

# TEMPERATURE AND HUMIDITY CONTROLLER FOR ONE-BATTERY AIR HANDLING UNIT

OPTIONAL

**C ← BUS**

## XTU 614 C1 Eng.



- **Temperature & relative humidity control in air handling units**
- **24-hour, 7-day, and annual programming**
- **Power supply 24 V~, DIN rail mounting**
- **Communication systems:**
  - C-Bus: XTU 614 is already wired for Telemangement
  - To enable Telemangement use **C-Bus Plug-in, model ACB 460 C1 or later**, to be ordered separately as an accessory.

### 1. APPLICATION

XTU 614 is designed for temperature and humidity control in air handling units composed of:

- 1 battery for hot/chilled water or vapour with 3-wire modulating controll or electric batteries with 1-,2-, or 3-stage On-Off control or direct expansion batteries with 1- or 2-stage On-Off control
- 1 adiabatic humidifying unit with On-Off control or vapour-operated, with 0...10 V- control (alternative to air damper control)
- 1 air mixing unit with 0...10 V- air damper actuators or 1 heat regenerator with 0...10 V- or On-Off control (CSV 304 converter).

The controller can be included in a Telemangement system through the C-Bus connection.

### 2. FEATURES

The main features of XTU 614 are as follows:

- One 3-wire modulating output, or 2-stage On-Off (two equal loads) or 3-stage (two unequal loads) outputs, configurable for:
  - winter and summer room temperature control with optional summer external compensation; flow limits to prevent cold drafts, hot air stratification and condensing in the air ducts.
  - flow temperature control (heating or cooling) with optional winter and summer compensation
  - pre-heating temperature control according to room temperature and humidity
  - battery frost protection temperature control
- One On-off output for winter adiabatic humidifying unit control
- One 0...10 V- progressive output, configurable for:
  - control of air mixing according to temperature, with minimum limit opening external air
  - external air control for room dehumidification with compensation of dew point temperature on glass windows and with minimum limit external air
  - On-Off control heat regenerator according to room-outside temperature comparison
  - adjustment vapour humidifier by means of 0...10 V- control
- One 3-wire On-Off output for manual or automatic season switching.
- Two On-Off outputs for control fan and pump according to timed program in use
- Winter battery frost protection temperature control
- Programming by means of 25 24-hour programs, five 7-day programs, and 25 annual period programs
- Variation of temp. and humidity set-points by remote control
- Alarms for short and open sensor circuits and for system and equipment malfunction.
- Enabled for data transmission via C-Bus with local PCs or remote Telemangement PC.

**To enable data transmission and Telemangement use C-Bus Plug-in type ACB 460 C1 or later**  
**To communicate locally with a PC use test Plug-in ACX 232**

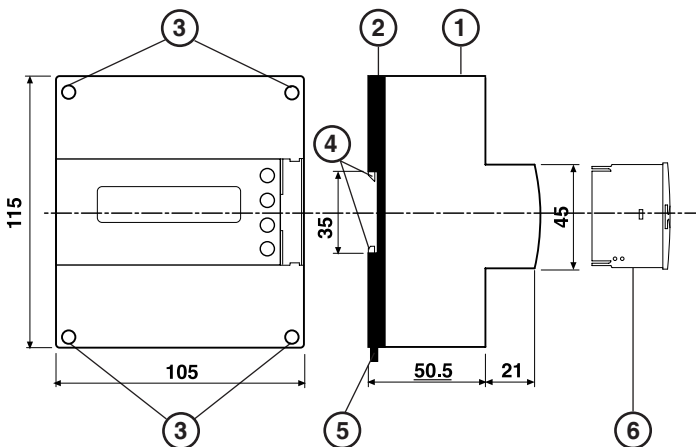
### 3. ACCESSORIES

No.	Description	Type	Application Range	Sensing element t°	Code	Data sheet
1	Discharge air temperature duct sensor	<b>STA 010</b>	0...60 °C	NTC 10 kΩ	B1	-
1	Outside air temperature sensor - duct type or wall type	<b>STA 001</b> <b>SAE 001</b>	-30...+40 °C -30...+40 °C	NTC 1 kΩ NTC 1 kΩ	B2 B2	- -
1	Extract air temperature sensor - duct type or room type	<b>STA 010</b> <b>SAB 010</b>	0...40 °C 0...40 °C	NTC 10 kΩ NTC 10 kΩ	B3 B3	- -
1	Pre-heating temperature sensor - duct type or dew point	<b>STA 010</b> <b>STV 010</b>	0...40 °C 0...40 °C	NTC 10 kΩ NTC 10 kΩ	B4 B4	- -
1	Room relative humidity and temperature sensor or duct relative humidity sensor	<b>SAU 012</b> <b>SUR 012</b>	0...40 °C ; 20...80 % 20...80 %	NTC 10 kΩ -	B3-B6 B6	- -
1	or duct relative humidity sensor (swimming pools)	<b>SUR 051</b>	10...90 %	-	B6	-
1	Battery frost protection temp. sensor - cable type or immersion type	<b>SAF 010</b> <b>SIH 010</b>	0...40 °C 0...40 °C	NTC 10 kΩ NTC 10 kΩ	B7 B7	- -
1	0...10 V - to 2-stage On-Off converter	<b>CSV 304</b>	-	-	Y	-
1	Temperature set-point adjuster	<b>CDB 100</b>	± 5 °C	-	Rt°	-
1	Relative humidity set-point adjuster	<b>CDB 200</b>	± 10 %	-	RH	-
1	Outside air minimum distance positioner	<b>PCS 04</b>	-	-	Rs	-
<b>Accessories for Telemangement</b>						
1	Plug-in for communicating via C-Bus	<b>ACB 460 C1</b>	-	-	-	-

**4. TECHNICAL DATA** (default values in bold print)

<b>• Electrical</b>	
Power supply	24 V ~ ± 10%
Frequency	50 ... 60 Hz
Consumption	5 VA
Protection	IP40
Radio interference	VDE0875/0871
Vibration test	with 2g (DIN 40 046)
Voltage-free output contacts:	
maximum switching voltage	250 V ~
maximum switching current	5 (1) A
Construction standards	Italian Elechtrotech Comm. (CEI)
Data storage period	5 years
Software	Class A
<b>• Mechanical</b>	
Enclosure	Modulo DIN 6E
Installation	on DIN 35 rail
Materials:	
base	NYLON
cover	ABS
Room temperature:	
operating	0 ... 45°C
storage	- 25 ... + 60°C
Room humidity	Class F DIN 40040
Dimensions	105 x 115 x 71.5
Weight	0.6 kg
<b>• Programs and annual periods</b>	
24-hour programs	1...25
24-hour schedules	2...6
7-day programs	1...5
Annual periods	0...25
<b>• Setting range</b>	
Heating (or cooling) temperatures:	
desired room (B3 or B1+B3)	0... <b>20 (25)</b> ...40 °C
desired flow (B1)	0... <b>20 (25)</b> ...60 °C
min. flow limit (B1+B3)	1... <b>18 (8)</b> ...60 °C
max. flow limit (B1+B3)	1... <b>50 (25)</b> ...60 °C
room heating flow limit (B1+B3)	0... <b>40</b> °C
room cooling flow limit (B1+B3)	0... <b>40</b> °C
outside design temp. (B1+B2)	-30...- <b>10 (35)</b> ...40 °C
design flow (B1+B2)	1... <b>50 (10)</b> ...60 °C
summer compensation Te-Ta (B2+B3)	0...6...20 °C
Pre-heating or glass dewpoint temperature (B4):	
min. limit	0... <b>10</b> ...40 °C
adjustment	- 9.5... <b>0</b> ...+9.5 °C
Heat pump min. outside temp.	
Temp. Proportional Band (base value):	-30... <b>0</b> ...40 °C
Heating (room) (B3 or B1+B3)	1... <b>2</b> ...40 °C

**5. OVERALL DIMENSIONS**



- 1 - Protective cover for electronic components
- 2 - Base with transformer, relay & terminal blocks
- 3 - Screws for fixing cover- base
- 4 - DIN rail securing elements
- 5 - DIN rail release lever
- 6 - Plug-in for C-Bus communication

Heating (flow) (B1)	1... <b>10</b> ...40 °C
Various temp. Proportional Band multipliers:	
Heating flow (B1+B3)	PB amb x 0.5... <b>5</b> ...20
Cooling temperatures	PB heat x <b>0.5</b> ...20
Pre-heating (B4)	PB heat disch x 0.5... <b>1</b> ...20
Dew point glass (B4)	PB room heat x 0.5... <b>1</b> ...20
Air dampers (B2+B3)	PB room heat x 0.5... <b>1</b> ...20
Aux. heating (B3)	PB room heat x 0.5... <b>1</b> ...20
Aux heating (B1 or B1 + B3)	PB flow heat x 0.5... <b>1</b> ...20
Temp. Integral Time	0... <b>10</b> ...255 min
Room or flow relative humidity (B6):	
humidification	0... <b>50</b> ...99 %
dehumidification	0... <b>60</b> ...99 %
Proportional Band humidity	0.5... <b>6</b> ...40 %
Integral time humidity	0... <b>10</b> ...255 min
Y output control:	
	- <b>modulating</b>
	- 2 stage
	- 3 stage
0...10 V-	
Ys output control	
Valve run time (modulating)	30... <b>120</b> ...630 s
Season switching:	
	- manual from display
	- by external control
	- auto based on outside temp.
	- auto based on room temp.
	- automatic by dates
Season switching outside temperatures:	
Winter	0... <b>20</b> ...40 °C
Summer	0... <b>25</b> ...40 °C
Season switching delay based on outside temp.:	
Winter	1... <b>24</b> ...60 h
Summer	1... <b>4</b> ...60 h

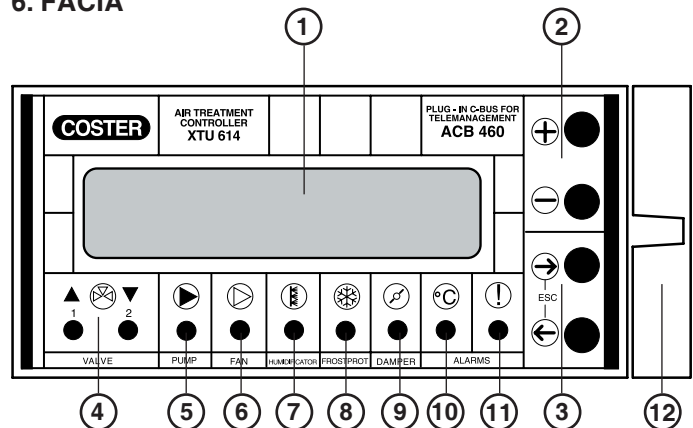
<b>• Alarm setting</b>	
Telemangement (from PC)	
Alarm call attempts	1... <b>5</b> ...255
Interval between calls	2... <b>10</b> ...255 min
Alarms (settings from PC)	
Flow temp. diff. threshold (B1)	0... <b>5</b> ...99 °C
Flow temp. diff. delay	2... <b>30</b> ...255 min
Room temp. diff. threshold (B3)	0... <b>1</b> ...99 °C
Room temp. diff. delay	2... <b>30</b> ...255 min
Delay trip Frosprot temperature (B4)	2... <b>5</b> ...255 min
Humidity diff. threshold (B6)	0... <b>10</b> ...100 %
Humidity diff. delay	2... <b>30</b> ...255 min

<b>• Telemangement</b>	
Speed C-Bus chosen from	1200, 2400, 4800, 9600 bauds

**Warning :**

In case of static, the equipment's output controls may change settings; original settings will be subsequently restored automatically.

**6. FACIA**



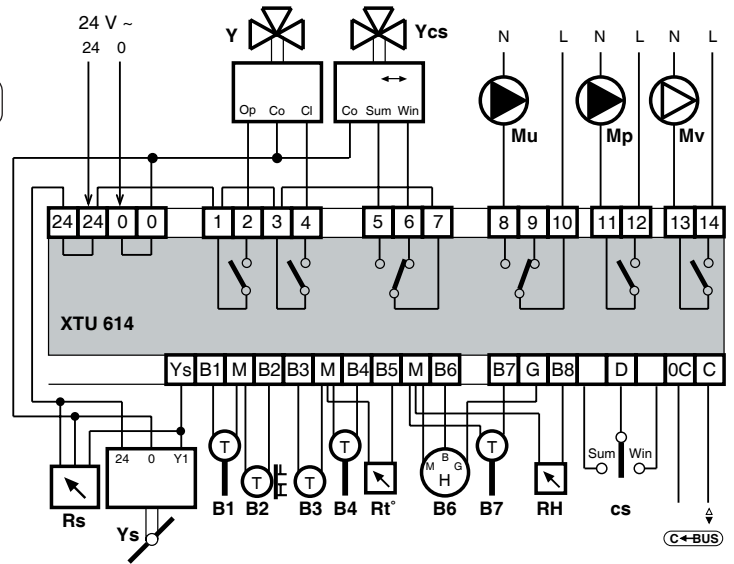
- 1 - Alphanumeric display
- 2 - + and - operating keys
- 3 - ← and → operating keys
- 4 - Valve warnings
- 5 - Pump warning
- 6 - Fan warning
- 7 - Humidifier warning
- 8 - Frostprotection warning
- 9 - Air damper warning
- 10 - Readings alarm warning
- 11 - Malfunction warning
- 12 - Plug-in type ACB 460 for C-Bus communication

**7. WIRING DIAGRAM**

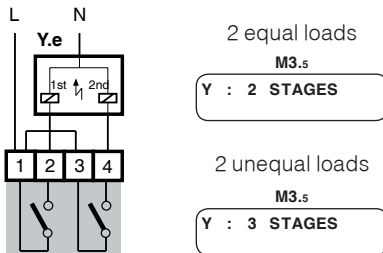
**7.1 3-wire modulating valve control**

- B1 – Discharge air temp. sensor 0...60°C
- B2 – Outside temp. sensor -30...+40°C
- B3 – Room or extract air temp. sensor 0...40°C
- B4 – Pre-heating or dew point temp. sensor 0...40°C
- B6 – Room humidity or extract air or discharge air sensor
- B7 – Frost protection sensor
- Y – 3-wire modulating control or 2- or 3-stage On-Off
- Ys – 0...10V- control of air dampers or heat recuperator or vapour humidifier
- Ycs – Season switch
- Mv – Fan control
- Mp – Pump control
- Mu – Adiabatic humidifier control
- Rt° – Heating setting adjuster
- RH – Humidity setting adjuster
- Rs – Outside air minimum distance positioner
- cs – Season switch: 1 = winter, 2 = summer
- C-Bus – Transmission Telemangement

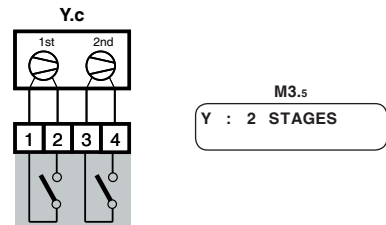
M3.s  
Y : MODULATING  
Run time : xx xs



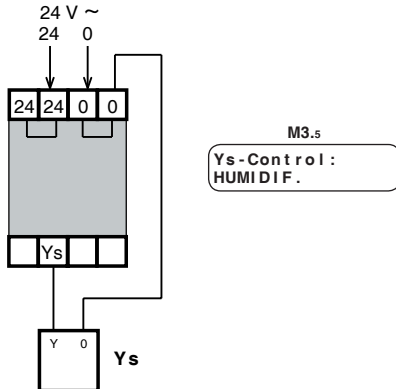
**7.2 Electric battery control**



**7.3 Direct expansion battery control**



**7.4 Vapour humidifier control (0...10 V-)**



**7.5 Use of D-E1-E2 outputs – examples**

- E1 D E2** On-Off according to program in use (M0.2 or M0.4)  
Season Switching (M3.2) can be: No; Winter; Summer; By Outside T; By Room T; By Seasons
- E1 D E2** c1 open : On-Off according to Program setting (M0.2 or M0.4)  
c1 closed : Always On (for switchings outside program)  
To use c1 as only On-Off control set OFF in Programs in use (M0.2 and M0.4).  
Season switch (M3.2) can be: No; Winter; Summer; From Outside T; From Room T; From Seasons.
- E1 D E2** cs Win: On-Off by Winter Program in use (M0.2)  
cs Sum: On-Off by Summer Program in use (M0.4)  
Season switching (M3.2) must be : by cs control
- E1 D E2** cs Win & c1 open : On-Off -according to Winter Program setting (M0.2)  
cs Win & c1 closed: On-Off -Always On, Winter  
cs Sum & c1 open : On-Off -according to Summer Program setting (M0.4)  
cs Sum & c1 closed: On-Off -Always On, Summer  
To use c1 as only On-Off control, set OFF in the Program setting (M0.2 and M0.4).  
Season Switching (M3.2) must be : As control cs + c1

cs – Control of manual or centralised season switching or by controller with season switch type XTU 614.  
c1 – On-Off switch for manual control or by fan heavy duty switch,

## 8. WIRING

Proceed as follows :

- Separate base and cover
- Mount base on DIN rail and check that securing elements (5.4) hold it firmly in place.
- Carry out wiring according to the diagram and in observance of the relevant regulations in force, and using cables of :
  - 1.5 mm<sup>2</sup> for power and relay control outputs
  - 1 mm<sup>2</sup> for sensors and remote control
  - 1 mm<sup>2</sup> for C-Bus and C-Ring. For wire length limits please see technical data sheets T 021 and T 022
- Reposition the cover on the base / terminal block and fasten with the 4 screws supplied (5.3).
- Check that voltage is correct and supplied by the dedicated auxiliary line, measuring it upstream of the protection (circuit breaker, fuse....).
- Power up the device.

You are advised not to insert more than two cables in a single terminal of the controller and if necessary to use external junction boxes.

## 9. SITING DEVICES

### 9.1 Controller

The controller should be sited in a dry environment which meets the relevant ambient conditions given under 4. TECHNICAL DATA “. If installed in a location classified as “Hazardous” it must be installed in a cabinet for electrical equipment constructed according to the regulations in force for the class of danger concerned.

The controller can be mounted on a DIN rail and housed in a standard DIN enclosure.

### 9.2 Discharge air temperature sensor B1

B1 must be installed downstream of the discharge air fan.

### 9.3 Outside temperature sensor B2

STA 001: It may be used in systems with constant inflow of outside air. It must be installed upstream of the outside air dampers near the air intake.

SAE 001: It should be used in systems where the intake of outside air is not constant. It must be installed outside the building, on the north or northwest side, at a height of at least three metres from the ground, protected from sunlight and as far as possible from windows, doors, chimneys or other direct sources of thermal interference.

### 9.4 Room temperature or extract air sensor B3, or room temperature and humidity sensor B3 + B6

Room sensors SAB 010 or SAU 012: Must be installed in a spot that represents the average temperature and/or humidity of a significant room (e.g. living room) at a height of 1.5 to 1.6 metres from the floor, on an inside wall away from windows, doors and sources of heat and corners, bookcases and curtains should be avoided

STA 010 extract air: Must be installed upstream of the extract air fan..

### 9.5 Air duct humidity detector B6

Extract air SUR 012 or SUR 051: It must be installed upstream of the extract air fan.

Discharge air SUR 012 or SUR 051: It must be installed downstream of the discharge air fan.

### 9.6 Pre-heating temperature sensor or swimming pool glass dew point B4

Pre-heating STA 010: Must be installed downstream of the humidifying unit, preferably downstream of the drop separator.

Windows dew point STV 010: Must be installed in contact with the glass most exposed to north.

### 9.7 Frost protection temperature sensor B7

SAF 010: It should be installed downstream of the pre-heating battery, in contact with the battery itself (cable-type sensor SAF 010) or immersion type on the battery outflow piping.

**10. COMMUNICATION**

**10.1 C-Bus Telemangement Communication** (for more detailed information please see Technical Sheet T 021)

XTU 614 provides:

- remote Telemangement by means of **C-Bus Plug-in type ACB 460 C1**
- local communication (e.g. setting via PC) with Test Plug-in ACX 232

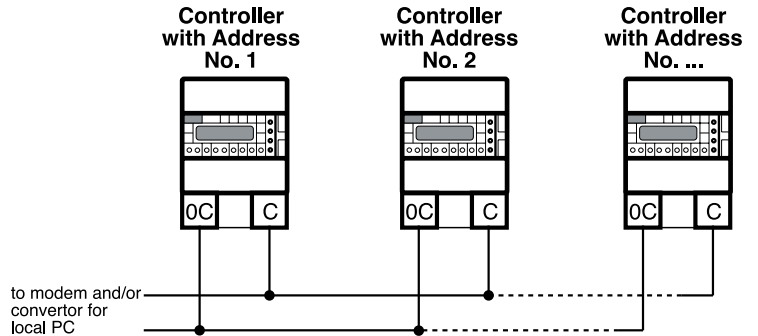
Telemangement is two-way, with one or more local PC(s) and/or a remote central computer via telephone network.

From the PC(s) it is possible:

- to view and change data and values entered on the controller display pages, and the configuration data dedicated to Telemangement only (see 4. Technical Data)
- check the operational status of the site components (pumps, accessories in general)
- to acquire system-generated alarms
- to view sensor readings (temperatures: outside, room, flow, etc.)

**10.2 C-Bus wiring for local or remote Telemangement**

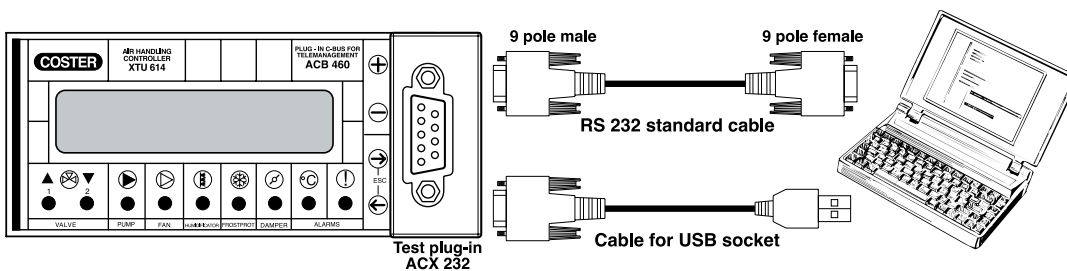
**Each controller must be equipped with the correct model of the C-Bus Plug-in of the required type for the controller in question**



**10.3 Connection to PC for local communication via test Plug-in ACX 232**

Extract the C-Bus Plug-in and insert the test Plug-in ACX 232; use a standard cable to connect the RS232 plug to the PC (the cables are included in the "HANDY KIT").

If the PC has only USB sockets use a standard RS232 to USB conversion cable.



**ACCESSORIES:**

- Test Plug-in = **ACX 232**
- handy kit = **KIT RS 232**

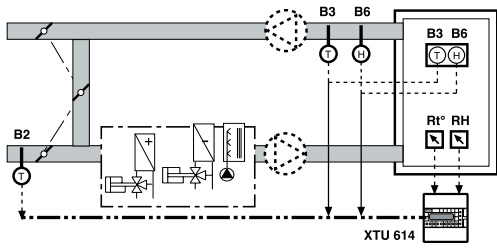
The "handy kit" contains the 2 cables & other useful accessories.

Observations : - Before communicating, ensure that the address entered in the controller is the address with which you wish to communicate via PC.

- It is advisable to use a portable PC powered by battery with the connection to 230 Volts unplugged, since the earth (0 volts) of the controller is connected to that of the RS 232 and so to that of the PC. By connecting the two earths together the currents may be dispersed, if the earths have not been well made and if the PC has its 0 volt connected directly to the central pole of the plug (as is usual).
- The transmission speed can be adjusted (1200, 2400, 4800, 9600 bps). A speed suitable for all the devices connected in C-Bus must be chosen.

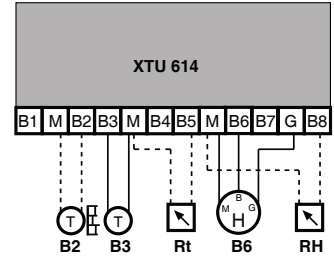
## 11. TEMPERATURE AND HUMIDITY CONTROL – EXAMPLES

### 11.1 – Room temperature and humidity control

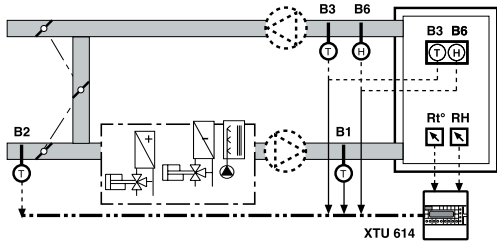


B2 – Outside temp. sensor (for compensation only)  
 B3 – Room or extract air temp. sensor  
 B6 – Room humidity or extract air sensor  
 Rt° – Temperature set point adjuster (optional)  
 RH – Humidity set point adjuster (optional)

M3.1  
**Detectors Layout**  
 - 2 3 - 5 6 - 8

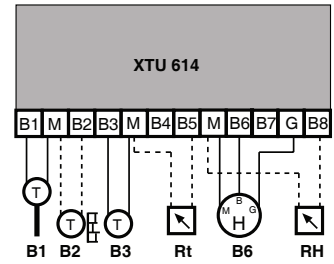


### 11.2 – Room temperature and humidity control with discharge air temperature limits

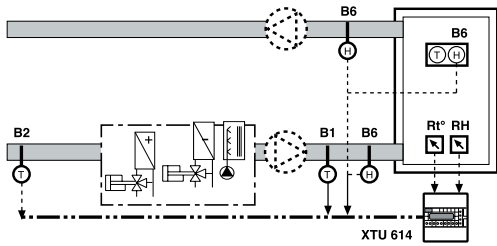


B1 – Discharge air temp. sensor  
 B2 – Outside temp. sensor (for compensation only)  
 B3 – Room or extract air temp. sensor  
 B6 – Room or extract air humidity sensor  
 Rt° – Temperature set point adjuster (optional)  
 RH – Humidity set point adjuster (optional)

M3.1  
**Detectors Layout**  
 1 2 3 - 5 6 - 8

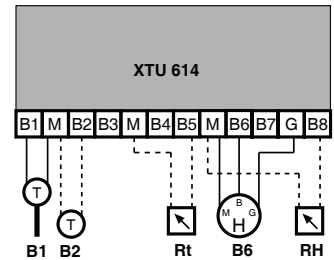


### 11.3 – Discharge air temperature and room or discharge air humidity control



B1 – Discharge air temp. sensor  
 B2 – Outside temp. sensor (for compensation only)  
 B6 – Discharge air or room or extract air humidity sensor  
 Rt° – Temperature set point adjuster (optional)  
 RH – Humidity set point adjuster (optional)

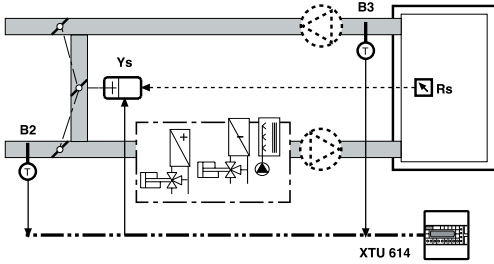
M3.1  
**Detectors Layout**  
 1 2 - - 5 6 - 8





**12. USE OF YS OUTPUT- EXAMPLES**

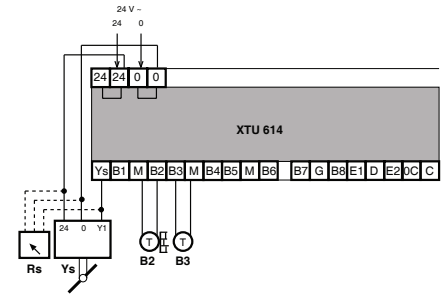
**12.1 – Temperature comparison air damper optimization**



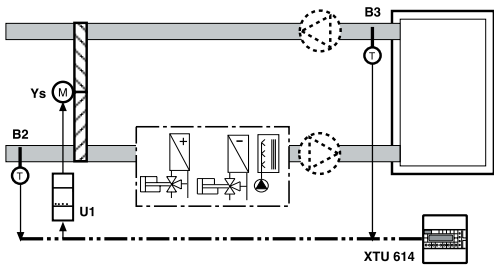
- B2 – Outside temp. sensor
- B3 – Room or extract air temp. sensor
- Ys – Progressive air damper control
- Rs – Outside air min. distance positioner (optional)

M3.1  
**Detectors Layout**  
- 2 3 - - - -

M3.6  
**Ys-Control :**  
DAMP. TEM



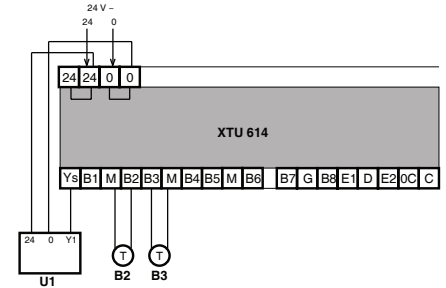
**12.3 – Heat recuperator On-Off control**



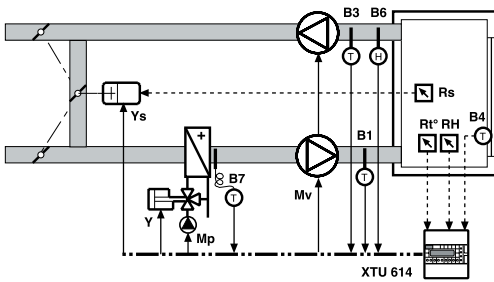
- B2 – Outside temperature sensor
- B3 – Room or extract air temp. sensor
- Ys – Recuperator
- U1 – 0...10 V-to On-Off signal converter

M3.1  
**Detectors Layout**  
- 2 3 - - - -

M3.6  
**Ys-Control :**  
RECUPERATOR



**12.3 – Outside air control for room dehumidification (swimming pools) with dew point control (optional) – 1 Heating modulating battery**



- B1 – Discharge air temp. sensor
- B3 – Room or extract air temp. sensor
- B4 – Dew point temp. sensor (optional)
- B6 – Room or extract air humidity sensor
- B7 – Battery antifreeze sensor
- Mp – Pump On-Off control
- Mv – Fan On-Off control
- Rt – Temperature set point adjuster (optional)
- RH – Humidity set point adjuster (optional)
- Rs – Outside air min. distance positioner (optional)
- Y – Heating modulating control
- Ys – Progressive air damper control (dehumidification)

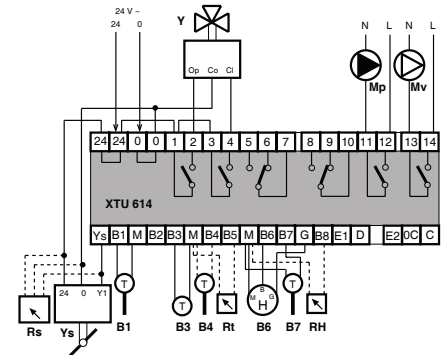
M3.1  
**Detectors Layout**  
1 - 3 4 5 6 - 8

M3.3  
**Use Detector**  
DEWPOINT

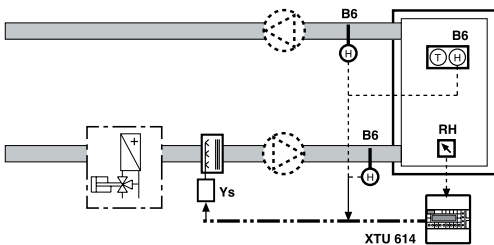
M3.4  
**Y : MODULATING**  
Run Time : xxxs

M3.5  
**Y : HEATING**

M3.6  
**Ys-Control :**  
DEHUMIDIFICATION



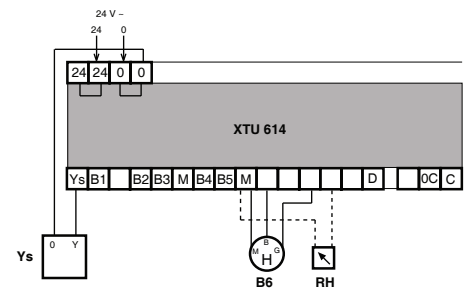
**12.4 – Vapor humidifying unit control (0...10 V-)**



- B6 – Room or extract air or discharge air humidity sensor
- RH – Humidity set point adjuster (optional)
- Ys – Progressive humidifier control

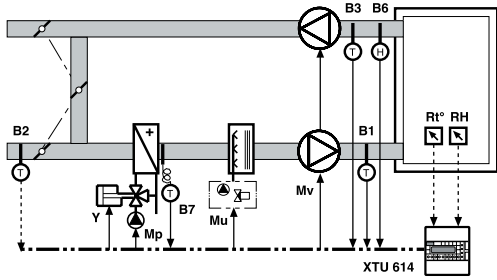
M3.1  
**Detectors Layout**  
6 - 8

M3.6  
**Ys-Control :**  
HUMIDIFICATION

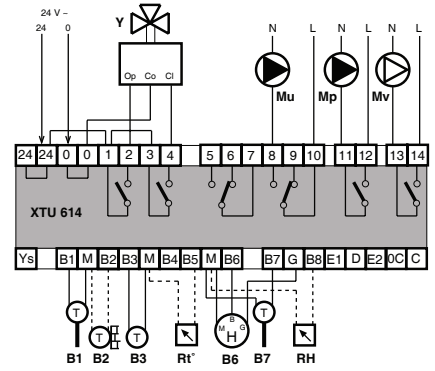


**13. USE OF Y OUTPUTS- EXAMPLES**

**13.1 - 1 Heating modulating battery  
- 1 Humidifying On-Off unit**

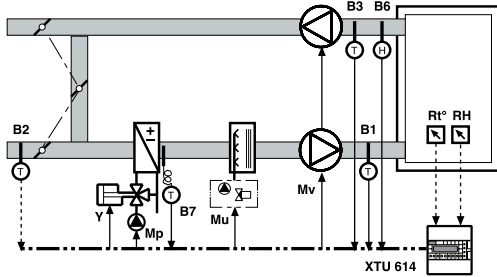


- B1 - Discharge air temp. sensor
- B2 - Outside temp. sensor (for compensation)
- B3 - Room or extract air temp. sensor
- B6 - Room or extract air humidity sensor
- B7 - Battery frost protection sensor
- Mu - Humidifier On-Off control
- Mv - Fan On-Off control
- Mp - Pump On-Off control
- Rt° - Temperature set point adjuster (optional)
- RH - Humidity set point adjuster (optional)
- Y - Heating modulating control

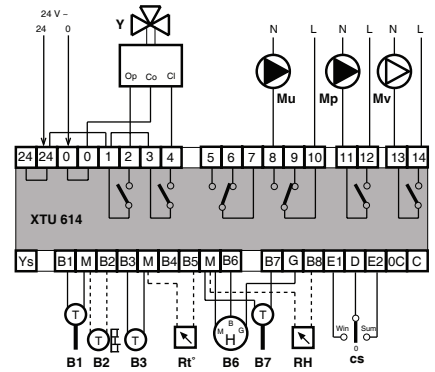


M3.1	M3.2	M3.4	M3.5
Detectors Layout 1 2 3 - 5 6 7 8	Season Switching NO	Y : MODULATING Run Time : xxs	Y : HEATING

**13.2 - 1 Winter heating, summer cooling modulating battery  
- 1 Humidifying On-Off unit**

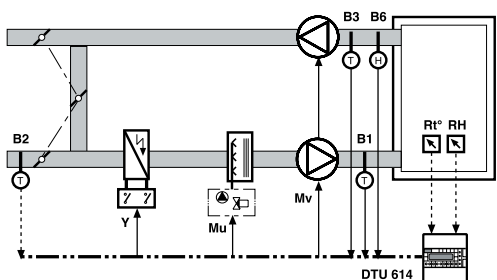


- B1 - Discharge air temp. sensor
- B2 - Outside temp. sensor (for compensation)
- B3 - Room or extract air temp. sensor
- B6 - Room or extract air humidity sensor
- B7 - Battery frost protection sensor
- Mu - Humidifier On-Off control
- Mv - Fans On-Off control
- Mp - Pump On-Off control
- Rt° - Temperature set point adjuster (optional)
- RH - Humidity set point adjuster (optional)
- Y - Winter heating, summer cooling modulating control

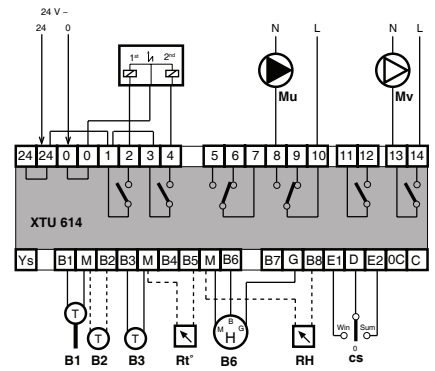


M3.1	M3.2	M3.4	M3.5
Detectors Layout 1 2 3 - 5 6 7 8	Season Switching XXXXXXXXXX	Y : MODULATING Run Time : xx xs	Y : HEATING

**13.3 - 1 Heating On-Off battery  
- 1 Humidifying On-Off unit**



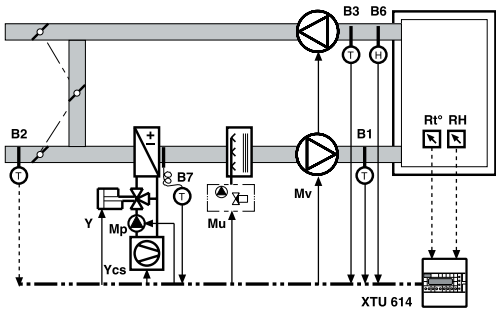
- B1 - Discharge air temp. sensor
- B2 - Outside temp. sensor (for compensation)
- B3 - Room or extract air temp. sensor
- B6 - Room or extract air humidity sensor
- Mu - Humidifier On-Off control
- Mv - Fans On-Off control
- Rt° - Temperature set point adjuster (optional)
- RH - Humidity set point adjuster (optional)
- Y - On-Off heating control



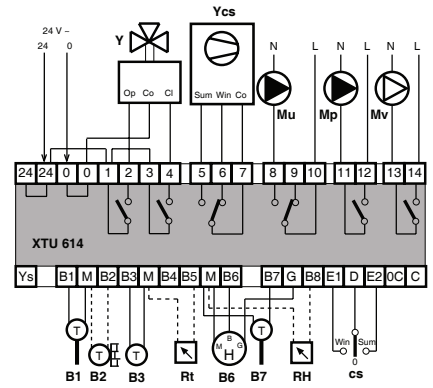
M3.1	M3.2	M3.4	M3.5
Detectors Layout 1 2 3 - 5 6 - 8	Season Switching NO	Y : 2 STAGES	Y : HEATING



**13.4 – 1 Winter heating, summer cooling modulating battery with season switching heat pump  
– 1 Humidifying On-Off unit**

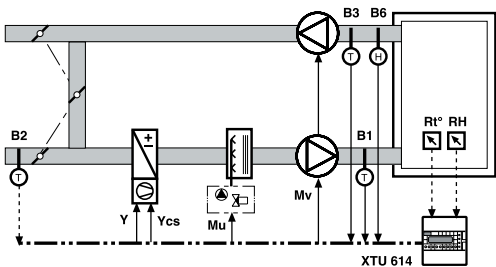


- B1 – Discharge air temp. sensor
- B2 – Outside temp. sensor (for compensation)
- B3 – Room or extract air temp. sensor
- B6 – Room or extract air humidity sensor
- B7 – Battery frost protection sensor
- Mu – Humidifier On-Off control
- Mv – Fans On-Off control
- Y – Modulating control winter heating & summer cooling
- Ycs – Heat pump season control
- Rt – Temperature set point adjuster (optional)
- RH – Humidity set point adjuster (optional)

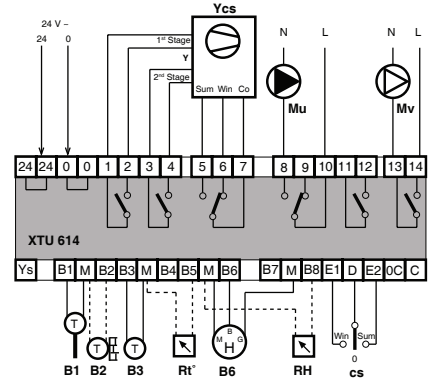


M3.1 Detectors Layout 1 2 3 - 5 6 7 8	M3.2 Season Switching XXXXXXXXXX	M3.4 Y : MODULATING Run Time : xxxs	M3.5 Y -Win: HEATING Y -Sum: COOLING
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**13.5 – 1 Winter heating, summer cooling On-Off battery with heat pump season switching  
– 1 Humidifying On-Off unit**



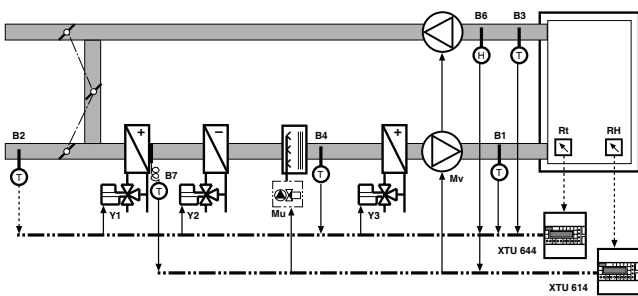
- B1 – Discharge air temp. sensor
- B2 – Outside temp. sensor (for compensation)
- B3 – Room or extract air temp. sensor
- B6 – Room or extract air humidity sensor
- B7 – Frost protection sensor
- Mu – Humidifier On-Off control
- Mv – Fans On-Off control
- Y – Winter heating, summer cooling On-Off control (heat pump)
- Ycs – Heat pump season control
- Rt – Temperature set point adjuster (optional)
- RH – Humidity set point adjuster (optional)



M3.1 Detectors Layout 1 2 3 - 5 6 7 8	M3.2 Season Switching XXXXXXXXXX	M3.4 Y : 2 STAGES	M3.5 Y -Win: HEATING Y -Sum: COOLING
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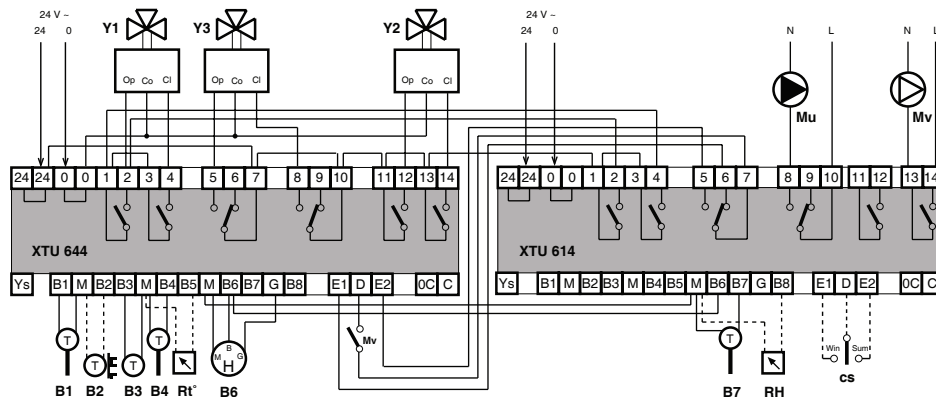
**14. 3 - OR 4 - BATTERY SYSTEM CONTROL (XTU644 + XTU 614) – EXAMPLES**

**14.1 – 1 Winter pre-heating with frost protection control modulating battery  
– 1 Summer cooling/dehumidifying modulating battery  
– 1 post-heating modulating battery  
– 1 Humidifying On-Off unit**



- B1 – Discharge air. temp sensor
- B2 – Outside temp. sensor (for compensation)
- B3 – Room or extract air temp. sensor
- B4 – Pre heating temperature sensor
- B6 – Room or extract air humidity sensor
- B7 – Frost protection sensor
- Mv – Fans
- Mu – Humidifier On-Off control
- Y1 – Winter preheating modulating control
- Y2 – Summer cooling/dehumidifying modulating control
- Y3 – Post-heating modulating control
- Rt – Temperature set point adjuster (optional)
- RH – Dehumidification set point adjuster (optional)

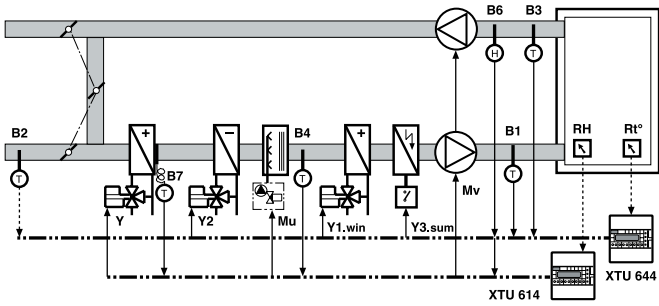
M3.1 Detectors Layout 1 2 3 - 5 6 - -	M3.2 Season Switching FR CONTROL ss	M2.3 Output 8-9-10: CONTROL	M3.3 Use detector B4 PREHEATING	M3.4 Y1: MODULATING Run Time : xx xs	M2.6 Y1-Win: PREHEAT. Y1-Sum: OFF	M2.7 Y2: MODULATING Run Time : xxxs	M2.8 Y2-Win: OFF Y2-Sum: COOL+DEHU	M2.9 Y3: MODULATING Run time : xxxs	M2.10 Y3-Win: HEATING Y3-Sum: HEATING
---	---	-----------------------------------	---------------------------------------	--	---	---	--	---	---



M3.1 Detectors Layout - - - - 6 7 8	M3.2 Season Switching XXXXXXXXXX	M3.4 Y : MODULATING Run Time : xxxs	M3.5 Y -Win: FROSPROT. Y -Sum: OFF
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**14.2 – 1 Winter pre-heating modulating battery with frost protection control**

- 1 Summer cooling/dehumidifying modulating battery
- 1 Winter post-heating modulating battery
- 1 Summer post-heating On-Off battery
- 1 Humidifying On-Off unit



- B1 – Discharge air temp. sensor
- B2 – Outside temp. sensor (for compensation)
- B3 – Room or extract air temp. sensor
- B4 – Pre-heating temperature sensor
- B6 – Room or extract air humidity sensor
- B7 – Frost protection sensor
- Mu – Humidifier On-Off control
- Mv – Fans
- Y – Winter pre-heating modulating control
- Y1win – Winter post-heating modulating control
- Y2 – Summer cooling/dehumidifying modulating control
- Y3sum – Summer post-heating On-Off control
- Rt° – Temperature set point adjuster (optional)
- RH – Dehumidification set point adjuster (optional for humidifying only)

M2.1  
**Detectors Layout**  
1 2 3 - 5 6 - -

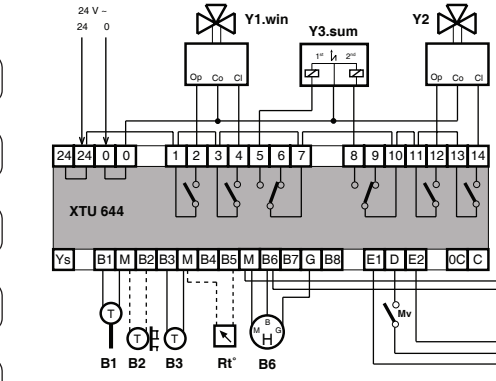
M2.2  
**Season Switching**  
FR CONTROL cs

M2.3  
**Output 8-9-10:**  
CONTROL

M2.5  
**Y1: MODULATING**  
Run time :xxxs

M2.6  
**Y1-Win: HEATING**  
Y1-Sum: OFF

M2.7  
**Y2: MODULATING**  
Run time :xxxs



M2.8  
**Y2-Win: OFF**  
Y2-Sum: COOL+DEHU

M2.9  
**Y3: 2 STAGES**

M2.10  
**Y3-Win: OFF**  
Y3-Sum: HEATING

M3.1  
**Detectors Layout**  
- - - 4 - - 7 8

M3.2  
**Season Switching**  
XXXXXXXXXX

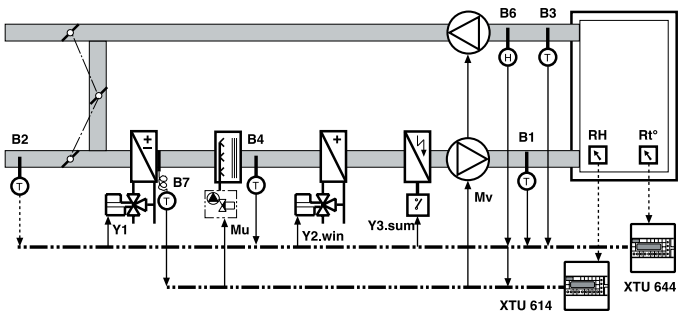
M3.3  
**Use detector B4**  
PREHEATING

M3.4  
**Y : MODULATING**  
Run time :xxxs

M3.5  
**Y -Win: PREHEAT .**  
Y -Sum: OFF

**14.3 – 1 Battery modulating winter pre-heating with frost protection control and summer cooling/dehumidifying**

- 1 Battery winter post-heating modulating
- 1 Battery summer post-heating On-Off
- 1 Humidifying On-Off unit



- B1 – Discharge air temperature sensor
- B2 – Outside temperature sensor (for compensation)
- B3 – Room or extract air temp. sensor
- B4 – Preheating temperature sensor
- B6 – Room or extract air humidity sensor
- B7 – Frost protection sensor
- Mu – Adiabatic humidifier On-Off control
- Mv – Fans
- Y – Winter pre-heating control
- Y1win – Winter post-heating control
- Y2 – Summer cooling/dehumidifying control
- Y3sum – Summer post-heating control
- Rt° – Temperature set point adjuster (optional)
- RH – Dehumidification set point adjuster (optional for humidifying only)

M2.1  
**Detectors Layout**  
1 2 3 - 5 6 - -

M2.2  
**Season Switching**  
FR CONTROL ss

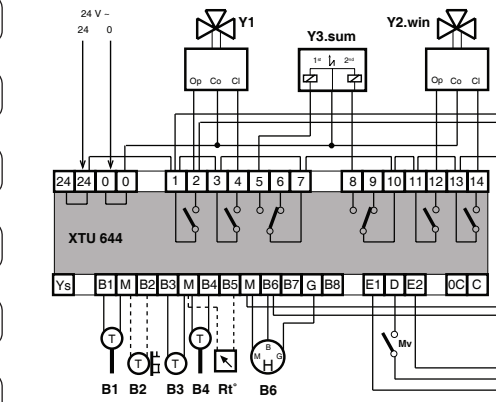
M2.3  
**Output 8-9-10:**  
CONTROL

M2.4  
**Use detector B4**  
PREHEATING

M2.5  
**Y1: MODULATING**  
Run time :xxxs

M2.6  
**Y1-Win: PREHEAT .**  
Y1-Sum: COOL+DEHU

M2.7  
**Y2: MODULATING**  
Run time :xxxs



M2.8  
**Y2-Win: HEATING**  
Y2-Sum: OFF

M2.9  
**Y3: 2 STAGES**

M2.10  
**Y3-Win: OFF**  
Y3-Sum: HEATING

M3.1  
**Detectors Layout**  
- - - - 7 8

M3.2  
**Season Switching**  
XXXXXXXXXX

M3.4  
**Y : MODULATING**  
Run time :xxxs

M3.5  
**Y -Win: FROSTPR .**  
Y -Sum: OFF

**15. OPERATION**

XTU 614 is a microprocessor-based digital controller for temperature and relative humidity control in air handling units composed of:

- 1 unit with 3-wire modulating control, or 1, 2 or 3-stage On-Off control which can be: Pre-heating; Heating; Cooling; Heating with heat pump.
- 1 adiabatic humidification On-Off unit or vapour with 0...10 V- control (as alternative to air-mixing or heat recovery unit
- 1 air mixing or heat recovery unit) with 0...10 V- control (as alternative to vapour humidifier)

To adjust the controller to the site requirements, proceed as follows:

M3.1  
**Detectors Layout**  
 - - - - -

- configure site according to sensors and controls connected.

M3.5  
**Y : HEATING**

- assign to control output Y the action it is required to perform also according to season switching, if applicable.

Y -Win: HEATING  
 Y -Sum: COOLING

**16. TEMPERATURE CONTROL**

Temperature control can operate alternatively with:

M3.1  
**Detectors Layout**  
 - - 3 - - - -  
**Detectors Layout**  
 1 - - - - -  
**Detectors Layout**  
 1 - 3 - - - -

- Room or extract air sensor **B3** only:  
Fixed point control of room heating and cooling temperature
- Discharge air sensor **B1** only:  
Fixed point control of heating and cooling discharge air temperature.
- Room or extract air sensor **B3** and discharge air sensor **B1**:  
Control of heating and cooling discharge air temperature according to deviation of room temperature

**16.1 Desired temperatures**

The desired temperatures for heating and cooling

M3.1  
**Detectors Layout**  
 - - - - 5 - -

Can be entered in 

M0.5
Heat T. Room Desir.: 20.0c±0.0

 and 

M0.7
Cool T. Room Desir.: 25.0c±0.0

 if **B3** or **B1** and **B3** are connected  
 or in 

M0.5
Heat T. Flow Desir.: 20.0c±0.0

 and 

M0.7
Cool T. Flow Desir.: 25.0c±0.0

 if only **B1** is connected

If set point adjuster **Rt°** is connected it is possible to adjust such values remotely. The value of the variation made is shown, in ±°C, next to the values entered.

**16.2 Proportional Band and Integral Time**

Basic temperature control parameters, **Proportional Band and Integral Time**, apply to **heating control** (Room: if **B3** only or **B1 + B3** are connected, or discharge air: if **B1** only is connected) and can be changed in the SETTINGS menu.

M2.1  
**Temper. Room**  
**Prop. Band: ± 2.0c**

The **Proportional Band** parameter (in ± °C) is used for the other temperature settings by means of modifiable **multipliers** that adapt it to the different types of control (Cooling; Pre-heating; Auxiliary heating; Dew point; Air Dampers).

M2.2  
**Temper. Room**  
**Integr. Time: 10m**

Examples of PB multipliers with 

M2.1
Temper. Room Prop.band: ± 2.0c

M3.14  
**Pb Flow** =  
**Pb Room** x 5.0

PB Discharge air (heating) = PB Room (heating) x **5.0** (= ± 10 °C)

M3.15  
**Pb Cooling** =  
**Pb Heating** x 0.5

PB Cooling (room) = PB heating (room) x **0.5** (= ± 1 °C)  
 PB Cooling (Discharge air) = PB heating (Discharge air) x **0.5** (= ± 5 °C)

M3.16  
**Pb Preheating** =  
**Pb HeatFlow** x 1.0  
**Pb Dew point** =  
**Pb HeatRoom** x 1.0

PB Pre-heating = PB Discharge air heating x **1.0** (= ± 10°C)

PB Dew point = PB room heating x **1.0** (= ± 2 °C)

M3.17

**Pb Dampers =**  
**Pb HeatRoom x1.0**  
**dT Recuperator =**  
**Pb HeatRoom x1.0**

PB Air dampers = PB room heating x **1.0** (= ± 2 °C)

PB recuperator = PB room heating x **1.0** (=± 2 °C)

M3.18

**Pb Frostprotect=**  
**Pb HeatFlow x5.0**

PB Frost protection = PB room heating x **1.0** (=± 10°C)

M2.3

**Flow Temperature**  
**Integr. Time: 10m**

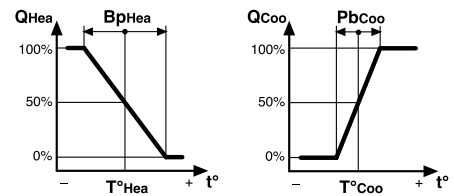
When sensors **B1** and **B3** are connected, the Integral Time parameter of the discharge air temperature (**B1**) is shown on a display page to permit changes to be made to it separately from the room temperature parameter.

**16.3 Control by room detector (B3) only or discharge air detector (B1) only**

The controller compares the values:

<p>M0.5</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Heat T. Room Desir.: 20.0c±0.0</div>	or	<p>M0.7</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Cool T. Room Desir.: 25.0c±0.0</div>	if <b>B3</b> is used
or		<div style="border: 1px solid black; padding: 2px; display: inline-block;">Heat T. Flow Desir.: 20.0c±0.0</div>	or
		<div style="border: 1px solid black; padding: 2px; display: inline-block;">Cool T. Flow Desir.: 25.0c±0.0</div>	if <b>B1</b> is used

with the temperature measured by sensor B1 or B3, and calculates the load values for Heating **QHea** and for Cooling **QCoo** according to the deviations measured.

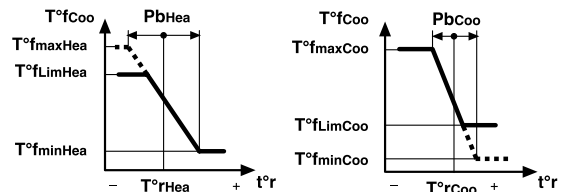


**16.4 Control by room detector (B3) and discharge air detector (B1)**

The controller compares the values:

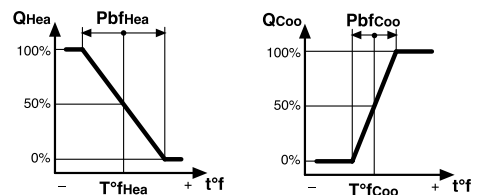
<p>M0.5</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Heat T. Room Desir.: 20.0c±0.0</div>	or	<p>M0.7</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Heat T. Room Desir.: 25.0c±0.0</div>
---	----	---

with the temperature measured by sensor B3, and calculates the desired discharge air temperatures for Heating **T^fHea** and for Cooling **T^fCoo** according to the deviation measured and the values set:



- Min : -- c Max : -- c = minimum and maximum values of Heating discharge air temp. which determine the range of the Proportional Band (**PbHea**.)  
 The minimum value **T^fminHea** helps to eliminate annoying **cold drafts** in the room.
- Min : -- c Max : -- c = minimum and maximum values of Cooling discharge air temp. which determine the range of the Proportional Band **PbCoo**.

The controller compares desired discharge air temperatures for Heating **T^fminHea** and for Cooling **T^fCoo** against the temperature measured by the discharge air detector B1 and derives the load values for Heating **Qhea** and for Cooling **Qcoo** according to the deviations detected.



M2.4  
**Heating Flow**  
**Min: 18c Max: 50c**

M2.6  
**Cooling Flow**  
**Min: 8c Max: 25c**

M2.6 bis  
**Ambient Authority**  
**MinFlowHeat: 0.0c**

When the manipulation of air dampers (**M3.6**) is foreseen the operation is optimised.

If under **Ambient Authority** (**M2.6 bis**) a value other than zero has been set, the controller re-calculates the desired minimum heating flow temperature (**T^fminHea**) at the moment in which the measured room temperature is between **T^fminHea**) at the moment in which the measured room temperature is between **T^Hea** and **T^Coo**

M3.6  
**Ys-Control:**  
**DAMPERS TEMPERAT**

M2.6 bis  
**Ambient Authority**  
**MinFlowHeat: 0.0c**

Example: values set **T^fminHea**: 18°C, **T^Hea**: 20°C, **T^Coo**: 25°C, **Ambient Authority**: 2°C.  
 Operation: for each degree of increase in room temperature between 20°C (**T^Hea**) and 25°C (**T^Coo**), the desired value of minimum flow heating will be decreased by 2°C (**T^fmin Hea**).  
 If Ambient Authority: 0°C the function is excluded

**M2.5**

**Heating Limit Max**  
**Flow-Room : 10c**

To prevent **hot air stratification** during the heating stage it is possible to prevent the heating discharge air temp. **T°fHea** from ever exceeding an established actual room temperature value.

**M2.7**

**Cooling Limit Max**  
**Flow-Room : 7c**

To prevent **condensation in the discharge air duct** during the cooling stage it is possible to prevent the cooling discharge air temp. **T°fCoo** from dropping below the actual room temperature by more than a certain value

**16.5 Operating modes**

**M0.3**

**Current mode :**  
**ON Winter**

The controller can operate in the following modes: – ON Winter; OFF Winter  
– ON Summer; OFF Summer  
– ON ; OFF

depending on: – current season according to setting in **M3.2** (see section 24)  
– Program in use selected in **M0.2** or in **M0.4**  
– Status of season switch **cs** and/or the **c1** control (terminals D-E1-E2).

Examples :

- With **M3.2** **Season Switching NO** mode is: **M0.3** **Current mode : ON**
  - When program in use requires unit to be On
  - When program in use requires unit to be off and switch **c1** (D-E1) is closed.
  
- With **M3.2** **Season Switching WINTER**
  - When Program in use requires unit to be off and switch **c1** (D-E1) is open.
- With **M3.2** **Season Switching FR. OUTSIDE T.** and outside temp. imposes winter operating mode
- With **M3.2** **Season Switching FR. ROOM T.** and room temp. imposes winter operating mode
- With **M3.2** **Season Switching FR. SEASONS** and season periods impose winter operating mode
  - mode is : **M0.3** **Current mode : ON Winter**
    - When Winter Program in use requires unit to be On
    - When Winter Program in use requires unit to be Off and switch **c1** (D-E1) is closed.
  - M0.3** **Current mode : OFF Winter**
    - When winter program in use requires unit to be Off and switch **c1** (D-E1) is open.
- With **M3.2** **Season Switching SUMMER**
  - When summer program in use requires unit to be Off and switch **c1** (D-E1) is closed.
- With **M3.2** **Season Switching FR. OUTSIDE T.** and outside temp. imposes summer operating mode
- With **M3.2** **Season Switching FR. ROOM T.** and room temp. imposes summer operating mode
- With **M3.2** **Season Switching FR. SEASONS** and season periods impose summer operating mode
  - mode is : **M0.3** **Current mode : ON Summer**
    - when summer program in use requires unit to be On
    - when summer program in use requires unit to be Off and switch **c1** (D-E1) is closed.
  - M0.3** **Current mode : OFF Summer**
    - when summer program in use requires unit to be off and switch **c1** (D-E1) is open.
- With **M3.2** **Season Switching FR CONTROL ss** with switch **cs** on winter (D-E1 closed)
  - mode is : **M0.3** **Current mode : ON Winter**
    - When winter program in use requires unit to be On
  - M0.3** **Current mode : OFF Winter**
    - When winter program in use requires unit to be off
- With **M3.2** **Season Switching FR CONTROL ss** with switch **cs** on summer (D-E2 closed)
  - mode is : **M0.3** **Current mode : ON Summer**
    - When summer program in use requires unit to be On
  - M0.3** **Current mode : OFF Summer**
    - When summer program in use requires unit to be off

- M3.2

• With **Season Switching FR CONTROLss+c1** with switch cs on winter (D-E1 closed)

mode is :

M0.3 **Current mode : ON Winter** – When winter program in use requires unit to be On  
 – When winter program in use requires unit to be Off and switch c1 (D-E1) is closed.

M0.3 **Current mode : OFF Winter** – When winter program in use requires unit to be Off and switch c1 (D-E1) is open.
- M3.2

• With **Season Switching FR CONTROLss+c1** with switch cs on summer (D-E2 closed)

mode is :

M0.3 **Current mode : ON Summer** – When summer program in use requires unit to be On  
 – When summer program in use requires unit to be Off and switch c1 (D-E2) is closed.

M0.3 **Current mode : OFF Summer** – When summer program in use requires unit to be Off and switch c1 (D-E2) is open.

**17. OUTSIDE TEMPERATURE COMPENSATION**

Compensation functions are only enabled if the outside sensor B2 is connected. Such functions can be:

- Compensation of desired discharge air heating and cooling temperatures;
- Summer compensation of desired room temperature required by cooling;

Desired temperature adjustment values, resulting from compensation, are displayed in

M0.6 **Flow Heat . T. Compensat . : ±00.0**

M0.8 **Flow Cool . T. Compensat . : ±00.0**

**17.1 Climatic compensation of desired flow Heating and Cooling temperatures**

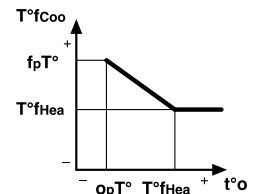
M3.1 **Detectors Layout 1 2 - - - - -**

This function can be used only if sensors **B1** and **B2** are connected and sensor B3 is not connected. It is useful when the primary air system, in addition to ensuring air circulation, also has to provide for external dispersions.

Desired discharge air temperature required by heating **M0.5 Flow Heat . T. Desir . : 20.0c±0.0**

The controller increases desired temp. when outside temperature drops, according to settings:

- Heating Comp. : NO = function disabled  
 YES = function enabled
- Opt : xx c = design outside temp. : winter
- Fpt : xx c = design flow temp. : winter

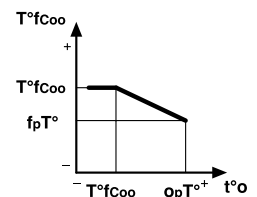


M2.8 **Heating Comp. : NO Ppt : -10c Fpt : 50c**

Desired discharge air temperature required by cooling **M0.7 Flow Cool . T. Desir . : 25.0c±0.0**

The controller decreases desired temp. when outside temperature increases, according to settings:

- Heating Comp. : NO = function disabled  
 YES = function enabled
- Opt : xx c = design outside temp. : summer
- Fpt : xx c = design discharge air temp. : summer



M2.9 **Cooling Comp. : NO Opt : +35c Fpt : 10c**

**17.2 Summer compensation of desired room Cooling temperature**

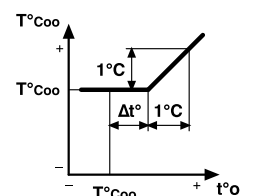
M3.1 **Detectors Layout 1 2 3 - - - - -**

This function can be only used if sensors **B2** and **B3** or **B1**, **B2** and **B3** are connected. It is useful to prevent excessive temp. differences between room and outside.

The controller maintains temp. at a constant level **M0.7 Cool . T. Room Desir . : 25.0c±0.0**

until outside temp. exceeds the value **T°Coo + Δt°**, when this occurs **T°Coo** is increased by 1°C per each °C increase in outside temp.

- Heating Comp.: NO = function disabled  
 YES = function enabled
- Diff. OT-R T : xx c = maximum allowed difference between outside and room temp.



M2.10 **Summer Compen : NO Diff . O . T . R . T : 6c**



**18. RELATIVE HUMIDITY CONTROL**

M3.1

**Detectors Layout**  
- - - - - 6 - 8

The function is only enabled if detector B6 is connected.

M0.9

Desired Humidification and Dehumidification values can be set in:

**Humidification Desir.:50 %±00**

and

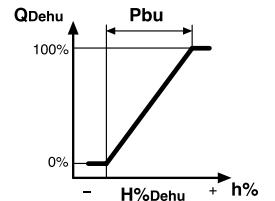
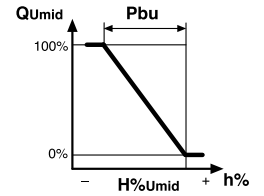
**Dehumidification Desir.:60 %±00**

M0.10

If set point adjuster **R%** is connected, such values can be changed remotely. The value of the change is displayed in ± % next to the set values.

The controller compares the desired values with the relative humidity as measured by sensor **B6**, and calculates the humidification load value **Qhumi** and for Dehumidification **Qdehu** according to deviations and the parameters set:

- Prop. Band: -- . - % = Humidity Proportional Band in %
- Integral time: -- m = Humidity Integral Time in minutes



The Humidification load is always assigned to the **Mu** control output for an adiabatic humidifier On-Off control, and can also be assigned to the **Ys** control output for a 0...10 V- vapour humidifier control. The Dehumidification **Qdehu** load can only be assigned to the **Ys** control output for swimming pool dehumidification with outside air.

M2.11

**RelativeHumidity Prop. Band:± 6.0%**

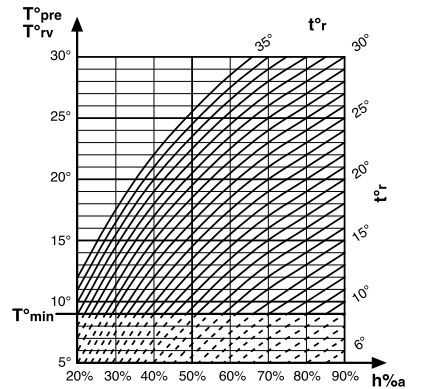
M2.12

**RelativeHumidity Integr. Time: 6m**

**19. PREHEATING OR DEW POINT CONTROL**

The function is enabled only if sensor B4 is connected.. It can be used for :

- PREHEATING = control of pre-heater battery unit according to humidification condensation temperature through duct mounting sensor B4, installed downstream of the humidification unit..
- DEW POINT = De-humification value compensation to limit dew formation on swimming pool windows with sensor B4 in contact with the glass.



M3.1

**Detectors Layout**  
- - - 4 - - - -

M3.3

**Use detector B4 PREHEATING**

**Use detector B4 DEW POINT**

**19.1 Preheating temperature control**

If sensor B3 or sensors B1 and B3 are connected, the controller calculates the pre-heating temp **T°pre** according to the following:

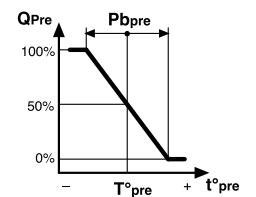
- Condensation curve calculated on the basis of actual room temp. (**t°r**) and room humidity (**h%a**)
- Minimum value set in **M0.12**
- Manual adjustment in **M0.13** if applicable

M0.13

**Preheating T. Calc. :16.0c±0.0**

If only sensor B1 is connected, the controller calculates pre-heating temp. **T°pre** according to the following.

- Minimum value set in **M0.12**
- Manual adjustment in **M0.13** if applicable



The controller compares dew point temp. **T°dp** with the temp. measured by sensor B4, and calculates the load value for preheating **Qpre** according to the deviation detected.

**19.2 Swimming pool windows dew point temperature control**

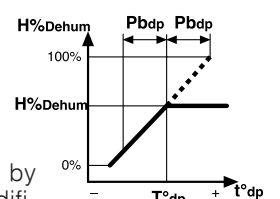
The controller calculates the dew point temp. **T°dp** according to the following:

- Condensation curve calculated on the basis of room temp.( **t°r**) and room humidity ( **h%a**) actual values
- Minimum value set in **M0.12**
- Manual adjustment in **M0.13** if applicable

M0.13

**Dew point T. Calc. :16.0c±0.0**

The controller compares dew point temp. **T°dp** with the temp. measured by sensor B4, and calculates the reduction of the value required for dehumidification **H%Dehu** according to the deviation detected..



M0.11

**Dehumidification Compensat.:±0.0**

**20. FROST PROTECTION TEMPERATURE CONTROL**

M3.1

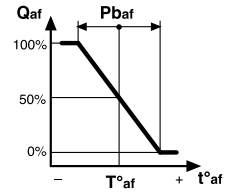
**Detectors Layout**  
- - - - - 7 -

M0.14

**Des. Frostp: 7.0c**  
**Act. Frostp: 35.0c**

The function is enabled only if sensor B7 is connected.

The controller compares the frost protection temp. entered with the temp. measured by sensor B7, and calculates the load value **Qaf** according to the deviation detected and the PI parameters. The **Qaf** load value acts in priority with the **Qpre** load or **Qhea** load (opening pre-heating or heating valve).



If the controller has switched off the **Mp** pump, when the **Qaf** load value exceeds the 10% value the controller turns it on again, and turns it off when it drops to 0%.

If the controller has switched on the **Mv** fan, when the **Qaf** load value reaches the 100% value the controller turns off the **Mv** fan, and cancels the **Ys** air damper control signal (closing); when it drops to 0%, the controller turns on the fan again and restores the air damper control signal.

**21. HEAT PUMP CONTROL**

M3.5

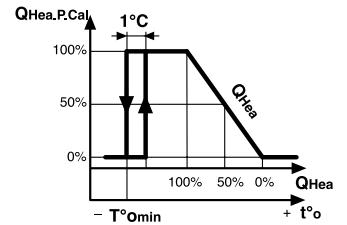
**Y -Win: HEATPUMP**  
**Y -Sum: COOLING**

M2.17

**Minim. Outside T.**  
**Heat.pump : --c**

If the Air Handling Unit is composed of a direct-exchange heat pump, output Y can be assigned the HT.P.HEA. winter function. (diagramma)

The load **QH.pmp** replicates load **Qhea** exactly, the only difference being that when outside temp. drops below the **T°omin** value, the load **QH.pmp** is cancelled.

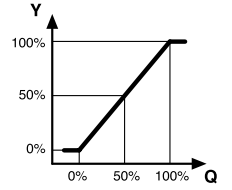


**22. CONTROL OUTPUTS**

**22.1 Control output Y**

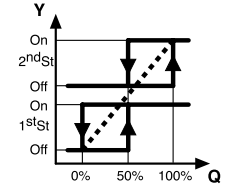
The **Y** outputs can be configured as:

- **Y - MODULATING** = modulating control for 3-wire valves or converters of 3-wire signals into 0...10 V- direct current or step controllers

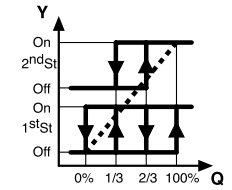


**M3.4**  
**Y - MODULATING**  
 Run time : 120s

**2 STAGES** = 2-stage On-Off control (1 ; 1+2) for solenoid valves, pumps, humidifiers, burners, refrigerators single or two stage heat pumps, 2 equal-load electric batteries, etc.



**3 STAGES** = 3-stage On-Off control (1 ; 2; 1+2) for 2 unequal-load electric batteries.



- Run time: xxx s = valve actuator run time. It only appears if control is MODULATING.

**M3.5**  
**Y : PREHEAT .**  
**Y -Win: PREHEAT .**  
**Y -Sum: OFF**

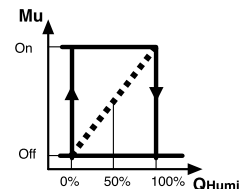
To output **Y** must be assigned the type of action (load) which it must perform. E.g.: Heating. If Season Switching is enabled in **M3.2**, a different action can be assigned for each season. e.g.: Y - Win: Preheating; Y - Sum: Cooling.

- **Y - .....: PREHEAT** = Preheating **QPre**
- HEATING** = Heating **QHea**
- HTP HEA** = Heating through heat pump **QHea.P.Cal**
- COOLING** = Cooling **Qcoo**
- FROSTPROT.** = Frostprotection **Qfrp** (antifreeze control through one valve controlled by another controller)
- OFF** = Not used in current season

**22.2 Mu adiabatic humidifier control output**

Output **Mu** (8-9-10) uses the humidification **Qhumi** load to control the adiabatic humidifier:

- While operating : – when setting is ON (only if the fan control **Mv** is on, and only in Winter if season switching is activated)
- Off : – when setting is OFF  
 – in Summer, if season switching is activated  
 – when setting is ON, if the fan control **Mv** is off, due to antifreeze temperature (B7)



**22.3 Mv fan control output**

The system's fan **Mv** (output 13-14) is:

- On : – when setting is ON  
 Off : – when setting is OFF  
 – when setting is OFF : when, for action of Frosprot temp. (B7), load value **Qfrp** exceeds 10%

**22.4 Mp pump control output**

The system's pump **Mp** (output 11-12) is:

- On : – when setting is ON  
 – when setting is OFF : when load value **Qfrp** exceeds 10%, due to frosprot temperature (B7)
- Off : – when setting is OFF

**23. OUTPUT Ys**

Output **Ys** with 0...10V- control signal is only enabled when the **Mv** fan is operating, and can be used for:

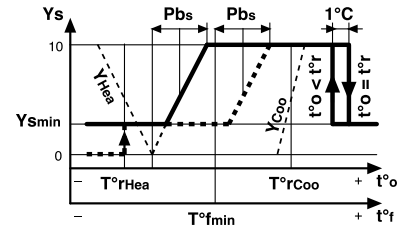
- AIR DAMPERS TEMP. = Control air damper according to temperature
- HUMIDIFICATION = 0...10 V- vapor humidifiers control.
- DEHUMIDIFICATION = Control air damper for room dehumidification (swimming pools)
- RECUPERATOR = Heat recuperator control

M3.1

**23.1 Air damper control based on temperature comparison** Detectors Layout  
- 2 3 - - - - -

M3.6  
**Ys-Control :  
AIR DAMPER**

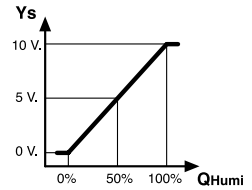
When actual room temperature  $t^r$  exceeds the desired value  $T^rHea$ , the controller starts with PI characteristic the progressive opening of the outside air. When the actual room temp.  $t^r$  exceeds the desired value  $T^rCoo$ , and the outside temperature  $t^o$  exceeds the actual room temperature  $t^r$ , the controller shuts off the outside air by On-Off control.



**23.2 0...10 V- control of vapour humidifiers** Detectors Layout  
- - - - - 6 - -

M3.6  
**Ys-Control :  
HUMIDIFICATION**

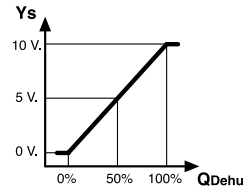
The controller converts the humidification load signal **Qhumi** into the **Ys** output 0...10V- signal to control vapour humidifiers.



**23.3 Air damper control for room dehumidification (swimming pools)** Detectors Layout  
- - - - - 6 - -

M3.6  
**Ys-Control :  
DEHUMIDIFICATION**

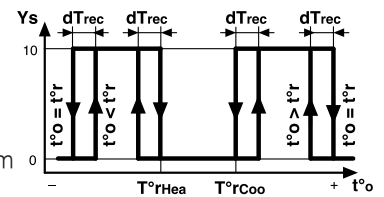
The controller converts the dehumidification load signal **Qdehu** into the **Ys** output 0...10V- signal to control the mixing dampers and to use the outside air to dehumidify the room.



**23.4 Heat recuperator control** Detectors Layout  
- 2 3 - - - - -

M3.6  
**Ys-Control :  
RECUPERATOR**

- The recuperator is off ( $Ys$  signal = 0 V-) when:
- The outside temperature value  $t^o$  is comprised between  $T^rhea$  and  $T^rCoo$ .
- The recuperator is switched on ( $Ys$  signal = 10 V-) when:
- The outside temperature value  $t^o$  is below the actual room temperature  $T^r$  and below the desired value  $T^rHea$ .
  - The outside temperature value  $t^o$  is above the actual room temperature  $T^r$  and above the desired value  $T^rCoo$ .



A signal converter is required to convert the 0...10V- signal into an On-Off control.

**23.5 Minimum discharge air temperature limit**

In the case: M3.6  
Ys-Control :  
DAMP. TEM

When actual discharge air temperature  $t^f$  drops below the minimum discharge air value  $T^fmin$  the controller shuts outside air with a modulating action.

M2.4  
**Heating Flow  
Min: 18c Max: 50c**

**23.6 Minimum outside air**

M2.13  
**Ys-Outside Air  
Minimum : xxx%**

In the cases shown: M3.6  
Ys-Control :  
DAMPERS TEMPERAT M3.6  
Ys-Contro :  
DEHUMIDIFICATION

The minimum amount of outside air required to ensure air circulation can be controlled in two different ways:

- directly through the controller display, or
- using a minimum air positioner **Rs** directly connected to the air damper actuator.

**23.7 Rapid function**

M2.14  
**Ys-RapidFunction  
accensione: SI**

In the cases: M3.6  
Ys-Control :  
DAMP. TEM M3.6  
Ys-Control :  
DEHUMIDIFICATION

If the Rapid Function is enabled, when the controller is switched on (E1-D or E2-D closed) the air dampers remain shut 0% until room temp. returns within the  $T^rHea$  and  $T^rCoo$  target value range.

Rapid Function deletes the value M2.13  
Ys-Outside Air  
Minimum : xxx% but not the setting for the minimum positioner **Rs**.

**24. SEASON SWITCHING**

The controller switches the action of output **Y** and the position of season control **Ycs** depending on the choice: NO; WINTER; SUMMER; BY cs CONTROL; BY cs + c1 CONTROL; AUTOM. BASED ON OUTSIDE TEMP.; AUTOM. BASED ON SEASON;

M3.2  
Season Switching  
NO

- Without season switching :  
– the action of output **Y** is according to setting in M3.5  
Y - :XXXXXXXX  
– season control **Ycs** cannot be used

M3.2  
Season Switching  
WINTER

- Manual season switching through display:  
Winter: – the action of output **Y** is according to setting in M3.5  
Y -Win:XXXXXXXX  
Y -Sum:  
– season control **Ycs** is on Winter: 7-6 = closed; 7-5 = open.

Season Switching  
SUMMER

- Summer : – the action of output **Y** is according to setting in M3.5  
Y -Win :  
Y -Sum:XXXXXXXX  
– season control **Ycs** is on Summer: 7-6 = open; 7-5 = closed.

M3.2  
Season Switching  
FR. CONTROL ss

- Season switching according to position of season switch **cs** (D-E1-E2).  
– with D-E1 closed and D-E2 open: action of output **Y** and season control **Ycs** on Winter  
– with D-E1 open and D-E2 closed: action of output **Y** and season control **Ycs** on Summer  
– with D-E1 open and D-E2 open: control **Y** on **OFF** and season control **Ycs** on last position assumed.

Season Switching  
FR.CONTROL ss+c1

M3.2  
Season Switching  
FR. OUTSIDE T.

- Automatic season switching according to outside temp. (only if B2 is connected).

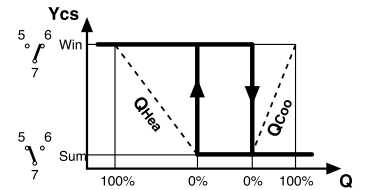
When outside temp. remains lower than M2.15  
OutWinter T. : 20c  
Delay : 24hrs for a period exceeding  
The controller switches the action of output **Y** and season control **Ycs** to Winter

When outside temp. remains lower than M2.16  
OutSummer T. : 25c  
Delay : 4hrs for a period exceeding  
The controller switches the action of output **Y** and season control **Ycs** to Summer

M3.2  
Season Switching  
FR. ROOM T.

- Automatic season switching according to room temp. (only if B3 is connected).

When Heating load value **Qhea** is higher than 0% and the Cooling load value **Qcoo** is 0%, the season control **Ycs** switches to Winter.



When Heating load value **Qhea** is 0% and the Cooling load value **Qcoo** is higher than 0%, the season control **Ycs** switches to Summer.

M3.2  
Season Switching  
FR. SEASONS

- Automatic season switching according to season periods. In this case, the following conditions may occur:

– Successive season periods: M1.19  
Winter Season  
Fr: 15.10 to: 15.04 M1.20  
Summer Season  
Fr: 16.04 to: 14.10

Result: no intermediate periods  
From 15.10 to 15.04 = **Y** control and **Ycs** season switch on Winter  
From 16.04 to 14.10 = **Y** control and **Ycs** season switch on Summer.

– Shortened season periods: M1.19  
Winter Season  
Fr: 15.10 to: 15.04 M1.20  
Summer Season  
Fr: 15.05 to: 15.09

Result: intermediate periods with unit off  
From 15.10 to 15.04 = **Y** control and **Ycs** season switch on Winter  
From 16.04 to 14.05 = **Y** control on OFF and **Ycs** season switch on Winter  
From 15.05 to 15.09 = **Y** control and **Ycs** season switch on Summer  
From 16.09 to 14.10 = **Y** control on OFF and **Ycs** season switch on Summer

– Overlapping season periods: M1.19  
Winter Season  
Fr: 01.09 to: 15.05 M1.20  
Summer Season  
Fr: 15.03 to: 01.11

Result: overlapping periods according to outside temperature  
From 02.11 to 14.03 : = **Y** control and **Ycs** season switch on Winter  
From 16.05 to 31.08 : = **Y** control and **Ycs** season switch on Summer.  
From 15.03 to 15.05 and from 01.09 to 01.11 :

When outside temperature remains below temp. M2.15  
OutSummer T. : 20c  
Delay : 24hrs  
for a period exceeding:  
the controller switches **Y** control and **Ycs** season switch on Winter

when outside temperature stays above Summer Outside Temp. M2.16  
OutSummer T. : 25c  
Delay : 8hrs  
for a period exceeding:  
the controller switches **Y** control and **Ycs** season switch on Summer

## 25. PROGRAMS & PERIODS WITH DATES

XTU 614 can start and shut down the air handling sites using:

- 25 24-hour programs
- 5 7-day programs
- 25 annual periods with dates

### 25.1 Assigning the program

M0.2

Program  
DAILY 1

If Season Switching is not required <sup>M3.2</sup> Season Switching  
NO the program is assigned on a single page

If Season Switching is enabled, the program is assigned on two separate pages, one for the Winter season and one for the Summer season.

M0.2

Program Winter  
DAILY 1

M0.4

Program Summer  
DAILY 1

### 25.2 24-hour programs

M1.1

How many daily  
Programmes ? 1

Set the number of 24-hour programs to be used (1 to 25) in order to eliminate unused display pages.

In each 24-hour program (**24hr 1 ... 24hr 25**) you can enter up a maximum of 6 start times (**h1 ... h6**), assigning to each one of the following modes :

- ON :
  - output **Y** active
  - system fan **Mv** on
  - pump **Mp** on
- OFF :
  - output **Y** closed or off (if On-Off type)
  - system fan **Mv** off
  - pump **Mp** off

M1.2.7

Daily 1hr1 6.00  
ON

Period start times must be entered in increasing order.

Unused times (---) should be deleted by pressing the two + and - keys simultaneously..

No unused times (---) should be left between programmed times.

### 25.3 7-day programs

M1.8

How many weekly  
Programmes ? 1

Enter the number of 7-day programs to be used (1 to 5) in order to eliminate unused display pages.

M1.9

Week 1 : MONDAY  
DAYLY 1

In each 7-day program you can assign to each day of the week one of the programs (24hr 1 ... 25); ON; or OFF.

### 25.4 Annual periods

M1.16

How many annual  
periods ? 0

Each annual period, as defined by the period start and end dates, imposes an operating program that replaces the one currently in use.

At the end of each annual period, the controller restores the normal program.

Enter the number of annual periods to be used, in order to eliminate unused display pages.

M1.17

Prog. Period 1  
OFF

For each annual period, select the program to be used:

- 7-DAY 1...4; 24-HOUR 1...25; ON; OFF

Enter the data for each individual period:

- Per. 01 = selection of available periods
- Start :
  - NO = annual period not used
  - 00 = annual period used; start time midnight
  - 12 = annual period used; start time 12 o'clock noon
- from - - , - - t o - - . - - = day and month start and end of the annual period

For one-day periods set the same date as start and end .

To cancel annual period, press + and - keys simultaneously

### 25.5 Season periods

M1.19

Winter Season  
Fr : - - . - - to : - - . - -

Season periods define the winter and summer seasons.

Enter the day and month of start and end of the winter season.

31.19

Summer Season  
Fr : - - . - - to : - - . - -

Enter the day and month of start and end of the summer season.

To cancel periods, press + and - keys simultaneously

For use of season periods, please see section 24. SEASON SWITCHING

### 25.6 Summer time

M1.21

BST AUT  
Fr : 25.03 to : 27.10

The controller can automatically change the current time of day at the beginning and end of the daylight saving period.

- AUT = The change from BST to GMT and *viceversa* is automatic.
  - MAN = you can set date different from that of European Community
- To cancel the period, press + and - keys simultaneously



**26. COMPLEMENTARY FUNCTIONS**

**26.1 Transmission speed**

M3.11

CBUS speed  
1200 bps

The speed of the communication bus (C-Bus) can be chosen from: 1200, 2400, 4800, 9600 bouds. The speed must be chosen above all on the basis of the other devices on the site and on the type of modem use.

**26.2 Access keynumber**

M3.12

Password choice  
- - - -

Password  
- - - -

Choice and enabling of access keynumber which disables the use of + and – keys and so prevents any change to data. Enter the number (1900...1999) using + and – keys. To cancel the keynumber, press + and - keys at the same time until the dashes re-appear.

When the keynumber is enabled, if you press + or – keys there will appear on the display the request to enter the keynumber.

Only after having entered the exact key number can you use the + and - keys. If for 15 minutes no key is pressed the keynumber is automatically enabled..

**26.3 Site name**

M3.13

Site Name  
- - - - -

Enter name of plant site which appears on first page of display. Using the + and – keys, replace each dash by a letter of the alphabet (A...Z) or by a digit (0...9). The → key serves to position the cursor.

**26.4 Display of values and operating data**

M0.1

Site - - - - -  
Rt : 20.0c H% : 50%

M0.15

Calculated Flow  
Heating T : 22.0c

M0.16

Calculated Flow  
Cooling T : 35.0c

M0.17

Actual Flow  
Temperat. : 20.0c

M0.18

Actual Outside  
Temperat. : - 2.0c

M0.19

Des. Prheat : 15.0c  
Act. Prheat : 15.0c

Des. Dewpnt : 15.0c  
Act. Dewpnt : 15.0c

M0.14

Des. Frostp : 7.0c  
Act. Frostp : 35.0c

M0.20

Y - HEATING : 100%  
Ys - DAMP. TEM: 100%

M0.21

Mu - HUMIDIF. : 100%  
FROSTPR. : 100%

The controller displays all values measured by the sensors as well as all data that help understand the system's operating status:

- Actual room temperature – Rt (if **B3** is connected) or flow temperature – Ft (if only **B1** is connected).
- Actual humidity (if **B6** is connected)
- discharge air temperature calculated by Heating control (if **B3** and **B1** are connected).
- discharge air temperature calculated by Cooling control (if **B3** and **B1** are connected).
- Actual temperature measured by sensor **B1** (only if **B3** and **B1** are connected).
- Actual outside temperature (only if **B2** is connected).
- Preheating desired and actual temperature, only if **B4** is connected and M3.3  
Use detector B4  
PREHEATING
- Dew point desired and actual temperature, only if **B4** is connected and Use detector B4  
DEWPOINT
- Setting of desired battery Frosprot temperature and actual value, only if **B7** is connected
- Output Y load value: Preheat. or Heat. or Ht.P.Hea. or Cool. or Frosprot
- Output Ys load value: DampTemp. or Recuper. or Dehumid.. or Humid.
- Output Mu load value: Humidification
- Battery Frosprot function load value

**26.5 Data recording**

Every hour and with every mode change the controller stores a set of data indicating operating status:

- Current date and time, type of recording (new hour or mode change)
- Current mode: On or Off; current season: Winter or Summer.
- Controller's desired and calculated values
- Values measured by the sensors connected
- Outputs Y and Ys load value.

The controller is able to store 32 complete recordings, and the latest recording causes the oldest to be deleted.

If the display is not on page1, the controller will perform the new hour recordings, but not the mode change recordings, since it assumes that changes are being made to setting data.

Recordings can only be viewed from the Telemanagement computer.

## 27. ALARMS

The controller processes two types of alarm:

- alarms related to functional irregularities affecting the controller (LED 6.11) and the sites controlled (LED 6.10).
- alarms for or short open sensor circuits (LED 6.10)

Alarms are signalled by LEDs located on the controller's front panel and by the word ALARM appearing on the display when the alarm is transmitted to the PC and identified on the configuration page by the letter "A" flashing alternately with the number of the alarm concerned.

With C-Bus connection alarms can be transmitted to a local and/or a central Telemangement PC.

### 27.1 Functional alarms

Functional alarms occur when there is a continuing deviation between actual and desired measurements.

These alarms do not affect the correct operation of the controller.

Factory setting: all alarms disabled except clock alarm (8)

Use + and – keys to enable desired alarms, entering numbers in place of the dashes.

Number flashing = the alarm is on

Alarm limit values and delays in sending alarms can only be changed via PC.

M3.9

**Alarm Function.**  
- - - - 8

Types and reasons of alarms:

- 1** = flow temperature difference (if only B1 is connected)
  - triggered when actual temp. lower than **T°fHea** when Y: Heating or higher than **T°fCoo** when Y..: Cooling
- 3** = room temperature difference (if B3 is connected)
  - triggered when actual temp. lower than **T°rHea** when Y: Heating or higher than **T°rCoo** when Y..: Cooling
- 4** = preheating or dew point temperature difference (if B4 is connected)
  - triggered when actual temp. lower than desired value
- 6** = humidity difference (B4)
  - triggered for actual humidity lower than **H%Humi** when Y: Humidification or higher than **H%Dehu** when Ys: Dehumidification
- 7** = battery Frosprot temp.intervention (B7)
  - enabled in Winter
  - transmitted for Frosprot intervention (Mv off)
- 8** = internal clock cannot be disabled
  - triggered when the clock assumes inconsistent values

### 27.2 Sensor Alarms

M3.10

**Alarms Detectors**  
- - - - -

Sensor alarms are triggered in the event of **short** or **open** sensor circuits.

The effect of alarm situations is delayed by one minute.

Factory setting: al alarms disabled.

Use the + and – keys to enable desired alarms, entering numbers in place of the dashes.

Types and effects of alarms:

- 1** = dscharge air temp.sensor ( B1): valve stops where it is
- 2** = outside temp. sensor ( B2): valve stops where it is
- 3** = room temp. sensor ( B3): valve stops where it is
- 4** = preheating temp. sensor ( B4): valve stops where it is  
dew point sensor ( B4): action cancelled
- 7** = battery frosprot sensor ( B7): fan Mv off, pump Mp on, valve Y open.

## 28. SITE STARTUP TEST

The test must be carried out once installation is completed and the wiring and configuration have been executed and checked.

Using the + and – keys, select:

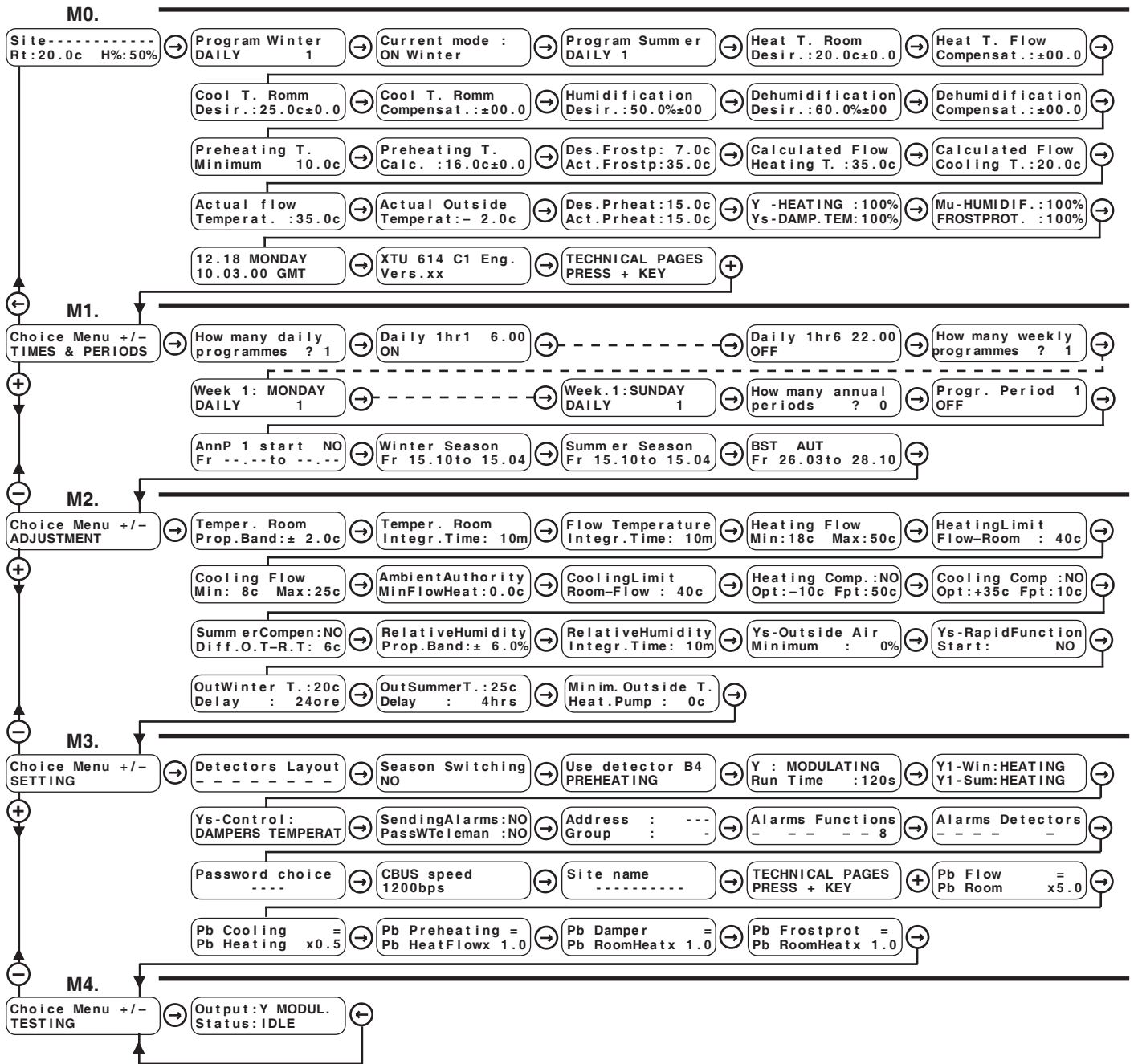
M4.1

**Output: Y MODUL.**  
**Status: IDLE**

- output to be tested: – Y MODUL. or Y 2 STAGES or Y 3 STAGES;  
– Ysc ; – Ys ; – Mu ; – Mp ; – Mv ;
- status : – with Y MODUL. : IDLE ; CLOSES ; OPEN  
– with Y 2 STAGES : ON 1 ; ON 1+2 ; OFF.  
– with Y 3 STAGES : ON 1 ; ON 2 ; ON 1+2 ; OFF.  
– with Y cs : WINTER ; SUMMER  
– with Ys : 0 VOLT ; 5 VOLT ; 10 VOLT.  
– with Mu , Mp , Mv : ON ; OFF.

Check results.

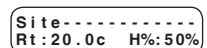
**29. SEQUENCE OF DISPLAY PAGES (data and functions as stored at delivery)**



Use these keys to scroll pages on the display and to position the cursor  on modifiable data in the pages.

In following display pages, modifiable data are highlighted as shown:

Pressing these keys simultaneously, or in any case after 15 minutes, the display returns to page 1



Use these keys to : - modify values indicated by the cursor

- view a given function's configuration options, e.g.:



or



- pass directly from one menu (block of pages) to another

<b>M0. NORMAL USE</b>				
Ref.	Display	Description	Notes	Sect.
M0.1	Site----- Rt : 20.0c H%: 50%	Site name. Actual temperature and humidity	Set in <b>M3.12</b> Rt : If <b>B3</b> is connected Ft: if only <b>B1</b> is connected H% : if <b>B6</b> is connected	26.3
M0.2	Program Winter DAILY 1	Winter program selection: 7 DAY 1...5; 24 HOUR 1...25 ; ON ; OFF.	Winter not displayed if <b>M3.2</b> is NO. In Summer the page is in the <b>M0.4</b> position. YEAR PERIOD 1...25 may be displayed instead of program	16.5
M0.3	Current mode : ON Winter	Current mode : ON ; OFF. ON Winter ; OFF Winter ; ON Summer ; OFF Summer ;	Current mode is determined by program in use, Season Switching ( <b>M2.2</b> ) and output D-E1-E2	16.5
M0.4	Program Summer DAILY 1	Summer program selection: 7 DAY 1...5; 24 HOUR 1...25 ; ON ; OFF.	Summer not displayed if <b>M3.2</b> is NO. In Summer the page is in the <b>M0.2</b> position. ANNUAL PERIOD 1...25 may be displayed instead of program	16.5
M0.5	Heat.T. Room Desir. : 20.0c±0.0	Required heating temperature and adjustment through set point adjuster Rt° (only if configured)	Displayed if <b>B3</b> or <b>B1</b> and <b>B3</b> are connected	16.1
	Heat.T. Flow Desir. : 20.0c±0.0			
M0.6	Flow Heat. T. Compensat. : ±00.0	Compensation of heating temperature as calculated by the controller	Displayed if <b>B1</b> and <b>B2</b> are connected, and <b>B3</b> is not connected	17.
M0.7	Cool.T. Room Desir. : 25.0c±0.0	Required cooling temperature and adjustment through set point adjuster Rt° (if connected)	Displayed if <b>B3</b> or <b>B1</b> and <b>B3</b> are connected	16.1
	Cool.T. Flow Desir. : 25.0c±0.0			
M0.8	Cool.T. Room Compensat. : ±00.0	Compensation of cooling temperature as calculated by the controller	Displayed if <b>B2</b> with <b>B3</b> or <b>B1</b> and <b>B3</b> are connected	17.
	Cool.T. Flow Compensat. : ±00.0			
M0.9	Humidification Desir. : 50 %±00	Required humidifying temperature and adjustment through set point adjuster Rt° (only if configured)	Displayed if <b>B6</b> is connected	18.
M0.10	Dehumidification Desir. : 60 %±00	Required dehumidification value and adjustment through set point adjuster R% (only if configured)	Displayed if <b>B6</b> is connected	18.
M0.11	Dehumidification Compensat. : ±00	Compensation of dehumidification as calculated by the controller	Displayed if <b>B4</b> and <b>B6</b> are connected and if <b>M3.3</b> setting is DEWPOINT	19.2
M0.12	Preheating T. Minimum: 10.0c	Minimum Preheating or Dew Point temperature	Displayed if <b>B4</b> is connected and if <b>M3.3</b> setting is PREHEATING Displayed if <b>B4</b> is connected and if <b>M3.3</b> setting is DEWPOINT	19.1.2
	Dewpoint T. Minimum: 10.0c			
M0.13	Preheating T. Desir. : 16.0c±0.0	Preheating or Dew Point temperature calculated temp. Manual adjustment of calculated value	Displayed if <b>B4</b> is connected, and if <b>M3.3</b> setting is PREHEATING Displayed if <b>B4</b> is connected, and if <b>M3.3</b> setting is DEWPOINT	19.1.2
	Dewpoint T. Desir. : 16.0c±0.0			
M0.14	Des. Frostp: 7.0c Act. Frostp: 35.0c	Desired battery frostprot temperature Temperature measured by frostprot detector B7	Displayed if <b>B7</b> is connected	20.
M0.15	Calculated Flow Heating T. : 35.0c	Controller calculated discharge air temperature for heating	Displayed if <b>B1</b> and <b>B3</b> are connected.	26.3
M0.16	Calculated Flow Cooling T. : 20.0c	Cal Controller calculated discharge air temperature for cooling	Displayed if <b>B1</b> and <b>B3</b> are connected	26.3
M0.17	Actual Flow Temperat. : 35.0c	Actual discharge temp. as measured by B1	Displayed if <b>B1</b> and <b>B3</b> are connected	26.3
M0.18	Actual outside Temperat. : - 2.0c	Actual outside temperature	Displayed if <b>B2</b> is connected	26.3
M0.19	Des. Prheat : 15.0c Act. Prheat : 15.0c	Preheating or Dew Point temperature Des. = calculated temp. + adjustment Act. temp. measured by detector B4	Displayed if <b>B4</b> is connected, and if <b>M3.3</b> setting is PREHEATING Displayed if <b>B4</b> is connected, and if <b>M3.3</b> setting is DEWPOINT	26.3
	Des. Dewpnt : 15.0c Act. Dewpnt : 15.0c			
M0.20	Y -HEATING : 100% Ys -DAMP. TEM: 100%	Output Y load: PREHEAT or HEATING or COOLING or HEATPUMP; or FROSTPROT Output Ys load: DAMP.TEM.or RECUPER or DEHUMIDIF		26.3

<b>M0. NORMAL USE</b>				
Ref.	Display	Description	Notes	Sect.
M0.21	Mu - HUMIDIF. : 100% FROSTPROT. : 100%	Output Mu load: humidification Battery frosprot function load		26.3
M0.22	12.18 MONDAY 10.02.96 GMT	Setting: time of day, day of week and date Current time: GMT, BST (daylight saving time)	Dates for BST (daylight saving time) to be set in <b>M1.21</b>	
M0.23	XTU 614 C1 Eng. Vers.xx	Controller ID data		
<b>M1. TIME SETTINGS AND PERIODS</b>				
Ref.	Display	Description	Notes	Sect.
M1.1	How many daily programmes ? 1	Selection of amount of 24-hour programs to be used (1...25)	Eliminates unused display pages	25.2
M1.2	Daily 1hr1 6.00 ON	Program number, time setting number, and programmed period starting time. Selection of type of mode to be assigned to the period: ON; OFF. <b>Other 6-page groups according to data in M1.1</b>	Max. 6 periods. To eliminate an unused period press + and - simultaneously, display will show - - - - Time settings must be in increasing order. No - - - - should be left among programmed time settings. Modes set are winter modes.	25.2
M1.7	Daily 1hr6 22.00 OFF			
M1.8	How many weekly Programmes ? 0			
M1.9	Week.1: MONDAY DAILY 1	Selection of amount of 7-day programs to be used (0...5)  Winter program selection for the entire year period 1 : 7-DAY 1...5; 24-HOUR 1...25; ON; OFF	Eliminates unused display pages	25.3
M1.15	Week.1: SUNDAY DAILY 1			
M1.16	How many annual periods ? 0			
M1.17	Progr. Period 1 OFF	Program selection for the entire year period 1 : 7-DAY 1...5; 24-HOUR 1...25; ON; OFF <b>Other 6-page groups according to data in M1.16</b>	Displayed only if more than 0 in <b>M1.16</b>	25.4
M1.18	AnnP 01 start NO Fr: - - - - to: - - - -	NO=period not used; 00=starting time midnight; 12=starting time 12 o'clock noon; Year period start and end date <b>Other pages according to selection in M1.16</b>	Displayed only if more than 0 in <b>M1.16</b>	25.4
M1.19	Winter Season Fr: 15.10 to: 15.04	Winter season start and end dates		25.5
M1.20	Summer Season Fr: 15.06 to: 15.09	Summer season start and end dates		25.5
M1.21	BST AUT Fr: 25.03 to: 27.10	Dates of start and end of BST period.		25.6

<b>M2. ADJUSTMENT</b>				
Ref.	Display	Description	Notes	Sect.
M2.1	<b>Temper. Room</b> <b>Prop. Band: ± 2.0c</b> <b>Temper. Flow</b> <b>Prop. Band: ±10.0c</b>	Heating proportional band in ± °C. If <b>B3</b> or <b>B1</b> and <b>B3</b> are configured If only <b>B1</b> is configured	Base value from which controller, using multipliers set in menu CONFIGURATION CONTROLLER derives Prop. Band of the other functions	16.2
M2.2	<b>Temper. Room</b> <b>Integr. Time: 10m</b> <b>Temper. Flow</b> <b>Integr. Time: 10m</b>	Heating and cooling integral time, in minutes	Displayed if <b>B3</b> or <b>B1</b> and <b>B3</b> are connected Displayed if only <b>B1</b> is connected	16.2
M2.3	<b>Flow Temperature</b> <b>Integr. Time: 10m</b>	Heating and cooling integral time, in minutes	Displayed if <b>B1</b> and <b>B3</b> are connected	16.2
M2.4	<b>Heating Flow</b> <b>Min: 18c Max: 50c</b>	Heating discharge air temperature limits Also field of room heating Pb. ( <b>M2.1</b> ).	Displayed if <b>B1</b> and <b>B3</b> are connected	16.4
M2.5	<b>Heating Limit Max</b> <b>Flow-Room : 40c</b>	Discharge air temp. max. limit based on difference between calculated discharge air temp. and actual room temp., to prevent air stratification	Displayed if <b>B1</b> and <b>B3</b> are connected	16.4
M2.6	<b>Cooling Flow</b> <b>Min: 8c Max: 25c</b>	Cooling discharge air temperature limits Also field of room cooling Pb. ( <b>M2.1</b> ).	Displayed if <b>B1</b> and <b>B3</b> are connected	16.4
M2.6 Bis	<b>Ambient Authority</b> <b>MinFlowHeat: 0.0c</b>	Ambient Authority on minimum heating flow temperature		16.4
M2.7	<b>Cooling Limit Max</b> <b>Room-Flow : 40c</b>	Discharge air temp. min. limit based on difference between calculated discharge air temp. and actual room temp., to prevent air condensation	Displayed if <b>B1</b> and <b>B3</b> are connected	16.4
M2.8	<b>Heating Comp.: NO</b> <b>Opt: -10c Fpt: 50c</b>	Climatic variation of summer discharge air temp. Opt = Outside project temp. Fpt = discharge air project temp.	Displayed if <b>B1</b> and <b>B2</b> are connected, and <b>B3</b> is not connected	17.1
M2.9	<b>Cooling Comp.: NO</b> <b>Opt: +35c Fpt: 10c</b>	Climatic variation of summer discharge air temp. Opt = Outside project temp. Fpt = discharge air project temp.	Displayed if <b>B1</b> and <b>B2</b> are connected, and <b>B3</b> is not connected	17.1
M2.10	<b>Summer Compen: NO</b> <b>Diff. O.T-R.T: 06c</b>	Summer compensation: NO; YES Diff. O.T - R.T. = maximum allowed difference between summer outside temp. and desired temp., above which desired temp. is increased by 1°C for each °C increase in outside temp.	Displayed if <b>B2</b> and <b>B3</b> or <b>B1</b> , <b>B2</b> and <b>B3</b> are connected	17.2
M2.11	<b>Relative Humidity</b> <b>Prop. Band: ± 6.0%</b>	Humidification and dehumidification proportional band, in %	Displayed if <b>B6</b> is connected	18.
M2.12	<b>Relative Humidity</b> <b>Integr. Time: 10m</b>	Humidification, dehumidification and dew point integral time, in min.	Displayed if <b>B6</b> is connected	18.
M2.13	<b>Ys-Outside Air</b> <b>Minimum : 0%</b>	Minimum percent opening damper outside air.	Displayed if <b>M3.6</b> setting is DAMP.TEMPERATURE or DEHUMIDIFICATION	23.6
M2.14	<b>Ys-RapidFunction</b> <b>Start : NO</b>	Close outside air during system startup rapid function: YES; NO	Displayed if <b>M3.6</b> setting is DAMP.TEMPERATURE or DEHUMIDIFICATION	23.7
M2.15	<b>OutWinter T.: 20c</b> <b>Delay : 24hrs</b>	Outside temp. for winter switching. Period during which outside temp. must remain lower than the set value before switching to Winter	Displayed if <b>M3.2</b> setting is FR.OUTSIDE T.	24.
M2.16	<b>OutSummer T.: 25c</b> <b>Delay : 4hrs</b>	Outside temp. for summer switching. Period during which outside temp. must remain higher than the set value before switching to Summer	Displayed if <b>M3.2</b> setting is FR.OUTSIDE T.	24.
M2.17	<b>Minim. Outside T.</b> <b>Heat.Pump : + 0c</b>	Outside temp. for heat pump switch-off	Displayed if output Y has been assigned HEATPUMP function	21.



<b>M3. SETTING</b>				
Ref.	Display	Description	Notes	Sect.
M3.1	<b>Detectors Layout</b> - - - - -	Configuration of connected sensors (outputs B-M) - = sensors not connected; number = sensors connected. Default config.: no sensors configured	1 : Flow temp. sensors <b>B1</b> . 2 : Outside temp. sensors <b>B2</b> . 3 : Room or extract air temp. sensors <b>B3</b> . 4 : Preheating or dew point temp. sensors <b>B4</b> . 5 : Temperature set point adjuster <b>Tr°</b> . 6 : Room humidity sensors <b>B6</b> . 7 : Battery frostprotection temperature sensors <b>B7</b> . 8 : Humidity set point adjuster <b>HR</b> .	16.
M3.2	<b>Season Switching</b> NO	Season switching: NO ; WINTER ; SUMMER ; FR CONTROL cs ; FR CONTROL cs+c1 ; FR OUTSIDE T. ; FR ROOM T. ; FR SEASON.		24.
M3.3	<b>Use Detector B4</b> PREHEATING	Use of sensors B4 : PREHEATING ; DEWPOINT	Displayed if <b>B4</b> is connected	19.
M3.4	<b>Y : MODULATING</b> Run time : 120s	Output Y control : MODULATING ; 2 STAGES ; 3 STAGES . Actuator stroke time in seconds	Stroke time: displayed only if MODULATING	22.1
M3.5	<b>Y : HEATING</b>	Output Y action. Displayed if <b>M3.2</b> setting is NO	Select action: PREHEATING.; HEATING ; HEATPUMP; COOLING; FROSPROT; OFF	22.1
	<b>Y -Win: HEATING</b> <b>Y -Sum: HEATING</b>	Output Y action in season periods Displayed if <b>M3.2</b> setting is different from NO		
M3.6	<b>Ys -Control :</b> DAMPERS TEMPERAT	Output Ys action.	Select Type action: DAMPERS TEMPERAT; HUMIDIF.; DEHUMID.; RECUPER	23.
M3.7	<b>Sending Alarms: NO</b> <b>PassWTeleman : NO</b>	Alarm transmission to telemanagement PC enabled. Telemanagement password enabled	Required only if connected through C-Bus	10.4
M3.8	<b>Address :</b> - <b>Group :</b> -	Telemanagement address of controller Controller group	Required only if connected through C-Bus	10.3
M3.9	<b>Alarms Functions</b> - - - - - 8	Function alarms enabled. Default config.: Only alarm # 8 enabled (cannot be disabled)	1 : discharge air alarm <b>B1</b> . 3 : room temp. or extract air alarm <b>B3</b> . 4 : preheating or dew point temperature alarm <b>B4</b> 6 : humidity allarm <b>B6</b> . 7 : battery frostprotection temp. alarm <b>B7</b> . 8 : internal clock alarm	27.1
M3.10	<b>Alarms Dectors</b> - - - - -	Short or open circuit alarms enabled. Default config.: all disabled	1 : flow temp. detector <b>B1</b> . 2 : outside temp. detector <b>B2</b> . 3 : room temp. or extract air detector <b>B3</b> . 4 : preheating or dew point detector <b>B4</b> 7 : battery frosprot temp. alarm <b>B7</b> .	27.2
M3.11	<b>CBUS speed</b> 1200 bps	The speed of the communication bus (C-Bus) can be chosen from: 1200, 2400, 4800, 9600 bouds.		
M3.12	<b>Password choice</b> - - - -	Select password to disable + and - keys: - 1901 ... 1999	To delete key press + and - simultaneously	26.1
M3.13	<b>Site Name</b> - - - - -	Set site name	Use + and - to enter letters or numbers Use ← and → to change positions	26.2
	<b>TECHNICAL PAGES!</b> <b>PRESS + KEY</b>			
M3.14	<b>Pb Flow</b> = <b>Pb Room</b> x5.0	Multiplier to obtain Pbs of flow temp. from room Pbs.	Displayed if <b>B1</b> and <b>B3</b> are connected.	16.2
M3.15	<b>Pb Cooling</b> = <b>Pb Heating</b> x0.5	Multiplier to obtain Pbs of cooling temp. from heating Pbs.	Displayed if output Y has been assigned the function COOLING	16.2
M3.16	<b>Pb Preheating</b> = <b>Pb HeatFlow</b> x1.0	Multiplier to obtain Pb of Preheating temp. from heating flow Pb.	Displayed if <b>B4</b> is connected, and if <b>M3.3</b> setting is PREHEATING	16.2
	<b>Pb Dewpoint</b> = <b>Pb HeatRoom</b> x1.0	Multiplier to obtain Pb of Dew point Control from room heating Pb.	Displayed if <b>B4</b> is connected, and if <b>M3.3</b> setting is DEWPOINT	16.2
M3.17	<b>Pb Dampers</b> = <b>Pb HeatRoom</b> x1.0	Multiplier to obtain Pb of Air Damper Control from room heating Pb.	Displayed if <b>B2</b> and <b>B3</b> and in <b>M3.6</b> setting is DAMP.TEMPERATURE	16.2
	<b>Pb Recuperator</b> = <b>Pb HeatRoom</b> x1.0	Multiplier to obtain Pb of recuperator Control from room heating Pb.	Displayed if <b>B2</b> and <b>B3</b> are connected, and if <b>M3.6</b> setting is RECUPERATOR	16.2
M3.18	<b>Pb Frostprotect</b> = <b>Pb HeatFlow</b> x1.0	Multiplier to obtain Pb of Battery frosprot from flow heating Pb	Displayed if <b>B7</b> is connected	16.2

<b>M4. TESTING</b>				
Ref.	Display	Description	Notes	Sect.
M4.1	<div style="border: 1px solid black; padding: 2px; width: fit-content;"> <b>Output : Y MODUL</b>  <b>Status : IDLE</b> </div>	Select outputs to be tested Select output status	Output selection: Y MODUL. or Y 2 STAGES or Y 3 STAGES; Ycs ; Mu ; Mp ; Mv ; Ys ; Status selection: With Y MODUL : IDLE ; CLOSES ; OPENS. With Y 2 STAGES : ON 1 ; ON 1+2 ; OFF. With Y 3 STAGES : ON 1 ; ON 2 ; ON 1+2 ; OFF. With Ycs : WINTER ; SUMMER. With Mu, Mv : ON ; OFF. With Ys : 0 VOLT ; 5 VOLT ; 10 VOLT	<b>28.</b>

**Amendment to data sheet**

Date	Revision No.	Page	Section	Details of amendments	Firmware version	Software version
25.09.07 AM	<b>01</b>	3 6-10	WIRING DIAGRAM EXAMPLES of CONTROL	The numbers of the terminals shown in the actuators have been eliminated	10	≥ 0.95.2185
01.09.09 VM	<b>02</b>	various 21 12 - 26	various 26.1 transmission speed 16.4 Control with room sensor....	Change to version C1. Added C-Bus speed display, Added Ambient Authority display (M2.6 Bis)	1	≥ 098.2650
22.11.10 VM	<b>03</b>	4	8. Wiring	Wiring procedure modified	1	≥ 098.2650

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