

INSTALLATION AND INSTRUCTION MANUAL FOR CR110LK DEHUMIDIFIER.

PRODUCTION NO.
STOCK NO. :12111E-1
DOCUMENT NO. :110LK-12111E-1B
Electric Diagrams :E12111-10

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18.05.2021

1. PRINCIPLE OF OPERATION.

The dehumidifier removes water from an airflow through, and the removed water is carried away from the dehumidifier with the regeneration air (henceforward called reg.-air). Water adsorption and -extraction takes place in an rotor made of water resistant silicagel.

The air flows in the dehumidifier divides the rotor in two parts : drying part and reg.-part.

Two separate air flows passes through the rotor:

- the process air passes the drying part, which is 75% of the rotor material. In the rotor, part of the water content is adsorped and the air leaves the rotor as dry air
- the reg.-air is a closed circuit:
 - in the electric heater it is heated to app. 130C (at 25C inlet)
 - passing the reg.section of the rotor (25% of the rotor-material) the energy is used for evaporating the adsorped water, which is then carried out of the rotor
 - the air is then cooled in the heat exchanger and the water will condensate and leave the dehumidifier as free water.

The two air flows are fixed and the rotor turns - this gives an automatic process of simultaneous water adsorption and water extraction (see principle of operation, drawing R1213 page 2.

The heat exchanger is cooled by the cooling air, which has common inlet with the process air (see principle, fig. 1, page 2.

CAPACITY DIAGRAM.

The inlet conditions of the air to be dried, determines how much water the dehumidifier will remove.

On page 8 the capacity diagram shows how much water will be removed per kg air going through.

Example: (shown in the diagram R292)

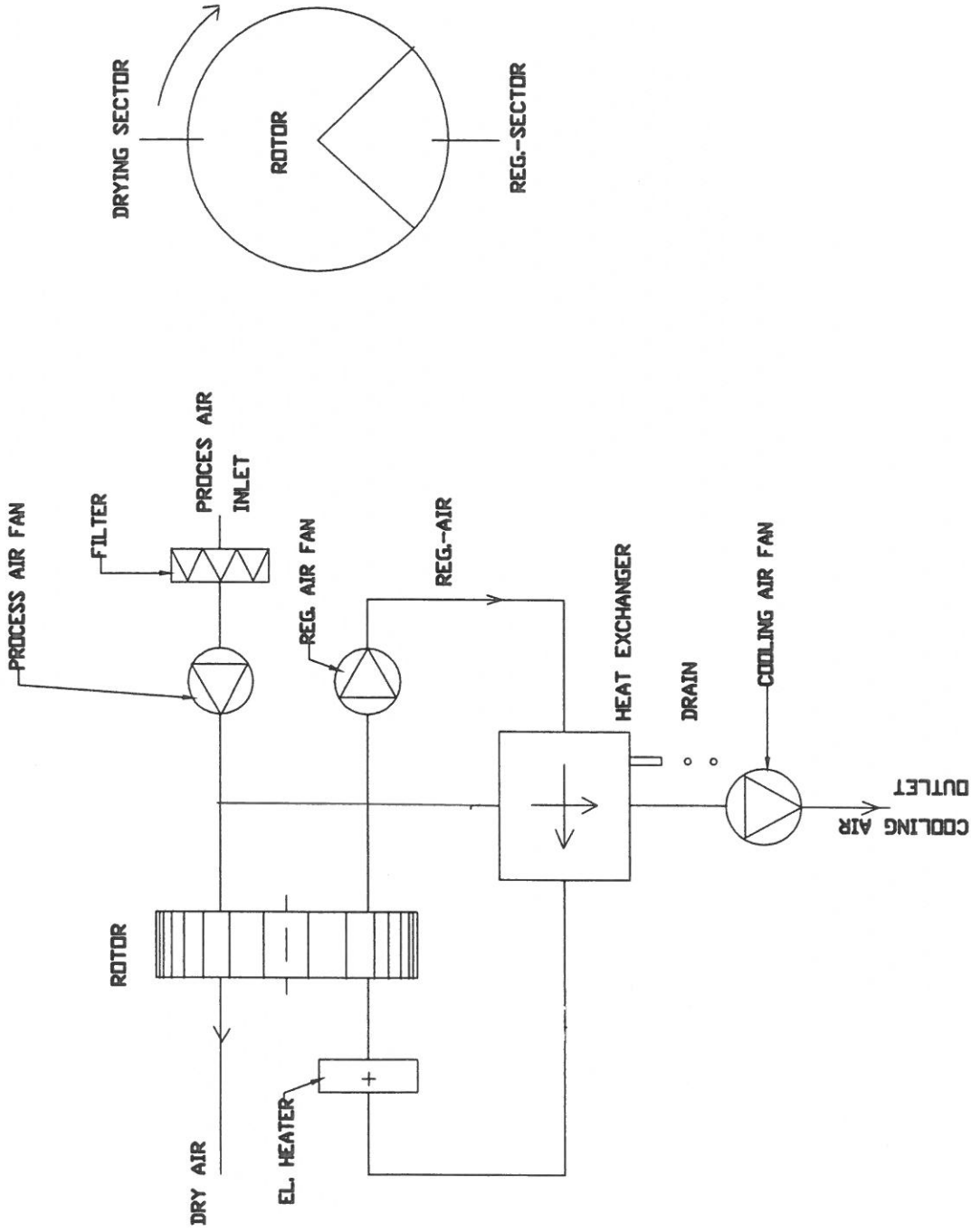
- inlet air conditions 20C, 60 %RH, gives water content 8,7 g/kg
- the diagram shows then dry air condition of X= 4,0 g/kg
- removed per kg air is then: $8,7 - 4,0 = 4,7$ g/kg

Data for the LK version must be reduced with 10% = 4,2 g/kg

Capacity CR110LK at this condition:

Dry air flow is nominal 110 m³/h = (x 1,2) = 132 kg/h
Capacity, removed water per hour = 132 x 4,2 = 554 g/h
= 13,3 kg/24h

The temperature of the dry air is higher than for the inlet air. This is caused by the evaporation heat release and heat gain from the rotor. The temperature is shown to be 35C.



Titel: PRINCIPLE OF OPERATION, ...

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Industrivej 31A		Målestok 1:2	
DK-4230 Skælskør		Dato: X	
		Rettelse:	
		Dato: X	
		Dato: 01.03.97	
		Tegn. nr.: R1475	

2. APPLICATIONS.

Dehumidifiers in the CR range is used for dehumidification of ambient air at normal atmospheric pressure. This can be an installation for moisture control in an unheated store room, in a water work building, production room for hygroscopic materials... - with the dehumidifier in a separate installation. The dehumidifier also can be used as a part of a bigger air treatment system. Here the dehumidifier often will be placed in a by-pass to the main system. In this case the pressure in the main system will influence the dehumidifier - and your supplier must be contacted, as this can influence the capacity of the dehumidifier.

Normally the dehumidifier will be placed on the floor, on a table or in a wall bracket (option). It should always be placed horizontal, resting on the four pcs. rubber supports.

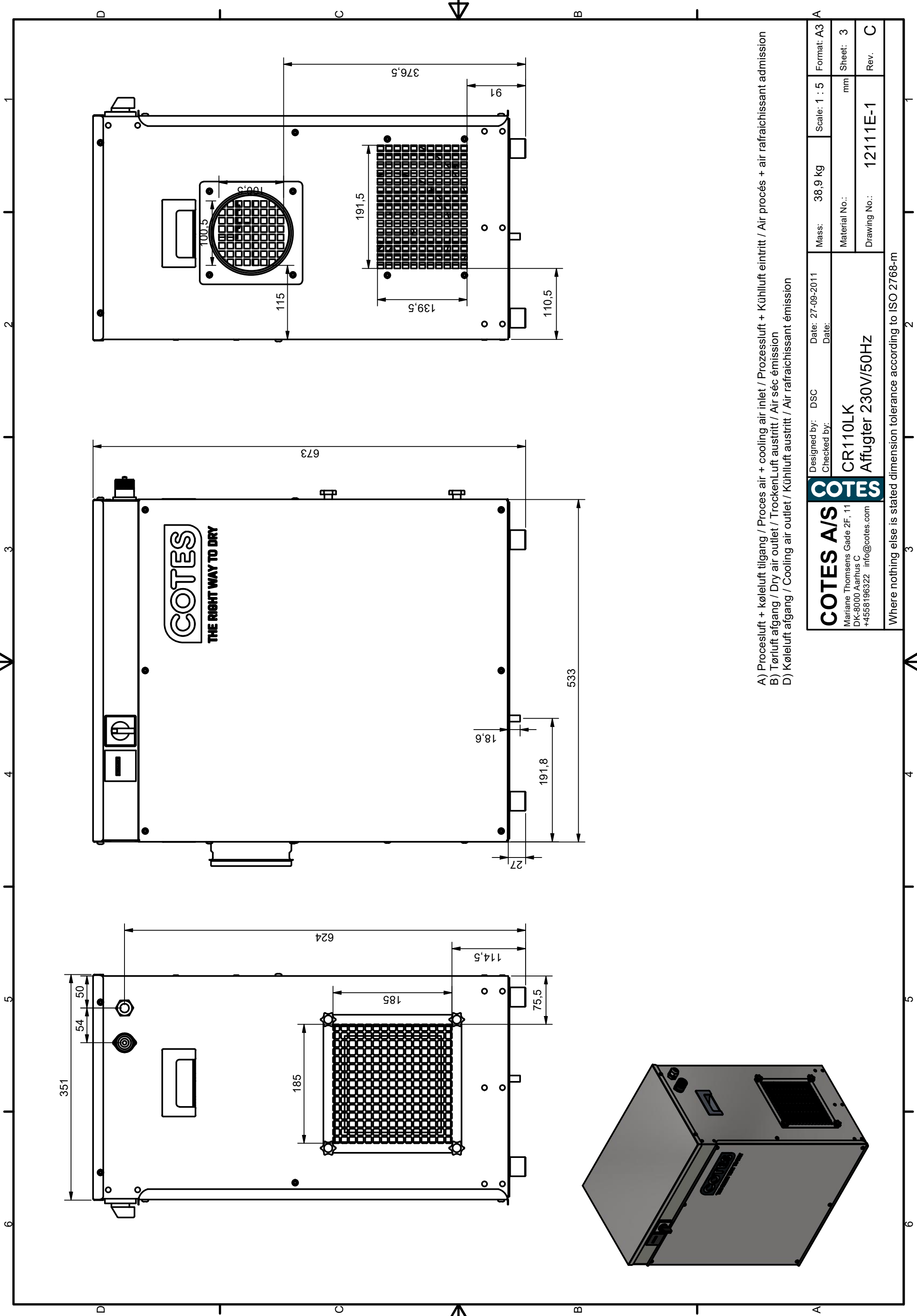
The air to the dehumidifier should be free from solvents or other explosive components, and should be free from pollution from solid particles.

For air to the dehumidifier the following limit values must be respected :

- max. humidity 100 %RH
- max. temperature 35C *)
- max./min. pressure ambient +/- 300Pa

**The CR range is for indoor, stationary installations.
Should not be placed in rooms with possibility for free water on the cabinet.**

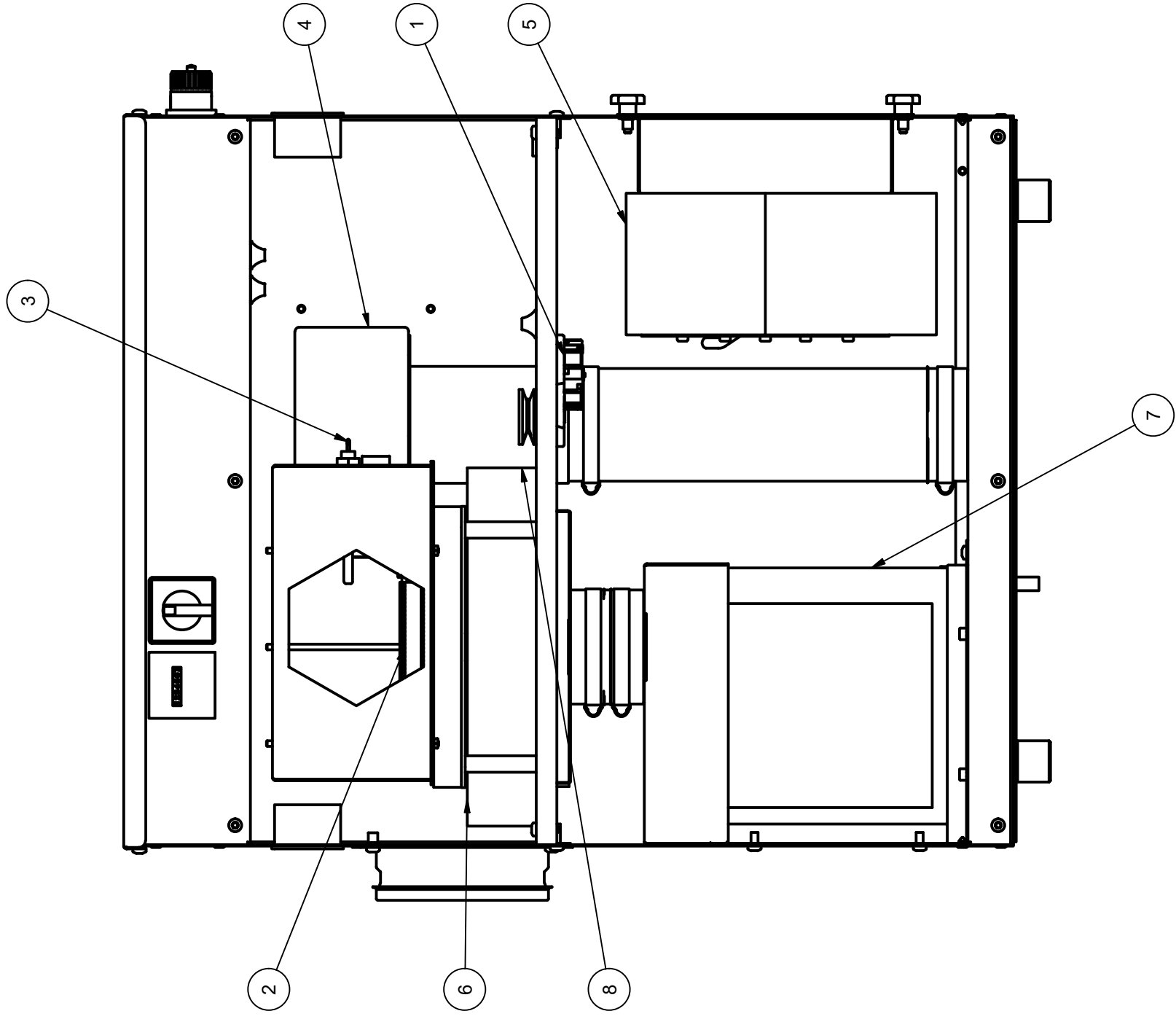
- *) at inlet air temperatures higher than 20C or at %rH lower than 30%, a reduction of the capacity must be considered.



- A) Procesluft + køleluft tilgang / Proces air + cooling air inlet / Prozessluft + Kühlluft eintritt / Air proces + air rafraichissant admission
- B) Tørluft afgang / Dry air outlet / TrockenLuft austritt / Air séc émission
- D) Køleluft afgang / Cooling air outlet / Kühlluft austritt / Air rafraichissant émission

COTES A/S Mariane Thomsens Gade 2F, 11 DK-8000 Aarhus C +4558196322 info@cotes.com	Designed by: DSC Checked by:	Date: 27-09-2011 Date:	Mass: 38,9 kg	Scale: 1 : 5	Format: A3
	CR110LK Affugter 230V/50HZ		Material No.: mm	Sheet: 3	Rev. C

Where nothing else is stated dimension tolerance according to ISO 2768-m



ITEM	QTY	PART NUMBER	DESCRIPTION	MASS
1	1	110406	Saia gear/motor UFR1ND4B25CNNZ	
2	1	111457	PTC heating element 15/22 IS	
3	1	111460	Heating cartridge 10W. 230V	
4	1	111702	Fan G2E108-AA01-37 230V 50/60H	
5	1	111770	Fan Ruck GE160-2E-132033	
6	1	124060	Rotor PPS ø260/50	
7	1	126513	Heatexchanger 200x200x200	
8	1	132104	Drive belt ø6/880	

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Designed by: DSC
 Checked by:

COTES
CR110LK
Afflugter 230V/50Hz

Date: 27-09-2011
 Date:

Mass: 38,9 kg
 Scale: 1 : 5
 Material No.: mm
 Drawing No.: 12111E-1
 Format: A3
 Sheet: 4
 Rev. D

Where nothing else is stated dimension tolerance according to ISO 2768-m

5. TECHNICAL DATA, SPECIFICATIONS CR110LK.

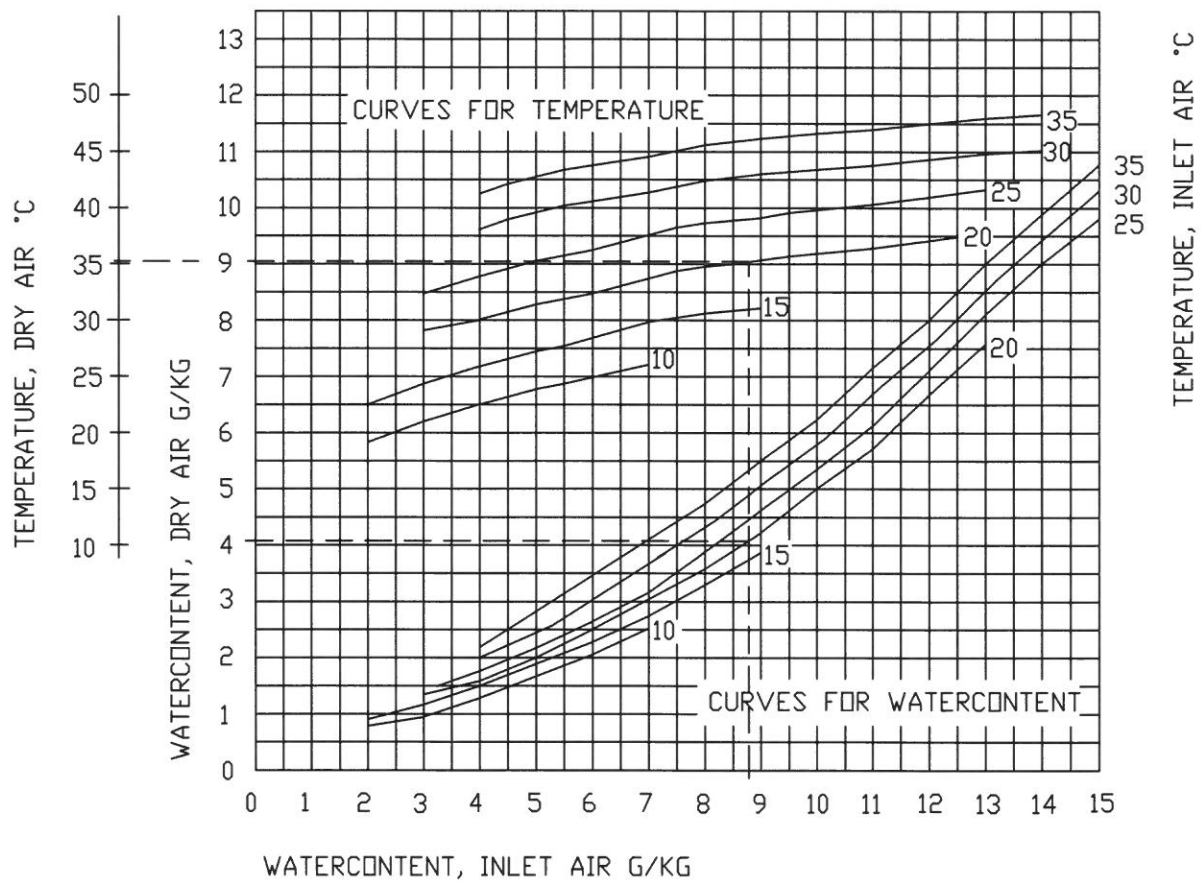
Dry air, free blowing.....	140 m ³ /h
Dry air, nominal.....	110 m ³ /h
Reg.-air, nominal *)	35 m ³ /h
*) adjusted by supplier	
Cooling air flow	380 m ³ /h
External pressure, dry air (at 110m ³ /h):	50 Pa
Capacity at 20C, 60% RH (at 230V)	13,3 kg/day
See capacity diagram, page 8	(4,7 g/kg *)
*) to be reduced with 10% in the LK version.	
Electric heater.....	1500 W
Power consumption, electric heater at nominal conditions.....	920 W (4A/230V)
See 7.5, page 11, Electric connection	
Fan.....	210 W 230V/50
Motor for gear.....	3,5 W 230V/50
Nominal power consumption.....	1130 W at 230V
Voltage.....	220 - 230V/50

FURTHER SPECIFICATIONS:

Rotor.....	Silicagel, Ø260/50
Rotations of rotor.....	18 rph
Gear (Fiber)	30S, M52/G12
Drivebelt.....	Ø6/880
Pully.....	R995

DIMENSIONS:

L x W x H.....	530x347x670 mm
(see drawing page 4)	
Weight.....	43 kg



VOLTAGE 230V

Titel: CAPACITY DIAGRAM

HB COTES A/S
 Værkstedsvvej 5
 4230 Skælskør
 Tlf.: 58196322

Dato:	Rettelse:	Vare nr.:
X	X	Målestok 1:1
		Dato: 09.09.96
		Tegn. nr.: R292

7.0 ELECTRIC DIAGRAMS/COMPONENTS.

Refer to diagrams E12111E-1 from page 14

7.2 REGULATION BY HYGROSTAT.

The dehumidifier is prepared for external regulation by a hygostat. For connection, use the black plug in the front. The corresponding male part can be supplied by Cotes or your locale supplier.

The selector switch SA1 must then be in position "Auto". Position "man" is for continuous operation.

The hygostat should be approved for 230V/3A.

7.3 ELECTRIC CONNECTION.

The dehumidifier CR110LK is connected 230V, 1N+PE. The dehumidifier is equipped with a 2m cable for the power supply. Power consumption is 1,15 KW - fused by 10A. (see below)

SUBJECT : POWER CONSUMPTION & AIRFLOWS.

The electric heater is 230V, 1500W and the external installation should be made for this.

In the electric heater the power consumption is decided by the reg.air flow - which is adjusted by the manufacturer. During operation the am-meter should indicate 4,0-4,2A.

THE INSTALLED ELECTRIC HEATER :

The PTC type electric heater is only functioning when air flows through. This is the reason why no thermostats or thermostatic switch is installed, as the function of these components will be regulation of the energy for the electric heater.

WARNING : DO NOT TOUCH THE ELECTRIC HEATER WHEN SWITCHED ON, AS IT IS AN UNINSULATED LIVE WIRE.

8. INSTALLATION.

The dehumidifier should be installed indoors, placed on a wall bracket or some other horizontal basis. It should be placed on the four pcs supports underneath the cabinet.

CONNECTION OF DUCTS :

- 8.1 The process and the cooling air is normally taken from the room, through the air inlet filter.
We cannot recommend to connect ducts at the air inlet and for the cooling air outlet.
The dry air outlet can be connected some ducting, with regard of the available external pressure.

In general ducts of the same size as placed on the dehumidifier should be used.

9. START-UP PROCEDURE.

9.1 ELECTRIC.

Before starting-up the dehumidifier, check that all electric connections are made correctly.
If this is OK, just connect the plug into the electric switch, and switch on.

9.2 STOP OF DEHUMIDIFIER.

The relay D1, (on delay) controls the gear motor and the reg.-air fan. This means that they will continue operating even that the dehumidifier is stopped by a connected hygostat or on the build in selector switch.
This continued operation cools the electric heater and at the same time the evaporated water vapours from the warm rotor material in the reg.-section is ventilated out of the dehumidifier.
It is important that the dehumidifier is stopped as described above and this delay for the gear motor and the reg.-air fan is achieved. If not, the moisture might cause short circuit in the PTC heater at restart.

9.3 AIR FLOWS.

No adjustment of the air flows is necessary.

The dry air flow is free blowing 150 m³/h - and could be reduced to 110 m³/h by a damper or in connected dry air ducts - in order to obtain data from the capacity diagram.

The reg.-air is adjusted by the manufacturer and must not be changed.

The cooling air flow must be as big as possible, and no ducts should be connected (reducing the airflow)

With the electrical settings and air flows adjusted, the dehumidifier will then operate automatically by means of the internal control- and safety functions - controlled by an external hygostat.

11. MAINTENANCE.

Dehumidifier CR110LK only needs a minimum of maintenance. All components are service free, which means no lubrication or adjustment.

Only three things should be checked under normal operation:

- air filter should be replaced often.
- the rotation of the rotor should be checked once a month
- the power consumption of the electric heater should be checked often (reading 4,0A on the amp.meter).

If the rotor rotates during operation, and the energy consumption of the electric heater shows 4,0A, - you can be almost sure that the dehumidifier is operating at an optimum. We nevertheless recommend some periodic verification of the entire dehumidifier, to see if all internal functions are OK and checking of gaskets and moving parts for wear and tear. This will ensure that the capacity is on its maximum, and thus won't waste any energy.

12. TROUBLE SHOOTING.

12.1 If the dehumidifier does not start when electric connected, control the external fuse.

12.2 If the dehumidifier is not operating it is probably the external hygrostat which has broken.

This is a normal situation when the desired humidity is obtained.

To check : adjust the hygrostat for 20 %RH, and the dehumidifier should start operating. Adjust again for the desired humidity.

12.3 If the desired humidity is not obtained, the problem can be the dehumidifier - or the other parts in the total installation (room tightness, hygrostat...).

To verify this, check:

- rotation of rotor ?
- the dry air should be 10-15C warmer than the inlet main air. If it is cold it could indicate that the rotor is not turning caused by broken drive belt or the motor has stopped.
- by hand feel the temperature of the cooling outlet air and feel the airflow. The temperature is depending on the inlet conditions, but should be 5-6C higher than the inlet main air. The am-meter should show 4,0A.

If it is cold and am-meter shows 0A, the electric heater might be replaced.

13. SERVICE/REPAIR.

13.1 SAFETY INSTRUCTION.

Before opening the dehumidifier, make sure that the electric power is switched off on the main switch.

The dehumidifier CR110LK is manufactured in the intention of easy cleaning and maintenance, which is important when it is used on building sites.

To dismantle the dehumidifier, do like this:

13.2 Remove the top cover (4 pcs M5 inbus screws)

13.3 Separate the cables to the fan in the multi connector

13.4 Pull the fan and the palate on which it is fixed up and when they are in the top position, pull them backwards and out of the cabinet

13.5 The hose for the reg.air can be removed by just pulling them off the connection pieces

13.6 Separate the multi connector in front on the dividing plate

13.7 Remove the two striking plates which is locking the front dividing plate. The striking plates is located on top of the cabinet, on each side close to the dividing plate. They have to be pushed against the middle - and total rotor section is ready to be removed.

13.8 To remove the rotor section:
- lift it the possible 4mm
- move it backwards until it meet the two bigger slits in the top of the cabinet
- pull the rotor section up and out of the cabinet

13.9 Now the cabinet is empty and can be easy cleaned, or defective am-meter, hour counter, toggle switch, power cable can be replaced.
At the same time the rotor section is accessible for replacing the electric heater, gear motor - or cleaning or replacing the rotor.

13.10 To dismantle the rotor section :
- remove the screws in the guide shafts
- remove the springs and the discs
- remove the screw in the shaft for the rotor, and then pull the rear dividing plate out
- remove the teflon disc
- pull the rotor out from the shaft

All parts to be assembled again in the opposite order.

14. SOUND LEVEL.

The sound level is measured according to EN292-2:

The dehumidifier is during the measuring of the sound level placed with the top plate 1 m above the floor. Ducts for reg. air is installed and let out of the room, and 2 m dry air duct $\varnothing 100$ is installed too. The sound level is then measured 1 m outside the cabinet, and 1,6 m above the floor, and a sound level of 66 dB(A) is measured.

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	0	1	2	3	4	5	6	7	8	9
A										
B										
C										
D										
E										
F										

MODEL: CR110LK
 PROJECT NR: E1211E-10
 SECTION: ELECTRICAL BOX
 VOLTAGE: 230V 50Hz 1PH+N+PE
 SYSTEM GROUND: TT SYSTEM
 FUSE: MAX 10A
 I_{kmax}: 6 kA

COTES
 +4558196322

COTES A/S
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PLATE

Project
 E1211E-10 CR110LK

Date
 10-05-2021

Audit

Document

Initials

SD/TM

DCC

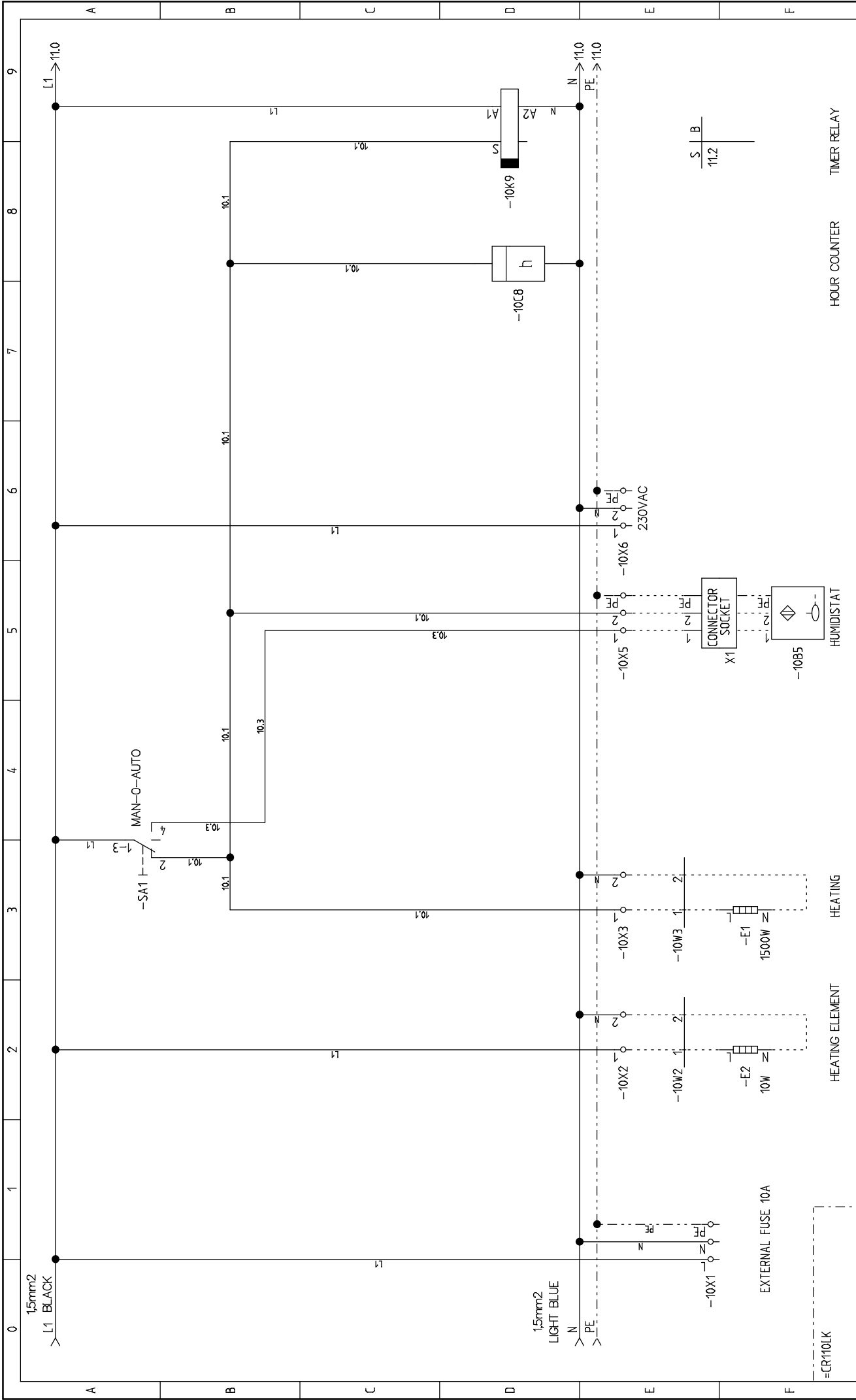
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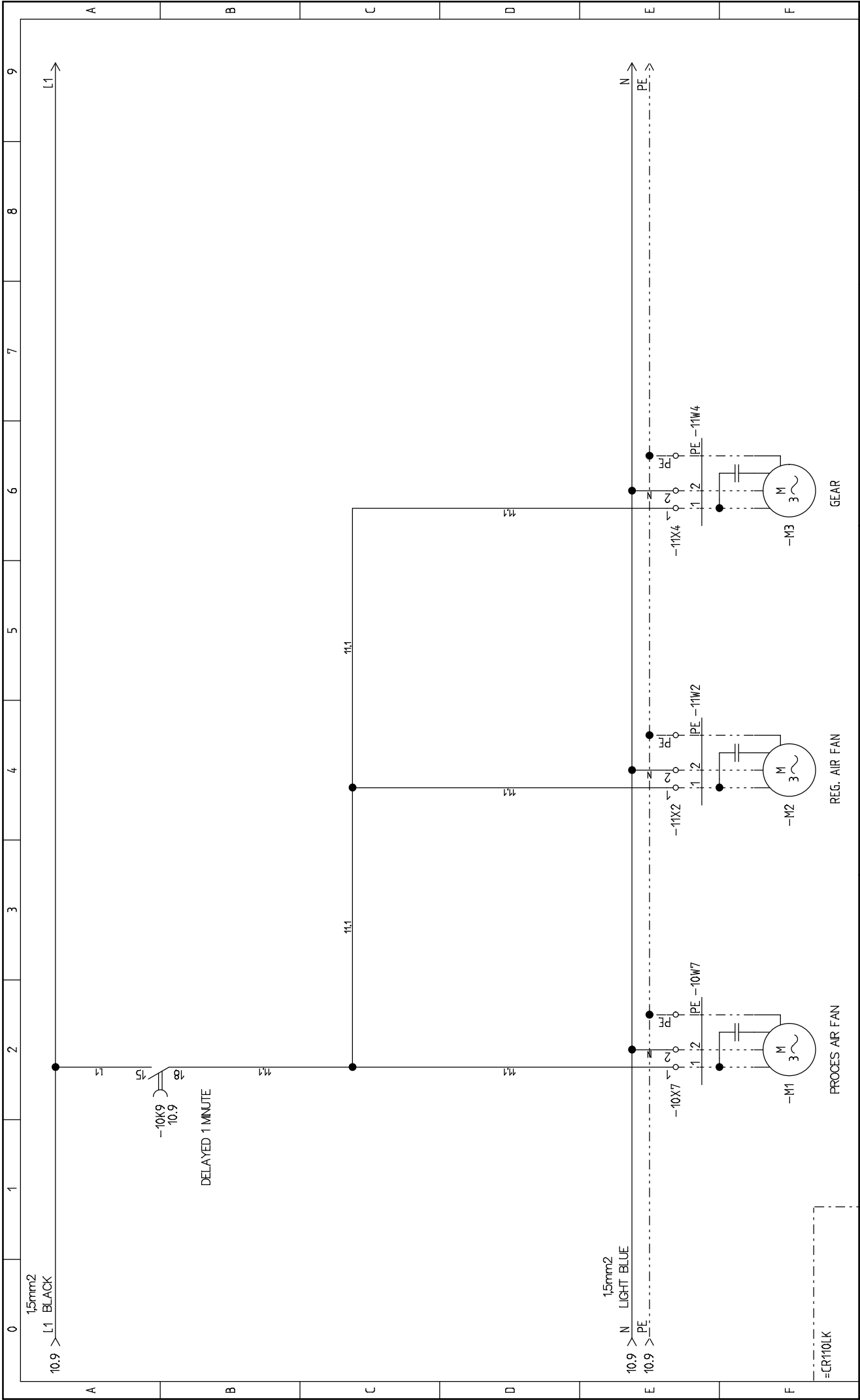
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	Date 12-02-2021		Audit		Initials SD/TM		DCC &EFS		
				Document		Next page		Page 11	

Productlist

Function (=)	Location (+)	Product (-)	Type	Description	Manufacturer	Documenttype	Page	Circuit
=CR110LK		-C1	111638	CAPACITOR, 7µF		Kredsskema	11	2
=CR110LK		-C2	111620	CAPACITOR, 15µF		Kredsskema	11	4
=CR110LK		-C3	110431	CAPACITOR, 0,12µF		Kredsskema	11	6
=CR110LK		-E1	111457	220-240V/50Hz - PTC, HR 15/22 IS		Kredsskema	10	3
=CR110LK		-E2	111460	HEATING ELEMENT 230V 10W		Kredsskema	10	2
=CR110LK		-M1	111770	GE160-2A, 230V 50Hz, 210W		Kredsskema	11	2
=CR110LK		-M2	111702	GZE108-AA01-01, 230V, 44W		Kredsskema	11	4
=CR110LK		-M3	110406	SAIA UFR12, 230V/50 / SAIA B30S		Kredsskema	11	6
=CR110LK		-SA1	110215	DESIM, U1/8ZM/F621/DK		Kredsskema	10	4
=CR110LK		-X1	112001 / 112000	HYDROSTAT CONNECTOR CA3GD / CA00SD4		Kredsskema	10	5
=CR110LK		-10L8	112003	HOUR COUNTER, 230V/50, HB C0TES, 48x48 MM.		Kredsskema	10	8
=CR110LK		-10K9	822254	Timer MF.8A.12-240VAC/DC. 1C0		Kredsskema	10	9
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