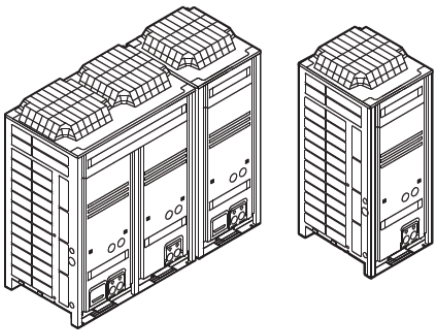
Guideline for CO2-Cascade connection for CO2-CVP / ZEAS



LRYEN10AY1

LREN8AY1
LREN10AY1
LREN12AY1

LRNUN5AY1

1. About the documentation

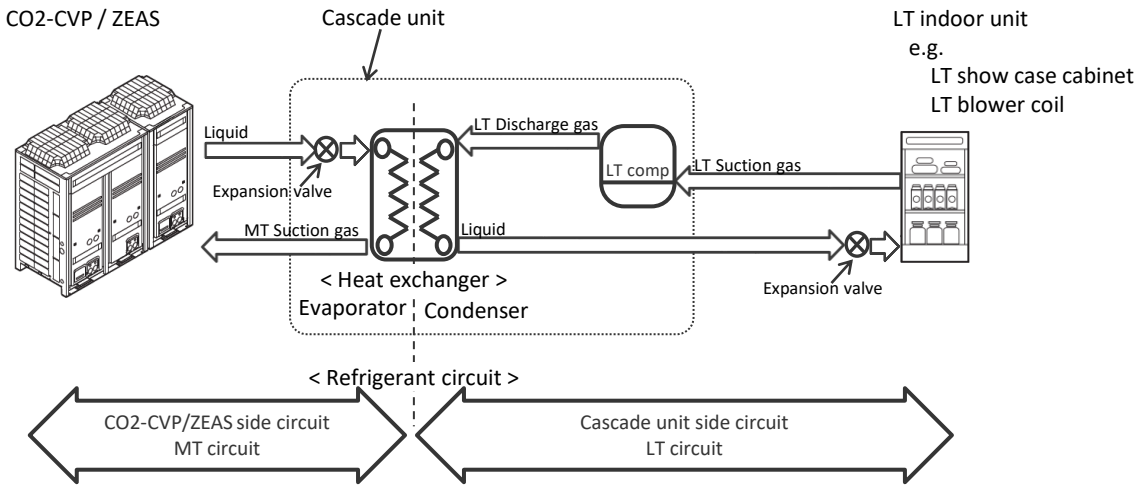
This document provides guidelines for installing non-Daikin cascade units to a Daikin developed CO2-CVP or CO2-ZEAS.
This document is not an installation manual.
For actual installation instructions, including safety precautions, please refer to the installation manuals of the CO2-CVP or CO2-ZEAS units and the installation manuals of the cascade unit.

2. Scope

The cascade units defined in this document comply to the following requirements.
The cascade unit has its own independent refrigerant circuit for LT* evaporating temperature making.

- The condenser side of LT* circuit of the cascade unit exchanges heat with the MT** evaporator of CO2-CVP/ZEAS side circuit.

LT* : Low evaporating temperature Te ≤ -20 °C
MT** : Medium evaporating temperature -20°C < Te ≤ 5 °C
(Te : set evaporating temperature)



3. Restrictions

This section describes the restrictions for the heat exchanger of the condenser in the LT cascade side circuit and the evaporator in the CO2-CVP/ZEAS side circuit.

The definition of 'Evaporator' in the below chapters means: the evaporator at the CO2-CVP/ZEAS circuit side.

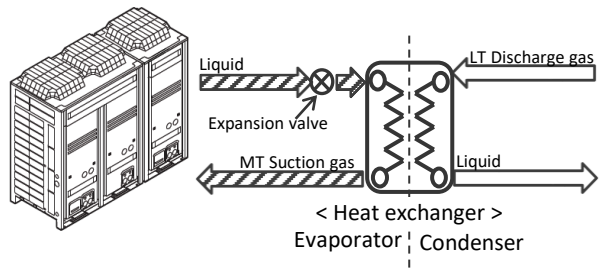
3.1 The type of evaporator.

The restrictions relate to the following 2 evaporator types.

Connection of evaporators other than these types is not allowed.

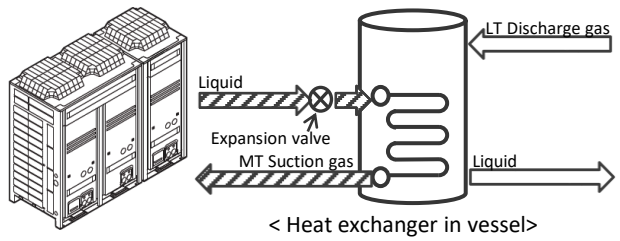
- Plate heat exchanger type

CO2-CVP / ZEAS



- Heat exchanger inside the pressure vessels

CO2-CVP / ZEAS



3.2 Flow direction of CO2-CVP/ZEAS side (MT circuit)

For oil control point of view, refrigerant direction in CO2-CVP/ZEAS side must be from top to bottom.

If this direction is not possible, please add a quantity of oil equal to the internal volume of the CO2-CVP/ZEAS circuit side of the heat exchanger.
In this case, capacity and efficiency of CO2-CVP/ZEAS cannot be guaranteed

3.3. Refrigerant amount

Calculation of adding amount of refrigerant.

To calculate the additional amount of refrigerant per LT cascade unit, replace the table in "To determine the refrigerant amount - Conversion ratio for indoor units: refrigeration" of the installation manual of CO2-CVP/ZEAS by the below table:

Type	Amount
Plate heat exchanger	0.1 Kg / l (internal volume of HEX at CO2-CVP/ZEAS side)
Heat exchanger inside the pressure vessels	

3.4 Gas piping size : from evaporator to main gas piping.

Select the piping size between the cascade unit and branching point by following the installation manual of CO2 ZEAS/ CO2 CVP: chapter “Piping size between branching areas or between first and second branch”.

As ‘indoor unit capacity index (kW)’, please use the total capacity of the connected LT indoor unit to the cascade unit.

3.5 Maximum connection

The number of maximum connection is 3 cascade units.

3.6 Follow CO2-CVP/CO2-ZEAS installation manual

The heat exchanger of the Cascade unit corresponds to the refrigeration indoor unit similar to the CO2-CVP/CO2-ZEAS refrigeration circuit side.

Please install the cascade system by following the content indicate in the CO2-CVP/CO2-ZEAS installation manual.

Particular attention should be paid to the following points.

- Chapter : “Piping installation”

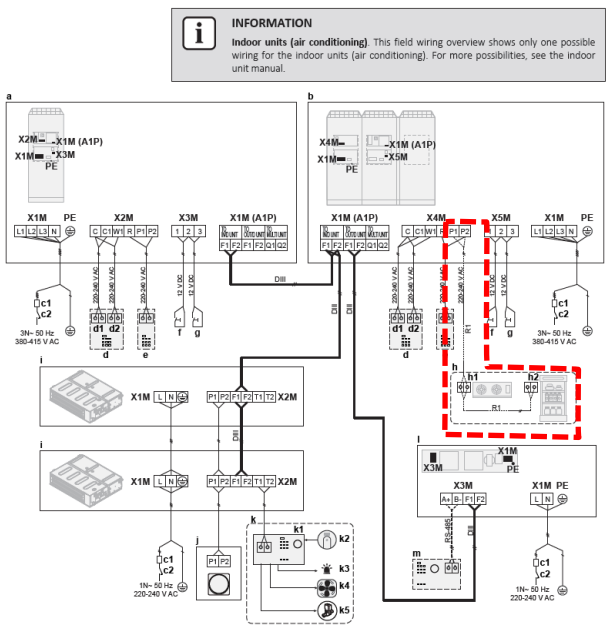
  To avoid the malfunction of CO2-CVP/CO2-ZEAS, please follow the piping rules mentioned in the CO2-CVP/CO2-ZEAS manual, and consider the Cascade unit as refrigeration indoor unit.

- Chapter : “Electrical Installation”

  The connection of "Operation output signal to expansion valve".
  Be sure to connect P1/P2 and ensure that the cascade unit can only be operated when the CO2-CVP/CO2-ZEAS is available.

  If the Cascade unit operates without operation of the CO2-CVP/CO2-ZEAS unit, the temperature of the low pressure side of the CO2-CVP/CO2-ZEAS may increase and the safety valve on the low pressure side can be triggered.

17.2 Field wiring: Overview



- Chapter : “Constraints for refrigeration”

  Regarding the calculation of the "refrigeration total capacity" for CO2-ZEAS/CVP, the calculation should be based on the required capacity of MT evaporators.

  e.g. LT showcase capacity + output of the compressor of the cascade unit