

TECHNICAL MANUAL

Installation, Commissioning, Operation and Maintenance
HumEvap MC3

Thank you for choosing Condair

Installation date (MM/DD/YYYY):

Commissioning date (MM/DD/YYYY):

Location ref.:

Model:

Serial number:

Manufacturer

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1.0 General Information

Foreword:

This manual has been written to ensure the safe use, performance and longevity of the equipment and is intended for use by engineers and properly trained technical personnel. Please read this manual thoroughly before specifying, designing or installing a HumEvap system. Retain for reference.

Condair plc policy is one of continuous research and development. Condair plc reserves the right to amend, without notice, the specifications provided in this document. The distributor does not guarantee, or accept liability for, the accuracy of information in this document.

Health and Safety:

Installation, maintenance, repair work or de-commissioning should only be carried out by appropriately qualified and properly trained technical personnel. It is the customers responsibility to ensure their suitability. The customer is responsible for ensuring that the installation of the equipment complies with all local regulations.

Any risks or hazards relating to the system, including during installation and maintenance, should be identified by a competent Health & Safety representative who shall be responsible for introducing effective control measures as necessary.



WARNING:

Always isolate all supplies to the system before commencing any maintenance or repair.

COSHH and Personal Protective Equipment:

Refer to HSE for information on the Control Of Substances Hazardous to Health and recommendations with regard to Personal Protective Equipment including Respiratory Protective Equipment.

Hygiene:

Your attention is drawn to the local Health & Safety Executive's technical guidance on the control of Legionellosis in water systems. If inadequately maintained, water systems, of which any humidifier is a part, can support the growth of micro-organisms, including the bacterium that causes Legionnaires' disease. The distributor has considered all aspects of this equipment to reduce as far as possible the risk of Legionnaires' disease and other similar conditions, but it is important that users are aware of their responsibilities under the ACoP in reducing the risk of Legionellosis.

To prevent the growth of Legionella, users are required to:

1. Carry out a risk assessment of the water system using a competent person, and implement an appropriate monitoring and control regime.
2. Avoid water temperatures which favour the growth of Legionella.
3. Avoid water stagnation.
4. Clean and disinfect the system in accordance with the Health & Safety Executives technical guidance and instructions in this manual.
5. The HumEvap system **MUST** be connected to a clean, potable mains water supply and it is recommended that the supply pipe work is chlorinated. It is the responsibility of the user to ensure

that the water system complies with local regulations and bylaws, particularly those for the control of Legionella microbes (such as the HSE ACoP L8, The control of Legionella microbes in water systems). The use of mains water fed tanks and reservoirs is only permitted as part of a managed water treatment system.



WARNING:

The HumEvap must be installed, operated and maintained in accordance with this manual. Failure to do so could result in contamination that might cause Legionnaires' disease, which can be fatal.

Correct Use:

The HumEvap system is intended for adiabatic humidification and cooling. Any other, or further, application is not considered use for the intended purpose. The distributor cannot be made liable for any damage or injury attributable to inattentive, inappropriate, negligent or incorrect operation of the equipment whether or not caused deliberately.



CAUTION:

To prevent water stagnation and microbial contamination, the HumEvap power supply should be left switched on continuously. If the system is switched off for prolonged periods, typically longer than one week (subject to risk assessment) the pipework and system should be disinfected as per instructions and a full risk assessment undertaken to ensure safe operation.

Warranty:

HumEvap parts are warranted for 2 years from invoice date with the exception of replacement items listed in the routine maintenance section. Failure to observe the manufacturers installation and maintenance recommendations and instructions will invalidate the warranty. Condaire plc cannot be made liable for damage or injury attributable to failure to observe the manufacturers installation and maintenance recommendations and instructions.

HumEvap OEM Versions

The HumEvap OEM versions are designed for customers who are familiar with evaporative humidification/cooling systems and wish to provide their own controls and hygiene precautions. OEM versions are designed to be components in a hygienic humidification/evaporative cooling system, and are not to be considered as entire systems in their own right. There are a number of requirements that the customer **MUST** ensure are met in order to bring the OEM versions up to a standard to comply with WRAS and VDI hygiene specifications. These are listed in this manual.



WARNING:

The HumEvap 'OEM' versions, unlike the HumEvap MC3, do NOT incorporate, as standard, methods to control the growth of micro-organisms (including the bacterium which causes Legionnaire's disease). When designing or installing an air handling system that incorporates an 'OEM HumEvap', appropriate micro-organisms and microbial control methods **MUST be considered and this should only be undertaken by suitably qualified persons. A risk assessment **MUST** also be undertaken in relation to control of micro-organisms and microbial growth, especially Legionnaires disease. If in doubt and for further information, contact your distributor.**

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Guide to symbols used within this manual



WARNING:

Instructions relating to safety.



CAUTION:

Instructions relating to the correct operation of the unit.

1.3 Delivery and Storage

To ensure consistent quality, each evaporative module is inspected before leaving the factory. If the module is to be put into storage prior to installation, it must be stored under cover and protected from physical damage, dust, frost and rain.

It is recommended that the evaporative module be kept in its transit packaging for as long as possible prior to installation.

All evaporative modules are supplied flat-packed for assembly 'in situ'. The evaporative module must be assembled before water and electrical connections are made.

Please refer to HumEvap Evaporative Module Assembly Instructions supplied with the system.

Inspection

Upon receipt, remove the transit packaging and inspect the unit to ensure that no damage has occurred during transit. Any visible damage must be reported to your distributor immediately. If the unit is to be put into storage, the packaging should be replaced.

Handling Evaporative Material



The HumEvap evaporative material should not be cut or crushed as doing so may generate dust.

HumEvap evaporative material is manufactured from glass fibre and is not classified as hazardous. It is recommended that Personal Protection Equipment such as gloves, protective clothing and eye protection are used during handling to protect the user from fibres or dust. If dust is generated during handling it is recommended that respiratory protection is worn. Damage to the evaporative material will affect the performance of the humidifier and may result in water carry over.

In the event of contact, the following procedures should be observed:

Eye contact – wash well with water for a minimum of 15 minutes.

Skin contact – wash well with soap and water.

Contact your distributor for COSHH data sheet if required.

Correct Method of Lifting

Lifting or handling must only be carried out by trained and qualified personnel. Ensure that the lifting operation has been properly planned and risk assessed, and that all equipment has been checked by a skilled and competent Health & Safety representative.

It is the customer's responsibility to ensure that operators are trained in handling heavy goods and to enforce the relevant lifting regulations.

Any personnel handling or lifting the HumEvap system must follow the Lifting Operations and Lifting Equipment Regulations 1998 and Approved Code of Practice L113. The regulation imposes duties on employers and self employed persons and persons who have control, to any extent of lifting equipment.

Delivery and Storage Cont.



The packaged HumEvap unit may be carried by fork lift from the underside, but caution should be exercised to ensure that the load is balanced before lifting. Refer to weights and measures section for system weight.

Disposal

You must observe local laws and regulations when disposing of your HumEvap at the end of its working life. Use personal protective equipment as recommended in the handling section above when handling the evaporative material. In addition, respiratory protection should be worn to avoid inhalation of dust or debris from the air flow which may have accumulated on the material.

The evaporative module is constructed from stainless steel which may be fully recycled.

1.4 Inlet Water - Quality Guide

The quality of water being used in the HumEvap system should be checked prior to the commissioning of a system. It is recommended that the HumEvap system must be connected to a clean, potable (drinking water quality) mains water supply. For areas of hard water and to minimise scale build up the water supply may be treated by "Reverse Osmosis" (RO).

Reverse Osmosis

For HumEvap systems where the water supply is treated by RO it is recommended that the system is operated within the following parameters. The use of RO water fed tanks and reservoirs is only permitted as part of a managed and hygiene monitored water system and should form part of the water system risk assessment.

Other Water Supplies

Conductivity	> 5 $\mu\text{S cm}^{-1}$ at 20 °C	Circulating HumEvap pump system
Conductivity	> 30 - 50 $\mu\text{S cm}^{-1}$ at 20 °C	Direct feed system

There is a growing demand to utilise sustainable water sources to help overcome scarcity challenges and recycle water. It is possible to use high-quality, treated effluent for non-potable applications. The following gives guidance on reclaimed water quality that may be acceptable for use within the HumEvap. 'Effluent treated water', must be treated by an appropriate water treatment method and risk assessed to ensure it is safe and suitable for use in the HumEvap unit. It is the responsibility of the user to ensure that the water supply system is part of a managed, hygiene monitored water system, risk assessed and complies with the local regulations and bylaws.

Below are example water conditions that would allow a HumEvap to operate within specification.

Inlet Water - Quality Guide

Parameter	Supply Water	Concern
Temperature	< 20°C	Warm water favours growth of bacteria
Aluminium	-	No specific concerns
Ammonium	< 0.50 mg/l	Odour passed to air
Calcium	< 300 mg/l	Scale formation
Chloride	< 300 mg/l	Corrosion of stainless steel
Colour	None	Not directly a concern
Copper	< 1 mg/l	Deposits and corrosion stimulation
Conductivity	< 650 $\mu\text{S cm}^{-1}$ at 20°C	Total hardness and scale formation.
pH	6.5 to 9.5	Acid or Alkali damage to equipment.
Iron	< 0.5 mg/l	Deposit formation on oxidation and a critical support role in Legionella growth.
Manganese	< 0.1 mg/l	Deposit formation
Nitrate	-	No specific concerns
Nitrite	-	No specific concerns
Odour	Acceptable to users	Smell passed to air
Sulphate	< 250 mg/l	No specific comments
Sodium	-	No specific concerns
Total organic carbon	-	No specific concerns
Turbidity	< 5 NTU	No specific concerns
Colony count 22°C	< 1000 cfu/ml	Indicator of contaminated water supply
Coliform bacteria	< 10 cfu/100 ml	Indicator of poor water quality
Legionella bacteria	< 50 cfu/1000 ml	Risk of Legionella
Pseudomonas species	< 10 cfu/100 ml	Indicator of slime forming potential

Inlet Water - Quality Guide Cont.

Controlled Substances

Many of the following controlled substances are toxic; for example Vinyl chloride is highly toxic, flammable and carcinogenic and could be evaporated off the matrix and passed to the airflow. Therefore it is important to note that any supply water coming from complex waste water, which may contain these contaminants should therefore be carefully risk assessed by a water treatment specialist.

Clostridium perfringens (including spores)	Cadium	Nickel
Acrylamide	Chromium	Pesticides
Antimony	Cyanide	Polycyclic aromatic hydrocarbons
Arsenic	1,2-dichloroethane	Selenium
Benzene	Epichlorohydrin	Tetrachloroethene and Trichloroethene
Benzo(a)pyrene	Fluoride	Trihalomethanes
Boron	Lead	Vinyl chloride
Bromate	Mercury	

Water Monitoring

The HumEvap water system must be monitored for hygiene as part of the maintenance programme. Please refer to the maintenance section for further guidance.

Depending on the system hygiene, it is advised that preventative disinfection chemical should be added to the HumEvap water tank at an appropriate frequency, such as a monthly basis.

It is recommended that disinfection chemical 'DISIFIN' is added to the tank at approx 500 ppm strength on a monthly basis to control microbiological activity. DISIFIN is a safe, non toxic, environmental friendly & 100% biodegradable chemical which provides a prophylactic, disinfection dose and is effective against all types of microorganisms including; legionella and E.coli.

DISIFIN may be added to the tank whilst the system continues operating and left to dissolve away naturally. Please refer to the maintenance section for further guidance.

Note: Adding DISIFIN or other disinfection chemicals will increase the conductivity in the tank. This should be taken into account on systems where a conductivity control system is in use.

If you are in any doubt about the suitability of water quality please contact Condair plc who will be pleased to advise you.

1.5 HumEvap Principle of Operation

Raising the relative humidity or reducing the temperature by evaporative cooling by passing air through a wetted matrix is a simple and safe way to humidify and cool the air - with the added benefits of very low running costs.

At the heart of the HumEvap is the evaporative module, which is installed in an AHU or duct. Water is supplied to the top of a highly efficient bonded matrix, which is impregnated with silver for added hygiene. Dry air passes through this moist material picking up water vapour, raising the humidity as it does so. This process consumes very little energy, far less than steam humidifiers, or even cold water atomisers.

The water that doesn't evaporate assists in washing the matrix material and flows into a stainless steel tank at the base of the unit before being re-circulated up onto the matrix again (except in the HumEvap OEM Direct Feed version, in which the water passes directly to drain).

As each vertical matrix bank has its own water supply, multi-stage control is an option which individually operates sections of the system for closer control.

Modular construction facilitates a range of system sizes and efficiencies to match the requirements of individual applications, and ease of installation, maintenance and replacement should damage occur to any of the matrix cassettes.

To prevent clogging of the humidifier cassettes, the airflow into the module must be filtered to at least EU5 filtration standard. Finer filtration may be required for hospitals or where air is being supplied to areas where food or electronic products are being handled.

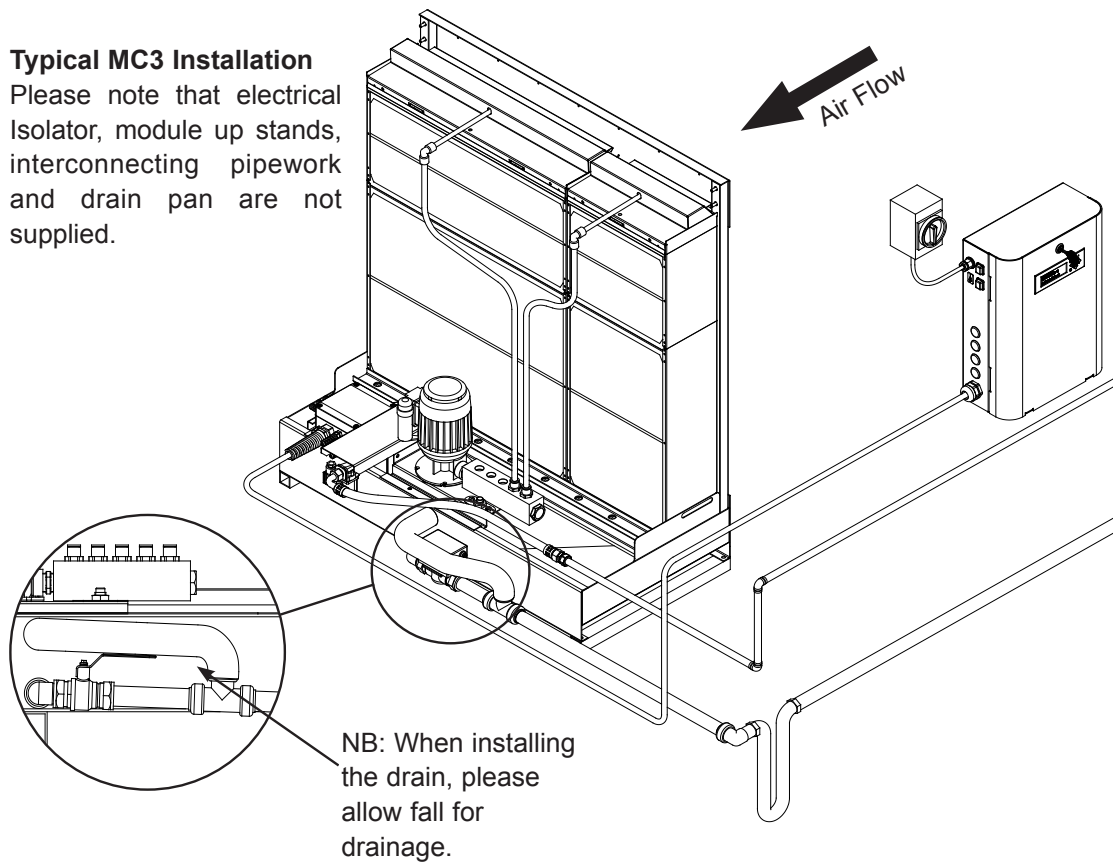
To prevent droplet carry over an optional droplet separator can be fitted. It is recommended for velocities above 3.5 m/s (11.5 ft/s) and the HumEvap system is installed after the fan, a suitable laminating device may be required.

For areas of hard water, water treatment such as reverse osmosis is recommended to reduce maintenance requirements. (see water quality guide for further information).

HumEvap Principle of Operation Cont.

Typical MC3 Installation

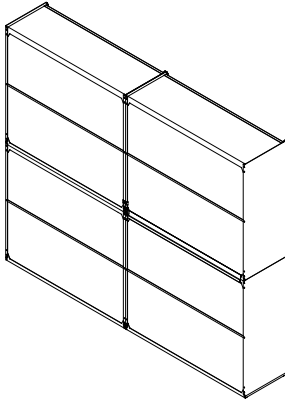
Please note that electrical Isolator, module up stands, interconnecting pipework and drain pan are not supplied.



1.6 HumEvap Overview

The HumEvap system consists of two main components as follows:

Evaporative Module



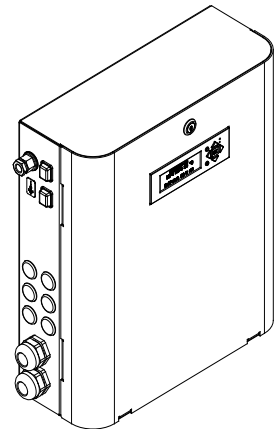
The evaporative module is available in a range of widths. Standard width; (600mm (24") to 3000mm (118")) and XL width; (3300mm (130") to 3900mm (153.5")). The module is also available in a range of heights; (750mm (30") - 3000mm (118")) to match the requirements of individual applications. The evaporative matrix consists of modular cassettes with low pressure drop which are available in a range of sizes and efficiencies.

The evaporative module is constructed from recyclable high grade stainless steel.

The module has drain and overflow connections which are integrated on MC3 versions. The drain assemblies supplied with XL and MC3 systems are reversible and simplify drain plumbing.

A single electrical junction box, with pre-wired flying lead for connection to the management system is included in the HumEvap MC3 system to simplify installation. The MC3 Plus system has two electrical junction boxes with pre-wired flying leads.

Water flow and level in the MC3 systems are controlled by a fill control solenoid, float valve (x 2 on MC3 or MC3 Plus XL) and low/high level float switch. Drain flow is controlled by a motorised valve on MC3 systems. Water is recirculated over the matrix by a high grade circulating pump.



Management system

The HumEvap MC3 or MC3 Plus systems include a microprocessor control panel which is located outside the AHU, up to 100m (328') away from the evaporative module. A 10m (33') flying lead is supplied unless otherwise specified (two flying leads are supplied on a MC3 Plus system).

The system gives digital control over desired relative humidity or temperature levels, with a built in hygiene measures such as; dilution, drain and other water quality maintenance features.

The system can be timer controlled to activate only during hours of building occupancy.

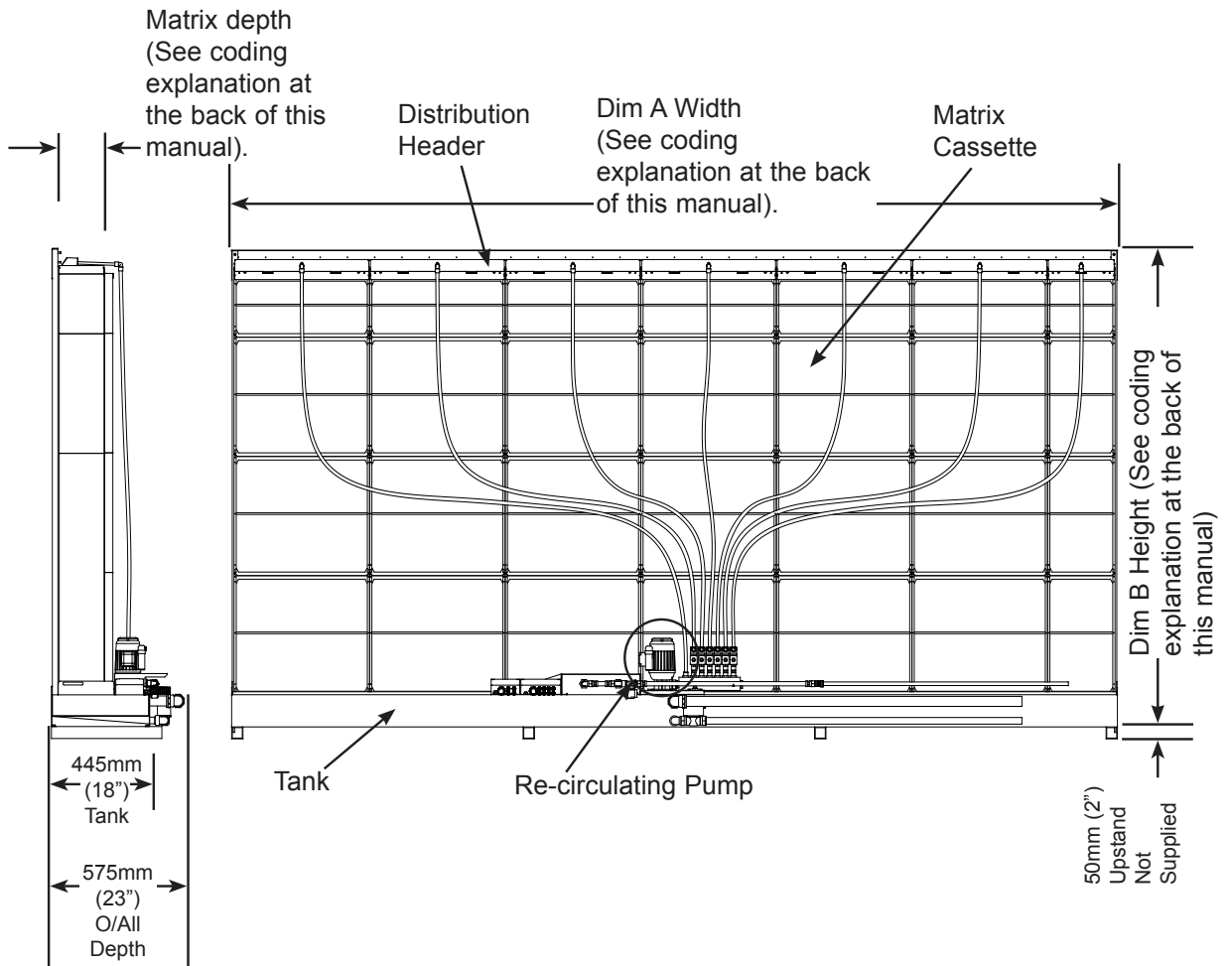
Comprehensive real-time feedback shows current relative humidity and temperature, demand, hours run, system operating status and whether maintenance is required.

The whole system is easy to set up, has multi-lingual options (English, French, German, Spanish, Czech, Dutch, and Swedish) and is security code protected to prevent unauthorised alteration of system settings.

1.7

Typical HumEvap XL Evaporative Module Overview

Module Specification



WARNING:

The unit must be installed on a minimum 50mm (2") upstand to ensure gravity drainage.

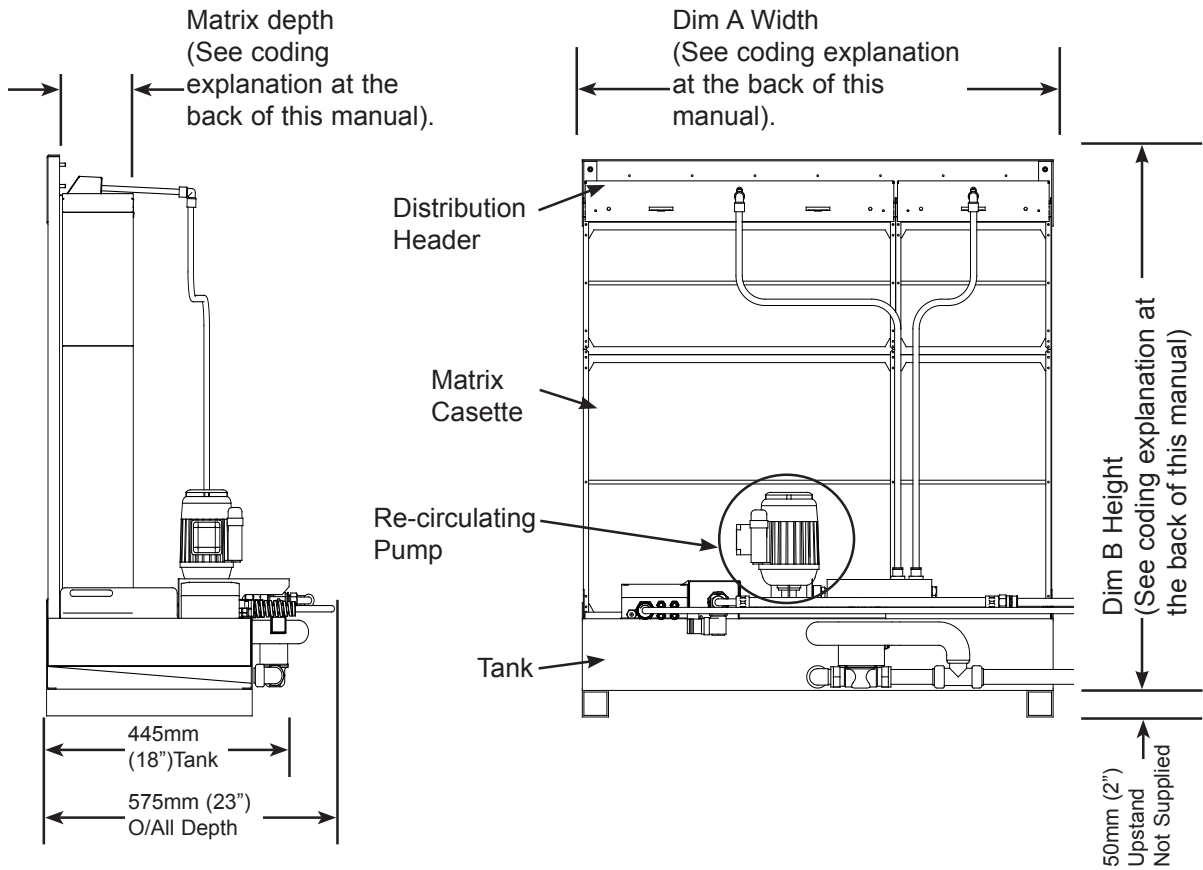
Typical HumEvap XL Evaporative Module Overview Cont.

Module Specification

Description	Specification
Module Construction	Stainless Steel 304
Evaporative Material	Composite glass fibre impregnated with an inorganic rigidifying solution (non-combustible according to Euro Class A2-S2, d0 - conforming to EN13501-1 (BSI)).
Water Pump	Immersion Pump 110/230 V 50/60 Hz. IP 55 CE Approved
Water Inlet Size	15mm (1/2") Pipe-work
Water Inlet Control	Inlet Solenoid Valve Float Switch Float Valve x 2
Water Drain Size	1 x 54mm (2") Overflow Outlet plus 1 x 28mm (1") Drain Outlet
Water Drain Control	Motorised two port n/o valve 110/230 V 50/60 Hz 28mm
Water Inlet Flow and Pressure	28 l/m (7.4 US gallons/min) @ 2 bar (29psi)
Max. Inlet Water Pressure	7 bar (101 psi)
Max. Inlet Water Temperature	20°C (68°F)
Modulating Control Option	2 Stage (1 Solenoid valve) 5 Stage (4 Solenoid valves) - MC3 Plus only 3 Stage (2 Solenoid valves) 6 Stage (5 Solenoid valves) - MC3 Plus only 4 Stage (3 Solenoid valves) 7 Stage (6 Solenoid valves) - MC3 Plus only
Optional Hygiene Systems	PureFlo Ag+ anti-microbial cartridge and 5 micron sediment filter PureFlo conductivity sensor with setpoint drain PureFlo UV (in-line/submerged) disinfection system with interlock
System Options	Leak Detection Sensor to raise an alarm when water is detected - MC3 Plus only Water Temperature Monitor to regulate the water temperature - MC3 Plus only

Typical HumEvap MC3 Evaporative Module Overview Cont.

Module Specification



⚠ WARNING:

The unit must be installed on a minimum 50mm (2") upstand to ensure gravity drainage.

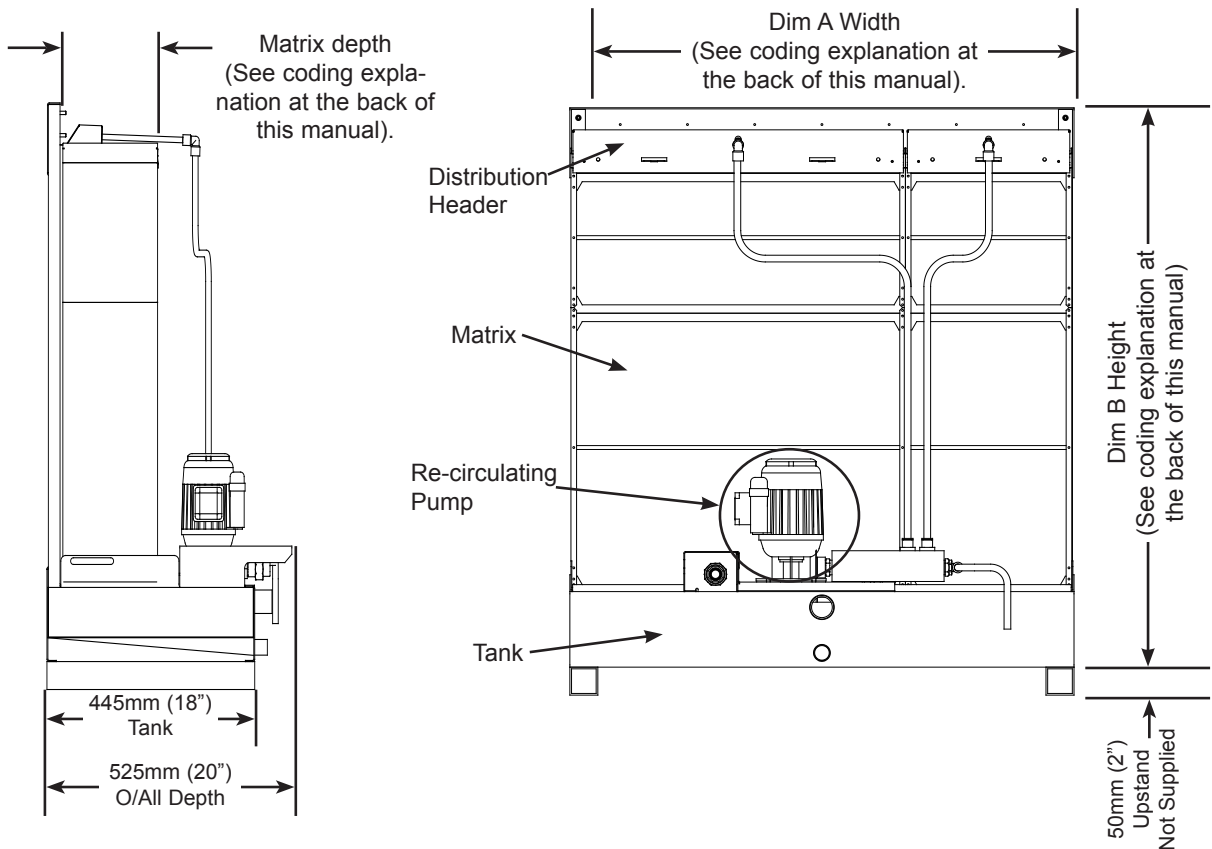
Typical HumEvap MC3 Evaporative Module Overview Cont.

Module Specification

Description	Specification
Module Construction	Stainless Steel 304
Evaporative Material	Composite glass fibre impregnated with an inorganic rigidifying solution (non-combustible according to Euro Class A2-S2, d0 - conforming to EN13501-1 (BSI)).
Water Pump	Immersion Pump 110/230 V 50/60 Hz. IP 55 CE Approved
Water Inlet Size	15mm (1/2") Pipe-work
Water Inlet Control	Inlet Solenoid Valve Float Switch Float Valve
Water Drain Size	1 x 54mm (2") Overflow Outlet plus integrated 1 x 28mm (1") Drain Outlet
Water Drain Control	Motorised two port n/o valve 110/230 V 50/60 Hz 28mm
Water Inlet Flow and Pressure	14 l/m (3.7 US gallons/min) @ 2 bar (29psi)
Max. Inlet Water Pressure	7 bar (101 psi)
Max. Inlet Water Temperature	20°C (68°F)
Modulating Control Option	2 Stage (1 Solenoid valve) 5 Stage (4 Solenoid valves) - MC3 Plus only 3 Stage (2 Solenoid valves) 6 Stage (5 Solenoid valves) - MC3 Plus only 4 Stage (3 Solenoid valves) 7 Stage (6 Solenoid valves) - MC3 Plus only
Optional Hygiene Systems	PureFlo Ag+ anti-microbial cartridge and 5 micron sediment filter PureFlo conductivity sensor with setpoint drain PureFlo UV (in-line/submerged) disinfection system with interlock
System Options	Leak Detection Sensor to raise an alarm when water is detected - MC3 Plus only Water Temperature Monitor to regulate the water temperature - MC3 Plus only

Typical HumEvap OEM Circulating Evaporative Module Overview

Module Specification



! CAUTION:

The unit must be installed on a minimum 50mm (2'') upstand to ensure gravity drainage.

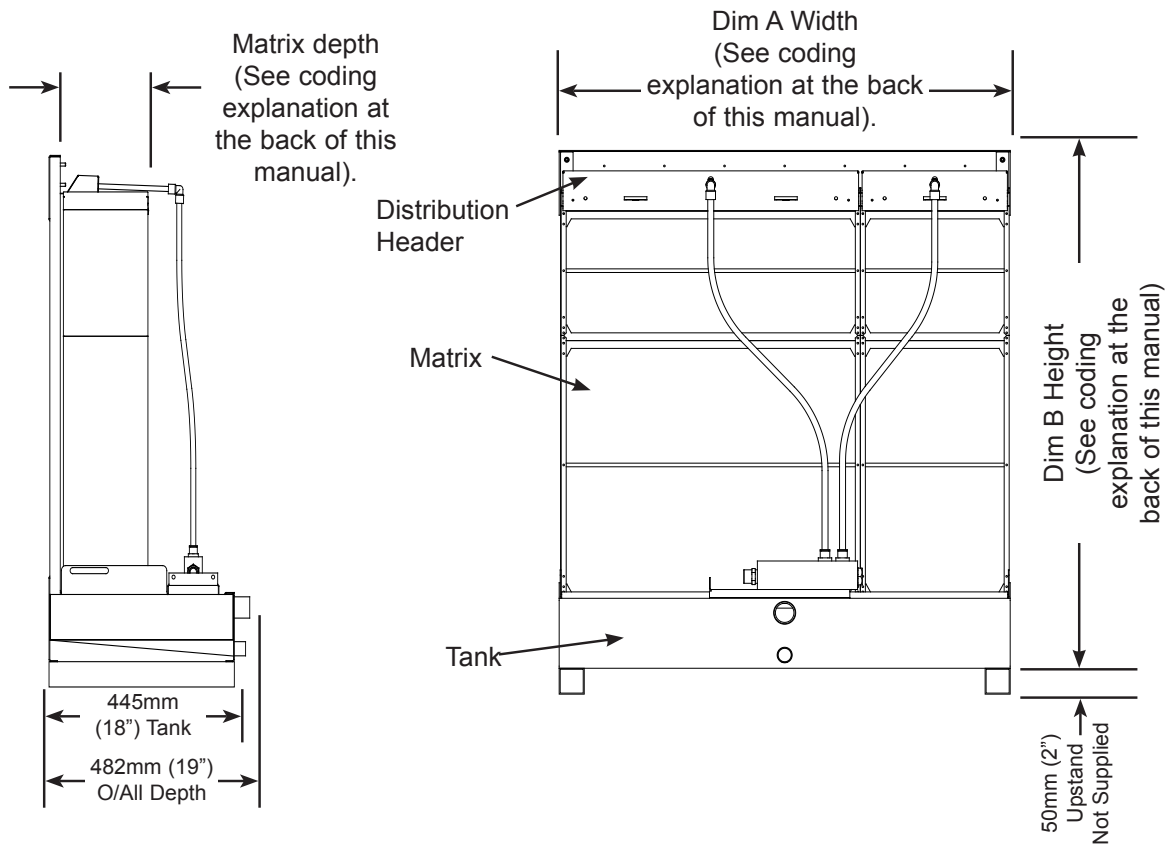
Typical HumEvap OEM Circulating Evaporative Module Overview Cont.

Module Specification

Description	Specification
Module Construction	Stainless Steel 304
Evaporative Material	Composite glass fibre impregnated with an inorganic rigidifying solution (non-combustible according to Euro Class A2-S2, d0 - conforming to EN13501-1 (BSI)).
Water Pump	Immersion Pump 110/230 V 50/60 Hz IP 55 CE UL CSA Approved
Water Inlet Size	1/2" BSP Male
Water Inlet Control	Float Valve
Water Drain Size	54mm (2") Overflow Spigot 28mm (1") Drain Spigot
Water Drain Control	N/A
Water Inlet Flow and Pressure	14 l/m (3.7 gallons) @ 2 bar (29psi)
Max. Inlet Water Pressure	7 bar (101 psi)
Max. Inlet Water Temperature	20°C (68°F)
Modulating Control Option	2 Stage (1 Solenoid valve) 3 Stage (2 Solenoid valves) 4 Stage (3 Solenoid valves)
Optional Hygiene Systems	PureFlo Ag+ anti-microbial cartridge and 5 micron sediment filter PureFlo UV (in-line/summerged) disinfection system with interlock
System Options	Please refer to HumEvap OEM Circulating Product Options

Typical HumEvap OEM Direct Feed Evaporative Module Overview

Module Specification



! CAUTION:

The unit must be installed on a minimum 50mm (2") upstand to ensure gravity drainage.

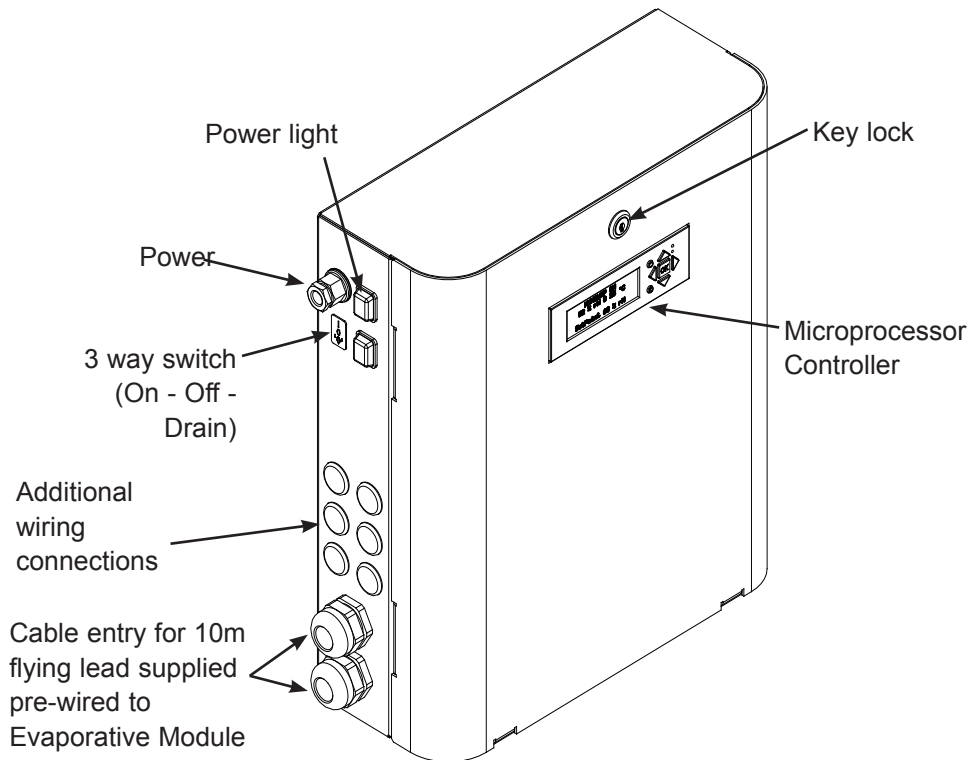
Typical HumEvap OEM Direct Feed Evaporative Module Overview Cont.

Module Specification

Description	Specification
Module Construction	Stainless Steel 304
Evaporative Material	Composite glass fibre impregnated with an inorganic rigidifying solution (non-combustible according to Euro Class A2-S2, d0 - conforming to EN13501-1 (BSI)).
Water Pump	N/A
Water Inlet Size	3/4" BSP Female
Water Inlet Control	N/A
Water Drain Size	54mm (2") Overflow Spigot 28mm (1") Drain Spigot
Water Drain Control	N/A
Water Inlet Flow and Pressure	N/A
Max. Inlet Water Pressure	7 bar (101 psi)
Max. Inlet Water Temperature	20°C (68°F)
Modulating Control Option	2 Stage (1 Solenoid valve) 5 Stage (4 Solenoid valves) 3 Stage (2 Solenoid valves) 6 Stage (5 Solenoid valves) 4 Stage (3 Solenoid valves) 7 Stage (6 Solenoid valves)
Optional Hygiene Systems	PureFlo Ag+ anti-microbial cartridge and 5 micron sediment filter PureFlo UV (in-line) disinfection system with interlock
System Options	Please refer to HumEvap OEM Direct Feed Product Options

Please note that the management system is not supplied with the OEM Versions.

1.8 HumEvap MC3 Plus Management System Overview



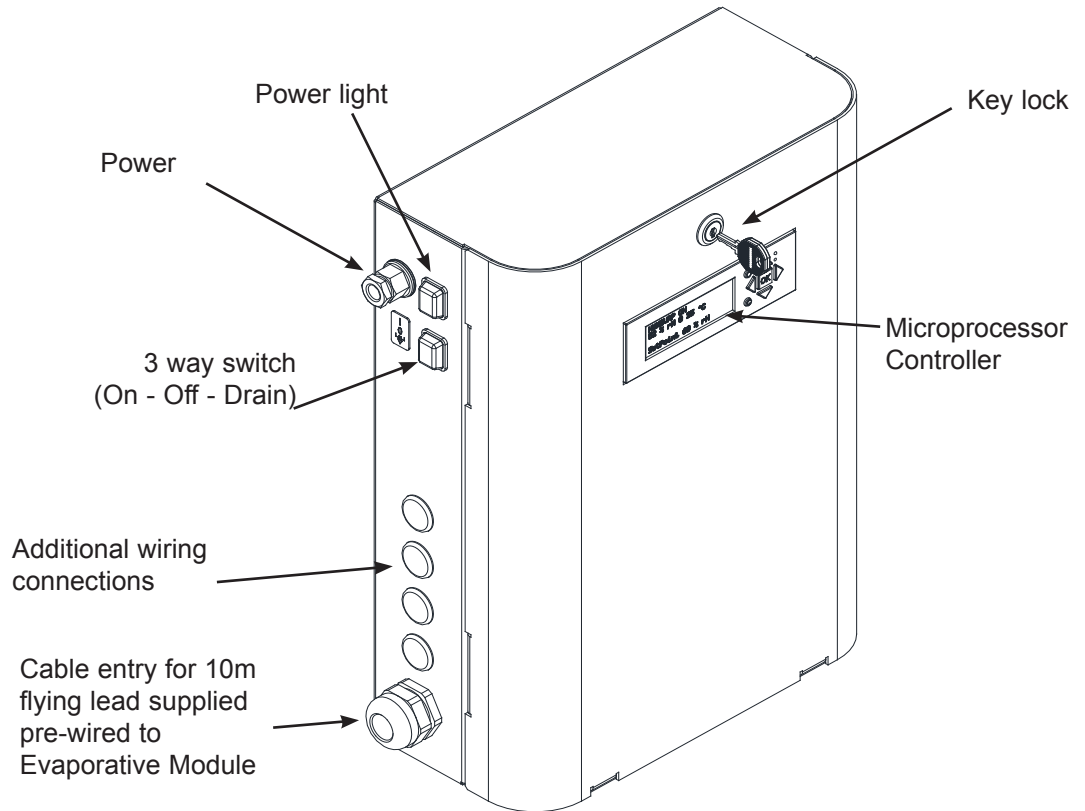
Management System Specification

Description	Specification
Dimensions	360mm (14") wide x 420mm (17") high x 140mm (6") deep
Weight	8.5kg (18.7lb)
Required Power Supply	230 Vac fused at 5 Amps in the EU 110 Vac fused at 10 Amps in the US.
Power Consumption	490 Watts max (excluding options)
Module to Management System	2 x Armoured 15mm (1/2") diameter, 10m (33') supplied as standard (100m (328') Max).
Inter-connecting Cable	Common fault alarm (volt free contacts)
BMS Outputs	HumEvap running output (volt free contacts) On / Off (controlled by external enable, panel switch or internal timer)
Control Options	Humidity sensor input (0-10 Vdc, 2-10 Vdc, 4-20 mA*) Temperature sensor input (0-10 Vdc, 2-10 Vdc, 4-20 mA*) External demand input (0-10 Vdc, 2-10 Vdc, 4-20 mA*) Safety Interlock Terminals
IP Rating	IP 31
Options	Leak Detection Sensor to raise an alarm when water is detected Water Temperature Monitor to regulate the water temperature Up to 7 stage control (6 solenoid valves)

*Requires load resistor of 500 Ohms (not supplied).

Please note that the management system is not supplied with the OEM Versions.

HumEvap MC3 Management System Overview



Management System Specification

Description	Specification
Dimensions	300mm (12") wide x 420mm (17") high x 140mm (6") deep
Weight	6.5kg (14.5 lb)
Required Power Supply	230 Vac fused at 5 Amps in the EU 110 Vac fused at 10 Amps in the US.
Power Consumption	490 Watts max (excluding options)
Module to Management System	1 x Armoured 15mm (1/2") diameter, 10m (33') supplied as standard (100m (328') Max).
Inter-connecting Cable	Common fault alarm (volt free contacts)
BMS Outputs	On / Off (controlled by external enable, panel switch or internal timer)
Control Options	Humidity sensor input (0-10 Vdc, 2-10 Vdc, 4-20 mA*) Temperature sensor input (0-10 Vdc, 2-10 Vdc, 4-20 mA*) External demand input (0-10 Vdc, 2-10 Vdc, 4-20 mA*) Safety Interlock Terminals
IP Rating	IP 31
Options	Up to 4 stage control (3 solenoid valves)

*Requires load resistor of 500 Ohms (not supplied).

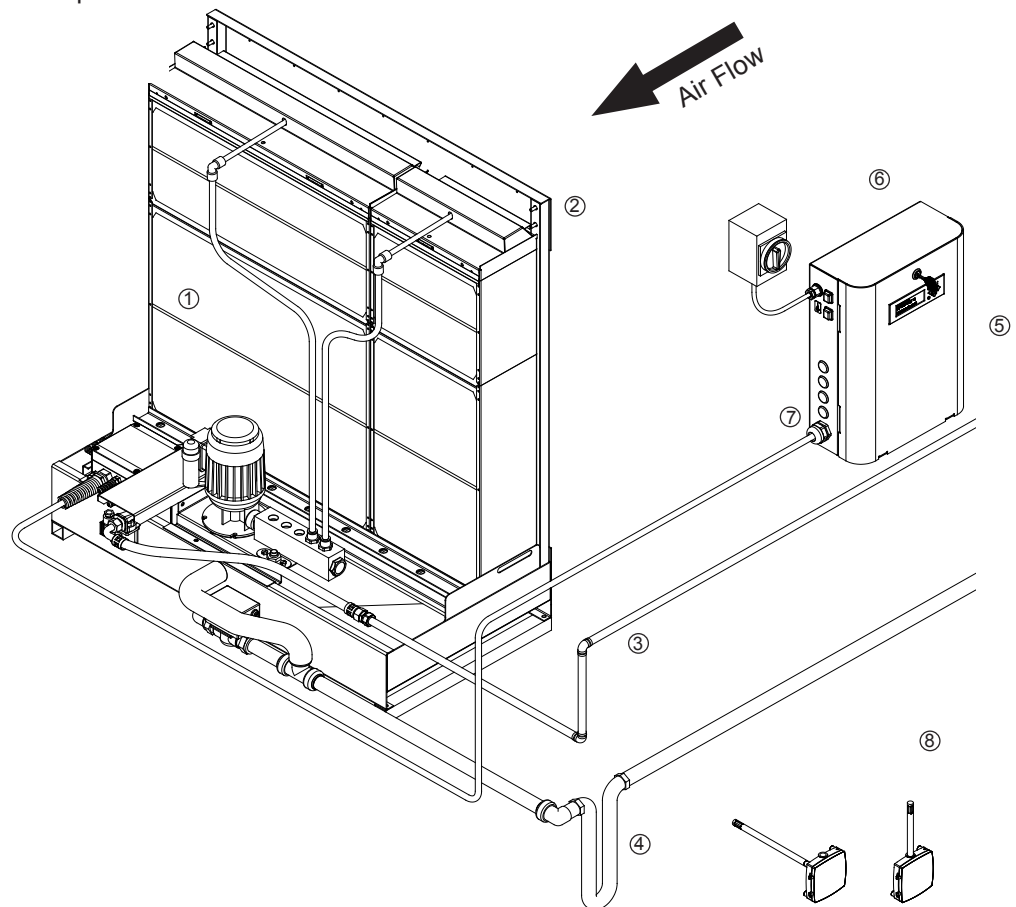
Please note that the management system is not supplied with the OEM Versions.

2.1 MC3 / MC3 Plus Installation Overview

Note: Your distributor offers an installation and commissioning service.

- Step 1 - Positioning the Evaporative Module
- Step 2 - Install blanking plates
- Step 3 - Connect feed water supply
- Step 4 - Install drain and overflow
- Step 5 - Position and mount Management System
- Step 6 - Connect power supply to Management System
- Step 7 - Connect Management System to Evaporative Module
- Step 8 - Connect Controls wiring
- Step 9 - Install the Leak Detection System (MC3 Plus Option)

Model shown HumEvap MC3



MC3 / MC3 Plus Installation Overview

Services available include:

- Site surveys.
- Turnkey packages.
- Contract management.
- Management of site health & safety.
- Risk management.
- Preparation of operation & maintenance documentation & drawings.
- Client demonstration and hand over.

In accordance with the Health & Safety at Work Act 1974 and subsidiary regulations, only trained operatives meeting the health and safety standards dictated by Construction Skills Certification Scheme (CSCS) are used on all contracts.

Condair plc are compliant with the government's "Contractors Health & Safety Assessment Scheme" (CHAS), and meet the requirements of "SAFE", the contractor accreditation scheme for business.

For further information, please contact your local areas sales manager or distributor.



2.2 Step 1 - Position the Evaporative Module

Installation should only take place after careful consideration of final position of the Evaporative module and management system and should be in accordance with AHU/duct-work installation diagram on page 28.

Always discuss the position of the HumEvap module with your distributor/engineer or representative!

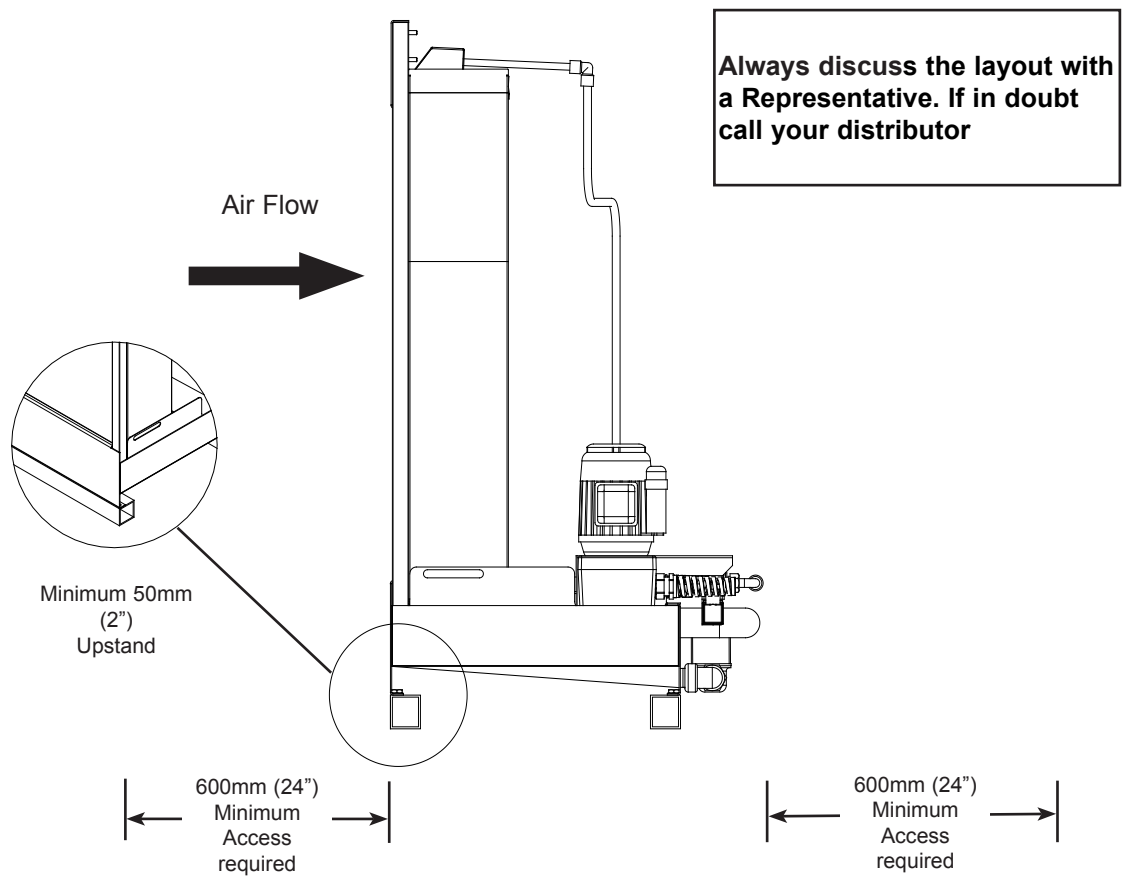


The HumEvap system must be installed within a waterproof AHU section.

The following points must be considered

1. The AHU / duct-work floor must be designed with a loading capacity capable of supporting the humidifier's weight when wet, as the largest unit will weigh 465kg (1025 lb) when in operation - see back of this manual for weights and measures.
2. A drain pan with provision for running water to waste should be installed within the humidification section to allow for wetting that might occur during installation, commissioning, operation or servicing. Where drain pans are required to drain under gravity, ensure that the drains are trapped and primed and have enough head to overcome the pressure of the system and for hygiene reasons completely drain down. On commissioning the system, drainage of the humidification section should be tested. The drain pan **MUST** drain fully and should be accessible for cleaning and disinfection as part of routine maintenance of the system.
3. The Module must be positioned on a minimum height 50 mm (2") up-stand or runners to allow for drain pipe-work installation and removal of the tank and cassettes through the side of the AHU if required.
4. Provisions should be made for the water inlet, drain pipe-work and interconnecting electrical cable to exit through the side of the AHU.
5. Side access through a door (preferably such that the cassettes may be pulled through for maintenance) should always be provided and a minimum of 600mm (24") access front and rear of system for inspection, commissioning and maintenance.
6. A perforated plate (60/40) should be installed upstream in cases where the air flow is uneven.

Step 1 - Position the Evaporative Module Cont.



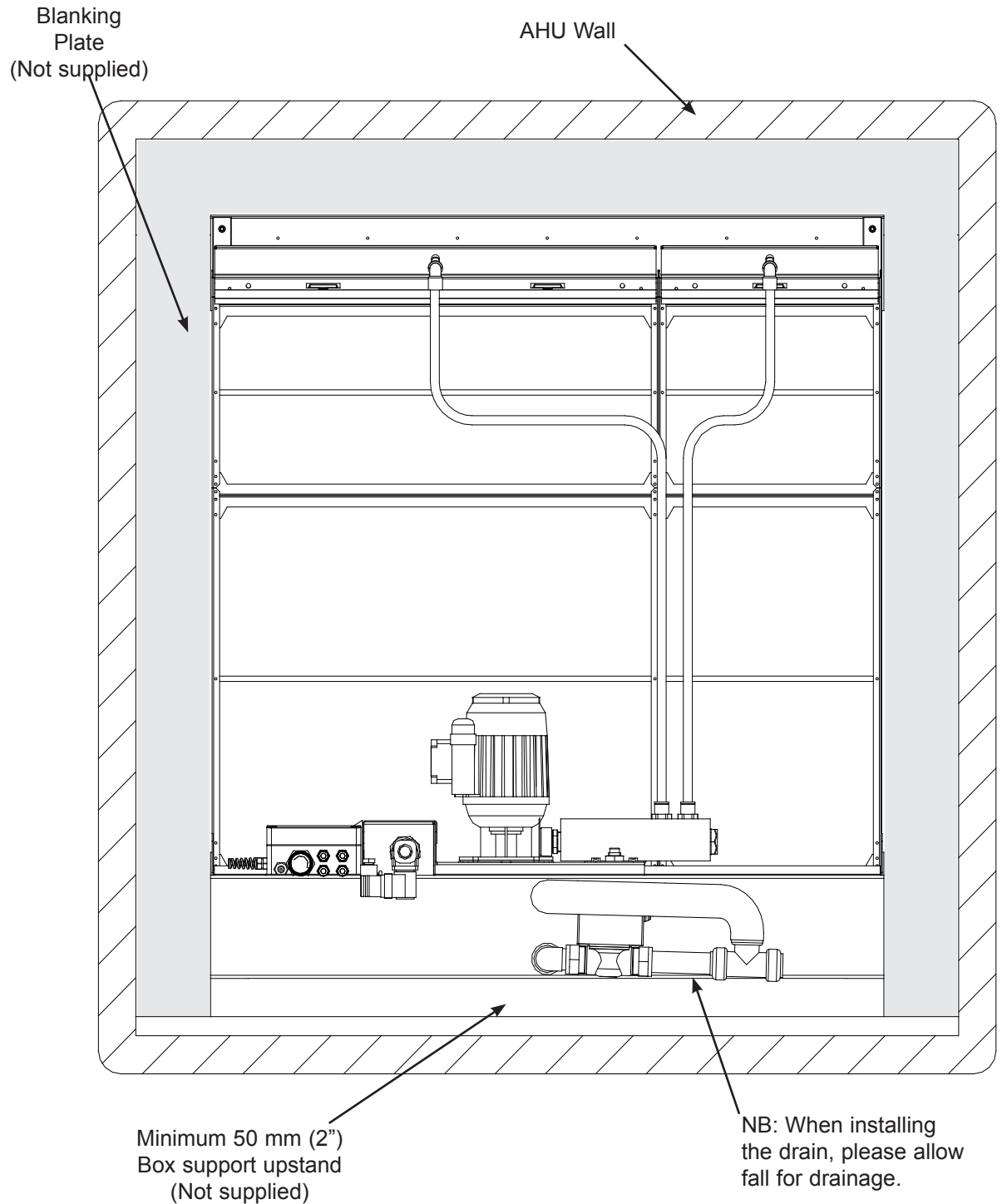
CAUTION:

Very important: Use a spirit level to make sure that the unit is level front to back and across the width when installed. Failure to observe this point could result in flooding of the AHU / duct.

2.3 Step 2 - Install Blanking Plates

Once the HumEvap Evaporative Module has been positioned in the waterproof section of air handling unit, non-corrosive blanking plates (not supplied) must be installed to prevent air bypass around the Module in the AHU.

Typical blanking plate arrangement shown below.

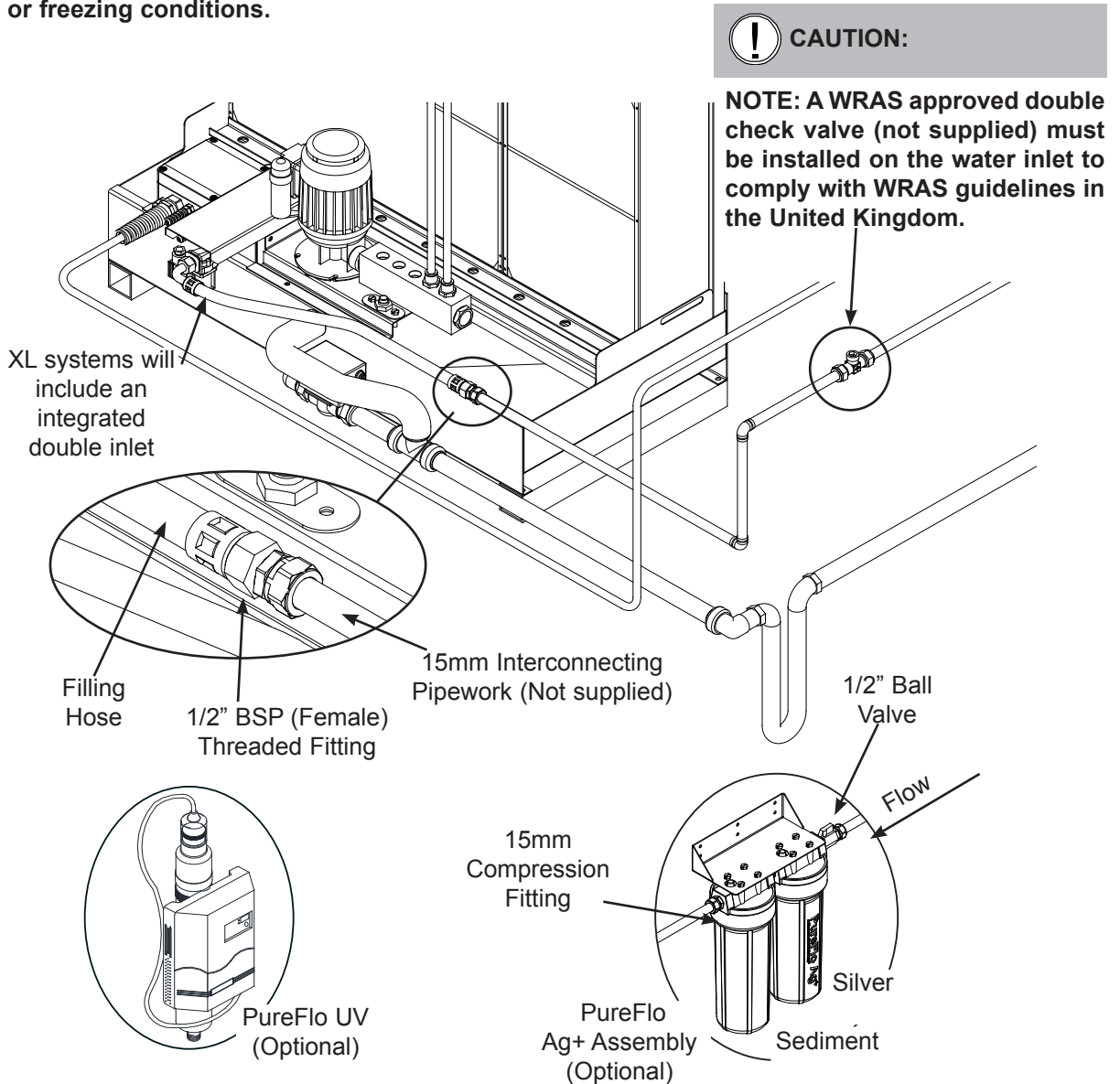


2.4 Step 3 - Connect Feed Water Supply

A feed water supply with a minimum flow of 14 litres (3.7 gallons) (28 litres (7.4 gallons) for XL) per minute at a pressure of 2 bar (29 psi) should be connected to the 1/2" BSP female threaded connection of the filling hose.

If installing the PureFlo Ag+ or PureFlo UV (in-line) system option, it should be positioned as close to the Evaporative Module inlet as possible. It is advisable to mount the PureFlo Ag+ or PureFlo UV (in-line) outside the AHU for ease of access.

Typically, 15mm interconnecting copper pipework will be used. **Not suitable for external mounting or freezing conditions.**



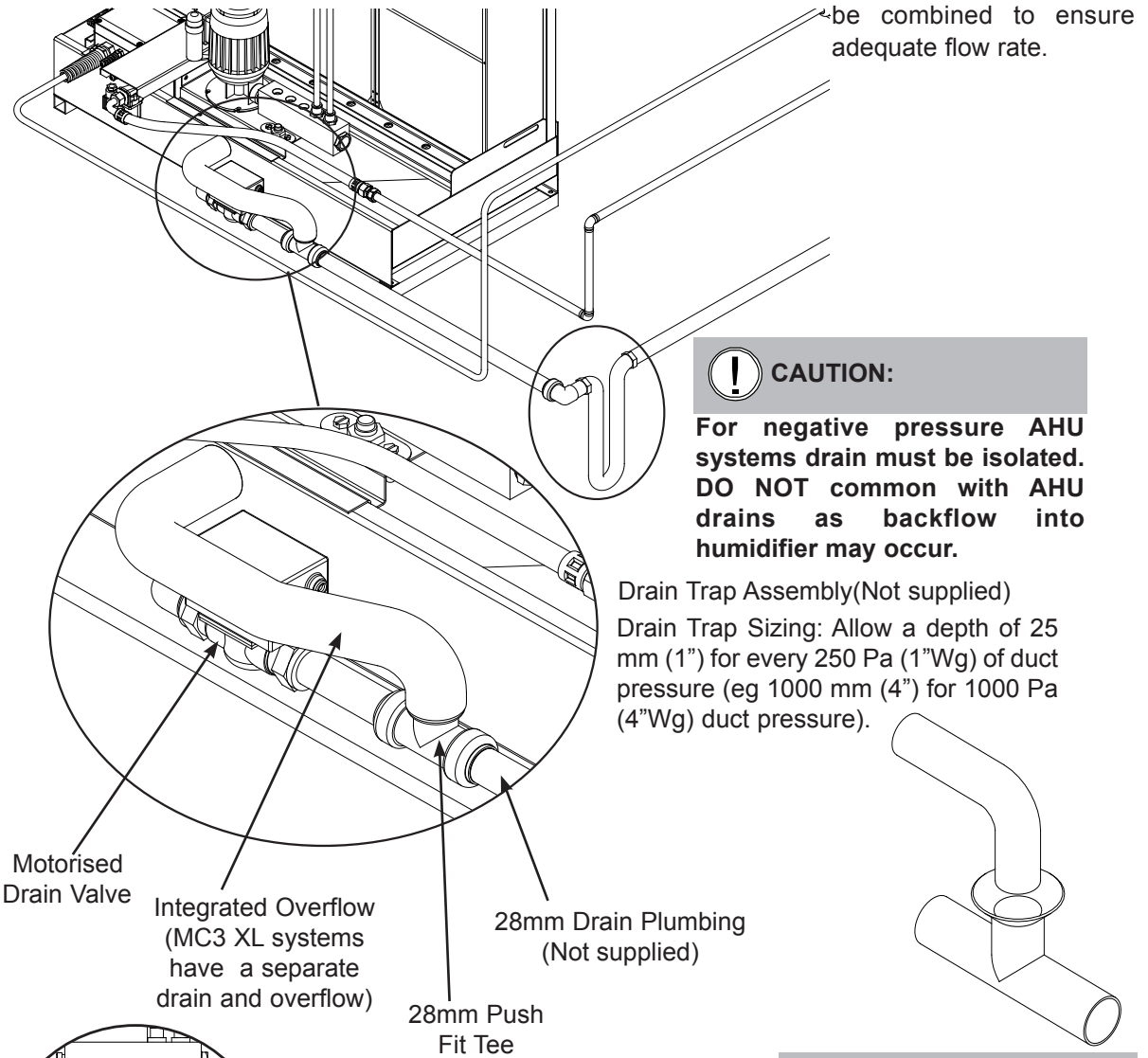
! CAUTION:

Where water quality exceeds 60ppm (ie. value is lower than 60), stainless steel pipework should be used.

2.5 Step 4 - Install Drain Pipework

The Evaporative Module features a gravity drain and overflow which must be connected to the main building drain with 28mm copper or stainless pipework. The normally open drain assembly can be reversed to face in the opposite direction to suit either left or right feed pipe-work. This drain assembly should be connected to the main building drain via the 28mm push fit connection (with an appropriate fall for gravity drain) and must be trapped to a suitable depth in accordance with the operating pressure of the AHU.

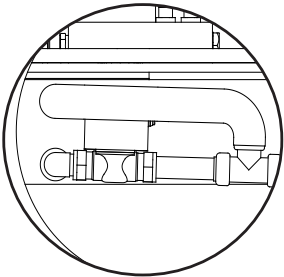
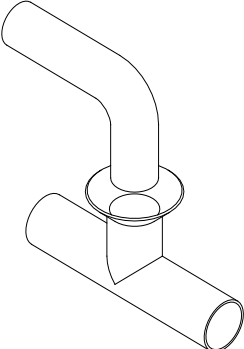
Please note: HumEvap XL Systems do not have a combined drain and overflow. The system is supplied with drain plumbing and a separate 42mm push fit elbow on the overflow. They should NOT



CAUTION:

For negative pressure AHU systems drain must be isolated. DO NOT common with AHU drains as backflow into humidifier may occur.

Drain Trap Assembly (Not supplied)
 Drain Trap Sizing: Allow a depth of 25 mm (1") for every 250 Pa (1"Wg) of duct pressure (eg 1000 mm (4") for 1000 Pa (4"Wg) duct pressure).



CAUTION:

When installing the drain, please allow an adequate fall for gravity drain.

CAUTION:

NOTE: The drain connection must be made via an air gap to comply with WRAS guidelines in the United Kingdom.

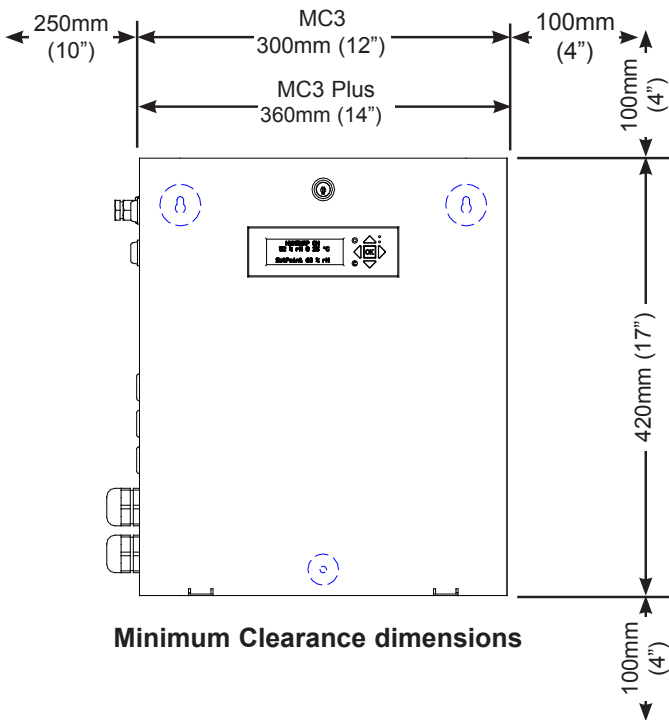
2.6 Step 5 - Position the Management System

The Management System should ideally be positioned as close to the Evaporative Module as possible for ease of servicing and maintenance. The management system is IP31 rated. Do not mount control panel where exposure to weather or moisture is possible.

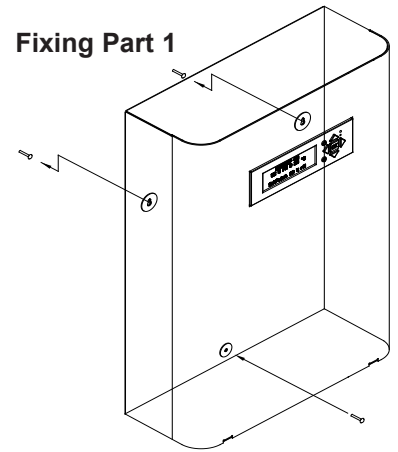
The Evaporative Module is supplied with one 10m (33') 12-core electrical inter-connecting cable for connection to the Management System (See Stage 5 Electrical Installation for details). The MC3 Plus management system has two 12-core electrical inter-connecting cables.

If it is necessary to extend this cable ensure it is no longer than 100 meters (328') and rated for 110V / 10A or 230V / 5A according to the rating shown on the CE label.

The HumEvap Management System must have an electrical power isolator (not supplied) fitted within 1m (39") for purposes of maintenance and emergencies.



Minimum Clearance dimensions



Fixing Part 2



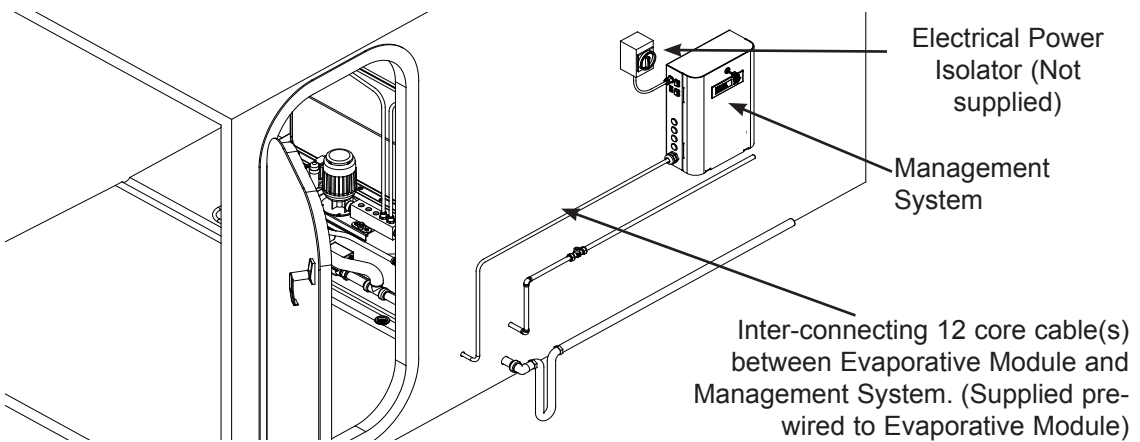
CAUTION:

Ambient Conditions:

Temperature 5-45°C

Humidity <85% rH

NB: Ensure that the HumEvap Management system is accessible for maintenance.



2.7 Step 6 - Connect Power Supply to Management System.



WARNING:

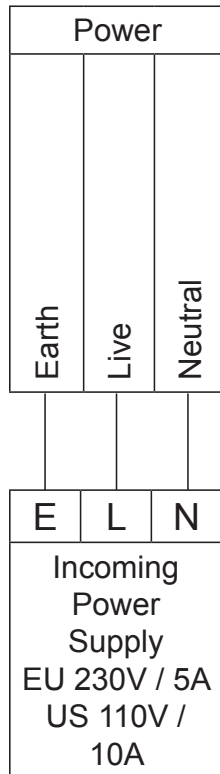
All work concerned with electrical installation **MUST** only be performed by skilled and qualified technical personnel. (e.g. electrician or technicians with appropriate training). The customer **MUST** be responsible for ensuring their suitability.

Please observe the local regulations concerning the provision of electrical installations.

Electrical Connections

An electrical power isolator (not supplied) must be fitted within 1m (39") of the HumEvap Management System. This is essential for the purposes of maintenance and emergencies.

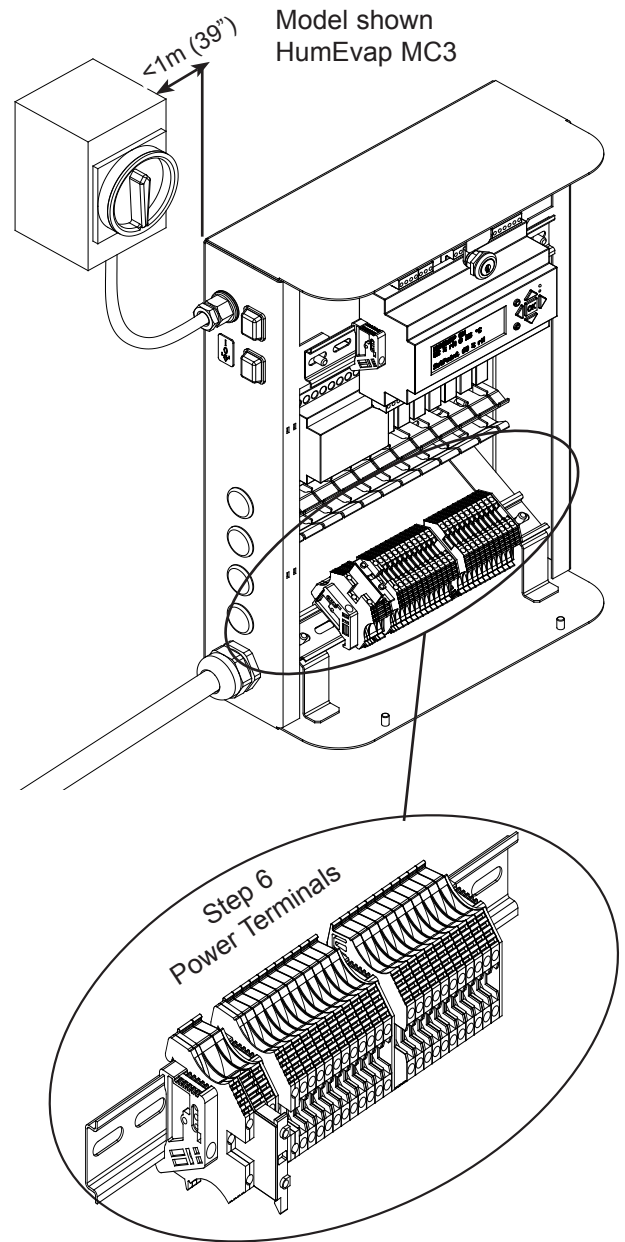
The electrical power cable to HumEvap Management System should be suitably rated for a 230V / 5 Amp in the EU or 110V / 10 Amp load in the US. Refer to label on HEMC3 Management System.



Terminals E, L and N

230Vac / 5A fused power supply - Europe
110Vac / 10A fused power supply - US

The power supply should be connected to the E, L and N terminals as shown.

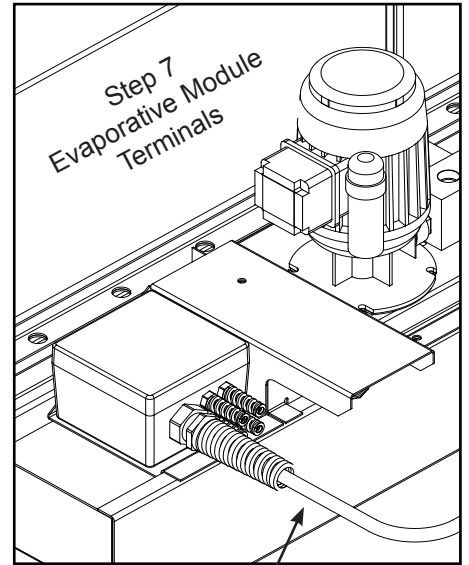
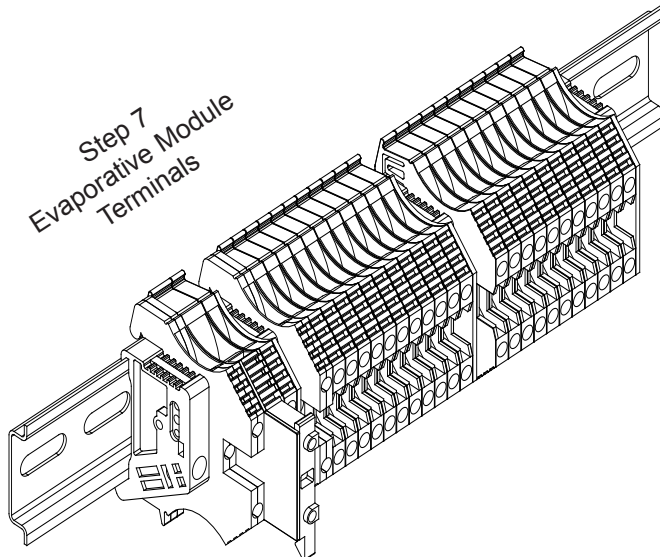


2.8 Step 7 - Connect HumEvap Module

HumEvap MC3

The evaporative module is connected to the HumEvap MC3 control panel by a 12 core flying lead which is supplied pre-wired to the evaporative module.

Once the evaporative module and HumEvap MC3 control panel are installed, the cable should be cut to a suitable length for installation and wired as shown. Each core is numbered and should be wired to the corresponding terminal number in the HumEvap MC3 control panel.



HumEvap Module											
Earth	Pump	Neutral	Water Inlet Valve	Drain Valve	Stage 2 Valve	Stage 3 Valve	Stage 4 Valve	+ 24 Vdc	Low Level Switch	High Level Switch	Spare
E	1	2	3	4	5	6	7	8	9	10	11
E	1	2	3	4	5	6	7	8	9	10	11
Connected to the corresponding numbers shown on the 12 core armoured flying lead from the Evaporative Module.											

Inter-connecting 12 core cable between Evaporative Module and Management System. (Supplied pre-wired to Evaporative Module)



WARNING:

Terminals E - 7 = Live Mains Voltage
Terminals 8 - 11 = Low Voltage (24Vdc)



WARNING:

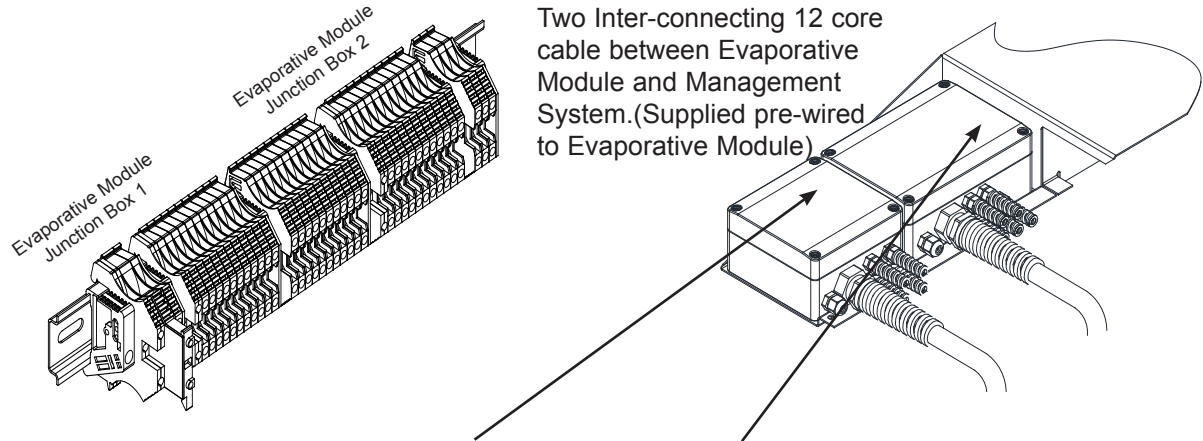
The HumEvap MC3 Panel and Evaporative Module contain live mains voltage and MUST be isolated before commencing installation and maintenance work.

Step 7 - Connect HumEvap Module Cont.

HumEvap MC3 Plus

The MC3 Plus evaporative module is connected to the HumEvap MC3 Plus control panel by two 12 core flying leads which are supplied pre-wired to the evaporative module.

The first evaporative cable should be installed as instructed on the previous page. The second 12 core flying lead (which is pre-wired to the larger junction box on the evaporative module) should also be wired to the corresponding terminal number in the HumEvap MC3 Plus control panel.



HumEvap Module Junction Box 1											
Earth	Pump	Neutral	Water Inlet Valve	Drain Valve	Stage 2 Solenoid Valve	Stage 3 Solenoid Valve	Stage 4 Solenoid Valve	+24 Vdc	Low Level Switch	High Level Switch	Spare
E	1	2	3	4	5	6	7	8	9	10	11
E	1	2	3	4	5	6	7	8	9	10	11

Connect to the corresponding numbers shown on the 12 core armoured flying lead from the Evaporative Module

HumEvap Module Junction Box 2											
Earth	Stage 5 Solenoid Valve	Neutral	Stage 6 Solenoid Valve	Stage 7 Solenoid Valve	Standing Water Sensor	Standing Water Sensor	Water Temperature Sensor	Water Temperature Sensor	Spare	Spare	Spare
E	1	2	3	4	5	6	7	8	9	10	11
E	1	2	3	4	5	6	7	8	9	10	11

Connect to the corresponding numbers shown on the 12 core armoured flying lead from the Evaporative Module



WARNING:

Terminals E - 7 = Live Mains Voltage
Terminals 8 - 11 = Low Voltage (24Vdc)

Terminals E - 4 = Live Mains Voltage
Terminals 5 - 11 = Low Voltage (24Vdc)

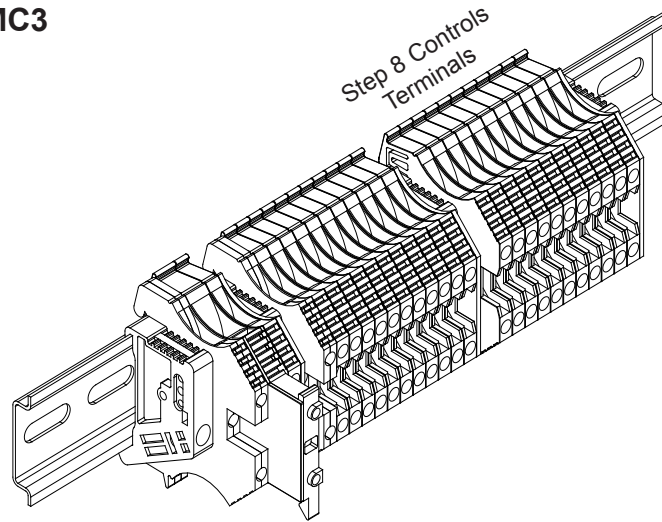


CAUTION:

Care should be taken to ensure the two cables are not wired the wrong way around!
The HumEvap MC3 Plus Panel and Evaporative Module contain live mains voltage and MUST be isolated before commencing installation and maintenance work.

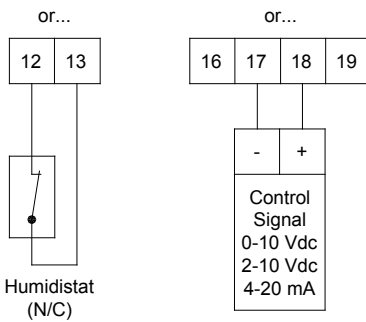
2.9 Step 8 - Connect HumEvap Controls

HumEvap MC3



Controls

Controls												
+ 24 Vdc	External Enable	+ 24 Vdc	Safety Interlock	+ 24 Vdc	0 Vdc	Analogue Input / rH	Analogue Input / Temp	Common Fault C	Common Fault N/C	Common Fault N/O		
12	13	14	15	16	17	18	19	20	21	22		
						+	-	rH	T	C	N/C	N/O
Factory supplied with a link		Factory supplied with a link		Connected to Humidity and Temperature Sensor				Volt Free Contact Common Fault				



WARNING:

The HumEvap MC3 Panel and Evaporative Module contain live mains voltage and be isolated before commencing installation and maintenance work.

Step 8 - Connect HumEvap Controls

HumEvap MC3

Controls Wiring

Interlocks are connected to terminals 12-15 and provide a method of switching the unit on or off, or overriding the normal operation of the HumEvap.

The interlocks are supplied pre-wired with a link as standard.

Thermostat/Humidistat Wiring:

When a stat is used, it should be wired to terminals 12 & 13.

If a control stat (N/C) and high-limit stat (N/C) are required, they would be wired in series onto 12 & 13 and the unit will switch off in the event that either contact is open.

Safety Interlock:

If fault indication is required on the microprocessor, for example where the connection is an interlock for a water treatment product such as an Ultra-Violet (UV) Steriliser, terminals 14 & 15 should be used. If the contact is opened, the unit will not operate and a fault will be indicated.

Sensor / External Signal:

Terminals 16-19 are used to power a sensor and provide the HumEvap MC3 with temperature and humidity readings. If an external signal (i.e. from a BMS) is to be used, it should be wired onto terminals 17 & 18 as shown.

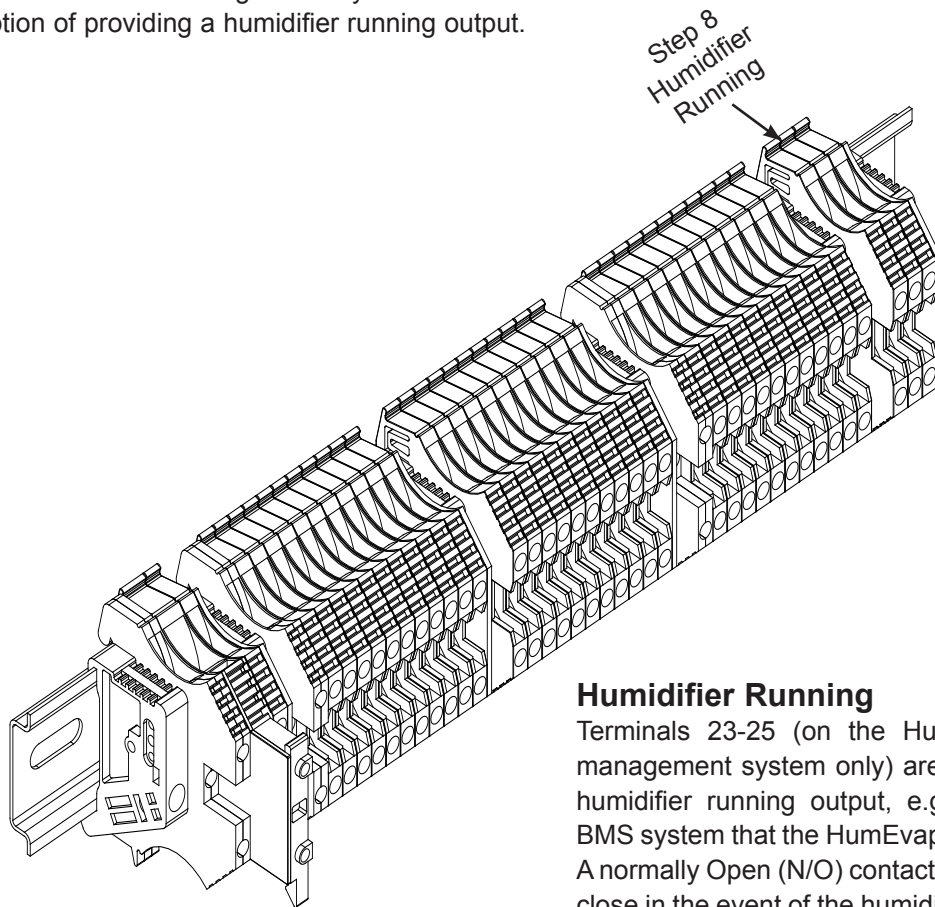
Common Fault Contact:

Terminals 20-22 are used to provide a common fault output, e.g. to indicate to a BMS system that there is a fault preventing the system from operating correctly. A Normally Open (N/O) contact, i.e. one which will close in the event of a fault, or Normally Closed (N/C) contact, i.e. one which will open in the event of a fault, is available as required by wiring to the appropriate terminals. The HumEvap MC3 control panel has the following fault modes: Safety Interlock Open, Water Inlet Alarm, High Water Level, Service Due and PureFlo Ag+ Cartridge Replacement Due. An explanation of each fault mode can be found in the "HumEvap - Alarms and Fault Modes" section of this manual.

Step 8 - Connect HumEvap Controls

MC3 Plus

The MC3 Plus Management system has the option of providing a humidifier running output.



HumEvap Module		
Humidifier Running C	Humidifier Not Running N/C	Humidifier Not Running N/O
23	24	25
C	N/C	N/O
Volt Free Contact Humidifier Running		

Humidifier Running

Terminals 23-25 (on the HumEvap MC3 Plus management system only) are used to provide a humidifier running output, e.g. to indicate to a BMS system that the HumEvap system is running. A normally Open (N/O) contact, (i.e. one which will close in the event of the humidifier not running), or Normally Closed (N/C) contact (one which will open in the event of the humidifier not running), is available as required by wiring to the appropriate terminals.



WARNING:

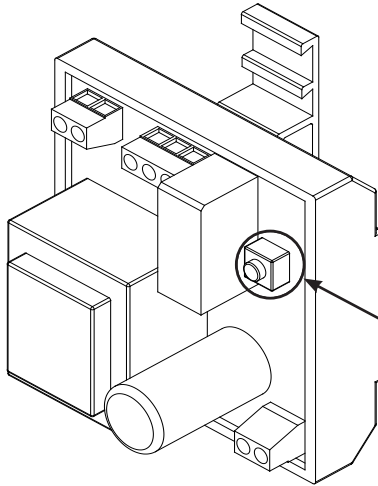
The HumEvap MC3 Plus Panel and Evaporative Module contain live mains voltage and be isolated before commencing installation and maintenance work.

2.10 Step 9 - Install the Leak Detection System

(Option available on MC3 Plus System only)

The MC3 Plus Management system has the option of a leak detection system, which will raise an alarm if water is detected on the AHU floor. The Detector wire is fixed into a protective case and a rubber gasket seals the underside. The case should be fixed to the AHU floor (using the screw supplied) near the HumEvap drain.

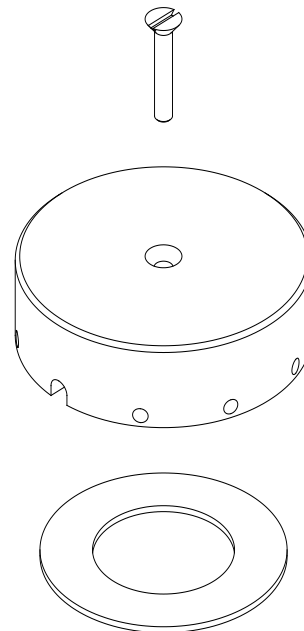
2.9



If a leak is detected an alarm will sound and 'Leak Detected' will be displayed on the microprocessor display.

Once the leak has been resolved, the protective case should be removed from the AHU floor, and the detector wire dried. Once dry, reassemble the detector.

Reset the alarm by pressing the reset button on the leak detector's PCB, which is mounted within the management system.

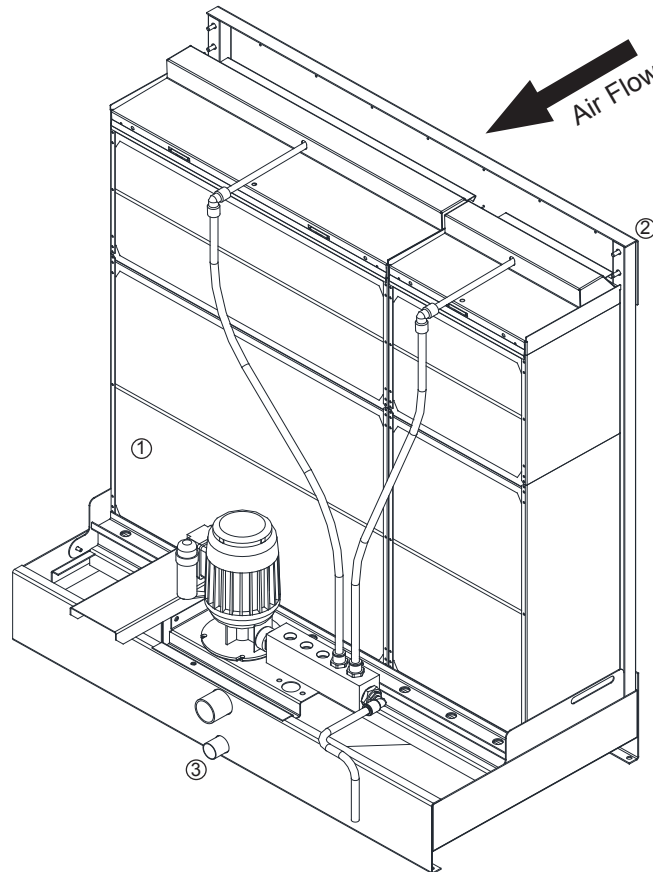


3.0 HumEvap OEM Circulating Installation Overview

Note: Your distributor offers an installation and commissioning service.

- Step 1 - Positioning the Evaporative Module
- Step 2 - Install blanking plates
- Step 3 - Connect feed water supply
- Step 4 - Install drain and overflow

Model shown HumEvap OEM Circulating



WARNING:

The HumEvap ‘OEM Circulating’ versions, unlike the HumEvap MC3, do NOT incorporate, as standard, methods to control the growth of micro-organisms (including the bacterium which causes Legionnaire’s disease). When designing or installing an air handling system that incorporates an ‘OEM HumEvap’, appropriate micro-organisms and microbial control methods **MUST** be considered and this should only be undertaken by suitably qualified persons. A risk assessment **MUST** also be undertaken in relation to control of micro-organisms and microbial growth, especially Legionnaires disease. If in doubt and for further information, contact your distributor.

3.1 Step 1 - Position the Evaporative Module

Step 1 - Position the Evaporative Module

Installation should only take place after careful consideration of final position of the Evaporative module and management system and should be in accordance with AHU/duct-work installation diagram below.



Always discuss the position of the HumEvap module with your engineer or representative!

The following points must be considered

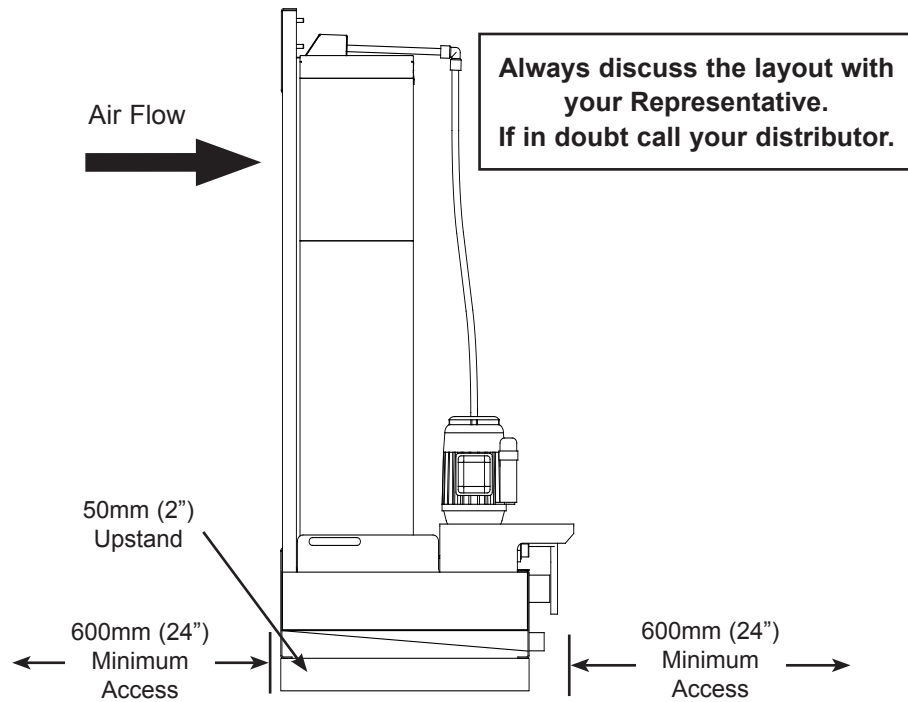
1. The AHU / duct-work floor must be designed with a loading capacity capable of supporting the humidifier's weight when wet, as the largest unit will weigh 461kg (1016 lb) when in operation - see back of this manual for weights and measures.



2. The HumEvap system must be installed within a waterproof AHU section. A drain pan with provision for running water to waste should be installed within the humidification section to allow for wetting that might occur during installation, commissioning, operation or servicing. Where drain pans are required to drain under gravity, ensure that the drains are trapped and primed and have enough head to overcome the pressure of the system and for hygiene reasons completely drain down. On commissioning the system, drainage of the humidification section should be tested. The drain pan **MUST** drain fully and should be accessible for cleaning and disinfection as part of routine maintenance of the system.

3. The Module must be positioned on a minimum height 50 mm (2") up-stand or runners to allow for drain pipe-work installation and removal of the tank and cassettes through the side of the AHU if required.
4. Provisions should be made for the water inlet, drain pipe-work and interconnecting electrical cable to exit through the side of the AHU.
5. Side access through a door (preferably such that the cassettes may be pulled through for maintenance) should always be provided and a minimum of 600mm (24") access front and rear of system for inspection, commissioning and maintenance.
6. A perforated plate (60/40) should be installed upstream in cases where the air flow is uneven.

Step 1 - Position the Evaporative Module Cont.



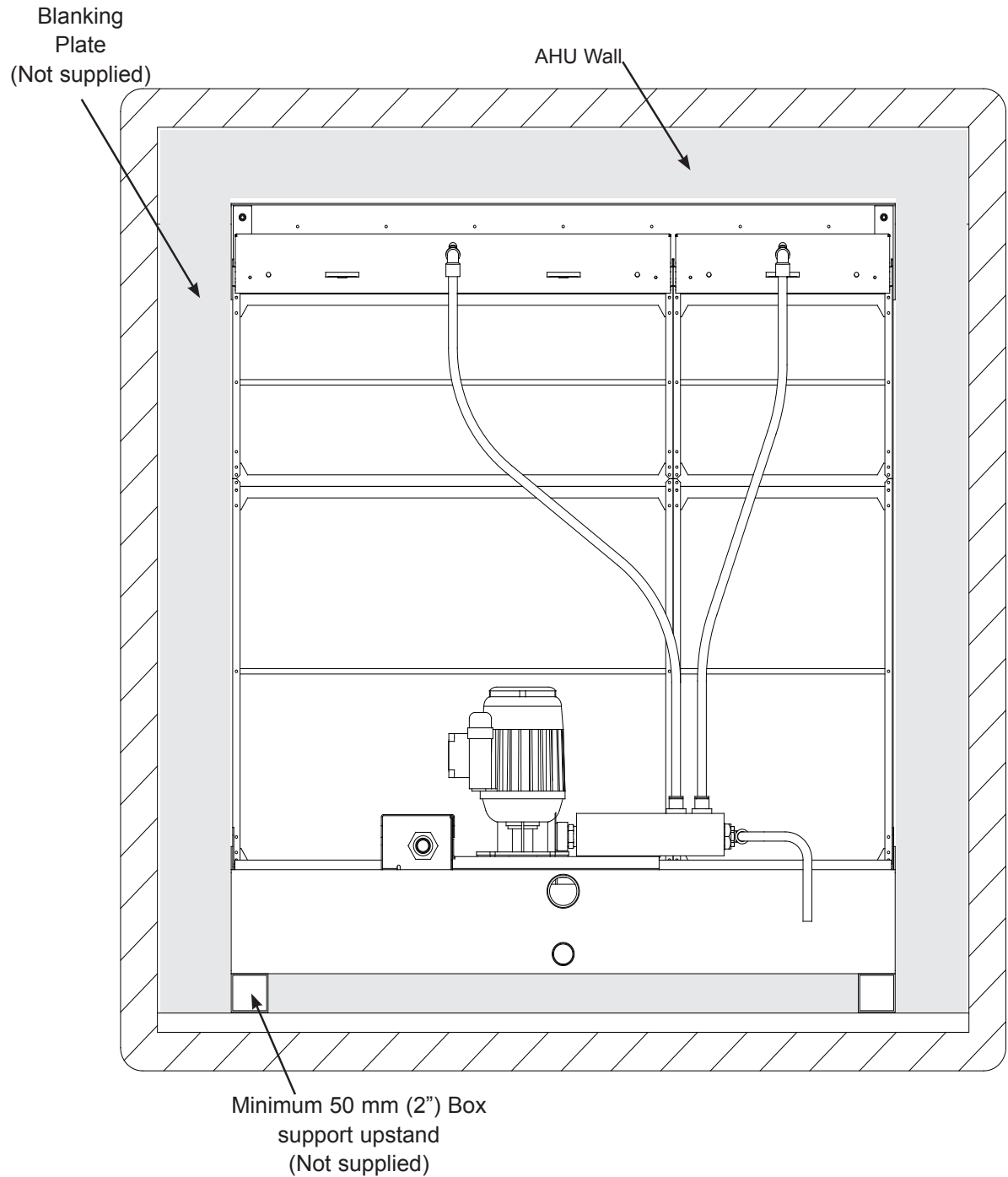
CAUTION:

Very important: Use a spirit level to make sure that the unit is level front to back and across the width when installed. Failure to observe this point could result in flooding of the AHU / duct.

3.2 Step 2 - Install Blanking Plates

Once the HumEvap Evaporative Module has been positioned in the waterproof section of air handling unit, non-corrosive blanking plates (not supplied) must be installed to prevent air bypass around the Module in the AHU.

Typical blanking plate arrangement shown below.



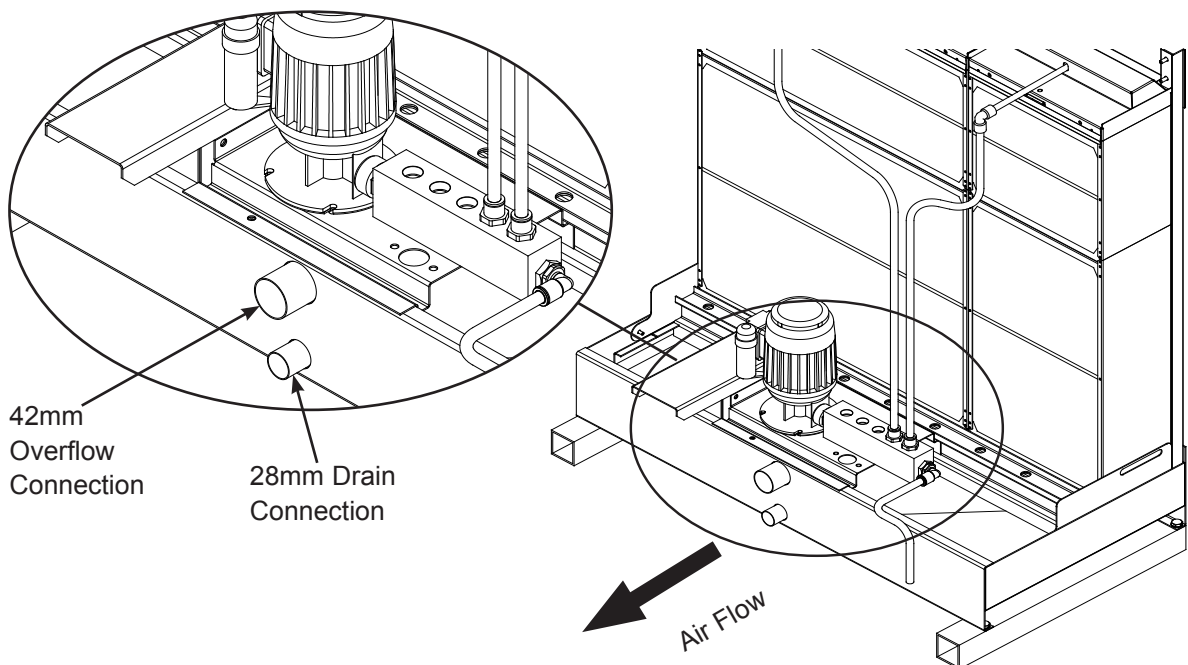
3.3 Step 3 - Connect Feed Water Supply

A feed water supply with a minimum flow of 14 litres (3.7 gallons) (28 litres (7.4 gallons) for XL) per minute at a pressure of 2 bar (29 psi) should be connected to the 1/2" BSP female threaded connection of the filling hose.

If installing the PureFlo Ag+ or PureFlo UV (in-line) system option, it should be positioned as close to the Evaporative Module inlet as possible. It is advisable to mount the PureFlo Ag+ or PureFlo UV (in-line) outside the AHU for ease of access.

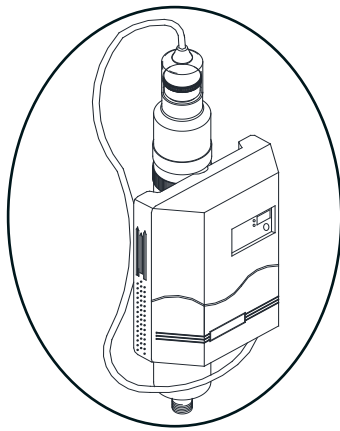
Typically, 15mm interconnecting copper pipework will be used. **Not suitable for external mounting or freezing conditions.**

Feed Water Supply Connections - A feedwater supply with a minimum flow of 14 litres (31lb) per minute as a pressure of 2 bar (29 psi) should be connected to the Evaporative Module via the float valve.



Step 3 - Connect Feed Water Supply Cont.

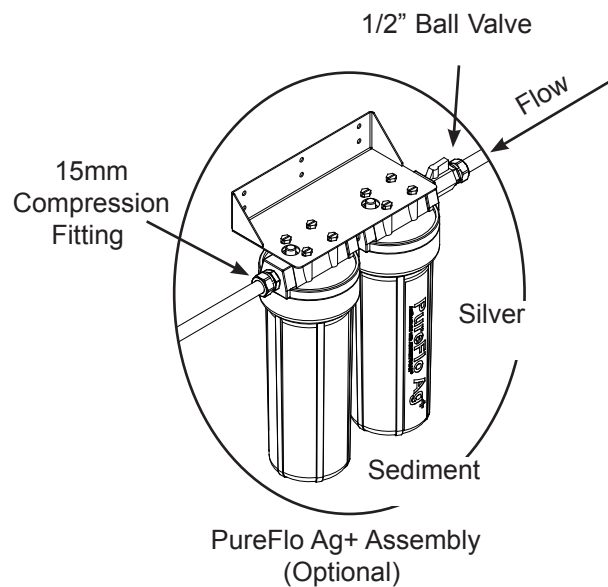
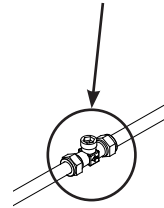
Drain Connection - The Evaporative Module drain and overflow should be connected to the main building drain. The drain must be trapped to prevent back siphonage. 50 mm (2") upstands must be fitted to improve gravity drain as shown in the picture above.



PureFlo UV
(Optional)

! CAUTION:

NOTE: A WRAS approved double check valve (not supplied) must be installed on the water inlet to comply with WRAS guidelines in the United Kingdom.



PureFlo Ag+ Assembly
(Optional)

! CAUTION:


Where water quality exceeds 60ppm (ie. value is lower than 60), stainless steel pipework should be used.

3.4 Step 4 - Install Drain Pipework

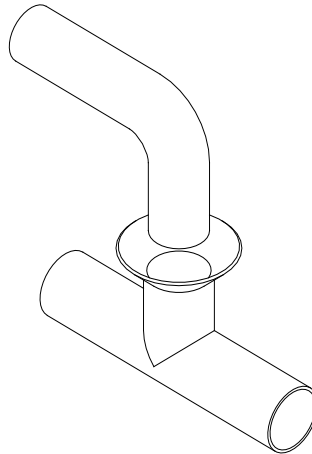
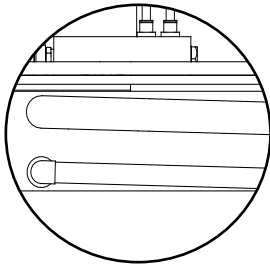
The Evaporative Module features a gravity drain and overflow which must be connected to the main building drain with 28mm copper or stainless pipework. The normally open drain assembly can be reversed to face in the opposite direction to suit either left or right feed pipe-work. This drain assembly should be connected to the main building drain via the 28mm push fit connection (with an appropriate fall for gravity drain) and must be trapped to a suitable depth in accordance with the operating pressure of the AHU.


Please note: HumEvap XL Systems do not have a combined drain and overflow. The system is supplied with drain plumbing and a separate 32mm push fit elbow on the overflow. They should NOT be combined to ensure adequate flow rate.

Drain Installation

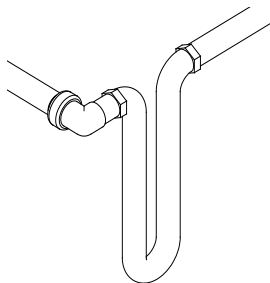
 **CAUTION:**

When installing the drain, please allow an adequate fall for gravity drain.



 **CAUTION:**

NOTE: The drain connection must be made via an air gap to comply with WRAS guidelines in the United Kingdom.



Drain Trap Assembly
(Not supplied)

Drain Trap

For negative pressure AHU systems drain must be isolated. DO NOT common with AHU drains as backflow into humidifier may occur.

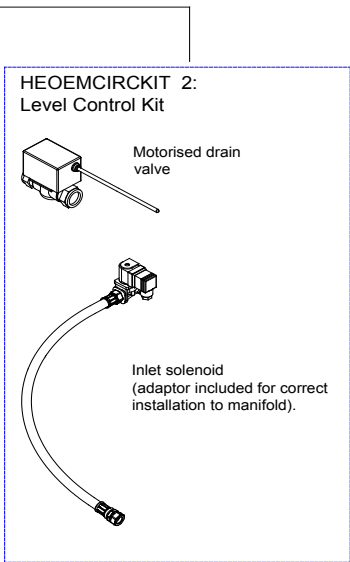
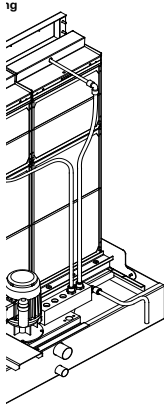
Drain Trap Sizing: Allow a depth of 25 mm (1") for every 250 Pa (1"Wg) of duct pressure (eg 1000 mm (4") for 1000 Pa (4"Wg) duct pressure).

3.5 HumEvap OEM Circulating - Requirements

To ensure hygiene of the HumEvap OEM Circulating Humidifier and to comply with WRAS and VDI standards, the following requirements should be met:

1. A double check valve (DCV) must be fitted on the mains water inlet in the UK, to protect contamination of the mains water supply in accordance with WRAS guidelines.
2. The drain plumbing connections must be made via an air gap in accordance with local regulations to prevent back siphonage into the system. The air gap will allow the user to check that water is running to drain.
3. There must be a means of preventing the tank staying full of water during periods of non-operation of more than 24 hours. This will prevent water stagnation and reduce the risk of legionella.
4. The bleed off must be connected to the drain. This will allow a percentage of the water in the system to pass to drain thus preventing excessive mineral build up in the system.
5. A float switch should be fitted to shut off the fill solenoid in the event of overflow.
6. A float switch should be fitted to prevent the pump from running if the tank is empty.
7. A water inlet valve should be fitted to shut off the water supply whenever the system is not required.
8. There must be a method of ensuring that an rH of 90% is not exceeded.
9. A Motorised normally open drain must be fitted to ensure flow shut off in the event of maintenance or AHU failure.
10. A suitable hygiene system should be used to maintain the cleanliness of the HumEvap OEM Circulating. Your distributor offers a number of options, please contact them, if required.

3.6 HumEvap OEM Circulating Product Options



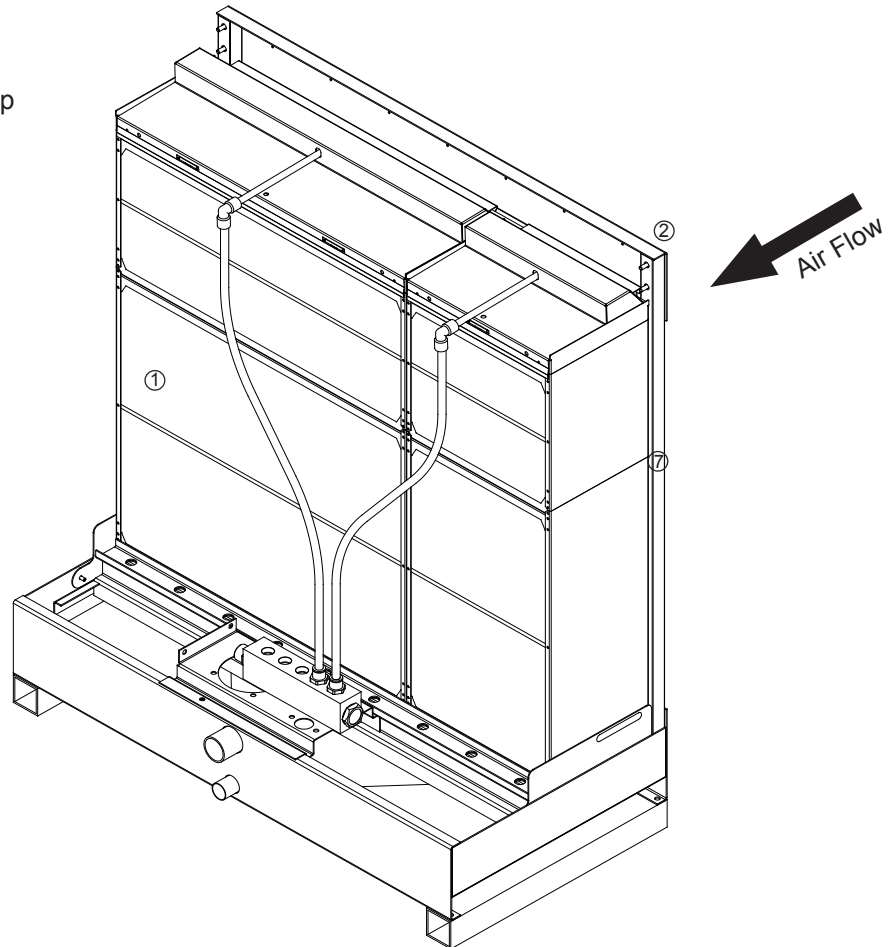
4.0

HumEvap OEM Direct Feed Installation Overview

- Step 1 - Positioning the Evaporative Module
- Step 2 - Install blanking plates
- Step 3 - Connect feed water supply
- Step 4 - Install drain and overflow

Note: Your distributor offers an installation and commissioning service.

Model shown HumEvap
OEM Direct Feed



WARNING:

The HumEvap 'OEM Circulating' versions, unlike the HumEvap MC3, do NOT incorporate, as standard, methods to control the growth of micro-organisms (including the bacterium which causes Legionnaire's disease). When designing or installing an air handling system that incorporates an 'OEM HumEvap', appropriate micro-organisms and microbial control methods **MUST** be considered and this should only be undertaken by suitably qualified persons. A risk assessment **MUST** also be undertaken in relation to control of micro-organisms and microbial growth, especially Legionnaires disease. If in doubt and for further information, contact your distributor.

4.1 Step 1 - Position the Evaporative Module

Step 1 - Position the Evaporative Module

Installation should only take place after careful consideration of final position of the Evaporative module and management system and should be in accordance with AHU/duct-work installation diagram below.



Always discuss the position of the HumEvap module with your engineer or representative!

The following points must be considered

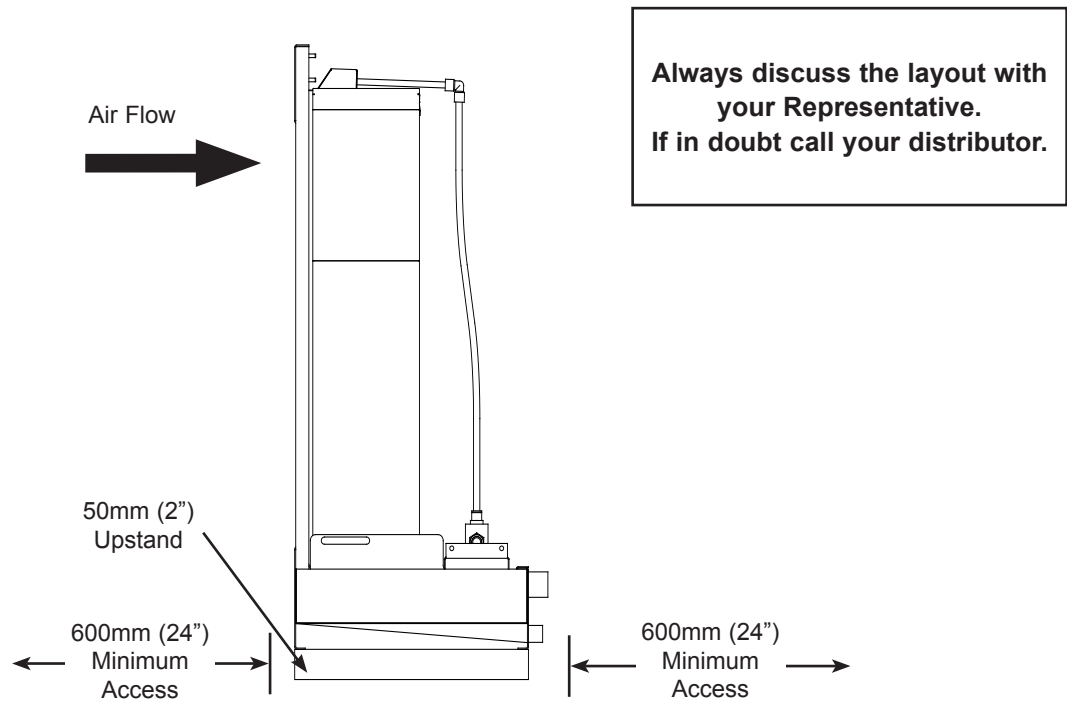
1. The AHU / duct-work floor must be designed with a loading capacity capable of supporting the humidifier's weight when wet, as the largest unit will weigh 461kg (1016 lb) when in operation - see back of this manual for weights and measures.



2. The HumEvap system must be installed within a waterproof AHU section. A drain pan with provision for running water to waste should be installed within the humidification section to allow for wetting that might occur during installation, commissioning, operation or servicing. Where drain pans are required to drain under gravity, ensure that the drains are trapped and primed and have enough head to overcome the pressure of the system and for hygiene reasons completely drain down. On commissioning the system, drainage of the humidification section should be tested. The drain pan **MUST** drain fully and should be accessible for cleaning and disinfection as part of routine maintenance of the system.

3. The Module must be positioned on a minimum height 50 mm (2") up-stand or runners to allow for drain pipe-work installation and removal of the tank and cassettes through the side of the AHU if required.
4. Provisions should be made for the water inlet, drain pipe-work and interconnecting electrical cable to exit through the side of the AHU.
5. Side access through a door (preferably such that the cassettes may be pulled through for maintenance) should always be provided and a minimum of 600mm (24") access front and rear of system for inspection, commissioning and maintenance.
6. A perforated plate (60/40) should be installed upstream in cases where the air flow is uneven.

Step 1 - Position the Evaporative Module Contd



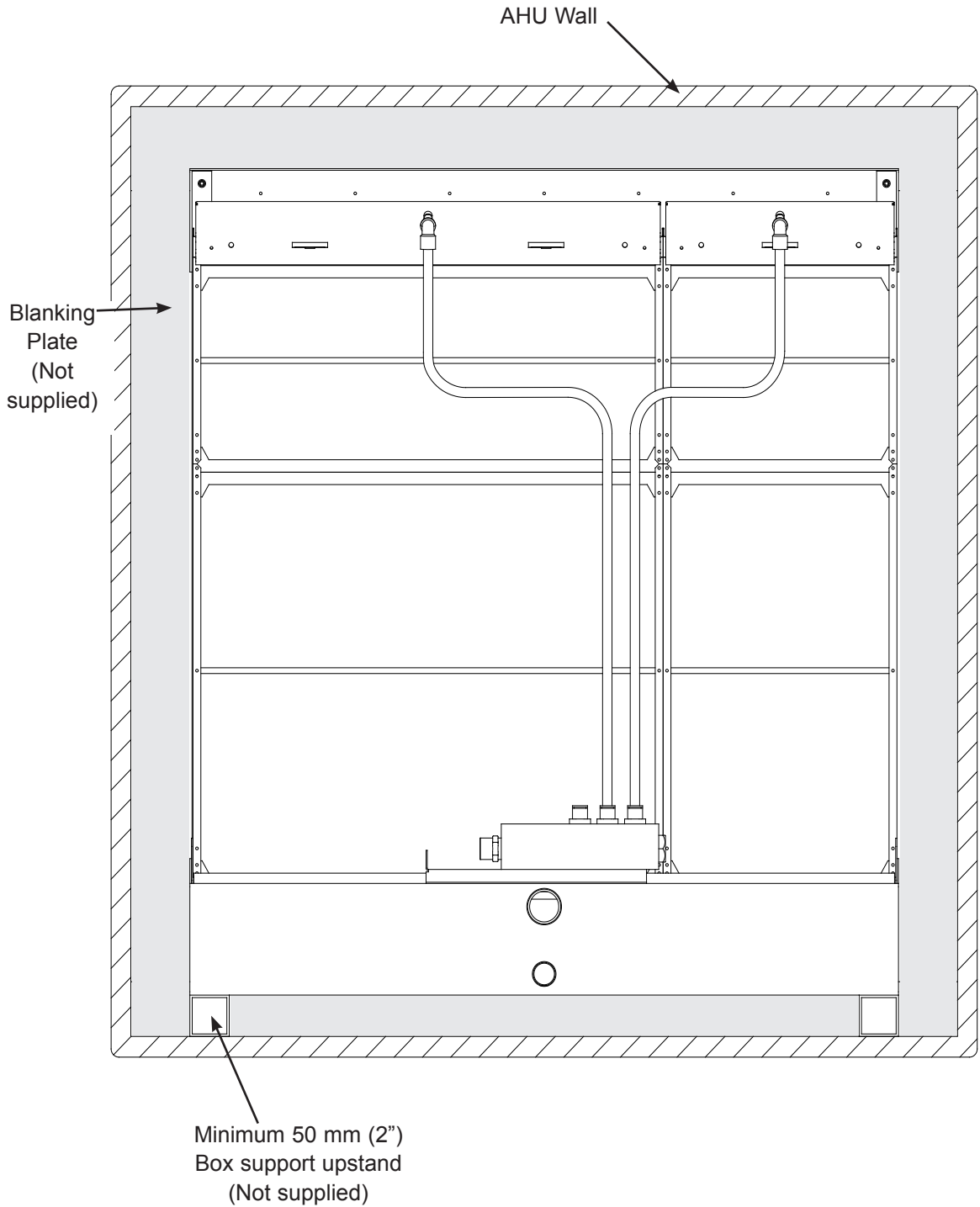
CAUTION:

Very important: Use a spirit level to make sure that the unit is level front to back and across the width when installed. Failure to observe this point could result in flooding of the AHU / duct.

4.2 Step 2 - Install Blanking Plates

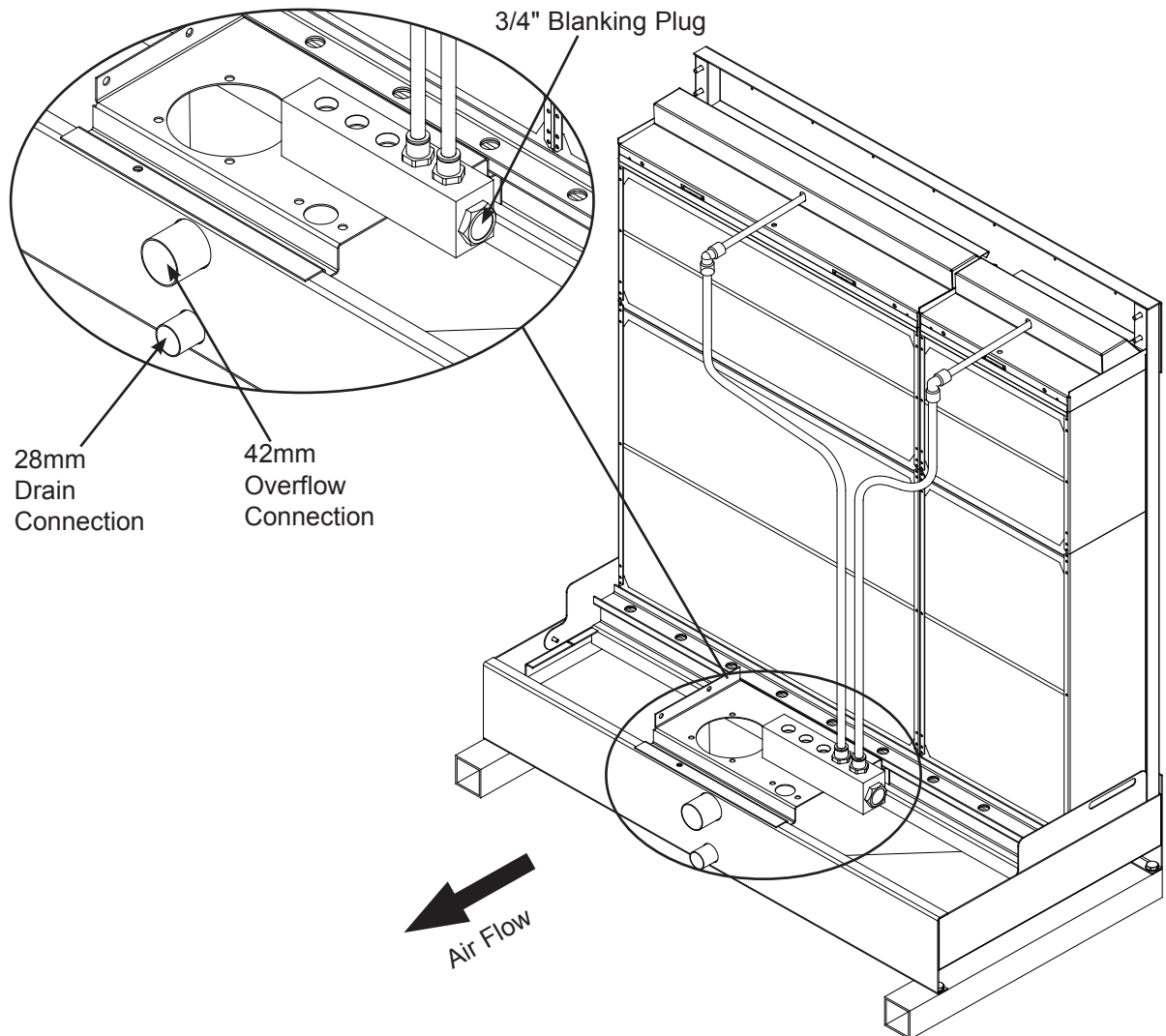
Once the HumEvap Evaporative Module has been positioned in the waterproof section of air handling unit, non-corrosive blanking plates (not supplied) must be installed to prevent air bypass around the Module in the AHU.

Typical blanking plate arrangement shown below.



4.3 Step 3 - Connect the Feed Water Supply

Feed Water Supply Connections - A feedwater supply with a minimum pressure of 2 (29 psi) bar should be connected to the 15mm spigot.



Drain Connection - The Evaporative Module drain and overflow should be connected to the main building drain. The drain must be trapped to prevent back siphonage. 50 mm (2") upstands must be fitted to improve gravity drain as shown in the picture above.

 **WARNING:**

The HumEvap 'OEM Direct Feed' versions, unlike the HumEvap MC3, do NOT incorporate, as standard, methods to control the growth of micro-organisms (including the bacterium which causes Legionnaire's disease). When designing or installing an air handling system that incorporates an 'OEM HumEvap', appropriate micro-organisms and microbial control methods MUST be considered and this should only be undertaken by suitably qualified persons. A risk assessment MUST also be undertaken in relation to control of micro-organisms and microbial growth, especially Legionnaires disease. If in doubt and for further information, contact your distributor.

4.4 Step 4 - Install Drain Pipework

The Evaporative Module features a gravity drain and overflow which must be connected to the main building drain with 28mm copper or stainless pipework. The normally open drain assembly can be reversed to face in the opposite direction to suit either left or right feed pipe-work. This drain assembly should be connected to the main building drain via the 28mm push fit connection (with an appropriate fall for gravity drain) and must be trapped to a suitable depth in accordance with the operating pressure of the AHU.

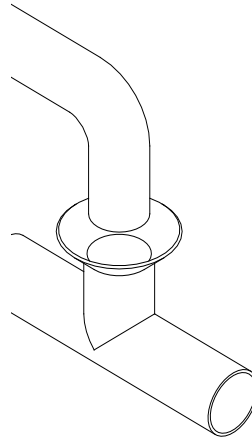
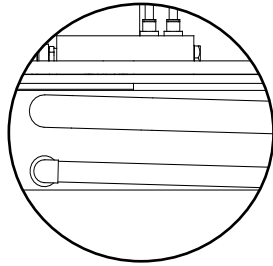
Please note: HumEvap XL Systems do not have a combined drain and overflow. The system is supplied with drain plumbing and a separate 32mm push fit elbow on the overflow. They should NOT be combined to ensure adequate flow rate.

Drain Installation



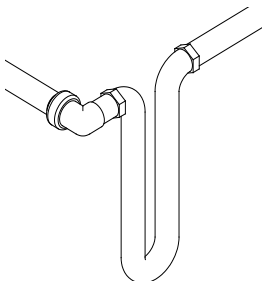
CAUTION:

When installing the drain, please allow an adequate fall for gravity drain.



CAUTION:

NOTE: The drain connection must be made via an air gap to comply with WRAS guidelines in the United Kingdom.



Drain Trap Assembly
(Not supplied)

Drain Trap

For negative pressure AHU systems drain must be isolated. DO NOT common with AHU drains as backflow into humidifier may occur.

Drain Trap Sizing: Allow a depth of 25 mm (1") for every 250 Pa (1"Wg) of duct pressure (eg 1000 mm (4") for 1000 Pa (4"Wg) duct pressure).

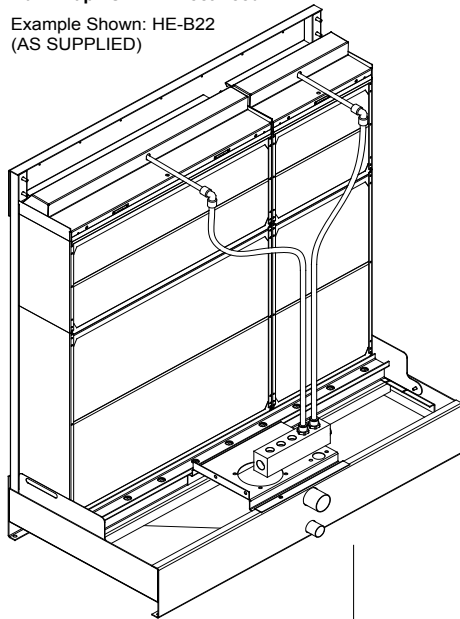
4.5 HumEvap OEM Direct Feed - Requirements

To ensure good hygiene of the HumEvap OEM Direct Feed Humidifier and to comply with WRAS and VDI standards, the following requirements should be met:

1. A double check valve (DCV) must be fitted on the mains water inlet, to protect contamination of the mains water supply.
2. The drain plumbing connections must be made via an air gap in accordance with local regulations to prevent back siphonage into the system. The air gap will allow the user to check that water is running to drain.
3. A means of automatically shutting off the water supply in the event of a drain blockage.
4. A water inlet valve should be fitted to shut off the water supply whenever the system is not required.
5. There must be a method of ensuring that an rH of 90% is not exceeded.

4.6 HumEvap OEM Direct Feed Product Options

HumEvap "OEM" Direct Feed
 Example Shown: HE-B22
 (AS SUPPLIED)



**HEOEMDIRECTKIT 1:
 Drain Kit**

28mm push fit drain assembly

Overflow hose

Jubilee clips x 2

**HEOEMDIRECTKIT 2:
 Inlet Valve Kit**

Inlet solenoid (adaptor included for correct installation to manifold).

As Assembled:

**HEOEMDIRECTKIT 3:
 Automatic Drain Kit**

1 x Drain Solenoid (adaptors included for correct installation to manifold).
 1 x 12mm Hose (250mm)

As Assembled:

5.0 Commissioning (MC3/Plus)



WARNING:

The commissioning of the HumEvap humidifier requires appropriately trained technical personnel. It is strongly recommended that your distributor commissions your system.

Please pay attention to local regulations regarding working at heights and electrical work. Part of this commissioning process is a disinfection of water tank and matrix. Please read this document in full before commencing any work.

Pre-Commissioning Checklist

Warning! This humidifier must be installed, operated and maintained in accordance with this manual. Failure to do so could result in contamination that might cause Legionnaires' disease, which can be fatal.

Complete the following checklist before commencing commissioning:

- 1. Switch off AHU.**
- 2. Evaporative Module Installation.** Check that the Module has been installed level in all planes with secure blankingplates to prevent air bypass. Check that there is sufficient access for cassette removal during maintenance. Ensure assembly is securely fixed, and that there is no visible damage. Check that the Module is installed in a waterproof section.
- 3. Management System Installation.** Check that the management system is mounted in a convenient dry location and has been connected to the Evaporative Module via the 12-core electrical cable (or two electrical cables if an MC3 XL). Check electrical connections with reference to the wiring diagram in the manual.
- 4. Feed water Installation.** Ensure the water system in the building has been subject to a Risk Assessment. The HumEvap system **MUST** be connected to a clean, potable mains water supply. It is the responsibility of the user to ensure that the water system complies with local regulations and bylaws, particularly those for the control of Legionella microbes (such as the HSE ACoP L8, The control of Legionella microbes in water systems). The use of mains water fed tanks and reservoirs is only permitted as part of a managed water treatment system. Check that the Evaporative Module has a feed water supply in excess of 2 bar (29 psi) connected to the supplied WRAS approved filling hose. Ensure that any hygiene options have been correctly installed. Check all joints and fittings for leaks.
- 5. Drain installation.** Check that the gravity drain on the Evaporative Module is connected to the main building drain. Ensure that this drain pipe-work is trapped to a suitable level for the applicable working duct pressure, refer to the relevant section of the manual. Check all joints and fittings. Ensure that the drain connection includes an air gap.

Commissioning (MC3/Plus)

6. **Distribution Pipework.** Check all water distribution pipework between the pump assembly and the distribution headers are securely fitted.
7. **Electrical Power Supply.** Check that a 230V / 5A (or 110V / 10A power supply in the US) is connected to the Management System. Check that this power supply is isolated within 1 m (39") of the Management System.
8. **Optional Controls.** Check that appropriate controls connections have been made to the Management System. Refer to the controls wiring section of the manual.
9. **Module Water Tank.** Check that the Evaporative Module water tank is free of any dirt and debris, and is clean.
10. **Flush Water Supply.** Check that the water supply has been flushed to prevent water stagnation and to clear any flux or foreign matter. This must be done carefully without creating splashing or aerosols.
11. **Pressure test.** Turn on water supply and check for leaks.
12. **Health and Safety.** Take a water sample to ensure that supply meets the requirements specified in the water quality guide. The sample should be tested using a dip slide to indicate the total number of coliforming units per ml (cfu/ml). Generally, levels of 1×10^3 cfu/ml may be considered acceptable for this type of humidifier provided the species of microbes and/or fungi involved are themselves not considered to be harmful. If you are unsure of the quality of your water please consult your distributor for advice.

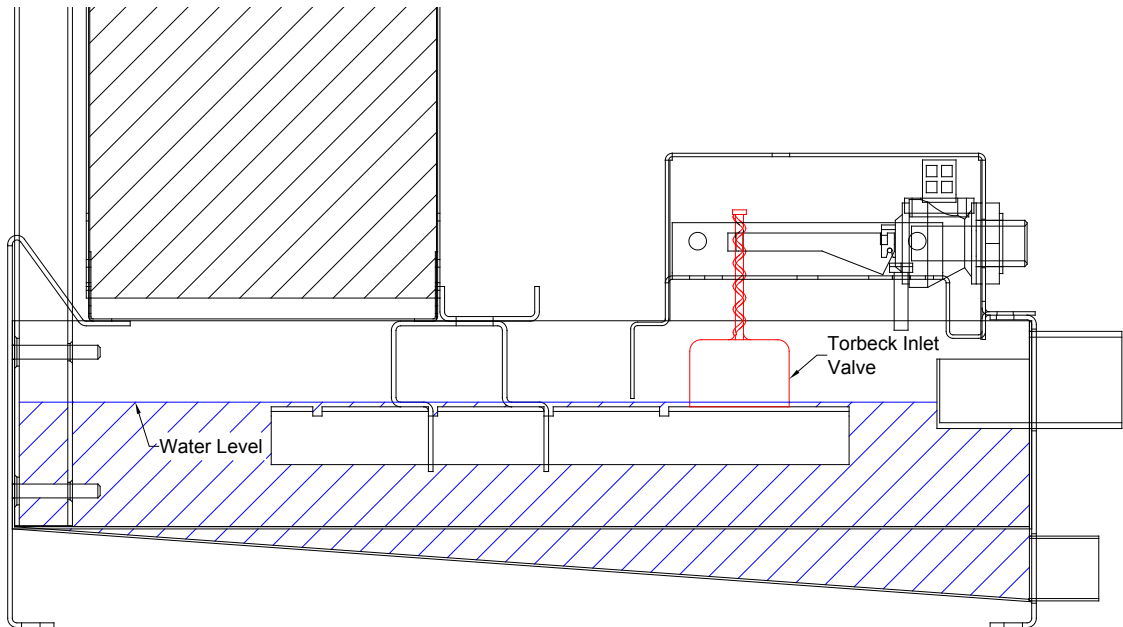
5.1 Commissioning (MC3/Plus)

Programming the Controller

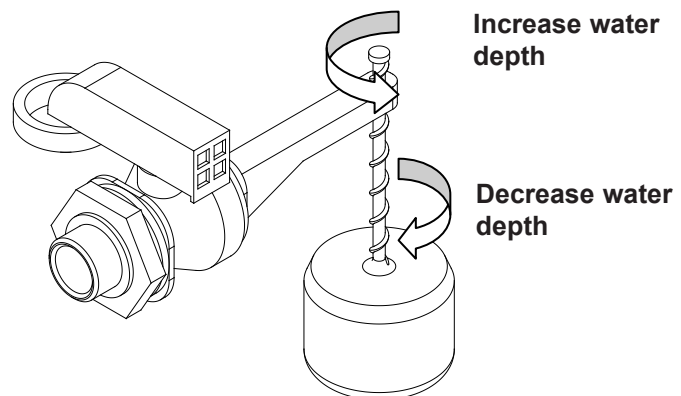
The HumEvap controller is pre-set to the most commonly used parameters. However, each HumEvap application is different and may require parameters to be adjusted. The following section shows the default settings and the method used to adjust them.

1. **Validate Temperature and Air Flow.** Measure the air volumes and the air conditions, check this against the design data.
2. **Initial Power Up.** When the panel is switched on for the first time, start by selecting the correct language.
3. **Activation Code.** Once the language is selected, you will be required to enter the activation code. To obtain an activation code, contact your HumEvap distributor.
4. **Purge Cycle.** Once the correct activation code has been entered, the microprocessor will automatically complete a purge cycle. "Purge in Progress..." will be displayed.
5. **Fill the Tank.** Once the purge is complete, allow the tank to fill until the float closes the inlet valve.
6. **Adjust the water level.** If the water level is incorrect, adjust the float on the water inlet valve to ensure that the water level in the tank is correct. See below.

Commissioning (MC3/Plus)



How to adjust the water inlet valve



Commissioning (MC3/Plus)

Programming the Controller cont'd

- 7. Drain Duration.** Once the water level is correct, switch the panel to manual drain, and time how long it takes for the tank to empty whilst in normal operating conditions (i.e. the fan on). Make a note of the time taken; this will become the “DRAIN DURATION” in the commissioning section of the software.
- 8. Inlet Duration.** Once the tank has fully drained, allow the tank to refill. Time how long it takes to fill until the low level float switches. This will give you the “Inlet Fault Delay”.

System Code:	Operating Capacity (ltrs)	MAX Inlet Duration (mins)
HUMEVAP HE-X1X	16	3
HUMEVAP HE-X2X	25	4
HUMEVAP HE-X3X	33	5
HUMEVAP HE-X4X	41	6
HUMEVAP HE-X5X	49	7
HUMEVAP HE-X6X	57	9
HUMEVAP HE-X7X	66	10
HUMEVAP HE-X8X	74	11
HUMEVAP HE-X9X	82	12
HUMEVAP XL-X1X	88	13
HUMEVAP XL-X2X	96	14
HUMEVAP XL-X3X	104	15



WARNING:

This table should be used as a guide only. Ensure you correctly time how long it takes for the tank to fill.

- 9. Pump Delay.** Adjust the pump delay using the table in the manual if necessary. This will be entered as the “PUMP DELAY” in the commissioning section of the software.
- 10. Water Conductivity.** Measure the TDS of the water in the tank. Use the water quality guide in this manual as a guide to the acceptability of water quality.

Programming the Controller cont'd

- 11. Enter the commissioning section of the software.** Enter the commissioning code into the software, and input the appropriate values using the data collected from the instructions in this section of the manual. It will also be necessary to input the temperature unit (default °C), and the air temperature (minimum and maximum) range for the sensor.
- 12. Matrix Wash over Cycle.** The matrix wash over cycle is designed to flush new matrix material to remove any dust and glue left after the manufacturing of matrix material. Whilst in the commissioning section of the software, refer to the manual for the "MATRIX WASH OVER DURATION". Select 'yes' to start the cycle.
- 13. Enter the programming section of the software.** Whilst the "MATRIX WASH OVER" is underway, enter the programming section of the software. Input the "HUMEVAP CONTROL" and "STAGE CONTROL" settings, depending on the requirements.
- 14. Dilution Cycle.** The table below should be used as a guide when inputting the dilution cycle interval and duration. Measure the water supply TDS (ppm) and set the dilution cycle accordingly. The dilution cycle duration should be set according to the evaporative system width. Ensure that the TDS is monitored, and the interval is adjusted accordingly.

TDS (ppm)	Dilution Cycle Interval (mins)
0	120
50	110
100	100
150	90
200	80
250	70
300	60
350	50
400	40
450	30

- 15. Drain Cycle.** Set the "DRAIN CYCLE" depending on the application and the customer's requirements;
 - Select "TIME MODE" if the drain cycle should initiate at a particular time of day.
 - Select "INTERVAL MODE" if the customer would like the unit to complete a drain cycle after a set period of not running.
- 16. Water temperature sensor.** If a water temperature sensor is fitted, set the "H2O TEMPERATURE" settings.
- 17. Disinfection counter.** Use the information in the manual to calculate how frequently the HumEvap should be disinfected.

Commissioning (MC3/Plus)

Programming the Controller cont'd

System Width:	Operating Capacity (ltrs)	TDS (ppm)										Dilution Cycle Duration (mins)
		0	50	100	150	200	250	300	350	400	450	
600	16	1	1	1	2	2	2	2	3	3	3	
900	25	1	1	2	2	3	3	3	4	4	5	
1200	33	1	2	2	3	3	4	4	5	5	6	
1500	41	1	2	3	3	4	5	5	6	7	7	
1800	49	1	2	3	4	5	5	6	7	8	9	
2100	57	1	2	3	4	5	6	7	8	9	10	
2400	66	2	3	4	5	6	7	8	9	10	11	
2700	74	2	3	4	5	7	8	9	10	12	13	
3000	82	2	3	5	6	7	9	10	11	13	14	
3300	88	2	3	5	6	8	9	11	12	14	15	
3600	96	2	4	5	7	8	10	12	13	15	16	
3900	104	2	4	6	7	9	11	13	14	16	18	

18. Complete the programming section of the software. Set the "PANEL OFF FAULT", and "SERVICE SCHEDULE". Use the guide in the manual to calculate the "PUREFLO SYSTEM" interval. Change the "TIME, DATE, AND DAY" if different to the default settings. Enter the "OCCUPANCY SETTINGS".

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Allow the unit to complete the "MATRIX WASH OVER CYCLE". Once the programming section of the software has been updated, observe the "MATRIX WASH OVER CYCLE" to check that everything is working correctly.

5.2

Commissioning (OEM Circulating and OEM Direct Feed)

The commissioning of the HumEvap humidifier requires appropriately trained technical personnel. It is strongly recommended that your distributor commissions your system.



WARNING:

Please pay attention to local regulations regarding working at heights and electrical work. Part of this commissioning process is a disinfection of water tank and matrix. Please read this document in full before commencing any work.

Pre-Commissioning Checklist

Warning! This humidifier must be installed, operated and maintained in accordance with this manual. Failure to do so could result in contamination that might cause Legionnaires' disease, which can be fatal.

Complete the following checklist before commencing commissioning:

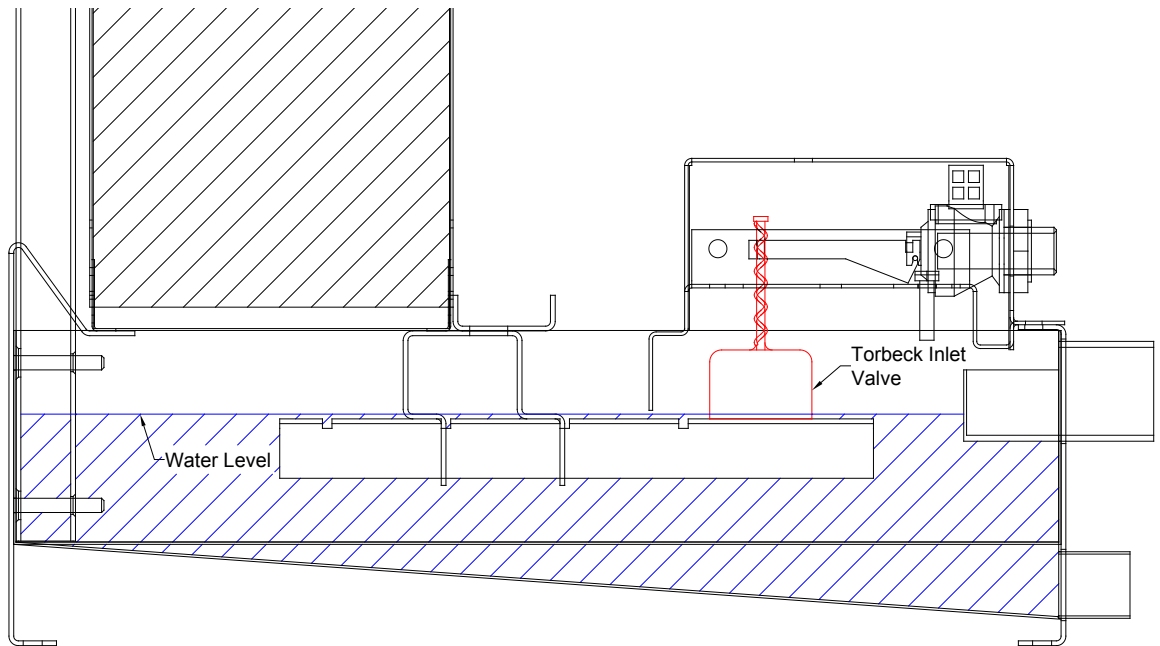
- 1. Switch off AHU.**
- 2. Evaporative Module Installation.** Check that the Module has been installed level in all planes with secure blanking plates to prevent air bypass. Check that there is sufficient access for evaporative matrix cassette removal during maintenance. Ensure assembly is securely fixed, and that there is no visible damage. Check that the Module is installed in a waterproof section.
- 3. Feed water Installation. Please refer to the Water Guide in this manual.** Ensure the water system in the building has been subject to a Risk Assessment. The HumEvap system **MUST** be connected to a clean, potable mains water supply. It is the responsibility of the user to ensure that the water system complies with local regulations and bylaws, particularly those for the control of Legionella microbes (such as the HSE ACoP L8, The control of Legionella microbes in water systems). The use of mains water fed tanks and reservoirs is only permitted as part of a managed water treatment system. Check that the Evaporative Module has a feed water supply in excess of 2 bar (29 psi) connected to the supplied WRAS approved filling hose. Ensure that any hygiene options have been correctly installed. Check all joints and fittings for leaks.
- 4. Drain installation.** Check that the drain on the Evaporative Module is connected to the main building drain. Ensure that this drain pipe-work is trapped to a suitable level for the applicable working duct pressure, refer to the relevant section of the manual. Check all joints and fittings. Ensure that the drain connection includes an air gap.
- 5. Distribution Pipework.** Check all water distribution pipework between the pump assembly and the distribution headers are securely fitted.

Commissioning (OEM Circulating and OEM Direct Feed)

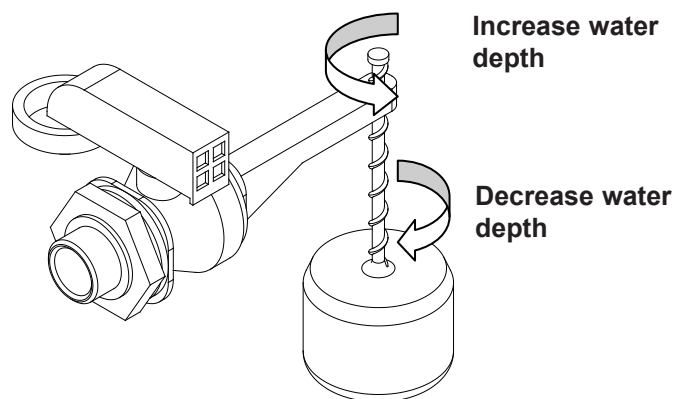
6. **Electrical Power Supply.** Check that a 230Vac / 5A (or 110Vac / 10A power supply in the US) is connected to the system pump. Check that the system is installed in accordance with the local regulations.
7. **Module Water Tank.** Check that the Evaporative Module water tank is free of any dirt and debris, and is clean.
8. **Flush Water Supply.** Check that the water supply has been flushed to prevent water stagnation and to clear any flux or foreign matter. This must be done carefully without creating splashing or aerosols.
9. **Pressure test.** Turn on water supply and check for leaks.
10. **Health and Safety.** Take a water sample to ensure that supply meets the requirements specified in the water quality guide. The sample should be tested using a dip slide to indicate the total number of coliforming units per ml (cfu/ml). Generally, levels of 1×10^3 cfu/ml may be considered acceptable for this type of humidifier provided the species of microbes and/or fungi involved are themselves not considered to be harmful. If you are unsure of the quality of your water please consult your distributor for advice.

Commissioning (OEM Circulating and OEM Direct Feed)

1. **Validate temperature and air flow.** Measure the air volumes and the air conditions, check this against the design data.
2. **Adjust the water level (Circulating ONLY).** If the water level is incorrect, adjust the float on the water inlet valve to ensure that the water level in the tank is correct. See below.



How to adjust the water inlet valve

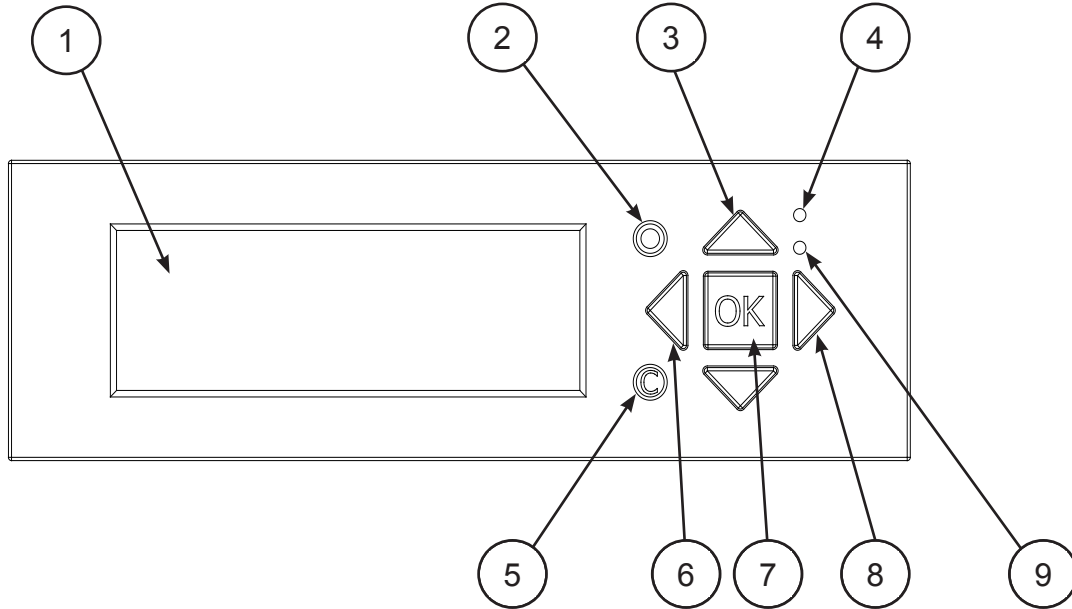


3. **Water Conductivity.** Measure the TDS of the water in the tank. Use the manual as a guide to the acceptability of water quality.

5.3 HumEvap Microprocessor Controller

The Microprocessor

The HumEvap MC3 systems include a backlit microprocessor control system.



User Interface: Principle of Navigation

No.	Name	Discription
1	Display	The default display in the HumEvap software is the status page. If no button is pressed for 10 mins, or the left arrow button is pressed, the software will return to this page.
2	Red Button	By pressing the red button, the controller will display the fault page showing active faults (if any) and the time at which they were detected. After looking at fault pages, press the left arrow key to return to the status page.
3	Up/Down Arrow keys	Use the up/down arrow keys to scroll through pages.
4	Alarm LED	The Alarm LED will Flash for a fault warning, and it will be permanently on for a fault. The LED will go off as soon as the fault is cleared.
5	C Button	By pressing the C Button, the user can modify an editable value in the software, or discard a value which has been entered.
6	Left Arrow key	Pressing the left arrow key at any time during changes will return the controller to the default status page and changes will be disregarded.
7	OK Button	Press the OK button to edit, or enter a value in the software.
8	Right Arrow key	To reset counters, press the right arrow key for 10 seconds on applicable software pages in the programming section. It is not possible to reset the total hours run value.
9	Edit LED	The LED will flash anytime the user is editing a value, or the microcontroller is processing a value.

5.4 Programming the Controller

When the HumEvap system is connected to the power supply for the first time, the product needs to be activated.

SELECT LANGUAGE Not Selected

Press OK and use the up/down arrow keys to select the language. English, Deutsch, Français, Svenska, Espanol and Czech are available. Press OK to validate the selected language.

ACTIVATION CODE **** Call Distributor +00 0000 000 000

Press OK and enter the product Activation Code. You will require an Activation Code. Call your distributor on the number shown on the last line. When calling you'll need the following information; site address, equipment details and the serial number of your humidifier.

Once the HumEvap has been activated the controller will show the Status Page and will automatically complete a purge.

Programming the Controller

The HumEvap controller is pre-set to the most commonly used parameters. However, each HumEvap application is different and may require parameters to be adjusted. The following section shows the default settings and the method used to adjust them.

Commissioning the HumEvap System

When installing a HumEvap MC3, it is important to correctly commission the system. By completing some basic timed tests and inputting the results, the system will run more efficiently. Incorrect settings may prevent the system operating efficiently and hygienically, and could result in nuisance fault activating.

From the Status screen, press the right arrow key to see the software version and to access the commissioning section. Press OK and enter the code **111**, and press OK to validate.

TEMPERATURE UNIT Celsius ->

Screen 1 allows the temperature unit to be selected as Celsius or Fahrenheit. This will update all temperature based parameters in the software.

SENSOR RANGE <- Min: -20 °C Max: 80 °C
--

The next screen will display the Air Temperature setpoints. By pressing the right arrow key the temperature range can be adjusted. The standard temperature sensor range is set to Min: -20°C, Max: 80°C.

PUMP DELAY Duration: ** secs

The pump delay default is set to 60 seconds in the software. If you find that the pump is rapidly switching as the unit fills, the duration can be increased.

INLET FAULT Delay: ** mins
--

As part of the commissioning of a HumEvap, it is important to accurately time how long it takes for the tank to fill from empty. This time should be entered as the Inlet Fault Delay. See the commissioning section of this document for further instructions.

DRAIN Duration: ** mins

As part of the commissioning procedure, its important to check the drain has been correctly fitted as per the installation manual. A timed test should be carried out under working conditions (i.e. the fan(s) running) for the time it takes for the tank to fully drain.

Programming the Controller Cont.

Matrix Wash Over Cycle

In order to correctly commission a HumEvap system, it is necessary to complete a Matrix Wash Over cycle. This automatic function washes the material over, to remove any manufacturing residues from the Matrix material. **It is important that the AHU fan is switched OFF during the Matrix Wash Over to prevent carry over.**

MATRIX WASH OVER	
Duration:	*** mins
Start:	No

Whilst in the Commissioning section of the software, the last screen to be displayed is the Matrix Wash Over. Press OK to change the duration. Use the table to calculate the Duration.

HumEvap Width (mm)	Matrix Wash Over Duration (mins)
600	108
900	124
1200	136
1500	148
1800	160
2100	176
2400	188
2700	200
3000	212
3300	196
3600	204
3900	216

MATRIX WASH OVER	
Duration:	*** mins
Start:	Yes

Once the Duration has been changed, press the OK button, and change Start to Yes. The HumEvap will automatically start the Matrix Wash Over Cycle. The drain will remain permanently open for the duration of the cycle.

MATRIX WASH OVER	
In Progress...	
94 min remaining	
Hold > to cancel	

During the Matrix Wash Over cycle, the status page will display the time remaining. Holding the right arrow key will cancel the cycle. If at any point during the cycle the panel is switched off, the cycle will be paused. Switching the panel back on will continue the cycle. Once completed, the unit will automatically return to normal operation and the display will return to the default status page.

If at any point during the cycle an Inlet Fault, Pump Fault, or Leak Detected activates, the drain will close until the fault is cleared. A pump failure during a Matrix Wash Over will pause the timer.

It is possible to access any section of the software whilst a Matrix Wash Over cycle is in operation. If no button is pressed for 30 seconds the display will automatically return to the Matrix Wash Over Status page.

Note:

If there is evidence of surfactant in the tank once the cycle has completed, the Matrix Wash Over cycle should be repeated. If at any point the Matrix Material is replaced, a Matrix Wash Over Cycle must be completed.

Programming the Controller Cont.

Programming Section

Step 1 - Select the Control Mode

Screen 1 allows selection of the control mode from one of the following options:

```
Software Version
2.00 25/03/2011
Enter Access Code
****
```

From the Status Page, press the right arrow key to see the software version and to access the programming section of the software. Press OK and enter the code **234**. Press OK to validate.

```
HUMEVAP CONTROL
ON/OFF
```

ON/OFF

The HumEvap will operate when the Panel Switch is ON, all interlocks are closed and the integrated timer is in occupancy.

```
HUMEVAP CONTROL
Humidity Sensor ->
```

Humidity Sensor

The HumEvap will operate when the humidity level indicated by the sensor is below the setpoint in the software. When Stage Control is fitted, the unit will operate in steps, i.e. wet a proportion of the evaporative module only, within the proportional band set in the software to achieve close control.

```
CONTROL
PARAMETERS
  Setpoint: 70 %
<- PropBand: 10 %
  Sensor: 0-10 V
```

External Signal

The HumEvap will operate when it receives a demand signal from an external source, e.g. BMS. A 0-10V, 2-10V, or 4-20mA signal can be accepted. When stage control is fitted, the unit will operate in steps, i.e. wet a proportion of the evaporative module only, at pre-set points within the range.

```
HUMEVAP CONTROL
External Signal ->
```

Programming the Controller

Step 1 - Select the Control Mode Cont'd

HUMEVAP CONTROL
Temperature Sensor->

Temperature Sensor

The HumEvap will operate when the temperature level indicated by the sensor is above the setpoint in the software. When Stage Control is fitted, the unit will operate in steps, i.e. wet a proportion of the evaporative module only, within the proportional band set in the software to achieve close control.

CONTROL PARAMETERS
Setpoint: 20 °C
<- PropBand: 10 °C
Sensor: 0-1

In addition, the HumEvap can be overridden by the panel switch, the interlock connections or the integrated "occupancy" timer. The system will only operate when all the interlocks including the panel switch and intergrated timer are closed and there is demand (if applicable), i.e. if any are open the system will be switched off. The external signal and the sensor range can be selected with the following configurations:

- 0-10 Vdc (0% rH gives 0V, 100% rH gives 10V)
- 2-10 Vdc (0% rH gives 2V, 100% rH gives 10V)
- 4-20 mA (Select 2-10 Vdc with a 500ohm load resistor)

Step 2 - Select Stage Control (Optional)

STAGE CONTROL
Enabled

Screen two allows the stage control option to be switched on or off. If Stage Control is enabled, scrolling right will display the set points at which each stage will switch on or off. The points at which sequential stages switch on and off and the hysteresis, can be adjusted.

STAGE CONTROL
Stage 2: 20%
<- Stage 3: 50% ->
Stage 4: 80%

The "HumEvap MC3 Plus" can control up to seven stages. A second page allows setpoints for stages five, six, and seven to be adjusted.

STAGE CONTROL
Stage 5: 20%
<- Stage 6: 50% ->
Stage 7: 80%

Default Values:

- | | | | |
|----------------|---------------|----------------|---------------|
| Up to 4 Stage: | Stage 2 - 20% | Up to 7 Stage: | Stage 2 - 20% |
| | Stage 3 - 50% | | Stage 3 - 30% |
| | Stage 4 - 80% | | Stage 4 - 40% |
| | | | Stage 5 - 50% |
| | | | Stage 6 - 60% |
| | | | Stage 7 - 70% |

STAGE CONTROL
<- Hysteresis 5%

Programming the Controller

Step 3 - Dilution Cycle

DILUTION CYCLE	
Interval:	60 mins
Duration:	10 mins

Screen three allows setting the parameters for the dilution cycle. The process of evaporative humidification or cooling leads to a build up of dissolved solids in the water tank. To control the level of dissolved solids in the tank, the HumEvap will operate a Dilution Cycle at preset intervals of operation. During the Dilution Cycle the HumEvap will simultaneously open the inlet solenoid and motorised drain valve for a preset duration to drain dissolved solids away and replenish the tank with fresh water. The Dilution Cycle does not interrupt normal system operation. The Dilution Cycle frequency and duration is determined by the inlet water quality and operating capacity of the HumEvap tank, and should be set in accordance with the tables shown overleaf.

Refer to the commissioning section of the manual.

Step 4 - Drain Cycle

DRAIN CYCLE	
Start Time:	00:01

DRAIN CYCLE	
Interval:	30 hrs

Screen four allows setting the parameters for the Drain Cycle. To reduce the risk of bacterial growth caused by water stagnation in the system, the HumEvap system carries out a Drain Cycle. The HumEvap can be set to operate the Drain Cycle at a preset time of day ("Time Mode"), or after a preset period of non-operation ("Interval Mode"). After selecting the required Drain Cycle mode, scrolling right will display the page on which the time, or interval, can be set.

Step 5 - Assisted Drain

ASSISTED DRAIN	
Enabled	

Screen five allows Assisted Drain mode to be enabled or disabled. On larger HumEvap systems, the volume of water held in the evaporative matrix during operation is significant. When there is no demand and the pump stops running, this water runs back to the tank and can increase the water level to a point at which it will leave the system through the overflow. To help prevent this, Assisted Drain mode opens the motorised drain valve when there is no demand until the water reaches the low operating level, at which point it closes.

Step 6 - Water Temperature Monitoring (Optional, "MC3 Plus" only)

H2O TEMPERATURE	
Limit:	20 °C
Fault Time:	5 mins

Screen six allows settings the parameters for the Water Temperature Monitoring function. Where fitted, the temperature limit for the tank can be preset, along with the delay after which an alarm output is required. When the system is running and the water temperature exceeds the preset limit, the HumEvap system will simultaneously open the inlet solenoid and motorised drain valve to bring in fresh water and reduce the operating water temperature of the system. If the temperature does not decrease to below the Limit' within the 'Fault Time', the unit will enter a fault mode and activate an alarm output.

Programming the Controller

Step 7 - Disinfection Counter

DISINFECTION	
Interval:	10 mths
Due in:	28
mths	

The next screen is the disinfection counter. The disinfection counter is designed to raise an alarm after a pre-defined period, to notify when a disinfection of the HumEvap is due. Once the disinfection has been completed, the right arrow key should be held for 10 seconds to rest the counter.

Step 8 - Panel Off Fault

PANEL OFF FAULT	
Enabled	->

PANEL OFF FAULT	
<- Limit:	**** hrs

Screen eight is the Panel Off Fault. When enabled, the controller will activate an alarm if the panel switch is in the off or manual drain position for longer than the 'Limit'. If the Limit is set to '0' hours, the microprocessor will activate an alarm as soon as the panel is switched off or to manual drain.

Step 9 - Service Counter

SERVICE SCHEDULE	
Interval:	200 hrs
Due in:	200 hrs
Total run:	0 hrs

Screen nine allows setting the service interval counter parameters for the HumEvap system. The HumEvap system will provide a warning when a service will soon be required, and will activate an alarm output when the service frequency is reached. The Service Counter does not interrupt normal system operation. The Service Schedule page includes a "Total Hours Run" counter for the HumEvap system. After completing a service, pressing and holding the right arrow button for ~10secs will reset the "Due In" counter and clear a fault if applicable.

Programming the Controller

Step 10 - PureFlo Cartridge

PUREFLO CARTRIDGE
Interval: 3 mths
Replace in: 90 days

Screen ten allows setting the PureFlo cartridge replacement interval counter parameters for the HumEvap system. The HumEvap system will provide a warning when PureFlo Ag+ Cartridge replacement will soon be required, and will activate an alarm output when the replacement frequency is reached. The PureFlo Ag+ cartridge replacement counter does not interrupt normal system operation. After replacing the PureFlo Ag+ Cartridge, pressing and holding the right arrow button for ~10secs will reset the "Due In" counter and clear a fault if applicable.

Step 11 - Date, Time and Day

DATE TIME AND DAY
YY:MM:DD 11:03:28
HH:MM 12:15 Friday

The date, time and day are preset in the HumEvap system and backed up with a battery. The system will also automatically adjust for daytime saving. However, screen eleven allows the date, time or day to be adjusted if required. If incorrect, "Occupancy Mode" will not operate as required.

Step 12 - Set Occupancy

OCCUPANCY
Mode: Everyday ->

The occupancy function can be used to control the hours during which the HumEvap operates. Select periods of occupancy from the following list:

OCCUPANCY
<- Switch on: 09:00
Switch off: 17:00

Always On, Every Day, Weekdays or Weekends. Default value is Always On.

OCCUPANCY
<- Switch on: 09:00
Switch off: 17:00

When a mode is selected, use the right arrow to specify the switch on/off times. Default values are shown.

Step 13 - Restore Defaults

RESTORE DEFAULTS
No

To restore all default values select Yes.

When selecting Yes, all programming values will be reset to default value as they were when the unit left the factory.

The Controller

5.5 Status Page

The following screens will be seen on the microprocessor display of the HumEvap MC3 during normal operation.

```
HUMEVAP ON
55 % rH @ 21 °C
Setpoint: 60 % rH
```

The display will default to the status page.

The first line shows if the HumEvap is ON or OFF.

The second line shows the relative humidity and the temperature of the area under control. If an external control signal is used to control the HumEvap, the second line will show the signal value in percentage or it will be blank if ON/OFF mode has been selected.

The third line will show information about the system operation such as:

```
HUMEVAP ON
55 % rH @ 21 °C
Filling
Setpoint: 60 % rH
```

- Purge in Progress
- Assisted Drain
- Manual Drain
- Panel Switched Off
- H2O Temp Reduction
- External Enable
- Out of Occupancy
- High Temp Reduction
- Pump Delay
- Dilution Cycle
- Drain Cycle
- Filling...
- Max Run Drain
- No Demand

The fourth line will show the Setpoint or any of the following alarms:

```
HUMEVAP ON
55 % rH @ 21 °C
Filling
Setpoint: 60 % rH
```

- Leak Detected
- Safety Interlock
- Pump Fault
- Disinfection Due
- Service Due
- Drain Fault
- Water Inlet Alarm
- High Water Level
- H2O Temp Fault
- Service PureFlo
- PureFlo Due in *** d
- Disinfect in *** d
- Service Due in *** d

The Controller

5.6 Information Pages

DATE TIME AND DAY
YY:MM:DD 01:01:11
HH:MM 12:00
Monday

From the Status Page, pressing the down arrow key will display the information pages.

The first information page displays the current Date, Time and Day.

STAGE CONTROL
STATUS
S2 S3 S4 S5 S6 S7
1 1 1 1 1 1

If stage control is enabled, the second page will display the status of the Stages. '0' will show the stages that are closed, and '1' shows stages which are open. If stage control is disabled, N/A is displayed.

H2O TEMPERATURE
Actual: 10 °C
Limit: 20 °C

The third information page will display the H2O Temperature. N/A will be displayed if the H2O option is not installed, or if the pump is not running. Whenever the pump is running, the water temperature sensor will monitor the water temperature. If at any point the water temperature remains above the limit for 10 seconds, a Temperature Reduction Cycle would initiate.

If the water temperature does not drop below the setpoint after the 'Fault Time' the controller will enter a Water Temperature Fault (see 'Fault Modes').

DILUTION CYCLE
Interval: 400 mins
Due in: 200 mins

The next information page is the Dilution Cycle. This page will display the Interval, and how many minutes until the next Dilution Cycle is due.

DRAIN CYCLE
Interval Mode
Interval: 12 hrs
Due in: 200 mins

Pressing the down arrow will navigate to the fifth information page. The second line will display the Drain Cycle Mode, i.e. Interval or Time mode. The fourth line will display how many minutes until the next Drain Cycle is due.

The Controller

Information Pages

MAX. RUN TIME DRAIN	
Due in:	200 mins

The next display will show the Max. Run Time Drain. If disabled, N/A will be displayed on the third line. If enabled, Due in will display the number of minutes remaining before the next Max Run Time Drain. If the pump stops running the timer will pause. If the system completes a Drain Cycle, the Max Run Time Drain counter will be reset.

Disabling the Max Run Drain could be a potential Health & Safety issue on sites where the units are running 24/7, if the Drain Cycle is set to Interval Mode.

PUREFLO SYSTEM	
Interval:	3 mths
Replace in:	90 days

Pressing the down arrow key will navigate to the PureFlo information page. The fourth line will display the number of days until the cartridge should be replaced.

SERVICE SCHEDULE	
Interval:	200 hrs
Due in:	200 hrs
Total Run:	0 hrs

The next information page shows the service schedule. The interval will be set in the Programming section of the software as part of the commissioning of a unit.

DISINFECTION	
Interval:	6 mths
Due in:	10 days

This next information page is a counter to display when the next disinfection of the HumEvap is due.

MISCELLANEOUS	
Exp Module:	Off
Stand-by Mode:	Off
Shut Down Drain:	Off

The miscellaneous information page will display whether the Expansion Module, Stand-By Mode, and Shut Down Drain are Enabled (On) or Disabled (Off).

DISTRIBUTOR	
Distributor Name	
+00 0000 000 000	

The last information page will display the Distributor's name and contact number.

The Controller

5.7 Alarms and Fault Modes

The following screens will be seen on the microprocessor display of the HumEvap MC3 when faults occur.

The HumEvap controller has an integrated fault diagnostic system and will indicate any faults on the display. All faults and alarms will be active as long as the cause is present. As soon as the cause is removed the faults will be cleared and the controller will return to normal operation. The following is a list of fault codes and how they affect unit operation:

HUMEVAP OFF 56 % rH @ 25°C Safety Interlock SetPoint: 70 % rH
--

Safety Interlock

If the link between terminals 14 and 15 is broken, the HumEvap is disabled and the third line of the display will indicate "Safety Interlock". The common fault output (terminals 20-21-22) will be active during the Safety Interlock fault mode and will be automatically reset if the link between terminals 14 and 15 is present again.

Terminal 14 and 15 must be linked to enable the HumEvap system.

HUMEVAP OFF 56 % rH @ 25°C Water Inlet Alarm
--

Water Inlet Alarm

If the HumEvap system is trying to fill, and does not reach its minimum operating level within a preset amount of time, the system will enter a fault mode. The system will continue to try and fill, but "Water Inlet Alarm" will be displayed and the common fault output will activate.

HUMEVAP OFF 56 % rH @ 25°C High Water Level

High Water Level

If the water level in the HumEvap system tank is above the maximum operating level for a preset amount of time, the system will enter a fault mode. The system will attempt to reduce the operating level by opening the drain valve. "High Water Level" will be displayed on the microprocessor.

The Controller

HUMEVAP ON
56 % rH @ 25°C
Service Due

Service Due

The HumEvap system requires regular servicing. When a service will soon be required, the microprocessor will display “Service Due in *** Hrs”. When the service is due, “Service Due” will be displayed on the microprocessor and the common fault output will activate.

Alarms and Fault Modes

HUMEVAP OFF
56 % rH @ 25°C
PureFlo Due in 22 D

PureFlo Service Due (OPTION)

The PureFlo Ag+ anti-microbial system requires routine replacement. When replacement cartridges will soon be required, the microprocessor will display “PureFlo Due in *** Days”. When the replacement is due, “Replace Ag” will be displayed on the microprocessor and the common fault output will activate.

IMPORTANT
Service PureFlo

When the PureFlo Ag+ Cartridge and Sediment Filter are due for replacement the controller will display a reminder to change the cartridge and the common fault output will be active. Once the cartridge and filter have been replaced, the PureFlo Ag+ counter can be reset by pressing and holding the right arrow key for 10 seconds on screen 7 in the programming section (refer to the relevant programming section of the manual for information on how to access the programming pages). As soon as the counter is reset the controller will clear the PureFlo Ag+ fault.

HUMEVAP ON
56 % rH @ 25°C
Leak Detected

The Controller

Alarms and Fault Modes

HUMEVAP ON 56 % rH @ 25°C H2O Temp Fault
--

H2O Temperature Fault (OPTION)

If the operating water temperature in the HumEvap system exceeds a preset limit, the system will attempt to reduce it by tempering the water in the tank. If it does not bring the water temperature down within a preset fault delay, the system will enter a fault mode. "H2O Temp Fault" will be displayed on the microprocessor and the common fault output will activate. The system will continue to run and attempt to reduce the water temperature.

HUMEVAP ON 56 % rH @ 25°C Pump Fault
--

Pump Fault (OPTION)

If the HumEvap system is trying to run, and does not detect flow within a preset amount of time, the system will enter a fault mode. The system will continue to try and run, but "Pump Fault" will be displayed and the common fault output will activate.

HUMEVAP ON 56 % rH @ 25°C Drain Fault

Drain Fault

If the HumEvap system is trying to drain, and does not reach its minimum operating level within a preset amount of time, the system will enter a fault mode. The system will continue to try and drain, but "Drain Fault" will be displayed and the common fault output will activate.

HUMEVAP ON 56 % rH @ 25°C Disinfection Due
--

Disinfection Due

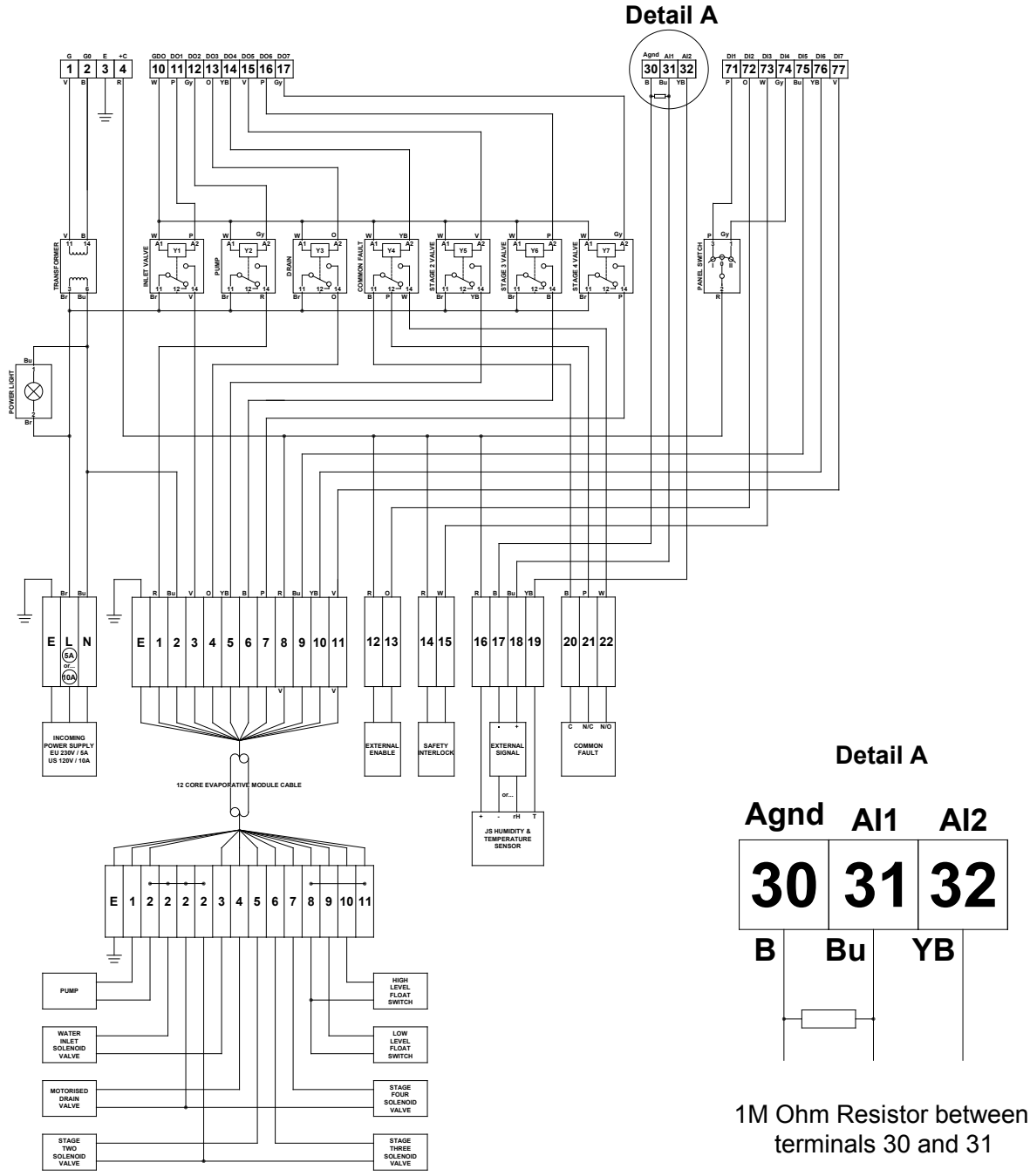
The HumEvap system requires regular disinfection. When a disinfection will soon be required, the microprocessor will display "Disinfection Due in *** Hrs". When disinfection is due, "Disinfection Due" will be displayed on the microprocessor and the common fault output will activate.

Leak Detected (OPTION)

If standing water is detected in the AHU or duct in which the HumEvap system is situated, the system will enter a fault mode. The water inlet will be isolated. The system will continue to run provided there is sufficient water in the tank. "Leak Detected" will be displayed on the microprocessor and the common fault output will activate.

For instructions on how to silence the alarm, and rest the system, see Step 9 of the installation overview.

5.8 MC3 Wiring Diagram



- Key**
- B - Black
 - O - Orange
 - Gy - Grey
 - V - Violet
 - W - White
 - YB - Yellow/Black
 - Bu - Blue
 - R - Red
 - Br - Brown
 - P - Pink

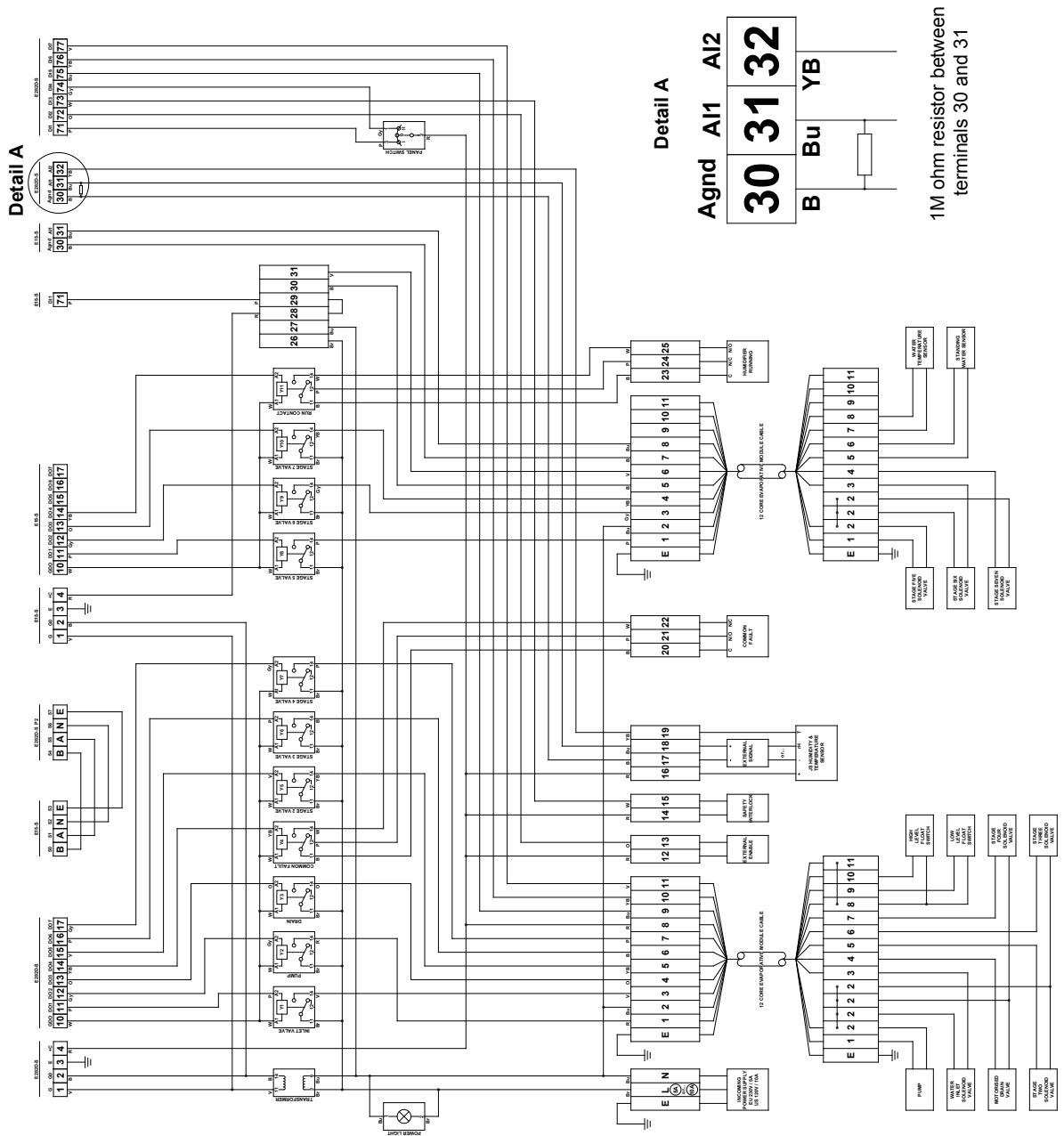
WARNING:

Mains Voltage. Isolate unit before removing cover.

**Terminals E - 7 = Live Mains Voltage
Terminals 8 - 11 = Low Voltage (24Vdc)**

5.9

MC3 Plus Wiring Diagram



Key

- | | | | |
|------------|-------------------|-----------|------------|
| B - Black | O - Orange | Gy - Grey | V - Violet |
| W - White | YB - Yellow/Black | Bu - Blue | |
| Br - Brown | P - Pink | R - Red | |

WARNING:

Mains Voltage. Isolate unit before removing cover.

Terminals E - 7 on both Evaporative Module Cables = Live Mains Voltage
 Terminals 8 - 11 on both Evaporative Module Cables = Low Voltage (24Vdc)

HumEvap MC3 Maintenance Schedule

**WARNING:**

This humidifier must be installed, operated and maintained in accordance with this manual. Failure to do so could result in contamination that might cause Legionnaires' disease which can be fatal.

Although the HumEvap Humidification System requires very little maintenance, it does require servicing. The procedure for this is outlined in this maintenance section and service schedule tables. Maintenance of the water treatment systems should be carried out as per the instructions supplied with that equipment.

Comprehensive maintenance contracts are available from your distributor. Services include:

- **Planned maintenance contracts**
- **Breakdown response**
- **Technical advice and back up**
- **Product training**
- **Spares on demand**

Contact your distributor or the distributor's customer service department for more information.

Service Schedule (MC3)

The service schedule should be determined at commissioning. This will depend on the application, the water quality and the system usage. The default is 200 hrs operation. The programming section contains details of how to adjust the service schedule to suit the applications.

Refer to the software overview section for details on how to access this page.

The "Interval" is the required frequency of service.

The "Due in" is the time left until the next service is due.

The "Total run" is the total hours run of the humidifier.

After the humidifier has been serviced the "Due in" hours can be reset by pressing and holding the right arrow button for 10 seconds.

**WARNING:**

WARNING: The HumEvap system should not be electrically isolated for periods exceeding 24hrs as automatic drain and purge cycles will be disabled.

HumEvap MC3 Maintenance Schedule

Service Schedule (HumEvap MC3 & OEM)

If the HumEvap system is turned off for prolonged periods, water stagnation might occur and microbial contamination result, therefore the system, including any storage tanks or vessels should be drained and left dry. Before putting the system back into service, a full risk assessment should be undertaken to ensure safe operation, with particular attention paid to water supply quality.

The water pipe-work supplying the HumEvap should be purged carefully, avoiding the creation of aerosols by splashing, and a water sample should be taken to ensure cleanliness. In the event that the humidifier contains any residual water or has remained damp, and the temperature exceeded 20°C, the HumEvap should be cleaned and disinfected. Refer to the cleaning, disinfection and descaling instructions in this manual.

Always call your distributor for advice on water sampling and analysis, disinfection of systems, service and maintenance contracts.

6.2 HumEvap MC3 & OEM Maintenance Guide

Please note that the information given below is only to act as a guide and the frequency of maintenance may depend upon the unit's age, usage and water quality.

Correct maintenance is vital to ensure optimum output and reliability.

All humidifiers will form part of your hot and cold water system and as such require you to undertake certain duties with regards to "The control of Legionella microbes in water systems" (L8). Your water sampling / testing and disinfection regime must be based on details in the O&M manual and from results of a site specific risk assessment. For this type of Evaporative Humidifier, it is recommended that disinfection is undertaken at least twice a year.

If any further assistance is required or you are interested in a planned maintenance quote, please contact your distributor.

HumEvap MC3 & OEM Maintenance Guide

Operations	Minor Service	Main Service
Replace inlet water filter	Yes	Yes
Check PureFlo & service if applicable	Yes	Yes
Clean inlet valve strainer		Yes
Check water inlet solenoid valve operation	Yes	Yes
Clean water inlet solenoid valve strainer	Yes	Yes
Check pump operation	Yes	Yes
Check all hoses	Yes	Yes
Check water distribution header pipes	Yes	Yes
Clean water distribution header pipes		Yes
Check drain valve operation	Yes	Yes
Clean drain valve		Yes
Clean pump basket filter	Yes	Yes
Clean stage option solenoid valve kits (if applicable)		Yes
Scrub clean front section of tank	Yes	Yes
Remove matrix cassettes and scrub clean all sections of tank		Yes
Disinfect system at 6 monthly intervals		Yes
Replace all feed hoses where necessary		Yes
Replace flow restrictors		Yes
Check all matrices for full saturation during operation	Yes	Yes
Measure spray header flow rates		Yes
Test control and high water level float switch		Yes
Check and secure all electrical connections	Yes	Yes
Check overall installation for leaks and damage	Yes	Yes
Check inlet float valve water level setting	Yes	Yes
Check software settings	Yes	Yes
Test cleaning and flush cycle operation		Yes
Reset maintenance intervals	Yes	Yes
Test operation of humidistat and controller (if applicable)	Yes	Yes
Test safety interlock and controls operation		Yes
Clean unit throughout	Yes	Yes
Check air velocities at face of the matrix		Yes
Check any fitted options	Yes	Yes
Update service log book	Yes	Yes
Add DISIFIN disinfection tablet to reservoir, monthly or as required	Yes	Yes

6.3 HumEvap Routine Water Sampling and Testing

Hygiene:

Your attention is drawn to the local Health & Safety Executive's technical guidance on the control of Legionellosis in water systems. If inadequately maintained, water systems, of which any humidifier is a part, can support the growth of micro-organisms, including the bacterium that causes Legionnaires' disease. All aspects of this equipment has been designed and considered to reduce the risk of Legionnaires' disease and other similar conditions as much as possible, but it is important that users are aware of their responsibilities under the ACoP in reducing the risk of Legionellosis.

To prevent the growth of Legionella, users are required to:

1. Carry out a risk assessment of the water system using a competent person, and implement an appropriate monitoring and control regime.
2. Avoid water temperatures which favour the growth of Legionella.
3. Avoid water stagnation.
4. Clean and disinfect the system in accordance with the Health & Safety Executives technical guidance and instructions in this manual.
5. The HumEvap system MUST be connected to a clean, potable mains water supply and it is recommended that the supply pipework is chlorinated. It is the responsibility of the user to ensure that the water system complies with local regulations and bylaws, particularly those for the control of Legionella microbes (such as the HSE ACoP L8, The control of Legionella microbes in water systems). The use of mains water fed tanks and reservoirs is only permitted as part of a managed water treatment system.

On commissioning and at regular intervals thereafter, test for possible water contamination using Dipslides. Take samples from the water supply to the HumEvap Matrix and from the HumEvap tank. Check for biofilm.

The Dipslides should be incubated for 2 days at 30°C (86°F).

1. If the microbial count from the tank exceeds 10^3 cfu/ml, the system should be turned off, any bio-film scrubbed clean and then disinfected using a 50 ppm chlorine solution for one hour before being put back into use.
2. If the microbial count in the water supply to the evaporative module exceeds 10^3 cfu/ml, this suggests contamination of the ice on cleaning your water supply.
3. If the water temperature anywhere in the system regularly exceeds 20°C, (68°F) increase the frequency of water sampling. The frequency may be reduced if successive tests show a consistent level below 10^3 cfu/ml.

HumEvap Routine Water Sampling and Testing

Health and Safety Requirements

Every 6 months, users are required by the Health & Safety Executive, Approved Code of Practice (ACoP) L8 to take samples for Legionella analysis. Samples should be taken from the same places as described above, and the analysis carried out by a UKAS accredited laboratory which is part of the Legionella AQS Scheme. In the event that the Legionella content exceeds 10^2 cfu/l, the humidifier should be switched off and specialist advice sought regarding its disinfection.

1. If biofilm (a slimy or gel-like deposit when wet, which might be dry and crisp in a dry system) is found during any inspection of the humidifier or water system, the humidifier **MUST** be switched off and not put back into operation until the system has been taken apart, scrubbed and thoroughly cleaned with a suitable biocide with biofilm penetrating qualities such as 50ppm chlorine dioxide solution. This work should only be carried out by fully trained specialist organisations or individuals.
2. **The HumEvap Humidifier must be left powered on to allow automatic flushing and cleaning cycles to occur.** If the HumEvap system is powered off for prolonged periods, water stagnation might occur and contamination result, so the system, including any storage tanks or vessels should be drained and left dry. Before putting the system back into service, the water pipework supplying the HumEvap should be purged carefully, avoiding the creation of aerosols by splashing, and a water sample should be taken to ensure cleanliness. In the event that the humidifier pipework contains any residual water or has remained damp, and the temperature exceeded 20°C (68°F), the HumEvap should be chlorinated using 50 ppm chlorine solution for 1 hour.

Call your distributor for advice on water sampling and analysis, disinfection of systems, service and maintenance contracts.

6.4 Cleaning and Disinfection



WARNING:

Before commencing cleaning and disinfection:

For brand new clean systems we recommend the use of DISIFIN XL disinfection chemical at 500ppm prophylactic dose. 1 sachet per 2m width of tank should be placed in the tank, allowed to dissolve and circulated around the system. DISIFIN is 100% biodegradable, non-toxic and environmentally friendly and may be left to dissolve and naturally flush away from the HumEvap after commissioning. For systems which have been previously used or where the water quality or air quality is poor, it is recommended to dismantle and scrub the system clean, to carry out a disinfection with a minimum of 50ppm chlorine circulated for 1 hour. Please refer to the cleaning and disinfection and method statement section to ensure that the relevant chemicals, equipment and Personal Protective Equipment are available to carry out disinfection.

1. **Risk assess the situation.** This should include but is not limited to observance of COSHH, L8 and the use of PPE, working from heights and ensuring a full understanding of the HumEvap System.
2. Coordinate with relevant responsible persons.
3. Check records (i.e sample results of microbiological control) for system history.
4. If possible, disinfection should be carried out when the building is unoccupied, with air flow off.

Evaporative humidifiers must be regularly cleaned and maintained, to prevent contamination especially in industrial environments.

All surfaces requiring disinfection or cleaning must be in contact with the appropriate concentration of disinfection solution for at least one hour. The method statement for disinfection may need to be adapted depending on the layout of the humidifier pipe-work, for example, where system pipe-work splits into 'H or U' shape, ensure that disinfection solution reaches all pipe-work end-of-lines. Additional procedures will be required for supply water system pipe-work or water treatment systems prior to the humidifier.

It is recommended that routine disinfection should take place in the following situations:

- At initial commissioning. (For brand new systems use DISIFIN XL disinfection chemical).
- Where routine monitoring and control regime or risk assessment shows it to be necessary, the use of DISIFIN XL monthly or as necessary is recommended. 1 sachet per 2m width of tank should be placed in the tank and allowed to dissolve.
- At six monthly intervals.
- If the system or part of it has been shutdown and/or substantially altered creating a risk of contamination.
- During or following an outbreak or suspected outbreak of Legionellosis.

This recommendation is in accordance with the HSE's Approved Code of Practice (ACoP) L8.

Cleaning and Disinfection Cont.

Recommended Disinfection Equipment

1. Disinfection solution in accordance with manufacturers guidelines.
2. Disinfection neutraliser (only if necessary).
3. Disinfection solution test kit (to measure strength).
4. Bucket of fresh water.
5. Braided hose (for flushing at end of line).
6. Measuring container / syringe.
7. Clean cloths.
8. Mixing vessel.
9. Risk assessment / test record sheets.
10. Standard tools

Cleaning and Disinfection Method Statement

Step 1 - Refer to the Risk Assessment

- Refer to the Manufacturers instructions and safety advice.
- Ensure the area is well ventilated.
- Ensure the HumEvap system is OFF and isolated from external controls.
- Dismantle unit and scrub tank fully. Remove matrix.

Step 2 - Mix Disinfection Solution

- Mix disinfection solution following the manufacturers instructions. L8 recommends 50ppm Chlorine solution circulated for 1 hour. NB: For larger or particularly unclean systems this process may need to be repeated.
- Calculate the total water volume of the system using wet and dry weight values (refer to dimension tables at the end of this manual).
Note: Depending on the Risk Assessment, it may be necessary to clean the sump tray prior to disinfection.
- Solution loses strength over time and the process may need to be repeated.

Step 3 - Run the unit

- *Note the various control settings in case it is necessary to override them.
- Switch the panel switch to the drain (lower) position to drain water in sump tray.
- Switch the unit to the on (upper) position and allow the tank to refill.
- Place the unit into a RUN condition (*control settings may need to be overridden, refer to the programming section of this manual).

Step 4 - Add disinfection solution

- Add the solution to the water sump tray and allow to mix.
- Measure the strength of the disinfection solution and check it is the correct strength in accordance with manufacturers guidelines.
- Note the strengths of the disinfection solution at 15 minute intervals and record on a *Record of Cleaning & Disinfection* sheet for further reference.
- Adjust solution strength as required.

Cleaning and Disinfection

Cleaning and Disinfection Method Statement Cont.

Step 5 - Circulate disinfection solution

- Check all surfaces are wetted for a minimum of 1 hour at 50ppm.

Step 6 - Neutralise the disinfection solution

- Mix neutralising agent as manufacturers instructions.
- Allow the neutralising agent to disperse over the matrix and circulate in the sump tray.
- Measure the strength until the disinfection solution is weak (less than 5ppm)

Step 7 - Drain the unit into foul drain (MC3 ONLY)

- Turn Off any fill cycle.
- Drain unit until empty into appropriate drain (depending on Risk Assessment) and rinse the tank if necessary.
- *Where required, reset to original setting and put unit back into operation. Test for correct operation as per commissioning section of the manufacturers manual.
- Check for and complete maintenance requirements as per manufacturers instructions.
- Always leave work area clean, dry and tidy.

Step 8 - Recommission the HumEvap system

- Refer to the commissioning section of this manual.

If in doubt always call your distributor for advice.

6.5 Recommended Spares List

Stock Code	Description	HumEvap MC3	HumEvap OEM Circ	HumEvap OEM Direct
DISFINXL5	Box of 5 Disfin tablets	Y	Y	N/A
155014-44	Sediment filter	Y	Y	N/A
PureFloAg	Antimicrobial filter	Y	Y	N/A
50046	Float valve	Y	Y	N/A
04476	Drain valve	Y	Optional	N/A
04492	Inlet valve	Y	N/A	N/A
01098	Stage Control Solenoid Valve	Y	N/A	N/A
01976*	Re-circulating Pump 8K	Y	Y	N/A
01978*	Re-circulating Pump 12K	Y	Y	N/A
04445	Water Level Float Switch	Y	N/A	N/A
04514	MC 3 Controller	Y	N/A	N/A
04***	Flow Restrictor	Y	Y	Y

Stock Code	Description			
04466	14 l/m Flow Restrictor	Y	Y	Y
04465	8 l/m Flow Restrictor	Y	Y	Y
04541	1 l/m Flow Restrictor	Y	Y	Y
04542	2 l/m Flow Restrictor	Y	Y	Y
04543	3 l/m Flow Restrictor	Y	Y	Y
04544	4 l/m Flow Restrictor	Y	Y	Y
04545	5 l/m Flow Restrictor	Y	Y	Y
04546	6 l/m Flow Restrictor	Y	Y	Y

Stock Code:	Description:	Width (mm)	Height (mm)	Depth (mm)	Efficiency %	
HU02-200-25-01	Evaporative Matrix Cassette	300	250	100	75 (Type A)	
HU02-200-25-02	Evaporative Matrix Cassette	300	500	100	75 (Type A)	
HU02-200-25-03	Evaporative Matrix Cassette	600	250	100	75 (Type A)	
HU02-200-25-04	Evaporative Matrix Cassette	600	500	100	75 (Type A)	
HU02-200-25-17	Evaporative Matrix Cassette	300	1000	100	75 (Type A)	
HU02-200-25-20	Evaporative Matrix Cassette	600	1000	100	75 (Type A)	
HU02-200-25-05	Evaporative Matrix Cassette	300	250	150	85 (Type B)	
HU02-200-25-06	Evaporative Matrix Cassette	300	500	150	85 (Type B)	
HU02-200-25-07	Evaporative Matrix Cassette	600	250	150	85 (Type B)	
HU02-200-25-08	Evaporative Matrix Cassette	600	500	150	85 (Type B)	
HU02-200-25-18	Evaporative Matrix Cassette	300	1000	150	85 (Type B)	
HU02-200-25-21	Evaporative Matrix Cassette	600	1000	150	85 (Type B)	
HU02-200-25-09	Evaporative Matrix Cassette	300	250	200	95 (Type C)	
HU02-200-25-10	Evaporative Matrix Cassette	300	500	200	95 (Type C)	
HU02-200-25-11	Evaporative Matrix Cassette	600	250	200	95 (Type C)	
HU02-200-25-12	Evaporative Matrix Cassette	600	500	200	95 (Type C)	
HU02-200-25-19	Evaporative Matrix Cassette	300	1000	200	95 (Type C)	
HU02-200-25-22	Evaporative Matrix Cassette	600	1000	200	95 (Type C)	
HU02-200-25-13	Droplet Separator Cassette	300	250	35	N/A	
HU02-200-25-14	Droplet Separator Cassette	300	500	35	N/A	
HU02-200-25-15	Droplet Separator Cassette	600	250	35	N/A	
HU02-200-25-16	Droplet Separator Cassette	600	500	35	N/A	



WARNING:

If replacing Matrix material cassettes, ensure that the Matrix Wash Over procedure is completed before the system is run (see the Commissioning section of this manual for details).

HumEvap MC3 Frequency Asked Questions

Basic Problems:

1. I have just had a HumEvap installed, what does it mean when it asks for the 'release code'?

- A product activation code is required to enable the unit to work, and this needs to be entered into the software. Please contact your distributor (which is displayed on your control panel display) with unit details (model No. and serial No.), site address, contact name, email and telephone details.

2. What should I do if there are no lights and no display?

This could mean that you do not have a power supply or have the incorrect voltage. The corrective action for this is as follows:

- Check that the green light is lit on the side of the control panel. This indicates that there is a power supply connected.
- Check the power supply for correct electrical voltages including Neutral and Earth. Refer to CE label for correct voltage.
- Check that the electrical power isolator is switched on.
- Check that the HumEvap control panel on/off switch is enabled.
- Check the internal cables are fixed correctly and the power supply fuse.

3. My unit is on, but it's not operating, what should I check?

i) This may be that the HumEvap has an incorrect humidity demand. Make sure that:

- The control parameters are correct, see 'Step 1 Programming the controller' in the 'commissioning section' in the current manual.
- Check the set point demand for humidity, or temperature (if cooling) is set for the desired condition.
- Test for the control signal at terminals of the humidifier.
- Check for the correct polarity of the signal against the wiring diagram which can be found in the 'commissioning section'.

ii) Or the HumEvap may be disabled by a fault or an interlock (inc. occupations). Check the display for alarm indication and correct by:

- Checking terminals 12 & 13 and 14 & 15 for closed circuit in the HumEvap control panel.
- Checking occupancy settings on the HumEvap controller, see 'Step 9 Programming the controller'.
- Check air flow switch or pressure sensor in AHU or duct (if applicable).
- Check humidity is not greater than high level set point.
- Temporarily place hard wire links across terminals 12, 13 and 14,15 to enable system.
- Check the water supply has not been isolated and is at the correct pressure of 2 bar and flow of 14 l/min.

4. A message saying: SERVICE DUE has appeared and common fault is activated, what should I do?

The run hours have exceeded the service counter.

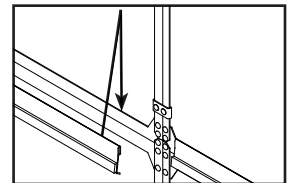
- Service to be completed as explained in the 'maintenance' section of the manual.
- *Contact the Customer Service hotline +44 (0)1903 858649 to arrange a service visit.*
- Reset service counters. Refer to the commissioning section of the manual.

HumEvap MC3 Frequency Asked Questions Cont.

Detailed Problems:

1. Why is there water is carrying over into the air stream and/or the water appears to be foaming?

- Make sure the humidifier evaporative material has been completely flushed at commissioning, to remove all manufacturing residues, including surfactants. Refer to the commissioning section of the manual.
- The humidifier matrix may be incorrectly fitted. Check the humidifier cassettes have been fitted correctly by referring to the HumEvap assembly guide.
- Check HumEvap installation is level in both planes.
- The water distribution header or pipework is damaged or incorrectly fitted. Check all pipes and fittings for damage. Check the water distribution header has been fitted correctly.
- The air velocity or flow might be uneven across the face area of the system. Fit a perforated plate before the HumEvap.
- The junction cover may be incorrectly fitted. Check the junction cover bracket is correctly fitted as shown.
- The air velocity across the face of the humidifier might be too high. Check the air velocity against the specification for the unit. Note that the HumEvap system has the following limits (see table):



2. Why is the HumEvap unit on but not filling up with water?

This could be due to:

- The control panel is not switched on. Switch on and check set-point.
- The water supply has been isolated. Check for water supply.
- The unit is outside occupancy. Check occupancy settings and times on the HumEvap controller; see 'Step 9 Programming the controller'.
- No demand for humidity. Refer to controls section of the current manual and check the control parameters are correct, see 'Step 1 Programming the controller' in the commissioning section. Check the demand for humidity or temperature (if cooling) is set for the desired condition.

No Separator	Separator
3.5 m/s (11.5 ft/s)	4.5 m/s (15 ft/s)

3. Water is leaking from the evaporative module tank or AHU, what should I check for?

- Check that the HumEvap is installed in a water proof section with drain pan.
- The tank level may be wrong. Check the tank is installed level in both planes.
- The HumEvap system might be incorrectly fitted. Check the humidifier has been fitted correctly by referring to the HumEvap assembly guide.
- The tank might be damaged. Check the tank for damage or holes.
- The drain pipe-work connection is damaged or incorrectly fitted. Check the pipe-work for leaks.
- Check that the float valve shuts off the water supply when the water depth rises above the bottom edge of the cross member (as shown).

HumEvap MC3 Frequency Asked Questions Cont.

4. The module pump won't start, why?

- The control panel is not switched on. Switch on and check set-point.
- The evaporative module tank water level isn't high enough. Check water level float switch position.
- The unit is in a fault mode. Refer to basic problem 3)ii.
- The unit is not calling for humidity/no control signal. Check control signal.
- The unit is out of occupancy. Check occupancy times, refer to programming the controller in the 'commissioning' section of the current manual.

5. Water sampling tests show contamination. What should I do?

- Check the drain pipe-work is not blocked and operation of the drain valve.
- This may be due to the AHU air, or supply water being contaminated. Refer to 'HumEvap Routine Water Sampling and Testing' and 'Cleaning and Disinfection' section. This can be found in the 'maintenance' section.
- Review the maintenance and cleaning requirements.
- Check the intake of the AHU for a contaminated source of moisture such as an ornamental pond fountain or cooling tower 'drift'. Note: A build up of 'dust or dirt' on the air on side may indicate air filtration problems.

6. The system is not reaching setpoint, or has loss of performance. What should I check?

- The humidifier cassettes are blocked or damaged. Check for damaged cassette(s) and replace if required.
- The humidifier cassettes are incorrectly fitted. Check the humidifier has been fitted correctly by referring to the HumEvap assembly guide.
- Insufficient water is being supplied to the matrix. Check the rotation of the module pump. Check the water supply pressure. Check the water distribution spray bars are not blocked with scale.
- Incorrect AHU air flow. Check the AHU airflow to ensure it is within the specification.

7. There is scale built up on the surface of the matrix. Why?

The process of evaporation leads to a build up of dissolved and salts in the reservoir. An excess concentration of minerals may result in scaling on the humidifier cassettes.

- Check the proximity of the heating coil and ensure that there is a minimum of 600mm clearance.
- Check the supply water quality and the parameters of the 'dilution cycle', especially the interval and duration settings, see 'Step 4 Programming the controller'.
- The water flow to the headers has reduced and wash over of humidifier cassettes is insufficient. Check the flow restrictors located after the pump in the water manifold are not blocked.
- Check the drain pipe-work is not blocked and operation of the drain valve.
- Note: A build up of 'dirt' on the air on side may indicate air filtration problems.

HumEvap MC3 System Weight

MODEL	Efficiency A	Efficiency A	Efficiency B	Efficiency B	Efficiency C	Efficiency C
	Dry Weight	Wet Weight	Dry Weight	Wet Weight	Dry Weight	Wet Weight
	(kg / lb)	(kg / lb)	(kg / lb)	(kg / lb)	(kg / lb)	(kg / lb)
HE-X11	48 / 106	66 / 146	49 / 108	70 / 154	51 / 112	73 / 161
HE-X12	50 / 110	71 / 157	53 / 117	76 / 168	55 / 121	80 / 176
HE-X13	53 / 117	75 / 165	56 / 123	81 / 179	59 / 130	87 / 192
HE-X14	56 / 123	79 / 174	60 / 132	87 / 192	63 / 139	94 / 207
HE-X15	58 / 127	83 / 183	63 / 139	92 / 203	67 / 148	101 / 223
HE-X16	61 / 134	88 / 194	66 / 146	98 / 216	71 / 157	108 / 238
HE-X17	64 / 141	92 / 203	70 / 154	104 / 229	75 / 165	115 / 254
HE-X18	67 / 148	96 / 212	74 / 163	110 / 243	80 / 176	123 / 271
HE-X19	69 / 152	100 / 220	76 / 168	114 / 251	83 / 183	129 / 284
HE-X21	55 / 121	85 / 187	57 / 126	89 / 196	59 / 130	93 / 205
HE-X22	58 / 127	90 / 198	61 / 134	97 / 214	64 / 141	103 / 227
HE-X23	61 / 134	95 / 209	65 / 143	104 / 229	69 / 152	112 / 247
HE-X24	65 / 143	101 / 223	70 / 154	112 / 247	74 / 163	122 / 269
HE-X25	67 / 148	106 / 234	73 / 161	119 / 262	79 / 174	131 / 289
HE-X26	71 / 157	112 / 247	78 / 172	127 / 280	84 / 185	141 / 311
HE-X27	74 / 163	117 / 258	82 / 181	134 / 295	89 / 196	150 / 331
HE-X28	78 / 172	123 / 271	87 / 192	142 / 313	95 / 209	160 / 353
HE-X29	80 / 176	127 / 280	90 / 198	148 / 326	98 / 216	168 / 370
HE-X31	62 / 137	102 / 225	65 / 143	107 / 236	67 / 148	113 / 249
HE-X32	67 / 148	109 / 240	71 / 157	117 / 258	74 / 163	125 / 276
HE-X33	69 / 152	114 / 251	75 / 165	126 / 278	79 / 174	136 / 300
HE-X34	74 / 163	122 / 269	81 / 179	136 / 300	86 / 190	149 / 328
HE-X35	76 / 168	128 / 282	84 / 185	144 / 317	91 / 201	160 / 353
HE-X36	81 / 179	135 / 298	90 / 198	155 / 342	98 / 216	173 / 381
HE-X37	84 / 185	141 / 311	94 / 207	163 / 359	103 / 227	184 / 406
HE-X38	89 / 196	149 / 328	100 / 220	174 / 384	110 / 243	197 / 434
HE-X39	91 / 201	154 / 340	104 / 229	182 / 401	114 / 251	207 / 456
HE-X41	71 / 157	120 / 265	75 / 165	127 / 280	78 / 172	134 / 295
HE-X42	77 / 170	129 / 284	82 / 181	140 / 309	86 / 190	150 / 331
HE-X43	79 / 174	136 / 300	87 / 192	150 / 331	92 / 203	164 / 362
HE-X44	85 / 187	145 / 320	94 / 207	163 / 359	101 / 223	180 / 397
HE-X45	89 / 196	152 / 335	99 / 218	174 / 384	107 / 236	194 / 428
HE-X46	95 / 209	162 / 357	106 / 234	187 / 412	116 / 256	210 / 463
HE-X47	98 / 216	169 / 373	111 / 245	198 / 437	123 / 271	224 / 494
HE-X48	104 / 229	178 / 392	119 / 262	210 / 463	132 / 291	240 / 529
HE-X49	108 / 238	186 / 410	124 / 273	222 / 489	138 / 304	254 / 560
HE-X51	79 / 174	137 / 302	83 / 183	146 / 322	87 / 192	155 / 342
HE-X52	85 / 187	148 / 326	90 / 198	160 / 353	96 / 212	172 / 379
HE-X53	88 / 194	155 / 342	96 / 212	173 / 381	103 / 227	189 / 417
HE-X54	94 / 207	166 / 366	104 / 229	188 / 414	113 / 249	207 / 456
HE-X55	98 / 216	175 / 386	110 / 243	200 / 441	120 / 265	223 / 492
HE-X56	105 / 231	185 / 408	118 / 260	214 / 472	129 / 284	241 / 531
HE-X57	108 / 238	193 / 425	124 / 273	227 / 500	137 / 302	258 / 569
HE-X58	115 / 254	204 / 450	132 / 291	242 / 534	146 / 322	276 / 608
HE-X59	119 / 262	213 / 470	139 / 306	255 / 562	154 / 340	293 / 646

HumEvap MC3 System Weight

MODEL	Efficiency A	Efficiency A	Efficiency B	Efficiency B	Efficiency C	Efficiency C
	Dry Weight (kg / lb)	Wet Weight (kg / lb)	Dry Weight (kg / lb)	Wet Weight (kg / lb)	Dry Weight (kg / lb)	Wet Weight (kg / lb)
HE-X61	85 / 187	153 / 337	90 / 198	164 / 362	95 / 209	174 / 384
HE-X62	93 / 205	166 / 366	100 / 220	181 / 399	106 / 234	195 / 430
HE-X63	96 / 212	175 / 386	106 / 234	196 / 432	115 / 254	214 / 472
HE-X64	104 / 229	188 / 414	116 / 256	213 / 470	126 / 278	236 / 520
HE-X65	110 / 243	198 / 437	124 / 273	228 / 503	136 / 300	256 / 564
HE-X66	117 / 258	211 / 465	133 / 293	246 / 542	147 / 324	278 / 613
HE-X67	121 / 267	220 / 485	141 / 311	261 / 575	156 / 344	297 / 655
HE-X68	129 / 284	233 / 514	150 / 331	278 / 613	168 / 370	319 / 703
HE-X69	133 / 293	243 / 536	156 / 344	292 / 644	176 / 388	337 / 743
HE-X71	95 / 209	173 / 381	100 / 220	185 / 408	105 / 231	196 / 432
HE-X72	103 / 227	187 / 412	110 / 243	204 / 450	118 / 260	220 / 485
HE-X73	106 / 234	197 / 434	118 / 260	220 / 485	127 / 280	242 / 534
HE-X74	115 / 254	211 / 465	128 / 282	240 / 529	139 / 306	266 / 586
HE-X75	121 / 267	223 / 492	136 / 300	257 / 567	149 / 328	288 / 635
HE-X76	129 / 284	237 / 522	147 / 324	276 / 608	162 / 357	312 / 688
HE-X77	133 / 293	247 / 545	155 / 342	293 / 646	171 / 377	334 / 736
HE-X78	142 / 313	262 / 578	165 / 364	312 / 688	184 / 406	358 / 789
HE-X79	146 / 322	272 / 600	172 / 379	328 / 723	193 / 425	379 / 836
HE-X81	105 / 231	193 / 425	111 / 245	206 / 454	117 / 258	219 / 483
HE-X82	113 / 249	208 / 459	122 / 269	227 / 500	131 / 289	246 / 542
HE-X83	119 / 262	221 / 487	132 / 291	247 / 545	143 / 315	272 / 600
HE-X84	129 / 284	237 / 522	144 / 317	269 / 593	157 / 346	299 / 659
HE-X85	135 / 298	249 / 549	152 / 335	288 / 635	168 / 370	323 / 712
HE-X86	144 / 317	265 / 584	164 / 362	309 / 681	182 / 401	350 / 772
HE-X87	149 / 328	277 / 611	173 / 381	328 / 723	193 / 425	375 / 827
HE-X88	158 / 348	293 / 646	185 / 408	350 / 772	207 / 456	402 / 886
HE-X89	164 / 362	305 / 672	193 / 425	368 / 811	218 / 481	426 / 939
HE-X91	112 / 247	210 / 463	119 / 262	224 / 494	125 / 276	239 / 527
HE-X92	121 / 267	226 / 498	131 / 289	247 / 545	140 / 309	268 / 591
HE-X93	127 / 280	240 / 529	141 / 311	269 / 593	153 / 337	296 / 653
HE-X94	137 / 302	257 / 567	154 / 340	293 / 646	168 / 370	326 / 719
HE-X95	144 / 317	271 / 597	163 / 359	313 / 690	180 / 397	352 / 776
HE-X96	153 / 337	288 / 635	176 / 388	336 / 741	195 / 430	382 / 842
HE-X97	159 / 351	301 / 664	185 / 408	358 / 789	206 / 454	409 / 902
HE-X98	168 / 370	318 / 701	198 / 437	381 / 840	222 / 489	439 / 968
HE-X99	174 / 384	331 / 730	207 / 456	401 / 884	233 / 514	465 / 1025

HumEvap OEM Circulating System Weight

MODEL	Efficiency A	Efficiency A	Efficiency B	Efficiency B	Efficiency C	Efficiency C
	Dry Weight (kg / lb)	Wet Weight (kg / lb)	Dry Weight (kg / lb)	Wet Weight (kg / lb)	Dry Weight (kg / lb)	Wet Weight (kg / lb)
HE-X11	35 / 77	54 / 119	37 / 82	58 / 128	38 / 84	61 / 134
HE-X12	38 / 84	59 / 130	40 / 88	63 / 139	43 / 95	68 / 150
HE-X13	40 / 88	62 / 137	43 / 95	69 / 152	46 / 101	74 / 163
HE-X14	44 / 97	67 / 148	47 / 104	75 / 165	51 / 112	82 / 181
HE-X15	46 / 101	71 / 157	50 / 110	80 / 176	54 / 119	88 / 194
HE-X16	49 / 108	75 / 165	54 / 119	86 / 190	59 / 130	96 / 212
HE-X17	51 / 112	79 / 174	57 / 126	91 / 201	63 / 139	103 / 227
HE-X18	55 / 121	84 / 185	61 / 134	97 / 214	68 / 150	110 / 243
HE-X19	56 / 123	87 / 192	64 / 141	102 / 225	71 / 157	116 / 256
HE-X21	43 / 95	72 / 159	45 / 99	77 / 170	47 / 104	81 / 179
HE-X22	46 / 101	78 / 172	49 / 108	84 / 185	52 / 115	91 / 201
HE-X23	49 / 108	83 / 183	53 / 117	92 / 203	56 / 123	100 / 220
HE-X24	52 / 115	89 / 196	58 / 128	100 / 220	62 / 137	110 / 243
HE-X25	55 / 121	94 / 207	61 / 134	106 / 234	66 / 146	118 / 260
HE-X26	59 / 130	99 / 218	66 / 146	114 / 251	72 / 159	128 / 282
HE-X27	61 / 134	104 / 229	70 / 154	122 / 269	77 / 170	138 / 304
HE-X28	65 / 143	110 / 243	74 / 163	130 / 287	82 / 181	148 / 326
HE-X29	67 / 148	115 / 254	78 / 172	136 / 300	86 / 190	156 / 344
HE-X31	50 / 110	89 / 196	53 / 117	95 / 209	55 / 121	101 / 223
HE-X32	55 / 121	97 / 214	58 / 128	105 / 231	62 / 137	113 / 249
HE-X33	57 / 126	102 / 225	62 / 137	114 / 251	67 / 148	124 / 273
HE-X34	62 / 137	110 / 243	68 / 150	124 / 273	74 / 163	137 / 302
HE-X35	64 / 141	115 / 254	72 / 159	132 / 291	78 / 172	148 / 326
HE-X36	69 / 152	123 / 271	78 / 172	142 / 313	85 / 187	160 / 353
HE-X37	71 / 157	128 / 282	82 / 181	151 / 333	90 / 198	171 / 377
HE-X38	76 / 168	136 / 300	88 / 194	162 / 357	97 / 214	184 / 406
HE-X39	79 / 174	142 / 313	91 / 201	169 / 373	102 / 225	195 / 430
HE-X41	59 / 130	108 / 238	62 / 137	115 / 254	65 / 143	122 / 269
HE-X42	64 / 141	117 / 258	69 / 152	127 / 280	74 / 163	138 / 304
HE-X43	67 / 148	123 / 271	74 / 163	138 / 304	80 / 176	152 / 335
HE-X44	73 / 161	133 / 293	82 / 181	151 / 333	89 / 196	168 / 370
HE-X45	76 / 168	140 / 309	87 / 192	162 / 357	95 / 209	181 / 399
HE-X46	82 / 181	150 / 331	94 / 207	174 / 384	104 / 229	197 / 434
HE-X47	85 / 187	157 / 346	99 / 218	185 / 408	110 / 243	211 / 465
HE-X48	92 / 203	166 / 366	107 / 236	198 / 437	119 / 262	228 / 503
HE-X49	96 / 212	174 / 384	112 / 247	209 / 461	126 / 278	242 / 534
HE-X51	67 / 148	125 / 276	71 / 157	134 / 295	74 / 163	142 / 313
HE-X52	72 / 159	135 / 298	78 / 172	148 / 326	83 / 183	160 / 353
HE-X53	76 / 168	143 / 315	84 / 185	161 / 355	91 / 201	177 / 390
HE-X54	82 / 181	154 / 340	92 / 203	175 / 386	100 / 220	195 / 430
HE-X55	86 / 190	162 / 357	98 / 216	188 / 414	108 / 238	211 / 465
HE-X56	92 / 203	173 / 381	106 / 234	202 / 445	117 / 258	229 / 505
HE-X57	96 / 212	181 / 399	112 / 247	215 / 474	125 / 276	246 / 542
HE-X58	102 / 225	192 / 423	120 / 265	230 / 507	134 / 295	264 / 582
HE-X59	107 / 236	201 / 443	126 / 278	243 / 536	142 / 313	281 / 619

HumEvap OEM Circulating System Weight

MODEL	Efficiency A	Efficiency A	Efficiency B	Efficiency B	Efficiency C	Efficiency C
	Dry Weight (kg / lb)	Wet Weight (kg / lb)	Dry Weight (kg / lb)	Wet Weight (kg / lb)	Dry Weight (kg / lb)	Wet Weight (kg / lb)
HE-X61	73 / 161	141 / 311	78 / 172	152 / 335	83 / 183	162 / 357
HE-X62	81 / 179	154 / 340	87 / 192	169 / 373	94 / 207	183 / 403
HE-X63	84 / 185	163 / 359	94 / 207	183 / 403	102 / 225	202 / 445
HE-X64	92 / 203	176 / 388	104 / 229	201 / 443	114 / 251	224 / 494
HE-X65	97 / 214	186 / 410	112 / 247	216 / 476	123 / 271	244 / 538
HE-X66	105 / 231	199 / 439	121 / 267	233 / 514	135 / 298	266 / 586
HE-X67	109 / 240	208 / 459	128 / 282	248 / 547	144 / 317	285 / 628
HE-X68	117 / 258	221 / 487	138 / 304	266 / 586	155 / 342	307 / 677
HE-X69	121 / 267	230 / 507	144 / 317	280 / 617	163 / 359	325 / 717
HE-X71	82 / 181	161 / 355	88 / 194	173 / 381	93 / 205	184 / 406
HE-X72	90 / 198	175 / 386	98 / 216	192 / 423	105 / 231	208 / 459
HE-X73	94 / 207	185 / 408	105 / 231	208 / 459	114 / 251	229 / 505
HE-X74	103 / 227	199 / 439	116 / 256	228 / 503	127 / 280	254 / 560
HE-X75	109 / 240	211 / 465	124 / 273	245 / 540	137 / 302	276 / 608
HE-X76	117 / 258	225 / 496	135 / 298	264 / 582	150 / 331	300 / 661
HE-X77	121 / 267	235 / 518	142 / 313	281 / 619	159 / 351	322 / 710
HE-X78	129 / 284	249 / 549	153 / 337	300 / 661	172 / 379	346 / 763
HE-X79	134 / 295	260 / 573	160 / 353	316 / 697	181 / 399	367 / 809
HE-X81	92 / 203	181 / 399	99 / 218	194 / 428	105 / 231	207 / 456
HE-X82	101 / 223	196 / 432	110 / 243	215 / 474	118 / 260	234 / 516
HE-X83	107 / 236	209 / 461	120 / 265	235 / 518	130 / 287	259 / 571
HE-X84	116 / 256	224 / 494	132 / 291	257 / 567	145 / 320	287 / 633
HE-X85	122 / 269	237 / 522	140 / 309	275 / 606	155 / 342	311 / 686
HE-X86	131 / 289	253 / 558	152 / 335	297 / 655	169 / 373	338 / 745
HE-X87	136 / 300	265 / 584	161 / 355	316 / 697	181 / 399	363 / 800
HE-X88	146 / 322	280 / 617	173 / 381	338 / 745	195 / 430	390 / 860
HE-X89	151 / 333	293 / 646	181 / 399	356 / 785	205 / 452	414 / 913
HE-X91	100 / 220	197 / 434	106 / 234	212 / 467	113 / 249	226 / 498
HE-X92	109 / 240	214 / 472	119 / 262	235 / 518	128 / 282	256 / 564
HE-X93	115 / 254	228 / 503	129 / 284	257 / 567	140 / 309	284 / 626
HE-X94	125 / 276	245 / 540	142 / 313	281 / 619	156 / 344	313 / 690
HE-X95	131 / 289	259 / 571	151 / 333	301 / 664	167 / 368	340 / 750
HE-X96	141 / 311	276 / 608	163 / 359	324 / 714	182 / 401	370 / 816
HE-X97	146 / 322	288 / 635	173 / 381	345 / 761	194 / 428	397 / 875
HE-X98	156 / 344	306 / 675	186 / 410	369 / 814	209 / 461	426 / 939
HE-X99	162 / 357	319 / 703	195 / 430	389 / 858	221 / 487	453 / 999

HumEvap OEM Direct Feed System Weight

MODEL	Efficiency A	Efficiency A	Efficiency B	Efficiency B	Efficiency C	Efficiency C
	Dry Weight (kg / lb)	Wet Weight (kg / lb)	Dry Weight (kg / lb)	Wet Weight (kg / lb)	Dry Weight (kg / lb)	Wet Weight (kg / lb)
HE-X11	26 / 57	45 / 99	27 / 60	48 / 106	29 / 64	51 / 112
HE-X12	28 / 62	49 / 108	31 / 68	54 / 119	33 / 73	58 / 128
HE-X13	31 / 68	53 / 117	34 / 75	59 / 130	37 / 82	65 / 143
HE-X14	34 / 75	57 / 126	38 / 84	65 / 143	41 / 90	72 / 159
HE-X15	36 / 79	61 / 134	41 / 90	70 / 154	45 / 99	79 / 174
HE-X16	39 / 86	66 / 146	44 / 97	76 / 168	49 / 108	86 / 190
HE-X17	42 / 93	70 / 154	48 / 106	82 / 181	53 / 117	93 / 205
HE-X18	45 / 99	74 / 163	52 / 115	88 / 194	58 / 128	101 / 223
HE-X19	47 / 104	78 / 172	54 / 119	92 / 203	61 / 134	107 / 236
HE-X21	33 / 73	63 / 139	35 / 77	67 / 148	37 / 82	71 / 157
HE-X22	36 / 79	68 / 150	39 / 86	75 / 165	42 / 93	81 / 179
HE-X23	39 / 86	73 / 161	43 / 95	82 / 181	47 / 104	90 / 198
HE-X24	43 / 95	79 / 174	48 / 106	90 / 198	52 / 115	100 / 220
HE-X25	45 / 99	84 / 185	51 / 112	97 / 214	57 / 126	109 / 240
HE-X26	49 / 108	90 / 198	56 / 123	105 / 231	62 / 137	119 / 262
HE-X27	52 / 115	95 / 209	60 / 132	112 / 247	67 / 148	128 / 282
HE-X28	56 / 123	101 / 223	65 / 143	120 / 265	73 / 161	138 / 304
HE-X29	58 / 128	105 / 231	68 / 150	127 / 280	76 / 168	146 / 322
HE-X31	40 / 88	80 / 176	43 / 95	85 / 187	45 / 99	91 / 201
HE-X32	45 / 99	87 / 192	49 / 108	95 / 209	52 / 115	104 / 229
HE-X33	47 / 104	92 / 203	53 / 117	104 / 229	57 / 126	114 / 251
HE-X34	52 / 115	100 / 220	59 / 130	114 / 251	64 / 141	127 / 280
HE-X35	54 / 119	106 / 234	62 / 137	122 / 269	69 / 152	138 / 304
HE-X36	59 / 130	113 / 249	68 / 150	133 / 293	76 / 168	151 / 333
HE-X37	62 / 137	119 / 262	72 / 159	141 / 311	81 / 179	162 / 357
HE-X38	67 / 148	127 / 280	78 / 172	152 / 335	88 / 194	175 / 386
HE-X39	69 / 152	132 / 291	82 / 181	160 / 353	92 / 203	185 / 408
HE-X41	49 / 108	98 / 216	52 / 115	105 / 231	56 / 123	112 / 247
HE-X42	55 / 121	107 / 236	62 / 137	118 / 260	64 / 141	128 / 282
HE-X43	57 / 126	114 / 251	65 / 143	128 / 282	70 / 154	142 / 313
HE-X44	63 / 139	123 / 271	72 / 159	141 / 311	79 / 174	158 / 348
HE-X45	67 / 148	130 / 287	77 / 170	152 / 335	85 / 187	172 / 379
HE-X46	73 / 161	140 / 309	84 / 185	165 / 364	94 / 207	188 / 414
HE-X47	76 / 168	147 / 324	89 / 196	176 / 388	101 / 223	202 / 445
HE-X48	82 / 181	157 / 346	97 / 214	188 / 414	110 / 243	218 / 481
HE-X49	86 / 190	164 / 362	102 / 225	200 / 441	116 / 256	232 / 511
HE-X51	57 / 126	115 / 254	61 / 134	124 / 273	65 / 143	133 / 293
HE-X52	63 / 139	126 / 278	68 / 150	138 / 304	74 / 163	150 / 331
HE-X53	66 / 146	133 / 293	74 / 163	151 / 333	81 / 179	167 / 368
HE-X54	72 / 159	144 / 317	82 / 181	166 / 366	91 / 201	185 / 408
HE-X55	76 / 168	153 / 337	88 / 194	178 / 392	98 / 216	201 / 443
HE-X56	83 / 183	163 / 359	96 / 212	192 / 423	107 / 236	219 / 483
HE-X57	86 / 190	171 / 377	102 / 225	205 / 452	115 / 254	236 / 520
HE-X58	93 / 205	182 / 401	110 / 243	220 / 485	124 / 273	254 / 560
HE-X59	97 / 214	191 / 421	117 / 258	233 / 514	132 / 291	271 / 597

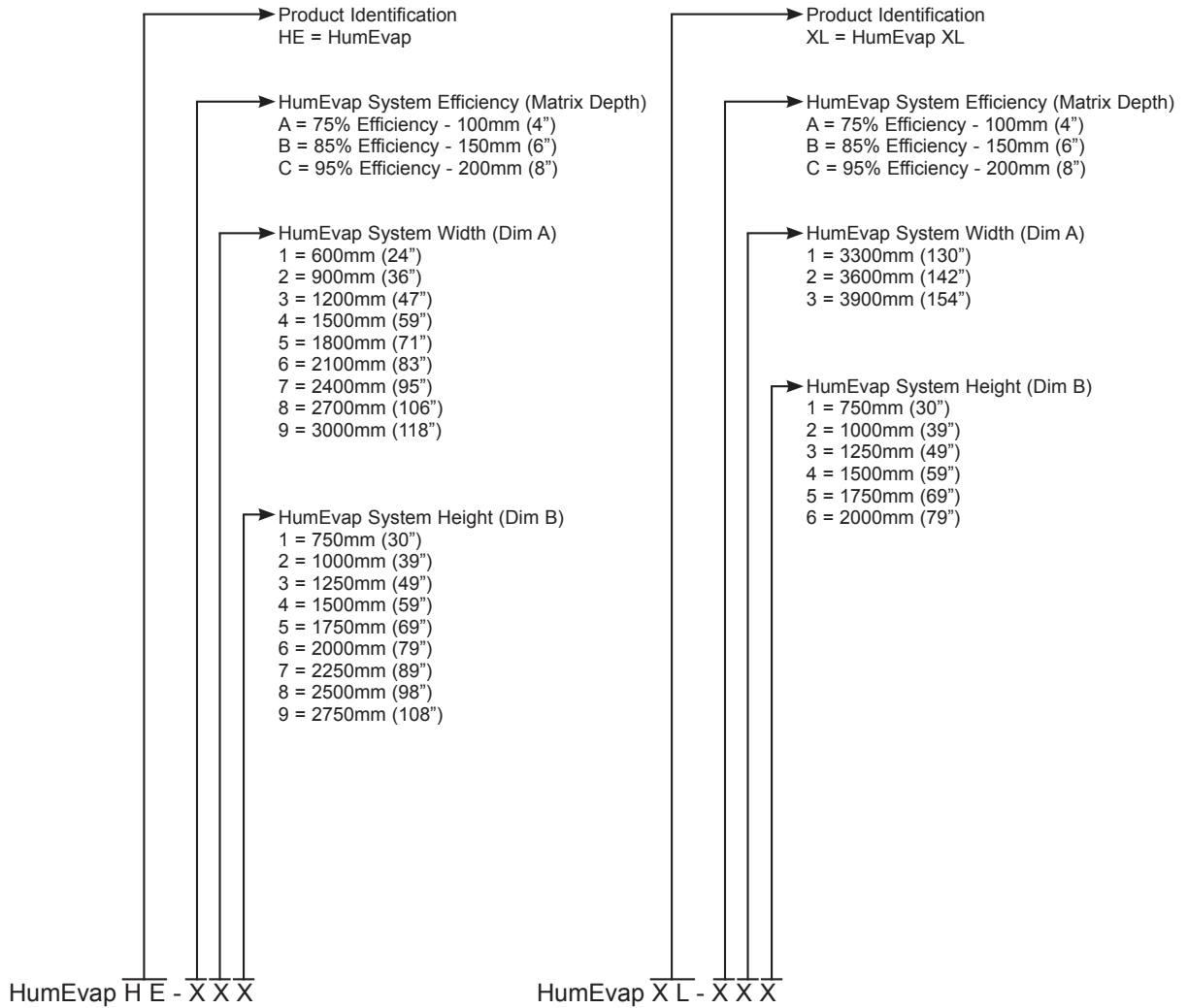
HumEvap OEM Direct Feed System Weight

MODEL	Efficiency A Dry Weight (kg / lb)	Efficiency A Wet Weight (kg / lb)	Efficiency B Dry Weight (kg / lb)	Efficiency B Wet Weight (kg / lb)	Efficiency C Dry Weight (kg / lb)	Efficiency C Wet Weight (kg / lb)
HE-X61	63 / 139	131 / 289	68 / 150	142 / 313	73 / 161	152 / 335
HE-X62	71 / 157	144 / 317	78 / 172	159 / 351	84 / 185	173 / 381
HE-X63	74 / 163	153 / 337	85 / 187	174 / 384	93 / 205	192 / 423
HE-X64	82 / 181	166 / 366	94 / 207	191 / 421	104 / 229	214 / 472
HE-X65	88 / 194	176 / 388	102 / 225	206 / 454	114 / 251	234 / 516
HE-X66	95 / 209	189 / 417	111 / 245	224 / 494	125 / 276	256 / 564
HE-X67	99 / 218	198 / 437	118 / 260	239 / 527	134 / 295	275 / 606
HE-X68	107 / 236	211 / 465	128 / 282	256 / 564	146 / 322	297 / 655
HE-X69	111 / 245	221 / 487	134 / 295	270 / 595	154 / 340	315 / 694
HE-X71	73 / 161	151 / 333	78 / 172	163 / 359	83 / 183	174 / 384
HE-X72	81 / 179	165 / 364	88 / 194	182 / 401	96 / 212	198 / 437
HE-X73	84 / 185	175 / 386	96 / 212	199 / 439	105 / 231	220 / 485
HE-X74	93 / 205	189 / 417	106 / 234	218 / 481	117 / 258	244 / 538
HE-X75	99 / 218	201 / 443	114 / 251	235 / 518	127 / 280	266 / 586
HE-X76	107 / 236	215 / 474	125 / 276	254 / 560	140 / 309	290 / 639
HE-X77	111 / 245	225 / 496	133 / 293	271 / 597	149 / 328	312 / 688
HE-X78	120 / 265	240 / 529	143 / 315	290 / 639	162 / 357	336 / 741
HE-X79	124 / 273	250 / 551	160 / 353	306 / 675	171 / 377	357 / 787
HE-X81	83 / 183	171 / 377	89 / 196	184 / 406	95 / 209	197 / 434
HE-X82	91 / 201	186 / 410	100 / 220	205 / 452	109 / 240	224 / 494
HE-X83	97 / 214	199 / 439	110 / 243	226 / 498	121 / 267	250 / 551
HE-X84	107 / 236	215 / 474	122 / 269	247 / 545	135 / 298	277 / 611
HE-X85	113 / 249	227 / 500	131 / 289	266 / 586	146 / 322	301 / 664
HE-X86	122 / 269	243 / 536	142 / 313	287 / 633	160 / 353	328 / 723
HE-X87	127 / 280	255 / 562	151 / 333	306 / 675	171 / 377	353 / 778
HE-X88	136 / 300	271 / 597	163 / 359	328 / 723	185 / 408	380 / 838
HE-X89	142 / 313	283 / 624	171 / 377	346 / 763	196 / 432	404 / 891
HE-X91	90 / 198	188 / 414	97 / 214	202 / 445	103 / 227	217 / 478
HE-X92	99 / 218	204 / 450	109 / 240	225 / 496	128 / 282	246 / 542
HE-X93	105 / 231	218 / 481	119 / 262	247 / 545	131 / 289	274 / 604
HE-X94	115 / 254	235 / 518	132 / 291	271 / 597	146 / 322	304 / 670
HE-X95	122 / 269	249 / 549	141 / 311	291 / 642	158 / 348	330 / 728
HE-X96	131 / 289	266 / 586	154 / 340	314 / 692	173 / 381	360 / 794
HE-X97	137 / 302	279 / 615	163 / 359	336 / 741	184 / 406	387 / 853
HE-X98	146 / 322	396 / 873	176 / 388	359 / 791	200 / 441	417 / 919
HE-X99	152 / 335	309 / 681	185 / 408	379 / 836	211 / 465	443 / 977

HumEvap Separator Weight

MODEL	Dry Weight (kg / lb)	Wet Weight (kg / lb)	MODEL	Dry Weight (kg / lb)	Wet Weight (kg / lb)
SEP-11	2.1 / 4.6	3.1 / 6.8	SEP-61	6.1 / 13.4	9.5 / 20.9
SEP-12	3.2 / 7.1	4.7 / 10.4	SEP-62	9.4 / 20.7	14.6 / 32.2
SEP-13	3.9 / 8.6	5.9 / 13.0	SEP-63	11.0 / 24.3	18.0 / 39.7
SEP-14	5.0 / 11.0	7.5 / 16.5	SEP-64	14.3 / 31.5	23.1 / 50.9
SEP-15	5.7 / 12.6	8.6 / 19.0	SEP-65	16.0 / 35.3	26.5 / 58.4
SEP-16	6.8 / 15.0	10.3 / 22.7	SEP-66	19.3 / 42.5	31.6 / 69.7
SEP-17	7.5 / 16.5	11.4 / 25.1	SEP-67	21.0 / 46.3	35.0 / 77.2
SEP-18	8.6 / 19.0	13.1 / 28.9	SEP-68	24.3 / 53.6	40.0 / 88.2
SEP-19	9.3 / 20.5	14.2 / 31.3	SEP-69	26.0 / 57.3	43.5 / 95.9
SEP-21	2.7 / 6.0	4.2 / 9.3	SEP-71	6.7 / 14.8	10.7 / 23.6
SEP-22	4.2 / 9.3	6.4 / 14.1	SEP-72	10.3 / 22.7	16.3 / 35.9
SEP-23	5.0 / 11.0	8.0 / 17.6	SEP-73	12.1 / 26.7	20.1 / 44.3
SEP-24	6.5 / 14.3	10.2 / 22.5	SEP-74	15.8 / 34.8	25.8 / 56.9
SEP-25	7.2 / 15.9	11.7 / 25.8	SEP-75	17.6 / 38.8	29.6 / 65.3
SEP-26	8.7 / 19.2	13.9 / 30.6	SEP-76	21.2 / 46.7	35.2 / 77.6
SEP-27	9.5 / 20.9	15.5 / 34.2	SEP-77	23.0 / 50.7	39.1 / 86.2
SEP-28	11.0 / 24.3	17.7 / 39.0	SEP-78	26.7 / 58.9	44.7 / 98.5
SEP-29	11.7 / 25.8	19.2 / 42.3	SEP-79	28.5 / 62.8	48.5 / 106.9
SEP-31	3.3 / 7.3	5.3 / 11.7	SEP-81	7.7 / 17.0	12.2 / 26.9
SEP-32	5.2 / 11.5	8.2 / 18.1	SEP-82	11.9 / 26.2	18.7 / 41.2
SEP-33	6.1 / 13.4	10.1 / 22.3	SEP-83	14.1 / 31.1	23.1 / 50.9
SEP-34	7.9 / 17.4	12.9 / 28.4	SEP-84	18.3 / 40.3	29.5 / 65.0
SEP-35	8.8 / 19.4	14.8 / 32.6	SEP-85	20.4 / 45.0	33.9 / 74.7
SEP-36	10.6 / 23.4	17.6 / 38.8	SEP-86	24.6 / 54.2	40.4 / 89.1
SEP-37	11.5 / 25.4	19.5 / 43.0	SEP-87	26.8 / 59.1	44.8 / 98.8
SEP-38	13.3 / 29.3	22.3 / 49.2	SEP-88	31.0 / 68.3	51.2 / 112.9
SEP-39	14.2 / 31.3	24.3 / 53.6	SEP-89	33.1 / 73.0	55.6 / 122.6
SEP-41	4.4 / 9.7	6.9 / 15.2	SEP-91	8.4 / 18.5	13.4 / 29.5
SEP-42	6.8 / 15.0	10.5 / 23.1	SEP-92	12.9 / 28.4	20.4 / 45.0
SEP-43	8.0 / 17.6	13.0 / 28.7	SEP-93	15.2 / 33.5	25.2 / 55.6
SEP-44	10.4 / 22.9	16.6 / 36.6	SEP-94	19.7 / 43.4	32.2 / 71.0
SEP-45	11.6 / 25.6	19.1 / 42.1	SEP-95	22.0 / 48.5	37.0 / 81.6
SEP-46	14.0 / 30.9	22.7 / 50.0	SEP-96	26.5 / 58.4	44.0 / 97.0
SEP-47	15.3 / 33.7	25.2 / 55.6	SEP-97	28.8 / 63.5	48.8 / 107.6
SEP-48	17.6 / 38.8	28.9 / 63.7	SEP-98	33.4 / 73.6	55.9 / 123.2
SEP-49	18.9 / 41.7	31.4 / 69.2	SEP-99	35.6 / 78.5	60.6 / 133.6
SEP-51	5.0 / 11.0	8.0 / 17.6			
SEP-52	7.7 / 17.0	12.2 / 26.9			
SEP-53	9.1 / 20.1	15.1 / 33.3			
SEP-54	11.8 / 26.0	19.3 / 42.5			
SEP-55	13.2 / 29.1	22.2 / 48.9			
SEP-56	15.9 / 35.1	26.4 / 58.2			
SEP-57	17.3 / 38.1	29.3 / 64.6			
SEP-58	20.0 / 44.1	33.5 / 73.9			
SEP-59	21.4 / 47.2	36.4 / 80.2			

HumEvap Module Code Identification



HumEvap Identification Example:

System Code: HE-B96

Therefore...

HE = HumEvap
 B = 85% Efficient, 150mm (6") Matrix Depth
 9 = 3000mm (108") Width
 6 = 2000mm (79") Height

NB: HumEvap XL systems are not part of the standard range and are selected by your distributor on request.

NOTES:

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