
ADSORPTION DEHUMIDIFIER A2ES/A4ES/A4ESX

USER MANUAL



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User Manual CTR A ES

Intended use

The CTR A ES family of adsorption dehumidifiers is developed and intended for construction drying and water damage restoration where it can be used standalone as well as in combination with turbine for, for instance, pressure and suction drying of layered constructions.

Through its control panel, the CTR A ES provides the user with the ability to optimize the operation for intended work, setting capacity and volume, controlling fan operation as well as using either built-in or external temperature and relative humidity sensors to achieve desired effect while also minimizing energy consumption. The CTR A ES is also capable of networked operation and it is prepared for remote supervision and control. The unit has cable parking integrated with its foldable carrying handle and its low weight makes it easy to carry and install. Durable yet flexible feet protect floor surfaces while also allowing stacking of machines. The dehumidifiers are naturally robust in their design, a prerequisite for a long service life.

• High Capacity	• Low weight – easy to carry and install
• Energy efficient	• Digital interface with networking capabilities
• Robust	• Energy and time meter – resettable work counter
• Very low noise	• The CTR A4ESX has an Extra heater function for improved drying effect

Manufacturing Directive

CTR A ES machines are CE approved.

Waiver of Liability

- Faulty, incorrect installations and/or incorrect use can cause damage to property and human injury.
- The manufacturer assumes no responsibility or liability for damages or injuries caused by non-compliance with the instructions herein, use for other purposes than the intended, or failure to observe its warnings. Such damage, injuries or liabilities are not covered by the product warranty.
- The product warranty does not cover consumables or normal wear and tear.
- It is the responsibility of the buyer to inspect the product at time of delivery and before use to ensure its good function. The product warranty does not cover damage resulting from use of faulty products.
- Changes or modifications to the equipment must not be made without written consent by Corroventa Avfuktning AB.
- The product, technical data and/or installation and operation instructions can be changed without prior notice.
- This manual contains information that is protected by the Intellectual Property laws. No part of this manual may be copied, stored in an information system or transferred in any form or in any way without the written consent of Corroventa Avfuktning AB.

Any comments on the contents of this document shall be sent or addressed to:

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Safety information

This equipment can be used by children aged eight (8) years or above and people with reduced physical, sensory or mental capabilities or with lack of experience and knowledge provided they have been given instructions and information on how it is safely used and that they understand the hazards involved.

Children must not be allowed to play with the equipment. Cleaning and maintenance must not be performed by children without supervision.

Electrical installations made in connection with the installation of the CTR A ES shall be made by authorized personnel in accordance with local and national regulations.

Furthermore, the following warnings and instructions shall be read and observed:

1. The dehumidifier is intended for indoor use only.
2. The dehumidifier must not be powered until the installation is finished in accordance with this manual.
3. The powered dehumidifier must not be covered as this can lead to overheating and fire hazard.
4. The dehumidifier must not be used as table, trestle, pallet or stool.
5. The dehumidifier must not be used to step or stand on or used as table, trestle pallet or stool.
6. Never use the dehumidifier without the filter installed as this can cause damage to it. Ensure that the filter is clean. A cluttered filter can cause the dehumidifier to overheat.
7. Bases or organic material with high boiling point such as oil, fat, solvents, boracol or similar substances must not be drawn into the dehumidifier. It may damage the rotor.
8. The dehumidifier must not be used in spaces where explosive gases can be present.
9. Do not stick objects into the air outlets or intakes as this can cause damage to the machinery as well as human injury.
10. Install the dehumidifier steadily and leveled so that it cannot fall over.
11. Keep children, animals and spectators away from the work place while installation is undertaken.
12. If the dehumidifier is broken, if the power connector or the cable is damaged, contact the retailer. Do not repair the equipment if you have not received specific training by the manufacturer.
13. Be careful not to damage the power cable. The cable must not go through water or pass sharp edges.
14. Never carry or tow the dehumidifier by its cable.
15. To use electrical equipment in humid or wet environment can be dangerous. Never power the dehumidifier if it is standing in water.
16. The dehumidifier must only be connected to grounded power outlet with voltage and frequency in accordance with dehumidifier nameplate.
17. A residual-current device / ground fault circuit interrupter should be used to minimize the risk of electric shocks.
18. Water must not come in contact with the electrical components of the equipment. If this has happened, ensure that the equipment is dry before it is used again.
19. The power must always be disconnected before the dehumidifier is opened.
20. Repairs and maintenance of the electronics and the electrical system of the dehumidifier must only be made by qualified electrician.
21. Wet air hose/pipe that is used and connected to the dehumidifier must be corrosion-resistant and able to withstand 80°C heat.

22. The Extra Heater on the CTR A4ESX must not be used if the dry air is led into another machine as this could cause overheat.
23. The dehumidifier must never be used with any other accessories than those listed in this manual or those specifically approved by Corroventa Avfuktning AB.

For further advice on product safety and use, please contact the supplier.

Relative humidity and its effect on substances

All air contains moisture, sometimes more, sometimes less although the naked eye cannot see it until it condenses in small droplets on, for instance, a metal or glass surface. Already before it is visible however, the moisture affects substances and production processes, causes corrosion and micro-organism growth.

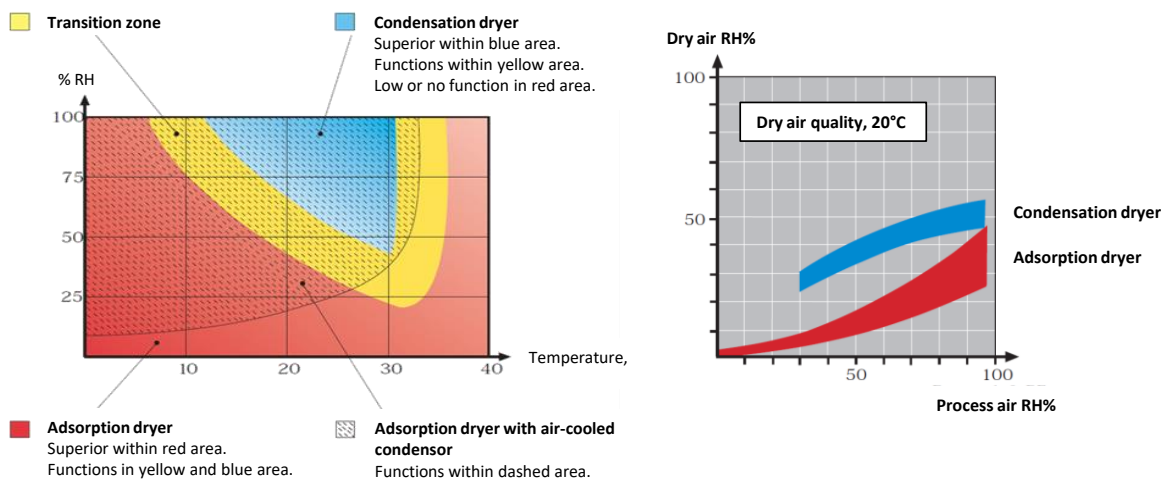
Air humidity is measured and referred to in terms of Relative Humidity (%RH) which is the ratio between how much water it does contain and how much it can contain at given temperature and pressure. The higher the temperature, the more water the air can contain but it is still the Relative Humidity that is important and that needs to be controlled if one wants to prevent corrosion or mould growth.

At RH 100% the air is saturated – there is fog and the moisture condenses in small droplets. Already at RH 60% steel corrodes and at 70% there is a risk for mould growth. As a rule of thumb, RH 50% is a good climate for most substances.

How to select dehumidifier type

The adsorption principal has, compared to condensation drying, the advantage of a lower ambient temperature dependency. Adsorption functions even well below the freezing point while the capacity of a condensation dehumidifier inevitably decreases rapidly with falling temperature, something that is depicted in the diagram below to the left.

As a rule of thumb, a general aid in the selection of type, it can be said that adsorption is the primary choice for drying of unheated spaces or when material is to be dried. Adsorption dehumidifier produces dehumidifier air, generates a greater reduction of water content measured in grams per kilogram (Δx), and consequently creates a greater water vapor pressure difference which is directly correlated to the drying speed. Drying of insulation such as floor structures are dried with combined use of turbines, high pressure fans, installed for either suction or pressure drying.



Condensation dehumidifiers are, in accordance with the diagram above, used in hot and humid conditions provided the goal and aim is drying of rooms, ambient air.

How the dehumidifier works

The desiccant used in the CTR A ES is silica gel which can be regenerated an almost infinite number of times. Silica gel is a crystal with enormous amounts of microscopic pores which makes its total surface very large, a single gram has an active surface of 500 to 700m². Silica gel is very potent and can absorb water corresponding up to 40% of its own weight. It is not water soluble and can therefore not be washed away nor dissipate into the passing air.

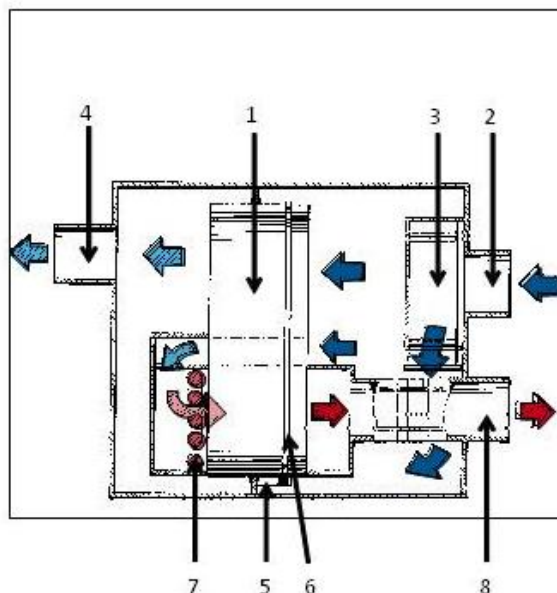
Dehumidification process

The desiccant is placed in a rotor (1). The air to be dried is drawn through the inlet (2) by a process air fan (3).

The air passes a filter and then the rotor where after the dried air passes through the dry air outlet (4) and into the environment to be dried. The rotor has air channels parallel to its axis and is made from a highly potent desiccant, silica gel, fixed in a ceramic structure. The air channels in the rotor provide a laminar air flow with a low pressure drop.

The rotor is rotated by an electric motor (5) and a belt (6). The moisture that is adsorbed is removed by a small volume of process air that is heated (7) where after it is passed through a section of the rotor, thus regenerating it as well as cleaning it through the counter flow principle.

The wet air is evacuated through the wet air outlet (8).



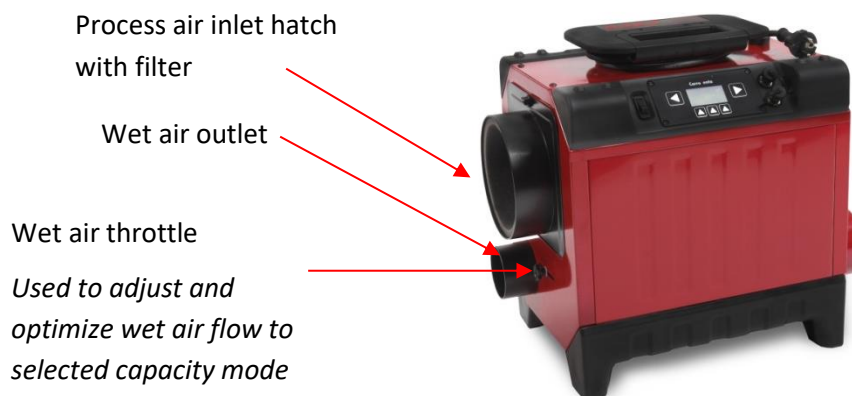
Delivery inspection

CTR A ES is delivered with the following items included:

Adsorption dehumidifier CTR A ES	1 pc
Spare process air filters	2 pcs
Manual	1 pc

Product Overview

Below pictures present CTR A ES with all its external features and controls. The CTR A2 ES is shorter and has fewer dry air outlets but the other features are the same.



Drying Methods

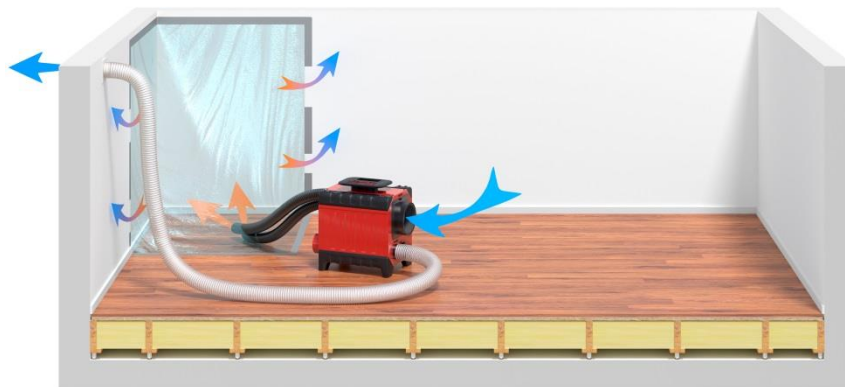
In the following the basics for the different drying methods that can be applied with the CTR A ES and applicable supplemental products from the Corroventa product portfolio are presented. The descriptions are merely overviews. Thus, if in doubt on how to proceed with given situation, consult experienced drying expert.

General drying, ambient air

An adsorption dehumidifier like the CTR A ES produces such dry air that a recirculation air flow rate of between one and two times per hour is sufficient, to be compared with three to four times which is suitable for a condensation dehumidifier. In other words, the CTR A ES which produces approximately 300 m³ of dry air per hour has capacity enough for a room of at least 50 – 60 m² and a ceiling height of 2.5 meters.

As for all drying, regardless of type or model of machine used, it is important that the room or space to be dried is well sealed in order for the process to be as energy efficient and quick as possible. Windows and doors shall be shut and in absence of such delimiters, plastic foils or other temporary sealing should be used.

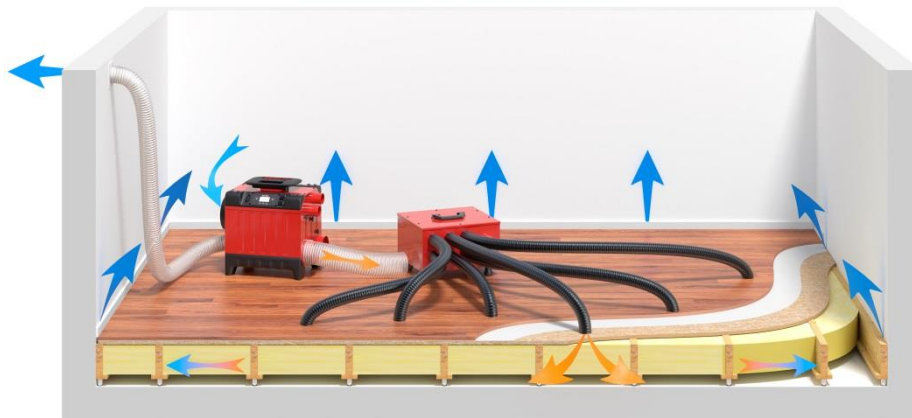
If the damage is limited and local, it is preferably sealed with plastic foil and a hose then used to lead the dry air in under the foil. By the edges of the foil small openings are left to let the air through and create circulation. This method makes the process go faster and thus consume less energy.



Drying of limited, local damage sealed with plastic foil in order to speed up the process and save energy.

Drying of floor structures

For drying of floor structures with easily dried insulation like glass wool or none insulated structures, the CTR A ES is with advantage used with a high pressure fan like the HP2000 in accordance with the schematic sketch below. Note that the capacity of the fan widely exceeds that of the dehumidifier and therefore the fan must not be directly connected to the dehumidifier by hose as this would seriously affect its function and degrade its efficiency. Instead, leave the dry air hose from the dehumidifier on the floor just by the fan so that the dry air is sucked in along with ambient air.



Drying of floor structure. Note that the dry air hose of the dryer on the right is not directly connected to the fan but left just next to its inlet.

Suction Drying

For suction drying of layered constructions such as floating floors, the CTR A ES is used with one or more turbines from the Corroventa product portfolio, in accordance with the schematic sketch below. The turbine or turbines are connected to hoses with filters and water separators through which they draw air from layered construction and then evacuate this, normally outdoors. The dehumidifier is placed in the room and its wet air hose installed to evacuate the wet air. The turbines will this way draw dry air down into the layered construction through drilled holes or through the gaps between the floor and the walls.

Note that, as mentioned above, a water separator must be used to avoid free water from being sucked into, and damaging, the turbine.



Suction drying. The dryer dries the ambient air and turbines draws and evacuates air from the construction. The resulting underpressure in the construction draws dry air into it.

Suction drying setup:

At the top, CTR A4 ES drying ambient air.

In the center, a CTR T4 ES turbine pulling air from the water separator. The turbine outlet shall be provided a hose leading to where the humid air from the construction can be released. The turbine is powered through the water separator power outlet.

At the bottom, a WS4 ES water separator connected to hose system with suitable number of distributed suction points so as to ensure air movement beneath the entire floor.

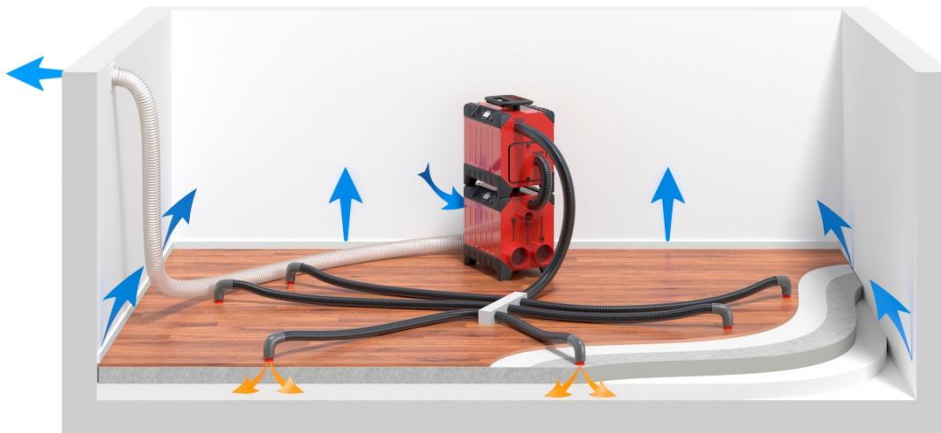


Pressure drying

For pressure drying of layered constructions such as floating floors, the CTR A ES is used with one or more turbines from the Corroventa product portfolio, in accordance with the schematic sketch below. Pressure drying is two to four times faster than suction drying and is therefore, whenever feasible, the primary choice unless mould or fibres are present.

Pressure drying means leading dry air from the CTR A ES to a turbine and applying that to push the air into the layered construction. This way, hot and dry air will travel through construction making its temperature rise which increases the speed of the drying process. Wet and cooled air exits the construction through drilled outlets or through the gaps between the floor and the walls and then returns to the dehumidifier as process air.

Before pressure drying is applied, suction drying should be used to evacuate any free water and prevent this from being pushed into other parts of the construction/building. When setting up the machines for pressure drying, it is very important to check turbine is not pulling more air from the dehumidifier than it can deliver. Therefore, always verify that the wet air volume is in balance with the dehumidifier. When using a CTR ES version turbine, this machine is preferably set to flow mode so that it maintains constant air flow. There is also the possibility of networking the two units, using the turbine as Master, and setting up the adsorption dehumidifier slave to pressure drying mode where it automatically adjusts the wet air volume to requirements. Still, always check the status of the units before leaving the site so that the installation works as intended. Furthermore, please note that the Extra Heater available with the CTR A4ESX must not be used when the dry air is led to a turbine as this will cause overheating.



Pressure drying. The turbine is fed with dry air from the dehumidifier and presses this air into the layered construction.

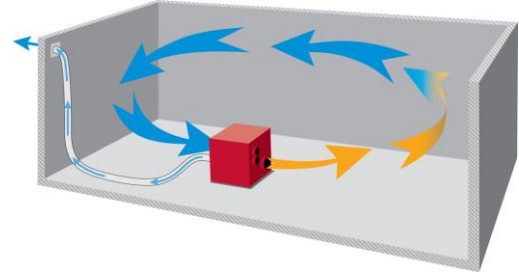
Pressure drying might free particles/fibers from the construction and thus release them in the air. If this is a potential problem, another method, e.g. suction drying, should be applied.

Installation

CTR A ES is placed and installed leveled and in a stable position so that it does not fall over and cause damage to the machine itself, person or property.

A hose is connected to the wet air outlet in order to evacuate the moist from the room or space to be dried. The wet air hose shall have a smooth interior surface and shall be as short as possible, no longer than 5 meters for optimal function and performance.

In the event of problems with condensate in the wet air hose these can, unless the hose can be shortened which is the best solution, be improved by a further small reduction of the dry air volume which will increase the dry air volume. The performance will be lowered so this must be considered and decided case by case. Another option is to make a small hole in the wet air hose and use a bucket for collection of the condensate.



The wet air shall always be evacuated from the room/space to be dried.

Installation in short, main points:

1. Place the dehumidifier where the wet air hose will reach the intended evacuation point. Make sure that the dehumidifier is leveled and that it cannot fall over and cause damage.
2. Connect the wet air hose and lead it to intended evacuation point (hole in the wall or window etc). Verify that the hose is not squeezed or bent to sharply but that it will allow for unobstructed wet air flow.
3. Verify that the wet air throttle is fully open. For normal drying of ambient air, both dry air throttles shall be fully open too.
4. Connect the cable to a 1-phase, 230 V AC socket with a 10A or maximum 16A fuse. As the machine is normally used in humid or wet spaces, the use of a ground fault circuit interrupter is strongly recommended.
5. Start the machine using the power switch. When the display lights up, in the first screen presented after the start-up, push Start.
6. Allow for the machine to warm up for a few minutes.
7. In order to optimize the operation of the machine, push the top right button three times to enter the Capacity menu. At the bottom of the screen, there is a wet air level indicator showing current operation. Slowly, use the dry air throttle to adjust the flow so that the indicator is centered on the dashed line for optimum performance.

To Use CTR A ES, menus and operation

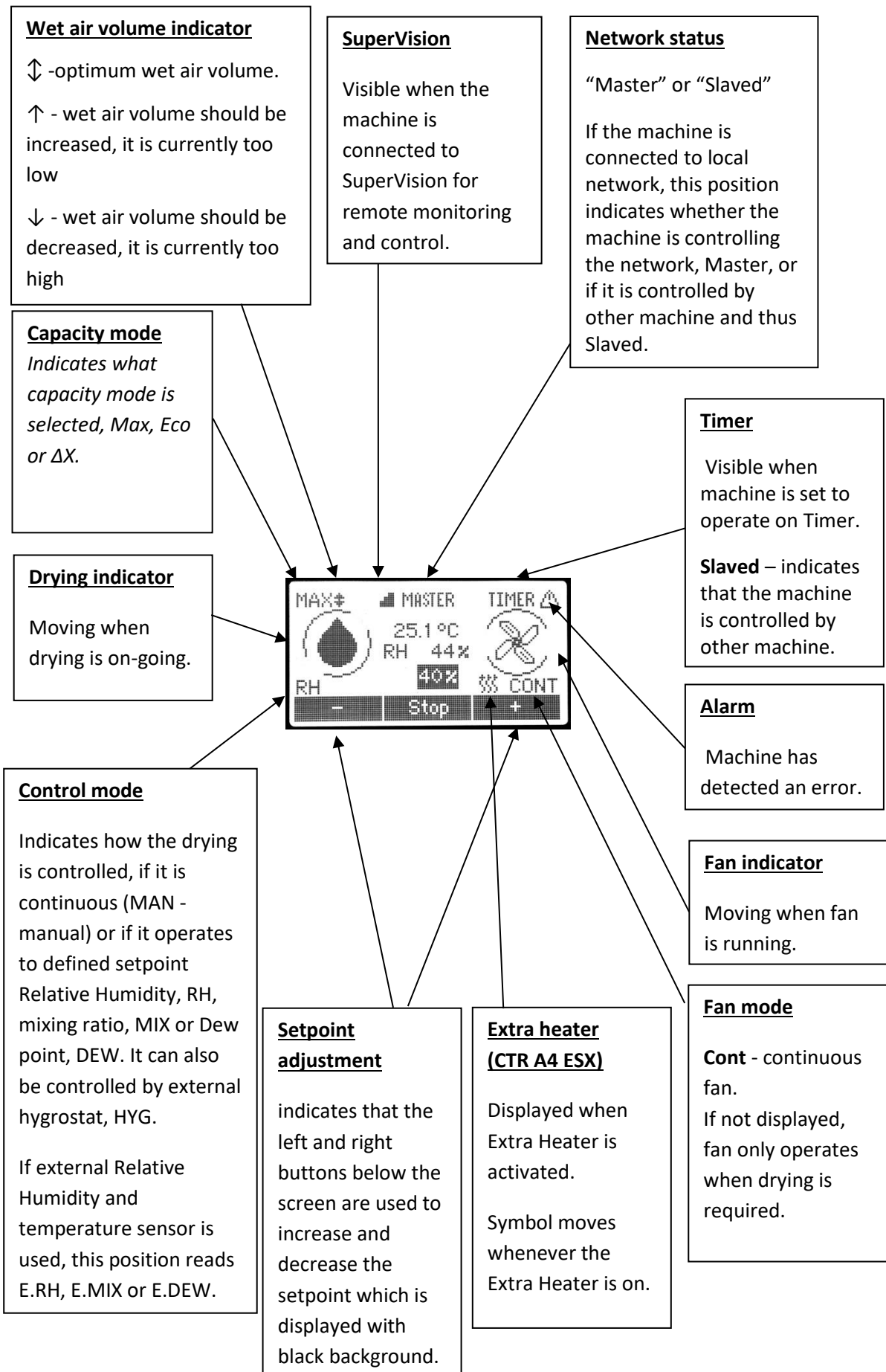
The CTR A ES has an easily understood user interface with a display and five push buttons. The two larger buttons on the respective sides of the display are used to select between the different menus – no changes to the setup can ever be made with these buttons as they are for navigation only.

The three smaller buttons below the display are used for selection and editing and their respective functions are always presented in text at the bottom of the screen. At the top level menus, the left of these buttons is named Home and a push on this button will immediately lead back to the default view. In many of the views there is an Info button which presents information that may be of use to the inexperienced user.

If the backlight of the display has timed out, the first button push serves only to light up the display.

After 10 minutes, if no button is pushed, a key pad lock is activated. The machine is then unlocked by simultaneous push of the two upper buttons, something that is presented in text as well as picture on the display.

Top left and right buttons –	Menu navigation only. Never changes any settings.
Home button	Return to the default view
Info button	Presents information. On-board manual



Start up view

When the A ES starts up, the display presents the user with two options:

Start: Starts the machine with default settings, continuous operation with maximum capacity. Previous settings made such as the use of sensor control, Timer etc..

Resume: The machine resumes operation with the settings it had last time it was used.

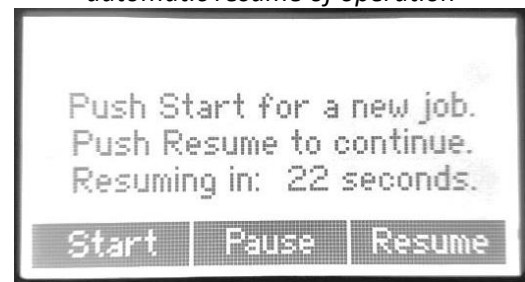
If, last time it was used, the user never pushed stop before the power was cut, the machine will automatically resume operation when the countdown has reached zero.

A push of Pause button will stop the countdown and the machine will remain in standby until manually started.

Normal start



Start after power out – automatic resume of operation

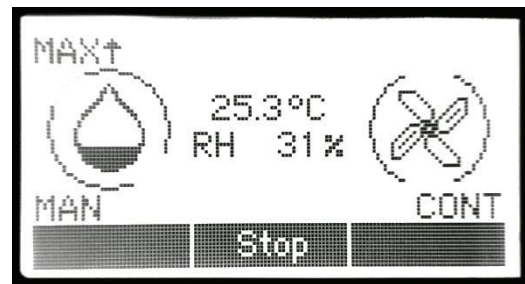


Default View

When the A ES is operating, the machine can always be stopped, set to standby, by use of the center button below the display.

When the machine is running with a control mode other than MAN, manual, the setpoint value which is highlighted with black background at the center of the screen can be increased and decreased by use of the minus (-) and plus (+) buttons respectively.

Default screen pictures.



Control Mode

The Control Mode determines whether the drying shall be continuous (MAN – manual mode) or if it shall operate only when required as determined by the ambient climate.

The selected control mode is displayed in the lower left corner of the default view.

The Control Mode selection screen is reached by one push of the upper right button.

The following basic control modes are available:

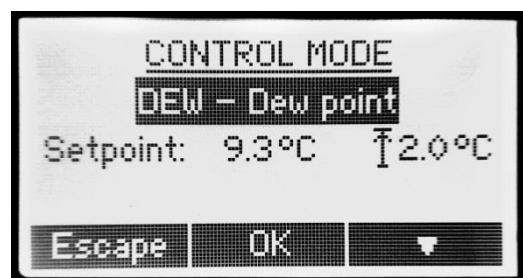
MAN	Manual, continuous drying.
RH	Drying down to selectable Relative humidity, %.
MIX	Drying down to selectable mixing ratio, g/kg.
DEW	Drying down to selectable dew point, °C
HYG	Drying controlled by external hygrostat connected to the machine.

Through its network capabilities, the machine can also connect to external RHT sensors and use their values to control the operation rather than using the built-in Relative Humidity and Temperature sensor. For this purpose there are also the following External sensor modes:

E.RH	Drying down to selectable Relative humidity, % as given by external RHT sensor(s) connected to the machine.
E.MIX	Drying down to selectable mixing ratio, g/kg as given by external sensor(s) connected to the machine.
E.DEW	Drying down to selectable dew point, °C, as given by external sensor(s) connected to the machine.

The External control modes require the machine to be networked and connected to an external RHT sensor. If the machine is not networked already, the machine will ask if it shall create a network.

If there are multiple sensors in the network and alternative <All> is selected rather than one unique sensor, e.g. RHT61, the machine applies “worst case” and operates as long as any one of the sensors read a humidity above the setpoint.



When selecting mode other than MAN, the machine presents the user with the possibility of determining the setpoint.

When reaching the setpoint level, the drying automatically stops. Should the humidity later on rise above the setpoint level, drying operation is automatically resumed.

Hysterisis

When selecting RH, DEW or MIX control modes, to the right in the display there is a symbol and a hysteresis value presented.

The symbol indicates the position of the setpoint in the operation span as presented below.

↕ - center

↓ - bottom

↑ - top

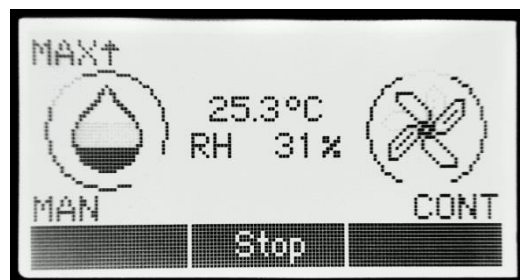
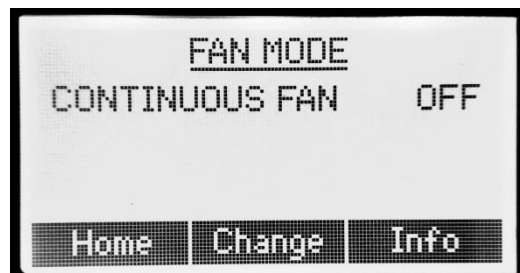


Fan Mode

The Fan mode determines whether the fan in the dehumidifier shall operate continuously or if it shall operate only when drying is required and ongoing.

If continuous fan is selected, the word CONT is presented in the lower right corner of the default screen.

If possible, for optimal drying effect, use continuous fan to keep the air in constant motion.



Capacity Mode

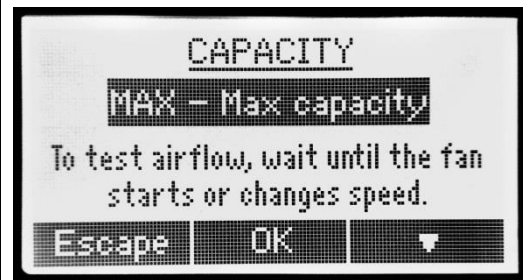
The drying capacity of the CTR A ES can be optimized to the given work and situation by use of three different operation modes.

When set to MAX, maximum, the machine operates to remove as much water as possible. When the full effect of the machine is not required, it can instead be set to ECO, eco-mode, where the energy consumption per liter of removed water is minimized.

For local water damages where the dry air volume is not required, the machine can be set to one of its ΔX modes where it operates to produce a smaller volume of even drier air, something that will further increase the speed of the drying process. The difference between $\Delta X1$ and $\Delta X2$ etc., is the dry air volume where $\Delta X1$ has the lowest volume.

For use during pressure drying when the machine is slaved to a turbine on a local network, the CTR A ES also has a pressure drying mode, PRS, where it automatically adjusts the wet air flow to produces as dry air as possible.

MAX	For maximum water removal
ECO	For minimal energy consumption per liter water removed
$\Delta X1, \Delta X2..$	For maximum ΔX , as dry air as possible. Reduced air volumes suitable for, for instance local, sealed of water damages.
PRS	Pressure drying mode that can be used when the machine is connected to a network and slaved to a turbine.



When the machine is installed and started up and whenever the capacity mode is changed, the wet air flow needs to be adjusted for optimum performance. When the capacity mode is changed, the machine will guide the user through the procedure as depicted to the right.

If the wet air hose is long, it might be necessary to reduce the dry air flow somewhat in order to achieve the correct wet air volume. Normally however, adjusting the wet air throttle is sufficient to achieve required wet air volume.

When adjusting the wet air flow, adjust slowly the throttle slowly and allow for the indicator to stabilize before evaluating whether the adjustment was sufficient or if further increase or decrease is required.



Extra Heater CTR A4ESX

The CTR A4 ESX is equipped with an Extra Heater increasing the temperature of the dry air and thus further improving the drying effect.

When this function is selected, there is an Extra Heater icon in the default view below the fan symbol. Naturally, the Extra Heater is only active when the fan is active.

Note: The Extra Heater must not be used if the dry air is fed into another machine as this could cause overheat.



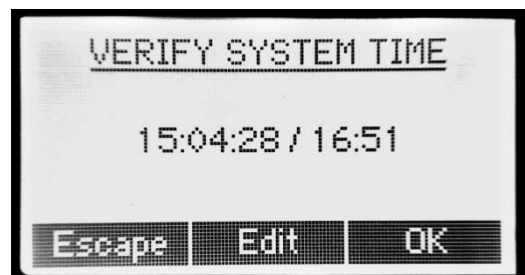
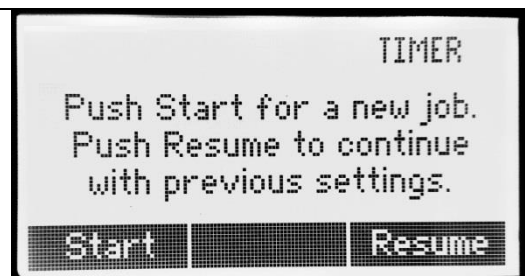
Timer

The CTR A ES has built-in timer functionality allowing the user to determine when the machine shall operate. When Timer function is used, the word Timer is presented in the top right corner of the default view as can be seen to the right.

To activate Timer, push the right arrow button four times to enter the Timer menu. Push Activate.

When timer is activated, as a first step, the machine asks the user to verify that its time and date settings are correct. If so, push OK. If changes are required, push edit to do the required changes before continuing.

In the next step, the user is allowed to set the time interval within which the machine shall operate. The machine remembers the timer settings from last time it was used and presents that data as default. The Outside int. setting determines whether, for the remaining hours of the day, the machine shall remain in stand-by or if it should operate with a lower fan speed so as to minimize the noise.



Network

Note: Install all the system cables before powering up the machines.

The CTR A ES is equipped with networking capabilities enabling local cooperation between the machines such as pressure drying as well as the use of external Relative Humidity and Temperature sensors for control of the machine. The networking capabilities are also a preparation for a future SuperVision system that will enable remote monitoring and control of the machines through Internet.

In order to establish a network, install the machines as intended and connect the with system cables before powering them up.

On the machine intended to be Master, to be in control of the others, enter the Network menu.

Push Create and wait while the machine establishes the network which can take up to a minute.

Once established, in the network menu, the presentation will toggle between the slave units which are referred to with type, for instance A4, and address on the bus, for instance 101.

In order to change the settings of a slave unit, press Edit and the select the given slave. As a confirmation of what unit was selected, the display backlight of the selected unit will start blinking.

The desired settings can still also be made on the respective machines themselves.

When all desired settings are made, start the Master machine and the slaves will be started automatically within a minute. Similarly, when the machines are to be stopped, push Stop on the Master machine and the slaves will soon stop automatically.

As the Master machine is controlling the network, if a slave unit is started manually when the Master is in standby, the slave unit will be stopped. Similarly, if a slave unit is manually stopped while the Master is running, the slave unit will be started again.



Setup and Maintenance Menus

Under Setup and Maintenance, functions that are not required for normal operation are found.

Date and Time: Setting of system date and time. Format is YY:MM:DD / HH:MM.

Language: Selection of language for the interface.

Menu System: The menu system is by default set to Advanced with all functions visible and accessible. If set to Basic, the more advanced functions are removed from the menu system.

Key Pad lock: Possibility to activate/deactivate the key pad lock.

RH Hysteresis: Possibility to adjust the hysteresis settings for RH Control Mode. The position of the setpoint in the operation span can be set as well as the hysteresis value.

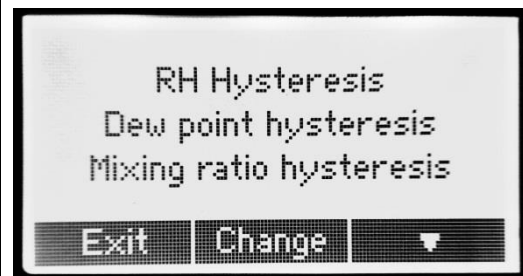
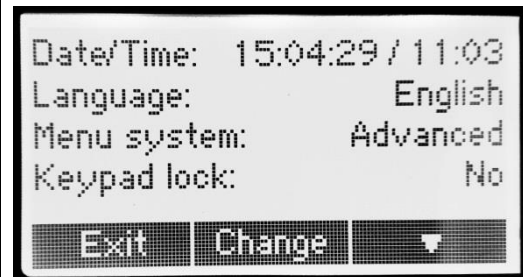
Dew point Hysteresis: Possibility to adjust the hysteresis settings for Dew point (DEW) Control Mode. The position of the setpoint in the operation span can be set as well as the hysteresis value.



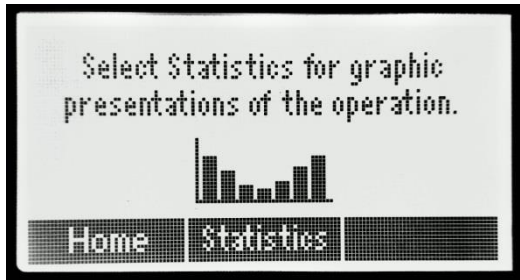
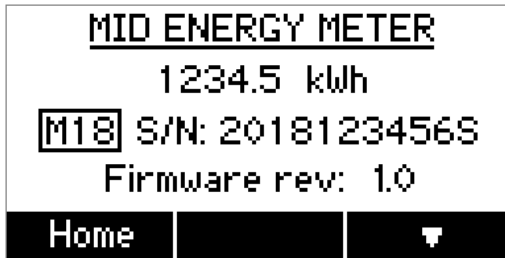
Mixing ratio Hysteresis: Possibility to adjust the hysteresis settings for Mixing ratio (MIX) Control Mode. The position of the setpoint in the operation span can be set as well as the hysteresis value.

Run built-in test: A built-in self test that is available for service technicians.

Reset Service Time: The machine is set to give a service reminder once every 12 months. When service has been performed, this service reminder can be reset using this function.

View sensor data: Functionality intended for service technicians.



<p>Counters</p> <p>This screen presents the hour and energy counters. At the top, the resettable work counters are presented, followed by the date at which the counters were reset. After the date, the number of hours elapsed since this reset is presented so as to allow for a quick comparison.</p> <p>To reset the work counters, push Reset. Acknowledge the intent to reset the counters by push of OK in the following confirmation screen.</p> <p>At the bottom, the machine life time counters for energy and hours are presented. These counters are not resettable.</p> <p>With machines that have MID energy meters, the energy lifetime counter is removed from this screen and presented in the MID Energy meter menu.</p>	 
<p>Statistics</p> <p>Statistics are provided to assist the user in studying the progress of the drying process and to allow for monitoring and follow-up of the operation of the machine.</p> <p>Found under the statistics menu are the following graphs:</p> <ul style="list-style-type: none"> • Average Relative humidity for the last 12 hours and for the last 14 days. • Average temperature for the last 12 hours and the last 14 days • Drying operation hours for the last 14 days • Consumed energy, kWhrs, for the last 14 days. <p>The last value, the bar at the far right in the respective graphs, is the current hour or current day as applicable.</p>	
<p>MID Energy Meter</p> <p>This menu presents the total, accumulated energy consumption. For more information, please refer to chapter MID Energy Meter.</p>	

Alarms

In this screen, the machine presents identified alarms. As soon as an alarm is identified, this is also presented as a pop-up screen. Furthermore, as long as the error condition remains, in the top right corner of the default view there is a warning symbol.

The alarms presented need not be erased by the user. Instead, as soon as the machine detects that the functionality is again in place, the alarm will disappear automatically.



Control Modes and Hysteresis

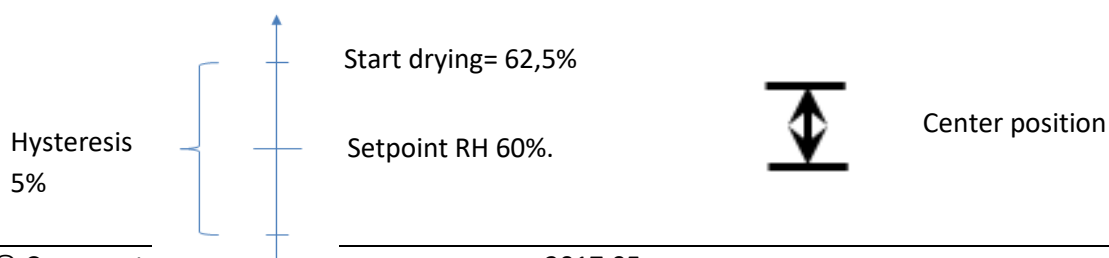
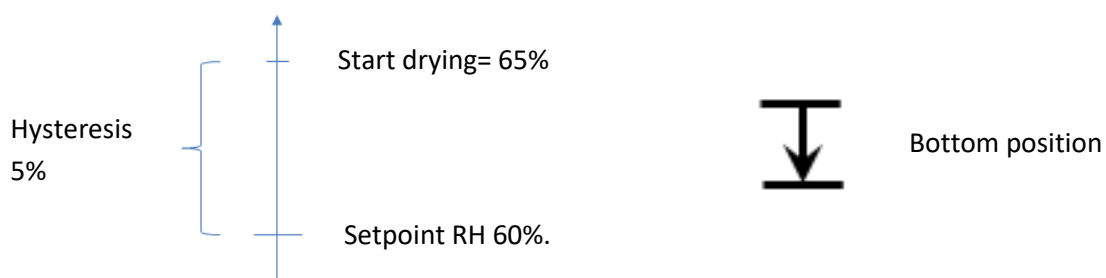
In addition to normal, continuous drying operation, the CTR A ES operation can be controlled by use of its internal Relative Humidity and Temperature sensor, external hygrostat or external, networked sensor.

When using an electronic sensor, built-in or external, the machine applies a software controlled hysteresis to make the operation of the machine stable and prevent excessive on- and off-switching.

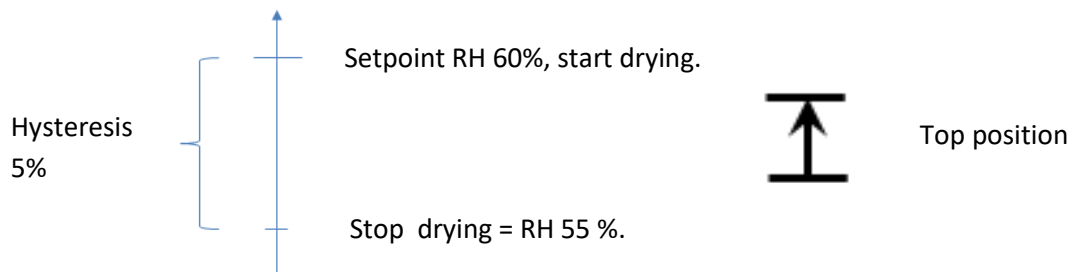
The table below presents the default settings of the machine. If changes are required, these can be made under the Setup and Maintenance menu.

Control mode	Hysteresis	Setpoint position
RH	4%	Bottom
Dewpoint	2°C	Top
Mix	0.5 g/kg	Bottom

The below illustrations describe the different hysteresis settings, bottom, center and top.



Stop drying= 57,5%



Alarms

If the machine detects an error, this information is presented in a pop-up screen and for as long as one or more problems exist, there is a warning symbol in the top right corner of the default view.

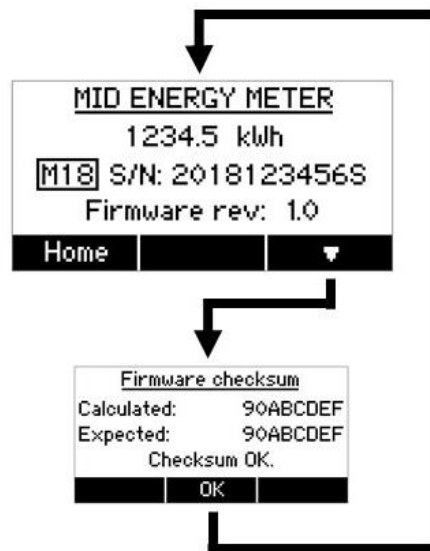
The alarms that can be displayed are the following, each presented with recommendation on what to do.

Alarm	Action / Advice
One or more slaves are not responding	This alarm is presented when the machine, used as Master on a network, has lost connection with one or more of its slave machines. If it is presented, check all the system cables and the power to the respective machines. As soon as communication is re-established, the alarm will automatically disappear.
Ambient temperature too high!	The machine has shut off all heaters due to too high ambient temperature, above 40 degrees Centigrade. If continuous fan is selected, the fan will continue operating. The machine automatically resumes operation if the temperature drops.
Fan control failure	The fan speed deviates from what is expected. If this remains, please contact service technician.
Mainboard connection failure	Internal error. If it remains, please contact service technician.
Internal RHT sensor failure	Internal error. If it appears after the machine has been disassembled it might be so that the sensor connector to the lid has not been correctly mounted. If not and if it remains, please contact service technician.
External RHT sensor failure	The machine has lost contact with the external RHT sensor(s). Please check that the cables are correctly mounted. When losing the external sensors, the machine automatically reverts to using the built-in RHT sensor.
Failed to save the statistics	Internal error. If it remains, please contact service

	technician.
Failed to save the event log	Internal error. If it remains, please contact service technician.

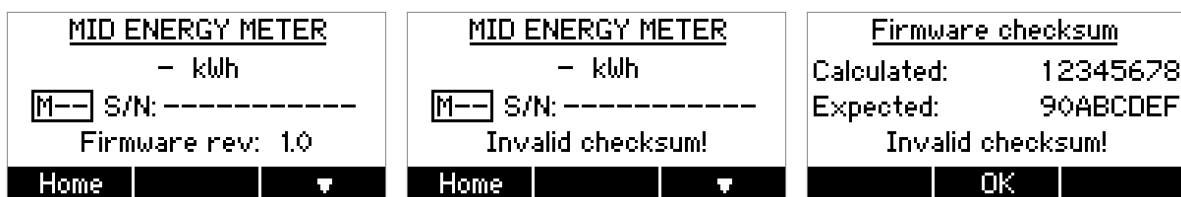
MID ENERGY METER MENU

Part of the main menu loop and accessible with either of the navigation keys, the MID Energy Meter menu presents the total, accumulated energy consumption. The affixing, M18 in the example below, as well as the serial number that follows is information on the built-in CEMP energy meter. The revision number given at the bottom row refers to the legally relevant firmware within the machine.



The integrity of the data presented with this menu is thoroughly checked and protected. One such important test is the calculation of a checksum to verify that the program memory has not been corrupted. The result of the latest calculation is always available with the Firmware checksum screen, accessed through the MID Energy Meter menu with the lower right button.

If any of the tests fail and the machine concludes that the available energy meter data must not be trusted, the information is removed from the screen and replaced with dashes. If the problem detected has to do with the checksum calculation, the bottom row of the screen will say so.



Left: Data removed due to communication error
 Centre: Data removed due to checksum error
 Right: Appearance of Firmware checksum screen when error is detected.

Network functions

As a member of the new CTR ES family of machines, the CTR A ES can be networked with other turbines and adsorption dryers which provides extended functionality including:

- Relation – cooperation between two or more turbines with defined relation between the respective air flows.
- Optimized pressure drying, a mode of operation where the slaved adsorption dryer automatically adjusts to the turbine air flow producing as dry air as possible.
- Operation on common timer
- Interoperability with future SuperVision system allowing remote monitoring and control of machine operation.

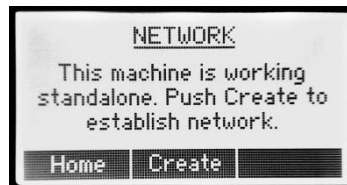
The networking of machines requires no pre-configuration or other preparations. When installed, the machines are simply connected with system cables and then a simple push of the Create button in the Network menu of the intended Master machine is all that is required. The Master is the machine selected to control the others and all machines can be used to this purpose. For use of Relation and Pressure drying modes, the Master needs to be a turbine but for other purposes it does not matter what machine is Master on the network.

While a machine is slaved to another unit, its settings can still be changed on the machine itself and not only through the Master. If the user selects to do necessary changes to the settings through the Master, the display of the selected Slave flashes while the changes are made so as to allow for easy identification and avoid confusion.

How to network machines

In order to network machines to use for instance the pressure drying mode of the dehumidifier, proceed as follows:

1. If the machines are powered, switch them off and then proceed by connecting the machines with system cables. The two connectors on the machines have the same functionality so it does not matter which one is used. If SuperVision is to be used, this too must be connected to one of the machines, it does not matter which one.
2. Power up the machines.
3. Select what machine shall be master, for use of pressure drying mode, this shall be the Turbine set to push the dry air into the construction.
If networking the units with the only purpose of having them monitored and remotely operated through SuperVision, it does not matter what machine is selected as Master.
4. On the selected Master machine, use right arrow button to step to the Network menu depicted below.



(If this menu is not found, the machine is set to Basic menu setting. To change this, select Setup and Maintenance menu and change the menu system setting to Advanced.)

5. In the Network menu, push <Create> and then wait while the machine sets up the network.
6. When the network is created, at the top of the screen the presentation will toggle between the different slaves. If SuperVision is connected, the text SuperVision will be presented at the bottom of the screen although it can take up to a minute before this is shown.

After having followed the steps above, all the slave machines are now controlled by the Master. This means that they will all be started and stopped with the Master. They still work with the same settings they had before the network connection so if these need to be changed, push Edit and then select the slave to be edited through the Master or do the necessary changes to the settings on the machine itself. When being edited through the Master, the slave machine will start to blink its display backlight so that the user can see what machine is selected.

Service Reminder

The machine is set to provide a service reminder every twelve months. The reminder is presented as an alarm but it does not affect the operation of the machine. The service reminder function is reset under Setup and Maintenance.



Maintenance and service

Filter replacement

The dehumidifier's process air filter shall be replaced regularly in order to maintain energy efficiency and to avoid overheating, suitably between every installation, every work, that the dehumidifier is used for. When used in dirty environment, the filter needs to be replaced more often.

1. Disconnect power to the dehumidifier - remove its cable from the socket.
2. Turn the knob of the filter hatch anti-clockwise to open it. Pull out the dirty filter and insert the replacement filter. Close the hatch by turning the knob clockwise.
3. Reconnect power.

Turn anti-clockwise to open filter hatch.



Cleaning of rotor

When required, yearly or after use in very dirty environment, it is recommended to clean the rotor with pressurized air. The rotor can be clogged by dirt resulting in lowered air flow and capacity. To clean the rotor, follow these instructions:



When the rotor shall be cleaned, the dehumidifier must be disconnected from power.



Always use a suitable protective mask and stand outdoors when cleaning the rotor.

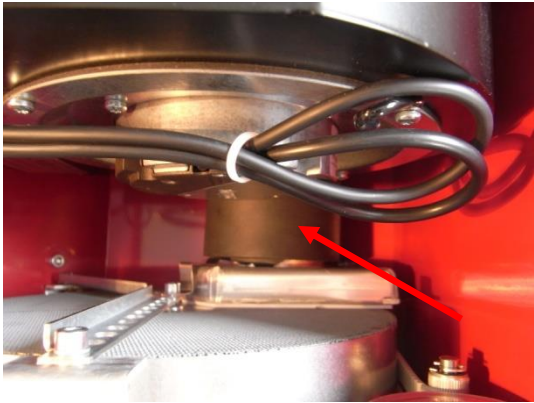

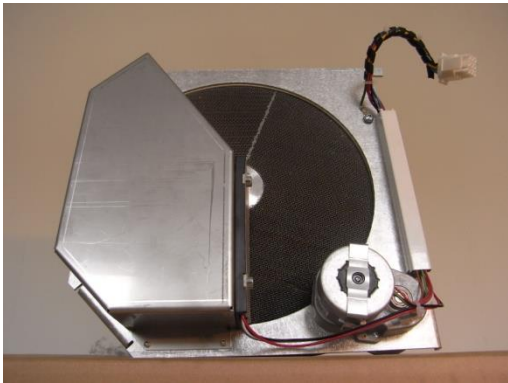
Make the machine powerless.

Remove the four screws that hold the top lid of the dehumidifier.



1. Gently lift the lid enough to reach and disconnect the three cable connectors that are positioned along the front of the machine.
Note: The connectors have clamps that lock them into place and these need to be pushed while the connector is pulled out.



<p>2. On the A4ES or the A4ESX, reach into the machine between the fan and the rotor assembly and pull the internal wet air hose off the spigot. Pull the entire rotor assembly upwards to lift it out of the machine. Be careful not to damage the rotor.</p> <p>On the A2ES, it is easier to remove the fan gable. Remove the two screws that hold the fan gable in place, found between the feet of the machine. When the screws are remove, pull the fan gable upwards and remove it.</p>	
<p>3. On the rotor assembly, push the tensioning wheel back and slide the belt off the wheel so that the rotor can be turned freely.</p>	
<p>4. <i>Note: Always use a suitable protective mask and clean the rotor at suitable location outdoors.</i></p> <p>With pressurized air, carefully blow the rotor interior clean. Hold the nozzle approximately 15cm from the rotor and begin by blowing from the heater cover side of the rotor. This way, the air will flow through the rotor in the opposite direction of what it usually does which will prevent further dirt from getting stuck inside.</p> <p>When later cleaning from the other side, avoid blowing into the heater cover as the dirt will collect inside. Only blow on the rotor where the opposite side is free and unobstructed.</p>	
<p>5. When the rotor is cleaned, assemble the dehumidifier in the reverse order, thus:</p> <ul style="list-style-type: none"> • Mount the belt • Carefully lower the rotor assembly into the machine. 	

<ul style="list-style-type: none"> • Reattach the wet air hose. On the A2ES, put the gable back in place while sliding the hose onto the spigot of the heater cover on the rotor assembly. • Put the lid back on the dehumidifier, re-connect the three cable assemblies. Mount and tighten the four screws. 	
<p>6. Inspect and verify the good function of the dehumidifier as follows: Connect power to the dehumidifier and put it in manual mode. Verify that it starts, that the fan starts running. Verify, by looking into the wet air outlet that the rotor is rotating. Put one hand in front of the wet air outlet and verify that the air feels warm, thus that the heater is functioning.</p>	

Accessories and consumables

The following articles are available as accessories and consumables to the CTR A ES machines:

Article number	Name
9901100	Humidistat, HR1-5 (Adapter cable, hygostat req)
1002720	Process air filter
1002749	System cable, 0.5m
1002748	System cable, 5m
1002816	Adapter cable, hygostat.
1002817	External RHT sensor ES series

Fault finding

Symptom	Probable cause	Action
Room is not getting dehumidifier/low capacity.	Depending on the situation, the cause of the problem can be either incorrect installation such as obstructed wet air hose, clogged filter, incorrect settings to the machine or machine failure.	<p>Begin trouble shooting as follows until the problem is identified:</p> <p>Check the installation – verify that the wet air hose is not obstructed, that the dry air throttles are in their intended position and that any hose used on the dry air side too is not squeezed or clogged but that the air flow seems correct.</p> <p>If the air flow is weak, check and if necessary replace, the process air filter.</p> <p>Check the settings of the machine as follows:</p> <p>First, check that the water symbol in the left part of the screen is moving, an indication of on-going dehumidification. If it is not moving, check the control mode in the lower left corner of the display. For continuous drying, this should read MAN for manual mode. If external hygrostat is connected and used, HYG mode, check the setting of the hygrostat. If RH, DEW or MIX control mode is used, check the setpoint highlighted at the center of the display and adjust as required. Verify that the water symbol starts moving.</p> <p>If the control mode and its settings was not the problem, continue by checking the capacity mode presented in the top right corner of the default view. For maximum water removal, the text should read “MAX”. ECO mode is for minimizing energy consumption per liter water removed and the ΔX modes are used for, for instance, drying of local, sealed of water damages. If required, use right arrow button to step to the capacity mode menu and change mode. Follow instructions presented for adjustment of wet air volume.</p>

		Immediately after the capacity mode name, there is a symbol, either \updownarrow , \uparrow or \downarrow . The first symbol, the \updownarrow , indicates that the wet air volume is correct, in balance. The down arrow, \downarrow , means that the wet air volume should be decreased and the up arrow means that it should be increased. If the wet air volume is incorrect, use right arrow button to proceed to the capacity mode menu and use the wet air meter as guidance while adjusting the wet air throttle.
The rotor is rotating anti-clockwise as seen through the dry air outlet or doesn't rotate at all.	Rotor motor or the motor capacitor is faulty.	Contact your retailer for repair.
No air is blowing, the fan is not running.	<p>The machine has been set in standby.</p> <p>The dehumidifier is set to a control mode other than MAN, manual, continuous fan function is off and the ambient humidity is so low that the machine is now in standby.</p> <p>The machine is operating on timer and currently in standby.</p>	<p>Push either Start to start the machine with default settings or Resume to start with the previous settings.</p> <p>Check the control mode in the lower left corner of the machine For continuous operation, it should read MAN as in manual mode. If other mode is used, check the setpoint.</p> <p>For continuous fan, use right arrow button to step to the Fan mode menu and activate Continuous fan.</p> <p>If applicable, adjust the set point of the humidistat.</p>

Technical data

CTR A2 ES

Typ LAF 50 LAF 50E LAF 50E2 LAF 100 LAF 100E LAF 150 LAF 150E

Dry air volume (m ³ /hr)	220
Drying capacity at 20°C, 60% RH MAX-mode (liters/day)	17
Ø Dry air outlets (mm)	1 x 100, 2 x 50
Ø Wet air outlet (mm)	80
Noise level, normal operation dBA (3m)	approx. 52 *
Voltage	230 VAC / 50 Hz
Rated power (W)	1200
Power, ECO-mode (W)	approx. 825
Height x width x length (mm)	430 x 295 x 415
Weight, kg	16

*Noise level varies with installation.

CTR A4 ES

Typ LAF 50 LAF 50E LAF 50E2 LAF 100 LAF 100E LAF 150 LAF 150E

Dry air volume (m ³ /hr)	350
Drying capacity at 20°C, 60% RH MAX-mode (liters/day)	27
Ø Dry air outlets (mm)	2 x 100, 2 x 50
Ø Wet air outlet (mm)	80
Noise level, normal operation dBA (3m)	approx. 54 *
Voltage	230 VAC / 50 Hz
Rated power (W)	1500
Power, ECO-mode (W)	approx. 850
Height x width x length (mm)	430 x 295 x 475
Weight, kg	18

*Noise level varies with installation.

CTR A4 ESX

Typ LAF 50 LAF 50E LAF 50E2 LAF 100 LAF 100E LAF 150 LAF 150E

Dry air volume (m ³ /hr)	350
Drying capacity at 20°C, 60% RH MAX-mode (liters/day)	27
Ø Dry air outlets (mm)	2 x 100, 2 x 50
Ø Wet air outlet (mm)	80
Noise level, normal operation dBA (3m)	approx. 54 *
Voltage	230 VAC / 50 Hz
Rated power [including extra heater] (W)	1500 [2500]
Power, ECO-mode (W)	approx. 850
Height x width x length (mm)	430 x 295 x 475
Weight, kg	18

*Noise level varies with installation.

CEMP ENERGY METERING DATA

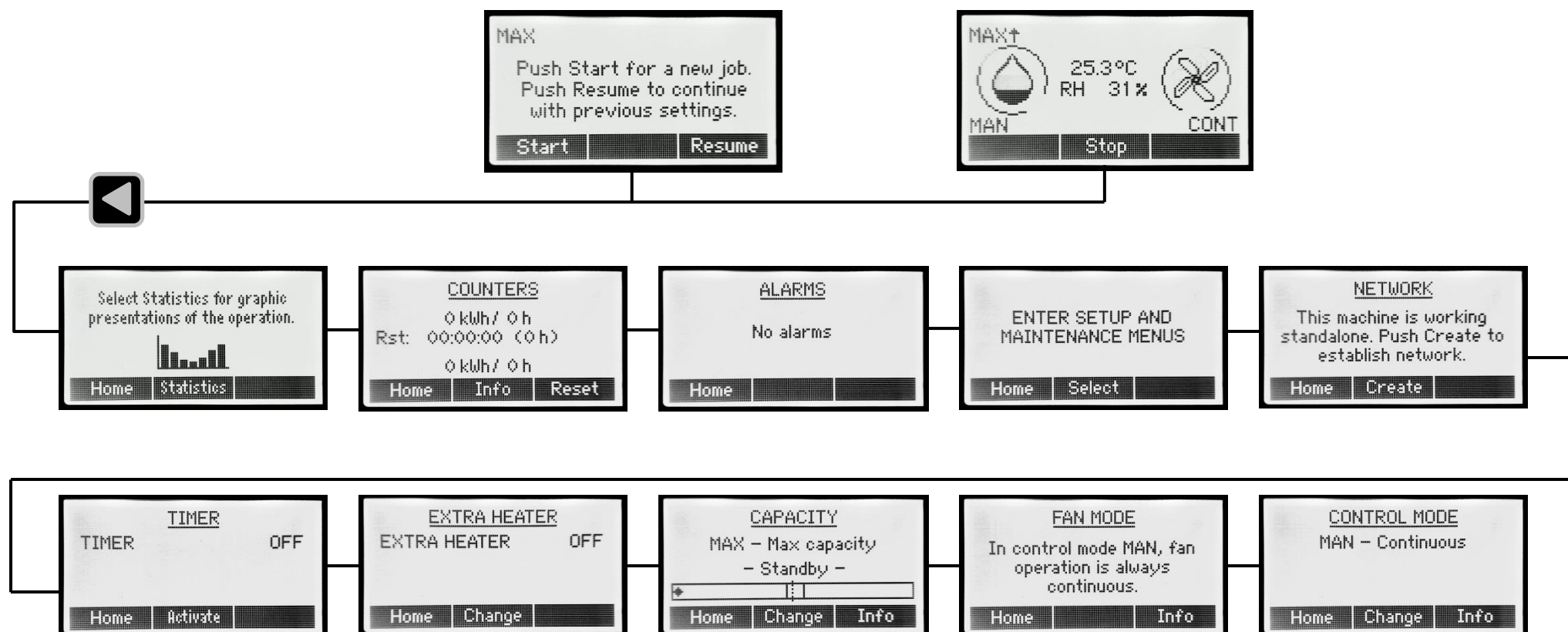
NOTE: The below data, temperatures and current levels etc., relate to the built-in energy metering function, the CEMP, alone and not to the complete machine.

The CEMP declaration of conformity is available at www.corroventa.com/mid-certificate/.

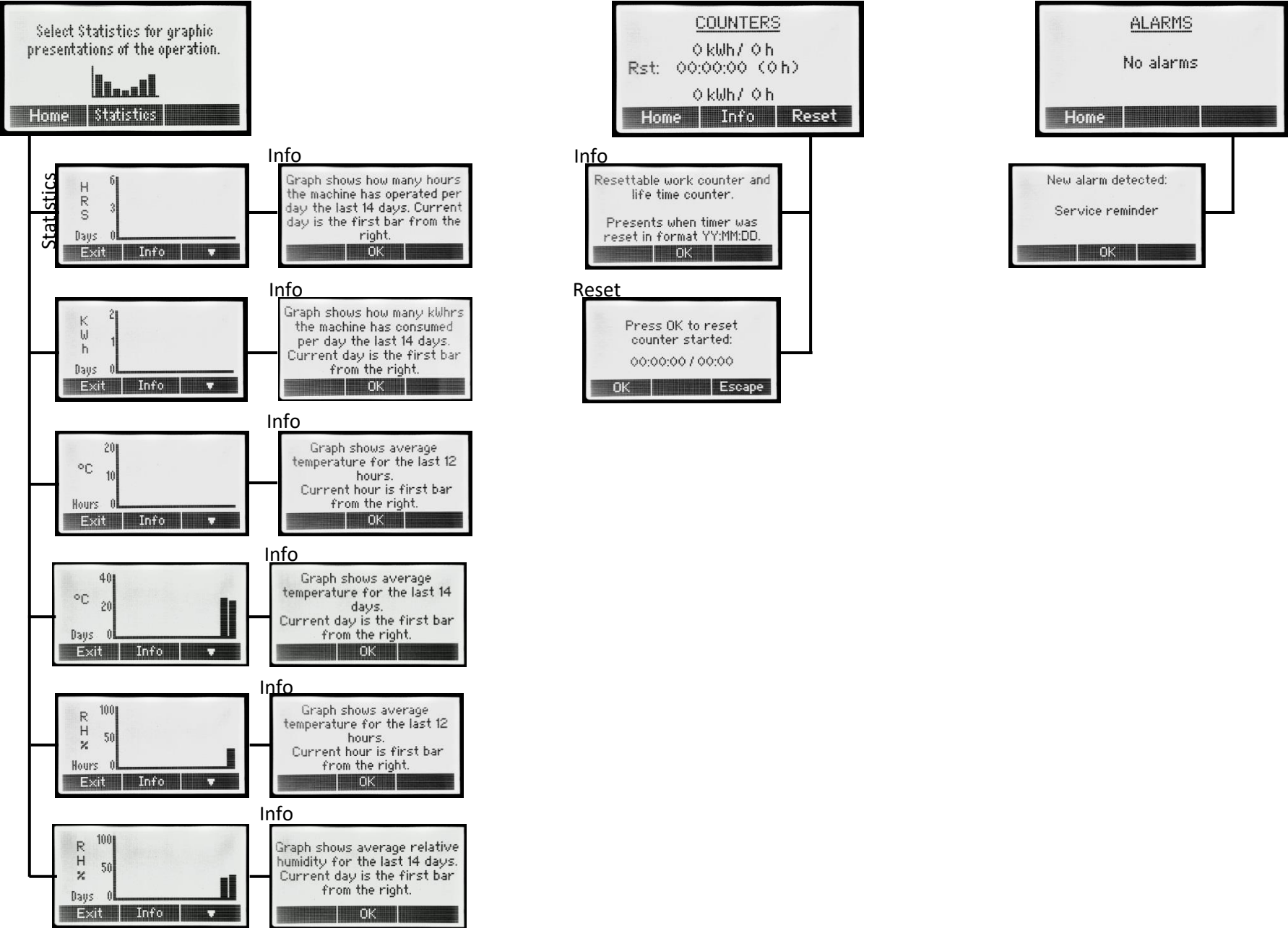
Accuracy class	Class B
Rated Operating conditions	
Voltage	230VAC
Frequency	50Hz
Power factor	0.5ind. to 0.8cap.
Current	
I st	0.02A
I min	0.25A
I tr	0.5A
I ref	5A
I max	45A
Operating temperature	-25°C to + 55°C
Climate	Non-condensing
Environment/position	Closed location
Electromagnetic environment class	E2
Mechanical environment class	M2
Max capacity of energy register	9 999 999,9 kWh
Notified body	0402

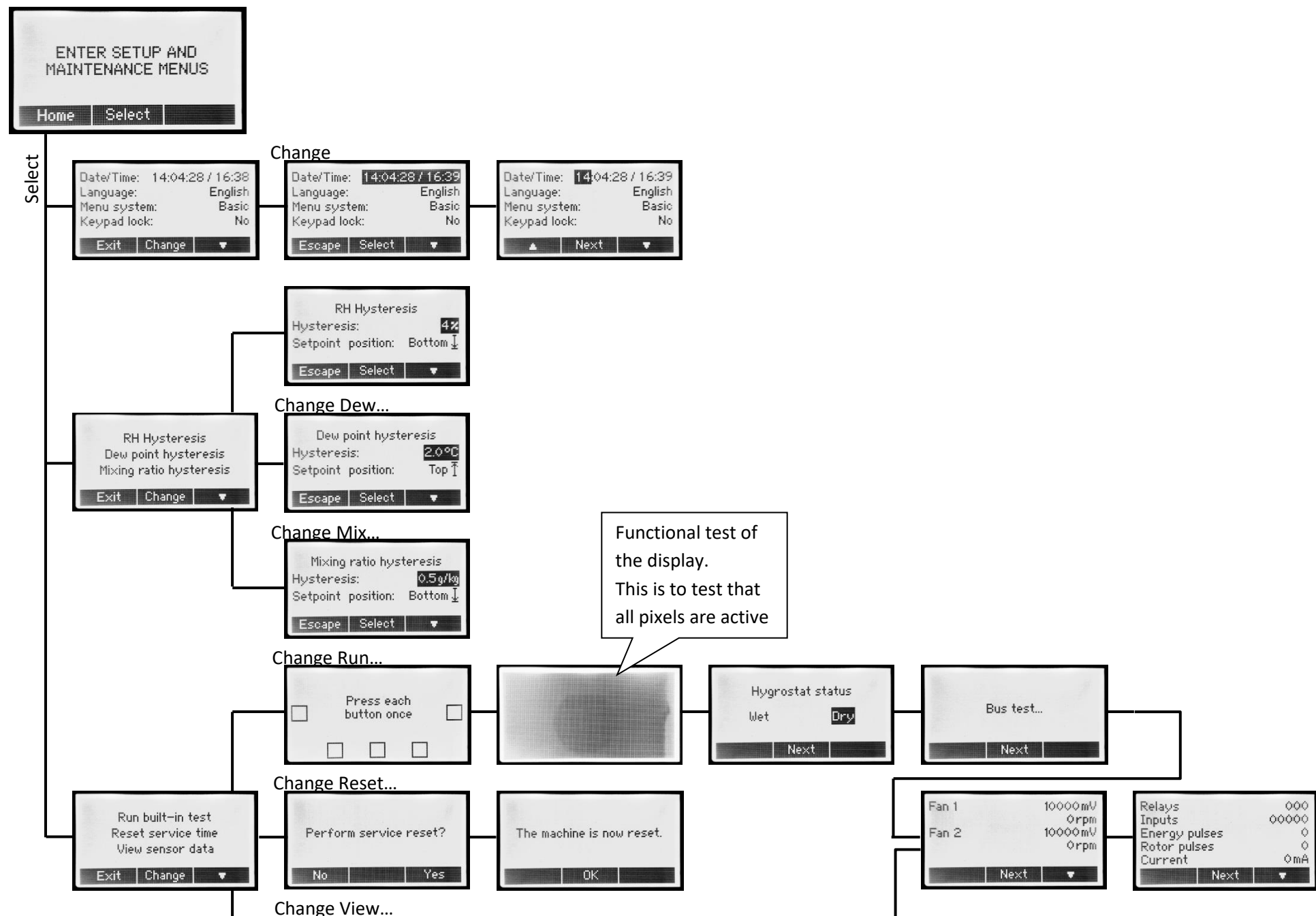
Interface Map for CTR A2ES, CTR A4 ES and CTR A ES

Top Menu



Sublevels





NETWORK

This machine is working standalone. Push Create to establish network.

Home Create

Create

Creating network...

Escape

NETWORK

No slaves

Home Close

Do you wish to close network? All devices will continue working alone.

Yes No

TIMER

TIMER OFF

Home Activate

Activate

VERIFY SYSTEM TIME

15:04:28 / 16:51

Escape Edit OK

Edit

TIMER

Active time: 06:00-22:00
Outside int: Off

Escape Edit OK

Edit

SET TIMER

Active time: 06:00-22:00
Outside int: Off

▲ Next ▼

SET TIMER

Active time: 06:00-22:00
Outside int: Quiet mode

▲ Save ▼

EXTRA HEATER

EXTRA HEATER OFF

Home Change

Change

EXTRA HEATER

EXTRA HEATER ON

Escape OK ▼

CAPACITY
 MAX – Max capacity
 – Standby –

◀ | | ▶

Home Change Info

Info

Following capacity modes are available:

OK ▼

MAX:
Remove max amount of water.

▲ OK ▼

ECO:
Minimize the energy consumption per liter water.

▲ OK ▼

ΔX:
Lower volume of even drier air.

▲ OK ▼

PRS:
Pressure drying - only for use in network. Machine automatically regulates air flow to fit with Turbine Master.

▲ OK ▼

Change

CAPACITY
 MAX – Max capacity
 To test airflow, wait until the fan starts or changes speed.

Escape OK ▼

CAPACITY
 ECO – Energy save
 Testing airflow
 Allow fan to stabilize

Escape OK ▼

CAPACITY
 ΔX1 – Max delta X
 Testing airflow
 Allow fan to stabilize

Escape OK ▼

CAPACITY
 ΔX2 – Max delta X
 Testing airflow
 Allow fan to stabilize

Escape OK ▼

OK

To optimize air flow for selected mode, push Continue and the machine will start.

Escape Continue

Before continuing, verify that the installation is complete and the throttles on the outlets in use are completely open.

Escape Continue

Adjust the dry air throttle(s) slowly to center the indicator on dashed line.

◀ | | ▶

Escape Info OK

Info

Adjust slowly and allow the air flow to stabilize.

OK ▼

If the line is not reachable and wet air throttle is fully open, the wet air hose is squeezed or too long. Adjust and try again.

▲ OK ▼

FAN MODE
 In control mode MAN, fan operation is always continuous.

Home Info

Info

Fan operation continuous or only while drying. If possible, leave this function active for best drying effect.

OK

CONTROL MODE
MAN - Continuous

Home | Change | Info

Info

MAN:
Continuous drying.

▲ | OK | ▼

RH:
Drying to setpoint RH%.

▲ | OK | ▼

DEW:
Drying to set dew point.

▲ | OK | ▼

MIX:
Drying to set mixing ratio
(g/kg).

▲ | OK | ▼

HYG:
Control by external
hygrostat connected
through adapter cable.

▲ | OK | ▼

E.-modes:
Control modes that allow use of
external RHT sensor connected to
the machine.

▲ | OK | ▼

⬇ ⬆ ⬇ indicate position of setpoint
in operation span; bottom, top or
center.
Configurable under Setup and
Maintenance.

▲ | OK | ▼

Change

CONTROL MODE
MAN - Continuous

Escape | OK | ▼

CONTROL MODE
RH - Humidity
Setpoint: 50% ⬆ 4%

Escape | OK | ▼

CONTROL MODE
DEW - Dew point
Setpoint: 9.3°C ⬆ 2.0°C

Escape | OK | ▼

CONTROL MODE
MIX - Mixing ratio
Setpoint: 7.3g/kg ⬇ 0.5g/kg

Escape | OK | ▼

CONTROL MODE
HYG - Hygrostat

Escape | OK | ▼

CONTROL MODE
E.RH - External humidity
Setpoint: 50% ⬆ 4%
Ext.sensor: All

Escape | OK | ▼

CONTROL MODE
E.DEW - External dew point
Setpoint: 9.3°C ⬆ 2.0°C
Ext.sensor: All

Escape | OK | ▼

CONTROL MODE
E.MIX - Ext. mixing ratio
Setpoint: 7.3g/kg ⬇ 0.5g/kg
Ext.sensor: All

Escape | OK | ▼

OK

This mode requires a
network with external
sensor modules.
Do you wish to create
network now?

Yes | No



DO YOU HAVE QUESTIONS OR NEED HELP?

*Visit www.corroventa.com or call us to speak with an expert.
We have the knowledge and the equipment to find a solution as efficiently as possible.*

Corroventa develops, manufactures, sells and rents high quality products for dealing with water damage, moisture, odours and radon. We are one of the market leaders and specialists in innovation within the industry. Our products are compact, effective, ergonomic and energy efficient. In emergency situations and during flooding, Corroventa's customers have access to one of the largest rental parks in Europe. All our products are manufactured in Bankeryd, Sweden.

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