

# OPERATION MANUAL

Adiabatic air humidification/air cooling system  
Condair **ME Direct Feed**

Humidification, Dehumidification  
and Evaporative Cooling

 **condair**

# Thank you for choosing Condair

Installation date (MM/DD/YYYY):

Commissioning date (MM/DD/YYYY):

Site:

Model:

Serial number:

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# 1 Introduction

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## 1.1 General

We thank you for having purchased the **Condair ME Direct Feed Evaporative Humidifier and Cooler** (Condair ME Direct Feed for short).

To ensure a safe, proper, and economical operation of the Condair ME Direct Feed, please observe and comply with all information and safety instructions contained in the present documentation as well as in the separate documentations of the components installed in the humidification system. Improper use of the Condair ME Direct Feed may result in danger to the user or third parties and/or impairment of material assets.

If you have questions after reading this documentation, please contact your Condair representative. They will be glad to assist you.

## 1.2 Notes on the operation manual

### Limitation

**The subject of this operation manual is the Condair ME Direct Feed Evaporative Humidifier and Cooler.** The various options and accessories are only described insofar as is necessary for proper operation of the equipment. Further information on options and accessories can be obtained in the respective instructions.

This operation manual is restricted to the **commissioning**, the **operation**, the **maintenance** and **troubleshooting** of the Condair ME Direct Feed and is meant for **well trained personnel being sufficiently qualified for their respective work**.

Please note, some illustrations in this manual may show options and accessories which may not be supplied as standard or available in your country. Please check availability and specification details with your Condair representative.

The operation manual is supplemented by various separate items of documentation (such as the installation manual), which are included in the delivery as well. Where necessary, appropriate cross-references are made to these publications in the operation manual.

## Symbols used in this manual



### CAUTION!

The catchword "CAUTION" used in conjunction with the caution symbol in the circle designates notes in this operation manual that, if neglected, may cause **damage and/or malfunction of the unit or other material assets**.



### WARNING!

The catchword "WARNING" used in conjunction with the general caution symbol designates safety and danger notes in this operation manual that, if neglected, may cause **injury to persons**.



### DANGER!

The catchword "DANGER" used in conjunction with the general caution symbol designates safety and danger notes in this operation manual that, if neglected, may lead to **severe injury or even death of persons**.

## Safekeeping

Please safeguard this operation manual in a safe place, where it can be immediately accessed. If the equipment changes hands, the operation manual must be passed on to the new operator.

If the operation manual gets mislaid, please contact your Condair representative.

## Language versions

This operation manual is available in various languages. Please contact your Condair representative for information.

## 2 For your safety

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### General

Every person working with the Condair ME Direct Feed must have read and understood the operation manual of the Condair ME Direct Feed before carrying out any work.

Knowing and understanding the contents of the operation manual is a basic requirement for protecting the personnel against any kind of danger, to prevent faulty operation, and to operate the unit safely and correctly.

All ideograms, signs and markings applied to the components of the Condair ME Direct Feed must be observed and kept in readable state.

### Qualification of personnel

All work described in this operation manual **may only be carried out by specialists who are well trained and adequately qualified and are authorized by the customer.**

For safety and warranty reasons any action beyond the scope of this manual must only be carried out by personnel with appropriate industry recognised qualifications or training.

It is assumed that all persons working with the Condair ME Direct Feed are familiar and comply with the appropriate local regulations on work safety and the prevention of accidents.

The Condair ME Direct Feed may not be used by persons (including children) with reduced physical, sensory or mental abilities or persons with lacking experience and/or knowledge, unless they are supervised by a person responsible for their safety or they received instructions on how to operate the system. Children must be supervised to make sure that they do not play with the Condair ME Direct Feed.

### Intended use

The Condair ME Direct Feed is intended exclusively for **air humidification and air cooling in AHU's or air ducts** within the specified operating conditions. Any other type of application, without the written consent of the manufacturer, is considered as not conforming with the intended purpose and may lead to the Condair ME Direct Feed becoming dangerous.

Operation of the equipment in the intended manner requires **that all the information contained in this operation manual are observed (in particular the safety instructions).**

## Danger that may arise from the Condair ME Direct Feed



### **DANGER!**

**Health risk because of inadequate hygiene!**

**Inadequately operated and/or poorly maintained evaporative humidification/cooling systems may endanger health. When inadequately operated and/or poorly maintained micro-organisms (including the bacterium which causes Legionnaire's disease) may grow in the evaporative module, the water tank and the water system of the Condair ME Direct Feed and may affect the air in the AHU/air duct.**

**Prevention:** the Condair ME Direct Feed must strictly be operated and maintained in accordance with this manual



### **WARNING!**

Some types of evaporative material are manufactured from glass fibre. Though this material 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.

## **Correct lifting and handling**

Lifting or handling of components always carries an element of risk, and therefore must only be carried out by trained and qualified personnel. Ensure that any lifting operations have been fully planned and risk assessed. All equipment should be 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.

## **Preventing unsafe operation**

If it is suspected that **safe and hygienic operation is no longer possible**, then the Condair ME Direct Feed should immediately **be shut down and secured against accidental power-up according to [chapter 4.5](#)**. This can be the case under the following circumstances:

- if the Condair ME Direct Feed is damaged
- if the Condair ME Direct Feed is contaminated
- if the electrical installations are damaged
- if the Condair ME Direct Feed is no longer operating correctly
- if connections and/or piping are leaking

All persons working with the Condair ME Direct Feed must report any alterations to the system that may affect safety to the owner without delay.

## **Prohibited modifications to the unit**

**No modifications must be undertaken** on the Condair ME Direct Feed without the express written consent of the manufacturer.

For the replacement of defective components use exclusively **original accessories and spare parts** available from your Condair representative.

## 3 Product Overview

### 3.1 Model overview

The **standard version** includes the **evaporative module** (75%, 85 % or 95 % efficiency depending on the cassette type) and a **hydraulic manifold without valves** (for internal or external installation).

All controls to the Condair ME Direct Feed system must be supplied by others. The Condair ME Direct Feed system can be controlled in two modes:

- **On/Off Control:** Provides simple control of direct feed systems which includes timed purge function to enhance system hygiene.
- **Stage Control:** Provides simple analogue control of direct feed systems which includes timed purge function to enhance system hygiene.

Options
<b>Glass Fibre Media</b> Composite non particle-releasing glass fibre media with anti-microbial impregnation and A2, S2, d0 (UL Class 1) fire rating. Available in 75%, 85% and 95% efficiencies.
<b>Droplet Separator</b> Droplet catching matrix increasing maximum face velocity limit without droplet carry-over to 4.5 m/s (886 fpm).
<b>Evaporative module Blanking</b> Kit to secure Condair ME and prevent air-bypass within the duct / AHU.
<b>Stage valves</b> Valve kit which facilitates stage control of direct feed systems using customer controls. Available in 2, 3, 4 and 5 stage versions.
<b>Inlet, drain and purge valve</b> Valve kit for customers who wish to create their own basic on/off direct feed control system.



## 3.2 Product designation / Which model do you have

The product designation and the most important unit data (e.g. serial number, evaporative module product key, etc.) are found on the rating plate fixed on the left side of the evaporative module.

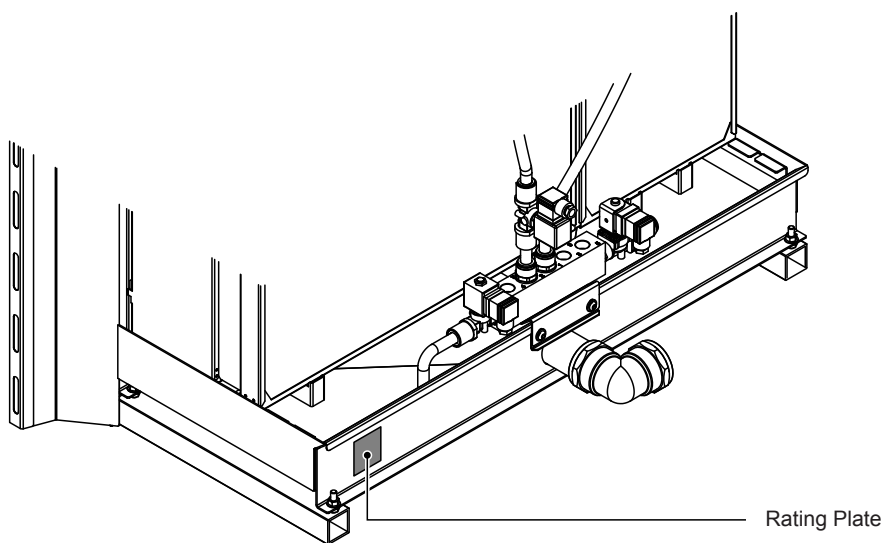


Fig. 1: Position of rating plate

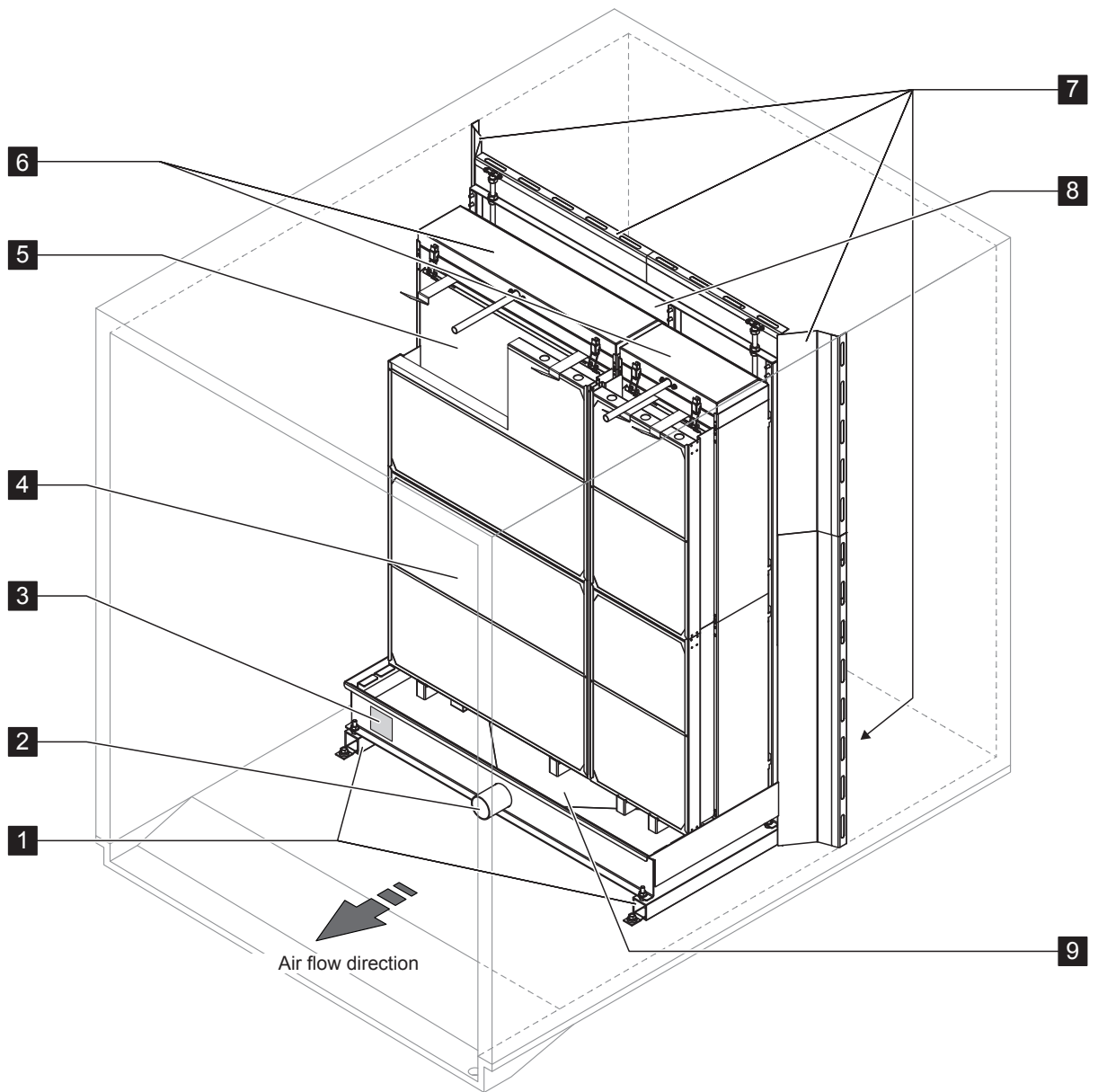
### Evaporative module product key

Example:  
**ME-CL0900S-1125-F95X**

Product identification	_____	_____	_____	_____	_____	_____	_____	_____	_____
<b>ME</b> (media evaporator)									
Tank spigot position:	_____	_____	_____	_____	_____	_____	_____	_____	_____
<b>C</b> = Center									
<b>L</b> = Left									
<b>R</b> = Right									
Tank spigot diameter:	_____	_____	_____	_____	_____	_____	_____	_____	_____
<b>S</b> = Small = $\varnothing 50$ mm									
<b>L</b> = Large = $\varnothing 54$ mm ( $\varnothing 2.125$ " )									
<b>Width</b> evaporative module in mm	_____	_____	_____	_____	_____	_____	_____	_____	_____
Tank type:	_____	_____	_____	_____	_____	_____	_____	_____	_____
<b>S</b> = Single spigot tank									
<b>D</b> = Double spigot tank (systems >3000 mm wide only)									
<b>Height</b> evaporative module in mm	_____	_____	_____	_____	_____	_____	_____	_____	_____
Material type and efficiency evaporative cassettes:	_____	_____	_____	_____	_____	_____	_____	_____	_____
<b>F75</b> = F-Type Glass fibre 75 %									
<b>F85</b> = F-Type Glass fibre 85 %									
<b>F95</b> = F-Type Glass fibre 95 %									
<b>C85</b> = C-Type Glass fibre 85 %									
<b>C95</b> = C-Type Glass fibre 95 %									
Indicates a country specific variation:	_____	_____	_____	_____	_____	_____	_____	_____	_____

### 3.3 Construction of the system components

#### 3.3.1 Construction of the evaporative module



- |   |   |
|---|---|
| 1 Upstands  | 5 Evaporative cassettes (F75, F85, F95, C85 or C95) |
| 2 Tank connector $\varnothing 50$ mm, or $\varnothing 54$ mm (2.125"), as applicable                | 6 Distribution heads                                |
| 3 Rating plate  | 7 Blanking plates (option)                          |
| 4 Droplet separator, mandatory for high face velocities (allows velocities up to 4.5 m/s (886 fpm)) | 8 Mounting frame for evaporative cassettes          |
|   | 9 Water tank  |

*Fig. 2: Construction of the evaporative module*

### 3.3.2 Construction of the hydraulic manifold

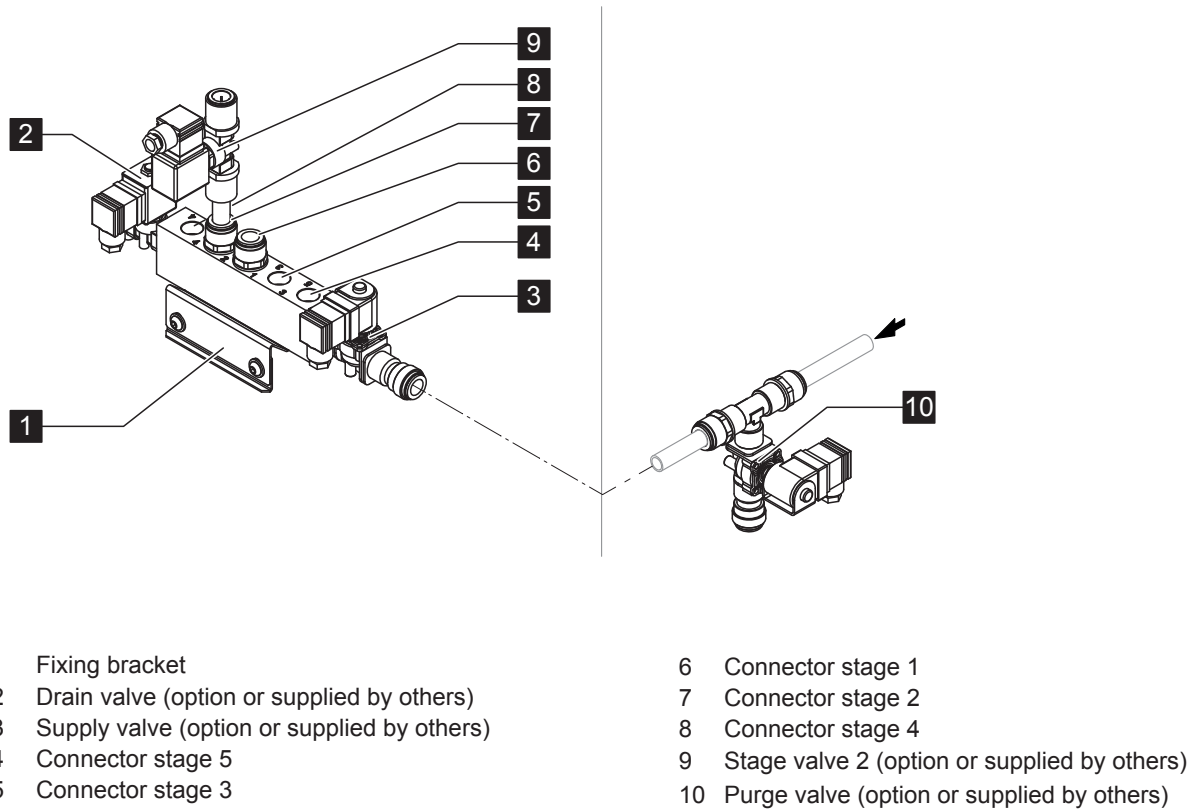


Fig. 3: Construction of the hydraulic manifold (figure shows layout for 2-stage control)

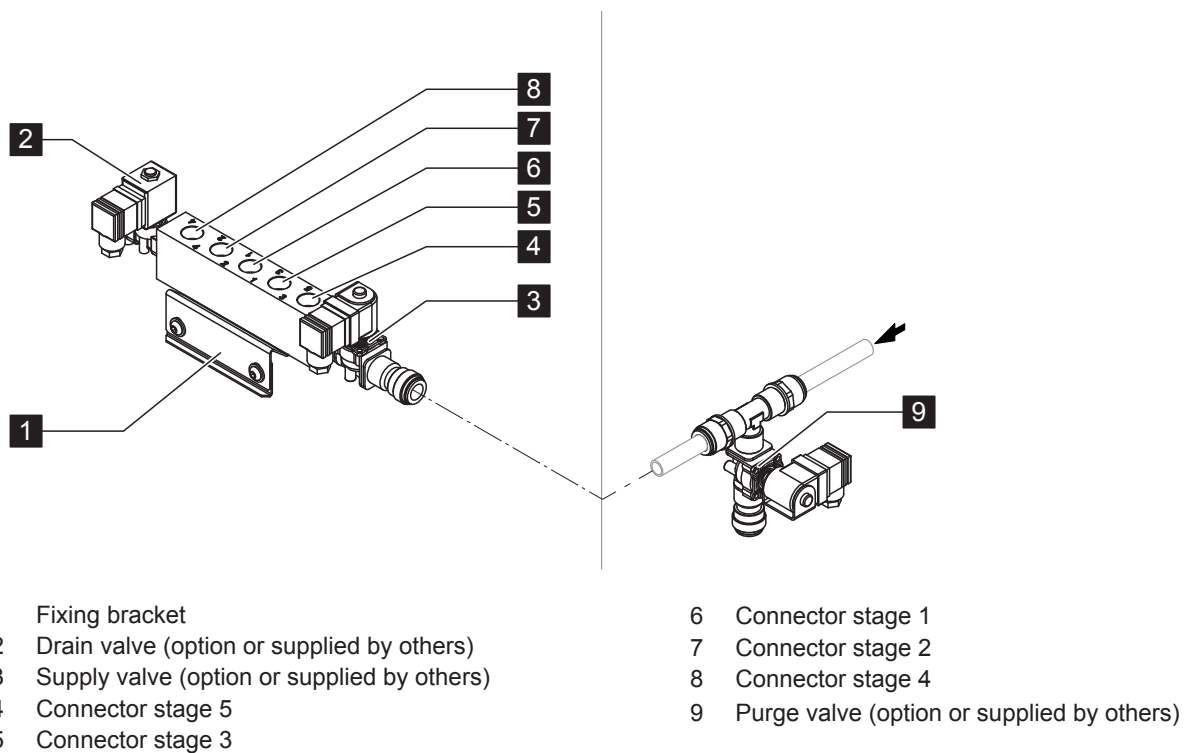


Fig. 4: Construction of the hydraulic manifold (figure shows layout for On/Off control)

## 3.4 System overviews

### 3.4.1 Typical system Condair ME Direct Feed (internally mounted)

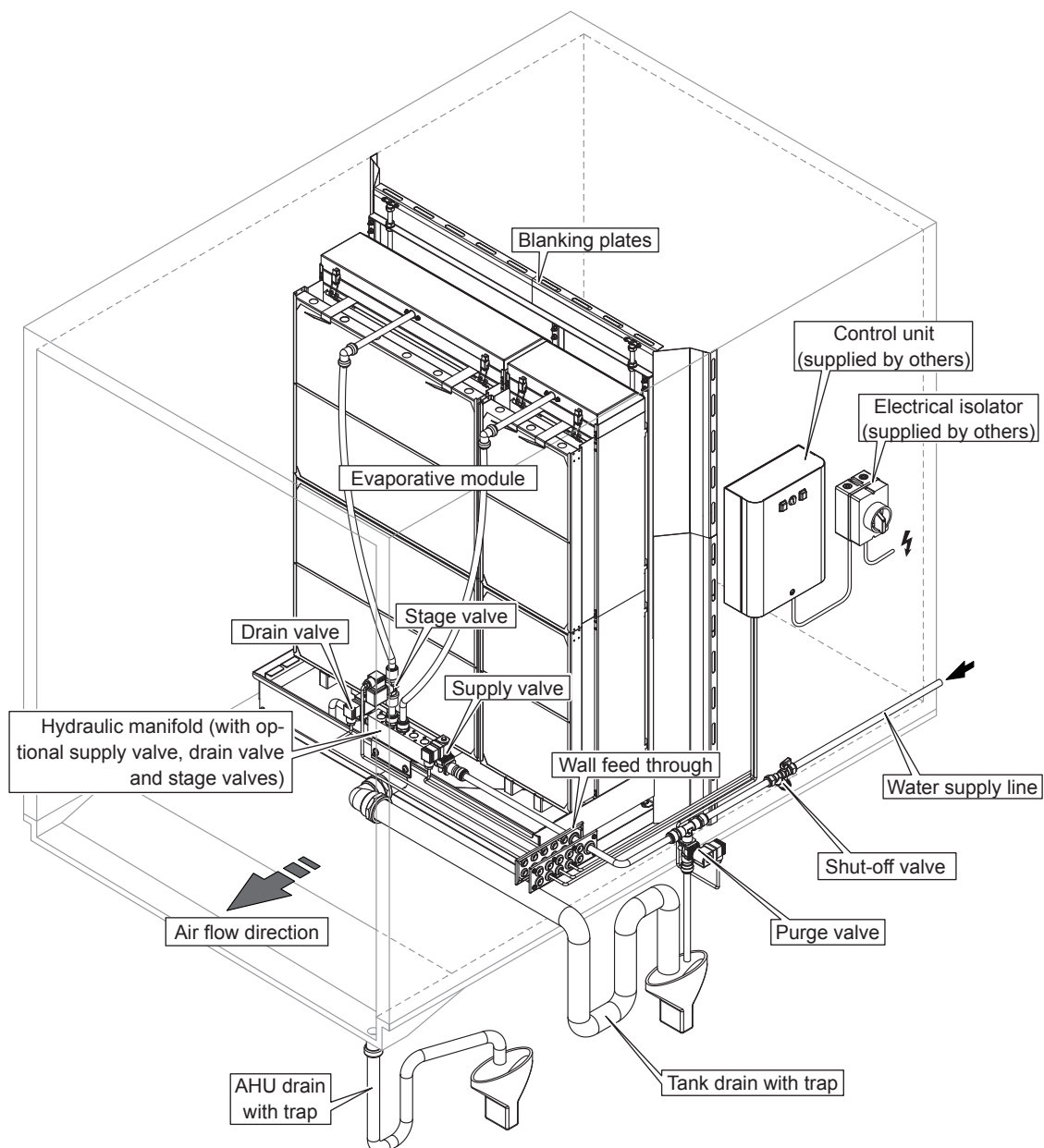


Fig. 5: Typical system Condair ME Direct Feed (internal installation with optional valves)

### 3.4.2 Typical system Condair ME Direct Feed (externally mounted)

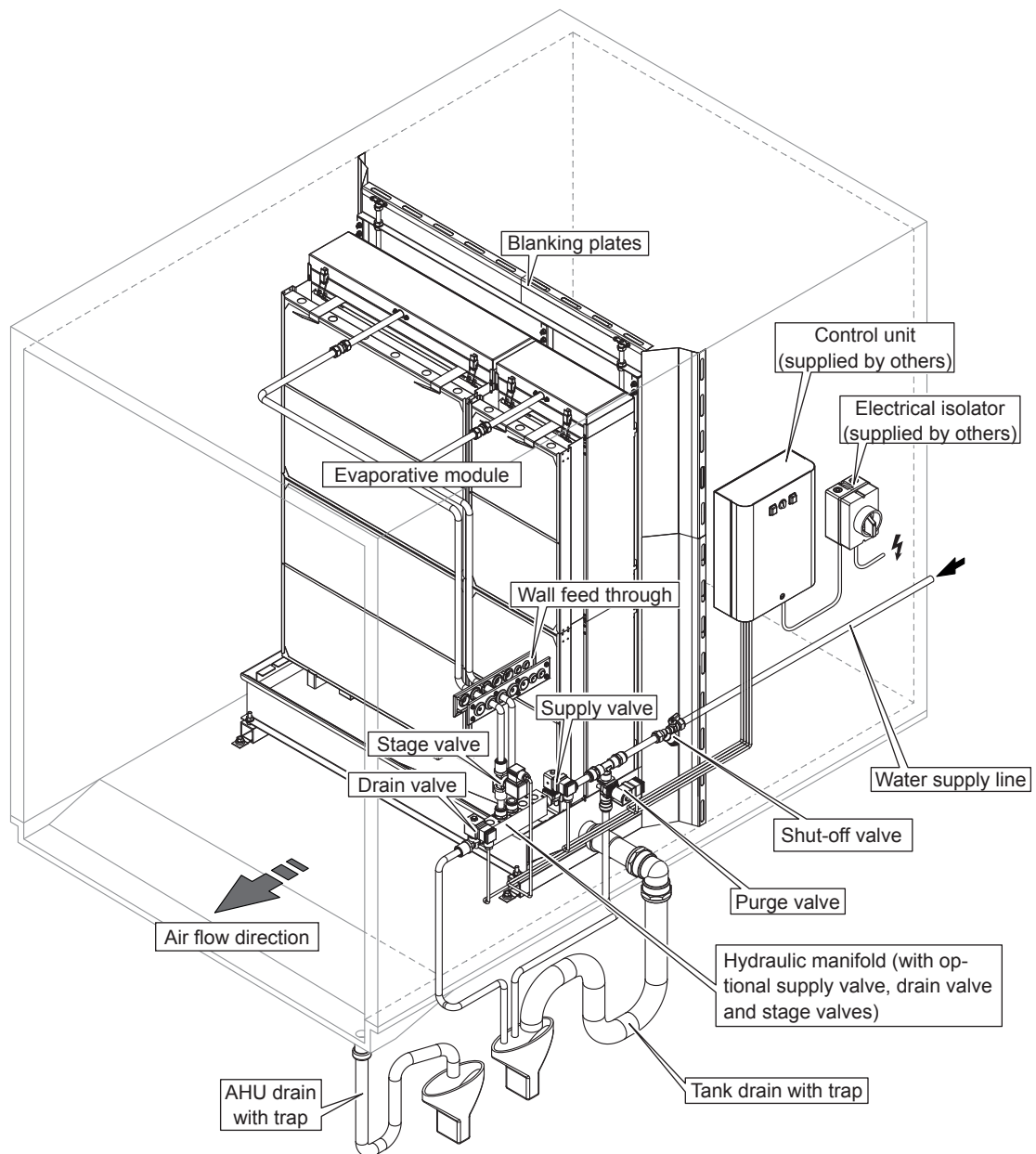


Fig. 6: Typical installation Condair ME Direct Feed (external installation with optional valves)

## Schematic flow diagram

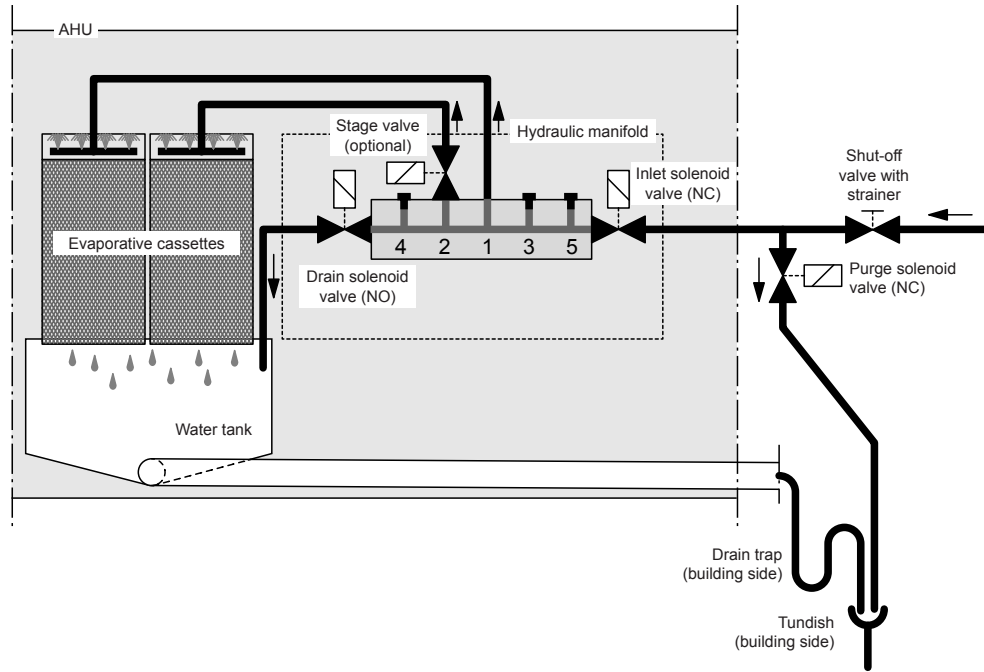


Fig. 7: Schematic flow diagram Condair ME Direct Feed System (internally mounted)

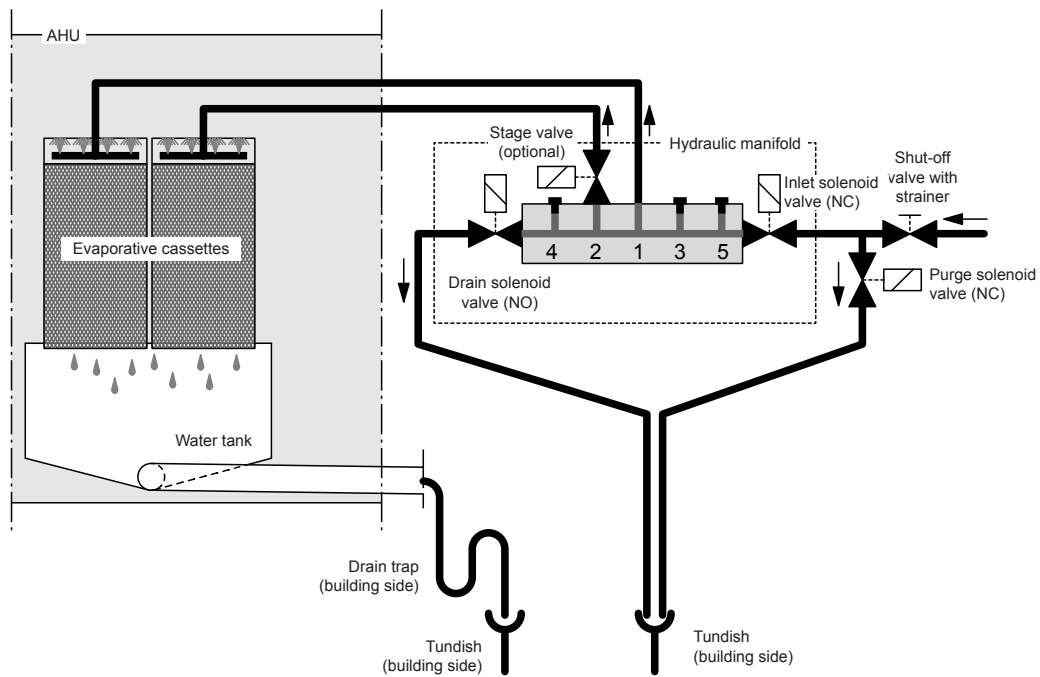


Fig. 8: Schematic flow diagram Condair ME Direct Feed System (externally mounted)

## Functional description

As standard the Condair ME Direct Feed is operated with a customer supplied On/Off control (requires a drain and a supply valve fitted to the hydraulic manifold (both valves available as options).

Equipped with the optional stage valves and a customer supplied stage control unit, stage control can be established.

In case of a humidification/cooling request with **standard On/Off control** the drain solenoid valve (NO) closes and the inlet solenoid valve (NC) opens and the water flows to the distribution header above the evaporative cassettes.

In case of a humidification/cooling request with **stage control** the drain solenoid valve (NO) closes and the inlet solenoid valve (NC) opens (stage 1 is active). Depending on the demand signal and the evaporative module size, up to 4 additional stage valves open to supply water to the distribution header of the corresponding evaporative cassette bank.

The distribution pipes inside the distribution header evenly supply the water to the entire surface of the evaporative cassettes where it flows down and humidifies the air flowing through the evaporative cassette matrix. The excess water not used for humidification flows to the water tank and then directly to the drain.

Time based controls (supplied by others) should flush the water supply line via the purge valve every 20 hours to prevent water stagnation in the water supply line. Purging of the optional stage pipework should also be done for any unused stages every 20 hours. Stagnation in the water supply line can lead to the growth of micro-organisms.

## 4 Operation

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### 4.1 Important notes on operation

#### Qualification of personnel

The Condair ME Direct Feed must be commissioned and operated only by personnel familiar with the system and adequately qualified for the respective tasks. It is the owner's responsibility to verify proper qualification of the operating personnel.

#### General notes

The instructions and details regarding commissioning and operation must be followed and upheld.

The initial commissioning of the Condair ME Direct Feed requires appropriately trained technical personnel. It is strongly recommended that your Condair representative commissions your system. Part of this initial commissioning process may include a disinfection of the water tank and the evaporative cassettes. Please read this document in full before commencing any work.

Please pay attention to local regulations regarding working at heights and electrical work.

#### Safety and hygiene



**DANGER!**

**The Condair ME Direct Feed must be operated in accordance with this manual. Failure to do so could result in contamination that might cause Legionnaires' disease, which can be fatal**

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## 4.2 Initial commissioning

The initial commissioning of the Condair ME Direct Feed requires appropriately trained technical personnel. We strongly recommend that your Condair representative commissions your system.

### Inspections

Prior to initial commissioning the complete system must be inspected for correct execution of the installations. Proceed as follows:

1. Switch off AHU, and lock off to prevent AHU from starting.
2. **Evaporative module installation:** Check correct selection of evaporative module on rating plate if multiple units on site. Check that the evaporative module has been installed level in all planes with secure blanking plates 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 evaporative module is installed in a waterproof section. Check evaporative module (including tank) is free of dirt/ debris and clean as necessary.
3. **Control unit (supplied by others):** Check that the control unit is mounted in a convenient dry location
4. **Supply water Installation:** Ensure the water system in the building has been subject to a Risk Assessment. The Condair ME Direct Feed **must be connected to a clean, wholesome 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. 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 between 2 bar (29 psi) and 5 bar (73 psi). Ensure that any hygiene options have been correctly installed. Check all joints and fittings for leaks.
5. **Drain installation:** Check that the drain line is made according to the corresponding instructions given in the installation manual. Ensure the drain line is connected to the main building drain and that drain pipework is trapped to a suitable level for the applicable working duct pressure. Check all joints and fittings. Ensure that the drain connection includes an air gap.
6. **Distribution pipework:** Check all water distribution pipework between the hydraulic manifold and the distribution headers are securely fitted.
7. **Electrical wiring:** For systems equipped with a custom control unit please refer to the corresponding manual.
8. **Flush water supply and test supply water quality:** Disconnect water supply pipe from connector on the hydraulic manifold. Fix hose to free end of supply pipe and lead hose to a drain. Carefully flush supply pipe a suitable amount of time without creating splashing or aerosols.

Take a water quality sample to ensure that supply water meets the requirements specified in the water quality guide. The sample should be tested using a dip slide to indicate the total number of colony forming units per ml (cfu/ml). Generally, levels of  $1 \times 10^3$  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 Condair distributor for advice.

Then reconnect the water supply pipe to the supply connector on the hydraulic manifold.

9. **Perform pressure test:** Turn on water supply and check for leaks. Ensure shut off valve is installed correctly.

After the system has been inspected and found correct proceed with the initial commissioning:

1. Ensure AHU is switched off, and locked off to prevent starting.
2. Ensure the water supply pipe is flushed and reconnected to the hydraulic manifold.



**WARNING!**

If the water supply pipe was flushed more than 24 hours ago, repeat flushing procedure as described in [step 9](#) in the previous section) before proceeding with the commissioning.

3. If the evaporative cassettes have become dirty or damp prior to commissioning, follow the disinfection procedure described in [chapter 5.8](#) and [chapter 5.9](#) of this manual.
4. Validate the system controls and enable a full demand to the unit.
5. Flush water through all cassettes (ensure all stages are operating if stage control option).
6. Check water is flowing to drain with no leakage.
7. Allow system to flush with full demand until the water runs clean.
8. Check all components are operating correctly (including any option kits i.e. inlet valve, drain valve, purge valve, stage valves).
9. Measure the flow of water to the distribution headers, and compare with the design conditions.
10. Switch on fan of AHU and test operation with fans running and validate air conditions against the design data.
11. Test controls set up and ensure correct set points. If automatic flush or drain options are installed, check suitable flush timings are programmed to ensure that the water supply line and all stage pipes are flushed at least once every 24 hours.
12. Switch off AHU.
13. Wipe tank clean (including section under cassettes).
14. If commissioning has not been completed by an approved Condair representative, it is recommended that records are kept of commissioning date and what was done.
15. Demonstrate system to customer and highlight hygiene and maintenance requirements.
16. Raise any installation concerns.
17. Issue commissioning documentation.

The system is now ready for normal operation.

### 4.3 Start up for normal operation

It is assumed that initial commissioning has been carried out properly by appropriately trained technical personnel.

Proceed as follows to prepare the Condair ME Direct Feed for operation:

1. Switch off AHU.
2. Examine the Condair ME Direct Feed for possible damage. Ensure tank is empty and clean.



#### **DANGER!**

Damaged systems or systems with damaged components or faulty installation may present danger to life or cause severe damage to material assets.

**Damaged systems and/or systems with damaged or faulty installation must not be operated.**

3. **If the Condair ME Direct Feed was isolated from the mains for a prolonged period of time (>48 hours),** then the ME system, including any storage tanks or vessels should be drained and left dry. Before putting the system back into operation, a full risk assessment should be undertaken to ensure safe operation, with particular attention paid to water supply quality. **Additionally a complete system service has to be performed prior to putting the system back in operation.**
4. Make sure doors of AHU are closed, then switch on AHU if switched off.
5. Open shut-off valve in the water supply line.
6. Refer to the operating instructions of the controls supplier in order to put the Condair ME Direct Feed system into operation.

The Condair ME Direct Feed is now ready for operation.

## 4.4 Notes on operation

### 4.4.1 Important notes on operation

Controls supplied by others should ensure that the water supply line is purged every 20 hours for approximately 3 minutes in order to flush water supply line. Additionally it should be ensured that the hoses that supply water to the distribution header are drained in these 3 minutes too.

### 4.4.2 Recommended regular checks during operation

During operation the Condair ME Direct Feed has to be checked periodically in accordance with the table below.

Operations Checks	Daily	Weekly	Monthly	Quarterly
Monitor humidity/temperature control	✓	✓	✓	✓
Check for any low humidity/temperature concerns	✓	✓	✓	✓
Check any alarms on BMS	✓	✓	✓	✓
Visible check for: <ul style="list-style-type: none"><li>– No water leakage (air on and air off side)</li><li>– system components for correct fixing and any damage</li><li>– electric installation for any damage.</li></ul>	✓	✓	✓	✓
Matrix media is saturated (relative to demand signal)			✓	✓
Condition of tanks and air on matrix is clean			✓	✓
Inspect and determine replacement frequency of sediment filter			✓	✓
Condition of tanks are clean (clean as required)				✓

If the checks reveal any irregularities (e.g. leakage, error indication) or any damaged components take the Condair ME Direct Feed out of operation as described in [chapter 4.5](#). Then, have the malfunction eliminated or the damaged component replaced by a well trained specialist or a service technician from your Condair representative.

## 4.5 Decommissioning the system

In order to decommission the Condair ME Direct Feed (e.g. to perform maintenance works, to eliminate a malfunction, etc.) perform the following steps:

1. Close the shut-off valve in the water supply line.
2. Switch off control unit.  
Note: Please refer to the corresponding manual (supplied by others) for switching off the control unit.
3. **Disconnect control unit from the mains:** switch off the electrical isolator in the mains supply to the control unit and secure switch in "Off" position against accidentally being switched on.
4. **Let the fan of the ventilation system run** until the evaporative module is dry.
5. If work has to be carried out on the evaporative module or the hydraulic manifold mounted inside the duct, switch off the AHU and secure the system against accidentally being switched on.

### Important notes!

Condair recommends that control of the Condair ME Direct Feed should remain powered on even if the Condair ME direct feed is not being used for prolonged period of time. Hygiene functions (supplied by others) can remain active to limit build-up of germs.



### DANGER!

If control of the Condair ME Direct Feed is isolated from the mains power for a prolonged period, water stagnation might occur in the supply pipework, and microbial contamination of the supply pipework and Condair ME system could result.

**If control of the Condair ME Direct Feed is isolated from the mains for a prolonged period**, then the ME system, including any storage tanks or vessels should be drained and left dry. Before putting the system back into operation, a full risk assessment should be undertaken to ensure safe operation, with particular attention paid to water supply quality. **Additionally a complete system service has to be performed prior to putting the system back in operation.**

## 5 Maintenance

### 5.1 Important notes on maintenance

#### Qualification of personnel

All maintenance work must be carried out only by **well qualified and trained personnel authorised by the owner**. It is the owner's responsibility to verify proper qualification of the personnel.

#### General notes

The instructions and details for maintenance work must be followed and upheld. Only carry out the maintenance work described in this documentation.

The Condair ME Direct Feed must be maintained in the prescribed intervals, the cleaning work must be carried out correctly.

For safety and warranty reasons, only use original spare parts from your Condair representative to replace defective parts or parts which have elapsed their lifetime.

#### Safety and hygiene

Some maintenance work requires removal of the unit cover. Please note the following:



**DANGER!**  
**Danger of electric hazard!**

**Before carrying out any maintenance work take the Condair ME Direct Feed out of operation as described in [chapter 4.5](#) and secure the system against inadvertent power-up.** In addition take AHU out of operation as described in the operations instructions of the AHU and secure the AHU against inadvertent power-up.



**DANGER!**  
**Health risk by inadequate maintenance!**

**Inadequately operated and/or poorly maintained adiabatic humidification/cooling systems may endanger health. When inadequately operated and/or poorly maintained, micro-organisms (including the bacterium which causes Legionnaire's disease) may grow in the water system and in the area of the humidification unit and may affect the air in the AHU/air duct.**

**Prevention:** the adiabatic air humidification /air cooling system Condair ME must be correctly operated as described in [chapter 4](#), and must be correctly maintained and cleaned in the prescribed intervals as described in [chapter 5](#).



**DANGER!**

Damaged systems / components may present a danger to life, or cause damage to material assets. We advise that the customer routinely checks the system and components for damage. It is particularly important that the tank, structural components, and fixings (such as studs) are inspected as damage to these items could affect the structural integrity of the system. Please contact your local Condair representative immediately in the event of discovering damaged components.

## 5.2 Maintenance Intervals

In order to maintain operational safety and hygienic demands the Condair ME Direct Feed must be serviced at regular intervals. The time interval for the complete system service is to be adapted to the operating conditions. The hygiene status depends mainly on the quality of the humidifier water but also on the adherence to the exchange intervals of the upstream air filter, the air velocity and the microbiological and chemical composition of the supply air. Therefore the service intervals must be determined for each system separately.

The interval time for a complete system service is to be determined at commissioning. A typical interval time is **2000 hours of operation**.

Depending on the encountered hygiene status when performing a complete system service the interval time must be decreased or increased.

**In any case the Condair ME Direct Feed should receive a complete service at least once annually.**

Note: We recommend to perform a minor service between two complete system service.

## 5.3 Maintenance guide

The Condair ME unit will form part of your cold water system and as such require you to undertake certain duties with regards to local regulations and bylaws concerning the control of Legionella microbes in water systems. Your water sampling / testing and disinfection regime must be based on results of a site specific risk assessment.

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

Note: routine water sampling and testing is not included as part of a Condair service contract.

Please note that the information given in the table below is only to act as a guide which shows the work to be carried out on "Minor Service" and "Complete System Service".

Correct maintenance is vital to ensure optimum output, reliability and safety.

Operations	Minor Service	Complete System Service
Replace inlet water filter if applicable	Yes	Yes
Check all solenoid valves	Yes	Yes
Clean all solenoid valves	—	Yes
Replace purge valve flow restrictor (if applicable)	—	Yes
Check all hoses and connectors	Yes	Yes
Check flow restrictors in hydraulic manifold	—	Yes
Clean inlet valve strainer	—	Yes
Replace all feed hose	—	Yes
Check distribution headers	Yes	Yes
Clean distribution headers	—	Yes
Clean front section of tank	Yes	Yes
Check droplet separator (if applicable) and evaporator cassettes in suitable condition	Yes	Yes
Lightly brush evaporator cassettes if necessary, replace if heavily soiled	—	Yes
Remove evaporator cassettes and clean all sections of tank and frame structure	—	Yes
Check and secure frame structure and seal	—	Yes
Check all media for full saturation	Yes	Yes

<b>Operations</b>	<b>Minor Service</b>	<b>Complete System Service</b>
Measure flow rates to distribution headers	—	Yes
Check and secure all electrical connections	Yes	Yes
Check overall installation for leaks and damage	Yes	Yes
Check any options as per relevant documentation	Yes	Yes
Complete disinfection as described in this manual	Yes	Yes
Check safety interlock and humidity/temperature control devices (if applicable)	—	Yes
Check air velocity at face of evaporative cassettes matrix	—	Yes
Update service log book	Yes	Yes



## 5.4 Dismantling and installation of components for maintenance



### WARNING!

A full risk assessment must be completed by suitably trained personnel prior to carrying out maintenance of the ME unit. There may be increased risk when carrying out maintenance on systems that necessitate working at height.

The following risks should be considered (this list is not exhaustive, and there may be additional site specific risks that will need to be considered):

- Manual handling
- Musculoskeletal disorders
- Electrical work
- Working at height
- Falling objects & objects dropped from higher levels
- Risks arising from the use of Mobile Elevated Work Platforms
- Risk of contact with ceilings, overhead items or asbestos roofing while using access equipment
- Adverse weather conditions
- Unsuitable surface and ground
- Other equipment, machinery or supply pipework in the vicinity of the work area

Maintenance of the ME unit must only be carried out by trained personnel, and all tools & equipment must be checked by a skilled and competent health & safety representative.



### WARNING!

In the event of water carry-over from the evaporative cassettes or a water leak, surfaces near the ME system may have become wet. This could result in a slipping hazard or an increased risk when handling components. If this occurs, risk assess the situation and take suitable precautions before working on the ME system. If carry-over was the cause of any standing water in the AHU/duct, follow the advice in [chapter 6.1](#) to remedy the problem.

### 5.4.1 Dismantling and installation of the evaporative module

1. Take the Condair ME Direct Feed out of operation as described in [chapter 4.5](#) and allow to drain and dry.
2. Switch the AHU off, and isolate the power and water supply to the AHU.
3. Disconnect distribution hoses from the connectors on the distribution heads, the wall feed-throughs (if applicable) and the hydraulic manifold.
4. Remove droplet separator boxes (column by column):
  - Remove upper separator brackets.
  - Remove bank of separator boxes.
  - Remove lower separator brackets.
5. Remove distribution headers assemblies from topmost evaporative cassettes:
  - Undo the clamps securing the distribution header assembly to the evaporative cassette.
  - Carefully lift off the distribution header assembly.
6. Remove evaporative cassettes (column by column):
  - Push box upwards and remove.
7. Remove the tank cross bar and the tank cross bar supports (if applicable). Make a note of the cross bar position and facing.

Clean dismantled components, water tank, frame structure, blanking plates and air duct as described in [chapter 5.3](#). If all components have been cleaned and dried, assemble the evaporative module in the reverse dismantling order. Replace any defective components with new ones.

## 5.5 Consumables Guide

### Common consumables

Description	Standard Frequency (month)
Disinfection chemical (sourced locally)	1
Descaling chemical (sourced locally)	as required
Inlet flow restrictor	24
Distribution header feed hose	24
Evaporative matrix cassette	
– Wholesome mains water	36 - 60
– RO water	60 - 84 +

### Option consumables

Description	Standard Frequency (month)
PureFlo sediment cartridge	6
PureFlo hygiene cartridge	6

Contact your Condair distributor for consumables list/order codes.

To help us ensure that the correct spares parts are sent, please confirm your unit serial and model number with your order.

## 5.6 Health and Safety Requirements

In accordance with local regulations, users must take water samples for Legionella analysis. Samples should be taken from the same places as described in [chapter 5.7](#), and the analysis carried out by an accredited laboratory which is part of an appropriately certified Legionella testing 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.

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 50 ppm chlorine dioxide solution. This work should only be carried out by fully trained specialist organisations or individuals.

The control unit (supplied by others) of the system must be left powered on to allow automatic flushing and cleaning cycles to occur. If the control unit is powered off for prolonged periods, water stagnation might occur and contamination result, so the system should be drained and left dry.

Before putting the system back into service, the water pipework supplying the Condair ME Direct Feed 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 Condair ME Direct Feed should be disinfected using an appropriate solution.

Contact your Condair representative for advice on water sampling and analysis, disinfection of systems, service and maintenance.

## 5.7 Routine Water Sampling and Testing

### Hygiene

Your attention is drawn to local regulations and bylaws regarding 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. Condair Condair 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 local regulations 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 local regulations and bylaws, and the instructions in this manual.
5. The Condair ME Direct Feed system MUST be connected to a clean, wholesome mains water supply and it is recommended that the supply water 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. 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, the evaporative cassettes and from the 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 biofilm 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 water system within the building. The system should be turned off and you should seek specialist advice 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.

## 5.8 Cleaning and Disinfection

### Before commencing cleaning and disinfection:

For systems in operation or where the water quality or air quality is poor, it is recommended to dismantle and scrub the system clean, and carry out a disinfection of all the evaporative module parts with a minimum of 50ppm chlorine or an appropriate disinfection solution. 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. **A qualified person appointed by the customer must risk assess the cleaning and disinfection operation.** This assessment should include but is not limited to observance of local regulations and the use of PPE, working at heights and ensuring a full understanding of the Condair ME Direct Feed.
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 the correct contact period. The method statement for disinfection may need to be adapted depending on the layout of the humidifier pipework. Additional procedures will be required for supply water system pipework or water treatment systems prior to the humidifier.

Condair recommends that routine disinfection should take place in the following situations:

- At initial commissioning (for brand new systems use a mild disinfection chemical).
- At six monthly intervals as part of the maintenance regime.
- If the system or part of it has been shutdown and/or substantially altered creating a risk of contamination.
- During or following any increase of bacterial activity (as per recommendations in [chapter 5.7](#)) or outbreak or suspected outbreak of Legionellosis.

### Recommended Disinfection Equipment

- Disinfection solution in accordance with manufacturers guidelines.
- Disinfection neutraliser (only if necessary).
- Disinfection solution test kit (to measure strength).
- Bucket of fresh water.
- Cleaning equipment.
- Mixing vessel / Measuring container.
- Risk assessment / test record sheets. Appropriate report/record
- Standard tools
- Appropriate PPE
- COSHH risk assessment / MSDS

## 5.9 Cleaning and Disinfection Method Statement



### WARNING!

Disinfectants can be corrosive, toxic or irritant. Use of disinfectants may present a risk to health and could harm the environment.

#### Step 1 - Refer to the cleaning and disinfection risk assessment

- If the unit is already in operation, check for correct operation.
- Ensure the Condair ME system is OFF and isolated.
- If the system has been without power for more than 48 hours, flush the water supply.
- Ensure the area is well ventilated.
- Refer to the manufacturers instructions and safety advice for chosen disinfectant.
- If there are concerns over the level of biofilm or bacteria in the system, disinfect the tank before starting cleaning work.
- **Scrub tank fully.** For more thorough disinfection remove droplet separator banks (if applicable) and the evaporative cassettes to allow better access to the tank (refer to maintenance section)
- Consider appropriate maintenance requirements at this time including parts replacement i.e. replacing distribution hoses to ensure that these are also disinfected.
- Re-assemble the Condair ME system (refer to installation manual).

#### Step 2 - Mix Disinfection Solution

- Prepare a vessel into which the evaporative cassettes and droplet separator banks can be placed for disinfection
- Mix disinfection solution following the manufacturers instructions and in the required amount.
- **Note:** Solution loses strength over time and the solution may need to be increased throughout the process or the disinfection process may need to be repeated.

#### Step 3 - Disinfection

- Place evaporative cassettes and droplet separator banks into the vessel with the disinfection solution and leave them in the solution for the correct amount of time.
- Note the strengths of the disinfection solution at 15 minute intervals and adjust solution strength as required.
- Wash tank, tank frame and AHU section with a cloth soaked with disinfection solution.
- After disinfection rinse all parts thoroughly with wholesome water to remove any disinfection chemicals. Then, dry or let dry all components.

#### Step 4 - Neutralise the disinfection solution – if required based on chemical used



##### **WARNING!**

If a neutralising solution is required, always ensure that the neutralising solution is used in accordance with the manufacturer's guidance. Failure to follow the manufacturer's guidance with regard to neutralising the disinfection chemical may present a risk to health.

- Mix neutralising agent as per manufacturers instructions.
- Measure the strength as per MSDS until the disinfection solution is down to desired strength.

#### Step 5 - Drain neutralised disinfection solution

- Drain neutralised disinfection solution into appropriate drain (depending on Risk Assessment) .
- Always leave work area clean, dry and tidy.

#### Step 6 - Re-assemble evaporative module and Re-start the Condair ME system

- Re-assemble evaporative module and restart ME system. Refer to the corresponding section.

If in doubt always contact your Condair distributor.

## 6 Fault elimination

**Important!** Most operational malfunctions are not caused by faulty equipment but rather by improper installation or disregarding of planning guidelines. Therefore, a complete fault diagnosis always involves a thorough examination of the entire system. Often, the installations have not been properly executed, or the fault lies with the humidity control system.

### 6.1 Malfunction list

Malfunction	Cause	Remedy
<b>Residual water in the section of the duct downstream of the evaporative module.</b>	Face velocity is too high.	Install droplet separator or reduce air velocity in the duct.
	Water tank, water piping or hydraulic manifold is leaking.	Check/seal water tank, water piping and hydraulic manifold.
	Water flow to media too high.	Check/replace flow restrictors in the hydraulic manifold.
	Evaporative cassettes have become blocked with minerals.	Check set up, replace evaporative cassettes, perform system service.
	Uneven or non laminar air flow.	Check design conditions of AHU. Install perforated plate on the air supply side.
	Air on temperature is too low.	Check design conditions of AHU. and increase temperature.
<b>Humidity/cooling demand present however the Condair ME Direct Feed does not humidify.</b>	Shut-off valve in the water supply line closed.	Open shut-off valve.
	Site control are not correct.	Prove controls and control module.
<b>Maximum humidification/cooling capacity is not reached.</b>	Insufficient water supply capacity.	Check water supply, increase water pressure.
	Evaporative cassettes have become blocked with minerals.	Check set up, replace evaporative cassettes, perform system service.



## 6.2 Notes on fault elimination

- For the elimination of faults set the Condair ME Direct Feed out of operation as described in [chapter 4.5](#), disconnect control unit from the mains and close shut-off valve in the water supply line.



### **DANGER!**

Make sure the control unit is separated from the mains (check with voltage detector) and the shut-off valve in the water supply line is closed.

- The elimination of faults must be carried out by qualified and well trained professionals only. Malfunctions relating to the electrical installation must be repaired by authorized personnel (e.g. licensed electrician) or by your Condair representative's service technician only.
- Repair work and the replacement of faulty components must be carried out by your Condair representative's service technician only!

## 7 Taking out of service/Disposal

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### 7.1 Taking out of service

If the Condair ME Direct Feed must be replaced or if the humidification system is not needed any more, proceed as follows:

1. Take the Condair ME Direct Feed out of operation as described in [chapter 4.5](#).
2. Have the system components unmounted by a qualified service technician.

### 7.2 Disposal/Recycling

Components not used any more must not be disposed of in the domestic waste. Please dispose of the individual components in accordance with local regulations at the authorised collecting point.

If you have any questions, please contact the responsible authority or your local Condair representative.

Thank you for your contribution to environmental protection.

## 8 Product specifications

### 8.1 Technical data

Control accuracy	Control accuracy depends on air conditions, control distance, water quality and on the number of On/Off cycles
Max. admissible matrix face velocity	4.5 m/s (886 fpm) with droplet separator
Water supply	ø15mm or ø16mm (ø 0.625") connector as applicable
Water drain (outside diameter)	ø 50 mm or ø 54 mm (ø 2.125") as applicable
Admissible water supply pressure	2...5 bar (29...72.5 psi)
Admissible water temperature	5...20 °C (41...68 °F)
Water quality	Tap water, softened or fully demineralised water with a max. of 100 cfu/ml
Degree of protection of optional valves	IP54
Fire classification of evaporative media	glass fibre media: A2-S2,-D0 (UL Class 1)

**Notes**

Notes

**Notes**

# Warranty

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Condair Inc. or Condair Ltd. (depending on the entity that supplied the product, and hereinafter collectively referred to as CONDAIR) warrant for a period of two years after installation or 30 months from the manufacturer's ship date, whichever date is earlier, that CONDAIR's manufactured and assembled products, not otherwise expressly warranted, are free from defects in materials and workmanship. Notwithstanding the foregoing, the products listed below have an alternate warranty period:

- GS/GSTC Series heat exchanger(s) are warranted to be free from defects in materials and workmanship for a period of 3 years from installation or 40 months from the manufacturer's ship date, whichever is earlier.
- SAM-e Short Absorption Manifolds, except for the coupling seals, are warranted to be free from defects in materials and workmanship for a total period of 10 years from the manufacturer's ship date.
- Humilife RH humidifiers are warranted to be free from defects in materials and workmanship for a period of 5 years from the manufacturer's ship date. CONDAIR may, at its discretion, replace individual components or Humilife RH units as a whole.
- Spare Parts used for repairs are warranted for the balance of the term of the warranty on the original humidifier or 90 days, whichever is longer.
- No warranty is made against corrosion, deterioration, or suitability of substituted materials used as a result of compliance with government regulations.

CONDAIR's obligations and liabilities under this warranty are limited to furnishing replacement parts to the customer, F.O.B. CONDAIR's factory. The replacement parts are warranted for the balance of the term of the warranty on the original humidifier or 90 days, whichever is longer. Procedure:

1. Customer Requests Warranty as per instructions on the CONDAIR Warranty Form.
2. CONDAIR reviews the warranty claim and will respond in one of two ways:
  - a. Warranty Accepted – Replacement Part or credit granted.
  - b. Warranty Declined – Response with justification will be provided to the customer.
3. In some cases, CONDAIR may request the part to be returned, freight prepaid by the customer, as part of the warranty acceptance or warranty determination process. Some reasons include:
  - a. Part must be analyzed to determine the root cause of failure.
  - b. Part must be returned to the supplier for claim/investigation.

When parts are requested to be returned, replacement parts will be sent by CONDAIR to the customer against an invoice from CONDAIR paid by the customer. The cost of the replacement parts will be reimbursed to the customer with a credit note after the parts are received and analyzed by CONDAIR, if the warranty is accepted.

The warranties set forth herein are in lieu of all other warranties expressed or implied by law. No liability whatsoever shall be attached to CONDAIR until said products have been paid for in full and then said liability shall be limited to the original purchase price for the product. Any further warranty, with the exception of a purchased extended warranty described below, must be in writing, and signed by an officer of CONDAIR.

CONDAIR makes no warranty and assumes no liability unless the equipment is installed in strict accordance with the installation manual in effect at the date of purchase, and by properly qualified and licensed professionals capable of installing such equipment.

CONDAIR makes no warranty and assumes no liability whatsoever for consequential damage or damage resulting directly from misapplication, incorrect sizing, or lack of proper maintenance of the equipment.

CONDAIR makes no warranty and assumes no liability whatsoever for damage to the products, humidifier, supply lines, drain lines, steam distribution systems, or the building as a whole caused by freezing.

CONDAIR reserves the right to change the design, specifications, and performance criteria of its products without notice or obligation.

## Extended Warranty

Extended warranties are available to purchase under the conditions listed above. Extended warranties must be purchased at the time of the original equipment order.



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