



- Heat recovery
- Integral heating and cooling
- Direct driven fans with EC motors
- Integrated control system
- Compact footprint
- Air volumes from $0.75\text{m}^3/\text{s}$ to $10\text{m}^3/\text{s}$

A packaged solution developed with simplicity and energy efficiency in mind.

Just add power and we will do the rest.



EcoAir Box

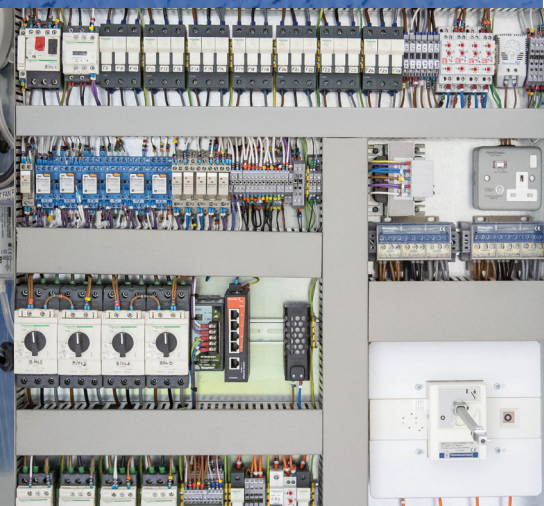
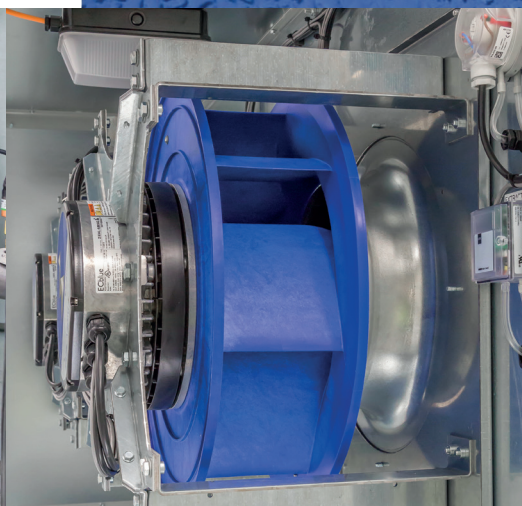
Packaged Reverse Cycle Heat Pump



This new ground breaking air handling unit offers full flexibility in control and design to provide conditioned fresh air to your system, whether it be fan coils, chilled beams, VRF or VAV. The unit consists of high spec components offering the very best in energy efficiency, just add power and we will do the rest

A packaged solution developed with simplicity and energy efficiency in mind.

- A packaged unit that does not require any services apart from mains power
- Incorporates heat/cool recovery with a reverse cycle heat pump that will fulfil all heating and cooling requirements enabling better performance
- No need for external condenser or chiller
- Reduce the buildings boiler requirements
- All on site labour pipework and total installation costs will reduce
- A packaged control system with software is provided that can integrate with all BMS systems
- All units come with sorption type recovery wheel that recovers heat as well as moisture, this reduces the load of the compressors in summer and winter seasons
- The whole unit range incorporates fans with direct driven EC motors
- Fan impellers – a composite construction designed to reduce noise levels thus reducing system attenuator lengths
- R410a refrigerant – the whole refrigerant circuit is less than 5m long keeping refrigerant quantity to a minimum





Direct Driven Fans with EC Motors

Specification:

- Single-sided intake, rear-curved motor impeller, energy-optimised for operation without spiral housing through special blade design with rotating, vaneless diffuser for high efficiency and with favourable acoustic behaviour
- Impeller: \varnothing 250-630mm in 9 frame sizes
- Centrifugal impeller made of high-strength composite material, with external rotor motor statically and dynamically balanced acc ISO 1940 Part 1
- Fitting position: horizontal and vertical
- Impeller with rotating diffuser
- 7 rear-curved, profiled blades
- Galvanised inlet nozzle with volume flow rate measuring equipment
- Design with integrated electronics
- Over-temperature protection of the device electronics through active temperature management
- Motor painted RAL 5002 (ultramarine blue); impeller colour; RAL 5002 (ultramarine blue)
- Protection class IP54
- Thermal class 155
- The permissible ambient temperature is -20°C to $+60^{\circ}\text{C}$
- Fan characteristic curve refer to measurements made on an inlet-side chamber test rig acc DIN 241623 Part 2 or ISO 5801
- Performance specifications comply with Precision Class 2 acc DIN 24166
- The motor efficiency class complies with IE4



The fan impeller is made using specially developed high-performance composite material and combines unique material properties with bionic insights.

The high-performance composite material makes it possible to create the innovative shape of the new centrifugal fan. The exceptional quality achieved is the result of a one-shot injection moulding process, so it does not have any welded seams or critical connections. The new shape produces higher efficiency, enabling performance which saves up to 15% energy during operation.

With its specifically profiled three-dimensional blade geometry, the impeller produces up to 5dB less tonal noise in use (3dB = physical halving). This reduction in noise makes living and working in the surroundings more pleasant. Furthermore, less acoustic insulating material is needed – this protects the environment and saves money at the same time.

The composite material combines the positive properties of both steel and composite material:

- Weight reduction of more than 50% as compared with a steel impeller – this reduces motor bearing loads, guaranteeing longer system lifetimes.
- The impeller geometry allows tip speeds of up to 70 m/s (60 m/s are customary in the market) – which is only otherwise possible with a steel impeller.
- No weld seams
- Can be combined with various types of motors
- Tonal noise reduction of up to 5dB
- Suitable for operational temperatures from -20°C to +80°C comparable with steel impellers
- Corrosion free
- No toxic gas emissions
- Colour stable

The reduced energy usage during manufacture is followed by up to 15% energy which is saved during use. Moreover, the material can be crushed after the end of the life of the impeller and is 100% recyclable, so there is no waste whatsoever.

Extremely light, stable, durable, quiet and efficient

Sorption Wheel

The storage mass has a surface that transmits moisture by pure sorption (ie. without condensation). The moisture recovery rate is therefore virtually independent of the condensation potential. The low decrease can be explained with the simultaneous reduction of the temperature difference.

Sorption wheels are recommended particularly systems with mechanical cooling. The high moisture recovery efficiency, even under summer conditions, dries the fresh air. This requires less cooling capacity and reduces energy costs for cooling up to 50%.

Series S: sorption wheel, consisting of an aluminium substrate foil coated with a sorption substance (eg. silica gel) for moisture transmission. This transmits moisture in the form of a gas without condensation.

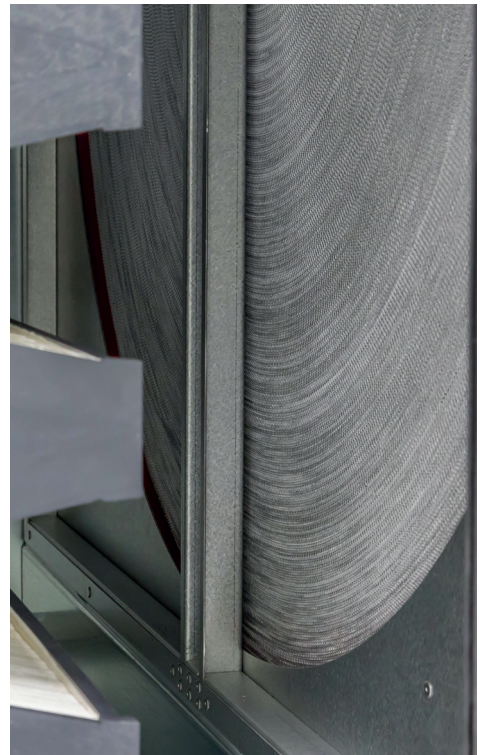
The depth of the wheel is 200mm. The wheel is stabilised by double spokes, screwed (and welded) to the hub and welded to the wheel mantle. This guarantees a long service life.

For stability and performance large-diameter wheels must be made in a segmented design. The diameter of the wheel can be freely selected in 10-mm steps. The outside of the wheel is held together by an aluminium jacket plate (welded). This guarantees uninterrupted radial runout and enables maximum usage of the wheel surface.

Hub with inner bearing

The hub, whose size depends on the wheel diameter, is fixed to the axle with two internal ball bearings. It is fastened to the crossbars of the casing. This design has the following advantages:

- The internal bearings are protected against contamination and require little space.
- The axial lock with circlips makes installation and removal quick and simple.
- Both bearings are integrated into the hub, i.e. in the same component. This ensures that they mesh together perfectly (in contrast to external bearings). This does not reduce the service life of the bearings.
- The position of the axle, hub and wheel is precisely fixed by the fastening of the internal ball bearings by the hub and the circlips.
- The fixed axle connects the two crossbars of the casing. This greatly increases its stability.



Compressor

The standard Scroll Compressor is the simplest solution. Quick and easy to implement, it does not require any additional components.

Main features:

- Single, tandem and trio configurations
- Complete range in R410A from 3 to 15hp
- A range of refrigerants available

Typical Applications:

- Multi evaporators systems
- Rooftop / AHU
- Optimal comfort
- Low condensing capabilities
- No complicated electronics and no additional components, simple system architecture
- Easy to install, commission and maintain
- No impact on the system mechanical balance found with inverter
 - No vibration and resonance phenomenon
 - No frame / piping redesign work necessary
- No EMC noise issues
- Reduce number of units for multiple evaporator system
 - Minimum floor space requirements with maximum cooling capacity

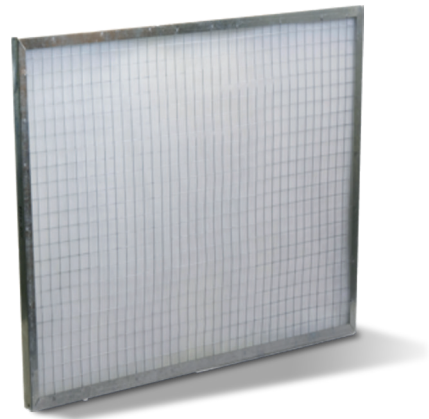


Washable Panel Filter

Filters and filter housings to EN779 and EN1886. Aluminium washable filters class M5 shall be installed in the return air. Each filter shall have a filter pressure drop monitoring with the actual pressure drop displayed on the control panel and low level alarm when filter dirty as a clear text message on the controller.

Advantages:

- Low pressure drop
- Washable
- Filter dirty alarm and text message
- Takes out the larger particles which would usually clog finer filters



Bag Filters

Filters and filter housings to EN779 and EN1886.

Bag filters class F7 shall be installed in the supply air.

Filters shall not be installed in any mixed air stream.

Fully incinerable filters with plastic frames.

Filter housing to EN1886 with filter bypass leakage to class F8.

Each filter shall have a filter pressure drop monitoring with the actual pressure drop displayed on the control panel and low level alarm when filter dirty as a clear text message on the controller.

The entire filter element is non-corroding and fully incinerable, since it contains no metal parts. The frame consists of halogen free plastic.

Viledon MVP filters are microbiologically inactive and meet all the criteria of VDI guideline 6022 "Hygiene requirements for HVAC systems".

MVP cassette filters excel in terms of high dust holding capacity and low pressure drop and offer an optimum price performance ratio.

The leak proof casting of the dimensionally stable media pleat pack provides high burst strength, as well as excellent security against dust penetration during operation.

Advantages:

- Suitable for 100% RH
- Do not require frost protection
- Low pressure drop
- Plastic frame
- Corrosion free
- Can be incinerated
- Filter dirty alarm and text message



Control System

The unit shall be supplied with a control panel including a readily programmable direct digital controller.

Cabling to all control, regulation and drive components shall be built into the unit and factory tested.

The control panel shall include:

- Door interlocked isolator
- Terminals for main power supply
- Motor and control components
- Component isolators
- Safety circuits
- All necessary components for motor control including fuses and overloads
- Reverse cycle heat pump control

A terminal strip shall be provided for connections to external components and control signals. All potential free contacts suitable for 230V/2A.

An operation and status panel with keypad for data entry and function control shall be provided with an LCD display for set points and actual values, damper positions, hours run and status messages text as well as BEMs complete with LED's for operation and fault status.

Programs and time clocks shall remain secure in the event of power failure. The essential sensors for measuring outside air temperature, supply air temperature / humidity, return air temperature / humidity, all damper actuators and the hot water coil valve shall be connected to a single bus system.

All sensors and actuators shall be individually readily programmable and individually addressable. Permanent communication shall be provided to monitor and detect failure of any sensor / actuator or any break down of communication with any component.

Connection of all sensors / actuators shall be achieved by a M12 ply system with distribution junction boxes and tested shielded twisted pair cables for communication up to 100m over a free network structure.

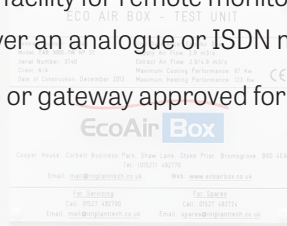
Remote Monitoring and Interface

The control system shall have the facility for remote monitoring and adjustment by the supplier over an analogue or ISDN modem.

The unit shall include an interface or gateway approved for use with the following BMS systems:

- Bacnet over IP

The interface shall provide access to data points giving information on all temperature and humidity values, actuator positions, status of all motors, hours run, actual supply and return air flow in m³/h, filter pressure drop displayed in Pa.



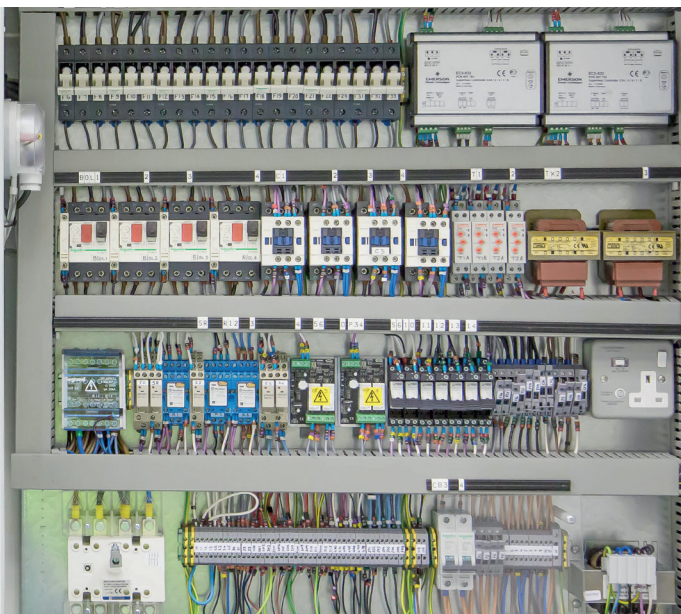
EcoAir Box

Direct Digital Control

The function control software and all aspects of control and regulation devices shall be tested and documented under a certified EN ISO 9001 : 2000 quality system.

Control functions shall include:

- Sensor monitoring – short circuits, cable breakdowns etc. shall activate general fault indication with a clear text. Fault indication – scheduled as high and low level alarms and shown on LED's and in clear text on the display. For remote indication of fault signals, potential free signals shall also be available on the terminal strip.
- Operating mode simulations shall be provided for testing, commissioning, maintenance or in the event of an emergency.



Test Chamber



EcoAir Box has a world class environmental test chamber and demonstration suite at our UK factory capable of generating And controlling extremes of temperature and humidity.

- All external environments simulated within the chamber
- Mimics conditions from Iceland to Singapore
- Internal conditions simulated – incl. a fully populated data centre space
- Excool environmental conditions monitoring software
- Demonstration suite to allow the highly positive results to be shown to all during testing
- Vast array of sensors to monitor:
 - Temperature
 - Humidity
 - Fan
 - Speed
 - Air volumes
 - Power usage
 - Water flow rate
 - Water usage

Data based upon the following:

Summer ambient
30 deg C @ 50% RH

Winter ambient
-5 deg C @ 100% RH

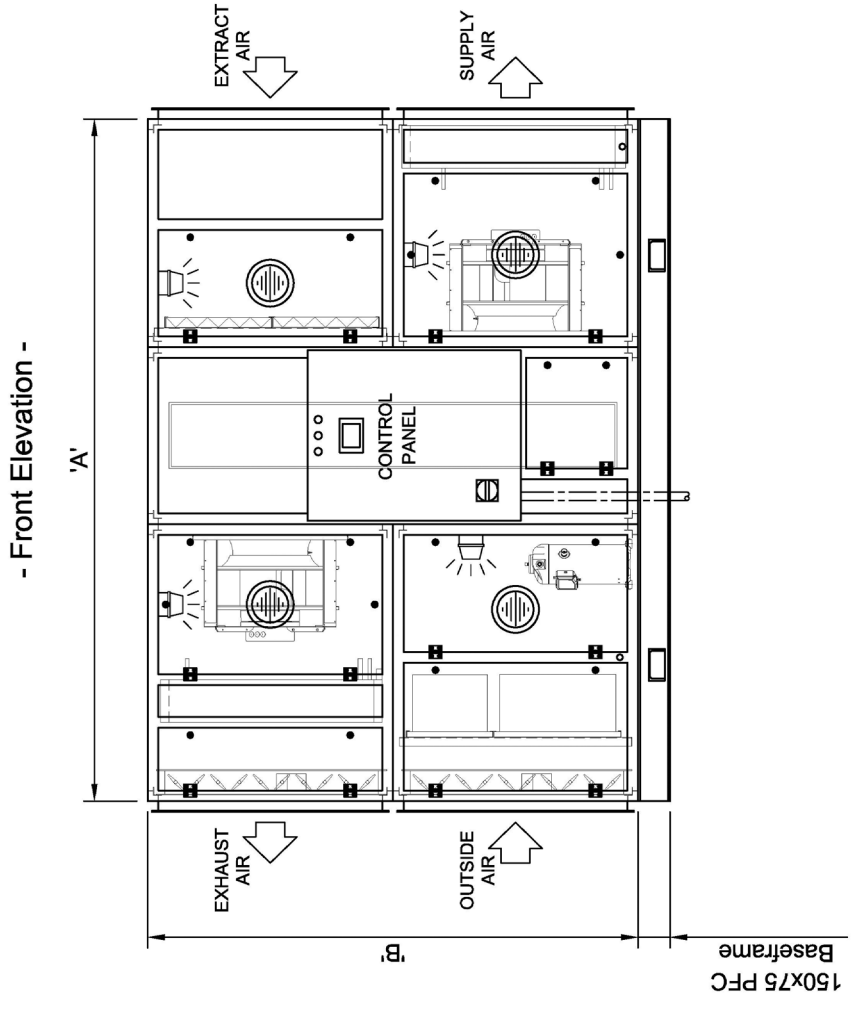
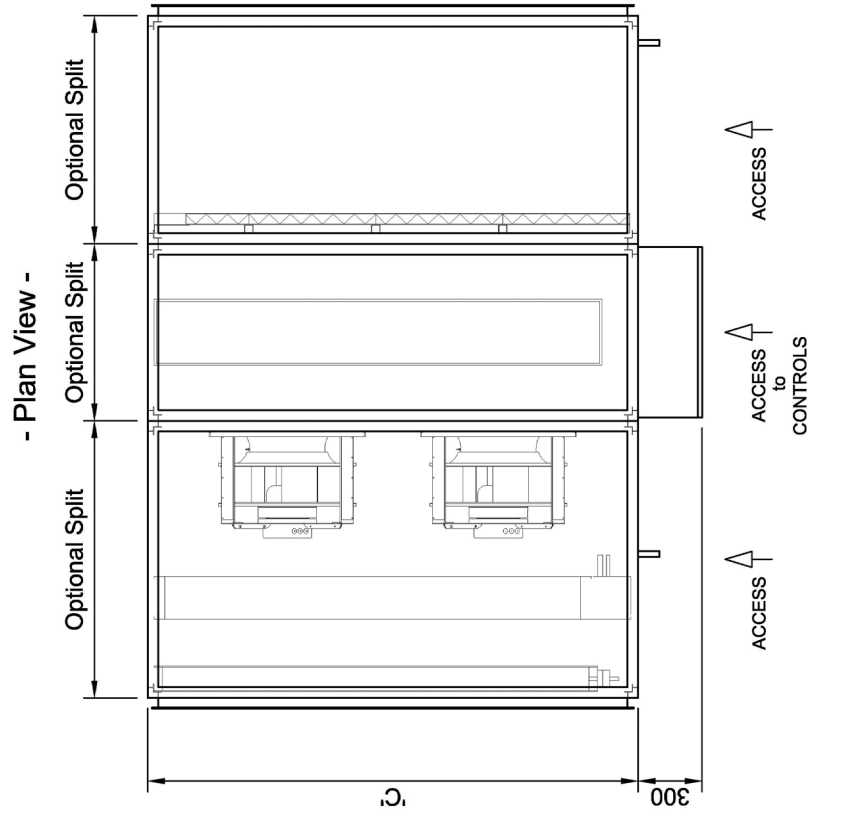
Return air from rooms
21 deg C in winter and
23 deg C in summer

**Fan selection with F7
filters and External
static pressure of
250 pa**

Model Reference	Output		Fan Data		Performance	
	Total Cool (kw)	Total Htg (kw)	Absorbed Total (Kw)	SFP w/l/s	Cooling EER	Htg EER
ECO 10 HP	16.7	37.5	1.83	1.83	3.76	10.75
ECO 20 HP	32.3	73	3.8	1.88	4.31	11.97
ECO 30 HP	49.9	112.6	5.4	1.8	3.21	9.67
ECO 40 HP	66.2	146.8	7.8	1.93	3.81	10.38
ECO 50 HP	80.8	180.5	9.7	1.93	4.18	10.93
ECO 60 HP	99.5	222.8	11.4	1.89	3.53	10.12
ECO 70 HP	115.9	261.8	13.9	1.98	3.19	9.39
ECO 80 HP	129.7	291.4	15.6	1.92	3.7	10.46
ECO 90 HP	145.9	326.1	17.8	1.96	4.01	10.83
ECO 100 HP	158.9	359.9	19.8	1.96	4.22	11.36

Model Reference	Capacity		Dimensions		Thermal Wheel		Compressor			
	Air Vol m3/s		Length (mm) A	Height (mm) B	Width (mm) C	Recovery (kw) heat	Recovery (kw) Cool	Heating Kw	Cooling Kw	Power Input (kw)
ECO 10 HP	1.00		3200	1300	1300	7.5	29.9	7.6	9.2	2.62
ECO 20 HP	2.00		3200	1700	1700	15	59.9	13.1	17.3	3.5
ECO 30 HP	3.00		3300	2000	2000	22.5	89.8	22.8	27.4	9.98
ECO 40 HP	4.00		3300	2200	2200	29.6	118.2	28.6	36.6	9.2
ECO 50 HP	5.00		3300	2400	2400	36.8	147.2	33.3	44	9.25
ECO 60 HP	6.00		3300	2600	2600	44.2	176.8	46	55.3	16.4
ECO 70 HP	7.00		3400	2800	2800	51.6	205.2	56.6	64.3	22.14
ECO 80 HP	8.00		3400	3000	3000	58.8	235	56.4	70.9	19.04
ECO 90 HP	9.00		3400	3200	3200	66.6	266.1	60	79.3	17.83
ECO 100 HP	10.00		3500	3400	3400	74.6	297.8	62.1	84.3	17.08

Dimensions



Psychrometric Chart

SI (metric) units
 Barometric Pressure 101.325 kPa (Sea level)
 based on data from
 Carrier Corporation Cat. No. 794-001, dated 1975

