XE99 SERIES

FAN-COIL THERMOSTATS
2-PIPE & 4-PIPE FAN-COIL CONTROL

FEATURES

- Attractive modern styling makes this thermostat ideal for offices or hotels
- Digital display of room ambient temperature, with display of user selected setpoint on demand
- Can be configured to display setpoint temperature only
- Push button adjustment of setpoint
- Switches allow manual control of system operation and fan speed
- Special energy savings mode activated by external input from Energy Management System (EMS) – a window contact or hotel card-key - overrides the temperature setting to installer defined heating and cooling temperatures
- Energy savings input (EMS) can be configured to be normally open circuit or normally closed circuit
- All models have a proportional plus integral (P+I) control algorithm which allows the ON/OFF control to regulate the temperature to within ±0.75°C
- Thermostat mounts directly onto a wall, a standard 65x65mm junction box (hole pitch 60mm) or a US 2x4inch horizontal junction box
- Installer setup mode allowing operating parameters to be changed
- °C or °F display selectable
- Adjustable deadband (some models) for heat & cool sequence control
- Fixed 1°C stage separation (some models) for 2-stage heating or 2-stage cooling operation
- Possibility to configure heating or cooling mode (some models) for energy savings feature
- Adjustable energy savings (setup) cooling setpoint and (setback) heating setpoint
- Adjustable maximum heating and minimum cooling setpoint limits
- Adjustable minimum relay off-times (heating or cooling) for applications requiring compressor short-cycle protection
- EEPROM permanently retains user settings in the event of power loss
- Digital display shows unique icons when cooling or heating relays have operated, or when energy savings mode is active
- Suitable for use with Honeywell valves and actuators: VU448A + VU53/VU54, VC4000 series, V4043/V4044 and thermal actuators M100, Z100, M4450 with associated valves
- Plug-in remote sensor available on some models
- Line voltage (230V~) and low voltage (24V~) models available

APPLICATION

The XE99 range of digital thermostats is designed for ON/OFF control of the fan, valves, compressor or auxiliary electric heater in fan-coil and small air-conditioner applications.

Models are available for control of :
- 2-pipe fan-coil units
- 2-pipe fan-coil units with manual heat/cool changeover
- 2-pipe fan-coil units with auxiliary electric heater
- 4-pipe fan-coil units with manual heat/cool changeover
- 4-pipe fan-coil units with sequence (deadband) control
- single stage or 2-stage air-conditioners

Many XE99 models are suitable for multiple applications – they can be configured for each application by changes in the output wiring and the connection of different external links between the wiring terminals.
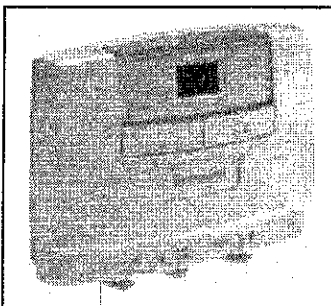
The fan can also be controlled from the thermostat. In some cases it is wired to run continuously, and can be switched off with the system ON/OFF switch, while with other models there is a choice of running the fan continuously, or cycling it with the thermostat.

Heat/cool changeover operation is also possible. This function can be accomplished either by a manually operated heat/ cool switch on the front of the thermostat or in some versions automatically by the use of a pipe thermostat on the supply water pipe of the fan-coil.

Where a compressor or an auxiliary electric heater is used, this should be normally switched using a relay or contactor, whose operation is controlled by the thermostat.

INDEX OF CONTENTS

SPECIFICATIONS

230 V~ MODELS

Model 230 V~	Switches				Features				Applications			
	On / Off (SPST)	3-Speed Fan (SP3T)	Fan On / Auto (SPDT)	Heat / Cool (SPDT)	Number of Relays	Energy Savings Input	Remote Sensor	Deadband	2-Pipe Fancoil	2-Pipe Fancoil + Electric Heater	4-Pipe Fancoil	2-Stage Air-cond. Unit
T6570A2008					1	✓			✓			
T6570A2016					1	✓	✓		✓			
T6570B2006	✓				1	✓			✓			
T6570B2014	✓				1	✓	✓		✓			
T6574A2004	✓	✓			1	✓			✓			
T6574A2012	✓	✓			1	✓	✓		✓			
T6574B2002	✓	✓	✓		1	✓			✓			
T6574B2010	✓	✓	✓		1	✓	✓		✓			
T6575A2003	✓	✓		✓	2	✓		✓		✓		
T6575A2011	✓	✓		✓	2	✓	✓	✓		✓		
T6575B2001	✓	✓		✓	2	✓			✓		✓	
T6575B2019	✓	✓		✓	2	✓	✓		✓		✓	
T6575C2006	✓	✓			2	✓		✓		✓	✓	
T6575C2014	✓	✓			2	✓	✓	✓		✓	✓	
T6576A2002	✓	✓			2	✓		✓ *				Cooling
T6576A2010	✓	✓			2	✓	✓	✓ *				Cooling
T6576A2028	✓	✓			2	✓		✓ *				Heating
T6576A2036	✓	✓			2	✓	✓	✓ *				Heating

* Stage separation = 1°C

24 V~ MODELS

Model 24 V~	Switches				Features				Applications			
	On / Off (SPST)	3-Speed Fan (SP3T)	Fan On / Auto (SPDT)	Heat / Cool (SPDT)	Number of Relays	Energy Savings Input	Remote Sensor	Deadband	2-Pipe Fancoil	2-Pipe Fancoil + Electric Heater	4-Pipe Fancoil	2-Stage Air-cond. Unit
T8574A1010	✓	✓			1	✓			✓			
T8574B1018	✓	✓	✓		1	✓			✓			
T8575B1017	✓	✓		✓	2	✓			✓		✓	
T8575B1025	✓	✓		✓	2	✓	✓		✓		✓	
T8575C1015	✓	✓			2	✓		✓		✓	✓	

Setpoint range : 10...30°C

Supply voltage : T657xxxxx models   230 V~ (±10%), 50/60 Hz
: T857xxxxx models   24 V~ (+25%,-20%), 50/60 Hz

Thermostat switch : 1 or 2 S.P.D.T. relays (depending on model)

Control : P+I algorithm applied to ON/OFF control gives typical control to ±0.5°C at 22°C at 50% duty cycle,
Performance   nominal control to ±0.75°C

Electrical ratings : 4(2) A, at 230 V~ or 24 V~, 12A inrush.   Typical loads - fans, zone valves, relays

Operational life : Greater than 100,000 cycles (all loads) for thermostat contacts at 230 V~
: Greater than 10,000 operations for all manually operated switches

Mounting : Mounts directly onto wall or wall-box - a standard 65x65mm junction box (hole pitch 60mm) or a US 2x4inch horizontal junction box. Mounting screws supplied.

Wiring : 11 screw-in terminals per unit, capable of accepting 2 wires up to 1.5 mm^2, 2 x 18AWG or 1 x 14AWG

3

SPECIFICATIONS (CONTINUED)

Energy Savings Input : Voltage-free contact (rating 24Vdc), maximum contact resistance of 1000ohms

Enclosure : Plastic 3-piece housing

Dimensions : 94 x 122 x 37 mm (w x h x d).

Protection class : IP30

Environmental requirements : Operating temperature range 5 to 45°C Shipping and storage temperature range -20 to 55°C Humidity range 5 to 95% rh, non-condensing at 26 °C

Remote Sensor : Plug-in connection, with 1.5m cable (where supplied)

Approvals : CE mark, complying with standards EN60730-1 (1995), EN55014-1 (1997), EN55014-2 (1996). Product must be wired as shown for CE compliance.

APPLICATIONS

How to use this Applications Table

1. Use along with **Specifications** Tables on page 3 to help select the specific XE99 model required.
2. Select the application of interest in the **Application** column.
3. Then look in the **Detailed Applications Capability** column to see the many control options and to select the specific application required.
4. When the application has been selected, refer to **Wiring Schematic** number and any notes in the box immediately to the right.
5. The OS Numbers in the left-most column indicate which model numbers can be chosen. The OS numbers within each box differ only in choice of operating voltage and availability of on-board or remote sensor features.

OS Numbers	Application	Wiring Schematic (see pages 12,13,14)	Detailed Applications Capability	Notes
T6570A2008 T6570A2016	general – no fan control	1	cooling only	Can be wired to cycle a single speed fan.
		1	heating only	
T6570B2006 T6570B2014	general – with single speed fan	2	cooling only	With output for 1-speed continuous fan operation.
		2	heating only	
T6574A2004 T6574A2012 T8574A1010	2-Pipe fan-coil	3 & 13	cooling only, fan continuous	
		3 & 13	cooling only, fan cycled	
		4 & 14	heating only, fan continuous	
		4 & 14	heating only, fan cycled	
		5 & 15	heat/cool changeover, fan continuous	For heat/cool changeover, use external aquastat. Note - energy savings feature not possible. Select parameter settings as for cooling mode. Note that display will not show heating icon during heating operation.
		5 & 15	heat/cool changeover, fan cycled	
T6574B2002 T6574B2010 T8574B1018	2-Pipe fan-coil with fan auto/on	6 & 16	cooling only, fan continuous or cycled	Fan On / Auto switch is used to switch between fan continuous or fan cycled
		6 & 16	heating only, fan continuous or cycled	
T6575A2003 T6575A2011	2-Pipe fan-coil + electric heater	7	heat/cool changeover, fan continuous	Output is suitable for controlling a relay or contactor for electric heat switching. Deadband between heat/cool operation and electric heater operation is adjustable.
T6575B2001 T6575B2019 T8575B1017	2-Pipe fan-coil	8 & 17	heat/cool changeover, fan continuous	Heat/cool changeover using manual switch
		8 & 17	heat/cool changeover, fan cycled	
T8575B1025	4-Pipe fan-coil	9 & 18	heat/cool changeover, fan continuous	
T6575C2006 T6575C2014	2-Pipe fan-coil +electric heater	10 & 19	cool+ electric heat in sequence, fan continuous	Connect heating output to electric heat contactor. Note that deadband is adjustable.
T8575C1015	4-Pipe fan-coil	10 & 19	heat + cool in sequence, fan continuous	Connect outputs to separate heat and cool valves. Note that deadband is adjustable.
T6576A2002 T6576A2010	air conditioner	11	2-stage cooling	Stage separation is 1°C, non-adjustable
T6576A2028 T6576A2036	air conditioner	12	2-stage heating	Stage separation is 1°C, non-adjustable

INSTALLATION
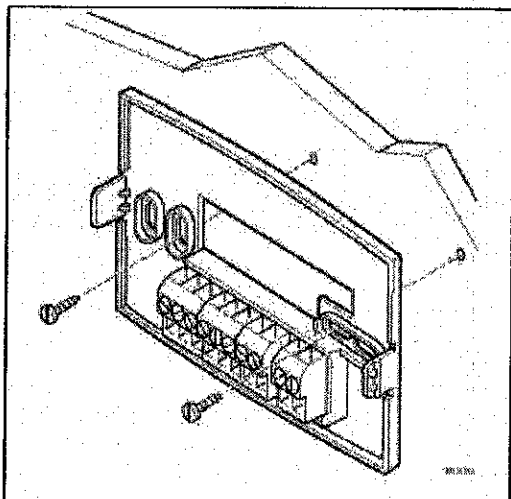
Location

The XE99 Series thermostat is the temperature control element in the fan-coil or air-conditioning system, and must be located about 1.5m above the floor in a position with good air circulation at room temperature. Do not mount it where it could be affected by :-

- draughts or dead spots behind doors or in corners
- hot or cold air from ducts
- radiant heat from the sun or appliances
- unheated (uncooled) areas such as an outside wall behind the thermostat
- concealed pipes or chimneys

Mounting the thermostat

Any XE99 Series thermostat can be directly mounted on the wall or horizontally on either a 65x65mm standard junction box or a 2x4inch US junction box (see diagram). Mounting screws are supplied for both alternatives.

IMPORTANT

The installer must be a trained service engineer
Isolate the power supply before beginning installation

1. Locate the wall-plate in the mounting position, insert the mounting screws through the appropriate holes, and screw into position.
2. Complete the wiring (see later).
3. Attach the thermostat to the wall-plate as follows :
4. Locate the 2 side slots on the back of the thermostat
5. Align these slots with the 2 side tabs on the wall-plate
6. Press down firmly and snap the thermostat into place

Wiring the thermostat

The standard wiring access is via a hole in the centre of the thermostat wall-plate. There is also a single breakout on top of the thermostat for surface wiring from above.

Removing the thermostat

If it becomes necessary to remove the thermostat from the wall-plate :

1. *Isolate the power supply before removing the thermostat.*
2. Pry the left side of the thermostat away from the wall-plate (see diagram below).
3. Pry the right side of the thermostat away from the wall-plate.
4. Use both hands to pull the thermostat straight away from the wall-plate.
5. NOTE - Improper removal of the thermostat from the wall-plate may damage the device.
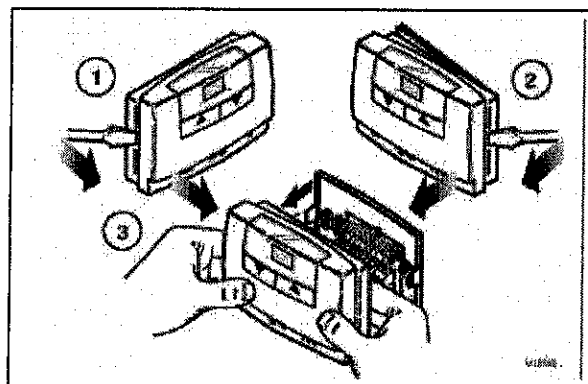
DIMENSIONS
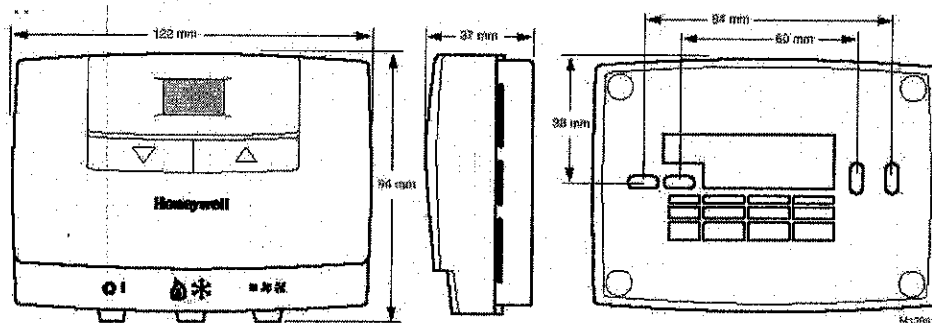
OPERATION

Control

Proportional + Integral Control

Like a mechanical thermostat, XE99 has an ON/OFF control output. However, this output is regulated by a *proportional + integral* algorithm, which enables XE99 to control closer to setpoint than a conventional thermostat and ensures the space temperature is maintained within 0.75°C of the setpoint.

Proportional + integral action eliminates the difference between the temperature setpoint and the effective control point by adjusting the on-time of the output until the control point matches the setpoint. The on-time is based on a fixed cycle rate of 4 cycles/hour for cooling and 8 cycles/hour for heating, and the proportional band is 1.6°C.
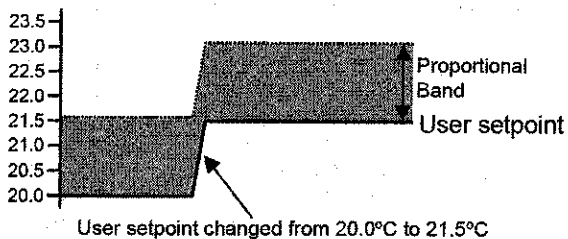
Single Stage Control (Cooling or Heating)

In cooling mode the user setpoint will be positioned at the bottom of the Proportional Band, so the setpoint will effectively be the temperature where the cooling switches off.
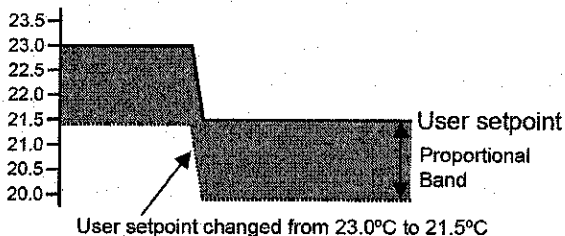
In heating mode the user setpoint will be positioned at the top of the Proportional Band, and this will be the temperature where the heating switches off.

This also applies to XE99 models with manual heat/cool changeover.

SINGLE STAGE COOLING

User setpoint changed from 20.0°C to 21.5°C

SINGLE STAGE HEATING


User setpoint changed from 23.0°C to 21.5°C

Single Stage Control – Heat/Cool Changeover

This type of control is only available on T6575B models, where there is a manual Heat/Cool changeover switch. This model can be used for control of 2-pipe fan-coil units (by linking the outputs from both relays) or for 4-pipe fan-coil units.

With cooling selected the user setpoint will be positioned at the bottom of the Proportional Band, so the setpoint will be the temperature where the cooling switches off.

In heating mode the user setpoint will be positioned at the top of the Proportional Band, and this will be the temperature where the heating switches off.
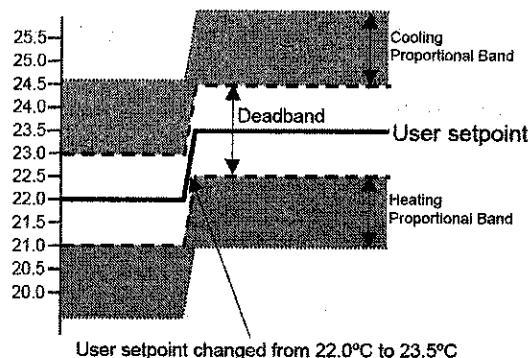
MANUAL HEAT/COOL CHANGEOVER
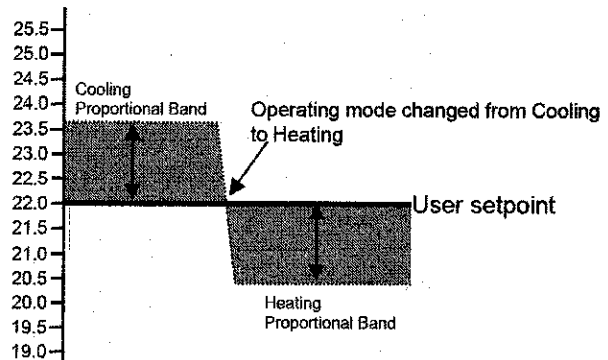
Heating+Cooling Sequence Control with Deadband

This type of control is only available on T6575C models. The required deadband is selected in the *Installer Setup Mode*. For control purposes the deadband is centred on the user setpoint, so its value then defines the effective heating and cooling setpoints. The cooling switch-off-point will be positioned at the bottom end of the cooling proportional band. Likewise, the heating switch-off point will be positioned at the top end of the heating proportional band. For example, with a deadband of 2°C and a user setpoint of 22°C, the effective heating setpoint will be 21°C and the effective cooling setpoint will be 23°C. Any change to the user setpoint will cause both heating and cooling setpoints to change in parallel, unless they are limited by the minimum cooling setpoint or maximum heating setpoint limits set within the *Installer Setup Mode*.

HEATING + COOLING SEQUENCE CONTROL

User setpoint changed from 22.0°C to 23.5°C

Control (continued)

Heat/Cool Changeover + Electric Heat

This type of control is only available on T6575A models. One of the output relays is used to control the valve of a 2-pipe fan-coil unit, and the other relay provides an output for an auxiliary electric heater. The setpoint for the electric heater operation is separated from the normal heat/cool control by an adjustable deadband.

With cooling selected the user setpoint will be positioned at the bottom of the Cooling Proportional Band, at the temperature where the cooling switches off. For the electric heating to switch on, the temperature must decrease until it has passed completely through the deadband.

When heating is selected, the user setpoint remains the same value, but now it is at the top of the heating proportional band. The electric heating setpoint will decrease by 1.6°C so as to maintain the same deadband separation between the bottom of the heating proportional band and the point where the electric heating can come on.

HEAT/COOL CHANGEOVER + ELECTRIC HEAT
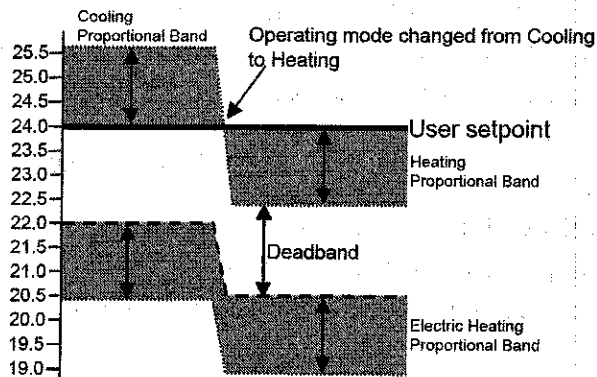
2-Stage Control (2-stage cooling or 2-stage heating)

This type of control is only available on T6576 models. There are separate XE99 models dedicated for 2-stage cooling, and others for 2-stage heating (see the *Specifications* and *Applications* sections). The stages are separated by a fixed amount, 1°C, so that, once the first stage is 100% **ON**, the temperature has to change by a further 1°C before the second stage will start to cycle. Examples are shown below.

2-STAGE COOLING CONTROL
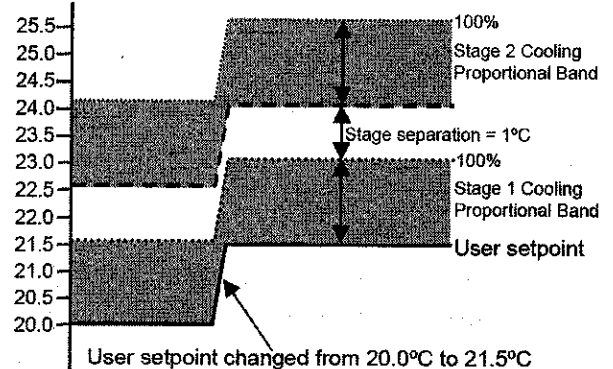
2-STAGE HEATING CONTROL
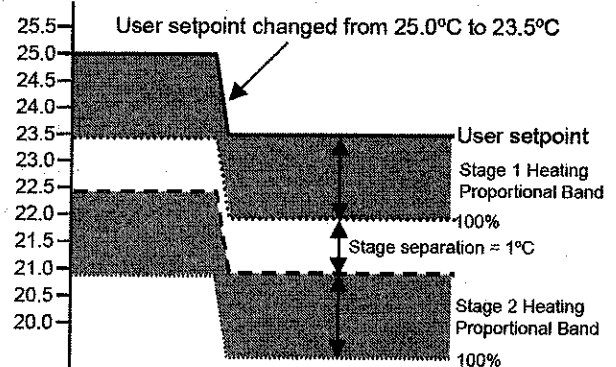
Operating Modes

XE99 has 2 main operating modes, *Comfort Mode* and *Energy Savings Mode*, and also has an *OFF Mode* selected by the on/off switch.

Comfort Mode

This is the normal operating mode where the XE99 controls to the setpoint selected by the user.
On initial switch on, or after the On / Off switch has been activated the user setpoint will return to the default value. The control action will be determined by either the default settings or the installer set parameters if the defaults have been altered.

Energy Savings Mode

Energy savings mode is activated by a special Energy Management System (EMS) input from a card-key, occupancy switch or window contact switch. In Energy Savings Mode the XE99 will control to user/installer defined setback setpoints, for increased energy savings. The display will show a $ symbol to indicate when this mode is active.

For example, if the user setpoint is 21°C and the Energy Savings Mode setpoint for cooling (*Energy Savings Cooling Setpoint*) has been set to 28°C, then XE99 will control to 28°C when it receives the correct input signal. The default *Energy Savings Mode* setpoints are shown in the table below.

Energy Savings Mode - Setpoints				
	Heating Setpoint		Cooling Setpoint	
Description	Default	Range	Default	Range
°C Scale	18°C	10-18°C	25°C	25-30°C
°F Scale	65°F	50-65°F	77°F	77-90°F

Activation of Energy Savings Mode

The Energy Savings Input is connected via input terminals 10 and 11 on XE99. It can be configured within the *installer setup mode* to be activated either by a close circuit or open circuit signal.
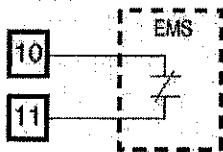By default (Installer Parameter ES=1):
    open circuit = Comfort Mode
    close circuit = Energy Savings Mode
By choice (Installer Parameter ES=0):
    close circuit = Comfort Mode
    open circuit = Energy Savings Mode
The wiring connections are shown below for the EMS input.

Off Mode

If the system switch is set to the Off position, power will be removed from the XE99 electronics and output terminals, and the display will go blank. The thermostat will reboot when power is restored with the On/off switch.
Please note – this ON/OFF switch is a functional switch and should not be used as an isolating switch.

Startup

On first powering up, or after the ON/OFF switch has been set to ON, the XE99 undergoes a startup and self-checking sequence. Firstly all the segments on the LCD display are illuminated to check the display. Next a number appears to indicate the software version. The final check is a check of the sensor. The symbol **rS** will appear to indicate the remote sensor is connected. On completion of the startup sequence, after approximately 2 seconds, XE99 will resume normal control in either *Comfort* or *Economy* Mode.

On initial power on, the temperature setpoint defaults are as shown in the following table. The current setpoint is stored in EEPROM, and if the XE99 is switched off, then on again, it will resume control at the last known setpoint.

Power Up Default Setpoints				
	1-relay or heat/cool changeover models		2-relay heat + cool sequence models	
	°C Scale	°F Scale	°C Scale	°F Scale
Setpoint default	22	73	22	73
Cooling OFF point	-	-	23	75
Heating OFF point	-	-	21	71

Fault Detection

The message **SF** will appear on the display to indicate if a Sensor Fault is detected at power-up, or at any time during the operation of XE99. For remote sensor models, all the sensor connections should be checked and any breaks in the connection should be repaired.

The power must then switched off then on again to reset the fault message, and resume normal control.

Additional Switches

Fan Speed Switch (SP3T line voltage)
Where supplied, the fan switch allows the selection of 3 different settings - low, medium, or high.
System Heat/Cool Switch (SPST low voltage)
Where supplied, this switch signals the microprocessor to operate the relays in either heating or cooling mode. In heating mode the cooling relay is disabled, and in cooling mode the heating relay is disabled.
Fan On/Auto Switch
Where supplied, this switch allows the user to select whether the fan is cycled with temperature, or is operated continuously.

User Interface

Temperature (Comfort) Setpoint

The temperature setpoint can be adjusted between 10°C and 30°C in steps of 0.5°C by using the ▼ and ▲ keys. If °F operation is set within the *installer setup mode* (see later) the range will be 50°F to 90°F, adjustable in 1°F steps.

Display

The measured room temperature is normally displayed (unless configured otherwise in the *installer setup mode*) and the first press of the ▲ or ▼ keys will switch to displaying the user setpoint. If no key is pressed for 5 seconds, the display will return to showing the room temperature.

When the cooling relay is closed this will be indicated by a ✳ symbol, whereas closure of the heating relay will be indicated

INSTALLER SETUP MODE

The XE99 Series thermostat allows many of its operating parameters to be adjusted via an *Installer Setup Mode*. For ease of programming, each operating parameter has a 2 letter identifier code, which is shown on the display during the *Installer Setup Mode* programming sequence. A brief description of these is shown in the table below. For more details see Pages 9 and 10.

Settable Parameters

Parameter	ID	Description
Temperature Scale	tS	Allows selection of either °C or °F scale.
Dead Band	db	Allows deadband to be set.
Heat or Cool Operating Mode	OP	Allows setting of operating mode on single relay, non-changeover models, to either Heat or Cool.
Energy Savings Cooling Setpoint	uC	Allows energy savings cooling setpoint to be programmed, for energy savings.
Energy Savings Heating Setpoint	uH	Allows energy savings heating setpoint to be programmed, for energy savings
Minimum Cooling Off Time	CO	Allows the cooling off-time to be set for short cycle prevention.
Minimum Heating Off Time	HO	Allows the heating off-time to be set for short cycle prevention.
Minimum Cooling Setpoint	CL	Sets the minimum allowable cooling setpoint.
Maximum Heating Setpoint	HL	Sets the maximum allowable heating setpoint.
Configuration of Energy Savings Input	ES	Allows the energy savings mode to be activated by a choice of either contact closure or contact opening
Display of Room Temperature	rt	Allows the installer to restrict the displayed temperature to setpoint only. If this parameter is selected the unit will always display the setpoint temperature.

Programming the Parameters

The installer setup mode is accessed by reducing the setpoint to 10°C (50°F), waiting until the room temperature is displayed, and then pressing the ▼ and ▲ keys simultaneously for 3 seconds. *If the installer set-up has previously been entered and the Minimum Cooling Setpoint increased above 10°C, the installer set-up mode can be accessed by reducing the setpoint to the new value before pressing the two buttons. If XE99 has been configured to display the setpoint only, then access Installer Setup Mode by reducing the setpoint as before, then waiting for 3 seconds before pressing the ▼ and ▲ keys.*

The first parameter identifier will be displayed at this point and the parameter value can be changed by pressing the ▲ key. The first press displays the default value and any subsequent press alters the value. The values will wrap around. To select the parameter value and move to the next parameter the ▼ is pressed. After the final parameter is selected a further press of the ▼ key exits from programming mode.

The programming mode can be re-entered by pressing the ▲

Parameter Values

Each parameter has a *default* value that is used when the XE99 is first powered up. This value can be changed from within the Installer Setup Mode, and once changed it will be stored in EEPROM so it is not lost in the event of power failure.

If the user wishes to restore the parameters to the default values, this can be done by changing the temperature scale **tS** from °C to °F and back again.

Choice of Parameters

Description	Default		Range	
Temperature Scale	°C		°C / °F	

	°C Scale		°F Scale	
Description	Default	Range	Default	Range
Dead Band	2	2, 3, 4	4	3, 4, 5
Heat or Cool Operating Mode	0 =cool	0, 1 0=cool, 1=heat	0 =cool	0, 1 0=cool, 1=heat
Energy Savings Cooling Setpoint	25	25...30	77	77...90
Energy Savings Heating Setpoint	18	10...18	65	50...65
Minimum Cooling Off Time (minutes)	0	0,3,4,5	0	0,3,4,5
Minimum Heating Off Time (minutes)	0	0,3,4,5	0	0,3,4,5
Minimum Cooling Setpoint	10	10 - 30	50	50 - 90
Maximum Heating Setpoint	30	10 - 30	90	50 - 90
Configuration of Energy Savings Contact Input	1 =close	1, 0 1=close, 0=open	1 =close	1, 0 1=close, 0=open
Display of Room Temperature	1 =Display room temp	1, 0 1=Display room temp, 0=display setpoint only	1 =Display room temp	1, 0 1=Display room temp, 0=display setpoint only

Programming Example

To enter the installer setup mode:

1. Press ▼ to change the temperature setpoint to 10°C (50°F)
2. Wait until the room temperature is displayed.
3. Press and hold ▼ ▲ together until **tS** is displayed.
4. The temperature scale can now be changed, if required, by pressing ▲
5. Now press ▼ to move to the next parameter.
6. When the parameter code is displayed, press ▲ once to show the factory set value
7. Continue to press ▲ to show all possible values of this parameter in sequence (the values will scroll around).
8. When the desired value is displayed, it is selected by pressing ▼ once. This will also move to the next parameter, whose identifier will now be displayed.
9. Continue to use ▼ to move from one parameter to the next, and ▲ to alter the parameter value.
10. When the last parameter **rt** has been selected, a final press of ▼ will return the display to the normal operating mode

9

DETAILED EXPLANATION OF FEATURES

1. Heat or Cool Operating Mode

For single output stage XE99 models (T6570, T8570, T6574, and T8574) it is necessary to configure the thermostat for **Cooling** or **Heating** mode, depending on which of these applications is required. This is done from within the **Installer Setup Mode**, by setting parameter OP. This is necessary for 2 reasons :

a. So that the correct heating symbol (♦) or cooling symbol (✳) is displayed during control operation.
b. So that, when **Energy Savings** is activated, the thermostat 'knows' whether to control to the **Energy Savings Cooling Setpoint** or to the **Energy Savings Heating Setpoint**.

Note the default setting is for Cooling.

2. Energy Savings Cooling Setpoint

This is the minimum Cooling Setpoint which will be used whenever the Energy Savings feature is activated, in order to save energy, for example, when the room is unoccupied. The value can be set in the **Installer Setup Mode**, from the default value of 25°C up to 30°C in 1°C steps. When activated, this setpoint will not be shown on the display, but **Energy Savings Mode** will be indicated by a $ symbol. If the user setpoint is made higher than the **Energy Savings Cooling Setpoint**, then control will be at the user setpoint. See diagrams below that illustrate how **Energy Savings** operates with Single Stage or Sequence control.
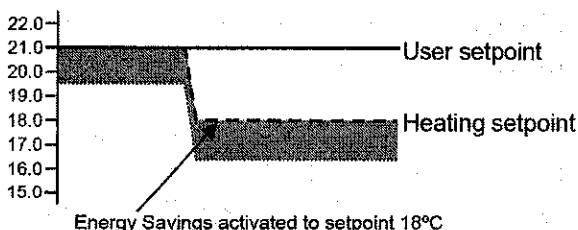
3. Energy Savings Heating Setpoint

This is the maximum Heating Setpoint which will be used whenever the Energy Savings feature is activated, in order to save energy, for example, when the room is unoccupied. The value can be set in the **Installer Setup Mode**, from the default value of 18°C down to 10°C in 1°C steps. When activated, this setpoint will not be shown on the display, but **Energy Savings Mode** will be indicated by a $ symbol. If the user setpoint is made lower than the **Energy Savings Heating Setpoint**, then control will be at the user setpoint. See diagrams below that illustrate how **Energy Savings** operates with Single Stage or Sequence control.
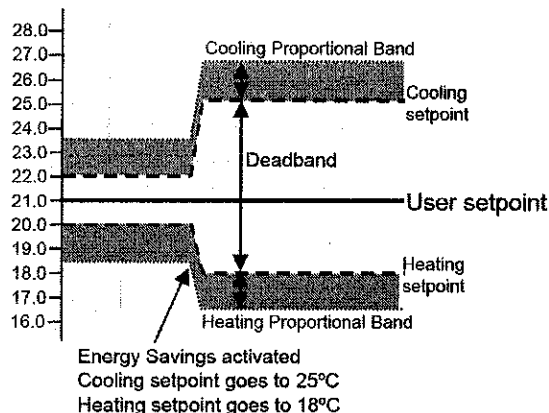
ENERGY SAVINGS - SINGLE STAGE COOLING

Energy Savings Activated to setpoint 25°C
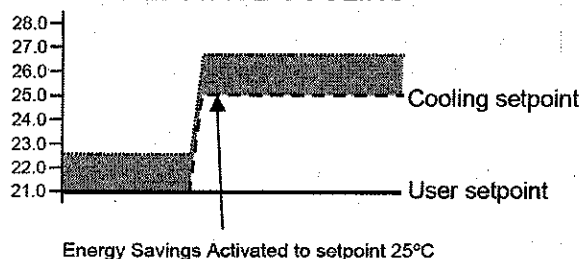
ENERGY SAVINGS - SINGLE STAGE HEATING

Energy Savings activated to setpoint 18°C

ENERGY SAVINGS - HEATING + COOLING SEQUENCE CONTROL

Energy Savings activated
Cooling setpoint goes to 25°C
Heating setpoint goes to 18°C

4. Minimum Cooling Off Time

XE99 allows the installer to minimise the cycling of such devices as compressors and fans to prevent increased wear. This short-cycle protection is done by setting a **minimum off-time** for the control output, either 0, 3, 4, or 5 minutes. This means that when the control relay switches off it will not come on again until **the minimum off-time** has elapsed. If the setpoint is changed in the meantime, the output will not come on again, but the cooling symbol (✳) on the display will flash to indicate **minimum cooling off-time** is operating. The default is zero **minimum off-time**. For heat/cool XE99 models, it is possible to set the **minimum cooling off-time** and **minimum heating off-time** separately. For single output stage XE99 models (T6570, T8570, T6574, and T8574) it is possible to set either **minimum cooling off-time** or **minimum heating off-time** but not both. In these models, the selection of **operating mode** determines which minimum off-time can be set.

5. Minimum Heating Off Time

Minimum heating off-time can be set to either 0, 3, 4, or 5 minutes. This means that when the control relay switches off it will not come on again until **the minimum off-time** has elapsed. If the setpoint is changed in the meantime, the output will not come on again, but the heating symbol (♦) on the display will flash to indicate **minimum heating off-time** is operating. The default is zero **minimum off-time**. For heat/cool XE99 models, it is possible to set the **minimum cooling off-time** and **minimum heating off-time** separately. For single output stage XE99 models (T6570, T8570, T6574, and T8574) it is possible to set either **minimum cooling off-time** or **minimum heating off-time** but not both. In these models, the selection of **operating mode** determines which minimum off-time can be set.
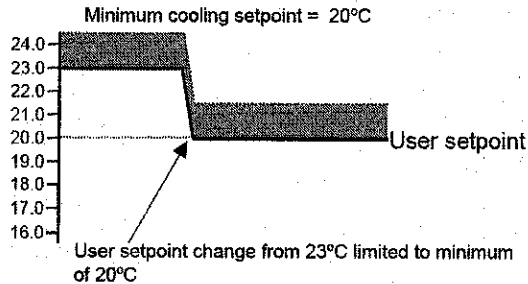
6. Minimum Cooling Setpoint

To prevent over-cooling and help save energy, XE99 allows the cooling setpoint to be limited so that the user cannot reduce it below a limit value. By default this value is 10°C and can be set anywhere from 10°C to 30°C in 1°C steps from within the **Installer Setup Mode**. For single stage applications (T6570 and T6574 models) or manual heat/cool changeover (T6575B) it is not possible to reduce the displayed setpoint below the **minimum cooling setpoint**. For sequence control applications, the user setpoint is in the
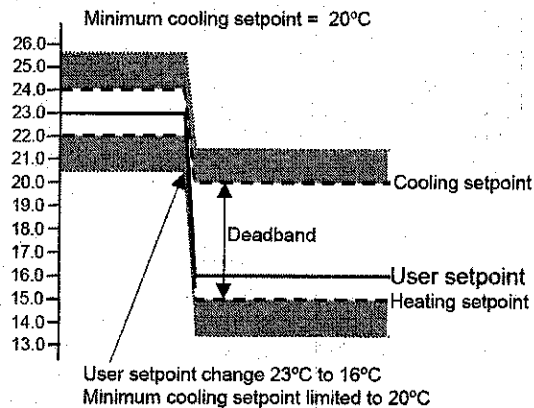
EXPLANATION OF FEATURES (CONTINUED)

deadband between cooling and heating setpoints, so it can still be adjusted and shown on the display. However, the cooling setpoint itself will be limited as shown in the diagrams below.

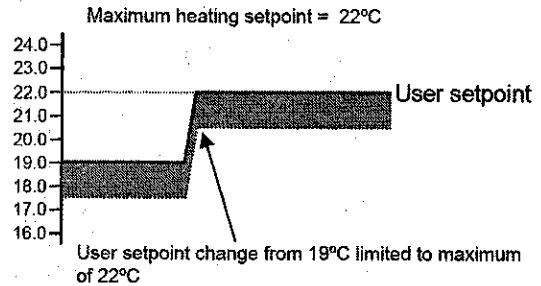## MINIMUM COOLING SETPOINT
SINGLE STAGE COOLING

Minimum cooling setpoint = 20°C

User setpoint change from 23°C limited to minimum of 20°C

MINIMUM COOLING SETPOINT
HEATING + COOLING SEQUENCE CONTROL

Minimum cooling setpoint = 20°C

User setpoint change 23°C to 16°C
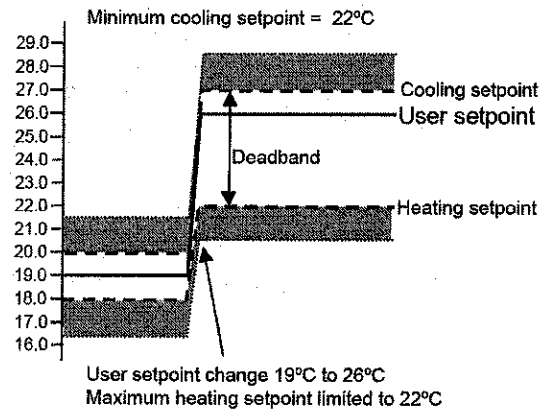Minimum cooling setpoint limited to 20°C

7. Maximum Heating Setpoint

To prevent over-heating and help save energy, XE99 allows the heating setpoint to be limited so that the user cannot increase it above a limit value. By default this value is 30°C and can be set anywhere from 10°C to 30°C in 1°C steps from within the *Installer Setup Mode*. For single stage applications (T6570 and T6574 models) or manual heat/cool changeover (T6575B) it is not possible to increase the displayed setpoint above the **maximum heating setpoint**. For sequence control applications, the user setpoint is in the deadband between cooling and heating setpoints, so it can still be adjusted and shown on the display. However, the heating setpoint itself will be limited as shown in the diagrams below.

MAXIMUM HEATING SETPOINT
SINGLE STAGE HEATING

Maximum heating setpoint = 22°C

User setpoint change from 19°C limited to maximum of 22°C

MAXIMUM HEATING SETPOINT
HEATING + COOLING SEQUENCE CONTROL

Minimum cooling setpoint = 22°C

User setpoint change 19°C to 26°C
Maximum heating setpoint limited to 22°C

8. Configuration Of Energy Savings Input
See page 7 for full details.

9. Display of Room Temperature
By default, the display will show measured room temperature as normal, and setpoint temperature by demand, whenever any of the ▼ or ▲ keys is pressed. This feature allows the installer to decide whether to restrict the display to show the temperature setpoint only.