



AtomSpray SERIES

INSTALLATION AND MAINTENANCE MANUAL

COOLING AND HUMIDIFICATION SYSTEMS

ADIABATICS BY PNEUMATIC SPRAYING

MAS-F1-EN-22-0

In compliance with the European Union Regulations on Machine Safety, it is essential to read this protocol in detail prior to the installation of the equipment.



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ANEX I: DECLARATION OF CONFORMITY**ANEX II: WARRANTY****ANEX III: WIRING DIAGRAM:**

E10031_AS-F1_220VAC

E10032_AS-F1-Z_220VAC

E10034_AS-F1_110VAC

E10035_AS-F1-Z_110VAC

E10363_AS-F1+LAMP-UV_220VAC (with U.V. lamp.)

E11088_AS-F1_110-240-RS485+UV (with U.V. lamp and/or communication)

E11213_AS-F1-Z_110-240-RS485+UV (with U.V. lamp and/or communication)

1. Introduction

Dear Customer,

The AtomSpray evaporative humidifier is our answer to current technical needs, thanks to its safety in operation, its operational comfort and its economic efficiency.

To ensure the effective operation of your AtomSpray evaporative humidifier please read these Installation, Operation and Maintenance Instructions.



Use the AtomSpray evaporative humidifier only under appropriate and safe conditions, paying attention to all the notes of 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 your local dealer.

1.1. Operating instructions.

Correct use of the AtomSpray evaporative humidifier includes compliance with our installation, commissioning, operation and maintenance instructions, as well as following the steps as indicated, in the correct order.

This equipment should only be used by suitably qualified and authorized personnel.

Any person who transports and/or installs the unit or works with it should read and understand the appropriate parts of this manual, in particular the "Safety Notes" section.

It is recommended to have a copy of the user manual where the humidifier will operate (or near it).

Ignoring these instructions may invalidate all applicable warranties.

2. Safety notes

FISAIR disclaims any liability if not all the installation and operating instructions it has provided are complied with; if the products have been modified or altered without the written consent of FISAIR; or if the products have been subjected to improper use, mishandling, alteration, improper maintenance or show signs of negligent use or being involved in an accident. These situations could include an incorrect power connection, impacts with other objects, removal or disarming of security fittings/measures, etc.

2.1. General

Read these safety notes carefully and examine your equipment to familiarize yourself with it before installing, commissioning, or performing maintenance operations.

The following symbols or messages which may appear in this document or on your computer, warn of potential hazards, or provide information that can help you clarify or simplify a procedure.



See instructions

Read this manual before installation, which should be undertaken by suitably qualified personnel. Incorrect installation may cause personal harm and/or equipment damage. Before embarking on maintenance or commissioning, make sure you have consulted the manual. All risks or hazards associated with the system, including during the installation process and maintenance work should be identified by a competent health and safety representative, who will be responsible for implementing effective control as required.



Attention

This symbol is a security alert. It warns you of the potential danger of bodily injury or mechanical damage. Observe all safety instructions that accompany this symbol to avoid any situation that may cause injury to you and/or damage to the unit.



Attention, Voltage

The presence of this symbol on a hazard or warning label indicates that there is a risk of electrocution, which may result in bodily injury or death if the instructions are not followed.

**Installation of a residual current device in the power supply line.**

The installer has to install a specific residual current device in the machine's electrical power circuit.

General

- If you notice something malfunctioning, turn off the unit immediately and ensure it cannot be restarted. Problems should be rectified straight away.
- Only properly qualified personnel should carry out repair work, to ensure the continued safe operation of the unit.
- Use only original FISAIR spare parts.
- Refer to any local regulations that restrict or regulate the use of this humidifier.

Operation of the unit

- Do not compromise the safety of the unit.
- Periodically check the protection and warning devices.
- Built in safeguards must not be removed or switched off.

Installation, Disassembly, Maintenance and Repair of the Unit

- Turn off power to the unit when maintenance or repairs are performed.
- Do not upgrade or install additional equipment on the unit without prior written approval from FISAIR.

Electrical components

- Work affecting electrical components must be carried out by qualified electricians.
- Disconnect the power and make sure that it cannot be reconnected while any electrical components are being handled.
- Turn off the unit immediately if power supply failures are detected.
- Use only original class fuses with correct calibration.
- Perform regular checkups on the electrical equipment.
- Defects, such as loose connections or burnt cables, should be repaired immediately.

2.2. Hygiene:

Refer to the country equivalent of the Health and Safety Executive's Guidelines on the Control of the Cultivation of Microorganisms in Water Systems. Water systems, of which humidifiers are part, if not properly maintained, can lead to the cultivation of microorganisms. All aspects of this equipment have been taken into consideration in order to reduce this, and all other hygiene risks, as much as possible, but it is still important that users are aware of their responsibilities under the above guidelines to reduce risk...

To prevent the cultivation of microorganisms, users should:

1. Conduct a risk assessment of the water system, by a competent person, and implement an appropriate monitoring and control regime.
2. Avoid water temperatures that favor the cultivation of microorganisms.
3. Avoid water stagnation.
4. Clean and disinfect the humidification system as indicated in the relevant Health and Safety Executive guidelines and in the instructions in this manual.
5. The AtomSpray must be connected to a clean, drinking water supply. It is the user's responsibility to ensure that the water system complies with local laws.
6. The use of water tanks is only permitted as part of a water treatment system.



NOTE: This humidifier must be installed, operated and maintained in accordance with this manual. Failure to do the above could lead to contamination that could cause the cultivation of microorganisms.

The AtomSpray humidification system is designed for adiabatic humidification and cooling. This system is not intended to be suitable for any other application.



NOTE: To prevent water stagnation and bacterial contamination, this humidifier should be left on continuously. If the system is shut down for extended periods, the pipes should be purged according to the AtomSpray's operating stop/cut instructions and a full risk assessment carried out to ensure that operation is safe. Disinfection would be advisable.

3. Transport and storage

During transport, any type of knock or blow to the unit should be avoided, as well as measures put in place to prevent breakages due to incorrect loading and unloading of the equipment.

When receiving the unit, make sure that the label type and serial number of the plate corresponds to the order and supply information. Check that the equipment is complete and in perfect condition. In the event of missing components or damage during transportation, make a written claim to your supplier immediately.

During storage, keep the unit dry and protected from the weather. If it must be stored for a long period prior to installation, choose a place where the equipment does not suffer mechanically, or become contaminated by dust or building materials. In case of outdoor storage, protect against the elements.



Attention

Avoid direct exposure to the sun and temperatures in excess of 50°C.

Note: Required storage conditions:

- ❖ Temperature: [-10... +50°C]
- ❖ Relative Humidity: [5... 95%HR] non-condensing.

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



Note: Make a written claim to your carrier immediately in case of damage or missing components during transport.

4. General

	AS-F1-1.. 8	AS-F1-Z-2.. 16
TOTAL CAPACITY [l/h]	Min 4,8 ; Max 128	Min 4,8 ; Max 256
On/OFF programmer microprocessor	Optional	Optional
External dimensions [mm]	485x460x150mm	485x600x150 mm
Weight [kg]	10	15



Figure 1: AS-F1 Overview

5. Rating plate

The rating plate provides essential information on the technical operating characteristics of the machine.

The CE machinery safety regulations require that any machine which must operate in the field of European Union has a Rating plate indicating its main characteristics, the serial number of the machine and the name of the manufacturer in a durable medium.

According to article 2, section g of the Machinery Directive 2006/42/CE - RD 1644/2008, 'partly completed machinery' (quasi machine) means

"an assembly which is almost machinery, but which cannot in itself perform a specific application. A drive system is partly completed machinery. Partly completed machinery is intended only to be incorporated into or assembled with other machinery or other partly completed machinery or equipment, thereby forming machinery to which this Directive applies"

Therefore, the HEF2 device is classified according to whether it is delivered with a CCB2.0 or CCE2.0 control panel:

- If only the HEF2 device is supplied → **Partly completed machinery (quasi machine)**
- If the HEF2 device + CCB2.0 or CCE2.0 control panel are supplied → **Machine**
- If the HEF2 device + CCB2.0 or CCE2.0 control panel are supplied separately → **Partly completed machinery + Partly completed machinery ≠ Maquina**

The AtomSpray series incorporates the following information into its plate:

- Unit model
- Unit serial number
- Electrical power supply
- Maximum power
- Rated current
- Wiring diagram number
- Configuration program
- FISAIR devices it can be joined with
- Machine type: Machine or Partly completed machinery
- Designed in accordance with directive
- Made in Spain (EU): Place and date of manufacture
- QR code for technical assistance service and warranty activation

fisair air humidity control		RIS AIR S.L.U. C/ Urano, 20 - P.I. AIM AYR 28330 San Martín de la Vega MADRID (SPAIN) www.fisair.com	After Sales Service Servicio Postventa Mail: sat@fisair.com Tel: +34916921514
Modelo Model			AS-F1-01
Nº Serie Serial Number			2020----01
Alimentación Eléctrica Power Supply			230±10%V/IN/50-60Hz
Potencia Máxima Maximum Power Maximale Leistung			600 W
Intensidad Nominal Rated Current Bemessungsstrom			2,2 A
Esquema Eléctrico Wiring Diagram Schaltplan			E09489
Programa Configuración Configuration Program Konfigurationsprogramm			FISAIR01_SEF025.1 V2.1
Equipos de FISAIR a los que puede incorporarse FISAIR equipment you can join FISAIR-Ausrüstung, an der Sie teilnehmen können			-
Tipo de máquina Machine type Maschinentyp			Quasi Máquina Quasi Machine Quasi Maschine
Diseñada de acuerdo a directiva Designed according to directive Entwickelt nach richtlinie n			2006/42/CE
Fabricado en España (UE) Made in Spain (EU) Made in Spain (UE)			-/2020
			
fisair air humidity control		fisair air humidity control	
Modelo Model			AS-F1-01
Nº Serie Serial Number			2020----01
Alimentación Eléctrica Power Supply			230±10%V/IN/50-60Hz
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Equipos de FISAIR a los que puede incorporarse FISAIR equipment you can join FISAIR-Ausrüstung, an der Sie teilnehmen können			-
Tipo de máquina Machine type Maschinentyp			Máquina Machine Maschine
Diseñada de acuerdo a directiva Designed according to directive Entwickelt nach richtlinie n			2006/42/CE
Fabricado en España (UE) Made in Spain (EU) Made in Spain (UE)			--/2020
			

Figure 2: Example of feature plate of an AtomSpray AS-F1-01 machine and quasi-machine equipment

6. Operational principle and components

FISAIR S.L.U's AtomSpray water spraying equipment is an adiabatic wetting and cooling system that uses compressed air to atomize water. Through the mixture of water and compressed air by the spray nozzles, an aerosol is obtained, in the form of mist, and easily absorbed by the air. Therefore, dry air cools and wets quickly. The nozzles are made of AISI-316 stainless steel and are equipped with an outstanding internal design that makes the use of water treatments prior to the atomization system unnecessary. A complete control system is provided next to the nozzles for automatic, reliable and accurate operation at the required moisture level.

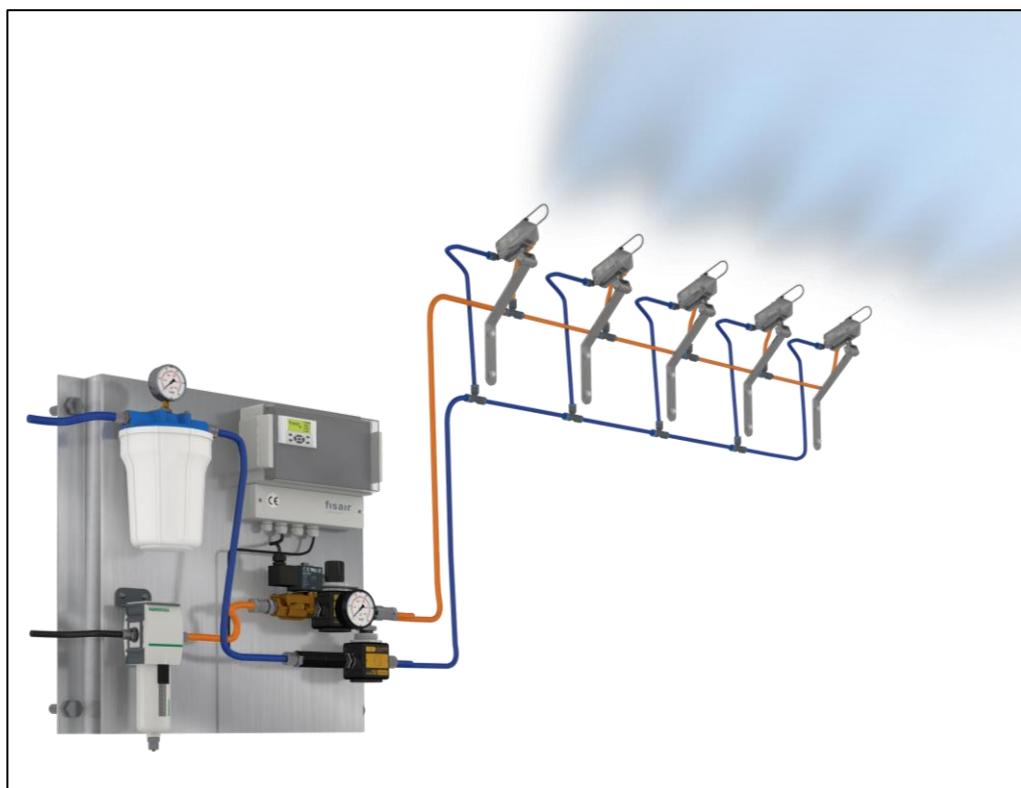
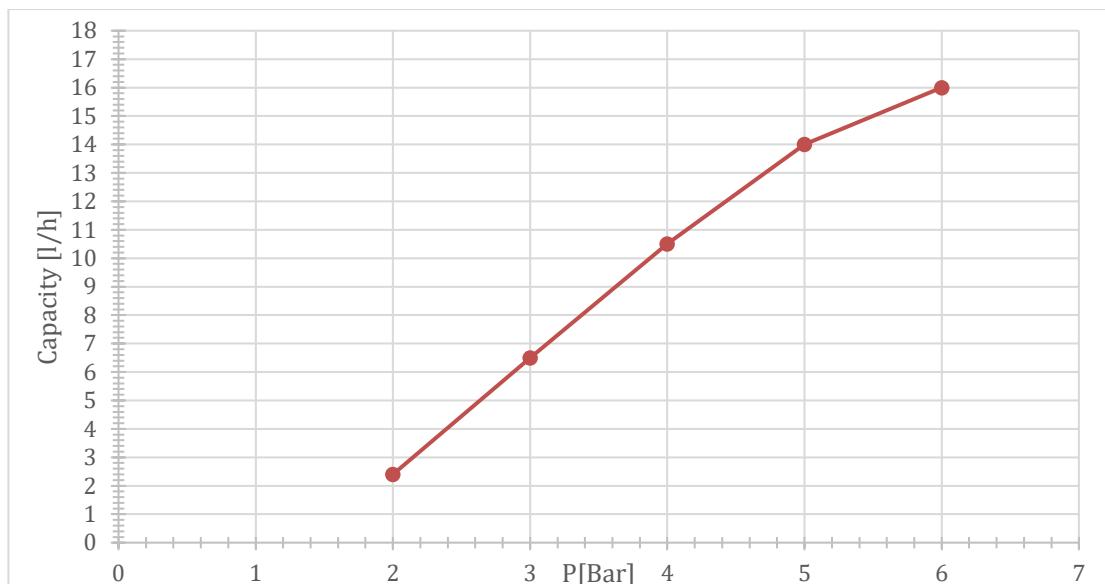


Figure 3: Operational principle scheme

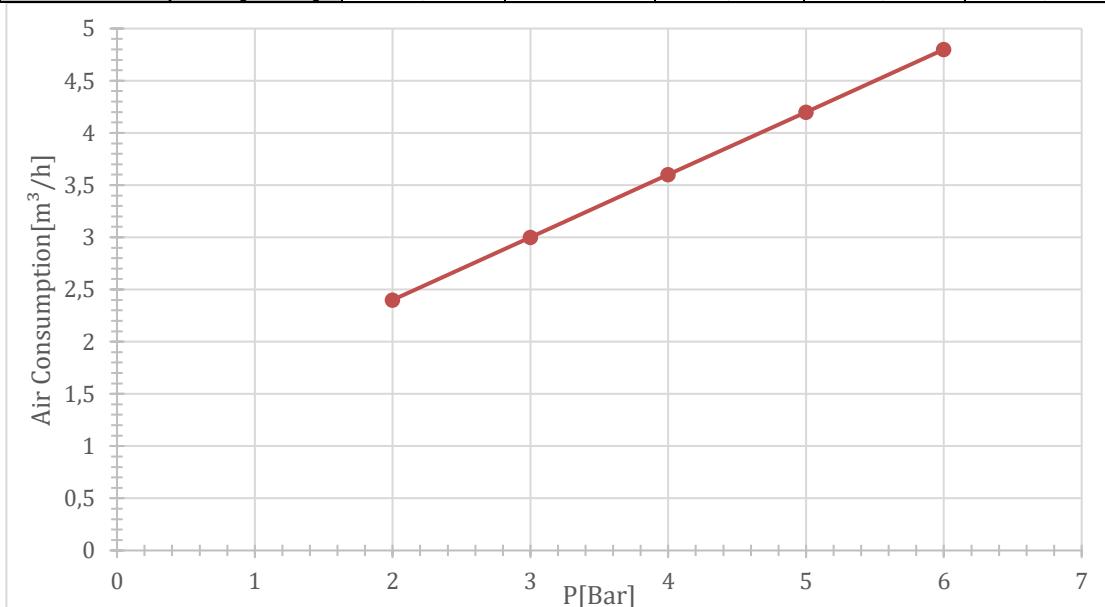
Compressed air and mains water (without treatment of any kind) passes through the filters and the set of regulating valves (ON/OFF or proportional) to the spray nozzles. At discharge, both air and water are mixed, onto a rod that, atomizes the water by resonance. This forms a mist which is absorbed by the air at a minimum contact distance/time.

Capacity and air consumption of equipment per nozzle:

MODEL: AS-F1 (one nozzle)	Inlet air pressure [Bar]				
	2	3	4	5	6
Humidification capacity [l/h]	2,4	6,5	10,5	14	16



MODEL: AS-F1 (one nozzle)	Inlet air pressure[Bar]				
	2	3	4	5	6
Air consumption [m³/h]	2,4	3	3,6	4,2	4,8



Note: To obtain the capacity or air consumption in equipment with multiple nozzles, the values shown for 1 nozzle must be multiplied by the number of nozzles.

Calculation method: Pressure and air consumption

When you have multiple nozzles, you must first calculate the capacity for each nozzle:

$$Q_1 = \frac{Q_T}{N}$$

Where

- Q_1 = Capacity per nozzle [l/h]
- Q_T = Capacity total[l/h]
- N = N° of Nozzles

The air pressure of each nozzle is then obtained from the graph.

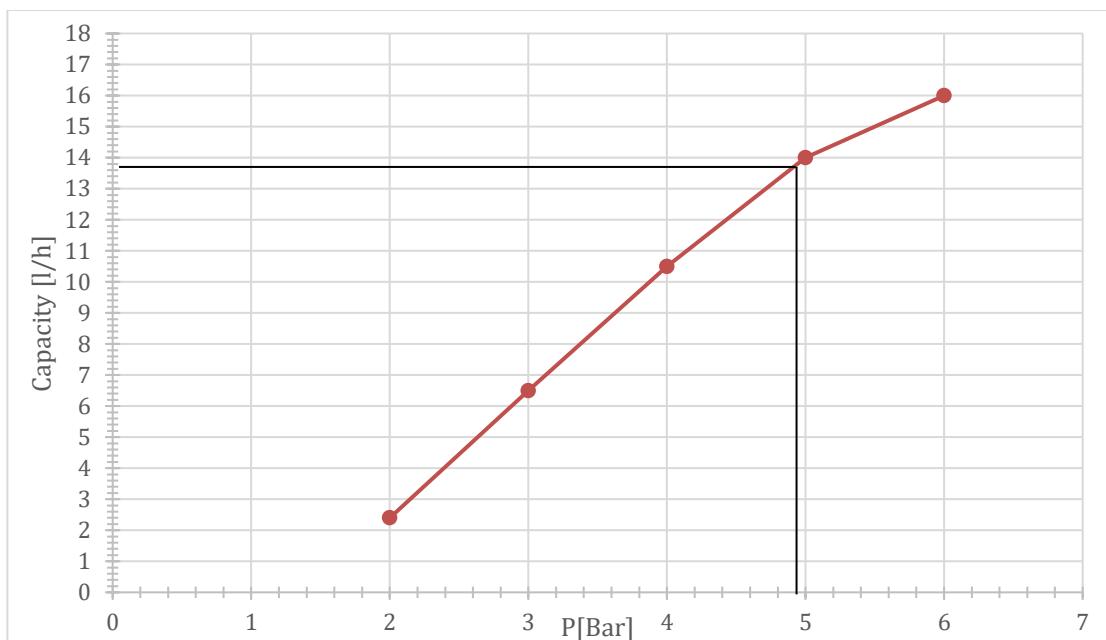
With this pressure, the air consumption for each nozzle is obtained from the graph of air/pressure consumption.

Ex: AS-F1-08

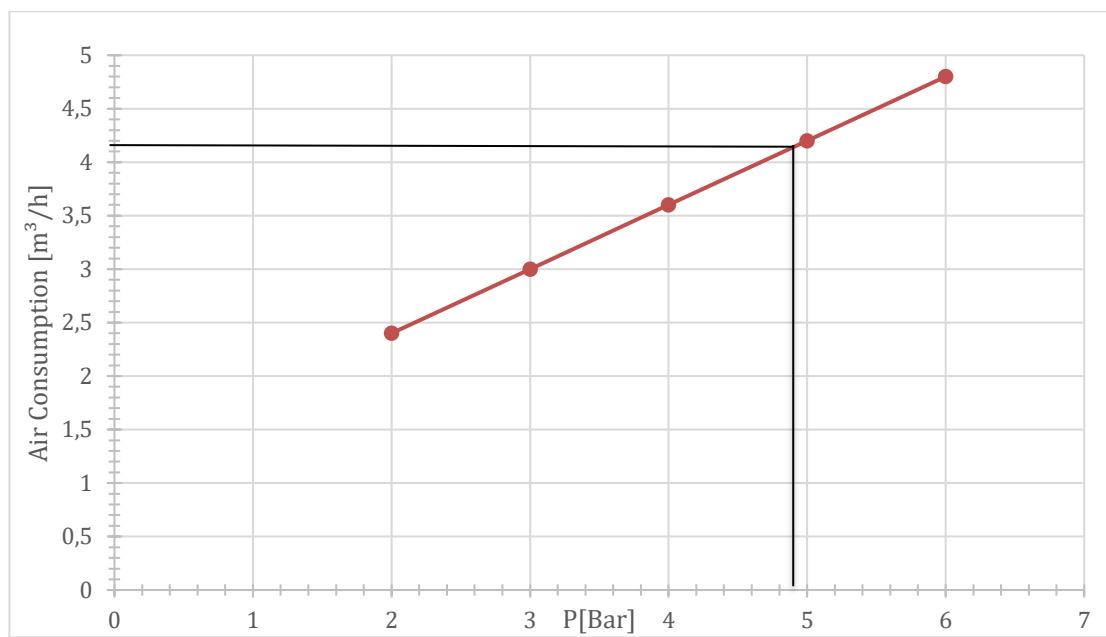
- $Q_T = \text{Capacity total} = 110[\text{l/h}]$
- $N = 8 \text{ Nozzles}$

$$Q_1 = \frac{110}{8} = [13.75 \text{ l/h}]$$

Enter the capacity/pressure graph with the capacity per nozzle ($Q_1 \times 13.75 \text{ l/h}$)



A nozzle pressure of $P_1 \times 4.92 \text{ Bar}$ is obtained



Enter the air/pressure consumption graph with a nozzle pressure of $P_1 \times 4.92 \text{ Bar}$.

An air consumption is obtained per nozzle of $Q_{\text{air}} 4.25 \text{ m}^3/\text{h}$

6.1. AS-F1: Zone 1 On-Off

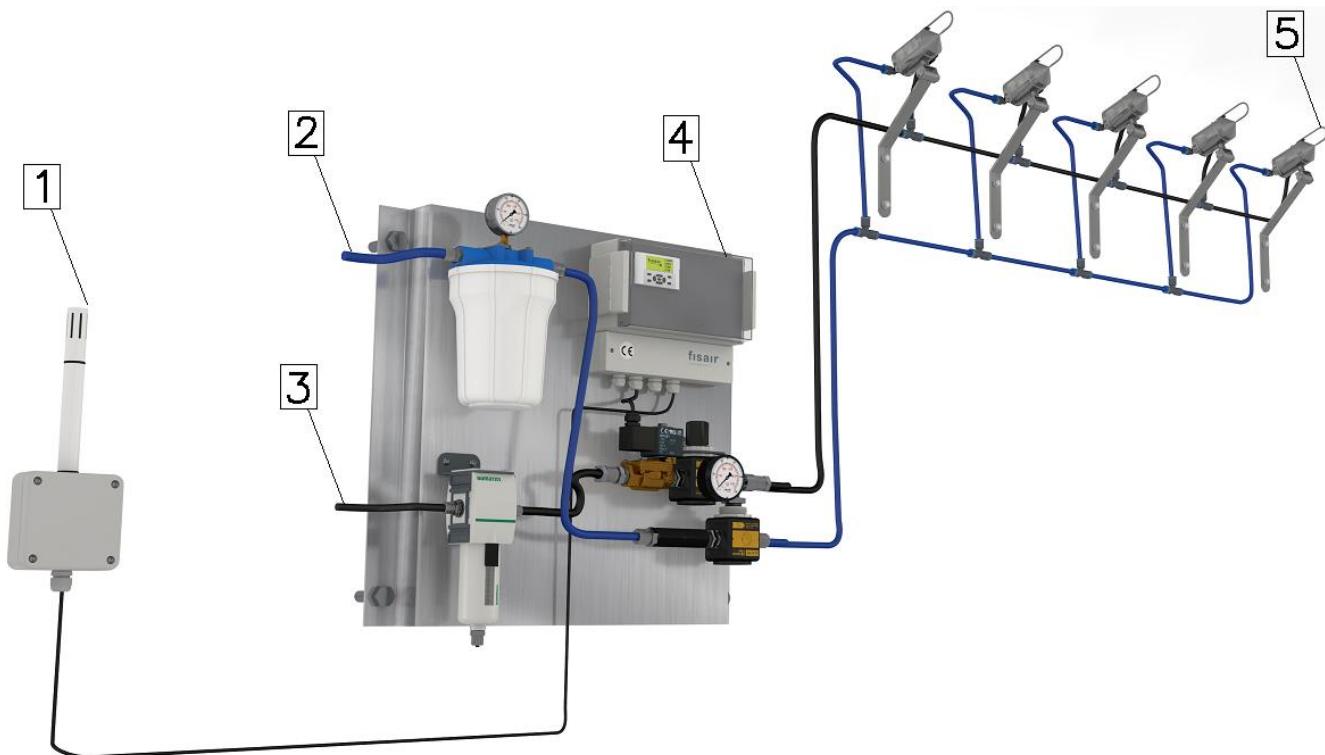


Figure 4: As-F1 operating scheme

- 1** Passive RH probe (0 to 100% RH) (**optional**)
- 2** Untreated drinking water line (2.5 to 6 bar)
- 3** Compressed air line (2 to 6 bar)
- 4** Control box. On/OFF regulation by maximum RH set-point. (**optional**)
- 5** Spray nozzles

System	No Nozzles	Power Connection	Power (W)	Control	Air Operating Pressure (bar)	Total Capacity (l/h) (*)	Air Consumption (m ³ /h)
AS-F1	1 to 8	230VAC/IN/50-60Hz or 110VAC/IN/50-60Hz	15W	ON/OFF	2 bar to 6 bar	Min. 2.4 l/h - Max. 128 l/h	Min. 2.4 m ³ /h - Max. 38.4 m ³ /h

(*) Capacity (l/h) nozzle - Total capacity (l/h) / No nozzles

Main components AS-F1: Zone 1 On-Off



Figure 5: Main component AS-F1

- [A] Humidity regulator (**optional**)
- [B] Manual air regulator with pressure gauge
- [C] Water regulator
- [D] Anti-return valve
- [E] Air filter 5µ (*)
- [F] Air ON/OFF solenoid valve
- [G] Water filter 5µ with pressure gauge

(*) If you have an external water treatment system via UV lamp, the water filter "G" will not be mounted. See section 13.1 "Water treatment by U.V. Lamp special"

6.2. AS-F1-Z: Zone 2 On-Off

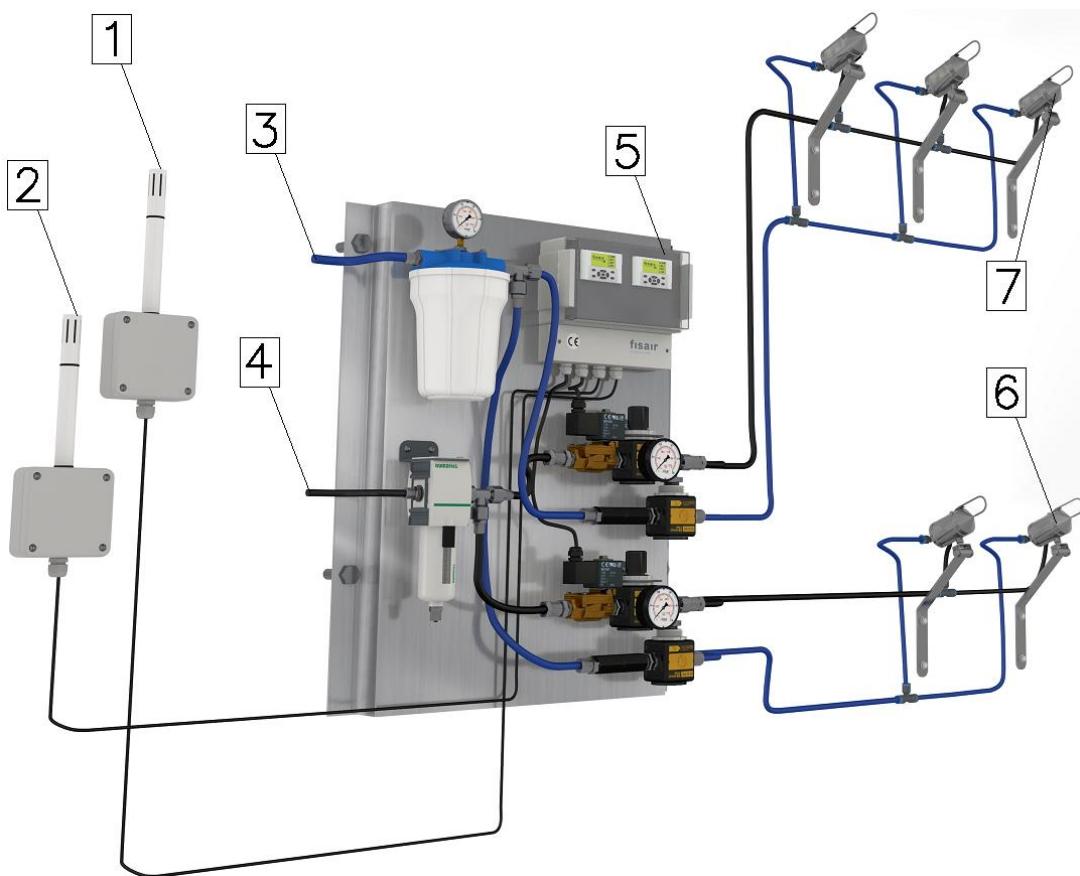


Figure 6: Operating scheme AS-F1-Z

- 1** Passive probe HR zone 1 (0 to 100% RH) (optional)
- 2** Passive probe HR zone 2 (0 to 100% RH) (optional)
- 3** Untreated drinking water line (2.5 to 6 bar)
- 4** Compressed air line (2 to 6 bar)
- 5** Control box (RH set-point setting) (optional)
- 6** Zone 1 spray nozzles
- 7** Zone 2 spray nozzles

System	No Nozzles (**)	Power Connection	Power (W)	Control	Air Operating Pressure (bar)	Total Capacity (l/h) (*)	Air Consumption (m ³ /h)
AS-F1-Z	2 to 16	230VAC/IN/50-60Hz or 110VAC/IN/50-60Hz	30W	ON/OFF	2 bar to 6 bar	Min. 4.8 l/h - Max. 256 l/h	Min. 4.8 m ³ /h - Max. 76.8m ³ /h

(*) Capacity (l/h) nozzle - Total capacity (l/h) / No nozzles

(**) Maximum number of nozzles per zone - 8 nozzles

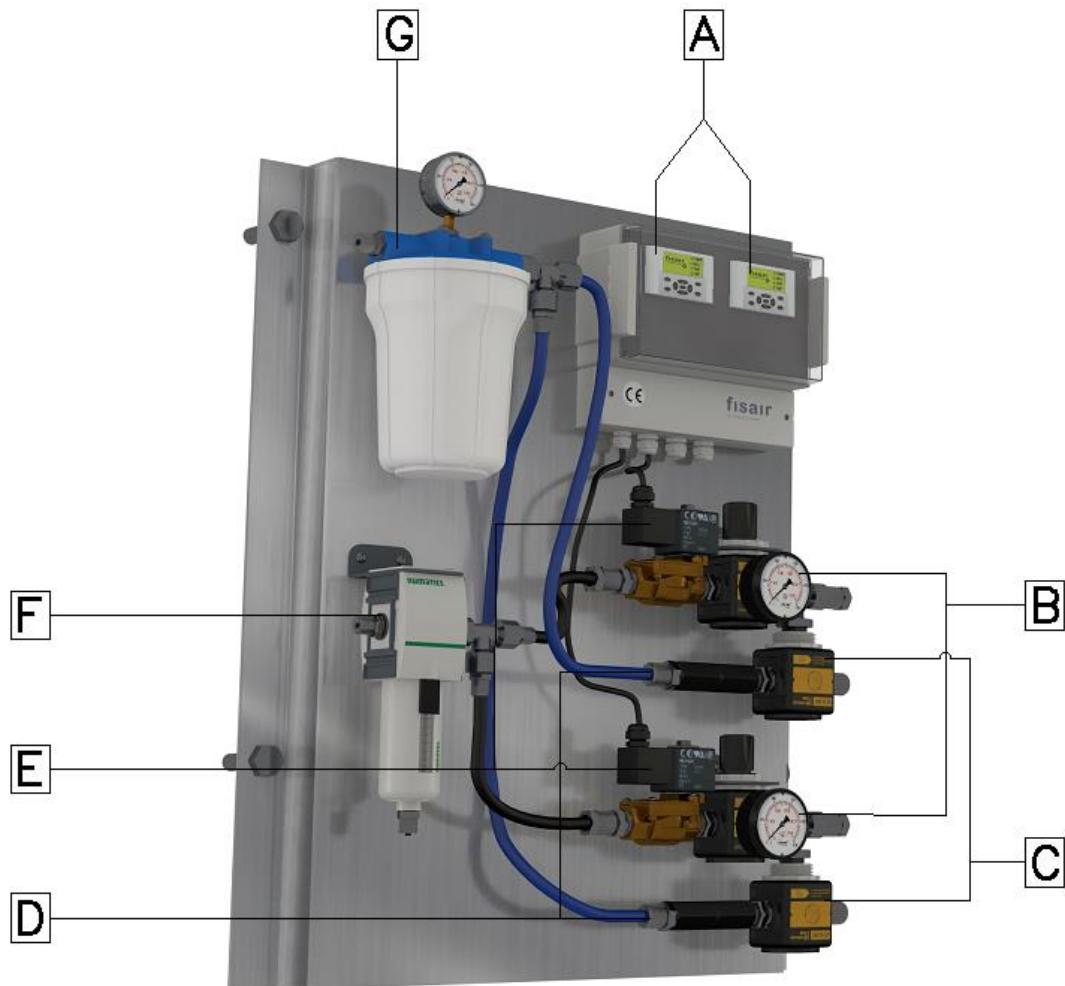
Main components AS-F1-Z: Zone 2 On-Off


Figure 7: Main components AS-F1-Z

- A** Humidity regulators zones 1 and 2 (optional)
- B** Manual air regulators with pressure gauge
- C** Water regulators
- D** Anti-return valves
- E** Air ON/OFF solenoid valves
- F** Air Filter 5μ
- G** Water filter 5μ with pressure gauge (*)

(*) If you have an external water treatment system via UV lamp, the water filter "G" will not be mounted. See section 13.1 "Water treatment by U.V. Lamp special"

7. Positioning the unit

7.1. AS-F1

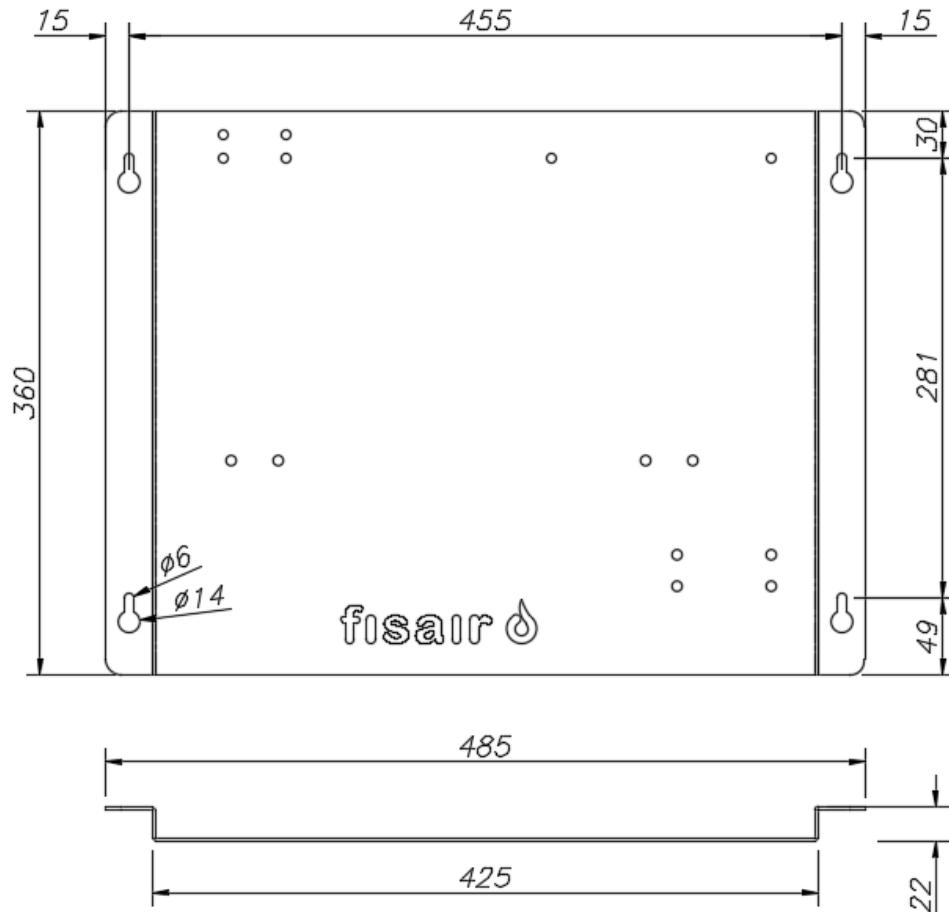


Figure 8: AS-F1 Equipment fixtures



Note: Ensure that the equipment is accessible for maintenance, with a minimum of 500mm free on all sides of the system.

Ensure that the installation site will not be subjected to constant vibration.

Required conditions of the installation area:

- ❖ Temperature: [5... +50°C]
- ❖ Relative Humidity: [5... 95 %RH] non-condensing.
- ❖



Note: The minimum recommended temperature is 5°C. It can be lowered below 5°C when, in the case of cold rooms or similar, the cooling loop does not work and the room to be conditioned has a temperature >1°C.

7.2. AS-F1-Z

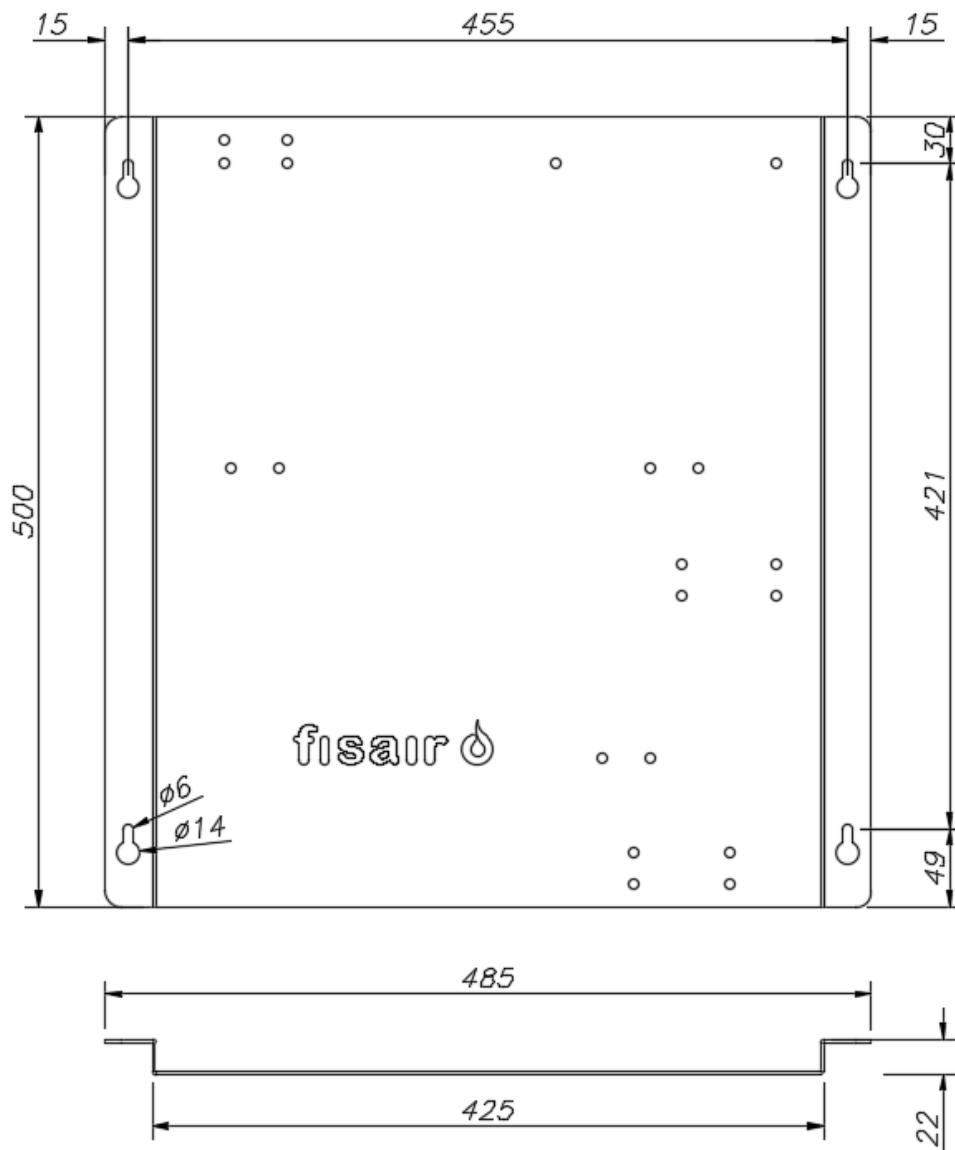


Figure 9: AS-F1 Equipment fixtures



Note: Ensure that the equipment is accessible for maintenance, with a minimum of 500mm free on all sides of the system.

Ensure that the installation site will not be subjected to constant vibration.

Required conditions of the installation area:

- ❖ Temperature: [5... +50°C]
- ❖ Relative Humidity: [5... 95 %RH] non-condensing.



Note: The minimum recommended temperature is 5°C. It can be lowered below 5°C when, in the case of cold rooms or similar, the cooling loop does not work and the room to be conditioned has a temperature >1°C.

8. Supply/output of water and pressurized air

8.1. Connecting pressurized water and air pipes

8.1.1. AS-F1

You have the option to connect to metric smooth tube or BSP inch tube using the detachable adapter.

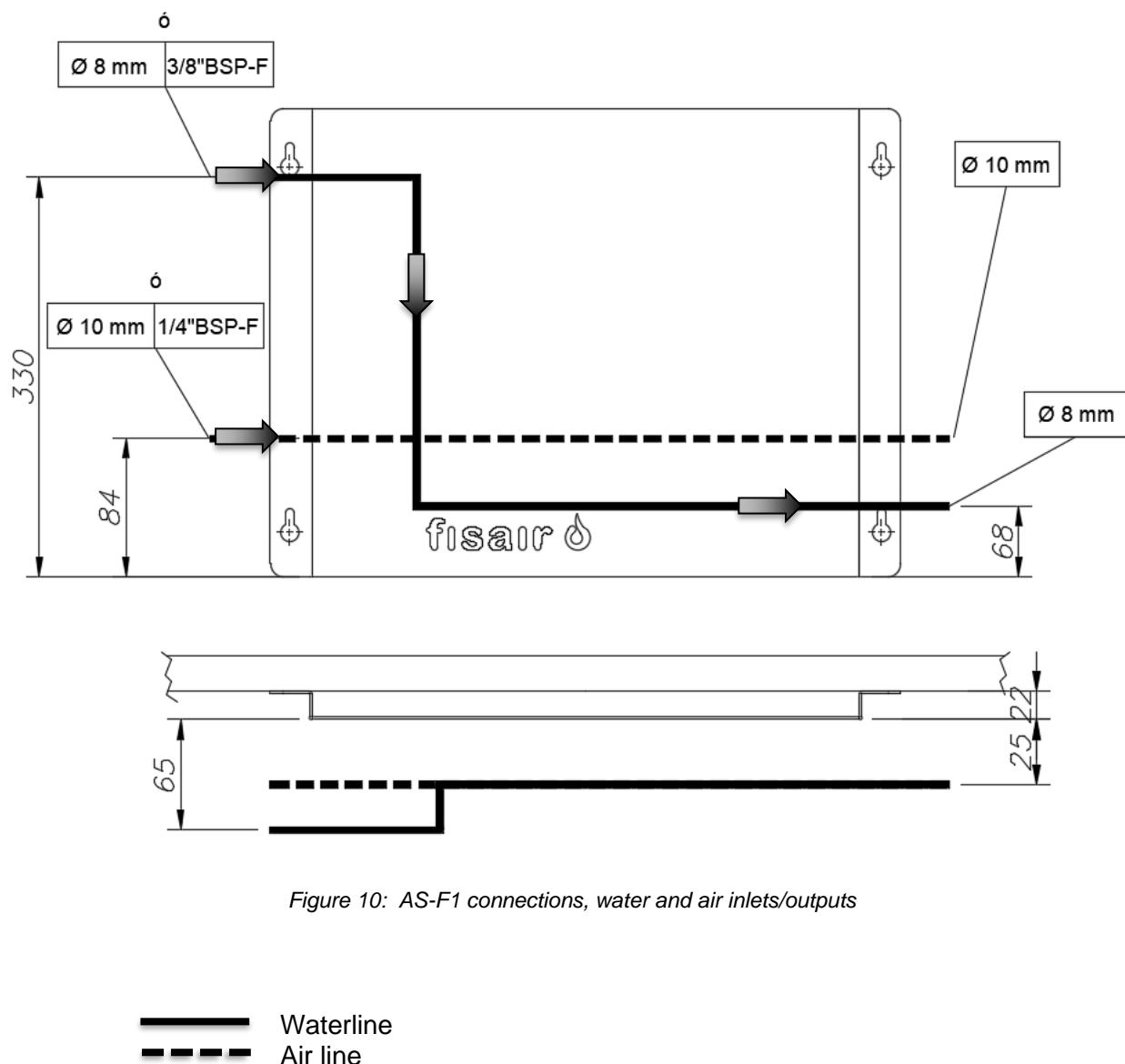


Figure 10: AS-F1 connections, water and air inlets/outputs

Waterline
 Air line

8.1.2. AS-F1-Z

You have the option to connect to metric smooth tube or BSP inch tube using the detachable adapter.

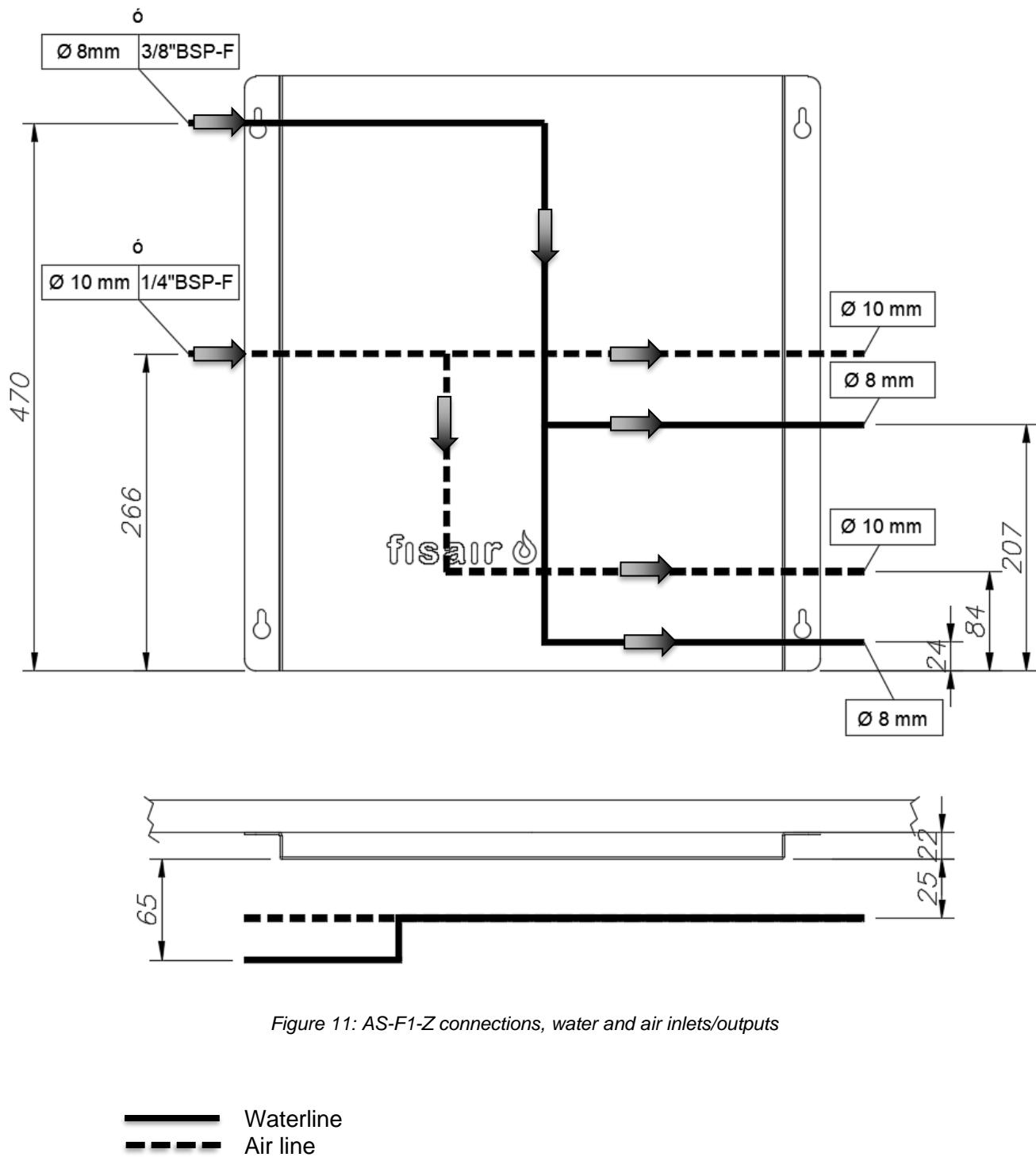


Figure 11: AS-F1-Z connections, water and air inlets/outputs

8.2. Water supply

1. The water supply pipe must be purged before it is connected to the water inlet to prevent any component failure and to prevent contaminated water from entering.
2. The equipment must be connected to a clean, drinking water line. The use of tanks/accumulators is only valid as part of a water treatment system.
3. It is important to monitor the quality of the equipment's water supply periodically according to the site's risk assessment criteria.
4. A shut-off valve must be installed at the inlet of the water supply line.
5. It is advisable to place an insulator and a "T" inlet before the water inlet of the equipment for cleaning/maintenance of the water supply pipe.
6. Parameters:

- **Pressure:** 2.5 ... 3,5 Bar
- **Purity:** In the case of reverse osmosis water, it cannot be less than 20 µS/cm.
- **Temperature:** The water supply should be less than 22°C, 5 minutes after opening the supply.
- **Turbidity:** Less than 2 units of nephelometric turbidity must be present. If this limit is exceeded, additional filtration must be added.
- **Material:** The material used for flexible equipment pipes is Nylon (.8/6mm Ø).



Note: The distance between the main water supply and the water inlet of the equipment must not exceed 7m to avoid stagnation in sections with interrupted flow circulation.

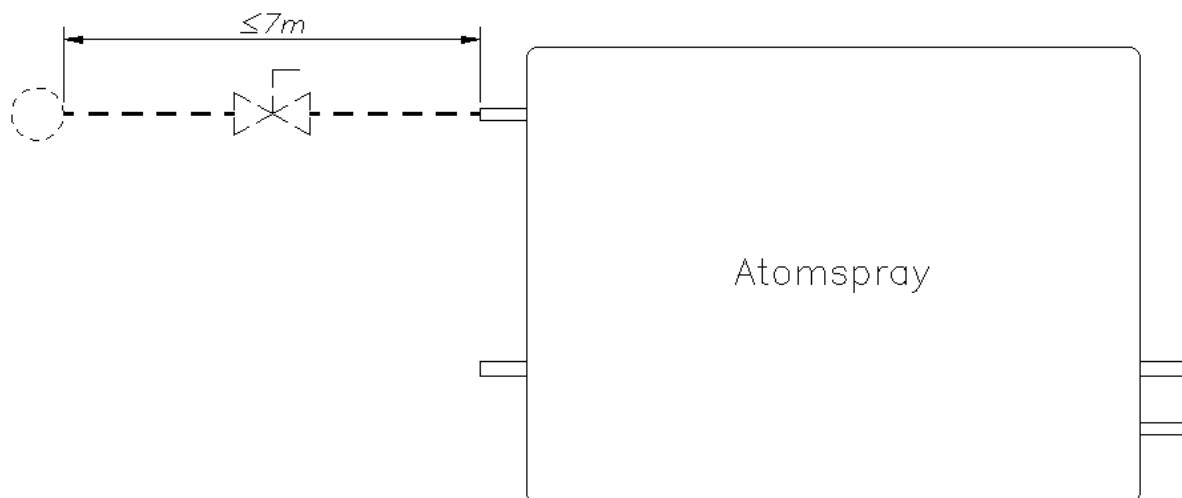


Figure 12: Maximum distance between main water supply and water inlet to the equipment

- **Water supply quality conditions:** According to "Table 8.13. Treatment achievability for chemicals from industrial sources and human dwellings for which guideline values have been established" in the WHO "Guidelines for Drinking water Quality" document:

N °	Designation	STANDARD VALUE
1	Common bacteria	Colonization number by 100 or less than 1ml
2	Escherichia Coli	Not detected
3	Cadmium and compounds	0.003mg/l or less (Cadmium volume)
4	Mercury and compounds	0.0005mg/l or less (Mercury volume)
5	Selenium and compounds	0.01mg/l or less (Selenium volume)
6	Lead and compounds	0.01mg/l or less (lead volume)
7	Arsenic and compounds	0.01mg/l or less (arsenic volume)
8	Chromium Compounds [VI]	0.05mg/l or less (Chromium volume [VI])
9	Cyanide Ion and Cyanogen Chloride	0.01mg/l or less (Cyanogen volume)
10	Nitrate and nitrite	10mg/l or less
11	Fluoride and compounds	0.8mg/l or less (Fluoride volume)
12	Boroorganic compounds	1.0mg/l or less (Boroorganic volume)
13	Carbon Tetrachloride	0.002mg/l or less
14	1,4-Dioxane	0.05mg/l or less
15	Cis-1,2-Dichloroethylene and trans-1,2- Dichloroethylene	0.04mg/l or less
16	Dichloroethylene	0.02mg/l or less
17	Tetrachloroethylene	0.01mg/l or less
18	Trichloroethylene	0.01mg/l or less (standard value was reinforced in 2011 from 0.03mg/l)
19	Benzene	0.01mg/l or less
20	Chlorate	0.6mg/L or less
21	Chloroacetic acid	0.02mg/L or less
22	Chloroform	0.06mg/L or less
23	Dichloroacetic acid	0.04mg/L or less
24	Dibromochloromethane	0.1mg/L or less
25	Bromate	0.01mg/L or less
26	Total trihalomethane (total concentration of chloroform, dibromochloromethane, bromodichloromethane and bromoform)	0.1mg/L or less
27	Trichloroacetic acid	0.2mg/L or less
28	Bromodichloromethane	0.03mg/L or less
29	Bromoform	0.09 mg/L or less
30	Formaldehyde	0.08mg/L or less
31	Zinc and compounds	1.0mg/l or less (Zinc volume)
32	Aluminium and composites	0.2mg/L or less (Aluminium volume)
33	Copper and compounds	1.0mg/L or less (Copper volume)
34	Sodium and compounds	200mg/L or less (Sodium volume)
35	Manganese and compounds	0.05mg/L or less (Manganese volume)

8.3. Compressed air supply

1. The compressed air supply pipe must be purged before it is connected to the air inlet to avoid component failure or contaminated air.
2. A shut-off valve must be installed at the inlet of the air supply line.
3. Parameters:

Pressure: 2 ... 6 Bar

Purity: It is important that the compressed air supply is clean, dry and without oil residues. It is mandatory to install an air filter and an oil separator when such conditions cannot be guaranteed. If there is a separator, the drainage of the oil must be ensured.

Material: The material used for flexible equipment pipes is Nylon (10/8mm Ø)

4. Air Compressor:

Water produced by condensation in the compressor should be avoided as it reduces the performance of the dispersing nozzles. To avoid this happening, it is recommended to install a daily drainage system.

In situations where there is a high risk of condensation in the pipe (due, for example, to a non-insulated pipe section with a low outside temperature) it is recommended to install a dryer. Installing a dryer can reduce the effective air supply by 20%.

In the case of screw compressors, it recommends a safety margin of 20% when sizing the compressor. Most quality screw compressors incorporate post-cooling. However, if this is not the case, it should be installed for air consumption of higher than 85m³/h (or if the manufacturer recommends it).

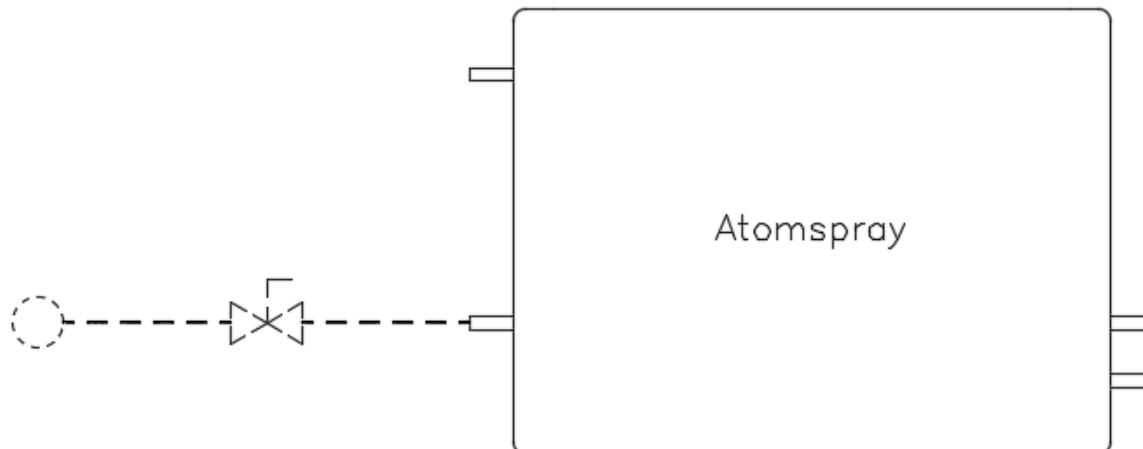


Figure 13: Air shut off valve location:

8.4. Compressed air outlet

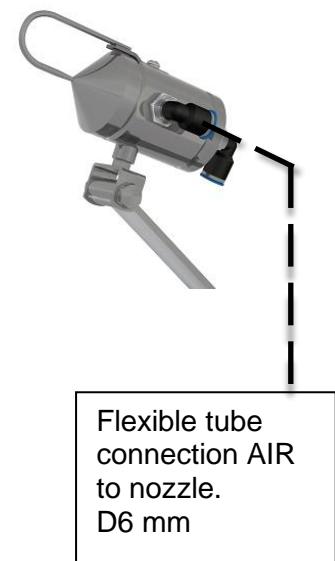
Material: The material used for the flexible pipes that connect the equipment to the atomizing nozzles is black Nylon (10/8mm Ø).

8.4.1. Air tube installation - atomizing nozzles for AS-F1

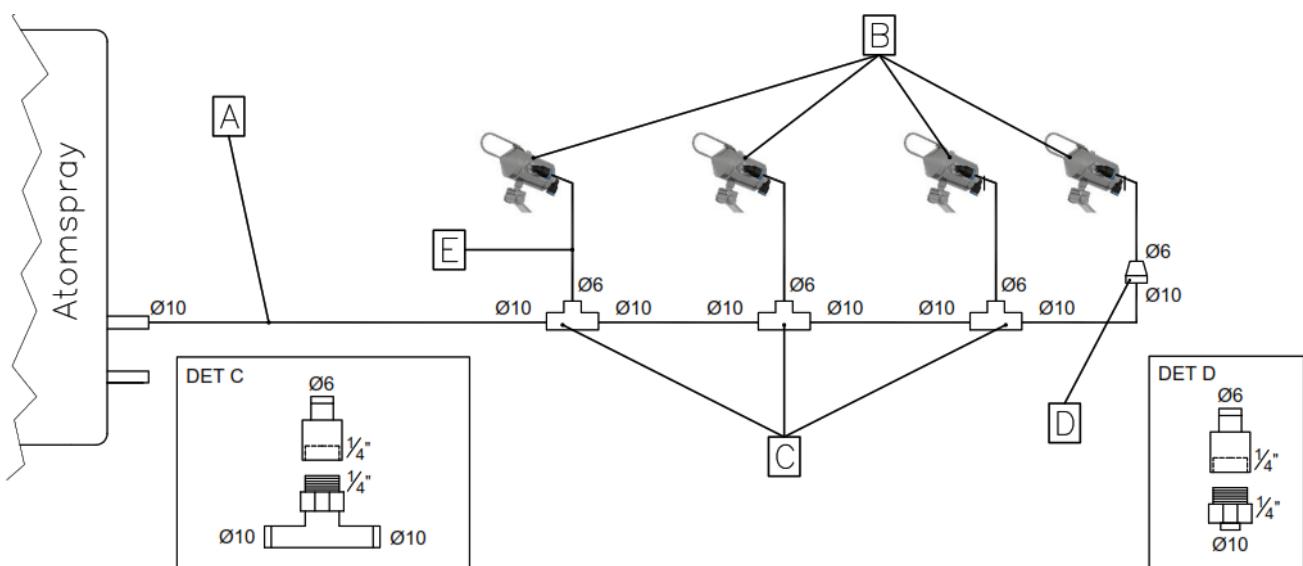
The following connection elements are delivered depending on the number of nozzles available:

- [A] 25m from Black Tube Nylon 10mm Ø
- [B] Atomizing nozzles
- [C] Link-reducer T-10-6-10mm Ø
- [D] Reduction - 10-6mm
- [E] 5m Black Tube Nylon 6mm Ø

AS-F1 (1 zone)				
No Nozzles "B"	No Links reducers T "C"	No Reductions "D"	Flexible tube length [m] "A"	Flexible tube length [m] "E"
AF-F1-1	0	1		
AF-F1-2	1	1		
AF-F1-3	2	1		
AF-F1-4	3	1		
AF-F1-5	4	1		
AF-F1-6	5	1		
AF-F1-7	6	1		
AF-F1-8	7	1		



Installation example for AS-F1-04:

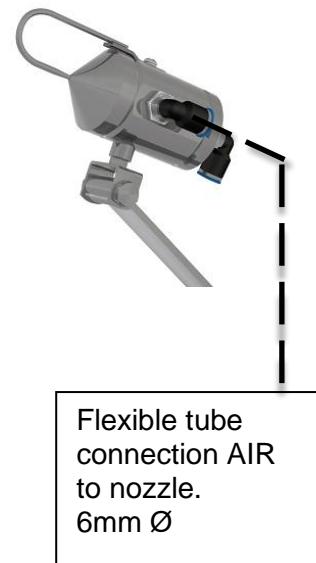


8.4.2. Air tube installation - atomizing nozzles for AS-F1-Z

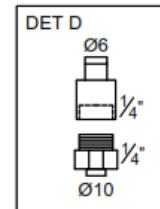
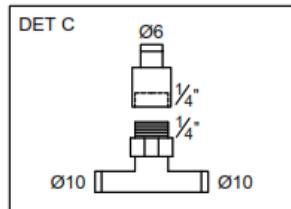
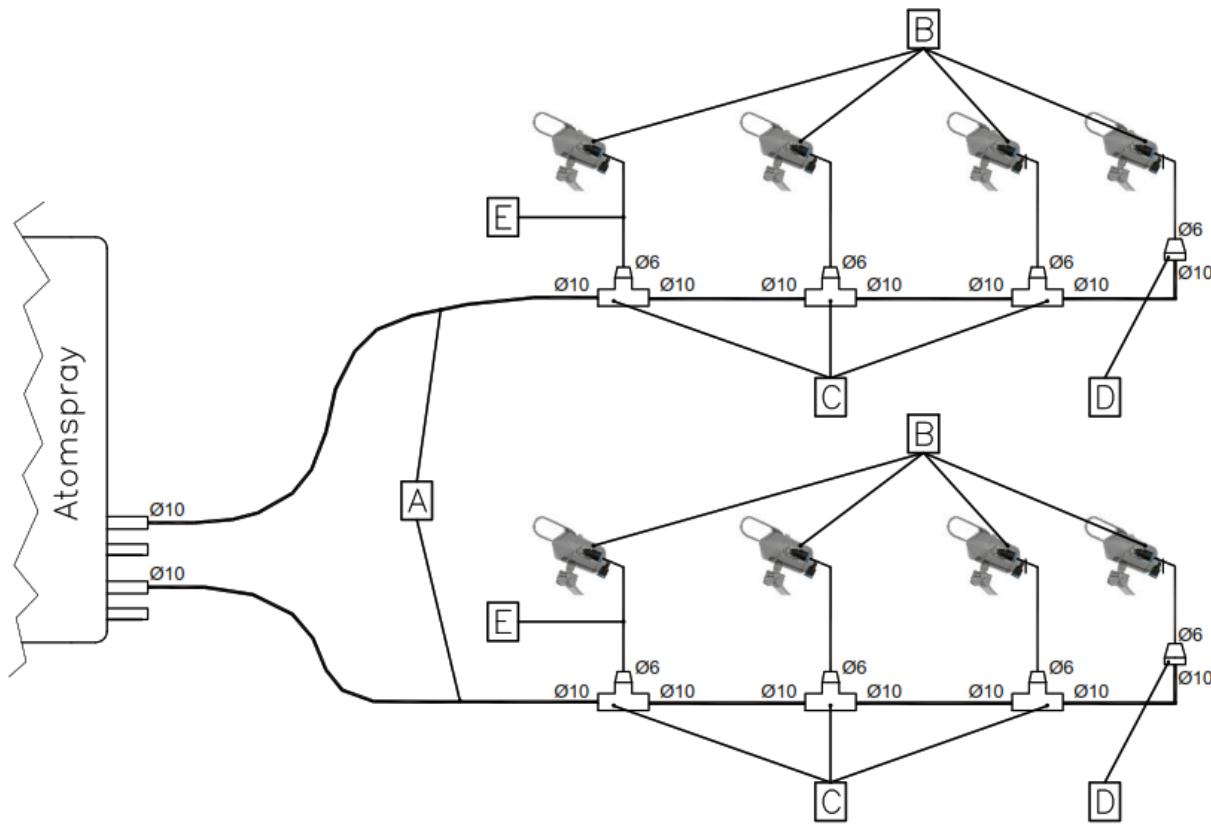
The following connection elements are delivered depending on the number of nozzles available:

- [A] 50m from Black Tube Nylon 10mm Ø
- [B] Atomizing nozzles
- [C] Reducer link T x 10-6-10mm
- [D] Reduction - 10-6mm
- [E] 10m Black Tube Nylon 6mm Ø

AS-F1-Z (2 zones)				
No Nozzles "B"	No Links reducers T "C"	No Reductions "D"	Flexible tube length [m] "A"	Flexible tube length [m] "E"
AF-F1-Z-2	0	2		
AF-F1-Z-3	1	2		
AF-F1-Z-4	2	2		
AF-F1-Z-5	3	2		
AF-F1-Z-6	4	2		
AF-F1-Z-7	5	2		
AF-F1-Z-8	6	2		
AF-F1-Z-9	7	2	50	10
AF-F1-Z-10	8	2		
AF-F1-Z-11	9	2		
AF-F1-Z-12	10	2		
AF-F1-Z-13	11	2		
AF-F1-Z-14	12	2		
AF-F1-Z-15	13	2		
AF-F1-Z-16	14	2		



Installation example for AS-F1-Z-08:



8.5. Water outlet

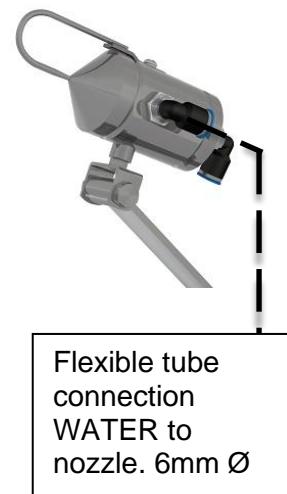
Material: The material used for the flexible pipes that connect the equipment to the spray nozzles is nylon (x8/6mm Ø).

8.5.1. Water tube installation - atomizing nozzles for AS-F1

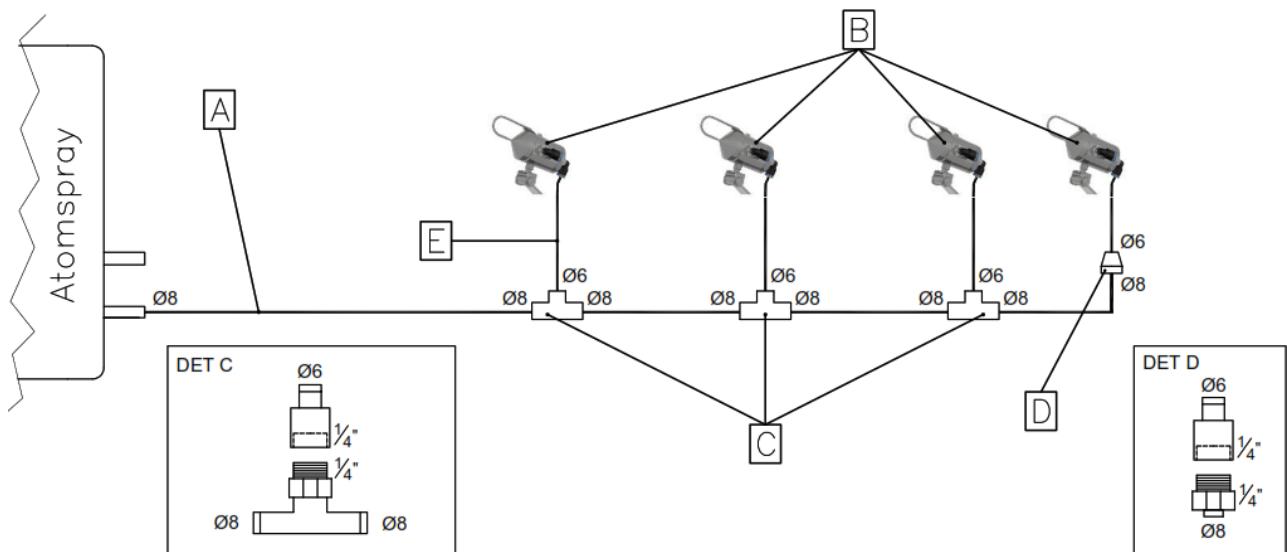
The following connection elements are delivered depending on the number of nozzles available:

- [A] 25m from Blue Tube Nylon 8mm Ø
- [B] Atomizing nozzles
- [C] Link T x 8-6-8mm: T link + reduction
- [D] Reduction 8-6mm: Link + reduction
- [E] 5m blue tube Nylon 6mm Ø

AS-F1 (1 zone)				
No Nozzles "B"	No T-links "C"	No Reductions "D"	Flexible tube length [m] "A"	Flexible tube length [m] "E"
AF-F1-1	0	1		
AF-F1-2	1	1		
AF-F1-3	2	1		
AF-F1-4	3	1		
AF-F1-5	4	1		
AF-F1-6	5	1		
AF-F1-7	6	1		
AF-F1-8	7	1		



Installation example for AS-F1-04:

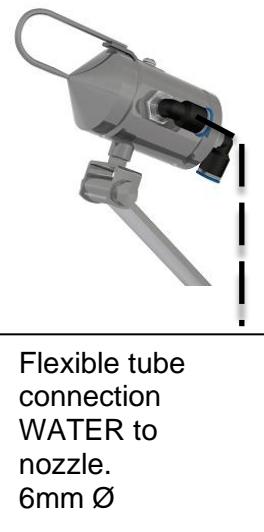


8.5.2. Water tube installation - atomizing nozzles for AS-F1-Z

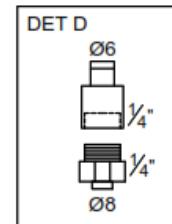
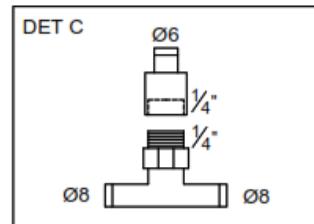
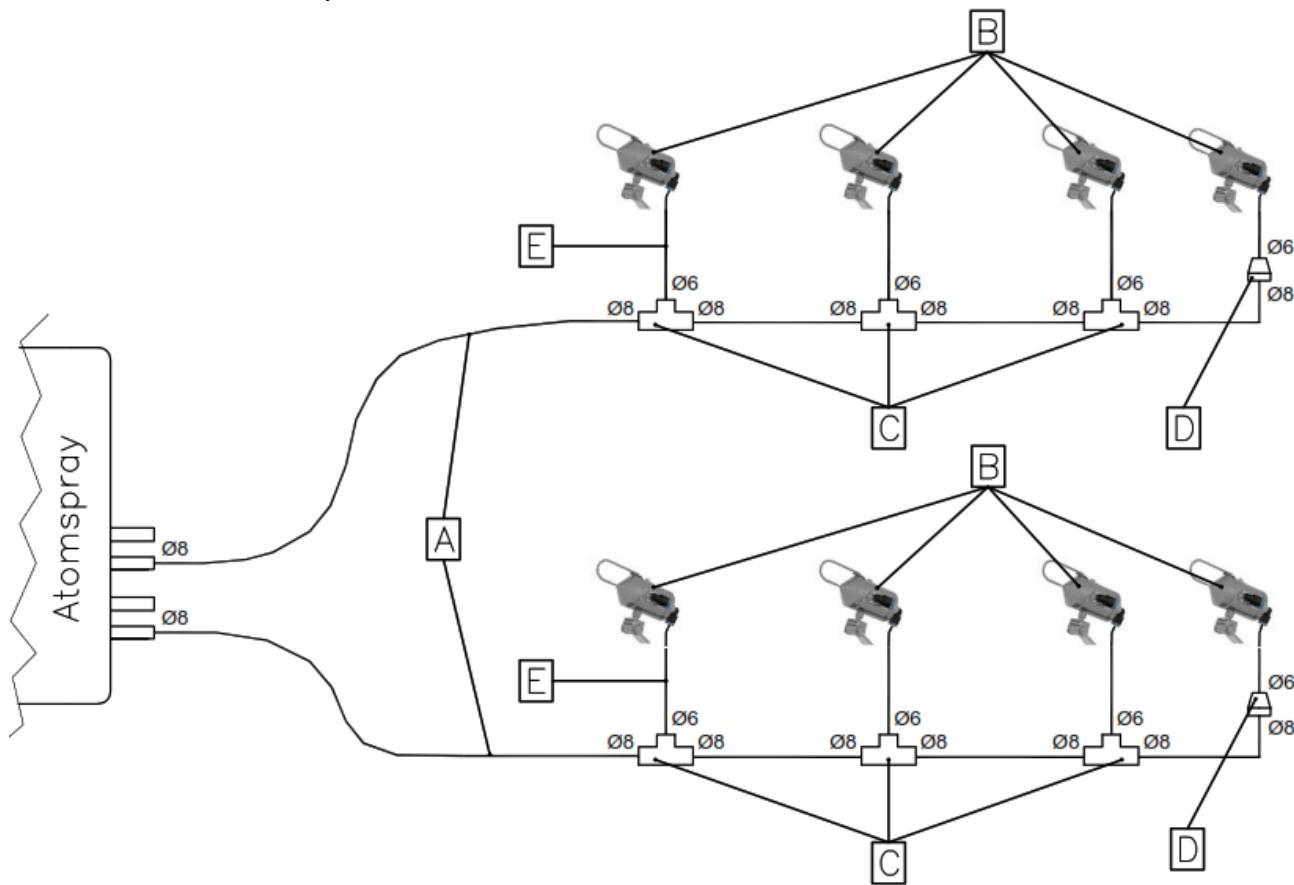
The following connection elements are delivered depending on the number of nozzles available:

- A** 50m of Blue Tube Nylon 8mm Ø
- B** Atomizing nozzles
- C** Link T - 8-6-8mm: T link + reduction
- D** Reduction 8-6mm : Link + reduction
- E** 10m tube Blue Nylon 6mm Ø

AS-F1 (1 zone)				
No Nozzles "B"	No T-links "C"	No Reductions "D"	Flexible tube length [m] "A"	Flexible tube length [m] "E"
AF-F1-Z-2	0	2		
AF-F1-Z-3	1	2		
AF-F1-Z-4	2	2		
AF-F1-Z-5	3	2		
AF-F1-Z-6	4	2		
AF-F1-Z-7	5	2		
AF-F1-Z-8	6	2		
AF-F1-Z-9	7	2		
AF-F1-Z-10	8	2		
AF-F1-Z-11	9	2		
AF-F1-Z-12	10	2		
AF-F1-Z-13	11	2		
AF-F1-Z-14	12	2		
AF-F1-Z-15	13	2		
AF-F1-Z-16	14	2		



Installation example for AS-F1-Z-08:



8.6. Spray nozzle installation limits

The farthest nozzle must be less than or equal to 25m from the equipment outlet (does not affect having multiple nozzles in series).

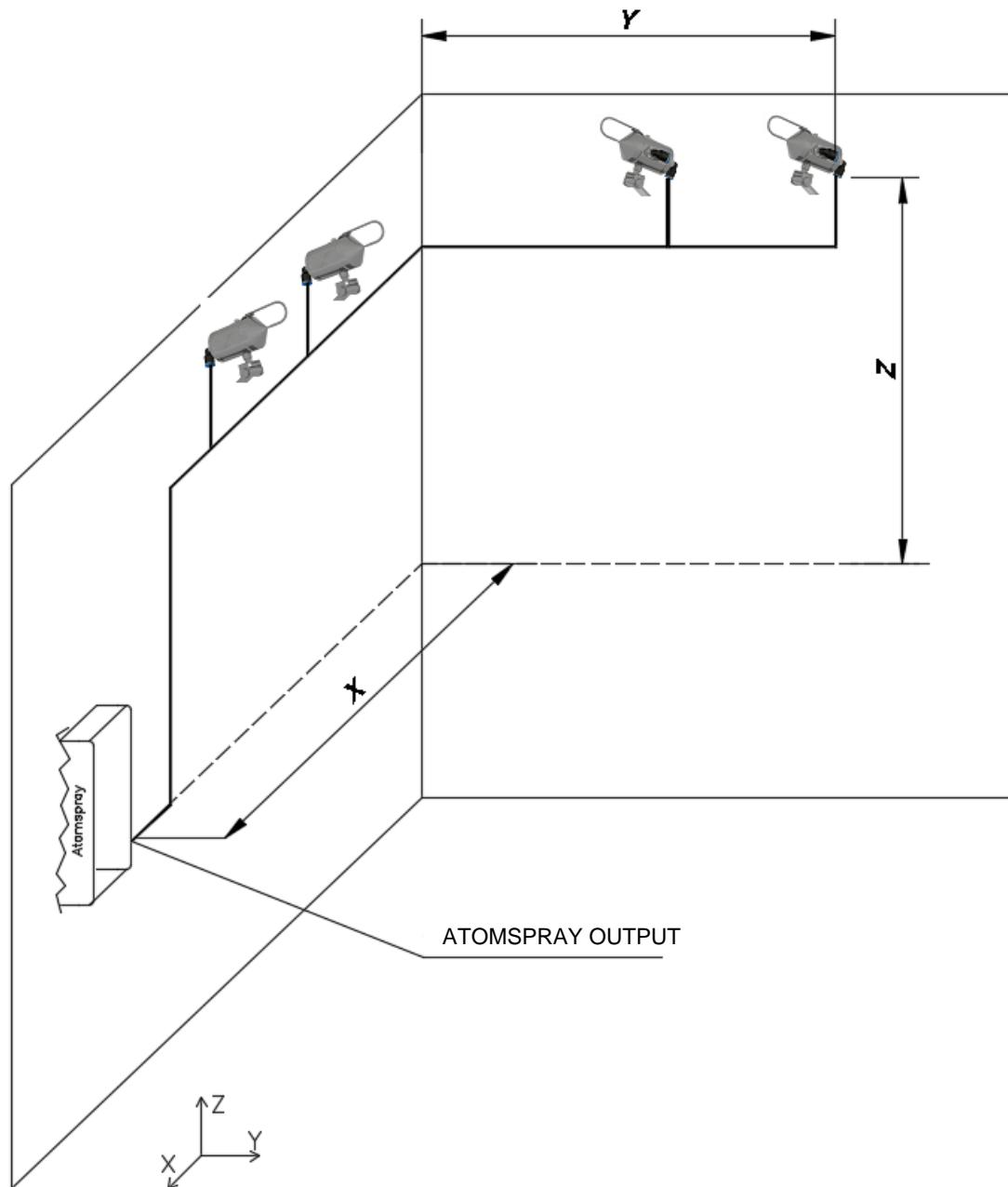


Figure 14: Installation limits simple output

For the **farthest spray nozzle you have**, the following must be met:

$$\sum X + \sum Y + \sum Z \leq 25 \text{ m}$$

Installation with double fork:

The farthest nozzle of each branch must be less than or equal to 25m from the equipment outlet (does not affect having multiple nozzles in series).

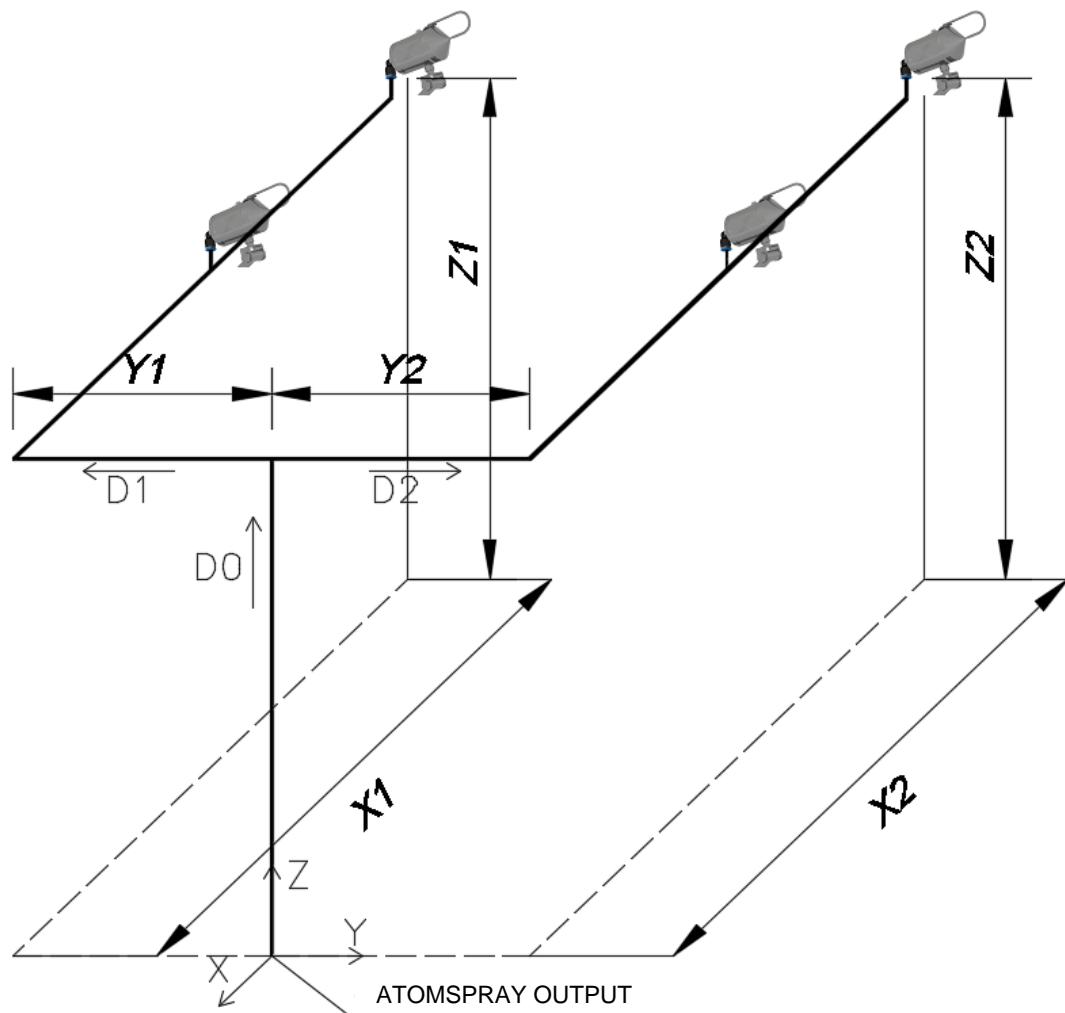


Figure 15: Limits installation output with double fork

For the **farthest atomizing nozzle you have**, for each of the branches (branch 1 and branch 2) the following must be met:

$$\sum X_1 + \sum Y_1 + \sum Z_1 \leq 25 \text{ m}$$

$$\sum X_2 + \sum Y_2 + \sum Z_2 \leq 25 \text{ m}$$

Installation with quad fork:

The farthest nozzle of each branch must be less than or equal to 25m from the equipment outlet (does not affect having multiple nozzles in series).

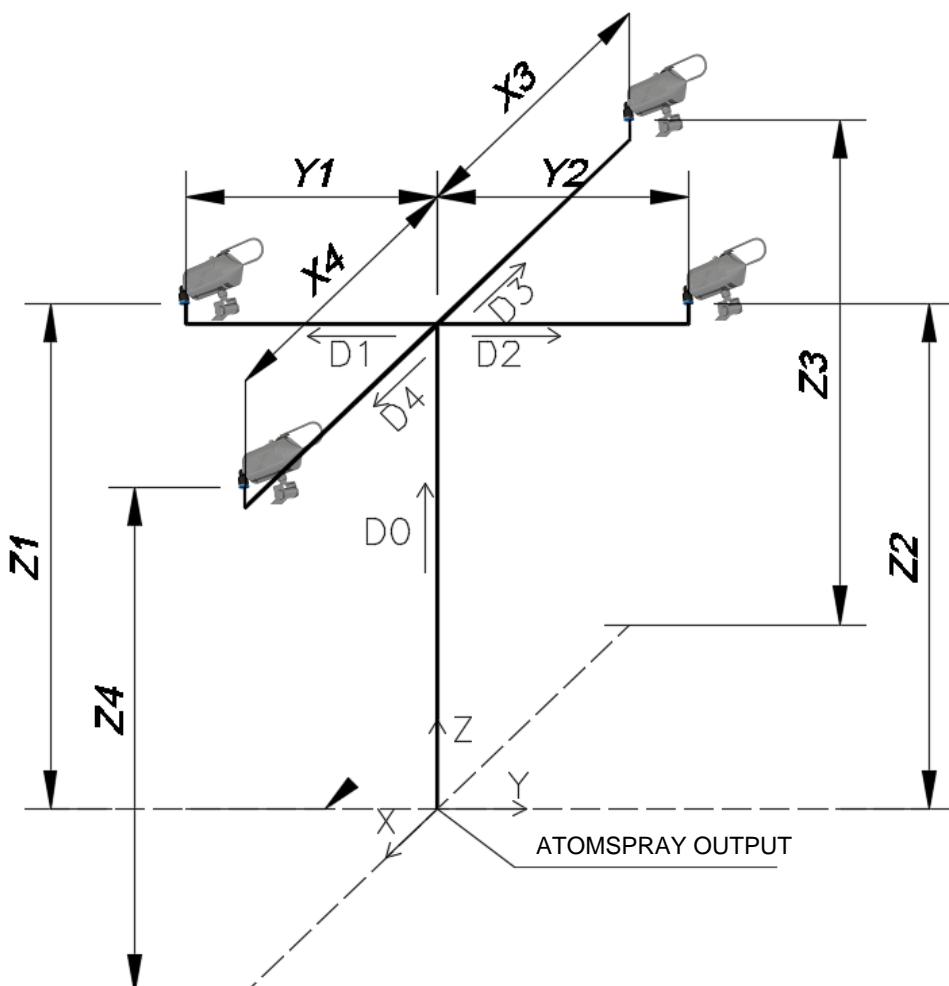


Figure 16: Limits installation output with quad fork

For the **furthest atomizing nozzle you have**, for each of the branches (branch 1, branch 2, branch 3 and branch 4) the following must be met:

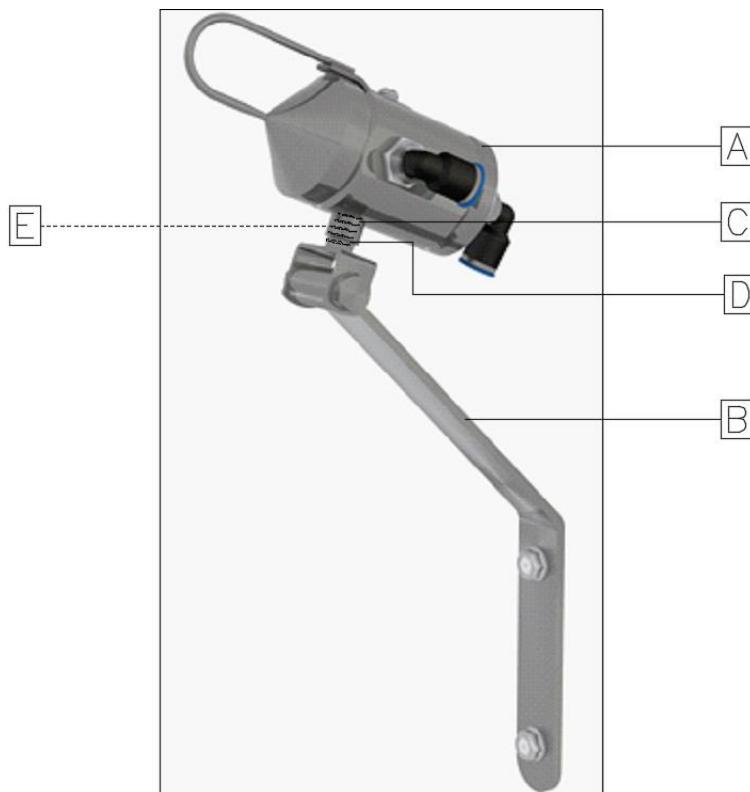
$$\begin{aligned}
 & \sum_{\text{branch}} |IXI_1| + \sum_{\text{branch}} |IYI_1| + \sum_{\text{branch}} |IZI_1| \leq 25 \text{ m} \\
 & \sum_{\text{branch}} |IXI_2| + \sum_{\text{branch}} |IYI_2| + \sum_{\text{branch}} |IZI_2| \leq 25 \text{ m} \\
 & \sum_{\text{branch}} |IXI_3| + \sum_{\text{branch}} |IYI_3| + \sum_{\text{branch}} |IZI_3| \leq 25 \text{ m} \\
 & \sum_{\text{branch}} |IXI_4| + \sum_{\text{branch}} |IYI_4| + \sum_{\text{branch}} |IZI_4| \leq 25 \text{ m}
 \end{aligned}$$

9. Assembly of spray nozzles

The atomizing nozzles are made up of the following elements or parts:

- A. Nozzle – female threaded
- B. Bracket angle with welded screw - male threaded *
- C. Cylinder
- D. Adjustable nut*
- E. Thread*

(*) Elements [B], [D] and [E] are delivered together.



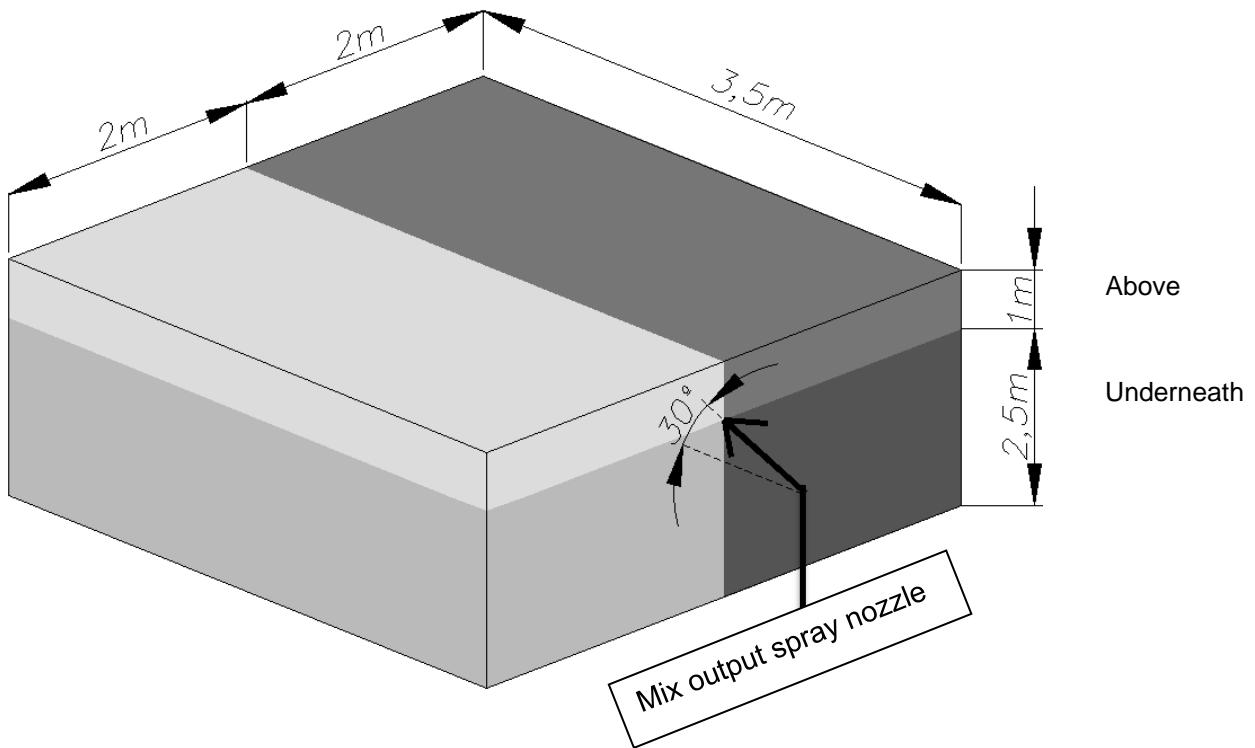
Assembly sequence:

1. Insert the cylinder [C] on the thread [E] resting on the nut [D].
2. Thread nozzle [A] into the thread [E]
3. Adjust and tighten the nut [D] to set the desired 360° position for the nozzle.

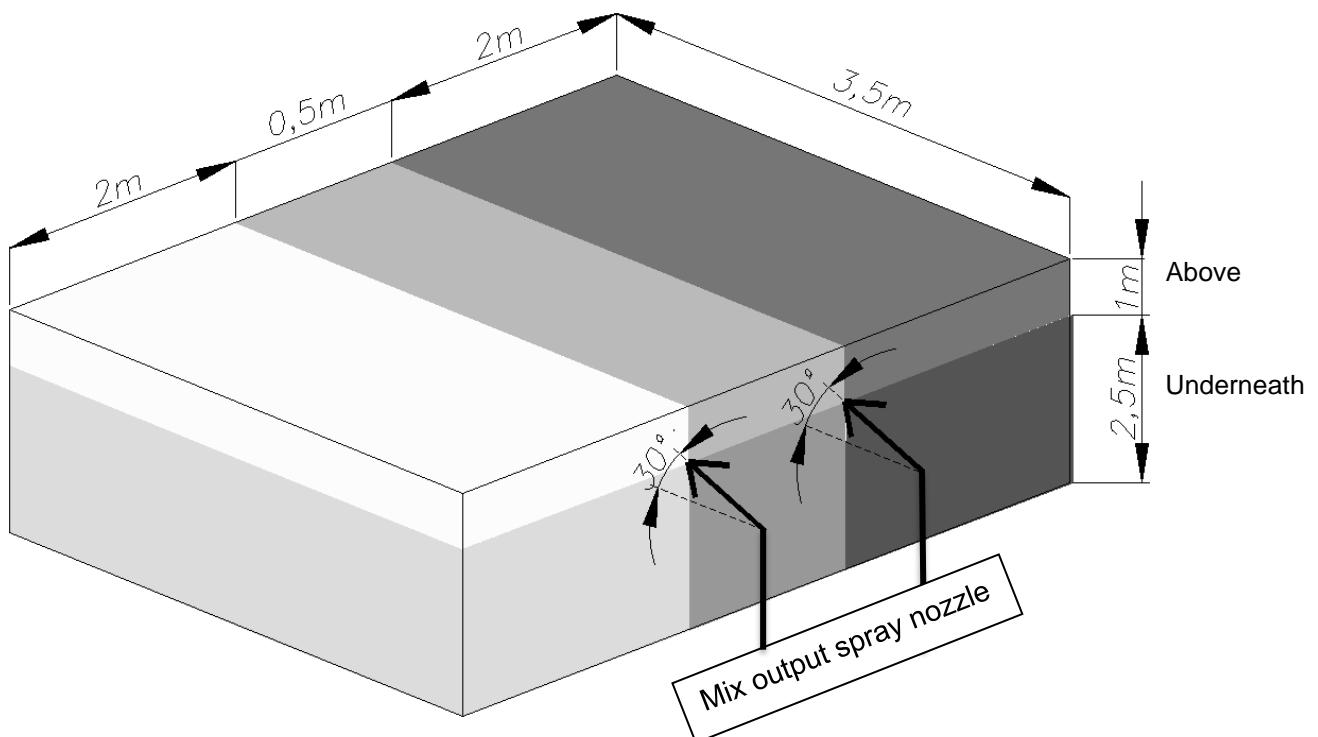


10. Free spaces required for spray nozzles

And free spaces required for area with only one nozzle:



Free spaces required for area with more than one nozzle:



11. Electrical panel and connections

There are 4 types of electrical panels and connections depending on the product code and their options:

- AS-F1
- AS-F1 (with communication and/or UV)
- AS-F1-Z
- AS-F1-Z (with communication and/or UV)

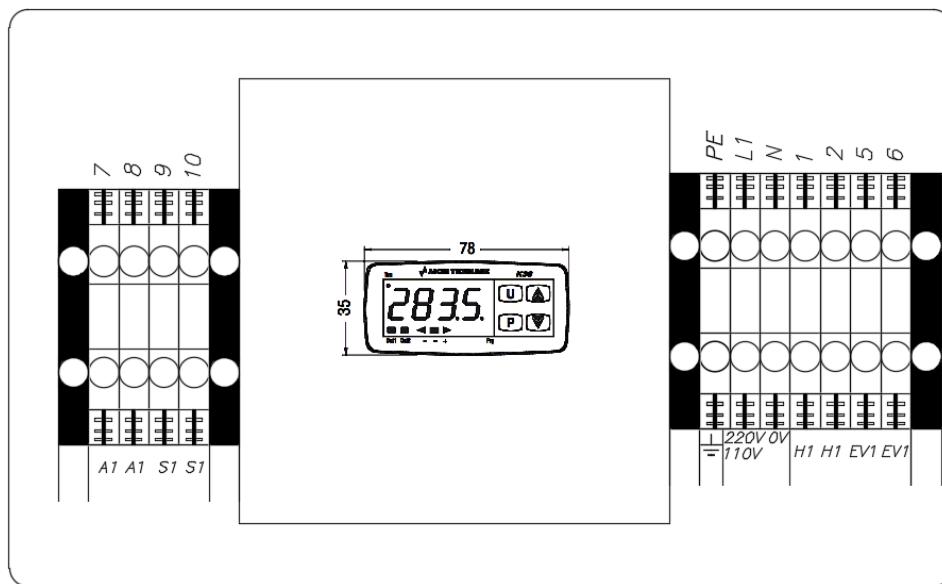


Figure 18: AS-F1 electrical panel interior

Connection type	Connection	Description	Max. power Max. voltage
Compulsory	PE-L1-N	Electrical power	230VAC/110VAC 15W – AS-F1 30W – AS-F1-Z
Optional	1-2	H1 ON/OFF remote interlock	Potential-free
Compulsory	5 (Bu) -6 (Br)	EV1 water/air supply solenoid valve	230V - 4W 120V – 5W
Compulsory	9 (Br) - 10 (Gr)	S1 moisture probe	Passive capacitive probe 4..20mA 8..24VDC
Optional	7-8	Alarm (zone 1)	Potential-free

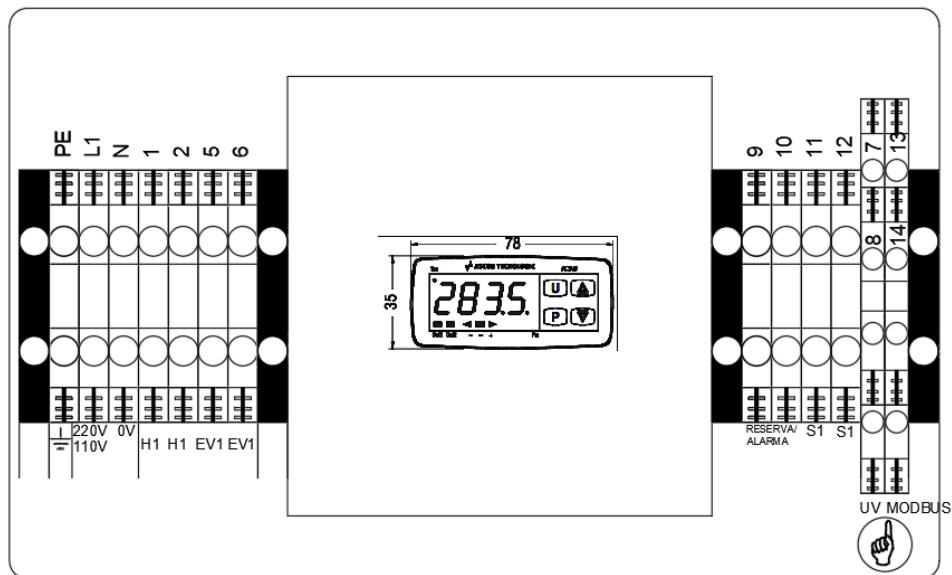


Figure 19: AS-F1 electrical panel interior (with communication and/or U.V. lamp)

Connection type	Connection	Description	Max. power Max. voltage
Compulsory	PE-L1-N	Electrical power	230VAC/110VAC 15W – AS-F1 30W – AS-F1-Z
Optional	1-2	H1 ON/OFF remote interlock	Potential-free
Compulsory	5 (Bu) -6 (Br)	EV1 water/air supply solenoid valve	230V - 4W 120V – 5W
Compulsory	11 (Br) -12 (Gr)	S1 moisture probe	Passive capacitive probe 4..20mA 8..24VDC
Optional	9-10	Alarm	Potential free
Optional	7-8	UV lamp	230V – 80W
Optional	13-14	Communication	Free potential

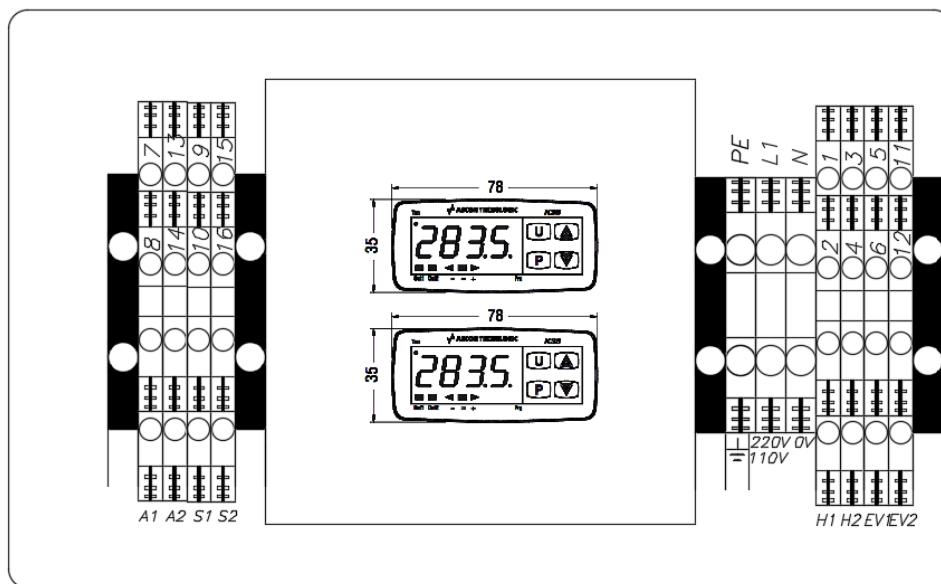


Figure 20: AS-F1-Z electrical panel interior

Connection type	Connection	Description	Max. power Max. voltage
Compulsory	PE-L1-N	Electrical power	230VAC/110VAC 15W – AS-F1 30W – AS-F1-Z
Optional	1-2	H1 ON/OFF Remote interlock (Zone 1)	Potential-free
Only for AS-F1-Z	3-4	H2 ON/OFF remote interlock ON/OFF (Zone 2)	Potential-free
Compulsory	5 (Bu) - 6 (Br)	EV1 water/air supply solenoid valve (zone 1)	230V - 4W 120V – 5W
Only for AS-F1-Z	11 (Bu) - 12 (Br)	EV2 water/air supply solenoid valve (zone 2)	230V - 4W 120V – 5W
Compulsory	9 (Br) - 10 (Gr)	S1 moisture probe (Zone 1)	Passive capacitive probe 4..20mA 8..24VDC
Only for AS-F1-Z	15 (Br) - 16 (Gr)	S2 moisture probe (zone 2)	Passive capacitive probe 4..20mA 8..24VDC
Optional	7-8	Alarm (zone 1)	Potential free
Only for AS-F1-Z	13-14	Alarm (zone 2)	Potential free

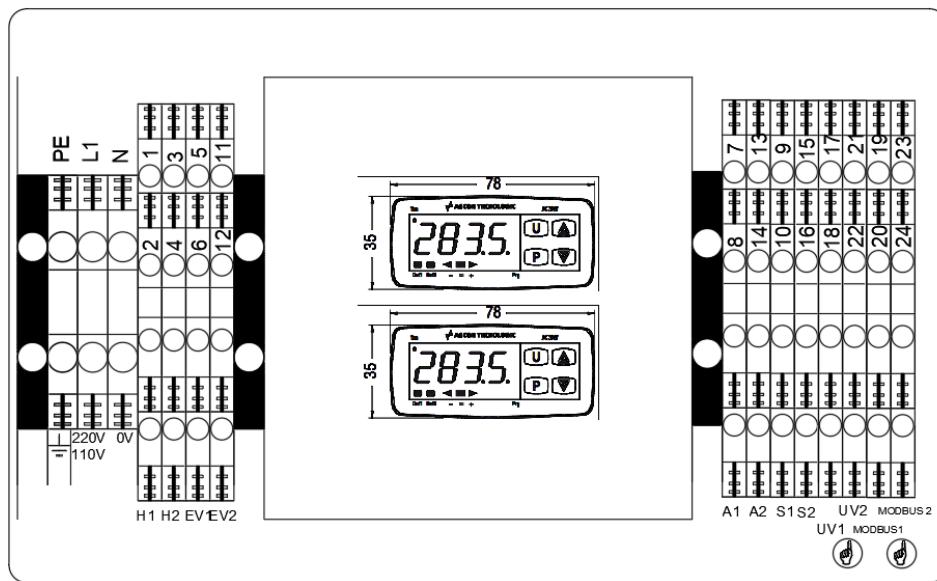


Figure 21: Interior electrical panel AS-F1-Z (with communication and/or U.V. lamp)

Connection type	Connection	Description	Max. power Max. voltage
Compulsory	PE-L1-N	Electrical power	230VAC/110VAC 15W – AS-F1 30W – AS-F1-Z
Optional	1-2	H1 ON/OFF Remote interlock (Zone 1)	Potential-free
Only for AS-F1-Z	3-4	H2 ON/OFF remote interlock ON/OFF (Zone 2)	Potential-free
Compulsory	5 (Bu) - 6 (Br)	EV1 water/air supply solenoid valve (zone 1)	230V - 4W 120V – 5W
Only for AS-F1-Z	11 (Bu) - 12 (Br)	EV2 water/air supply solenoid valve (zone 2)	230V - 4W 120V – 5W
Compulsory	9 (Br) - 10 (Gr)	S1 moisture probe (Zone 1)	Passive capacitive probe 4..20mA 8..24VDC
Only for AS-F1-Z	15 (Br) - 16 (Gr)	S2 moisture probe (Zone 2)	Passive capacitive probe 4..20mA 8..24VDC
Optional	7-8	Alarm (Zone 1)	Potential free
Only for AS-F1-Z	13-14	Alarm (Zone 2)	Potential free
Optional	17-18	UV1 lamp (Zone 1)	230V – 80W
Only for AS-F1-Z	21-22	UV2 lamp (Zone 2)	230V – 80W
Optional	19-20	Zone 1 communication	Potential-free
Only for AS-F1-Z	23-24	Zone 2 communication	Potential-free

11.1. Relative humidity probe

The relative humidity probe, connected at terminals 9 (Brown) - 10 (green) and 15 (Brown) -16 (green) (as-F1-Z only):

Electrical data:

Power supply: 8.. 20 VDC

Consumption: 20 mA MAX

Sensor type: Capacitive-digital. Passive probe.

Output signal: 4.. 20 Ma (0.100 HR%)

Degree of protection against electric shock: Class 3

Mechanical data:

Installation: Wall mounted

Connections: Non-disposable flexible PVC cable. 2 x 0.25 mm²

Degree of protection: IP 65

Environmental operating conditions: -10.. 70°C and 0..100%RH

Functional data:

Measurement range 5.. 95%RH (4.8 .. 19.2 mA)

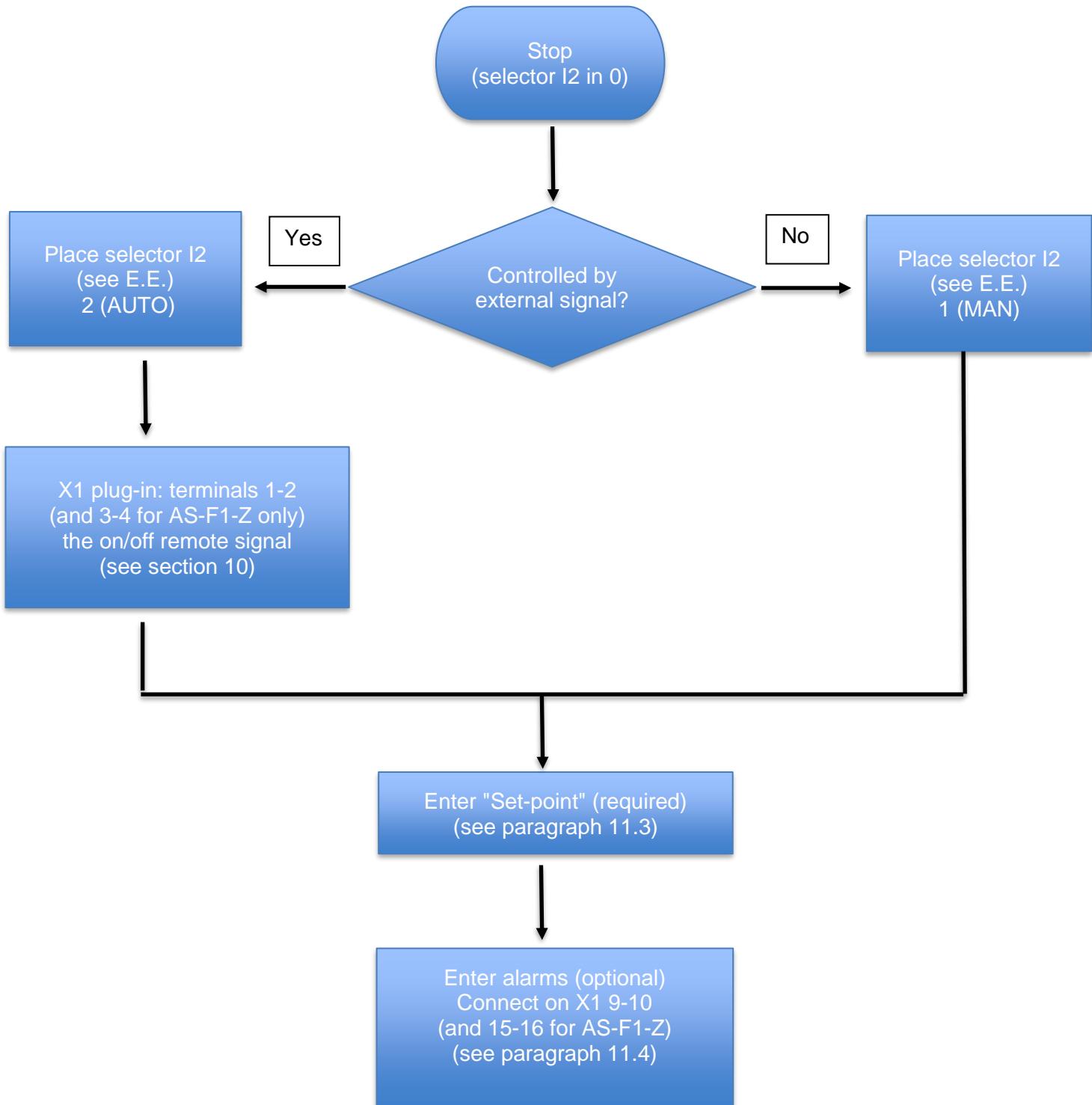
Precision: +/- 3% (20... 80%RH); +/-5% (5... 20, 80... 95%RH)



Note: It is recommended not to extend the probe cable more than **15m** so as not to have alterations in the measurement signal.

12. Regulator Management Protocol

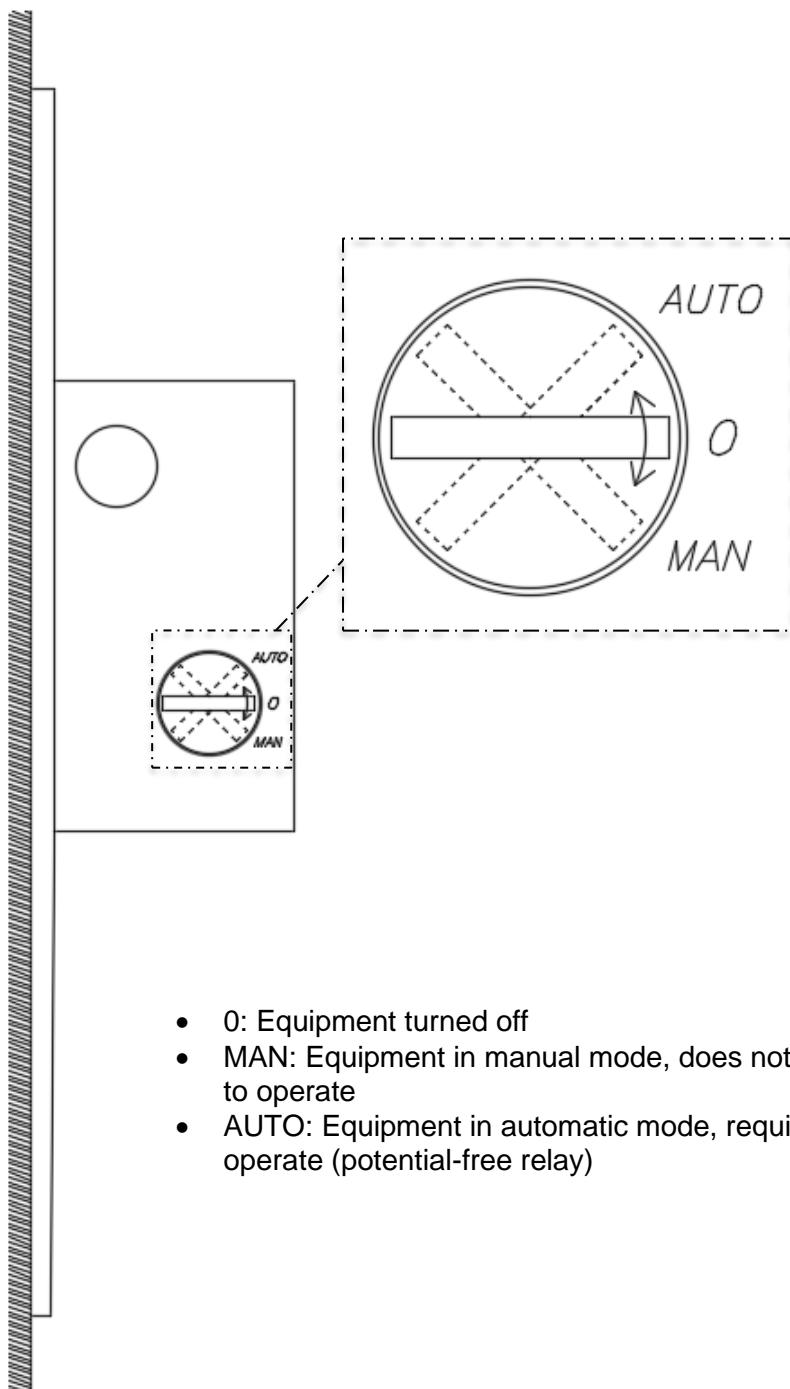
12.1. Operational diagram



Note: Before starting the computer read section 12 "start-up"

12.2. Selector 2 (I2)

Select the desired operating mode for the equipment by turning the I2 selection lever (see electrical diagram) on the side of the electrical panel:



- 0: Equipment turned off
- MAN: Equipment in manual mode, does not require remote signal activation to operate
- AUTO: Equipment in automatic mode, requires remote signal activation to operate (potential-free relay)

Figure 22: location of selector I2

12.3. 10.2 Description and operation of the display

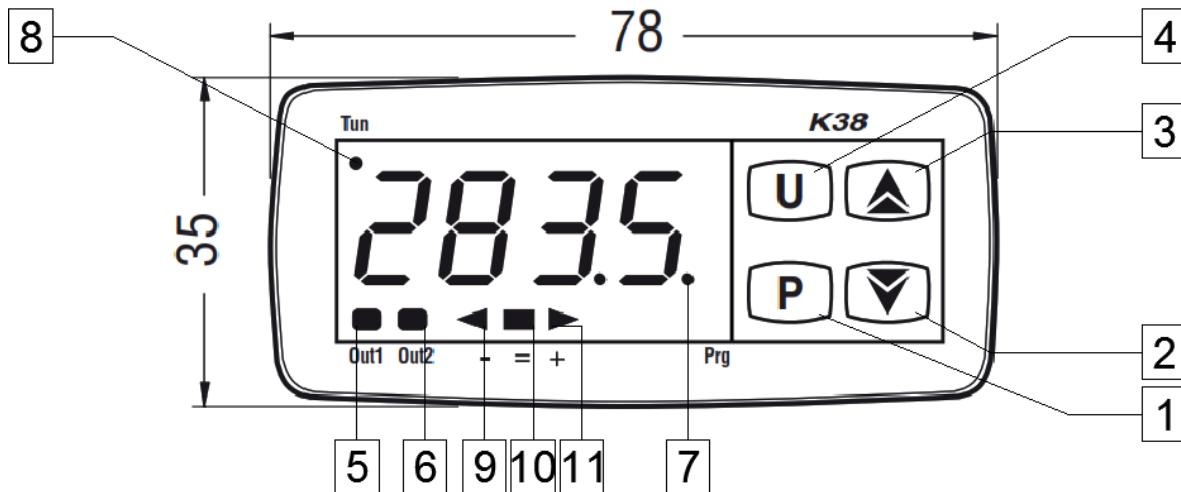


Figure 23: Front view of the Display

1 - KEY P: To access the programming of the parameters and to confirm the selection.

2 - DOWN KEY: Allows you to select the different configuration parameters and decrease their value. By holding the key pressed, it will return to the prior programming level.

3 - UP KEY: Allows you to select the different programming parameters and increase their value. Keeping the key pressed, will return you to the previous programming level. If you press this key when you are not within the programming, the output power in the regulation will be displayed.

4 - U KEY: Function key programmable by par. "USrb". It can be configured to: Activate Autotuning or Self tuning, put the instrument in manual regulation, stop the alarm, change the active Set Point, deactivate regulation.

5 - LED OUT1: Indicates the activation status of the compressed air shut-off valve.

5 - LED OUT2: Indicates the activation status of the maximum/minimum alarm exceeded.

7 - LED SET: Flashing indicates entry into programming mode.

8 - LED AT/ST: Indicates the self-tuning function is switched on or auto tuning in progress.

9 - LED - DEVIATION INDEX: Indicates that the value of process is lower than the set point.

10 - LED - DEVIATION INDEX: Indicates that the value of process is the same as the setpoint.

11- LED - DEVIATION INDEX: Indicates that the value of process is higher than the set point.

12.4. Programming the “**“Set-point”** direct (output OUT1)

By means of the “Set-Point” configuration, the ON-OFF activity of the compressed air flow solenoid valve will be regulated, indicating its operation through output OUT1

This function allows you to quickly change the value of the set point selected by [79] SPAt (selection of the active Set-point) or the set-point of the segment currently in progress (from the Programmer).

The equipment is displaying the "standard display".

1. Press the key **P**.

The display will alternately show the acronym of the selected set-point (eg SP2) and its value.

2. Using the **▲** and keys **▼**, assign the parameter the desired value.

3. Do not press buttons for more than 5 seconds or press the key **P**.

In both cases the equipment memorizes the new value and returns it to the "standard display".

12.5. Alarm setting (output OUT 2)

By configuring the "Alarm", the ON-OFF activity of the OUT2 output will be regulated, indicating that the maximum alarm value "AL1H" has been exceeded or has fallen below the minimum alarm value "AL1L":

1. Press for 3 sec.
2. Press to set "1030" which is the default scheduled password.
3. Press again. This shows the list of parameters that are possible to modify in the controller. Press to navigate between the parameter list. When "AL1" appears press several times, until "AL1t"
4. Once "AL1t" has appeared on screen press until you reach "LHAb" (Absolute Band Alarm).
5. Press to enter the menu and press again until you reach "AL1L" (minimum alarm value) or "AL1H" (maximum alarm value):

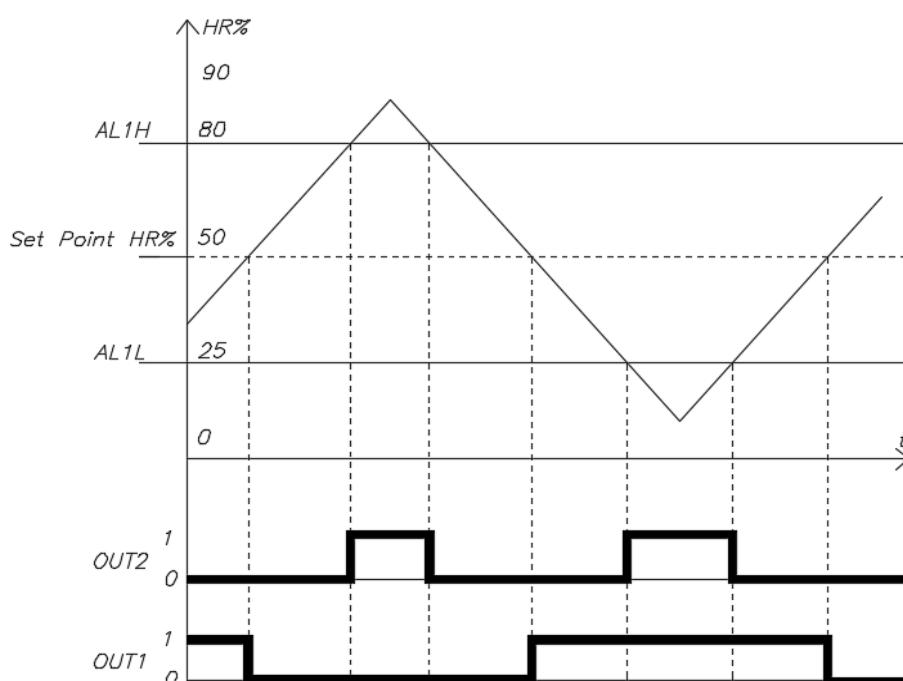
Op. A: Minimum alarm value

Press until the desired Minimum Alarm value is reached (default 25). When the desired AL1L value appears on the screen, press .

Finally press to exit the parameter selection menu.

Op. B: Maximum alarm value

Press until you reach the desired maximum alarm value (default 80). When the desired AL1H value appears on the screen, press . Finally press to exit the parameter selection menu.



12.6. Setting procedure working mode On/Off asymmetric hysteresis

The computer contains this factory working mode, if you want to reconfigure you must follow the following steps:

1. Press  once to eliminate 'ErAT'
2. Press  for 3 sec.
3. Press   to set "1030" which is the default scheduled password.
4. Press  again. This shows the list of parameters that are possible to modify in the controller. Press  several times to navigate between the parameter list. When 'REG' appears press  several times, until 'Cont' appears on the screen.
5. Once 'Cont' has appeared on the screen, press   until you reach 'On FA' (On/Off asymmetric hysteresis). When OnFA appears, press  2 times. Then appears "H.Act reLy".
6. Once you reach this point, press and hold  until it completely exits programming mode or the actual %HR measured value is displayed.

12.7. Factory Reset: Default Parameter Loading Procedure

The default data is typical values loaded on the equipment prior to factory shipment. To load the factory settings, proceed as follows:

1. Press the key  for more than 5 seconds.
2. The display will alternately display PASS and 0.
3. Using the   keys and select - 481.
4. Press the key .
5. The computer will turn off all LEDs, then display dFLt messages and turn on all LEDs on the display for 2 seconds. The computer will restart as a new start-up.
6. Set the "Set-point" according to section 11. 4
7. Set the working mode "On/Off asymmetric hysteresis" according to 11. 6
8. Set up alarms according to section 11.5

The procedure is complete.



Note: The full list of default parameters can be found in **Appendix A** of the operator's manual.

12.8. Modbus RTU communication protocol.

The equipment has Modbus RTU communication with RS485 physical layer protocol. The following procedure is followed to establish the communication:

1. Connect the two communication cables to their corresponding terminals. See section 11 "Electrical panel and connections".
2. Press  during more than 3 s.
3. Press  to set "1030" which is the default password programmed.
4. Press again . This displays the list of parameters that are possible to modify in the controller. Press  to navigate through the list of parameters. When "SEr" is displayed. Then press .
5. Once the "SEr" menu has been accessed, modify the "Add" parameter. To do this, press the  key until "Add" is displayed. Once the "Add" parameter has been selected, change the slave address of the controller using the keys  and press  once you have the desired address.
6. Once the "SEr" menu has been accessed, modify the "Baud" parameter. To do this, press the  key until "Baud" appears on the display. Once the "Baud" parameter has been selected, change the baud rate using the keys  and press  once the desired baud rate is reached. These baud rates are as follows:

1200 baud/s
2400 baud/s
9600 baud/s
19200 baud/s
38400 baud/s



Note: All write and read addresses are shown in the Modbus address mapping appendix of the controller.

7. When the equipment is AS-F-Z, check that each zone has a different Modbus RTU slave address. The equipment will come configured with addresses 1 (zone 1 controller) and 2(zone 2 controller).

To change the address of the controllers see point 5.

13. Optional

13.1. Water treatment by U.V. Lamp special

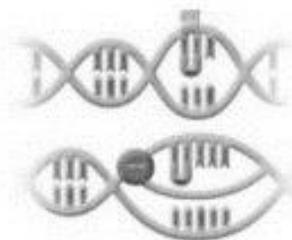
UV LAMP

Concerns about water pathogens that cause disease and pollute industrial processes, has led FISAIR S.L to the integration (optional) of ultraviolet technology into their evaporative equipment. Such systems eliminate bacteria, viruses and other pathogens preventing their reproduction; obtaining completely safe drinking water. U.V. radiation is one of the stripes of the electromagnetic spectrum and has more energy than visible light. The irradiation of germs present in water with U.V. rays causes a series of damage to its DNA molecule (Figure 1), which prevent cell division and cause its death. The most germicidal radiation is one with a wavelength of 254 nanometers. DNA exposed to this energy has a maximum absorption, resulting in irreversible inactivation in the growth of pathogens.

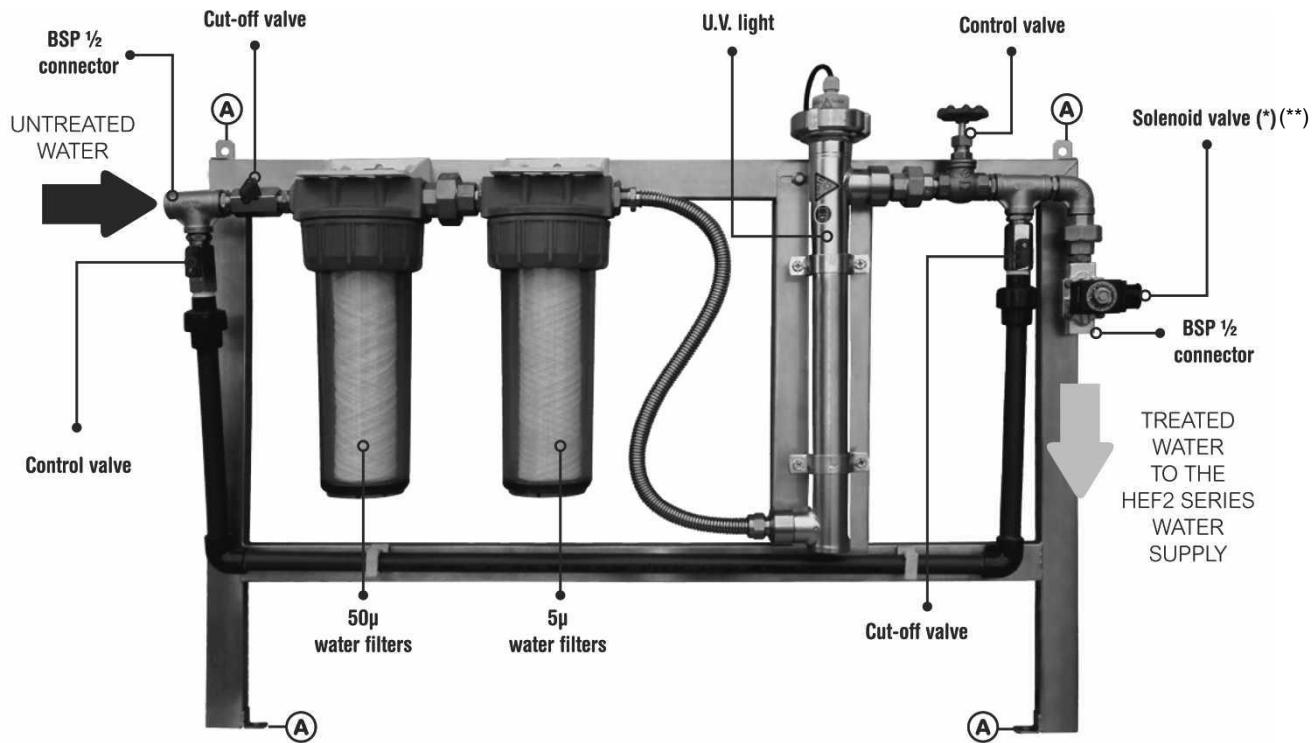
Figure 2:
Control panel



Figure 1
DNA molecule damage caused
by U.V. light



UV LAMP DISINFECTION SYSTEM + WATER FILTERS



Warning!!! To avoid unnecessary blockages in the filters of the system, the water should be made to circulate through the by-pass when the appropriate settings are being made to the irrigation of the cassettes and the cellular panel is being washed during installation.

(A) M8 attachment points

(*) This valve is the optional water supply valve.

(**) This On/Off solenoid valve will be installed on the AS-F1 or AS-F1-Z it will not be installed on the UV system. The only control panel included as standard, is indicated in Figure 2.

13.2. AtomSpray inserted in epoxy painted steel frame or stainless-steel frame

This table lists the AS-F1/ AS-F1-Z and has an approximate weight of 25kg.



Figure 23: AtomSpray AS-F1 front view in Epoxy painted frame



Figure 24: AtomSpray AS-F1-Z front view in Epoxy painted frame

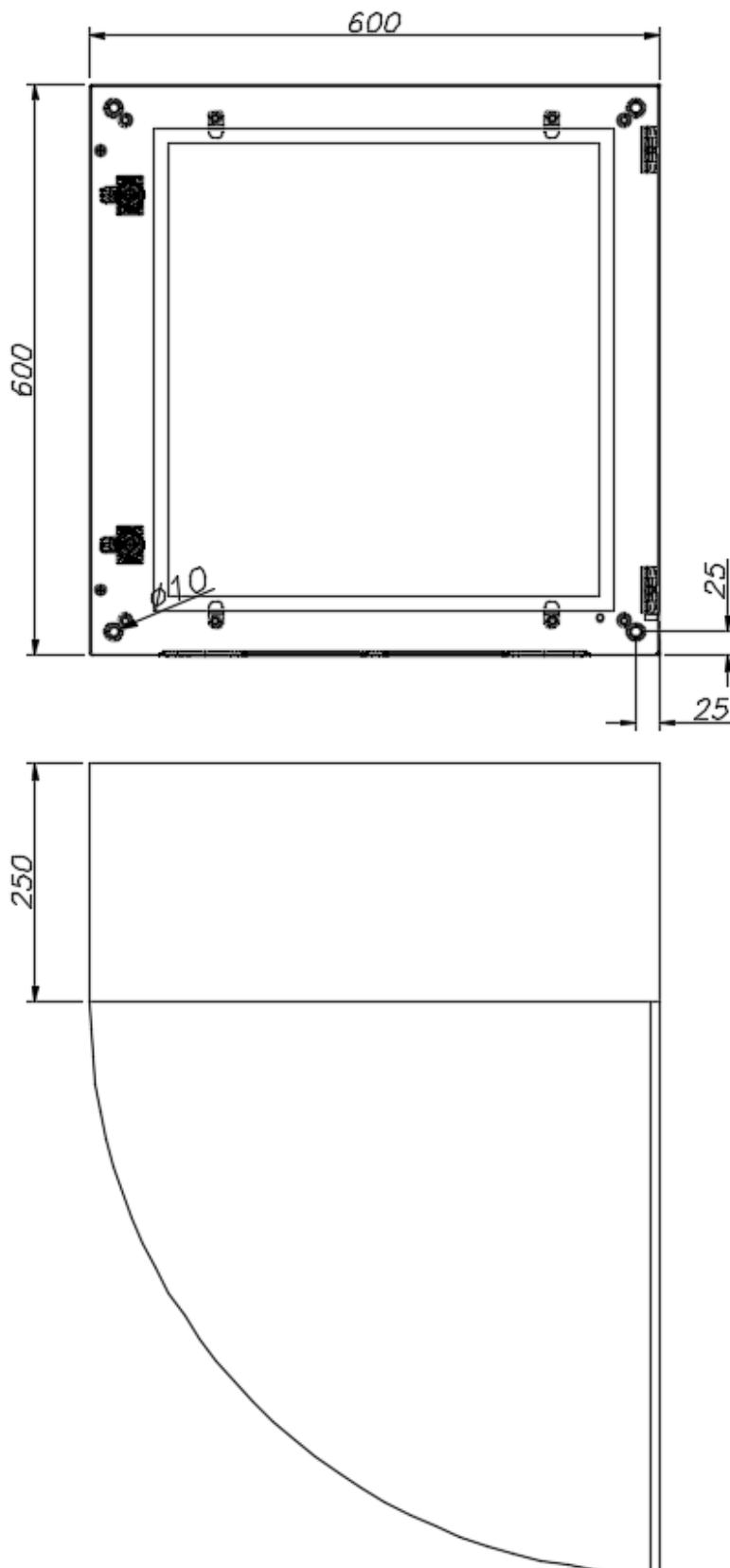


Figure 25: Location of Ø10mm holes to fix the frame

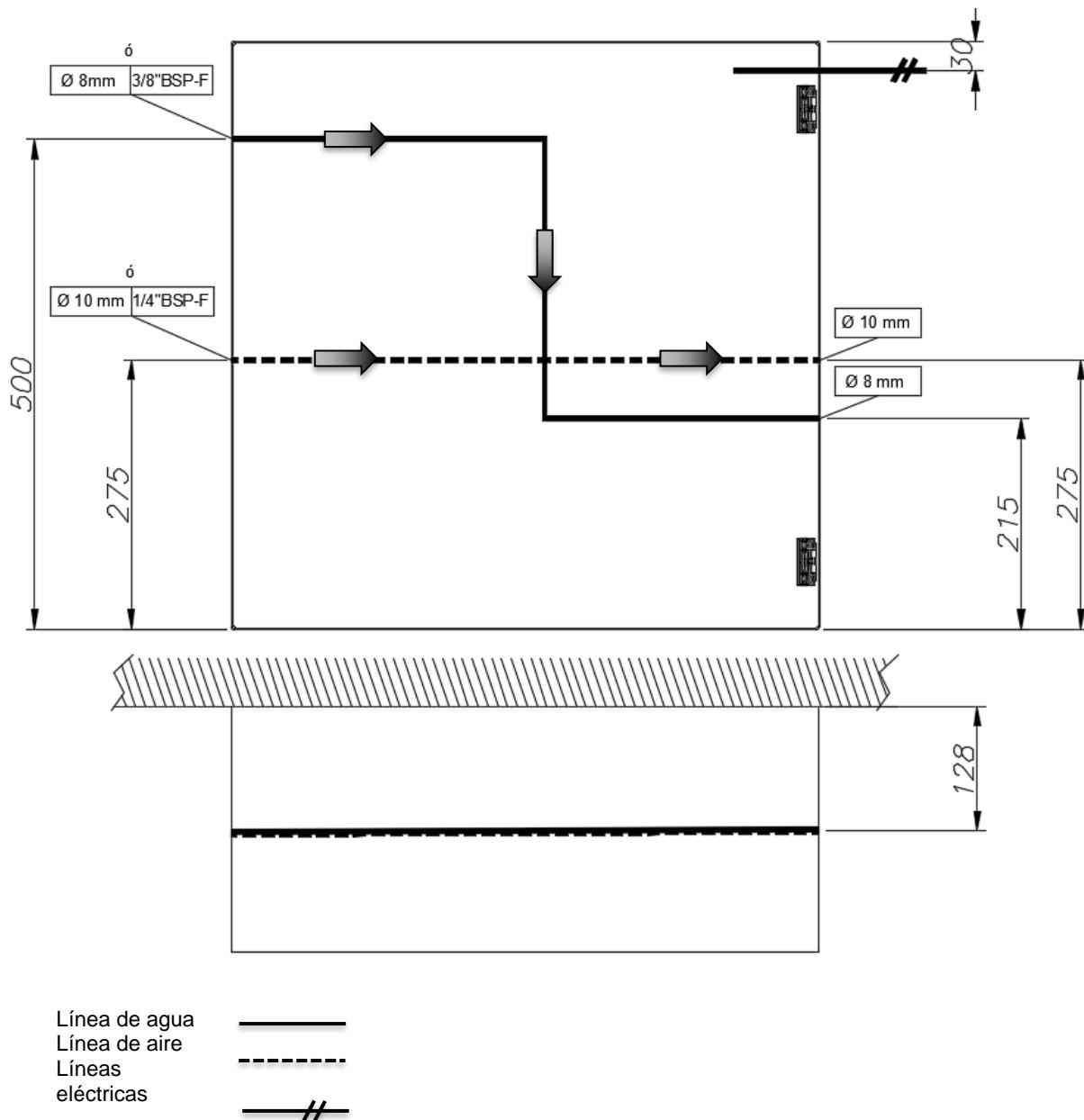
Inlet / outlet positions for water, air and electrical lines AS-F1:


Figure 26: Dimensions of water and air inlets/outputs



Note: If this option is selected in conjunction with the optional UV lamp, the AS-F1 water filter will not be installed as the system has been previously filtered.

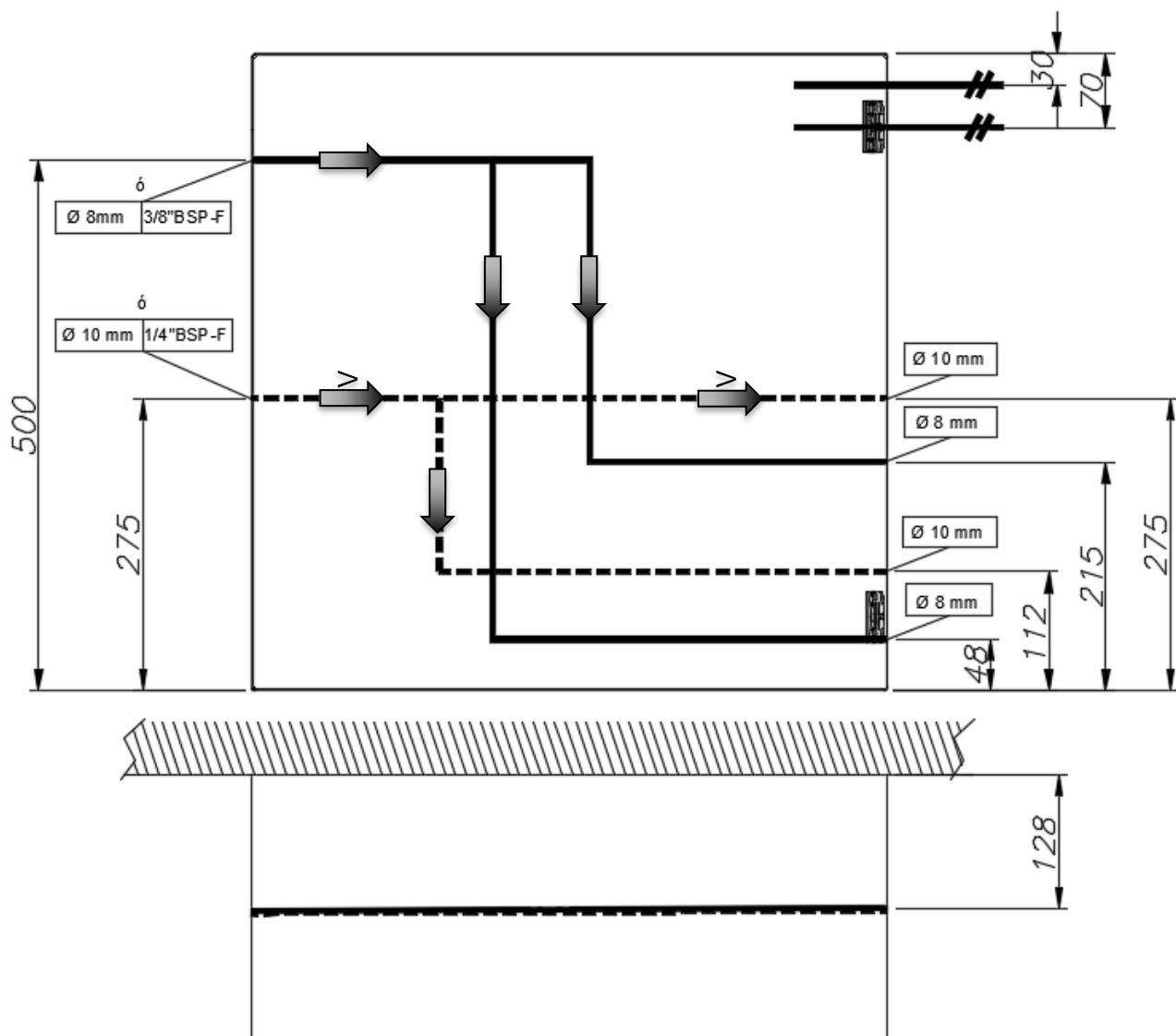
Inlet / outlet positions for water, air and electrical lines AS-F1-Z:


Figure 27: Dimensions of water and air inlets/outputs

Línea de agua	—
Línea de aire	- - -
Líneas eléctricas	//



Note: If this option is selected in conjunction with the optional UV lamp, the AS-F1 water filter will not be installed as the system has been previously filtered

14. Start-up

IMPORTANT Request start-up of your units by contacting:

sat@fisair.com o service@fisair.com

<https://fisair.com/es/servicio/puestas-en-marcha/> (application in Spanish)

<https://fisair.com/service/start-ups/> (application in English)

14.1. Pre-commissioned checks

Before commissioning, please ensure the following points:

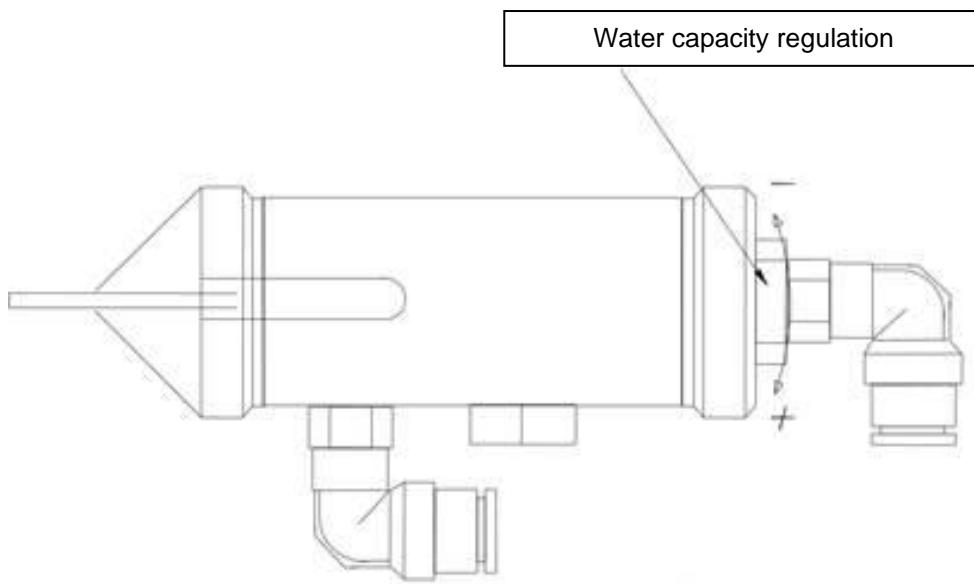
1. Check that the site water installation has undergone a risk assessment. A clean drinking water supply must be provided.
2. It should be ensured that the compressed air and water feeds are completely clean.
3. Check that the electrical connections are correct (see section 10 "electrical box and connections" with the electrical diagram corresponding to the equipment)
4. Check that the feed water pressure is between 2.5 and 6 Bar.
5. Check that the feed air pressure is between 2 and 6 Bar.
6. Appropriate access to the spray nozzle piping must be provided.

14.2. Commissioning of the AtomSpray

The start-up must be carried out by suitably qualified and authorized personnel. Local regulations for working at heights as well as electrical regulations should be analyzed:

1. Check connections again (water and compressed air). Recheck the electrical supply connections of the RH sensor (pay special attention to this connection), remote on/off connections (only when required) and alarm signal connections (only when required).
2. It is very important to check that the spray nozzles are correctly positioned at the recommended 30 degree angle and with the object-free zones as recommended in section 9 "Free spaces required for spray nozzles".
3. Open the pre-system air and water shut-off valve.
4. Turn the I2 switch to manual mode or automatic mode according to control needs. The value shown is the %RH measured by the capacitive probe 4... 20 mA connected to the control. Select a "Set-point" with an %RH value greater than the environment. Refer to section 11.4 to change the factory set-point.

5. Adjust the manual air pressure regulator to the required pressure, for the required capacity according to section 6 "Operating principle and components"
6. Check system for water and air leaks. Repair where necessary.
7. Make the final adjustments. The dispersion range varies depending on nozzle capacity, ambient temperature and relative humidity. Visible scattering is also affected by background color and lighting. It is difficult to regulate the dispersion visually; the air pressure should be increased to the point where fine droplets are seen and then reduced until there are no visible droplets. As a general principle, the dispersion of nozzles can be increased by increasing air pressure and decreased by lowering air pressure.
8. The water regulation valve is pneumatically controlled so that the air-to-water ratio is constant and suitable for uniform atomization. If a higher water supply is needed for each nozzle, capacity can be increased or reduced based on:



*Figure 29: regulating the water capacity
in each nozzle*

9. If the mist pattern of a nozzle is very dense or light, it may be necessary to adjust the distance between the resonator and the nozzle drive outlet using a Philips screwdriver (where indicated on the nozzle by the arrow). Adjust until you find the desired pattern.



Position 1: Resonator farther away.

- Angle **minor**
- Distance **d** greater

Position 2: Resonator closer.

- Angle **Major**
- Distance **d** less

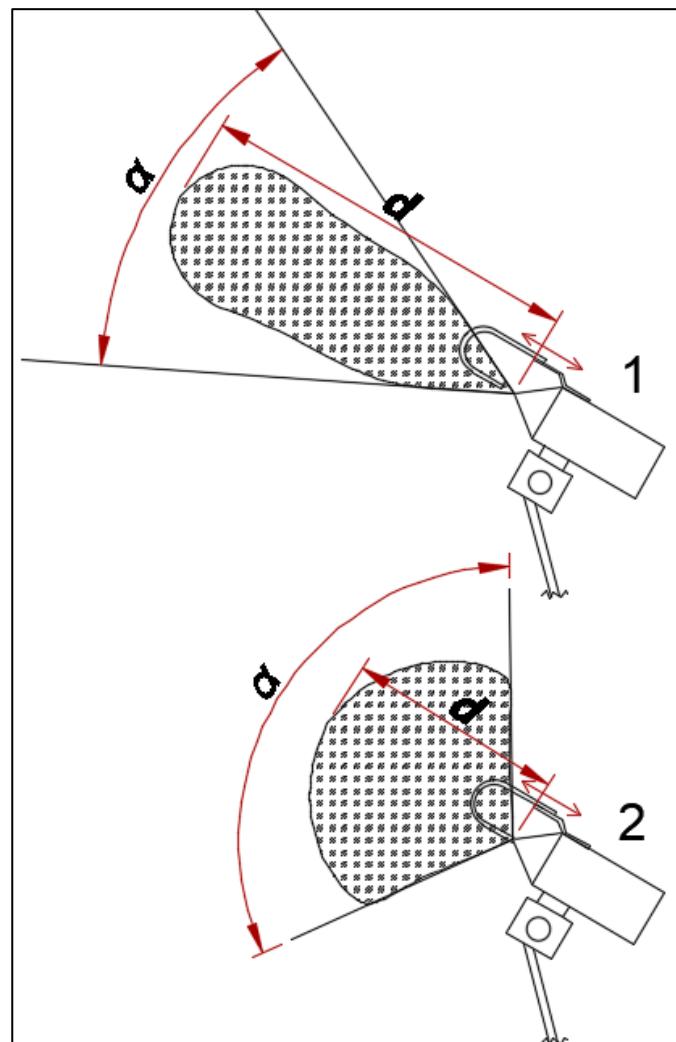


Figure 30: Atomization pattern depending on the position of the resonator.

10. The direction of the nozzle in the horizontal plane can also be adjusted. To do this, rotate the nozzle, loosening the fixing nut and the cylinder placed in the nozzle joint with the support and once the desired position has been adjusted, retightening it. (see chapter 9 "Assembly of spray nozzles")



11. The AtomSpray has to turn on and off a minimum of 5 times. This is done to check and adjust, if necessary, the consistency of the nozzle dispersion pattern.



Note: A new installation may require re-adjustments to the nozzles and compressed air pressure regulator until all parts are well seated. This period can last about a week.

15. Switching Off the AtomSpray

If the equipment remains off longer than 72h or a seasonal shutdown that may occur due to weather conditions (e.g. in summer it is likely that no humidification is required), the purging procedure should be performed to avoid the possible growth of microorganisms.

Purging procedure:

1. Set the I2 selector to position 0.
2. Close the water supply shut-off valve.
3. Unscrew the bucket where the water filter is housed.
4. Start the machine in manual mode, using the selector in position 1. Make sure that the "set-point" value is above the ambient %RH value.
5. All water will be purged from the pipes until only air comes out of the spray nozzles.
6. Empty the water filter bucket and reposition it. If it is a long seasonal shutdown, it is recommended to install a new water and air filter until the start of next season.
7. Finally shut off the compressed air supply until the next time you start up.

16. Maintenance

IMPORTANT Request maintenance of your units by contacting:

sat@fisair.com o service@fisair.com

<https://fisair.com/es/servicio/mantenimientos/> (application in Spanish)

<https://fisair.com/service/maintenance/> (application in English)

For proper operation of the equipment, the following maintenance procedures must be performed:

Weekly:

- **Water filter:** The water pressure P_0 should be measured and noted each time a new and clean filter cartridge is installed.

The pressure value must be measured **each week** and when the pressure difference between the initial pressure value P_0 and the weekly measured value P_1 is greater than 0.1 bar, the filter cartridge should be replaced with a new one.

Si $P_0 - P_1 > 0,1 \text{ Bar} \rightarrow \text{Replace filter cartridge}$

If the filter is found to be **extremely dirty**, it must also be replaced with a new filter cartridge.

It is recommended to have replacement filter cartridges in stock.

- **Atomizing nozzles:** If the dispersion pattern of the spray nozzles has been distorted from the initial pattern, the spray nozzle should be reset (visual check).
- **Air filter:** When it is observed that the pressure on the air gauge is not stable and has decreased, the filter cartridge must be replaced.

Annually or in case of prolonged seasonal shutdown:

- **Water filter and air filter:** Replace the cartridges mandatorily.
- **Clean the water solenoid valve** by disassembling it to clean the diaphragm of possible impurities.
- **Atomizing nozzles:** identification of parts for disassembly. Clean the nozzle output manually using hole measurement bits:
 - ❖ Clean the nozzle hole (1.4 mm) no "19".
 - ❖ Clean nozzle head hole (1.8 mm) no "18"

1. M3x8 screw
2. M3 snap washer
3. M3 washer
4. Resonator
5. Support 208068
6. Support 208068
7. Nozzle body
8. Membrane
9. Valve plate
10. 2,9 x2,62 O-ring
11. Valve cover
12. 2,9 x 1,78 O-ring
13. Valve
14. Valve spring 22100
15. 10,77 x 2,62 O-ring
16. Base nut
17. Elbow
18. Nozzle head
19. Inside nozzle
20. 26,7 x 1,78 O-ring

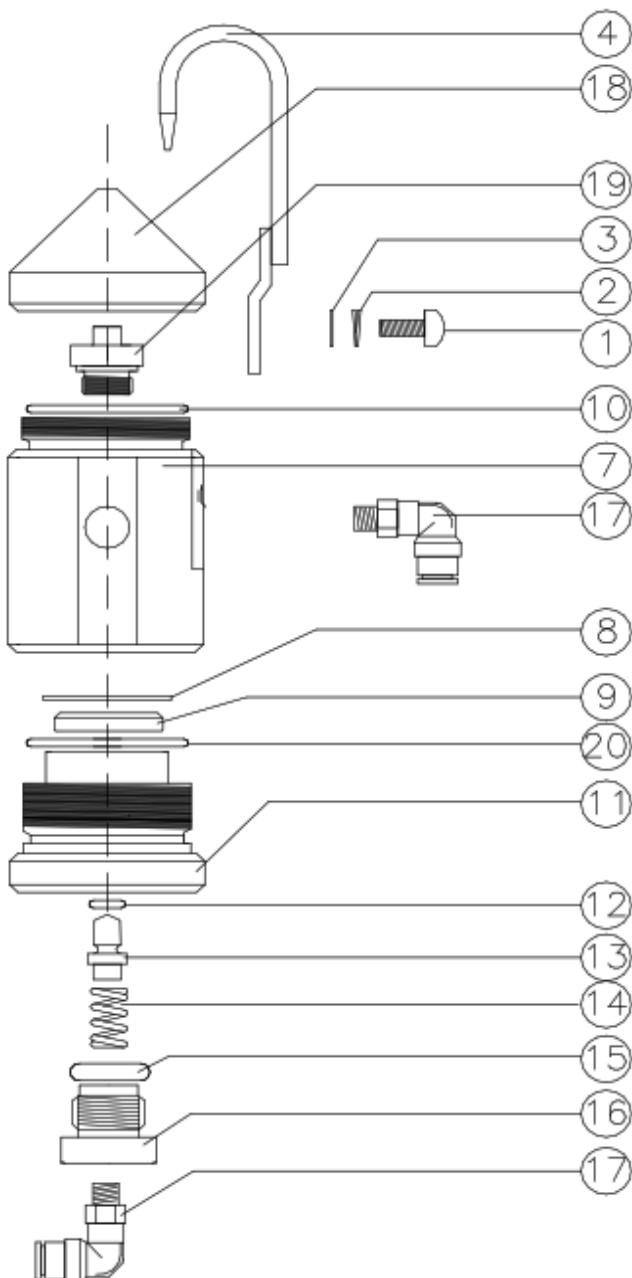
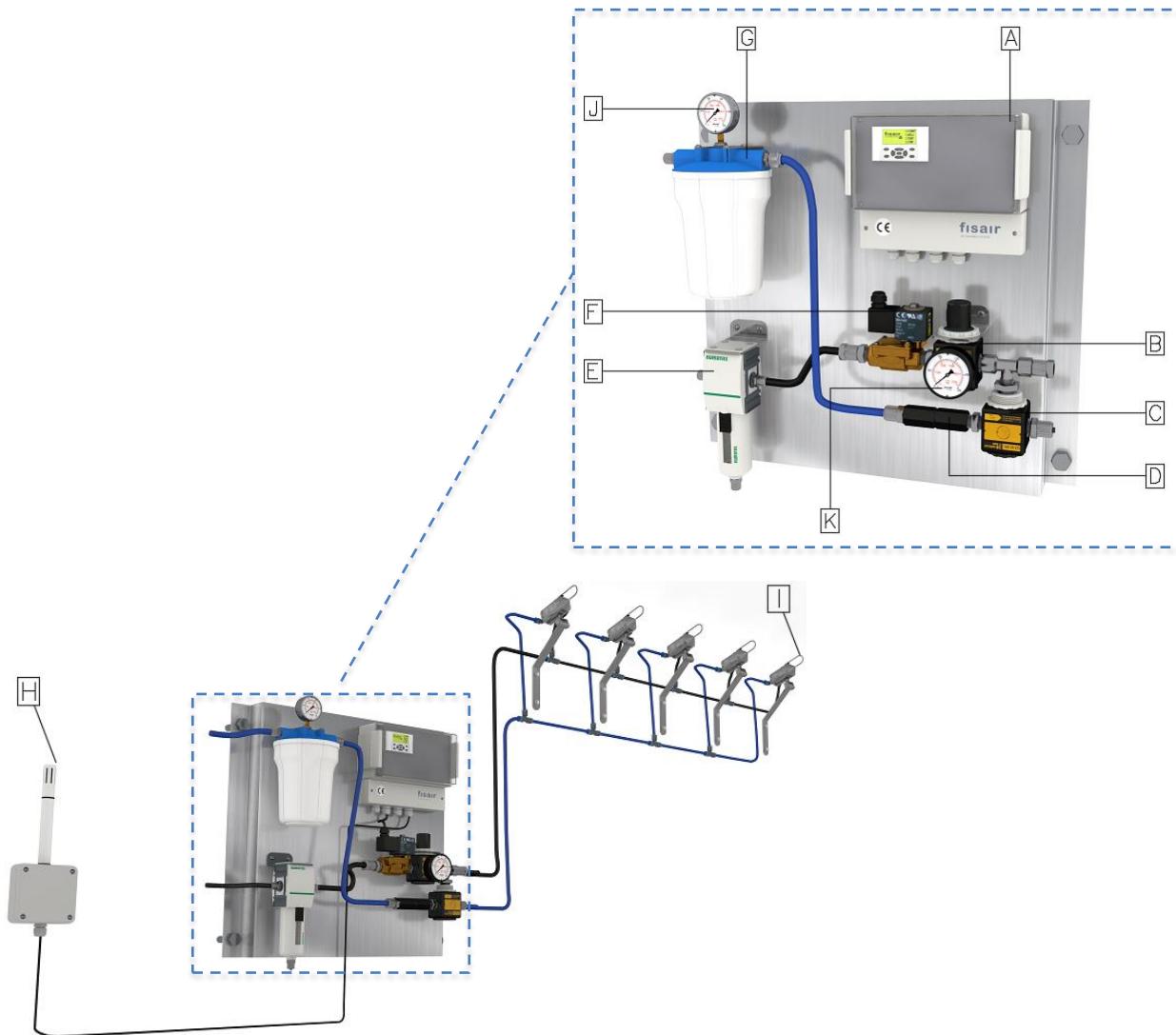


Figure 31: Spraying nozzle

17. Spare parts list

17.1. Key elements

ITEM	Component	FISAIR CODE
A	Digital electronic regulator 100/240 VAC (4.. 20 mA)	64910015
B	Manual air regulator without pressure gauge	62554081
C	Water Pressure Regulator R1/4"	62554080
D	Anti-return valve	62554090
E	Air filter R 1/4" 5'mm	62554050
F	a) electrovalve 2/2 3/8 N/C 13MM Vitón	62554060
	b) Bonina DIN 43650B 220VAC	62554065
G	Water filter cartridge of 5'm μm	62250235
H	Capacitive relative humidity probe	64220123
I	FD-A Spray Nozzle	62554000



17.2. Optional kit installation water/air tubes - spray nozzles

Optional connection elements:

The following KIT can be purchased to expand the installation possibilities of the nozzles in the room:

Water installation:

- Kit Reducer link T x 8 -6-8 mm air (x5). Fisair Code: 71610251
- Kit Elbows Ø 8-8 mm air (x5). Fisair Code: 71610254
- Reduction kit 8-6 air (x5). Ø Fisair Code: 71610252
- Kit tube blue Nylon 8 (x 25 m). Fisair Code: 71610277
- Kit tube blue Nylon 6 (x 25 m). Fisair Code: 71610278

Air installation:

- Kit Reducer link T - 10-6-10 mm water (x5). Fisair code: 71610250
- Kit Elbows Ø 10-10 mm water (x5) Fisair code: 71610255
- Reduction kit 10-6 mm water (x5) Fisair code: 71610253 Ø
- Black tube kit Nylon 10 (x 25 m) Fisair code: 71610276
- Black tube kit Nylon 6 (x 25 m) Fisair code: 71610275

17.3. List of spare parts for spray nozzle

Tell Fisair which of these elements is required:

- 21. M3x8 screw
- 22. M3 snap washer
- 23. M3 washer
- 24. Resonator
- 25. Support 208068
- 26. Support 208068
- 27. Nozzle body
- 28. Membrane
- 29. Valve plate
- 30. 2,9 x2,62 O-ring
- 31. Valve cover
- 32. 2,9 x 1,78 O-ring
- 33. Valve
- 34. Valve spring 22100
- 35. 10,77 x 2,62 O-ring
- 36. Base nut
- 37. Elbow
- 38. Nozzle head
- 39. Inside nozzle
- 40. 26,7 x 1,78 O-ring

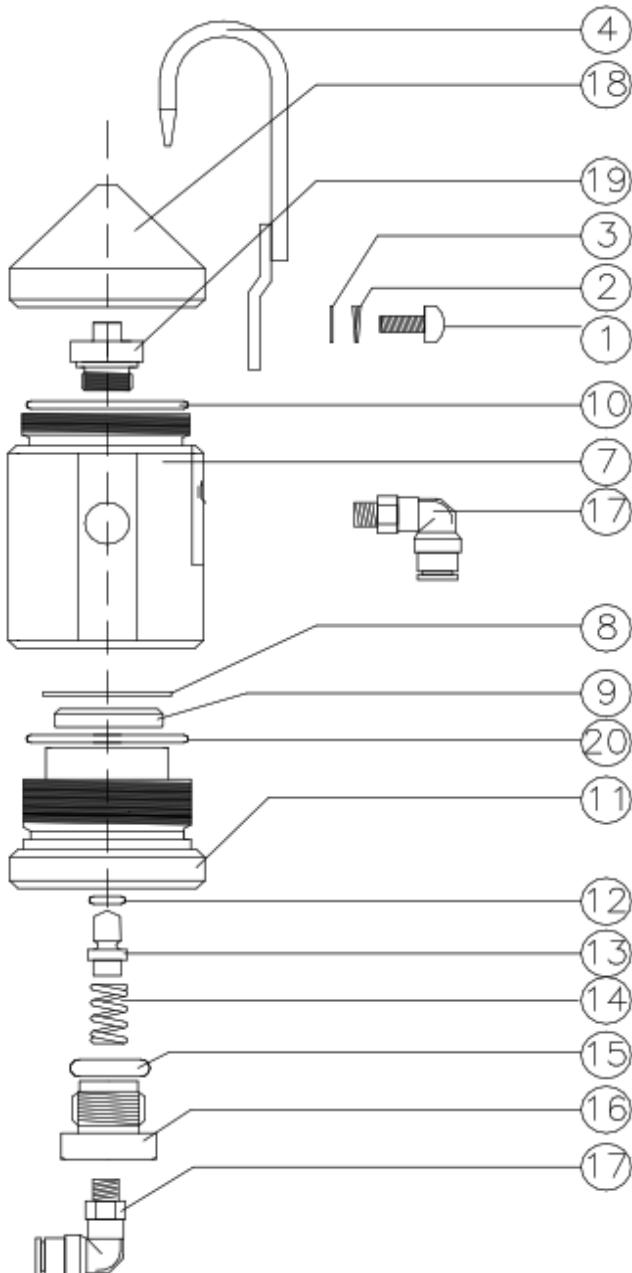


Figure 32: Disassembling the spray nozzle

18. Declaration of conformity

18.1. Machine declaration of conformity

**DECLARACIÓN CE DE CONFORMIDAD**
EC CONFORMITY DECLARATION
EG KONFORMITÄTSERKLÄRUNG
DECLARATION CE DE CONFORMITÉ**Departamento de Dirección de Calidad**
Quality Management DepartmentQualitätsmanagement-Abteilung
Département de gestion de la qualitéFISAIR S.L.U.
C/ Ciudad de Frias,33-(P.L. Camino de Getafe)
28021 Madrid SPAIN
Tel.: (+34) 916921514
info@fisair.com**La presente declaración de conformidad se expide bajo exclusiva responsabilidad del fabricante.**

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Diese Konformitätserklärung wird in der alleinigen Verantwortung des Herstellers ausgestellt.

Cette déclaration de conformité est délivrée sous la seule responsabilité du fabricant.

Descripción/ Product description/ Produktbeschreibung/ Description du produit: **AS-F1 / AS-F1-Z****Tipo de máquina/ Machine type/ Maschinentyp/ Type de machine:** **MÁQUINA/ MACHINE/ MASCHINE/ MACHINE****Marca/ Brand/ Marke/ Marque:** **FISAIR****Es conforme con la legislación de armonización pertinente a la Unión Europea:**

It complies with the harmonization legislation relevant to the European Union:

Es entspricht den für die Europäische Union relevanten Harmonisierungsgesetzen

2006/42/CE**2014/30/UE****2014/35/UE****Es conforme con las siguientes normas:**

It complies with the following standards:

Es entspricht den folgenden Normen:

Il est conforme aux normes suivantes:

UNE-EN ISO 12.100:2012**UNE-EN 60204-2:2019****UNE-EN 61000-6-6:2012****UNE-EN 61000-6-3:2012**

FISAIR se exime de cualquier responsabilidad a menos que se cumplan con todas las instrucciones de instalación y funcionamiento proporcionadas por FISAIR, o si los productos han sido modificados o alterados sin el consentimiento por escrito de FISAIR, o si tales productos han sido sometidos a un mal uso, mala manipulación, alteración, mantenimiento inadecuado o muestran consecuencias de accidente o utilización negligente.

FISAIR disclaims any liability unless all installation and operating instructions provided by FISAIR are followed, or if products have been modified or altered without FISAIR's written consent, or if such products have been subjected to misuse, use, mishandling, alteration, improper maintenance or show consequences of accident or negligent use.

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.

18.2. Partly completed machinery (quasi-machine) declaration of conformity

**DECLARACIÓN CE DE CONFORMIDAD**
EC CONFORMITY DECLARATION
EG KONFORMITÄTSERKLÄRUNG
DECLARATION CE DE CONFORMITÉ**Departamento de Dirección de Calidad**
Quality Management DepartmentQualitätsmanagement-Abteilung
Département de gestion de la qualité**FISAIR S.L.U.**
C/ Ciudad de Frias,33-(P.L. Camino de Getafe)
28021 Madrid SPAIN
Tel.: (+34) 916921514
info@fisair.com**La presente declaración de conformidad se expide bajo exclusiva responsabilidad del fabricante.**

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Diese Konformitätserklärung wird in der alleinigen Verantwortung des Herstellers ausgestellt.

Cette déclaration de conformité est délivrée sous la seule responsabilité du fabricant.

Descripción/ Product description/ Produktbeschreibung/ Description du produit: **AS-F1 / AS-F1-Z****Tipo de máquina/ Machine type/ Maschinentyp/ Type de machine:** **CUASI MÁQUINA/ QUASI MACHINE/ QUASI MASCHINE/ QUASI MACHINE****Marca/ Brand/ Marke/ Marque:** **FISAIR****Es conforme con la legislación de armonización pertinente a la Unión Europea:****2006/42/CE**

It complies with the harmonization legislation relevant to the European Union:

2014/30/UE

Es entspricht den für die Europäische Union relevanten Harmonisierungsgesetzen

2014/35/UE**Es conforme con las siguientes normas:****UNE-EN ISO 12.100:2012**

It complies with the following standards:

UNE-EN 60204-2:2019

Es entspricht den folgenden Normen:

UNE-EN 61000-6-6:2012

Il est conforme aux normes suivantes:

UNE-EN 61000-6-3:2012

FISAIR se exime de cualquier responsabilidad a menos que se cumplan con todas las instrucciones de instalación y funcionamiento proporcionadas por FISAIR, o si los productos han sido modificados o alterados sin el consentimiento por escrito de FISAIR, o si tales productos han sido sometidos a un mal uso, mala manipulación, alteración, mantenimiento inadecuado o muestran consecuencias de accidente o utilización negligente.

FISAIR disclaims any liability unless all installation and operating instructions provided by FISAIR are followed, or if products have been modified or altered without FISAIR's written consent, or if such products have been subjected to misuse, use, mishandling, alteration, improper maintenance or show consequences of accident or negligent use.

Lea el Manual de Instalación, Funcionamiento y Mantenimiento antes de utilizar este equipo.

La puesta en servicio de cuasi máquina estará prohibida hasta que la cuasi máquina sea montada en una máquina y esta cumpla las disposiciones de la Directiva 2006/42/CE y se disponga de la declaración de conformidad de acuerdo con lo dispuesto en el Anexo II A. En el manual se determinan medidas de seguridad que deberá cumplir la máquina en la que se monte la cuasi máquina. FISAIR no se responsabiliza de la seguridad.

Read the Installation, Use and Maintenance Manual before using this equipment.

The commissioning of the quasi-machine shall be prohibited until the quasi-machine is mounted on a machine and the machine complies with the provisions of Directive 2006/42/CE and the declaration of conformity is available in accordance with the provisions of Annex II A. The manual determines the safety measures that the machine on which the quasi-machine is mounted must comply. FISAIR is not responsible for security.

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.

19. Warranty



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 paid 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.



FISAIR S.L.U. WARRANTY POLICY



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:

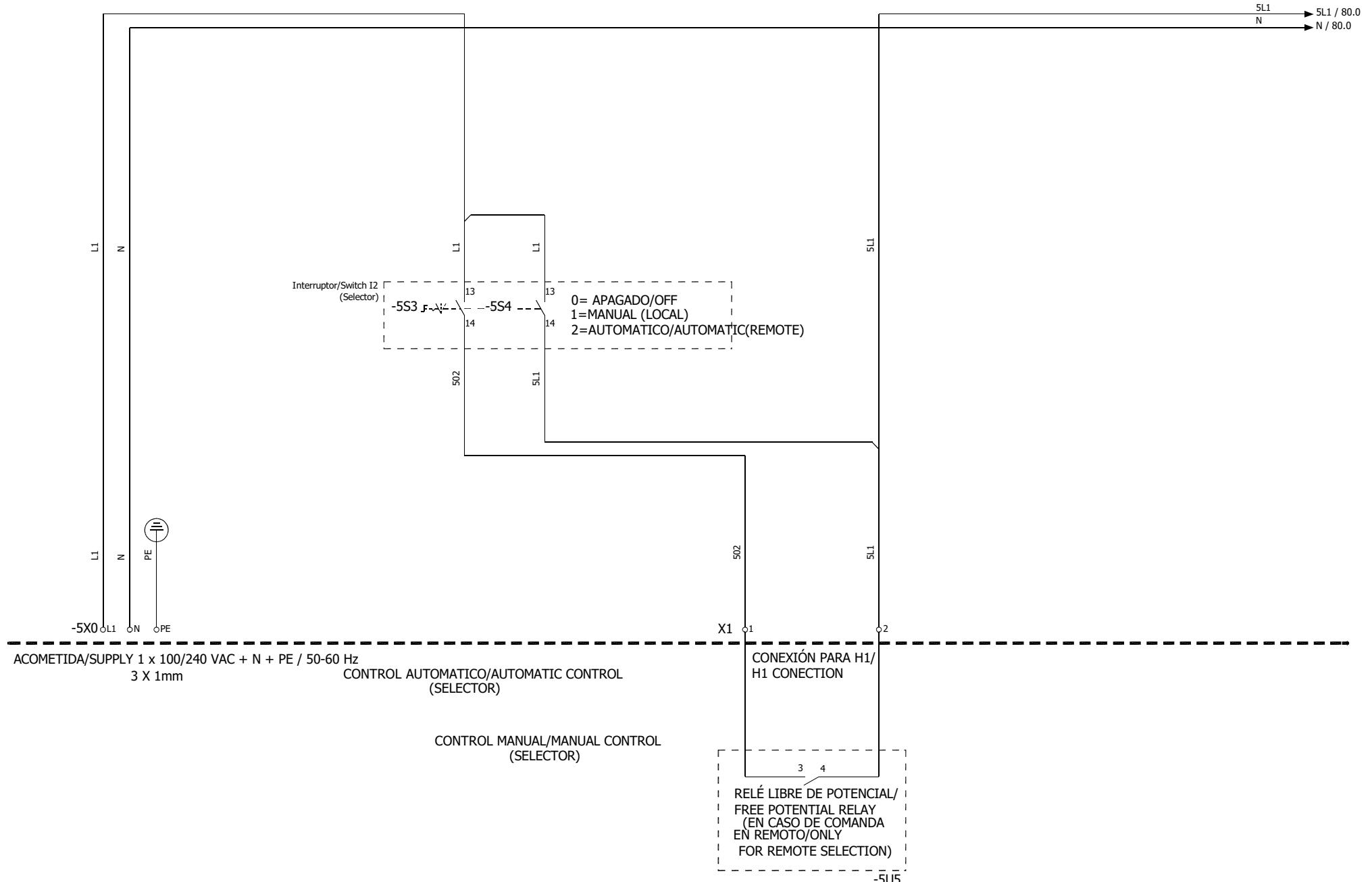
Hugo J. López Álvarez
San Martín de la Vega, February 2016

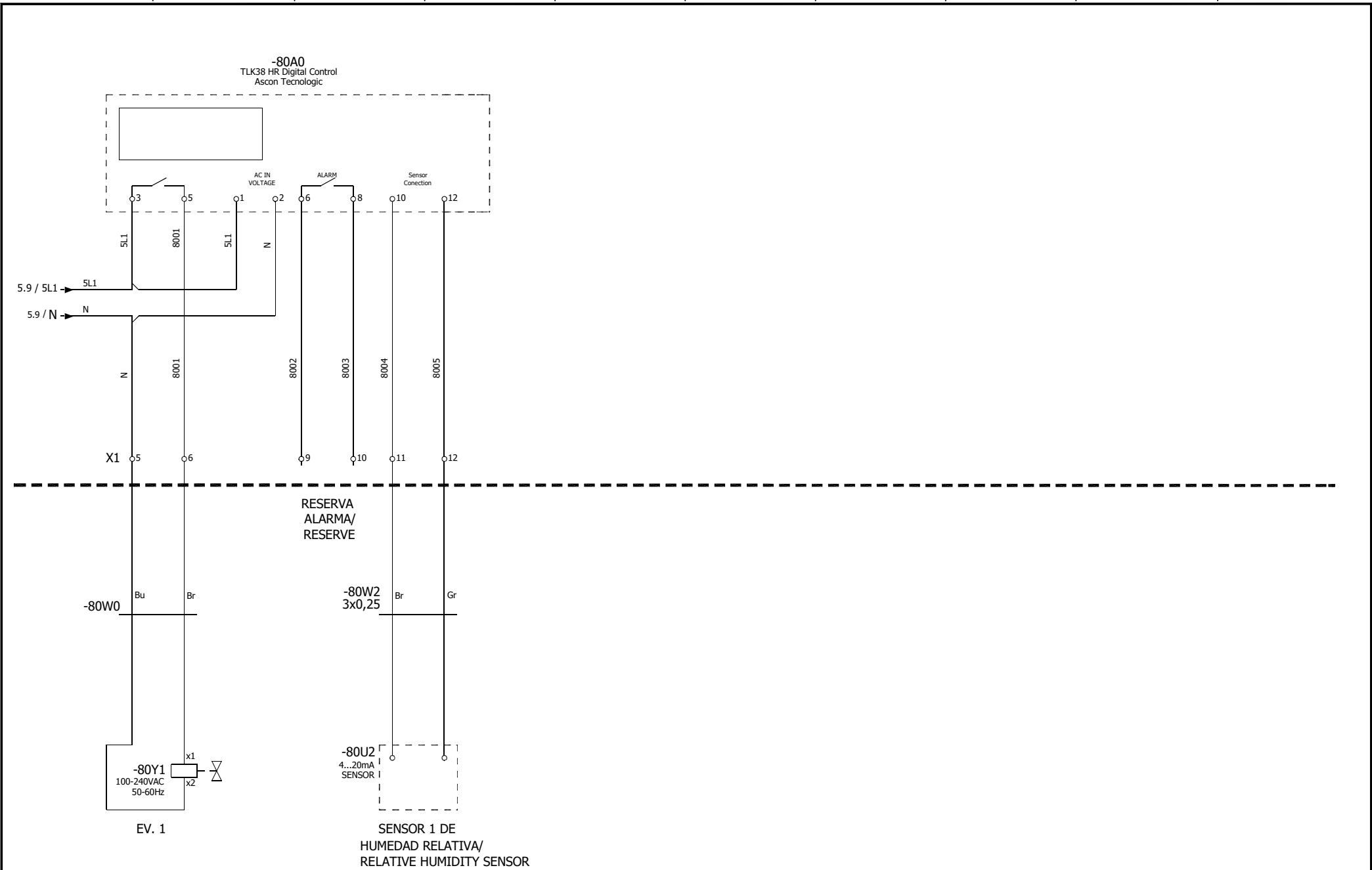
AS-F1-110/240-VAC

WRING DIAGRAM

REV.	DATE		
Air Humidity Control			FISAIR S.L.U.
CONTRACT : E10031			REV. B PAGES 01

Índice de páginas/Page Index





REV. A	FISAIR S.L.U.	WRING DIAGRAM	Date 13/10/2021	Page 80
Project : E10031	Name: AS-F1-110/240-VAC		PROJECTED: S.F.B.	APROBED: H.L.A.



Air Humidity Control

Empresa/cliente

Producción

Descripción de proyecto

AS-F1-Z_220VAC (2 Etapas)

Número de diseño

E10032-A

Alimentación

220 VAC I+N+T/50-60Hz

Fabricante (empresa)

Fisair S.L.; Air Humidity Control.

Nombre de proyecto

E10032-A_AS-F1-Z_220VAC

Producto

Humidificación

Tipo

Diseño Propio

Lugar de instalación

Responsable del proyecto

Oficina Técnica

Particularidad de pieza

No aplica

Creado

04/09/2016

Modificado

11/02/2021

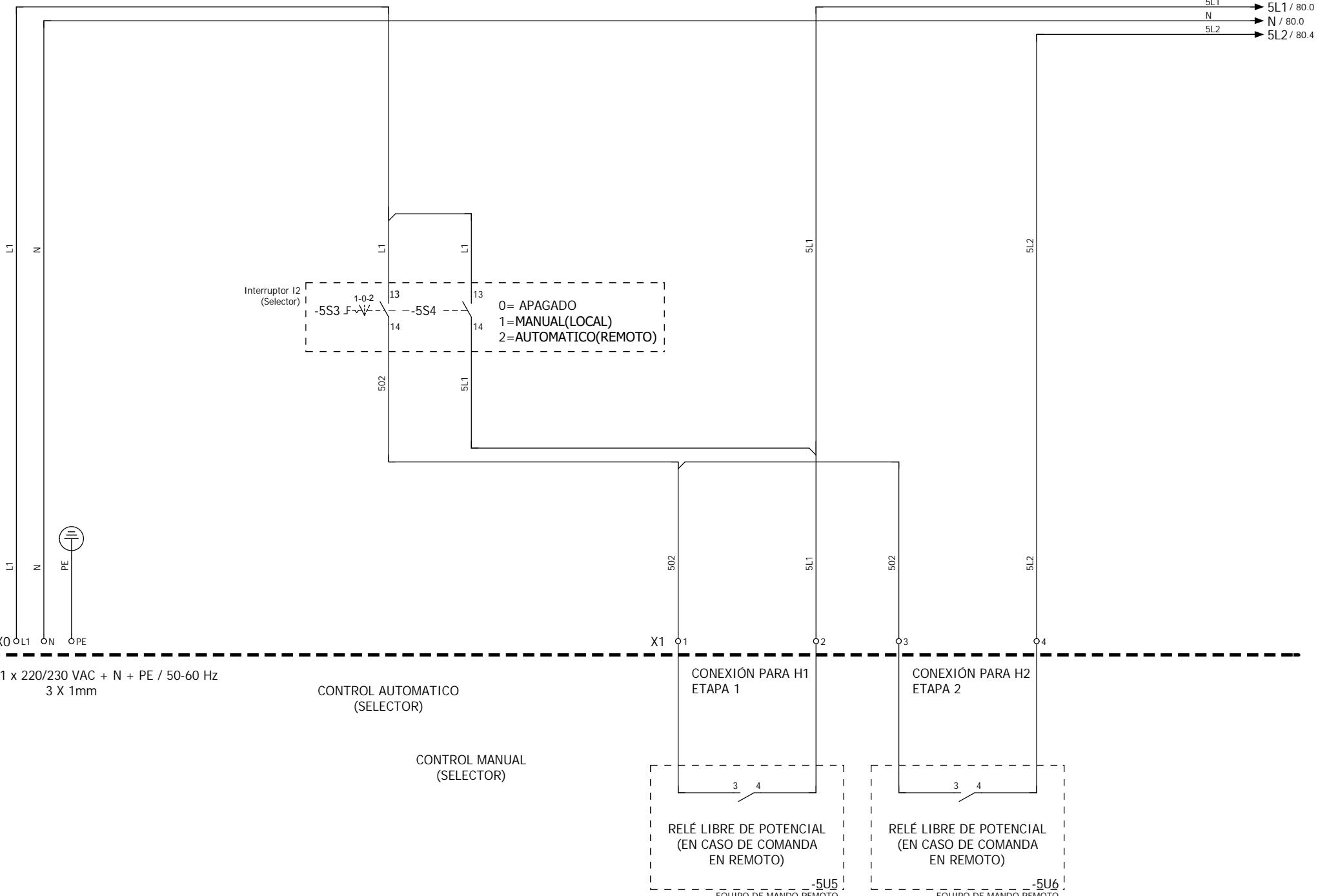
Número de páginas 5

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			Resp	PRODUCCION-DH						+ CPPAL
			Probado							
Cambio	Fecha	Nombre	Original	Sustitución por	Sustituido por			E10032-A		Hoja 1

Índice de páginas

Columna X: una página creada automáticamente se ha modificado de forma manual

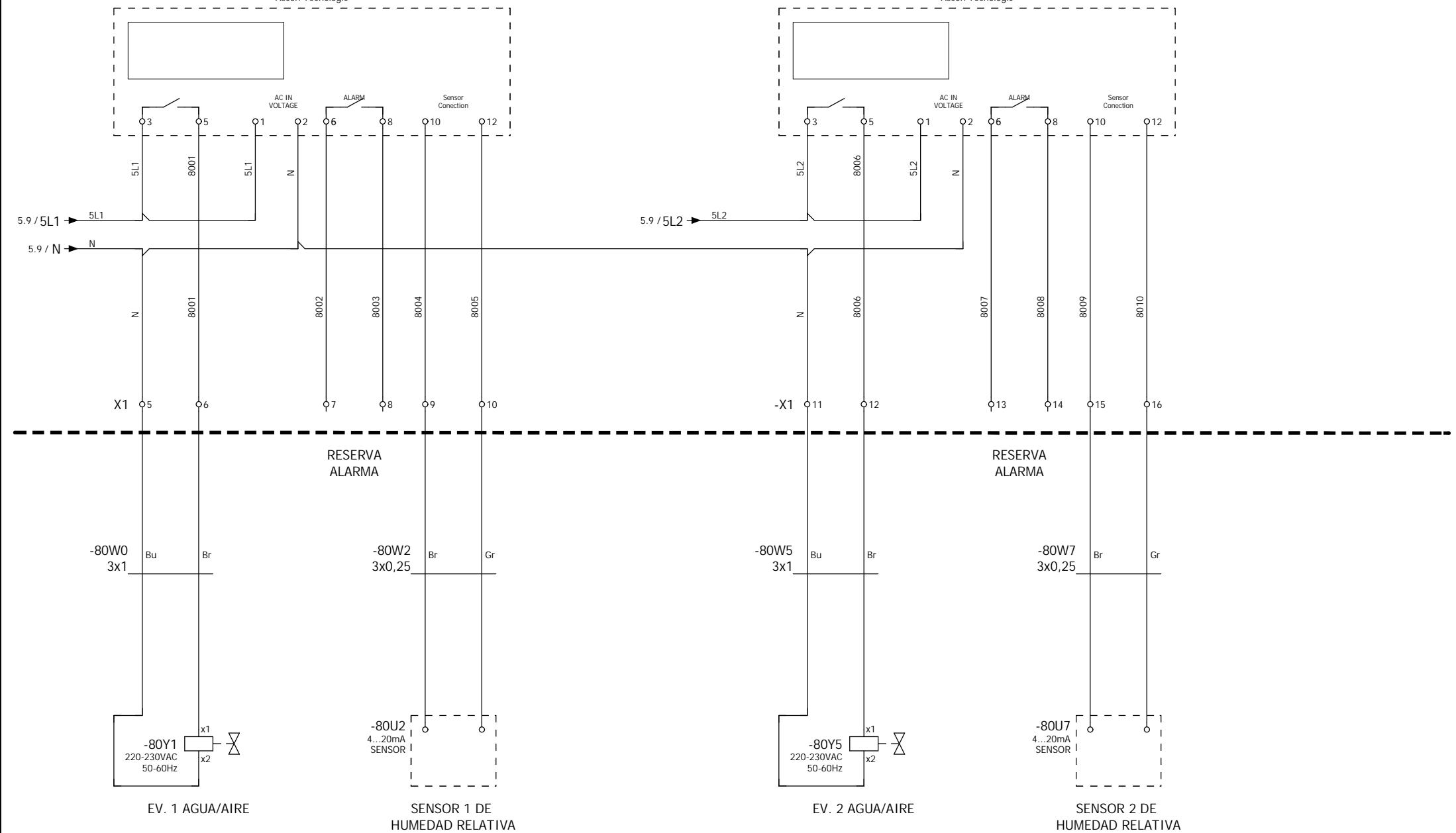
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-XO = Acometidas

-80A0
TLK38 HR Digital Control
Ascon Tecnologic

-80A5
TLK38 HR Digital Control
Ascon Tecnologic



			Fecha	08/02/2021	AS-F1-Z_220VAC (2 Etapas)	Fisair S.L.; Air Humidity Control.	Rack PLC/Arquitectura Control			= AtomSpray
			Resp	Alex				+ CPPAL		
			Probado					E10032-A		Hoja 80
Cambio	Fecha	Nombre	Original	Sustitución por	Sustituido por				Hj	



Air Humidity Control

Empresa/cliente	Producción
Descripción de proyecto	AS-F1 _110VAC (1 Etapa)
Número de diseño	E10034-A
Alimentación	110 VAC I+N+T/50-60Hz

Fabricante (empresa)	Fisair S.L.; Air Humidity Control.
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Nombre de proyecto	E10034-A_AS-F1_110VAC
Producto	Humidificación
Tipo	Diseño Propio
Lugar de instalación	
Responsable del proyecto	Oficina Técnica
Particularidad de pieza	No aplica

Creado	04/09/2016
Modificado	11/02/2021

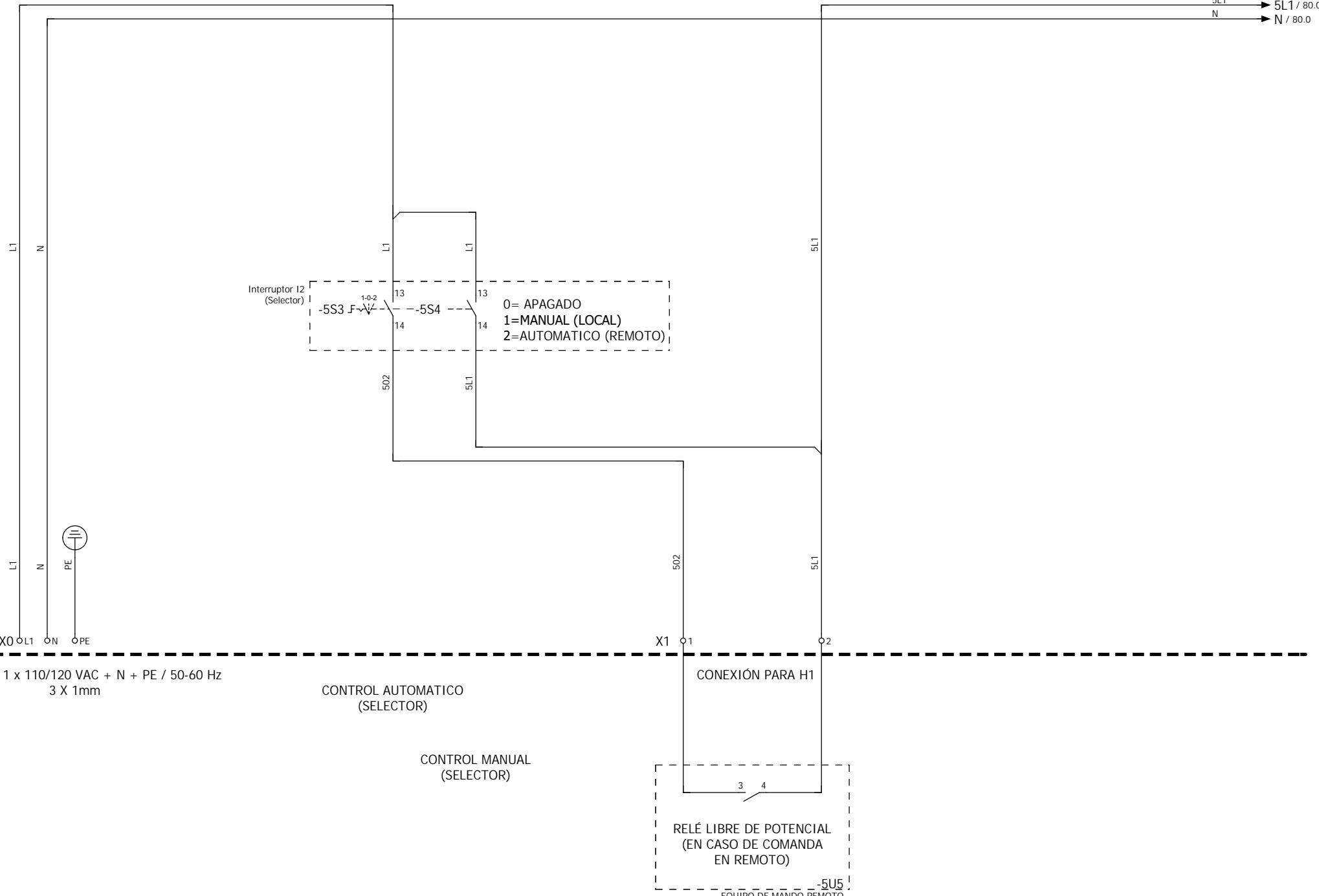
Número de páginas	5
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Índice de páginas

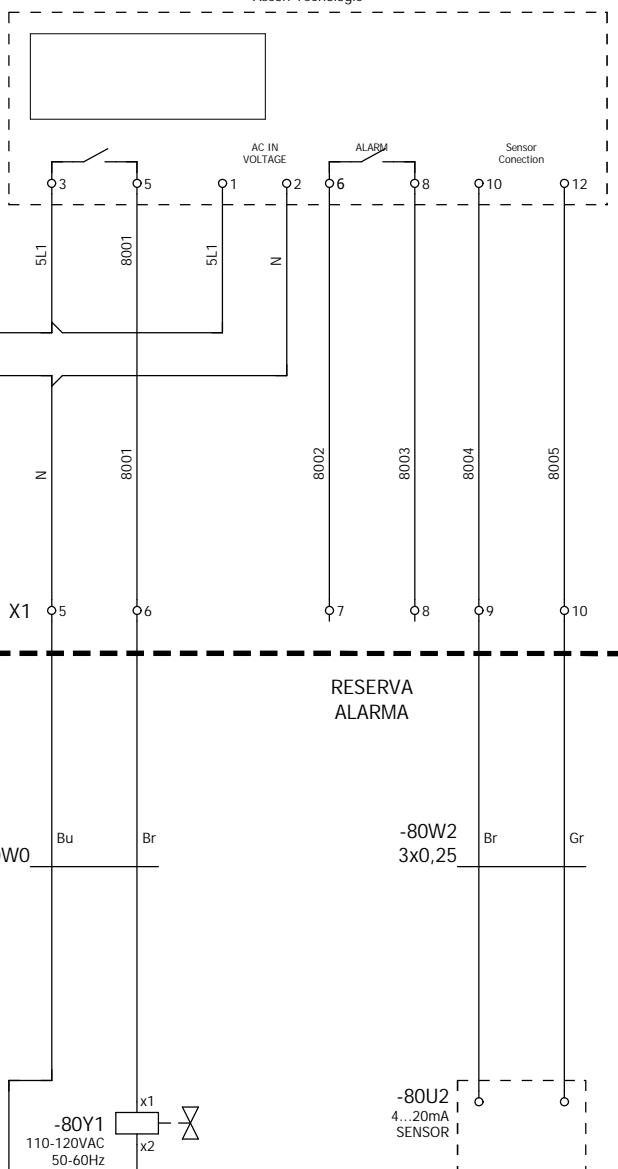
Columna X: una página creada automáticamente se ha modificado de forma manual

F06_001



-X0 = Acometidas

-80AO
TLK38 HR Digital Control
Ascon Technologic



EV. 1 AGUA/AIRE

SENSOR 1 DE
HUMEDAD RELATIVA

			Fecha	08/02/2021	AS-F1_110VAC (1 Etapa)	Fisair S.L.; Air Humidity Control.	Rack PLC/Arquitectura Control		= AtomSpray
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			Probado						
Cambio	Fecha	Nombre	Original	Sustitución por	Sustituido por			E10034-A	Hoja 80 Hj



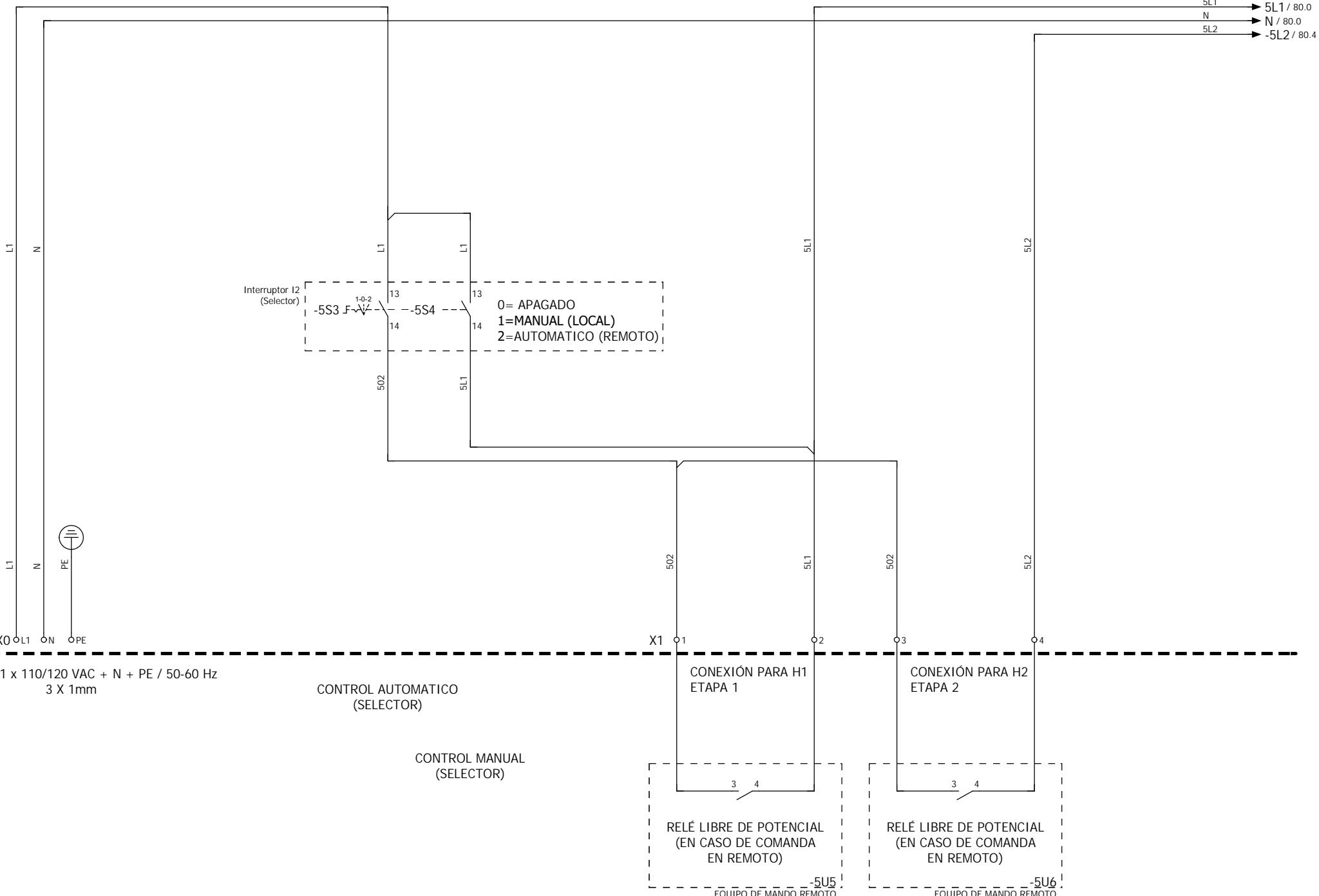
Air Humidity Control

Empresa/cliente	Producción
Descripción de proyecto	AS-F1-Z (2 Etapas)
Número de diseño	E10035
Alimentación	110 VAC I+N+T/50-60Hz
Fabricante (empresa)	Fisair S.L.; Air Humidity Control.
Nombre de proyecto	E10035_AS-F1-Z_110VAC
Producto	Humidificación
Tipo	Diseño Propio
Lugar de instalación	
Responsable del proyecto	Oficina Técnica
Particularidad de pieza	No aplica
Creado	04/09/2016
Modificado	08/02/2021
Número de páginas	5

Índice de páginas

Columna X: una página creada automáticamente se ha modificado de forma manual

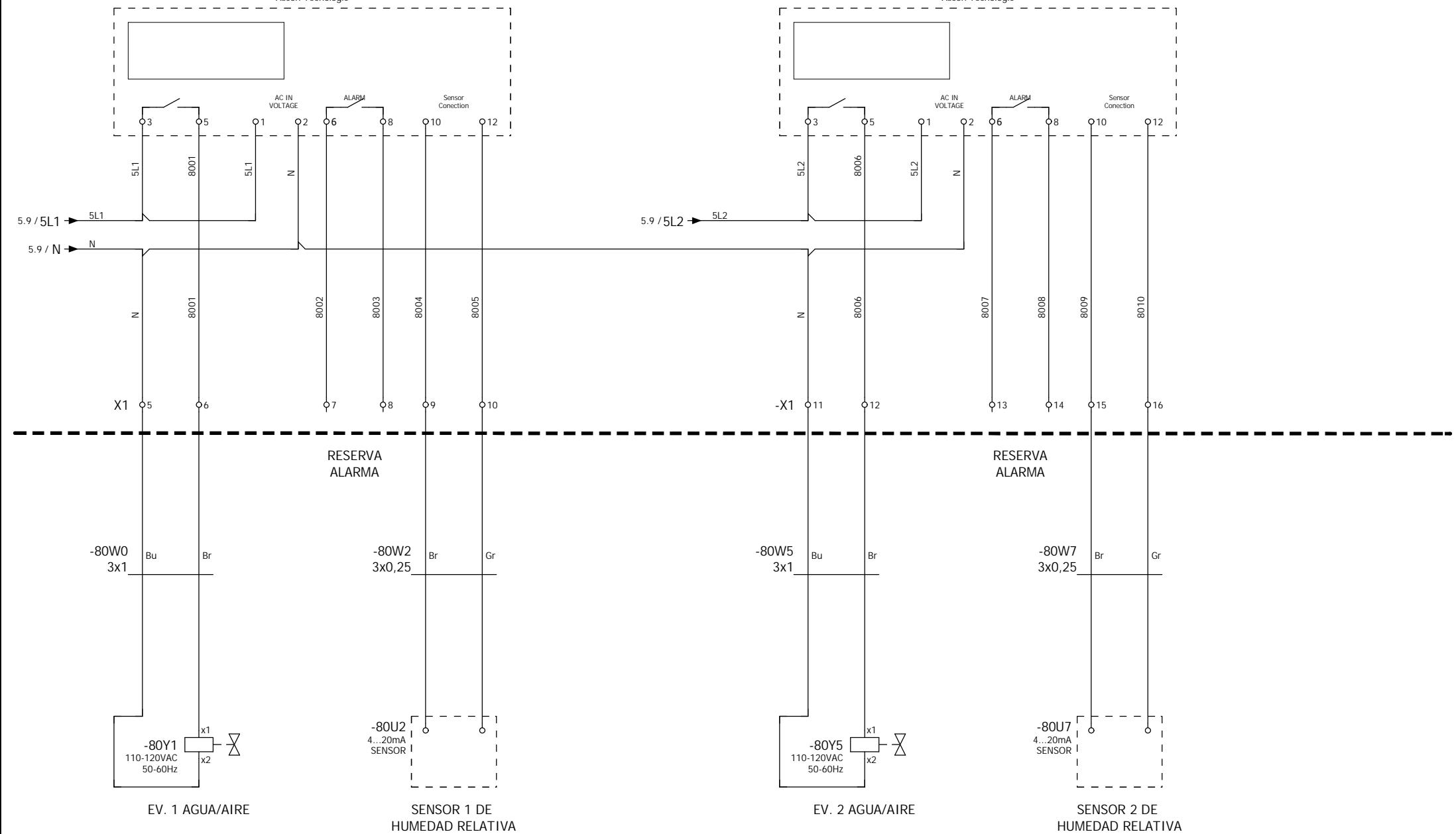
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Ascon Tecnologic

-80A5
TLK38 HR Digital Control
Ascon Tecnologic



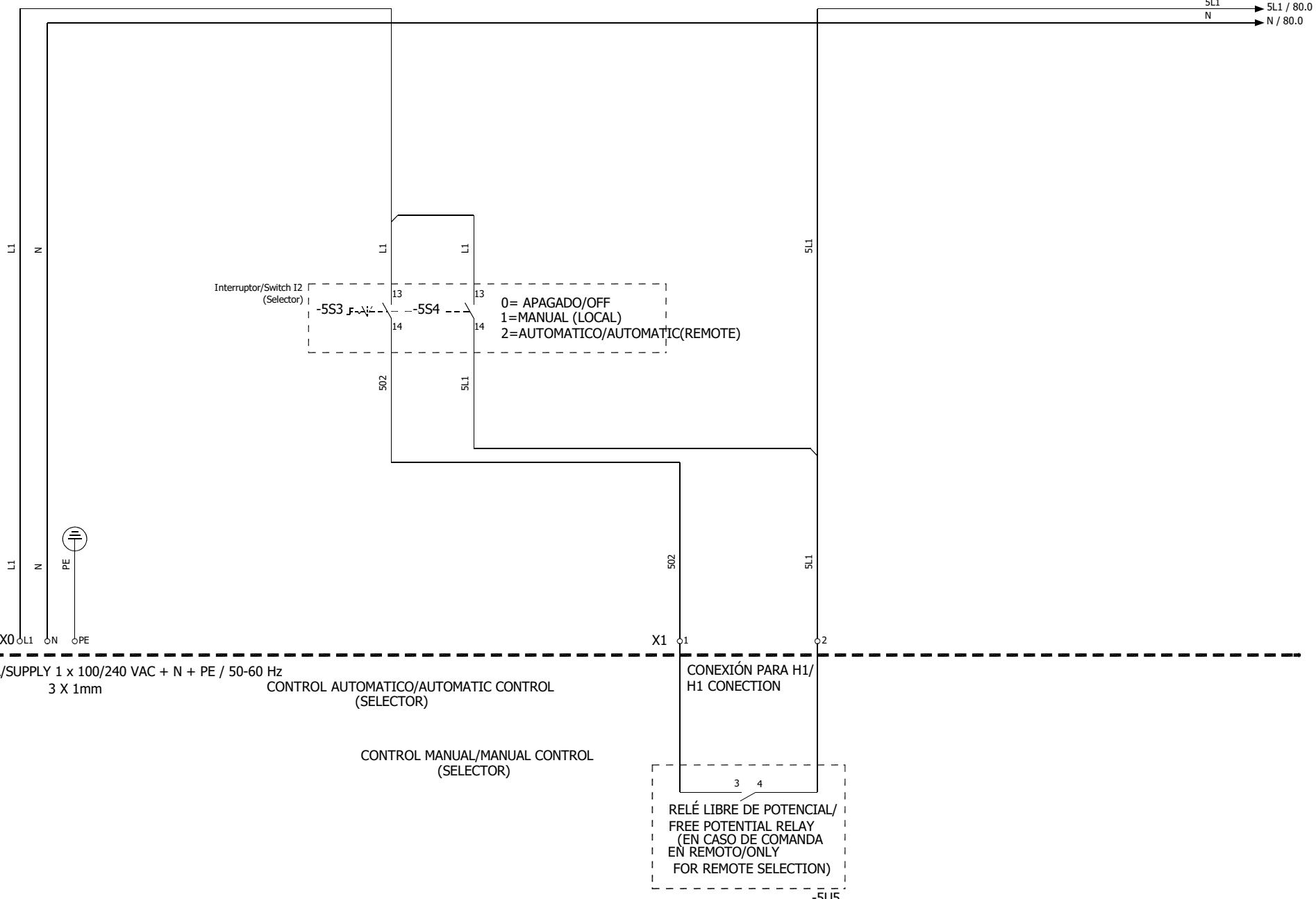
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			Probado					E10035		Hoja 80
Cambio	Fecha	Nombre	Original	Sustitución por	Sustituido por				Hj	

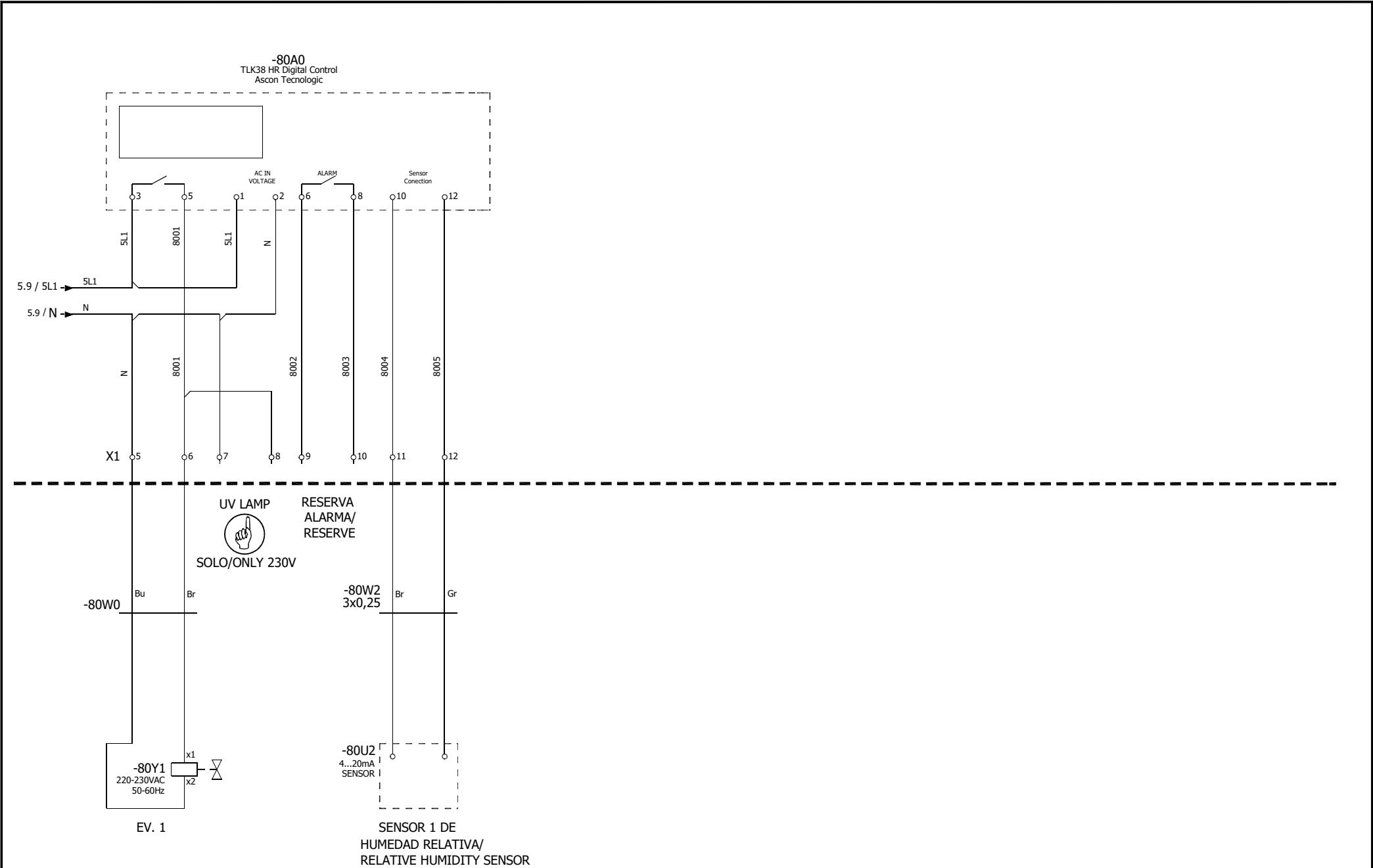
AS-F1-110/240-VAC + UV

WIRING DIAGRAM

REV.	DATE		
Air Humidity Control			FISAIR S.L.U.
CONTRACT : E10363			REV. B PAGES 04

Índice de páginas/Page Index





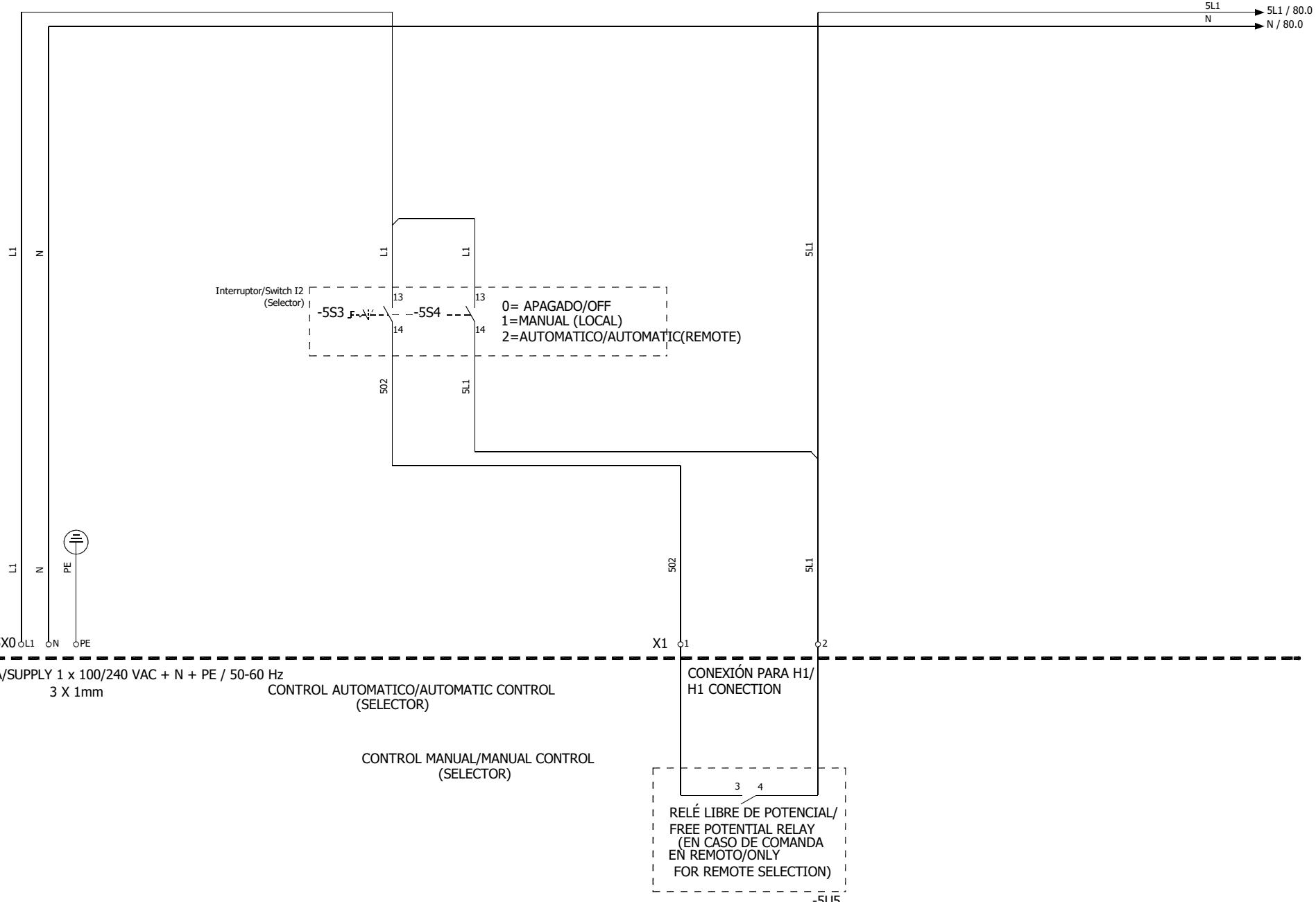
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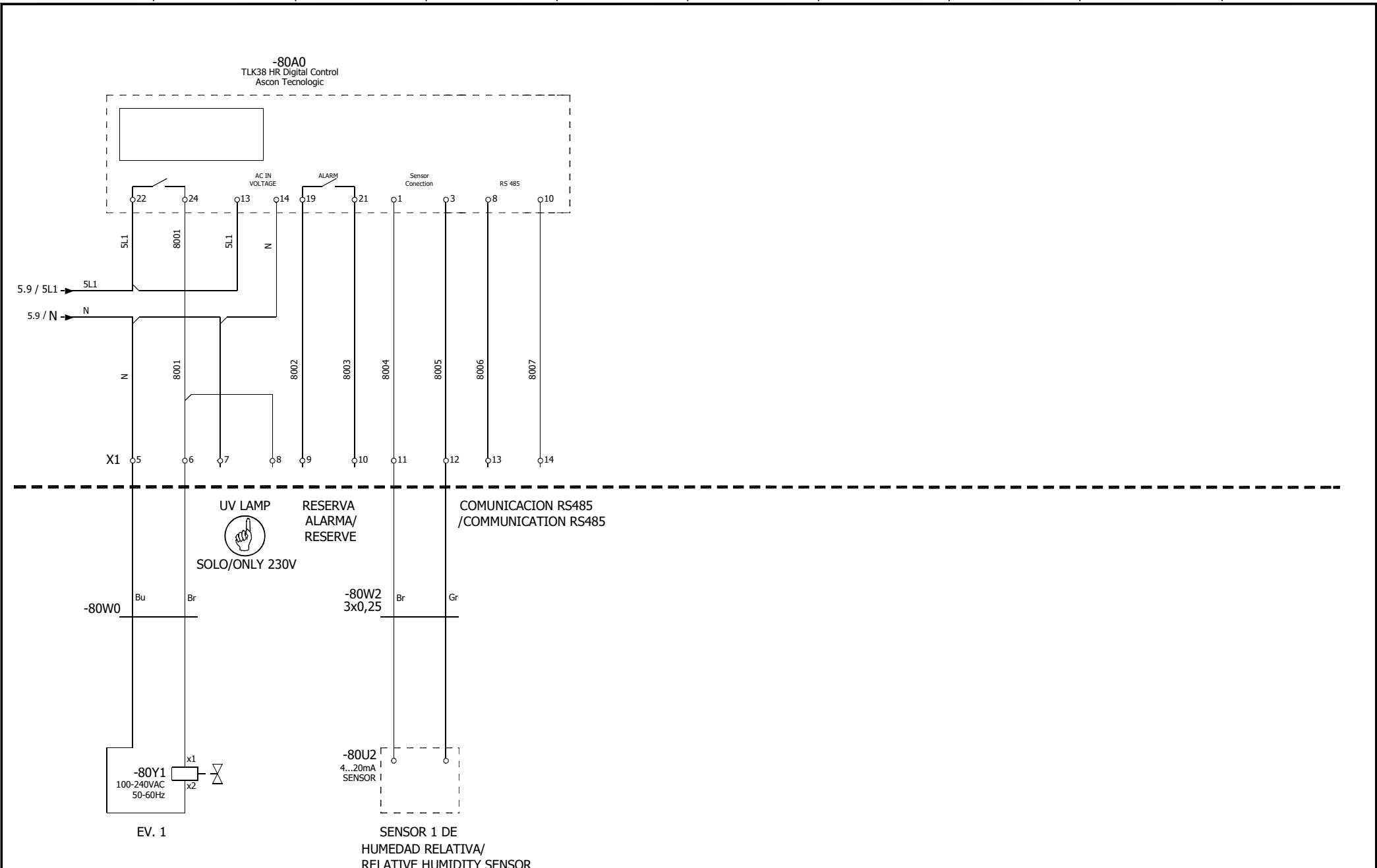
AS-F1_110-240-RS485+UV

WIRING DIAGRAM

REV.	DATE		
Air Humidity Control			FISAIR S.L.U.
CONTRACT : E11088			PAGES 04

Índice de páginas/Page Index





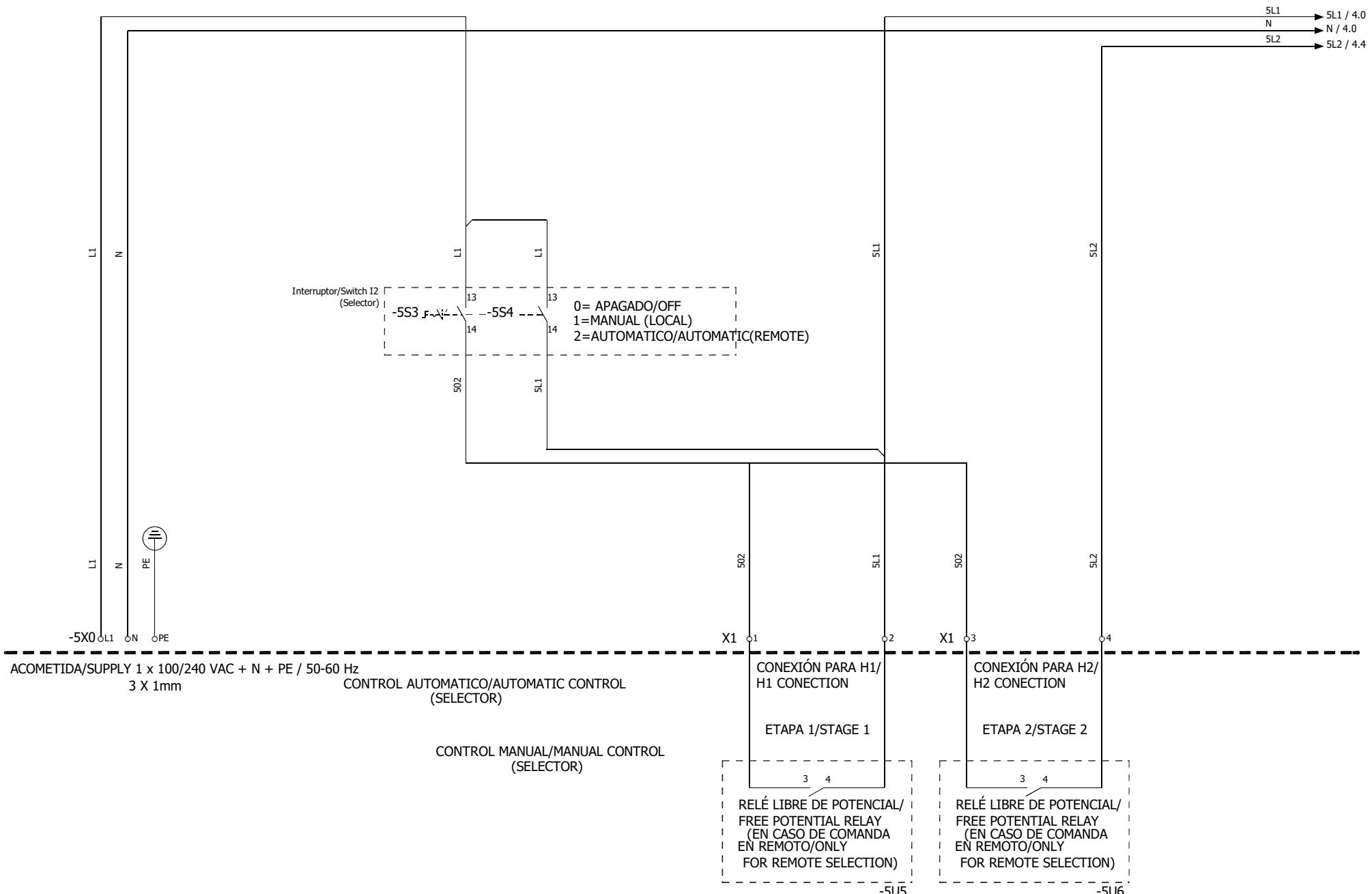
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AS-F1-Z_110-240-RS485+UV

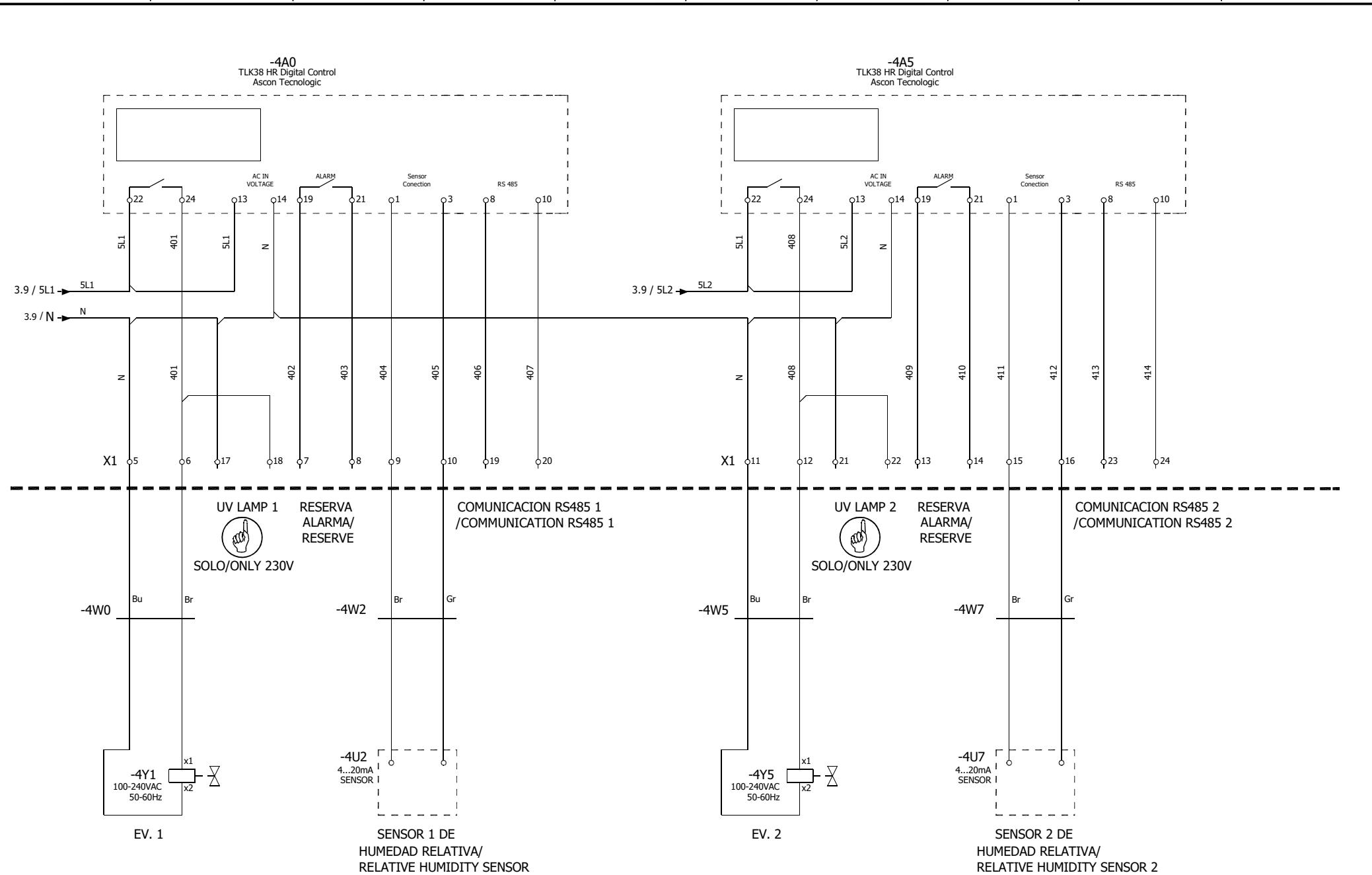
WIRING DIAGRAM

REV.	DATE		
Air Humidity Control			FISAIR S.L.U.
CONTRACT : E11213			PAGES 04

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0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9



REV.	A	FISAIR S.L.U.	WIRING DIAGRAM	Date	25/01/2022	Page
Project :	E11213	Name: AS-F1-Z_110-240-RS485+UV		PROJECTED: S.F.B.	APROBED: H.L.A.	04