

Panasonic

AIR CONDITIONING

Panasonic Heat Pump Defrost Cycle Operation

Why Do Heat Pumps Need to Defrost?

All heat pumps are designed to defrost during very cold outdoor conditions in order to continue operation. Defrost performance and frequency is critical to the efficient operation of a heat pump. The defrost function will usually occur in the early morning and evening when customers want their unit to continually produce heat.

When the heat exchanger coil in the outdoor unit is iced up, airflow over the coil is significantly reduced and the efficiency of heat exchange is greatly reduced as the ice acts as a thermal insulation barrier which prevents the unit absorbing heat from the air. In order for the heat exchange coil to operate efficiently and heat the outside air up, it is necessary to defrost the coil and remove the ice.

If the POWER LED light on the indicator panel of the indoor unit is flashing, this indicates that the unit is going through a defrost cycle. During the defrost process the unit is melting the ice that has built up on the heat exchanger coil in the outdoor unit. The unit does this by running the compressor in heating mode to generate heat in the outdoor unit which in turn melts the ice.

Depending on the outdoor air conditions (air temperature and moisture in the air) the coil and pipes in the outdoor unit may generate condensation which will then turn into ice again. This means that the unit may need to perform multiple defrost operations before the unit is able to start producing heat. Other factors that may require the unit to perform multiple defrost operations are:

- How cold/wet the outdoor air is
- The units capacity/sizing for the area that needs to be heated
- Care and maintenance of the unit
- User Settings
- Is the unit malfunctioning and not operating correctly?

How Long Does the Defrost Process Take?

Assuming that the unit is not faulty, the unit will not start the defrost process until 30 - 40 minutes has elapsed from initial start-up. During this time, the unit will run in heat mode and the indoor unit may produce a small amount of warm air. After this 30–40 minute period, the unit will then begin the defrost operation if required. The defrost operation runs for 10–15 minutes and no warm air will be produced from the indoor unit. Once the defrost operation finishes the unit will then begin to operate in heating mode again.

After this heating operation, the coil will have defrosted enough and no further defrost operations will be required, however, if the coil is still iced up, the defrost operation will then be repeated. This cycle of Heat / Defrost / Heat will continue until the point where the coil is no longer iced up. Remember that the outside air temperature and moisture level will still have a factor in whether or not the unit will need to run multiple defrost operations

What could be wrong if my Heat Pump is Constantly Defrosting?

- **Does the unit have the correct amount of heat capacity for the job?**

Multiple defrost operations that are not successful in defrosting the coil may indicate that the system is under sized (i.e. does not have a high enough heating capacity) for the area to be heated. An under sized unit will continually defrost at regular intervals in low ambient air conditions as it struggles to reach the room temperature that the user has set on the remote control. In a correctly sized unit, the compressor will not need to run as often and will run at a lower frequency, this means that the unit will need to defrost less often.

When the assessment was made to determine the what capacity heat pump was required, the average lowest outdoor ambient temperature in your geographical area during winter should have been taken into consideration, along with the other determining factors such as the size of the area to be heated, amount and type of insulation etc.

- **Care and Maintenance**

This can include factors such as:

- Loss of refrigerant gas through piping connections, kinks in pipework, or moisture in the system that has not been correct evacuated from the unit during the installation process
- Blocked coils: In order for the unit to operate efficiently, there must be enough return air flow through the coils in both the indoor and outdoor unit coils. Clogged filters in the indoor unit will also restrict airflow, so it is critical that the filters in the indoor unit are cleaned at least every 3 weeks during the period in which the heat pump is used the most
- Ideally, the outdoor unit should be raised off the ground level by 100mm and the drain hole in the base pan of the outdoor unit must not be blocked or obstructed so that the unit can drain condensate water from the outdoor unit. Also ensure that the outdoor unit is free of any debris or obstruction
- Ensure all the doors and windows in the room you are heating are closed and there is sufficient insulation to stop heat loss. Make sure there are no drafts that will allow warm air to escape out or cold air to blow in

How to Best Operate Your Heat Pump When Icing/Defrosting Occurs

Correct operation of the unit during the winter months can have an effect on the need for the unit to defrost.

- Some customers may power cycle the power supply isolator thinking that this will 'reset' the unit, doing this while the unit is in defrost operation will only result in further build-up of ice
- Setting the temperature on the remote to a high temperature will only result in the unit defrosting more as the unit struggles to reach the high set temperature.
- We recommended that the unit has to be set according via the remote control to the following settings:
 - The unit is set to HEAT mode
 - FAN SPEED is set to AUTO – this ensures the unit can control the fan speed to match the heat output
 - AIR SWING is set to AUTO
 - Temperature range to set the unit to should be between 20°C – 23°C
 - Use the POWERFUL button on the remote to operate the unit at full capacity for a maximum period of 20 minutes, this will provide a boost of warm air into the room. The unit will then return to the normal setting temp or sooner if you use the POWERFUL button again.
 - Leave the louvers in AUTO position as this reduces the feeling of cold drafts because the louvers do not oscillate the same way as in cooling mode. The louver will move in 2 steps, horizontal or downward at a 45° angle depending on how hot the indoor coil is
 - In the colder months of the year or when a severe frost has been forecast overnight, we recommend that you use the timer function for the unit to turn on two hours before you wake up. This will give the unit a chance to defrost a few times and come up to temp. Alternatively, you can leave the unit running overnight on HEAT mode at a temp of 16°C or 17°C with the FAN SPEED set to LOW