E 123
17.09.01

TEMPERATURE CONTROLLER FOR TWO-BATTERY AIR HANDLING UNIT

C ←BUS

DTA 624 Eng.

- **Temperature control in air handling units**
- **Communication systems:**
  – telemanagement C-Bus
- **24 V ~ power supply; DIN rail mounting**

CE

1. APPLICATION

DTA 624 is designed for temperature control in air handling units composed of:

- 2 hot/chilled water or vapor batteries with 3-wire modulating control
  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 air mixing unit with 0...10 V– air damper actuators
  or 1 heat recuperator with 0...10 V– or On-Off control (CSV 304 converter).

The equipment can be included in a Telemanagement system through the C-Bus connection.

2. OPERATION

The main features of DTA 624 are as follows:

- Two 3-wire modulating outputs or 2-stage On-Off (two equal loads) or 3-stage (two unequal loads) outputs, configurable for:
  – room temperature control (heating or cooling) with summer external compensation if desired, minimum and maximum flow limits to prevent cold drafts.
  – flow temperature control (heating or cooling) with winter and summer compensation if desired
  – pre-heating temperature control at a fixed value
- One 0...10 V– progressive output, configurable for:
  – air mixing control based on temperature comparison or with minimum external air limit
  – heat recuperator On-Off control according to room-external temperature comparison
- 2 pump control On-Off outputs accoring to output load
- Manual seasonal switching from a display or an external switch.
- Remote-controlled temperature setting adjustment
- Alarms for short and open detector circuits and for system and equipment malfunction.

3. ACCESSORIES

No.	Description	Type	Application range	Sensing element	Code	Data sheet
1	Duct flow air temperature detector	**STA 010**	0…60 °C	NTC 10 kΩ	B1	–
1	Duct outside air temperature detector	**STA 001**	–30…+40 °C	NTC 1 kΩ	B2	–
	or wall outside air temperature detector	**SAE 001**	–30…+40 °C	NTC 1 kΩ	B2	–
1	Duct extract air temperature detector	**STA 010**	0…40 °C	NTC 10 kΩ	B3	–
	or room air temperature detector	**SAB 010**	0…40 °C	NTC 10 kΩ	B3	–
1	Duct pre-heating temperature detector	**STA 010**	0…40 °C	NTC 10 kΩ	B4	–
1	Temperature set-point adjuster	**CDB 100**	± 5 °C	–	Rt°	–
1	Outside air minimum distance positioner	**PCS 04**	–	–	Rs	–

4. TECHNICAL DATA (default values in bold print)

• Electrical data

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 Electroth. Committee(CEI)
Data storage period	5 yars
Software	Class A

• Mechanical data

Case	DIN 6E Module
Mounting	DIN 35 rail
Materials:	
base	NYLON
cover	ABS
Room humidity	
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

• Adjustment ranges

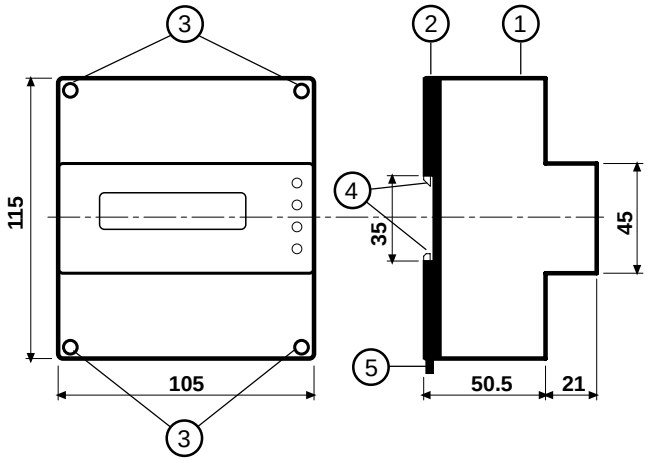
Heating (or cooling) temperatures:	
desired room temp. (B3 or B1+B3)	0…**20** (**25**)…40 °C
desired flow temp. (B1)	0…**20** (**25**)…60 °C
min. flow limit (B1+B3)	1…**18** (**8**)…60 °C
max. flow limit (B1+B3)	1…**50** (**25**)…60 °C
outside default temp. (B1+B2)	–30…**–10** (**35**)…40 °C
flow default temp. (B1+B2)	1…**50** (**10**)…60 °C
summer compensation Te–Ta (B2+B3)	0…**6**…20 °C
Preheating temperature (B4)	0…**10**…40 °C
Temp. proportional band (base value):	
Heating (room)(B3 o B1+B3)	±1…±**2** …±40 °C
Heating flow (B1)	±1…±**10**…±40 °C
Various temp. proportional band multipliers:	
Heating flow(B1+B3)	Bp amb x 0,5…**10**…20
Cooling temperatures	Pb heat x **0,5**…20
preheating (B4)	Pb heat disch x 0,5…**1**…20
Air dampers (B2+B3)	Pb room heat x 0,5…**1**…20
Valve stroke time (modulating)	0…**10**…255 min.
Y1, Y2 output control	– **modulating**
	– 2 stage
	– 3 stage
Valve stroke time (modulating)	30…**120**…630 s
Ys output control	0…10 V–
Season switching:	– manual (display)
	– external control
M1, M2 pump Off control delay	0…**20**…99 min.

• Alarm adjustments

Telemanagement (PC-controlled adjustments)	
Alarm call attempts	1…**5**…255
Alarm call interval	2…**10**…255 m
Alarms (PC-controlled adjustments):	
Disch.temp. diff. threshold (B1)	1…**5**…99 °C
Disch.temp. diff. delay	2…**30**…255 min.
Room temp. diff. threshold (B3)	0,5…**1**…30 °C
Room temp. diff. delay	2…**30**…255 min.
Preheat temp. diff. threshold (B4)	1…**5**…99 °C
Preheat temp. diff. delay (B4)	2…**5**…255 min.

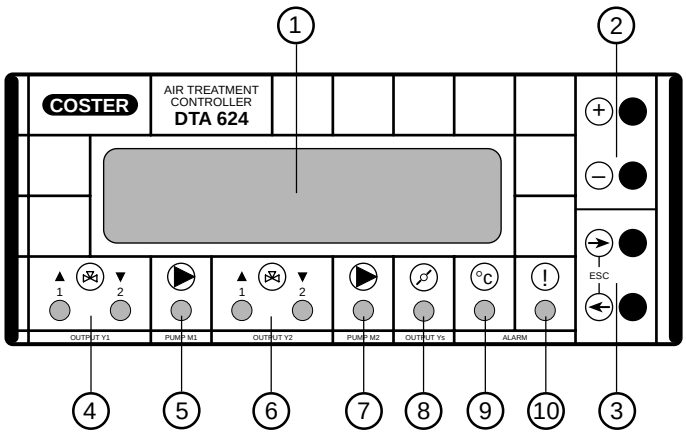
Warning :
In case of static, the equipment's output controls may change settings; original settings will be subsequently restored automatically.

5. OVERALL DIMENSIONS



1 – Electronic component protection cover
2 – Support base with transformer, relays and terminal boards
3 – Screws for securing cover to base
4 – DIN rail securing elements
5 – DIN rail release lever

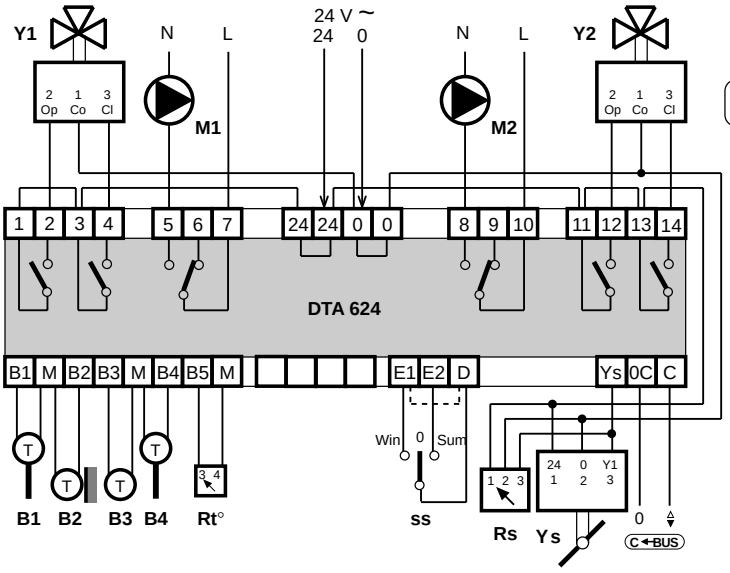
6. FACIA



1 - Alphanumeric display
2 - + and – operating keys
3 - ← and→ operating keys
4 - Y1 output LED
5 - M1 pump LED
6 - Y2 output LED
7 - M2 pump LED
8 - Ys output LED
9 - Measurement alarm LED
10 - Microprocessor malfunction LED

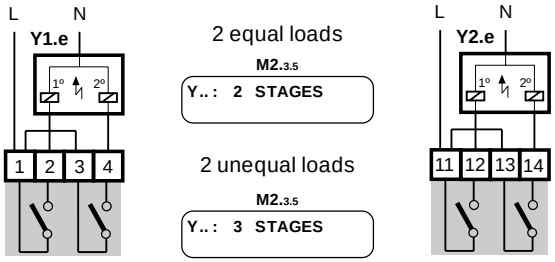
7. WIRING DIAGRAMS

7.1 3-Wire Modulating Valve Control



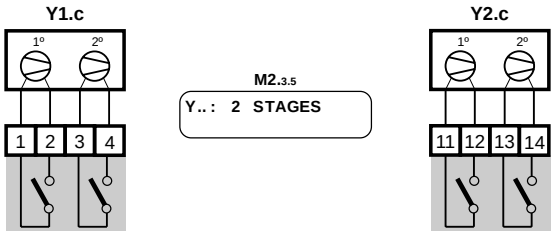
B1 – Flow air temp. detector
B2 – Outside temp. detector
B3 – Room or extract air temp. detector
B4 – Preheating temp. detector
ss – Season switch (eliminate D-E1 link)
Win = Winter, Sum = Summer.
M 1-2 – Pump On-Off control
Y 1-2 – 3-wire modulating controls
Ys – Air dampers or recuperator 0...10V– control
Rt° – Temp. set-point adjuster
Rs – Minimum outside air positioner

7.2 Electric Battery Control



Y1-2.e – Electric batteries

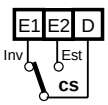
7.3 Direct Expansion Battery Control



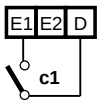
Y1-2.c – Direct expansion batteries (refrigerators)

7.4 Use of D-E1-E2 Outputs – Examples

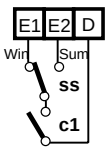
Always On (as supplied)
Possible Season switching (M2.2)modes:
No ; Winter; Summer; Based on Outside Temp.; Based on Room Temp.; Based on Seasons



ss Win = On – Winter
ss Sum = On – Summer
Season switching(M2.2) must be:
through ss control



c1 closed = On; c1 open = Off
Possible Season switching (M2.2) modes:
No ; Winter ; Summer ; Based on Outside Temp.; Based on Room Temp.; Based on Seasons



Ss Win and c1 closed = On - Winter;
ss Sum and c1 open = On – Summer
c1 open = Off
Season switching (M2.2) must be:
through ss control

ss – Control through manual or centralized season switch or through DTU 614-type controller.

c1 – on-off contact through timeswitch or through manual control or through fan relay

8. WIRING

Proceed as follows:
- Separate the base from the cover
- Install the base onto the DIN rail and check that it is properly anchored by the securing elements (5.4)
- Perform the wiring connections as illustrated in the diagram, in compliance with applicable regulations andusing:
  - 1.5 mm² cables for supply voltage and relay control outputs
  - 1 mm² cables for the detectors and remote control
  - 1 mm² cables for the C-Bus. See sheet T 021 for length limits
- Apply power (24 V~) and make sure voltage properly reaches terminals 24 and 0.
- Remove power, re-install the cover onto the base/terminal board, and fasten it with the 4 screws included in the package (5.3).

It is recommended not to insert more than two cables in a single controller terminal. Use external terminals if necessary.

9. WHERE TO PLACE DEVICES

9.1 Controller

The controller should be placed in a dry environment, in compliance with acceptable environment conditions as described under “Technical Data”. If located in environments classified as “hazardous” it should be installed in switchboards built in accordance with applicable regulations depending on hazard class.
The controller may be installed on the board’s bottom on a DIN rail, or in DIN modular boards

9.2 Flow temperature detector B1

B1 must be installed downstream with respect to the flow fan.

9.3 Outside temperature detector B2

STA 001 : It may be used in systems with constant outside air inflow. It must be installed upstream with respect to the outside air dampers near the air intake.
SAE 001 : It should be used in systems where outside air flow is not constant. It must be installed outside the building, on the north or northwest side, at a height of at least 3 m. above the ground, protected from sunshine and away from windows, doors, chimneys or other direct thermal interference.

9.4 Room temperature or extract air detector B3

SAB 010 : environment : It must be installed in a spot that reflects the average temperature of a significant room (e.g. living room) at a height of 1.5...1.6 m. above the floor, on an inside wall away from windows, doors and sources of heat (no alcoves, scaffolds or hangings).
STA 010 : extract air: It should be installed upstream with respect to the extract fan.

9.5 Preheating temperature detector B4

It must be installed downstream with respect to the humidifying unit, preferably downstream of the drop separator.

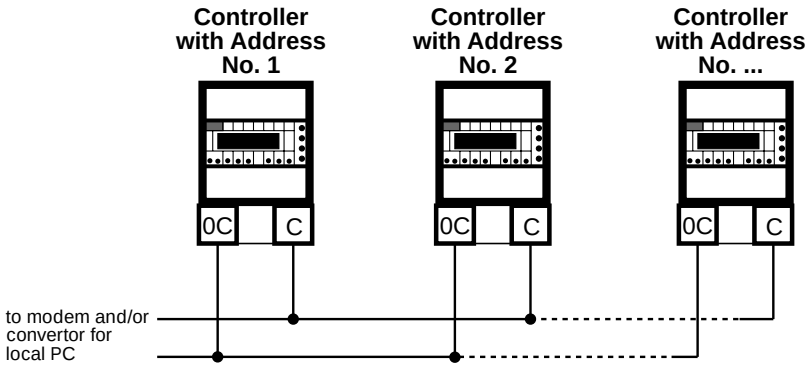
10. COMMUNICATION

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

Through the C-Bus output, DTA 624 can be managed remotely (two-way data communication) by means of 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/or change the following:

- data and value settings on the controller display pages, and configuration data dedicated to telemanagement only (see “Technical Data”)
- system component’s operating status (pumps, accessory in general)
- acquire system-generated alarms
- view detector readings (temperatures: outside, room, flow, etc.)

10.2 C-Bus wiring



10.3 Telemanagement Address

M2.9

Address	:	–
Group	:	–

In telemanagement mode, controllers must have an address sequence number in order to be identified by the central computer or by the local PC(s),.
Additionally, controllers can be subdivided into groups.

Note

When in non-telemanagement mode, the address should be saved (–)
To cancel values, press + and – keys simultaneously.

10.4 Sending Alarms

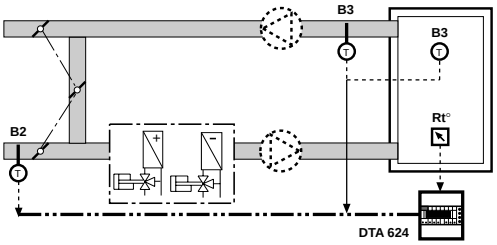
M2.8

Send Alarms	:NO
PassWTeleman	:NO

- **Sending alarms**: NO = No alarms are sent
  YES= Alarms are sent to the central computer
- **Teleman Passw** : NO = Password disabled
  YES= Password enabled

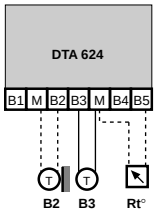
11. TEMPERATURE CONTROL – EXAMPLES

11.1 Room temperature control

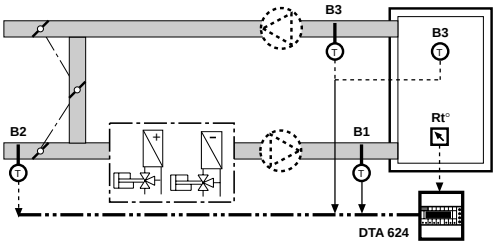


B2 – Outside temp. detector (for compensation only)
B3 – Room or extract temperature detector
Rt° – Temperature set point adjuster (optional)

M2.1
Detectors Layout
– 2 **3** – 5

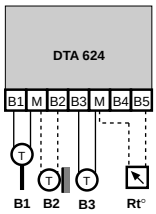


11.2 Room temperature control with flow temperature limits

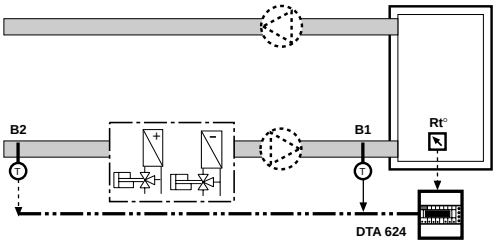


B1 – Flow temperature detector
B2 – Outside temperature detector (for compensation only)
B3 – Room or extract temperature detector
Rt° – Temperature set point adjuster (optional)

M2.1
Detectors Layout
1 2 **3** – 5

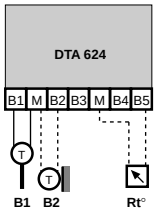


11.3 Flow temperature control



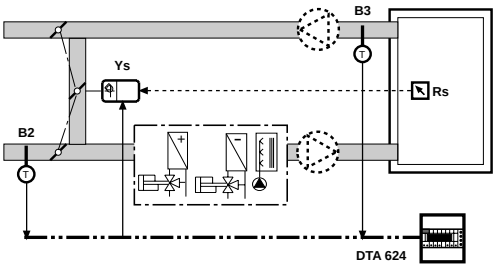
B1 – Flow temp. detector
B2 – Outside temperature detector (for compensation only)
Rt° – Temperature set point adjuster (optional)

M2.1
Detectors Layout
1 2 – – 5



12. USE OF Ys OUTPUT– EXAMPLES

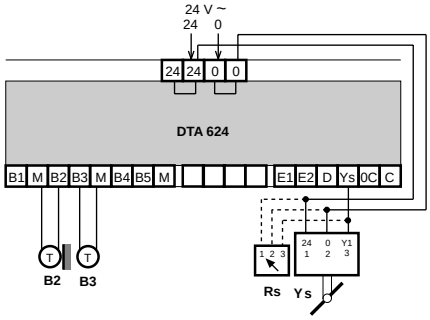
12.1 Temperature comparison air damper optimization



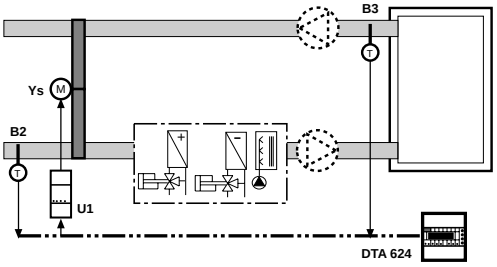
B2 – Outside temperature detector
B3 – Room or extract temperature detector
Ys – Progressive air damper control
Rs – Outside air min. distance positioner (optional)

M2.1
Detectors Layout
– **2 3** – – – – –

M2.7
Ys - Control :
DAMP. TEMPERATURE



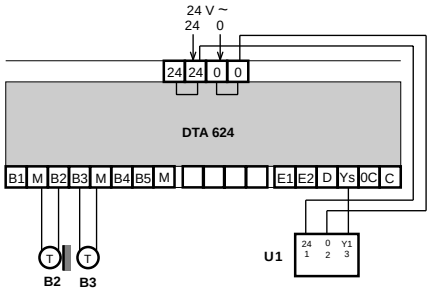
12.2 Heat recuperator On-Off control



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

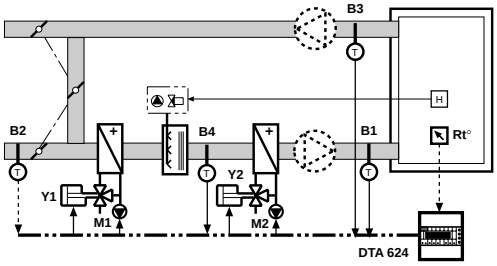
M2.1
Detectors Layout
– **2 3** – – – – –

M2.7
Ys - Control :
RECUPERATOR

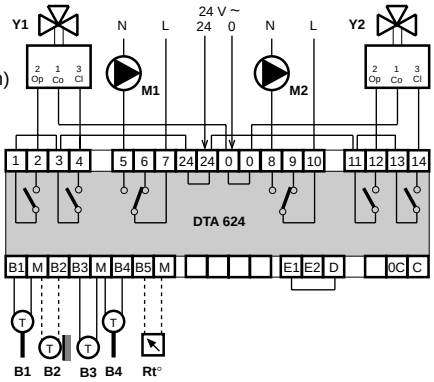


13. USE OF Y1, Y2 OUTPUT – EXAMPLES

13.1 – 1 Preheating modulating battery
– 1 Post-heating modulating battery
– 1 Humidifying On-Off unit (controlled from outside the controller)



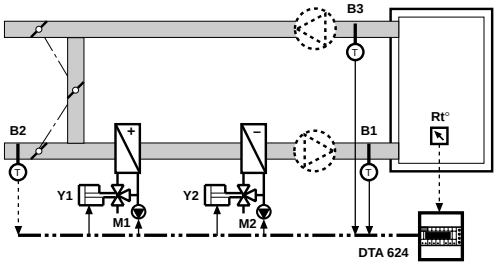
B1 – Flow temp. detector
B2 – Outsidetemperature detector (for compensation)
B3 – Room or extract temperature detector
B4 – Pre-heating temperature detector
M1 – Pre-heating pump
M2 – Post-heating pump
Rt° – Temperature set point adjuster (optional)
Y1 – Heating modulating control
Y2 – Cooling modulating control



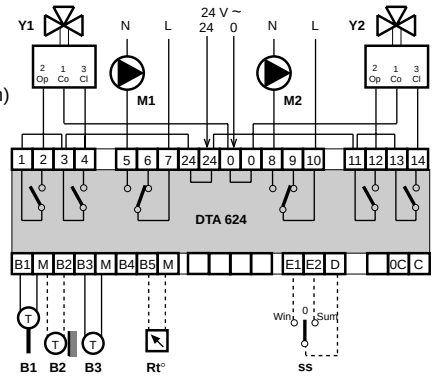
M2.1	M2.2
Detectors Layout 1 2 3 4 5	Season switching NO

M2.3	M2.4	M2.5	M2.6
Y1: MODULATING Run Time:xxxs	Y1:PREHEATING	Y2: MODULATING Run Time :xxxs	Y2:HEATING

13.2 – 1 Heating modulating battery
– 1 Cooling modulating battery



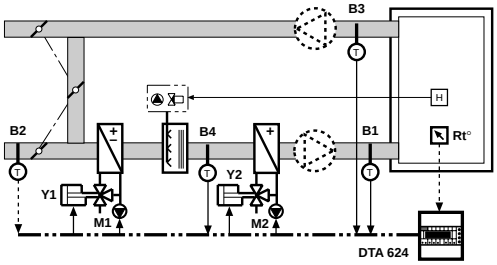
B1 – Flow temperature detector
B2 – Outside temperature detector (for compensation)
B3 – Room or extract temperature detector
M1 – Heating pump
M2 – Cooling pump
Rt° – Temperature set point adjuster (optional)
Y1 – Heating modulating control
Y2 – Cooling modulating control



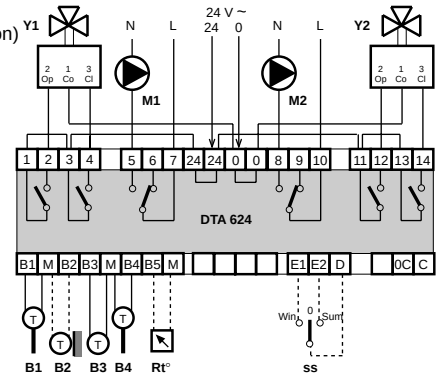
M2.1	M2.2
Detectors Layout 1 2 3 4 5	Season switching NO

M2.3	M2.4	M2.5	M2.6
Y1: MODULATING Run Time :xxxs	Y1:HEATING	Y2: MODULATING Run Time:xxxs	Y2:COOLING

13.3 – 1 Winter pre-heating, summer cooling modulating battery
– 1 Winter post-heating modulating battery
– 1 Humidifying On-Off unit (controlled from outside the controller)



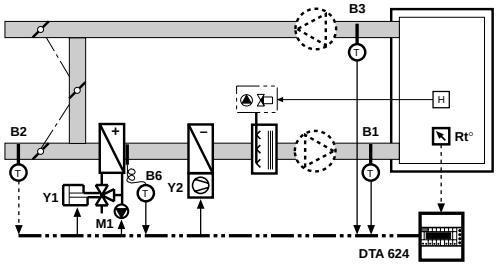
B1 – Flow temperature detector
B2 – Outside temperature detector (for compensation)
B3 – Room or extract temperature detector
B4 – Winter pre-heating temperature detector
M1 – Winter pre-heating, summer cooling pump
M2 – Winter post-heating pump
Rt° – Temperature set point adjuster (optional)
Y1 – Winter pre-heating, summer cooling modulating control
Y2 – Winter post-heating modulating control



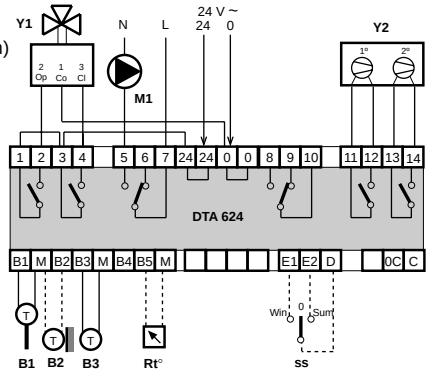
M2.1	M2.2
Detectors Layout 1 2 3 4 5	Season switching: XXXXXXXXX

M2.3	M2.4	M2.5	M2.6
Y1: MODULATING Run Time:xxxs	Y1-Win:PREHEAT. Y1-Sum:COOLING	Y1: MODULATING Run Time:xxxs	Y2-Win:HEATING Y2-Sum:OFF

13.4 – 1 Winter heating modulating battery
– 1 Summer cooling direct expansion On-Off battery
– 1 Humidifying On-Off unit (controlled from outside the controller)

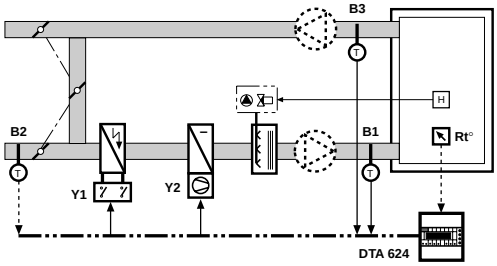


B1 – Flow temperature detector
B2 – Outside temperature detector (for compensation)
B3 – Room or extract temperature detector
M1 – Heating pump
Rt° – Temperature set point adjuster (optional)
Y1 – Winter heating modulating control
Y2 – Summer heating On-Off control

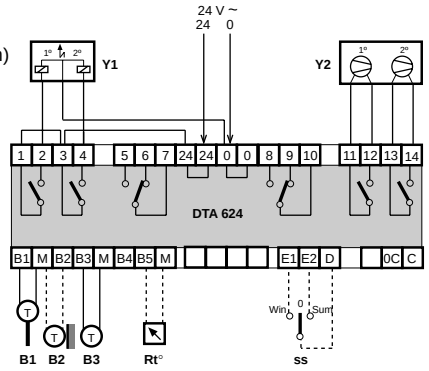


M2.1	M2.2	M2.3	M2.4	M2.5	M2.6
Detectors Layout 1 2 3 – 5	Season switching XXXXXXXXX	Y1: MODULATING Run time :xxxs	Y1-Win:HEATING Y1-Sum:OFF	Y2: 2 STAGES	Y2-Win:OFF Y2-Sum:COOLING

13.5 – 1 Winter heating electric On-Off battery
– 1 Summer cooling direct expansion On-Off battery
– 1 Humidifying On-Off unit (controlled from outside the controller)



B1 – Flow temperature detector
B2 – Outside temperature detector (for compensation)
B3 – Room or extract temperature detector
M1 – Heating pump
Rt° – Temperature set point adjuster (optional)
Y1 – Winter heating On/Off control
Y2 – Summer cooling On-Off control



M2.1	M2.2	M2.3	M2.4	M2.5	M2.6
Detectors Layout 1 2 3 – 5	Season switching XXXXXXXXX	Y1: 2 STAGES	Y1-Win:HEATING Y1-Sum:OFF	Y2: 2 STAGES	Y2-Win:OFF Y2-Sum:COOLING

14. OPERATION

DTA 624 is a microprocessor-operated digital controller for temperature control in air handling units composed of: 2 units with 3-wire or 1, 2 or 3-stage On-Off modulating control.
The units can have the following functions: Preheating; Heating; Cooling.

M2.1
```
Detectors Layout
– – – – –
```

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

– configure system according to connected detectors and controls

M2.4.6
```
Y..     : HEATING
```
```
Y..-Win: HEATING
Y..-Sum: COOLING
```

– assign control outputs Y1, Y2 and Y3 the action they are to perform also according to season switching, if applicable.

15. TEMPERATURE CONTROL

M2.1
```
Detectors Layout
– – 3 – – –
```
```
Detectors Layout
1 – – – – –
```
```
Detectors Layout
1 – 3 – – –
```

Temperature control can operate either with:

- Room or extract air detector B3 only:
  Fixed point room Heating and Cooling temperature control, or:
- Discharge air detector B1 only:
  Fixed point flow Heating and Cooling temperature control, or:
- Room or extract air detector B3 and discharge air detector B1:
  Flow Heating and Cooling temperature control according to room temperature deviation

15.1 Desired temperatures

Desired temperatures for heating and cooling

M0.3 / M0.5

Can be set in `Heat.T. Room Desir.:20.0c±0.0` and `Cool.T. Room Desir.:25.0c±0.0` if B3 or B1 and B3 are connected

or in `Heat.T. Flow Desir.:20.0c±0.0` and `Heat.T. Flow Desir.:25.0c±0.0` if only B1 is connected

M2.1
```
Detectors Layout
– – – – 5
```

If the set point adjuster Rt° is connected, these values can be changed remotely. The value of the change expressed in ± °C is displayed next to the set values.

15.2 Proportional band and Integral Time

M1.1
```
Temper. Room
Prop.Band:± 2.0c
```

Basic temperature control parameters, **Proportional Band** and **Integral Time**, refer to **heating** control (Room*:* if B3 only or B1 + B3 are connected, or Flow*:* if B1 only is connected) and can be changed through the ADJUSTMENT menu.

M1.2
```
Temper. Room
Integr.Time: 10m
```

The Proportional Band parameter (in ± °C) is used for other temperature settings through modifiable multipliers that adapt it to the different types of controls (Cooling; Preheating; Air Damper).

M1.1
```
Temper. Room
Prop.Band : 2.0c
```

Examples of PB multipliers with

M2.14
```
Pb Flow      =
Pb Room   x5.0
```

Pb Flow (heating) = Pb Room (heating) x **5.0** (= ±10 °C)

M2.15
```
Pb Cooling   =
Pb Heating x0.5
```

Pb Cooling (room) = Pb heating (room) x **0.5** (= ±1 °C)
Pb Cooling (flow) = Pb room heating x **0.5** (= ±5 °C)

M2.16
```
Pb Preheating  =
Pb HeatFlow x1.0
```

Pb Preheating = Pb flow heating x **1.0** (= ±10 °C)

M2.17
```
Pb Dampers     =
Pb HeatRoom x1.0
```

Pb Air damper= Pb room heating x **1.0** (= ±2 °C)

```
dt Recuperator =
Pb HeatRoom x1.0
```

dT recuperator = Pb room heatingx **1.0** (= 2 °C)

M1.3
```
Flow Temperature
Integr.Time: 10m
```

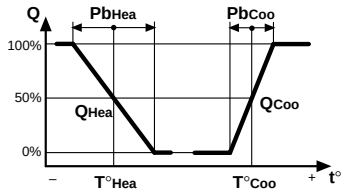
When detectors **B1** and **B3** are connected, the flow temperature (B1) *Integral Time* parameter is displayed on a display page to allow for changes to be made separately from the room temperature parameter.

15.3 Control through room detector (B3) only or discharge air detector (B1) only

The controller compares the values M0.3 `Heat.T.Room Desir.:20.0c±0.0` and M0.5 `Cool.T. Room Desir.:25.0c±0.0` if B3 is used

or M0.3 `Heat.T.Flow Desir.:20.0c±0.0` and M0.5 `Cool.T. Flow Desir.:25.0c±0.0` if B1 is used

against the temperature measured by detector B1 or B3, and calculates the load values for Heating **QHea** and for Cooling **QCoo** according to the deviation measured.



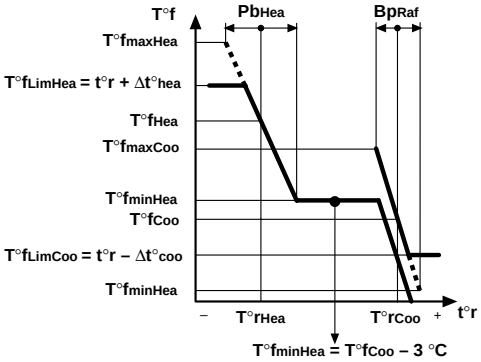
15.4 Control through room detector (B3) and discharge air detector (B1)

The controller compares the values: M0.3 `Heat.T.Room Desir.:20.0c±0.0` and M0.5 `Cool.T. Room Desir.:25.0c±0.0`

against the temperature measured by detector B3, and calculates the load values for *desired* flow temperatures for Heating **T°fHea** and for Cooling **T°fCoo** according to the deviation measured and values set:

M1.4 `Heating Flow Min:18c Max:50c`

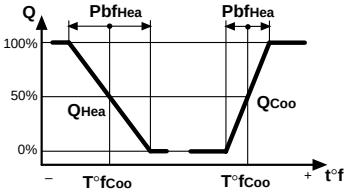
- Min : – – c Max : – – c = Heating flow temp. min and max values determine the **PbHea** proportional band's range.
  The minimum value **T°fminHea** helps eliminate annoying **cold drafts** in the room. To prevent heating and cooling simultaneousness, the minimum value **T°fminHea** is always 3°C lower than Cooling flow temperature **T°fCoo.**



M1.5 `Cooling Flow Min: 8c Max:25c`

- Min : – – c Max : – – c = Cooling flow temp. min and max values determine the **PbCoo** proportional band's range.

The controller compares desired flow temperatures for Heating **T°minHea** and for Cooling **T°fCoo** against the temperature measured by the discharge air detector B1and derives the load values for Heating **Qhea** and for Cooling **Qcoo** according to the deviations detected.



15.5 Operating modes

M0.2 `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 M2.2 `Season Switching XXXXXXXXX` (see paragraph 24).
– status of season switching (**ss)** and/or the control **c1** (terminals D-E1-E2).

Examples :

- With M2.2 `Season Switching NO` mode is : ON – when contact c1 (D-E1) is closed
  OFF – when contact c1 (D-E1) is open
- With M2.2 `Season Switching WINTER` mode is : ON winter – when contact c1 (D-E1) is closed
  OFF winter – when contact c1 (D-E1) is open
- With M2.2 `Season Switching SUMMER` mode is : ON Summer – when contact c1 (D-E1) is closed
  OFF Summer – when contact c1 (D-E1) is open
- With M2.2 `Season Switching FR CONTROL ss` with ss contact on Winter (D-E1 closed)
  mode is : ON Winter - when contact c1 (D-E1) is closed
  OFF Winter - when contact c1 (D-E1) is open
- With M2.2 `Season Switching FR CONTROL ss` with ss contact on Summer (D-E2 closed)
  mode is : ON Summer - when contact c1 (D-E2) is closed
  OFF Summer - when contact c1 (D-E1) is open

16. OUTSIDE COMPENSATION OF TEMPERATURE

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

M0.4
```
Flow Heat T.
Compensat :±00.0
```
M0.6
```
Flow Cool T.
Compensat :±00.0
```

- Compensation of desired flow Heating and Cooling temperatures;

M0.6
```
Cool T. Room
Compensat.:±00.0
```

- Summer compensation of desired room or flow Cooling temperatures;

16.1 Compensation of desired flow Heating and Cooling temperatures

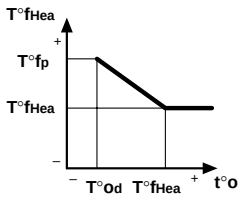
M2.1
```
Season Switching
1 2 – – –
```

This function can only be used if detectors B1 and B2 are connected, and Detector B3 is not connected. It is useful when the primary air system, in addition to ensuring air circulation, is also intended to make up for ambient dispersion.

Desired flow Heating temperature

M0.3
```
Heat T. Flow
Desir.:20.0c±0.0
```

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



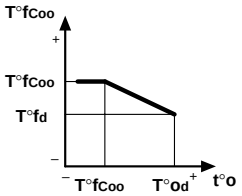
M1.6
```
Heating Comp.:NO
Opt:–10c Fpt:50c
```

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

Desired flow Cooling temperature

M0.5
```
Cool T. Flow
Desir.:25.0c±0.0
```

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



M1.7
```
Cooling Comp.:NO
Opt:+35c Fpt:10c
```

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

16.2 Summer compensation of desired room Cooling temperature

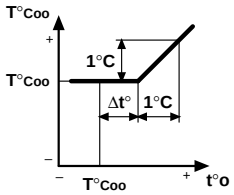
M2.1
```
Season Switching
1 2 3 – – –
```

This function can only be used if detectors 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

M0.5
```
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.



M1.8
```
Summer Compen:NO
Diff. T-R.T : 6c
```

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

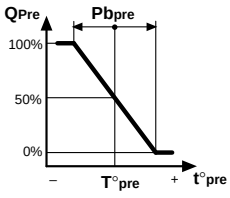
17. PREHEATING TEMPERATURE CONTROL

M2.1
```
Season Switching
– – – 4 –
```

The function is only enabled if detector B4 is connected. It can be used for the following purposes:

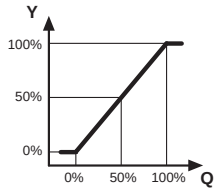
M0.7
```
Preheating T.
Desir. : 18.0c
```

The controller compares preheating temp. **T°pre** with the temp. measured by detector B4, and calculates the load value for Preheating **Qpre** according to deviation detected.

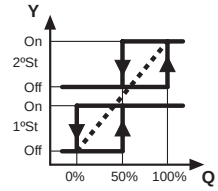


18. OUTPUT Y1, Y2

Outputs **Y1** and **Y2** can be configured as:



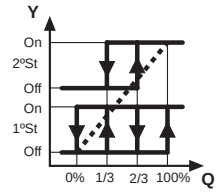
- Y.. - MODULATING = modulating control for 3-wire valves or 3-wire signal converters into 0...10 V- or step controllers.



2 STAGE = 2-stage On-Off control (1 ; 1+2) for solenoid valves, pumps, humidifiers, burners, refrigerators, 2 equal-load electric batteries, etc.

M2.3.5

Y.. - MODULATING
Run Time :120s



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

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

Each output can be assigned a different action (load). E.g.: Y1: Heating.
If Season Switching is enabled in **M2.2**, a different action can be assigned for each season. E.g.: Y1 – Win: Heating; Y1 – Sum: Cooling.

M2.4

Y1: HEATING

Y1-Win: HEATING
Y1-Sum: HEATING

- Y1 - .....: PREHEAT = Preheating (only if B4 is configured)
  HEATING = Heating
  COOLING = Cooling
  OFF = Not used in current season

M2.6

Y2: COOLING

Y2-Win: COOLING
Y2-Sum: COOLING

- Y2 - .....: PREHEAT = Preheating (only if B4 is configured)
  HEATING = Heating
  COOLING = Cooling
  OFF = Not used in current season

19. OUTPUT Ys

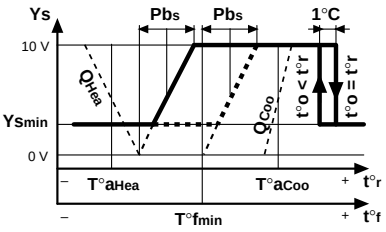
Output **Ys** with 0...10 V– control signal can be used for:

- AIR DAMPER TEMP. = Temp. comparison air damper control
  RECUPERATOR = Heat recuperator control

19.1 Air damper control through temperature comparison

M2.7
Ys-Control :
DAMP. TEMPERATURE

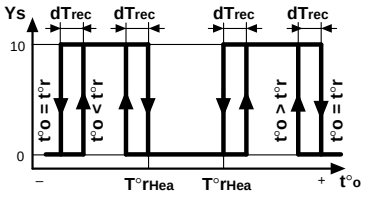
Whenever actual outside temperature t°r exceeds the target T°rHea value, the controller starts the progressive opening of outside air through the PI feature.
Whenever actual outside temperature t°r exceeds the target T°rCoo value, and outside temperature t°o exceeds actual room temperature t°r, the controller shuts outside air through the On-Off control.



19.2 Heat recuperator control

M2.7
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 on (Ys signal = 10 V–) when:
– The outside temperature value t°o is lower than actual room temperature T°r and lower than the target T°rHea value.
– The outside temperature value t°o is higher than actual room temperature T°r and higher than the target T°rCoo value.



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

19.3 Minimum flow temperature limit

In the case shown : M2.7 Ys-Control : DAMP. TEMPERATURE

When actual flow temperature t°f drops below the minimum flow value **T°fmin** the controller shuts off outside air with a modulating action.

M1.4
Heating Flow
Min:18c Max:50c

19.4 Minimum outside air

In the case shown : M2.7 Ys-Control : DAMP. TEMPERATURE

M1.9
Ys-Outside air
Minimum : *xxx*%

The minimum amount of outside air required to ensure air circulation can be controlled in two different ways:
– directly through the controller display
– using a minimum air positioner **Rs** directly connected to the air damper actuator.

20. SEASON SWITCHING

The controller switches the action of outputs **Y1** and **Y2** depending on selection:

- Season switching : NO ;
  WINTER;
  SUMMER;
  THROUGH cs CONTROL;

M2.2
Season Switching
NO

- Without season switching :
  – the action of outputs **Y1**, **Y2** is according to setting in

M2.4.6
Y.. - :XXXXXXXX

  – output D-E1 can be used for Remote Control On-Off
  with D-E1 closed: outputs **Y1**, **Y2** controlling
  with D-E1 open: outputs **Y1**, **Y2** closing

M2.2
Season Switching
WINTER

- Manual season switching through display:

Winter : – the action of outputs **Y1**, **Y2** is according to setting in

M2.4.6
Y.. -Win :XXXXXXXX
Y.. - Sum:

M2.2
Season Switching
SUMMER

Summer : – the action of outputs **Y1**, **Y2** is according to setting in

M2.4.6
Y.. -Win :
Y.. - Sum:XXXXXXXX

M2.2
Season Switching
FR CONTROL ss

- Season switching according to position of season switch **ss** (D-E1-E2).
  – with D-E1 closed and D-E2 open: action of outputs **Y1**, **Y2** to Winter
  – with D-E1 open and D-E2 closed: action of outputs **Y1**, **Y2** to Summer

21. M1, M2 PUMP CONTROLS

The controller controls **M1** pump output depending on control output **Y1** load, and **M2** pump output depending on control output **Y2** load:

– Pump on with load over 0%
– Pump off with load equal to 0 after delay time

M1.10

```
Delay Off M1:xxm
Delay Off M2:xxm
```

22. COMPLEMENTARY FUNCTIONS

22.1 Password

M2.12

```
Password choice
    ----
```

Password selection and enabling. The command disables the use of keys + and –, so that data cannot be modified. Enter the number (1900... 1999) using the + and – keys. To delete password press + and – simultaneously until the dashes reappear.

```
Password choice
    ----
```

Password selection and enabling. The command disables the use of keys + and –, so that data cannot be modified. Enter the number (1900... 1999) using the + and – keys. To delete password press + and – simultaneously until the dashes reappear.

22.2 Site name

M2.13

```
Site Name
  ----------
```

Site name as it appears on the first display page.
Each dash can be replaced with a letter (A...Z) or a number (0...9), using the + and – keys.
The → key is used to position the cursor.

22.3 Display of values and operating data

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

M0.1

```
Site----------
Room T.   :20.0c
```

• Actual room temperature (if **B3** is connected) or flow temperature (if only **B1** is connected).

M0.8

```
Calculated Flow
Cooling T.:22.0c
```

• Calculated flow temperature based on Heating setting (if **B3** and **B1** are connected).

M0.9

```
Calculated Flow
Cooling T.:35.0c
```

• Calculated flow temperature based on Cooling setting (if **B3** and **B1** are connected).

M0.10

```
Flow T.  : 20.0c
Preheating:15.0c
```

• Actual temperature measured by detector **B3** (only if **B3** and **B1** are connected).
• Actual Pre-heating temperature, only if **B4** is connected

M0.11

```
OutsideT.:– 2.0c
```

• Actual outside temperature (only if **B2** is connected).

M0.12

```
Y1-PREHEAT.:100%
Y2-COOLING :100%
```

• Output Y1 load value: Preheat. or Heat. or Cool.
• Output Y2 load value: Preheat. or Heat. or Cool.

M0.12

```
Ys-DAMP.TEM:100%
```

• Output Ys load value: DampTemp. or Recuper.

22.4 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 desired and calculated values
– Values measured by the detectors connected
– Outputs Y1, Y2 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 page 1, the controller will perform the new hour recordings, but not the mode change recordings, as it assumes that changes are being made on adjustment data.

Recordings can only be viewed from the Telemanagement computer.

23. ALARMS

The controller processes two types of alarms:
– alarms related to functional irregularities affecting the controller and the controlled systems (LED 6.10)
– alarms related to short and open detector circuits (LED 6.8)

Alarms are signaled by LEDs located on the controller's front panel. On the display page alarms are identified by a letter "A" flashing alternately to the number corresponding to the relevant alarm.

Alarms can be transmitted to a local and/or a central telemanagement computer through the C-Bus connection.

23.1 Functional alarms

M2.10

```
Alarms Function.
–  – –          8
```

Functional alarms occur when there is a continuing deviation between actual and desired measures. These alarms do not affect the controller's proper operation.
"By default" all alarms are disabled except clock alarm (8)
Use the + and – keys to enable desired alarms, entering numbers in place of the dashes.
Number flashing = the alarm is on
/Alarm limit values and delays can only be changed via computer.

Types and reasons of alarms:
1 = flow temperature difference (if only B1 is connected)
–for 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)
–for actual temp. lower than T°rHea when Y..: Heating
or higher than T°rCoo when Y..: Cooling
4 = preheating temperature difference (if B4 is connected and when Y..: Pre-heating)
– for actual temp. lower than desired value
8 = internal clock cannot be disabled
– when the clock assumes inconsistent values

23.2 Detector alarms

M2.11

```
Alarms Detector
–  –  –  –
```

Detector alarms occur when there is a short circuit or open circuit affecting the connected detectors.
The effect of alarm situations is delayed by one minute.
By default" all alarms are disabled.
Use the + and – keys to enable desired alarms, entering numbers in place of the dashes.

Types and effects of alarms:
1 = flow temp. detector (B1): valve stops where it is
2 = outside temp. detector (B2): valve stops where it is
3 = room temp. detector (B3): valve stops where it is
4 = preheating temp. detector (B4): valve stops where it is

24. SYSTEM STARTUP TEST

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

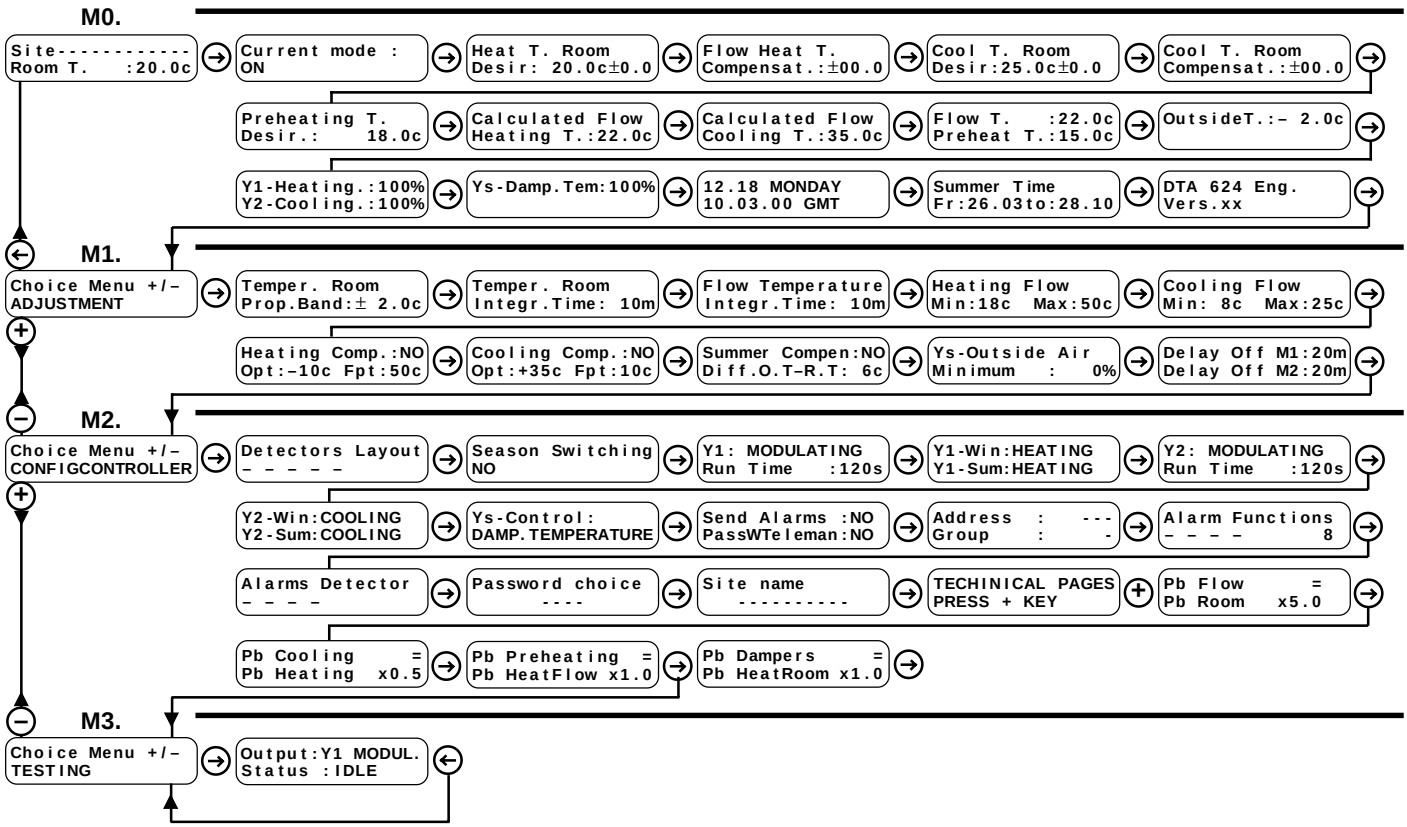
M3.1

```
Output:Y1 MODUL.
Status:IDLE
```

Using the + and – keys, select:
- output to be tested:
  – Y1 MODUL. or Y1 2 STAGES or Y1 3 STAGES: depending on **M2.3** setting .
  – Y2 MODUL. or Y2 2 STAGES or Y2 3 STAGES: depending on **M2.5** setting .
  – PUMP M1 ;
  – PUMP M2 ;
  – Ys ;
- status :
  – with Y...MODUL. : IDLE ; CCLOSES ; OPEN
  – with Y.. 2 STAGES : ON 1 ; ON 1+2 ; OFF.
  – with Y.. 3 STAGES : ON 1 ; ON 2 ; ON 1+2 ; OFF.
  – with Ys : *0 VOLT* ; *5 VOLT ; 10 VOLT*.
  – with PUMP M1 and PUMP M2 : ON ; OFF.

Check results.

25. SEQUENCE OF DISPLAY PAGES (the data and functions are those set at factory)



⊖ ⊕ Keys for scrolling the display pages and positioning the cursor ▮ on adjustable data on the pages.

The adjustable data, in the following descriptive tables of display pages are highlighted by

By pressing these keys together, or in any event after 15 minutes, the first page returns to the display

```
Site----------
Room T.   :20.0c
```

⊖ ⊕ Keys forr : – adjusting the values highlighted by the cursor ▮

– displaying the configuration options of a function, e.g. :

```
Season Switching
WINTER
```

or

```
Season Switching
SUMMER
```

– switch directly from one menu (block of pages) to another.

M0. NORMAL USE

Ref.	Display	Description	Notes	Sect.
M0.1	Site---------- Room T. :20.0c	Site name. Actual temperature	Set in **M2.13** Roon temp. : if **B3** or **B1** and **B3** are connected Floow temp. : if only **B1** is connected	**22.2**
M0.2	Current mode : ON Winter	Current mode : – ON; OFF. – ON Winter ; OFF Winter. – ON Summer ; OFF Summer.	Mode is determined by Season Switching (**M2.2**) and output D-E1-E2	**15.5**
M0.3	Heat T. Room Desir.:20.0c±0.0 Heat T. Flow Desir.:20.0c±0.0	Required heating temperature and adjustment through set point adjuster Rt° (only if configured)	Displayed if **B3** or **B1** and **B3** are connected, and if **M2.4** or **M2.6** setting is HEATING Displayed only if **B1** is connected, and if **M2.4** or **M2.6** setting is HEATING	**15.1**
M0.4	Flow Heat T. Compensat.:±00.0	Compensation of heating flow temperature as calculated by the controller	Displayed if **B1** and **B2** are connected and **B3** is not connected, and if **M2.4** or **M2.6** setting is HEATING	**16.**
M0.5	Cool. T. Room Desir.:25.0c±0.0 Cool. T. Flow Desir.:25.0c±0.0	Required cooling temperature and adjustment through set point adjuster Ht° (only if configured)	Displayed if **B3** or **B1** and **B3** are connected, and if **M2.4** or **M2.6** setting is COOLING Displayed if only **B1** is connected, and if **M2.4** or **M2.6** setting is COOLING	**15.1**
M0.6	Cool. T. Flow Compensat.:±00.0 Cool. T. Flow Compensat.:±00.0	Compensation of cooling temperature as calculated by the controller	Displayed if **B2** and **B3** or **B1, B2** and **B3** are connected, and if **M2.4** or **M2.6** setting is COOLING Displayed if **B2** with **B1** only is connected, and if **M2.4** or **M2.6** setting is COOLING	**16.**
M0.7	Preheating T . Desir. : 18.0c	Desired Preheating temperature	Displayed if **B4** is connected, and if **M2.4** or **M2.6** setting is PREHEATING	**17.**
M0.8	Calculared Flow Heating T.:22.0c	Calculated flow temperature based on Heating control	Displayed if **B1** and **B3** are connected, and if **M2.4** or **M2.6** setting is HEATING	**22.3**
M0.9	Calculared Flow Cooling T.:35.0c	Calculated flow temperature based on Cooling control	Displayed if **B1** and **B3** are connected, and if **M2.4** or **M2.6** setting is COOLING	**22.3**
M0.10	Flow T. :22.0c Preheat T.:15.0c	Actual flow temp. as measured by B1 Preheating temp. as measured by B4	Flow T.: Displayed if **B1** and **B3** are connected Preheat. T.: Displayed if **B4** is connected	**22.3**
M0.11	OutsideT.:– 2.0c	Outside temp. as measured by B2	Outside t.: Displayed if **B2** is connected	**22.3**
M0.12	Y1-Heating.:100% Y2-Cooling.:100%	Value of load assigned to output Y1 Value of load assigned to output Y2	Y1 - Y2 : PREHEAT; HEATING; COOLING; OFF	**22.3**
M0.13	Ys-DAMP.TEM:100%	Value of load assigned to output Ys	Ys : DAMP.TEM.; RECUPERATOR	**22.3**
M0.14	12.18 MONDAY 10.03.00 GMT	Setting: time of day, day of week and date Current time: GMT, BST	For data recording only. Dates for BST (daylight saving time) to be set in **M0.15**	
M0.15	Summer Time Fr:26.03to:28.10	BST (daylight saving time) start and end dates	For data recording only.	
M0.16	DTA 624 Vers.xx	Controller ID data		

M1. ADJUSTMENT

Ref.	Display	Description	Notes	Sect.
M1.1	Temper. Room Prop.Band: ± 2.0c	Heating proportional band in ± °C. If **B3** or **B1** and **B3** are connected	Based on this value the controller derives other functions' proportional bands using the multipliers set in the EQUIPMENT CONFIGURATION menu	15.2
	Temper. Flow Prop.Band: ±10.0c	If only **B1** is connected		
M1.2	Temper. Room Integ.Time: 10m	Heating and cooling integral time, in minutes	Displayed if **B3** or **B1** and **B3** are connected	15.2
	Flow Temperature Integ.Time : 10m		Displayed if only **B1** is connected	
M1.3	Flow Temperature Integ.Time: 10m	Heating and cooling flow temperature integral time.	Displayed if **B1** and **B3** are connected	15.2
M1.4	Heating Flow Min:18c Max:50c	Heating flow temp. limits Field of room heating Pb.	Displayed if **B1** and **B3** are connected, and if **M2.4** or **M2.6** setting is HEATING	15.4
M1.5	Cooling Flow Min: 8c Max:25c	Cooling flow temp. limits Field of room cooling Pb.	Displayed if **B1** and **B3** are connected, and if **M2.4** or **M2.6** setting is COOLING	15.4
M1.6	Heating Comp.:NO Opt:–10c Fpt:50c	Climatic variation of winter flow temp. Opt=Outside project temp. Fpt =flow project temp.	Displayed if **B1** and **B2** are connected and **B3** is not connected, and if **M2.4** or **M2.6** setting is HEATING.	16.1
M1.7	Cooling Comp.:NO Opt:+35c Fpt:10c	Climatic variation of summer flow temp. Opt=Outside project temp. Fpt=flow project temp.	Displayed if **B1** and **B2** are connected and **B3** is not connected, and if **M2.4** or **M2.6** setting is COOLING	16.1
M1.8	Summer Compen:NO Diff.O.T-R.T: 6c	Summer compensation : NO ; YES. Differ.. 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 **B2** and **B3** or **B1**, **B2** and **B3** are connected, and if **M2.4** or **M2.6** setting is COOLING	16.2
M1.9	Ys-Outside Air Minimum : 0%	Outside air damper opening minimum percentage	Displayed only if **M2.12** setting is DAMP. TEMPERATURE	19.4
M1.10	Delay Off M1:20m Delay Off M2:20m	Delay time to M1 and M2 pump switch off		21.

M2. EQUIPMENT CONFIGURATION

Ref.	Display	Description	Notes	Sect.
M2.1	Detectors Layout – – – – –	Configuration of connected detectors (outputs B-M) – = detector not connected; number = detector connected. Default config.: no detectors connected	1 : Flow temp. detector **B1**. 2 : Outside temp. detector **B2**. 3 : Room or extract air temp. detector **B3**. 4 : Preheating or dew point temp. detector **B4**. 5 : Temperature set point adjuster **Rt**°.	**14.**
M2.2	Season Switching NO	Commutazione stagionale : NO ; WINTER ; SUMMER; FR ss CONTROL ;		**20.**
M2.3	Y1: MODULATING Run time :120s	Output Y1 : MODULATING ; 2 STAGES ; 3 STAGES ; actuator stroke time in seconds	Stroke time: displayed only if MODULATING	**18.**
M2.4	Y1:HEATING	Output Y1 action. Displayed if **M2.2** setting is NO	Select action: PREHEAT; HEATING; COOLING; OFF	**18.**
	Y1-Win:HEATING Y1-Sum:HEATING	Output Y1 action in season periods. Displayed if **M2.2** setting is NO		
M2.5	Y2:MODULATING Run time :120s	Output Y2 : MODULATING; 2 STAGES; 3 STAGES; actuator stroke time in seconds	Stroke time: displayed only if MODULATING	**18.**
M2.6	Y2:COOLING	Output Y2 action. Displayed if **M2.2** setting is NO	Output Y2 action. PREHEAT; HEATING; COOLING; OFF	**18.**
	Y2-Win:COOLING Y2-Sum:COOLING	Output Y2 action in season periods. Displayed if **M2.2** setting is NO		
M2.7	Ys-Control: DAMP.TEMP.	Select Ys action: DAMP.TEM.; RECUPER	.	**19.**
M2.8	Send Alarms :NO PassWTeleman :NO	Alarm transmission enabled. Telemanagement password enabled	Required only if connected through C-Bus	**10.4**
M2.9	Address : --- Group : –	Equipment Web address Equipment group	Required only if connected through C-Bus	**10.3**
M2.10	Alarm Functions – – – 8	Functional alarms enabled. Default config.: Only alarm 8 enabled (cannot be disabled)	1 : flow temperature difference **B1** 3 : room temperature difference**B3** 4 : preheating temperature difference**B4** 8 : internal clock alarm	**23.1**
M2.11	Alarms Detector – – – –	Detector alarms enabled. Default config.: all disabled	1 : flow temp. detector **B1** malfunction 2 : outside temp. detector **B2** malfunction. 3 : room temp. detector **B3** malfunction 4 : preheating detector **B4**.	**23.2**
M2.12	Password choice ----	Select password to disable + and – keys: 1901 … 1999	To delete key press + and – simultaneously	**22.1**
M2.13	Site Name ----------	Set site name	Use + and – to enter letters or numbers Use ← and → to change positions	**22.2**
	TECHNICAL PAGES PRESS + KEY			
M2.14	Pb Flow = Pb Room x5.0	Multiplier to obtain Pbs of cooling temp. from heating Pbs.	Displayed if **B1** and **B3** are connected	**15.2**
M2.15	Pb Cooling = Pc Heating x0.5	Multiplier to obtain Pbs of cooling temp. from heating Pbs.	Displayed if either output has been assigned the function COOLING	**15.2**
M2.16	Pb Preheating = Pb HeatFlow x1.0	Multiplier to obtain Pb of Preheating temp. from heating flow Pb.	Displayed if either output has been assigned the function PREHEATING	**15.2**
M2.17	Pb Dampers = Pb HeatFlow x1.0	Multiplier to obtain Pb of Air Damper Control from room heating Pb.	Displayed if **B2** and **B3** are connected, and if **M2.7** setting is DAMP.TEMPERATURE	**15.2**
	dT Recuperator = Pb HeatFlow x1.0	Multiplier to obtain Pb of recuperator Control from room heating Pb.	Displayed if **B2** and **B3** are connected, and if **M2.7** setting is RECUPERATOR	

M3. TESTING				
Ref.	Display	Description	Notes	Sect
M3.1	**Output : Y1 MODUL.** **Status : IDLE**	Select outputs to be tested Select output status	Output selection: Y1 MODUL. or Y1 2 STAGES or Y1 3 STAGES ; Y2 MODUL. or Y2 2 STAGES or Y2 3 STAGES ; PUMP M1 ; PUMP M2 ; Ys ; Status selection : with Y... MODUL.: STOPS; OPENS; CLOSES with Y... 2 STAGES: ON 1; ON 1+2; OFF with Y...3 -STAGE: ON 1; ON 2; ON 1+2; OFF with M1 PUMP AND M2 PUMP ON; OFF with Ys: 0 VOLT; 5 VOLT; 10 VOLT	**24.**

COSTER

CONTROLS TEMPERATURE ENERGY

20132 Milan — Head Office & Sales
Via San G.B. De La Salle 4/a
Tel. (0039) 02.2722121
Telefax. (0039) 02.2593645
E-mail : coster@costerte.com
www.costerte.com

25048 Edolo (BS) — Factory
Via Gen. Treboldi 190/192
Tel. (0039) 0364.773211
Telefax.(0039) 0364.72615

UK SALES & SERVICE

COSTER ENVIRONMENTAL CONTROLS LTD

5 Shaftesbury Street South
Sir Francis Ley Industrial Park - Derby
DE23 8YH
Telephone : (0044) 01332 200555
Fax : (0044) 01332 204181
www.costerec.co.uk

ISO 9002 / EN 29002

EQNet

CISQ/CSQ cert. nº 9115.COEE

D 33189