

# Reznor OP33E Mk.2.3 Remote Control Panel

## 1. INTRODUCTION

The Reznor OP33E Mk.2 remote control panel is an electronic time and temperature controller for use as a single appliance control. It is a direct replacement for the OP33E range of panels. The OP33E Mk.2 is designed to control one appliance only and particularly for controlling Reznor gas fired air heaters. It may also be used on other types of appliances. It is suitable for use with 24 or 240v burner control systems either single or two stage burners with or without automatic ignition. It is also capable of controlling the ventilation and cooling functions of a system which has these features available. A 4-position switch controls the unit in the following modes:-

- Heat only
- Vent only
- Off
- Auto (automatic switching from heat to vent/cool)

It may be necessary to provide wiring links in the OP33E Mk.2 terminal rail and the appliance to ensure the correct function is obtained.

Detailed installation drawings are available for all Reznor combinations.

## 2. TIMED CONTROL

The clock provides timed control of all the functions included, except frost protection. The OP33E Mk.2 clock has a switch accuracy of  $\pm 1$  minute and a possibility of 6 on and 6 off switchings spread over a 7-day period. The uses of group day settings enables complex programs to be set up. A rechargeable battery will provide up to 3 months back-up to maintain the time switch programme in the event of loss of mains electrical power.

**NB. The battery becomes fully charged after 100 hours continuous connection of the OP33E Mk.2 to mains electrical supply via the air heater.**

## 3. TEMPERATURE SENSOR

The OP33E Mk.2 is supplied with a remote temperature sensor which may be located adjacent to or up to 200 metres from the control panel and requires connecting to the OP33E Mk.2 with a twin wire. Ideally it should be fitted 1.7 metres above floor level and away from other heat sources which may influence the function of the sensor. A switching differential of 1°C is built into the OP33E Mk.2.



## 4. NOTE:

- (1) **Open circuit on the sensor circuit results in a continuous call for heat.**
- (2) **Sensor wires must not be run in conduits or trunking with other power cables.**
- (3) **If screened cable is used only one end must be earthed at the control panel end.**

## 5. FROST PROTECTION

5.1 The OP33E Mk.2 is supplied so that frost protection at 3° is always present whilst the control is in the "VENT or OFF" position, providing the appli-

## WARNING

Failure to observe these instructions may render the OP33E Mk.2 warranty void.

1. Do not use this control outdoors, in high humidity conditions or where the atmosphere is corrosive.
2. Do NOT overtighten terminal screws.
3. Do NOT run sensor wires in conduit with other mains cables.
4. Do NOT connect the power supply direct to the panel.
5. Do NOT control more than one unit from an OP33E Mk.2.
6. Do NOT install the panel or sensor in areas of high electromagnetic flux, i.e. distribution boards or heavy duty supply cables.

ance is operative and powered electrically. This feature may be disconnected by the installer if required.

**5.2** To disable frost protection remove wire loop across terminals "A" and "A" located at the bottom of the lower printed circuit board. Fig. 6.

**5.3** When the heat selector switch is in the heat mode and the time switch is in the off setting, only the night set back thermostat controls the appliance at the night set back temperature. The minimum setting is 0°C.

**5.4** To ensure that frost protection feature is enabled make sure that green light is glowing. Fig. 1 Key 2 (if light does not illuminate check that link is fitted to terminals "A" and "A"). Fig. 6.

## 6. INSTALLATION

Use of the template supplied will ensure fixing points are located accurately and its use will prevent the ingress of swarf or masonry dust, etc. from entering the OP33E Mk.2. The panel should be fixed using qty

4 No.8 wood screws or M4 machine screws if fitting to steelwork. The sensor should be fixed similarly using qty 2 No.6 wood screws or M3 machine screws. Fig. 3 indicates Fixing Centres.

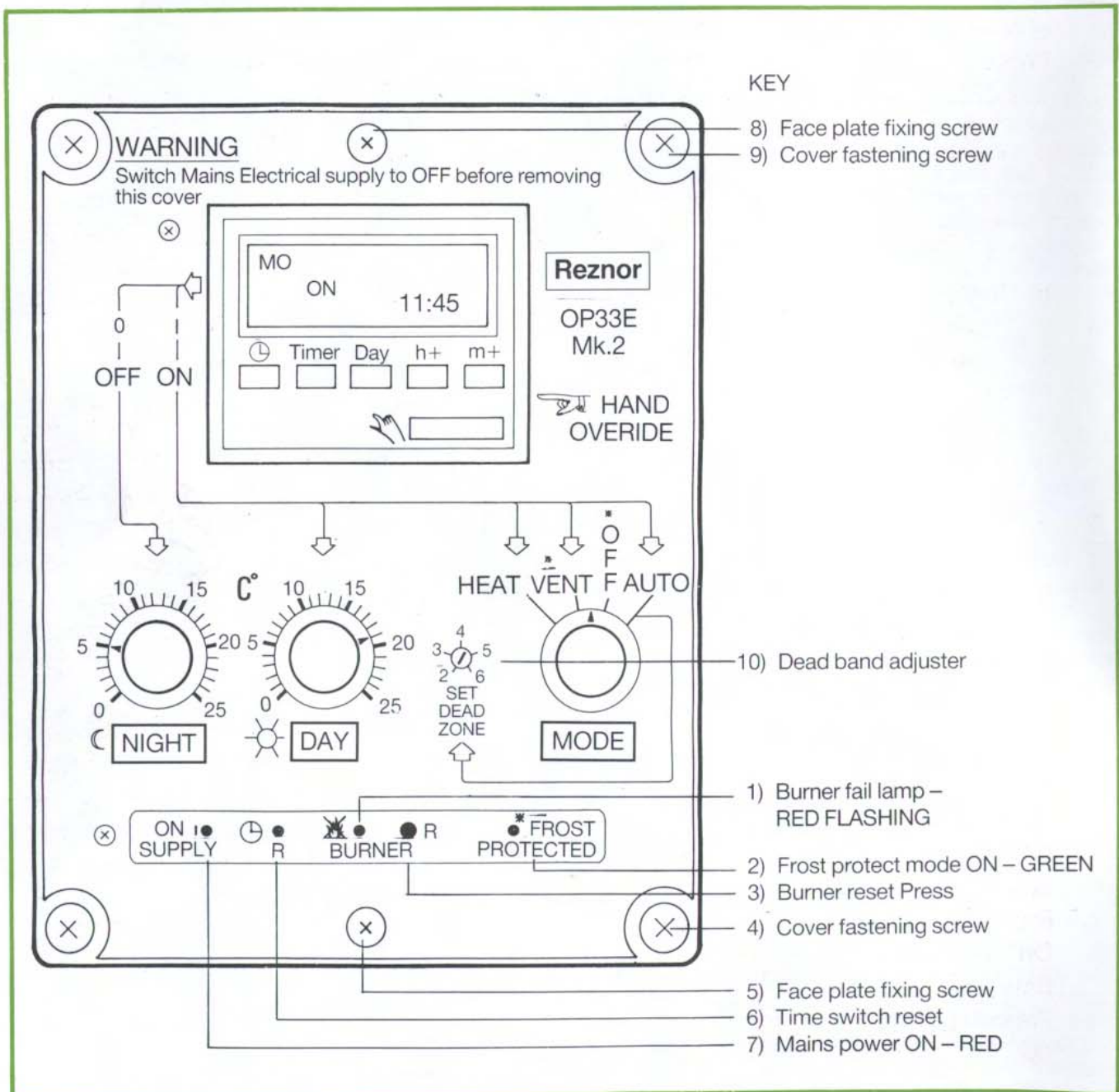
## 7. PROGRAMMING THE TIME SWITCH

**7.1** The following procedures require understanding before use:-

- Cancelling all programmes and time
- Setting the clock
- Setting the on and off times
- Changing the time
- Changing the on and off times
- Manual override

**7.2** It is recommended that an operational schedule is written down prior to setting the time switch; two formats for this are shown on pages 4 and 5. Blank formats for customer use are available on the last pages of this document.

**7.3** The time switch used is a Grasslin type Digi STA-E (Fig.4) which uses a 24 hour display. It is



## SUPPLEMENTARY CLOCK SETTING INSTRUCTIONS

### FOR OP33 MK.2 PANEL WITH NEW CLOCK NO. MIL 72 A/1 DIGI 16

1.  $\pm 1h$  changes between Winter and Summertime.
2. CH1 selects the switches for programming. Up to 8 Ons and Offs are available.
3. The  $\pm 1$  button is the mode switch for the clock, auto On/Off. Fixed On and Fixed Off are selectable.
4. Days selectable are MO, TU, WE, TH, FR, SA, SU; MO through SU; MO through FR, SA and SU.

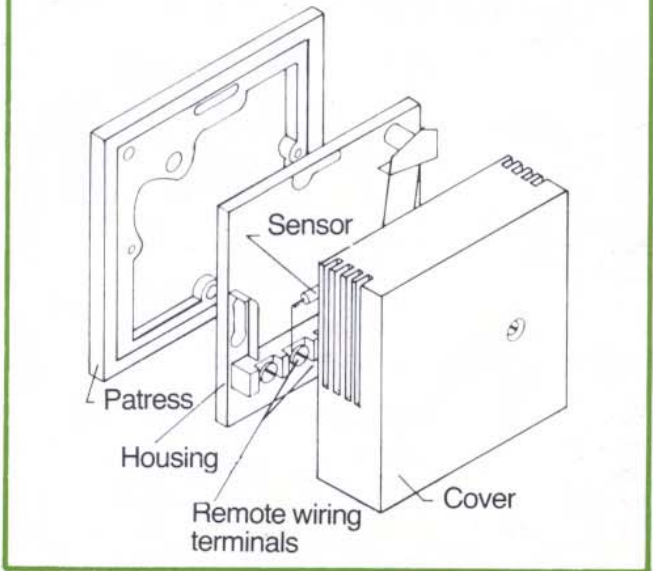
### CLOCK SETTING INSTRUCTIONS

1. Press reset switch on clock to clear and reset memory.
2. Check top left side of display. If +1h is shown press  $\pm 1h$  switch to clear.
3. Press and hold down  $\ominus$  button. Press day button until current day is displayed at top of screen.
4. a. If the time of year is winter hold down the clock button and set the current time of day using the h+ and m+ switches.  
b. If the time of year is Summer hold down the clock  $\ominus$  button and set the time of day, using the h+ and m+ buttons to one hour before the current time. (If the current time is 10.00 set the clock to 09.00). Release the  $\ominus$  button.
5. Press the CH1 button and "CH1 On" should be displayed. Press the day button until the day or group of days to be switched on is displayed. Press the h+ and m+ buttons until the required switch on time is displayed.
6. Press the CH1 button and "CH1 Off" should be displayed. Press the day button until the day or group of days to be switched off is displayed. Press the H+ and M+ buttons until the required switch off time is displayed.
7. Pressing CH1 again will bring up "CH1 On" with a blank screen. Another on time may now be programmed in. Pressing the CH1 button again will bring up "CH1 Off" with a blank screen.  
Another off time may now be programmed in. A total of eight ons and offs are programmable on CH1.
8. Press the clock button and the clock is placed in operation.
9. If the current time of year is Summer press the  $\pm 1h$  switch. +1h will be displayed in the upper left corner of the display. The clock is now set to Summertime. In the Autumn when the clocks go back press the  $\pm 1h$  and the clock will revert to Wintertime.
10. Pressing the  $\pm 1$  button will, in order, show "Auto On", "Off", "Fix On", "Fix Off". The "Auto On" and "Off" leave the unit under time clock control. The "Fix On" and "Fix Off" keep the unit on or off until the switch is pressed again to show "Auto On" or "Off", placing the unit back under time clock control.
11. To change a programmed time or day press the CH1 switch repeatedly until the time or day requiring changing is displayed. Make necessary changes using day, h+ and m+ buttons. After corrections are made press L button.

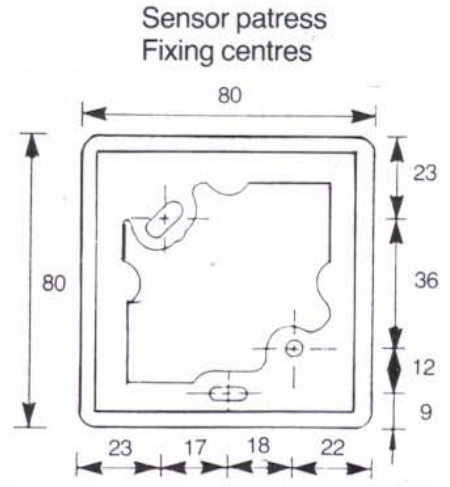
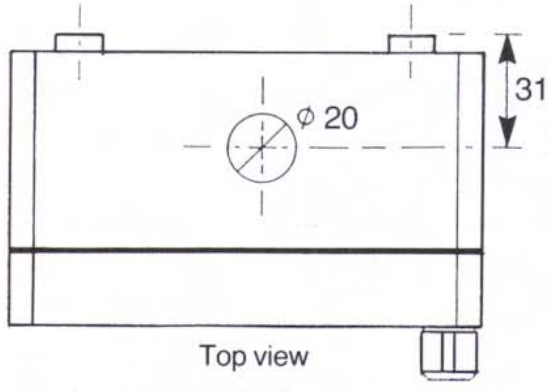
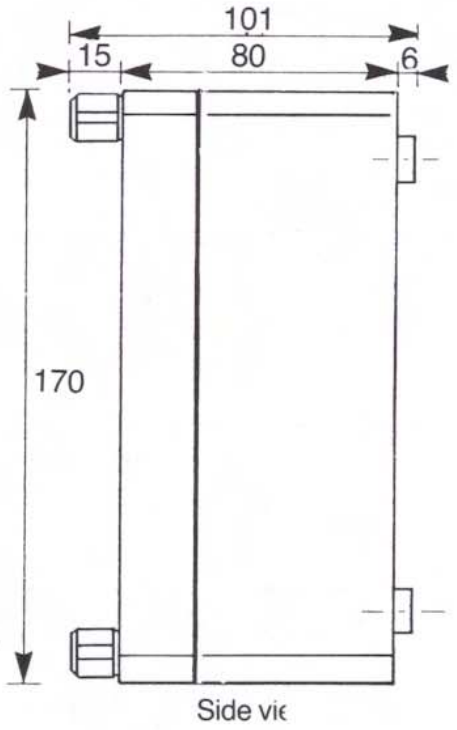
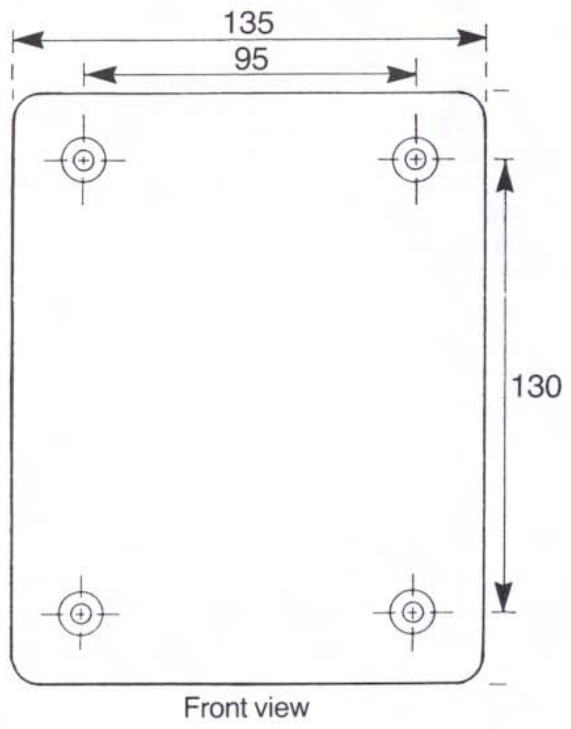
equipped for 6 "On" and 6 "Off" switchings which may be spread over a combination of day selections as shown below. By careful selection of "On" and "Off" times complex programmes may be set. "On" and "Off" may be used independently.

- The optional groups available are as follows:
- Mon to Sun by individual days
  - Mon to Fri as a group
  - Sat and Sun as a group
  - Mon to Sat as a group
  - Mon to Sun as a group (shows blank screen)

**Fig 2. SENSOR HOUSING AND PATTRESS**



**Fig 3. DIMENSIONS AND FIXING CENTRES**



## 8. PROCEDURE (First Setting)

### 8.1 Starting

Ensure that the electrical power supply to the control panel has been on for at least 15 minutes before commencing to programme. (If the clock battery is not adequately charged the programme may not be retained even for momentary power interruptions). Clear the entire memory in the clock by inserting a 2mm diameter non metallic rod in the clock reset hole adjacent to the supply on lamp. Press lightly and the clock should display "off 00:00".

### 8.2 To Set the Time

Times must be programmed in full, i.e. hours and minutes must be set.

To set the time press and hold down the clock button. Press H+ to set the hour and M+ to set the minutes. Press Day repeatedly until the current day is shown in the display.

Release the clock button and the clock will commence operating. The ":" will wink.

### 8.3 To Programme the Days

**Re-use of a switch number will erase the previous programme.**

Press the timer button and release. The timer should be indicating "1 on--:--". If display does not show this press timer button repeatedly until "1 on--:--" appears in the display.

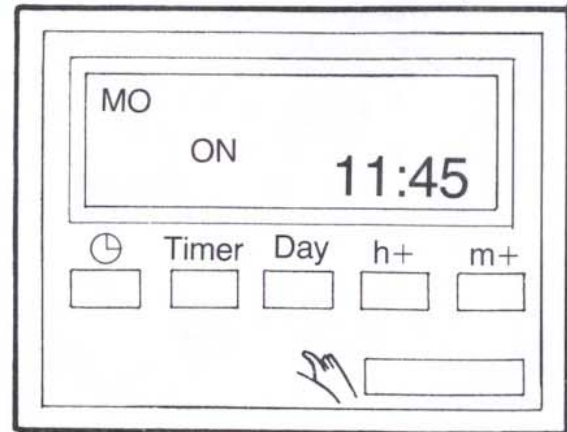
To view the combination of/or days available press and release the button repeatedly.

The first 7 pushes will display Monday to Sunday as individual days.

The next push will indicate Monday to Friday.

The next push will indicate Saturday and Sunday.

Fig 4. GRASSLIN DIGI STA-E TIME SWITCH



Clock  
Timer  
Day  
Hour Set  
Minute Set  
Manual override

⌚  
Timer  
Day  
h+  
m+  
⤴

The next push will indicate Monday to Saturday.

No display equals Monday to Sunday.

Repeat the process until the appropriate day or combination of days has been selected.

Holding down the day button will result in continuous scanning of the day selection.

## WEEKLY OPERATING SCHEDULE

	HOURS																								
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
MONDAY																									
TUESDAY																									
WEDNESDAY																									
THURSDAY																									
FRIDAY																									
SATURDAY																									
SUNDAY																									

WEEKLY OPERATING SCHEDULE													
		SWITCH TIMES											
		1		2		3		4		5		6	
		On	Off	On	Off	On	Off	On	Off	On	Off	On	Off
DAYS	NO												
MONDAY	1	07.00	17.30	06.00									
TUESDAY	2	07.00	17.30										
WEDNESDAY	3	07.00	17.30										
THURSDAY	4	07.00	17.30										
FRIDAY	5	07.00	17.30										
SATURDAY	6					07.00	13.00						
SUNDAY	7												

#### 8.4 To Programme the "On" Times

Press hour button repeatedly until the "On" hour is reached.

Similarly press the minute button until the "On" minute is reached.

On completion there should be no horizontal bars in the display.

#### 8.5 To Programme the "Off" Times

Press the timer button to set the first off period.

Set the day, hour and minute combination using the procedure outlined above (8.3 and 8.4).

There are 6 On/Off switch time options available.

#### 8.6 To Programme Further "On" and "Off" Times

Press and release timer button until "2 on--:--" appears on the display. To set days and on and off times proceed as detailed in 8.3, 8.4 and 8.5.

Continue to press timer button to reveal further on and off programmes.

It is not obligatory to set an equal number of "On" or "Off" timings or for all the combinations to be used.

#### 8.7 To Check the Programme

To check the programme press and release the timer button repeatedly and the set programmes will be displayed in switch number order.

To make the programme operational press the clock button once and the current time will be re-displayed.

**When the time switch is in the clock mode the next "On" or "Off" switching may be advanced by pressing the hand button. Actual switching occurs in chronological sequence not in switch number order.**

#### 8.8 To Change a Programme

Press the timer button until the programme requiring changing shows in the display.

Change the setting using the day, hour and minute buttons as required.

On completion press the clock button once.

The normally programmed switch operation will occur at the next programme switch operation.

#### 8.9 To Cancel a Programme

Press the timer button until the "on" programme requiring cancelling shows in the display.

Press the day button until no days show in the display.

Press the hour and minute buttons until "on--:--" appears in the display.

Press the timer button until the "off" programme requiring cancelling shows in the display.

Press the day button until no days show in the display buttons as required.

Press the hour and minute buttons until "off--:--" appears in the display.

Press clock button to make programmes operational.

#### 9. TWO STAGE BURNER OPERATION

The control panel is designed to operate a single or two stage burner system. There is a fixed differential of 2°C between the two stages on space temperature increases and a similar amount on space temperature decrease. In order to ensure correct cross lighting on all new calls for heat two stage units will automatically light up on high fire and stay on high fire for a period of one minute. It will then revert to the control requirement of the panel.

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## 10. CONTROLLER OPERATION

### 10.1 Daytime Temperature Control

The daytime temperature control is set by adjusting the centre (day) temperature selection dial which is calibrated from 0°C to 25°C. Since the sensing is carried out by a thermistor there is accurate correlation between the temperature at the sensing point and the temperature setting knob on the panel.

### 10.2 Night Set-Back Temperature Control

The night set-back temperature control is set by adjusting the left hand (night) temperature selection dial which is calibrated from 0°C and 25°C.

### 10.3 Frost Protection Temperature Control

The panel is equipped with a means of sensing the night time temperature using the remote room sensor. When the panel is in a non-heating position the frost stat will override all other temperature settings in the event of the room temperature dropping below 3°C. If required this feature may be disabled by removing an internal link.

### 10.4 Two Stage Operation

The panel contains two separate relays for the control of two-stage burners with a fixed differential of 2°C. The two stage burner control eliminates temperature swing and will result in longer fan-run periods.

### 10.5 Season Switch

A season switch (mode) with 4 operating positions is provided to control heating only, ventilation only, off and auto. During the clock "off" period in vent and off modes, frost protection at 3°C is available providing terminals "A" and "A" are linked.

### 10.6 Auto Mode

In the auto position the unit will operate under clock control in the heating mode all the time the temperature is below the set point. If the temperature increases above the set point on the day temperature dial, then power is automatically available to operate the fan only or to switch in external cooling and/or fresh air dampers.

In the auto mode an adjustable differential provides a dead band between the heating and vent (cooling) function. The dead band is adjustable from 2°C to 6°C and enables the fans only to operate if the space temperature rises above the set point, plus the differential, i.e., if the heating temperature is set to 19°C and the differential is set to 3°C the fan operation will commence when the ambient reaches 22°C. If the temperature rises a further 2°C a second ventilation (cooling) output is provided.

### 10.7 Heat Mode

In the heat mode the unit provides two stages of temperature controlled heating, via the day setting during clock "on" and via the night setting during clock "off".

### 10.8 Vent Mode

In the vent mode two stages of ventilation are available during clock "on". This is temperature controlled, i.e. if ambient temperature rises above set point the vent function operates. A further 2°C rise will bring in the second stage of ventilation.

During clock "off" frost protection is available.

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## 11. BURNER RESET

Appliances fitted with automatic burner controls require resetting in the event of a burner lock-out. The lock-out condition will be indicated by the red coloured lamp flashing, figure 1 key 1. Various ways of configuring the resetting of the burner are available.

As despatched the panel is not fitted with a link in terminals BB. In this mode the panel is suitable for resetting burners which require the power to be interrupted, i.e. Pactrol.

For burners which require either the switching of a positive supply or the switching of the neutral the link BB must be inserted and the volt free relay, Relay 6, connected appropriately. Terminals 11, 11C and 11A.

In all cases the burner is reset by depressing the burner reset switch, item 3 figure 1, for at least 5 seconds.

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## 12. TAMPERPROOF COVER

To render the OP33E Mk.2 tamperproof secure the transparent cover using a screwdriver (do not fit the hand catches). The plastic cover may then be secured with a wire and plug seal or the security seals provided.

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## 13. STANDARD SETTINGS

The panel is despatched with partially charged battery with frost protection activated and for Pactrol Ignition System. If this is not correct read instructions for procedure to modify in Sections 5 and 11.

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## 14. ENCLOSURES

Enclosed with OP33E Mk.2 panel are:-

- 1) Sensor and Housing
- 2) Pattress
- 3) Bag containing two push-in knobs for hand operation of the cover retaining screws
- 4) Two small self tapping screws to secure sensor housing to pattress.
- 5) Operating instructions
- 6) Installation instructions
- 7) Cable Tie
- 8) Security seals

Fig 7. INTER-CONNECTION EXAMPLE BETWEEN HEATER & OP33E Mk.2.3

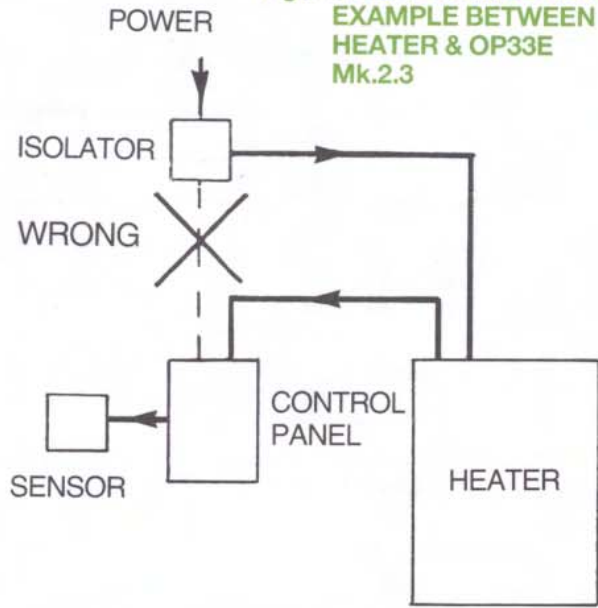


Fig 8. TERMINAL CONNECTIONS FOR SENSOR

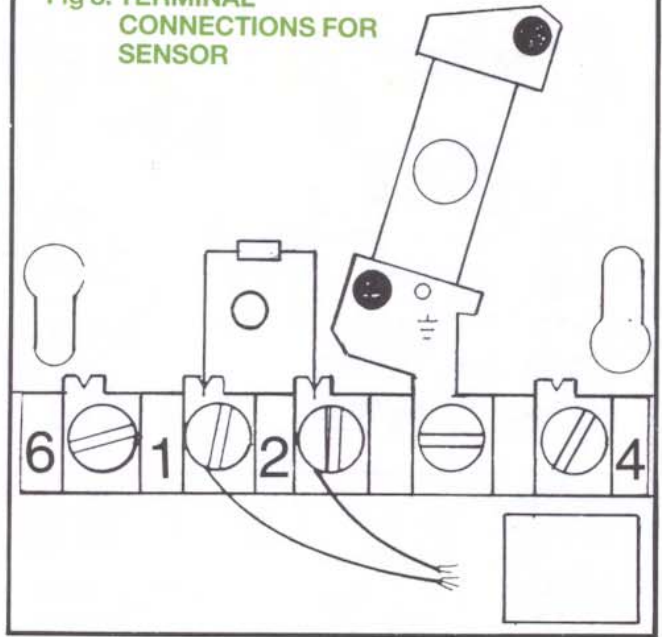
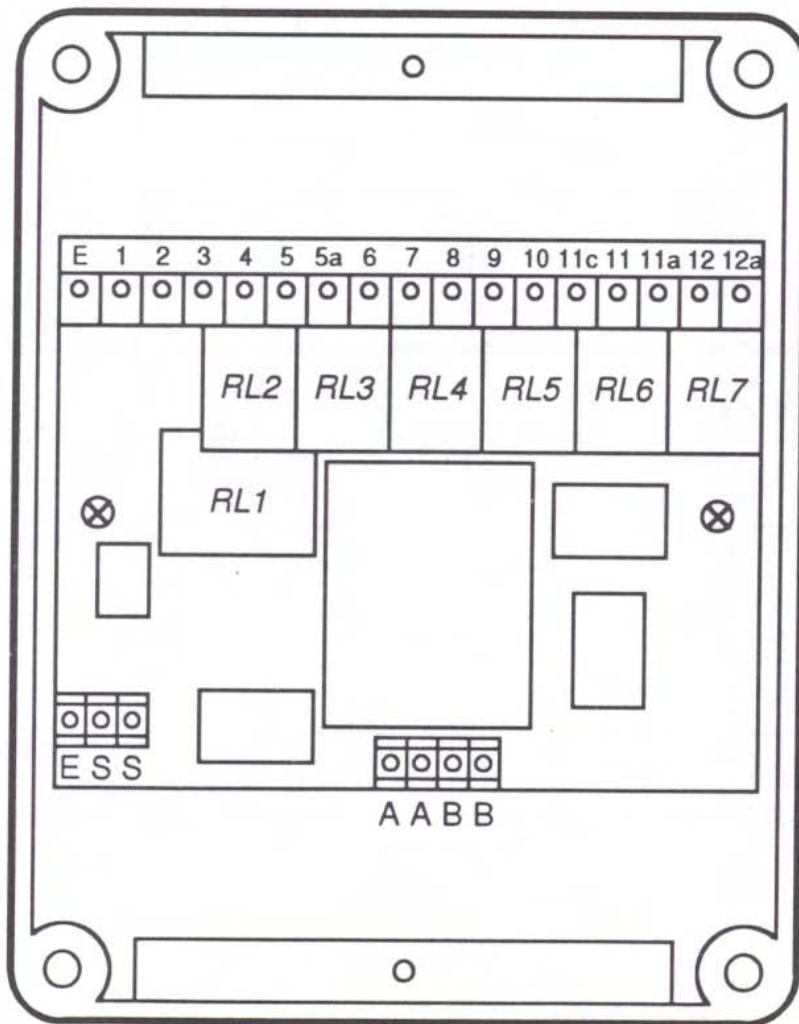


Fig 6. OP33E Mk.2.3 TERMINAL ARRANGEMENT





## OP33E Mk.2.3 TRUTH TABLES

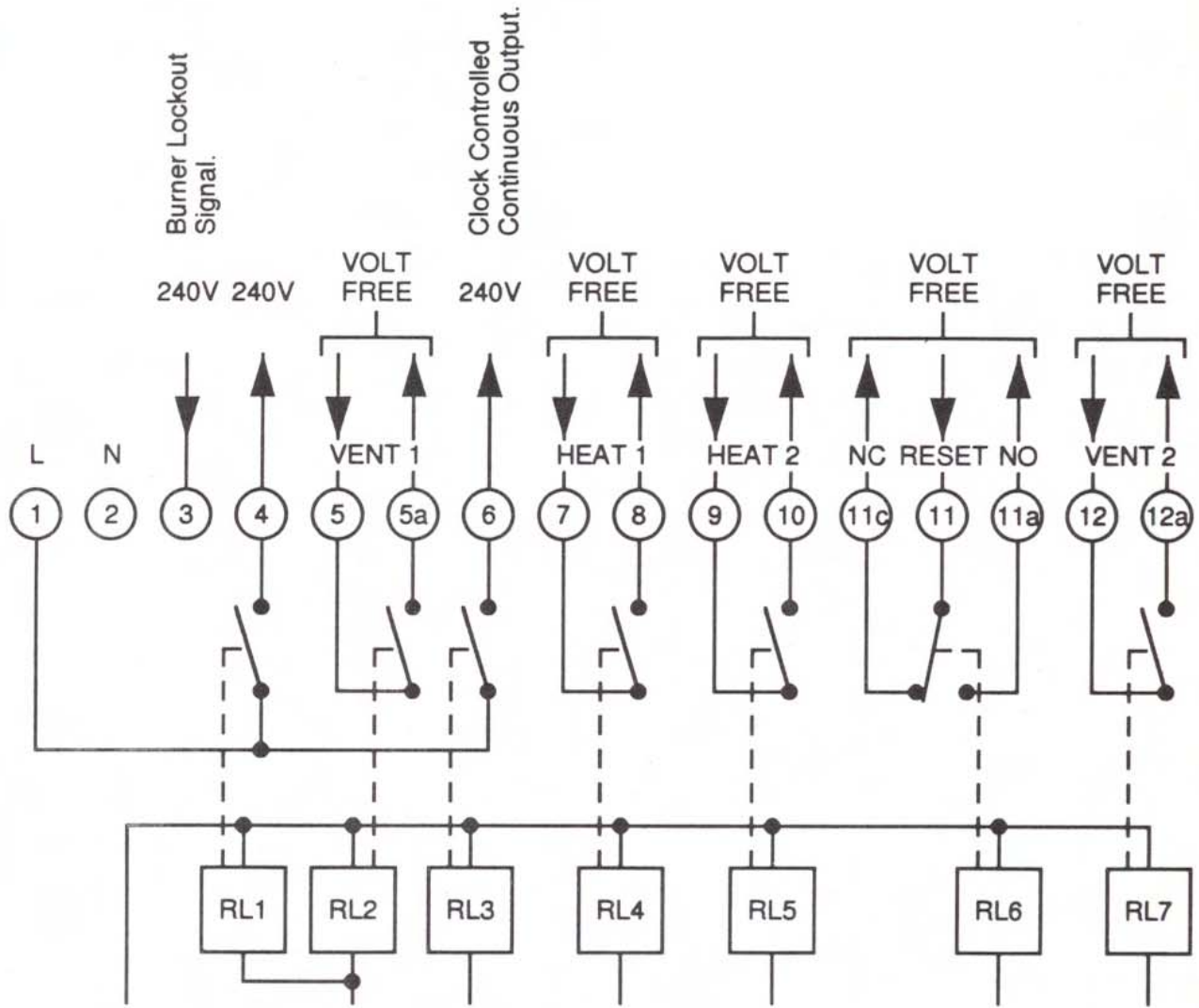
Function		Relays ON						
		1	2	3	4	5	6	7
First Stage Burner on.	HEAT 1			●	●			
Second Stage Burner on.	HEAT 2			●	●	●		
Constant Run Fan Relay on.	CRFR			●				
First Stage Vent.	VENT 1	●	●	●				
Second Stage Vent.	VENT 2	●	●	●				●
Reset. BB Link OUT.	RES.1							
Reset. BB Link fitted.	RES.2			●	●	●	●	

MODE SET	CLOCK	AA LINK	SENS.T	CONDITIONS	OUTPUT
OFF	X	X	X	X	OFF
OFF	X	IN	>	3°C	OFF
OFF	X	IN	<	3°C	HEAT 1
OFF	X	IN	<	1°C	HEAT 2
OFF	OFF	IN	>	3°C	RLY 3 ON
VENT	OFF	OUT	X	X	OFF
VENT	X	IN	<	3°C	HEAT 1
VENT	X	IN	<	1°C	HEAT 2
VENT	ON	X	>	DAY SET	VENT 1
VENT	ON	X	>	DAY SET + 2°C	VENT 2
VENT	ON	X	X	X	RLY 3 ON
HEAT	OFF	X	>	NT.SET	OFF
HEAT	OFF	X	<	NT.SET	HEAT 1
HEAT	OFF	X	<	NT.SET - 2°C	HEAT 2
HEAT	ON	X	>	DAY SET	RLY 3 ON
HEAT	ON	X	<	DAY SET	HEAT 1
HEAT	ON	X	<	DAY SET - 2°C	HEAT 2
AUTO	OFF	X	>	NT.SET	OFF
AUTO	OFF	X	<	NT.SET	HEAT 1
AUTO	OFF	X	<	NT.SET - 2°C	HEAT 2
AUTO	ON	X	>	DAY SET	RLY 3 ON
AUTO	ON	X	<	DAY SET + DZ.DIFF	RLY 3 ON
AUTO	ON	X	<	DAY SET	HEAT 1
AUTO	ON	X	<	DAY SET - 2°C	HEAT 2
AUTO	ON	X	>	DAY SET + DZ.DIFF	VENT 1
AUTO	ON	X	>	DAY SET + DZ.DIFF + 2°C	VENT 2

### Terminology used

- NT.SET (Temperature set on NIGHT dial)
- DAY SET (Temperature set on DAY dial)
- SENS.T. (Air temperature at Sensor location)
- DZ.DIFF (Temperature set on DEAD ZONE dial)
- > (Greater than)
- < (Less than)
- X (Any. Does not matter)

# REMOTE PANEL OP33E Mk.2.3 SCHEMATIC DIAGRAM



- NOTES
1. RL1 and RL2 ALWAYS OPERATE TOGETHER.
  2. RL1 IS HEAVY DUTY TYPE.



WEEKLY OPERATING SCHEDULE																										
	HOURS																									
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
<b>MONDAY</b>																										
<b>TUESDAY</b>																										
<b>WEDNESDAY</b>																										
<b>THURSDAY</b>																										
<b>FRIDAY</b>																										
<b>SATURDAY</b>																										
<b>SUNDAY</b>																										

WEEKLY OPERATING SCHEDULE													
	Period	SWITCH TIMES											
		1		2		3		4		5		6	
		On	Off	On	Off	On	Off	On	Off	On	Off	On	Off
<b>DAYS</b>	<b>NO</b>												
<b>MONDAY</b>	<b>1</b>												
<b>TUESDAY</b>	<b>2</b>												
<b>WEDNESDAY</b>	<b>3</b>												
<b>THURSDAY</b>	<b>4</b>												
<b>FRIDAY</b>	<b>5</b>												
<b>SATURDAY</b>	<b>6</b>												
<b>SUNDAY</b>	<b>7</b>												

## APPENDIX 1 – Setting Example

- 1 Reset switch as described in sections 8.1
- 2 To set clock press and hold down the clock button
- 3 Press Day until current day appears in display
- 4 Press h+ until current hour appears in display
- 5 Press m+ until current minute appears in display
- 6 Release clock button
- 7 To set programme press timer button until 1 on appears in display
- 8 Press Day until Mon to Fri appears in display
- 9 Press h+ until 07:-- appears in display
- 10 Press m+ until 07:00 appears in display
- 11 Press timer until 1 off appears in display
- 12 Press Day until Mon to Fri appears in display
- 13 Press h+ until 17:-- appears in display
- 14 Press m+ until 17:30 appears in display
- 15 Press timer until 2 on appears in display
- 16 Press Day until Mon appears in display
- 17 Press h+ until 06:-- appears in display
- 18 Press m+ until 06:00 appears in display
- 19 Press timer until 2 off appears in display (do not set)
- 20 Press timer until 3 on appears in display
- 21 Press Day until Sat appears in display
- 22 Press h+ until 07:-- appears in display
- 23 Press m+ until 07:00 appears in display
- 24 Press timer until 3 off appears in display
- 25 Press Day until Sat appears in display
- 26 Press h+ until 13:-- appears in display
- 27 Press m+ until 13:00 appears in display
- 28 Press clock
- 29 To review settings press and release timer until all settings have been reviewed, to change proceed as above from any on or off period. Settings can only be cancelled by resetting the clock or by entering --:-- in hours and minutes.
- 30 As the switch can be manually overridden until the next on or off period a final off switching can be set for some convenient time say 22:00 hrs in order to prevent wasted fuel
- 31 Press timer until 4 off appears in display
- 32 Press day until all display of days is blank (=7 days)
- 33 Press h+ until 22:-- appears in display
- 34 Press m+ until 22:00 appears in display
- 35 Press clock
- 36 If the clock is in the incorrect switching mode press the manual override button to correct

**Reznor Europe** J. & M. Sabbestraat 130 – 8930 Menen – België Tel: (056) 52 95 11 Fax: (056) 52 95 33

**Reznor Lufttechnik** Sontraerstrasse 18 – Frankfurt 60 – Deutschland  
Tel: (069) 401001-0 Tlx: 413845 Fax: (069) 401001-10

**Reznor Nederland** Mickelhorst 5 – 7961 DC Ruinerwold – Nederland  
Tel: 05222 2214 Fax: 05222 2562

**Reznor France** Av. Le Verrier – ZA1. les Bruyères – 78190 Trappes – France  
Tel: (1) 30667092 Fax: (1) 30508606

**Reznor Suomi** Korkkullantie – SF-02400 Kirkkonummi – Suomi Finland  
Tel: (90) 2963191 Fax: (90) 2963193

**Reznor is a ISO 9001/EN 29001 Registered Firm of Assessed Capability**

### Other Products

Gas fired unit heaters.  
Infra-red plaque heaters.  
Radiant tube heaters.  
Direct fired make-up air heaters.  
Floor standing heaters.  
Roof mounted heating/cooling units.  
Water Heating Products.

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### Remarks:

Use of this product in corrosive or inflammable atmosphere is not recommended. Warranty is void if unit is operated in presence of chlorinated vapours.

### Models and Data:

Subject to modification without prior notice.



### Reznor UK Ltd

Park Farm Road  
Folkestone Kent  
England CT19 5DR  
Telephone: (01303) 259141  
Fax: (01303) 850002

Registered in England No. 2426941

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