Advice on reducing wear and tear on DX system compressors

April 2025

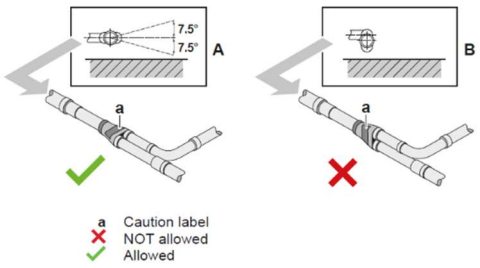
The longevity of a Daikin compressor, the heart of our systems, depends on several key installation factors. While installation manuals cover these details extensively, some requirements may be missed.

This document serves as a quick reference guide, highlighting the eight main installation factors to help ensure optimal performance and durability.

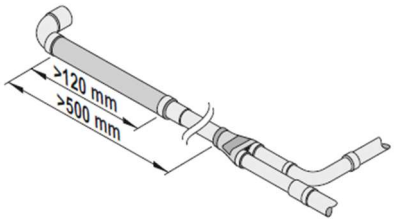
The following list outlines the most common factors that can reduce the performance and lifespan of compressors in Daikin systems:

1) **Incorrect condenser branch kit or refnet installation**

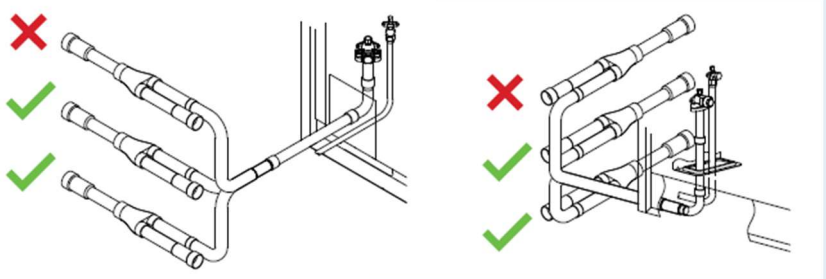
Condenser branch kit must be no more than 7.5° from horizontal.



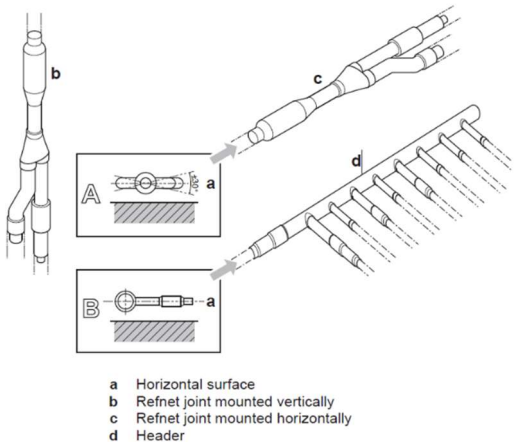
Condenser branch kit must have a straight pipe of at least 500mm after the converging section of the branch kit.



Condenser branch kit must be installed below the stop valve of the condenser.



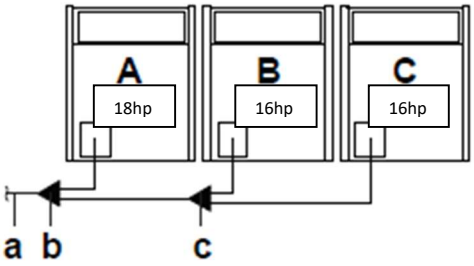
Refnets and headers must be installed horizontally (A) with no more than a 15° tilt. Refnets (not headers) can be installed vertically (upwards or downwards) provided the diverging section is horizontal (B)



a Horizontal surface
b Refnet joint mounted vertically
c Refnet joint mounted horizontally
d Header

2) Incorrect order of outdoor units

When multiple outdoor units are connected to make a single circuit, they should be placed with the largest outdoor closest to the main pipe run and subsequent outdoors should be equal to or reduced in capacity.
The capacities of outdoor units A, B and C must fulfil the following restriction conditions: A≥B≥C.



3) Incorrect vacuuming procedure

Without the correct vacuuming steps being taken there is a significant risk of moisture remaining in the pipework when commissioned. This moisture mixes with the system oil causing it to degrade and oxidise the windings on the compressor. Copper plating on the compressor will reduce the lubrication on the hottest parts reducing the lifespan of the compressor considerably.

- Use the correct tools for the vacuuming procedure:
  - Use vacuum gauge + pump which can evacuate till -100.7 kPa (–1.007 bar) (5 Torr absolute).
- Further requirements (See Install & Operation manuals in all cases)
  - The vacuum drying of the system should be conducted from both pipes.
  - Vacuum through liquid and gas stop valve for 2 hours until -1.007 bar is reached.
  - Stop vacuuming and turn off the pump and check level of vacuum after 1 hour.
  - Once the appropriate level has been reached the vacuum pump must be switched off.
  - If the system holds the vacuum for 15 minutes, there is no more water vapour present in the system.
  - In case moisture is still inside the system, the vacuum should be broken by using nitrogen. Then the above procedure should be repeated.
  - The temperature should be recorded at time of pressure test.
  - The pressure will:
    - Decrease by 0,1bar (2 psi) for every 1°C fall in ambient temperature.
    - Increase by 0,1 bar (2 psi) for every 1°C rise in ambient temperature.
  - Make sure to vacuum dry the refrigerant circuit down to a pressure at which the outdoor temperature is above the boiling point of water to make sure all moisture inside the system is removed.

4) Incorrect Brazing procedure

Flux should not be used when brazing copper to copper. Instead, phosphor copper brazing filler metal (BCuP) should be used to avoid pipe corrosion caused by chlorine or oil degradation from fluorine-containing flux. Nitrogen must be flowing through any pipework being brazed to prevent the oxidised film from coating valves and compressor components. Additionally, a Nitrogen flush of the installed pipework is required to eliminate small particles from the system.

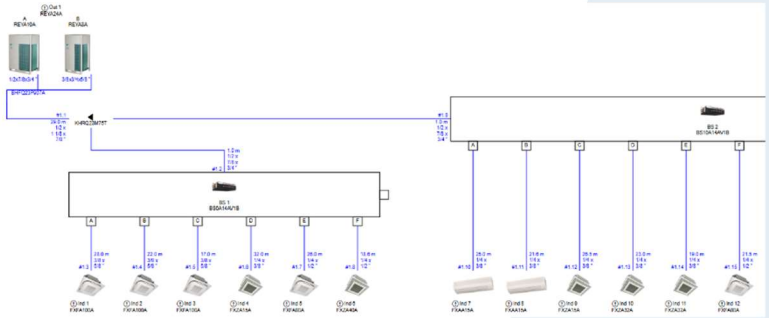
Clean brased piping example

Poor (oxidised) brased piping example

5) Piping Limitations

When piping limits are exceeded, the primary concern is that oil is left in the pipework instead of being returned to the compressor. The databook and installation manual contain the most important guides, but some combinations of units will require some differing piping requirements.

Using the VRV Xpress programme will allow you to see any potential issues prior to installation by adding in pipework information > https://vrvxpress.daikin.eu/



6) Incorrect refrigerant charge

Undercharging the system with refrigerant will cause high discharge temperatures and potential overheating of the compressor motor caused by low suction gas density.

Overcharging can lead to liquid returning to the compressor. In large quantities, the compressor is unable to compress liquids and can be irreparably damaged. Small droplets in the refrigerant oil can “foam”, causing it to leave the compressor. This can result in low oil levels, reducing lubrication and potentially harming compressor components.

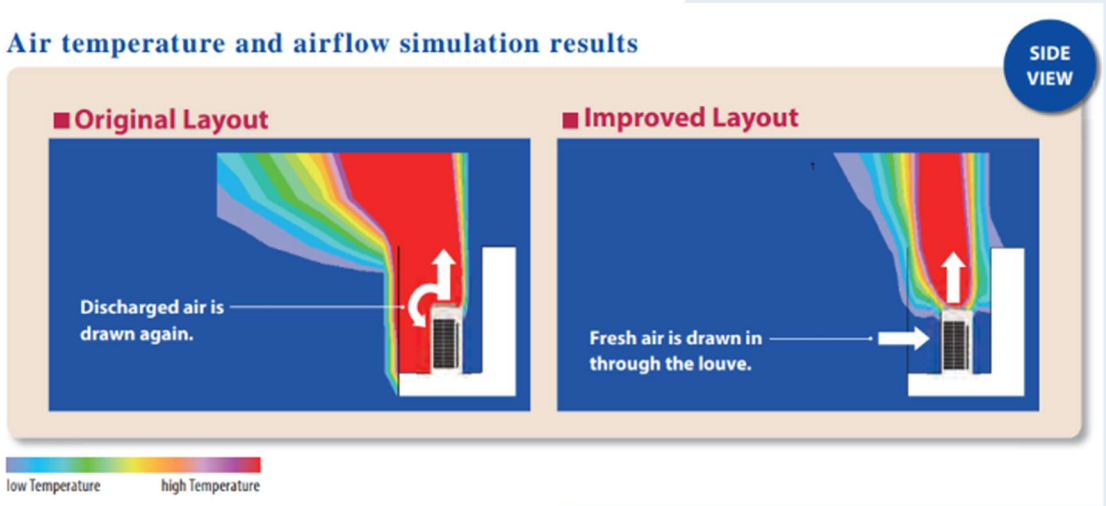
7) Starting a system without pre-heating the oil with the crankcase heater

The crankcase heater should be powered on at least 6 hours before the unit is first run. This is to ensure the oil is warm enough to prevent foaming which removes refrigerant oil from the compressor, lowering the lubrication of the compressor.

8) Air short circuit

The space around the indoor unit needs to be suitable to allow the discharge air to mix with the room air before being returned to the fan coil. For example, in cooling, if the return air temperature is consistently low, then this can affect the superheat of the fan coil.

For outdoor units, continued recirculation of the discharge air can lead to sustained high or low temperatures that can result in it operating outside of the unit's design limitations. In extreme cases, this can lead to compressor failure.



These are some of the main causes of compressor lifetime issues. Awareness of these factors is likely to extend the life of the system and increase the satisfaction of the end clients.

Please speak to your Daikin Sales engineer if you have any queries