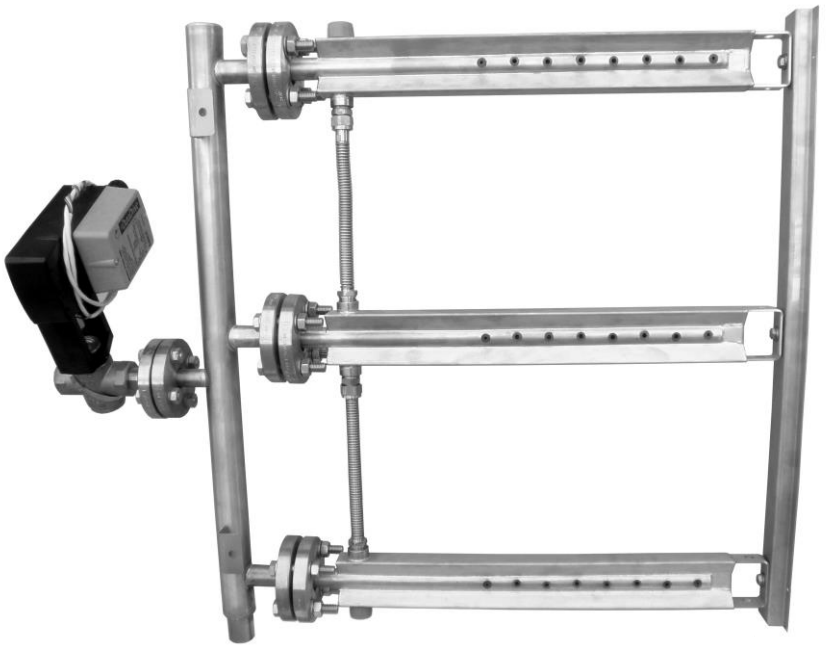

# INSTALLATION AND MAINTENANCE MANUAL
# ISOTHERMIC HUMIDIFIERS
# BY DRY STEAM INJECTION
# DIPHUSAIR-FSH

MFSH-EN-18-0

In compliance with the Rules and Standards of the European Union on Machine Safety, it is essential to read this protocol carefully before installing any equipment.

FISAIR S.L. C/Uranio, 20; Pol. Ind. Aimayr, 28330 San Martín de la Vega (Madrid) Spain.
Tel: (+34) 91 692 15 14 Fax: (+34) 91 691 64 56 | info@fisair.com| fisair.com

RC-0529/2015

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# 1 Introduction

Dear Customer,

The DIPHUSAIR humidifier is our answer to current technical needs, due to its safe operation, its operational convenience and economic efficiency.

**To ensure effective operation of your DIPHUSAIR humidifier, please read the Installation, Operation and Maintenance Instructions.**

Use the steam humidifier only in appropriate and safe conditions, while paying attention to all the notes in these instructions.

If you have any questions... Please contact us:

FISAIR, S.L.U.
Tel.: (34) 916.921.514
Fax: (34) 916.916.456
www.fisair.com/contact

Or contact your local distributor.

## 1.1 Operation instructions

The correct use of the humidifier includes following our instructions for installation, set-up, operation and maintenance, as well as following the steps indicated in the instructions in the correct sequence as described.

This humidifier may only be used by persons who are fully qualified and authorized to do so.

Any person who transports and/or used the unit or who works with it must read and understand the relevant section of this manual, in particular the section entitled "Safety Instructions".

You are advised to keep a copy of the user manual in the place where the humidifier is going to operate (or nearby).

Ignoring these instructions may invalidate all applicable guarantees and warranties.

## 2 Safety Instructions

Please read these safety notes carefully and examine the equipment to become familiar with it before installing, commissioning or servicing.

The following symbols or messages may appear in this document or on the equipment. They warn of potential hazards or provide information that may help you clarify or simplify a procedure.

**See instructions**

This manual should be read before installation by properly qualified personnel. Incorrect installation can cause personal and equipment damage. You must consult the manual before maintenance or start-up.

**Attention**

This is a safety alert symbol. It warns of the potential of bodily injury.

Observe all safety information with this symbol to avoid any situation that could lead to injuries and/or damage to the unit.

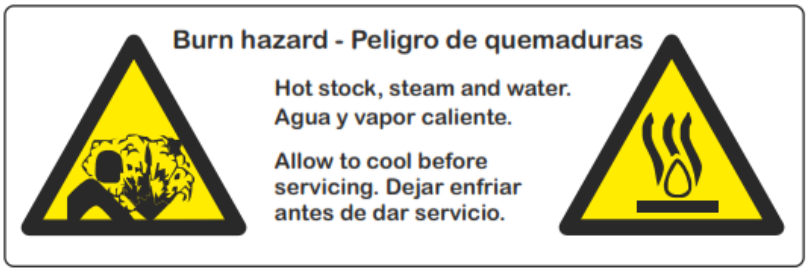
**Attention, Live Current**

The presence of this symbol on a hazard or warning label indicates that there is a risk of electrocution, which can lead to personal injury or life-threatening conditions if the instructions are not followed.

**Turn off before opening**

Turn off the power before opening the equipment to make new connections or perform maintenance in any part of it. Electric shock or fire may result if not turned off. Follow the equipment shutdown and control instructions to ensure the safety of the equipment and personnel.

**Hot surface and danger of burns**




This steam humidifier has extremely hot surfaces. Water in the tank, pipes and distribution assemblies can reach 100°C.

Contact with the equipment surfaces and boiler water inlets and outlets is very dangerous and can cause severe burns. Let the equipment cool down before maintenance or inspection of any part of the system. The steam injected/discharged may not be visible and is therefore dangerous.

Make sure that all threaded connections in the system are properly tightened so they cannot leak steam or condensed water. These can cause burns and/or serious injuries.

Contact with hot surfaces, with condensate water or air containing discharged steam can cause burns and/or serious injuries.

**Insulation standards in equipment with hot surfaces:**

According to the additional technical instructions standard, ITE 02.15.2 Hot Surfaces: *"Except for the surfaces of heat-emitting components, any equipment surface that can be touched accidentally must have a temperature lower than 60°C or be protected, where necessary ..."*

Appendix 03.1 of the same ITE, Minimum *thermal* insulation thickness: *"Equipment components (e.g. devices, appliances, pipes and accessories) must have a thermal insulation with the minimum thickness outlined below when they contain fluids at temperature: Lower than the environment, above 40°C and located in unheated rooms, including conduits, galleries, machine rooms and similar ..."* This type of equipment should be thermally insulated.

**General points**

- If you notice that something is not working properly, switch off the unit immediately and take steps to ensure that it does not switch on again. All faults must be corrected immediately.
- Use duly qualified personnel to carry out repair work. This will ensure that the unit operates safely.
- Use only original FISAIR replacement parts.
- Refer to local regulations that restrict or regulate the use of this humidifier.

**How the unit works**

- Do not jeopardise the safety of the unit.
- Periodically check the device's protection and alert devices.
- The unit's safety fittings must not be removed or disabled.

**Installing, Disassembling, Maintaining and Repairing the unit**

- Switch off the unit's power supply when conducting maintenance work or making repairs to the unit.
- Never add components to the unit without prior written approval from FISAIR.

**About the electrical components**

- Any work that affects the electrical components must be carried out by qualified electricians.
- Switch off the power supply and ensure that it does not re-connect while any electrical component is being handled.
- Switch off the unit immediately if any fault is detected in the electrical power supply.
- Use only original, correctly calibrated fuses.
- Carry out periodic checks of the electrical unit.
- All defects, such as loose connections or burnt cables, must be repaired immediately.

## 3 Transport and storage

When in transit, the unit must be protected from impacts of any kind, and all possible measures must be taken to prevent malfunctions due to improper loading or unloading of the unit.

When lifting the equipment, always use a pallet truck or forklift.

Upon receipt of the unit, make sure that the type and serial number of the plate correspond to the order and delivery information. Check that the unit is complete and in perfect conditions. If there are components missing or damaged during transport, immediately inform your supplier in writing.

Keep the unit dry and protected from the elements while in storage. If it has to be stored for a long period before installation, choose a place where the equipment will not be damaged mechanically or be contaminated by dust or construction materials. If stored outdoors, protect it against the weather and atmospheric elements.

**Attention**

Avoid direct exposure to the sun and places that can exceed 50°C.

**Note**: Storage area temperature and humidity conditions:

- Temperature: [-20…+50ºC]
- Relative humidity: [5…50% RH] no condensation.

Check the merchandise upon receipt. Check that the type and serial number of the label corresponds to the order and supply information, and that the equipment is complete and in good condition.

**Note:** Immediately inform your carrier in writing if there is any transportation damage or missing components.

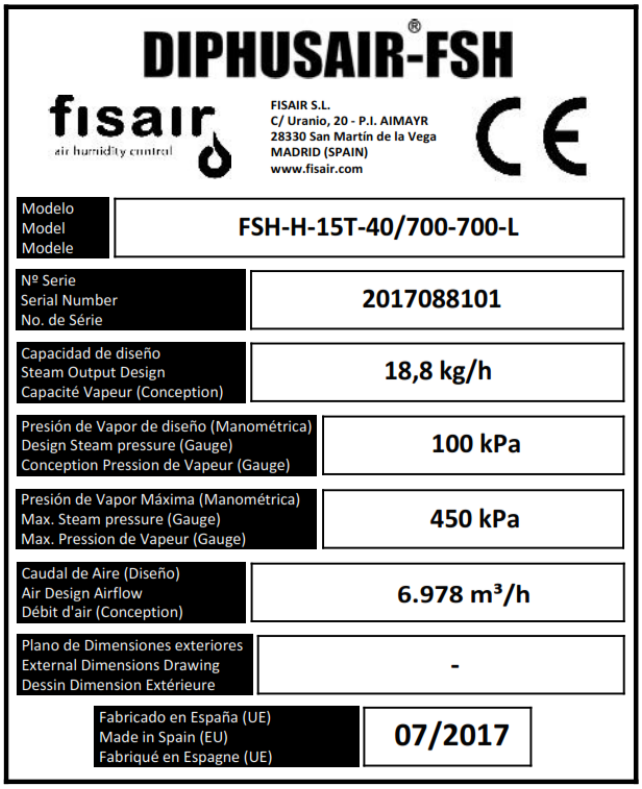
## 4 Rating plate

The rating plate provide essential information about the technical features of the machine.

The EC Machinery Safety Regulation requires all machinery operated within the European Economic Community to have a rating plate indicating its main features, the machine serial number and the manufacturer's name inscribed in a durable manner.

The DIPHUSAIR-FSH series incorporates the following information on its plate:

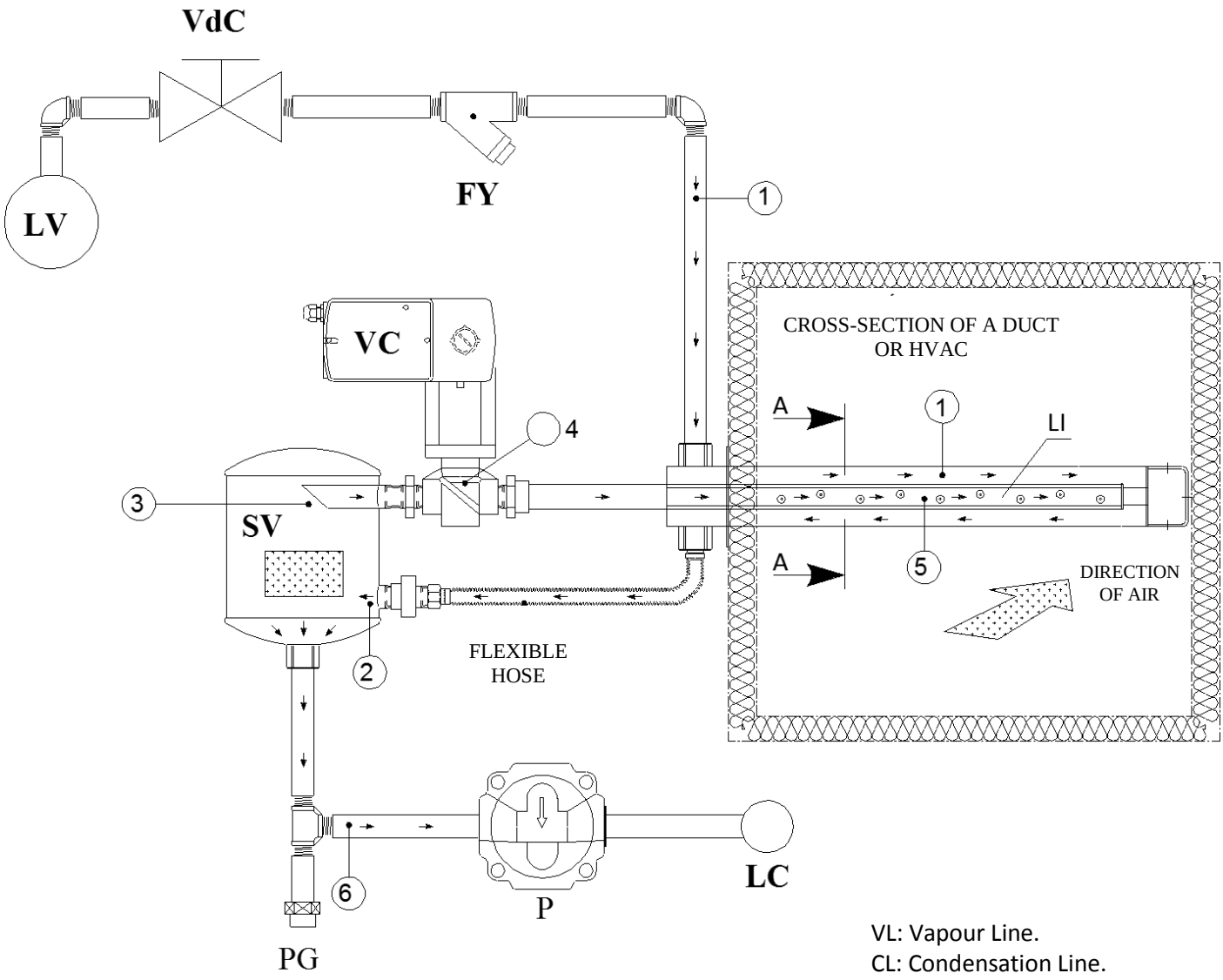
- Equipment model
- Equipment serial number
- Design capacity
- Design steam pressure (gauge)
- Maximum steam pressure (gauge)
- Design air flow
- Plan number: equipment external dimensions
- Place and date of manufacture




*Example of a DIPHUSAIR-FSH device specification plate*

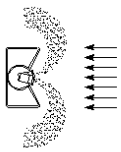
## 5 Operating principle and components

The FISAIR series DIPHUSAIR air humidifiers work by steam injection, to isothermally increase the absolute air humidity in a controlled manner, such as in an AHU. There are two configurations: FSH-SIMPLE TUBE (one jet) and FSH-MULTI TUBE (two or more jets).




Tube profile
without insulation

Section A-A



VL: Vapour Line.
CL: Condensation Line.
YF: Filter in Y.
VS: Vapour Separator
C-OV: Cut-off Valve
CV: Control Valve
IL: Injection Line
P: Steam trap
DL: Drip leg

1) The supply steam is filtered before entering the injection jet jacket, creating a heating jacket at the temperature of the supply steam, which ensures the re-evaporation of possible condensate in the inner discharge pipe.

2) The steam enters the separator and hits a baffle which gives it a centrifugal path, separating the thicker droplets, and an intermediate helix, which acts as a separator of the smaller drops.

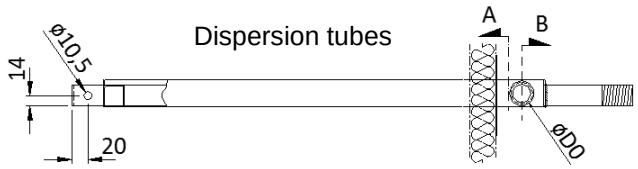
3) The dry steam rises and exits through the centre of the separator through an inner tube to ensure that it does not drag any droplets with it.

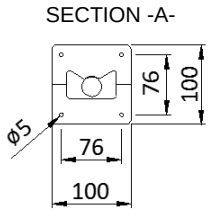
4) The control valve regulates the passage of dry steam to the injection jets. Here, the steam expands at its output to atmospheric pressure, which also ensures the re-evaporation of any condensate.

5) The steam is discharged uniformly throughout the length of the injection jets through the nozzles. Any condensate formed from the valve is re-evaporated by the “heating jacket”.

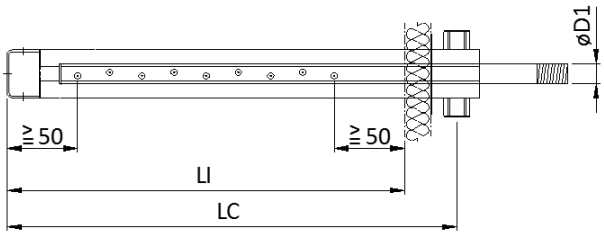
6) The condensate collected by the separator drains and goes directly into the trap. The MULTI-TUBE FSH has one more trap: exclusively to drain the condensate formed in the “heating jackets”.

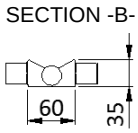
## 6 General dimensions



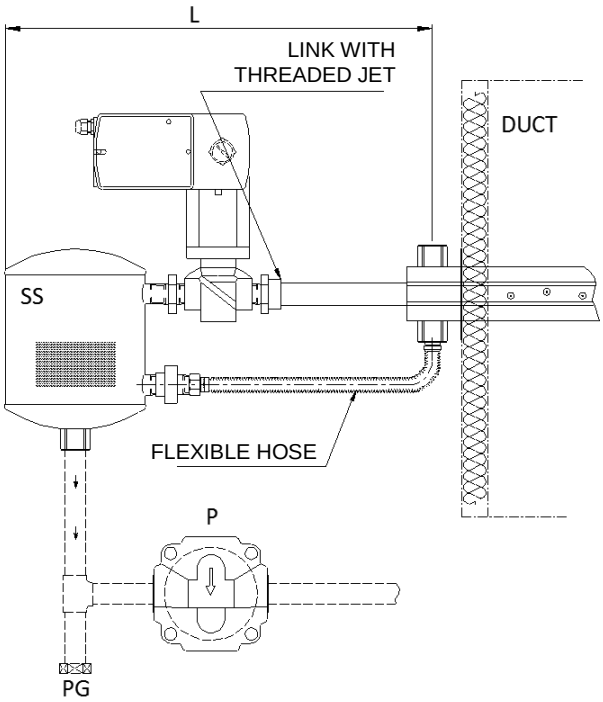




**Case 1: Links and threaded valves**



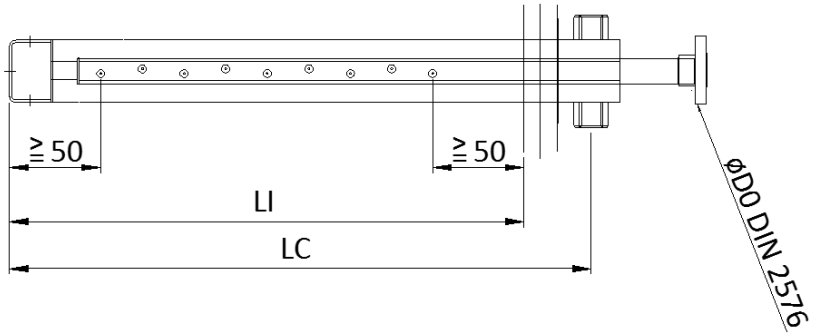

Steam Separator




| | | Thread |
|---|---|---|
| **ØD0** | DN-20 | MALE GAS |
| **ØD1** | DN-20 | FEMALE GAS |

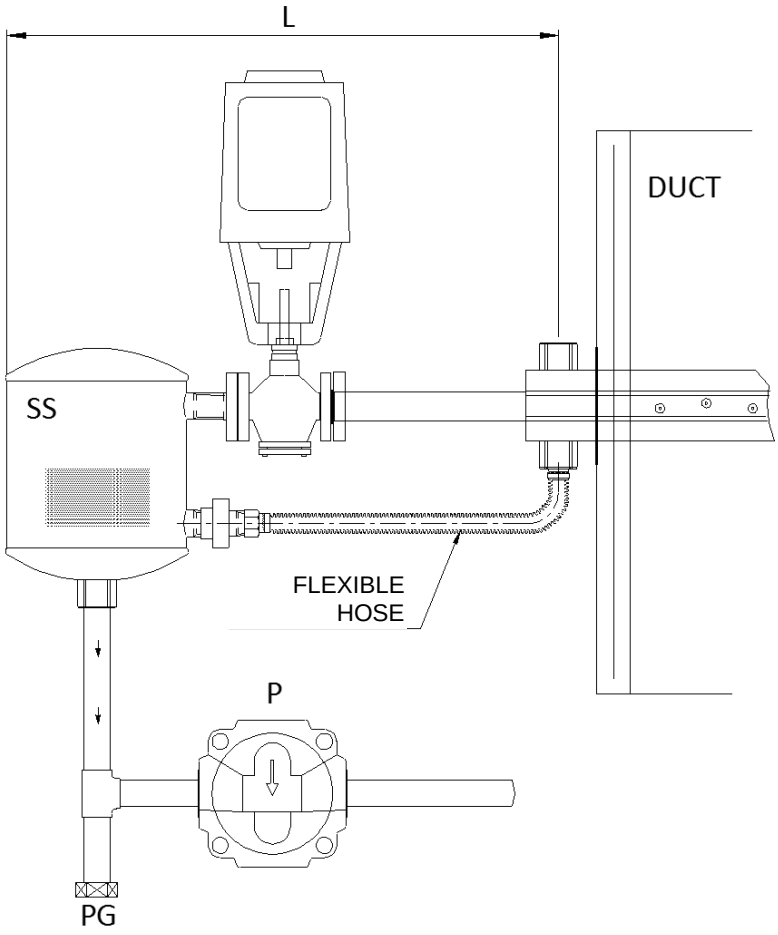
| Type of separator | L (mm) |
|---|---|
| **1** | 400 |
| **2** | 430 |
| **3** | 460 |

| Model | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1200 |
|---|---|---|---|---|---|---|---|---|---|
| **LI (mm)** | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1200 |
| **LC (mm)** | 382 | 490 | 598 | 706 | 814 | 886 | 994 | 1102 | 1282 |
| **Model** | **1400** | **1600** | **1800** | **2000** | **2200** | **2400** | **2600** | **2800** | **3000** |
| **LI (mm)** | 1400 | 1600 | 1800 | 2000 | 2200 | 2400 | 2600 | 2800 | 3000 |
| **LC (mm)** | 1498 | 1678 | 1886 | 2110 | 2290 | 2506 | 2686 | 2902 | 3082 |




**Case 2: Flanges and flanged valves**

Steam Separator




| Type of separator | L (mm) | ∅D0 (mm) |
|---|---|---|
| **1** | 452 | 15 |
| **2** | 488 | 20 |
| **3** | 502 | 25 |

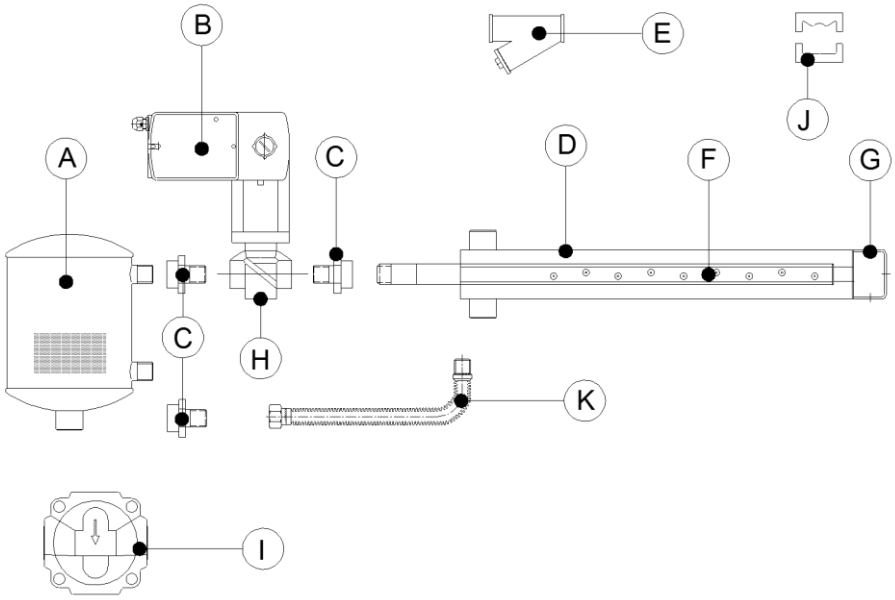
| Model | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1200 |
|---|---|---|---|---|---|---|---|---|---|
| **LI (mm)** | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1200 |
| **LC (mm)** | 382 | 490 | 598 | 706 | 814 | 886 | 994 | 1102 | 1282 |
| **Model** | **1400** | **1600** | **1800** | **2000** | **2200** | **2400** | **2600** | **2800** | **3000** |
| **LI (mm)** | 1400 | 1600 | 1800 | 2000 | 2200 | 2400 | 2600 | 2800 | 3000 |
| **LC (mm)** | 1498 | 1678 | 1886 | 2110 | 2290 | 2506 | 2686 | 2902 | 3082 |

## 7 FSH-SIMPLE TUBE Humidifier

- with threaded valve (for pressures less than 2.4 barG)

List of parts delivered by FISAIR:

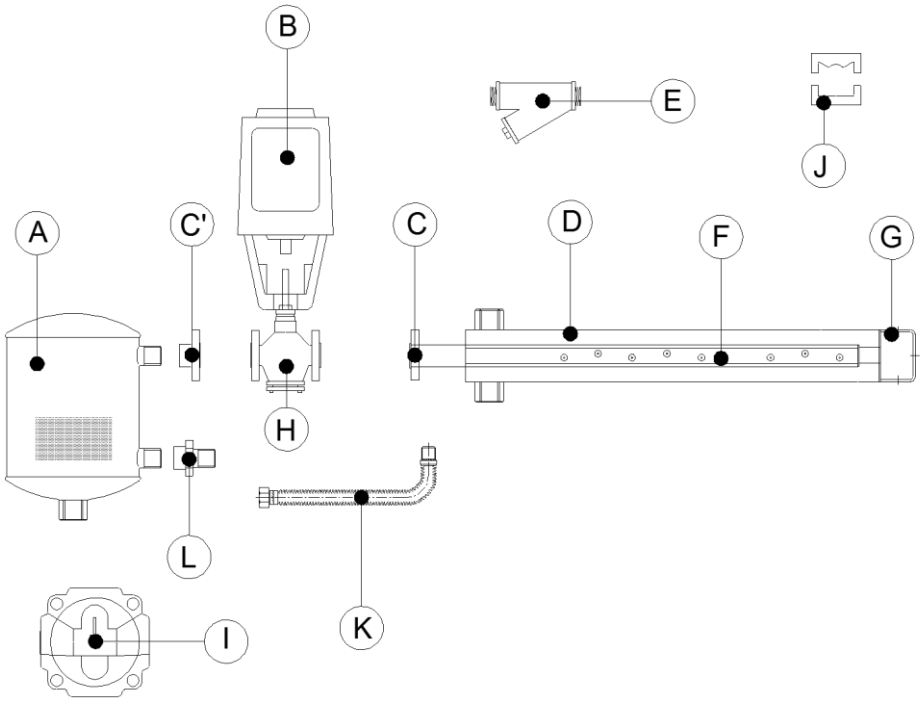
| | |
|---|---|
| A | Separator |
| B | Actuator |
| C | Threaded link |
| D | Injection Line |
| E | Filter in “Y” |
| F | Nozzles |
| G | Clamping fork |
| H | Threaded valve |
| I | F&T trap |
| J | Seal cover |
| K | Flexible hose |




- with flanged valve (for pressures greater than 2.4 barG or by customer request)

List of parts delivered by FISAIR:

| | |
|---|---|
| A | Separator |
| B | Actuator |
| C | Loose flange |
| C’ | Threaded flange |
| D | Injection Line |
| E | Filter in “Y” |
| F | Nozzles |
| G | Clamping fork |
| H | Flanged valve |
| I | F&T trap |
| J | Seal cover |
| K | Flexible hose |
| L | Threaded link |



## 7.1 Assembly and installation

### Assembly on site

Sometimes, large units are delivered without assembling to reduce transportation costs. Follow the instructions below for assembly:

1) Unpack the equipment and check the parts list. If a component is missing, please contact us.
2) Attach the dispersion tube with its corresponding valve-separator assembly. The nozzles should be oriented against the air current.
3) Unscrew the union tubing by removing the elbow and nut and installing it in the socket of the tube sleeve. Before this point, you must have decided in which direction (left or right) the steam holes should be directed and installed it in the proper coupling.
4) Fasten the links. At the same time, tighten the silencer clamps (if applicable) and slide them into the adapters, allowing them to grip with the bottom of the connector. Join the halves of the joints, tightening the union of the nuts with plastic not too strongly. The unit is ready to be installed in the duct.

### Installation

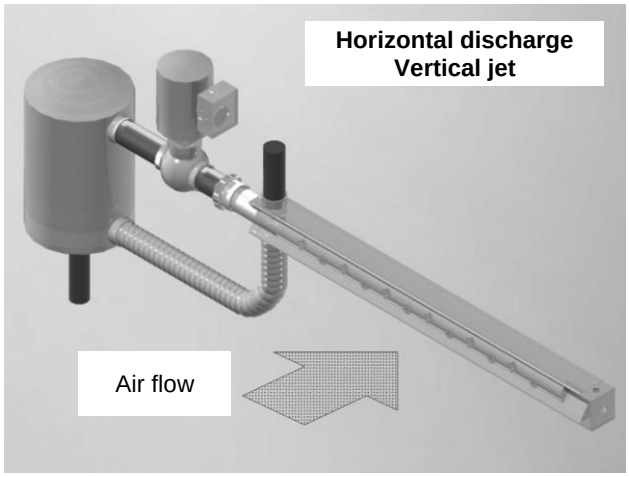
If you are unsure about positioning the equipment in the AHU or duct, see sections 13 and 14.

1) Insert the equipment in the air treatment unit on one side and position it crosswise to the duct.
2) Fasten the device by the clamping fork at the end of the jet on one side of the treatment unit. Fasten the other end of the jet to the other side of the treatment unit using the seal cover provided with the equipment.
3) Install the steam trap and the “Y” filter, see section 7.4.
4) Install the valve actuator electrical connections (see section 7.5). In addition, you should install a pressure switch to detect air flow, to prevent the valve from opening if there is no flow.

## 7.2 FSH-SIMPLE TUBE assembly configuration

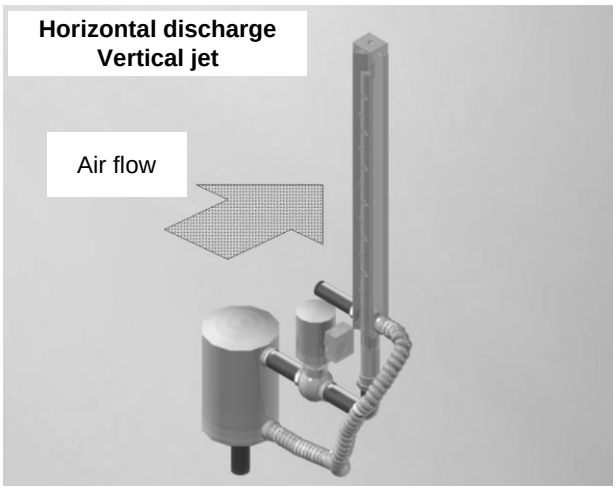
- Standard configuration (*)

Horizontal jet and horizontal steam discharge.
This configuration covers most uses.
This is how the units are delivered unless otherwise indicated.
The left hand configuration is displayed. To change side, see section 7.3.



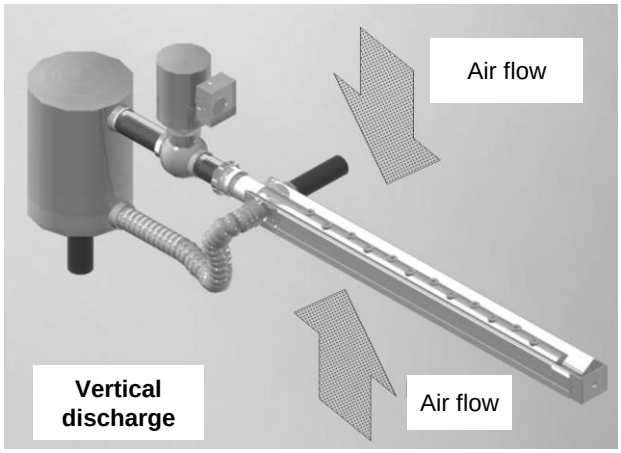

- Optional configuration A (*)

Vertical jet and horizontal steam discharge.
This is used when there is no access on one side of the duct.
Steam absorption will increase if the duct is high and narrow instead of deep and wide.




- Optional configuration B (*)

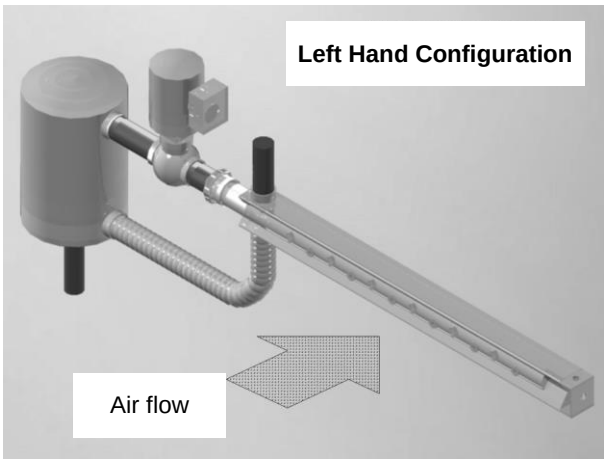
Horizontal jet and vertical steam discharge.
It is used in vertical ducts.
The nozzles should always point up, regardless of the direction of the air flow (up or down).

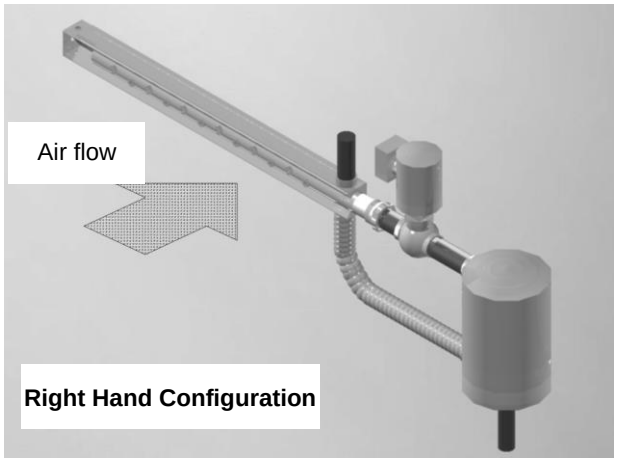



(*) Note: The steam must be discharged against the air flow. The insulated pipes must discharge in favour of the air flow to prevent condensation in the enclosure. A minimum speed of 1.5 m/s is recommended with the insulated dispersion tubes.

## 7.3 FSH-SIMPLE TUBE configuration: Chaining side

The two possible configurations are shown below.

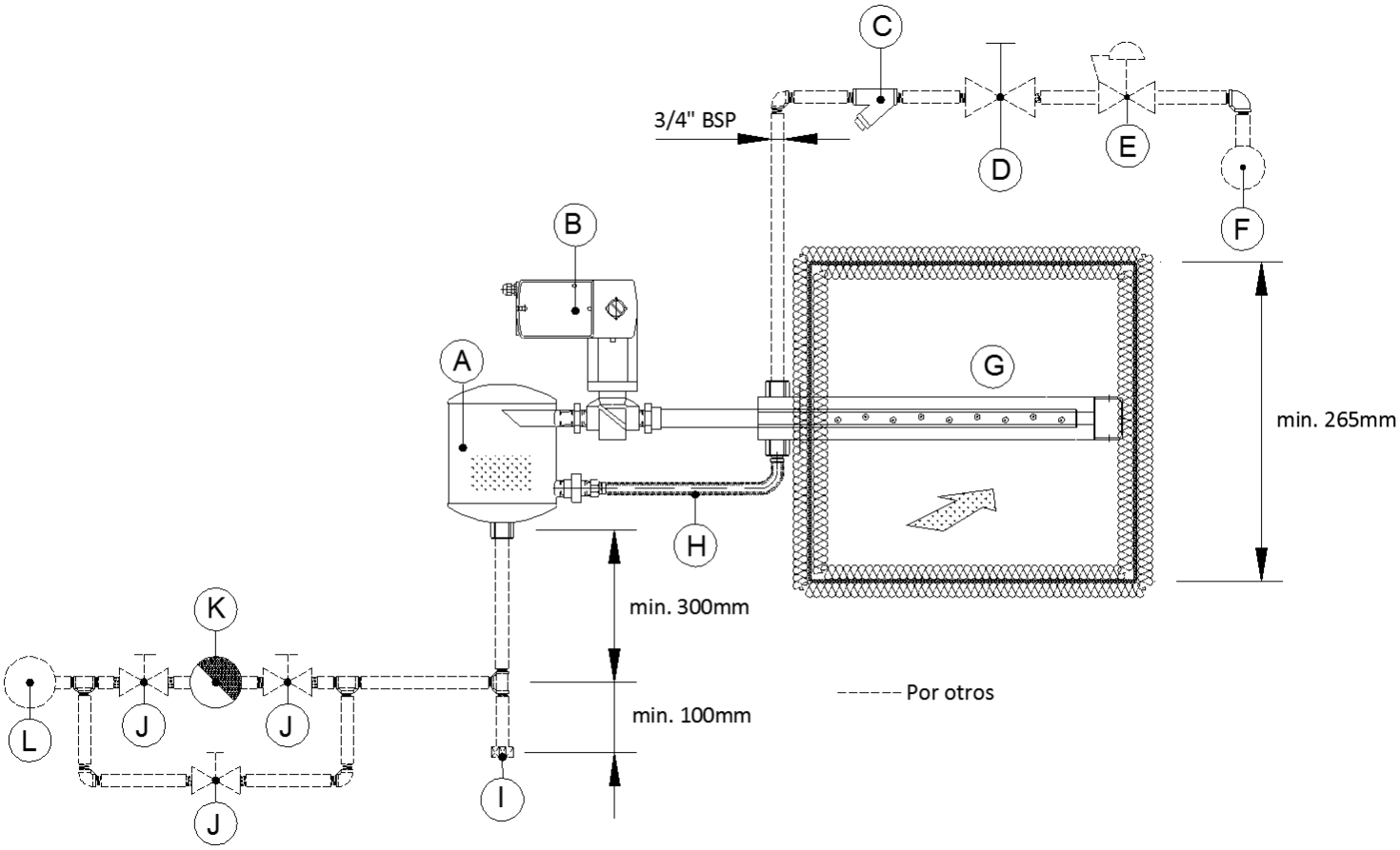



To change from one configuration to another, follow these steps:

1. Unscrew the binding link.
2. Remove the elbow-sleeve assembly from the dispersion tube and install it in the opposite connection.
3. Rotate the dispersion tube 180° with respect to the steam separator.
4. Reassemble the two halves and tighten the union link.

## 7.4 Installing recommended tubing for FSH-SIMPLE TUBE

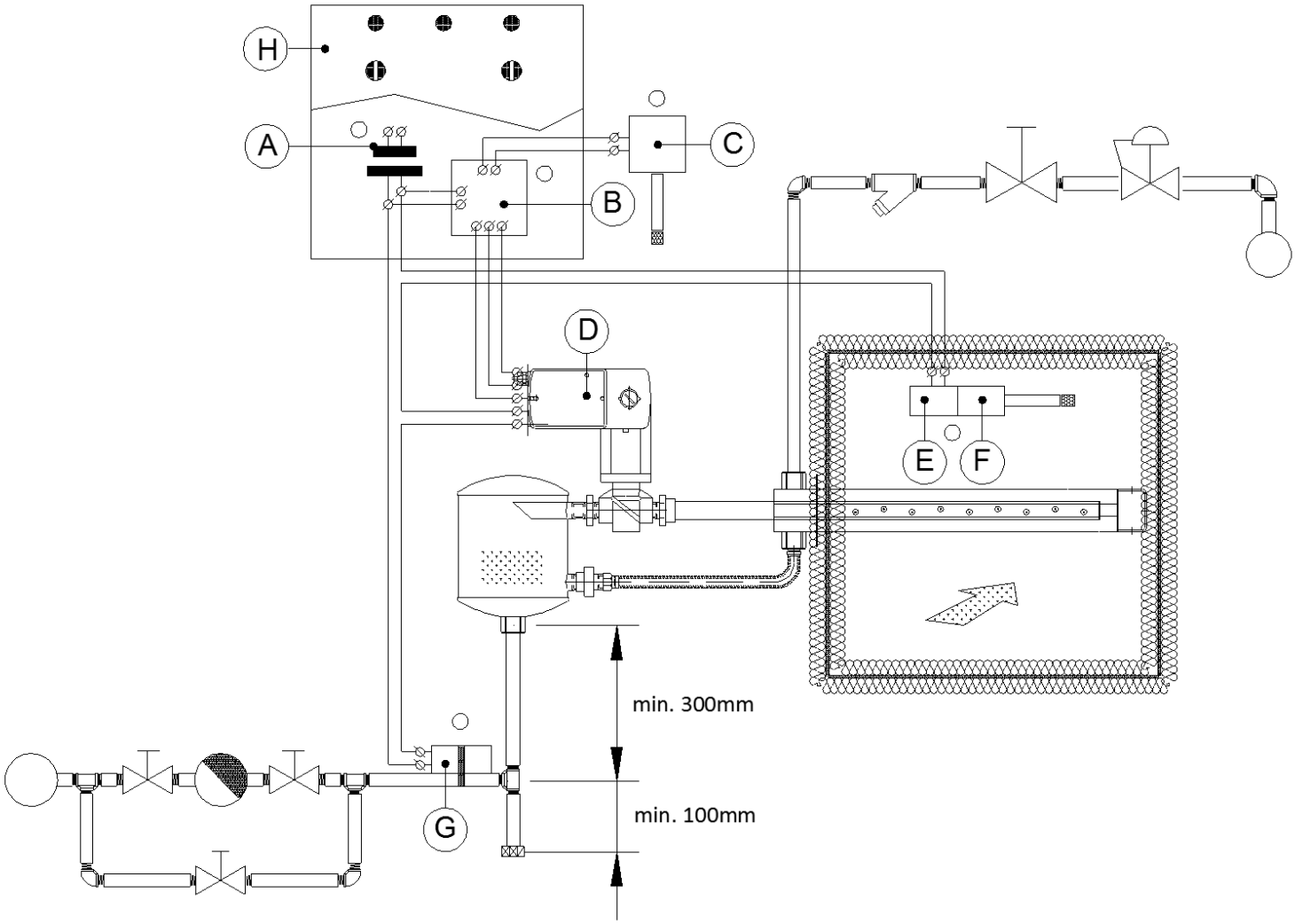



| | | | |
|---|---|---|---|
| A | Steam Separator | G | Steam dispersion tube |
| B | Valve actuator | H | Flexible tubing |
| C | Filter in Y | I | Drip leg |
| D | Cut-off Valve | J | Bypass cut-off valve |
| E | Pressure regulator | K | F&T trap |
| F | Boiler steam | L | Condensate line (pressurised) |

- The main steam supply for the humidifier must come from a height above or at the same level as the humidifier, not below, to ensure the driest steam. The main steam line supply must contain a condensate trap and drain according to the regulations.

- A hygrostat set to 80-90% RH should be installed when the temperature in the duct is below 21°C. The hygrostat must be placed downstream to ensure the air has absorbed the injected steam.
- The humidifier F&T steam trap must empty by gravity to the main return with little or no back pressure. If the condensate cannot be drained by gravity, it must be raised to return to the main return flow (see section 10).

## 7.5 Recommended electric installation for FSH-SIMPLE TUBE

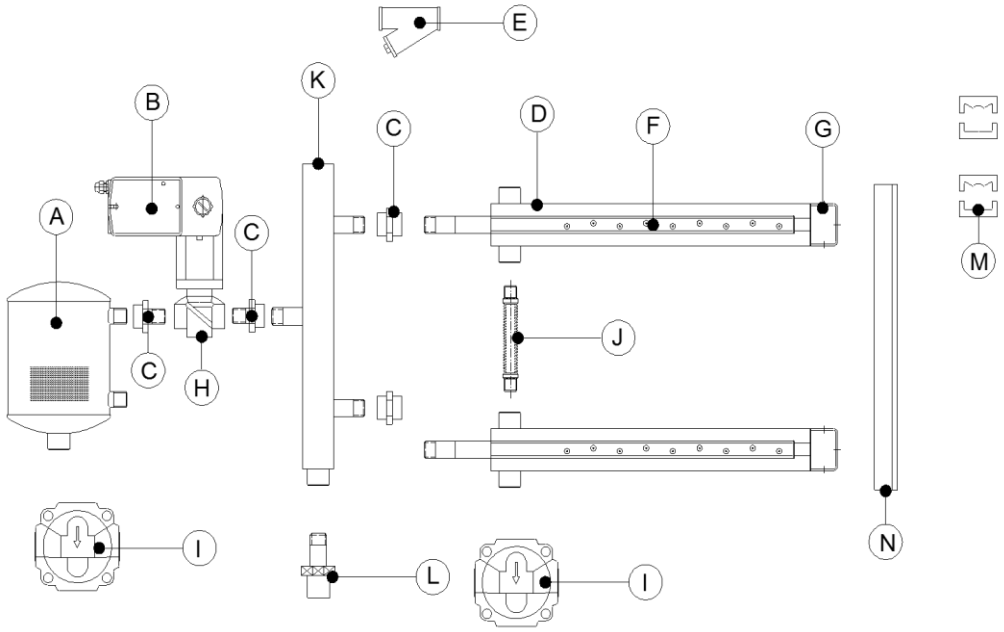



| | | | |
|---|---|---|---|
| A | Transformer | E | Flow switch |
| B | Humidity regulator | F | Safety hygrostat |
| C | Humidity probe | G | Safety thermostat |
| D | Valve actuator | H | Control panel |

## 8 FSH-MULTI TUBE Humidifier

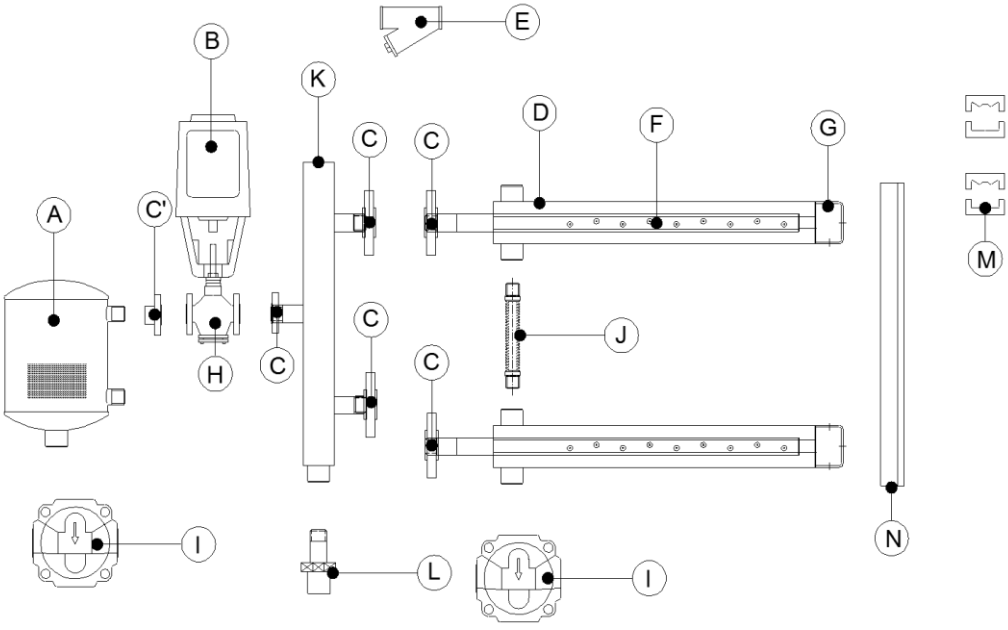
- with threaded valve (for pressures less than 2.4 barG)

| | |
|---|---|
| A | Separator |
| B | Actuator |
| C | Threaded link |
| D | Jet |
| E | Filter in “Y” |
| F | Nozzles |
| G | Clamping fork |
| H | Threaded valve |
| I | F&T trap |
| J | Flexible hose |
| K | Collector |
| L | Thermostatic trap |
| M | Seal cover |
| N | Attachment fork |




- with flanged valve (for pressures greater than 2.4 barG or by customer request)

| | |
|---|---|
| A | Separator |
| B | Actuator |
| C | Loose flange |
| C’ | Threaded flange |
| D | Jet |
| E | Filter in “Y” |
| F | Nozzles |
| G | Clamping fork |
| H | Valve |
| I | F&T trap |
| J | Flexible hose |
| K | Manifold |
| L | Thermostatic trap |
| M | Seal cover |
| N | Attachment fork |



## 8.1 Assembly and installation

### Assembly on site

Sometimes, large units are delivered without assembling to reduce transportation costs. Follow the instructions below for assembly:

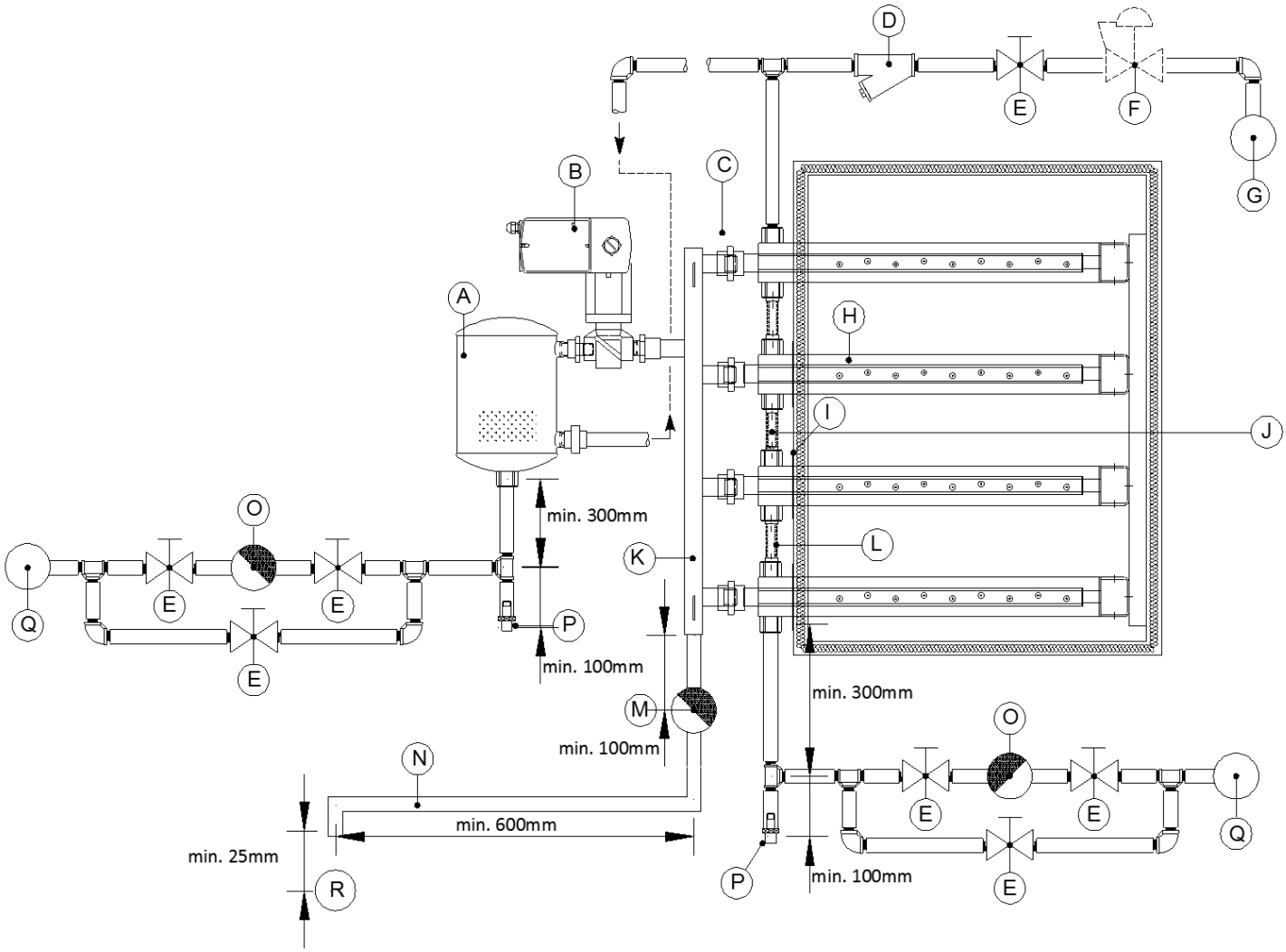
1) Unpack the equipment and check the parts list. If a component is missing, please contact us.
2) To make installation easier, we recommend first inserting the dispersion tubes into the manifold before the entire system is installed in the duct or air conditioner.
3) Install the manifold using threaded links or flanges.
4) Join the unions of the sleeves and fasten them by hand.

### Installation

If you are unsure about positioning the equipment in the AHU or duct, see sections 13 and 14.

1) Place the assembly inside the duct or air conditioner and attach it or build a structure at the end.
2) Position and secure the collector by the attachment angles provided. Tighten the joints of the interconnecting pipes.
3) Fasten the device by the clamping fork at the end of the jet on one side of the treatment unit. Fasten the other end of the jet to the other side of the treatment unit using the seal cover provided with the equipment.
4) Install the separator and the valve assembly to the manifold, using threaded links or flanges.
5) Install the steam trap and the Y filter, see section 8.2.
6) Install the valve actuator electrical connections (see section 8.3). In addition, you should install a pressure switch to detect air flow, to prevent the valve from opening if there is no flow.

## 8.2 Installing recommended tubing for FSH-MULTI TUBE




| | | | |
|---|---|---|---|
| A | Vapour Separator | J | Intermediate trap (see note)* |
| B | Valve actuator | K | Manifold |
| C | Links | L | Air flow switch |
| D | Filter in Y | M | Thermostatic trap |
| E | Cut-off Valve | N | Condensate line at atmospheric pressure |
| F | Pressure regulator | O | F&T trap |
| G | Boiler Water | P | Drip leg |
| H | Steam dispersion tubes | Q | Condensate line (pressurised) |
| I | Protective plates | R | Drain |

- A hygrostat set to 80-90% RH should be installed when the temperature in the duct is below 21°C.The hygrostat must be placed downstream to ensure the air has absorbed the injected steam.

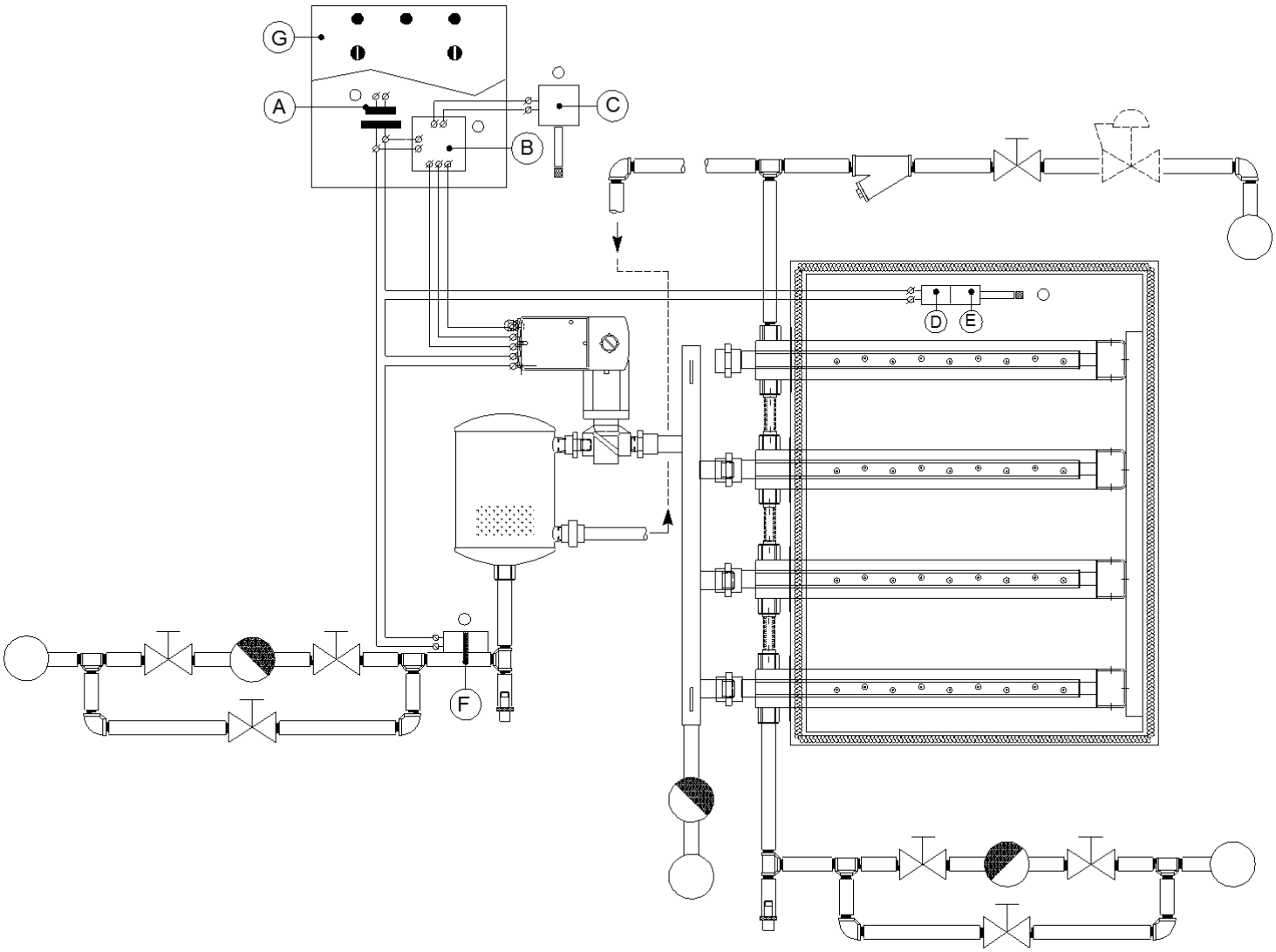
- The main steam supply for the humidifier must come from a height above or at the same level as the humidifier, not below. The main steam line supply must contain a condensate trap and drain according to the regulations.

- The humidifier F&T steam trap must empty by gravity to the main return with little or no back pressure. If the condensate cannot be drained by gravity, it must be raised to return to the main return flow (see section 10).

- The manifold is drained into a thermostatic trap with a very low steam pressure inside, so it should not return to the pressurised condensate line, but to a line at atmospheric pressure.

- *NOTE: When the total length of the steam dispersion tubes exceeds 13m, an intermediate steam trap should be installed in the position J in the diagram.

## 8.3 Recommended electric installation for FSH-MULTI TUBE

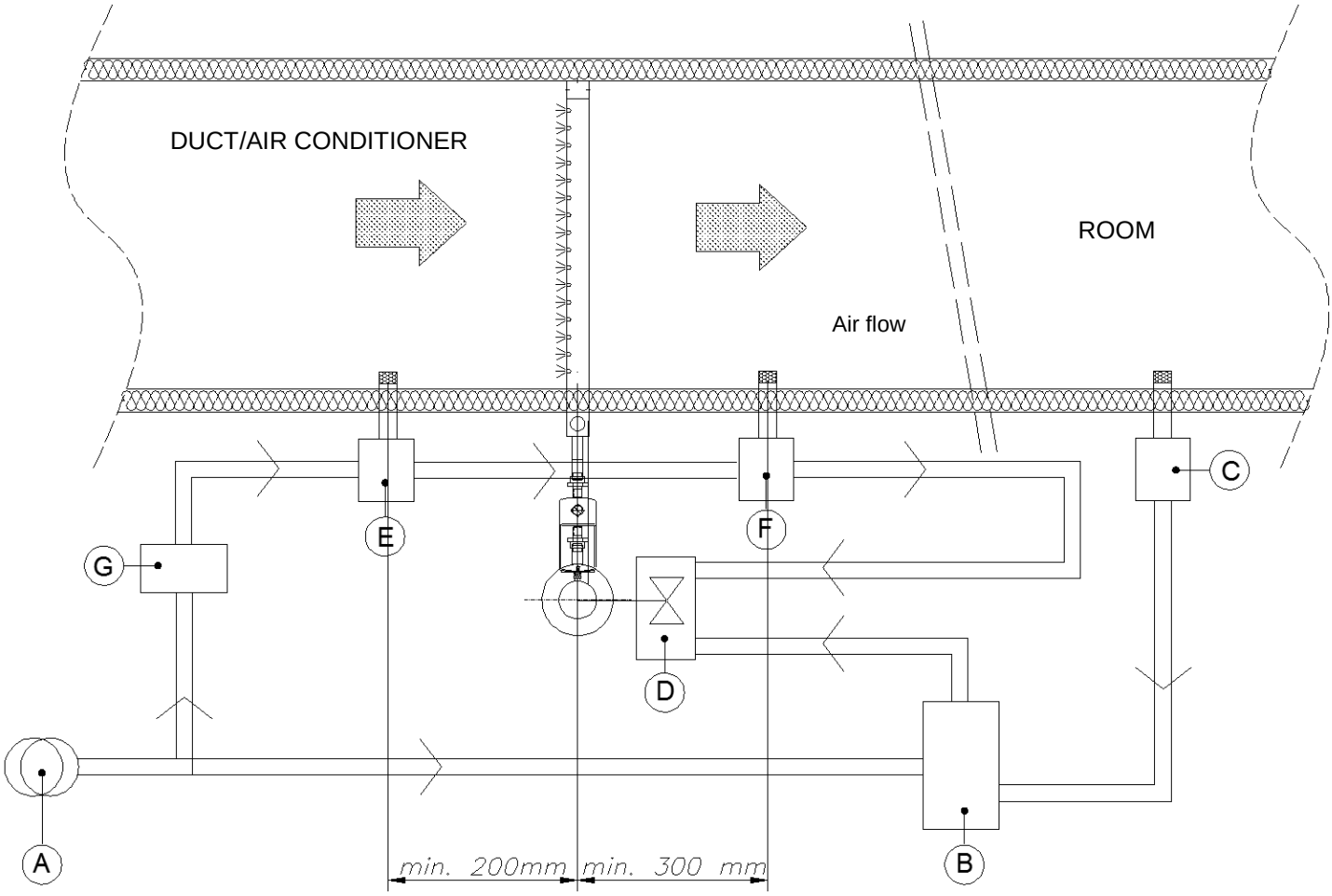



| | | | |
|---|---|---|---|
| A | Transformer | E | Safety hygrostat |
| B | Humidity regulator | F | Safety thermostat |
| C | Humidity probe | G | Control panel |
| D | Flow switch | | |

## 9 Recommended sensor location

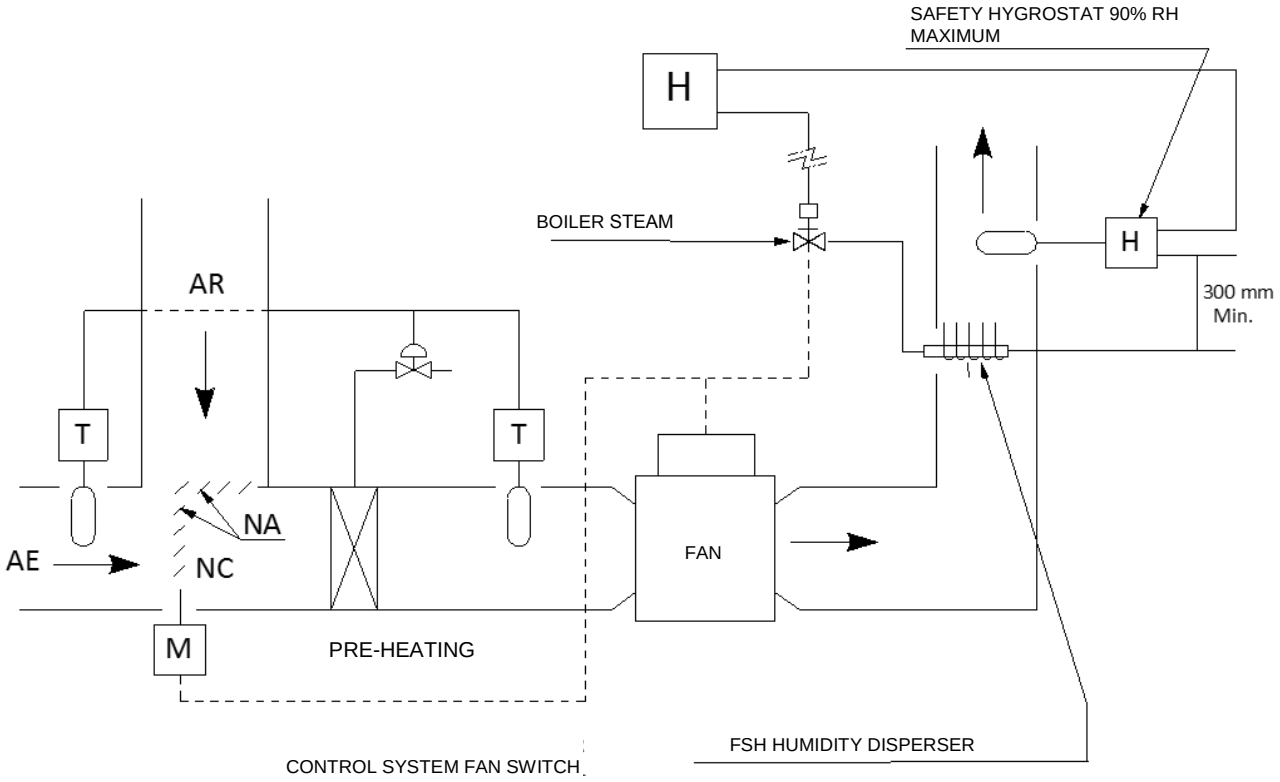
The location of the sensors has a significant impact on the operation of the humidifier. It is recommended not to exchange the duct sensors with the room sensors, since each is calibrated for a certain air velocity.

The proposed assemblies appear below. Some components must be supplied by the installer.

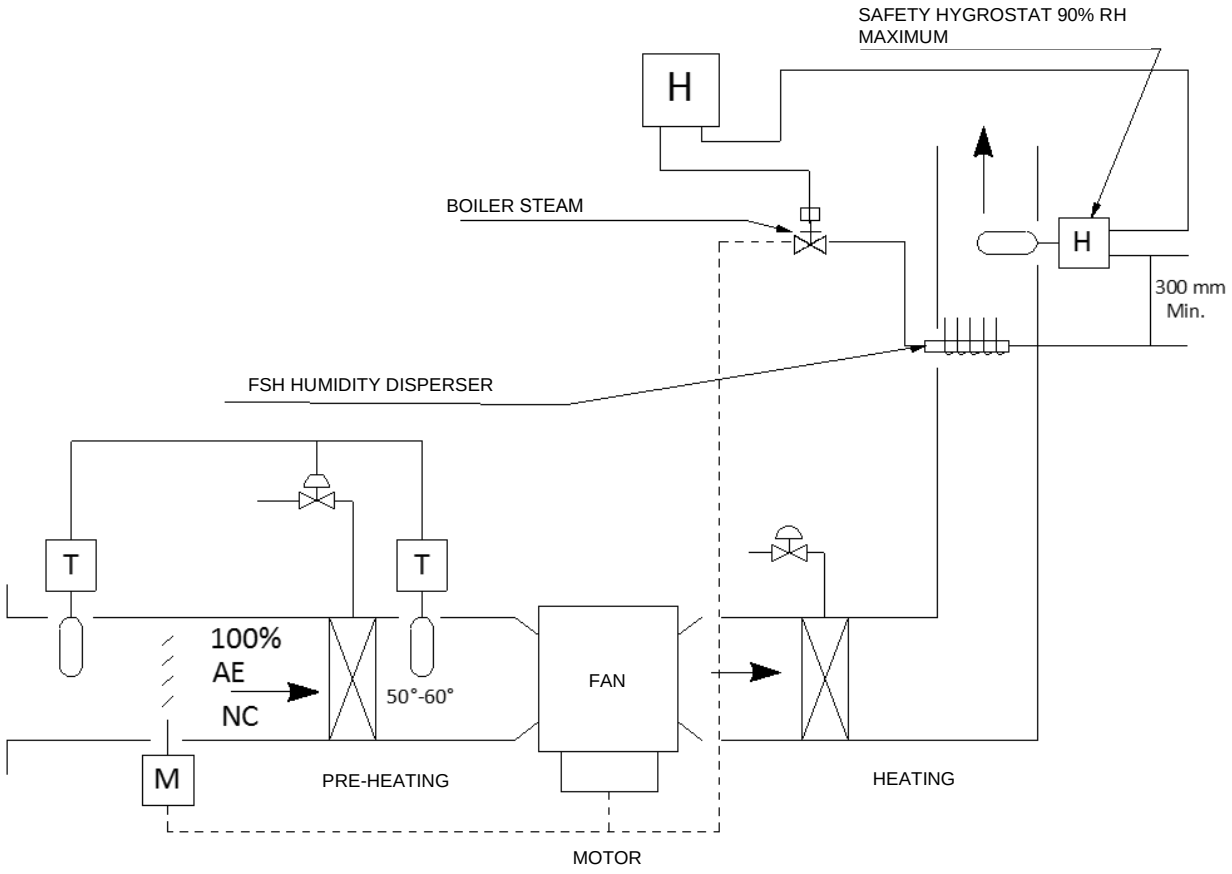



| | | | |
|---|---|---|---|
| A | Transformer | E | Flow switch |
| B | Humidity regulator | F | Safety hygrostat |
| C | Humidity probe | G | Safety thermostat |
| D | Valve actuator | | |

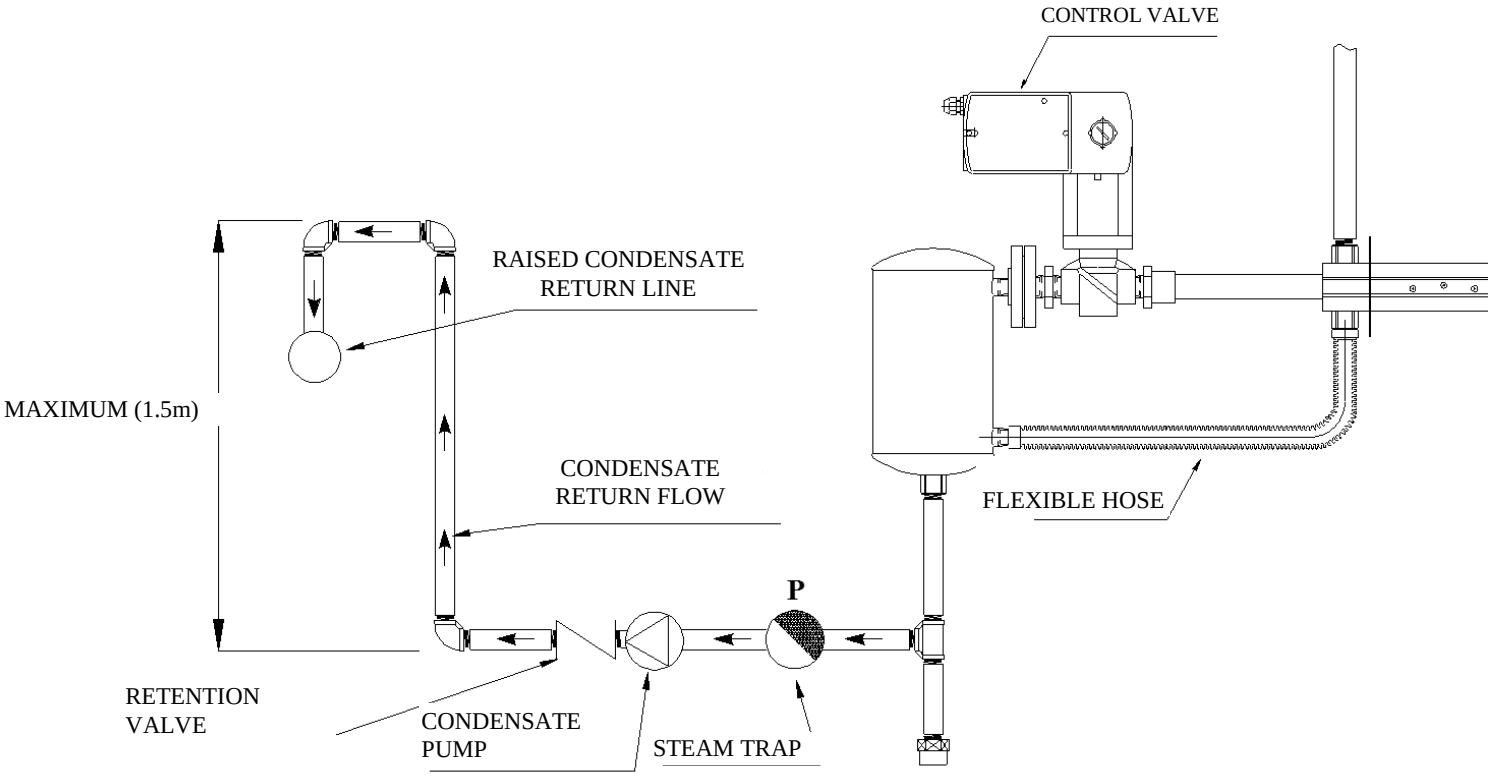
## DUCT INSTALLATION WITH RETURN AND EXTERIOR AIR WITH PRE-HEATING




## DUCT INSTALLATION WITH 100% EXTERIOR AIR AND 2 HEATING STATIONS



## 10 Raising condensate



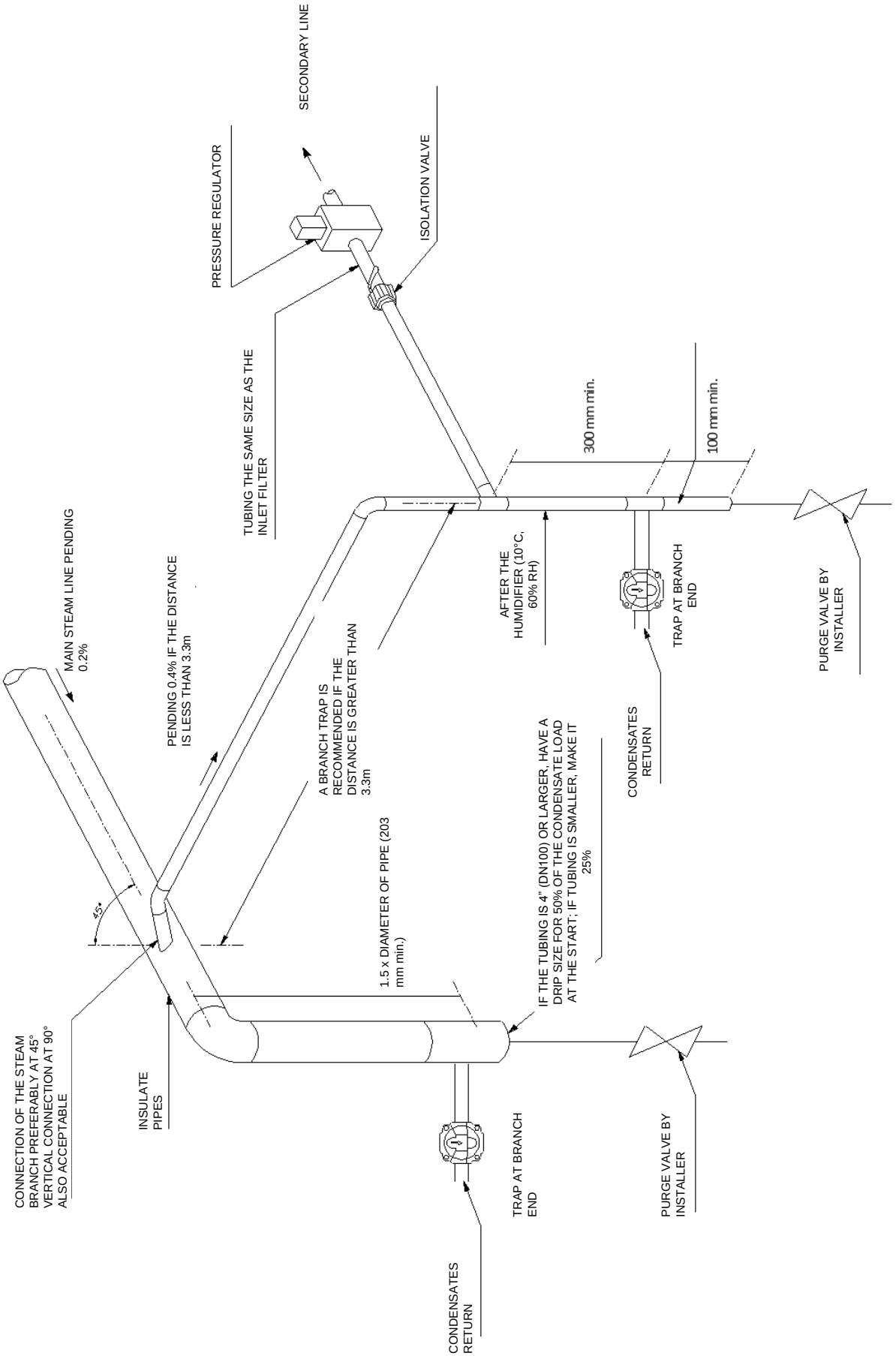

*Note: Use a condensate pump only if necessary, as the steam pressure itself can lift the condensate up to 1.5m; with a condensate pump, a check valve must be installed.

## 11 Operating environment temperature and humidity

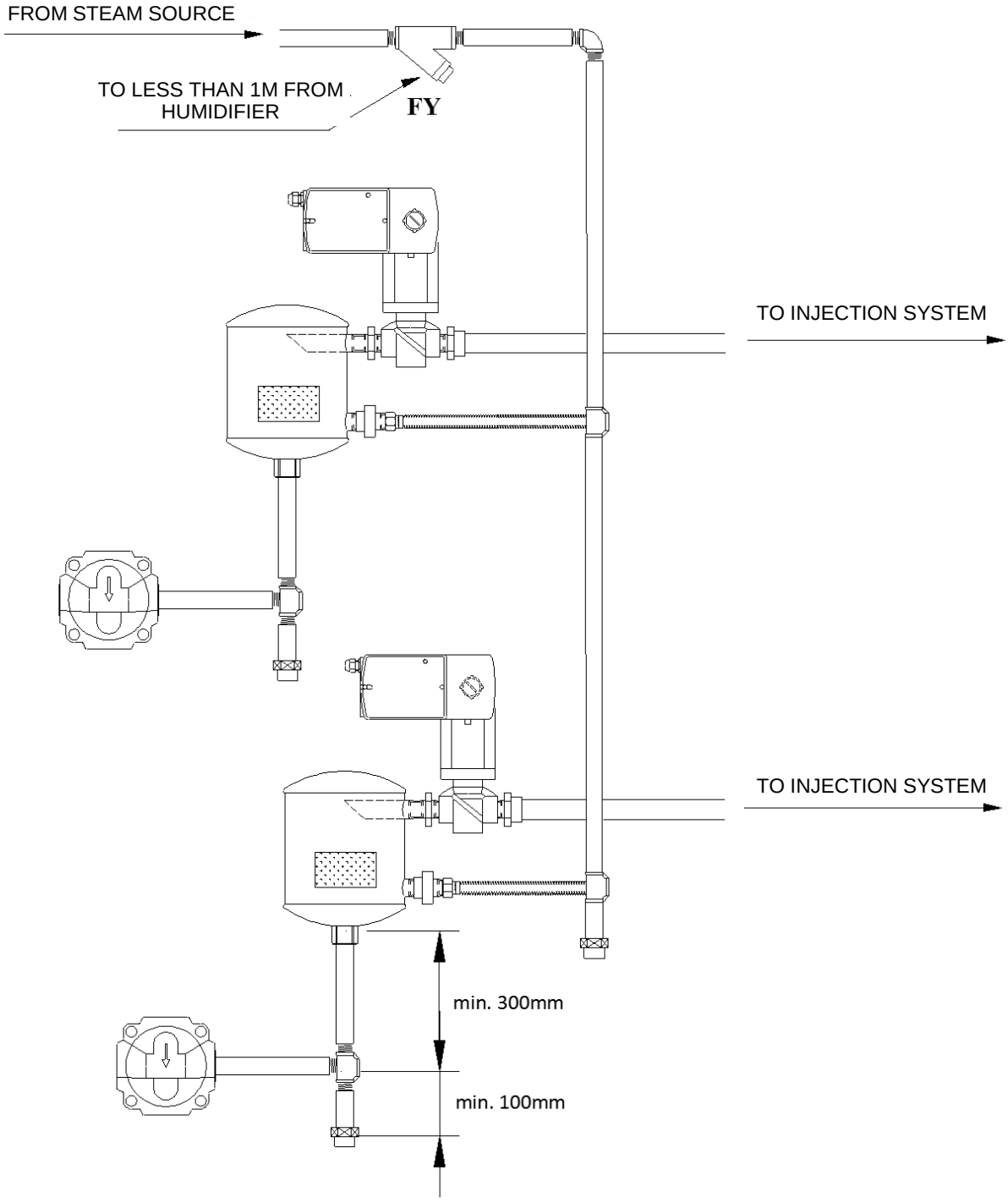
- Temperature: [-20…+50ºC]
- Relative humidity: [5…95% RH] no condensation.

# 12 Connection to boiler steam line

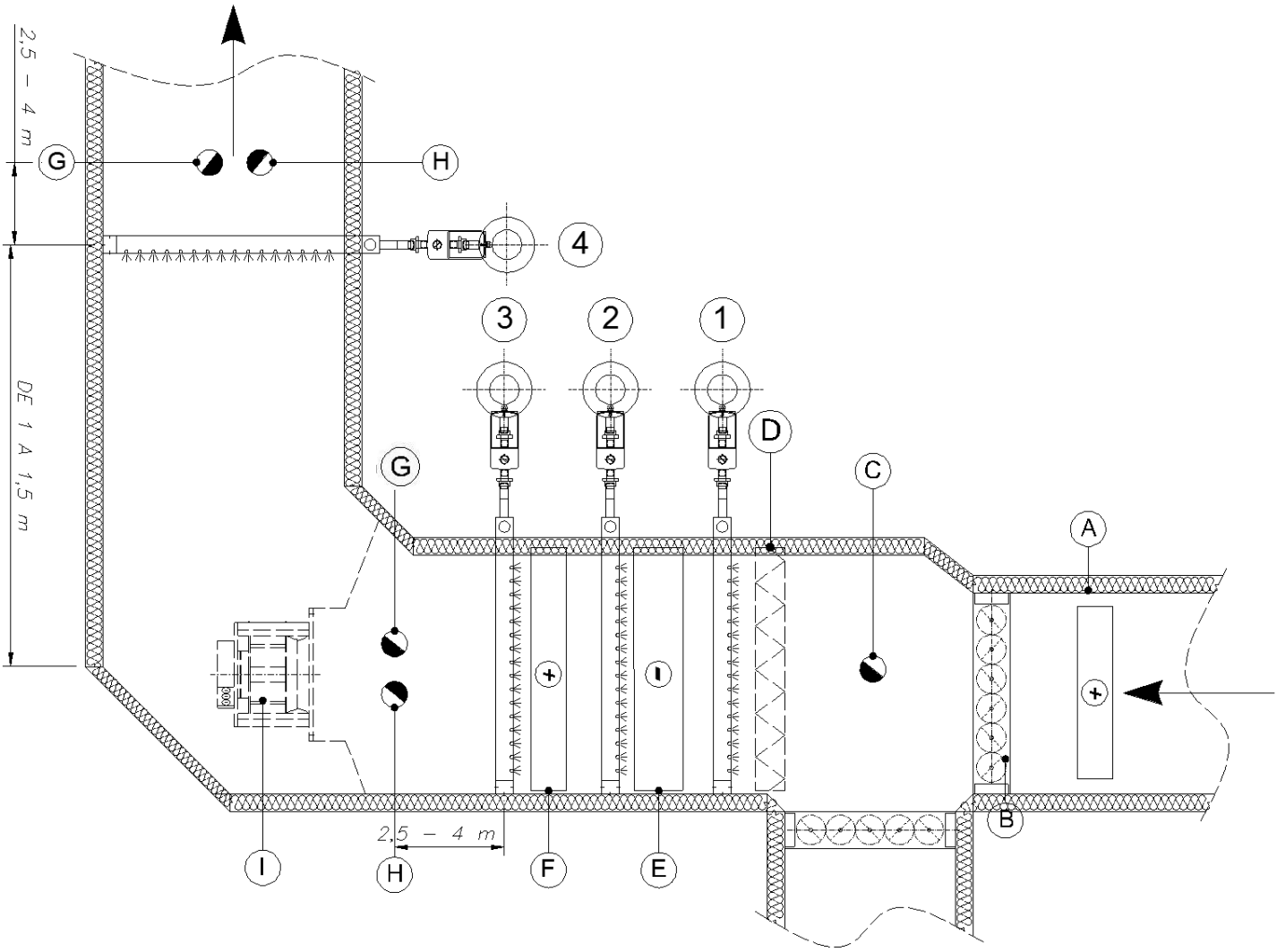
## 12.1 Connection to main line



## 12.2 Connecting secondary lines to each injection system



## 13 FSH located inside an AHU




| | | | |
|---|---|---|---|
| A | Pre-heating coil | F | Cooling coil |
| B | Gate | G | Safety hygrostat |
| C | Economiser, control device | H | Air flow switch |
| D | Filter | I | Fan |
| E | Heating coil | | |

**Location 3:**

This is the best option. Installing downstream from the heating and cooling coils, as it provides laminar flow through the dispersion unit, and the heated air absorbs the steam better. It is recommended to use FSH-PT to ensure complete absorption before entering the fan.

**Location 2:**

This is the second best option, for overload periods, the cooling coil removes part of the moisture for humidification.

**Location 4:**

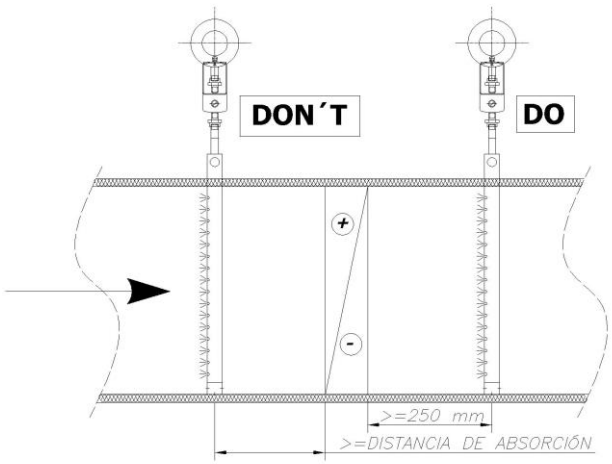
This is the third option. When the air leaves the fan, it is turbulent and the steam may not be absorbed within the established absorption distance. This gives more absorption distance if installing downstream from the fan.

**Location 1:**

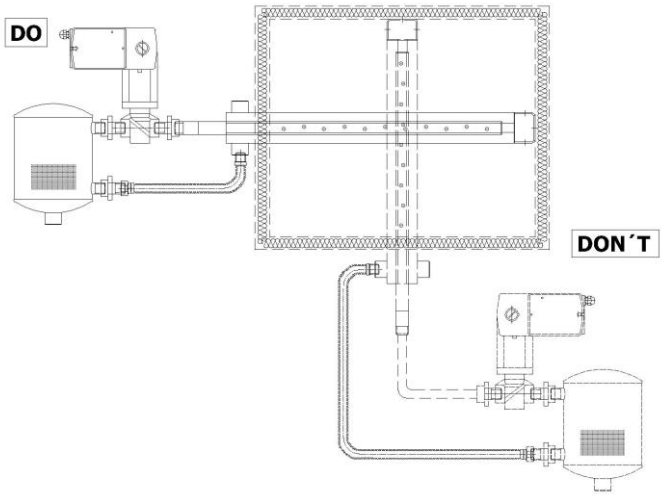
This is the least recommended position. The cooler air in this position requires a greater absorption distance.

## 14 FSH located inside a duct

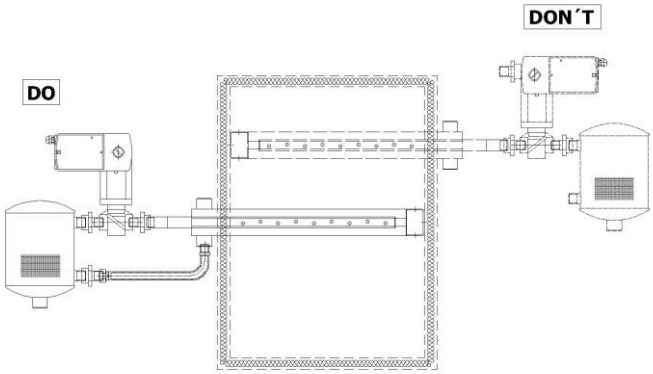
When possible, install the humidifier by injection downstream of the coils. If there is more than 90cm of available distance between the jets and the coil on the upstream side, the humidifier can be installed at that location.



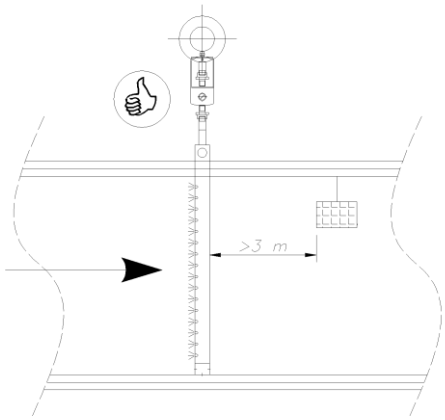

Always adjust and install the jet to cover the largest dimension of the duct section.



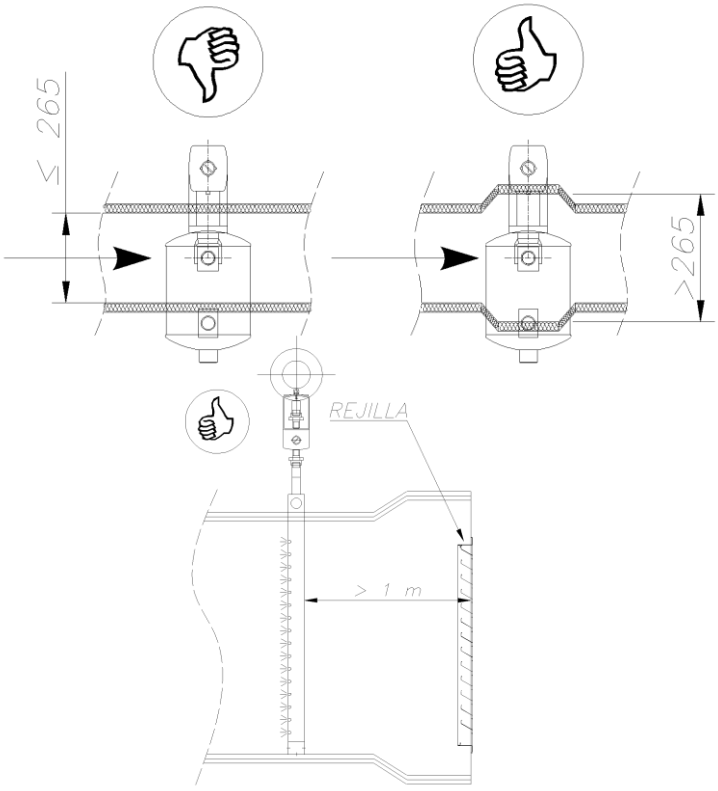

When possible, install the jet in the centre of the duct.



Do not install the jet less than 3m upstream of the temperature controller as it may give an erroneous signal.



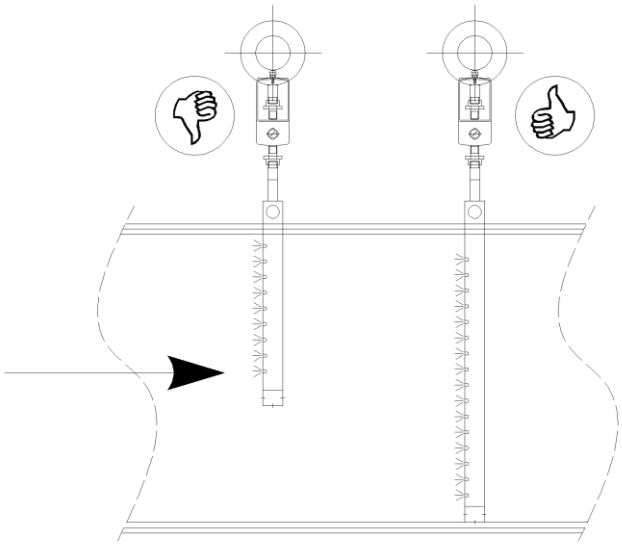

Do not risk restricting airflow in conduits of 265mm or less depth. Use an expansion section as shown in the image.




Always install the jet as far as possible upstream of the air discharge grilles, and never less than 1m upstream.



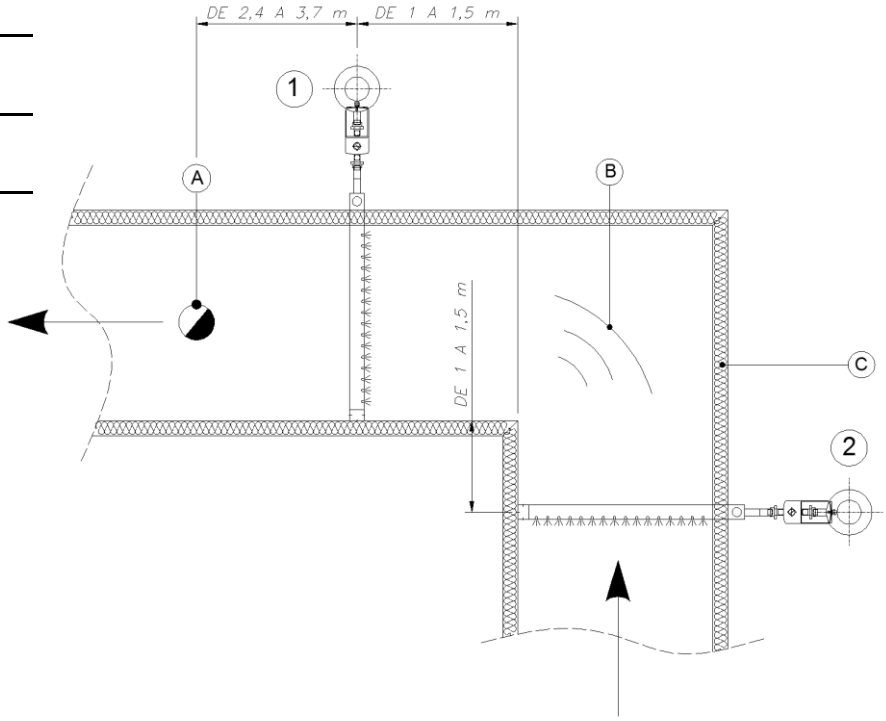

Always select the jet with the length that covers the width of the duct.



- Installing the humidifier near an elbow:

  Position 1: This is the best option. It leads to better absorption downstream from the elbow.
  Position 2: This is the second best option. Moisture may collect on the elbows of the duct. Where it is structurally impossible to avoid this position, use FSH-multitube to ensure complete absorption. Try to place it 1-1.5m from the elbow.

| | |
|---|---|
| A | Hygrostat |
| B | Duct elbow |
| C | Duct |



## 15 Maintenance

- The equipment requires regular inspection; if not, it could damage the components and invalidate the guarantee. Keep in mind that the equipment can be contaminated by bacteria causing Legionella, and must be controlled to prevent this.
- The humidifier should be sterilised twice a year.
- The humidifier must be inspected monthly to ensure its proper operation, and that it has no difficulty requiring immediate correction.

| COMPONENT | FREQUENCY AND PROCEDURE |
|---|---|
| Filter in Y | Inspect at least twice during the first year. If it is dirty, it should be inspected more frequently and cleaned as necessary. |
| Steam trap | At least twice a year, verify that it works correctly.<br>- If it is blocked, the trap will be cold.<br>- If a malfunction causes steam to escape, the trap will be hot and make a noise.<br>- The trap is operating properly if it leads to a drop of approx 1°C through it. |
| Valve | Inspect annually to make sure:<br>- The valve operates freely<br>- The valve completely stops steam from passing<br>- There are no leaks |
| Dispersion tube links | Replace every 2-3 years of service |
| Vapour Separator | Does not require maintenance |
| Steam jets | Do not require maintenance |
| Silencer (if applicable) | Inspect annually to ensure cleanliness. Clean or replace as needed. |

## 16 Troubleshooting

| PROBLEM | POSSIBLE CAUSE | ACTION |
|---|---|---|
| The humidifier discharges water into the duct. | Main steam line overloaded with water due to discharge of water and steam from the boiler or inadequate purging of the main steam line. | - Locate cause and correct it. |
| | The trap does not drain properly. | - Replace, clean or repair trap, as required.<br>- Reduce condensate return line pressure. |
| | Steam pressure is very low. | - Check the shut-off valves are fully open.<br>- Adjust the pressure regulator.<br>- Adjust the boiler pressure. |
| | Condensates are being collected at low points, without purging, from the main steam line. | - Install drip legs or traps as required. |
| | The disperser sleeves are not at the right temperature. | - Excessive condensate lifting. Redirect pipes or increase steam pressure.<br>- Short circuit within the sleeves. Replace tube.<br>- Incorrect trap location. Reposition and/or add trap.<br>- Condensate return line pressure is very high. Redirect tubes.<br>- The dispersion tube is not level. Relocate. |
| | Condensate return line overload. | - Replace with larger tubes or redirect to ground water trap. |
| | Trap capacity inadequate. | - Replace with larger trap. |
| Water leaks from the humidifier. | Defective links. | - Replace links. |
| | Steam leaks in the dispersion tube outer sleeves. | - Repair leak or replace tube. Note: Check the installation to ensure that the tubes are not anchored; they must be able to expand/contract with the change in temperature. |
| Humidity exceeds the hygrostat value. | The automatic valve does not close completely. | - Something prevents the valve from closing. Clean it; check the filter.<br>- The steam pressure exceeds the valve spring closing value.<br>- The valve is installed in reverse. Re-install it.<br>- Adjust the valve link. |
| | The control system does not work properly. | - Incorrect control voltage. Check and correct.<br>- Incorrect control signal. Check and correct.<br>- Incorrect connection. Check and correct.<br>- Incorrect humidity sensor. Check and correct.<br>- Humidity controller not calibrated. Calibrate. |
| | Steam leak inside the duct. | - Repair leak. |
| Humidity fluctuates around the desired humidity set point. | The control system does not work properly. | - Humidity controller defective or inaccurate. Calibrate or replace.<br>- Control components poorly located. Reposition.<br>- Incompatible control components. Change components. |

| | | |
|---|---|---|
| The humidity of the space does not increase to the humidity point established. | Excessive external air volume. | - Check fans, gates, etc.<br>- Reduce air volume. |
| | Steam pressure is very low. | - The manual steam valve is partially closed. Open.<br>- Clean filter.<br>- Boiler pressure is very low. Adjust.<br>- Pressure regulator does not work properly. Repair or correct.<br>- Check fans, gates, etc.<br>- The tubes are too small. Change. |
| | The humidifier is too small. | - Replace valve with one of greater capacity.<br>- Replace with larger humidifier.<br>- Add additional humidifier. |
| | The automatic valve does not open completely. | - It is too tight. Release or replace tightening.<br>- Adjust links.<br>- Check pilot position settings. |
| | The control system does not work properly. | - Incorrect control voltage. Check and correct.<br>- Incorrect control signal. Check and correct.<br>- Incorrect connection. Check and correct.<br>- Incorrect humidity sensor. Check and correct.<br>- Humidity controller not calibrated. Calibrate.<br>- Temperature switch works incorrectly. Replace or readjust. |
| | Foreign matter prevents the valve from opening. | - Clean or replace valve. |
| | Excessive external air volume. | - Reduce air volume. |
| Condensate forms in the ducts. | The humidifier is mounted very close to internal devices (e.g. gates or elbows) in the duct. | - Check fans, gates, etc.<br>- Move the humidifier tubes to a point further from these devices upstream.<br>- Add dispersion tubes to reduce absorption distance. Consult with FISAIR to determine the number of tubes required. |
| | An uninsulated duct passes through an unheated area (cold surface temperature). | - Insulate duct. |
| | The air cannot absorb the amount of steam discharged. | - The humidifier operates when the fan is off. Install flow switch.<br>- The air temperature in the duct is very low for the amount of steam supplied. |
| | The steam pressure is very high, causing excess capacity. | - Reduce steam pressure. |
| The humidifier is noisy. | There is no silencer. | - Install silencer. |
| | Excessively high steam output from dispersion tubes. | - Install additional tubes. |

# DECLARACIÓN CE DE CONFORMIDAD
EC CONFORMITY DECLARATION
EG KONFORMITÄTSERKLÄRUNG
DECLARATION CE DE CONFORMITÉ

**Departamento de Dirección de Calidad**
Quality Management Department

Qualitätsmanagement-Abteilung
Département de gestion de la qualité


**FISAIR S.L.U.**
C/ Uranio, 20 (Pol. Ind. Aimayr)
28330 San Martín de la Vega (Madrid) ESPAÑA
Tfº (34) 916921514
Fax (34) 916916456


**DECLARAMOS Bajo nuestra única responsabilidad que el humidificador de aire:**
WE DECLARE, under our own responsability that the air humidifier:
Unter unserer ausschließlicher Verantwortung ERKLÄREN WIR, daß der Luftbefeuchter:
NOUS DECLARONS, sous notre unique responsabilité que l'humidificateur d'air:

**MARCA**/BRAND/MARKE/MARQUE: **FISAIR**

**SERIE**/SERIES/REIHE/SÉRIE: **DIPHUSAIR FSH**

**Se adapta a las normas:**
Meets the regulations:
Den Normen entspricht:
S'adapte aux normes:

- **EN ISO 12100**: 2010
- **EN 60204-1**: 2006
- **EN 61000-6-1**: 2007
- **EN 61000-6-3**: 2007
- **EN 13445-1/5**: 2015

**Es conforme a los requisitos esenciales de las Directivas:**
Conforms to the essential requirements of the Directives:
Und den von den Richtlinien aufgestellten Grundvoraussetzungen Rechnung trägt:
Et est conforme aux conditions essentielles des Directives:

- **2006/42/CE**
- **2014/30/UE**
- **2014/35/UE**
- **2014/68/UE**

**Con exclusión de responsabilidades sobre las partes o componentes adicionados o montados por el cliente.**
With no liability for the parts or components added or assembled by the customer.
Unter Ausschluß der Verantwortung über die vom Kunden bereitgestellten und/oder angebauten Teile.
Avec exclusion des responsabilités concernant les parties ou les composants ajoutés ou assemblés par le client.

**Departamento de Dirección de Calidad**/Quality Management Department/
Qualitätsmanagement-Abteilung/Département de gestion de la qualité:

**Hugo J. López Álvarez**
San Martin de la Vega, julio 2016

# FISAIR S.L.U. WARRANTY POLICY

**Quality Department**
Departamento de Calidad

**FISAIR S.L.U.**
C/ Uranio, 20 (Pol. Ind. Aimayr)
28330 San Martín de la Vega (Madrid) SPAIN
☎ Tfº (34) 916921514
Fax (34) 916916456

## Two-year Limited Warranty

FISAIR warrants to the original purchaser that its products will be free from defects in materials and parts for a period of two (2) years after installation or twenty-seven (27) months from the date FISAIR ships such product, whichever date is the earlier.

If any FISAIR product is found to be defective in material or assembly during the applicable warranty period, FISAIR's entire liability, and the purchaser's sole and exclusive remedy, shall be the repair or replacement of the defective product or part.

## Warranty disclaimer

FISAIR shall not be liable for any costs or expenses, whether direct or indirect, associated with the installation, removal or reinstallation of any defective product.

The Limited Warranty does not include any consumer part such as joints, pulleys, filters or media.

FISAIR's Limited Warranty shall not be effective or actionable if:

a) All related product invoices have been payed in time and terms.
b) Unless there is compliance with all installation and operating instructions furnished by FISAIR, or if the products have been modified or altered without the written consent of FISAIR, or if such products have been subject to accident, misuse, mishandling, tampering, negligence or improper maintenance. Such situations could be an incorrect power supply connection, crashed with inappropriate objects, security protection devices unblocked and so.
c) Components and/or manufactures are affected or damaged by the effects of corrosion (gradual wear of the metal bodies by the action of external actors not controlled by FISAIR).

Any warranty claim must be submitted to FISAIR in writing within the stated warranty period.

## Parts Warranty

Defective parts may be required to be returned to FISAIR. In case any part is claimed as a faulty one, FISAIR will ask the customer to send the part back to the factory in order to analyze if the part is failing due to any of above referred actions (see warranty disclaimer) or due to effective part failing.

If the part must be replaced immediately, FISAIR will ship the part to the customer immediately and invoice the part with a 30 days delay payment for the faulty part to be returned. If the part is returned in this period, the part fail analysis would be made to emit a technical report for the warranty coverage based in this Warranty Statement document.

In case that the part is failing due to a lack of quality, FISAIR will credit this invoice in order to stop the payment. In case FISAIR does not receive the part in this period, or if the failure is due to the reasons covered in the Warranty disclaimer paragraph, the invoice will be effective.

In case any part from the product / shipment is missing, the customer should notify FISAIR before 3 days from the shipment date of arrival.

**Quality Department**
Departamento de Calidad

## Service Covered by Warranty

In case that there is any FISAIR product that should be serviced in order to recover its proper used designed, FISAIR will select the person (s) in charge of this operation. These qualified technicians should have the enough knowledge to service FISAIR units.

No company should practice a warranty service without the writing FISAIR notice giving the authorization to do it and if any cost should be cover by FISAIR should be advised in advance to the service job. In case that FISAIR should send FISAIR staff to solve the solution, trip expenses are not covered by the warranty.

FISAIR's Limited Warranty is made in lieu of, and FISAIR disclaims all other warranties, whether express or implied, including but not limited to any implied warranty of merchantability, any implied warranty of fitness for a particular purpose, any implied warranty arising out of a course of dealing or of performance, custom or usage of trade.

FISAIR shall not, under any circumstances be liable for any direct, indirect, incidental, special or consequential damages (including, but not limited to, loss of profits, revenue or business) or damage or injury to persons or property in any way related to the manufacture or the use of its products. The exclusion applies regardless of whether such damages are sought based on breach of warranty, breach of contract, negligence, strict liability in tort, or any other legal theory, even if FISAIR has notice of the possibility of such damages.

By purchasing FISAIR's products, the purchaser agrees to the terms and conditions of this Limited Warranty.

## Extended Warranty

The original user may extend the term of the FISAIR Limited Warranty for a limited number of months past the initial applicable warranty period and term provided in the first paragraph of this Limited Warranty. All the terms and conditions of the Limited Warranty during the initial applicable warranty period and term shall apply during any extended term.

Each case should be valued in terms of type of product, equipment application, use and location of the product operation site.

Any extension of the Limited Warranty under this program must be in writing, signed by FISAIR, and paid for in full by the purchaser.

**Quality Manager:**

**Hugo J. López Álvarez**
San Martín de la Vega, February 2016