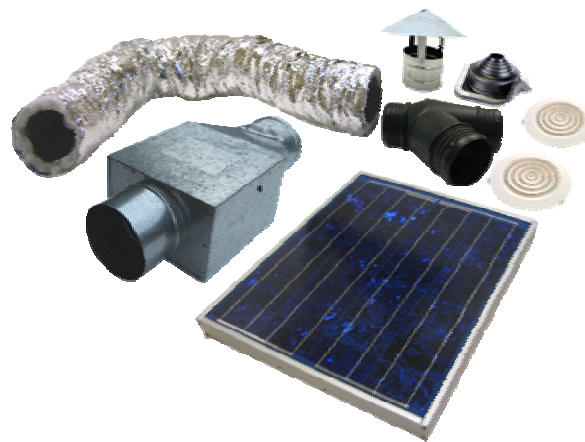
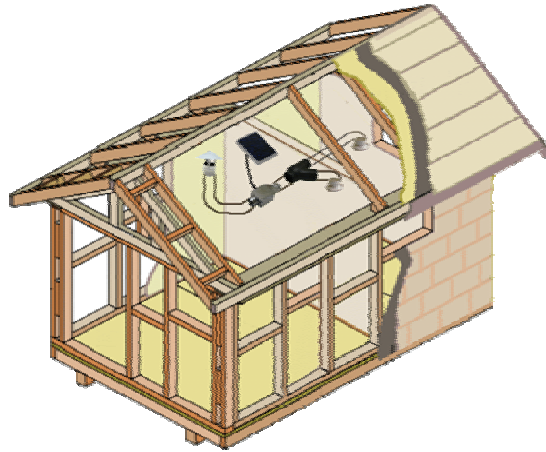


# Installation Guide



## Version 1.1

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**Caution**

No Liability is assumed for any damage caused by improper installation.

**Notice**

The information in this manual is subject to change without notification. Additional pages may be inserted in future editions. The user is asked to excuse any technical inaccuracies or typographical errors in the present edition.

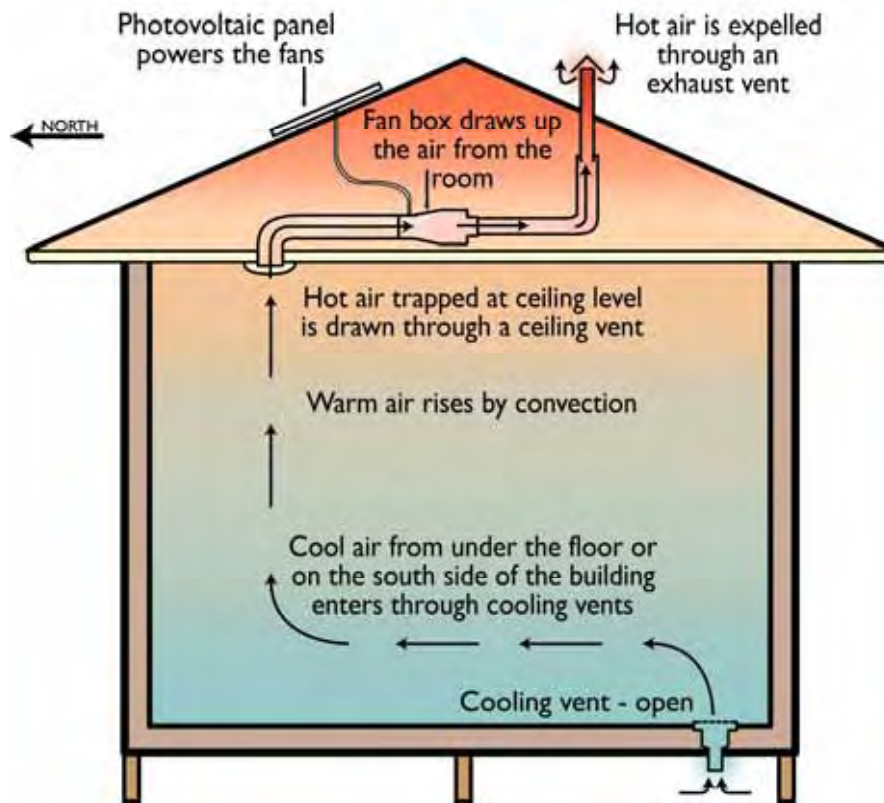
No responsibility is assumed if accidents occur while the user is following the instructions in this manual.

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**1. Introduction** *Congratulations on your purchase of a Sun Lizard Heat Extractor and reducing your contribution to Australia's greenhouse gas emission.*

## Sun Lizard Heat Extraction Mode



The Sun Lizard has been designed to install quickly and easily to most buildings. Prior to commencing the installation of the Sun Lizard, please read the following installation guide carefully and if in doubt, contact your local distributor or installer.

## 2. Handling & Unpacking

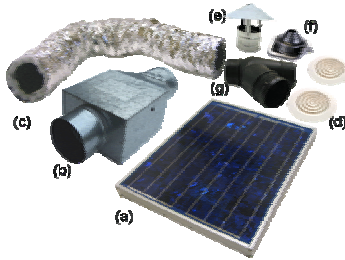
Carefully remove the items from the boxes. Please take note of these general precautions.

- When handling the Photovoltaic Panel, take extreme care, as the glass is fragile.
- Do not twist or bend the Photovoltaic Panel; always lay the panel on a flat surface.
- When moving the Photovoltaic Panel, ensure that it is lifted by its side and not by the corners.
- Do not place tools or other heavy objects on the glass even with the protective cover in place. Glass breakage during installation or through negligence will not be covered under warranty.
- **Throughout the installation of the Sun Lizard, the installer should ensure that the Product Specifications are not compromised.**

### 3. Inventory Checklist

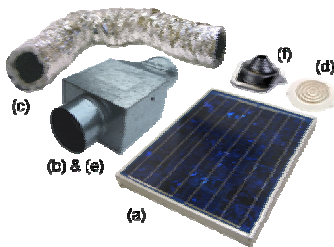
Check that nothing is missing against the list of shipped components below:

#### Typical Installation of Sun Lizard Solar Air Heat Extractor



#### Ceiling Cavity Kit

- 1 x (a) PV Panel (30W BP Photovoltaic Panel)
- 1 x (b) Fan Box
- 2 x (c) Insulated Flexible Duct
- 2 x (d) Ceiling Diffuser
- 1 x (e) Exhaust Flue
- 1 x (f) Dektites
- 1 x (g) Y Adaptor
- 1 x Electronic Control System (incl. Wall Switch & Cable)
- 1 x PV Adjustable Mounting Frame (optional)



#### No Ceiling Cavity Kit

- 1 x (a) PV Panel (30W BP Photovoltaic Panel)
- 1 x (b) Fan Box
- 1 x Exhaust Adapter
- 2 150mm x 500mm Pipe
- 1 x (d) Ceiling Diffuser
- 1 x (f) Dektites
- 1 x 90 Degree Bend
- 1 x Electronic Control System (incl. Wall Switch & Cable)
- 1 x Waterproof Cover
- 1 x PV Adjustable Mounting Frame (optional)

Additional components supplied with Sun Lizard if required and ordered;

- Filtered cooling kit (optional)

If there are any missing parts, please contact AFE on (03) 9722 9596.

Where possible, please recycle all packaging. If you have received a number of Sun Lizards, your local distributor may collect packaging for reuse. Unfortunately, the cost to ship empty packaging back exceeds the cost of new packaging unless it is done in bulk. We have tried to use recycled materials, offcuts and recyclable components to reduce waste.

#### **4. Important Notes Before Installing a Sun Lizard**

It is recommended that a qualified tradesman be used to install the Sun Lizard Heat Extractor to:

- Complete the installation and ensure that the Sun Lizard is correctly mounted to withstand any extreme local conditions.
- Complete all roof penetrations to meet any regulations.

While it is possible for a home handyman to do the installation, local regulatory requirements may necessitate the use of a qualified tradesman. While no warranty will be void if a qualified tradesman is not used, no responsibility for roof leaks or other possible damage through incorrect installation will be entertained.

To avoid damaging any of the components, it is recommended to assemble the Sun Lizard on the roof as part of the installation procedure. If assembly is impossible on the roof of the building, then assembly should occur prior to installation.

We recommend laying out all the components in a dummy assembly to ensure you are familiar with how they will all fit together. Do this on the ground first and then on and in the roof. This is also useful to ensure you keep ducting to a minimum and have all the components required prior to commencing installation.



## 5. Selecting a Location for the PV Panel

The Sun Lizard PV Panel should be installed on the roof of your building as close as possible to the following conditions:

1. The most effective direction to install the PV Panel is between 5 degrees East and 10 West of due North. Installation outside of this orientation will degrade performance to some degree. Local conditions may require minor changes to this ideal.
2. If no roof surface faces North, then a PV Adjustable Mounting Frame may need to be used to achieve the optimum performance. If you have not purchased additional frames for your specific roof type, please contact your local distributor or contact us direct to aid you in the selection of the appropriate accessories.
3. The Sun Lizard requires the sun to work. If trees shade your roof during the day, the Sun Lizard will not be as effective, or in extreme cases, it may not work at all. Ensure that minimal shading occurs on the roof (where the proposed location of the Sun Lizard is to be) during the day. The elevation of the sun and therefore any shading will vary throughout the year and is different in various parts of Australia. If you are unsure, please talk to your local distributor or contact us direct.
4. The PV Panel will need to be mounted at an angle that is suited for your location to ensure the PV Panel obtains the maximum solar gain. Please refer to the map and tables below to determine the optimum tilt angle (elevation from horizontal). If unsure, please talk to your local distributor or contact us direct.



Latitudinal Range	PV Panel		Examples of Major Centers
	Optimum Elevation	Elevation Range	
15°-20°	5°N - 10°N	0°N-20°N	Cairns
20°-25°	10°N - 15°N	5°N-25°N	Mackay Rockhampton
25°-30°	15°N-20°N	10°N-30°N	Brisbane, Gold Coast, Geraldton
30°-35°	20°N-25°N	15°N-35°N	Port Macquarie, Newcastle, Gosford, Sydney, Adelaide, Perth
35°-40°	25°N-30°N	20N-40°N	ACT, Melbourne, Ballarat, Bendigo, Geelong
40°-45 °	30°N-35 °N	25°N-45°N	Devonport, Launceston, Hobart

5. There are limitations on the length of ducting that can be installed with the Sun Lizard. The selected position for the Sun Lizard and all components must be such that it does not exceed the maximum 12m length inclusive of all ducting. The shorter the duct length, the more efficient the Sun Lizard will work.

<p><b>6. Selecting a location for the Fan Box</b></p>	<p>If you have a ceiling cavity, it is easier to locate the Fan Box inside the ceiling cavity approximately mid-way between the ceiling return diffuser and the Exhaust Flue.</p> <p>If you do not have a roof cavity (flat roof or cathedral ceiling) then the Fan Box will need to be located on the roof immediately beside the Exhaust Flue. A weatherproof cover is included in this case.</p>
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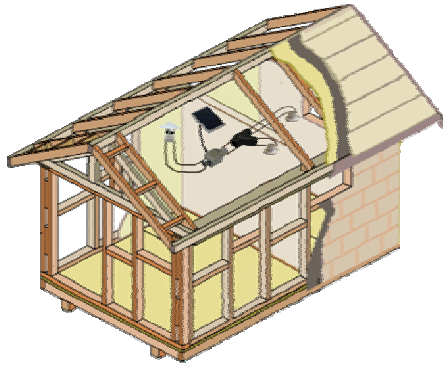
<p><b>7. Selecting a location for the Ceiling Inlet Return Diffusers</b></p>	<p>The optimum location for the ceiling inlet return diffuser is at the highest point of the ceiling in the area to be cooled. In a two story building it should be in the upper story. However, this may be impractical or aesthetically not possible or may make the ducting length too long. Any position high up in the ceiling or on a wall will draw out the warmer air near the ceiling.</p> <p>If you have a Ceiling Cavity Kit then you have 2 Ceiling Diffusers and a Y Branch as well as enough ducting to do 2 rooms. Ensure the Ceiling Diffusers are as close to each other as possible, ie. If they are in two adjacent rooms, put them close to the common wall.</p> <p>If you have a No Ceiling Cavity Kit then only one Ceiling Diffuser is supplied as it would be impossible to ship the external pipe required to connect to Ceiling Diffusers. You may however purchase this pipe and an appropriate metal Y Branch from a local plumbing supplier and connect to two rooms.</p>
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<p><b>8. Selecting a location for the Exhaust Flue or Exhaust Adaptor</b></p>	<p>The Exhaust Flue should be located as close to the Fan Box as possible to minimise ducting length. Ensure that it will not cast a shadow on the PV Panel.</p> <p>If you have a flat roof or cathedral ceiling, the Fan Box will be on the roof. In this case an Exhaust Adaptor is provided that takes the place of the Exhaust Flue. This is fitted to the Outlet Port of the Fan Box (see <a href="#">diagram</a>). A waterproof cover will go over the Fan Box and the Exhaust Adapter.</p>
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## 9. Penetrating & Flashing the Roof

### Roof with Ceiling Cavity

- a) Select location for roof penetration and remove tiles or cut 160mm holes in metal.
- b) Cut rubber of Dektite or Aquaseal to suit 150mm pipe and fit pipe into rubber.
- c) Place into hole in roof but do not seal at this stage.



### Roof with Ceiling Cavity

The Sun Lizard Heat Extractor requires one opening in the roof to allow 150mm pipe ducting to be connected to the Exhaust Flue. Typically this is done using Dektites or Aquaseals.

### Roof with no Ceiling Cavity

If there is no ceiling cavity, the ceiling return diffuser and the heating outlet pipe will connect directly to the roof.

### Roof with no Ceiling Cavity

- a) Select location for ceiling return diffuser by checking inside the building where any timber structures are located and marking and cutting plaster first. Mark and cut the holes for the ceiling diffuser using the template on the diffuser box.
- b) Cut hole in metal roof matching hole in plaster.
- c) Cut rubber of Dektite or Aquaseal to suit 150mm pipe and fit pipe into rubber.
- d) Place into hole in roof but do not seal at this stage
- e) Connect Ceiling Diffuser to pipe inside building and screw or tape securely then fit Ceiling Diffuser into plaster ceiling
- f) On roof, cut excess pipe and fit the 90 degree bend and second pipe.

## 10.Ducting

### Roof with Ceiling Cavity

- a) Select location for ceiling return diffuser by checking inside the building where any timber structures are located and marking and cutting plaster first. Mark and cut the holes for the ceiling diffuser using the template on the diffuser box. This diffuser will draw warm air from the ceiling into the Fan Box. Choose a location at the highest practical point in the building.
- b) Fit Ceiling Diffuser into plaster ceiling and lock.
- c) Connect pipe or flexible ducting and make sure it is well taped and sealed.

You should plan out the installation of the ducting to maximise efficiency and produce the most effective airflow system for the building. **Diagram 1** in this installation guide provides a simple explanation of airflow and the duct installation for any building.

One thing to consider is that many buildings are quite warm on the northern side and cold on the southern side. If your building is like this, consider placing the ceiling diffuser close to the north side to take out this warmer air.

### Roof with no Ceiling Cavity

The ceiling return diffuser should already be installed – see section 9.

## 11. Connecting the Fan Box

### Roof with Ceiling Cavity

- a) Connect the ducting or pipe from ceiling return diffuser to Fan Box inlet and securely screw and/or tape.
- b) Connect the ducting or pipe from the roof outlet to the Fan Box outlet and securely screw and/or tape

Diagram showing duct connections to Fan Box

### Roof with no Ceiling Cavity

- a) Connect the ducting or pipe from ceiling return diffuser to Fan Box inlet and securely screw and/or tape.
- b) Connect the Exhaust Adapter to the Fan Box outlet and securely screw and/or tape

The Fan Box is connected to the ducting coming from the ceiling return diffuser and going to the ducting for the Exhaust Flue.

This may be done inside the ceiling cavity or on the roof. Labels on the Fan Box indicate the air direction. The fan box should not be connected too close to the ceiling diffuser to avoid fan noise coming into the room via the ducting.

It should be located at the furthest point from the ceiling diffuser, just before it goes through the roof.

Ducting should be secure and airtight.

If mounted on the roof, an optional weather resistant cover is provided. The base of the cover is fixed to the roof, the Fan Box mounted inside and the top cover screwed down over the Fan Box.

## 12. Connecting the Electronic Control System (ECS), Switch and Cable

### Pic of ECS Roof with Ceiling Cavity

- a) The Electronic Control System Box is located with the fan box to make cable connections simple.
- b) Locate the wall mounted switch in an appropriate, accessible location and connect to the cable coming from the Electronic Control System (ECS) box.
- c) Connect the Fan Box to the ECS using the cable supplied.
- d) Connect the power cable for the PV Panel (labelled PV Power) to the ECS and pass through the Dektite or Aquaseal onto the roof to connect to the PV Panel.
- e) Connect the 240/12 volt plug pack to a 240 volt power source if available to allow for night time functionality.

### Roof with no Ceiling Cavity

- a) Locate the wall mounted switch in an appropriate, accessible location and connect to the cable coming from the Electronic Control System (ECS) box.
- b) Connect the Fan Box to the ECS using the cable supplied.
- c) Connect the power cable for the PV Panel (labelled PV Power) to the ECS and pass through the Dektite or Aquaseal onto the roof to connect to the PV Panel.
- d) Connect the 240/12 volt plug pack to a 240 volt power source if available to allow for night time functionality. This may not be possible with most roof installations.

All the electronics and switching is managed through the Electronic Control System.

This box will have a number of labelled connections and cables to attach to the various modules.

It may be necessary to drill a hole in the Top Plate of a wall and drop the cable through this hole and then make a small hole in the plaster wall to locate the cable and connect to the switch.

The cable may be run behind box ducting, inside a cupboard or other location and then the switch located and connected.

It may also be necessary to use electrical conduit if no other convenient way is found to get the cable from the roof to the switch.

**Make sure the cable and switch are installed before connecting the PV panel on the roof.**

Once the PV Panel is connected, swap modes from heating to cooling and swap from low to high speed to ensure all functions are operational.

### Roof with no Ceiling Cavity

The Electronic Control System Box is supplied with a weatherproof cover when located on the roof. If it can be located in an accessible position elsewhere that still enables cable connections then this is preferred



### 13. Connecting the Photovoltaic Panel

- a) Place the PV Panel face down on the roof inside the packing box it came in.
- b) Use a sharp knife to carefully puncture a small hole in the rubber grommet at the end of the terminal box.
- c) Slide the power cable through the rubber grommet
- d) Connect the two wires to the appropriate positive and negative terminals (red - positive and white - negative).
- e) Replace the cover and screw shut.
- f) Turn the PV panel over and when it is turned over the fans should immediately start operating if there is any sunshine.
- g) Attach PV Panel to adjustable mounting frame if required
- h) Securely attach PV Panel and/or mounting frame to roof

The photovoltaic panel should be the last device connected to complete the Sun Lizard assembly on the roof.

**We strongly advise placing a cover (the box it came in or a towel) over the face of the panel until after it has been connected to the power cable to stop it from generating electricity and causing any shorts or electrical faults.**

Fix the Photovoltaic Panel to the roof using the mounting frame, strapping and fixing bolts supplied.

If the roof doesn't face north or the angle is not at least 10 degrees towards north, use a small frame or bracket to raise and correct the angle. This will ensure optimal performance.

#### Step by step pics

### 14. Finishing the Job

Once all the components are connected and tested, the ducting, roof penetrations and weatherproof covers (if used) need to be sealed and checked.

It is extremely important to ensure that water cannot enter any of the electronic components so they should be mounted so that in the event of severe storms that no backing up of water due to leaves or debris on the roof will allow water to enter any of the boxes. If in any doubt, raise the boxes off the roof or place some form of diverter around the boxes.

Check that all the functions are working by changing modes on the Control Switch and then make sure it is left in the correct mode for the weather conditions.



## 15. Handy Tips

- The overall ducting (inlet and outlet) can be up to 12 metres in length, however the unit will operate more efficiently the shorter the total ducting is. Ideally restricting ducting to less than 6 to 8 metres will give the best performance. Therefore location of the Sun Lizard in relation to the room(s) to be heated is critical in overall performance.
- The flexible ducting if used, should be stretched tight. If left loose this creates more resistance and reduces air flow.
- The ducting should not be compressed to fit through gaps or taped to anything which may cause the ducting to be compressed.
- Try to avoid 90 degree or sharper bends - ideally have 2 x 45 degree bends.
- If possible, use metal or polypropylene pipe made to measure. Although more expensive, it won't deteriorate and will allow optimum airflow. Use short lengths of flexible ducting to connect longer metal pipe or where it is too difficult to get metal fittings installed.
- We recommend using at least R1.0 (preferably R1.5) insulation around the outlet ducting to prevent any heat loss.
- The inlet ducting should be located at the highest point of the ceiling and as close to the Sun Lizard as possible. This facilitates removal of hot air in summer.
- The Sun Lizard is supplied with a control switch. This is connected via a cable to the electronic control box. The cable should feed down with the ducting and then mounted, with the control switch, on a wall near the vent register. 15 metres of cable is supplied, so it can be placed in other locations, but ideally in the same room.

### Filtered Cooling Vent



Your kit may optionally come with a filtered floor boot and register if it was ordered. If you have a timber floor, you can install this in the floor, somewhere near the south or centre of your home to allow cool, filtered air to come into the building to replace the hot air being extracted.

If you have a concrete slab, you may be able to install this in a southern wall, down low so that it can draw in cooler air. Make sure it is far enough off the ground to prevent water ingress. You can remove a brick and replace it with a metal grill immediately opposite the filtered boot in the wall.

During winter you should close the vent to stop drafts.

## **17. Warranty**

Photovoltaic Panel - 10 years  
Fans – 2 years  
Electronics – 2 years

Accidental or deliberate damage is not covered.  
Incorrect installation may void the warranty.

## **18. Technical Help**

The Sun Lizard is designed to give years of maintenance free service. If there are any problems please check the web site for technical help. The latest troubleshooting information is available or you can contact a technical expert to give advice.

## 19. User Guide **Pic of switch**

### Switching On/Off

Press the button labelled On/Off until the LED flashes. This will turn the fans on or off. One flash will indicate On and 2 flashes Off.

### Swapping from high to low speed fans

Press the button labelled Fan Speed until the LED flashes. This will change the fans to High or Low. One flash will indicate low speed and 2 flashes high speed.

### Night Time Heat Extraction

If you have the optional 240/12 volt plug pack plugged into the Fan Box connected to a mains power socket and switched on, then if the Air Shifter is set to on the mains power will take over when there is not enough sunlight to power the fans including at night.

The Sun Lizard is designed to provide a solar solution to cooling your home.

To optimise your benefits from the Sun Lizard please note the following will help you get the most from your investment.

#### Make your home energy efficient

- Insulation ceiling, walls and floor
- Seal doors and windows
- Use curtains and pelmets on windows
- Allow passive solar gain if possible
- Provide external shading in summer

#### Zone your home when practical

- Close doors to rooms not being used when you are home
- During the day when the Sun Lizard is working leave doors open to spaces you want cooled to allow warm air to be removed effectively.

#### Work with the natural environment

- Wear appropriate clothing for the weather conditions
- Check the weather forecast so you set the Sun Lizard to the correct setting for the time of year or type of day
- Use external shading or allow passive solar gain at the relevant times of year
- Allow cross ventilation in summer when cool breezes replace the hot air

<b>Image</b>	<b>Description</b>	<b>Document and page no</b>	<b>Page</b>	<b>Quality</b>
Sun Lizard Logo	Sun Lizard Logo	Heat Extractor Installation Guide	1	High
HE Picture	Picture of HE	Heat Extractor Installation Guide	1	High
HE Diagram	Diagram showing HE on building		4	High
HE Inventory Pic	Picture of all components laid out	Heat Extractor Installation Guide	6	High
Australia Map	Map showing latitude	Heat Extractor Installation Guide	8	High
Exhaust Flue and Adapter	Pic showing both to show different installation	Heat Extractor Installation Guide	10	High
Pic of installed HE	Show flashing and pipes	Heat Extractor Installation Guide	15	High
Fan Box	Showing close up of connections with labels	Heat Extractor Installation Guide	13	High
Pic of ECS	ECS showing connections	Heat Extractor Installation Guide	14	High
Pics of PV connection	Step by step PV connection	Heat Extractor Installation Guide	15	High
Pic of Switch	Pic of switch on wall	Heat Extractor Installation Guide	19	High