

Room module for Hotel management system

Note: the following descriptions refers to ModHTs module equipped by firmware 8.2 or higher.

ModHTs module is a version smaller than ModHT module (housing is 6 DIN modules against 9 DIN modules of ModHT). ModHTs works in a manner substantially identical to ModHTs, the difference is only in the amount of input and output earlier to reduce the number of terminals.

ModHTs does not require any additional power supply, being enough the 24Vdc supplying the **CONTATTO** bus.

Each room is managed by the room module ModHTs, regardless of the bus status; in facts, the connection to the **CONTATTO** bus is substantially required for the supervision of the plant and for the handling of extended functions like described in the following. The autonomous management of each room offers the great advantage to guarantee the operation also in case of temporarily bus failure, avoiding any trouble to the Guests of the rooms.

The Hotel System, in its maximum configuration, for each room and is made by:

- a room module ModHTs
- a room panel PCAM
- an outdoor panel TPR/H including a transponder (or TAG) reader for the access control to the room and some signaling LEDs
- a badge holder TPB including a TAG reader antenna
- a NTC temperature probe

Main characteristics of ModHTs module

ModHTs room module provides an input for the temperature probe and 5 ON-OFF inputs for the connection of:

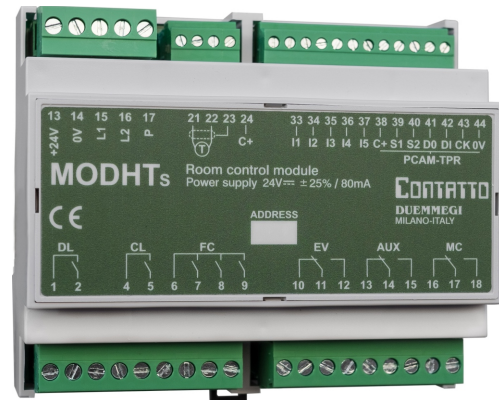
- Door microswitch
- Window microswitch
- Bathroom pulling-down switch (or other alarms)
- Generic input 1
- Generic input 2

For the best installation flexibility, all these inputs can be set for NC or NO contacts, in absolutely independent way each one from the others. The status of these inputs is available on the bus, therefore they can be used for specific functions by proper programming of **CONTATTO** MCP XT or MCP4 controller.

The room module ModHTs features 8 relays for the control of the following functions:

- Electrical door lock, DL
- Courtesy light, CL
- 3-speed fan-coil, FC
- Electro valve for hot pipe (and for cold pipe in the 2-pipe configuration), EV
- Auxiliary output (can be controlled by the bus) or electro valve for cold pipe, AUX
- Main contactor for room lights and services, MC

ModHTs module also manages the room panel PCAM and outdoor panel TPR/H.



PCAM room panel

The room panel PCAM features a 3-digit display for the visualization of the measured room temperature and the set-point. The visualization of the room temperature, if required, can be disabled during the system setting up as explained later. The temperature is measured by a proper NTC sensor connected to ModHTs module.

The PCAM room panel also allows the Guest to set, inside a range defined by the manager of the structure, the desired temperature of the room and the speed of the fan-coil (among minimum, medium and maximum speed or completely OFF). The PCAM room panel also features two pushbuttons for the activation of the “do not disturb” signaling and the request of the room make up; each one of these settings is clearly shown by LEDs on the same panel.

TPR/H outdoor panel

The TPR/H outdoor panel includes a transponder reader for the access management to the room, both of the Guests and of the service personnel.

The outdoor panel TPR/H also provides some LEDs for the following signaling:

- Valid TAG code: it lights if the badge is valid and it has been accepted
- Invalid TAG code: it lights if the badge is not valid or it has expired
- Presence in the room: it lights if the badge is valid and it is inserted in the TPB badge holder
- Help request (SOS): it lights at the activation of the Bathroom pulling-down switch or other alarms inside the room. The service personnel, after the proper intervention, must manually reset the alarm
- Do not disturb: the Guest can switch ON and OFF this signaling acting on the related pushbutton on the PCAM room panel; the current status of this request is also shown by a LED on the PCAM panel, thus replying the LED status on the outdoor panel
- Room make up request: the Guest can require the make up of the room acting on the related pushbutton on the PCAM room panel; the current status of this request is also shown by a LED on the PCAM panel, thus replying the LED status on the outdoor panel

ModHTs

The TPR/H outdoor panel also features a terminal block for the connection of an additional TAG reading antenna. This allows sensing the kind of presence in the room; this additional antenna can be mounted in the TPB badge holder.

Room temperature regulation

The temperature regulator of ModHTs module can operate both in a 2-pipe system and 4-pipe system. For more details, see the paragraph "The temperature regulation in 2-pipe and 4-pipe systems" at the end of this manual.

ModHTs module regulates, in autonomous way, the temperature of the room, depending on the settings chosen by the manager of the structure and depending on the settings made by the Guest on the PCAM panel.

These settings are the temperature set-point and the speed of the fan-coil; the system decides the best speed of the fan (in AUTO mode), unless the Guest (or the service 4) does not set another value which can be chosen among minimum, medium and maximum. The temperature regulation of the room can be also completely switched off acting on the PCAM panel (OFF mode).

If the additional antenna has been installed in the room, then the system can identify the kind of the TAG inserted in the TPB badge holder, among Guest and service type; the temperature set-point and the speed of the fan-coil can be changed, on the PCAM panel, by the Guest and by the service 4 personnel only.

The temperature regulator features 3 set-points for each season (Winter and Summer); depending on the detected conditions, ModHTs module decides which set-point has to be activated as described in the following table:

Set-point	Condition	Description
T1	Room assigned and Guest inside room, or service 4 inside room (regardless the room assignment)	Set-point for maximum comfort
T2	Room assigned but Guest outside room	Set-point for medium comfort
T3	Room vacant	Set-point for maximum energy saving

All these 3 set-points have to be chosen by the manager of the structure.

The room set-point is normally set to T3; when a Guest performs the check-in, the supervision system of the structure "informs" the related ModHTs that the room has been assigned, and this information causes the automatic loading of set-point T2. When the Guest goes in the room and he inserts his badge in the TPB holder, then ModHTs loads the set-point T1.

In this last condition, the Guest can also change the set-point T1, increasing or decreasing it as desired, but however inside a range decided by the supervisor; in addition, the Guest can modify the fan-coil speed or completely switch off the temperature regulation.

The system stores the settings of the Guest, therefore anytime he come back in his room, the system will reload the same temperature regulation parameters previously chosen by the Guest himself.

Anybody is currently inside the room, the system switches off the temperature regulation 40" after the opening of the window; the regulation restarts, with the same settings, 40" after the closing of the window.

If the window switch input on ModHTs is not used (not connected), it is mandatory to set it as NO input (normally open, see in the next pages), otherwise the temperature regulation will be permanently in OFF condition.

The temperature regulator is based on a proportional-Integral algorithm with 10 minutes timebase. ModHTs module regulates the temperature by modulating the ON time of the electro valve (hot and cold valves for 4-pipe systems) and of the fan-coil over a fixed period.

PCAM room panel shows possible failures or wrong connections of the temperature probe by the messages SCC (short circuit) and SAP (unconnected).

Access to the room

The access to the room is controlled by a transponder reader integrated in the outdoor panel TPR/H. The read code is sent to the room module ModHTs that provides to verify its validity, comparing it to the allowed codes. The codes allowing the access to each room can be sent to the room module ModHTs from the supervisor system through the **CONTATTO** bus.

Each ModHTs module can recognize up to 5 different codes: 1 of these belongs to "Guest type" and the other 4 codes belong to "Service type" (for instance director, service staff, security and maintenance). The type of the TAG will be detected by MCP XT or MCP 4 and therefore by the supervisor, allowing the recording of any access to each room together to date and time of the event. The system allows to know in any moment who is the last one that opened the room and who is currently inside the room.

As consequence of a TAG validation by ModHTs module (regardless it belongs to Guest or service type), the system performs the following actions:

- Lighting of the code OK LED on TPR/H until the TAG is no more detected
- Execution of an opening pulse on the electrical door lock (the duration of the pulse can be programmed)
- The information about the TAG type which opened the door (Guest or service 1-2-3-4) is sent on the bus; this information persists on the bus for 5" and, if required, it must be stored by MCP XT or MCP4 through proper programming and archived by the supervisor of the structure
- Activation of the courtesy light for 60"; if a TAG is already inserted in the badge holder inside the room, or if the main contactor of the room is energized, then the courtesy light will not be switched on

The same logic for the courtesy light will be activated also at the door opening, allowing the working of this function even if the TPR/H outdoor panel was not installed.

Presence inside room

The TPB badge holder has an antenna connected to the transponder reader integrated in the outdoor panel TPR/H. In this way the supervisor can know every time who is inside each room.

When a Guest or service 4 TAG is inserted in the badge holder, the system performs the following actions:

- Activation of the contactor for the enabling of the room services (the MC output on ModHTs works in safety mode, therefore the activation of the contactor is made by removing the supply to the coil of MC relay); the contactor remains activated until the TAG is inserted and it will be deactivated 90" after its removing
- The information about the TAG type in the badge holder is sent on the bus; this information persists on the bus until the TAG is removed
- Signaling of the "presence inside room" by switching on the related LED on TPR/H outdoor panel
- If the room is assigned, PCAM panel will be enabled in order to accept the Guest settings (set-point and speed of fan-coil)
- If the room is assigned, the maximum comfort set-point T1 will be loaded

When the system detects a service 1-2-3 TAG in the badge holder, it performs the same actions, with the exclusion of the two last ones.

Room main contactor

The contactor that supplies the electric power to the room (light and services) **must be connected to the normally closed contact of the relay MC** of ModHTs room module.

When a presence in room is detected (Guest or service), the MC relay of room module ModHTs will be immediately switched off, thus supplying the coil of the main contactor and, therefore, the electrical circuits of the room.

When the module does not detect any presence, the relay MC of the room module will be energized after 90", thus removing supply to the coil of the main contactor and therefore disconnecting the electrical circuits of the room.

The using of the normally closed contact of relay MC for the room enabling allows to guarantee the connection of the electrical circuits, even in the case of failure of the room module or of its power supply.

The main contactor must disconnect only the electrical circuits that must be disabled when nobody is in the room; these circuits must be chosen by the designer and/or by the property of the plant. Example of circuits that must not be disabled are surely the door lock, the courtesy light, the fan-coil and the valve (if any) for the temperature regulation. As consequence, take attention to connect these circuits **before** the main contactor of the room.

Help request reset

PCAM room panel allows the service staff to reset the help request (SOS) of the related room. The reset occurs pushing down at the same time the pushbuttons "Do not disturb" and "Room make up request".

ModHTs module address programming

The room module ModHTs takes 1 input and 1 output address having always the same value. The address must be assigned using the FXPRO programmer connected to the bus terminal.

A white label on the front panel of ModHTs module allow the writing of the assigned address for an immediate visual identification.

Installation

The schematic diagram in Figure 1 shows the connections to be made between ModHTs module, the bus, the temperature probe and the several inputs/outputs.

All terminals identified as C+ in the schematic diagram are internally connected each one to the others, and they are the positive common terminal for the inputs of ModHTs module and for supplying PCAM and TPR/H panels.

ModHTs modules features a green LED near to the bus terminal block; this is ON when the +24V power supply is connected. The types of the contact connected to the inputs shown in Figure 1 are only examples, because ModHTs allows to set each input for the desired NC/NO logic.

The following table gives some hints about the minimum section to be used for the connection wires.

Connection	Suggested wire
Bus	4 x 2.5 mmq not shielded
Temperature probe	2 x 0.5 mmq + shield, MAX 15mt
Inputs, contacts and pushbuttons	0.5 mmq, MAX 25mt
Electrical door lock	0.5 mmq
Courtesy light	Depend on the connected load and on the length
Fan-coil	
Electro valve	
Room main contactor	
PCAM room panel	6 x 0.22mmq, MAX 15mt
TPR/H outdoor panel	6 x 0.22mmq, MAX 15mt

The available relay outputs on ModHTs module are:

Terminal	Description	Contact type
1-2	Electrical door lock	NO
4-5	Courtesy light	NO
6-7-8-9	Fan-coil	NO
	➤ 6: common	
	➤ 7: speed 1 (minimum)	
	➤ 8: speed 2 (medium)	
10-11-12	Electro valve (or other, see Settings): connect to terminals 11 and 12	CO
	Auxiliary output or cold electro valve	
13-14-15	Auxiliary output or cold electro valve	CO
16-17-18	Room main contactor: this relay is de-energized when ModHTs detects a valid TAG in the badge holder. Connect the coil of the contactor to terminals 16 and 17 (NC contact)	CO

Note: NO=normally opened, NC= normally closed, CO=change over contact.

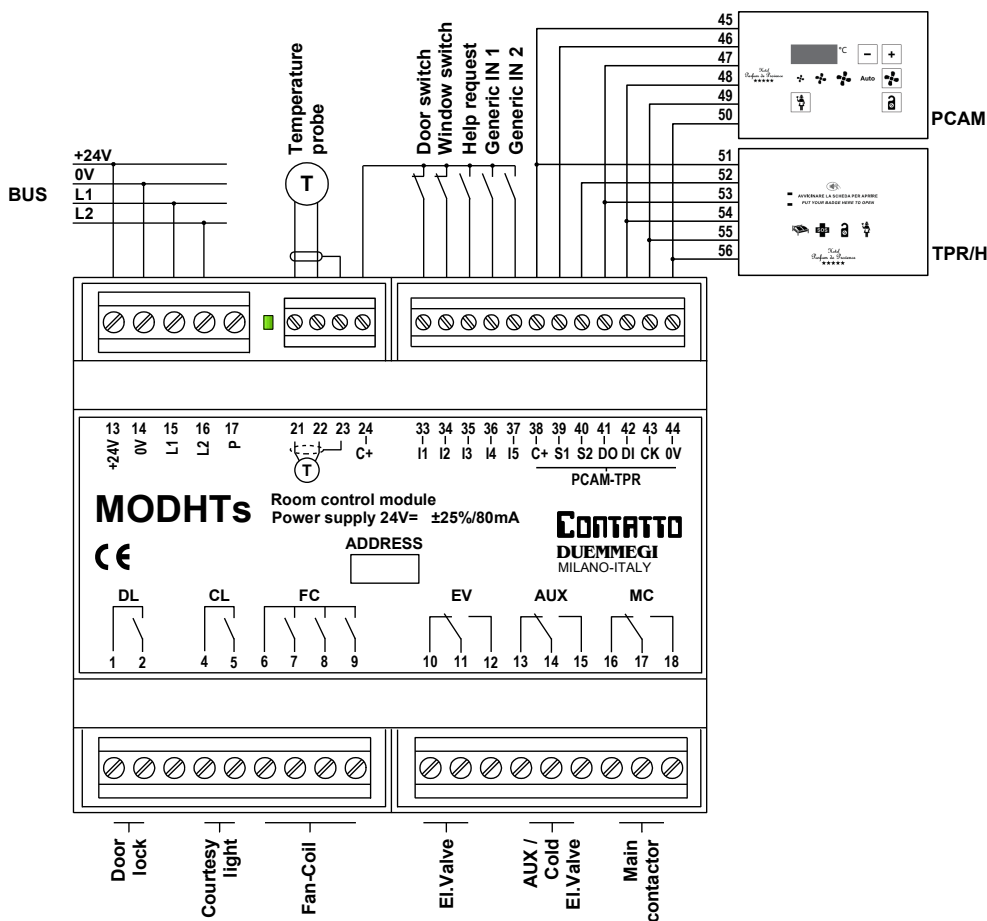


Figure 1: Schematic diagram and connections to PCAM and TPR/H

As said before, the coil of the contactor that supplies the room electrical services and lights must be connected to the NC contact of relay MC of ModHTs module (terminals 16 and 17); in this way it is possible to guarantee that the room main contactor will be energized even if a failure to ModHTs module or to its power supply occurs, thus avoiding troubles to the Guest of the room.

The Figure 2 shows, in details, the connections between ModHTs, PCAM room panel, TPR/H outdoor panel and the optional antenna for the badge holder (TPB); connect the shield of both cables only at the ModHTs side as shown.

Information from and to ModHTs room module

The room module ModHTs takes, inside the **CONTATTO** system, one input and one output address.

Through the **CONTATTO** bus, the supervisor is constantly informed about the status of each room of the building and it can send commands and settings to the rooms.

Input section

The input address provides four 16-bit channels each one, used as described in the following.

Channel 1: digital inputs

The digital input are mapped into channel 1 as listed in the following table:

Point	Description
1	Door status (1=door opened)
2	Window status (1=window opened)
3	Help request signaling status (1=activated)
4	Presence inside room status (1=presence)
5	Generic input 1 status (1=activated)
6	Generic input 2 status (1=activated)
7	Do not disturb signaling status (1=activated)
8	Room make up request signaling status (1=activated)
9	Assigned room setting status (1=assigned)
10	Winter/Summer setting status (1=Summer)
11	OFF setting on the PCAM room panel
12	AUTO setting on the PCAM room panel
13	Speed 1 setting on the PCAM room panel
14	Speed 2 on the PCAM room panel
15	Speed 3 on the PCAM room panel
16	OR status of the 3 speeds of the fan-coil

The logic of the status on the bus in respect to the related status of the contact connected to ModHTs depends on the NC/NO setting chosen for each input. If the input was set as NC, then the status on the bus will be 1 when the contact is opened; if the input was set as NO, then the status on the bus will be 1 when the contact is closed. The window and the door will be considered as closed by the system if the related contact is in its steady status.

The points related to the status of the signaling of “help request”, “make up” and “do not disturb” are not the status of the related “physical” inputs of ModHTs; they are instead virtual points in the memory of ModHTs which reflect the status of the signaling.

The “presence inside room” status is activated when a valid TAG is detected in the badge holder.

The “assigned room” input point reflects the status of the related current setting of ModHTs; this setting is controlled by the output point 9 (see paragraph about the output section in the next page).

The “Winter/Summer” input point reflects the status of the related current setting of ModHTs; this setting is controlled by the output point 10 (see paragraph about the output section in the next page).

“OR status of the 3 speeds of the fan-coil” means that this point is activated (=1) if almost one of the three speeds of the fan-coil is running; this point is useful to report to the supervisor if the temperature regulator of the room is requiring energy or not.

The input points from 11 to 16 reflect the current setting of the temperature regulator of the room; note that points related to the fan-coil speed give information about the setting of the fan, and not its current speed (in other words, if point 13 is activated, this does not mean that the fan is running at speed 1, but it means that the Guest set the regulator in such a way that the fan, when ON, is running at that speed). The point showing if the fan is currently running, regardless its speed, is instead the input point 16.

Channel 2: current temperature value of the room

This channel reports the current value of the ambient temperature of the room, in the format °Kx10 (Kelvin degrees multiplied by 10). Being the zero °C equivalent to 273°K, then the value 2980, for instance, means:

$$(2980 - 2730) / 10 = 25.0 \text{ °C}$$

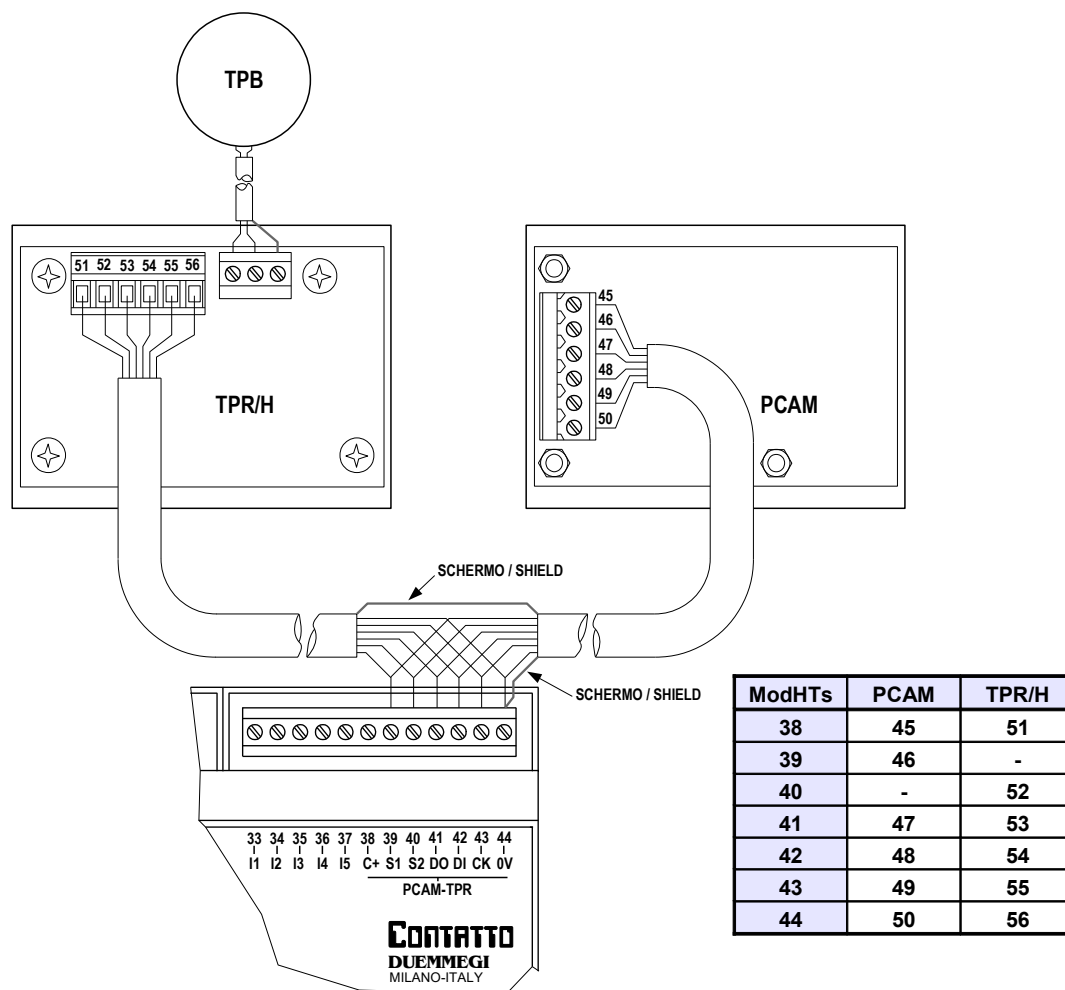


Figure 2: Detail of connections of ModHTs to PCAM, TPR/H and TPB

This channel always contains the current room temperature, therefore even if PCAM room panel was set in order to hide it.

If a failure occurs to the temperature probe, the value reported by this channel will be greater than 100 if the probe is short circuited, or lower than 0 if the probe is not connected.

Channel 3: current set-point value of the room

This channel reports the current value of the set-point currently loaded for the temperature regulation (therefore with the possible corrections made by the Guest of the room). The set-point in this channel is in the format °Kx10 (Kelvin degrees multiplied by 10); for instance, 2945 means:

$$(2945 - 2730) / 10 = 21.5 \text{ °C}$$

Channel 4: various information

The following table lists the information available in this channel:

Point	Description
1	Type of the last badge which opened the room (1÷4 = service badge, 5 = Guest badge, 9÷12 = service master badge, 13 = Guest master badge). This code is sent on the bus by ModHTs at the validation of a TAG and this information persists for 5"
2	
3	
4	
5	Type of badge currently inserted in the TPB badge holder inside the room (if the 2 nd antenna has been installed); the codes are: 1÷4 = service badge,
6	5 = Guest badge)
7	
8	
9	PCAM room panel failure
10	TPR/H outdoor panel failure
11	Not used
12	Not used
13	Not used
14	Not used
15	EV output status (hot valve)
16	AUX output status (cold valve in 4-pipe systems)

Output section

The output address provides only one 16-bit channel for the execution of the following commands:

Point	Description
1	Enable for EV relay () (see EV out configuration)
2	Enable for AUX relay () (see AUX out configuration)
3	Reset of the "Help request" signaling (^)
4	Force presence inside room (1=force presence) ()
5	Command EV relay ()
6	Command AUX relay ()
7	Reset of the "Do not disturb" signaling (^)
8	Reset of "Room make up request" signaling (^)
9	Set room as assigned (1=assigned) ()
10	Set Winter/Summer (1=Summer) ()
11	Set temperature regulation to OFF (^)
12	Set temperature regulation to AUTO (^)
13	Force the comfort setpoint (1=force comfort) ()
14	Command generic output O3 ()
15	Limit fan speed to MIN during heat request (1=limit) ()
16	Limit fan speed to MIN during cool request (1=limit) ()

Note: the outputs AUX and EV may be set in various modes, therefore the commands related to points 1-2 and 5-6 depend on the chosen mode. See the setting up paragraph for more details.

The points identified as (^) must be controlled by a pulse, while the points identified by () must be controlled by a level. For instance, to reset the "Room make up request" signaling, the supervisor must generate a pulse on the (virtual) output point Ox.8, where x is the address of the related ModHTs.

To change the operating mode of the temperature regulator from Winter to Summer, instead, the supervisor must set and hold to 1 the point Ox.10; the selected season will be Summer during all the time this point is activated.

Even if it is possible to reset the "Help request" of a room simply generating a pulse on the output **point 3**, the praxis would be to executed the reset procedure going in the room, after having verified the situation and after having performed the intervention required.

The **point 4** (Force presence inside room), when activated, allows to simulate the Guest presence inside the room, with all the effects due to this event, therefore the switching on of the related LED on the outdoor panel, the activation of the room circuits, the loading of the comfort set point (provided that the room has been assigned) and enabling of the PCAM room panel. This feature is useful when 2 communicating rooms are assigned to the same Guest: the supervisor, when it detects the presence of the Guest inside one of the two rooms, will force the presence also in the connected room through this point.

The **point 13**, when activated, allows to force the comfort set point even if the Guest is not inside the room, but provided that the room has been assigned (the point 9 must be activated too). This feature is useful when the room has to be made comfortable, from the climatic point of view, before the arriving of the Guest.

The **points 15 and 16** (limit fan speed to MIN), when activated, limit the fan to the minimum speed; the point 15 is related to the heath request, while the point 16 is related to the cool request, both during Winter and Summer season. This feature allows to decrease the load required to the heating and cooling power station; these points may be managed by MCP through a threshold function based on the difference between the temperature of the outlet and the inlet water of the power station, both on the hot and on the cold circuit. When the temperature difference override a given value, this means that the amount of heath (or cold) globally required by the rooms is too high and therefore the risk is to overload the heating (or cooling) power station; to reduce the load, it is possible to limit to the minimum value the speed of the fancoil of all the rooms.

In 2-pipe mode, the point 15 acts only if Winter has been selected, while the point 16 only if Summer has been selected; in 4-pipe mode, the points 15 and 16 act both during Winter and Summer, respectively in the case of heath and cold request as said before.

The settings "Room assigned" and "Winter/Summer" are stored in the non-volatile memory of ModHTs. To find all modules in the same operating conditions, in the event of a break and restoring of the supply, it is however mandatory to properly "instruct" MCP XT or MCP 4 in such a way these two settings will be transferred from ModHTs modules to MCP XT or MCP 4 rather than vice-versa.

To do this, the following statement must be included into MCP program:

```
FIELDtoRAM = ( O1.9, O1.10, \
                O2.9, O2.10, \
                O3.9, O3.10, \
                O4.9, O4.10, )
```

Enter inside the round brackets the points 9 and 10 of all installed ModHTs (addresses 1-2-3-4 in this example). In this way, the related points into the MCP memory will be aligned to the field.

Setting up ModHTs module

Note: the following descriptions refers to ModHTs module equipped by firmware 8.2 or higher.

ModHTs module can be freely customized directly on the field by the installer, in order to meet the requirements of the application. The setting is performed through **CONTATTO** bus using the specific configuration panel in MCP IDE, which can be opened selecting, from the main menu, Configuration, Hotel and ModHTs >= 8.x. The windows shown in Figure 3 will be displayed; here the various parameters and options can be entered like explained in the following of this paragraph.

Take in account that the main purpose of the configuration panel is for configuration of ModHTs module during the setting up and the maintenance of the plant; it is also useful as "evaluation program" to get confidence with the system, but the "real" management of

the plant must be executed by a proper supervision program taking in account the global requirements of the structure property.

Additional modules

ModHTs module allows to choose if use or not its two satellites: the PCAM room panel and the TPR/H outdoor panel. Since these two satellites are optional modules, ModHTs must be informed about their installation or less, in order to properly handle the related information on the bus; if one or both of these satellites were not installed, simply remove the check sign in the related option box.

Regarding the PCAM room panel, it is also possible to choose if the display has to show the ambient temperature or less; in this last case, instead of the room temperature, the current set-point will be shown.

Selection of the external temperature probe

If the 4-pipe mode has been selected (and in this case only), it is possible to specify an address and a channel of an external temperature probe (e.g. ModNTC module) to optimize the energy consumption. For more details see the paragraph "The temperature regulation in 2-pipe and 4-pipe systems" at the end of this manual.

Figure 3: ModHTs >= 8.x configuration panel

Set Point

This section of the ModHTs configuration window allows to enter the desired parameters related to the room temperature regulation. In details, a set of three set-point values has to be specified, both for Winter and Summer. Depending on current the status of the presence inside the room and the status of room assigned or less, ModHTs module will load the specified set-point. The set-points are here bottom described:

- ➔ T1: set-point related to Guest inside room (or service 4); this is the more comfortable set-point (warm in Winter and cold in Summer)
- ➔ T2: set-point related to room assigned but Guest outside the room; this is a set-point for medium comfort
- ➔ T3: set-point related to room vacant; this is the less comfortable of the three set-points, but it is that allowing the best energy saving for the temperature regulation of the room.

Each one of the 3 summer set points must be greater than almost 2 degrees in respect of the related winter set point; for instance, if winter T1 has been set to 21.0°C, then the summer T1 must be greater or equal to 23.0°C.

Two pair of values, one for Winter and one for Summer, must be also defined, and related to the maximum positive and negative correction allowed to the Guest around the set-point T1. For instance, defining a max positive correction of 2°C and a negative one of 3°C, and supposing that T1 Winter was set to 21°C, then the Guest can change the set-point of the room in the range 18 to 23°C.

Note that T1 (with correction) will be loaded if the TPB badge holder detects the code of the Guest (or service 4); on the contrary, the set-point will be T2 (if the room has been assigned) or T3 (if the room is vacant).

Inputs for NC contacts

ModHTs module provides 5 inputs for the connection to potential-free contacts. Each one of these inputs can be configured, independently from the others, as input for NC or NO contact. Take in account that some inputs in the configuration panel are not available for ModHTs module.

The notation NO means a contact which is opened in its steady state condition, and therefore the active status of the contact is the closed one; in the same way, the notation NC means a contact which is opened in its active status. The following table specifies, for each one of the 5 inputs, the meaning of NC and NO setting.

Input	Set to NC	Set to NO
Door contact	Opens opening the door	Closes closing the door
Window contact	Opens opening the window	Closes closing the window
Help request push-button	At the opening, the alarm starts	At the closing, the alarm starts
Generic 1 contact	Opened when activated	Closed when activated
Generic 2 contact	Opened when activated	Closed when activated

The check sign in the section “N.C. Inputs” of the configuration panel means that the related input is set for normally closed contact.

EV output

The EV output of ModHTs module can be set to 4 operating modes as here explained:

1. as OR of the 3 outputs driving the the fancoil (hot/cold valve driving in 2-pipe systems)
2. controlled by the bus as output Ox.5
3. follows I4 (generic input 1)
4. follows I4 (generic input 1) with the consent of the (virtual) output point Ox.1 of the same ModHTs
5. hot valve driving in 4-pipe systems

In the **case 1** the output EV is ON when at least one of the 3 outputs FC, related to the 3 fan-coil speed, is ON. This setting may be used when the fan-coil integrates a valve which must be controlled by ModHTs module; in this case, and in a 2-pipe system, select this option: the module will drive this output both during Winter and Summer.

In the **case 2** the output EV is absolutely equivalent to any output of the **CONTATTO** bus; this output is seen as Ox.5, where x is the address assigned to ModHTs module.

In the **case 3** the output EV follows the “active” status of I4, therefore if I4 has been set as NO input, then the output EV switches ON at the closing of the contact connected to I4; if the input has been instead set as NC, then the output EV switches ON at the opening of the contact connected to I4.

In the **case 4** the output EV follows again the status of I4 as just described, but in addition the point Ox.1 (where x is the address of the same ModHTs) behaves as consent; in other words, if Ox.1 is 0, then the output EV is OFF, while if Ox.1 is 1, then the output EV follows the status of I4. Since the consent point Ox.1 can be controlled by the bus as any other **CONTATTO** output point, then the supervisor can easily use this point to enable/disable the output EV.

In the **case 5** the EV output is fully reserved to the driving of the hot valve in 4-pipe systems.

AUX output

The EV output of ModHTs module can be set to 3 operating modes as here explained:

1. controlled by the bus as output Ox.6
2. follows I5 (generic input 2)
3. follows I5 (generic input 2) with the consent of the (virtual) output point Ox.1 of the same ModHTs
4. cold valve driving in 4-pipe systems

In the **case 1** the output AUX is absolutely equivalent to any output of the **CONTATTO** bus; this output is seen as Ox.6, where x is the address assigned to ModHTs module.

In the **case 2** the output AUX follows the "active" status of I5, therefore if it has been set as NO input, then the output AUX switches ON at the closing of the contact connected to I5; if the input has been instead set as NC, then the output AUX switches ON at the opening of the contact connected to I5.

In the **case 3** the output AUX follows again the status of I5 as just described, but in addition the point Ox.2 (where x is the address of the same ModHTs) behaves as consent; in other words, if Ox.2 is 0, then the output AUX is OFF, while if Ox.2 is 1, then the output AUX follows the status of I5. Since the consent point Ox.2 can be controlled by the bus as any other **CONTATTO** output point, then the supervisor can easily use this point to enable/disable the output AUX.

In the **case 4** the AUX output is fully reserved to the driving of the cold valve in 4-pipe systems.

Winter fan-coil enable

This setting is useful if the specific application requires, in Winter mode, to disable the fan of the fan-coil until the temperature of the ingoing water to the fan-coil itself exceed a given value (in order to avoid to eject cold air).

In this case the fan-coil can be equipped with a thermostat mounted on the ingoing pipe (if not already equipped with it) connected to one of the inputs I4 or I5 of ModHTs. The choice about this function must be specified in the configuration window.

If this function is not used, select "None"; otherwise, ModHTs module will disable the 3 outputs FC until the activation of the specified input, that means until the contact of the thermostat opens or closes depending on the NC or NO setting chosen for the related input of ModHTs module. When switching the temperature regulation to Summer, the outputs FC are always enabled, regardless of the status of the specified input. The valve outputs controlled by ModHTs module (outputs EV and AUX) are not affected by this options.

Door lock activation

The duration of the pulse on the output DL for the activation of the electrical door lock can be adjusted according to the specific opening device used in the application. The value to be specified in the relevant configuration box must be in millisecond; for instance, to set a 0.6" pulse, the value to be entered is 600. the duration of the pulse may be set in the range 0.1 to 25.5 seconds.

Writing the configuration to ModHTs

Once configured all parameters of ModHTs as required by the specific application, click on the button Program to transfer them to the module having the address specified in the related text box. Enabling the "Multi" option, specify a starting and an ending address; in this case, the displayed parameters will be sent to all ModHTs found in that address range.

The button Read executes the reverse operation, therefore it is useful to "see" the configuration of a given ModHTs, or to check its firmware version by clicking on the button "ID & Ver". The Access Control button opens the related panel described in the following paragraph.

Access Control

Selecting Access Control in the configuration window (PQ5 or Kprog depending on installed programmer, ModPQ5 or KeyProg), the section regarding the room access management and the TAG programming will be entered. The window shown in Figure 4 will be opened.

As previously said, ModHTs features the definition of 4 service codes, organized for instance by their typology; as here bottom listed:

- ➔ Service 1: direction
- ➔ Service 2: cleaning personnel
- ➔ Service 3: security
- ➔ Service 4: electrical maintenance

Of course, as many badge as required can be programmed for each one of these types, in order to distribute them to the whole service personnel which must have free access to the rooms.

In addition, a Guest code can be defined in order to program the badge allowing the access to the related room; in this case too, more than one badge can be programmed with the same Guest code (for instance, husband and wife must have access to the same room).

R/W and R/O badges

The transponders (also said TAG) can be grouped in two main families:

- ➔ Read Only (R/O): these TAGs are shipped by the manufacturer with a well defined unique code which can be only read and that cannot be changed anyway; the code of the R/O TAGs is made by 5 bytes (to simplify, a byte can be considered as a number in the range 0 to 255)
- ➔ Read and Write (R/W, Read and Write): these TAGs can be read and written; the code of the R/W TAGs used in the ModHTs is made by 24 bytes, but only 15 of these ones are currently used

Coming back to the window in Figure 4, in the TAB Access Cards, note that ModHTs Module can handle both R/W and R/O TAGs; to choose the type to be used, select the related option.

Therefore, the first choice to be made is the type of TAG to be used; normally the R/W type is preferred, because it is more flexible and it offers many operating options, such as the possibility to handle the expiring date and time and the management of the access to the common areas of the structure using the same badge.

A R/O TAG can be used (for Guest) if the following minimum conditions can be satisfied:

- ➔ the Guest, before to leave his room, gives back the badge to the reception; on the contrary, the Guest code stored in the related ModHTs module must be re-set and then programmed again with a new code (at the check-in of a new Guest)
- ➔ the manager of the structure is not interested to implement a system with the handling of expiring date and time for each badge
- ➔ the system does not handle any common area, whose access must be controlled by the same room badge

The using of R/O TAGs for the service personnel have some limitations too, because more badge with the same code are normally required to be distributed to all persons that must have access to the rooms (pass-partout); if the chosen TAGs belong to R/O type, this cannot be made.

Of course, it is always possible to use a R/O TAG, for instance, for service 1 and 2 (especially if the required badges are only one for each of these types) and then using R/W TAG for the other services.

The main advantages of R/O TAGs are that they do not require any programming and that their cost is little bit less than R/W type.

As can be noted, there are many possibilities of choice. The suggestion is, however, to use R/W TAGs anyway, because, as just said, they offer more flexibility.

Definition of the codes

The 12 boxes for each type of badge, in the window of Figure 4, identify the first 12 bytes of the TAG; these bytes can be freely defined (each byte, to simplify, can be considered as a number in the range 0 to 255). The other 3 bytes stored in the TAG are reserved and they are used by the ModHTs for special functions, as the expiring date and time and the discrimination between service and Guest codes.

The rule to be followed to define the 12 bytes of each service and Guest code, substantially, is absolutely free; this manual will give only some suggestions, as example of a possible implementation.

If the system must manage also the access control to the common areas, the best suggestion is to reserve the bytes 9-10-11-12 to the handling of these areas; for more details, see the documentation of **CONTATTO** SysCA2 access control system SYSCA2.

For this reason, in the following examples, the bytes 9-10-11-12 will not be considered.

Take in account that the main purpose of the panel in Figure 4 is the configuration of the ModHTs module during the setting up and the maintenance of the plant; it is also useful as “evaluation program” to get confidence with the system, but the “real” management of the plant must be executed by a proper supervision program taking in account the global requirements of the structure property.

Definition of service codes

The service cards must allow the access to all rooms (pass-partout). For instance, the first 8 bytes related to each service card may be defined as in the following table:

1	2	3	4	5	6	7	8	9	10	11	12
Structure secret code								Additional code		Reserved to common areas	

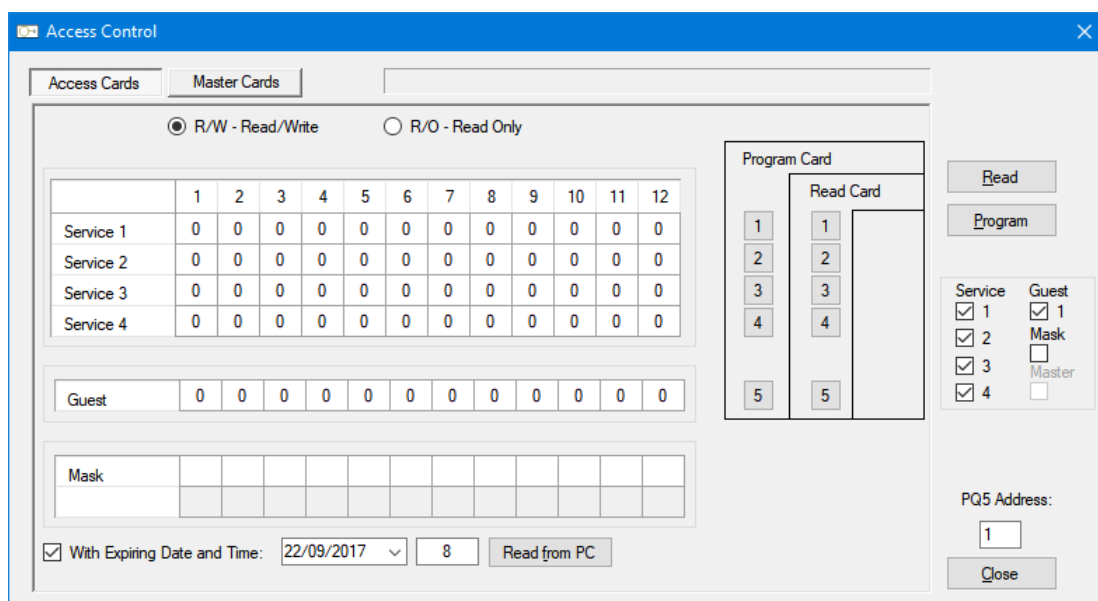


Figure 4: Access Control panel

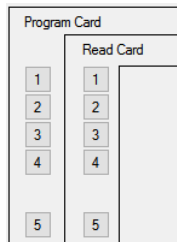
As the example described in the previous paragraphs has been developed, the 4 masked bytes are those to be reserved to the management of the common areas.

Programming the badges

Once set the desired codes, enabled or less the expiring date and time and defined the mask, the badges and the ModHTs room module have to be programmed.

To program the TAGs, ModPQ5 or KeyProg programmer or is needed, connected to the CONTACTTO bus the first one and to PC the second one.

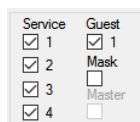
The window in Figure 4 has a section assigned to the management of the cards (see the figure on this right side), with 5 programming buttons and 5 reading buttons, each one corresponding to the 4 service codes and to the Guest code. For instance, to program the Guest card with the code currently shown in the related 12 text boxes, click on the button 5 of the column "Program Card", of course after having placed the card itself on the available ModPQ5 or KeyProg programmer



The buttons of the column "Read Card" allow reading the badge currently placed on the programmer and to show the read bytes on the same line of the button that has been clicked.

Writing the access control codes to ModHTs

To send to ModHTs the codes currently shown in the Access Control window, click on the button Program (after having checked that the PC has been connected to MCP XT or MCP 4 and that the communication has been established); in details, only the codes that have been checked will be programmed:



Master cards

The writing of the access control codes to the ModHTs module can be executed via bus, as just described or by the using of special TAG, called Master Cards.

A master card is a R/W TAG, programmed with a well defined code; approaching a master card to a TPR/H reader of a room, the related ModHTs module prepares itself to receive and store the code of the card that will be approached to TPR/H during the 10" after the master card (but only if the badge to be acquired is valid and of the same type of the master card).

The status of "module ready to store" will be shown on the panel of TPR/H by blinking of the valid code green LED, while the occurred acquisition of the badge approached after the master card will be shown by a fixed ON status of the same LED.

The acquisition procedure by master card is always operating, regardless of the activity of the CONTACTTO bus.

This procedure to store the access codes in the ModHTs module has therefore can be used in two important conditions:

- ➔ when the supervisor or MCP XT or MCP 4 have not been started yet
- ➔ when, for any reason, the CONTACTTO bus is temporarily out of order and it is absolutely necessary the programming of an access code of a room

A master card can be created for each access type (Service 1-2-3-4 and Guest), therefore a maximum of 5 master card types can be created. The creation of these cards is performed in the Master Cards tab in the same Access Control panel in Figure 4.

In order to increase the safety of the system, a numerical code in the range 0 to 65535 must be defined for the master cards; this code acts as a password to be accepted by the ModHTs modules to be programmed.

Of course, the ModHTs modules must be instructed to accept this password, and this is performed enabling the option "Master" in the window "Send to ModHTs".

The procedure to create a master card is the following:

- ➔ define the "Master card unique code", entering its value in the range 0 to 65535
- ➔ In the section on the right hand side check "Master" option only
- ➔ send this code to all ModHTs modules that must accept the master cards; to perform this operation, click on the button Program (after having checked that the PC has been connected to MCP and that the communication has been established)
- ➔ place a R/W card on ModPQ5 or KeyProg programmer
- ➔ click on the desired button among the 5 available, depending on the type of master card to be created (Service 1-2-3-4 or Guest)

Card programmer

The section Prog. TAG in the ModHTs configuration panel is not normally needed to program the cards, being possible to execute this operation as before described. To access to this function use the buttons PQ5 or Kprog depending on the used programmer (ModPQ5 or KeyProg). In this section, however, all the 15 bytes used by ModHTs module and stored on a card can be viewed, thus it can be useful for the programmers that will be charged to develop the supervision software of the Hotel.

Firmware updating

The firmware of ModHTs module can be updated through the bus. This feature allows to have the module always updated with last modifications or new features. An application note is available for updating **DUEMMEGI** modules.

Management by a supervisor program

All the parameters and access codes described in this manual can (and must) be managed by a proper supervisor program. Through MCP XT or MCP 4 and the **CONTATTO** bus, the supervisor can send the required information and settings to each ModHTs module; in the same way, it can manage the proper codes to grant the access to each room and to the common areas.

Contact **DUEMMEGI** offices to require more information about the proper management program for of System HT.

The temperature regulation in 2-pipe and 4-pipe systems

As said before, the temperature regulator integrated in ModHTs module can be set for 2-pipe systems (inlet and outlet pipes for hot or cold water, depending on the season) or for 4-pipe systems (inlet and outlet pipes for hot water and inlet and outlet pipes for cold water).

2-pipe system

In this case the fan coil is connected to a water inlet pipe (hot or cold depending on the season) and to a water outlet pipe. A 3-way ON/OFF valve with bypass is generally inserted on this pipes, in each room. The EV output (if it has been set as "OR of Fan-Coil Outputs" by HTTools) always controls the same valve of the fan coil (or similar device) both during Winter and Summer season. Of course, the water circulating into the pipes is hot during Winter and cold during Summer. The fan and the valve will be properly controlled in order to maintain the setpoint T1, T2 or T3 related to the selected season.

4-pipe system

In this case, each fan coil is connected to a hot water inlet pipe and to a cold water inlet pipe, regardless of the season; of course, each fan coil is also connected to the 2 related water outlet pipes. A 3-way ON/OFF valve with bypass is generally inserted on each pair of pipes, in each room. EV and AUX outputs (if the option 4-pipe mode has been set by HTTools) respectively control the hot and the cold valve of the fan coil (or similar device) both during Winter and Summer season. The fan and the valves will be properly controlled in order to maintain the setpoint T1, T2 or T3 related to the selected season.

Suppose to have selected Winter season and suppose that the Guest is inside the room: the regulator will try to maintain the temperature near to Winter T1, normally controlling the hot valve. If the room temperature, due to external climatic conditions (e.g. during Spring and Autumn) approaches to Summer T1, then the regulator will control the cold valve in order to maintain the room temperature near to the Summer T1.

The same feature occurs in the complementary case: suppose to have selected Summer season and suppose that the Guest is inside the room: the regulator will try to maintain the temperature near to Summer T1, normally controlling the cold valve. If the room temperature, due to external climatic conditions (e.g. during Spring and Autumn) approaches to Winter T1, then the regulator will control the hot valve in order to maintain the room temperature near to the Winter T1.

This performance is true also for the other set points T2 and T3 (both Winter and Summer), with the difference that the "dead zone" between the Winter set point and the related Summer set point probably increases when changing from T1 to T2 to T3.

Remember that the difference between a Winter set point and the related Summer set point must be almost 2 degrees. If the external probe option has been activated (see the following figure) and only in the case the 4-pipe mode has been selected, an energy saving algorithm will be activated; its logic is described in the following.

ModHTs module, through the ModNTC having the specified address and channel, detect the external temperature and use this vale as follows:

- ➔ during WINTER, if the external temperature is 2°C lower than the setpoint to be reached (supposing that the room temperature is greater than the SP), then the system does not activate the cold valve and the fan. The heating, instead, will be anyway activated regardless of the external temperature.
- ➔ during SUMMER, if the external temperature is 2°C greater than the setpoint to be reached (supposing that the room temperature is lower than the SP), then the system does not activate the hot valve and the fan. The cooling, instead, will be anyway activated regardless of the external temperature.

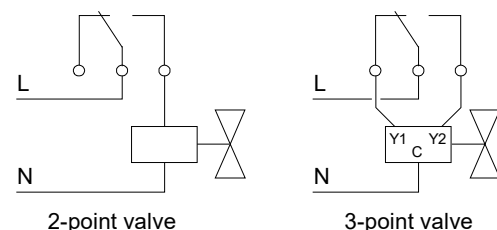
In the occurrence of failure of the bus or of the module detecting the external temperature, this energy saving algorithm will be automatically disabled.

2-point ON/OFF valves and 3-point ON/OFF valves

The ON/OFF actuator normally used for the valves in these applications can be:

- ➔ 2-point actuators (2 electrical terminals): the valve is opened if the actuator is supplied, while it is closed if the actuator is not supplied
- ➔ 3-point actuators (3 electrical terminals): the valve opens if the actuator is supplied between the common and a first terminal (Y1), while it closes when supplying between the common and another terminal (Y2); the position is maintained if the actuator is not supplied

ModHTs module can control both these types of actuators as in the following schematic diagram:

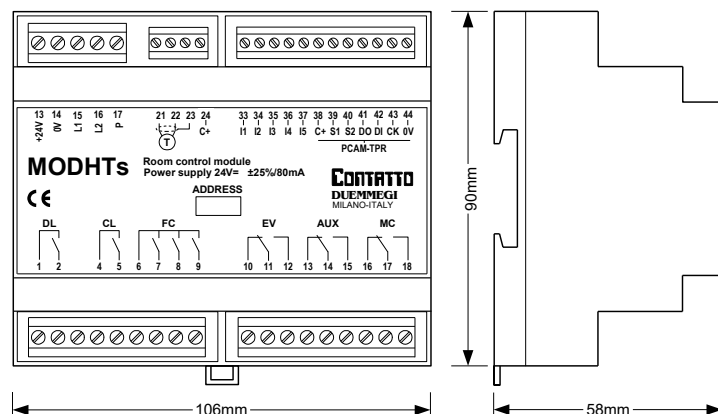


Technical characteristics

Power supply ModHTs	24V \pm 25% SELV
Power supply PCAM	Provided by ModHTs
Power supply TPR/H	Provided by ModHTs
MAX consumption (PCAM and TPR/H connected)	80mA
Digital Inputs	5, for potential free contacts
Current for each digital IN	4mA (with closed contact) TYP
Threshold voltage on dig. IN	5V TYP
Temperature analog IN	1 for NTC probe
Temperature measurement range	0 ÷ 51.1°C
Temperature measurement resolution	0.1°C
Temperature measurement MAX error	\pm 0.5°C
MAX rating for NO contact (each relay)	5A, 0÷250V~ resistive load 1A, 0÷250V~ inductive load 3A, 0÷30V \pm resistive load
MAX rating for NC contact (each relay)	5A, 0÷250V~ resistive load 0.5A, 0÷250V~ inductive load 1A, 0÷30V \pm resistive load
Minimum load on relay contacts (both NO and NC)	1.2W (100mA@12V \pm)
Operating temperature	0 ÷ +50 °C
Storage temperature	-30 ÷ +85 °C
Protection degree (all modules)	IP20

Note: this manual refers to ModHTs module equipped by firmware 8.2 or higher. All characteristics and features and the operation of ModHTs module described in this manual are subject to change without notice.

Outline dimensions



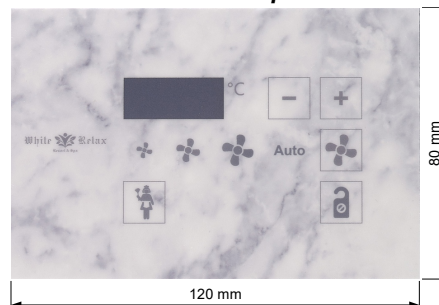
Notes about FW versions

8.2	Operation exactly like described in this manual
9.0	Input I4 (Generic IN1) dedicated to toggle command for courtesy light by a pushbutton

PCAM, TPR/H e TPB

Due to several versions available for the satellites PCAM, TPR/H e TPB, contact **DUEMMEGI** for more information about them.

PCAM room panel



TPR/H outdoor panel



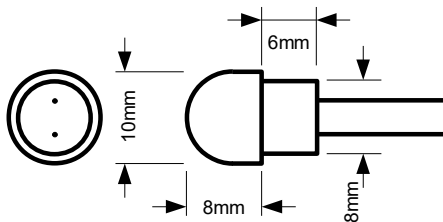
TPB badge holder



ModPQ5 programmer



NTC Temperature probe



Correct disposal of the product (waste electrical & electronic equipment)



(Applicable in the European Union and other European countries with separate collection systems). This marking on the product, accessories or documentation indicates that the product and its electronic accessories should not be disposed of with other household waste at the end of their working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources. Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take these items for environmentally safe recycling. Business users should contact their supplier and check the terms and conditions of the purchase contract. Adequate disposal of the decommissioned equipment for recycling, treatment and environmentally compatible disposal contributes in preventing potentially negative effects on the environment and health and promotes the reuse and/or recycling of equipment materials. Abusive product disposal by the user is punishable by law with administrative sanctions.

Installation and use restrictions

Standards and regulations

The design and the setting up of electrical systems must be performed according to the relevant standards, guidelines, specifications and regulations of the relevant country. The installation, configuration and programming of the devices must be carried out by trained personnel.

The installation and the wiring of the **CONTATTO** bus line and the related devices must be performed according to the recommendations of the manufacturers (reported on the specific data sheet of the product) and according to the applicable standards.

All the relevant safety regulations, e.g. accident prevention regulations, law on technical work equipment, must also be observed.

Safety instructions

Protect the unit against moisture, dirt and any kind of damage during transport, storage and operation.

Do not operate the unit outside the specified technical data.

Never open the housing. If not otherwise specified, install in closed housing (e.g. distribution cabinet).

Earth the unit at the terminals provided, if existing, for this purpose.

Do not obstruct cooling of the units.

Setting up

The physical address must be assigned with the specific programmer and the setting of parameters (if any) must be performed by the specific configuration softwares; for more details refer to the specific data sheet of the product. For the first installation of the device, generally and unless otherwise specified on the specific data sheet of the product, proceed according to the following guidelines:

- Check that any voltage supplying the plant has been removed
- Assign the address to module (if any)
- Install and wire the device according to the schematic diagrams on the specific data sheet of the product
- Only then switch on the 230Vac supplying the bus power supply and the other related circuits

Applied standards

The devices belonging to **CONTATTO** line comply with the essential requirements of the following directives:

- 2014/30/UE (EMC)
- 2014/35/UE (Low Voltage)
- 2011/65/UE (RoHS)

Note

Technical characteristics and this data sheet are subject to change without notice.