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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 maximum altitude for operation is 2000 m.
- 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. Children must not be allowed to play with the appliance.
- Do not install and use the product near objects that may be damaged when in contact with water (or condensate). Prevent the area around the humidifier from becoming damp or wet. If condensate forms on the ground or on objects underneath the humidifier, install it in a higher position, while respecting the minimum distance from the ceiling. If this is not possible, lower humidifier production by setting the maximum production parameter, so as to obtain pulsed operation. Do not let absorbent materials, such as carpets, curtains, drapery, or tablecloths, get wet. Be aware that high humidity levels can promote the growth of biological organisms in the environment. 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. Empty and clean the humidifier before putting it away. Clean the humidifier before it is next used.
- 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.

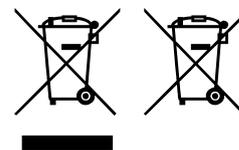


Fig.1

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  and  mark

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 Unit management

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 Burn hazard!

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 IP20. 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 (UU0*R)

Range of ultrasonic adiabatic humidifiers for direct humidification in rooms, with built-in fans for uniform atomised water distribution. humiSonic is suitable for many applications, such as: the humidification in production plants, data centres, warehouses, printing facilities, museums, restoration workshops, theatres, etc., where optimisation of room humidity is essential in ensuring personal comfort and safeguarding goods.

3.2 Name/ Part numbers

Part number	Description
UU0(X)R(*)0001	without auxiliary card, without temperature and humidity probe
UU0(X)R(*)AS01	with auxiliary card and with temperature and humidity probe

Tab. 3.a

(X) = **2** -> 2 kg/h (4.4 lbs/h), **4** -> 4 kg/h (8.8 lbs/h), **6** -> 6 kg/h (13.2 lbs/h), **8** -> 8 kg/h (17.6 lbs/h)
 (*) = **D** -> 230 Vac power supply, **1** -> 110 Vac power supply

3.3 Dimensions and weights

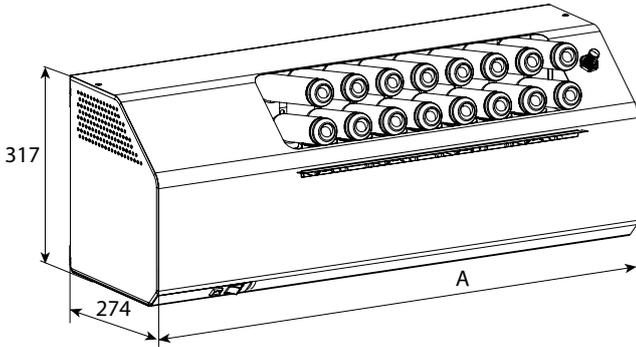


Fig. 3.a

Models	UU02	UU04	UU06	UU08
Production kg/h (lbs/h)	2 (4.4)	4 (8.8)	6 (13.2)	8 (17.6)
Width mm (in)	317 (12.5)			
Depth mm (in)	274 (10.8)			
Width A mm (in)	483 (19)	608 (24)	733 (28.9)	858 (33.8)
Weight kg (lb)				
packaged	11 (24.2)	14 (30.9)	17 (37.5)	21 (46.3)
empty	9.5 (20.9)	12.5 (27.6)	15.5 (34.2)	18.5 (40.8)
installed*	10.3 (22.7)	14.1 (31.1)	17.9 (39.5)	21.7 (47.8)

Tab. 3.b

* in operating conditions, filled with water.

3.4 Opening the packaging

NOTICE Dropping or bumping the humidifier may irreparably damage its internal components and panelling.

- 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:

1. wall-mounting bracket;
2. kit of screws and anchors;
3. 1 cable gland;
4. 4 feet;
5. user manual.

3.6 Preparing for assembly

- The unit is designed to be assembled on a horizontal support or wall that can support its weight in normal operating conditions (see par. "Wall-mounting");
- Install the humidifier in a safe place where it cannot be tampered with, as far as possible from any air flows;
- Position the humidifier horizontally using a spirit level, observing the minimum clearances in mm (see Fig. 1.b) to ensure the correct flow of supply air and allow the required maintenance operations.

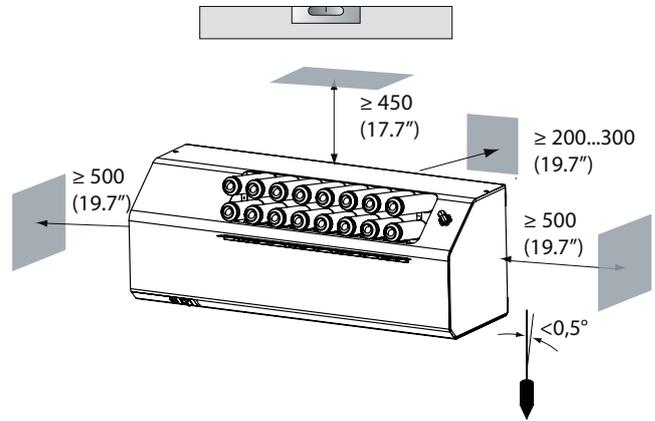


Fig. 3.b

NOTICE: the minimum distance at the rear is recommended for assembly on a horizontal support.

NOTICE: for installation on a horizontal support/wall:

1. the humidifier takes in air through by the slits at the back/bottom respectively;
2. the feet/spacers are fitted at the bottom/rear;
3. the fill/drain hoses are attached at the rear/on the bottom;
4. the power cable gland is fitted at the rear/on the bottom;
5. remove the rear bracket for assembly on a horizontal support.

ASSEMBLY ON A HORIZONTAL SUPPORT

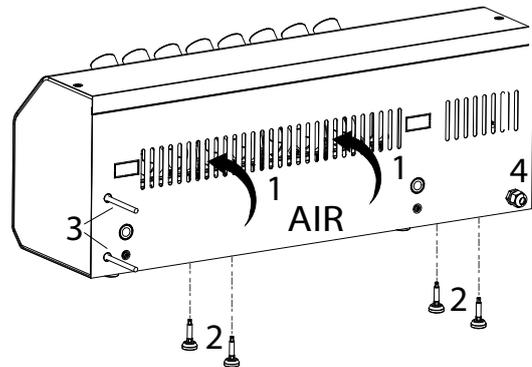


Fig. 3.c

WALL-MOUNTING

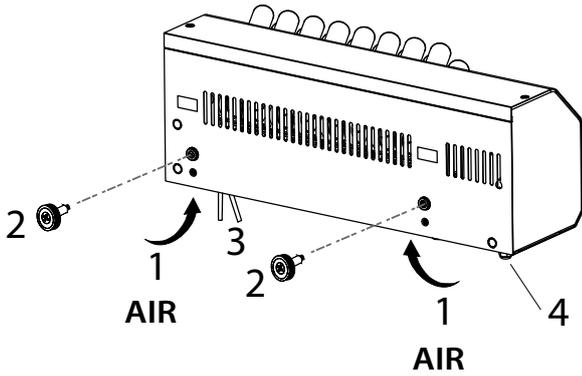


Fig. 3.d

- adjust the feet at the rear to make sure the humidifier is parallel to the floor, using a spirit level.

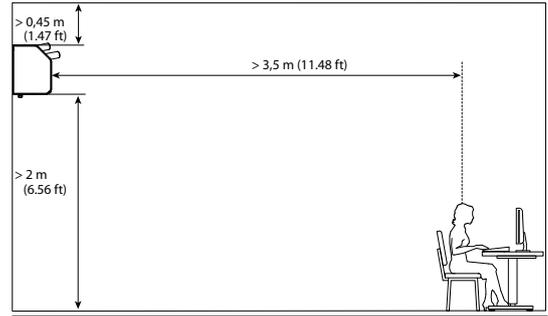


Fig. 3.g

3.7 Wall-mounting

NOTICE: mount the unit only to a masonry wall.

Fit the humidifier to the wall using the support bracket already fixed to the humidifier, and the kit of screws supplied (for the dimensions and weights see the previous paragraph).

Assembly instructions:

- fasten the wall bracket, checking horizontal position with a spirit level. Drill the holes in the wall using the bracket as a template. If mounting on a masonry wall, use the plastic anchors (Ø 8 mm, Ø 0.31 in) and screws (Ø 5 mm x L= 50 mm, Ø 0.19 in x L= 1.97 in) supplied;
- use a wire cutter to remove the knock-outs from the panel trim the burrs.

CAUTION: risk of injury. Wear personal protective clothing.

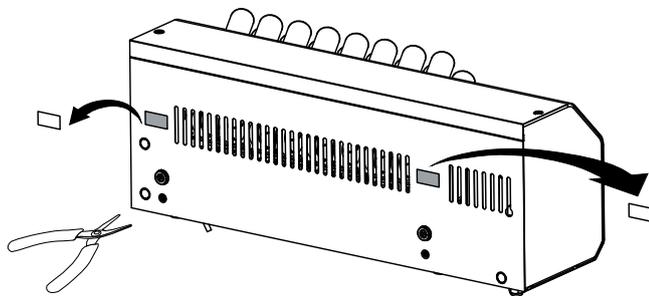


Fig. 3.e

- attach the humidifier to the bracket;

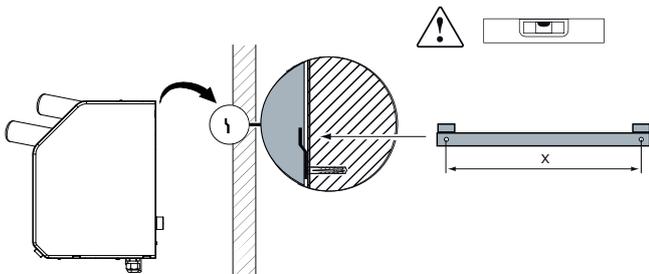


Fig. 3.f

Dimensions mm (in)	UU02	UU04	UU06	UU08
X	198 (7.8)	323 (12.7)	448 (17.6)	573 (22.5)

Tab. 3.c

3.8 Identification label

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

Date 06-Apr-2021
S.N. A0002066 Rev. 2.0
Code UU02RD0001

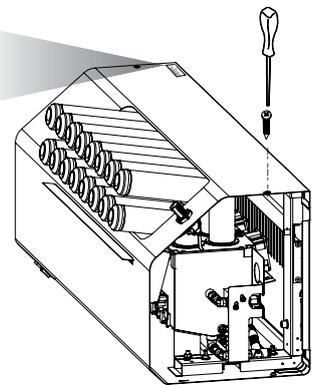
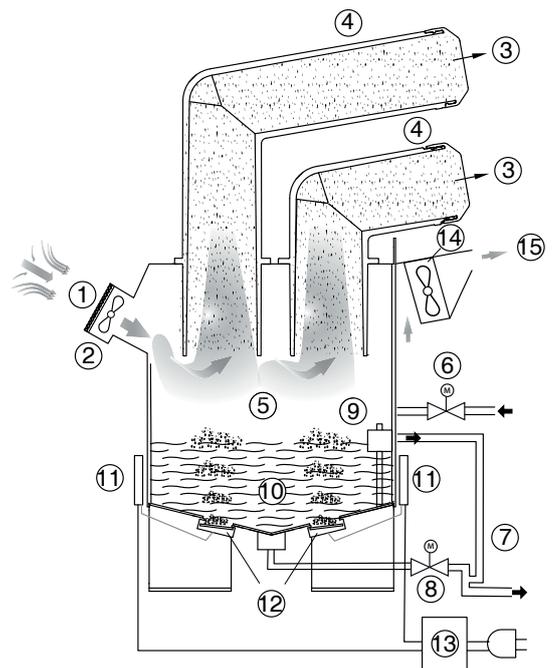


Fig. 3.h

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.

3.9 Functional diagram



Key

1	Air filter	9	Float level sensor
2	Rear fans	10	Tank
3	Atomised water	11	Driver
4	Diffuser	12	Piezoelectric transducer
5	Atomisation chamber	13	Power supply
6	Fill valve	14	Front fans
7	Overflow pipe	15	Laminar air flow
8	Drain valve		

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, which 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.

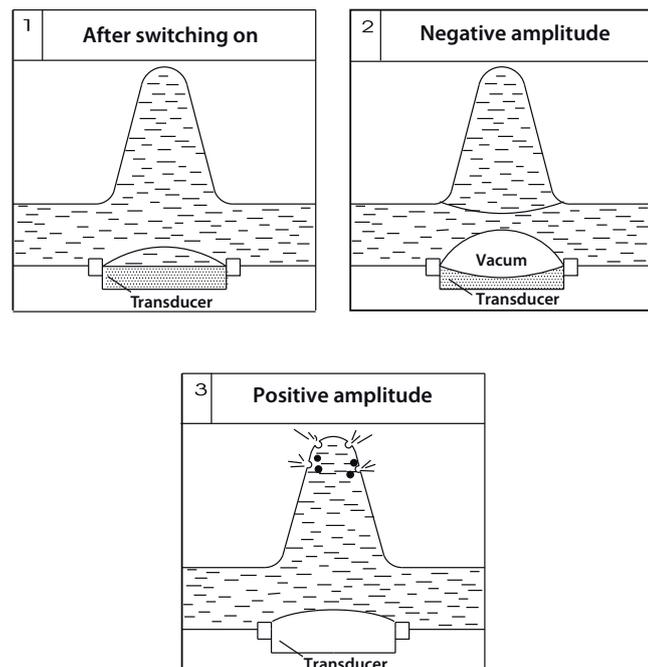


Fig. 3.i

3.11 Structure

The figure shows the structure of the humidifier, once having removed the side panels and the cover (see chap. "Maintenance and spare parts").

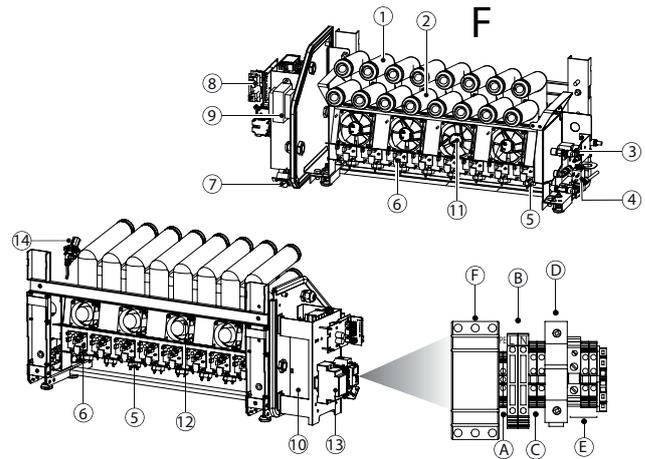


Fig. 3.j

Key

F	Front	10	Power supply (48 V)
R	Rear	11	Front fan
1	Rear diffuser	12	Rear fan
2	Front diffuser	13	Terminal block
3	Fill valve	A	Earth terminal (PE)
4	Drain valve	B	Power terminals (L, N) with fuse carrier
5	Piezoelectric transducer	C	Alarm relay terminals
6	Driver	D	Power supply (48 V) terminal with fuse carrier
7	ON/OFF switch	F	Mains filter
8	Electronic control board	14	Temperature and humidity probe (where featured)
9	Transformer (24 V)		

4. WATER CONNECTIONS

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

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.

4.1 Warnings

1. Only use demineralised water. Install a shut-off valve for each humidifier. Allowable water pressure: from 1 to 6 bars (from 100 kPa to 600 kPa) (from 14.5 to 87 psi);
2. The pipes/hoses and connections between the pipes/hoses in contact with demineralised water and the humidifier must be made from resistant material suitable for this use (e.g. PVC or stainless steel): nominal pressure ≥ 6 bar (600 kPa) (87 psi), working temperature at least 1 to 40°C (33.8 to 104°F);
3. The water lines must not be fouled by dust particles or other substances. Carefully clean the lines before connecting to the humidifier;
4. All humiSonic ultrasonic humidifiers are supplied with quick couplings for connecting the fill hose OD/ID = 8/6 mm (OD 5/16", ID 15/64").

4.2 Water connections (parts not included)

- Install a manual shut-off valve upstream of the installation (so as to shut off the feedwater supply); the valve must be suitable for use with demineralised water.
- Install a mechanical filter (10 μ m) downstream of the manual shut-off valve to trap any solid impurities; the filter must be fitted with shut-off devices to allow cleaning.

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. After installing the valve, flush with water to eliminate any processing residues and oil and prevent them from entering the humidifier;
- the drain hose must have a minimum inside diameter of 6 mm (15/64"); it must not have any bends that block water flow; the drain line must comply with national and local standards in force and must include a funnel to ensure interruption of continuity and a drain trap to prevent the return of bad odours. The end of the line must have a downwards slope to assist drainage;
- do not obstruct the atomised water outlet or air intake openings;
- if there is the risk of the feedwater freezing, insulate or using heating wires on the water pipes.

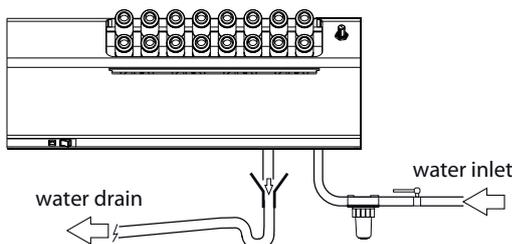


Fig. 4.a

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

4.3 Humidifier installed on a horizontal support

If the humidifier is installed on a horizontal support:

1. the fill/drain lines are connected through the rear panel;
2. the power cable gland is installed on the rear panel.

To connect the fill/drain lines:

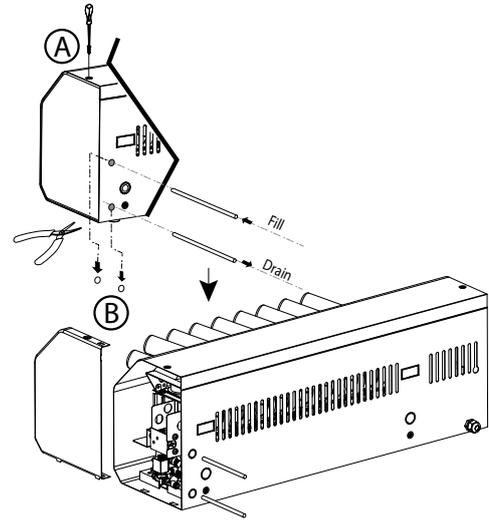


Fig. 4.b

- A. Unscrew the screw and remove the right-side panel;
- B. Cut the knock-outs to make openings for the fill/drain lines;

WARNING: cutting hazard. The openings have sharp edges. Wear personal protective clothing.

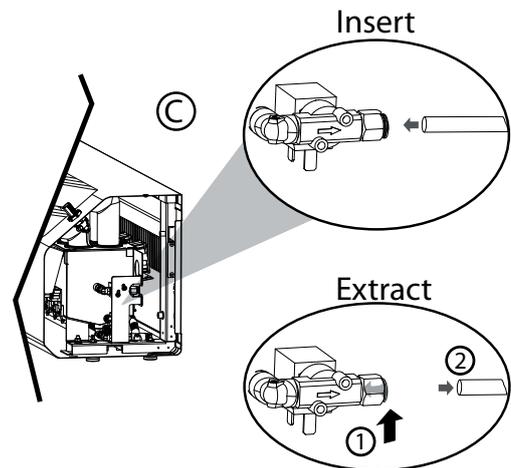


Fig. 4.c

NOTICE: outside diameter = 8 mm (5/16"), inside diameter = 6 mm (15/64").

- C. Attach the piping to the quick couplings so as to connect the fill and drain valves.
 1. press the quick coupling locking ring;
 2. insert the pipe.

4.4 Humidifier mounted on the wall

If the humidifier is wall-mounted, proceed as described in the previous paragraph to remove the covers, and then install:

1. the fill/drain lines, connected through the bottom panel;
2. the power cable gland, on the bottom panel.

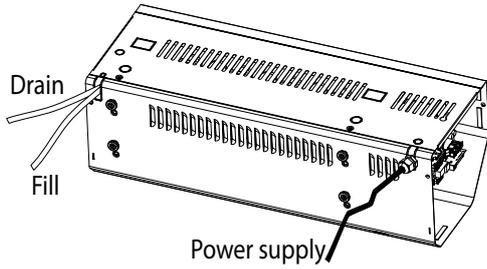


Fig. 4.d

4.5 Feedwater

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

FEEDWATER

Water connection pipe	OD 8 mm (OD 5/16")
Temperature limits °C (°F)	1 to 40 (33.8 to 104)
Pressure limits bars (psi)	1 to 6 (100 to 600 kPa) (14.5 to 87)
Specific conductivity at 20°C	3 to 80 µS/cm
Total hardness	0 to 25 mg/l CaCO3
Temporary hardness	0 to 15 mg/l CaCO3
Total quantity of dissolved solids (cR)	Depending on specific conductivity (1)
Dry residue at 180°C	Depending on specific conductivity (1)
Iron + manganese	0 mg/l Fe+Mn
Chlorides	0 to 10 ppm Cl
Silicon dioxide	0 to 1 mg/l SiO2
Chlorine ions	0 mg/l Cl
Calcium sulphate	mg/l CaSO4
Instant flow- fill SV	0.6 (0.16)
l/min (gpm)	

Tab. 4.a

(1) = typically $C_R = 0.65 * \sigma_{R,20} \text{ } ^\circ\text{C}$; $R_{180} = 0.93 * \sigma_{R,20} \text{ } ^\circ\text{C}$

The reverse osmosis system must be sized based on hourly production and not instant production, to avoid oversizing. For this purpose, an expansion vessel should be installed between the water treatment system and humiSonic. Discontinuous water consumption must be taken into account, involving the following phases:

- filling (fill valve open);
- production (fill valve closed);
- washing (fill valve open).

The table below suggests the minimum sizes for connection to a generic reverse osmosis system.

Mod.	Storage l (gal)	Total exp. vessel volume l (gal) (pre-charge 1.5 bars/22 psi)	Reverse osmosis system l/h (gph)
UU02	2.8 (0.62)	11.2 (2.46)	4.8 (1.27)
UU05	3.6 (0.79)	14.4 (3.17)	7.6 (2.01)
UU06	4.4 (0.97)	17.6 (3.87)	10.4 (2.75)
UU08	5.2 (1.14)	20.8 (4.56)	13.2 (3.49)

Tab. 4.b

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

Connecting humiSonic to the Carel WTS Compact

The Carel product range includes a series of reverse osmosis systems ("WTS Compact") designed to produce water according to the feedwater specifications and optimise connection to and operation with humiSonic (see manuals +0300017EN and +0300019EN). All WTS Compact systems (P/N ROC%) always come with an expansion vessel, that maintains the required pressure in the circuit downstream. Operation of the system is managed by pressure switches in the outlet circuit. The basic rule for connection to the humidifier is that the water contained in the expansion vessel must be sufficient to satisfy initial filling and, if necessary, the washing cycle, while the WTS production time must cover humiSonic production demand and fill the vessel as quickly as possible.

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

Mod.	Prod. l/h (gph)	Tank capacity l (gal)	Wash (*) l/h (gph)	WTS P/N (non-US markets)
UU02	2 (0.53)	0.8 (0.18)	2.8 (0.74)	ROC025500N
UU04	4 (1.06)	1.6 (0.35)	3.6 (0.95)	ROC025500N
UU06	6 (1.59)	2.4 (0.53)	4.4 (1.16)	ROC025500N
UU08	8 (2.11)	3.2 (0.70)	5.2 (1.37)	ROC025500N

Tab. 4.c

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

Periodic washing is also recommended so as to maintain the WTS that supplies the humidifier in good working condition. The water inside the reverse osmosis system needs to be stirred periodically to avoid excessive build-up of minerals on the membranes.

! 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 breather via contaminated water and cause serious illness.

4.6 Drain water

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

DRAIN WATER

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

5. ELECTRICAL CONNECTIONS

5.1 Wiring requirements

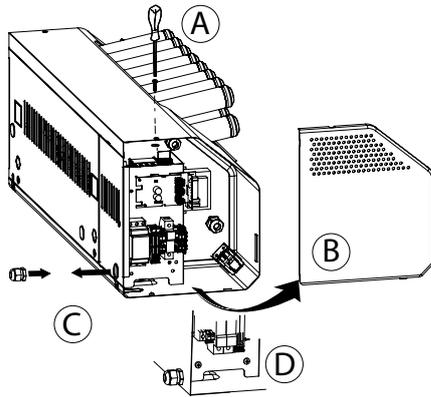


Fig. 5.a

1. Unscrew the screw (A) and remove the cover (B);
2. If the humidifier is wall-mounted/installed on a horizontal support, remove the corresponding metal knock-out using cutting nippers on the bottom/rear panel (C);
3. Fit the cable gland (D).

5.2 Electrical installation

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:

- check that the unit's power supply voltage corresponds to the rated data shown on the product label;
- do not power on the unit if tilted or upside down: the transducers may be damaged.

Connect the power cable to the terminal block through the cable gland.

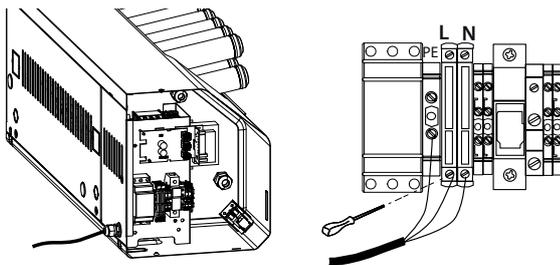


Fig. 5.b

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

The humiSonic electronic control board in fact comprises two boards, a main board (1) installed horizontally, and an auxiliary card (2) installed vertically.

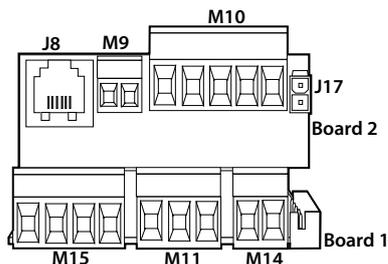


Fig. 5.c

MAIN BOARD

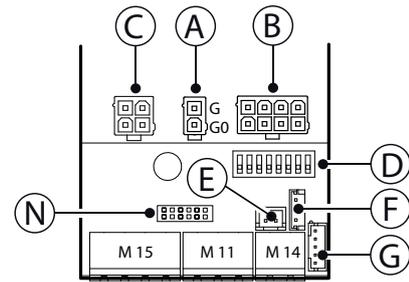


Fig. 5.d

Key:

A	Board power supply input from transformer 24V
B	Transducer control
C	Valve power (L drain / R fill)
D	Configuration dipperswitches
E	RESERVED
F	Power ON/OFF switch lights
G	TH temperature and humidity probe connection (IIC digital serial, part no.: HYHU000000) built-in on part numbers UU**R*AS*1.
M14	Remote ON/OFF (M14.1-M14.2)
M11	RS4845 serial (M11)
M15	Front fan power
N	Auxiliary card connection

AUXILIARY CARD

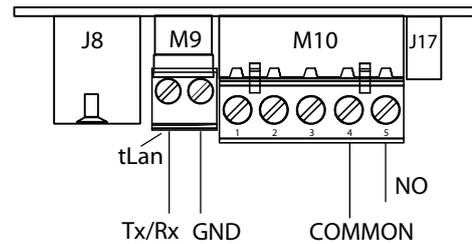


Fig. 5.e

J8	tLAN terminal connection (optional)
M9	tLAN auxiliary serial connector
M10	M10.1 - + proportional control signal/probe/humidistat
	M10.2 - GND reference signal
	M10.3 - +21 Vdc for power to active probes
	M10.4 - Alarm relay - CO
	M10.5 - Alarm relay - NO
J17	Reserved

Tab. 5.a

Dipswitch configuration: configuration must be performed before switching on the humidifier (default position shown in Fig. 3.f).

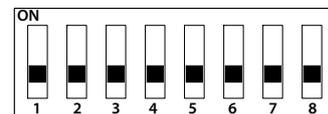


Fig. 5.f

1	Communication	5-6	Humidity set point
	OFF Serial 485 Carel/Modbus		OFF/OFF 50 %rH
	ON tLAN		OFF/ON 30 %rH
2-3	tLAN address (if 1 is ON)		ON/OFF 40 %rH
	OFF/OFF - -		ON/ON 60 %rH
	OFF/ON address 1	7	RESERVED
	ON/OFF address 2	8	Transducer prod. management
	ON/ON address 3		
4	Serial 485 / tLAN baud rate		OFF parallel
	OFF 19200		ON series
	ON 9600		

Tab. 5.b

5.3 Main board connections

Depending on the type of signal used, atomised water production can be enabled and/or managed in different ways (ON/OFF or modulating).

HUMIDISTAT 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).

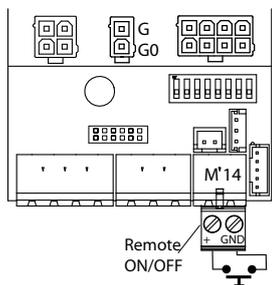


Fig. 5.g

TH TEMPERATURE & HUMIDITY PROBE (built-in on part numbers UU**R*AS01)

If the TH temperature and humidity probe is connected to terminal G, atomised water production starts when:

- 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).

485 SERIAL CONNECTION Carel/Modbus protocol

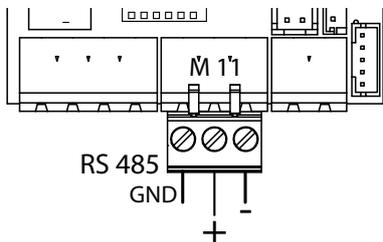


Fig. 5.h

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

The connections can be used to directly control a light or an auxiliary relay coil or signal when reaching the humidity or dew point temperature set point (see table of parameter b0 values).

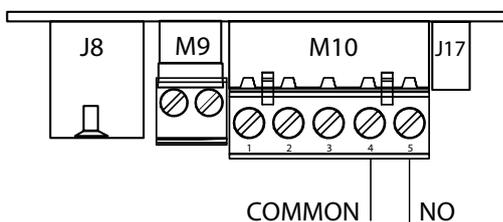


Fig. 5.i

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.

5.4 Auxiliary card connections

See chap. "Configuration parameters" for the description of parameters A0, A1, A2.

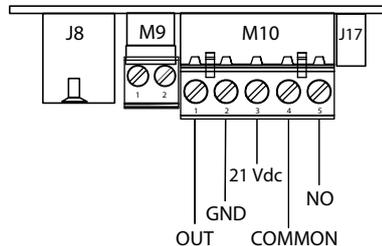


Fig. 5.j

The auxiliary card features the following connections:

ON/OFF CONTROL (humidistat or remote switch)

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

EXTERNAL PROPORTIONAL CONTROL (modulating operation)

- 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 and parameter A2 depending on the chosen signal (0 to 10 V, 2 to 10V, 0 to 20, 4 to 20 mA).

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 terminal M10.3 can be connected via a cable with a maximum length of 2 m (6.6 ft); for longer connections, use an external power supply with the earth electrically connected to the controller's earth.
- set parameter A0=2 to enable control via probe and parameter A2 depending on the chosen signal (0 to 10 V, 2 to 10V, 0 to 20, 4 to 20 mA).

If non-CAREL probes are used, check:

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

ENABLE TH PROBE AS HUMIDITY LIMIT / DEW POINT TEMPERATURE

In control modes A0 = 0, A0 = 1, A0 = 2, the built-in temperature and humidity probe (TH) can be used as a humidity limit probe or dew point temperature limit probe by 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's earth.

6. 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 resolved the problem and restored the connections;
- electrical connections.

6.1 Starting

See chap. "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 the temperature and humidity probe (TH, optional) is connected to terminal G, the humidifier will operate until the humidity set point (pre-set at 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".

6.2 Shutdown/Standby

- 1 To switch the humidifier off, disconnect power
- 2 If connected to the power supply, the humidifier goes into standby when:
 - the remote ON/OFF contact is open
 - the TH probe is present and the humidity/dew point temperature set point has been reached;
 - the ON/OFF contact is open or disabled via serial (see chap. "Humidifier control via network") or disabled from the keypad;
 - 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.

6.3 Autotest

Whenever the humidifier is first started (from off), if enabled and humidity production is required, a test cycle is run and the message 'At' is displayed on the user terminal. A complete fill and drain cycle is performed, during which the level sensor is monitored; if the test is successful, regular atomised water production will begin. In the event of errors, production is stopped. See the Alarm table.

6.4 ON/OFF switch lights

The ON/OFF switch has 2 lights: blue and red:

BLUE LED	Description
Fixed	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 light means an alarm is present. For the table of alarms, see the corresponding chapter.

6.5 Disabling

The humidifier can be disabled in different ways:

- opening contact M14.1 and M14.2 (OFF from contact);
- from the user terminal by pressing Esc for 5 s (OFF from keypad);
- from the supervisor via RS485 serial;
- when there are active alarms.

6.6 Reset tank hour counter

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

The humidifier is fitted with an hour counter that records 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 "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:

1. Switch the humidifier OFF;
2. Close the feedwater tap and wait for the tank to empty completely;
3. Unplug the connector (figure) from the control board;
4. Open the ON/OFF contact;
5. Switch on the humidifier (with the connector unplugged from the control board). Both lights on the unit power button, blue and red, will flash;
6. Close the ON/OFF contact, the blue and red lights remain on steady;
7. Switch the humidifier OFF;
8. Plug the connector (figure) onto the board, making sure it is the right way round;
9. Switch the humidifier ON.

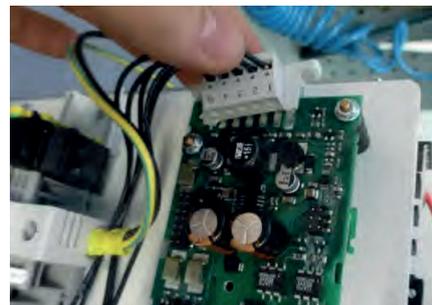


Fig. 6.a

6.7 Automatic washing

The humidifier automatically runs a washing cycle at intervals in operating time set by parameter b1 (default 12 hours, parameter b0 can be used to convert the unit of measure of b1 from hours to minutes, see b0 in the parameter table). The washing cycle involves a complete drain cycle, a phase in which fill and drain are activated alternately (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 cycle, production of atomised water is stopped and the message 'Cln' is displayed on the user terminal. The maximum time between two washing cycles must not exceed 72 hours (required by standard IEC 60335-2-98). This operation is identified by the symbol on top of the humidifier.

6.8 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, and the message 'Cln' is displayed on the user terminal. This cleans the tank of any residues (e.g. dust) that may have formed 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 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.

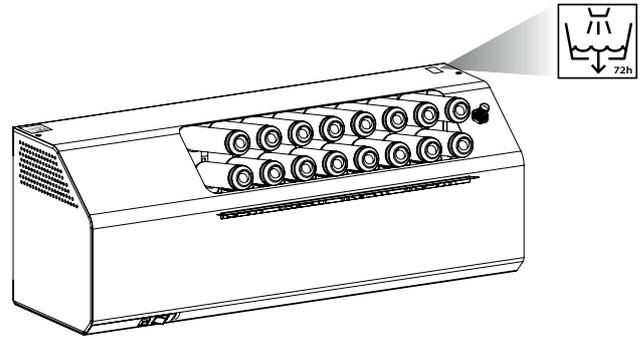


Fig. 6.b

7. LCD TERMINAL (OPTIONAL)

7.1 Remote display terminal (UUKDI00000)

The LCD terminal is an option and can only be used if the auxiliary card is fitted, already built-in on models UU**R*AS01.

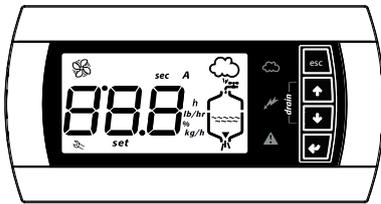


Fig. 7.a

The terminal displays humidifier status and can be used to customise operation by setting the parameters.

TEMPORARY CONNECTION (SERVICE)

To access the unit parameters without opening the electrical compartment when the display is not mounted on the wall

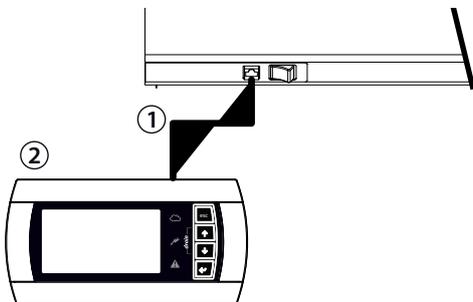


Fig. 7.b

FINAL CONNECTION

When the display is to be mounted on the wall, remove the telephone cable connecting the auxiliary card and the RJ11 connector on the unit's frame and connect the display directly to the auxiliary card

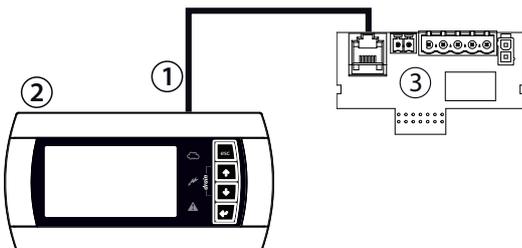


Fig. 7.c

Key:

1	6-wire telephone cable P/N S90CONN000 or equiv., max. length 2 m (6.6 ft) ⁽¹⁾
2	remote display terminal
3	Auxiliary control card

Remote connection of the terminal up to 200 m

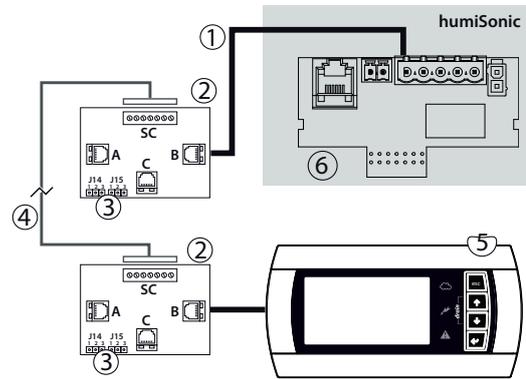


Fig. 7.d

Key:

- 1 telephone cable (distance up to 0.8 m);
- 2 CAREL TCONN6J000 card;
- 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 AWG20-22 shielded cable with 3 twisted pairs to move the display terminal up to 200 m away. Connection to the TCONN6J00 card:

terminal SC	function	terminal SC	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

7.2 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	Work hours
%	Humidity production as a percentage of rated capacity
	Maintenance request (active alarm)
	On steady: humidifier fan operating. Flashing: fan on during deactivation phase
888	3 digits, after 999 the display shows i00 to indicate 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 in progress water already in the tank water drainage from the tank in progress (also shown when the unit is in standby, as the drain valve is normally open)

Tab. 7.c

7.3 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	manual drain: press UP and DOWN together

Tab. 7.d

7.4 Main display

The humidifier display normally shows the 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 atomised water production adjustment (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 or dew point temperature reading;
- tank hour counter (h);
- maximum atomised water production adjustment (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/dew point temperature limit set point (parameter SL) (*);
- limit proportional band (parameter bL) (*)

To return to the main display press ESC. Parameter C0 (see "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 the 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 (RS485 Carel/Modbus) the display shows "S - -" alternating with the main screen.

If multiple disabling modes are active concurrently, these alternate cyclically on the main screen. If the display shows "----", it means there is a communication error between display and humidifier: check the connection cable. If the problem persists, contact 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").

7.5 Display software release

1) at power-on the display shows "rel. x.y" (e.g. rel. 1.2);

2) during operation:

- on the display: from the main screen press ESC and UP together, the following are shown in sequence: humidifier size and software release;
- via network on integer variable 81. Format "## = #.#" (e.g. 12 = release 1.2).

7.6 Accessing and setting parameters

The configuration parameters can be used to set and control all of the humidifier functions and states. 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, also press DOWN;
 - DOWN to modify (decrease) the value of the parameter. To scroll faster, also press UP;
 - 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.

7.7 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;
- dFt is shown, press ENTER and dFt starts flashing; press ENTER again to recall the default settings, or ESC to exit.

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

7.8 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 and DOWN for 5 seconds.

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

8. OPERATING PRINCIPLES

8.1 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 in the forced air flow. The quantity of atomised water depends on the 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 builds up over time will foul the piezoelectric transducer, compromising atomisation. To avoid excessive scale, the humidifier periodically drains and automatically refills the water (periodic washing)

8.2 Control principles

The humidifier can be controlled using the following signals:

- Remote ON/OFF;
- External proportional signal (only with auxiliary card);
- 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 atomised water if the remote ON/OFF contact is closed;
- contact open: atomised water production stops.

Proportional control (only with auxiliary card)

- Atomised water production 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 10Vdc, 2 to 10Vdc, 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").

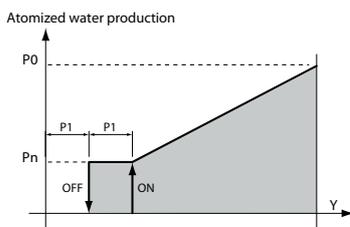


Fig. 8.a

Stand-alone control with humidity probes

The production of humidity is linked to the reading of the connected relative humidity probe (TH or connection to 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.

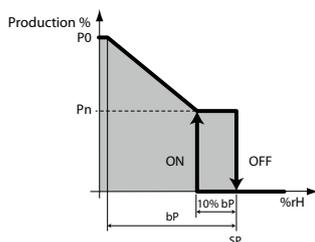


Fig. 8.b

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 10%rH). The minimum production has a fixed activation hysteresis of 10% of the proportional band amplitude bP.

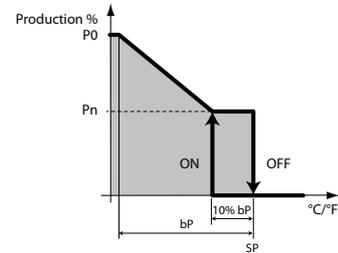


Fig. 8.c

Enable TH probe as humidity/ dew point limit

When the TH probe is connected to the input on the dedicated card (P/N UU**R*AS*1), 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 the TH probe can be enabled as a humidity limit probe, setting parameter bH = 1, or a dew point limit probe, setting parameter bH = 2. When approaching the limit set point (parameter SL, modifiable, default 70% rH or 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.

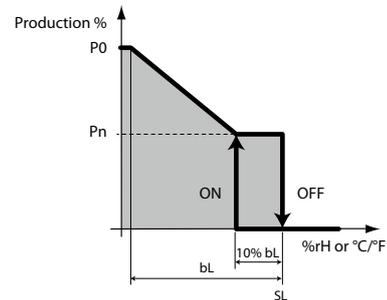


Fig. 8.d

8.3 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).

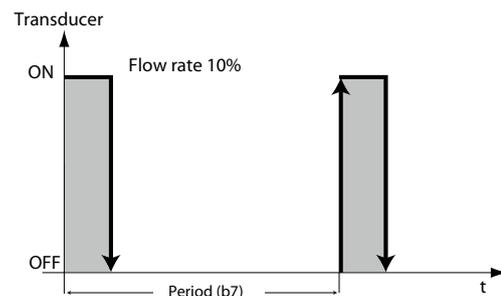


Fig. 8.e

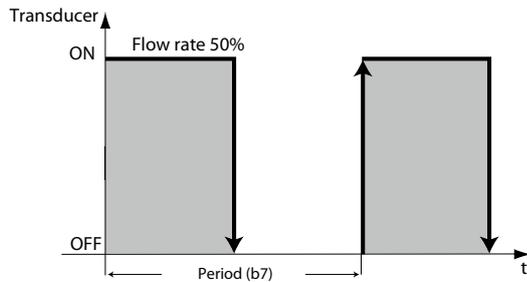


Fig. 8.f

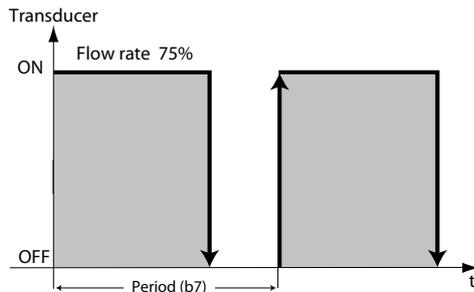


Fig. 8.g

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

8.4 Series flow-rate modulation (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 transducer lines (front and rear) and each line generates 50% of total production. If humidity demand from the external signal (when using the optional card and proportional control) and parameter P0 are both 100%, both transducer lines will be activated. For lower demand, production will be split between the two pairs of transducers as follows:

- 51% - 99%: one pair of transducers is always activated to generate 50% of required production, while the other pair modulates - as described in the previous paragraph - to generate the remaining percentage of production. (e.g. 75% demand: one pair of transducers is always activated, the other modulates at 50%, as shown in Fig. 8.d)
- 10% - 50%: one pair of transducers is always off, the other modulates - as described in the previous paragraph - to generate the required percentage of production. (e.g. 25% demand: one pair of transducers is always off, the other modulates at 50%, as shown in Fig. 8.d)

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

8.5 Automatic insufficient feedwater management

The humidifier detects if the feedwater 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 in minutes, depending of the size), humidification is stopped, 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 unit continues the Retry procedure for a further time in minutes set for parameter AA. The process is repeated until the feedwater supply returns, as measured by the sensor. 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 feedwater supply is available again.

8.6 Automatic control of atomised water production

The humidifier monitors the water level inside the tank during atomised water production. 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 time set for variable A8 (in minutes, default 30) the water level does not fall below the low level, atomised water production stops. The unit waits a few minutes, based on the value set for parameter AA (default = 10 minutes). The message "Rty" is shown on the display, after which production resumes. If the situation is repeated, alarm EP is activated, which shuts the unit down. If after a percentage of A8, set by parameter Ab (default 70%) the water is above the high level, atomised water production stops, warning EL is generated and the appliance waits AA minutes (default 10), during which time the display shows "Rty" (Retry), before attempting to resume production. The warning signal EL is reset at the end of a production cycle that is completed correctly.

8.7 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 activated again, 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.

8.8 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 water is above the low level.

During operation, if the 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.

9. CONFIGURATION PARAMETERS

To access and set the following parameters, see chapters 7 and 10.

9.1 Basic parameters

Parameter	UoM	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 = AUTO mode: if fitted, humidity probe TH reading is used, 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 to 4	3	
A1 Unit of measure 0 = International system; 1 = Imperial system	-	0-1	0	
A2 Type of external sensor (auxiliary card) (0 = On/Off; 1 = 0-10V; 2 = 2-10V; 3 = 0-20 mA; 4 = 4-20 mA)	-	0 to 4	1	
P0 Maximum production	%	Pn...100	100	
P1 Proportional control hysteresis for mode A0=1	%	2 to 20	2	
Pn Minimum production	%	5...P0	10	
SP Humidity (1) / dew point set point	%rH	20 to 80	50	only if terminal connected, otherwise values set by dipswitch
	°C (°F)	-16 to 35 (3 to 95)	10 (50)	only editable on the terminal
SL Humidity / dew point limit set point	%rH	0 to 80	70	
	°C (°F)	-16 to 35 (3 to 95)	15 (59)	
bP Proportional band for control with probe	%rH	2 to 20	10	
	°C (°F)	1 to 10 (2 to 20)	3 (5)	
bL Proportional band for humidity / dew point limit	%rH	2 to 20	10	
	°C (°F)	1 to 10 (2 to 20)	3 (5)	
C0 Default display (terminal) 0 = Probe reading/control signal; 1 = Hour counter	-	0-1	0	

Tab. 9.a

9.2 Service parameters

Parameter	UoM	range	def	note
A3 Probe minimum	%rH	0 to 100	0	
A4 Probe maximum	%rH	0 to 100	100	
A5 Probe offset	%rH	-99 to 100	0	
A6 Fan off delay time	min	0 to 15	5	
A7 Fan speed	%	40 to 100	50	
A8 Maximum evaporation time for reduced production alarm	min	0 to 200	30	
A9 Minimum evaporation time for reduced production alarm	min	0 to A8	1	
AA Waiting time for retry	min	1 to 60	10	
Ab Percentage of A8 to carry out level test	%	50 to 90	70	
AC Maximum time to measure level when refilling	s	1 to 240	40 (UU02) - 60 (UU04) - 80 (UU06) - 100 (UU08)	
Ad Maximum time to measure high level	s	1 to 60	10	
AE Restart fan time in standby for built-in probe reading	min	0 to 120	10(**)	
AF Piezoelectric transducer working life	h	0 to 9999	9999	with demineralised water
b0 Operating options (see table for parameter b0)	-	0 to 255	135	
b1 Time between two washing cycles	min/h	0...72	12	
b2 Inactivity time for washing	h	1...72	24	
b3 Washing time (fill + drain)	min	0 to 10	1	
b4 Start delay time	s	0 to 120	10	
b5 Operating hours for CL alarm	h	0 to 9999(*)	5000	
b6 Time to display new CL alarm after reset from keypad (without resetting hour counter)	min	0 to 240	60	
b7 Transducer modulating control period	s	0 to 10	1	
b8 Probe disconnected delay	s	0 to 200	30	
b9 Reserved	s	0 to 60	2	
bA Maximum fill time	min	0 to 30	6 (UU02) - 9 (UU04) - 12 (UU06) - 15 (UU08)	
bb Water refill time in production	s	0 to 120	20 (UU02) - 28 (UU04) - 40 (UU06) - 52 (UU08)	
bC Maximum drain time	s	0 to 1500	75 (UU02) - 100 (UU04) - 150 (UU06) - 200 (UU08)	
bd Drain opening time to completely empty tank	s	0 to 1500	60 (UU02) - 80 (UU04) - 120 (UU06) - 160 (UU08)	
bE Delay time after measuring low level for refilling	s	1 to 20	10	
bF Drain activation delay in standby (if drain solenoid valve in standby = OPEN)	h	0 to 48	1	
bH Enable TH probe as humidity limit (bH=1) or as dew point limit (bH=2)	-	0 to 2	0	can be set to 1 or 2 only in modes A0 = 0, 1, 2
bL Proportional band for humidity / dew point limit	%rH	2 to 20	10	
	°C (°F)	1 to 10 (2 to 20)	3 (5)	
bn Disable alarm buzzer 0 = enabled; 1 = disabled	-	0 to 1	0	
bP Proportional band for control with probe	%rH	2 to 20	10	
	°C (°F)	1 to 10 (2 to 20)	3 (5)	
bt Reserved	h	0...255	0	
L0 Reserved	s	0...255	0	
P1 Proportional control hysteresis for mode A0=1	%	2 to 20	2	
P2 Low humidity alarm threshold	%rH	0 to 100	20	
P3 High humidity alarm threshold	%rH	0 to 100	80	

Tab. 9.b

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

(***) the default is 0 (zero), for humidifiers without auxiliary card and without humidity/temperature probe.

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:

1. Unit of measure for parameter b1 (time between two periodical washing cycles): M = minutes; H = hours;
2. Backup: ON = if two humiSonic units are connected together, 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;
3. 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 (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 for 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. Autotest
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
25	M	OFF	Open	SP	NC	Off	Off	On
26	M	OFF	Open	SP	NC	On	Off	Off
27	M	OFF	Open	SP	NC	On	Off	On
28	M	OFF	Open	SP	NC	Off	On	Off
29	M	OFF	Open	SP	NC	Off	On	On
30	M	OFF	Open	SP	NC	On	On	Off
31	M	OFF	Open	SP	NC	On	On	On
32	M	OFF	Closed	AL	NO	Off	Off	Off
33	M	OFF	Closed	AL	NO	Off	Off	On
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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
45	M	OFF	Closed	AL	NC	Off	On	On
46	M	OFF	Closed	AL	NC	On	On	Off
47	M	OFF	Closed	AL	NC	On	On	On
48	M	OFF	Closed	SP	NO	Off	Off	Off
49	M	OFF	Closed	SP	NO	Off	Off	On
50	M	OFF	Closed	SP	NO	On	Off	Off
51	M	OFF	Closed	SP	NO	On	Off	On
52	M	OFF	Closed	SP	NO	Off	On	Off
53	M	OFF	Closed	SP	NO	Off	On	On
54	M	OFF	Closed	SP	NO	On	On	Off
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
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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
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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
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

b0	1. Unit of measure for 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. Autotest
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
92	M	ON	Open	SP	NC	Off	On	Off
93	M	ON	Open	SP	NC	Off	On	On
94	M	ON	Open	SP	NC	On	On	Off
95	M	ON	Open	SP	NC	On	On	On
96	M	ON	Closed	AL	NO	Off	Off	Off
97	M	ON	Closed	AL	NO	Off	Off	On
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105	M	ON	Closed	AL	NC	Off	Off	On
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107	M	ON	Closed	AL	NC	On	Off	On
108	M	ON	Closed	AL	NC	Off	On	Off
109	M	ON	Closed	AL	NC	Off	On	On
110	M	ON	Closed	AL	NC	On	On	Off
111	M	ON	Closed	AL	NC	On	On	On
112	M	ON	Closed	SP	NO	Off	Off	Off
113	M	ON	Closed	SP	NO	Off	Off	On
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
121	M	ON	Closed	SP	NC	Off	Off	On
122	M	ON	Closed	SP	NC	On	Off	Off
123	M	ON	Closed	SP	NC	On	Off	On
124	M	ON	Closed	SP	NC	Off	On	Off
125	M	ON	Closed	SP	NC	Off	On	On
126	M	ON	Closed	SP	NC	On	On	Off
127	M	ON	Closed	SP	NC	On	On	On
128	H	OFF	Open	AL	NO	Off	Off	Off
129	H	OFF	Open	AL	NO	Off	Off	On
130	H	OFF	Open	AL	NO	On	Off	Off
131	H	OFF	Open	AL	NO	On	Off	On
132	H	OFF	Open	AL	NO	Off	On	Off
133	H	OFF	Open	AL	NO	Off	On	On
134	H	OFF	Open	AL	NO	On	On	Off
135	H	OFF	Open	AL	NO	On	On	On
136	H	OFF	Open	AL	NC	Off	Off	Off
137	H	OFF	Open	AL	NC	Off	Off	On
138	H	OFF	Open	AL	NC	On	Off	Off
139	H	OFF	Open	AL	NC	On	Off	On
140	H	OFF	Open	AL	NC	Off	On	Off
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
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154	H	OFF	Open	SP	NC	On	Off	Off
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159	H	OFF	Open	SP	NC	On	On	On
160	H	OFF	Closed	AL	NO	Off	Off	Off
161	H	OFF	Closed	AL	NO	Off	Off	On
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
165	H	OFF	Closed	AL	NO	Off	On	On
166	H	OFF	Closed	AL	NO	On	On	Off
167	H	OFF	Closed	AL	NO	On	On	On
168	H	OFF	Closed	AL	NC	Off	Off	Off
169	H	OFF	Closed	AL	NC	Off	Off	On
170	H	OFF	Closed	AL	NC	On	Off	Off
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
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

b0	1. Unit of measure for 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. Autotest
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
201	H	ON	Open	AL	NC	Off	Off	On
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
205	H	ON	Open	AL	NC	Off	On	On
206	H	ON	Open	AL	NC	On	On	Off
207	H	ON	Open	AL	NC	On	On	On
208	H	ON	Open	SP	NO	Off	Off	Off
209	H	ON	Open	SP	NO	Off	Off	On
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. 9.c

9.3 Serial connection parameters

Parameter	UoM	range	def	note
C1	Baud rate: 0 = 4800 bps; 1 = 9600 bps; 2 = 19200 bps; 3 = 38400 bps	-	0 to 3	2
C2	tLAN address (if 0 = Main)			
C3	Serial address	-	1 to 207	1
C4	Timeout for Main serial offline alarm	s	0 to 240	30

The alarm is only generated if network production control is active (see the corresponding chapter)

Tab. 9.d

9.4 Read-only parameters

Parameter	UoM	range	def	note
d0	TH probe temperature reading	°C/°F	0-1000	0
d1	TH probe humidity reading	%rH	0-1000	0
d2	Configurable input reading (optional card)	% / %rH	0-100	0
d3	Tank operating hour counter (resettable, see 7.8)	h	0-9999(*)	0
d4	Unit hour counter (read-only)	h	0-9999(*)	0
d5	Instant production	kg/h (lb/h)	0 to 8 0 to 17.6	0
d6	Time remaining to end of piezoelectric transducer life	h	0 to 9999(*)	9999
d7	Manage Secondary unit production	-	0-1	0
d8	Dew point	°C/°F	0 to 1000	0

R/W parameter: 0 = the Secondary unit exactly replicates the production of the Main unit, as it depends on the setting of parameter P0 on the Main unit;
1 = the Secondary unit produces according to the request sent by the Main unit and its own P0 setting; it is not affected by the setting of P0 on the Main unit
calculated using d0 and d1

Tab. 9.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).

"I"		integer variables (Modbus®: REGISTERS)	R/W
CAREL	Modbus®		
89	216	Secondary humidifier 1 status	R
92	219	Secondary 1 parameter d3: Operating hour counter	R/W
93	220	Secondary 2 firmware release	R
95	222	Secondary humidifier 2 status	R
98	225	Secondary 2 parameter d3: Operating hour counter	R/W
99	226	Secondary 3 firmware release	R
101	228	Secondary humidifier 3 status	R
104	231	Secondary 3 parameter d3: 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: Secondary unit production management	R/W

Tab. 10.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	Set point reached	R
5	4	Green LED	R
6	5	Red LED	R
7	6	Yellow LED	R
8	7	Remote OnOff	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	Trasduttore1	R
22	21	Trasduttore2	R
23	22	Fan	R
24	23	Alarm relay	R
25	24	Auxiliary relay	R

"D"		digital variables (Modbus®: COILS)	R/W
CAREL	Modbus®		
26	25	Manual drain	R/W
27	26	Disable via serial	R/W
28	27	Reset counter	R/W
29	28	Resetting the alarms	R/W
30	29	Washing due to inactivity activated	R
30	31	Status of dipswitch 8: modulation in parallel/series	R
31	30	Functional test completed	R
33	31	Unit of measure	R/W
34	33	Secondary 1 online	R
35	34	Secondary 2 online	R
36	35	Secondary 3 online	R
37	36	Enable control via serial	R/W
38	37	Washing activated via serial	R/W
39	38	Skip autotest or washing while running	R
43	42	Reset piezoelectric transducer hour counter	R/W
44	43	Backup unit ready to produce	R
46	45	Production limitation in progress (limit probe function)	R
47	46	On/off control via 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 2 keypad	R/W
52	51	On/off control from Secondary unit 3 keypad	R/W
54	53	Parameter bn: disable alarm buzzer	R/W

Tab. 10.g

10.2 Production control via network

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

digital 27, digital 37 and integer 60 (Modbus 188)

When D37 is set to 1, the humidifier ignores the external control signals (external controller or probes) and uses the value of integer 60 (Modbus 188) as the control signal. Humidity production can be managed in two modes:

To manage production as a percentage:

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

To manage production with a humidity probe managed by the Main unit:

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

When D37 is set to 1, if communication is lost for the number of seconds set by parameter C4, the "Main Offline" alarm is activated (see Alarm table) and production stops.

Production can be activated/deactivated via digital parameter D27 (see the 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 status of D37.

10.3 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.

11. ALARMS

Signal Red LED (*)	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: • feedwater supply and fill valve; • blockage of filter on fill solenoid valve; • 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 the tank	yes	humidification interrupted	ESC / Digital 29
3 fast flashes	EF	 no water	Interruption to feedwater supply or fill solenoid valve malfunction	Check: • feedwater supply and fill valve; • blockage of filter on fill solenoid valve;	yes (in 10 minute waiting time)	humidification interrupted only for 10 minutes	automatic (after 10 minute wait, see chap. 8.5)
4 fast flashes	Ed	 drain fault	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	Operating hours for recommended maintenance (b5) exceeded	Carry out maintenance on tank and transducers (chap. 12)	no	signal only	Reset hour counter (see chap. 6.6 or 7.8)
6 fast flashes	PU	-	External control signal not connected correctly	Cable interrupted/ disconnected/ not connected properly.	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	Parameter memory corrupted	If the problem persists, contact the CAREL service centre	yes	humidification interrupted	If it 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 it persists, contact service
7 slow flashes	OFL	Main unit offline	No communication with the Main unit via serial (if D37=1)	Check Main unit status / communication cable	yes	humidification interrupted	AUTO
8 fast flashes	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 chapter 7.8)

Tab. 11.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

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

Tab. 11.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	Verification	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
	Other	The fan cables are loose or detached	Check connection after removing the humidifier cover Restore correct connection to the terminals
The quantity of atomised water is too low	Water level overflow	Float level sensor blocked	If there is continuity, contact service to replace the level sensor
		Fill valve fault	If the water level in the tank reaches the overflow pipe, remove the connector from the control board and check continuity of the level sensor Water is filled even after switching off the appliance Replace the fill valve

Tab. 11.c

12. MAINTENANCE AND SPARE PARTS

12.1 Electrical components

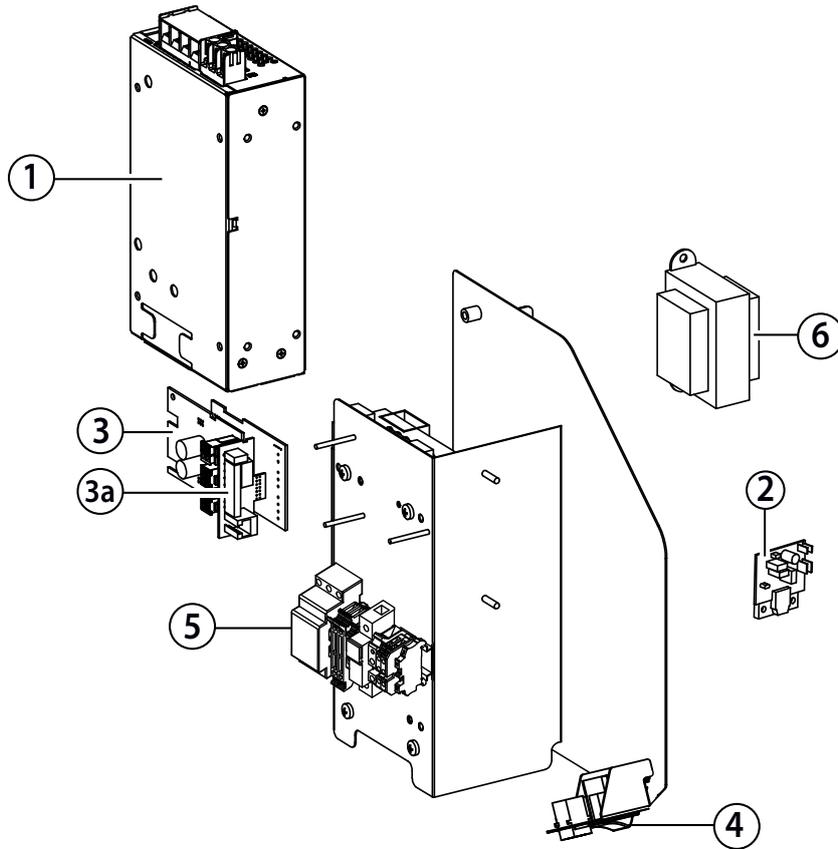


Fig. 12.a

no.	Description	Spare part number
1	Power supply	UUKA600010SP taglie 2-8 kg/h (4.4-17.6 lbs/h) UUKDE00000
2	Driver board	UUF0(X)R0000
3	Main board	UUKAX00000
3a	Auxiliary card	UUKPS00000SP
4	ON/OFF switch	-
5	Terminal block	MCKTR00000
6	Transformer	MCKTR00000

Tab. 12.a

(X) = 2 → 2 kg/h (4.4 lbs/h),

4 → 4 kg/h (8.8 lbs/h),

6 → 6 kg/h (13.2 lbs/h),

8 → 8 kg/h (17.6 lbs/h)

12.2 Mechanical components

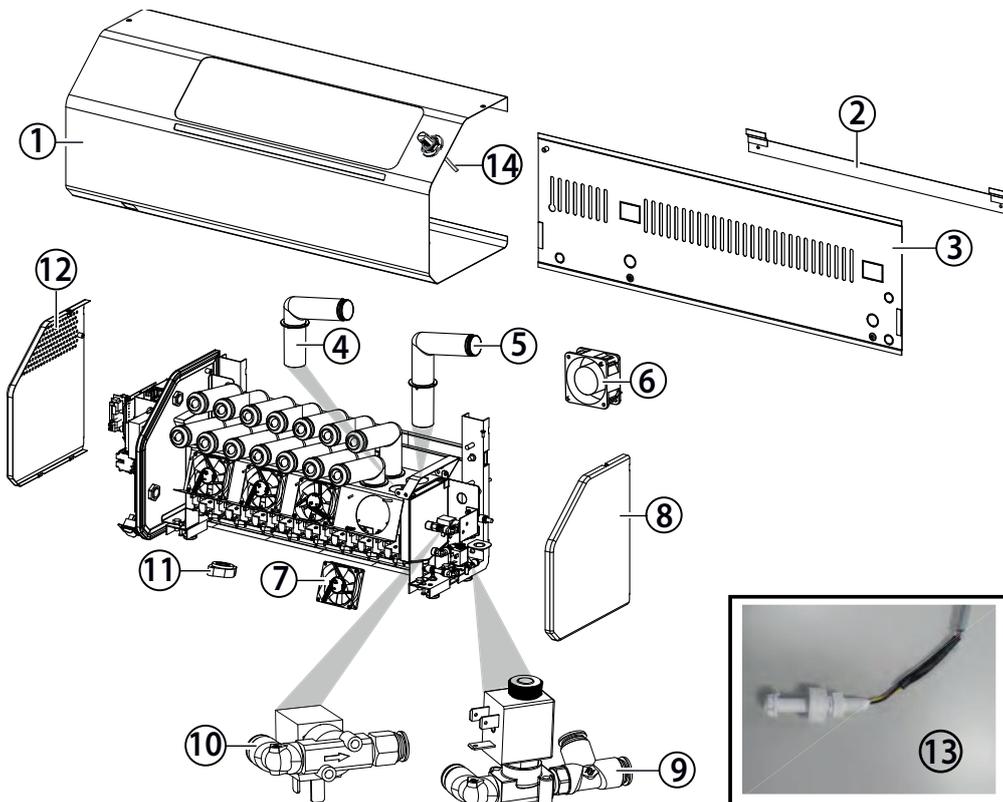


Fig. 12.b

no.	description	Spare part number
1	Cover	-
2	Wall-mounting bracket	-
3	Rear panel	-
4	Front diffuser	UUKRA00000
5	Rear diffuser	UUKRR00000
6	Rear fan	UUKFN00000
7	Front fan	UUKFF00000
8	Right closing panel	-
9	Drain solenoid valve kit	UUKDN00000
10	Fill solenoid valve kit	UUKFR00000
11	Piezoelectric transducer	UUKTP00000
12	Left closing panel	-
13	Level sensor inside the tank	UUKLV00000
14	Temperature and humidity probe (if provided)	UUKTH00000

Tab. 12.b



12.3 Maintenance

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

! 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.

The fill valve is normally closed and the drain valve is normally open, consequently, when powering down the humidifier, the unit is drained automatically. Wait for all of the water to be emptied from the humidifier tank.

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

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

NOTICE:

- the piezoelectric transducer is very delicate: when cleaning the inside of the tank, make sure not to scratch it, for example with a screwdriver;
- tighten the nuts applying the maximum allowed torque (0.08 ± 0.5 N·m). Excessive tightening torque may damage the humidifier.
- beware of electrostatic discharges, so as to prevent damage to electronic components.

12.4 Scheduled maintenance

Scheduled maintenance on humidifiers involves cleaning all the parts in contact with the water:

1. fill/drain lines;
2. water tank.

Maintenance intervals depend on water quality and humidifier operating hours. The use of demineralised water minimises maintenance requirements.

NOTICE: it is recommended to perform scheduled maintenance at least once a year, irrespective of water quality and humidifier operating hours.

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

1. make sure there is a water column above each of the piezoelectric transducers during humidifier operation, after having removed one or more atomised water outlet diffusers;
2. check that the LEDs on the driver boards are on and are yellow during humidifier operation;
3. check that the fans are running during humidifier operation.

12.5 Unscheduled maintenance

Unscheduled maintenance may involve replacement of:

1. fill/drain solenoid valve;
2. driver board;
3. piezoelectric transducer;
4. fan;
5. electronic control board;
6. power supply;
7. level sensor.

12.6 Replacing the components

To access the fill/drain solenoid valve, remove the right side panel and the L-bracket that supports the solenoid valves.

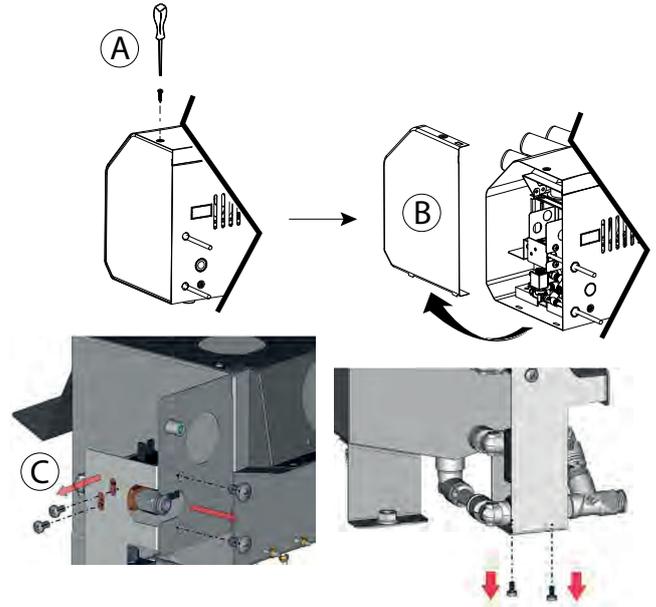


Fig. 12.c

1. loosen and remove the screw (A);
2. remove the cover (B).
3. remove the screws on the bracket (C).

Drain solenoid valve

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

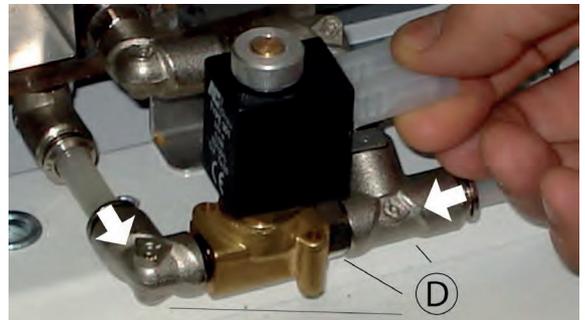


Fig. 12.d

Fill solenoid valve

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

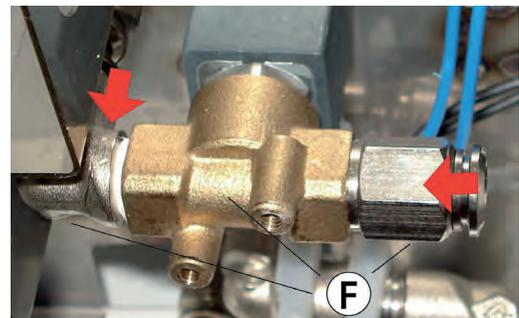


Fig. 12.e

Dismantling the rear panel (to access the rear fans)

! 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 remove the rear panel, first take off the left closing panel:

1. loosen and remove the screw (A);
2. remove the cover (B);
3. unscrew the screws (C) to disconnect the power cable from the terminal block, and the screws (D) to remove the rear panel (E).

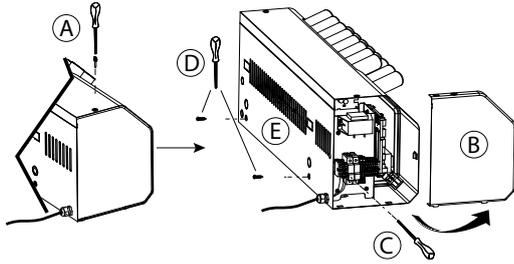


Fig. 12.f

Diffusers

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

Rear fan/driver board

To access to the front fans and drivers with the wall-mounted humidifier, remove the cover, after having disconnected the water connections and power supply. To carry out the maintenance operations on the workbench, proceed as follows:

1. unplug the electrical cables running from the fan to the driver board;
2. remove the fastening screws using a screwdriver;
3. remove the fan;
4. to remove the front driver board, loosen and remove the two fastening nuts with a socket wrench.

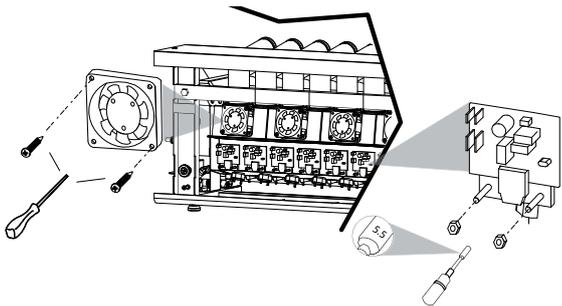


Fig. 12.g

Front fan/driver board

1. Unscrew the screws under the bottom panel;

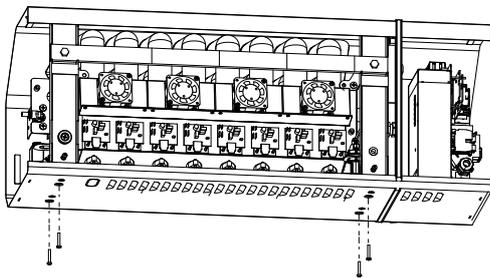


Fig. 12.h

2. Remove the cover from the two uprights;

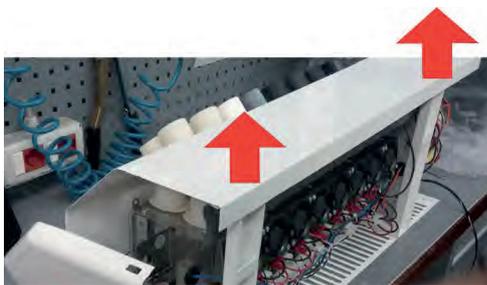


Fig. 12.i

3. Slide out the humidifier body;

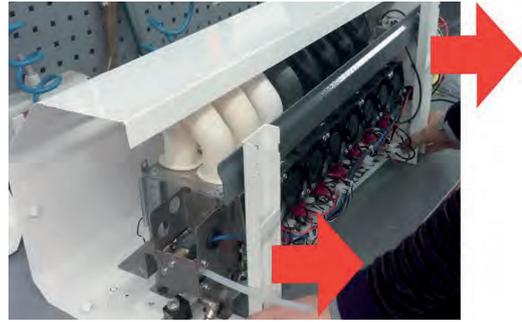


Fig. 12.j

4. To remove the front driver board, loosen and remove the two fastening nuts with a socket wrench.

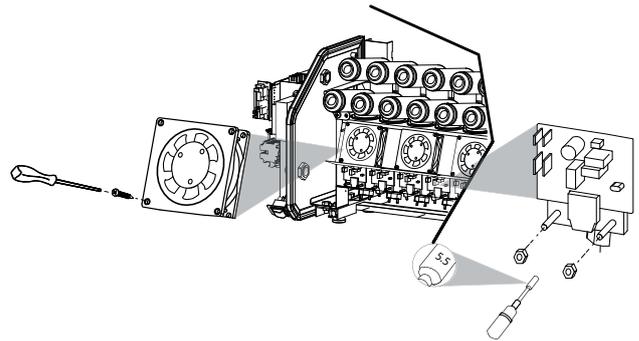


Fig. 12.k

NOTICE: together with the driver board, it is recommended to also replace the corresponding piezoelectric transducer.

Replacing the level sensor

To access the level sensor and carry out maintenance on the workbench, proceed as follows:

1. remove the casing by unscrewing the top and bottom screws, remove the rear panel and the side panels and then remove the probe by unscrewing the nut;
2. open the top of the tank by unscrewing the screws;

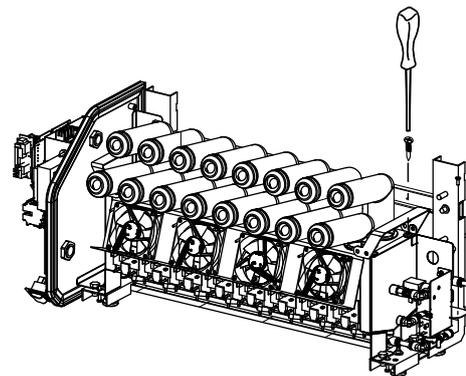


Fig. 12.l

3. electrically disconnect the front and rear fans and remove the tank cover



Fig. 12.m

- free the sensor cable from the other cables on the left of the tank, and unplug the 4-pin connector on the sensor cable;

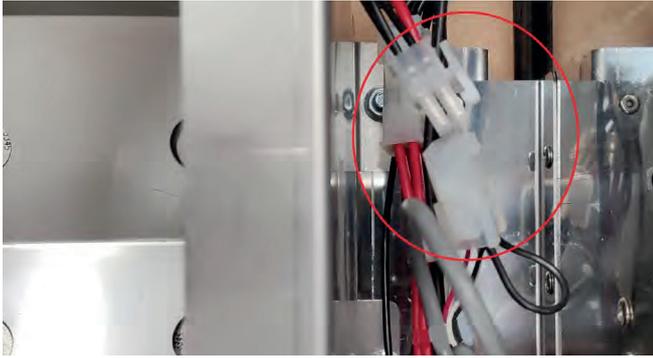


Fig. 12.n

- cut the cables, white, red and 2 black, from the connector on the sensor being replaced, leaving 1 cm of wire on the connector side to use as a reference when wiring the new sensor to the connector;
- unscrew the nut on the cable gland where the sensor cable runs into the tank, and remove the cable by sliding it out into the tank;
- unscrew and remove the level sensor nut, remove the partition covering the sensor, remove the sensor and cable from the bracket that holds it inside the tank;



Fig. 12.o

- take the new sensor and place the silicone O-ring on the threaded part;



Fig. 12.p

- place the new sensor cable through the hole on the support in the tank, repeating the above steps in reverse order;
- reposition the partition and then the nut, and then secure the new sensor to the support. The O-ring will remain between the partition and the nut;
- run the cable through the cable gland and arrange the part that remains inside the tank so that the section covered by the black sheath remains in a loose position without tension;
- run the cable through the nut on the cable gland, then tighten the nut and secure the assembly to the tank;
- using the old connector as a reference, insert the cable ends - respecting the colours of the wires and the positions - into the new connector supplied with the new level sensor, making sure that each wire makes a "click" sound when being inserted;
- plug the 4-pin connector on the new level sensor to the male connector that runs to the electronic control board.

Piezoelectric transducer

All transducers, both front and rear, can be inspected by removing the cover, leaving the humidifier mounted on the wall, after having disconnected the water connections and power supply.

NOTICE: the atomisation capacity of the piezoelectric transducers gradually decreases with use. It is recommended to replace them after 10,000 operating hours, if demineralised feedwater is used, even though the unit can still continue to operate as long as actual capacity corresponds to requirements. With softened or tap water, operating hours will be reduced depending on feedwater quality.

To remove the piezoelectric transducer:

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

NOTICE: fitting the transducer the wrong way round (rotated 180°) will cause a reduction in atomised water production and potential humidifier malfunctions.



Fig. 12.q



Fig. 12.r



Fig. 12.s

NOTICE: the tightening torque of the nuts that fasten the transducer must be 0.8±0.5 N·m..

Control board and power supply

To access the electronic control board and power supply, simply remove the left closing panel (Fig. 12.g). To remove the control board (Fig 12.p):

1. unscrew and remove the nuts and take off the control board;
2. to remove the power supply (Fig. 12.q), unscrew the screws and pull it out from above.

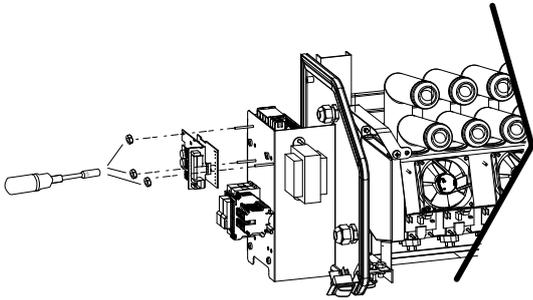


Fig. 12.t

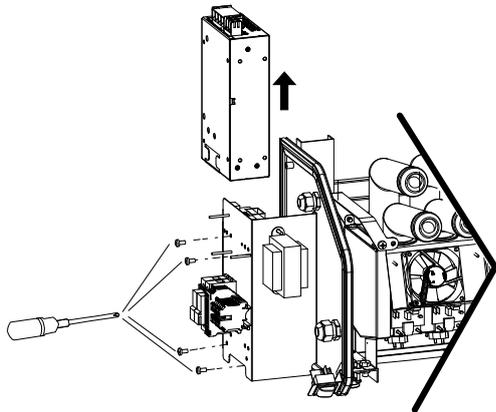


Fig. 12.u

12.7 Cleaning the tank

To access and clean the tank:

- A. unscrew the screws that secure the cover and remove the fastening brackets;
- B. unscrew the screws that fix the fans;
- C. if necessary, unscrew the screws to detach the fans and clean the air filters;
- D. lift the cover out to access the tank.

To clean the tank, use a soft brush.

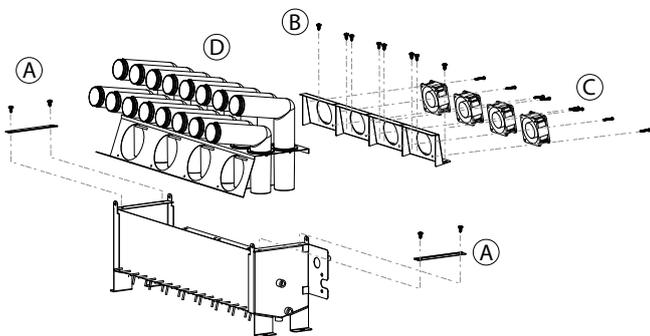


Fig. 12.v

13. WIRING DIAGRAM

13.1 Unit diagram, 230 Vac version

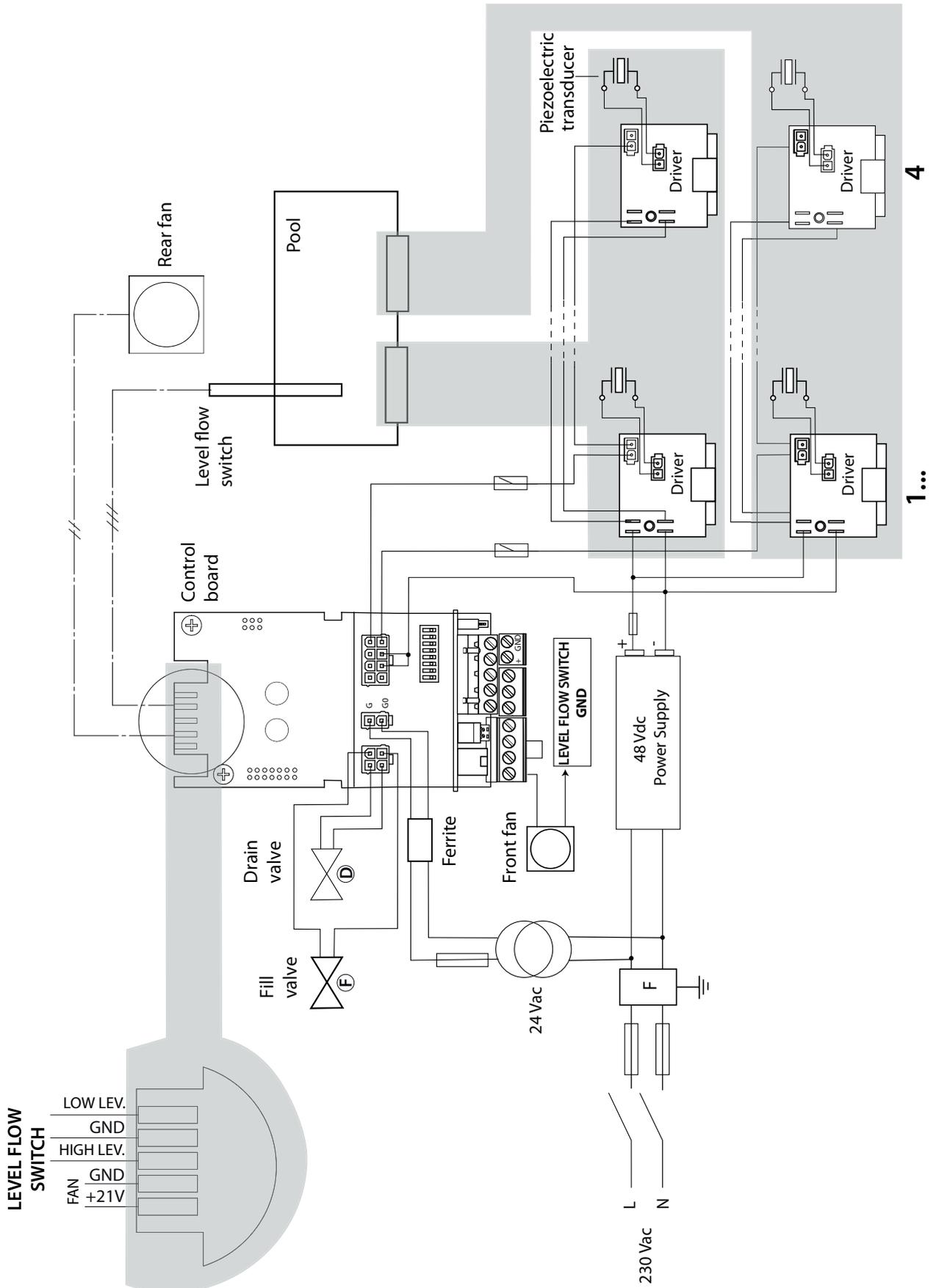


Fig. 13.a

13.2 Unit diagram, 110 Vac version

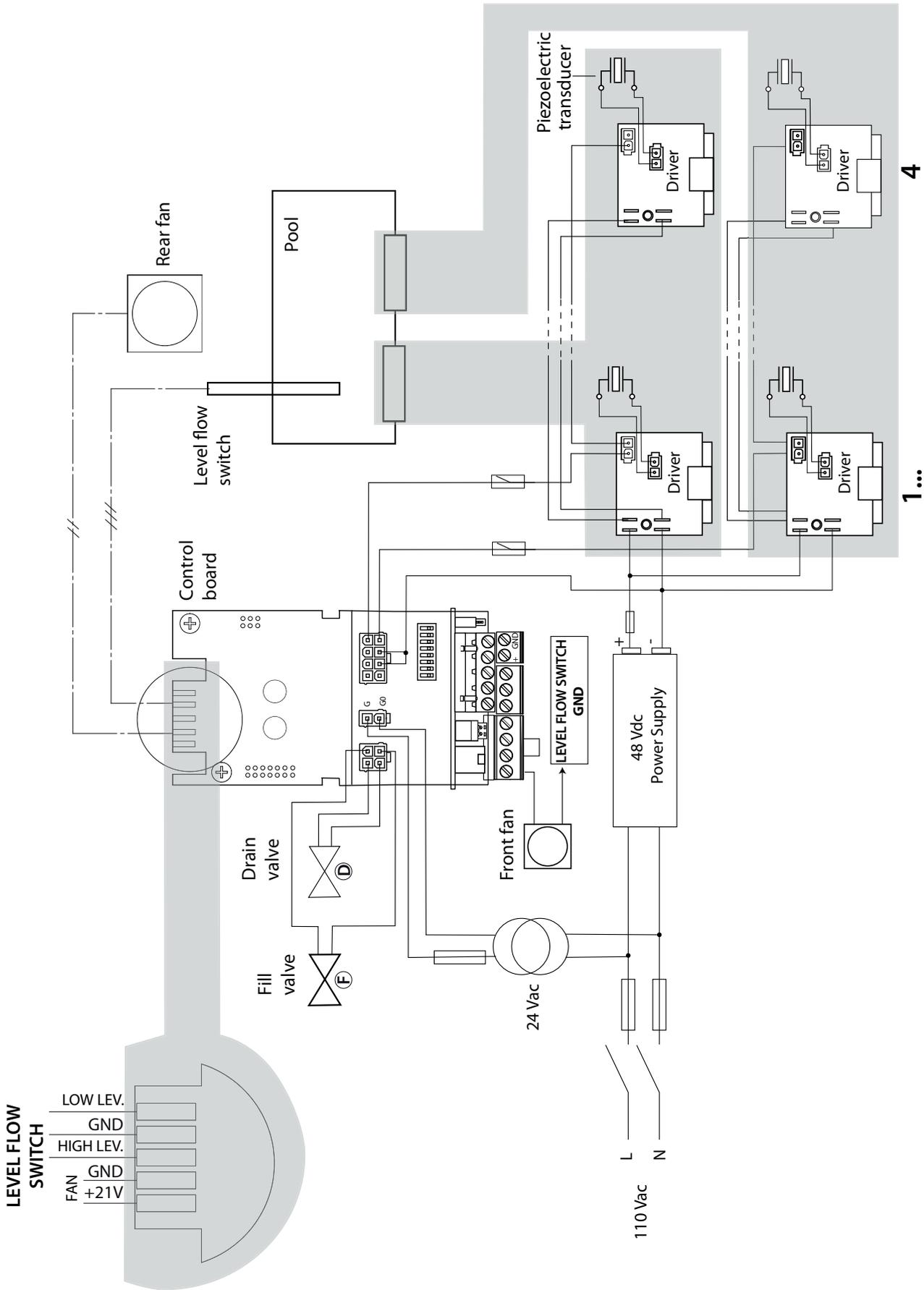


Fig. 13.b

14. GENERAL FEATURES AND MODELS

14.1 Ultrasonic humidifier models and electrical specifications

The table below summarises the electrical data (power supply voltages) of the various models, as well as their functional characteristics. Install an external single-pole disconnect device suitable for overvoltage category III (IEC 60335-2-98). 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 (lbs/h)	Power supply		Current draw ⁽²⁾ (A)	Cable ⁽³⁾ (mm ² - AWG)
		Power ⁽²⁾ (W)	Voltage ⁽¹⁾ (V - type)		
UU02RD%	2 (4.4)	180	230	0.8	0.823 - 18
UU02R1%	2 (4.4)	180	110	1.65	
UU04RD%	4 (8.8)	330	230	1.5	
UU04R1%	4 (8.8)	330	110	3	
UU06RD%	6 (13.2)	480	230	2.1	
UU06R1%	6 (13.2)	480	110	4.4	
UU08RD%	8 (17.6)	690	230	3	
UU08R1%	8 (17.6)	690	110	6.3	

Tab. 14.a

- (1) tolerance allowed on the nominal mains voltage: -15%, +10%;
- (2) tolerance on nominal values: +5%, -10% (EN 60335-1) for 230 Vac only. For 110 Vac, refer to UL998;
- (3) recommended values, referring to PVC or rubber cable in a closed conduit, 10 m (32.8 ft) long; compliance with standards in force is always required. Use one of the power cables specified in IEC 60245, IEC 60227 or IEC 62821 for 230 Vac (e.g.: IEC 60245 -> cable type H**RNF or IEC60227 -> cable type H**VU or IEC 62821 -> cable type H**VV-F);
- (4) max instant rated atomised water production: average atomised water production may depend on external factors, such as: room temperature, water quality, atomised water production distribution system

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

14.2 Technical specifications

Model	UU02R*	UU04R*	UU06R*	UU08R*
Flow-rate kg/h (lbs/h)	2 (4.4)	4 (8.8)	6 (13.2)	8 (17.6)
No. of transducers	4	8	12	16
Nominal power (W) (2)	180	330	480	600
Application	room			
Feedwater pressure bars (kPa) (psi)	1 ... 6 (100...600) (14.5...87)			
Feedwater temperature °C (°F)	5 to 40 (41 to 104)			
Ingress protection	IP20			
Electronic controller				
Auxiliary voltage / frequency (V/ Hz)	24 V / 50 – 60 Hz			
Maximum auxiliary power (VA)	3			
Probe inputs (general specifications)	Can be selected for these 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 20 Vdc 100 Ω with signals: 0 to 20 mA, 4 to 20 mA			
Power supply for active probes (general specifications)	21 Vdc, max 150 mA			
Alarm relay output (general specifications)	24 V (max 3 W)			
Remote enabling input (general specifications)	Voltage-free contact. Max resistance 100 Ω; max 5 Vdc open, 7 mA closed			
Serial communication	RS485 (Carel/Modbus protocols) 1/8 unit load (96 kΩ)			
Environmental conditions				
Ambient operating temperature °C (°F)	1 to 40 (33.8 to 104)			
Ambient operating humidity (% rH)	10 to 80			

Tab. 14.b

14.3 Fuse table

Humidifier P/N	48 Vdc power supply fuse (1 type 10.3 x 38 fuse)	Power supply fuse (2 type 5 x 20 fuses)	250 Vac transformer fuse (1 type 6.3 x 32 T fuse)
UU02RD%	4 A	2.5 A	3.15 A
UU02R1%	4 A	2.5 A	3.15 A
UU04RD%	6 A	2.5 A	3.15 A
UU04R1%	6 A	3.15 A	3.15 A
UU06RD%	10 A	2.5 A	3.15 A
UU06R1%	10 A	5 A	3.15 A
UU08RD%	12 A	3.15 A	3.15 A
UU08R1%	12 A	6.3 A	3.15 A

Tab. 14.c

15. NETWORK CONNECTION

15.1 Setup

The Main unit is able to control the operation of a maximum of 3 Secondary units connected via tLAN network. For the electrical connections, see the diagram on the following page. Dipswitches 1-3 on the Main unit must be all set to OFF. Each Secondary unit must be correctly configured via the following dipswitches:

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

15.2 Control logic

The Main unit controls each Secondary unit connected to it using the following parameters:

- enable/disable operation;
- atomised water production capacity.

The control signals (probes/humidistat/external controller) are read and managed only by the Main unit, which then controls the operation of the Secondary units. Production capacity of the Main unit is sent to all of the Secondary units:

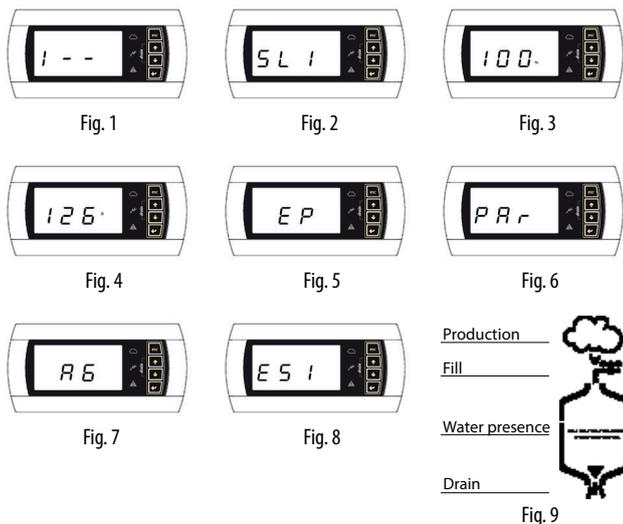
E.g. 1: Main configured with proportional control (see chapter “Electrical connections”) and 90% request: the Main unit and each Secondary unit will modulate operation at 90% capacity (see chapter “Operating principles”).

E.g. 2: Main configured with room probe control, set point 50% rH: when the set point is reached, the Main unit and all of the Secondary units will stop atomised water production.

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

15.3 Management of Secondary units from the terminal (Main)

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



The symbol 1 means “unit online”, while the symbol - means “unit offline”. Fig. 1 shows the example of Unit 1 online (left digit 1), while Units 2 and 3 are offline (middle and right digit -).

Press ENTER to access the menu for selecting the unit to be controlled, and UP and DOWN to scroll through the list of units. Fig. 2 shows the screen to select Unit 1.

Press ENTER to access the control menu for the desired unit, and UP and DOWN to scroll through the following screens:

- Request sent by the Main unit as a percentage (Fig. 3).
- Operating hour counter (Fig. 4), which can be reset by pressing UP+DOWN for 5 seconds (see parameter d3).
- Unit alarms (Fig. 5, if there are no alarms -- is displayed), can be reset by 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
- Accessing the parameter configuration menu (Fig. 6).

In this view, the icons show the status of the selected Secondary unit (Fig. 9)

Press ENTER on the configuration parameters menu screen to access the list of modifiable parameters (Fig. 7).

For the meaning of the parameters, see chap. “Configuration parameters”.

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

15.4 Alarms

From the main screen, the Main units displays any alarms on a specific Secondary unit, with the code ESX. X refers to the address of the Secondary unit with the active alarm (Fig. 8, Secondary Alarm 1).

For details of the current alarm, access the corresponding Secondary unit menu. Each unit manages its own alarms independently, with the exception of those referring to the control signals connected to the Main unit that disable the entire network of humidifiers

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

Tab. 15.a

15.5 Control via supervisor (Carel/Modbus®)

Supervisor variables I62 and I63 (Modbus® 189 and 190) can be used to view and set the parameters for the Secondary units. Variable I62 (Modbus 189), used to read/write a given parameter, must be written as shown in the following table; the value of the parameter is displayed/set using variable I63 (Modbus 190).

For a read request, the value of the variable will be available at I63 (Modbus 190), and after writing at I62; while for a write request, the written value will be available at I63.

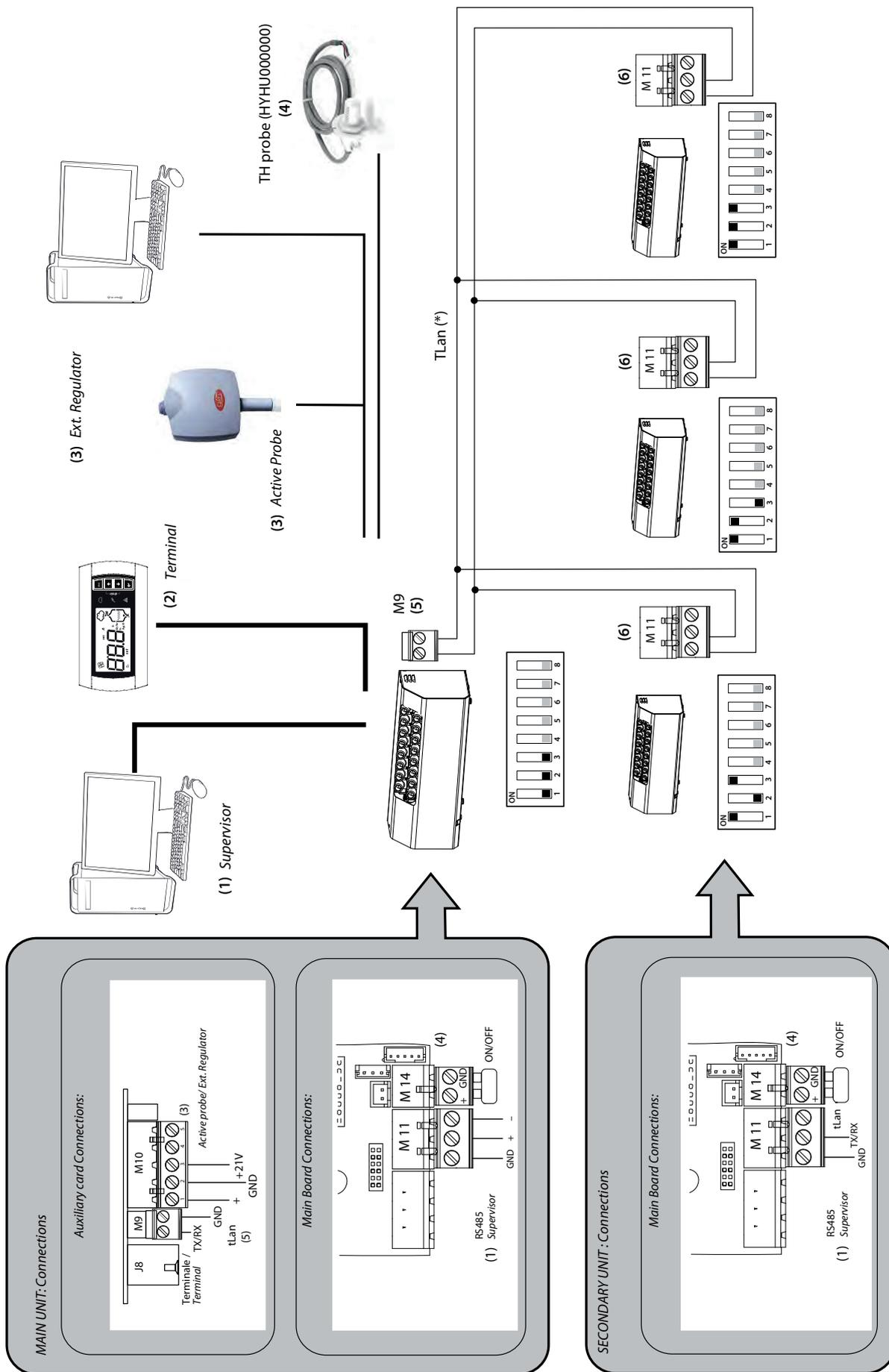
Bit 15 Mode	Bit 13-14 Secondary unit address	Bit 8-12 Variable type	Bit 0-7 CAREL supervisor address
0=Read 1=Write	01 = Secondary 1 10 = Secondary 2 11 = Secondary 3	00100=Int. 01000=Analogue 10000=Dig	E.g.: 0000 1000=8

Tab. 15.b

E.g.: Write parameter P0 on 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



NOTICE: connect the shield of the serial cable to the humidifier earth terminal (PE)
Shielded cable AWG 20/22 max. 10 m/33 ft

15.6 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 main humiSonic unit. The backup unit will be activated only if the main unit shuts down (due to an alarm). 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;

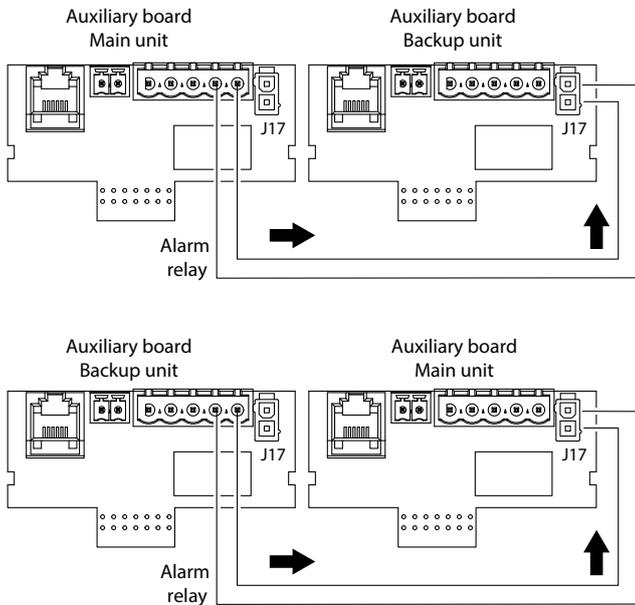


Fig. 15.c

- 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 suitably configured (see chap. “Configuration parameters” Tab. 9.c) on both 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 or dew point request signal/measurement; 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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