Harvest
Open

User Manual - Open

1. User Manual

1.1. Welcome

A PDF copy of this manual can be obtained using the download icon (⬇) above.

Features and Benefits of Your Harvest Thermal Battery System™

Congratulations on being a pioneer in the shift to clean energy use. Your new Harvest Thermal Battery System™ shifts electricity consumption for heating and hot water to the times of day when grid energy is cleanest and cheapest, and then leverages the system's thermal storage to deliver that energy whenever it is needed in the home. Since the system is paired with the most efficient and lowest global-warming-potential refrigerant heat pump on the market, you can feel confident that you have minimized the impact of your home energy use on the environment and on your wallet.

Stay Connected with Harvest

Each Harvest Thermal Battery System is connected to the Harvest cloud for commissioning, accessing the weather forecast to minimize your energy bills, enabling remote support and monitoring, as well as keeping the pod up-to-date with the latest energy-saving software. Keep your Harvest Pod™ connected to the Internet to get full heating performance and to help you share in all the benefits of owning a Harvest System.

During commissioning, the Harvest Pod will be connected either via an Ethernet cable to your router or by connecting the Pod to your Wi-Fi network. An Ethernet cable is the most robust long-term option if available.

If your Pod is connected via Wi-Fi , please email support@harvest-thermal.com if your Wi-Fi network name/password changes. This will help us keep your system updated and send you system alerts if needed.

In addition, please email support@harvest-thermal.com if your phone or email changes so we can keep our records accurate.

1.2. System Operation

How Harvest Systems Feel Different in the Home

Unlike traditional gas furnaces which often deliver heat via short intermittent blasts of hot air, your Harvest Thermal Battery System™ provides gentler and longer heating cycles to better match your heating needs. The first difference you may “notice” is the noise reduction since the system is much quieter. The second difference is that you may feel warmer. Due to the more continuous heating cycle and stable temperature, many Harvest users find that they feel comfortable at a lower thermostat setting.

The remaining difference is that the system heats more gradually than gas furnaces, so it is best to keep your home at a fairly constant temperature (e.g., just 2-3°F lower at night but no more). This approach maximizes home comfort while minimizing energy use (similar to how it is better to drive a car at a constant speed rather than cycle through periods of acceleration and hard braking).

- Do not change the thermostat setting more than 2-3°F when you expect to be absent or asleep or if you come home at a different time than usual. Refer to the Heating section below for more information.
- When heating begins, it may take a few hours for your home to reach the set target temperature.

Heating

To use Heating mode, set your thermostat to Heat.

> Smart thermostats often have a built-in smart recovery algorithm. For example, on the Ecobee thermostat, this is called "Smart Recovery", and on a Nest thermostat it is called "Early-On".
>
> This feature ensures the temperature in your home reaches the desired setpoint at the beginning of each scheduled change by having your heat or cooling start early if required. This is a great feature to use, if available to you.

Gas furnace users have long been advised to lower their thermostat temperature by 5°F or more, or even shut them off completely at night and when away to save energy. This doesn't work for heat pumps like Harvest, it reduces their performance and they take longer to warm up a chilly home. It is still recommended to lower your thermostat temperature at night and when away, but only by 2 to 3°F, to maximize your comfort and the system's performance.

When adjusting thermostat settings, follow the manufacturer's instructions and these guidelines:

- Set the temperature down ("setback") only by 2 or 3°F at night and when no one is home.
- If you are not using a smart thermostat with a smart recovery algorithm, start reheating 1 hour per degree F setback before target time. For example, if using a 2°F setback, program the thermostat to start heating at 5 a.m. for a 7 a.m. wake up time.

Suggested settings if using a smart thermostat

Time	Temperature
7 a.m.	69°F
9 a.m.	67°F (away) 69°F (home)
5 p.m.	69°F
10 p.m.	66°F

Suggested settings if NOT using a smart thermostat

Time	Temperature
4 a.m.	69°F
9 a.m.	67°F (away) 69°F (home)
3 p.m.	69°F
10 p.m.	66°F

Vacation

When going on vacation, set the thermostat to your normal nighttime temperature to ensure that your home does not take too long to reheat upon your return. For those with connected

thermostats, you can turn off the heat and remotely start reheating your home 1-2 days before returning.

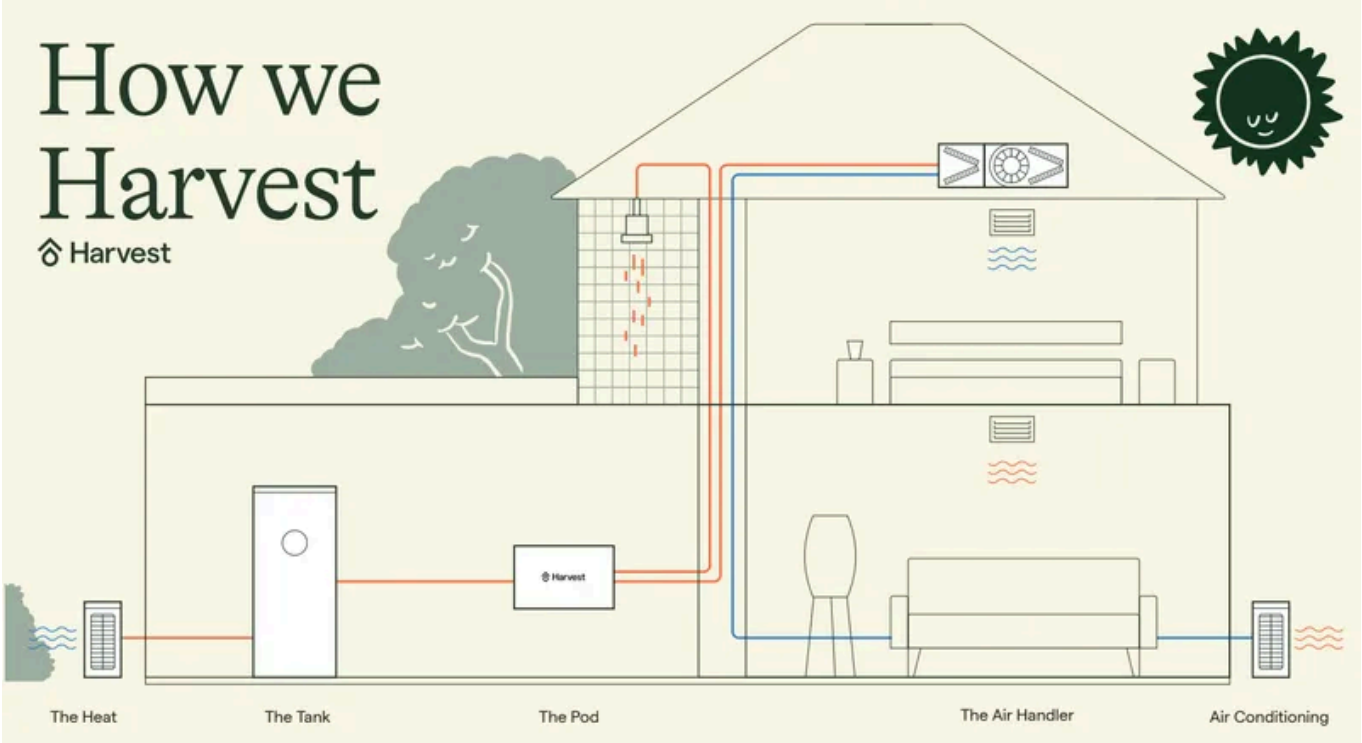
Cooling

Harvest Thermal integrates with many different separate air-to-air heat pumps and air handlers to provide cooling. The system works the same as a traditional air conditioner and uses the same thermostat settings. Just set to “Cool” to enjoy filtered, cooler air any time.

1.3. How the Harvest Thermal Battery System Works

Your Harvest Thermal Battery System uses five primary components to supply your home with heating and hot water:

- the heat pump, which is a SANCO2 heat pump water heater,
- the tank, which is a SANCO2 water tank, typically with 119 gallons storage (although one or two 83-gallon tanks may be installed),
- the Harvest Pod,™
- the air handler, which may be in your attic or crawl space, and
- optionally, the air conditioner, which can be a reversible heat pump (we often call it a heat pump A/C outdoor unit).

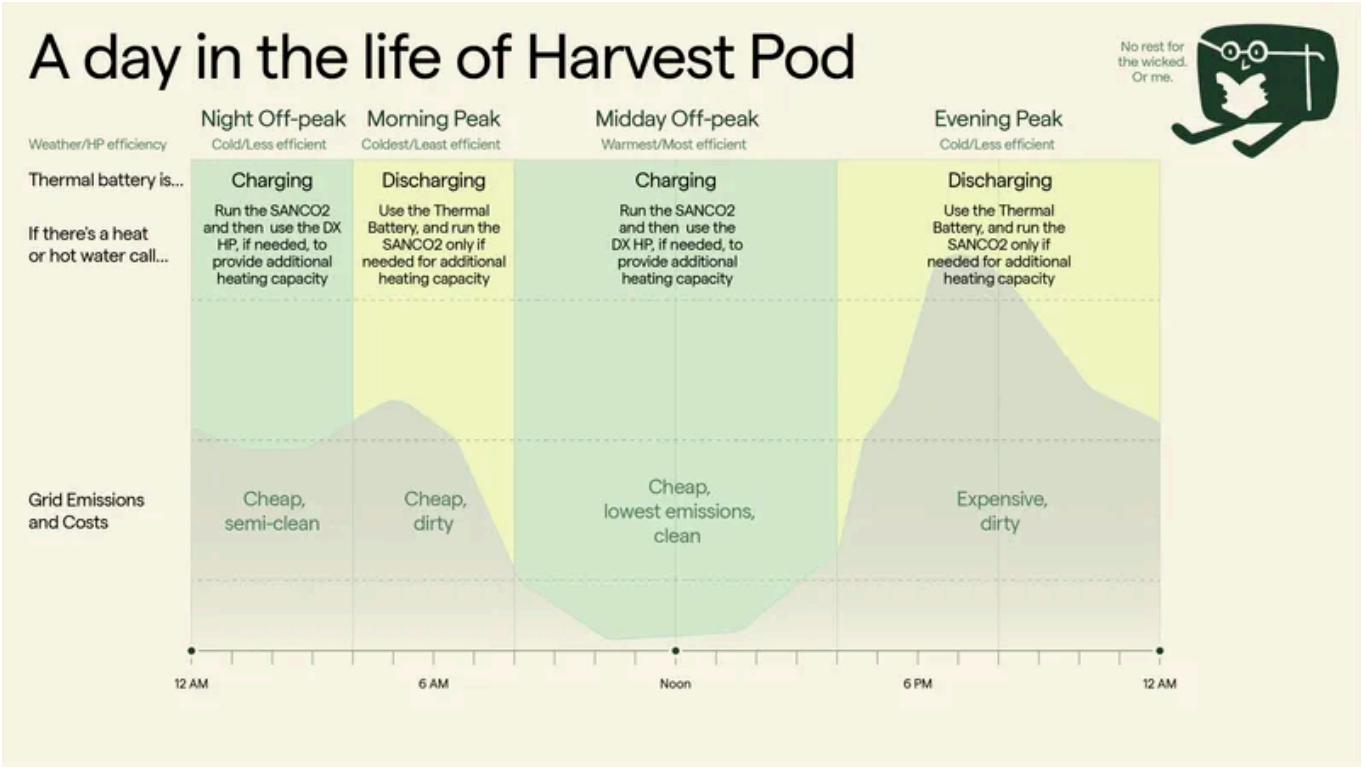


The heat pump water heater and Pod work together to maintain a supply of hot water in the storage tank. That hot water is used directly in the home for showers, etc., and is also directed through the air handler for heating. When hot water passes through the air handler, the heat is transferred to air blown through the unit's heat-exchanging coil, and the warm air then heats the home.

The air conditioner unit provides cooling in the warmer months. In addition, if it is a heat pump, it can supplement the heating provided by the heat pump water heater to maximize the thermal battery system's ability to shift heating loads away from times of peak cost and peak greenhouse gas emissions.

The Harvest Pod manages all of these components, serving three primary purposes:

1. maintains just the right amount of hot water in the tank
2. monitors and predicts heating and hot water demand based on the weather forecast and occupant usage patterns, and
3. optimizes the heat pump water heater operating schedule to shift electricity from times of high prices and emissions to times and low prices and emissions, while always delivering heating and hot water whenever needed (see Leveraging Time-of-Use Rates to take best advantage for this feature)



1.4. The Harvest Home App

What is the Harvest Home App?

The Harvest Home App provides visibility on system operation, performance, and control over some system settings, such as:

- **WiFi**: Changing the WiFi network
- **Time-of-use**: Changing the time-of-use schedule that the system optimizes for
- **Hot water reserve**: Updating the hot water reserve level that the system will try to maintain even at high price hours
- **Full charge**: Fully charging the tank ahead of emergency high-demand events

The Harvest Home App does not replace your thermostat or smart thermostat app. The thermostat is still your primary interface to control your home heating and cooling.

The Harvest Home app gives you access to data and system settings that determine how your Harvest system responds to your thermostat and hot water usage.

Accessing the Harvest Home App

The Harvest Home App is a web app hosted on the Harvest Pod: it is accessible on the local network that your Pod is connected to. It is **NOT** accessible from the Internet outside of your home.

Connect your phone/tablet/laptop to your local network (WiFi or Ethernet). In most cases, your home has a single network. However, if you have multiple local networks, make sure to connect to the same network that the Harvest Pod.

- Type "**http://harvestpod*NNNN*.local**" in an internet browser address bar, where "NNNN" is the four-digit serial number printed on the label underneath your Harvest Pod.
- Also note the **password** printed on the same label, and use it to unlock the page when prompted.
- Use the "**User Settings, Data & Control**" button.

> Using the “System Setup (Advanced)” section can risk losing your commissioned settings and making your system inoperative.

Troubleshooting

If **http://harvestpodNNNN.local** doesn’t work, it means that your router does not support multicast DNS. If you know how to find the IP address of the Harvest Pod on your network, use **http://[your ip address]** instead.

If you do not know how to find your IP address, ask us at *support@harvest-thermal.com* and we will help you.

1.5. Leveraging Time-of-Use Rates

What is a Time-of-Use (TOU) rate?

Time-of-Use rate plans vary the price the utility charges for electricity depending on the time of day, day of week, and season. By shifting electricity usage to times when demand on the grid and electricity costs are low, you can lower your bill and reduce the need to run fossil fuel power plants, cutting air and climate pollution.

Why should I sign up for a TOU rate?

Your Harvest Thermal Battery System™ is designed to save you money when on a TOU rate by shifting your home's electricity demand from peak to off-peak times. The lower the off-peak price, the more you will save.

How do I sign up for a TOU rate?

Contact your energy company about time-of-use rate plans and choose one which offers a high difference between peak and off-peak times. For example, Pacific Gas & Electric (PG&E)'s EV2-A and E-Elec rates have large peak to off-peak differences and are ideal for Harvest. We recommend starting with PG&E's E-Elec rate if you have a heating-only system, and EV2-A if you have a heat pump A/C, and then using your utility's online tool to find which rate is best for you after 12 months of Harvest Thermal Battery System operation.

1.6. Understanding Energy Usage Reports

The Energy Usage Report can be found on the Harvest App under the Data tab.

Electricity Used:

The electricity consumption is attributed to:

- the heat pump(s) - specifically, the Heat Pump Water Heater (HPWH) for hot water generation, and, if present, the heat pump A/C unit used for cooling and supplemental heating. The heat pump A/C electricity use is an estimate;
- the air handler which distributes air throughout the home, or circulator pump for radiant,
- and the Harvest Pod, which controls the entire system and pumps water to and from the air handler or radiant heat exchanger.

Harvest makes the operation of the heat pump independent from the delivery of heating and domestic hot water, prioritizing heat pump operation during off-peak times.

Thermal Energy Delivered:

The energy delivered as hot water, heating, and cooling. The A/C heat pump energy delivered is an estimate, based on Energy Star for cooling (SEER2 15.2) and the median heating efficiency of heat pumps in a field study of heat pumps in Massachusetts and Connecticut (HSPF2 8.4).

Heat Pump Water Heater Efficiency:

This represents the electrical energy consumed by the CO2 hot water heat pump in relation to the thermal energy produced in the hot water. The CO2 heat pump efficiency ranges from approximately 200% to 550%. Factors influencing this efficiency include the outdoor air temperature, returning water temperature, frequency of startups and shutdowns, and defrosting. Harvest prioritizes operating the heat pump during suitable outdoor temperatures and regulates the return water temperature, allowing the CO2 heat pump to operate more efficiently than standard heat pump

Hydronic System Efficiency:

This represents the electrical energy consumed by all components of the water-based system, including the CO2 heat pump, air handler fan, circulator pump, Harvest Pod, and thermal losses from the storage tank, in relation to heating and hot water delivered to the home. It does not include heating and cooling from the A/C heat pump.

Whole System Efficiency:

This is the thermal energy delivered to the home as heating and hot water in relation to the electrical energy used by all components to generate and deliver heating and hot water. Thermal energy delivered refers to domestic hot water and heating/cooling provided to the home, excluding thermal losses from the water tank. Electrical energy includes the heat pump(s), the air handler fan, water pump, and electronic controller inside the Pod. Including all components means system efficiency is lower than heat pump efficiency. Typical annual efficiency ranges from about 50%-60% for gas tank water heaters, 80%-95% for furnaces, 200%-300% for heat pumps.

Q: *Why is my system efficiency lower in summer than in winter, when the air is warmer?*

A: Thermal energy use is lower in summer when there is little or no heating. As a result, thermal losses from the thermal battery make a larger share of overall energy consumption, leading to lower overall efficiency.

Heating and Hot Water Time Shifting:

Average electricity used, and heat and hot water delivered, by hour of day, over the report time period. Harvest uses the tank as a thermal battery to run the heat pump at the lowest-price and most efficient times of day, stores that energy as heat in the hot water tank, and delivers the stored energy as heating and hot water whenever it is needed. The Heat Pump Water heater occasionally runs at peak times when needed to avoid running out of hot water. Air handler fan and pod energy use also contribute to peak energy use but are much lower than heat pump energy use.

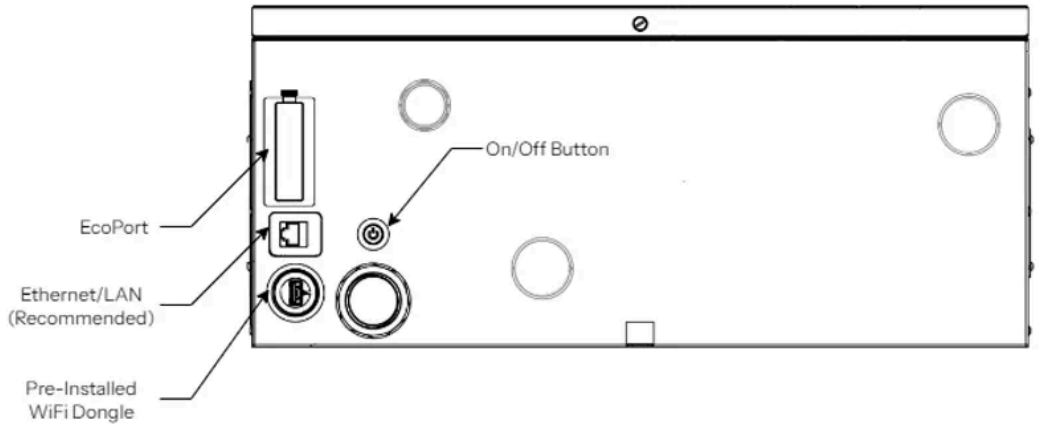
1.7. Troubleshooting

Below are some checks you can perform in case of any issues with your system.

> For issues related to, or warranty on, the heat pump water heater, the air conditioner heat pump, the hot water tank, the air handler unit, and please consult the documentation from the respective manufacturer.

System is off

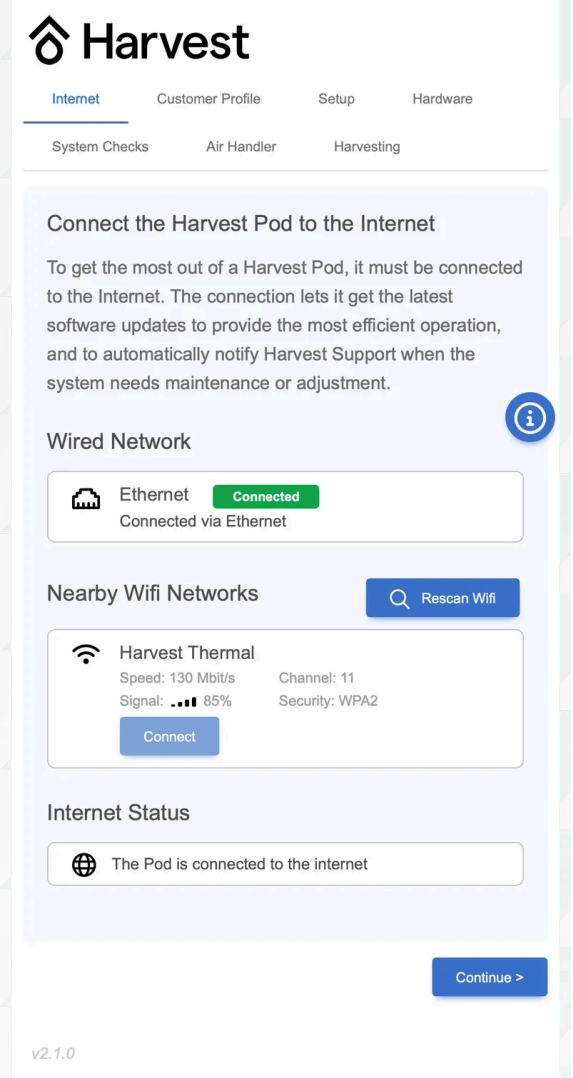
- Check that all devices are plugged in and the outlets have power. Verify that:
  - The Harvest Pod power button LED light is on. It is located on the underside of the Pod on the left (see figure below).
  - The SANCO2 heat pump water heater has a small red "heart beat" light on the left hand side, which indicates it has power and is has no internal errors.
  - The heat pump A/C outdoor unit may have a power indicator on the unit.
  - The thermostat is on. A thermostat without power may indicate the air handler is not powered.
- If power is off to any component, check the circuit breakers. Note that the SANCO2 heat pump water heater (15 amp) and Heat Pump A/C outdoor unit (40 amp) will have dedicated breakers.
- If necessary, ‘reboot’ the Harvest Pod™ by pressing the power button, waiting one minute, and then pressing the power button again.
  - If the pod power button is not accessible, the breaker that powers the circuit the Pod is plugged into may be shut off instead, or the Pod power supply unplugged.



Bottom of the pod

Connecting the Harvest Pod to a different wifi router

1. Make sure the Harvest Pod is powered on.
2. Connect your phone/tablet/laptop to the Harvest Pod's WiFi access point
    1. The network name (HarvestPodXXXX) and password can be found on the label on the bottom of the Pod
    2. Wait at least 5 minutes after powering the pod before attempting to access the Harvest Tech App.
3. Navigate to "http://harvestpodXXXX.local" using an internet browser, where "XXXX" is the same as the name of the network.
4. Configure the Internet Connection, and look for a green "Connected" indicator:



Either heat pump is on during TOU peak hours

Your comfort is the first priority of every Harvest system, and occasionally, this may result in either heat pump powering up during peak hours. You can minimize this by:

1. Turning the thermostat down when leaving doors and windows open for extended times during heating season, and;
2. Limiting temporary thermostat changes during heating season to 2°F or less at one time.

Low air flow or no heating/cooling

- With the thermostat calling for heating or cooling, check if there is air blowing from the vents, even gently. If there isn't, the air handler may not have power (refer to Troubleshooting section on "System is off").

- If you have just adjusted the thermostat, wait at least 20 minutes to give it time to start warming or cooling your home. Refer to the section titled, “Thermostat Settings,” for more information.
- Check that registers are not covered by furniture or other obstructions.
- Check that filters are clean, and replace dirty filters if needed.

No hot water or not hot enough hot water

- Check that the hot water heat pump and Pod have power (refer to Troubleshooting section on "System is off")
- Carefully see if you can sense heat from any of the three pipes that exit the tank towards the top.
    - If they are cold, check the hot water heat pump and Pod have power (refer to Troubleshooting section on "System is off")
- If you have recently used a lot of hot water (e.g., filling a large bathtub), wait at least 20 minutes and try again.
- If hot water is consistently not hot enough, the mixing valve in the pod can be adjusted. Please contact your contractor and email us at support@harvest-thermal.com at the same time.

ℹ For further support or questions, **contact your contractor and email us at support@harvest-thermal.com at the same time.** We will support the installer and help troubleshoot the system to your satisfaction. You can also call us at 510-962-6898 options 3, 2.

1.8. Maintenance

> ❗ CAUTION: Before having any general plumbing work done in your home, be sure to share the Harvest System Service Card with your service technician so they know what precautions to take when shutting off water to the house or shutting any valves connected to the Harvest System.

The System Service Card comes with the Pod, and may be located near the Harvest Pod or water tank.

Air Filters

Change air filters regularly per the air handler manufacturer's instructions. This is important for good indoor air quality and system performance. Change filters:

- Every 12 months if system is used mostly for heating
- Every 6 months if you have air conditioning or frequently use the fan

The exact dimensions and location of your air filter will depend on the system layout and air handling unit. We recommend MERV-13 filters. If the filter is installed in a return grille and not in the air handling unit itself, we recommend the filter to be at least 4 inches thick for better air flow and higher system efficiency.

Connecting the Harvest Pod to a different wifi router

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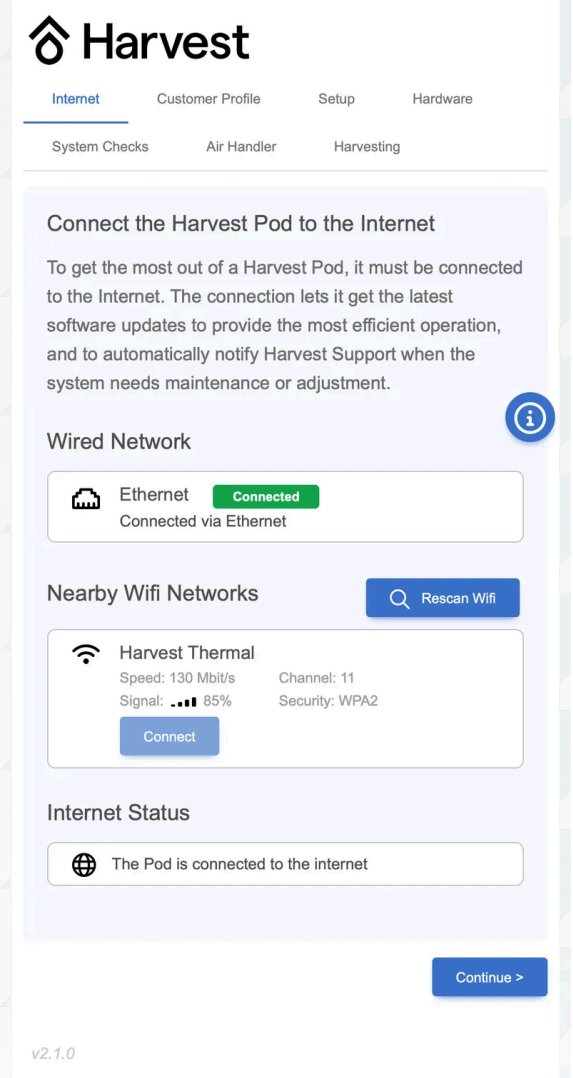

Descaling

Scaling is the build up of minerals on the inner linings of pipes and of the hydronic coil. Over time it can reduce system performance.

Consider asking your plumber to descale the system every 3 to 5 years depending the hardness of your water. The system has drain valves to facilitate descaling of the heating coil.

Real-Time Clock Battery Replacement

The Pod contains a real-time clock with battery backup to keep track of time when it loses power and isn't connected to the internet. The battery is a CR1220 coin cell type. Replacement is recommended every 10 years and must be performed by a Harvest-authorized professional, not by the homeowner. Replacement parts must be high quality brand name parts.

⚠ CAUTION: There is a risk of explosion if the battery is replaced by an incorrect type. Dispose of used batteries according to manufacturer instructions.

SANCO2 Heat Pump Maintenance

Please see the SANCO2 maintenance document linked here.

1.9. Contact Us

For issues related to the Harvest Pod or its installation (e.g., leaks), please consult a Harvest-Qualified Installer for assistance.

For issues related to, or warranty on, the heat pump, hot water tank, air handler unit, and other system devices please consult the documentation from the respective manufacturer.

For any remaining questions or concerns about your Harvest Thermal Battery System™ contact us at support@harvest-thermal.com or 510-962-6898 during business hours. We welcome all feedback.