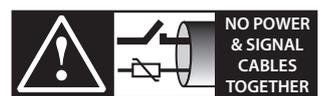
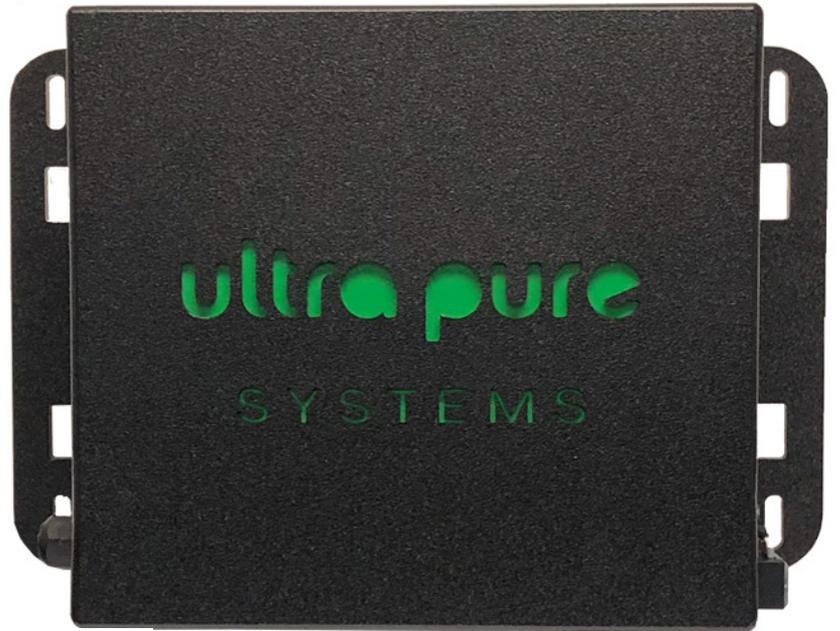


# pureMIST

Compact Ultrasonic Humidifier



## Engineering Manual



READ CAREFULLY IN THE TEXT!



## WARNINGS

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

**DANGER OF ELECTRIC SHOCK:** The humidifier contains live electrical components. Disconnect the mains power supply before accessing inside parts or during maintenance and installation.

**DANGER OF WATER LEAKS:** The humidifier automatically and constantly fills/drains certain quantities of water. Malfunctions in the connections or in the humidifier may cause leaks.



## IMPORTANT

- Ultra Pure compact is a component integrated in various applications. Its installation requires the installer inserts appropriate protections against direct contact with parts carrying dangerous voltages. Nobody should have access to parts with dangerous voltage during normal operation of the humidifier.
- Environmental and power supply conditions must conform to the values specified on the product rating labels.
- The product is designed exclusively to humidify rooms directly.
- Only qualified personnel who are aware of the necessary precautions and able to perform the required operations correctly may install, operate or carry out technical service on the product.
- Only water with the characteristics indicated in this manual must be used for water vapor production.
- All operations on the product must be carried out according to the instructions provided in this manual and on the labels applied to the product. Any uses or modifications that are not authorized by the manufacturer are considered improper. Ultra Pure declines all liability for any such unauthorized use.
- Do not attempt to open the humidifier in ways other than those specified in the manual.
- Observe the standards in force in the place where the humidifier is installed.
- Keep the humidifier out of the reach of children and animals.
- Do not install and use the product near objects that may be damaged when in contact with water (or condensate). Ultra Pure declines all liability for direct or indirect damage following water leaks from the humidifier.
- Do not use corrosive chemicals, solvents or aggressive detergents to clean the inside and outside parts of the humidifier, unless specifically indicated in the user manual.
- Do not drop, hit or shake the humidifier, as the inside parts and the linings may become inoperable.

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

**WARRANTY ON MATERIALS: 2 YEARS. WARRANTY PERIOD STARTS NO LATER THEN 90 DAYS FROM DELIVERY OF EQUIPMENT AND NOT WHEN EQUIPMENT IS STARTED**

**DI WATER IS ESSENTIAL FOR PROPER OPERATION. ANY OTHER FORM OF WATER VOIDS WARRANTY. ULTRA PURE TAKES NO RESPONSIBILITY TO ANY FOREIGN DEBREE IN AIR OR INSIDE ULTRA SONIC HUMIDIFIER DUE TO HARDNESS OF WATER OR ANY CONTAMINENTS IN WATER SUPPLY.**

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### Humidifier Specs

Production	Supply Temperature	Electrical Rating	Amp Max	Weight	Dimensions
2.2 Lbs/Hr	33.8 - 104° F	115 V/60Hz .8	MFS 15	28lbs	12" x 9" x 11"

### Optional Accessories



5M Filter



90 Connection



Fan Conveyor



Temp/Hum Stat



Diffuser



Wand Distributor

\*Diffuser or Wand required for each system\*

# 1. INTRODUCTION AND ASSEMBLY

## 1.1 Ultrasound humidifier

UltraSonic humidifiers can be used for a variety of applications, e.g. data centers, humidors, process machines, wine rooms, music rooms to maintain a given RH% control. Either UP01 or UP02 compact humidifier can be used as a self standing unit with a distributor attached to the top of each cabinet or used with a plastic hose to distribute mist into a stainless steel wand that has approx. 30 small holes to allow mist to evenly distribute mist. Caution: stainless steel wand must be sloped back to humidifier to drain any mist that may have condensed in tube or wand. Mist displacement is 1.1 lb/hr using Ultra Pure (UP01) cabinet and 2.2lb. hr using Ultra Pure (UP02), delivered directly into the air stream running 100% for 1 hour.

## 1.2 Dimensions and weights

1 lbs/hr and 2 lbs/hr  
(UP01 and UP02)

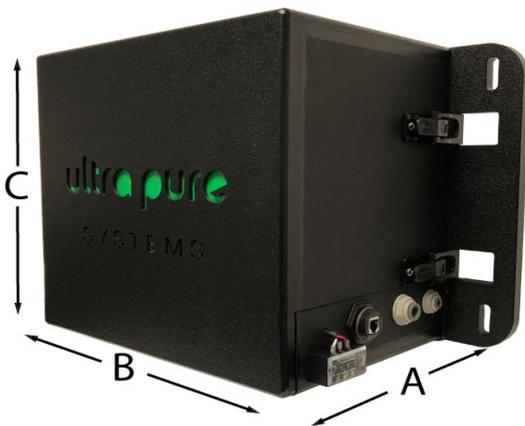


Fig. 1.a

		UP02
dim. inches	A Depth	9"
	B Width	12"
	C Height	11"
weights ((lb)	packaged	46 Pounds
	empty	39 Pounds

Tab. 1.a

## 1.3 Opening the packaging

- Make sure the humidifier is intact upon delivery and immediately notate on BOL any damage to box or glass sticker affixed to each box. Notify Ultra Pure immediately due to careless or improper transport.
- Move the humidifier to the site of installation before removing from the packaging
- Open the cardboard box, remove the protective material and remove the humidifier
- The following are contained inside (fig 1):
- A: IOM manual
- B: Optional accessories if purchased ie, distributor, 50M filter, plastic tube separate box, S/S distributor separate box
- 10' 1/4" RED inlet water & 3/8" BLACK drain hose

## 1.4 Positioning

Ultra Pure has taken every measure to provide a self contained humidifier for ease of installation and startup.

In order to produce even mist across the water bed inside humidifier make sure cabinet is on a level surface. In order to set onto a flat surface (1) 2" hole will need to be drilled to allow for drain line to not impede with cabinet setting flat on surface. Installing drain is required and will void warranty if not terminated and ran to an approved drain.

Both cabinets can also be hung onto a wall. In order to have access to the humidifier deep or shallow channel strut is required to secure cabinet prior to hanging onto wall.

Confirm cabinet is level on wall front to back and side to side.

Temperature and Humidity conditions that change throughout day will also change the distance of absorption. Please allow for 60" clear space in front of humidifier or optional S/S wand.

## 1.5 Fastening

Fastening instructions:

1. Fastening instructions:
2. Use (4) spring nuts and 3/8" bolts to attach to unistrut Fig. 1.b;
3. Confirm that humidifier mist leaving cabinet does not have any obstructions close to or the possibility that mist can touch anything prior to being absorbed into air stream.
- 4.

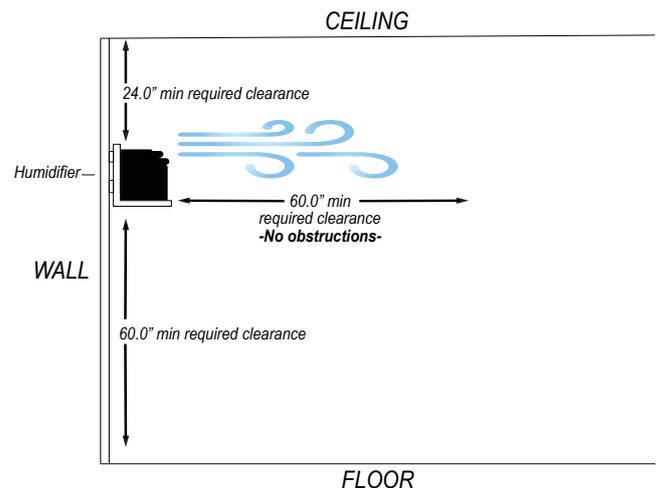


Fig. 1.b

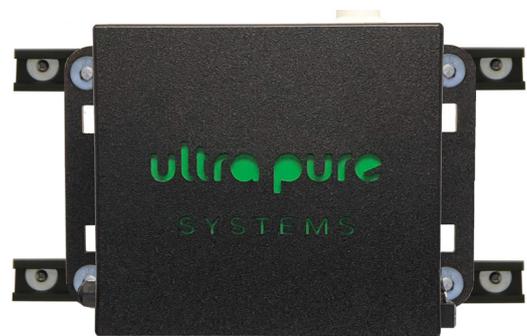


Fig. 1.c

## 1.6 Humidifier Connections

Connect DI water to marked 1/4" push connect fitting (RED)  
Connect Drain water to marked 3/8" push connect fitting (Black)  
Connect included RJ11 cord to display and plug into cabinet  
Terminate 3 wire color coded wired if optional temperature and humidity sensor is used to side of cabinet (color for color)  
Plug pre installed extension cord into dedicated 15a GFCI (required)

GFCI wall outlet required



Fig. 1.d



Fig. 1.e

## 2. WATER CONNECTIONS

**⚠ Important:** before proceeding with the water connections, make sure that DI water connections and drain are not reversed. Damage is not under warranty

### 2.1 Supply water

The ultrasonic humidifier works on DI water. Using normal water will shorten transducer life; specifically, maintenance intervals for cleaning or replacing transducers depend on to what extent the supply water mineral content exceeds the values recommended in Table 11.b (p.24). In the case of use RO or city water use, Reduction in the production of moisture declared in Table 11.a due to salts and impurities present.

Operating conditions:

DI water with the characteristics indicated in Table 11.b, supply water (p. 24); pressure between (14.5 and 58 PSI), temperature between (33.8 and 104 °F).

Temperature and Humidity conditions that change throughout day will also change the distance of absorption. Please allow for 60" clear space in front of humidifier

**⚠ Important:**

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

### 2.2 Drain water

Drain water from the humidifier is not toxic and can be drained into the approved drain system.

Attach 1/2" FPT (female pipe thread) safety drain on bottom of cabinet and 3/8" push connection on side of cabinet to approved drain

## 3. MIST DISTRIBUTION OPTIONS

### 3.1 Mist distributors (Optional)

**⚠ Important:** Optional plastic wand and S/S distributor, front diffuser, fan conveyor and elbow connector are not supplied with the humidifier

Code	Part #
Tube & S/S wand	10" UP_P 0553-1
	21" UP_P 0553-2
	24" UP_P 0553-3
	33" UP_P 0553-4
	39" UP_P 0553-5
Plastic flexible hose	
Fan Conveyor	UP_P 0554
Elbow Connector	UP_P 0555
Diffuser	UP_P 0556
50M Filter	UP_P_0557

Requirements:

- minimum 1 mist distributor is required for proper operation
- slope S/S distributor so any water that may accumulate inside pipe will drain into P trap or back into humidifier
- use hose clamp to securely tighten hose to S/S tube.
- confirm water in S/S distributor does not leak out of connection to hose
- position the distributor in such a way that the air is not directed against nearby objects (minimum distance 5ft);
- bends or choking the hose may cause condensate to form and decrease humidity delivery;
- avoid loads that may cause mechanical stress on the humidifier outlet connector.



Fig. 3.a



Fig. 3.b

### 3.2 Fan conveyor

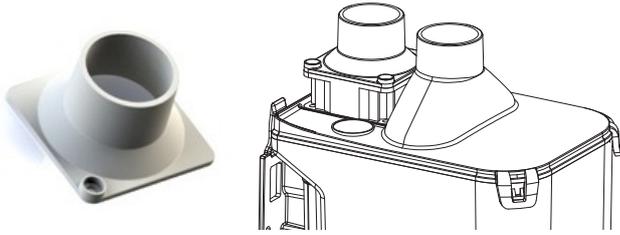


Fig. 3.d

The air flow conveyor P# UP\_P\_0554 can be installed on the top of the inlet air fan by (removing the protection grill) so air from a different place can used entering humidifier chamber. Ideal for tooling or machine in a sealed environment

### 3.3 Elbow connector

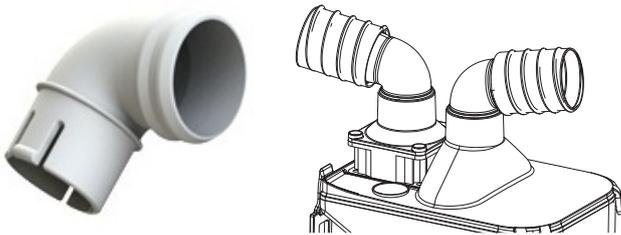


Fig. 3.e

The elbow connector P# UP\_P\_0555 can be installed on the top of the inlet air fan. Ideal if plastic hose is attached to minimize crimping hose.

### 3.4 Diffuser

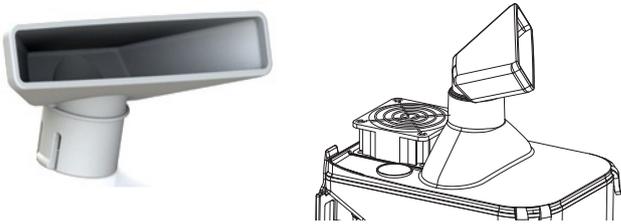


Fig. 3.f

The diffuser P# UP\_P\_0556 can be installed on the cover, to deliver mist directly into the room.

### 3.5 Filter: 50 micron

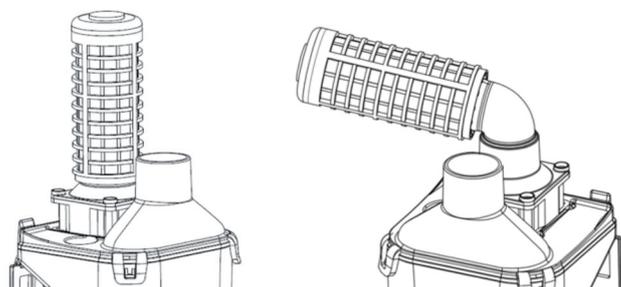


Fig. 3.g

The 50micron filter P# UP\_P\_0557 is available to be installed on inlet fan, using the conveyor (with or without the elbow). It's necessary to clean the filter (with compressed air or running water) periodically: frequency depends on the environment in which the system is installed. Features filter: 50 micron, H = 5", D = 2"

### 3.6 Example in tooling application

Fan coil installation example

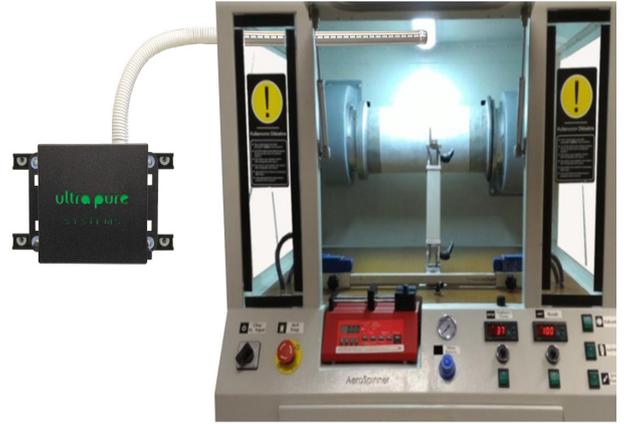


Fig. 3.h

### 3.7 Duct installation example (UP02)

Duct installation example.

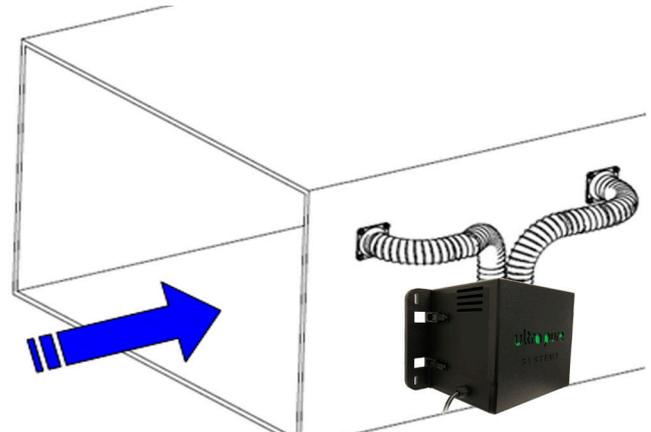


Fig. 3.i

Connect the optional fan conveyor P# UP\_P\_0554 on top of return fan and connect optional plastic flexable hose P# UP\_P\_0553-5 to the return side of the duct. Connect out of humidifer with same hose to downstream air.

Ultra Pure can supply fan conveyor (P# UP\_P\_0554 to create the connections between duct and hose. The hoses should be as short and as straight as possible (max 2' part), so as to reduce pressure drop.

If using P# UP\_P\_0553 distribution system in, turn the distributor so that the holes are in the direction of air flow (see the figure)



Fig. 3.j

## \*TECHNICAL TROUBLESHOOTING\*

### 4. ELECTRICAL CONNECTIONS

Below instructions pertain to troubleshooting only. Ultra Pure cabinets are designed and delivered for plug and play operation. Careful consideration should be taken prior to making any adjustments within cabinet.

Contact Ultra Pure for additional information.

#### 4.1 Electrical installation

##### Board connections

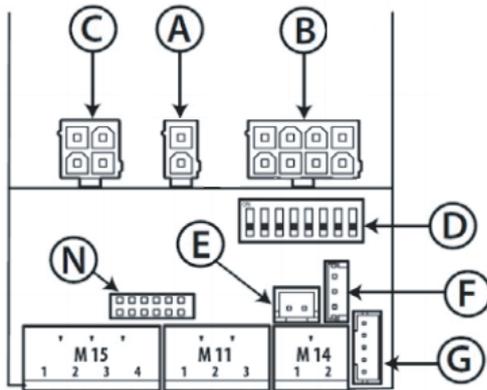


Fig. 4.a

Key to Fig. 4.a:

A	Power supply input to the transformer board (24/50V)
B	supply and controller cable driver ;
C	valve power cables (L drain / R fill)
D	configuration dipswitch
E	TAM (current transformer) input for measuring current on external fan
F	(not use for this application)
G	TH humidity probe connection (IIC digital serial, part no.: UP_P_0558) optional.
M14	remote ON/OFF (M14.1-M14.2)
M11	RS4845 serial (M11)
M15	- N.O. alarm relay (M15.1-M15.2) - 30 Vdc output (24 Vac rectified , max. 3W) (M15.3-M15.4)
N	auxiliary card connection

Tab. 4.b

##### Dipswitch configuration:

Dipswitches are not used if display RJ11 port is used on side of cabinet

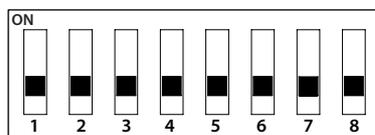


Fig. 4.b

1.	Communication	OFF Serial 485 Carel/Modbus
		ON tLAN
2-3	tLAN address (if 1 is ON)	OFF/OFF - -
		OFF/ON address 1
		ON/OFF address 2
		ON/ON address 3
4	Serial 485 / tLAN baud rate	OFF 19200
		ON 9600
5-6	Humidity Setpoint	OFF/OFF 50 %rH
		OFF/ON 30 %rH
		ON/OFF 40 %rH
		ON/ON 60 %rH
7	TAM	OFF disabled
		ON enabled

8	Production transducer management (only for 2-transducer version)
	OFF --> parallel management (modulation of all 2)
	ON --> if demand is less than 50%, it works only one transducer at a time, alternately

Tab. 4.c

#### 4.2 Power cable connection

- Confirm voltage is 115v where the humidifier will be plugged into. Confirm receptacle is grounded and polarity is correct.
- GFCI receptacle is required

**Note:** Avoid 115v cord and control wire being strapped together or run in same conduit

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

#### 4.3 Main board connections

Depending on the type of signal used, mist 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).

##### TH HUMIDITY PROBE (factory basis of design) mounted on side of cabinet

If the T&H humidity probe is connected to the G terminal (fig 4.a) atomized water production starts if:

- The terminal M14 is closed;
- The humidity value measured by the probe is below the setpoint (preset at 50%rH and modified via dipswitches 5-6, see Tab.4.a). Only used if display is removed from system.

The setpoint can be changed by connecting the trimmer (optional) to F terminal (fig 4.a)

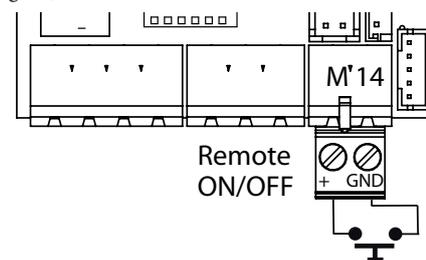


Fig. 4.c

#### 485 SERIAL CONNECTION

Carel/Modbus protocol

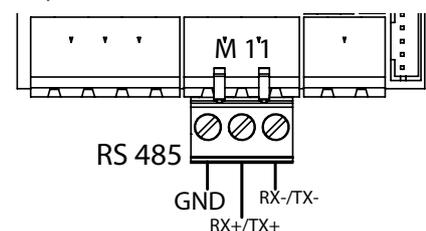


Fig. 4.d

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

#### ALARM RELAY

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

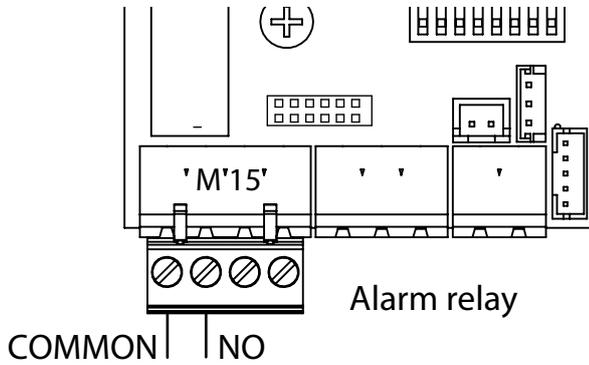


Fig. 4.e

#### ALARM RELAY POWER SUPPLY

The connections shown in Fig.4.g can be used to directly control an auxiliary relay coil 30 Vdc (24 Vac rectified), 3 W max.

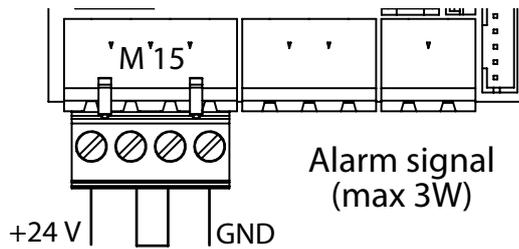
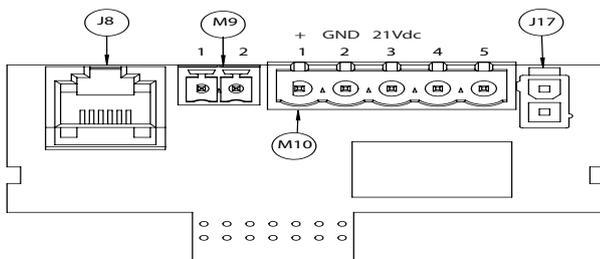


Fig. 4.f

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

## 4.4 Auxiliary card connections (optional)



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

The auxiliary card features the following connections

#### ON/OFF CONTROLLER (humidistat or remote switch)

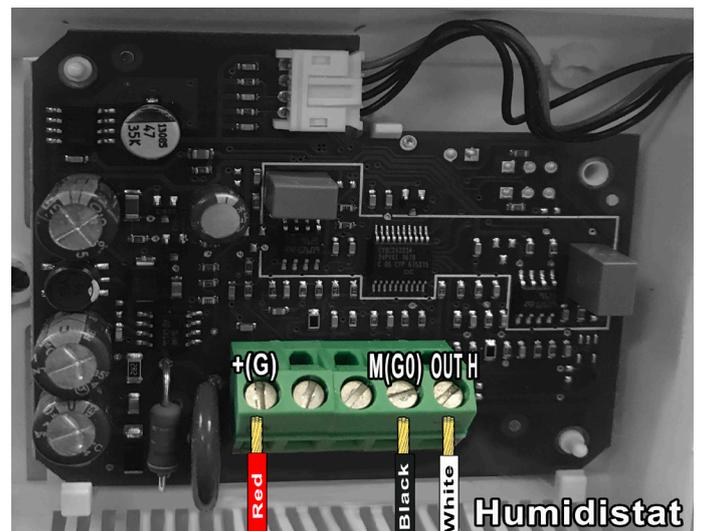
- jumper inputs M14.1 and M14.2 (enable) on the main board;
- connect terminals M10.1 and M10.2 to a humidistat or a remote switch (voltage-free contact)
- set parameter A0=0 to enable On/Off operation (see Chap. 7)

#### EXTERNAL PROPORTIONAL CONTROLLER (modulating)

- jumper inputs M14.1 and M14.2 (enable) on the main board;
- connect terminals M10.1 and M10.2 (production request) to an external controller;
- set parameter A0=1 to enable modulating control (see Chap. 7) and parameter A2 depending on the chosen signal (0 to 10 V, 2 to 10V, 0 to 20, 4 to 20 mA) (see Chap. 7).

#### CONTROL WITH CAREL HUMIDITY PROBE

(Optional) identified with remote sensor included with cabinet, terminate 3 conductor wire to terminal strip. Terminations have been completed inside by Ultra Pure. Simply terminate 3 wires (white,black and red) color for color to terminal strip and mount T&H in desired location using 5' included wire.



#### Final checks

The following conditions represent correct electrical connection:

- main power to the humidifier corresponds to the voltage shown on the rating plate.
- Receptacle has been verified to be 115v, correct polarity and grounded

## 5. STARTING, USER INTERFACE AND BASIC FUNCTIONS

Before starting the humidifier, check:



- 1 Confirm electrical connection is protected by a GFCI receptacle
- 2 Confirm cabinet is secure and level on wall or surface
- 3 Confirm water supply supply and drain is secure. Open up water supply slowly, check for leaks.
4. Confirm display is connected on side of cabinet using pre installed RJ11 connector

### 5.1 Starting

- 1 Once plugged into wall and water supply has been turned on humidifier will go through initial startup. Display light will turn on and go through a number of steps prior to displaying current relative humidity %.
- 2 If there are no other external connections made during installation ie , M14 remote jumper removed for BMS control the humidifier will start if current RH in space is lower then setpoint .
- 3 If humidity probe (optional) is connected to terminal strip, the humidifier will operate until reaching humidity set point +/- hysteresis (parameter P1)

### 5.2 Shutdown/Standby

To switch the humidifier off, disconnect power from wall

The humidifier goes into standby when:

- the remote on/off contact is open M14.
- Humidity set point has been reached
- if alarms are present (see chap.8)

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

### 5.3 Autotest

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

### 5.4 LED signals

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

	GREEN LED	ORANGE LED
Steady	Humidity production	Retry procedure**
Flashing slowly*	Set point reached	Standby
Flashing quickly*	Fill or Autotest	Washing

\*Flashing slowly: 1s ON and 1s OFF

Flashing quickly: 0.2s ON and 0.2s OFF

\*\*See paragraphs 13.5 and 13.6.

The red LED means an alarm is active. See chapter 8 for information on alarms.

### 5.5 Reset tank hour counter

The humidifier is fitted with an hour counter that records operation. After a set number of hours (1500), a signal is activated to indicate maintenance should be performed on the tank and operation of the piezoelectric elements checked. parameter b5. Contact ultra pure if alarm does not clear by pushing escape on the display. Record date and time for future reference to how often your system operates.

See below 6.7 for steps to clear hour counter.

### 5.6 Automatic washing

Ultra Pure humidifiers are not designed to flush water with exception to periodic flushing.

## 6. LCD TERMINAL (OPTIONAL)

### 6.1 Remote display terminal (UUKDI00000)

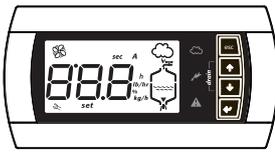


Fig. 6.a

The LCD terminal is standard with all cabinets. Plug display into side of cabinet using RJ11 connection. Although this is a standard RJ11 connection. Standard telephone wire will not work. Contact ultra pure for extended wire if needed.

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

CONNECTION:

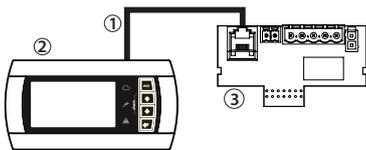


Fig. 6.b

Key:

1	6-wire cable 12ft maximum
2	remote display terminal.
3	optional card

### 6.2 Meaning of the symbols

	Power supply (Green LED)
	Humidifier operating (yellow LED) Steady: humidity production not yet at the set point Flashing: humidity production at the set point
	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. 8)
<b>sec</b>	Time in seconds
<b>h</b>	Hour counter
<b>%</b>	Humidity production as a percentage of rated capacity
<b>set</b>	Parameter setup
	Maintenance request (active alarm)
	On steady: humidifier fan operating. Flashing: fan on during deactivation phase
<b>888</b>	3 digits, after 999 the display shows to indicated the 1000s (the three digits are displayed with a dot at the top between the first and second digit).
	Humidity production in progress
	Tank filling
	Water in the tank

Tab. 6.a

### 6.3 Keypad

button	function
<b>Esc</b>	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)

### 6.4 Display software release

- 1) on power-up the display shows "rel. x.y;
- 2) while the functioning;
  - a) on the display: from the main screen press ESC and UP together, the following are shown in sequence: humidifier size, supply, number of phases and software release;
  - b) via network on integer variable 81. Format "## = #.#"

### 6.5 Accessing and setting parameters

CAUTION: Changing parameters can effect operation. Contact ultra pure if multiple parameters will be changed.  
The configuration parameters can be used to set and control humidifier functions and status.

From the main screen press:

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

### 6.6 Parameters: Recall default values

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

From the main screen press:

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

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

### 6.7 Reset hour counter from display

- Access parameter 'd3' (see Chap. 7)
  - press UP and DOWN for 5 seconds
- When reset is complete, 'res' is shown on the display.

## 7. CONFIGURATION PARAMETERS

To access and set the following parameters, see chapters 6 and 12.

### 7.1 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	-	0..3	3	
A1 Unit of measure 0 = Celsius ; 1 = Fahrenheit	-	0..1	0	
A2 Type of external sensor (optional card) (0 = On/Off ; 1 = 0-10V; 2 = 2-10V; 3 = 0-20 mA; 4 = 4-20 mA)	-	0..4	1	
P0 Maximum production <sup>(1)</sup>	Pm...100	100	100	only if terminal connected, otherwise values set by dipswitch
P1 Humidity control hysteresis	2...20	2	2	
Pm Produzione minima	5...P0	10	10	
St Default display (Terminal)	20...95	50	50	only if terminal connected, otherwise values set by dipswitch
C0 Default display (Terminal) 0 = Probe reading/control signal; 1 = P0 maximum production; 2 = Hour counter	-	0..2	0	

Tab. 7.a

### 7.2 Advanced parameters

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

Tab. 7.b

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

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

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

## 8. ALARMS

red LED signal (*)	code and symbol on display (flashing)		meaning	cause	solution	alarm relay activation	action	reset
2 fast flashes	Et	-	Autotest failed	- Fill not connected or insufficient - drain open - faulty float	Check: • water supply and fill valve; • blockage of filter on fill solenoid valve; • check drain solenoid valve and drain connection;	yes	humidification interrupted	ESC / Digital 29
5 fast flashes	EP		No production	Malfunction of piezoelectric transducers	Carry out maintenance on tank	yes	humidification interrupted	ESC / Digital 29
3 fast flashes	EF		No water	Interruption to water supply or fill solenoid valve malfunction	Check: • water supply and fill valve; • blockage of filter on fill solenoid valve	yes (in the 10 min. waiting period)	humidification interrupted only per 10 minutes	automatic (after 10 minute wait, see Chap. 5.8)
4 fast flashes	Ed		No drain	Drain solenoid valve/circuit malfunction	Check drain valve and drain connection	yes	humidification interrupted	ESC / Digital 29
5 slow flashes	CL		Tank maintenance request signal	b5 operating hours for recommended maintenance exceeded	Carry out maintenance on tank and transducers (cap. 9)	no	signal only	Reset hour counter (See Chap 5.6 or 6.8)
6 fast flashes	PU	-	External control signal not connected correctly	Cable interrupted/disconnected/not connected correctly.	Check the reference signal (4 to 20 mA or 2 to 10V).	yes	humidification interrupted	AUTO
2 slow flashes	H^		High humidity	The signal from the probe indicates humidity above 80%rH	Check humidity probe signal/cable	yes	humidification interrupted	AUTO
3 slow flashes	H_		Low humidity	The signal from the probe indicates humidity less than 20%rH	Check humidity probe signal/cable	yes	humidification interrupted	AUTO
4 slow flashes	EE		EEPROM alarm	Problems in the EEPROM	If the problem persists, contact the CAREL service centre	yes	humidification interrupted	If this persists contact service
1 fast flash	E0		Functional test not performed	Functional test not performed by manufacturer/EEPROM problems	If the problem persists, contact the CAREL service centre	yes	humidification interrupted	If this persists contact service
7 slow flashes	OFL		Master Offline	Loss of connection from the serial master (If D37=1)	Check state of the Master / Cable	yes	humidification interrupted	AUTO
8 fast flash	EL		Water level alarm	Level too high during atomised water production due to: • fill SV leak • transducer malfunction • fan malfunction	Check: • fill SV • transducers • fans	yes	humidification interrupted	AUTO
6 slow flashes	ES1 ES2 ES3		Alarm on slave unit 1/2/3	Display slave 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. The logic of the alarm relay on the slave unit must be NC, settable by parameter b0	no	signal only	AUTO

Tab. 8.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

### 1.1 Troubleshooting

 Note: if the problem identified cannot be solved using the following guide, contact ultra pure technical support. 800 729-5192

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

Problem	Cause	Check	Solution	
No Mist production	Power supply	Terminal M14 open	Visual verify	Jumper M14
		No power	Measure the voltage at the humidifier input terminals of the transformer	Connect power
		Power supply fault	Measure the voltage at the power supply output terminals	Replace the power supply
The quantity of mist is too low	Feedwater system	Valve closed upstream	Check	Open the valve
	Power supply	Low power supply voltage	Check the voltage at the power supply output terminals	Replace the power supply, if damaged
	Feedwater system	Water level during production is too high and overflowing	Check visually	See table 2)
No mist production	Other	The humidifier is not installed horizontally	Check visually	Adjust
	Dust and foreign matter accumulated in the tank (*)			Clean the inside of the tank
The quantity of mist is too low	Transducer deterioration		Verify the d6 >0 parameter	Repalce if d6=0
	Scale build-up on the surface of the piezoelectric transducers (*)		Check a view the inside of the tank	Clean the inside of the tank and replace the transducers

Tab. 8.b

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

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

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

Tab. 8.c

## 9. MAINTENANCE AND SPARE PARTS

### 9.1 Spare parts

Table of water circuit, electrical and electronic spare part numbers

	part number	pos.	fig.
<b>Water circuit</b>			
Fill solenoid valve kit	UP_P_0558	F	9.a
Drain solenoid valve kit	UP_P_0559	E	9.a
<b>Water circuit (UP02)</b>			
Tank complete	UP_P_0560_1	B	9.a
Cover with fan and level sensor	UP_P_0561_1	L	9.a
<b>Water circuit (UP02)</b>			
Tank complete	UP_P_0562_2	B	9.a
Cover with fan and level sensor	UP_P_0563_2	L	9.a
<b>Electrical and electronic parts</b>			
Main electronic board	UP_P_0560	D	9.a
Main board + auxiliary card	UP_P_0561	D + H	9.a
Driver	UP_P_0562		
Transducer TDK	UP_P_0563		
<b>Electrical parts - (UP02)</b>			
Power transformer: 115-24V	UP_P_0564	A	9.a
Power transformer: 115-50V	UP_P_0565	A	9.a
Cable Kit UU01F	UP_P_0566	G	9.a
Cable Kit UU01G	UP_P_0567	G	9.a

Tab. 9.a

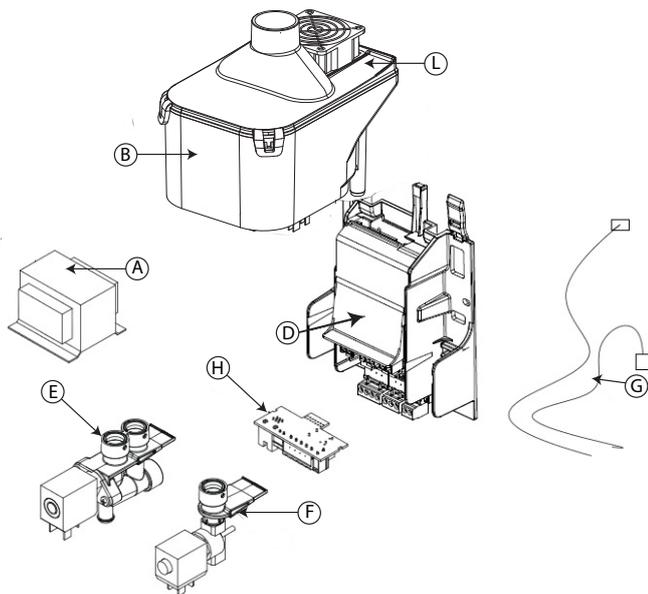


Fig. 9.a

### 9.2 Tank cleaning and maintenance

#### Replacement

**!** Important: replacement must only be carried out by qualified personnel, with the humidifier disconnected from the power supply. In normal conditions, the tank requires maintenance after one year (or 1500/5000 operating hours respectively with mains/demineralised water), or if not used for an extended period. Replacement is required immediately – even before the scheduled period – should problems occur (for example, when scale inside the tank prevents correct operation of the piezoelectric transducers).

#### Replacement procedure:

- switch the humidifier off (switch “0”), and open the mains disconnect switch (safety procedure);
- disconnect the transducer power cable;
- release the tank (the two tabs at the rear) and lift it vertically to remove it;
- clean or replace the transducers by removing the screws, see Fig. 9.b (after replacement test water-tightness by filling the tank manually)
- reconnect the transducer power cables;
- reposition the tank;
- switch the humidifier on.



Note: the tightening torque of the screws that fasten the transducer must be 0.2ft-lb-0.03ft-lb.

#### Periodical checks

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



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

### 9.3 Cleaning and maintenance of other components

- Ultra Pure humidifiers work best with DI water. Each transducer will operate approx. 10,000hrs proportionally. If RO or City water is used, transducers useful life is reduced proportionally
- When cleaning plastic parts do not use detergents/solvents;
- To replace the drivers and transducers, loosen the screws shown in the figure with a screwdriver. Before applying the new driver, spread on the back of the heat sink in contact with the tank, a layer of conductive paste. The lack of the conductive paste may cause malfunctions. To insert new transducers, observing the direction of insertion (please, pay attention to the print before removing the old one).



Note: the tightening torque of the screws that fasten the transducer must be 0.02ft-lb-0.03ft-lb.

#### Maintenance checks on other components:

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



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



Fig. 9.b

# 10. GENERAL FEATURES AND MODELS

## 10.4 Version 115V

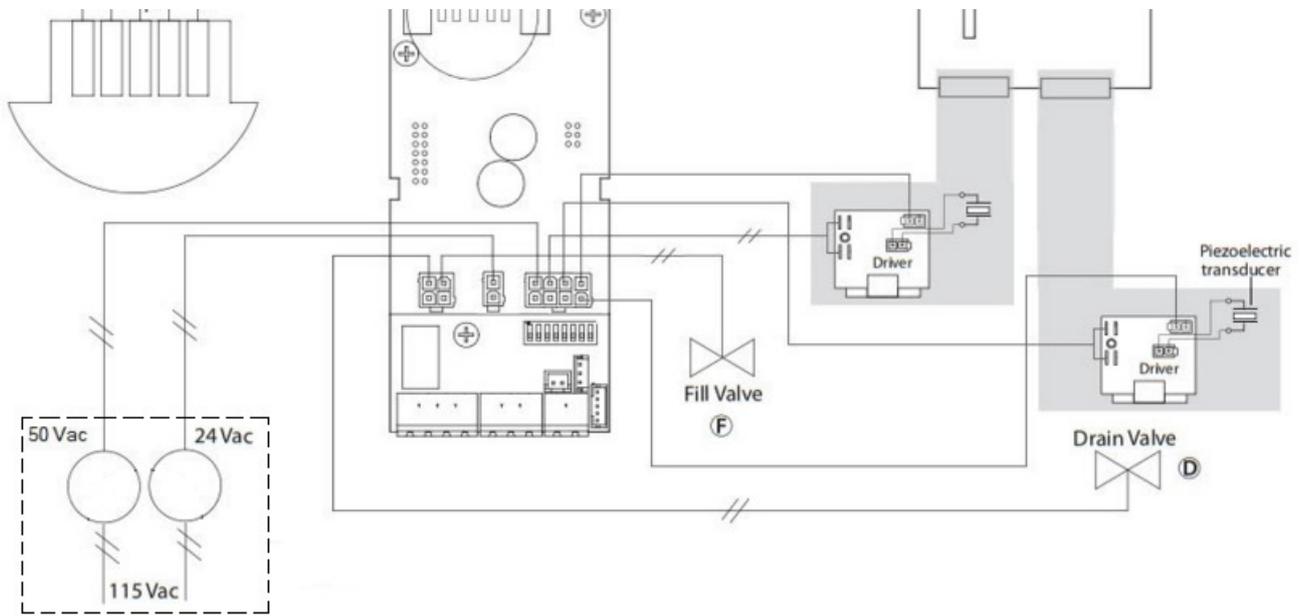


Fig. 10.c

## 11. GENERAL FEATURES AND MODELS

### 10.1 Ultrasound humidifier models for fan coils and electrical specifications

Electrical data (power supply voltages) of the various models, as well as their functional characteristics. Note that some models can be powered at different voltages, obviously with different current and humidity production values.

model	humidity production <sup>(2,4)</sup> (kg/h)	power <sup>(2)</sup> (W)	code	power supply		cable <sup>(3)</sup> (mm <sup>2</sup> )	wiring diagram (Fig.)
				voltage <sup>(1)</sup> (V - type)	current <sup>(2)</sup> (A)		
UP2.2	2.2pnd/hr	110	1	115 - 1~	1,2	1,5	10.b

Tab. 1.a

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

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

(3) recommended values, referring to PVC or rubber cable in a closed conduit, 20 m (65.6 ft) long; compliance with standards in force is always required;

(4) max instant rated water vapor production: average water vapor production may depend on external factors, such as: room temperature, water quality, water vapor distribution system.



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

### 10.2 Technical specifications

Technical specifications	UU models
	UU01*
humidity outlet	
connection dia. mm	40 (ensure an outlet area of 1100 mm <sup>2</sup> , e.g. 22 x 8 mm holes)
supply water	
connection	G 1/8" F
temperature limits °C (°F)	1...40 (33.8...104)
pressure limits (MPa)	0,1...0,4 (1...4 bar)
specific conductivity at 20°C	0...50 µS/cm
total hardness	0...25 mg/l CaCO <sub>3</sub>
temporary hardness	0...15 mg/l CaCO <sub>3</sub>
total quantity of dissolved solids (cR)	depending on specific conductivity <sup>(1)</sup>
dry residue at 180°C	depending on specific conductivity <sup>(1)</sup>
iron + manganese chlorides	G 1/8" F 1...40 (33.8...104)
silicon dioxide	0,1...0,6 (1...6 bar)
chlorine ions	0...50 µS/cm
calcium sulphate	0...25 mg/l CaCO <sub>3</sub>
instant flow-rate (l/min)	0...15 mg/l CaCO <sub>3</sub>
drain water	
connection dia. mm (")	10 mm
typical temperature °C (°F)	
instant flow-rate (l/min)	7
environmental conditions	
ambient operating temperature °C (°F)	1...45 (33.8...113)
ambient operating humidity (% rH)	10...80
storage temperature °C (°F)	-10...60 (14...140)
storage humidity (% rH)	5 to 95 (41 to 203)
index of protection	IP00
electronic controller	
auxiliary voltage/frequency (V- Hz)	24 V / 50-60 Hz
maximum auxiliary power (VA)	3
control signal inputs (general features)	can be selected for the following signals: 0 to 10 Vdc, 2 to 10 Vdc, 0 to 20 mA, 4 to 20 mA, input impedance: 20 kΩ with signals: 0 to 10 Vdc, 2 to 10 Vdc 100 Ω with signals: 0 to 20 mA, 4 to 20 mA
alarm relay outputs (general features)	24 V (max 3 W)
remote enabling signal input (general features)	voltage-free contact; max. resistance 100 Ω; Vmax= 5 Vdc; Imax= 5 mA
power	
instant water vapour production <sup>(2)</sup> kg/h (lb/h)	see Tab. 11.a
power consumption at rated voltage (W)	see Tab. 11.a

Tab. 1.b

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

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

## 12. HUMIDIFIER CONTROL VIA NETWORK

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

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

- Address 1
- Baud rate 19200 bps
- Frame 8,N,2

### 12.1 Supervisor variable list

"A"			
ULTRA PURE-Modbus®		analogue variables* (Modbus®: REGISTERS)	R/W
1		param. d0: Th probe temperature reading	R
2		param. d1: Th probe humidity reading	R
3		param. d2: Probe reading	R
4		param. d5: Instant production	R

"I"			
ULTRA PURE	Modbus®	integer variables (Modbus®: REGISTERS)	R/W
1	128	Level access password	R/W
2	129	Firmware release	R
15	142	Alarms, refer to Chap.8 ALARMS: <ul style="list-style-type: none"> <li>• bit0: Alarm E0</li> <li>• bit1: Alarm Et</li> <li>• bit2: Alarm EF</li> <li>• bit3: Alarm Ed</li> <li>• bit4: Alarm EP</li> <li>• bit5: Alarm PU</li> <li>• bit6: Alarm H<sub>1</sub></li> <li>• bit7: Alarm H<sub>2</sub></li> <li>• bit8: Alarm EE</li> <li>• bit9: Alarm CL</li> </ul>	R/W
20	147	Parameter A0: Operating mode	R/W
21	148	Parameter A2: Type of external probe	R/W
22	149	Parameter A3: Probe minimum	R/W
23	150	Parameter A4: Probe maximum	R/W
24	151	Parameter A5: Probe offset	R/W
25	152	Parameter A6: Fan off delay time	R/W
26	153	Parameter A7: Fan speed	R/W
27	154	Parameter A8: Maximum evaporation time for no production alarm	R/W
28	155	Parameter A9: Minimum evaporation time for no production alarm	R/W
29	156	Parameter b0: Operating options	R/W
30	157	Parameter b1: Time between two washing cycles	R/W
31	158	Parameter b2: Inactivity time for washing on next start	R/W
32	159	Parameter b3: Washing time (fill + drain)	R/W
33	160	Parameter b4: Start delay time	R/W
34	161	Parameter b5: Operating hours for CL alarm	R/W
35	162	Parameter b6: Time to display new CL alarm in minutes	R/W
36	163	Parameter b7: Transducer On/Off control interval	R/W
37	164	Parameter b8: Probe delay disconnected	R/W
38	165	Parameter b9 TAM OFF delay	R/W
39	166	Parameter bA: Maximum fill time	R/W
40	167	Parameter bb: Refill time in evaporation	R/W
41	168	Parameter bC: Maximum drain time	R/W
42	169	Parameter bd: Drain opening time to completely empty tank	R/W
43	170	Parameter bE: Delay time after measuring low level for refilling	R/W
44	171	Parameter C0: Default display (Terminal)	R/W
45	172	Parameter C1: Parameter A0: Baud rate	R/W
46	173	Parameter C2: tLAN address (If 0 Master controller)	R/W
47	174	Parameter C3: Serial address	R/W
48	175	Parameter P0: Maximum flow-rate	R/W
49	176	Parameter P1: Humidity control hysteresis	R/W
50	177	Parameter P2: Low humidity alarm threshold	R/W
51	178	Parameter P3: High humidity alarm threshold	R/W
52	179	Parameter SP: Humidity set point	R/W
53	180	Parameter d3: Operating hour counter	R
54	181	Parameter d4: Unit hour counter (not resettable)	R/W
60	187	Request via serial (if digital 37 set)	R/W
62	189	Identification of variable on slave unit to read/write from supervisor (see paragraph 14.4)	R/W
63	190	Value of variable on slave unit identified by integer 62 (see paragraph 14.4)	R/W
65	192	Parameter C4: Timeout for master serial offline	R/W
69	196	AA: Waiting time for retry	R/W
70	197	Ab: Percentage of A8 for carrying out level test	R/W

"I"			
ULTRA PURE	Modbus®	integer variables (Modbus®: REGISTERS)	R/W
72	199	bF: Drain activation delay in standby	R/W
73	200	AC: Maximum time to measure level when refilling	R/W
74	201	Ad: Maximum time to measure high level	R/W
82	209	AE: Restart fan time in standby for integrated probe reading	R

Tab. 12.b

"D"			
ULTRA PURE - Modbus®		digital variables (Modbus®: COILS)	R/W
2		Just started flag	R
3		Humidifier ready to produce	R
4		Humidity set point reached	R
5		Green LED	R
6		Red LED	R
7		Yellow LED	R
8		Remote On/Off	R
9		Low level	R
10		High level	R
11		Aux level	R
12		Autotest completed	R
14		BMS serial in tLAN mode	R
15		TAM enabled	R
16		TAM reading	R
17		Terminal connected	R
18		Production in progress	R
19		Fill	R
20		Drain	R
21		Transducer 1	R
22		Transducer 2	R
23		Fan	R
24		Alarm relay	R
25		Auxiliary relay	R
26		Manual drain	R/W
27		Disable from serial	R/W
28		Reset hour counter	R/W
29		Reset alarms	R/W
30		Washing due to inactivity activated	R
31		Functional test performed	R
33		Unit of measure	R/W
34		Slave 1 online	R
35		Slave 2 online	R
36		Slave 3 online	R
37		Enable control from serial	R/W
38		Wash activation from serial	R/W
40		Slave 1 disabled	R
41		Slave 2 disabled	R
42		Slave 3 disabled	R

Tab. 12.c

## 12.2 Production control via network

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

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

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

To manage the production level in percentual mode:

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

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

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

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

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

If D27 = 1 the humidifier is disabled and production stops  
 if D27 = 0 the humidifier is enabled and production is activated.  
 D27 is independent from the state of D37.

## 12.3 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.

## 13. OPERATING PRINCIPLES

### 13.1 Ultrasonic atomisation

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

### 13.2 Control principles

The humidifier can be controlled using the following signals:

- remote ON/OFF;
- TAM (set by dipswitch);
- Humidity probe (set by dipswitch);
- 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 water vapour if the remote ON/OFF contact is also closed;
- contact open: water vapour production ends.

#### Proportional control (only with auxiliar card)

- Water vapor 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 10 Vdc, 2 to 10 Vdc, 0 to 20 mA, 4 to 20 mA
- Maximum humidifier production, corresponding to the maximum value of the external signal, can be set from 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 5% of the proportional band of external signal "Y").

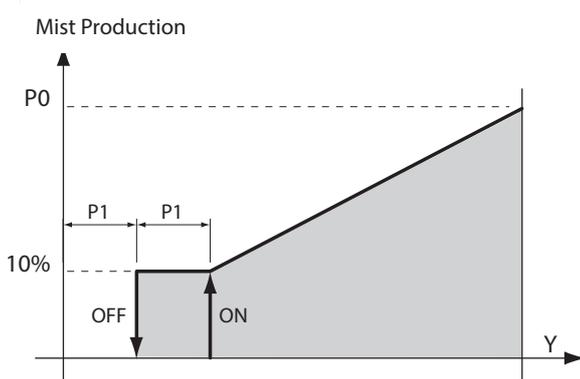


Fig. 13.a

#### Automatic control with humidity probe

Humidity production is controlled based on the reading of the relative humidity probe (TH or connection via optional card). The humidifier will produce until reaching the set point (St, default 50 %rH), with a settable activation hysteresis (P1 default 5%) (see the figure) to maintain the set point.

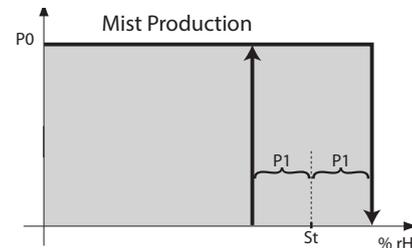


Fig. 1.a

### 13.3 Flow-rate modulation

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).

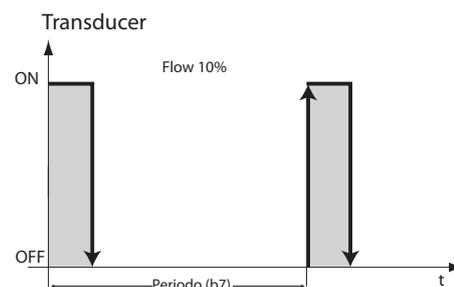


Fig. 13.b

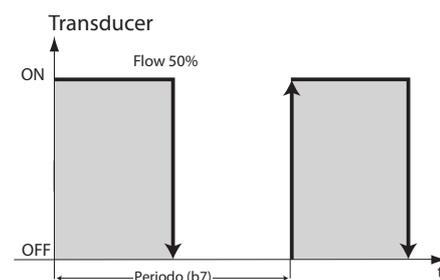


Fig. 13.c

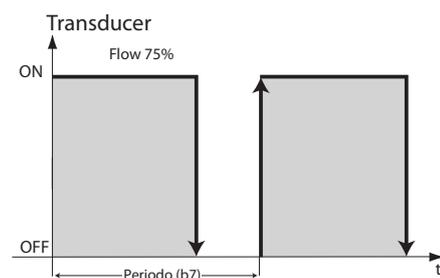


Fig. 13.d

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

### 13.4 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. 13.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. 13.d)

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

### 13.5 Automatic insufficient supply water management

The humidifier detects if the water supply is interrupted (or insufficient) by monitoring the status of the level sensor after opening the fill solenoid valve. If the sensor is not activated within the time set for parameter bA (default 15 minutes), humidification is interrupted, the drain is activated and humidifier waits a set number of minutes (parameter AA, default 10), during which the display shows “Rty” (Retry), before attempting to fill with water again.. If this attempt succeeds, production will resume, otherwise the appliance waits a further AA minutes. The process is repeated until the water 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 water supply is available again.

### 13.6 Automatic control of atomised water production

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

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

If after the set time for variable A8 (in minutes, default 30) the water level does not fall below the low level threshold, atomised water production stops and humidifier waits a set number of minutes (parameter AA, default 10), during which the display shows “Rty” (Retry), before attempting to resume production. If the situation is repeated, alarm EP is activated, which shuts down the unit.

If after a percentage of A8, set by parameter Ab (default 70%) the water is above the high level threshold, atomised water production stops, warning EL is generated and the appliance waits AA minutes (default 10), during which 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.

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

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

### 13.8 Automatic protection of the piezoelectric transducers

The piezoelectric transducers will, by nature, be rapidly damaged and eventually break if operated without water. To prevent this from happening, the control board makes sure, via the level sensor, that even in the event of anomalies the transducers are never activated when no water is present. When starting with the tank empty, the transducers are only activated when the low level is measured. When refilling during operation, i.e. after the water level has fallen below the minimum as a result of consumption due to atomisation, with consequent activation of the fill solenoid 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.

## 14. NETWORK CONNECTION

### 14.1 Settings

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

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

### 14.2 Control logic

The Master unit controls each connected Slave unit via the following parameters:

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

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

Ex.1: Master configured for proportional control (see chap. “Electrical connections”) and request at 90%: the Master and each Slave will modulate at 90% capacity (see chap. “Operating principles”).

Ex.2: Master configured for control by room probe, set point 50 %rH: when reaching the set point, the Master and all the Slaves will stop atomised water production.

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

### 14.3 Management of Slaves from terminal (Master)

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

The symbol 1 means “unit online”, while the symbol 7 means “unit offline”. Fig.1 shows an example of Unit 1 online (left digit 1) while Unit 2 and 3 offline (central and right digit 7).

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

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

- Percentage request sent to the Master (Fig.3).
- Operating hour counter (Fig.4), resettable pressing UP+DOWN for 5 seconds (see “parameter d3”).
- Unit alarms (Fig.5, -- means no alarms are present), resettable pressing UP+DOWN for 5 seconds.
- Access parameter configuration menu (Fig.6).

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

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

For the meaning of the parameters see Configuration parameters.

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

#### Alarms

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

For details of the current alarm access the menu for the slave in question. Each unit is independent in managing its own alarms, except for those relating to the control signals connected to the Master, which affect the entire network of humidifiers (see Tab.14.a).

### 14.4 Control via supervisor (Ultra Pure Modbus®)

Supervisor variables I62 and I63 (Modbus® 189 and 190) can be used to display and set the slave parameters. Variable I62 (Modbus 189) must be written as shown in Tab. 14.b.

To read the variable, the value will be saved for variable I63 (Modbus 190) after writing I62, while to write the variable, the value written will then be available for variable I63.

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

- Write I63 to 70
- Write I62 to 50224 (see the example in Tab. 14.b).



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6



Fig. 7



Fig. 8

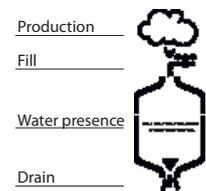


Fig. 9

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

Tab. 14.d

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

Tab. 14.e

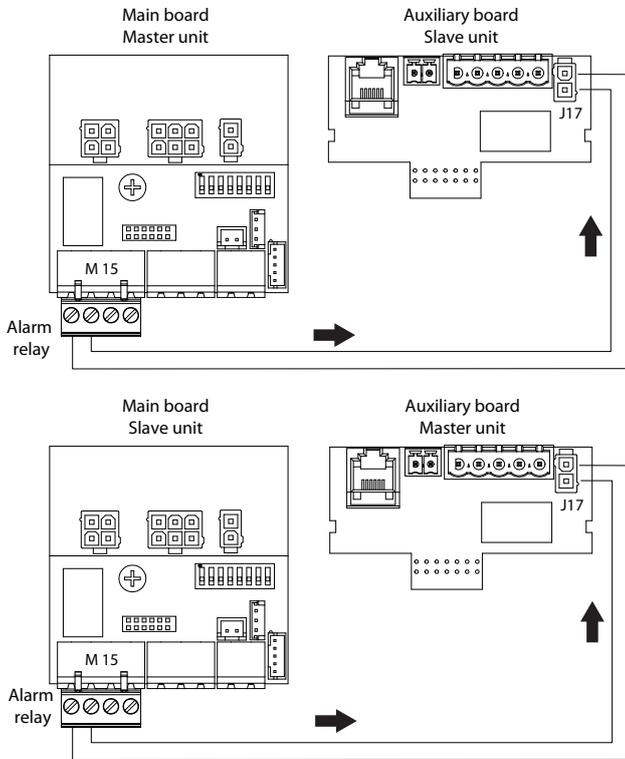
Example:

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

## 14.6 Slave unit acting as backup for the Master unit

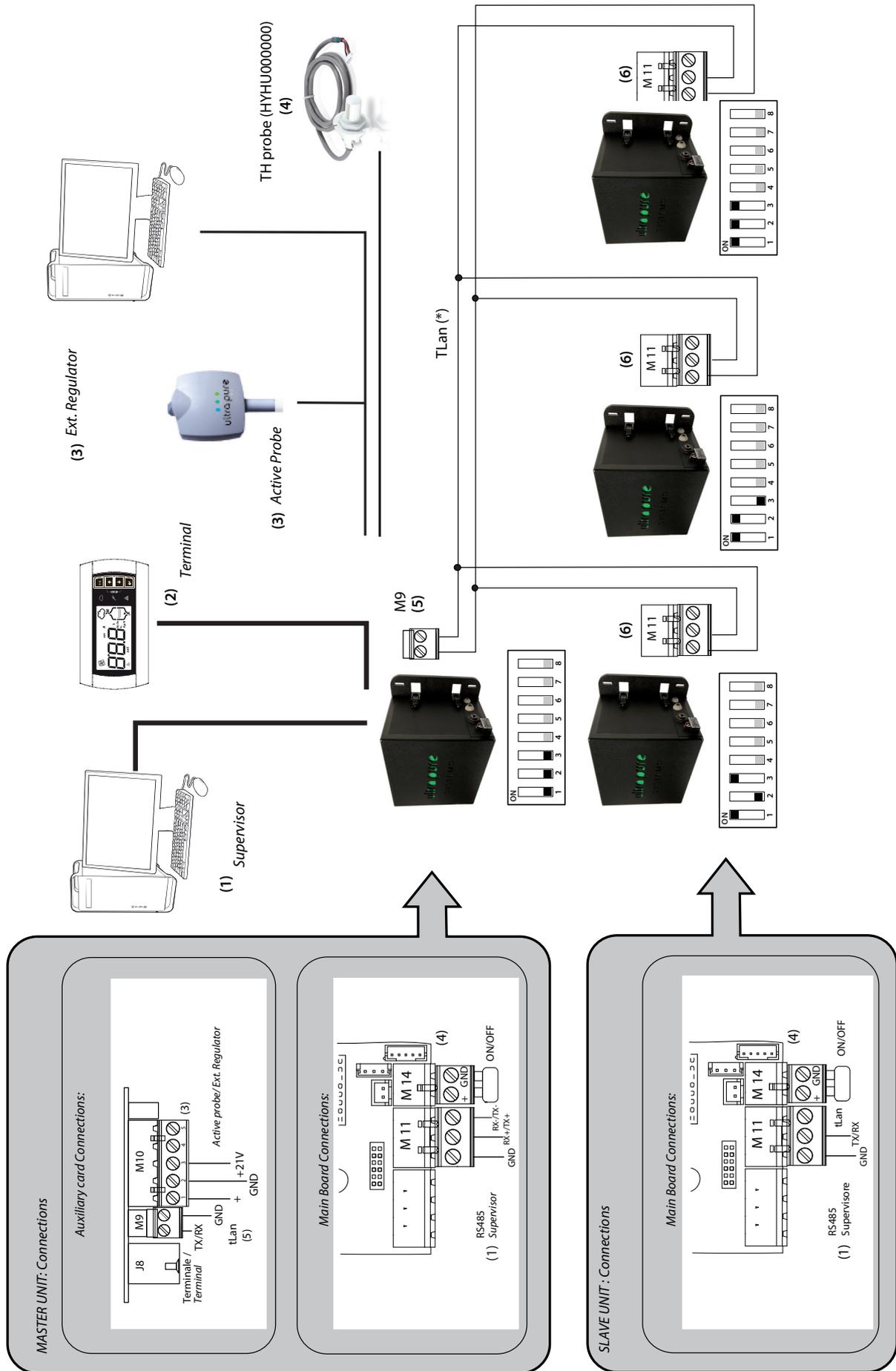
For “mission critical” applications in which service continuity must be guaranteed, a humiSonic slave can be set as backup for the humiSonic master (main unit). The backup unit will be activated only if the main unit shuts down (due to an alarm), operating based on the request signal sent to the Master. From a wiring point of view, this function uses the network connection as described in the previous paragraphs, in addition to the following:

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



- parameter b0 configured suitably (see chap. “Configuration parameters” Tab. 7.c) both on the master (main) and slave (backup), so as to:
  1. enable the backup function on both;
  2. activate the alarm relay for active alarms on both;
  3. set NO logic for the alarm relay on the master and NC logic for the alarm relay on the slave.

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





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