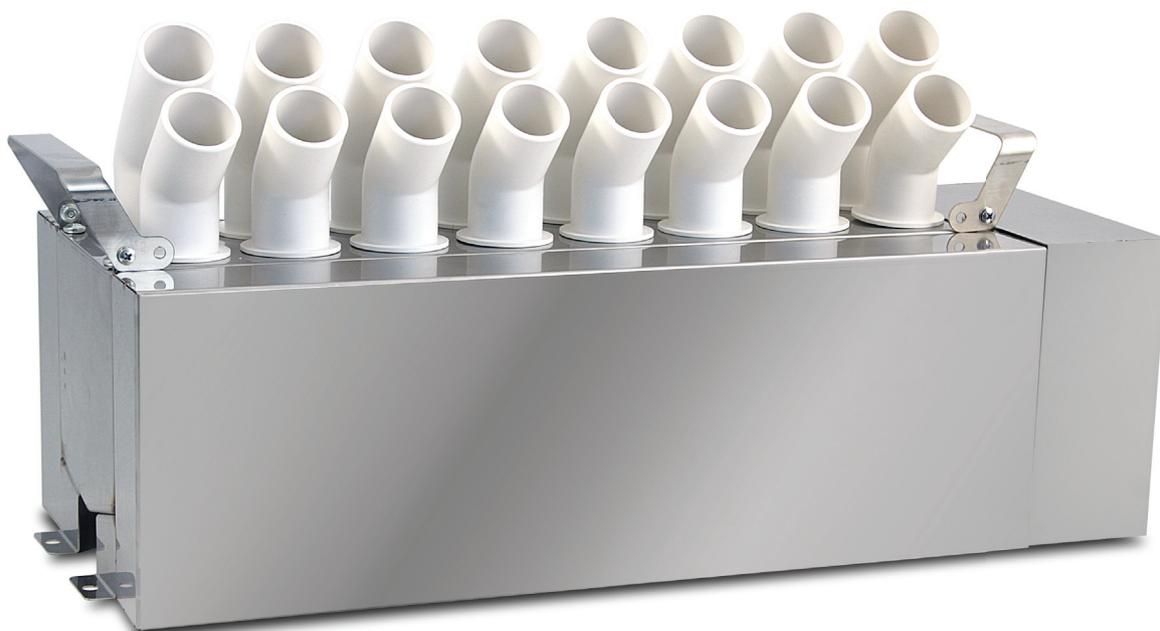


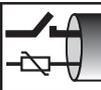
humi**S**onic
Ultrasonic humidiers
ventilation - duct version

CAREL



(ENG) User manual

**LEGGI E CONSERVA
QUESTE ISTRUZIONI**
**READ AND SAVE
THESE INSTRUCTIONS**

  **NO POWER
& SIGNAL
CABLES
TOGETHER**
READ CAREFULLY IN THE TEXT!



WARNINGS

CAREL humidifiers are advanced products, whose operation is specified in the technical documentation supplied with the product or can be downloaded, even prior to purchase, from the website www.carel.com. Each CAREL product, in relation to its advanced level of technology, requires setup/configuration/programming/commissioning to be able to operate in the best possible way for the specific application. The failure to complete such operations, which are required/indicated in the user manual, may cause the final product to malfunction; CAREL accepts no liability in such cases. The customer (manufacturer, developer or installer of the final equipment) accepts all liability and risk relating to the configuration of the product in order to reach the expected results in relation to the specific final installation and/or equipment. CAREL may, based on specific agreements, act as a consultant for the installation/commissioning/use of the unit, however in no case does it accept liability for the correct operation of the humidifier and the final installation if the warnings or suggestions provided in this manual or in other product technical documents are not heeded. In addition to observing the above warnings and suggestions, the following warnings must be heeded for the correct use of the product:

- **DANGER OF ELECTRIC SHOCK:** The humidifier contains live electrical components. Disconnect the mains power supply before accessing inside parts or during maintenance and installation.
- **DANGER OF WATER LEAKS:** The humidifier automatically and constantly fills/drains certain quantities of water. Malfunctions in the connections or in the humidifier may cause leaks.

Important:

- Environmental and power supply conditions must conform to the values specified on the product rating labels.
- Only qualified personnel who are aware of the necessary precautions and able to perform the required operations correctly may install, operate or carry out technical service on the product.
- Only water with the characteristics indicated in this manual must be used for atomized water production.
- All operations on the product must be carried out according to the instructions provided in this manual and on the labels applied to the product. Any uses or modifications that are not authorised by the manufacturer are considered improper. CAREL declines all liability for any such unauthorised use.
- Do not attempt to open the humidifier in ways other than those specified in the manual.
- Observe the standards in force in the place where the humidifier is installed.
- Keep the humidifier out of the reach of children and animals.
- Do not install and use the product near objects that may be damaged when in contact with water (or condensate). CAREL declines all liability for direct or indirect damage following water leaks from the humidifier.
- Do not use corrosive chemicals, solvents or aggressive detergents to clean the inside and outside parts of the humidifier, unless specifically indicated in the user manual.
- Do not drop, hit or shake the humidifier, as the inside parts and the linings may be irreparably damaged.

CAREL adopts a policy of continual development. Consequently, CAREL reserves the right to make changes and improvements to any product described in this document without prior warning. The technical specifications shown in the manual may be changed without prior warning. The liability of CAREL in relation to its products is specified in the CAREL general contract conditions, available on the website www.carel.com and/or by specific agreements with customers; specifically, to the extent where allowed by applicable legislation, in no case will CAREL, its employees or subsidiaries be liable for any lost earnings or sales, losses of data and information, costs of replacement goods or services, damage to things or people, downtime or any direct, indirect, incidental, actual, punitive, exemplary, special or consequential damage of any kind whatsoever, whether contractual, extra-contractual or due to negligence, or any other liabilities deriving from the installation, use or impossibility to use the product, even if CAREL or its subsidiaries are warned of the possibility of such damage.



1

2

DISPOSAL

Please read and keep these instructions.

The humidifier is made up of metal parts and plastic parts. With reference to European Union directive 2012/19/EU issued on 4 July 2012 and related national legislation, please note that:

1. Waste Electrical and Electronic Equipment (WEEE) cannot be disposed of as municipal waste but must be collected separately so as to allow subsequent recycling, treatment or disposal, as required by law;
2. users are required to take Electrical and Electronic Equipment (EEE) at end-of-life, complete with all essential components, to the WEEE collection centres identified by local authorities. The directive also provides for the possibility to return the equipment to the distributor or retailer at end-of-life if purchasing equivalent new equipment, on a one-to-one basis, or one-to-zero for equipment less than 25 cm on their longest side;
3. the equipment may contain hazardous substances: the improper use or incorrect disposal of such may have negative effects on human health and on the environment;
4. the symbol (crossed-out wheeled bin, see Figure 1), is shown on the product or on the packaging, indicates that the equipment must be disposed of separately at end-of-life;
5. if at end-of-life the EEE contains a battery (Figure 2), this must be removed following the instructions provided in the user manual before disposing of the equipment. Used batteries must be taken to appropriate waste collection centres as required by local regulations;
6. in the event of illegal disposal of electrical and electronic waste, the penalties are specified by local waste disposal legislation.

Warranty on materials: 2 years (from the date of production, excluding consumables).

Approval: the quality and safety of CAREL products are guaranteed by the ISO 9001 certified design

and production system, as well as by the  and  mark.

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1. INTRODUCTION AND ASSEMBLY

1.1 humiSonic (UU0*D)

Range of ultrasonic adiabatic humidifiers for direct humidification in ducts or air handling units. humiSonic is particularly suitable for many applications in which optimisation of room humidity is an essential factor for personal comfort and the quality of goods. The humidifiers are controlled by an external electrical panel. Depending on the required functions, this can be the "Secondary" (ON/OFF, status signal, remote ON/OFF) or "Main" model (user interface and programming).

1.2 Part numbers

| humisonic P/N | Description |
|---------------|------------------------------------------------|
| UU(XY)DD0000 | without auxiliary card, without humidity probe |

Tab. 1.a

(XY) = **02** → 2,4 kg/h (5.3 lbs/h), **05** → 4,8 kg/h (10.6 lbs/h), **07** → 7,2 kg/h (15.8 lbs/h), **09** → 9,6 kg/h (21.1 lbs/h), **14** → 14,4 kg/h (31.7 lbs/h), **18** → 18 kg/h (39.6 lbs/h)

| Elect. panel P/N | Description |
|------------------|------------------------------|
| UQ(XY)B(*)0000 | "Secondary" electrical panel |
| UQ(XY)C(*)0000 | "Main" electrical panel |

Tab. 1.b

(XY) = **05** → fino a 4,8 kg/h (10.6 lbs/h), **09** → fino a 9,6 kg/h (21.1 lbs/h), **18** → fino a 18 kg/h (39.6 lbs/h)

(*) = **D** → alimentazione 230 Vac, **1** → alimentazione 110 Vac

Note: for the table of humidifier/electrical panel combination, see the chapter "General features and models".

1.3 Dimensions and weights

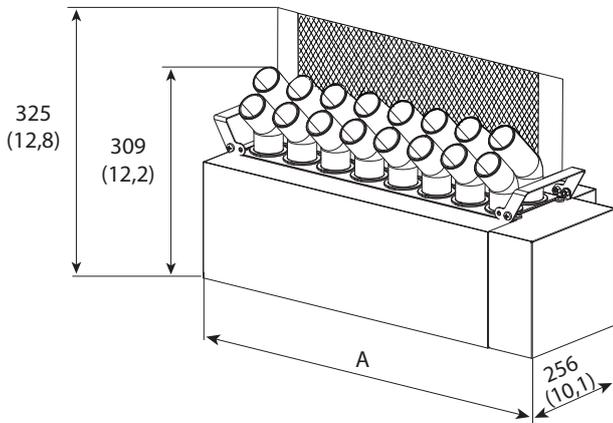


Fig. 1.a

| Model | UU02 | UU05 | UU07 |
|----------------------------|------------|------------|-------------|
| Production kg/h (lbs/h) | 2,4 (5.3) | 4,8 (10.6) | 7,2 (15.8) |
| Height with baffle mm (in) | | 325 (12.8) | |
| Height mm (in) | | 309 (12.2) | |
| Depth mm (in) | | 256 (10.1) | |
| Width A mm (in) | 261 (10.3) | 386 (15.2) | 511 (20.1) |
| Weight kg (lb) | | | |
| packaged | 5,9 (13) | 7,4 (16.3) | 9,5 (20.9) |
| empty | 4,9 (10.8) | 6,4 (14.1) | 8 (17.6) |
| installed* | 5,7 (12.6) | 8,4 (18.5) | 10,8 (23.8) |

| Model | UU09 | UU14 | UU18 |
|----------------------------|-------------|-------------|-------------|
| Production kg/h (lbs/h) | 9,6 (21.1) | 14,4 (31.7) | 18 (39.6) |
| Height with baffle mm (in) | | 325 (12.8) | |
| Height mm (in) | | 309 (12.2) | |
| Depth mm (in) | | 256 (10.1) | |
| Width A mm (in) | 636 (25.0) | 886 (34.9) | 1074 (42.3) |
| Weight kg (lb) | | | |
| packaged | 11 (24.2) | 14,7 (32.4) | 17,8 (39.2) |
| empty | 9,5 (20.9) | 12,7 (28.0) | 15,8 (34.8) |
| installed* | 13,1 (28.9) | 18,3 (40.3) | 23 (50.7) |

Tab. 1.c

* in normal operating conditions, filled with water.

1.4 Opening the packaging

- make sure the humidifier is intact upon delivery and immediately notify the transporter, in writing, of any damage that may be due to careless or improper transport;
- move the humidifier to the site of installation before removing from the packaging, grasping the neck from underneath;
- open the cardboard box, remove the protective material and remove the humidifier.

1.5 Material supplied

Make sure the following are included:

1. baffle with 2 bolts;
2. user manual.

1.6 Preparing for assembly

Important: avoid installing the humidifier in the duct in a position where it may get wet.

- The unit is designed for assembly in compact air-conditioning units, ventilation systems and air ducts.
- To ensure a very short free path, the atomised water needs to be delivered as uniformly as possible along and across the duct or the unit.
- Install the humidifier in position where it is easily accessible/removable for maintenance or repairs;
- Make an inspection opening on the wall of the ducting;
- To maximise absorption of atomised water in the air flow, for air handling units with fan that:
 - is centrifugal, remove the deflector (D),
 - is axial or tangential, install the deflector (D).

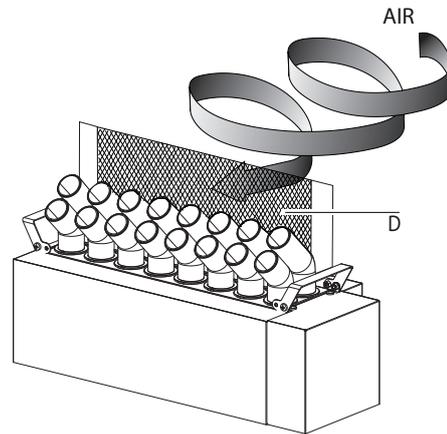


Fig. 1.b

- Place a drain tank underneath the humidifier to collect any condensate; this must be at least 0.6 m (2 ft) long and cover the free path. Install a drain line with drain trap: the height of the drain trap must exceed the system static pressure to ensure adequate draining of the tank.
- Air velocity in the duct must be between 1.5 and 3 m/s (295 e 590 fpm), so that the atomised water is rapidly dispersed. In the event of faster air flows, the cross-section of the duct must be increased so that the velocity is within the allowed range. The length of the widened section must be at least 0.6 m (2 ft) beyond the humidifier in the direction of air flow, so as to minimise condensation on the walls of the ducting or air handling unit.

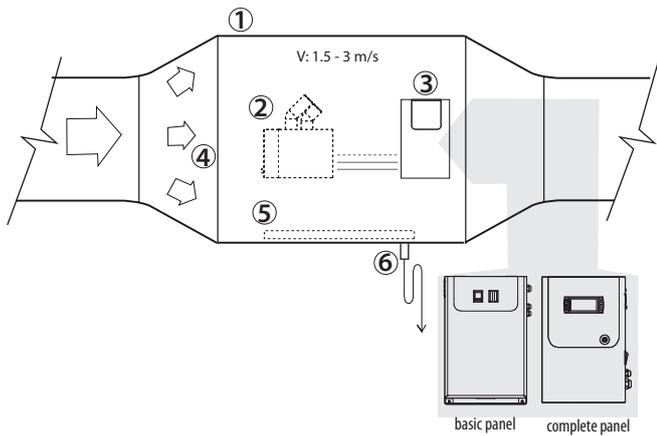


Fig. 1.c

Key

| | | | |
|---|--------------------------|---|-----------------------------|
| 1 | Stainless steel duct | 4 | Air flow |
| 2 | Humidifier | 5 | Condensate collection basin |
| 3 | Control panel (external) | 6 | Drain trap |

! Important:

1. Choose the installation position so that the air flow disperses the atomised water uniformly;
2. Make sure that the supporting surface is able to support the weight of the unit.

The humidifier can only be activated (atomised water production) when the air handling unit fan is running. NEVER start atomised water production without air flow in the duct: this may damage one or more parts of the appliance.

1.7 Assembly

The appliance must be assembled on a horizontal support. Check correct positioning using a spirit level.

Procedure:

1. Unscrew the screws (A) and remove the right side cover (B);

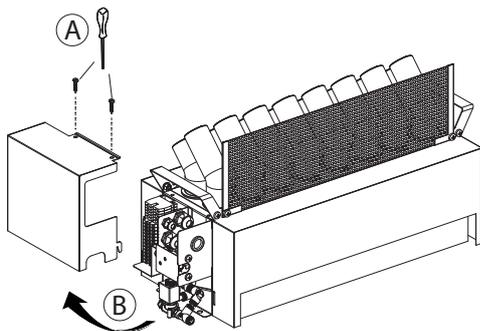


Fig. 1.d

2. Secure the humidifier to the horizontal support using the fastening brackets on the right and left sides;

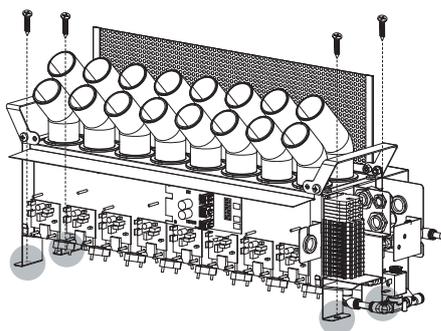


Fig. 1.e

! Important:

1. Install the humidifier in horizontal position, using a spirit level, so that the level sensor does not give a false reading;
2. Carefully secure the unit so that it does not move during operation.

1.8 Identification label

The humidifiers are identifiable from the packaging label and the identification label on the side.

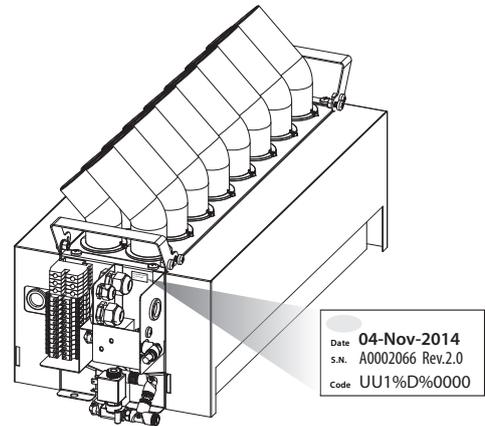


Fig. 1.f

➡ Note: tampering with, removing or failing to reattach the identification labels or anything else that prevents certain identification of the product will make installation and maintenance operations more difficult.

1.9 Functional diagram

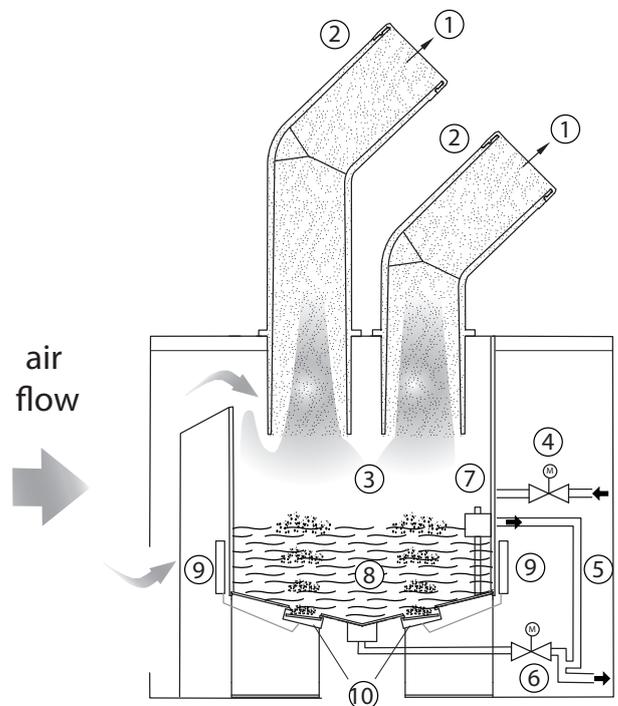


Fig. 1.g

Key

| | | | |
|---|---------------------|----|--------------------------|
| 1 | Atomized water | 7 | Float level sensor |
| 2 | Diffuser | 8 | Tank |
| 3 | Atomization chamber | 9 | Driver |
| 4 | Fill valve | 10 | Piezoelectric transducer |
| 5 | Overflow pipe | 11 | Power supply |
| 6 | Drain valve | | |

1.10 Operating principle

The operation of humiSonic humidifiers is based on the principle of atomisation of demineralized water using ultrasound technology. The humidifier operating principle can be summarised as follows:

- water fill via a fill solenoid valve until reaching the required level, measured by the float;
- if the autotest is enabled (default), the drain solenoid valve opens and empties the tank (function designed to clean the tank of any residues/dirt);
- water filled again to the required level;
- start ultrasonic atomisation (the air flow in the duct carries the particles of moisture and distributes them into the surrounding environment);
- water refill based on the float measures that the level has fallen below the recommended value.

Ultrasound technology uses a voltage input signal that is transformed via an oscillating circuit into a high frequency signal (1.7 MHz). This signal supplies a transducer, the top of which is in contact with the water, which starts vibrating at high frequency. The surface of the transducer vibrates at very high speed (1.7 million times a second), a speed that does not allow the water to move, due to its inertial mass. Consequently, a column of water is created above the transducer. During the negative amplitude of the transducer cycle, a void is created that is not filled by the water (as this cannot respond to the extremely fast movements of the transducer). The cavity thus created leads to the production of bubbles that are pushed to the edge of the water column during the positive amplitude of the cycle, thus colliding. During this process, very fine particles of water are atomised on the edge of the water column. The resulting intersecting sound waves created directly underneath the surface of the water cause very small droplets of water to separate, forming a fine mist of vapour that is immediately absorbed by the flow of air.

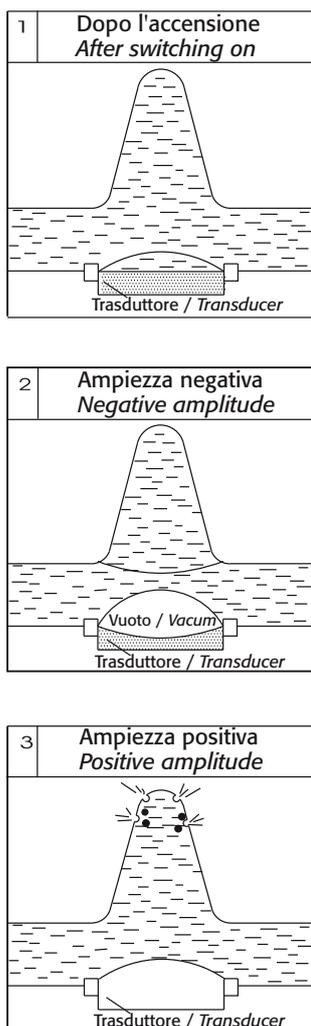


Fig. 1.h

1.11 Accessories

- BMS/RS485 serial card (P/N PCOS004850): to be installed on the control board on the "Main" panel, used for direct interface to an RS485 network, with a maximum baud rate of 19200. The board guarantees opto-isolation of the controller from the RS485 serial network.
- Humidity/temperature probes for ducts, CAREL P/Ns DPD*(T/H), DPP*(T/H). Used in ducted heating and air-conditioning systems. Supplied together with a mounting bracket. See manual +030220660.

1.12 Structure

The figure shows the body of the humidifier, once having removed the side panels and the cover (see chap. "Spare parts and maintenance").

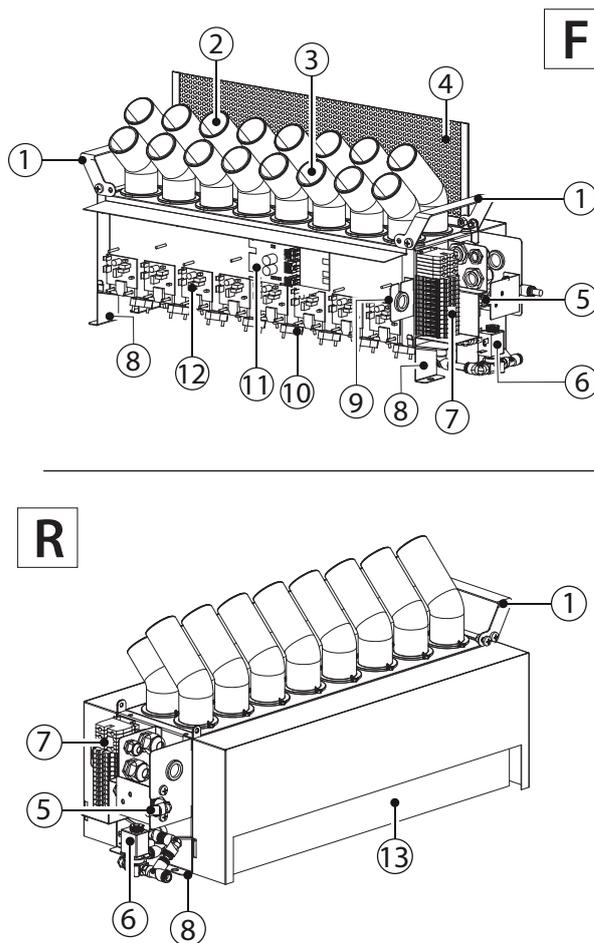


Fig. 1.i

Key

| | | | |
|---|-----------------|----|---------------------------|
| F | Front | 7 | Terminal block |
| R | Rear | 8 | Fastening bracket |
| 1 | Lifting handles | 9 | Bracket with cable glands |
| 2 | Rear diffuser | 10 | Piezoelectric transducer |
| 3 | Front diffuser | 11 | Electronic control board |
| 4 | Baffle | 12 | Driver |
| 5 | Fill valve | 13 | Air intake |
| 6 | Drain valve | | |

2. WATER CONNECTIONS

! IMPORTANT: before proceeding with the water connections, make sure that the humidifier is not connected to the mains power supply.

2.1 Warnings

1. Only use demineralised water. Install a shut-off valve for each humidifier. Allowable water pressure: from 1 to 6 bars (from 14.5 to 87 psi);
2. The connections between the pipes/hoses in contact with demineralised water and the humidifier must be made from resistant material suitable for this use (e.g. PVC or stainless steel): nominal pressure ≥ 6 bar (87 psi), working temperature at least 1...40°C (33.8...104°F);
3. The water lines must not be fouled by dust particles or other substances. Carefully clean the lines before connecting to the humidifier;
4. All humiSonic ultrasonic humidifiers are supplied with quick couplings for connecting the fill hose $\varphi_e/\varphi_i = 8/6$ mm (OD 5/16", ID 15/64").

! NOTICE: for the Australian market and to comply with Watermark requirements, a watermarked approved dual check valve shall be installed in the supply line to the humidifier when connected to potable water. Should on the other hand the humidifier be fed with treated water from a Carel reverse osmosis system connected to potable water, the dual check valve shall be installed in the supply line to the reverse osmosis system.

2.2 Water connections (parts not included)

- Install a manual shut-off valve upstream of the installation (so as to shut off the water supply); the valve must be suitable for use with demineralised water.
- Install a mechanical filter (10 μ m) downstream of the manual shut-off valve to trap any solid impurities; the filter must be fitted with shut-off devices to allow cleaning;
- Install a condensate collection basin that is at least 0.6 m longer than the humidifier, made from corrosion-resistant material such as plastic or stainless steel.

! Important:

1. when installation is completed, flush the supply hose for around 30 minutes by piping water directly into the drain, without sending it into the humidifier. After installing the valve, flush with water to eliminate any processing residues and oil and prevent that enter the humidifier;
2. the drain hose must have a internal minimum diameter of 6 mm (15/64"); it must not have any bends that block water flow; the drain line must comply with national and local standards in force and must include a funnel to ensure interruption of continuity and a drain trap to prevent the return of bad odours. The end of the line must have a downwards slope to assist drainage;
3. do not block the atomised water outlet or the intake air openings;
4. always check for water leaks. If the humidifier is sprayed with water during operation, short circuits may occur;
5. if there is the risk of the feedwater freezing, or using heating cables on water pipes.

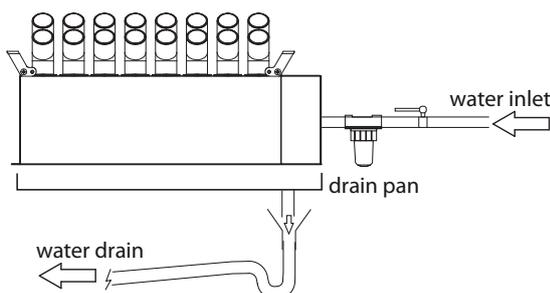


Fig. 2.a

2.3 Positioning

As seen in chap.1, the humidifier must be installed in ducting where the air velocity is between 1.5 and 3 m/s (295...590 fpm).

! Note: when calculating air velocity in the duct, keep in mind that the area occupied by the humidifier needs to be subtracted from the cross-section of the duct.

The recommended position is downstream of the heating coil.

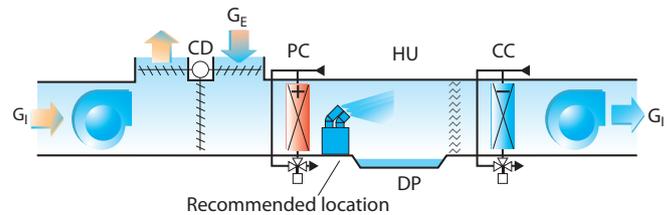


Fig. 2.b

Key

| | | | |
|----------------|--------------------------------|----|----------------------------|
| G ₁ | Total air flow-rate introduced | HU | Humidifier |
| CD | Combined dampers | DP | Condensate collection tank |
| G _e | Outside air flow-rate | CC | Cooling coil |
| PC | Heating coil | | |

If assembling multiple humidifiers, arrange them in a structure that can support the weight of the appliances and that leaves optimum space between the units, so as to ensure efficient operation. Install a manual shut-off valve for each humidifier.

! Note: any obstacles downstream of the humidifier are places where water may condense.

2.4 Water connections

Once the humidifier has been fitted, make the water connections as follows:

1. Unscrew the screws (A) and remove the right side cover (B);

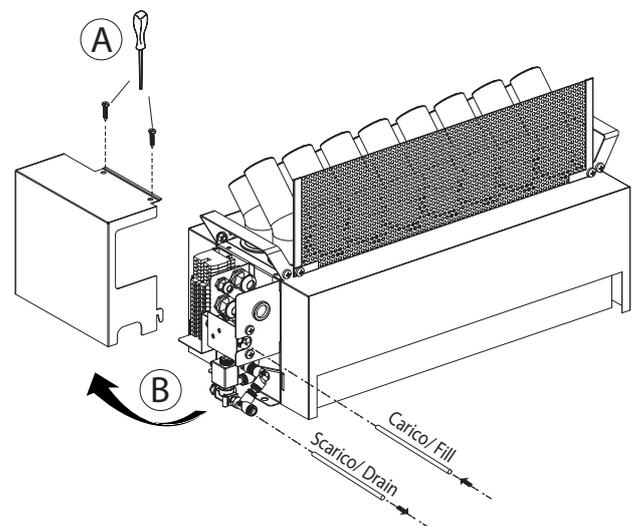


Fig. 2.c

- Attach the pipes to the quick couplings (C) to connect the fill/drain valves;

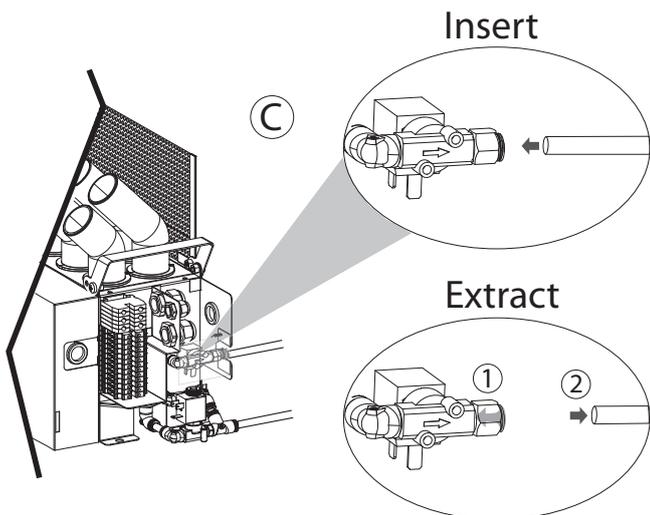


Fig. 2.d

Note: OD = 8 mm (5/16"), ID = 6 mm (15/64")

- Reposition the cover, paying attention to the point of attachment (D).

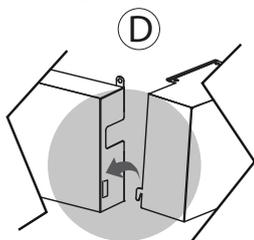


Fig. 2.e

2.5 Feedwater

To ensure correct operation, humiSonic requires the use of demineralised water, with the chemical and physical characteristics specified in the table. To ensure these water quality values, a reverse-osmosis demineralisation system is typically used.

FEEDWATER

| | |
|-----------------------------------------|---------------------------------------------------|
| Quick coupling | OD 8 mm (OD 5/16") |
| Temperature limits °C (°F) | 1...40 (33.8 to 104) |
| Pressure limits bar (psi) | 1...6 (14.5...87) |
| Specific conductivity at 20°C | 0...80 µS/cm |
| Total hardness | 0...25 mg/l CaCO ₃ |
| Temporary hardness | 0...15 mg/l CaCO ₃ |
| Total quantity of dissolved solids (cR) | Depending on specific conductivity ⁽¹⁾ |
| Dry residue at 180°C | Depending on specific conductivity ⁽¹⁾ |
| Iron + manganese | 0 mg/l Fe+Mn |
| Chlorides | 0 to 10 ppm Cl |
| Silicon dioxide | 0 to 1 mg/l SiO ₂ |
| Chlorine ions | 0 mg/l Cl |
| Calcium sulphate | mg/l CaSO ₄ |
| Instant flow-rate l/min (gpm) | 0.6 (0.16) |

Tab. 2.a

(1) = in general $C_R = 0,65 * \sigma_{R,20^\circ C}$; $R_{180} = 0,93 * \sigma_{R,20^\circ C}$

To avoid excessive oversizing of the reverse osmosis system, it is recommended to avoid sizing the system based on instant flow-rate. Rather, an expansion vessel should be installed between the water treatment system and humiSonic.

The sizing calculations need to consider discontinuous water consumption, comprising the following stages:

- filling (fill valve open);
- production (fill valve closed);
- washing (fill valve open).The table below suggests the minimum sizes for connection to a generic reverse osmosis system.

| Model | Storage l (gal) | Total expansion l (gal) vessel volume (pre-charge 1.5 bars/22 psi) | Reverse osmosis system l/h (gph) |
|-------|-----------------|--------------------------------------------------------------------|----------------------------------|
| UU02 | 2,8 (0.62) | 11,2 (2.46) | 5,2 (1.37) |
| UU05 | 3,6 (0.79) | 14,4 (3.17) | 8,4 (2.22) |
| UU07 | 4,4 (0.97) | 17,6 (3.87) | 11,6 (3.06) |
| UU09 | 5,2 (1.14) | 20,8 (4.56) | 14,8 (3.91) |
| UU14 | 6,8 (1.50) | 27,2 (5.98) | 20,8 (5.49) |
| UU18 | 8,0 (1.76) | 32,0 (7.04) | 26,0 (6.89) |

Tab. 2.b

If no storage vessel is available, the reverse osmosis system must guarantee the instant flow-rate of the fill SV, equal to 0.6 l/min (0.16 gpm).

Connecting humiSonic to the Carel WTS Compact (only for not American market)

The Carel product range includes a series of reverse osmosis systems ("WTS Compact") designed to produce water according to the feedwater specifications and optimise connection to and operation with humiSonic (see manuals +0300017 and +0300019).

All WTS Compact systems (P/N ROC%) always come with an expansion vessel that maintains the required pressure in the circuit downstream. Operation of the system is managed by pressure switches in the outlet circuit. The basic rule for connection to the humidifier is that the water contained in the expansion vessel must be sufficient to satisfy initial filling and, if necessary, the washing cycle, while the WTS production time must cover humiSonic production demand and fill the vessel as quickly as possible.

The table below suggests the water consumption values and connections for all sizes of humidifiers.

| Model | Prod. l/h (gph) | Tank capac. l (gal) | Wash (*) l/h (gph) | Code WTS (only for not American market) | Additional vessel |
|-------|-----------------|---------------------|--------------------|-----------------------------------------|-------------------|
| UU02 | 2,4 (0.63) | 0,8 (0.18) | 2,8 (0.74) | ROC025500N | Not required |
| UU05 | 4,8 (1.27) | 1,6 (0.35) | 3,6 (0.95) | ROC025500N | Not required |
| UU07 | 7,2 (1.90) | 2,4 (0.53) | 4,4 (1.16) | ROC025500N | Not required |
| UU09 | 9,6 (2.53) | 3,2 (0.70) | 5,2 (1.37) | ROC025500N | Not required |
| UU14 | 14,4 (3.80) | 4,8 (1.06) | 6,8 (1.80) | ROC025500N | ROKCO0KTVE |
| UU18 | 18 (4.76) | 6,0 (1.32) | 8,0 (2.11) | ROC025500N | ROKCO0KTVE |

Tab. 2.c

(*) Water consumption during the washing cycle is calculated based on the default settings (1 wash every 12 hours, lasting 1 minute, which ends by totalling filling and emptying the volume of the tank). Consumption depends on the fill solenoid valve flow-rate, which is 0.6 l/min (0.16 gpm). The duration and frequency of the washing cycles are parameters that can be set by the user, and these have a significant impact on the sizing of the WTS system.



Important:

- do not add disinfectants or anticorrosive compounds to the water, as these are potential irritants;
- the use of well water, industrial water or water from cooling circuits and, in general, any potentially chemically or bacteriologically contaminated water is prohibited.

2.6 Drain water

This is not toxic and can be drained into the sewerage system, as defined by directive 91/271/EEC on urban waste-water treatment.

DRAIN WATER

| | |
|-----------------------------|-----------------------|
| Quick coupling | OD Ø 8 mm (OD 5/16") |
| Typical temperature °C (°F) | 1 to 40 (33.8 to 104) |

Tab. 2.d

3. ELECTRICAL CONNECTIONS

3.1 Humidifier electrical connections

! Important:

- before proceeding with the electrical connections, ensure that the control panel – humidifier system is disconnected from the mains power supply;
- make sure that the power supply voltage of the control panel corresponds to the value indicated in the rated data.

To power up the humidifier, connect the cables running from the electrical panel:

1. +48 Vdc/ -48 Vdc from the power supply;
2. +24 Vac/ -24 Vac from the transformer;
3. the power cable for the lights ("Secondary" electrical panel only);
4. the cable for the signal lights ("Secondary" electrical panel) or RS485 serial line ("Main" electrical panel).

After having removed the screws (A), remove the side cover (B) and run the cables through the cable glands on the case and inside the unit (C). Then make the electrical connections (D) and reposition the cover, repeating the same operations in reverse.

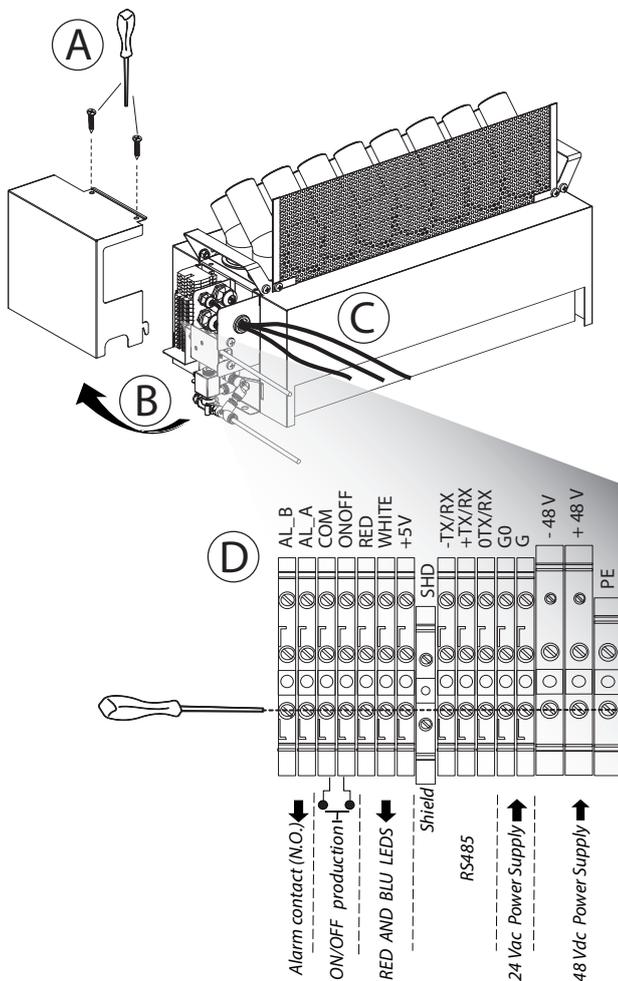


Fig. 3.a

Note: to avoid unwanted interference, power cables should be kept separate from probe signal cables.

DIPSWITCH CONFIGURATION

The dipswitches are located on the humidifier control board. These must be set before starting the humidifier.

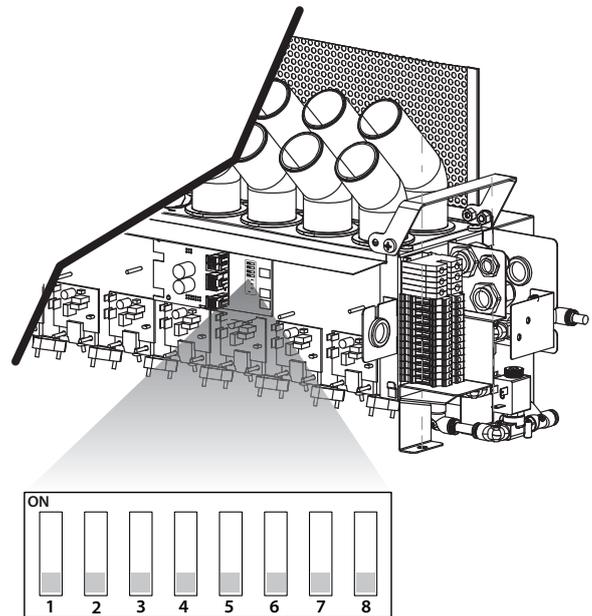


Fig. 3.b

Key

| | |
|-----|----------------------------------------------|
| | Communication |
| 1 | OFF: Carel/Modbus Serial 485 ON: Reserved |
| 2-3 | Reserved Serial 485 / tLAN baud rate |
| 4 | OFF: 19200 ON: 9600 |
| 5-6 | Reserved |
| 7 | Reserved Transducer production management |
| 8 | OFF: --> parallel ON: --> series |

3.2 Functional wiring diagram

humiSonic

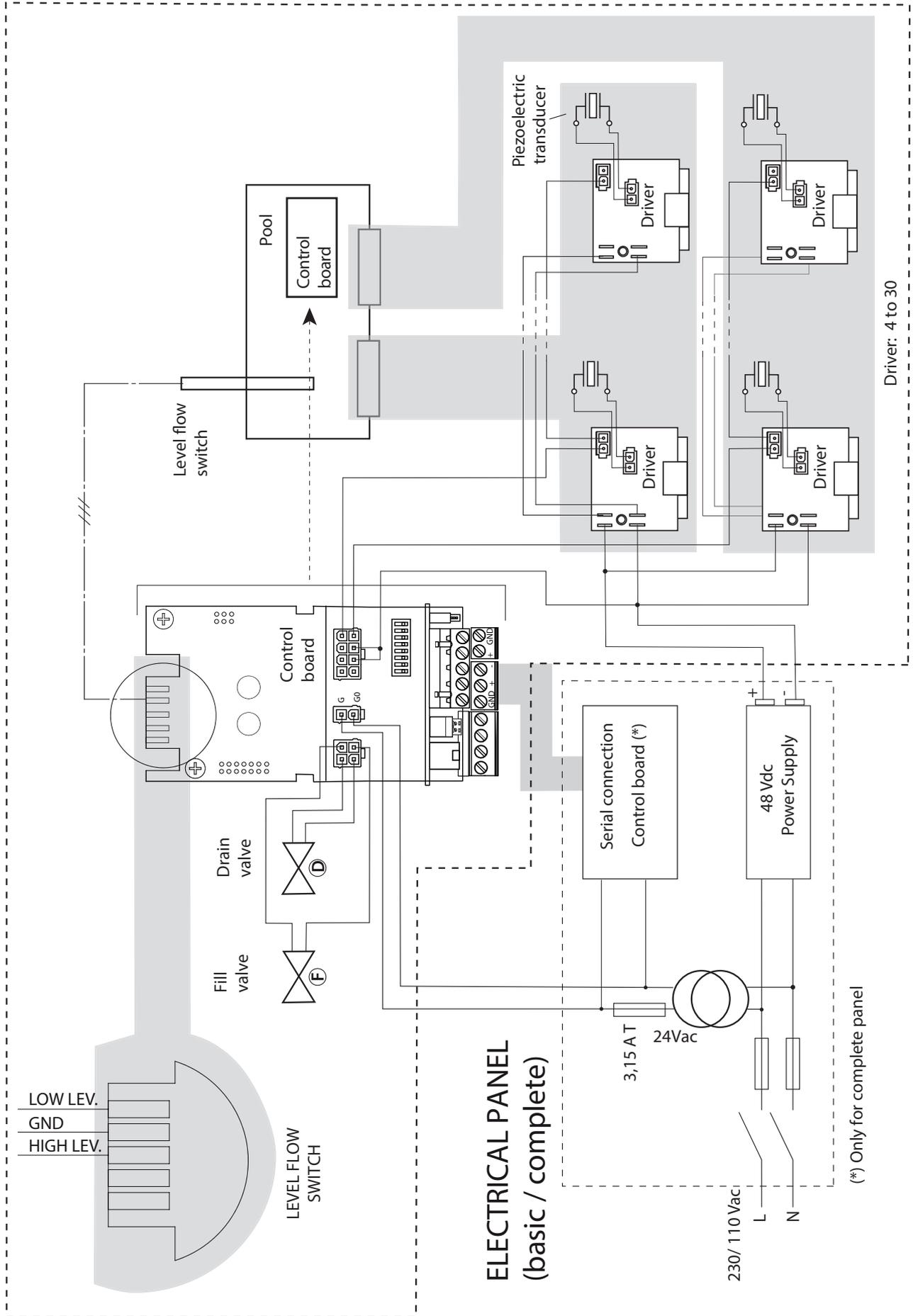


Fig. 3.c

3.3 "Secondary" electrical panel

STRUCTURE

OUTSIDE

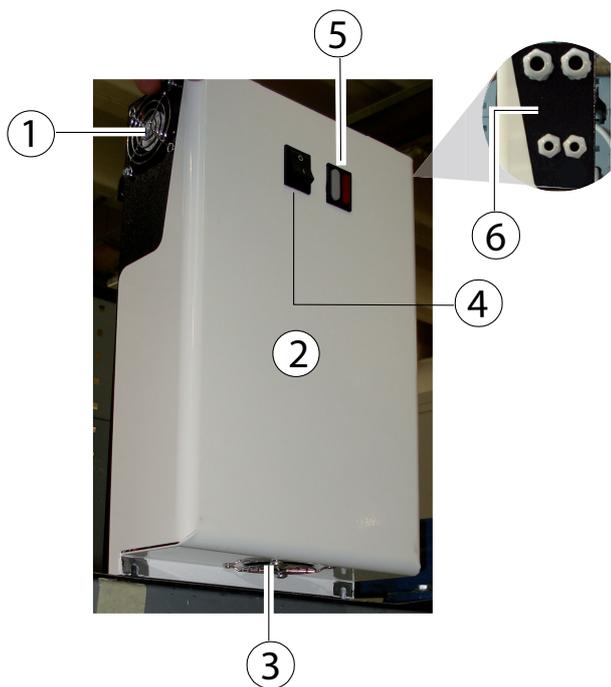


Fig. 3.d

INSIDE

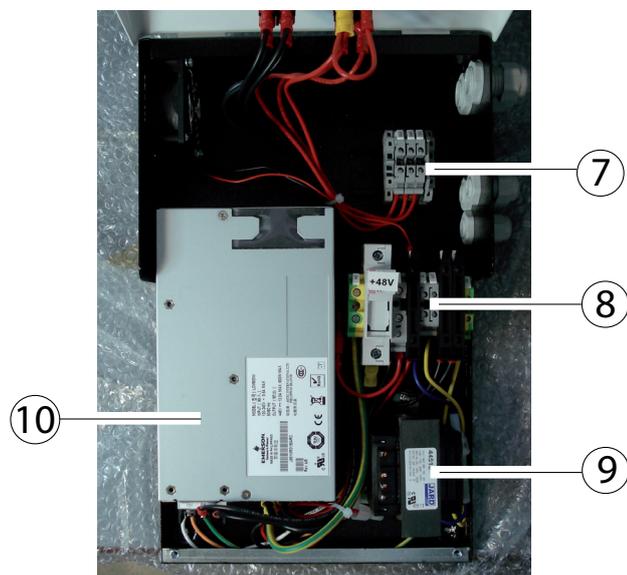


Fig. 3.e

Key

| | | | |
|---|-----------------|----|----------------------|
| 1 | Exhaust air fan | 6 | Cable glands |
| 2 | Cover | 7 | Light terminal block |
| 3 | Air intake | 8 | Main terminal block |
| 4 | ON/OFF switch | 9 | Transformer |
| 5 | LED | 10 | Power supply |
| | BLUE | | |
| | power | | |
| | RED | | |
| | alarm | | |

DIMENSIONS - mm (in)

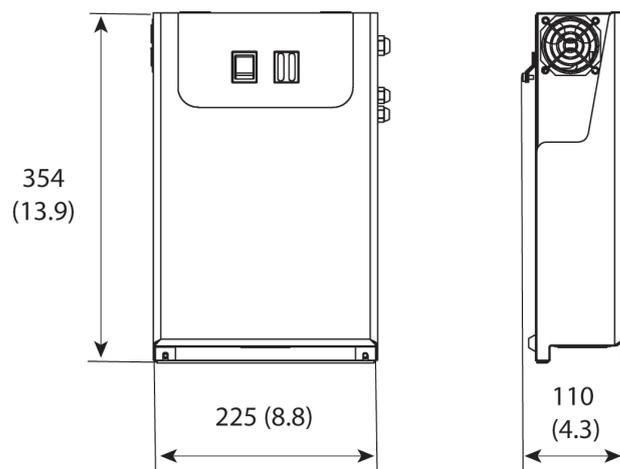


Fig. 3.f

Note: for UQ18B% dimensions, refer to the quotes indicated in 3.5 section concerning "Main" control panel.

POSITIONING

The electrical panel is designed for wall-mounting and features forced ventilation for cooling. See the figure for the minimum clearances in mm (in) that ensure sufficient air flow and change inside the electrical panel.

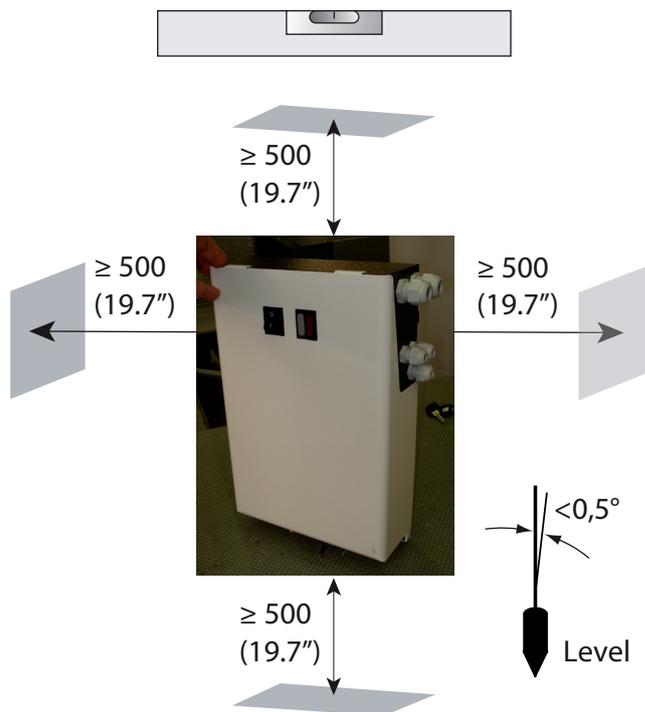
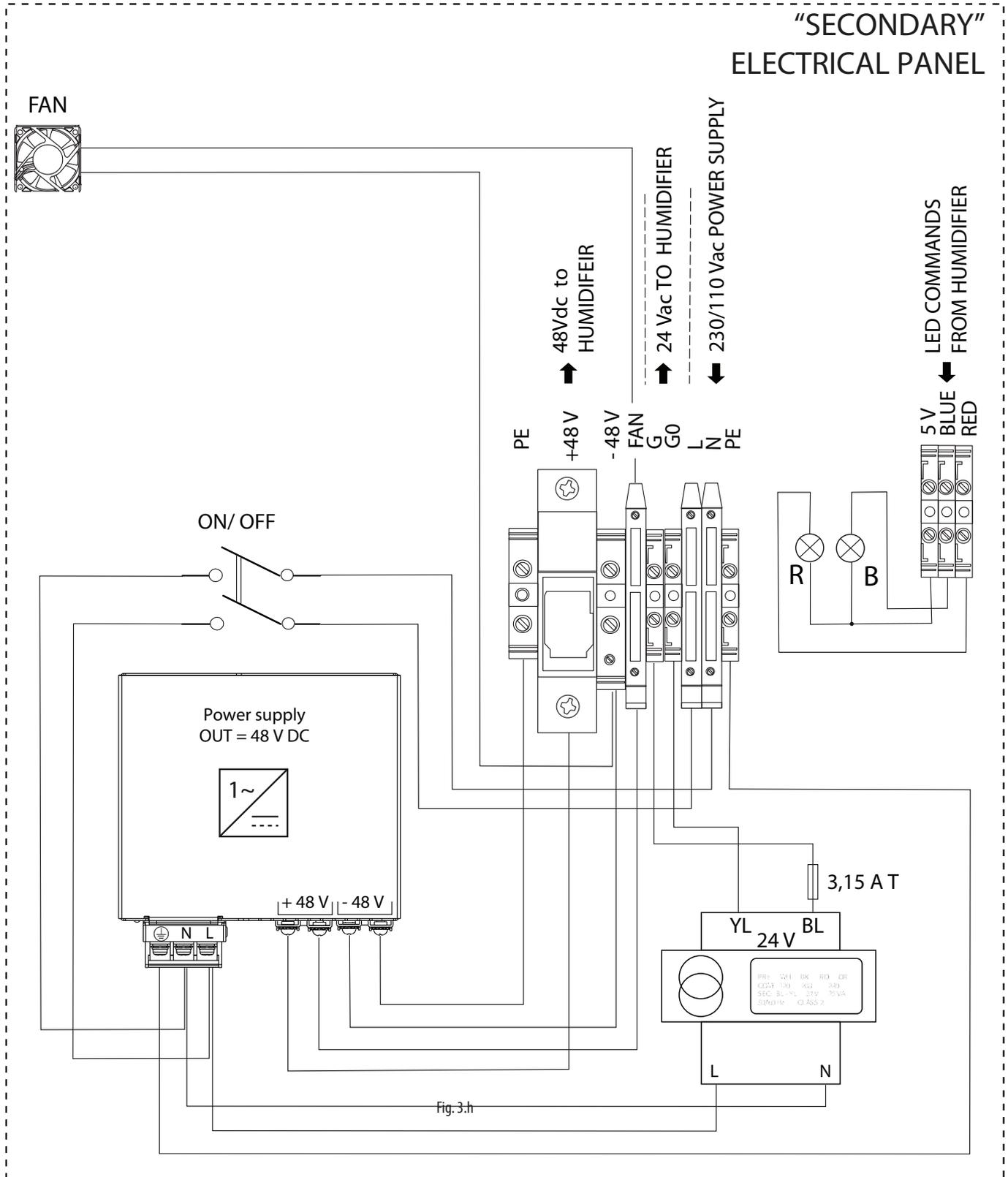


Fig. 3.g

Weight

| | | |
|------------|------------------------------------------|--------------------|
| UQ05B10000 | Secondary electrical panel 300 W -110 V | 6,5 Kg / 14,3 lbs |
| UQ05BD0000 | Secondary electrical panel 300 W -230 V | 7 Kg / 15,4 lbs |
| UQ09B10000 | Secondary electrical panel 600 W -110 V | 9 Kg / 19,8 |
| UQ09BD0000 | Secondary electrical panel 600 W -230 V | 7 Kg / 15,4 lbs |
| UQ18B10000 | Secondary electrical panel 1200 W -110 V | 11,9 Kg / 26,2 lbs |
| UQ18BD0000 | Secondary electrical panel 1200 W -230 V | 11,9 Kg / 26,2 lbs |

3.4 "Secondary" panel wiring diagram



3.5 "Main" electrical panel

STRUCTURE

OUTSIDE

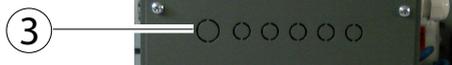
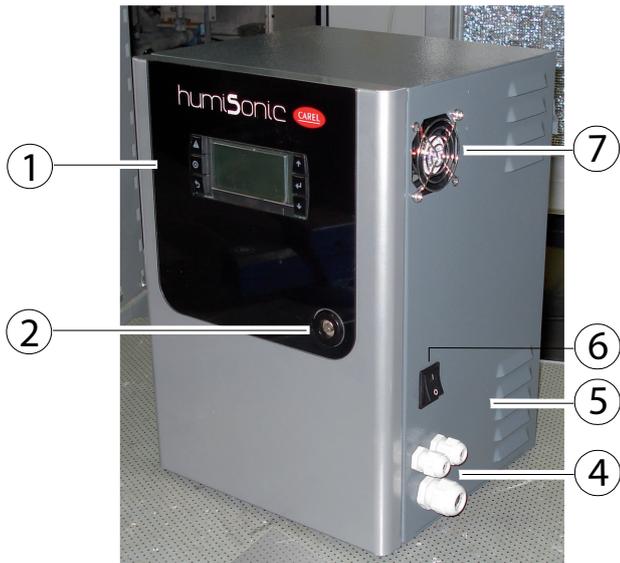


Fig. 3.i

INSIDE

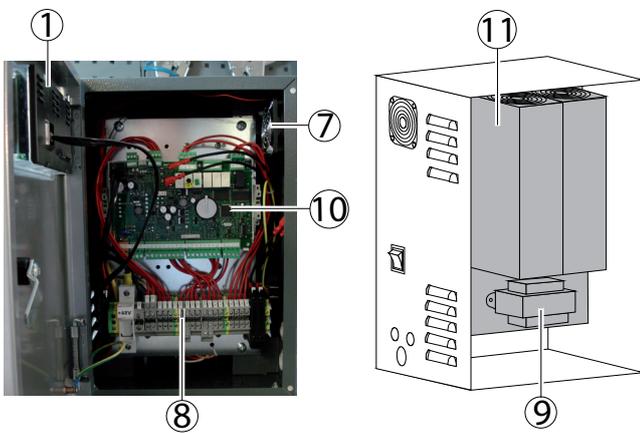


Fig. 3.j

Key

| | | | |
|---|---------------------------------------------------------------------|----|-----------------|
| 1 | Terminal | 7 | Exhaust air fan |
| 2 | Cover with lock | 8 | Terminal block |
| 3 | Knock-outs for additional cable glands (installer's responsibility) | 9 | Transformer |
| 4 | Cable glands | 10 | Control board |
| 5 | Air intake openings | 11 | Power supply |
| 6 | ON/OFF switch | | |

DIMENSIONS - mm (in)

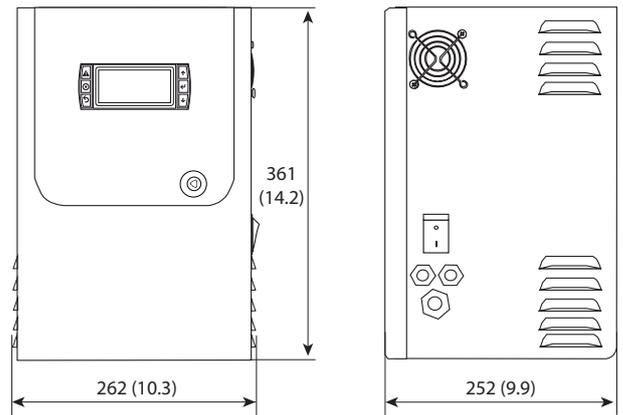


Fig. 3.k

POSITIONING

The electrical panel is designed for wall-mounting and features forced ventilation for cooling. See the figure for the minimum clearances in mm (in) that ensure sufficient air flow and change inside the electrical panel.

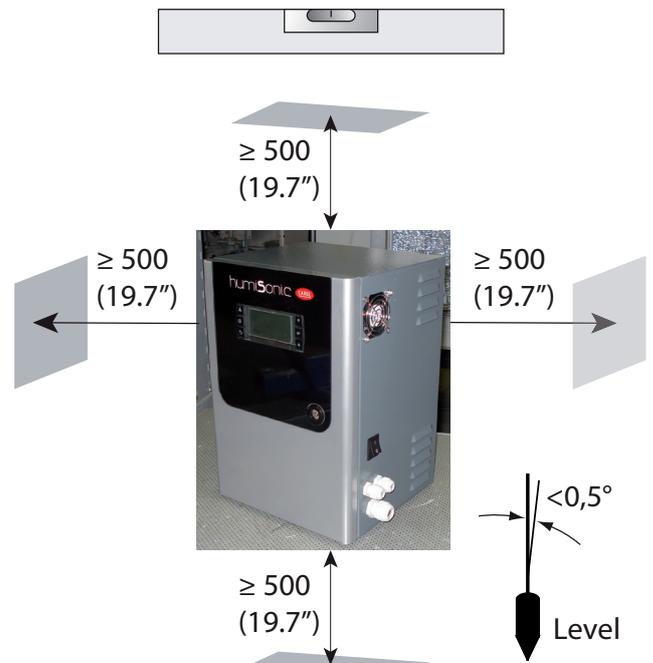
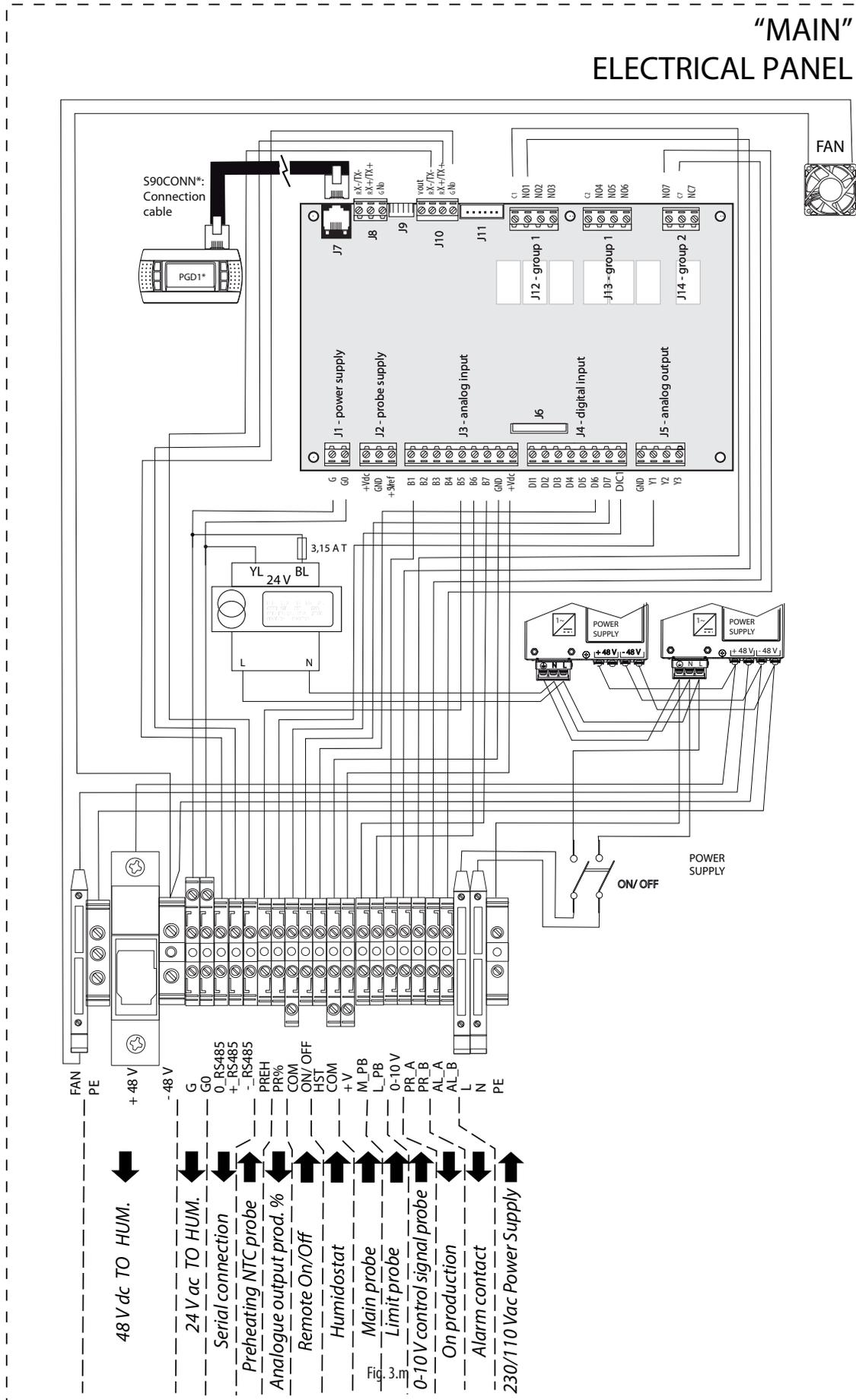


Fig. 3.l

Weight

| | | |
|------------|-------------------------------------|--------------------|
| UQ05C10000 | Main Electrical Panel 300 W -110 V | 9,5 Kg / 20,9 lbs |
| UQ05CD0000 | Main Electrical Panel 300 W -230 V | 9,5 Kg / 20,9 lbs |
| UQ09C10000 | Main Electrical Panel 600 W -110 V | 9 Kg / 19,8 lbs |
| UQ09CD0000 | Main Electrical Panel 600 W -230 V | 10 Kg / 22 lbs |
| UQ18C10000 | Main Electrical Panel 1200 W -110 V | 11,5 Kg / 25,4 lbs |
| UQ18CD0000 | Main Electrical Panel 1200 W -230 V | 11,5 Kg / 25,4 lbs |

3.6 "Main" panel wiring diagram



3.7 Electrical connections to the “Secondary” panel

Below is the connection diagram between the terminal block on the “Secondary” electrical panel and the terminal block on the humidifier.

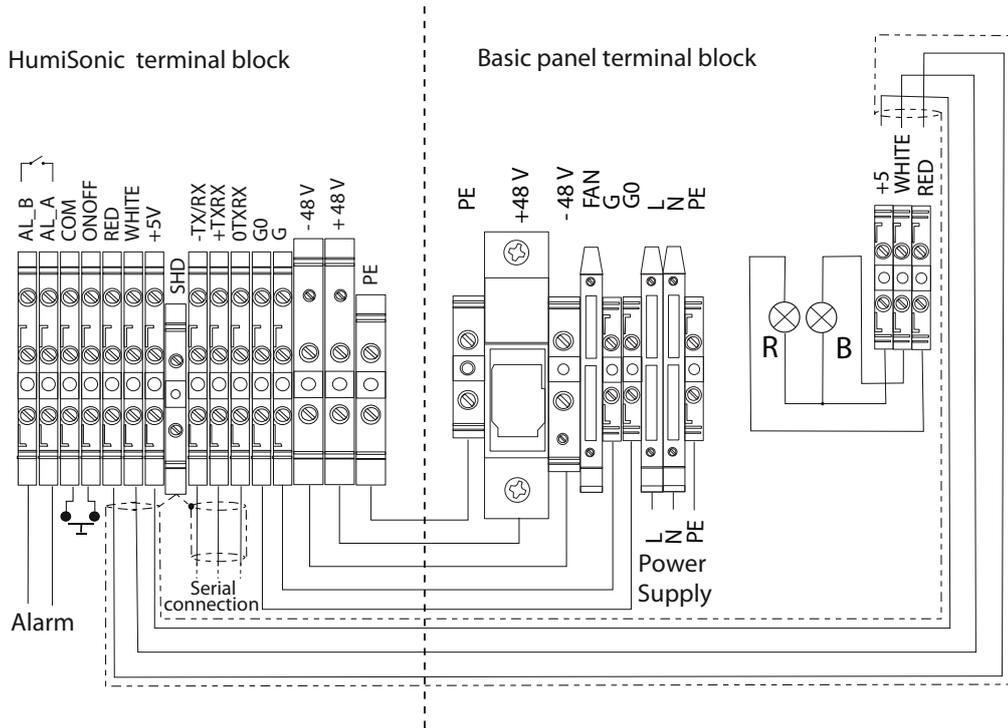


Fig. 3.n

HUMIDISTAT OR REMOTE CONTACT (ON/OFF action)

Production is enabled by closing the ONOFF – COM contact on the terminal block. This can be connected to a switch, a humidistat or a controller (voltage-free contact, max 5 Vdc open, max 7 mA closed).

RS485 SERIAL CONNECTION

CAREL/ Modbus protocol: -TXRX-, +TXRX, 0TXRX terminals.

Important: for RS485 connections in household (IEC EN 55014-1) and residential (IEC EN 61000-6-3) environments, use shielded cable (with shield connected to PE both on the terminal and controller ends), maximum length specified by the EIA RS485 protocol, equivalent to European standard CCITT V11, using AWG26 twisted pair cable; the input impedance of the 485 stage is 1/8 unit-load (96 kOhm). This configuration allows a maximum of 256 devices to be connected, with cables in separate conduits from the power cable.

ALARM RELAY

Terminals: AL_B, AL_A

Ready for remote signalling of one or more alarms.

Note: in industrial environments (IEC EN61000-6-2) the signal cables leaving the unit must not exceed 10 m (33 ft) in length: remote on/off digital input (ON/OFF - COM terminals) and shielded cable for RS485 communication.

3.8 Connection cable sizing

The table below shows the sizing of the 48 Vdc connection cable between the humidifier and the “Secondary” or “Main” electrical panel. The minimum cross-section depends on the length. Use cable for working voltages ≥ 300 Vac and operating temperatures $\geq 90^\circ\text{C}$.

| P/N | Current (A) | L=5 m | L=10 m |
|--------|-------------|------------------------|---------|
| | | AWG (mm ²) | |
| UU02D% | 3,2 | 14(2,5) | 14(2,5) |
| UU05D% | 6,4 | 14(2,5) | 14(2,5) |
| UU07D% | 9,6 | 14(2,5) | 13(4) |
| UU09D% | 12,8 | 14(2,5) | 13(4) |
| UU14D% | 19,2 | 10(6) | 10(6) |
| UU18D% | 24 | 10(6) | 9(10) |

Tab. 3.a

24 Vac connection: two-wire cable, type AWG 16 (1.32 mm²).

Light connection (“Secondary” panel only): three-wire shielded cable, type AWG 22 (0.33 mm²).

3.9 Electrical connect. to the "Main" panel

Below is the connection diagram between the terminal block on the "Main" electrical panel and the terminal block on the humidifier.

Depending on the type of signal, atomised water production can be enabled and/or managed in different ways.

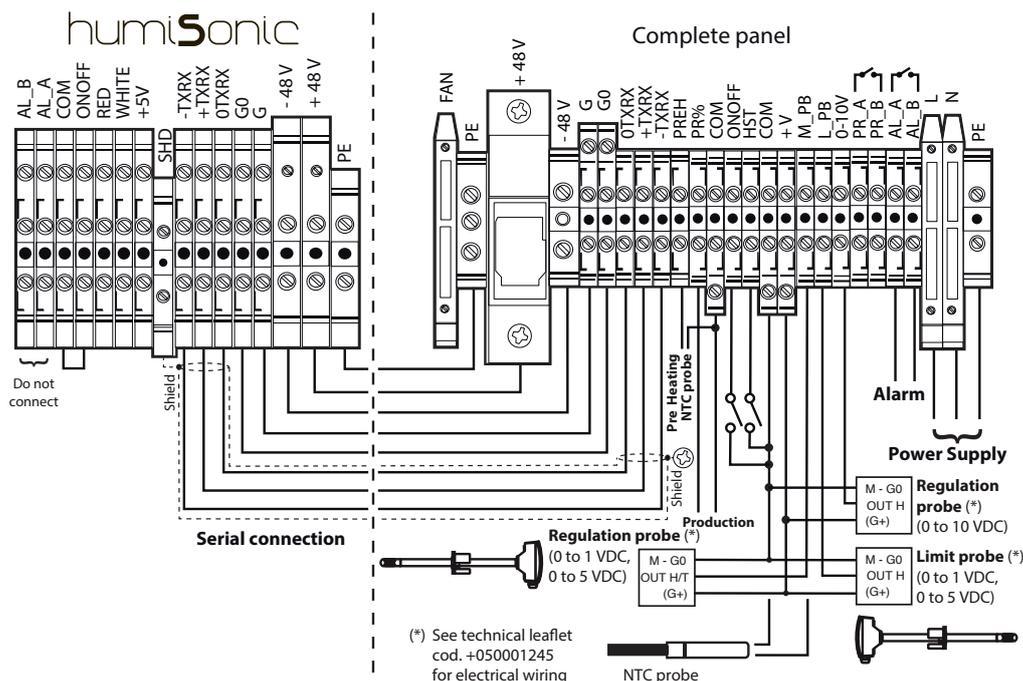


Fig. 3.0

3.10 Control types

To enable all types of control:

1. Humidifier terminal block: keep the factory-set jumper on terminals COM and ONOFF;
2. Terminal block on the "Main" electrical panel: Jumper terminals ONOFF and COM (enable)

ON/OFF CONTROL (humidistat or remote contact):

"Main" electrical panel terminal block

- Connect terminals HST and COM to a humidistat or remote contact (voltage-free contact);
- Set Fa01: Regulation type = On/Off.

EXTERNAL PROPORTIONAL CONTROLLER (modulating action):

"Main" electrical panel terminal block

- Connect the COM and 0-10V terminals to a 0-10V external controller, or the COM and M_PB (main probe) terminals to a 0-1V / 0-5V external controller
- Set Fa01: Ext. regulator;
- Set parameter Fa04 for the type of signal from the external controller: Probe type = 0 to 1V, 0 to 5V / 0 to 10V.

EXTERNAL PROPORTIONAL CONTROLLER (mod. action) + limit rH%:

"Main" electrical panel terminal block

- Connect the COM and 0-10V terminals to a 0-10V external controller, or the COM and M_PB (main probe) terminals to a 0-1V / 0-5V external controller
- Connect the COM, +V and L_PB (limit probe) terminals to a 0-1V / 0-5V active humidity probe;
- Set Fa01: Ext. regulator + limit rH%;
- Set parameter Fa04 for the type of signal from the external controller: Probe type = 0 to 1V, 0 to 5V / 0 to 10V;
- Set parameter Fa06 for the type of signal from the limit probe: Probe type = 0 to 1V, 0 to 5V.

TEMPERATURE CONTROL

"Main" electrical panel terminal block

- Connect the COM, +V and 0-10V terminals to a 0-10V temperature probe; or the COM, +V and M_PB (main probe) terminals to a 0-1V / 0-5V / 0-10V temperature probe; or the COM and M_PB terminals only to an NTC probe;
- Set Fa01: T probe;
- Set parameter Fa04 for the type of signal from the temperature probe: Probe type = 0 to 1V, 0 to 5V, 0 to 10V, NTC.



Note: if using the NTC probe, remove the sheathed resistor placed between terminals B7-GND on the electronic board

TEMPERATURE CONTROL + limit rH%

"Main" electrical panel terminal block

- Connect the COM, +V and 0-10V terminals to a 0-10V temperature probe; or the COM, +V and M_PB (main probe) terminals to a 0-1V / 0-5V temperature probe; or the COM and M_PB terminals only to an NTC probe;
- Connect the COM, +V and L_PB (limit probe) terminals to a 0-1V / 0-5V humidity probe;
- Set Fa01: T probe + limit rH%;
- Set parameter Fa04 for the type of signal from the temperature probe: Probe type = 0 to 1V, 0 to 5V, 0 to 10V, NTC.
- Set parameter Fa06 for the type of signal from the limit probe: Probe type = 0 to 1V, 0 to 5V.



Note: if using the NTC probe, remove the sheathed resistor placed between terminals B7-GND on the electronic board

HUMIDITY CONTROL

"Main" electrical panel terminal block

- Connect the COM, +V and 0-10V terminals to a 0-10V humidity probe; or the COM, +V and M_PB (main probe) terminals to a 0-1V / 0-5V temperature probe;
- Set Fa01: probe rH%;
- Set parameter Fa04 for the type of signal from the humidity probe: Probe type = 0 to 1V, 0 to 5V / 0 to 10V.

HUMIDITY CONTROL + Limit %rH

"Main" electrical panel terminal block

- Connect the COM, +V and 0-10V terminals to a 0-10V humidity probe; or the COM, +V and M_PB (main probe) terminals to a 0-1V / 0-5V / 0-10V temperature probe;
- Connect the COM, +V and 0-10V terminals (limit probe) to a 0-1V / 0-5V humidity probe;
- Set Fa01: probe rH% + limit rH%;
- Set parameter Fa04 for the type of signal from the humidity probe: Probe type = 0 to 1V, 0 to 5V;
- Set parameter Fa06 for the type of signal from the limit probe: Probe type = 0 to 1V, 0 to 5V.

PRE-HEATING NTC PROBE OPTION: “Main” electrical panel terminal board

- It allows modulation of the nebulized flow rate if the preheating upstream of the humidifier in the air handling unit is lower than the design conditions.
- Connect the NTC probe to the PREH and COM terminals
- Enable the probe to the Fa12 mask

FINAL CHECKS

The following conditions represent correct electrical connection:

- mains power to the humidifier corresponds to the rated voltage;
- a mains disconnect switch has been installed so as to be able to disconnect power to the humidifier;
- terminals COM – ONOFF on the humidifier terminal block are jumpered or connected to a contact to enable operation;
- if the humidifier is controlled by an external controller, the signal earth is electrically connected to the controller earth.

4. STARTING AND USER INTERFACE (“SECONDARY” PANEL)

Before starting the humidifier check:

- water connections: in the event of water leaks, do not start the humidifier before having restored the connections;
- electrical connections between the humidifier and the control panel.

4.1 Starting

See chap. “Electrical connections”

1. The humidifier, once powered and enabled for production (remote on-off/humidistat), is ready for operation.
2. Operation will only stop if the enabling signal is no longer present.

4.2 Shutdown / Standby

1. To switch the humidifier off, press the ON/OFF button.
2. The humidifier goes into standby when:
 - the remote on/off contact is open;
 - the on/off contact is open and serial enabling is set to 1 (see chapter “Humidifier control via network”).

When the humidifier is in standby, the tank is emptied automatically

4.3 Autotest

When the humidifier is first started (from off), if enabled and humidity production is required, a test cycle is run. A complete fill and drain cycle is performed, during which the level sensor is monitored; if the test is successful, regular atomised water production will start. If the test fails, production is disabled (see the alarm table).

4.4 Signal lights on the “Secondary” panel

| | |
|--------------|---------------------|
| | Blue light |
| Steady | Humidity production |
| Slow flash* | Standby |
| Fast flash** | Autotest or wash |

* Slow flash: 1 s ON and 1 s OFF

** Fast flash: 0.2 s ON and 0.2 s OFF

The red LED means an alarm is active. See the chapter on Alarms for the alarm table.

4.5 Disabling

The humidifier can be disabled in three different ways:

- Opening the COM-ONOFF contact (enabling signal);
- Active alarms;
- Via network.

4.6 Reset tank hour counter

The humidifier is fitted with an hour counter that records operation. After a set number of hours (5,000), a signal is activated to indicate maintenance should be performed on the tank and operation of the piezoelectric elements checked (see the chapter on Maintenance). To reset the hour counter at any time, proceed as follows:

- switch the humidifier off;
- close the water supply tap and wait for the tank to empty completely;
- remove the front panel from the humidifier to access the control board;
- unplug the Lumberg connector on the control board;
- open the On/Off contact;
- switch the humidifier on (with the Lumberg connector disconnected from the control board). Both lights will flash;
- close the On/Off contact. The yellow LED will remain on steady;
- switch the humidifier off;
- plug the Lumberg connector (A) onto the board, making sure it is inserted in the correct direction;
- switch the humidifier on.

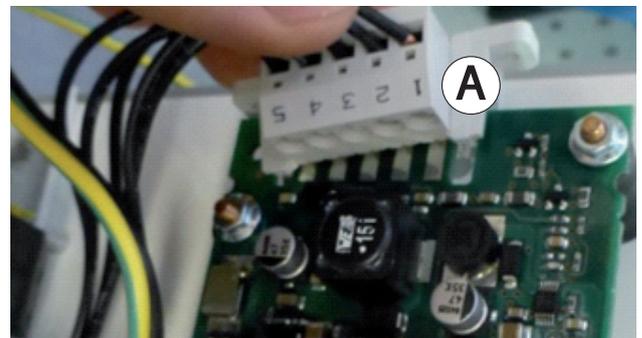


Fig. 4.a

4.7 Automatic washing

The humidifier performs an automatic washing cycle periodically (default every 60 minutes), during which the production of sprayed water is interrupted. The washing cycle involves a complete drain cycle, a phase in which fill and drain are activated together (default 1 minute) to flush out any residues in the tank, a complete fill cycle and finally another complete drain cycle. During this operation, atomised water production is stopped.

4.8 Washing due to inactivity

If the humidifier remains inactive (on but in standby) for an extended period (24 hours) a washing cycle is performed, as described in the previous paragraph. This cleans the tank of any residues (e.g. dust) that may have accumulated during the period of inactivity. The washing cycle is run after default 24 hours (continuous) of no operation, i.e. the humidifier is in standby.

5. USER INTERFACE ("MAIN" PANEL)

5.1 Graphic terminal

The built-in terminal on the "Main" electrical panel comprises the display and the keypad, featuring 6 buttons, which are used to perform all the configuration and programming operations on humiSonic.

5.2 Keypad



Fig. 5.a

| BUTTON | DESCRIPTION |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Alarm | <ul style="list-style-type: none"> • Display the list of active alarms • Reset alarms with manual reset |
| Prg | Access to the main menu |
| Esc | Return to the previous screen |
| Up / Down | <ul style="list-style-type: none"> • Scroll between screens • Increase / decrease the value |
| Enter | <ul style="list-style-type: none"> • Switch from display mode to setting mode • Confirm the value and move to the next parameter |

Tab. 5.a

5.3 Display

During normal operation, the display shows, as well as the current date and time, the type of control selected, the reading of the control probe and limit probe (if featured), and the quantity of atomised water produced.

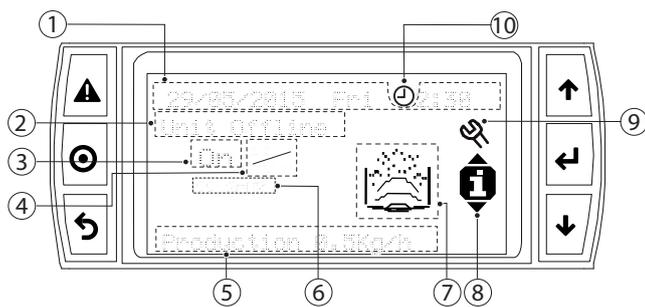


Fig. 5.b

Key

| | |
|----------------------------------------|---------------------------------------|
| 1 Current date/time | 6 Limit humidity probe reading |
| 2 Cause of unit shutdown/Unit status | 7 Unit status icon/active actuators |
| 3 Request | 8 Quick access button menu icon |
| 4 Control type selected | 9 Maintenance required |
| 5 Unit status | 10 Time bands enabled |

| CAUSE OF UNIT SHUTDOWN | |
|------------------------|-----------------|
| Message | Description |
| Off by Key | Off from keypad |
| Unit Offline | Unit offline |
| Remote On/Off | Remote On/Off |
| No request | No request |
| Unit disabled | Unit disabled |
| Alarms | Alarms |
| Manual mode | Manual mode |
| Off from BMS | Off from BMS |
| Off from Sched. | Off from Sched. |

Tab. 5.a

| UNIT STATUS | |
|----------------------------|-----------------------------------|
| Message | Description |
| Production ... Kg/h/(lb/h) | Instant production in kg/h (lb/h) |
| Drain | Drain |
| Init | Initialisation |
| Fill | Filling |
| Autotest | Autotest |
| Waiting (. min) | Waiting (. min) to restart |
| Disabled | Disabled |

Tab. 5.b

| Request | Meaning | Control type |
|------------|--------------------------------|--------------------|
| On/-- | On= request -- = no request | On/Off |
| 0 to 100 % | Request percentage | % → Ext. regulator |
| rH%: | Control probe reading in rH% | rH% probe |
| °C | Control probe reading in °C | T probe |

Tab. 5.c

| Unit status/ active actuators | Meaning |
|-------------------------------|-------------------------|
| | Production in progress |
| | Fill in progress |
| | Drain open |
| | Water present |
| | Stop transducer control |
| | Malfunction |

Tab. 5.d

Note: the control type is selectable in user menu F, under screen Fa01: Regulation. See the parameter table.

5.4 Programming mode

The parameters can be modified using the front keypad. Access differs according to the level: User (accessible without password), Service (password=PW1) and Manufacturer (password = PW2). Press Prg to access the main menu.



Fig. 5.c

Main menu icons

| | | | | | |
|----|--|-------------------------------|----|--|-----------|
| A. | | Unit On/Off | E. | | Alarm log |
| B. | | Set point | F. | | User |
| C. | | Clock/scheduler | G. | | Service |
| D. | | Main/ Secondary (future uses) | | | |

Tab. 5.e

5.5 Setting/displaying the user parameters

The user parameters (A...F) are all the parameters accessible without password, and include the following categories:

- A: Unit ON/OFF: enable power-on from keypad, enable Autotest and manual washing, set maximum production.
- B: Set point: if Fa01 is set to control with probe (+ limit humidity probe), the screen will show the humidity/temperature set point (+limit humidity set point);
- C: Clock/scheduler: set the current time and date (C01), the date for changeover from standard time to daylight saving time and vice-versa (C02), the daily time bands (C03) with weekly programming: up to 3 daily time bands can be set with independent set points. See example 2 described below.
- D: Main-Secondary network configuration: Reserved.
- E: Alarm log: the alarm log contains all the alarms, both active (↓) and already reset (↑). The display can include up to 50 alarms with progressive numbering, time and date of activation.
- F: User: select the type of control and related parameters, enable washing and activation mode, general settings for restart times, alarm relay logic, drain valve in standby. See the chapter on "Functions".

EXAMPLE 1: Setting the current time/date.

1. press Esc one or more times to move to the standard display;
2. press Prg: the display shows the main menu;
3. press UP/DOWN to move to category C. Clock/scheduler;
4. press Enter to display the first screen: C01;
5. press Enter to modify the current time using UP/DOWN; confirm by pressing Enter and set the month and year;
6. confirm by pressing Enter and set the hour/minutes;
7. at the end of the settings, press Esc twice to exit the parameter setting procedure.

EXAMPLE 2: Setting the time bands and copying from one day to another.

- press Esc one or more times to move to the standard display;
- press Prg: the display shows the main menu;
- press UP/DOWN to move to category C. Clock/scheduler and Enter again until reaching screen C03;
- press Enter and enable the time bands (No → Yes); then go to screen C04;
- in screen C04:
 - a. press Enter and UP/DOWN to show the check sign for time band 1;
 - b. press Enter and UP/DOWN to select the day of the week. Confirm by pressing Enter. Press UP/Down to uncheck the box. Press Enter to set the band start hours and minutes and the status: OFF, ON, ON+SET (ON+SET if control with probe selected). If ON, the set point selected in screen B is shown, if ON+Set, set the desired set point;
 - c. once the time bands have been set for the day in question, press PRG to copy the settings from one day to another.

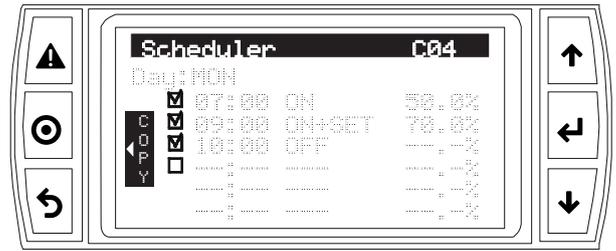


Fig. 5.d

5.6 Setting the Service parameters

The Service parameters (letter G) concern:

- a: change language;
 - b: information on: application, BIOS and BOOT version; flash memory and RAM on the control board;
 - c: hour counter: operating hours in production and total unit operating hours; maintenance interval setting.
- To access the screens from d) on, the service password is needed - PW1(0077).
- d: BMS configuration: set BMS communication protocol (CAREL, Modbus), communication speed, network address, enable control serial.
 - e:
 - Timings (Gea): set fill/drain times, refilling, production, delay for water level or no communication alarms between control panel and humidifier. See the chapter "Functions";
 - Delete alarm log (Geb), counter and restore default parameters;
 - Access management (Gec): interval of new Service password entry when browsing, enable quick menu (On/Off and set point), enter User password (PW0), change Service password (PW1).
 - f: Manual management: manual activation of fill/drain valves, group 1/2 (mist 1/2) of piezoelectric transducers, alarm relay, ambient and limit probes.

Procedure: the setting/display procedure is similar to the one for the user parameters, however password PW1 must be entered to access category G parameters.



Note:

- if no button is pressed, after around 5 min the display automatically returns to standard mode;
- the service password PW1 can be changed on screen Gec04 (and the main password on screen Gec03);
- once entered, the password remains active for a certain time, after which it needs to be entered again.

5.7 Quick access menus

The quick access menus can be used to rapidly access the unit information and settings.

Procedure:

1. Press Esc one or more times to return to the standard display;
2. Press UP/DOWN to show the required quick access menu icon;

| | | | |
|------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| ICON |  |  |  |
| | Info | On/Off | Set point* |

Tab. 5.f

(*) Only shown if control with probe is selected for Fa01.

3. Press Enter to enter the menu, UP/DOWN to scroll, ESC to exit.

5.6.1 Info

Read-only screens that display the main unit information:

- Humidifier size;
- Waiting time until the next wash;
- Operating hours with atomised water production;
- Total unit operating hours;
- Float level sensor status: low, working (normal operation), high;
- Dipswitch status on the control board;
- Status and operating hours of the Secondary units (if there is a Main/Secondary connection)
- Preheating probe reading (if enabled);
- Replicate request and related voltage signal for multi-Main connection.

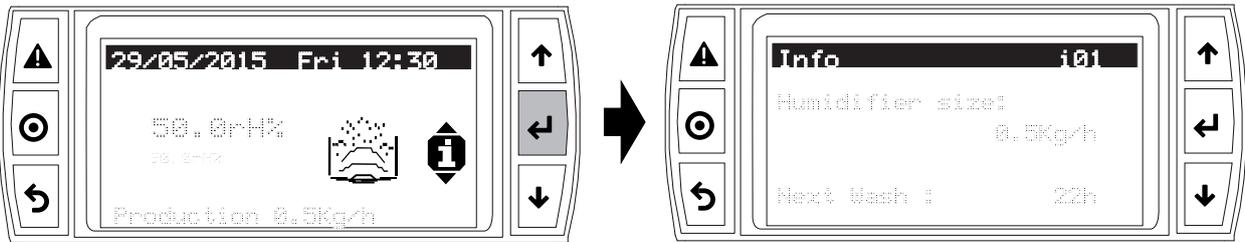


Fig. 5.e

5.6.2 Set point

Only shown if control with probe has been selected (Fa01).

On this screen, the control set point for humidity / temperature probe and limit humidity probe set point can be set.

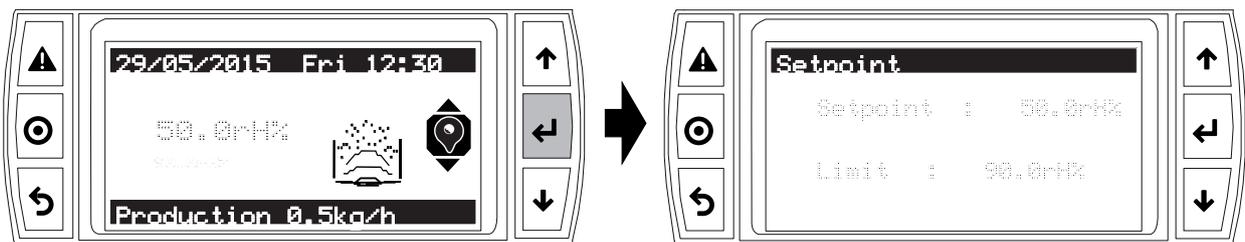


Fig. 5.f

5.6.3 On/Off

Unit On/Off from the keypad.

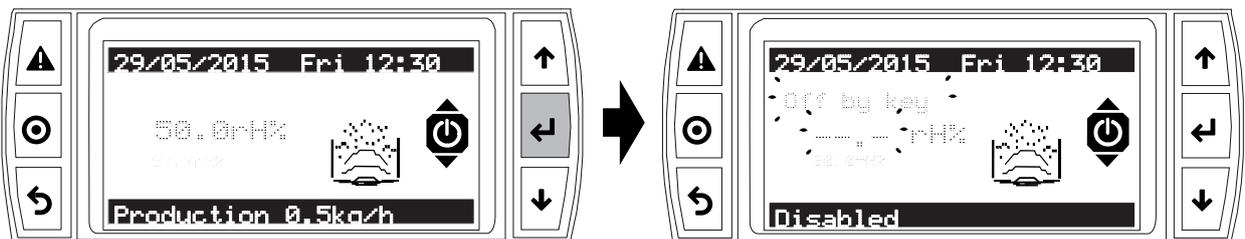


Fig. 5.g

6. COMMISSIONING ("MAIN" PANEL)



Important:

Before starting the humidifier check:

- water connections: in the event of water leaks, do not start the humidifier before having restored the connections;
- electrical connections between the humidifier and the control panel.

The following series of parameters needs to be set when commissioning the unit.

6.1 Starting

See chap. "Electrical connections"

1. The humidifier, once powered and enabled for production (remote on-off/humidistat), is ready for operation.
2. Operation will only stop if the enabling signal is no longer present.

6.2 Scheduler

Programming is weekly, with the possibility to enter up to 3 daily time bands, each with a different set point. See chap. "User interface"

| Screen index | Display description | Def | Min | Max |
|--------------|---------------------|-----|-----|-----|
| C03 | Scheduler | | | |
| | Enable scheduler ? | No | No | Yes |

Tab. 6.a

6.3 Regulation type

Select whether control is based on a humidistat, external controller, humidity/temperature probe and a limit humidity probe. See chapter "Functions".

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|---------------------|--------|--------|-------------------|--------------------------------------------------------------------------------------------------------------------|
| Fa01 | Regulation | | | | |
| | Regulation type | On/Off | On/Off | T probe+limit rH% | On/Off ; Ext. regulator ; Ext. regulator+limit rH% ; rH% probe ; rH% probe+Limit rH% ; T probe ; T probe+limit rH% |

Tab. 6.b

6.4 Shutdown / Standby

1. To shutdown the humidifier, switch the unit Off from the keypad (see chap. "User interface");
2. The humidifier goes into standby when:
 - the remote on/off contact is open;
 - the humidity/temperature probe is present and the humidity set point has been reached;
 - the on/off contact is open and serial enabling is set to 0 (see chapter "Humidifier control via network").

When the humidifier is in standby, the tank is emptied automatically, if the valve in standby is selected as open.

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|-------------------------|------|--------|------|-----|
| Fc03 | Settings | | | | |
| | Drain valve in stand-by | Open | Closed | Open | - |

Tab. 6.c

6.5 Autotest

When the humidifier is first started (from off), if enabled and humidity production is required, a test cycle is run. A complete fill and drain cycle is performed, during which the level sensor is monitored; if the test is successful, regular atomised water production will start. If the test fails, production is disabled (see the alarm table).

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|---------------------|-----|-----|-----|-----|
| A01 | On/Off | | | | |
| | Enable | No | No | Yes | - |
| | Autotest | Yes | No | Yes | - |

Tab. 6.d

6.6 Reset tank hour counter

The humidifier is fitted with an hour counter that records operation. After a set number of hours (5,000), a signal is activated to indicate maintenance should be performed on the tank and operation of the piezoelectric elements checked (see the chapter on Maintenance). To reset the hour counter at any time, go to screen Geb01.

| Screen index | Display description | Def | Min | Max |
|--------------|---------------------|-----|-----|-----|
| Geb01 | Reset Cnt/Logs | | | |
| | ... | | | |
| | Reset counter | No | No | Yes |

Tab. 6.e

6.7 Automatic washing

The humidifier, if enabled on the screen or via BMS, automatically runs a washing cycle at set intervals, defined by parameter "Operating period". See the functions chapter for the parameters corresponding to activation of the washing cycle. During this operation, atomised water production is stopped.

| Screen index | Display description | Def | Min | Max | Value desc. |
|--------------|---------------------|---------------|--------|--------------|------------------------------------------------------------|
| Fb01 | Washings | | | | |
| | Time triggered | Absolute time | Disab. | Progr. | Disabled ; Absolute time ; Working/ No working ; Scheduled |
| | Event triggered | Disab. | Disab. | From request | Disabled ; From digital input ; From request |

Tab. 6.f

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|--------------------------------|-----|-----|-----|-----|
| Fb03 | Work wash (Fb01=Work /Standby) | | | | |
| | Enabled | Yes | No | Yes | - |
| | Work wash period | 1 | 1 | 480 | min |

Tab. 6.g

6.8 Manual procedures

At the end of the programming procedure, before starting the unit, manual operation can be enabled in order to:

1. run a fill/drain cycle;
2. activate production by one group of transducers (mist1/ mist 2) or both;
3. activate the alarm relay

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|---------------------|-----|-----|-----|----------|
| Gf01 | Manual management | | | | |
| | Manual mode | No | No | Yes | - |
| Gf02 | Manual mode | | | | |
| | Fill | Off | Off | On | Off ; On |
| | Drain | Off | Off | On | Off ; On |
| Gf03 | Manual mode | | | | |
| | Mist 1 | No | No | Yes | No ; Yes |
| | Mist 2 | No | No | Yes | No ; Yes |

Tab. 6.h

6.9 Probe calibration

Once the control (regulation) type has been selected, the probes can be calibrated by setting the offset. The delay for activation of the probe alarm can also be set.

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|-------------------------------------|-------|--------|-------|-----|
| Fa04 | Regulation | | | | |
| | Ambient probe (AI7) | | | | |
| | Probe type: 0 to 1V ; 0 to 5V ; NTC | | | | |
| | Offset | 0.0 | -100.0 | 100.0 | - |
| | Min | 0.0 | 0.0 | 100.0 | - |
| | Max | 100.0 | 0.0 | 100.0 | - |
| | Alarm delay | 0 | 0 | 999 | s |
| Fa05 | Regulation | | | | |
| | Ambient probe (TH) | | | | |
| | Type | rH%+T | | | |
| | Offset | 0.0 | -20.0 | 50.0 | - |
| Fa06 | Regulation | | | | |
| | Limit probe (AI6) | | | | |
| | Probe type: 0 to 1V ; 0 to 5V | | | | |
| | Offset | 0.0 | -100.0 | 100.0 | - |
| | Min | 0.0 | 0.0 | 100.0 | - |
| | Max | 100.0 | 0.0 | 100.0 | - |
| | Alarm delay | 10 | 0 | 999 | s |

Tab. 6.i

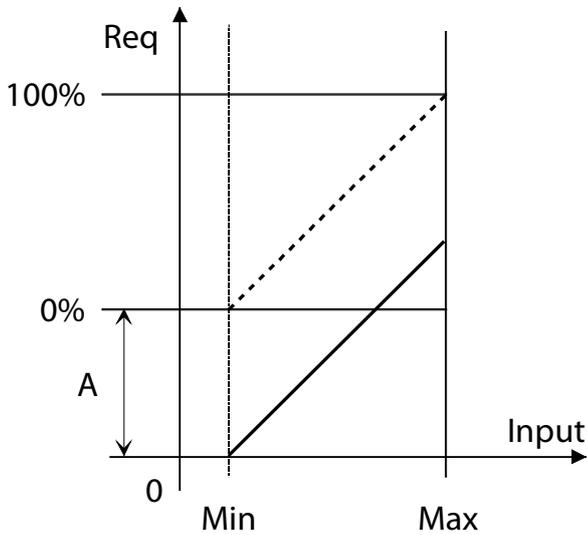


Fig. 6.a

Key

| | | | |
|-------|--------------|-----|------------------------------|
| Input | Input signal | Min | Input value for min. request |
| Req | Request | Max | Input value for max request |
| A | Offset | | |

6.10 Access management

The delay after which the Service password (PW1) is requested can be set, and quick access (Quick menu) to the parameters via the Set point and On/Off icons disabled (see chap. "User interface"). In addition, a new password can be set, and the main password PW0 enabled to access any screen in the programming menu, not only the Service parameters.

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|-------------------------------------|------|------|------|-----|
| Gec01 | Access management | | | | |
| | Password delay | 1 | 0 | 30 | min |
| Gec02 | Access management | | | | |
| | Quick menu | Yes | No | Yes | - |
| | Main menu password | No | No | Yes | - |
| Gec03 | Access management | | | | |
| | Insert new main menu password (PW0) | 0000 | 0000 | 9999 | - |
| Gec04 | Access management | | | | |
| | Insert new service password (PW1) | 0000 | 0000 | 9999 | - |

Tab. 6.j

6.11 Settings

These parameters are set in the event of special needs:

- to filter an excessive number of requests over a certain period, and avoid numerous starts and stops, enter a longer start delay;
- if there is no water, it may be useful to extend the delay time before restarting, to avoid a premature no water alarm;
- the alarm relay can be normally open (N.O.) or normally closed (N.C.); the solenoid valve in standby can be set as open or closed;
- the "drain delay in standby" time is only set if the drain solenoid valve is selected as open in standby. This determines in delay for opening the drain solenoid valve after switching to standby. It is useful in the event of frequent starts/stops, to minimise the time needed to reach steady operation.

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|-------------------------|------|------|--------|-----|
| Fc01 | Settings | | | | |
| | Start delay | 10 | s | 0 | 120 |
| | Restart wait | 10 | min | 1 | 60 |
| | Alarm relay logic | N.O. | N.O. | N.C. | - |
| Fc03 | Settings | | | | |
| | Drain valve in stand-by | Open | Open | Closed | - |
| | Drain delay in stand-by | 0 | min | 60 | min |

Tab. 6.k

6.12 Network settings

The RS485 serial card (accessory) needs to be installed on the control board in the "Main" panel. The network parameters need to be set in the event of connection to a serial network. All the controllers in the network must be set with the same protocol and communication speed parameter. By enabling serial control, the humidifier parameter can be set over the serial connection.

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|---------------------|----------|----------|---------|-----|
| Gd01 | BMS configuration | | | | |
| | Protocol | Modbus | Modbus | Carel | - |
| | Speed | 19200 | 1200 | 19200 | bps |
| | Address | 1 | 1 | 207 | - |
| Gd02 | BMS configuration | | | | |
| | Serial manager | Disabled | Disabled | Enabled | - |

Tab. 6.l

7. FUNCTIONS ("MAIN" PANEL)

7.1 On/Off

7.1.1 ON

At power-on, before beginning atomised water production, humiSonic temporarily runs the Autotest: to check correct operation of the float level sensor, the humidifier performs a complete tank fill cycle and then a drain complete cycle.

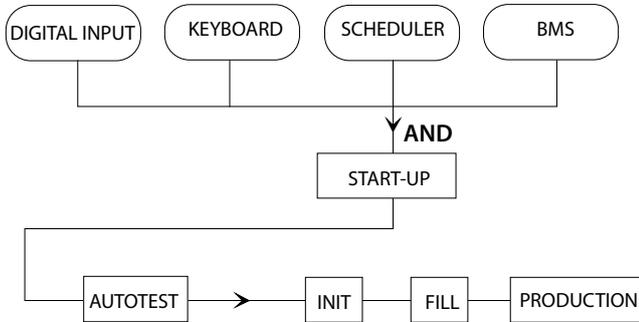


Fig. 7.a

7.1.2 OFF

Before switching from On to Off, humiSonic temporarily runs the Shutdown procedure, in which the controller deactivates the control devices and activates the drain valve. Off status involves a logical OR of the following:

- digital input;
- keypad;
- time band
- BMS.

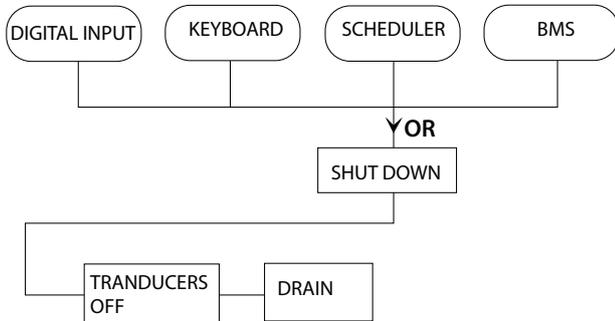


Fig. 7.b

7.2 Set point

The control and limit set points are set in the "Set point" quick menu. Based on the type of control, set the control humidity / temperature probe set point and the limit humidity probe set point. The following screens are then used to set the control differential and hysteresis.

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|----------------------------|------|-----|------|-----|
| Fa07 | Regulation | | | | |
| | Ambient probe | | | | |
| | Ambient probe differential | 10 | 0 | 99.9 | rH% |
| Fa08 | Limit probe differential | 10 | 0 | 99.9 | rH% |
| | Reg. hysteresis | 10.0 | 0 | 99.9 | rH% |

Tab. 7.a

7.3 Regulation (control)

See chapter "Electrical connections" for the electrical connections to the "Secondary" or "Main" electrical panel, based on the type of control.

The built-in electronic controller on humiSonic features different control algorithms, which can be selected from the user menu:

On/Off: operation in on/off mode requires the connection of an external voltage-free contact to input HST (for example, a humidistat, see terminal block). Unit capacity will therefore be all or nothing, according to the status of the external contact. The humidistat logic defines whether production is active with the contact closed (N.C.) or with the contact open.

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|---------------------|------|------|------|-----|
| Fa10 | Regulation | | | | |
| | Logic humidos. | N.C. | N.C. | N.O. | - |

Tab. 7.b

External controller + limit rH%

Capacity modulation is proportional to an external control signal (0 to 1 V, 0 to 5V, 0 to 10V) and is limited based on the value measured by the limit humidity probe. This is the typical configuration for humiSonic installations connected to a Building Management System that provides a control signal.

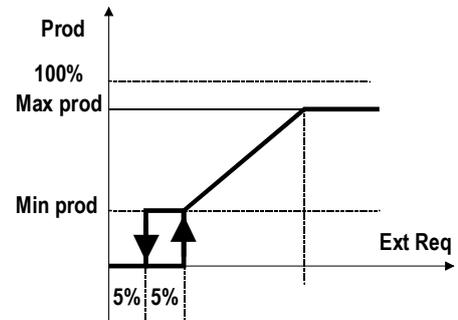


Fig. 7.c

Key

| Prod | Production | Min prod | Min. production |
|----------|--------------------|----------|---------------------|
| Max prod | Maximum production | Ext Req | Ext. control signal |

External controller

Same as the previous algorithm, however without the humidity probe.

rH% probe

The control probe is normally the room return temperature probe in the air duct.

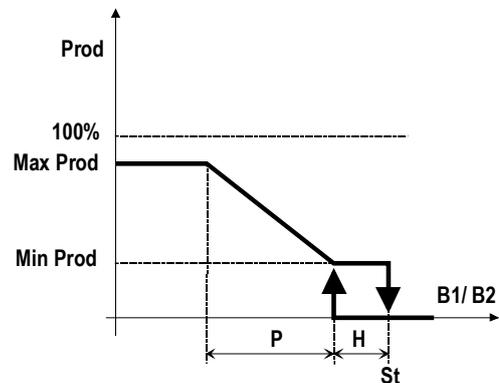


Fig. 7.d

Key

| Prod | Production | B1/B2 | Control/limit probe |
|----------|--------------------|-------|---------------------|
| Max prod | Max. production | P | Differential |
| Min prod | Minimum production | H | Hysteresis |
| St | Set point | | |

rH% probe + limit rH%

As in the previous case with limit humidity probe, normally installed downstream of the droplet separator. The limit humidity probe is usually set to a high value, e.g. 80% rH, so as to limit the maximum humidity level in the ducting and in the room. This is especially recommended in installations where the air flow-rate and temperature and humidity conditions may vary over time, and consequently an additional safety feature is useful for preventing the humidifier from over-humidifying the air and, in the worst case scenario, leading to condensation in the ducting downstream of the unit.

T probe

The control probe is normally the room return temperature probe in the air duct.

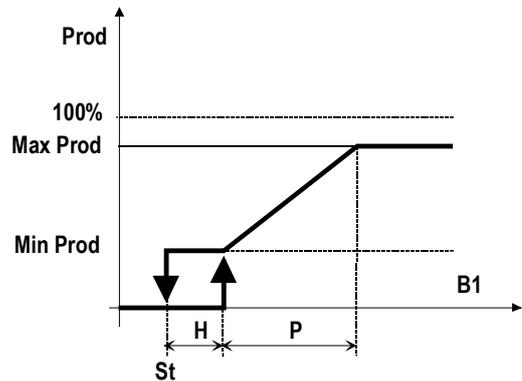


Fig. 7.e

Key

| | | | |
|----------|--------------------|----|-------------------|
| Prod | Production | B1 | Temperature probe |
| Max prod | Maximum production | P | Differential |
| Min prod | Minimum production | H | Hysteresis |
| St | Set point | | |

T probe + limit rH%

As in the previous case, yet with limit humidity probe.

NTC preheating probe (option)

After enabling the function on screen Fa12, this NTC probe reads the air preheating temperature upstream of the humidifier in the air handling unit. Production will be modulated proportionally to the value measured by the probe, according to the graph shown in Fig. 7.e, where H+P is the preheat differential and H is a fixed hysteresis equal to 10% of the differential. The preheating set point (default 28°C) and preheating differential (default 10°C) can be set on screen Fa13.

7.4 Probe alarms

The settings of the maximum control probe and limit probe limits determine activation of the alarms. See the alarm table.

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|----------------------|-------|-----|-------|-----|
| Fa09 | Regulation | | | | |
| | Max ambient humidity | 80.0 | 0 | 100.0 | rH% |
| | Min ambient humidity | 0.0 | 0 | 100.0 | rH% |
| | Max limit humidity | 100.0 | 0 | 100.0 | rH% |
| | Min limit humidity | 0.0 | 0 | 100.0 | rH% |

Tab. 7.c

7.5 Flow-rate modulation

Atomised water flow-rate is modulated between the minimum and maximum rated capacity.

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|------------------------|--------|--------|----------|-----|
| Fa02 | Regulation | | | | |
| | Max prod | 100 | 10 | 100 | % |
| | Min prod | 10 | 0 | 100 | % |
| Fa11 | Regulation | | | | |
| | Mist modulation mode | Series | Series | Parallel | - |
| | Mist modulation period | 1 | 1 | 10 | s |

Tab. 7.d

7.5.1 Parallel (dipswitch 8 Off)

Atomised water flow-rate can be modulated as a percentage from 10% to 100% (Max prod and min prod) of the rated value, with alternating starts and stops of the transducers over a set period (modulation period, default 1 second). The flow-rate is set based on the Max Prod parameter (default 100%) and the request from the external signal (for proportional control).

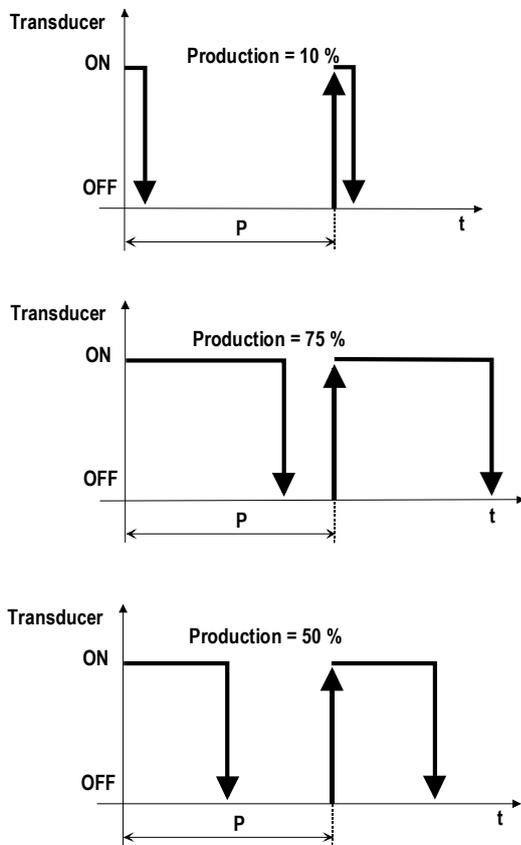


Fig. 7.f

Key

| | | | |
|------------|---------------------------|---|------|
| Transducer | Piezoelectric transducers | t | time |
| P | Modulation period | | |

If the flow-rate is 100%, the transducers are always on.

7.5.2 Series (dipswitch 8 On)

Atomised water flow-rate can be modulated as a percentage from 10% to 100% of the rated capacity. Each humidifier is managed with two groups of transducers (front and rear) and each line generates 50% of total production. If the request is set by the external signal (if proportional control is active) and the Max prod parameter is 100%, both the lines of transducers will be activated. For lower output, production will be shared between the two lines of transducers as follows:

- 51% - 99%: one line of transducers is always activated to generate 50% of required production, while the other modulates as described in the previous paragraph to generate the remaining percentage. (e.g. 75% request: one line of transducers is always activated, the other modulates at 50%);
- 10% - 50%: one line of transducers is always off, the other modulates as described in the previous paragraph to generate the required production (e.g. 25% request: one line of transducers is always off, the other modulates at 50%).

The distribution of production between the two lines of transducers is rotated every hour of operation so as to avoid non-uniform ageing.

7.6 Washing

The washing cycle involves a complete drain cycle, a phase in which fill and drain are activated together to flush out any residues in the tank, a complete fill cycle and finally another complete drain cycle. During this operation, atomised water production is stopped.

The washing cycle can be time triggered or event triggered. Once activated, the washing cycle lasts the time set on screen Fb09.

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|---------------------|-----|-----|-----|-----|
| Fb09 | Wash settings | | | | |
| | Washing time | 1 | 0 | 10 | min |
| | Only if ready ? | NO | NO | YES | - |

Tab. 7.e

The washing cycle can only be performed if humiSonic is operating (only if ready ? = YES), or if it is operating or in standby (only if ready ? = NO). It is assumed that the humidifier is not operating because it is disabled (see ON activation conditions). The washing cycle can also be activated on the screen or via BMS, if enabled.

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|---------------------|-----|-----|-----|-----|
| Fb02 | Washings | | | | |
| | From mask | Yes | Yes | No | - |
| | From BMS | Yes | Yes | No | - |

Tab. 7.f

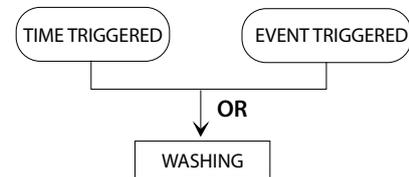


Fig. 7.g

| Screen index | Display description | Selection |
|--------------|---------------------|------------------------------------------------------------|
| Fb01 | Washings | |
| | Time triggered | Disabled Absolute time Working/ No working Scheduled |
| | Event triggered | Disabled From digital input From request |

Tab. 7.g

7.6.1 Time triggered

Absolute time: the washing cycle is run periodically, and the period is defined on screen Fb05.

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|---------------------|-----|-----|-----|-----|
| Fb05 | Absolute | | | | |
| | Period | 24 | 0 | 999 | h/m |
| | Next wash | 24 | 0 | 999 | h/m |

Tab. 7.h

The duration of the period can be expressed in either hours or minutes (press UP/DOWN to changeover from one to the other), based on the screen display (it is NOT the sum of the two times).

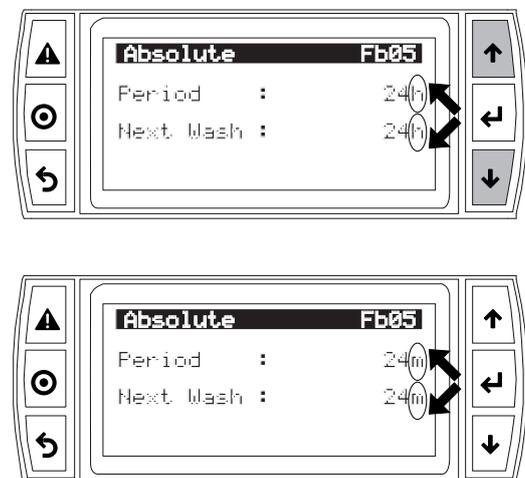


Fig. 7.h

Work / stand by: the type of washing cycle is enabled on screens Fb03/Fb04; the cycle starts after the corresponding operating period.

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|---------------------|-----|-----|-----|-------|
| Fb03 | Work wash | | | | |
| | Enabled | Yes | No | Yes | - |
| | Work wash period | 1 | 0 | 480 | h/min |
| Fb04 | Nowork wash | | | | |
| | Enabled | Yes | No | Yes | - |
| | Nowork period | 24 | 1 | 480 | h/min |
| | Next wash | 24 | 1 | 480 | h/min |

Tab. 7.i

Scheduled: the starting time and day are set on screen Fb06.

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|---------------------|--------|--------|--------|-----|
| Fb06 | Scheduled | | | | |
| | Start | 00:00 | 00:00 | 23:59 | - |
| | Select day ? | No | No | Yes | - |
| | Every | Monday | Monday | Sunday | |

Tab. 7.j

7.6.2 Event triggered

Digital input: select whether the digital input or the humidistat enables the action, and whether the event is from open to closed (Off→On) or vice-versa (On→Off).

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|---------------------|------------|------------|------------|-----|
| Fb07 | From DI | | | | |
| | Input | Humidistat | Humidistat | Rem.On/Off | - |
| | When | On → Off | On → Off | Off → On | - |

Tab. 7.k

From request: the request can derive from a probe or a humidistat (rise/fall = request activated/deactivated).

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|---------------------|------|------|------|-----|
| Fb08 | From request | | | | |
| | When request | Rise | Rise | Fall | - |

Tab. 7.l

7.7 Timings

The activation times are applied during unit operation and are used by the controller to detect any malfunctions.

7.7.1 Fill/drain times

Tmax fill: maximum fill solenoid valve opening time.

| Model | Load T max [min] default |
|-------|--------------------------|
| UU02D | 6 |
| UU05D | 9 |
| UU07D | 12 |
| UU09D | 15 |
| UU14D | 21 |
| UU18D | 24 |

The humidifier detects when there is no feedwater (or the quantity is too low), by checking the level sensor status after opening the fill solenoid valve. If the tank is empty, and sensor activation is not detected within the time set by parameter "Tmax fill", the humidifier is not activated, rather the drain valve opens, after which there is a waiting time equal to the number of minutes set by parameter "Restart wait" (Fc01, default 10), during the which is the message is shown on the display:

Waiting (Restart: xx minutes)

xx displays the minutes remaining until restart (starting from the value set for Fc01), after which there is another refill attempt. If this is successful, production restarts, otherwise there is a further "Restart wait (Fc01)" for the set number of minutes. The process is repeated until the sensor detects water is present. For the first two attempts, no alarm is generated, however if after the third attempt the procedure is not successful, alarm EF is generated, which is reset automatically when the humidifier detects water is present again. If the water fill cycle occurs during atomised water production, see the paragraph "Tmax refill".

Tmax drain: maximum drain solenoid valve opening time.

| Model | Drain T max [s] default |
|-------|-------------------------|
| UU02D | 75 |
| UU05D | 100 |
| UU07D | 150 |
| UU09D | 200 |
| UU14D | 300 |
| UU18D | 400 |

The humidifier detects when the water fails to drain (or the level is too high), by checking the level sensor status after opening the drain solenoid valve. If sensor activation is not detected within the time set by parameter "Tmax drain", the humidifier keeps the drain solenoid valve open and activates the wait procedure, as described in the previous paragraph, displaying alarm Ed. The humidifier will reset the alarm and resume normal operation when the low water level is correctly measured.

Empty drain T: time during which the drain solenoid valve remains open after correctly measuring the low water level.

| Model | Empty drain T. [s] default |
|-------|----------------------------|
| UU02D | 60 |
| UU05D | 80 |
| UU07D | 120 |
| UU09D | 160 |
| UU14D | 240 |
| UU18D | 300 |

Following the water drain cycle, this is the time that must elapse after the level sensor measures the low water level to ensure the tank is completely emptied. This is useful if for parameter Fc03 the drain solenoid valve has been selected as closed in standby.

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|---------------------|-----|-----|------|-----|
| Gea01 | Timings | | | | |
| | Tmax fill | * | 0 | 30 | min |
| | Tmax drain | * | 0 | 1200 | s |
| | Empty drain T. | * | 0 | 1200 | s |

Tab. 7.m

*: Depending on humiSonic size, see previous tables.

7.7.2 Production, refilling times

Tmax prod: maximum atomised water production time (drivers active), during which the level sensor must signal low water level.

Low lev delay: filtering time for low water detection. When the humidifier detects the low level during production, it waits the Low lev delay time before activating the load in order to reintegrate the water to the working level.

Max Hlev time: maximum time for measuring the high water level.

The humidifier checks the water level in the tank during production of atomised water. If the level does not fall, the following faults may have occurred:

1. piezoelectric transducer malfunction;
2. leaking fill solenoid valve;
3. fan malfunction.

If after the time set for Tmax prod (in minutes, default 30), the low water level has not been reached, atomised water production is stopped and the wait procedure starts (see the description in Tmax fill), after which the control attempts to resume production. If the condition remains, alarm EP will be activated, shutting down the unit. If after a percentage of Tmax prod, set on screen Gea03 (default 70%) the water level is above the high level for a time equal to "Max Hlev time", atomised water production stops and warning EL is generated. The wait procedure then starts, after which the controller will attempt to restart production. Warning EL is reset at the end of a production cycle that ends correctly. Alarm EL is also generated during standby if an abnormal water level is measured (the water level differs from the level measured when switching to standby, for a time equal to Max Hlev time).

Tmin prod: minimum atomised water production time (driver active) during which the low level sensor must not be activated.

Tmin prod sets a minimum production time (default 1 minute). If the production cycle lasts less than this time, the drain solenoid valve may not be tight or the fill solenoid valve flow-rate may be too low. The controller, in this case, activates the following procedures:

1. at the end of the first cycle, ending after less than Tmin prod, the Refill time is increased (50% more than Refill time);
2. at the end of the second cycle, ending after less than Tmin prod, the water refill time is further increased (100% more than Refill time) and chattering* of the drain solenoid valve is activated during the first automatic washing cycle;
3. at the end of the third cycle, ending after less than Tmin prod, the water refill time is further increased (150% more than Refill time) and a washing cycle is performed, including chattering* as activated in the previous step. Warning Ed will also be generated.
4. following the last stage, a new production cycle will be performed.

If the cause of the error persists, the controller will start the procedure from the beginning again, until it a full cycle is completed within the defined times. Any warnings will also be reset.

*Chattering: series of rapid opening/closing cycles of the drain solenoid valve, aimed at removing any residues (scale, dust, etc.) that prevent it from closing correctly.

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|---------------------|-----|-----|-----|-----|
| Gea04 | Timings | | | | |
| | Low lev delay | 10 | 0 | 200 | s |
| | MaxHLev Time | 10 | 1 | 60 | s |

Tab. 7.n

Refill time: time the fill solenoid valve is kept open for, after the control level (intermediate) has been reached during atomised water production.

| Model | Refilling T. [s] default |
|-------|--------------------------|
| UU02D | 20 |
| UU05D | 28 |
| UU07D | 40 |
| UU09D | 52 |
| UU14D | 80 |
| UU18D | 100 |

Tmax refill: maximum time the drivers remain active for during a water refilling cycle, after the level sensor has measured the low water level during atomised water production.

| Model | Refilling T. max [s] default |
|-------|------------------------------|
| UU02D | 40 |
| UU05D | 60 |
| UU07D | 80 |
| UU09D | 100 |
| UU14D | 160 |
| UU18D | 200 |

The piezoelectric transducers, by nature, if operated without water, will be quickly damaged until failing. To prevent this from happening, the controller ensures, via the level sensor, that even in the event of malfunctions the transducers are never activated without water present. When starting with an empty tank, the transducers are only activated when the low level is measured and, subsequently, the "Refill time" has elapsed. During refilling when the unit is operating, that is, after the low level has fallen due to atomised water consumption with consequent activation of the fill solenoid valve, if the level is not restored before the "Tmax refill" time, the transducers are switched off, while the fill cycle continues until:

- 1) the level has been restored and the "Refill time" has elapsed. The transducers are then reactivated
- 2) on activation of the fill valve, the time set for Tmax fill must elapse. Then the wait procedure will be activated, as described previously.

If, on the other hand, the level is correctly restored within the "Tmax refill" time, the transducers remain on and the fill cycle continues until the end of the Refill time.

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|---------------------|-----|-----|-----|-----|
| Gea02 | Timings | | | | |
| | Tmax refill | * | 1 | 60 | s |
| | Refill time | * | 0 | 120 | s |
| Gea03 | Timings | | | | |
| | Tmax prod | 30 | 1 | 200 | min |
| | Tmin prod | 1 | 1 | 200 | min |

Tab. 7.o

*: Depending on humiSonic size, see previous tables.

Low lev delay: low level filtering time for activating the fill cycle.

The float sensor must remain active for the time set by Low lev delay before the fill cycle (Refill) or the complete emptying timer (Empty Drain) is activated).

7.7.3 Unit offline alarm times

Remote board offline time: time after which the remote unit is deactivated (standby) if there is no serial connection with the control panel.

The remote unit checks communication status with the "Main" panel, and if for some reason there is no communication for the time set for the parameter, the unit goes into "safety" mode, that is, atomised water production is stopped and the drain cycle is activated.

Main board offline time: time after which the control panel generates the "Remote unit offline" alarm if no serial communication is detected.

If the "Main board offline time" elapses, and the control panel continues to not receive a response, the "Remote unit offline" alarm is activated. In this status, atomised water production can no longer be activated.

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|---------------------------|-----|-----|-----|-----|
| Gea05 | Timings | | | | |
| | Remote board offline time | 10 | 0 | 240 | s |
| | Main board offline time | 30 | 0 | 999 | s |

Tab. 7.p

8. PARAMETERS TABLE ("MAIN" ELECTR. PANEL)

| Mask | Display description | Notes | Def. | UOM | Min | Max | Value description | Type | R/W |
|---------------------------------------------------------------------------------------------------------|------------------------------|----------------------|---------------------|--------------|--------------|--------------------|-------------------------------------------------------------------------------------------------------------------|------|-----|
| Press UP/DOWN to display the Info icon and then press Enter to access the Information quick menu | | | | | | | | | |
| Info | | | | | | | | | |
| i01 | Humidifier size | | 0,5 | kg/h | 0,5 | 18 | | I | R |
| | Next wash | | - | h | | | | I | R |
| i02 | Work hours counter | | - | h | | | | I | R |
| | Machine hours counter | | - | h | | | | I | R |
| i03 | Water level sensor state | | - | | Low | High | Low ; Work ; High | I | R |
| i04 | Dip-switch state | | | | | | | | R |
| i05 | Secondary 1 status | | | | | | | I | R |
| | Secondary 1 op. hour counter | | | h | | | | I | R |
| i06 | Secondary 2 status | | | | | | | I | R |
| | Secondary 2 op. hour counter | | | h | | | | I | R |
| i07 | Secondary 3 status | | | | | | | I | R |
| | Secondary 3 op. hour counter | | | h | | | | I | R |
| i08 | Preheat probe | | | °C | -50 | 90 | | I | R |
| i09 | Output request | | - | % | 0.0 | 100.0 | | I | R |
| | Output signal | | - | V | 0.0 | 10.0 | | I | R |
| A. On/Off Unit | | | | | | | | | |
| A01 On/Off | | | | | | | | | |
| | Enable | | No | - | No | Yes | No ; Yes | D | R/W |
| | Autotest | | Yes | - | No | Yes | No ; Yes | D | R/W |
| | Manual wash | | No | - | No | Yes | No ; Yes | D | R/W |
| | Max Prod | | 100 | % | 10 | 100 | | I | R/W |
| B. Setpoint | | | | | | | | | |
| B01 | Setpoint | Fa01=reg. with probe | 50.0 | rH % / °C | 10.0 | 80.0 | | I | R/W |
| | Limit | | 90.0 | rH % | 0 | 100.0 | | I | R/W |
| C. Clock/ Scheduler | | | | | | | | | |
| C01 Clock | | | | | | | | | |
| | Day | | Monday | day | Monday | Sunday | - | I | R |
| | Date | | 01/01/2015 | dd/mm/yy | --/--/---- | --/--/---- | dd/mm/yy | I | R/W |
| | Hour | | hh:mm | hh:mm | 00:00 | 23:59 | hh:mm | I | R/W |
| C02 Clock | | | | | | | | | |
| | DST (daylight saving time): | | Enable | - | Enable | Disable | | D | R/W |
| | Transition time | | 60 | min | 0 | 240 | | I | R/W |
| | Start: | | Last | - | First | Last | First ; ... ; Fourth ; Last | I | R/W |
| | | | Sunday | day | Monday | Sunday | Monday ; ... ; Sunday ; *** | I | R/W |
| | in | | March | month | January | -- | January ; ... ; December ; - - | I | R/W |
| | at | | 2.00 | hour | 0.00 | 23.00 | | I | R/W |
| | End: | | Last | - | First | Last | First ; ... ; Fourth ; Last | I | R/W |
| | | | Sunday | day | Monday | *** | Monday ; ... ; Sunday | I | R/W |
| | in | | October | month | January | December | January ; ... ; December | I | R/W |
| | at | | 3.00 | ora | 0.00 | 23.00 | | I | R/W |
| C03 Scheduler | | | | | | | | | |
| | Enable scheduler ? | | No | - | No | Yes | No ; Yes | D | R/W |
| C04 Time bands (press Enter and UP/DOWN to check the box) | | | | | | | | | |
| | Day | | Monday | - | Monday | Sunday | Monday ; ... ; Sunday | I | R/W |
| | Time 1 | | hh/mm | 00:00 | 23:59 | | | I | R/W |
| | Off | | - | Off | On+Set | Off ; On ; On +Set | | I | R/W |
| | Humidity set point | | %rH | 0 | 100 | | | I | R/W |
| | Time 2 | | hh/mm | 00:00 | 23:59 | | | I | R/W |
| | Off | | - | Off | On+Set | Off ; On ; On +Set | | I | R/W |
| | Humidity set point | | %rH | 0 | 100 | | | I | R/W |
| | Time 3 | | hh/mm | 00:00 | 23:59 | | | I | R/W |
| | Off | | - | Off | On+Set | Off ; On ; On +Set | | I | R/W |
| | Humidity set point | | %rH | 0 | 100 | | | I | R/W |
| | Time 4 | | hh/mm | 00:00 | 23:59 | | | I | R/W |
| | Off | | - | Off | On+Set | Off ; On ; On +Set | | I | R/W |
| | Humidity set point | | %rH | 0 | 100 | | | I | R/W |
| | Time 5 | | hh/mm | 00:00 | 23:59 | | | I | R/W |
| | Off | | - | Off | On+Set | Off ; On ; On +Set | | I | R/W |
| | Humidity set point | | %rH | 0 | 100 | | | I | R/W |
| | Time 6 | | hh/mm | 00:00 | 23:59 | | | I | R/W |
| | Off | | - | Off | On+Set | Off ; On ; On +Set | | I | R/W |
| | Humidity set point | | %rH | 0 | 100 | | | I | R/W |
| D. Main/Secondary | | | | | | | | | |
| Secondary Manager | | | | | | | | | |
| E. Data logger | | | | | | | | | |
| E01 | Data logger | | | | | | | | |
| | N° | | - | - | 001 | 50 | Nr. alarm | I | R |
| | Hour | | - | hour : min | 00:00 | 23:59 | Time of alarm activation | I | R |
| | Date | | - | dd : mm : yy | 01 : 01 : 00 | 01 : 01 : 00 | Date of alarm activation | I | R |
| F. User | | | | | | | | | |
| a. Regulation | | | | | | | | | |
| Fa01 | Regulation | | | | | | | | |
| | Regulation type | | Probe rH%+limit rH% | - | On/Off | Probe T+Limit rH% | On/Off ; Ext.regulator ; Ext. regulator+limit rH% ; Probe rH% ; probe rH%+Limit rH% ; Probe T ; Probe T+Limit rH% | I | R/W |
| | Unit of measure | | °C-Kg/h | | °C-Kg/h | °F-lb/h | °C-Kg/h ; °F-lb/h | D | R/W |
| Fa02 | Regulation | | | | | | | | |
| | Max Prod | | 100 | % | 10 | 100 | | I | R/W |
| | Max Prod | | 100 | % | 10 | 100 | | I | R/W |
| | Min Prod | | 10 | % | 0 | 100 | | I | R/W |
| Fa03 | Regulation | | | | | | | | |
| | Ambient probe | | Analog | - | Analog | HYHU000000 | Analog ; HYHU000000 | D | R/W |

| Mask | Display description | Notes | Def. | UOM | Min | Max | Value description | Type | R/W |
|--------------------|-------------------------------|-----------------------------------------------|---------------|--------|------------|-------------------------------|------------------------------------------------------------|------|-----|
| Fa04 | Regulation | | | | | | | | |
| | Ambient probe | | (AI7) | | | | | | |
| | Type | | 0..1 V | - | 0..1 V | 0..1 V; 0..5 V; 0...10 V; NTC | | I | R/W |
| | Offset | | 0.0 | | -100.0 | 100.0 | | I | R/W |
| | Min | | 0.0 | | 0.0 | 100.0 | | I | R/W |
| | Max | | 100.0 | | 0.0 | 100.0 | | I | R/W |
| Fa05 | Alarm delay | | 0 | s | 0 | 999 | | I | R/W |
| | Regulation | Fa03=HYHU... | | | | | | | |
| Fa06 | Ambient probe (TH) | | | | | | | | |
| | Type | | rH%+T | | | | | | |
| | Offset | | 0.0 | | -20.0 | 50.0 | | I | R/W |
| Fa07 | Regulation | | | | | | Fa01: reg.=...+lim.rH% | | |
| | Limit probe | | (AI6) | | | | | | |
| | Type | | 0..5 V | - | 0..1 V | 0..5 V | | I | R/W |
| | Offset | | 0.0 | | -100.0 | 100.0 | | I | R/W |
| | Min | | 0.0 | | 0.0 | 100.0 | | I | R/W |
| | Max | | 100.0 | | 0.0 | 100.0 | | I | R/W |
| Fa08 | Alarm delay | | 10 | s | 0 | 999 | | I | R/W |
| | Regulation | | | | | | Fa01: reg.=probe (+lim.rH%) | | |
| Fa09 | Ambient probe differential | | 10 | rH%/°C | 0 | 99.9 | | I | R/W |
| | Limit probe differential | | 10 | rH% | 0 | 99.9 | | I | R/W |
| Fa10 | Regulation | | 10.0 | % | 0 | 99.9 | Fa01: reg.=probe ... | I | R/W |
| | Reg. hysteresis | | | | | | | | |
| Fa11 | Regulation | | | | | | Fa01: reg.=probe (+lim.rH%) | | |
| | Max amb. H/T | | 80.0 | rH%/°C | 0 | 100.0 | | I | R/W |
| | Min amb. H/T | | 0.0 | rH%/°C | 0 | 100.0 | | I | R/W |
| | Max Lim. Hum. | | 100.0 | rH% | 0 | 100.0 | | I | R/W |
| Fa12 | Min Lim. Hum. | | 0.0 | rH% | 0 | 100.0 | | I | R/W |
| | Regulation | | N.C. | - | N.C. | N.O. | N.C: production if closed contact | I | R/W |
| Fa13 | Regulation | | | | | | | | |
| | Mist modulation mode | | Serie | - | Serie | Parallel | See DIP-SWITCH settings | I | R |
| | Mist modulation period | | 1 | s | 1 | 10 | | I | R/W |
| Fa14 | Enable preheating probe | | No | - | No | Yes | | D | R/W |
| | Alarm delay | | 0 | s | 0 | 999 | | I | R/W |
| Fa15 | Preheat set point | | 28 | °C | -100 | 100 | | I | R/W |
| | Preheat differential | | 10 | °C | -100 | 100 | | I | R/W |
| Fa16 | PR% out type (output request) | | 0-5V | - | 0-5V | 0-10V | | I | R/W |
| b. | | | | | | | | | |
| Fb01 | Washings | | | | | | | | |
| | Washings | | | | | | | | |
| | Time triggered | <i>Time or event triggered (OR condition)</i> | Absolute time | - | Disabled | Scheduled | Disabled Absolute time Working/ No working Scheduled | I | R/W |
| Fb02 | Event triggered | | Disabled | - | Disabled | From request | Disabled From digital input From request | I | R/W |
| | From mask | | Yes | - | Yes | No | Yes No | I | R/W |
| Fb03 | From BMS | | Yes | - | Yes | No | Yes No | I | R/W |
| | Work wash | Fb01=working/ no working | | | | | | | |
| Fb04 | Enabled | | Yes | | No | Yes | Yes No | I | R/W |
| | Work wash period | | 1 | min | 1 | 480 | | I | R/W |
| Fb05 | Nowork wash | Fb01= working/no working | | | | | | | |
| | Enabled | | Yes | - | No | Yes | Yes No | I | R/W |
| | Nowork period | | 24 | h/m | 1 | 480 | | I | R/W |
| Fb06 | Next wash | | 24 | h/m | 1 | 480 | | I | R/W |
| | Absolute | Fb01= absolute time | | | | | | | |
| Fb07 | Period | | 24 | h/m | 0 | 999 | | I | R/W |
| | Next wash | | 24 | h/m | 0 | 999 | | I | R/W |
| | Scheduled | Fb01=Progr. | | | | | | | |
| Fb08 | Start | | 00:00 | hh/min | 00:00 | 23:59 | | I | R/W |
| | Select day ? | | No | | No | Yes | | D | R/W |
| | Every | | Monday | | Monday | Sunday | | I | R/W |
| Fb09 | From DI | Fb01=da DI | | | | | | | |
| | Input | | Humidostat | | Humidostat | Rem. On/Off | | D | R/W |
| Fb10 | When | Activ. event | On --> Off | | On --> Off | Off --> On | | D | R/W |
| | From request | Fb01=from request | | | | | | | |
| Fb11 | When request | | Rise | - | Rise | Falls | | D | R/W |
| | Wash settings | Fb01=abs. time | | | | | | | |
| Fb12 | Washing time | | 1 | min | 0 | 10 | | I | R/W |
| | Only if ready ? | | No | | No | Yes | | D | R/W |
| c. Settings | | | | | | | | | |
| Fc01 | Settings | | | | | | | | |
| | Start delay | | 10 | s | 0 | 120 | | I | R/W |
| | Restart wait | | 10 | min | 1 | 60 | | I | R/W |
| Fc02 | Settings | | | | | | | | |
| | Alarm relay logic | | N.O. | - | N.O. | N.C. | | D | R/W |
| | Status relay | | Production | | Production | Maintenance | Production Maintenance | I | R/W |
| Fc03 | Logic | | N.O. | - | N.O. | N.C. | | D | R/W |
| | Settings | | | | | | | | |
| Fc04 | Drain valve in stand-by(*) | | Open | - | Open | Closed | | D | R/W |
| | Drain delay in stand-by | (*)=Open | 0 | min | 0 | 60 | | I | R/W |
| G. Service | | | | | | | | | |
| a. | Change language | | | | | | | | |
| | Language | | Italian | - | English | Italian | | D | R/W |
| b. | System information | | | | | | | | |

| Mask | Display description | Notes | Def. | UOM | Min | Max | Value description | Type | R/W |
|-----------|-------------------------------------------------------------------------------------------|-------------|------------------|----------|----------|--------------------------|-----------------------------------------------------------------|------|-----|
| Gb01 | Information | | | | | | | | |
| | FLSTDMHUSU | | SW name | | | | | | |
| | Version | | 0.3.008B | | | | | | |
| | Date | | - | dd/mm/yy | | | Date software release | I | R |
| | Bios | | | dd/mm/yy | | | BIOS release date | I | R |
| | Boot | | | dd/mm/yy | | | BOOT release date | I | R |
| Gb02 | Information | | | | | | | | |
| | Board type | | --- | | | | | | |
| | Board size | | --- | | | | | | |
| | Total flash | | 2048 | KB | | | | I | R |
| | RAM | | 512 | KB | | | | I | R |
| | Built-in type | | None | | | | | I | R |
| | Main cycle | | - | ms | | | | I | R |
| Gb03 | Firmw. release | | - | | | | | I | R |
| | HW Id | | - | | | | | I | R |
| | Functional Test | | - | | | | | I | R |
| c. | Working hours | | | | | | | | |
| Gc01 | Work counter | | 0 | h | 0 | 32767 | | I | R/W |
| | Machine counter | | 0 | h | 0 | 32767 | | I | R/W |
| Gc02 | Hours counter | | | | | | | | |
| | Maintenance hours | | 5000 | h | 0 | 20000 | | I | R/W |
| | Remainder every | | 60 | min | 0 | 240 | | I | R/W |
| d. | BMS configuration | | | | | | | | |
| Gd01 | Service password | | | | | | | | |
| | Insert service password (PW1) | | | | | | | | |
| | BMS configuration | | | | | | | | |
| | Protocol | | Modbus | - | Modbus | Carel | Modbus ; Carel | D | R/W |
| Gd01 | Speed | | 19200 | bps | 1200 | 19200 | 1200 ; 2400 ; 4800 ; 9600 ; 19200 | I | R/W |
| | Address | | 1 | - | 1 | 207 | | I | R/W |
| Gd02 | BMS configuration | | | | | | | | |
| | Serial manager | | Disabled | | Disabled | On/off + Control + Limit | Disabled On/off On/off + Control On/off + Control + Limit | I | R/W |
| e. | Service settings | | | | | | | | |
| a. | Timings | | | | | | | | |
| Gea01 | Timings | | | | | | | | |
| | Tmax fill | | see chapt. 7.7.1 | min | 0 | 30 | | I | R/W |
| | Tmax drain | | see chapt. 7.7.1 | s | 0 | 300 | | I | R/W |
| | Empty Drain T. | | see chapt. 7.7.1 | s | 0 | 60 | | I | R/W |
| Gea02 | Timings | | | | | | | | |
| | Tmax Refill | | see chapt. 7.7.2 | s | 1 | 60 | | I | R/W |
| | Refill time | | see chapt. 7.7.2 | s | 0 | 120 | | I | R/W |
| Gea03 | Timings | | | | | | | | |
| | Tmax prod. | | 30 | min | 1 | 200 | | I | R/W |
| | Level test at | | 70 | % | 50 | 90 | | | |
| | Tmax production | | | | | | | | |
| Gea04 | Tmin prod. | | 1 | min | 1 | 200 | | I | R/W |
| | Timings | | | | | | | | |
| Gea04 | Low lev delay | | 10 | s | 0 | 200 | | I | R/W |
| | Max HLev Time | | 10 | s | 1 | 60 | | I | R/W |
| Gea05 | Timings | | | | | | | | |
| | Remote board offline time | | 30 | s | 0 | 240 | | I | R/W |
| | Main board offline time | | 30 | s | 0 | 999 | | I | R/W |
| b. | Reset / Default | | | | | | | | |
| Geb01 | Reset Cnt/Logs | | | | | | | | |
| | Delete data logger | | No | - | No | Yes | No ; Yes | D | R/W |
| | Reset counter | | No | - | No | Yes | No ; Yes | D | R/W |
| Geb02 | DEFAULT INSTALLATION: erase user settings and install global default value ("Main" panel) | | No | - | No | Yes | No ; Yes | D | R/W |
| Geb03 | Install default parameters on remote unit (humidifier) | | No | - | No | Yes | No ; Yes | D | R/W |
| c. | Access management | | | | | | | | |
| Gec01 | Access management | | | | | | | | |
| | Password delay | | 1 | min | 0 | 30 | | D | R/W |
| Gec02 | Access management | | | | | | | | |
| | Quick menu | | Yes | - | No | Yes | No ; Si | D | R/W |
| | Main menu password | | No | - | No | Yes | No ; Si | D | R/W |
| Gec03 | Access management | | | | | | | | |
| | Insert new main menu password (PW0) | | 0000 | | 0000 | 9999 | | I | R/W |
| Gec04 | Access management | | | | | | | | |
| | Insert new service password (PW1) | | 0000 | | 0000 | 9999 | | I | R/W |
| f. | Manual management | | | | | | | | |
| Gf01 | Manual mode | | | | | | | | |
| | Manual mode | | No | - | No | Yes | No ; Yes | D | R/W |
| Gf02 | Manual management | Gf01:mod=si | | | | | | | |
| | Fill | | Off | - | Off | On | Off ; On | D | R/W |
| | Drain | | On | - | Off | On | Off ; On | D | R/W |
| Gf03 | Manual management | | | | | | | | |
| | Mist 1 | | No | - | No | Yes | No ; Yes | D | R/W |
| | Mist 2 | | No | - | No | Yes | No ; Yes | D | R/W |
| | Alarm relè | | On | - | Off | On | Off ; On | D | R/W |
| Gf04 | Manual management | | | | | | | | |
| | Ambient probe | | 0 | - | 0 | 1000 | | I | R/W |
| | Limit probe | | 0 | - | 0 | 1000 | | I | R/W |

Tab. 8.a

8.1 Supervisor variable list

The interface to an RS485 supervisor network using the Carel/Modbus protocol with a maximum baud rate of 19200 bps requires installation of the optional opto-isolated card PCOS004850 and the plastic support PCOS005030 that fixes the optional card to the electronic control board slot on the "Main" electrical panel board.

The serial line is configured by default with the following parameters:

- address 1
- baud rate 19200 bps
- frame 8, N, 2 (not modifiable)

It is recommended to not set any variables that are not shown in the table, even if they are visible on the supervisor, so as to not risk comprising correct humidifier operation.

| CAREL | Modbus® | Analogue variables (Modbus®: REGISTERS) | Type | Screen index |
|-------|---------|------------------------------------------|------|-------------------------------------|
| 4 | 4 | Instant production | D | Main screen |
| 5 | 5 | Main humidifier capacity | D | i01 (in the absence of Secondaries) |
| 6 | 6 | Secondary humidifier 1 capacity | D | D02 |
| 7 | 7 | Secondary humidifier 2 capacity | D | D04 |
| 8 | 8 | Secondary humidifier 3 capacity | D | D06 |
| 14 | 14 | Preheat set point | R/W | Fa13 |
| 15 | 15 | Preheat differential | R/W | Fa13 |
| 19 | 19 | Total Main + Secondary capacity | D | i01 |
| 20 | 20 | Room probe | D | Main screen |
| 22 | 22 | Limit probe | D | Main screen |
| 23 | 23 | Room set point | R/W | A01 |
| 24 | 24 | Limit set point | R/W | A01 |
| 25 | 25 | Min NTC main probe | R/W | Fa04 |
| 26 | 26 | Max NTC main probe | R/W | Fa04 |
| 29 | 29 | Room probe differential | R/W | Fa07 |
| 30 | 30 | Limit probe differential | R/W | Fa07 |
| 31 | 31 | Control hysteresis | R/W | Fa08 |
| 32 | 32 | Maximum value read by active room probe | R/W | Fa09 |
| 33 | 33 | Minimum value read by active room probe | R/W | Fa09 |
| 34 | 34 | Maximum value read by active limit probe | R/W | Fa09 |
| 35 | 35 | Minimum value read by active limit probe | R/W | Fa09 |

Tab. 8.b

| CAREL | Modbus® | Digital variables (Modbus®: COILS) | Type | Screen index |
|-------|---------|--------------------------------------------------|------|--------------|
| 9 | 9 | Low level | R | i03 |
| 10 | 10 | High level | R | i03 |
| 12 | 12 | Autotest completed | R | - |
| 18 | 18 | Production in progress | R | - |
| 19 | 19 | Fill | R | - |
| 20 | 20 | Drain | R | - |
| 21 | 21 | Piezoelectric transducers row 1 status | R | - |
| 22 | 22 | Piezoelectric transducers row 2 status | R | - |
| 26 | 26 | Manual drain | R/W | Gf02 |
| 28 | 28 | Reset counter | R/W | Geb01 |
| 29 | 29 | Reset alarms | R/W | - |
| 34 | 34 | Secondary 1 online | R | D01 |
| 35 | 35 | Secondary 2 online | R | D01 |
| 36 | 36 | Secondary 3 online | R | D01 |
| 39 | 39 | Skipping wash | R/W | - |
| 40 | 40 | Disable Secondary 1 | R/W | - |
| 41 | 41 | Disable Secondary 2 | R/W | - |
| 42 | 42 | Disable Secondary 3 | R/W | - |
| 50 | 50 | Manual mode | R/W | Gf01 |
| 51 | 51 | Alarm relay | R | - |
| 52 | 52 | Status relay | R | - |
| 53 | 53 | Remote on/off | R | - |
| 54 | 54 | Humidistat status | R | - |
| 55 | 55 | On/Off from keypad | R/W | A01 |
| 57 | 57 | Enable scheduler | R/W | C03 |
| 58 | 58 | Unit of measure SI/IP | R/W | Fa01 |
| 59 | 59 | Analogue room probe/HYHU | R/W | Fa03 |
| 60 | 60 | Digital humidistat input logic | R/W | Fa10 |
| 61 | 61 | Enable manual wash activation from screen A01 | R/W | Fb02 |
| 62 | 62 | Enable manual wash activation from BMS serial | R/W | Fb02 |
| 63 | 63 | Serial wash command | R/W | - |
| 64 | 64 | Enable wash during operation | R/W | Fb03 |
| 65 | 65 | Unit of measure for wash time during operation | R/W | Fb03 |
| 66 | 66 | Enable wash due to inactivity | R/W | Fb04 |
| 67 | 67 | Unit of measure for wash time due to inactivity | R/W | Fb04 |
| 68 | 68 | Unit of measure for total wash time | R/W | Fb05 |
| 69 | 69 | Enable day selection for programmed washing | R/W | Fb06 |
| 70 | 70 | Type of digital input for physical washing event | R/W | Fb07 |
| 71 | 71 | Digital input logic for physical washing event | R/W | Fb07 |
| 72 | 72 | Request logic for physical washing event | R/W | Fb08 |
| 73 | 73 | Washing only if ready | R/W | Fb09 |
| 74 | 74 | Alarm relay logic | R/W | Fc02 |
| 75 | 75 | Status relay function | R | Fc02 |
| 76 | 76 | State relay logic | R/W | Fc02 |
| 78 | 78 | Disable via serial | R/W | - |
| 82 | 82 | Enable preheat probe | R/W | Fa12 |

Tab. 8.c

| CAREL | Modbus® | Integer variables (Modbus®: REGISTERS) | Type | Screen index |
|-------|---------|------------------------------------------------|------|----------------------|
| 2 | 210 | Firmware release | R | Gb03 |
| 4 | 212 | Hardware id | R | Gb03 |
| 7 | 215 | Humidifier status | R | Schermata principale |
| 13 | 224 | Dipswitch status | R | i04 |
| 27 | 235 | Max production T | R/W | Gea03 |
| 28 | 236 | Min production T | R/W | Gea03 |
| 32 | 240 | Wash duration | R/W | Fb09 |
| 33 | 241 | Delay at start-up | R/W | Fc01 |
| 34 | 242 | Hours for maintenance | R/W | Gc02 |
| 35 | 243 | Maintenance reminder | R/W | Gc02 |
| 36 | 244 | Modulation period | R/W | Fa11 |
| 39 | 247 | Max fill T | R/W | Gea01 |
| 40 | 248 | Refill T | R/W | Gea02 |
| 41 | 249 | Max drain T | R/W | Gea01 |
| 42 | 250 | Empty drain time | R/W | Gea01 |
| 43 | 251 | Low lev delay | R/W | Gea04 |
| 53 | 261 | Operating hour counter | R | Gc01 |
| 54 | 262 | Unit hour counter | R | Gc01 |
| 62 | 270 | Serial Secondary Command | R/W | D03/D05/D07 |
| 63 | 271 | Secondary Value | R/W | D03/D05/D07 |
| 65 | 273 | Remote board offline time | R/W | Gea05 |
| 69 | 277 | Waiting for restart | R/W | Fc01 |
| 70 | 278 | Percentage of max prod T for level test | R/W | Gea03 |
| 72 | 280 | Drain delay in standby | R/W | Fc03 |
| 73 | 281 | Max refill T | R/W | Gea02 |
| 74 | 282 | Max HLev Time | R/W | Gea04 |
| 87 | 295 | Secondary 1 FW release | R | D02 |
| 89 | 297 | Secondary 1 status | R | D02 |
| 92 | 300 | Secondary 1 hour counter | R | D02 |
| 93 | 301 | Secondary 2 FW release | R | D04 |
| 95 | 303 | Secondary 2 status | R | D04 |
| 98 | 306 | Secondary 2 hour counter | R | D04 |
| 99 | 307 | Secondary 3 FW release | R | D06 |
| 101 | 309 | Secondary 3 status | R | D06 |
| 104 | 312 | Secondary 3 hour counter | R | D06 |
| 105 | 313 | Piezoelectric transducer hour counter | R | - |
| 106 | 314 | Countdown to replace piezoelectric transducers | R | - |
| 107 | 315 | Life of piezoelectric transducers | R/W | - |
| 108 | 316 | SW Version | R | Gb01 |
| 109 | 317 | SW Date | R | Gb01 |
| 110 | 318 | Percentage output | R | i09 |
| 111 | 319 | Type of control | R/W | Fa01 |
| 112 | 320 | Max production | R/W | Fa02 |
| 113 | 321 | Min production | R/W | Fa02 |
| 114 | 322 | Type of main probe | R/W | Fa04 |
| 115 | 323 | Main probe offset | R/W | Fa04 |
| 116 | 324 | Min active main probe | R/W | Fa04 |
| 117 | 325 | Max active main probe | R/W | Fa04 |
| 118 | 326 | Main probe alarm delay | R/W | Fa04 |
| 119 | 327 | Limit probe type | R/W | Fa06 |
| 120 | 328 | Limit probe offset | R/W | Fa06 |
| 121 | 329 | Min active limit probe | R/W | Fa06 |
| 122 | 330 | Max active limit probe | R/W | Fa06 |
| 123 | 331 | Limit probe alarm delay | R/W | Fa06 |
| 124 | 332 | Time event for wash activation | R/W | Fb01 |
| 125 | 333 | Time event for wash activation | R/W | Fb01 |
| 126 | 334 | Washing time during operation | R/W | Fb03 |
| 127 | 335 | Washing countdown during operation | R | Fb03 |
| 128 | 336 | Washing time due to inactivity | R/W | Fb04 |
| 129 | 337 | Washing countdown due to inactivity | R | Fb04 |
| 130 | 338 | Total washing time | R/W | Fb05 |
| 131 | 339 | Total washing countdown | R | Fb05 |
| 132 | 340 | Scheduled wash hours | R/W | Fb06 |
| 133 | 341 | Scheduled wash minutes | R/W | Fb06 |
| 134 | 342 | Scheduled wash weekday | R/W | Fb06 |
| 136 | 344 | Request from BMS serial | R/W | - |
| 139 | 347 | Main board offline time | R/W | Gea05 |
| 140 | 348 | Preheat probe alarm delay | R/W | Fa12 |
| 143 | 351 | Supervisor control type | R/W | Gd02 |

Tab. 8.d

9. ALARMS

9.1 Types of alarms

There are two types of alarms:

- manual reset;
- automatic reset: the alarm is reset and the unit restarts automatically when the alarm condition is no longer present;

When an alarm occurs, the Alarm button flashes and the display shows the standard display.

Press Alarm to display a short description of the alarm.

Press Alarm again to attempt to reset the alarm:

1. if the cause is no longer present, the alarm should be reset and the red light on the button will go off;
2. if the reset attempt fails, the Alarm button stays on steady, signalling that the alarm has been acknowledged.

If the alarm is reset automatically, the Alarm button goes off and the alarm reset event is recorded in the alarm log.

Example: the high humidity alarm is visible in the list of alarms, and the log shows the activation event (down arrow) and reset event (up arrow).

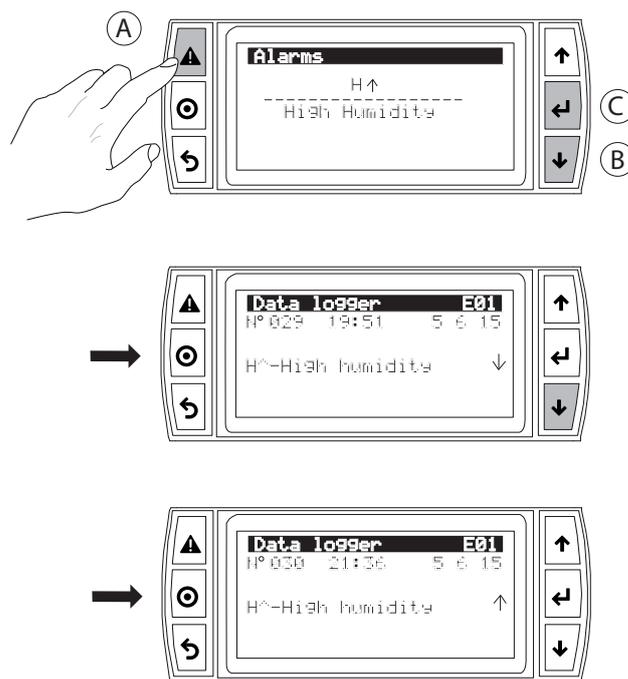


Fig. 9.a

9.2 Alarm table

| Source | "Secondary" electr. panel | "Main" electrical panel | Cause | Solution | Alarm relay activation | Action | Reset |
|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------------------------------------|----------------------------------|
| Humidifier | 2 fast flashes | Et Autotest failed | <ul style="list-style-type: none"> • Feedwater not connected or insufficient • drain open • float failure | Check: <ul style="list-style-type: none"> • feedwater and fill valve; • blockage of the filter on the fill solenoid valve; • check drain solenoid valve and drain connection; | yes | humidification stopped | ESC ("Main") |
| Humidifier | 5 fast flashes | EP no production  | Piezoelectric transducer malfunction | Perform maintenance on the case | yes | humidification stopped | ESC ("Main") |
| Humidifier | 3 fast flashes | EF no water  | Mains water interruption or fill solenoid valve malfunction | Check: <ul style="list-style-type: none"> • feedwater and fill valve; • blockage of the filter on the fill solenoid valve; | yes (in the 10 minute waiting period) | humidification stopped for 10 minutes only | automatic (after 10 minute wait) |
| Humidifier | 4 fast flashes | Ed drain failure  | Drain circuit/solenoid valve malfunction | Check drain valve and drain connection | yes | humidification stopped | ESC ("Main") |
| Humidifier | 5 slow flashes | CL tank maintenance request signal  | 1500 operating hours exceeded for recommended maintenance | Carry out maintenance on tank and transducers (chap. 10) | no | signal only | Reset hour counter (Geb01) |
| "Main" panel | - | Ambient probe Probe broken or incorrectly connected | Cable interrupted/disconnected/incorrectly connected. | Check the reference signal | yes | humidification stopped | AUTO |
| "Main" panel | - | Limit probe Probe broken or incorrectly connected | Cable interrupted/disconnected/incorrectly connected. | Check the reference signal | yes | humidification stopped | AUTO |

| Source | "Secondary" electr. panel | "Main" electrical panel | Cause | Solution | Alarm relay activation | Action | Reset |
|--------------|---------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|------------------------|------------------------|----------------------------------------|
| "Main" panel | - | H ↑ High humidity | The signal from the probe indicates a humidity higher than 80%rH | Check humidity probe signal/cable | yes | signal only | AUTO |
| "Main" panel | - | H ↓ Low humidity | The signal from the probe indicates a humidity lower than 20%rH | Check humidity probe signal/cable | yes | signal only | AUTO |
| Humidifier | 2 slow flashes | EE EEPROM alarm | EEPROM problems | If the problem persists, contact the CAREL service centre | yes | humidification stopped | If the fault persists, contact service |
| Humidifier | 1 fast flash | E0 Remote unit | Functional test not complete in the factory / EEPROM problems | If the problem persists, contact the CAREL service centre | yes | humidification stopped | If the fault persists, contact service |
| Humidifier | 8 fast flashes | EL Water level alarm  | Level too high during atomised water production due to: • fill SV leaks • transducer malfunction | Check: • fill SV • transducers | yes | humidification stopped | AUTO |
| "Main" panel | - | Offline Remote unit offline | The panel does not detect communication with the remote unit | Check: • serial connection cable • power cable | yes | humidification stopped | AUTO |

Tab. 9.a

9.3 Troubleshooting

 **Note:** if the problem identified cannot be solved using the following guide, contact CAREL technical service.

1. Firstly, check the humidifier and the surrounding area.

| Problem | Cause | | Check | Solution |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------|
| No atomised water production | Power supply | Humidifier switch in the OFF position | Check the switch | Switch ON |
| | | No power | Measure the voltage at the humidifier input terminals | Connect power |
| | | Power supply fault | Measure the voltage at the power supply output terminals | Replace the power supply |
| The quantity of atomised water is too low | Feedwater system | Valve closed upstream | Check | Open the valve |
| | Power supply | Low power supply voltage | Check the voltage at the power supply output terminals | Replace the power supply, if damaged |
| | Feedwater system | Water level during production is too high and overflowing | Check visually | See table 2) |
| | Other | The humidifier is not installed horizontally | Check visually | Adjust |
| No atomised water production | Dust and foreign matter accumulated in the tank (*) Transducer deterioration | | The average life of the transducer is around 10,000 to 15,000 operating hours | Clean the inside of the tank Replace |
| | | | Visually check the inside of the tank | |
| The quantity of atomised water is too low | Dust and foreign matter accumulated in the tank (*) Scale build-up on the surface of the piezoelectric transducers (*) | | | Clean the inside of the tank and replace the transducers |
| | | | | |

Tab. 9.b

(*) These malfunctions can be avoided by carrying out preventive maintenance.

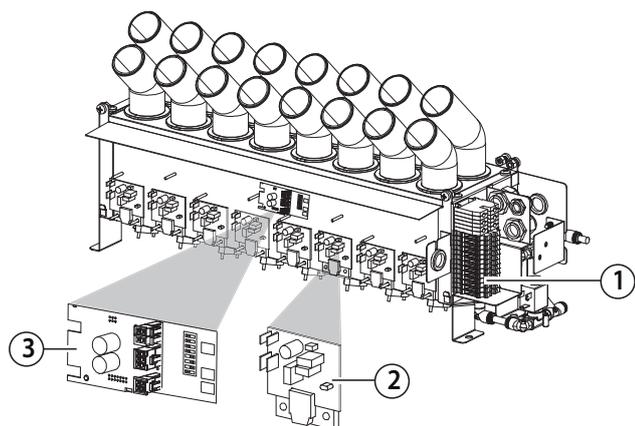
2. If the cause has not been identified with the previous checks, there may be faulty components. Check the inside of the humidifier.

| Problem | Cause | | Check | Solution |
|-------------------------------------------|----------------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| No atomised water production | Feedwater system | Float level sensor fault | Empty the tank, remove the electronic board and check continuity of the level sensor | Contact service to replace the level sensor |
| | | Float level sensor blocked | | Clean the sensor. If normal operation is not restored, replace |
| | | Fill valve fault | No water filled even when the tank has been emptied | Replace the valve Clean the sensor. If normal operation is not restored, replace |
| | Other | The fan cables are loose or detached | Check connection after removing the humidifier cover | Restore correct connection to the terminals |
| The quantity of atomised water is too low | Water level overflow | Float level sensor blocked | If the water level in the tank reaches the overflow pipe, remove the connector from the control board and check continuity of the level sensor | If there is continuity, contact service to replace the level sensor |
| | | Fill valve fault | Water is filled even after switching off the appliance | Replace the fill valve |

Tab. 9.c

10. MAINTENANCE AND SPARE PARTS

10.1 Electrical components



UQ Control Panel

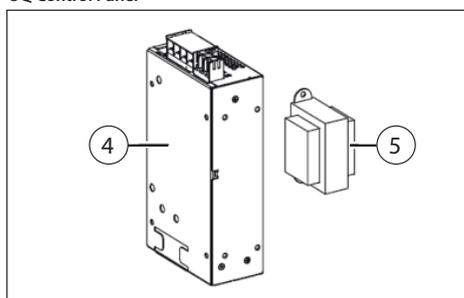


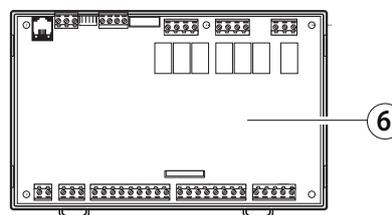
Fig. 10.a

Key:

| no. | Description | Spare part no. |
|-----|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 1 | Terminal block | - |
| 2 | Driver board | UUKDE00000 |
| 3 | Electronic control board | UUF(XY)D0000 |
| 4 | Secondary/Main control panel power supply | UUKA300000 for UQ05 control panel UUKA600000 for UQ09 control panel 2 pz. UUKA600000 for UQ18 control panel |
| 5 | Secondary/Main control panel Transformer | MCKTR00000 for all control panel-models UQ |
| 6 | Main panel electronic board | UUKI000000 |

Tab. 10.a

(XY) = **02** → 2,4 kg/h (5.3 lbs/h), **05** → 4,8 kg/h (10.6 lbs/h), **07** → 7,2 kg/h (15.8 lbs/h), **09** → 9,6 kg/h (21.1 lbs/h), **14** → 14,4 kg/h (31.7 lbs/h), **18** → 18 kg/h (39.6 lbs/h)



10.2 Mechanical components

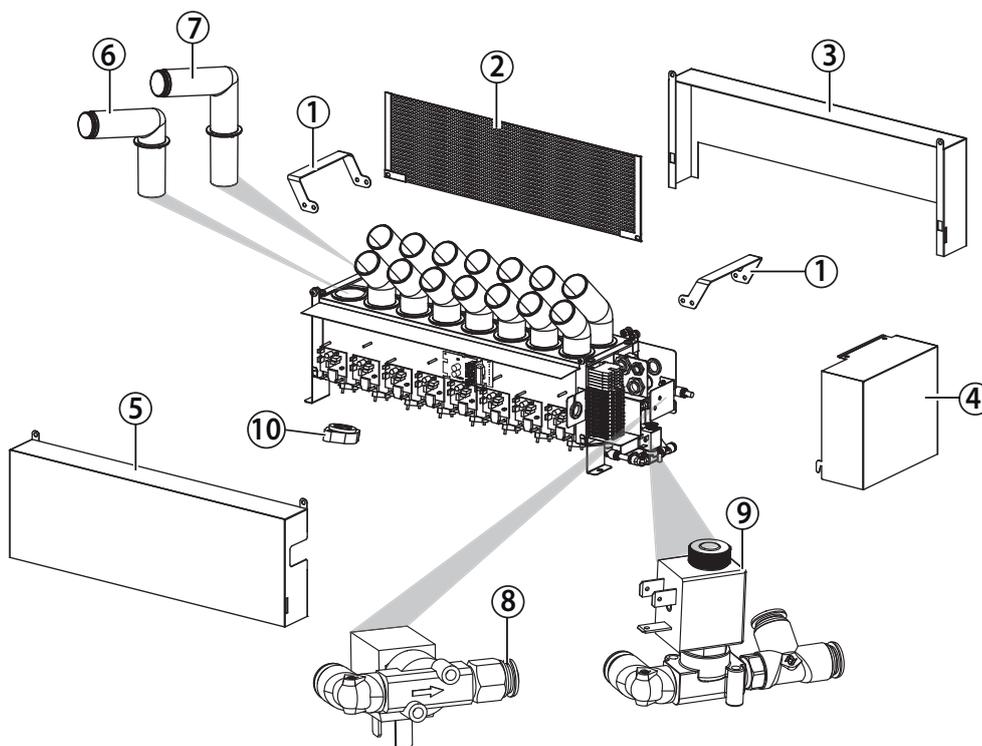


Fig. 10.b

Legenda:

| no. | Description | Spare part no. |
|-----|----------------------------------|----------------|
| 1 | Lifting handle | - |
| 2 | Baffle | - |
| 3 | Rear cover | - |
| 4 | Terminal block cover | - |
| 5 | Front cover | - |
| 6 | Front diffuser | UUKDA00000 |
| 7 | Rear diffuser | UUKDR00000 |
| 8 | Drain solenoid valve kit | UUKDN00000 |
| 9 | Fill solenoid valve kit | UUKFR00000 |
| 10 | Piezoelectric transducer | UUKTP00000 |
| 11 | Sensore di livello interno vasca | UUKLV00000 |

Tab. 10.b



Note: maintenance on the humidifier must be carried out by CAREL technical service or other professionally qualified personnel

10.3 System information

This screen shows the currently installed software revision, the memory usage and the cycle time.

| Screen index | Display description | |
|--------------|---------------------|-----------------------|
| Gb01 | Information | |
| | FLSTDMHUSU | |
| | Version | |
| | Date | Software release date |
| | Bios | BIOS release date |
| Gb02 | Boot | BOOT release date |
| | Information | |
| | Board type | |
| | Board size | |
| | Total flash | |
| Gb03 | RAM | |
| | Built-in type | |
| | Main cycle | |
| | Firmware release | |
| | HW Id | |
| | Functional test | |

Tab. 10.c

| Screen index | Display description | Def | Min | Max | UOM |
|--------------|---------------------|------|-----|-------|-----|
| Gc01 | Hour counter | | | | |
| | Work counter | 0 | 0 | 32767 | h |
| | Machine counter | 0 | 0 | 32767 | h |
| Gc02 | Hour counter | | | | |
| | Maintenance hours | 5000 | 0 | 20000 | h |
| | Reminder every | 60 | 0 | 240 | min |

Tab. 10.d

Mains water

| Water hardness | 15...25 °f (150 ... 250 µS/cm) | 25...40 °f (250 to 400 µS/cm) |
|-----------------------------|-----------------------------------|----------------------------------|
| Daily operating hours | 8...10 | 8...10 |
| Maintenance operations/year | 2 | 3 |

Tab. 10.e

Demineralised water

The use of demineralised water minimises maintenance requirements.

Note: it is recommended to perform special maintenance and repairs at least once a year, irrespective of the number of operating hours shown on the operating hour counter.

10.4 Maintenance

Important: before performing any operations:

- power the unit off at the switch (off) on the control panel;
- empty the water from the tank.

The fill valve is normally closed and the drain valve is normally open, consequently, when powering down the humidifier, the unit is drained automatically.

Note: preventive maintenance on the humidifier is recommended to ensure optimum system performance. Maintenance includes:

- checking tightness of the electrical connectors;
- cleaning and visual inspection of the components;
- checking water level and making sure there are no leaks.

Important:

- the piezoelectric transducer is very delicate: when cleaning the inside of the tank, make sure not to scratch it, for example with a screwdriver;
- tighten the nuts applying the maximum allowed torque (8 ± 0.5 kg-cm). Excessive tightening torque may damage the humidifier.

It is recommended to periodically check operation of the piezoelectric transducers, the corresponding driver boards and the fans, by carrying out a visual inspection:

- make sure there a water column above each of the piezoelectric transducers during humidifier operation;
- check that the LEDs on the driver boards are on and are yellow during humidifier operation.

10.5 Maintenance operations

Routine maintenance on humidifiers operating on demineralised water involves cleaning all the parts in contact with the water:

- fill/drain lines;
- water tank.

Special maintenance and repairs involve replacement of:

- fill/drain solenoid valve;
- driver board;
- piezoelectric transducer;
- electronic control board.

10.6 Maintenance intervals

Maintenance intervals depend on water quality and the quantity of atomised water produced. An operating hour counter (effective production) and a unit operating hour counter (total hours) can be set, together with a maintenance hour counter, after which the display shows a warning message. See alarm CL.

10.7 Replacing the components

To access the load/drain solenoid valve, remove closure on the terminal block-side.

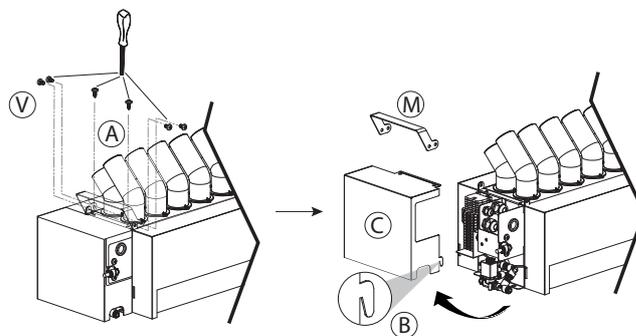


Fig. 10.c

- loosen and remove the screws (A) and release the cover (C) at point (B) to remove. If necessary, loosen the screws (V) to remove the lifting handle (M).

Drain solenoid valve

- unplug the electrical connectors and move the spring fasteners so as to remove the hoses, then remove the block (D): elbow connector, drain valve, T-connector.

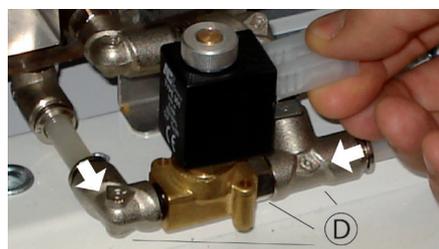


Fig. 10.d

Fill solenoid valve

- loosen and remove the screws (arrows) so as to remove the bracket (E);

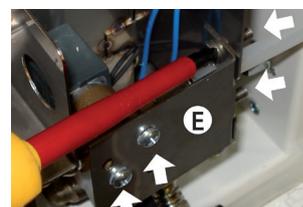


Fig. 10.e

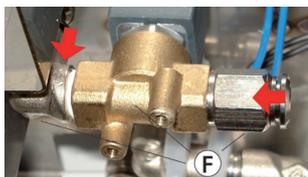


Fig. 10.f

- unplug the electrical connectors and move the spring fasteners so as to remove the hoses, then remove the block (F): elbow connector, fill valve, connector.

Dismantling the panels (to access the front driver board and the tank)

After having removed the cover (C) on the terminal block, work on the left-hand side and:

- unscrew the screws (V) that secure the bracket (S) and remove it;
- loosen the bolts/nuts that fasten the handles (M) and remove them;
- remove the front (G) and rear (H) panels;
- finally, lift the cover (D) and the diffusers to access the tank.

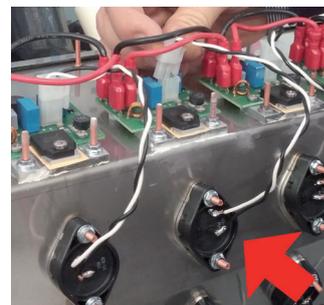


Fig. 10.i

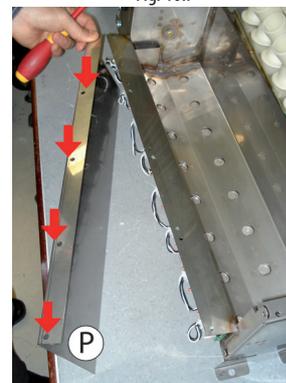


Fig. 10.j

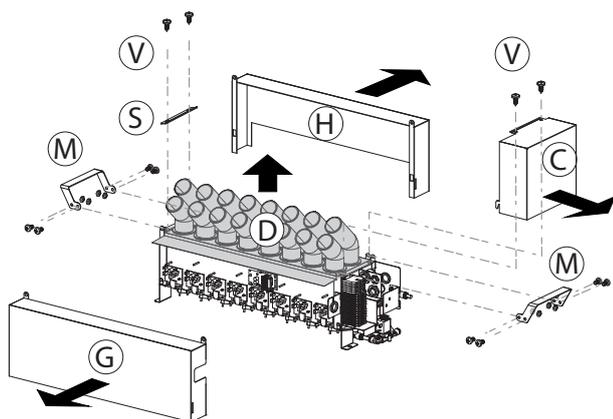


Fig. 10.g

Diffusers

The diffusers are only attached to the top cover. Once the cover has been removed, to replace the diffusers simply lift them off.

Control board and front driver board

Remove the front panel (G) as explained in the previous paragraph.

- unplug the electrical cables connected to the controller board/driver board;
- loosen the fastening nuts and remove them with a socket wrench;

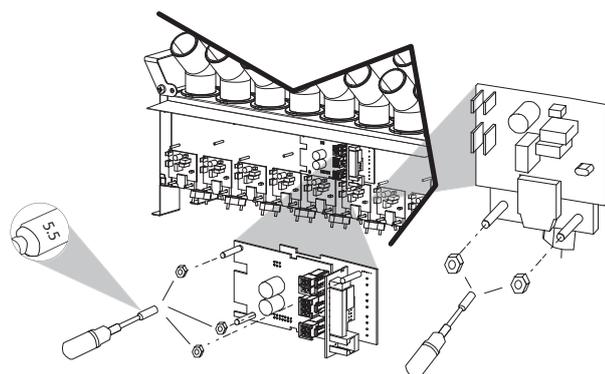


Fig. 10.h

Rear driver board

- Unscrew the screws and remove the protective panel (P) to access the rear driver board.
- Remove the boards in the same way as described for the front driver board.

Piezoelectric transducer

Note: the atomisation capacity of the piezoelectric transducer gradually decreases with use. It must be replaced after around 10,000 operating hours (depending on water quality), even if the unit can continue operating while effective capacity still responds to requirements.

To remove the piezoelectric transducer:

- turn the humidifier body over and identify the piezoelectric transducer to be replaced;
- unplug the electrical cable terminals from the corresponding driver board;
- using a socket wrench (5.5), loosen the fastening nuts, remove the transducer and replace it;
- when replacing the transducer, pay attention to the white markings (arrow): the top line of transducers has the markings on the right, and the bottom line has the markings on the left. The transducer must have the markings positioned in the same ways as the adjacent ones.

Note: the tightening torque of the nuts that fasten the transducer must be 8 ± 0.5 kg cm

Important: if the transducer is fitted rotated 180°; incorrect assembly will cause a reduction in atomised water production and potential humidifier malfunctioning.



Fig. 10.k

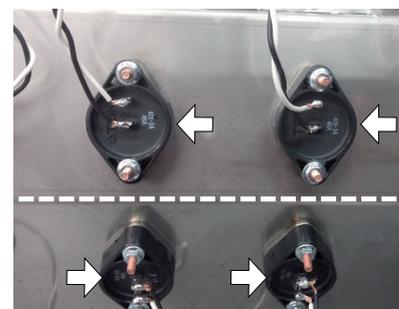


Fig. 10.l

10.8 Cleaning the tank

Proceed as shown previously to remove the side panels and top cover with the diffusers. To clean the tank, use a soft brush.

11. GENERAL FEATURES AND MODELS

11.1 Ultrasonic humidifier models and electrical specifications

The table below summarises the electrical data (power supply voltages) of the various models, as well as their functional characteristics. Note that some models can be powered at different voltages, obviously with different current and atomised water production values.

| model | Humidity production ^(2,3) kg/h (lbs/h) | Power supply | | | | |
|--------|------------------------------------------------------|-----------------------------|----------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------------------------------|
| | | Power ⁽²⁾ (W) | Panel P/N * = B, D = (B = "Secondary", C = "Main") | Control panel Voltage ⁽¹⁾ (V - type) | Control panel Current ⁽²⁾ (A) Vac power supply | Current ⁽²⁾ (A) 48 Vdc power supply control panel output towards UU%D |
| UU02D% | 2,4 (5.3) | 210 | UQ05*D0000 | 230 | 0.7 | 3.2 |
| | | 210 | UQ05*10000 | 110 | 1.5 | 3.2 |
| UU05D% | 4,8 (10.6) | 350 | UQ05*D0000 | 230 | 1.3 | 6.4 |
| | | 350 | UQ05*10000 | 110 | 2.7 | 6.4 |
| UU07D% | 7,2 (15.8) | 500 | UQ09*D0000 | 230 | 2 | 9.6 |
| | | 500 | UQ09*10000 | 110 | 4 | 9.6 |
| UU09D% | 9,6 (21.1) | 650 | UQ09*D0000 | 230 | 2.6 | 12.8 |
| | | 650 | UQ09*10000 | 110 | 5.5 | 12.8 |
| UU14D% | 14,4 (31.7) | 950 | UQ18*D0000 | 230 | 4 | 19.2 |
| | | 950 | UQ18*10000 | 110 | 8.2 | 19.2 |
| UU18D% | 18 (39.6) | 1150 | UQ18*D0000 | 230 | 4.7 | 24 |
| | | 1150 | UQ18*10000 | 110 | 10 | 24 |

Tab. 11.a

(1) tolerance allowed on rated mains voltage: -15%, +10%;

(2) tolerance on rated values: +5%, -10% (EN 60335-1);

(3) max rated instant atomised water production: average atomised water production may be affected by external factors, such as: ambient temperature, water quality, distribution system.



Important: to avoid interference, keep power cables separate from probe cables.

11.2 Cable cross-section

See par. "Connection cable sizing: humidifier – electrical panel".

11.3 Technical specifications

| Model | UU02D% | UU05D% | UU07D% | UU09D% | UU14D% | UU18D% |
|-------------------------------|-------------------------|------------|------------|------------|-------------|-----------|
| Flow-rate kg/h (lbs/h) | 2,4 (5.3) | 4,8 (10.6) | 7,2 (15.8) | 9,6 (21.1) | 14,4 (31.7) | 18 (39.6) |
| No. of transducers | 4 | 8 | 12 | 16 | 24 | 30 |
| Rated power (W) | 180 | 330 | 480 | 600 | 1100 | 1100 |
| Application | duct | | | | | |
| Feedwater pressure bar (psi) | 1 to 6 bar (14.5 to 87) | | | | | |
| Feedwater temperature °C (°F) | 5 to 40 (41 to 104) | | | | | |
| Ingress protection | IP20 | | | | | |

Electronic controller

| | |
|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Auxiliary voltage / frequency (V/ Hz) | 24V/50 – 60 Hz |
| Maximum auxiliary power (VA) | 3 |
| Probe inputs (general features) | Can be selected for these signals: 0-1V, 0-5V, 0...10 V, NTC low temperature: 10 kΩ at 25°C, -50T90 °C; |
| Power supply to active probes (general features) | 21Vdc, max 150 mA |
| Relay outputs (general features for "Main" panel) | EN60730-1: NA 1(1)A 250 Vac cos phi = 0.4; 100,000 cycles UL-873: NO 1 A resistive 24 Vac, 30 Vdc, 100,000 cycles/PILOT DUTY: 24 Vac, peak 15A, continuous 1A 30,000 cycles 24 V (max 3 W) |
| Alarm relay output (general features for "Secondary" panel) | |
| Digital inputs (general features) | Voltage-free contact. Max resistance 100 Ω; max 5 Vdc open, 7 mA closed |
| Analogue outputs (general features for "Main" panel) | 0 to 5V, 0 to 10V Maximum load 2 kΩ (5 mA) Precision ±3 % of full scale |

Environmental conditions

| | |
|---------------------------------------|-----------------------|
| Ambient operating temperature °C (°F) | 1 to 40 (33.8 to 104) |
| Ambient operating humidity (% rH) | 10 to 80 |

Tab. 11.b

11.4 Fuse table

11.4.1 Electrical panel "Secondary"

| Electrical panel P/N | 48 Vdc power supply fuse (one 10.3 x 38 fuse) | Power supply fuse (two 5 x 20 fuses) | Fan fuse (one 5 x 20 fuse) |
|----------------------|-----------------------------------------------|--------------------------------------|----------------------------|
| UQ05BD0000 | 6 A | 2 A | 250 mA |
| UQ05B10000 | 6 A | 3.15 A | 250 mA |
| UQ09BD0000 | 12 A | 3.15 A | 250 mA |
| UQ09B10000 | 12 A | 6.3 A | 250 mA |
| UQ18BD0000 | 20 A | 5 A | 250 mA |
| UQ18B10000 | 20 A | 10 A | 250 mA |

Tab. 11.c

11.4.2 Electrical panel "Main"

| Electrical panel P/N | 48 Vdc power supply fuse (one 10.3 x 38 fuse) | Power supply fuse (two 5 x 20 fuses) | Fan fuse (one 5 x 20 fuse) |
|----------------------|-----------------------------------------------|--------------------------------------|----------------------------|
| UQ05CD0000 | 6 A | 2 A | 250 mA |
| UQ05C10000 | 6 A | 3.15 A | 250 mA |
| UQ09CD0000 | 12 A | 3.15 A | 250 mA |
| UQ09C10000 | 12 A | 6.3 A | 250 mA |
| UQ18CD0000 | 20 A | 5 A | 250 mA |
| UQ18C10000 | 20 A | 10 A | 250 mA |

Tab. 11.d

12. MULTI-UNITS INSTALLATION

12.1 Connection Main-Secondary (until 4 humisonics)

In order to optimize the control and management of multiple humidifiers within the same air duct, it is possible to connect them in serial following the diagrams reported on the follow pages. It is necessary to install on the humiSonic "Main", the auxiliary board cod. UUKAX00000 at available space on board the electronic board identified as no. 3 in Fig. 10.a.

Setup

The "Main" unit is able to control the operation of a maximum of 3 "Secondary" units connected via tLan network. For electrical connections refer to diagram in fig.12.1.a and 12.1.b. The Main unit's dipswitches 1-3 must be all set to OFF. Each Secondary unit must be properly configured via the following dip switches:

- 1: Set to ON for the conversion of the serial port (M11) from 485 to tLan.
- 2/3: Secondary address, as in following figure:

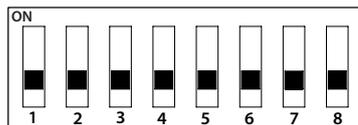


Fig. 12.a

| | |
|-----|-----------------------------|
| 1. | Communication |
| | OFF Serial 485 Carel/Modbus |
| | ON tLAN |
| 2-3 | tLAN address (if 1 is ON) |
| | OFF/OFF -- |
| | OFF/ON address 1 |
| | ON/OFF address 2 |
| | ON/ON address 3 |

Control logic

The Main unit controls each "Secondary" unit, through the following parameters:

- Enable / Disable the operation
- Level of production of atomized water

The control signals (probes / humidistat / external regulator) are read and handled only by the Main who shall then adjust the operation of the Secondary. The production level of the Main is replicated by all the Secondary units.

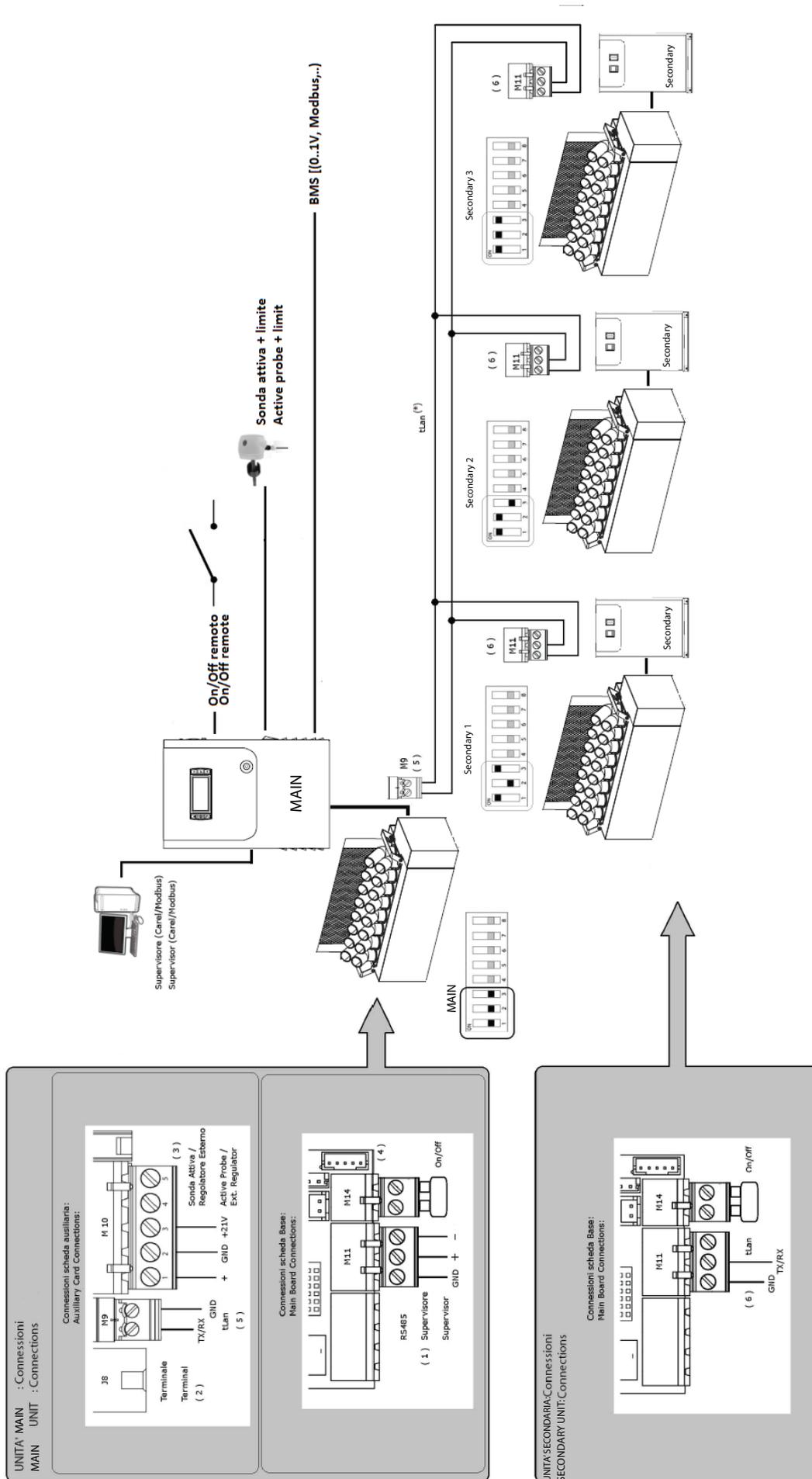


Fig. 12.a

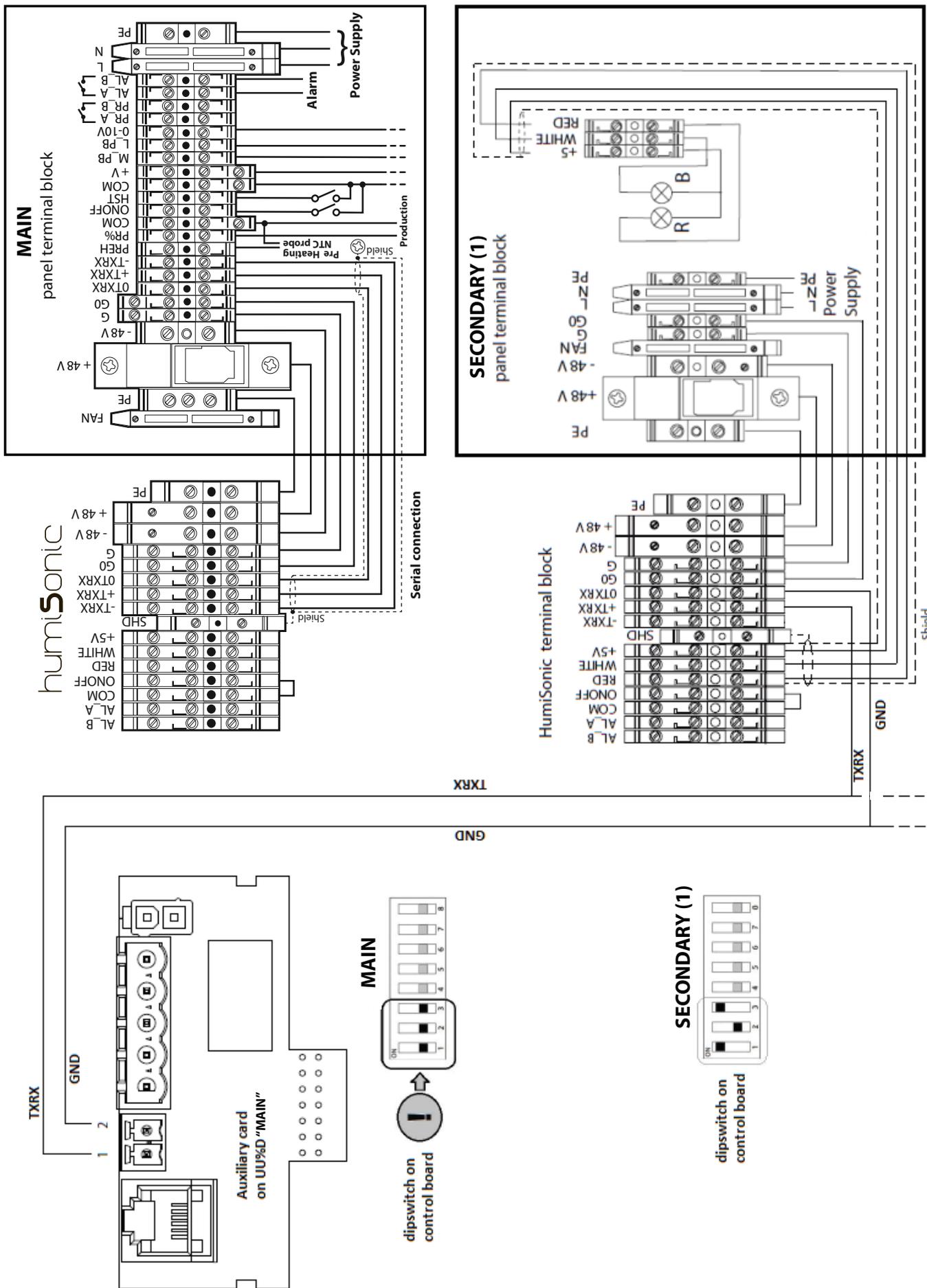
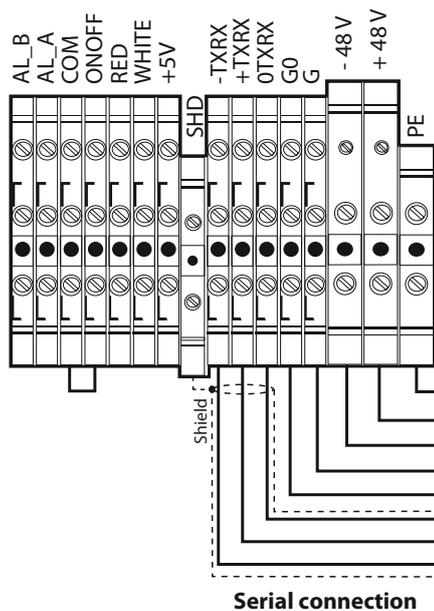


Fig. 12.b

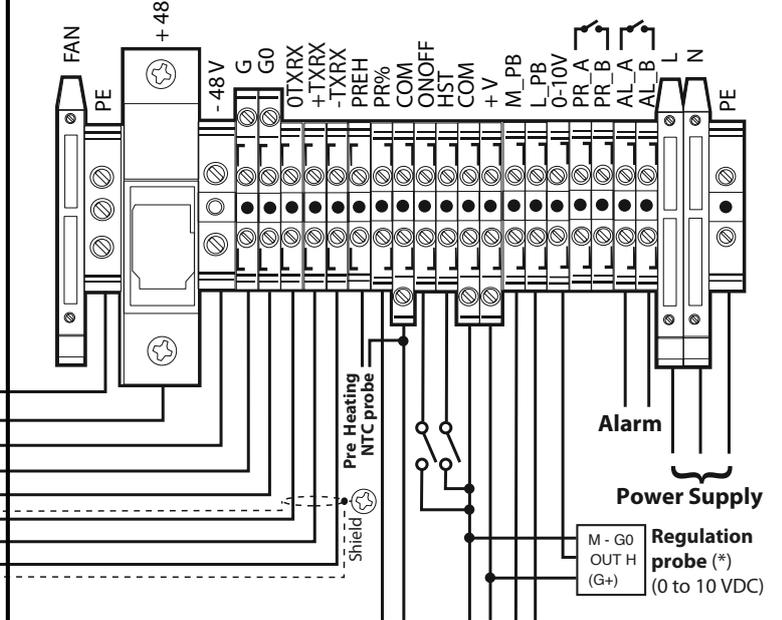
humiSonic



Serial connection

MAIN (1)

Complete panel terminal block



Alarm

Power Supply

Regulation probe (*)
M - G0
OUT H
(G+)
(0 to 10 VDC)

Regulation probe

(0 to 1 VDC,
0 to 5 VDC)

M - G0
OUT H/T
(G+)

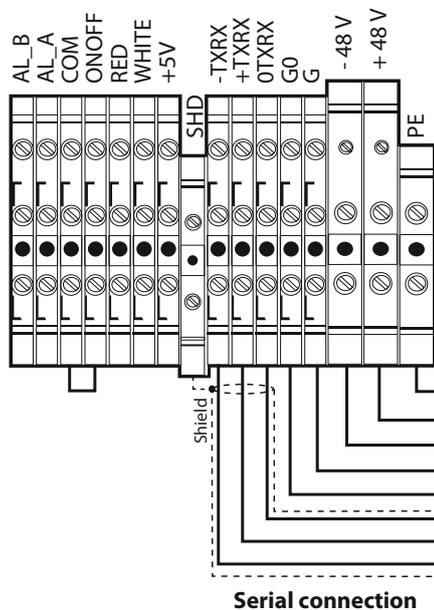
Limit probe (*)
M - G0
OUT H
(G+)
(0 to 1 VDC,
0 to 5 VDC)

NTC probe

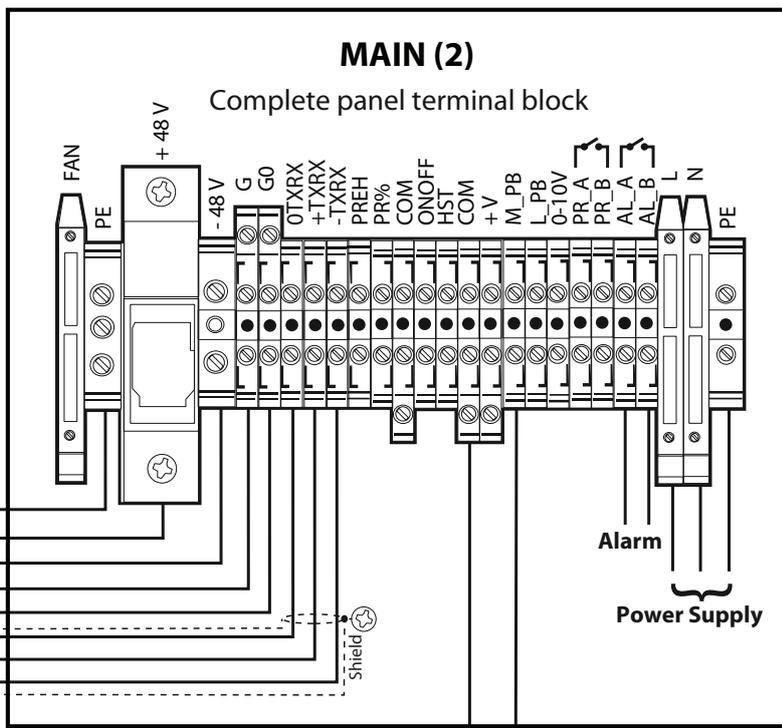
MAIN (2)

Complete panel terminal block

humiSonic



Serial connection



Alarm

Power Supply

PR%

COM

PR%

COM

until n.4 MAIN

Fig. 12.d

13. DUCT INSTALLATION

If several Humisonics are to be installed into the same duct, it is necessary to arrange them within the duct so as to obtain a homogeneous and constant atomization.

Suggested installative layouts are:

- "On line" layout: units are positioned on different levels along the same vertical section. The diagram 13.a shows the minimum distances for humidifiers placement within the same duct. Quotas don't change, even if the deflector used is D as Fig. 1.b.

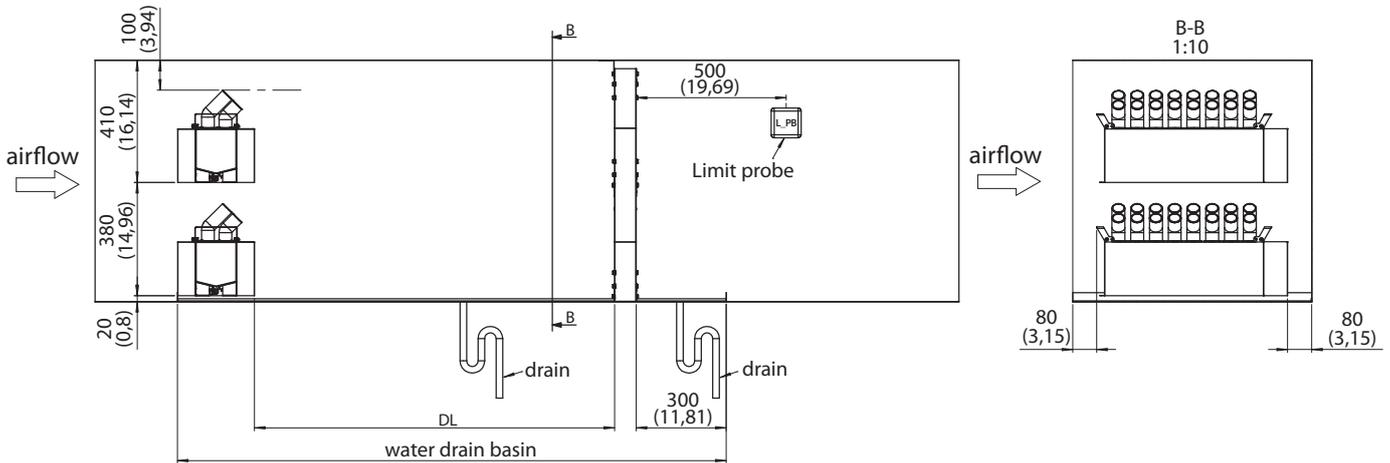


Fig. 13.a

- "Cascade" layout: units are positioned on different levels and along different vertical sections. The diagram 13.b shows the minimum distances for humidifiers placement within the same duct. Quotas don't change, even if the deflector used is D as Fig. 1.b.

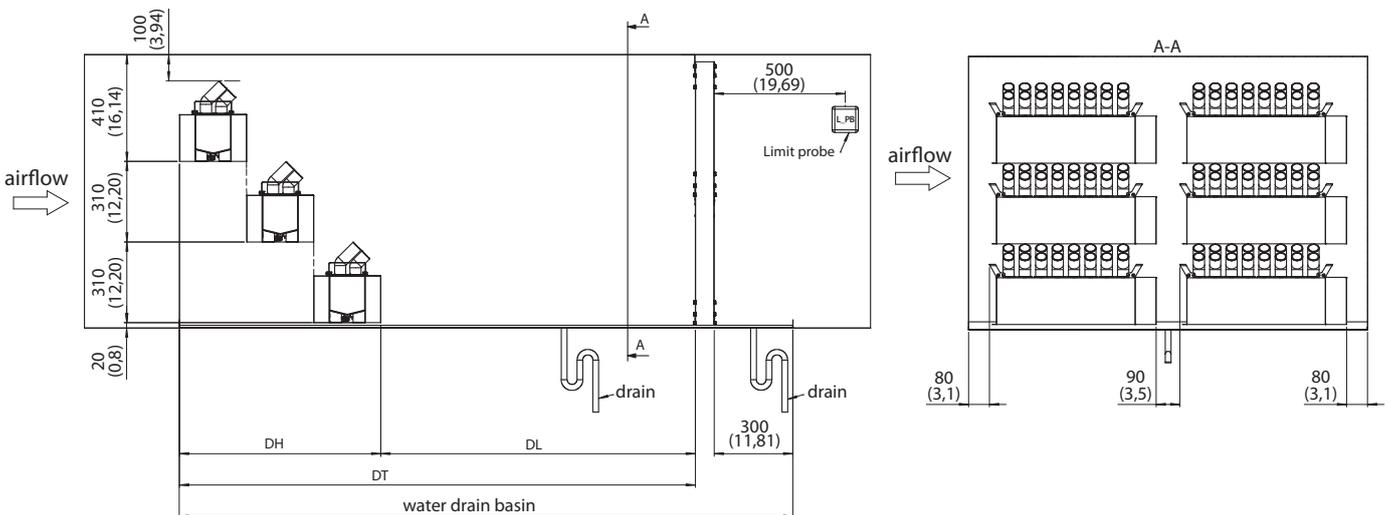


Fig. 13.b

Key:

| | |
|--------------------------------------------------------------------------------------|----------------------------|
| DH | Humisonics total dimension |
| DL | Absorption distance |
| DT | Total length |
| For proper sizing and placement of Humisonic within the duct , contact Carel support | |

CAREL

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