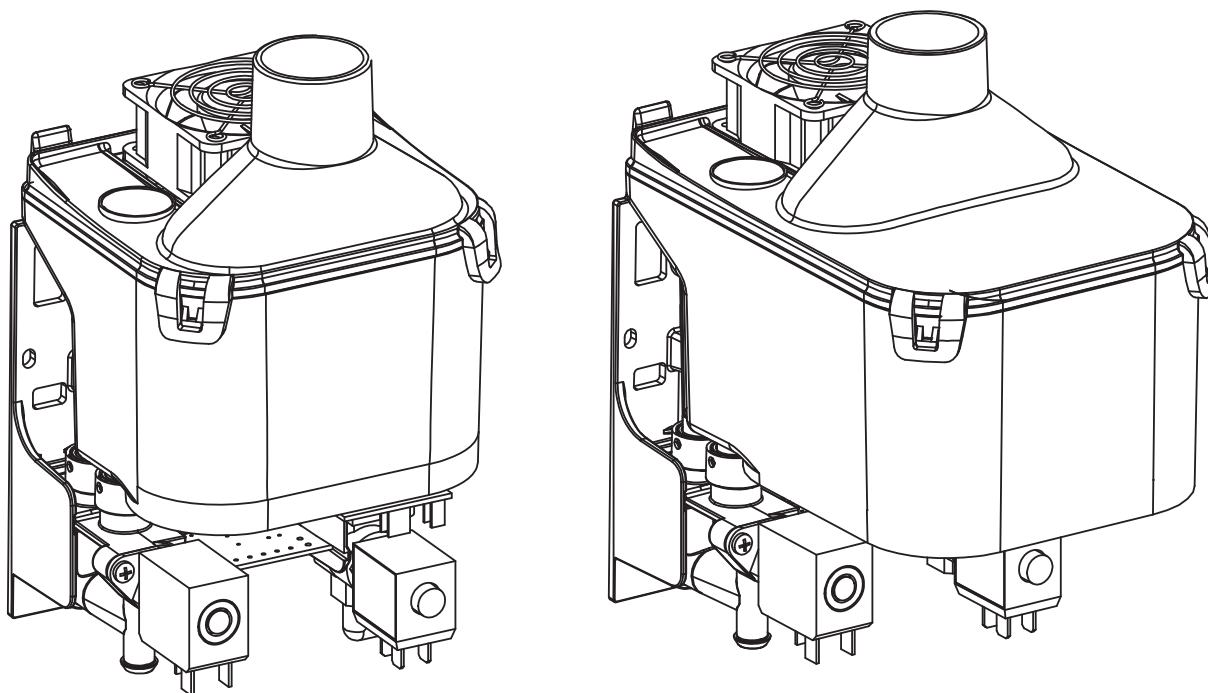


humiSonic
Compact

CAREL

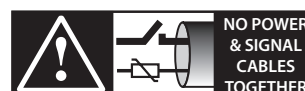
Umidificatore a ultrasuoni
Ultrasound humidifier



ITA Manuale d'uso

ENG User manual

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



READ CAREFULLY IN THE TEXT!

High Efficiency Solutions

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1. INTRODUCTION

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 technical development, requires setup/configuration/programming to be able to operate in the best possible way for the specific application.

Failure to complete the required analysis, as specified in the manual, or the configuration procedure, may cause the final product to malfunction; CAREL accepts no liability in such cases. The customer (manufacturer, developer or installer of the final equipment or system) accepts all liability and risk relating to the configuration of the product in order to reach the expected results in relation to the installation and/or specific final equipment. CAREL may, based on specific agreements, act as a consultant for correct installation/commissioning/operation, 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 particular, as well as observing the above warnings and suggestions, the following warnings must be observed for correct use of the product.

1.1 Intended use

- This product complies with the European directives and other requirements as indicated in the EC declaration of conformity. It is the customer's responsibility to carefully evaluate how the product is used, in relation to the requirements concerning special environments and/or processes (e.g. heavy industry, medical, marine environments, railway, etc.), which fall outside of the conditions of use specified by CAREL.
- The environmental conditions and power supply voltage must correspond to the values specified on the rating plate.
- The product can only be used for the functions contemplated in its design. CAREL declines all liability for any improper use of the product.
- Observe the standards in force in the place where the humidifier is installed.
- The humidifier must be installed 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.
- Installation, use and maintenance must be carried out by qualified personnel who are aware of the necessary precautionary measures and are able to carry out the appropriate operations.
- Only water with the characteristics indicated in this manual must be used to produce humidity.
- All work must be carried out according to the instructions specified in this manual and on the labels affixed to the appliance. All uses/modifications not permitted by the manufacturer are illegal. CAREL declines all liability for any illegal use of the product.
- Do not attempt to open the humidifier in any way other than described in the manual.

CAREL adopts a policy of continual development; consequently, CAREL reserves the right to make changes and improvements to any component 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 (see 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/affiliates be liable for any lost earnings or sales, losses of data and information, damage to things or people, costs of replacement goods or services, 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 or use of the product, even if CAREL or its subsidiaries/affiliates are warned of the possibility of such damage.

1.2 Disposal: information for users

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.



Fig.1



Fig. 2

Warranty: the warranty does not include consumables.

Approval: the quality and safety of CAREL products are guaranteed by ISO 9001 certification, as well as by the mark  and .

2. SAFETY INSTRUCTIONS

Safety instructions are required by law. These are intended to ensure safety in the workplace and prevent accidents.

2.1 Purpose

To comply with the national and local regulations in force for the prevention of personal and third-party injuries.

2.2 Symbols used

The symbols used to represent hazards correspond to the warning messages specified in accordance with EN 82079-1 (and ANSI Z535.6):



DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION indicates a hazardous situation which, if not avoided, may result in light or moderate injury.

NOTICE indicates a potentially hazardous situation which may cause damage to surrounding property and equipment.

2.3 Management of the unit

Do not carry out any work that compromises the safety of the humidifier. Follow all safety instructions and warnings marked on the unit. In the event of a malfunction or power failure, immediately switch the unit off and prevent it from being switched on again. Repair any faults promptly.



WARNING Reserved use.

IEC 60335-1 states the following: this appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Cleaning and user maintenance shall not be made by children unless they are supervised.

2.4 Operation of the unit



WARNING Risk of burns! (steam humidifiers)

The humidifier contains high-temperature components. For electrode, heater or gas-fired isothermal humidifiers, in the event of leaks or component faults, uncontrolled release of steam at 100°C/212°F may be possible. Switch the unit off immediately.

Steam production is only allowed when the unit's cover is closed.

NOTICE Risk of damage to the appliance!

The appliance may be damaged if switched on repeatedly following an unrepaired fault. Repair any malfunctions promptly.

The appliance must not be operated with a DC power supply.

Regularly check that all safety and monitoring devices are working properly. Do not remove or disable the safety devices.

NOTICE Possibility of water leaks due to faulty connections or malfunctions.

Water is continuously and automatically fed into and drained by the humidifier. The connections and components that carry water must be regularly checked to ensure they are working perfectly.

2.5 Assembly, disassembly, maintenance and repair of the unit

NOTICE The humidifier's protection rating is IP00. Make sure that it is not affected by dripping water in the site of installation.

Installation of the humidifier in a place without a water drainage system requires the presence of safety devices that, in the event of water leaks, can safely shut off the water supply to the humidifier.

- Only use original spare parts.
- After any repairs, make sure that safe operation of the unit is checked by qualified personnel.
- Connection or installation of additional components is only allowed with the written authorisation of the manufacturer.



WARNING

Do not install the humidifier on top of electrical devices such as fuse boxes, household appliances, etc. In the event of water leaks, this may damage the electrical equipment below.

2.6 Electrical system



WARNING Electric shock hazard!

Dangerous electrical voltage.

Work on the electrical system must only be carried out by qualified personnel (electrician or technician with equivalent training). During maintenance or installation work, the appliance must be disconnected from the mains power supply and must be prevented from being powered on. Electrical disconnection must be verified by measurement.

The humidifier can only be started when the cover is closed.

Water leaks may cause leakage current. Observe the safety rules when working on parts that may be live.

After electrical installation or repair work, check all safety devices (e.g. earth resistor).

NOTICE

Only use original fuses with the correct amperage. Regularly check the electrical parts of the equipment. Promptly repair any damage, such as loose connections, burnt wiring or defective electrical insulation.

Responsibility for intrinsically safe installation of the humidifier lies with the company that carried out installation.

2.7 Disposal after decommissioning

NOTICE The system manager is responsible for disposal of the appliance's components as specified by law. See 1.2

3. GENERAL DESCRIPTION

3.1 humiSonic

Ultrasound humidifiers can be used for vast variety of applications, e.g. data centers, climate rooms, close control units and food preservation, for the RH% control. It is a device developed to be integrated into fan or fancoils, but can also be used in other applications. Atomised water production of the units is respectively 0.5 l/h (UU01F) and 1 l/h (UU01G), delivered directly into the air stream.

3.2 Name/part numbers

Code	Description
UU01FD	Compact ultrasonic humidifier, 0.5 l/h, 230V - 1~
UU01F1	Compact ultrasonic humidifier, 0.5 l/h, 115V - 1~
UU01GD	Compact ultrasonic humidifier, 1 l/h, 230V - 1~
UU01G1	Compact ultrasonic humidifier, 1 l/h, 115V - 1~

Tab. 3.a

3.3 Dimensions and weights

Model with 1 piezoelectric transducer Model with 2 piezoelectric transducers

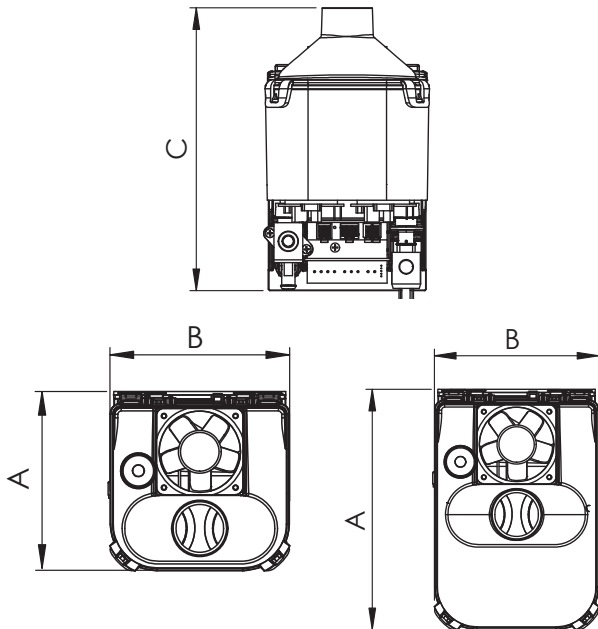


Fig. 3.a

		UU01F	UU01G
dim. mm (*)	A	121 (4,76)	185 (7,28)
	B	125 (4,92)	125 (4,92)
	C	221 (8,70)	216 (8,50)
weights kg (lb)	packaged	3,9 (8,60)	5,5 (12,13)
	empty	2,8 (6,17)	4,4 (9,7)

Tab. 3.b

3.4 Opening the packaging

NOTICE: dropping or bumping the humidifier may irreparably damage its internal components.

- Make sure the package 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;
- the unit must always be stored in a dry place before installation.

3.5 Material supplied

Check that the following are present:

Model	
230 V	115 V
1 transformer: 230 V primary and dual secondary, 50 V and 24 V	1 transformer: 115 V primary and 50 V secondary
-	1 transformer: 115 V primary and 24 V secondary
Wiring	
2 screws	
Electrical connectors	
L fitting (water supply inlet)	
User manual	



Fig. 3.b

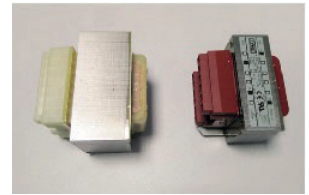


Fig. 3.c

NOTICE: on the 230 V model, a pair of wires marked L and N remain unused.

3.6 Identification label

The humidifiers can be identified by the packaging label and the identification label.

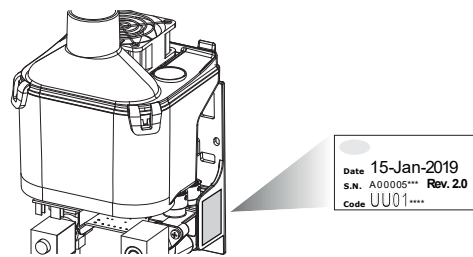


Fig. 3.d

NOTICE: tampering, removal or absence of the identification label or anything else that does not allow certain identification of the product will make any installation or maintenance operations difficult.

3.7 Positioning

- The humidifier may only be accessed by specialist personnel;
- make sure the humidifier is level horizontally, observing the minimum clearance of 200mm on the sides to leave room for maintenance;
- position the humidifier so as to allow the atomised water to be freely delivered and the water freely drained;
- position the transformer in a place that's protected against possible water leaks and in any case not underneath the humidifier.

3.8 Fastening

Fastening instructions:

1. make two holes (figure)
2. fix the fastening bracket using two M4x12 screws supplied, using a spirit level to make sure installation is horizontal;

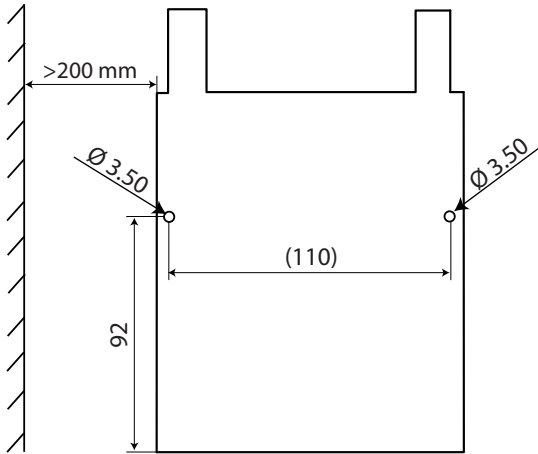


Fig. 3.e

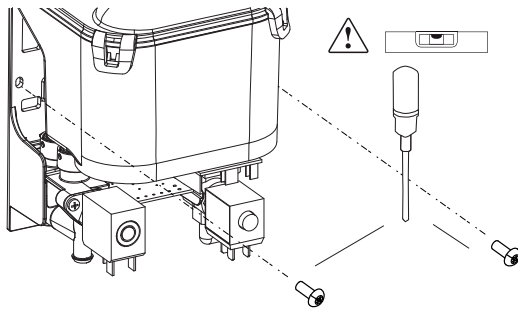


Fig. 3.f

3.9 Structure

The figure shows the structure of the humidifier with 1 piezoelectric transducer (0.5 l/h)

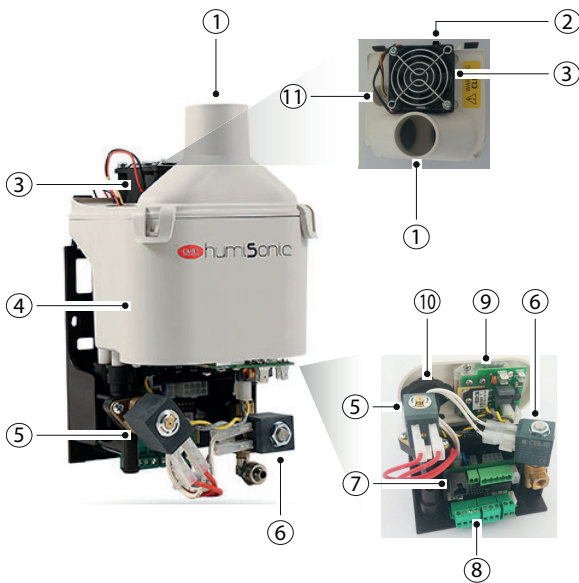


Fig. 3.g

Key	
1	Atomised water outlet
2	Signal LED
3	Fan
4	Tank
5	Drain valve
6	Fill valve
7	Auxiliary card
8	Main board
9	Piezoelectric transducer driver card
10	Piezoelectric transducer
11	Level sensor (internal)

3.10 Operating principle

The operation of humiSonic humidifiers is based on the principle of atomisation of demineralised 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 fans installed on the humidifier expel the particles of moisture and distribute 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 water that is immediately absorbed by the flow of air.

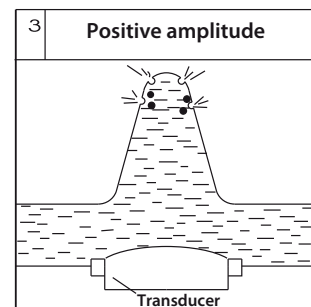
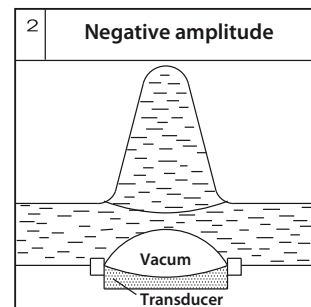
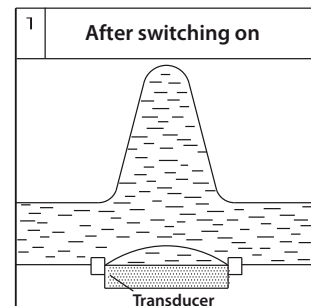


Fig. 3.h

4. WATER CONNECTIONS

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

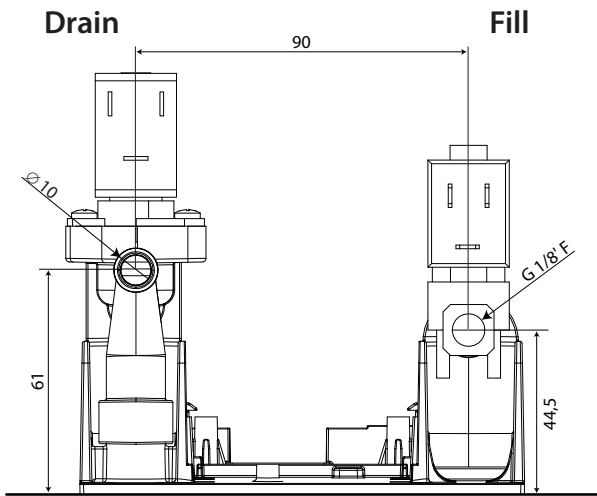


Fig. 4.a
(bottom view)

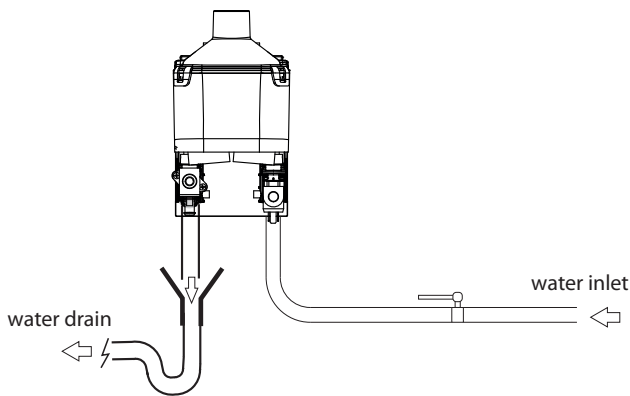


Fig. 4.b

NOTICE: the drain water must be able to flow freely.

Water connections (parts not included):

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.



- 1. Install a manual shut-off valve upstream of the installation (so as to shut off the water supply);
- 2. use a hose to connect the humidifier to the water supply for external diameter of 8 mm and internal of 6 mm (a quick-fit elbow connector is supplied with the product);
- 3. install a mechanical filter (< 60 µm) - no included - to trap any solid impurities (connected downstream of the water tap);
- 4. connect a section of drain hose, minimum inside diameter 6 mm;
- 5. prepare a funnel to interrupt continuity in the drain line;
- 6. connect a drain trap to prevent bad odours.

NOTICE: 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. This will eliminate any scale or processing residues that may block the fill valve.

4.1 Supply water

The ultrasound humidifier works on demineralised water. Using normal water will shorten transducer life; specifically, maintenance intervals for cleaning or replacing transducers depend on to what extent the supply water mineral content exceeds the values recommended in Table "Technical specifications". In the case of use of mains water, it is possible a reduction in the production of moisture due to salts and impurities present.

Operating conditions:

- demineralised water with the characteristics indicated in 'Technical specifications (supply water)';
- pressure between 0.1 and 0.6 MPa (14.5 and 87 PSI), temperature between 1 and 40 °C (33.8 and 104 °F), G1/8 F connection (see 'Technical specifications');
- no organic compounds.



DANGER:

- 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. Bacteria and viruses can enter the air we breathe via contaminated water and cause serious illness.

4.2 Drain water

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

5. ATOMISED WATER DISTRIBUTION

5.1 Atomised water distributor

NOTICE: the atomised water delivery hose, the distributor, the fan conveyor, the elbow connection and the diffuser are not supplied with the humidifier.

Code	Length (mm)
UUKDP02500	250
UUKDP05300	530
UUKDP06100	610
UUKDP08500	850

Requirements:

- humidifier delivery hose Øext 40mm;
- make sure the atomised water outlet area is 1100 mm² (e.g. 22 holes 8 mm in diameter);
- if the customer has to provide a distributor with different length, it is important to respect a maximum length of 1m. For greater lengths, please contact the Service Department Carel;
- the hose running to the distributor should have a minimum upward gradient of 2° so that any condensate flows back into the humidifier or a special condensate drain system;
- make sure there are no condensate leaks from the water vapour distributor;
- position the distributor in such a way that the air is not directed against nearby objects (minimum distance 10 cm);
- bends or choking of the hose may cause condensate to form and decrease humidity delivery;
- avoid loads that may cause mechanical stress on the humidifier outlet connector.

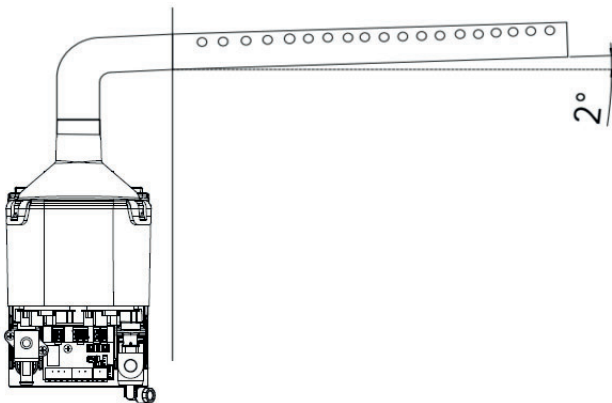


Fig. 5.a

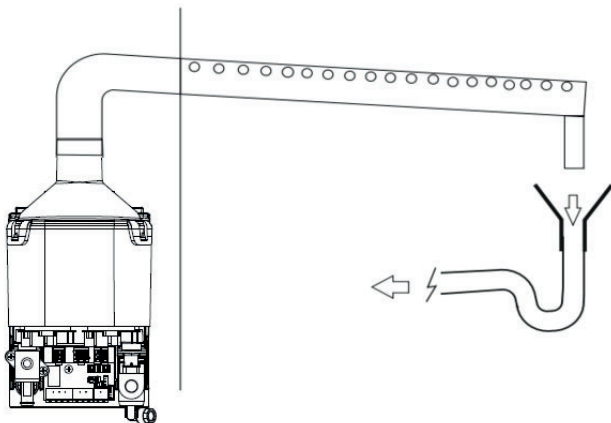


Fig. 5.b

5.2 Accessories

Fan conveyor

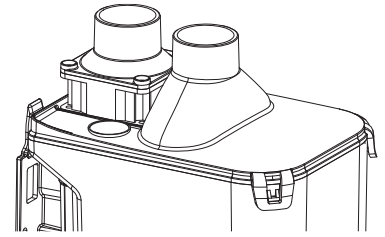
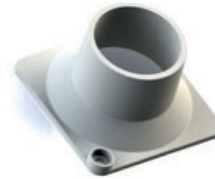


Fig. 5.c

The air flow conveyor UUKCY00000 can be installed on the top of the fan (removing the protection grill) so as to take in air from a different place to where humiSonic is installed.

Elbow connector

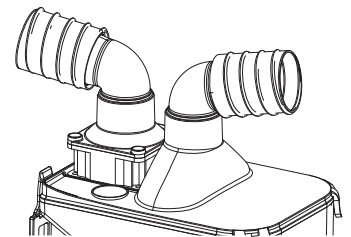


Fig. 5.d

The elbow connector UUKHS00000 can be installed on the cover and/or the fan conveyor, so as to reduce the overall height occupied by the product.

Diffuser

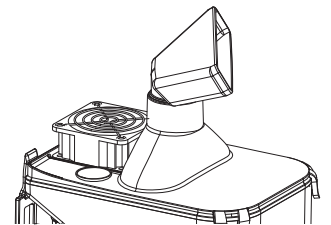


Fig. 5.e

The diffuser UUKDF00000 can be installed on the cover, so as to deliver atomised water directly into the room.

Filter: 50 micron

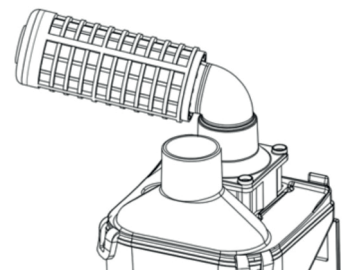
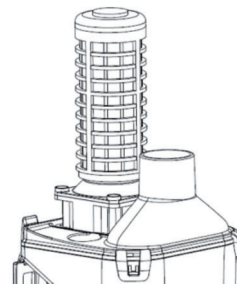


Fig. 5.f

A filter UUKFL00000 is available to be installed on the fan, using the conveyor (with or without the elbow). The filter is delivered disassembled (cap not fixed) because on one side it is possible to mount it on the conveyor, on the other side on the elbow (to mount with a slight interference). Once mounted, insert the cap. It's necessary to clean the filter (with compressed air or running water) periodically: frequency depends on the environment in which the system is installed.

Features filter: 50 micron, H = 13 cm, D = 5 cm
Hose (cod. UUKPE00100)

5.3 Installation examples

Fan coil installation

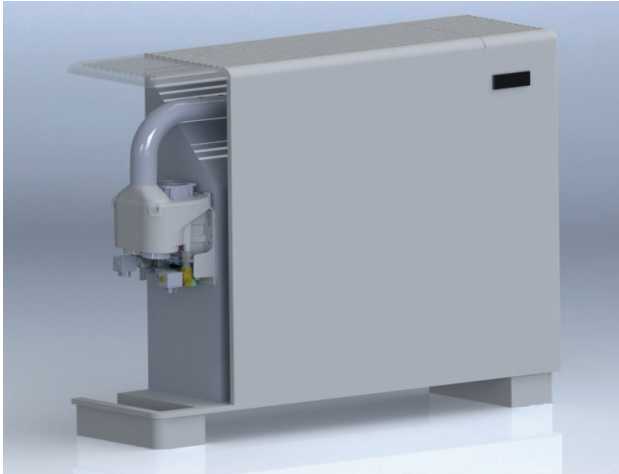


Fig. 5.g

NOTICE: the connections of the hoses for humiSonic air intake and atomised water delivery into the duct must be positioned so as to avoid pressure differences. Excessive unbalances in pressure may cause the system to malfunction, preventing atomised water production. It is preferable to install the system (humiSonic + distribution) on the intake, making sure to leave enough space for absorption. Alternatively, if this is not possible, suggested installation is near the end of the duct, close to the outlet grill (away from the fan, so as to avoid too high pressure).

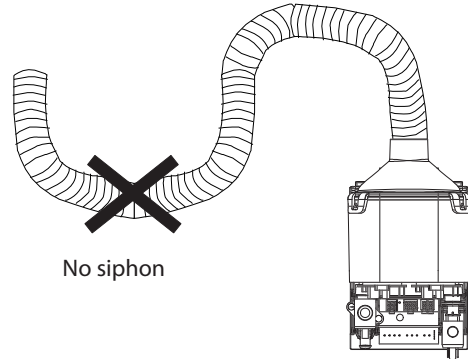


Fig. 5.j

Duct installation

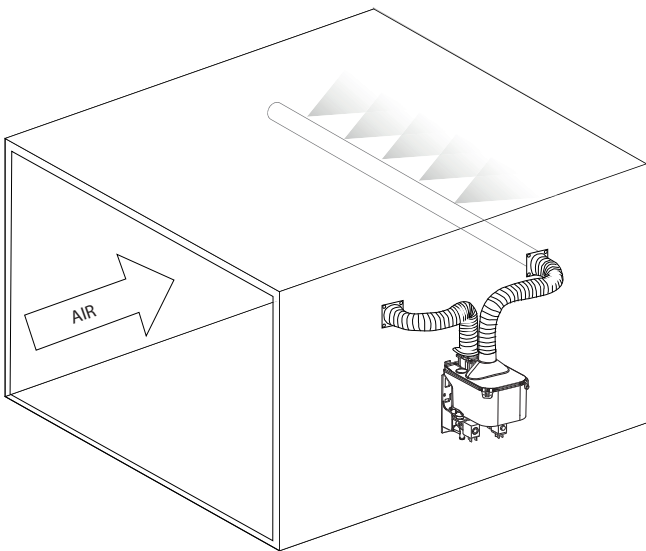


Fig. 5.h

Connect the humiSonic fan inlet to the duct, in a position between the main fan and the connection created for delivering atomised water into the duct.

Carel can supply the fan conveyor (P/N UUKCY00000) to create the connections between the fan, duct and hose (cod. UUKPE00100). The hoses should be as short and as straight as possible (max 1.2m each part), so as to reduce pressure drop.

If using the UUKDP0**00 distribution system in the installation, turn the hose so that the holes are in the direction of air flow (see the figure)



Fig. 5.i

6. ELECTRICAL CONNECTIONS

! WARNING: electric shock hazard. Before making the electrical connections, the appliance must be disconnected from the mains power supply and must be prevented from being powered on. Electrical disconnection must be verified by measurement.

NOTICE: correct wiring of the ultrasound humidifier is the responsibility of the installer of the final appliance manufacturer, as required by IEC EN 60335-1.

6.1 Electrical installation

Main board

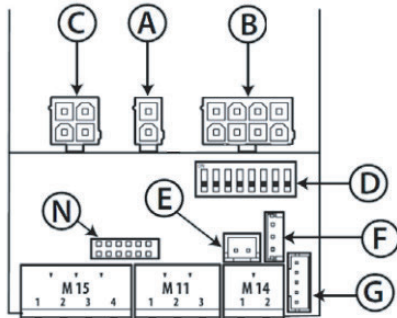


Fig. 6.a

Key

A	Power supply input to the board from the transformer 24V
B	Supply and controller cable driver; Power supply input to the board from the transformer 50V
C	valve power cables (L drain / R fill)
D	configuration dipswitch
E	TAM (current transformer) input for measuring current on external fan
F	(not use for this application)
G	TH temperature and humidity probe connection (IIC digital serial, part no.: HYHU000000) optional.
M14	remote ON/OFF (M14.1-M14.2)
M11	RS4845 serial (M11)
M15	- N.O. alarm relay (M15.1-M15.2) - 30 Vdc output (24 Vac rectified , max. 3W) (M15.3-M15.4)
N	auxiliary card connection

Electrical connections

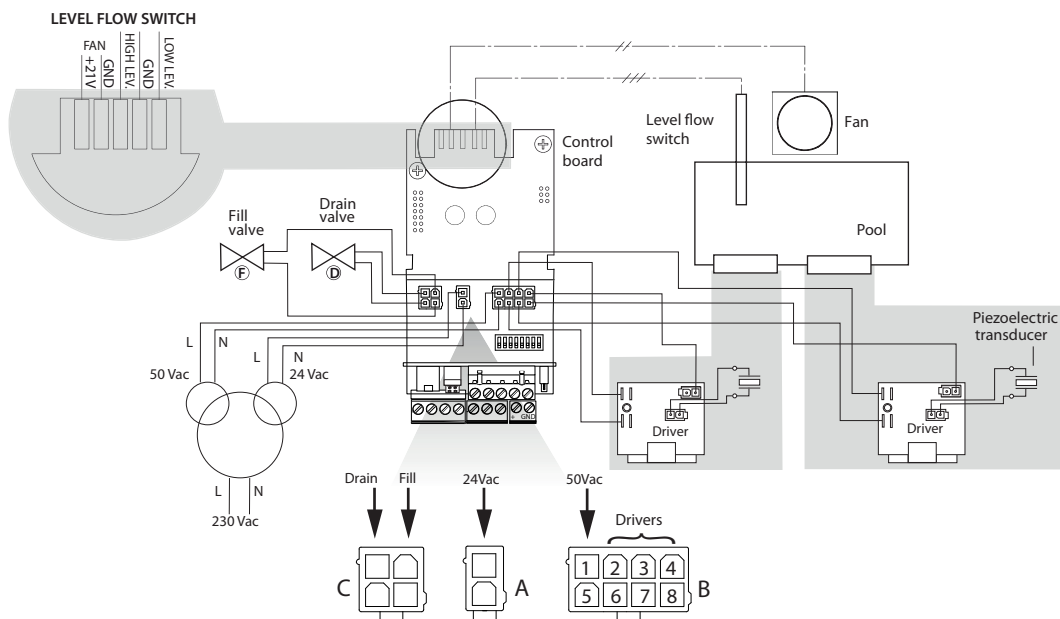


Fig. 6.b

6.2 Internal electrical connections

1. Connect the wires from connector C to the fill and drain valves;
2. Connect the power and control cables to the driver card(s) positioned under the tank, in accordance with the wiring diagram and the screen printing on the cables (photo).

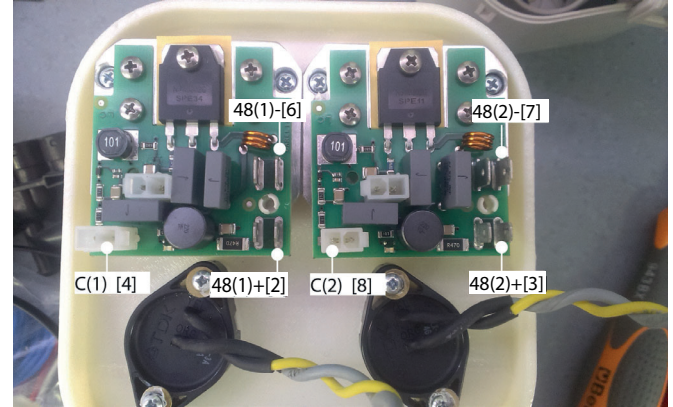


Fig. 6.c

6.3 Power supply

- Check that the power supply voltage of the appliance corresponds to the value indicated on the rating plate.
- Connect the 50 Vac transformer output to terminals 1 and 5 on connector B;
- Connect the 24 Vac transformer output to the terminals on connector A;
- Connect the transformer input cable to the mains. The humidifier power line must be fitted with a disconnect switch.

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

Once the electrical and water connections have been completed, the humidifier is ready for operation.

6.4 Dipswitch configuration:

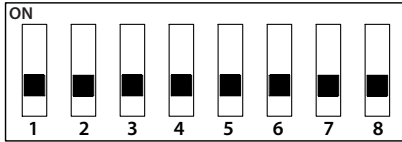


Fig. 6.d

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
4	Serial 485 / tLAN baud rate
	OFF 19200
	ON 9600
5-6	Humidity set point
	OFF/OFF 50 %rH
	OFF/ON 30 %rH
	ON/OFF 40 %rH
	ON/ON 60 %rH
7	TAM
	OFF disabled
	ON enabled
8	Production transducer management (only for 2-transducer version)
	OFF --> parallel management (modulation of all 2)
	ON --> if demand is less than 50%, it works only one transducer at a time, alternately

Tab. 6.c

6.5 Main board connections

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

HUMIDOSTAT OR REMOTE CONTACT (ON/OFF action)

Production is enabled by closing terminal M14.
M14 can be connected to a switch, a humidistat or a controller (voltage-free contact, max 5 Vdc open, max 7 mA closed).

TH TEMPERATURE/HUMIDITY PROBE (Optional)

If the TH TEMPERATURE/HUMIDITY PROBE is connected to the G terminal, atomized water production starts if:

- the terminal M14 is closed;
- in humidity control mode (A0 = 3), The humidity value measured by the probe is lower than the set point (pre-set at 50% rH and modifiable via dipswitches 5-6 or on the display);
- in dew point temperature control mode (A0 = 4), the dew point value calculated based on the temperature and humidity measured by the probe is lower than the set point (pre-set at 10°C/50°F and modifiable via the optional display).

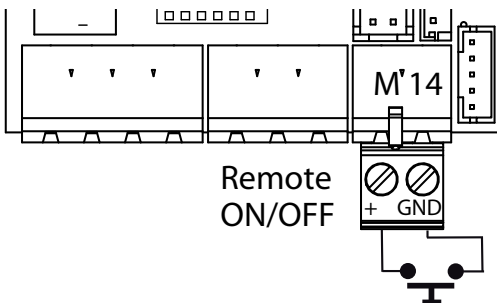


Fig. 6.e

485 SERIAL CONNECTION Carel/Modbus protocol

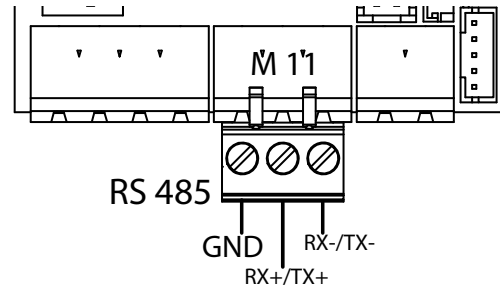


Fig. 6.f

NOTICE: 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

This is used to signal one or more alarms via a remote connection.

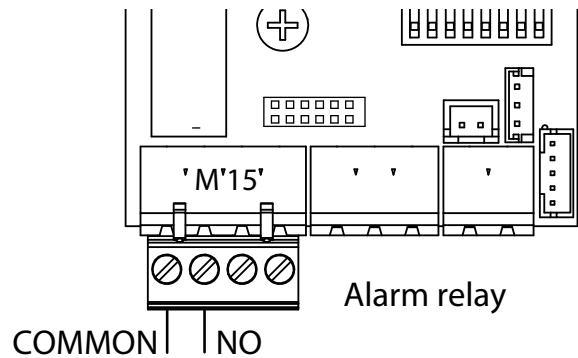


Fig. 6.g

ALARM RELAY POWER SUPPLY

The connections shown in figure can be used to directly control a light or an auxiliary relay coil 30 Vdc (24 Vac rectified), 3 W max.

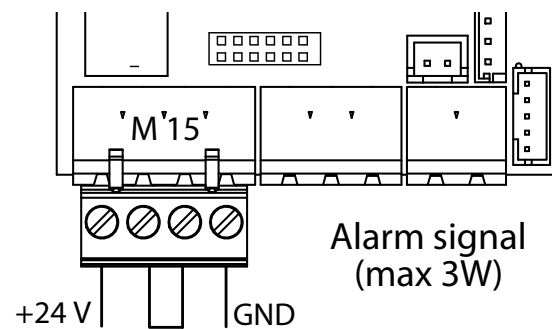


Fig. 6.h

NOTICE: in industrial environments (IEC EN61000-6-2) the signal cables leaving the unit must not exceed 10 m (33 ft)⁽¹⁾ in length: remote on/off digital input (terminals M14.1...M14.2) and shielded cable for RS485 communication.

6.6 Auxiliary card connections (optional)

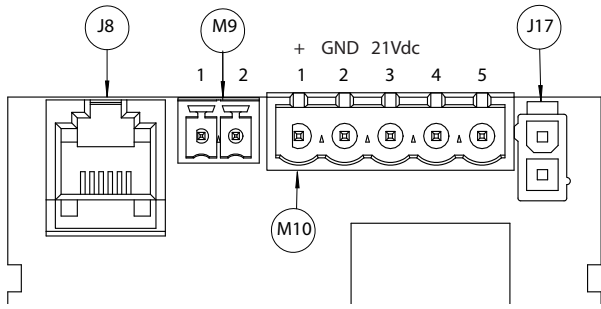


Fig. 6.i

J8	tLAN terminal connection (optional) with 30 Vdc power supply (24 Vac rectified)
M9	tLAN AUX serial connector
M10	M10.1 - + Analogue proportional controller/probe/humid. M10.2 - + GND signal reference M10.3 - +21Vdc for active probe supply M10.4 - N.U. M10.5 - N.U.
J17	AUX input - N.U.

The auxiliary card features the following connections

ON/OFF CONTROLLER (humidostat or remote switch)

- jumper inputs M14.1 and M14.2 (enable) on the main board;
- connect terminals M10.1 and M10.2 to a humidostat or a remote switch (voltage-free contact)
- set parameter A0=0 to enable On/Off operation (see chapter "Configuration parameters").

EXTERNAL PROPORTIONAL CONTROLLER (modulating)

- jumper inputs M14.1 and M14.2 (enable) on the main board;
- connect terminals M10.1 and M10.2 (production request) to an external controller;
- set parameter A0=1 to enable modulating control (see chapter "Configuration parameters")
- and parameter A2 depending on the chosen signal (0 to 10V, 2 to 10V, 0 to 20, 4 to 20 mA) (see chapter "Configuration parameters").

CONTROL WITH CAREL HUMIDITY PROBE

- jumper inputs M14.1 and M14.2 (enable) on the main board;
- connect the probe to terminals M10.1, M10.2. The power line M10.3 can be connected with cable of maximum length of 2 m (6,6 ft); for greater lengths use an external power supply with the signal earth electrically connected to the signal earth of the controller.
- set parameter A0=2 to enable probe control (see chapter "Configuration parameters") and parameter A2 depending on the chosen signal (0 to 10 V, 2 to 10V, 0 to 20, 4 to 20 mA) (see chapter "Configuration parameters").

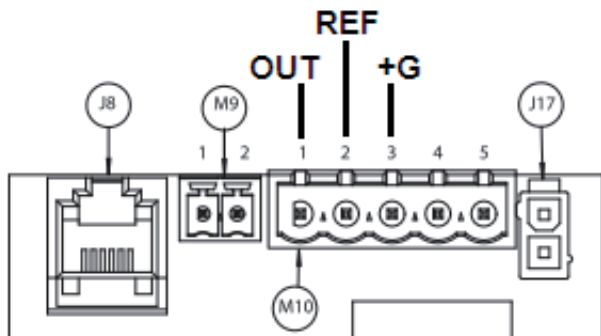


Fig. 6.j

If non-CAREL probes are used, check:

- voltage signal: 0 to 10 Vdc, 2 to 10 Vdc, terminal M10.1 (GND: M10.2);
- current signal: 4 to 20, 0 to 20 mA, terminal M10.1 (GND: M10.2).

ENABLE PROBE TH AS HUMIDITY/ DEW POINT TEMPERATURELIMIT
In control modes A0=0, A0=1, A0=2, the built-in humidity probe TH can be used as a limit probe, setting parameter bH=1 or bH=2 respectively. The limit set point and proportional band are set by parameters SL and bL.

Final checks

The following conditions represent correct electrical connection:



- mains power to the humidifier corresponds to the voltage shown on the rating plate;
- a mains disconnect switch has been installed so as to be able to disconnect power to the humidifier;
- terminals M14.1, M14.2 are jumpered or connected to a contact to enable operation;
- if the humidifier is controlled by an external controller (with auxiliary card), the signal earth is electrically connected to the controller earth.

7. STARTING, USER INTERFACE AND BASIC FUNCTIONS

Before starting the humidifier, check:



- water connections: in the event of water leaks, do not start the humidifier before having restored the connections;
- water vapour distribution: and electrical connections

7.1 Starting

See chapter "Electrical connections".

- 1 The humidifier, once powered and enabled for production (remote on-off/humidistat, terminal M14, ON/OFF from user terminal; ON/OFF from serial), is ready for operation.
- 2 If there are no other external connections, the humidifier will start, and operation will only stop if the enabling signal (M14) is no longer present.
- 3 If TH temperature/humidity probe (optional) is connected to terminal G, the humidifier will operate until reaching the humidity set point (default 50%rH) or the dew point temperature set point (pre-set at 10°C/50°F) is reached, depending on the control mode set. See chap. "Operating principles".
- 4 If terminal E is connected to the current transformer (TAM, optional) and is enabled (dipswitch 7) the humidifier will only start if current is measured on the fan neutral wire on the principal system. This wire must run inside the TAM. In this way, atomised water will only be produced when the fan is on.

7.2 Shutdown/Standby

- 1 To switch the humidifier off, disconnect power
- 2 If connected to power supply, the humidifier goes into standby when:
 - the remote on/off contact is open
 - TH probe is fitted and the humidity/dew point temperature set point has been reached
 - no current is measured by the TAM (if fitted and enabled)
 - the on/off contact is open and serial enabling is set to 0 (see Chap. "Humidifier control via network") /or "Reset hour counter from display" or disabling by keyboard
 - a modulating signal is used (optional card) and there is no request

When the humidifier is in standby, the unit is emptied automatically. When in standby the fan stays on for 5 min.

7.3 Autotest

Whenever 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 water vapour production will start. If the test fails, production is disabled (see the alarm table).

7.4 LED signals

A light is fitted on the top of the humidifier to indicate operating status:

GREEN	Description
Steady	Atomisation in progress
Flashing slowly*	Unit disabled
Flashing slowly and dimmed	Set point reached
Flashing quickly**	Transitory status with atomisation temporarily paused (e.g. autotest, washing)

*Flashing slowly: 1s ON and 1s OFF

**Flashing quickly: 0.2s ON and 0.2s OFF

The red LED means an alarm is active. See the specific chapter.

7.5 Reset tank hour counter

NOTICE: this operation must only be carried out by authorised personnel.

The humidifier is fitted with an hour counter that increases during operation. After a set number of hours (5000), a signal is activated to indicate maintenance should be performed on the tank and operation of the piezoelectric elements checked (see chap. "Maintenance and spare parts" and chap. "Alarms"). If the display terminal is connected to the humidifier, reset the hour counter on the terminal as described in par. "Reset hour counter from display". Otherwise, if the terminal is not available, the hour counter can be reset by accessing the electronic control board.



WARNING: electric shock hazard. Before making the electrical connections, the appliance must be disconnected from the mains power supply. Electrical disconnection must be verified by measurement.

To reset the hour counter at any time, proceed as follows:

- Switch the humidifier off
- Wait for the tank to empty completely
- Close the water supply tap
- Remove the tank, making sure to disconnect the power connector to the piezoelectric transducer driver card
- Open the On/Off contact
- Switch the humidifier on WITHOUT THE TANK. The orange LED, observing the light guide from above, will flash
- Close the On/Off contact, the orange LED will remain on steady
- Switch the humidifier off
- Assemble the tank, reposition the piezoelectric element connector of the driver board and open the water supply tap
- Switch the humidifier on

7.6 Automatic washing

The humidifier automatically runs a washing cycle at intervals in operating time set by parameter b1 (default 60 minutes, parameter b0 can be used to convert this value into hours, see Table parameter b0).

The washing cycle involves a complete drain cycle, a phase in which fill and drain are activated together (default 1 minute, parameter b3) to flush out any residues in the tank, a complete fill cycle and finally another complete drain cycle.

During this operation, the production of nebulized water is stopped.

7.7 Washing due to inactivity

If the humidifier remains inactive (on but in standby) for an extended period (parameter b2, default 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. Parameter b0 can be used to set the time when this washing cycle is performed. By default, the washing cycle is run after 24 hours (continuous) of no operation, i.e. the humidifier is in standby. This is because the humidifier is normally connected to a reverse osmosis system, which needs to operate frequently in order to avoid malfunctions. Parameter b0 (see Table parameter b0, reverse osmosis) can be set so that the washing cycle is performed when first restarting after a period of continuous inactivity set by b2.

8. LCD TERMINAL (OPTIONAL)

8.1 Remote display terminal (UUKDI00000)

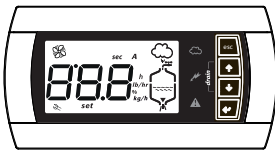


Fig. 8.a

The LCD terminal is an option and can only be used if the auxiliary card is fitted (UUKAX00000 optional, already built-in on models UU01**A**1). The terminal displays humidifier status and can be used to customise operation by setting the parameters.

CONNECTION:

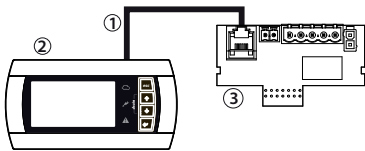


Fig. 8.b

Key:

- 1 6-wire telephone cable P/N S90CONN000 or equiv., max. length 2 m (6,6 ft);
- 2 remote display terminal.
- 3 auxiliary card

Remote connection of the terminal up to 200 m

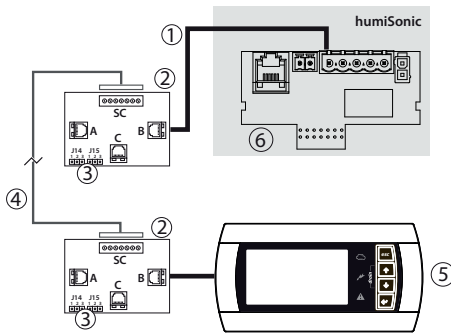


Fig. 8.c

Key:

- 1 telephone cable (up to 0.8 m distance);
 - 2 CAREL TCONN6J000 board;
 - 3 pin strip J14 and J15 in position 1-2 (power supply available on the telephone connectors A, B and C and screw SC);
 - 4 WG20-22 shielded cable with 3 twisted pairs to move the display terminal up to 200 m away. Connection to the TCONN6J00 board:
- | SC terminal | function | SC terminal | function |
|-------------|----------------|-------------|----------|
| 0 | EARTH (shield) | 4 | RX/TX+ |
| 1 | +VRL | 5 | GND |
| 2 | GND | 6 | +VRL |
| 3 | RX/TX- | | |
- 5 remote display terminal
 - 6 auxiliary card

8.2 Meaning of the symbols

	Power supply (Green LED)
	Humidifier operating (yellow LED) Steady: humidity production in progress Flashing: transitory status, atomisation temporarily paused
	Alarm (red LED) - On activation of an alarm: LED flashing and buzzer active - When an alarm is active, pressing ESC mutes the buzzer and the LED comes on steady, pressing ESC again resets the alarms (see Chap. "Alarms")
sec	Time in seconds
h	Hour counter
%	Humidity production as a percentage of rated capacity
set	Parameter setup
	Maintenance request (active alarm)
	On steady: humidifier fan operating. Flashing: fan on during deactivation phase

	3 digits, after 999 the display shows to indicated the 1000s (the three digits are displayed with a dot at the top between the first and second digit).
	Humidity production in progress
	Tank filling
	Water in the tank
	Water draining from the tank (also shown when the unit is in standby as the drain valve is normally open)

Tab. 8.a

8.3 Keypad

button	function
Esc	return to the previous display
UP	from the main screen: display the humidification values, see the following paragraph from the list of parameters: scroll the parameters and set the values
DOWN	from the main screen: display the humidification values from the list of parameters: scroll the parameters and set the values
ENTER (PRG)	for 2 seconds: access the list of parameters inside the list of parameters: select and confirm (like "Enter" on a computer keyboard)
drain	forced drain: press simultaneously UP and DOWN

Tab. 8.b

8.4 Main display

The humidifier display normally shows control signal status. For ON/OFF or proportional input signal (A0=0, A0=1, A0=3 and Th probe disconnected):

- display input signal;
- tank hour counter (h).
- maximum water vapour production control (parameter P0) (*);
- control hysteresis (parameter P1, only for proportional control A0=1) (*);
- humidifier status (Enb = enabled): pressing ENTER disables the humidifier and dIS is shown on the main screen.

For humidity probe input signal (A0=2, A0=3 and Th probe connected) or dew point temperature control (A0=4):

- display humidity probe reading;
- tank hour counter (h).
- maximum water vapour production control (parameter P0) (*);
- proportional band (parameter bP)(*);
- humidity/dew point temperature set point (parameter SP)(*);
- humidifier status (Enb = enabled): pressing ENTER disables the humidifier and dIS is shown on the main screen.

If enabling probe TH as a humidity limit probe (bH=1) or as a dew point temperature limit probe (bH=2) in control modes A0=0, A0=1, A0=2, the following parameters will be added to the main screen:

- humidity setpoint limit / dew point temperature (parameter SL)(*);
- limit proportional band (parameter bL) (*)

Parameter C0 (see Chap. "Configuration parameters") can be used to change the value shown on the main display (default: display input signal).

Disabling options:

- from remote (ON-OFF contact open), the display shows "C - -" alternating with the main screen;
- on the display, by pressing ENTER on Enb, the display will then show dIS (to enable it again, press ENTER); for a main/secondary network, this only disables the individual humidifier in question;
- from display (pressing Esc for 5 s), the display shows "t - -" alternating with the main screen, for a main/secondary network, this will disable all of the humidifiers in the network; to switch back ON, press ESC for 5 s until t - - is no longer shown;
- from supervisor (RS 485 Carel/Modbus) the display shows "S - -" alternating with the main screen;

CAREL

If there are multiple-disabling concurrently, they are alternated cyclically on the main screen.

If the display shows "----", it means a communication error between display and humidifier: control connection cable. If the problem persists, call for service.

(*) To modify the parameter displayed press:

- ENTER (display: **set**);
- UP or DOWN to set the value
- ENTER to confirm the new value.

Press ESC to return to the main screen. The parameters can also be accessed from the list of parameters (see Chap. "Configuration parameters").

8.5 Display software release

- 1) on power-up the display shows "rel. x.y" (e.g. rel. 1.2);
- 2) while the functioning;
 - a) on the display: from the main screen press ESC and UP together: software release is shown;
 - b) via network on integer variable 81. Format "## = #.#" (e.g. 12 = release 1.2)"

8.6 Accessing and setting parameters

The configuration parameters can be used to set and control humidifier functions and status.

From the main screen press:

- ENTER for 2 seconds,
- enter the password 77 using UP or DOWN,
- ENTER to confirm and access the list of parameters,
- UP or DOWN to scroll the list,
- ENTER to select a parameter (display: 'set'),
- UP to modify (increase) the value of the parameter. To scroll faster press DOWN together,
- DOWN to modify (decrease) the value of the parameter. To scroll faster press UP together,
- ENTER to save the new value and return to the list of parameters, or ESC to return to the list without saving the value,

Press ESC to return to the main screen.

8.7 Parameters: Recall default values

The default values of the parameters can be recalled at any time from the main screen.

From the main screen press:

- ENTER for 2 seconds,
- enter the password 50 using UP or DOWN and press ENTER,
- the message dFt is displayed, press ENTER and dFt will start flashing: to restore the default values, press ENTER again, or press ESC to exit.

If no button is pressed for 30 seconds, the display returns to the main screen without recalling the default values.

8.8 Reset hour counter from display

Tank hour counter

- Access parameter 'd3' (see chap. "Configuration parameters");
- press UP and DOWN for 5 seconds.

When reset is complete, 'res' is shown on the display.

Internal piezoelectric transducer hour counter:

- Access parameter 'd6' (see chap. "Configuration parameters");
- press UP & DOWN for 5 seconds

When reset is complete, 'res' is shown on the display (d6 returns to the value AF = 9999 default).

9. OPERATING PRINCIPLES

9.1 Ultrasonic atomisation

Ultrasonic humidifiers atomise water through propagation of a wave generated by a piezoelectric transducer to the surface of the water. Droplets of water thus form on the surface, with the smaller ones being carried air by the forced air flow. The quantity of atomised water depends on water level, water temperature and distribution in the air. Water level is kept constant using fill and drain valves, and a level sensor. Demineralised water is recommended: if using mains water, the scale that accumulates over time will foul the piezoelectric transducer, affecting atomisation. To avoid excessive scaling, humidifier periodically drains and automatically refills the water (periodical washing).

9.2 Control principles

The humidifier can be controlled using the following signals:

- remote ON/OFF;
- TAM (set by dipswitch);
- External proportional signal (only with auxiliary board);
- Humidity probe;
- Built-in temperature and humidity probe for dew point temperature control;
- Serial.

ON/OFF control

The action is all or nothing, activated by an external contact that consequently determines the control set point and differential. The external contact may be a humidistat, whose status determines the operation of the humidifier:

- contact closed: the humidifier produces nebulized water if the remote ON/OFF contact is also closed;
- contact open: the production of nebulized water ends.

Proportional control (only with auxiliar card)

- The production of nebulized water is proportional to the value of a signal "Y" from an external device. The type of signal can be selected between the following standards: 0 to 10 Vdc, 2 to 10 Vdc, 0 to 20 mA, 4 to 20 mA
- Maximum humidifier production, corresponding to the maximum value of the external signal, can be set from Pn (default 10%) to 100% of the rated value of the humidifier (parameter P0).

Minimum production has an activation hysteresis, equal to the value of P1 (default 2% of the proportional band of external signal "Y").

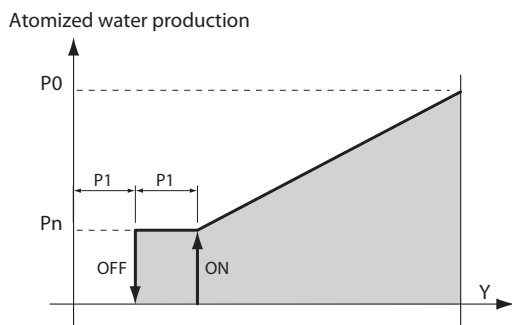


Fig. 9.a

Autonomous control with humidity probe

Humidity production is controlled based on the reading of the relative humidity probe (TH or connection via optional card). The humidifier will work at maximum capacity if the humidity measured is less than the set point minus the proportional band, while it will modulate production inside the proportional band, parameter bP modifiable, default 10%rH). The minimum production has a fixed activation hysteresis of 10% of the proportional band amplitude bP.

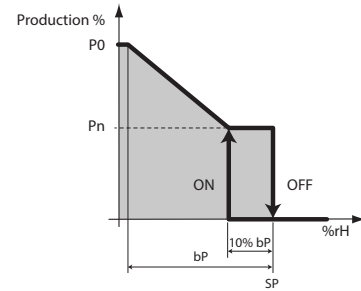


Fig. 9.b

Stand-alone dew point control

The production of humidity is linked to the reading of the temperature and humidity probe (TH). The humidifier will work at maximum capacity if the dew point temperature measured is less than the set point minus the proportional band, while it will modulate production inside the proportional band, (parameter bP modifiable, default 3°C/5°F). The minimum production has a fixed activation hysteresis of 10% of the proportional band amplitude bP.

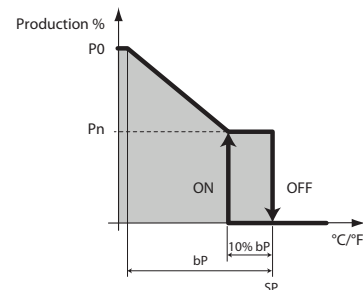


Fig. 9.c

Enable probe TH as humidity/ dew point temperature limit

When probe TH is connected to the dedicated card input, the unit can be controlled via ON/OFF contact (A0=0), external proportional signal or RS485 (A0=1) or external active probe (A0=2) and probe TH can be enabled as a **humidity limit** probe, setting parameter bH = 1. When approaching the limit set point (parameter SL, modifiable, default 70% rH) o 10°C/50°F inside the proportional band bL, atomisation is increasingly modulated, until stopping at the limit set point. The hysteresis for reactivation of minimum production is fixed and equal to 10% of the proportional band amplitude bL.

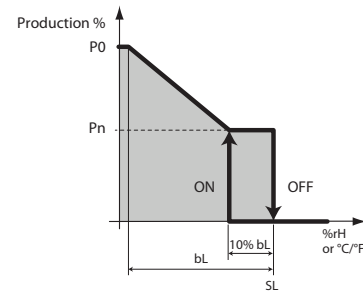


Fig. 9.d

9.3 Parallel flow-rate modulation (dipswitch 8 Off)

Atomised water flow-rate can be varied from 5% to 100% (parameters Pm and P0) by alternating on-off cycles of the transducers over a set period (parameter b7, default 1 second). Flow-rate is set based on parameter P0 (default 100%) and the request from the external signal (with optional card and proportional control).

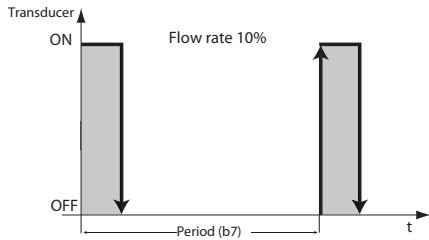


Fig. 9.e

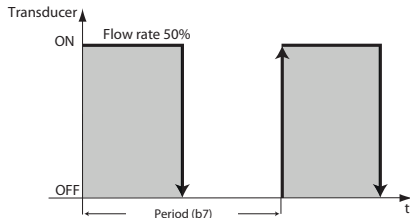


Fig. 9.f

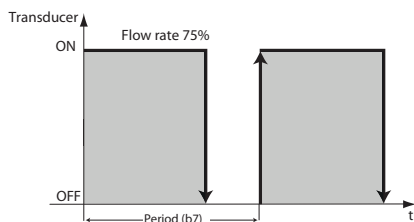


Fig. 9.g

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

9.4 Series flow-rate modulation (only model 11/h - dipswitch 8 On)

Atomised water flow-rate can be modulated as a percentage of rated production, from 10% to 100%. Each humidifier is managed with two piezoelectric transducers and each transducer generates 50% of total production. If the demand from the external signal or calculated according to the probe readings is 100% and parameter P0 is at 100%, both the piezoelectric transducers will be activated. For lower demand, production will be split between the two pairs of transducers as follows:

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

Distribution of production between the two transducers is rotated every hour of operation, to avoid uneven ageing of the transducers.

9.5 Automatic insufficient supply water management

The humidifier detects if the water supply is interrupted (or insufficient) by monitoring the status of the level sensor after opening the fill solenoid valve. If the sensor is not activated within the time set for parameter bA (default 15 minutes), humidification is interrupted, the drain is activated and the appliance waits a set number of minutes (parameter AA, default 10), during which the display shows "Rty" (Retry), before attempting to fill with water again. If this attempt succeeds, production will resume, otherwise the appliance waits a further time in minutes set in parameter AA. The process is repeated until the water sensor detects water. For the first two attempts, no alarm is generated, while if on the third attempt the procedure is not successful, alarm EF is generated, which is reset automatically when the humidifier verifies that the water supply is available again.

9.6 Automatic control of atomised water production

The humidifier monitors the water level inside the tank during production of atomised water. If the level does not fall, it means one of the following faults may have occurred:

- Malfunction of the piezoelectric transducers
- Leaky fill solenoid valve
- Fan malfunction

If after the set time for variable A8 (in minutes, default 30) the water level does not fall below the low level threshold, atomised water production stops. The unit waits a number of minutes set in parameter AA (default 10 minutes). The display shows "Rty" (Retry), then the control resumes the production. If the situation is repeated, alarm EP is activated, which shuts down the unit. If after a percentage of A8, set by parameter Ab (default 70%) the water is above the high level threshold, atomised water production stops, warning EL is generated and the unit waits AA minutes (default 10), during which the display shows "Rty" (Retry), then the control resumes the production. The warning signal EL is reset at the end of a production cycle that is completed correctly.

9.7 Automatic control of leaking drain solenoid valve and fill solenoid valve flow-rate

Parameter A9 sets a minimum production time (default 1 minute); if the production cycle lasts less than this time, it may mean that the drain solenoid valve is leaking or that the fill solenoid valve flow-rate is too low. In this case, the controller carries out the following operations:

1. At the end of the first cycle that ends after a time less than A9, the water refill time is increased (50% higher than parameter bb).
2. At the end of the second cycle that ends after a time less than A9, the water refill time is increased further (100% higher than parameter bb) and a chattering* cycle is activated on the drain solenoid valve, performed during the first automatic wash cycle.
3. At the end of the third cycle that ends after a time less than A9, the water refill time is increased further (150% higher than parameter bb) and a washing cycle is performed, during which chattering* is applied, as enabled in the previous step. Warning Ed is also generated.
4. After the final step, a new production cycle will be activated. If the problem persists, the controller will restart the procedure from the first step, until completing a cycle in the expected time. In this case, any warnings will be reset.

*Chattering: a sequence in which the drain solenoid valve is opened/closed in rapid succession, with the aim of removing any residues (scale, dust, etc.) that prevent it from closing correctly.

9.8 Automatic protection of the piezoelectric transducers

The piezoelectric transducers will, by nature, be rapidly damaged and eventually break if operated without water. To prevent this from happening, the control board makes sure, via the level sensor, that even in the event of anomalies the transducers are never activated when no water is present. When starting with the tank empty, the transducers are only activated when the low level is measured. During operation, if the water level has fallen below the minimum as a result of consumption due to atomisation, water is replenished by opening the fill valve. If the level does not rise in the minimum time (AC), the transducers are switched off, while the filling cycle continues until the level has been replenished or bA minutes have elapsed since the water fill cycle started. If the level is replenished correctly, the piezoelectric transducers are immediately restarted.

10. CONFIGURATION PARAMETERS

To access and set the following parameters, see chapters 8 and 11.

10.1 Basic parameters

Parameter	UM	range	def	note
A0 Operating mode 0 = On/Off mode from auxiliary card probe input 1 = Proportional mode from auxiliary probe input 2 = Humidity probe mode from auxiliary card probe input 3 = if the temperature and humidity probe TH is present, the humidity is read and adjusted; otherwise On/Off mode from contact on main board. Parameter A2 is not used. 4 = Dew point control mode by reading the temperature and humidity probe TH	-	0..4	3	
A1 Unit of measure 0 = International system; 1 = Imperial system	-	0..1	0	
A2 Type of external sensor (optional card) (0 = On/Off; 1 = 0-10V; 2 = 2-10V; 3 = 0-20 mA; 4 = 4-20 mA)	-	0..4	1	
P0 Maximum production	%	Pn...100	100	
P1 Proportional control hysteresis for mode A0=1	%	2...20	2	
Pn Produzione minima	%	5...P0	10	
SP Humidity Setpoint / dew point temperature ⁽¹⁾	%rH	20..95	50	only if terminal connected, otherwise values set by dipswitch only editable on the terminal
	°C (°F)	-16...35 (3...95)	10 (50)	
SL Humidity limit set point / dew point temperature	%rH	0...100	70	
	°C (°F)	-16...35 (3...95)	15 (59)	
bP Proportional band for control with probe	%rH	2...20	10	
	°C (°F)	1...10 (2...20)	3 (5)	
bL Proportional band for humidity / dew point temperature limit	%rH	2...20	10	
	°C (°F)	1...10 (2...20)	3 (5)	
C0 Default display (Terminal) 0 = Probe reading/control signal; 1 = Hour counter	-	0..1	0	

Tab. 10.a

10.2 Advanced parameters

Parameter	UM	range	def	note
A3 Probe minimum	%rH	0...100	0	
A4 Probe maximum	%rH	0...100	100	
A5 Probe offset	%rH	-99...100	0	
A6 Fan off delay time	min	0...15	5	
A7 Fan speed	%	40...100	100	
A8 Maximum evaporation time for reduced production alarm	min	0...200	30	
A9 Minimum evaporation time for reduced production alarm	min	0...A8	1	
AA Waiting time for retry	min	1...60	10	
Ab Percentage of A8 to carry out level test	%	50...90	70	
AC Maximum time to measure level when refilling	s	1...60	10	
Ad Maximum time to measure high level	s	1...60	10	
AE Restart fan time in standby for TH probe reading	min	0...120	0	
AF Piezoelectric transducer working life	h	0...9999	9999	with demineralised water
b0 Operating options (see table for parameter b0)	-	0...255	7	
b1 Time between two washing cycles	min/h	0...120	60	
b2 Inactivity time for washing	h	1...240	24	
b3 Washing time (fill + drain)	min	0...10	1	
b4 Start delay time	s	0...120	10	
b5 Operating hours for CL alarm	h	0...9999(*)	5000	
b6 Time to display new CL alarm after reset from keypad (without resetting hour counter)	min	0...240	60	
b7 Transducer modulating control period	s	0...10	1	
b8 Probe disconnected delay	s	0...200	10	
b9 OFF delay from TAM	s	0...60	2	
bA Maximum fill time	min	0...30	2	
bb Water refill time in production	s	0...120	5	
bC Maximum drain time	s	0...1500	60	
bd Drain opening time to completely empty tank	s	0...1500	30	
bE Delay time after measuring low level for refilling	s	1...20	10	
bF Drain activation delay in standby (if drain solenoid valve in standby = OPEN)	min	0...60	0	
bH Enable TH probe as humidity limit (bH=1) or as dew point limit (bH=2)	-	0...2	0	can be set to 1 or 2 only in modes A0 = 0, 1, 2
bL Proportional band for humidity / dew point temperature	%rH	2...20	10	
	°C (°F)	1...10 (2...20)	3 (5)	
bn Disable alarm buzzer 0 = enabled; 1 = disabled	-	0...1	0	
bP Proportional band for control with probe	%rH	2...20	10	
	°C (°F)	1...10 (2...20)	3 (5)	
P1 Proportional control hysteresis for mode A0=1	%	2...20	2	
P2 Low humidity alarm threshold	%rH	0...100	20	
P3 High humidity alarm threshold	%rH	0...100	80	

Tab. 10.b

⁽¹⁾ To be able to modify the value on the terminal, the corresponding dipswitches must all be Off. To be able to use the value set by the dipswitches again, set one of the dipswitches to On and power off. When powering on again, the controller will use the values set by the dipswitches..

^(*) after 999 the display shows **1000** to indicate the 1000s (the three digits are displayed with a dot at the top between the first and second digit).

Setting the value of parameter b0 in the range from 0 to 255 (default 7) changes the humidifier operating options as regards the following preferences:

- Unit of measure of parameter b1 (time between two periodical washing cycles): M = minutes; H = hours;
- Backup: ON = if two humiSonic units, the secondary unit becomes the backup unit for the main unit, i.e. it starts production only if the main unit has shut down due to an alarm; OFF = backup function disabled;
- Position of the drain solenoid valve in standby: OPEN = standby empty, the NO valve is not powered and the humidifier tank is emptied; CLOSED = standby full, the NO valve remains powered, keeping the humidifier tank full during standby;

4. Alarm relay activation: AL = signals alarms are present; SP = signals the set point has been reached;
5. Alarm relay operating logic: NO = normally open; NC = normally closed;
6. Enable washing due to inactivity: ON/OFF;
7. Washing due to inactivity: ON = the humidifier performs the washing cycle regularly when the time between two washing cycles due to inactivity expires (parameter b2); OFF = the humidifier performs the washing cycle before starting production (the time b2 must have already elapsed);
8. Enable autotest when starting from unit off: ON/OFF.

NOTICE: if connecting to a reverse osmosis system, it is recommended to leave preferences 6 and 7 ON.

b0	1. Unit of measure of parameter b1 M = minutes; H = hours	2. Enable backup function	3. Drain solenoid valve in standby	4. Alarm relay activation AL= alarms present SP= set point reached	5. Alarm relay logic NO= norm. open NC= norm. closed	6. Enable wash due to inactivity	7. Off = wash due to inactivity at next start On= standard wash due to inactivity	8. Auto- test
0	M	OFF	Open	AL	NO	Off	Off	Off
1	M	OFF	Open	AL	NO	Off	Off	On
2	M	OFF	Open	AL	NO	On	Off	Off
3	M	OFF	Open	AL	NO	On	Off	On
4	M	OFF	Open	AL	NO	Off	On	Off
5	M	OFF	Open	AL	NO	Off	On	On
6	M	OFF	Open	AL	NO	On	On	Off
7	M	OFF	Open	AL	NO	On	On	On
8	M	OFF	Open	AL	NC	Off	Off	Off
9	M	OFF	Open	AL	NC	Off	Off	On
10	M	OFF	Open	AL	NC	On	Off	Off
11	M	OFF	Open	AL	NC	On	Off	On
12	M	OFF	Open	AL	NC	Off	On	Off
13	M	OFF	Open	AL	NC	Off	On	On
14	M	OFF	Open	AL	NC	On	On	Off
15	M	OFF	Open	AL	NC	On	On	On
16	M	OFF	Open	SP	NO	Off	Off	Off
17	M	OFF	Open	SP	NO	Off	Off	On
18	M	OFF	Open	SP	NO	On	Off	Off
19	M	OFF	Open	SP	NO	On	Off	On
20	M	OFF	Open	SP	NO	Off	On	Off
21	M	OFF	Open	SP	NO	Off	On	On
22	M	OFF	Open	SP	NO	On	On	Off
23	M	OFF	Open	SP	NO	On	On	On
24	M	OFF	Open	SP	NC	Off	Off	Off
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26	M	OFF	Open	SP	NC	On	Off	Off
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36	M	OFF	Closed	AL	NO	Off	On	Off
37	M	OFF	Closed	AL	NO	Off	On	On
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39	M	OFF	Closed	AL	NO	On	On	On
40	M	OFF	Closed	AL	NC	Off	Off	Off
41	M	OFF	Closed	AL	NC	Off	Off	On
42	M	OFF	Closed	AL	NC	On	Off	Off
43	M	OFF	Closed	AL	NC	On	Off	On
44	M	OFF	Closed	AL	NC	Off	On	Off
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49	M	OFF	Closed	SP	NO	Off	Off	On
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55	M	OFF	Closed	SP	NO	On	On	On
56	M	OFF	Closed	SP	NC	Off	Off	Off
57	M	OFF	Closed	SP	NC	Off	Off	On
58	M	OFF	Closed	SP	NC	On	Off	Off
59	M	OFF	Closed	SP	NC	On	Off	On
60	M	OFF	Closed	SP	NC	Off	On	Off
61	M	OFF	Closed	SP	NC	Off	On	On
62	M	OFF	Closed	SP	NC	On	On	Off
63	M	OFF	Closed	SP	NC	On	On	On
64	M	ON	Open	AL	NO	Off	Off	Off
65	M	ON	Open	AL	NO	Off	Off	On
66	M	ON	Open	AL	NO	On	Off	Off
67	M	ON	Open	AL	NO	On	Off	On
68	M	ON	Open	AL	NO	Off	On	Off
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70	M	ON	Open	AL	NO	On	On	Off
71	M	ON	Open	AL	NO	On	On	On
72	M	ON	Open	AL	NC	Off	Off	Off
73	M	ON	Open	AL	NC	Off	Off	On
74	M	ON	Open	AL	NC	On	Off	Off
75	M	ON	Open	AL	NC	On	Off	On
76	M	ON	Open	AL	NC	Off	On	Off
77	M	ON	Open	AL	NC	Off	On	On
78	M	ON	Open	AL	NC	On	On	Off
79	M	ON	Open	AL	NC	On	On	On
80	M	ON	Open	SP	NO	Off	Off	Off
81	M	ON	Open	SP	NO	Off	Off	On
82	M	ON	Open	SP	NO	On	Off	Off

b0	1. Unit of measure of parameter b1 M = minutes; H = hours	2. Enable backup function	3. Drain solenoid valve in standby	4. Alarm relay activation AL= alarms present SP= set point reached	5. Alarm relay logic NO= norm. open NC= norm. closed	6. Enable wash due to inactivity	7. Off = wash due to inactivity at next start On= standard wash due to inactivity	8. Auto- test
83	M	ON	Open	SP	NO	On	Off	On
84	M	ON	Open	SP	NO	Off	On	Off
85	M	ON	Open	SP	NO	Off	On	On
86	M	ON	Open	SP	NO	On	On	Off
87	M	ON	Open	SP	NO	On	On	On
88	M	ON	Open	SP	NC	Off	Off	Off
89	M	ON	Open	SP	NC	Off	Off	On
90	M	ON	Open	SP	NC	On	Off	Off
91	M	ON	Open	SP	NC	On	Off	On
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94	M	ON	Open	SP	NC	On	On	Off
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110	M	ON	Closed	AL	NC	On	On	Off
111	M	ON	Closed	AL	NC	On	On	On
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114	M	ON	Closed	SP	NO	On	Off	Off
115	M	ON	Closed	SP	NO	On	Off	On
116	M	ON	Closed	SP	NO	Off	On	Off
117	M	ON	Closed	SP	NO	Off	On	On
118	M	ON	Closed	SP	NO	On	On	Off
119	M	ON	Closed	SP	NO	On	On	On
120	M	ON	Closed	SP	NC	Off	Off	Off
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136	H	OFF	Open	AL	NC	Off	Off	Off
137	H	OFF	Open	AL	NC	Off	Off	On
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141	H	OFF	Open	AL	NC	Off	On	On
142	H	OFF	Open	AL	NC	On	On	Off
143	H	OFF	Open	AL	NC	On	On	On
144	H	OFF	Open	SP	NO	Off	Off	Off
145	H	OFF	Open	SP	NO	Off	Off	On
146	H	OFF	Open	SP	NO	On	Off	Off
147	H	OFF	Open	SP	NO	On	Off	On
148	H	OFF	Open	SP	NO	Off	On	Off
149	H	OFF	Open	SP	NO	Off	On	On
150	H	OFF	Open	SP	NO	On	On	Off
151	H	OFF	Open	SP	NO	On	On	On
152	H	OFF	Open	SP	NC	Off	Off	Off
153	H	OFF	Open	SP	NC	Off	Off	On
154	H	OFF	Open	SP	NC	On	Off	Off
155	H	OFF	Open	SP	NC	On	Off	On
156	H	OFF	Open	SP	NC	Off	On	Off
157	H	OFF	Open	SP	NC	Off	On	On
158	H	OFF	Open	SP	NC	On	On	Off
159	H	OFF	Open	SP	NC	On	On	On
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162	H	OFF	Closed	AL	NO	On	Off	Off
163	H	OFF	Closed	AL	NO	On	Off	On
164	H	OFF	Closed	AL	NO	Off	On	Off
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166	H	OFF	Closed	AL	NO	On	On	Off
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171	H	OFF	Closed	AL	NC	On	Off	On
172	H	OFF	Closed	AL	NC	Off	On	Off
173	H	OFF	Closed	AL	NC	Off	On	On
174	H	OFF	Closed	AL	NC	On	On	Off
175	H	OFF	Closed	AL	NC	On	On	On
176	H	OFF	Closed	SP	NO	Off	Off	Off
177	H	OFF	Closed	SP	NO	Off	Off	On

b0	1. Unit of measure of parameter b1 M = minutes; H = hours	2. Enable backup function	3. Drain solenoid valve in standby	4. Alarm relay activation AL= alarms present SP= set point reached	5. Alarm relay logic NO= norm. open NC= norm. closed	6. Enable wash due to inactivity	7. Off = wash due to inactivity at next start On= standard wash due to inactivity	8. Auto- test
178	H	OFF	Closed	SP	NO	On	Off	Off
179	H	OFF	Closed	SP	NO	On	Off	On
180	H	OFF	Closed	SP	NO	Off	On	Off
181	H	OFF	Closed	SP	NO	Off	On	On
182	H	OFF	Closed	SP	NO	On	On	Off
183	H	OFF	Closed	SP	NO	On	On	On
184	H	OFF	Closed	SP	NC	Off	Off	Off
185	H	OFF	Closed	SP	NC	Off	Off	On
186	H	OFF	Closed	SP	NC	On	Off	Off
187	H	OFF	Closed	SP	NC	On	Off	On
188	H	OFF	Closed	SP	NC	Off	On	Off
189	H	OFF	Closed	SP	NC	Off	On	On
190	H	OFF	Closed	SP	NC	On	On	Off
191	H	OFF	Closed	SP	NC	On	On	On
192	H	ON	Open	AL	NO	Off	Off	Off
193	H	ON	Open	AL	NO	Off	Off	On
194	H	ON	Open	AL	NO	On	Off	Off
195	H	ON	Open	AL	NO	On	Off	On
196	H	ON	Open	AL	NO	Off	On	Off
197	H	ON	Open	AL	NO	Off	On	On
198	H	ON	Open	AL	NO	On	On	Off
199	H	ON	Open	AL	NO	On	On	On
200	H	ON	Open	AL	NC	Off	Off	Off
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202	H	ON	Open	AL	NC	On	Off	Off
203	H	ON	Open	AL	NC	On	Off	On
204	H	ON	Open	AL	NC	Off	On	Off
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206	H	ON	Open	AL	NC	On	On	Off
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208	H	ON	Open	SP	NO	Off	Off	Off
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210	H	ON	Open	SP	NO	On	Off	Off
211	H	ON	Open	SP	NO	On	Off	On
212	H	ON	Open	SP	NO	Off	On	Off
213	H	ON	Open	SP	NO	Off	On	On
214	H	ON	Open	SP	NO	On	On	Off
215	H	ON	Open	SP	NO	On	On	On
216	H	ON	Open	SP	NC	Off	Off	Off
217	H	ON	Open	SP	NC	Off	Off	On
218	H	ON	Open	SP	NC	On	Off	Off
219	H	ON	Open	SP	NC	On	Off	On
220	H	ON	Open	SP	NC	Off	On	Off
221	H	ON	Open	SP	NC	Off	On	On
222	H	ON	Open	SP	NC	On	On	Off
223	H	ON	Open	SP	NC	On	On	On
224	H	ON	Closed	AL	NO	Off	Off	Off
225	H	ON	Closed	AL	NO	Off	Off	On
226	H	ON	Closed	AL	NO	On	Off	Off
227	H	ON	Closed	AL	NO	On	Off	On
228	H	ON	Closed	AL	NO	Off	On	Off
229	H	ON	Closed	AL	NO	Off	On	On
230	H	ON	Closed	AL	NO	On	On	Off
231	H	ON	Closed	AL	NO	On	On	On
232	H	ON	Closed	AL	NC	Off	Off	Off
233	H	ON	Closed	AL	NC	Off	Off	On
234	H	ON	Closed	AL	NC	On	Off	Off
235	H	ON	Closed	AL	NC	On	Off	On
236	H	ON	Closed	AL	NC	Off	On	Off
237	H	ON	Closed	AL	NC	Off	On	On
238	H	ON	Closed	AL	NC	On	On	Off
239	H	ON	Closed	AL	NC	On	On	On
240	H	ON	Closed	SP	NO	Off	Off	Off
241	H	ON	Closed	SP	NO	Off	Off	On
242	H	ON	Closed	SP	NO	On	Off	Off
243	H	ON	Closed	SP	NO	On	Off	On
244	H	ON	Closed	SP	NO	Off	On	Off
245	H	ON	Closed	SP	NO	Off	On	On
246	H	ON	Closed	SP	NO	On	On	Off
247	H	ON	Closed	SP	NO	On	On	On
248	H	ON	Closed	SP	NC	Off	Off	Off
249	H	ON	Closed	SP	NC	Off	Off	On
250	H	ON	Closed	SP	NC	On	Off	Off
251	H	ON	Closed	SP	NC	On	Off	On
252	H	ON	Closed	SP	NC	Off	On	Off
253	H	ON	Closed	SP	NC	Off	On	On
254	H	ON	Closed	SP	NC	On	On	Off
255	H	ON	Closed	SP	NC	On	On	On

Tab. 10.c

10.3 Serial connection parameters

Parameter	UOM	range	def	note
C0 Default display (Terminal)	-	0-5	0	
C1 Baud rate: 0 = 4800 bps; 1 = 9600 bps; 2 = 19200 bps; 3 = 38400 bps	-	0-3	2	
C2 tLAN address (if 0 = main)				
C3 Serial address	-	1-207	1	
C4 Timeout for main offline alarm	s	0-240	30	The alarm is only generated if online production control is active (see chap. "Humidifier control via network")

Tab. 10.d

10.4 Read-only parameters

Parameter	UOM	range	def	note
d0	°C/°F	0-1000	0	
d1	%rH	0-1000	0	
d2	% / %rH	0-100	0	
d3	h	0-9999(*)	0	
d4	h	0-9999(*)	0	
d5	%	0..100	0	
d6	h	0..9999(*)	9999	equal to AF - piezoelectric transducer hour counter
d7	-	0..1	0	R/W parameter: 0 = the secondary exactly replicates the production of the main, as it depends on the setting of parameter P0 on the main; 1 = the secondary produces according to the request sent by the main and its own P0 setting; it is not affected by the setting of P0 on the main
d8	°C/°F	0...1000	0	calculated using d0 and d1

Tab. 10.e

(*) after 999 the display shows **100** to indicate the 1000s (the three digits are displayed with a dot at the top between the first and second digit).

11. HUMIDIFIER CONTROL VIA NETWORK

The variables shown in the list are a set of all the internal variables. **DO NOT CONFIGURE ANY VARIABLES THAT ARE NOT SHOWN IN THE TABLE, OTHERWISE HUMIDIFIER OPERATION MAY BE AFFECTED.**

The serial connection (M11) is configured by default with the following parameters:

- Address 1
- Baud rate 19200 bps
- Frame 8,N,2 (not modifiable)

NOTICE: it is recommended to set on the supervisor (main) the maximum waiting time for a response from humiSonic - after being queried by the supervisor - of at least 500 ms.

11.1 Supervisor variable list

"A"		analogue variables* (Modbus®: REGISTERS)	R/W
CAREL	Modbus®		
1	0	param. d0: Th probe temperature reading	R
2	1	param. d1: Th probe humidity reading	R
3	2	param. d2: Probe reading	R
4	3	param. d5: Instant production	R
9	8	param. d8: Dew point temperature	R

"I"		integer variables (Modbus®: REGISTERS)	R/W
CAREL	Modbus®		
1	128	Level access password	R/W
7	134	Humidifier status 0=disabled/standby 3=fill 6=reset alarms 1=autotest 4=production 7=washing 2=initialisation 5=drain 8=cleaning procedure	R
2	129	Firmware release	R
15	142	Alarms, refer to Chap.ALARMS: • bit0: Alarm E0 • bit5: Alarm PU • bit10: Alarm ES1 • bit1: Alarm Et • bit6: Alarm H ⁻ • bit11: Alarm ES2 • bit2: Alarm EF • bit7: Alarm H _L • bit12: Alarm ES3 • bit3: Alarm Ed • bit8: Alarm EE • bit13: Alarm OFL • bit4: Alarm EP • bit9: Alarm CL • bit14: Alarm EL • bit15: Alarm EtL	R/W
20	147	Parameter A0: Operating mode	R/W
21	148	Parameter A2: Type of external probe	R/W
22	149	Parameter A3: Probe minimum	R/W
23	150	Parameter A4: Probe maximum	R/W
24	151	Parameter A5: Probe offset	R/W
25	152	Parameter A6: Fan off delay time	R/W
26	153	Parameter A7: Fan speed	R/W
27	154	Parameter A8: Maximum evaporation time for no production alarm	R/W
28	155	Parameter A9: Minimum evaporation time for no production alarm	R/W
29	156	Parameter b0: Operating options	R/W
30	157	Parameter b1: Time between two washing cycles	R/W
31	158	Parameter b2: Inactivity time for washing on next start	R/W
32	159	Parameter b3: Washing time (fill + drain)	R/W
33	160	Parameter b4: Start delay time	R/W
34	161	Parameter b5: Operating hours for CL alarm	R/W
35	162	Parameter b6: Time to display new CL alarm in minutes	R/W
36	163	Parameter b7: Transducer On/Off control interval	R/W
37	164	Parameter b8: Probe delay disconnected	R/W

"I"		integer variables (Modbus®: REGISTERS)	R/W
CAREL	Modbus®		
38	165	Parameter b9 TAM OFF delay	R/W
39	166	Parameter bA: Maximum fill time	R/W
40	167	Parameter bb: Refill time in evaporation	R/W
41	168	Parameter bC: Maximum drain time	R/W
42	169	Parameter bd: Drain opening time to completely empty tank	R/W
43	170	Parameter bE: Delay time after measuring low level for refilling	R/W
44	171	Parameter C0: Default display (Terminal)	R/W
45	172	Parameter C1: Parameter A0: Baud rate	R/W
46	173	Parameter C2: tLAN address (If 0 Main controller)	R/W
47	174	Parameter C3: Serial address	R/W
48	175	Parameter P0: Maximum flow-rate	R/W
49	176	Parameter P1: Proportional control hysteresis	R/W
50	177	Parameter P2: Low humidity alarm threshold	R/W
51	178	Parameter P3: High humidity alarm threshold	R/W
52	179	Parameter SP: Humidity / dew point set point	R/W
53	180	Parameter d3: Operating hour counter	R
54	181	Parameter d4: Unit hour counter (not resettable)	R/W
60	187	Request via serial (if digital 37 set)	R/W
62	189	Identification of variable on secondary unit to read/write from supervisor (see paragraph "Network connection")	R/W
63	190	Value of variable on secondary unit identified by integer 62 (see paragraph "Network connection")	R/W
65	192	Parameter C4: Timeout for main serial offline	R/W
69	196	AA: Waiting time for retry	R/W
70	197	Ab: Percentage of A8 for carrying out level test	R/W
71	198	Pn: Minimum production	R
72	199	bF: Drain activation delay in standby	R/W
73	200	AC: Maximum time to measure level when refilling	R/W
74	201	Ad: Maximum time to measure high level	R/W
82	209	AE: Restart fan time in standby for integrated probe reading	R
87	214	Secondary 1 firmware release	R
89	216	Secondary 1 humidifier status	R
92	219	Parameter d3, secondary 1: Operating hour counter	R/W
93	220	Secondary 2 firmware release	R
95	222	Secondary 2 humidifier status	R
98	225	Parameter d3, secondary 2: Operating hour counter	R/W
99	226	Secondary 3 firmware release	R
101	228	Secondary 3 humidifier status	R
104	231	Parameter d3, secondary 3: Operating hour counter	R/W
105	232	Piezoelectric transducer operating hour counter	R
106	233	Parameter d6 Time remaining to end of piezoelectric transducer life	R/W
107	234	Parameter AF: Piezoelectric transducer working life	R/W
112	239	Parameter bH: Enable TH probe as humidity / dew point limit	R/W
113	240	Parameter SL: Humidity / dew point limit set point	R/W
114	241	Parameter bP: proportional band for control with probe TH or external probe	R/W
115	242	Parameter bL: limit proportional band	R/W
117	244	Parameter d7: manage secondary unit production	R/W

Tab. 11.f

"D"		digital variables (Modbus®: COILS)	R/W
CAREL	Modbus®		
2	1	Just started flag	R
3	2	Humidifier ready to produce	R
4	3	Setpoint reached	R
5	4	Green LED	R
6	5	Red LED	R
7	6	Yellow LED	R
8	7	Remote On/Off	R
9	8	Low level	R
10	9	High level	R
11	10	Aux level	R
12	11	Autotest completed	R
14	12	BMS serial in tLAN mode	R
15	14	TAM enabled	R
16	15	TAM reading	R
17	16	Terminal connected	R
18	17	Production in progress	R
19	18	Fill	R
20	19	Drain	R
21	20	Transducer 1	R
22	21	Transducer 2	R
23	22	Fan	R
24	23	Alarm relay	R
25	24	Auxiliary relay	R
26	25	Manual drain	R/W
27	26	Disable from serial	R/W
28	27	Reset hour counter	R/W
29	28	Reset alarms	R/W
30	29	Status of dipswitch 8: parallel/series modulation	R
31	30	Functional test performed	R
33	31	Unit of measure	R/W
34	32	Secondary 1 online	R
35	34	Secondary 2 online	R
36	35	Secondary 3 online	R
37	36	Enable control from serial	R/W

38	37	Wash activation from serial	R/W
39	38	Skip Autotest or washing while in progress	R/W
43	42	Reset piezoelectric transducer hour counter	R/W
44	43	Backup unit ready for production	R
46	45	Production limiting in progress (limit probe function)	R
47	46	On/Off control from keypad for main/secondary network	R/W
49	48	On/off control from main unit keypad	R/W
50	49	On/off control from secondary unit 1 keypad	R/W
51	50	On/off control from secondary unit 1 keypad	R/W
52	51	On/off control from secondary unit 1 keypad	R/W
54	53	Parameter bn: disable alarm buzzer	R/W

Tab. 11.g

11.2 Production control via network

To control production via a he connection, configure the humidifier using following parameters:

Digital 27, Digital 37 and Integer 60 (Modbus 188)

When the D37 is at 1, the humidifier excludes the external command signals (external regulator or probes) and uses the value of Integer 60 (modbus 188) as like comand signal. The humidity production can be managed in two modes:

To manage the production level in percentual mode:

- Set D 37 = 1;
- Set parameter A0 = 1 (Carel 20, Modbus 148, Proportional Mode);
- Set integer variable 60 Carel (188 Modbus) to the desired level (0-1000 = 0-100.0%).

To manage the production with a humidity probe managed by the main:

- Set D 37 = 1;
- Set parameter A0 = 2 (Carel 20, Modbus 148, Humidity probe Mode);
- Set integer variable 60 Carel (188 Modbus) to the desired level (0-1000 = 0-100.0 rH%);
- Set integer variable 52 Carel (180 Modbus) to the desired humidity setpoin.

When the D37 is at 1, if the communication is lost for the seconds settled by parameter C4, is generated the "Main Offline" alarm (see alarms table) and the production stops.

Production is activated/deactivated via digital parameter D27 (see parameter table).

If D27 = 1 the humidifier is disabled and production stops

if D27 = 0 the humidifier is enabled and production is activated.

D27 is independent from the state of D37.






11.3 Washing cycle activation via network

A washing cycle can be performed at any time by managing digital variable 38.

Setting the variable to 1 will immediately activate a washing cycle, even if the unit is in standby, and even if both automatic washing and washing due to inactivity are disabled by their corresponding parameters.

The variable will keep the value 1 throughout the duration of the washing cycle, and will automatically be reset at the end of the cycle.

12. ALARMS

red LED signal (*)	code and symbol on display (flashing)		meaning	cause	solution	alarm relay activation	action	reset
2 fast flashes	Et	-	Autotest failed	- Fill not connected or insufficient - drain open - faulty float	Check: • water supply and fill valve; • blockage of filter on fill solenoid valve; • check drain solenoid valve and drain connection;	yes	humidification interrupted	ESC / Digital 29
5 fast flashes	EP		No production	Malfunction of piezoelectric transducers	Carry out maintenance on tank	yes	humidification interrupted	ESC / Digital 29
3 fast flashes	EF		No water	Interruption to water supply or fill solenoid valve malfunction	Check: • water supply and fill valve; • blockage of filter on fill solenoid valve	yes (in the 10 min. waiting period)	humidification interrupted only per 10 minutes	automatic (after 10 minute wait, see Chap. 9.5)
4 fast flashes	Ed		No drain	Drain solenoid valve/circuit malfunction	Check drain valve and drain connection	yes	humidification interrupted	ESC / Digital 29
5 slow flashes	CL		Tank maintenance request signal	b5 operating hours for recommended maintenance exceeded	Carry out maintenance on tank and transducers (cap. 13)	no	signal only	Reset hour counter (See Chap 7.5 or 8.8)
6 fast flashes	PU	-	External control signal not connected correctly	Cable interrupted/disconnected/not connected correctly.	Check the reference signal (4 to 20 mA or 2 to 10V).	yes	humidification interrupted	AUTO
2 slow flashes	H^		High humidity	The signal from the probe indicates humidity above 80%rH	Check humidity probe signal/cable	yes	humidification interrupted	AUTO
3 slow flashes	H_		Low humidity	The signal from the probe indicates humidity less than 20%rH	Check humidity probe signal/cable	yes	humidification interrupted	AUTO
4 slow flashes	EE		EEPROM alarm	Problems in the EEPROM	If the problem persists, contact the CAREL service centre	yes	humidification interrupted	If this persists contact service
1 fast flash	E0		Functional test not performed	Functional test not performed by manufacturer/EEPROM problems	If the problem persists, contact the CAREL service centre	yes	humidification interrupted	If this persists contact service
7 slow flashes	OFL		Main Offline	Loss of connection from the serial main (If D37=1)	Check state of the Main / Cable	yes	humidification interrupted	AUTO
8 fast flash	EL		Water level alarm	Level too high during atomised water production due to: • fill SV leak • transducer malfunction • fan malfunction	Check: • fill SV • transducers • fans	yes	humidification interrupted	AUTO
6 slow flashes	ES1 ES2 ES3		Alarm on secondary unit 1/2/3	Display secondary unit from terminal for details of the alarm	see specific alarm code, chapter "Network connection"	yes	signal only	AUTO
1 slow flash	-bu		Backup unit not available	The backup unit is off or has an alarm: contact J17 on the main unit is open	Check the connection from the alarm relay on the backup unit to input J17 on the main unit.	no	signal only	AUTO
9 fast flashes	EtL		End of piezoelectric transducer life	The unit has reached AF working hours (default 9999 h)	Replace the piezoelectric transducers to guarantee rated unit production	yes	signal only	Reset internal piezoelectric transducer counter by setting parameter d6 to zero (See 8.8)

Tab. 12.a

To reset the alarms, press ESC once to mute the buzzer, press ESC a second time to completely reset the alarm.

(*) Fast flash: 0.2 seconds ON and 0.2 seconds OFF
Slow flash: 1 second ON and 1 second OFF

12.1 Troubleshooting

NOTICE: 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	Terminal M14 open	Visual verify	Connect terminal M14 to a bridge
		No power	Measure the voltage at the humidifier input terminals of the transformer	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 following table
No atomised water production	Other	The humidifier is not installed horizontally	Check visually	Adjust
		Dust and foreign matter accumulated in the tank (*)		Clean the inside of the tank
The quantity of atomised water is too low	Transducer deterioration	Scale build-up on the surface of the piezoelectric transducers (*)	Verify the d6 >0 parameter	Replace if d6=0
		Dust and foreign matter accumulated in the tank (*)	Check a view the inside of the tank	Clean the inside of the tank and replace the transducers

Tab. 12.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
The quantity of atomised water is too low	Other	The fan cables are loose or detached	Check connection after removing the humidifier cover	Restore correct connection to the terminals
		Water level overflow	Float level sensor blocked	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. 12.c

13. MAINTENANCE AND SPARE PARTS

13.1 Spare parts

Table of water circuit, electrical and electronic spare part numbers

	part number	pos.
Water circuit		
Fill solenoid valve kit	UUKFV00000	F
Drain solenoid valve kit	UUKDV00000	E
Water circuit (UU01F)		
Tank complete	UUKC200010	B
Cover with fan and level sensor	UUKCO00010	L
Water circuit (UU01G)		
Tank complete	UUKC400010	B
Cover with fan and level sensor	UUKCD00010	L
Electrical and electronic parts		
Main electronic board	UUF02S0010	D
Main board + auxiliary card	UUF02M0010	D + H
Driver	UUKDE00000	
Transducer TDK	UUKTP00000	
Electrical parts - (UU01%01 - UU01G%01)		
Power transformer: 230-24/50V	UUKTFD0010	A
Power transformer: 115-24V	UUKTF10000	A
Power transformer: 115-50V	UUKTF30010	A
Cable Kit UU01F	UUKWR00010	G
Cable Kit UU01G	UUKWR10010	G

Tab. 13.a

13.2 Dismantling

Maintenance on the humidifier must be carried out by CAREL Technical Service or professionally qualified personnel.

⚠ WARNING: electric shock hazard. Before carrying out any work, the appliance must be disconnected from the mains power supply and must be prevented from being powered on. Electrical disconnection must be verified by measurement.

To dismantle the humidifier:

1. Press where the arrows are marked and remove the tank;

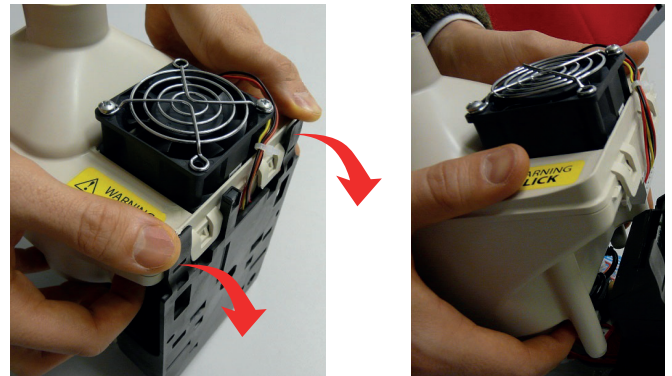


Fig. 13.a

2. Press the flaps (C) to release and remove (D) the fill and drain valves.

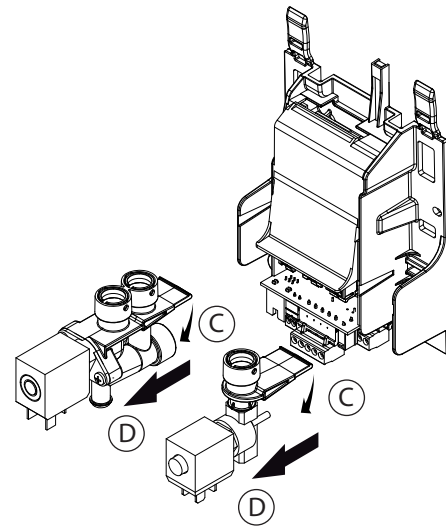


Fig. 13.b

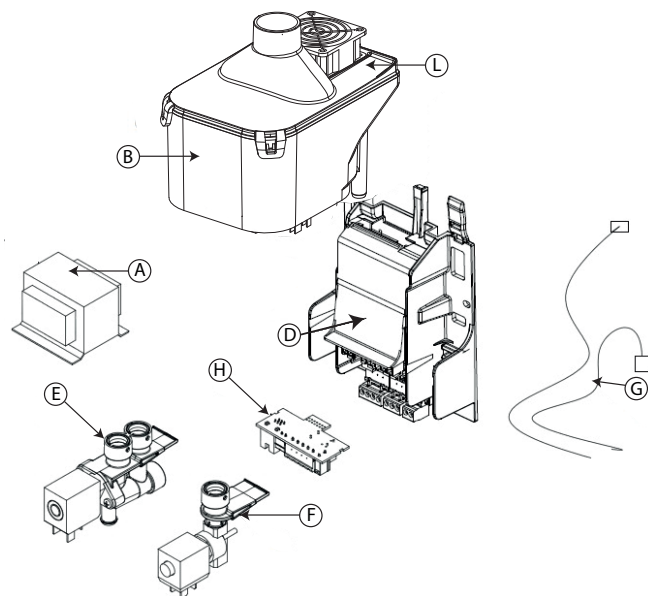


Fig. 13.a

13.3 Tank cleaning and maintenance

Replacement

In normal conditions, the tank requires maintenance after one year (or 1500/5000 operating hours respectively with mains/demineralised water), or if not used for an extended period. Replacement is required immediately – even before the scheduled period – should problems occur (for example, when scale inside the tank prevents correct operation of the piezoelectric transducers).

NOTICE:

- the tightening torque of the screws that fasten the transducer must be $0.4 \pm 0.05 \text{ Nm}$;
- beware of electrostatic discharges, so as to prevent damage to electronic components.

Replacement procedure:

3. switch the humidifier off (switch "0"), and open the mains disconnect switch (safety procedure);
4. disconnect the transducer power cable;
5. release the tank (the two tabs at the rear) and lift it vertically to remove it;
6. clean or replace the transducers by removing the screws (figure). After replacement test water-tightness by filling the tank manually;
7. reconnect the transducer power cables;
8. reposition the tank;
9. switch the humidifier on.

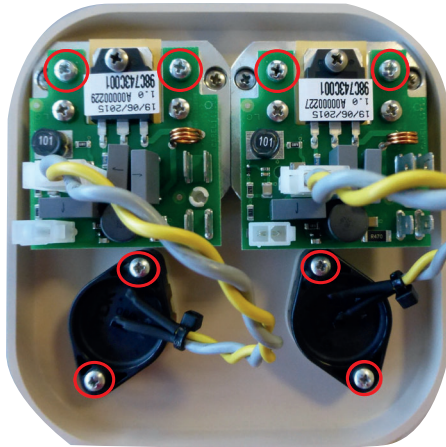


Fig. 13.c

Periodical checks

- **Every year or no** more than 1500/5000 operating hours respectively with mains/demineralised water:
 - clean the piezoelectric transducers
 - make sure the level sensor slides freely

NOTICE: in the event of water leaks, disconnect the humidifier from the power supply and repair the leak

13.4 Cleaning and maintenance of other components

- Using humiSonic with demineralised water, transducers last about 10,000 h. If it is used another type of water or if the water has impurities and dirt, the transducers useful life is reduced proportionally
- when cleaning plastic parts do not use detergents/solvents;
- descaling can be performed using a 20% acetic acid solution, followed by rinsing with water;
- To replace the drivers and transducers, loosen the screws shown in the figure with a screwdriver. Before applying the new driver, spread on the back of the heat sink in contact with the tank, a layer of conductive paste. The lack of the conductive paste may cause malfunctions. To insert new transducers, observing the direction of insertion (please, pay attention to the print before removing the old one).

NOTICE: the tightening torque of the screws that fasten the transducer must be $0.4 \pm 0.05 \text{ Nm}$.

Maintenance checks on other components:

- fill solenoid valve. After having disconnected the cables and hoses, remove the solenoid valve, check the inlet filter and clean if necessary, using water and a soft brush.

NOTICE: after having replaced or checked the water circuit components, make sure the connections are restored correctly.

14. WIRING DIAGRAMS

14.1 Model with 230V power supply

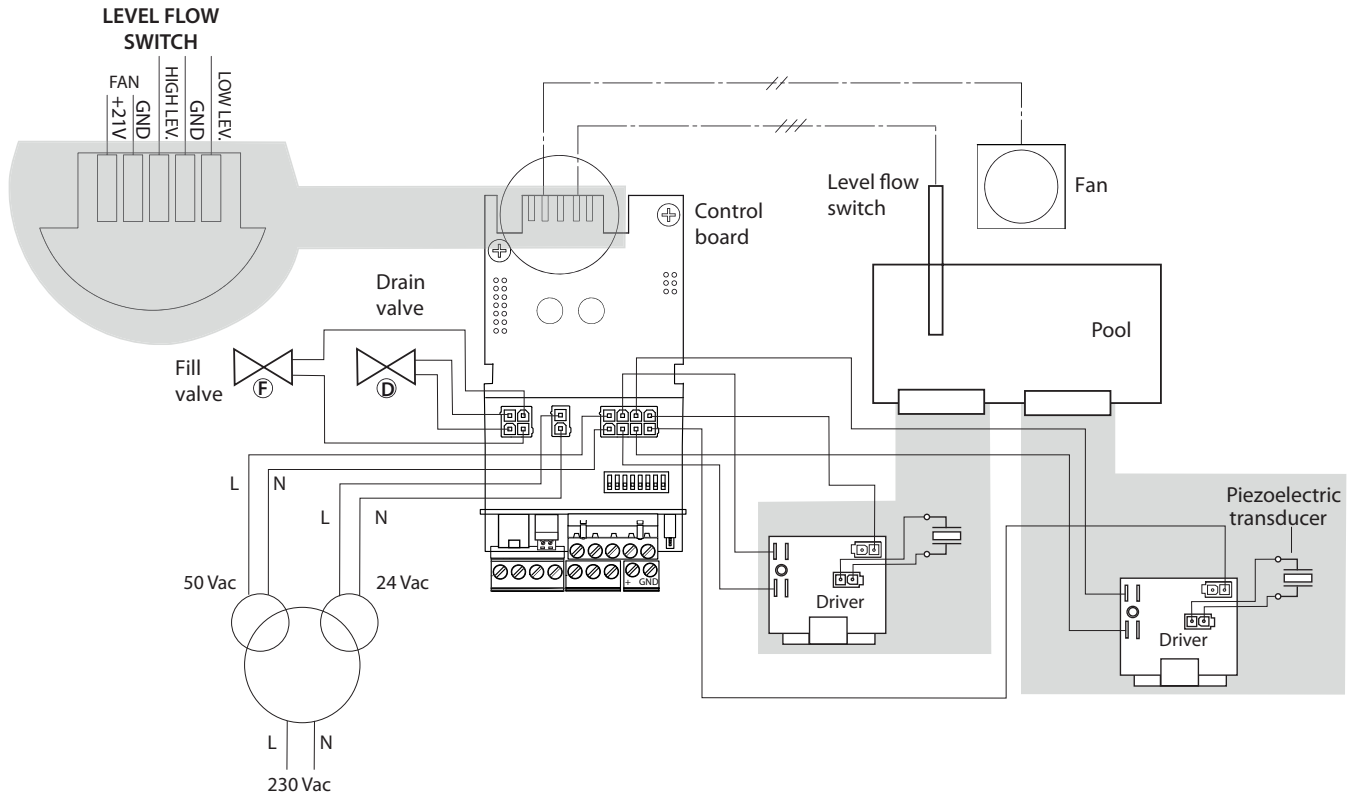


Fig. 14.a

14.1 Model with 115V power supply

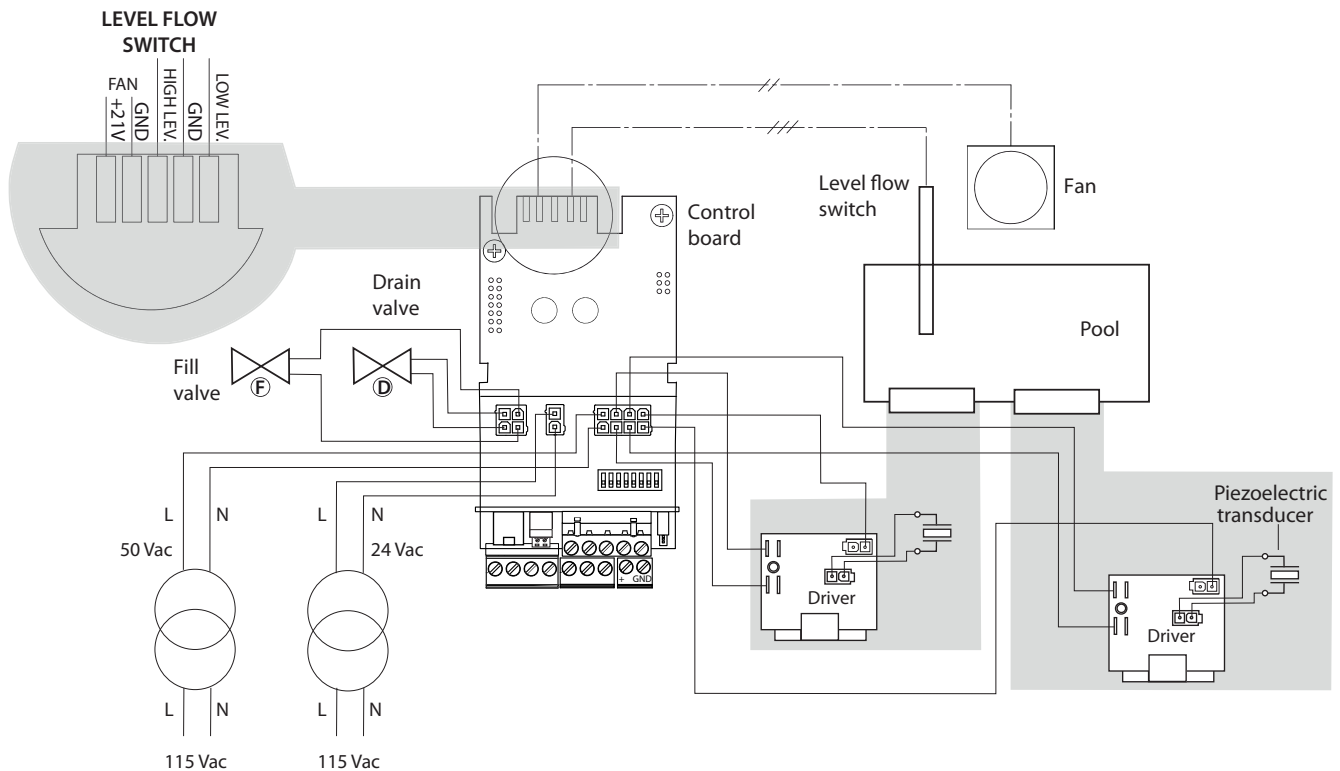


Fig. 14.b

15. GENERAL FEATURES AND MODELS

15.1 Ultrasound humidifier models for fan coils 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 humidity production values.

model	humidity production ^(2;4) (kg/h)	power ⁽²⁾ (W)	power supply		current ⁽²⁾ (A)	cable ⁽³⁾ (mm ²)
			code	voltage ⁽¹⁾ (V - type)		
UU01FD	0,5	60	D	230-1~	0,75	1,5
UU01F1	0,5	60	1	115 - 1~	0,6	1,5
UU01GD	1	110	D	230 - 1~	1,5	1,5
UU01G1	1	110	1	115 - 1~	1,2	1,5

Tab. 15.a

- (1) tolerance allowed on rated mains voltage: -15%, +10%;
- (2) tolerance on rated values: +5%, -10% (EN 60335-1);
- (3) recommended values, referring to PVC or rubber cable in a closed conduit, 20 m (65.6 ft) long; compliance with standards in force is always required;
- (4) max instant rated water vapour production: average water vapour production may depend on external factors, such as: room temperature, water quality, water vapour distribution system.

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

15.2 Technical specifications

Technical specifications	UU models UU01*
humidity outlet	
connection dia. mm	40 (ensure an outlet area of 1100 mm ² , e.g. 22 x 8 mm holes)
supply water	
connection	G 1/8" F
temperature limits °C (°F)	1...40 (33.8...104)
pressure limits (MPa)	0,1...0,6 (1...6 bar)
specific conductivity at 20°C	3...50 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	G 1/8" F
chlorides	1...40 (33.8...104)
silicon dioxide	0,1...0,6 (1...6 bar)
chlorine ions	0...50 µS/cm
calcium sulphate	0...25 mg/l CaCO ₃
instant flow-rate (l/min)	0...15 mg/l CaCO ₃
drain water	
connection dia. mm (*)	10 mm
instant flow-rate (l/min)	7
environmental conditions	
ambient operating temperature °C (°F)	1...45 (33.8...113)
ambient operating humidity (% rH)	10...80
storage temperature °C (°F)	-10...60 (14...140)
storage humidity (% rH)	5 to 95 (41 to 203)
index of protection	IP00
electronic controller	
auxiliary voltage/frequency (V- Hz)	24 V / 50-60 Hz
maximum auxiliary power (VA)	3
control signal inputs (general features)	can be selected for the following signals: 0 to 10 Vdc, 2 to 10 Vdc, 0 to 20 mA, 4 to 20 mA, input impedance: 20 kΩ with signals: 0 to 10 Vdc, 2 to 10 Vdc 100 Ω with signals: 0 to 20 mA, 4 to 20 mA
alarm relay outputs (general features)	24 V (max 3 W)
remote enabling signal input (general features)	voltage-free contact; max. resistance 100 Ω; Vmax= 5 Vdc; Imax= 5 mA
power	
instant water vapour production ⁽²⁾ kg/h (lb/h)	see table above
power consumption at rated voltage (W)	see table above

Tab. 15.b

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

⁽²⁾ = average water vapour production is affected by factors such as: room temperature, water quality, water vapour distribution system

16. NETWORK CONNECTION

16.1 Settings

The Main unit can control the operation of up to 3 Secondary units connected via tLAN network. For the electrical connections see the wiring diagram on the next page. Dipswitches 1-3 on the Main unit must all be set to OFF. Each Secondary unit must be suitably configured using the dipswitches, as follows:

- 1: Set ON for serial port (M11) conversion from RS485 to tLAN;
- 2/3: Secondary address, as in the figure below.

16.2 Control logic

The Main unit controls each connected Secondary unit via the following parameters:

- enable/disable operation;
- level of atomised water production.

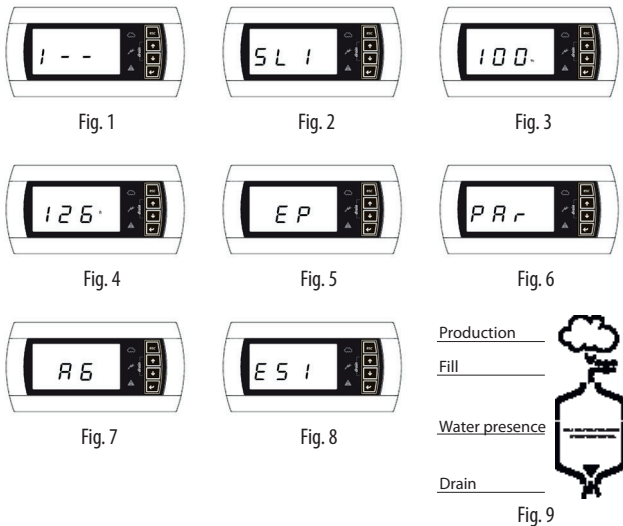
The control signals (probe/humidistat/external controller) are only read and managed by the Main unit, which then controls operation of the Secondaries. The level of production on the Main unit is sent to all the Secondaries:

- Ex.1:** Main configured for proportional control (see chap. "Electrical connections") and request at 90%: the Main and each Secondary will modulate at 90% capacity (see chap. "Operating principles").
- Ex.2:** Main configured for control by room probe, set point 50 %rH: when reaching the set point, the Main and all the Secondaries will stop atomised water production.

Each unit (Main or Secondary) is independent as regards the atomised water production control logic and all the other functions.

16.3 Management of Secondaries from terminal (Main)

From the main screen press PRG for 3 seconds and enter the password: 90. The terminal will display the status of the Secondary connected, with the following logic - starting from the digit on the left: Unit 1, Unit 2, Unit 3.



The symbol 1 means "unit online", while the symbol - means "unit offline". Fig.1 shows an example of Unit 1 online (left digit 1) while Unit 2 and 3 offline (central and right digit -).

Press ENTER on the terminal opens the menu for selecting the unit to be controlled, using UP and DOWN to select the desired unit. Fig.2 shows the screen for selecting Unit 1.

Pressing ENTER accesses the menu for controlling the desired unit, UP and DOWN scroll the following fields:

- Percentage request sent to the Main (Fig.3).
- Operating hour counter (Fig.4), resettable pressing UP+DOWN for 5 seconds (see "parameter d3").
- Unit alarms (Fig.5, -- means no alarms are present), resettable pressing UP+DOWN for 5 seconds.
- humidifier status (Enb = enabled): pressing ENTER disables the humidifier and dIS is shown on the main screen; to enable the unit press ENTER again;
- limit probe set point and proportional band (SL, bL), if enabled by setting bH=1, parameter bH available in the list of parameters Par
- Access parameter configuration menu (Fig.6).

The icons, in this display, indicate the status of the selected Secondary (Fig.9)

Pressing ENTER from parameter configuration menu access screen opens the list of parameters that can be set (Fig.7).

For the meaning of the parameters see Configuration parameters.

Parameter b8 is used as a timeout for recognising when a unit is offline; depending on the number of secondaries connected, it may be necessary to change this parameter, set by default to 10 s.

Alarms

From the main screen the Main displays any alarms present on a certain secondary with the code ESX, where X is the address of the secondary with the active alarm (Fig. 8, Secondary 1 alarm).

For details of the current alarm access the menu for the secondary in question. Each unit is independent in managing its own alarms, except for those relating to the control signals connected to the Main, which affect the entire network of humidifiers.

Alarm	Description
PU	External control signal not connected
OFL	Supervisor disconnected and Main in request from serial mode

Tab. 16.a

16.4 Control via supervisor (Carel/Modbus®)

Supervisor variables I62 and I63 (Modbus® 189 and 190) can be used to display and set the secondary parameters. Variable I62 (Modbus 189) must be written as shown in table. To read the variable, the value will be saved for variable I63 (Modbus 190) after writing I62, while to write the variable, the value written will then be available for variable I63.

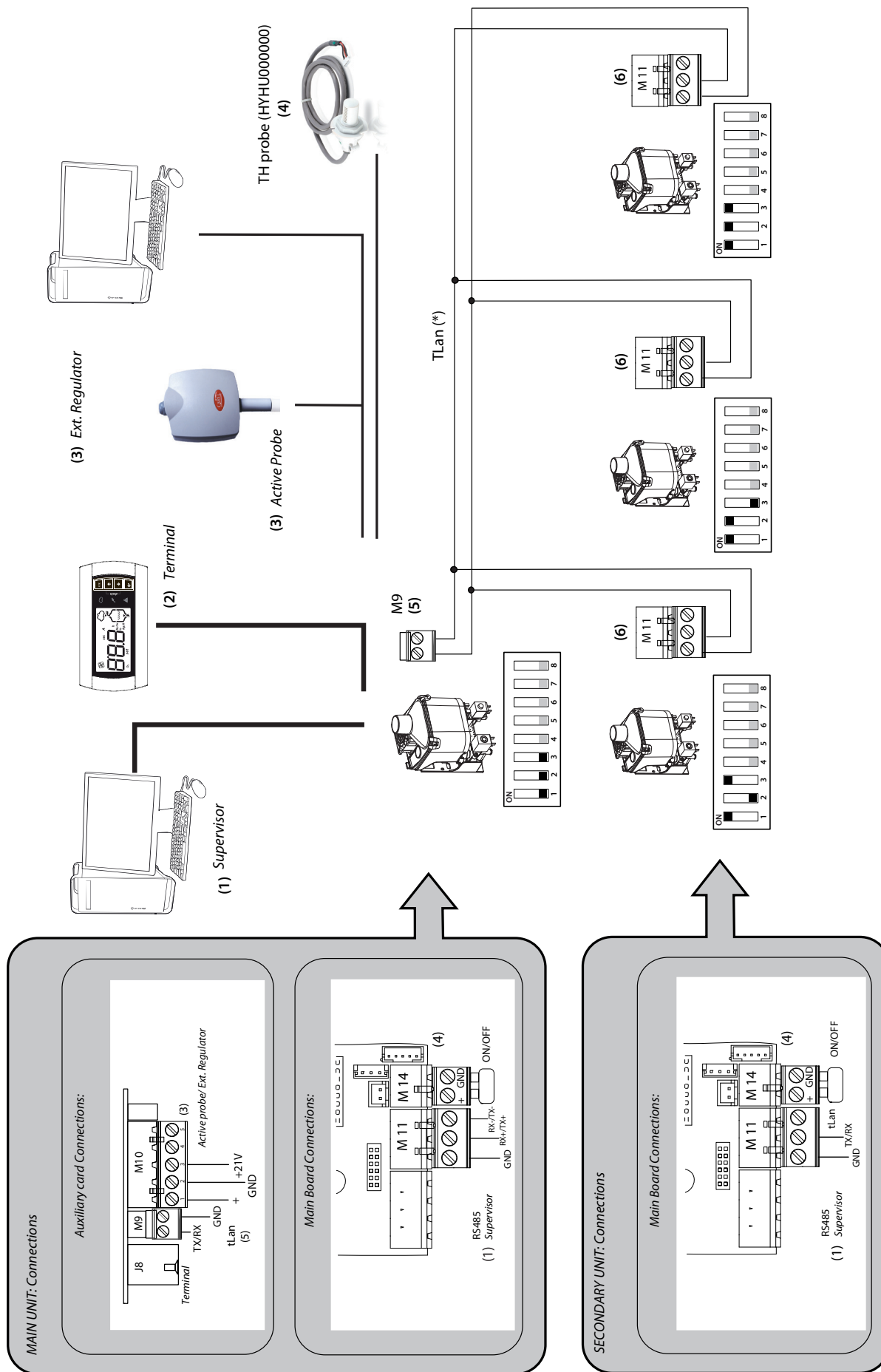
Bit 15 Mode	Bit 13-14 Secondary address	Bit 8-12 Variable type	Bit 0-7 CAREL supervisor address
0=Read 1=Write	01 = Secondary 1 10 = Secondary 2 11 = Secondary 3	00100=Int. 01000=Analog 10000=Dig	E.g.: 0000 1000=8

Tab. 16.b

E.g.: write parameter P0 for Secondary 2 to 70

- Write I63 to 70
- Write I62 to 50224

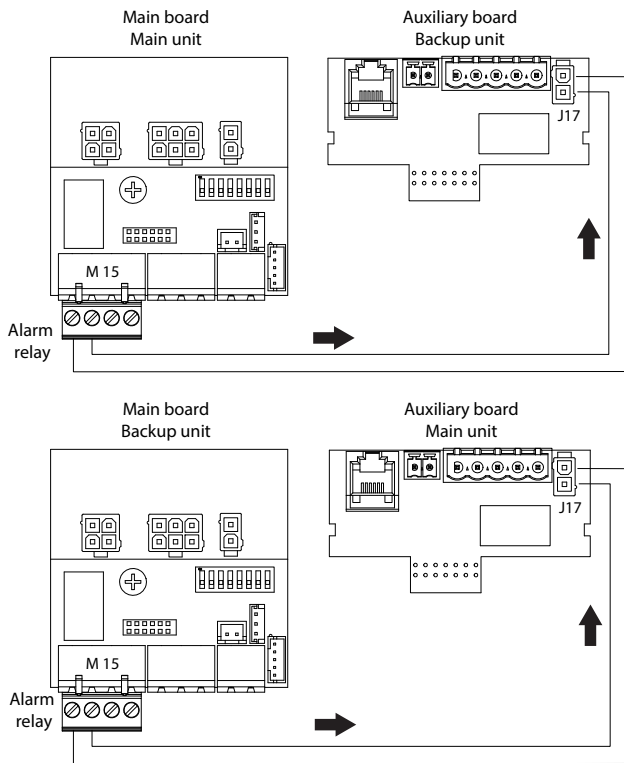
Write	Secondary 2	Integer variable	P0= address 48	
1	10	00100	00110000	=1100010000110000=50224



16.5 Secondary unit acting as backup for the main unit

For “mission critical” applications in which service continuity must be guaranteed, a secondary humiSonic can be set as backup for the humiSonic main unit. The backup unit will be activated only if the main unit shuts down (due to an alarm), operating based on the request signal sent to the main unit. Observe the following points to correctly enable the backup function:

- auxiliary card also fitted on the both main unit and backup;
- electrical wiring from alarm relay output on the main unit to auxiliary input J17 on the secondary, and vice-versa from alarm relay output on the secondary to auxiliary input J17 on the main unit;



- dipswitch 1 on the main unit and the backup unit in the OFF position;
- dipswitch 2 or 3 on a backup unit in the ON position;
- request signal also sent to the backup unit;
- parameter b0 configured suitably (see chap. “Configuration parameters”, table parameter b0) both on the main unit and backup, so as to:
 1. enable the backup function on both;
 2. activate the alarm relay for active alarms on both.

NOTICE: the connector body needed for input J17 is a Molex two-pin male Minifit housing Molex 5556-T female terminals.

When the main unit is not powered off and has no alarms (alarm relay contact closed), the display on the backup unit will show the disabled message "b -" on the main screen, alternating with the humidity request signal/measurement of dew point temperature; vice-versa, when the alarm relay contact on the main unit is open, the backup unit will be enabled for production.

When the backup unit is powered down or has an alarm, "-bu" (see alarm table) will be shown on the display on the main unit, meaning the backup unit is not available.

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