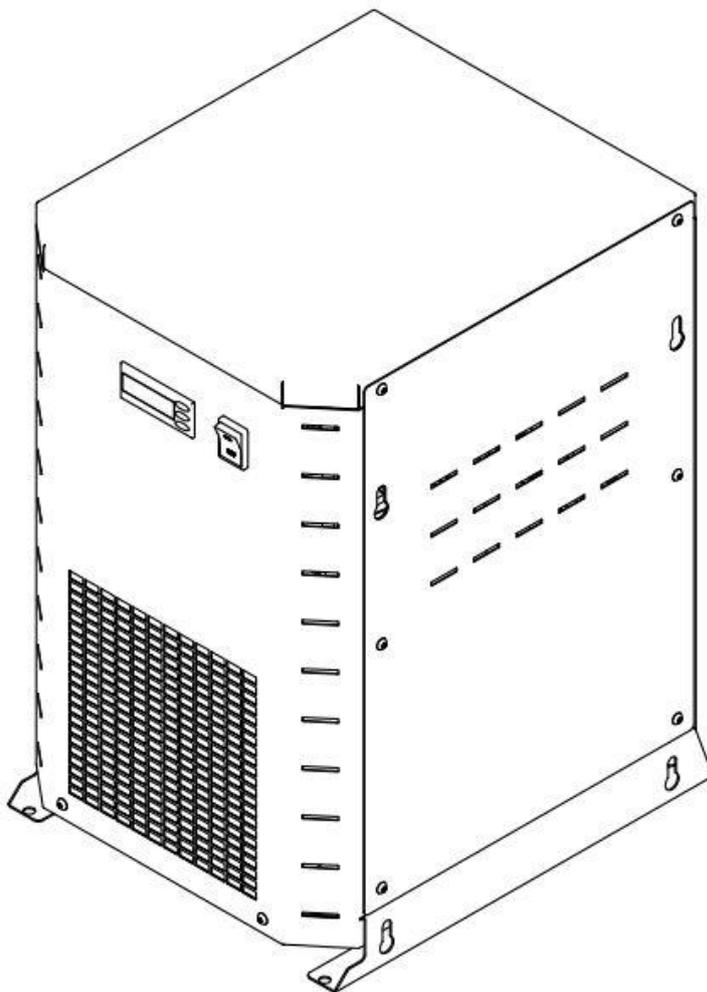


# Installation and operating manual

Refrigeration Dryer Series UDT 20 - 1900



Please read the instructions carefully before installation or use. The proper and safe operation of the refrigeration air dryer is ensured only by following the recommendations and conditions stated in the instructions.



For additional questions, contact the manufacturer and inform him of the information on the data plate found on the front of the dryer.

Dear customer!

Thank you for purchasing our product. In order for the product to serve well and reliably, please read these installation and operating instructions carefully.

In order to avoid misuse of equipment and potential hazards for the operator, please read thoroughly and strictly follow the instructions contained in this installation and operating manual.

Before packing and shipping, each unit of the UDT refrigeration air dryers is subjected to rigorous tests to ensure that the factory defects are removed and all the functions of the device for which it was designed checked.

After correctly installing the unit in accordance with the instructions in this manual, it will be ready for use without the need for additional settings. The operation is fully automated, and maintenance is limited to a few checks and cleanings, as shown in the continuation of this manual.

**These instructions must always be present at the unit and be available for the entire operating life of the device. The instructions are considered as an integral part of each refrigeration air dryer.**

This manual provides the user, installer and maintenance technician with all the technical information needed to install, operate and perform routine maintenance work to ensure long service life. If spare parts are required, they must be original. Requests for SPARE PARTS and any information relating to the unit must be sent to the distributor or to the nearest service center, indicating the MODEL and SERIAL NUMBER located on the data plate of the device.

Due to uninterrupted technical development, we reserve the right to introduce the necessary changes without prior notice. If you need further explanation or clarification, contact the manufacturer or distributor of the device.

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## 1 General information

### 1.1. Device information

Model of refrigeration air dryer:

Serial number:

Year of manufacture:

Date of installation:

Please fill in the fields carefully. Correct data enables proper and efficient maintenance of the device, selection of suitable spare parts and technical support.

### 1.2. Information on the supplier

Name:

Address:

Phone / Fax:

e-mail:

### 1.3 Basic

Compressed air contains contaminants such as water, oil and particles. Impurities need to be removed or their concentration reduced to an acceptable level according to the requirements of the application. The ISO 8573-1 standard specifies the purity / quality of the air for contaminants. The humidity (water vapor content) can be expressed in terms of Pressure Dew Point (PDP). Dew point is the temperature at which the air is 100% saturated with moisture. When the air temperature falls below the dew point, moisture condenses. Reduction of moisture content to the point of dew point +3°C can be achieved by refrigeration air dryers.

### 1.4. Refrigeration air dryers

Refrigeration air dryers are the best choice in all standard applications, where pressure dew point 3 °C suffices. Examples of such applications are process air in the processing industry (pneumatic equipment, wood industry, paint shop, chemical industry, pharmacy, etc.).

### 1.5 Proper use

⚠ UDT refrigeration air dryers are designed for efficient and quality preparation of dry compressed air. This device must only be used for the purposes for which it was designed. All other uses of the device are considered incorrect.

⚠ The manufacturer is not liable under any circumstances for damage resulting from improper, incorrect or unreasonable use of the device.

⚠ Only use genuine spare parts. Warranty or Reclamation cannot be claimed for damage or malfunction of the device caused by the use of non-original parts.

## 2 Safety instructions

- ⚠ Improper use of the compressed air system and electrical installations can lead to injury or death.
- ⚠ Improper handling (transport, installation, use, maintenance) of a refrigeration air dryer can lead to serious injury or death. The result of improper use may be damage to the device and/or reduced efficiency of the dryer.
- ⚠ When operating the dryer, you must follow all relevant safety and accident prevention instructions, all regulations and instructions for use. The UDT refrigeration air dryer was developed in accordance with the generally recognized rules of engineering practice.
- ⚠ Ensure that the installation complies with local legislation.
- ⚠ The user or operator of the refrigeration air dryer must be familiar with the installation, commissioning and operation of the appliance.
- ⚠ All safety information is intended to ensure your personal safety. If you do not have experience with such systems, contact the manufacturer or local supplier for technical assistance.
- ⚠ Before working on the dryer, ensure that the dryer is vented and not under pressure (this also includes the closest components of the installation in front and behind the dryer) and that the dryer is not connected to an electrical source.
- ⚠ Do not exceed the maximum operating pressure or operating temperature (information on the data label).
- ⚠ The permissible operating temperatures and working pressures for the accessories of the adsorption dryer are given in the technical documentation of this accessory. The maximum temperature and pressure of the assembled system is the lowest maximum temperature or pressure of any individual part of the system.
- ⚠ Ensure that the refrigeration air dryer is not subject to vibrations that can cause fatigue and cracking of material.
- ⚠ The refrigeration air dryer must not be subjected to mechanical stress.
- ⚠ All installation and maintenance work on the refrigeration air dryer can only be carried out by a qualified and experienced specialist.
- ⚠ It is forbidden to make any changes to the refrigeration air dryer.
- ⚠ Vent the refrigeration air dryer system before performing any kind of installation or maintenance work.
- ⚠ Ensure that the refrigeration air dryer is installed in accordance with specifications and without mechanical loads.

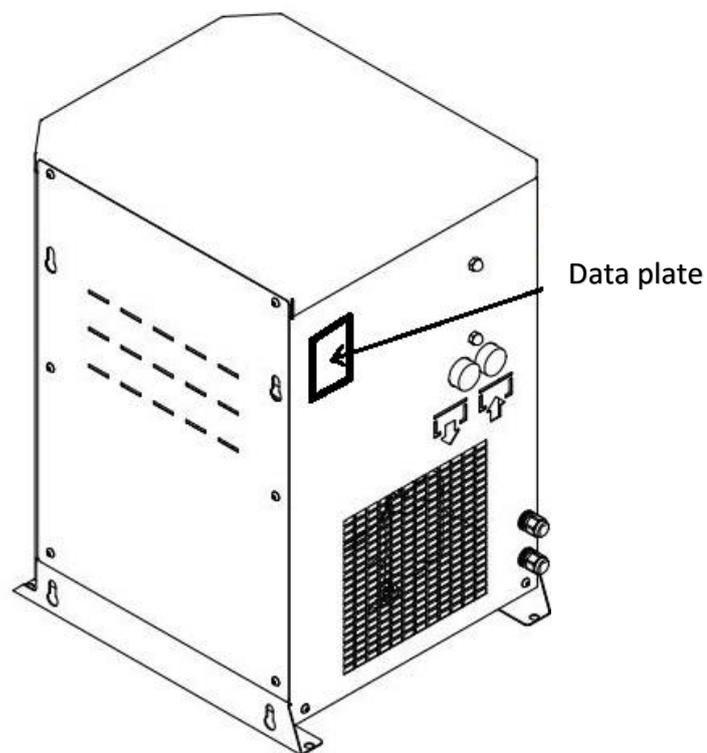
⚠ Only use genuine spare parts.

⚠ Only use refrigeration air dryers for intended purpose.

⚠ When transporting the dryer, check and follow the local regulations for lifting and transporting heavy objects.

⚠ In the event of fire, do not use extinguishing water on the dryer and nearby objects.

⚠ Wear suitable protective equipment: ear plugs, safety goggles, safety helmet, safety gloves and safety shoes.



*Figure 1: Location of the data plate*

## 3 Technical Specifications

### 3.1 Components

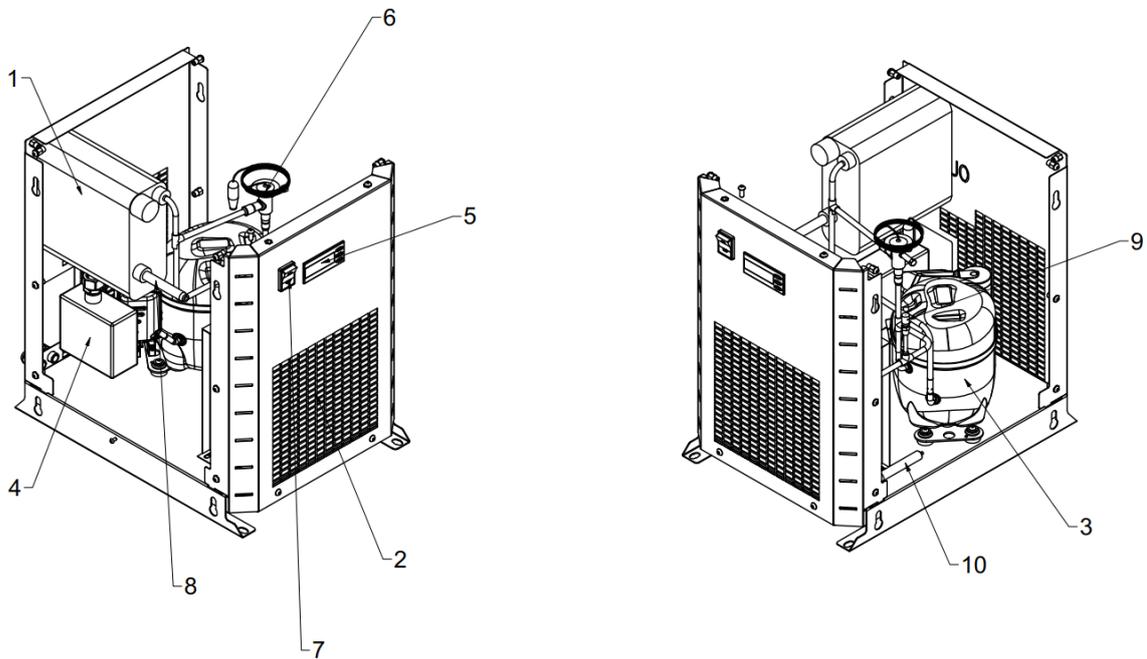


Figure 2: Components (shown: UDT 100)

- |                                  |                                    |
|----------------------------------|------------------------------------|
| <b>1. Heat exchanger 3in1</b>    | <b>7. Switch</b>                   |
| <b>2. Condenser</b>              | <b>8. Capillary tube</b>           |
| <b>3. Compressor</b>             | <b>9. Sensor for fan operation</b> |
| <b>4. Timed condensate drain</b> | <b>10. Filter / dehydrator</b>     |
| <b>5. Controller</b>             |                                    |
| <b>6. Hot gas bypass valve</b>   |                                    |

## 3.2 Specifications

### TECHNICAL SPECIFICATIONS

Max. operating pressure	16 bar(g)
Max. inlet air temperature	55 °C (for temperature ≠ 35 °C apply correction factor)
Operating ambient temperature	1 °C to 45 °C (for temperature > 25 °C apply correction factor)
Storage conditions	1 °C to 65 °C, <90 % relative humidity
Pressure dew point	+ 3 °C
Filter requirement (inlet)	Prefilter 3 µm
Communication	MODBUS
Digital input	Remote ON/OFF
Digital output	Alarm
Type of cooling	Air cooled
Compressor operation	Non-cycling
Condensate drain	Timer controlled
Condensate drain time ON	1 s - 10 s (default 1 s)
Condensate drain time OFF	0 s - 600 s (default 200 s)
Max. noise level at 1m	< 65 dbA
Refrigerant	R134a
Protection class	IP 20
Handling option	Manual (UDT 20-100), Forklift (UDT 140-1900)

### MATERIALS

Casing	Carbon steel
Casing corrosion protection	Epoxy powder paint
Evaporator	Brazed plate stainless steel (UDT 20-1900)
Evaporator insulation	Flexible elastomeric foam
Condenser	Aluminium fin and copper tube (UDT 20-1900)
Compressor	Carbon steel
Refrigerant piping	Copper
Controller enclosure	Plastic

### SIZES

Model	Compressed air			Electrical connection		Ambient air		Refrigerant		Dimensions & Mass	
	<sup>(3)</sup> Flow	Connection	Pressure drop	Power supply	<sup>(4)</sup> Power/Consumption	Cooling flow	Heat rejec.	Type	Mass	W x L x H	Net
	m <sup>3</sup> /h		bar	Ph~V-Hz	kW	m <sup>3</sup> /h	kW		kg	mm	kg
UDT 20	20	G 3/8" BSP-F	<0,2	1~230-50*	0,160 / 0,135	350	0,2	R134a	0,190	352 x 485 x 499	25
UDT 35	35	G 3/8" BSP-F	<0,2	1~230-50*	0,170 / 0,135	350	0,3	R134a	0,230	352 x 485 x 499	25
UDT 50	50	G 3/4" BSP-F	<0,2	1~230-50*	0,20 / 0,18	350	0,4	R134a	0,330	352 x 485 x 499	26
UDT 75	75	G 3/4" BSP-F	<0,2	1~230-50/230-60	0,40 / 0,25	350	0,6	R134a	0,380	352 x 485 x 499	27
UDT 100	100	G 3/4" BSP-F	<0,2	1~230-50/230-60	0,45 / 0,32	350	0,8	R134a	0,585	352 x 485 x 499	32
UDT 140	140	G 1" BSP-F	<0,2	1~230-50/230-60	0,50 / 0,38	700	1,1	R134a	0,61	356 x 552 x 684	50
UDT 180	180	G 1" BSP-F	<0,2	1~230-50*	0,60 / 0,45	700	1,5	R134a	0,71	356 x 552 x 684	52
UDT 235	235	G 1" BSP-F	<0,2	1~230-50*	0,73 / 0,60	700	1,9	R134a	0,89	356 x 552 x 684	56
UDT 300	300	G 1 1/4" BSP-F	<0,2	1~230-50/230-60	1,0 / 0,7	1100	2,4	R134a	1,07	495 x 589 x 827	84
UDT 380	380	G 1 1/4" BSP-F	<0,2	1~230-50/230-60	1,1 / 0,8	1100	3,1	R134a	1,20	495 x 589 x 827	90
UDT 480	480	G 1 1/2" BSP-F	<0,2	1~230-50/230-60	1,2 / 1,0	1100	3,9	R134a	1,31	495 x 589 x 827	99
UDT 600	600	G 2" BSP-F	<0,2	1~230-50/230-60	1,3 / 1,1	2200	4,9	R134a	1,59	491 x 708 x 973	110
UDT 750	750	G 2" BSP-F	<0,2	3~400-50/440-60	2,0 / 1,5	2200	6,1	R134a	2,19	491 x 708 x 973	120
UDT 950	950	G 2" BSP-F	<0,2	3~400-50/440-60	2,4 / 1,9	2200	7,7	R134a	2,55	491 x 708 x 973	150
UDT 1150	1150	G 2 1/2" BSP-F	<0,2	3~400-50/440-60	2,4 / 2,0	1900	9,4	R134a	3,49	662 x 856 x 1534	250
UDT 1300	1300	G 2 1/2" BSP-F	<0,2	3~400-50/440-60	2,6 / 2,3	1900	10,6	R134a	3,25	662 x 856 x 1534	280
UDT 1500	1500	G 2 1/2" BSP-F	<0,2	3~400-50/440-60	2,7 / 2,4	4600	12,2	R134a	5,00	662 x 856 x 1534	290
UDT 1900	1900	G 2 1/2" BSP-F	<0,2	3~400-50/440-60	3,8 / 3,4	3800	15,5	R134a	5,30	662 x 856 x 1534	310

<sup>(3)</sup> Nominal conditions: inlet flow 20 °C at 1 bar<sub>a</sub>, ambient 25 °C, dryer inlet 35°C at 7 bar<sub>g</sub>, 3 °C pressure dew point (-20,5 °C atmospheric).

<sup>(4)</sup> For 60 Hz 20 % more than stated. Consumption at nominal conditions.

\* Special 60 Hz version available.

## CORRECTION FACTORS

To calculate the correct capacity of a given dryer based on actual operating conditions, multiply the nominal inlet flow by the appropriate correction factor(s). CORRECTED CAPACITY = NOMINAL FLOW CAPACITY x C<sub>OP</sub> x C<sub>AT</sub> x C<sub>IN</sub> x C<sub>DP</sub>

### OPERATING PRESSURE

[bar]	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
[psi]	29	44	58	72	87	100	115	130	145	160	174	189	203	218	232
C <sub>OP</sub>	0,39	0,60	0,77	0,86	0,93	1,00	1,05	1,10	1,14	1,18	1,21	1,2	1,27	1,30	1,32

### DEW POINT

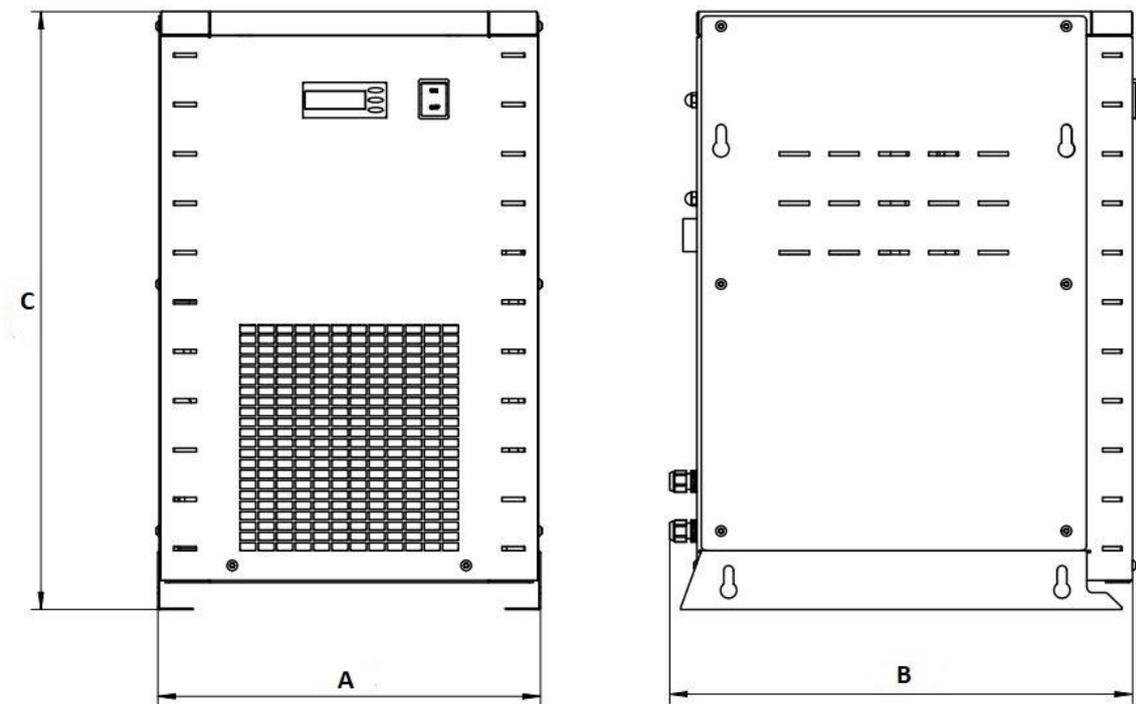
°C	3	5	7	10
°F	37,4	41	44,6	50
C <sub>DP</sub>	1	1,10	1,21	1,39

### INLET TEMPERATURE

°C	≤25	30	35	40	45	50	55
°F	77	86	95	104	113	122	131
C <sub>IN</sub>	1,2	1,12	1	0,83	0,69	0,59	0,5

### AMBIENT TEMPERATURE

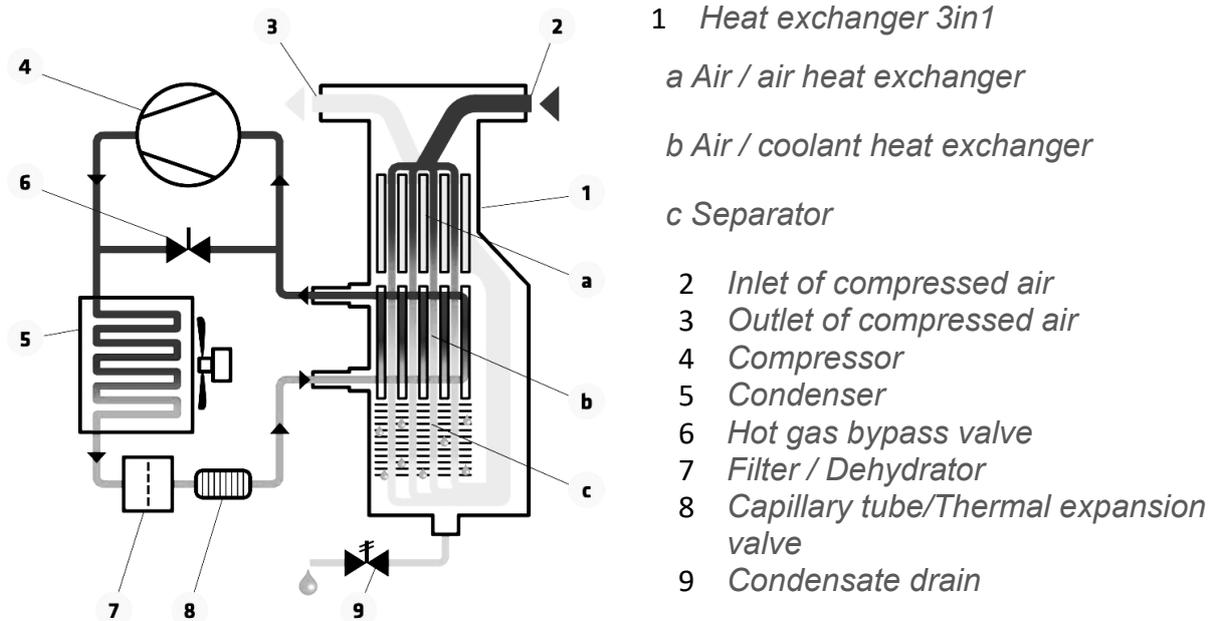
°C	≤25	30	35	40	45
°F	77	86	95	104	113
C <sub>AT</sub>	1	0,96	0,9	0,82	0,72



## 4 Refrigeration air dryer operation

The refrigeration air dryer is designed to remove moisture from the input air to achieve the desired dew point at the exit.

All refrigeration air dryers described above operate according to the same principle. The operation of the refrigeration air dryer can be divided into two main circuits: Air and refrigeration circuit.



**Air Circuit:** Hot, moisture saturated air enters the 3in1 heat exchanger. The air then passes through the evaporator, also called the air / refrigerant heat exchanger. The air temperature is reduced to about 2 ° C, which causes condensation of the water vapor. The liquid is merged into larger droplets and collected in a separator, from where the condensate drain removes it from the system. The cool air without liquid water is returned through the air / air heat exchanger, where it is heated to approximately 5 ° C lower temperature than the input air.

**Refrigeration circuit:** The refrigerant enters the compressor and then enters the condenser at high pressure, where it transfers heat to the ambient air and condenses. The liquid then passes through the capillary tube, where its pressure and consequently the temperature decreases. At low pressure, the liquid refrigerant enters the heat exchanger where it receives heat from the inlet compressed air and causes the evaporation of the refrigerant. The low-pressure gaseous refrigerant returns to the compressor, which compresses it and starts the cycle again. During periods of reduced compressed air load, the excess of the refrigerant automatically passes through the hot gas bypass valve back to the compressor.

\* For more detailed information contact your supplier.

## **5 Refrigeration air dryer components**

### **5.1 Compressor**

The compressor sucks the gaseous phase of the refrigerant from the evaporator (low pressure side) and compresses it to the condensation pressure (high pressure side). Built-in compressors are manufactured by leading manufacturers and are designed for applications where high compression ratios and high temperature differences are present. Hermetically sealed structure is tight and provides high energy efficiency and long service life. The anti-vibration springs that carry the compressor reduce sound emissions and transmission of vibrations. The refrigerant flowing through the compressor to the cylinders of the compressor also cools the electric motor. Thermal protection protects the compressor against overheating and overcurrent. The protection is automatically reset when normal temperature operating conditions are reached.

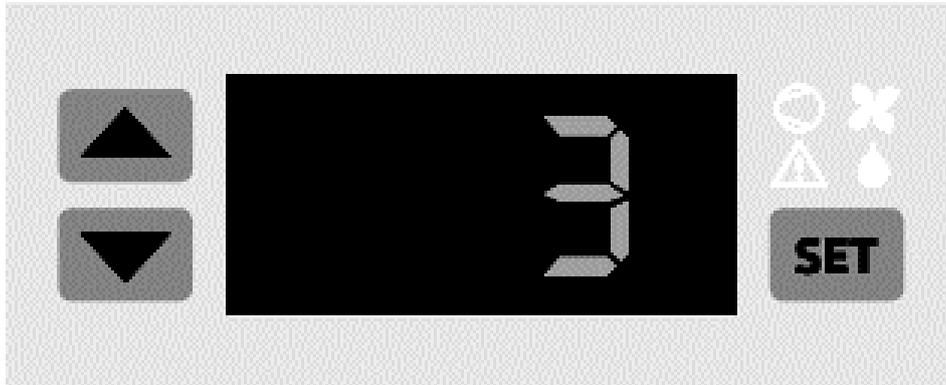
### **5.2 Condenser**

The condenser is a component in which the gas coming from the compressor cools, condenses and changes the aggregate state from the gaseous to the liquid. The condenser is a pipe in which the refrigerant is flowing, and on which fins are placed. The heat transfer is accelerated by an efficient fan. It is important to ensure that the room temperature does not exceed the nominal values. It is also important that the condenser unit is always clean and that dust or other impurities are not accumulated on it.

### **5.3. Heat exchanger 3in1**

The heat exchanger 3in1 combines air / air heat exchanger, air / coolant heat exchanger and condensate separator. The compressed air counterflow in the air / air heat exchanger ensures maximum heat transfer. A large cross-section of the flow channel in the heat exchanger 3in1 provides low speed and low-pressure losses. The large dimensions of the heat exchanger air / refrigerant and the counter-flow design enable the complete evaporation of the refrigerant (preventing the return of the liquid to the compressor). A highly efficient condensate separator is located inside the heat exchanger 3in1. No maintenance required, the effect of collecting drops ensures a high degree of moisture separation.

## 5.4 Controller RDC 2

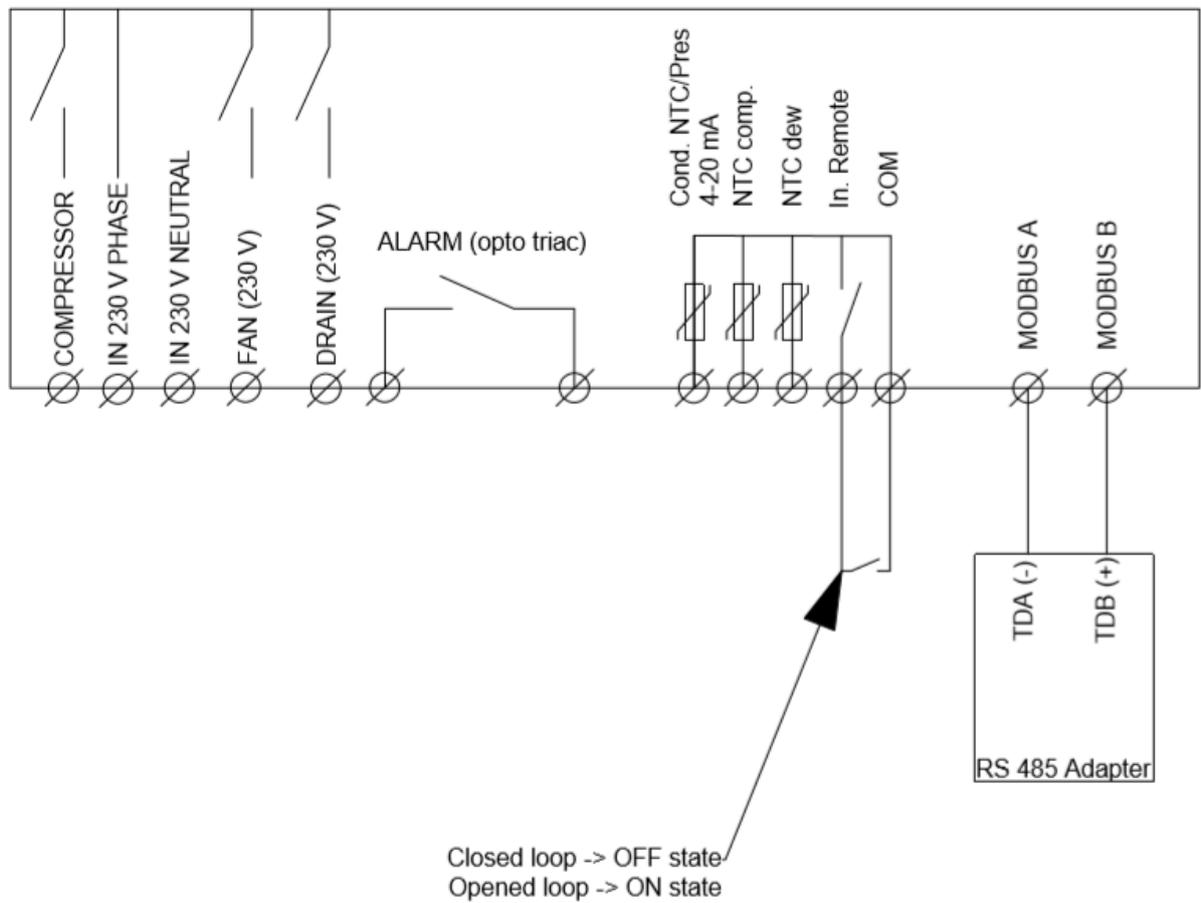


At startup, the controller shows the time remaining until compressors starts by displaying COMP TIME X MIN. The value X can be changed by changing the parameter no. 5.

The controller RDC 2 shows the temperature of the dew point reached by the refrigeration air dryer in the normal operation. By pressing the UP ( $\blacktriangle$ ) button, the outlet temperature of the compressor is displayed. By pressing the DOWN ( $\blacktriangledown$ ) button, the condensation temperature is displayed (the temperature sensor is connected) or the condensation pressure is displayed (the pressure sensor is connected). In case of fault, an alarm will appear on the display. The alarm automatically turns off when the dryer is restarted and is operating properly.

- a) Sensors used for regulation:
  - 1)  $T_{\text{dew}}$  = Dew point temperature
  - 2)  $T_{\text{comp}}$  = Compressor temperature
  - 3)  $T_{\text{cond}}$  ali  $p_{\text{cond}}$  = Condensation temperature or pressure (4-20 mA)
- b) Regulated components:
  - 1) Fan (ON/OFF)
  - 2) Compressor (ON/OFF)
  - 3) Drain (ON/OFF)
- c) Operation of fan and compressor
  - 1) Normal operation:
    - The compressor is always running
    - The fan is regulated based on measured condensation temperature or pressure
    - Dew point temperature is displayed.
  - 2) Alarm operation
    - In alarm state the normal operation is overridden.
    - If more alarms are activated the last one activated has priority with display and fan/compressor operation. All other active alarms have to be resolved before continuing in normal operation.
    - Alarm is displayed.

### 5.4.1 Electric scheme RDC 2



The controller has 3 outputs (230 V), for compressor, fan and drain. The other outputs are for alarm. The alarm is triggered via opto triac, which can handle 600VAC/50mA.

Controller can also be turned OFF/ON via In. Remote by changing the parameter 13 (Remote control) from 0 to 1. When the circuit is connected, the controller goes to OFF state, when the circuit is disconnected, the controller is in ON state. (See the attached scheme above).

For the MODBUS communication, the twisted pair cable needs to be screwed to the A and B terminals. To communicate with the PC, an adapter is needed. The address for the MODBUS communication is 1.

## 5.4.2 RDC 2 parameters

Parameter number	Parameter name	Allowed to change	Press UP	Press DOWN	Default
1	Drain Cycle Value	yes	Increase value	Decrease value	1
2	Drain Period Value	yes	Increase value	Decrease value	200 sec
3		no	Increase value	Decrease value	0
4		no	Increase value	Decrease value	5
5	Min Compressor OFF time	yes	Increase value	Decrease value	1 min
6		no	Increase value	Decrease value	2
7		no	Increase value	Decrease value	5
8		no	Increase value	Decrease value	0
9		no	Increase value	Decrease value	0
10		no	Increase value	Decrease value	0
11		no	Increase value	Decrease value	40.0
12		no	Increase value	Decrease value	39.5
13	Remote Control	yes	Increase value	Decrease value	0
14	MOD BUS Address	yes	Increase value	Decrease value	1
15		no	Increase value	Decrease value	365

In the following paragraph, a procedure to change the minimal compressor OFF time is shown.

To change the minimal compressor OFF time, you must choose programming parameter no. 5 and change the value from default to the desired value. To do that you must:

- Hold SET button for 3 seconds
- Enter password (000) (press SET 3 times)
- Continue pressing SET button until you reach parameter number 5
- You will see the default parameter value (1 min). Change it to a desired value if necessary, if not skip the next step
- Wait a couple of seconds, the controller exits automatically

Turn off the dryer and then turn it back on.

Every other parameter can be changed by similar procedure. Differences are in parameter number and in parameter value.

To reset the parameters in the WORKING status, you must first hold SET+UP for 3 seconds and you move to STANDBY status. When in STANDBY status, you can reset the parameters to default values by holding UP+DOWN for 3 seconds.

### 5.4.3 RDC 2 MODBUS communication

ADDRESS	NAME	TYPE	VARIABLE X	UNIT
40013	ADDRESS	RDWR	Address = X	
40014	Service Time	R_ONLY	Service Time = X	day
40015	No. of alarms in last 24h	R_ONLY	Alarm 24 H Number= X	
40016	No. of alarms since service	R_ONLY	Total Alarms = X	
40017	Days Between Maintenance	R_ONLY	Days after Service = X	
40018	Output Compressor Status	R_ONLY	0= Comp. OFF 1= Comp. ON	
40019	Output Fan Status	R_ONLY	0= Fan OFF 1= Fan ON	
40020	Output Drain Status	R_ONLY	0= Drain OFF 1= Drain ON	
40021	Output Alarm Status	R_ONLY	0= Alarm OFF 1= Alarm ON	
40022	T_Dew	R_ONLY	$T\_Dew = (X-200)/10$	°C
40023	T_Comp	R_ONLY	$T\_Comp = (X-200)/10$	°C
40024	T_Cond	R_ONLY	$T\_Cond = (X-200)/10$	°C
40025	P_Cond	R_ONLY	$P\_Cond = X/10$	Bar
40026	Digital Input status	R_ONLY	0= contact open 1 = contact close	
40027	Buttons	R_ONLY	0= no switches 1= SET 2=UP 3= SET & UP 4= DOWN 5= SET & DOWN 6= UP & DOWN 7= SET & UP & DOWN	
40028	Alarm CLn Status	R_ONLY	0=no alarm 1 = alarm active	
40029	Alarm Lt Status	R_ONLY	0=no alarm 1 = alarm active	
40030	Alarm Ht status	R_ONLY	0=no alarm 1 = alarm active	
40031	Allarm PF1 Status	R_ONLY	0=no alarm 1 = alarm active	
40032	Alarm PF2	R_ONLY	0=no alarm 1 = alarm active	
40033	Alarm PF3	R_ONLY	0=no alarm 1 = alarm active	
40034	Controller Status	R_ONLY	0= STANDBY 1=NORMAL OPERATION 2=PROGRAMMING MODE 3=ALARM MODE 4= TESTING MODE	

## 5.5 Expansion valves

This valve injects a portion of the hot gases (taken from the compressor outlet) into the tube between the evaporator and the suction side of the compressor, thereby maintaining a constant temperature / pressure of the evaporator at about +2 ° C. This injection prevents the formation of ice in the evaporator of the dryer under any load conditions.

### SETTING

The hot gas bypass valve is factory set during the test phase. As a rule, no additional settings are needed, but if an intervention is required, an experienced cooler technology engineer should do this.

The screw needs to be adjusted without the load on the dryer. Rotate the screw until the following value is reached:

Hot gas setting: R134.a pressure 2.0 barg ( $\pm 0.1$  bar)

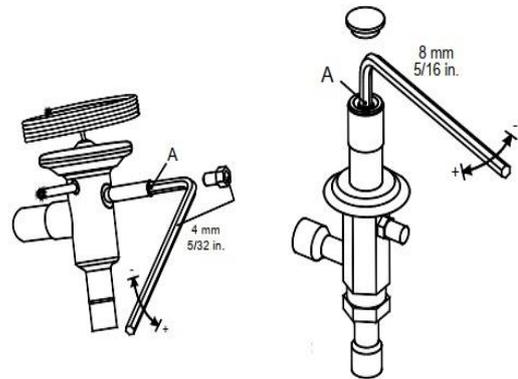


Figure 3: Bypass valve

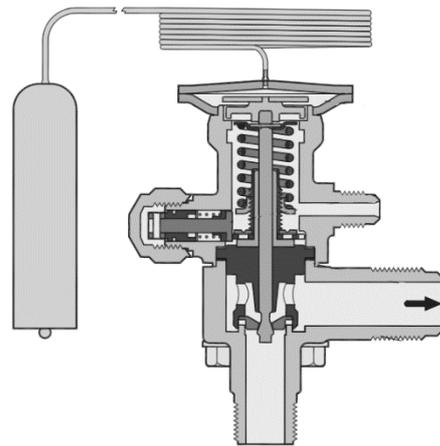


Figure 4: Thermal expansion valve

## 5.6. Timed condensate drain

Condensate drain consists of two timers, Ton and Toff which are regulated by controller RDC 2. Ton timer regulates the time duration of discharging and Toff regulates time between two discharges (period). When the controller sends a signal at pin DRAIN, it activates the discharging process immediately, which is noticed by the sound of valve being open. Condensate flows through inlet connection and is discharged through valve and outlet connection. After the set time Ton passes, valve closes until the time Toff passes, when new cycle begins. Cycles are continuously repeating.

## 5.7 Safety functions

For protection against low-pressure, the low-pressure switch is added. Other safety functions are implemented in the controller.

### 5.7.1 Low-pressure switch

LPS: Low-pressure protection device on the suction side of the compressor trips, if the pressure drops below the pre-set value. The values are automatically reset when the nominal conditions are restored.

Calibrated pressure: R 134.a Stop 0.7 barg - Restart 1.7 barg

### 5.7.1 Safety functions of RDC 2

ALARM DISPLAY	CAUSE - PROPOSED ACTIVITY
»PF«	Temperature sensor failure - Ensure that the temperature sensor is properly connected to the controller / replace the temperature switch 1 – Dew point sensor 2 – Compressor sensor 3 – Condensation sensor
»Cln«	High condensation temperature/pressure – Check that the temperature sensor is correctly inserted into its position, check the cooling system sealing / charging / check the hot gas bypass valve
»Lt«	Low dew point temperature - Check that the temperature sensor is correctly inserted into its position, check the cooling system sealing / charging / check the hot gas bypass valve
»Ht«	High compressor outlet temperature – Check that the temperature sensor is correctly inserted into its position, check the cooling system sealing / charging / check the hot gas bypass valve

## 5.8 Filter / dehydrator

Moisture and impurities can be present in the refrigeration circuit. This can reduce the lubrication of the compressor and block the expansion valve or capillary tube. The dryer filter / dehydrator is located in front of the capillary tube to remove moisture and impurities from the circulation system.

## 5.9 Capillary tube

The capillary tube is located between the condenser and the evaporator and functions as a metering device for reducing the pressure of the refrigerant. The pressure reduction is a design-based function. The length and inner diameter of the capillary tube are precisely dimensioned, ensuring good performance in all designed conditions.

## 6 Efficiency

The efficiency of the refrigeration air dryer and the desired pressure dew point temperature depends mainly on the right size of the UDT drier. To ensure efficient operation, the UDT refrigeration air dryers are available in a large number of sizes and operating conditions.

It is advisable to provide the following information when ordering or technical assistance:

- Working pressure
- Working volume flow
- Ambient temperature
- Inlet air temperature
- Dew point requirement

## 7 Transport

- Transport must be carried out by trained personnel.
- Follow local regulations for lifting and transporting heavy loads.
- Provide adequate lifting and transport equipment.
- A forklift truck can be used to lift the refrigeration air dryer.

The refrigeration air dryer may be damaged during transport. In the event of damage to the interior components of the dryer, the installation and use may result in injury or death! Check the dryer for any visible damage after removing the packaging. If the refrigeration air dryer is damaged, contact the transport operator and the dryer manufacturer.

## 8 Storing

In order to prevent damage to the refrigeration air dryer during storage, the following conditions must be provided:

- The dryer should only be stored in a dry and enclosed space.
- During storage, the ambient temperature must be within the temperature range of 1 ° C to 45 ° C. Contact the manufacturer for other storage temperatures.
- Make sure the refrigeration air dryer input and output are sealed.

In case you intend to store a dryer that has already been used, follow the instructions below:

- Turn off the dryer.
- Disconnect the power supply.
- Disconnect the refrigeration air dryer from the air connection.
- Disconnect the pipe connections.
- Seal the input and output of the dryer.
- Clean the front of the condenser
- Cover the dryer to protect it from dust.

## 9 Installation

### 9.1 General requirements for installation

The UDT refrigeration air dryer is designed to operate in an environment that ensures the following conditions:

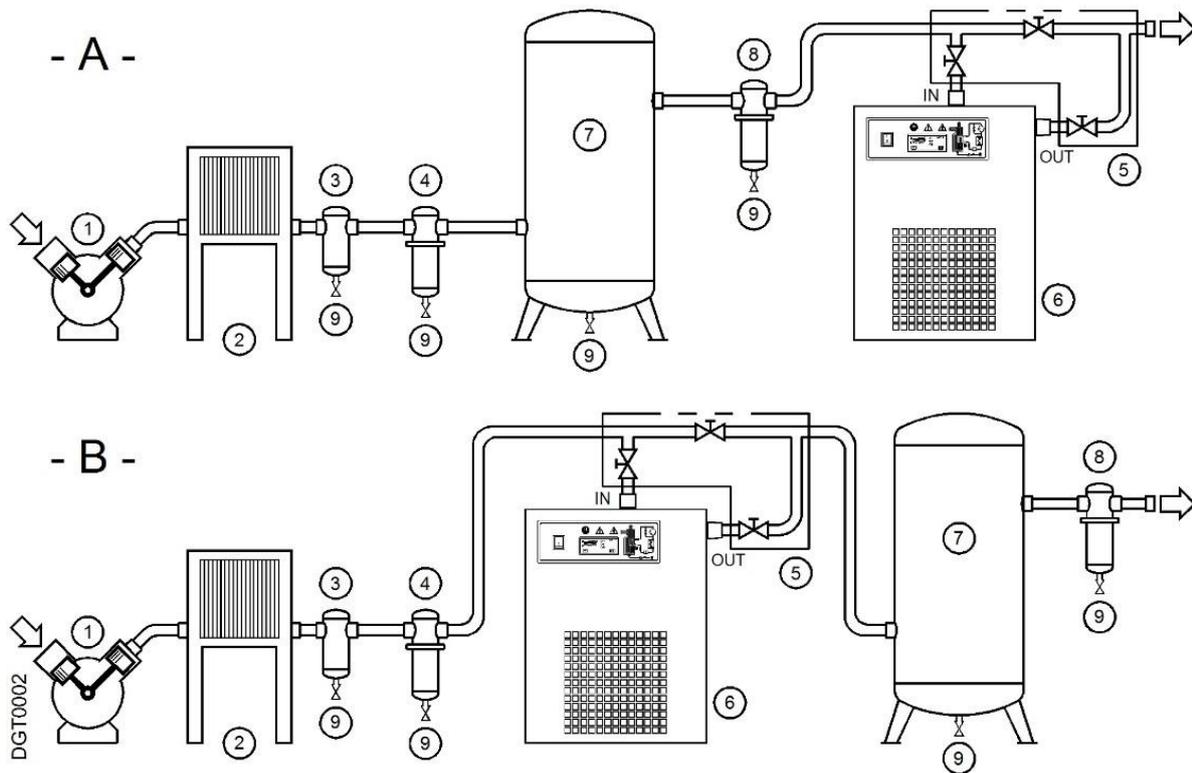
- Internal installation, clean and dry space
- Non-aggressive atmosphere
- The minimum ambient temperature is +1,5 ° C
- The maximum ambient temperature is +45 ° C
- Ensure adequate ventilation to cool the device
- Installation without vibration (refers to the floor and pipes)
- For maintenance and servicing, provide sufficient space for uninhibited work around the unit (1 m).
- The ventilation grilles of the device must not be covered for the operation of the system

The air supplied to the refrigeration air dryer must satisfy the following conditions:

- The quality of compressed air 2 for particulate matter (if the dryer is equipped with a super fine coalescent filter 0,01um)
- The quality of compressed air 2 for oil particles (if the dryer is equipped with a super fine coalescent filter 0,01um)
- Absence of aggressive substances

## 9.2 Installation positioning

Below are the two most common configurations of installations in which the UDT refrigeration air dryer is installed. The schemes below are not mandatory and they are just a sample. A different arrangement of components is always possible.



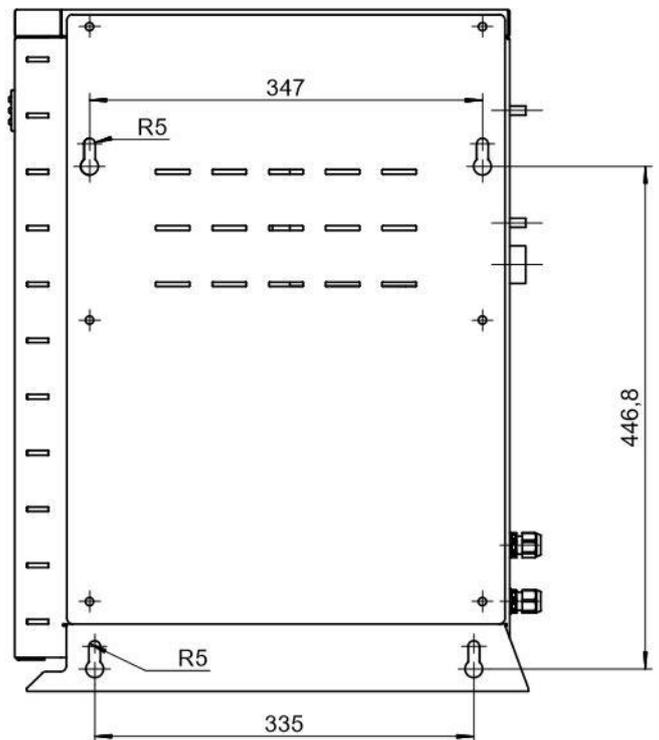
- |                               |                            |
|-------------------------------|----------------------------|
| 1. Compressor                 | 6. Refrigeration air dryer |
| 2. Air conveyor               | 7. Pressure vessel         |
| 3. Condensate Separator       | 8. Filter                  |
| 4. Pre-filter (min. 5 micron) | 9. Condensate drain        |
| 5. Bypass air valve           |                            |

Type A installation is recommended when the compressor operates at a reduced interruption rate and total consumption that equals the flow of the compressor.

Type B installation is recommended when air consumption is usually repeated with conical values that are much higher than the compressor flow. The capacity of the pressure vessel must be dimensioned according to possible instantaneous needs (peak consumption).

### 9.3. Installation procedure

- The UDT refrigeration air dryer is typically delivered on the standard pallet on which it is screwed with four screws.
- The UDT refrigeration air dryer can be lifted with forklift trucks.
- Remove the screws and the pallet before positioning the dryer at the desired location.
- The refrigeration air dryer should be installed in such a way that it is protected from weather (for example, a compressor station).
- It is recommended to have 1 m of space around the dryer. This measure facilitates maintenance.
- Make sure that the dryer is protected against vibration and mechanical wear.
- The dryer must stand firmly on a horizontal basis. The tilt of the unit must not exceed  $\pm 3^\circ$ . The best way to achieve these conditions is to fasten the dryer with screws onto a horizontal base through the appropriate openings on the base. If the dryer is not installed properly, there may be improper operation. Fastening the dryer with screws is not obligatory.
- UDT 20 - 235 drier models can be attached to the wall with wall screws - the position of the holes in the illustration is shown. (maximum size M8)
- The pipe connections for the compressed air in the front and back of the dryer must be fitted with suitable valves that allow the independent installation or removal of the dryer from the system.
- Install a super fine coalescent filter on the input side and pre-filter on the output side. It only applies if the dryer has no built-in filters.
- Check that the air is properly treated before the dryer (air conveyor, cyclone separator, filters, condensate separators ...).
- Remove the plastic covers from the dryer's input and output.
- Connect the air source to the dryer.
- The temperature and flow of the intake air into the refrigeration air dryer must remain within the limit values indicated on the nominal label of the device.
- The pipelines of the system must be free of dust, rust, filings and other impurities and must correspond to the flow of the dryer.
- It is also recommended that you arrange an air bypass line.
- Connect the dryer to the power source. Ensure that the supply voltage and the frequency correspond to the data on the type label ( $\pm 5\%$  acceptable tolerance for the supply voltage).
- Remove the packaging and other material that could hinder the dryer during normal operation.



## 10 Start-up

### 10.1 Before start-up

Before start-up, check that the operating parameters correspond to the nominal values indicated on the data label of the dryer (frequency, air pressure, air temperature, ambient temperature, ...). This dryer has been fully tested, packaged and checked before shipping. Nevertheless, it may happen that it is damaged during transport. Before starting it up for the first time, check its compliance, and for the first few hours of operation, you should also carefully monitor its behaviour.

- Ensure that the connection to the compressed air system is correct!
- Ensure that the condensate piping is properly secured and connected to the collection system or collector
- Ensure that the bypass air circuit is closed and that the dryer is insulated from the system
- Check and ensure that the condenser is clean, free of impurities

### 10.2 Start-up

- Connect the dryer to the power supply.
- Connect the dryer to the compressed air system
- Move the switch to ON position - pos. I on the switch.
- Wait for a few minutes; make sure that the dew point temperature on the controller is appropriate and that the condensate drainage is normal.

## 11 Remove from use

To switch off the refrigeration air dryer, move the switch to the OFF position - pos. O on the switch. Disconnect the refrigeration air dryer from the power supply. Ensure that the dryer is not pressurized (check bypass conduit valves). Disconnect the dryer from the compressed air system.

To protect the UDT refrigeration air dryer during storage, seal the input and the output of the dryer,  
clean the front of the condenser and cover it with a cover.

## 12 Maintenance

During the maintenance work on the refrigeration air dryer, turn it off and wait for at least 30 minutes for it to cool down. Some components can reach high temperature during operation. Avoid contact with these components until they completely cool down.

**Daily** check that the dew point shown on the controller is appropriate. Also check the correct operation of the condensate drainage system. In case of impurities on the condenser, clean them.

**Monthly or every 200 hours** blow out and clean the condenser with an air jet from the inside to the outside. Repeat the procedure from the opposite direction, making sure that you do not damage the aluminium ribs of the condenser. Check the condensate drainage function. Finally check the operation of the device.

**Annually or every 1000 hours** check for potential coolant leakage points. Measure and record the power consumption. Ensure that the measured values are within the limit values recorded in these instructions. Finally check the operation of the device.

**Every 8,000 hours** replace the electronic condensate drainage unit. (Service kit)

## 13 Troubleshooting technical problems

During the maintenance work on the refrigeration air dryer, turn it off and wait for at least 30 minutes for it to cool down. Some components can reach high temperature during operation. Avoid contact with these components until they completely cool down.

SYMPTOM	POSSIBLE CAUSE - PROPOSED ACTIVITY
The dryer does not start	<ul style="list-style-type: none"> <li>● Make sure that the system is connected to a power source.</li> <li>● Check the electrical installation (internal and external).</li> </ul>
The compressor does not work	<ul style="list-style-type: none"> <li>● Activated internal thermal protection of the compressor - wait 30 min, then try again.</li> <li>● Check the electrical installation.</li> <li>● If installed, replace internal thermal protection and / or start-up relay and / or start-up capacitor and / or working capacitor</li> <li>● If installed - The HPS pressure sensor has been activated.</li> <li>● If installed - The LPS pressure sensor has been activated.</li> <li>● The TS thermal safety switch has been activated - see the relevant section of these instructions.</li> <li>● If the compressor still does not work, replace it.</li> </ul>
The condenser fan does not work (air-cooled units)	<ul style="list-style-type: none"> <li>● Check the electrical installation.</li> <li>● The PV pressure switch is defective - replace it.</li> <li>● Leakage has occurred in the cooling circuit - get in touch with an engineer in the field of refrigeration.</li> <li>● Replace the fan if it still does not work.</li> </ul>
The dewpoint is too high	<ul style="list-style-type: none"> <li>● The dryer does not start.</li> <li>● Dew point sensor incorrectly detects temperature - check if the sensor is fully inserted into the sleeve.</li> </ul>

	<ul style="list-style-type: none"> <li>● The compressor does not work.</li> <li>● Ambient temperature is too high, or ventilation is too low - ensure adequate ventilation.</li> <li>● The inlet air is too hot. Establish normal operating conditions.</li> <li>● The inlet pressure is too low. Establish normal operating conditions.</li> <li>● The flow of inlet air is higher than the flow of the dryer - reduce flow - establish normal operating conditions.</li> <li>● The condenser is dirty - clean it.</li> <li>● The condenser fan does not work.</li> <li>● Condensate has not been drained from the dryer.</li> <li>● The hot gas bypass valve is not properly set up - contact an engineer in the field of refrigeration.</li> <li>● Leakage has occurred in the cooling circuit - contact a specialist in the field of refrigeration.</li> </ul>
The dewpoint is too low	<ul style="list-style-type: none"> <li>● Fan always on - PV pressure switch is defective - replace it.</li> <li>● Ambient temperature is too low - establish nominal operating conditions.</li> <li>● The hot gas bypass valve is not properly set up - contact an engineer in the field of refrigeration.</li> </ul>
Excessive pressure drop in the dryer	<ul style="list-style-type: none"> <li>● Condensate has not been drained from the dryer.</li> <li>● Dew point is too low - the condensate is frozen and blocks the air flow.</li> <li>● Check the dampening of the pipe connections.</li> </ul>
The condensate was not drained from the dryer	<ul style="list-style-type: none"> <li>● Check the electrical installation.</li> <li>● Dew point is too low - the condensate is frozen and blocks the air flow.</li> <li>● The compressed air pressure is too low and the condensate is not removed - establish normal operating conditions.</li> <li>● The electronic condensate drain is not working properly.</li> </ul>
The dryer continuously drains the condensate	<ul style="list-style-type: none"> <li>● The electronic condensate separator is dirty.</li> </ul>
There's water in the pipeline.	<ul style="list-style-type: none"> <li>● The dryer does not start.</li> <li>● <b>If it is installed</b> - Unprepared air flows through the bypass conduit - close the bypass conduit.</li> <li>● The dryer does not discharge condensate.</li> <li>● Dew point is too high.</li> </ul>
High compressor outlet temperature	<ul style="list-style-type: none"> <li>● Check which of the following caused the activation: <ol style="list-style-type: none"> <li>1. Overload heat - set normal operating conditions.</li> <li>2. The temperature of the input air is too high - establish normal operating conditions.</li> <li>3. The ambient temperature is too high, or the ventilation of the room is too low - ensure adequate ventilation.</li> <li>4. The condenser is dirty.</li> <li>5. The fan does not work.</li> <li>6. The hot gas bypass valve is not properly set up - contact the engineer in the field of refrigeration.</li> <li>7. Coolant is leaking - consult with an engineer in the field of refrigeration.</li> </ol> </li> <li>- Reset the thermal switch by pressing the button on the thermal switch itself - check the proper operation of the dryer.</li> <li>- TS thermal switch is defective - replace it.</li> </ul>

## 14 Spare Parts

DESCRIPTION	PART NUMBER	RDP																	
		20	35	50	75	100	140	180	235	300	380	480	600	750	950	1150	1300	1500	1900
Compressor	1401365	1	1	1															
	1401437				1														
	1401431					1	1												
	1401369							1											
	1401439								1										
	1401440									1	1								
	1401441											1	1						
	1401374													1					
	1401375														1	1			
	1401376																1	1	
	1401410																		1
1401421																			
Fan & Condenser pack	2101729						1	1	1										
	2101700									1				2					
	2101701										1	1		2	2				
	2101732															1	1		
	2101802																	2	2
Condenser	2101822	1	1																
	2101839				1	1	1												
	2101855																		
Fan	1101981																		
Fan motor	2101864	1	1	1	1	1													
Fan blade	2101865	1	1	1	1	1													
Fan diffuser	2101863	1	1	1	1	1													
Hot gas by-pass valve	2204737	1	1	1	1	1	1	1	1										
	2204746									1	1								
	2204736											1	1						
	2204748													1	1	1			
	2204749																1	1	1
Expansion valve	2204771																		
Expansion valve connector	2204773																		
Filter	2101578	1	1	1	1														
	2100441					1	1												
	2100597							1	1										
	2101609									1	1								
	2300921											1	1	1	1				
	2300922															1	1	1	1
2300925																			
Fan regulation pressure switch	3001095							1	1	1	1	1	1	1	1	1	1	1	
High pressure switch	3001154													1	1	1	1	1	
Low pressure switch	3001111													1	1	1	1	1	
RDC 2 Controller	2101826	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Pressure transducer PP011	2101898																		
PT1000 probe PMT6-67	3000857																		
XEV 22 D Dixell Driver	2101897																		
NTC temperature probe 1m	4001120	3	3	3	3	3	3	3	3	3	3	3							
NTC temperature probe 2m	4001141													3	3	3	3	3	
Main 1 - phase Switch	1219579	1	1	1	1	1	1	1	1	1	1	1							
Main 3 - phase Switch	3001135													1	1	1	1	1	
	3001156																		
Main 3 - phase Switch - handle	3001136													1	1	1	1	1	
Timed drain	321900862	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	
1 - phase circuit breaker	3003681													1	1	1	1	1	
3 - phase circuit breaker	3003715													1	1	1	1	1	
	3003713																		
Phase protection relay	3003527																		
Contactor	3001134													1	1	1	1	1	
	3001162																		
Motor protection	3003680													1					
	3003682														1	1	1		
	3003683																1	1	
	3003695																		
	3003699																		

## 15 Warranty

The warranty is valid for 12 months from the date of purchase and no more than 14 months from the date of dispatch.

During this time, the parts that were originally incomplete will be repaired or replaced free of charge.

This does not include travel costs, accommodation and food for our technicians.

The guarantee excludes any possible direct or indirect damage to people, animals or property resulting from improper use or inadequate maintenance of the device, and is limited solely to production errors.

When claiming a warranty, you must provide information from the identification label.

Guarantee is invalid if:

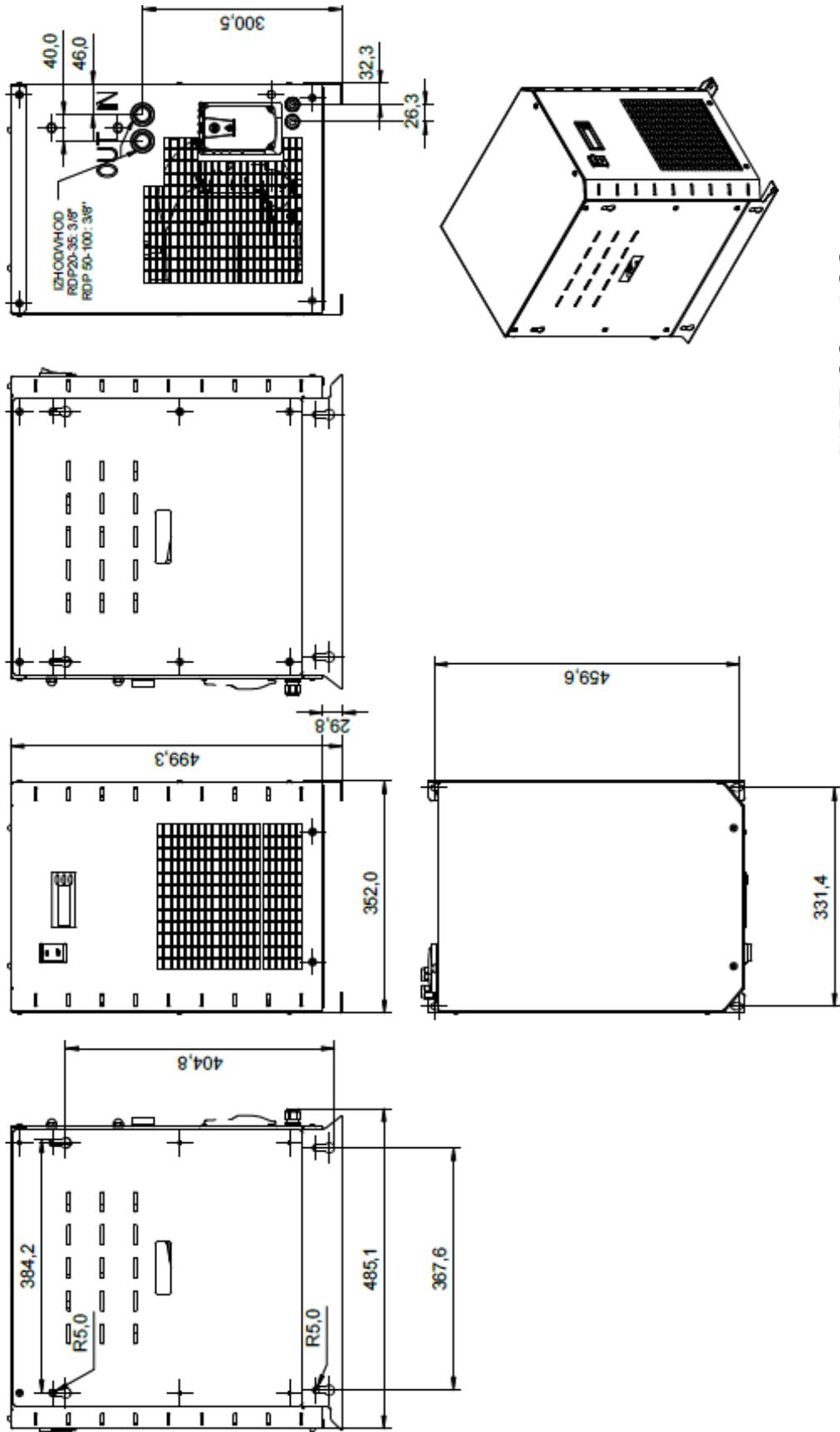
1. The instructions were not followed for installation and maintenance
2. The unit was not used according to the instructions.
3. The unit operated even though the improper operation was apparent.
4. Non-original parts were used.
5. The unit did not work within the allowed technical parameters.
6. Unauthorized structural changes were made on the unit or parts thereof.

**16 Maintenance notebooks**

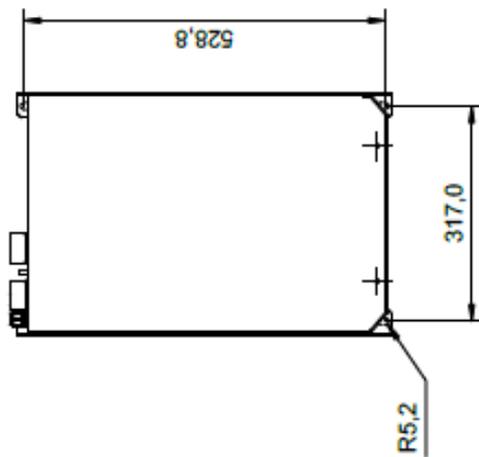
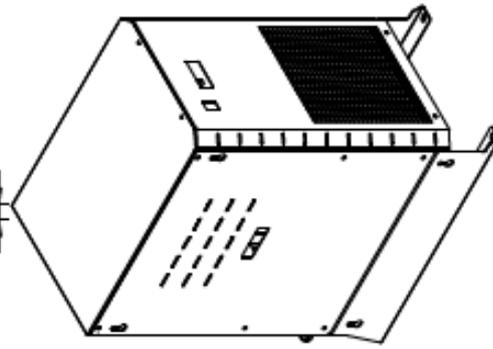
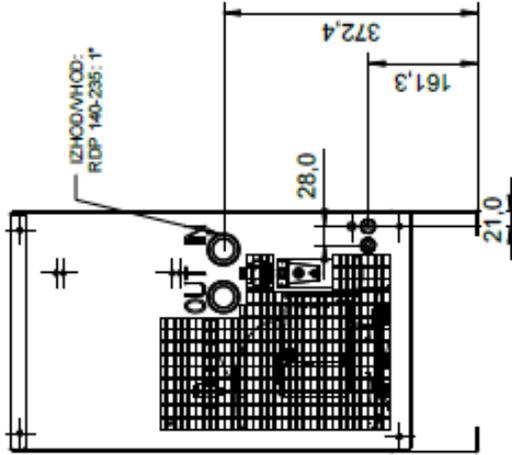
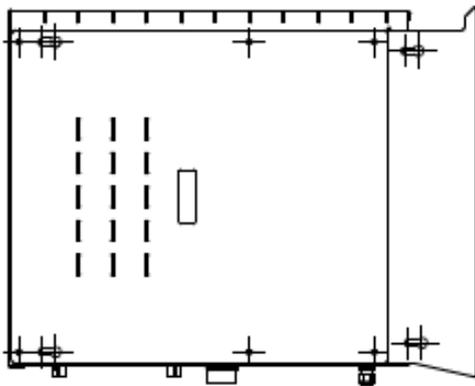
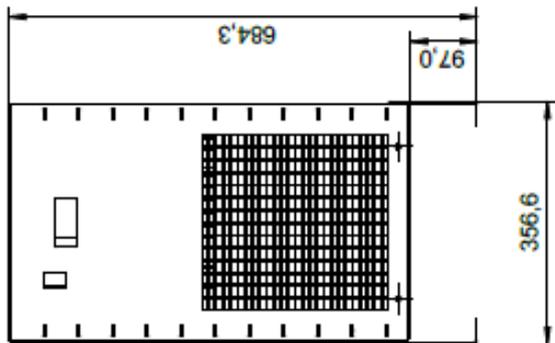
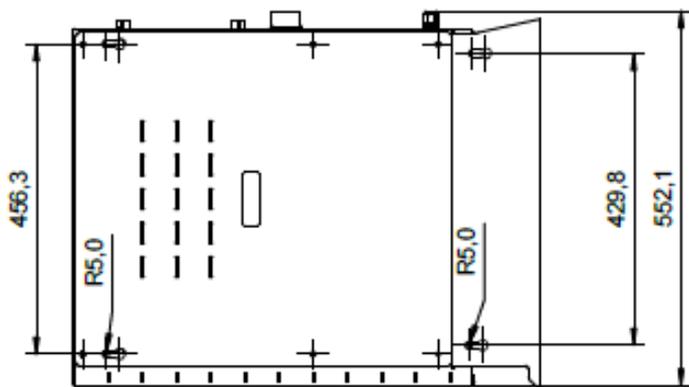
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First installation			



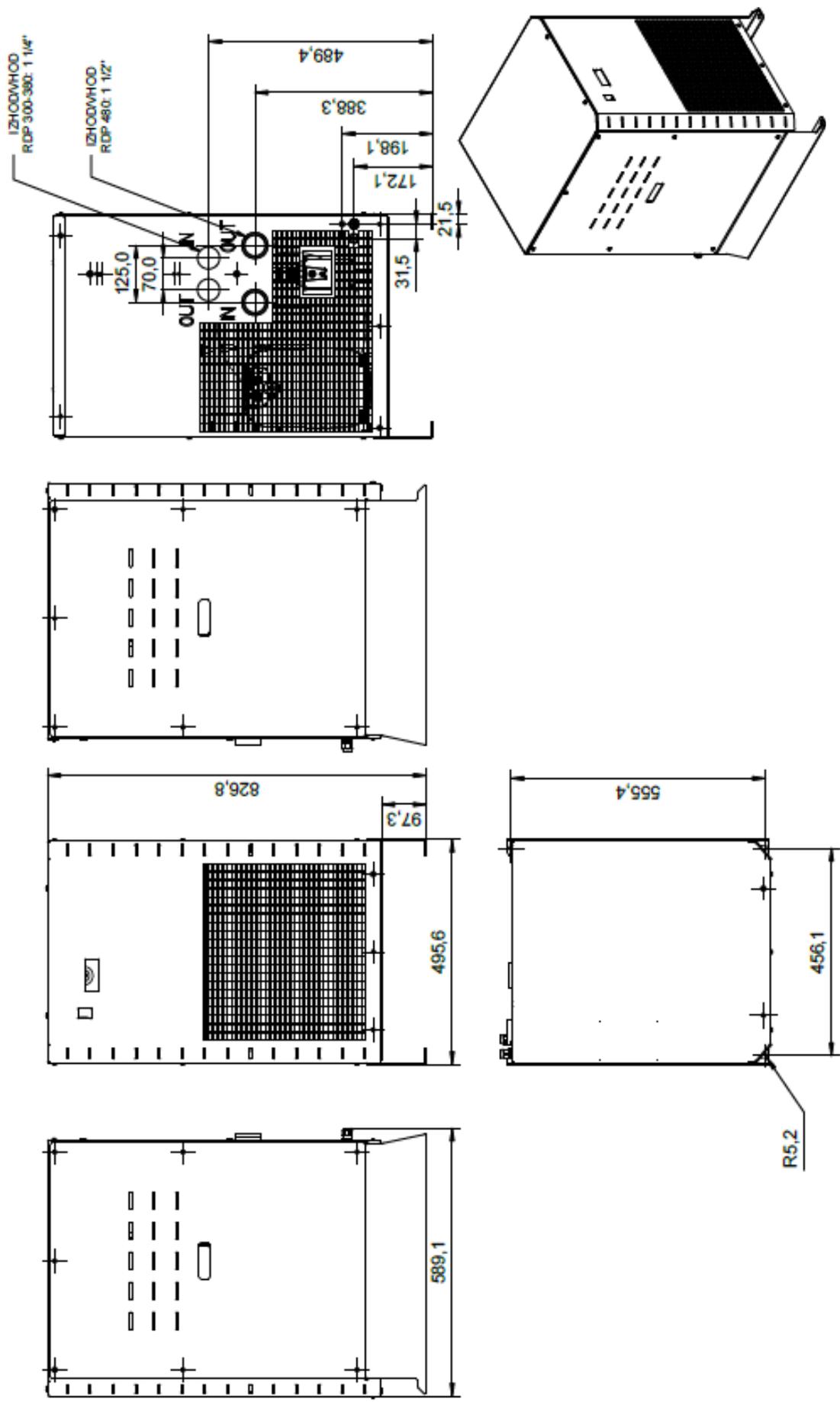
17 Drawings of UDT refrigeration air dryers



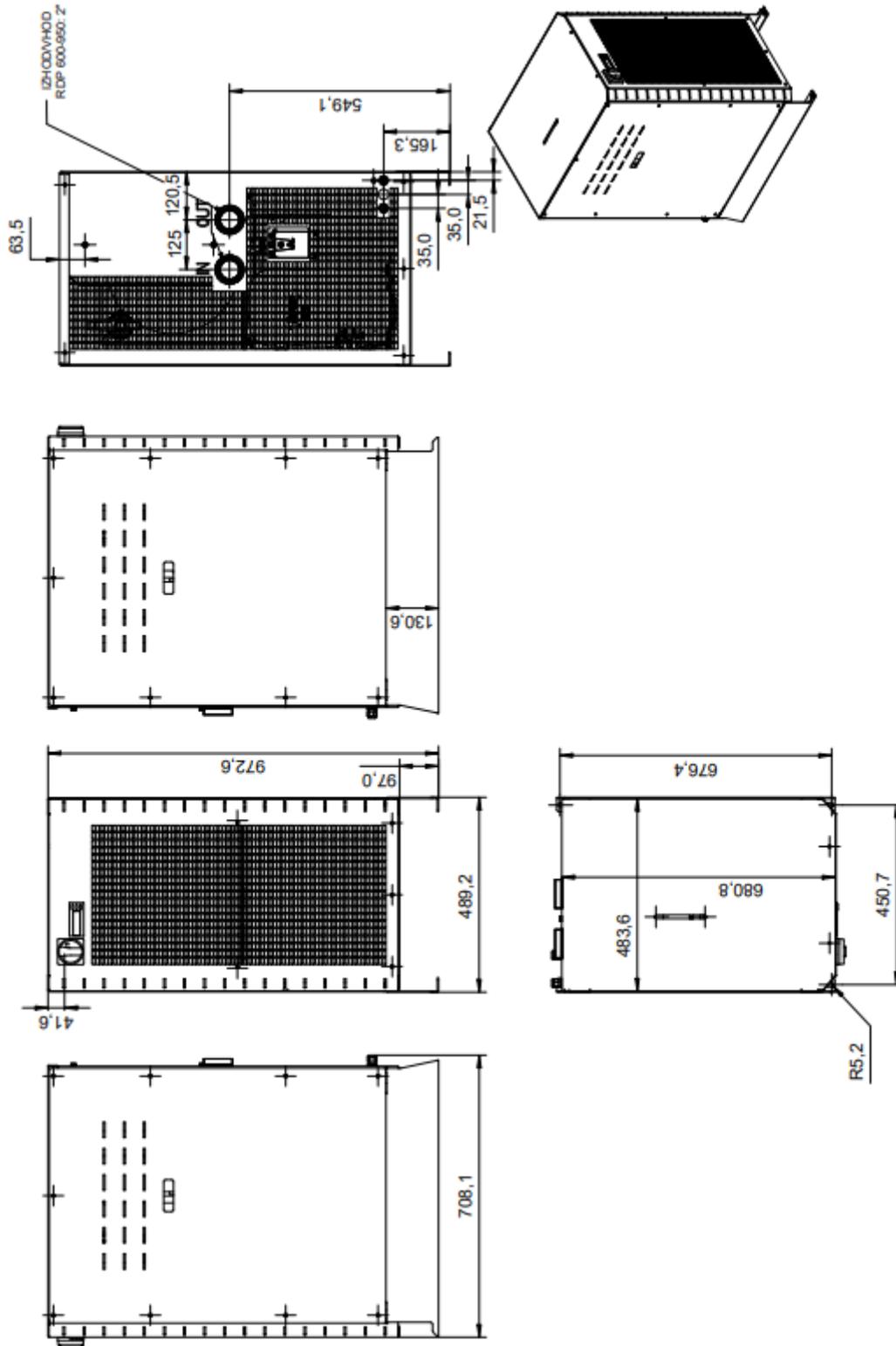
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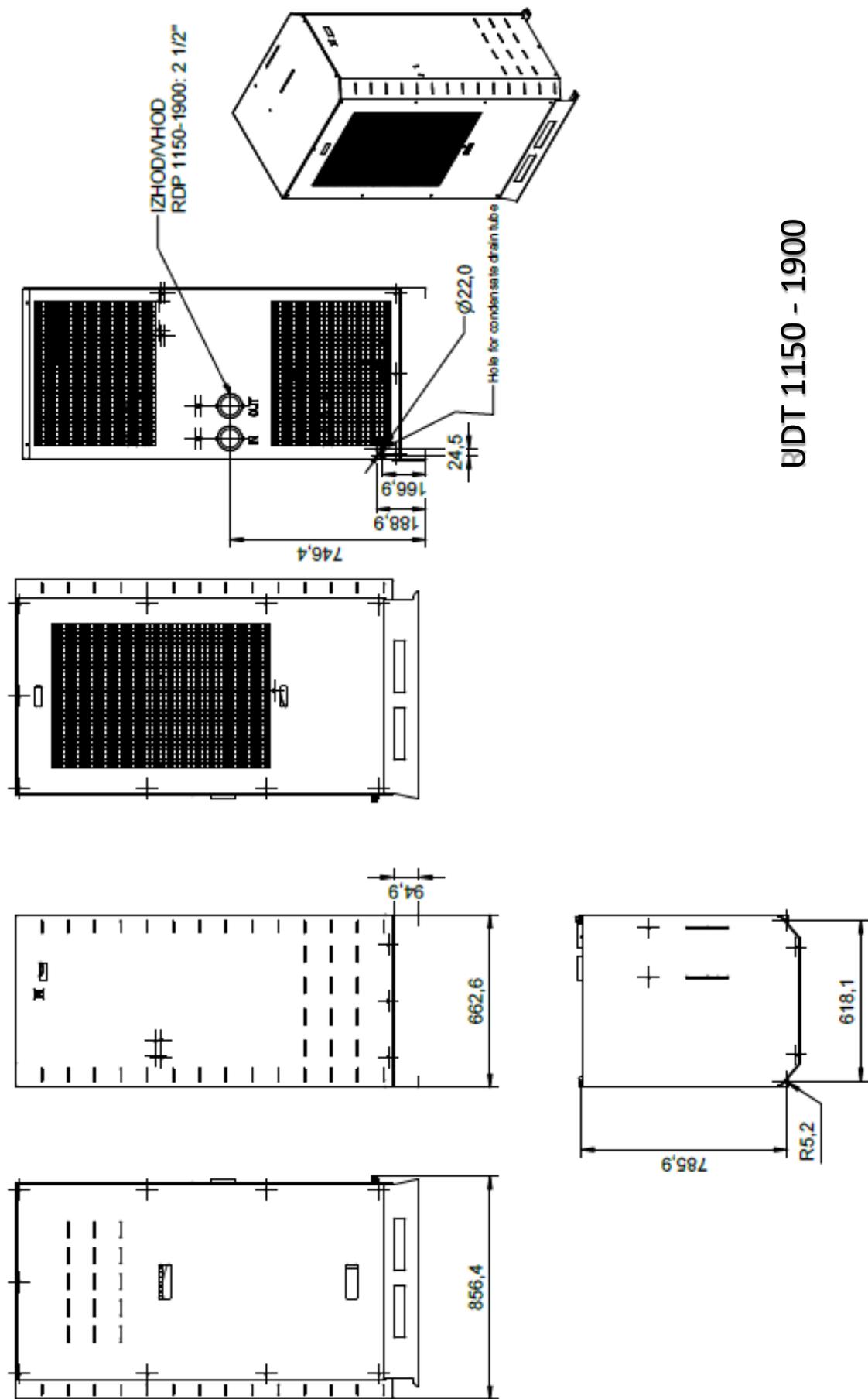
UDT 140 - 235



UDT 300 - 480

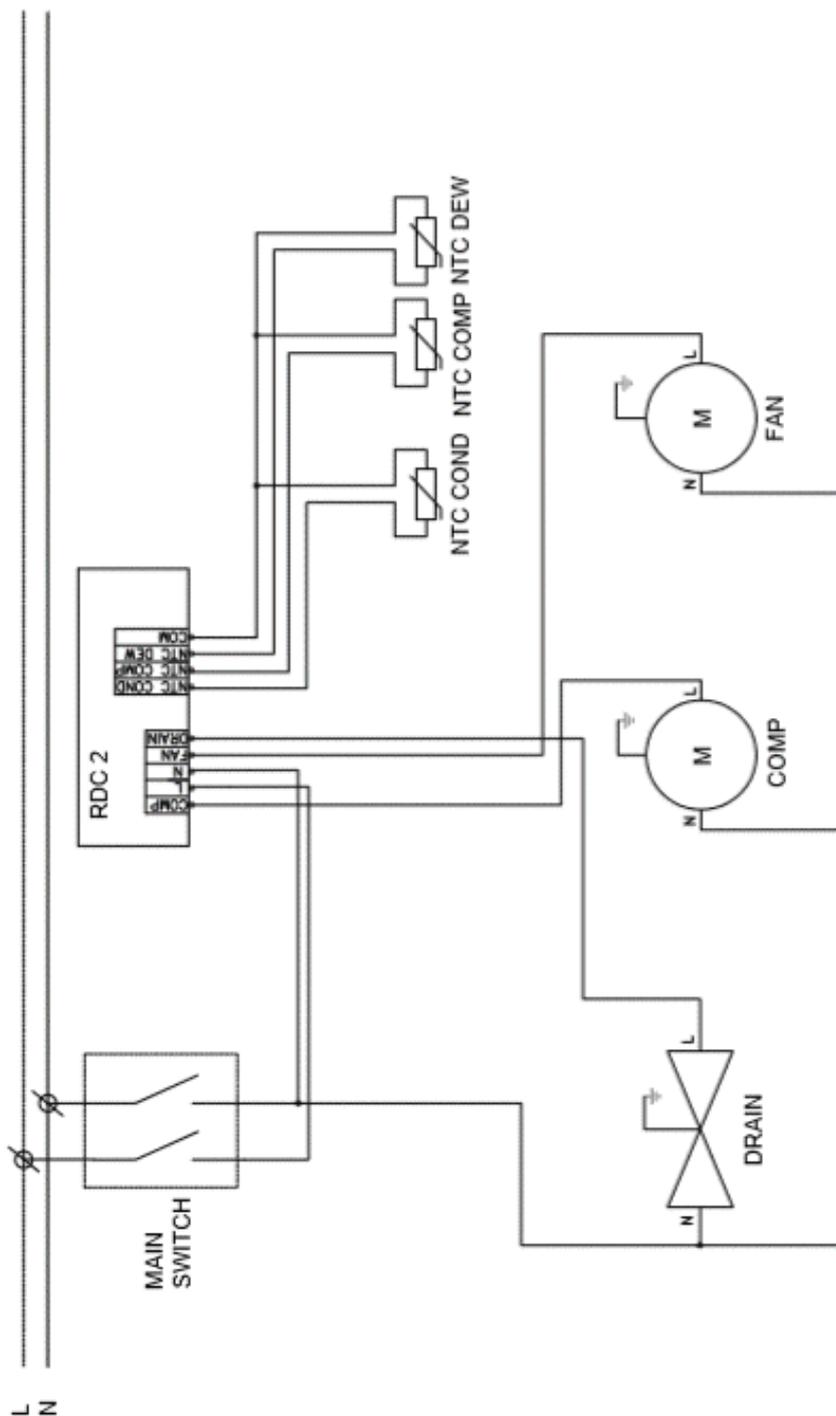


BDT 600 - 950

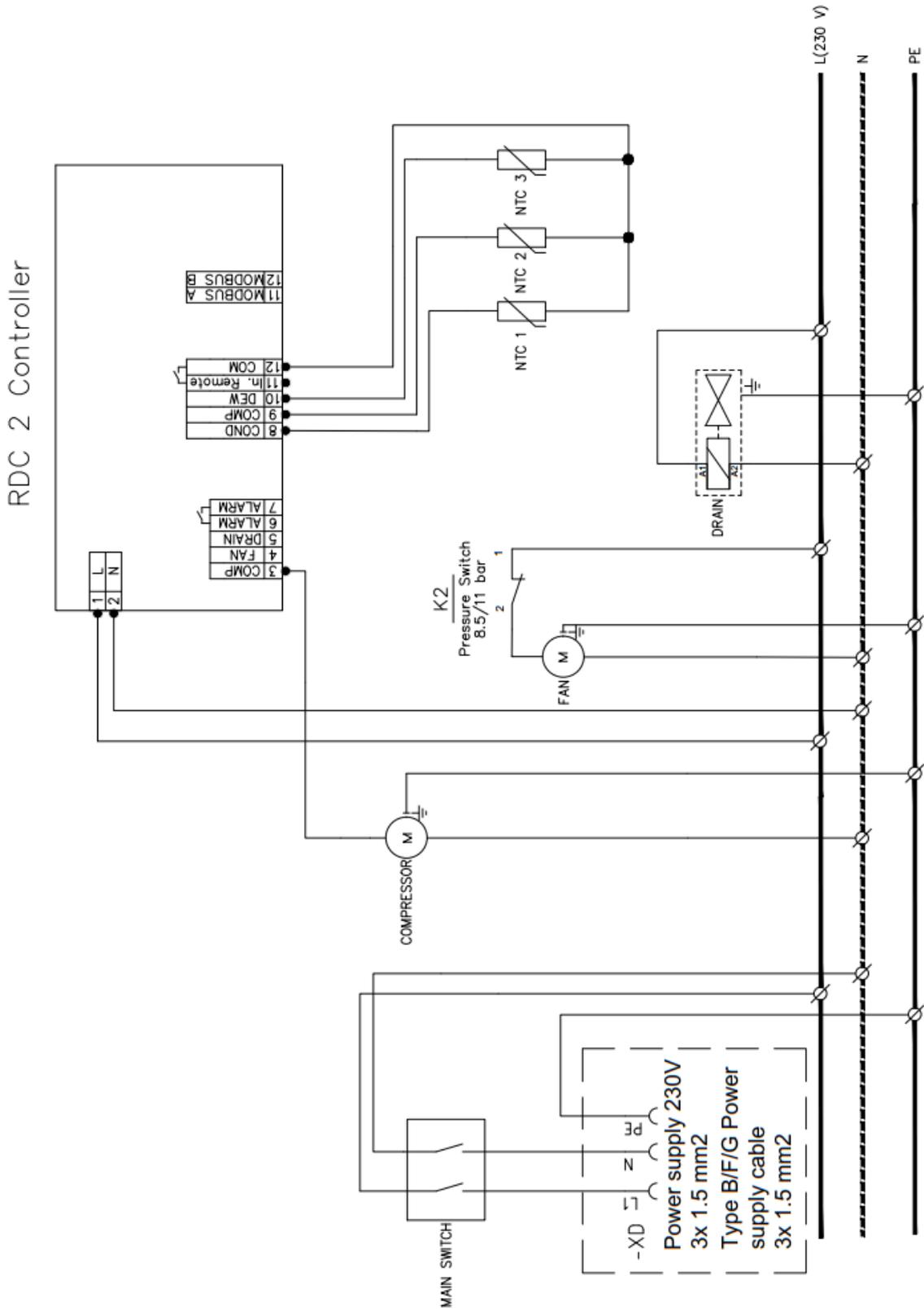


UDT 1150 - 1900

# UDT 20 - 180



# UDT 235 - 600



# UDT 750- 1900

