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FRESH-DEMO

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CI	Classified, information as referred to in Commission Decision 2001/844/EC	

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1. Introduction

The aim of this work package is to adapt, test and optimize the FRESH-DEMO systems under industrial conditions in the fruit and vegetable distribution facilities of UNIVEG-DE, UNIVEG-IT, and GURP. This includes the installation and integration of the prototypes at the respective case study sites, the implementation of comprehensive test series and 3 demonstration workshops for an interested audience from the fruit/vegetable distribution sector. Besides the determination of the overall performance, an analysis of system reliability is also important. The problem of process reliability is that different products have different requirements regarding to process parameters such as humidity, airflow, etc. The knowledge gained during these tests will be looped back for further optimization of the prototypes and for life cycle assessment and cost benefit analysis in WP5

In deliverable D4.1 "Installation and putting into opereration of the prototypes", the prototypes have been installed by CEN, RFT and BIOAZUL in the case study sites. CEN, RFT and BIOAZUL were in charge of the mechanical and electrical installations and put the prototypes into operation. Series of functional tests have been carried out before the actual demonstration trials begin (task 4.2). The personal from GURP, RFT, BIOAZUL and CEN have been trained at the test sites in the standard operating procedures of the FRESH-DEMO systems (according definitions in task 1.2). As explained instead of installing equipment in the distribution centres of Univeg, the Fresh-Demo team used a van with humidification equipment.

Figure 1: FRESH-DEMO van

In deliverable D4.2 Industrial validation of the prototypes, under the lead of TTZ, the FRESH-DEMO sytems as well as the effects on treated products are evaluated and thoroughly assessed regarding reliability, stability, and reproducibility according to the test protocols established in task 1.2. All test results gained are continuously re-used in the test series in order to allow an efficient means of optimisation. All technical data gathered during these demonstration tests were looped back to the CFD program developed in WP2 in order to get a better knowledge of the process as well as to have more reliable data for the later design of commercial plants which will be introduced about a year after the successful completion of the project. TTZ was responsible for the implementation of the test programme, BIOAZUL, RFT, CEN and GURP were responsible for the daily handling of the systems and CEN, RFT, POLYPAN, and BIOAZUL as the main manufacturers cared about mechanical and/or electrical modification and the maintenance of the prototypes which may became necessary during the demonstration trials. After successful completion of the test programme, TTZ assessed the results with respect to the overall efficiency in comparison to the standard procedures (baseline, results from task 1.4 will be used). The results will also feed into an updated version (D4.3) of the user manual which will be made available by BIOAZUL and translated into the respective languages just as in task 3.3.

In this deliverable D4.3 User manual, second version, contain the user manuals of the different systems. Besides this introduction nothing has been changed relative to D3.5 user manual first version.

In D4.2 there is a comprehensive evaluation of the equipment during the trials. There was no reason to adept the first manual.

2. Prototypes

As described in D2.3 for the technical solutions of the ultrasonic humidification units there will be necessary four types of systems/humidifiers/(proto)types:

Type 1:
Stationary humidifier for in-store, capable of delivering humidification in different amounts.

Type 2:
Stationary humidifier for storage, capable of delivering humidification in different amounts.

Type 3:
Stationary unit for humidification with natural water acidifier.

Type 4:
Mobile humidifier capable of delivering humidification during transport.

All types will be specified with their manual (**see chapter 3,4,5 and 6)**

For some types there is the possibility that there is a special capacity of humidity needed. There are several humidifiers available with a different capacity.
(**see chapter 7, humidifiers**) The manuals are included.

Also for the water treatment, there are different systems with different capacities available (**see chapter 8, water treatment**) The manuals are included.

And there are several controllers (**see chapter 9, controllers**) The manuals are included.

3. Type 1 Stationary humidifier in-store

This system is already developed and is easy to install in a supermarket. The humidifier-unit will be adapted to the needed capacity. In this humidifier unit is an humidifier with a capacity needed for this size of the display. Humidifiers with several capacities are available. See chapter 7.

Figure 2: Humidification of fruit and vegetables in a supermarket

3.1. User manual humidifier for in-store

CONTRONICS

HUMIDIFIER SYSTEM

HU-64OG-SYS

USER MANUAL

05-09-2014 version 1.2

HU-64OG-SYS

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CE

Contronics Engineering B.V., Ambachtsweg 8, 5492 NJ Sint-Oedenrode, The Netherlands, hereby declares that the product HU-64OG-SYS produced and delivered by Contronics Engineering B.V., is in accordance with the following CE directives:

EMC-Directive	: 2004/108/EG
Directive for low-voltage electrical installation	: 2006/95/EG

CONTRONICS HU-64OG-SYS

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HU-64OG-SYS

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1. PREFACE

This user manual contains the operating, installation and maintenance instructions for the ultrasonic humidifier of type HU-64OG-SYS.

WARNING
It is possible that bacteria could be present in the humidifier's water supply. Some bacteria (Legionella) could be harmful to health if they are present in the aerosols that are blown out by the humidifier.

Through the construction, flushing programme and materials used, Contronics has ensured that the stimulation of bacterial growth is kept to the absolute minimum. In order to ensure the supply of pure water, it is strongly recommended that demineralised water is used (see the Contronics product range). In conditions where bacterial pollution could occur in the surrounding air (e.g. at meat counters) or in areas where hot ambient air could arise (e.g. bakeries), it is also recommended to incorporate an ozone generator in the air supply system (see the Contronics product range). Contronics cannot be held liable for any harm caused by bacteria or micro-organisms. It is the responsibility of the user to regularly carry out maintenance and to check the quality of the supplied water. For these reasons a reverse osmosis filter and an ozone generator have been included in the system.

IMPORTANT
Although the installation of this product may appear quite simple for experts, the manufacturer urges the installer to carefully read through the instructions before starting to install the device.

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2. PREAMBLE

Introduction

The humidity in a supermarket is extremely low in the winter when the heaters are working and in the summer with the air conditioning on.
This causes fresh products on show to lose quality quickly because they part with moisture into the dry ambient air.
With a humidification system from Contronics you have the perfect solution for keeping your products fresh long-term.

How do they work?

Purified water is atomized by means of high frequency waves (ultrasonic). This spray of very small droplets is spread like a blanket over the products. The water droplets evaporate by removing the energy from the ambient air and forming a cool moist layer just above the product. The temperature is lowered by approx. 4-5 degrees and the relative humidity will increase to approx. 95%. The fresh product will no longer lose moisture and is also cooled at the same time. Your vegetables and fruit will not become wet.

Hygiene

The mains water used is purified first so that maximum hygiene is guaranteed. A so-called reverse osmosis filter is used for this purpose. It removes all the bacteria, viruses, calcium and minerals that can normally be found in mains water. The system is automatically rinsed through every hour. The humidification process stops then for a short while.
The bacteria that get into the system with the air are dealt with in a built-in ozone generator that works at night.
Ozone (O3) is a molecule with 3 oxygen atoms. It is a strong oxidant that will kill all the bacteria entering. In a short time it reverts to normal oxygen without leaving a residue.
Annual maintenance guarantees problem-free, hygienic use.

Parts of the system

Water treatment (LP-10), humidification (HU-64), ozone generator (OG) and drainage system (POMPUNIT) are combined in the HU-64OG system in a stainless steel frame for ease of installation. The system is plug and play. (See figure 1 and 2).

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3. SAFETY REGULATIONS

IMPORTANT
The humidifier has an open water tank. Any overflow of the water tank could damage the electronics inside the humidifier.

The following measures must always be observed:
- **Always disconnect the 230 V mains voltage from the humidifier before moving it and/or carrying out maintenance activities.**
- **Always keep the humidifier horizontal and motionless while it is in operation and for up to 2 minutes afterwards.**
- **Ensure that the water is always discharged via the outlet and ensure that this is never blocked.**
- **The humidifier may only be dismantled by authorized Contronics technicians.**

4. PACKING

The HU system is delivered in recyclable packaging that should be kept for re-shipping the unit for maintenance activities. Any shipment using other packaging could cause damage to the HU for which the manufacturer cannot be held liable.

It is possible that some traces of water could be found in the packaging; all the functions of the HU are thoroughly tested during the quality control and, for this reason, some water could still remain in the HU before it is packed.

The package contains:
- HU system.
- Power cord.
- Instructions for use.

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5. CONNECTIONS AND FUNCTIONS

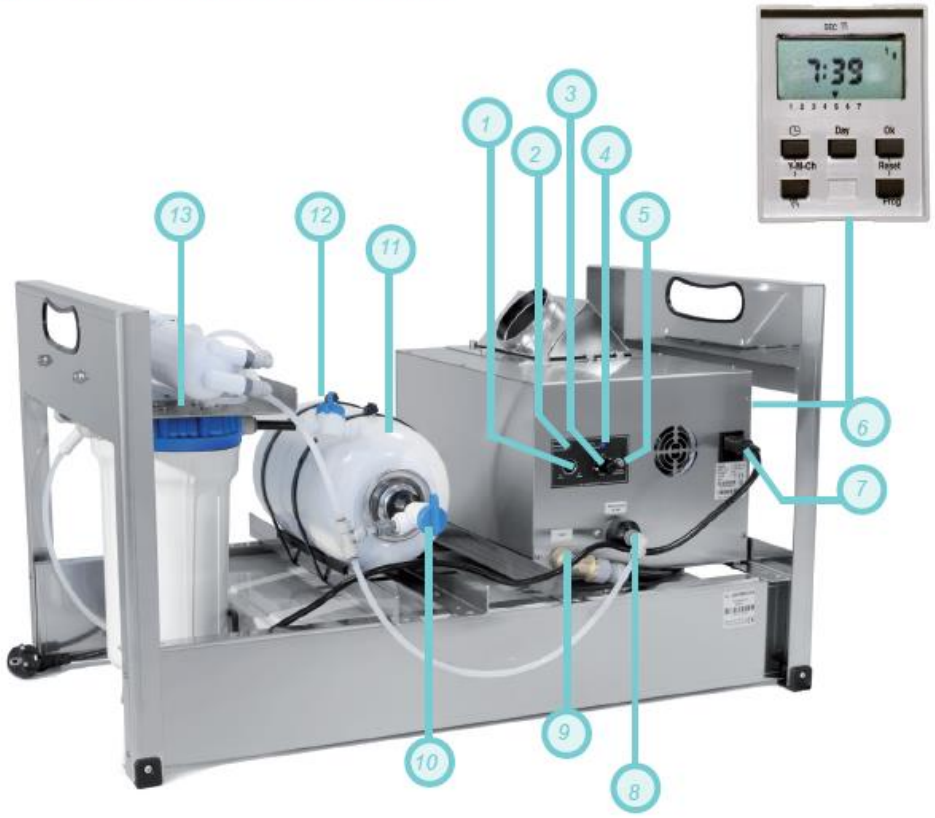

Figure 1 Connections and functions

1. Plug connection for HS-91, DZR-45, HTR-10 or HK-01 (external control 0-10 V).
2. LED for flushing and alarm.
3. Dial for setting the humidity.
4. LED for humidity setting
5. Dial for setting the airspeed.
6. Timer for programming of the ozone generator and humidifier.
7. Mains connection + fuse (230 V± 10%/50-60 Hz).
8. Water supply 3/8", min. 1 bar/max. 6 bar.
9. Water outlet 1/2" free flow-through.
10. Tap.
11. Buffer tank.
12. Water supply.
13. R.O. unit.

HU-64OG-SYS

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6. INSTALLATION INSTRUCTIONS

IMPORTANT
The guarantee will become void if the system is installed incorrectly or if it is handled in an improper manner.

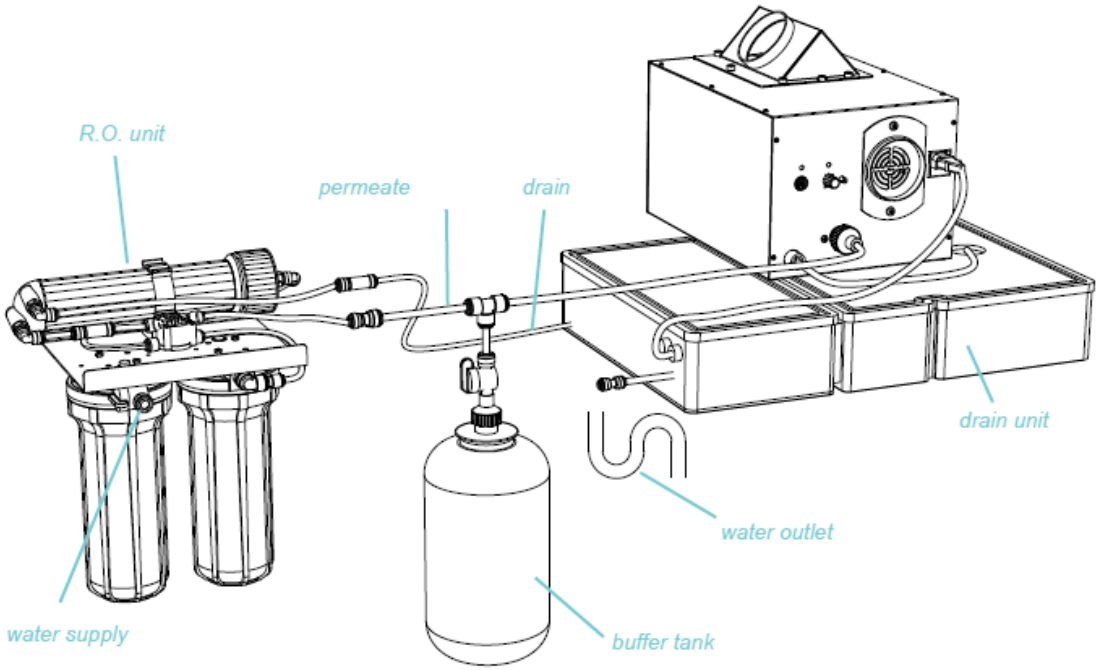

Figure 2. Connections and functions

7. ELECTRICAL CONNECTIONS

Supply voltage (230V AC ± 10%)
Ensure there is an earthed wall socket next to the humidifier.

External control
A HTR-10 can be connected for external /remote control.

IMPORTANT
If an external controller has been connected to the DIN plug, the dial on the humidifier must be set to 0. This will prevent the humidifier from humidifying if a fault occurs in the controller.

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8. WATER CONNECTIONS AND FLUSHING CYCLE

IMPORTANT
Thoroughly flush out the piping before connecting the humidifier in order to prevent installation debris from blocking the intake valve.

Water supply
The system has an integrated flow-reduction valve and can handle a water pressure from a minimum of 1 bar to a maximum of 6 bar. The water level in the humidifier is controlled by a float switch and a solenoid valve.

Water outlet
The system is equipped with a pump unit and a catchment tray because there is not usually a drain near the system. When this tray is full it will be emptied automatically.

Flushing
The standard factory setting for the flushing cycle is once every hour.

Standard cycle
The humidifier's "flushing/alarm" LED will light up every hour. The device will start the flushing cycle:
- The fogging will stop.
- The water tank will be flushed for approx. 15 seconds (depending on the water pressure).
- The water will be discharged.
- The humidifier will be re-filled and will restart normal operation.
- The green LED will blink while this procedure is taking place.

If the humidifier is switched off (230V supply voltage switched off), the water content will be discharged to the drain unit.

9. AIR CONNECTIONS

Air outlet
The air outlet must always be extended by a 80 cm pipe to allow larger droplets to be captured. Mount the outlet so that it slopes towards the humidifier to ensure that any condensed fog can flow back.
The connected pipe must be free from dust, dirt and oil residues. The length of the air outlet channel to the outlet may not exceed 6m with a diameter that remains the same.

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10. EXAMPLE SET-UP (FRESH IN FRESH OUT)

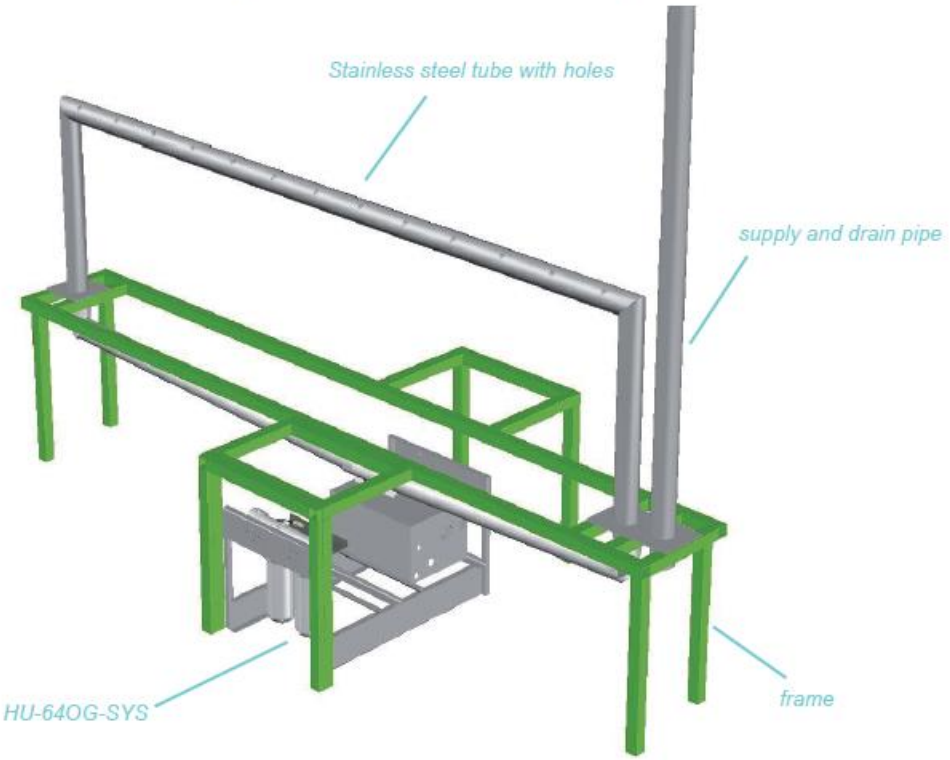

Figure 3. Set-up witht U-Tube

The U-pipe is placed on the frame and connected to the humidifier.
The horizontal part of the U pipe has holes out of which the humidified air streams.
The longer vertical pipe contains the supply and drainage of water and electricity that is supplied from the ceiling.
See also Fresh-in Fresh-out on www.contronics.nl

IMPORTANT
The connected pipes must be free from dust, dirt and oil residues.

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11. SWITCHING ON AND STARTING UP/FUNCTIONAL TEST

Switching on

Check the following before the humidifier is switched on for the first time:

- The humidifier is positioned level.
- All pipes have been properly connected.
- The mains voltage is correct.
- The water discharge channel has been connected according to the instructions.
- The water supply has been connected according to the instructions. The water piping has been flushed in order to prevent any installation debris blocking the water valve.

IMPORTANT
Never switch the mains voltage on if the humidifier is not in the correct position or if it is placed upside-down, as this would cause the transducers to burn.

Start up and functional test

- Open the water valve.
- Set the % RH knob on maximum position.
- Switch on the power.
- Set the % knob in the desired position.
- Control if necessary the airspeed with setting 5 (figure 1).

Note: During start up and flushing (water filling) of the humidifier the LED "Flushing/alarm" will blink green.This is a normal indication on the humidifier during this procedure.

IMPORTANT
If the humidifier becomes overheated it will switch off. Once it has cooled down it will automatically switch on again. In case of overheating, the "Flushing/alarm" LED will show red.

The following conditions could cause overheating:

- **A blockage in the air inlet.**
- **A blockage in the air outlet.**
- **Air intake temperature too high.**
- **Water temperature too high.**
- **Water discharge blocked.**
- **Ambient temperature too high.**
- **Ventilator speed set too low.**

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12. OZONE GENERATOR

In the HU-64OG-SYS an ozone generator is integrated. Ozone ensures that any bacteria that are present in the humidifier and the connected piping will be destroyed.

Ozone only takes effect if the humidification is switched off while the ozone generation is taking place. A programmable timer has been incorporated in the side panel of the humidifier for switching the ozone generator and the humidification on and off. Contronics sets the timer to a default setting of 2 hours of ozone generation at night, between 2 a.m. and 4 a.m., while the humidifier is switched off. This setting can be changed (see "Applications").

The blue LED indication for humidification flashes while the ozone generator is working. The ventilator speed is then at maximum. Independent of the adjustment.

WARNING
Ozone could be harmful to your health if the gas is inhaled over a longer period of time in a higher concentration. However, this concentration only occurs inside the humidifier and the connected piping. Once discharged, ozone gas quickly breaks down into ordinary oxygen, without any residual products.

The timer is independent of the mains supply and has a rechargeable battery incorporated in the ozone module for this purpose.

WARNING
If these batteries have to be replaced, the old battery must be disposed off as chemical waste or, alternatively, returned to the manufacturer.

The following information about the ozone generator can be found on www.contronics.nl:
- Programming the timer.
- What is ozone?

13. DRAIN UNIT

The pump unit fitted in the drain unit can transport the water over a distance of 30 meters and 10 meters upwards.

14. MAINTENANCE

Regular maintenance is important for the optimum operation of the system and to maintain hygiene.

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Humidifier

The maintenance interval of the water reservoir will depend on the quality of the water and the purity of the air that is sucked in. Contronics advises al least 1 x year maintenance.
The transducers must be replaced after approximately 20,000 operating hours (i.e. after about 2 years in the case of continuous use).

IMPORTANT
Make sure that the transducers are not damaged during cleaning.

Check the following before starting maintenance or shipping the humidifier:
- The mains plug has been removed from the socket and the ventilator is not moving.
- The water supply has been closed.
- The water supply pipe has been removed.
- The humidity sensor plug has been removed.
- The water reservoir is empty and the water discharge hose has been removed.
- The humidifier remains horizontal while dismantling.

Cleaning
- Remove the connecting flange.
- Clean the reservoir with a soft brush or cloth.

In the case of water scale, the reservoir can be filled with household vinegar. Allow to soak for 4-12 hours then clean with a soft brush and flush through. Remove the filter from the water inlet. Clean the filter or replace it with a new one. Flush the water discharge with water and clean it with a round brush.

R.O. system

Some maintenance is necessary in order to guarantee the long service life of the system. Normal maintenance consists of replacing the sediment filter and the active carbon filter(s). This should be done at least once a year if the humidifier is in continuous use. If the supply water is heavily polluted with minerals or chlorine, however, it is recommended to do this more often.

Checking the demineralised water

- Take a sample of the supply water.
- Measure the conductivity of the supplied tap water using a micro-siemens meter.
- Take a sample of the demineralised water.
- Measure the conductivity of the demineralised water using a micro-siemens meter.
- Divide the value found for the demineralised water by the value found for the supplied tap water and multiply the result by 100%:
  - < 10%: the water quality is good
  - Between 10% and 20%: the water quality is acceptable
  - > 20%: the water quality is poor – replace the membrane.
- If the micro-siemens value for the supplied tap water is >500 uS, it is recommended to install a de-scaling system ahead of the R.O. system.

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Checking the buffer tank

If the buffer tank is not completely filled during the start-up procedure, it is possible that the pressure in the tank is too high compared to the pressure of the supplied water. In this case it is possible to release some of the (air) pressure step-by-step via the valve situated underneath the tank under a black cap, until the tank is filled. It is also possible to measure the pressure with the same kind of meter that is used for car tyres. To check that the pressure is not too low, the tank must be disconnected with the tap closed. Open the tap in an area where this is possible and allow the tank to empty completely.
If the pressure is too low, it is possible to increase the pressure using the valve and the same system that is used to increase the pressure in car tyres. The pressure is normally adjusted to 0.45 bar.

Procedure:

Before replacing the filters, the system must be de-pressurised.

1. Switch the humidifier off.
2. Close the supply tap.
3. Close the tap on the storage tank.
4. Disconnect one of the tubes from the storage tank and collect the excess water.
5. Exchange the filters by unscrewing the filter holders.
   Beware: The filter holders still contain water.
6. Before re-installing the filters, the O-ring must be checked for damage and correct seating.
7. The holders can be cleaned with soap and water or with chlorine, if necessary. Rinse thoroughly afterwards.
8. After re-installing, screw the holders back into place (hand-tight!).

Starting up again:

1. Open the supply tap and let the system flush through for about 5 minutes (in order to flush out any air).
2. Supply voltage to the pump.
3. Reconnect the tube to the storage tank.
4. Open the tap on the storage tank.
5. Wait until the system reaches the correct pressure (the discharge water will stop).
6. Switch the humidifier on again.

Ozone generator

The ceramic element must be cleaned once a year:

- The humidifier must be disconnected from the mains.
- Remove the screws on the side where the timer is located.
- Remove the side panel and disconnect the timer.
- Remove the 2 Phillips screws (bottom and top) from the stainless steel cover plate (on the black aluminium casing).
- Remove the ceramic element from the holder.
- Carefully clean the ceramic element on both sides with cleaning spirit or alcohol.
- If the vapour-deposited metal on the ceramic element is damaged, replace the ceramic element.
- Re-assemble in the reverse order.

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Replacing the transducers

The replacement of the transducers can only be done by Contronics or representatives authorised by Contronics.

IMPORTANT
All maintenance must be carried out by Contronics or by an organisation authorized by Contronics.

Drain unit

The HU-64OG-SYS has a drain unit to catch the waste water and pump it away to the drain. The pump unit requires little maintenance. Only the XP STAYCLEAN has to be replaced annually. The XP STAYCLEAN deals with the disinfection in the drain unit. Figure 6. shows where the XP STAYCLEAN should be fitted.

Figure 4. Drain unit

Figure 5. XP STAYCLEAN

Figure 6. Holder for the XP STAYCLEAN

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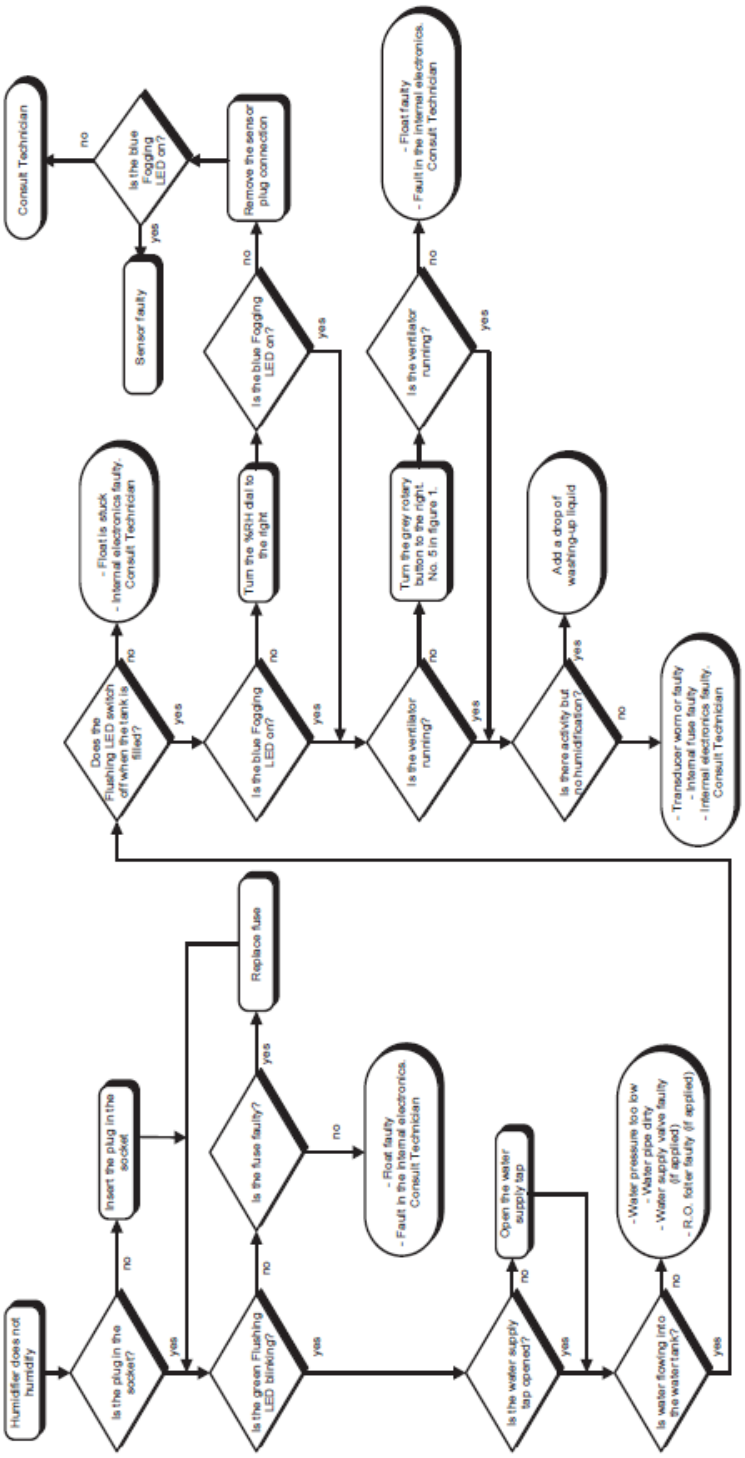
15. MALFUNCTIONS



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16. TECHNICAL SPECIFICATIONS

	HU-64OG-SYS
Transducer frequency	1,7 MHz
Maximum capacity	0-4,0 kg/hour (adjustable)
Service life of the transducers	10.000-20.000 hour
Size op the water droplets	1-3 micron
Diameter of outlet flange	1 x 80 mm
Diameter of suction flange	80 mm
Airflow	adjustable (0-60 m^3 0 Pa)
Outlet pipe length	6 meter
Water pressure	1-6 bar
Water connection	3/8" external
Flushing frequency	1 x per hour (adjustable)
Water discharge	3/8" external
Content of water tank	1100 cm^3
Mains Voltage	230V ± 10% 50/60 Hz
Power consumption	350 W
Ambient temperature	0 °C till 35 °C
Water temperature	5 °C till 15 °C
Dimensions (LxWxH)	770 x 490 x 460 mm
Housing	RVS 316L
Weight	41 kg
OG	
Capacity ozone	0-20 mg/hour (adjustable)
Controlling ozone	Via timer with day programming
LP-10	
Retention of salts and minerals (%)	98
Buffer tank (L)	2
Inlet pressure (bar)	0.45
DRAINUNIT	
Pump height	10 meter
Max. length of drain	30 meter

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17. OPTIONS LP-10WS, LP-10WSG, LP-10WSWSG, LP-10BP and HTR-10

This extra manual shows specific operation, installation and maintenance instructions for the LP-10WS, LP-10WSG and de LP-10WSWSG options.

Figure 7. LP-10WS

LP-10WS is an LP-10 combined with a permeate pump. The pump, that is water-powered, ensures that the rin sing water is used more efficiently. The LP-10 needs 30 litres of rinsing water to produce 10 litres of demineralized water. The LP-10WS only uses 20 litres for this.
The LP-10WS saves 85 m3 on an annual basis.
See graph and specifications page 21.

Figure 8. LP-10WSG

The LP-10WSG continuously monitors the membrane function. Normally the membrane would be checked 1 x a year. This is now done automatically and an indication is given when the membrane needs replacing. If the quality of the membrane gets below a certain value, the humidification system that is connected to the LP-10WSG will be switched off.
See specifications page 21.

Figure 9. LP-10WSWSG

The LP-10WSWSG combines both the options above.

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Figure10. LP-10BP

The LP-10BP is used when the water pressure is < 3 bar.
See specifications page 21.

Figure 11. HTR-10

The HTR-10 is a room hygrostat and remote control for the HU-xxx series of air humidifiers.
A very accurate air humidity sensor and temperature sensor are built-in.
The humidity sensor is also very accurate in the higher regions of the relative air humidity.
A built-in heating element in the sensor element ensures that the sensor stays dry when the dew point is reached.
The heart of the electronics is a microchip designed and programmed by Contronics.
The electronic circuit board is protected from moisture. The HTR-10 remote control is used in combination with a Fresh in Fresh out system. See specifications page 21.

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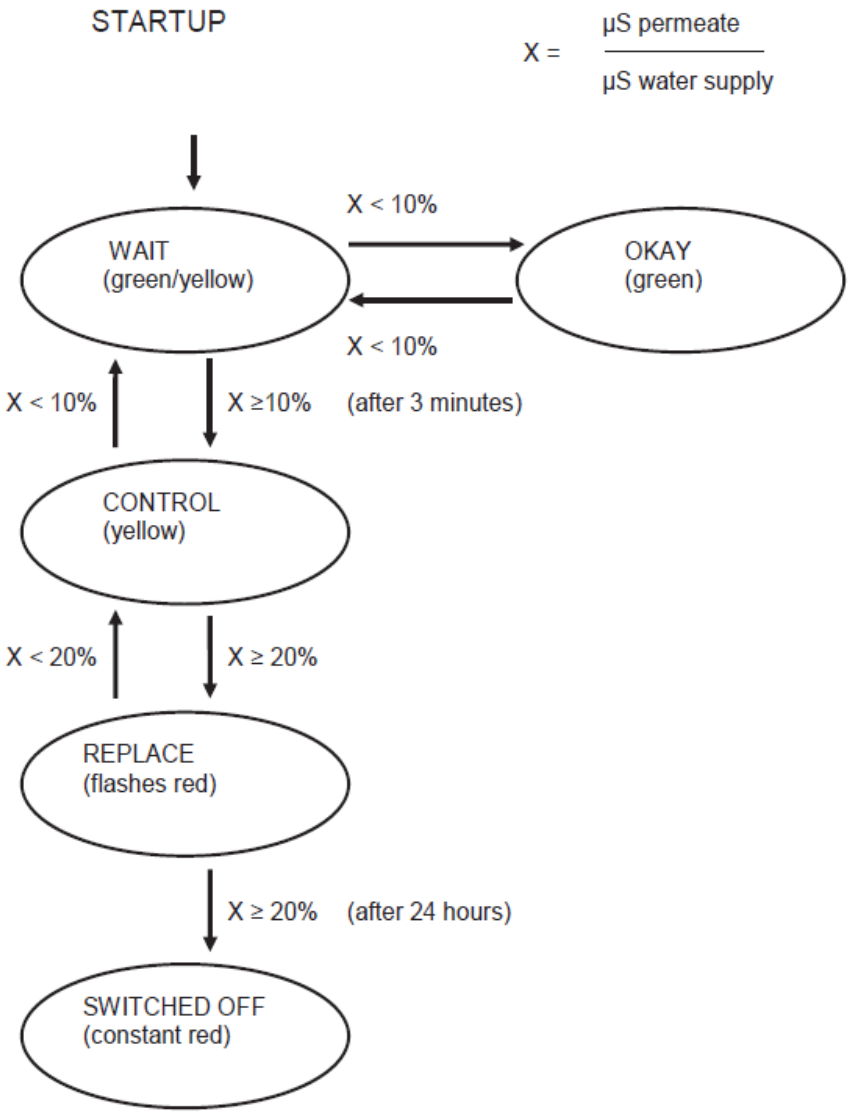
18. WORKINGS OF WSG OPTION

The Osmosis is working properly when the green LED lights up. When the yellow LED lights up, the membrane needs to be replaced during a service. When the red LED flashes, the membrane must be replaced immediately. If it is not replaced within 24 hours the red LED will light up and the humidifier will be switched off.



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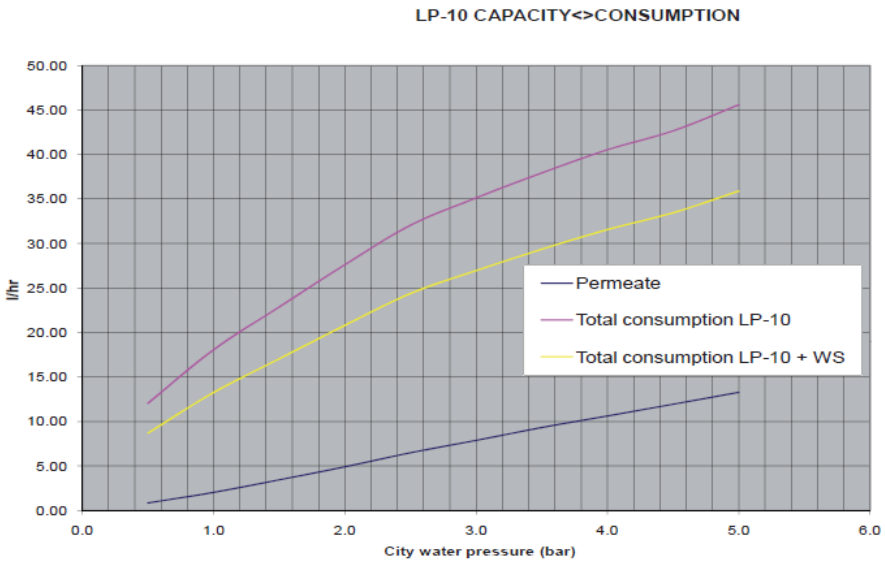
19. SPECIFICATIONS OPTIONS

	LP-10WS	LP-10WSG	LP-10WSWSG	LP-10BP
Electricity consumption (W)	n/a	2	2	25
Mains voltage (V)	n/a	230	230	230
Maximum switching capacity (W)	n/a	500	500	500
Yield in respect to added water (%)	35 - 40	20 - 35	35 - 40	20 - 35
Dimensions LxWxH (cm)	36x23x43	36x23x43	36x23x43	36x23x46

	HTR-10
Mains voltage (V)	12
General accuracy	0,4 °C bij 25 °C
Permissible ambient temperature	50 °C
Reaction time	5 sec. temperature 4 sec. humidity
Dimensions LxWxH (mm)	125x65x30



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DISCLAIMER

Contronics works continuously on the further development of its humidifiers. We therefore
reserve the right to modify the design, construction and technology of the product at any time. For this reason, no claims can be made based on the data, illustrations and
description in this user manual.

Additional, up-to-date information is available on www.contronics.nl.

4. Type 2 Stationary humidifier for storage

This system is already developed and is easy to install in a cold storage. The humidifier-unit will be adapted to the needed capacity. The humidifier is placed nearby the cooling unit, and connect with city water, drain, electricity and outlet tubes.

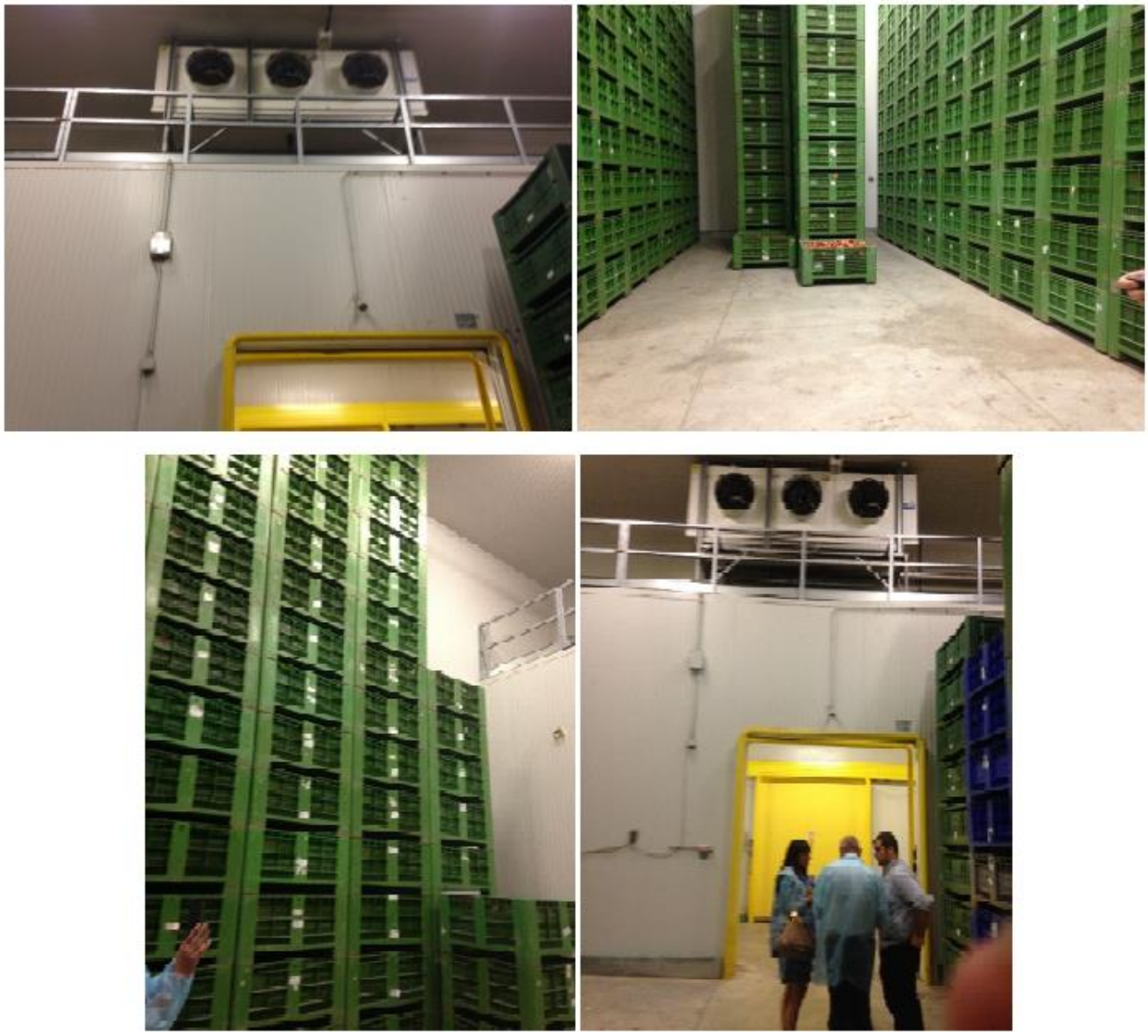

Figure 3: Schematic picture of the cooling unit

Figure 4: Cooling Unit with outlets of the humidifier

Humidification for the cold storage in FRESH-DEMO Trailer

In all kind of cold storage this system can be installed. For our project there is also the use of a trailer/container (40ft) which will be in use of cold storage nearby a distribution centre. In this one there will be installed a small humidifier, **for manuals see chapter 7.**

In future when there will be trucks for transport of fruit and vegetables with humidification, there will be installed a mobile humidifier (prototype 3). The size of this container is the same as most trucks for transports of fruit and vegetables.

Figure 5: Schematic Picture of the cooling Unit of trailer

5. Type 3 Stationary unit for humidification with natural water acidifier.

This unit is special designed/developed for treating fruit and vegetables with clean water mist by using a natural acidifier. Best time is just after harvest in the farm.
This Reverse Osmosis (R.O.) water treatment system with dosing unit and digital controller can be used to dose fluids like natural acidifiers in demineralised water.
The system is equipped with a Dosing Gard (D.G.). This device continuously monitors the percentage of the dosing. When the solution differs from the set percentage it activates an alarm. The integrated Controller DZR-45 is used as main controller of the system.
This system must be connected to a humidifier, depending of the needed capacity there are several humidifiers available, see chapter 7.

This unit mixes the water with the fluid. For the fluid you need a special unit, a so called Tank Unit system (TU-system), see figure 7, **with manual**, page 38

Figure 6: RO-unit water treatment (LP-SYS-001)

5.1. User manual dosing system

CONTRONICS

DOSING SYSTEM

LP-SYS-001

USER MANUAL

LP-SYS-001 CONTRONICS

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The Netherlands, hereby declares that product LP-SYS-001 is produced and delivered by Contronics Engineering B.V., is in accordance with the following CE directives:

EMC-Directive	: 2004/108/EG
Directive for low-voltage electrical installation	: 2006/95/EG

1. PREFACE

This user manual contains the installation and operating instructions for the R.O system with Dosing pump LP-SYS-001. The LP-SYS-001 consist out of 1 x LP-20BPWSWSG, 1 x Dosing pump and DZR-45 Separate manuals for each of these products are enclosed.

2. INTRODUCTION

The LP-SYS-001 is an Dosing system that can be used to dose liquids like ECAS or (natural) sanitizers in the demineralised water. The dosing can be set between 0.5 and 5%. It will dose the correct percentage independent of the water demand. It is equipped with a Solution Guard (SG). This device continuously monitors the percentage of the dosing. When the solution differs from the set percentage it activates an alarm. When correctly set it gives a warning when the dosing liquid vessel is empty.

The integrated DZR-45 is used as a main controller for the system. With the built-in programmable timer blocks it's possible to select between demineralised water and solution at any time of the day. It also controls the output of the connected humidifier(s) based on a fixed capacity or relative humidity.

3. CONTENT OF DELIVERY

The content of delivery consist out of:
- LP-SYS-001
- User manual: - LP-20BPWSWSG
  - Dosing pump
  - DZR-45

CONTRONICS LP-SYS-001

4. CONNECTIONS AND FUNCTIONS

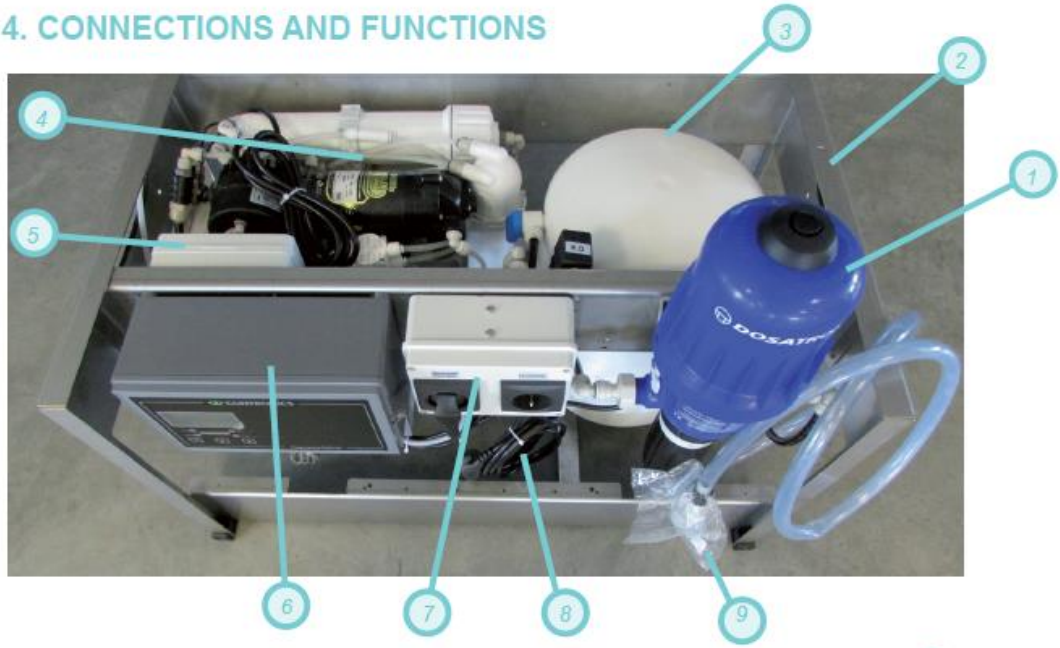

Figure 1. Connections and functions

1. Dosing pump.
2. Stainless steel frame.
3. Buffer tank.
4. Reversed Osmosis (LP-20BPWSWSG).
5. Solution guard (SG-10).
6. Controller (DZR-45).
7. Junction box.
8. Main power 230VAC / 50HZ.
9. Solute inlet with strainer.
10. Humidifier power outlet.
11. Drain water (1/4").
12. Humidifier water connection (3/8").
13. Water supply (3/8").

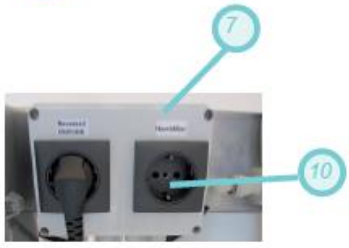

Figure 2 . Junction box.

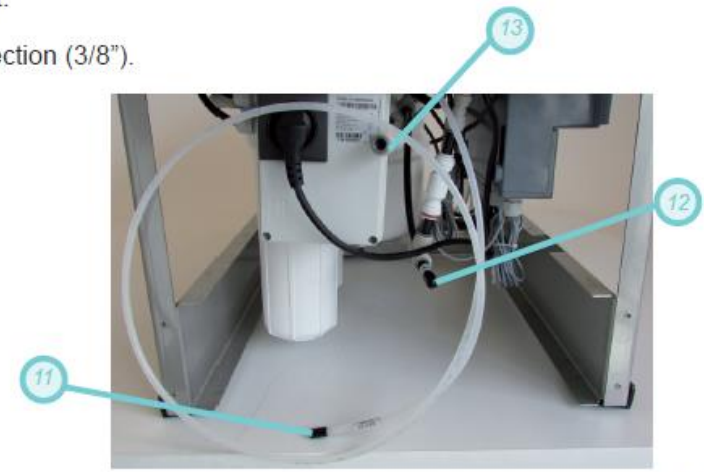

Figure 3. Water connections.

3

LP-SYS-001

CONTRONICS

5. INSTALLATION INSTRUCTIONS

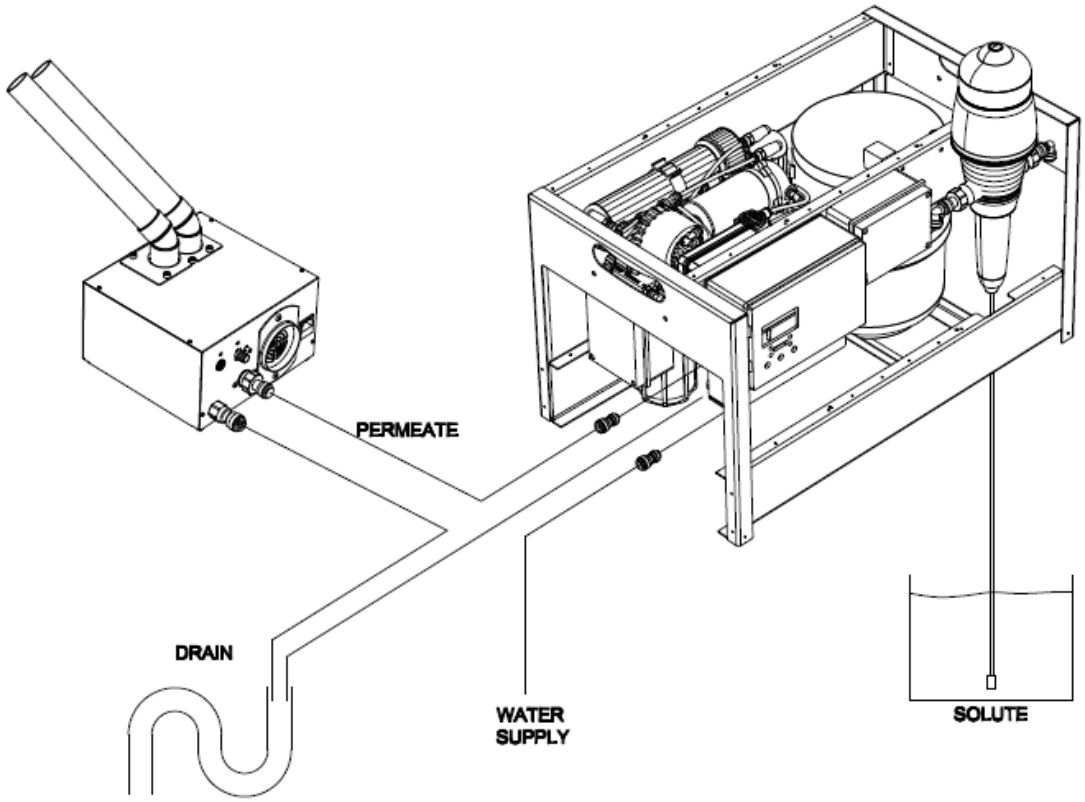

Figure 4. General set-up.

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CONTRONICS LP-SYS-001

1. Set-up the R.O. unit (for detailed instructions see the LP-20BP manual)
   a. Place the pre-filter in the left-hand holder
   b. Place the carbon filter in the right-hand holder (remove the cellophane and check correct position of the "o" rings).
2. Set-up the dosing pump
   a. Install the dosing pump in the bracket
   b. Adjust the dosing pump between 0.5 – 5 %.
   c. Install the suction tube with strainer in the container as shown in fig. 5.

IMPORTANT: Do not put the suction tube strainer on the bottom of the stock solution container. The strainer must be supended at least 10cm (4") above the bottom of the tank to avoid sucking up the insoluble particles that may damage the injection assembly.

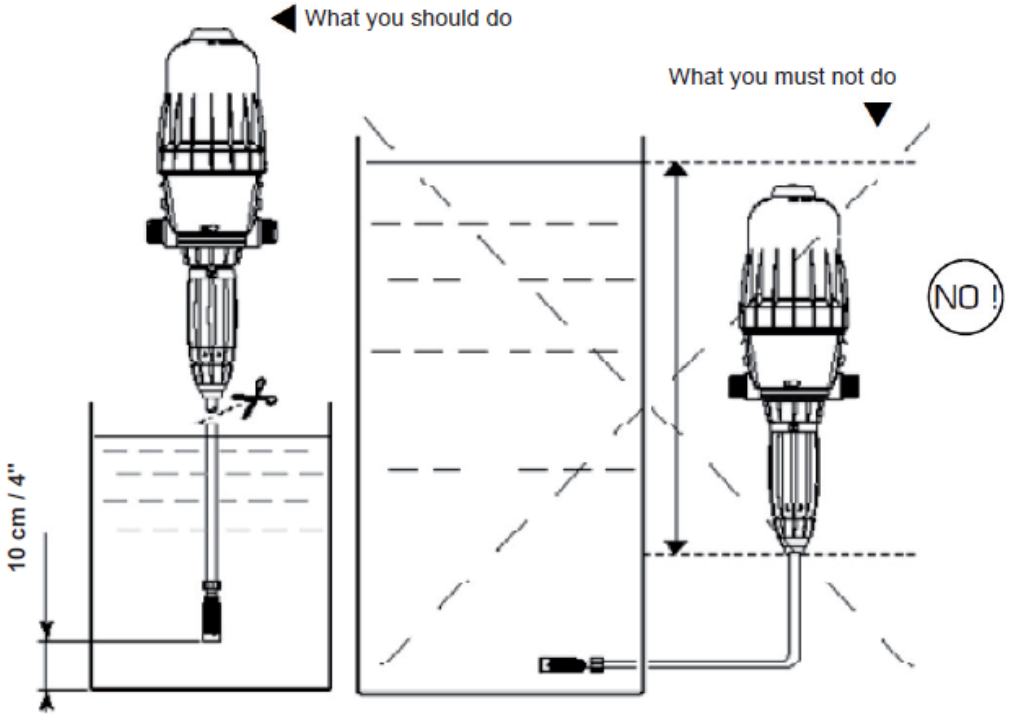

Figure 5. What you should do and not do.

3. Connect water connections as shown in fig. 6.
4. Connect the 0-10V (HK-01) control cable into the DIN socket of the humidifier.
5. Connect main power to the LP-SYS.
6. Leave the system powered for 1 hour to fill the buffer tank.
7. Connect the humidifier to the humidifier power outlet fig. 2, no. 10.

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LP-SYS-001

CONTRONICS

6. OPERATING INSTRUCTIONS

The LP-SYS-001 is controlled by a DZR-45 controller in block mode. Below you will find a short instruction on how to operate the system. For detailed instructions on the DZR-45 refer to the manual.

Block setup

A day can be divided in different time blocks which can be programmed individually.

Water type

The system can deliver pure R.O. water or a solution of R.O. water mixed with a solute by the dosing pump. The selection of a water type is done in the block configuration for each different time block.
When switching to a different type of water during the program the controller will power off the connected humidifier to drain the internal reservoir. After this the humidifier is powered back on and will start to fill with water. Two solenoid valves inside the system are operated according to the water type currently needed.

Solution guard

The dosing system is monitored by the solution guard connected to the controller It measures the conductivity of the produced solution. If the conductivity drops below the set-point it will signal an alarm. The set-point can be changed in the Alarm menu. The measured conductivity can be found on the sensor screen of the controller by pressing the up/down keys.

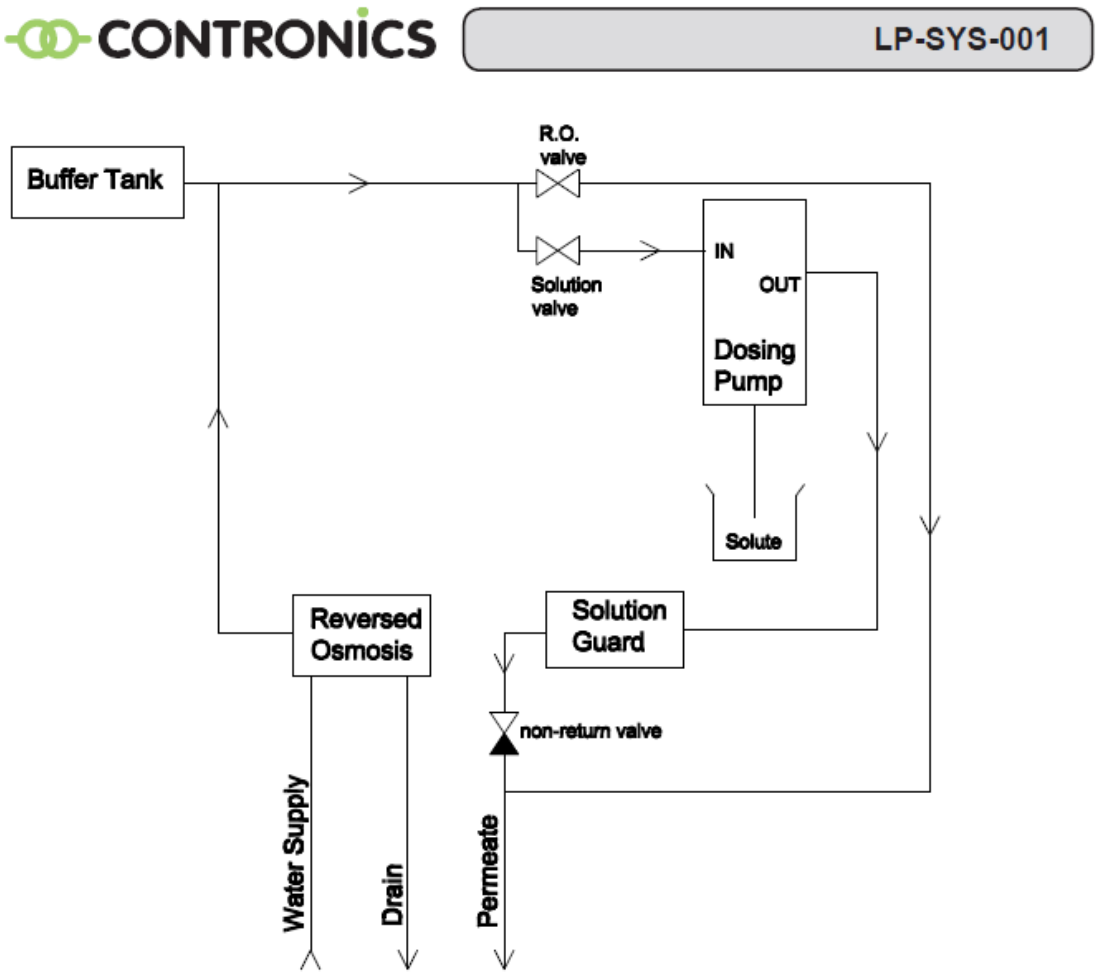

Figure 6. Internal water connections.

DISCLAIMER
Contronics works continuously on the further development of its R.O. systems.
We therefore reserve the right to modify the design, construction and technology of the product at any time. For this reason, no claims can be made based on the data, illustrations and description in this user manual.

Additional, up-to-date information is available on www.contronics.nl.

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Tank unit system (TU-SYS-001)

Figure 7: Tank unit system (TU-SYS-001)

5.2. User manual Tank unit

CONTRONICS

TANK UNIT

TU-SYS-001

USER MANUAL

version 4

TU-SYS-001

CONTRONICS

CE

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The Netherlands, hereby declares that product TU-SYS-001 is produced and delivered by Contronics Engineering B.V., is in accordance with the following CE directives:

EMC-Directive	: 2004/108/EG
Directive for low-voltage electrical installation	: 2006/95/EG

1. PREFACE

This user manual contains the installation and operating instructions for the Tank Unit with controller TUC-45.

2. INTRODUCTION

The TU-SYS-001 is a Tank Unit system with digital controller TUC-45. The tank is equipped with a float valve to keep the tank at the right level. This level is also supervised by the controller which will signal an alarm if the level drops too low.
If desired the controller can be wired to a proximity switch to stop humidifying if nothing is detected for a period of time.

.

3. CONTENT OF DELIVERY

The content of delivery consist out of:
- TU-SYS-001
- User manual: - TU-SYS-001

CONTRONICS TU-SYS-001

4. CONNECTIONS AND FUNCTIONS

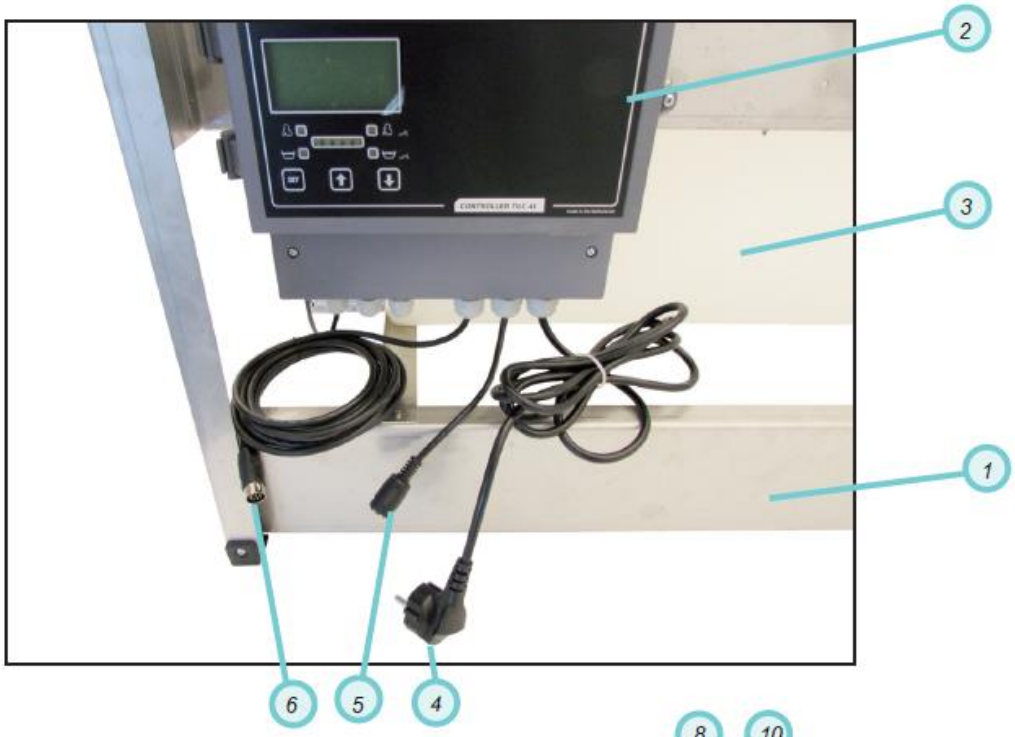

Figure 1. Connections and functions.

1. Stainless steel frame.
2. Controller TUC-45.
3. Tank.
4. Power connection.
5. Control connection to LP-SYS-001.
6. Control connection to humidifier.
7. Tank drain.
8. Screw cap.
9. Water connection.
10. Dosing pump suction tube opening.

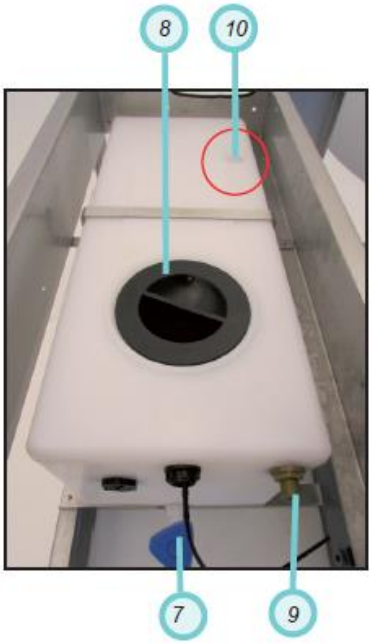

Figure 2. Tank connections.

3

TU-SYS-001

CONTRONICS

5. ELECTRICAL CONNECTIONS

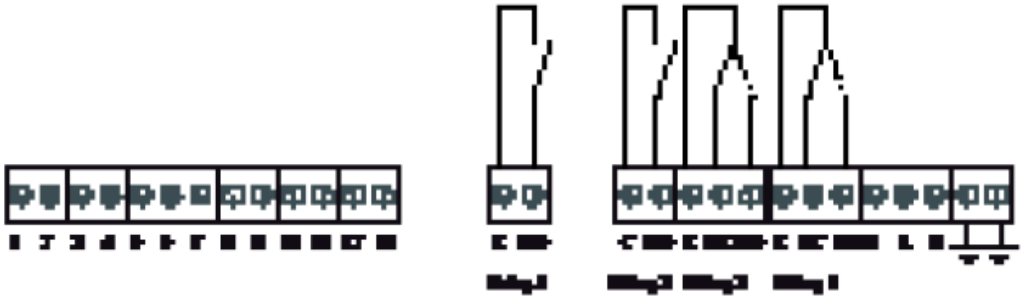

Figure 6. Connections.

Floating switch

Connection	Colour	Description
1	White	Floating switch (+12V)
2	White	Floating switch (input)

Proximity switch

Connection	Colour	Description
5	-	Proximity switch (+12V)
6	-	Proximity switch (input)

Alarm

Connection	Colour	Description
Relay 4	-	Alarm output

Control cables (male) to humidifier

Connection	Colour	Description
Relay 2 (C)	Grey	0-10V output
Relay 2 (NC)	Blue + White	Ground

Control cable (female) to LP-SYS

Connection	Colour	Description
Relay 2 (NC)	Blue	Ground
Relay 2 (NO)	Grey	0-10V output

CONTRONICS TU-SYS-001

6. OPERATING INSTRUCTIONS

The TU-SYS-001 is equipped with a TUC-45 controller.
Below you will find a short instruction on how to operate the system.

Tank level alarm.
The level of the tank is monitored through a float switch. If the level is below 20L and the alarm delay time is passed the controller will signal an alarm.

Proximity sensor.
A proximity sensor can be connected to the controller

7. INSTALLATION INSTRUCTIONS

1. Stack the frames together with the supplied M6xXX bolts supplied as shown in figure 3. The LP-SYS needs to be on top of the TU-SYS.
2. Connect the water connection to a source.
3. Let the tank fill itself and observe the level. The alarm on the controller should stop when the tank is full. The level is determined by the float switch. It can be adjusted if desired by turning the red knob. (see figure 4, float switch).
4. Connect the strainer to the suction tube. (both supplied with the LP-SYS)
5. Put the suction tube in the tank through the special opening. (see figure 2 nr.10).
6. Connect the open end of the tube to the dosing pump. Cut off excess length.
7. Connect the first control connection to the HK-01 cable of the LP-SYS.
8. Connect the second control connection to the humidifier.
9. Refer to the LP-SYS manual for further installation instructions

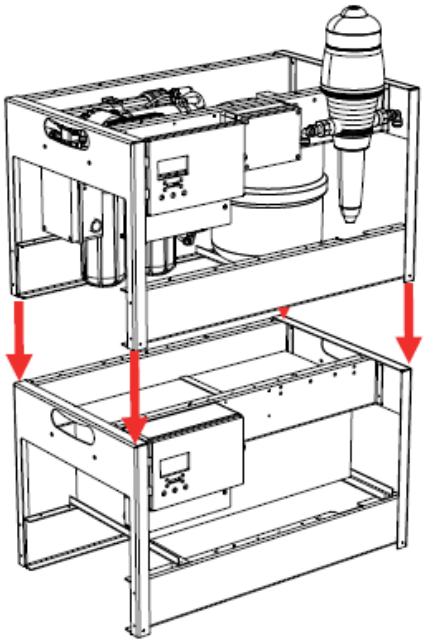

Figure 3. Mounting drawing.

Figure 4. Float switch with red knob for adjustin

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6. Type 4 Mobile humidifier

Specially developed for the Fresh-Demo project is the mobile humidifier, which can be installed in each truck. For the Fresh-demo trials this system is installed in a van.

Figure 8: Mobile Humidifier (MHU-10 Mobile Humidifier)

Figure 9: Van with humidifiers and watersupply tanks

It must be possible to drive 3 days with the van. Therefore, you will need about 80 liters of water (approximately 1 liter/hour). There are 2 humidifiers installed, one for back up, just in case.

There a two tanks filled with a solution with a natural acidifier for cleaning the water in the farm and will be used for a specific trial. The products will only be used in the laboratory for the trials/tests. There will be examined or those products have a longer life time etc.

Figure 10: 2 Mobile humidifiers installed in the Van

Figure 11: 2 Mobile humidifiers with outlets and cooling unit in the Van

6.1. User manual Mobile Humidifier

CONTRONICS

HUMIDIFICATION

MHU-10 MOBILE HUMIDIFIER

USER MANUAL

MHU-10 MOBILE HUMIDIFIER CONTRONICS

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The Netherlands, hereby declares that product MHU-10 Mobile Humidifier, produced and delivered by Contronics Engineering B.V., is in accordance with the following CE directives:

EMC-Directive	: 2004/108/EG
Directive for low-voltage electrical installation	: 2006/95/EG

2

CONTRONICS MHU-10 MOBILE HUMIDIFIER

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MHU-10 MOBILE HUMIDIFIER CONTRONICS

1. PREFACE

This user manual contains the operating, installation and maintenance instructions for the ultrasonic humidifier MHU-10 Mobile Humidifier.

WARNING
It is possible that bacteria could be present in the humidifier's water supply. Some bacteria (Legionella) could be harmful to health if they are present in the aerosols that are blown out by the humidifier.

Through the construction and materials used, Contronics has ensured that the stimulation of bacterial growth is kept to the absolute minimum.
In order to ensure the supply of pure water, it is strongly recommended that demineralised water is used (see the Contronics product range).
Contronics cannot be held liable for any harm caused by bacteria or micro-organisms. It is the responsibility of the user to regularly carry out maintenance and to check the quality of the supplied water.

WARNING
It is possible that bacteria could be present in the humidifier's water supply. Some bacteria (Legionella) could be harmful to health if they are present in the aerosols that are blown out by the humidifier.

- The Mobile Humidifier is specially developed for humidification in mobile areas including cargo area of (cool) trucks, containers and railway carriages.
- The humidifier continues to work even though this experience G-forces during movements.
- The reservoir is closed.
- Movements up to 45° from the vertical axis are allowed.

CONTRONICS MHU-10 MOBILE HUMIDIFIER

2. INTRODUCTION

Principle of ultrasonic air humidification

Minute water droplets with a size of 1 to 3 microns are ejected above the water surface by means of high-frequency vibrations (1.7 MHz). The humidifier's air movement system ensures that these water droplets are then blown into the area to be humidified. The major advantages of this humidifier are the very low energy consumption, the limited amount of maintenance required and the low noise level.

Water quality

Even though the humidifier itself can be connected to plain tap water up to 8° German hardness, Contronics recommends demineralised water. This will limit the maintenance of the device to a minimum and the service life of the transducer will be considerably extended.
This will also prevent certain substances that are contained in tap water, such as calcium, salts, minerals and bacteria, ending up in the area to be humidified. Contronics has various filters available in its product range, operating on the basis of reverse osmosis. (See also the warning on page 4).

3. SAFETY REGULATIONS

IMPORTANT
The following measures must always be observed:

- **Always disconnect the 12V supply voltage from the humidifier before moving it and/or carrying out maintenance activities.**
- **Always keep the humidifier horizontal and motionless while it is in operation and for up to 2 minutes afterwards.**
- **Ensure that the water is always discharged via the outlet and ensure that this is never blocked.**
- **It is not necassary to mount the humidifier in level position. It also works under an angle of < 45°.**
- **The humidifier may only be dismantled by authorized Contronics technicians.**

MHU-10 **MOBILE HUMIDIFIER** CONTRONICS

4. PACKING

The HU is delivered in recyclable packaging that should be kept for re-shipping the unit for maintenance activities. Any shipment using other packaging could cause damage to the HU for which the manufacturer cannot be held liable.

It is possible that some traces of water could be found in the packaging; all the functions of the HU are thoroughly tested during the quality control and, for this reason, some water could still remain in the HU before it is packed.

The package contains:
- HU humidifier.
- Instructions for use.
- PVC connection to 40 mm.

5. CONNECTIONS, FUNCTIONS AND INSTRUCTIONS

IMPORTANT
The guarantee will become void if the humidifier is installed incorrectly or if it is handled in an improper manner.

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CONTRONICS MHU-10 MOBILE HUMIDIFIER

Connections and functions

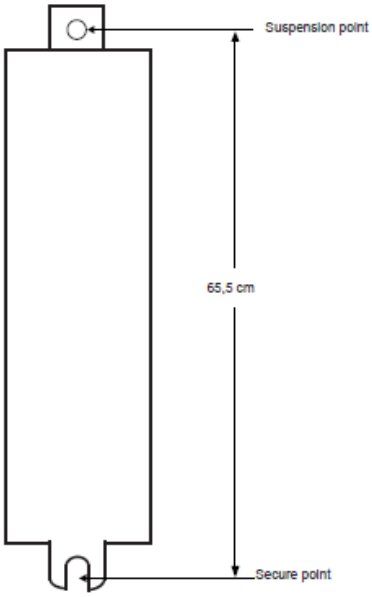
1. Water supply 3/8" John Guest push-in fitting, min. 0,1 bar / max. 6 bar.
2. Supply voltage connection 12V.
3. Waterafdischarge 3/8" John Guest push-in fitting.
4. Pushbuttons for adjustments.
5. Display.

Installation

1. Mount the humidifier in an environment with a temperature between 0°C and 35°C and humidity < 100%.
2. The humidifier upright mount. See mounting instructions.

Mounting

The humidifier is attached at the top and secured at the bottom. See drawing below.



6. ELECTRICAL CONNECTIONS

Supply voltage (12-14V DC)

Ensure a stable power supply.

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MHU-10 MOBILE HUMIDIFIER CONTRONICS

7. WATER CONNECTIONS AND FLUSHING CYCLE

IMPORTANT
Thoroughly flush out the piping before connecting the humidifier in order to prevent installation debris from blocking the intake valve.

Water supply

Demineralised (R.O.) water must be used for the humidifier and will provide adequate protection against bacteria. The use of plain tap water will lead to faster contamination of the water tank and transducerss, which will result in a shorter service life. Moreover, the dissolved calcium and mineral particles in ordinary tap water will be blown into the area to be humidified together with the fog droplets and will be precipitated in the area. Depending on the hardness of the water, this could cause a layer of dust after only a few days (see also the warning on page 4).

Water discharge

Connect a hose with a diameter of 3/8" to the humidifier's water discharge connection point so that any excess water can be discharged from the humidifier.
The outlet of this hose or pipe must be free; the end may not be hanging in the water.
The water discharge from the humidifier is unpressurised.

IMPORTANT
The water discharge connection point on the humidifier must constitute the highest point on the water discharge channel. The water discharge is not pressurised. A blocked outlet could damage the humidifier.

8. AIR CONNECTIONS

Air supply

Ensure a clean air supply without water droplets.

Air outlet

The air outlet must always be extended by a 75 cm pipe to allow larger droplets to be captured. Mount the outlet so that it slopes towards the humidifier to ensure that any condensed fog can flow back.
The connected pipe must be free from dust, dirt and oil residues. The length of the air outlet channel to the outlet may not exceed 3 m with a diameter that remains the same.

CONTRONICS MHU-10 MOBILE HUMIDIFIER

9. SWITCHING ON AND STARTING UP/FUNCTIONAL TEST

Switching on

Check the following before the humidifier is switched on for the first time:

- The humidifier is mounted.
- All pipes are connected.
- The water discharge channel has been connected according to the instructions.
- The water supply has been connected according to the instructions. The water piping has been flushed in order to prevent any installation debris blocking the water valve.

Start up and functional test

- Open the water valve.
- Switch on the power, check and take the following steps if:
  - Control a. On the display appears the text 'stand by'.
  - Action b. Push the I/O for 2 till 3 seconds (audio signal is given), the appliance start.
  - Control c. In about 10 seconds the reservoir is filled with water.
  - Control d. Depending on the ambient air humidity the humidification will start.
  - Action e. If there is no fog formed set in the menu the humidity setpoint on 99% and the production of fog will start after a few seconds.
- Switch the humidifier of with the I/O button and check if:
  - a. The water content is drained away.
  - b. After 30 sec. the remaining water is discharged from the pump.
  - c. After about 1 minute the water reservoir is emptied completely. (disconnect the hose from the water discharge).
- Connect the water drain and check for leakages.
- Switch on the main supply again.
- Put the set point in the desired position.
- Adjust, if necessary, the airspeed. (See the menu overview on page 11).

IMPORTANT
If the humidifier becomes overheated it will switch off. Once it has cooled down it will automatically switch on again. In case of overheating, an "Alarm" will sound and information appears on the display.

The following conditions could cause overheating:

- **A blockage in the air inlet.**
- **A blockage in the air outlet.**
- **Air intake temperature too high.**
- **Water temperature too high.**
- **Water discharge blocked.**
- **Ambient temperature too high.**
- **Ventilator speed set too low.**

Low Level

If the water level in the humidifier becomes too low, the humidification will stop.
An alarm will sound and information appears on the display.

10. MAINTENANCE

IMPORTANT
All maintenance must be carried out by Contronics or an organisation authorized by Contronics.

11. REPLACING SPARE PARTS

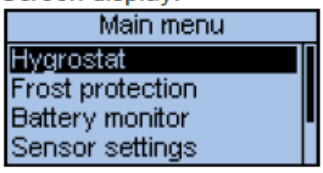
Replacing the transducers

The replacement of the transducers can only be done by Contronics or representatives authorised by Contronics.

12. MENU OVERVIEW

Settings
- Push on to activate the menu.
- Scroll to the desired setting using the ↑ or ↓ button.
- Press SET to confirm the selection.
- Scroll using the button ↑ or ↓ to <<.
- Press SET to leave the menu.

Screen display:

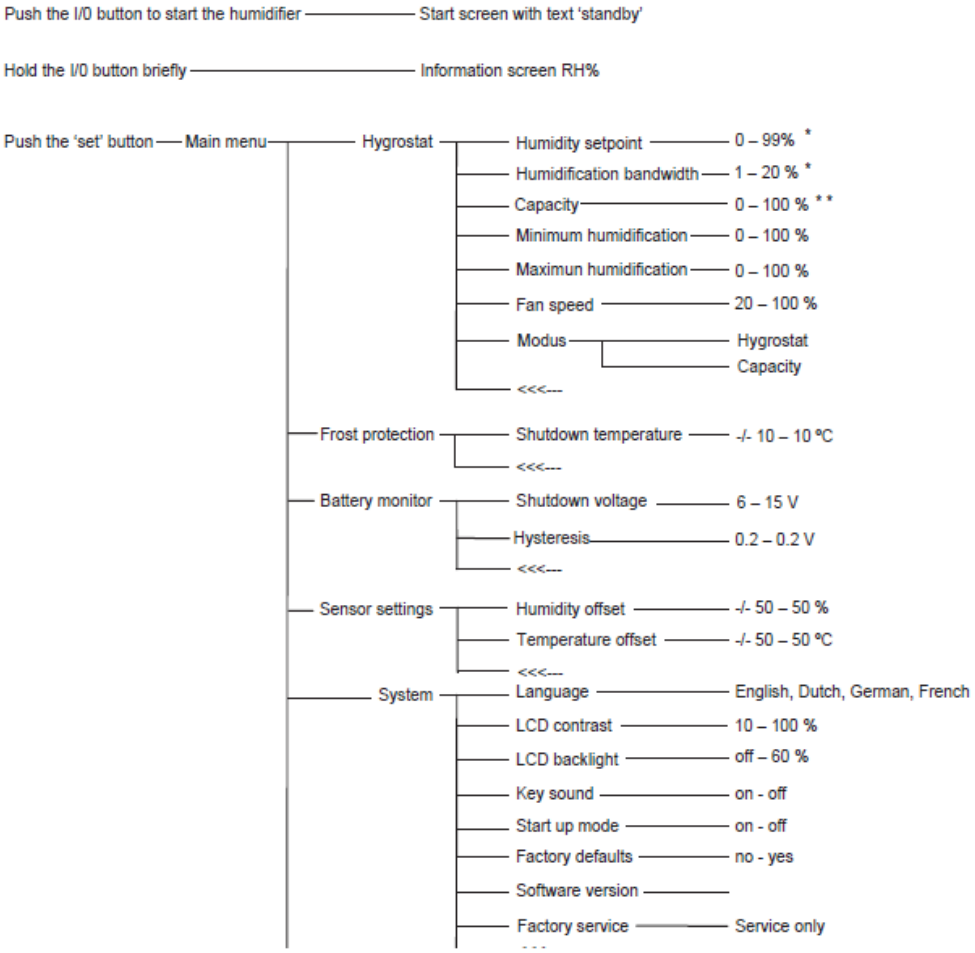


On the display the text 'standby' appears.
Push the I/O briefly and on the display appears information about % RH.
Push the 'set'button and the mainmenu appears.

HYGROSTAT MENU:
- Setting the hygrostat RH. *
- Setting the bandwith. *
- Setting the capacity. **
- Setting the maximum and minimum humidification.
- Settintg the fan speed.
- Modus --> hygrostat or capacity

SYSTEM MENU:
- Setting the language.
- Setting the display contrast.
- Setting tyhe background lighting.
- Setting the key tone.
- Consult the software version and return to factory settings.

CONTRONICS **MHU-10 MOBILE HUMIDIFIER**



* Setting only available in hygrostat modus.
** Setting only available in capacity modus.

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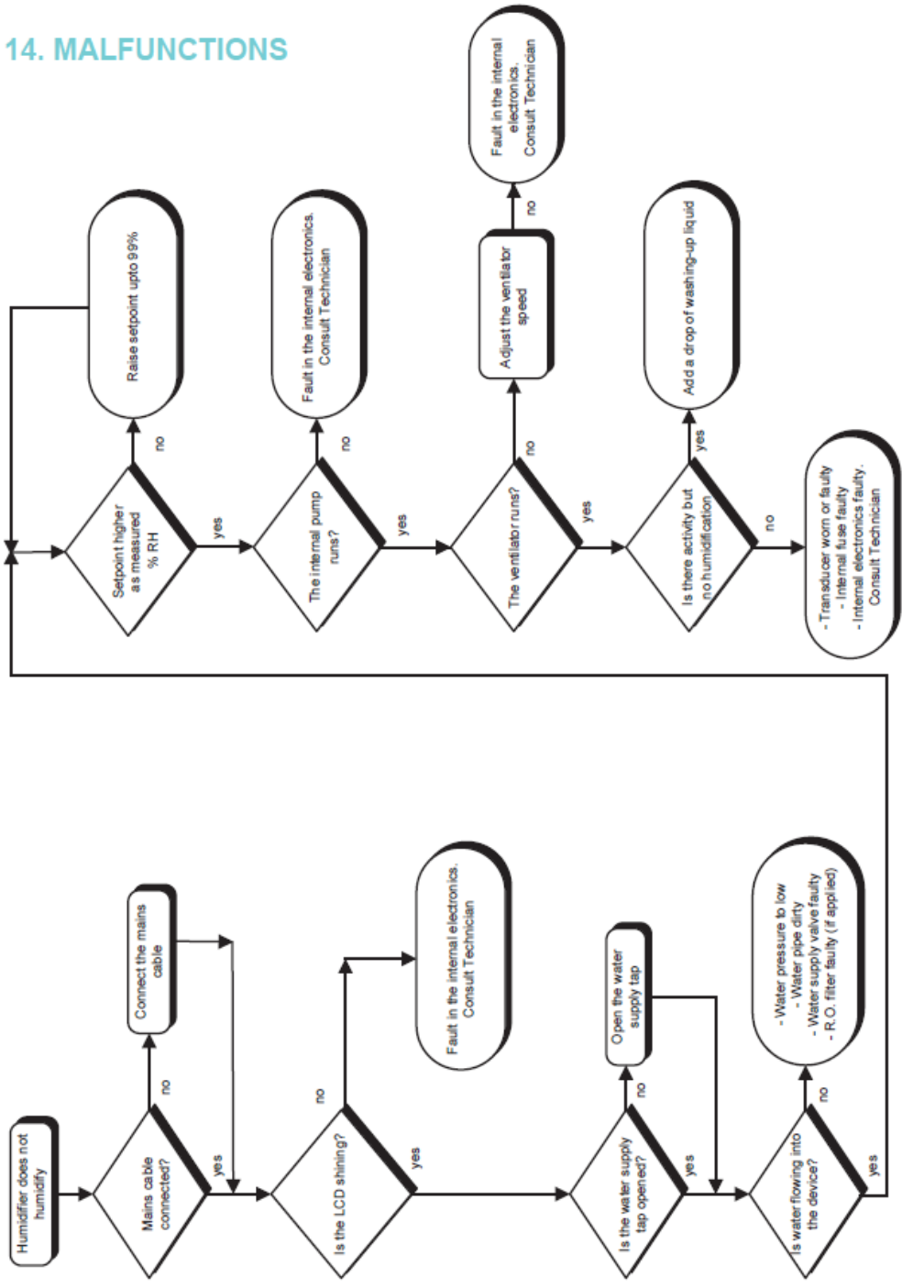
MHU-10 MOBILE HUMIDIFIER CONTRONICS

13. FACTORY SETTING AND RANGE

Parameter			Max.	Min.	Factory settings	Unit
HU settings	Hygrostat	Setpoint humidity	99	0	0	%
		RH bandwith	20	1	3	%
		Capacity	100	0	50	%
		Minimum humidification	0	100	0	%
		Maximum humidification	100	0	100	%
	Fan	Fan speed	100	20	100	%
	Frost protection	Shutdown temperature	10	-10	0	°C
	Battery	Shutdown voltage	15	6	11	V
		Hysteresis	2.0	0.2	1.0	V
	Sensor settings	Humidification off-set	50	-50	0	%
		Temperature off-set	50	-50	0	°C
	System settings	LCD contrast	100	0	50	%
		LCD background light	60	Off	30	sec.

CONTRONICS MHU-10 MOBILE HUMIDIFIER

14. MALFUNCTIONS



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MHU-10 MOBILE HUMIDIFIER CONTRONICS

15. TECHNICAL SPECIFICATIONS

	MHU-10 Mobile Humidifier
Transducer frequency	1,7 MHz
Maximum capacity	0-0,8 kg/hour (adjustable)
Service life of the transducers	10.000-20.000 hour
Size of the water droplets	1-3 micron
Diameter of the outlet flange	1 x 40 mm
Airflow	Adjustable
Outlet pipe length	3 meter
Water pressure	0.1 - 6 bar
Water connection	3/8" John Guest fitting
Maximum water hardness	Demineralised water
Water discharge	3/8" John Guest fitting
Mains voltage	12 - 14V DC
Power consumption	120W
Ambient temperature	0 °C till 35 °C
Water temperature	0 °C till 35 °C
Air temperature	0 °C till 35 °C
Ambient temperature compared to supply ait temperature	Non condensing
Dimensions (LxWxH)	110 x 155 x 600 mm
Housing	RVS 316L
Weight	8 kg

CONTRONICS MHU-10 MOBILE HUMIDIFIER

DISCLAIMER
Contronics works continuously on the further development of its humidifiers. We therefore reserve the right to modify the design, construction and technology of the product at any time. For this reason, no claims can be made based on the data, illustrations and description in this user manual.

Additional, up-to-date information is available on www.contronics.nl.

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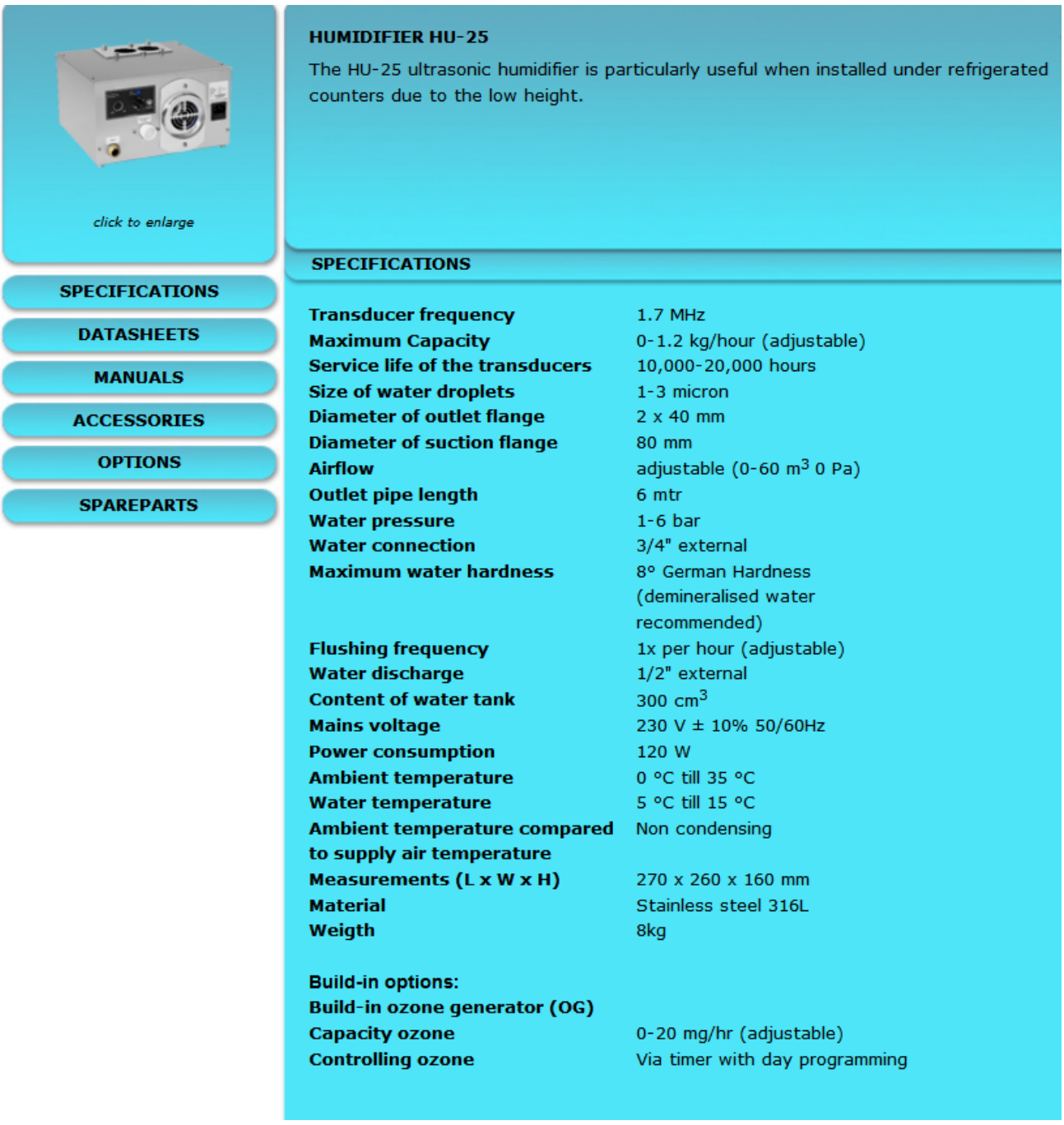
7. Humidifiers

Several humidifiers with different capacity are available: HU25, HU45, HU85, HU 245 and HT 485, HT965, HT1445. Depending of the need of capacity they can be choosen.



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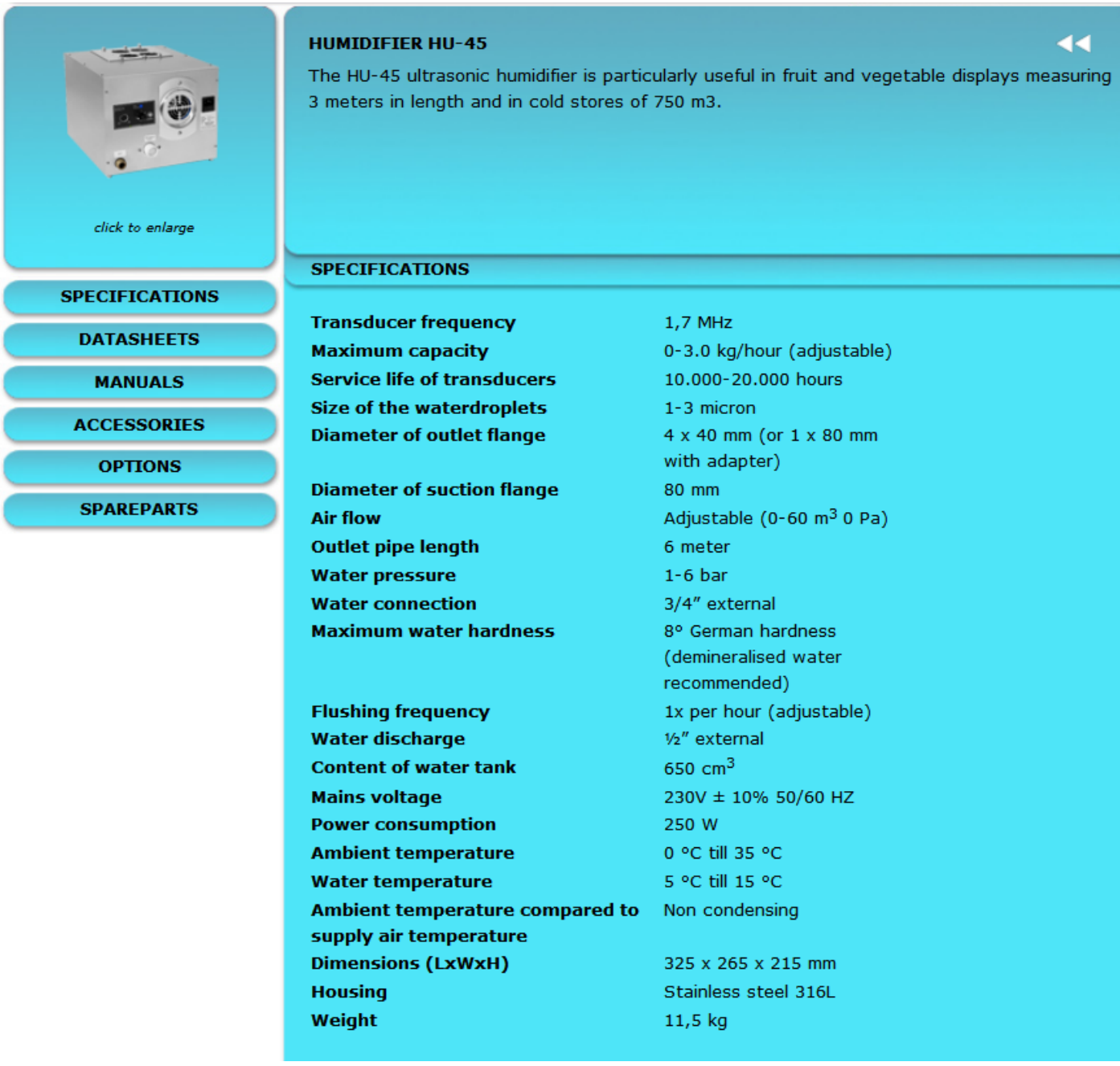
HUMIDIFIER HU-25

The HU-25 ultrasonic humidifier is particularly useful when installed under refrigerated counters due to the low height.

SPECIFICATIONS

Transducer frequency	1.7 MHz
Maximum Capacity	0-1.2 kg/hour (adjustable)
Service life of the transducers	10,000-20,000 hours
Size of water droplets	1-3 micron
Diameter of outlet flange	2 x 40 mm
Diameter of suction flange	80 mm
Airflow	adjustable (0-60 m^3 0 Pa)
Outlet pipe length	6 mtr
Water pressure	1-6 bar
Water connection	3/4" external
Maximum water hardness	8° German Hardness (demineralised water recommended)
Flushing frequency	1x per hour (adjustable)
Water discharge	1/2" external
Content of water tank	300 cm^3
Mains voltage	230 V ± 10% 50/60Hz
Power consumption	120 W
Ambient temperature	0 °C till 35 °C
Water temperature	5 °C till 15 °C
Ambient temperature compared to supply air temperature	Non condensing
Measurements (L x W x H)	270 x 260 x 160 mm
Material	Stainless steel 316L
Weigth	8kg
Build-in options:	
Build-in ozone generator (OG)	
Capacity ozone	0-20 mg/hr (adjustable)
Controlling ozone	Via timer with day programming

Figure 12: Specification Humidifier HU 25 (0-1.2 kg/hour)



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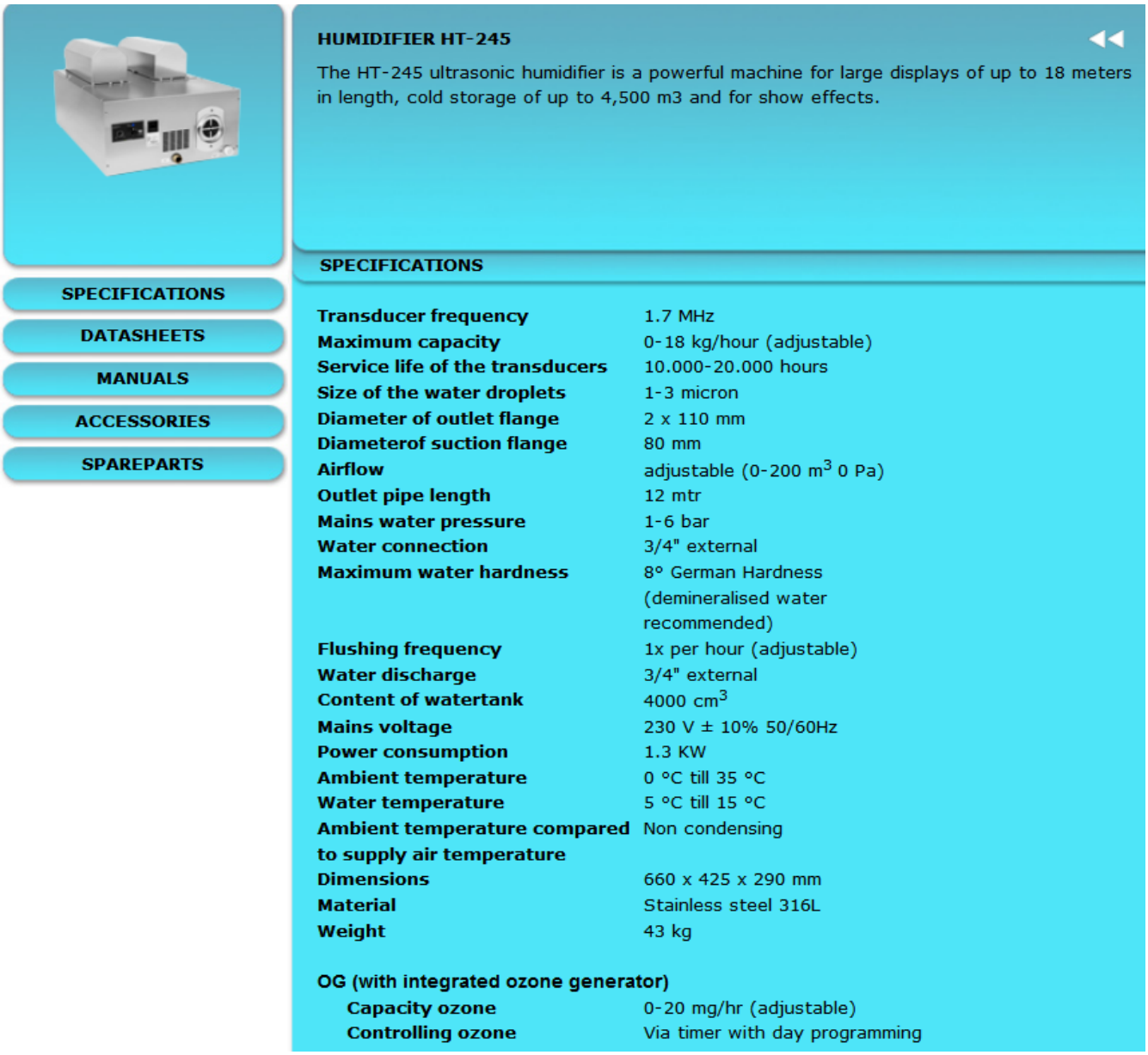
HUMIDIFIER HU-45

The HU-45 ultrasonic humidifier is particularly useful in fruit and vegetable displays measuring 3 meters in length and in cold stores of 750 m3.

SPECIFICATIONS

Transducer frequency	1,7 MHz
Maximum capacity	0-3.0 kg/hour (adjustable)
Service life of transducers	10.000-20.000 hours
Size of the waterdroplets	1-3 micron
Diameter of outlet flange	4 x 40 mm (or 1 x 80 mm with adapter)
Diameter of suction flange	80 mm
Air flow	Adjustable (0-60 m^3 0 Pa)
Outlet pipe length	6 meter
Water pressure	1-6 bar
Water connection	3/4" external
Maximum water hardness	8° German hardness (demineralised water recommended)
Flushing frequency	1x per hour (adjustable)
Water discharge	½" external
Content of water tank	650 cm^3
Mains voltage	230V ± 10% 50/60 HZ
Power consumption	250 W
Ambient temperature	0 °C till 35 °C
Water temperature	5 °C till 15 °C
Ambient temperature compared to supply air temperature	Non condensing
Dimensions (LxWxH)	325 x 265 x 215 mm
Housing	Stainless steel 316L
Weight	11,5 kg

Figure 13: Specification Humidifier HU 45 (0-3 kg/hour)



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HUMIDIFIER HT-245

The HT-245 ultrasonic humidifier is a powerful machine for large displays of up to 18 meters in length, cold storage of up to 4,500 m3 and for show effects.

SPECIFICATIONS

Transducer frequency	1.7 MHz
Maximum capacity	0-18 kg/hour (adjustable)
Service life of the transducers	10.000-20.000 hours
Size of the water droplets	1-3 micron
Diameter of outlet flange	2 x 110 mm
Diameterof suction flange	80 mm
Airflow	adjustable (0-200 m^3 0 Pa)
Outlet pipe length	12 mtr
Mains water pressure	1-6 bar
Water connection	3/4" external
Maximum water hardness	8° German Hardness (demineralised water recommended)
Flushing frequency	1x per hour (adjustable)
Water discharge	3/4" external
Content of watertank	4000 cm^3
Mains voltage	230 V ± 10% 50/60Hz
Power consumption	1.3 KW
Ambient temperature	0 °C till 35 °C
Water temperature	5 °C till 15 °C
Ambient temperature compared to supply air temperature	Non condensing
Dimensions	660 x 425 x 290 mm
Material	Stainless steel 316L
Weight	43 kg

OG (with integrated ozone generator)

Capacity ozone	0-20 mg/hr (adjustable)
Controlling ozone	Via timer with day programming

Figure 14: Specification Humidifier HU 245 (0-18 kg/hour)

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SPECIFICATIONS

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MANUALS

HUMIDIFIER HT-1445 / HT-965 / HT-485

The HT-1445/965/485 ultrasonic humidifiers/nebulizers, specially designed to treat large volumes. They have an automated fluid selector.

SPECIFICATIONS

	HT-1445	HT-965	HT-485
Transducer frequency	1.7 MHz	1.7 MHz	1.7 MHz
Maximum capacity	0-100 kg/hour (adjustable)	0-65 kg/hour (adjustable)	0-35 kg/hour (adjustable)
Service life of transducers	10.000-20.000 hours	10.000-20.000 hours	10.000-20.000 hours
Size of the water particles	1-3 micron	1-3 micron	1-3 micron
Diameter of the outlet	4 x 200 mm	4 x 160 mm	4 x 110 mm
Diameter of the inlet	400 mm	400 mm	400 mm
Air flow	Adjustable (0-4.000 m^3 0 Pa)	Adjustable (0-4.000 m^3 0 Pa)	Adjustable (0-4.000 m^3 0 Pa)
Outlet pipe length	40 meter	40 meter	40 meter
Connect pressue	1-6 bar	1-6 bar	1-6 bar
Supply connection	2 x 3/4" external	2 x 3/4" external	2 x 3/4" external
Water discharge	1" internal	1" internal	1" internal
Content of reservoirs	24 litres	16 litres	8 litres
Mains voltage	400V ± 10% 50/60 Hz	400V ± 10% 50/60 Hz	400V ± 10% 50/60 Hz
Power consumption	8KW	5.4KW	2.7KW
Ambient temperature	0 °C till 35 °C	0 °C till 35 °C	0 °C till 35 °C
Ambient temperature compared to supply air temperature	Non condensing	Non condensing	Non condensing
Dimensions (LxWxH)	1115 x 950 x 1780 mm	1115 x 950 x 960 mm	1115 x 950 x 240 mm
Housing inside	Stainless steel 316L	Stainless steel 316L	Stainless steel 316L
Housing outside	Aluminium + forex	Aluminium + forex	Aluminium + forex
Weight	400 kg	320 kg	240 kg

Figure 15: Specification Humidifier HU 485 – HU1445 (0-100 kg/hour)

7.1. User manual Humidifiers HT25/45/85/245

CONTRONICS

HUMIDIFIER

HT-25/45/85/245

USER MANUAL

25-02-2014 version 1.2

HT-25/45/85/245 CONTRONICS

Contronics Engineering B.V., Ambachtsweg 8, 5492 NJ Sint-Oedenrode,
The Netherlands, hereby declares that products HT-25, HT-45, HT-85 and HT-245 produced and delivered by Contronics Engineering B.V., are in accordance with the following CE directives:

EMC-Directive	: 2004/108/EG
Directive for low-voltage electrical installation	: 2006/95/EG

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CONTRONICS HT-25/45/85/245

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HT-25/45/85/245

CONTRONICS

1. PREFACE

This user manual contains the operating, installation and maintenance instructions for the ultrasonic humidifier of types HT-25, HT-45, HT-85 and HT-245.

WARNING
It is possible that bacteria could be present in the humidifier's water supply. Some bacteria (Legionella) could be harmful to health if they are present in the aerosols that are blown out by the humidifier.

Through the construction, flushing programme and materials used, Contronics has ensured that the stimulation of bacterial growth is kept to the absolute minimum. In order to ensure the supply of pure water, it is strongly recommended that demineralised water is used (see the Contronics product range). In conditions where bacterial pollution could occur in the surrounding air (e.g. at meat counters) or in areas where hot ambient air could arise (e.g. bakeries), it is also recommended to incorporate an ozone generator in the air supply system (see the Contronics product range). Contronics cannot be held liable for any harm caused by bacteria or micro-organisms. It is the responsibility of the user to regularly carry out maintenance and to check the quality of the supplied water.

IMPORTANT
Although the installation of this product may appear quite simple for experts, the manufacturer urges the installer to carefully read through the instructions before starting to install the device.

CONTRONICS HT-25/45/85/245

2. INTRODUCTION

Principle of ultrasonic air humidification

Minute water droplets with a size of 1 to 3 microns are ejected above the water surface by means of high-frequency vibrations (1.7 MHz). The humidifier's air movement system ensures that these water droplets are then blown into the area to be humidified. The major advantages of this humidifier are the very low energy consumption, the limited amount of maintenance required and the low noise level.

Continuously-variable air humidity control (CVH)

The humidifier has a dial with which the capacity can be regulated between 0 and the maximum per hour. If a humidity sensor has been connected to the humidifier, the desired humidity can be set between 35% and 95% using the same dial. The CVH system will then control the humidity proportional to the set value. The humidifier is therefore continuously in operation and ensures that the relative humidity is maintained at the set value. Instead of controlling the humidity with a humidity sensor, it is also possible to control the humidifier externally (0-10V), for example by using the DZR-45 and HTR-10 controllers.

Capacity

There is no limit to the modular expansion of the HU and this can be carried out as and when needed. This means that an unlimited number of modules can be linked together to form one system, thus allowing the capacity to be increased. As a result of the very high frequency of 1.7 MHz, the water droplets are minute, causing them to evaporate quickly and thereby cause less condensation in the humidifier's distribution pipes on their way towards the area to be humidified.

Water quality

Even though the humidifier itself can be connected to plain tap water up to 8° German hardness, Contronics recommends demineralised water. This will limit the maintenance of the device to a minimum and the service life of the transducer will be considerably extended.

Disinfection

For situations where bacterial purity is necessary (food industry) it is possible to connect an ozone generator. Contronics has an ozone generator in its delivery program.

HT-25/45/85/245 CONTRONICS

3. SAFETY REGULATIONS

IMPORTANT
The humidifier has an open water tank. Any overflow of the water tank could damage the electronics inside the humidifier.

The following measures must always be observed:
- **Always disconnect the 230 V mains voltage from the humidifier before moving it and/or carrying out maintenance activities.**
- **Always keep the humidifier horizontal and motionless while it is in operation and for up to 2 minutes afterwards.**
- **Ensure that the water is always discharged via the outlet and ensure that this is never blocked.**
- **The humidifier may only be dismantled by authorized Contronics technicians.**

4. PACKING

The HU is delivered in recyclable packaging that should be kept for re-shipping the unit for maintenance activities. Any shipment using other packaging could cause damage to the HU for which the manufacturer cannot be held liable.

It is possible that some traces of water could be found in the packaging; all the functions of the HU are thoroughly tested during the quality control and, for this reason, some water could still remain in the HU before it is packed.

The package contains:
- HU humidifier.
- Power cord.
- Instructions for use.

CONTRONICS HT-25/45/85/245

5. CONNECTIONS AND FUNCTIONS

Figure 1 Connections and functions

1 Plug connection for HS-91, DZR-45, HTR-10 or HK-01 (external control 0-10 V).
2. LED for flushing and alarm.
3. Dial for setting the humidity.
4. LED for humidity setting.
5. Dial for setting the airspeed.
6. Water outlet 1/2" free flow-through. (HU-245: 3/4").
7. Water supply 3/4", min. 1 bar/max. 6 bar.
8. Mains connection + fuse (230 V± 10%/50-60 Hz).
9. Timer for programming of the ozone generator and humidifier (OG option).

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HT-25/45/85/245

CONTRONICS

6. INSTALLATION INSTRUCTIONS

IMPORTANT
The guarantee will become void if the humidifier is installed incorrectly or if it is handled in an improper manner.

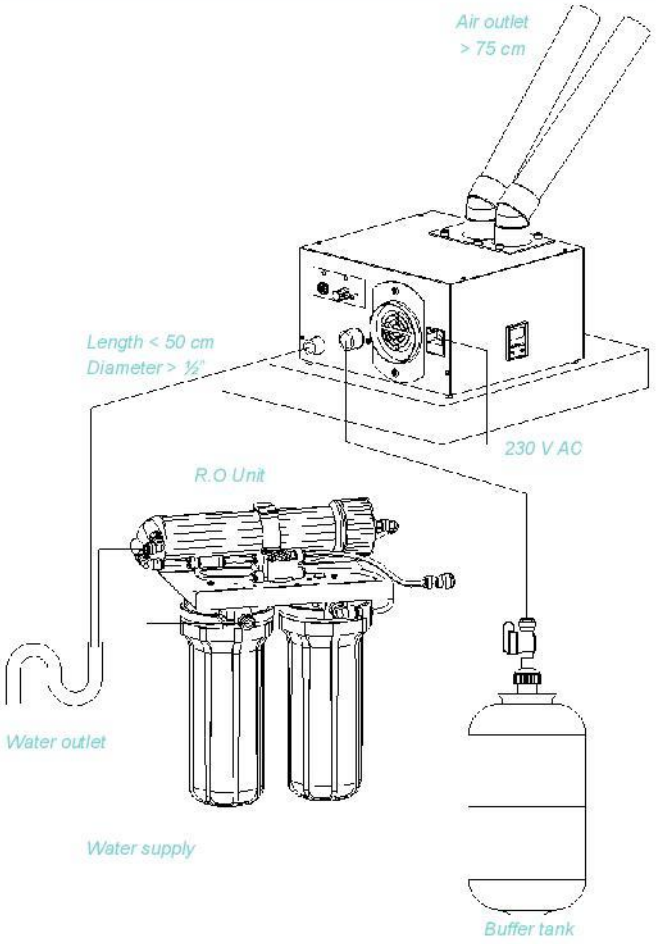

Figure 2 General set-up

1. Place the humidifier in an environment with a temperature between 0°C and 35°C and humidity < 100%.
2. Place the humidifier in a level position (2-dimensional).
3. Never place the humidifier on a closed tray with raised edges.

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CONTRONICS HT-25/45/85/245

7. ELECTRICAL CONNECTIONS

Supply voltage (230V AC ± 10%)

Ensure there is an earthed wall socket next to the humidifier. If necessary, connect it in parallel to any external ventilators. This will ensure that the ventilators and the humidifier switch on and off simultaneously.

Sensor connection

Mount the sensor in a suitable place (for measuring) and connect the DIN plug to the humidifier.

External control voltage

The HU can be controlled via an external control voltage (0-10 Volt). Use the HK-01 cable for this purpose. The DIN plug is connected to the humidifier, which can then be controlled using a direct current of 0 Volt (min.) up to 10 Volt (max.).

IMPORTANT
The external control signal must be floating with respect to earth (there must never be a connection to "earth"). Set the capacity dial to 0. The output impedance of the external control signal must be < 470Ω.

The humidifier can also be switched on and off using the same signal and HK-01 cable. If there is a short-circuit between the two cables, the humidifier will switch to stand-by mode and will not continue to humidify. If the contact is opened, the humidifier will immediately start operating again at the capacity set on the dial (Figure 1, Setting 3).

IMPORTANT
If an external controller has been connected to the DIN plug, the dial on the humidifier must be set to 0. This will prevent the humidifier from humidifying if a fault occurs in the controller.

HT-25/45/85/245 CONTRONICS

8. WATER CONNECTIONS AND FLUSHING CYCLE

IMPORTANT
Thoroughly flush out the piping before connecting the humidifier in order to prevent installation debris from blocking the intake valve.

Water supply

The humidifier has an integrated flow-reduction valve and can handle a water pressure from a minimum of 1 bar to a maximum of 6 bar. The water level in the humidifier is controlled by a float switch and a solenoid valve.

Demineralised (R.O.) water must be used for the humidifier and will provide adequate protection against bacteria. The use of plain tap water will lead to faster contamination of the water tank and transducers, which will result in a shorter service life. Moreover, the dissolved calcium and mineral particles in ordinary tap water will be blown into the area to be humidified together with the fog droplets and will be precipitated in the area. Depending on the hardness of the water, this could cause a layer of dust after only a few days (see also the warning on page 4).

Water discharge

Connect a hose with a maximum length of 50 cm and a minimum diameter of 1/2" to the humidifier's water discharge connection point so that any excess water can be discharged from the humidifier. The outlet of this hose or pipe must be free; the end may not be hanging in the water (see Figure 2). The water discharge from the humidifier is unpressurised.

IMPORTANT
The water discharge connection point on the humidifier must constitute the highest point on the water discharge channel. The water discharge is not pressurised. A blocked outlet could damage the humidifier.

A blocked water discharge channel could cause the humidifier to overflow. For this reason, never place the humidifier on a tray with raised edges as this could cause damage to the humidifier for which the manufacturer cannot be held liable.

Flushing

The standard factory setting for the flushing cycle is once every hour. This may not be suitable for some applications. In these cases, the flushing cycle can be modified to take place once every two hours or set to no flushing cycle at all (consult the manufacturer).

Standard cycle

The humidifier's "flushing/alarm" LED will light up every hour. The device will start the flushing cycle:

- The fogging will stop.
- The water tank will be flushed for approx. 15 seconds (depending on the water pressure).
- The water will be discharged.
- The humidifier will be re-filled and will restart normal operation.
- The green LED will blink while this procedure is taking place.

If the humidifier is switched off (230V supply voltage switched off), the water content will be discharged.

9. AIR CONNECTIONS

Air supply

Ensure a clean air supply without water droplets. Any air supply channel must be free from obstructions.

Air outlet

The air outlet must always be extended by a 75 cm pipe to allow larger droplets to be captured. Mount the outlet so that it slopes towards the humidifier to ensure that any condensed fog can flow back.
The connected pipe must be free from dust, dirt and oil residues. If an outlet opening is blocked, the capacity will be reduced. The length of the air outlet channel to the outlet may not exceed 6m with a diameter that remains the same.

10. SWITCHING ON AND STARTING UP/FUNCTIONAL TEST

Switching on

Check the following before the humidifier is switched on for the first time:

- The humidifier is positioned level.
- All pipes have been properly connected.
- The mains voltage is correct and connected in parallel with any ventilators that are used.
- The water discharge channel has been connected according to the instructions.
- The water supply has been connected according to the instructions. The water piping has been flushed in order to prevent any installation debris blocking the water valve.

IMPORTANT
Never switch the mains voltage on if the humidifier is not in the correct position or if it is placed upside-down, as this would cause the transducers to burn.

HT-25/45/85/245 CONTRONICS

Start up and functional test

- Open the water valve
- Set the % RH knob on maximum position
- Switch on the power and check if:
  a. The water runs to the humidifier
  b. The water flow stops after about 60 seconds.
  c. The production of mist starts after a few seconds
- Switch off the power and check if:
  a. The water content is drained away.
  b. After about 1 minute the water reservoir is emptied completely.
- Connect the water drain and check for leakages
- Switch on the main supply again
- Set the % knob in the desired position
- Control if necessary the airspeed with setting 5 (figure 1).

Note: During start up and flushing (water filling) of the humidifier the LED "Flushing/alarm" will blink green.This is a normal indication on the humidifier during this procedure.

IMPORTANT
If the humidifier becomes overheated it will switch off. Once it has cooled down it will automatically switch on again. In case of overheating, the "Flushing/alarm" LED will show red.

The following conditions could cause overheating:
- **A blockage in the air inlet.**
- **A blockage in the air outlet.**
- **Air intake temperature too high.**
- **Water temperature too high.**
- **Water discharge blocked.**
- **Ambient temperature too high.**
- **Ventilator speed set too low.**

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11. OZONE GENERATOR (OPTIONAL)

As an option, an ozone generator may be integrated in the HU by the manufacturer. Ozone ensures that any bacteria that are present in the humidifier and the connected piping will be destroyed.

Ozone only takes effect if the humidification is switched off while the ozone generation is taking place. A programmable timer has been incorporated in the side panel of the humidifier for switching the ozone generator and the humidification on and off. Contronics sets the timer to a default setting of 2 hours of ozone generation at night, between 2 a.m. and 4 a.m., while the humidifier is switched off. This setting can be changed (see "Applications").

WARNING
Ozone could be harmful to your health if the gas is inhaled over a longer period of time in a higher concentration. However, this concentration only occurs inside the humidifier and the connected piping. Once discharged, ozone gas quickly breaks down into ordinary oxygen, without any residual products.

The timer is independent of the mains supply and has a rechargeable battery incorporated in the ozone module for this purpose.

WARNING
If these batteries have to be replaced, the old battery must be disposed off as chemical waste or, alternatively, returned to the manufacturer.

The following information about the ozone generator can be found on www.contronics.nl:
- Programming the timer.
- What is ozone?

HT-25/45/85/245 CONTRONICS

12. MAINTENANCE

Regular maintenance is important for the optimum operation of the humidifier and to maintain hygiene.

The maintenance interval of the water reservoir will depend on the quality of the water and the purity of the air that is sucked in. The transducers must be replaced after approximately 20,000 operating hours (i.e. after about 2 years in the case of continuous use).

IMPORTANT
Make sure that the transducers are not damaged during cleaning.

Check the following before starting maintenance or shipping the humidifier:
- The mains plug has been removed from the socket and the ventilator is not moving.
- The water supply has been closed.
- The water supply pipe has been removed.
- The humidity sensor plug has been removed.
- The water reservoir is empty and the water discharge hose has been removed.
- The humidifier remains horizontal while dismantling.

Cleaning
- Remove the connecting flange.
- Clean the reservoir with a soft brush or cloth.

In the case of water scale, the reservoir can be filled with household vinegar. Allow to soak for 4-12 hours then clean with a soft brush and flush through. Remove the filter from the water inlet. Clean the filter or replace it with a new one. Flush the water discharge with water and clean it with a round brush.

13. MAINTENANCE OF THE OZONE GENERATOR (OPTIONAL)

The ceramic element must be cleaned once a year:
- The humidifier must be disconnected from the mains.
- Remove the screws on the side where the timer is located.
- Remove the side panel and disconnect the timer.
- Remove the 2 Phillips screws (bottom and top) from the stainless steel cover plate (on the black aluminium casing).
- Remove the ceramic element from the holder.
- Carefully clean the ceramic element on both sides with cleaning spirit or alcohol.
- If the vapour-deposited metal on the ceramic element is damaged, replace the ceramic element.
- Re-assemble in the reverse order.

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CONTRONICS HT-25/45/85/245

14. REPLACING SPARE PARTS

Replacing the transducers

The replacement of the transducers can only be done by Contronics or representatives authorised by Contronics.

IMPORTANT
All maintenance must be carried out by Contronics or by an organisation authorized by Contronics.

15. APPLICATIONS OF THE HUMIDIFIER

Various information sheets and drawings are available covering different applications. These can be downloaded from www.contronics.nl.

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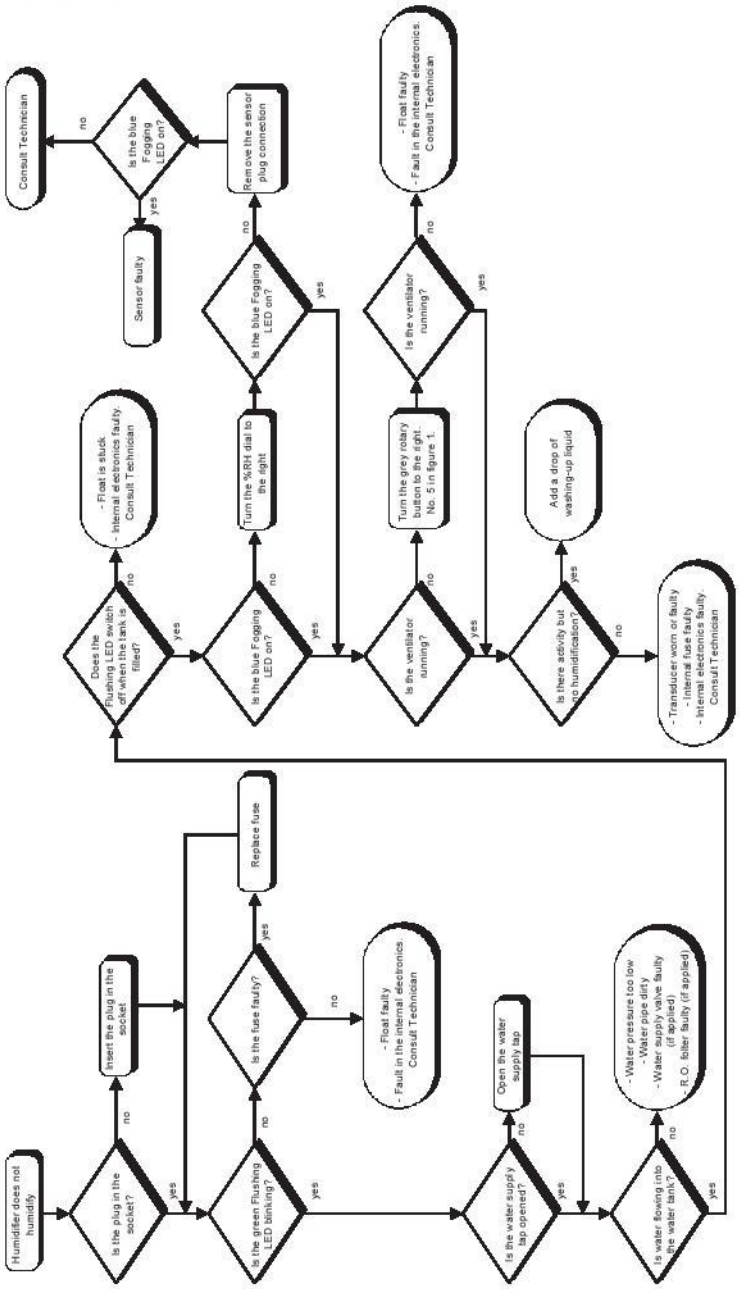
16. MALFUNCTIONS



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CONTRONICS HT-25/45/85/245

17. TECHNICAL SPECIFICATIONS

	HT-25	HT-45
Transducer frequency	1,7 MHz	1,7 MHz
Maximum capacity	0-1,2 kg/hour (adjustable)	0-3,0 kg/hour (adjustable)
Service life of the transducers	10.000-20.000 hours	10.000 - 20.000 hours
Size of the water droplets	1-3 micron	1-3 micron
Diameter of outlet flange	2 x 40 mm	4 x 40 mm (or 1 x 80 with adapter)
Diameter of suction flange	80 mm	80 mm
Air flow	Adjustable (0-60 m^3 0 Pa)	Adjustable (0-60 m^3 0 Pa)
Outlet pipe length	6 meter	6 meter
Water pressure	1-6 bar	1-6 bar
Water connection	3/4" external	3/4" external
Maximum water hardness	8° German hardness (demineralised water recommended)	8° German hardness (demineralised water recommended)
Flushing frequency	1x per hour (adjustable)	1x per hour (adjustable)
Water discharge	1/2" external	1/2" external
Content of water tank	300 cm^3	650 cm^3
Mains voltage	230V ± 10% 50/60 Hz	230V ± 10% 50/60 Hz
Power consumption	120 W	250 W
Ambient temperature	0 °C till 35 °C	0 °C till 35 °C
Water temperature	5 °C till 15 °C	5 °C till 15 °C
Ambient temperature compared to supply air temperature	Non condensing	Non condensing
Dimensions (LxWxH)	270 x 260 x 160 mm	325 x 265 x 215 mm
Housing	Stainless steel 316L	Stainless steel 316L
Weight	8 kg	11,5 kg

OG (with integrated ozone generator)		
Capacity ozone	0-20 mg/hour (adjustable)	0-20 mg/hour (adjustable)
Controlling ozone	Via timer with day programming	Via timer with day programming

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HT-25/45/85/245

CONTRONICS

	HT-85	HT-245
Transducer frequency	1,7 MHz	1,7 MHz
Maximum capacity	0-6,0 kg/hour (adjustable)	0-18,0 kg/hour (adjustable)
Service life of the transducers	10.000-20.000 hours	10.000 - 20.000 hours
Size of the water droplets	1-3 micron	1-3 micron
Diameter of outlet flange	2 x 80 mm or 8 x 40 mm	2 x 110 mm
Diameter of suction flange	80 mm	80 mm
Air flow	adjustable (0-60 m^3 0 Pa)	adjustable (0-200 m^3 0 Pa)
Outlet pipe length	6 meter	12 meter
Water pressure	1-6 bar	1-6 bar
Water connection	3/4" external	3/4" external
Maximum water hardness	8º German hardness (demineralised water recommended)	8º German hardness (demineralised water recommended)
Flushing frequency	1x per hour (adjustable)	1x per hour (adjustable)
Water discharge	1/2" external	3/4" external
Content of water tank	1500 cm^3	4000 cm^3
Mains voltage	230V ± 10% 50/60 Hz	230V ± 10% 50/60 Hz
Power consumption	450 W	1,3 KW
Ambient temperature	0 °C till 35 °C	0 °C till 35 °C
Water temperature	5 °C till 15 °C	5 °C till 15 °C
Ambient temperature compared to supply air temperature	Non condensing	Non condensing
Dimensions (LxWxH)	450 x 265 x 290 mm	660 x 425 x 290 mm
Housing	Stainless steel 316L	Stainless steel 316L
Weight	18 kg	43 kg

OG (with integrated ozone generator)		
Capacity ozone	0-20 mg/hour (adjustable)	0-20 mg/hour (adjustable)
Controlling ozone	Via timer with day programming	Via timer with day programming

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CONTRONICS HT-25/45/85/245

DISCLAIMER
Contronics works continuously on the further development of its humidifiers. We therefore reserve the right to modify the design, construction and technology of the product at any time. For this reason, no claims can be made based on the data, illustrations and description in this user manual.

Additional, up-to-date information is available on www.contronics.nl.

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7.2. User manual Humidifier HT 485

CONTRONICS

HUMIDIFIER

HT-485-001

USER MANUAL

HT-485-001

CONTRONICS

CE

Contronics Engineering B.V., Ambachtsweg 8, 5492 NJ Sint-Oedenrode,
The Netherlands, hereby declares that product HT-485-001produced and delivered by
Contronics Engineering B.V., are in accordance with the following CE directives:

EMC-Directive	: 2004/108/EG
Directive for low-voltage electrical installation	: 2006/95/EG

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CONTRONICS HT-485-001

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HT-485-001

CONTRONICS

1. PREFACE

This user manual contains the operating, installation and maintenance instructions for the ultrasonic humidifier of type HU-485-001 with a build-in reversed osmosesystem (LP-100BP). A separate user manual is included.

WARNING
It is possible that bacteria could be present in the humidifier's water supply. Some bacteria (Legionella) could be harmful to health if they are present in the aerosols that are blown out by the humidifier.

Through the construction and materials used, Contronics has ensured that the stimulation of bacterial growth is kept to the absolute minimum. In order to ensure the supply of pure water, it is strongly recommended that demineralised water is used (see the Contronics product range). Contronics cannot be held liable for any harm caused by bacteria or micro-organisms. It is the responsibility of the user to regularly carry out maintenance and to check the quality of the supplied water.

IMPORTANT
Although the installation of this product may appear quite simple for experts, the manufacturer urges the installer to carefully read through the instructions before starting to install the device.

2. INTRODUCTION

Principle of ultrasonic air humidification

Minute water droplets with a size of 1 to 3 microns are ejected above the water surface by means of high-frequency vibrations (1.7 MHz). The humidifier's air movement system ensures that these water droplets are then blown into the area to be humidified. The major advantages of this humidifier are the very low energy consumption, the limited amount of maintenance required and the low noise level.

Capacity

As a result of the very high frequency of 1.7 MHz, the water droplets are minute, causing them to evaporate quickly and thereby cause less condensation in the humidifier's distribution pipes on their way towards the area to be humidified.

Water quality

Although the humidifier itself on plain tap water can be connected up to 8 ° German hardness, recommends Contronics demineralised water. Maintenance of the device is kept to a minimum and the life of the vibrating images is significantly extended.This will also prevent all kinds of substances from the tap water, such as lime, salts, minerals and bacteria to moisten in the space. Contronics has various filters in its product range, which work on the basis of reverse osmosis. (See also warning on page 4)

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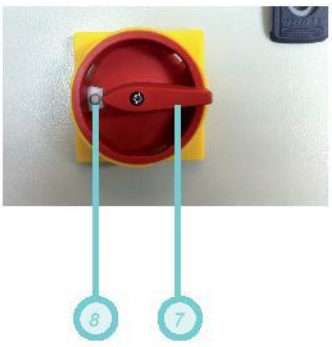
CONTRONICS HT-485-001

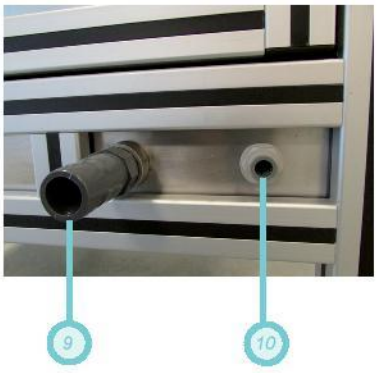
3. SAFETY REGULATIONS

IMPORTANT
The humidifier has an open water tank. Any overflow of the water tank could damage the electronics inside the humidifier.

The following measures must always be observed:
- **Always disconnect the mains voltage from the humidifier before moving it and/or carrying out maintenance activities.**
- **Always keep the humidifier horizontal and motionless while it is in operation and for up to 2 minutes afterwards.**
- **Ensure that the water is always discharged via the outlet and ensure that this is never blocked.**

4. CONNECTIONS AND FUNCTIONS





1. Readout window.
2. Indication LEDs.
3. Push buttons.
4. Mains connection.
5. Connection HK-01 or HS-91P
6. Lock
7. On/off turn button.
8. Indication.
9. Water drain.
10. Water supply.

Figure 1 Connections and functions.

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HT-485-001 CONTRONICS

5. INSTALLATION INSTRUCTIONS

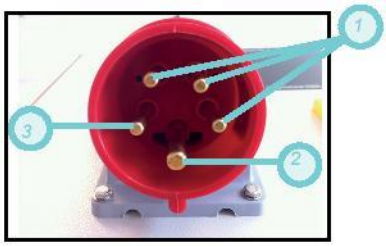
IMPORTANT
The guarantee will become void if the humidifier is installed incorrectly or if it is handled in an improper manner.

1. Place the humidifier in an environment with a temperature between 0°C and 35°C and humidity < 100%.
2. Place the humidifier in a level position (2-dimensional).
3. Means the area consider opening the doors for maintenance.

6. ELECTRICAL CONNECTIONS

Supply voltage (230/400VAC ± 10%)

Ensure there is an earthed wall socket (3-fase, 0 en aarde) next to the humidifier.



1. 3-phase.
2. Earth.
3. 0.

Figure 2 Electrial connections.

7. WATER CONNECTIONS AND FLUSHING CYCLE

IMPORTANT
Thoroughly flush out the piping before connecting the humidifier in order to prevent installation debris from blocking the intake valve.

Water supply

The humidifier has an integrated flow-reduction valves and can handle a water pressure from a minimum of 1 bar to a maximum of 6 bar. The water level in the humidifier is controlled by a float switches and a solenoid valves.

Demineralised (R.O.) water must be used for the humidifier and will provide adequate protection against bacteria. The use of plain tap water will lead to faster contamination of the water tank and transducerss, which will result in a shorter service life. Moreover, the dissolved calcium and mineral particles in ordinary tap water will be blown into the area to be humidified together with the fog droplets and will be precipitated in the area. Depending on the hardness of the water, this could cause a layer of dust after only a few days (see also the warning on page 4).

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CONTRONICS HT-485-001

Water discharge
The outlet of the pipe must be free.

IMPORTANT
The water discharge connection point on the humidifier must constitute the highest point on the water discharge channel. The water discharge is not pressurised. A blocked outlet could damage the humidifier.

A blocked water discharge channel could cause the humidifier to overflow. For this reason, never place the humidifier on a tray with raised edges as this could cause damage to the humidifier for which the manufacturer cannot be held liable.

8. AIR CONNECTIONS

Air supply
Ensure a clean air supply without water droplets. Any air supply channel must be free from obstructions.

Air outlet
The air outlet must always be extended by a 90° turn and 100 cm pipe to allow larger droplets to be captured. Mount the outlet so that it slopes towards the humidifier to ensure that any condensed fog can flow back.
The connected pipe must be free from dust, dirt and oil residues. If an outlet opening is blocked, the capacity will be reduced. The length of the air outlet channel to the outlet may not exceed 6m with a diameter that remains the same.

Figure 3 Air suction and fog outlet.

9. SWITCHING ON AND STARTING UP/FUNCTIONAL TEST

Switching on
Check the following before the humidifier is switched on for the first time:
- The humidifier is positioned level.
- All pipes have been properly connected.
- The mains voltage is correct and connected.
- The water discharge channel has been connected according to the instructions.
- The water supply has been connected according to the instructions. The water piping has been flushed in order to prevent any installation debris blocking the water valve.

IMPORTANT
Never switch the mains voltage on if the humidifier is not in the correct position, as this would cause the transducers to burn.

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HT-485-001 CONTRONICS

Start up and functional test

- Open the water valve
- Switch on the power and check if:
  a. The water runs to the humidifier.
  b. The water flow stops after about 20 seconds - 20 minutes. (depending on the water pressure)
  c. Set capacity at 100%.
  d. The production of mist starts after a few seconds.
- Switch off the power and check if:
  a. The water content is drained away.
  b. After about 5 minutes the water reservoir is emptied completely.
- Switch on the main supply again.
- Set the capacity to the desired value.
- Control if necessary the airspeed.

IMPORTANT
Overheating of the humidifier will be damaged beyond repair
The following conditions could cause overheating:
- **A blockage in the air inlet.**
- **A blockage in the air outlet.**
- **Air intake temperature too high.**
- **Water temperature too high.**
- **Water discharge blocked.**
- **Ambient temperature too high.**
- **Ventilator speed set too low.**

10. MAINTENANCE

Regular maintenance is important for the optimum operation of the humidifier and to maintain hygiene.

The maintenance interval of the water reservoir will depend on the quality of the water and the purity of the air that is sucked in. The transducers must be replaced after approximately 20,000 operating hours (i.e. after about 2 years in the case of continuous use).

Check the following before starting maintenance or shipping the humidifier:
- The mains plug has been removed from the socket and the ventilator is not moving.
- The water supply has been closed.
- The water supply pipe has been removed.
- The water reservoir is empty and the water discharge hose has been removed.
- The humidifier remains horizontal while dismantling.

IMPORTANT
All maintenance must be carried out by Contronics or by an organisation authorized by Contronics.

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CONTRONICS HT-485-001

11. REPLACING SPARE PARTS

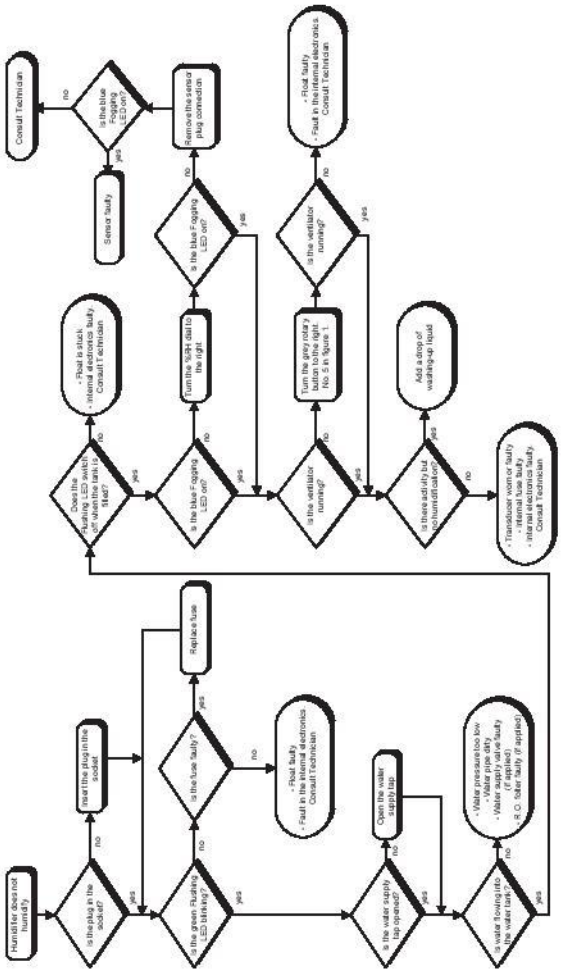
Replacing the transducers

The replacement of the transducers can only be done by Contronics or representatives authorised by Contronics.

12. APPLICATIONS OF THE HUMIDIFIER

Various information sheets and drawings are available covering different applications. These can be downloaded from www.contronics.nl.

13. MALFUNCTIONS



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HT-485-001 CONTRONICS

14. TECHNICAL SPECIFICATIONS

	HT-485-001
Transducer frequency	1,7 MHz
Maximum capacity	35 kg/hr (adjustable)
Service life of the transducers	10.000-20.000 hour
Size of water droplets	1-3 micron
Diameter of outlet flange	2 x 125 mm
Diameter of suction flange	435 mm
Air flow	adjustable (0-800 m^3 0 Pa)
Outlet pipe length	40 meter
Water pressure	1-6 bar
Water connection	1 x 1/2" John Guest fitting
Water discharge	1" external
Content of water tank	8 liter
Mains voltage	400V ± 10% 50 Hz
Power consumption	3.1kW
Ambient temperature	0 °C till 35 °C
Ambient temperature compared to supply air temperature	Non condensing
Dimensions	112 (L) x 95 (W) x 155 (H) cm
Housing	Cabinet: plastic, aluminium and stainless steel Water tank: Stainless steel 316L
Weight	240 kg

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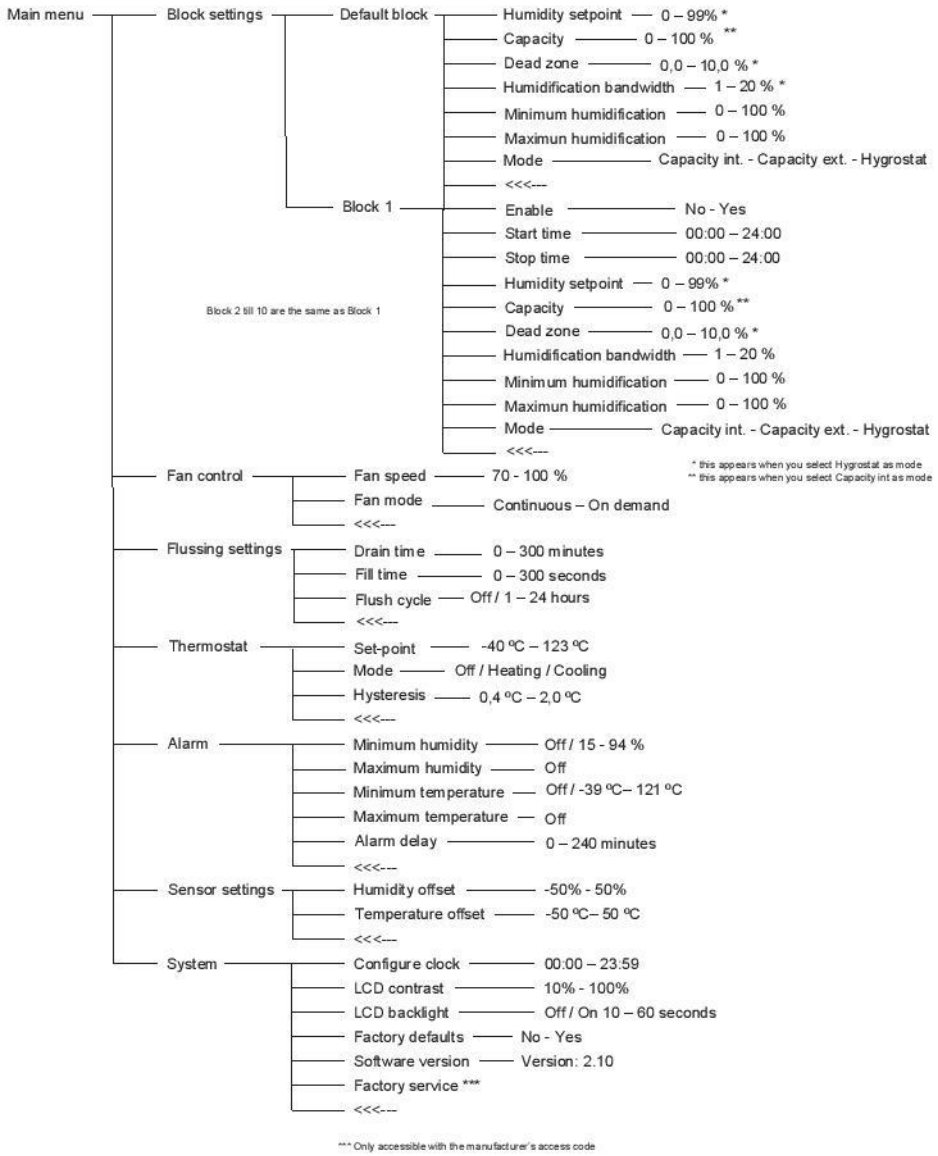
CONTRONICS HT-485-001

15. MENU OVERVIEW



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HT-485-001

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We therefore reserve the right to modify the design, construction and technology of the product at any time. For this reason, no claims can be made based on the data, illustrations and description in this user manual.

Additional, up-to-date information is available on www.contronics.nl

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8. Water treatment

Each humidifier need water treatment by using a Reverse Osmosis unit (see D3.1). Specifications of possible systems are described in this chapter. There are different systems with different capacity. Which one will be needed depends of capacity, water pressure (more pressure needed) and the drain (or pump is needed).

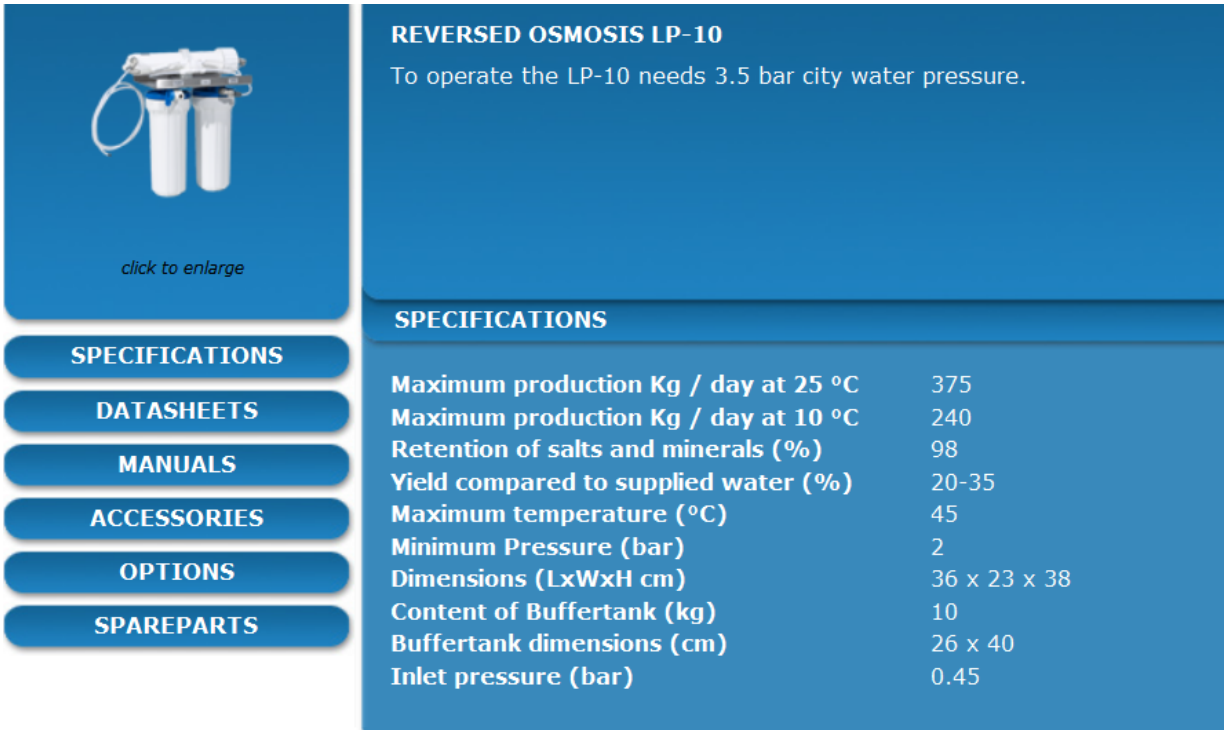

Figure 16: Specification RO-unit LP-10

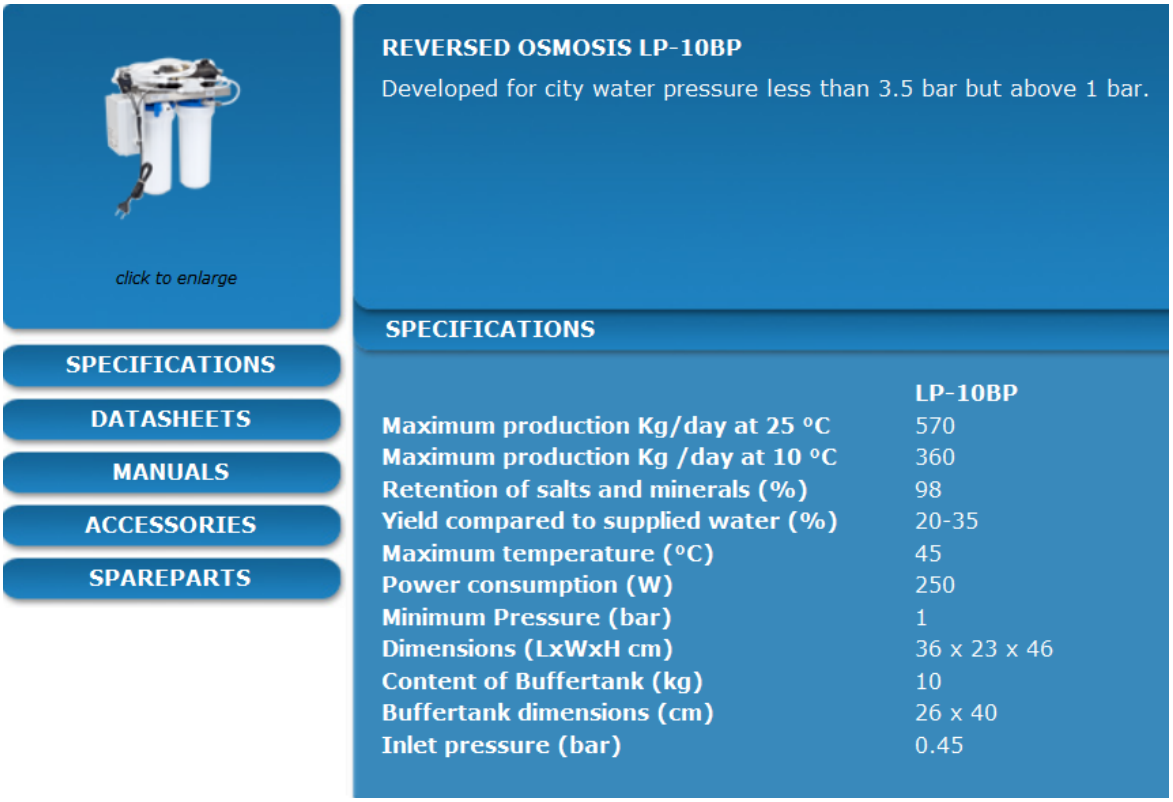

Figure 17: Specification RO-unit LP-10BP

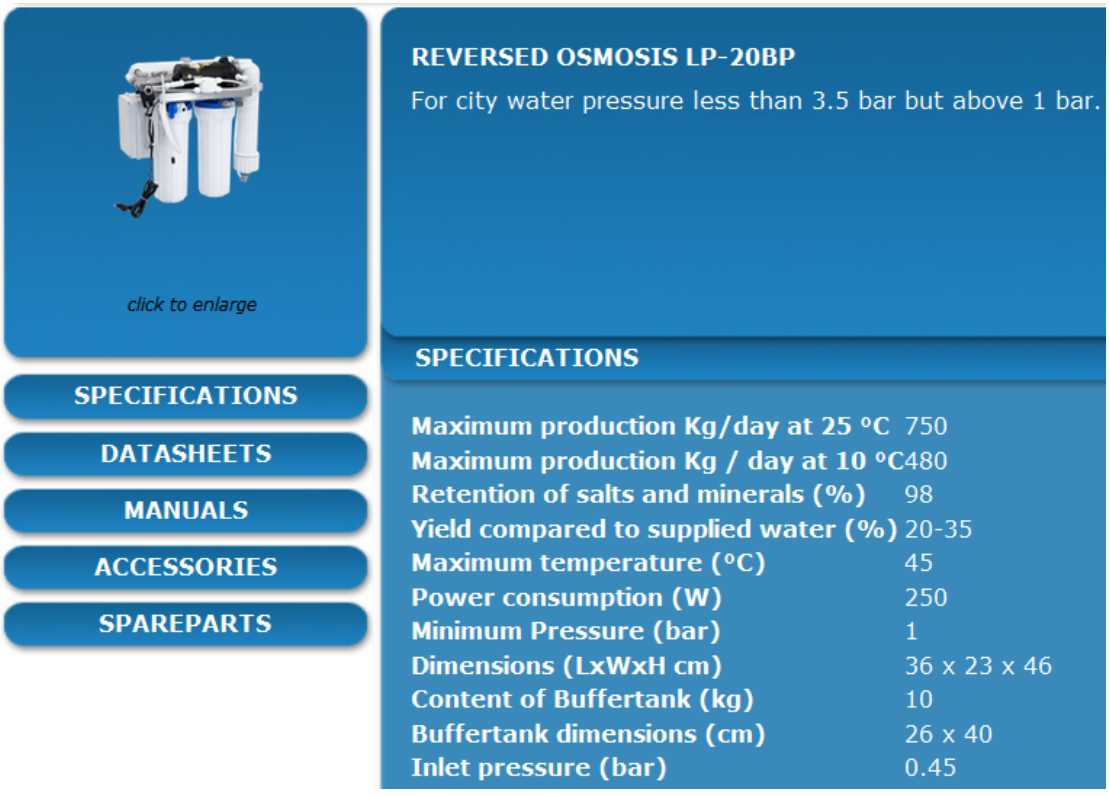

Figure 18: Specification RO-unit LP-20BP

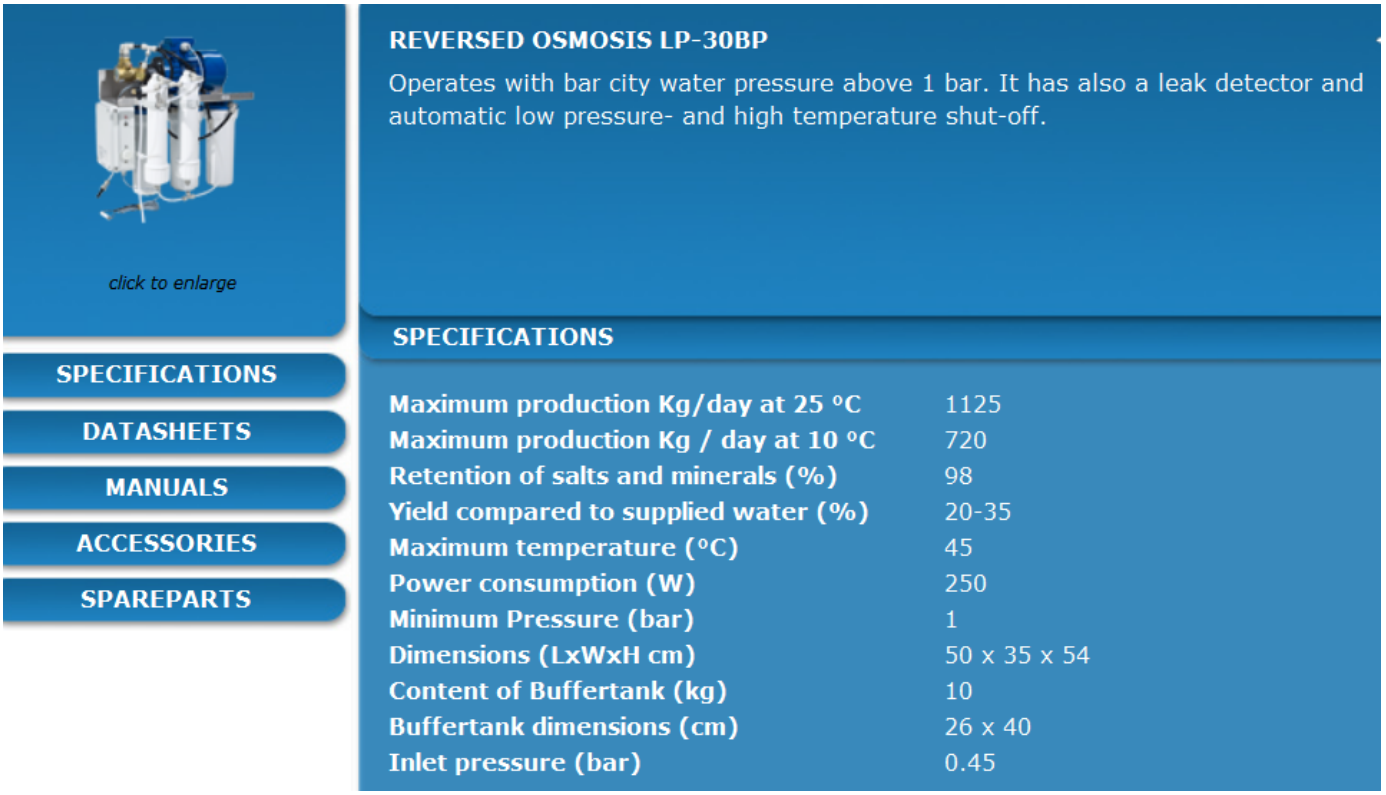

Figure 19: Specification RO-unit LP-30BP

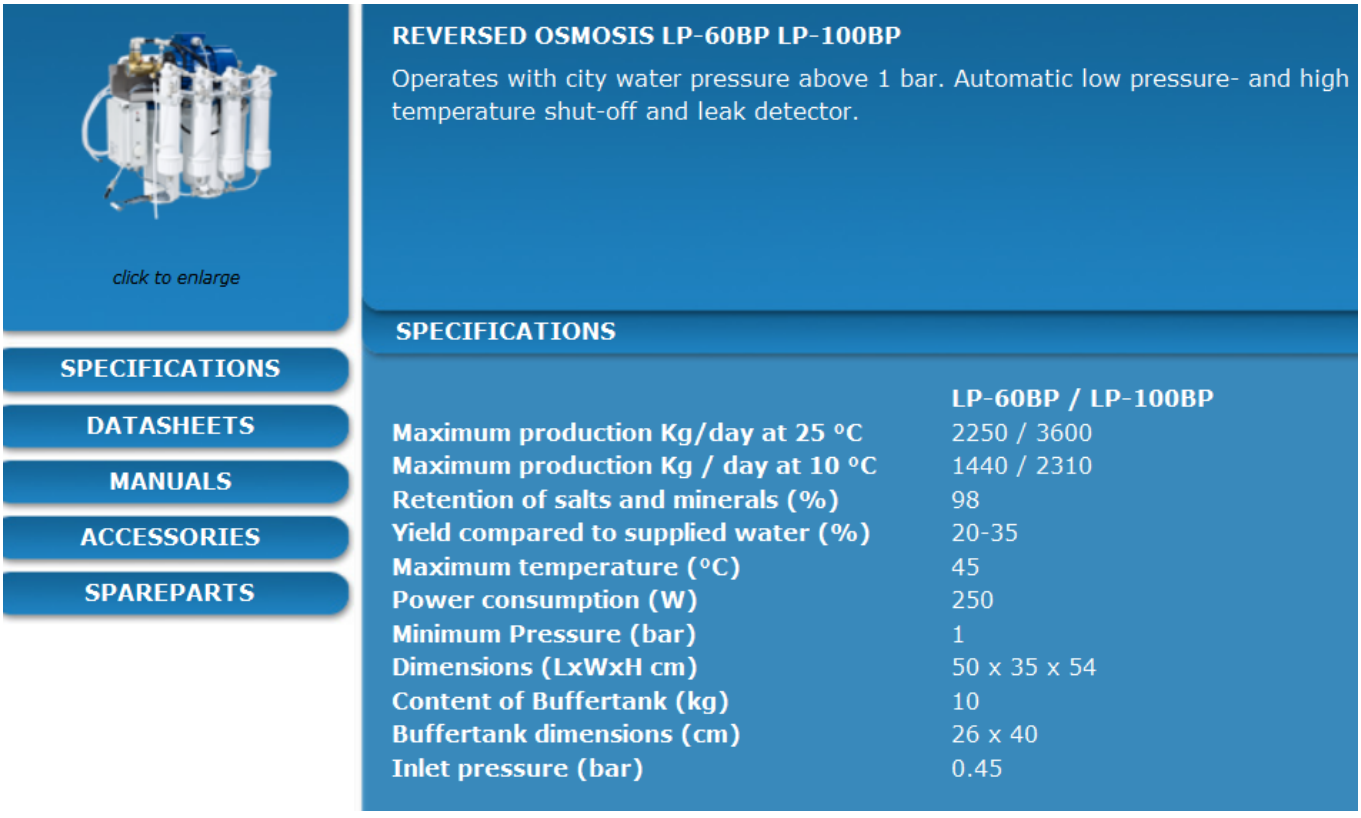

Figure 20: Specification RO-unit LP-60BP/ LP-100BP

8.1. User manual RO-systems

CONTRONICS

R.O. SYSTEMS

LP-10/10BP/20BP/30BP/60BP/100BP

USER MANUAL

10-12-2013 version 2.3

LP-10/10BP/20BP/30BP/60BP/100BP CONTRONICS

CE

Contronics Engineering B.V., Ambachtsweg 8, 5492 NJ Sint-Oedenrode, The Netherlands, hereby declares that products LP-10BP, LP-20BP, LP-30BP, LP-60BP and LP-100BP, produced and delivered by Contronics Engineering B.V., are in accordance with the following CE directives:

EMC-Directive	: 2004/108/EG
Directive for low-voltage electrical installation	: 2006/95/EG

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CONTRONICS LP-10/10BP/20BP/30BP/60BP/100BP

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LP-10/10BP/20BP/30BP/60BP/100BP CONTRONICS

1. INTRODUCTION

The use of demineralised water is recommended with Contronics humidifiers for the following reasons:

- Any minerals, salts and bacteria that enter the humidifier will cause the water reservoir to become polluted. The integrated flushing programme will delay this process but will not prevent it entirely.
  Depending on the quality of the added water, the water reservoir will eventually become blocked. As a result, the energy of the transducers will no longer be effective, and they will wear out more quickly. In addition, the float switch could transmit the wrong information to the electronics system, thereby causing damage to the electronics.
- The minerals and salts (calcium) present in the water will end up in the area to be humidified and could cause annoying deposits of dust.
- Any bacteria present in the water (Legionella) could multiply easily in the relatively warm water in the tank and could thereby constitute a health hazard.

The use of demineralised water reduces:

- Maintenance
- Wear and tear to the transducers
- Deposits of dust in the area
- Bacterial growth

System components

The Contronics LP series is fitted with a high-quality (Dow Chemical) membrane. Working on the principle of Reverse Osmosis (R.O.), the membrane only allows water molecules to pass through. A flushing system prevents clogging, increases the service life of the membrane and improves performance.
Systems can be supplied with a capacity of 375 – 3,600 l per day (at a temperature of 25°C and depending on the water pressure).
Two preliminary filters are positioned ahead of the membrane: a 5 micron pre-filter and an active carbon filter.

In the BP version, an electric pump has been added to increase the capacity in order to cope with low water pressure or higher consumption.
The system also incorporates an automatic shut-off valve. When the system does not need to supply demineralised water and is at the correct pressure, this will ensure that the supply water will be shut off in order to prevent water from being unnecessarily wasted through flushing.

A buffer tank is also included in the delivery (including the T-piece connector) and must be fitted in the supply line to the humidifier. This tank will supply additional water whenever the humidifier is consuming more than the osmosis system is able to supply. This occurs during flushing and filling. At any other time, the system supplies more than the required consumption and any excess water will be used to top-up the tank. The tank incorporates a rubber bag in which the demineralised water is stored. The air

pressure is higher between the bag and the external shell.
In the LP-30BP, LP-60BP and LP-100BP models, an electronic water leakage detector is supplied that will cut off the water supply if any leakage is detected.

2. KNOW YOUR REVERSE OSMOSIS (R.O.) SYSTEM

Before starting the installation, take a few moments to become familiar with the names of the components. Compare the device you have unpacked to the drawing below. Once you are familiar with the lay-out, you can start the installation.

Figure 1. LP-10

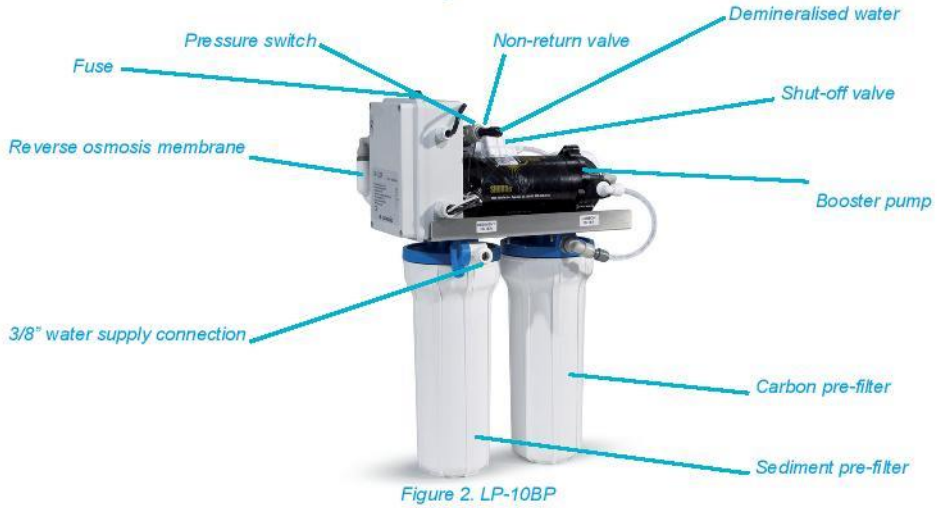

Figure 2. LP-10BP

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LP-10/10BP/20BP/30BP/60BP/100BP CONTRONICS

Figure 3. LP-20BP

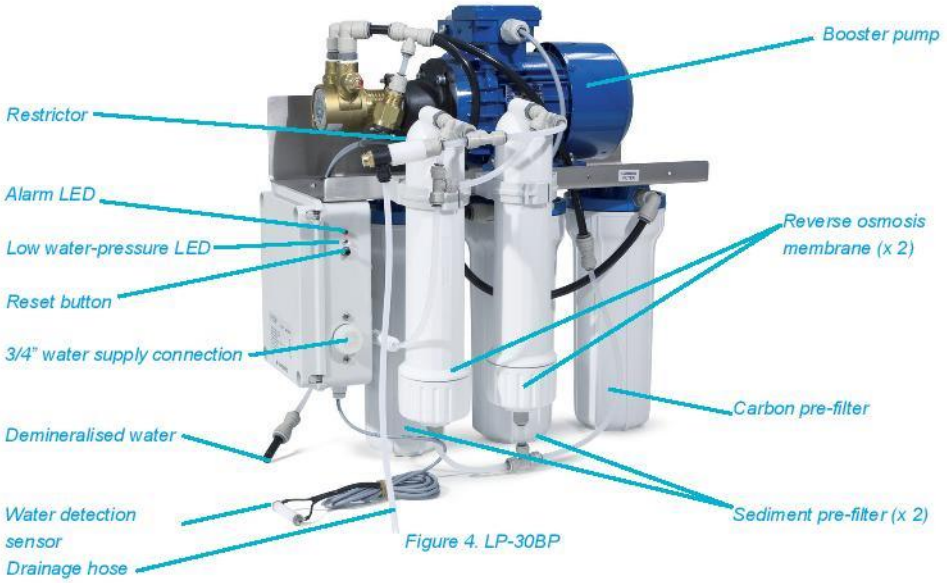

Figure 4. LP-30BP

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CONTRONICS LP-10/10BP/20BP/30BP/60BP/100BP

Figure 5. LP-60BP – LP-100BP

3. AVAILABLE SYSTEMS

LP-10	Reverse osmosis filter with a maximum capacity of 375 kg/day (15.6 kg/hr) at a water pressure of 3.5 bar (50 PSI) and a water temperature of 25 °C. Under normal operating conditions (10 °C), 240 kg/day, 3.5 bar, suitable for maximum: 5 x HU-25 or 2 x HU-45 or 1 x HU-85
LP-10BP	Reverse osmosis filter with booster pump and a maximum capacity of 375 kg/day (15.6 kg/hr) at a minimum water pressure of 1 bar (15 PSI) and a water temperature of 25 °C. Under normal operating conditions (10 °C), 240 kg/day, suitable for maximum: 5 x HU-25 or 2 x HU-45 or 1 x HU-85

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LP-10/10BP/20BP/30BP/60BP/100BP CONTRONICS

LP-20BP	Reverse osmosis filter with booster pump and a maximum capacity of 750 kg/day (31.2 kg/hr) at a minimum water pressure of 1 bar (15 PSI) and a water temperature of 25 °C. Under normal operating conditions (10 °C), 480 kg/day, suitable for maximum: 4 x HU-45 or 2 x HU-85
LP-30BP	Reverse osmosis filter with booster pump and a maximum capacity of 1125 kg/day (47 kg/hr) at a minimum water pressure of 1 bar (15 PSI) and a water temperature of 25 °C. Under normal operating conditions (10 °C), 720 kg/day, suitable for maximum: 4 x HU-85 or 1 x HU-245
LP-60BP	Reverse osmosis filter with booster pump and a maximum capacity of 2250 kg/day (114 kg/hr) at a minimum water pressure of 1 bar (15 PSI) and a water temperature of 25 °C. Under normal operating conditions (10 °C), 1440 kg/day, suitable for maximum: 8 x HU-85 or 2 x HU-245
LP-100BP	Reverse osmosis filter with booster pump and a maximum capacity of 3600 kg/day (140 kg/hr) at a minimum water pressure of 1 bar (15 PSI) and a water temperature of 25 °C. Under normal operating conditions (10 °C), 2310 kg/day, suitable for maximum: 4 x HU-245

4. CONTENT OF THE DELIVERY

- R.O. unit with 1/4" supply tap
- Buffer tank (hydro-pneumatic) with shut-off tap
- 3/8" hose, 4 metres
- 3/8" T-piece
- Coupling 3/4" screw thread - 3/8" hose
- 1/4" discharge hose, 2 metres

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CONTRONICS LP-10/10BP/20BP/30BP/60BP/100BP

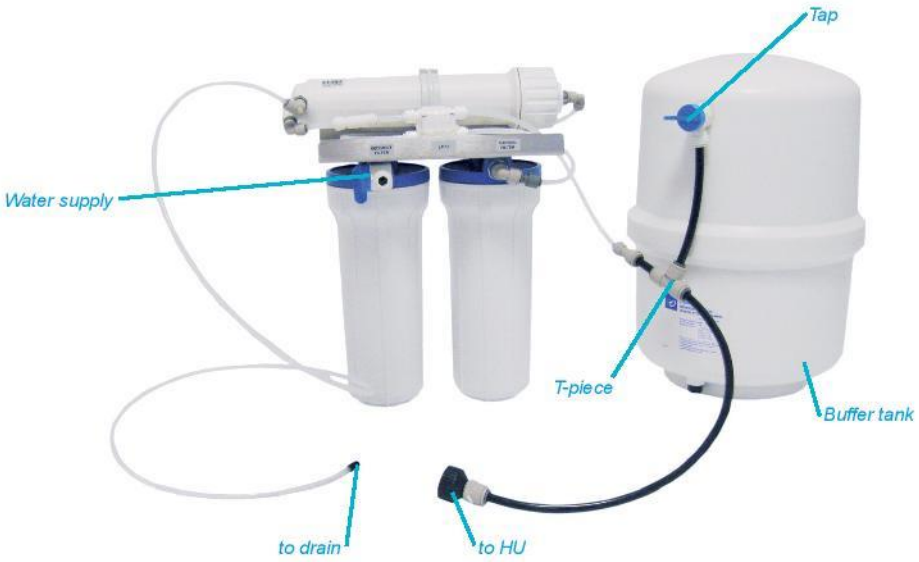

Figure 6 LP-10 with pressure tank and connections

5. INSTALLATION PROCEDURE

Place the device in a suitable location. Place the pre-filter (for LP-30BP/60BP/100BP 2 x) in the left-hand holder.
Place the carbon filter in the right-hand holder (remove the cellophane).

When doing this, ensure that the O-rings on the holders are seated correctly. The carbon filter is fitted with a flat rubber flange at the top and the bottom.
Remember to make allowance for the connections for the water supply, discharge, buffer tank and socket. It is recommended to fit the device against the wall in the vertical position. This will speed up the air bleeding and will enable easy replacement of the filters. Although it is possible to mount the device in a horizontal position, the preferred position is vertical with an eye to the easy replacement of the pre-filters.

Supply water connection:

WARNING
Do not place an automatic stop valve in the water supply to the R.O. system. No inlet pressure, or inadequate inlet pressure, can damage the pump and/or motor.

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Check that the supply pressure is at least 2 bar. Where the inlet pressure < 2 bar it is recommended to install a device incorporating a booster pump (BP).
For maximum performance, the inlet pressure must be a minimum of 4 bar for the LP-10.
Connect the R.O. unit to a washing machine tap with an air bleed valve. The R.O. unit has a shut-off tap in the water supply with 1/4" inner thread. A shut-off valve ensures that the water supply is cut off when the buffer tank is completely full and no water is being consumed.

R.O. water connection:

WARNING
Use only plastic or stainless steel tubing for demineralised water.

1. Fit a 3/8" tube from the R.O. water connection (Figure 6) to the T-piece and from the T-piece to the inlet valve on the storage tank.
2. Fit a tube from the T-piece to the humidifier. The ¾" connection coupling to the humidifier is included in the delivery.

Discharge connection:

Fit a tube (1/4" minimum) from the discharge connection (Figure 6) to the drain.

Important: Always leave a gap between the discharge tube and the drain in order to prevent the water from flowing back into the R.O. system.

Electrical connection (BP model only):

Insert the plug into the socket.

6. WATER DETECTION CIRCUIT (LP-30BP/60BP/100BP)

Position the water detector in an area where you would expect water to collect first in case of a leak. If the surface here is conductive, first lay an insulating layer. If the water detector detects a leak, the supply valve to the system will be closed immediately. It is, however, possible that the content of the buffer tank will continue to leak (10 l water).
A reset button has been located on the electronics housing; if this button is briefly pressed, the system will be re-activated.
In addition, a connection for an external alarm is also provided on the electronics housing in the form of a potential-free contact.

CONTRONICS LP-10/10BP/20BP/30BP/60BP/100BP

7. TEMPERATURE PROTECTION (LP-30BP/60BP/100BP)

The LP-30BP/60BP/100BP are fitted with a temperature cut-out device that will temporarily interrupt the power supply if the pump motor becomes overheated.

8. LOW-PRESSURE PROTECTION (LP-30BP/60BP/100BP)

The LP-30BP/60BP/100BP are fitted with a low-pressure protection device to protect the pump. If the inlet pressure to the pump falls below 1 bar, the system will be switched off and the blue LED will light up. A reset button has been located on the electronics housing; if this button is briefly pressed, the system will be re-activated.

9. START-UP PROCEDURE

1. Check all connections once again.
2. Close the tap on the buffer tank. This will bring the system up to pressure quickly without the need to wait until the buffer tank is filled.
3. Open the supply tap and check for any leaks. If any are found, close the supply tap and repair the leaks first.

3a. For the BP model: Insert the plug into the wall socket.

4. Disconnect the water supply tube from the humidifier and allow the water to flow freely for about 2 minutes in order to flush the membrane, which is saturated with a disinfecting agent.
5. Re-connect the tube to the humidifier.
6. Open the tap on the storage tank and wait until the tank is completely filled (the discharge water will stop).
7. Only now can you switch the humidifier on.

10. MAINTENANCE

Some maintenance is necessary in order to guarantee the long service life of the system. Normal maintenance consists of replacing the sediment filter and the active carbon filter(s). This should be done at least once a year if the humidifier is in continuous use. If the supply water is heavily polluted with minerals or chlorine, however, it is recommended to do this more often.

Procedure:
Before replacing the filters, the system must be de-pressurised.

1. Cut off the power from the pump (BP model only).
2. Switch the humidifier off.
3. Close the supply tap.
4. Close the tap on the storage tank.
5. Disconnect one of the tubes from the storage tank and collect the excess water.
6. Exchange the filters by unscrewing the filter holders.
   Beware: The filter holders still contain water.

7. Before re-installing the filters, the O-ring must be checked for damage and correct seating.
8. The holders can be cleaned with soap and water or with chlorine, if necessary. Rinse thoroughly afterwards.
9. After re-installing, screw the holders back into place (hand-tight!).

Starting up again:

1. Open the supply tap and let the system flush through for about 5 minutes (in order to flush out any air).
2. Supply voltage to the pump.
3. Reconnect the tube to the storage tank.
4. Open the tap on the storage tank.
5. Wait until the system reaches the correct pressure (the discharge water will stop).
6. Switch the humidifier on again.

11. CHECKING THE DEMINERALISED WATER

- Take a sample of the supply water.
- Measure the conductivity of the supplied tap water using a micro-siemens meter.
- Take a sample of the demineralised water.
- Measure the conductivity of the demineralised water using a micro-siemens meter.
- Divide the value found for the demineralised water by the value found for the supplied tap water and multiply the result by 100%:
  < 10%: the water quality is good
  Between 10% and 20%: the water quality is acceptable
  > 20%: the water quality is poor – replace the membrane.
- If the micro-siemens value for the supplied tap water is >500 uS, it is recommended to install a de-scaling system ahead of the R.O. system.

12. CHECKING THE BUFFER TANK

If the buffer tank is not completely filled during the start-up procedure, it is possible that the pressure in the tank is too high compared to the pressure of the supplied water. In this case it is possible to release some of the (air) pressure step-by-step via the valve situated underneath the tank under a black cap, until the tank is filled. It is also possible to measure the pressure with the same kind of meter that is used for car tyres.
To check that the pressure is not too low, the tank must be disconnected with the tap closed. Open the tap in an area where this is possible and allow the tank to empty completely.
If the pressure is too low, it is possible to increase the pressure using the valve and the same system that is used to increase the pressure in car tyres. The pressure is normally adjusted to 0.45 bar.
If the humidifiers are installed at a higher elevation than the buffer tank, 0.1 bar must be added for every metre of height difference.

CONTRONICS LP-10/10BP/20BP/30BP/60BP/100BP

13. STORING THE SYSTEM

Always store the system in a frost-free area, but with a temperature that is as low as possible. If the storage period is to exceed 3 months, remove the membrane and store it fully immersed in disinfected water in order to prevent desiccation and/or bacterial growth.

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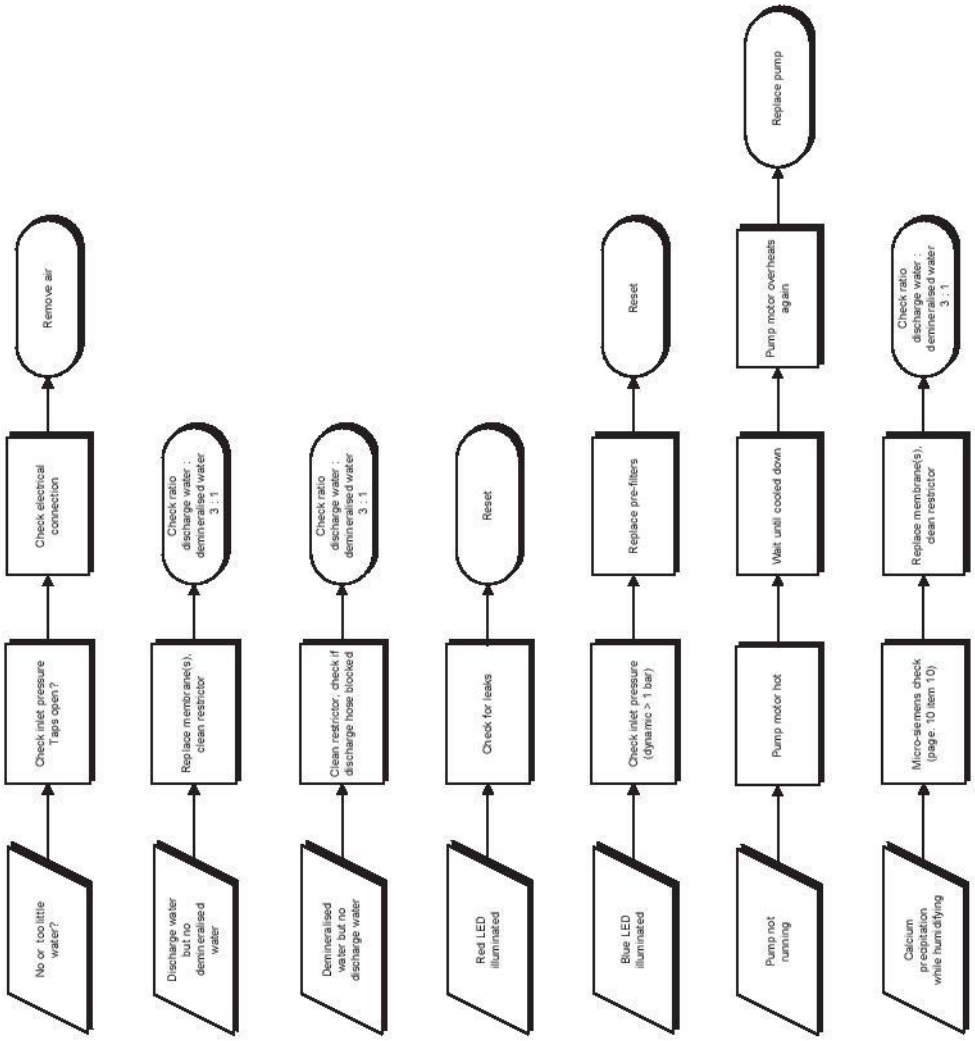
LP-10/10BP/20BP/30BP/60BP/100BP CONTRONICS

14. MALFUNCTIONS



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CONTRONICS LP-10/10BP/20BP/30BP/60BP/100BP

15. SPECIFICATIONS

	LP-10	LP-10BP	LP-20BP	LP-30BP	LP-60BP	LP-100BP
Maximum production in kg/day at 25 °C water temperature	375	560	750	1125	2250	3600
Maximum production in kg/day at 10 °C water temperature	240	360	480	720	1440	2310
Retention of salts and minerals (%)	98	98	98	98	98	98
Yield compared to supplied water (%)	20-35	20-35	20-35	20-35	20-35	20-35
Ambient temperature	0 °C till 25 °C	0 °C till 25 °C	0 °C till 25 °C	0 °C till 25 °C	0 °C till 25 °C	0 °C till 25 °C
Water temperature	0 °C till 25 °C	0 °C till 25 °C	0 °C till 25 °C	0 °C till 25 °C	0 °C till 25 °C	0 °C till 25 °C
Power consumption (W)	0	25	25	250	250	250
Minimum pressure	2 bar	1 bar	1 bar	1 bar	1 bar	1 bar
Dimensions (LxWxH cm)	36x23x38	36x23x46	36x23x46	50x35x54	50x35x54	50x35x54
Content of buffer tank (kg)	10	10	10	10	10	10
Buffer tank dimensions	26 x 40	26 x 40	26 x 40	26 x 40	26 x 40	26 x 40
Inlet pressure (bar)	0.45	0,45	0,45	0,45	0,45	0,45
Net weight (kg)	3,9	7,7	8,7	16,3	18,1	18,1

LP-10/10BP/20BP/30BP/60BP/100BP CONTRONICS

16. OPTIONS LP-10WS, LP-10WSG en LP-10WSWSG

This extra user manual provides specific operating, installation and maintenance instructions for the LP-10WS, LP-10WSG and LP-10WSWSG options.

Figure 7. LP-10WS

LP-10WS is an LP-10 combined with a permeate pump. The pump, which is powered by water, ensures that the rinsing water is used more efficiently. The LP-10 needs 30 litres of rinsing water to produce 10 litres of demineralised water.
The LP-10WS uses only 20 litres. Annually the LP-10WS saves 85 m^3. See the graph and specifications on page 19.

Figure 8. LP-10WSG

The LP-10WSG monitors the membrane function continuously. Normally the membrane is checked 1 x a year.
This is now done automatically and will show when the membrane needs to be replaced. If the quality of the membrane sinks below a certain level, the humidification system that is connected to the LP-10WSG is switched off. See specifications page 19.

Figure 9. LP-10WSWSG combines the options WS en WSG

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CONTRONICS LP-10/10BP/20BP/30BP/60BP/100BP

17. INSTALLATION PROCEDURE

Ditto LP-10. See page 9. The only difference being putting the plug for the LP-10WSG and the10WSWSG in the socket.

18. STARTPROCEDURE

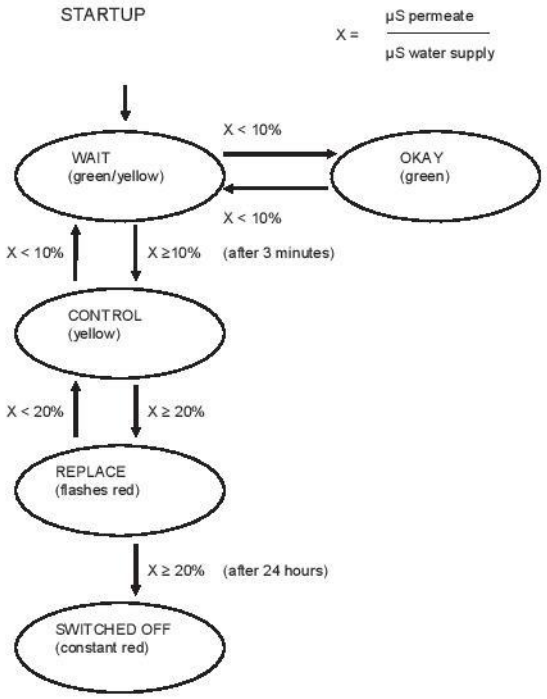
See page 11. The green or green/yellow LED lights up when LP-10WSG and LP-10WSWSG has been installed. After a few minutes, and with a good supply of water, the green LED is the only one lit up.

19. MAINTENANCE

The LP-10WS, LP-10WSG and the LP-10WSWSG only need the maintenance described on page 11. There is no maintenance for the WS and WSG options.

20. OPERATION OF LP-10WSG

The osmosis is working properly if the green LED is lit up. The membrane needs replacing during the maintenance inspection if the yellow LED lights up. If the red LED flashes the membrane must be replaced at once. If it is not replaced within 24 hours, the red LED will light up and the connected humidifier will be switched off.



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LP-10/10BP/20BP/30BP/60BP/100BP CONTRONICS

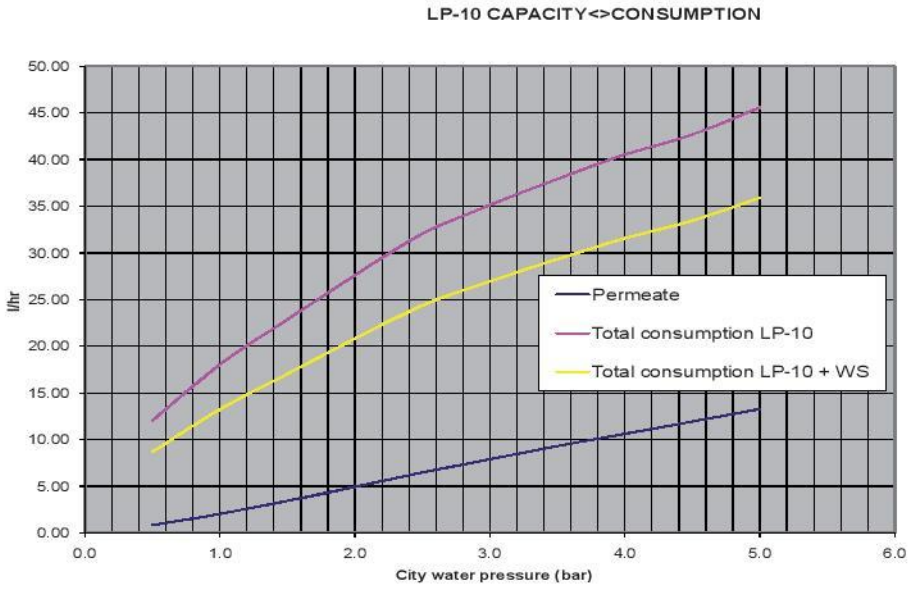
21. SPECIFICATIONS

	LP-10WS	LP-10WSG	LP-10WSWSG
Electricity consumption (W)	n/a	2	2
Mains voltage (V)	n/a	230	230
Maximum switching capacity (W)	n/a	500	500
Yield in respect to added water (%)	1 : 2	1 : 3	1 : 2
Water yield per hour (L) (3.5 bar)	10	10	10
Dimensions LxBxH (cm)	36x23x43	36x23x43	36x23x43
Net weight (kg)	4,5	4,8	5,2

	LP-10BPWS	LP-10BPWSG	LP-10BPWSWSG
Electricity consumption (W)	25	277	27
Mains voltage (V)	230	230	230
Maximum switching capacity (W)	500	500	500
Yield in respect to added water (%)	1 : 2	1 : 3	1 : 2
Water yield per hour (L) (3.5 bar)	18	15	18
Dimensions LxBxH (cm)	36x23x46	36x23x46	36x23x46
Net weight (kg)	7,6	7,9	8,3

	LP-20BPWS	LP-20BPWSG	LP-20BPWSWSG
Electricity consumption (W)	25	27	27
Mains voltage (V)	230	230	230
Maximum switching capacity (W)	500	500	500
Yield in respect to added water (%)	1 : 2	1 : 3	1 : 2
Water yield per hour (L) (3.5 bar)	23	20	23
Dimensions LxBxH (cm)	43x23x46	43x23x46	43x23x46
Net weight (kg)	9	9,3	9,7

CONTRONICS LP-10/10BP/20BP/30BP/60BP/100BP



DISCLAIMER
Contronics works continuously on the further development of its R.O. systems. We therefore reserve the right to modify the design, construction and technology of the product at any time. For this reason, no claims can be made based on the data, illustrations and description in this user manual.

Additional, up-to-date information is available on www.contronics.nl.

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9. Controllers

Each system needs a controller and a separate humidity and temperature sensor. There are two types of controllers the DZR-45 or HTR-10.

9.1. User manual controller DZR-45

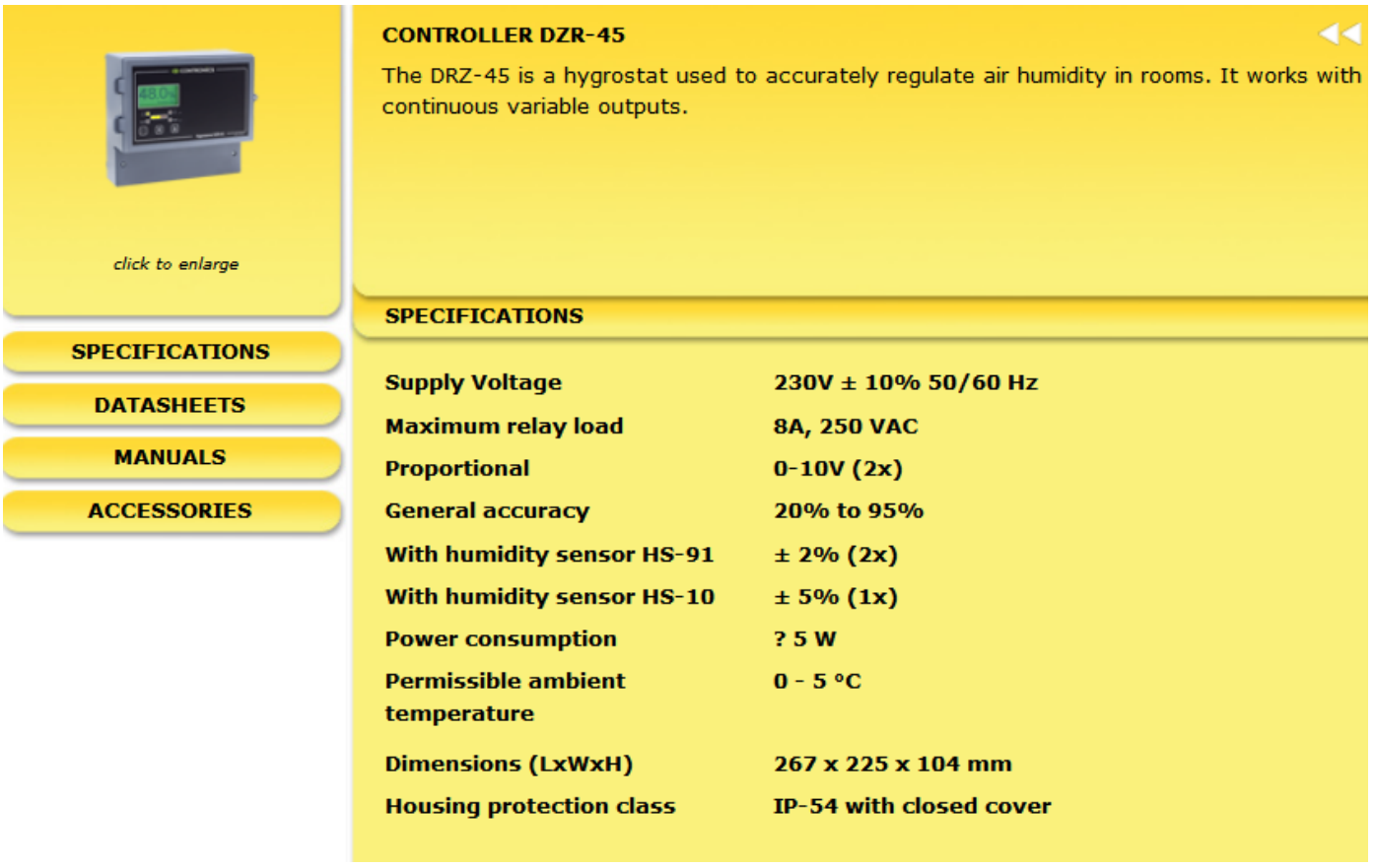

Figure 21: Specification of controller DZR-45

CONTRONICS

CONTROLLER

DZR-45

USER MANUAL

04-12-2014 version 1.5

DZR-45

CONTRONICS

CE

Contronics Engineering B.V., Ambachtsweg 8, 5492 NJ Sint-Oedenrode, The Netherlands, hereby declares that the product DZR-45, produced and delivered by Contronics Engineering B.V., are in accordance with the following CE directives:

EMC-Directive	: 2004/108/EG
Directive for low-voltage electrical installation	: 2006/95/EG

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CONTRONICS DZR-45

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DZR-45

CONTRONICS

1. PREFACE

This user manual contains the operating and installation instructions for the DZR-45 model controller.

2. INTRODUCTION

The DZR-45 is a hygrostat used to accurately regulate air humidity in rooms.
The DZR-45 is fitted with the following as standard:
- Graphic readout screen (multi-lingual).
- LED bar readout of the proportional control.
- LED indicators for humidification and dehumidification.
- Main switch 230V.
- Touch key operation.
- Bandwidth setting.
- Dead zone setting.
- Maximum/minimum setting.
- Offset for the sensors.
- Hygrostat function (2x).
- Thermostat function (2x).
- Capacity control.
- Proportional control (2x) 0-10 Volt.
- Relay control (4x).
- Connection for 2 humidity/temperature sensors.

3. CONTENT OF THE DELIVERY

When you receive the controller, the package must contain the following items:
DZR-45 controller
2 M16 screws
2 M20 screws
User manual

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CONTRONICS DZR-45

4. DESCRIPTION OF THE CONTROLLER

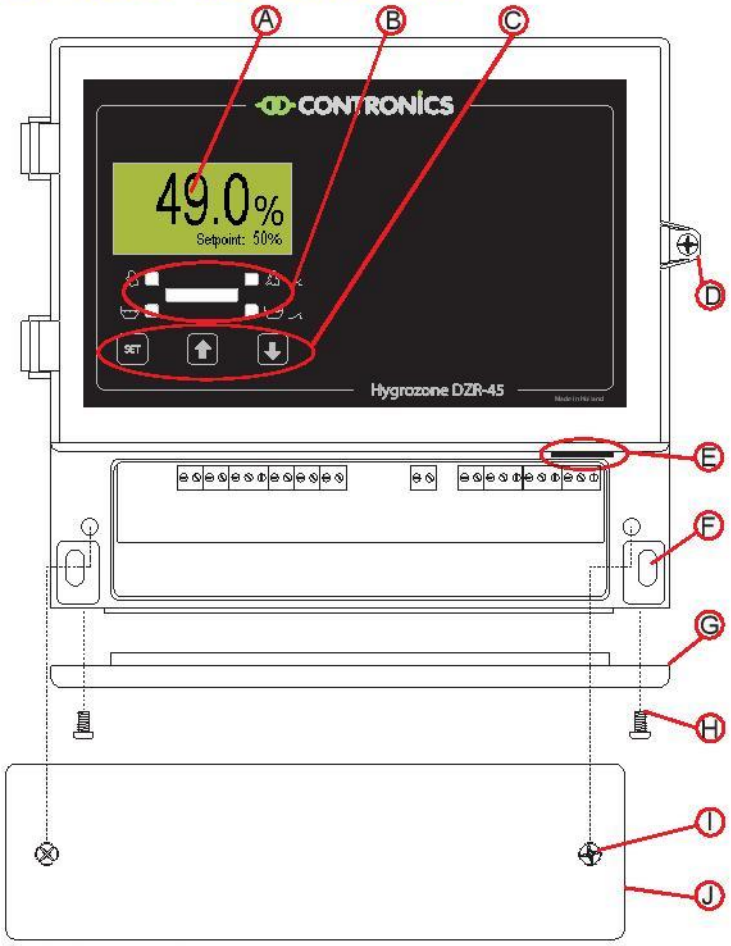

Figure 1. Description and connections

A Readout window
B Indication LEDs
C Pushbuttons
D Securing screw for the upper cover
E On/Off switch
F Holes for wall mounting
G Perforated plate
H Mounting screws for perforated plate (M4 x 8mm)
I Screws for the connection compartment cover (M4 x 8mm)
J Connection compartment cover

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DZR-45 CONTRONICS

5. WALL-MOUNTING OF THE CONTROLLER

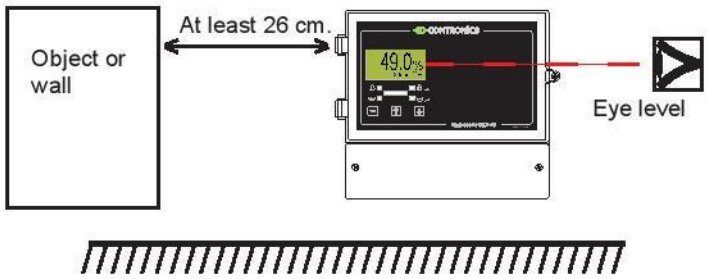

Figure 2. Installation of the controller

The controller must be mounted on an interior wall, preferably in a clean room where the humidity level is not excessive. Do not mount the controller above a heating system or the like. When installing, ensure that the display is located at eye level and that the perforated plate (Fig. 1, item G) is facing downwards. Keep an area of up to 26 cm free to the left of the controller to ensure that the cover can be opened (see Fig.2).

Open the cover of the controller by removing the screw from the upper cover (see Fig. 1, item D). Remove the cover from the connection compartment (Fig. 1, item J) by removing the two retaining screws. There are 4 mounting holes: 2 in the top corners of the housing, and 2 at the bottom (Fig. 1, item F). M4 or M5 screws can be used for these holes. You will find the hole pattern in the diagram below:

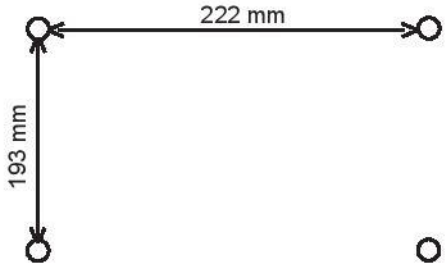

Figure 3. Mounting holes pattern.

IMPORTANT
If you wish to make holes in the perforated plate (Fig. 1, item G), please ensure that the cover (J) of the connection compartment is positioned correctly. Then carefully make the required number of holes using a hammer.

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CONTRONICS DZR-45

6. CONNECTIONS

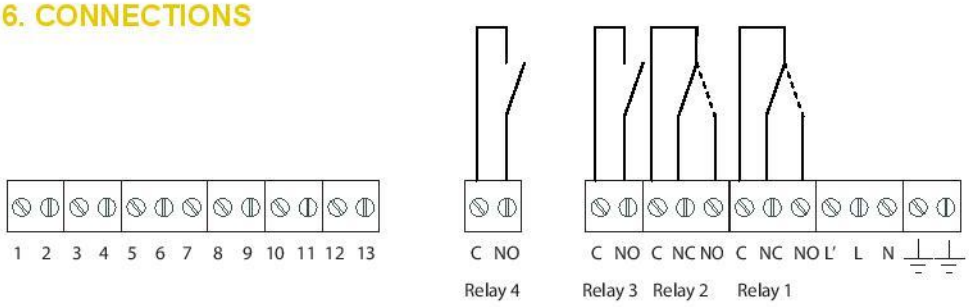

Figure 4. Connections

HS-91 connections

Connection	Colour	Description
1	Brown	Sensor 2 – HS-91 +12V
2	Grey	Sensor 2 – HS-91 RH
3	Yellow	Sensor 2 – HS-91 temperature
4	Green	Sensor 2 – HS-91 0V
5	Brown	Sensor 1 – HS-91 +12V
6	Grey	Sensor 1 – HS-91 RH
7		Not used
8	Yellow	Sensor 1 – HS-91 temperature
9	Green	Sensor 1 – HS-91 0V

HS-10 connections

Connection	Colour	Description
5	Brown	Sensor 1 – HS-10 +12V
7	White	Sensor 1 – HS-10 RH
9	Green	Sensor 1 – HS-10 0V

HK-01 connections

Connection	Colour	Description
10	White	0-10V dehumidification output
11	Brown	0V
12	White	0-10V humidification output (HK-01)
13	Brown	0V

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DZR-45 CONTRONICS

Relais connections

Relay	Function
1	Humidification
2	Dehumidification or humidification 2
3	Thermostat
4	Alarm

230V connection

Connect the incoming mains voltage to terminals L and N. When the main switch is set to 'On', L will be connected through to L'.
It is then possible to connect, a humidifier to L', for example.

IMPORTANT
- **Ensure that all the connections are soldered when lengthening a cable.**
- **In order to prevent interference, ensure that low-voltage cables (0-10V) are never installed parallel to high-voltage lines (230V).**
- **Sensor wiring must cross electricity lines at a 90° angle.**

Optimization of energy and water consumption.

A humidifier also uses energy (10 Watt) and water (rinse program) in the stand-by position (230V switched on, no humidity generation).
You can reduce this by switching off the humidification completely if the RH is 10% higher than desired. The dehumidification relay is used for the connection. The dehumidification bandwidth must thereby be set to 10%. Up to and including the HU-85, the humidifier can be connected directly to the relay. If an HU-245 humidifier is installed, an auxiliary relay must be used. See the connection diagram on page 20.

7. OPERATION

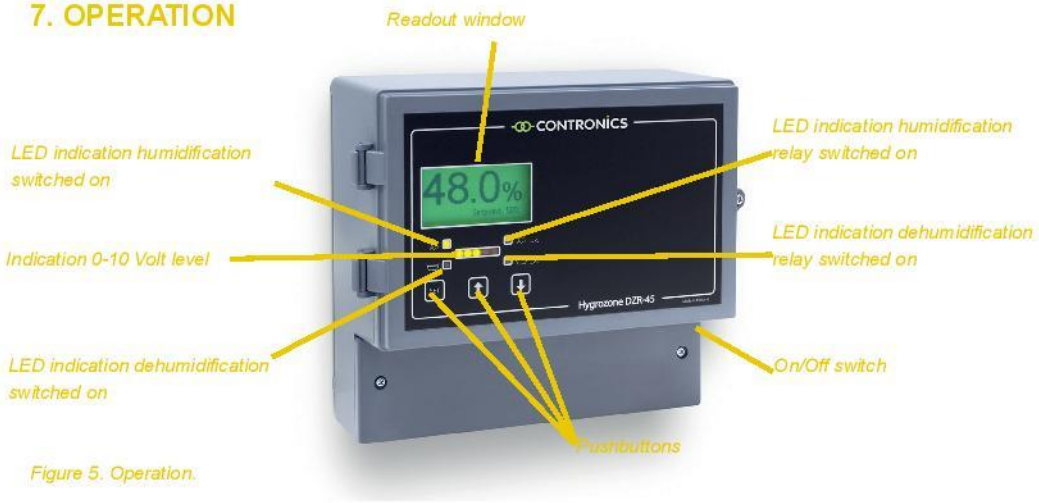

Figure 5. Operation.

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CONTRONICS DZR-45

Press SET to go to the menu.
Select the desired menu item using the ↑ or ↓ button.
Press SET to confirm the selected item.
Select <<<< and press SET to leave a (sub)menu.
If no buttons are operated for 1 minute, the menu screen will switch off.

IMPORTANT
Some of the menus are hidden from the user if they have no influence on the operation of the controller.
For example: In a single hygrostat configuration, the menu for hygrostat 2 is not visible.

8. SCREEN SETTING

Main screen and sensor screen

The main screen is displayed as standard. The screen displays the measured and set relative humidity. The sensor screen displays all the values measured at the connected sensors.
Press the ↑ button in order to display the sensor screen, and also use the button to return to the main screen.

Figure 6. Main screen.

Figure 7. sensor screen.

Language setting

Press SET
Scroll to System using the ↑ or ↓ button.
Press SET
Scroll to Language using the ↑ or ↓ button.
Press SET
Select the language using the ↑ or ↓ button.
Press SET
Scroll to <<<< using the ↑ or ↓ button.
Press SET to leave the menu.

Basic configuration for DZR-45

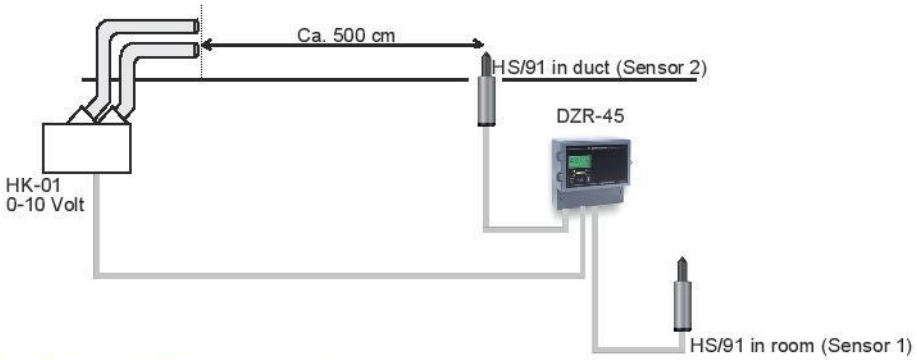
The DZR-45 has 3 different configurations, which can be selected via this menu.

Single hygrostat
Single hygrostat with 1 humidity sensor, 1 humidification output and 1 dehumidification output. For more data, see General Hygrostat Operation.

DZR-45 CONTRONICS

Hygrostat with max.

This hygrostat operates in the same manner as the single hygrostat, but with an additional sensor for maximum humidification. The additional sensor can be placed in an air channel in order to limit the maximum humidity.
The sensor can be selected as follows:
Hygrostat -> maximum humidification -> sensor selection.
This will limit the humidification as soon as the measured relative humidity has reached the set maximum value.
The set maximum value can be adjusted as follows:
Hygrostat -> maximum humidity -> humidity set point.
The setting for the bandwidth can be found under:
Hygrostat -> maximum humidity -> bandwidth.



Figuur 8. Hygrostat with maximun control.

Double hygrostat

In principle, this is the same as 2 single hygrostats. The regulation of dehumidification is hereby not possible.
The output of hygrostat 2 uses the dehumidification output.
Two hygrostat submenus are available in the main menu.
In this way, 2 areas can be monitored with one controller.

Figure 7. General hygrostat operation

Block mode

In block mode, the regulator is divided into several blocks with settings. Each block can be activated based on time and/or an external signal. This makes it possible for the configuration to operate during the day with a variety of settings. It is also possible to indicate a fluid type for each block. This feature allows the regulator to supply R.O. water or another fluid to the humidifier.
For comprehensive information, please refer to chapter X Block configuration

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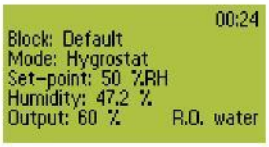
CONTRONICS DZR-45

Block configuration

The block configuration becomes active if Block mode is selected under DZR Configuration. This configuration makes it possible to use time or another external signal to operate the regulator in another manner. Firstly, the correct time needs to be set. System -> Setting the time. The start screen will now be as follows:



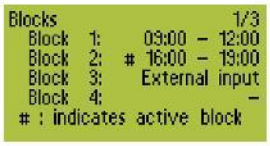
All available blocks can be seen under Block settings. The first block is the Standard block. This features all settings that are active if none of the other blocks are active. The other blocks (1 to 10) will only be active if the stipulated conditions have been met. This could involve being within a certain time or could require a certain external control signal to be present.

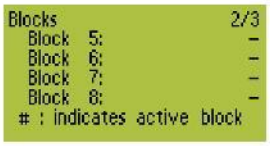
Block settings

Settings in the standard block mainly resemble those of the single hygrostat, but without de-humidification. The Start time and Stop time setting is used to indicate the time within which the block will be active. The Fluid type setting can, as an option, be used to switch between different fluids via an electrical valve.

Overview of configured blocks

An overview of configured blocks can be found by pressing twice on the [UP} key in the main screen. The first 4 blocks are shown. Blocks 5 to 8 will appear if the [UP] key is pressed once again. Blocks 9 and 10 are located in the final screen. If several blocks are subject to overlapping times, then the block with the highest number will be given priority over other blocks.





Rinsing

Block mode makes it possible to switch between two fluids. In this case, it may be important to rinse the humidifier during the change process. This means old fluid will no longer be sprayed after the change, but only the newly selected fluid. It would be wise to measure how long it takes for the humidifier to become empty and how long it takes to fill it. These times can be entered under Emptying time and Filling time in the Rinsing menu.

DZR-45 CONTRONICS

Sensor settings

Two HS-91 humidity sensors can be connected to the DZR-45. It is also possible to connect 1 HS-10 humidity sensor to sensor input 1, instead of an HS-91.
Select the correct type of sensor as follows:
Sensor settings menu -> sensor 1 -> sensor type setting.
If desired, an offset can be defined for the sensors.
Sensor settings menu -> sensor 1 and sensor settings menu -> sensor 2.

Sensor selection: Select the sensor (1/2) that controls each hygrostat (1/2).
Hygrostat (1/2) -> Sensor selection.

General hygrostat operation

The hygrostat uses a sensor to measure current air humidity in an area. The measured value and the configured air humidity will be used by the hygrostat to implement a humidifier or de-humidifier so the required value can be achieved.
The hygrostat features various settings. Firstly, the appropriate hygrostat mode must be selected for the application in question, after which the other settings can be configured.

Sub-configuration

Mode	Hygrostat:	Standard hygrostat function with set value. *Hygrostat 1/2 -> humidity set point.*
	Capacity:	Provides a fixed output value. *Hygrostat 1/2 -> Capacity.*
	Hygrostat / Capacity:	The output will act as a hygrostat below a set temperature. Above this set value, the output will be defined by the capacity value. *Hygrostat (1/2) -> Temperature. Selection.*
	Capacity / Hygrostat:	The output will act as a hygrostat above a set temperature. Below this set temperature, the output will be defined by the capacity value. The temperature setting can be adjusted as follows: *Hygrostat (1/2) -> Temperature. Selection.*

Dead zone: A dead zone is an inactive, neutral area.
A dead zone of 2% and a humidity setting of 50% results in a neutral area of 49 – 51%. The dead zone is often used to prevent oscillations.

Bandwidth: The bandwidth can be set in:
Hygrostat (1/2) -> (De)humidification -> (De)humidification bandwidth.
The bandwidth monitors the reaction speed of a humidifier between 1 and 20% around the setpoint.

Minimum: A minimum can be set for any output. This can be set as follows:
Hygrostat (1/2) -> (De)humidification -> Minimum (de)humidification settings (0-99%).

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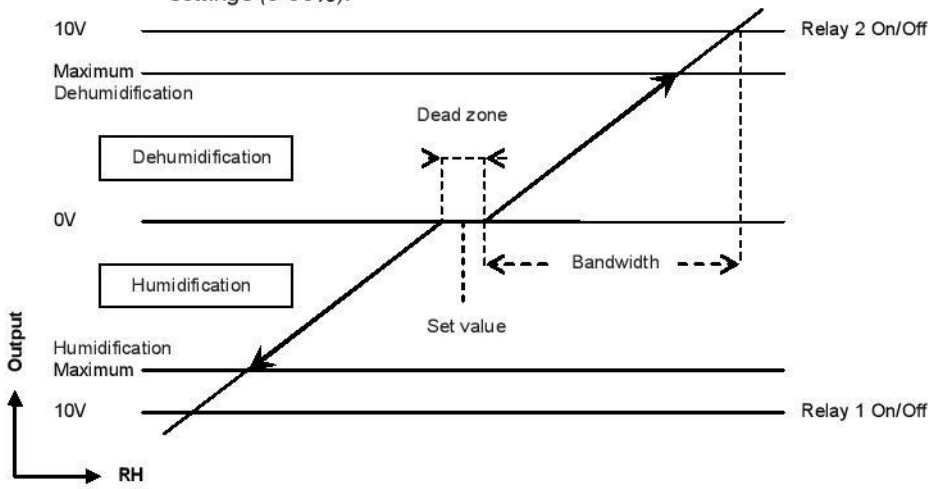
Maximum: A maximum can be set for any output. This can be set as follows: *Hygrostat (1/2) -> (De)humidification -> Maximum (de)humidification settings (0-99%).*



Figuur 9. General hygrostat operation.

Output

The hygrostat generates a 0-100% signal that corresponds to a 0-10V signal at the outputs of the DZR-45. Relay 1 switches on if Output 1 reaches 100% (10V), it switches off when Output 1 is below 95% (9.5V) again.
Relay 2 has the same function, but corresponds to the Output 2 level.

Thermostat

The DZR-45 is fitted with a built-in thermostat for heating or cooling.
All settings for this function can be found in the Thermostat submenu.

- Set point: The desired temperature.
- Sensor selection: The sensor used (sensor 1 or sensor 2).
- Mode: Cooling: Relay 3 will be activated if the current temperature is above the set value.
  Heating: Relay 3 will be activated if the current temperature is below the set value.
- Hysteresis: The range within which the thermostat will not change the output.

Alarm

Every sensor readout can be activated with the DZR alarm function. It is possible to adjust the settings in the submenus *Alarm -> Sensor 1 and Alarm -> Sensor 2*.
Alarm relay (4) will be activated if one or more readouts reach their minimum or maximum values. *Alarm -> Alarm delay*. The alarm relay will immediately turn off if the value falls below the set alarm level again.

DZR-45

CONTRONICS

System

- Language:	English / German / Dutch / French.
- LED readout*:	Which hygrostat is using the LED bar: Hygrostat 1 / Hygrostat 2.
- LCD contrast:	Adjust the LCD contrast.
- LCD background light:	Time setting for background lighting.
- Factory default:	Reset all settings to factory settings.
- Software version:	Internal DZR software version.
- Factory service:	Special menu, not accessible.

* Only available in double hygrostat configuration

9. TECHNICAL DATA

Supply voltage:	230V ± 10% 50/60 Hz
Maximum relay load:	8A, 250 VAC
Proportional outputs:	0-10V (2x)
General accuracy	20% tot 95%
With humidity sensor HS-91:	± 2% (2x)
With humidity sensor HS-10:	± 5% (1x)
Power consumption:	≤ 5 W
Permissible ambient temperature:	0 - 50 °C
Dimensions:	L 267 x W 225 x H 104 mm
Housing protection class:	IP-54 with closed cover.

Accessories:
HS-10: Relative humidity sensor ± 5%.
HS-91: Relative humidity sensor ± 2%.
HK-01: Connection cable for Contronics humidifier.

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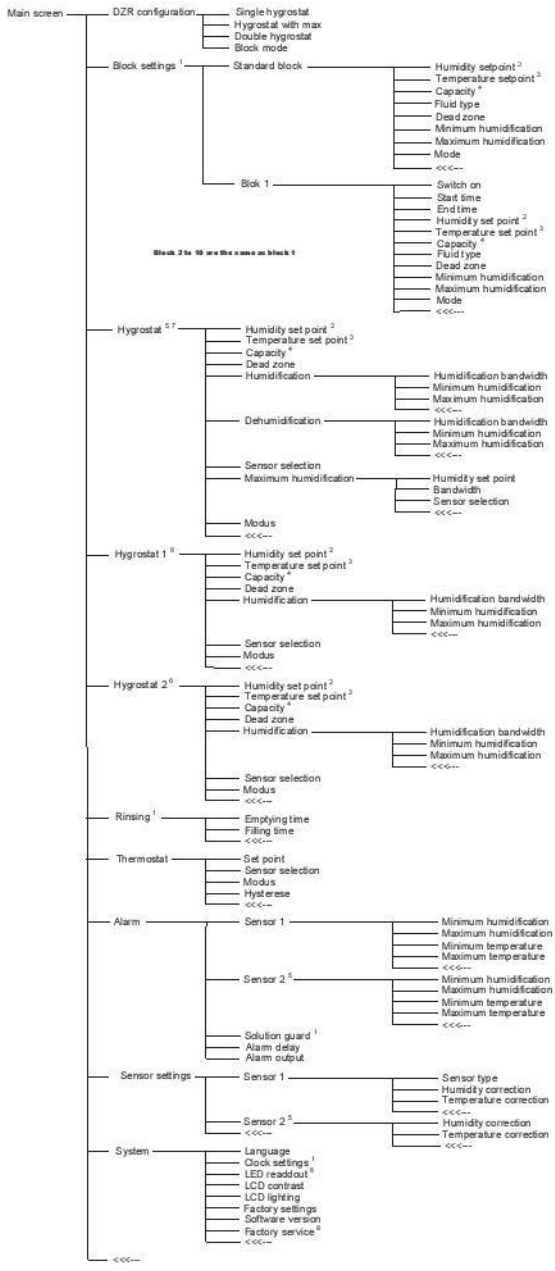
CONTRONICS DZR-45

10. MENU OVERVIEW



1. Only in block configuration
2. Only in hygrostat or hygrostat/capacity mode
3. Only in hygrostat/capacity mode
4. Only in capacity or hygrostat/capacity mode
5. Not in block mode
6. Only in double hygrostat configuration
7. Not in double hygrostat configuration
8. Only accessible with the manufacturer's access code.

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DZR-45 CONTRONICS

11. FACTORY SETTING AND RANGE

Para-meter		Min.	Max.	Factory setting	Own setting	
Configuration		Single hygrostat Hygrostat with max. Double hygrostat Block mode		Single hygrostat		
Hygrostat (1/2) / block X	Humidity set point	1	99	50		%
	Dead zone	0,0	10,0	2,0		℃
	Humidification bandwidth	1	20	3		%
	Minimum humidification	0	100	0		%
	Maximum humidification	0	100	100		%
	Dehumidification bandwidth	1	20	3		%
	Minimum dehumidification	0	100	0		%
	Maximum dehumidification	0	100	100		%
	Maximum humidification set point	10	100	80		%
	Maximum humidification bandwidth	1	20	4		%
	Maximum humidification sensor selection	Sensor 1 Sensor 2		Sensor 1*		%
	Mode	Hygrostat Capacity Hygro/Capacity Capacity/Hygro		Hygrostat		
Fluid type	R.O Solution	R.O.				

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CONTRONICS DZR-45

Para-meter		Min.	Max.	Factory setting	Own setting	
Flush	Idle time	0	300	Default 2 min		
	Filling time	0	300	Default 30 sec		
Thermostat	Set point	-40	70	25		℃
	Sensor selection	Sensor 1 Sensor 2				
	Mode	Off Cooling Heating				
	Hysteresis	0,4	2,0	1,0		K
Alarm	Minimum humidity	Off 5	 94	Off		%
	Maximum humidity	Off 6	95	Off		%
	Minimum Temperature	Off -39	121	Off		℃
	Maximum Temperature	Off -38	 122	Off		℃
	Alarm delay	0	240	0		min
Sensor set-tings	Sensor type					
	Humidity correction	-50	50	0		%
	Temperature cor-rection	-50	50	0		℃
System	Language	English German Dutch French		English		
	LCD contrast	10	100	50		%
	LCD Lighting	10 Off	60 On	10		sec

* In double hygrostat configuration is sensor 2 the standard setting at hygrostat 2.

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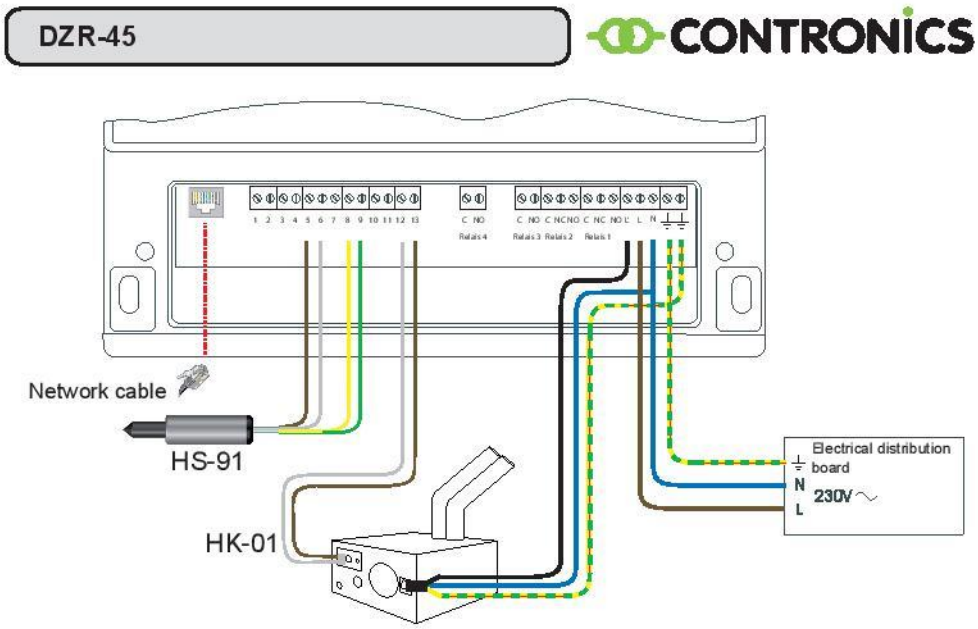

Figure 9. Connection diagram single hygrostat.

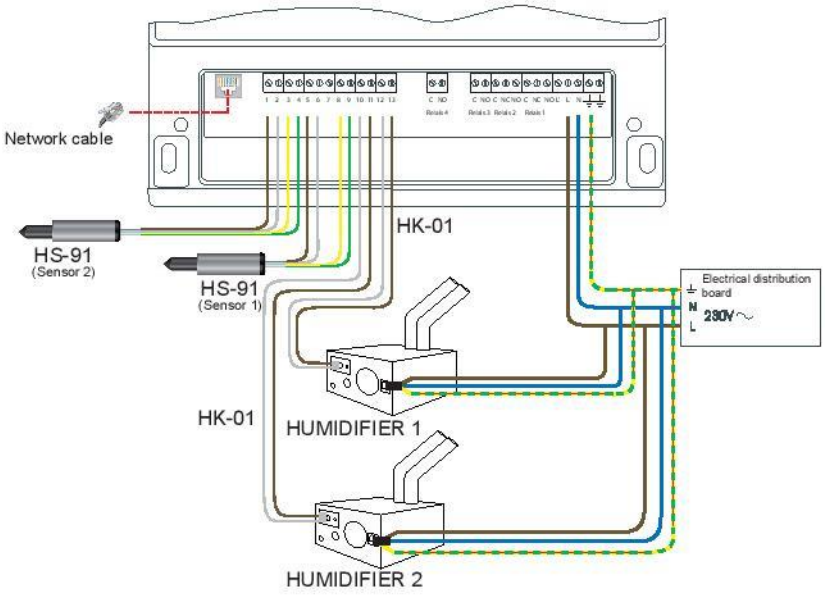

Figure 10. Connection diagram double hygrostat.

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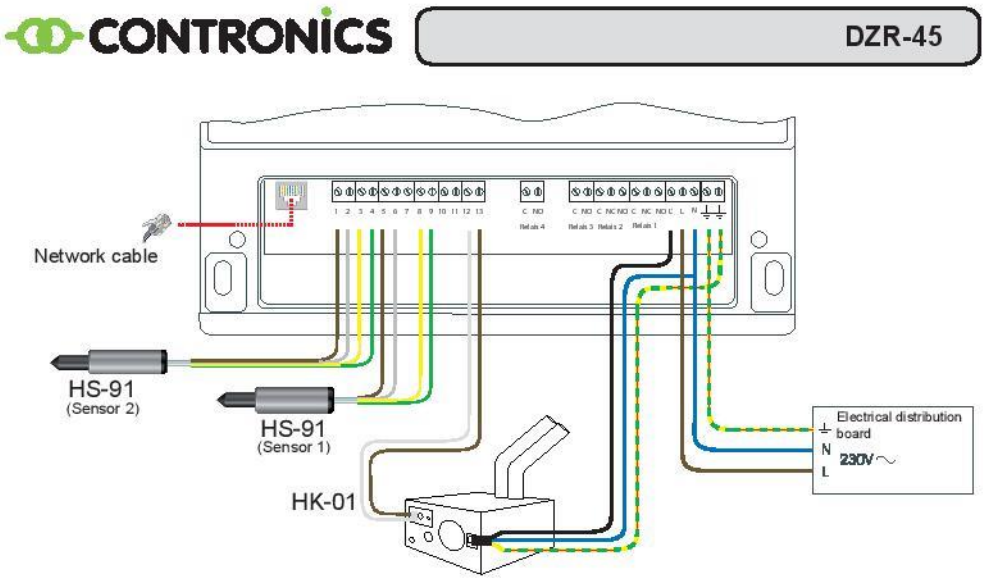

Figure 11. Connection diagram hygrostat with maximun control.

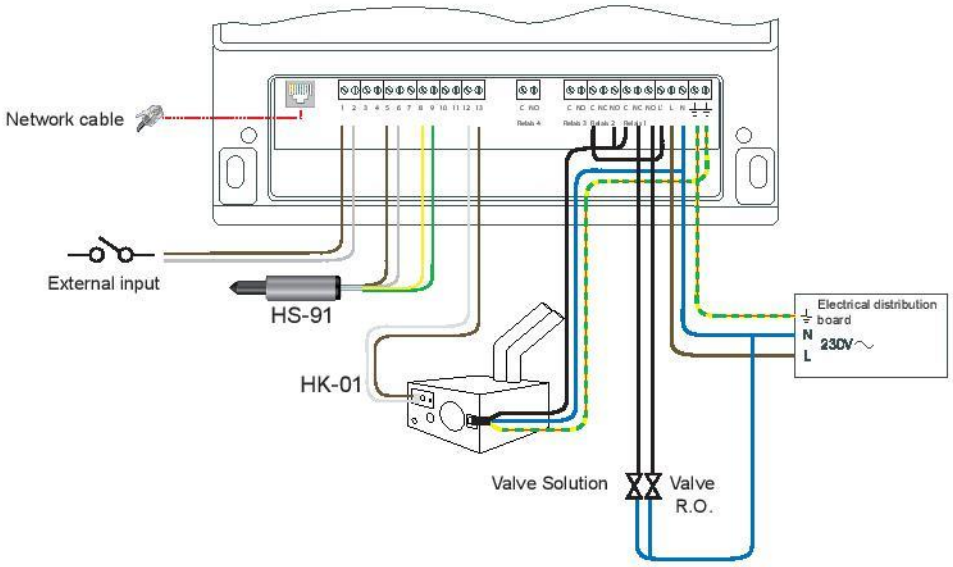

Figure 12. Connection diagram block mode.

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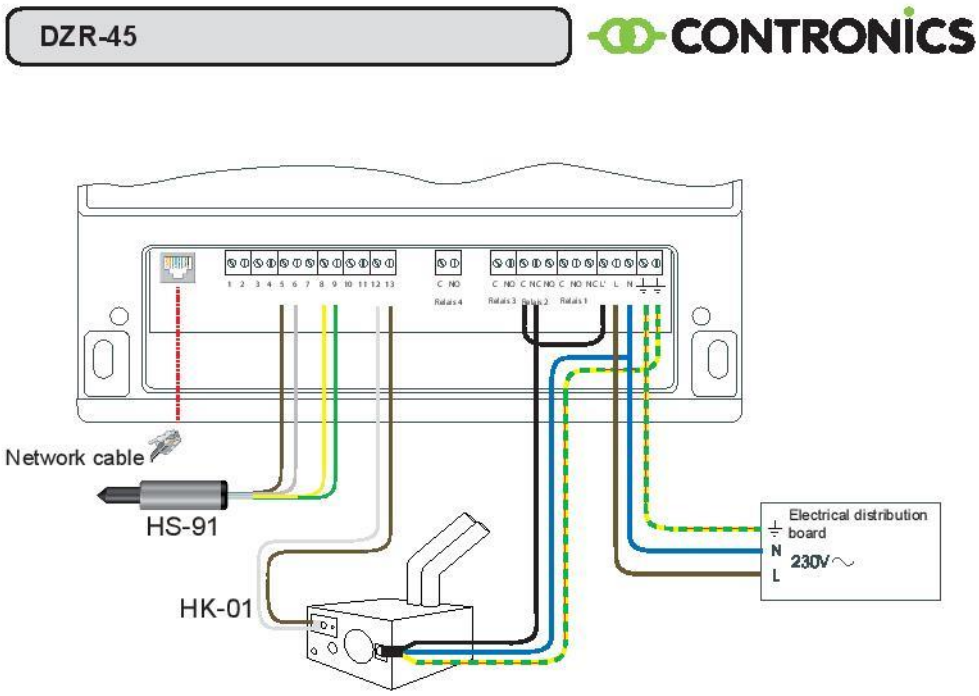

Figure 13. Connection diagram for optimization of energy and water consumption.

CONTRONICS DZR-45

12. OPTION DZR-45NET

This extra manual describes the steps to take to get the DZR-45NET connected to the network and explains the PC application.

Installation

1. Install the Contronics Network Application from the CD, this is an autorun CD. If it does not start automatically please install the application by hand by running "setup.exe".
2. Connect the DZR-45NET to your network via a new network cable:
   - Put a network cable through the adapter sleeve on the leftside of the DZR-45NET.
   - Attach a network connector to the cable.
   - Insert the network cable into the network interface.
3. Connect the DZR-45NET as described in this manual.
4. Switch the DZR-45NET on.

PLEASE NOTE
The DZR-45NET expects a DHCP server available on the network in order for it to get an IP address. If you choose to run it on a network without a DHCP server please contact us for help.

Using the PC application

1. Start the application. The applicationwindow will appear. On the left hand an overview will appear of all devices that have been found on the network.
2. By clicking on a device, it is shown in more detail in the right part of the window as seen in figure 14.

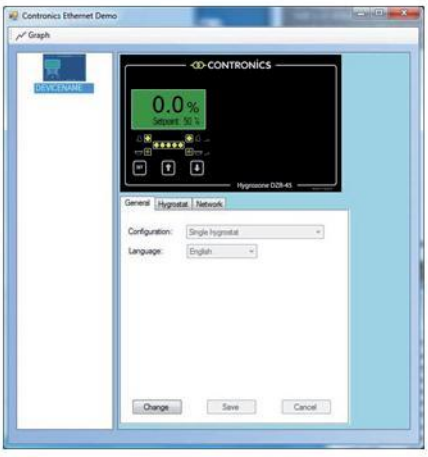

Figure 14. Selected device

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DZR-45 CONTRONICS

PLEASE NOTE
A connection is available when the display that is shown in the window is lighted. See Figure 19 connected device.
Depending on your network, getting connected can take up to 5 minutes.

Figure 15. Conneted device

3. By pressing on the tab 'Hygrostat' more DZR-45NET settings can be controlled via the network.

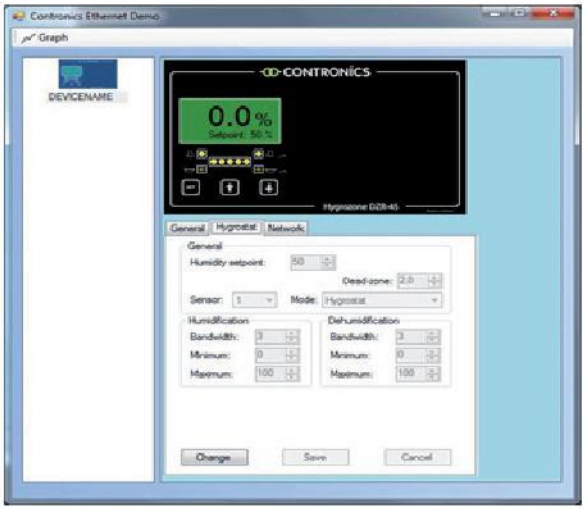

Figure 16. Hygrostat tab

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CONTRONICS DZR-45

4. By pressing on the tab 'Network' it is possible to control network related parameters. E.g. the devicename.

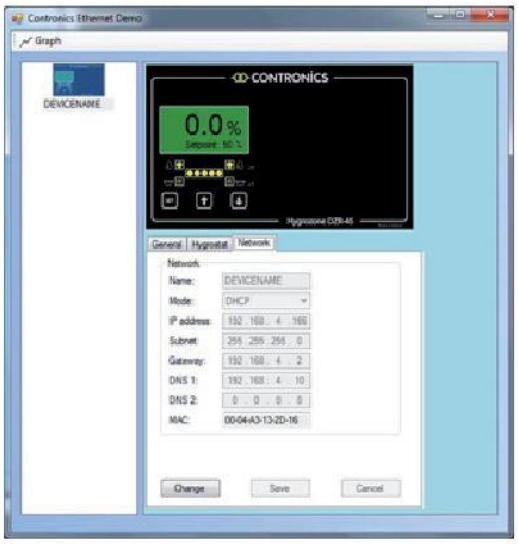

Figure 17. Network tab

Changes are done by clicking on 'Change' and 'Save'.

5. Finally, via the 'Graph'button in the lefttop corner, values measured by the DZR-45NET are shown as a graph.

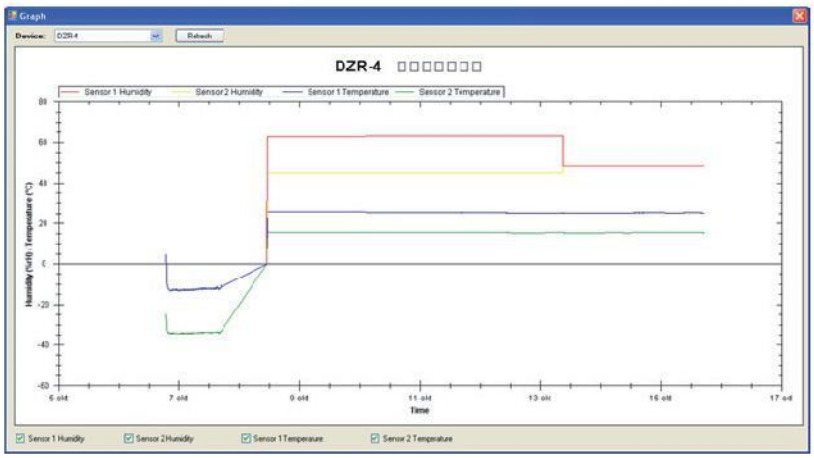

Figure 18. The graph windows

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DZR-45

By left click-and-hold on your mouse a rectangle can be drawn around the area of which you would like to see more details. See Figure 19 - Zoom in on graph and see Figure 20 - Result of zoom.

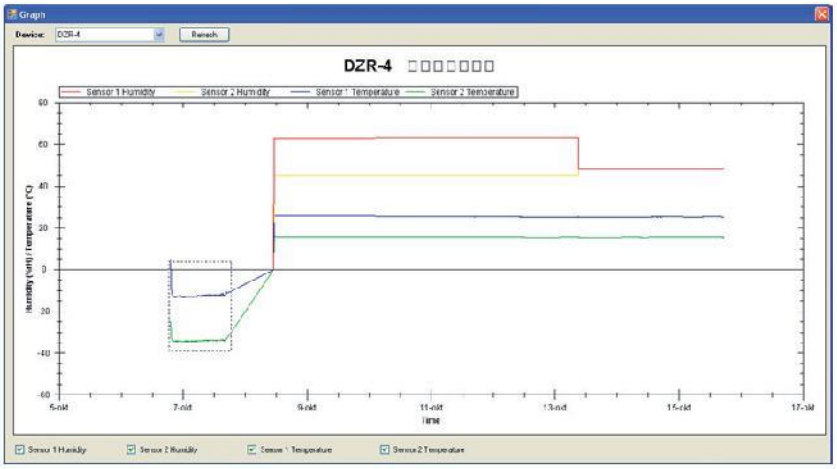

Figure 19 Zoom in on graph

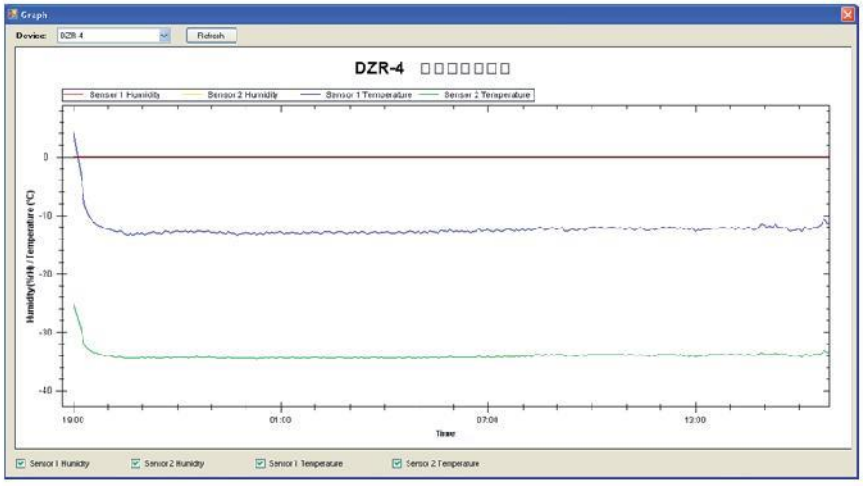

Figure 20. Results of zoom

All logged information is also kept in a file. This file can be found in the same place as the application is situated. By default this should be: "c:\programme files\contronics". Each file has a unique ID that corresponds to each DZR-45NET on the network. This file can be opened in Excel by importing the file as a TAB-seperated file.

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CONTRONICS DZR-45

DISCLAIMER
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We therefore reserve the right to modify the design, construction and technology of the product at any time. For this reason, no claims can be made based on the data, illustrations and description in this user manual.

Additional, up-to-date information is available on www.contronics.nl

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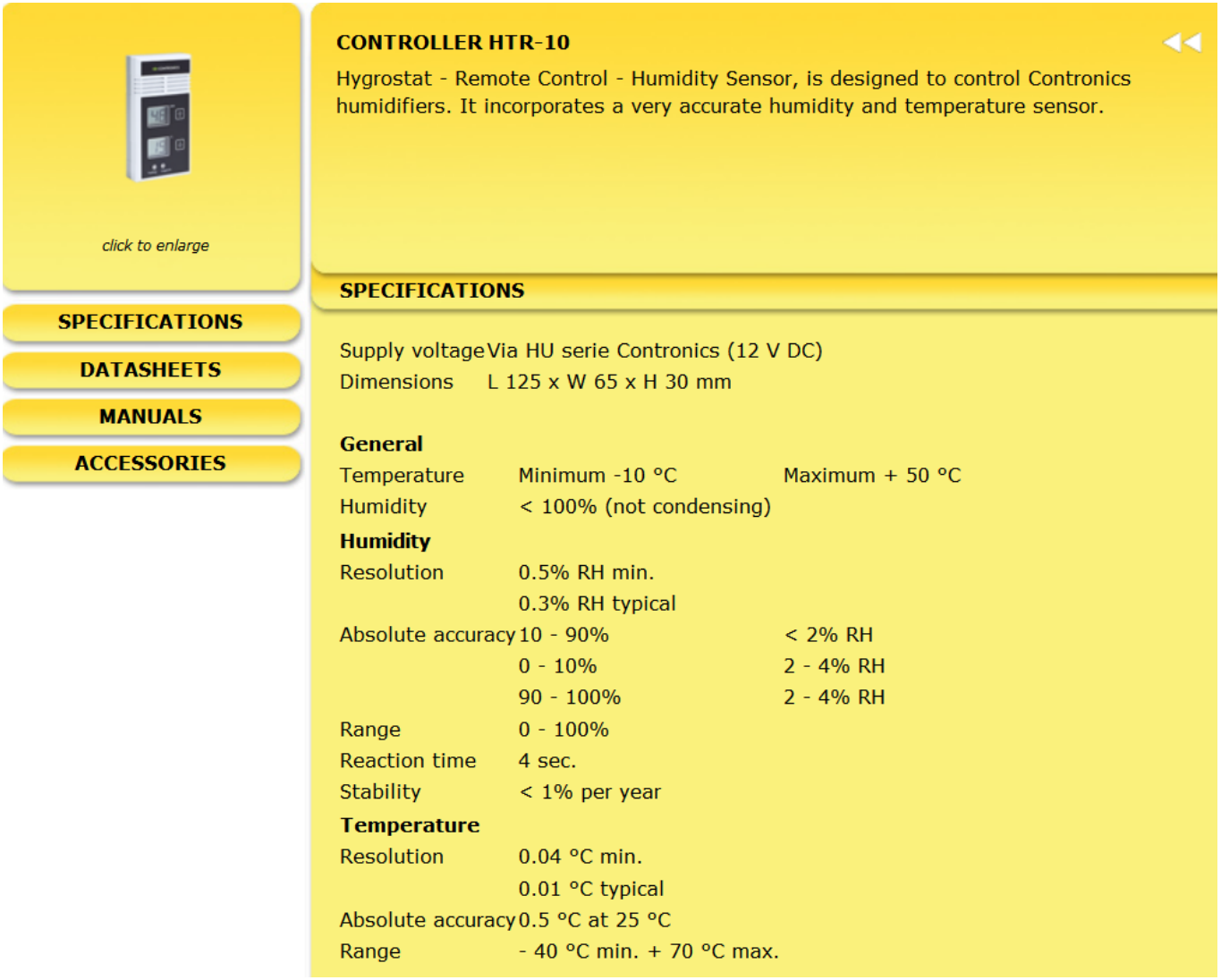
9.2. User manual Controller HTR-10



click to enlarge

SPECIFICATIONS
DATASHEETS
MANUALS
ACCESSORIES

CONTROLLER HTR-10

Hygrostat - Remote Control - Humidity Sensor, is designed to control Contronics humidifiers. It incorporates a very accurate humidity and temperature sensor.

SPECIFICATIONS

Supply voltage	Via HU serie Contronics (12 V DC)	
Dimensions	L 125 x W 65 x H 30 mm	
General		
Temperature	Minimum -10 °C	Maximum + 50 °C
Humidity	< 100% (not condensing)	
Humidity		
Resolution	0.5% RH min.	
	0.3% RH typical	
Absolute accuracy	10 - 90%	< 2% RH
	0 - 10%	2 - 4% RH
	90 - 100%	2 - 4% RH
Range	0 - 100%	
Reaction time	4 sec.	
Stability	< 1% per year	
Temperature		
Resolution	0.04 °C min.	
	0.01 °C typical	
Absolute accuracy	0.5 °C at 25 °C	
Range	- 40 °C min. + 70 °C max.	

Figure 22: Specification of controller HTR-10

CONTRONICS

CONTROLLER

HTR-10

USER MANUAL

03-09-2013 version 2

HTR-10 CONTRONICS

CE

Contronics Engineering B.V., Ambachtsweg 8, 5492 NJ Sint-Oedenrode, The Netherlands, hereby declares that the product HTR-10, produced and delivered by Contronics Engineering B.V., are in accordance with the following CE directives:

EMC-Directive	:	2004/108/EG
Directive for low-voltage electrical installation	:	2006/95/EG

1. PREFACE

This user manual contains the operating and installation instructions for the HTR-10 model controller.

2. INTRODUCTION

The HTR-10 is a room hygrostat and remote control for the HU-xxx series of humidifiers. It features a very accurate in-built humidity sensor and temperature sensor. The humidity sensor is also very accurate in the higher regions of relative humidity. An built-in heating element within the sensor element ensures that the sensor remains dry when the dew point is reached. The core feature of the electronics is a programmed microchip designed by Contronics. The electronic circuit board is protected against moisture.

3. CONTENT OF THE DELIVERY

When you receive the controller, the package must contain the following items:
HTR-10
3-meter cable with plug
Wall-mounting bracket
User manual

4. ASSEMBLY

The cable with plug that accompanies the HTR-10 is normally placed at the bottom.
The alternative is to place the cable in the centre, at the back of the controller.

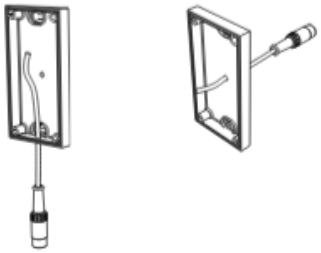


Figure 1. Cable normal and alternative.

2

CONTRONICS HTR-10

The HTR-10 can be mounted in a number of ways using the accompanying wall-mounting bracket:
1. Mounted directly on to a wall. Cable is at the bottom.
2. In a wall-mounted box. Cable must be in the centre, at the back.

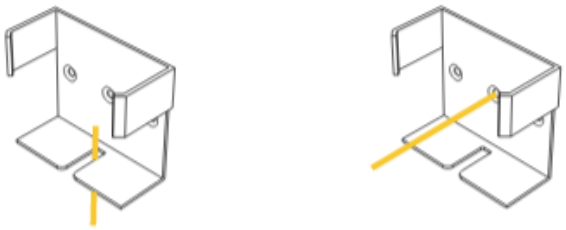


Figure 2. Possibilities for using wall-mounting bracket.

5. CONNECTIONS

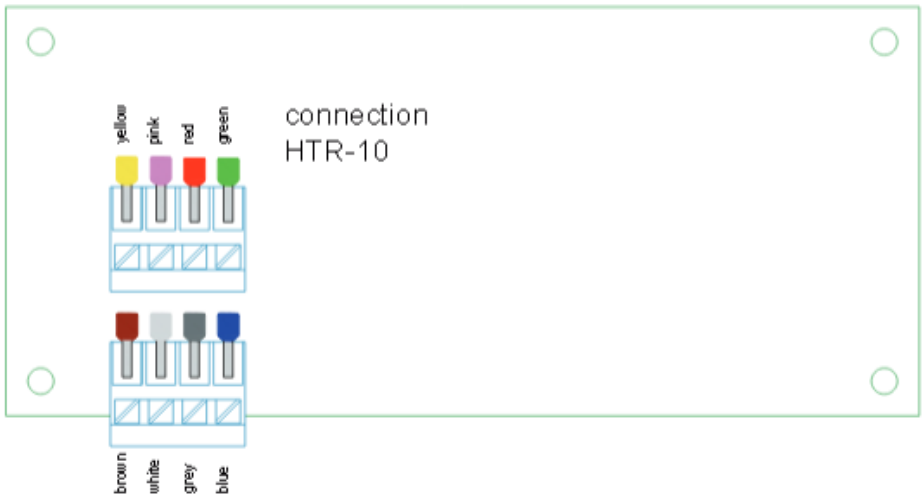


Figure 3. Connections.

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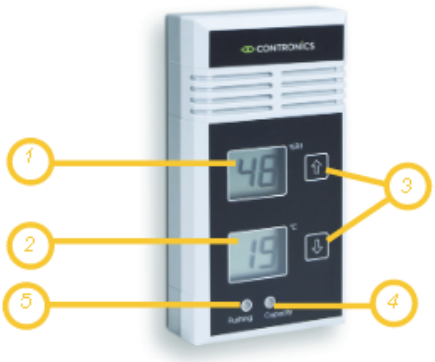
HTR-10

CONTRONICS

6. FEATURES



1. LCD with current relative humidity.
2. LCD with current temperature.
3. Operating buttons.
4. Blue LED indicates the current capacity of the humidifier (identical to the blue LED on the front panel of the humidifier).
5. Green LED flashing:
   Waterreservoir being filled.
   Green LED on:
   Humidifier in flushing cycle.

7. SETTINGS

Configure control mode

Determines whether controller must operate based on capacity or in hygrostat mode.
Press ↑ and ↓ simultaneously for 10 seconds.
The upper screen shows the index 11.
The lower screen shows:
0 = Capacity control;.
1 = Hygrostat control. (factory setting)

Change the mode:
Press ↑ and ↓ simultaneously for 3 seconds.
The screen will now flash.
Press ↑ or ↓ to change.
Press ↑ and ↓ simultaneously for 3 seconds to confirm.
Press ↓ to return to the start screen.

Configure parameters

Determines how the controller reacts.
Press ↑ and ↓ simultaneously for 5 seconds.
The upper screen shows the index 1.
The lower screen shows the parameters:
1 = humidity offsett
2 = temperature offset
3 = minimum capacity
4 = maximum capacity
5 = bandwidth
Press ↑ to go to the required parameter.

CONTRONICS HTR-10

Change the configuration of the parameters:
Press ↑ and ↓ simultaneously for 3 seconds.
The screen will now flash.
Press ↑ or ↓ to change the setting.
Press ↑ and ↓ simultaneously for 3 seconds to confirm.
Press ↓ multiple times to return to the start screen.

Installation menu 1				
Index	Setting	Minimum	Maximum	Factory setting
1	Humidity offset	-9 %	30 %	0 %
2	Temperature offset	-9 °C	10 °C	0 °C
3	Minimum capacity	0 %	99 %	0 %
4	Maximum capacity	0 %	99 %	99 %
5	Bandwidth*)	1 %	20 %	10 %

*) this setting cannot be read or changed in capacity mode.

Installation menu 2				
Index	Setting	Minimum	Maximum	Factrory setting
11	Mode 0 = Capacity	0 %	99 %	99 %
11	Mode 1 = Humidity (factory setting)	0 %	99 %	85 %

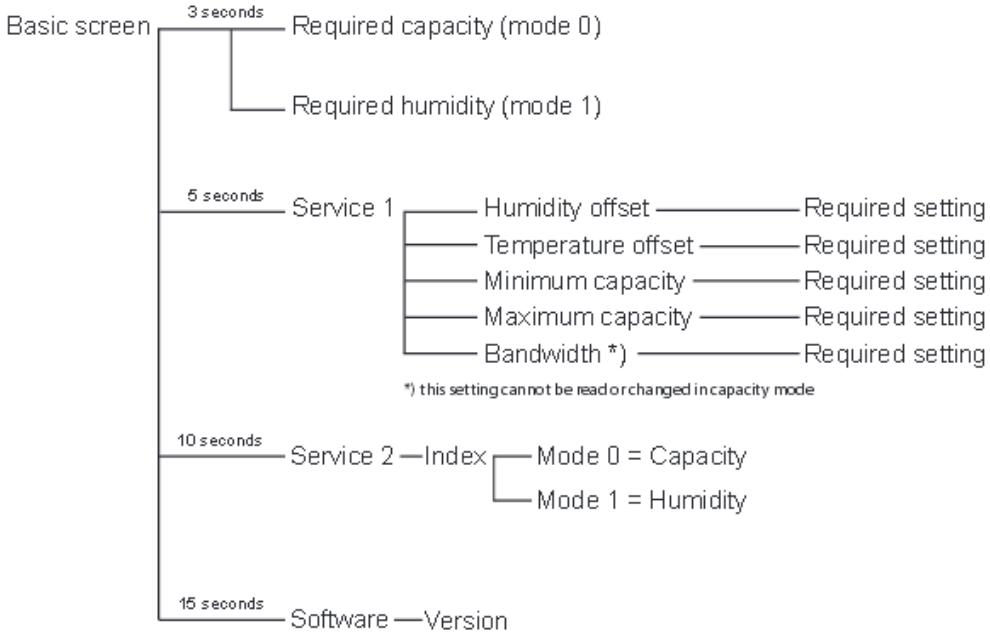
8. OPERATION

Configuring the humidity (in hygrostat mode) or capacity (in capacity mode):
Press ↑ for 3 seconds.
The upper screen shows the setting.
Press ↑ and ↓ simultaneously for 3 seconds.
The screen will now flash.
Change setting using ↑ or ↓.
Press ↑ and ↓ simultaneously for 3 seconds to confirm.
Press ↓ return to the start screen.

HTR-10

CONTRONICS

9. MENU OVERVIEW



CONTRONICS HTR-10

10. TECHNICAL DATA

Supply voltage	Via HU serie Contronics (12 V DC)
Dimensions	L 125 x W 65 x H 30 mm

General		
Temperature	Minimum -10 °C	Maximum + 50 °C
Humidity	< 100% (not condensing)	
Humidity		
Resolution	0,5% RH min.	
	0,3% RH typical	
Absolute accuracy	10 - 90%	< 2% RH
	0 - 10%	2 - 4% RH
	90 - 100%	2 - 4% RH
Range	0 - 100%	
Reaction time	4 sec.	
Stability	< 1% per year	
Temperature		
Resolution	0,04 °C min.	
	0,01 °C typical	
Absolute accuracy	0,5 °C at 25 °C	
Range	- 40 °C min. +70 °C max.	

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We therefore reserve the right to modify the design, construction and technology of the product at any time. For this reason, no claims can be made based on the data, illustrations and description in this user manual.

Additional, up-to-date information is available on www.contronics.nl

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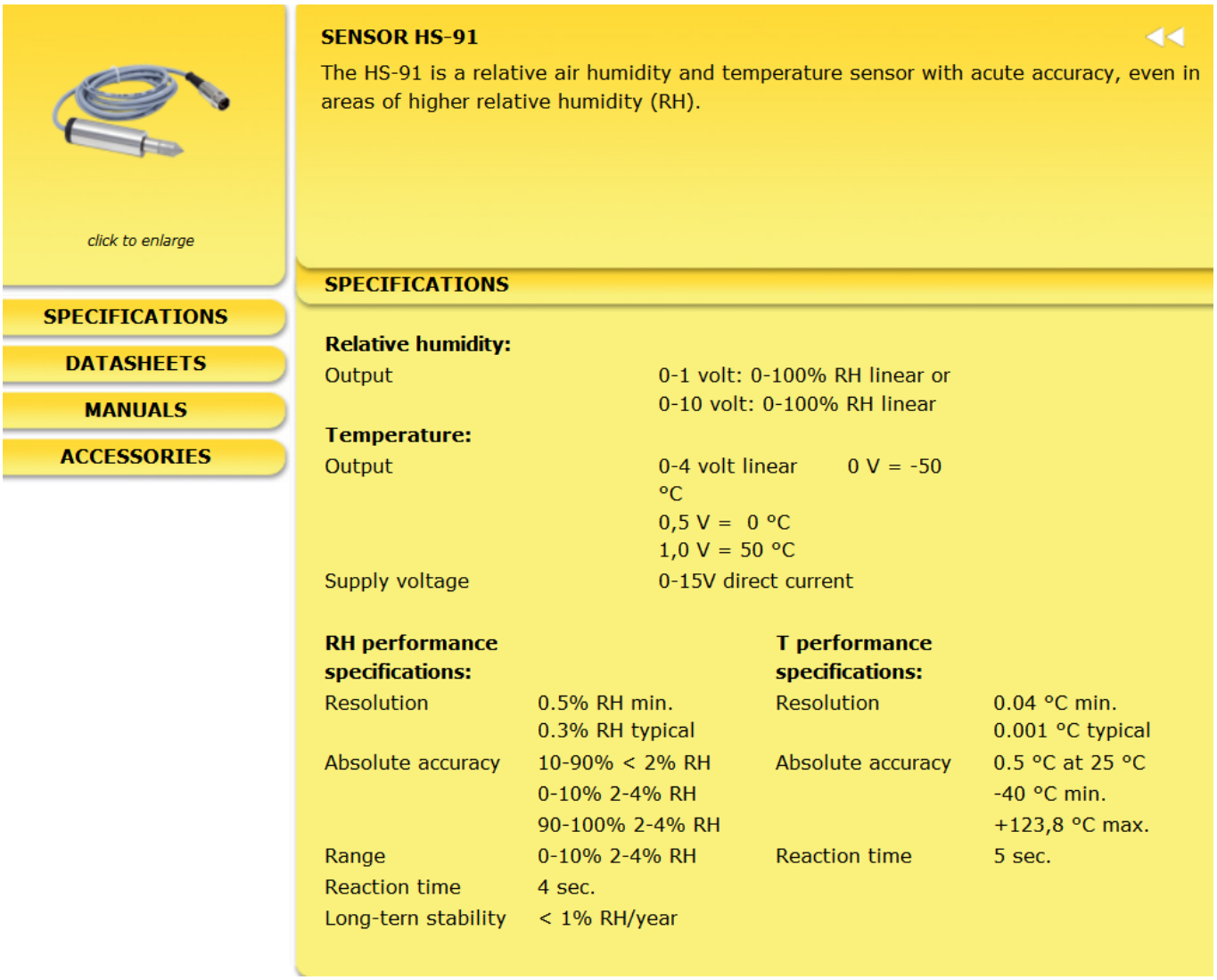
9.3. User manual sensor HS-91



click to enlarge

SPECIFICATIONS

DATASHEETS

MANUALS

ACCESSORIES

SENSOR HS-91

The HS-91 is a relative air humidity and temperature sensor with acute accuracy, even in areas of higher relative humidity (RH).

SPECIFICATIONS

Relative humidity:

Output	0-1 volt: 0-100% RH linear or 0-10 volt: 0-100% RH linear

Temperature:

Output	0-4 volt linear 0 V = -50 °C 0,5 V = 0 °C 1,0 V = 50 °C
Supply voltage	0-15V direct current

RH performance specifications:		**T performance specifications:**	
Resolution	0.5% RH min. 0.3% RH typical	Resolution	0.04 °C min. 0.001 °C typical
Absolute accuracy	10-90% < 2% RH 0-10% 2-4% RH 90-100% 2-4% RH	Absolute accuracy	0.5 °C at 25 °C -40 °C min. +123,8 °C max.
Range	0-10% 2-4% RH	Reaction time	5 sec.
Reaction time	4 sec.		
Long-tern stability	< 1% RH/year		

Figure 23: Specification of controller HTR-10

CONTRONICS

SENSOR

HS-91(P)

USER MANUAL

06-09-2010 version 1.4

HS-91(P) CONTRONICS

CE

Contronics Engineering B.V., Ambachtsweg 8, 5492 NJ Sint-Oedenrode, The Netherlands, hereby declares that the product HS-91(P), produced and delivered by Contronics Engineering B.V., are in accordance with the following CE directives:

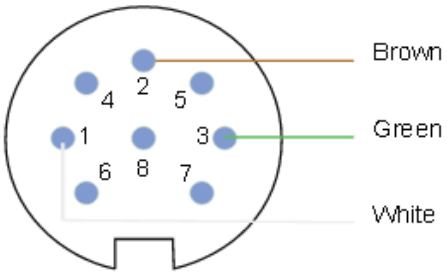
EMC-Directive	: 2004/108/EG
Directive for low-voltage electrical installation	: 2006/95/EG

1. INTRODUCTION

The HS-91 is a relative air humidity and temperature sensor with high accuracy, even in the case of higher relative humidity (RH) values.
The electronics are moulded into a solid stainless steel housing, and the device can therefore be used virtually everywhere. A built-in heating system prevents condensation on the sensor element when the dew point is reached.
A chip programmed by Contronics compensates for temperature fluctuations.
The sensor is already calibrated on delivery. Follow-up calibration is unnecessary due to the excellent stability.

HS-91P

The HS-91 can also be delivered with a DIN plug for direct connection to a Contronics humidifier. (Order number: HS-91P).



DIN-plug male
Solderside
Yellow and grey not connected

DIN-plug connections

2

CONTRONICS HS-91(P)

2. CONNECTIONS

HS-91

Colour	Description		Colour	Description
Brown	+12 V		Yellow	temperature
Green	0V		White	0-1V RH
Grey	0-10 V RH			

3. TECHNICAL SPECIFICATIONS

Relative humidity:	
Output	0-1 volt: 0-100% RH linear or 0-10 volt: 0-100% RH linear
Temperature:	
Output	0-4 volt linear 0 V = -50 °C 0,5 V = 0 °C 1,0 V = 50 °C
Supply voltage	12 – 15 V direct current

RH performance specifications:		T performance specifications:	
Resolution	0.5% RH min. 0.3% RH typical	Resolution	0.04 °C min. 0.01 °C typical
Absolute accuracy	10-90 % < 2 % RH	Absolute accuracy	0,5 °C at 25 °C
	0-10% 2-4% RH	Range	-40 °C min. +70 °C max.
	90-100% 2-4% RH	Reaction time	5 sec.
Range	0-100%		
Reaction time	4 sec.		
Long-term stability	< 1% RH/year		

3

HS-91(P)

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Additional, up-to-date information is available on www.contronics.nl

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