



**Dry room customized
desiccant dehumidifier**

s/n 321310C10064

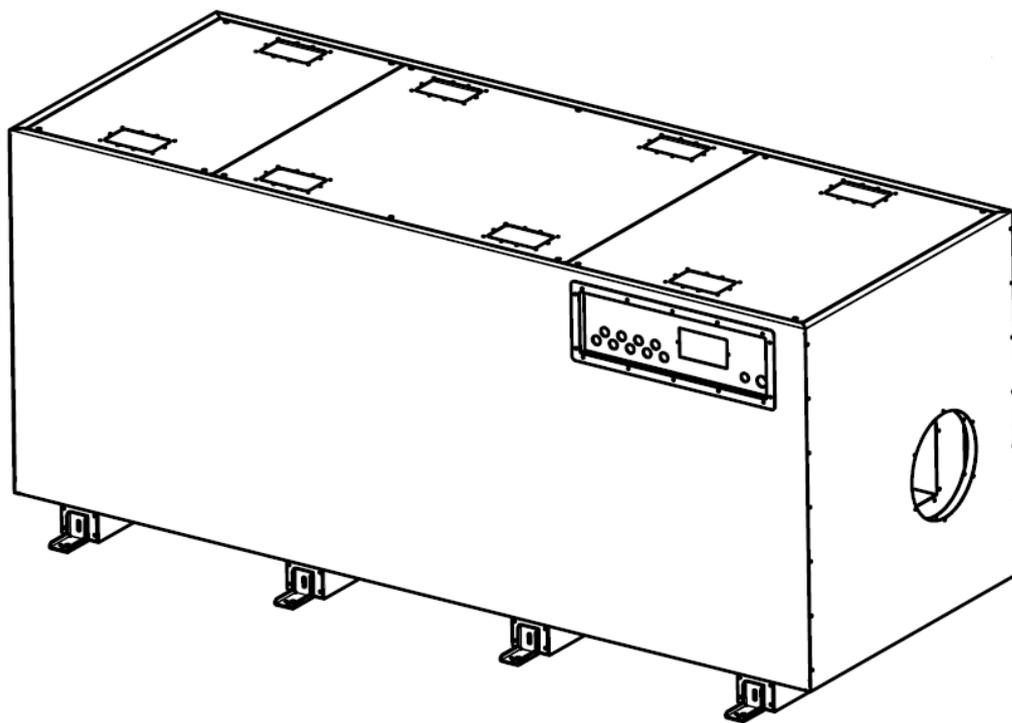


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1 GENERAL INFORMATION

1.1 Application

Dry room customized desiccant dehumidifier (hereinafter - Device) is designed to dehumidify indoor air (buildings, warehouses, basements, pumping stations, with special moisture and temperature parameters) and use in the dehumidifying process. The desiccant dehumidifier of air MDC have high efficiency and are irreplaceable at low temperatures and low level of relative humidity. Dehumidifiers are equipped with silica gel desiccant wheel, heating element, fans, and air filters. They can work as an independent device and in a combination with system of air handling. Efficiency at low temperatures, achievement and maintenance of very low humidity level are the distinctive properties of the desiccant dehumidifier.

In addition to the mentioned problems, desiccant dehumidifiers can:

- maintain the strength of load-bearing structures of various kinds of objects, including swimming pools, ice arenas, hydro-technical facilities;
- protect windows and glass ceilings against fogging in the administrative and residential buildings;
- improve the quality of the finishing works at repaired apartments due to the drying without thermal deformations of used coating walls, floor and ceiling;
- liquidate consequences of flooding, dry new building objects;
- increase the storage duration of hygroscopic materials: medicines, washing powders, construction materials and other bulk products;
- support a low level of humidity by manufacturing foodstuff and wood, rubber products and plastic, at manufacturing of fur skins;
- keep marketable condition of clothes and packaging;
- reduce growth of bacteria, fungus etc.



ATTENTION!

Use of this product for other purposes or with violation of instructions, may cause injury to personnel and / or equipment damage.

1.2 Mode of operation of the desiccant dehumidifier

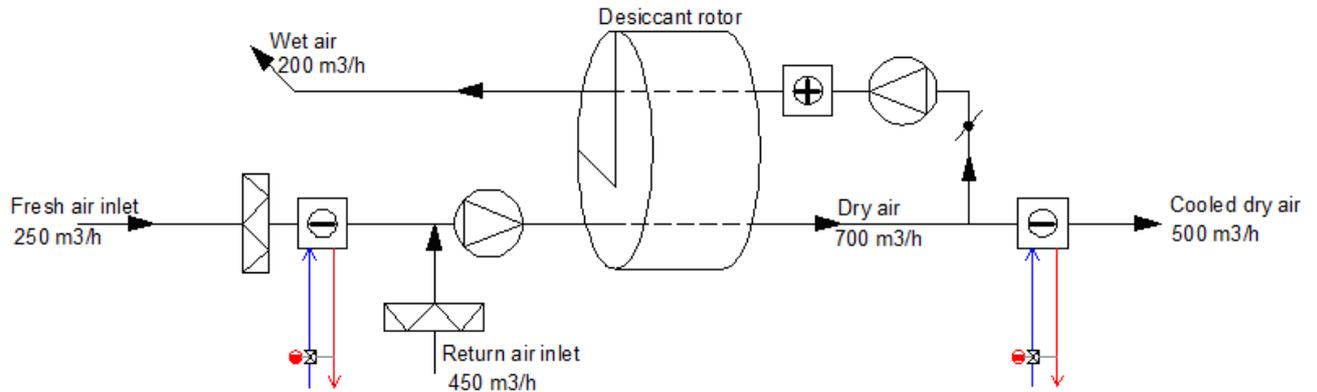


Figure 1.1: Mode of operation of Dry room customized desiccant dehumidifier

Mode of operation of desiccant dehumidifier is shown in Figure 1.1. desiccant wheel (rotor) is the main element of the Device. Its inner surface is formed in the honeycombs, thereby achieving tremendous increase of dehumidifying surface. It also contributes to a laminar flow of air in the rotor, so significantly reducing aerodynamic losses.

The supply of streams of air is carried out so that the dehumidified air (process air) passes through 75% of the rotor surface and the reactivation air passes through 25%. Wet dehumidified air passing through the rotor gives moisture to the sorbent (Silica Gel). Reactivation air, in turn, is warmed in the heater to 90°C-140°C, so increasing the moisture saturation capacity, and passing through the rotor, restores its sorption capacity. Reactivation air, saturated with water vapor is ejected to outdoor. This reactivation air flow also performs the function of rotor cleaning from possible contamination. The constant rotor rotation provides a continuous sorption - reactivation process. Special sector seals are used to prevent mixing of process and reactivation air flows. The absence of condensate during dehumidification process allows installing the dehumidifier not connected to sewer network.

1.3 Packaging arrangement

The package includes:

- ◆ desiccant dehumidifier Dry room customized desiccant dehumidifier1 PCs;
- ◆ technical data sheet.....1 PCs;
- ◆ packing1 PCs.

2 TECHNICAL SPECIFICATIONS

2.1 General characteristics

The casing of a dehumidifier is made from stainless steel with isolation of 20mm that gives superresistance to atmospheric corrosion, and also increases durability.

Connection of air ducts are made through round air ducts of the standard sizes. The electric panel is in a separate section of internal part of a dehumidifier, the control panel is placed on frontal part of a dehumidifier.

Average moisture removal of a dehumidifier makes 3.1 kg/h of moisture (at 20°C/60% RH fresh air and 20°C/7% RH return air).

Process air	
Nominal airflow	500 m ³ /h
Available static pressure	100 Pa
Fresh air filter	panel, G4 (EN779) 402×470×48
Return air filter	panel, G4 (EN779) 222×470×48
Reactivation air	
Nominal airflow	200 m ³ /h
Available static pressure	250 Pa
Max. power capacity	
Process fan	1 kW
Reactivation fan	0.3 kW
Reactivation heater	11.4 kW
Total power capacity	12.8 kW (3x400V, 50 Hz)
Current	20 A
Average power consumption	9 kW
Miscellaneous data	
Operating temperature	-30/+40°C
Max noise level without ductworks	70 dBA
Weight	300 kg
IEC protective class	IP44
Insulation	20 mm

2.2 Overall and installation dimensions

Overall and installation dimensions of Dry room customized desiccant dehumidifier are shown in Figure 2.2

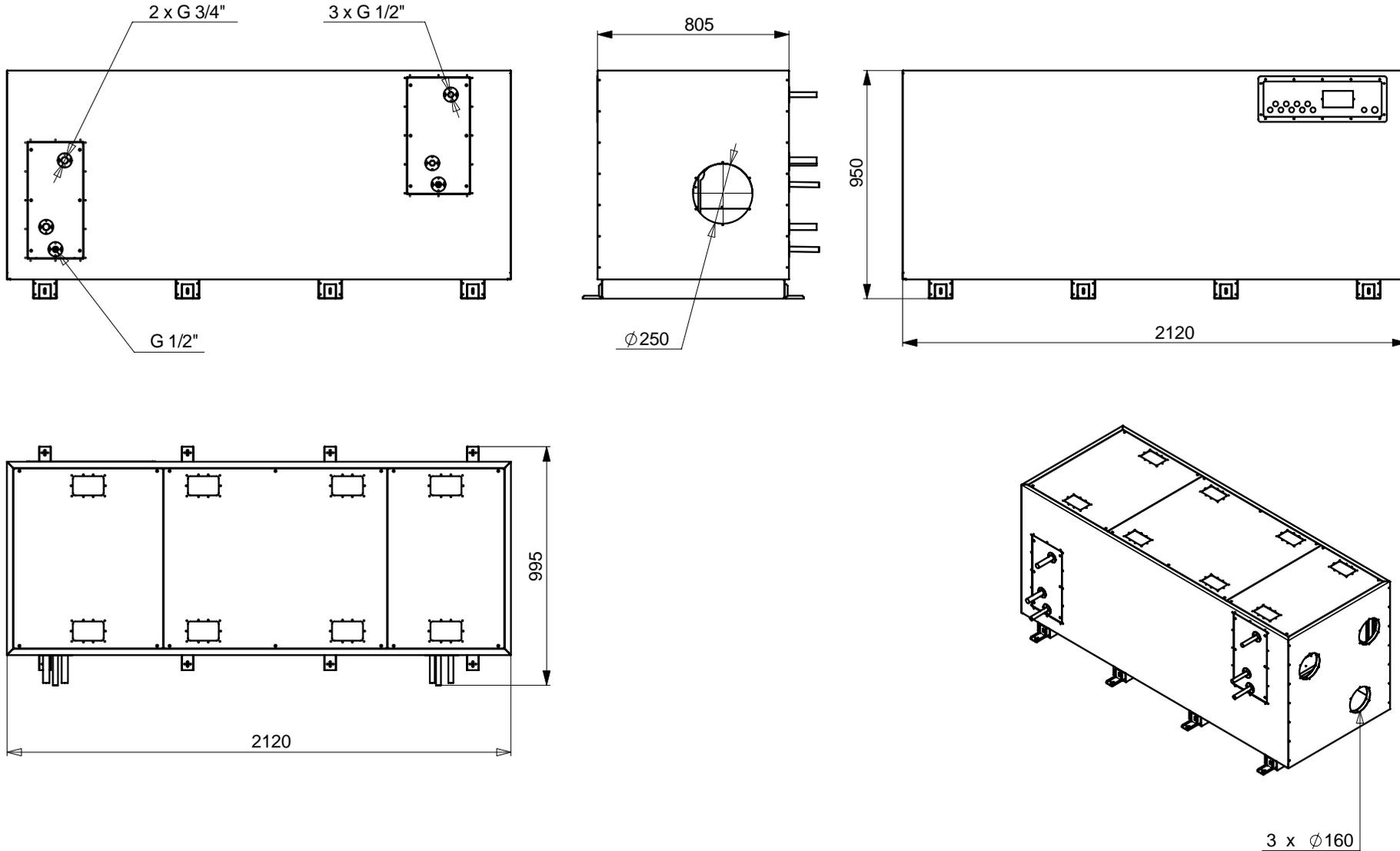


Figure 2.2: Overall and installation dimensions of Dry room customized desiccant dehumidifier

2.3 Fans

The Device has modern EC fan. Energy efficiency of EC motors is many times higher in comparison with the AC motors. Low power consumption and easiness of management are the advantages of EC fans. EC technology is based on the use of the integrated electronic control system and allows the motor to operate always optimally. Integrated electronic control system can change the speed to meet the exact requirements for air flow and work with high efficiency.

The main advantages of EC fans:

- High efficiency (about 93%);
- Energy savings ensures lower operating costs by at least 30%;
- Low noise level at a relatively high power;
- Compact size at a relatively high power;
- The possibility of smooth and fine adjustments;
- The possibility of programming;
- Adjustment of capacity of the fan depending on the level of temperature, pressure, and humidity level;
- Protection of the engine against mechanical influences and electric overloads;
- Does not require service maintenance;
- Has long lifetime

The motors of EC series has higher reliability in comparison with the asynchronous motors with the frequency converter at voltage network fluctuations, and also, is resistant to voltage increases. The motors of the EC series smoothly stops and gives an alarm signal after network voltage lowering.

EC fans made in Germany are used in this Device. The impeller of the fan of unilateral suction is executed with backward curved blades. It has aerodynamically optimized shape of the blades of the impeller. The rotating vaneless diffuser increases efficiency and improves acoustic characteristics. The impeller is made of high-strength material according to ISO 1940. The fan has protection against overheating by active temperature control. Compliances to standards:

- Isolation class is IP 54;
- tests of fans are carried out in chamber, according to DIN 24163, part 2 or ISO 5801;
- specifications conform to accuracy class 2, according to DIN 24166;
- the efficiency of the electric motor corresponds to the class IE4.

Technical data of the fans shown in tables 2.1, 2.2.

Table 2.1 Technical data of the process air fan

Parameter	Measurement unit	Value
Phase		3~
Operating voltage	V	400
Operating voltage range	V	380...480
Frequency	Hz	50
RPM	min ⁻¹	2580
Nominal power consumption	kW	1
Current consumption	A	1.63
Minimum ambient temperature	°C	-30
Maximum ambient temperature	°C	+50

Table 2.2 Technical data of the reactivation air fan

Parameter	Measurement unit	Value
Phase		1~
Operating voltage	V	230
Frequency	Hz	50
RPM	min ⁻¹	2250
Nominal power consumption	kW	0,3
Current consumption	A	1.24
Minimum ambient temperature	°C	-30
Maximum ambient temperature	°C	+50

2.4 Desiccant wheel (rotor)

Silica gel rotor R1000 made in Europe is the principal element of the Device. Rotors for 80% consist of active silica gel and that provides their highest performance data.

Silica gel is a solid adsorbent, dried gel of polysilicic acid. Silica gel according to its structure is highly porous, formed by the smallest and spherical particles, chemical composition is silicon dioxide SiO₂ (silica).

The main advantages of silica gel are:

- inertness, chemical and biological harmlessness;
- high mechanical resistance to abrasion and crushing;
- low temperature is required for regeneration (90° C - 140° C) and, as a consequence, lower energy consumption;
- explosion and fire safety.

Silica gel rotor is resistant to acidic environment, and can be used for drying air with relative humidity up to 100%. This material is highly efficient in the attraction and retention of water molecules. The know-how techniques of rotor enables the manufacturing of products, capable to handle the saturated with moisture air without the risk of destruction. Effective and reliable rotor design provides unlimited uses. The rotor has bacteriostatic properties, so it can be used where there

are high hygienic requirements. The adsorbing structure of the rotor can withstand a huge amount of adsorption-regeneration cycles, so the rotors are extremely durable, and their service life is 10-15 years. Special sealants in the places of air flow through the rotor are used to prevent mixing of process and reactivation air.

2.5 Heater

The unit uses a heating element, made on the basis of innovative technologies of thermo-resistors with a positive temperature coefficient (PTC) of resistance.

PTC-heating elements have the following advantages compared to the traditional tubular electric heaters.

- fire safety;
- properties of self-regulation: the thermal power output depends on the ambient temperature (the lower the temperature, the higher the power) and the speed of the airflow passing through the heater, which simply indicates the ability to quite easily control the heat power performance changes of the air flow (when you turn off the fan, power consumption is reduced substantially);
- environmentally friendly: oxygen is not burned, no carbon monoxide and other harmful substances are produced, specific odors are not emitted;
- power stability: changes in voltage $\pm 25\%$ results in power changes at about $\pm 10\%$;
- lack of infrared radiation, so you can have parts made from non-heat resistant plastic next to it, fan motors and that does not lead to overheating;
- long lifetime.

2.6 Air filters

The air filter is designed for the purposes of cleaning of the process air and for the air reactivation. The filter is made in the form of a cassette and is used to prevent clogging of the silica gel rotor and to clean the air according the required parameters.

2.7 Pre-cooler

DESIGN DATA

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EXTERNAL FLUID: Air

Ambient pressure	mmHg	760			
Capacity	kW	1.29			
Gas quantity	Sm³/h	250			
Air treated weight	kg/h	301	Sensible heat factor		0.72
Inlet temperature	°C	20.00	Condensed water	kg/h	0.50
Relative humidity	%	60.00	Actual velocity	m/s	0.78
Outlet temperature	°C	9.00	Pressure drop	Pa	21
Outlet relative humidity	%	100.00	Dry fin pressure drop	Pa	10

INTERNAL FLUID: Water

Inlet temperature	°C	5.00	+ GLIC. 35.00 % Etylenic by Volume		
Outlet temperature	°C	10.00	Pressure drop	kPa	16.60
Liquid weight	kg/h	277	Density	kg/m ³	1063
Liquid volume	l/h	261	Viscosity	mPa	5.42
Actual velocity	m/s	0.67	Conductivity	W/mK	0.43
			Specific heat	J/kgK	3335.36

2.8 Post-cooler

DESIGN DATA

CC User-278-00177/1 -1 128

Rel. 4.1 10-04-2015

EXTERNAL FLUID: Air

Ambient pressure	mmHg	760
Capacity	kW	3.54
Gas quantity	Sm³/h	500
Air treated weight	kg/h	602
Inlet temperature	°C	36.00
Absolute humidity	g/kg	0.14
Outlet temperature	°C	15.00
Outlet absolute humidity	g/kg	0.14

Sensible heat factor		1.00
Condensed water	kg/h	0.00
Actual velocity	m/s	1.63
Pressure drop	Pa	28
Dry fin pressure drop	Pa	28

INTERNAL FLUID: Water

Inlet temperature	°C	5.00
Outlet temperature	°C	10.00
Liquid weight	kg/h	763
Liquid volume	l/h	717
Actual velocity	m/s	0.92

+ GLIC. 35.00 % Etylenic by Volume		
Pressure drop	kPa	15.60
Density	kg/m ³	1063
Viscosity	mPa	5.42
Conductivity	W/mK	0.43
Specific heat	J/kgK	3335.36

2.9 Design features

- The casing is completely hermetic and panels are made of stainless steel with isolation of 20mm (rockwool). It is compact and lightweight.
- High efficiency at low temperatures and a low level of relative humidity in served rooms.
- Sufficient available static pressure to connect the dehumidifier to the duct system.
- Optional humidistat is an accessory.
- Highly efficient filters.
- Easy access to internal components of the dehumidifier for maintenance.
- High efficiency of washable silica gel rotor.

3 STORAGE AND TRANSPORTATION

It is necessary to implement the following recommendations for storage of the Device before installation (if required):

- Do not remove the dehumidifier from the packaging;
- Place the dehumidifier in a horizontal position on a flat, firm surface; upturning on either side can cause irreparable damage to some components;
- Ensure the protection of Device against mechanical damage;
- Cover the dehumidifier in order to protect from dust, rain, frost, chemical aggressive environments, etc.
- Valid storage period for dehumidifier depends on the surrounding environment. The maximum storage period for the Device in a well-ventilated heated premises is 5 months;
- Never place heavy objects on the dehumidifier.

Devices are transported fully assembled or in separate parts (sections), packed in a protective film. At transportation it is necessary to perform the following steps:

- It is necessary to make sure in completeness of the Device in the case of transportation in parts (sections);
- The Device may only be transported in a horizontal position;
- Special attention must be paid to prevent mechanical damage of the protruding parts;
- The Device can be transported by any type of transport, ensuring its safety and avoiding mechanical damage, according to the rules of cargo transportation for this transport.

4 INSTALLATION

4.1 Safety requirements

The requirements of this technical data sheet, „Electrical Installations Code," „Rules of the technical operation of electrical consumers", existing construction norms and regulations have to be fulfilled during installation and operation of the Device.

Dry room customized desiccant dehumidifier is the electric equipment, therefore it is necessary to comply with safety rules on the treatment of electrical equipment. The Device should be used specifically on its purpose. It is forbidden to spend any works on the Device if it is connected to the power supply.



ATTENTION!

Never open the door if the dehumidifier is running. To avoid electrical shock, the replace of damaged power cables should be done only by qualified specialists.

Do not install the dehumidifier in the environment with corrosive chemicals, explosive and toxic gases, and high temperature vapor, in high temperature environment or extreme dust and dirt.

4.2 Location

The dehumidifier is designed for installation indoors and outdoors.



ATTENTION!

Do not install the dehumidifier in humid places where there is a risk of direct contact with the water to the device; in very dusty places and places with chemically aggressive environment.

The Device has to be placed thus that there was a possibility of an easy access to it and further opening of side doors for carrying out service for scheduled maintenance or repair of a dehumidifier.

Figure 4.1 shows the installation of the dehumidifier outside serviced room when working on recirculation ("closed" circuit), i.e. the air is taken from the indoor volume, dehumidified and thrown back. Reactivation air is drawn outside the served room and ejected. In automatic mode the dehumidifier will work as long as it reaches the set point.

It is forbidden to use option of work of a dehumidifier on the "closed" circuit in the presence of particles or substances in internal air which can damage the Device elements.

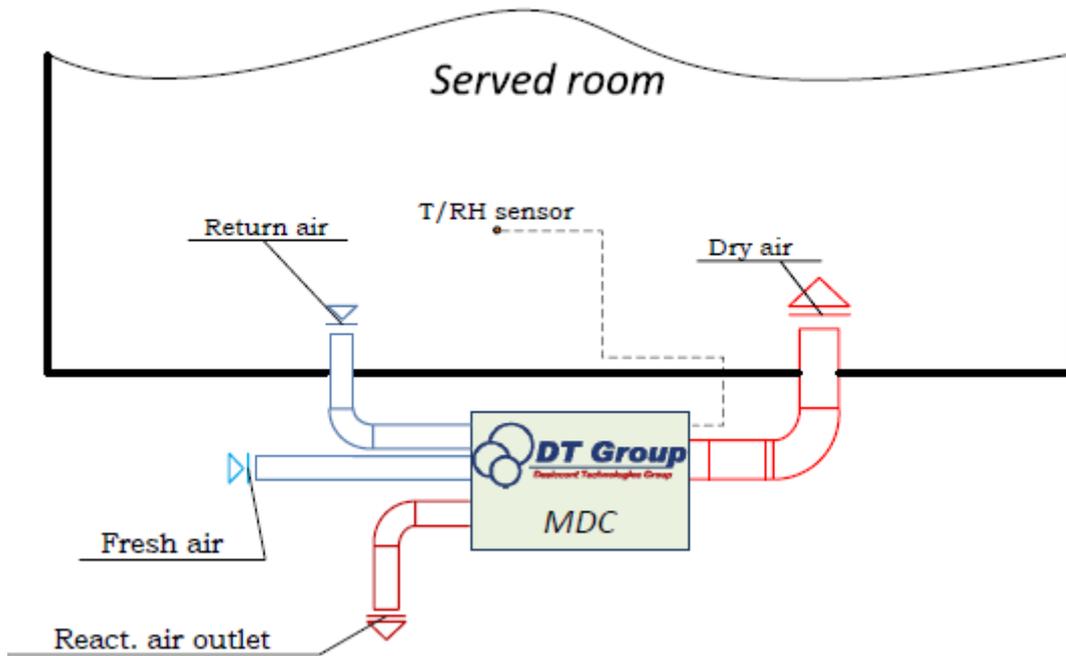


Figure 4.1: Installation scheme of Dry room customized dehumidifier

4.3 Connection of air ducts

The length of the connected duct system should be as small as possible in order to minimize pressure loss. The pressure of the fan allows connecting rather complex systems of air ducts to a dehumidifier, but before you should consult with experts.

At design of a dehumidifier the special attention was paid to reduction of the vibrations arising during the operation of the equipment, but, nevertheless, it is necessary to use flexible connectors at connection of rigid air ducts.

To reduce the load of its own weight, air ducts, directly connected to the dehumidifier, need to be mounted on supports.

It is recommended to install dampers with manual or the electric drive on air ducts of dehumidified and reactivation air for prevention of an uncontrolled flow of air when the dehumidifier is switched off. It is possible to establish sound attenuators on the inlet and on the outlet of the process air. This is required to be done taking into account the requirements for noise level of the served room.

4.3.1 Air duct for process (fresh/return) air intake

The intake port of the duct must be positioned high enough above the ground in order to prevent the system from dust, dirt and sand. Air intake must also be located away from the sources of possible contamination, such as: steam, exhaust gases and other harmful substances.

Outdoor air intakes are not allowed to place closer than 8m horizontally from the waste bin, parking cars zone, driveways, loading areas, sewer vents, tops of chimneys and other similar sources of pollution and odours.

It is necessary behind the intake to provide a chamber for settling large particles of dust, sand, etc.

in areas with possible intensive transfer of dust and sand and position the bottom of air intake device not less than 3m above ground level.

4.3.2 Air duct for exhaust of wet reactivation air

Air duct for exhaust of wet reactivation air must be made of corrosion-resistant material (e.g., stainless steel). The air duct must withstand the temperature of air up to 60° C. The wet air exiting from the dehumidifier has very high moisture content, due to which it is high probability of condensation formation on the inner surface of the duct. In order to avoid this phenomenon it must be properly insulated.

Horizontal sections of the duct must be installed with a slope (greater than 2.5 cm per meter) from the dehumidifier (see Figure 4.8). If there are vertical air ducts, condensate drain trap is installed at the lowest point to drain the water in case of its occurrence (see Figure 4.9). The wet reactivation air exhaust should be done at least 2 m from the air intake devices of process and reactivation air.

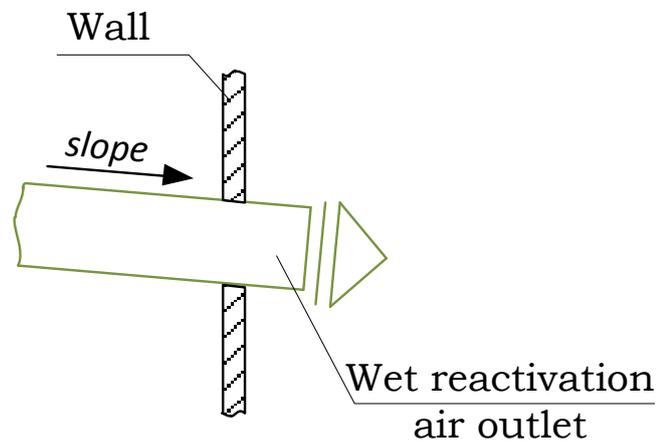


Figure 4.8: The example of laying horizontal air duct for the exhausted reactivation air

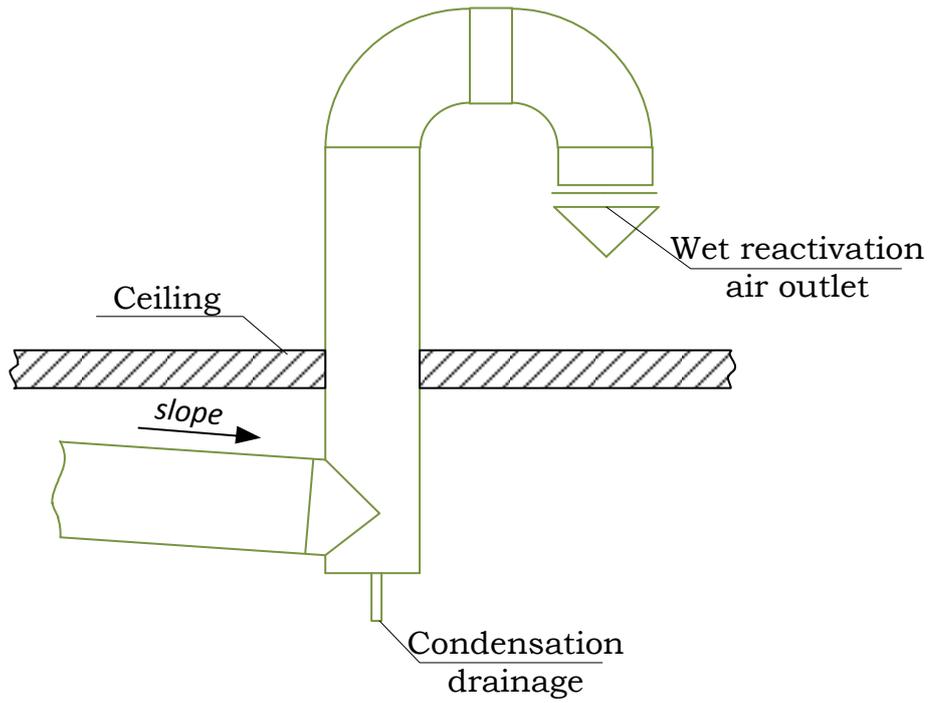


Figure 4.9: The example of laying vertical air duct for exhausted reactivation air

5 OPERATION

Dry room customized desiccant dehumidifier requires minimal maintenance. All components do not demand hard maintenance, i.e., lubrication or adjustment.

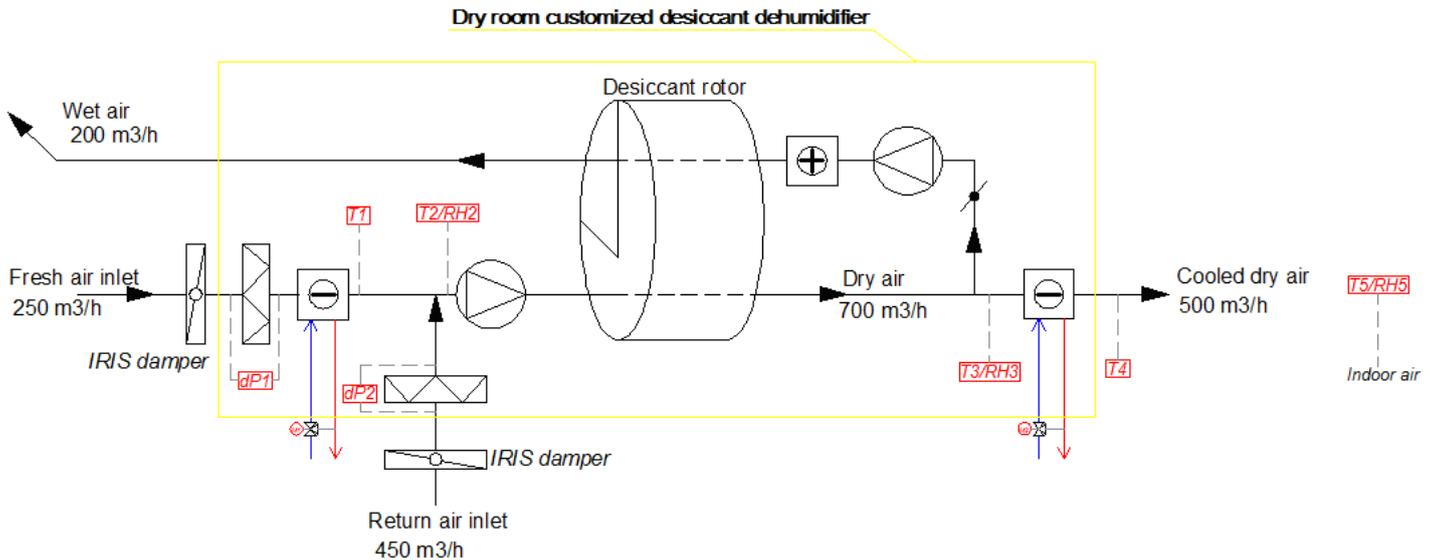


Figure 5.1: Principle scheme of sensors location

5.1 Maintenance

The Dry room customized desiccant dehumidifiers designed for prolonged continuous use and has a high degree of reliability. As in case of use of any other equipment, periodic maintenance service for maintenance of a dehumidifier in an optimum condition which will ensure the efficiency of its operation is required.

Frequency of maintenance is primarily determined by the operating conditions and environment in which the dehumidifier is installed. Reduction of intervals of servicing is necessary also at intensive operation of a dehumidifier.

During the normal work of a dehumidifier it is necessary to carry out the following preventive actions:

- monthly check and, if necessary, replacement of filters;
- monthly check of rotation of a rotor;
- monthly check of degree of wear of the desiccant wheel belt.

In addition it is recommended to make periodic survey of all dehumidifier components for correctness of functioning and the absence of wear of moving parts. Such check allows ensuring the functioning of a dehumidifier with the maximal productivity without additional energy consumption.

Close windows and doors of the served room for ensuring high efficiency of dehumidification. Windows and doors should be open only to ventilate the room.

Use only specially designed tools for the maintenance.

6 ELECTRIC CIRCUIT AND CONTROL SYSTEM

The electric part of a dehumidifier and control system are made from high-quality components manufactured in Europe. Quality meets the international standards ISO 9001, ISO 14001 and other applicable standards.

The control system includes:

- protection of engines and cables short circuit;
- protection of fan motors and heaters from the thermal overload;
- an optional humidistat to monitor and maintain the necessary humidity;
- rotor stop alarm;
- blocked filter alarm;
- microprocessor based control;
- remote control relay

7 THE BASIC TROUBLESHOOTING

Failure description	Possible cause	Solution
Dehumidification capacity decrease	Clogged air filters Reactivation heater does not work Reduced air flow Rotor does not rotate Process air mixing with reactivation air Changed air volume Changed the reactivation temperature Inner air mixing	Replace the filter Check fuses Check shutoff dampers Check belt tensioner Check consolidations of a rotor Check value of air volumes Check operability of the heater Check all sealings of a dehumidifier
The main circuit breaker does not work or switches off	Malfunction of the fan Too high air volume The rotor doesn't rotate The heater doesn't work	Check the fan Check air flow and shutoff dampers Check the drive rotor Check the heater of reactivation
The dehumidifier does not turn on	Interruption of electric circuit Malfunction of the control signal Phase failure Fault of control systems	Check automatic devices and an electric circuit Check the external start / stop signal Check automatic devices and sequence of phases Check all automatic components on working capacity
The rotor does not rotate	Slips a driving belt The driving belt is damaged Jammed rotor Malfunction of the rotor drive	Check the belt tensioner Replace a belt Check bearings and rotor seals Replace of the rotor drive
There is no process or regeneration air	Clogged air filter Fan is faulty Phase failure No air passing through the air ducts	Replace the filter Check the fan, the motor or the driving wheel of the fan Check the main circuit and the phase sequence Check the air ducts and shutoff dampers

8 SPECIFICATION

ITEM	MODEL	QTY
The process air fan	R3G310	1
The reactivation air fan	RH28L	1
Desiccant wheel (rotor)	R1000	1
Heater	PTC, 11.4 kW	1
Rotor drive motor	ASM 24 SG 10 KK	1
Rotor drive belt	11249 L	1
Belt tensioner	20L 100	1
Belt tensioner	Rosta RE10	1
Fresh air filter	G4 (EN779) 402x470x48	1
Return air filter	G4 (EN779) 222x470x48	1

9 WARRANTY TERMS

The warranty period for the Dry room customized desiccant dehumidifier is 12 months from the date of sale.

- The manufacturer during the warranty period assumes liabilities on elimination of troubleshooting of the equipment that occurs due to factory defects of Device or its parts and elements.
- The basis for consideration of claims on implementation of guarantee certificates is the Claim. The order of submission and contents of the Claim are specified in section 10 of the present Technical data sheet.
- The executed guarantee service doesn't prolong a warranty period; a guarantee for the replaced parts expires with the termination of guarantee period on the Device.
- These conditions of a guarantee are valid for all contracts on acquisition of the Device of the Manufacturer if other conditions aren't defined in these contracts.

These warranties do not apply to:

- parts of the equipment and the consumables which are the subject to natural physical wear (filters, seals, belts, light bulbs, fuses, etc.).
- the Device damages, resulting from:
 - a) appearance of foreign subjects or liquids in Device;
 - b) natural phenomena;
 - c) influences of environment;
 - d) unauthorized access to nodes and details of the Device of the persons who aren't authorized on carrying out the specified works,
 - e) all mechanical damages and breakages that occurred as a result of non-compliance with the recommendations of this present technical data sheet, norms, standards and rules of work.
- Various modifications, changes of work parameters, processing, repairs and replacements of parts of the Device which are carried out without consent of the Manufacturer or his representative.

Warranty works:

- works within this guarantee are performed within 30 days from the date of submission of the claim. In exceptional cases this period may be extended, in particular when time for delivery of a necessary component is required;
- the parts which are dismantled from the Device within warranty repair and are replaced by new ones, are the property of the Manufacturer;
- Manufacturer has the right to refuse to carry out guarantee works or service, if the customer delays the payment for the equipment.

10 CLAIMS SUBMISSION PROCEDURE

- At detection of discrepancy of quality, the consumer is obliged to send the Claim to the Producer which is the basis for a decision on the validity of the claim which is presented.
- The Claim in writing should be provided to the Producer. It is permitted to provide a complaint by fax or e-mail. The claim has to contain type, serial number and date of purchase of the Device, and also the exact address of a place where the dehumidifier has been installed as well as phone numbers of the responsible person on site.
- The Claim has to contain also the description of problems with the Device, and moreover (if it is possible) list of the damaged parts.
- Quality claims are not accepted if the user (customer) violates the rules of transportation, acceptance, storage, installation and operation of the dehumidifier.

EC DECLARATION OF COMFORMITY

Date: 2016/12/4

Manufacturer: UAB Desiccant Technologies Group

Address: Verkiu str. 5, LT-08218 Vilnius, Lithuania

Product: Desiccant dehumidifier (S/N 321310c10064)

Desiccant Technologies Group UAB, under sole responsibility, declares that the equipment listed above complies with following European directives :

2006/42/EC

Council directive on machinery

2006/ 95 / EC

Council Directive on the harmonization laws of Member States relating to electrical equipment designed for use within certain voltage limits (low voltage)

2004/108/EC

Council Directive of 15 December 2004 on the approximation of the laws of Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC (EMC)

Applied standards:

EN 61000-6-2 (EMC interference immunity)

EN 61000-6-3 (EMC interference emission)

EN 60335 part 1: 94+A1+A2+A11 to A16: 2001

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