REV	**00**
Date	**07-2024**
Supersedes	

Installation and Operation Manual
D-EOCOM01307_24EN

Intelligent Chiller Manager Advanced

ICM OPTION VERSIONING

Revision	Software Version	Changelog
0 – 07/2024	iCM-Adv_1.00	Introduction of iCM Advanced Panel

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1 WHAT IS ICM ADV©

1.1 Before starting

EKDICMADV, iCM Advanced panel"; is an external panel able to provide all the functionalities of iCM embedded and moreover, it can provide through a touch panel a graphic representation, monitoring and control of the whole plant-room.

iCM Advanced Panel can be purchased as "accessory" of Daikin units. It can be associated only to Daikin units with Microtech IV controller and "iCM Adv option" (option 236). Purchase of "iCM Adv option" provides a "License key" to activate iCM Adv control on unit controller. The activation can be performed by Factory or during the commissioning of the units on site by a Daikin technician.

1.2 Available Control functions

In this section are resumed all the control function provided by iCM Adv.

- **Unit Sequencing**: allows to equalize the operation hours of the units through rotation of units.
- **Unit Staging:** allows to provide a stable system controlled water, minimizing the number of running units and consequently reducing the power consumption.
- **Controlled temperature configuration:** (Two-pipe plant only) allows to select the controlled temperature which Unit Staging is based on. Possible configurations are:
    - Control on System Leaving water temperature: the installation of a temperature sensor on supply header is mandatory
    - Control on System Entering water temperature: the installation of a temperature sensor on Return header is mandatory.
- **Circuit Staging Control:** (Multipurpose unit only) allows to provide a stable chilled water and hot water in a four-pies distribution system, minimizing the number of running units and controlling the mode of unit circuits.

Control on Entering water temperature and consequently sensor-less installation is not possible. Please refer to table Table 3 Common Leaving water temperature in plant room

Further system functions are available with iCM. Those functions are related to advanced unit management or management of unit options at system level:

- **Unit Capacity control:** (not available for Multipurpose unit or Four-pipe plant) allows to manage the capacity generation of each unit, in order to increase or decrease the overall system capacity according to building load demand. Thus, this function provides energy efficiency optimization.
- **System Changeover:** (not available for Multipurpose unit) allows to set the operating mode of the system and consequently on all the units able to perform the changeover.
- **System Defrost:** (available only in system with Air-cooled Heat Pumps) allows to manage the defrost process of the units assuring that available heating capacity will be higher than cooling capacity generated during defrost
- **System Heat Recovery:** (available only for units with Heat Recovery option installed) allows to manage the activation of heat recovery function on the units in order to provide a stable system entering water temperature on Heat recovery circuit. Moreover, iCM will prioritize the start of units with heat recovery option among all the managed units to maximize the heat recovery production.
- **System Free Cooling** (available only for units with Free Cooling option installed) allows to manage the activation of free-cooling function on units in order to maximize the system cooling capacity generated through free-cooling despite of mechanical cooling. For this reason, iCM will prioritize the start of units with free-cooling option among all the managed units.
- **System Variable primary flow management with dedicated pumps:** (available only for units with VPF option installed) allows to manage the speed of primary pumps dedicated to each unit in order to afford the building flow demand and assuring minimum flow to running units exchanger.
- **Evaporator Pump Manager:** (available only with additional "accessory" "iPMxx": external panel) allows to monitor the evaporator water distribution management based on manifolded piping.
- **Condenser Pump Manager:** (available only with additional "accessory" "iPMxx": external panel) allows to monitor the condenser water distribution management based on manifolded piping.
- **Cooling tower Manager** (available only with additional "accessory" "iPMxx": external panel, configured as Condenser Pump Manager) allows to monitor water distribution management based on manifolded piping and the cooling tower management.
- **Secondary Pump Manager:** (available only with additional "accessory" "iSM": external panel) allows to monitor the pump groups on secondary water distribution.
- **Four-pipe Management:** allows the possibility to manage Four pipe system and controlling the simultaneous and separated Hot and Chilled water production for the following layout:
    - **Multipurpose, AC Heat pump, AC Chiller** (with NO heat recovery)
    - **AC Heat pump and AC chiller with Heat Recovery**

  The iCM management, according to type of unit and request on both Heat and Chilled primary system, selects the best sequence of units to minimize energy consumption and it sets the operating mode to satisfy both demands.

1.3 Possible configurations

iCM Adv can manage only plants with up to 8 Units and composed by:

- all chillers (mix of air-cooled and water cooled is not allowed)
- all heat pumps (mix of air-cooled and water cooled is not allowed)
- all multipurpose
- mix of Heat pumps and Chillers (operating in two-pipes water distribution: chiller units are stopped during Heating mode)
- mix of Screw and Scroll compressor Air-cooled unit
- mix of Screw and Centrifugal compressor Water-cooled unit
- mix of VFD and Slide compressor unit
- air cooled chillers with optional Heat Recovery (not all chillers must have heat recovery)
- air cooled chillers with optional Free-cooling (not all chillers must have free-cooling)
- mix of Multipurpose and Air cooled Chillers and Air-cooled Hea pumps (Four-Pipe Layout)
- mix of Air-cooled Heat pumps and Air-cooled Chiller with Heat Recovery (Four Pipe Layout)

iCM Adv external controller is able to detect the type of units and the type of Daikin system management (iCM Option) activated on each controller connected in the network. If the combination between Daikin unit type and Daikin System manager type were wrong, iCM Adv external controller disables the Daikin System Manager and provide a notification.

1.4 Limitations

iCM Advanced can manage only some kind of units and plant layout configiration.
If the limitations will not be respected, iCm Advacned controller will raise a configuration error and consequently the management of the plant-room will be locked.
Moreover iCM Advanced can be connected only to Daikin units with "**iCM Advanced option**" activated (**Option 236**).

The following Table 1 resumes the possible configurations and limitations of iCM Adv:

Primary System Type	**iCM Adv©**
Up to 8 Units	✓
All Chillers	✓
All Heat Pumps	✓
All Multipurpose	✓
EWWT/EWHT/EWLT-Q (Modular water-cooled units)	×
EWAT/EWYT-CZ / Split (Small Inverter Chiller)	×
EWWQ/EWLQ-KC (Hydrocube)	×
Mix of Water-cooled Units + Air-cooled Units	×
Mix of Water-cooled Units + Multipurpose Units	×
All Screw Units	✓
All Scroll Units	✓
All Centrifugal Units	✓
Mix of Screw + Scroll Units	✓
Mix of Centrifugal + Screw/Scroll Units	✓
Mix of Screw Units with slide compressor + Units with VFD compressor	✓
Two Pipe System: Mix of Chillers + Heat Pumps	✓
Heat Pumps + System Changeover	✓
Air-cooled Heat Pumps with Collective housing	✓
Air-cooled Heat Pumps + System Defrost	✓
Air-cooled Chillers with Heat Recovery (HR)	✓
Mix Air-cooled Chiller with HR + Air-cooled Chiller with no HR	✓
Mix of Chillers with HR + Multipurpose	×
Air-cooled Chillers with Free-cooling (FC)	✓
Mix Air-cooled Chiller with FC + Air-cooled Chiller with no FC	✓
Mix of Chillers with FC + Multipurpose	×
Four Pipe System: Multipurpose + Air-cooled Chillers + Air-Cooled Heat pumps	✓
Four Pipe System: Air-cooled Heat pumps + Air-cooled Chiller with HR	✓
Four Pipe System: Air-cooled Heat pumps + Air-cooled Chiller with no HR	×

Table 1: Configurations and Limitations of iCM Adv

iCM is able to manage different plant layout and Daikin units:

a) **Two-pipe plant layout**: Only one primary distribution system is present for both Heated and Chilled water. iCM is able to manage Chiller and Heatpumps units and the changeover of them to satisfy the primary system demand.

b) **Four pipe plant layout**: it consists in two separated distribution systems respectively for Heated water and Chilled water. iCM Adv is able to manage two different groups of units:
   a. Multipurpose connected to both sides, Air cooled Chiller connected to Chilled side, Air cooled Heat pump connected through changeover valve to both sides.
   b. Air-cooled Heat pump connected through changeover valve to both sides, Air-cooled Chiller with heat Recovery connecting evaporator to Chilled side and Heat Recovery coil to Heated side

In case of doubts about what iCM Adv© can and cannot do, please refer to the following sections or contact your Sales Support referent in Daikin Applied Europe S.p.A.

1.4.1 Four Pipe Plant Limitations

iCM is able to manage only two groups of Daikin units:

1) Configuration A: Multipurpose, Air-cooled chiller and Air-cooled heatpump.
2) Configuration B: Air-cooled heat pump and Air-cooled Chiller with Heat recovery.

Both configuration working in Constant primary flow system.

Plant-room must consist in:

A) Configuration:
   a. NO Air-cooled Chiller unit with “Heat Recovery with control” option
   b. ONLY Air-cooled Heat pump unit with “Changeover Valve Management” option
B) Configuration:
   a. ONLY Air-cooled Heat pump unit with “Changeover Valve Management” option
   b. All Heat recovery circuits of Air cooled chiller units must be connected to hot primary headers
   c. Separated Heat Recovery circuit beside Hot primary system is NOT allowed
   d. NO Multipurpose unit

Both configurations have some limitations on provided function of iCM management:

Functions	Multi + AC-CO + AC-HP	AC-HP + AC-COwHR
Unit Sequencing	✓	✓
Unit Staging	✓	✓
Control on System EWT	×	×
System Leaving water temperature control	✓	✓
System Entering water temperature control	×	×
Circuit Staging & Mode Control (for Multipurpose)	✓	×
Unit mode Changeover	✓	✓
Unit capacity control	×	×
System Mode Changeover	✓	✓
System Defrost	×	×
System Collective housing	×	×
System Heat Recovery	×	✓
System Free-cooling	×	×
System Variable Primary Flow	×	×
Evaporator Pump Manager (iPM)	×	×
Condenser Pump Manager (iPM)	×	×
Cooling Tower Manager (iCT)	×	×
Secondary Pump Manager (iSM)	×	×

Table 2 - Four Pipe system: iCM Functions limitation

1.5 Integration in a Building Management System

Daikin unit is elected as the “iCm Adv external panel”, it is able to retrieve the most important information of all the other “Slave” units and of the equipment managed by additional Panels (Evaporator or Condenser Pump Manage) connected to Daikin Communication Network.
Thus, iCM Adv external panel controller works as single point of integration with the BMS that will be able to gather all that information through protocol communication:

- BACnet over IP
- BACnet MSTP
- Modbus over RS485

Moreover, BMS will be able even to set the most important setpoints related to Daikin Unit Manager.

Please refer to document “BAS Integration – iCM Modbus protocol” or “iCM BACnet protocol” where all the datapoints are listed.

Not all the variables regarding the single unit are accessible through iCM Adv external controller. In case all the information about single unit are request, even Slave controller must be integrated by BMS

1.6 Daikin on Site

iCM© is integrated within Daikin on Site (DoS). When a Unit is connected to DoS and it is elected as ICM Adv external panel, all the status info, settings and web graphics of the plant are displayed. Specific sections will support an easy commissioning of the system and trending to monitor capacities and temperatures, starts and stops can help the remote Operator to fine tune and optimize the plant control.

2 LICENSING

2.1 When license is needed

iCM Advanced Panel can be purchased as “accessory” of Daikin units. It can be associated only to Daikin units with Microtech IV controller and “iCM Adv option” (option 236).
All the Daikin units to be connected to iCM Advanced Panel must have Option 236 activated.

Purchase of “Option 236” for a Daikin units provides a “License key” to unlock the iCM Advanced software option.
The License key is a unique code specifying the special options associated to that Unit and applicable to that Unit only.
In case of multiple Units in the same plant an individual License key must be set on every Unit to let iCM Adv© being unlocked.

The activation can be performed by Factory or during the commissioning of the units on site by a Daikin technician.
In case Option 236 is added to the Units’ order (Material Request), the control function is automatically activated from the Factory by allowing a Plug&Play control solution during the commissioning phase.
If Option 236 is requested in a later stage, the License can be ordered from the Factory. Simple information like the order number of Units and the corresponding serial numbers of the Unit controllers are needed for the License activation.

Option 236 is a Unit option and must be purchased as any other option. Don’t forget to add it to your order for Factory activation.

2.2 Temporary License

A temporary License can be used if iCM Advanced has not been ordered and the system layout requires its functionalities.
To activate the time-limited License for iCM Advanced Option please, let’s proceed through menu *Commissioning – Software Options* page and the *Temporary Passwords* menu:

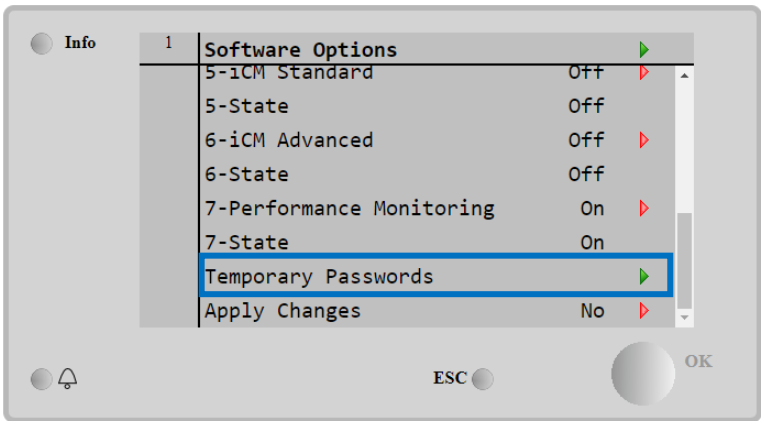

Figure 1: Temporary Activation

Then, by entering the page, three temporary passwords are displayed:

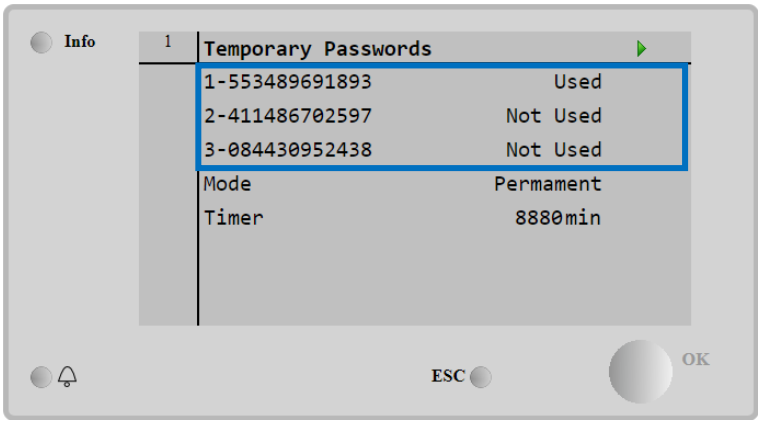

Figure 2: Temporary password activation

In the same page the usage of the activation code is also visible and a Timer indicating the remaining time before expiration can be checked.

When timer expires, iCM Advanced option will be disabled on the units. In that moment, iCM Advanced panel will raise a configuration alarm and the management of the whole plant-room will be locked.

If the iCM Advanced get disabled because the temporary licenses expire, Daikin Applied Europe cannot be considered responsible for any consequence or claims from the customer.

2.3 Permanent License

To enter a permanent License and activation key of the iCM Advanced option in Daikin Unit controller, go into the *Commissioning – Software Options* page:

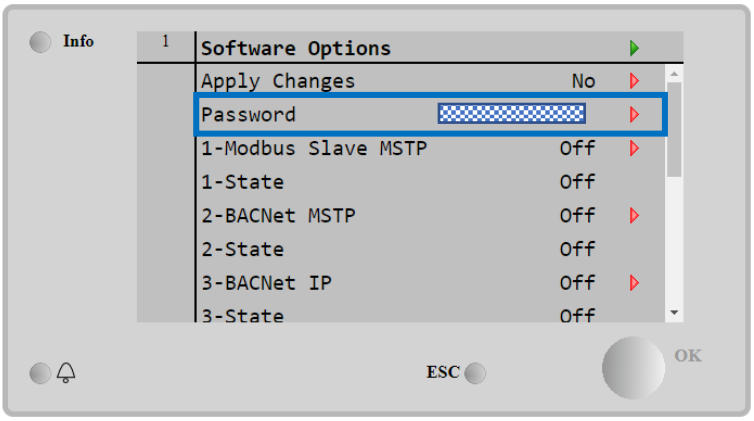

Figure 3:Software Options page

Click on the red arrow next to the item Password and enter the numeric License key.

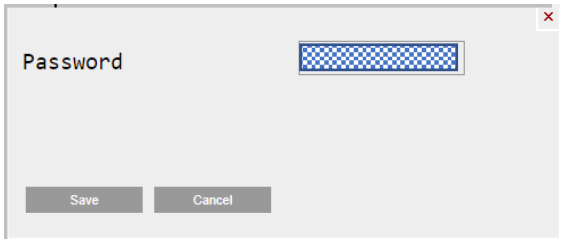

Figure 4: Enter the license code

With the License key correctly installed, let's proceed and activate all the options including the iCM Advanced by changing the corresponding value to *On*, then apply all the changes.

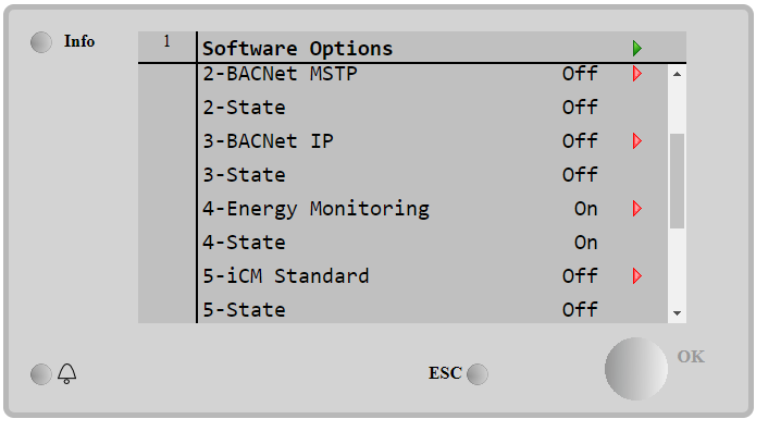

Figure 5: Activate the iCM Advanced

After the controller reboot, go back again to the *Software Options* page and check if the activation states (6-State) are *On* to confirm the correct activation of the iCM© function.

3 FIELD WIRINGS

3.1 Daikin Communication Network connection

The following diagram shows how to connect iCM Advanced and the Daikin Units to each other and establish the Daikin Communication Network. Starting from first iCM Advanced controller, connect in parallel the PB terminals [CE+ / CE-] of every controller. Refer to iCM Advanced and Unit wiring diagram for the enumeration of the terminals.
A shielded twisted pair cable must be used to make the connection.

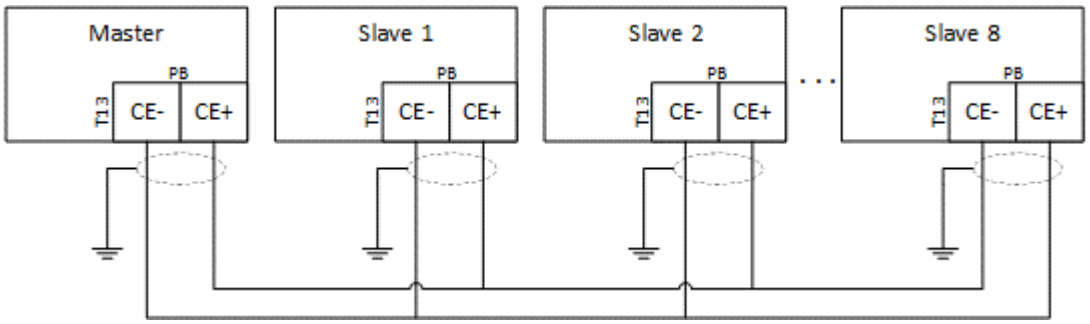

Figure 6: Connecting the network

It is important to respect the below limitation to avoid instability in the communication network:

- Twisted and Shielded 2-wire cable
- Bus cable length between 2 Units Max. 700 m
- Total bus cable length Max. 1,000 m

3.2 Common water temperature sensors

According to type of managed Daikin units and primary plant layout, a certain number of temperature sensors must be connected to iCM Advanced panel:

Option	2 sensor	4 sensors
Two pipe Plant: Air Cooled units	M	×
Two pipe Plant: Water cooled cooling only	M	✓
Two pipe Plant: Water cooled cooling/heating	×	M
Two pipe Plant: Water cooled heating only	×	M
Four Pipe: Mix of Multipurpose + Chiller + Heat pump	×	M
Four Pipe: Heat Pumps + Chiller with HR	×	M

Table 3 Common Leaving water temperature in plant room

Two sensors refer to Leaving and Entering Water Temperature to be installed on Supply and Return pipe of the plant room.
Four sensors refer to Supply and Return water temperature sensors to be installed on pipes of Cold primary system and Heat Primary system

Type of sensors that can be used are:

- Daikin NTC10K (with a beta of 3977), that can be bought as an “accessory” of the Daikin unit in the material request
- Generic PT1000 sensors.

Please refer to iCM advanced wiring diagrams for a correct hardwired connection of the sensors to controller terminals.

These sensors must be installed in a proper position to measure the Supply and Return water temperatures of the system. The temperature sensor must be installed upstream an eventual bypass pipe or tank or common header that decouple primary circuit from secondary circuit.
Below picture shows the recommended position on supply header:

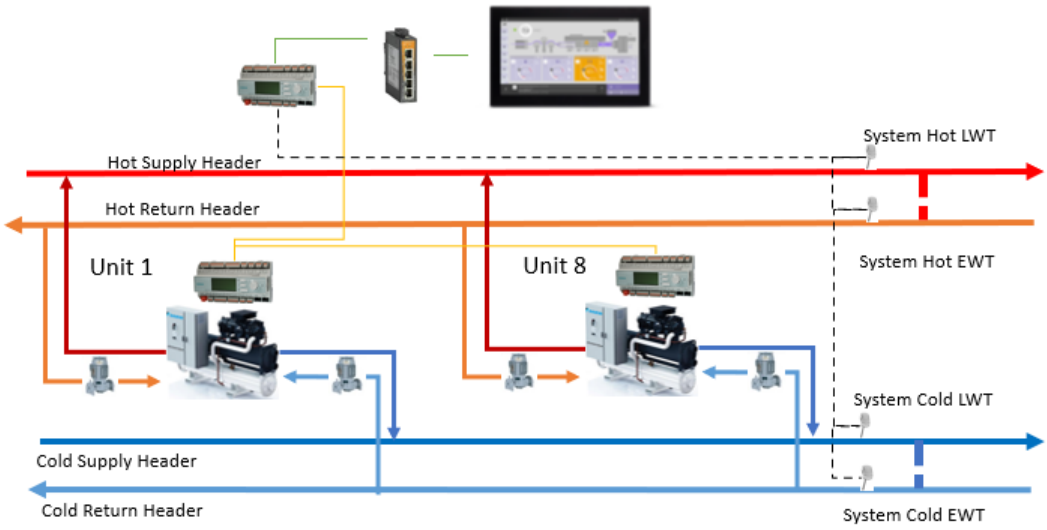

Figure 7 - System water temperature installation position

3.3 Four-pipe Plantroom: equipment installation

iCM is able to manage only two groups of Daikin units

1) Configuration A: Multipurpose, Air-cooled chiller and Air-cooled Heat pump.
2) Configuration B: Air-cooled Heat pump and Air-cooled Chiller with Heat recovery.

Moreover Daikin Units must be equipped with specific options and must be installed in a specific way.

3.3.1 Four-pipe Plantroom consisting in Multipurpose, A/C Heat pump and A/C Chiller

This plant layout must comply with the following guidelines to be managed by iCM:

1) At least one multipurpose unit.
2) Four Common water temperature sensors must be installed on supply and return headers of Heated water and Chilled water primary systems
3) For all Multipurpose evaporator pipes must be connected to Chilled water primary headers and condenser pipes to Heated water primary headers
4) All the Air-cooled Heatpump must be equipped with “Changeover Valve Management” option. The valve must be installed on the outlet pipe and it is used to divert the water from evaporator pipes towards Heated primary headers or Chilled primary headers according to Unit Mode. It is recommended to install the evaporator pump/s on inlet evaporator pipe or upstream Changeover valve
5) For all the Air-cooled Chiller, evaporator pipes must be connected to Chilled Primary headers.

The following picture shows an example of this plant layout:

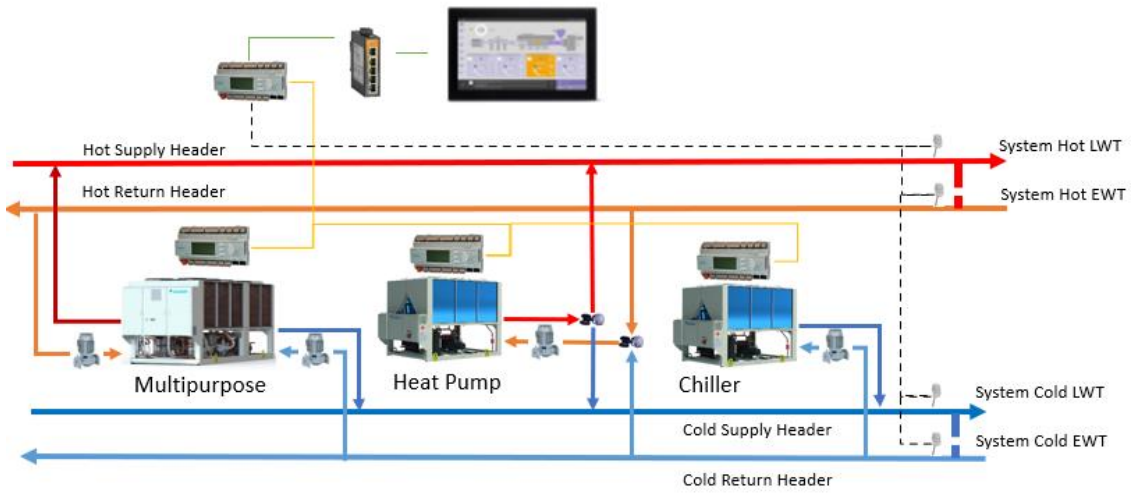

Figure 8 - Four-pipe: Multipurpose, A/C Chiller and A/C Hea pump

3.3.2 Four-pipe Plantroom consisting in A/C Heat pump and A/C Chiller

This plant layout must comply with the following guidelines to be managed by iCM:

1) All the Air-cooled Heat pump must be equipped with “Changeover Valve Management” option. The valve must be installed on the outlet pipe and it is used to divert the water from evaporator pipes towards Heated primary headers or Chilled primary headers according to Unit Mode. It is recommended to install the evaporator pump/s on inlet evaporator pipe or upstream Changeover valve.
2) At least one A/C Chiller must be equipped with “Heat Recovery with control” option and configured as iCM Slave 1 unit.
3) Common Chilled Leaving water temperature sensor must be installed on supply header of Chilled primary headers and connected to Slave 1 unit.
4) For all the Air-cooled Chiller units with Heat Recovery, evaporator pipes must be connected to Chilled primary headers and Heat Recovery pipes to Heated primary headers.
5) For all the Air-cooled Chiller, evaporator pipes must be connected to Chilled Primary headers.

The following picture shows an example of this plant layout:

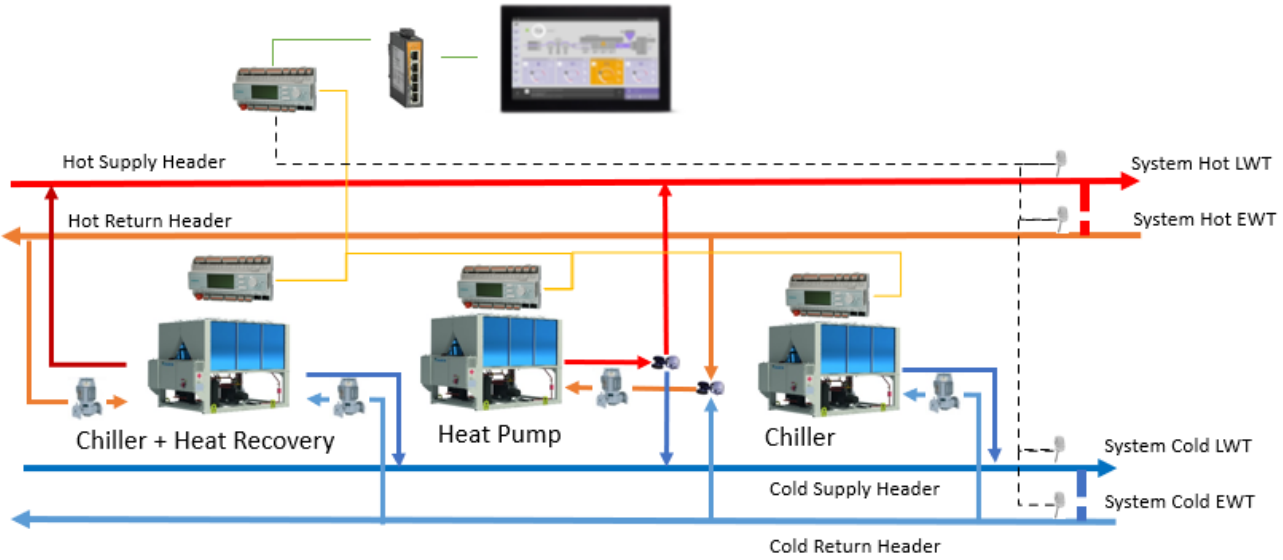

Figure 9 - Four-pipe: A/C Heat Pump and A/C Chiller with Heat Recovery

3.4 System Variable primary flow with dedicated pump: equipment installation

iCM Advanced panel is able to manage variable primary flow system composed by units with dedicated piping.
iCM Adv calculates the speed of the pump according to the System Differential Pressure sensor, to assure the correct flow to the building, and to manage the opening of the by-pass valve to assure minimum flow to running units.
Daikin unit controller must be equipped with Option 143 (VPF option); in this way unit is provided with a Differential pressure sensor installed between Leaving and Entering water pipe on the exchanger, that notifies the possible minimum flow.
iCM Adv communicates the speed of the pump to Daikin units that send the speed signal to its own dedicated pump.
Daikin units communicate to iCM Adv the eventual minimum flow, to force iCM Adv to open the by-pass valve.

The equipment installation and connection to Daikin units is shown in the following picture:

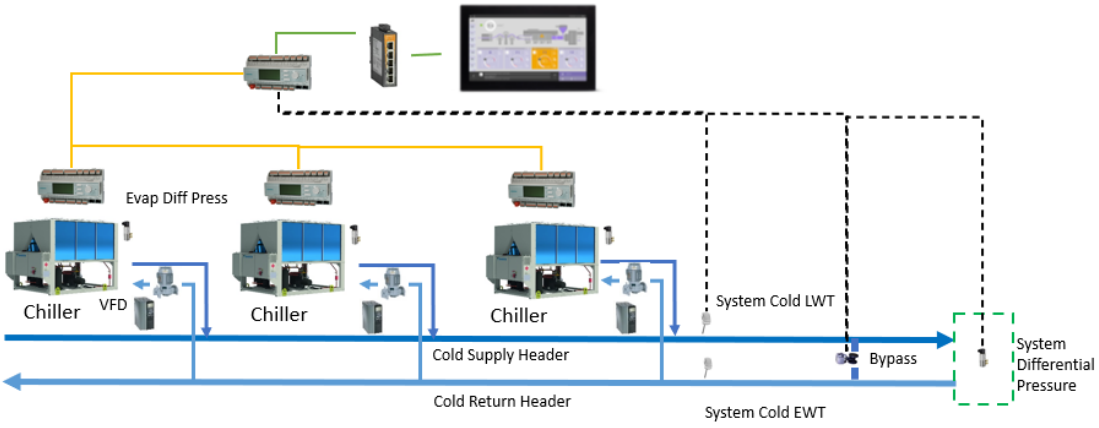

Figure 10 - Variable Flow based on DP in primary system with dedicated pumps

On iCM Advanced controller, by-pass valve actuator and Differential pressure sensor on the building must be connected to the following controller terminals:

- "System Differential pressure": 0…10Vdc Input Signal to gather the measurement of the sensor (controller provides 24Vdc for power supply)
- "By-pass Valve Request": 0…10Vdc Output Signal to open of the valve actuator.

By-pass Valve needs an External Power Supply at 24 or 230 Vac (not provided by controller)

System Differential Pressure sensor and By-pass Valve actuator and body are not part of Factory provision

Daikin Units with Option 143 are equipped with an Evaporator differential pressure and they are able to manage the dedicated primary pump with the following signals:

- "Pump #1 Request": Digital Output (Normally Open contact) to command the start of variable speed driver (VFD) of the pump.

Pump Request contact needs an External Power Supply at 24 or 230 Vac (not provided by unit controller)

- Pump Speed Signal": 0…10Vdc Output Signal to command the speed of VFD of the pump.

Please refer to the specific Unit wiring diagrams for a correct hardwired connection of the equipment to the controller terminals.

3.5 System Pump Management in manifolded piping: Shut-off valve installation

In plant-room where primary water distribution is designed as manifolded piping, primary pumps are installed in parallel and provide water flow to all the units. In order to avoid water flow when the unit is shut-down, shut-off valve must be installed on the outlet pipe of each unit.
Each unit can manage the closure or opening of the shut-off valve through the following output:

- "Pump #1 Request": Digital Output (Normally Open contact) to be connected to an External Relay that can provide separated Normally Close and Normally Open contact to send open/close command to valve.

The following scheme shows the electrical device that must be installed in unit panel and connections with valve actuator:

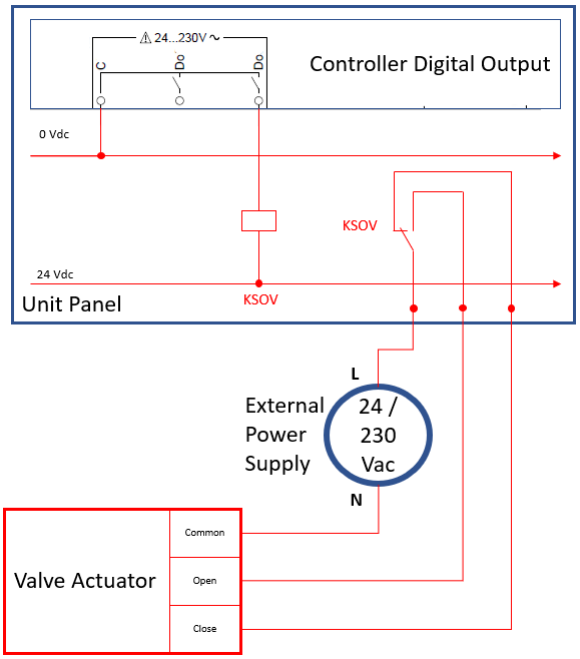

Figure 11 - Shut-off valve electrical installation

Installation of KSOV Relay, External Power supply, Valve actuator and body are not part of Factory provision

3.6 System Variable primary flow with manifolded pump: equipment installation

In plant-rooms with manifolded piping, intelligent Pump Manager can manage the primary pumps and variable primary flow, in conjunction with iCM Advanced panel that will manage the Daikin units.
In those plant-rooms:

- iCM Advanced is connected to iPM and all the Daikin units and manage them according to System Water Temperature sensors
- iPM will manage all the equipment related to water distribution:
  - VFD pump
  - Bypass Valve
  - Load Differential pressure
- Each unit must be equipped with “VPF option” to measure the Evaporator Differential Pressure
- Each unit can manage the dedicated inlet shut-off valve (connections are explained in the previous paragraph).

The following picture shows the hardwired connections to iPM and Daikin units:

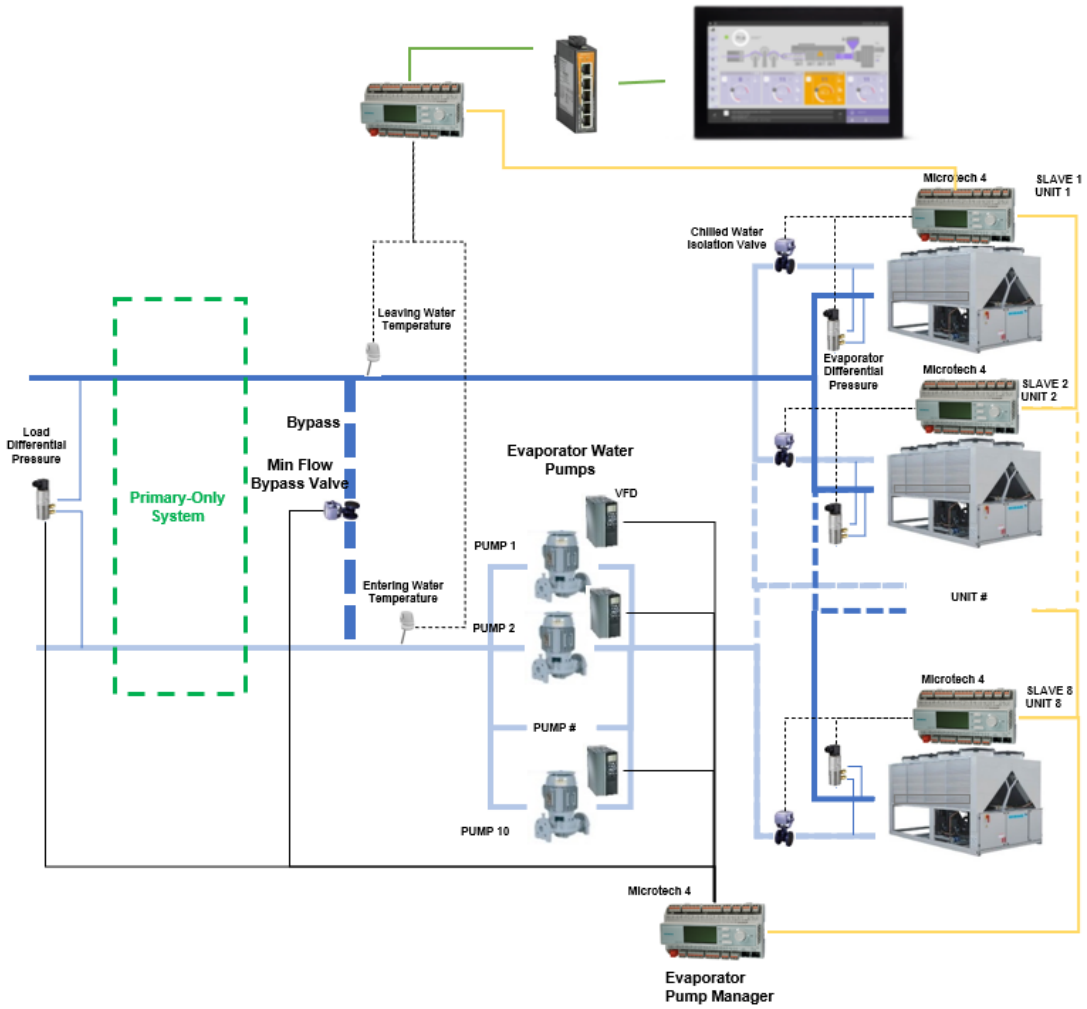

Figure 12 - Variable Primary Flow with iCM and iPM

4 HMI DESCRIPTION

4.1 Introduction

The following sections will go into the configuration and navigation of iCM Adv. All the menu and submenu will be described in terms of purpose and contents. All the pages will be described in terms of parameters and settings. The two classes can be easily identified referring to the below table.

Description	Default	Range and function	AL
This is a parameter	7.6°C	-15.0°C…30.0°C This is a parameter	4
This is a setting	2	iCM: 2…8	2
This is a link to a subpage	u		4

Table 4: Example of parameter and setting representation

The description of any setting or parameter will also include the required Access Level (AL). Access level is defined by the password entered to access the different menus of the Microtech© 4. Please refer to the Unit's Operating Manual for more details.
Access levels are the following:

AL	Profile	Access rights
6	Basic user	Limited access to settings and parameters
4	Maintenance	extended access to settings and parameters
2	Service	full access to configuration, settings and parameters

Table 5:Access levels

Some of the settings for the lower profile users can be limited to read only but can be changeable with a higher access level.

4.1.1 Web HMI Introduction

Before explaining the details of various menus, is necessary to make a differentiation between writable and read-only variables.

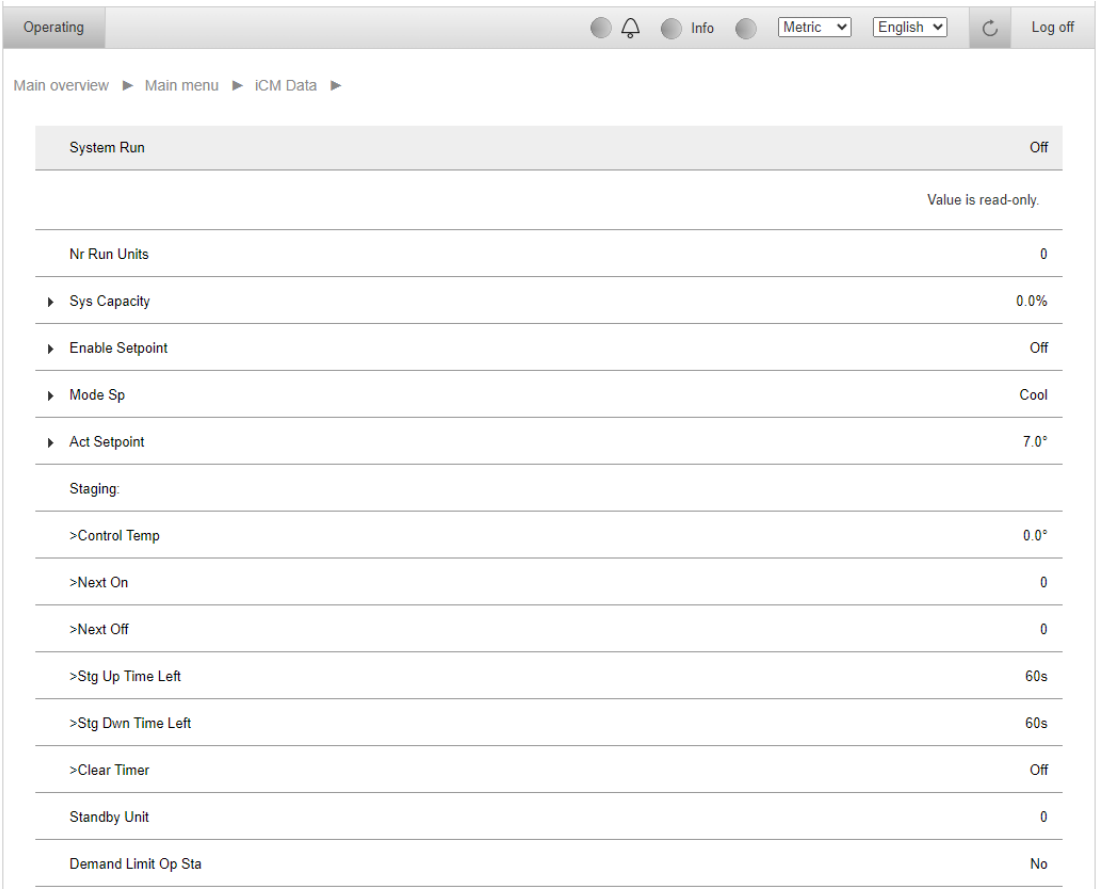

Figure 13: Read-only value in Web HMI

A ready-only value is not editable. These values represent monitoring data, it is possible recognize them by the label "Value is read-only".

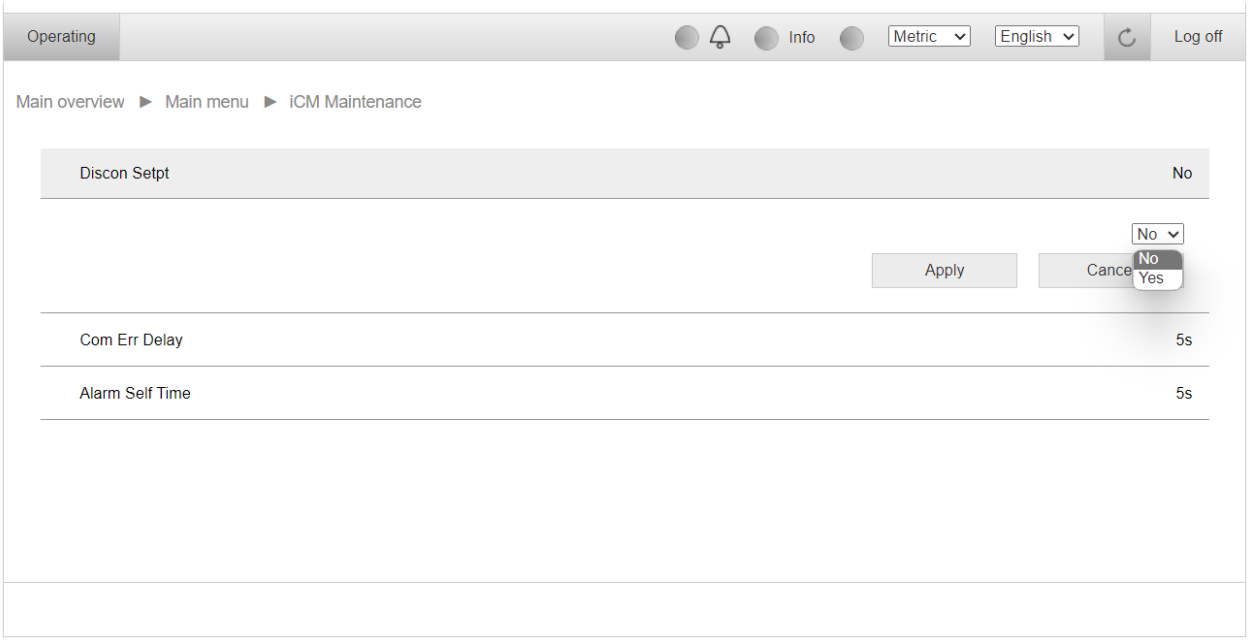

Figure 14: Writable value in Web HMI

A writable value is editable via the drop-down. In case of numeric value is mandatory to set a value between the lower bound limit and the upper bound limit.

4.2 Main Overview

The Main Overview contains the link to Main Menu page and a data display list regarding the status of the system.

4.3 Main Menu

The Main Menu contains the links to all configuration and visualization pages. The following table will list all the sections and the related contents.

Section	Content	AL
iCM Data	iCM Data menu contains data on the iCM system and data on each water-cooled unit connected to the iCM.	
Evap Speed Ctrl	Menu contains data and setpoint about the Dedicated Evaporator Speed Control embedded in each iCM Adv Controller	
Cond Speed Ctrl	Menu contains data and setpoint about the Dedicated Condenser Speed Control, embedded in each iCM Adv Controller	
Evap iPM Data	Menu contains data and setpoint exchanged between iCM Adv external panel and Pump Manager controller that manage Manifold Evaporator Pumps	
Cond iPM Data	Menu contains data and setpoint exchanged between iCM Adv external panel and Pump Manager controller that manage Manifold Condenser Pumps	
iCT Data	Menu contains data and setpoint exchanged between iCM Adv external panel and Cooling Tower manager (inside Condenser Pump manager controller)	
iSM Data	Menu contains the data about the Secondary Pump Manager communicated by iSM to iCM Adv external panel	
iCM Setting	iCM Setting menu allows to define all the settings for Intelligent Chiller Manager logic	
iCM Maintenance	iCM Maintenance menu allows to define the limit values of delays and offsets about iCM parameters	
Alarming	Display page of active alarms and alarm history	
Configuration	Configuration menu allows to set the iCM and iPM configuration parameters. It also possible configure the touch panel	
Controller SetUp	Controller SetUp menu allows to set the controller IP address and the parameters about BACnet and Modbus communication	
Controller Info	Controller Info contains the software version and the information about the plant	

Table 6: Main Menu

4.4 iCM Data

This section will describe the parameters accessible in the iCM Data page.

It will also describe the links to other sub-sections.

Description	Default	Range and function	AL
System Run	Off	Off, On	6
This is the system status.			
Nr Run Units	0	0,…, 8	6
This is the number of Units in run			
Sys Capacity	0%	0…100%	6
This is the average of Capacity of running unit on the total number of Units.			
Enable Setpoint	Off	Off, On	6
This is set to On if enabling from the control source and remote switch are enabled. A link from this data will shows a page with additional information related to local/network setpoints.			
Mode Sp	Cool	Cool, Ice, Heat, Multi	6
This the actual System operating mode. Multi is available if there is at least one multipurpose unit. A link from this data will shows a page with additional information related to local/network setpoints.			
Act Setpoint	-.-°C		6
This is the actual value of setpoint for the system. It may change according to System mode. For water cooled heat pump, this could be Hot Setpoint or Cool Setpoint according to System operating mode. A link from this data will shows a page with additional information related to local/network setpoints.			
Staging			
Control Temp	-.-°C		6
This is the actual value of the controlled temperature. It may change according to the Unit mode (Cool or Heat). For a water-cooled heat pump unit it may change if operating in Cool mode (evaporator side) or Heat mode (condenser side).			
Control Heat Temp	-.-°C		6
This is the actual value of the Heat controlled temperature. It is enabled only if at least one water cooled heat pump is configured.			
Next On	-	Slave1,…, Slave8	6
This is the elected next on Unit.			
Next Off	-	Slave1,…, Slave8	6
This is the elected next off Unit.			
Stg Up Time Left	0s		6
This is the time left before the next stage up of the Next On Unit.			
Stg Dwn Time Left	0s		6
This is the time left before the next stage down of the Next Off Unit.			
Clear Timer	Off	Off, Reset	6
This allows to reset the Stage down and Stage Up inhibition timers.			
Standby Unit	-		6
This shows the actual Unit in standby mode			
Demand Limit Op Sta	No	No, Yes	6
This is the Demand Limit Operating System.			
Cmn LWT	-.-°C	Off, Run, NotAvail, Alm, Stdaln, ComErr	6
System Common Leaving Water Temperature. A link from this data will show a page with additional information related to iCM temperature sensors.			
Heat Rec Status	Off: Switch	Off:Swi, WaitEWT, Run, Off:Alm	6
- Off:Swi: System heat recovery management is disabled by HR enable Switch on each unit controller - WaitEWT: System heat recovery management is not running because condition on Entering Water Temperature is not achieved - Run: System Heat Recovery management is enabled, condition on EWT is achieved and it is running - Off:Alm: System Heat Recovery management is stopped because EWT sensor is in alarm. A link from this data will show a page with additional information related to Heat Recovery.			
Free Cool Status	Off: Switch	Off:Swi, WaitOAT, Run, Off:Alm	6
- Off:Swi: System free-cooling management is disabled by FC enable Switch on each unit controller - WaitOaT: System free-cooling management is not running because condition on Outside air temperature is not achieved - Run: System Free-cooling management is enabled, condition on OaT is achieved and it is running - Off:Alm: System Free-cooling management is stopped because OaT sensor is in alarm. A link from this data will show a page with additional information related to Free Cooling.			
Energy Monitoring	▶		6
A link from this data will show a page with additional information related to Energy Monitoring.			
ClearAlarm Units	Off	Off, On	6
This allows to reset the alarms on all Units			

Slave #	Off	Off, Run, Alarm, ComErr, N/Avail, N/Cfgd	6
This shows the Slave # operating status. # can assume the value between 1 and 8.			

Table 7: iCM Data overview

4.4.1 iCM Data: System Capacity

This section will list the actual system capacity by mode.

Description	Default	Range and function	AL
Sys Cooling Cap	0%	0,…, 100%	6
This shows the actual system cooling capacity			
Sys Heating Cap	0%	0,…, 100%	6
This shows the actual system heating capacity			

Table 8: iCM – System Capacity

4.4.2 iCM Data: Setpoints

This section will list the current setpoints on iCM Advanced to manage the plant-room.
Some of these setpoints are communicated from iCM Adv external pannel to other iCM Slaves.

Description	Default	Range and function	AL
Ctrl Source	Loc	Loc, Ntwk	6
This allows to set the Control Source type: - Local: setpoints set through iCM Adv HMI - Network: setpoints set by an eventual BMS communicating in BACnet or Modbus protocol			
Enable Setpoint	Off	Off, On	6
This is set to On if all the following condition are satisfied - Enabled by Local Setpoint - Enable by network if the control source = Ntwk - Enabled by remote switch on iCM panel. A link from this data will show a page with additional information related to local/network setpoints.			
Remote Switch	Off	Off, On	6
This shows the Remote Switch state			
Local Setp	Off	Off, On	6
This setting allows to send setpoint for Enable Setpoint from Local HMI			
Network Setp	Off	Off, On	6
This value indicates the setpoint for Enable Setpoint sent by BMS if Control Source = Network			
Mode Sp	Cool	Cool, Ice, Heat	6
This shows the actual operating mode of iCM Adv and consequently of Plant-room			
Cool-Heat Switch	Cool	Cool, Heat	6
This shows the Cool-Heat switch state of the iCM Adv extrenal Panel			
Local Setp	Cool	Cool, Ice, Heat	6
This allows to set the actual mode setpoint operating mode setpoint from Local HMI			
Network Setp	Cool	Cool, Ice, Heat	6
This value indicates the actual mode setpoint sent by BMS if Control Source = Network			
Cool Setp	-.-°C		6
This shows the actual cool temperature setpoint			
Local Setp	-.-°C	-8.0°C,…, 20.0°C	6
This allows to set the actual cool temperature setpoint from Local HMI			
Network Setp	-.-°C		6
This value indicates the actual cool temperature setpoint sent by BMS if Control Source = Network			
Heat Setp	-.-°C		6
This shows the actual heat temperature setpoint			
Local Setp	-.-°C	25.0°C,…, 75.0°C	6
This allows to set the actual heat temperature setpoint from Local HMI			
Network Setp	-.-°C		6
This value indicates the actual heat temperature setpoint sent by BMS if Control Source = Network			
Ice Setp	-.-°C		6
This shows the actual ice temperature setpoint			
Local Setp	-.-°C	-20.0°C,…, 5.0°C	6
This allows to set the actual ice temperature setpoint from Local HMI			
Network Setp	-.-°C		6
This value indicates the actual ice temperature setpoint sent by BMS if Control Source = Network			
Demand Lim Setp	0%	0%,…, 100%	6

This shows the actual Demand Limit setpoint			
Local Setp	0%	0%,…, 100%	6
This allows to set the actual Demand Limit setpoint from Local HMI			
Network Setp	0%	0%,…, 100%	6
This value indicates the actual Demand Limit setpoint sent by BMS if Control Source = Network			

Table 9: iCM – Setpoints overview

iCM Adv setpoints are chosen according "Control Source" setting:

- ***If "Control Source" is Local:***
  _Setpt Local: Local setpoint on HMI of iCM external controller or Touch Panel, if it is configured, will be communicated to the system
- ***If "Control Source" is Network***
  _Setpt Ntwk: Writeable setpoint by BMS through Modbus or BACnet communication

4.4.3 iCM Data: Sensor

This section lists the current Common Entering/Leaving water temperature data and the outside air temperature read from the sensors.

Description	Default	Range and function	AL
Cmn EWT	-.-°C		6
This shows the actual System Entering Water Temperature			
Cmn Heat LWT	-.-°C		6
This shows the actual System Heat Leaving Water Temperature			
Cmn Heat EWT	-.-°C		6
This shows the actual System Heat Entering Water Temperature			
Outside Air Temp	-.-°C		6
This shows the actual Outside Air Temperature			

Table 10: iCM – Sensor overview

4.4.4 iCM Data: Heat Recovery

This section will list the current datapoint on iCM Advanced related to Heat Recovery.

Heat Recovery is enabled if at least one unit connected on iCM Adv has Heat Recovery option configured.

Description	Default	Range and function	AL
Heat Rec Op State	Stop	Stop, Run	6
This shows the actual Heat Recovery operating system			
Act Enable	Off	Off, On	6
This is set to On if all the following condition are satisfied - Enabled by Local Setpoint - Enable by network if the control source = Ntwk			
Local Setp	Off	Off, On	6
This setting allows to send setpoint for Enable Setpoint from Local HMI			
Network Setp	Off	Off, On	6
This value indicates the setpoint for Enable Setpoint sent by BMS if Control Source = Network			
Average EWT	-.-°C	-20.0°C,…, 130.0°C	6
This shows the actual entering water temperature average calculated as the average of EWT of the slaves that have HR activated			
Act EWT Setp	0	-25.0°C,…, 100.0°C	6
This shows the actual entering water temperature setpoint			
Local Setp	-.-°C	-64.0°C,…, 64.0°C	6
This allows to set the actual entering water temperature setpoint from Local HMI			
Network Setp	-.-°C		6
This value indicates the actual entering water temperature setpoint sent by BMS if Control Source = Network			
Next On	-	Slave1,…, Slave8	6
This is the elected next on Unit to activate Heat Recovery			
Next Off	-	Slave1,…, Slave8	6
This is the elected next off Unit to deactivate Heat Recovery			

Table 11: iCM – Heat Recovery overview

iCM Adv Setpoints for Heat Recovery are chosen according "Control Source" setting:

- ***If "Control Source" is Local:***
  _Setpt Local: ***Local setpoint on HMI of iCM external controller or Touch Panel, if it is configured, will be communicated to the system***
- ***If "Control Source" is Network***
  _Setpt Ntwk: ***Writeable setpoint by BMS through Modbus or BACnet communication***

4.4.5 iCM Data: Free Cooling

This section will list the current datapoint on iCM Advanced related to Free Cooling.

Free Cooling is enabled if at least one unit connected on iCM Adv has Free Cooling option configured.

Description	Default	Range and function	AL
Free Cool Op State	Stop	Stop, Run	6
This shows the actual Free Cooling operating system			
Act Enable	Off	Off, On	6
This is set to On if all the following condition are satisfied - Enabled by Local Setpoint - Enable by network if the control source = Ntwk			
Local Setp	Off	Off, On	6
This setting allows to send the Enable Setpoint from Local HMI			
Network Setp	Off	Off, On	6
This value indicates the setpoint for Enable Setpoint sent by BMS if Control Source = Network			
Next On	-	Slave1,…, Slave8	6
This is the elected next on Unit to activate Heat Recovery			
Next Off	-	Slave1,…, Slave8	6
This is the elected next off Unit to deactivate Heat Recovery			

Table 12: iCM – Free Cooling overview

iCM Adv Setpoints for Free Cooling are chosen according "Control Source" setting:

- ***If "Control Source" is Local:***
  _Setpt Local: ***Local setpoint on HMI of iCM external controller or Touch Panel, if it is configured, will be communicated to the system***
- ***If "Control Source" is Network***
  _Setpt Ntwk: ***Writeable setpoint by BMS through Modbus or BACnet communication***

4.4.6 iCM Data: Energy Monitoring

This section will list the current datapoint on iCM Advanced related to Energy Monitoring.

Energy Monitoring system option is enabled only if each slave unit has configured Energy Monitoring option.

Description	Default	Range and function	AL
Pwr Therm	-.- kW	0.0,…,2000000.0 kW	6
This shows the actual system Thermal Power			
Pwr Elecr	-.- kW	0.0,…,2000000.0 kW	6
This shows the actual system Electrical Power			
COP	-.-	0.0,…, 20.0	6
This shows the actual system Coefficient Of Performance (COP)			

Table 13: iCM – Energy Monitoring overview

4.4.7 iCM Data: Slave # data

This section will list the data received from the Slave # Unit connected to iCM Adv external panel.
# indicates the index of Unit, # can be assume the value 1,2,3,4,5,6,7,8.

Slave# Data are the information gathered by iCM Adv external panel.

Defrost in available only for Heat Pump or Multipurpose units.

It will also describe the links to other sub-sections.

Description	Default	Range and function	AL
Op Sta	Stop	Stop, Run	6
This shows the actual operating state. A link from this data will show a page with additional information related to Slave # states			
Act Mode	Cool	Cool, Ice, Heat, Test, Multi	6
This shows the actual operating mode. Multi mode is available only if there is at least one multipurpose unit.			
Act Capacity	0%	0,…, 100%	6
This shows the Slave # actual capacity.			
Act Setpoint	-.-°C		6
This shows the Slave # actual temperature setpoint. It may change according to System mode			
ELWT	-.-°C		6
This shows the Evaporator Leaving Water Temperature			
EEWT	-.-°C		6
This shows the Evaporator Entering Water Temperature			
CLWT	-.-°C		6
This shows the Condenser Leaving Water Temperature			
CEWT	-.-°C		6
This shows the Condenser Entering Water Temperature			
Heat Rec Op State	Stop	Stop, Run	6
This shows the actual Heat Recovery operating status related to Slave # A link from this data will show a page with additional information regarding Heat Recovery of Slave #.			
Free Cool Op State	Stop	Stop, Run	6
This shows the actual Free Cooling operating status related to Slave # A link from this data will show a page with additional information regarding Free Cooling of Slave #.			
Power Mngmt	▶		6
A link from this data will show a page with additional information regarding Power Management of Slave #.			
Defrost Demand	No	No, Yes	6
This shows the Slave # actual Defrost demand.			
Rapid Restart State	No	No, Yes	6
This shows the Rapid Restart State. Rapid Restart is enabled only if configured			
Fault Code	0	0…4294967295	6
This shows the code related to the alarm type			
Clear Alarm	Off	Off, On	6
This allows to reset the Slave # alarms			
Slave # - Circuit1	▶		6
A link that will show a page with additional information related to Circuit1 data			
Slave # - Circuit 2	▶		6
A link that will show a page with additional information related to Circuit2 data			
Slave # Configuration			6
A link that will show a page with additional information related to configuration data			
Enable Cmd	Off	Off, On	6
This shows the unit On/Off command			
Mode Sp	Cool	Cool, Ice, Heat, N/A, Multi	6
This shows the actual operating mode setpoint. Multi mode is available only if the slave is a multipurpose unit.			
Defrost Cmd	Off	Off, On	6
This shows the actual defrost command send from iCM to the unit.			

Figure 15: iCM – Slave # data

4.4.7.1 Slave # – states

This section lists the current states received by iCM Adv external panel from the iCM Adv Slaves #.
# indicates the index of Slave unit, # can be assume the value 1,2,3,4,5,6,7,8.

Description	Default	Range and function	AL
Availability	No	No, Yes	6
This shows if the unit is available			
Standalone	No	No, Yes	6

Unit, set in Standalone mode will work independently from iCM sequencing even if connected on Daikin Chiller network. Those Unit can be managed by Unit controller itself.			
Evaporator State	Off	Off, Start, Run	6
This value indicates the Evaporator operating state			
Condenser State	Off	Off, Start, Run	6
This value indicates the Condenser operating state			
Run Hours	0	0…4294967295	6
This shows the Unit operating hours			
Nr Start	0	0…4294967295	6
This shows the Unit number of start			
Alarm	None	None, InAlarm	6
This value indicates that an alarm occurred on Unit			
Comm Error	None	None, Active	6
This value shows if the Unit is in communication error with iCM			
Miss Alarm	None	None, Active	6
This alarm notifies that the present unit flag has not been configured			

Figure 16: Slave # – states overview

4.4.7.2 Slave # – Heat Recovery

This section will list the Heat Recovery data received by iCM Adv from the iCM Adv Slave #.

Description	Default	Range and function	AL
Heat Rec Cmd	Off	Off, On	6
This shows the Heat Recovery command sent by iCM to Slave #			
Heat Rec Avail	No	No, Yes	6
This shows the actual Heat Recovery availability. Unit is considered “Not Available” for heat recovery if Heat recovery function is disabled by HR switch on unit cabinet or through BMS HR enabling.			
Heat Rec EWT	No	No, Yes	6
This shows the actual Heat Recovery entering water temperature			
Heat Rec Run Hours	0	0…4294967295	6
This shows the Unit operating hours in Heat Recovery mode			

Table 14: iCM – Slave # data – Heat Recovery

4.4.7.3 Slave # – Free Cooling

This section will list the Free Cooling data received by iCM Adv from the iCM Adv Slave #.

Description	Default	Range and function	AL
Free Cool Cmd	Off	Off, On	6
This shows the Free Cooling command sent by iCM to Slave #			
Free Cool Avail	No	No, Yes	6
This shows the actual Heat Recovery availability. Unit is considered “Not Available” for heat recovery if Heat recovery function is disabled by FC switch on unit cabinet or through BMS HR enabling.			
Free Cool Mode	Off	Off, Mech-only, FC_Start, FC+Mech, FC-only	6
This shows the actual Free Cooling operating mode. - *Off:* unit is shut down - *Mech-only:* unit is generating cooling capacity using circuit compressors (free-cooling is stopped) - *FC_Start:* Unit is starting one or both circuits in free-cooling (Free-cooling Valves are changing their position to activate the Free Cooling) - *FC+Mixed:* unit is generating cooling capacity with both Compressors and Free-cooling equipment - *FC-only:* unit is generating cooling capacity only with Free-cooling equipment.			
Heat Rec Run Hours	0	0…4294967295	6
This shows the Unit operating hours in Heat Recovery mode			

Table 15: iCM – Slave # data – Free Cooling

4.4.7.4 Slave # – Power Management

This section will list the Free Cooling data received by iCM Adv from the iCM Adv Slave #.

Description	Default	Range and function	AL
Availability	No	No, Yes	6
This shows the Power Management availability received by iCM from engine control room			
Demand	No	No, Yes	6

This shows the Power Management Demand received by iCM from the Slave #			
Fail	None	None, Active	6
This shows if the Slave # has a Power Management alarm			

Table 16: iCM – Slave # data – power Management

4.4.7.5 Slave # – Circuit @

This section lists the current data about circuit # received by iCM Adv external panel from iCM Adv Slaves.
# indicates the index of Slave unit, # can be assume the value 1,2,3,4,5,6,7,8.
@ indicates the index of circuit, @ can be assume the value 1 or 2.

Defrost in available only for Heat Pump or Multipurpose units.

Description	Default	Range and function	AL
Availability	No	No, Yes	6
This shows if the unit circuit is available			
Act Mode	Off	Water, Cool, Heat	6
This shows the circuit # actual operating mode.			
Act Capacity	0%	0,…, 100%	6
This shows the circuit # actual capacity			
Defrost State	Stop	Stop, Run	6
This shows the defrost actual state			
Run Hours	0	0…4294967295	6
This shows the Unit Circuit # operating hours			
Nr Start	0	0…4294967295	6
This shows the Unit Circuit # number of starts			

Figure 17: Slave # – Circuit @ data overview

4.4.7.6 Slave# – Configuration

This section lists the current configuration data received by iCM Adv external panel from iCM Adv Slaves.

Description	Default	Range and function	AL
Unit Type	0	0,…,16	6
This shows if the unit circuit is available			
iCM Option Type	iCMAdv	Mst/Slv, iCMstd, iCMAdv	6
This shows the configured unit iCM Option. Only iCAdv is available with iCM Adv configuration			
Nr Circuit	0	0, 1, 2, 3	6
This shows the number of configured circuits			
Heat Recovery config	No	No, Yes	6
This shows if the Heat Recovery is configured			
Free Cool config	No	No, Yes	6
This shows if the Free Cooling is configured			
Energy Mon config	No	No, Yes	6
This shows if the Energy Monitoring is configured			

Table 17: Slave # – Configuration data overview

4.5 Dedicated pump: Evaporator / Condenser Pump Speed Control

This section lists the current data about the Evaporator Pump Speed Control function embedded in iCM Adv Logic.
The Evaporator and Condenser Pump Speed Control share the same logics and menus, for this reason only Evaporator Speed Control will be explained.
It will also describe the links to other sub-sections.

Description	Default	Range and function	AL
Speed	0%	0, …, 100%	6
This shows the pump actual speed. - on iCM Adv external panel, calculated according to Speed Control Configuration/Settings - on iCM Adv Slave received by iCM Adv external panel A link that will show a page with additional maintenance data related to evaporator pump speed			
BypValve Cmd	Close	Close, Open	6
This shows the bypass valve opening request received on each iCM Adv Slave and sent to iCM Adv external panel			
BypValve Opening	0%	0, …, 100%	6
This shows the percentage of bypass valve opening only on iCM Adv external panel			
Dif Press	-.- kPa		6

This shows the evaporator differential pressure connected only to iCM Adv external panel and if "Configuration→Evap Ctrl Type"=VPF			
Dpres Setp	-.- kPa		6
This shows the evaporator differential pressure setpoint only on iCM Adv external panel and if "Configuration→Evap Ctrl Type"=VPF A link that will show a page with additional setpoints related to evaporator pump speed			
Delta Temp	-.-°Dc		6
This shows the evaporator differential temperature setpoint only on iCM Adv external panel and if Configuration→Evap Ctrl Type"=VarDT			
Dtemp Setp	-.-°Dc		6
This shows the evaporator differential temperature setpoint only on iCM Adv external panel and if "Configuration→Evap Ctrl Type"=VarDT A link that will show a page with additional setpoints related to evaporator pump speed			
Evap Speed Settings	▶		6
A link that will show a page with additional settings related to evaporator pump speed			

Table 18: Evaporator Pump speed control overview

4.5.1 Evaporator Pump Speed Control – Maintenance

This section lists the current maintenance settings about the Evaporator Pump Speed Control.
Some Settings are displayed on iCM Adv Slave. Some other are shown only on iCM Adv external panel.

Description	Default	Range and function	AL
Manual Selector	Auto	Auto, Manual	6
This allows to manually change the speed of the pump and position of the Bypass Valve on iCM Adv Slaves			
Manual Speed	0%	0, …, 100%	6
This allows to set the manual speed value on iCM Adv Slaves			
Valve Manual	Closed	Closed, Opened	6
This allows to select the bypass valve manual command value on iCM Adv Slaves			
Manual Position	0%	0, …, 100%	6
This allows to set the bypass valve manual position value on iCM Adv Slaves			
Dif Press	-.- kPa		6
This shows the actual differential pressure value. It displays only on iCM Adv external panel			
Offset	0kPa	-100kPa… 100kPa	6
This allows to set the offset value related to pressure sensor. It displays only on iCM Adv external panel			
Max Scale	150kPa	0kPa… 1000kPa	6
This allows to select the maximum scale value related to pressure sensor. It displays only on iCM Adv external panel			
Min Scale	0kPa	-100kPa… 50kPa	6
This allows to set the minimum scale value related to pressure sensor. It displays only on iCM Adv external panel			
Raw Value			6
This shows the raw input value related to pressure sensor. It displays only on iCM Adv external panel			

Table 19: Evaporator Pump Speed Control – Maintenance overview

4.5.2 Evaporator Pump Speed Control – Setpoint

This section lists the current setpoint about the Evaporator Pump Speed Control.

This menu will display only on iCM Adv external panel

Description	Default	Range and function	AL
Dpres Setp	-.- kPa		6
This shows the actual differential pressure setpoint			
Local Setp	300kPa	LoLim,…, HiLim	6
This setting allows to send setpoint for differential pressure to Pump Manager from Local HMI on iCM			
Network Setp	-.- kPa		6
This value indicates the setpoint for differential pressure sent by BMS when iCM is in Control Source = Network			
Hi Lim	500kPa	LoLim,…, 10000kPa	6
This allows to set the High Limit related to pressure setpoint			
Low Lim	10kPa	10kPA,…, HiLim	6
This allows to set the Low Limit related to pressure setpoint			
DTemp Setp	-.-°Dc		6
This shows the actual differential temperature setpoint			
Local Setp	5.0°Dc	LoLim,…, HiLim	6
This setting allows to send setpoint for differential temperature to Pump Manager from Local HMI on iCM			

Network Setp	-.-°Dc		6
This value indicates the setpoint for differential temperature sent by BMS when iCM is in Control Source = Network			
Hi Limit	10.0°Dc	LoLim,…, 20.0°Dc	6
This allows to set the High Limit related to temperature setpoint			
Low Limit	2.0°Dc	0.0°Dc,…,HiLim	6
This allows to set the Low Limit related to temperature setpoint			

Table 20: Evaporator Pump Speed Control – Setpoint overview

iCM Adv Setpoints for Evaporator\Condenser Pump Speed Control are chosen according "Control Source" setting:

- ***If "Control Source" is Local:***
- ***_Setpt Local: Local setpoint on HMI of iCM external controller or Touch Panel, if it is configured, will be communicated to Evaporator\Condenser Pump Speed Control***
- ***If "Control Source" is Network***
  _Setpt Ntwk: Writeable setpoint by BMS through Modbus or BACnet communication

4.5.3 Evaporator Pump Speed Control – Setting

This section list, the current setting data about the Evaporator Pump Speed Control.

This menu will display only on iCM Adv external panel.

Description	Default	Range and function	AL
Max Speed	0%	0, …, 100%	
This allows to set the maximum speed			
Minimum Speed	0%	0, …, 100%	
This allows to set the minimum speed			
ThermoOff Speed	0%	0, …, 100%	
This allows to set the speed valu when unit is enabled with capacity=0%			
ThermoOff Time	0s		
This allows to set the time value to set "ThermoOff Speed" when unit is enabled with capacity=0%			
Fix Speed Sel	0	0, 1	
This allows to select the actual fixed speed selector value. - 0: Fixed speed 1 - 1: Fixed Speed 2			
Fix Speed 1	0%	0, …, 100%	
This allows to set the actual fixed speed1 value			
Fix Speed 2	0%	0, …, 100%	
This allows to set the actual fixed speed2 value			
PID_PropBand	200kPa	10kPa,…, 1000kPa	
This allows to set the actual PID proportional value related to DP			
PID_PropBand	10.0°Dc	1.0*Dc,…, 20.0°Dc	
This allows to set the actual PID proportional value related to DT			
PID_Integr Time	60s	0s,…,3600s	
This allows to set the actual PID integration time			
PID_Deriv Time	0s	0s,…,3600s	
This allows to set the actual PID derivative time			

Table 21: Evaporator Pump Speed Control – Setting overview

4.6 Manifolded Pumps: Evaporator or Condenser Pump Manager

This menu contains all the values communicated by the Pump Manager to iCM Adv external panel.
Moreover, it contains the setpoint for Manifolded Pump Speed control and Header Bypass Valve opening that iCM can set on the Pump Manager controller through Daikin Communication Network.

Description	Default	Range and function	AL
App Version	#.#		
This shows the application version			
Status	Off: Auto	Off:Auto, On:Auto, Off:Local, Off:SensAlarm, On:SensAlarm,	

		Off:CommErr, On:CommErr, Configuration, Off:ConfigAlarm	
This value indicated the Status of Pump Manager to iCM			
Op Sta	Off: Auto	Off, On	
This value indicates the operating state of Pump Manager			
Clear Alarm	Off	Off, On	
This setting allows to send a reset of the active alarms on Pump Manager from iCM.			
Pump # Status	Off	Off, On, ManOn, ManOff, Alm, Test, N/Cfg	
This shows the actual operating status of Pump #. # can be assume the value from 1 to 10.			
Nr Run Pump	0	0,…, 10	
This value indicates the number of running pump			
Speed	0%	0%...100%	
This value indicates the speed percentage of the pump			
Ctrl DTemp	-.-°Dc		
This value indicates the controlled sensor measurement on Pump Manager			
Act Setpoint	-.-°Dc		
This value indicates the actual setpoint on Pump Manager for actual controlled delta temperature			
Setp iCM	5.0°Dc	0.5°Dc…20.0°Dc	
This setting allows to send setpoint forcontrolled temperaturel to Pump Manager from Local HMI on iCM			
Setp Network	-.-°Dc		
This value indicates the setpoint for controlled delta temperature to Pump Manager sent by BMS when iCM is in Control Source = Network			
Diff Press	-.-kPa		
This value indicates the controlled sensor measurement on Pump Manager			
Act Setpoint	-.-kPa		
This value indicates the actual setpoint on Pump Manager for actual dirrential pressure			
Setp iCM	50.0kPa	0.0kPa…300.0kPa	
This setting allows to send the setpoint dirrential pressure to Pump Manager from Local HMI on iCM			
Setp Network	-.-kPa		
This value indicates the setpoint for dirrential pressure to Pump Manager sent by BMS when iCM is in Control Source = Network			
Abs Press	-.-kPa		
This value indicates the controlled sensor measurement on Pump Manager			
Abs Press Act Setp	-.-kPa		
This value indicates the actual setpoint on Pump Manager for actual absolute pressure			
Abs Press Setp iCM	50.0kPa	0.0kPa…300.0kPa	
This setting allows to send the setpoint for absolute pressure to Pump Manager from Local HMI on iCM			
Speed Abs Press Sp Ntwk	-.-kPa		
This value indicates the setpoint for absolute pressure to Pump Manager sent by BMS when iCM is in Control Source = Network			
Valve Opening	0%	0%...100%	
This value indicates the opening percentage of header bypass valve			
Ctrl Min Diff Press Unit	None	None, Active	
This value indicates that Minimum pressure drop has been reached by one of the Units and force opening of the header bypass Valve			
Flow	-.- l/s		
This value indicates the controlled sensor measurement on Pump Manager			
Act Setpoint	-.- l/s		
This value indicates the actual flow setpoint on Pump Manager			
Setp iCM	50.0 l/s	50.0l/s…300l/s	
This setting allows to send the flow setpoint for absolute pressure to Pump Manager from Local HMI on iCM			
Setp Network	-.- l/s		
This value indicates the flow setpoint to Pump Manager sent by BMS when iCM is in Control Source = Network			
Bypass Ctrl EWT	-.-°C		
This value indicates the controlled sensor measurement on Pump Manager			
Act Setpoint	-.-°C		
This value indicates the actual setpoint for bypass control entering water temperature on Pump Manager			
Setp iCM	7.0°C	4.0°C…30.0°C	

This setting allows to send the setpoint for bypass control entering water temperature to Pump Manager from Local HMI on iCM			
Setp Network	-.-°C		
This value indicates the setpoint for bypass control entering water temperature to Pump Manager sent by BMS when iCM is in Control Source = Network			
Elect Active Pwr	-.- kW		
This value indicates the Active Electrical Power consumption			

Table 22: Evaporator or Condenser Pump Manager Menu

Pump Speed Controlled sensor and related setpoint will display only if Speed Control is different from "Constant"

Header by-pass Valve controlled sensor and setpoint will display only if BypValve Control is different from "None"

Active Power value will display only if Energy Mtr is configured on Pump Manager

iCM can set the values of control functions of the Pump Manager.
The values chosen depend on "Control Source" setting of iCM Adv external controller.

- ***If "Control Source" is Local:***
  _Setpt iCM: Local setpoint on HMI of iCM external controller or Touch Panel, if it is configured, will be communicated to Pump Manager
- ***If "Control Source" is Network***
  _Setpt Ntwk: Writeable setpoint by BMS through Modbus or BACnet communication with iCM Adv external controller, that will be communicated by iCM to the Pump Manager

4.7 Cooling Tower Manager

This menu contains all the values communicated by the Cooling Tower Manager to iCM. Moreover, it contains the setpoint for Cooling tower management and Cooling tower speed control that iCM can set on the Condenser Pump Manager controller through Daikin Communication Network.

Description	Default	Range and function	AL
Status	Off:Auto	Off:Auto, On:Auto, Off:Local, Off:SensAlarm, On:SensAlarm, Off:CommErr, On:CommErr, Configuration, Off:ConfigAlarm	
This value indicated the Status of Pump Manager to iCM			
Op Sta	Off	Off, On	
This value indicates the operating state of Pump Manager			
Clear Alarm	None	None, Active	
This allows to clear the alarms related to Pump Manager			
Nr Run Tower	0%	0,…, 10	
This value indicates the number of running pump			
Next On	-	0,…, 10	
This is the elected next on cooling tower			
Next Off	-	0,…, 10	
This is the elected next off cooling tower			
LWT	-.-°C		
This value common leaving water temperature from cooling system			
Setp Reset Type	None	None, Toa, Twb	
This value indicates if leaving water temperature setpoint Reset function is enabled on Cooling tower controller and which type of reset is active: - None: Disabled - ToA: Reset based on Outside air temperature - Twb: Reset of LWT setpoint based on Web bulb temperature Setpoint Reset function affects the Actual Lwt Setpoint value			
Act Setpoint	-.-°C		
This value indicates the actual setpoint for Cooling tower manager for Tower Staging and Tower speed control			

Setp iCM	5°C		
This setting allows to send setpoint for Cooling Tower Manager from Local HMI on iCM			
Setp Network	-.-°C		
This value indicates the setpoint for Cooling Tower Manager sent by BMS to iCM Adv if it is in Control Source = Network			
Outside Air Temp	-.-°C		
This value indicates the outside air temperature read by Cooling Tower Manager			
Outside Relative Humidity	-.-%rH		
This value indicates the outside air relative humidity read by Cooling Tower Manager			
Outside Wet Bulb Temp	-.-°C		
This value indicates Wet bulb temperature based on Outside Air temperature and Relative Humidity calculated by Cooling Tower Manage			
Cooling Tower #: (# can be assume the value 1,…,10)			
Status	Off	Off, On, ManOn, ManOff, Alm, Test, N/Cfg	
This value indicated the actual tower operating status			
Fan Status	Off	Off, On, Manual On, Manual Off, Alarm, Test	
This value indicated the actual tower fan operating status			
Fan Speed	0%	0, …, 100%	
This shows the actual fan speed			
Inlet Valve Status	None	None, Cgfd	
This shows the actual inlet valve status			
LWT	-.-°C		
This shows the actual tower leaving water temperature			

Table 23: Cooling Tower Manager Menu

iCM can set the values of control functions of the Cooling Tower Manager.
The values chosen depend on "Control Source" setting of iCM Adv external controller.

- ***If "Control Source" is Local:***
  _Setpt iCM: Local setpoint on HMI of iCM external controller or Touch Panel, if it is configured will be communicated to Pump Manager
- ***If "Control Source" is Network***
  _Setpt Ntwk: Writeable setpoint by BMS through Modbus or BACnet communication with iCM Adv external controller, that will be communicated by iCM to the Cooling Tower Manager

This menu is available only if "ICT" is enabled and after reboot of controller

4.8 Secondary Pump Managers

This menu contains all the values communicated by the Secondar Pump Manager controller to iCM Adv External panel through Daikin Communication Network. Moreover, iSM controller communicates its own data and even the data of other two iSM controllers connected to it through Secondary Manager Network (Please refer to IOM of iSM). The menu contains all the relevant data from Secondary Managers.

Description	Default	Range and function	AL
Nr iSM Connected	0	0, 1, 2, 3, 4	
This shows the number of iCM connected. Each iSM is able to manage up to 4 pump groups			
Tot Cool Thrm Pwr	kW		
This shows the actual total cooling thermal power			
Tot Heat Thrm Pwr	kW		
This shows the actual total heating thermal power			
iSM01			
PG# Status	Off:Auto	Off:Auto, On:Auto, Off:Local, Off:SensAlarm, On:SensAlarm, Off:CommErr, ConfigStaus, Off, ConfigAlm, Test, Off:Remote, Off:Network	
This shows the Pump Group # actual operating status. # can be assume the value 1, 2, 3, 4			

iSM02
As iSM01
iSM03
As iSM01
iSM04
As iSM01

Table 24: Secondary Pump Managers Menu

This menu is available only if "ISM" is enabled and after reboot of controller

4.9 iCM Adv Settings

This section will describe the parameters to fine-tune the management of iCM Adv external panel.

This menu and submenus will display only on iCM Adv external panel.

Description	Default	Range and function	AL
Min Unit Run	1	0,…, Max Unit Run	4
This setting allows to define the minimum number of Units that will always run in the system.			
Max Unit Run	1	1,…,8	4
This setting allows to define the maximum number of Units that can be started by iCM.			
Ctrl Temp Type	Leaving	Leaving, Entering	4
This value indicates what temperature is used to stage up and down the Units: - Leaving: in this case the additional common water temperature sensor(s) is required - Entering: in this case the controlled temperature will be the average of the entering water temperature to the Units.			
Staging Temperature:			
Start DT Cool	2.5°Dc	0.5°Dc…5.0°Dc	4
This setting defines what is the delta temperature with setpoint to force a Unit stage up in Cool mode.			
Shut DT Cool	2.5°Dc	0.5°Dc…5.0°Dc	4
This setting defines what is the delta temperature with setpoint to force a Unit stage up in Cool mode.			
Start DT Heat	2.5°Dc	0.5°Dc…5.0°Dc	4
This setting defines what is the delta temperature with setpoint to force a Unit stage up in Heat mode.			
Shut DT Heat	1.5°Dc	0.5°Dc…5.0°Dc	4
This setting defines what is the delta temperature with setpoint to force a Unit stage up in Heat mode.			
Stage Dead Band	0.5°Dc	0.2°Dc…2.5°Dc	2
This setting defines what is the temperature range around the actual setpoint in which the system manager will not do staging actions or capacity control.			
Staging Timers:			
Act Stg Up Time	600s	60s…3600s	6
This value indicates what is the actual stage up time to start the Next On Unit. This is a calculated value.			
Max Stg Up Time	600s	60s…3600s	2
This setting defines what is the maximum delay between to Unit starts.			
Min Stg Up Time	300s	60s…3600s	2
This setting defines what is the minimum delay between to Unit starts.			
Start DT Err	3°Dc	0.5°Dc…5.0°Dc	2
This setting defines what is the error which corresponds to the minimum delay in a linear interpolation. The maximum delay is calculated at 0.0°C of error			
Act Stg Dwn Time	600s	60s…3600s	6
This value indicates what is the actual stage up time to start the Next Off Unit. This is a calculated value.			
Max Stg Dwn Time	600s	60s…3600s	2
This setting defines what is the maximum delay between Unit stops.			
Min Stg Dwn Time	300s	60s…3600s	2
This setting defines what is the minimum delay between Unit stops.			
Stop DT Err	3°Dc	0.5°Dc…5.0°Dc	2
This setting defines what is the error which corresponds to the minimum delay in a linear interpolation. The maximum delay is calculated at 0.0°C of error.			
Changeover Mngt	Disable	Disable, Enable	2
This allows to set the mode changeover management. This setpoint can be enabled and iCM will be able to change Operating mode of the connected unit			
Defrost Setting	▶		4

A link that will show a page with defrost settings			
Capacity Ctrl Setting	▶		4
A link that will show a page with capacity control settings			
Standby Setting	▶		4
A link that will show a page with standby settings			
Demand Limit Setting	▶		4
A link that will show a page with demand limit settings			
Unit # Setting	▶		4
A link that will show a page with Unit # settings. # can be assume the value 1,.., 8			

Table 25: iCM Setting Menu

4.9.1 iCM Setting: Defrost Setting

This section will describe the settings needed to configure the Defrost function.

This menu will display only if the unit is Heat Pump or Multipurpose.

Description	Default	Range and function	AL
Management	Disable	Disable, Enable	6
This shows if Defrost is managed by iCM.			
Defrost Wait Time	5 min	0,…, 10 min	6
This setting allows to set the defrost inhibition time. This setting defines the time that should expire since unit defrost demand before iCM allow the defrost on Unit			
Nr Not Alwd	1	0,…,8	6
This value indicates the number of units that are not allowed to Defrost.			

Table 26: Defrost Setting menu

4.9.2 iCM Setting: Capacity Control Setting

This section will describe the settings needed to configure the Capacity Control function.

Description	Default	Range and function	AL
Cap Ctrl Mngt	Disable	Disable, Enable	6
This allows to set if the Capacity Control is managed by iCM.			
Cap Ctrl Action	Fixed	Fixed, Regime	6
This setting specifies the type of load control: - Fixed: iCM will control the load/unload of the Unit since start-up of the system - Regime: iCM will control the load/unload of the Units until the system temperature is inside Stage for Load/Unload temperature range.			
Load Dwn Type	Hi Load	Hi Load, Lo Load, Next Off	2
This setting specifies the type of unload control: - Hi Load: the Unit with the higher capacity will be unloaded first - Lo Load: the Unit with the lower capacity will be unloaded first - Next Off: the elected Next Off Unit will be downloaded first			
Load Up Time	30 sec	5sec...600sec	2
This setting defines the wait time after each unit load before iCM swaps to another unit.			
Load Dwn Time	30 sec	5sec...600sec	2
This setting defines the wait time after each unit unload before iCM swaps to another unit.			
Delta Load	15%	0,…,100%	2
This setting defines the capacity step that the unit needs to perform during load or unload of compressors, after iCM swaps to another unit to load or unload.			
Sys Lwt DT Sp	5.0 °Cd	0.0,…,10.0°Cd	2
This setting defines the DT to apply to System Leaving Water Temperature when Entering temperature control is set.			

Table 27: Capacity Control Management Setting

4.9.3 iCM Setting: Standby Setting

This section will describe the settings needed to configure the standby function.

Description	Default	Range and function	AL
Unit Selection	No	No, Auto, Unit1, Unit2, Unit3, Unit4, Unit5, Unit6, Unit7, Unit8	2
This allows to select the unit that will go into standby.			
Type	Run Hours	Run Hours, Sequence	2

This setting is used to define how to select the standby Unit - Run Hours: the Unit with the higher number of run hours will be selected. - Sequence: the Unit with the next numeral id is selected. If the Unit in standby is the Slave 3 the next standby Unit will be Slave 4 and so on.			
Rot Days	7Day	1,…365 days	2
This setting is used to define after what number of days the standby Unit is rotated.			
Rot Time	00:00:00	00:00:00…23:59:59	2
This setting is used to define at what time of the day the standby Unit is rotated. This might be useful to command the rotation of the standby Unit when the system is off			
Rot Reset	Off	Off, Reset	2
This setting is used to reset the Standby Unit calculation. The elected Standby Unit will be re-defined if the reset is activated.			
Temp Comp En	No	No, Yes	2
This setting is used to activate the standby Unit for temperature compensation. If the active setpoint cannot be reached for multiple reasons different from a Unit alarm, the standby Unit can become operational and compensate the lack of capacity			
Temp Comp Time	120min	0min…600min	2
This setting is used to define the how long the system manager should wait before activating the standby Unit to compensate the lack of capacity.			
Temp Comp Dly Off	10min	0min…600min	
This allows to set the delay before set unit in standby when temperature compensation is no more needed			
Min Before Stanby Switch	1min	0min…600min	2
This allows to set the time in minute before the time switch			

Table 28: Standby chiller configuration

If the switch time is improperly set, the Standby Unit changeover may have an impact on the water temperature stability. Please, check with the plant Manager if there are specific limitations on the changeover time (i.e. process applications).

4.9.4 iCM Setting: Demand Limit Setting

This section will describe the settings needed to configure the standby function.

Description	Default	Range and function	AL
Type	Unit	Unit, Sys	2
This allows to select the Demand Limit type.			
Delta	3%	0,…,20%	2
This allows to set the demand limit hysteresis value			

Table 29: Demand Limit Setting

4.9.5 iCM Setting: Heat Recovery Setting

This section will describe the settings needed to configure the Heat Recovery function.

Description	Default	Range and function	AL
Management	Disable	Disable, Enable	2
This allows to select if Heat Recover is managed by iCM.			
Max Unit Run	1	1,…,8	2
This setting specified the maximum number of Units with activated Heat Recovery. After reaching up this number, iCM will stop activating heat recovery function on other units.			
Stage Up Time	15 min	1,…,60 min	2
This setting defines the stage delay between any heat recovery activation commanded by the iCM.			

Table 30: Heat Recovery Setting

4.9.6 iCM Setting: Free Cooling Setting

This section will describe the settings needed to configure the Free Cooling function.

Description	Default	Range and function	AL
Management	Disable	Disable, Enable	2
This allows to select if Free Cooling is managed by iCM.			
Max Unit Run	1	1,…,8	2

This setting specified the maximum number of Units with activated Free Cooling. After reaching up this number, iCM will stop activating heat recovery function on other units.			
High Threshold	90%	0%,…,100%	2
This setting represents the capacity threshold of the running units with activated free-cooling to be exceeded to allow the changeover from Free-cooling to Mix Mode or from Mix Mode to Mechanical.			
FC Approch	10.0°Dc	0.0°C,…,20.0°C	2
setting represents the minimum delta temperature between System Actual setpoint and Outside air temperature to activate the Free Cooling at system level.			
Changeover DT	1.5°C	0.5°C…2.5°C	2
This setting represents the DT from System actual setpoint to be exceeded to allow the changeover from Free-cooling to Mix mode or from Mix Mode to Mechanical			
Changeover Delay	15min	1min…60min	2
This setting represents the delay after each Free-cooling mode changeover that must expire before allowing the changeover of another unit.			
OaT Limit	24.0°C	10.0°C…30.0°C	2
This setting represents the outside air temperature limit for Hydronic Free Cooling enable condition			

Table 31: Free Cooling Setting

4.9.7 iCM Setting: Unit # Settings

This section will describe the settings needed to configure the Unit #.
can be assume the value 1,2,3,4,5,6,7,8.

Description	Default	Range and function	AL
Priority	1	1,…, 4	
These settings are used to define the individual Unit priority when operating in cooling mode. If properly set, they will allow Units grouping.			
Priority Heat	1%	1,…, 4	
These settings are used to define the individual Unit priority when operating in heating mode. If properly set, they will allow Units grouping.			
Stg Dwn Thresh	80%	0%…Stg Up Thresh	
These settings are used to set the individual stage down thresholds on each Unit in cool mode. This threshold is used for staging down the Units and, if properly set, can let the iCM achieve an improved system efficiency			
Stg Dwn Thresh Heat	80%	0%…Stg Up Thresh Heat	
These settings are used to set the individual stage down thresholds on each Unit in heat mode. This threshold is used for staging down the Units and, if properly set, can let the iCM achieve an improved system efficiency			
Stg Up Thresh	30%	Stg Dwn Thresh…100%	
These settings are used to set the individual stage up thresholds on each Unit in cool mode. This threshold is used for staging up the Units and, if properly set, can let the iCM achieve an improved system efficiency			
Stg Up Thresh Heat	30%	Stg Dwn Thresh Heat…100%	
These settings are used to set the individual stage up thresholds on each Unit in heat mode. This threshold is used for staging up the Units and, if properly set, can let the iCM achieve an improved system efficiency			

Table 32: Unit # configuration

4.10 iCM Adv Maintenance

This section will describe the parameters accessible in the Maintenance page.

Description	Default	Range and function	AL
Discon Sept	No	No, Yes	
This allows to disconnect the iCM Adv Slaves from control of iCM Adv			
Evap Backup Speed	50%	0, …, 100%	
This allows to set the backup speed and it displays only if “Configuration→Evap Ctrl Type”=VPF or VarDT			
Evap Fix Standby Speed	50%	0, …, 100%	
This allows to set the backup speed and it displays only if “Configuration→Evap Ctrl Type”=Fixed			
Cond Backup Speed	50%	0, …, 100%	
This allows to set the backup speed and it displays only if “Configuration→Evap Ctrl Type”=VPF or VarDT			
Cond Fix Standby Speed	50%	0, …, 100%	
This allows to set the backup speed and it displays only if “Configuration→Evap Ctrl Type”=Fixed			
Max Heat LWT	50°C	20°C… 50°C	
This allows to set the maximum heat leaving water temperature setpoint			
Freeze Limit	4°C	-20°C… 6°C	
This allows to set the freeze limit			
Cmn LWT Ofs	0dK	-5dK… 5dK	
This allows to set the common leaving water temperature offset in cool mode			

Cmn EWT Ofs	0dK	-5dK… 5dK	
This allows to set the common entering water temperature offset in cool mode			
Cmn Heat LWT Ofs	0dK	-5dK… 5dK	
This allows to set the common leaving water temperature offset in heat mode			
Cmn Heat EWT Ofs	0dK	-5dK… 5dK	
This allows to set the common entering water temperature offset in heat mode			
Com Err Delay	5s	0s…300s	
This allows to set the communication error delay between iCM Adv external panel and iCM Adv Slaves			
Alarm Self Timer	5s	0s…300s	
This allows to set the timer for all the self-release alarm			

Table 33: iCM Maintenance menu

In the above menu only Discon Sept, Com Err Delay, Alarm Self Timer are displayed for iCM Adv Slaves

4.10.1.1 Backup Speed and Fixed Stand-by Speed

The value of Back-up speed will be used in the following situation:

1. An alarm occurs on the Controlled sensor (Field Differential Pressure sensor or System Temperature Sensor) connected to iCM Adv external panel.
2. Exchanger side is not controlled as Primary Side of the Water-Cooled Plant-room, according to System Mode setpoint
   - In Cool mode: Primary exchanger is evaporator side and calculated speed is used; whereas Condenser side is commanded with “Back-up Speed”
   - In Heat mode: Primary exchanger is condenser side and calculated speed is used; whereas Evaporator side is commanded with “Back-up Speed”

The value of Fixed Stand-by Speed will be used in the following situation:

- When system is in Wait for Load state, the Fixed Stand-by Speed will be communicated on the first iCM Adv Slave ready to start.

4.10.1.2 Disconnection from iCM Adv external panel

Through this setting, each iCM Adv Slave can be disconnected from management of iCM Adv external panel. Consequently, the iCM Adv Slave will assume the “Standalone”.
If Discon Setp is set on iCM Adv external panel, all the iCM Adv Slave will run in “Standalone” mode and they should be managed by respective HMI.

4.11 Configuration

This section will describe the parameters accessible in the Configuration page. This page contains the main system configuration.

Description	Default	Range and function	AL
Apply Changes	No	No, Yes	
This allows the controller reboot. This is required for saving parameters after they have been changed			
MUSE Enable	Off	Off, On	
This allows to enable the MUSE option. It is NOT an iCM Adv option.			
Config MUSE	▶		
A link that will show a page with data configuration related to MUSE. It is NOT an iCM Adv option.			
iCM Option Type	iCMAdv	iCMStd, iCMAdv	
This shows the iCM Option Type. In iCM Advanced configuration iCMAdv is required.			
iCM Adv Adr	iCMAdv	iCMAdv, Master, Slave1, Slave2, Slave3, Slave4, Slave5, Slave6, Slave7, Slave 8	
This allows to set the iCM Address. In Advanced configuration is not possible to set Master address. iCMAdv address is required for iCM Adv external controller			
Config iCM	▶		
A link that will show a page with data configuration and data visualization related to iCM			
Config Dedic Pump	▶		
A link that will show a page with data configuration related to the dedicated pumps			
Config iPumpManagers	▶		
A link that will show a page with data configuration and data visualization related to iPM			
Touch Panel	N/Cfg	N/Cfg, Cfg	

This allows to configure the external touch panel

Table 34: Configuration menu

4.11.1 iCM Configuration

This section will describe the parameters accessible in iCM configuration page.

Description	Default	Range and function	AL
Nr of Units	0	0,…,8	
This allows to set the number of connected units			
Sys Temp Sens Type	None	None, NTC10K, PT1000	
This allows to set the temperature sensor type			
Plant Layout	2pipe	2pipe, 4pipe	
This allows to set the plant layout			
Plant Type	Undef	Undef, OnlyCO, OnlyHP, CO-HP, Only4Z, 4Z-CO, 4Z-HP, MixUnit	
A link that will show on one page the type of each connected unit.			
Alarm Reason	None	None, ModeErr, ComprErr, CondErr, UndefErr, iCMOptErr, PltErr	
This shows the configuration alarm reason. For more details see the troubleshooting section.			
Heat Rec config	N/Cfg	N/Cfg, Cfgd	
This shows the system Heat Recovery configuration option.			
Free Rec config	N/Cfg	N/Cfg, Cfgd	
This shows the system Free Cooling configuration option.			
Energy Mon config	N/Cfg	N/Cfg, Cfgd	
This shows the system Energy Monitoring configuration option.			
Pwr Mngt config	N/Cfg	N/Cfg, Cfgd	
This shows the system Power Management configuration option.			

Table 35: iCM configuration menu

4.11.1.1 iCM Configuration – Plant Type

This page will show the type of each connected unit.

Description	Default	Range and function	AL
Unit Type #	Undef	Undef, OnlyCO, OnlyHP, CO-HP, Only4Z, 4Z-CO, 4Z-HP, MixUnit	
iCM Adv option allows only "Undef", "OnlyCO", "OnlyHP", "CO-HP" unit type. # can assume the value between 1 and 8.			

Table 36: Units type menu

4.11.2 Dedicated Pump Control Configuration

This section will describe the parameters accessible in the Dedicated Pump Control configuration page.

Description	Default	Range and function	AL
Evap Ctrl Type	On-Off	On-Off, FixSpd, VPF, VarDT	
This allows to select the evaporator speed control type: - On-Off: Pump Speed Control is disabled and not managed by iCM Adv - FixSpd: Pump Speed Control is a fixed value management - VPF: Pump Speed Control is Variable Primary Flow and based on Field Differential pressure control - VarDT: Pump Speed Control is Variable Primary and based on Difference between System Leaving and Entering Water Temperature Control			
Evap Diff Prs Hw Type	None	None, 0-10V, 4-20mA	
This allows to select the evaporator differential pressure sensor hardware input type. This value can be selected only if Evap Ctrl Type=VPF			
Cond Ctrl Type	On-Off	On-Off, FixSpd, VPF, VarDT	
This allows to select the condenser differential pressure hardware type			
Cond Diff Prs Hw Type	None	None, 0-10V, 4-20mA	
This allows to select the condenser speed control type			

Table 37: Dedicated Pump Control configuration menu

4.11.3 Pump Manager Configuration

This section will describe the parameters accessible in the Pump Manger configuration page.

Configuration of Intelligent Pump Managers is allowed only on iCM Adv panel

Description	Default	Range and function	AL
Evap PM Enable	No	No, Yes	
This allows to enable the communication on evaporator pump manager			
Nr of Pumps	0	0…10	
Number of evaporator pumps configured and managed by Pump Manager			
Speed Ctrl Type	None	None, MinDiffOress, Flow, Ewt	
This value indicates which kind of sensor is used by evaporator Pump Manager to control speed of the pumps			
Valve Ctrl Type	None	None, MinDiffPress, Flow, Ewt	
This parameter specifies which kind of sensor is used by Pump Manager to control opening of Headers Bypass Valve			
Cond PM Enable	No	No, Yes	
This allows to enable the condenser pump manager			
Nr of Pumps	0	0…10	
Number of condenser pumps configured and managed by Pump Manager			
Speed Ctrl Type	None	None, MinDiffOress, Flow, Ewt	
This value indicates which kind of sensor is used by condenser Pump Manager to control speed of the pumps			
Valve Ctrl Type	None	None, MinDiffPress, Flow, Ewt	
This parameter specifies which kind of sensor is used by Pump Manager to control opening of Headers Bypass Valve			
iCT Enable	No	No, Yes	
This allows to enable the cooling tower manager			
Nr of Towers	0	0…10	
Number of cooling tower configured and managed by Cooling Tower Manager			
Inlet Valve En	None	None, Cfgd	
This value indicates each Cooling tower has installed an inlet shut-off valve			
Fan Type	CSD	CSD, VFD	
This value indicates which kind of Cooling tower fan driver is configured on Cooling Tower			
iSM Enable	No	No, Yes	
This allows to enable the secondary pump manager			
iSM0# Nr Group	0	0…4	
This value indicates the number of Pump Groups managed by iSM panel. # can assumes the value from 0 to 3			

Table 38: Pump Managers configuration menu

Evap/Cond menu is available only if "Evap PM Enable or Cond PM Enable" is enabled. Reboot of controller is needed.

iCT menu is available only if "iCT Enable" is enabled. Reboot of controller is needed.

iSM menu is available only if "iSM Enable" is enabled. Reboot of controller is needed.

4.12 Controller Setup

This section will describe the parameters accessible in the Controller Setup page. It will also describe the links to other sub-sections.

Description	Default	Range and function	AL
Ip-Config	▶		
A link that will show a page with IP configuration			
DoS - Cloud Set Up	▶		
A link that will show a page with Daikin on Site configuration			
Inbuilt RS485:	ModbusRS485	ModbusRS485, BACnetMSTP	
This allows to select inbuilt communication option between ModbusRS485 and BACnetMSTP			
BACnet Embed	▶		
A link that will show a page with BACnet embedded configuration			
MODbus Embed	▶		
A link that will show a page with MODbus embedded configuration			
BACnet IP module	▶		
A link that will show a page with BACnet IP module configuration			
Save/load	▶		

A link that will show a page with data related memory

Table 39: Controller Setup menu

4.12.1 IP Configuration

This section will describe the parameters accessible IP Configuration page.

Description	Default	Range and function	AL
DHCP	Passive	Passive, Active	4
This allows to enable DCHP			
IP address	___.___.___.___		4
This allows to set the IP address			
Subnet mask	___.___.___.___		4
This allows to set the subnet mask			
Default gateway	___.___.___.___		4
This allows to set the default gateway			
Preferred DNS server	___.___.___.___		4
This allows to set the preferred DNS server			
Alternate DNS server	___.___.___.___		4
This allows to set the alternative DNS server			
Host name	POL688_******		4
This shows the host name			
MAC address	_		4
This shows the MAC address			
Link	Active	Disable, Active	4
This shows the actual IP link state			
100MBit	Active	Disable, Active	4
Restart	None	None, Execute	4
The controller reboot is required after values modification			

Table 40: IP configuration menu

4.12.2 DoS – Cloud Set Up

This section will describe the parameters accessible Daikin on Site – Cloud Configuration page.

Description	Default	Range and function	AL
Enable	Disabled	Disabled, Enabled	
This allows to enable Daikin on Site			
Serial Number	-		
This shows the serial number			
Activation Key	-		
This shows the activation key			
Communication	-		
This shows the communication state			
Cloud server	-		
This shows the cloud server state			
Upgrade allowed	Wait	Wait, Yes, No	
This allows to set the upgrade			
Upgrade request	-		
This shows the request of upgrade			

Table 41: DoS setup menu

4.12.3 BACnet Embedded

This section will describe the BACnet embedded parameters accessible in the follow page.

Description	Default	Range and function	AL
Application state	-		
This shows the application state			
Device Name	-		4
Thos allows to set the device name			
Device ID	-		4
Thos allows to set the device ID			
BACnet TCP/IP	Passive	Passive, Active	4
This allows to set the BACnet TCP/IP			
Port	-		4

This allows to set the BACnet number port			
RS485:2	Passive	Passive, Active	4
This allows to enable RS485:2			
MSTP-Address	255		4
This allows to set the MSTP address			
Baud Rate	76800		4
This allows to set the baud rate value			
Max Master	127		4
This allows to set the maximum master value			
Max Info Frames	10		4
This allows to set de maximum value of information frame			
Imperial Unit sys	OK	OK, Init, NoActivePort, StacErr, Term, NoLic	4
This allows to select the imperial unit system			
Restart	Passive	Passive, Active	4
The controller reboot is required after values modification			

Table 42: BACnet embedded menu

4.12.4 MODbus Embedded

This section will describe the MODbus embedded parameters accessible in the follow page.

Description	Default	Range and function	AL
Address	22		4
This allows to set the address			
RS485:2			
Baud Rate	19200	4800, 9600, 19200, 38400	4
This allows to set the baud rate			
Parity	None	None, Even, Odd	4
This allows to select the parity bit			
Two StopBits	Yes	Yes, No	4
This allows to select the stop bits			
Delay [ms]	100ms		4
This allows to select the delay time in ms			
Modbus IP config	Disable	Disable, Enable	4
This allows to set the Modbus IP configuration			
Restart	Passive	Passive, Active	4
The controller reboot is required after values modification			

Table 43: MODbus embedded menu

4.12.5 BACnet IP module

This section will describe the BACnet IP module parameters accessible in the follow page.

Description	Default	Range and function	AL
State	-		4
This shows the state value			
BACnet:			
Device name	-		4
This allows to set de device name			
Device ID	-		4
This allows to set de device ID			
Port	-		4
This allows to set the BACnet number port			
Host name	-		4
This allows to set the host name			
Link	Passive	Passive, Active	4
This shows the actual IP link state			
DHCP	Passive	Passive, Active	4
This allows to enable DHCP option			
Actual IP address	___.___.___.___		4
This shows actual IP address			
Actual subnet mask	___.___.___.___		4
This shows the actual subnet mask			

Actual Default gateway	___.___.___.___		4
This shows the actual default gateway			
Restart	Passive	Passive, Active	4
The controller reboot is required after values modification			

Table 44: BACnet IP module menu

4.12.6 Save/Load

This section will describe the Save/Load page.

Description	Default	Range and function	AL
SD-Card	NoCard	NoCard, Card	4
This shows if the SD card is inserted			
Config save to SD	Passive	Passive, Active	4
This allows to Save the configuration in SD card			
Config load to SD	Passive	Passive, Active	4
This allows to load the configuration from SD card			

Table 45: Save-Load menu

4.13 Controller Info

This section will describe the Controller Info page.

Description	Default	Range and function	AL
Application Info	-		6
This shows the application name			
Version	-		6
This shows the version number			
Application			
Plant Info	-		4
This allows to set the plant information			
Target ID	-		6
This shows the target ID			
BSP version	-		6
This shows the BSP version			

Table 46: Controller Info menu

5 SYSTEM COMMISSIONING

This section explains how the iCM Adv shall be configured and set to provide proper control of the system. The purpose would be to provide a guideline that, starting from some example, can help to extend the same operations to any plant covered by the iCM Adv.

Before starting to read the following, it's strongly suggested to read the HMI description to get familiarity with some terminology and choices.

5.1 How to configure the iCM Adv

Configuration parameters are available in

➔ *Main Menu → Configuration.*

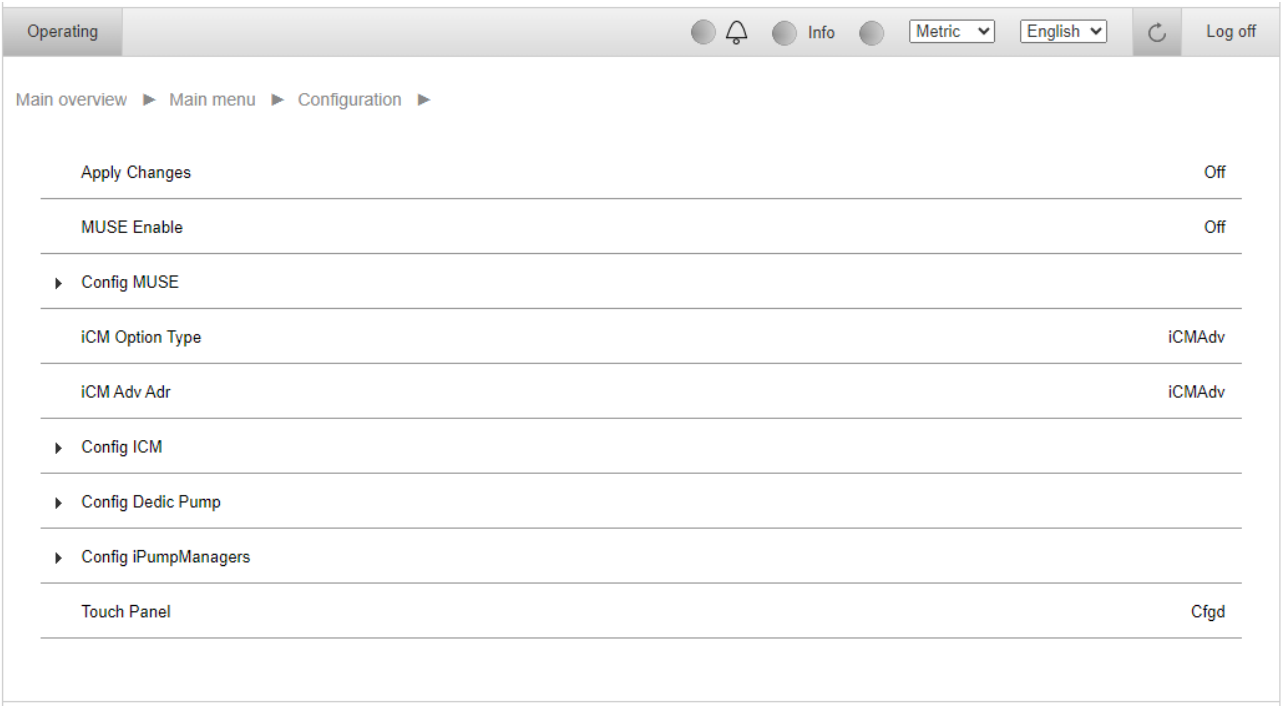

Figure 18: Configuration menu

The configuration can be resumed in the following steps:

1. Configuration of iCM Adv
2. Configuration of Dedicated Pump Control
3. Configuration of intelligent Pump Managers

5.1.1 Configuring iCM

First operation is to set the iCM Adv Adr = iCMAdv.

It is highly recommended to configure at first the iCM Adv Slaves and at last the iCM Adv external controller.

➔ Configuration → Config iCM

Allows to set the number of Daikin Units i.e number of slaves to be managed in the plant-room, the system temperature sensor type and the Plant Type configuration.
In the below example the system is configured with 5 Daikin Unit in a 4pipe Plant and with NTC10K temperature sensor.

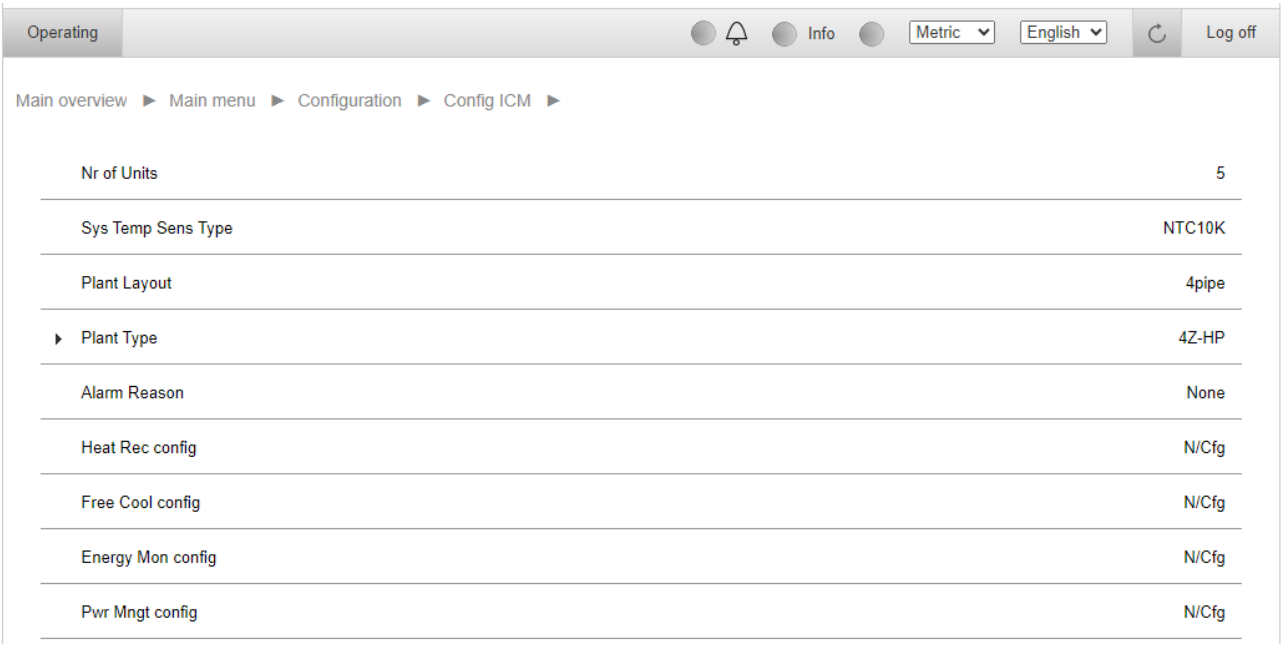

Figure 19: Main Menu → Configuration → Config iCM

5.1.1.1 Configuration Check

Once iCM Adv external panel is configured, the parameter "Plant Type" gives some indication about the plant type. Inside menu

➔ *Main Menu → Configuration → Config ICM → Plant Type*

the user can have an overview of the iCM Adv configuration type.

Unit Type	Description
Undef	Slave is not coomunicating
OnlyCO	AirCooled Chiller units
OnlyHP	AirCooled Heat Pump units with set "Avail Mode" = Cool/Heat
CO-HP	AirCooled Chillers and AirCooled Heat Pumps with set "Avail Mode" = Cool/Heat
Only4Z	AirCooled Multipurpose units
4Z-CO	AirCooled Multipurpose units and AirCooled Chillers
4Z-HP	AirCooled Chillers and AirCooled Multipurpose units
MixUnit	Multupurpose units, AirCooled Chillers, AirCooled Heat Pump

Table 47 Unit Types

If communication errors between and Slaves occur, network between controllers is not properly installed. Before keeping on configuring system, all communication issues MUST be solved.

if "Plant Type" or at least one "Units: Type" is Undef, ConfigurationAlarm is raised by iCM Adv external controller.
Reset of iCM Adv external controller is needed before keeping on configuration.

5.1.1.2 iCM configuration Error Alarm

As explained, iCM Adv external panel detects the "Unit Type" of connected iCM Adv Slaves and consequently define the "Plant Type". If configuration of the plant type is not supported as explained in the first Chapter, iCM Adv external controller raises a "Configuration Alarm" in the menu "Alarming"
The reason of this "ConfigAlarm" can be found in menu

➔ *Main Menu → Configuration → Config ICM → Alarm Reason*

If Configuration Alarm is raised, iCM logic cannot be started.

5.1.2 Configuring Dedicated Pump Speed Control

In system where is requested variable flow, user can configure this control function on iCM Adv external controller for the Evaporator and Condenser side of the plant-room through the following menu:

➔ *Main Menu → Configuration → Config Dedic Pump → Speed Ctrl*

Operator can select the kind of Speed Control:

1) Fixed Speed
2) Variable Primary Flow Only: based on System differential pressure
3) Variable Primary- Variable secondary: Based on difference between System LWT and System EWT

When Speed Control is set to "VPF", control of bypass valve (to be installed on the bypass between the main headers) is automatically activate.
By-Pass Valve and power supply are NOT provided by Factory.

5.1.3 Configuring Pump Managers

It is possible assign the management of pumps and cooling towers to the pump manager and cooling tower manager, respectively.
In the manifolded system iCM Adv panel should be connected to the Pump Managers external panels.
Once the connection with the external panels is established, the operator need to configure the respective manager in the following menu:

➔ *Main Menu → Configuration → Config iPumpManager*

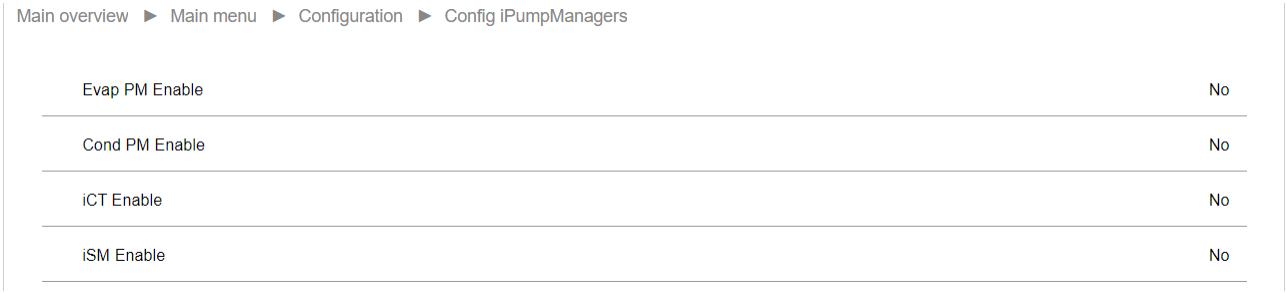

Figure 20: iPump Managers configuration menu

After a configuration with the Pump Managers, controller reboot is required.

After controller reboot iCM will shows the configuration data communicated by the Pump Managers:

1. *Number of pumps*
2. *Speed control type*
3. *Valve control type*
4. *Configure the Energy Meter*

For possible configurations refer to the section 4.11.3

After controller reboot iCM will shows the configuration data communicated by the Cooling Tower Manager:

1. *Number of Towers*
2. *Inlet valve enable*
3. *Fan type*

For possible configurations refer to the section 4.11.3

After controller reboot iCM will shows the configuration data communicated by the Secondary Manager:

1. iSM01 Number of Pump Group
2. iSM02 Number of Pump Group
3. iSM03 Number of Pump Group

5.2 How to setup the Management Settings

The Main Menu contains the submenu to set management parameters of:

➔ *Main Menu → iCM Setting* to manage the iCM Adv or the connected Daikin units.

Min Unit Run	1
Max Unit Run	5
Ctrl Temp Type	Leaving
Staging Temperature:	
>Start DT Cool	2.5°Cd
>Shut DT Cool	1.5°Cd
>Stage Dead Band	0.5°Cd
Staging Timers:	
Act Stg Up Time	600s
>Max Stg Up Time	600s
>Min Stg Up Time	60s
>Start DT Err	3.0°Cd
Act Stg Dwn Time	60s
>Max Stg Dwn Time	600s
>Min Stg Dwn Time	60s
>Stop DT Err	3.0°Cd

Figure 21: iCM Setting menu

5.2.1 Priority

iCM Adv allows to set Units individual priorities.
Units with the same priority are sequenced only looking to run hours and starts.
Setting different priority, user is deciding a fixed sequence.
By default, all the priorities are set to 1 so all the Units are sequenced to balance run hours and starts.

Changing the priorities will have an impact on the balancing of the run hours. Different priorities will be available for cool and heat mode.

5.2.2 Min and Max Run Units

Min and Max Run Units are used to define the minimum and maximum number of Units that can run.
With Min Run Units is possible to define a number of Units that will be always running. This can be useful in case of process application where part of the system load is fixed. In this case the iCM will always keep this number of Units enabled.
Operator cannot be set which units will be kept enabled, but they depend on sequencing function (at the start up the Next On Units; at system low demand the running Next Off Units)
The Max Run Units defines the maximum number of Units that can run at the same time. With this setting is possible to define a number of Units as backup of the others whose are started in case of alarm. For example, in a system of 6 Units this setting can be set to 5. These 5 Units will be started following the sequence function among the available 6 units. If one Unit fails, the logic will start the 6th Unit to integrate the capacity request.

Figure 22: Max number of Units running equal 5

5.2.3 Controlled Temperatures

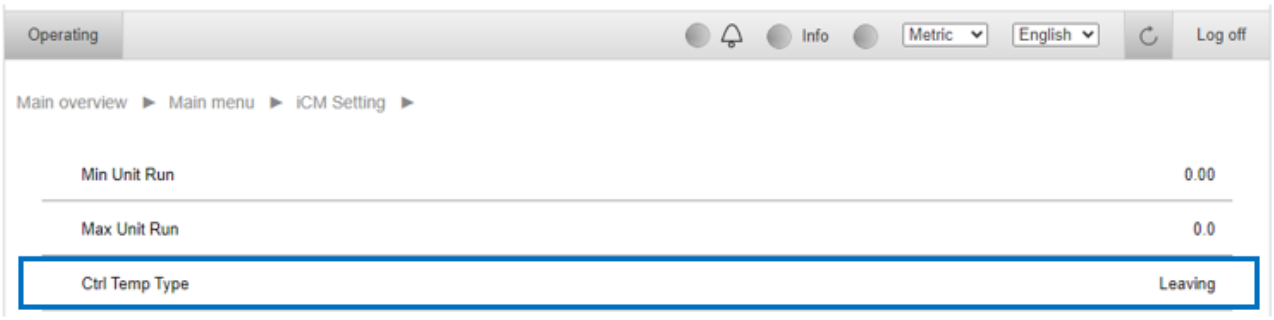

Figure 23: Selection of the controlled temperature

The selection of the controlled temperature affects the Unit Staging function.
The decision between leaving and entering is mainly related to the application of the system. Leaving control tries to deliver exactly the temperature requested by the customer on supply header.
On the other hand, with Entering control, iCM performs the staging of the unit to satisfy the water temperature setpoint on return pipe. In this case water temperature of supply header is not take in consideration and it can be higher or lower than default leaving water temperature setpoint of individual Unit.

Entering Water temperature control is not available in the following case:

- ***Four-pipe plant-room***
- ***Free-cooling option on units***

5.2.4 Staging Settings

Staging Settings affect the staging functions in different ways:

1. Staging Thresholds determine the behaviour of Staging for Capacity Range
2. Staging Differential temperatures determines the behaviour of Staging when the deviation between Common LWT setpoints is too wide
3. Staging delays are used by iCM logic to stabilize the behaviour of staging function to changes in the system demand.

The following picture shows how the settings of Staging Thresholds, Staging Delta temperature, Staging Delays affects iCM Staging function:

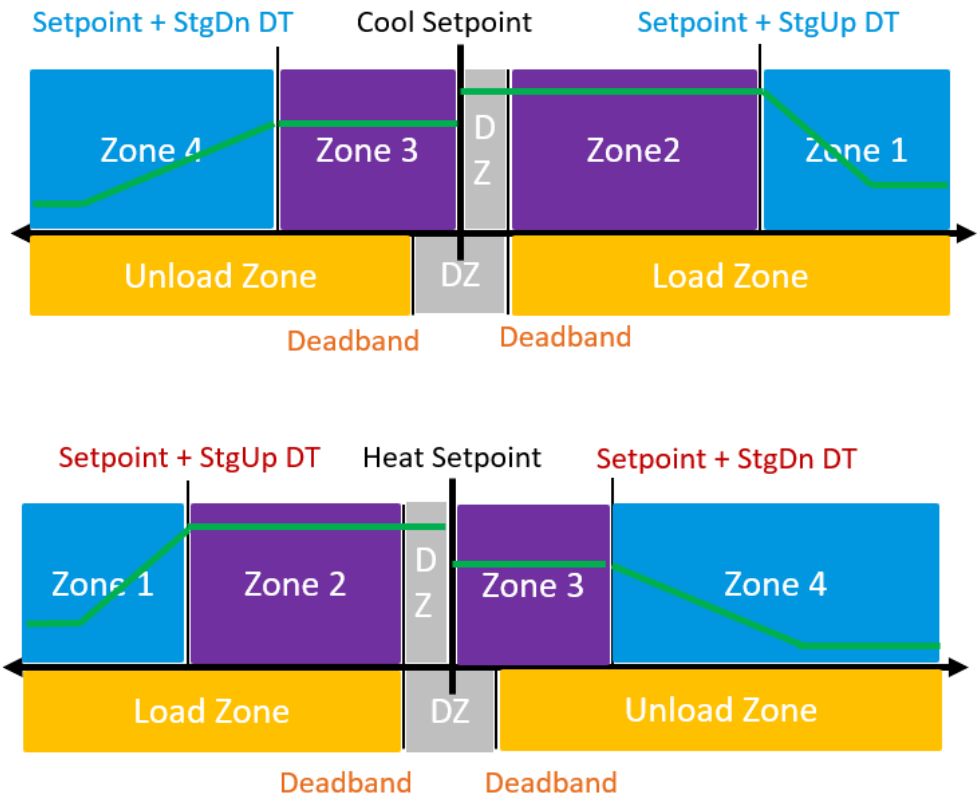

Figure 24 – iCM Staging Setting effects

In zone 2 and 3, Staging on Capacity Range is active; in zone 1 and 4 Staging on temperature takes over the staging on Capacity Range. Outside the Dead zone around the setpoint, Unit Capacity control is working.

Thresholds are chosen after a process of fine tuning: during iCM commissioning, service engineer needs to test the response of the iCM to system load request and consequently refine the values.

The following picture shows how the setting of Staging Delta temperature and Staging Delays affects the Staging and Mode Control functions in four-pipe system:

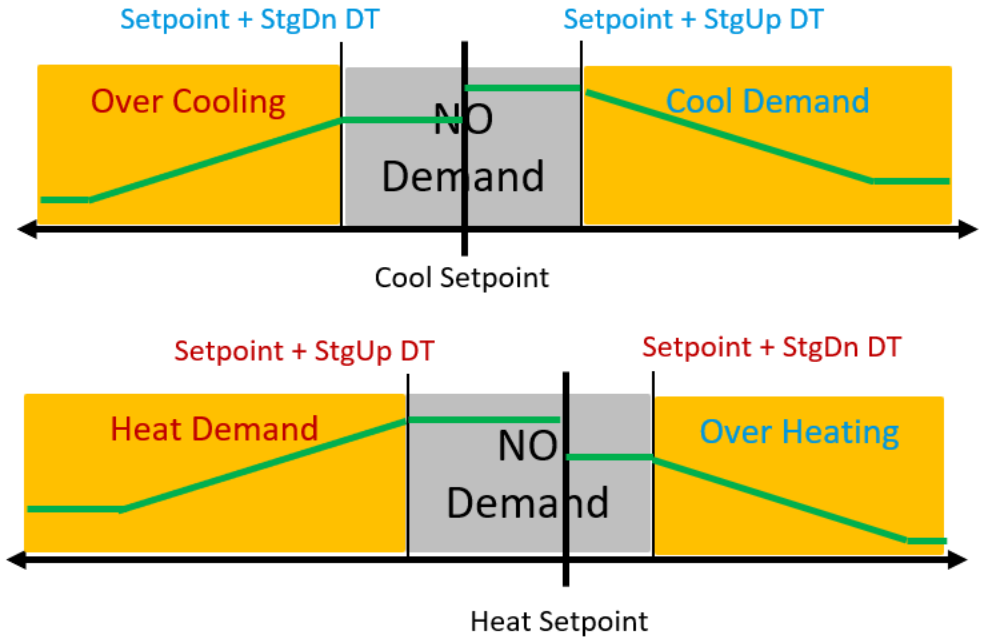

Figure 25 Staging Setting effects in four pipe Plant room

The comparison between the cool and heat demand determines the Start/stop of a unit or a Changeover mode of AC heat pump or circuit of a multipurpose or the enable/disable of heat recovery function of AC Chiller

Thresholds are chosen after a process of fine tuning: during iCM commissioning, service engineer needs to test the response of the iCM to system load request and consequently refine the values.

5.2.5 Staging on Capacity Thresholds (only in Two-Pipe Plant-room)

The staging Up and Down Thresholds define the management of the start and stop strategy of the Units and, if Unit Load control function is enabled, the management of load up and load down range of the Units.
Before proceeding it's very important that what explained in paragraph **Errore. L'origine riferimento non è stata trovata.** has been fully understood.

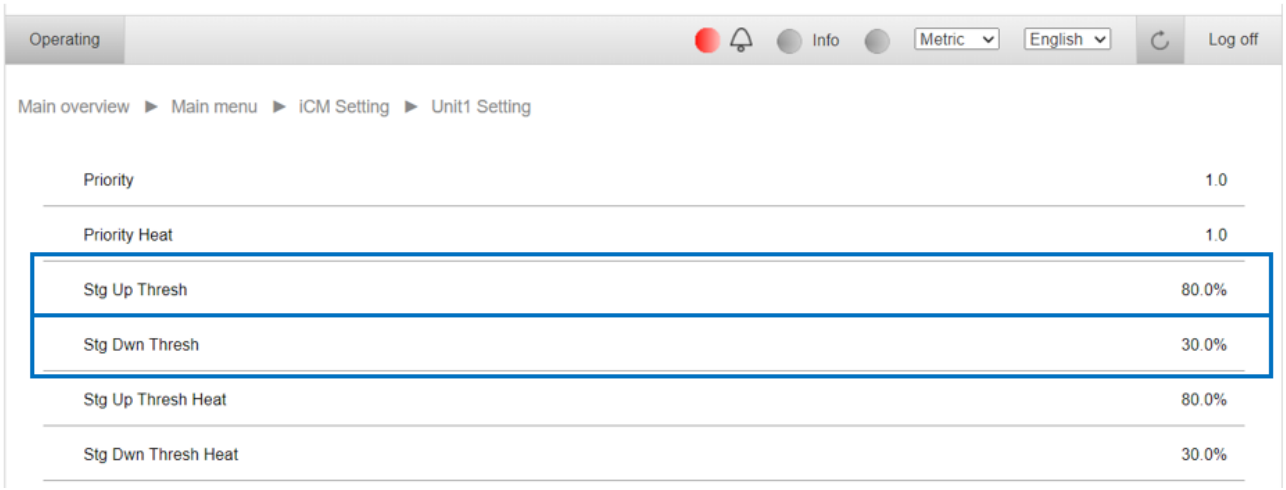

Figure 26: Staging thresholds

Selection of optimal Staging thresholds depends on several factors: number and size of Unit, type of compressor, etc.
In general, Stage Up and Stage down thresholds are set in order to make the Unit work inside a capacity range in which the specific Unit has the higher efficiency.
For example, in case of Units with Non-Inverter screw compressor Stage up should be set about 80%, whereas in case of Units with Inverter Screw compressor these thresholds should be set about 60%. Moreover, it is worth noting that the lower is staging up threshold, the higher will be the number of started Units, leading to a partial load sharing, whereas the higher is the staging up threshold, the lower will be the number of started Units, leading to a full load step staging.

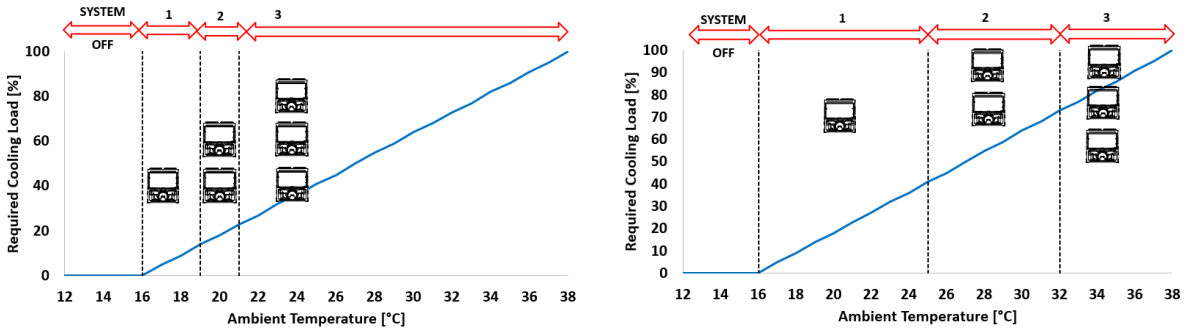

Figure 27 Load Sharing VS Minimum running Units

It's important to consider that the overall system efficiency is not only achieved letting the Units work in their best efficiency range, but it depends on other systems that have electrical consumption and own efficiency that shall be considered.
For example, in system with dedicated fixed speed pumps, starting an additional Unit leads to start one additional pump and consequently to an increase of power consumption. On the other hand, with a VFD pump, each start-up will correspond to a speed increase with a smaller increase in power consumption compared with fixed speed.
Concerning the stage down capacity thresholds, this determines when a running Unit must be stopped: the higher is the value, the smaller is the number of running Unit, whereas the lower is the value, the larger will be the number of running Units at partial load. For example, with Non-VFD screw Unit, Stage Down Threshold can be set about 40%, whereas with VFD screw Unit, the threshold can be set about 30% to enhance the load sharing.
Moreover, it is worth noting that this parameter has an impact on the setpoint stability. In fact, a too high value (for example above 50%) can lead to an anticipated shut-down of a running Unit and it can force iCM to load up the remaining running Units to compensate the requested system load and even to start again another stopped Unit. That can cause a fluctuation of leaving water temperature and unnecessary start and stop of the Units.

For example, in case of process application, to decide how to set the stage down thresholds, note down the minimum capacity percentage of each Unit and use this value to configure the thresholds. This will permit the iCM to unload the Units down to the minimum and have a smoother effect on the water stability. In case of process application, it might be also suggested to use the Next Off load control.
The thresholds are available for both cooling and heating.

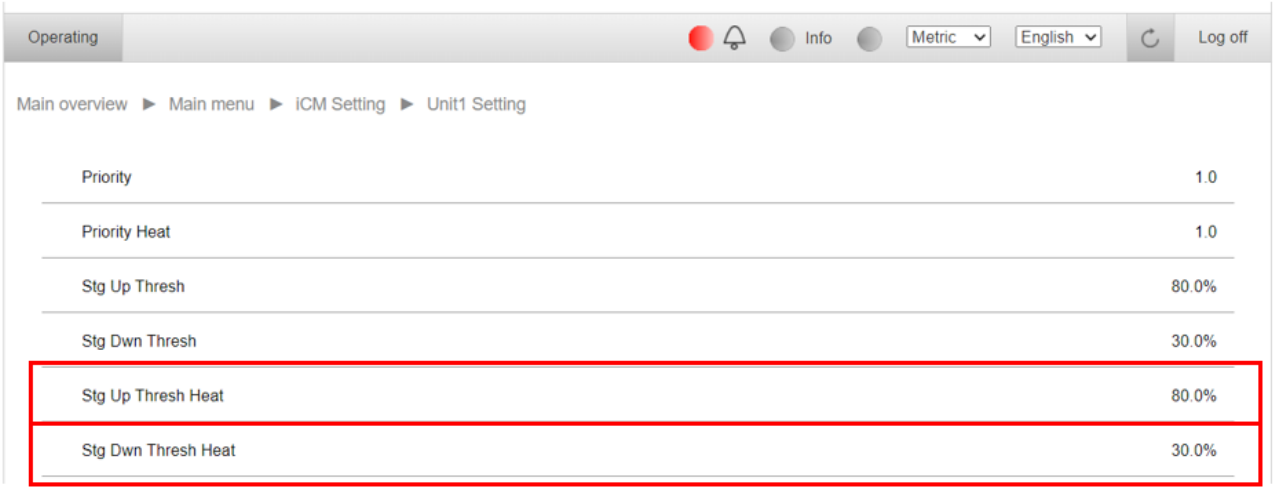

Figure 28: Staging thresholds for heat

In heating it can be convenient to have more Units at part load because this may mean less defrosts over time. So, it is better to set a lower capacity range.
Moreover, the Stage up and down threshold has an impact on the Load Control. In fact, iCM will load up each running Unit up to stage up threshold. So, a too low Stage up threshold will force the system to start all the Units and reach the stage up threshold before releasing the loading up to maximum system capacity.
In case of decrease of system load, iCM will load down the Units down to stage down capacity before stopping a running Unit (if unload type is high load or Low load) or iCM will load down the Next Off Unit to stage down capacity before stopping the Unit and start to load down the new next off. For this reason, a too high load down threshold can lead to unnecessary shut-down that cannot be afforded by remaining running Units.

5.2.6 Staging Temperature Differentials

The staging temperature thresholds and deadband are used to define:

- In two-pipe plant-room, the regulation zones for iCM when Staging on Capacity Range and/or Unit Load Control (If enabled) and Staging for temperature are active
- in four-pipe plantroom, the regulation zones for iCM when Staging for temperature and Mode Control are active

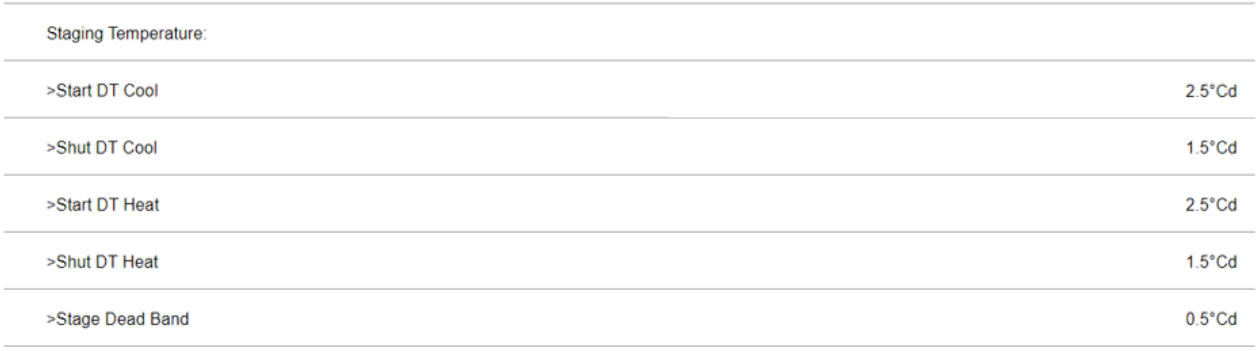

Figure 29: Staging temperature thresholds configuration

In case of two pipe system, if controlled temperature is higher than setpoint + Stage Up DT, iCM starts an additional Unit without considering actual capacity of running Units, whereas if the controlled temperature is lower than setpoint + Stage Down DT, iCM stops a running Unit without considering actual capacity of the running Units. This represents a back-up logic to compensate a sudden increase or decrease of system load, as faster as possible.
Those values must be set quite wide from setpoint to allow Staging on Capacity to start/stop the unit efficiently. In fact, a too low Stage Up DT can lead to unnecessary start-up of Unit and a too low Stage Down DT can lead to unnecessary shut down of a Unit.

Regarding the deadband, this parameter affects Unit Capacity Control logic, if enabled. When controlled temperature is inside range between setpoint and setpoint + deadband, iCM will stop to load or unload the Unit. So, the higher is this value the higher is the deviation from setpoint that can be afforded. For example, in comfort application it can be set at 0,7...1,0°C. On the other hand, the lower is the parameter, the higher is the precision of iCM to follow controlled temperature fluctuations, which might be needed in process application when operator can set 0,3...0,5°C.
The Stage Up and Down delta temperatures are available in both cooling and heating if there is a heat pump in the system.

In case of four pipe system, where Staging on Capacity and Unit Capacity Control are disabled, staging is based only on temperature control and iCM Start/stop/ mode changeover of all the Units to satisfy the cooling and heating requests. So, stage up and stage down DT are used to evaluate the deviation from cooling and heating setpoint. Inside the range between Stage up and down DTs, iCM will keep the system as it is, whereas outside this temperature range, iCM decides to start/stop/change mode of units and/or of circuits multipurpose. For this reason, those parameters can be lower and the range of regulation around the two setpoints can be narrower. Usually, this range can be set about 2,0°C around the two setpoint, so that stage up and down delta temperature are set to 1,0°C and –1,0°C.

5.2.7 Staging Delays

The stage up and down of a Unit are defined also following delays. The delays are introduced to limit the simultaneous starts of different Units in the system and to let the Units load up or down to have an effect on the water temperature.
The delays depend on the distance from the Stage temperature Threshold, the farther is the controlled temperature from the target, the lower is the delay. The delays are started at each start up or shut down of a Unit.
The delay profiles for stage up and down are split to maximize the iCM configuration flexibility.

Staging Timers:	
Act Stg Up Time	600s
>Max Stg Up Time	600s
>Min Stg Up Time	60s
>Start DT Err	3.0°Cd
Act Stg Dwn Time	60s
>Max Stg Dwn Time	600s
>Min Stg Dwn Time	60s
>Stop DT Err	3.0°Cd

Figure 30: Stage delays configuration

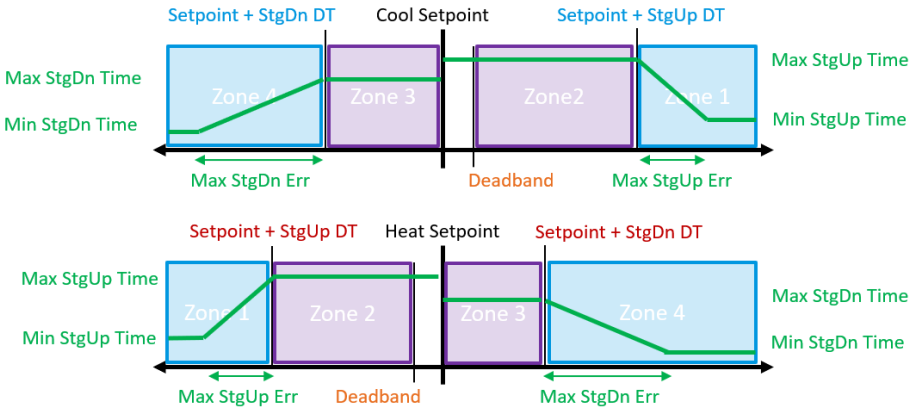

Figure 31: Staging delays calculations

Considering as example the default values, it results that if the controlled temperature is higher than 3°C (Max StageUp Error) from Stage Up temperature the delay is calculated at 60 seconds; in any temperature between stage up temp and 3°C, the delay is calculated using a linear interpolation so that at the StageUp Threshold the delay becomes 600 seconds. The same applies to stage down delay so that as the controlled temperature drops below stage down threshold in cooling or raise above stage down threshold in heating the stage delay can range between 600s and 60s accordingly.

So, the staging delays are affected by kind of Unit on system, kind of enabled iCM functions, kind of controlled temperature and temperature dynamic of the whole system.

In Two-pipe Plant-room, Staging on Capacity and Unit Capacity Control logics are enabled. When controlled temperature is inside stage delta temperature, iCM checks and manages the actual capacity of the Unit, so that a too long “Max Stage Up Time” could delay the start-up of an additional Unit, whereas a too short “Max Stage down Time” could cause shut-downs of Units too close in time. In the same way, when controlled temperature is outside stage delta temperature, where staging on temperature works as back up logic for sudden increase or decrease in load demand, a too long “Min Stage Up time” or a too high “Stage Error” could delay the start-up, whereas a too short “Min Stage down Time” can cause unnecessary shutdowns of Units.
Generally, Max Stage Up time is set at 5 minutes and Min Stage Up time at 2 minutes with a short Stage Up Error, about 1°C, because Stage Up DT is still quite high (default, 2,5°C). For the shut-down, Max Stage Down is set at 6 minutes, Min Stage Down time at 3 minutes and a short Stage down Error (about 0,5°C).
It is important to mention the case of Entering water temperature as controlled temperature. In this case, start/stop of Units can be evaluated after a certain delay due to dynamic of water in the system. For this reason, Stage Delays should be higher compared with the case of control with the leaving water temperature.

On the other hand, in Four-pipe plant-room, iCM manages individual Strat/Stop/Changeover of Units/Circuits according only to deviation from leaving water temperature setpoint (Cool and Heat), set with Stage Up and Down DTs. So, More time is needed to appreciate the effect of Staging and Mode Control function on controlled temperature, and consequently Staging delays and Stage Error must be longer. For this reason, Max Stage Time could be set at 10 minutes, Min Stage time at 1 minutes and Stage Error at 3°C.

5.2.8 Defrost Management (only in Two pipe plant-room)

If Plant Type is OnlyHP, this setting displays in Configuration menu and allows operator to enable the System Defrost Management.

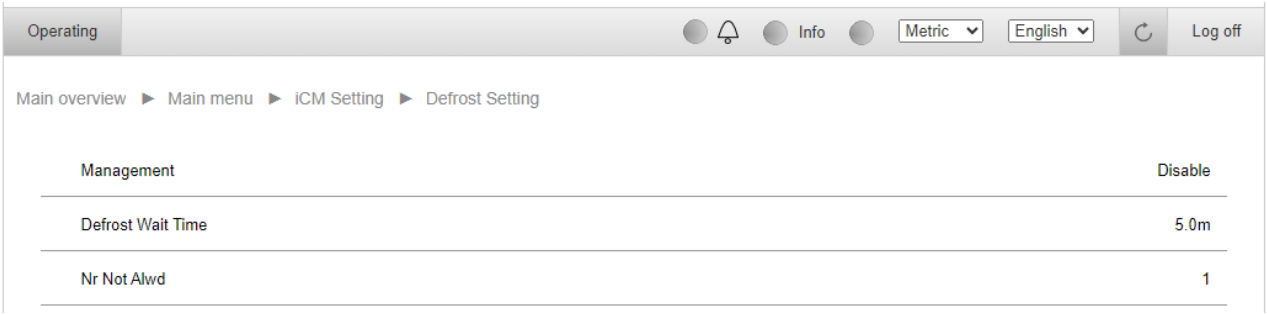

Figure 32: Defrost Management selection

The “Defrost Wait Time” paramenter indicates the inhibition time that the unit must wait to receive the defrost command by iCM.
“Nr Not Alwd” indicates the number of units that are not allowed to defrost.

Defrost Management can operate only if iCM option is configured on all the units and if there are no Multipurpose Unit in the system.

In four pipe plant-room Defrost is managed by unit itself. If unit is working in defrost is considered “Not available for Staging and Mode Control

5.2.9 Unit Capacity Control (only for Two-pipe Plant-room)

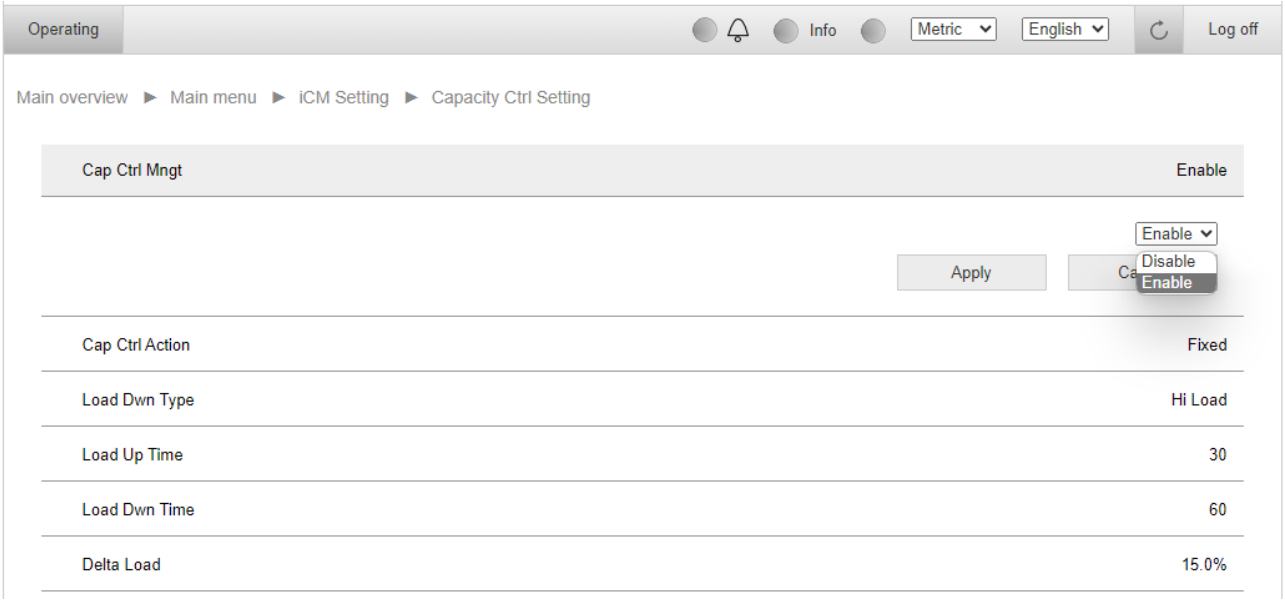

Figure 33: Load control Enable/Disable

In case of four-pipe plantroom, Unit Load Control is always disabled.

This setting will enable or disable the load control by the iCM. When the load control is enabled, iCM will force Units to load or unload basing on the water temperature error. Commands will be given to each Unit individually. This setting will try to share the system capacity on all the running Units when loading and unloading.
There is only one loading up strategy, and it is based on **Minimum Load**: iCM will force the load up of the running Unit with lower capacity time by time, up to stage up threshold. This strategy makes the Units load up one by one altogether, so that increase of system load will be shared homogeneously among the Units
On the other hand, there are three possible Loading down strategies each of those delivering different unloading profiles, described in the following paragraph.

5.2.9.1 Setting the Load Control Mode

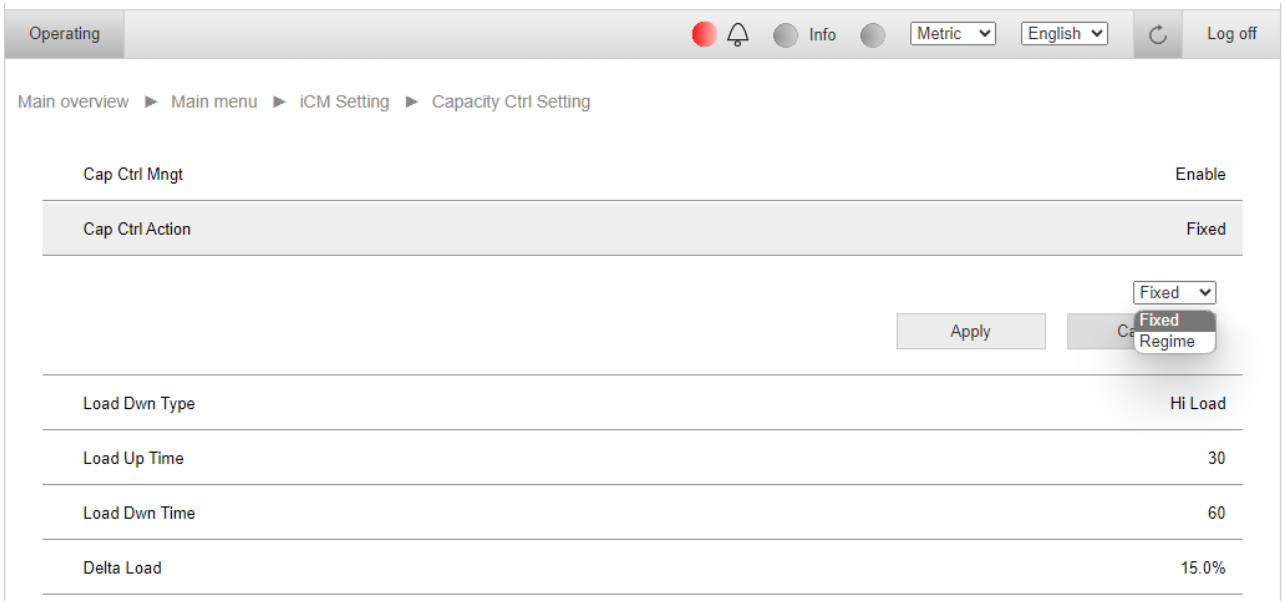

Figure 34: Load control action selection

This setting will define when the Load Control will be used. Fixed will give the iCM the continuous load control of the Units. This might be good in case of comfort application and can help to get to the target sharing better the system load. When Regime is selected, the Load Control is activated only in Zone 2 (see par. **Errore. L'origine riferimento non è stata trovata.**) while in Zone 1 the iCM will only control the staging of the Units. This second option is preferable when the Unit should get to the setpoint quickly and eventually starting more Units than in an optimal situation.

5.2.9.2 Setting the Unloading Strategy

Configuration requires to select the unloading strategy.

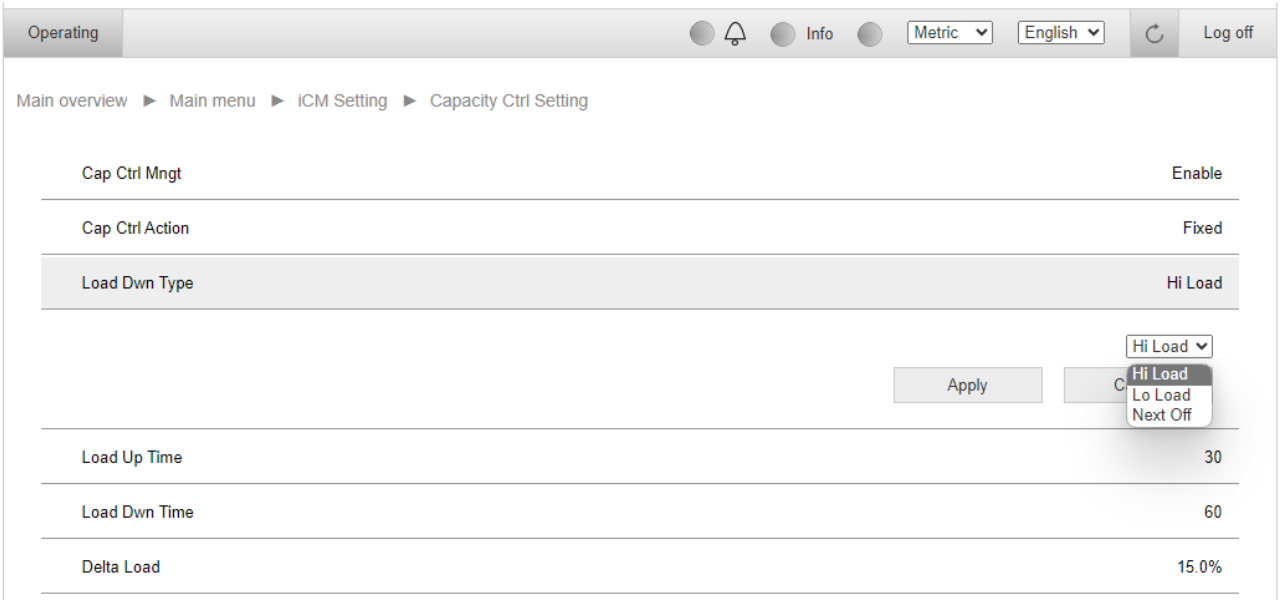

Figure 35: Unload Type selection

Unload can follow three different strategies that may lead to different distribution of the capacities as seen from the above picture.

With **Hi Load**, the iCM will force the unload of the running Units with higher load time by time. This strategy makes the Units unload one by one altogether, so that decrease of system load will be shared homogeneously among the Units during the unload. One application of this strategy could be the case of all non VFD Units with VFD pumps with variable.

The **Lo Load** strategy will force the unload of the Unit with lower capacity per time, down to its stage down threshold. In this case, decrease of system load will be compensated by one Unit at time and left running Unit will keep the achieved capacity. When all the Units will be unloaded to their stage down thresholds, then one Unit is disabled and switched off. This strategy fits well in applications with all VFD Units and VFD pumps with variable flow.

The **Next Off** strategy will unload the Next Off Unit and when the Unity capacity reaches the stage down threshold the Unit is switched off. The decrease of system load is compensated by one Unit at time till total shut-down. This strategy could be the right choice in case of fixed speed pumps (manifolded or dedicated) because it minimizes the number of running chillers so the number of running pumps.

5.2.9.3 Setting timers and delta

The last parameters to set are the ones related to Unit Capacity control.

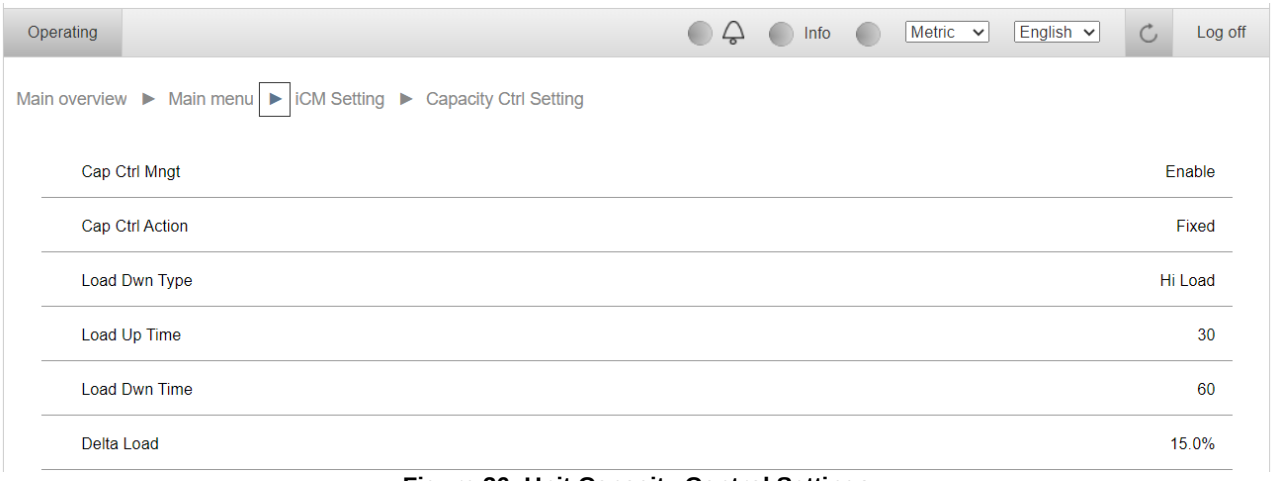

Figure 36: Unit Capacity Control Settings

When load control is enabled and active, iCM controls the load up and load down of the Units one by one. The Delta Load represents the percentage of capacity that loading/unloading Unit must generate from its actual capacity before iCM switches to load/unload the next Unit. In case of Load up (controlled temperature is higher than setpoint + deadband), after each capacity step of the loading Unit, iCM will wait for Load time to expire and then it commands the load up of the next

Unit. During Load down (controlled temperature is below setpoint - deadband), after each unload step, iCM will wait for Unload time to expire before commanding to unload the next Unit. Inside the deadband, Unit will keep the reached capacity. The Load/Unload timers should provide to iCM the time to evaluate the impact of each delta capacity increase or decrease on controlled temperature and, at the same time, prevent iCM from delaying the load Up or shortening the load down with consequently system capacity fluctuation. In fact, a too short Load timer can cause an increase of Units' capacity too close in time; whereas a too long Load time can bring to an increase of temperature. Unload time can have the same effect with an excessive capacity generation or an unnecessary capacity decrease and possible shut down of the Unit.
Generally, Capacity unload of the Unit is faster than load up, so Load time can be set at 30sec and Unload time at 60sec.
It is worth noting that controlled temperature has an impact on the choice. In fact, if controlled temperature is the Entering water temperature, a capacity change of the Units has a delayed effect on the controlled temperature, so timers must be increased and fine-tuned according to plant-room inertia.
Regarding the temperature ranges, Min Cool Temp and Max Heat Temp must be set according to specific Unit parameters and system application. For example, in case of brine applications, the Min Cool Temp shall be reduced accordingly with the system setpoint. The same will happen with the Max Heat Temp and High temperature heat pumps.

5.2.10 Configuring System Mode Management

In two-pipe system with Daikin Heat pump units, iCM advanced can manage the operating mode of the units automatically.

Figure 37 - Mode Changeover selection

If this setting is disabled, iCM advanced will not change the mode of the units according to system mode and the units will be stopped and considered "Not Available"

In four-pipe plant-room, this setting is not take in consideration
System mode is fixed to "MULTI" and iCM Advanced will change automatically the operating mode of the connected units.

5.2.11 Heat Recovery (only for Two-pipe Plant-room)

iCM Adv can control the staging of Heat Recovery of all the Units with this option installed.

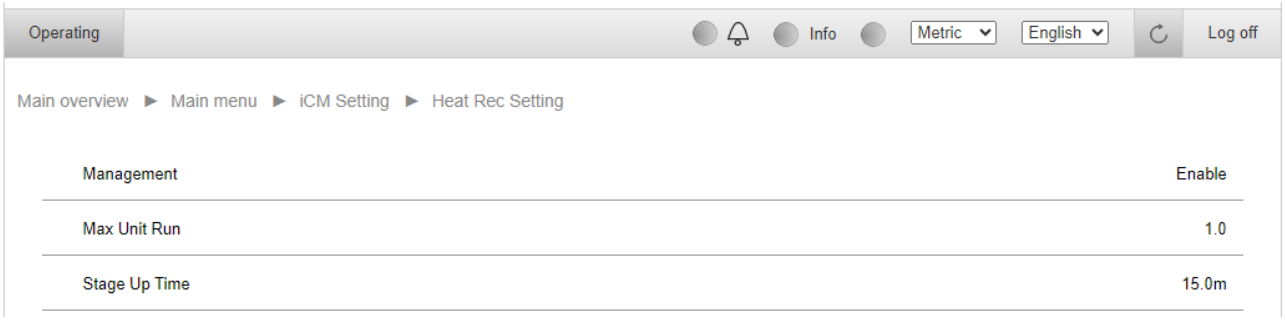

Figure 38: Heat Recovery settings

The settings allow to configure the maximum number of Units with Heat Recovery to be activated to reach the required temperature. If the total Heat Recovery available capacity exceeds the maximum required load, then this number can be set lower than the number of heat recovery Units. In case of doubts or to easily configure this function, it's suggested to set this value equal to the number of Units with heat recovery. What is important to remember is that the activation of heat recovery influences the Unit efficiency and capacity so in order to try to keep high the overall efficiency, when possible, the HtRec Max Run should be set at the minimum possible value.
That said, iCM will stage up the number of Units needed to reach the Heat Recovery target trying not to exceed the Heat Recovery system load and maximizing the system efficiency.
The HtRec Stage Timer represents the delay between activations of heat recovery across the different Units.

5.2.12 Free-cooling (only for Two-pipe Plant-room)

iCM is able to manage the activation/deactivation in sequence of Freecooling function among managed units. The below picture show settings used to iCM that affects this staging logic.

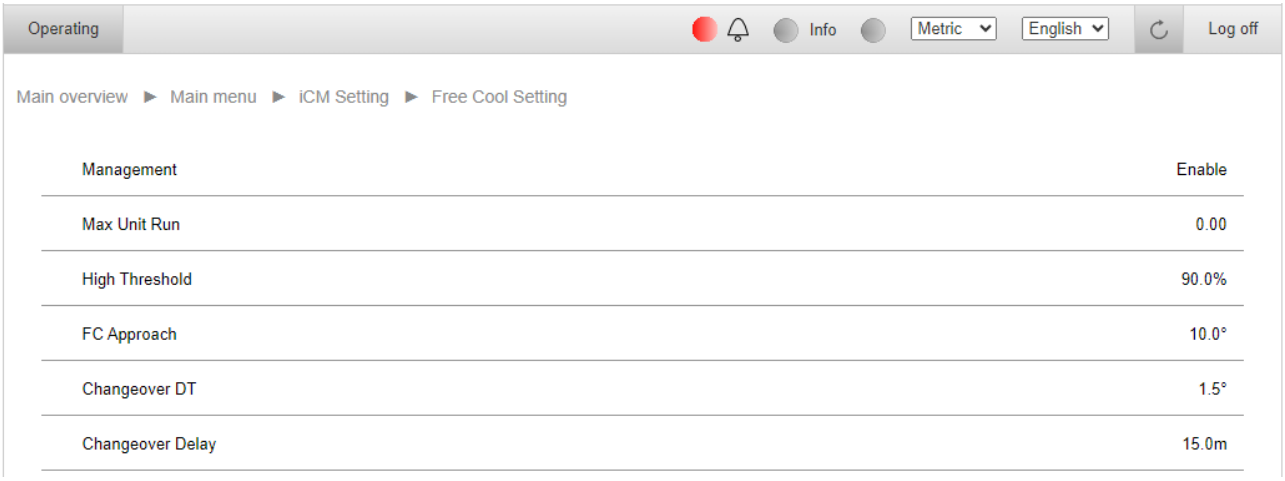

Figure 39 - Freecooling settings

The settings allow to configure the max number of running unit with activated free-cooling function. According to plantroom design and unit design, user can decide to set this parameter equal to number of unit with equipped FC option or decide to set a lesser number in case of whole free-cooling capacity has been oversized comparing to the cool load request.
The other important parameter is the Freecooling Approach, i.e. minimum difference between System Actual setpoint and Outside air temperature. This parameter defines when the free-cooling can be activated because cooling capacity generate with this option is able to afford the load request. Consequently, the value of this parameter is strictly related to the size and number of fan on the units. The higher is the number of fan, the higher is the cooling capacity generated and the lower is the FC Approach. It is also through that this value should never be set less than 4°C (minimum Free-cooling approach).
The other three parameter are used by iCM to manage the Free-cooling mode changeover of the units. In other words are used by iCM to allow the transition from Full Free-cooling mode to Mixed Mode (free-cooling and mechanical generation of capacity) or from Mixed Mode to Full mechanical (cooling capacity generated only from compressors).
FC High threshold is calculated automatically.This defines the Capacity threshold that all the units in Freecooling mode must exceed to let iCM to allow the changeover to Mixed mode or to full mechanical mode of one unit.
FC Change Mode DT represents the condition on system leaving water temperature to allow the transition to Mix Mode or to Full mechanical of one unit. It is highly recommended to set this value between “Stage Up DT” and “Start Up DT” of the unit.
FC Change Mode delay, is a stabilizing timer that prevents from unit changeovers in too short time. This value should be set at least equal to the “Hold Time” of the unit Free-cooling setting.

5.2.13 Standby Unit

iCM and includes the management of Standby Unit.
Only one unit can be elected as “Standby” at time. iCM can start the stand-by unit only in case of alarm of the one running units or if all the units are running and System temperature setpoint is not achieved (temperature compensation).

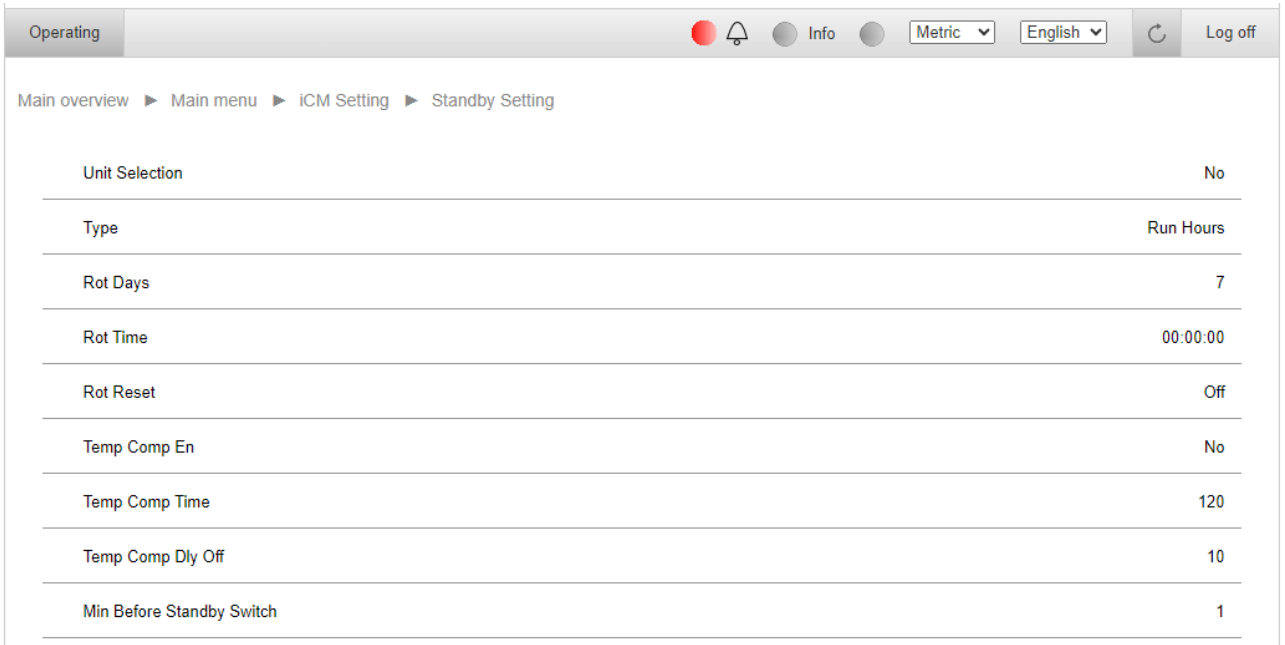

Figure 40: Standby chiller configuration

First setting is to activate the Stand-by function selecting a value different from “No”.

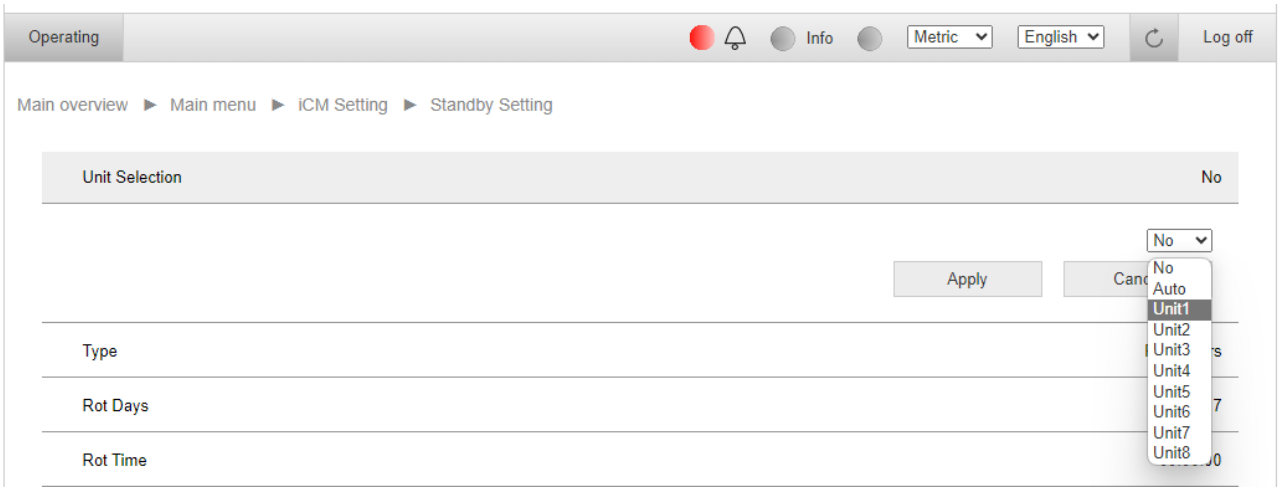

Figure 41: Selection of the Standby chiller mode

The configuration parameter allow to set a fixed Standby Unit among all the units. In this case no rotation of the stand-by is active. Usually, an older unit or with lower efficiency than the others should be set as Stand-by.
The same configuration allows to set Auto rotation of the Standby Unit chosen by iCM according to two strategies:

- Unit with More running hours; this strategy can be used to balance the running hour of the unit.
- Sequence number of unit: (for example, Slave1, then Slave 2, then Slave 3, etc): too assure that every unit in the system will become Stand-by unit.

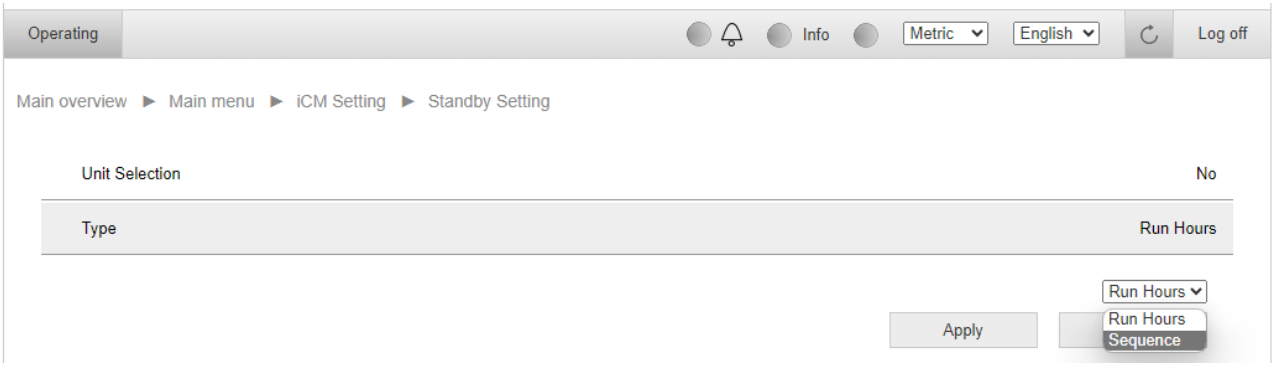

Figure 42: Rotation strategy configuration

It is possible to select the period and time when rotation of the Standby unit will occur. Selecting properly this time the changeover can be executed when the system is off so not affecting the system stability.

The Standby function can also start the Standby Unit for temperature compensation which is, by default, not active.

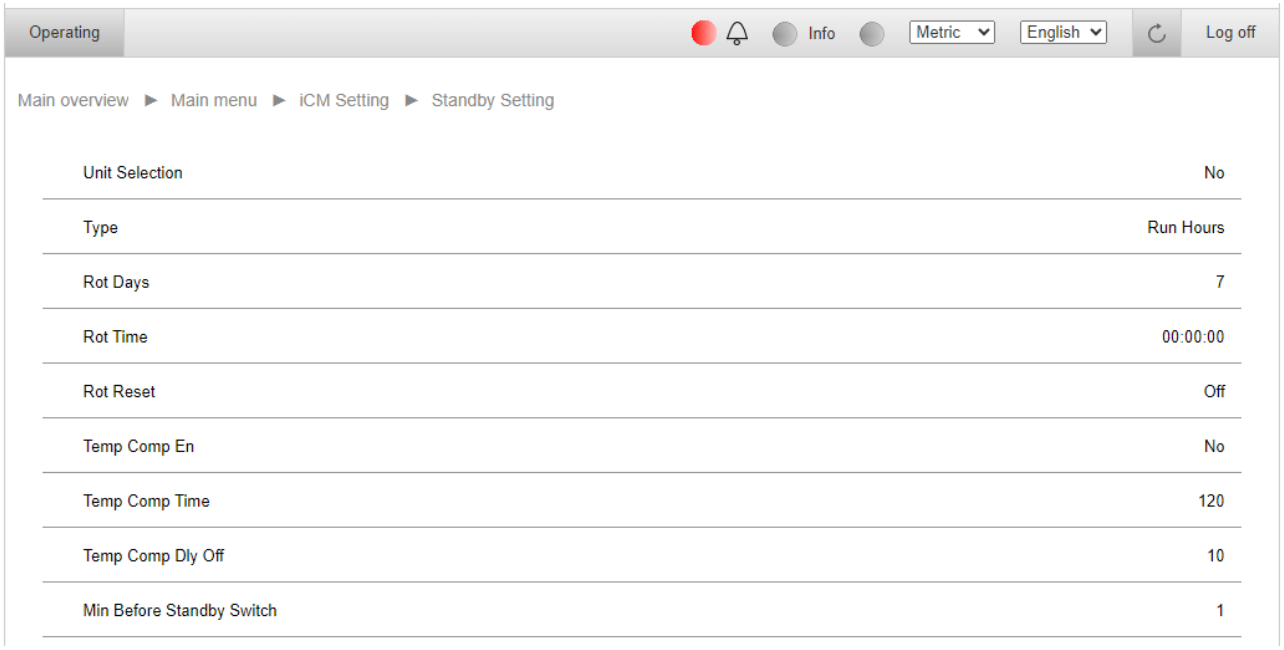

Figure 43: Temperature compensation with Standby Unit

Activating Temperature Compensation, iCM will start the Standby Unit if the system setpoint is not reached after a compensation timer. This delay can be increased or reduced to fit the application. In case of process application this delay can be reduced below default 120 min. This setting should be evaluated on the basis of the system requirements.

6 SYSTEM OPERATING

This chapter explains how to interact with iCM Adv external panel.
Firstly, it must be highlighted that iCM Adv logic is embedded in an external unit controller. The main setpoints on iCM Adv external panel will be used as “System Setpoints”. On the other hand, the “Slave” units are under iCM Adv control that will communicate the operating setpoints. If “Slave” unit is not communicating anymore with iCM Adv external panel or it is set in “Standalone” mode through HMI setting, “Slave” will work using its own setpoints.

6.1 System Enable setpoint

The enabling conditions on iCM Adv external controller, generally checked to enable a unit, must be satisfied to enable iCM logic and consequently the system sequencing and staging. Those conditions are the following:

1. “Remote Switch” turned ON on the iCM Advanced cabinet (displayed on HMI)
2. *iCM Data→Setpoints→Enable Setpoint→Local Setpoint* = ON on controllerHMI
3. *iCM Data→Setpoints→Enable Setpoint→Network Setpoint* by third party BMS though protocol communication only if “Control Source” = Network, (displayed on HMI).

If all the above conditions are true on iCM Adv external controller, the user can visualize the system run state in

➔ *“Main Menu → iCM Data → System Run” = “On”*

and iCM sequencing and staging logic will be performed.

If one of the above conditions is false on iCM Adv controller, management at plant-room level is stopped.

6.1.1 Slave Disable

To set temperature setpoints, used for management of the plant-room, user should operate on Cool or Hot setpoint on iCM Adv controller. These setpoints will be communicated by iCM Adv to all the Slaves.
It must be highlighted that iCM Adv manage the plant-room to reach the System Leaving water temperature on evaporator or condenser side, according to System operation Mode.

6.2 System water temperature setpoints

To set temperature setpoints, used by iCM for sequencing and staging logic, user should operate on Cool or Hot setpoint on iCM advanced controller.

6.2.1 System Cool Setpoint

To set the cool setpoint of the System, user needs to operate on the following parameter:

- ➔ *iCM Data → Actual Setpoint → Local Setpoint* (in Cool Setpoint section) by controller HMI
- ➔ *iCM Data → Actual Setpoint → Network Setpoint* (in Cool Setpoint section) by third party BMS though protocol communication

According to “Control Source” setting, iCM Adv controller will assume the setpoint from HMI or from BMS as System Cool setpoint

6.2.2 System Heat Setpoint

To set the heat setpoint of the System, user needs to operate on the following parameter:

- ➔ *iCM Data → Actual Setpoint → Local Setpoint* (in Heat Setpoint section) by controller HMI
- ➔ *iCM Data → Actual Setpoint → Network Setpoint* (in Heat Setpoint section) by third party BMS though protocol communication

According to “Control Source” setting, iCM Adv will assume the setpoint from HMI or from BMS as System Heat setpoint.

6.2.3 System Active Setpoint

According to “System Operation Mode” (Cool/Heat), iCM Adv selects one of the two setpoints to set as the “System Active Setpoint”. This setpoint is used by Staging function to control the plant-room; moreover it is communicated to all the iCM Adv Slave “.
User can check this parameter in menu

➔ *iCM Data→Act Setpoint*

6.2.4 System Heat Recovery EWT Setpoint in Two-pipe plantroom

In two-pipe plantroom with more than two units equipped with Heat recovery option, to set Heat Recovery setpoint, used by iCM Adv for heat recovery management at system level, user needs to operate on the setpoint of iCM Adv external controller HMI:

➔ *iCM Data→Heat Recovery→ Local Setpoint* by controller HMI

➔ *iCM Data→Heat Recovery→ Network Setpoint* by third party BMS though protocol communication

The Heat Recovery setpoint on iCm external panel HMI will become the “System Heat Recovery Setpoint”.

6.2.5 System Heat Recovery EWT Setpoint in Four-pipe plantroom

In four-pipe system the “System Heat Setpoint” is set as Heat Recovery Setpoint of Chiller units.

6.3 System mode and System mode setpoint

6.3.1 System Mode in Two pipe Plant

In two pipe system with only Heat-pump units or a mix of Heat-pump and Chiller units, iCM Adv can sequence the unit in order to achieve System Cool temperature setpoint or System Heat temperature setpoint. To allow changeover of the operation mode in the sequencing and staging logic of iCM, user should operate on setpoints on iCM Adv external controller.
The following conditions trigger the mode-changeover from Cool mode to Heat Mode:

1. “Cool-Heat Switch” is turned on “Heat” on iCM Advanced cabinet.
2. *iCM Data → iCM Setpoints→ Local Setpoint* set in “Heat” by controller HMI
3. *iCM Data→iCM Setpoints→ Network Setpoint* set in “Heat” by third party BMS though protocol communication (if Control Source setting is set to network)

If one of the aforementioned conditions should become “Cool”, iCM Adv changes System operation mode in “Cool”.
System Operation Mode can be checked in menu

➔ “*iCM Data→Mode setpoint*

If a Slave unit should not be set with same operation mode of the iCM Adv external controller, iCM will consider it “Not Available” and stop it.

6.3.2 Changeover management on Slave units

If “Mode Changeover Management” is configured, iCM Ad will set the System mode on all the connected heat pump slaves.

System Mode Setpoint by iCM Adv takes over the aforementioned conditions on the slave units (Mode Switch and Network mode setpoint are ignored by Slave unit controller).

6.3.3 System Mode in Four pipe Plant

In Four-pipe system, Staging and Mode Control function are always active and decides which unit/circuit to start/stop/change mode and which operating mode is needed.
System Operating Mode will be always “Multi” (Multipurpose).

Operating mode decided by iCM Adv logic takes over the aforementioned conditions on the slave units (Mode Switch and Network mode setpoint are ignored all the unit controller).

To force a different operating mode on Heat pump or Multipurpose units, operator needs to set them in Standalone mode and set the local condition

6.4 System controlled temperature

This variable represents the temperature at system level that iCM tries to affect with sequencing and staging of the units to achieve the system temperature setpoint. The variable is shown in menu:

- “System → Data → Sys Ctrld Temp”

The table below shows the values that “System Controlled temperature” can assume according to configuration of Common LWT sensor, type of unit (Air-cooled/Water Cooled/Multipurpose) and System Operation Mode:

Common LWT Config	Unit Type	Sys Op. Mode	Sys Ctrl Temp
NTC10K (sensor is installed)	2Pipe	Cool	Common Leaving WT sensor
NTC10K	2Pipe	Heat	Common Leaving WT sensor
NTC10K	W/C	Cool	Common Evaporator Leaving WT sensor
NTC10K	W/C	Heat	Common Condenser Leaving WT sensor
NTC10K	4Pipe	Multi	1) Common Cool Leaving WT sensor 2) Common Heat Leaving WT sensor

Table 48: System controlled temperature based on system layout

6.5 System Heat Recovery

6.5.1 System Heat Recovery Enable in Two Pipe Plant-room

In two pipe plant-room with more than two units equipped with Heat recovery option, iCM Adv external controller can manage sequencing and staging of the units in order to maximize Heat Recovery at system level.

The enabling conditions on iCM external controller, generally checked to start heat recovery management on a unit, must be satisfied to enable heat recovery management on iCM logic. Those conditions are the following:

1. *iCM Data → Heat recovery → Local Setpoint* (in Heat Setpoint section) by controller HMI
2. *iCM Data → Heat recovery → Network Setpoint* by third party BMS though protocol communication")

If all the above conditions are true on iCM Adv external controller, in menu

- "*iCM Data → Heat Recovery Status* = Run

and iCM sequencing and staging logic to satisfied Heat recovery load will be performed.

If one of the above conditions is false on iCm Adv external Controller, Heat Recovery function is disabled on all the Slave units.

Heat Recovery in a Four Pipe Plant is not managed at System level. Each unit, with Heat Recovery configured, manages HR at unit level.

6.5.2 Heat Recovery Disable on Slave

If user would like to stop Heat Recovery function on Slave unit and take it out of sequence, he should set one of the enabling conditions to false.
When Slave unit is disabled, iCM will consider it as "Not available" and consequently, out of sequencing logic. iCM will send stop command to heat recovery function of unit and it will show in menu

- iCM Data → Slave# → HeatRecovery → Heat Recovery Avail" = No (not available)

When Heat Recovery function is disabled on a unit, iCM keeps on taking in consideration the unit to satisfy load on cooling side.

6.6 System Free Cooling Enable (in two pipe plant-room)

In system with more than two units equipped with Free Cooling option, iCM Adv external controller can manage sequencing and staging of the units in order to maximize cooling capacity generated by free-cooling at system level.
The enabling conditions on iCM Adv external controller, generally checked to start free cooling management on a unit, must be satisfied to enable free cooling management on iCM logic. Those conditions are the following:

1. "*iCM Data → Free Cooling → Local Setpoint* (in Heat Setpoint section) by controller HMI
2. *iCM Data → Free Cooling → Network Setpoint* by third party BMS though protocol communication")

If all the above conditions are verified on iCM Adv external controller, in menu

- "*iCM Data → Free Cooling Status* = Run

and iCM start to perform the sequencing and staging logic to satisfied cooling load request through free-cooling.
Moreover "Sys FreeClg Status" can assume different values as explained below:

a) *Off:Switch:* Free-cooling is stopped because one of the enabling setpoints on iCM Adv external controller is not satisfied
b) *Wait for OAT:* Free-cooling is stopped because even if the option is enabled, condition on OAT is not satisfied.
c) *Run:* Free-cooling is running because all the conditions are satisfied.
d) *Off:Alm:* Free-cooling is stopped because the outside air temperature sensor on iCM Adv external controller (use by iCM at system level) is broken or it is not working properly.

6.6.1 Free-cooling Disable on Slave

If user would like to stop Free-cooling function on Slave unit and take it out of sequence, he should set one of the enabling conditions to false.
When Slave unit is disabled, iCM will consider it as "Not available" for free-cooling and, consequently, out of free-cooling sequencing logic. iCM will send stop command for free-cooling function and it will show in menu

- iCM Data → Slave# → Free Cooling → Free Cooling Avail" = No (not available)

When Free-cooling function is disabled on a unit, unit will change its not in Full mechanical and it can keep on generating cooling capacity through circuit compressor. Beside that, iCM can stop the unit if staging conditions on unit capacity or system controlled temperature will be satisfied.

6.7 Standalone Mode

In any moment, setting an iCM Adv in “Standalone” mode allows to operate the slaves independently from plant-room management of iCM Adv.
User needs to set the related setpoint in menu:

➔ *iCM Maintenance → Disconnect setpoint = Yes*

iCM Adv detects is a Slave is in Standalone mode and iCM considers it no more controllable and out of plant-room management.
User can check which iCM Adv Slave is Standalone in menu:

➔ *iCM Data → Slave # → Op Sta → Standalone*

6.7.1 Setting Slave in Standalone

If a Slave unit is set “Standalone”, it cannot become Next On or Next Off unit and user has to operate locally.
Once a unit is set again under iCM Adv control (setting “Standalone” = No), iCM starts to operate the unit in the last found status. In other words, if the unit previously in “Standalone”, was running, iCM lets the unit running and stops it only if Stage Down conditions are satisfied. Likewise, if the unit previously in “Standalone”, was stopped, iCM leaves the unit stopped and available for sequencing and staging.

6.8 Dedicated Pump Speed Control setpoints

iCM Adv external panel regulates the speed of the Evaporator/Condenser pump according to the configuration.

6.8.1 Fixed Speed Control Setpoint

The setpoints “Fixed speed 1” or “Fixed speed 2” on iCM Adv menu:

➔ *Evap / Cond Speed Ctrl→ Speed Settings*

is communicated to all the Slaves. Slave Unit, in turn, sends this speed command to the related pump.
Selection of one of the two speeds setpoints is possible with

➔ *Evap / Cond Speed Ctrl→ Speed Settings→Fix Speed Selector*

If a Slave should suffer a communication error with iCM Advanced or if it is set in “Standalone Mode”, Pump be commanded by Slave itself with speed value that can be set in menu

➔ ***Main Menu→ View/Set Units → Pumps → Fix Standby Speed***

6.8.2 Variable Primary Only Setpoint

The value of speed is calculated by iCM Advacned to satisfy the “Differential Pressure Setpoint” of primary circuit (through the System Differential Pressure sensor equipped only on iCM Advanced):
The actual setpoint depends by iCM Advacned “Control Source” setting, and it will be chosen between:

➔ *Evap/Cond Speed Ctrl→ DPress Setp→ Evap/Cond Speed Setpoint→ Local Setpt: through controller HMI*
➔ *Evap/Cond Speed Ctrl→ DPress Setp→ Evap/Cond Speed Setpoint→ Network Setpt: by third party BMS though protocol communication*

The controlled Value of speed is communicated to all Slaves. Slaves, in turn, sends this speed command to the related pump.

If a Slave should suffer a communication error with iCM Advanced or if it is set in “Standalone Mode”, Pump will be commanded by Slave itself with speed value that can be set in menu

➔ ***Main Menu→ View/Set Units → Pumps→ BackUp Speed***

6.8.3 Variable Primary – Variable Secondary Setpoint

The value of speed is calculated by iCM Adv to satisfy the “Delta Temperature Setpoint” of primary circuit (difference between System EWT and System LWT connected only to iCM Adv):
The actual setpoint depends by iCM Adv “Control Source” setting, and it will be chosen between:

➔ *Evap/Cond Speed Ctrl→ DTemp Setp→ Evap/Cond Speed Setpoint→ Local Setpt: through controller HMI*
➔ *Evap/Cond Speed Ctrl→ DTemp Setp→ Evap/Cond Speed Setpoint→ Network Setpt: by third party BMS though protocol communication*

The controlled value of speed is communicated to all Slaves. Slave unit, in turn, sends this speed command to the related pump.

If a Slave should suffer a communication error with iCM Advanced or if it is set in “Standalone Mode”, Pump will be commanded by Slave itself with speed value that can be set in menu

➔ ***Main Menu➔ View/Set Units ➔ Pumps➔ BackUp Speed***

6.8.4 Manual Speed Control

Operator can force manually the speed of all the pumps connected to all the Slaves units through the following menu that will display iCM Advanced

➔ *Evap/Cond Speed Ctrl➔ Speed➔ Evap/Cond Speed Maintenance➔Manual Selector=Manual*

With this setting, operator will be able to force

➔ Manual Speed
➔ Manual position of the System Bypass valve (in case of Configuration of Variable Primary Only: “VPF”)

The manual speed value is communicated to all Slave units. Slave units, in turn, send this speed command to the related pump if it is running.

6.9 System Overview

On iCM Adv external controller HMI, Main page shows an overview of the status of the system:

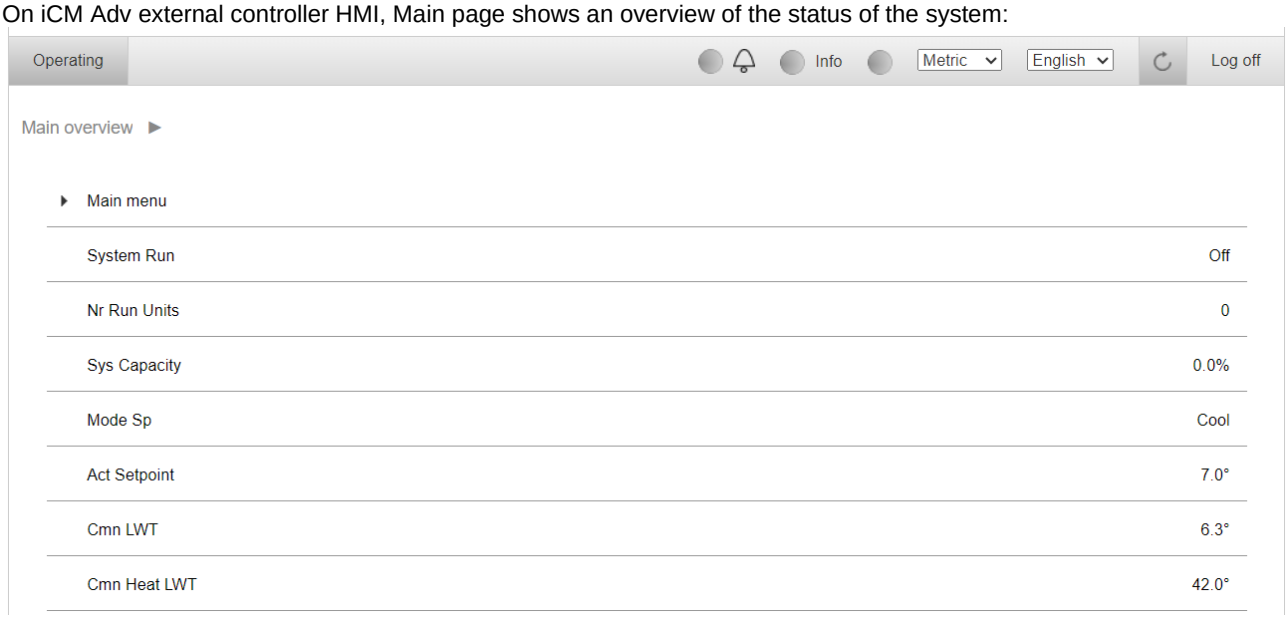

Figure 44: System Overview on Main menu of iCM Adv external cotrnoller HMI

At any moment, user can check all the information about system management and unit statuses on iCM Adv external cotroller HMI in menu:

- “Main Menu → iCM Data → Slave #”

7 TROUBLESHOOTING

This chapter will try to explain the alarms and events generated by the iCM Adv and guide to resolution.
In the following sections all the alarms will be described. Alarms will disable the iCM Adv or will reduce their ability to control the system properly.

7.1 iCM Adv Alarms

7.1.1 iCM Configuration Alarm

This alarm on iCM Adv external controller can occur during configuration of System Control and it indicates that kinds of Unit (Unit Type) or kind of System Control Type from Units on process network is not correct.

The reason of configuration alarm can be checked in menu:
Main menu --> Configuration --> Config iCM --> Alarm Reason.

Available configurations and possible configuration alarms are explained on Paragragh 1.3

Symptom	Cause	Solution
Bell icon is blinking on controller's display. String in the alarm list: *iCM Config Alm* System does not start even if enabled by iCM Adv Switch NOTE: reason of configuration alarm can be read in menu: *Main menu --> Configuration --> Config iCM --> Alarm Reason*	*Main menu-->Configuration --> Config iCM --> Alarm Reason = Undef* Connected slaves did not send the "Unit Type".	Check if Communication Error with slaves occurred. Reboot iCM Adv external controller when all the communication errors with slaves are fixed.
	Main menu-->Configuration --> Config iCM --> Alarm Reason = iCMTypeError System Control Type (Software Option is different among connected Units.	Check if iCM Adv (software option) is not unlocked on all the connected Units. Contact Factory for Unlock Key
	Main menu-->Configuration --> Config iCM --> Alarm Reason = CooledError WaterCooled + AirCooled Chiller or WaterCooled + Multipurpose Unit are connected to iCM Adv external panel	Configuration NOT supported. Contact Factory
	System→Configuration→ ConfigAlarm = ComprError Scroll + Centrifugal compressor Units are connected to iCM Adv external panel	Configuration NOT supported Contact Factory
	System→Configuration→ ConfigAlarm = PltError In Four-pipe Plant layout, configuration of units is not supported	Only to two type of 4Pipe Plant supported: a) *Multipurpose + AC Heat Pump + AC Chiller*: b) *AC Heat Pump + AC Chiller (with HR option)*
Reset	**.**	**Notes**
Local HMI Network	□ □	

7.1.2 System Lwt Sensor Fault

This alarm indicates that the sensor for the Cool/Heat water header on Evaporator side is not working properly. This alarm can occur if CommonLWT sensor is configured on all the Unit

Symptom	Cause	Solution
Bell icon is blinking on controller's display. String in the alarm list: *iCM Cmn LWT Alm*	Sensor is broken.	Check for sensor integrity. according table and allowed kOhm (kΩ) range.
		Check correct sensors operation

Forced Start of all Units, Load control disabled, All Units in Local.	Sensor is shorted.	Check if sensor is shorted with a resistance measurement.
	Sensor is not properly connected (open).	Check for absence of water or humidity on electrical contacts.
		Check for correct plug-in of the electrical connectors.
		Check for correct sensors wiring also according electrical scheme.
Reset		**Notes**
Local HMI Network	□ □	

7.1.3 System Ewt Sensor Fault

This alarm indicates that the sensor for the Cool/Heat water inlet on Evaporator side is not working properly. This alarm can occur if CommonEWT sensor is configured on all the Unit.

Symptom	**Cause**	**Solution**
Bell icon is blinking on controller's display. String in the alarm list: *iCM Cmn EWT Alm* If Evap Speed Control = VarDT Pump will be set at back-up speed	Sensor is broken.	Check for sensor integrity. according table and allowed kOhm (kΩ) range.
		Check correct sensors operation
	Sensor is shorted.	Check if sensor is shorted with a resistance measurement.
	Sensor is not properly connected (open).	Check for absence of water or humidity on electrical contacts.
		Check for correct plug-in of the electrical connectors.
		Check for correct sensors wiring also according electrical scheme.
Reset		**Notes**
Local HMI Network	□ □	

7.1.4 System Heat Lwt Sensor Fault

This alarm indicates that the sensor for the hot water header on condenser side is not working properly. This alarm can occur if CommonLWT sensor is configured only on WaterCooled heat-pump and Multipurpose Units.

Symptom	**Cause**	**Solution**
Bell icon is blinking on controller's display. String in the alarm list: *iCM Heat Cmn LWT Alm* Forced Start of all Units, All Units in Local.	Sensor is broken.	Check for sensor integrity. according table and allowed kOhm (kΩ) range.
		Check correct sensors operation
	Sensor is shorted	Check if sensor is shorted with a resistance measurement.
	Sensor is not properly connected (open).	Check for absence of water or humidity on electrical contacts.
		Check for correct plug-in of the electrical connectors.
		Check for correct sensors wiring also according electrical scheme.
Reset		**Notes**
Local HMI Network	□ □	

7.1.5 System Heat Ewt Sensor Fault

This alarm indicates that the sensor for the hot water inlet on condenser side is not working properly. This alarm can occur if CommonEWT sensor is configured only on WaterCooled heat-pump.

Symptom	**Cause**	**Solution**
Bell icon is blinking on controller's display.	Sensor is broken.	Check for sensor integrity according table and allowed kOhm (kΩ) range.

String in the alarm list: *iCM Heat Cmn EWT Alm* If Cond Speed Control = VarDT Pump will be set at back-up speed		Check correct sensors operation
	Sensor is shorted.	Check if sensor is shorted with a resistance measurement.
	Sensor is not properly connected (open).	Check for absence of water or humidity on electrical contacts.
		Check for correct plug-in of the electrical connectors.
		Check for correct sensors wiring also according electrical scheme.
Reset		**Notes**
Local HMI Network	□ □	

7.1.6 Controlled Temperature Alarm

This alarm on the iCM Adv external controller appears when the System Temperature Sensor is in alarm.

Symptom	**Cause**	**Solution**
Bell icon is blinking on controller's display. String in the alarm list: *iCM Ctrl Temp Alm* iCM does not properly execute the Staging and Sequencing functions.	Refer to section 8.1.2 and section 8.1.3.	Refer to section 8.1.2 and section 8.1.3.
Reset		**Notes**
Local HMI Network	□ □	

7.1.7 Controlled Heat Temperature Alarm

This alarm on the iCM Adv external controller appears when the System Heat Temperature Sensor is in alarm.

Symptom	**Cause**	**Solution**
Bell icon is blinking on controller's display. String in the alarm list: *iCM Ctrl Heat Temp Alm* iCM does not properly execute the Staging and Sequencing functions.	Refer to section 8.1.4 and section 8.1.5.	Refer to section 8.1.4 and section 8.1.5.
Reset		**Notes**
Local HMI Network	□ □	

7.1.8 Slave Standalone

This alarm on the iCM Adv external controller indicates that the Slave # is not managed by iCM Adv anymore.

Symptom	**Cause**	**Solution**
Bell icon is moving on controller's display. String in the alarm list: *Slv# Standalone* *# identifies the Slave number* The Unit# starts working in Local according to Unit logic, Enable Setpoints and Temperature setpoints	1) Parameter "Disconnect" on iCM Adv external controller is set "Yes" 2) An Alarm of System controlled sensor has occurred.	1) Set "Disconnect" = "No" on iCM Adv external controller. 2) Fix the temperature sensor alarm on iCM Adv external panel.
Reset		**Notes**
Local HMI Network Auto	□ □ □	The alarm clears automatically when the communication is re-established.

7.1.9 Slave Alarm

This alarm on the iCM Adv external controller indicates that the Slave # is not working properly and it is not managed by iCM Adv anymore.

Symptom	Cause	Solution
Bell icon is moving on controller's display. String in the alarm list: *Slv# Alarm* *# identifies the Slave number* The Unit # in not available for sequencing and staging.	The Unit # is in alarm.	Check the cause of alarm on the HMI of the unit in alarm.
Reset		**Notes**
Local HMI Network Auto	□ □ □	The alarm clears automatically when the communication is re-established.

7.1.10 Slave Communication Error

This alarm on the iCM Adv external controller, indicates that the communication with one Slave is not working properly. There is the possibility that this alarm can be related to several Units in case of wrong wiring.

Symptom	Cause	Solution
Bell icon is moving on controller's display. String in the alarm list: *Slave# CommErr.* *# identifies the Slave number* Unit Not available for sequencing and staging.	Process bus network is not properly cabled.	Check the continuity of the RS485 network with the Unit which is not communicating.
	Process bus communication is not running properly.	Check Units' addresses in the Process bus network. All the addresses must be different.
	EM noise over the process bus	Check the cabling. It's required to use shielded twisted pairs to connect the different Units with the shield properly connected to the system ground. See section related to field wiring for further details.
Reset		**Notes**
Local HMI Network Auto	□ □ □	The alarm clears automatically when the communication is re-established.

7.1.11 Slave Missing

This alarm on the iCM Adv external controller, indicates that some of the Slaves are not visible in the network. This can happen during the system configuration if the iCM Adv is configured first.

Symptom	Cause	Solution
Bell icon is moving on controller's display. String in the alarm list: *Slave# Missing* *# identifies the Slave number* Unit Not available for sequencing and staging.	Wrong configuration of the system.	Check the number of configured Units and the corresponding individual Units' configurations. All the Units must be configured with a different address and the number of Units configured on the iCM Adv external panel matches the number of Units in the system.
Reset		**Notes**
Local HMI Network Auto	□ □ □	The alarm clears automatically when the communication is re-established.

7.2 Dedicated Pump Control Alarms

7.2.1 Pump Manager Differential Pressure Sensor Fault

This alarm on the iCM Adv external controller when Pump Controller Manager communicates the alarm of connected sensor used for evaporator\condenser pressure control.

Symptom	Cause	Solution
Bell icon is moving on controller's display. String in the alarm list: *Evap Speed Ctrl DP* Or *Cond Speed Ctrl DP* Evap\Cond pump run at Buckup Speed	On iPM sensor is broken.	Check for sensor integrity according table and allowed 0-10 Volt (V) range.
		Check correct sensors operation
	On iPM sensor is shorted	Check if sensor is shorted with a resistance measurement.
	On iPM sensor is not properly connected (open).	Check for absence of water or humidity on electrical contacts.
		Check for correct plug-in of the electrical connectors.
		Check for correct sensors wiring also according electrical scheme.
Reset		**Notes**
Local HMI Network Auto	□ □ □	The alarm clears automatically when sensor issue is fixed.

7.3 Pump Managers Alarms

7.3.1 Pump Manager Configuration Error

This alarm on the iCM Adv external controller appears when Evaporator\Condenser Pump Manager is configured and in communication, but configuration of pump system as not been received. This can happen during the system configuration if the iCM Adv is configured first.

Symptom	Cause	Solution
Bell icon is moving on controller's display. String in the alarm list: *EvapPM Config* Or *CondPM Config* System does not start even if enabled by iCM Adv Unit Switch	Configuration from Evap\Cond Pump Manager has not been received through Daikin Network and applied on iCM.	Check that no communication error is active and that iPM have sent its own configuration parameters to iCM. Then reboot iCM controller
Reset		**Notes**
Local HMI Network Auto	□ □ □	The alarm clears automatically when the communication is re-established, and controller is reboot.

7.3.2 Pump Manager Available Pump Alarm

This alarm on the iCM Adv external controller when Evaporator\Condenser Pump Manager communicates a cumulative alarm of the pumps.

Symptom	Cause	Solution
Bell icon is moving on controller's display. String in the alarm list: *EvapPM Avail Pmp* Or *CondPM Avail Pmp* Staging Up of the Units is inhibited.	On iPM number of alarmed pumps exceed the number of Daikin Units.	Check pumps connected to iPM controller and solve the cause of alarm.
Reset		**Notes**
Local HMI Network Auto	□ □ □	This alarm clears automatically when pump issue is fixed.

7.3.3 Pump Manager Communication Error

This alarm can occur only on iCM Adv external if Evaporator pump Manager or Condenser pump manager has been configured but communication is not working properly.

Symptom	Cause	Solution
Bell icon is blinking on controller's display. String in the alarm list: *EvapPM Comm Err.* Or *CondPM Comm Err* Staging Up of the Units is inhibited.	Process bus network is not properly cabled.	Check the continuity of the RS485 network with the Unit which is not communicating.
	Process bus communication is not running properly.	Check Units' addresses in the Process bus network. All the addresses must be different.
	EM noise over the process bus	Check the cabling. It's required to use shielded twisted pairs to connect the different Units with the shield properly connected to the system ground. See section related to field wiring for further details.
Reset		**Notes**
Local HMI Network Auto	□ □ □	The alarm clears automatically when the communication is re-established.

7.3.4 Pump Manager Missing

This alarm on the iCM Adv external controller indicates that Pump managers are not visible in the network. This can happen during the system configuration if the iCM Adv is configured first.

Symptom	Cause	Solution
Bell icon is blinking on controller's display. String in the alarm list: *EvapPM Miss Alm* Or *CondPM Miss Alm*	Wrong configuration of the system.	Check that iPM has been configured (on iPM controller). Check that same iPM has been configured on iCM.
Reset		**Notes**
Local HMI Network Auto	□ □ □	The alarm clears automatically when the communication is re-established.

7.3.5 Pump Manager Sensor Fault

This alarm on the iCM Adv external controller when Pump Manager communicates the alarm of connected sensor used for pump speed control.

Symptom	Cause	Solution
Bell icon is moving on controller's display. String in the alarm list: *EvapPM Spd Sensor* Or *CondPM Spd Sensor* Staging Up of the Units is inhibited.	On iPM sensor is broken.	Check for sensor integrity according table and allowed kOhm (kΩ) range.
		Check correct sensors operation
	On iPM sensor is shorted	Check if sensor is shorted with a resistance measurement.
	On iPM sensor is not properly connected (open).	Check for absence of water or humidity on electrical contacts.
		Check for correct plug-in of the electrical connectors.
		Check for correct sensors wiring also according electrical scheme.
Reset		**Notes**
Local HMI Network Auto	□ □ □	The alarm clears automatically when sensor issue is fixed.

7.4 Cooling Tower Manager Alarms

7.4.1 Cooling Tower Manager Communication Error

This alarm can occur only on iCM Adv external if Condenser Manager controller and Cooling Tower Manager are not communicating.

Symptom	Cause	Solution
Bell icon is moving on controller's display. String in the alarm list: *iCT Comm Err.*	Process bus network is not properly cabled.	Check the continuity of the RS485 network with the Unit which is not communicating.
	Process bus communication is not running properly.	Check Units' addresses in the Process bus network. All the addresses must be different.
	EM noise over the process bus	Check the cabling. It's required to use shielded twisted pairs to connect the different Units with the shield properly connected to the system ground. See section related to field wiring for further details.
Reset		**Notes**
Local HMI Network Auto	□ □ □	The alarm clears automatically when the communication is re-established.

7.4.2 Cooling Tower Manager Missing

This alarm on the iCM Adv external controller indicates that Condenser Pump controller and Cooling Tower manager are not visible in the network.
This can happen during the system configuration if the iCM Adv external panel is configured first.

Symptom	Cause	Solution
Bell icon is moving on controller's display. String in the alarm list: *iCT Miss Alm*	Wrong configuration of the system.	Check that iCT has been configured (on Condenser PM controller). Check that same iCT has been configured on iCM.
Reset		**Notes**
Local HMI Network Auto	□ □ □	The alarm clears automatically when the communication is re-established.

7.4.3 Cooling Tower Configuration Error

This alarm on the iCM Adv external controller when Cooling Tower Manager is configured and Condenser Pump Manager are communicating, but configuration of Cooling Tower system has not been received. This can happen during the system configuration if the iCM Adv external controller is configured first.

Symptom	Cause	Solution
Bell icon is moving on controller's display. String in the alarm list: *iCT Config Err*	Configuration from Pump Manager has not been received through Daikin Network and applied on iCM.	Check that no communication error is active with Cond iPM and that Cooing Tower Manager has sent its own configuration parameters to iCM. Then reboot iCM controller
Reset		**Notes**
Local HMI Network Auto	□ □ □	The alarm clears automatically when the communication is re-established, and controller is reboot.

7.4.4 Cooling Tower Manager Sensor Fault

This alarm on the iCM Adv external controller when Cooling Tower Manager communicates the alarm of connected sensor used for Cooling tower control.

Symptom	Cause	Solution

Bell icon is moving on controller's display. String in the alarm list: *iCT LWT Sensor*	On iCT Main Board sensor is broken.	Check for sensor integrity. according table and allowed kOhm (kΩ) range.
		Check correct sensors operation
	On iCT Main Board sensor is shorted	Check if sensor is shorted with a resistance measurement.
	On iCT Main Board sensor is not properly connected (open).	Check for absence of water or humidity on electrical contacts.
		Check for correct plug-in of the electrical connectors.
		Check for correct sensors wiring also according electrical scheme.
Reset		**Notes**
Local HMI Network Auto	□ □ □	The alarm clears automatically when sensor issue is fixed.

7.4.5 Cooling Tower # Alarm

This alarm on the iCM Adv external controller when Cooling Tower # communicates the alarm.

Symptom	**Cause**	**Solution**
Bell icon is blinking on controller's display. String in the alarm list: *CT# Alarm* *# identifies the Cooling Tower number*	Wrong configuration of the system.	Check the number of configured Units and the corresponding individual Units' configurations. All the Units must be configured with a different address and the number of Units configured on the iCM Adv external matches the number of Units in the system.
Reset		**Notes**
Local HMI Network Auto	□ □ □	The alarm clears automatically when the communication is re-established.

7.4.6 Cooling Tower # Lwt Sensor Alarm

This alarm on the iCM Adv external controller when Cooling Tower # communicates the alarm of connected leaving water temperature sensor used for Cooling tower control.

Symptom	**Cause**	**Solution**
Bell icon is moving on controller's display. String in the alarm list: *CT# LWT Sensor* *# identifies the Cooling Tower number*	On CT# sensor is broken.	Check for sensor integrity. according table and allowed kOhm (kΩ) range.
		Check correct sensors operation
	On CT# sensor is shorted	Check if sensor is shorted with a resistance measurement.
	On CT# sensor is not properly connected (open).	Check for absence of water or humidity on electrical contacts.
		Check for correct plug-in of the electrical connectors.
		Check for correct sensors wiring also according electrical scheme.
Reset		**Notes**
Local HMI Network Auto	□ □ □	The alarm clears automatically when sensor issue is fixed.

7.5 Secondary Pump Manager Alarms

7.5.1 Secondary Pump Manager Communication Error

This alarm can occur only on iCM Adv external if Secondary Pump is not communicating.

Symptom	**Cause**	**Solution**
Bell icon is moving on controller's display. String in the alarm list: *iSM Comm Err.*	Process bus network is not properly cabled.	Check the continuity of the RS485 network with the Unit which is not communicating.

	Process bus communication is not running properly.	Check Units' addresses in the Process bus network. All the addresses must be different.
	EM noise over the process bus	Check the cabling. It's required to use shielded twisted pairs to connect the different Units with the shield properly connected to the system ground. See section related to field wiring for further details.
Reset		**Notes**
Local HMI Network Auto	□ □ □	The alarm clears automatically when the communication is re-established.

7.5.2 Secondary Pump Manager Missing Alarm

This alarm on the iCM Adv external controller indicates that Secondary Pump Manager is not visible in the network.
This can happen during the system configuration if the iCM Adv external controller is configured first.

Symptom	**Cause**	**Solution**
Bell icon is moving on controller's display. String in the alarm list: *iSM Miss Alm*	Wrong configuration of the system.	Check that iSM has been configured. Check that same iSM has been configured on iCM.
Reset		**Notes**
Local HMI Network Auto	□ □ □	The alarm clears automatically when the communication is re-established.

7.5.3 Secondary Pump Manager Configuration Error

This alarm on the iCM Adv external controller appears when Secondary Pump Manager is configured and in communication, but configuration of Secondary Pump Manager system as not been received. This can happen during the system configuration if the iCM Adv external controller is configured first.

Symptom	**Cause**	**Solution**
Bell icon is moving on controller's display. String in the alarm list: *iSM Config Err*	Configuration from Secondary Pump Manager has not been received through Daikin Network and applied on iCM.	Check that no communication error is active and that iSM have sent its own configuration parameters. Then reboot iSM controller
Reset		**Notes**
Local HMI Network Auto	□ □ □	The alarm clears automatically when the communication is re-established, and controller is reboot.

7.6 Events

In this section all the events will be described. Events are situation where some functionality cannot be started or managed by the iCM for a wrong configuration of the system.

7.6.1 Heat Recovery Configuration Error

This alarm on the iCM Adv external controller, indicates that the system configuration would require the use of the iCM Adv option, but the Slave option has been configured

Symptom	**Cause**	**Solution**
No alarm bell is shown on controller display The event will be shown in the event log. String in the event log: *HeatRec Config Error*	Wrong configuration of the system to be managed by iCM.	Check if Slave units have iCM Option configured

Heat Recovery managed by iCM is inhibited. NOTE: Heat Recovery can be managed by HR unit according to unit logic		

7.6.2 Free-cooling Configuration Error

This event on the iCM Adv external controller, indicates that the system configuration would require the use of the iCM Adv option, but the Slave option has been configured.

Symptom	Cause	Solution
No alarm bell is shown on controller display The event will be shown in the event log. String in the event log: *FreeClg Config Error* Free cooling managed by iCM is inhibited. NOTE: Free-cooling can be managed by FC unit according to unit logic	Wrong configuration of the system to be managed by iCM.	
		Check if Slave units have iCM Option configured
		Check that “Common LWT sensor” is configured, installed on supply header and connected to iCM Adv external controller

7.6.3 Energy Monitoring Configuration Error

This event on the iCM Adv external controller, indicates that the system configuration would require the use of the iCM option, but the Slave option has been configured.

Symptom	Cause	Solution
No alarm bell is shown on controller display The event will be shown in the event log. String in the event log: *EnergyMon Config Error* Energy monitoring at system level is not available	Wrong configuration of the system to be managed by iCM.	

8 TOUCH PANEL

iCM Advanced controller is provided of an external touch panel with which it communicates all parameters via a BACnet/IP communication.

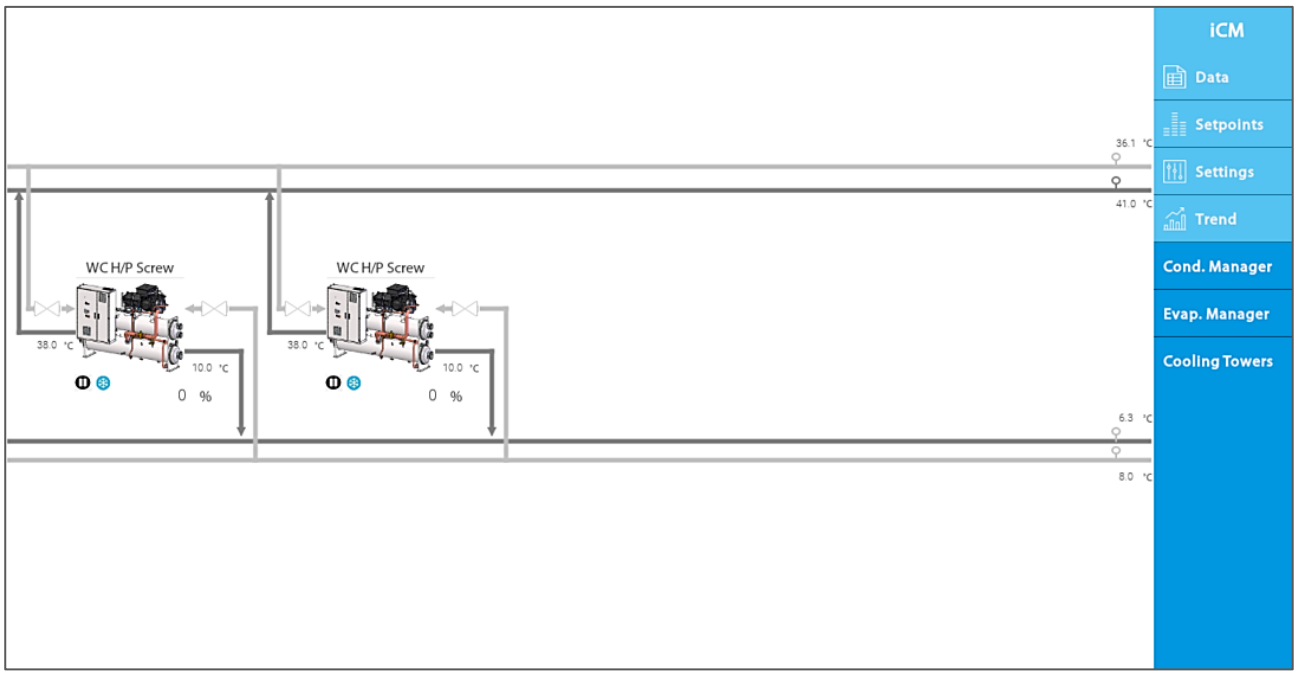

Figure 45: Touch Panel home page

The operator can monitor and manage the iCM Advanced parameters directly from the touch panel.
This section explains how to configure the iCM Adv controller and the touch panel so that BACnet/IP communication occurs correctly.

8.1 Configuring iCM Adv

First of all, it is necessary to enable the external touch panel in the iCM Adv controller configuration.

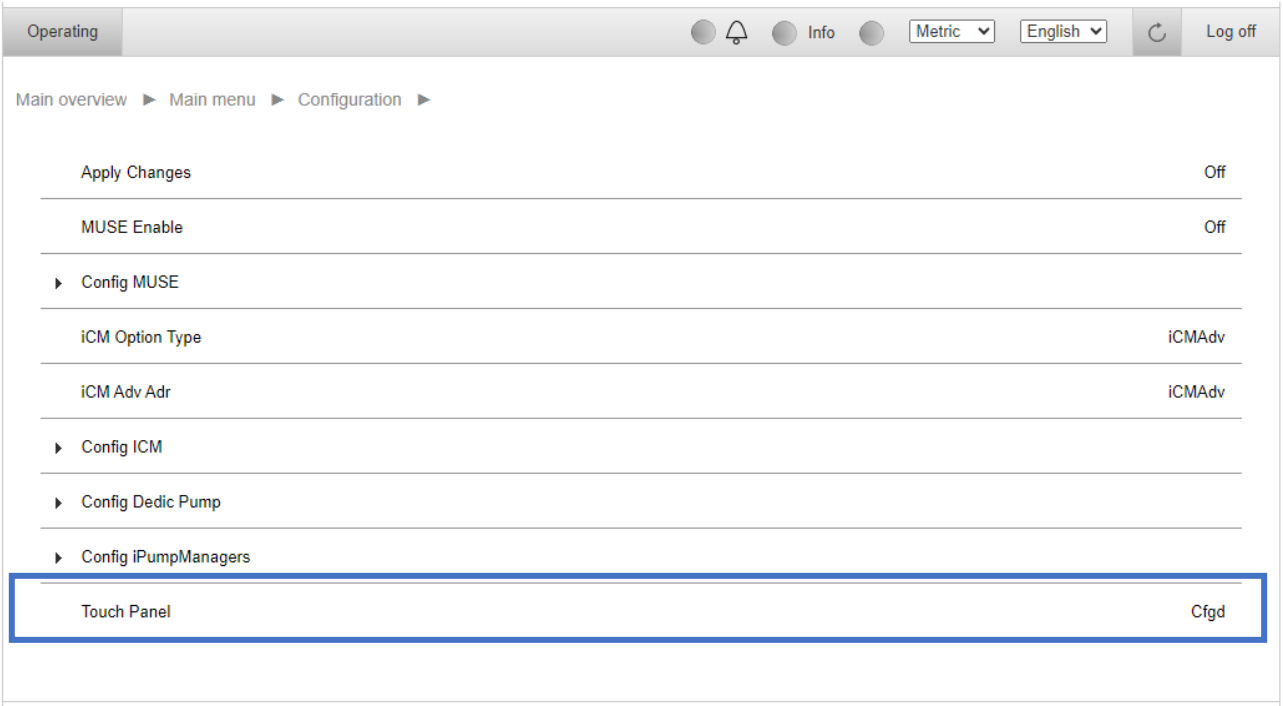

Figure 46: Touch panel configuration

After the option has been enabled, the “Apply Changes” is required.

8.1.1 BACnet parameters

Configure the BACnet communication in Main Menu → Controller SetUp → BACnet
It is necessary to configure:

- Device ID
- Active TCP/IP
- Port
- Controller restart

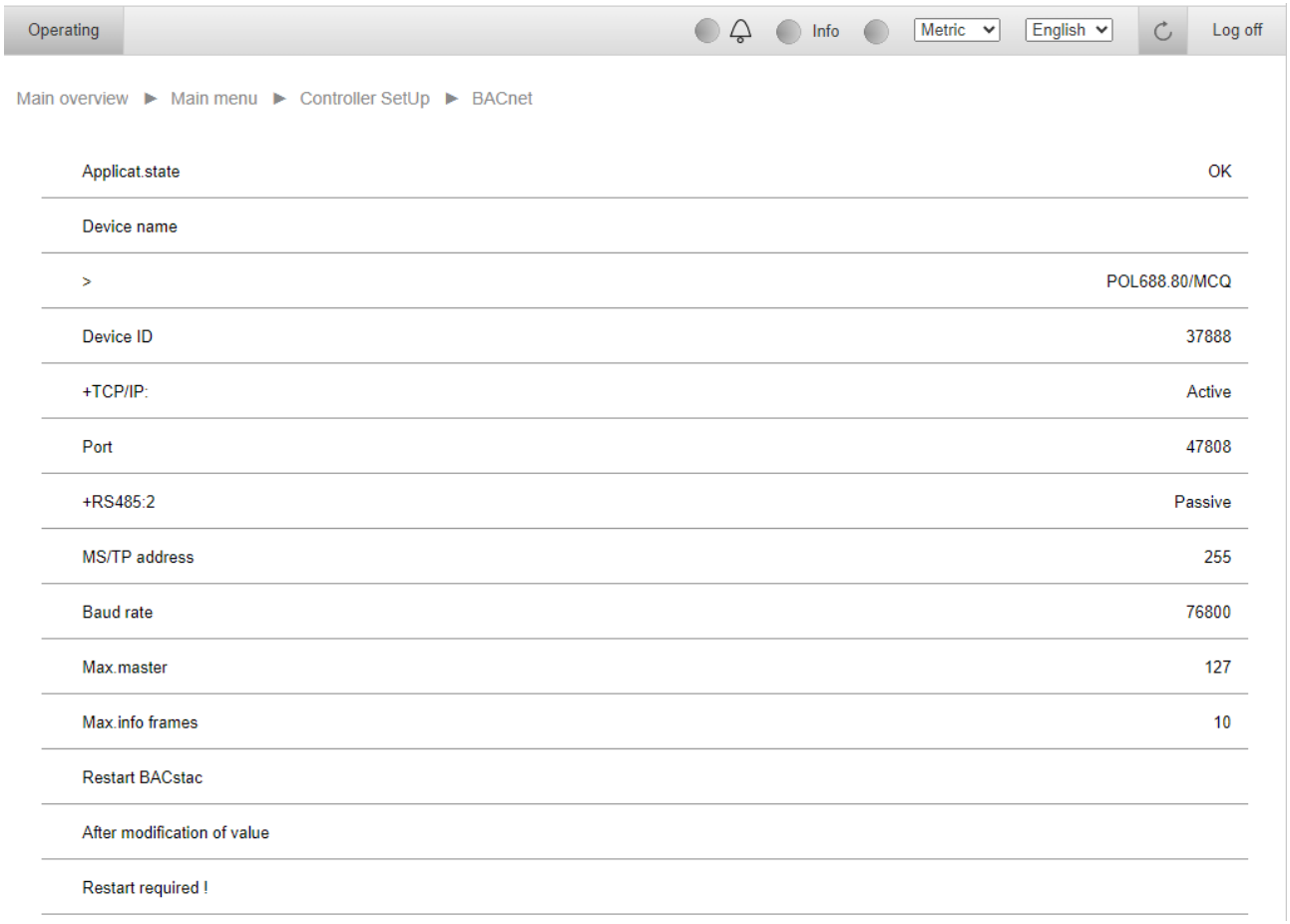

Figure 47: BACnet parameters

8.2 Configuring Touch Panel

The touch panel is self-configuring, once the BACnet connection with the controller is established, the panel displays all the pages needed to view and manage the iCM Adv directly from the panel itself.

8.2.1 Touch panel log in

Log in to the panel with the credentials to configure panel settings.

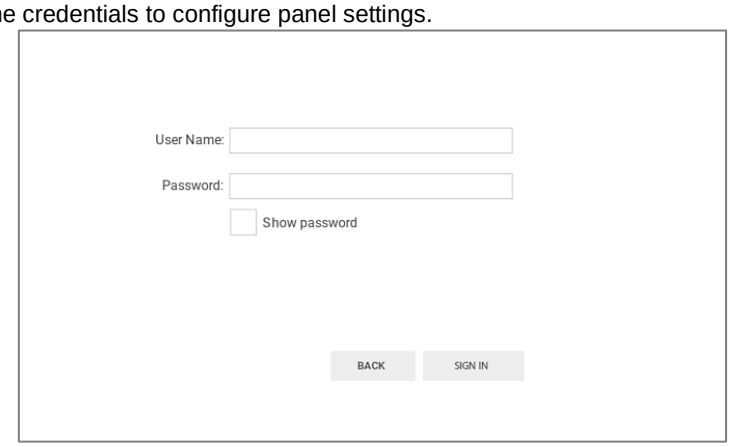

Figure 48: Touch panel log in

8.2.2 Touch panel communication parameters

In the main page click on  button to configure panel settings.
In this page set:

- iCM Adv BACnet ID (same value as previously set in Device ID on the controller)
- Network Adapter Parameters
  - Eth 0: this port is available for an external communication.
  - Eth 1: this port is enabled for BACnet communication with the controller.
- Touch Panel BACnet ID
- Touch Panel BACnet Port

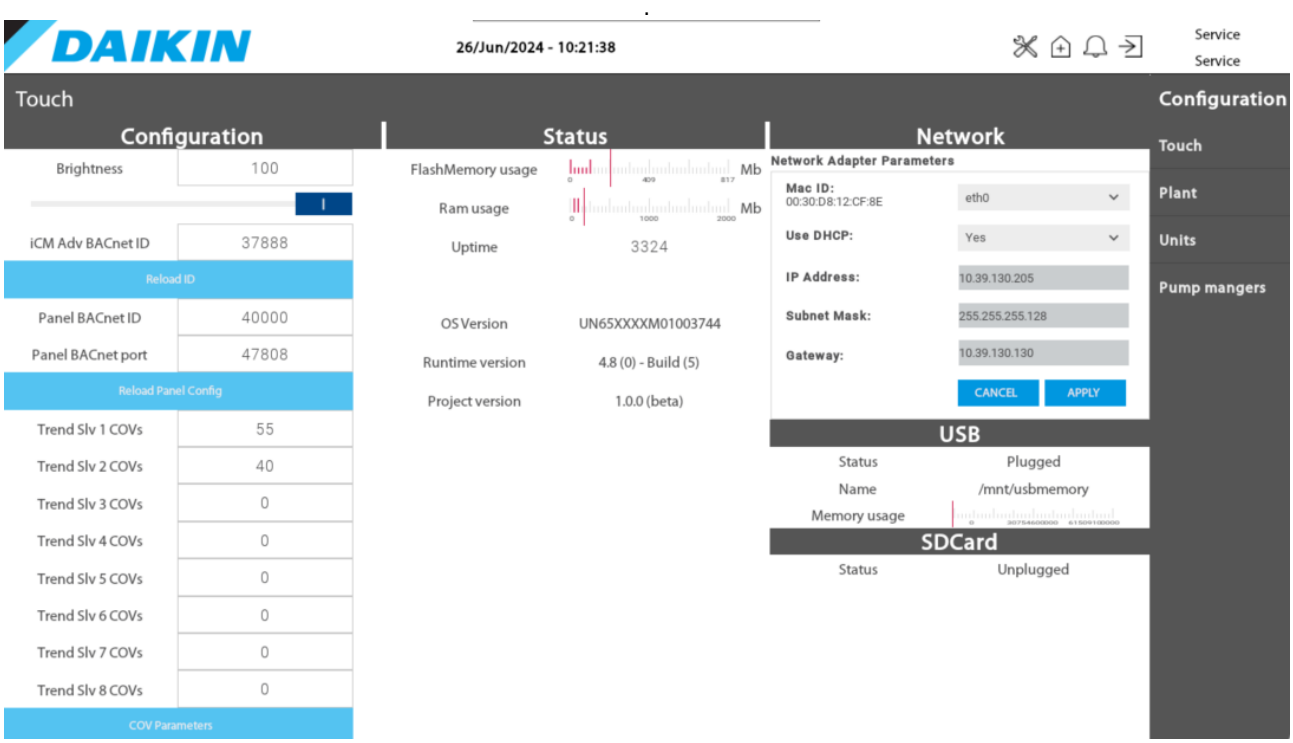

Figure 49: Touch panel configuration page

Once the iCM Adv BACnet ID has been changed, it is necessary to click on the button "Reload ID" to perform a new scan.

8.2.3 Reading /writing variables

Depending on the access level, the user can read or write the system parameters. Only the variables in the rectangle can be written by the user, the other variables are read-only.
Menus and variables in grey indicate that they are not enabled.

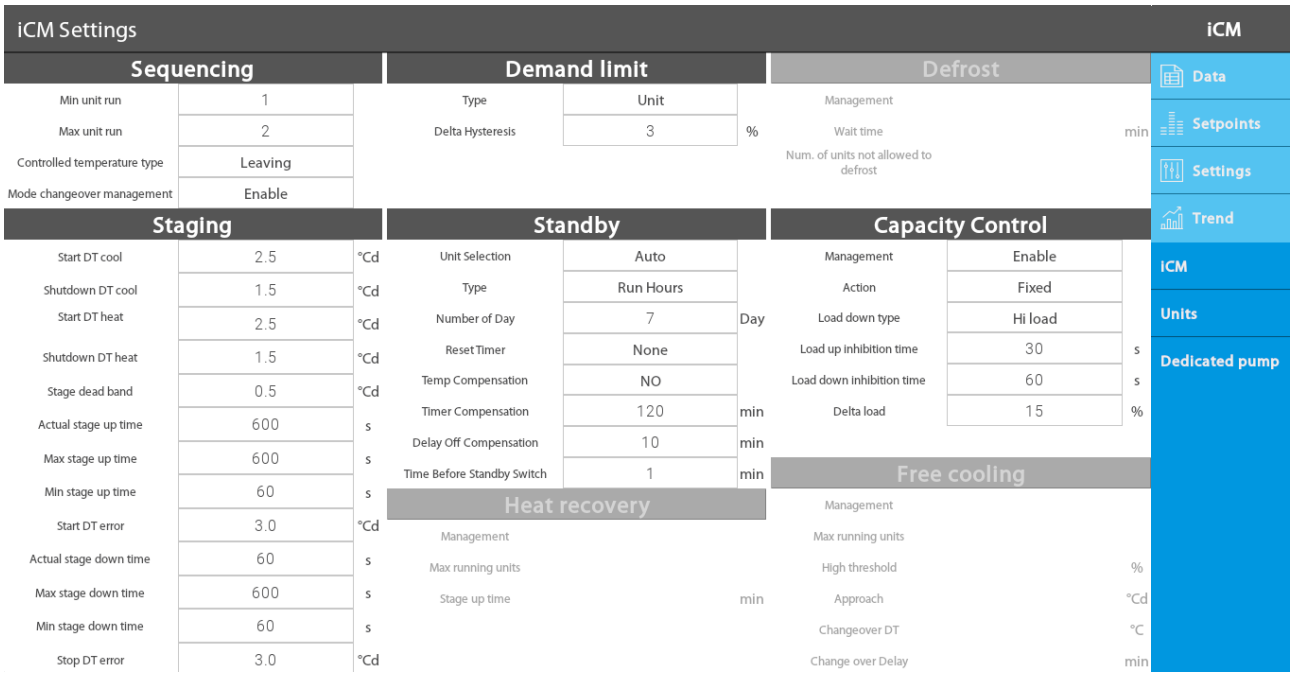

Figure 50: iCM Settings menu

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