



**CONDENSATION CONTROL &
HEAT RECOVERY VENTILATION**

CONTENTS	
PRODUCT OVERVIEW.....	2
Introduction	2
Who Is Home Ventilations Solutions ?	2
Your HVS Features	2
What Is Condensation ?	2
What Problems Can Condensation Cause ?	3
What Is Condensation Control ?	3
What Is Heat Recovery Ventilation ?	3
Operating Principles	4
OPERATING GUIDELINES.....	5
General	5
Control Panel	6
Summer Months	7
Factory Default Settings	7
Other Settings	7
CUSTOMER SERVICE	8
Warranty	8
HVS Performance Expectations	8
“Warm N Dry” Performance Guarantee	8
Heat Recovery Expectations	8
TECHNICAL	9
Troubleshooting	9
Specifications *	10
Setting the Thermostat back to default	10
Appendix A - Sample data	11
Appendix B - Heat Recovery Calculations	12

PRODUCT OVERVIEW

Introduction

Thank you for choosing your “Warm N Dry “ Home Ventilation System (HVS). We are proud of our product and confident that the HVS will improve your home comfort as a result of a drier, fresher, warmer and healthier environment.

Although the HVS was calibrated to the size of your home, you can easily adjust the air flow to suit changing family circumstances, seasons and weather. We encourage you to experiment with the settings to better optimize the system and obtain the maximum benefit from your investment.

Your satisfaction is important to us. If you have any questions or suggestions please contact us on 03) 6273 7644 or info@hvsolutions.com.au.

Who Is Home Ventilations Solutions ?

PFTAS Pty Ltd, trading as Home Ventilation Solutions is the manufacturer of the Warm N Dry product range. The original Home Ventilation Systems were imported, sold and installed by heating and ventilation specialist retailer Pellet Fires Tasmania which has its head office and showroom at 108 Gormanston Rd, Moonah, TAS 7009.

PFTAS has been installing Domestic Ventilation Systems (DVS) from New Zealand since 2002 and has many hundreds of customers who are benefiting from this proven technology. Home Ventilation Solutions now manufactures its own systems built in Tasmania, for Tasmanian conditions and sold by specialist retailers.

Your HVS Features

- Reduces condensation throughout the whole home all year round - no more crying windows and wet sills.
- Helps to distribute heat around the home.
- Whisper quiet. Set and forget automatic operation.
- Low running cost - as low as a single light bulb, more than pays for itself by providing free solar heat when its available.
- Ventilation has been proven to reduce humidity, dust mites, mould and fungal spores (triggers for many asthma and allergy sufferers).
- Backed by a 3 consecutive winter month money back guarantee and 3 years warranty.
- Designed and built by a Tasmanian company for Tasmanian conditions.
- Fully programmable to meet the needs of any home that has a suitable roof space.
- Filter prevents dust and pollens from entering the home.

What Is Condensation ?

Condensation in the home is a result of too much moisture in the air. Inside air is made up of outside air plus what ever we add to it. The occupants of an average home will add up to 15 litres of water to the air per day from breathing, showering, cooking, drying clothes etc.

When moist air cools down below its ‘dew point’, such as when it contacts a cold surface, the moisture falls out of suspension. Water pools on surfaces and runs down walls etc. Glass windows are usually the first places to show evidence of condensation because they are the coldest surfaces.

What Problems Can Condensation Cause ?

Condensation left untreated can promote mould, mildew growth and damage wood work, furnishings and clothing. Mould spores are known asthma and allergy triggers. Unpleasant odours are caused by damp conditions. Damp houses take more energy to heat, feel unhealthy and are unpleasant to live in. Dust mites thrive in moist conditions.

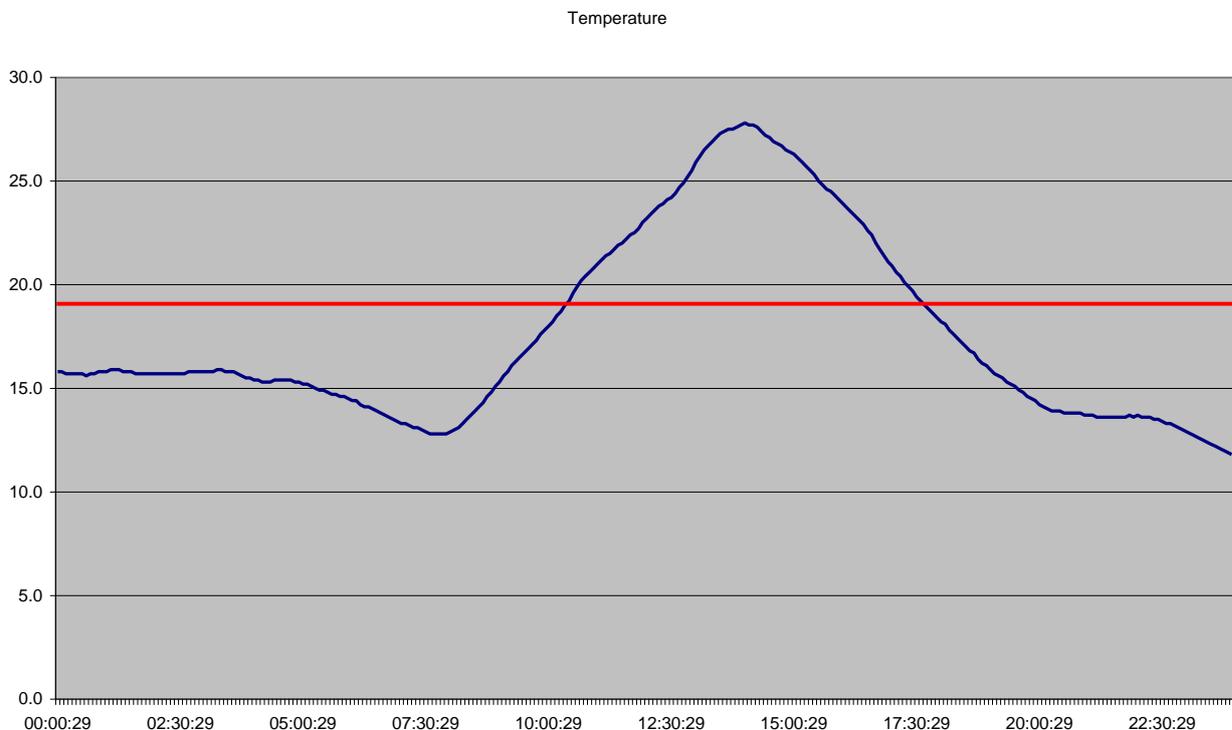
What Is Condensation Control ?

Constant low volume filtered **fresh air ventilation** will dilute and expel the internally created moist air from inside your home. The Home Ventilation System automatically manages the correct amount of ventilation required.

What Is Heat Recovery Ventilation ?

Your homes roof space is usually warmer than the outside air thanks to the sun. The graph below shows temperature changes in the roof space during a typical day. The sample was for the 10/5/08 and shows a minimum temp of 12 and a maximum of 28 degrees. The actual outside minimum was just 10.8 and a maximum of just 17 on that day (refer Appendix A). The difference between the roof and outside temperature is considerable and available as free heat by automatically transferring warmer roof air into the house as required. During summer the heating facility is turned off.

The period above the red line is the Heat Recovery period and totalled 8 hours on this particular day. That is 8 hours with the fan operating at maximum capacity (200 litres per second [l/s] - HVS2). During this period, warm air (19 to 28 degrees) is transferred into the home reducing the need for other more expensive heating while flooding the house with fresh air as well. Autumn and spring time will provide the greatest heat gain but even winter months benefit. Refer to the Technical section for more statistics.

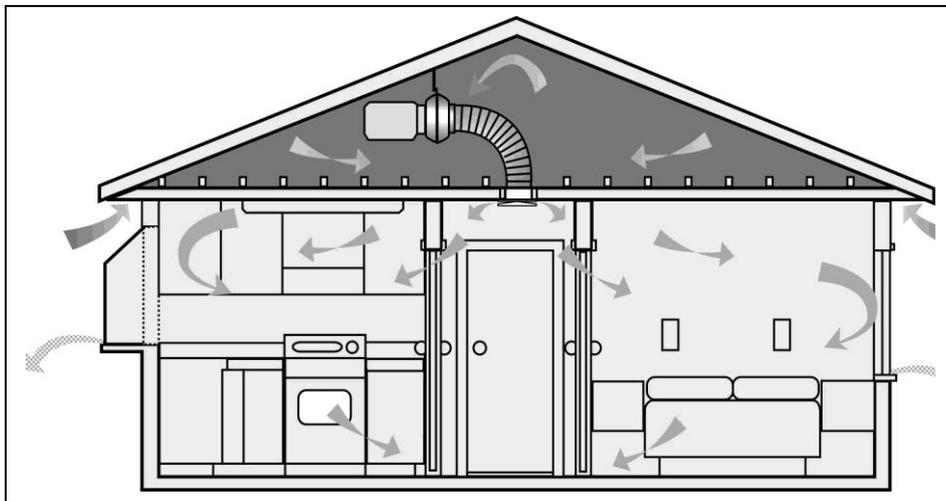


Operating Principles

The purpose of the HVS is to ventilate your home with introduced air which is fresher and drier than the air inside your home in a controlled manner. Air from the roof space replaces stale humid air which causes condensation, which can lead to mould and damp problems, or at least to reduce them to an acceptable level.

The diagram (below) shows how the system works. Air is transferred from the roof space because it is always warmer than the outside air. During the night, the roof space cools down (but usually not as cold as outside) and air flow into the home is reduced, but **NOT** stopped completely, to control condensation.

A small continuous supply of fresh air into the home is required to banish condensation during winter. The ventilation air supply positively pressurises the home causing stale air to be gently forced out through cracks under doors, floor boards etc.



This method of positive pressure ventilation (PPV) is the most cost effective way to reduce moisture build up in the home.

Outside doors and windows could be left open, which will allow in the necessary fresh air, however there are a number of draw backs with this approach such as security, inability to control the flow rate (too much or not enough) and the increased heating cost that would be required to overcome these cold draughts.

Heat Pumps (reverse cycle air-conditioners) do not de-humidify in heating mode and are only effective in summer cooling mode. Room de-humidifier units are very expensive to run and like moisture crystals have little effect on moisture. None of them provide the necessary fresh air ventilation that your home requires.

OPERATING GUIDELINES

General

This Home Ventilation System is capable of providing:

1. Constant low volume ventilation - required to improve air quality and control the effects of condensation and/or
2. Free solar heating - complements other heating sources in cold weather.

Your Home Ventilation System is easy to operate and is basically set and forget. The aim is to set the air flow rate to the lowest setting in order to manage the condensation/air problem for your home.

Your unit has been calibrated to your house size which means the system should manage the air flow to achieve the required result when set to the lowest setting most of the time. The air flow rate can be increased by adjusting the fan speed control knob if condensation/air quality is not being controlled adequately. It is recommended that the fan control knob setting should only be increased in small steps and given sufficient time (1 or 2 days) at the new setting to check for the desired result before changing it again.

Experience will determine the best setting. When you have found the correct setting for your home, **leave it there**. During summer, “Heat Recovery” should be switched off or the house will become too hot.

The number of ceiling outlets required will depend on house size, layout and barriers to air flow throughout the home. Normally one or two outlets is sufficient however if internal doors get closed, extra outlets will be required.

The air from your Home Ventilation System is filtered for your protection. The filter should be replaced every 12 months. A replacement filter is available from your retailer and is easy to change. The standard filter is a G4 grade which is adequate for dust control etc. A finer filter (F6) is available for those people who suffer from air borne allergies and asthma. A carbon filter is available which reduces the effects of wood smoke entering the roof space.

Ceiling vent outlets can simply be cleaned with mild detergent in warm water. Apart from changing the air filter every year, there is no other maintenance required.

Typically a HVS system can achieve a significant and noticeable reduction in condensation within the first few days, certainly within 1 month. The time required will depend on a number of factors. To maximize the effectiveness of the HVS system please observe the following points:

- Maintain adequate home heating as required.
- Fine tune the air flow rate by finding the optimum minimum setting.
- Keep all external doors and windows shut during cold winter weather (even during the day).
- Keep internal doors wide open to allow the fresh air to circulate throughout the home.
- Slightly open curtains to allow air flow to the glass surfaces at night.
- Slightly open wardrobes and drawers to allow air flow around clothing.
- Avoid exhausting moisture into the roof space (eg kitchen, laundry and bathroom exhaust fans should be ducted outside the home as per building regulations and not into the roof).
- Change the filter every year.



Control Panel

The thermostat displays the roof space temperature at all times accurate to 0.1 degree celsius and has two programmable set points (SP1 and SP2):

- SP1 is the setting at which the unit switches from Ventilation mode to Heat Recover mode (typically set at 18 degrees).
- SP2 is the temperature at which the unit switches off completely when it is too cold for ventilation to be effective (typically 5 degrees).

Both set points can be changed by pressing the P button for 1 second and raising or lowering the settings with the arrow keys. The settings should be selected depending on the house requirements i.e. degree of condensation, fresh air requirements and free heat recovery or varying degrees of each. If you are unsure of the best setting, please contact HVS for advice and or check the Technical section later in this document.

In addition to SP1 and SP2, there are two switches that turn the Ventilation and Heat Recovery modes on or off and a variable fan speed control.

The variable fan speed dial controls the amount of air transferred during the ventilation mode which is the temperature range between SP1 and SP2. It can be manually varied between 30% and 100% of the fans air flow capacity (min to max on the dial). When the roof temperature is above the SP1 value, the variable fan speed control is bypassed and the fan runs at 100% if the Heat switch is on otherwise the fan will turn off if the Heat switch is in the off position.

The correct setting for the variable fan speed controller is the minimum airflow setting that clears the condensation from windows and or provides the desired air quality. Experimentation with the variable speed setting is required because it will depend on how bad the condensation problem is and the house size. Too high a setting could result in the house becoming cold during the night, too low will prevent the system from providing adequate ventilation.

Modes of operation	Variable fan position	SP1 range	SP2 range	Fan Switch	Heat Switch
System OFF				Off	Off
Heat recovery mode only. (Fan operates at 100% when the roof space temperature is > SP1)		17 – 22		Off	On
Automatic Climate Control. (Fan operates at the variable speed setting when the roof space temperature is > SP2 and < SP1. Fan operates at 100% when > SP1)	0 – 50%	17 – 22	3 – 10	On	On

Summer Months

During summer the day time roof temperature can become too hot, set the Heat Switch to OFF. This will stop the house becoming over heated during the day but still provide ventilation when the roof space cools down to below the SP1 setting during the night. You may choose to set the variable speed control to a higher setting during summer so that more air is brought in during the night.

Factory Default Settings

The default settings are for fully automatic operation assuming a severe condensation problem. SP1 is set at 18.0 degrees and SP2 is set to 5.0 degrees. If the condensation problem is very bad, SP2 could be reduced to as low as 3 degrees but home heating would need to be increased. If the condensation problem is only slight then SP2 could be set to as high as 8 degrees. HVS has determined that 5 degrees is the best setting for average to severe condensation problems.

Other Settings

If your home does not have a condensation problem and you purchased the HVS for the ventilation and heat recovery benefits alone then the setting of SP2 could be increased to 10 or 12 this would stop any fresh air coming in below that temperature.

Note: If you have your home sprayed with insecticides by a Pest Control company, switch the “Warm N Dry” OFF for 24 hours to allow the sprays to do their job. Place both the Fan and Heat switches in the OFF position to turn the system off. Don't forget to turn it back on.

CUSTOMER SERVICE

Warranty

For your piece of mind all “Warm N Dry” HVS products come with a full 3 year on site parts and labour warranty service for systems that were installed by an approved installer. A travel charge may apply for installations that are greater than 30klm from your local retailer.

If your system was installed by anyone other than an approved installer, faulty product should be returned to Home Ventilation Solutions for warranty repair and or replacement during the 3 year warranty period commencing from the date of purchase.

HVS Performance Expectations

Home Ventilation Solutions guarantees the performance of the system in controlling condensation problems in the Customer's home. The Customer should expect condensation free windows and other dampness problems to be reduced and controlled, as long as the customer follows the Operating Guidelines. In some instances, misting on glass may still occur to a small degree. It is also possible that some condensation may still occur during climatic extremes.

Typically a “Warm N Dry” system can achieve a noticeable reduction in condensation within 2 or 3 weeks, and often immediately. Moisture levels will continue to decrease but it could take up to 12 months to reach the maximum benefit.

“Warm N Dry” Performance Guarantee

All “Warm N Dry” systems installed by an approved installer for the purpose of controlling household condensation and dampness problems have the following performance guarantee:

If after 3 consecutive winter months the Customer is dissatisfied with the level of condensation control and the Customer has been adhering to all operating guidelines issued by HVS and HVS has had the opportunity to inspect the installation and suggest alterations as it deems necessary to better suit the Customer's house, then HVS will, at the Customer's written request, remove the product from the Customer's house and refund monies paid, less the installation costs (\$300 and less a further \$50 per additional outlet), provided that the product has not been damaged.

All ceiling outlets will remain in place and will be wound closed. All electrical wiring installed by will be left in a safe, legal and unobtrusive manner. The control panel will be replaced with a blanking plate. The customer must inform HVS in writing after 4 to 6 weeks of winter time operation if the system is not performing to expectations. For the purposes of this guarantee winter time is deemed to be the period from the first day of April to the last day of August. A deferred winter period may be mutually agreed upon between HVS and the Customer if HVS believes this to be of benefit to the success of the installation.

Heat Recovery Expectations

The “Warm N Dry” is not a home heater. The benefits that can be expected from the system in heat recovery mode will depend on the sun and the roof structure. Whenever there is heat gain in the roof space, it is available to transfer as long as the control panel is set correctly. The money back guarantee is limited to condensation control, HVS can not predict how much benefit a particular house will receive from heat recovery.

TECHNICAL

Troubleshooting

1. Thermostat display is on but there is no air coming out of the outlets.
 - a. The system may have switched the fan off automatically because the roof space temperature is below SP2.
 - b. The roof space temperature is above SP1 and the "Heat" switch is off.
 - c. The roof space temperature is between SP1 and SP2 and the "Fan" switch is off.
 - d. Duct work in the roof space has come apart.
 - e. The ceiling outlets are wound up and closed.
 - f. The filter is blocked.
 - g. System failure (contact HVS).
2. Thermostat display is off.
 - a. Power failure.
 - b. Unit has been unplugged in the roof.
 - c. System failure (contact HVS)
3. Still getting some condensation problems.
 - a. Slowly increase the variable fan speed control to increase air flow over 2 or 3 days to find the optimum setting.
 - b. Check that air is not escaping through open vents, windows or doors. Air flow will take the path of least resistance which will deprive other areas of adequate air flow.
 - c. Ensure that the air can reach the effected rooms. Open internal doors or add outlets if required.
 - d. Check and adjust the settings of SP1 and SP2 if necessary (check with HVS).
 - e. Check the filter.
 - f. Do not use un-flued gas heaters in the home.
 - g. Ensure exhaust extraction fans are not dumping moisture into the roof space.
 - h. Check for other sources of moisture that could effect the roof space such as ground water or rising damp or uncovered gravity feed water tanks or water leaks or no vapour barrier (sisalation) under an iron roof.
 - i. Curtains should be left open slightly to allow air flow to reach the glass during the night and fully open during the day. Drilling holes in the top of enclosed pelmets can also help ventilate behind closed curtains.
4. I no longer get condensation but the house is colder at night or when there is no sun.
 - a. Adjust the variable speed control down to the point just above where condensation returns. This will be the correct and minimum setting required to achieve control without over ventilating.
 - b. Increase the house heating slightly to compensate for the necessary ventilation during very cold periods.
5. The house is too hot
 - a. In warmer weather switch the "Heat" switch off, fresh air will then only be introduced when the roof space temperature is below SP1.
6. I can smell an odour
 - a. You may notice some odour from the roof space for the first few days after the system is installed or if the roof space has been disturbed. This is normal and will disappear once it settles down and the roof space becomes ventilated by outside fresh air.

- b. Ensure exhaust extraction fans are not introducing smells into the roof space.
7. I can hear a noise
- a. It is possible that you may hear a very faint hum from the “Warm N Dry” fan in the still of night, this is normal.
 - b. You will hear the flow of air from the outlets and possibly the fan during heat recovery mode because the fan is operating at maximum speed, this is normal.

Specifications *

Model	Recommended house size	Max power consumption	Air flow	Minimum outlets	Maximum Outlets
HVS1	80 to 160 m ²	62 watts	45 - 135 l/s	2	4
HVS2	120 to 240 m ²	80 watts	66 - 199 l/s	2	6
HVS3	220 to 480 m ²	160 watts	132 - 398 l/s	4	12

* subject to change without notice

Setting the Thermostat back to default

Set Points

- Press and hold the **P** button for 1 second until the “**SP1**” message shows up. (program mode)
 - Use the **Up** or **Down** arrowed buttons to set the display to **18.0**. This is temperature at which the module switches to Heat Recovery.
 - Press the **P** button to step to “**SP2**” and set this to **5.0**. This is the temperature at which the module switches the fan OFF (minimum temp).
 - Press the **P** button again will exit Level 1 mode and return to normal operation. If no button is pressed for 20 seconds, program mode is cancelled automatically.

Appendix A - Sample data

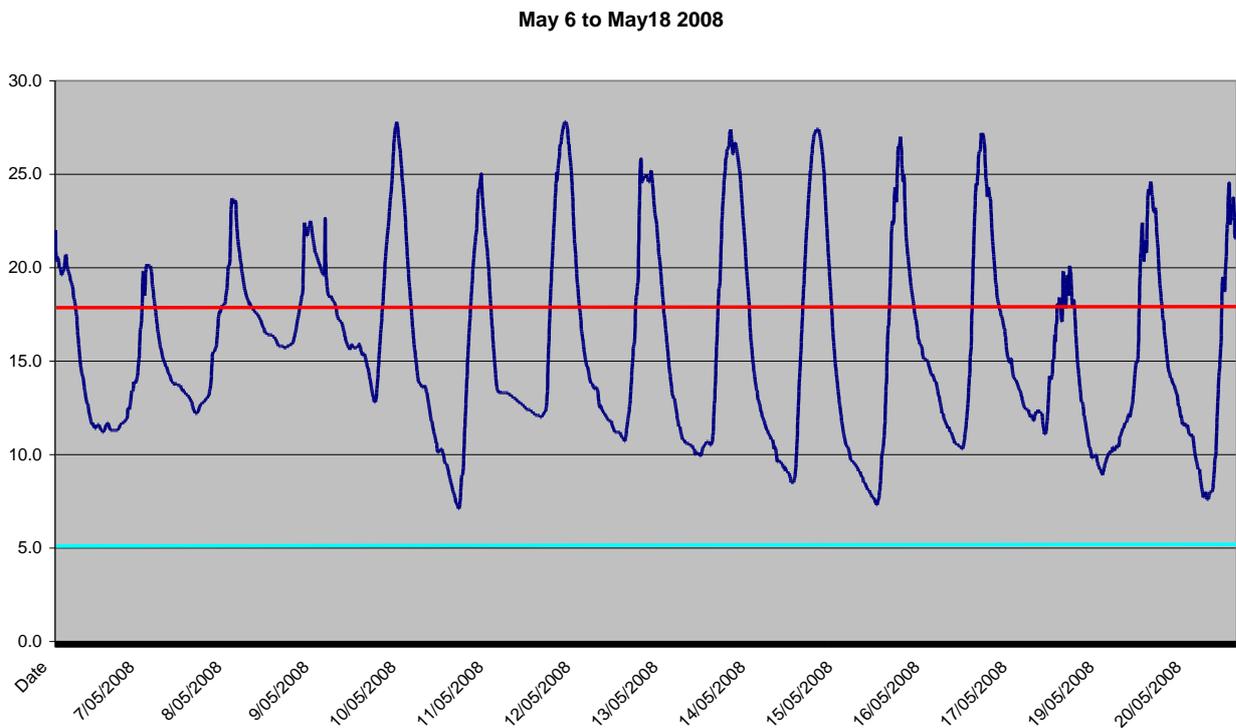
Hobart, Tasmania

May 2008 Daily Weather Observations

Source Bureau of Meteorology

Date May	Day	Temps	
		Min	Max
		°C	°C
6	Tu	9.2	15.6
7	We	8.8	15.6
8	Th	9.0	19.2
9	Fr	13.6	19.5
10	Sa	10.8	17.0
11	Su	5.0	13.8
12	Mo	7.6	16.0
13	Tu	8.2	18.1
14	We	8.9	18.9
15	Th	7.2	18.9
16	Fr	8.0	18.9
17	Sa	10.1	19.9
18	Su	9.7	14.5
19	Mo	8.8	18.4
20	Tu	6.2	16.8

The following graph shows the roof space temperature at 108 Gormanston Road Moonah for the period 6 May 08 to 20 May 08. The blue line = SP2 (5 degrees) and the red line is SP1 (18 degrees). The period between the two lines is the ventilation mode and the period above the red line is the heat recovery mode.



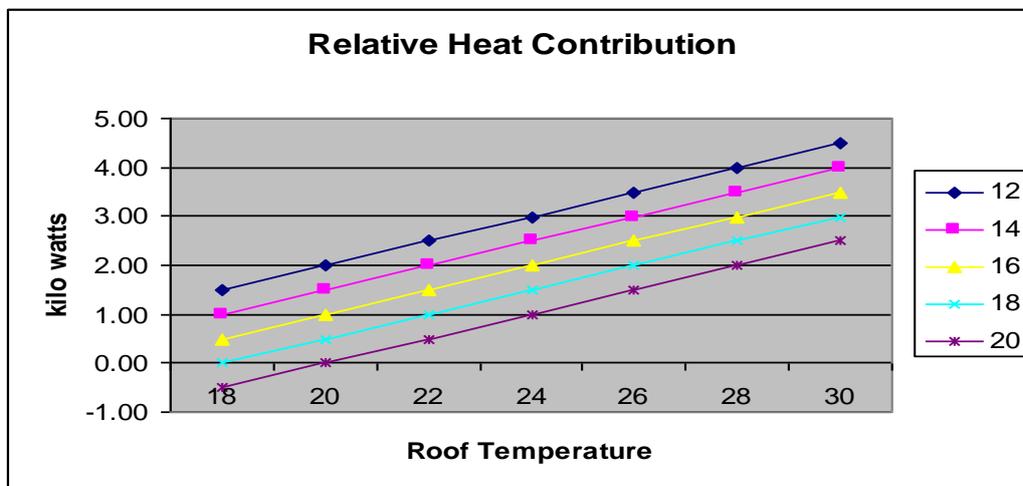
Appendix B - Heat Recovery Calculations

The amount of heat or loss that can be contributed to the home is dependant upon the following factors:

- Outside temperature and atmospheric pressure which effects the “Air Density”
- Roof temperature (sun and roof structure etc)
- House temperature (thermal mass, insulation and other heat sources/losses)
- Air flow (fan speed and capacity)

$$\text{Power (kw)} = (\text{Air Flow}) \times (\text{Air Density}) \times (\text{Roof Temperature} - \text{House Temperature})$$

The following graph shows the expected heat gain in kilowatts based on assumptions that the atmospheric pressure is normal at sea level (1013 mbar), air density is constant @ 1.24 kg/m³ and that flow rate is 200 l/s which is maximum speed of a single HVS2 fan.



Each coloured line on the graph represents various house temperatures which determines the relative heating/cooling effect from the incoming air. If the air temperature in the roof is the same as inside the house, then obviously there is zero heat gain. If the roof temp is greater than the inside air then there is a gain. Conversely if the roof air is colder than inside the home then there is a heat loss.

Graph examples:

- If the house temperature is 16 degrees (yellow line) and the Roof Temp is 26 degrees, the heat gain is 2.5kw (2,500 watts).
- If the house temperature is 20 degrees (purple line) and the Roof Temp is 26 degrees, the heat gain is 1.5kw (1,500 watts)
- If the house temperature is 20 degrees (purple line) and the Roof Temp is 18 degrees, the heat loss is 0.5kw (500 watts)

During condensation control mode (roof temp between 5 and 18), the fan speed is reduced which reduces the amount of heat loss to as little as 170 watts in the worst case scenario (outside temp of 3 degrees, inside temp of 12 degrees and roof temp of 5 degrees). Typical night time condensation control mode of say 8 degrees outside, 12 degrees in the roof and 16 degrees inside would account for only 100 watts of heat loss (that of a light bulb).

The above does not take into account the significant energy savings resulting from the drying effect (displacement of moist humid air with dryer fresh air).