

# heatline

## *Duct Mounted Heaters*

*Operation & Maintenance Manual*



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VES Ref. ID.889  
Issue J


February 2024  
Original Instructions


## Conventions


**Important**  This manual must be read in full before Installation, Operation and Maintenance of the units supplied

Please ensure that this document is passed to the end user. This manual forms an integral part of the product and should be kept for the working life of the product. Additional copies of this and supporting documents are available by contacting VES or by visiting [www.ves.co.uk](http://www.ves.co.uk) and following the 'Download O & M's' link.

The following symbols used within this document refer to potential dangers, advice for safe operation or important points of reference

**Warning**  Indicates hazards associated with electric current and high voltages

**Caution**  Indicates hazards that require safety advice for personnel or potential unit/property damage

**Important**  Indicates important information

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**Introduction 1** The **VES HEATLINE** Duct Mounted Heater Battery brings wider versatility to existing and new ventilation installations. Intelligent control options for BMS or LCD room units, plus a Thyristor (EHB option) /Valve actuator (LPHW option) heater make this the ideal solution to accurately heat individual rooms. HEATLINE is also both simple to install and maintain. Duct sizes form a slow as 100 Square/Round on EHB, 200 Square/Round on LPHW. Operating temperature -5 to 40 °C.

For further technical details regarding dimensions and weights, contact VES Andover Ltd on **02380 46 11 50**, quoting the sales order (SO) number and the unit type as found on the unit nameplate or visit [www.ves.co.uk](http://www.ves.co.uk).

**Unit Description 2**  
Part Number Coding

	Point Description	Point Variants	Details (as appropriate)
1	Product	HLD HLC HLS	Square Ducting Circular Ducting Square Ducting Stab-in
2	Duct Size	100 to 600 100 to 600	Diameter size for circular ducting Lengths of sides for square ducting
3	Config	/Null /W	Plantroom Weatherproof
4	Heating	0.5 to 32 /W	KW rating Coil
5	Thyristor Heater Supply	/Null 1x1 1x3	1 Phase 3 Phase
6	Control Options	BMS  CP	V/F enabled and 0-10V heat demand control from remote source LCD room unit control

Typical example



**Receipt of Goods 3**  
& Handling

Immediately upon receipt of goods, check for possible damage in transit. Also check to ensure that any ancillary items are included. These will normally be supplied fitted or taped to the unit (in the case of small items).

In the event of any damage having occurred or if any item found to be missing, it is essential to inform VES Andover Ltd. within **7 working days** of delivery quoting sales order (SO) number and the unit type as found on the unit nameplate. After this period we will be unable to accept any claim for damaged or missing goods.

## Product Overview 4

### 4.1 Features

- Suitable for circular (HLC) and square ducts (HLD) in various sizes.
- Single or three phase Thyristor or LPHW available for modulating output.
- Integrated controls for response to BMS.
- Optional versatile LCD room unit with built in sensor and timers.
- Easy installation to existing ductwork systems.
- Extensive built-in safety features.
- Mez flange or self sealing spigots .
- Weatherproof units fitted with lid and powder coated to RAL7004.

Use with **VES ecovent** products, filter and fan kits . (Refer to page 6).

### 4.2 Control types

#### 4.2.1 BMS

External control

Control option 1 - BMS V/F enabled and 0-10 V dc control (no room unit).

- 1ph or 3ph Thyristor or low pressure hot water heater options .
- Fan control up to 4 Amps 230 V @ 50 Hz (Run on timer required).
- Main isolating switch with lockable handle.
- Independent safety circuitry.
- Factory fitted safety interlock airflow pressure and thermal cutout switches.
- Volt free run and trip indication.
- V/F enable and 0-10 V heating demand signal required to operate unit.
- Run on timer requiring heating demand signal to be removed for a minimum of 2 minutes before V/F system run signal is removed.

#### 4.2.2 CP

Control option 2 - LCD Room Unit

As control option 1 PLUS...

- LCD room unit with built-in room sensor and user temperature adjustment.
- On/Off/Auto control.
- Time clock setup and fan overrun timer adjustment.
- Fault display.
- Adjustable commissioning and control parameters.
- Tamperproof locking with PIN access.
- Optional duct sensor for supply air or return temperature control.

## Installation 5

The entire system must be considered for safety purposes and it is the responsibility of the installer to ensure that all of the equipment is installed to compliance with the manufacturer's recommendations, with due regard to the current HEALTH AND SAFETY AT WORK ACT and conforms to all relevant statutory regulations.

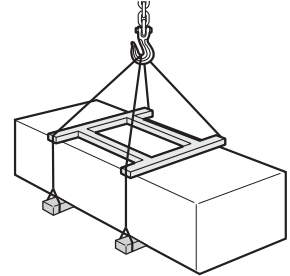
Where a unit is installed so that failure of components could result in injury to personnel, precautions should be taken to prevent such an injury. It is the installer's responsibility to ensure that access panels are not obstructed in any way and safe working access for maintenance must be provided in accordance with the Health and Safety, and Building Regulations. For confirmation of required access please see the appropriate unit outline drawing.


Consideration must also be given by the installer for adequate illumination of the unit location in order for safe maintenance. Further consideration should be given to the unit's position and secured into place as appropriate. This is especially important with external mounting as the wind and elements may effect overall stability.

Installation 5 Continued

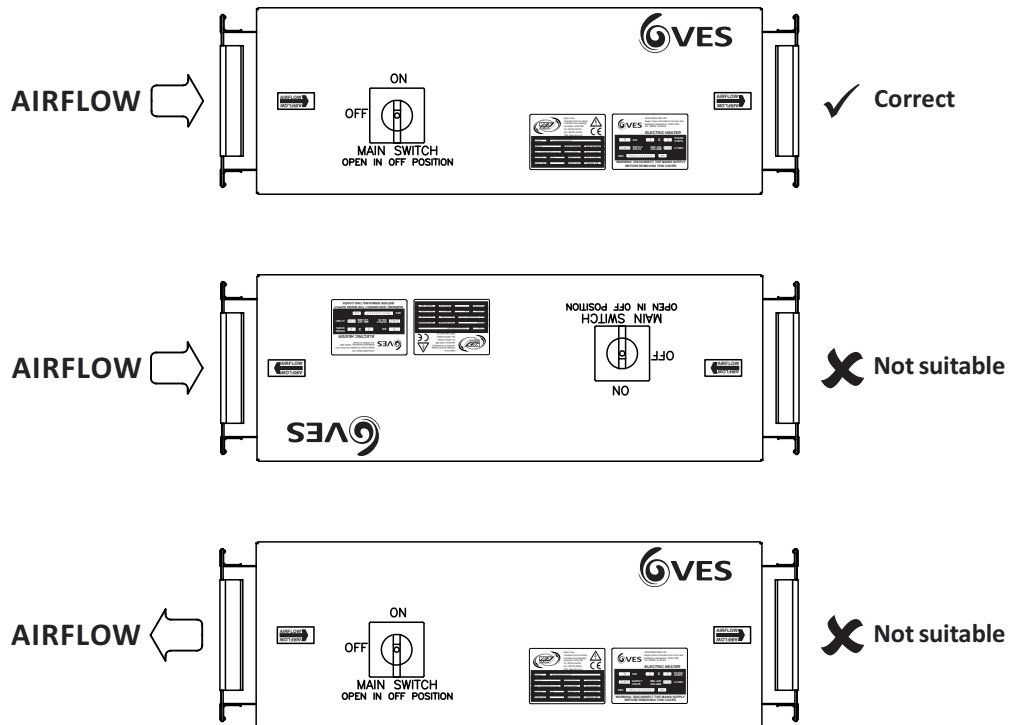
**Caution**  Lids, housing and coil connections must NOT be used as lifting points.

When moving the unit, handle with care and in such a manner as to avoid damaging the external finish as this may reduce the ability to reduce corrosion. Units are to be rigged and lifted using spreaders, taking into account the weight of the unit, and lifting gear should be arranged so as not to bear on the casework see right.



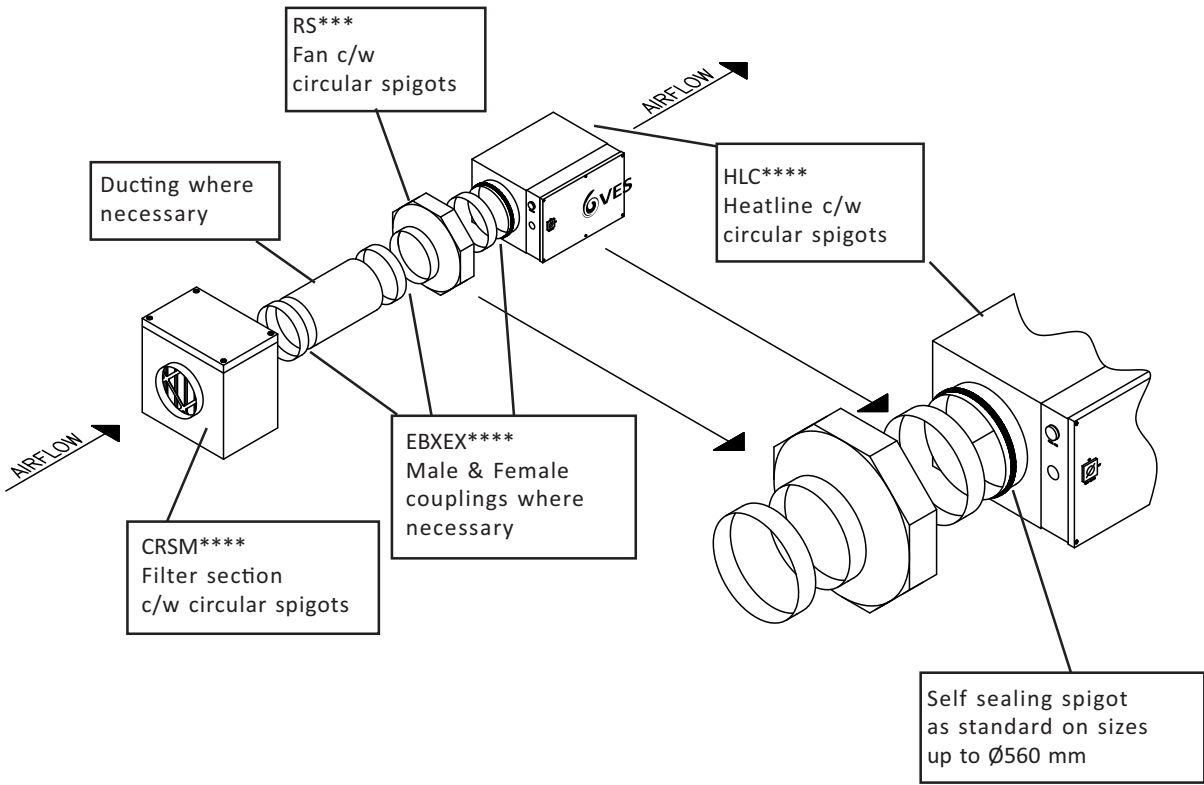
**Caution**  Where units have been supplied, without feet fitted, take all necessary measures & precautions to ensure the unit is fully supported and does not rely on adjoining ductwork for full weight bearing. Only experienced fitters should undertake this work. Take necessary safety precautions when working in elevated positions.

5.1 Orientation

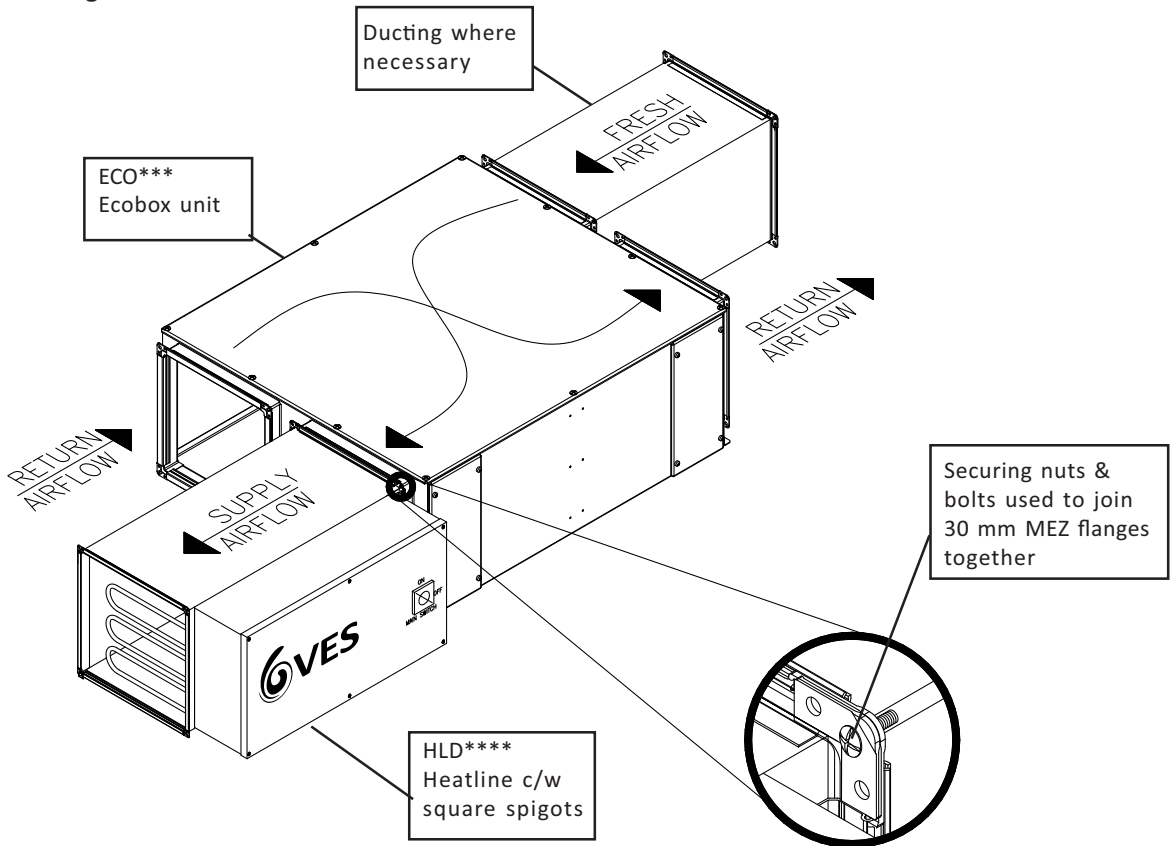


**Duct Installation 6**  
Circular ducting


Examples for illustrative purposes only





**Square ducting**




Duct Installation 6 Continued


**Important**  For sensitive installations, VES can offer a 4 to 20 mA control option.

**Warning**  Fan run on sequence determined by BMS.

**Warning**  To ensure safety and compliance, please refer to O&M manual for wiring, fan run-on, and installation instructions.


6.1 Airflow

**Caution**  The heater can be used for horizontal or vertical airflow. The air should be evenly distributed across the duct and if the minimum air volume as stated on the air heater name plate must be maintained.

**Important**  It is important to ensure the system has a minimum working pressure across the heater of **at least 20 Pa** or more. Less than this the system will not operate as expected.

6.2 Thermal Cutout (Auto)

(EHB option only)

**Warning**  Every heater is provided with a thermal cutout which will break contacts when the duct temperature rises above 70 °C. This cutout is provided to comply with M & E specifications and will require removal of the terminal cover to reset.  
**Supply must be isolated before removing cover.**





6.3 Testing

(EHB option only)

N.B. It is very important that all electrical connections are properly made. Elements are tested prior to dispatch and are within tolerance of  $\pm 7\frac{1}{2}\%$  W of total load. If the elements are found to be faulty they can be easily removed and replaced. Elements stored in damp conditions may need drying to attain correct insulation readings - contact VES Andover Ltd. if in doubt.

6.4 Notes

(EHB option only)

- Warning**  • Supply to Heatline should be 1ph or 3ph and a neutral - refer to name plate for correct supply.
- Caution**  • The heater is fitted with a manual reset high temperature cutout which has NC (normally closed) terminals and an air flow pressure switch. This is connected in series with the main contactor coil circuit, to remove power from the heater in the event of over-temperature or airflow failure. **Under no circumstances is this circuit to be by passed.**
- Important**  • Ensure sufficient earth connection to terminal is provided.
- Important**  • The speed controller must not switch off fan independent of control system or allow airflow to fall below stated volume on the electric heater battery.
- Fan run on timer required. Turn off 0-10 V heat demand signal 2 minutes before fan enable signal.
  - Separate cables should be installed for 0-10 VDC, Control signal and 24 VAC switched enable signal in compliance BS7671/2018.

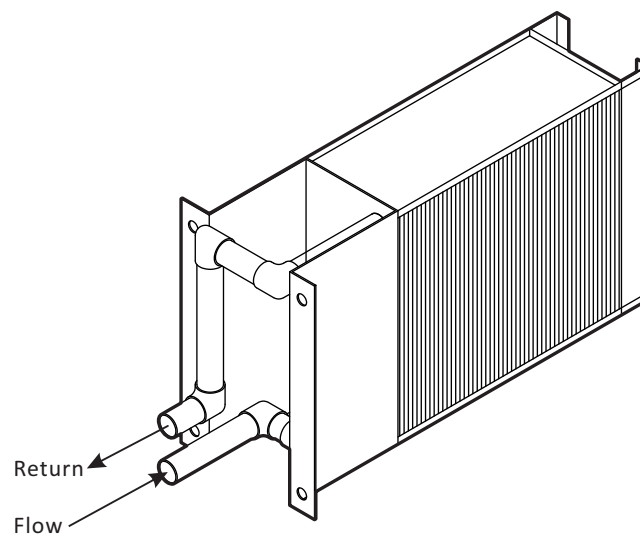
**Coil Installation 7** Coils should be piped according to any relevant local codes of practice. Where threaded connections are supplied, the only approved method of jointing is by use of Boss white and hemp. The thread fitted to the coil is to be supported at all times whilst making joints. All external piping is to be supported independently from the coil. Fluid filters are recommended.

It is important that water and steam coils are protected against damage from extreme weather conditions during the winter season. If the water is allowed to freeze in the coil system, damage may occur potentially bursting pipes and resulting in emergency problems. Fitting a frost thermostat at the unit inlet and ensuring that boilers run continuously in low ambient temperatures can help to prevent this.

Heating coils do not cool immediately when the hot water supply is turned off. The residual heat must be dissipated to avoid damage. The continuous running of the fan after shutdown resolves this, by operation of a run-on timer; the recommended length of run-on is **2 minutes minimum**.

On **HeatLine** units, a Low Pressure Hot Water (LPHW) coil will be installed. Coils are normally suitable for LPHW at 82 °C flow and 71 °C return temperature. LPHW coils are supplied as standard with an air vent and drain plug located on the pipe work immediately adjacent to the coil connection. The air vent should be at the highest point, with the drain at the lowest. The coil should be regularly vented so as to avoid potential air locks, resulting in a fall off of duty.

It is recommended that a check be made as to whether any treatment is required to the water supply for prevention of corrosion and scaling of the equipment. Information regarding the necessary action to be taken can be obtained from the relevant Local Water Supply Authority.



The unit will have been supplied with connections either left or right-hand side looking in direction of airflow. Please see order acknowledgment for confirmation of this handing. Should you need to alter this please consult VES Andover Ltd as unit adjustment may invalidate your warranty.

LPHW units feature a coil connection cover. To access during installation carefully remove the cover by unfastening the fixings around the cover. Holes have been provided in the housing base for pipe work entry. Please follow the appropriate manufacturer's instruction carefully when fitting a valve actuator. Ensure that the cover and fixings are replaced upon completion.



Wiring 8

**Warning** 

The electrical supply **must be fully isolated** before attempting to affect any work on this unit. All electrical connections to any unit must be carried out in accordance with the current edition of the I.E.T Regulations, only competent Electricians should be allowed to affect any electrical work to our units.

**Important** 

It is the customer's responsibility to supply earth fault protection through the building installation device and a dedicated, isolated power supply with overload protection.

**Warning** 

Do not connect any unit to an electrical supply voltage outside of the specification.

**Important** 

This document refers to 0-10 V control input. In some cases a 4-20 mA control input may have been provided.

**Warning** 

- Supply to Heatline should be 1ph or 3ph and a neutral - refer to name plate for correct supply.
- The heater is fitted with a manual reset high temperature cutout which has NC (normally closed) terminals and an air flow pressure switch. This is connected in series with the main contactor coil circuit, to remove power from the heater in the event of over-temperature or airflow failure. **Under no circumstances is this circuit to be bypassed.**

**Caution** 

- Ensure sufficient earth connection to terminal is provided.

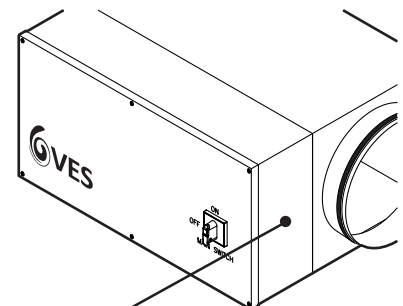
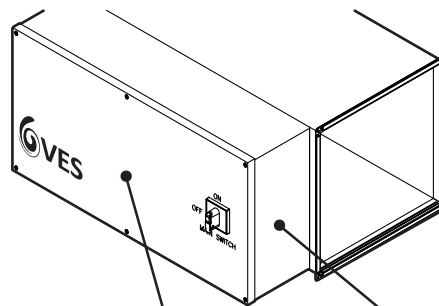
**Important** 


- The speed controller must not switch off fan independent of control system or allow airflow to fall below stated volume on the electric heater battery.
- Fan run on timer required. Turn off 0-10 V heat demand signal 2 minutes before fan enable signal.
- Separate cables should be installed for 0-10 VDC, Control signal and 24 VAC switched enable signal in compliance BS7671/2018.

**Important** 

It is recommended that the cable entry point should be at the end of the control section as shown in the figure below. It is the responsibility of the installer to ensure that a suitable cable gland (giving adequate protection and strain relief) is fitted, and in doing so also ensure that no internal components are damaged during this installation. Make certain all swarf is removed before use.

Recommended cable entry point



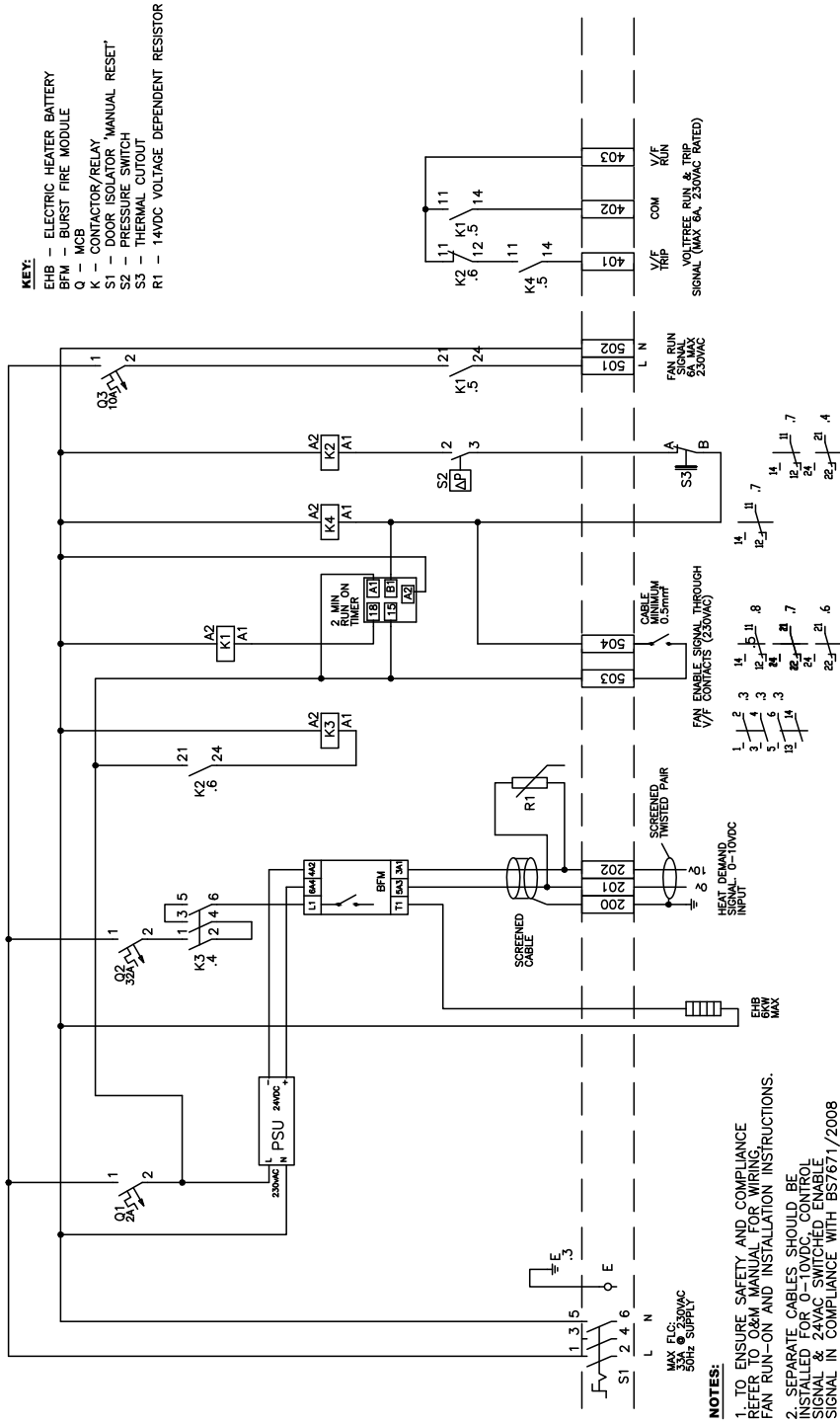
 Remove Cover before making cable entry.

Recommended cable entry point

Wiring 8 Continued

The following wiring diagrams are a guide to installing the standard fan and actuator options found on Heatline units. If in any doubt, for units with fitted VES controls or for special versions of the units, consult the wiring diagram in your document pack or contact VES Customer Services Department on **02380 46 11 50**, quoting the sales order (SO) number and unit type as found on the unit name plate.

8.1 BMS 1ph example wiring diagram

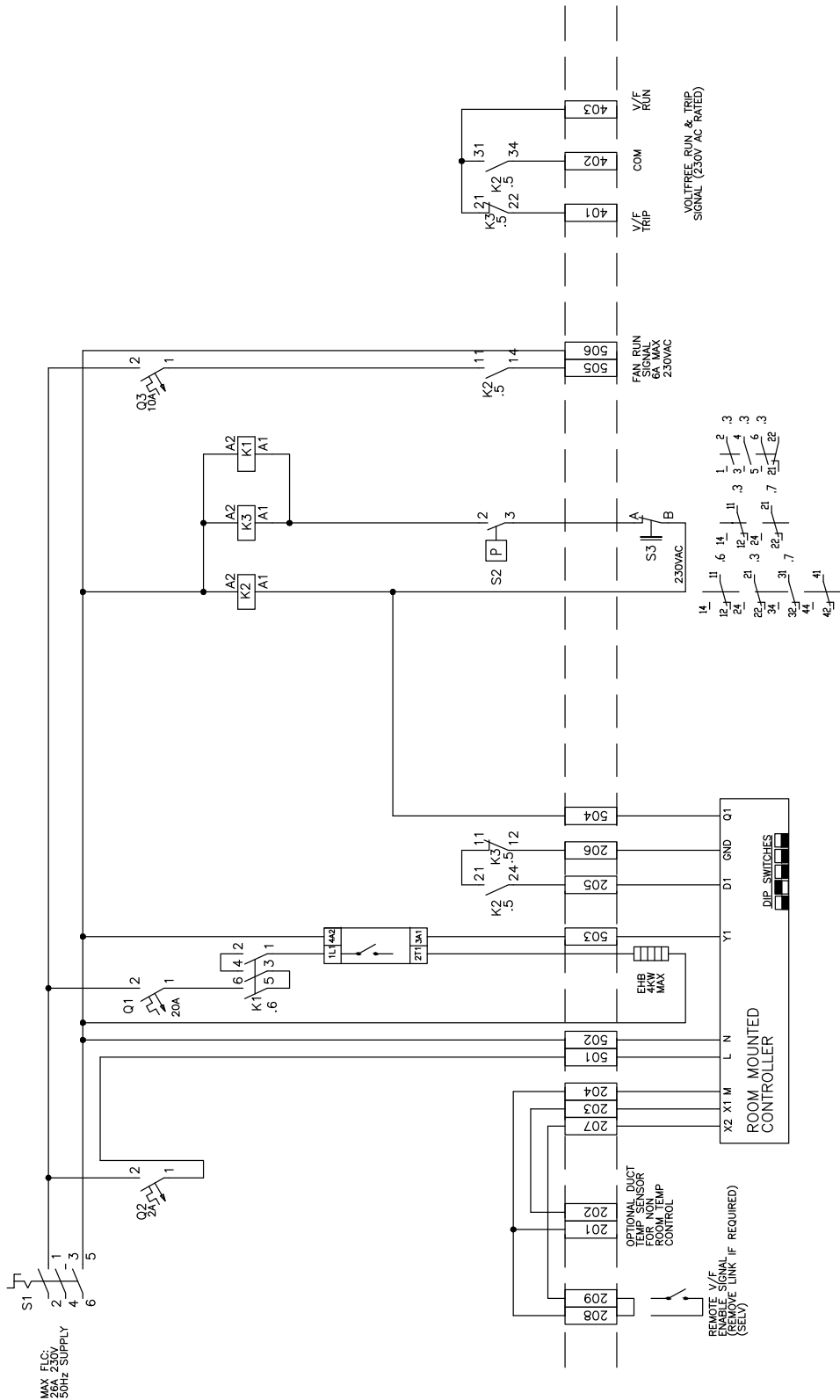


Warning  Caution  Important  Note: Please refer to order acknowledgement for specific load wiring information and heater load.



Wiring 8 Continued

8.2 CP 1ph example wiring diagram



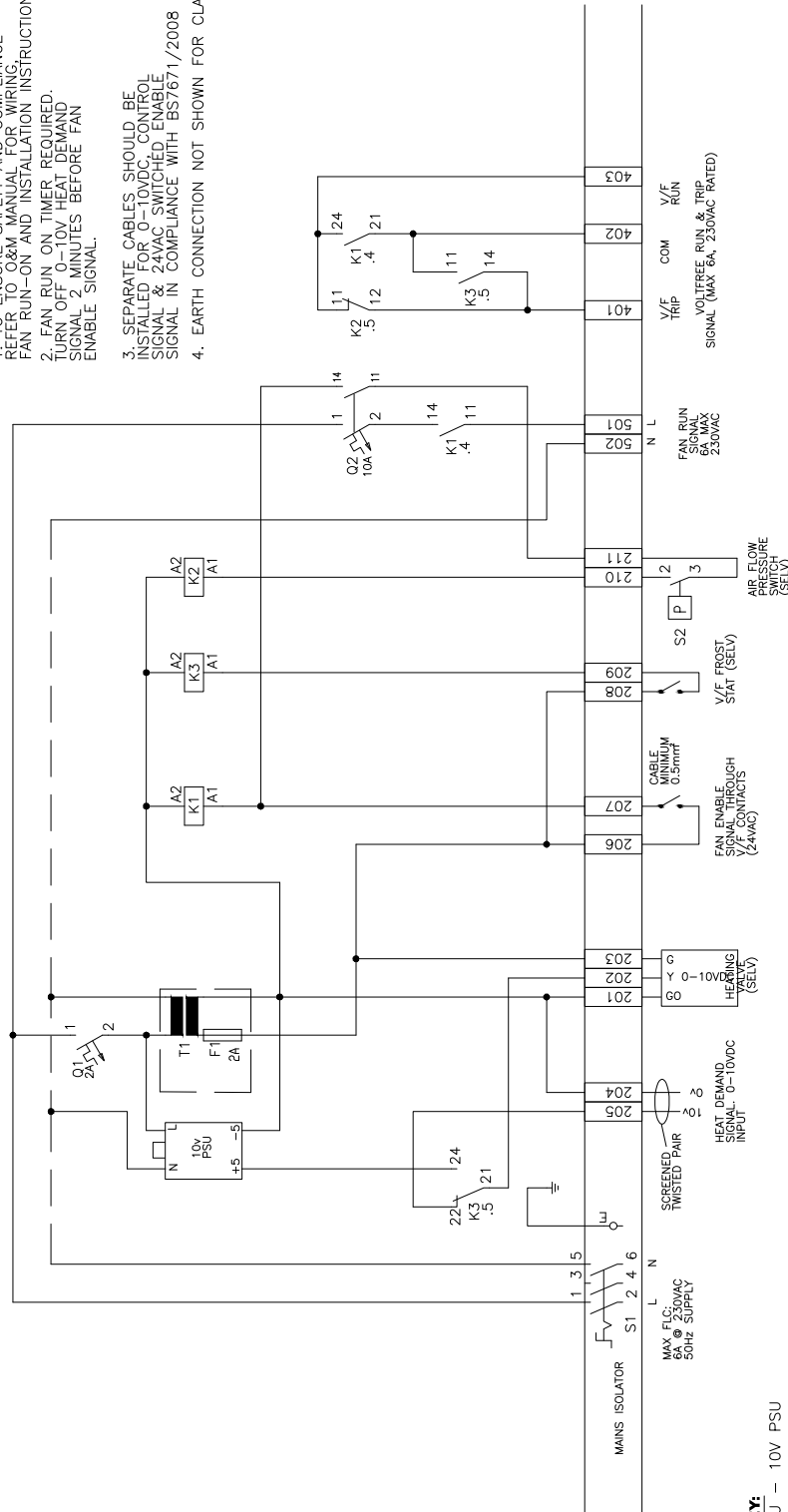
Warning		Caution		Important		Note: Please refer to order acknowledgement for specific controls wiring information and heater load.
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Wiring 8 Continued

8.3 LPHW BMS example wiring diagram

- NOTES:**
1. TO ENSURE SAFETY AND COMPLIANCE REFER TO O&M MANUAL FOR WIRING, FAN RUN-ON AND INSTALLATION INSTRUCTIONS.
  2. FAN RUN ON TIMER REQUIRED. TURN OFF 0-10V HEAT DEMAND SIGNAL 2 MINUTES BEFORE FAN ENABLE SIGNAL.
  3. SEPARATE CABLES SHOULD BE INSTALLED FOR 0-10VDC CONTROL SIGNAL & 24VAC SWITCHED ENABLE SIGNAL IN COMPLIANCE WITH BS7671/2008
  4. EARTH CONNECTION NOT SHOWN FOR CLARITY.

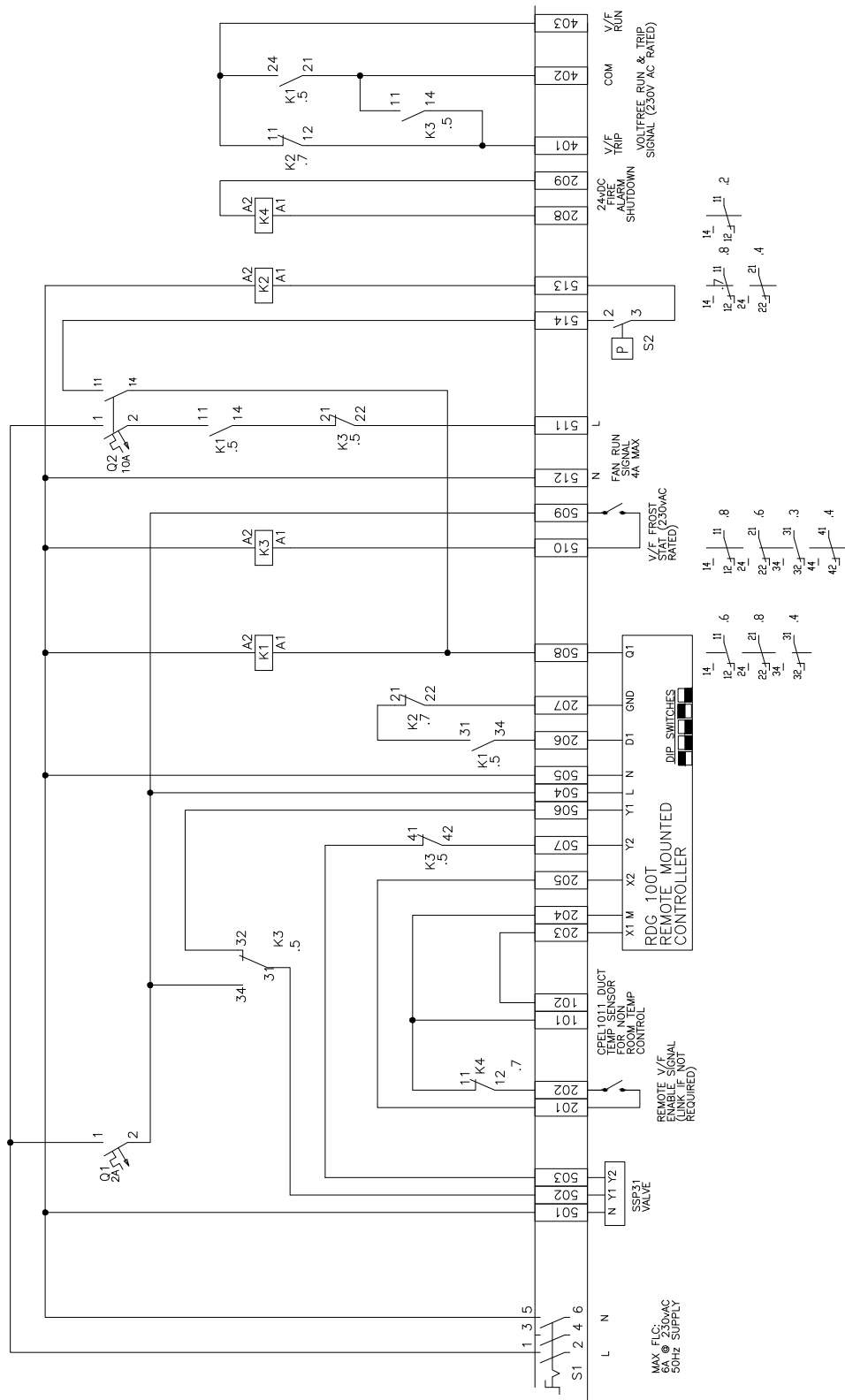


- KEY:**
- PSU -- 10V PSU
  - Q -- MCB
  - T1 -- TRANSFORMER
  - K -- CONTACTOR/RELAY
  - S1 -- DOOR ISOLATOR 'MANUAL RESET'
  - F -- FUSE

Warning ⚡ Caution ⚠ Important ❗ Note: Please refer to order acknowledgement for specific controls wiring information and heater load.

Wiring 8 Continued

8.4 LPHW CP  
example wiring  
diagram



Warning Caution Important

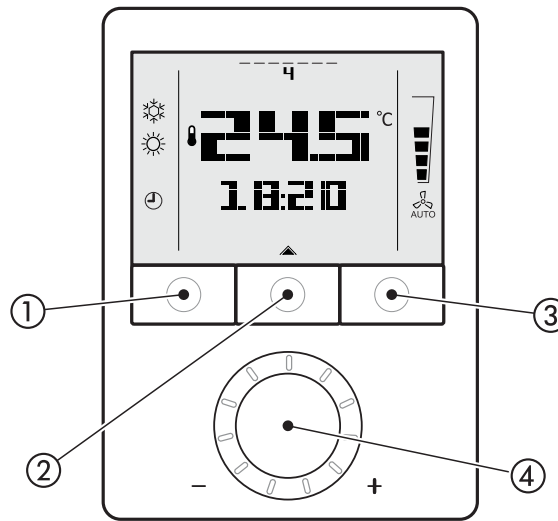
Note: Please refer to order acknowledgement for specific controls wiring information and heater load.



Controls 9

9.1 CP Option Operation

Layout



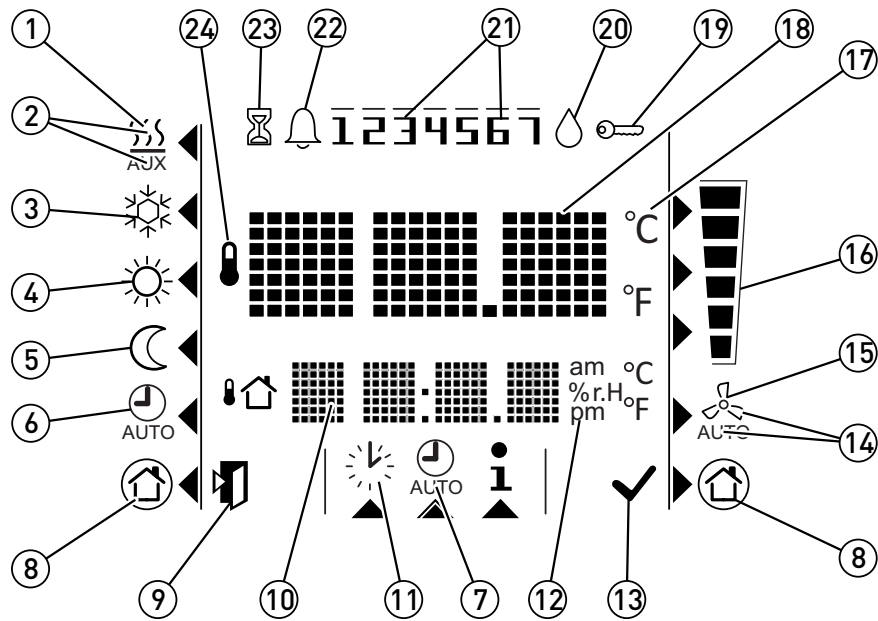
- 1 Operating mode button / Esc
- 2 Button to enter the time and to set the timers
- 3 Fan mode button / OK
- 4 Rotary knob for setpoint and parameter adjustment

Button Operation

- When the thermostat is in normal operation, the actual operating mode and status are indicated by symbols.
- When a button is pressed, the RDG goes into mode selection.
- The LCD backlight will turn on, all possible mode selection options (symbols) will turn on, indicator element (arrow) will appear on the current mode/status.
- When the button is pressed again, the indicator element will change to the next mode symbol and so on.
- After the last press and a time-out of 3 seconds, the newly selected mode is confirmed, the other elements disappear.
- After a time-out of 20 seconds, the LCD backlight will turn off.

User Action	Effect, description
Press left button	Go into Operating mode selection
Press left button >3 seconds	Set thermostat to protection mode
Keep left button depressed & turn rotary knob clockwise	Activate temporary timer "Extend Presence" & set the time
Keep left button depressed & turn rotary knob anticlockwise	Activate "Extend Comfort mode"
Press right button >3 seconds	Activate/Deactivate button lock
Press right button	Change fan mode
Turn rotary knob	Adjust the room temperature setpoint
Press left & right button >3 seconds, release, then press right button for >3 seconds	Go to parameter mode "Service Level"
Press left & right button >3 seconds, release, then press left button for >3 seconds, then turn rotary knob anticlockwise ½ turn (min)	Go to parameter mode "Expert Level", diagnostics
Press centre button	Go to timer settings

Controls 9 Continued



#	Symbol	Description	#	Symbol	Description
①		Heating mode	⑭		Automatic fan
②		Electrical heater on	⑮		Manual fan
③		Cooling mode	⑯		Fan speed 1
④		Comfort mode			Fan speed 2
⑤		Energy Saving mode			Fan speed 3
⑥		Auto Timer mode	⑰		Degrees Celsius Degrees Fahrenheit
⑦		View & set auto timer program			
⑧		Protection	⑱		Digits for room temperature and setpoint display
⑨		Escape	⑲		Button lock
⑩		Digits for time of day, room temperature, setpoint etc.	⑳		Condensation in room (dewpoint sensor active)
⑪		Setting the time of day and the weekday	㉑		Weekday 1....7:1 = Monday /7 = Sunday
⑫	am pm	Morning:12-hour format Afternoon: 12-hour format	㉒		Fault
			㉓		Temporary timer function (visible when operating mode is temporary extended due to presence or absence)
⑬		Confirmation of parameters	㉔		Indicates that room temperature is displayed

## Controls 9 Continued

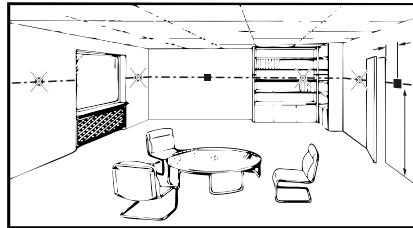
### 9.2 Brief description

#### 9.2.1 Applications

#### 9.2.2 Features

- Controls for modulating thyristor electric heater.
- 2 multifunctional inputs and 1 digital input for keycard contact, external sensor, etc.
- Operating modes: Comfort, Energy Saving and Protection.
- Adjustable commissioning and control parameters.
- Minimum and maximum setpoint limitation.
- Backlit LCD.
- Auto Timer mode with 8 programmable timers.
- 7-day time program: 8 programmable timers to switch over between Comfort and Energy Saving mode.
- Maintenance of room temperature via built-in temperature sensor or external room temperature / return air temperature sensor.
- Display of current room temperature or setpoint in °C and/or °F.
- Button lock (automatic or manual).
- Fault input.
- Reminder to clean filters.
- Reload factory settings for commissioning control parameters.

### 9.3 Mounting and installation



Do not mount on a wall in niches, bookshelves, behind curtains, above or near heat sources, or exposed to direct solar radiation.  
Mount about 1.5 m above the floor.

**Caution**



**Important**



**Warning**



- The room unit must be mounted in a clean, dry indoor place and must not be exposed to water.
- Comply with local regulations to wire, fuse and earth the thermostat.
- Use the correct size cables for the duct EHB controller and room unit.
- The power supply line must have an external fuse or circuit breaker with a rated current to meet the required heater full load current.
- Isolate the cables of inputs X1-M / X2-M and D1-GND if the conduit box carries AC 230 V mains voltage.
- Inputs X1-M and X2-M carry mains potential. If the sensor's cables are extended, they must be suited for mains voltage.
- Inputs X1-M, X2-M or D1-GND of different units (e.g. summer / winter switch) may be connected in parallel with an external switch. Consider overall maximum contact sensing current for switch rating.
- Disconnect power supply before removing the thermostat from the mounting plate!



**Controls 9 Continued**

**9.3 Mounting and installation continued**

Commissioning

Select the application and the type of control output via the DIP switches before fitting the thermostat to the mounting plate. After power is applied, the thermostat carries out a reset during which all LCD segments blink, indicating that the reset was correct. After the reset, which takes about 3 seconds, the thermostat is ready for commissioning by qualified HVAC staff. Refer to section 7.4

The control parameters of the thermostat can be set to ensure optimum performance of the entire system. See page 15 to find out how to set.

Control sequence

The control sequence may need to be set via parameter P01 depending on the application. The factory setting is P01= 0 (heating only)

Calibrate sensor

Recalibrate the temperature sensor if the room temperature displayed on the thermostat does not match the room temperature measured. To do this, change parameter P05.

Setpoint and setpoint setting range limitation

We recommend to review the setpoints and setpoint setting ranges (parameters P08...P12) and change them as needed to achieve maximum comfort and save Energy

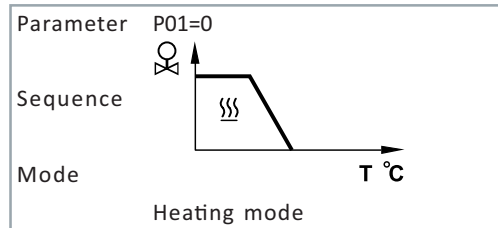
**9.4 Control sequences**

**Important !**

9.4.1 Sequences overview (setting via parameter P01)

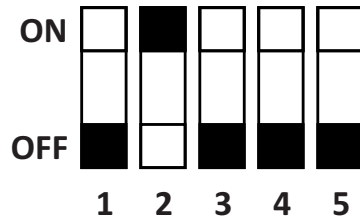
The sequence can be set via **parameter P01**. The thermostats can be used in systems featuring:

- Heating only (P01=0)



9.4.2 Controls output overview (setting via DIP switches)


The patterns of DIP switches is as follows:



Y1/Y2= 2-position

Controls 9 Continued

9.5 Fan control The HLS/HLD unit has single speed fan control only.

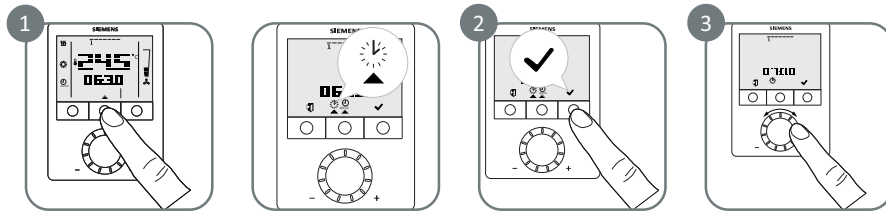
**Caution**  When the electrical heater is switched off, the fan overruns for at least 3 minutes (parameter P54 factory set by VES) to avoid over temperature of the electrical heater or prevent the thermal cutout from responding. In case of fan failure, the thermostat cannot protect the electrical heater against over temperature. That is why the electrical heater features a separate safety device (thermal cutout).  
 Note: For the BMS option the fan run on must be controlled by others

Fan overrun for EHB unit (CP option only)

**Clean Filter** The clean fan filter reminder function counts the fan operating hours and displays message "FIL" to remind the user to clean the fan filter as soon as the threshold is reached. This does not impact the thermostat's operation, which continues to run normally. The clean filter reminder is reset when the operating mode is manually set to Protection and back. See section 9.1

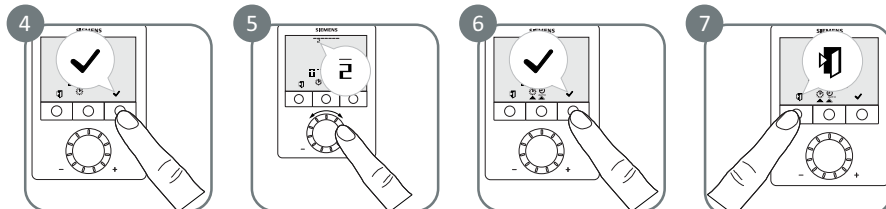
**Fan operation in AutoTimer** In Auto Timer mode, the default fan mode is automatic. The fan mode can be changed to manual by pushing the "FAN" button. The fan returns to the automatic default mode after each switchover from Comfort to Energy Saving mode and vice versa.

**9.6 AutoTimer** The thermostat provides an Auto Timer mode with 8 programmable timers. Each timer can be assigned to one or several days. In this mode, the thermostat automatically changes over between Comfort and Energy Saving mode according to the preprogrammed timers.



**Setting time of day and the weekday**

1. Press the program mode button to enter the programming mode menu.
2. Press button (OK) to enter the setting mode for the time of day. The time digits start blinking.
3. Turn the rotary knob clock- or counterclockwise to set the time of day. 12Hr or 24Hr time format:



**Controls 9 Continued**

**9.6 AutoTimer**  
12 and 24-hour  
format

If the current time of day is in 24-hour format and you wish to change it to 12-hour format, turn the knob clockwise passed 23:59 or counterclockwise passed 00:00. If the current time of day is in 12-hour format and you wish to change it to 24-hour format, turn the knob clockwise passed 12:00 pm or counterclockwise passed 12:00am.

4. Confirm the time of day by pressing the right button. The weekday indicator starts blinking.
5. Turn the rotary knob clock- or counterclockwise to set the current weekday.
6. Confirm the current weekday by pressing button (OK).
7. Press the program mode button (Esc) to leave the program mode.

Default timer setting

Timers A1...A4 have the following default settings (residential use):

Days	Time when thermostat is in Comfort mode	
Mon (1)-Fri (5)	06:30-08:30 (A1)	17:30-22:30 (A2)
Sat (6)	08:00-23:00 (A3)	
Sun (7)	08:00-22:30 (A4)	
	<ul style="list-style-type: none"> <li>• The thermostat is in Energy saving mode ☾ during the remaining time</li> <li>• Timers A5...A8 are free with no default settings</li> </ul>	

Power failure

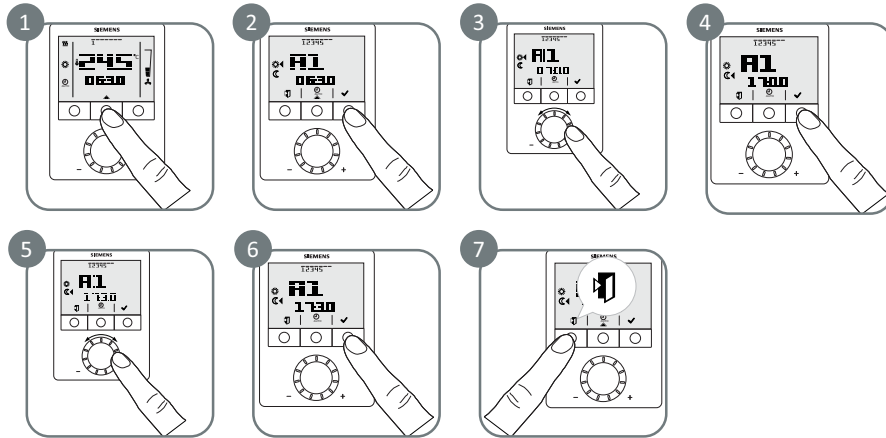
After a power failure, the time of day will blink to indicate power was lost. However the auto timer will continue to run with the time before the power loss occurred. Enter the setting mode to adjust the time of day if needed.

Controls 9 Continued

9.6 AutoTimer Continued

Setting the timers

The CP option provides 8 programmable timers A1 ... A8. Each timer has a Comfort mode start and end time that can be applied to one or several weekdays.

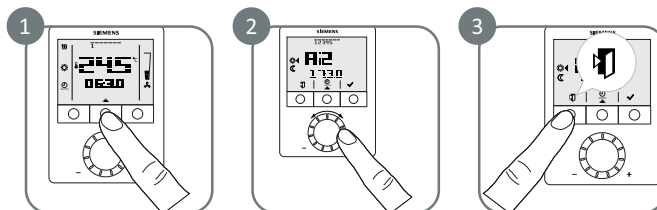


To set an auto timer, proceed as follows:

1. Press the program mode button twice to select “Auto timer setting” on the “Programming mode” menu.
2. Turn the rotary knob to the desired timer A1...A8 that you wish to adjust and press button (OK).
3. Turn the rotary knob to adjust the Comfort mode start time and confirm by pressing button (OK).
4. Turn the rotary knob to adjust the Comfort mode end time or Energy Saving start time respectively and confirm by pressing button (OK)
5. Weekday, and blink. Press button (OK) to select or button (Esc) to deselect each day and advance to the next day.
6. After the 7th day is adjusted, all selected weekdays blink. Confirm setting for actual timer by pressing button (OK) and advance to the next timer. To adjust the next timer, repeat step 3...6 or press button (Esc) to leave the setting mode.

To save your adjustments, remember to press button (OK) in step 6 above before pressing button (Esc) to leave the programmable timer setting mode.

Viewing the timers

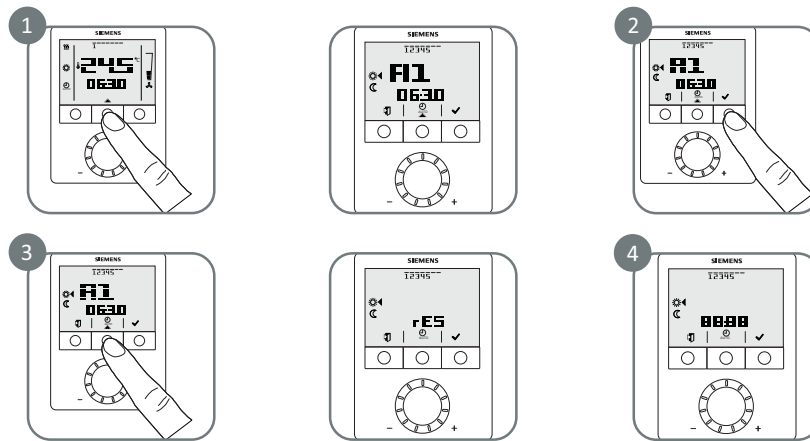


You can view the 8 timers in sequence:

1. Press the program mode button twice to select the “Auto timer setting” in programming mode.
2. Turn the rotary knob to review the 8 auto timers.
3. Press button (Esc) to return to normal operation.

**Controls 9**  
**Continued**  
**9.6 Autotimer**  
**Continued**

Reloading the default timer settings



1. Press the program mode button twice to select the “Auto timer setting” in programming mode.
2. Press button (OK) to enter the timer setting mode.
3. Press the program mode button for at least 3 seconds. “RES” will be displayed
4. Press button (OK) to confirm reloading of the default timer settings or button (Esc) to leave without change. The display will show “8888” during the reloading process.

**9.7 Handling faults**

When the room temperature is outside the measuring range, i.e. above 49 °C or below 0 °C, the limiting temperatures blink, e.g. “0 °C” or “49 °C”. The heating output is activated if the current setpoint is not set to “OFF”, the thermostat is in heating mode and the temperature is below 0 °C. For all other cases, no output is activated. The thermostat resumes Comfort mode after the temperature returns to within the measuring range.

**9.8 Control parameters**

A number of control parameters can be readjusted to optimise control performance. These parameters can also be set during operation without opening the unit. In the event of a power failure, all control parameter settings are retained.

The control parameters are assigned to 2 levels:

- “Service level”
- “Expert level” and “Diagnostics and test”

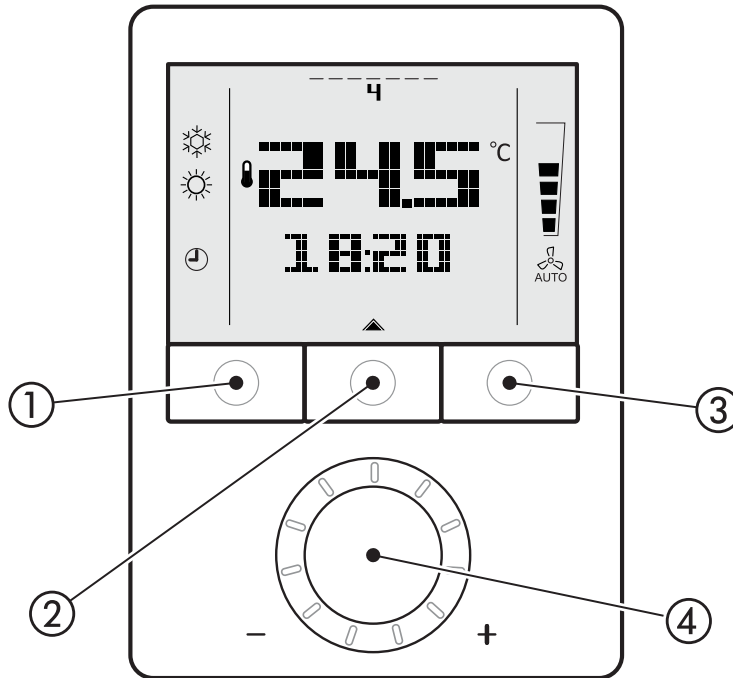
The “Service level” contains a small set of parameters to set up the thermostat for the HVAC system and to adjust the user interface. These parameters can usually be adjusted any time.

Change parameters at the “Expert level” carefully, as they impact control performance and functionality of the thermostat.

Controls 9 Continued

9.8 Control parameters  
Continued

9.8.1 Parameter  
setting



- 1 Operating mode button / Esc
- 2 Button to enter the time and to set the timers
- 3 Fan mode button / OK
- 4 Rotary knob for setpoint and parameter adjustment

**Caution**

- |                                    |   |
|------------------------------------|---|
| Service level                      | 1. Press left and right button simultaneously for >3 seconds, release, then press the right button for >3 seconds. The display shows "P01". Continue with step 2.   |
| Expert level                       | 1. Press left button and right button simultaneously for >3 seconds, release, press the left button for >3 seconds, then turn the rotary knob counterclockwise min. 1/2 rotation. The display shows "Pxx". Continue with step 2.  |
| Adjusting parameters (both levels) | 2. Select the required parameter by turning the rotary knob.<br>3. Press button 3 (OK); the current value of the selected parameter starts blinking and can be changed by turning the rotary knob.<br>4. Press button 3 (OK) to confirm the adjusted value or button (Esc) to cancel the change.<br>5. If you wish to adjust additional parameters, repeat steps 2...4.<br>6. Press button 1 (Esc) to leave the parameter setting mode. |
| Resetting parameters               | The factory setting for the control parameters can be reloaded via parameter P71, by changing the value to "ON". Confirm by pressing the right button. The display shows "8888" during reloading.   |

Controls 9 Continued

9.8 Control parameters  
Continued

9.8.2: Service level

The following parameters are factory set by VES

Parameter	Service Level	Factory Setting	Range	
P01	Control sequence	When 2-pipe /2-stage: 1 = Cooling only When 4-pipe: 4 = H and C *	0 = Heating only 1 = Cooling only 2 = H/C changeover manual 3 = H/C changeover auto 4 = Heating and Cooling	✓
P02	User operating mode profile (mode button)	1	1 = (Auto)-Comfort-Protection 2 = (Auto)-Comfort-E Saving- Protection	✓
P03	User fan mode selection	0	0 = Auto-Manual 1 = Manual 2 = Auto-Manual-Protection	✓
P04	Selection of °C or °F	0 (°C)	0 = Degrees Celsius (°C) 1 = Degrees Fahrenheit (°F)	✓
P05	Sensor calibration (internal/external)	0 K	-3 ... 3K	✓
P06	Standard temperature displayed	0	0 = Room temperature 1 = Setpoint	✓
P08	Comfort setpoint	21°C	5 ... 40°C	✓
P09	Minimum Setpoint in Comfort mode	5°C *	5 ... 40°C	✓
P10	Maximum Setpoint in Comfort mode	35°C	5 ... 40°C	✓
P11	Energy saving heating point	15°C *	OFF, 5 ... WcoolE-saving; (WcoolE-saving = 40 °C max)	✓
P12	Energy saving cooling point	30°C *	OFF, WHeatE-saving ... 40 °C; (WHeatE-saving = 5 °C min)	✓
P13	Electric reheater in cooling mode	ON *	ON: Enabled OFF: Disabled	✓
P14	Button lock function	0	0 = Unlocked 1 = Auto locked 2 = Manual locked	✓

✓ Parameter available

\* Do not adjust

✗ Parameter not available

**Note:** Parameter display depends on selected application and function.  
Some parameter may need adjusting to enable other parameter changes.

## Controls 9 Continued

### 9.8 Control parameters Continued

9.8.3: Expert level

The following parameters are factory set by VES

	Expert Level	Factory Setting	Range	
P30	P-band / Switching differential in heating mode	2K	0.5 ... 6K	✓
P31	P-band / Switching differential in cooling mode	1K *	0.5 ... 6K	✓
P32	P-band / Switching differential for radiator	2K *	0.5 ... 6K	✓
P33	Dead zone in Comfort mode	2K *	0.5 ... 6K	✓
P34	Setpoint differential (wD)	2K *	0.5 ... 6K	✓
P35	Integral time	5 min	0...10 min	✓
P36	Heating / cooling changeover switching point cooling (X1/X2)	16 °C *	10...25 °C	✓
P37	Heating / cooling changeover switching point heating (X1/X2)	28 °C *	27...40 °C	✓
P38	Functionality of X1	1: = Ext. sensor	0 = --- (no function) 1 = Room temp ext / Return temp (AI) 2 = H/C changeover (AI/DI) 3 = Operating mode contact [DI] 4 = Dew point sen. (DI) 5 = Enable electric heater (DI) 6 = Fault input (DI)	✓
P39	Operating action of X1 if digital input	0 (N.O.)	0 = Normally open / Open 1 = Normally closed / Closed	✓
P40	Functionality of X2	2 = H/C changeover	0 = --- (no function) 1 = Room temp ext / Return temp (AI) 2 = H/C changeover (AI/DI) 3 = Operating mode contact [DI] 4 = Dew point sen. (DI) 5 = Enable electric heater (DI) 6 = Fault input (DI)	✓
P41	Operating action of X2 if digital input	0 (N.O.)	0 = Normally open / Open 1 = Normally closed / Closed	✓
P42	Functionality of D1	3 = Op. mode changeover	0 = --- (no function) 2 = H/C changeover (DI) 3 = Operating mode contact [DI] 4 = Dew point sen. (DI) 5 = Enable electric heater (DI) 6 = Fault input (DI)	✓
P43	Operating action of D1 if digital input	0 (N.O.)	0 = Normally open / Open 1 = Normally closed / Closed	✓
P44	Running time of Y1/Y2 output (only when modulating PI control)	150 s	20...300 sec	✓
P45	Running time of Y3/Y4 output (only when modulating PI control)	150 s	20...300 sec	✓

✓ Parameter available

\* Do not adjust

✗ Parameter not available

**Note:** Parameter display depends on selected application and function.  
Some parameter may need adjusting to enable other parameter changes.



Controls 9 Continued

9.8 Control parameters Continued

The following parameters are factory set by VES

	Expert Level	Factory Setting	Range	
P46	Output Y1/Y2 (if not parameterised as 3-pos)	ON/OFF (1) *	1 = 2-position 2 = PWM	✓
P47	Output Y2/Y3 (if not parameterised as 3-pos)	ON/OFF (1) *	1 = 2-position 2 = PWM	✓
P48	Min. output on time 2-Position control output	1 min. *	1...20 minutes	✓
P49	Min. output off time 2-Position control output	1 min. *	1...20 minutes	✓
P50	Purging function (only when changeover appl with local sensor is selected)	OFF *	OFF: Not active 1...5 min: Active with selected duration	✓
P51	Floor heating limit temperature	OFF *	OFF, 10..50 °C	✓
P52	Fan operation	1 *	0 = Disabled 1 = Enabled 2 = Heating only 3 = Cooling only	✓
P53	Fan speed	3-speed *	1 = 1-speed 2 = 3-speed	✓
P54	Fan overrun time (only when electr. heater is used)	60 sec	0 ... 360 sec	✓
P55	Switching point fan speed high	100% *	80..100%	✓
P56	Switching point fan speed med	65% *	30..75%	✓
P57	Switching point fan speed low	10% *	1..15%	✓
P58	Fan start booster	ON *	ON: enabled OFF: disabled	✓
P59	Fan minimum on time (dwell time)	2 min *	1 ... 6 min	✓
P60	Fan kick in Comfort (time until next kick)	0 *	0...89 min, OFF(90 min)	✓
P61	Fan kick in E-saving mode (time until next kick)	OFF *	0...359 min, OFF(360 min )	✓
P62	Clean filter reminder run-time	Off (0)	Off, 100 ... 9900 hours	✓
P65	Protection heating setpoint	8 °C	OFF, 5 ... W Cool Prot; (W Cool Prot = 40 °C max)	✓
P66	Protection cooling setpoint	OFF *	OFF, W Heat Prot ... 40; (W Heat Prot = 5 °C min.)	✓
P67	Fan start delay in 2P control	0 s *	0.. 180 s	✓
P68	Prolong Comfort period	OFF	OFF; 15 ... 360 min	✓
P69	Temporary setpoint Comfort (see also Comfort setpoint P08)	OFF	OFF = Disabled ON = Enable	✓
P70	Infrared receiver	ON *	OFF = Disabled ON = Enabled	✓
P71	Reload factory settings	OFF	OFF = Disabled ON = Enabled	✓

✓ Parameter available      \* Do not adjust      ✗ Parameter not available

**Note:** Parameter display depends on selected application and function. Some parameter may need adjusting to enable other parameter changes.

Controls 9 Continued

9.8 Control parameters Continued

The following parameters are factory set by VES

Parameter	Diagnostics & test	Factory setting	Range
d01	Application type	Diagnostics	0 = (No application) ✓ 1 = 2-pipe 2 = 2-pipe with electric heater 3 = 2-pipe with radiator 4 = 4-pipe 5 = 2 stage heat or cool 6 = 4-pipe with electric heater
d02	X1 status	Diagnostics	0 = Not activated (for DI) ✓ 1 = activated (DI) 0...49 °C = cur. temp. value (for AI) 00  = HC input short 100  = HC input open
d03	X2 status	Diagnostics	0 = Not activated (for DI) ✓ 1 = activated (DI) 0...49 °C = cur. temp. value (for AI) 00  = HC input short 100  = HC input open
d04	D1 status	Diagnostics	0 = Not activated (for DI) ✓ 1 = activated (DI) 00  = HC input short 100  = HC input open
d05	Test mode for checking the Y1/Y2 actuator direction (press left button to escape)	— *	"---" = no signal on outputs Y1 and Y2 ✗ OPE = output Y1 forced open CLO = output Y2 forced closing
d06	Test mode for checking the Y3/Y4 actuator direction (press left button to escape)	—	"---" = no signal on outputs Y3 and Y4 ✗ OPE = output Y3 forced open CLO = output Y4 forced closing

✓ Parameter available      \* Do not adjust      ✗ Parameter not available

**Note:** Parameter display depends on selected application and function.  
Some parameter may need adjusting to enable other parameter changes.

**Controls 9 Continued**

**9.9 Functions**

9.9.1 Temperature control

General note

Setting of the control parameters (P01, etc., mentioned throughout the document) is described in section 9.8.

The thermostat acquires the room temperature via built-in sensor, or external duct air temperature sensor (CPEL2011), and maintains the setpoint by delivering actuator control commands to heating equipment. The switching differential or proportional band is 2 K for heating mode (adjustable via parameters P30). The integral action time for modulating PI control is 5 minutes (adjustable via parameter P35).

Display

The display shows the acquired room temperature or the Comfort setpoint, selectable via parameter P06. The factory setting displays the current room temperature. Use parameter P04 to display the room temperature or setpoint in °F rather than °C as needed.

**9.10 Operating Modes**

Select the thermostat's operating mode via the operating mode button on the unit or operating mode input (e.g. keycard occupancy sensor), when X1, X2, or D1 is set to 3 (P38, P40, P42). A corresponding setpoint is used to maintain the room temperature at the desired level depending on the active operating mode. The following operating modes are available:

Comfort mode



In Comfort mode, the thermostat maintains the room temperature setpoint which can be adjusted via the **rotary knob**.

Energy Saving mode

Energy Saving mode helps save energy. Select it by pressing the operating mode button if parameter P02 is set accordingly, control will then be according to Energy Saving setpoints (P11 and P12).





Protection mode



In Protection mode, the system is **24**  
 – protected against frost (factory setting **8 °C**, can be disabled or changed via P65)  
 – protected against overheating (factory setting **OFF**, can be enabled or changed via P66)













Auto Timer mode



In Auto Timer mode , the thermostat automatically changes from Comfort to Energy Saving mode according to the 8 pre programmed timers. The display shows the Auto Timer mode symbol  along with the symbol for the current operating mode (Comfort  or Energy Saving .


Operating mode button

The behavior of the operating mode button can be selected via parameter P02:

#	Without timer program	With timer program	Remark
1	 → 	 →  → 	Factory Setting
2	 →  → 	 →  →  → 	

## Controls 9 Continued

### 9.11 Room temperature setpoints


Comfort mode  The setpoint in Comfort mode can be adjusted via the **rotary knob**.


Setpoint limitation For energy saving purposes, the setpoint setting range can be limited to minimum (P09) and maximum (P10).

- If the minimum limit **P09 is set lower** than the maximum limit P10, both heating and cooling are adjustable between these 2 limits.
- Heating setpoint adjustable 5...21 °C.

Temporary setpoint If the “Temporary setpoint function” is enabled via parameter P69, the setpoint adjusted via the rotary knob is set back to the Comfort basic setpoint when the operating mode changes.

The factory setting for the Comfort basic setpoint is **21 °C** and can be changed via parameter P08.

Energy Saving mode  Use control parameter P11 to adjust the Energy Saving mode setpoints. The heating setpoint is factory-set to **15 °C**,

Protection mode  Use control parameters P65 to adjust the Protection mode setpoint. The heating setpoint is factory-set to **8 °C** (frost protection).

#### Caution



If a setpoint is set to OFF (P65), the thermostat does not maintain the setpoint in the corresponding mode (heating). This means no protective heating function and thus risk of frost in the heating mode.

### 9.12 Additional features

External/return Temperature The thermostat acquires the room temperature via built-in sensor, or external duct air temperature sensor (CPEL2011) connected to multifunctional input X1 or X2. Inputs X1 or X2 must be commissioned accordingly. X1 via P38 and P39, X2 via P40 and P41

Button Lock If the button lock function is enabled by parameter P14, the buttons will be locked or unlocked by pressing the right button for 3 seconds. If “Auto lock” is configured, the thermostat will automatically lock the buttons 10 seconds after the last adjustment.

Window Contact The thermostat can be forced into Energy Saving mode, e.g. when a window is opened. The window contact can be connected to digital input D1 (or multifunctional input X1, X2). Set parameter P42 (P38, P40) to 3.

**Controls 9 Continued**

**9.12 Additional features continued**

**Extended Comfort** The left button switches the operating mode from Energy Saving to Comfort for the period preset in P68, if the following conditions are fulfilled:

- The operating mode switchover contact is closed (connected to input X1, X2, D1, parameter P38, P40, P42 set to 3).
- Parameter P68 (extend Comfort period) is greater than 0.

During the temporary Comfort mode extension, timer symbol appears. If parameter P68 (extend Comfort period) = 0, extended Comfort cannot be activated; pressing the left button will show "OFF" (blinking 3 times)

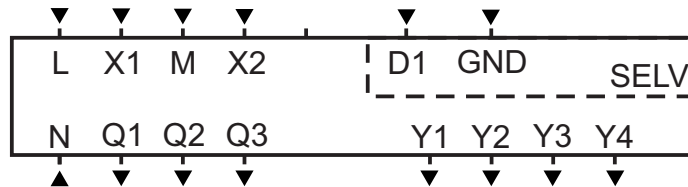
**Temporary Timer for extension of presence/absence** The current operating mode can be forced temporarily into Comfort or Energy Saving / Protection mode. The time period is adjusted via the rotary knob:

- Extend presence: Set the device to Comfort mode for the selected time period
- Extend absence: Set the device to Energy Saving/ Protection mode for the selected time period.

To activate the function, keep the left button pressed and, within 3 seconds, turn the rotary knob

- Clockwise for extended presence.
- Counterclockwise for extended absence.
- Extend presence: 0.00...+9:30 in steps of 30 minutes; symbol appears.
- Extend absence: 0.00...-9:30 in steps of 30 minutes; symbol appears.
- During the extended presence / absence period, timer symbol appears.

**9.13 Connection terminals**



Connection	Function		
L, N	Operating voltage 230V AC	Q1	Control output fan speed "low" 230V AC
X1, X2	Multifunctional input for temperature sensor (e.g. CPEC1011) or potential-free switch. Factory setting : - X1 = external room temperature sensor - X2 = sensor or switch for heating /cooling changeover Change of setting: Parameters P38, P40	Q2	Control output fan speed "medium" 230V AC
		Q3	Control output fan speed "high" 230V AC
		Y1...Y4	Control output "Valve" AC 230 V (NO, for normally closed valves), output for electrical heater via external relay
M	Measuring neutral for sensor and switch		
D1, GND	Multifunctional input for potential-free switch. Factory setting: Operating mode switchover contact Change of setting: Parameter P42		

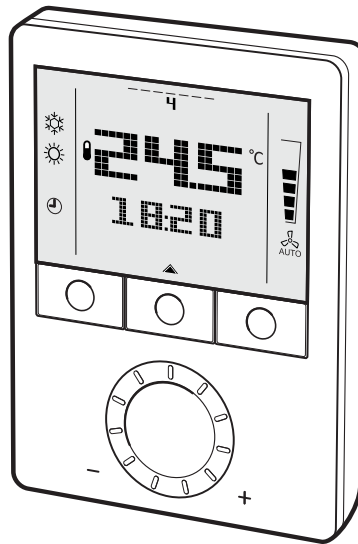
Controls 9 Continued

9.14 Mechanical design

The room thermostat consists of 2 sections:

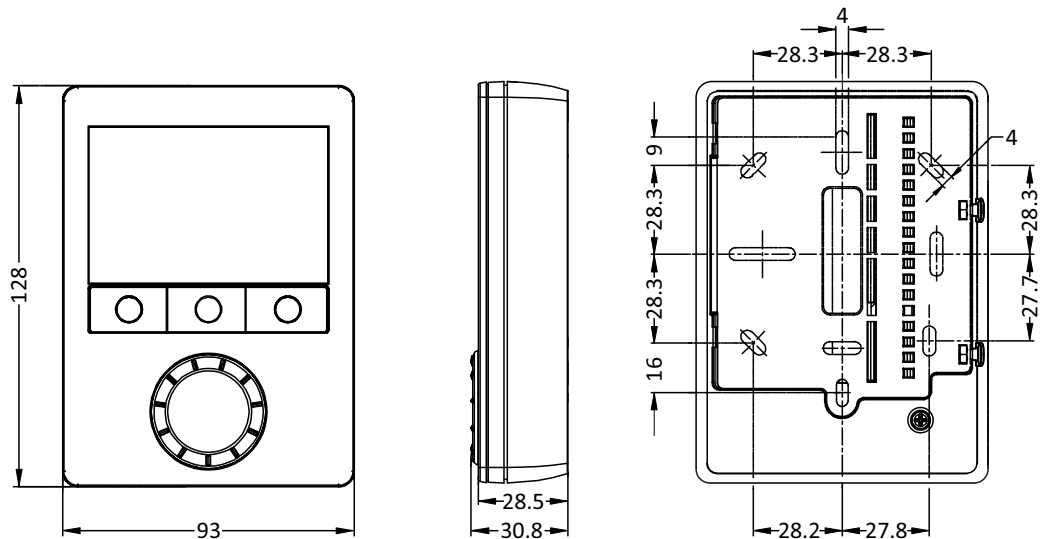
- Plastic housing which accommodates the electronics, the operating elements and the temperature sensor.
- Mounting plate with the screw terminals.

The housing engages in the mounting plate and is secured with 2 screws on the left side.



9.14.2 Dimensions

Dimensions in mm




Controls 9 Continued


9.15 Technical data

Operating voltage	AC 230 V +10/ -15%	
Frequency	50/ 60 Hz	
Power consumption	Max. 18 VA	
Fan control rating Q1, Q2, Q3-N	AC 230 V, max.5(4) A	
Control outputs Y1, Y2, Y3, Y4-N	AC 230 V, max.1 A	
Multifunctional inputs X1 - M/X2 - M		
Temperature sensor input		
Type	CPEL2011 (NTC)	
Digital input		
Operating action	Selectable (NO/NC)	
Contact sensing	DC 0...5 V, max 5 mA	
Insulating against mains	N/A, mains potential	
D1-GND		
Operating action	Selectable (NO/NC)	
Contact sensing	SELV DC 6...15V, 3...6 mA	
Insulating against mains	3.75 kV, reinforced insulation	
Function input External temperature sensor, fault contact	Selectable	
Switching differential, adjustable Heating mode	(P30)	2 K (0.5...6 K)
Set point setting and setting range		
☀ Comfort mode	(P08)	21 °C (5...40 °C)
☾ Energy saving mode	(P11-P12)	15 °C /30 °C (OFF, 5...40 °C)
⊕ Protection	(P65-P66)	8 °C/ OFF (OFF, 5...40 °C)
Built - in room temperature sensor		
Measuring range	0...49 °C	
Accuracy at 25°C	< + 0.5 K	
Temperature calibration range	+ 3.0 K	
Settings and display resolution		
Setpoints	0.5 °C	
Current temperature value displayed	0.5 °C	
Operation	As per IEC 721-3-3	
Climatic controls	Class 3K5	
Temperature	0...50 °C	
Humidity	< 95% r.h	
Transport	As per IEC 721-3-2	
Climatic controls	Class 2K3	
Temperature	-25...60 °C	
Humidity	< 95% r.h	
Mechanical conditions	Class 2M2	
Storage	As per IEC 721-3-1	
Climatic controls	Class 1K3	
Temperature	25...60 °C	
Humidity	< 95% r.h	

## Controls 9 Continued

### 9.15 Technical data Continued

CE	Conformity	
	EMC directive	2004/108/EC
	Low Voltage directive	2014/35/EC
C	N474 C-tick conformity to EMC emission standard.	AS/NS Z 4251.1:1999
	 Reduction of hazardous substances	2002/95/EC
Product standards		
	Automatic electrical controls for house hold and similar use	As per EN 607 30-1
	Special requirements for temperature dependant controls	As per EN607 30-2-9
	Electrical control type	2.B (micro-disconnection on operation)
Electromagnetic compatibility		
	Emissions	As per IEC/EN 61000-6-3
	Immunity	As per IEC/EN61000-6-2
	Safety class	II as per EN 607 30
	Pollution class	Normal
	Degree of protection of housing	IP30 as per EN 60529
	Connection Terminals	Solid wires or prepared stranded wires 1 x 0.4...2.5 mm <sup>2</sup> or 2 x 0.4...1.5 mm <sup>2</sup>
	Housing front color	RAL 9003 white
	Weight	0.30 kg

**9.16 Disposal**  The Printed Circuit Board may be sent to any PCB recovery contractor to recover some of the components for any metal such as gold and silver



The device is classified as waste electronic equipment in terms of the European Directive 2012/19/EU (WEEE) and should not be disposed of as unsorted municipal waste. The relevant national legal rules must be adhered to.

Regarding disposal, use the systems in place for collecting electronic waste. Observe all local and applicable laws.

**At the end of their useful life the packaging and product should be disposed of via a suitable recycling centre. Do not dispose of with normal household waste. Do not burn.**



**Maintenance 10**

In general, this series of units require little maintenance. Regular inspection for damage and cleaning. In the unlikely event of component failure, spares are available from stock at VES Andover Ltd.

**Important**



Before attempting to carry out any work on our units, all accompanying documentation including warning labels on the unit must be referenced.  
Should it be necessary to remove any component ensure that these are secured into position once reinstalled. It is critical that after any maintenance work has been conducted that all components removed/replaced be refitted correctly by a competent engineer.

**Warning**



Before attempting to carry out any maintenance work, investigative or repair work on our units, the unit **MUST BE COMPLETELY ISOLATED** from its electrical supply. Ensure a minimum of two minutes after electrical disconnection before removing access panels.

**Caution**



A failure to keep up with cleaning maintenance could result in the increase of potential risks and fire hazards. Ensure the unit is incorporated into a regular cleaning schedule.

**Caution**



Care must be taken when working on the unit due to potential hot surfaces. Allow the unit to completely cool before commencing any works.

The **heatline** duct should be cleaned at least every 6 months, however this may need to be adjusted depending on use of the system. Refer to **TR/19** "*Guide to good practice - cleanliness of ventilation system*" or similar for guidance as to the recommended frequency of maintenance. A failure to clean the duct on a regular basis could result in loss of fan performance or cause a potential fire risk.

**Spares & repairs**

When enquiring about or ordering spares contact VES Spares Department, quoting the sales order (SO) number and unit type found on the unit nameplate.

**Tel: 02380 46 11 50**

**WEEE Directive**



At the end of their useful life the packaging and product should be disposed of via a suitable recycling centre. Do not dispose of with normal household waste. Do not burn.

**PLEASE ENSURE THAT THIS DOCUMENT IS PASSED ON TO THE END USER**



# heatline

## *Duct Mounted Heaters*

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### *Operation & Maintenance Manual*

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