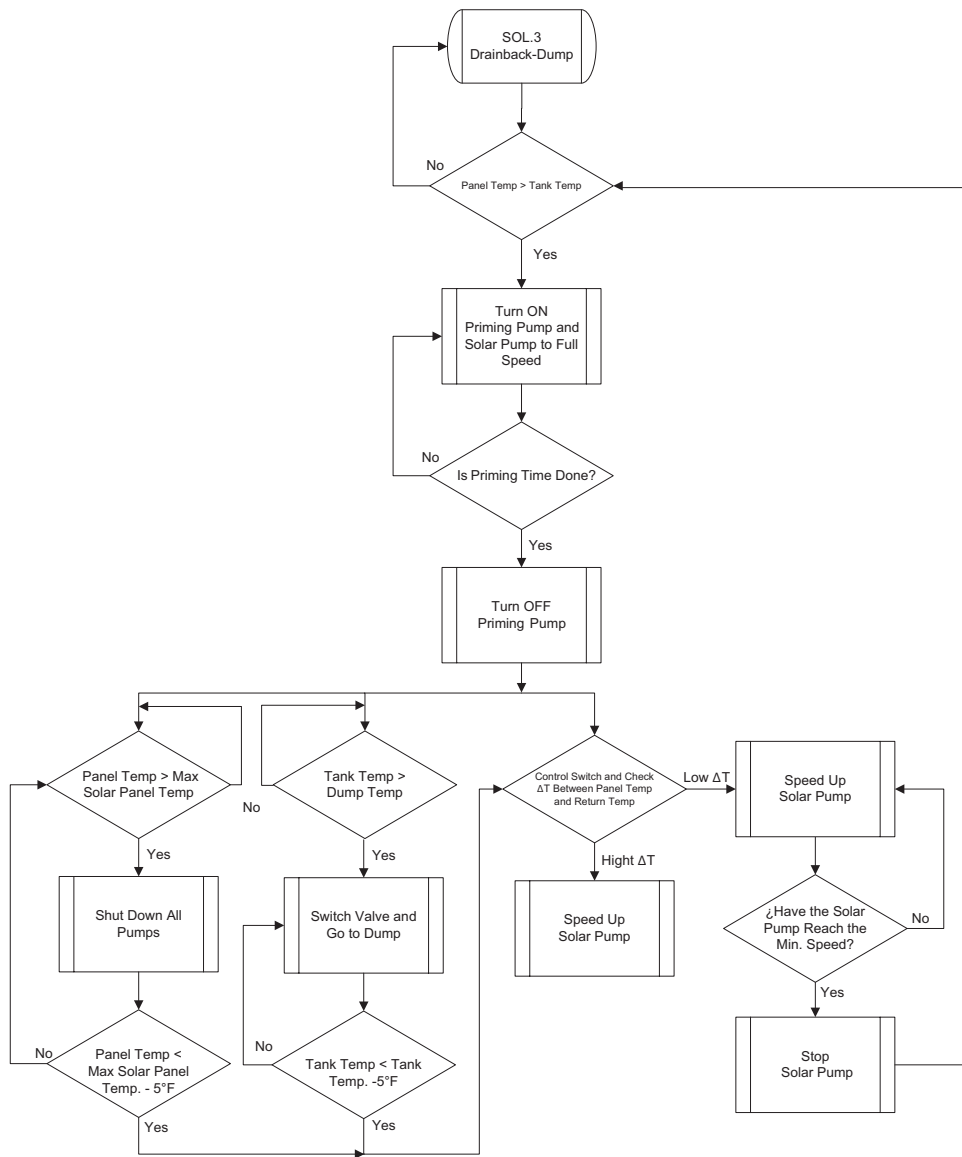


Example Mechanical Drawing only! Does not depict all components required for complete installation/applications.



Contacts 6 and 7 are 24 VAC MAX. Use relay to run a pump.

SOL-0100-04. FLOWCHART: DRAINBACK SYSTEM



SOL-0100-05. DRAINBACK WITH EXTRA RELAY



Limited Warranty

HBX Controls warrants each of its products to be free from defects in workmanship and materials under normal use and service for a period of 24 months from date of manufacture or 12 months from date of purchase from an HBX Authorized Dealer, if within the above documented period after date of manufacture.

If the product proves to be defective within the applicable warranty period, HBX on its sole discretion will repair or replace said product. Replacement product may be new or refurbished of equivalent or better specifications, relative to the defective product. Replacement product need not be of identical design or model. Any repair or replacement product pursuant to this warranty shall be warranted for not less than 90 days from date of such repair, irrespective of any earlier expiration of original warranty period. When HBX provides replacement, the defective product becomes the property of HBX Controls.

Warranty Service, within the applicable warranty period, may be obtained by contacting your nearest HBX Controls office via the original Authorized Agent and requesting a Return Material Authorization Number (RMA #). Proof of purchase in the form a dated invoice/receipt must be provided to expedite the issuance of a Factory RMA.

After an RMA number has been issued, the defective product must be packaged securely in the original or other suitable shipping package to ensure that it will not be damaged in transit. The RMA number must be visible on the outside of the package and a copy included inside the package. The package must be mailed or otherwise shipped back to HBX with all costs of mailing/shipping/insurance prepaid by the warranty claimant.

Any package/s returned to HBX without an approved and visible RMA number will be rejected and shipped back to purchaser at purchaser's expense. HBX reserves the right, if deemed necessary, to charge a reasonable levy for costs incurred, additional to mailing or shipping costs.

Limitation of Warranties

If the HBX product does not operate as warranted above the purchasers sole remedy shall be, at HBX's option, repair or replacement. The foregoing warranties and remedies are exclusive and in lieu of all other warranties, expressed or implied, either in fact or by operation of law, statutory or otherwise, including warranties of merchantability and fitness for a particular purpose/application. HBX neither assumes nor authorizes any other person to assume for it any other liability in connection with the sale, installation maintenance or use of HBX Controls products.

HBX shall not be liable under this warranty; if its testing and examination discloses that the alleged defect in the product does not exist or was caused by the purchasers or third persons misuse, neglect, improper installation or testing, unauthorized attempts to repair or any other cause beyond the range of intended use, or by accident, fire, lightning or other hazard.

Limitation of Liability

In no event will HBX be liable for any damages, including loss of data, loss of profits, costs of cover or other incidental, consequential or indirect damages arising out of the installation, maintenance, commissioning, performance, failure or interruption of an HBX product, however caused and on any theory of liability. This limitation will apply even if HBX has been advised of the possibility of such damage.

Local Law

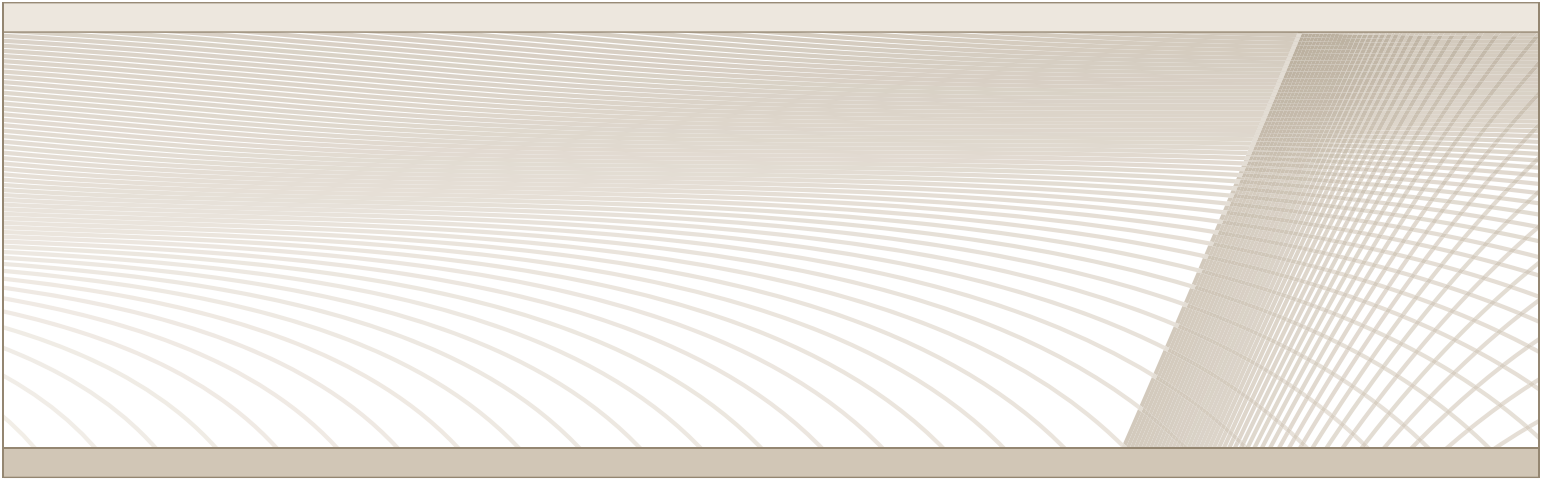
This limited warranty statement gives the purchaser specific legal rights. The purchaser may also have other rights which vary from state to state in the United States, from Province to Province in Canada and from Country to Country elsewhere in the world.

To the extent this Limited Warranty Statement is inconsistent with local law, this statement shall be deemed modified to be consistent with such local law. Under such local law, certain disclaimers and limitations of this statement may not apply to the purchaser. For example, some states in the United States, as well as some governments outside the United States (including Canadian Provinces), may:

Preclude the disclaimers and limitations in this statement from limiting the statutory rights of a consumer (e.g. United Kingdom);

Otherwise restrict the ability of a manufacturer to enforce such disclaimers or limitations; or grant the purchaser additional warranty rights which the manufacturer cannot disclaim, or not allow limitations on the duration of implied warranties.

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