ProAir 600

Heat Recovery Ventilation Systems

OPERATION MAINTENANCE & TECHNICAL MANUAL

ProAir Systems, Tuam Business Park, Weir Rd., Tuam, Co. Galway.

Tel 093 60892
www.proair.ie
Email proair@proair.ie

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System Description

The whole house ventilation system has been professionally designed and manufactured in Ireland by ProAir Heat Recovery Ventilation Systems Ltd. It has been installed and tested in accordance with the relevant EN standards and in conformity to Part F and B of the DOE SI 497 of 1997 & DOE SI 581 of 2002 Regulations.

It has been designed to:

- Continuously ventilate all the rooms in your house in a controlled manner to give a healthy environment.
- Remove moisture & odours thereby preventing condensation build-up, mould growth etc.
- Provide a draught free environment with the required amount of filtered fresh air for the occupants.
- Minimise the energy losses by recovering the heat from the extracted stale air & transferring up to 90% of this heat to the incoming fresh air.

The principle behind energy efficient whole house ventilation is to continuously supply fresh air & extract stale air, such that the air is changed in the house around ten times per day. Air is supplied to living areas (bedrooms living room) and extracted from service areas (bathrooms, kitchen, utility).
It is normal to feel a very slight air movement at supply points. This air will be within 2 degrees of the average temperature of your house (17-19°C) but may still feel cool. This is because of the movement of the air and because your body temperature will be normally around 37°C.
The temperature of the supply air is dependant on the average of all the extract points. If one extract point is at low temperature (because a bathroom window was opened in winter and forgotten) then this will bring down that average and cause supply air temperature to be low throughout the system.
The ProAir system in your house is the PA 600 model shown in fig.1 It is designed to operate 24 hours / day, 7 days/week, running at a low speed while the house is normally occupied. At other times when there is higher than normal water vapour generated (cooking & showers) the system can be triggered, extract higher volumes of air, for a pre-defined period.

These two modes (low and occasional boost) will provide you with the regulation air-changes required for you and your dwelling. The medium mode is available for special situations such as spring cleaning, or when extra people are in the house.

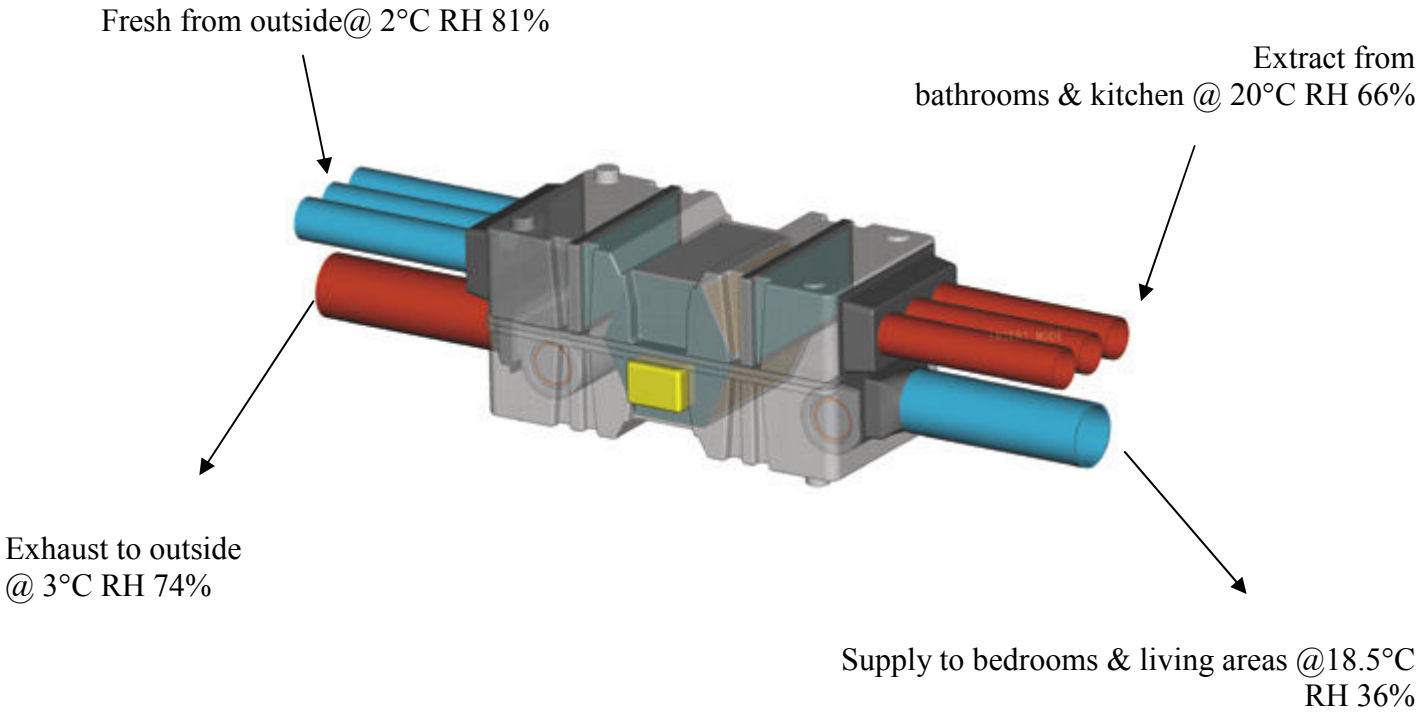


Figure 1

When air is heated the relative humidity of the air reduces as shown above. This allows water to be picked up and expelled to outside in one of two ways.

1. Exhausted directly with the stale air as water vapour.
2. Condenses in the heat exchanger exhaust passages and drains to outside via a 15mm hose connected from the bottom of the HRV unit to outside.

Control

In the utility room, or at some central point in the house you will find a switch as shown below in Figure 2. This is the master controller. The system is controlled by progressive switching. The options for controlling the unit are as follows:

Off: As with any other electro-mechanical system it can be switched off as required, but it is recommended to run the system as much as possible.

On: In this position the other two switches are functional

Low Speed: Operate during normal occupancy at this position.

Medium Speed: Operate in this position during abnormal occupancy as described above.

Boost Speed: Momentary depression of this switch provides a pre-set timed boost for high water vapour generation (Cooking & showers). It is normal that this switch does not stay on. The default pre-set time is 24 minutes, but this can be set to any time you like by the ProAir technician.

While the system is in the boost mode, the low/normal switch is non-operational.

The system goes back to the low or medium mode after the pre-set time has elapsed.

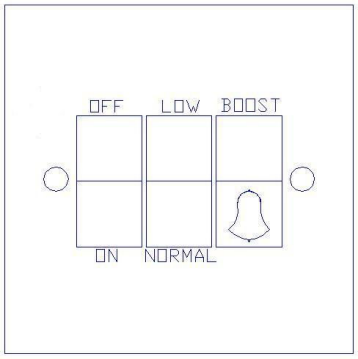


Figure 2

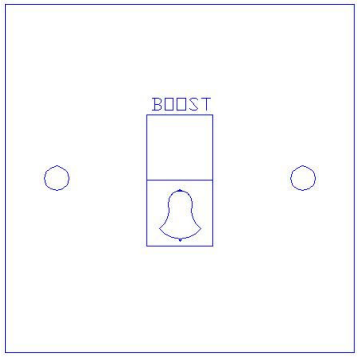


Figure 3

At other locations throughout the house you will find switches as shown in Figure 3. These are mimics of the boost switch on the main controller and allow you to go to boost mode from outside your shower.

Pressing more than one boost switch together does not cause a problem. Whoever gets there first triggers the timer.

Installation

The system consists of

- Air Handling Unit (AHU) unit usually located in the attic
- Intake and exhaust vents leading to outside
- Ducting to facilitate the transport of air to and from this unit to the various rooms
- Ceiling terminals for the delivery and extraction of air in rooms
- Control switches

The Air Handling Unit (AHU) is located in either the attic or a utility area. It contains a high efficiency counter-flow heat exchanger, fans to drive air in and out and filters to clean the air. It is mains powered (220V) from a standard 13Amp socket. It is suspended by light chain from the rafters and supported slightly proud of the ceiling joists. This is for two reasons, (a) to prevent any vibration and (b) to allow house insulation under the unit.

The outer casing is made of polypropylene and is insulated on the inside where possible to minimise noise levels and heat loss. It is just off level. This helps the egress of water through the condensate drain. This is a 15mm plastic hose from the unit to the outside. It has been provided to assist in the disposal of any water that may result from condensation.

One end of the unit is connected to outside in order to take in fresh air and exhaust stale air. There are a few options for this:

1. Duct connections to slate vents.
2. Duct connections to soffits
3. Duct connections to gables
4. A combination of any of above

The outdoor and intake vents have been reasonably separated to ensure that the exhaust air is not collected as fresh air.

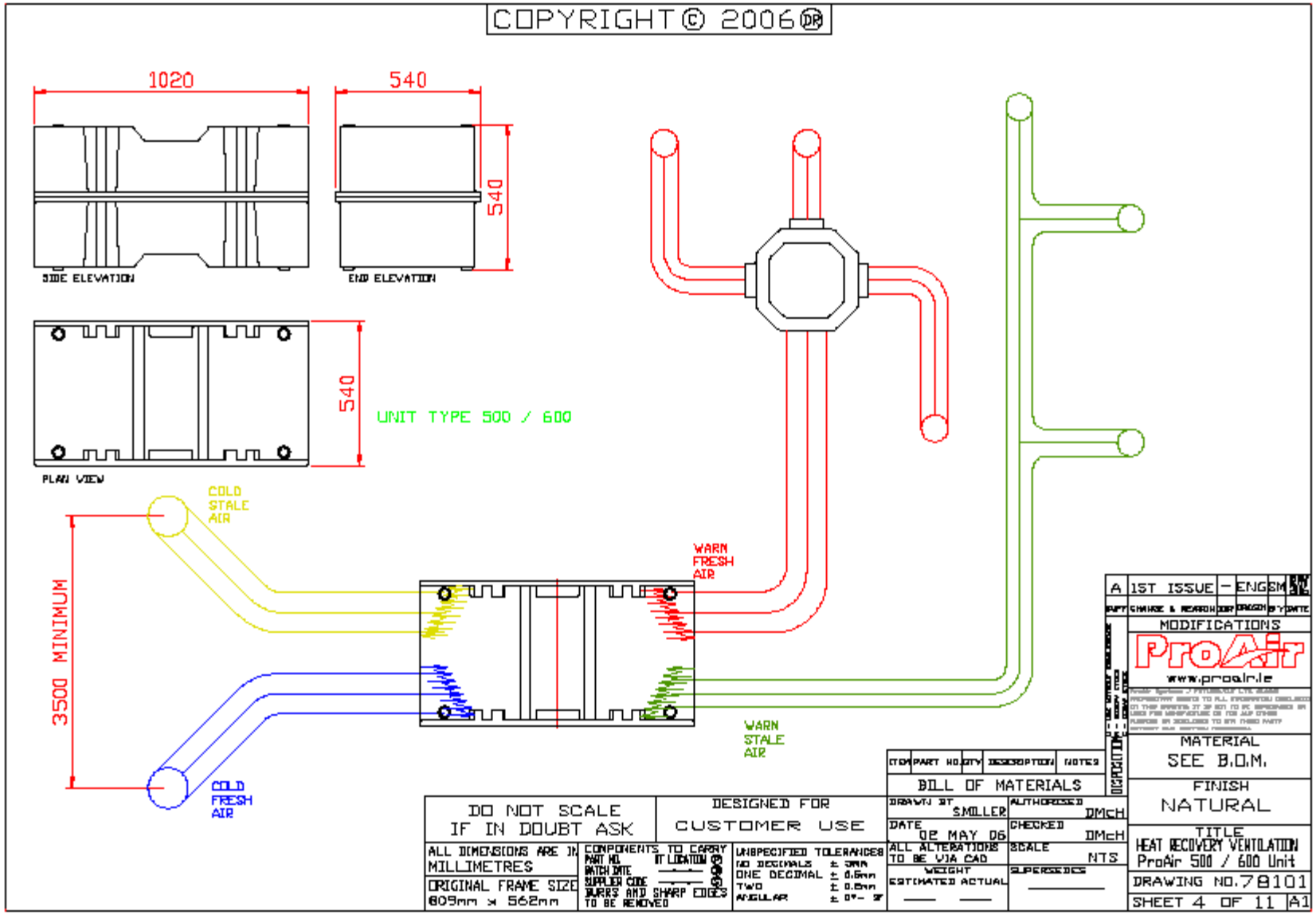
Plastic ducts have been installed to carry the air to and from each room. Sealant has been applied at all joints to make sure that no air leaks occur. The ducts are supported where appropriate. Duct runs are optimised to the shortest overall length. All ducts exposed in the attic are thermally insulated in order to (i) eliminate the possibility of condensation happening inside or outside of the ducts and (ii) avoid heat losses to the attic. The number of bends has been minimized. Similarly the use of flexible ducting is minimized to less than5% of the total installation so as provide an internal surface that is as smooth as possible thereby minimizing air flow resistance. Silencers are installed as the final connections to the AHU to eliminate noise from the fans reaching the rooms via the ducts.

In each room you will find a delivery or extract terminal as shown in Figure 4. These terminals have an adjustable centre disc which we use to control air-flow and balance the system. Your system has been tested & balanced by our technicians and needs no further adjustment. These terminals should not be adjusted in any way as to do so will impede the effective operation of the entire system.

Figure 4

The system is designed, to fully ventilate the house without opening any windows during the heating season (anytime the external temperature is below 14°C). Below this temperature, your heating system, if properly controlled, will come on at a low level and will not appreciate the ingress of cold air through an open window. Above this temperature, when there will be no heating demand it is human nature to open doors and windows. At this point, your supply fan will go off automatically and start again when the outside temperature drops.

There are two advantages to this, a saving on fan power and a summer bypass arrangement whereby cool air is being drawn through open windows and exhausted as normal from the wet area


COPYRIGHT © 2006
1020
540
540
SIDE ELEVATION
END ELEVATION
540
UNIT TYPE 500 / 600
PLAN VIEW
COLD STALE AIR
WARM FRESH AIR
3500 MINIMUM
WARM STALE AIR
COLD FRESH AIR
A 1ST ISSUE - ENG SM
MODIFICATIONS
ProAir
www.proair.ie
MATERIAL
SEE B.O.M.
FINISH
NATURAL
TITLE
HEAT RECOVERY VENTILATION
ProAir 500 / 600 Unit
DRAWING NO. 78101
SHEET 4 OF 11 A1
ITEM PART NO QTY DESCRIPTION NOTES
BILL OF MATERIALS
DRAWN BY SMILLER
DATE 02 MAY 06
ALL ALTERATIONS TO BE VIA CAD
WEIGHT ESTIMATED ACTUAL
AUTHORISED DMcH
CHECKED DMcH
SCALE NTS
SUPERSEDES
DO NOT SCALE IF IN DOUBT ASK
DESIGNED FOR CUSTOMER USE
ALL DIMENSIONS ARE IN MILLIMETRES
ORIGINAL FRAME SIZE 609mm x 562mm
COMPONENTS TO CARRY
PART NO IT LOCATION
BATCH DATE
SUPPLIER CODE
BURRS AND SHARP EDGES TO BE REMOVED
UNSPECIFIED TOLERANCES
NO DECIMALS ± 1mm
ONE DECIMAL ± 0.5mm
TWO ± 0.5mm
ANGULAR ± 0°- 3'

Maintenance

In order for the system to work correctly and effectively it is important that approved maintenance procedures are followed. The three main points are:

1. Cleaning the Filter Material to be carried out every 3 months.
2. Changing the Filter Material to be carried out at least every year.
3. Service by ProAir technician every 3 years.

WARNING Safety is of the utmost importance whilst working on the system. The power supply must be disconnected before attempting any procedure. Wear protective clothing and an appropriate face mask in the attic space if recommended by the insulation provider. Gloves should be worn when handling filter media.

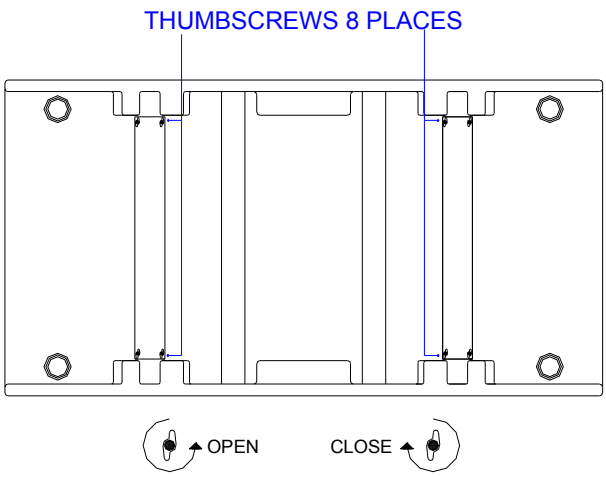


Figure 5

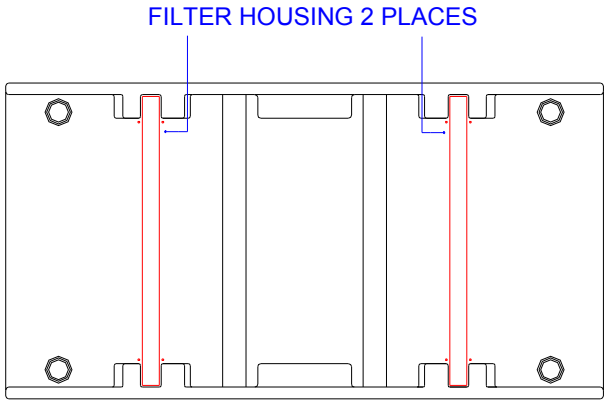


Figure 6

1. **Cleaning the Filter Media.**

Dirty or clogged filters can lower ventilation efficiency. It is highly recommended that they are cleaned at least every three months. Having turned off the power

a. Remove the 4 thumb screws from the topside of the exchanger unit Figure 5).
b. Remove the cover to reveal the exchanger core & filter housings (Figure 6).
c. Extract each filter housing separately noting it's location and orientation.
d. Clean the filter media by using a vacuum cleaner.

e. Refit the filter media into the housing exactly as previously fitted.
f. Replace the HRV unit cover.
g. Refit the 4 thumb screws.

2. **Changing the Filter Media.**
This should be done on an annual basis. A spare set of filters has been provided for installation at the end of the first year's operation. For subsequent years order the replacement media from ProAir Systems (Order Form at the back of this booklet).

a. Carry out steps 1.a, 1.b & 1.c.
b. Remove the filter media from the housing & replace with the new media.
c. Carry out steps 1.e, 1.f & 1.g.

3. **Three year service by ProAir technician**.
This consists of cleaning the heat exchanger, checking the fans for dirt build-up and clearing of same, check and cleaning of condensate drain, replacing of filters and overall check of the system operation.
Check the outdoor intake and exhaust points. Remove leaves, dirt, waste paper or other obstructions that may be blocking the outside vents of your HRV. Check all the ductwork leading to and from your HRV.

If ductwork is damaged, crushed, kinked etc. contact ProAir to have it repaired correctly.

A record of all maintenance work done should be kept. A page at the back of this booklet has been provided for this purpose.

Service Record

Date	Filter Cleaning	Filter Replacement	Service by ProAir

(Fill in and tick as appropriate)

Order Form

ProAir
Heat Recovery Ventilation Systems
Tuam Business Park, Weir Road,
Tuam, Co Galway.

Customer Name		Serial No.	
Address 1		Date of Installation	
Address 2		Date of last full service(if applicable)	
Address 3			

	Please supply set of filters for above unit
	Please arrange full service
	Tick as appropriate

Details of costs are outlined on our website www.proair.ie

Payment to be made in advance.

Signed …… Date ……

Warranty

A 3 year warranty starts from the day of commissioning. It includes parts and labour for the first year. A spare set of replacement filters has been provided to facilitate the change of filters at the end of the first year's operation. The warranty covers parts only (excluding filters) for the remaining 2 years. Replacement filters should be ordered from ProAir for the end of Year 2 change. This warranty is conditional on planned maintenance being undertaken as scheduled in the Maintenance section above.

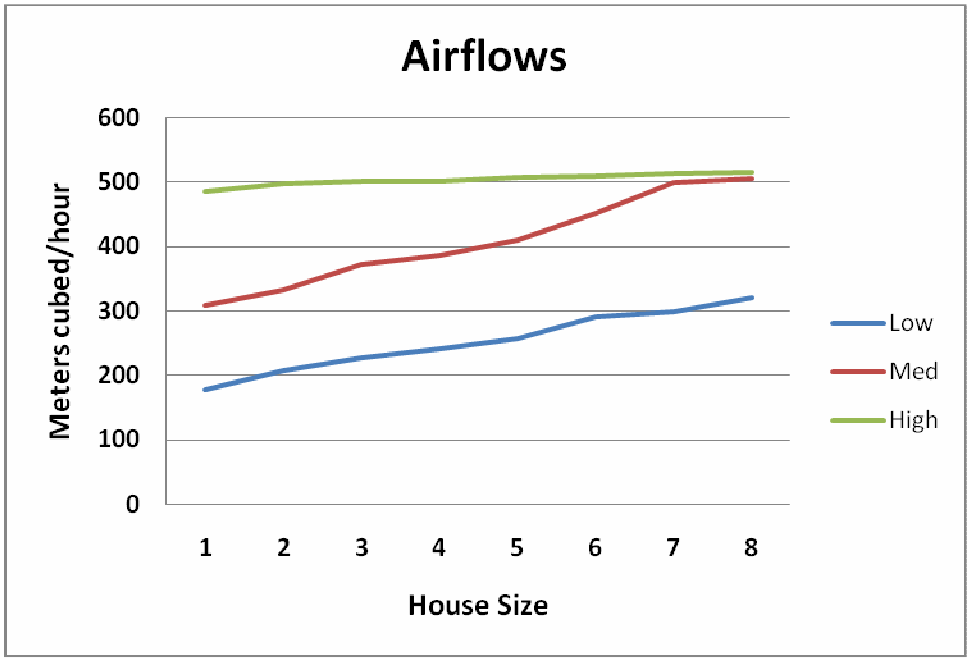
Technical Specification.

Length	0.995m	
Width	0.490m	
Height	0.495m	
Weight	32Kg	
Casing:		Polyethylene.
Heat exchanger		**Type;** Counter flow reed exchanger **Material;** Polystyrene.
Filters: 2 No		EU5 grade media in cardboard panel450*225*20mm
Fans: 2 No		FB190C Backward curved centrifugal impellors

Technical performance values

House size m2**	Speed	System Efficiency	Supply airflow M^3/hr	Extract Airflow M^3/hr	Power Consumption Watts	Sound power dba at 1 meter
170	Low	92.6	177	177	34	39
	Med	91.5	308	308	56	45
	High	89.4	485	485	137	54
190	Low	92.2	207	207	34	41
	Med	91.6	332	332	60	46
	High	88.9	497	497	144	54
210	Low	91.8	227	227	37	42
	Med	91.2	372	372	77	47
	High	89.2	501	501	143	55
230	Low	92.5	241	241	42	43
	Med	91.7	386	386	89	48
	High	89.3	502	502	146	55
250	Low	92.7	257	257	46	44
	Med	91.8	409	409	98	50
	High	90.2	507	507	146	56
270	Low	92.1	290	290	53	45
	Med	91.2	451	451	119	52
	High	89.6	510	510	145	56
290	Low	91.8	299	299	56	47
	Med	90.4	499	499	134	54
	High	88.9	514	514	146	56
310	Low	91.1	321	321	58	48
	Med	89.6	506	506	141	54
	High	88.3	516	516	144	57

** Above air flows were measured in a laboratory environment with a simulated installation. Actual air flows may vary from house to house depending on ducting layouts etc.



Notes on above technical data.

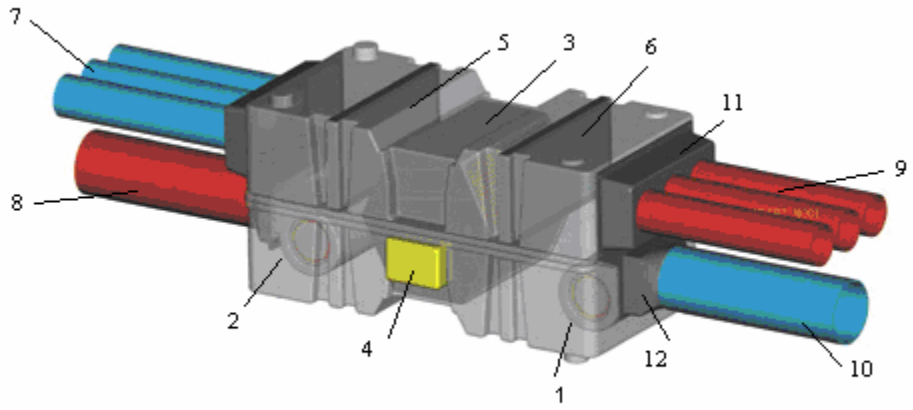
1. Sound data is based on that measured at 1 meter and will normally be considerably reduced by the inclusion of insulation between it and the living space.
2. Power consumed is for the total unit including both fans.

The ProAir 600 is fitted with the new generation electronically commutated (EC) motors to drive its FB190C backward curved centrifugal fans.

One of the advantages of the new EC motors is their controllability. There is an option of 32 control points within the range. This means that each installation can be commissioned to match the application exactly, within the air-flows shown. The ProAir technician will programme in three speeds suitable for your house size.

With a traditional AC induction motor, efficiency is compromised at lower speeds, which is the region that ventilation fans are usually operated at. This is why the electronically commutated motors are so well suited to this application.

PA 600 parts list



1	Supply fan
2	Extract fan
3	Heat Exchanger
4	Electrical control panel
5	Supply air filter
6	Extract air filter
7	Fresh air inlets(3 of)
8	Exhaust to outside
9	Extract from bathrooms & kitchen
10	Supply to bedrooms & living areas
11	Exterior Spigot Plate
12	Interior Spigot Plate

Electrical schematic