Hotel room control system

Note: *the following descriptions refers to ModHT module equipped by firmware 3.3 or higher.*

System HT was properly developed for the management of specific structures, as hotels and residences.

This system interfaces to the well tested CONTATTO world allowing to integrate the several room functions with the management of the common zones and the technological systems of the structure. System HT needs to be controlled by the CONTATTO MCP XT unit.

Each room is managed by the room module ModHT, 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.

System HT, for one room and in its maximum configuration, is made by:

- a room module ModHT
- 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
- a transformer with 12V~ 5VA secondary winding

ModHT room module

The ModHT room module provides an input for the temperature probe and 8 ON-OFF inputs for the connection of:

- Door microswitch
- Window microswitch
- Bathroom pulling-down switch (or other alarms)
- Room activator microswitch (as option to the badge holder with integrated antenna); this input can be also set as general purpose input
- General purpose input 1
- General purpose input 2
- “Do not to disturb” pushbutton
- “Room make up request” pushbutton

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 some of these inputs is available on the bus, therefore they can be used for specific functions by proper programming of the controller CONTATTO MCXP XT.

Up to 3 LEDs can be connected to ModHT room module for the following additional information:

- Help request (SOS)
- Valid transponder code
- Invalid transponder code

Three external relays (12V⎓) can be connected to outputs O1, O2 and O3 (terminals 38, 39 and 40); O1 will be activated when detecting the Guest inside room, while O2 will be activated when the room is assigned. O3 is a generic output that can be controlled via the CONTATTO bus.

The room module ModHT contains 8 relays for the control of the following functions:

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

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 temperature is measured by a proper NTC sensor connected to ModHT module. The visualization of the room temperature, if required, can be disabled during the system setting up as explained later.

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; this last one can be chosen among minimum, medium and maximum speed or it also can be completely switched 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

Some information reported by the outdoor panel are replied on the terminal block of ModHT module (O4, O5 and O6).

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 ModHT module can operate both in a 2-pipe sytem 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.

ModHT 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 for 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, ModHT 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 bur 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 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 ModHT 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 ModHT 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 ModHT 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. ModHT 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 ModHT 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 ModHT from the supervisor system through the CONTATTO bus.

Each ModHT 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 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 ModHT module (regardless it belongs to Guest or service type), the system performs the following actions:

- Lighting of the code OK LED on TPR/H and activation of the related output on ModHT module (O5) 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 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 ModHT 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 and activation of the related output on ModHT (O1)
- 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.

As option to the "intelligent" badge holder, it is possible to use a similar system integrating a potential free switch, connecting it to the proper input I4 of ModHT; in this case, however, the information about the type of presence inside the room will be lost, the temperature regulation will be set on T1 and PCAM panel will be enabled anyway.

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 ModHT room module.

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

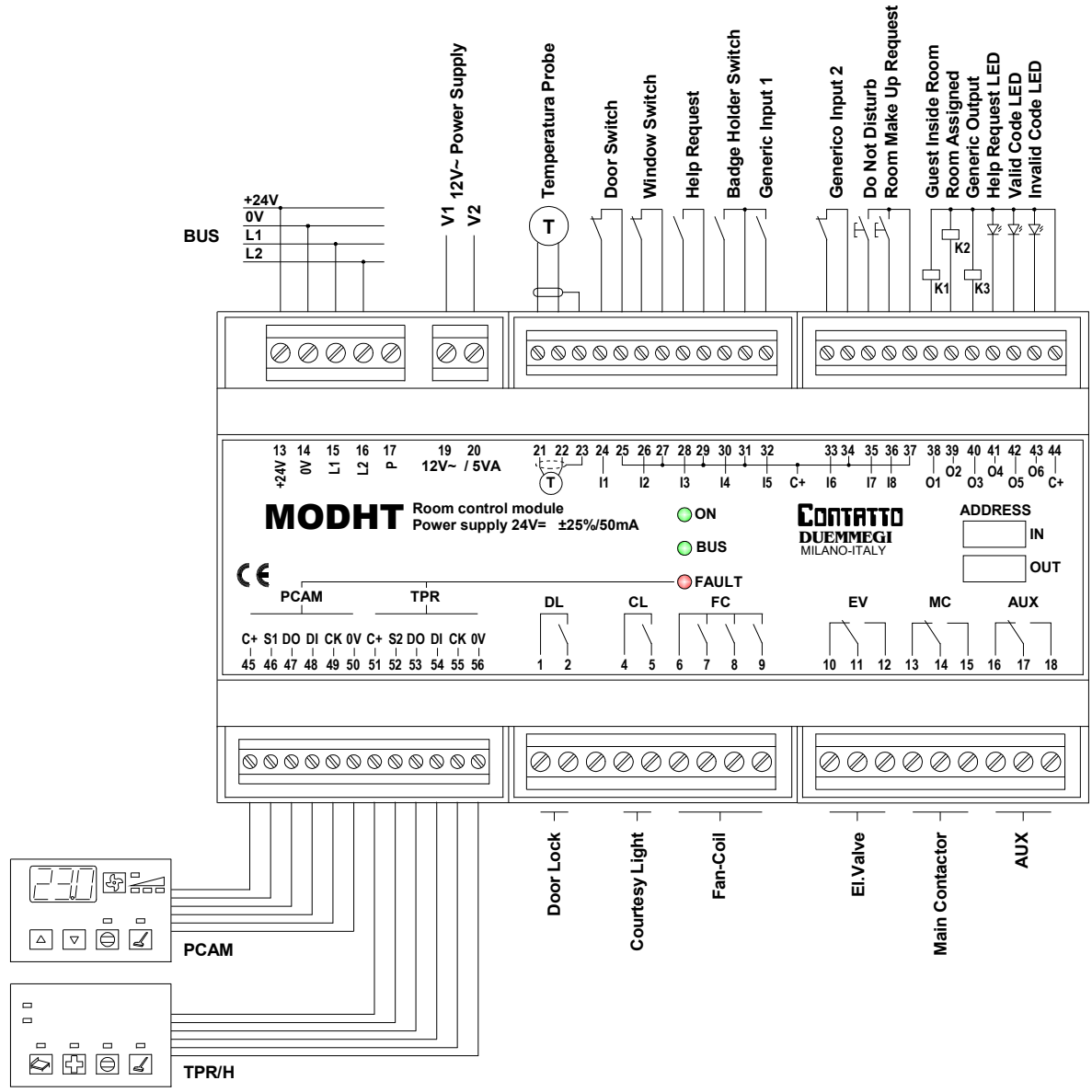


Figure 1: Schematic diagram

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 supplying transformer.

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".

The same operation can be also performed by pushing down the two pushbuttons (if any) connected to inputs I7 and I8 of ModHT room module.

ModHT module address programming

The room module ModHT 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 of ModHT module (regardless of the presence of 12V~ supply).

Two white labels on the front panel of ModHT module allow the writing of the assigned addresses for an immediate visual identification. The room panel PCAM and the outdoor panel TPR/H do not need any setting up.

Installation hints

The schematic diagram in Figure 1 shows the connections to be made between ModHT module, the bus, the 12V~ power supply input, the temperature probe and the several inputs contacts.
All terminals identified as C+ in the schematic diagram are internally connected each one to the others, and they are the positive 12V common terminal for the input of ModHT module and for the external LEDs and relays (if any).

ModHT modules features 3 LEDs on its front panel: ON (it lights if the +24V or the +12V~ is connected), BUS (it blinks if the bus is connected and operating) and FAULT (it lights if a failure of PCAM or TPR/H occurs).

The types of the contact connected to the inputs shown in Figure 1 are only examples, because System HT allows to set each input for the desired NC/NO logic (see in the next pages of this manual).

The LEDs connected to terminals 41÷44, if the outdoor panel TPR/H has been installed, normally are not needed; the current limiting resistors for external LEDs are mounted inside ModHT module, therefore no additional components are required.

The 12V~ power supply is necessary for proper operation of ModHT module and its satellites (PCAM and TPR/H); the system cannot operate by connecting the +24V only.
The Figure 2 shows, in details, the connections between ModHT, PCAM panel, TPR/H panel and the optional antenna for the badge holder; connect the shield of both cables only at the ModHT side as shown.

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
12V~ (V1-V2)	0.5 mmq
Temperature probe	2 x 0.5 mmq + shield, MAX 15mt
Inputs, contacts and pushbuttons	0.5 mmq, MAX 25mt
LED and external relays	0.22 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 + shield, MAX 15mt
TPR/H outdoor panel	6 x 0.22mmq + shield, MAX 15mt

The available relay outputs on ModHT module are:

Terminal	Description	Contact type
1-2	Electrical door lock	NO
4-5	Courtesy light	NO
6-7-8-9	Fan-coil ➢ 6: common ➢ 7: speed 1 (minimum) ➢ 8: speed 2 (medium) ➢ 9: speed 3 (maximum)	NO
10-11-12	Electro valve (or other, see Settings): connect to terminals 11 and 12	CO
13-14-15	Room main contactor: this relay is de-energized when ModHT detects a valid TAG in the badge holder or if the input for the badge holder switch is activated (opened or close depending on the Setting). Connect the coil of the contactor to terminals 13 and 14 (NC contact)	CO
16-17-18	Auxiliary output or cold electro valve	CO

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

As said, the coil of the contactor that supplies the room electrical services and lights must be connected to the NC contact of relay MC of ModHT module (terminals 13 and 14); in this way it is possible to guarantee that the room main contactor will be energized even if a failure to ModHT module or to its power supply occurs, thus avoiding troubles to the Guest of the room.

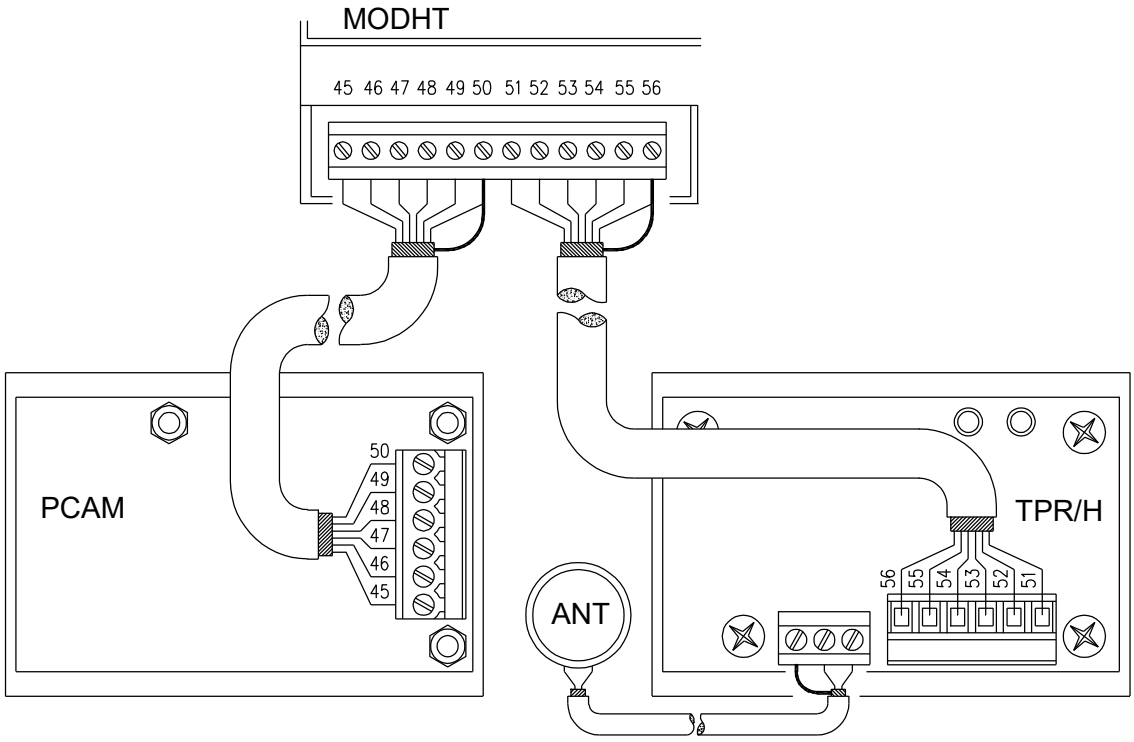


Figure 2: Connections of PCAM and TPR/H

Information from and to ModHT room module

The room module ModHT 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 ModHT 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 ModHT; they are instead virtual points in the memory of ModHT which reflect the status of the signaling.

The “presence inside room” status is activated when a valid TAG is detected in the badge holder, or when the input I4 of ModHT (badge holder switch) is activated. This input can be set as general purpose input 3; in this case its status will be reported on the bus (point 14 of the input channel 4) without any effect on the operation of ModHT module.

The “assigned room” input point reflects the status of the related current setting of ModHT; 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 ModHT; 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 °C

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 °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 ModHT 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 2nd antenna has been installed); the codes are: 1÷4 = service badge, 5 = Guest badge)
6	
7	
8	
9	PCAM room panel failure
10	TPR/H outdoor panel failure
11	Not used
12	Not used
13	Not used
14	I4 (generic input 3) status
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 (_)
2	Enable for AUX relay (_)
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 paragraph about the setting 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 ModHT.

To change the operating mode of the temperature regulator form 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 re-

lated 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 ModHT. 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 in such a way these two settings will be transferred from ModHT modules to MCP XT rather than vice-versa.

To do this, the following statement must be included into MCP XT 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 ModHT (addresses 1-2-3-4 in this example). In this way, the related points into the MCP XT memory will be aligned to the field.

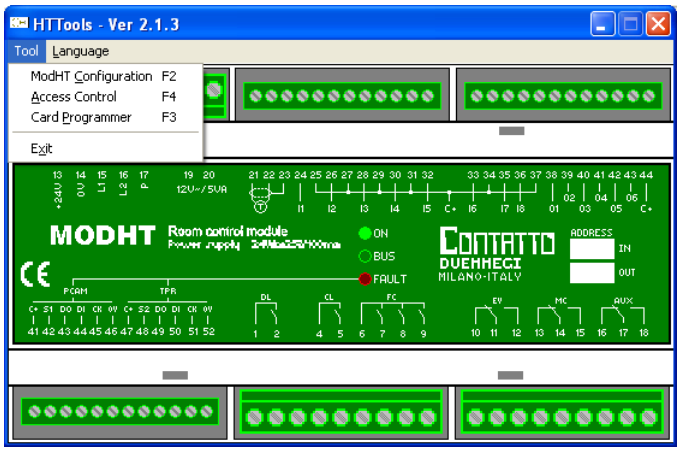
Setting of ModHT module

***Note:** the following descriptions refers to ModHT module equipped by firmware 3.3 or higher.*

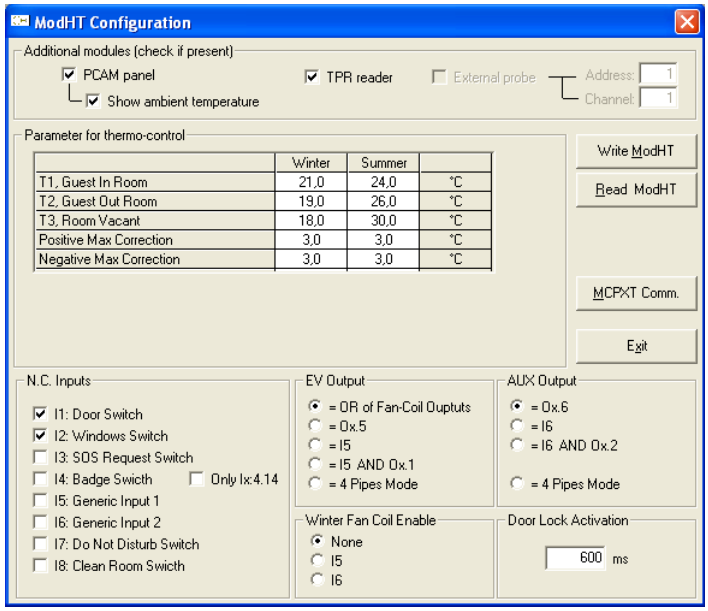
The System HT can be freely customized directly on the field by the installer, in order to meet the requirements of the designer according to the specifications of the structure property.

The setting is performed through the CONTATTO bus using a specifically developed program named HTTools; this program is part of the **MCP IDE package version 2.1.4 or higher** and can be launched selecting, from the main menu of MCP Visio, "Configuration" and then "ModHT 2.x" (the menu item "ModHT 1.x" of MCP Visio allows instead the setting of ModHT modules with firmware older than 2.0).

The main windows of HTTools will be displayed as shown in the following figure.



Selecting "Tool", the various functions can be accessed. A good idea is to set, as first step, the main parameters of ModHT module, selecting the first menu item. In the window that will be opened, shown here bottom, it is possible to set some options and define some parameters as described in the following of this paragraph.

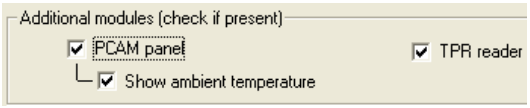


Take in account that the main purpose of HTTools program is the configuration of the System HT during the setting up and the maintenance of the plant; it is also useful as "evaluation program" to get confidence with the system, but the "real" management of the plant must be executed by a proper supervision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

Additional modules

The System HT allows to choose if use or not its two satellites: the PCAM room panel and the TPR/H outdoor panel.

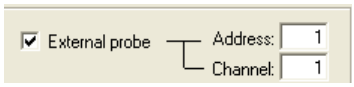
Since these two satellites are optional modules, ModHT must be informed about their installation or less, in order to properly handle the FAULT LED on the room module panel and the related information on the bus; if one or both of these satellites were not installed, simply remove the check sign in the 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.

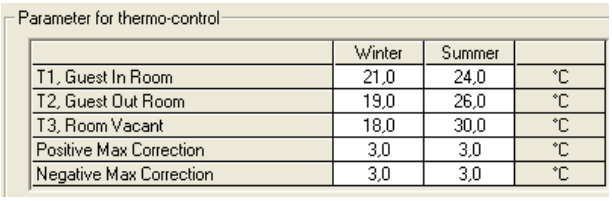
Selection of the external temperature probe

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.



Parameters for the temperature regulation

This section of the ModHT 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, the System HT 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 tree 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), or if the input I4 of ModHT is activated (badge holder switch, if set for this function); in all other cases, the set-point will be T2 (if the room has been assigned) or T3 (if the room is vacant).

Inputs for NC contacts

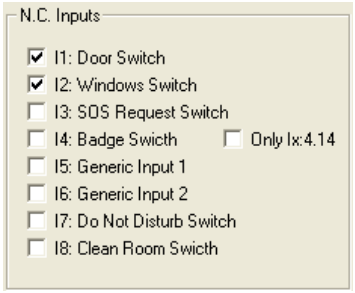
ModHT module provides 8 inputs for the connection to potential-free contacts. Each one of these inputs can be configured, independently from the others, as input for NC or NO contact.

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 8 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
Badge holder switch or Generic 3	Opens inserting the badge (or opens when activated)	Closes inserting the badge (or closes when activated)
Generic 1 contact	Opened when activated	Closed when activated
Generic 2 contact	Opened when activated	Closed when activated
Do not disturb pushbutton	At each opening the relating signaling changes status	At each closing the relating signaling changes status
Room make up request pushbutton	At each opening the signaling changes status	At each closing the relating signaling changes status

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

The section in the following figure allows the NO/NC settings of ModHT inputs.

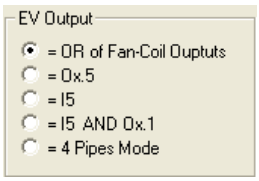


Selecting "Only Ix:4.14" the input I4 does not more operate as input for the switch related to the Guest presence; the status of this input can be therefore used for general purposes, being its status reported on the bus as point 14 of the input channel 4.

EV output

The EV output of ModHT 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 I5 (generic input 1)
4. follows I5 (generic input 1) with the consent of the (virtual) output point Ox.1 of the same ModHT
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 ModHT 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 ModHT module.

In the **case 3** the output EV follows the "active" status of I5, therefore if I5 has been set as NO input, then the output EV switches ON at the closing of the contact connected to I5; if the input has been instead set as NC, then the output EV switches ON at the opening of the contact connected to I5.

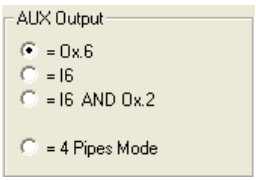
In the **case 4** the output EV follows again the status of I5 as just described, but in addition the point Ox.1 (where x is the address of the same ModHT) behaves as consent; in other words, if Ox.1 is 0, then the output EV is OFF, while if Ox.1 is 1, then the output EV follows the status of I5. Since 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 thedriving of the hot valve in 4-pipe systems.

AUX output

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

1. controlled by the bus as output Ox.6
2. follows I6 (generic input 2)segue I6
3. follows I6 (generic input 2) with the consent of the (virtual) output point Ox.2 of the same ModHT
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 ModHT module.

In the **case 2** the output AUX follows the "active" status of I6, therefore if I6 has been set as NO input, then the output AUX switches ON at the closing of the contact connected to I6; if the input has been instead set as NC, then the output AUX switches ON at the opening of the contact connected to I6.

In the **case 3** the output AUX follows again the status of I6 as just described, but in addition the point Ox.2 (where x is the address of the same ModHT) 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 I6. 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.

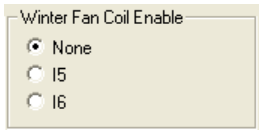
In the **case 4** the AUX output is fully reserved to the driving of the cold valve in 4-pipe systems.

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).

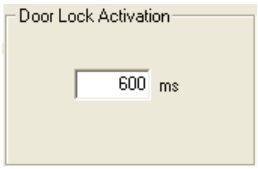
In this case the fan-coil can be equipped with a thermostat mounted on the ingoing pipe (if not already equipped with it) connected to one of the inputs I5 or I6 of ModHT.

The choice about this function must be specified in the configuration window shown here bottom.



If this function is not used, select "None"; otherwise, ModHT module will disable the 3 outputs FC until the activation of I5 or I6 , that means until the contact of the thermostat opens or closes depending on the NC or NO setting chosen for the related input of ModHT module (I5 or I6). 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 ModHT module (outputs EV and AUX) are not affected by this options.

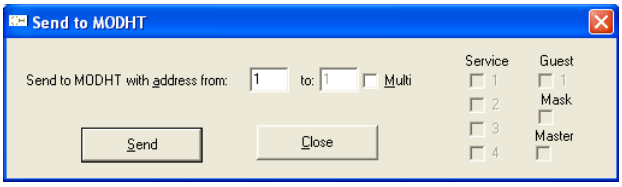
Door lock activation



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 ModHT

Once configured all parameters of ModHT as required by the specific application, click on the button "Write ModHT" to transfer them to the module. The following window will be shown:



Specify the address of the ModHT to be configured or, activating the "Multi" option, specify a starting and an ending address; in this case, the displayed parameters will be sent to all ModHT found in that address range. The options on the right side of the window (Service, Guest, Mask, Master) are used only for the transferring of the parameters related to the access control that will be described in the next pages.

The communication with MCP XT, of course, must be enabled before to start the sending of the parameters; to do this, click on the button "MCPXT Comm." in the "ModHT Configuration" window.

The button "Read ModHT" executes the reverse operation, therefore it is useful to "see" the configuration of a given ModHT, or to check its firmware version by clicking on the button "ID & Ver".

Access control

***Note:** the following descriptions refers to ModHT module equipped by firmware 3.3 or higher.*

Selecting "Tool" from the main window of HTTools and then "Access Control", the section related to the room access management and the programming of badges (or other TAGs) will be entered. The window shown in Figure 3 will be opened. As previously said, the System HT 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.

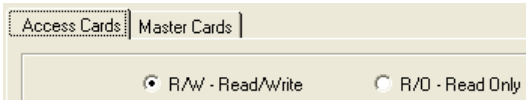
In addition, a Guest code can be defined in order to program the badge allowing the access to the related room; in this case too, more than one badge can be programmed with the same Guest code (for instance, husband and wife must have access to the same room).

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 System HT is made by 24 bytes, but only 15 of these ones are currently used

Coming back to the window in Figure 3, in the TAB Access Cards, note that the System HT 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.

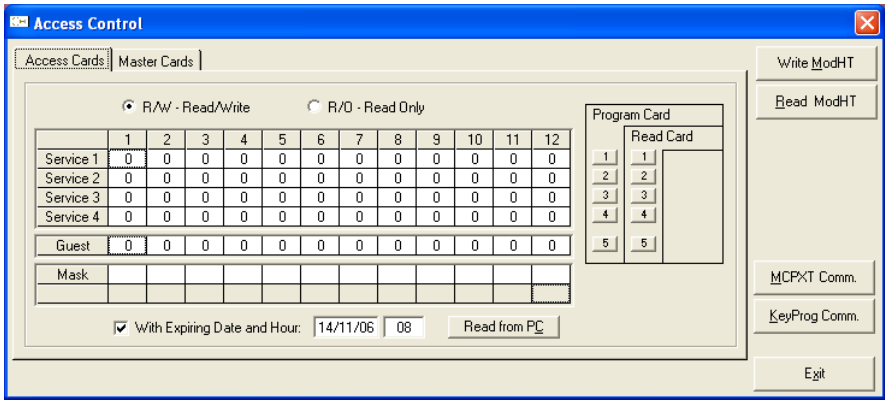


Figure 3: Configuration of the room access cards

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 ModHT module must be reset 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 doe 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 3, 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 System HT 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 HTTools program is the configuration of the System HT 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			

Where:

- ➔ Structure secret code: it is made by 5 number, each one in the range 0 to 255, identifying the plant in a unique way; this code is normally the same for all the badge type having access to that structure (both service and Guests)
- ➔ Additional code: it is made by additional 3 bytes that can be freely defined
- ➔ Reserved to common areas: these bytes, referring to the writing on the badges, must be handled by the supervisor, being reserved to the access control to the common areas; if the structure does not require this function, and this will be the case considered in this example, these byte can assume any value, because the ModHT room modules will be instructed to ignore them (see paragraph about the masking)

The Service section in Figure 3 may be therefore compiled as in the following example:

	1	2	3	4	5	6	7	8	9	10	11	12
Service 1	231	24	122	14	147	78	50	11	0	0	0	0
Service 2	231	24	122	14	147	78	50	12	0	0	0	0
Service 3	231	24	122	14	147	78	50	13	0	0	0	0
Service 4	231	24	122	14	147	78	50	14	0	0	0	0

These will be the service codes of the structure "231 24 122 14 147". The 4 service codes will have the additional code from "78 50 11" to "78 50 14", each one identifying the related type (Service 1-2-3-4).

If each type of service counts more than one person, the easier solution (that here considered) is to program more badge with the same identical code for each type.

Definition of Guest codes

For instance, the first 8 bytes related to a Guest card may be defined as in the following table:

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

Where:

- ➔ Structure secret code: it is made by 5 number, each one in the range 0 to 255, identifying the plant in a unique way; this code is normally the same for all the badge type having access to that structure (both service and Guests)
- ➔ BL is, for instance, the building number, inside the structure, where the room is located

- ➔ FL is the floor where the room is located
- ➔ RM is the room number
- ➔ Reserved to common areas: these bytes, referring to the writing on the badges, must be handled by the supervisor, being reserved to the access control to the common areas; if the structure does not require this function, and this will be the case considered in this example, these byte can assume any value, because the ModHT room modules will be instructed to ignore them (see paragraph about the masking)

The Guest section in Figure 3 may be therefore compiled as in the following example:

Guest	231	24	122	14	147	3	4	25	0	0	0	0

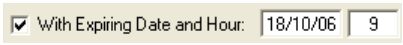
This code will be associated to the room 25 at floor 4 of the building 3 of the structure “231 24 122 14 147”.
If the room have more than one Guest, and each one must have an own badge, the easier solution (that here considered) is to program more badge with the same identical code for each Guest.

The Guest code of this example, intended as a set of 12 “numbers” in the range 0 to 255, must be written both in the badge and in the ModHT memory.

When approaching a badge to TPR/H outdoor panel, the ModHT module compares, one by one, the 12 bytes read from the badge (with exception of the masked ones, see related paragraph) with the correspondent ones in its memory. If the module finds an exact match, then it can open the door of the room, but before to do this, another condition must be verified: the expiring date and time.

In the window in Figure 3 the expiring date and time is an option; placing the check sign, this option is enabled.

The expiry must be entered in the two text boxes (time without minutes, in the range 0 to 23); in the following figure, e.g., the expiring date and time was enabled and fixed at 9:00 of October 10th '06 (this means that the access to the room will be granted until 8:59':59” of that day).



HTTools program converts the expiring date and time in a proper format to be stored on the badge using the 3 reserved bytes B13-14-15.
The service codes cannot have not expiring date and time.

Note: *MCP XT sends on the bus, every 10”, the current date and time; in the case of temporarily out of order of the bus, the expiring date and time will be ignored by ModHT, thus allowing the access to the room regardless of it.*

Mask

The mask allows to “instruct” the ModHT module to ignore, during the validation of a Guest or service badge, the specified bytes.
The following figure shows an example where the bytes 9-10-11-12 have to be ignored (the presence of the sign X in the related position set this choice). To activate or less a byte masking, simply left-click with the mouse on the desired box on the line “Mask”.

	1	2	3	4	5	6	7	8	9	10	11	12
Service 1	231	24	122	14	147	78	50	11	0	0	0	0
Service 2	231	24	122	14	147	78	50	12	0	0	0	0
Service 3	231	24	122	14	147	78	50	13	0	0	0	0
Service 4	231	24	122	14	147	78	50	14	0	0	0	0
Guest	231	24	122	14	147	3	4	25	0	0	0	0
Mask									X	X	X	X

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 ModHT room module have to be programmed.
The badge programming needs the KeyProg programmer, connected via RS232 to a PC running HTTools and with the communication established (operation performed by clicking on the button “KeyProg Comm.”).

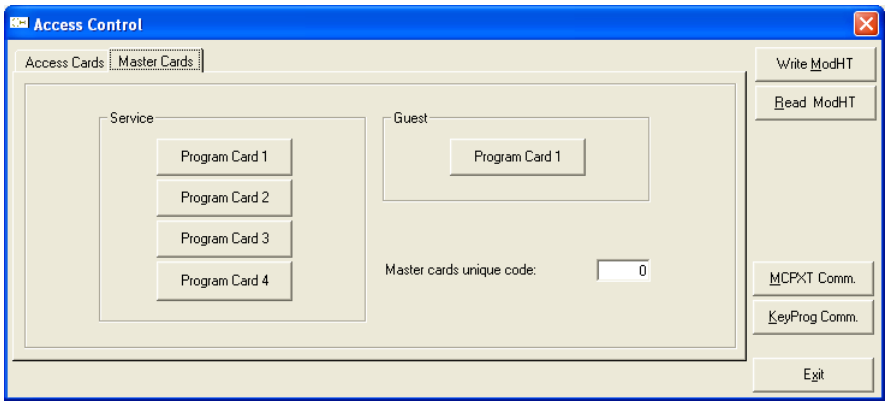
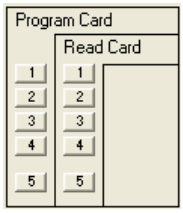


Figure 4: Configuration of master cards

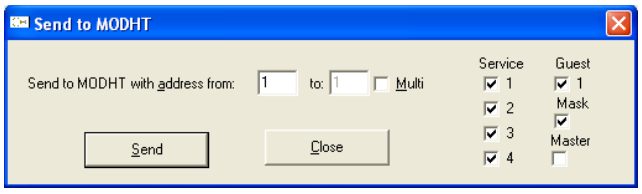
The window in Figure 3 has a section assigned to the management of the cards (see the figure on this right side), with 5 programming buttons and 5 reading buttons, each one corresponding to the 4 service codes and to the Guest code. For instance, to program the Guest card with the code currently shown 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 programmer.



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

Writing the access control codes to ModHT

To send to ModHT the codes currently shown in the table of HTTools, click on the button “Write ModHT” (after having checked that the PC has been connected to MCP XT and that the communication has been established); the following window will be shown:



Some programming options are locate on the right side of this window: only the codes related to the checked options will be sent to ModHT module. Note that, in this example, also the mask option was enabled.

Enter the address of the ModHT to be programmed (of course, the Multi option, described in the paragraph regarding the writing of parameters, must not be enabled, otherwise the same Guest card will open more rooms).

Master cards

The writing of the access control codes to the ModHT 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 ModHT 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 CONTATTO bus.

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

- ➔ when the supervisor or MCP XT have not been started yet
- ➔ when, for any reason, the CONTATTO 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 Figure 4 shows the TAB of HTTools related to the programming of these 5 master cards.

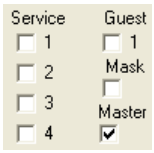
In order to increase the safety of the system, a numerical code in the range 0 to 65535 must be defined for the master cards; this code acts as a password to be accepted by the ModHT modules to be programmed.

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

The procedure to create the master cards and to send to ModHT the password is then the following:

- ➔ define the “Master card unique code”, entering its value, in the range 0 to 65535, as in the following example:

- ➔ send this code to all ModHT modules that must accept the master cards; to perform this operation, click on the button “Write ModHT” (after having checked that the PC has been connected to MCP XT and that the communication has been established)
- ➔ in the window “Send to ModHT”, select the “Master” option only as in the figure on this right side; select then the address of the ModHT to be programmed or select the Multi option if more than one module have to be automatically programmed



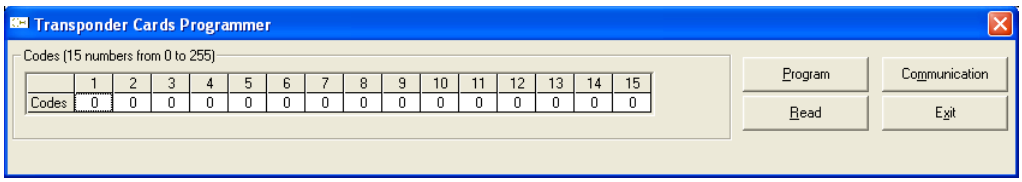


Figure 5: Transponder cards programmer

- ➔ connect the KeyProg programmer to a RS232 port of the PC and enable the communication (operation performed by clicking on the button “KeyProg Comm.”)
- ➔ place a R/W card on the 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

Note: *the following descriptions refers to ModHT module equipped by firmware 3.3 or higher.*

Selecting “Tool” from the main window of HTTools and then “Card Programmer”, the section dedicate to the direct management of KeyProg programmer will be entered.

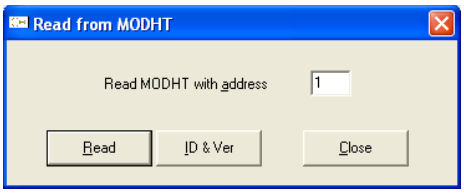
This section, shown in Figure 5, normally is not needed to program the cards, because this operation can be easily performed from the section “Access Control” (Figure 4) as before described.

In this section it is however possible to see all the 15 bytes used by the System HT, therefore it can be useful to the supervisor program developers.

Firmware updating

The firmware of ModHT room module can be updated through the bus. This feature allows to have the module always updated with last modifications or new features.

To check the firmware version currently loaded in a ModHT module, use HTTools program. Clicking the button “Read ModHT” in the “ModHT Configuration” window or in the “Access Control” window, the following one will be shown:



Enter the address of the ModHT module whose firmware version has to been checked and then click on the button “ID & Ver”; at this point, the searched information will be shown in the same window.

To update the firmware of a ModHT module, the program named BootPIC must be used. This program is part of MCP IDE software package. An application note explaining the updating procedure can be provided; for more details contact **DUEMMEGI**.

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 and the **CONTATTO** bus, the supervisor can send the required information and settings to each ModHT module; in the same way, it can manage the proper code to grant the access to each room and to the common areas.

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

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

As said before, the temperature regulator integrated in ModHT 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.

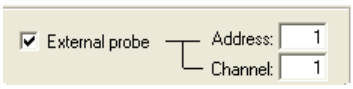
Suppose to have selected Winter season and suppose that the Guest is inside the room: the regulator will try to maintain the temperature near to Winter T1, normally controlling the hot valve. If the room temperature, due to external climatic conditions (e.g. during Spring and Autumn) approaches to Summer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



ModHT 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.

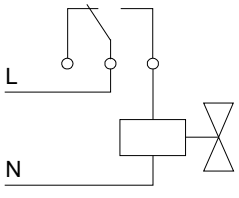
In the occurrence of failure of the bus or of the module detecting the external temperature, this energy saving algorithm will be automatically disabled.

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

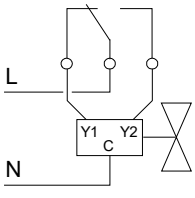
The ON/OFF actuator normally used for the valves in these applications can be:

- 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

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



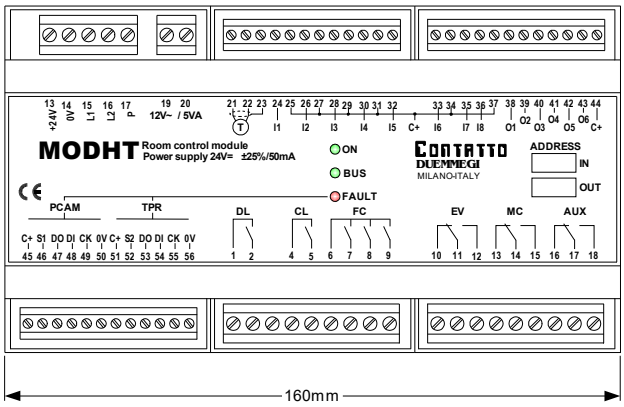
2-point valve

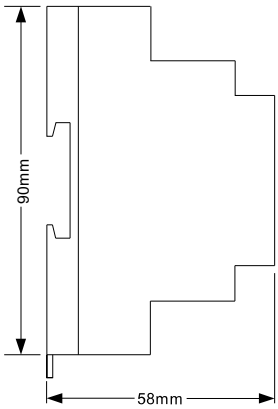


3-point valve

Outline dimensions of ModHT room module

ModHT room module is housed in a modular 9M DIN box.





Outline dimensions of PCAM room panel

PCAM room panel was developed to be housed into standard model 503 wall box and it can be mounted on the supporting frame of the main manufacturers on the market. The height and width vary depending on the chosen supporting frame. The maximum thickness is 34mm about.

Outline dimensions of TPR/H outdoor panel

TPR/H outdoor panel was developed to be housed into standard model 503 wall box and it can be mounted on the supporting frame of the main manufacturers on the market. The height and width vary depending on the chosen supporting frame. The maximum thickness is 31mm about.

Outline dimensions of TPB badge holder

TPB badge holder was developed to be housed into standard model 503 wall box and it can be mounted on the supporting frame of the main manufacturers on the market. The height and width vary depending on the chosen supporting frame. The maximum thickness is 41mm about.

Technical characteristics

Power supply ModHT	24V ⎓ ± 25% SELV and 12V~ ± 25% SELV
Power supply PCAM	Provided by ModHT
Power supply TPR/H	Provided by ModHT
MAX consumption (PCAM and TPR/H connected): - From 24V ⎓ - From 12V~	 50mA 5VA
Digital Inputs	8, 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	±0.5°C
Number of voltage outputs for external relays	3
MAX current for each voltage output for external relay	70mA
Number of LED outputs	3
Current for each LED output	8mA TYP internally limited
MAX rating for NO contact (each relay)	5A, 0÷250V~ resistive load 1A, 0÷250V~ inductive load 3A, 0÷30V ⎓ resistive load
MAX rating for NC contact (each relay)	5A, 0÷250V~ resistive load 0.5A, 0÷250V~ inductive load 1A, 0÷30V ⎓ resistive load
Minimum load on relay contacts (both NO and NC)	1.2W (100mA@12V⎓)
Operating temperature	0 ÷ +50 °C
Storage temperature	-30 ÷ +85 °C
Protection degree (all modules)	IP20

Note: this manual refers to ModHT module equipped by firmware 3.3 or higher. All characteristics and features of System HT described in this manual are subject to change without notice.

ModHT room module

TPB badge holder

Note: the frame, the cover plate and the 503 box are not provided.

PCAM room panel

Note: the frame, the cover plate and the 503 box are not provided.

KeyProg transponder programmer

Note: provided with power supply and RS232 cable.

TPR/H outdoor panel

Note: the frame, the cover plate and the 503 box are not provided.

KEY cards