devatec

User manual

ELECTROVAP RTH

Resistive steam humidifier

from 3 to 17 kg/h

Contents

Pictures for illustrative purposes only

ELECTROVAP RTH-LC

Product accreditation

DIRECTIVES CE APPLIED

Electromagnetic Compatibility Directive :	**89/336/EEC, 2004/108/EC**
Low Voltage Directive :	**73/23/EEC, 2006/95/EC**
« Machinery » Directive:	**98/37/EC, 2006/42/CE**

The humidifier complies with :

EN 61000-6-3: Electromagnetic compatibility generic requirements (residential, commercial and light industries)

- EN 55022 class B; conducted and radiated emission limits

EN 61000-6-2: Electromagnetic compatibility (EMC) - Generic standards—Immunity for industrial environments;

- EN 61000-4-3: Radiated, radio frequency, electromagnetic field immunity test
- EN 61000-4-6: Immunity to conducted distrubances induced by radio frenquency fields
- EN 61000-4-4: Electrical fast transient/burnt immunity test
- EN 61000-4-5: Surge immunity test
- EN 61000-4-2: Electrostatic discharge immunity test.

EN 60335-1: Low voltage : safety of electrodomestical devices and similar

EN 60335-2-88: Low voltage : safety of electrodomestical devices and similar, concerning humidifiers

EN 60204-1: Safety of machinery—Electrical Equipment of machines—Part 1 : General requirements

Manufacturer's name & address

devatec SAS
87 Rue Feu Saint Eloi
76550 Ambrumesnil - FRANCE

Type of equipment

Steam humidifier

Model name & series

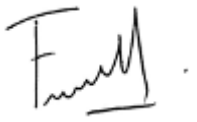
ELECTROVAP RTH-LC

Year of manufacturing

2007

We the undersigned, hereby declare that the equipment specified above complies with the above-mentioned Directive(s) and Standard(s).

Name : FRAMBOT Jean-François
Position : General Manager
Date : 05.06.2008
Signature:



Pictures for illustrative purposes only

IMPORTANT

Please read, heed and follow the enclosed safety information and the warning labels inside the humidifier before installation or maintenance.

Warnings & safety symbols

Warning : This symbol is used to designate a danger of injury or potential damage to the system.

Caution : High voltages are present inside the humidifier. All works concerned with the electrical installation must be carried out by skilled and qualified personnel.

Caution : Danger of scalding ! The ElectroVap RTH-LC generates steam during operation and therefore surfaces and pipe-work become very hot. Ensure that equipment not sustaining high temperatures be kept away.

Warning : the end user should ensure that the equipment be disposed of according to the local prevailing regulations.

Delivery and storage

Any loss or damage during delivery should be reported to carrier by registered letter within 3 working days and be advised to **devatec** or to authorized dealer.

It is recommended that the ElectroVap RTH-LC humidifier be kept in its transit packaging for as long as possible prior to maintenance. If the humidifier is to be put into storage prior to installation, it must be stored under cover and protected from physical damage, dust, frost, rain and humidity. More than 6 months storage is not recommended.

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IMPORTANT

This section should be read carefully to ensure safe and correct installation of your humidifier.

GENERAL

This manual contains all details necessary for the planning and installation of the ElectroVap RTH-LC humidifier. In addition commissioning and maintenance details are included.

The manual is intended for use by engineers and properly trained technical personnel. Maintenance, servicing or repair work must only be carried out by suitable skilled and qualified personnel, the customer must be responsible for ensuring their suitability.

Any risks or hazards, especially when working from ladders or towers should be identified by a skilled and Health and Safety representative and effective control measure put in place.
No liability will attach to the Distributor if any damage, injury or accident is attributable to inattentive, inappropriate, negligent or incorrect operation of the machinery whether or not caused deliberately. Always isolate all electrical and water supplies before commencing any maintenance.

Every effort has been made to ensure details contained in this manual are correct, however, in view of the wide range of conditions experienced in air handling systems, the information provided should only be used as a guide. Please contact your Agent if any doubt.

Correct use

ElectroVap RTH-LC humidifiers are ONLY intended for use with air handling systems or direct air humidification. ANY OTHER APPLICATION IS NOT CONSIDERED USE FOR THE INTENDED PURPOSE. THE MANUFACTURER CANNOT BE MADE LIABLE FOR ANY DAMAGE RESULTING FROM INCORRECT USE.

Water

ElectroVap RTH humidifiers are designed to be used with mains, demineralized R/O with a minimum conductivity of 30 µs or softened water. On no account attempt to introduce any other fluid or chemical into the system. Water supply should not exceed 6.0 bar and installation should comply with local regulations. If the water pressure exceeds 6.0 bar, a water regulator valve must be used.

Electricity

All work concerned with electrical installation MUST only be performed by skilled and qualified technical personnel (eg electrician or technicians with appropriate training). The customer MUST be responsible for ensuring their suitability.

It is the duty of the installer to ensure that suitable sized cables and MCB protection is provided. Please observe the local regulations concerning the provision of electrical installations.

Warranty

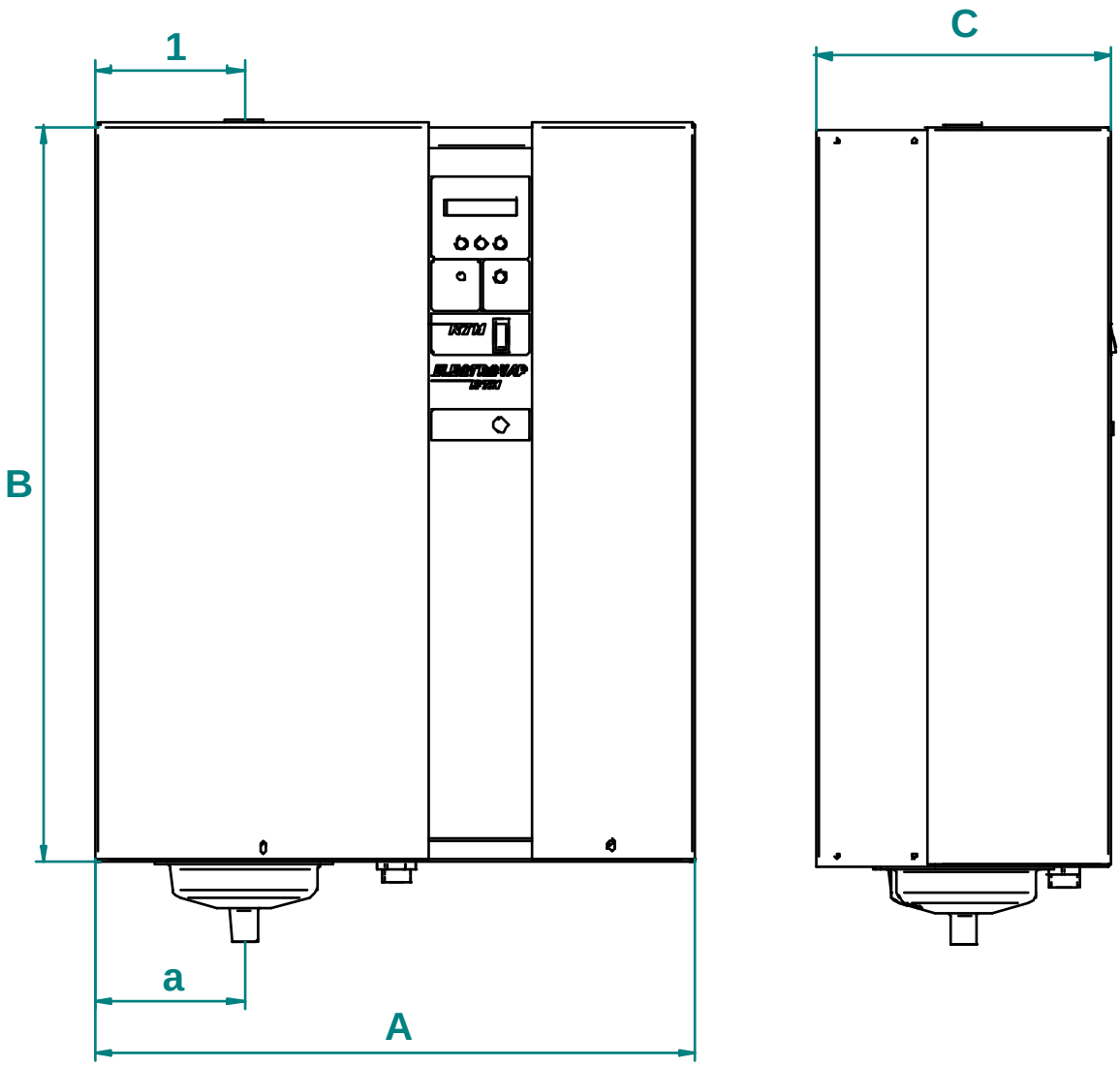
A two year warranty term—cost and labor—is applicable to the parts of the ElectroVap RTH-LC to the exception of the usual consumable parts provided our recommendations of use & maintenance have been adhered to. Failure to specify and fit original parts and accessories will invalidate our warranty.

NOTE

The manufacturer's policy is one of continuous research and development. He therefore reserves the right to amend without notice the specifications given in this document.

Pictures for illustrative purposes only

RTH 3 to 15



Overall dimensions (mm)		Steam outlet (mm)		Drain outlet (mm)		Weight empty (kg)	In operation (kg)
A	550	1	140	a	140	25	35
B	680						
C	272						

Pictures for illustrative purposes only

TAKE CARE :

The humidifier should be installed in a room the temperature of which must be between 5°C and 40°C that the humidity level should not exceed 80 %.

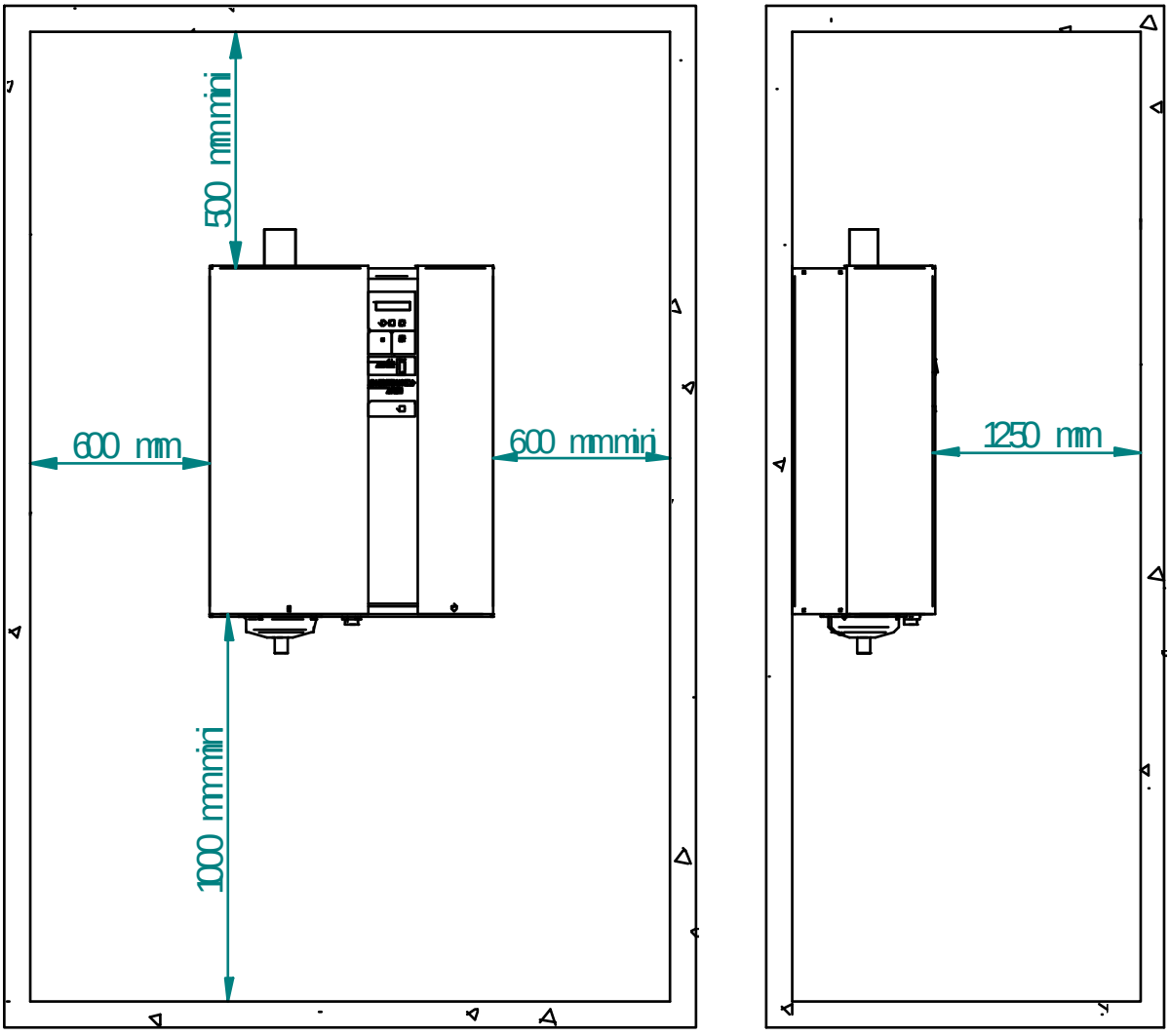
The rear part of the RTH-LC becomes hot during operation (about 60°C). Make sure that the surface on which the humidifier is installed can sustain hot temperatures.

The devatec steam humidifiers are designed to be installed on wall. Make sure that the surface the humidifer is hanged on is strong enough.

Install the humidifier at the shortest distance of the steam pipe (s.a. page 13) whenever possible for best performance.

Arrange position of the humidifier on wall to provide free access for easy maintenance (see after installation drawings here under).

Remove the blocking ring from the stainless steel cylinder before use.



Pictures for illustrative purposes only

NOTABENE :

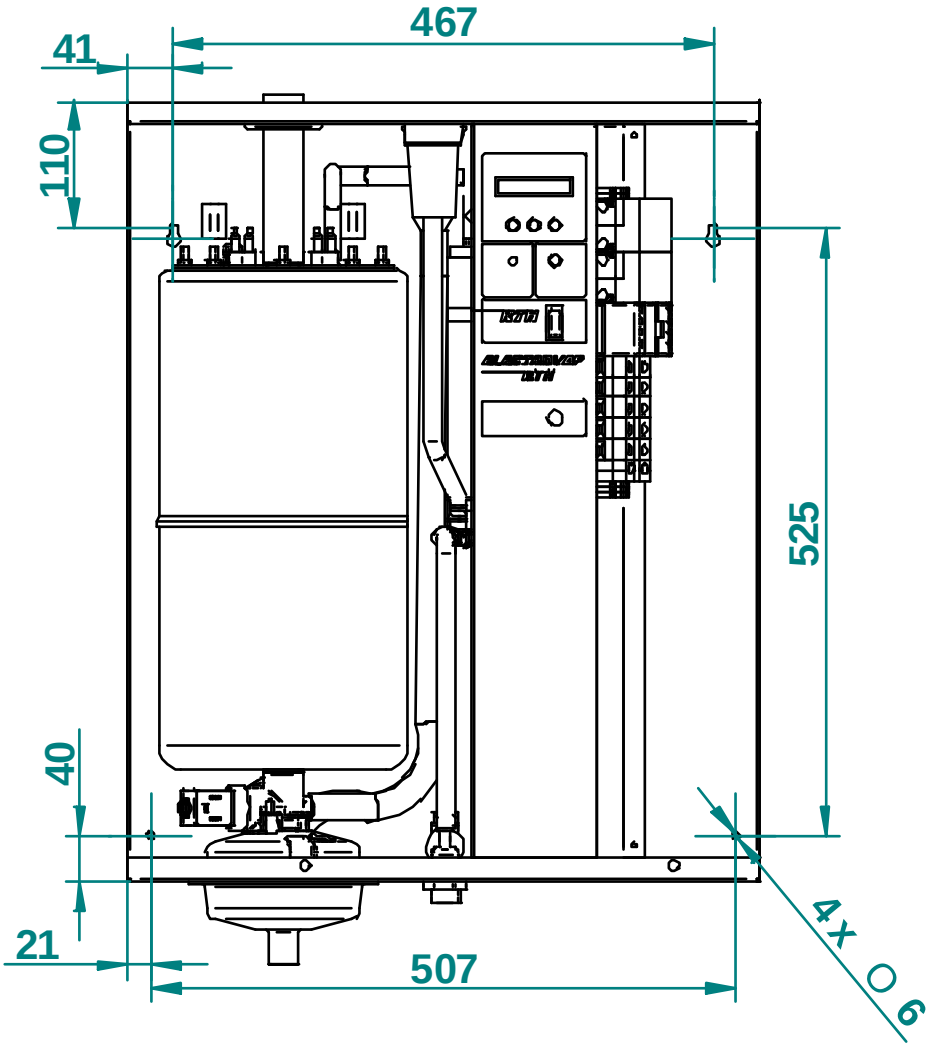
Use attachment equipment appropriate to the support.

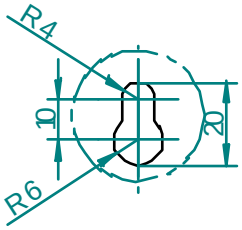
Installation procedure :

Mark the 4 mounting holes and drill.

Insert pegs. Screw the upper screws allowing (diam 6mm) allowing about 10 mm for hanging the cabinet.

Hang the cabinet and screw the lower screws. Tighten up all the screws for securing the installation while ensuring that the cabinet is level.



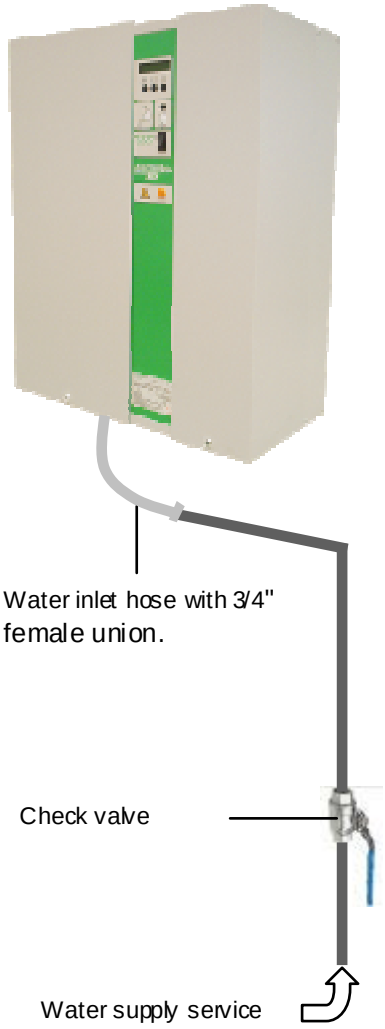


Attachment point (detail)

Pictures for illustrative purposes only

Water connection

A fresh mains cold water service should be used to supply the unit. The water pressure should be between 1 & 6 bar & should not exceed 40°C in temperature. In case the water pressure exceeds 6 bar, a water regulator valve must be used.



The water supply connection is under the bottom of the unit. The humidifier is delivered with a water inlet hose of 50 cm long with a 3/4" female fitting to the cold water supply. A direct copper connection is **PROHIBITED**.

A check valve should be located on the mains and cold water service connection to the unit.

The inlet valve base has a basket filter (s.a. page 47).

The RTH humidifier uses water to produce steam so leakage may happen causing potential damage. If an installation in false ceiling or above prime rooms (such as museum, exhibition or laboratory rooms) is considered, ensure that the floor below the humidifier is constructed from waterproof materials (with draining facilities) to withstand any water spilling during servicing or if a problem occurs.

Information about the water quality : chloride concentration : < 75mg/l, phosphate concentration : < 5mg/l, chlorine consentration (3 to 6° dA) : < 100mg/l, poor concentration inCO_2, organic elements in poor concentration.

The RTH humidifier can run with the following water qualities :

- Tap or raw water : water TH between 5° and 40° French grade.
- Demineralized water : **30µS/cm minimum** (caution : the demineralized water is corrosive; use appropriate piping material : stainless steel, PVC)
- Demineralized water of less than **30µS/cm** : for ensuring a correct water level detection, a special floating water level detection device must come in replacement of the standard water level system (s.a. attached picture). This replacement is factory made when this is specified on the purchase order or a replacement kit is available for existing humidifiers (caution : the demineralized water is corrosive; use appropriate piping material : stainless steel, PVC). **Please consult your local reseller.**

Floating water level detection device

Pictures for illustrative purposes only

- **Softnened waters (not recommanded)**

A water softener does not affect the quantity of mineral salts contained in the water but alters their nature, the poly phosphate measuring devices as well.

An excess of sodium chloride may generate foam which disturbs greatly the correct running of the humidifier. It is essential that a duplex softener be used.

A small volume of tap water **must** be added to the softener water to get a **TH value of 10° minimum (however a TH value of 12° is highly recommended).** A water analysis should be made to determine the sodium chloride content.

Far from what is generally considered, the use of softened waters does not bring down the maintenance frequency. Only the use of reverse osmosis or demineralized water can space maintenance periods significantly.

TAKE CARE : the use of demineriliz ed water in combination with tap water is strictly prohibited.

Pictures for illustrative purposes

1. Use preferably hose from our supply

   NB : when brand new hoses are installed, a smell of burning may be smelt during the first running of the steam humidifier. This is normal and will eventually dispel.

2. Number of steam outlets :

   RTH-LC 3 to 15 = 1 x Ø 25 mm

3. The RTH-LC humidifier can be used with pressure ducts (P) having the following characteristics :

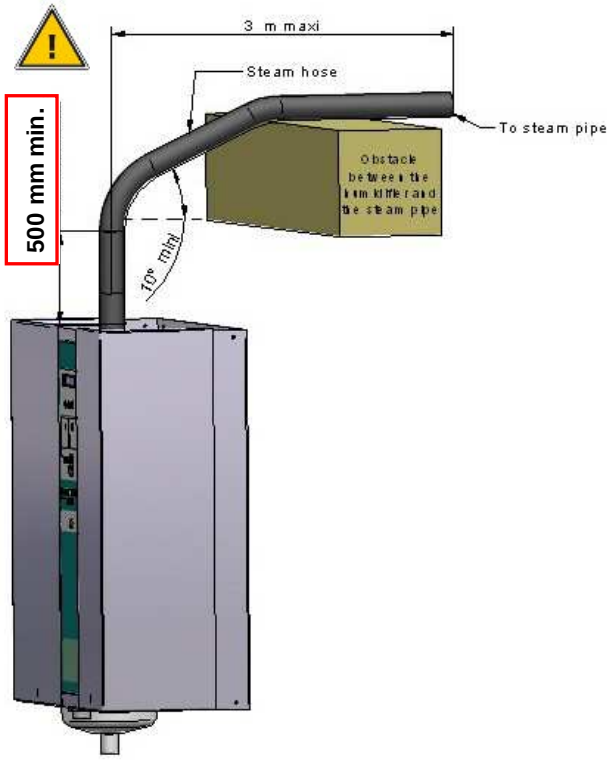
   - If P is inferior to 150 mm CE (Water column) i.e. 1470 Pa.
   - If P is between 150 mm CE and 300 mm CE (2941 Pa.) , our optional filling cup plateform must be used.

4. Please adhere to the recommendations given underneath for the installation of the steam hose according to one of the shown examples, the most suited to your installation. A set of hose clamps is supplied for ensuring a correct installation.

The humidifier should be located within 3 m. of the steam distribution pipe. If the distance is superior to 3 m. insulated steel or copper pipe of a slightly larger diameter must be used. It should not exceed 6 m.

TAKE CARE : The steam hose must be kept as tight as possible. If it happens to be pinched or kinked, this can cause the heating elements to overheat and to be destroyed due to an incorrect detection of a too low water level inside the cylinder.

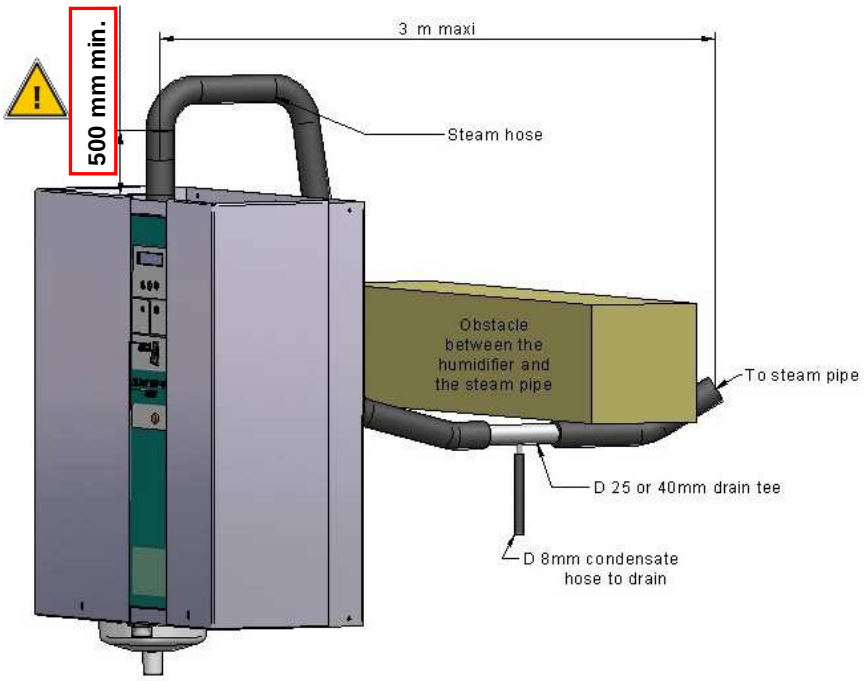
Example a



Radius of bend for steam hose :

- Ø 25mm steam hose = 250mm minimal radius

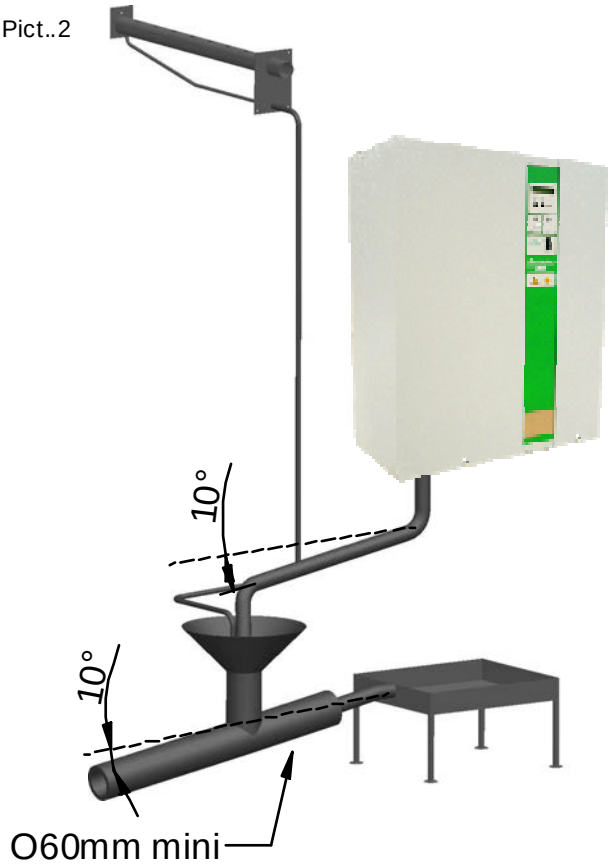
Example b



Pictures for illustrative purposes

Pciture.1

Pict..2



The following drawings show the water draining connections that should be made.

1. The **devatec** supplied steam hose should be used :

   RTH-LC 3 to 15 : 1 m Ø 25 mm hose with 1 hose clamp (supplied).

   This hose is designed to be connected to the draining system. Regular replacement is recommended.

2. If rigid piping is used, it must be heat (100°C) and pressure resistant PVC material and have a 100 mm wide diameter.

3. The discharge hose must be free from any obstacle. It is recommended that each humidifier has its own drain pipe and tank arrangement in case a number of humidifiers is installed.

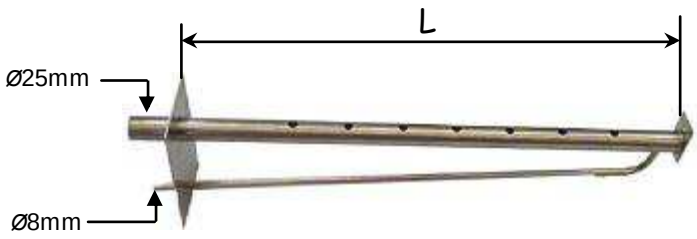
4. Use water tanks with a lid that has water collecting facilities (option on request) (s.a. drawing 1).

5. A funnel can also be used (s.a. pict. 2), but it should be offset from the underside of the unit to prevent any steam and/or condensation from getting into the cabinet. The installation of a siphon (as per the draining hose) is recommended and arrangements for holding water spilling should also be made.

6. **CAUTION :** keep a minimum pitch of 10° for both the draining & overflow hoses of the humidifier and for general drain pipe (s.a. pictures 1 and 2).

Pictures for illustrative purposes

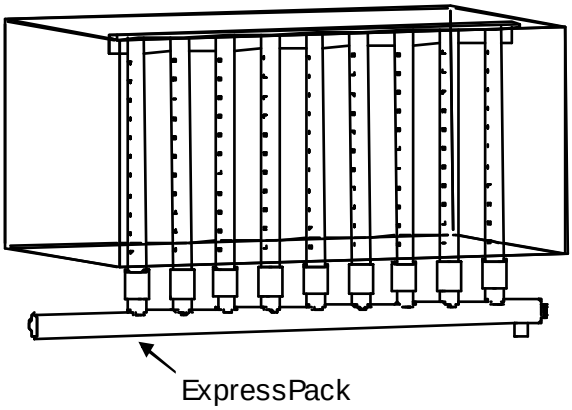
Steam distribution pipe



The steam from the boiler enters the duct or an air handling unit via a steam distribution pipe.

In order to obtain the optimum performance of the humidifier, select the longest pipe.

ExpressPack



ExpressPack

The Armstrong ExpressPack is a bespoke steam humidification system made to suit your configuration and ready to install in a ventilation duct.

It permits to have vapor trails (absorbing distances) as short as 600 mm. For further reference, please contact **devatec** or their authorized agent.

Steam distribution selection table

Steam distribution pipe for RTH-LC 3 to 15	L
	mm
D25 -L290	290
D25-L590	590
D25-L790	790
D25-L1000	1000
D25-L1250	1250
D25-L1500	1500

Pictures for illustrative purposes

Evaporation distance or vapor trail « D »

A certain length is required so that the steam coming out of the steam distribution pipe be absorbed by the air. All along this length, descrided as the evaporation distance, the steam can still be seen in the airflow as a mist which can condensate in water against any obstacle if placed within. To prevent condensation, this evaporation distance should be calculated before positioning the steam distribution pipe.

How to calculate the evaporation distance « D » (FAST METHOD)

In order to determine the evaporation distance, the attached calculation table can be used :

	% RH1 inlet air							
	5	10	20	30	40	50	60	70
% HR2 outlet air	Minimum humidification distance « D » in m.							
40	0,9	0,8	0,7	0,5	-	-	-	-
50	1,1	1	0,9	0,8	0,5	-	-	-
60	1,4	1,3	1,2	1	0,8	0,5	-	-
70	1,8	1,7	1,5	1,4	1,2	1	0,7	-
80	2,3	2,2	2,1	1,9	1,7	1,5	1,2	0,8
90	3,5	3,4	3,2	2,9	2,7	2,4	2,1	1,7

Nota bene : this calculation table is to be used for temperatures between 20°C and 25°C.

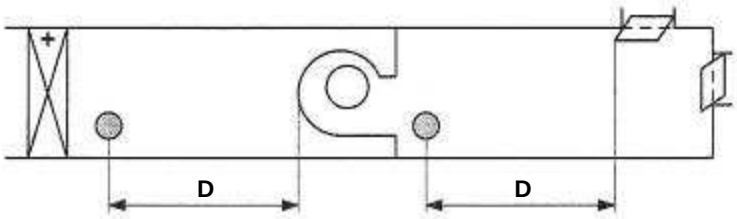
HR1 = relative humidity of air before humidification in %.

HR2 = relative humidity of air after humidification in %.

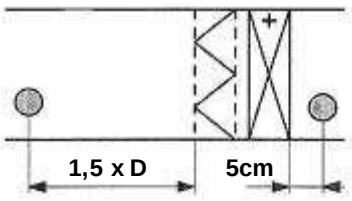
Minimal humidification distance

The steam distribution pipes must be positioned after the minimum humidification distance calculated with the help of the above table.

Before / after fan



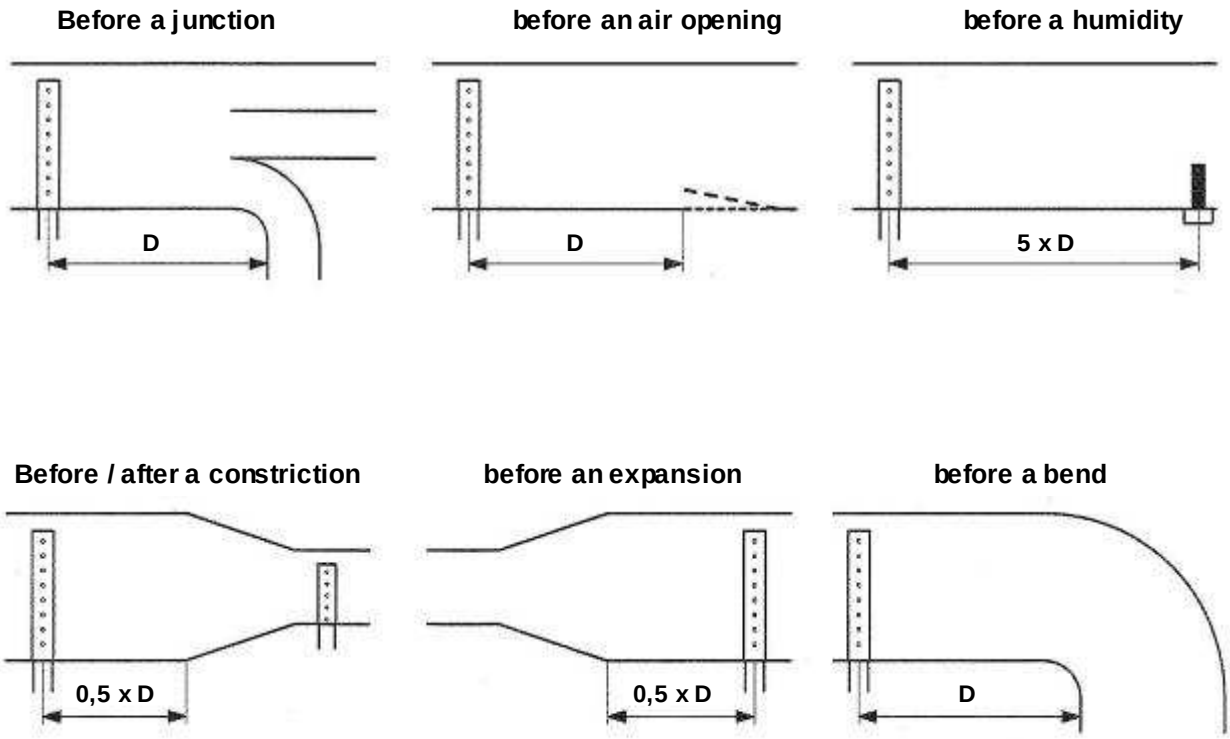
before / after heater/filter



2,5 x D before thin particule filter

Pictures for illustrative purposes

(continued)



A high humidity limit humidistat must be installed in the duct to stop the humidifier in case the level of humidity exceeds the preset value.

In case the recommended distances cannot be met, please contact **devatec** or their authorized agent for an alternative solution.

If accurate values cannot be reached, a distance of 2 m. should be considered as a minimum distance between pipes & obstruction and 3 / 4 m. before sensor or humidistat.

Pictures for illustrative purposes

Please meet the following dimensions and spaces according to your configuration. For further information, please contact **devatec** or their authorized agent.

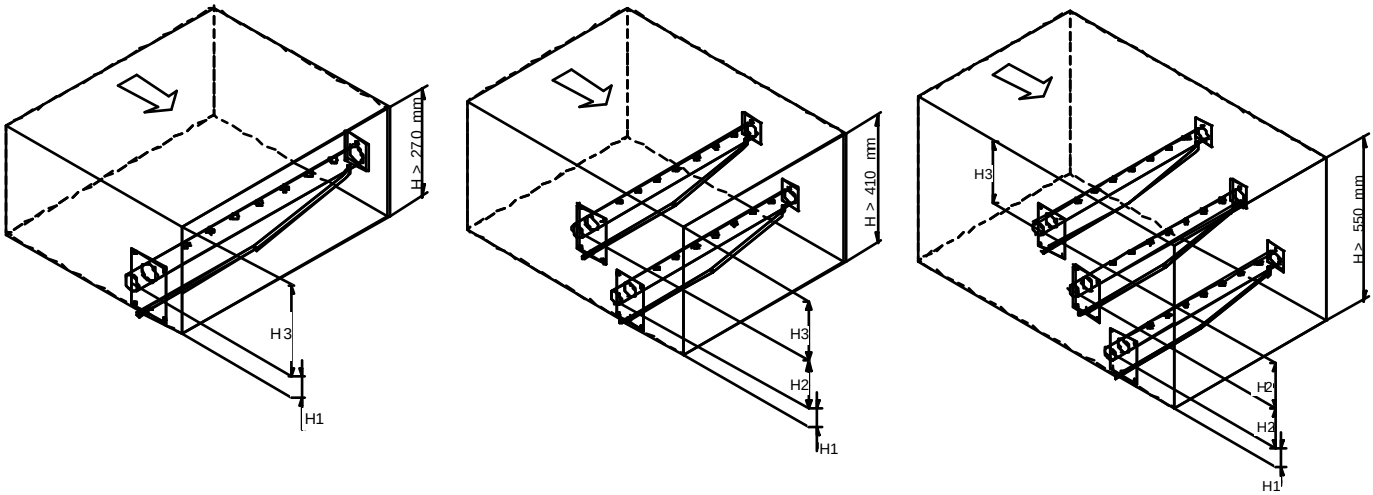
H1 = 110 mm = Minimum height between the duct floor and the axle of the steam pipe.

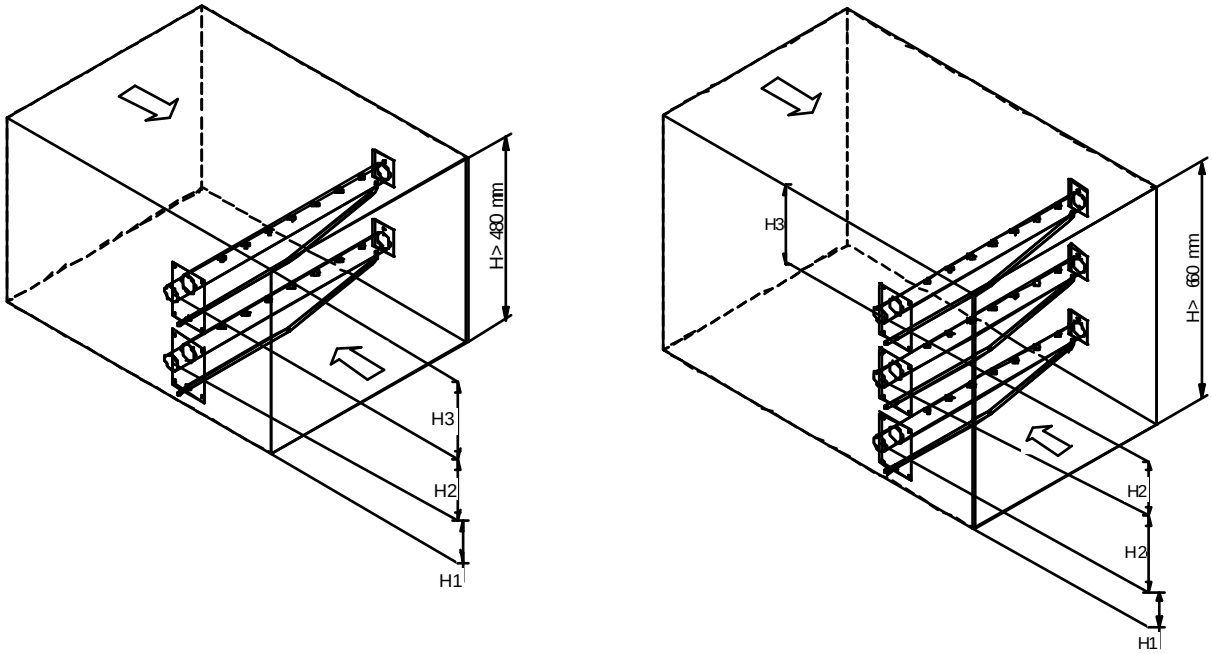
H2 = 140 mm = Minimum distance between two pipes.

H3 = 160 mm = Minimum height between the duct top and the axle of the steam pipe.

The H3 distance can be 80 mm at the shortest in case the steam pipe is installed at an angle of 30°.

The arrow shows the direction of the air flow.





Pictures for illustrative purposes

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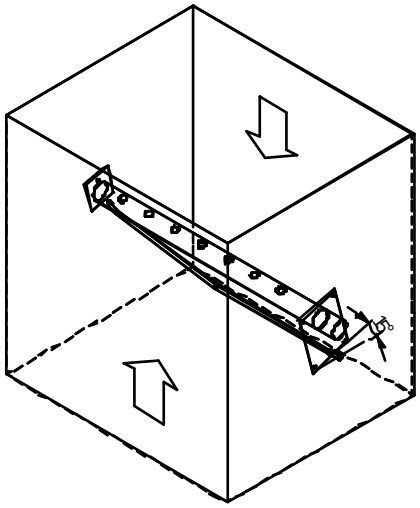
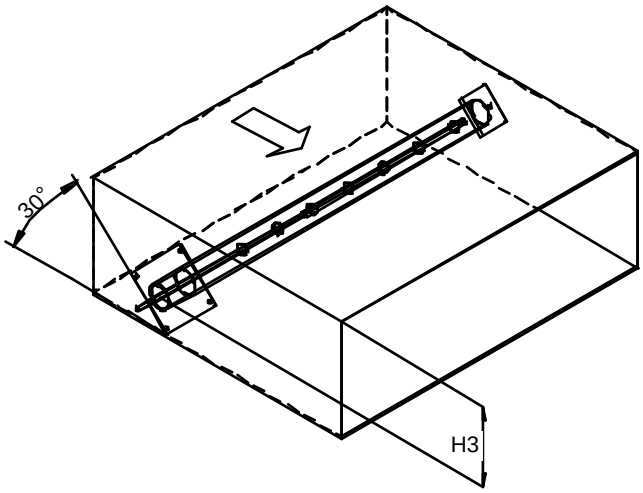
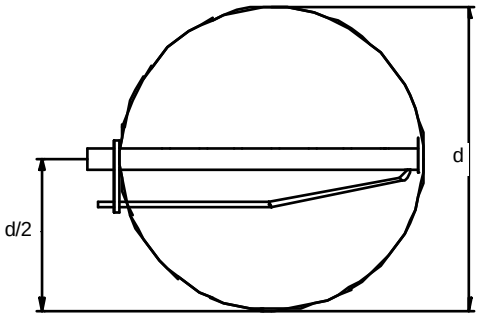


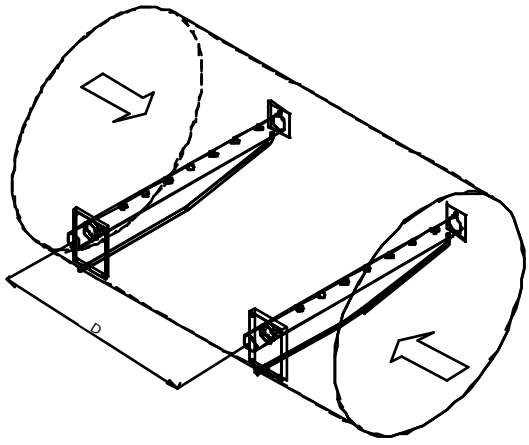
In vertical ducts where the air flow is upward or downward, the steam distribution pipe(s) must be tilted by 15° sideways.



In duct with limited height, the distribution pipe(s) can be tilted by 30° to get the 80 mm minimum height.



d = Duct diameter

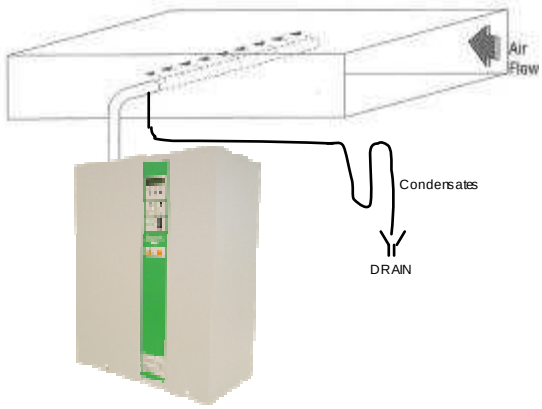


D = Humidification distance

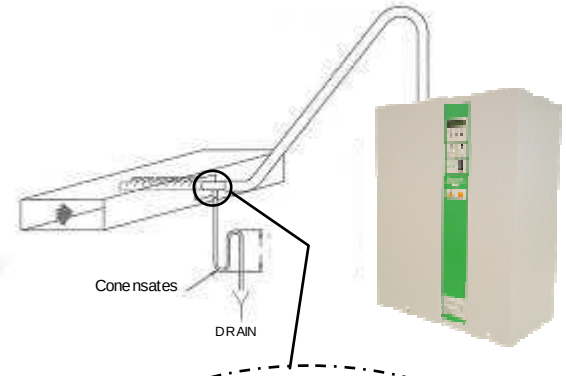
Pictures for illustrative purposes

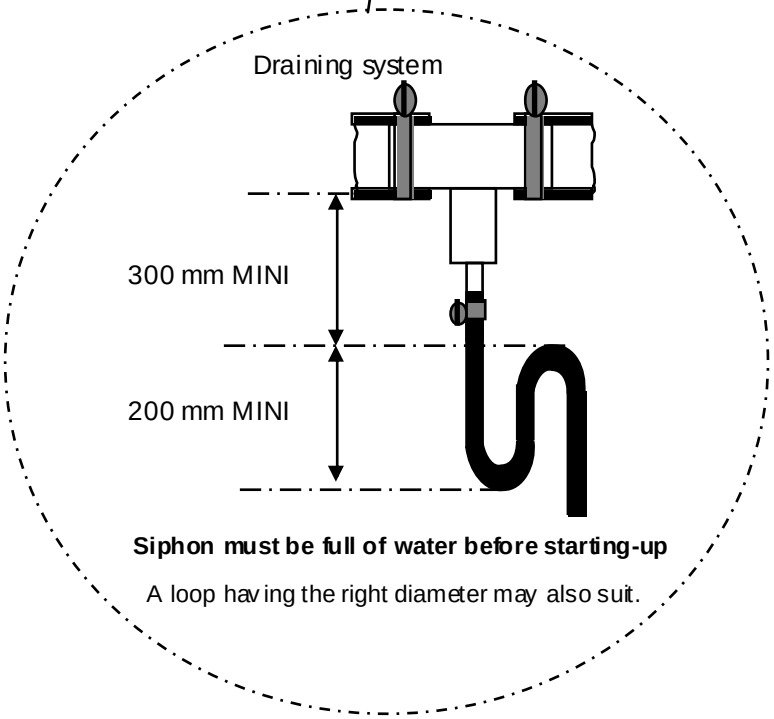
(continued)

Steam pipe above humidifier RTH-LC 3 to 15

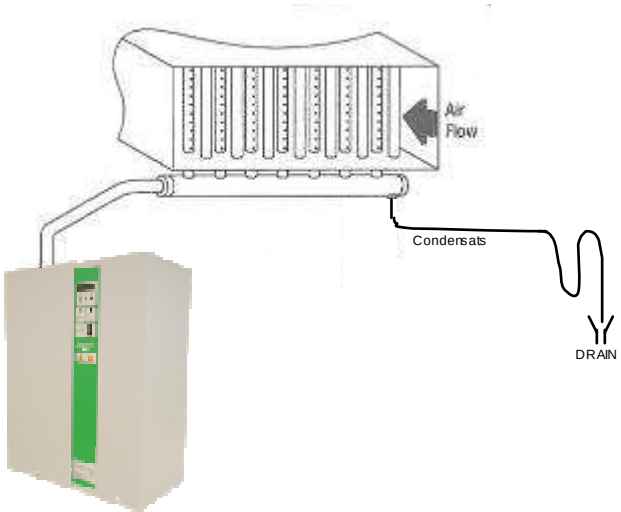


Steam pipe under humidifier RTH-LC 3 to 15





ExpressPack duct insersion RTH-LC 3 to 15



Pictures for illustrative purposes

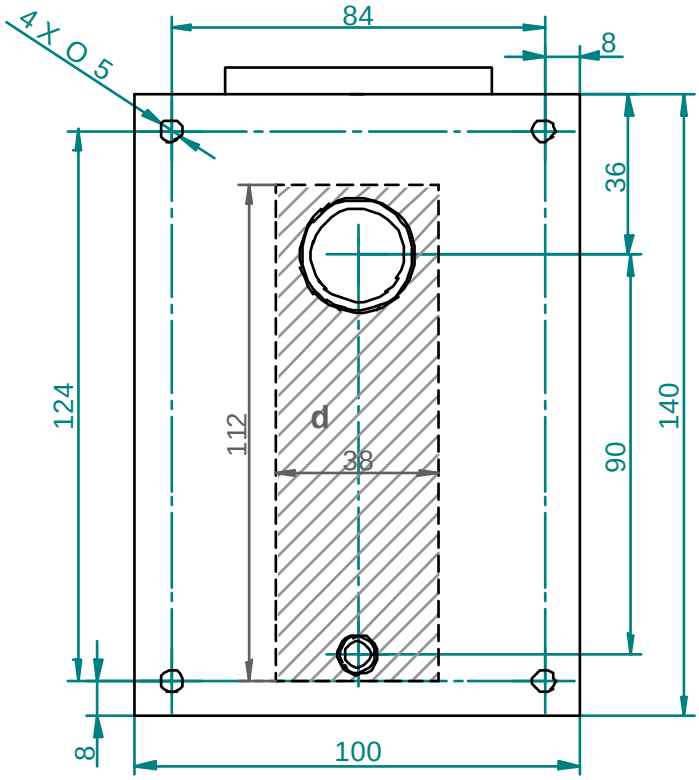
For ensuring the best steam distribution possible, we would recommend to install the steam pipes as per the two methods described underneath.

How to install in a duct

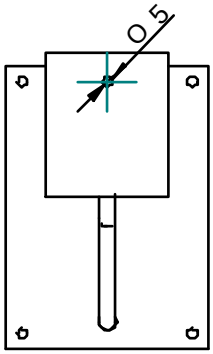
Your steam pipes must be screwed onto the ventilation duct by the fixing plate with a set of 4 bolts and nuts of Ø 5 mm. For ensuring airtightness, apply a large silicon film all around the duct installation plate.

The length of the bolts will be according to the thickness of the ventilation duct.

Steam pipe Ø 25mm



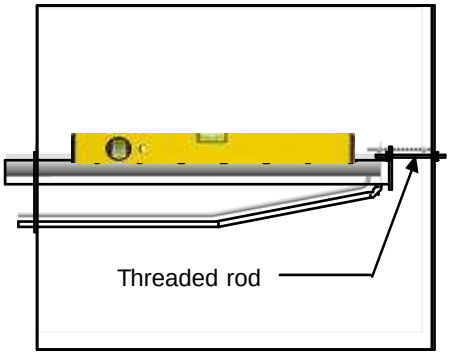
How to attach the pipe (inside the duct)



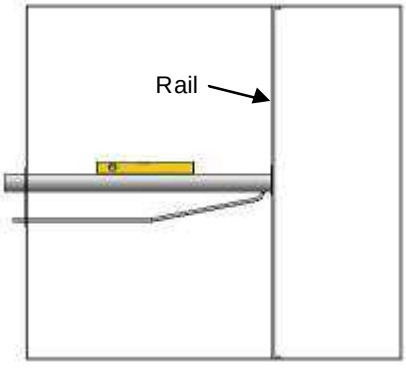
The end of the steam pipe should be attached to the duct with a threaded rod of Ø 5 mm going from the dedicated hole of the fixing plate to the outside of the duct and attached by a couple of nuts (method 1). A rail attached to the inner side of the duct can also be used - a 5mm bolt and nut are used to settle the pipe on the rail (method 2).

The steam pipe must be at level with the duct.

Method 1



Method 2



Pictures for illustrative purposes

BLOWER PACK

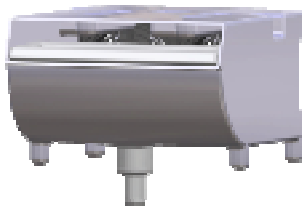
The Blower Pack BP1 permits the use of the humidifier in direct in-space applications where there is no ductworks.

The Blower Pack BP1 provides an output of 5kg/h.

The direct steam connection to the humidifier is ensured by a Ø 25 mm steam hose.

The Blower Pack BP1 is energized by connecting it to terminals 3 & 4 of the humidifier.

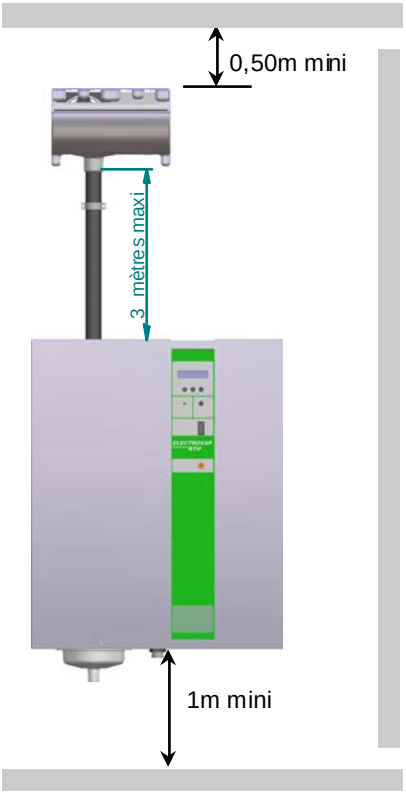
Allow a 3 m. distance ahead to the BP1 for a free diffusion of the steam.

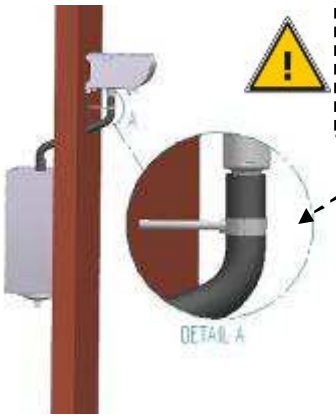


Blower Pack BP1

For use and installation of the Blower Pack ventilation unit, please refer to the Blower Pack technical manual available in English.

Examples of installation





TAKE CARE :

Attach hose on wall before connecting it to Blower Pack.

Dimensions & characteristics

	Width	Heigth	Depth	Weight Kg	dB	Max. output Kg/h	m3/h	Steam connection Ø
BP1	260mm	170mm	285mm	2	40	5	53	Ø 25 mm

Pictures for illustrative purposes

Recommandations:

All works concerned with the electrical installation must be carried out by skilled and qualified personnel (eg electrician with appropriate training). The customer is responsible for ensuring their suitability. Please observe local regulations concerning the provision of electrical installations.

Check all electrical terminal screws at commissioning, after 50 hours operation and at every service thereafter.

Take care : the RTH-LC electronic components are very sensitive to electrostatic shocks. Appropriate steps must be taken before any operation.

Pictures for illustrative purposes

RTH-LC steam humidifier in 1 x 230V - 50/60Hz

RTH	Steam production (kg/h)	Voltage (V)	Nb of phase(s)	Amperage (A)	Power (KW)	Nb of boiler(s)	Nb of heating element(s)	Power of heating element (KW)
3	2,5	230	1	8,3	1,9	1	1	1,9 (230V)
5	6	230	1	19	4	1	1	4,3 (230V)
8	8	230	1	27	6	1	2	4,3 (230V) 1,9 (230v)

RTH-LC steam humidifier in 3x 208V - 50/60Hz

RTH	Steam production (kg/h)	Voltage (V)	Nb of phase(s)	Amperage (A)	Power (KW)	Nb of boiler(s)	Nb of heating element(s)	Power of heating element (KW)
8	6	230	3	13	5	1	3	1,9 (230V)

RTH-LC steam humidifier in 3x 230V - 50/60Hz

RTH	Steam production (kg/h)	Voltage (V)	Nb of phase(s)	Amperage (A)	Power (KW)	Nb of boiler(s)	Nb of heating element(s)	Power of heating element (KW)
8	8	230	3	14	6	1	3	1,9 (230V)

RTH-LC steam humidifier in 3 x 400V - 50/60Hz

RTH	Steam production (kg/h)	Voltage (V)	Nb of phase(s)	Amperage (A)	Power (KW)	Nb of boiler(s)	Nb of heating element(s)	Power of heating element (KW)
5/3	5	400	3	6	4	1	3	1,9 (277V)
7	8	400	3	8	6	1	3	1,9 (230V)
10	12	400	3	13	9	1	3	4,3 (277V)
15	17	400	3	19	13	1	3	4,3 (230V)

Beware ! Before connecting power, make sure that the electrical installation has been made according to the above-mentioned values.

Pictures for illustrative purposes

ALL WORKS CONCERNED WITH THE ELECTRICAL INSTALLATION MUST BE CARRIED OUT BY SKILLED AND QUALIFIED PERSONNEL.

RTH-LC steam humidifier in 3x400V - 50/60Hz

RTH	Steam production (kg/h)	Voltage (V)	Nb of phase(s)	Amperage (A)	Power (KW)	Nb of boiler(s)	Nb of heating element(s)	Power of heating element (KW)
5/3	5	400	3	6	4	1	3	1,9 (277V)
7	8	400	3	8	6	1	3	1,9 (230V)
10	12	400	3	13	9	1	3	4,3 (277V)
15	17	400	3	19	13	1	3	4,3 (230V)

RTH-LC steam humidifier in 3x415V - 50/60Hz

RTH	Steam production (kg/h)	Voltage (V)	Nb of phase(s)	Amperage (A)	Power (KW)	Nb of boiler(s)	Nb of heating element(s)	Power of heating element (KW)
5/3	6	415	3	6	4	1	3	1,9 (277V)
7	8	415	3	9	6	1	3	1,9 (230V)
10	13	415	3	14	10	1	3	4,3 (277V)
15	19	415	3	20	14	1	3	4,3 (230V)

RTH-LC steam humidifier in 3x460V - 50/60Hz

RTH	Steam production (kg/h)	Voltage (V)	Nb of phase(s)	Amperage (A)	Power (KW)	Nb of boiler(s)	Nb of heating element(s)	Power of heating element (KW)
7	7	460	3	7	6	1	3	1,9 (277V)
15	16	460	3	15	12	1	3	4,3 (277V)

Beware ! Before connecting power, make sure that the electrical installation has been made according to the above-mentioned values.

Pictures for illustrative purposes

ALL WORKS CONCERNED WITH THE ELECTRICAL INSTALLATION MUST BE CARRIED OUT BY SKILLED AND QUALIFIED PERSONNEL.

RTH-LC steam humidifier in 3x480V - 50/60Hz

RTH	Steam production (kg/h)	Voltage (V)	Nb of phase(s)	Amperage (A)	Power (KW)	Nb of boiler(s)	Nb of heating element(s)	Power of heating element (KW)
7	8	480	3	7	6	1	3	1,9 (277V)
15	17	480	3	16	14	1	3	4,3 (277V)

RTH-LC steam humidifier in 3x575V - 50/60Hz

RTH	Steam production (kg/h)	Voltage (V)	Nb of phase(s)	Amperage (A)	Power (KW)	Nb of boiler(s)	Nb of heating element(s)	Power of heating element (KW)
7	7	575	3	5	5	1	3	1,9 (346V)
15	16	575	3	12	12	1	3	4,3 (346V)

RTH-LC steam humidifier in 3x600V - 50/60Hz

RTH	Steam production (kg/h)	Voltage (V)	Nb of phase(s)	Amperage (A)	Power (KW)	Nb of boiler(s)	Nb of heating element(s)	Power of heating element (KW)
7	8	600	3	6	6	1	3	1,9 (346V)
15	17	600	3	12	12	1	3	4,3 (346V)

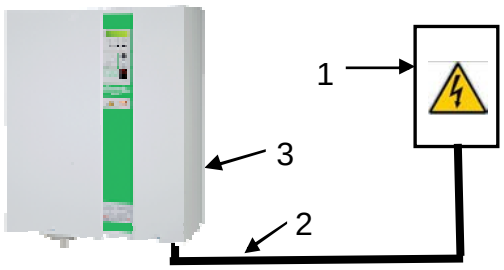
Beware ! Before connecting power, make sure that the electrical installation has been made according to the above-mentioned values.

Pictures for illustrative purposes

ALL WORKS CONCERNED WITH THE ELECTRICAL INSTALLATION MUST BE CARRIED OUT BY SKILLED AND QUALIFIED PERSONNEL.

ELECTRICAL CONNECTIONS

All works concerned with electrical installation must be carried out by a skilled and qualified personnel. Make sure that all incoming power supplies are isolated before installation and maintenance of the ElectroVap RTH humidifier.



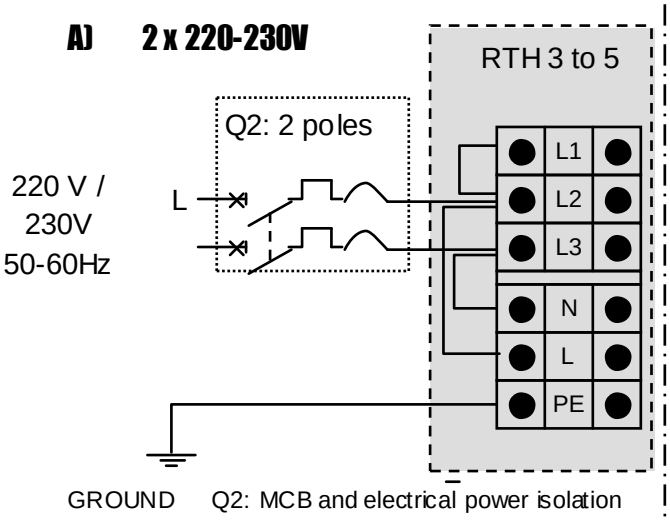
1 - Power supply isolator and MCB (near the unit)
2 - Power supply cable
3 - Electrical compartment

WARNING :

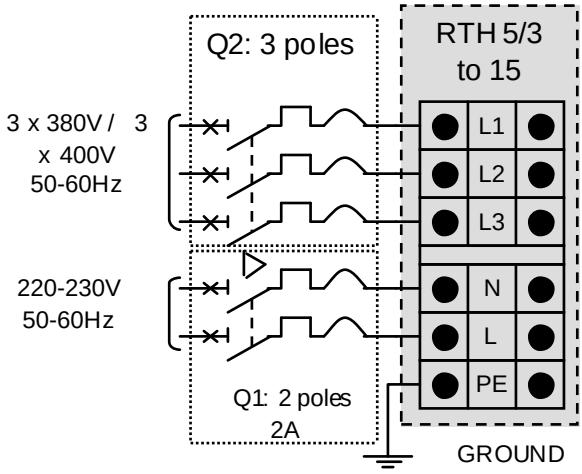
Failure to fit an electrical power isolator and MCB as part of the electrical installation significantly increases the risk of electric shock, which can be fatal.

Install a differential electrical circuit breaker in head of the line supplying the humidifiers inside the general switchboard. In case of several humidifiers, we would recommend to install a differential circuit breaker per humidifier so as to prevent a total power cut off of all the humidifiers.

A) 2 x 220-230V

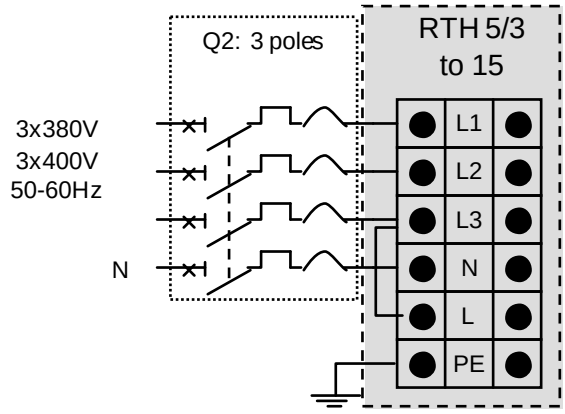


B) 3 X380-400 V without neutral



The symbol Δ between Q1 & Q2 means that these MCB are coupled. The power MCB Q2 and control MCB Q1 are mechanically linked together. So if a fault is detected, the power and the control circuits are switched off and there is no voltage on the unit. The unit is really off voltage.

C) 3 phases + neutral: 3 x 380-400 V



D) 3 phases without neutral: 3 x 380-400 V

In this case, a transformer (option) must be installed (See technical notice page n°26)

Failure to observe manufacturer's installation recommendations will invalidate the manufacturer's warranty.

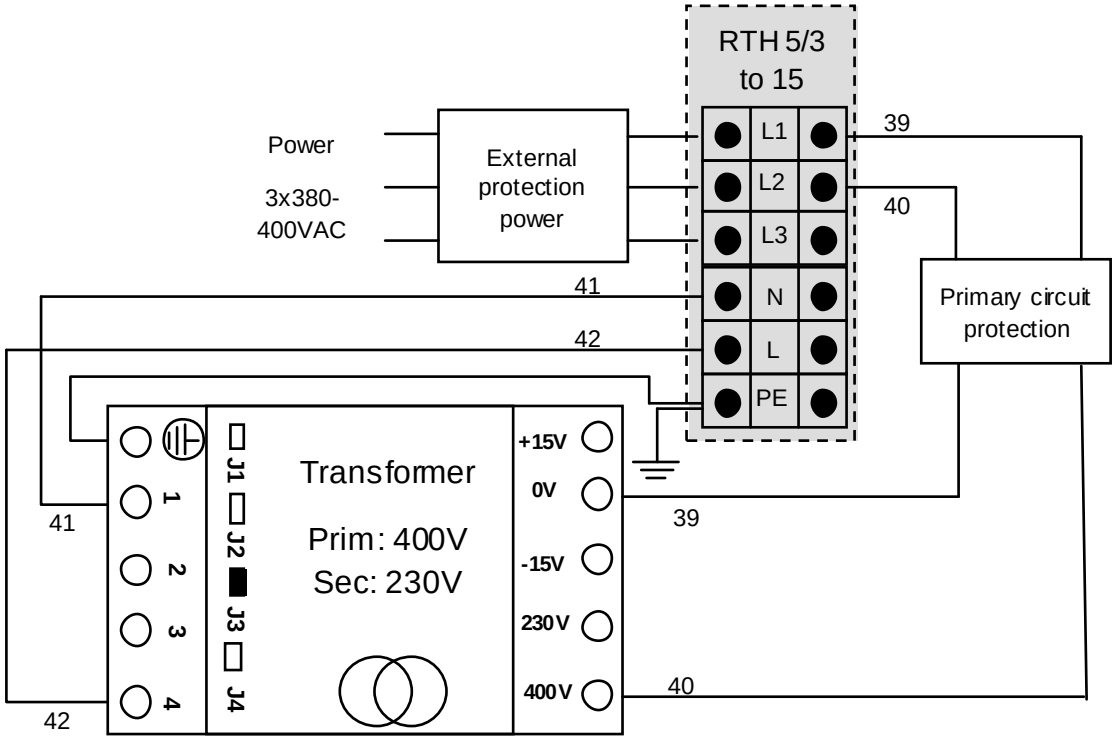
Pictures for illustrative purposes

ALL WORKS CONCERNED WITH THE ELECTRICAL INSTALLATION MUST BE CARRIED OUT BY SKILLED AND QUALIFIED PERSONNEL.

(continued)

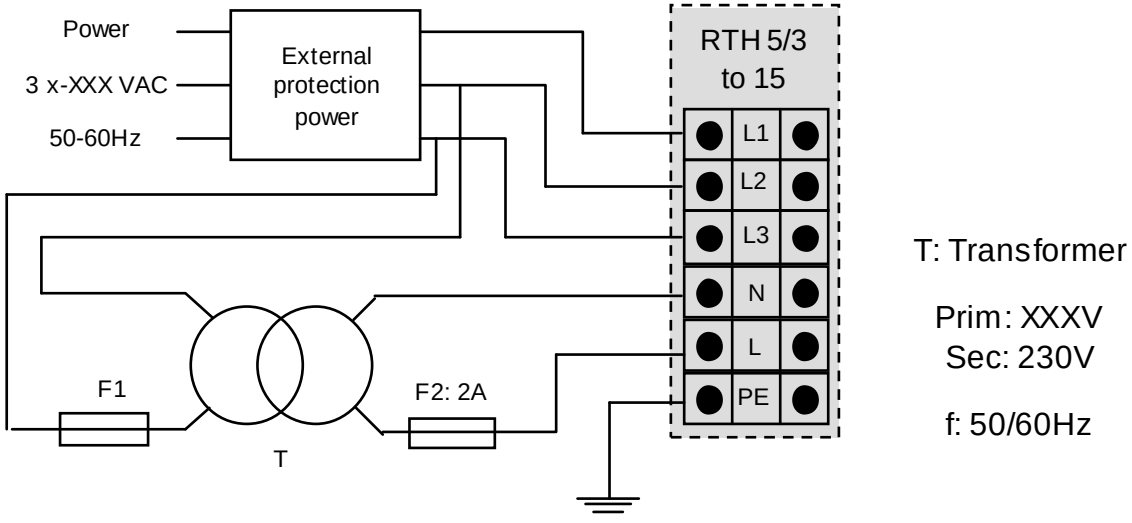
Humidifier without neutral fitted with a 400/230V transformer

The RTH-LC 5/3 to 15 humidifiers are electrically supplied in 3x400v + G + N. In case a neutral line is not available, this can however be easily substitued by the use of our optional transfomer preventing the installation of a specific neutral line.



WITH NEUTRAL « I T »

The neutral is not earthed. In this case, we advocate the installation of a transformer



Pictures for illustrative purposes

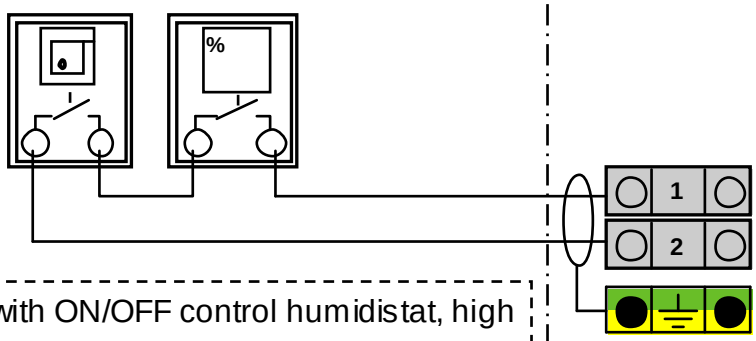
ALL WORKS CONCERNED WITH THE ELECTRICAL INSTALLATION MUST BE CARRIED OUT BY SKILLED AND QUALIFIED PERSONNEL.

ELECTROVAP RTH-LC

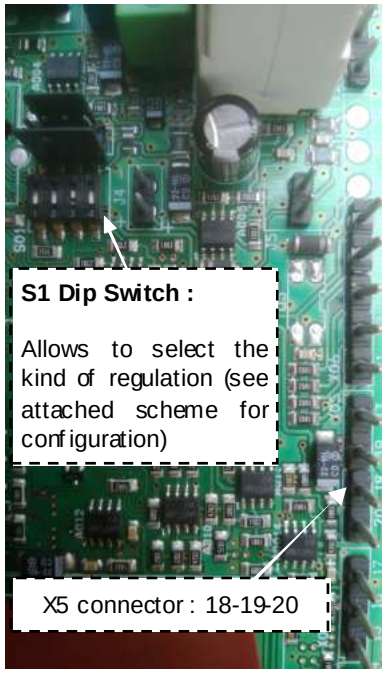
Control connection

The wiring of the optional equipment described under must be made with 0.75 mm2 flexible cable. This control signal wire should not go along with a power cable.

RTH ON / OFF

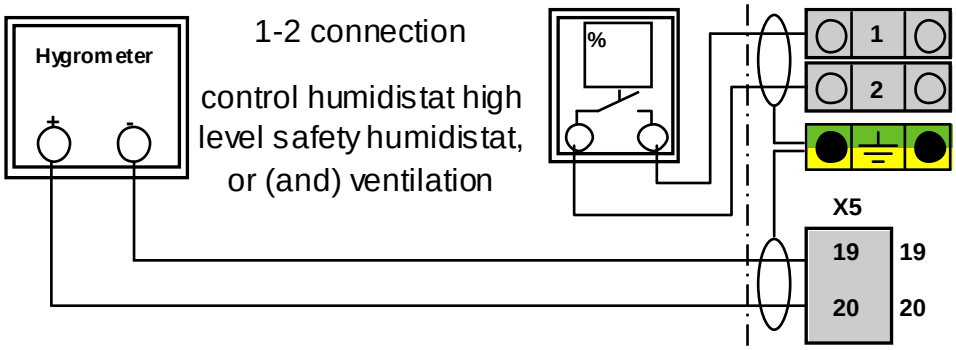


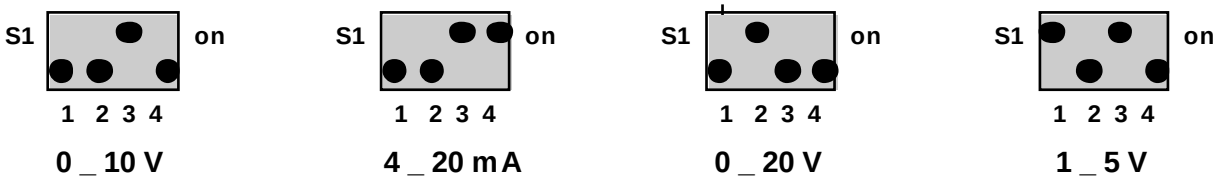
Connection with ON/OFF control humidistat, high level safety humidistat or to a ventilation system



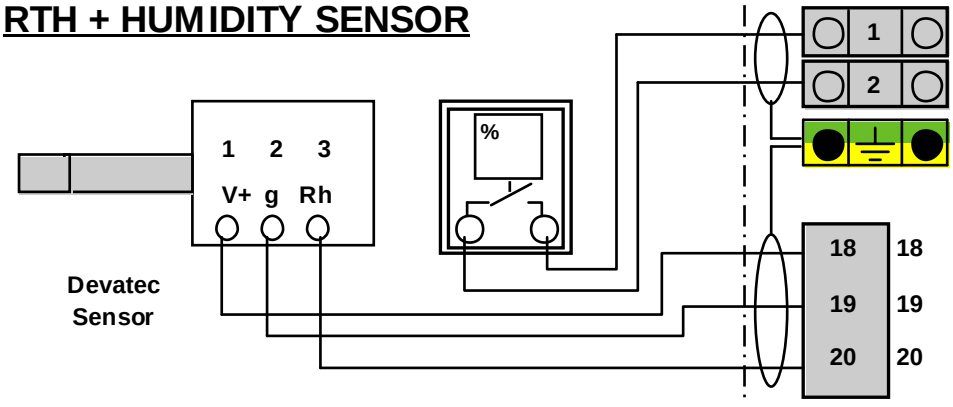
Caution : mind the signal polarity on connecting the control signal : **(+) on terminal 19 & (-) on terminal 20.** Reversing the polarity will damage the board.

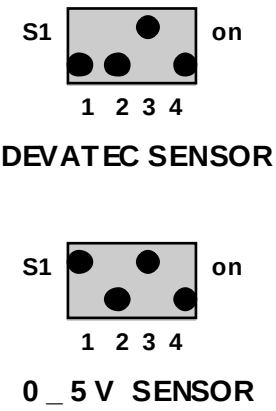
RTH PROPORTIONAL CONTROL





RTH + HUMIDITY SENSOR





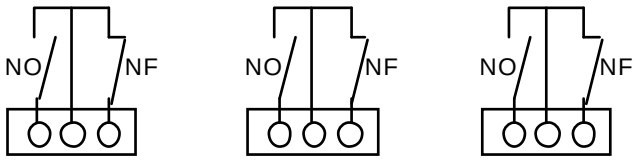
Pictures for illustrative purposes

ALL WORKS CONCERNED WITH THE ELECTRICAL INSTALLATION MUST BE CARRIED OUT BY SKILLED AND QUALIFIED PERSONNEL.

The wiring of the optional equipment described under must be made with 0.75 mm2 flexible cable.

REMOTE INFORMATION BOARD (OPTION)

Contact can be modified in NO or NF by wiring as per the following schemes (ex: wiring on 30 & 31 = NO contact).



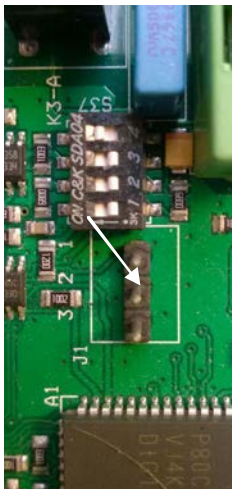
30 31 32 X20 | 33 34 35 X21 | 36 37 38 X22

X22 connector (36-37-38): Remote steam production dry contact.

X21 connector (33-34-35): Remote general fault dry contact

X20 connector (30-31-32): Remote cylinder maintenance dry contact

MODBUS connection - RS485 - Hardware connection



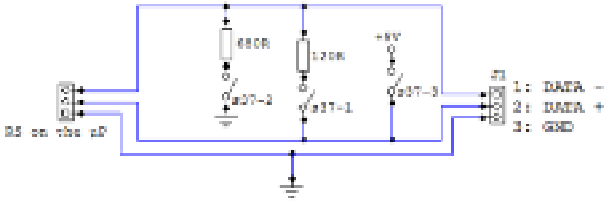
The RS485 connection must be plugged on the J1 connector (see pic.) :

Terminal 1 : Data –

Terminal 2 : Data +

Terminal 3 : Signal Ground

The S37 switch is use to enable or disable the line resistor. In most of cases, those resistors are useless and should be disabled.



Communication settings

Some settings are really important for a great communication with Devatec humidifiers.

Speed of the communication	9600 Bauds/sec (changeable)
Packet size	8 bits
Parity	No parity
Stop bit	1
Timeout response	2500ms (2.5sec)
Time between requests (after response received).	Min. 100ms
Nb of register per request	5

Pictures for illustrative purposes

ALL WORKS CONCERNED WITH THE ELECTRICAL INSTALLATION MUST BE CARRIED OUT BY SKILLED AND QUALIFIED PERSONNEL.

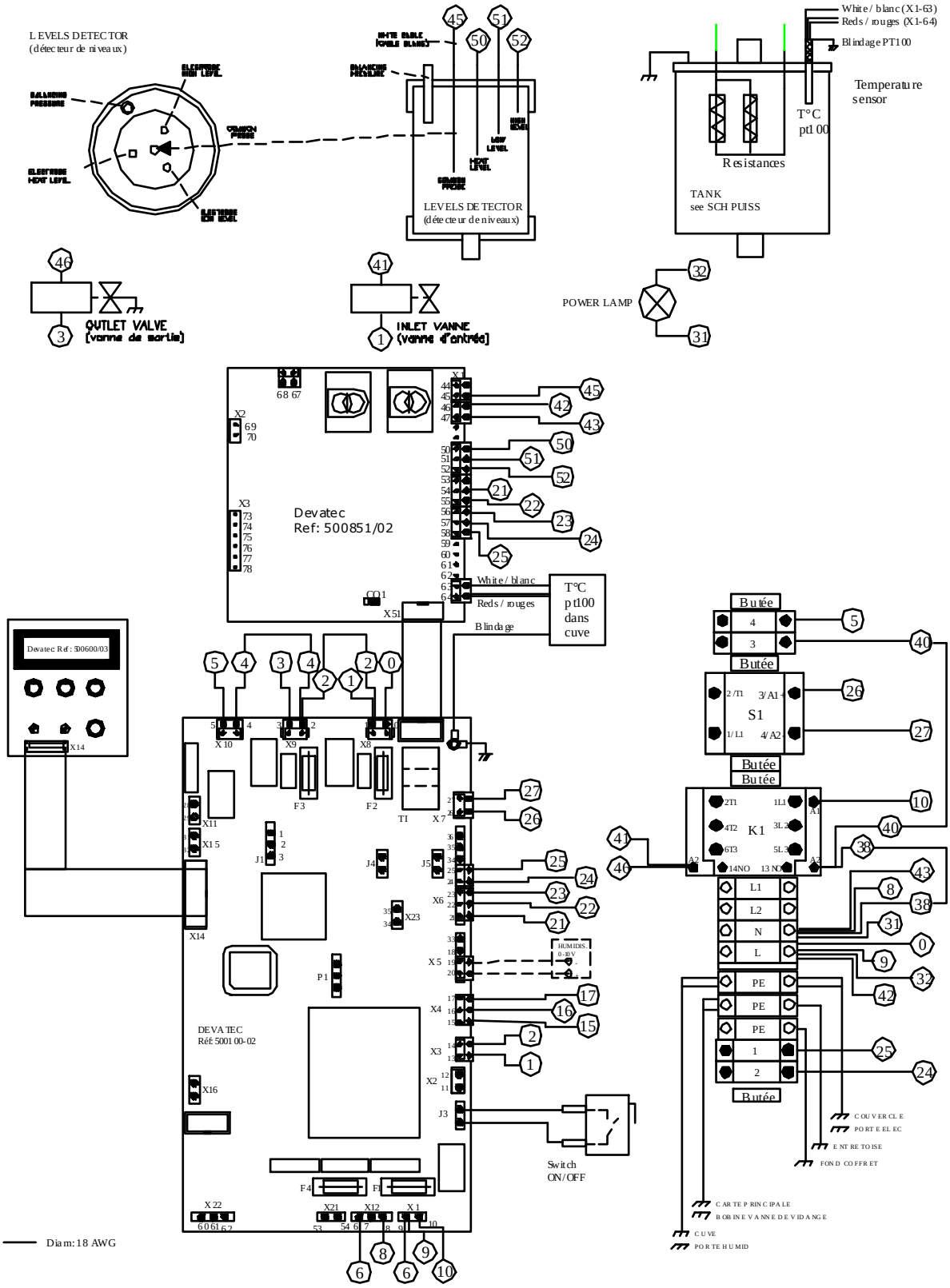
REGISTER MAP

Register Address	description	Value	Function number	Address Data (Dec)
10001	Steam Production (Contactor)	1 = Production: ON / 0 = Production: OFF	02 read only	0
10002	High limit (terminal block 1 and 2)	0 = opened / 1 = closed		1
10003	Fill (Inlet Valve)	1 = Filling / 0 = no filling		2
10004	Drain (Drain Valve)	1 = draining / 0 = no draining		3
10005	Ventilation Pack (Blower)	1 = Blower: ON – 0 = Blower: OFF		4
10006	Maintenance	1 is ON – 0 is OFF		5
10007	General fault	1 is ON – 0 is OFF		6
1	Stop the humidifier via the BMS	1 = ON: Start requested / 0 = Off : Stop Unit	01 read 05 write	0
30001	Run status	0: Idle 1: Steam Gen 2: End of season 3: Maintenance 4: Manual drain 5: Cooling 6:Failure A1 7:Failure A2 8:Failure A3 9: Failure A4 10:Failure A5	04 read only	0
30002	Steam output	(Kg/hr) x 10		1
30003	Steam output	(lbs) x 10		2
30004	Demand	(%)		3
30005	Proportional Signal (analog input)	10 x V or 10 x mA or % x 10		4
30006	Temperature tank	(°C)		5
30007	Temperature tank	(°F)		6
30008	Bed Life	(Hours)		7
30009	Run Time	(Hours)		8
30010	Idle Time before drain	(Hours)		9
30011	regulation used	1:On/Off 2: Digital Ctrl 3: Digital Sensor 4:0-10V 5 :0-20V 6 :0-20mA 7 :1-5V 8 :2-10V 9 :4-20V 10 :4-20mA 11 :devatec Sensor 12 :0-10V Sensor 13 :0-5V Sensor 14 :4-20mA Sensor		10
40001	"Maintenence interval"	(Hours / 100) mini = 1 and maxi = 200	03 read 06 write	0
40002	Idle Time (End of Season Time)	(Hour) mini = 1 and maxi = 168		1
40003	Steam capacity limit	(%) mini = 20% and maxi = 100%		2
40004	RH value in digital sensor or demand value in digital controller	(%) mini = 1 and maxi = 100		3
40005	RH Set point	(%) mini = 1 and maxi = 100		4

Pictures for illustrative purposes

ALL WORKS CONCERNED WITH THE ELECTRICAL INSTALLATION MUST BE CARRIED OUT BY SKILLED AND QUALIFIED PERSONNEL.

STEAM HUMIDIFIER RTH-LC 3 & 5 in 1x230V

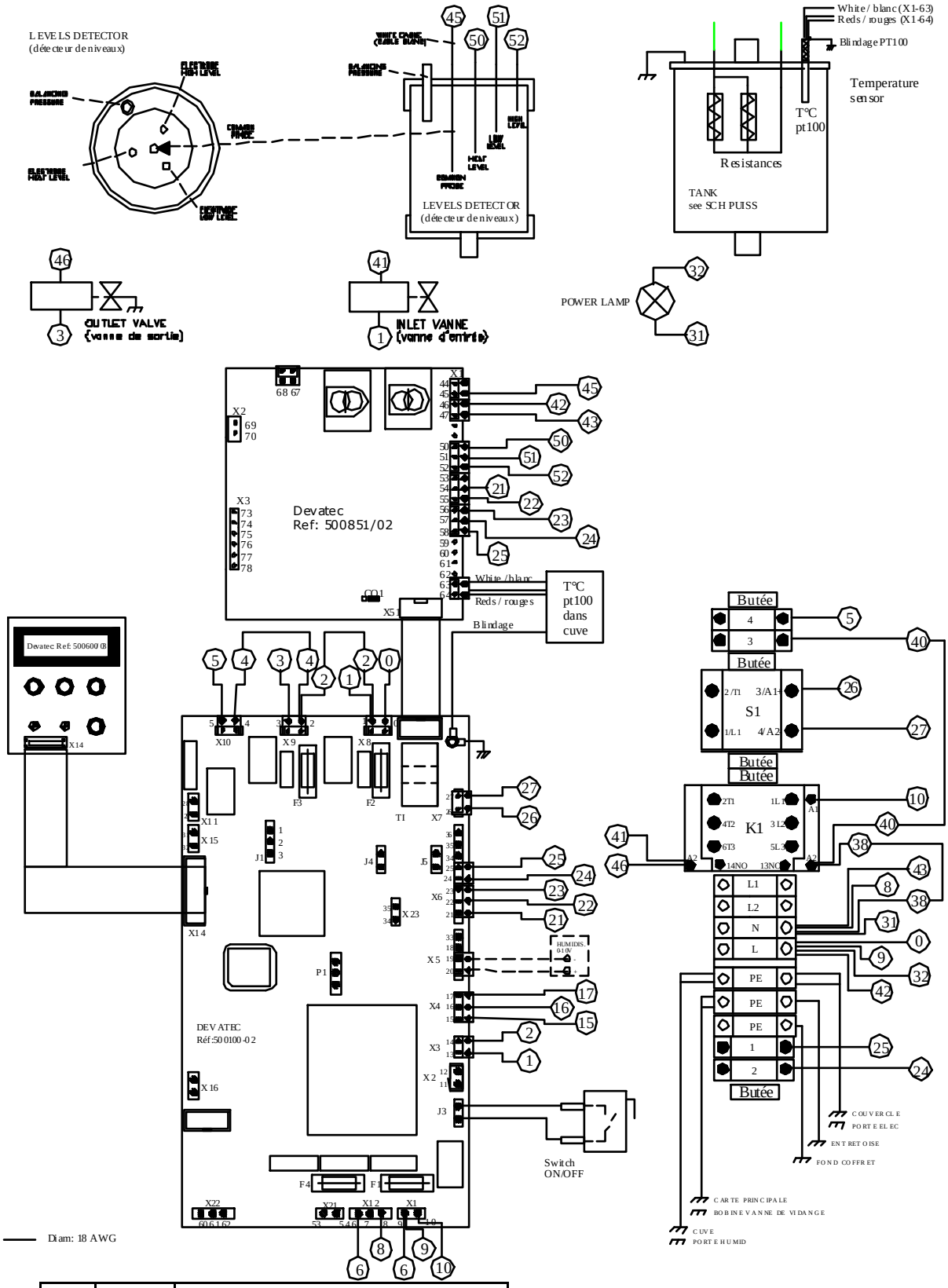


Mark	Intensity	Fuse function
F1	2A	Protection of the power contactor coil
F2	2A	Protection of the inlet valve coil
F3	2A	Protection of the drain valve coil
F4	100mA	Protection of the electronic boards

Pictures for illustrative purposes

ALL WORKS CONCERNED WITH THE ELECTRICAL INSTALLATION MUST BE CARRIED OUT BY SKILLED AND QUALIFIED PERSONNEL.

STEAM HUMIDIFIER RTH-LC 3 to 15 in 3x230V

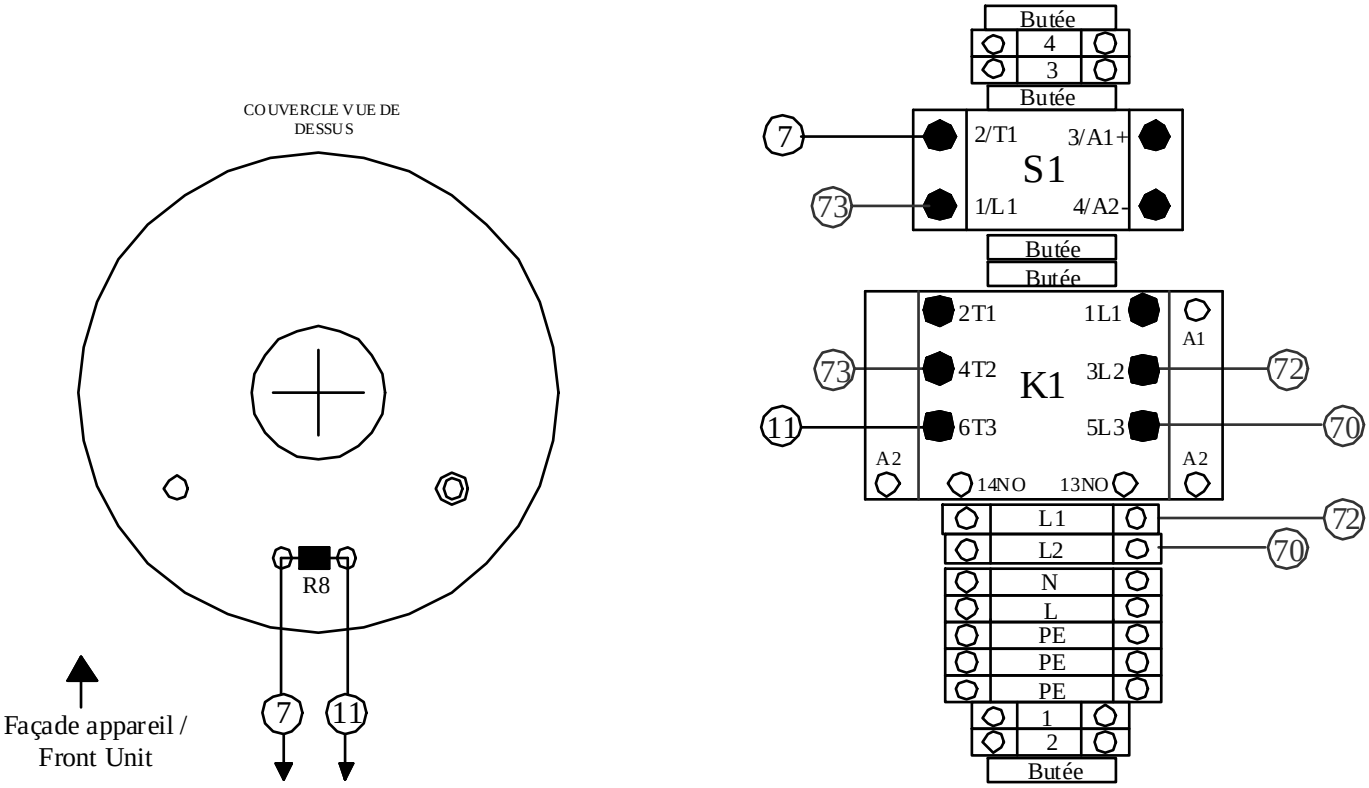


Mark	Intensity	Fuse function
F1	2A	Protection of the power contactor coil
F2	2A	Protection of the inlet valve coil
F3	2A	Protection of the drain valve coil
F4	100mA	Protection of the electronic boards

Pictures for illustrative purposes

ALL WORKS CONCERNED WITH THE ELECTRICAL INSTALLATION MUST BE CARRIED OUT BY SKILLED AND QUALIFIED PERSONNEL.

RTH –LC 3 & 5 STEAM HUMIDIFIERS in 1x230V

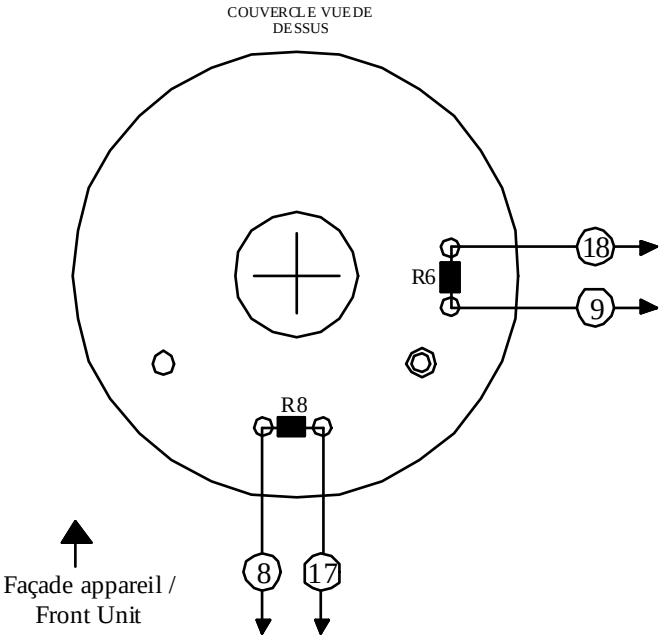


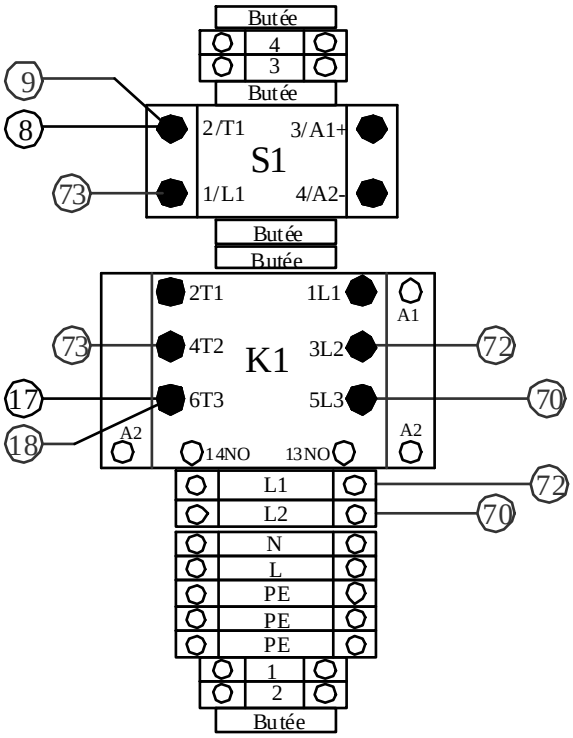
RTH	R5
3	1,9KW-230V
5	4,3KW-230V

Pictures for illustrative purposes

ALL WORKS CONCERNED WITH THE ELECTRICAL INSTALLATION MUST BE CARRIED OUT BY SKILLED AND QUALIFIED PERSONNEL.

STEAM HUMIDIFIER RTH-LC 8 in 1 x 230V



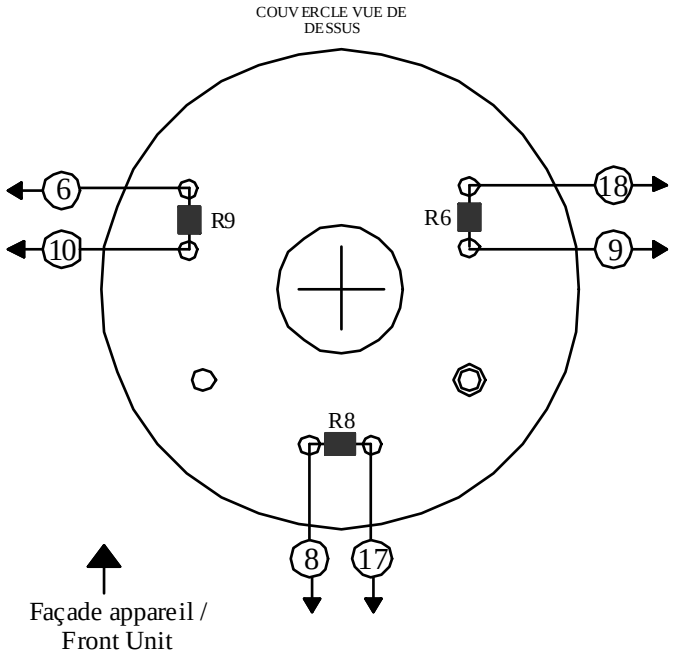


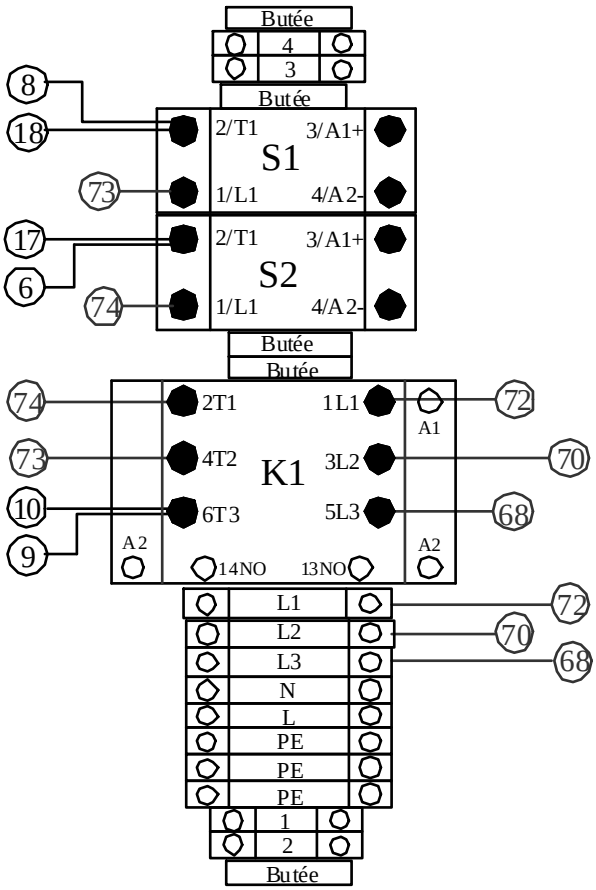
RTH	R8	R6
8	4,3KW-230V	1,9KW-230V

Pictures for illustrative purposes

ALL WORKS CONCERNED WITH THE ELECTRICAL INSTALLATION MUST BE CARRIED OUT BY SKILLED AND QUALIFIED PERSONNEL.

RTH-LC 8 STEAM HUMIDIFIER in 3x208-230V



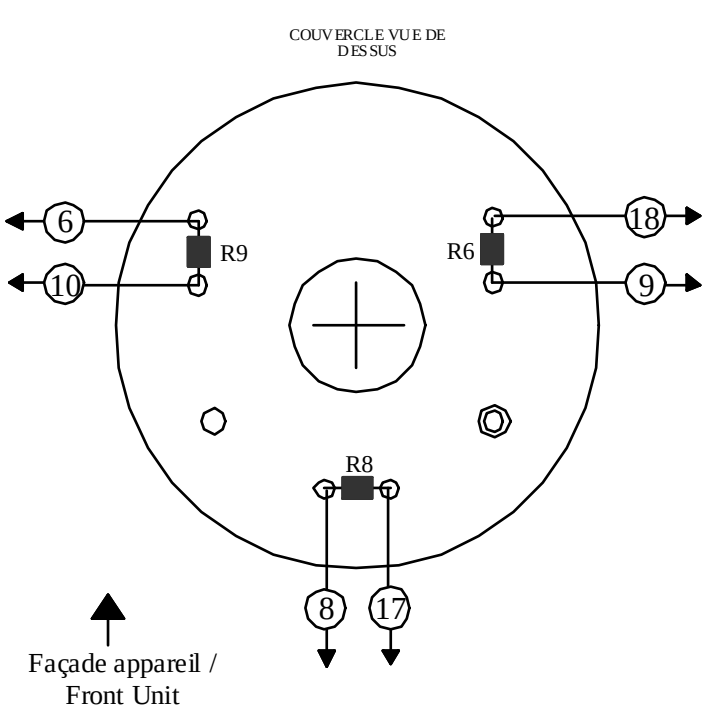


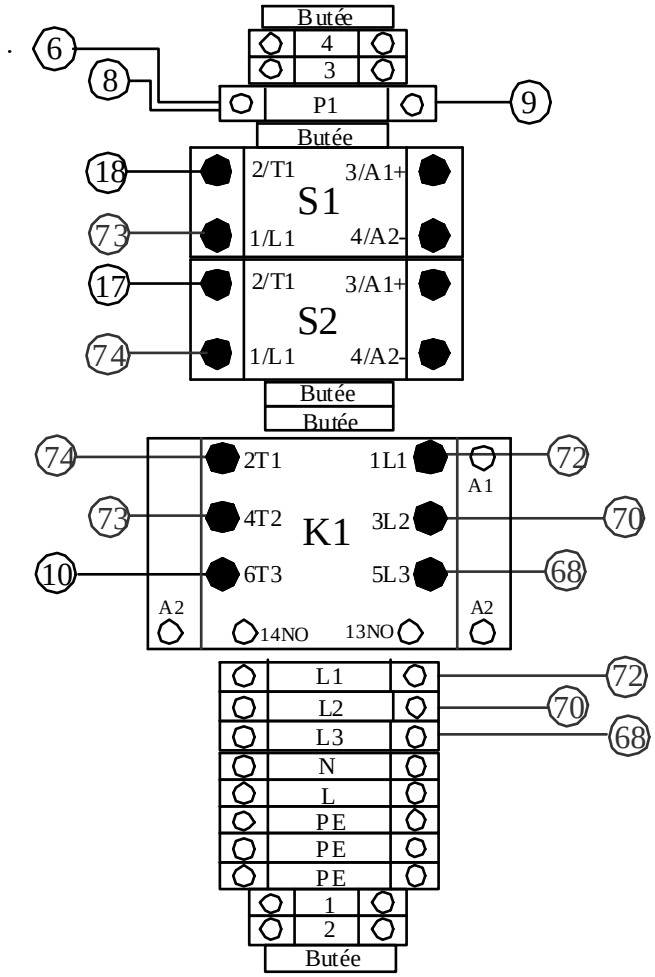
RTH	R6	R8	R9
8	1,9KW-230V	1,9KW-230V	1,9KW-230V

Pictures for illustrative purposes

ALL WORKS CONCERNED WITH THE ELECTRICAL INSTALLATION MUST BE CARRIED OUT BY SKILLED AND QUALIFIED PERSONNEL.

RTH-LC 5/3 to 15 STEAM HUMIDIFIER in 3x380 to 600V





3X380 - 400 - 415V			
RTH	R6	R8	R9
5/3	1,9KW-277V	1,9KW-277V	1,9KW-277V
7	1,9KW-230V	1,9KW-230V	1,9KW-230V
10	4,3KW-277V	4,3KW-277V	4,3KW-277V
15	4,3KW-230V	4,3KW-230V	4,3KW-230V

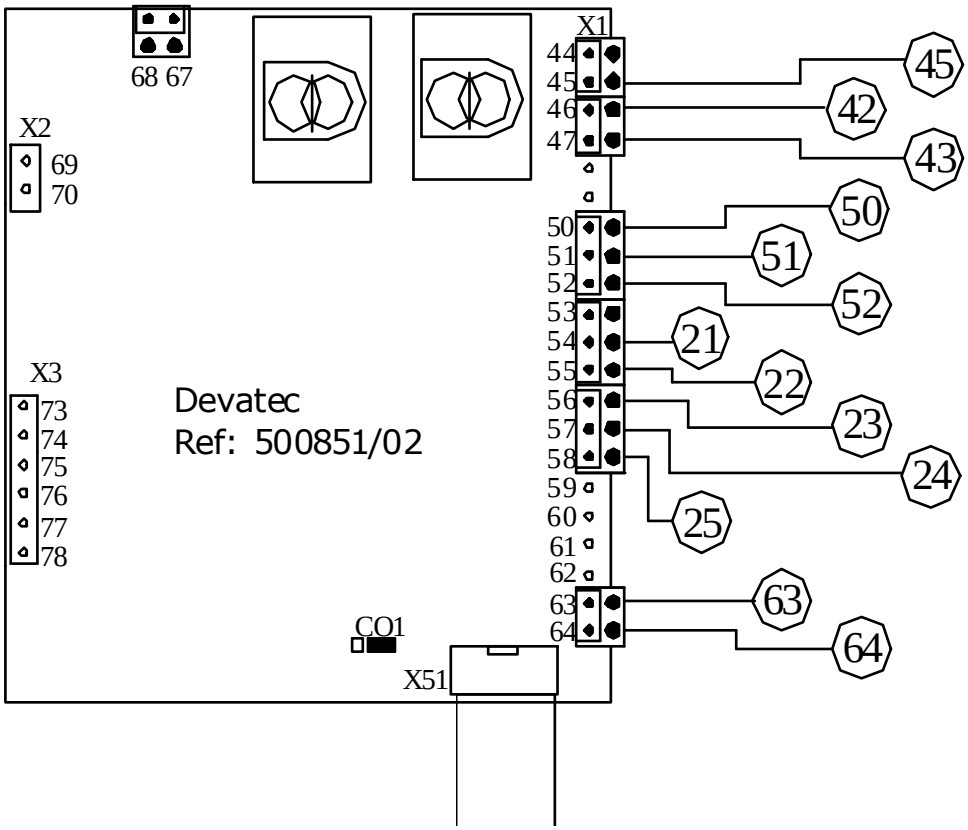
3X440 - 460 - 480V			
RTH	R6	R8	R9
7	1,9KW-277V	1,9KW-277V	1,9KW-277V
15	4,3KW-277V	4,3KW-277V	4,3KW-277V

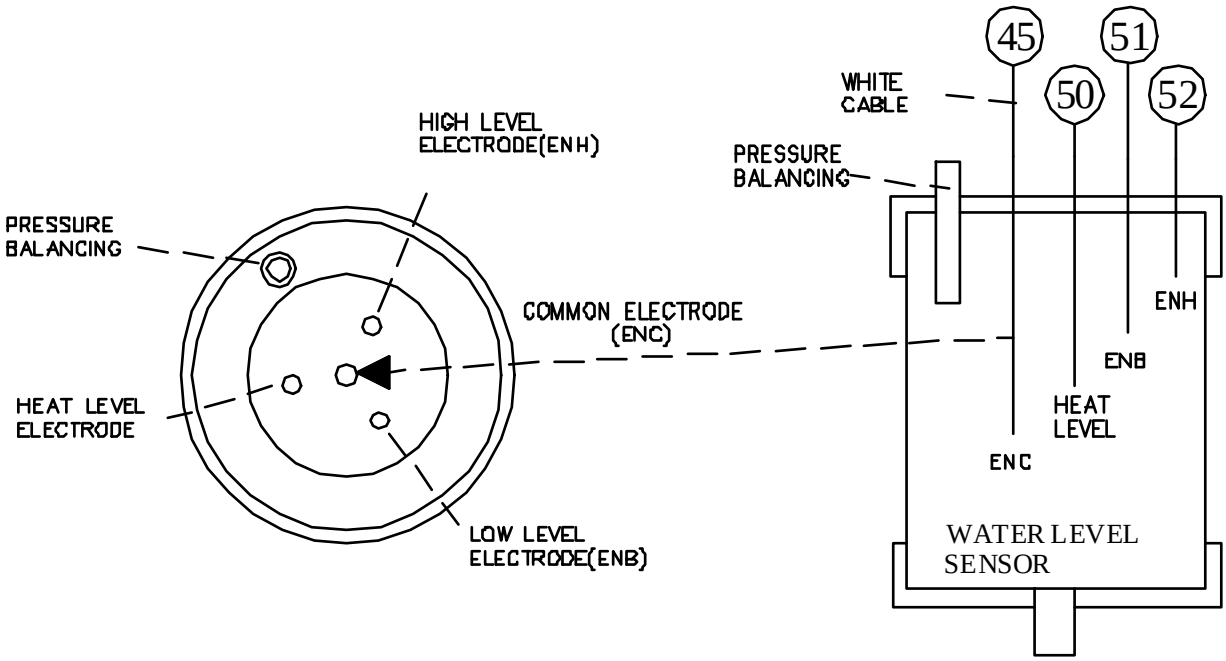
3X575 - 600V			
RTH	R6	R8	R9
7	1,9KW-346V	1,9KW-346V	1,9KW-346V
15	4,3KW-346V	4,3KW-346V	4,3KW-346V

Pictures for illustrative purposes

ALL WORKS CONCERNED WITH THE ELECTRICAL INSTALLATION MUST BE CARRIED OUT BY SKILLED AND QUALIFIED PERSONNEL.

WATER LEVEL MANAGEMENT BOARD





ALL WORKS CONCERNED WITH THE ELECTRICAL INSTALLATION MUST BE CARRIED OUT BY SKILLED AND QUALIFIED PERSONNEL.

Pictures for illustrative purposes

Before putting your humidifier in operation, please make sure that your installation is in conformity with the manufacturer's technical specifications.

- **Remove the blocking ring from the cylinder.**
- Open the water valve of the main water line.
- Switch on the main power supply contactors (voltage and command).
- The power-on light (1) must be illuminated.
- Switch on I the I/O (on/off) rocker switch.
- The display will default to show the rate of steam produced. You are in the user's information menu.

Blue anti-bubble hose inside filling cup

DISPLAY OPERATION :

1 Pressing the select button repeatedly will rotate between the three main pages.

2 Enter the derised menu by pressing the up or down button.

- As soon as the humidifier is prompted by the regulator, the humidity sensor or the humidistat, the contactor of the DIN rail turns on and the power heating is on (the steam production LED is illuminated) (2)

- When the humidifier is switched on, the inlet valve opens and the boiler is flushed with water. The heating elements then heat the water up and after about 10 minutes (the heating time depends on the model of humidifier and the water conductivity), the humidifier steams up.

Humidifier identification label stuck under and shielded by the front panel polycarbonate label.

This identification label provides the following information : RTH-LC model, unit serial number, command voltage, power voltage, number of power phases, intensity and electrical power.

Pictures for illustrative purposes

Any press on the enter key from any of these menus.

MENU: HUMIDIFIER STATUS

WWW.DEVATEC.COM/ ELECTROVAP/06_26.1

This display shows up shortly when the humidifier is powered on or when in stand-bye mode

MENU : USER INFORMATION MENU

STEAM HUMIDIFIER
RTH ---- 3x400V

STEAM PRODUCED
XX.Xlbs XX.XKG/LBS

ACTUAL CURRENT
XX.X A

ACTUAL CONTROL SIGNAL Y - - %

If in Modbus

ACTUAL CONTROL SIGNAL Y XX.Xuu

Uu=mA or V according to the control signal

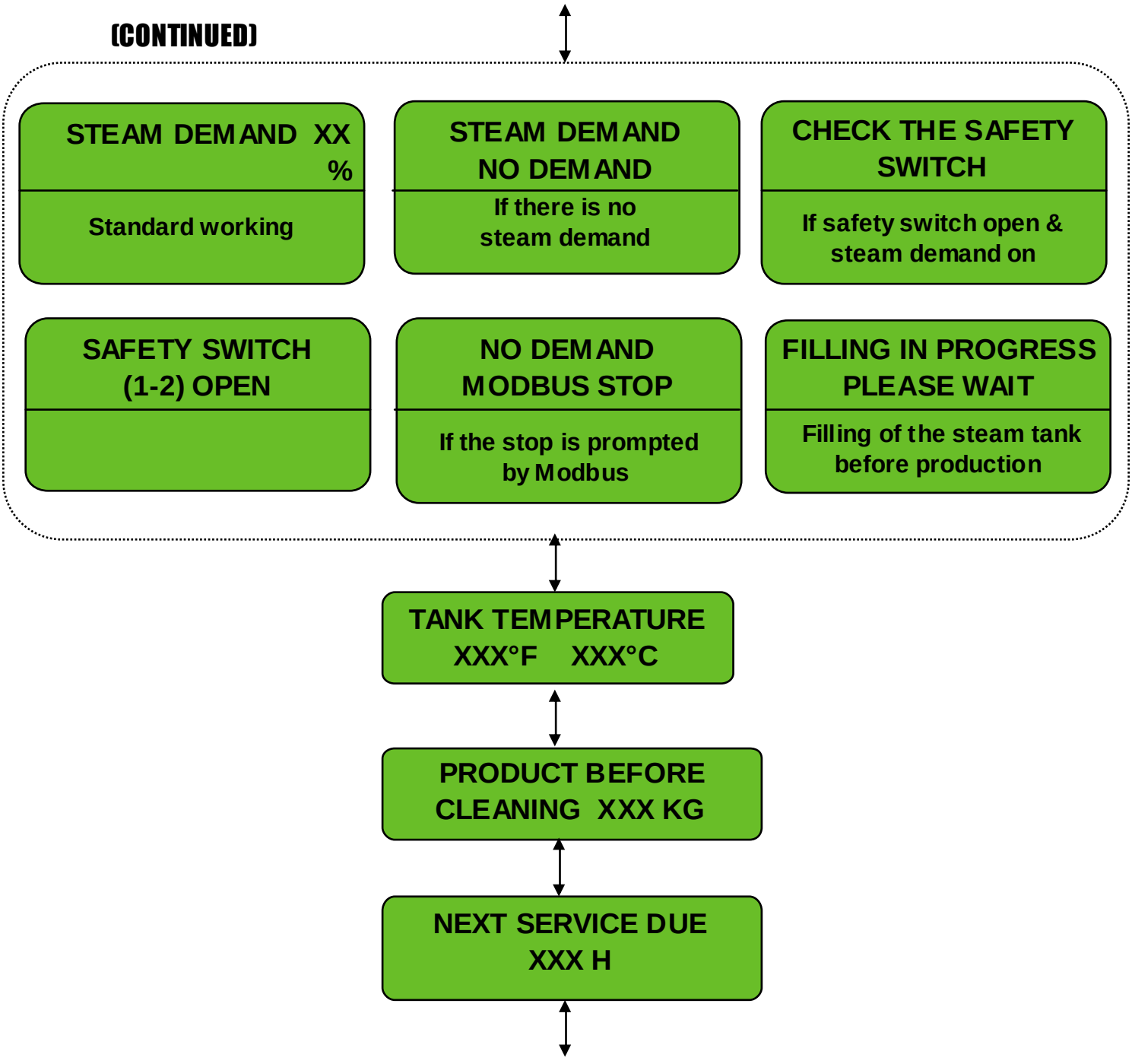
CHECK RH SENSOR

If rh < 7%

SET POINT - - %HrHR
MEASURE - - %

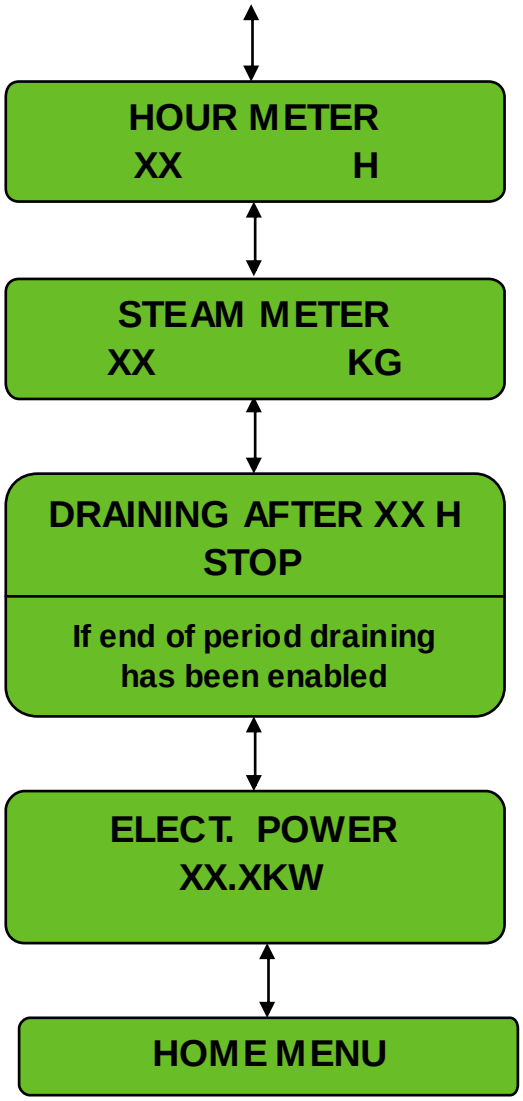
If in RH sensor mode

Pictures for illustrative purposes



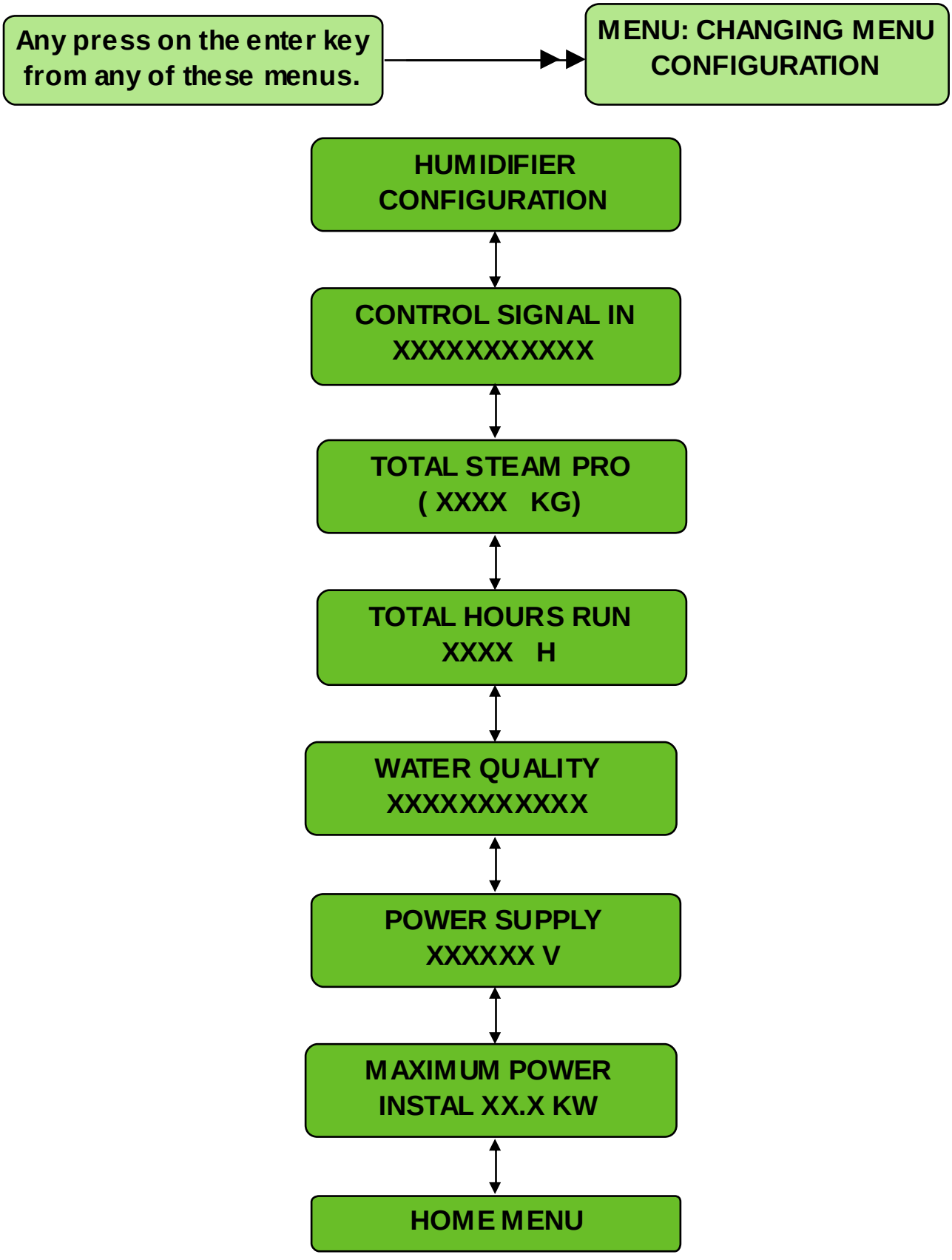
Pictures for illustrative purposes

Continued



Pictures for illustrative purposes

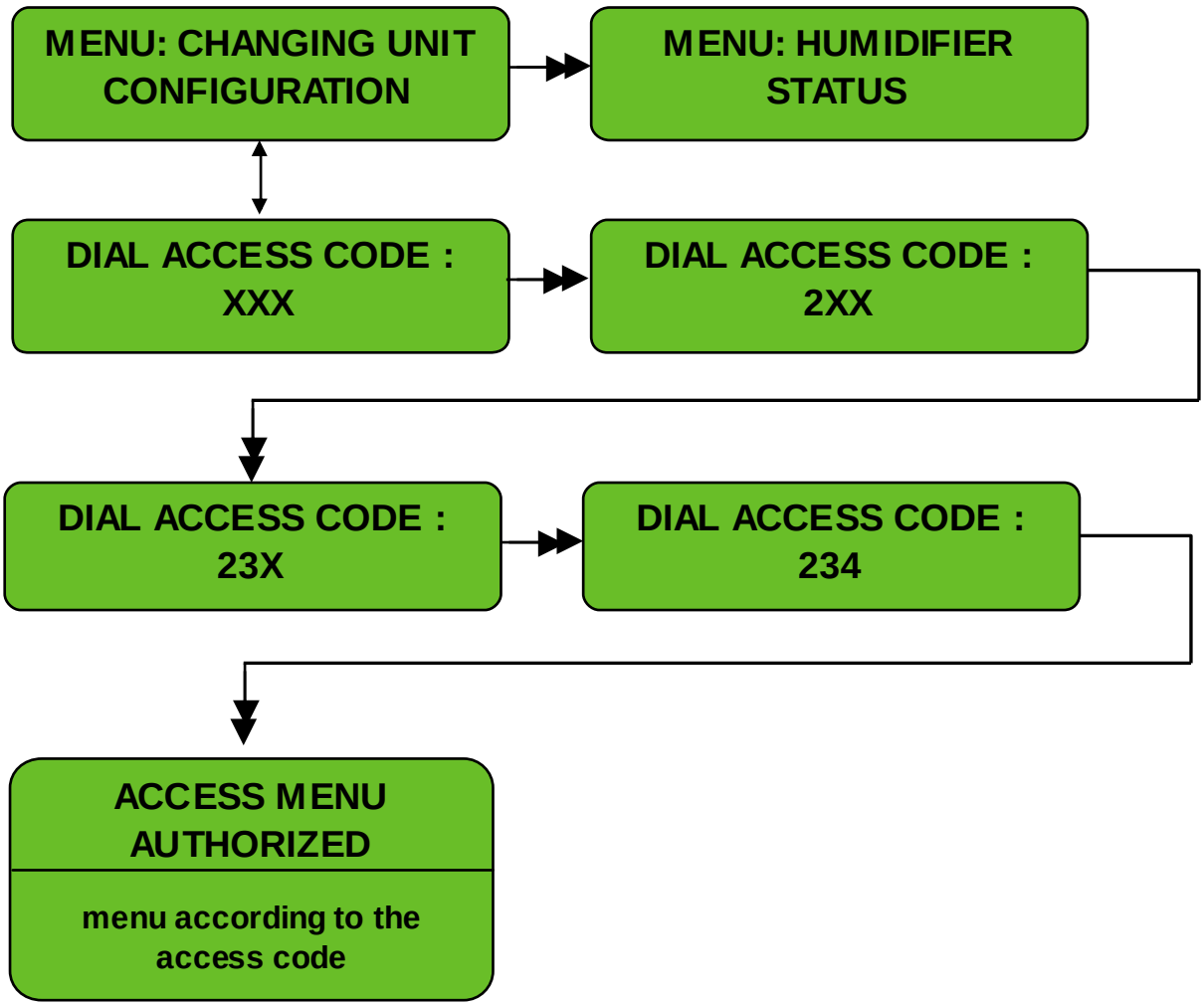
Humidifier status menu



Pictures for illustrative purposes

ATTENTION

- A press on button 1 will allow you to shift to sub-menu for changing configuration parameters.
- Then scroll display using the up (2) or down (3) keys.
- The selected parameter will flash and press return key (1) for recording.



Pictures for illustrative purposes

MENU : CHANGING UNIT CONFIGURATION

→ **Press on the enter key from any of these menus** → **MENU: HUMIDIFIER MENU**

CONTROL SIGNAL IN XXXXXXXXXXX

→ **Possible value : 1 step on/off, digital control, digital sensor 4 steps, 0-10V / 2-10V controler, 0-20 / 4-20 mA controler, 1-5V sensor, Devatec sensor**

STEAM CAPACITY LIMIT XX %

→ **Possible value : between 20 and 100 % if On/Off control otherwise 50-100 %**

ADJUST SET POINT XX % Hr

→ **Possible value : between 10 and 99 %**

ADJUST PROP BAND XX %

→ **Enables to tune the proportional accuracy. Possible value : between1 and 50 %**

MAINTENANCE FREQUENCY 10000 KG

→ **Possible value : between 0 and 999000 kg**

This is to preset a number of kg of steam or a number of hours of running before a visual inspection of the steam boiler takes place. If the steam boiler needs being maintained, please revert to the maintenance pages of this manual. Otherwise, a higher preset maintenance figure can be adjusted (factory preset value : 300h).

MAINTENANCE FREQUENCY 300 H

→ **Possible value : between 0 and 2000 H**

SETTING WATER T° : YES

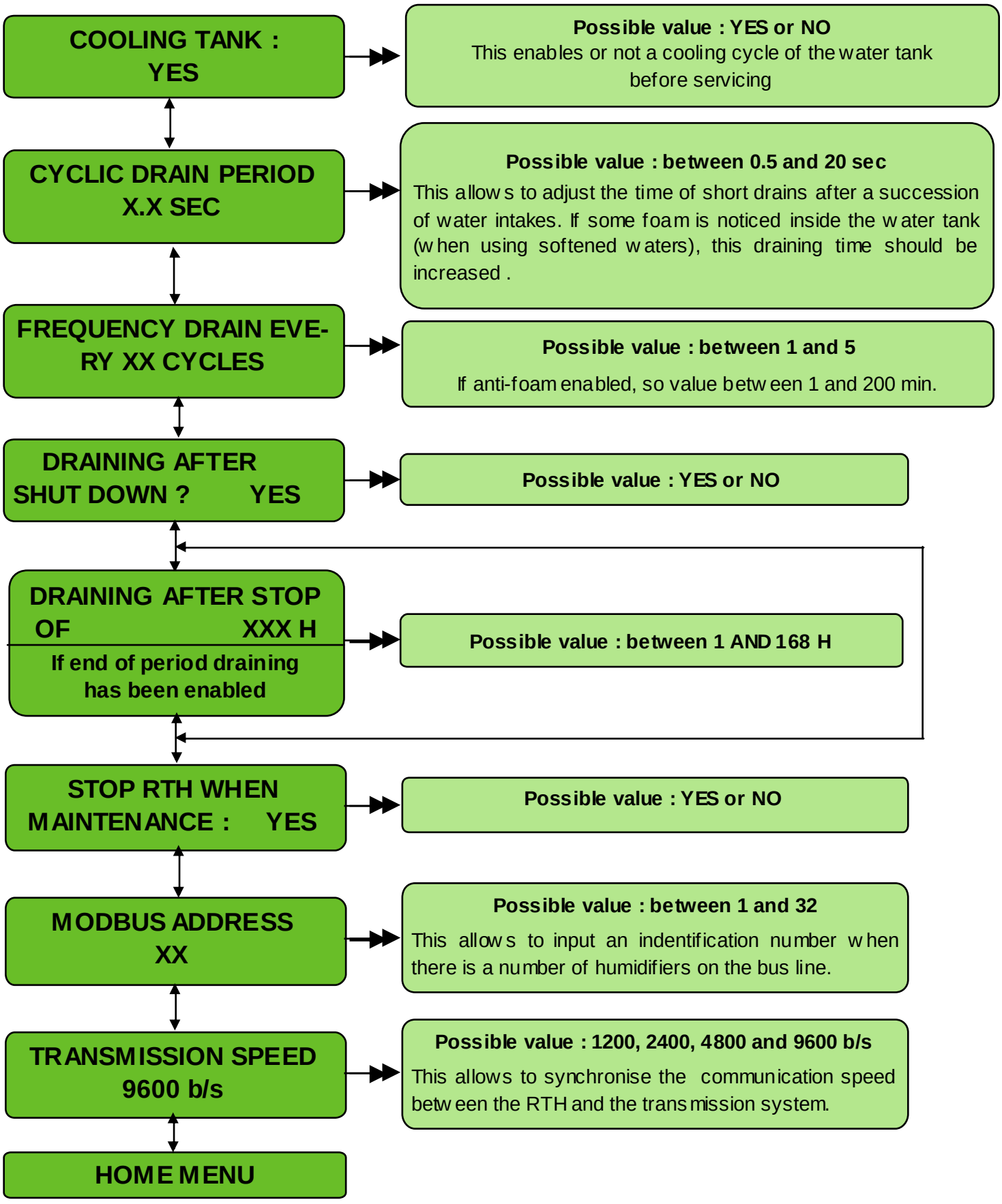
→ **Possible value : YES or NO**

This is to keep or not the water temperature on when the unit is on halt.

WATER TEMP. °C MAINTAINED XXX °F XXX °C

→ **Possible value : between 25°C and 85°C**

Pictures for illustrative purposes



Pictures for illustrative purposes

IMPORTANT NOTICE

The units have a factory default maintenance time of 300 hours that suits to most cases. The exact maintenance frequency is variable and depends on the water quality, the hours of run and the level of demand for humidification. New installations should be inspected or serviced frequently to enable a suitable maintenance routine to be established.

Alerts and alarms

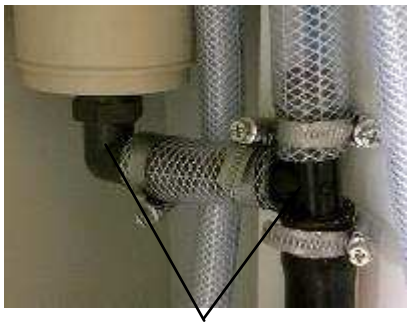
ALARM
A1

This means that the temperature inside the water tank is too high. The heating elements are no longer completely immersed.

When this alarm is shown, the water tank is drained out, the genaral fault alert is trigged on and the humidifier is stopped.

Causes and corrections

1. Incorrect water supply. Few or no water flushes the tank due to a piece of chalk clogging the inlet valve. All the water pipe must be cleaned up.



Water supply tees to clean up

Water filtre inside the water tank to clean or change

2. Faulty water level detector. Make sure that the sensor wires are correctly attached to their posts and that none of them create short-circuits. Open the detector and clean the electrodes. Make sure they work well.

3. Faulty temperature sensor : this message is generally displayed when the water tank is still cold. The temperature must be replaced and calibrated (s.a. §4).
4. Temperature calibration drifting. The sensor must be re-calibrated.
5. Control correct connection of wires 45, 50, 51, 52, 25, 24, 23, 22 and 21. There should be no short-circuit.
6. Electronics. Change the water level management board first. If the fault persists, change the main board.

Pictures for illustrative purposes

Alerts and alarms

ALARM
A2

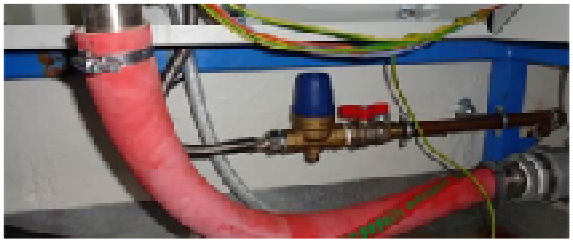
This means that there is no water supply.

The water level does not reach the low water detection level (the unit cannot produce steam). The fault is trigged on after some time.

When the fault is displayed, the tank is drained out, the general fault alert trigged on and the unit stopped.

Causes and corrections

1. Water pressure - It must be between 1 & 6 bar and kept as constant as possible. If not, a water regulator valve must be installed on the supply line and adjusted at 2 bar.



2. Water softerfer - In case a softener is used, make sure that the humidifier is still supplied in water during the regeneration cycles.

3. Blue hose in filling cup - The blue hose in the filling cup is missing or mislocated. The blue hose must have one end in the water feed hole and the other in the middle hole. The part having the shortest diameter should be in the center hole and go down to the level of the black tee (s.a. attached pictures)

4. Steam hose - Make sure that the pitch of the steam hose is constant and prevent unecessary ups and downs. The latter create pockets of condensate that hamper the natural flow of steam. This generates an undue pressure inside the tank that prevents the water to flush in.

5. Water level detector - Lime deposits clog the water access to the detector. The latter should be cleaned up together with the water supply union.

6. The draining valve does not close - Either a piece of chalk keeps the valve open (this is the most frequent occurrence) or the valve has become faulty. In one case, the complete cleaning of the valve solves the issue and in the other, the valve must be changed.

7. Water level detection - Control water level electrode sensors, X1 connector on the water level management board and X6 connector on the main board.

8. Electronics - Change the water level management board first. If the fault persists, change the main board.

Pictures for illustrative purposes

Alerts and alarms

ALARM
A3

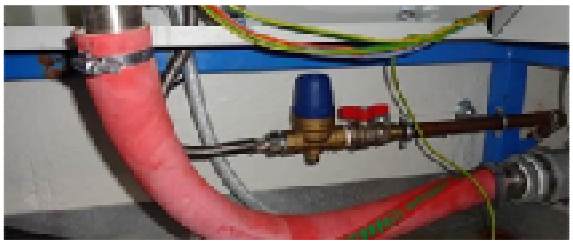
This means that the water feeding does not work well.

The alert is trigged on 8.5 mn after the feeding has begun and that the water has exceeded the low level dectection (the unit can produce steam).

When this message is shown, the tank is drained out, the general fault alert is trigged on and the humidifier is stopped.

Causes and corrections

1. Water pressure - It must be between 1 & 6 bar and kept as constant as possible. If not, a water regulator valve must be installed on the supply line and adjusted at 2 bar.



2. Water softerfer - In case a softener is used, make sure that the humidifier is still supplied in water during the regeneration cycles.

3. Blue hose in filling cup - The blue hose in the filling cup is missing or mislocated. The blue hose must have one end in the water feed hole and the other in the middle hole. The part having the shortest diameter should be in the center hole and go down to the level of the black tee (s.a. attached pictures)

4. Steam hose - Make sure that the pitch of the steam hose is constant and prevent unecessary ups and downs. The latter create pockets of condensate that hamper the natural flow of steam. This generates an undue pressure inside the tank that prevents the water to flush in.

5. Water level detector - Lime deposits clog the water access to the detector. The latter should be cleaned up together with the water supply union.

6. The draining valve does not close - Either a piece of chalk keeps the valve open (this is the most frequent occurrence) or the valve has become faulty. In one case, the complete cleaning of the valve solves the issue and in the other, the valve must be changed.

7. Water level detection - Control water level electrode sensors, X1 connector on the water level management board and X6 connector on the main board.

8. Electronics - Change the water level management board first. If the fault persists, change the main board.

Pictures for illustrative purposes

Alarms & alerts

ALARM
A4

This means that the temperature sensor either fails or does not work correctly.

In any of these cases, the humidifier is stopped.

Causes and corrections

1. Check correct wiring of the sensor on the water management board : X1 connector (terminals 63, 64) for the single tank humidifier.

2. Electronics - Change the water level management board first. If the fault persists, change the main board.

Pictures for illustrative purposes

Maintenance warnings

MAINTENANCE
M1

This means that the maintenance of the tank and of the draining and filling circuits are to be done.

Do not forget to replace the tank gasket.

Message with version program prior to program version RTH06-24

CLEANING : OUTLET VALVE + TANK

IF THIS MESSAGE IS SHOWN :

The RTH humidifier keeps producing steam if « NO » is selected at sub-menu « STOP RTH WHEN MAINTENANCE : NO » in the configuration changing menu (code 2,3,4).

The RTH humidifier comes to a halt if « YES » is selected at sub-menu « STOP RTH WHEN MAINTENANCE : YES » in the configuration changing menu (code 2,3,4).

STOP RTH WHEN MAINTENANCE XXX

WHAT TO DO :

- Power off the unit.
- Revert to paragraph « maintenance ».
- Once the maintenance done, process as per under-mentioned to reset the maintenance timer to 0

RTH humidifier with software version V01_07, V02_08, V03_08 & V04_08 :

- Press first on  then press on 

RTH humidifier with software version V05_08 or above :

- Press first on  then press on 

Once the initialization is over, press on the « manual drain » button again to set the unit back to production. A « STEAM PRODUCED » indication appears in the display window.

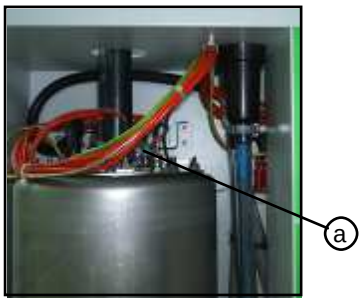
Pictures for illustrative purposes

Picture n°1

- Drain the tank out by pressing the manual drain button (s.a. picture n° 1). Wait for complete draining and allow the tank to cool down (if this feature has been enabled).

- Cut off the power supply at the power switch-board and power off the RTH humidifier (s.a. picture n°1).

Picture n°2



- Screw off the front door, lift it a little and take it away. Remove the black steam hose from the steam tank (s.a. picture n°2) and draw it out the humidifier.

Picture n°3

- Unscrew all the screws of the boiler top with a 10 mm wrench (s.a. picture n°3).

Picture n°4

- Lift the boiler up to get it free from its base (s.a. picture n° 4).

Picture n°5

- Grasp the body of the boiler and take off the top with the heating elements attached (s.a. picture n° 5).

Pictures for illustrative purposes

(continued)

Picture n°6

- Put the heating element assembly on the top of the humidifier (s.a. picture n° 6).

Picture n°7

- Put a container or the optional flexible calcius collecting bag on ground and empty the boiler contents in it (s.a. picture n° 7).

- **Take care : the tank gasket should be changed whenever the boiler is maintained (s.a. picture n° 8). Retigthen all the collar clamps.**

Do not scratch harshly, hit or use corrosive liquids on the heating elements.

Picture n°8

- Uncap the water level tank and clean the 4 electrodes (s.a. picture n° 9).

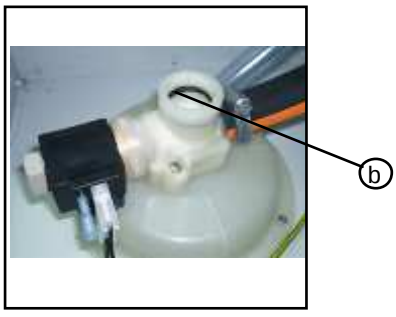
Do not use any solvent to clean the water level tank nor special glues if the tank needs being attended but use teflon. Use a scraper on sensor electrodes if needed.

Picture n°9

- Set back the high water level tank cap.

- Reassemble the boiler cover assembly and the boiler in the same position. **Pay particular attention that no power wires be jammed between the tank and the bottom and gathered them in the insert bundleclips as shown in picture 3.**

Picture n°10



- Make sure there is still the O ring in the drain valve body before putting back the steam boiler (s.a. picture n° 10-b).

Tighten up all the screws of the boiler top and reconnect the steam hose.

Pictures for illustrative purposes

DRAIN VALVE MAINTENANCE

The drain valve should be maintained whenever the steam cylinder is maintained or changed.

Once the steam cylinder has been pulled out (please refer to the « cleaning of the steam cylinder » page), disconnect the drain valve supply wires.

Unscrew the solenoid retaining nut and remove the washer. Put them on the cylinder compartment tray.

Remove the coil from the valve stem.

Unscrew and remove the valve stem and the filling hose from the valve body.

Important : Apply some soap on the O-ring and the cylinder draining outlet

Remove the « O » ring and the drain valve collar. Remove any pieces of calcius, rinse the steam and the body with fresh water.

Assemble in reverse order.

Once the drain valve has been cleaned up, put the boiler back in its compartment in proceeding this way : set the maintaining clip on the steam cylinder outlet, engage the drain outlet into the drain valve and push the cylinder downward. Locate the steam hose and fasten the clamp.

Ensure that all the clamps are properly tightened whenever the humidifier is maintained.

Pictures for illustrative purposes

INLET VALVE MAINTENANCE

The inlet valve should be maintained every 6 months as a minimum and after 50 hours operation.

Isolate the water supply and remove the water supply hose from the valve.

Disconnect the electrical wires from the coil.

Untighten the collar clamp and remove the water feed hose.

Unscrew the black nut ① and lay it on the cylinder compartment tray.

Take the valve out and remove the basket filter from the base of the valve with a pair of long nose pliers. Pull the coil out with a flat screw driver.

Wash the basket filter under clean water to remove any dirt and debris.

Replace whole valve if cleaning is not practical or replace coil if necessary.

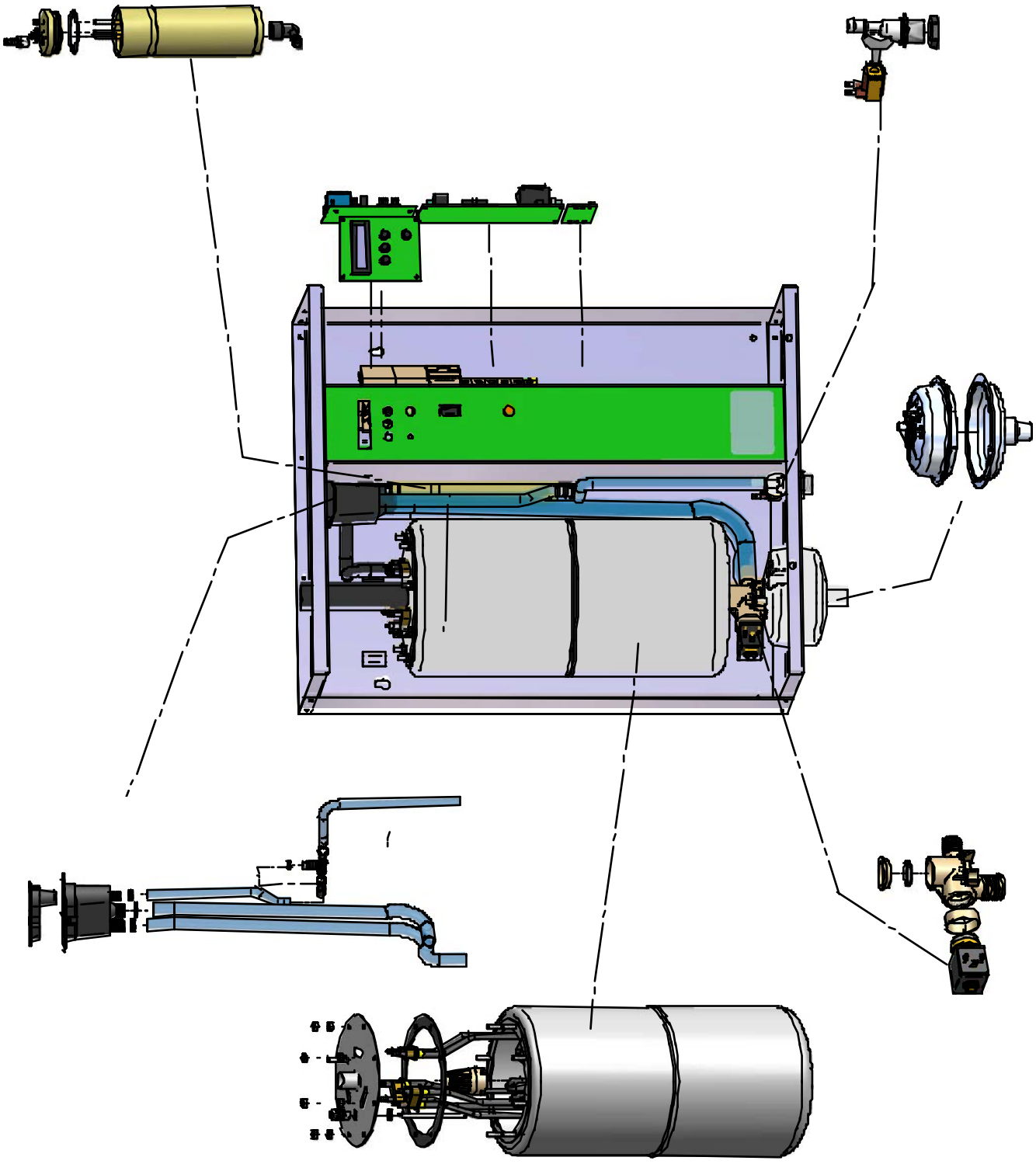
Assemble in reverse order taking care to replace collar clamp if necessary.

Ensure that everything is correctly assembled and switch the humidifier on.

Ensure that all the clamps are properly tightened whenever the humidifier is maintained.

Pictures for illustrative purposes

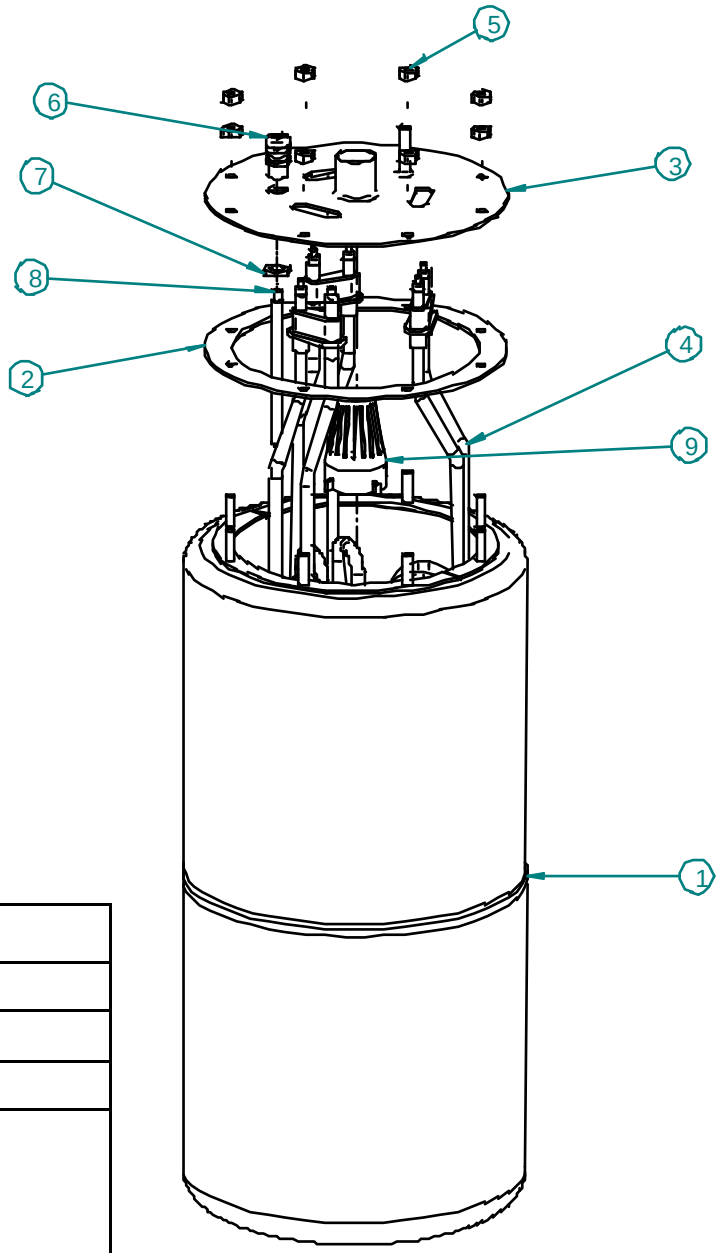
OVERVIEW



Pictures for illustrative purposes

STAINLESS STEEL BOILER

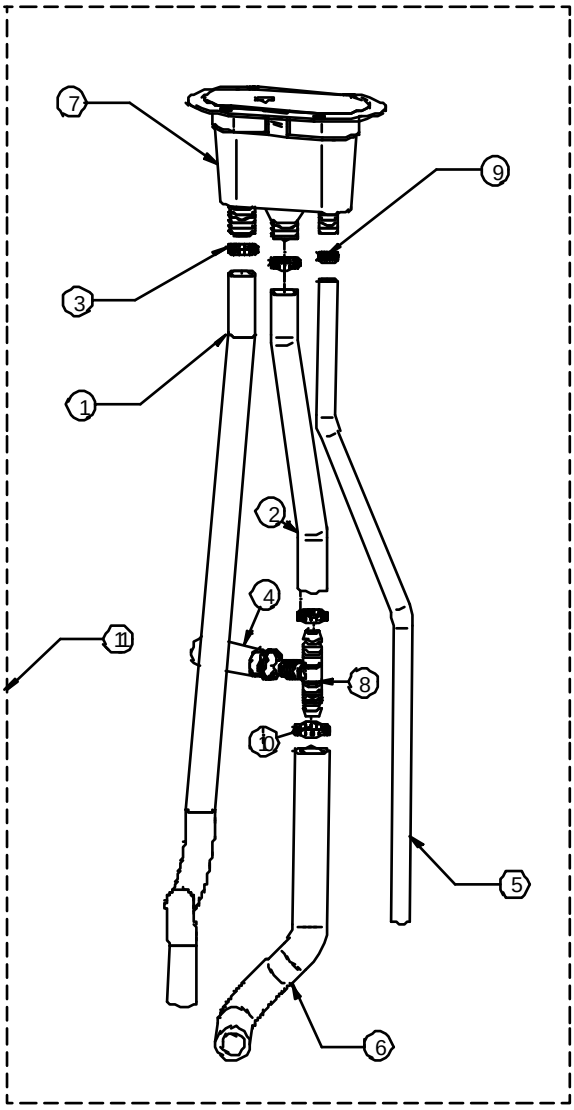
Please refer to the electrical tables on pages 22 to 24 and to the wiring schemes on pages 32 to 35 for the selection of the heating element(s) fiting your model of humidifier.



Rep	Code	Description
1		Stainless steel cylinder
2	930553	Cylinder gasket
3		Cylinder top
4	930500	Heating element 1,9KW (230V)
	930547	Heating element 1,9KW (277V)
	930503	Heating element 4,3KW (230V)
	930548	Heating element 4,3KW (277V)
5		Watertight nut M6
6	930505	Metal stuffing box
7		Stuffing box screw
8	930504	PT100 temperature sensor
9	930558	PPH inner filter

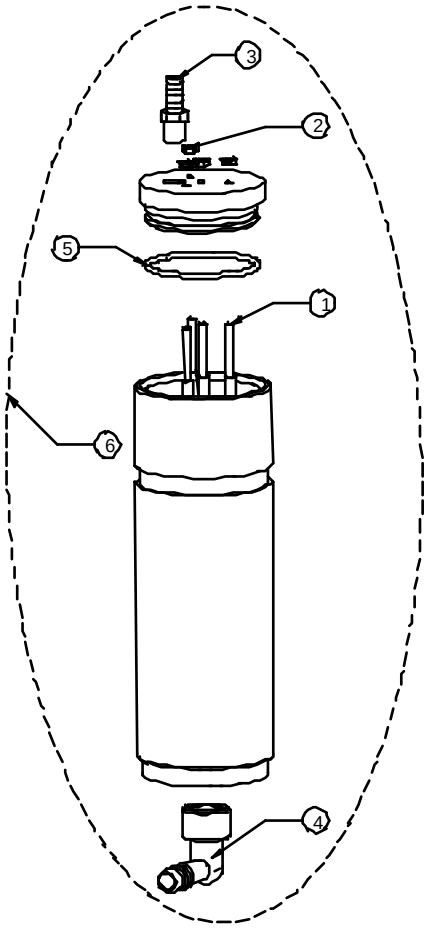
Pictures for illustrative purposes

Filling cup



Rep	Code	Description
1	930137	Water hose Ø18x22mm
2	930137	Water hose Ø18x22mm
3	930082	Ring clamp Ø16x27mm
4	930137	Water hose Ø18x22mm
5	93135	Water feed hose Ø12x16mm
6	930137	Overflow hose Ø18x22mm
7	930231	Filling cup assy
8	930506	Black PVC fluted tee Ø20x20x20mm
9	930081	Ring clamp Ø12x22mm
10	930082	Ring clamp Ø16x27mm
11	930554	RTH-LC filling cup with hoses
12	930287	Anti-bubble blue hose inside fillicing cup

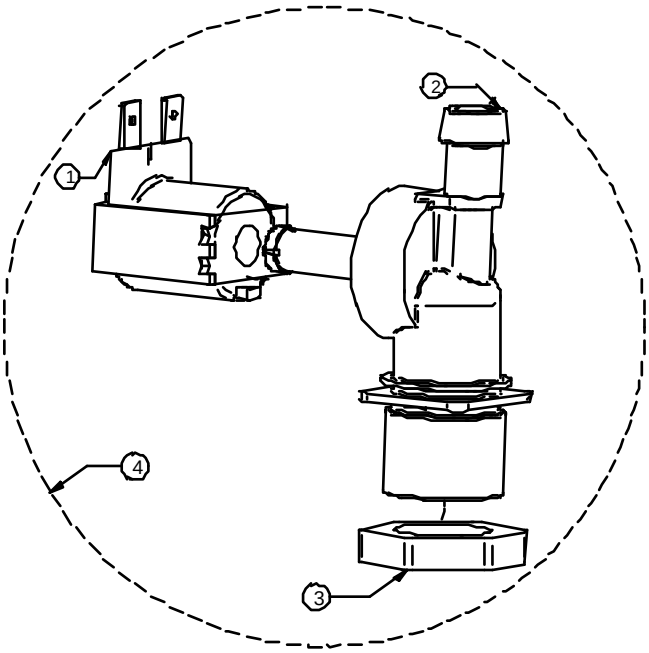
Water level detection tank



Rep	Code	Description
1	930521	Water level sensor (set of 4)
2		Stainless steel nut Ø4mm
3		Fluted chromium plated tip 1/4" G - Ø8mm
5	930523	Black O ring SIL70 (bag of 2)
6	930522	Water level assy

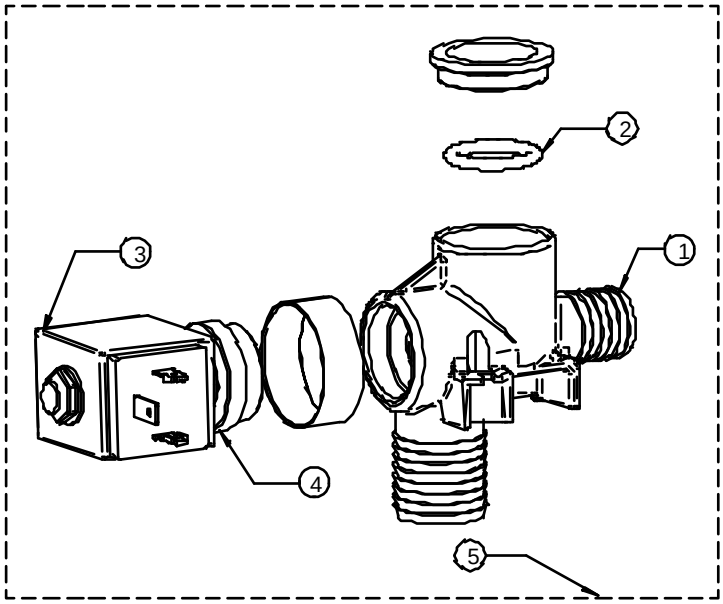
Pictures for illustrative purposes

Water inlet valve



Rep	Code	Description
1	930160	Inlet valve solenoid coil
2		Inlet valve body N2
3	930224	Screw 3/4"
4	930151	Complete inlet valve

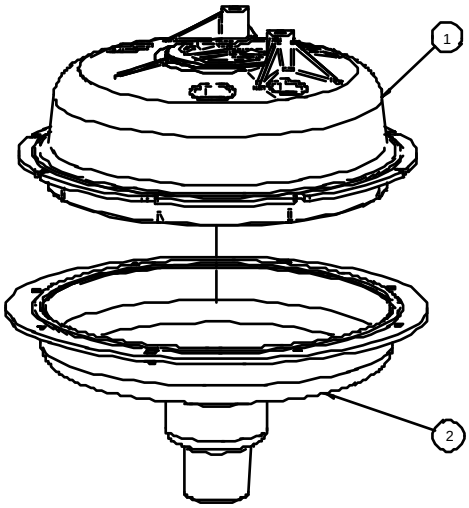
Water drain valve



Rep	Code	Description
1	930307	Drain valve body
2	930189	Drain valve O ring (bag of 10)
3	930161	Drain valve solenoid coil
4	930220	Insert (+ drain valve coil)
5	930153	Complete drain valve

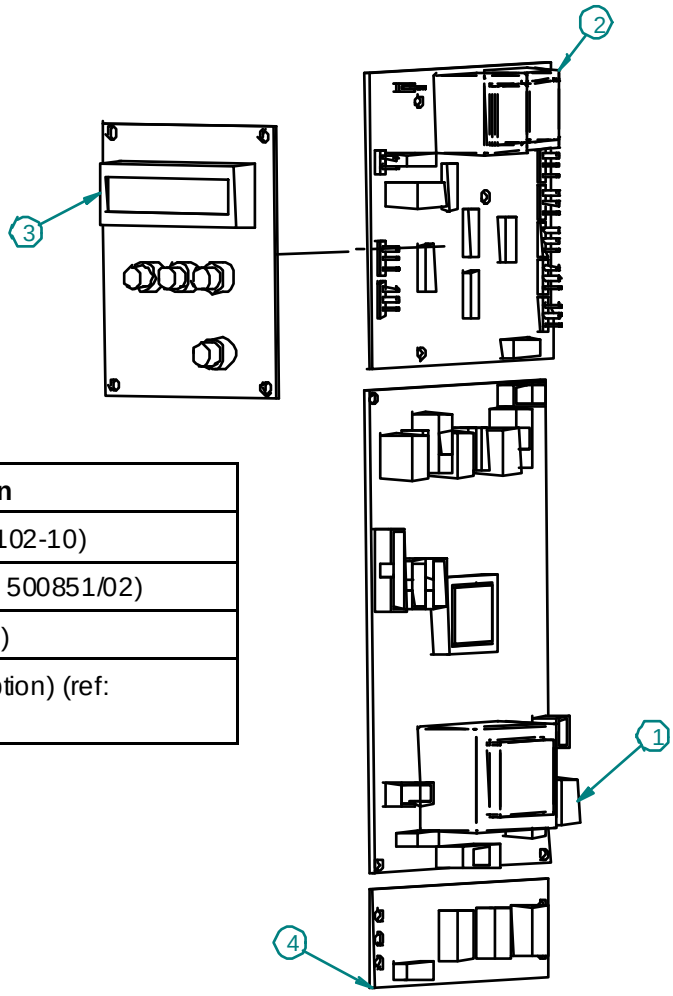
Pictures for illustrative purposes

Drain cups



Rep	Code	Description
1+2	930359	RTH-LC upper & lower drain cups

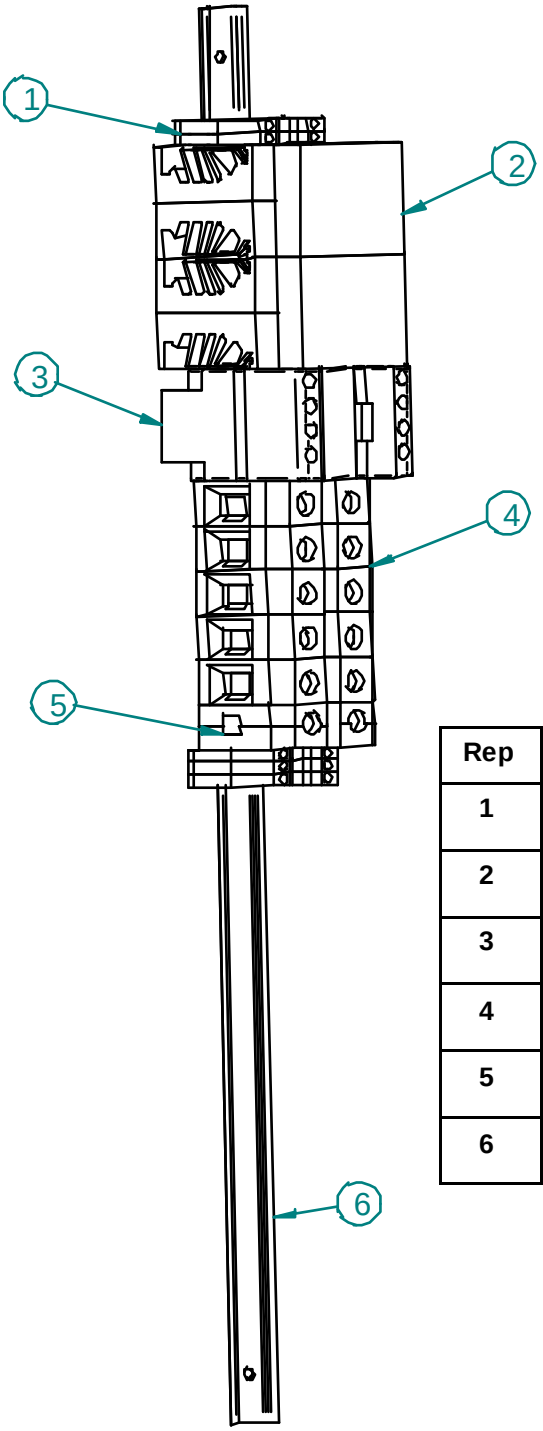
Electronic circuitry



Rep	Code	Description
1	930532	RTH-LC main board (ref: 500102-10)
2	930530	Water level control board (ref: 500851/02)
3	930101	Display board (ref: 500600/03)
4	930106	Remote information board (option) (ref: 500400/03)

Pictures for illustrative purposes

Electrical Din rail



Rep	Code	Description
1	930097	Electrical terminal JSAK 2,5 EN
2	930549	Static relay + heatsink RTH-LC
3	930093	Power contator LC1-D32
4	930094	Electrical terminal JSAK 16 EN
5	930096	Earth terminal JEK 35/35
6		DIN rail

Pictures for illustrative purposes

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Pictures for illustrative purposes