

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

COMFORT

CONTROL, SUPERVISION AND OPTIMISATION SYSTEMS

clima
PRO
● PERFORMANCE ● RELIABILITY ● OPTIMISATION

**TURN YOUR
PLANT ROOM
INTO A VALUE
GENERATING ASSET**



▶ **IMPROVE YOUR PROPERTY'S
VALUE AND ITS APPEAL TO
TENANTS**

▶ **IMPROVE UPTIME AND
MAINTENANCE LEVELS**

▶ **RUN THE PLANT ROOM AT
OPTIMUM EFFICIENCY**

▶ **REDUCE MAINTENANCE
RELATED COSTS**

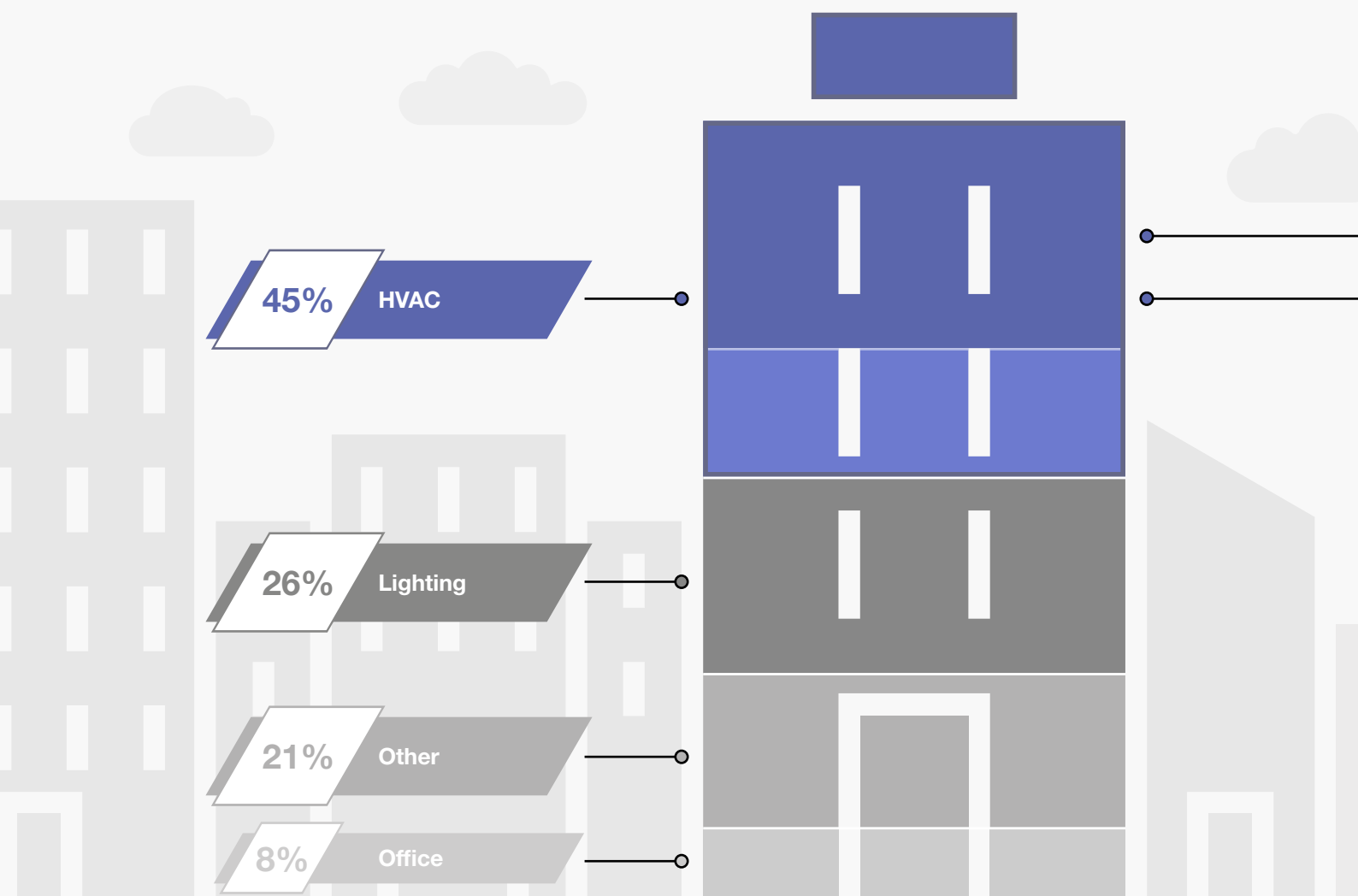
ClimaPRO

THE NEW RELIABLE DYNAMIC OPTIMISATION SOLUTION

By optimising the plant room conditions there is an immense potential for energy savings.

Nearly half of the total energy consumption comes from the HVAC system.

Based on solid engineering principles and advanced pre-programmed control logic, ClimaPRO provides the best solution to realise the true energy savings potential in the plant room.



In commercial buildings, HVAC is the most energy intensive system.

Chiller plants provide one of the largest energy savings opportunities in any building.

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is a simple to install, web based, easy to integrate, optimisation system that takes full control of the plant room, providing:

- ✓ Direct savings in energy consumption (typically 5 -15% on manually controlled plant)
- ✓ Easy-to-access performance measurement of key plant room components
- ✓ Condition-based maintenance; goes beyond the traditional 'fix and forget' regimes
- ✓ Improved Green Building rating potential and enhanced property value

29%

Plant room

of your building's total energy consumption is spent in the Plant Room

up to
15%

Direct Savings

on manually controlled plants

Air side

30%

65%
Plant Room

5%
Other

78%

Heating
& cooling
production

13%

Pumps

7%

Cooling
towers

2%

Other

ClimaPRO: THE ULTIMATE PLANT ROOM OPTIMISATION SOLUTION

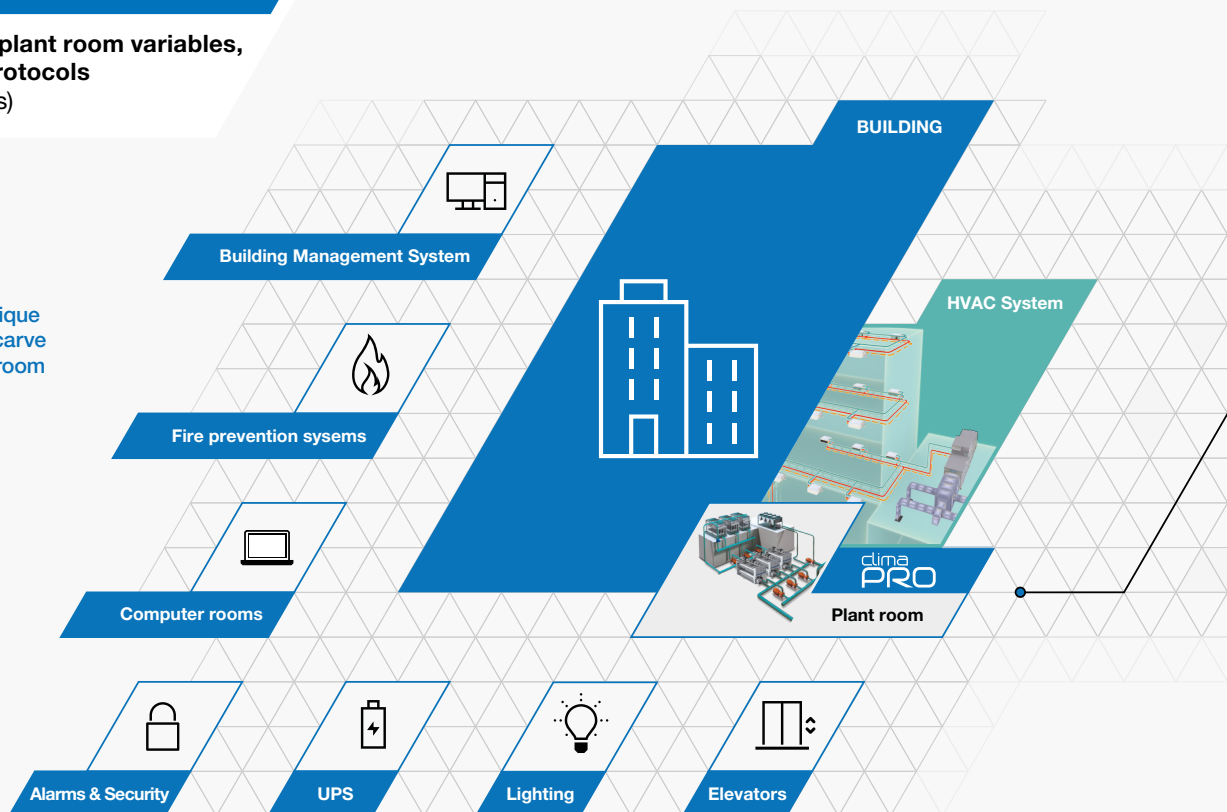
Building Management Systems (BMS)

Full visibility of critical plant room variables, using standard open protocols (BACnet, LON or Modbus)

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PERFORMANCE • RELIABILITY • OPTIMISATION

ClimaPRO offers further, unique functions that allow you to carve out the control of the plant room equipment from the BMS ensuring a greater focus on the HVAC system, thereby achieving an unchallenged quality of optimisation.

Its state-of-the-art technology infrastructure, designed to be completely transparent and integrated to the BMS, ensures full control of the system through various operating modules.



ClimaPRO System Architecture

The simple system architecture of ClimaPRO is designed on the following principles:

1

Performance feed-back loop operating logic

instantaneously detecting changes to the plant and modifying actions accordingly.

2

Complete control and accessibility

User profile based access with visibility tailored on specific user's needs.

3

High configurability; "design once, apply many" approach

based on a powerful wizard preventing errors in programming.

4

State-of-the-art technology

Using industry standard communication protocols: Modbus, LonWorks, BACnet and BACnet over IP

5

Modular approach

based on 5 independent, yet complimentary software modules

Transparent integration with BMS and full control of the plant room

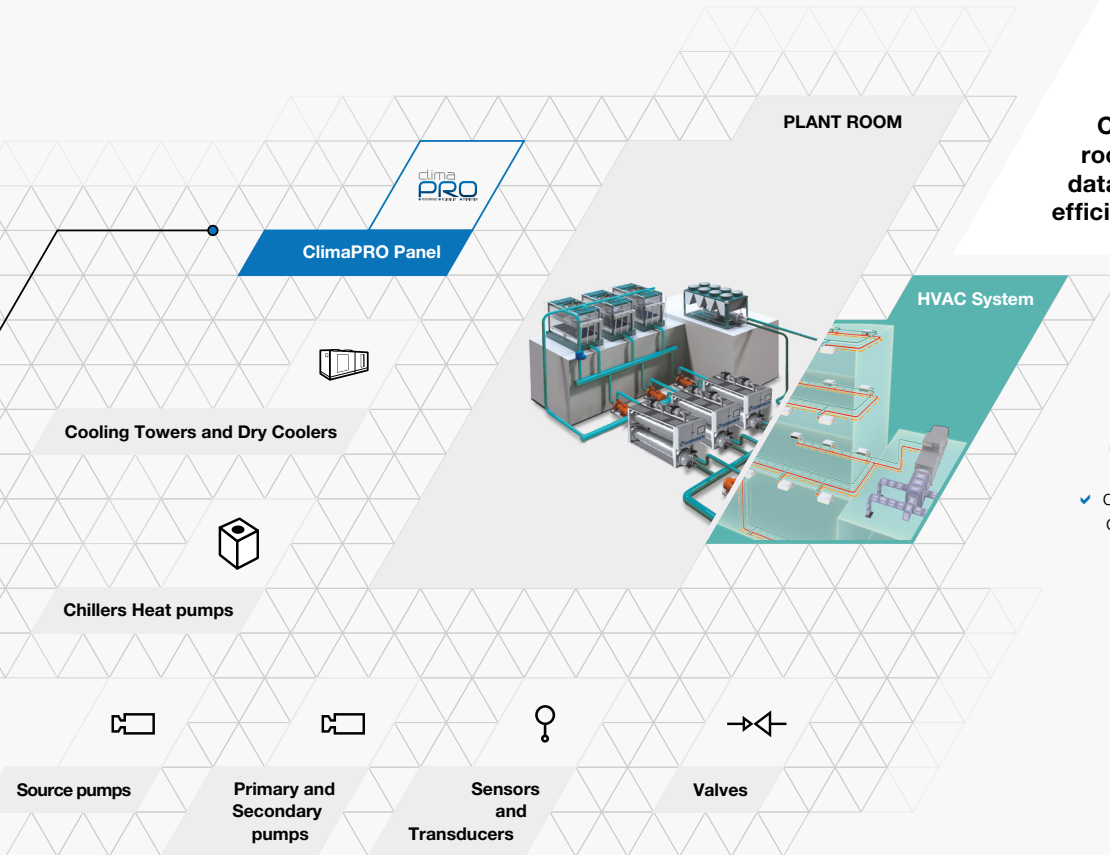
ClimaPRO is THE dedicated solution for optimal control over the entire plant room.

The Solution

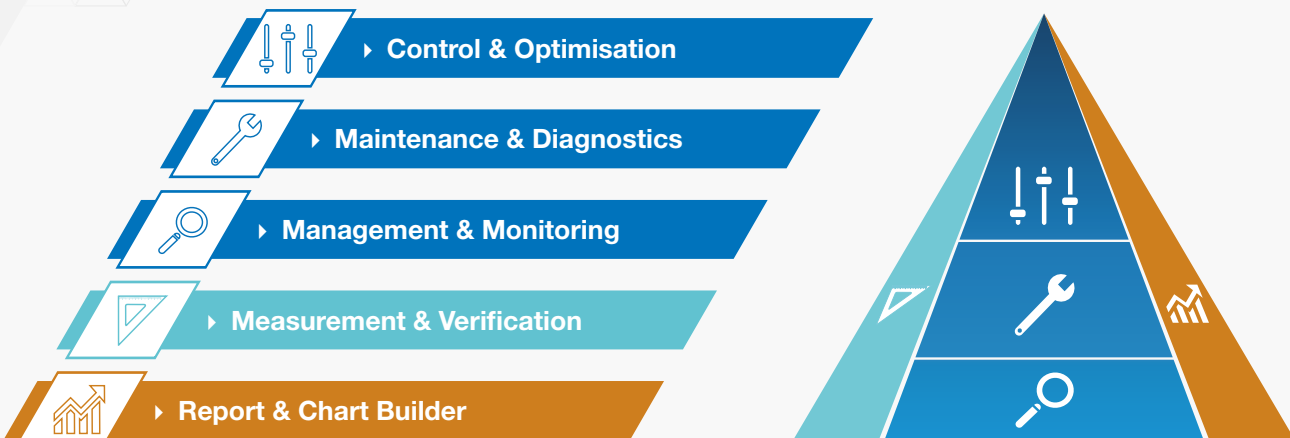
Developed from a history of innovative HVAC design & manufacturing experience, ClimaPRO carves out the plant room from the BMS, executing data and operations much more efficiently.

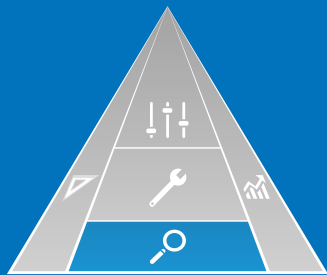
Thanks to advanced, built-in algorithms, the software:

- ✓ controls the main operating variables of all HVAC equipment
- ✓ manages the system more efficiently
- ✓ delivers seamlessly & transparently critical information to the BMS



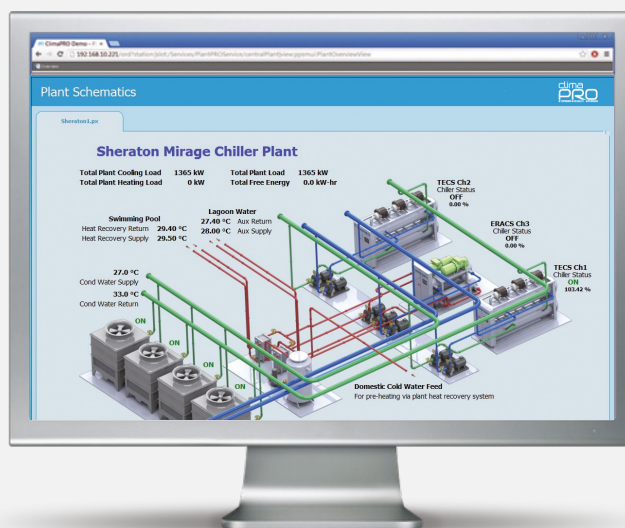
Modular Approach





MANAGEMENT AND MONITORING

Providing local and remote access as well as complete visibility of the plant room



- ✓ Powerful and intuitive graphic interface to monitor all the main operating variables
- ✓ Instantaneous overview of critical variables
- ✓ Web-based interface
- ✓ Local and remote monitoring from any computer connected on the LAN
- ✓ Stand-alone or 3-rd party integration
- ✓ Complete visibility of the plant room

Operating over the Niagara Framework® by Tridium, ClimaPRO can be natively interfaced with any BMS or it can successfully perform all functions stand-alone:

▶ If operating under the BMS

ClimaPRO manages the plant room according to BMS driven occupancy schedules or simple command signals, set-point changes.

▶ When operating stand-alone

ClimaPRO implements its own schedules and optimised control strategies to manage the plant room settings according to the demands of the building or process.

MEASUREMENT AND PERFORMANCE VERIFICATION

Calculating the actual system performance in real time whilst benchmarking against system design efficiency



- ✓ Comparison between actual performance and design data derived from the calculation engine
- ✓ Calculation of efficiency indices (EER, COP, TER)
- ✓ Instantaneous overview of critical variables
- ✓ Measurement of plant room costs and CO₂ emissions

The acquired data is accurately compared with the design data of each single unit at various working conditions to measure and calculate efficiency and performance indices of the whole plant room.

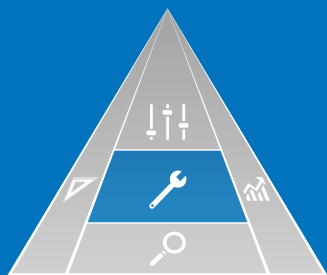
In particular it provides specific real-time calculations:

Unit level

- ✓ Measure
 - cooling and heating capacity delivered
 - instantaneous free energy produced
 - energy absorbed
 - actual EER, COP and TER values
- ✓ Compare actual efficiency values with the design efficiency at the same measured operating conditions
- ✓ Check validity for sensor calibration control (available only over water-to-water units)

Plant room level

- ✓ Measure
 - total cooling and heating capacity delivered
 - instantaneous total free energy produced by the whole plant room
 - total energy absorbed
 - full plant room efficiency
 - cost for producing each kilowatt of cooling and heating capacity delivered by the plant room
 - plant CO₂ emissions



MAINTENANCE AND DIAGNOSTICS

Early detection of system faults for enhanced uptime and minimised efficiency losses



- ✓ Real time monitoring of the system status
- ✓ Automatic display of the effective performance of key components in each HVAC unit
- ✓ Simplification and optimisation of maintenance activities
- ✓ Early warning system to support service activity
- ✓ Simple, easy-to-read colour graphics
- ✓ Advanced plant diagnostics integrating alarm acknowledgement
- ✓ Early detection of system faults

The advanced diagnostic module allows the effective performance level of each unit to be easily assessed. By using comparisons of live conditions versus those at start-up, and built-in diagnostic analysis, this module translates complex data into easy-to-read information:

GREEN

Unit operating at ideal design conditions



YELLOW

Unit deviating from design conditions



RED

Unit operating out of design conditions



REPORT AND CHART BUILDER

Turning data into valuable, easy-to-read, actionable system knowledge



- ✓ Configurable charts for easy trend analysis
- ✓ Instantaneous dynamic efficiency indices and trends display
- ✓ Clear information displayed at the right level of detail according to the user profile
- ✓ Easy-to-read reports with downtime analysis
- ✓ Customised analysis and dedicated reports for different users

ClimaPRO incorporates a powerful and comprehensive report & chart builder module

'Report' module

- ✓ Prepares and sends reports to individually selected users
- ✓ Presents information at the right level of detail according to various different user profiles
- ✓ Uniquely supports dynamic, real time system efficiency performance analysis and maintenance
- ✓ Includes system data and analysis of the main plant room Climaveneta HVAC devices as well as the energy indices for each single unit and the entire chiller plant

'Chart Builder' module

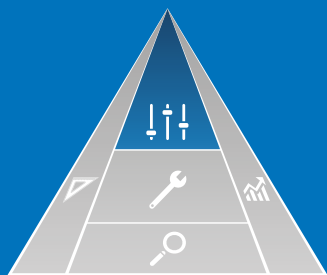
ClimaPRO includes a customisable Chart Builder function:



- ▶ A large set of pre-configured charts are available as standard for all users



- ▶ Certain user profiles can easily create their own customised charts by selecting any combination of ALL the measured variables in the system – from the entire data-points list

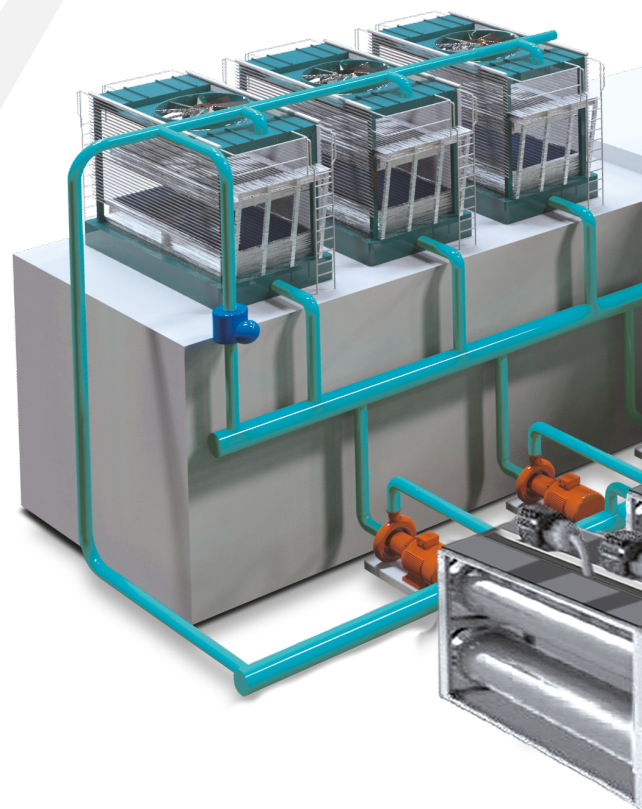


CONTROL AND OPTIMISATION

Running the plant room at the optimal energy consumption rate by controlling all HVAC equipment and the main system devices

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● PERFORMANCE ● RELIABILITY ● OPTIMISATION



SOURCE SIDE

- ✓ Advanced control of any type of source-side loop (e.g. well water, river, ground or air source loops, cooling tower basin and dry coolers, etc)
- ✓ Smart reduction of the condenser water temperature, whenever possible

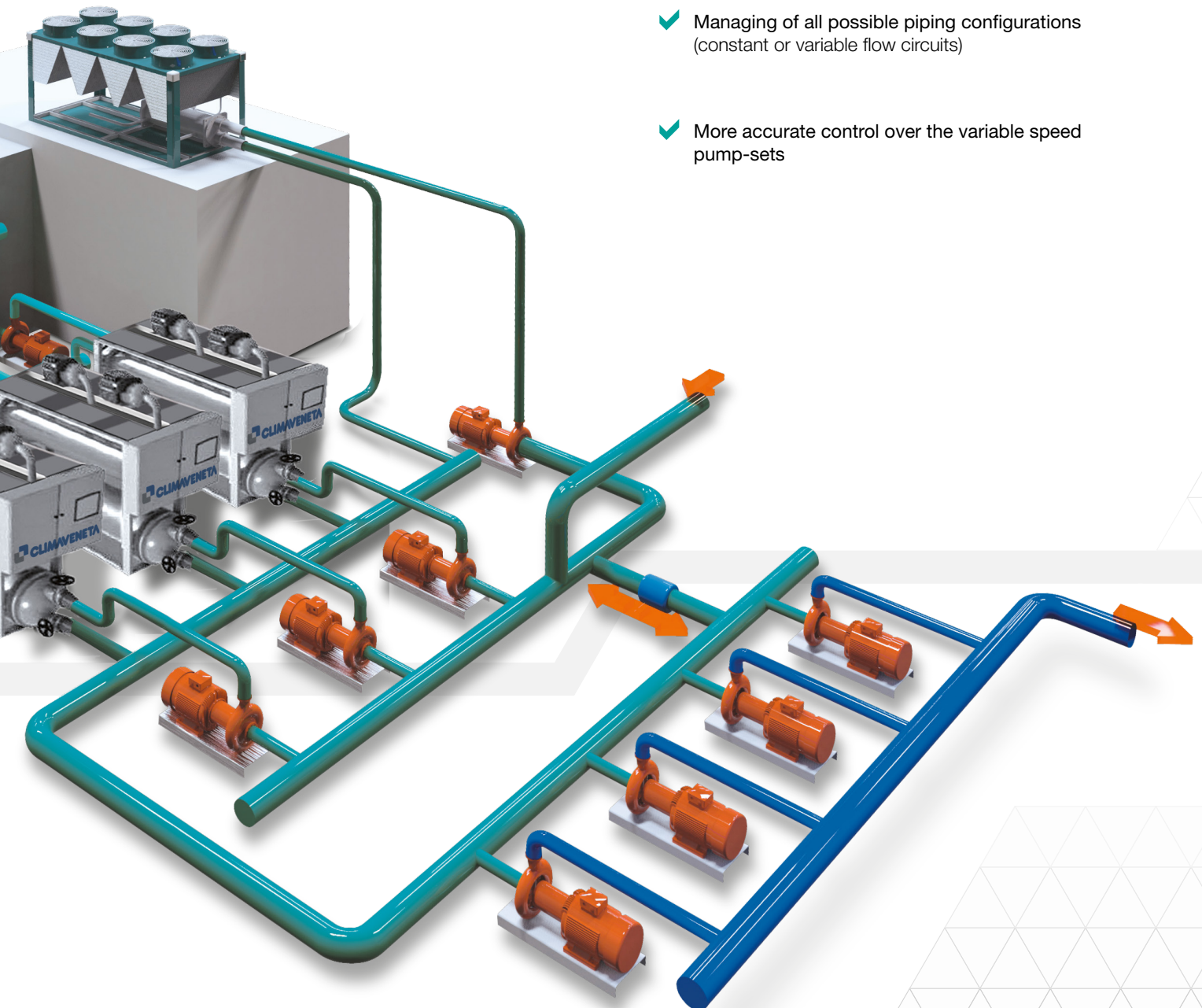
GENERATION

- ✓ Intelligent staging and sequencing of chillers, heat pumps, 4-pipe systems, according to the performance profile of the HVAC unit
- ✓ Efficient and effective integration of diverse technologies (scroll, screw and centrifugal compressors, various refrigerant types, fixed and variable speed air- and water source)
- ✓ Smart management of the best operating condition of each HVAC unit to reduce energy consumption
- ✓ Reliable management of redundancy in mission-critical applications

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

DISTRIBUTION

- ✓ Re-set of chilled and hot water set-points
- ✓ Managing of all possible piping configurations (constant or variable flow circuits)
- ✓ More accurate control over the variable speed pump-sets



ClimaPRO SOLUTIONS

TWO PACKAGES...

ClimaPRO Silver Package



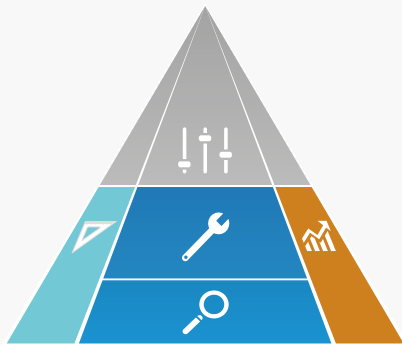
× Control & Optimisation

✓ Maintenance & Diagnostics

✓ Management & Monitoring

✓ Measurement & Verification

✓ Report & Chart Builder



ClimaPRO Gold Package



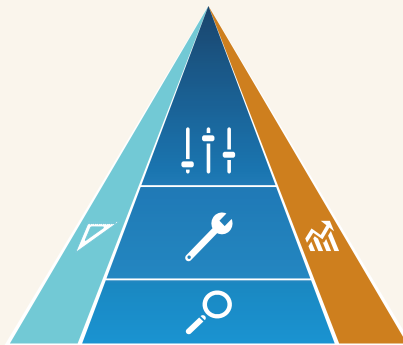
✓ Control & Optimisation

✓ Maintenance & Diagnostics

✓ Management & Monitoring

✓ Measurement & Verification

✓ Report & Chart Builder



ClimaPRO Silver Package

✓

Keep HVAC unit conditions under control (diagnostic)

✓

Rating HVAC unit performance

✓

Enabling condition-based maintenance

✓

Charting for historical data, Energy Reporting and Downtime analysis

✓

Early detection of potential faults and thereby cost avoidance

✓

Reporting plant performance, energy consumption and downtime analysis

Takes full control of the plant room

Runs the plant at the optimum efficiency

Includes all the options and functionalities featured by the CPMV version

ClimaPRO Gold Package

✓

✓

✓

✓

✓

✓

✓

✓

✓

ClimaPRO

...ONE PROVEN, ELEGANTLY SIMPLE, YET POWERFUL AND RELIABLE SOLUTION

Achieving both direct and indirect savings. In both new and existing installations, ClimaPRO is the most effective tool for enabling and executing a successful energy reduction strategy. This comprehensive and complete approach has been

possible thanks to the development of two different packages with specific features. In-depth, precise measurement of the performance of the building is a key factor in every successful energy reduction strategy.



ClimaPRO, thanks to its advanced system architecture is the ideal solution to address all these needs. Using this simple optimisation and control system in your plant room, you can ensure:

✓	Lower operating cost	✓	Improved output and productivity
✓	Better energy efficiency	✓	Higher building value
✓	Longer life of building assets	✓	Improved sustainability
✓	Better occupant comfort	✓	Greater visibility and control of operations

A SELECTION OF ClimaPRO INSTALLATIONS

CITTERIO PALACE

2016-2018 MILAN (ITALY)

Application:
Museum

Plant type:
Hydronic System

Cooling capacity: 945 kW

Heating capacity: 1101 kW

Installed machines:
3x NECS-WN/D/S 1004/ 8 x WIZARD
1x ClimaPRO



EUROPEAN INSTITUTE OF ONCOLOGY

2015-2016 MILAN (ITALY)

Application:
Healthcare / Hospitals

Plant type:
Hydronic System

Cooling capacity: 3500 kW

Installed machines:
3x TECS2/SL-CA-E 1054
1x ClimaPRO



clima PRO Achievements

- ✓ Increases the level of optimisation
- ✓ Rationalises costs of maintenance activities and improves service levels
- ✓ Detailed measurement of the electrical power consumption of the plant room
- ✓ Supports the local "Energy Manager" with a reliable tool for calculating cost vs occupancy

For solutions-based guidance on how ClimaPRO systems will contribute to the ongoing success and profitability of your building...

Accreditations



Memberships



for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.



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

Head Office: Via Sarson 57/c - 36061 Bassano del Grappa (VI) - Italy

Tel (+39) 0424 509 500 - Fax (+39) 0424 509 509

www.climaveneta.com

www.melcohit.com

