



YOU INSTALLED AN AIR SOURCE HEAT PUMP. NOW WHAT?



Who: New air source heat pump owners | **Why:** Learn how to operate and maintain your heat pump

WHAT IS A HEAT PUMP AND HOW DOES IT WORK?

A heat pump provides heating and cooling to your home without the use of fossil fuels. Heat pumps are highly efficient because they use electricity to move heat instead of using electricity to generate heat. In the colder months, air source heat pumps extract heat from the outside air and pump it into the house for indoor heating. They can also work in reverse to extract heat from indoors, providing cooling, and expel it outdoors during the warmer months.

GET TO KNOW YOUR HEAT PUMP

Well-designed air source heat pumps can effectively heat and cool any U.S. home year-round. Heat pumps provide a consistent gentle airflow of warm air, operating optimally when running continuously. Fuel fired systems provide hot air for shorter durations resulting in more temperature variation.

Heat pumps with inverter-driven or multi-speed compressors offer variable output to cater to large temperature variations, maintaining continuous comfort. Single-stage heat pumps operate more like traditional systems as they do not vary their outputs. Understanding how to operate and maintain your heat pump can enhance energy savings and cost efficiency. Review the provided tips, FAQs, and contractor advice to optimize your heat pump's performance.



OPERATING TIPS



Let Your Heat Pump Run

- Heat pumps are efficient with a steady thermostat setting.
- Avoid abrupt temperature changes of 3°F or more during unoccupied hours.
- Rapid adjustments can prompt inefficient heat pump operation, raising costs.
- Gradually modify the setting by a few degrees in the evening and morning if adjusting for nighttime comfort.
- Temperature setbacks typically save energy if the absence lasts more than a day.



Maximize Air Circulation

- Maximize air circulation by keeping doors open to rooms without ducts or ductless heads.
- Close doors to unneeded rooms to focus heating or cooling efforts.



Rely on Your Heat Pump

- Properly sized heat pumps offer year-round comfort without backup.
- If keeping an old heating system without ductwork (e.g., a boiler), set its thermostat 2-4 degrees below the setpoint of the heat pump.
- The other heating system should only turn on if needed to maintain comfort.
- Using the heat pump as the primary heating maximizes savings; ensure the secondary heating runs sufficiently during extreme cold or consider controls for automation.



Find a Comfortable Set Point

- Tune the thermostat to a temperature that makes the space comfortable.
- For a ductless system, the temperature is measured at the unit. The thermostat may need to be adjusted a degree or two for higher wall mounted units.

MAINTENANCE TIPS

Like any heating and cooling system, air source heat pumps require routine maintenance to stay functional and efficient and to ensure long term durability.

Change or Clean Your Filters

Maintain heat pump efficiency by keeping filters clean; a dirty filter strains the system and leads to high energy bills.

- **Ducted:** Wash or replace air handler or grille filters approximately every 90 days, following manufacturer recommendations.
- **Ductless:** Clean filters monthly at a minimum, following manufacturer recommendations. More frequency may be needed for households with pets.



Keep Outdoor Units Free from Debris

Maintain your outdoor unit's airflow by clearing obstructions throughout the year. For units prone to debris, consider professional coil cleaning to prevent buildup.

Protect Your Unit from Roof Run Off

In cold climates, placing heat pumps under a roof eave's drip line or deck slats can lead to snow and water issues affecting airflow. Preferred installation is on the home's gable end. For units under an eave without snow coverage or a gutter, consult a qualified contractor for relocation or a snow deflector to ensure proper winter heating operation.

Keep Duct Registers Clean

Dust and dirt in air ducts will reduce the efficiency of the system. Clean your supply registers and return air grilles annually to eliminate buildup of dust, dirt, or mold. Doing so will increase efficiency of the system and improve indoor air quality.

Check Condensate Lines

As the heat pump cools the indoor air, it wicks moisture from the air. Condensate will drain from the heat pump through the condensate line. Verify that the condensate line is clear and draining to a safe location that will not cause damage, mold, or a slip hazard.

CHOOSE THE RIGHT MODE



Temperature Modes

For best efficiencies, use "Heat" mode in winter

and "Cool" mode in summer for your heat pump, avoiding the "Auto Temperature" mode that switches between heating and cooling based on indoor temperature. "Auto" can result in heating on cool summer nights or cooling on sunny winter days, leading to energy-consuming HVAC battles.



Fan Modes

Continuous indoor fan operation can harm heat

pump performance. Begin with "Auto Fan" mode and adjust to your needs, using vane controls to direct airflow where you need heating or cooling.

FOR DUCTLESS SYSTEMS



Economy Mode

Activate Economy mode during cooling to save

energy with your heat pump. It lowers the compressor speed, adjusts the temperature slightly, and uses vane swinging for less power consumption while ensuring comfort.



Humidity Modes

Use "Dry" mode on select heat pumps to dehumidify

and enhance comfort in muggy yet cool conditions. This mode adjusts the fan for longer air-coil contact, extracting moisture to lower humidity. Note, it's not for cooling but solely for dehumidification when needed.

WHAT TO CONFIRM WITH YOUR CONTRACTOR

During a heat pump installation, you're bombarded with a lot of new information. After your installation is complete, make sure you know the following before your contractor completes the project.

OPERATION

1. If the system is designed to heat and cool the entire home or only a portion of the home
2. If your supplemental heating system is programmed to still operate
3. The temperature setpoint of the supplemental heating system
4. The current settings on the air source heat pump thermostat for temperature set points, temperature modes, and fan modes
5. If it's a ducted system, how to adjust the settings on the new air source heat pump system's thermostat
6. If it's a ductless system, how to adjust the settings on the new air source heat pump system's remote control

MAINTENANCE

1. Filter location
2. If filters are reusable
3. How to change the filters
4. Drain pan and condensate drainage locations
5. Length of the warranty
6. Contractor routine maintenance packages and services included

HEAT PUMPS DEFROST THEMSELVES

When the outdoor temperature drops below freezing, the outdoor coils may get a bit frosted but will clear themselves of ice. Defrosted water will drip at the outdoor unit, so make sure it does not pool and refreeze on a walkway. For ducted systems, supplemental heat may come on during a defrost cycle to prevent a gap in heating. For ductless systems, the indoor head may put off some cooling to heat the outdoor coils.

SIGNS YOUR HEAT PUMP IS NOT WORKING PROPERLY

When switching some or all of a home's heating to an ASHP, an increase in electric bills and a decrease in costs from the previous fuel should be expected. However, the most common and apparent sign your air source heat pump isn't working properly is a sudden increase in electricity consumption (kWh) on your utility bills. This may be due to a lack of maintenance or a malfunction with the heat pump. Other signs your system isn't working properly include:

- The heat pump is not running at all or frequently cycling off and on
- The space temperature setpoint is never reached
- There is high humidity in the space
- There is excessive noise from the unit or ductwork
- Auxiliary heating mode is constantly displayed on the thermostat
- There are strange smells coming from the unit or ductwork
- The outdoor or indoor unit coils are frozen
- The coils or filters are dirty
- There is mold growing near or around the heat pump

If you notice any of these, contact a qualified HVAC professional to check the unit is functioning properly.





FREQUENTLY ASKED ASHP QUESTIONS

How do air source heat pumps work?

In the colder months, air source heat pumps extract heat from the outside air and pump it into the house for indoor heating. They can also work in reverse to extract heat from indoors, providing cooling, and expel it outdoors during the warmer months.

What is the expected lifespan of an air source heat pump?

Air source heat pumps typically have a lifespan of 15 years. This depends on the type of heat pump and how well the heat pump is maintained.

What is the efficiency of my heat pump?

Heat pumps have multiple efficiency ratings. Coefficient of performance, COP, is the ratio of energy out to energy in. An air source heat pump typically has a COP greater than 3 and can maintain a COP greater than 1.75 even at 5°F. For reference, electric resistance has a COP of 1. New testing regulations have been implemented for EER, SEER, and HSPF. When comparing efficiencies, do not directly compare EER to EER2 and similar for the other ratings.

- EER/EER2 – Energy Efficiency Ratio – Cooling efficiency at peak cooling (95°F)
- SEER/SEER2 – Seasonal Energy Efficiency Ratio – Cooling efficiency over the entire cooling season
- HSPF/HSPF2 – Heating Seasonal Performance Factor – Heating efficiency over the entire heating season

Will my utility bills be reduced with an air source heat pump?

- Heat pumps decrease annual heating costs compared to oil, propane, and electric resistance.
- Cooling costs should be lower if the heat pump has better efficiency than the previous AC.
- Consider providing monthly meter readings initially if your utility uses estimated billing.

How well do air source heat pumps work in the middle of winter?

- Properly sized air-source heat pumps work well in most U.S. climates during winter.

- They handle sustained cold periods effectively.
- Many cold climate models are tested in subzero temperatures.

Are air source heat pumps good for the environment?

Air source heat pumps are energy efficient and use less energy than traditional fossil fuel heating and cooling systems. As states shift to renewable energy for electricity, heat pumps become cleaner for heating and cooling. They're especially environmentally friendly where clean energy standards are in place such as MN, where utilities are required by law to reach carbon free electricity in their mix by 2040. That's within the lifetime of a heat pump purchased today!

Is it normal for my air source heat pump to have frost on it?

When outdoor coils drop below 32°F, condensation freezes on them, forming frost. Your heat pump will enter a defrost cycle periodically that switches the pump to cooling mode, melting ice on coils with warm refrigerant. Fans might stop or slow, and auxiliary heating could activate to keep the temperature stable. Defrost typically takes 5 to 15 minutes. If your heat pump is stuck in defrost or covered in ice, consult an HVAC professional.

What is auxiliary heating mode?

Many all-electric heat pumps may have auxiliary heating which means using electric resistance strip heat as a supplement. This mode is costly and inefficient. If you see frequent use, consult an HVAC expert to ensure proper unit function.

Do I have to cover my air source heat pump in the winter?

Avoid covering your heat pump in the winter to ensure proper airflow for heat extraction. Yet, shield it from excessive water and snow, which can accumulate from the roof.

Should I turn my heat pump off when I'm not home?

For optimal efficiency, keep the thermostat steady. Turning off the heat pump during unoccupied times can lead to inefficient operation when restarted. Use temperature setback only for unoccupied periods exceeding a day.



GET YOUR HEAT PUMP SERVICED

To ensure your heat pump continues to operate efficiently, get your heat pump checked and serviced. Consult the manufacturer specifications and/or warranty for the recommended intervals (most are every 1-2 years).

Your heat pump service technician should be able to:

- ✓ Check the heat pump is properly charged with refrigerant
- ✓ Check for any refrigerant leaks
- ✓ Verify adequate air flow is being achieved

- ✓ Clean both the outdoor and indoor coils
- ✓ Clean the condensate drain pan and check for any clogging
- ✓ Inspect electric terminals
- ✓ Seal any areas where there is duct leakage
- ✓ Check refrigerant lines are insulated and UV protected
- ✓ Confirm the thermostat settings
- ✓ Check supplemental heating is only being activated when necessary

Some of these items can be done yourself while others require a qualified service technician. Regular maintenance to your heat pump can extend the life of your heat pump and save you money on operating costs.



FREQUENTLY ASKED ASHP QUESTIONS

How do air source heat pumps work?

In the colder months, air source heat pumps extract heat from the outside air and pump it into the house for indoor heating. They can also work in reverse to extract heat from indoors, providing cooling, and expel it outdoors during the warmer months.

What is the expected lifespan of an air source heat pump?

Air source heat pumps typically have a lifespan of 15 years. This depends on the type of heat pump and how well the heat pump is maintained.

What is the efficiency of my heat pump?

Heat pumps have multiple efficiency ratings. Coefficient of performance, COP, is the ratio of energy out to energy in. An air source heat pump typically has a COP greater than 3 and can maintain a COP greater than 1.75 even at 5°F. For reference, electric resistance has a COP of 1. New testing regulations have been implemented for EER, SEER, and HSPF. When comparing efficiencies, do not directly compare EER to EER2 and similar for the other ratings.

- EER/EER2 - Energy Efficiency Ratio - Cooling efficiency at peak cooling (95°F)
- SEER/SEER2 - Seasonal Energy Efficiency Ratio - Cooling efficiency over the entire cooling season
- HSPF/HSPF2 - Heating Seasonal Performance Factor - Heating efficiency over the entire heating season

Will my utility bills be reduced with an air source heat pump?

- Heat pumps decrease annual heating costs compared to oil, propane, and electric resistance.
- Cooling costs should be lower if the heat pump has better efficiency than the previous AC.
- Consider providing monthly meter readings initially if your utility uses estimated billing.

How well do air source heat pumps work in the middle of winter?

- Properly sized air-source heat pumps work well in most U.S. climates during winter.
- They handle sustained cold periods effectively.
- Some cold climate models are tested in subzero temperatures.
- Successful testing has been conducted in extreme cold areas like Alaska.

Are air source heat pumps good for the environment?

Air source heat pumps are energy efficient and use less energy than traditional fossil fuel heating and cooling systems. As states shift to renewable energy for electricity, heat pumps become cleaner for heating and cooling. They're especially environmentally friendly where clean energy standards are in place. Homes with solar panels gain extra environmental benefits by powering heat pumps with carbon-free electricity.

Is it normal for my air source heat pump to have frost on it?

When outdoor coils drop below 32°F, condensation freezes on them, forming frost. Your heat pump will enter a defrost cycle periodically that switches the pump to cooling mode, melting ice on coils with warm refrigerant. Fans might stop or slow, and auxiliary heating could activate to keep the temperature stable. Defrost typically takes 5 to 15 minutes. If your heat pump is stuck in defrost or covered in ice, consult an HVAC professional.

What is auxiliary heating mode?

Heat pumps may have auxiliary heating which means using electric resistance strip heat as a supplement. This mode is costly and inefficient. If you see frequent use, consult an HVAC expert to ensure proper unit function.

Do I have to cover my air source heat pump in the winter?

Avoid covering your heat pump in the winter to ensure proper airflow for heat extraction. Yet, shield it from excessive water and snow, which can accumulate from the roof. This is often done by placing the unit on the home's gable end, fully under the eave, beneath a deck, or using a snow shield for protection.

Should I turn my heat pump off when I'm not home?

For optimal efficiency, keep the thermostat steady. Turning off the heat pump during unoccupied times can lead to inefficient operation when restarted. Use temperature setback only for unoccupied periods exceeding a day.



Get Your Heat Pump Serviced

To ensure your heat pump continues to operate efficiently, get your heat pump checked and serviced. Consult the manufacturer specifications and/or warranty for the recommended intervals (most are every 1-2 years).

Your heat pump service technician should be able to:

- ✓ Check the heat pump is properly charged with refrigerant
- ✓ Check for any refrigerant leaks
- ✓ Verify adequate air flow is being achieved
- ✓ Clean both the outdoor and indoor coils
- ✓ Clean the condensate drain pan and check for any clogging
- ✓ Inspect electric terminals
- ✓ Seal any areas where there is duct leakage
- ✓ Check refrigerant lines are insulated and UV protected
- ✓ Confirm the thermostat settings
- ✓ Check supplemental heating is only being activated when necessary

Some of these items can be done yourself while others require a qualified service technician. Regular maintenance to your heat pump can extend the life of your heat pump and save you money on operating costs.