

DAIKIN



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**Operating Manual
D-EIMOC03508-25_00EN**

iDataCentre Manager



iDCM Versioning

Revision	Software Version	Changelog
0 – 08/2025		Introduction of iDCM

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1 WHAT IS iDCM

1.1 iDataCentre Manager Description

iDCManager is a highly specialised control and optimisation solution dedicated to plant rooms in Datacenters. Created with an in-depth understanding of thermodynamic variables involved in managing plant room HVAC equipment, iDCManager enables optimum control of every device and the integration of the plantroom into a single synergistic system. iDCManager achieves optimisation through a continuous process articulated through various levels of smart software functions.

iDCManager continuously optimises plant working conditions by adjusting equipment staging and sequencing, managing operating set-points as well as water flows throughout the entire HVAC system.

This results in significant energy savings, greater control flexibility and will provide opportunity to optimally operate and maintain any plant room.

Additionally, iDCManager can offer different levels of redundancy making this system ideal for high reliability requirements. Its high flexibility allows to incorporate any kind of dedicated system controls requirements.

iDCManager has an intuitive HTML5 interface, effortlessly accessible across any web browser. Users gain real-time insights into plant performance, compare equipment efficiency, chart historical data, and monitor alarms.

1.2 Datasheet

Product Name	iDataCentre Manager
Summary of Features	<p>Application-wide functionality:</p> <ul style="list-style-type: none"> • Feature rich HTML5 user interface • Multi-language support (English, Italian, Traditional Chinese, Simplified Chinese) • Alarming • Charting • History <p>Water Plant-room Management functionality:</p> <ul style="list-style-type: none"> • Advanced staging algorithms • Free Cooling management • Booster Heater management • Chilled water temperature optimization • Pumping and distribution optimization • Chiller control & optimization
Applicable system type	<ul style="list-style-type: none"> • Support for 2-Pipe Distribution system • Support for Primary Circuit <ul style="list-style-type: none"> ○ Dedicated Pump Configuration ○ Headered Pump Configuration
Equipment limit	<ul style="list-style-type: none"> • Up to 20 chillers • Up to 21 pumps in N+1 configuration • Up to 24 pumps in 2N configuration
Equipment compatibility	<p>Cool Generation Equipment:</p> <ul style="list-style-type: none"> • Daikin EWAT-BC • Daikin EWAD/S/H-TZ-D, EWFD/S/H-TZ-D • Daikin EWWD-VZ
Applicable sectors	<ul style="list-style-type: none"> • Datacentre
Web user interface technology	<ul style="list-style-type: none"> • Accessible via standard web browser without need for proprietary tools. • Desktop & tablet access. • Secured by HTTPS protocol User access level control. • Read only access for general user, operator access for plant manager user, engineering access for commissioning user.
Hardware platform	<p>CI-EdgeX series:</p> <ul style="list-style-type: none"> • Broadcom BCM2837B0, Cortex-A53 (ARMv8) 64-bit SoC @ 1.2GHz • 1GB LPDDR2 SDRAM, 8 GB eMMC storage

	<ul style="list-style-type: none"> • 2 x 10/100 Mbps ethernet ports • 24VDC +/-10%, Consumption 400mA power supply • 2 x RJ12 Edge Connect breakout, expandable IO • 2 x RS485 ports
Software platform	Niagara N4 framework, developed by Tridium

Table 1 - iDCManager Datasheet

1.3 Licensing

According to the number of chiller units to be integrated and managed, five different sizes of iDataCentre Manager are suggested:

1. Up to 4 chillers
2. Up to 8 chillers
3. Up to 12 chillers
4. Up to 16 chillers
5. Up to 20 chillers

The license is strictly related to the size of the iDataCentre Manager and it is unique for the controller inside iDataCentre Manager.



In case of changes in configuration that can increase the number of units integrated and possible request of a different license.

2 INSTALLATION MANUAL

2.1 Compatible Water Plant type

iDCM can manage only a Primary Variable-only plant-layout with specific devices in the water plant as listed in paragraph 1.2 Datasheet.

iDCM can manage only two-pipe system in Cooling-only configuration.

The only possible plant-layout is:

- Primary Variable-only.

For the primary loop, there could be two possible configurations of water pumps:

- 1) Dedicated pumps: each Daikin Unit has and manages its own onboard pump (one pump per units)
- 2) Manifolder pumps: iDCM can manage up to 24 pumps in parallel that serve up to 20 Daikin Units. iDCM controls those pumps through a compatible variable frequency driver (VFD).

2.1.1 Primary Variable Only

A Primary Variable-Only system is composed by only one circuit where Daikin units and Air side equipment are connected to. The circuit flow is regulated by the primary pumps.

iDataCentre Manager can manage two types of pump configuration for a Primary Variable-only system:

2.1.1.1 Dedicated pumps

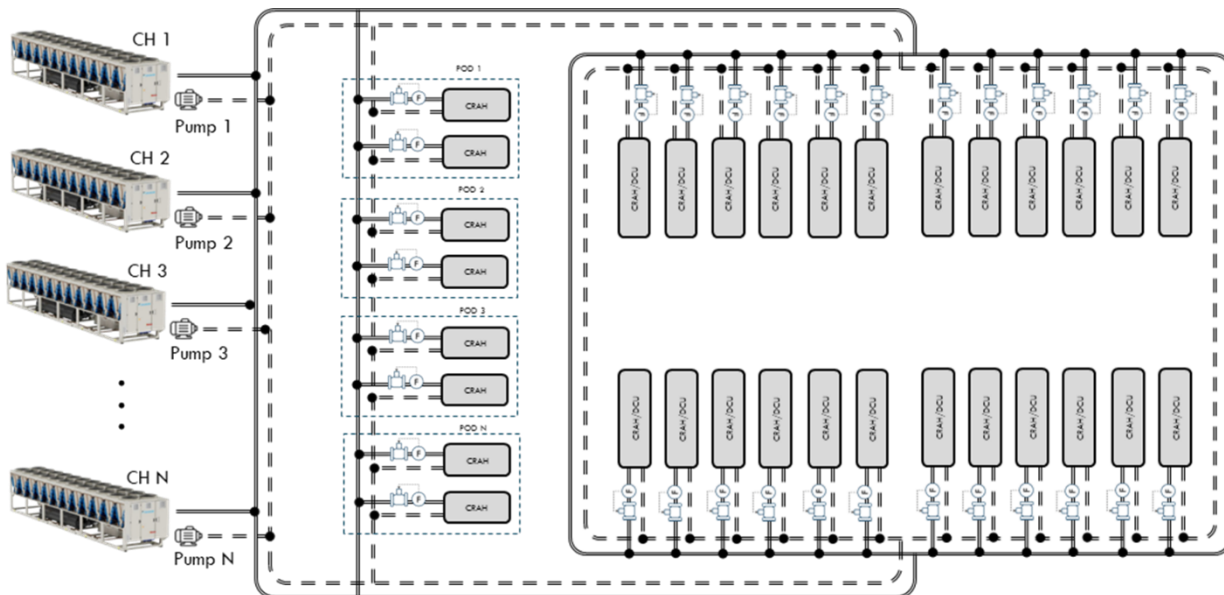


Figure 1 - Dedicated Primary Variable Only

- VFD of Onboard pumps is connected and managed by Daikin unit through communication, while iDataCentre Manager regulates the speed of the VFD communicating with the unit.
- Bypass pipe with a motorized bypass valve must be installed and it can be controlled by iDataCentre Manager.
- Differential pressure sensor must be installed downstream of the bypass pipe and connected to iDataCentre Manager, allowing the control of the VFD pumps and Bypass Valve actuator.
- Leaving water temperature is connected to first Daikin Unit and its value is communicated to iDataCentre Manager.
- Entering water temperature is an optional that can be requested during selection of the system.

2.1.1.2 Manifolded pumps

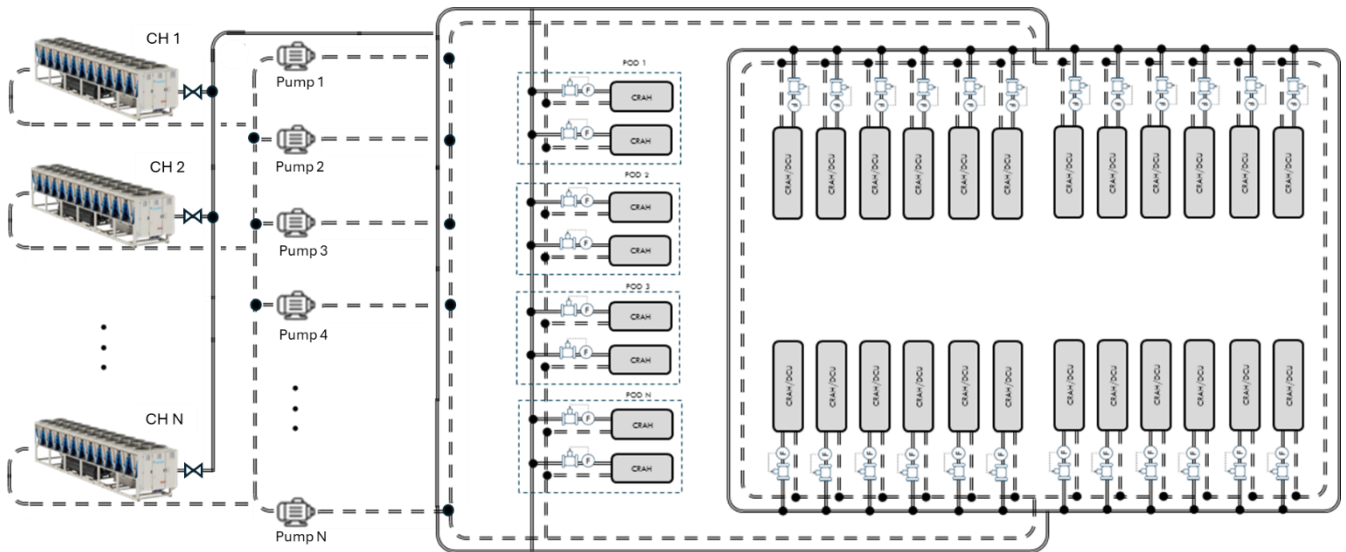


Figure 2 - Manifolded Primary Variable Only

- External pumps with compatible VFD are provided by Factory (Daikin Units are not provided with onboard pump). Variable Frequency Drivers must be connected to iDataCentre Manager. iDataCentre Manager manages the command, feedback, speed of the pump through the communication with VFD.
- A Shut-off valve must be installed and connected to dedicated to each unit. Daikin Unit commands the shut-off valve actuator.
- Bypass pipe with a motorized bypass valve must be installed and it can be controlled by iDataCentre Manager.
- Differential pressure sensor must be installed downstream of the bypass pipe and connected to iDataCentre Manager, allowing the control of the VFD pumps and Bypass Valve actuator.
- Leaving water temperature is connected to first Daikin Unit and its value is communicated to iDataCentre Manager.
- Entering water temperature is an optional that can be requested during selection of the system.

2.2 Hardwired Connections

2.2.1 Leaving water temperature sensor

For the management of primary circuit and Chiller by iDataCentre Manager, a Leaving Water Temperature sensor is mandatory.

The sensor must be installed in the plant-room downstream of the bypass pipe.

The sensor type is:

- 4-20 mA, 2x1.5 mm²

Please refer to Daikin Electrical Diagram for detailed information.



For additional redundancy, it is recommended to install two sensors related to the leaving water temperature.

Each probe should be installed one for each leg of the ring.

2.2.2 Entering water temperature sensor

For the Free Cooling management by iDataCentre Manager, an Entering Water Temperature sensor is mandatory.

The sensor must be installed downstream of the bypass pipe.

The sensor type is:

- 4-20 mA, 2x1.5 mm²

Please refer to Daikin Electrical Diagram for detailed information.



For additional redundancy, it is recommended to install two sensors related to the entering water temperature.

Each probe should be installed one for each leg of the ring.

2.2.3 Differential pressure sensor

In Primary Variable system, a differential pressure sensor is mandatory to control the speed of the pump to maintain the system differential pressure setpoint.

The sensor must be mounted downstream of the bypass pipe.

The sensor type can be:

- 4-20 mA, 2x1.5 mm²

Please refer to Daikin Electrical Diagram for detailed information.



For additional redundancy, it is recommended to install two sensors related to the system differential pressure. Each probe should be installed one for each leg of the ring.

2.2.4 Flow meter sensor

The flow meter sensor is mandatory to control the system flow in case iDCM performs flow-based unit staging. The sensor type is:

- 4-20 mA, 2x1.5 mm²

Please refer to Daikin Electrical Diagram for detailed information.



For additional redundancy, it is recommended to install two sensors related to the system flow. Each probe should be installed one for each leg of the ring.

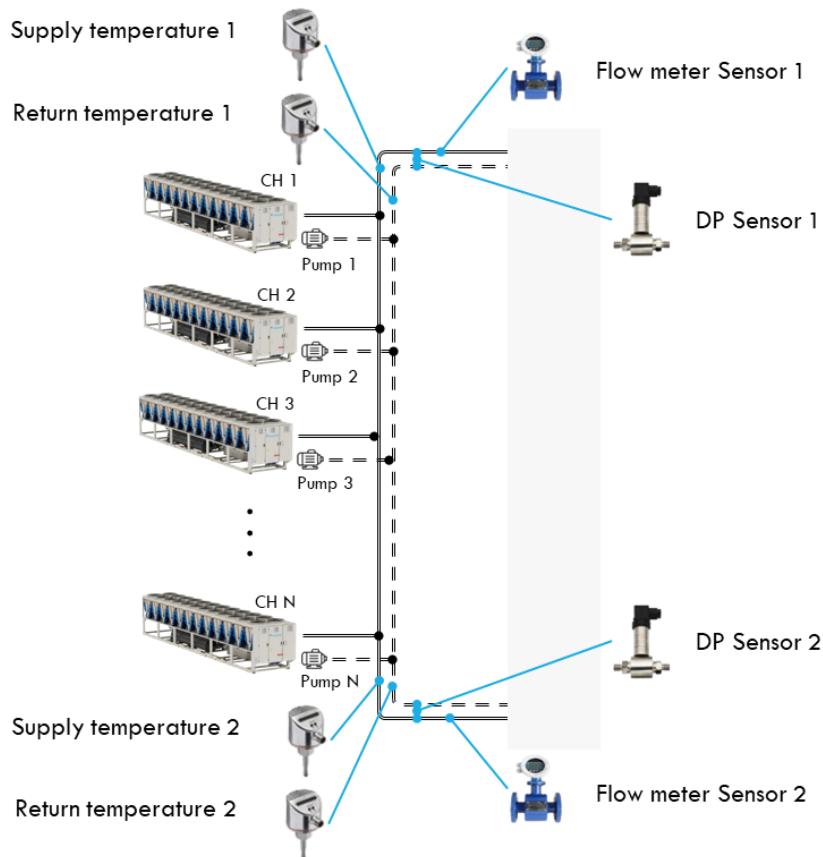


Figure 3 - Sensors location

2.3 iDataCentre Manager Network connection

iDataCentre Manager can manage compatible devices via the following serial protocols:

- Modbus RTU
- Modbus TCP/IP
- BACnet TCP/IP

2.3.1 Modbus RTU

iDCM provides two Modbus RS485 ports on the main controller CI-EdgeX2:

- Port RS485-1: is dedicated to CIx50IO.
- Port RS485-2: can be dedicated to daisy chain.

If additional ports are needed, the number of ports can be extended via the Modbus RTU CIx4-485 module.

In the case of connection via Modbus RTU, the optimal configuration is a daisy chain configuration.

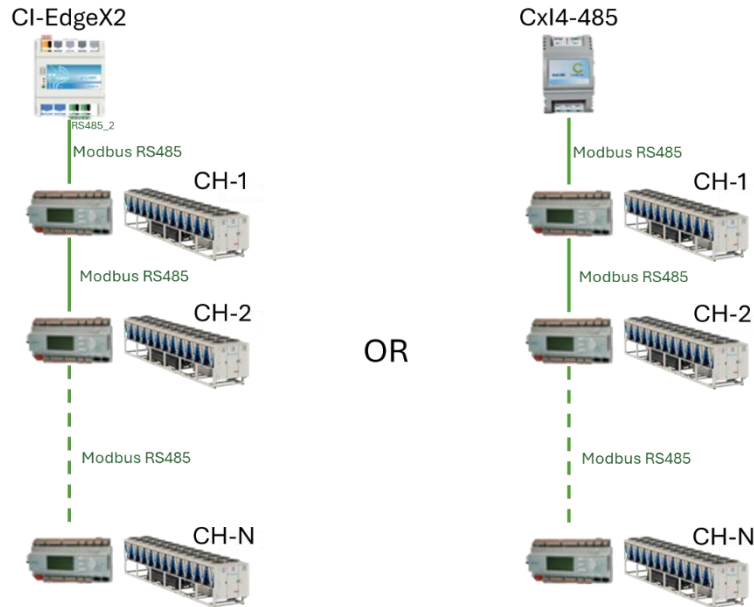


Figure 4 - Modbus RTU daisy chain configuration



In case more redundancy is required, more daisy chains can be provided. In this case one or more Modbus RS485 CI4-485 modules will be required.



Each device connected to the same daisy chain must have a unique Modbus address. All devices connected to the same daisy chain must have the same configuration for the following parameters:

- ***Baudrate***
- ***Parity***
- ***StopBits***

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

- 3-wire cable Twisted and Shielded
- Electrical characteristics:
 - o Nom. Conductor DCR: 72 Ohm/km
 - o Nom. Capacity: 39pF/m
 - o Nom. Impedance: 120 Ohm
- Bus cable length between 2 Units Max. 700 m
- Total bus cable length Max. 1,000 m



If more than 10 devices are connected to a Modbus network, two resistors 120 Ohm must be connected to the beginning (iDataCentre panel RS485 terminals) and to the end of the cabling (last device RS485 terminals).

Starting from iDCM panel, the RS485 terminals [Ref1, A+, B-] of each device must be connected in parallel.

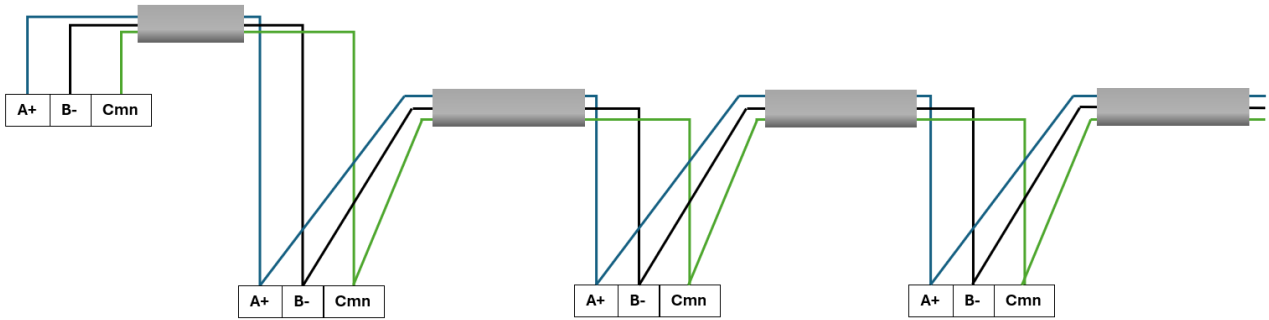


Figure 5 - General Example of Modbus Network



Star or tree configurations of the Modbus network are not supported and they can cause communication issues.

2.3.2 Modbus TCP/IP

iDCM provides two Ethernet/IP ports on the main controller CI-EdgeX2:

- Eth-1: is dedicated to the connection with the Ethernet switch
- Eth-2: can be dedicated to the connection with an external BMS.

In the case of connection via BACnet TCP/IP, the optimal configuration is a star configuration.

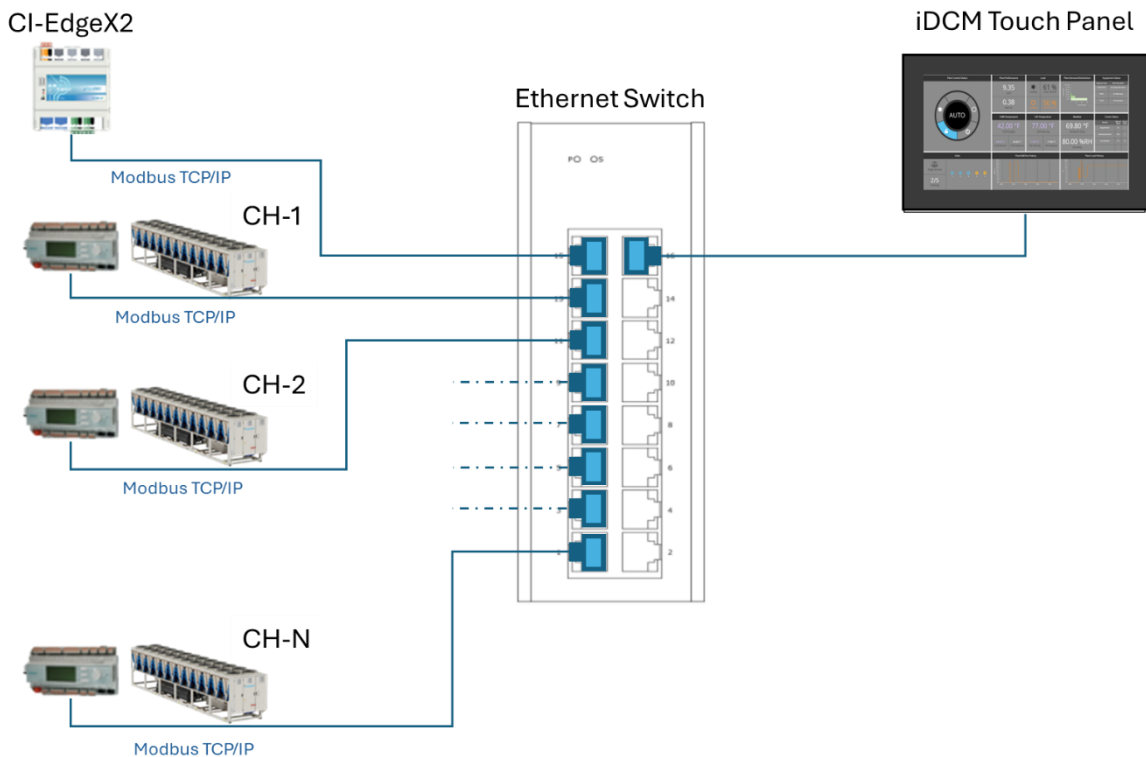


Figure 6 - Modbus TCP/IP star configuration

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

- Ethernet Cable CAT6A LSZH

2.3.3 BACnet TCP/IP

iDCM provides two Ethernet/IP ports on the main controller CI-EdgeX2:

- Eth-1: is dedicated to the connection with the Ethernet switch
- Eth-2: can be dedicated to the connection with an external BMS.

In the case of connection via BACnet TCP/IP, the optimal configuration is a star configuration.

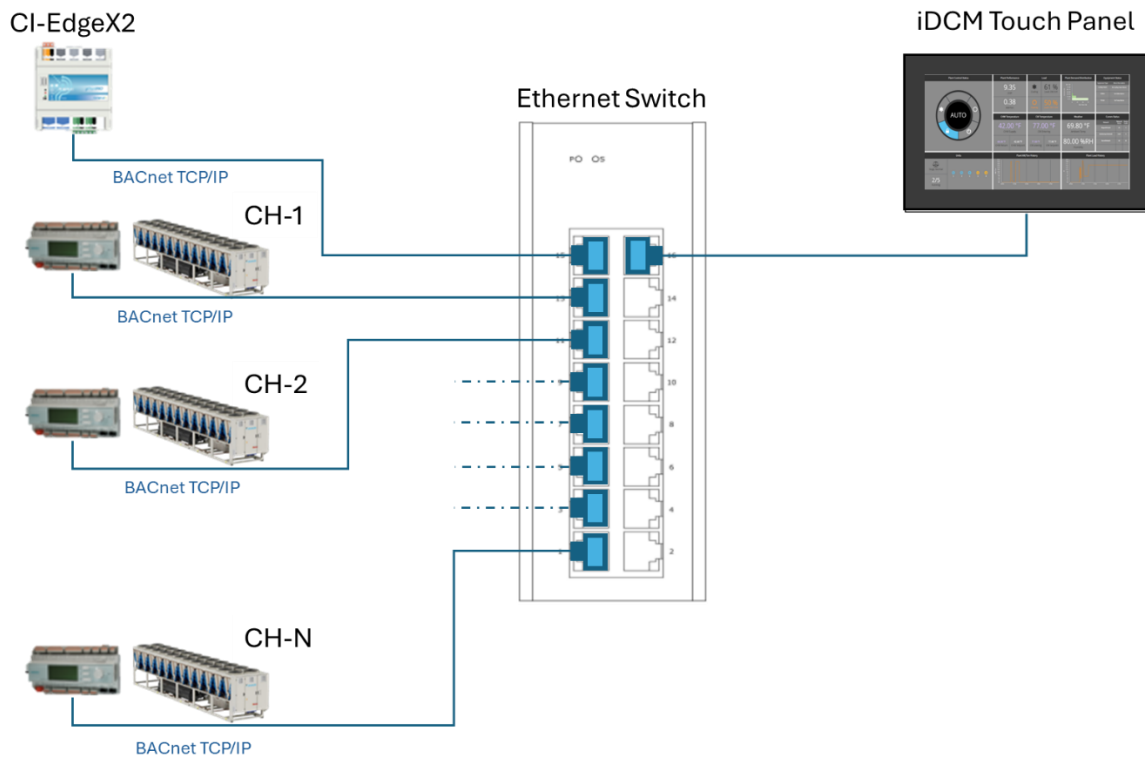


Figure 7 - BACnet TCP/IP star configuration

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

- Ethernet Cable CAT6A LSZH

2.4 iDataCentre Manager Interface

It is possible to access the iDataCentre Manager interface connecting the Ethernet Port to any computer using any web browser.

If a web browser on a third-party support device is not available, iDataCentre Manager cannot be accessed.

The cable to be used is:

- Type: Ethernet CAT6A LSZH.



A computer or touch panel is not part of Daikin provision.

3 NAVIGATION

iDataCentre Manager is provided with a web interface. This interface can be accessed through any web Browser (MS Edge, Google Chrome, Firefox, etc).

User needs to connect a Personal computer or tablet through an ethernet cable to the iDataCentre Manager controller Ethernet port.

iDCM controller has two Ethernet ports configured with default IP address

- Ethernet Port 1 (Eth0):
 - o IP Address: 192.168.1.100
- Ethernet Port 2 (Eth1):
 - o IP Address: 192.168.40.200
- Both Port:
 - o SubnetMask: 255.255.255.0

Typing in the web browser the address <https://192.168.1.100:9092>, the login page will display



iDataCentre Manager controller and panel are not provided with a physical interface. User must provide a personal computer or a tablet to access to the controller.

3.1 Login Page

Upon reaching login screen of iDataCentre web interface, the user will first be prompted to enter a username and password. There are three level of access, each of them with specific rights:

- Dashboard: able to access and monitor the plant operation only to the Overview page. Dashboard user has no access to the configuration portal and Plant manager view.
- PlantManager: PlantManager user operate manually the device of the plant. PlantManager can monitor the whole system and override commands and setpoints for Water Side devices.
- Configurator: Config user can commission iDataCentre project installation and edit plant design information and control parameters. Config user can change configuration of iDataCentre Manager, to change settings of the control functions, to override commands and setpoints for each device, monitor the whole system.

MasterStation

Username: proConfig

Password:

Login

Figure 8 - Login Screen

3.2 Navigation Menu

According to access level a different menus can be accessed.

In case of Dashboard level, only “Overview” page will display. User can monitor the main information and access to “Alarm” page.



Figure 9 - Overview page

In case of “PlantManager” level, user has access to Plant manager menus where plant can be operated manually.

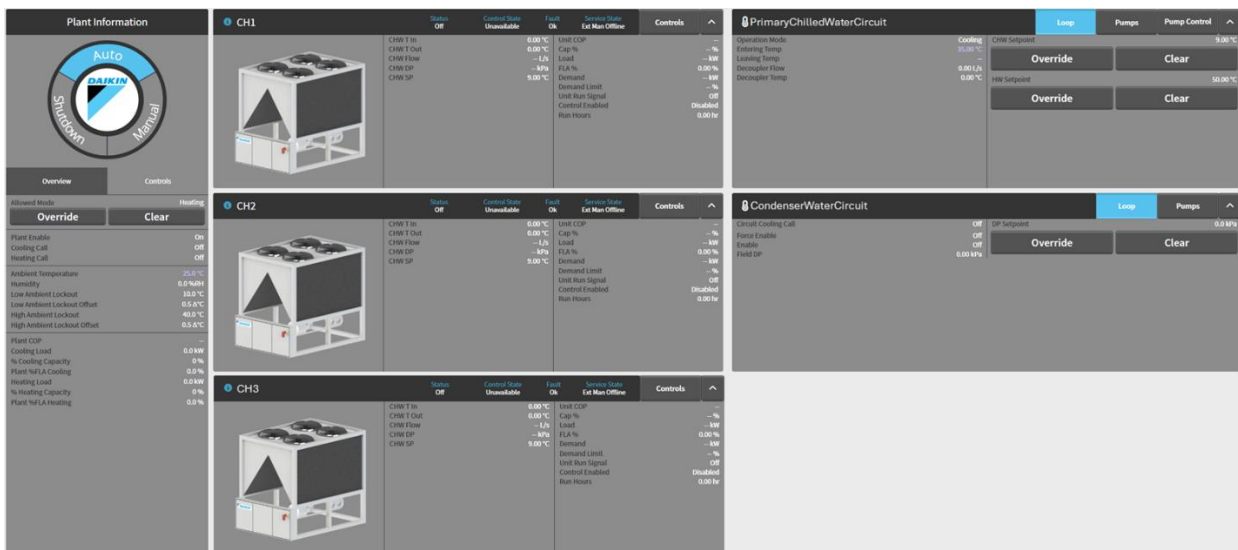


Figure 10 - PlantManager page

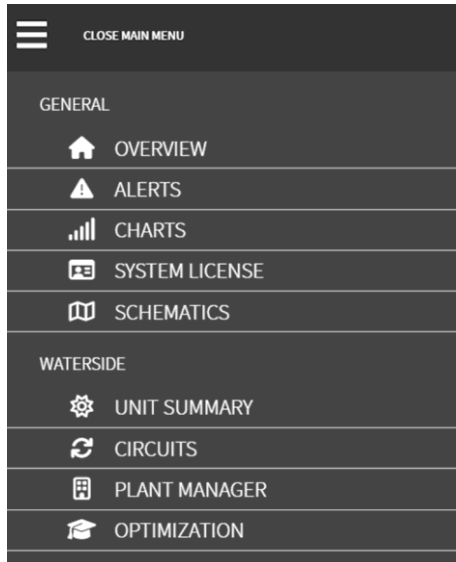


Figure 11 - PlantManager Menus

In case of Configurator level, user has access to “Overview Page”, PlantManager menus, Configuration menus:

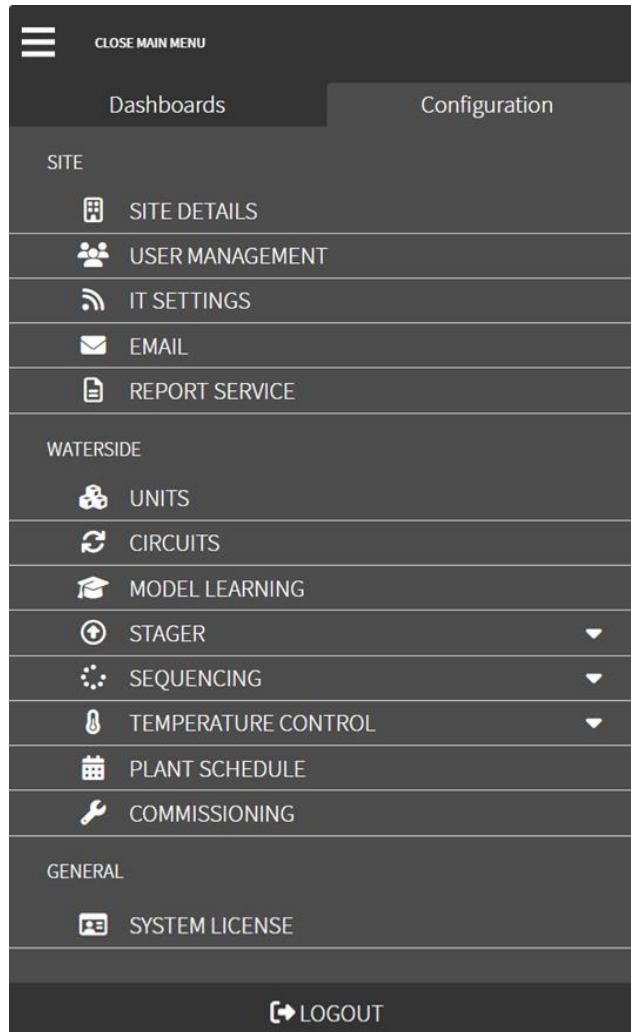


Figure 12 - Configuration Menus

4 CONFIGURATION MANUAL

In the following sections, all the menus of iDataCentre Manager configuration for HVAC system will be explained. This chapter is intended to be used by trained Daikin Service engineers and only to check the configuration in iDataCentre Manager.

4.1 Configuration Portal Navigation

The user can navigate around the iDataCentre Manager “Configuration Portal” by clicking the menu icon in the top left of the iDataCentre Manager screen.



Some menus contain settings to be fine-tuned to grant an optimal management of the iDataCentre Manager. Other menus instead are related to configuration of the devices and they should not be modified.

The navigation menu will appear from the left side of the screen as below. Only the highlighted menus are “Configuration” menu

- SITE
 - **Site Configuration**
 - User Management
 - IT Settings
 - Email
 - Report Service
- WATERSIDE
 - **Units**
 - **Circuits**
 - Model Learning
 - Stager
 - Sequencing
 - Temperature Control
 - Plant Schedule
 - Commissioning
- **GENERAL**
 - **System License**

The user can close the main menu and return to the current screen by pressing 'close main menu' at the top of the navigation menu. The user can also choose to log out of iDataCentre Manager by clicking the 'logout' button.

A user can switch to the Dashboard Portal by clicking on the 'DASHBOARD' tab. A series of alternate read-only screens are present within the dashboard portal.

Please refer to the iDataCentre Manager User manual chapter for information regarding the iDataCentre Manager “Dashboard portal”.

4.2 Site Configuration

Accessing as Configurator user, the first page to display is the Site Configuration menu

Figure 13 - Site Configuration

Site Details and Configuration	
Parameter	Description
Site Name	The site name can be configured here. The site name will appear at the bottom left hand of the screen in the footer after it has been configured

Site Details and Configuration	
Unit Arrangement	The Unit Arrangement will be configured here. The 'Parallel' option indicates a plant with units in a standard configuration.
CO2 Factor	The carbon dioxide equivalent factor per common unit.
Electricity tariff	The electricity tariff will be configured here.

4.3 Units Configuration

Units can be configured in iDataCentre Manager by navigating to the Units Configuration page. There are 7 options for Units to be added. The 7 options include: Water Cooled Chiller, Air Cooled Chiller, Dual Production Unit, Air Heat Pump, Air Reversible Heat Pump, Water Heat Pump, and Water Reversible Heat Pump.



Only Water Cooled Chiller and Air Cooled Chiller are supported. It highly recommended to not select other kind of devices.



Any Kind of modification of the Configuration (Adding or deleting a unit) can lead to a malfunctioning of the iDataCentre Manager management.



Daikin Service Engineer is allowed only to change "name" to a unit, to avoid any wrong configuration.

4.3.1 Water Cooled Chillers

To configure this water cooled chiller with all required design data, click the gear icon next to the air cooled chiller label. A window should appear as displayed below.

Figure 14 - Water Cooled Chiller Configuration Wizard

This presents the first page of the design data to be added in for the water cooled chiller.

Once all necessary data has been entered into this page, the *Next* button can be selected to navigate to the *Circuits* page of the unit wizard, where circuits can be added and compressor can be added and assigned to each circuit.

Figure 15 - Circuit Configuration Wizard

Once all necessary data has been entered into this Circuits page and select *Next* to the Evaporator page of the unit wizard.

Figure 16 - Evaporator Design Data

Once all necessary data has been input into the Evaporator page of the unit wizard, select *Next* to move to the Condenser page.

Figure 17 - Condenser Design Data

Once all necessary data has been input into the Condenser page of the unit wizard, select *Next* to move to the Control page.

Figure 18 - Water Cooled Chiller Control Settings

Water Cooled Chiller Design Data		
Parameter	Description	Units
Air Cooled Chiller Page		
Display Name	The name of the unit	
Unit Year	The manufacturing year of the unit	
Brand	The manufacturer of the unit	

Water Cooled Chiller Design Data		
Unit Display Number	The display number that will appear in iDataCentre Manager for this unit. The field is automatically filled and there must be a number entered for iDataCentre Manager to operate correctly. Throughout all screens, iDataCentre Manager will display the unit using this display number.	
Cooling Capacity	The design cooling capacity the unit is capable of	
Refrigerant Type	The refrigerant type used for this unit	
Compressor Type	The type of compressors on this unit	
Design Current	The unit's full load design current	Amps
Design Voltage	The unit's design voltage	Volts
Design Power Factor	The design power factor of the unit	
Minimum Cooling Load	Minimum required cooling capacity load	%
Minimum Pressure Ratio	Minimum required pressure ratio	
Maximum Pressure Ratio	Maximum required pressure ratio	
Circuits Page		
Type	The compressor speed which it could be either variable or constant	
Evaporator Page		
Fluid Specific Heat	The specific heat of the working fluid flowing through the evaporator	kJ/kgC
Is Isolation Valve present	Indicate if the Isolation Valve is present or not	
Isolation Valve Type	Is the isolation valve analog or digital	
Isolation Valve Drive Time	The time it takes for the isolation valve to open or close	seconds
Design Temperature In	The design full load production water return temperature for the chiller	°C
Design Temperature Out	The design full load production water supply temperature for the chiller	°C
Design Flow	The design full load production water flow for the chiller	L/s
Design Differential Pressure	The design full load production water differential pressure	kPa
Design Approach	The unit design production approach. The production approach is the difference between the production leaving water temperature and the fully saturated refrigerant temperature.	°C
Control Sensor	The control sensor determines whether the unit's DP sensor input or whether the unit's flow sensor input is used for pump or bypass valve control	
Pump Run On Time	The time that production water pumps will remain on after the chiller has become disabled	min
Design Flow Low Limit	The minimum amount of flow the vessel should receive	%
Design Flow High Limit	The maximum amount of flow the vessel should receive	%
Low Flow Pump Threshold	The amount to prevent pump speed decrease	%
High Flow Pump Threshold	The amount to prevent pump speed increase	%
Low Flow Bypass Threshold	The lowest amount of flow found to be acceptable through the bypass	%
Check Flow Safety On Startup	This is a field that has the option to be enabled or disabled	
Flow Stability Timer	The timer required to wait until the stability of the flow is checked	seconds
Check Flow When Chiller Running	This option can be either enabled or disabled. If enabled, iDataCentre Manager will monitor flow through the unit while it is running	
Condenser Page		
Fluid Specific Heat	The specific heat of the working fluid flowing through the evaporator	kJ/kgC
Is Isolation Valve present	Indicate if the Isolation Valve is present or not	

Water Cooled Chiller Design Data		
Isolation Valve Type	Is the isolation valve analog or digital	
Isolation Valve Drive Time	The time it takes for the isolation valve to open or close	seconds
Design Temperature In	The design full load production water return temperature for the chiller	°C
Design Temperature Out	The design full load production water supply temperature for the chiller	°C
Design Flow	The design full load production water flow for the chiller	L/s
Design Differential Pressure	The design full load production water differential pressure	kPa
Design Approach	The unit design production approach. The production approach is the difference between the production leaving water temperature and the fully saturated refrigerant temperature.	°C
Control Sensor	The control sensor determines whether the unit's DP sensor input or whether the unit's flow sensor input is used for pump or bypass valve control	
Pump Run On Time	The time that production water pumps will remain on after the chiller has become disabled	min
Design Flow Low Limit	The minimum amount of flow the vessel should receive	%
Design Flow High Limit	The maximum amount of flow the vessel should receive	%
Design CW Minimum Temperature	The minimum condenser water temperature accepted by the chiller before the chiller enters an alarm state	°C
Design CW Maximum Temperature	The maximum condenser water temperature accepted by the chiller before the chiller enters an alarm state	°C
Compression Ratio Low Cut Off	The compression ratio for the chiller is the difference between the evaporator and condenser pressures. The design compression ratio cutoff defines the minimum compression ratio accepted by the chiller before the chiller enters an alarm state.	
Compression Ratio High Cut Off	The compression ratio for the chiller is the difference between the evaporator and condenser pressures. The design compression ratio cutoff defines the minimum compression ratio accepted by the chiller before the chiller enters an alarm state.	
CWR to CHWS Approach Cut Off	The design approach cutoff for the chiller defines the maximum difference in chilled water supply and return that is acceptable as appropriate for the chiller before entering an alarm state	Δ°C
Low Flow Pump Threshold	The amount to prevent pump speed decrease	%
High Flow Pump Threshold	The amount to prevent pump speed increase	%
Max LCWT	The maximum allowed LCWT used during the optimisation calculation to prevent decreasing the CW Flow too much and result in too high discharge pressure in the chiller refrigeration cycle	°C
Max CW Delta T	The maximum allowed delta T on the Condenser Water used during the optimisation calculation, to prevent decreasing the CW Flow too much and result in too high discharge pressure in the chiller refrigeration cycle	°C
Check Flow Safety On Startup	This is a field that has the option to be enabled or disabled	
Flow Stability Timer	The timer required to wait until the stability of the flow is checked	seconds
Check Flow When Chiller Running	This option can be either enabled or disabled. If enabled, iDataCentre Manager will monitor flow through the unit while it is running	
Control Page		
Enable Induced Fault Check on Startup	This option can be either enabled or disabled. If enabled, iDataCentre Manager will check for chiller faults before chiller start-up	
Delay Time To Enable Fault	Once a condition is recognised to be outside of appropriate values, this timer is the delay time in which iDataCentre Manager will place the chiller into fault. The condition must remain outside appropriate values for the duration of the timer for the chiller to enter fault. If not, the timer will be restarted.	min

Water Cooled Chiller Design Data		
Induced Flow Fault Timer	Once flow is outside of the configured bounds, the flow fault timer will count down before iDataCentre Manager places the chiller into induced fault. The flow must remain outside of these bounds for the entire timer for the chiller to enter induced fault.	min
Low Operation Flow Fault Timer	Once flow is below the configured flow limit, the chiller will be placed into fault once this timer has finished. The flow must remain below this limit for the duration of the timer for the chiller to be placed into fault.	min
Delay Time To Enable Isolation Valve Fault	This delay time should be greater than or equal to the Delay Time to Enable Isolation Valve Fault (Unit Running) and also greater than Valve Drive Time	min
Delay Time To Clear Fault	If a chiller enters a fault state and conditions for chiller operation return to normal, the chiller will be set as unavailable by iDataCentre Manager for this set delay time	min

4.3.2 Air Cooled Chillers

To configure this air cooled chiller with all required design data, click the gear icon next to the air cooled chiller label. A window should appear as displayed below.

Figure 19 - Air Cooled Chiller Configuration Wizard

This presents the first page of the design data to be added in for the air cooled chiller.

Once all necessary data has been entered into this page, the *Next* button can be selected to navigate to the *Circuits* page of the unit wizard, where circuits can be added and compressor can be added and assigned to each circuit.

Figure 20 - Circuit Configuration Wizard

Once all necessary data has been entered into this Circuits page and select *Next* to the Evaporator page of the unit wizard.

chillerAir1

1. chillerAir1
2. Circuits
3. Evaporator
4. Condenser
5. Control
6. Study Configuration
7. Networking

DESIGN PARAMETERS

Fluid Specific Heat: 4.184 kJ/kg°C

Isolation Valves Present: Single None

Design Temperature In: 0.00 °C

Design Temperature Out: 0.00 °C

Design Flow: 0.00 L/s

Design Differential Pressure: 0.00 kPa

Design Approach: 0.00 Δ°C

OPERATIONAL PARAMETERS

Control Sensor: Flow

Pump Run On Time: 5.0 min

CHILLER OPERATIONAL FLOW CONSTRAINTS

Design Flow Low Limit: 60.00 % 0.00 L/s

Design Flow High Limit: 100.00 % 0.00 L/s

PUMP CONTROL FLOW CONSTRAINTS

Low Flow Pump Threshold: 80.00 % 0.00 L/s

High Flow Pump Threshold: 110.00 % 0.00 L/s

BYPASS VALVE CONTROL THRESHOLDS

Low Flow Bypass Threshold: 70.00 % 0.00 L/s

SAFETIES

Check Flow Safety On Startup: Enabled Disabled

Check Flow When Chiller Running: Enabled Disabled

Previous Next Cancel

Figure 21 - Evaporator Design Data

Once all necessary data has been input into the Evaporator page of the unit wizard, select *Next* to move to the Condenser page.

chillerAir1

1. chillerAir1
2. Circuits
3. Evaporator
4. Condenser
5. Control
6. Study Configuration
7. Networking

Condenser Design Approach Temperature: 0.00 Δ°C

Figure 22 - Condenser Design Data

Once all necessary data has been input into the Condenser page of the unit wizard, select *Next* to move to the Control page.

chillerAir1

1. chillerAir1
2. Circuits
3. Evaporator
4. Condenser
5. Control
6. Study Configuration
7. Networking

Enable Induced Fault Check on Startup: Enabled Disabled

Delay Time To Enable Fault: 15.0 min

Delay Time To Clear Fault: 2.0 hr

Figure 23 – Air Cooled Chiller Control Settings

Air Cooled Chiller Design Data		
Parameter	Description	Units
Air Cooled Chiller Page		
Display Name	The name of the unit	
Unit Year	The manufacturing year of the unit	
Brand	The manufacturer of the unit	

Air Cooled Chiller Design Data		
Unit Display Number	The display number that will appear in iDataCentre Manager for this unit. The field is automatically filled and there must be a number entered for iDataCentre Manager to operate correctly. Throughout all screens, iDataCentre Manager will display the unit using this display number.	
Cooling Capacity	The design cooling capacity the unit is capable of	
Refrigerant Type	The refrigerant type used for this unit	
Compressor Type	The type of compressors on this unit	
Design Current	The unit's full load design current	Amps
Design Voltage	The unit's design voltage	Volts
Design Power Factor	The design power factor of the unit	
Minimum Heating Load	Minimum required heating capacity load	%
Minimum Pressure Ratio	Minimum required pressure ratio	
Maximum Pressure Ratio	Maximum required pressure ratio	
Circuits Page		
Type	The compressor speed which it could be either variable or constant	
Evaporator Page		
Fluid Specific Heat	The specific heat of the working fluid flowing through the evaporator	kJ/kgC
Is Isolation Valve present	Indicate if the Isolation Valve is present or not	
Isolation Valve Type	Is the isolation valve analog or digital	
Isolation Valve Drive Time	The time it takes for the isolation valve to open or close	seconds
Design Temperature In	The design full load production water return temperature for the chiller	°C
Design Temperature Out	The design full load production water supply temperature for the chiller	°C
Design Flow	The design full load production water flow for the chiller	L/s
Design Differential Pressure	The design full load production water differential pressure	kPa
Design Approach	The unit design production approach. The production approach is the difference between the production leaving water temperature and the fully saturated refrigerant temperature.	°C
Control Sensor	The control sensor determines whether the unit's DP sensor input or whether the unit's flow sensor input is used for pump or bypass valve control	
Pump Run On Time	The time that production water pumps will remain on after the chiller has become disabled	min
Design Flow Low Limit	The minimum amount of flow the vessel should receive	%
Design Flow High Limit	The maximum amount of flow the vessel should receive	%
Low Flow Pump Threshold	The amount to prevent pump speed decrease	%
High Flow Pump Threshold	The amount to prevent pump speed increase	%
Low Flow Bypass Threshold	The lowest amount of flow found to be acceptable through the bypass	%
Check Flow Safety On Startup	This is a field that has the option to be enabled or disabled	
Flow Stability Timer	The timer required to wait until the stability of the flow is checked	seconds
Check Flow When Chiller Running	This option can be either enabled or disabled. If enabled, iDataCentre Manager will monitor flow through the unit while it is running	
Condenser Page		
Condenser Design Approach Temperature	The unit design condenser approach. The condenser approach temperature is the difference between the water supply temperature and the fully saturated refrigerant temperature.	°C

Air Cooled Chiller Design Data		
Control Page		
Enable Induced Fault Check on Startup	This option can be either enabled or disabled. If enabled, iDataCentre will check for chiller faults before chiller start-up	Manager
Delay Time To Enable Fault	Once a condition is recognised to be outside of appropriate values, this timer is the delay time in which iDataCentre will place the chiller into fault. The condition must remain outside appropriate values for the duration of the timer for the chiller to enter fault. If not, the timer will be restarted.	min Manager
Induced Flow Fault Timer	Once flow is outside of the configured bounds, the flow fault timer will count down before iDataCentre places the chiller into induced fault. The flow must remain outside of these bounds for the entire timer for the chiller to enter induced fault.	min Manager
Low Operation Flow Fault Timer	Once flow is below the configured flow limit, the chiller will be placed into fault once this timer has finished. The flow must remain below this limit for the duration of the timer for the chiller to be placed into fault.	min
Delay Time To Enable Isolation Valve Fault	This delay time should be greater than or equal to the Delay Time to Enable Isolation Valve Fault (Unit Running) and also greater than Valve Drive Time	min
Delay Time To Clear Fault	If a chiller enters a fault state and conditions for chiller operation return to normal, the chiller will be set as unavailable by iDataCentre for this set delay time	min Manager

Table 2 - Air-cooled Chiller Design Configuration

4.4 Water Circuits Configuration

Navigate to the *Circuits* page on the configuration menu. The page as shown below should appear.



Daikin Service Engineer is allowed only to change "name" of a circuit or a pump, to avoid any wrong configuration.


Figure 24 - Water Circuits Configuration

4.4.1 Primary Water Circuit Configuration

On the right hand side, the water circuit addition bar can be found. From the drop down menu, the type of circuit that is wished to be added to the plant can be selected. The selection of circuits in iDataCentre Manager include: primary, condenser and secondary water circuits.



***Only one primary circuit are supported by iDataCentre Manager.
Up to 24 pumps on primary circuit are supported by iDataCentre Manager***

The type of arrangement of primary water circuit can be selected to either be dedicated or headered.

The type of water production can be selected Only Chilled Water.

Additionally, the type of variable speed control can be selected and it includes: unit flow, field DP and Decoupler Flow.



Only “Field Differential Pressure” is supported as pump speed control function by iDataCentre Manager

Once all required settings have been selected for the primary water circuit, select the *Add* button. A loading bar will appear while the primary water circuit is being added.

Once the loading bar disappears, the primary water circuit should appear on the screen as seen below. It should be noted that once added, the water circuit should display *No Pump* in the corner of the thumbnail as no pumps have yet been configured for this circuit.



Figure 25 - Primary Circuit Configuration

To rename this circuit, select the Primary Water Circuit name and the dialogue box should appear.

Once the required name has been entered, click *OK* and the name will be saved. When entering a name, it is recommended to avoid any special characters and only using alphanumeric characters.

To configure the primary water circuit as required, select the *Configuration* button at the bottom of the primary water circuit thumbnail on the water circuits page.

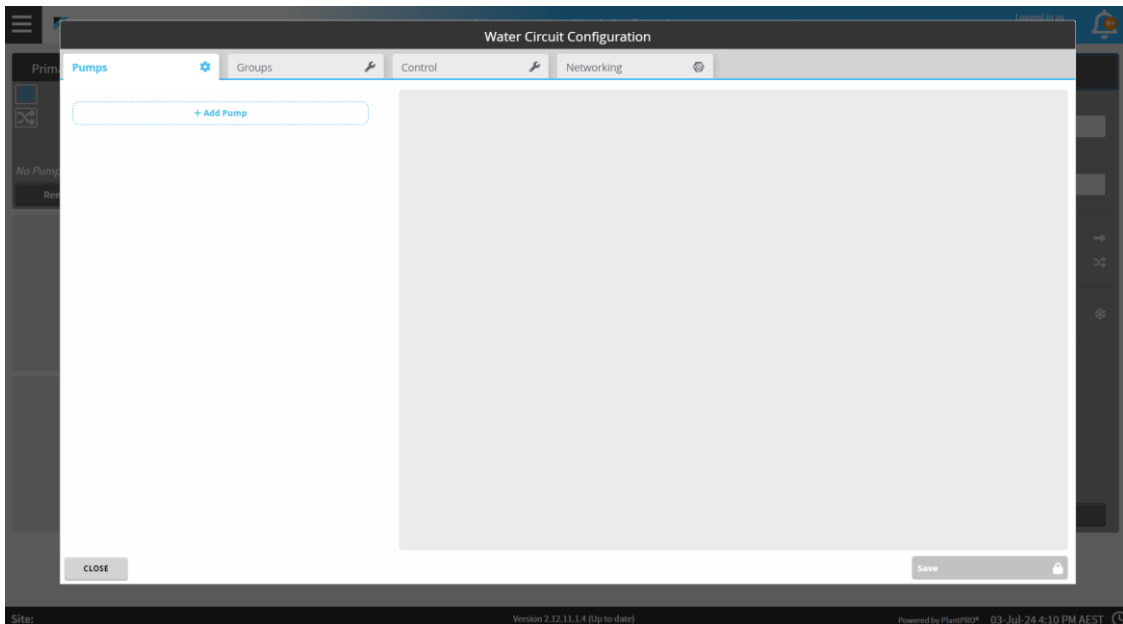


Figure 26 - Primary Circuit Configuration Wizard

On the first tab "Pumps", pumps can be added to the circuits, and can later be linked to specific chillers/chiller groups. Pumps can be added with the "Add Pump" button. Pump can be configured in this section to be either Constant or Variable Pump.



Only “Variable” is supported as pump type control function by iDataCentre Manager

Once the loading bar has disappeared, the requested pump should be added to the screen. All pump design data can now be added to the required fields.
 Click Save to save any changes made to the pump configurations.
 Please note that pumps are not linked to any specific chiller/group at this point.

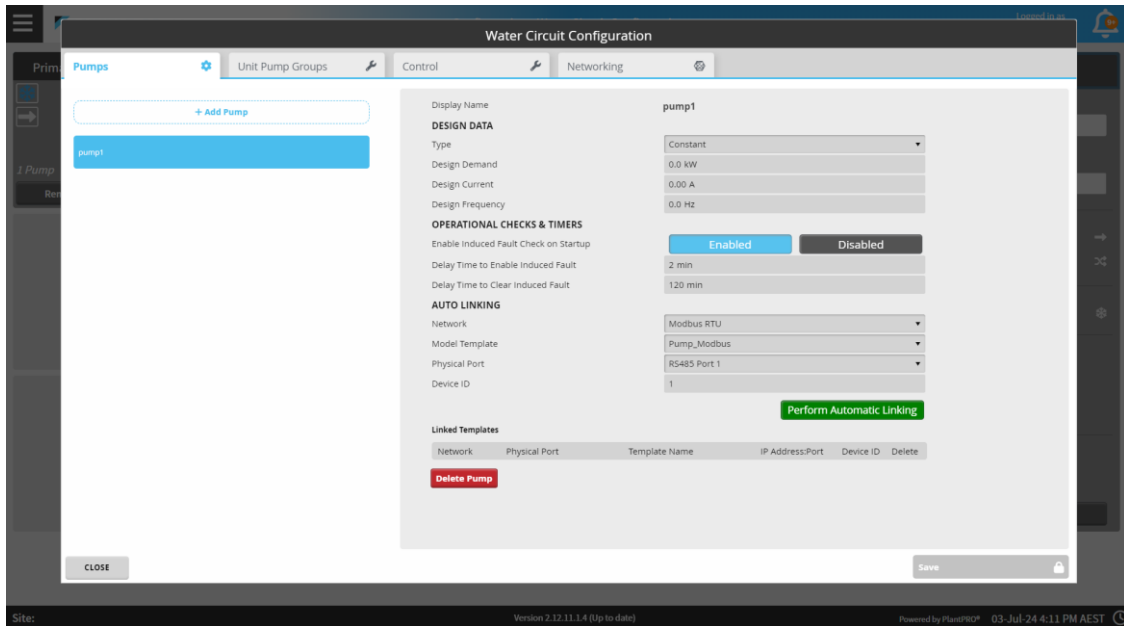


Figure 27 - Pump Configuration Wizard

For **dedicated** circuits, on the next tab "Unit Pump Groups", existing pumps can be linked to chillers. First, select the chiller to link on the left side panel. Then, the 3 columns in the middle panel will be updated to show:

1. Available Pumps - pumps that are not linked to any chillers
2. Linked Pumps - pumps that are already linked to the selected chiller
3. Pumps linked to another group - pumps that are linked to other chillers

Select pumps from the "Available Pumps" column and click "Link Selected Pump(s)" to link to the selected chiller. Pumps can be unlinked in a similar manner from the "Linked Pumps" column. Finally, click "Save" to persist changes made

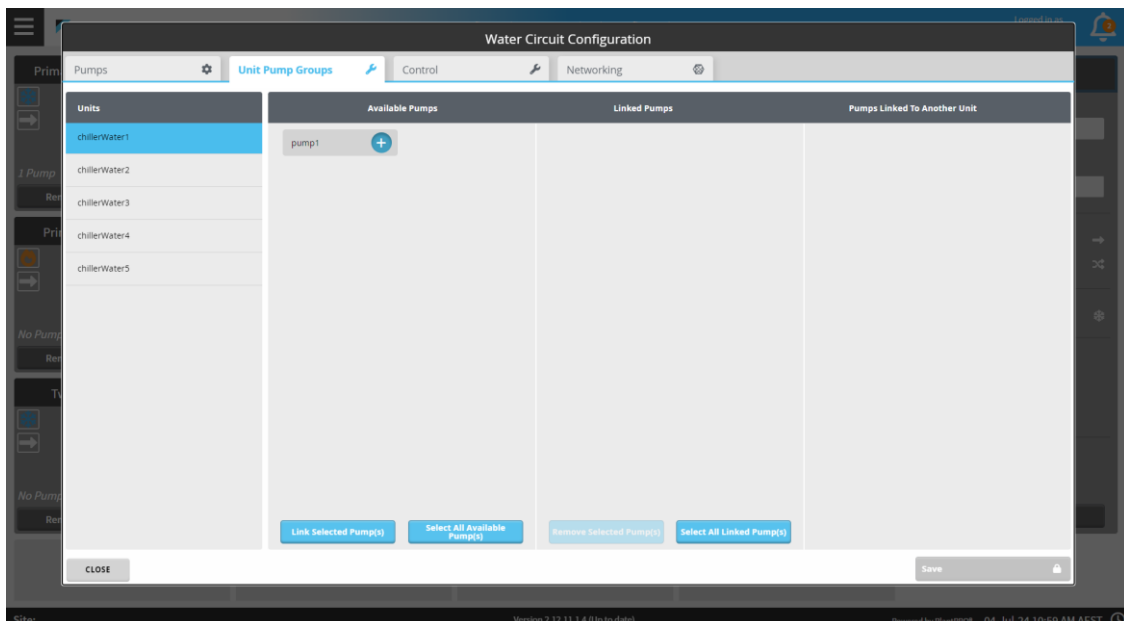


Figure 28 - Dedicated Pumps Assignment

For **headered** circuits, on the second tab "Groups", multiple chillers and pumps can be assigned into groups. By default, there will be only one group called "default" and all chillers and pumps will be assigned into this group.

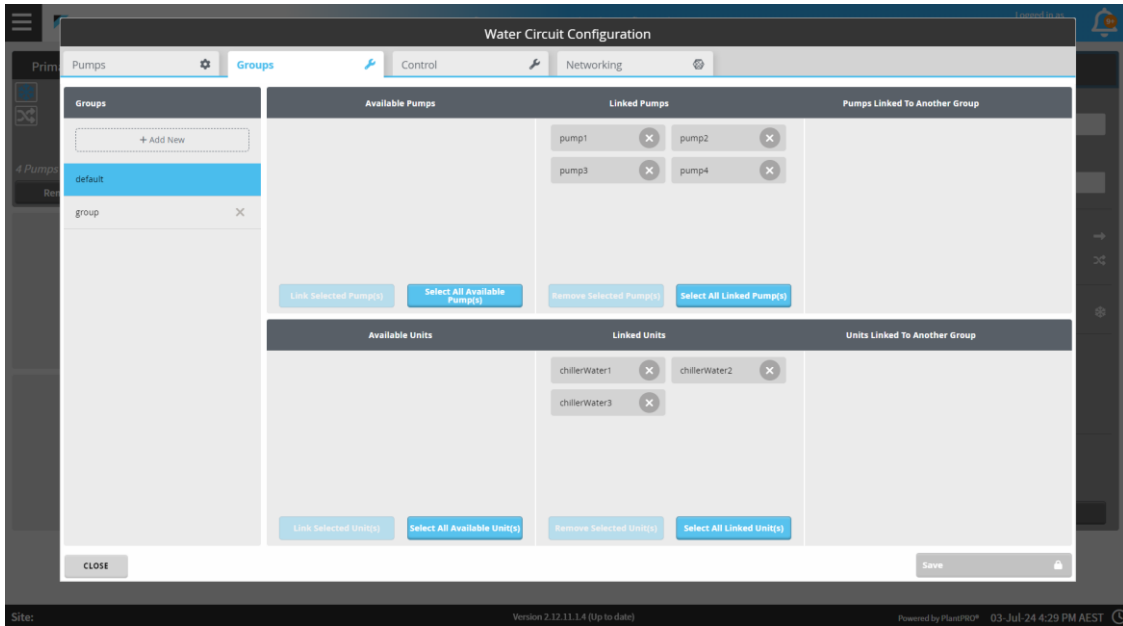


Figure 29 - Headered Pumps Assignment

If it is decided that a pump is no longer required in a configuration, it may be removed by clicking on "Delete Pump" button at the end of pump configuration. If this is selected, a dialogue box should appear asking for confirmation. Select Yes if this is the correct pump to be deleted and this pump will be removed from the water circuit. To add a variable pump, simply add a new pump and change its type from "Constant" to "Variable" in the individual configuration.

Once all required pumps have been added and linked properly for the primary water circuit, select the *Control* button near the top of the *Water Circuit Configuration* window to proceed to configure pump control details. Based upon the circuit type and the control method, different data will be required to be entered as can be seen below.

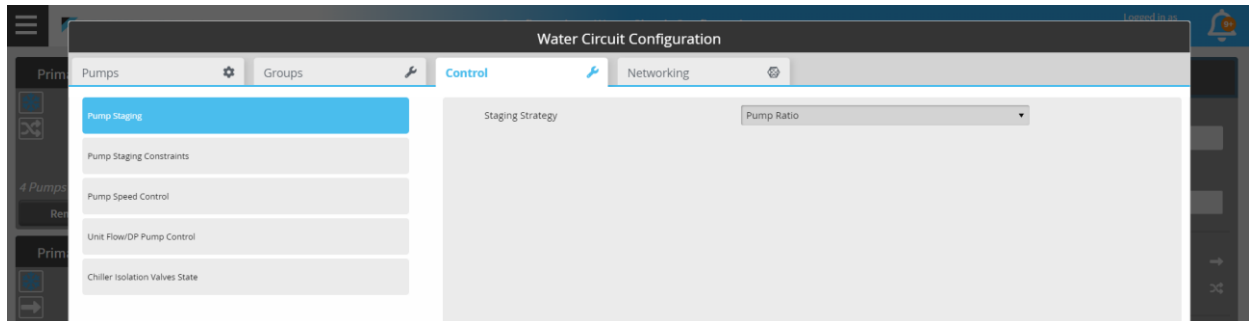


Figure 30 - Pump Staging type

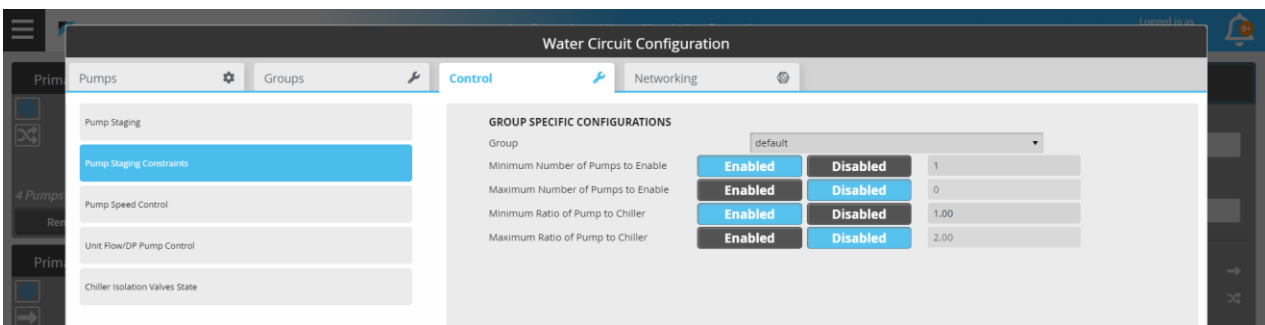
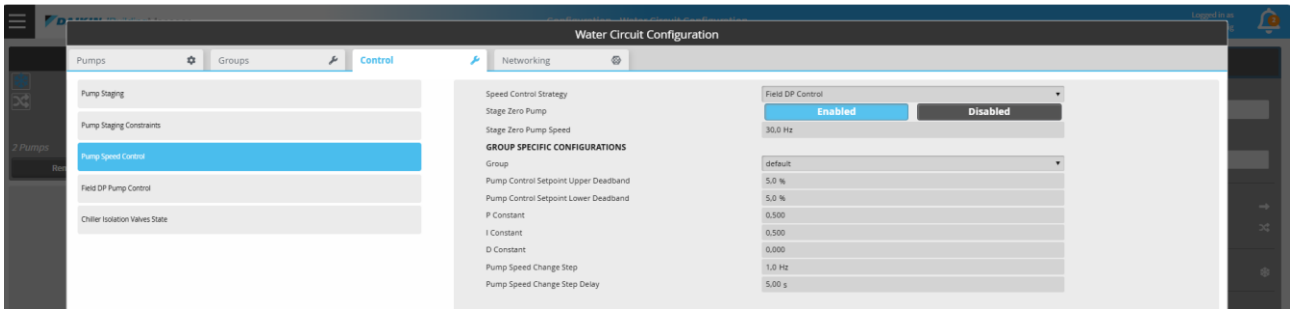
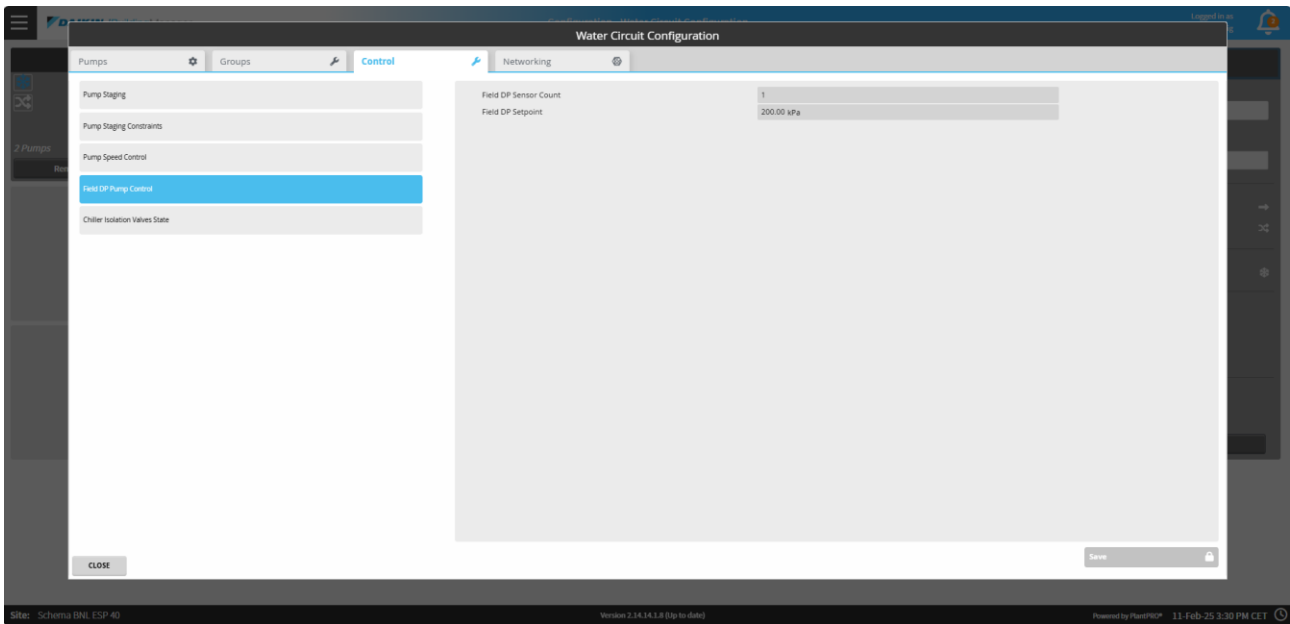


Figure 31 - Pump Staging Constraints


Figure 32 - Pump Speed Control

Figure 33 - Pump Speed Control Setpoint

Add in all required data and select save to save all changes.

If a variable primary only flow system is to be configured and iDCM is required to control the bypass valve, the bypass option must be enabled in the configuration tab.

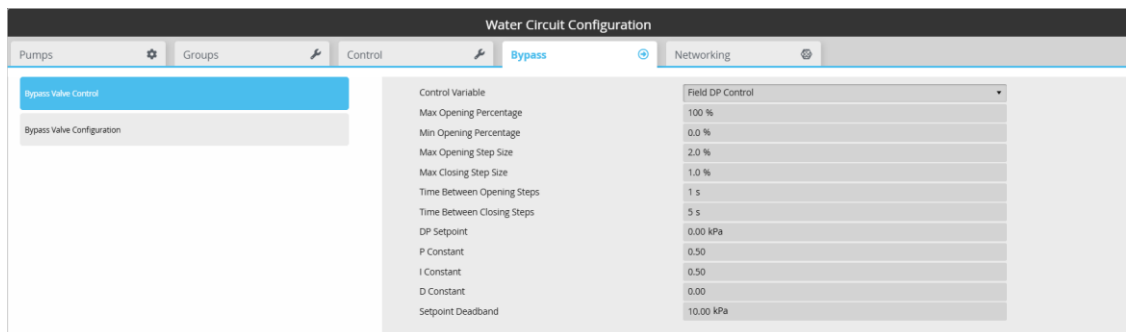
In this case, in the Water Circuit Configuration wizard the menu *Bypass* will be available.

Select the *Bypass* tab for bypass valve configuration.

The control method of the bypass valve will also need to be selected between Unit Flow/DP or Field DP.



Only "Field Differential Pressure" is supported as bypass valve control function by iDataCentre Manager


Figure 34 - Bypass Valve Configuration

Primary Water Circuit Design Data - Dedicated		
Parameter	Description	Units
Configuration Parameters - Constant & Variable Speed Pumps		
Type	Displays whether the selected pump is variable or constant speed	
Design Demand	The design demand of the pump	kW
Design Current	The design current of the pump	Amps
Design Frequency	The design frequency of the pump	Hz
Configuration Parameters - Variable Speed Pumps		
Max Speed	The maximum speed which the pump is capable of	Hz
Min Speed	The minimum speed which the pump is capable of	Hz
Speed Change	The speed increment which iDataCentre Manager will use to ramp up the speed of the pump	Hz
P	Proportional tuning coefficient	
I	Integral tuning coefficient	
D	Derivative tuning coefficient	
Ramp Time	The time it takes to ramp the pump from minimum to maximum speed on pump start up	sec
Configuration Parameters - Field DP Pump Control		
Max Speed Change	The speed increment which iDataCentre Manager will use to ramp up the speed of the pump	Hz
DP Setpoint	The DP setpoint which the primary water circuit works to maintain	kPa
DP Setpoint Upper Deadband	The upper limit of the DP setpoint deadband. If the DP lies within this deadband, no changes to commands to secondary pumps will be made.	kPa
DP Setpoint Lower Deadband	The lower limit of the DP setpoint deadband	kPa
P Constant	Proportional tuning coefficient	
I Constant	Integral tuning coefficient	
D Constant	Derivative tuning coefficient	
Dedicated Pump Start	Please disregard this parameter as it is now obsolete	%
Speed Decrease Bypass Cutoff Point Percent	The bypass opening percentage where no further pump speed reductions will occur	%
Time Between Two Pump Speed Increments	The time between pump speed increments	sec
Time Between Two Pump Speed Decrements	The time between pump speed decrements	sec
Configuration Parameters - Field DP Bypass		
Unit	The selected unit for bypass configuration	
Max Opening Percentage	The maximum opening percentage of the bypass valve	%
Min Opening Percentage	The minimum opening percentage of the bypass valve	%
Max Opening Step Size	The percentage of opening at each interval	%
Max Closing Step Size	The percentage of closing at each interval	
Time Between Two opening steps	The time between the opening steps	sec
Time Between Two closing steps	The time between the closing steps	sec
DP Setpoint	The DP setpoint for bypass valve control	kPa
P Constant	Proportional tuning coefficient	
I Constant	Integral tuning coefficient	
D Constant	Derivative tuning coefficient	
Setpoint deadband	Upper and Lower Differential of the DP setpoint that determines a deadband in which no positioning of the bypass valve is requested	kPa

Table 3 – Primary Water Circuit - Dedicated - Configuration

Primary Water Circuit Design Data - Headered		
Parameter	Description	Units
Configuration Parameters - Constant & Variable Speed Pumps		
Type	Displays whether the selected pump is variable or constant speed	
Design Demand	The design demand of the pump	kW
Design Current	The design current of the pump	Amps
Design Frequency	The design frequency of the pump	Hz
Max Speed	The maximum speed which the pump is capable of	Hz
Min Speed	The minimum speed which the pump is capable of	Hz
Control Configuration Parameters - Pump Staging		
Pump Staging Strategy	Whether pump is staged off of pump ratio or pump speed	
Setpoint Check for Staging (Speed Based Only)	Whether setpoint is checked before triggering a stage event	
Stage Up Delay Time (Speed Based Only)	Delay time to wait before staging up	sec
Stage Down Delay Time (Speed Based Only)	Delay time to wait before staging down	sec
Stage Up Speed (Speed Based Only)	Stage up will begin at this speed	Hz
Stage Down Speed (Speed Based Only)	Stage down will begin at this speed	Hz
Control Configuration Parameters - Pump Staging Constraints		
Minimum Number of Pumps to Enable	Enable/Disable having a minimum number of pumps running. If enabled, number of pumps can be set.	
Maximum Number of Pumps to Enable	Enable/Disable having a maximum number of pumps running. If enabled, number of pumps can be set.	
Minimum Ratio of Pump to Chiller	Enable/Disable having a Pump to Chiller ratio. If enabled, ratio can be set.	
Control Configuration Parameters - Pump Speed Control		
Speed Control Strategy	The choice of four Speed Control Strategies. If External is chosen, the below parameters do not apply.	
Pump Control Setpoint Upper Deadband	The upper limit of the setpoint deadband. If the Pump Control lies within this deadband, no changes to speed commands to pumps will be made.	kPa
Pump Control Setpoint Lower Deadband	The lower limit of the setpoint deadband. If the Pump Control lies within this deadband, no changes to speed commands to pumps will be made.	kPa
P Constant	Proportional tuning coefficient	
I Constant	Integral tuning coefficient	
D Constant	Derivative tuning coefficient	
Pump Speed Change Step	Increment by which pump speed will change	Hz
Pump Speed Change Step Delay	How often pump speed will change when increasing/decreasing	sec
Stage Zero Pump	Whether pumps should be enabled at Stage Zero	
Stage Zero Pump Speed	Speed required at Stage Zero	Hz
Control Configuration Parameters - Field DP Pump Control		
Field DP Sensor Count	The number of field DP sensors	
Field DP Setpoint	The target field DP setpoint that should be maintained	kPa

Table 4 – Primary Water Circuit - Headered – Configuration

5 SETTING MANUAL

iDataCentre Manager settings of the functions to manage the HVAC system can be changed accessing with “Configuration” access level.

The navigation menu will appear from the left side of the screen as below. Only the highlighted menu are “Settings” menus. Those menus contain parameter to be fine-tuned during the commissioning of the system.

- SITE
 - Site Configuration
 - **User Management**
 - **IT Settings**
 - **Email**
 - **Report Service**
- WATERSIDE
 - Units
 - Circuits
 - **Stager**
 - **Sequencing**
 - **Temperature Control**
 - **Plant Schedule**
 - **Commissioning**
- GENERAL
 - System License

If non-standard logics are added, it is possible to configure the related parameters within the Schematics pages: Dashboards → **Schematics**

5.1 Stager Settings

In the Stager menu, configuration of the sequencing can be chosen among multiple different algorithms

- Fixed: Fixed sequencing for single water production (only cooling)
- Runtime Balancing: sequencing based on unit run hour balancing for single water production (only cooling)



The selection between “Fixed” and “Runtime Balancing” have an impact on the Sequencer setting menu



Configuration of Staging/Sequencing algorithm is “RunTime Balancing” by default. This configuration grants a longer life-time cycle of the units.

The other parameters on the Stager menu have an impact on the Staging conditions and they should be fine-tuned during the commissioning.

Figure 35 - Single Water Production Stager menu

5.1.1 Plant Start/Stop Configuration

Plant Start/Stop Configuration Parameters		
Parameter	Description	Recommended Setting
Start Up Mode	There are two available modes to select: Restart Mode - upon restart of iDataCentre Manager, iDataCentre Manager will synchronise	

Plant Start/Stop Configuration Parameters		
	<p>communication with field devices and then shut down the entire plant and restart.</p> <p>Learn Mode - upon restart of iDataCentre Manager, iDataCentre Manager will synchronise communication with field devices, learn current running status of plant equipment and continue controlling the plant based on current running status.</p>	
Restart Comms Delay	The time that iDataCentre Manager waits upon a restart in order to synchronise communication with field devices	
Low Ambient Lockout Temperature	<p>As one of the Plant Start Conditions, Actual Ambient Temperature must be higher than Low Ambient Lockout Temperature + Lockout Differential.</p> <p>Plant will stop when Current Ambient Temperature < Low Ambient Lockout Temperature - Lockout Deviation</p>	In low humidity and cooler areas, if the site has active economy cycle, the ambient lockout temperature can be set to a relatively high value (for example 15+ °C) for maximum efficiency gains.
Low Ambient Lockout Temperature Differential	This provides a deadband around the ambient lockout temperature. This deadband ensures that the plant is started only when the ambient temperature has consistently remained above ambient lockout temperature. It also ensures that the plant is placed into ambient lockout only if the ambient temperature has consistently remained below ambient lockout temperature.	This parameter can be left at the default of 0.5 Δ°C
High Ambient Lockout Temperature	<p>As one of the Plant Start Conditions, actual Ambient Temperature must be lower than High Ambient Lockout Temperature + Lockout Differential.</p> <p>Plant will stop when Current Ambient Temperature > High Ambient Lockout Temperature - Lockout Deviation</p>	
High Ambient Lockout Temperature Differential	This provides a deadband around the ambient lockout temperature. This deadband ensures that the plant is started only when the ambient temperature has consistently remained above ambient lockout temperature. It also ensures that the plant is placed into ambient lockout only if the ambient temperature has consistently remained above ambient lockout temperature.	This parameter can be left at the default of 0.5 Δ°C
Minimum CHW Return Temperature for Plant Start	<p>As one of the Plant Start Conditions, CHW Return Temperature must be higher than this value.</p> <p>Once the plant has started, iDataCentre Manager will NOT stop the plant based on this point. In other words, this point is only effective for plant start-up process.</p>	This effectively provides a Stage Zero - Pump Only stage. The higher this value the longer the plant will run in the pump only stage before enabling the chillers.
Minimum HW Return Temperature for Plant Start	<p>As one of the Plant Start Conditions, HW Return Temperature must be lower than this value.</p> <p>Once the plant has started, iDataCentre Manager will NOT stop the plant based on this point. In other words, this point is only effective for plant start-up process.</p>	This effectively provides a Stage Zero - Pump Only stage. The lower this value the longer the plant will run in the pump only stage before enabling the chillers.
Plant Shutdown Timer	The Plant Shutdown timer ensures that chiller plant short cycling does not occur. The plant will not be restarted (regardless of other start conditions) until after the full duration of the shutdown timer. When a plant is completely shut down, this time will start to count down. The plant will NOT restart until this timer runs out or be manually cleared.	This parameter should be set based on the urgency of cooling for a chiller plant. For example, if the chiller plant is cooling important equipment you may set the shut down timer very short (5 minutes) or if space cooling for non-critical applications is being undertaken by the chiller plant a shut down time of ~20 minutes may be ideal.

Table 5 - Single Production - Plant Start/Stop Setting

5.1.2 Single Water Production - Staging Up/Down

Parameter	Description	Recommended Setting
Stage Up Load Percentage	As one of the Staging Up Conditions, Current Plant Load must be higher than Stage Up Load Percentage * Running Chillers' Total Cooling Capacity	This value is typically set to 90%. The higher the stage up load percentage the longer is the stage up event delayed.
Spare Capacity Factor	As one of the Staging Down Conditions, Active Load of the Next-OFF chiller must be lower than Spare Capacity Factor * (Sum of the Spare Capacity of the remaining chillers)	This value is typically set to 80%. The lower this value, the more delayed a stage down event will be.
Cooling Stage Up Delay Timer	To stage up, all Staging Up Cooling Conditions must be satisfied continuously for the amount of time configured in this timer.	This value is typically set to 5 - 20 mins.
Cooling Stage Down Delay Timer	To stage down, all Staging Down Cooling Conditions must be satisfied continuously for the amount of time configured in this timer.	This value is typically set to 5 - 15 mins.
Cooling Stage Hold Timer	After performing a staging action, iDataCentre Manager will hold the current cooling stage for the amount of time configured in this timer.	This timer should be long enough to allow for the chillers to load up. Typically this stage hold or settle timer is set to 15 - 20 mins.

Table 6 - Single Production - Staging Settings

5.1.3 Single Water Production - CHW Based Staging

Parameter	Description	Recommended Setting
Stage Up Offset	As one of the Staging Up Conditions, Supply CHW Temperature must be higher than (Supply CHW Setpoint + Stage Up Offset)	Typically this value is set between 0.5 and 2.0 Δ°C . The larger this value, the more delayed the stage up event will be.
Stage Down Offset	As one of the Staging Down Conditions, Supply CHW Temperature must be lower than (Supply CHW Setpoint + Supply Stage Down Offset)	Typically this value is set to a degree below the split between the design entering and leaving chilled water temperature of the chillers. (Assuming all chillers have the same split)

5.1.3.1 Return CHW Based Staging

Select Return Water in the drop-down menu of Water Control to enable Return CHW Based Staging.

Parameter	Description	Recommended Setting
Return Stage Up Offset	As one of the Staging Up Conditions, Return CHW Temperature must be higher than (Supply CHW Setpoint + Return Stage Up Offset)	Typically this value is set to 1 degree above the split between the design entering and leaving chilled water temperature of the chillers. (Assuming all chillers have the same split) In cases where the chillers have differing splits, supply water based control may be more suitable.
Return Stage Down Offset	As one of the Staging Down Conditions, Return CHW Temperature must be lower than (Supply CHW Setpoint + Return Stage Down Offset)	Typically this value is set to a degree below the split between the design entering and leaving chilled water temperature of the chillers. (Assuming all chillers have the same split)

5.1.4 Single Water Production - CHW Return High Limit Safety

Two different types of High Limit Safety are available - "Fixed and Dynamic" and "Fixed Only".



CHW Return High Limit Safety is a safety mechanism which prevents the plant CHW temperature from increasing too high. Once CHW Return Temperature reaches CHW Return High Limit Safety, iDataCentre Manager will initiate a staging-up event.

5.1.4.1 Fixed and Dynamic

When Fixed and Dynamic is enabled, both Fixed and Dynamic Return CHW High Limit Safety take effect. Select **Fixed and Dynamic** in the drop-down menu of Return Water Stage Up Safety to enable **Fixed and Dynamic**.

Parameter	Description	Example (if applicable)
Offset Above CHW SP	When Return CHW Temperature is higher than (Supply CHW Setpoint + Offset Above CHW SP) for a period of the stage up timer, iDataCentre Manager will initiate a staging-up event.	Supply CHW Setpoint is 6 deg C and Offset Above SP is set to 10 deg C. When CHW Return Temperature is higher than 16 deg C (=6+10), iDataCentre Manager will initiate a staging-up event.
Fixed Return Safety Limit	When Return CHW Temperature is higher than Fixed Return Safety Limit for a period of the stage up timer, iDataCentre Manager will initiate a staging-up event.	Fixed Return Safety Limit is set to 18 deg C. When CHW Return Temperature is higher than 18 deg C (Fixed Return Safety Limit), iDataCentre Manager will initiate a staging-up event.

5.1.4.2 Fixed Only

When Fixed is enabled, only Fixed Return CHW High Limit Safety takes effect. Select **Fixed Only** in the drop-down menu of Return Water Stage Up Safety to enable **Fixed Only**.

Parameter	Description	Example (if applicable)
Fixed Return Safety Limit	When Return CHW Temperature is higher than Fixed Return Safety Limit for a period of the stage up timer, iDataCentre Manager will initiate a staging-up event.	Supply CHW Setpoint is 6 deg C and Fixed Return Safety Limit is set to 18 deg C. When CHW Return Temperature is higher than 18 deg C (Fixed Return Safety Limit), iDataCentre Manager will initiate a staging-up event.

5.2 Sequencing Settings

In Sequencing Settings page, users can configure certain sequences to stage up/down Chiller units.



Please ensure that all Units have been added and configured before configuring sequencer. Please ensure that no Unit is running when configuring Sequencer

To access this page, select the Sequence Configuration option under Sequencing in the Main Menu.

5.2.1 Fixed Sequencing

In Fixed Sequencing, iDataCentre Manager stages up/down units in a fixed sequence that can be configured by the user. The fixed sequencing screen can be found below.



Figure 36 - Fixed Sequencing Settings

5.2.1.1 Adding a Sequence

To add a stage, press "+" button and select the desired chillers. Press Save button to save any changes. Each stage must respect the following conditions:



- 1) **The total cooling capacity of next stage must be higher than that of current stage.**
- 2) **The number of chillers selected of next stage can be only one more than that of current stage.**

User should add as many stages as the number of units.

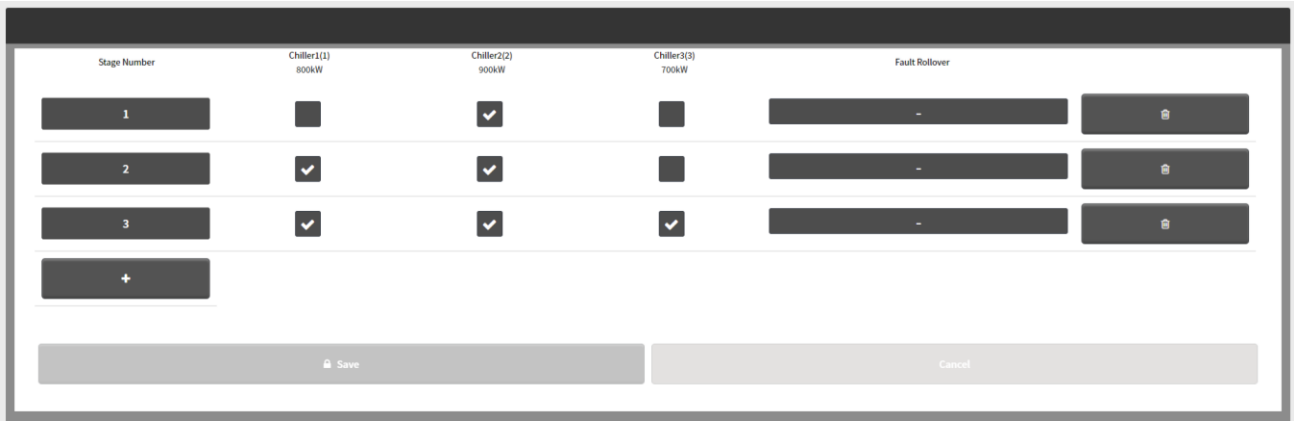


Figure 37 - Example of Fixed sequencing Configuration with three units

5.2.1.2 Set Fault Rollover Sequence

For each stage, user can configure the unit that will replace the one that suffer a shut-down alarm. To configure fault-rollover Units, manually enter the required fault-rollover Unit number under the Fault Rollover section of each sequence. When a Chiller/Unit fault occurs in any sequence, iDataCentre Manager start the Units nominated in the Fault Rollover section of that particular sequence.

5.2.2 Runtime Balancing

In Runtime Balancing Sequencing, iDataCentre Manager calculates a priority order based on the unit's run hours when triggered by a calendar event or by a fixed interval. Every time the recalculation occurs, the units will be ordered based on run hours from lowest to highest at that point in time. The new calculated sequence will be used on the plant when the plant starts, a stage up or down event occurs, or a unit fault occurs, unless the user sets "Force action new sequence on calculation" to true. In this case, the plant will force the running chillers to change to the new order upon its calculation. The Runtime Balancing screen can be found in the figure below

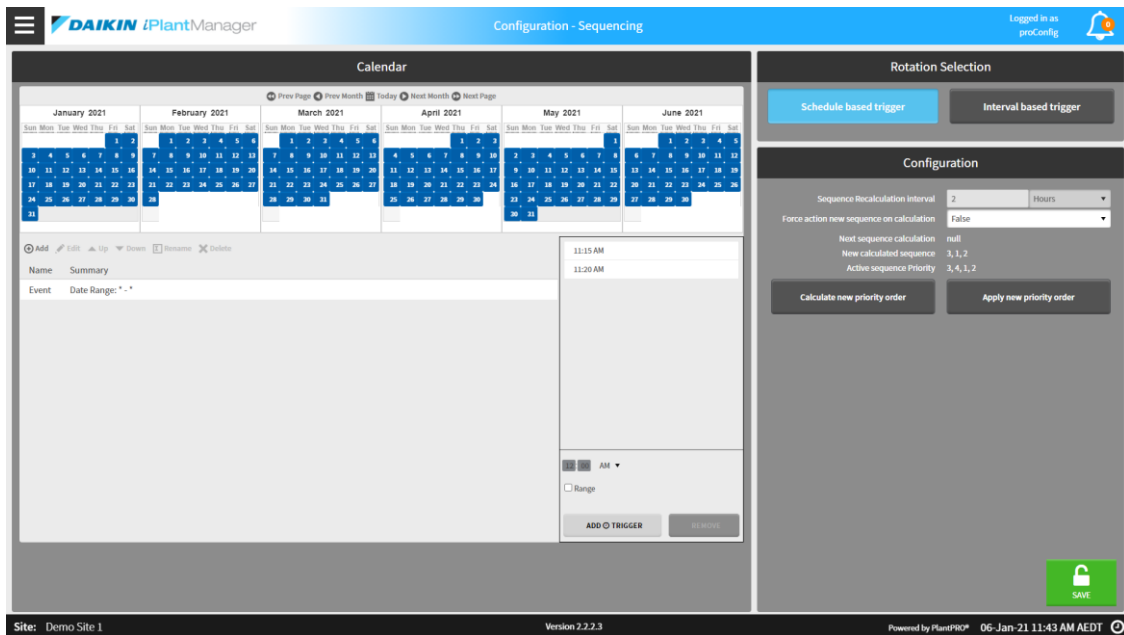


Figure 38 - Runtime Balancing Settings

5.2.2.1 Schedule based trigger

When set to schedule based trigger, the user can configure when the sequence is recalculated via a calendar. Events can be added by pressing the 'add' button

5.2.2.2 Interval based trigger

When set to interval based trigger, the user can configure the interval period in either hours or days. The sequence will then be recalculated when this interval expires. If the user manually triggers a recalculation, the next calculation time will automatically update to occur after one interval period from that time.

5.2.2.3 Forcing staging recalculation

The user is also able to:

- Have the new sequence be applied immediately by choosing the option 'Force action new sequence on calculation' when a new sequence priority order calculation occurs.
- Calculate a new priority order for the Units by pressing the respective button. This will be reflected in the field New calculated sequence.
- Apply the new priority order for the Units by pressing the respective button. This will be reflected in the field Active sequence Priority.



If the Apply new priority order button is pressed, this may result in any currently running chillers to turn off in order for the new sequence to be applied.

5.3 Sequence Transition Settings

In Sequence Transition page, user can set timers to stabilize the transition of each units.

A unit transition duration is the time that a unit take to change in the run status as a consequence of iDataCentre Manager command.

To access this page, select the Sequence Transitions under Sequencing in the Main Menu.

Figure 39 - Sequence Transition Settings

The following parameter can be configured for Sequence Transition

Parameter Name	Description
Max Units Running	The maximum number of units that can run at any given time. If so to 'No Limit' then there is no limitation on this.
Max Transition Duration	The maximum amount of time in minutes that consecutive transitions can take before all transitions are force completed.
Max Addition Transition Duration	The maximum amount of time in minutes that enabling a unit can take before the transition is force completed
Unit	The selected unit for configuration. Each unit can have a different configuration.
Unit Ramp Down Delay	The time in minutes that the sequencer will wait for the given unit to ramp down after it is disabled
Unit Stability Delay	The time in minutes that the sequencer will wait after the unit reports an active run status before ending the transition.

Table 7 - Unit Transitions Setting

5.4 Temperature Control Configuration

Users can select and configure CHW Setpoint control strategies by selecting an option from a drop-down.

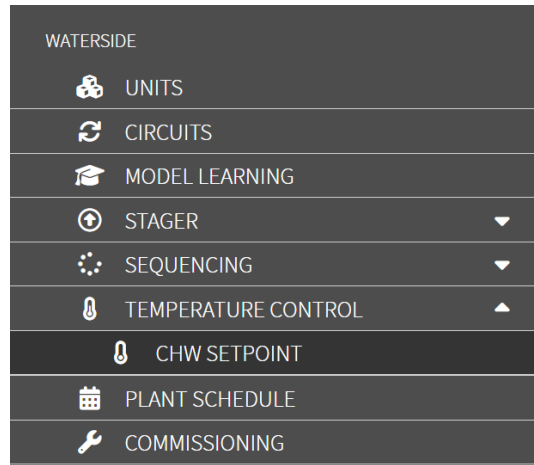


Figure 40 – CHW Setpoint menu

5.4.1 CHW setpoint control Strategy

The user can select between the following Setpoint control Strategy:

- Fixed: non control strategy
- Reset based on Return Temperature
- Reset based on Valve Position of the air side equipment



The use of Fixed strategy is highly recommended.
Through this strategy, iDataCentre Manager will send a constant setpoint to the connected units.

To select Reset based on Return Temperature, user needs to set "CHW Return Temp Reset" in the drop-down menu of Control Strategy for Chilled Water.

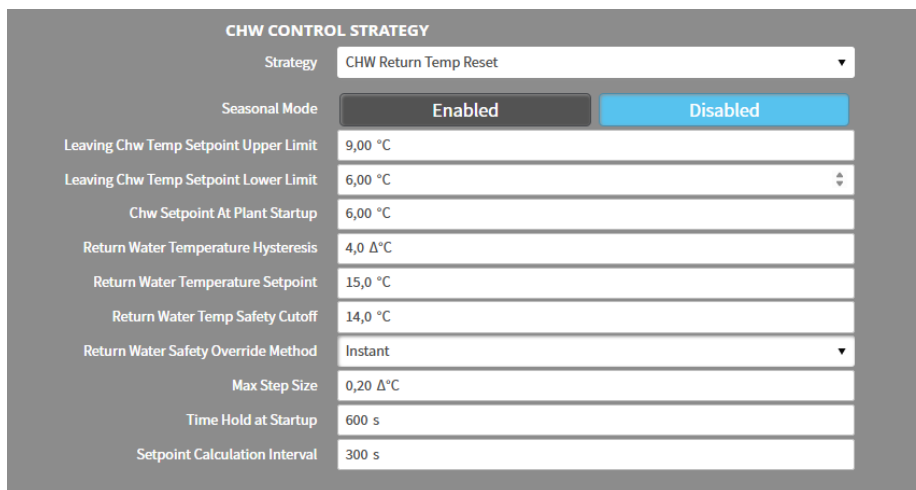


Figure 41 - Chilled Water Setpoint Reset based on RetT

CHW Return Temp Reset Configuration Parameters	
Parameter	Description
Setpoint At Plant Startup (Summer/Winter/Default)	The initial CHW Setpoint that iDataCentre Manager will hold for a certain amount of time (Time Hold At Startup) during plant startup (Temperature value can be set differently by enabling season mode).
Setpoint Upper Limit (Summer/Winter/Default)	The maximum value of CHW Setpoint (Temperature value can be set differently by enabling season mode).
Setpoint Lower Limit (Summer/Winter/Default)	The minimum value of CHW Setpoint (Temperature value can be set differently by enabling season mode).

CHW Return Temp Reset Configuration Parameters	
Return Water Temp Hysteresis (Summer/Winter/Default)	The maximum expected difference is below the upper limit of the Return Water Temperature Setpoint. This will define the lower limit and the expected range of the CHW Return Temperature.(Temperature value can be set differently by enabling season mode).
Return Water Temp Setpoint (Summer/Winter/Default)	The upper limit of the CHW Return Temperature (Temperature value can be set differently by enabling season mode).
Return Water Safety Cutoff (Summer/Winter/Default)	When CHW Return Temperature reaches Return Water Safety Cutoff+CHW Return Deadband, CHW Setpoint will be overridden to Setpoint Lower Limit in a certain method (as configured in Override Method) (Temperature value can be set differently by enabling season mode).
Return Water Safety Override Method	When CHW Return Temperature reaches Return Water Safety Cutoff+CHW Return Deadband, CHW Setpoint will be set to Setpoint Lower Limit in the following method <ul style="list-style-type: none"> • Standard Override: Override is subject to Max Step Size and Calculation Interval. • Fast Override: Override is subject to Calculation Interval, but not Max Step Size. • Instant Override: Override will take effect instantly, regardless of Calculation Interval or Max Step Size. • Smart Override: Override is calculated based on the rate of change on CHW Return Temperature.
Max Step Size	The maximum change on CHW Setpoint in each calculation
Time Hold At Startup	The amount of time during which iDataCentre Manager will hold CHW Setpoint at a certain value (Setpoint At Plant Startup)
Calculation Interval	The interval after which calculation is performed
Season Mode	By enabling this, the user can save different settings of the above temperatures in terms of different seasons, by disabling this, the plant will apply the default settings
Current Mode	The current mode used by the plant if the seasonal mode is enabled
Season Configuration	This is a selection of which seasonal settings the user wants to configure
Season Start Month	The season started in which month
Season Start Day	The season started on which day

Table 8 - Chilled Water Setpoint Reset on Return - Setting

To select Reset based on CHW Valve Position, select **"CHW Valve Position Reset"** in the drop-down menu of Control Strategy for Chilled Water.

Figure 42 – Chilled Water Setpoint Reset based on Valve Positioning

CHW Valve Position Reset Configuration Parameters		
Parameter	Description	Example (if applicable)
Setpoint At Plant Startup (Summer/Winter/Default)	The initial CHW Setpoint that iDataCentre Manager will hold for a certain amount of time (Time Hold At Startup) during plant startup (Temperature value can be set differently by enabling season mode).	
Time Hold At Startup	The amount of time during which SCS will hold CHW Setpoint at a certain value (Setpoint At Plant Startup)	

CHW Valve Position Reset Configuration Parameters		
Setpoint Upper Limit (Summer/Winter/Default)	The maximum value of CHW Setpoint (Temperature value can be set differently by enabling season mode).	
Setpoint Lower Limit (Summer/Winter/Default)	The minimum value of CHW Setpoint (Temperature value can be set differently by enabling season mode).	
Valve Deadband Upper Limit (Summer/Winter/Default)	The upper limit of valve position above which CHW Setpoint will decrease (Temperature value can be set differently by enabling season mode).	
Valve Deadband Lower Limit (Summer/Winter/Default)	The lower limit of valve position above which CHW Setpoint will increase (Temperature value can be set differently by enabling season mode).	
Step Time	The interval after which Step is perform if necessary	
Step Size	The maximum change on CHW Setpoint in each calculation.	Max Step Size is set to 0.1 deg C. Even though the calculation requires CHW Setpoint to increase by 1 deg C, the actual increase on CHW Setpoint is still 0.1 deg C.
Seasonal Mode	By enabling this, the user can save different settings of the above temperatures in terms of different seasons, by disabling this, the plant will apply the default settings	
Current Mode	The current mode used by the plant if the seasonal mode is enabled	
Seasonal Configuration	This is a selection of which seasonal settings the user wants to configure	
Season Start Month	The season started in which month	
Season Start Day	The season started on which day	

Table 9 - Chilled Water Setpoint Reset on Valve position - Setting

5.4.1.1 CHW Setpoint Limits

This defines the individual CHW setpoint limits for each chiller, the plant setpoint will not be applied directly to the chiller but will instead undergo stepping logic & min/max limits defined in the configuration in this section. This will allow you to limit the chw setpoints allowed by certain chillers or allow them to change their setpoint on a longer than usual period without having to apply those settings to the entire plant.

Chiller CHW Setpoint Limits	
Parameter	Description
Chiller	The chiller to modify the setpoint limits for. Every other parameter will be dependent on the chiller selected here.
Min CHW Setpoint	The minimum CHW setpoint that can be applied to the given chiller.
Max CHW Setpoint	The maximum CHW setpoint that can be applied to the given chiller.
Step Time	The period of time which the chiller will hold the same setpoint before changing in seconds.
Max Step Size	The maximum amount that the CHW setpoint can change at the conclusion of the step time

5.5 Schematics Page

5.5.1 Free Cooling Setting

The user can activate free cooling management and adjust the free cooling parameters.

Free Cooling Configuration

Free Cooling Enable Enabled

System Free Cooling Approach Temperature Setpoint	2.0 °C	•	Free Cool Mode Change Timer	5.0 min	•
Free Cool Start Timer	10.0 min	•	Mix Cool Allow Chiller Load	95.0 %	•
Free Cool Stop Timer	10.0 min	•	Free Cool Changeover Delta Temperature	2.0 °C	•
Unit Free Cool Changeover Timer	10.0 min	•	Unit Free Cool Mode Changeover Timer	10.0 min	•

Figure 43 - Free cooling parameters

Free Cooling settings	
Parameter	Description
Free Cooling Enable	Enabling/Disabling free cooling management by iDataCentre Manager
System Free Cooling Approach Temperature Setpoint	This setting represents the minimum delta temperature between System Actual setpoint and Outside air temperature to activate the Free-cooling at system level
Free Cool Start Timer	Time to wait to start free cooling once free cooling conditions are verified
Free Cool Stop Timer	Time to wait to start free cooling once conditions are no longer verified
Unit Free Cool Changeover Timer	The time that elapses between commands to disable freecooling
Free Cool Mode Change Timer	The time to wait to switch to Mixed mode once the conditions are verified
Mix Cool Allow Chiller Load	Percentage of load that all active chillers must exceed in order to enable the mixed mode switching condition
Free Cool Changeover Delta Temperature	This parameter is necessary to make the condition of switching from full free cooling to mixed mode more or less severe.
Unit Free Cool Mode Changeover Timer	The time that elapses between commands to switch a unit in mixed mode

Table 10 – Free Cooling settings

5.5.2 Booster Heating Limit Setting

iDataCentre Manager allows the use to adjust the booster heater limit setting.

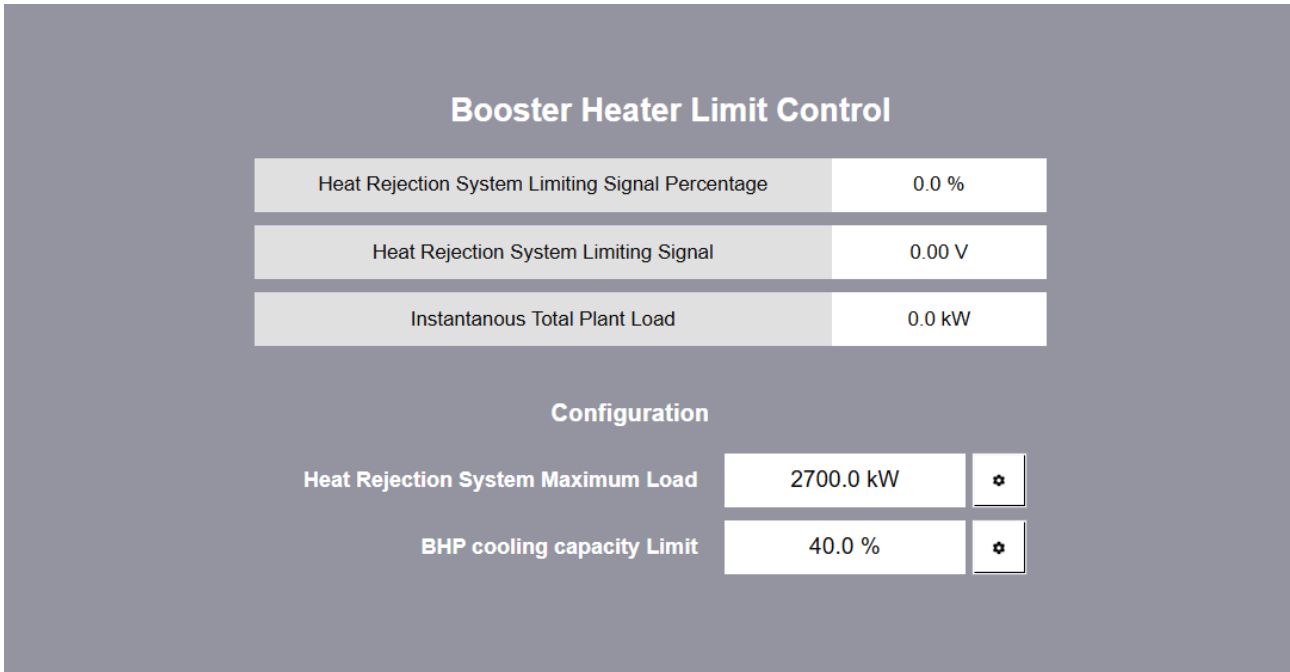


Figure 44 – Booster Heater Limit Settings

Parameter	Staging Condition
Heating Rejection System Limiting Signal Percentage	Actual limitation in percentage of the booster heating system
Heat Rejection System Limiting Signal	Actual limit signal sent by iDCM to the Booster Heater system
Instantaneous Total Plant Load	Actual Total Cooling Plant Load in kW
Heat Rejection System Maximum Load (HR_{max})	Maximum limitation in KW of the booster heating system
Booster Heating Plant cooling capacity limit (BHP_{lim})	This value limits the heating load produced by the water heat pumps based on the cooling load produced by the cooling system

5.6 Plant Schedule Setting

iDataCentre Manager supports two schedule modes

- 1) User Defined Schedule,
- 2) Always On

Schedule modes can be switched in the Schedule Mode panel on right hand side.

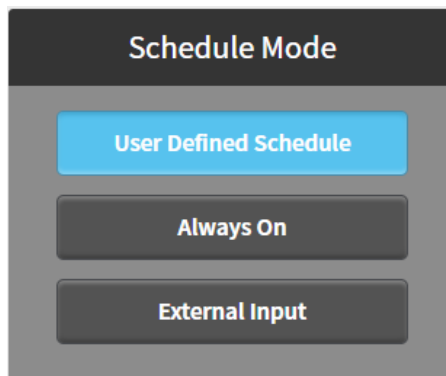


Figure 45 - Plant Schedule

5.6.1 User Defined Schedule Mode

When User Defined Schedule is selected, a Calendar panel appears with three tabs - Weekly Schedule, Special Events and Summary.

5.6.2 Weekly Schedule

When Weekly Schedule is selected, a weekly calendar appears. Users can specify the time range in which the plant is enabled or disabled. To specify a time range, simply move the mouse cursor on the start time and drag to the finish time, and **hit Save button**. For example, a time range from 9:00 AM to 6:00 PM on Monday is specified below.

WEEKLY SCHEDULE SPECIAL EVENTS SUMMARY

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
3:00 AM							
6:00 AM							
9:00 AM		True 9:00 AM - 6:00 PM					
12:00 PM							
3:00 PM							
6:00 PM							
9:00 PM							

Event Start: 9 : 00 AM Event Finish: 6 : 00 PM Event Output: true null

Figure 46 - Plant Weekly Schedule

To modify a created time range, select the time range and change Event Start and Finish time or change Event Output, and **hit the Save button**.

5.6.3 Special Events

Special events can be created in Special Events tab. To add a special event, click the Add button . In the pop-up window, specify Display Name, Type and Time.

For example, 1st January is a public holiday in which a plant is disabled. A special event is created for this day. Display Name is New Year Day, Type is Date and Data is 1st Jan Any Year as shown below,

Display Name:

Type:

Any Weekday 1 Jan

Figure 47 - Schedule Special Events

Press OK button to confirm the date. Then move the mouse cursor on the desired start time and drag to the finish time and set Event Output, and **hit Save button**. On 1st Jan, the plant is disabled from 12:00AM to 12:00PM as the setting shown below.

5.6.4 Schedule Summary

When Summary tab is selected, a summary calendar appears. Clicking on a particular date will show the schedule on this date. An example is shown below.

Summary

WEEKLY SCHEDULE
SPECIAL EVENTS
SUMMARY

Prev Page Next Page Today Prev Month Next Month

October 2018							November 2018							December 2018							January 2019							February 2019							March 2019							April 2019						
Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6					1	2	3	2	3	4	5	6	7	6	7	8	9	10	11	3	4	5	6	7	8	3	4	5	6	7	8	3	4	5	6	7	8	1	2	3	4	5	6
7	8	9	10	11	12	13	4	5	6	7	8	9	8	9	10	11	12	13	12	13	14	15	16	17	9	10	11	12	13	14	10	11	12	13	14	15	9	10	11	12	13	14	7	8	9	10	11	12
14	15	16	17	18	19	20	11	12	13	14	15	16	15	16	17	18	19	20	19	20	21	22	23	24	16	17	18	19	20	21	17	18	19	20	21	22	16	17	18	19	20	21	14	15	16	17	18	19
21	22	23	24	25	26	27	18	19	20	21	22	23	22	23	24	25	26	27	26	27	28	29	30	31	23	24	25	26	27	28	24	25	26	27	28	29	24	25	26	27	28	29	21	22	23	24	25	26
28	29	30	31				25	26	27	28	29	30	30	31					27	28	29	30	31		24	25	26	27	28		31						28	29	30									

05-Oct-18 12:00 AM AEST	false [ok]	Default Output
05-Oct-18 9:00 AM AEST	true [ok]	Week: Friday
05-Oct-18 6:00 PM AEST	false [ok]	Default Output

5.6.5 Always On Mode

When Always On mode is selected, the plant is constantly enabled. **No Save button is required to hit.**

5.7 User Management

A user with “Config” access level can add other user profile to the iDataCentre Manager, assigning the Username, Password and Access Level

Navigate to the User Management page via iDataCentre Manager Configuration navigation pane. The screen below should appear.

Figure 48 - User Management Settings

To add a new user, select the *Add User* button at the top right corner. The window, as observed below, should appear.

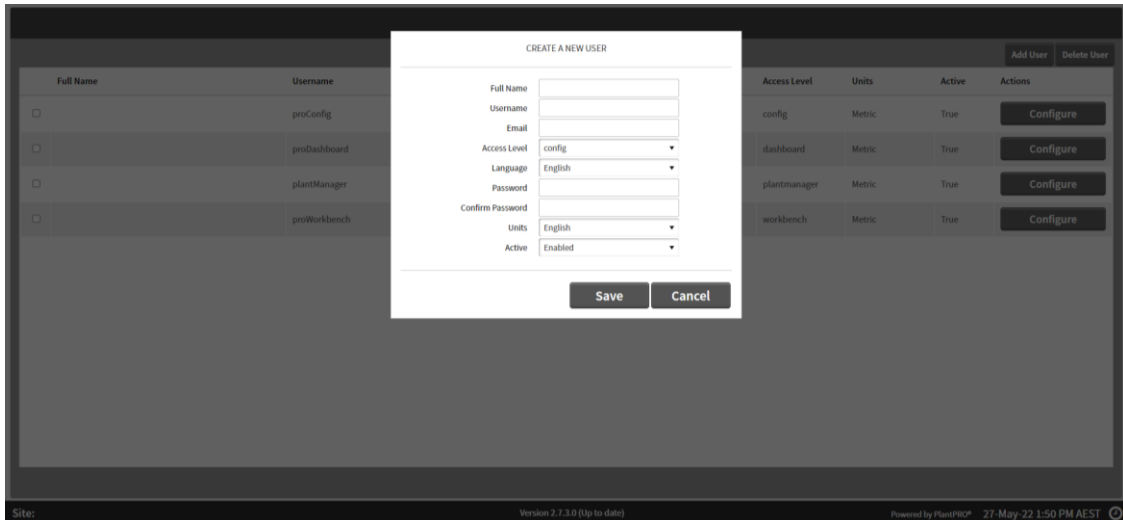


Figure 49 - User Management Wizard

Enter all required information and press the **Save** button to add this user. The added user should now be added to the *User Management* screen as seen below.

When adding/configuring user, user "access level" can be chosen from following three options:

- **config** - Config user can commission a iDataCentre Manager project installation, and edit plant design information and control parameters. Config user has full access to the configuration portal and dashboards portal.
- **plantManager** - PlantManager user has access to iDataCentre Manager dashboards portal and Plant manager view. On Plant manager view, the plant can be operated manually. PlantManager user has no access to the configuration portal.
- **dashboard** – Dashboard user is able to monitor the plant operation in iDataCentre Manager dashboards portal. Dashboard user has no access to the configuration portal and Plant manager view.



It is highly recommended to provide only PlantManager users and Dashboard Users for the final customer

To alter any settings of an existing user, select the **Configure** button for that user on the right hand side of the screen. A window as observed below should appear.

Once new data and values have been entered, select the **Save** button to save all changes for that user.

If a user or multiple users need to be deleted, users can be selected by selecting the check box next to the required users, Once all required users have been selected, press the **Delete User** button. The window as seen below will appear to confirm the deletion of the selected user

Press **OK** if this is the user that is required to be deleted. This user will then be removed from User Management list.

5.7.1 Default Users

Name	Authentication Scheme	Nav File	Roles
proConfig	config	file:^nav/configuration.nav	config
proDashboard	dashboard	file:^nav/dashboards.nav	dashboard
plantManager	plantManager	file:^nav/plantmanager.nav	plantManager

5.8 Email Service Configuration and Setting

In the Email Service Configuration page, users can configure accounts for the Niagara Email Service. To access this page, select the Email Configuration option under Services in the Main Menu.

Figure 50 - Email Configuration page

5.8.1 Email Service

The following data can be configured for the Email Service

Parameter Name	Description
Enabled	Whether the Email Service is enabled.
Status	The current Status of the Email Service.
Fault Cause	The latest Fault Cause from the Email Service.

5.8.2 Outgoing Account

The following data can be configured for the Outgoing Account

Parameter Name	Description
Enabled	Whether the Outgoing Email Account is enabled.
Hostname	The Hostname to use for sending Emails from this Account
Account	The account name used for authentication with the Email Service Provider.
Password	The password used for authentication with the Email Service Provider.
Pollrate	The frequency with which to poll the host
Use SSL	Secure Socket Layer for communication with host email server.
Use Start TLS	Enable STARTTLS for emails servers that don't support regular SSL/TLS
Connection Timeout	The connection timeout when connecting to the email host.
Use Authentication	Whether or not the email host requires authentication.
Reply To Name	This account's reply-to name
Reply To Address	This account's reply-to address
Status	The Status of the Outgoing Email account.
Last Poll Success	The last time a poll was successful.
Last Poll Failure	The last time a poll failed.
Last Poll Failure Cause	The reason that the last poll failed.

5.9 IT Settings

The screenshot shows the IT Settings configuration page. It includes the following sections and parameters:

- GENERAL NETWORK SETTINGS:** Host Name (localhost), Gateway (192.168.40.2), DNSV4 Server1 (192.168.40.2), DNSV4 Server2.
- WEB SERVICE SETTINGS:** Web Start (Enabled/Disabled), HTTPS Port (9002), HTTP Enabled (Enabled/Disabled), HTTP Port (8002).
- ETH0 - WIRED ETHERNET ADAPTER:** IP Address (192.168.40.119), Subnet Mask (255.255.255.0).
- ETH1 - WIRED ETHERNET ADAPTER:** IP Address (192.168.1.100), Subnet Mask (255.255.255.0).

Figure 51 - IT Settings

The iDataCentre Manager IT settings page can be accessed by clicking "IT SETTINGS" in the main navigation menu. The following parameters can be configured on this page:

IT Settings Page Parameters	
Parameter	Description
Host Name	Define the device host name. This name will be visible to other devices on the IP network
Gateway	Define the IP Gateway, this device is responsible for handling internet traffic. It is likely to be the address of a router
DNSV4 Server1	Define the primary DNS server1. Generally the DNS can be a public DNS or a private DNS server, a public DNS server example is 8.8.8.8
DNSV4 Server2	Define the secondary DNS server2. Generally the DNS can be a public DNS or a private DNS server, a secondary public DNS server example is 8.8.4.4
Web Start	Enable or disable allowing users to login using the Niagara Web Launcher.
HTTPS Port	Define the web port on which the user interface can be reached when using HTTPS (SSL). Note, on the CI-534 hardware the configured port MUST be above 1024.
HTTP Enabled	Define if the user interface can be reached using HTTP. This is not a secure connection.
HTTP Port	Define the web port on which the user interface can be reached when using HTTP. Note, on the CI-534 hardware the configured port MUST be above 1024.
IP Address	Define the IP address of SCS controller. Take caution in setting this address as incorrect configuration can cause the controller to become unreachable on the network
Subnet Mask	Define the IP Subnet for the SCS controller. This is related to the existing network configuration, generally 255.255.255.0 is utilised as a subnet mask. Take caution in setting this address as incorrect configuration can cause the controller to become unreachable on the network.

5.10 License Services

On this page users can review their license and its features, along with the EULA's that have been agreed to. This page can be viewed from both the Dashboard or the Configuration menus by selecting the "License Service" from the selection of drop downs on the main menu.

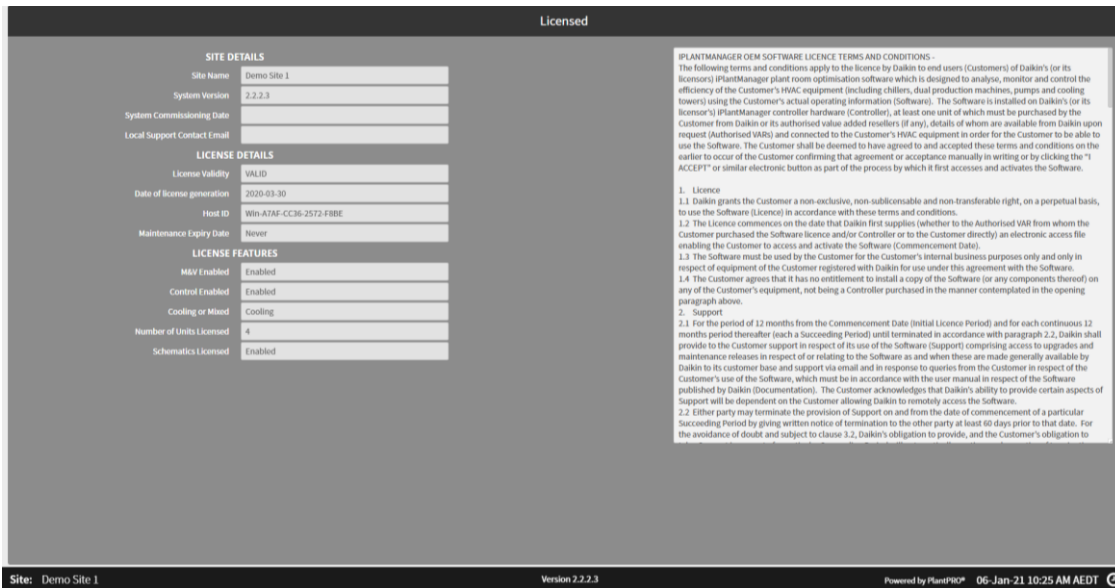


Figure 52 - License Page

While unlicensed, users will automatically be directed to this page if they try to access any other feature. The main menu will also be disabled.

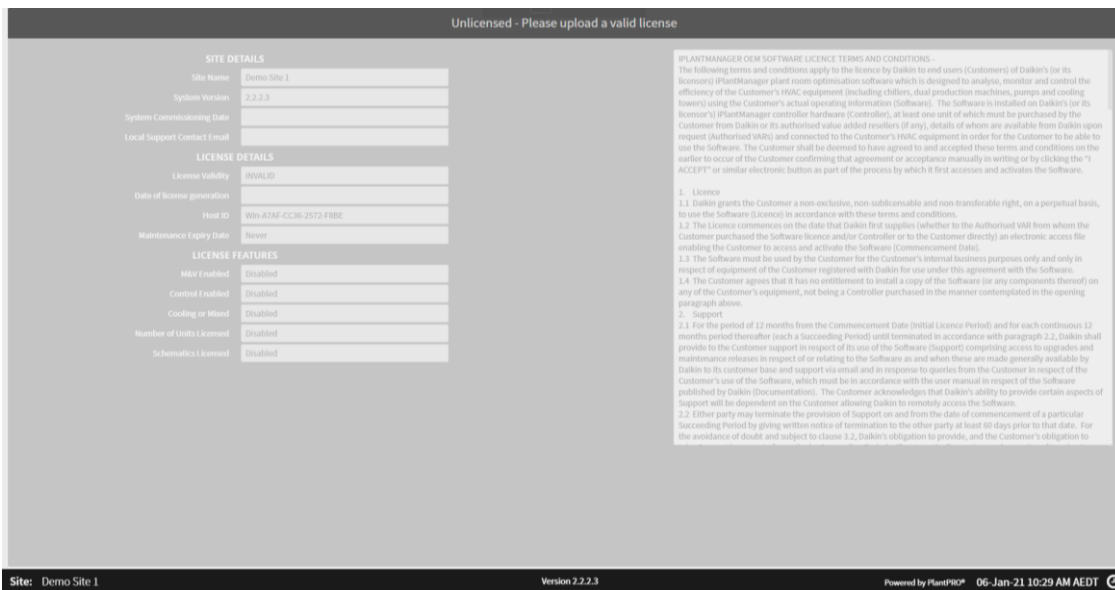


Figure 53 - License Page - Unlicensed Controller



If the controller should be unlicensed please contact Factory.

6 USER MANUAL

After logging in to iDataCentre Manager interface, a different menu and consequently even different information of the HVAC System will be available according to access level:

- plantManager - PlantManager user has access to iDataCentre Manager dashboards portal and Plant manager view. On Plant manager view, the plant can be operated manually. PlantManager user has no access to the configuration portal
- dashboard – Dashboard user is able to monitor the plant operation in iDataCentre Manager dashboards portal. Dashboard user has no access to the configuration portal and Plant manager view.

6.1 Overview page

Upon logging in with a 'dashboard' user, the iDataCentre Manager Overview page will be accessed. The iDataCentre Manager Overview includes a series of data widgets which provide the user with general information about the immediate state of the chiller plant.

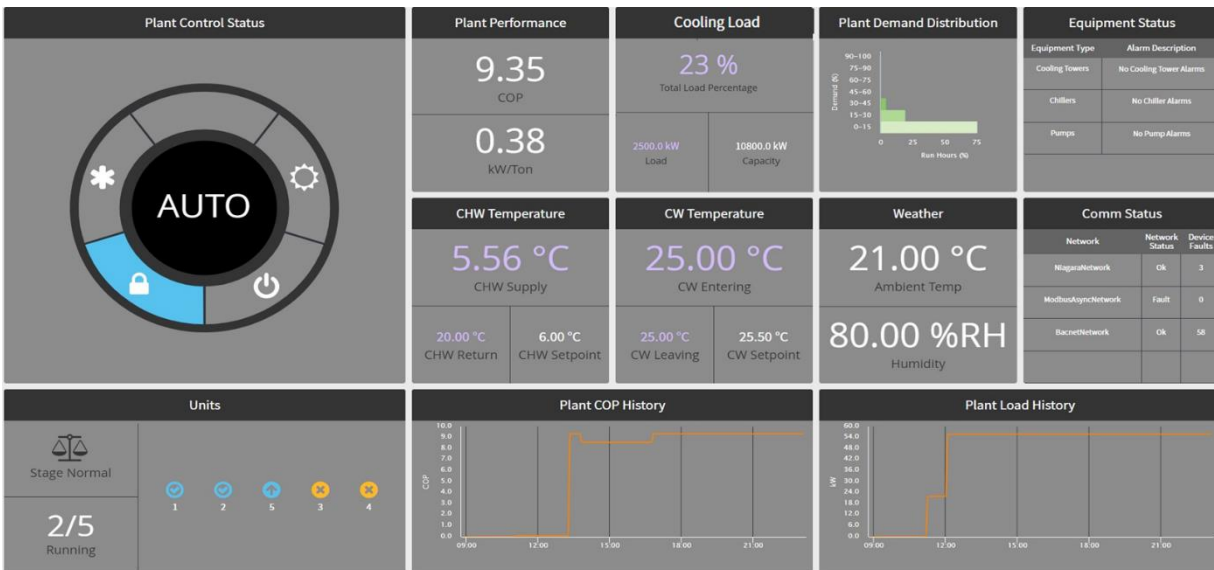


Figure 54 - Overview Page

6.1.1 Plant Control Status Widget

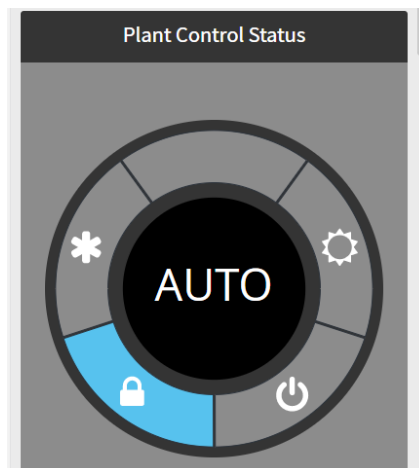


Figure 55 - Plant Control Status Widget

On the panel on the left-hand side, at the top, the control states are displayed:

- The **snowflake** icon shows whether a Cooling Call is present
- The **lock** icon shows whether plant is available to run or locked out based on ambient temperature lock out
- The **power** icon shows whether there is an external Plant Enable signal
- The **sun** icon shows whether a Heating Call is present

6.1.2 Plant Performance

Plant Performance Widget displays the instantaneous full plant COP and plant kW/Ton. This COP or kW/Ton indicates the level of efficiency present within the plant room - a higher COP indicates a more efficient plant and a lower kW/Ton indicates a more efficient plant.

6.1.3 Plant Load

The load data widget displays the instantaneous cooling load in percentage, current load and full plant capacity. Total plant load is a calculation of the current load over the full plant capacity. This total load percentage is not current load of active chillers. Current plant load is shown in either kW. Full plant capacity is the total capacity of the plant including all chillers configured within iDataCentre Manager, this is displayed in either kW.

6.1.4 Plant Demand Distribution

The Plant Demand Distribution widget informs the users of the percentage of time that the chiller plant operates within each demand region. This chart can help to visualise and understand the normal range of operation of the plant. By hovering over each region with a mouse, a pop-up will be shown to indicate the actual run hour percentage for the chosen region.

6.1.5 Units

The Units Data widget allows the user to quickly see how many units are running, which units are running and what state the current staging state is. The staging state is shown in the top left corner of the data widget. This will display one of the following states:

- Stage up Cooling - all conditions are present for a staging up event, currently waiting out stage up timer
- Stage down Cooling - all conditions are present for a staging down event, currently waiting stag down timer
- Stage normal - no staging up or down events currently in process, plant conditions are currently stable

The bottom left shows numerically how many units are running. The right portion of the data widget shows graphically which chillers are running.

Icon States	
	Unit Running
	Unit Available
	Unit Standby
	Unit Offline
	Unit Unavailable
	Unit Induced Offline
	Unit Manual Offline

Table 11 - Unit Icons

6.1.6 Temperature

The CHW Temperature data widget displays the instantaneous chilled water supply and return temperature as measured at the plant headers. This is not the individual unit water supply and return temperature, rather the temperature at the plant level. The temperatures are shown in either °C.

6.1.7 Weather

The weather widget displays the current ambient conditions as average of the temperature sensor read by Daikin Units. Outside air humidity will not be available unless the iDataCentre Manager Controller will not be connected to internet to a weather station.

6.1.8 Communication Status

The communication status widget displays all communication networks that are presently configured within iDataCentre Manager.

The status column will inform the user of the network status, while the faults column will inform the user of the number of current device faults.

6.1.9 Equipment Status

The Equipment Status widget displays any current equipment faults. If a fault is present on any equipment the text will change to 'ALARM' and the line will be highlighted in orange. The 'Alarm Description' field will display the number of 'unable to run' alarms present for each equipment category.

6.1.10 Plant COP History

The Plant COP History widget displays the efficiency history over the past 24 hours.

The data widget will continue to update automatically over time.

The efficiency is shown in either COP for SI.

Note that for heating capable systems COP is replaced with TER (Total Efficiency Ratio) which is the same calculation as COP but calculates load as the total of heating & cooling load.

6.1.11 Plant Load History

The Plant Load History widget displays the total plant cooling load over the past 24 hours.

The data widget will continue to update automatically over time.

The cooling load will be displayed in kW or tR for SI and US users accordingly.

6.2 PlantManager Navigation Panel

Upon logging in as "plantManager" access level, user can navigate around the iDataCentre Manager screen. The navigation menu will appear from the left side of the screen by clicking the menu icon in the top right of dashboard portal. Desktop users will have access to all iDataCentre Manager dashboard screens and functions.

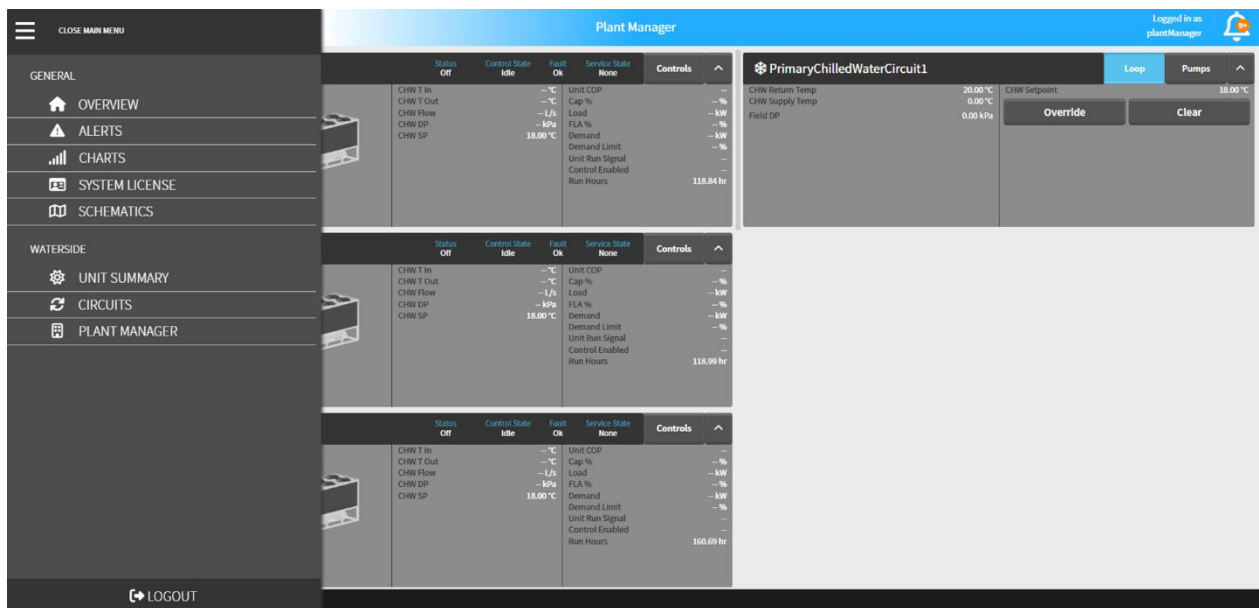


Figure 56 - PlantManager Main Menu

Within the menu, the user can select to visit the following screens:

- Overview
- Alerts
- Charts
- System License
- Schematics
- Waterside
 - o Unit Summary
 - o Circuits Summary
 - o Plant Manager



The schematics page can contain plant graphics and custom pages specific to each project

The user can close the main menu and return to the current screen by pressing 'close main menu' at the top of the navigation menu.

The user can also choose to log out of iDataCentre Manager by clicking the 'logout' button.

6.3 Alerts Page

The Alerts screen provides an in-depth look of all the alerts including alarms, faults, and analytics in the system. To navigate to this view, click on the Alerts tab from the main menu or just simple click on the "alarm bell" icon on the top right corner of the header of the page.

Notes:

1. By default, when first visiting the page, only the "Fault" of "All" equipment for the **last hour** will be shown on the alert table.
2. Users can query alerts based on "Equipment" type, Alert type and timestamps using the Filter pane on the left hand side.

Filter	TIMESTAMP	EQUIPMENT	SUMMARY
EQUIPMENT: All	Wed 23/12/2020 09:57:10 PM AEDT	cChillerfault	CH1_Load
ALERT TYPE: Fault	Wed 23/12/2020 09:20:16 PM AEDT	cChillerfault	CH1_Load
DATE: 23 Dec 2020	Wed 23/12/2020 09:11:45 PM AEDT	cChillerfault	CH1_Load
START TIME: 08:10 PM	Wed 23/12/2020 09:16:59 PM AEDT	cChillerfault	CH1_Load
END TIME: 11:59 PM	Wed 23/12/2020 09:16:13 PM AEDT	cChillerfault	CH1_Load

Figure 57 - Alerts Page

The user can click on a particular fault or alarm to receive additional information.

Alarm vs Fault

Alarms and Faults can be filtered out using the Alert type tab, also the alarms are highlighted in **Yellow**, while the faults will be highlighted in **Orange** instead. The timestamps format will be converted automatically and shown in either dd/mm/yyyy (UK) or mm/dd/yyyy (US) depending on the current user login

6.3.1 Filter

By default, when first navigating to this page, the filter will be set for **all equipment** (including chiller and compressor alerts), and for **"fault" type only**. Also, the time range will be set for the **"last hour"** of the current day.

To filter alerts by alert types, simple select the options from dropdowns. Alert type could be "All", "Fault", or "Alarm".

Equipment type will filter out alerts for chiller or for each individual compressor. There is a figure right next to each equipment indicating the total number of active Alarms and Faults for that particular equipment.

Users can also use "calendar" to select the start date and end date, start time and end time could be set easily by corresponding tab on the filter.

The "Query" button will be flashing when there is a new alert just arriving while on this view. When clicked, this button will be greyed out and the alert table will be updated accordingly. In addition, the "Cancel" button could be used to cancel the querying while the job is in progress.

To view detail on each individual alert, simply click on the alert row, the message detailing the cause of the alert will be shown.

6.3.2 Sorting

Alerts can be sorted in a certain order by Timestamp, Equipment, or Summary. To do this, click on the header of the alert table. For instance, to sort by equipment type, click on "Equipment" header of the second column, the content will be sorted by alphabetical order. By default, when first visiting this view, the table will be sorted by Timestamp in descending order, which shows the most recent alert at the top.

6.3.3 Active Alerts

By selecting the *All Active Alerts* button as highlighted in red below, all active alerts will be queried and appear in a pop-up window.

All Active Faults & Alarms		
Timestamp	Source	Select All: <input type="checkbox"/>
02-Mar-20 11:31:28 AM AEDT	Ch1_LowLoad	<input type="checkbox"/>
02-Mar-20 12:42:40 AM AEDT	Chiller2_cwtn	<input type="checkbox"/>
02-Mar-20 12:42:40 AM AEDT	Chiller2_calcCwFlow	<input type="checkbox"/>
02-Mar-20 12:42:40 AM AEDT	Chiller2_calcDischargeAppTemp1	<input type="checkbox"/>
02-Mar-20 12:42:40 AM AEDT	Chiller2_calcSuperheatTemp1	<input type="checkbox"/>
02-Mar-20 12:42:40 AM AEDT	Chiller2_chwtn	<input type="checkbox"/>
02-Mar-20 12:42:40 AM AEDT	Chiller2_calcChwFlow	<input type="checkbox"/>
02-Mar-20 12:42:40 AM AEDT	Chiller2_voltage	<input type="checkbox"/>
02-Mar-20 12:42:40 AM AEDT	Chiller2_cwtOut	<input type="checkbox"/>
02-Mar-20 12:42:40 AM AEDT	Chiller2_calcCompPressureRatio1	<input type="checkbox"/>
02-Mar-20 12:42:40 AM AEDT	Chiller2_calcPowerAbsorbed	<input type="checkbox"/>
02-Mar-20 12:42:40 AM AEDT	Chiller2_chwtOut	<input type="checkbox"/>
02-Mar-20 12:42:40 AM AEDT	Chiller2_calcEvapAppTemp1	<input type="checkbox"/>

Figure 58 - All Active Faults & Alarms

This pop up can be observed above. For only advanced users, active alerts can be removed by selecting the corresponding *Remove* box and pressing OK. These alarms will then be removed.

6.4 Charts Page

The Charts page provides all recorded historical data for all devices such as chillers, pumps, cooling towers, etc.



Figure 59 - Charts Page

The charts page is not available to tablet or mobile users.

6.4.1 Charting

Adding data points

The page is divided into two sections: chart select and charting area. The select tab on the left can be used to select data to plot on the right-hand side space. A maximum of four charts, with four data points is able to be plotted at a time. A warning will pop up if more than four charts, of four data points per chart, are selected. To select the points, use the drill-down menu in the "Points" to create a new chart select the data point on the left-hand side. To add a data-point to an existing chart, select and drag the data point to add and drop it on the chart to add it to. Once selected, the point will be underlined and highlighted.

Once plotted, the currently examined value of the point will be displayed on the right-hand side of the chart. The detailed information of the point including the exact value and time is shown in a square box on the chart with a little dot highlighted.

When users select different points on the chart, this detailed box will dynamically move along to show the value and time at any specific instance. For the sake of better visibility, different colors are used for plotting each data point. The title will also clearly mark which data point is being plotted.

To set the time range for charting:

- Use the drop-down menu in the "Time Range". By default, when first loading this page, the time range will be set to "Today".

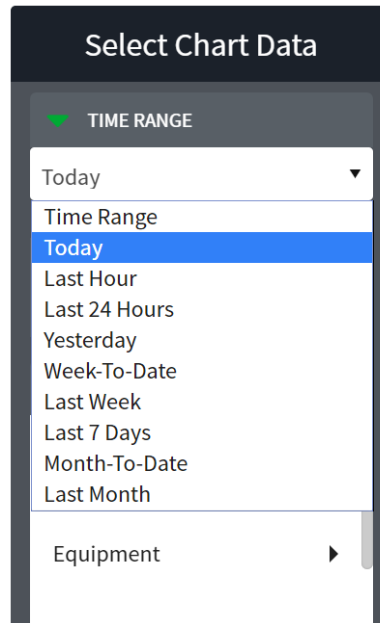


Figure 60 - Chart Selection pane

- To select a custom time range, select "time range", and press the clock icon below the drop-down menu. A pop-up will appear where the start date/time and end date/time can be configured.



Figure 61 - Chart Customized Time range

Removing data points

To remove a single data point simply click on the data point in the left-hand side or click the name of the data point in the title of the chart. To remove all charts and data points, simply click on the "Reset" button at the bottom of the left-hand side of the data select section.

6.4.2 Chart Exporting

The chart can be exported to .png or .csv files by clicking on a little button on the top right corner of the chart. A corresponding file will be saved to a local computer or external hard drive.

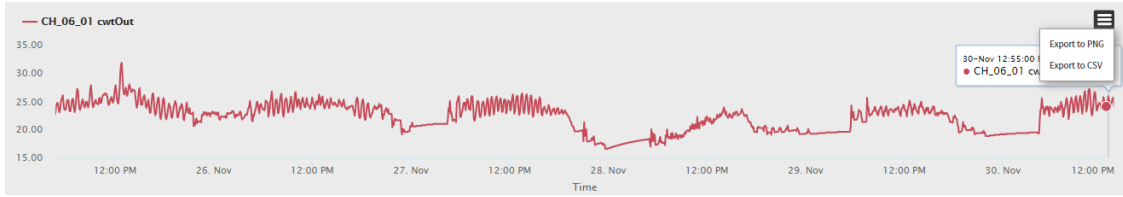


Figure 62 - Chart Export Button

	A	B	C	D
1	Time	Series 1		
2	28-08-18 0:00	6.498418		
3	28-08-18 0:05	6.5		
4	28-08-18 0:10	6.5		
5	28-08-18 0:15	6.5		
6	28-08-18 0:20	6.5		
7	28-08-18 0:25	6.5		
8	28-08-18 0:30	6.5		
9	28-08-18 0:35	6.5		
10	28-08-18 0:40	6.5		
11	28-08-18 0:45	6.5		
12	28-08-18 0:50	6.5		
13	28-08-18 0:55	6.5		
14	28-08-18 1:00	6.5		
15	28-08-18 1:05	6.5		

Figure 63 - Chart Export File .csv

6.5 Unit Summary

In the Unit Summary page, users can view summary data of heat pumps and reversible air heat pumps. To access this page, select the Unit Summary option under Dashboards->Waterside in the Main Menu.



Figure 64 - Unit Summary

The following datapoints are represented at header section of Unit Summary.

Data	Description	Unit
Unit Information Widgets		
Service State	Service state displays the current state of the machine.	The states include: Available Running Unavailable Fault - In fault or alarm
TER	Total Efficiency Ratio to measure the efficiency of the unit. The total energy produced for both heating and chilling for each kW of electrical energy used by the unit.	
Status	Displays the current operating mode of the machine	This status includes: Off, Fault, Cooling, Heating
FLA%	Display the instantaneous Full Load Amps (FLA), current used to provide the rated output as a percentage.	%
Unit General Information		
Total Run Hours	Display the total run hours of the machine as tracked by	Hours
Amps	Displays instantaneous current draw of selected chiller. Current shown is total current, including current from all individual compressors.	Amps
Volts	Displays instantaneous three phase voltage.	Volts

Data	Description	Unit
Power Factor	Displays instantaneous power factor.	
Demand	Displays instantaneous electrical demand of chiller. Demand shows total demand, including demand from all individual compressors.	kW
Cooling Load	Displays instantaneous calculated cooling load of selected unit. Cooling load calculated based on chilled water temperatures and cooling vessel flow rate.	kW
Cooling Setpoint	Temperature at which the unit will maintain in cooling production.	°C
Heating Load	Displays instantaneous calculated heating load of selected unit. Heating load calculated based on hot water temperatures and heating vessel flow rate.	kW
Heating Setpoint	Temperature at which the unit will maintain in heating production.	°C
<i>Production Vessel (Evaporator) Information</i>		
Temp In	Displays instantaneous fluid temperature measured at the inlet of the vessel.	°C
Temp Out	Displays instantaneous fluid temperature measured at the outlet of the vessel.	°C
Flow	Displays instantaneous calculated fluid flow rate through the vessel.	L/s
DP	Displays instantaneous calculated fluid differential pressure across the vessel.	kPa
Refrigerant Temp	Displays instantaneous refrigerant temperature in the vessel.	°C
Refrigerant Pres	Displays instantaneous refrigerant pressure in the vessel.	kPa
Approach Temp	Displays instantaneous refrigerant approach temperature in the vessel. The approach temperature is calculated from the difference of the fluid leaving temperature & the temperature of refrigerant in the vessel	Δ°C
Saturated Temp	Displays instantaneous refrigerant saturated temperature in the vessel. This is the temperature at which refrigerant will transition from a gas to liquid state.	°C
<i>Source/Sink (Condenser) Information</i>		
Air Temp	Displays instantaneous outside air temperature. This could be measured by the unit or externally depending on the sensor available.	°C
Refrigerant Temp	Displays instantaneous refrigerant temperature in the vessel.	°C
Refrigerant Pres	Displays instantaneous refrigerant pressure in the vessel.	kPa
Approach Temp	Displays instantaneous refrigerant approach temperature in the vessel. The approach temperature is calculated from the difference of the fluid leaving temperature & the temperature of refrigerant in the vessel	Δ°C
Saturated Temp	Displays instantaneous refrigerant saturated temperature in the vessel. This is the temperature at which refrigerant will transition from a gas to liquid state.	°C

Table 12 - Unit Data

To access Circuit/Design Data, press the information icon located to the left of the unit display name.

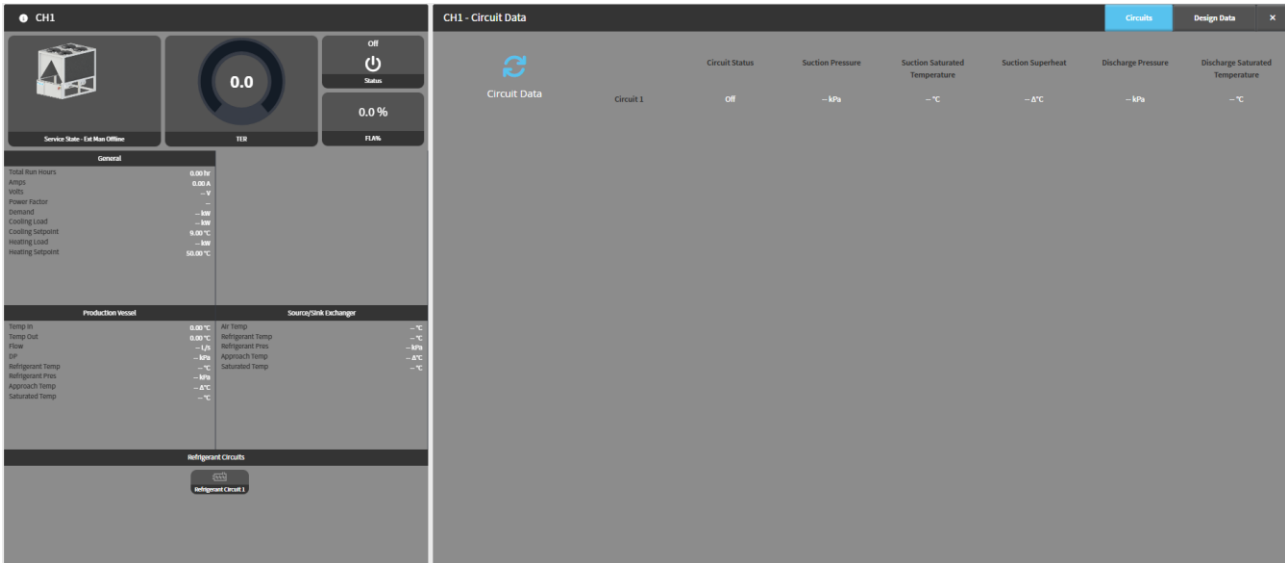


Figure 65 - Unit Circuit Summary

The data within the circuits is as follows:

Data	Description	Unit
Circuit Status	Displays the current operating mode of the circuit	This circuit status includes: Running & Off states
Suction Pressure	Refrigerant Pressure at the inlet of the compressor	kPa
Suction Saturated Temperature	The constant boiling/condensing temperature of refrigerant in the evaporator, determined by suction pressure and refrigerant-specific saturated tables.	°C
Suction Superheat	The temperature difference between the actual suction temperature and the suction saturated temperature of the refrigerant in the evaporator.	Δ°C
Discharge Pressure	Refrigerant Pressure at the outlet of the compressor	kPa
Discharge Saturated Temperature	The constant condensing temperature of the refrigerant in the condenser, determined by discharge pressure and refrigerant-specific saturated tables.	°C

Table 13- Unit Circuit Data

The data within the design data is as follows:

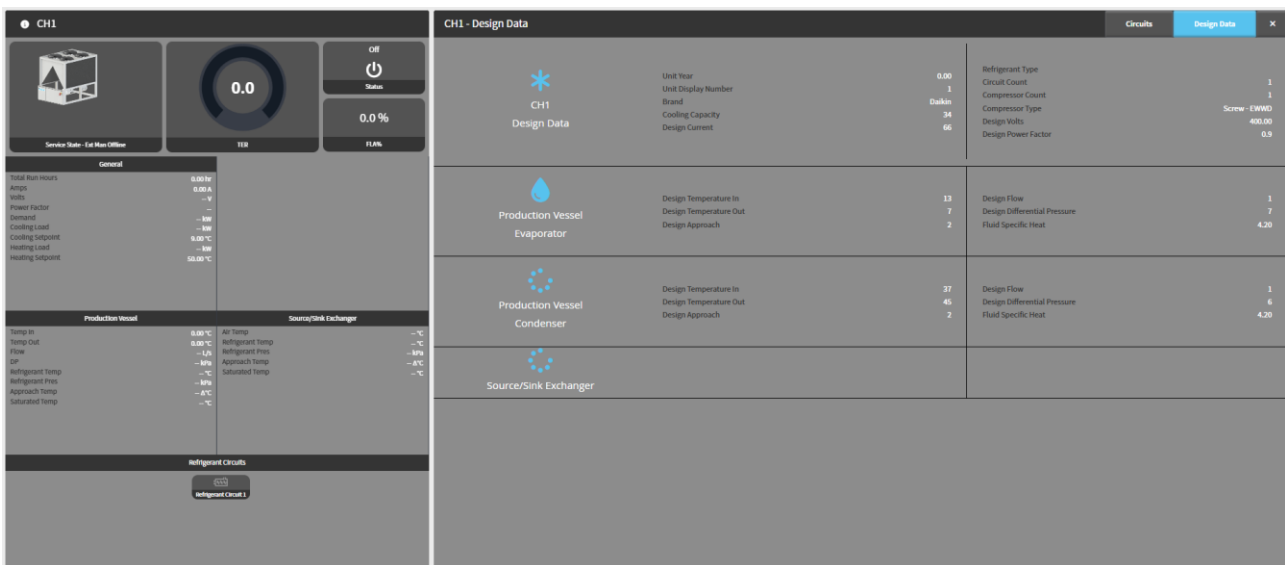


Figure 66 - Unit Circuit Design Data

Data	Description	Unit
Design Data		
Unit Year	The manufacturing year of the unit	
Unit Display Number	The display number of the unit	
Brand	The manufacturer of the unit	
Cooling Capacity	The design cooling capacity the unit is capable of	kW
Design Current	The unit's full load design current	Amps
Refrigerant Type	The refrigerant type used for this unit	
Circuit Count	The number of circuits the unit has	
Compressor Count	The number of compressors the specified circuit has	
Compressor Type	The compressor type used on the unit	
Design Volts	The unit's design voltage	Volts
Design Power Factor	The design power factor of the unit	
Production Vessel / Source, Sink Exchanger		
Design Temperature In	The anticipated temperature of the fluid entering the system during its operation.	°C
Design Temperature Out	The projected temperature of the fluid leaving the system after the heat exchange process has occurred.	°C
Design Approach	The targeted temperature difference between the leaving fluid temperature and the fully saturated refrigerant temperature.	Δ°C
Design Flow	The design full load production fluid flow for the unit	L/s
Design Differential Pressure	The design full load fluid differential pressure	kPa
Fluid Specific Heat	The specific heat of the working fluid flowing through the vessel	kJ/kg°C
Evaporator Design Approach	The evaporator design approach configured within the unit	
Condenser Design Approach	The condenser design approach configured within the unit	

Table 14 - Unit Design Data

6.6 Water Circuits Summary

The water circuit summary page allows the user to observe all water circuit operations in the plant simultaneously. Each water circuit card is applicable to all the pumps within the relevant circuit. It also displays all available and relevant information for this water circuit including water, field, speed and command/feedback information.

Primary constant loop					Secondary variable loop																			
Primary TwoPipe Headered					Secondary TwoPipe Headered																			
Overview					Loop																			
Pump Speed Control					Circuit Cooling Call																			
Active Setpoint	100.00 %				Off	Field DP	0.00 kPa																	
Control Variable	0.00 %				Off	DP Setpoint	150.0 kPa																	
Speed Control State	Disabled				Off																			
Speed Control Advanced Info	Speed control normal				Pumps																			
Loop					<table border="1"> <thead> <tr> <th>Pump Name</th> <th>CMD/FB</th> <th>Freq CMD/FB</th> <th>Demand</th> <th>Hours</th> </tr> </thead> <tbody> <tr> <td>P1-1</td> <td>Off/Off</td> <td>0.00 Hz/0.00 Hz</td> <td>0.00 kW</td> <td>0 hr</td> </tr> <tr> <td>pump1</td> <td>Off/Off</td> <td>0.00 Hz/0.00 Hz</td> <td>0.00 kW</td> <td>0 hr</td> </tr> </tbody> </table>					Pump Name	CMD/FB	Freq CMD/FB	Demand	Hours	P1-1	Off/Off	0.00 Hz/0.00 Hz	0.00 kW	0 hr	pump1	Off/Off	0.00 Hz/0.00 Hz	0.00 kW	0 hr
Pump Name	CMD/FB	Freq CMD/FB	Demand	Hours																				
P1-1	Off/Off	0.00 Hz/0.00 Hz	0.00 kW	0 hr																				
pump1	Off/Off	0.00 Hz/0.00 Hz	0.00 kW	0 hr																				
Operation Mode	Cooling	Decoupler Flow	0.00 L/s																					
Leaving Temp	—	Decoupler Temp	0.00 °C																					
Entering Temp	35.00 °C																							
Pumps																								
Pump Name	CMD/FB	Freq CMD/FB	Demand	Hours																				
Pump	Off/Off	0.00 Hz/0.00 Hz	0.00 kW	0 hr																				
pump1	Off/Off	0.00 Hz/0.00 Hz	0.00 kW	0 hr																				

Figure 67 - Water Circuit Summary

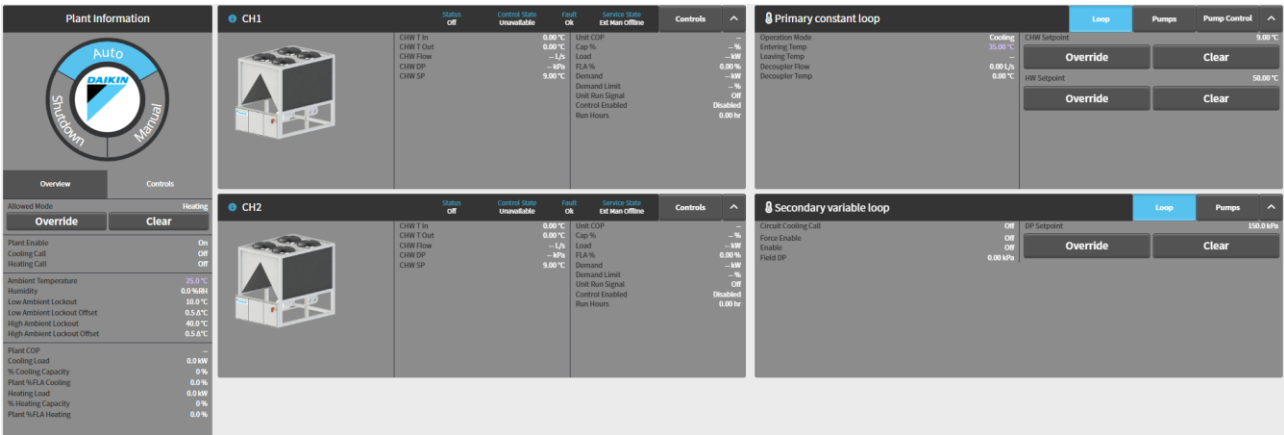


Figure 69 - PlantManager View

6.8.1 Plant Information

The plant information section displays the current plant operating mode, the plant level sensor and calculated data points, and also the plant level override controls under their respective tabs.

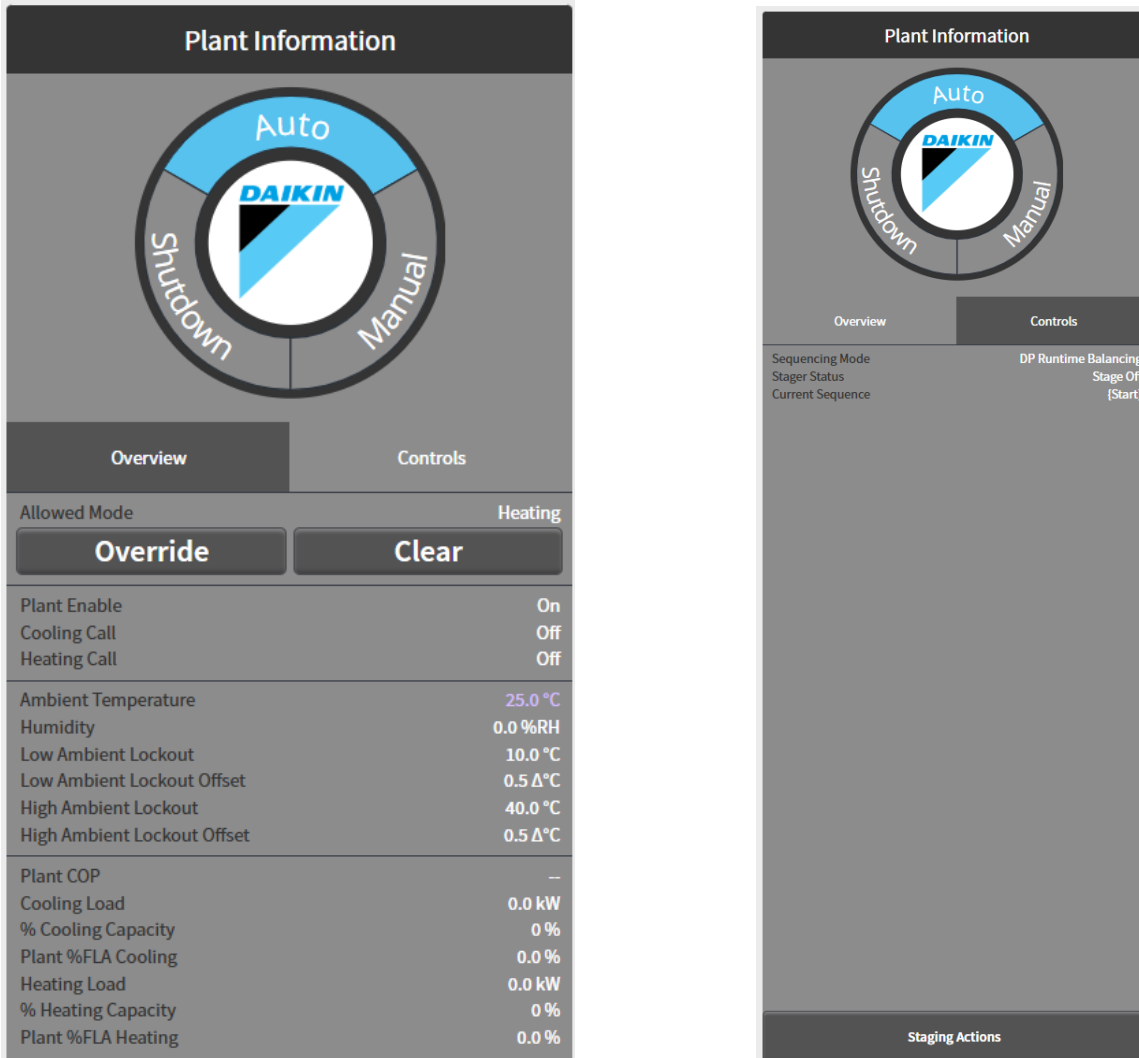


Figure 70 - Plant Information Widget - Overview & Control

Data	Description	SI Unit	US Unit
Plant Enable	Enabling of the system by "Plant Scheduler"		
Cooling Call	Request of Chilled Water by Airside equipment		
Heating Call	Request of Heated Water by Airside equipment		

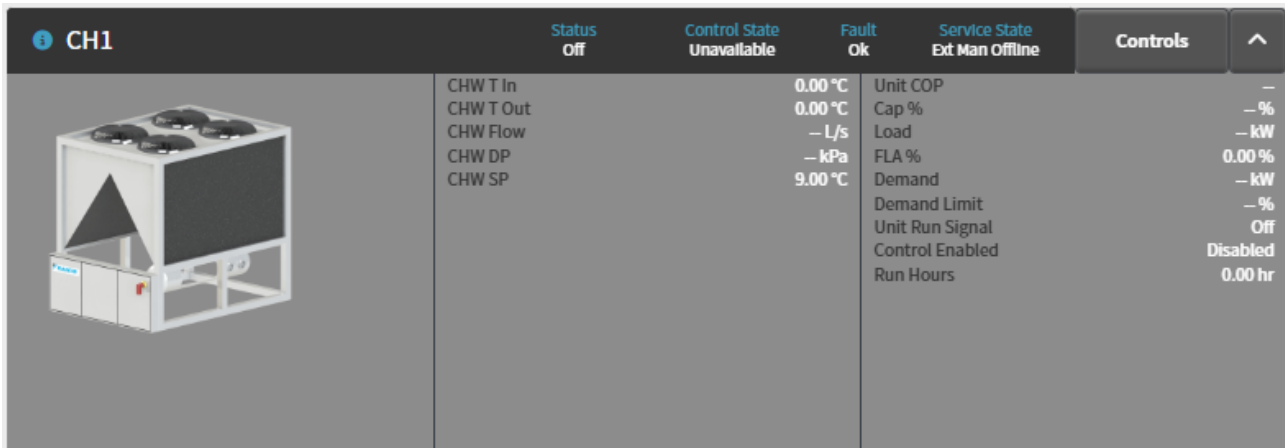
Data	Description	SI Unit	US Unit
Ambient Temperature	The ambient temperature of the environment surrounding the building.	°C	°F
Humidity	The humidity of the environment surrounding the building.	%	%
Low Ambient Lockout	The temperature below which the plant will not operate.	°C	°F
Low Ambient Offset	The differential from Low Ambient Lockout that release the plant operation	°dC	°dF
High Ambient Lockout	The temperature above which the plant will not operate.	°C	°F
High Ambient Offset	The differential from High Ambient Lockout that release the plant operation	°dC	°dF
Cooling/Heating Load	Total instantaneous cooling/heating load of the plant. A summation of the cooling load of all running units.	kW	Tons
% Cooling/Heating Capacity	Percentage of load of the running chillers/ heatpumps against their design capacity.	%	%
Plant % FLA	Percentage of FLA consumed by the running chillers		

Table 16 - Plant Data and Setpoints

6.8.2 Chiller Information

Information for each chiller will appear as a card in the centre of the plant manager. This card will show

- a graphic representation of the chiller along with
- all the relevant sensors and calculated data points.

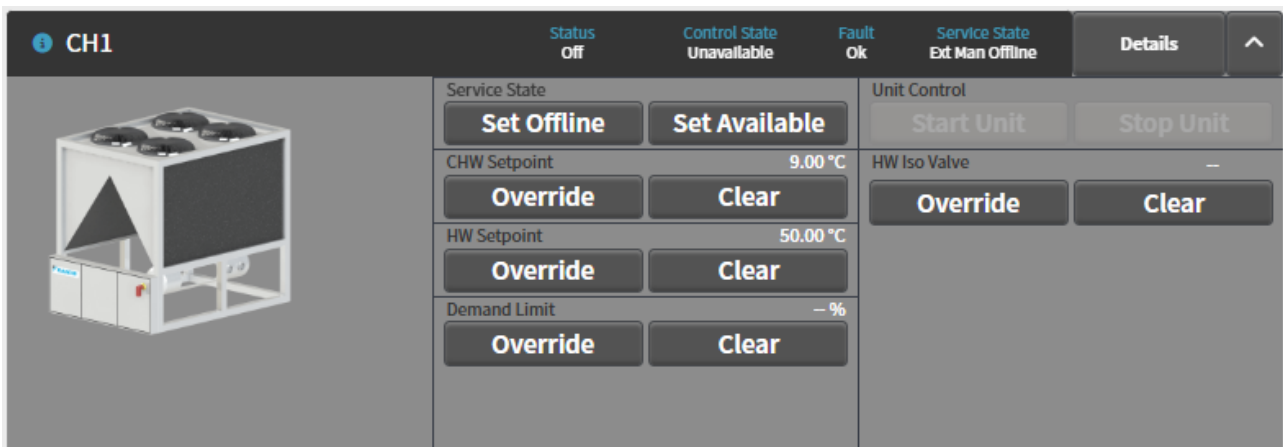

Figure 71 - Unit Widget - Overview

Data	Description	SI Unit	US Unit
Status	Run status feedback from the chiller.	on/off	on/off
Service State	The current service state of the chiller. Possible values: <ul style="list-style-type: none"> • Available • Standby • Offline • Unavailable • Induced Offline • Manual Offline • External Manual Offline 		
Induced Fault	Whether the chiller has an induced fault	ok/ induced fault	ok/ induced fault
Control State	The control state that the chiller controller is in. Possible values: <ul style="list-style-type: none"> • Chiller start • Chiller stop • Chiller fault • Inducing Flow Fault • Send message to start pump • Send message to stop pump • Waiting for flow 		

Data	Description	SI Unit	US Unit
	<ul style="list-style-type: none"> Idle Unavailable Chiller Run Fault Timeout Pump run on 		
Fault	Fault message from the chiller. Possible messages: <ul style="list-style-type: none"> Ok No Evap Flow Alarm Comms Fail Induced Fault 		
CHW T In	Instantaneous chilled water return temperature. Temperature is measured at the inlet of the evaporator vessel.	°C	°F
CHW T Out	Instantaneous chilled water supply temperature. Temperature is measured at the outlet of the evaporator vessel.	°C	°F
CHW Flow	Instantaneous evaporator water flow rate.	l/s	gpm
CHW DP	Instantaneous evaporator water differential pressure.	kPa	psi
CHW SP	Chilled water supply temperature setpoint.	°C	°F
Thermal Cap %	Instantaneous % cooling load of selected chiller. % cooling load is the percentage of current load against total design load. This parameter is <u>not</u> the traditional %FLA, rather it is a measure relating to the actual cooling being produced.	%	%
Thermal Load	Instantaneous calculated cooling load of selected chiller. Cooling load calculated based on chilled water temperatures and evaporator flow rate.	kW	tons
FLA %	Actual Capacity of the unit in %	%	%
Demand	Instantaneous electrical demand of chiller. Demand shows total demand, including demand from all individual compressors.	kW	kW
Demand Limit	The limit of the chillers electrical demand as a percentage of FLA.	%	%
Chiller run signal	Run signal sent to chiller .	on/off	on/off
Control enable	Whether control has been enabled on this chiller.	enabled/ disabled	enabled/ disabled
Run Hours	The total run ours of this chiller.	hrs	hrs

Table 17 – Unit Data and Setpoints

Override controls are available to the user by pressing the toggle button on the top right corner of the card. Some of these points will only be available to be overridden when the chiller is running or configured to use and are otherwise disabled. The chiller cards are collapsible by clicking the heading.


Figure 72 - Unit Widget - Control

In the situation when the Chiller belongs to a set an additional field called "Set" will be displayed to the end-user. This will show which Set the Chiller belongs to and whether is upstream (↑), downstream (↓), or Low Load.

6.8.3 Circuit Information

Information for each circuit along with its related pumps are displayed as a card on the right side of the plant manager. This card will show the relevant loop and pump under their respective tabs. Headered circuits also have a pump control tab.

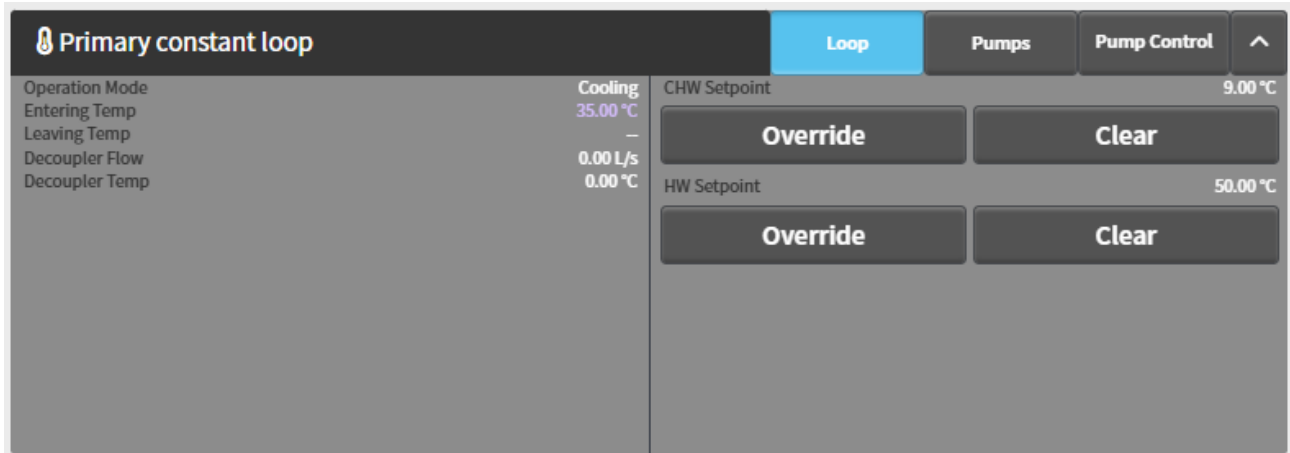


Figure 73 - Circuit Widget – Loop Data & Setpoints

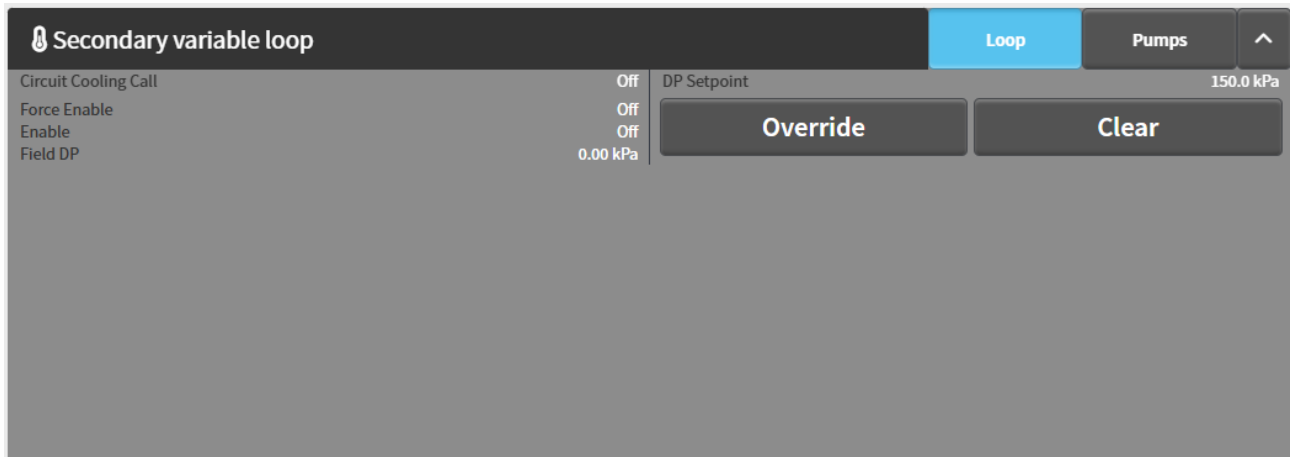


Figure 74 - Circuit Widget - Loop Information & Setpoints

Data	Description	SI Unit	US Unit
Operation Mode	Operation mode of the whole plant Cooling or Heating		
Entering Temp	Instantaneous water return temperature measured at the plant headers or as average of the entering water temperatures of the units.	°C	°F
Leaving Temp	Instantaneous water supply temperature measured at the plant supply header.	°C	°F
Decoupler Flow	The rate of water flow being bypassed through the decoupler line in a primary-secondary system (NOT AVAILABLE).	l/s	gpm
Decoupler Temp	Instantaneous temperature within the decoupler line (NOT AVAILABLE).	°C	°F
CHW SP	Chilled water temperature setpoint the plant will aim to supply.	°C	°F
HW SP	Hot water temperature setpoint the plant will aim to supply.	°C	°F
Circuit Cooling/Heating Call	Request from airside equipment to operate the pump of the circuit		
Enable	Command from iDataCentre Manager to operate the circuit device		
Field DP	Plant Differential pressure measured by sensor	kPa	psi
DP setpoint	Setpoint of differential pressure to achieve regulating the speed of the pumps	kPa	psi

Table 18 - Water Circuit Data and Setpoints

When viewing the pumps, the buttons on the left can be used to select the detailed information to be shown on the right. The selection buttons also show the enable command as a tick and its feedback as a green background. Faults will be shown with a orange background and a cross.

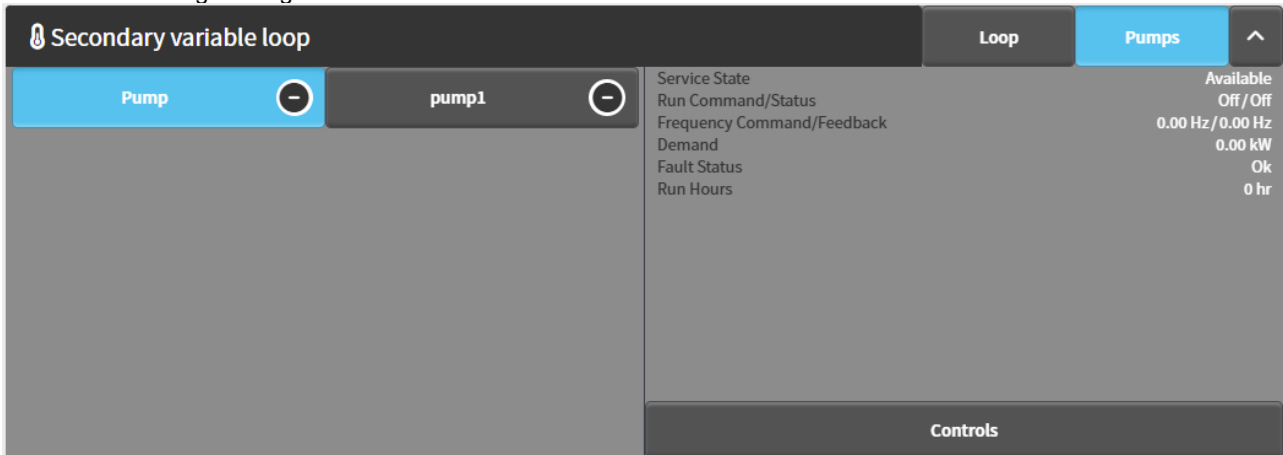


Figure 75 – Pump Widget - Data

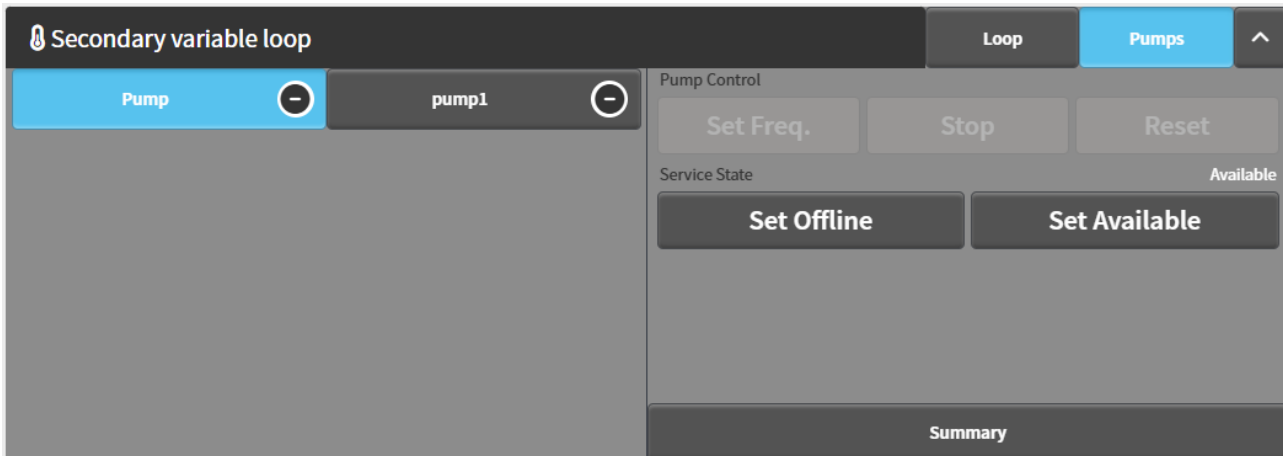


Figure 76 – Pump Widget - Controls

No Fault, no run command	
Run command, false feedback	
Run command, true feedback	
Fault	

Table 19 - Pump Icons

Data	Description	SI Unit	US Unit
Service State	Status of the pump for iDataCentre Manager control		
Run Command/ Status	The run enable command and feedback values for the pump.	on/off	on/off
Frequency Command/ Feedback	The frequency command and feedback values for the pump.	Hz	Hz
Demand	The electrical demand of the pump (if available).	kW	kW
Fault Status	The fault status of the pump.	ok/fault	ok/fault
Run Hours	The total run hours for the pump.	hrs	hrs

Table 20 - Pump Data

6.9 Plant Operation Manual

The plant can be set to one of three operating modes from the Plant Manager. These modes are:

- Auto - Plant is under full control by iDataCentre Manager . Limited override functionality available
- Manual - Plant will no longer perform automatic staging of chillers and equipment can be manually started and stopped. Chillers will still be run using iDataCentre Manager control when manually enabled.
- Shutdown - Plant is shut down completely and no equipment can be started.

The current mode will be highlighted green in the mode dial within the plant information card.

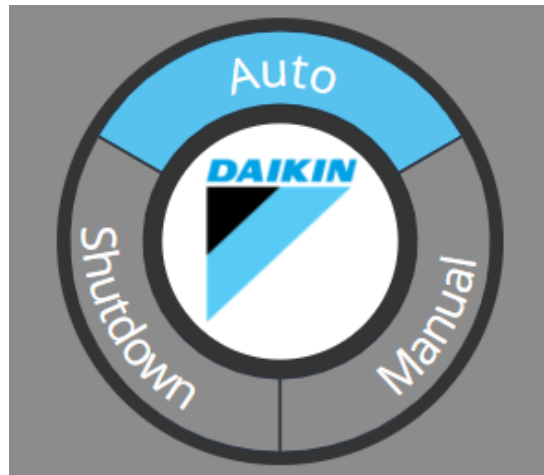


Figure 77 - Mode Selector

6.9.1 Switching Modes

Select a different mode by clicking on it in the mode dial. This will bring up a dialog asking for the override duration. After confirming the override the new mode will be highlighted in the mode dial along with the remaining override duration.

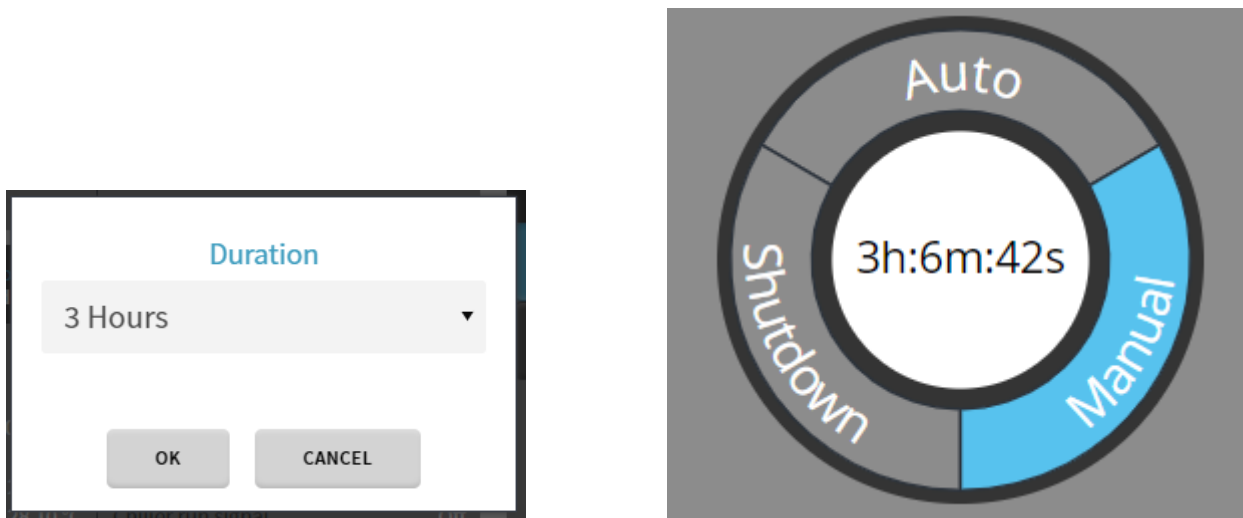


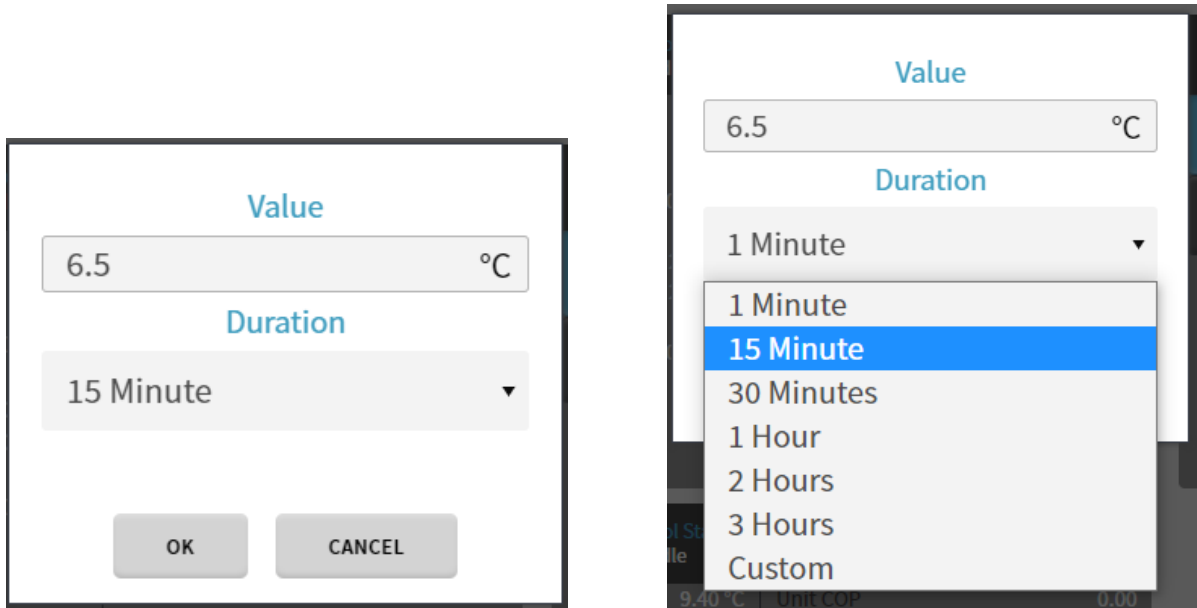
Figure 78 - Overriding the Plant mode

6.9.2 Returning to Auto

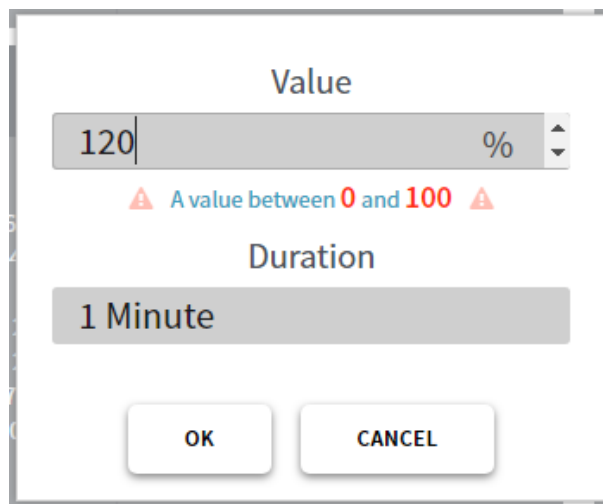
Upon expiry of the override or by user input, the plant will be returned to "auto" mode. Upon switching to auto mode, the plant will shut down and restart to resume full iDataCentre Manager control, clearing all overrides with the exception of those available during automatic control. The plant will adhere to all normal shutdown procedures for plant equipment but will ignore the plant shutdown timer.

6.9.3 Override Controls

The Plant Manager allows the user to perform timed overrides on key control points of the plant. In order to use these overrides, first click the override button for the point. An override dialog would appear to prompt the user to enter the desired override value and duration.


Figure 79 - Override of a Setpoint

For Override points that have limits on them, the lower and upper bounds will be shown in the dialog and will provide a warning to the user if a value outside the limits is entered. When this happens the user will be prevented from committing the override.


Figure 80 - Limit of overriding

After confirming the override by clicking "OK", the override button will show the current time remaining and the value overridden will be displayed in purple. The button can be clicked again to set a new override or cleared using the clear button.

6.9.4 All Possible Overrides in each mode

Setpoints	Description	Auto	Manual	Shutdown
Plant Setpoints				
Stage Up Cooling	Forces the plant to stage up cooling. Will warn user if conditions are not suitable for stage up cooling.	YES	NO	NO
Stage Down Cooling	Forces the plant to stage down cooling. Will warn user if conditions are not suitable for stage down cooling.	YES	NO	NO
Stage Up Heating	Forces the plant to stage up heating. Will warn user if conditions are not suitable for stage up heating.	YES	NO	NO
Stage Down Heating	Forces the plant to stage down heating. Will warn user if conditions are not suitable for stage down heating.	YES	NO	NO
Clear Timers	Clear the delay timers or inhibition timer to check the Staging conditions	YES	NO	NO

Setpoints	Description	Auto	Manual	Shutdown
End Transitions	Forces sequence transitions to end.	YES	NO	NO
Primary Circuit Setpoints				
Plant CHW/ HW Setpoint	Overrides the plant CHW setpoint	YES	YES	YES
Plant Field DP Setpoint	Overrides the plant Field DP setpoint	YES	YES	YES
Chiller Setpoints				
Chiller Set Offline	Overrides the chiller service state to Offline.	yes	yes	yes
Chiller CHW/HW Setpoint	Overrides the chiller CHW setpoint.	YES	YES	YES
Chiller Demand Limit	Overrides the chiller demand limit.	YES	YES	YES
Start Chiller	Starts the chiller. Note that this is done via iDataCentre Manager control of the chiller and will therefore follow the normal start procedure, automatically turning pumps on and will adhere to all timers and safeties for operation.	NO	YES	NO
Stop Chiller	Stops the chiller. Note that this is done via iDataCentre Manager control of the chiller and will therefore follow the normal stop procedure and adhere to all pump run on times.	NO	YES	NO
Pump Setpoints				
Start Pump	Starts a constant speed pump. This is a permanent override.	NO	YES	NO
Stop Pump	Stops a pump. This is a permanent override	NO	YES	NO
Reset Pump	Resets all overrides on the pump	NO	YES	NO
Set Pump Frequency	Starts a variable speed pump and sets its frequency. This is a permanent override.	NO	YES	NO
Pump Set Available	This button removes any override on the service state of the pump and makes the service state of the pump available. This reinstates the pump into the automatic pump control sequence and will allow the pump to be enabled during plant operation if and when required	YES	YES	YES
Pump Set Offline	This button overrides the service state of the pump to offline. It removes the pump from the automatic pump control sequence and will prevent the pump from being enabled during plant operation	YES	YES	YES

Table 21 - Possible overrides of setpoints and commands for Waterside equipment

7 REDUNDANCY

7.1 iDataCentre Manager Redundancy

To ensure operational continuity and system reliability, a redundant control architecture with dual iDataCentre Managers can be implemented. This configuration allows the automatic switchover to a backup controller in case of failure or malfunction of the primary iDataCentre Manager. The redundant system shall be designed and managed according to the following technical criteria.

To guarantee high availability, fault tolerance, and uninterrupted operation, the control system can be implemented using one of the following two redundancy architectures:

- Shared I/O with Redundant Controllers
- Fully Duplicated Panels with Independent I/O

7.1.1 Partly Redundant iDCM (N+1)

This architecture provides controller-level redundancy, where a primary and a backup iDCM controller operate in hot-standby mode, sharing a common I/O module.

Key Characteristics:

- Single set of field sensors and actuators, connected to shared I/O modules.
- Two iDCM controllers: the active controller manages the process, while the standby controller monitors and synchronizes.
- In the event of a failure, automatic switchover occurs without interruption to control logic or communication.
- Both iDCM controller run identical control logic with synchronized memory and process values.

Requires:

- Only one set of I/O module
- Two iDCM controllers with logic synchronization
- UPS for reliable power supply
- Two unmanaged Ethernet switches (network redundancy)
- Dual BACnet/IP networks to chillers for communication failover

This solution reduces hardware duplication while ensuring continuity of operation.

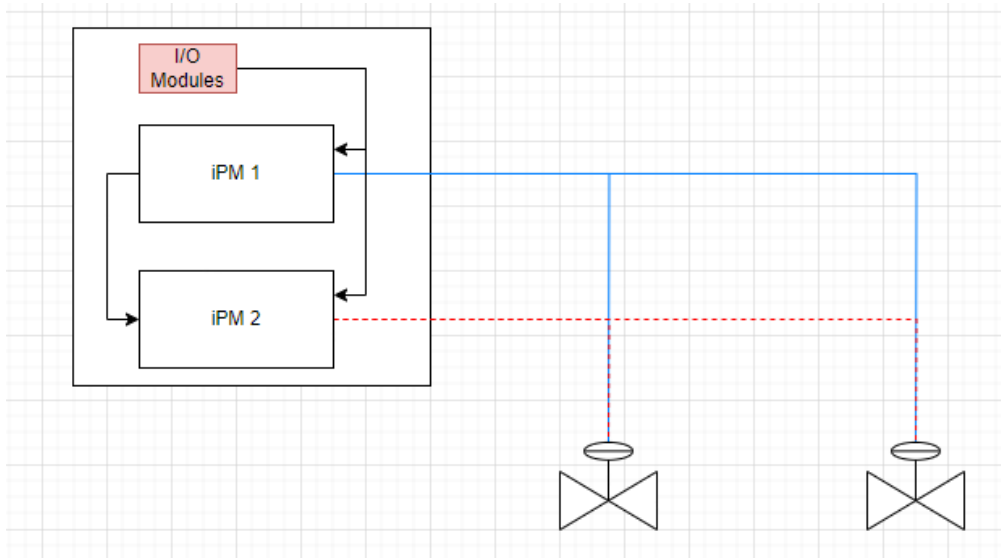


Figure 81- Partly Redundant iDCM scheme

7.1.2 Fully Redundant iDCM (2N)

This more robust architecture includes two fully independent control panels, each with its own dedicated I/O module and controllers. The two controllers communicate with each other and can coordinate control handover.

Key Characteristics:

- Complete duplication of electrical panels and field connections.
- Each controller has its own:
 - I/O module
 - Sensors and actuators

- Power supply and unmanaged Ethernet switch
- Controllers are connected via a dedicated communication link to share state information and enable coordinated switching.
- In the event of a fault in one controller or panel, the second panel takes full control, including direct access to its own field devices.
- Offers maximum system isolation and fault containment, ideal for critical environments.

This setup provides the highest level of redundancy but requires higher investment in hardware and wiring.

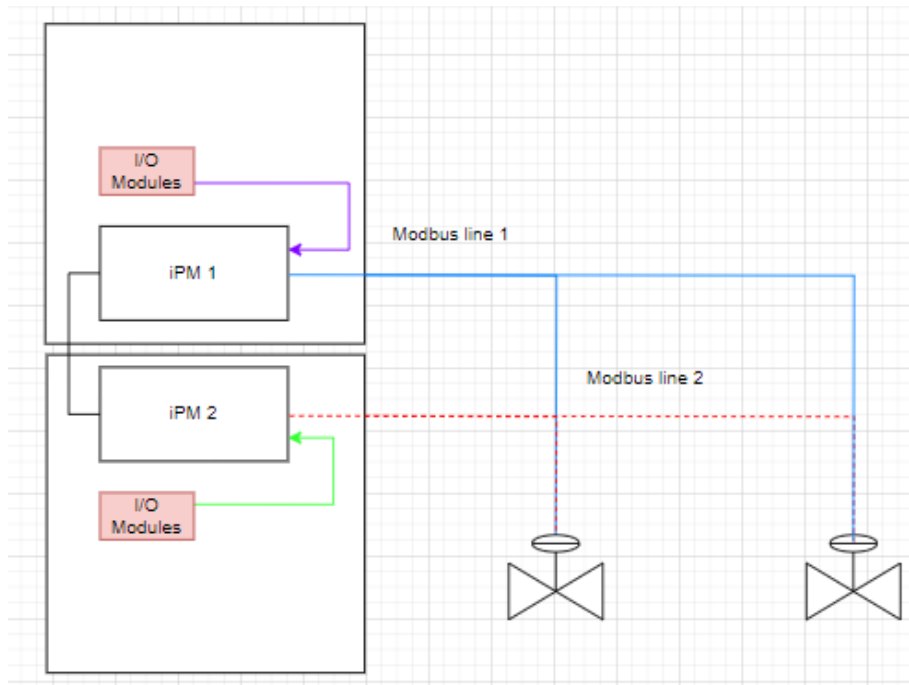


Figure 82 – Fully Redundant iDCM scheme

7.2 Hardwired Sensors Redundancy

iDataCentre Manager provides redundancy logics for the field sensors.

Redundancy in hardwired sensors is used to:

- Increase measurement reliability
- Reduce the risk of a single faulty sensor affecting the system
- Ensure operational continuity even in case of sensor drift or failure

Two separate logics can be integrated for probes redundancy:

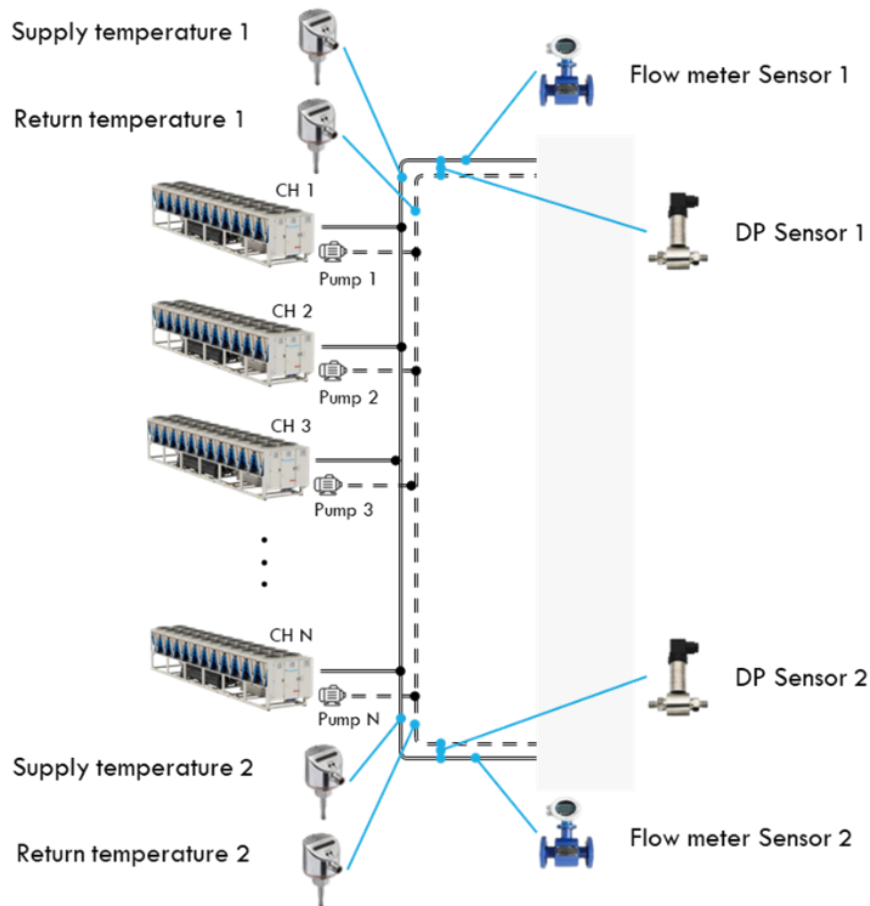
- Two probes redundancy
- Median probes redundancy

7.2.1 Two probes redundancy

In this scenario one probe is installed on each side, thus two probes on the ring.

In this case, the value used by iDCM in the staging logic will be the average of the two probes.

In the case where an invalid reading is received from a sensor, it is excluded and only the sensor with the valid reading is considered in the logic.


Figure 83 – Two probes redundancy layout

With this approach iDataCentre Manager considers the following reference value:

Supply Temperature: reference value is the Medium Value (Supply temperature 1; Supply temperature 2)

Return Temperature: reference value is the Medium Value (Return temperature 1; Return temperature 2)

Pressure Drop: reference value is the Minimum Value (Pressure Drop 1; Pressure Drop 2)

Flow rate: reference value is the Cumulative one (Flow rate value 1 + Flow rate value 2)

MODULE 1 (CIx50IO)			
Name	Signal Type	Description	Cable Type
AI1	4-20mA	Supply Water Temperature 1	2 x 1.5 mm ²
AI2	4-20mA	Supply Water Temperature 2	2 x 1.5 mm ²
AI3	4-20mA	Return Water Temperature 1	2 x 1.5 mm ²
AI4	4-20mA	Return Water Temperature 2	2 x 1.5 mm ²
AI5	4-20mA	DP Sensor 1	2 x 1.5 mm ²
AI6	4-20mA	DP Sensor 2	2 x 1.5 mm ²
AI7	4-20mA	Flow Meter 1	2 x 1.5 mm ²
AI8	4-20mA	Flow Meter 2	2 x 1.5 mm ²

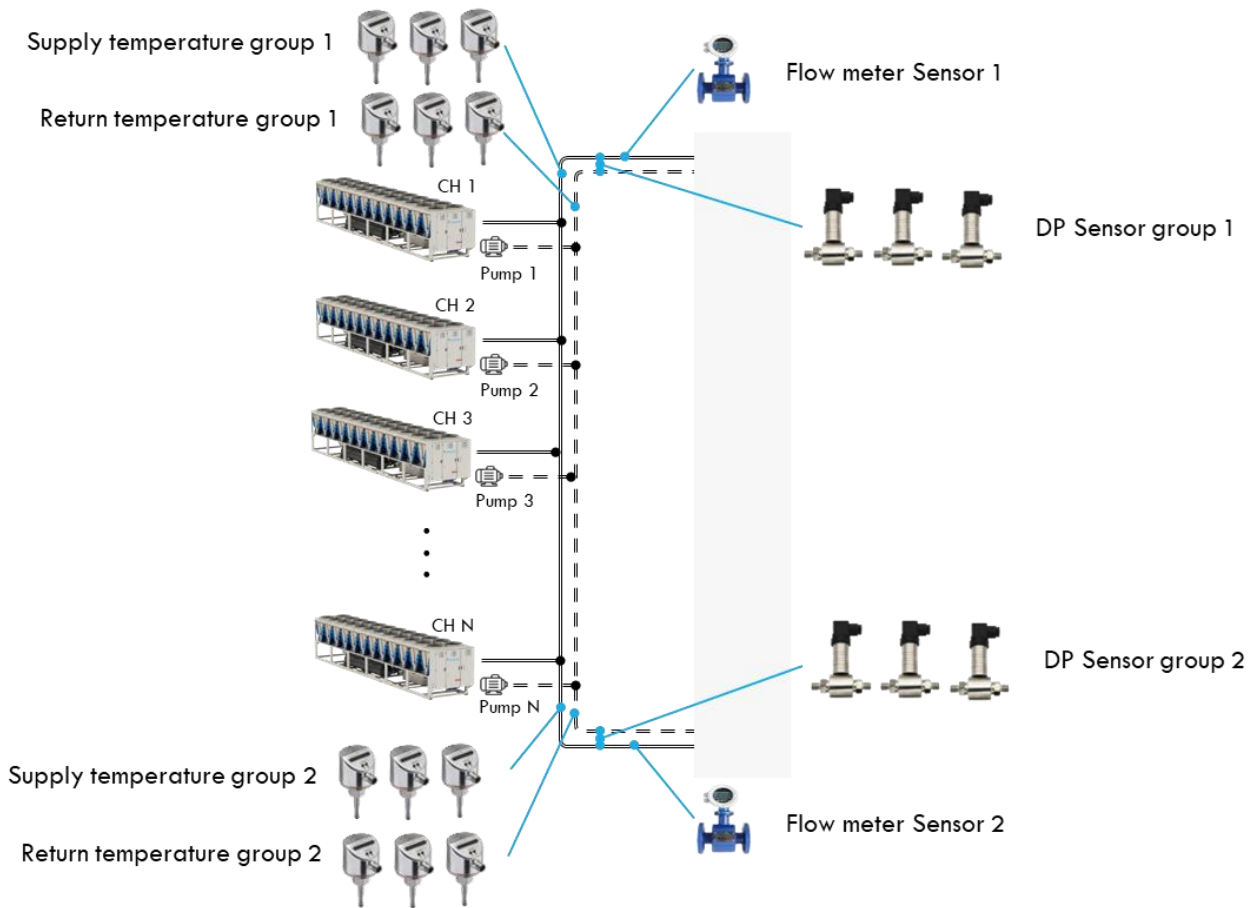
Table 22 - Two probes redundancy sensors configuration

7.2.2 Median probes redundancy

In this scenario, three probes are installed on each side, then six probes on the ring.

In this case iDCM calculates the median of the three probes on each side, at which point iDCM uses the average of the two medians in the staging logic.

The median is the middle value when three numbers are sorted in order.


Figure 84 – Median probes redundancy layout

With this approach iDataCentre Manager considers the following reference value:

Supply Temperature: Medium Value (Median value of Supply temperature group 1; Median value of Supply temperature group 2)

Return Temperature: Medium Value (Median value of return temperature group 1; Median value of return temperature group 2)

Pressure Drop: Minimum Value (Median extraction of DP sensor group 1; Median extraction of DP sensor group 2)

Flow rate: reference value is the Cumulative one (Flow rate value 1 + Flow rate value 2)

MODULE 1 (Cix50IO)			
Name	Signal Type	Description	Cable Type
AI1	4-20mA	Supply Water Temperature 1.1	2 x 1.5 mm2
AI2	4-20mA	Supply Water Temperature 2.1	2 x 1.5 mm2
AI3	4-20mA	Return Water Temperature 1.1	2 x 1.5 mm2
AI4	4-20mA	Return Water Temperature 2.1	2 x 1.5 mm2
AI5	4-20mA	DP Sensor 1.1	2 x 1.5 mm2
AI6	4-20mA	DP Sensor 2.1	2 x 1.5 mm2
AI7	4-20mA	Flow Meter 1	2 x 1.5 mm2
AI8	4-20mA	Flow Meter 2	2 x 1.5 mm2
AI9	4-20mA	Supply Water Temperature 1.2	2 x 1.5 mm2
AI10	4-20mA	Supply Water Temperature 1.3	2 x 1.5 mm2
AI11	4-20mA	Supply Water Temperature 2.2	2 x 1.5 mm2
AI12	4-20mA	Supply Water Temperature 2.3	2 x 1.5 mm2
AI13	4-20mA	Return Water Temperature 1.2	2 x 1.5 mm2
AI14	4-20mA	Return Water Temperature 1.3	2 x 1.5 mm2
AI15	4-20mA	Return Water Temperature 2.2	2 x 1.5 mm2
AI16	4-20mA	Return Water Temperature 2.3	2 x 1.5 mm2
AI17	4-20mA	DP Sensor 1.2	2 x 1.5 mm2
AI18	4-20mA	DP Sensor 1.3	2 x 1.5 mm2
AI19	4-20mA	DP Sensor 2.2	2 x 1.5 mm2
AI20	4-20mA	DP Sensor 2.3	2 x 1.5 mm2

Table 23 - Two probes redundancy sensors configuration

AI9 to AI 20 inputs must be added in case median probes redundancy is used

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DAIKIN APPLIED EUROPE S.p.A.

Via Piani di Santa Maria, 72 - 00072 Ariccia (Roma) - Italy

Tel: (+39) 06 93 73 11 - Fax: (+39) 06 93 74 014

<http://www.daikinapplied.eu>