

Therm-X

Frequently Asked Questions

Delivery

How are the units packaged?

The units are delivered wrapped with protective polystyrene and plastic film.

What accessories are delivered with the unit?

All units are delivered with a wired touchscreen controller (cable not supplied, UTP CAT5 cable recommended) and a room temperature sensor (loose for fitting and wiring by others).

Other optional accessories as quoted and ordered from Barkell are delivered packaged together with the units with the exception of large items (e.g. attenuators, duct transitions) which are delivered in their own pallet.

How are the units delivered?

Delivery of the products is offered in one single shipment to be fulfilled during standard working hours between Monday & Friday and delivered on a standard delivery vehicle (40ft truck, side offloading, 1 hour offloading maximum, no lifting facilities, no FORS certification).

Weekend/out of hours' delivery or non-standard delivery vehicles (e.g. HIAB's) can be offered upon request.

The offloading, final positioning and assembly of the products from the delivery vehicle is at the customer own responsibility and risk unless otherwise agreed in writing. The customer must ensure that suitable offloading facilities are available on site at the date and time of delivery (e.g. forklift).

Can the units or accessories be delivered in different dates?

The prices offered are for all goods in a single delivery. Multiple deliveries will require a separate quote for each delivery.

Are the units delivered in a single piece?

All HR85 units up to size 200 inclusive are supplied as a single piece assembly.

Larger units are delivered in three sections and supplied with quick-fit mechanical and electrical connectors. Unless otherwise agreed wiring and assembly of the sections is the responsibility of the customer.

My delivery is missing parts or has been damaged during transport, offloading or installation what should I do?

All claims for damage, or short delivery, should be advised to Barkell immediately upon receipt of the goods and confirmed in writing otherwise the right to claim will be lost.

Storage

Can I stack the units for storage?

The units cannot be stacked either for transport or storage.

What precautions should I have when storing the units?

Should it be required to store the products on site for any period of time prior to installation they should be stored in a clean, dry and secure area with an ambient temperature between 5°C and 35°C.

Inlet and discharge openings, pipe connections and filters should be sealed to avoid moisture ingress.

The equipment should be inspected on a regular basis and the packaging repaired if damaged.

Unpacking and handling

How should the units be handled?

Before off-loading the goods please ensure that a suitable means of transport/lifting to accommodate the weight and size of the equipment is available.

The weight of the equipment is displayed on the manufacturing label fitted on the outside of the packaging, on the equipment control panel door and on the documentation provided at the time of order confirmation. Please check the weight of the unit before attempting to handle it.

For products delivered in pallets or with integral base frame the use of a fork-lift or pallet truck is recommended. If the equipment needs to be lifted with straps it is recommended to use spreaders to avoid damage to the casing.

Take care when handling the equipment to ensure that damage to coil pipe work connections, spigots, drain trays, etc. is avoided.

What precautions should I have when unpacking the units?

Small items such as controllers and sensors are packaged either together with the product or inside the product.

Do not dispose of the packaging before verifying all items have been removed from it.

Do not put the product into operation before verifying there are no loose items inside it.

Installation

Are the units suitable for external installation?

The units are not suitable for external installation as standard. An optional roof can be quoted for this purpose. Un-ducted intakes or discharge must be louvered appropriately by others (louvres not supplied by Barkell).

Does the unit have a condensate outlet?

If a cooling coil is included the condensate connection for the coil drain tray must be trapped and connected to a suitable wastewater discharge.

All condensate outlets should be connected to a suitable wastewater discharge.

Additionally ensure a 3 degree tilt towards the condensate connection (s) so that the condensate can easily drain away when in operation.

Can I connect two condensate outlets to the same pump or trap?

This is not recommended. The pressure differentials between different sections of the unit might result on some of the water being held in the discharge pipes causing issues with drainage of the condensate.

Always connect each condensate outlet to its own pump or trap.

Are duct connections provided with the unit?

Unit sizes 070 and 100 are supplied with circular flanged connections.

Unit sizes 150 and 200 are supplied with both side and top flanged circular connections allowing the arrangement of the unit to be modified on site.

Unit sizes larger than size 200 are supplied with square connections and factory fitted nut inserts to allow easy installation of ductwork and dampers.

Duct transitions to circular are available as an optional accessory.

How do I know to which connection I should connect my ductwork?

The connections on each unit are marked with a label to ensure there is no confusion about which duct goes where. Check our Installation, Operation and Maintenance manual and the unit drawings for more information.

Can I use flexible ductwork for the duct connections?

Flexible corrugated ducting can impose high resistances if formed into tight bends and should be avoided. If it is absolutely necessary to install flexible ducting it should be extended so that it is internally as smooth as possible.

Can the unit connections position be changed?

No the unit connections position is standard and cannot be changed. Please check the drawings on our technical manuals to ensure you the connections position is suitable for your installation.

How far from the unit can I install an attenuator or duct appurtenance (e.g. bend, reduction, etc)?

To ensure these have no influence on the performance of the units it is recommended to install any duct appurtenances, coils or attenuators at least 3 duct diameters from the unit inlet/outlet.

The minimum recommended distance between any items and the equipment inlets/outlets is 500 mm however installing them this close might have some influence on the performance of the unit.

Can I leave the duct connections un-ducted?

If an opening of the unit is not connected to the ductwork, a metallic mesh in accordance with the Machinery Directive Requirements or similar protection must be used to avoid the contact with the fan, heating coils etc.

External un-ducted intakes or discharge must be louvered appropriately on site by others (louvres not supplied by Barkell).

Are the base frames removable?

The equipment base frames are removable and serve no structural purpose. However removing it will make joining, installing and accessing the equipment more difficult. Barkell will take no responsibility for any issues resulting from this.

Are the units fitted with anti-vibration mounts in the fans?

The units do not include anti vibration mounts in the fans. This is commonplace for wall mounted EC fans in any product.

The vibration from these assemblies is very low because the motor and fan are balanced and calibrated as a single assembly.

Are the units fitted with anti-vibration pads ?

No anti-vibration pads are provided with the units. Vibration damping pads (e.g. Tiko pads) are widely available from HVAC retailers.

Are the units fitted with flexible connections?

Flexible connections are not provided with the units but can be acquired as an accessory.

We recommend flexible connections are installed between any air and water connections and the unit. This is to minimize the chances of vibration transmission through the duct or pipework which can result in structure borne noise or, at the extreme, damage to the structure.

Can the units be supplied as flat pack?

No this is not possible. Given their compact, standard design and integral controls these units would be far too difficult to assemble in a site environment.

The units are designed to be as compact as possible to fit through most standard access doors. If a flat pack solution is definitely required we recommend you contact our specialist bespoke design team for a custom air handler.

Can the freestanding units be suspended from the ceiling?

Yes this is possible provided sufficient support is provided underneath the base frame and access for maintenance and connection of services is provided.

Please check the weight of the unit and ensure the supporting structure is suitable and does not restrict access.

Do units provided in sections require re-wire?

Yes all units supplied in sections need to be reassembled and rewired on site. The units are provided with quick-fit mechanical and electrical connectors to facilitate this.

Barkell can provide a cost to perform the reconnections on site.

Do external coils or modules require wiring to the unit?

Yes. Any external modules or coils for integration with the unit will be provided with sensors with a suitable length of cable to allow wiring to the control panel on the unit.

Can the access side to the equipment be changed?

You can select the units with right or left hand access. Please check the drawings on our technical manuals to ensure you have selected the correct unit for your installation.

Specification

Can the unit be supplied with a different filter?

All HR85 units are supplied with M5 (ePM10 50%) supply and return filters as standard. An F7 / ePM2.5 50% air filter is optionally available (supplied loose, installation on site by others).

Are the fans fitted with variable speed drives?

All fans are directly driven by low energy consumption IE4 electronically commutated (EC) motors. These motors include integral speed control similar to a variable speed drive.

Can I have viewport fitted on the doors and internal lighting on each section?

Due to how compact the units are fitting viewport and lights is not possible. The viewing angle from an external viewport would not allow proper inspection of the inside of the unit.

Removing the panels allows full inspection of the equipment and assuming a good natural or artificial light source in the room there is no need for internal lighting on the equipment.

Is there an acoustic version of the units?

No. The units are manufactured with high density rockwool and deep panels (30 to 50mm) to provide maximum attenuation. The use of additional sound dampening materials in the small area of the product is unlikely to result in a substantial improvement on their acoustic performance.

Can the heat exchangers be provided with special protective coating?

No this is not possible. The standard aluminium heat exchangers are suitable for most comfort applications.

For special applications such as process or swimming pools it is recommended to contact our specialist bespoke design team for a custom air handler.

Are the units suitable for coastal applications?

Yes. The units are corrosion protected on the outside. Internally the galvanized casing and aluminium heat exchangers are unlikely to get corroded unless heavy condensation is expected.

The unit is suitable for atmospheres up to class C3 (inshore areas with low salinity).

Are the units suitable for pool applications?

No the units internal finish is not suitable for highly corrosive environments.

For special applications such as swimming pools it is recommended to contact our specialist bespoke design team for a custom air handler.

What is the colour of the panels? Can this be changed?

The panels are finished with a RAL7040 powder coated paint finish for optimum corrosion protection. In large orders it is possible to change the colour of the panels please contact Barkell to discuss.

Are the units fitted with a frost heater?

Electric frost heaters are optional and can be integral to the equipment or externally mounted.

Are the units fitted with a heating or cooling coil?

Integral heating and cooling coils are optional. Bespoke duct mount coils are also available.

Can the units be fitted with a direct expansion coil?

Yes a DX coil can be fitted integral to the unit. Bespoke duct mount coils are also available.

We can also offer a matching external heat pump system.

Are units with heating/cooling coils fitted with valves and actuators?

No. Valve and actuator kits are provided as an optional accessory.

Are the units provided with an integral condensate pump?

No. A condensate pump kit is offered as an optional accessory.

Accessories

What accessories are available?

Multiple accessories are available for each range of units:

- Motorized shut off dampers
- Backdraft damper
- Square to round transitions
- Spare filters
- Duct mounted electrical heaters
- Duct mounted LPHW heaters
- Duct mounted circular attenuators
- Matched rectangular attenuators (straight and bend)
- Condensate pump kit
- Condensate trap
- Duct and room mounted IAQ sensors (CO2, humidity) and PIR motion sensor
- Valve kits
- Matched refrigeration systems

Please check our technical manuals for additional information.

Are matched attenuators available?

Yes we supply a full range of matched rectangular straight or bend attenuators as well as circular attenuators that can be supplied with the units.

Bespoke duct attenuators are also available.

Are NoX, HEPA or carbon filters available?

No these are not available. If any of these filters are required it is recommended to install them in the duct downstream from the unit and check that the fans will be capable of handling the additional pressure.

Can accessories such as damper actuators, valves and actuators be assembled at the factory?

No this is not possible. All accessories are supplied loose and must be installed and wired on site.

Can the units be fitted with a magnehelic gauge or manometer?

Some of the models have enough space for a gauge to be fitted however the controls system is already equipped with differential pressure sensors which monitor the pressure drop across the filters in real time and issue an alarm when its time to change them.

We are able to supply magnahelic gauges or manometers for fitting on site by others.

Is the cabling included for sensors and actuators?

Cabling is not included. Shielded cabling is recommended.

Electrical and Controls

What is included with the control package?

All units are delivered with the Therm-X control package which includes the control panel fitted with BMS capable controller, main switch isolator, rotary heat exchanger controller, temperature and pressure sensors, safety devices for electric heaters (if installed) and a loose room temperature sensor and LCD touchscreen.

There are no complicated options to choose from and you get the full package with each and every unit.

To enhance the operation of the unit additional controls sensors, actuators and valves can be acquired separately.

Detailed information can be found in the product technical manuals.

Is the unit provided with an isolator?

Yes all units are provided with an integral isolator.

Is the LCD touchscreen included?

Yes it is included.

Are temperature sensors included?

Fresh air, return air and supply air sensors are fitted on the unit.

A room sensor is also supplied loose for installation and wiring by others.

Are the optional electric heaters provided with thyristor and thermal protection?

Electric heaters are complete with fully modulating SCR (Silicon Controlled Rectifier) control (0-100%) and 2 stages of overheat protection (automatic and manual reset) all integral to the unit's control strategy.

The thermostat terminals are linked out if the electric heater is not present.

Is the controller BMS capable?

The provided controller is capable of BMS communication via BacNet TCP/IP, MODBUS RTU (RS485) and MODBUS TCP/IP allowing full control and monitoring of the unit.

Can the units be daisy chained?

Yes daisy chaining several units is possible. The distance between the units should not exceed 50m.

Since the units are not equipped with a signal booster the total length of the chain should not exceed 150m. A signal repeater is recommended if the installation exceeds this length.

Is master and slave configuration possible?

This is not possible.

Can the unit be controlled via the BMS and touchscreen controller simultaneously?

It is possible to connect the unit to the BMS and the touchscreen controller simultaneously.

Neither system has priority over the other. The sequence of control and speed of communication will determine priority of the control signal.

Can more than one touchscreen controller be connected to the unit?

Yes the unit can operate with up to two touchscreen controllers and the BMS simultaneously.

Can a single touchscreen controller operate multiple units?

No. Each unit requires a dedicated controller. Centralized control of multiple units is possible via the BMS.

I have lost the touchscreen controller can the unit be commissioned without it?

While it is possible to commission the unit via the BMS or the service software the controller provided is designed to facilitate this process. We recommend a new controller is ordered from Barkell.

Can the touchscreen controller be installed outside?

No. The controller is not suitable for external installation and should be installed or stored in a dry area protected from the weather.

Can I fit the touchscreen controller to the unit fascia?

There is no dedicated area to install the controller however it is acceptable to fit it to the unit as long as care is taken not to damage or undermine access to the unit.

What kind of cable is recommended for wiring the touchscreen controller?

The controller has been tested with CAT5 unshielded twisted pair cable. This is our minimum recommendation.

How far from the unit can I install the touchscreen controller?

The cable length should not exceed 50 meters (0.5 mm²) to avoid loss of communication.

Is power for accessories provided?

A fused 24V and 230V power supply for sensors and actuators is provided.

The capacity of this power supply is limited. Be sure to double check our Installation, Operation and Maintenance manuals for more details.

Are actuators or sensors pre-wired?

The integral temperature sensors and damper actuator for the bypass damper are factory wired.

Any other sensors, actuators (valves, shut off dampers) are supplied loose for installation and wiring on site.

The unit has gone into fault due to high temperature of the electric heater thermostat. How do I reset?

If the unit goes into to fault due to overheating first make sure the cause of the overheating is solved before re-setting the thermostat.

The location of the safety thermostat is indicated in the electric heater with the label RESET.

Due to design constraints in some units it might be required to disconnect the heater and remove it from the unit to access the reset switch.

Will the unit retain its settings in the event of a power failure?

Yes the unit is equipped with a CR2032 battery with an expected lifetime of 10 years.

Can the unit operate with unbalanced airflows?

Yes this is possible as long as the differential between airflows does not exceed 50%.

Can the unit operate on a trickle and boost mode?

Yes it can. The boost switch can be activated via the touchscreen controller, BMS or an external switch (not included).

For trickle a PIR sensor is required. This is available as an optional accessory.

Can the unit operate on demand control ventilation?

Yes the unit can operate via any 0-10V external signal be it a CO₂, RH, temperature sensor or the BMS.

Can the unit operate on constant pressure control?

Yes the unit can be set to provide a constant pressure in the supply duct to enable operation with a VAV system.

Can the unit provide freecooling / night purge?

Yes a freecooling mode is available. This can be set to operate at selected dates and times through the year and allows for a setpoint temperature to avoid overcooling the building.

Can the unit be set to run on a time schedule?

Yes the unit can operate on a daily, weekly and yearly schedule with up to 6 time blocks per day.

How does the unit control temperature?

The unit operates on a setpoint temperature measured at the selected sensor (supply, return or room) and PID (proportional, integrative derivative) control to achieve a uniform supply air or room temperature.

Priority is given to the operation of the heat recovery in order to save energy. Then the unit modulates the integral or external top up heaters/coolers in order to achieve the required setpoint.

Room and supply air temperature control strategies are possible with the integral sensors or the provided room temperature sensor.

What is the tolerance of the sensors?

The sensors are NTC 10k with $\pm 1^{\circ}\text{C}$ of tolerance. Depending on the installation this tolerance can rise to to 2-3 $^{\circ}\text{C}$.

Can the unit control the integral heaters or external heaters?

Yes a control signal is provided for up to 2 top up heaters and 2 pre-heaters (frost coils). That is 4 separate 0-10V signals.

Does the unit have integral frost protection?

Yes the unit automatically manages frost protection by use of the optional frost heater (if installed) or through a smart frost protection logic to avoid frosting of the heat exchanger.

Is the unit capable of controlling external dampers?

Yes the unit has the facility to control up to 2 shut off dampers with on/off control.

Is it possible to turn the unit ON/OFF via an external contact?

Yes a dedicated free volt contact is provided for this.

Is it possible to get a RUN and ERROR feedback from the unit?

Yes a dedicated free volt contacts is provided for this.

Is a fire alarm interlock provided?

Yes a dedicated contact is provided for this. The behaviour of the unit during the fire alarm can also be easily changed.

Can the unit control a heat pump?

Yes the unit is capable of controlling an heat pump however the details for the connection to different heat pumps brands should be discussed with Barkell.

Our products have been tested with Mitsubishi Electric R410 heat pump units.

Does the unit provide feedback on errors?

Yes feedback is provided via the touchscreen controller or BMS for any error such as clogged filters, malfunctioning sensors, etc.

Can the controller be locked?

Yes the controller can be locked with a 4 digit pin and the functionality without pin can be setup.

Can the unit be used for humidity control?

The unit is not capable to provide active humidity control. The facility to cool and heat simultaneously is not available. Additionally The cooling coils are not designed to operate at low temperatures (below 15 °C).

The unit also does not offer the possibility to control an humidifier.

If required a suitable cooling coil, re-heat coil and humidifier with their own standalone controls can be provided in the duct.

Can the unit operate on multiple IAQ sensors?

No. The unit takes input from a single IAQ sensor.

However there are controls solutions that can provide a single output from multiple sensors. Contact Barkell for additional information.

Is a commissioning software available?

Yes a commissioning software can be provided allowing setup of the equipment via a PC.

Can you provide a lists point for Bacnet or Modbus?

Yes a points list is available on request for both protocols.

Is it possible to supply the units without controls?

No this is not possible. The units are standard design and this includes the controls system.

Removing the controls would mean that a third party will have to do the installation.

Due to their compact design it can be very difficult to install your own controls on this equipment and it can lead to leakage, poor sensor placement etc.

Maintenance

What is the lifespan of the units?

The units can last for 15-20 years with regular maintenance.

The fans have a lifespan of around four years when run at full speed. However for most applications the equipment is run intermittently and at low speeds which prolongs the life of the fans significantly.

How often do the filters need changing?

The filters should be checked and replaced as necessary.

In a dirty environment filters might only last 3 months. In average they last 6 months but can last up to a full year with intermittent use in a clean environment.

The controls system provides an alert you when filters are 80% clogged and again when it's time to change them.

How often should I clean the unit?

We recommend checking and cleaning the unit every six months though this interval should be adapted to the operating conditions.

It is recommended to thoroughly clean the unit at least once a year.

Testing

What testing is performed on your equipment?

Performance is tested to ISO 5801:2007 Industrial fans – performance testing using standardized airways.

Casing radiated noise acoustically tested to BS EN 3744:2010 – Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane.

Published figures are for a non-punctiform source and spherical propagation as described in ISO 3744.

In duct noise acoustically tested to BS EN ISO 5136:2010 - Acoustics – Determination of sound power radiated into a duct by fans and other air-moving devices - In-duct method.

Heat recovery efficiency tested to EN 308:1997 - Heat exchangers - Test procedures for establishing performance of air to air and flue gases heat recovery devices.

Model box casing performance tested to EN1886:2007 - Ventilation for buildings - Air handling units.

What is the EN1886 performance of the unit?

Each model is not tested for its EN1886 performance however several model box tests to EN1886 have been performed with the following results:

- Thermal transmittance of the casing - T3 (MB)
- Thermal bridging of the casing - TB4 (MB)
- Casing air leakage - L1 (MB)
- Casing strength – D2 (MB)

Is factory testing available?

This is not available since Barkell does not have the facilities to perform such testing in-house. This would have to be performed by a third party which is costly and cumbersome.

The whole range of products has been tested at design stage and these are manufactured in a controlled quality environment therefore their performance is very consistent. We can provide a test report for the tests that were already performed.

The selections provided by our software are all based on tested data.

Furthermore the units also undertake EOL testing intended to ensure the electrics and controls have been correctly assembled, wired and are operating correctly within the parameters of the relevant regulations with no danger to the end user. This also serves to guarantee the correct controls configuration has been selected and that all the mechanical moving parts (damper, fans) as well as sensors (temperature, pressure) are operating correctly.

Compliance

Are the units compliant with Part L and the Ecodesign directive?

All units are selected to be compliant with the 2018 requirements of the ErP directive. The units will operate, at the design duty and pressure, within the parameters of the ErP directive.

All units are selected to be compliant with the requirements of the Building Regulations L2A 2013 for Zonal Supply and Extract Ventilation Systems. The units will operate, at the design duty and pressure, with an SFP lower or equal to $1.9 \text{ W} \cdot (\text{l.s})^{-1}$. All our selections are done at midpoint filter conditions.

Are the units BB101 or BB93 certified?

No. BB101 and BB93 are not product testing standards or regulations.

These are performance standards for buildings that specify recommended minimum targets for acoustics and ventilation in school buildings.

It is common to refer to BB93 in particular when setting out acoustic requirements for equipment however no manufacturer can guarantee compliance with these requirements unless their equipment has been tested in a room with equivalent characteristics to that of the intended installation.

Can your equipment achieve an Noise Rating (NR) or Noise Criteria (NC) level?

Barkell cannot guarantee compliance with a room noise level or NR (Noise Rating) as the noise level on the room is dependent on the installation, room dimensions and acoustical characteristics as well as the type of material and thickness of the ceiling tiles (if installed in ceiling void).

We provide noise data measured to the relevant standard

The acoustic analysis of the resultant room noise must always be performed by an acoustic consultant.

Are the units Eurovent certified?

Although the units as a full assembly are not Eurovent certified the heat exchangers are indeed. Leakage and thermal performance of the exchangers is guaranteed by the Eurovent certification.

Are the units HTM compliant?

The units do fall in line with some of the requirements of the HTM guideline however due to the dimensional constraints inherent to the design of these units some of the HTM clauses are simply not achievable.

Nonetheless the HTM is a guideline and the products can be compliant with only parts of such guideline as long as all parties involved are in agreement of any concessions made due to the specificities of the product.

As such we are able to provide a HTM specification matrix of compliance assessing each clause for compliance and stating the motive for any non-compliances and what mitigating measures are in place.

Commissioning

Can you attend site for commissioning?

The set-up of the controls on the Therm-X unit can be performed by one of our experienced commissioning teams.

We offer the following options to perform the commissioning of your Therm-X units:

Site attendance for demonstration of controls set-up

With this option one of our experienced engineers will attend to site for one day and demonstrate how to calibrate and set the controls for one Therm-X unit.

Site attendance for controls set-up

With this option one of our experienced engineers will attend to site to check the installation and wiring of every unit as well as calibrate and set up the controls to the required project design conditions.

For additional information about our commissioning options please contact our offices.

Do you offer commissioning training?

We offer both commissioning training in our offices, on site or online.

For additional information about our commissioning options please contact our offices.

How can I commission the units myself?

A detailed commissioning procedure is provided at the time you order the units.

This along with the provided IOM manuals shall be enough to enable you to commission the units yourself. Otherwise we offer commissioning training in our offices, on site or online.

Warranty

What is the product warranty?

All units are provided with 36 months warranty starting from the date of delivery. The warranty covers replacement parts only.

Will the warranty be voided if I tamper with the internal wiring or mechanical configuration of the unit?

Yes. Any unapproved changes to the wiring or the mechanical configuration of the unit will void the warranty.

Barkell shall not be liable for damage or malfunctioning resulting from these changes.

If you need to make a change to the wiring or mechanical parts of the equipment please check with Barkell beforehand.

Do I need to get commissioning from Barkell in order to validate the manufacturer warranty?

We do not require you to have a Barkell engineer commission the units in order to validate the warranty.

However in the event of a warranty claim the state of the units at the time of commissioning will be taken into account in the assessment of the claim.

We will require that you provide completed commissioning documentation and maintenance records.

Spares

How fast can I get spares?

All general wear and tear replacement spare parts are available in 3-5 business days.

What spares are recommended for the units?

The estimated average equipment lifetime is 15-20 years when maintained in accordance with the instructions in the installation, operation and maintenance manual.

We recommend acquiring 2 sets of spare filters as these will likely have to be replaced at the very least twice a year.

The fans might have to be replaced every 4-5 years as the bearings wear out, however this highly depends on the annual working hours of the equipment and they can even last the lifetime of the equipment when operated under normal conditions in accordance with the IOM manual.

We don't expect any other components of the unit to fail during its lifetime when operated under normal conditions and in accordance with the IOM manual.

If it's critical that the equipment is kept operating at all times (i.e. the equipment is the only source of heating/cooling into the space being conditioned, ventilation is essential for the space being conditioned, etc...) or that the maintenance downtime is very reduced then we would recommend to acquire:

- Replacement filters (2 sets)
- Replacement fans
- Replacement motor and belt for rotary heat exchanger (HR85)
- Replacement touchscreen controller
- Replacement electric heater auto and manual re-set thermostats (if installed)
- Replacement electric heater relay (if installed)

Please note the above covers only some the parts that are most susceptible to failure due to wear and tear.

This does not include parts that might fail due to lack of proper installation, operation and maintenance or due to unforeseeable circumstances..

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