Cotes dehumidifier	**C65E/C65C**
Manual number:	140757
Revision:	E

COTES ALL ROUND C65

How to install, set up, operate and service your Cotes dehumidifier

CONTENTS

SECTION 1 / GENERAL BACKGROUND

ABOUT THIS HANDBOOK

This is the installation and service handbook for your Cotes dehumidifier.

You should read the whole handbook before installing and/or starting the dehumidifier unit for the first time. It is important that you and your colleagues are familiar with the correct operating procedures and all precautionary safety measures, in order to avoid any damage to the surroundings, materials or installations, as well as to prevent any personal injury.

This handbook is mainly intended for use by technicians who install and operate this Cotes dehumidifier unit, who carry out preventive maintenance and who replace defective parts.

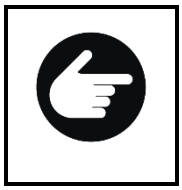
Anyone using Cotes dehumidifier units, or whose responsibilities include supervising their operation, will also benefit from reading this handbook and from consulting it as a practical help should the need arise.

Product number for this handbook

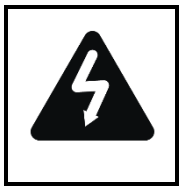
The product number of this service handbook is 140757.

This is the number you need to give us if you would like to order additional copies for your staff, colleagues or service personnel, or for technical staff from outside your company.

SYMBOLS USED IN THIS HANDBOOK



This tells you to perform a particular action



Important to note, because items in the dehumidifier can cause injury or affect people's health

You need to pay special attention to this

NOTE

It is each operator's responsibility to read and understand this manual and other information and to employ the correct operating and maintenance procedures.

ABOUT COTES

Cotes humidity management technology – cost-effective and energy-efficient

The moisture in the air all around us has surprising – and often costly – effects on the materials, structures and processes at the heart of virtually all business processes and industrial activity.

Cotes humidity management technologies enable you to control the levels of moisture in the air inside any building, installation or facility, using only a bare minimum of energy.

And effective control of the basic parameters for your operations is good business.

World leader

Cotes is one of the world's leading experts in the field of adsorption dehumidification, providing technology and expertise that enable companies to achieve better control of the humidity always present in the air.

Better management of the humidity in the air also makes it possible to improve and optimise a wide range of industrial processes, prevent damage and corrosion in many types of structures, and reduce energy consumption in all kinds of installations where air specifications are important.

Big benefits

Cotes dehumidification units provide exceptional advantages.

- Our know-how and experience make sure each customer gets the right equipment to tackle all the practical needs and operating priorities associated with the specific installation
- Our units are exceptionally reliable, and can withstand even harsh treatment unusually well
- They are very easy to maintain and service
- They only use a minimum of energy in order to achieve maximum effect.

We aim to provide our customers with the most technically effective and energy-efficient solution for the best price. This ensures the best possible return on investment, as well as peace of mind about having made the best decision.

SECTION 2 / THE DEHUMIDIFIER

ABOUT THE COTES C65 RANGE OF DEHUMIDIFIERS

The Cotes C65 range of dehumidifiers is designed and configured for a wide range of industrial uses. Prominent among these is humidity management in storage facilities and basement areas, in water works and in many kinds of process industry in which stable, well-controlled air conditions are crucial.

C65E units are specifically configured to minimize the overall energy consumption of the dehumidification process.

Dehumidifiers in the Cotes C65 range are designed for high serviceability and easy cleaning.

Design priorities

The Cotes C65 range features an eye-catching modern industrial design appearance, along with exceptional reliability.

It is designed to ensure:

- Maximum robustness and lifetime of internal components.
- Low energy consumption due to a built in Heat Exchanger module.

All the components, ancillary equipment and features are optimised for better performance, exceptional service life and ease of maintenance.

Capacities

The Cotes C65 range currently features models with air volumes of between 1100 m^3/hour and 3700 m^3/hour.

At process air inlet conditions of 20°C and 60% relative humidity (%RH), the capacities (the amount of water which can be removed from the air) of these units are between 7 kg/hour and 19 kg/hour.

Deep Drying

It is possible to adjust the dehumidifier to reach a lower dewpoint/relative humidity at the expense of process airflow. By decreasing the Process airflow, more water will be removed from the remaining airflow, and will thus reach a lower a lower relative humidity/dewpoint.

To adjust your dehumidifier to Deep Dry, follow the instructions in section g) on page 43.

Configuration priorities

The Cotes C65 range is available with three different control configurations – Configuration-A, Configuration-B, and Configuration-C.

Control Configuration-A is stripped down to a minimum of features and is therefore not equipped with a PLC screen interface.

Configuration-A/BASIC PLR

The Configuration-A configuration provides:

- High dehumidification capacity
- High energy efficiency
- Stainless steel cabinet
- Easy installation
- Low-noise running
- Low maintenance costs, reducing the overall operating cost
- Easy cleaning
- Hour counter, to keep track of how long the unit has been in operation
- Attachment of external humidity sensor (external humidify control and sensors are not included as standard, but are available for purchase from Cotes)
- Over-heating alarm
- Remote start/stop option
- External fault signal and operation signal
- Manually adjustable process and regeneration air fans, making installation easier

Configuration-B

In addition to the Configuration-A features, the Configuration-B provides:

- Attachment of one external humidity sensor
- 5.7-inch touch display
- Service indication, to keep track of any need for maintenance
- Hour counter, to keep track of how long the unit and components has been in operation
- Mechanical service alarm for rotor and filters
- Control of regeneration air fan from the PLC menu, making installation easier
- Capacity control / modulating heat control
- Measuring and controlling dew point temperature
- Data logging for keeping track of conditions in the space where the unit is installed
- Timer program
- Network connectivity (optional)
- Monitoring and control via smartphone app (optional)
- Monitoring and control by Cotes service centre (optional)

Configuration-C

In addition to the Configuration-B features, the Configuration-C provides:

- Automatic adjustment of process and regeneration air fans based on the selected program
- Monitoring and control of air flows [m^3/hour]
- Energy-saving program, for situations where energy consumption is the prime consideration
- Low-noise program, for situations where silence is the prime consideration
- CUSTOM program, for situation where dehumidifier parameters needs to be controlled

Process sensor kit

The Process sensor kit is an optional upgrade to Configuration-C and provides:

- Accurate control of humidity level, whether % relative humidity or specific humidity [g/kg]
- Continuous measurement of capacity
- Detailed energy-saving program, for situations where energy consumption is the prime consideration

Configuration combinations with optional modules

The table below show the possible combinations of optional modules with C65, depending on configuration.
The Steam Heating module is built into the C65 dehumidifier and thus cannot be retrofitted or changed after purchase.

The EW module adds a Hot Water heating coil to pre-heat the regeneration air before the electrical heating elements. It is an external add-on module installed on the right side of the C65 dehumidifier and can be purchased together with the C65 or be retrofitted to an existing C65 installation.

The Pre- and Post-module is an external add-on module installed on the left side of the C65 dehumidifier and can be purchased together with the C65 dehumidifier or can be retrofitted to an existing C65 installation.

In case you would like to add an external module to you C65 dehumidifier, please contact your local COTES dealer, or contact COTES directly, for more information.

Compatibility Table:		Standard			Optional Modules:				
Type		Electrical			STEAM	EW	PRE Cool	POST Cool	POST Heat
		BASIC	PLC B	PLC C	PLC C	PLC C	PLC B/C	PLC B/C	PLC B/C
400V 3PH+N+PE	C65E – 8	X	X	X	X	X	X	X	X
400V 3PH+N+PE	C65E – 11	X	X	X	X	X	X	X	X
400V 3PH+N+PE	C65E – 15	X	X	X	X	X	X	X	X
400V 3PH+N+PE	C65E – 19	X	X	X	X	X	X	X	X
400V 3PH+N+PE	C65C – 1	X							
400V 3PH+N+PE	C65C – 3	X							
230V 3PH+PE	C65E – 8		X				X	X	X
230V 3PH+PE	C65E – 11		X				X	X	X
230V 3PH+PE	C65E – 15		X				X	X	X
230V 3PH+PE	C65E – 19		X				X	X	X

OPERATING CONDITIONS

Intended use of the dehumidifier

The dehumidifier is designed for dehumidifying/conditioning atmospheric air only – filtered with at least a G4 filter. Unless specifically stated in the manual or in a separate agreement with Cotes or a Cotes dealer, this dehumidifier must not be used for the following purposes:

- Conditioning of gases other than atmospheric air at ambient pressure
- Conditioning of air contaminated with any chemical or other aggressive/corrosive elements including salt (sodium chloride)
- Conditioning of explosive or flammable air – including using the dehumidifier in ATEX-classified zones.

The unit is intended to be installed in industrial environments and conforms with the EMC emission limits for environments of this kind. Please take appropriate remedial measures to ensure compliance with the requirements that apply in your specific residential, commercial or light industry environment.

Operating conditions – standard models (E)

For the process and regeneration air inlet, the following operating conditions must be respected:

Relative humidity	0–100%
Temperature	0–40°C
Pressure	Ambient ± 100 Pa

It is only possible to deviate from these ranges if such deviations were specifically mentioned when the order was placed, and special considerations have been incorporated into the unit in order to deal with this.

Depending on configuration the actual sensor range may be limited to 5-100 %.

NOTE
Operating conditions for the air inlet flows must be respected.

Special considerations – Heat Exchanger

Regeneration inlet air temperature: > 0°C.

If a heat exchanger is installed in the dehumidifier, the inlet air temperature must be kept above 0°C. If the inlet air is colder than 0°C you risk freezing water droplets in the heat exchanger, thereby over time blocking the air from passing through it. In worst case, the dehumidifier risk overheating when the regeneration airflow decreases.

If it is not possible to maintain a regeneration inlet temperature above 0°C, the heat exchanger should be removed. See the section on how to remove it on page 66.

Storage conditions

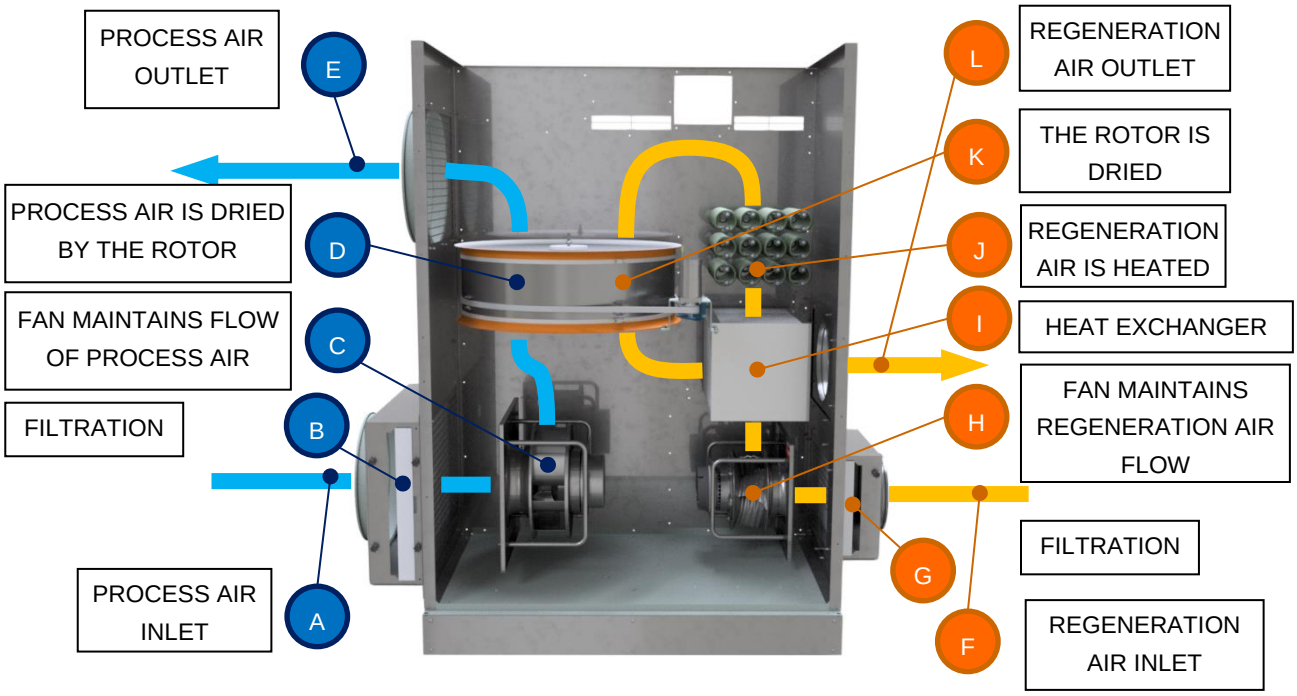
For storing the dehumidifier, the following conditions must be respected:

Relative humidity	0–90%
Temperature	-20°C to 50°C

It is only possible to deviate from these ranges if such deviations were specifically mentioned when the order was placed, and special considerations have been incorporated into the unit in order to deal with this.

NOTE
Storage conditions for the dehumidifier must be respected.

HOW IT WORKS



Two flows of air

The effect of Cotes adsorption dehumidifiers basically stems from the action of two flows of air.

The drying process (A to E)

The incoming moisture-laden flow of air (process air) (A) enters on the left side of the cabinet and gets filtered by a process air filter (B). The process air is controlled by the process fan (C) which builds up a pressure difference and forces the air through the dehumidifier. The air passes through a slowly turning rotor (D) whose inner surfaces are coated with desiccant silica crystals that attract the water molecules passing through.

When the moist air passes through the rotor, water molecules are adsorbed and lodge in the pores on the surface of the silica gel. This means the air (E) leaves the rotor containing less moisture (humidity) than when it entered. And because the adsorption process releases energy to the air, the temperature increases during the process.

The regeneration process (F to L)

The second air flow (the regeneration air) (F) is filtered by a regeneration air filter (G). The regeneration air is controlled by the regeneration fan (H) that builds up a pressure to force the air through the unit. A heat exchanger (I) pre-heats the regeneration air by recovering energy from the outgoing air. The air is then heated by heating elements (J) to reduce its relative humidity. On its way through the rotor (K), the energy from the hot air evaporates the moisture previously adsorbed by the silica crystals in the rotor. The resulting water vapour now leaves the dehumidifier in the outgoing regeneration air (L).

Fans

All units in the C65 range of adsorption dehumidifiers are fitted with two fans as standard.

Configuration-A and Configuration-B: With these configurations, the speed of the regeneration and process air fans are controlled manually only.

Configuration-C: With this configuration, the flow of process air and regeneration air can be controlled manually or automatically (standard). See “Extended PLC manual” for details.

Cotes adsorption dehumidifiers are always configured with a certain amount of “external pressure” to make sure that ducting does not cause a reduction in the amount of air.

Filters

All models of Cotes adsorption dehumidifiers are fitted with filters to remove undesirable particles or other pollutants from the incoming process and regeneration air.

Filters of the G4 class are fitted to Cotes C65 units as standard.

Heating units

Cotes C65 dehumidifiers are fitted with electrical heating elements as standard, to control the temperature of the regeneration air entering the unit.

Alternatively, the C65 dehumidifier can be fitted with steam heating units (installed internally in the cabinet) or combine the electrical heating elements with hot water heating by installing an external EW module. In such cases, certain characteristics of the dehumidifier will change.
If your Cotes dehumidifier is fitted with these heating units, see the respective steam appendix or EW manual to find out which points differ from standard.

For details about Cotes dehumidifiers fitted with alternative heating units, please contact your Cotes dealer, or Cotes.

FEATURES AND BENEFITS

Highlighted features	How customers benefit
Appearance/cabinet	
Eye-catching industrial design appearance.	Visually attractive units that can be mounted in highly visible positions.
Robust structure.	Longer service life. Better return on investment.
Equipment configurations inside the cabinet	
All fans are mounted inside the cabinet.	Can be mounted in a wider range of positions and structures, even where there is public access, etc.
Key components are standardised units easily available throughout the world.	Less downtime. Savings on maintenance and service work.
Utilizing the most effective rotor currently available anywhere in the world.	Most humidity removed from the flow of air at lowest cost.
Highly durable rotor bushings.	Savings on maintenance and service work. Greater operating efficiency.
Air flow	
Available with adjustable fans.	Savings on energy costs. Less noise

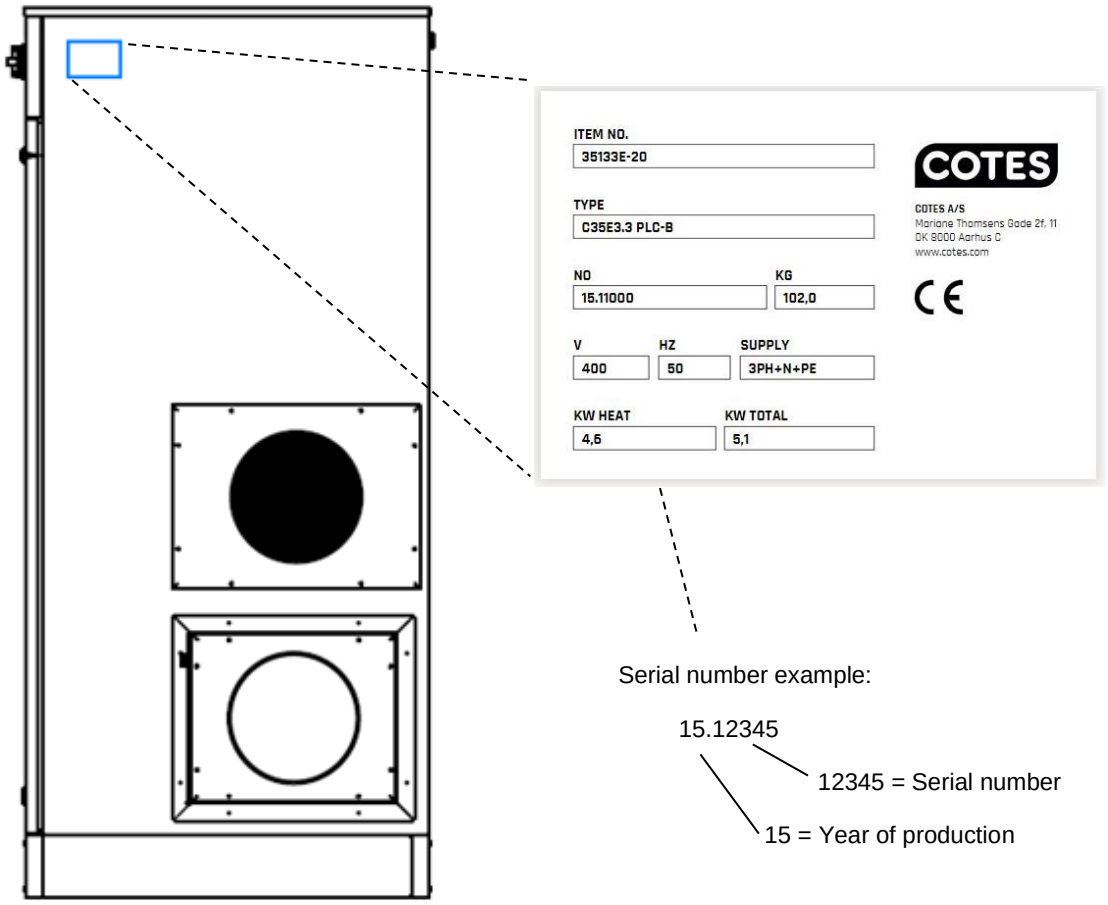
Access	
Large doors that provide rapid, easy access.	Savings on maintenance and service work. Less downtime means greater operating efficiency.
Filters that are easy to get out, and quick to change.	Savings on maintenance and service work. Greater operating efficiency.
Connectivity	
Compatible with common electrical voltages and frequencies • 400V 3PH+N+PE 50Hz • 230V 3PH+PE 50Hz	Savings on installation costs. More rapid commissioning.
Designed for compatibility with modern PLC and web-based control and warning systems.	Easy to control and monitor from virtually anywhere.
Modular design prepared for installation of control systems, heaters, cooling systems, hygrometers, sensors, etc.	Rational, cost-effective dehumidification installations. Maximum reliability.
Energy sources	
Thermal recovery module included in the dehumidifier.	Savings on energy costs Improved environmental footprint.

SECTION 3 / TECHNICAL DETAILS

SERIAL NUMBER/IDENTIFICATION

This is the installation and service handbook for your Cotes dehumidifier.

The serial number/identification code for your specific model is located on the right side of the dehumidifier (see drawing below).



Serial number example:

15.12345

12345 = Serial number

15 = Year of production

SPECIFICATIONS

Please note that specifications and controls given in this handbook are in some situations approximate.

Table 1 Technical data C65E

Type	C65E			
Model	8	11	15	19
Dry air, nominal** [m^3/hour]	1900	2600	3700	3700
Regen. air, nominal* [m^3/hour]	340	460	670	940
External pressure, dry air [Pa] (at nominal air flow)	400	400	400	400
External pressure, regen. air [Pa] (at nominal air flow)	400	400	400	400
Capacity at 20ºC, 60% relative humidity [kg/hour]	7,8	11,1	15,4	19,1
Electric heater, max. [kW]	10,2	14,4	20,4	28,8
Maximum Fuse [A] (3x230V)	63 (100)	63 (100)	63 (100)	63 (100)
Minimum Fuse [A] (3x230V)	17 (29)	26 (45)	35 (60)	49 (85)
Max nominal power consumption [kW]	11,4	17,8	23,8	33,8
Voltage [V]	3x400 / (3x230)			
Frequency[Hz]	50			
Ground	3PH+N+PE / (3PH+PE)			
Preliminary Sound level with ducts [dB(A)] ***	<66	<73	<73	<75

* Adjustable in Configuration-A and -B, and fully controlled in Configuration-C.

** Fully controlled in Configuration-C.

*** The dB values for noise levels are guidelines only and not exact values, because it depends on the specifics of each installation. If exact values are needed, professional noise measurements must be carried out at the actual site and installation.

NOTE

Due to the noise levels during normal operation, any personnel continuously exposed to this noise must wear hearing protection.

Table 2 Measurements

Type		C65**E**				C65**C**	
	Model	8	11	15	19	1	3
W x D x H cabinet	mm	1200 x 783 x 1718					
W x D x H total	mm	1635 x 816 x 1718					
Weight	kg	295	320	325	330	295	315
Regeneration air outlet	mm	Ø250					
Regeneration air inlet	mm	Ø250					
Process air inlet	mm	Ø400					
Process air outlet	Mm	Ø400					
Power cable size *	mm	Cable gland: M40 – Cable size / sealing range: 19-28 M25 – Cable size / sealing range: 11-17					

* Power cables are not part of the Cotes delivery.
If the selected cable is smaller than the sealing range, install a suitable cable gland.

	Type	C65C	
	Model	1	3
Dry air, nominal**	m^3/hour	1900	3700
Regeneration air, nominal*	m^3/hour	340	340
External pressure, dry air (at nominal air flow)	Pa	400	400
External pressure, regeneration air (at nominal air flow)	Pa	400	400
Capacity at -25ºC / -18ºC, 95% relative humidity	kg/hour	0.8 / 1.5	1.6 / 3.0
Electric heater, max.	kW	5.1	7.2
External duct heater, max.	kW	1.0	1.0
Fuse	A	20	20
Maximum connected load	kW	8	11
Voltage	V	400	400
Frequency	Hz	50	50
Ground		3PH+N+PE	3PH+N+PE
Sound level with duct (ISO11201) [dB(A)]	dB(A)	<73	<73

ASSEMBLIES AND COMPONENTS

Customised to meet your needs

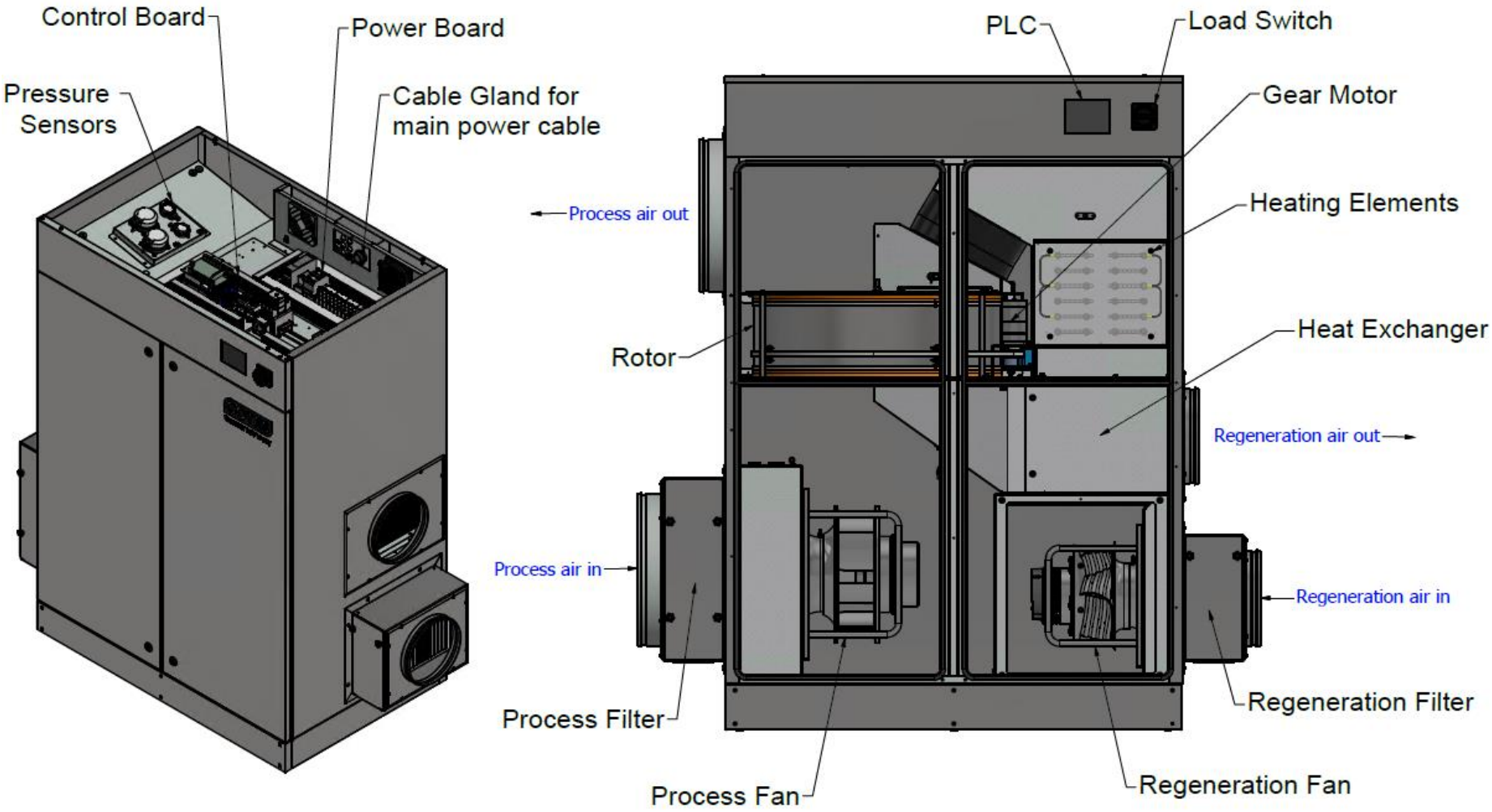
Cotes dehumidifier units are based on a modular design that enables our customers to select from a broad range of carefully selected components and assemblies, to meet specific installation and operating requirements.

If purchased through Cotes or an official Cotes dealer, the Cotes C65 dehumidifier can be configured to meet the specific requirements of your installation.

Dimensions and duct connections

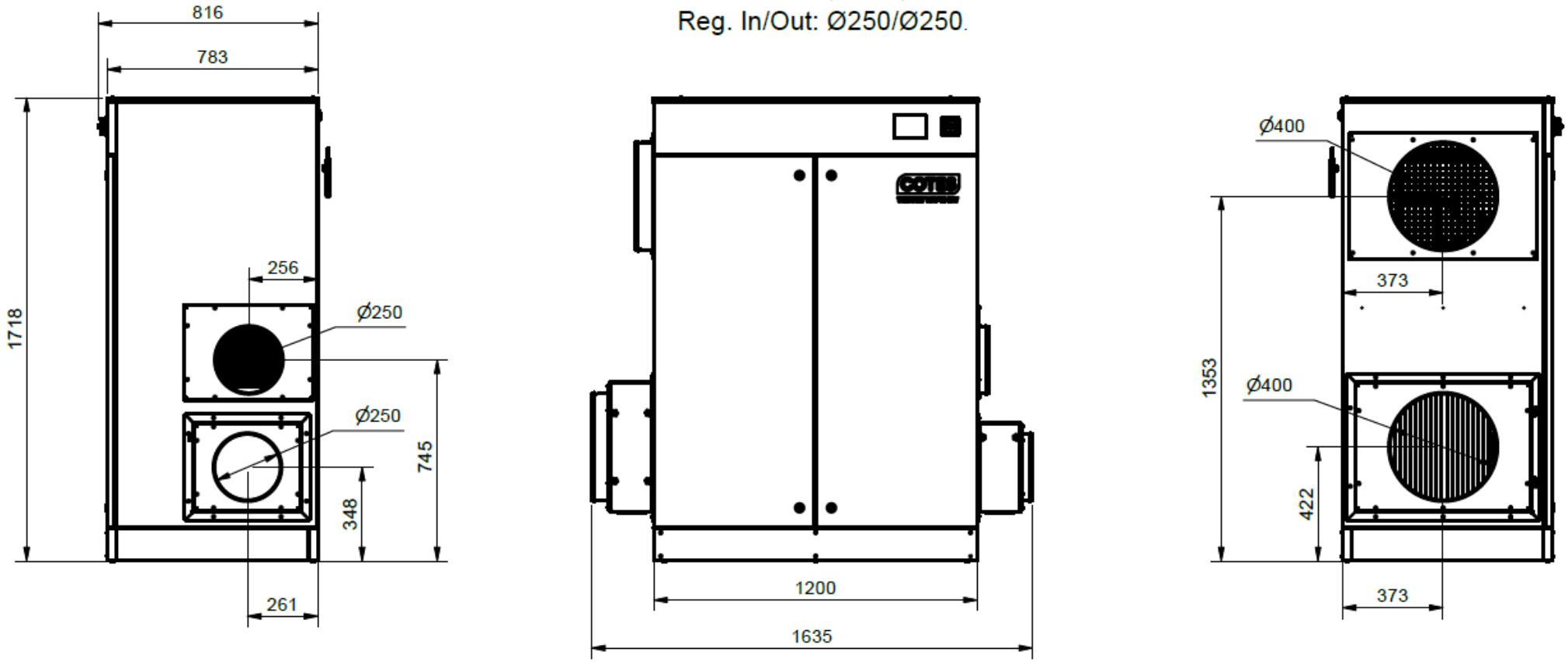
The C65 dehumidifier is factory fitted with round duct connection plates for all Process/Regeneration inlet/outlets. Please see the following illustrations for details and dimensions.

COMPONENT OVERVIEW



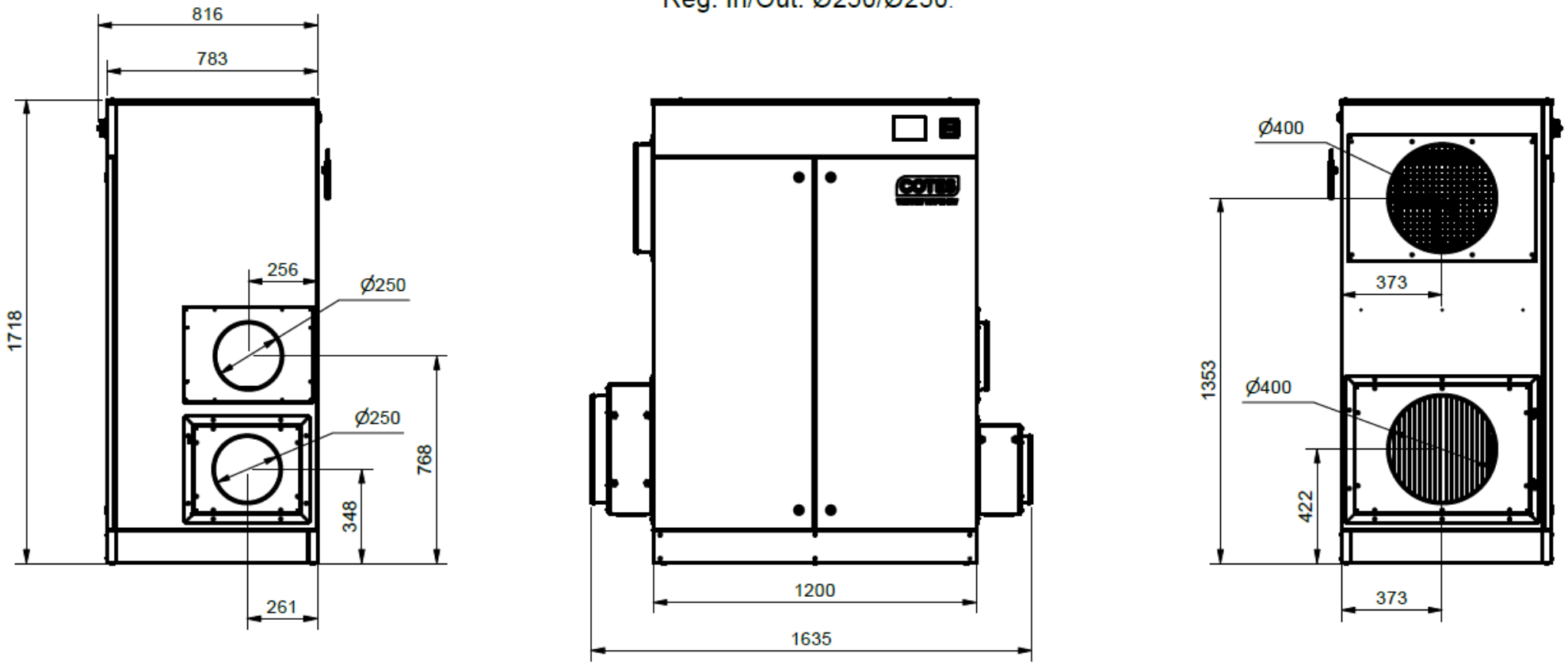
DIMENSIONS, C65 STANDARD

Proc. In/Out: Ø400/Ø400.
Reg. In/Out: Ø250/Ø250.

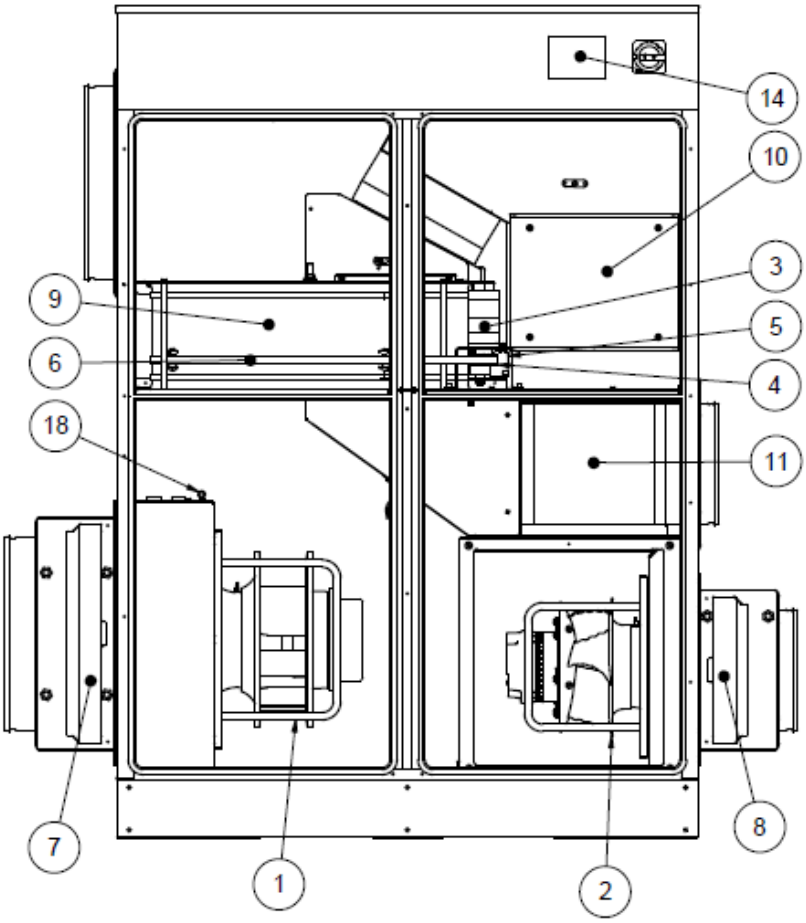


DIMENSIONS, C65 NO HEAT EXCHANGER

Proc. In/Out: Ø400/Ø400.
Reg. In/Out: Ø250/Ø250.



SPARE PARTS



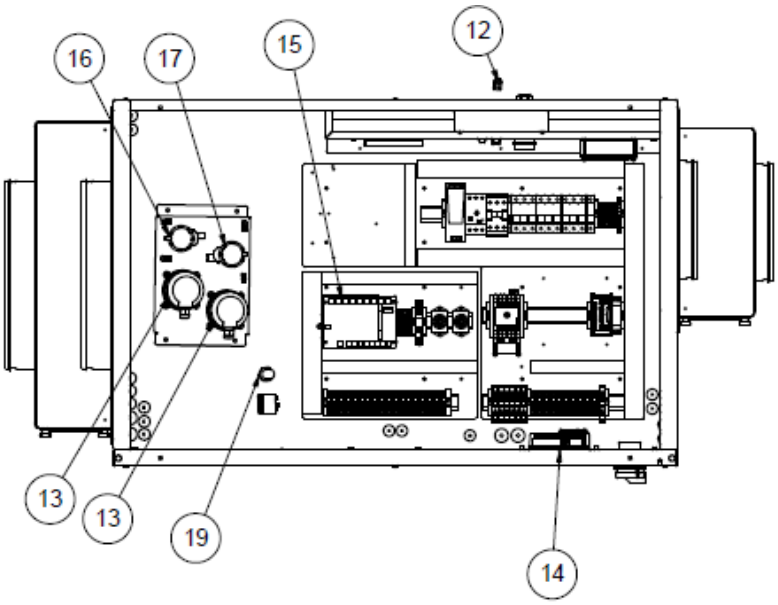


Table 3: Spare parts list C65E/C65C

Type		C65**E**				C65**C**	
Pos	Part	8	11	15	19	1	3
1	Process air fan	777504	777503 (777505:230V)				777503
2	Regeneration air fan	777506	777504		777503 (777505:230V)	777506	
3	Gear motor	777512 (777513:230V)					
4a	Pulley	646204					
4b	Taper Bush	722814					
5	Belt tensioner	127102/127103					
6	Drive belt	777507					
7	Process filter	G4: 777501 (note: 4x filters)					
8	Regeneration air filter	G4: 777502 (note: 4x filters)					

9	Rotor	777508	777509			777508	777509
10	Heating elements, 400V	777514	777516	777515	777517	777522	777523
10	Heating elements, 230V	77518	777520	777519	777521	n/a	
11	Heat Exchanger	777526				n/a	
Configuration B							
12	Humidity sensor	140639				n/a	
13	Pressure switch for filters	126844				n/a	
14	PLC	140621				n/a	
Configuration C							
15	I/O board (placed on the electrical board)	112086				n/a	
16	Pressure transmitter, Process airflow (pressure drop)	140666				n/a	
17	Pressure transmitter, Regeneration airflow (pressure drop)	140670				n/a	

Process Sensor Kit			
18	Process air in sensor	140625	n/a
19	Process air out sensor	140651	n/a

SOUND LEVELS

Sound dampening and silencers

Please check the maximum sound level permitted for the installation you are working with and select the sound dampening and silencers needed for the dry air outlet duct and the regeneration air outlet duct accordingly. These are not included with the C65 dehumidifier.

Measuring sound levels

The sound/noise levels for the dehumidifier are shown on page 19.

The dB values for noise levels are guidelines only and not exact values, because these depend on the specifics of each installation. If exact values are needed, professional noise measurements must be carried out at the actual site and installation.

The sound level in the specifications was measured 1 meter outside the front of the cabinet (outside the large cabinet cover), and 1.6 meters above the floor.

The dehumidifier was placed on the floor inside a large room with the air ducts for the incoming/outgoing air led out of the room/away from the sound measuring point.

SECTION 4 / INSTALLATION

HOW TO INSTALL A C65 DEHUMIDIFIER

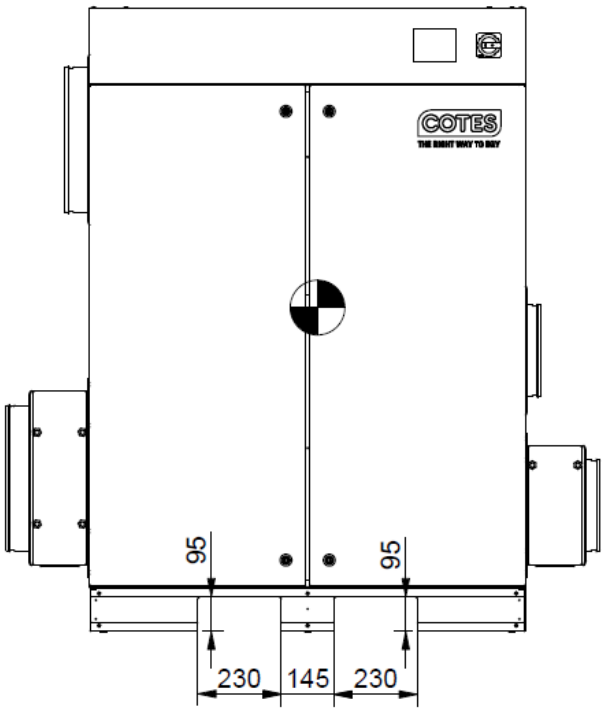
Removing the packaging

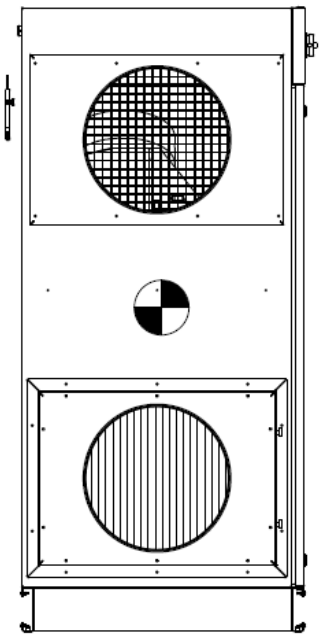
Cotes C65 dehumidifier units are delivered in a wooden box. Please dispose of this packaging responsibly and recycle it if possible.

Handling

Cotes dehumidifiers are built to be very robust, so there is no need for special handling, apart from normal sensible care and attention. Note the weight of the dehumidifier as specified on page 20.

The unit is designed to be moved by a forklift using the specified lifting slots. Remove both the front and back cover plates on the floor frame to provide access to the forklift lifting slots. Lifting must be done by a professional.





NOTE!

The forklift blades must go all the way through the slots and through the other side of the floor frame. Lifting must be done by a professional.

Where to mount this dehumidifier

Cotes adsorption dehumidifiers are designed for indoor installation.

The back of the dehumidifier can be placed against an outer wall to make it easier to install the regeneration air ducts. However, you should leave a gap of at least 300 mm to the wall to provide enough space for wires and the main power cable.

The three other sides of the unit should have at least 1 metre of unobstructed access, for easy service and maintenance.

Where <u>not</u> to mount it

Unless it has been arranged with Cotes and special considerations have been made, the unit should not be placed outdoors.

The unit should not be placed inside an office or in other locations where the sound pressure level must be kept to a minimum.

NOTE

The Dehumidifier must be placed indoors and protected from rain and water.

Things to be careful about

Electrical work should only be carried out by an authorised electrician.

NOTE

Electrical work should only be carried out by an authorised electrician.

Connections needed – electrical

First, make sure that the main switch is OFF.

NOTE

Make sure power is switched off before installing and servicing.

Now the power circuit cable can be connected to the main switch of the dehumidifier.

NOTE

The electrical board may include circuits that can retain a charge even if the mains power is disconnected. Detailed information about these electrical circuits is provided in the electrical diagram on drawing no. 270

Connections needed – ductwork

NOTE

To ensure low pressure drop and low sound pressure levels, please request assistance from a company that specialises in ductwork.

The C65 dehumidifier is factory fitted with circular duct connection plates. Please see the illustrations on page 23 for the measurements of duct connections.

Process air:

The ductwork for the process air should be selected with regard to the external pressure available, supplied by the process air fan, and the space available for ducting.

If the C65 dehumidifier is selected/purchased with the BASIC configuration, or Configuration-B, the process fan must be adjusted manually (see the "Commissioning" section of this manual), so that the process air flow can be adjusted to specifications.

In Configuration-C, the process air fan will be adjusted automatically by the PLC.

Regeneration air:

The ducts connected to the regeneration air intake should suck in air from the outdoors, And the ducting for the outgoing humid regeneration air should lead the air back outside the building.

NOTE

It is important that the ducting for the outgoing used regeneration air is positioned so that the air is not sucked back into the regeneration air inlet.
Keep a minimum distance of 2 metres between the regeneration air outlet and the inlet for both regeneration and process air.

The ductwork for the regeneration air should be selected with regard to the external pressure, supplied by the regeneration air fan, and the space available for ducting.

It is important that the ducting for the regeneration air outlet slopes downwards slightly in order to drain any water away from the dehumidifier, so that any condensate runs out. If a reduction is needed at the regeneration air outlet, the reducer must be eccentric, so that any condensation is led out throughout the ductwork.

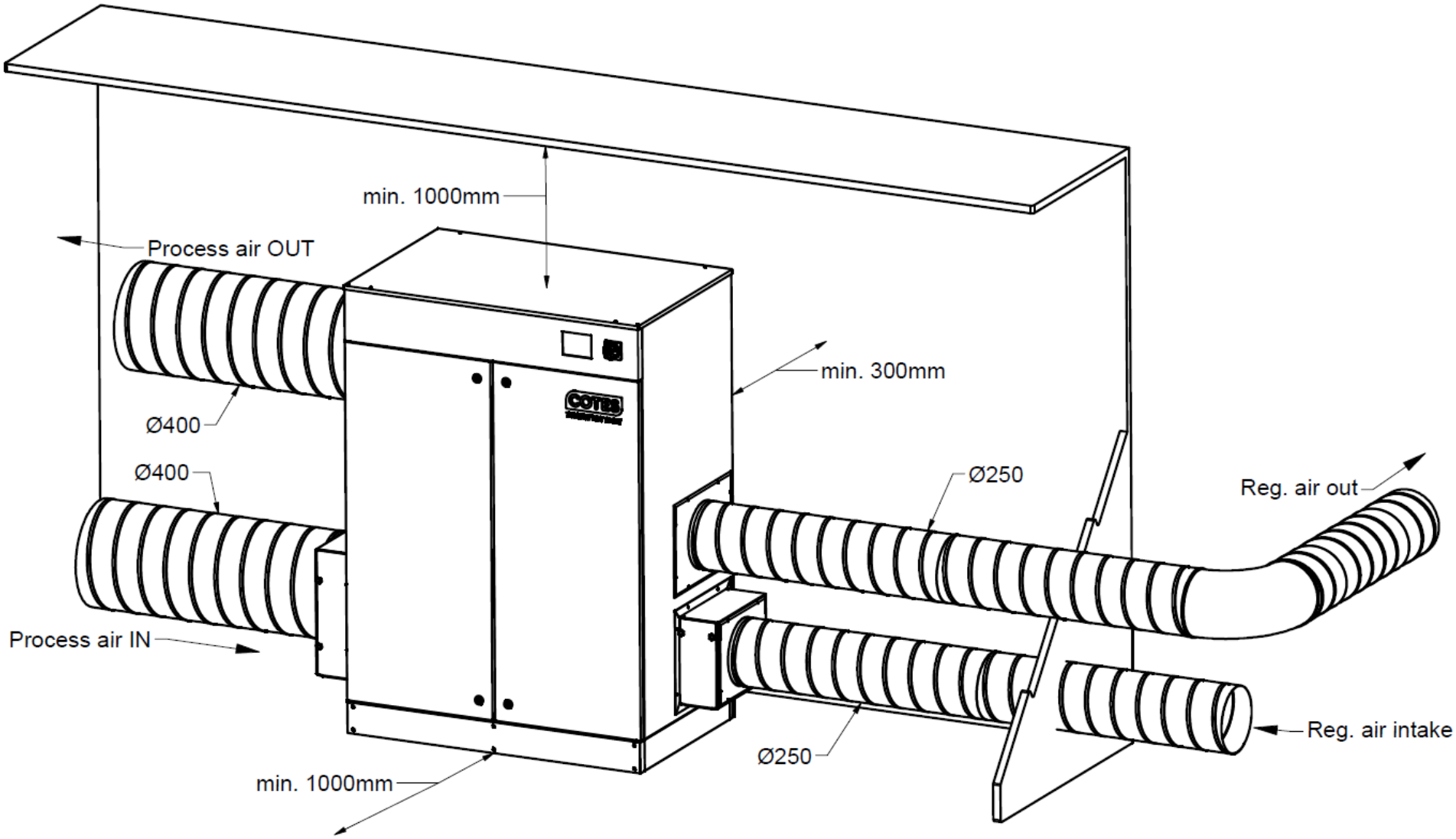
If it is not possible to get the ducting to slope slightly downwards away from the dehumidifier, drill a ø6 mm hole in the lowest part of the duct, so that any accumulated water can drain away.

NOTE

It is important that the ducting for the regeneration air outlet slopes downwards away from the dehumidifier to drain any water away from the dehumidifier.

If this is not possible, drill a ø6 mm hole in the lowest part of the duct, so that any accumulated water can drain away.

There must be at least 1000mm unrestricted access in front of the dehumidifier for easy access.



If the C65 dehumidifier is selected/purchased with the BASIC-configuration, the speed of regeneration air fan must be manually adjusted via the potentiometer, located on the Control Board in the electrical cabinet, so that the regeneration air flow is at nominal flow. See section “HOW TO COMMISION THIS DEHUMIDIFIER” for further instructions.

If the regeneration air fan speed is not adjusted, the regeneration air flow will – in most cases – be too high, making the unit less efficient. Use a standardised tool for measuring the velocity according to specifications.

In Configuration-B, the speed of regeneration air fan can be adjusted via the touch-screen interface, making the installation easier.

In Configuration-C, the flow of process and regeneration air will adjust automatically.

The regeneration air inlet and outlet must be placed with sufficient distance to each other to avoid rebreathing. If possible, Cotes recommends placing the regeneration inlet and outlet on each side of a corner – or some similar location – to reduce the risk further. If nothing is done to prevent the regeneration air from "short-circuiting", a capacity loss is possible and the risk of condensation inside the regeneration circuit will increase dramatically. Cotes recommends extending the inlet ductwork (rather than the outlet) to keep the risk of condensation in the outlet to a minimum.

NOTE

To avoid capacity losses and condensation issues, the regeneration air inlet and outlet must be placed with sufficient distance to each other.

Safety precautions

Dehumidifiers in the C65 range weigh approximately 315–365 kg and should therefore only be moved using a forklift or similar equipment. See the illustration at the start of this section, for lifting and handling instructions.

Any work in the electrical box should only be carried out by authorised electricians.

Any duct connections to and from the dehumidifier should only be carried out by authorised plumbers.

IMPORTANT NOTES FOR UNITS WITH HEAT EXCHANGERS

When the regeneration air is heated up and passed through the rotor, water is transferred from the rotor to the regeneration air thus drying the rotor.

The heat exchanger is placed such that heat is transferred from the outgoing air to the incoming, thus reducing the heating required to heat it up afterwards. As the outgoing hot and humid regeneration air passes through the heat exchanger, the outgoing air is cooled down, thereby reducing the air's capacity to contain water. The more you cool it down, the less water it can contain. When the air is cooled lower than its dewpoint temperature, it can no longer contain the water already in the air, thereby forming liquid water droplets.

Under normal conditions, the heat exchanger should not cool down the outgoing regeneration air below its dewpoint temperature, and thus no liquid water should form. However, if the conditions are right, the risk remain, and liquid water may form in/after the heat exchanger.

The dehumidifier is designed to handle the water as, at the regeneration outlet, a drain plate is installed to lead any liquid water out through the ducting and away from the dehumidifier.

NOTE

It is critically important that the ducting for the outgoing regeneration air is sloping downwards away from the machine, and that a hole is drilled in the lowest section of the ducting such that water is drained. The drilled hole should be min. Ø5mm.

If water from the heat exchanger becomes a problem, contact Cotes A/S or a Cotes dealer for information about how to adjust the settings of the dehumidifier to avoid any liquid water forming.

A crude quick fix:

A key factor leading to the risk of liquid water, is the running capacity of the dehumidifier, i.e., how much water is removed from the process air, and how much water is added to the regeneration air. If your process allows it, we can lower the risk of liquid water forming by reducing the running capacity of the dehumidifier slightly.

- Set the machine to "Custom" mode
- Enter your set points for the Process and Regeneration air.
- For heating, set the target temperature to e.g. 100degC (125 is the factory setting for the other operating modes)
- After 1-3 hours, observe if the heat exchanger is still producing liquid water.
- If water droplets are still forming, try lowering the target heating temperature further in steps of 10degC, until no liquid water is produced in the heat exchanger.

ADDITIONAL INFORMATION FOR C65C DEHUMIDIFIERS (COLD STORE MODEL)

Where to mount this dehumidifier

Cotes C65C adsorption dehumidifiers are specially designed for installation inside cold storage facilities.

Where <u>not</u> to mount it

The unit must not be installed outside the cold storage space unless this has been arranged with Cotes and special adjustments have been made to the unit.

Connections needed – electrical

First, make sure that the 1kW external heater is connected to 230V/50Hz and the external control current is connected to the electrical board, as described in the electrical diagram on page 300 for the C65C cold storage model. The external heater pre-heats the regeneration air before it enters the C65C dehumidifier.

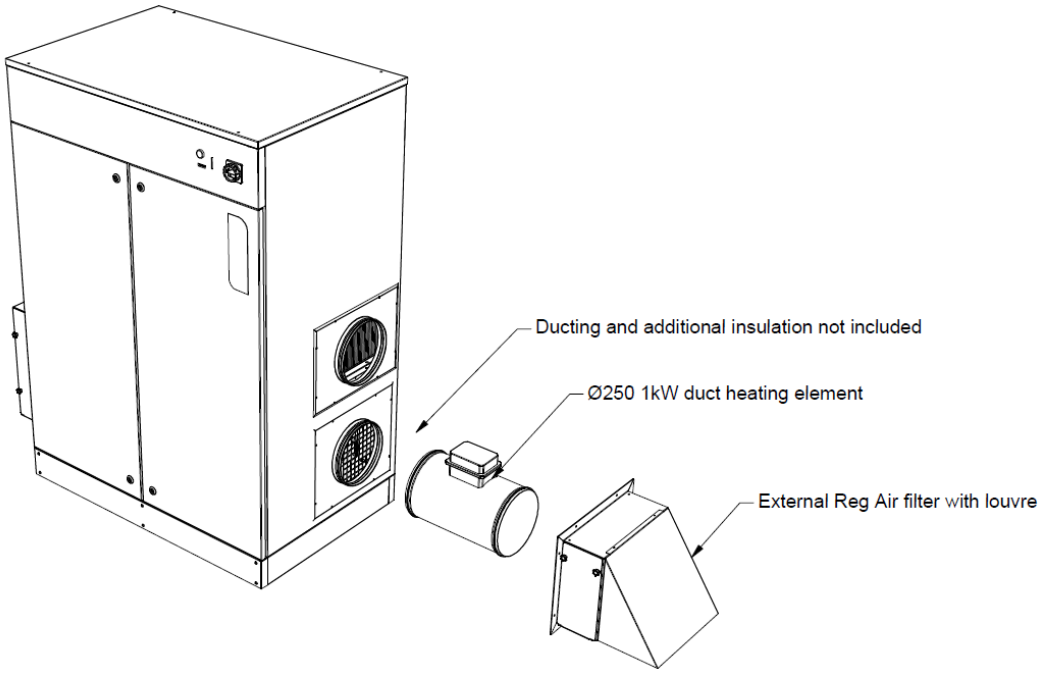
The C65C electrical cabinet has a small built-in fan heater to protect all the electrical components from the cold storage temperatures. The fan heater operates for 30 minutes before the dehumidifier starts, as a safety precaution when the main switch is on.

NOTE

The C65C dehumidifier has a built-in fan heater in order to protect the electrical components. A 30-minute timer is activated when the main switch is turned on.

Connections needed – ductwork

The regeneration air must be led to and taken from the outdoors. The ductwork must always be insulated from and to the cold storage. Such insulation is not included when purchasing a C65C dehumidifier.



NOTE

The regeneration air inlet and outlet ductwork must be insulated at all points within the cold store space. Furthermore, the external heater, filter frame and electrical box must be installed according to specifications.

A damper for adjusting the regeneration air flow must be installed on the outlet in order to adjust the regeneration air flow. If not, the regeneration air flow will – in most cases – be too high, making it impossible to reach the desired temperature for the regeneration air and thus making the unit less efficient. Use a standardized tool for measuring the velocity according to specifications.

HOW TO COMMISSION THIS DEHUMIDIFIER

NOTE

Only trained/authorised electricians are allowed to carry out any work required in the electrical box of this Cotes dehumidifier.

When the cover of the electrical box is open, the power supply must be switched off at the main switch (load switch).

Procedure

a) Check the electrical installation before starting the dehumidifier, switch on the load switch.

- Check the voltage between the terminals L1, L2, L3 (= 400V)
- Check one of the phases and Neutral (= 230V)
- Is the ground cable connected, and of the correct specifications?
- Is any hygrometer (if fitted) correctly connected?

b) To check the connected ducting system

- Do the air ducts connected to the regeneration air outlet, slope downwards away from the dehumidifier, to drain any accumulated water away?
- If the air ducts, connected to the regeneration air outlet, are not sloping downwards as to drain water away from the dehumidifier, check whether there is a 6mm-diameter hole drilled in the lowest part of the duct, so that any accumulated water can drain away.

c) Suggested fan speed / air flow settings at commissioning

The speed of process and regeneration air fans must be adjusted based on the actual measured air flows. If the air flows are not adjusted to nominal values, the dehumidifying capacity may be reduced or can cause damage to the dehumidifier i.e., if the regeneration air flow is much lower than nominal.

Before starting the commissioning, the fan speed settings must be set to the following:
(Note: The following settings should only be considered as a starting point for the commissioning of this dehumidifier.)

- Configuration-A and Configuration B:
    - Regeneration air fan speed: 80% - See section f).
    - Process air fan speed: 80% - See section f).
- Configuration-C:
    - Process air fan automatically adjusts to pre-set air flow.
    - Regeneration air fan automatically adjusts to pre-set air flow.

d) If the dehumidifier starts up as described above, then go to e)

If the dehumidifier does not start, you should check the humidity set point (Configuration-B or Configuration-C only). If set point is higher than measured by the humidity sensor, the dehumidifier will not start (unless the “Always On” program has been chosen – see section “HOW TO OPERATE WITH PLC BASED DEHUMIDIFIER” on page 48).

e) Once the dehumidifier is operating, you must adjust the air flows

The dehumidifier is configured to operate with a regeneration air temperature around 120-125 degrees Celsius and all configurations will automatically adjust to the target temperature at 125degC. However, if the airflow is too high it may not be possible to reach the optimal temperature. Under normal conditions the dehumidifier will heat up within 5-7 minutes, but it may take up to 20mins for the dehumidifier to fine tune heating output for a stable operating temperature. If after 20mins the regeneration air temperature is still below 110degC, verify the regeneration airflow as it may be too high.

Note: the above operating temperature assumes a regeneration inlet temperature of 20degC. If the inlet temperature is lower so will the expected/possible heated air temperature be, and vice versa.

Configuration-A:

- Check the air flows using a suitable instrument (pitot pipe/thermo-anemometer or similar) in the duct. Measure at several points over the cross-section of the ducts and use the average.
- Adjust the incoming regeneration air flow to the nominal values given on page 19.
    - Follow the instructions in section f) on page 42, to adjust the fan speed via the Potentiometer.
- Adjust the Process fan speed, until the Process air flow matches the nominal values given on Page 19.
    - Follow the instructions in section f) on page 42, to adjust the fan speed by adjusting the potentiometer.
    - Note: The door must be closed when measuring the process air flow.

Configuration-B:

- Check the air flow using a suitable instrument (pitot pipe/thermo-anemometer or similar) in the duct. Take measurements at several points over the cross-section of the ducts and use the average.
- Adjust the incoming regeneration air flow to the nominal values given on page 19.
    - Follow the instructions in section f) on page 42, to adjust the fan speed via the Potentiometer.
- Adjust the Process fan speed, until the Process air flow matches the nominal values given on Page 19.
    - Follow the instructions in section f) on page 42, to adjust the fan speed by adjusting the potentiometer.
    - Note: The door must be closed when measuring the process air flow.

Configuration-C:

- In the Configuration-C, the dehumidifier is self-adjusting, and adjusts according to default air flows and sensor measured conditions.

f) How to adjust the Process and Regeneration air fan using the Potentiometer:

Note that the process and regeneration fan speeds must be adjusted based on the actual measured air flows. If the air flows are not adjusted to nominal values, the dehumidifying capacity may be reduced.

The doors must be closed when measuring the air flows.

NOTE

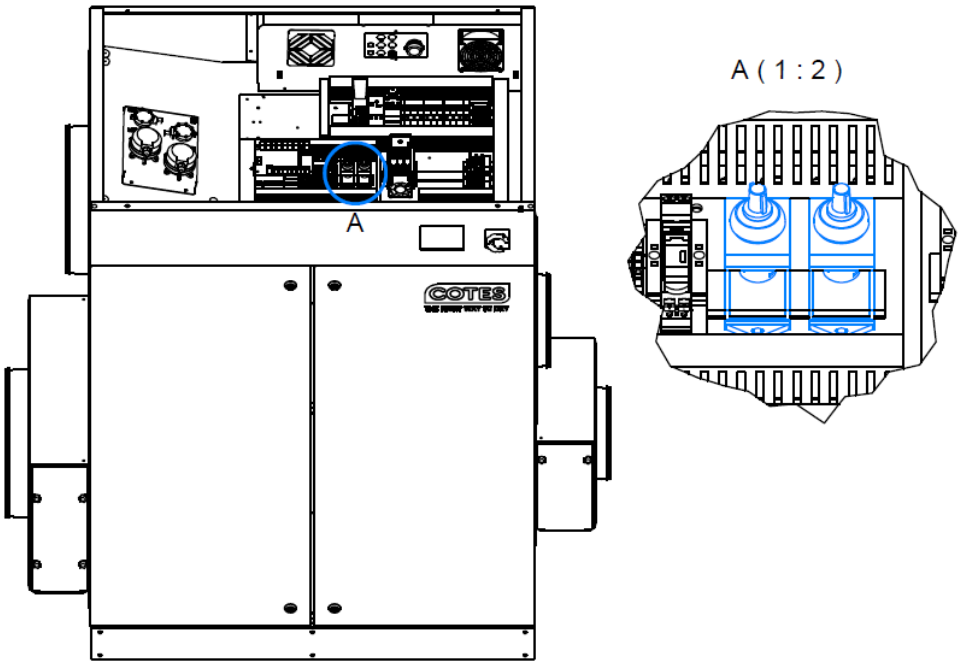
Only trained/authorised electricians are allowed to carry out any work required in the electrical box of this Cotes dehumidifier.

When the cover of the electrical box is open, the power supply must be switched OFF at the main switch (load switch).

Fan setting:	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**100%**
Potentiometer setting:	4	5	6	7	8	9	10

Follow the steps below to adjust the Process and Regeneration fans:

- Remove the Top Cover of the machine, to access the electrical boards.
- Adjust the process and regeneration fans by adjusting their respective potentiometers.
    - ! Verify the correct potentiometer using the Control Board electrical diagram!
    - Use the table above to help select the potentiometer setting.
    - If the measured air flow is too high, lower the setting on the potentiometer to slow down the fan, and vice versa.



g) How to adjust for Deep Drying:

It is possible to adjust the dehumidifier to reach a lower dewpoint/relative humidity at the expense of process airflow. By decreasing the Process airflow, more water will be removed from the lower airflow, and thus reach a lower a lower relative humidity/dewpoint.

For Configuration A and B:

- Follow the steps in section f), on page 42, to adjust the process fan to the desired level.
- Adjust the process air flow in steps of 10-20%, wait 2 minutes between each step and measure the relative humidity/dew point in the process outlet airflow.

For Configuration C:

- Use the CUSTOM operating mode.
    - See section “HOW TO OPERATE WITH PLC BASED DEHUMIDIFIER” on page 48, on how to use the PLC menus.
    - Before starting the machine, in the CUSTOM menu, make sure that the “Regeneration Airflow” and “Heating” is set to “TARGET” and the respective values are set to nominal: *(When set to “target” the machine will auto adjust outputs to the target values)*
        - Regeneration airflow: Nominal
        - Heating temperature: Maximum 125degC.
- Adjust the process air flow in steps of 10-20%, wait 2 minutes between each step and measure the relative humidity/dew point in the process outlet airflow.

NOTE

The Process airflow should not be set lower than 40%.

WARNING

In CUSTOM mode (PLC), it is possible to set heating to 100% and regeneration airflow to a low value. **This will cause the machine to overheat!**

Make sure that regeneration airflow is always set to nominal values and is never turned down while heating is at 100%.

SECTION 5 / OPERATION

HOW TO OPERATE WITH BASIC-PLR BASED DEHUMIDIFIER

Configuration-Basic PLR is designed for maximum dehumidification, and the standard setting is that it is kept running at all times. This configuration is kept as simple as possible, which is why there is no dehumidification management installed.

STARTING THE DEHUMIDIFIER

Rotate main switch to power on dehumidifier. After a short period, the dehumidifier is ready to operate. When the main switch is on, the integrated LED strip displays a single green diode at the lower end of the strip.

To turn the dehumidifier on, press the button on the left of the main switch. Press the button again to turn the dehumidifier off.

When the dehumidifier is operating, the entire LED strip is green.

HOUR COUNTER

Mechanical hour counter located on the front of the machine counts time, which machine is dehumidifying.

ALARM

The LED strip in the front of the panel turns red if an alarm occurs.

Detailed information about what caused the alarms is displayed on the HMI display.
All possible alarms are listed in Troubleshooting table on page 68.

EXTERNAL HUMIDITY MANAGEMENT

You can purchase an external humidity hygrostat to manage when the dehumidifier is operating or not. Contact Cotes or your Cotes dealer for more information.

HMI PANEL

The HMI panel is mounted into main PLR module inside the electrical cabinet.

During normal operation, the main screen will be on. The name of the machine family is showed in the first row. The second row shows current temperature in the regeneration air channel. If 'constant process flow' is active, this information will show in the third row. Machines designed to work in cold environments will have additional information shown in the fourth row.

Other information can be accessed from the main menu. Basic PLR versions register the hours that the regeneration air fan, process air fan and rotor have been in operation. These times are shown while pressing the "OK" button. To access information about software revisions, press the left and right arrows at the same time, when the dehumidifier unit is not running.

Main screen

Service time screen

Software version screen

CONSTANT PROCESS FLOW FEATURE

Cotes dehumidifiers provide a constant process air flow (CPF) mode. This means the process fan is always on, regardless of humidity levels.

To activate this constant process air flow mode, you stop the dehumidifier with the start/stop button on the front panel, then press the “0” and “3” buttons at the same time. To turn off this constant process air flow mode, press the “0” and “4” buttons at the same time.

DATE/TIME SETTINGS

To change current date or time follow the steps below.

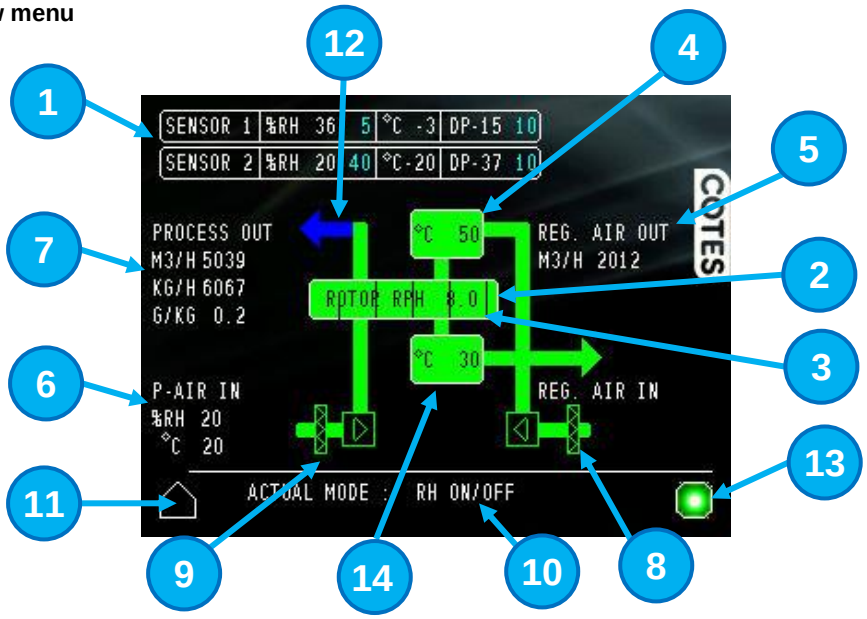
Screen	Action
	To access the setup menu, press “shift” and “OK” simultaneously
	Next step is to switch the controller to stop mode. To do this, press button “1” on the number keyboard.
	After this you will be asked for confirmation. Press “0” to confirm.
	The controller should display status as “Stopped”. Now you can adjust the time/date settings. If you skip the previous steps, the controller will refuse the new values in the control menu! Next press “4” to go to setup menu.

	To change current date press “1” and to change current time press “2”.
	Enter the correct date values in the order: day/month/year. To “jump” from dd to mm to yy, press the “right arrow” next to the “OK” button. To leave the menu without saving press simultaneously “SHIFT” and “UP arrow”. Confirm correct values by pressing “OK”. If everything is done correctly, the controller will go back to setup screen, otherwise CPU will not react to pressing “OK” (i.e. if controller is still in run mode, or bad values)
	Fill in the correct values in the order: hours/minutes/seconds. To “jump” from hh to mm to ss, press the “arrow RIGHT” next to the “OK” button. To leave the menu, press simultaneously “SHIFT” and “UP arrow”. Confirm correct values by pressing “OK”. If everything is done correctly, the controller will go back to setup screen, otherwise CPU will not react to pressing “OK” (i.e. if controller is still in run mode, or bad values)
	After adjustments, you must switch the controller to “Run” mode. Press simultaneously “SHIFT” and “UP arrow” to go back.
	Press button “1” to return the controller to run mode. Before You choose Run mode please be sure that the On/Off button on front panel of the machine is OFF! Otherwise the machine will start operating immediately after you select Run mode! If the entered adjustments were correct, and the controller is in Run mode. you should see main menu.

HOW TO OPERATE WITH PLC BASED DEHUMIDIFIER

The dehumidifier needs to be turned on at the main switch.
After a while the PLC overview screen will appear.

Overview menu



1. **Actual measurement and target value for % relative humidity and temperature –** within the space concerned (as registered by external sensors that are not part of the dehumidifier).
   The blue number is the **target value**. Pressing this will send you to the humidity menu.

   In Configuration-B, only one sensor is available. Configuration-C can be equipped with a second room sensor. Both sensors can calculate the dew point required in the humidity adjustment process.

2. **Rotor –** If the rotor is turning, this moves.

3. **Rotor speed –** in revolutions per hour (RPH).

4. **Regeneration air temperature –** Shows the temperature of the heated regeneration air. If the temperature is shown in red, an overheating alarm is triggered.

5. **Regeneration air flow** (Configuration-C) **–** Shows the current air flow based on internal measurements. In Configuration-B, the percentage of the maximum speed of the fan is shown.

6. **Inflow process air conditions** (Process Sensor kit only) **–** Actual process air inlet conditions measured in % relative humidity and temperature. This measurement is taken directly after the process air has passed through the process filter.

7. **Process air flow** (Configuration-C) **–** Shows the current process air flow, based on internal measurements. These are in different units, depending on configuration values.

8. **State of the regeneration air filter – I**f this is yellow, the filter should be replaced soon. If this is red, the service interval has been exceeded. A mechanical pressure switch triggers a warning (yellow alarm) if the set point is reached. The set point can be manually adjusted at the pressure switches inside the dehumidifier.
9. **State of the process air filter –** If this is yellow, filter should be replaced soon. If this is red, the service interval has been exceeded. A mechanical pressure switch triggers a warning (yellow alarm) if the set point is reached. The set point can be manually adjusted at the pressure switches located inside the dehumidifier.

The setting on the pressure switches must not exceed **250 Pa** for standard G4 class filters. Be aware that the available external pressure (or flow) will decrease as the filters get dirtier. Also note that higher air flows will reduce the expected lifetime of filters.

10. **Actual mode –** Indication of chosen program.
11. **Return to main menu**
12. **Pre-Post unit settings –** Blue arrow is only visible if any pre-post module is active. If you press this shortcut, you will go to directly to the module settings.
13. **Alarm/warning –** Shows the state of the dehumidifier unit:
    Green = everything is OK.
    Yellow = warning = a service will soon be required (the dehumidifier continue to operate).
    Red = alarm = there is a fault or malfunction somewhere (the dehumidifier stops immediately).
14. **Regeneration air temperature after rotor –** Shows the temperature of the heated regeneration air after rotor. If the temperature is shown in red, an overheating alarm is triggered.

Note that if you attempt to change values, you will be asked to enter an operator code (1234).

MAIN menu

START/STOP Turn the dehumidifier on and off.

HUMIDITY Setup target for relative humidity and/or dew point.

PROGRAMS menu. This is where you decide how you want the dehumidifier to operate:

- Always On, RH On/Off (all configurations)
- Capacity Control (Configuration-B)
- Energy, Quiet, Custom programs (Configuration-C)

INFO This provides information about this particular dehumidifier product, including the dehumidifier type, serial number, build date, software revision and running hours, as well as contact information to the dealer and the manufacturer. A performance log is available to provide indications of % relative humidity and dew point. This performance log registers data every hour.

SERVICE This is where you can see the status of the dehumidifier components and their life expectancy. There is also a diagnostics menu. Here you can also reset the timer after a time-expired component has been replaced.
Yellow = service is needed (the dehumidifier continues to operate).
Red = critical alarm and service is needed immediately (the dehumidifier stops operating).

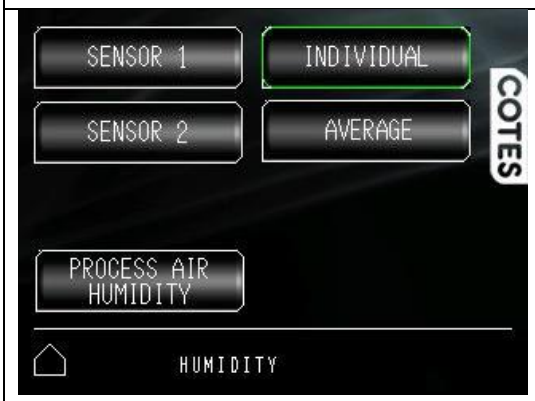
ALARM This is where you check any alarms or warnings detected by the control system (yellow flashing = warning detected, red flashing = alarm detected). Alarms also have to be manually reset after fixing the fault.

SETUP This is where you can change the settings for your dehumidifier.

First setup of PLC dehumidifier

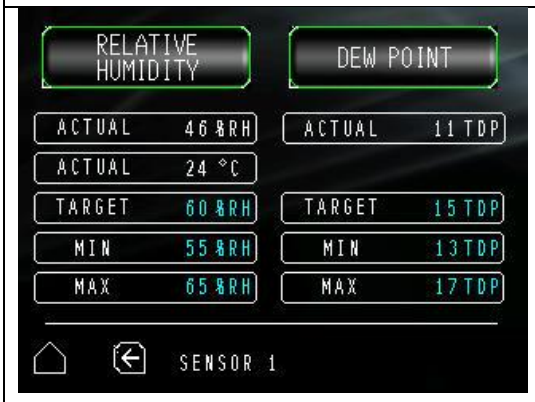
The basic programs for Cotes dehumidifiers are ALWAYS ON and RH ON/OFF. You should choose the program best suited to your needs. The ALWAYS ON program is the simplest – it runs the dehumidifier at full capacity all the time. You should use this if you have an external hygrostat fitted and do not need any additional functions but wish to keep all the safety features of the PLC unit.
The RH ON/OFF program uses the room sensor (temperature and relative humidity) included with the dehumidifier in order to maintain the target relative humidity and/or dew point at the place where the sensor is located. For details on the other programs, please consult the extended PLC manual.
Step-by-step instructions about how to set up your dehumidifier for the RH ON/OFF program are provided below:

1. Go to the programs menu and choose the **RH ON/OFF** program:
2. If you are not logged in, you will be asked for the operator's code (1234) Enter this code and press log in, then select the desired program again.
3. Go back to Main menu
4. Select the target humidity level



5. This shows settings for SENSOR 1 (and SENSOR 2 if included)

6. Select **SENSOR 1**



7. Use this menu to select your control conditions – relative humidity and/or dew point. You can select the target value here as well as setting the minimum and maximum values. The dehumidifier will start working if the measured value is above the maximum setting and will stop when it measures a value below the minimum setting. If you choose both control conditions options, the dehumidifier will start when either of the conditions are outside the selected range and will continue to work until both measurements are again inside the selected range.

8. You can go back to the main menu and start the dehumidifier.

For more details about operation of PLC dehumidifier, see:
“PLC EXTENDED OPERATING HANDBOOK”.

SECTION 6 / SERVICE AND REPAIR

HOW TO SERVICE AND REPAIR THIS DEHUMIDIFIER

Service and maintenance work on this dehumidifier

Cotes designs its dehumidifier units so that they are as robust as possible, and only need a minimum of service and maintenance.

None of the components require lubrication or adjustment.

The only maintenance work you need to do is listed below.

Once a month

- Check or replace the filters for incoming air and regeneration air. For Configuration-B and Configuration-C, the filter guard will automatically provide a warning if there are problems.
- Check or replace the filter for the cooling fan to the electrical cabinet.
- Check that the fans are operating (by listening to check whether they are turning).
- Check that the rotor is turning during operation. Do this by shutting off the dehumidifier and then turn off the load switch, open the middle door, and put a marking on the rotor. Close the door and turn on the load switch and start the dehumidifier for 10–20 seconds. Turn off the dehumidifier and turn off the load switch, open the middle door again, and check that the marking has moved, indicating that the rotor is turning during operation.

Once a year

We also recommend the following annual checks.

- Check the service indication menu in the PLC controller. Are the working hours of any component inside near their time-to-change limit? If so, replace. See time-to-change limits below:
    - Process air filter. Depends on the working environment. Specified for 8,700 hours under normal conditions.
    - Regeneration air filter. Depends on the working environment. Specified for 8,700 hours under normal conditions.
    - Air filter for electrical box. Depends on the working environment. Specified for 8,700 hours under normal conditions.
    - Process air fan: 40,000 hours
    - Regeneration air fan: 30,000 hours
    - Motor and gear for rotor: 30,000 hours
    - Heaters: 40,000 hours
    - Filter guard (if installed): 40,000 hours
    - Manometer (if installed): 40,000 hours
    - Rotor, including gaskets: 60,000 hours
    - Electrical board including PLC controller: 60,000 hours
- External humidity sensor should be calibrated or replaced (with recycled instruments)
- Internal humidity sensor (only with Process Sensor kit) should be recalibrated (with recycled instruments)

- Check the wear on the rotor gaskets, especially the gasket placed on the circumference of the rotor. The red side of the gasket is made of Teflon®, and this coating must be intact over its entire surface.
- Check the inside of the cabinet for any signs of dirt or corrosion. Check that the drive belt for the rotor is still tight and that no parts of it are too worn or close to the breaking point.
    - Tension of drive belts: deviation 8 mm at 7N.
- Check the internal flexible hoses
- Check that the insulation on all electrical cables is intact, with no mechanical or heat damage.
- Check that the insulation on the electric heater(s) is intact.
- Check that all cables inside the electrical box are properly attached, all miniature circuit breakers (MCBs) are switched on and all components are intact.
- Test that all electric components are working as intended – for example by following the instructions in the “Commissioning” section of this handbook.

Service/repair work on this dehumidifier

Service area must be clear at all time.

Diagrams and manual must be kept near the machine.

Machine will automatically startup in case of power loss and a following regain of electricity.

Safety instructions

Before opening the dehumidifier, make sure that the electric current is switched off at the mains before you open the cover of the electrical box or the covers for the electric heater, process air fan and rotor.

The 10Q1 load switch should always be switched OFF and locked with a padlock before any service is done.

You should never just turn off the power to the dehumidifier while it is running. The correct procedure is to press STOP C65 DEHUMIDIFIER (Configuration-A; press the operating button), after which the machine runs a cooling cycle before the regeneration air fan stops. Turning off the dehumidifier properly prevents any over-heating.

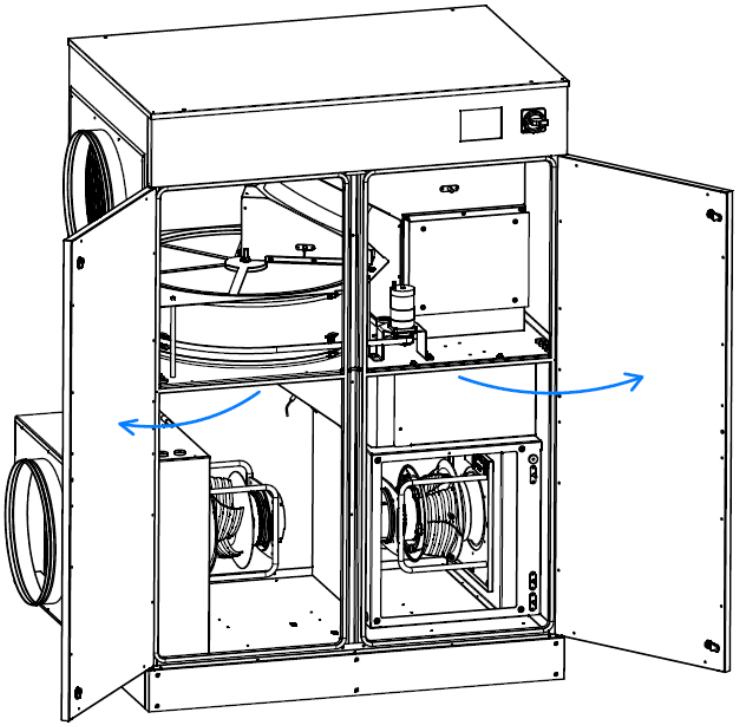
WARNING

Make sure that electric current is switched off at the mains before you open the cover of the electrical box or the covers for the electric heater, process air fan and rotor.

The 10Q1 safety switch should always be switched OFF and locked with a padlock.

Easy access for quick service

The C65 dehumidifier features two large service doors, which are easy to open and close. All internal parts that need service can be accessed from the front, through these doors. Behind these doors are the rotor, heating elements, fans, gear motor, etc.

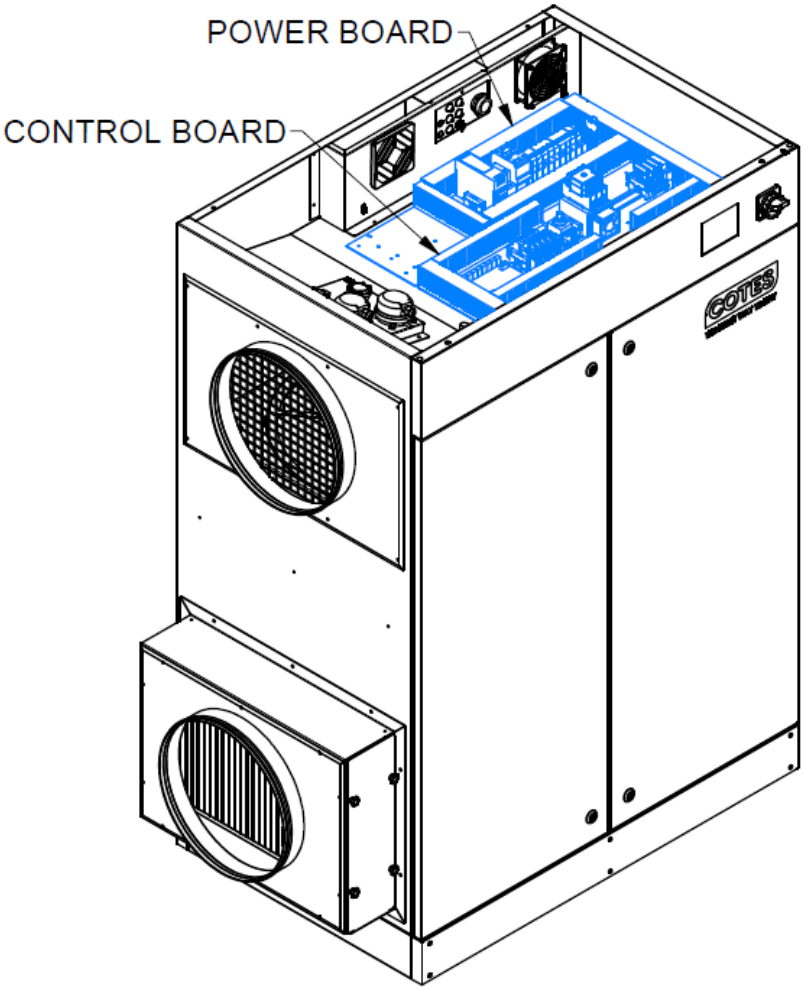


WARNING

Before opening the doors, the 10Q1 safety switch should always be switched OFF and locked with a padlock.

The electrical switchboard is divided into two separate electrical switchboards (where the contacts, fuse breakers, thermal relays, etc. are mounted). The first switchboard is the “control board" that determines how the dehumidifier runs. The second switchboard is the “Power board”, which controls the heating elements.

Both the Control board and the Power board are located in the electrical cabinet in the top of the dehumidifier.



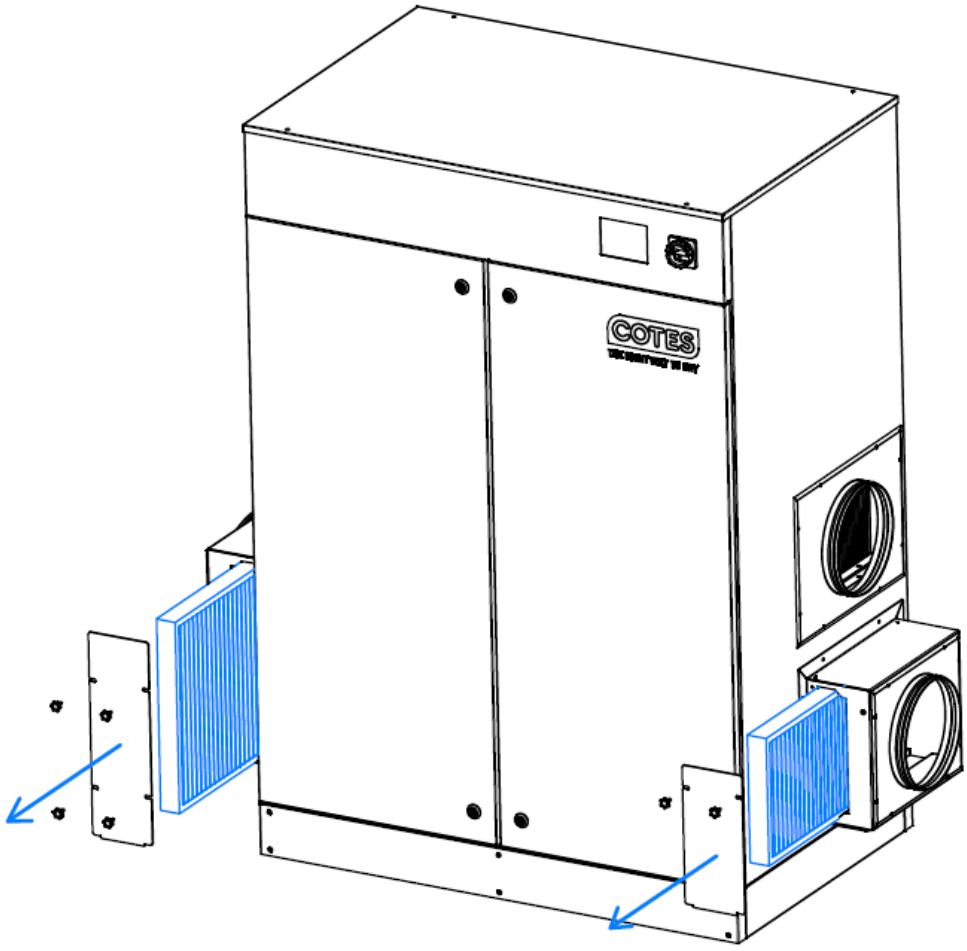
WARNING

Before opening the top cover, the 10Q1 safety switch should always be switched OFF and locked with a padlock.

Replacing filters

The following is standard procedure for replacing the filters:

- Loosen the finger screws on the filter doors
- Replace the filters



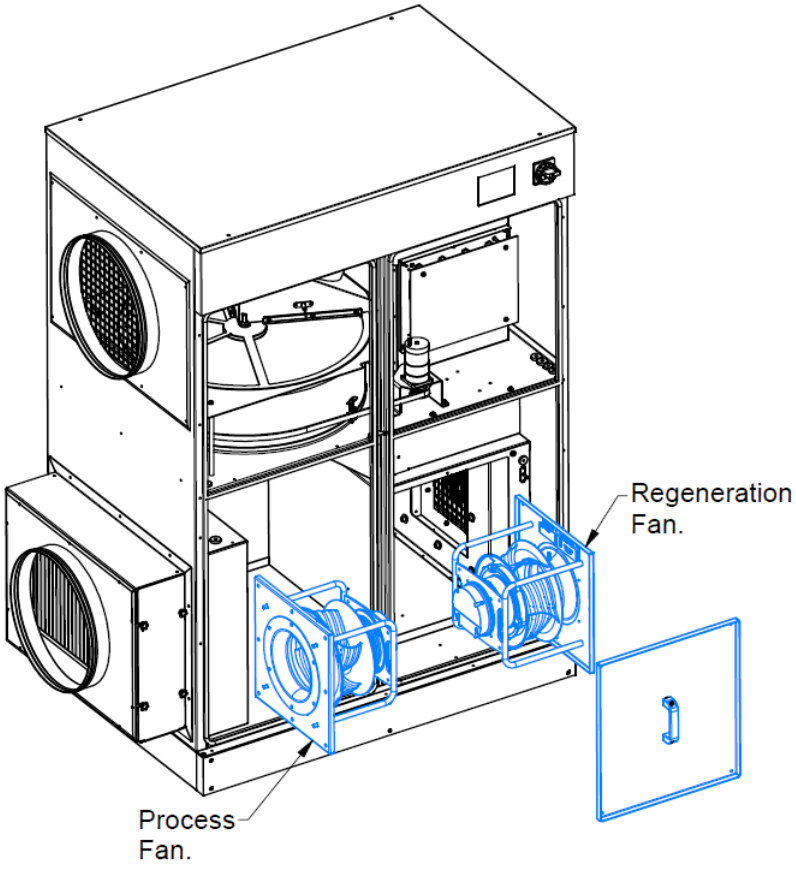
Replacing fans

The following is standard procedure for replacing the process air fan.

- Make sure that power to the machine is OFF.
- Open the front doors.
- Disconnect cables to the process air fan.
- Remove the screws on the fan bracket.
- Remove the fan.
- Replace the process air fan.
- (For PLC C) Remember to re-mount the plastic hose connected to the fan inlet nozzle. (the hose is used to measure the airflow)

The following is standard procedure for replacing the regeneration air fan:

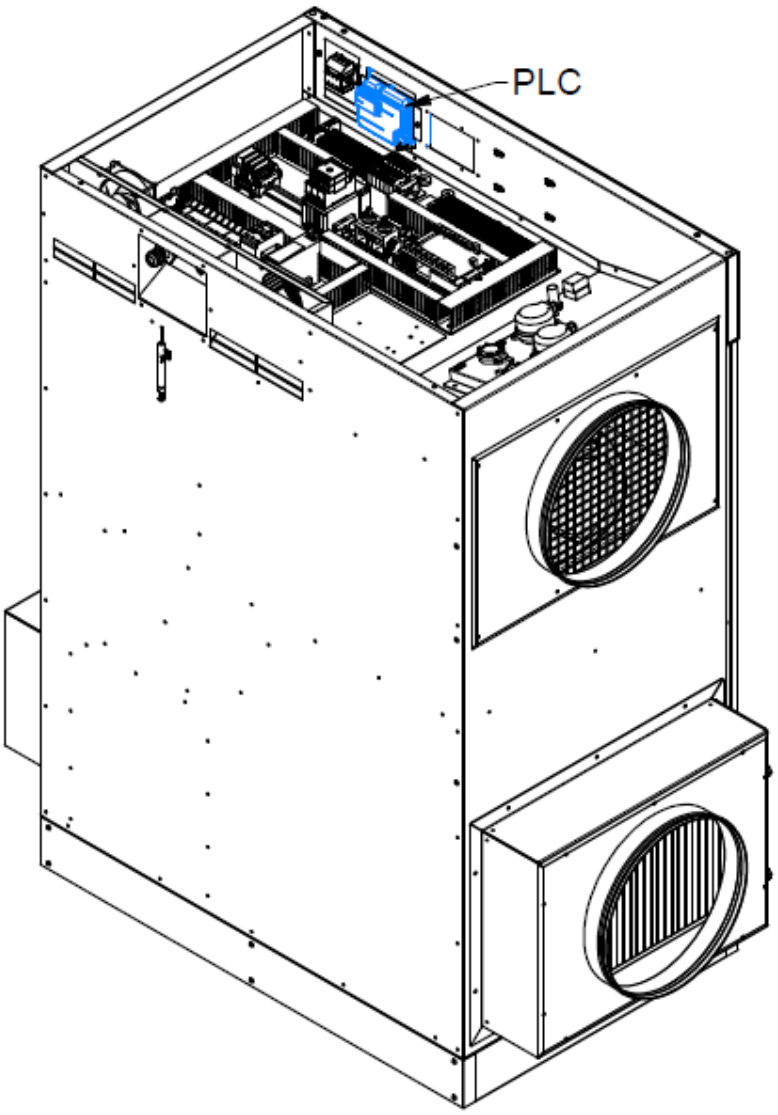
- Remove the service hatch to the regeneration fan box.
- Disconnect cables to the regeneration air fan
- Remove the screws on the fan bracket.
- Remove the fan.
- Replace the regeneration air fan.
- (For PLC C) Remember to re-mount the plastic hose connected to the fan inlet nozzle. (the hose is used to measure the airflow)



Replacing PLC

The following is standard procedure for replacing the PLC unit.

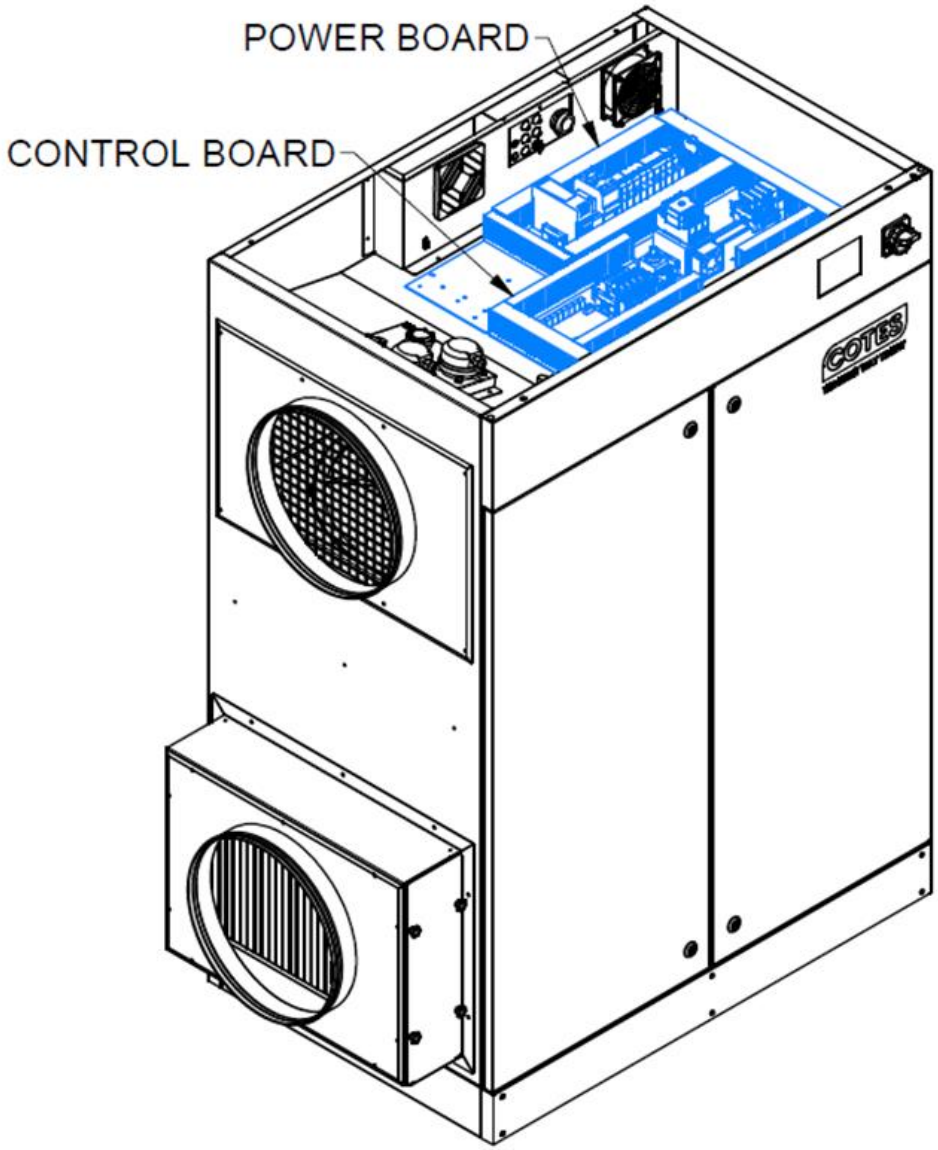
- Make sure that power to the machine is OFF.
- Remove the top cover.
- Disconnect cables for the PLC.
- Remove the screws for the PLC bracket.
- Replace the PLC.



Replacing electrical board

The following is standard procedure for replacing an electrical board

- Make sure that power to the machine is OFF.
- Remove the top cover.
- Disconnect all cables and sensors connected to the electrical board.
- Remove the screws fastening the electrical board to the cabinet.
- Replace the electrical board.



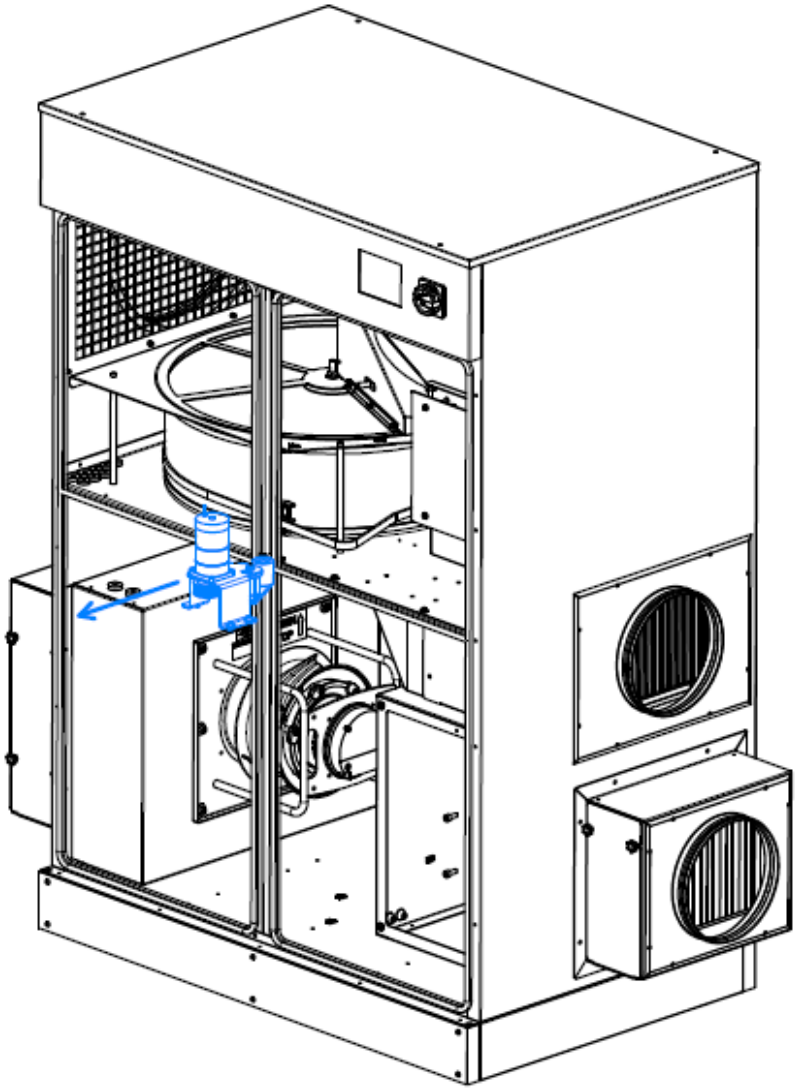
Replacing gear motor

The following is standard procedure for replacing the gear motor.

- Open the doors to the machine.
- Disconnect all cables to the gear motor.
- Remove the screws holding the gear motor bracket to the cabinet.
- Lift the gear motor free from the drive belt and remove the pulley and taper bush from the gear motor drive shaft.
- Remove the gear motor from the bracket.
- Replace the gear motor.

When re-starting the unit, check that the rotor is moving. If not, check the connections to the motor.

It is important that the rotor rotates from left to right (counterclockwise).

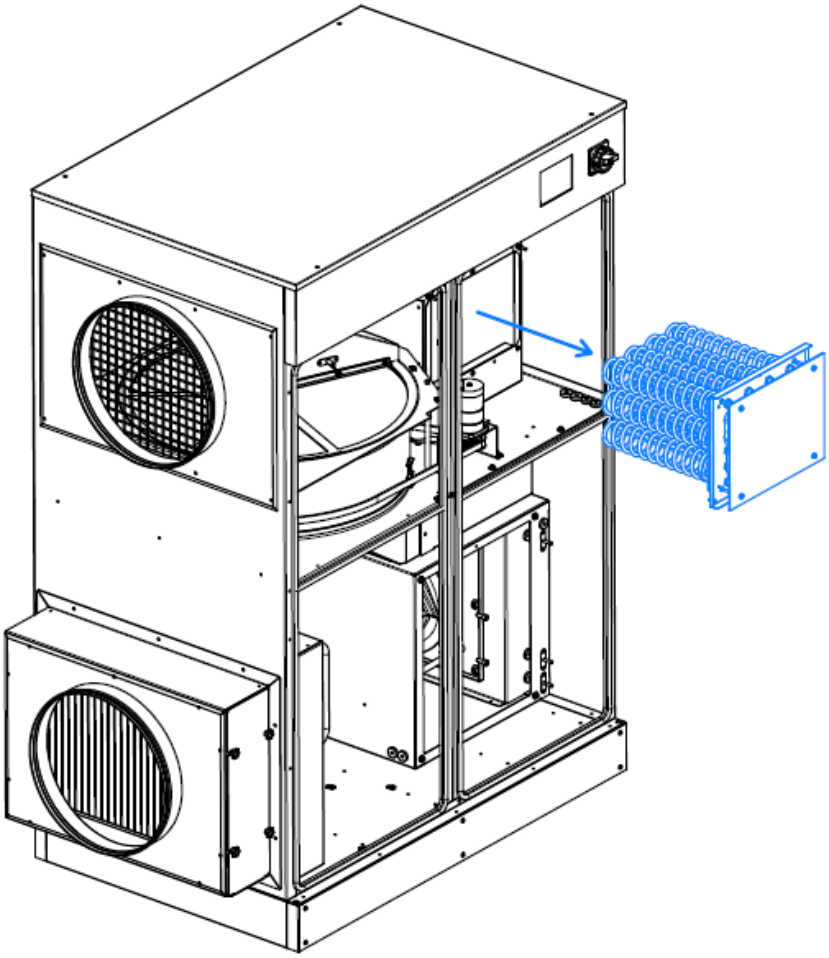


Replacing electric heaters

All electric heaters are mounted from the front in the heater section, in the top of the dehumidifier.

To replace these units:

- Make sure that power to the machine is OFF!
- Remove the heater cover plate.
- Disconnect the wiring and unscrew the heater plate. You can then withdraw the plate and heaters from the heating box.
- Replace the heating elements.



Replacing rotor gaskets

To replace the rotor gaskets you can either remove the rotor and replace the gaskets outside the machine, or you can chose to replace the gaskets while the rotor is still inside the machine.

To remove the rotor, follow the instructions for replacing the rotor in the next section of this manual.

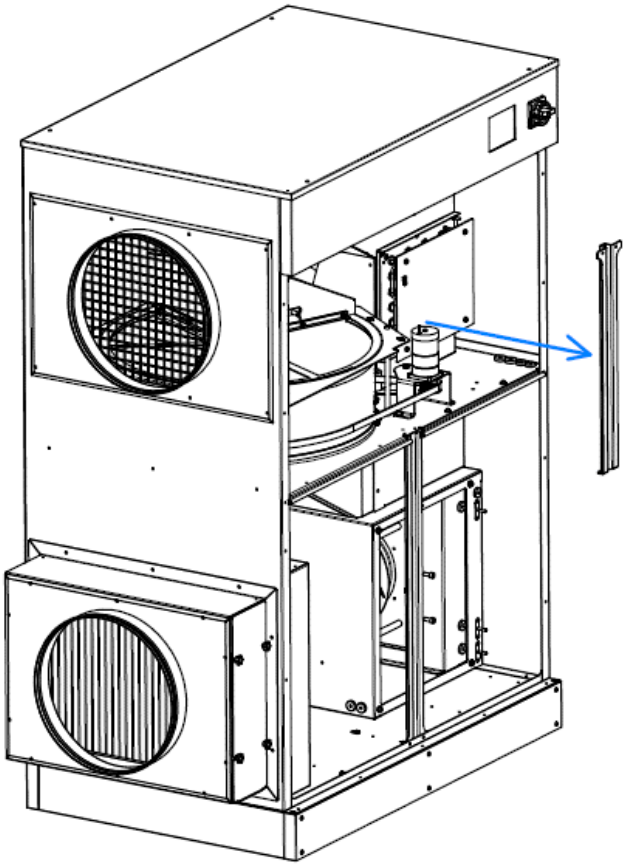
The following is standard procedure for replacing rotor gaskets inside the machine.

- Open door at the front of the cabinet
- Remove the drive belt from the pulley. (you may need to loosen the screws on the gear motor bracket)
- Loosen the metal bands and remove the rotor gaskets.
- Mount new rotor gaskets and push them down/up until the gasket's Teflon surface is flat against the rotor plates all the way around. – gradually tighten the metal bands while doing this.
    - NOTE: Only turn the rotor from left to right, counterclockwise!
- Re-attach the drive belt to the pulley and tighten the screws on the gear motor bracket.

Replacing the rotor and shaft

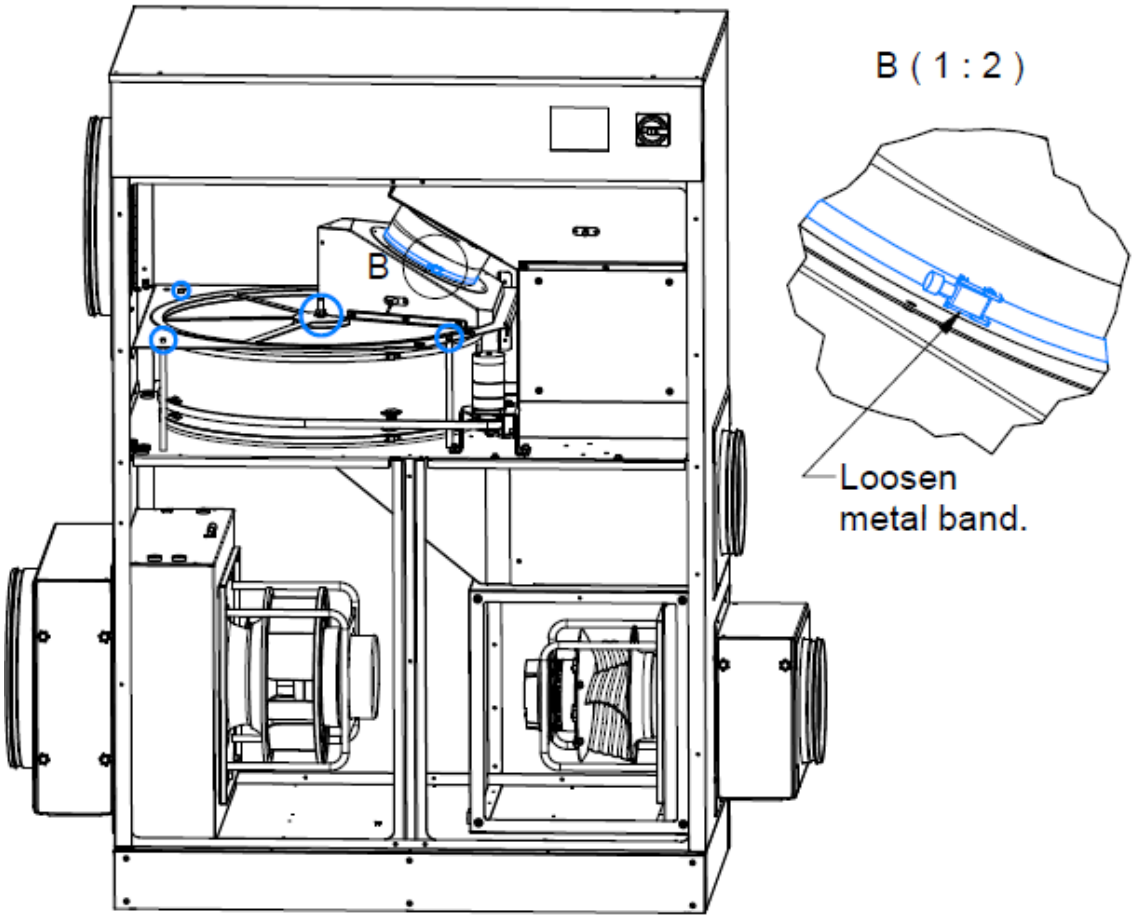
The following is standard procedure for replacing the rotor.

- Open the doors.
- Remove the rubber door seal on the middle beam.
- Remove the middle beam in front of the rotor.
- Remove the drive belt from the pulley and remove the gear (see “Replacing gear motor” section).
- (continues below)

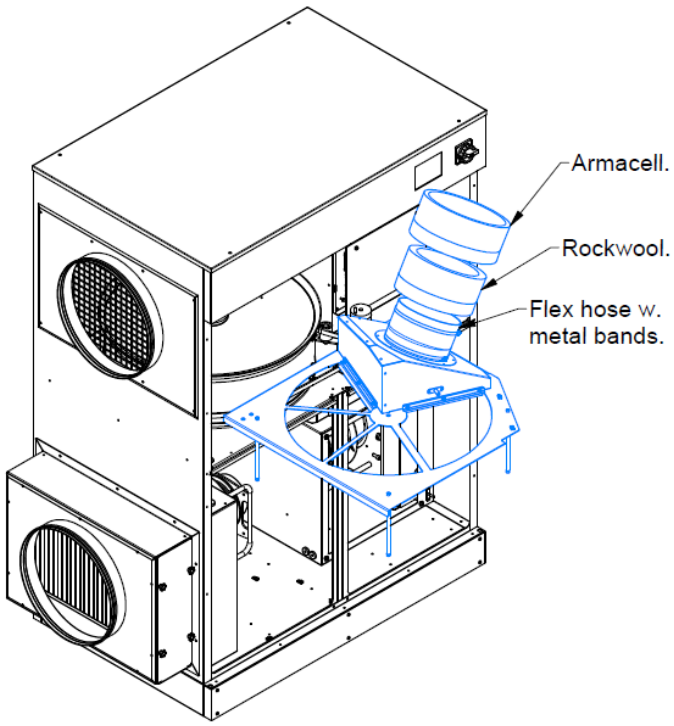


The next step is to remove the top rotor plate. The top box is connected to the heating box via. a flexible hose attached by metal bands like those on the rotor. The flexible hose has two layers of insulation, first a layer of Rockwool with a second layer of Armacell insulation on the outside.

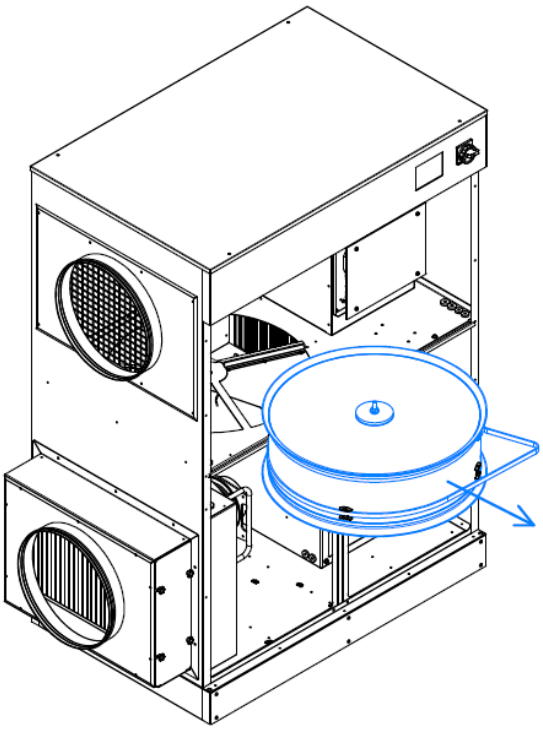
- Remove the black armacell and the rockwool layer to expose the flexible connection to the heating box.
- Loosen the bottom metal band and lift the flexible hose free.
- To remove the rotor shaft, remove the top nut and pull the shaft out from the bottom.
- Remove the 3 screws to the distance rods.
- (continues below)



- With the rotorshaft removed, the flex hose free, and the distancepices loosened, the top rotor plate can now be removed, exposing and giving easy access to the rotor.



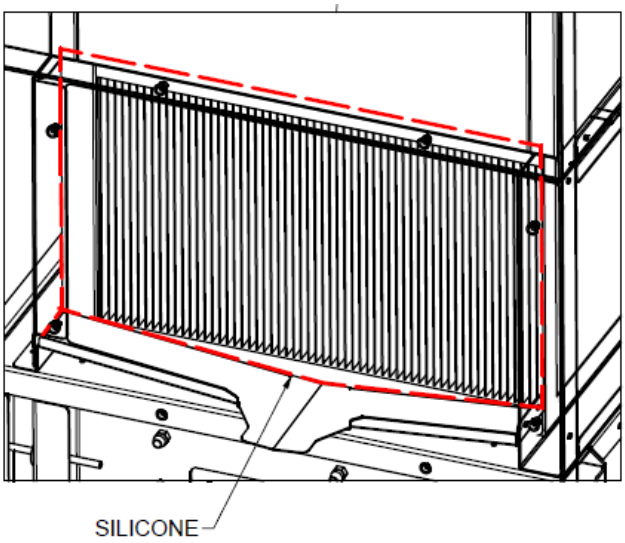
- Remove the rotor, replace it.
- To re-install, re-do the steps above in reverse order.



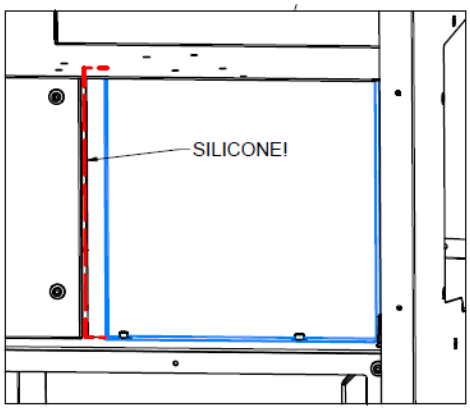
How to replace the Heat Exchanger and/or install the "No HeatEx Kit".

The following is standard procedure for removing the heat exchanger:

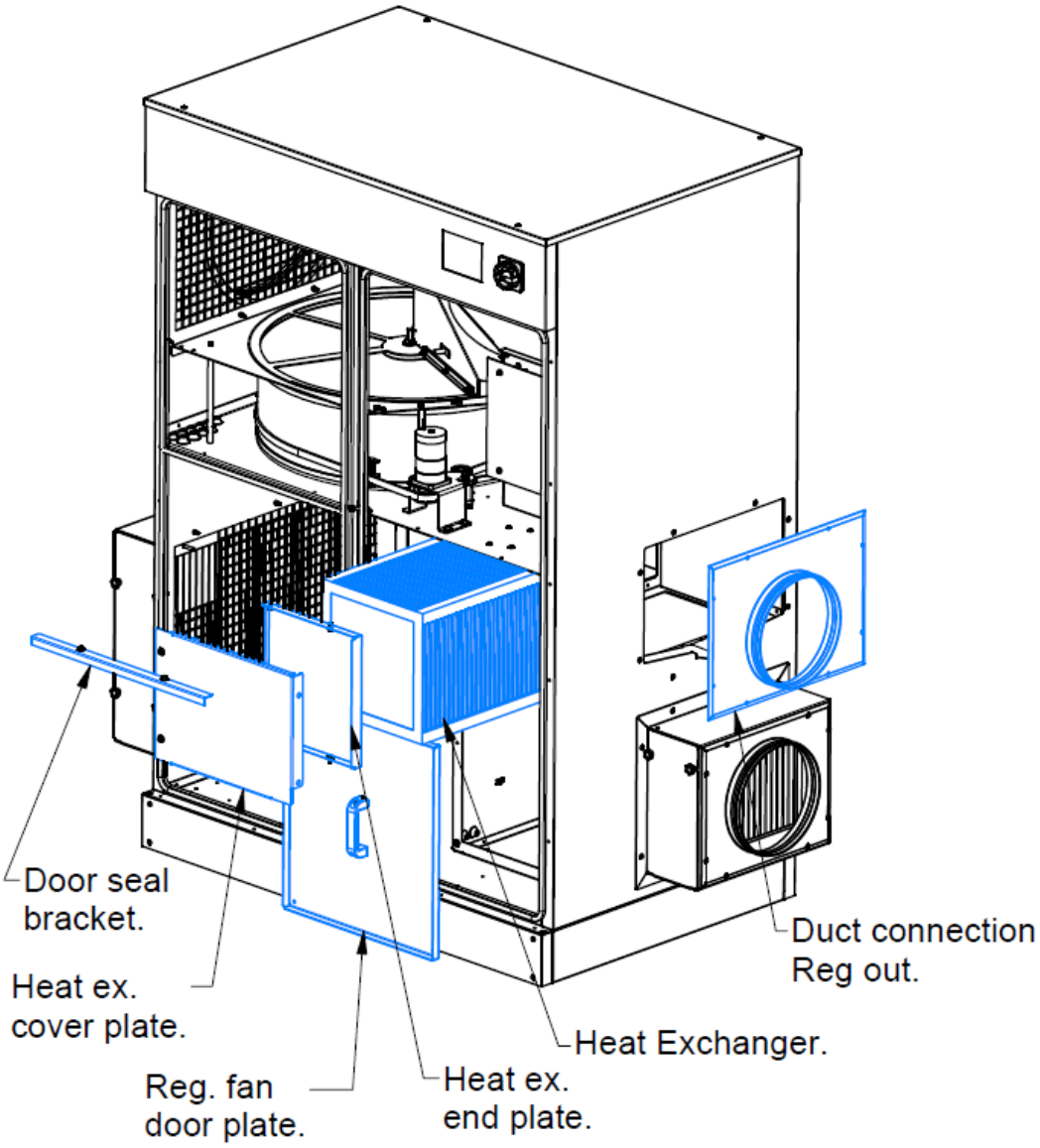
- Remove the "Reg. out duct connection plate".
- Cut the silicone seals up against the heat exchanger.



- Remove the middle "door seal bracket".
- Cut the silicone sealing the "heat ex. Cover plate" and remove it.
- Remove the door plate to the reg. fan, to get access to the nuts for the "heat ex. end plate".
- Remove the screws holding the "heat ex. end plate" and remove it.
- Cut the silicone seal on the left side of the heat exchanger.

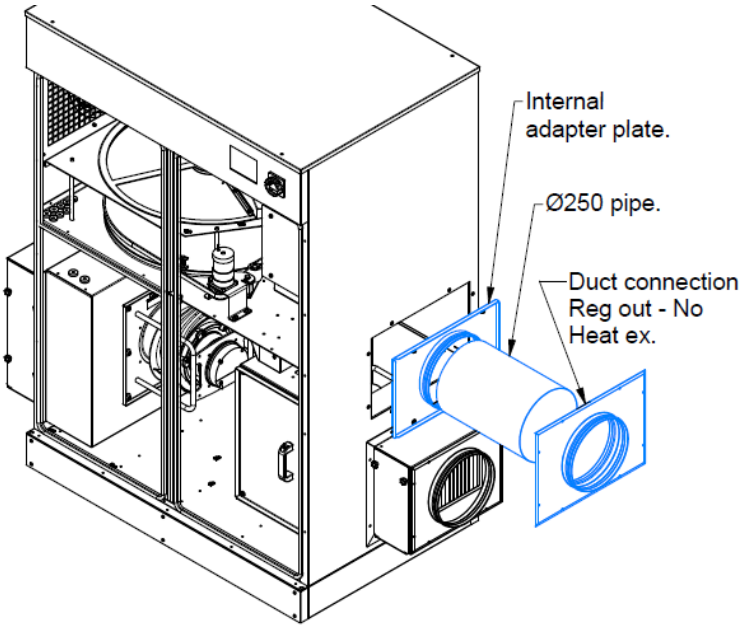


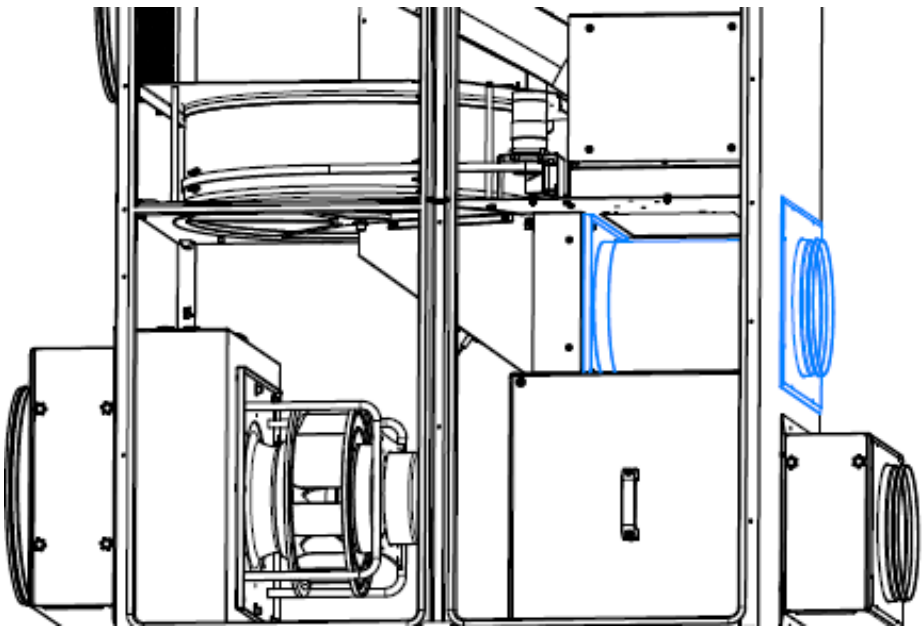
- The Heat exchanger is now free and can be removed.
- When re-installing the heat exchanger, re-apply new silicone seals in the above-mentioned places that were cut.

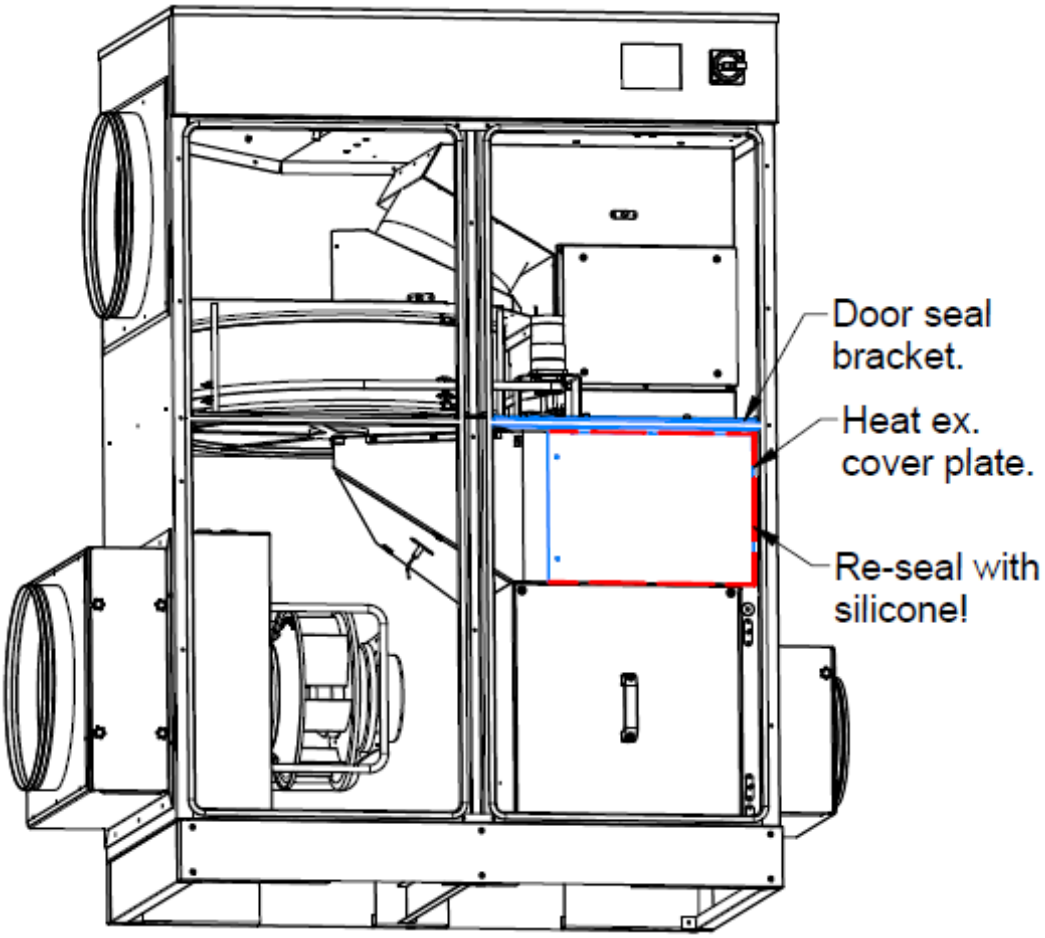

Door seal bracket.
Heat ex. cover plate.
Reg. fan door plate.
Heat ex. end plate.
Heat Exchanger.
Duct connection Reg out.

To install the “No HeatEx kit”:

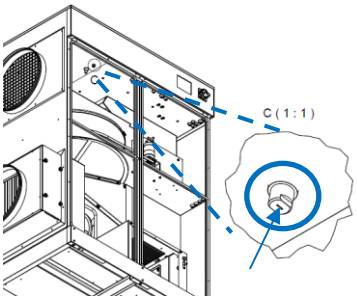
- Install the Internal adapter plate where the heat exchanger used to be.
- Mount the Ø250 pipe and mount the “No HeatEx – Reg out – duct connection plate” on the cabinet.
- Reinstall the Heat ex cover plate, and re-seal the edges with silicone. (If the cover plate is not sealed with silicone, the regeneration air will leak out.)
- Reinstall the door seal bracket and the door seal.
- When starting the machine, listen for leaks. (If there are leaks, they must be sealed with silicone).






Door seal bracket.
Heat ex. cover plate.
Re-seal with silicone!

TROUBLESHOOTING

Problem	Cause	Action
The unit (or parts of it) will not start after a power surge/an electrical short circuit.	One or more fuse breakers have been triggered.	Turn all fuse breakers on.
The air is not as dry as expected.	The rotor is not turning. The regeneration air temperature is lower than expected. The regeneration air flow is too low.	If the drive belt is intact, change the gear motor. Check that the regeneration air flow is not too high. Check that all heating elements are functioning. Check that the regeneration air filter is not clogged
The regeneration air temperature has large variations.	The regeneration air flow is too low.	Check that the regeneration air filter is not clogged.
PLR Screen displays “Machine overheated”. The PLC Alarm menu displays “Overheating Alarm””.	The 252ST1 safety switch has been triggered and must be deactivated. Temperature in heating box was higher than 176°C.	Deactivate the safety switch by pressing the small green button. The switch is located inside the dehumidifier in the top left side.  Check that the regeneration air flow is not too low. Check whether the filters should be changed.

PLR Screen displays “Process air fan (100M1) error”	One or more circuit breakers have been triggered. Wires to or from the fan or circuit breakers have become disconnected. The fan is broken.	Turn all circuit breakers on. Check that all the wire connections comply with the electrical diagram. If all the wire connections are connected correctly, replace the fan.
PLR Screen displays “Regeneration air fan (102M1) error”	One or more circuit breakers have been triggered. Wires to or from the fan or circuit breakers have become disconnected. The fan is broken.	Turn all circuit breakers on. Check that all the wire connections comply with the electrical diagram. If all wire connections are connected correctly, replace the fan.
PLC screen displays “A12: Temperature difference is too low” error.	Delta temperature of the regeneration airflow between above and below rotor is too low indicating that the rotor is not turning, possible issue with the drive.	Check the gear motor. Check drive belts. Remove drive belts and try turning the rotor by hand (from left to right). Observe that the rotor is turning smoothly. Turn the machine back ON and observe that the rotor is turning smoothly.
PLC or PLR screen displays “Temperature after rotor too high” error.	The temperature below the rotor is too high, indicating that the rotor is not turning, possible issue with the drive.	Check the gear motor. Check drive belts. Remove drive belts and try turning the rotor by hand (from left to right). Observe that the rotor is turning smoothly. Turn the machine back ON and observe that the rotor is turning smoothly.
PLR Screen displays “Phase sequence error! (104K1)”.	Main power supply phase sequence error. Main power supply asymmetry.	Check connection to the electro-energetic system. Check voltage between phases.

If you have any queries or questions, please contact your Cotes dealer.

SECTION 7 / FORMALITIES AND GENERAL/LEGAL INFO

WARRANTIES

Warranty conditions

The Cotes factory warranty is only valid if a documented programme of service and preventive maintenance has been carried out.

Maintenance must have been carried out at intervals of six months or less. Documentation for this must be in the form of a written log/journal, with attested entries.

All spare parts must have been purchased from Cotes or an authorised Cotes dealer.

LEGAL NOTICES

Terms

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EU DECLARATION OF CONFORMITY

Cotes A/S

Mariane Thomsens Gade 2F, 11

DK-8000 Aarhus C

www.cotes.com

info@cotes.com

VAT no. 15 20 03 32

Declares at its own liability that the following models of Cotes adsorption dehumidifiers:

C30, C35, C65, C105

are covered by this declaration complying with the following directives:

Machinery Directive 2006/42/EC

Ecodesign 327/2011 directive 2009/125/EF **as regards the eco-design fans driven by motors with input power and 125W to 500kW.**

EMC Directive 2014/30/EU

RoHS 2011/65/EC.

DK-Aarhus C, 01.02.2021

Thomas Rønnow

CEO

HOW TO UPDATE AND IMPROVE THIS COTES DEHUMIDIFIER

Additional pre cooling coil

A pre-cooling coil can increase the amount of moisture removed, especially when very dry air is needed.

Additional post cooling/heating

A post cooler/heater unit can be attached to the dehumidifier to control the temperature downstream from the dehumidifier.

Additional/better filters

If cleaner air is needed, it is possible to replace the fitted filter with a different filter featuring other specifications. If an additional filter is required, please contact a Cotes expert, and find out how the filters can be changed.

Next step

Please contact Cotes or a Cotes dealer to find the best solution.

WHOM TO CONTACT

Help when and where you need it

Contact Cotes in Denmark or your local dealer:

Cotes contact information:

Cotes A/S

Mariane Thomsens Gade 2F, 11

8000 Aarhus C

Denmark

+45 5819 6322

info@cotes.com

www.cotes.com