MITSUBISHI ELECTRIC
HYDRONICS & IT COOLING SYSTEMS S.p.A.

COMFORT PROCESS

CONTROL, SUPERVISION AND OPTIMISATION SYSTEMS

GROUP MANAGER C1

MEDIUM HVAC PLANT ROOM SYSTEM MANAGER

melcohit.com

CLIMAVENETA®

GROUP MANAGER C1

The perfect plug & play solution for hydronic group of units management

PLUG & PLAY

Factory-engineered plant room control for chillers, heat pumps, units for simultaneous and independent production of hot and chilled water.

Dedicated to both Comfort and Process applications, GROUP MANAGER C1 is the ideal solution to efficiently control and manage hydronic groups of chillers on a centralized plant room.

Thanks to unique control algorithms, GROUP MANAGER C1 selects the best sequencing for unit operation, smartly manages heat loads according to the plant demand and gives users a valid monitoring tool to check the plant conditions. This ensures stable and reliable control in any condition, complying with the strictest standards of 'uptime' required in comfort and process cooling applications.

DESIGNED FOR ANY PRODUCT TECHNOLOGY

- **Chillers**
- **Reversible Heat Pumps**
- **INTΣGRA 4-pipe systems**
- **Combined INTΣGRA 4-pipe systems + Chillers**
- **Free-Cooling Chillers**
- **Combined INTΣGRA 4-pipe systems + Reversible Heat Pumps**

IDEAL FOR ANY UNIT & PIPING CONFIGURATION

Unique wizard configuration function allows the automatic detection and integration of the all types of applied units

The primary pumps can be controlled at variable speed and take advantagefrom the benefits of adopting intelligent control strategies achievable withthe VPF and VPF.D configurations, thus minimizing the overall electricalconsumption of the plant room.

ADVANCED MANAGEMENT OF HEAT LOADS

ALWAYS RUN YOUR PLANT AT PEAK PERFORMANCE

GROUP MANAGER C1 performs advanced control logics for managing the heat loads in the most efficient and cost-saving way.

LOAD SATURATION & DISTRIBUTION

This function automatically activates the units one after the other, selecting the most efficient sequence of units.
The heating and cooling load is demand equally distributed among the units, fully exploiting partial load operation.

OPTIMIZED FREE-COOLING OPERATION

According to outdoor temperatures and conditions, GROUP MANAGER C1 activates chillers giving priority to free-cooling mode, in order to always exploit the outdoor air as the main source of cooling.
Compressors are activated only in case the cooling demand exceeds the available free-cooling energy with a consequent benefit of reducing the compressors' runtime.

HOT & CHILLED WATER OPTIMIZATION

Optimization of the working temperatures is further enhanced through hot and chilled water setpoint compensation based on the outdoor ambient temperature.

Optimise your plant room performance with advanced control logics.

EASY ACCESSIBILITY AND INTEGRATION WITH THIRD PARTIES

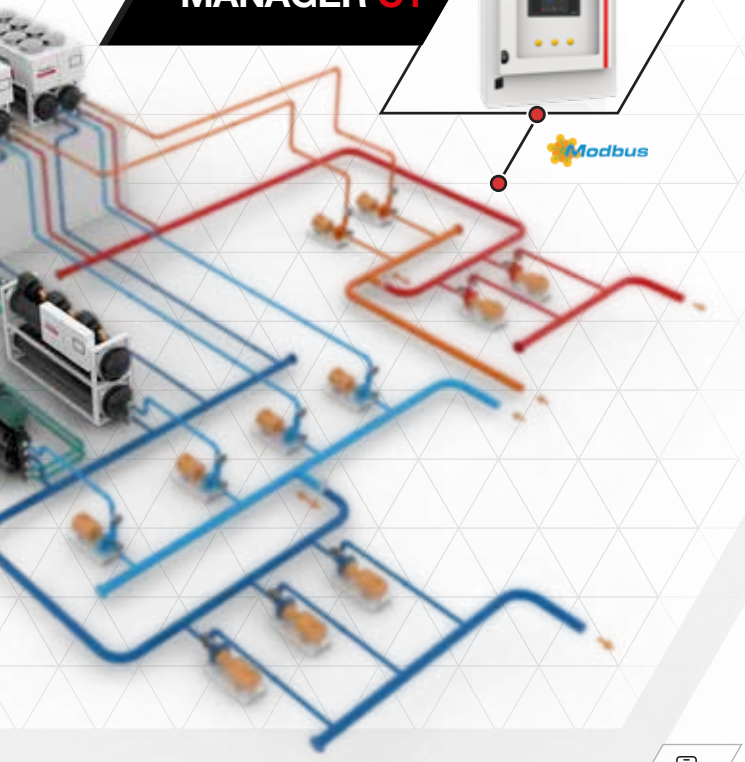
BACnet™ is a trademark of ASHRAE

EASY INTEGRATION TO THE BMS/BAS

through OPEN PROTOCOLS

EASY INTEGRATION INTO THE BUILDING NETWORK

LAN via TCP/IP



EASY ACCESSIBILITY VIA Wi Fi

Proximity Virtual Interface

Mobile and smart devices can access the GROUP MANAGER C1 via Wi-Fi or via LAN connection. No need to stand in front of the unit's electrical switchboard since all parameters are available via smartphone. Easy accessibility is possible also in case of any restriction:

- Unit's distance from the control room
- Plant room spread out between different floor levels or buildings
- Protected areas or with restricted accessibility
- Uncomfortable weather conditions

RESPONSIVE USER INTERFACE

GROUP MANAGER C1 features a new responsive interface with a user-friendly and tiles layout to allow the client to have at a glace an overview on the main plant operation and easily detect:

- The operating variables of each individual unit
- Pre-configured charts with the behavior of the common temperatures of both hot and chilled primary circuits
- High-priority alarms
- The status of the units operating in sequence
- The diagnostics variables

The new interface can be used on any browser and is compatible with all smart devices (smartphones and tablets).

AFTER-SALES AND MAINTENANCE SERVICES

For the client's complete peace-of-mind, GROUP MANAGER C1 offers devoted services aimed at making the service activity easier and quicker.

ALARM SERVICE

Notification, by e-mail, service for quick notification of system failures. The notification is available to all users (Site Managers, Site Service & Maintenance, Facility Managers) and includes all the most relevant information related to:

- Site name
- Alarm identification code
- Date / Time of the event

REMOTE SERVICE ASSISTANCE

Thanks to the secure remote connection via VPN tunnel, GROUP MANAGER C1 offers a quick and safe remote service assistance supporting Commissioning Engineers during start-up operations.

- It improves and accelerates maintenance and service activities from centralized office to technical personnel operating on-site.
- It reduces travel costs in case of trouble shooting and operator assistance.
- It supports specialists in analysing the system behaviour during the warranty period.

ADVANCED MANAGEMENT OF HEAT LOADS

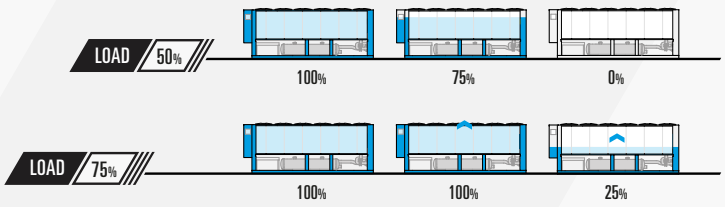
ADVANCED CONTROL OF HEAT LOADS

There are two possible load management logics:

LOAD SATURATION

According to the specific plant demand, the system automatically activates the units with the best sequence of units.
Different priorities can be assigned in order to deliver both heating and cooling simultaneously, without rejecting any energy to the atmosphere.

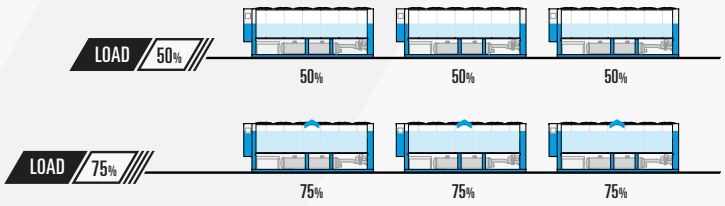
This corresponds to a significant increase of the entire plant efficiency thanks to the ability of the software to run the plant in heat-recovery mode, thus saving energy with any cooling load.



LOAD DISTRIBUTION

The heating and cooling plant demand is equally divided among the available units, fully exploiting the ability of the units to increase their efficiency during partial loads.

This operating mode distributes the hours each units works and these hours are the same for all units, making the maintenance and service activities easier to be planned and executed.



The proven Load Saturation and Load Distribution control algorithms represent the perfect way to stage and sequence unit operation in medium to large commercial installations. Today the new GROUP MANAGER C1 has been further empowered by the Free Cooling Optimization logic, which reduces running costs by exploiting the available surface area offered by the air-water coils of the chillers.

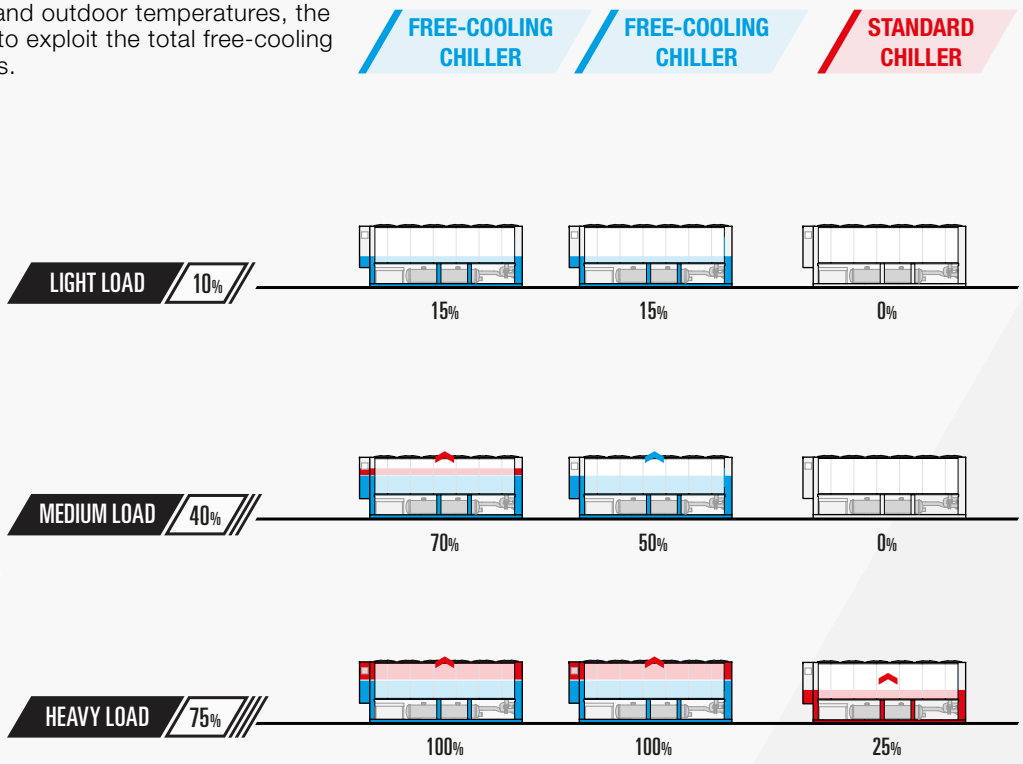
OPTIMIZED FREE-COOLING OPERATION

According to operating conditions and outdoor temperatures, the free-cooling mode is used in order to exploit the total free-cooling surface area available in all the units.

Free-cooling chillers have the highest priority in the activation sequence, whereas the mechanical chillers stay inactive in order to minimize the electrical consumption of the compressors.

If the cooling demand exceeds the available free-cooling energy, GROUP MANAGER C1 activates the compressors in order to meet the full plant cooling demand.

Standard mechanical chillers maintain the lowest priority and are added in the chiller sequence after the free-cooling units are operating at full load.



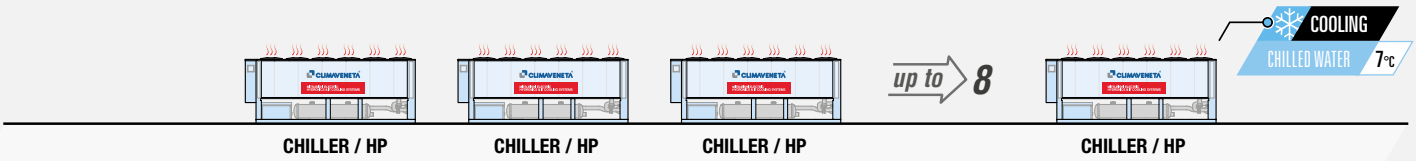
Mechanical cooling
Free-cooling operation

ADVANCED MANAGEMENT IN ANY PLANT CONFIGURATION

GROUP MANAGER C1 performs advanced control logics to improve the overall system operation and achieve the most critical working conditions.

PLANT CONFIGURATION 1

2-PIPE APPLICATION with CHILLERS OR REVERSIBLE HEAT PUMPS



UNITS STAGING & SEQUENCING

Both saturation and distribution operating modes are suitable for controlling a proper unit sequence in 2-pipe installations, thus avoiding unforeseen continuous activation and de-activation within same group of units.

COMPRESSOR OPERATION DISTRIBUTION

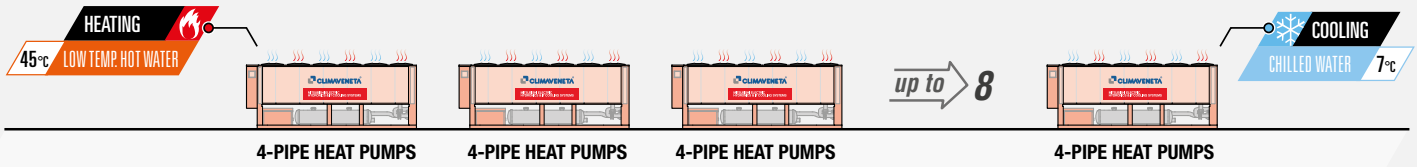
Runtime distribution of compressors for each individual unit in order to reduce short cycling and preventing wear.

OPTIMIZED FREE-COOLING OPERATION

Prioritization of the free-cooling mode by opening the valves of each individual chiller in order to exploit all the available surface area offered by the air-water coils.

PLANT CONFIGURATION 2

4-PIPE APPLICATION WITH INTΣGRA HEAT PUMPS



The 4-pipe heat pumps units produce simultaneous heating and cooling.

Load matching is achieved by GROUP MANAGER C1 by running the units in LOAD SATURATION mode in order to reduce the energy released into to the atmosphere.

LOAD SATURATION

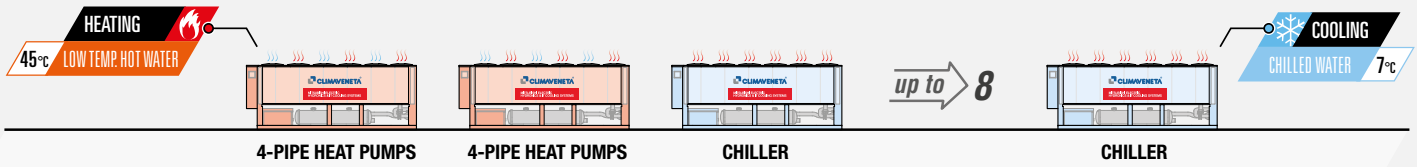
Units are activated one after the other. Each unit is activated when the previous one has achieved full load either in terms of cooling or heating. Under this condition the GROUP MANAGER C1 “unlocks” a new unit in the sequence.

PLANT EFFICIENCY

GROUP MANAGER C1 exploits the ability of units to operate in heat recovery mode as long as possible, avoiding inefficient combinations which happen with units operating independently in “cooling only” and “heating only” modes.

PLANT CONFIGURATION 3

4-PIPE APPLICATION WITH CHILLERS AND INTΣGRA HEAT PUMPS



Mixed configuration is highly recommended for applications where the cooling demand is higher than the heating demand during the year.

In this case the GROUP MANAGER C1 can optimize the unit’s operation according to the building’s actual energy demand.

PRIORITY ASSIGNMENT

GROUP MANAGER C1 can assign the highest priority to a specific unit. This unit is the first in the sequence to be activated and the last to be deactivated.

PLANT STABILIZATION

GROUP MANAGER C1 stabilizes the plant by limiting the over-production of thermal energy.

PLANT EFFICIENCY

The most convenient technology can be prioritized in order to meet the most critical building demand:

- 4-pipe heat pumps if simultaneous heating & cooling production is needed.
- The most efficient units featuring the best performance levels as, for example, chillers with magnetic levitation compressors.

SUPPORTED PIPING CONFIGURATION

VPF VARIABLE PRIMARY FLOW

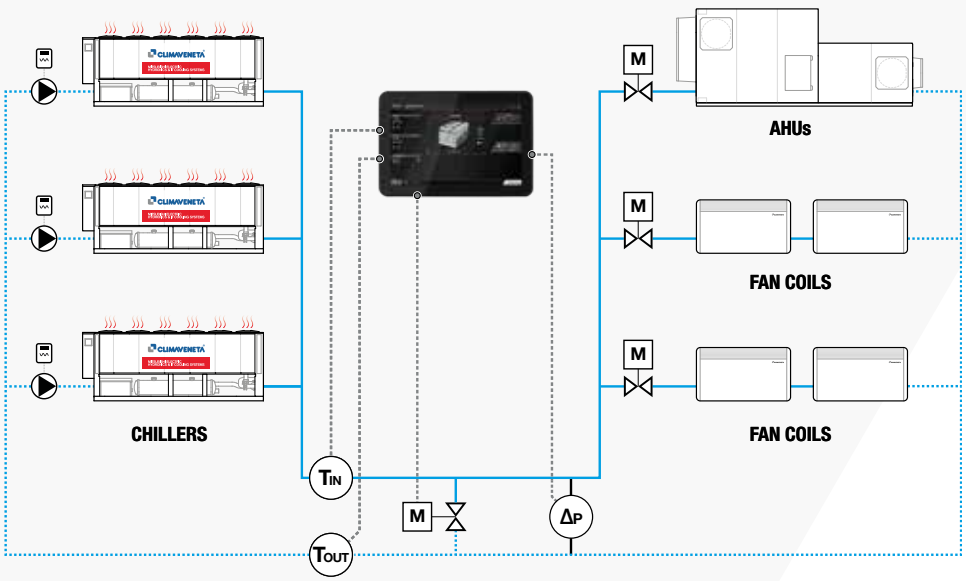
Primary Pumps Control on ΔP [Pressure]

GROUP MANAGER C1 controls the circulation of fluids through the system according to the plant's actual cooling and heating demand.

In the event of a low system load, the minimum water flow across the units' exchanger is managed by the modulating valve that diverts part of the water flow rate through the by-pass circuit.

The major benefits of this configuration are:

- Reduction of investment costs by eliminating circulation pumps in secondary circuits.
- Reduction of pumps' electrical energy consumption deriving from modulating the water flow rate.



GROUP MANAGER C1 controls the primary chilled water and low temperature hot water pumps (CHW and LTHW) at variable flow, obtaining significant energy savings from the circulation of fluids.

VPF.D VARIABLE PRIMARY FLOW WITH DECOUPLER

Primary Pumps Control on Δt [Temperature]

This configuration foresees the presence of variable pumps in both the primary and secondary circuits.

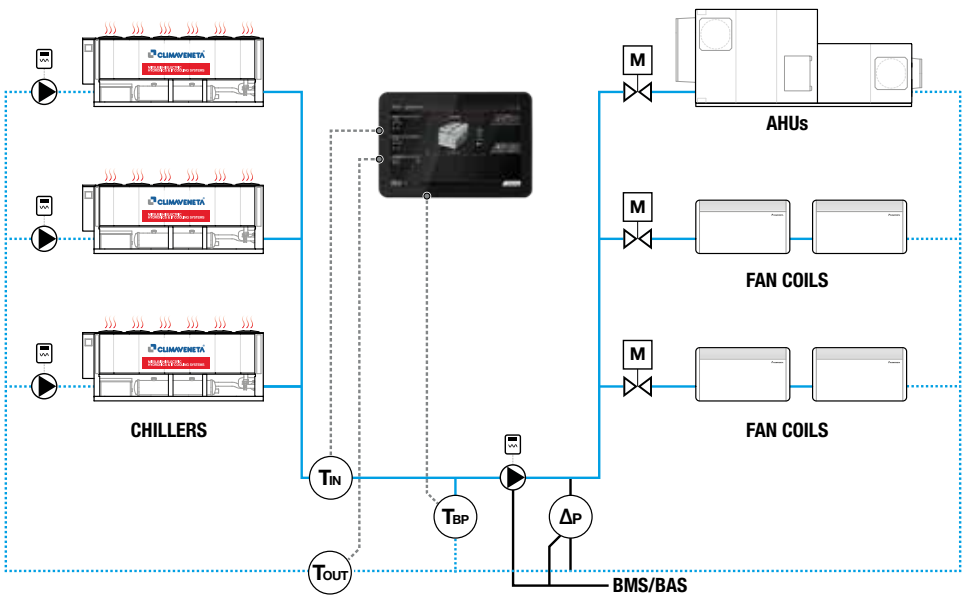
The water flow varies according to:

- the actual energy demand of secondary circuits
- the delta °T of the units in the primary circuits

Minimum circulation is ensured thanks to the presence of a decoupling line between the primary and secondary circuits.

The major benefits of this configuration are:

- Reduction of energy consumption deriving from the variable speed pumps on both primary and secondary circuits.
- System reliability thanks to the coexistence and independence of primary and secondary water circuits.



RESPONSIVE USER INTERFACE

New responsive HTML5 based interface with a user-friendly and tiles layout to allow the client to have at a glace an overview on the main plant operation. It makes the GROUP MANAGER C1 easy-to-use from any web browser and compatible with all smart devices (smartphones and tablets).

HOME

The home page is the main page and provides an immediate overview of the main data of the plant splitted in different section (graphic tiles): Plant Overview, Circuits, Graphs, Source, Alarms, System setting.

PLANT SCHEMATIC

The “Plant schematic” is the page displaying an overview of the plant’s operation. The synoptic is applicable to all plants and unit configuration. It’s created automatically once wizard configuration of the units is performed and doesn’t reflect the real pipe configuration but only a generic one.

It shows the following information:

- in a simplified and schematic manner, the hydronic loop of the system is represented with different colors
- an operating overview of the hydronic system displaying inlet and outlet temperature of the user sides (cold and hot), setpoints and operating modes
- the main unit data

PLANT ROOM & UNITS DETAILS

The “Plant Room” is the page displaying an immediate overview of the main data for each unit installed on the plant

By clicking on the specific tile to enter into the “Unit Details” pages provide data of interest regarding the units controlled by the GROUP MANAGER C1.

The page is composed by the following sections:

1. Unit name and status info
2. Units imagine
3. Unit information:
   - Unit type, operating mode, unit status
   - Percentage of thermoregulation in each operating mode and user side
4. Inlet and outlet temperature and active set point for each available circuit.
5. Outdoor air temperature
6. Circuits information:
   - Suction and discharge pressure
   - Ventilation percentage
   - Compressor type and related load
7. Energy absorption

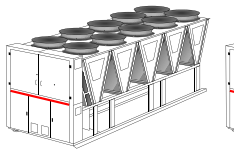
NOTE: this tile is displayed only if the units are equipped with energy meter (to select on unit’s price list the opt. 5925 ENERGY METER FOR W3000)

WIZARD CONFIGURATION TOOL

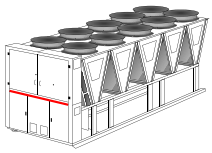
PLUG & PLAY

The new wizard funtion based on a specific graphical section makes the GROUP MANAGER C1 a real plug&play control system. Automatically the units can be installed and add on field with self-recognition scanning process through RS485 serial protocol.

This function is available on “Configuration” page accessing to the “service” user profile and permits to integrate the units on GROUP MANAGER C1 in very simple steps and automatically. Thanks to this features GROUP MANAGER C1 is a plug&play device for each kind of plant and units configuration.

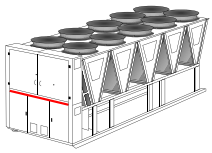


Units already connected



Unit to be added

Auto-discovering process through RS485 serial protocol



Unit added

The import of external units (chiller, heat pumps and Integra units) IMPORT EXTERNAL UNITS is performed in 2 modes:

1. **AUTOMATIC IMPORT**

2. **MANUAL CONFIGURATION** (only for the units equipped with W3000 SW controller or not already connected to the GROUP MANAGER C1 by serial cable)

STEP 1 - **DISCOVERING**

Press the key and waiting a few moments, depending on the number of Modbus addresses to be searched, a pop-up window appears to display in a drop-down list all the units founded automatically and GROUP MANAGER C1 adjust accordingly the own parameters.

STEP 2 - **ASSOCIATION**

To finalize the import, it is requested a single manual setting for each unit installed in the plant: Press ⚙ and associate the compressor with the correct refrigerant circuit configuration (single circuit, double, or multi-circuits)

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