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I. IMPORTANT SAFETY NOTES – Please READ

- A) When operating the air dryer the operator must apply safe working methods and observe all local safety instructions and relevant regulations.
- B) Prior to installation, the dryer and the compressed air system are to be depressurized and disconnected from the electrical main supply.
- C) The user is responsible for safe operating conditions. Parts and accessories must be replaced if inspection shows that safe operation cannot be assured.
- D) Installation, operation, maintenance and repair are only to be authorized, trained and skilled engineers.
- E) The minimum and maximum values stated must be observed, as well as all of the safety precautions described in this manual.
- F) If any statement in this manual does not comply with the local legislation, the strongest standard is to be applied.

1.1. Transportation

- A) Use care and caution when transporting the dryer. Avoid dropping and other physical abuse.
- B) A forklift can be used to transport the dryers provided the forks are long enough to support its full width or length and caution is used throughout the move.

1.2. Positioning

- A) The dryer must be installed horizontally. A minimum of 20" clearance around the dryer is necessary to allow a good ventilation and easy access for servicing.
- B) The ambient temperature in the room should not exceed 122°F and should not be below 39°F, taking the heat radiated by the dryer into account.
- C) (40 watt for each liter/sec under ISO 7183-A condition or 18 watts for each SCFM under ISO 7183-B condition).

1.3. Installation

- A) In addition to the general mechanical construction procedures and local regulations, the following instructions need to be emphasized:
 - 1) Only authorized, trained and skilled engineers should install the compressed air dryer.
 - 2) Safety devices, protecting covers or insulation in the dryers never to be dismantled or modified. Each pressure vessel or accessory installed outside the dryer with air above atmospheric pressure must be fitted with the required pressure relief safety valves.

1.4. Before Operating

- A) Review all safety precautions.
- B) The piping must have the correct diameter and be adapted to the operating pressure (see technical specification).
- C) Never operate the dryer at pressure above the maximum specified on the dryer label (check the technical specs too).

1.5. Maintenance by an Engineer

- A) Maintenance and repairs should only be performed when the air dryer is shut down and depressurized and when the main power switch is turned off.
- B) Use only the appropriate tools for maintenance and repair.
- C) Before dismantling a part under pressure, disconnect the pressure sources and depressurize the system.
- D) Proceed carefully during maintenance and repair. Prevent dirt from entering by covering parts and orifices with a clean cloth, paper or tape. A receiver should never be welded or modified in any way.
- E) Never leave tools, loose parts or cleaning rags in or on the air dryer.
- F) Before returning the dryer into service, check the setting of the control and safety devices as well as the pressure and the temperature of the compressed air circuit.

1.6. Maintenance by the user

- A) Keep the dryer clean.
- B) Regularly check the correct operation of the condensate drain trap.
- C) Every six months, check and clean the drain strainer by undoing the access screw and rinsing the filter with tap water to remove the trapped dirt from the inside.

- D) For air cooled dryers, clean the air condenser as soon as it's dirty or clogged.
- E) For optional water-cooled condensers, use only clean water and install a water filter if needed. Use water counter flow to clean condenser if need.
- F) Check the trouble-shooting list in case of maintenance troubles.
- G) Check operating pressures, temperatures and time settings after maintenance. If operating and safety devices function properly, the air dryer may be used.

2. INTRODUCTION TO THE DRYER

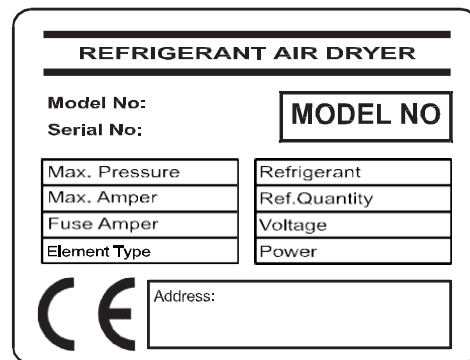
A) Manufacturer:

B) Purpose of this dryer

- 1) This refrigerated compressed air dryer has been designed to remove water vapor from industrial compressed air.
- 2) This dryer has been designed for indoor operation.
- 3) The minimum and maximum values stated must be observed, as well as the safety precautions described in this manual.

C) Dryer label

The following label is affixed on the cabinet of the refrigerant compressed air dryer.



D) Working details

1) Refrigerant circuit:

The refrigerant circuit can be divided in 3 parts:

- a) Low pressure section with an evaporator (heat exchanger)
- b) High-pressure section including: Condenser, liquid receiver, (if installed) and the filter dryer.
- c) Control circuit including: Compressor, Expansion valve, by-pass valve (if installed), Fan pressure switch (if installed)

2) For water - cooled dryers:

- a) Water valve
- b) Safety high pressure switch (if installed)

3) The Refrigerant circuit operates as follows:

- a) The compressor compresses gaseous refrigerant to a high temperature.
- b) The hot refrigerant condenses in the condenser. Being liquefied it is stored in the liquid receiver (if installed).
- c) The liquid is taken out the storage vessel and injected in the evaporator (heat exchanger) by an expansion valve. This expansion valve is protected by a filter, which removes particles and humidity that could be in the circuit.
- d) The injected liquid fills in the refrigerant section of the air / refrigerant heat exchanger and evaporates by taking out the calories from the compressed air. The gaseous refrigerant is sucked in the compressor and the cycle carries on.
- e) In order to keep the evaporation pressure steady, and thus the refrigerant temperature in the heat exchanger, a by-pass valve is injecting hot gaseous refrigerant in the circuit. On certain dryers, an automatic expansion valve regulates this.

4) Compressed air circuit

- a) The saturated hot compressed air flows into the Economiser where it is pre-cooled by the out flowing dry chilled air. In the cold zone of the air refrigerant section it continues to cool

down to dew point and enters the separator where condensates are collected. The outgoing chilled air is then warmed up in the economizer by the hot incoming air.

b) The condensates are collected after centrifugal separation and drained out through the automatic trap.

c) As long as the compressed air temperature does not drop below dew point, there will be no condensation in the air circuit.

5) Refrigerant compressor

Being of the hermetic type, it requires no servicing.

6) Condenser

a) The air condensers are equipped with a helicoidal at the condenser refrigerant level. On certain type of dryers, a water-cooled condenser can be fitted.

b) In this case, a water valve being driven by the refrigerant circuit is taking care of its regulation.

7) Refrigerant circuit protection

a) Klixon: The single phase compressors are equipped with a klixon which is a thermal sensitive switch controlling the temperature of the compressor and possible over intensity.

In case of malfunction, the klixon trips but switches on again automatically as soon as the compressor has cooled down.

b) High Pressure Security Switch: Refrigerant line is considered as a pressure vessel. That is why it is protected against bursts by the help of manually reset switch. It is set to 362.5 psi for dryers working with R134a

c) Filter dryer: A refrigerant circuit is a closed circuit and total water removal in the refrigerant circuit is paramount in order to obtain a correct functioning.

d) To avoid problems, the refrigerant circuit must be vacuumed before loading the refrigerant. It is equipped with a filter dryer, which also traps any solid particles, which may have migrated into the circuit during assembly.

e) Water-cooled dryers have a safety high-pressure switch.

In case of cooling water failure, the safety switch stops the dryer. When the safety switch has tripped out, it has to be manually resettled before switching on the dryer.

8) Refrigerant circuit controls

a) Liquid refrigerant injection: The liquid refrigerant is into the evaporator by a control valve. This valve is a thermostatic or pressostatic one maintaining a constant overheats of the refrigerant in the evaporator(s).

b) Constant evaporating pressure: In the dryers equipped with a by-pass valve, the evaporating pressure is kept constant by a controlled injection of hot gas from the high-pressure side into the low-pressure section of the circuit.

9) Condensate drain - trap assembly

Dismantling the drain is easy because it can be isolated from the air circuit under pressure with a ball valve.

The drain has to be depressurized before being dismantled.

10) Heat Exchanger Modular design

a) The dryers are equipped with a compact Mono Bloc Heat Exchanger module. This assembly has been specially designed to dry compressed air and is made of:

1) An Economiser which pre-cools the entering hot air with the out flowing cold air.

2) An air/refrigerant exchanger cooling down the compressed air.

3) A centrifugal separator concentrating all condensates and requiring no maintenance.

11) Accessories

a) Dew point indicator: Located on the control panel, it displays the value of the pressure dew point.

b) Temperature switch: Located inside the dryer, this temperature switch is adjustable from 32 °F up to 95 °F

c) Energy Saving Device: (ESD) This device helps dryer save energy when there is not any compressed air flow in the dryer. (Please see the models have standart and optional in next page)

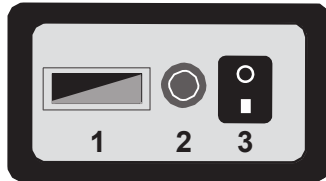
d) Filter change alarm on the front panel

3. OPERATION

3.1. Operation

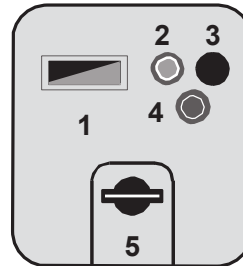
A) Control panels: The control panel of the dryer includes the following elements:

Monophase	Dew point indicator
PDRCF1150029 - PDRCF2300288	●



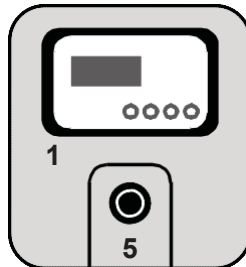
- 1) Dewpoint indicator (Standard)
- 2) Filter change Alarm**
- 3) Start / Stop Button

Monophase	Dew point indicator
DN120-US - DN130-US	●



- 1) Dewpoint indicator (Standard)
- 2) Start Light
- 3) N/A
- 4) Filter change Alarm**
- 5) Main Switch

Triphase	ESD3
PDRCF4600575 - PDRCF4601200	●



- 1) ESD3 (Standard)
- 5) EMERGENCY STOP

**** IMPORTANT NOTE:** The Dryer has two Compressed Air Filter inside. It is better to change filter element for the best efficiency when the alarm light is active. It is recommended to keep replacement filter elements in your stock in order to replace them when needed.

ATTENTION : DN-US range dryers have low pressure drop according its competitors. Do not use DN-US range dryers together with other dryers which have higher pressure drop without getting the confirmation from our technical team.

3.2. During Operation

Regularly check the digital temperature controller ESD3 or dew point indicator on dryer.

B) Start up and shut-down

Warning: Avoid leaving the dryer off when compressed air is still flowing through it.

C) Starting for the first time or after a long stop

1) Set the rotary switch to "I" This preheats the dryer and turns the drain system on.

It is recommended to leave the dryer power on permanently so the crankcase heater runs continuously.

2) **IMPORTANT NOTE!**

After a long stop of the dryer it is **MANDATORY** to allow a preheating period of minimum **4 hours** before starting again, to avoid any compressed air flow during preheating.

3) Follow the daily starting and shut down procedure.

D) Daily starting and shut-down

1) Push on the green button to start the dryer.

2) The start light will indicate that the dryer is running.

3) To stop the dryer, first stop the airflow (either shut-down the air compressor or close the inlet/outlet or by-pass valve) When the air flow is stopped set the rotary switch on " 0 " Set it again on " I " in order to keep the preheating on.

4) **IMPORTANT NOTE!**

Avoid leaving the dryer stopped when compressed air is still flowing through it.

5) To switch the already preheated dryer on again, simply push the green start button.

E) Digital Temperature Control technical features (ESD3)

ESD3: PLC clear text multilingual indication of alarms, maintenance and running hours

+ Energy Saving Device automatic switching OFF at no load and ON when warm compressed air is entering.

(Please see the ESD3 manual which is given with Dryer)