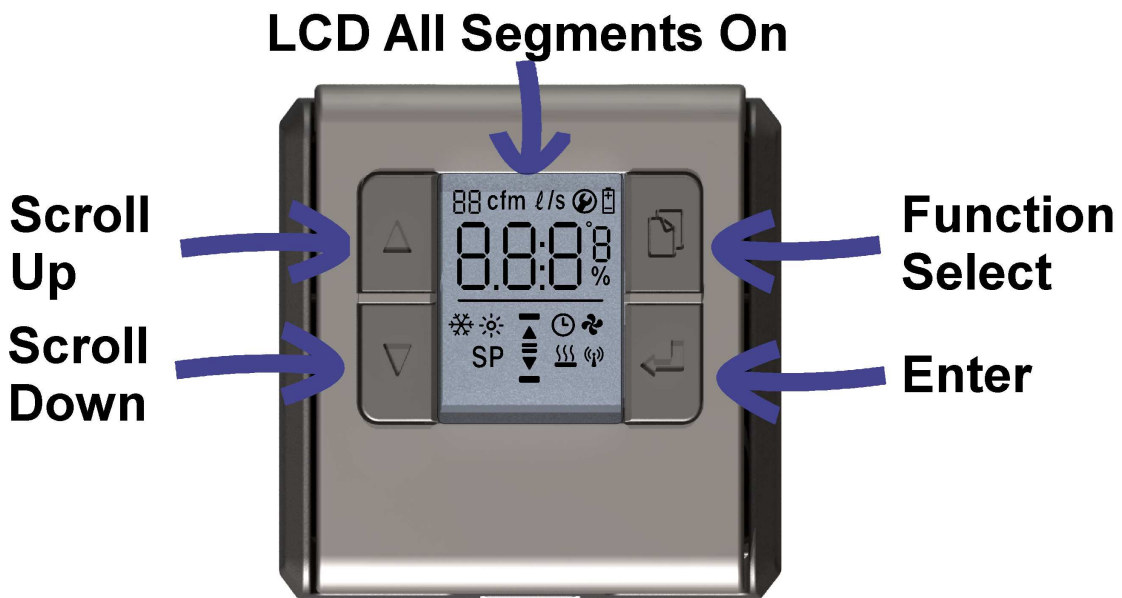


3. Hardware components

3.1 MLM DIGITAL REMOTE WALL THERMOSTAT (WS)









3.1.1 USER INTERFACE

The user has access to the system setup and diagnostics via the pushbutton and LCD interface on the Wall Thermostat Unit (wall-stat).






LCD KEY TABLE

Segment Display	Description	Function
°C	Degrees Celsius	Control
°F	Degrees Fahrenheit	Control
88	Function Display	Control/General
88:88	Main Display	All

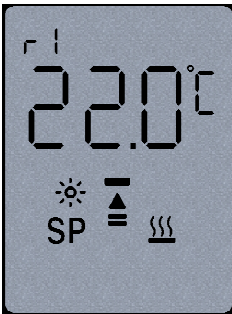
Icon Display	Description	Function
<i>l/s</i>	Liter per second	Air volume
cfm	Cubic feet per min	Air volume
	Battery Low	Diagnostics
	Setup	Commissioning
SP	Setpoint	Control
	Cooling mode	Control
	Heating mode	Control
	Real time clock	Back-off timer
	Wireless connect	Connection
	Air flow detect/limit	Air volume
	Heater on	Control
—	End-stop open/close	Control
▲	Moving towards close	Control
=	Actuator not moving	Control
▼	Moving towards open	Control
%	Percentage display	Control

3.1.2 TEMPERATURE DISPLAY

The default display shows room temperature. The top left function display shows the temperature source:

-  Control temperature not selected – the display shows the space temperature measured by the wall-stat. No temperature is selected for control purposes.
-  Onboard Control temperature – the display shows onboard temperature, as measured inside the diffuser. This temperature is used for the room temperature control.
-  Remote Control temperature – the display shows temperature, as measured by the wall-stat. This temperature is used for the room temperature control.

3.1.3 SETPOINT SELECTION



Setpoint selection is achieved by pressing either the up or down arrow button momentarily. The buzzer will sound once, the **SP** icon will switch on and the current setpoint value will show on the digital display.

The default value is 22°C (71°F). The top left function digits will indicate respectively the source of the setpoint and which setpoint is active.

If the function display shows **r1**, it indicates the 'remote setpoint' (wall-stat) is the temperature source and setpoint 1, ie. 'normal control' is currently active.

Should the function digits show **o2** it indicates an onboard-master controller (inside the diffuser) is where the setpoint is activated and the back-off setpoint is active at the current time.

By pressing the up or down buttons the setpoint value will increment or decrement in 0.5 degree intervals. Please note only setpoint 1, for normal control can be edited by this function.

Pressing the enter button (right bottom) will exit the setpoint function.

3.1.4 STEP THROUGH MENU

The user has the option to step through the diagnostic and manual control menu. Pressing the right top button (Function Select) for 5 seconds will activate this feature. The buzzer will sound once and the display will advance to the next function. To exit this mode, the user must press the Function Select button for 5 seconds before the buzzer will sound and the display will revert to the (default) space temperature value. The Step Through Menu will select the following functions:

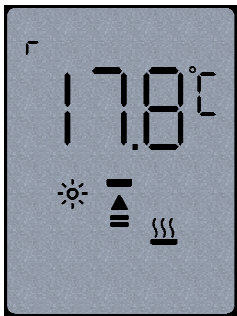
- **Menu 1 - Change-over display**



The top left function digits displays **CO** to indicate the supply air (changeover) temperature is being displayed. If no supply air sensor is connected the display will indicate zero.

Press the Function Select button to advance to the next display.

- **Menu 2 - Remote temperature display**



The top left function displays **r** to indicate the remote (wall-stat) temperature is being displayed. This temperature is displayed regardless of temperature selection for control purposes.

Press the Function Select button to advance to the next display.

- **Menu 3 - Real time clock function**



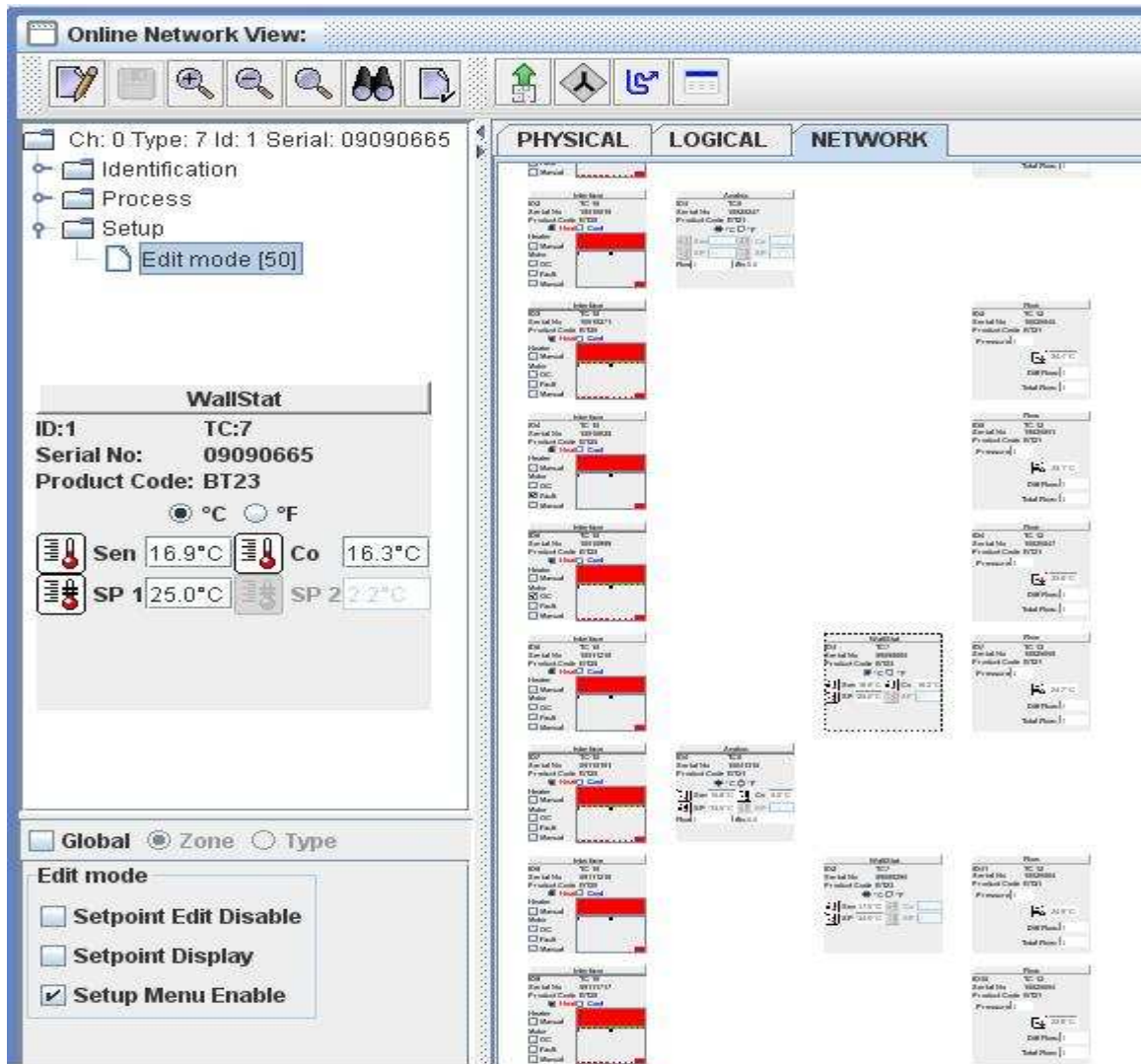
The watch icon will switch on to indicate the RTC function is selected. The current time, hh:mm will show. The top left function displays **dx**, with **x** being any digit between 1 and 7 to indicate the current day of the week. Monday is displayed as day 1. To edit the RTC, press the enter button and the minute display will flash. Select the current minute value with the up or down buttons. Press enter again and select the current hour. Enter again and select the current day. Pressing enter again will now exit the RTC edit function.

The RTC facilitates the back-off control function for energy conservation. The back-off function is activated through the MLM Application by setting the SP2 value during commissioning.

Press the Function Select button to exit this function and advance to the next display.

- Edit Mode**

The edit mode allows extended setup features through the wall-stat. The edit mode is enabled through the MLM Application by selecting the wall-stat box in the Network screen as indicated. Selecting the Setup Tab opens the Edit Mode select tick box:



- **Setpoint Edit Disable**

This feature disables the setpoint from being altered on the wall-stat unit. The setpoint can still be edited through the MLM Application. This feature can only be activated through the MLM Application.

- **Setpoint Display**

The default display on the wall-stat is for setpoint instead of the space (control) temperature display. This feature can only be activated through the MLM Application.

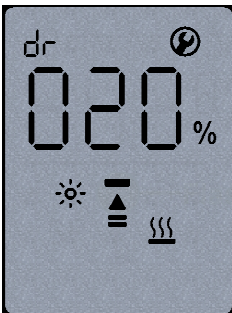
- **Setup Menu Enable**

If this function is selected, the step-through menu enables the following setup sub-menu features. These features will follow directly after the Real-time-clock function indicated above. Please note that these setting will be applied to all the diffusers connected in a control zone, master or slave.

The  icon will show to indicate this sub-menu selection.

- **Sub menu 1 - Actuator Drive Control**

The display will show the current control disk position in percentage, with the top left function display indicating **dr** for motor drive.

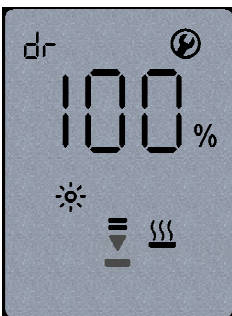


To manually drive the disk, press the up/down arrows for the required position and press enter. The double bar icon will flash to indicate the motor is manually controlled. Verify the disk movement of all the diffusers in that control zone and the position display update.

To advance to the next menu, press the Function button. The control will revert back to automatic mode.

- **Sub menu 2 – Control disk open end-stop**

The display will show the open end-stop disk position in percentage, with the top left function display indicating **dr**. The down arrow and single bar will flash to indicate 'open end-stop'

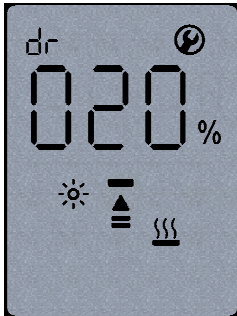


To change the open end-stop position, press the up/down arrows for the required position and press enter. The display will flash --- until the new parameter is accepted by the system. Should the disk be outside the end-stop range it will manually drive the diffusers in that control zone into range.

To advance to the next menu, press the Function button.

➤ Sub menu 3 – Control disk close end-stop

The display will show the close end-stop disk position in percentage, with the top left function display indicating **dr**. The up arrow and bar will flash to indicate 'close end-stop'



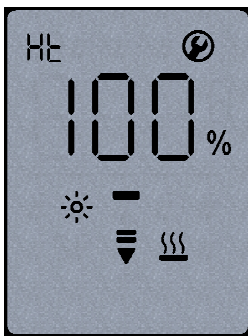
To change the close end-stop position, press the up/down arrows for the required position and press enter.

The display will flash --- until the new parameter is accepted by the system. Should the disk be outside the end-stop range it will manually drive the diffusers in that control zone into range.

To advance to the next menu, press the Function button.

➤ Sub menu 4 – Heater output

The display will show the current heater output in percentage, with the top left function display indicating **Ht**.



To manually drive the heater output, press the up/down arrows for the required percentage output and press enter.

The heater icon will flash to indicate the heater is manually controlled.

The character display will indicate zero until the new value is accepted and the heater in that zone controlled to the new value.

To advance to the next menu, press the Function select button. The control will revert back to automatic mode.

➤ Sub menu 5 – Option 1, Manual Control Zone Setup

To bind a diffuser to a control zone the following steps are required:



The top left function display will indicate **LS** for Loop Select.

Keep the enter button pressed until the unit beeps.

The menu displays **L** and a zone number, normally **00** will flash. If the zone has been set up previously, that particular zone number will display instead of the **00**.

Use the up/down arrow to select a zone number. On a new installation always start with zone **1**.

Press enter and observe the **L** starting to flash.

Go to the first diffuser in that zone and press the button on the Diffuser Controller board, normally situated on the trim disk.

After a few seconds the wall-stat unit will beep and the flashing LED on the Diffuser Controller board will stay switched on momentarily – both to indicated the diffuser is set up for that control zone.

Go to the next diffuser in that zone and press the button again and observe the same result. All the while the **L** indicator will flash and the zone number will be on permanently.

Continue the process until all the diffusers in the control zone has been selected.

Press the enter button and observe the **L** stationary and the zone number flashing.

Using the up/down arrows, select the next zone number and press enter.

Using the same procedure set up each diffuser in the control zone of interest.

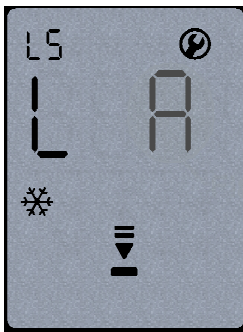
A maximum of fifteen control zones (one diffuser per zone) can be set up. By the same token a minimum of one zone containing from one to fifteen diffusers (slaves) can also be set up.

Press enter again to exit the last zone setup.

To advance to the next menu, press the Function button.

➤ Sub menu 5 – Option 2, Auto Zone Setup

In the special instance where all the diffusers connected to a Power Supply are intended as Master Diffusers, the Auto Loop Select function can be used. To bind each diffuser to a control zone the following steps are required:



The top left function display will indicate **LS** for Loop Select.

Keep the enter button pressed until the unit beeps.

The menu display **L** and a zone number, normally **00** will flash. If the zone has been set up previously, that particular zone number will display instead of the **00**.

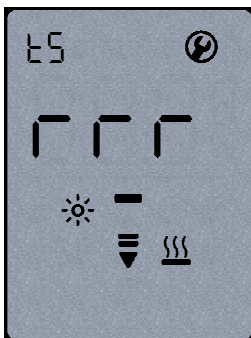
Press the down arrow until the **A** character (for Auto) flashes. Press enter and observe the **L** starting to flash.

Observe the loop number increasing to 5, then 9 and 13 as the control zones are being set up. With each increment the buzzer will sound.

Once the process is complete, the **L** and **A** characters will be displayed as static. Each diffuser is now set up for a separate control zone.

To advance to the next menu, press the Function button.

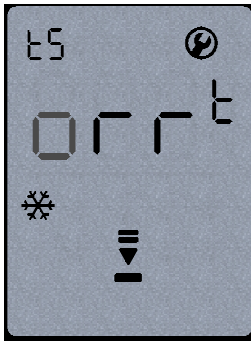
➤ Sub menu 6 - Control input select



The next function is to select the setpoint, control and supply air temperatures for a particular control zone.

To use this function the wall-stat must be connected to a diffuser in the control zone to be set-up. On a default system with only one wall-stat or one analog module connected to a control zone this function is not required and best not used.

The function display will indicate **tS**.



The character display will indicate the current status of the three control inputs as follows:

- o - indicates 'on-board' for on-board master module
- r - indicates 'remote' for wall-stat
- - indicates not selected

Keep the enter button pressed until the unit beeps. The first character will flash with the display indicating **t** for control temperature selection.

Pressing the up/down arrows will toggle between remote or on-board temperature selections. Be sure to select a valid option, ie when selecting **r** there must be a wall-stat connected to that particular control zone.

Press enter and the character **S** will show to indicate setpoint selection. The up/down arrows will toggle this function.

Press enter to select the supply air input, character **C**. The arrow buttons will toggle between **o**, **r** and **-** if supply air measurement is not required.



On pressing enter again the three characters will flash until the system has accepted the new setup.

Should a capital **E** character be displayed, it indicates an **ERROR** as the setup could not be done on the device being selected. Typically the **o** was chosen for 'on-board' sensing or setpoint, but an on-board controller is not installed in that control zone. Repeat with the correct selection of parameters.

Press the Function button to exit this function.

- **To exit the step through menu**

The display will now display the setpoint(s) as described above. To exit the step through menu, the user must press the Function Select button one more time and the display will revert to the (default) room temperature value.