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The Galletti Group's

The Galletti Group's profile is one of an Italian based organisation, whose view of the air conditioning market is global.

As one of the residential air conditioning sector's leading companies, the Galletti Group offers an extensive product range of heating and cooling units, as well as copper tube / aluminium fin heat exchangers.

The Galletti Group is also active in the sectors of close control air conditioners, industrial air conditioners and water chillers, and process cooling equipment, manufactured at the HIREF at Monselice, Padua.

Mission

To provide customer satisfaction which extends beyond the supply of products.

To design, produce and distribute high quality product/service offerings, ensuring that customer satisfaction remains at the forefront of Galletti's aims and objectives.

Vision

An omni-directional approach to production strategies.

To be identified as the benchmark for the supply of quality products and engineering solutions for all market requirements, through a total quality management approach towards supply chain management, production processes, distribution systems and after sales service.

Ergo/One system with several advantages

The Ergo solution, possible as a result of Galletti's extensive experience in offering climate control solutions, responds to the demand for a simpler management system for air conditioning installations, as well as the need to control system components intelligently in terms of overall system power consumption.

Specifically designed for:

- hotel applications
- control centre / office applications
- residential applications
- community / institutional applications

Ergo is an innovative management system for air conditioning installations, comprising customised software and microprocessor controls for indoor units.

Ergo by Galletti is aimed at owners, building designers and installers, to whom it offers a control strategy that adapts the operation of chiller and indoor units to the real thermal load requirements. The benefits include:

- energy saving in the production of chilled water
- simplicity and low cost installation
- reduction in operating costs
- user-friendly operation
- advanced system monitoring capabilities
- centralised system management

Ergo/Provides everything you need

The management software is the heart of Ergo.

The software analyzes in real time, the operation of the terminal units to determine the real and instantaneous thermal load of the single user. This monitoring of the individual terminal units enables an adaptive control strategy, minimising operating energy costs by maximising the efficiency in each air conditioned space.

THE INTELLIGENT SYSTEM ADAPTS ITSELF TO THE INSTANTANEOUS LOAD BY PERFORMING THE FOLLOWING



MONITORING
The operation of indoor units.



ADAPTING
The overall system control to suit the prevailing conditions.



DECIDING
The most appropriate control strategy.



CHECKING
The system again (to assess the effects of the decision, implementing further changes as required)

Ergo by Galletti can control up to 126 rooms, maintaining the temperatures required by individual users, whilst effecting overall control over the whole system. In doing so, significant energy savings are possible.

The programme is configurable to satisfy numerous requirements, from the automatic temperature setting of the single user through to the hourly/weekly programming of different temperature settings in different areas.

The system is set up with two different access levels

USER LEVEL ACCESS

("base" level dedicated to the end user) enables the adjustment of the main operation parameters.

SERVICE LEVEL ACCESS

("advanced" level dedicated to the installer and to the maintenance operator) enables free access to the global system parameters.

The user interface presents a visual display of the general operational condition of the system, both for the individual rooms and for the water chiller or heat pump.

The screenshot displays the Ergo control interface with the following sections:

- Navigation Menu (Left):** System Graphics, Control Panels Debug, Winter Programming, Summer Programming, Control Panels Configuration, Installation Features.
- Last 10' installation data:**
 - aver. set air temp. 22,0 °C
 - aver. delta set temp. 1,8 °C
 - aver. operating time 25,3 %
 - average air temp. 23,4 °C
 - prevailing fan speed 1
 - comfort index 76,5 %
- Chiller:**
 - chiller set point 12,0 °C
 - water outlet temp. 7,5 °C
 - water inlet temp. 14,5 °C
 - adaptive adjustment 0,7 °C
 - adj. set point temp. 12,7 °C
 - operation time 60,0 %
- Control panel:**
 - cooling/heating est
 - status stdby
 - speed selector v1
 - authority level local
 - fan speed -
 - room temp. 24,8 °C
 - local set temp. 25,0 °C
 - supervisor set temp. 22,0 °C
 - water temperature 7,8 °C
 - electric heater off
 - water valve off
 - operation time 24,2 %
 - comfort index 94,0 %
- Room Status (Bottom Right):** A row of 8 indicator lights labeled 1-8, with 'ON' and 'OFF' labels.

The Ergo logo is in the bottom left and the Galletti logo is in the bottom right.

The following values are displayed:-

- temperature control set-point
- starting times of the indoor units
- conditioned air temperature
- current fan operation speed
- **COMFORT INDEX**

these enable the performance of the air conditioning system to be monitored effectively.

In each conditioned space, the water and air temperatures, the selected set-point, the operating hours and the **COMFORT INDEX** are constantly monitored.

Meanwhile, the system simultaneously monitors the operational parameters of the water chiller / heat pump, including alarm status, and above all, the **ENABLE ADAPTIVE CONTROL FUNCTION**.

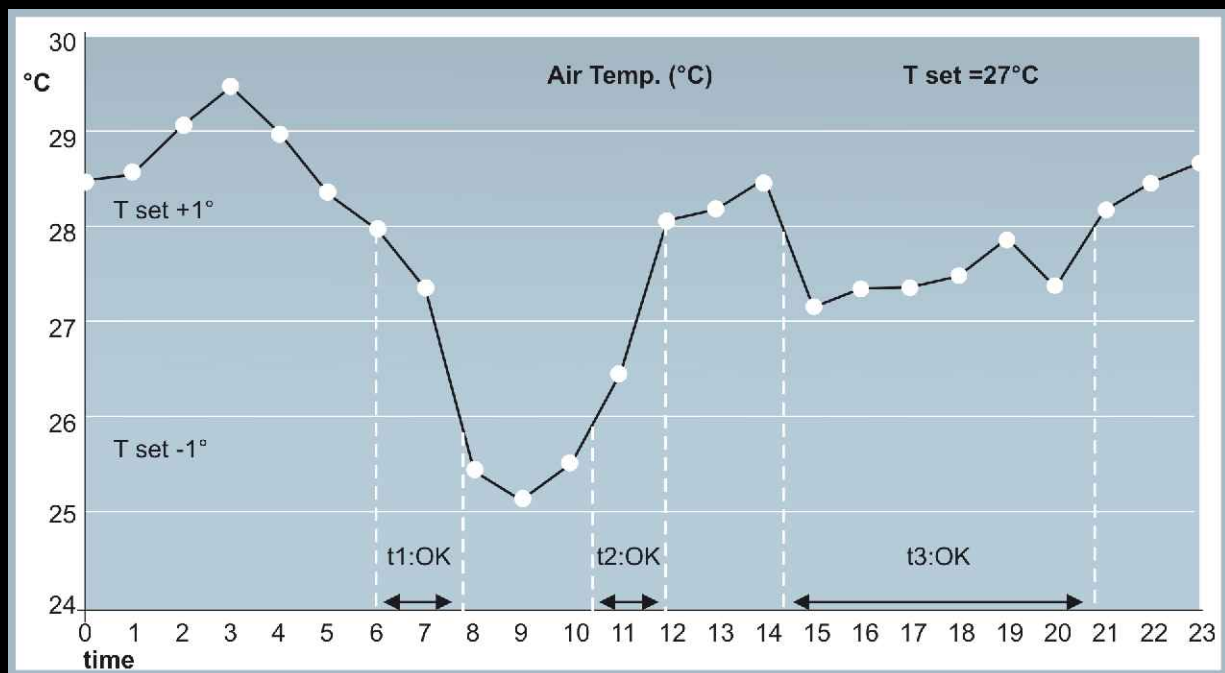
Ergo/Comfort index

One of the real innovations introduced by Ergo is the "comfort index", a new system to control the comfort conditions in an air conditioned room.

The comfort index is defined as the time period as a percentage of the total measured interval time that the room air temperature remains within a fixed tolerance around the selected set-point.

The comfort index performs two functions: The real-time monitoring of the status of the air conditioning system which enables the ADAPTIVE CONTROL FUNCTION to operate.

The detection of any operational problems at each of the individual terminals.



As an example, let us suppose we have a system comprising 2 rooms with the following working conditions:

Room 1: set-point 27,5 °C (comfort range: $\pm 1K$; from 26,5 to 28,5°C). The room temperature remains within the comfort range for a time period of 45 min against a total monitoring time of 60 min.

Room 2: set-point 25 °C (comfort range: $\pm 1K$; from 24 to 26°C). The room temperature remains within the comfort range for a time period of 20 min against a total monitoring time of 60 min.

In this case the comfort index of the system is 54%.

Where the comfort index for each room considered independently is 75% for room1 and 33% for room 2.

The value of 33% shows that the fan coil is not able to maintain the internal heating load, with possible problems like: air filter clogged, presence of air inside the exchanger, insufficient water flow rates etc.

Ergo/Adaptive function

By monitoring the operation of each single terminal unit, it is possible to calculate the actual internal cooling or heating load, enabling the load of the water chiller or heat-pump to be adjusted so that it is aligned with the room's cooling or heating load.

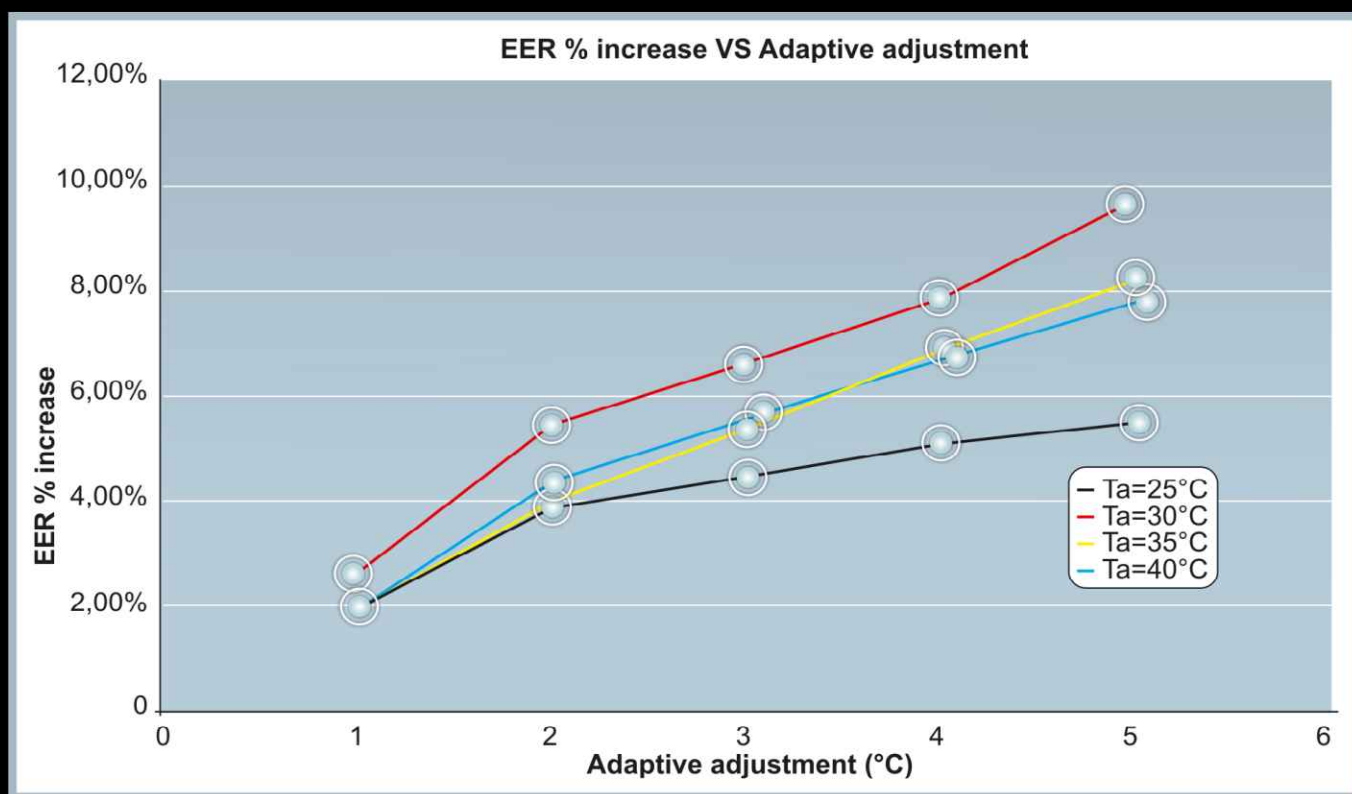
The adaptive function therefore makes corrections to the set-point, which leads to an improvement in the refrigerant cycle efficiency.

The set-point adjustment is a simultaneous function of:

- **prevalent speed:** the most frequently used fan speed of the possible 3, over a particular time interval. The higher the prevalent speed, the smaller will be the corrections to the set-point of the water chiller / heat-pump.
- **comfort index:** the higher the comfort index value, the greater will be the corrections to the set-point of the water chiller / heat-pump.
- **mean working time:** the greater the fans working time (calculated as mean value among all the terminal units) the smaller will be the corrections to the set-point of the water chiller / heat-pump.

The amplitude of the correction is a configurable parameter, adjustable during the system commissioning.

The efficiency improvement due to the set-point correction is particularly effective during heat pump operation, where the adaptive set-point correction leads to a reduction in the condensing pressure.



Ergo/Local management

Through the Ergo software, it is possible to access all of the working parameters of each individual terminal unit, as follows:-

- Selection of either local or remote control with 3 different levels.
- Selection of the set-points for heating and cooling mode.
- Setting of the temperature differential (Delta Set) in terms of the maximum positive/negative temperature deviation from the set-point, as allowed to the user.
- Select the fans' speed; set the fans speed to automatic mode; enabling the electric heaters if present.



Via software it is possible to assign to the local user terminal, four different levels of function control. One of the most common possibilities is to fix via software the local room temperature set-point and the working mode, leaving to the user the choice of the fan speed and the variation (within a limited range) of the room air temperature around the set point.

Via software, it is possible to carry out the switching on/off of each terminal unit, the enabling of the "Economy Function" and the disconnection of each terminal unit from the Ergo system

The 'working time' program feature allows the system to operate with different set-points, both in heating and cooling modes.

Ergo/The "complete" solution

Ergo, in its standard configuration, comprises the following items:-

- the whole control system, which controls all of the operational functions of each terminal unit (in each Hotel room, office, etc) including:
 - automatic fans speed control
 - summer/winter change over
 - water valves operations
 - electric heaters

Each control terminal is provided with a RS 485 serial board

- the data bus: a 2-wire shielded telephone cable. A water chiller / heat-pump may also be connected to the same data bus.

- the core of the system, the Ergo software, which can be installed in a normal PC (usually already present in the Hotel/office block technical room) or, on request, on a "touch screen" PC

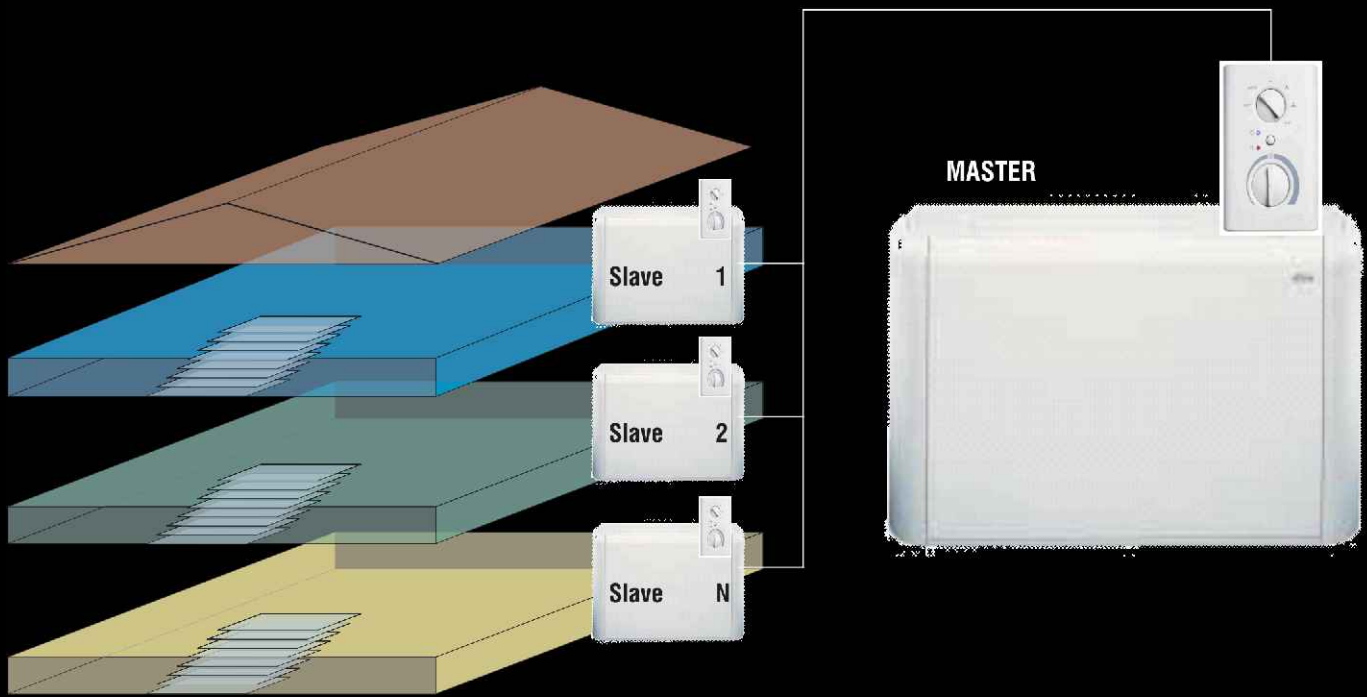
- the software kit provided by Galletti, with all the necessary components, including the RS 232-485 converter or USB-RS485 converter

During the configuration of the system, each individual terminal unit is identified with a specific. This means that it is possible to monitor the operation of, and adjust the control parameters of each single user.



Ergo/Micronet, the "small" solution

The control panel MICRONET is as the base at the small solution.



The installed microprocessor is the same as that used in the standard ERGO system. The "SMALL" solution is a master-slave system, in which up to 127 'MICRONET' control user terminals are connected together, one of which is assigned the role of 'MASTER'..

In the "SMALL" solution, the control of water valves and electric heaters, is the responsibility of the local MICRONET control terminal.

The terminal assigned as 'MASTER' selects the working mode (heating-cooling) and the temperature set-point for the whole system.

The user, through the local control terminal (SLAVE), is able to adjust the variation (within a limited range) of the room air temperature around the set point, and also the fan speed.

Inside the MICRONET control panel, all of the electrical components necessary for the correct operation of the system are already included. Polarity and termination are configured by means of jumpers.

Ergo/I plus

01

Simple Solution

The data bus is a simple "twisted pair" cable. The supervision system can be installed in a PC without any specialist knowledge.

02

Interconnectivity

The "active components" are all connected together in the system, enabling communication between each of them.

03

Supervision

It is possible to define different levels of authority for the centralized control, with further different levels of authority for the local control.

Strategy of control

04

The operation of the whole system is keeping pace with the real time internal loads present in the different rooms, and adapting itself to changes which occur. This all happens without compromising the operation and control of the water chiller / heat-pump (there is no set-point reduction which is typical of those installations without thermal inertia).

05

Low investment costs

The Ergo system is inexpensive in terms of software kit and its configuration. The extra investment compared with a classic system, is very low.

06

Reduced running costs

The adoption of the Ergo integrated supervision system, with its innovative control strategy, results in a reduction in energy consumption, a consequent reduction in running costs and a very short payback period.



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