



Heating Solutions

Heat Pumps and Heat Recovery Chillers



Comprehensive solutions for hotels,
hospitals, commercial and industrial projects

Heating | Cooling | Heat Recovery



Heating Solutions Applications

Hot water is produced for different purposes and is a crucial part of the building services, and normally required in almost all the applications.

Though some of the applications may require larger quantity of hot water such as hotel application where the hot water is not only required for domestic purpose but also for utilities such as laundry, dishwashers which require substantial amount of hot water. Hospitals could be another example where hot water is required in large quantity.

Most common requirement of hot water is domestic usage such as showers, bathtubs, utilities dishwasher, and laundries specially in hotel application.

Hot water is also required for space heating and humidity control in the Fresh Air Handling Units or Air Handling Units. Normally we see the humidity ratio levels are maintained by HSHP or electrical heater which can be replaced with the hot water coil.

Applications

- Hotels
- Hospitals
- Commercial Buildings
- Malls
- Industrial (Process, Pharma, Dairy)
- Laboratories
- Restaurants

Hot Water Applications



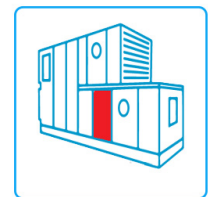
Showers, bath tubs,
and lavatories



Utilities such as
kitchens and
laundries



Space heating
(Winter applications
for Radiators, AHUs)



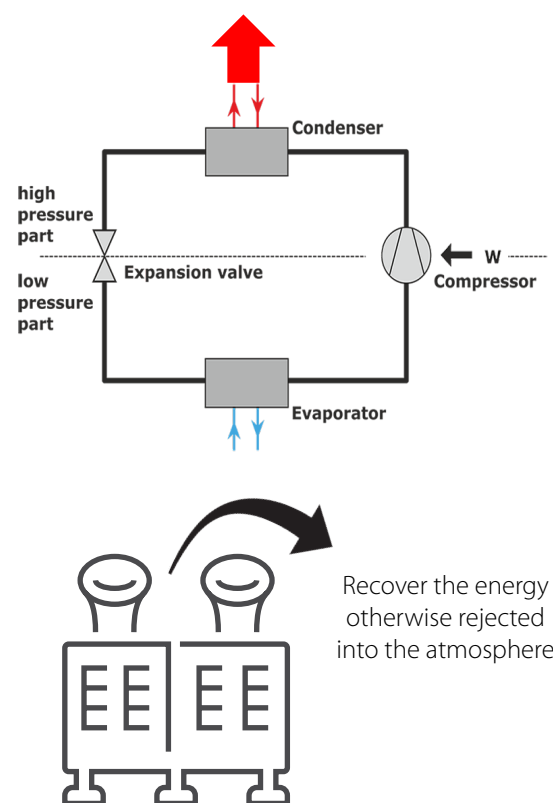
AHUs to adjust the
supply air
RH% level



Heat Pumps and Heat Recovery

Hot water production from refrigerant cycle machines

Many residential, commercial and industrial buildings in the region still use traditional energy sources such as electric resistors, oil or gas to produce hot water through calorifiers or boilers to cater to space heating or domestic hot water requirements. These buildings also use air cooled or water-cooled chillers for comfort cooling that reject large amount of heat energy into atmosphere either directly or indirectly. With available equipment and planning we can utilize the heat rejected by chillers to produce hot water. We can also reduce the cooling load on conventional cooling systems by utilizing a heat pump to cool the chilled water while it achieves desired heating!



Heat Pump and Heat Recovery Options



Air Cooled Chiller
Heat Recovery



Air to Water
Heat Pump



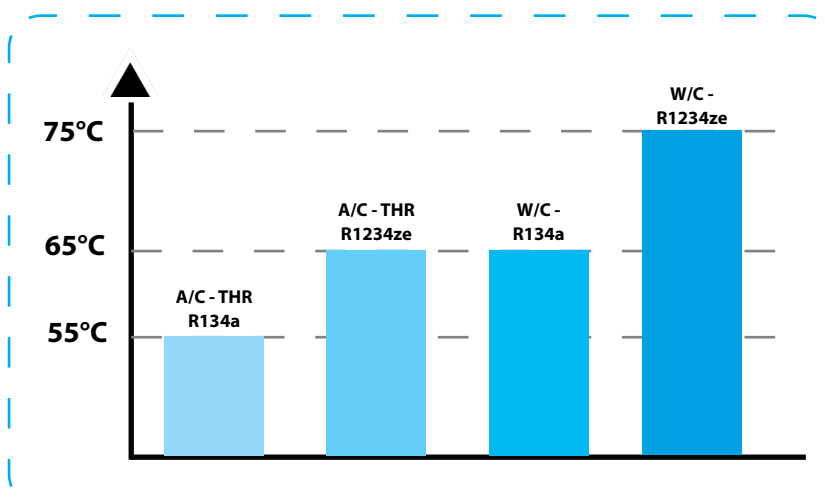
Water to Water
Heat Pump /
Water Cooled Chiller
Heat Recovery



Multi-Purpose
Unit Hybrid
Heat Pump



Heating Solutions

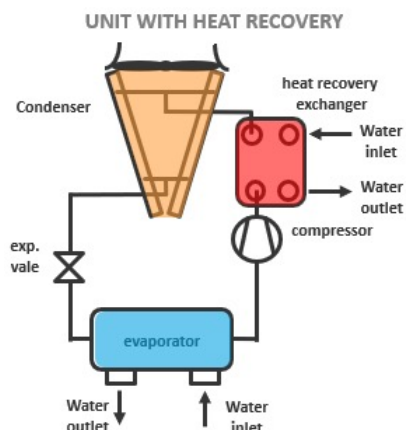


Hot water T overview by different machines: There are also opportunities to achieve up to 75°C using HFO water to water heat pump.

1. Heat recovery air-cooled chillers (130 – 1980kW)

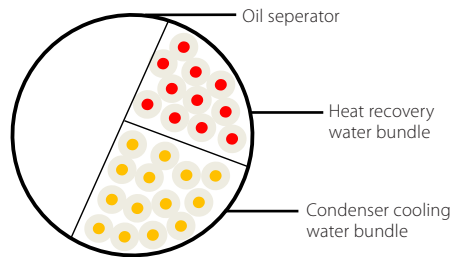


- Much simpler system; available in partial and full heat recovery
- Hot water temp up to 60 deg C in partial and 55 deg C in full heat recovery
- Heat recovery is proportional to cooling capacity
- Total EER up to 4.3
- As heating demand peaks in winter, corresponding cooling load to be evaluated to determine the quantity of heat recovery



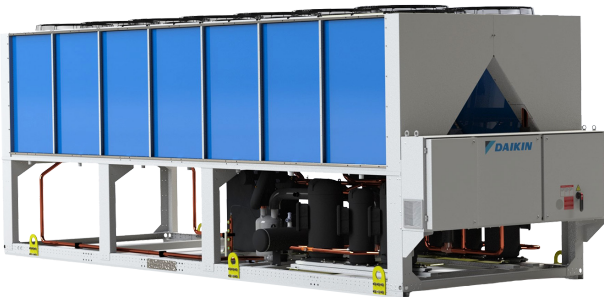
$$\text{Total}_{\text{EER}} = \frac{\text{Cooling Capacity} + \text{Heating Capacity}}{\text{Power Input}}$$

2. Heat recovery on water-cooled chiller (330 – 1530kW)

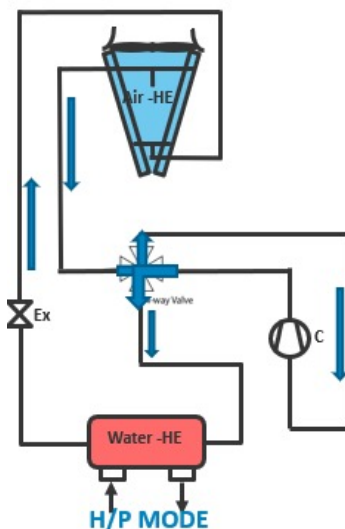
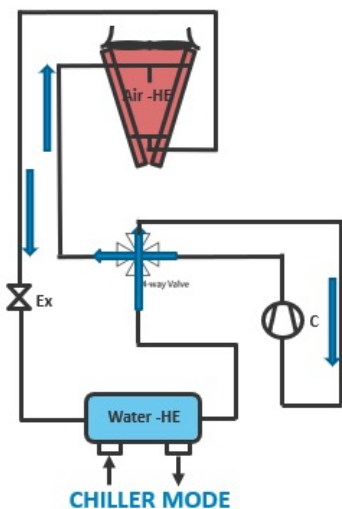


- Typically used in projects designed with water-cooled chillers
- Operates with cooling towers during cooling mode and uses heat recovery bundle in heating mode
- Hot water temp up to 55 deg C (60deg C with HFO)
- Heat recovery is proportional to cooling capacity
- Shares the cooling duty with other chillers
- Total EER up to 6.0

3. Air to water reversible heat pump (88–700kW)



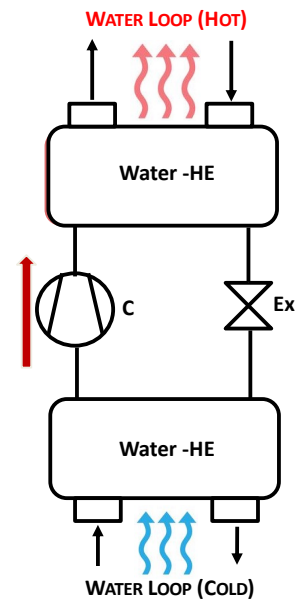
- Best suited for seasonal cooling and heating requirements
 - » Space cooling and heating
 - » Swimming pool cooling and heating
- Hot Water Temp up to 60 deg C
- Heat pump mode up to 35 deg C ambient
- Total EER up to 3.0



4. Water to water heat pump (330 – 2100kW)



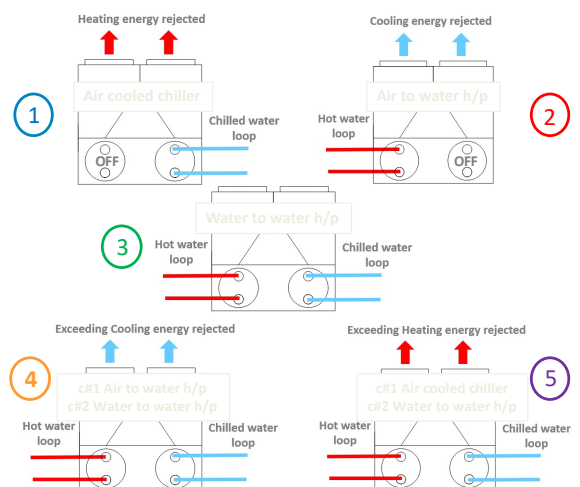
- Can be used in series with air- or water-cooled Chillers
- Operates only during heating demand; hence, its cooling capacity can not be considered in the design capacity
- Hot water temp up to 75 deg C with R1234ze
- Heat recovery is proportional to cooling capacity
- Range: Heating 450 – 2,100kW R134a
- Range : Heating 340 – 1,600kW R1234ze
- Total EER up to 7.16



5. Multi-purpose hybrid unit (400-880kW)



- Simultaneous or independent water heating/cooling
- Air-to-water + water-to-water
- Can handle simultaneous or independent year-round cooling and heating requirement
- Operates in 5 Modes
 - » Cooling Only
 - » Cooling > Heating
 - » Cooling = Heating
 - » Cooling < Heating
 - » Heating Only
- Hot water temp up to 60 deg C
- Total EER up to 6.6



Application Summary



Heat Recovery with Air Cooled Chiller

- A/C chiller plant
- Hot water up to 55c-60c
- Cooling production



Air-to-Water Reversible Heat Pump

- Seasonal Demand with integrated changeover:
- Swimming Pool
- Space Heating
- Hot water up to 60c



Heat Recovery with Water Cooled Chiller

- W/C chiller plant
- Hot Water up to 55-60c
- Cooling production



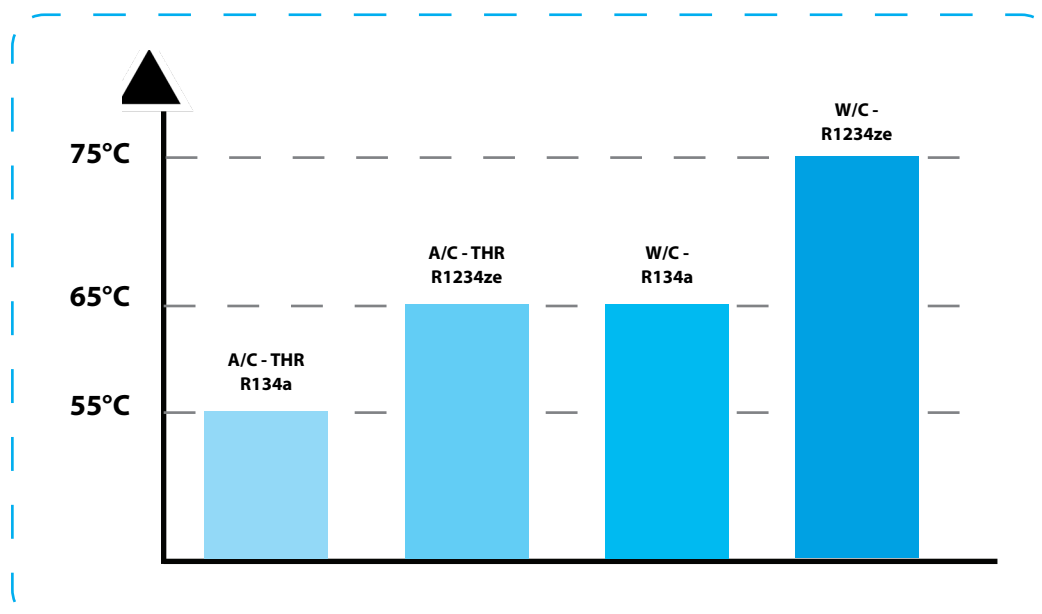
Water-to-Water Heat Pump

- In plants with A/c or W/c chillers
- Hot water up to 65..75c
- Cooling Production



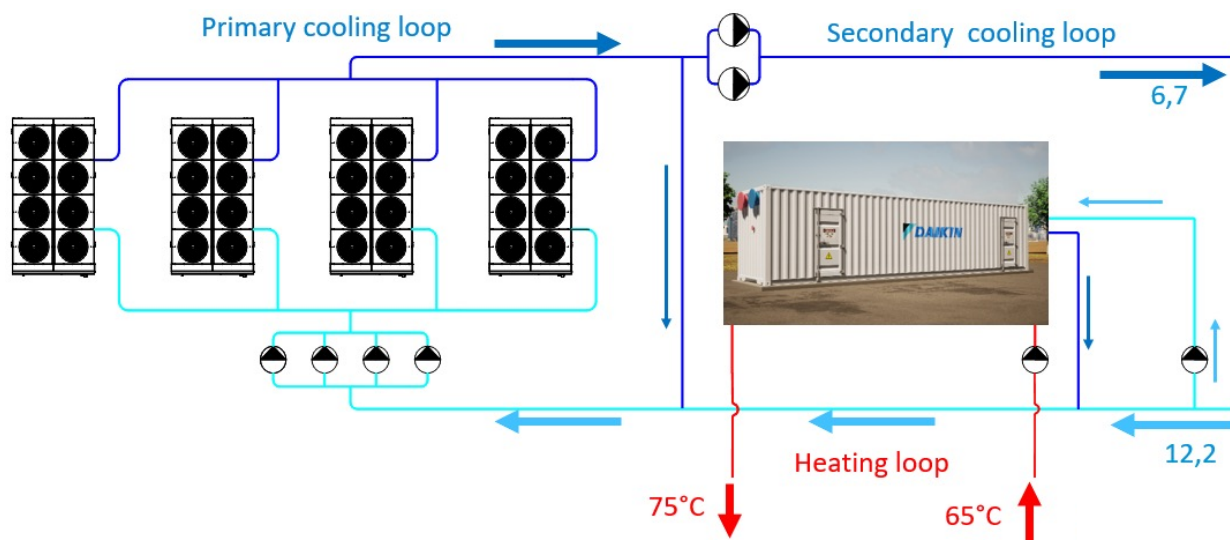
Multi-purpose Hybrid Unit (simultaneous or independent heating-cooling)

- Multi-purpose Demand:
 - » Space Heating | Cooling
 - » Hot water up to 60c





Turnkey Solution Support from Daikin



The Daikin Team offers a complete turnkey solution to meet your requirements. Our experts are available to study your existing system, understand your requirements, propose a matching solution and offer turnkey solution.

In some challenging cases with a space restrictions to install new equipment in the existing plant, or if its not possible to carry the MEP works at site our team shall be able to offer a containerized solution. All the equipment's shall be pre-installed in a packaged plant and the plant is delivered to your facility to just plug in to the existing service.



There is no need to build a separate service room for the water-cooled chiller, as Daikin can provide a containerized solution, delivered at site, and ready to connected as site.



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