

ULTRASONIC HUMIDIFICATION



- NOTICE -

This manual is prepared for the use of trained Service Technicians and should not be used by those not properly qualified.

The information presented in this document is only valid for standard Counter Configurations and not intended to be all encompassing. The specifications for custom configurations may differ.

Technical data and specifications are subject to amendment without prior notice.

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Detailed description

Ultrasonic Humidification

Ultrasound technology used for ultrasonic humidifiers feature a small water storage tank and piezoelectric transducers installed at the bottom of the tank.

The surface of the transducer vibrates at a very high speed (1,65 million times a second), a speed that does not allow water to move, due to its inertial mass.

Principally due to an effect known as; “cavitation”, the water is atomized into fine droplets and is instantly absorbed by the air flow.

Adiabatic humidification ensures spontaneous evaporation of microscopic droplets of water in the surrounding air.

The change in state absorbs energy from the air, which is therefore cooled.

Reliability of this technology

The piezoelectric transducers used in the HumiSonic are guaranteed for 10,000 hours of continuous operation, only if used with demineralized water.

This characteristic means extremely low maintenance, making Ultrasonic Humidification a reliable solution that is suitable for the critical applications, as being used in a food counter.

The installation of HumiSonic on food counter such as the Custom Counter is the ideal solution for food storage, in particular confectionery, chocolates, fruit, vegetables and fresh food in general.

Hygiene is guaranteed by complete air recirculation and the frequent washing cycles run automatically by Ultrasonic Humidification.

Ultrasonic atomization

Ultrasonic humidifiers atomize water through propagation of a wave generated by a piezoelectric element to the surface of the water.

Droplets of water are formed on the surface, from which the smaller ones are being carried by air through the forced air flow. The quantity of atomized water depends on water level, water temperature and distribution in the air.

Water level is kept constant using fill and drain valves, and a level sensor.

De-mineralized water is mandatory: if using mains water, the scale that accumulates over time will foul the piezoelectric transducer, affecting atomization. This will strongly decrease the lifetime of the elements.

To avoid excessive scaling, humidifier periodically drains and automatically refills the water (periodical washing).

Detailed description

ON/OFF control

The action is all or nothing, activated by an external contact which 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 vapor if the remote ON / OFF contact is also closed (jumper placed on M14);
- contact open: water vapor production ends.

Flow-rate modulation

Atomized 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).

Automatic insufficient supply water management

The humidifier detects if the water supply is interrupted (or insufficient by monitoring the status of the level sensor after opening the fill solenoid valve.

If the sensor is not activated within the time set for parameter bA (default 15 minutes), humidification is interrupted, the drain is activated and the appliance waits a set number of minutes (parameter AA, default 10), during which the display shows "Rty" (Retry), before attempting to fill with water again.

If this attempt succeeds, production will resume, otherwise the appliance waits a further 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.

Detailed description

Automatic control of atomised water production

The humidifier monitors the water level inside the tank during production of atomized 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, atomized water production stops and the appliance 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, atomized 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.

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

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

In this case, the controller carries out the following operations:

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

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

Detailed description

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 atomization, 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 6A minutes have elapsed since the water fill cycle started.

If the level is replenished correctly, the piezoelectric transducers are immediately restarted.

Start operating

First time the unit is turned on, connected to water and electricity, the small tank will start to fill which will be shown on the display.

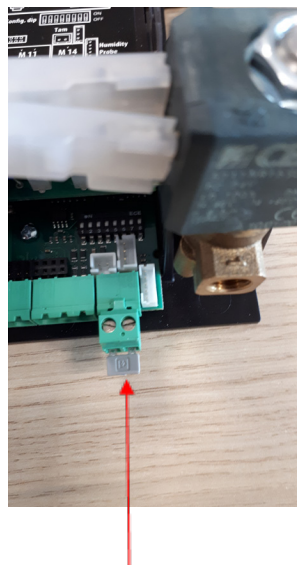
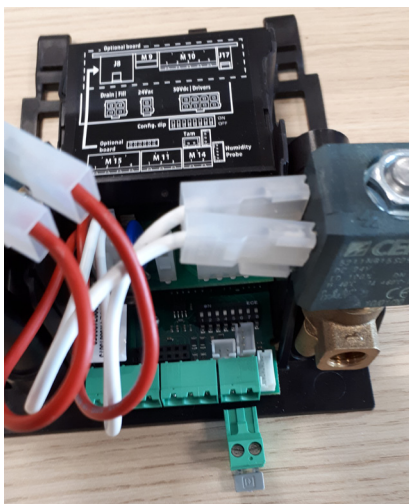


Also the message Atx will be visible.

If the tank is not filled within the specified time, the message Rty is shown, indicating the unit is retrying the filling cycles.

Please take care of the right diameter of the filling tube.

Basic functions



Jumper on M14

Reset tank hour counter

The humidifier is fitted with an hour counter that records operation. After a set number of hours (1500), the maintenance signal is activated to indicate maintenance should be performed on the tank and operation of the piezoelectric elements checked (see “maintenance and “Alarms table”).

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

- Switch the humidifier off
- Wait for the tank to empty completely
- Close the water supply tap
- Remove the tank, making sure to disconnect the piezoelectric element power supply
- Open the On/Off contact by removing Jumper from M14
- Switch the humidifier on WITHOUT THE TANK. The yellow LED will flash
- Close the On/Off contact, by replacing the jumper on M14, the yellow LED will remain on steady
- Switch the humidifier off
- Reposition the piezoelectric element connector, replace the tank and open the water supply tap
- Switch the humidifier on

Basic functions

Automatic washing

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

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

Washing due to inactivity

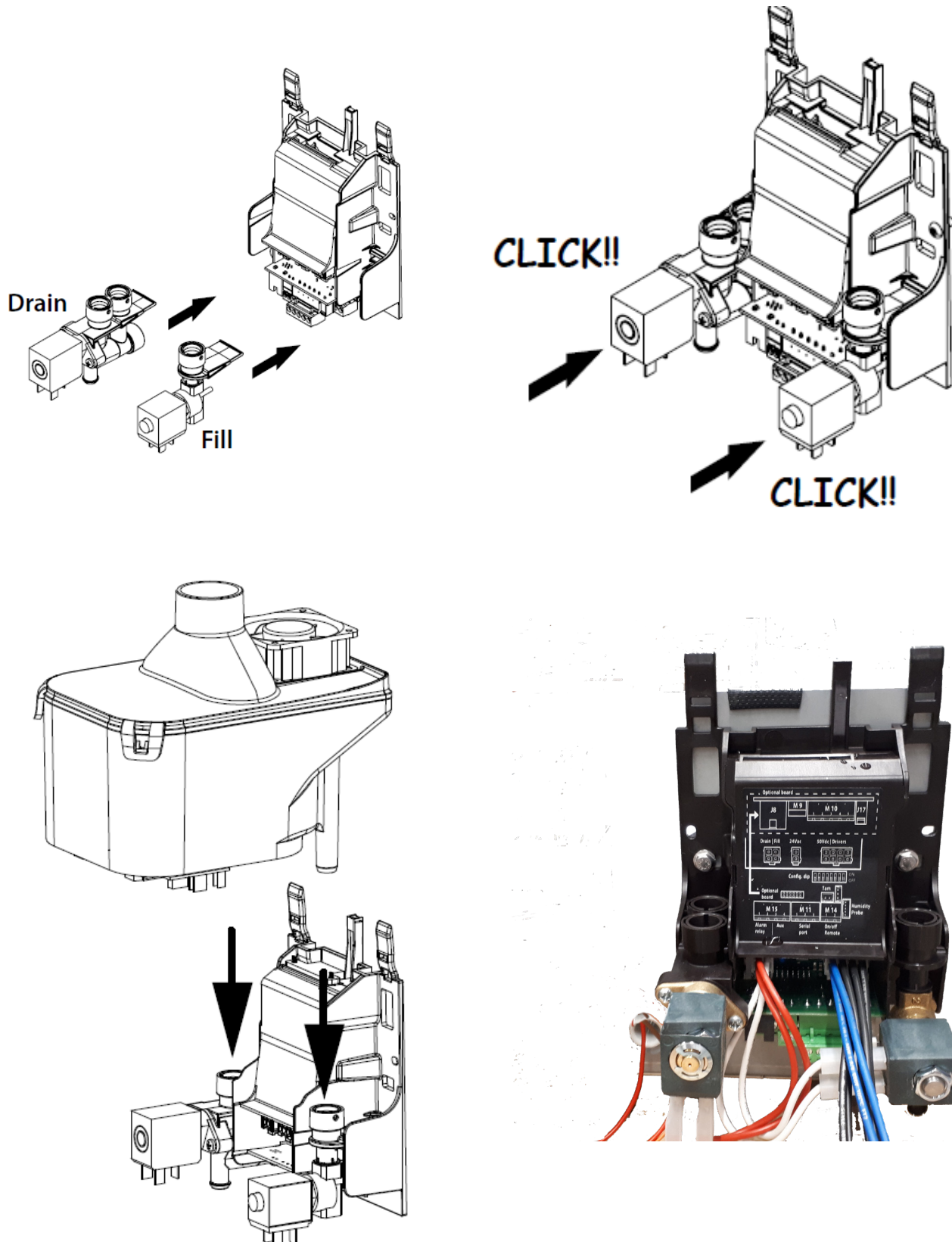
If the humidifier remains inactive (on but in standby) for an extended period (parameter b2, default 24 hours) a washing cycle is performed, as described in the previous paragraph.

This cleans the tank of any residues (e.g. dust that may have accumulated during the period of inactivity).

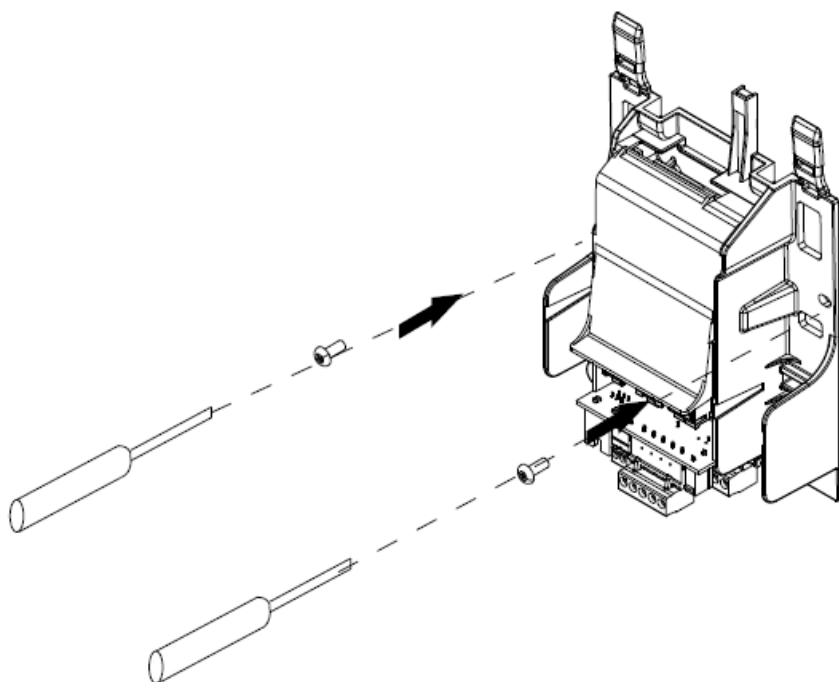
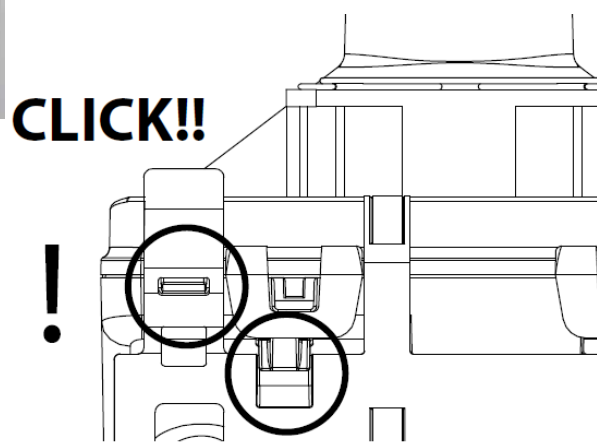
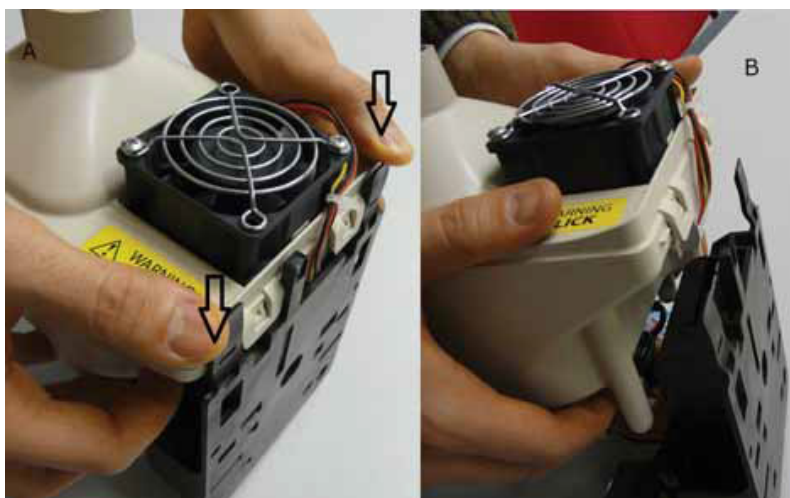
Parameter b0 can be used to set the time when this washing cycle is performed. By default, the washing cycle is run after 24 hours continuous of no operation, i.e. the humidifier is in standby.

This is because the humidifier is normally connected to a reverse osmosis system, which needs to operate frequently in order to avoid malfunctions. B0 can be set so that the washing cycle is performed when first restarting after a period of continuous inactivity set by b2.

Replacing Assembly



Replacing Assembly



Water connections

Supply water

The ultrasound humidifier works best on demineralized water.
Using mains 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 Technical specifications.

In the case of use of mains water, it is possible a reduction in the production of moisture, as declared in the Technical specifications due to salts and impurities, is present.



Operating conditions:

- Demineralized water with the characteristics indicated in the Technical specifications supply water ;
- Pressure between 0.1 and 0.4 MPa (14.5 and 58 PSI , temperature between 1 and 40 °C (33.8 and 104 °F , G1 8 F connection (see 'Technical specifications'));
- No organic compounds.



Important:

- Do not add disinfectants or anti corrosive 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 bacteriologic ally contaminated water is prohibited.

Drain water

This is not toxic and can be drained into the sewerage system.
(Council Directive 91/271/EEC on Urban Waste Treatment).

Alarm messages

LED signals

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






	LED Green
Steady	Atomization in progress
Flashing slowly*	Unit disabled
Flashing slowly and dimmed	Set point reached
Flashing quickly*	Transitory status with atomization temporarily paused (e.g. auto test, washing)

*Flashing slowly: 1s ON and 1s OFF, Flashing quickly: 0.2s ON and 0.2s OFF

The red LED means an alarm is active. See next page for detailed information on alarms.

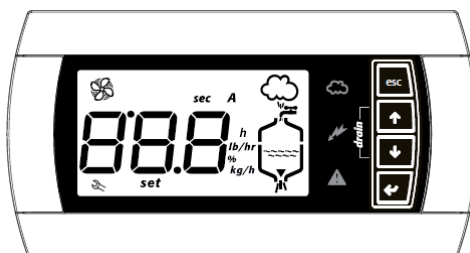
To reset the alarms, press ESC once to mute the buzzer, press ESC a second time to completely reset the alarm.

Alarm messages










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.	no	signal only	AUTO

red LED signal (*)	code and symbol on display (flashing)	meaning	cause	solution	alarm relay activation	action	reset
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 5.8)




Symbols on Terminal




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. 8)
sec	Time in seconds
h	Hour counter
%	Humidity production as a percentage of rated capacity
set	Parameter setup
	Maintenance request (active alarm)
	On steady: humidifier fan operating. Flashing: fan on during deactivation phase
888	3 digits, after 999 the display shows to indicated the 1000s (the three digits are displayed with a dot at the top between the first and second digit).
	Humidity production in progress
	Tank filling
	Water in the tank
	Water draining from the tank (also shown when the unit is in standby as the drain valve is normally open)

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)

Parameter settings

Doc. nr. 9124488	Rev. -	Registration form. Carel Ultrasonic Humidification UL	
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(CC FreshCold 208V)	

Note: ... for inserting parameters and only change **yellow arced parameters** manually!

A0	Operating mode (3 = auto mode)	3	-
A1	Unit of measure (1 = Fahrenheit)	1	-
A5	Probe offset	0	%rH
A6	Fan off delay time	0	min
A7	Fan speed	100	%
A8	Max. evaporation time for ... alarm	30	min
A9	Min. evaporation time for ... alarm	1	min
AA	Waiting time for retry	10	min
Ab	Percentage of A8 to carry out level test	70	%
AC	Max. time to measure level when refilling	10	s
Ad	Max. time to measure high level	10	s
AE	Restart fan time in standby ...	10	min
AF	Piezoelectric transducer working life	9999	h
b0	Operating options	3	-
b1	Time between two washing cycles	60	min/h
b2	Inactivity time for washing	24	h
b3	Washing time (fill + drain)	1	min
b4	Start delay time	10	s
b5	Operating hours for CL alarm	5000	h
b6	Time to display new CL alarm ...	60	min
b7	Transducer modulating control period	1	s
b8	Probe disconnected delay	10	s
b9	OFF delay from TAM	2	s
bA	Maximum fill time	2	min
bb	Water refill time in production	5	s
bC	Maximum drain time	60	s
bd	Opening time to completely empty tank	30	s

bE	Delay time after measuring low level ...	10	s
bF	Drain activation delay in standby	0	min
bH	Enable probe TH as humidity limit	0	-
bL	Proportional band for humidity limit	10	%rH
bP	Proportional band for control with probe	10	%rH
C0	Default display (1 = Hour counter)	1	-
C1	...	2	-
C2	...	0	-
C3	...	1	-
C4	...	30	-
P0	Maximum production	100	%
P1	Proportional control hysteresis ...	2	%
P2	Low humidity alarm threshold	20	%rH
P3	High humidity alarm threshold	80	%rH
Pn	Minimum production	10	%
SL	Humidity limit set point	70	%rH
SP	Humidity set point	50	%rH
d0	...	0.0	-
d1	...	0.0	-
d2	...	0.0	-
d3	...	1	-
d4	...	1	-
d5	...	100	-
d6	...	999	-
d7	...	0	-

Configuration parameters

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 = 0-10V; 2 = 2-10V; 3 = 0-20 mA; 4 = 4-20 mA)	-	0...4	1	
P0 Maximum production	%	Pn...100	100	
P1 Proportional control hysteresis for mode A0=1	%	2...20	2	
Pn Produzione minima	%	5...P0	10	
SP Humidity set point	%rH	20...95	50	only if terminal connected, otherwise values set by dipswitch
SL Humidity limit set point	%rH	0...100	70	
bP Proportional band for control with probe	%rH	2...20	10	
bL Proportional band for humidity limit	%rH	2...20	10	
C0 Default display (Terminal) 0 = Probe reading/control signal; 1 = Hour counter	-	0...1	0	

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 offdelay 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	
bH Enable probe TH as humidity limit	-	0...1	0	if enabled, applies to modes A0 = 0, 1, 2
bL Proportional band for humidity limit	%rH	2...20	10	
bP Proportional band for control with probe	%rH	2...20	10	
P1 Proportional control hysteresis for mode A0=1	%	2...20	2	
P2 Low humidity alarm threshold	%rH	0...100	20	
P3 High humidity alarm threshold	%rH	0...100	80	

(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.

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

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

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



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

Accessing parameters

Accessing and setting parameters

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

From the main screen press:

- ENTER for 2 seconds,
- Enter the password 77 using UP or DOWN,
- ENTER to confirm and access the list of parameters,
- UP or DOWN to scroll the list,
- ENTER to select a parameter (display: 'set' ,
- UP to modify (increase the value of the parameter.
To scroll faster press UP and DOWN together,
- DOWN to modify (decrease the value of the parameter.
To scroll faster press UP and DOWN 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.

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.

Reset hour counter from display

Tank hour counter

- Access parameter 'd3'
- 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'
- Press UP & DOWN for 5 seconds

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

Maintenance

Tank cleaning and maintenance Replacement



Important:

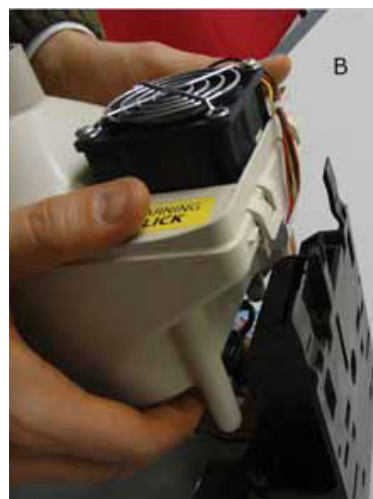
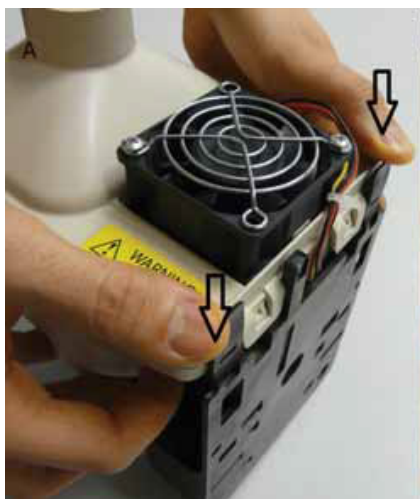
Replacement may only be carried out by qualified personnel, with the humidifier disconnected from the power supply.

In normal conditions, the tank requires maintenance after one year (r 1500 / 5000 operating hours respectively with mains / demineralized 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:

1. Switch the humidifier off (switch “0”), and open the mains disconnect switch (safety procedure);
2. Disconnect the transducer power cable;
3. Release the tank (the two tabs at the rear) and lift it vertically to remove it;
4. Clean or replace the transducers (See;”cleaning and maintenance of other components”) by removing the screws (after replacement test water-tightness by filling the tank manually)



5. Reconnect the transducer power cables;
6. Reposition the tank;
7. Switch the humidifier on.



Note:

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

Maintenance

Periodical checks

- Every year or no more than 1500/5000 operating hours respectively with mains / demineralized water;
- Clean the piezoelectric transducers;
- Make sure the level sensor slides freely;

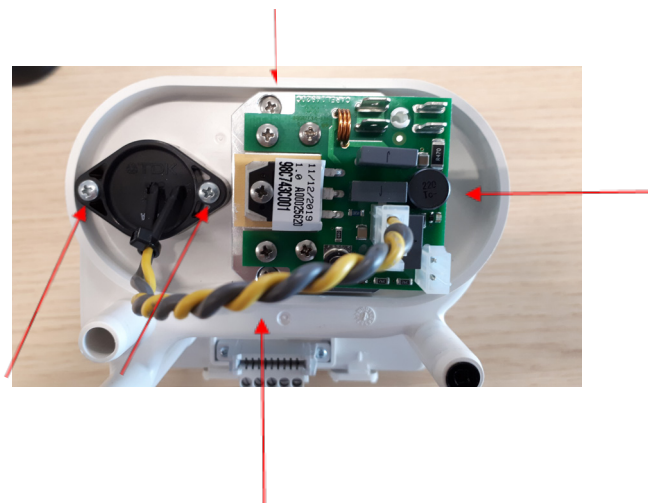
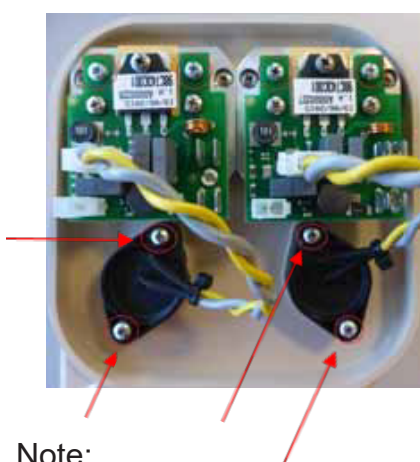


Important:

In the event of water leaks, disconnect the humidifier from the power supply and repair the leak.

Cleaning and maintenance of other components

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



Note:

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

Maintenance checks on other components:


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

Important:



After having replaced or checked the water circuit components, make sure the connections are restored correctly

Trouble Shooting

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

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

Problem	Cause		Check	Solution
No atomised water production	Power supply	Terminal M14 open	Visual verify	Connect terminal M14 to a bridge
		No power	Measure the voltage at the humidifier input terminals of the transformer	Connect power
		Power supply fault	Measure the voltage at the power supply output terminals	Replace the power supply
The quantity of atomised water is too low	Feedwater system	Valve closed upstream	Check	Open the valve
	Power supply	Low power supply voltage	Check the voltage at the power supply output terminals	Replace the power supply, if damaged
	Feedwater system	Water level during production is too high and overflowing	Check visually	See table 2)
	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		Verify the d6 >0 parameter	Replace if d6=0
The quantity of atomised water is too low	Dust and foreign matter accumulated in the tank (*)		Check a view the inside of the tank	
	Scale build-up on the surface of the piezoelectric transducers (*)			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 atomised water production	Feedwater system	Float level sensor fault	Empty the tank, remove the electronic board and check continuity of the level sensor	Contact service to replace the level sensor
		Float level sensor blocked		Clean the sensor. If normal operation is not restored, replace
		Fill valve fault	No water filled even when the tank has been emptied	Replace the valve Clean the sensor. If normal operation is not restored, replace
	Other	The fan cables are loose or detached	Check connection after removing the humidifier cover	Restore correct connection to the terminals
The quantity of atomised water is too low	Water level overflow	Float level sensor blocked	If the water level in the tank reaches the overflow pipe, remove the connector from the control board and check continuity of the level sensor	If there is continuity, contact service to replace the level sensor
		Fill valve fault	Water is filled even after switching off the appliance	Replace the fill valve

Technical specification

Humidity outlet	
connection dia. mm	40 (ensure an outlet area of 1100 mm ² , e.g. 22 x 8 mm holes)
Supply water	
connection	G 1/8" F
temperature limits °C (°F)	1...40 (3.8....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 ₃
temporary hardness	0...15 mg/l CaCO ₃
total quantity of dissolved solids (cR	depending on specific conductivity (1)
dry residue at 180°C	depending on specific conductivity (1)
iron + manganese	
chlorides	1...40 (33.8....104
silicon dioxide	0,1...0,6 (1...6 bar)
chlorine ions	0...50 µS/cm
calcium sulphate	0...25 mg / l CaCO ₃
instant flow-rate (l / min	
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

(1) in general $CR \leq 0,65 * \sigma R, 20\text{ }^{\circ}\text{C}$; $R180 \leq 0,93 * \sigma R, 20\text{ }^{\circ}\text{C}$

Technical specification

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 k Ω 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

Ultrasound humidifier electrical specifications

Type	humidity production (2; 4) (kg / h)	power(2) (W)	voltage (1 (V- type)	current (2) (A)	cable (3) (mm ²)
Min.	0,5	60	230-1~	0,75	1,5
Max.	1	110	230-1~	1,5	1,5

- (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.

Parts

Table of water circuit, electrical and electronic spare part numbers

	part number	pos.	fig.
Water circuit			
Fill solenoid valve kit	UUKFV00000	F	9.a
Drain solenoid valve kit	UUKDV00000	E	9.a
Water circuit (UU01F)			
Tank complete	UUKC200010	B	9.a
Cover with fan and level sensor	UUKCO00010	L	9.a
Water circuit (UU01G)			
Tank complete	UUKC400010	B	9.a
Cover with fan and level sensor	UUKCD00000	L	9.a
Electrical and electronic parts			
Main electronic board	UUF02S0010	D	9.a
Main board + auxiliary card	UUF02M0010	D + H	9.a
Driver	UUKDE00000		
Transducer TDK	UUKTP00000		
Electrical parts - (UU01%01 - UU01G%01)			
Power transformer: 230-24/50V	UUKTFD0010	A	9.a
Power transformer: 115-24V	UUKTF10000	A	9.a
Power transformer: 115-50V	UUKTF30010	A	9.a
Cable Kit UU01F	UUKWR00010	G	9.a
Cable Kit UU01G	UUKWR10010	G	9.a

Tab. 9.a

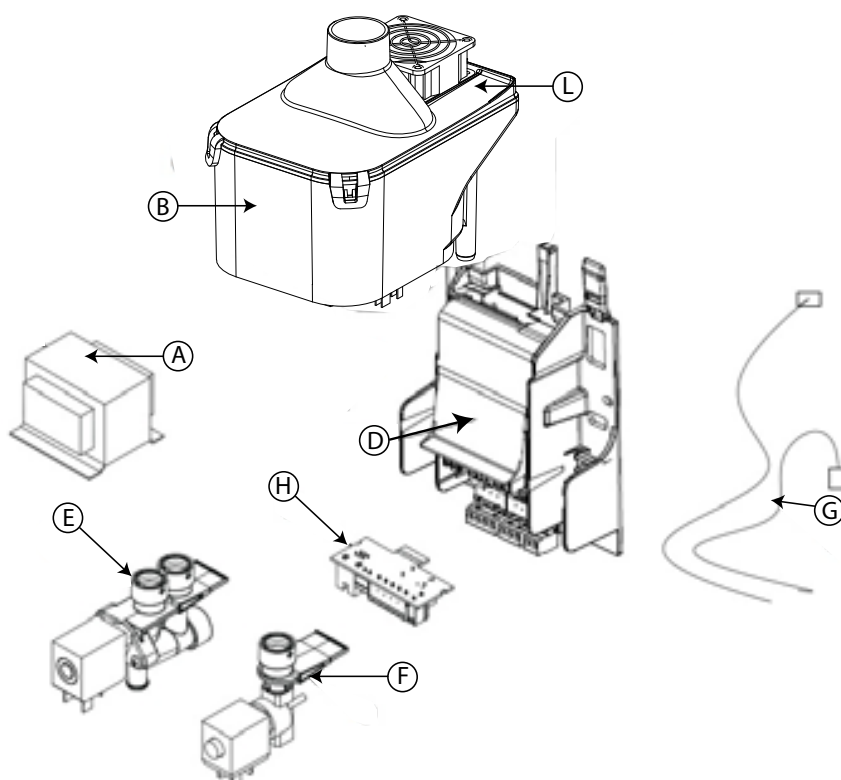
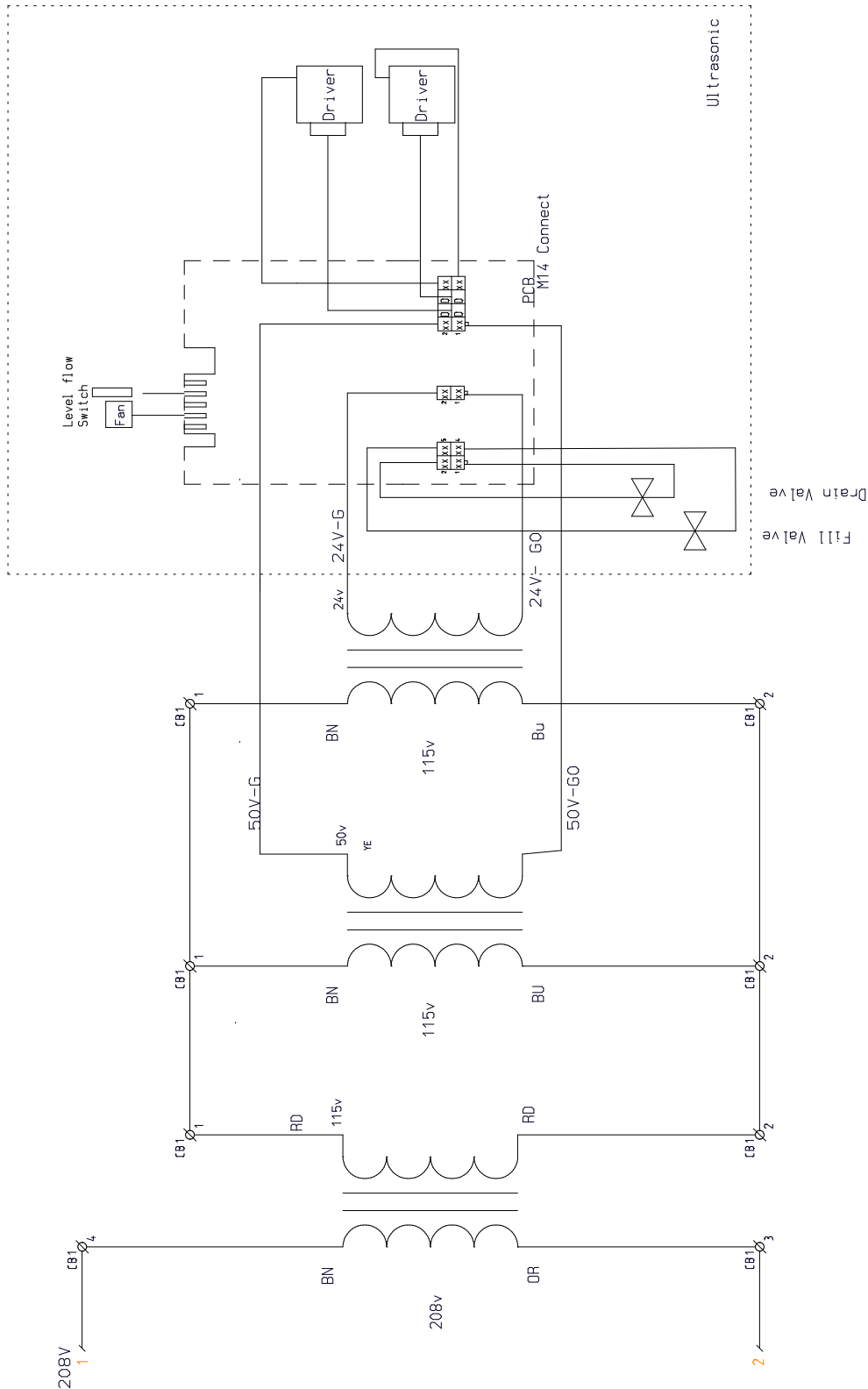


Fig. 9.a

Electrical schematic



BN - BROWN
BU - BLUE
GN - GREEN
RD - RED
YE - YELLOW

REVISION	REV.	DATE	REMARK
(tol. principle)			Geom. tolerance
			Surface treatment

MATERIAL					
MATERIAL ART.	NUMBER	DRAWN	van Susante Admin	APPROVED	
	UNIT mm	STATUS	In Progress	DATE	28.05.2020
	SCALE 1: 1	PROJECT	3720	DRAWING NUMBER	30130398
	REMARKS				
		DESCRIPTION	Circuit diagram CC Handwritten on cold UL	ART. NUMBER	30130398
		SITE		REV.	A3