

INSTRUCTION MANUAL

REFRIGERATION AIR DRYERS

PDE 3-S

PDE 5-S

PDE 8-S

PDE 10-S

PDE 15-S

PDE 20-S

AIR COOLING SYSTEM

Dear Customer,

thank you for choosing our product. In order to get the best performances in the use of this product, please read carefully this manual.

In order to prevent erroneous operating conditions and to avoid dangerous situations for the operator, please note that it's strictly recommended to respect the instructions of this manual and the safety rules in force in the country where the dryer is installed.

Each **PD-S** series chilling cycle dryer before packaging is submitted to a rigorous test, in order to verify the absence of any manufacturing faults and that the device can satisfy all the functions for which it has been designed.

Once the dryer will be properly installed on the basis of the instructions reported in this manual, it will be ready for use without any further adjustment. The operation is fully automatic, and the maintenance is limited to few controls and some cleaning operations, as detailed in the following chapters.

This manual must be maintained available in any moment for future references and it has to be intended as inherent part of the relevant dryer.

Due to the continuous technical evolution, we reserve the right to introduce any necessary change without giving previous notice.

Should you experience any trouble, or for further information, please do not hesitate to contact us.

IDENTIFICATION PLATE

The product identification plate, on the back of the dryer, shows all the primary data of the machine.

Upon installation, fill in the table copying the data shown on the identification plate. These data must always be referred to the manufacturer or to the dealer when information or spares are needed, even during the warranty period.

The removal or the alteration of the identification plate will void the warranty rights.

WARRANTY CONDITIONS

For 12 months from the installation date, but no longer than 14 months from the delivery date, the warranty covers eventual faulty parts, which will be repaired or replaced free of charge, except the travel, hotel and restaurant expenses of our engineer.

The warranty doesn't cover any responsibility for direct or indirect damages to persons, animals or equipment caused by improper usage or maintenance, and it's limited to manufacturing faults only.

The right to warranty repairs is subordinated to the strict compliance with the installation, use and maintenance instructions contained in this manual.

The warranty will be immediately voided in case of even small changes or alterations to the dryer.

To require repairs during the warranty period, the data reported on the identification plate must be notified.

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1.1 DEFINITION OF THE SIGNS USED IN THIS MANUAL



Before attempting any intervention on the dryer, read carefully the instructions reported in this use and maintenance manual.



General warning sign. Risk of danger or possibility of damage to the machine. Read carefully the text related to this sign.



Electrical hazard. The relevant text outlines conditions which could result fatal. The related instructions must be strictly respected.



Danger hazard. Part or system under pressure.



Danger hazard. Component or system which during the operation can reach high temperature.



Danger hazard. It's absolutely forbidden to breath the air treated with this apparatus.



Danger hazard: It's absolutely forbidden to use water to extinguish fire on the dryer on in the surrounding area.



Danger hazard. It's absolutely forbidden to operate the machine when the panels are not in place.



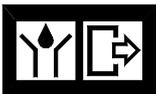
Maintenance or control operation to be very carefully performed by qualified personnel ¹.



Compressed air inlet connection point.



Compressed air outlet connection point.



Condensate drain connection point.



Operations which can be worked out by the operator of the machine, if qualified ¹.

NOTE : Text to be taken into account, but not involving safety precautions.



In designing this unit a lot of care has been devoted to the environment protection:

- CFC free refrigerators
- Foamed insulation parts realised without CFC
- Energy saving design
- Limited acoustic emission
- Dryer and relevant packaging composed of recyclable materials

Not to spoil our commitment, the user should follow the few ecological suggestions marked with this sign.

¹ Experienced and trained personnel acquainted with the relevant rules and laws, capable to perform the needed activities and to identify and avoid possible dangerous situations while handling, installing, using and servicing the machine.

1.2 WARNINGS



Compressed air is a highly hazardous energy source.

Never work on the dryer with parts under pressure.

Never point the compressed air or the condensate drain jet towards anybody.

The user is responsible for the installation of the dryer, which has to be executed on the basis of the instructions given in the "Installation" chapter. Otherwise, the warranty will be voided and dangerous situations for the personnel and/or damages to the machine could occur.

Only qualified personnel can use and service electrically powered devices. Before attempting any maintenance action, the following conditions must be satisfied :

- Be sure that any part of the machine is under voltage and that it cannot be connected to the mains.
- Be sure that any part of the dryer is under pressure and that it cannot be connected to the compressed air system



Any change to the machine or to the relevant operating parameters, if not previously verified and authorised by the Manufacturer, in addition to create the possibility of dangerous conditions it will void the warranty.



Don't use water to extinguish fire on the dryer or in the surrounding area.

1.3 PROPER USE OF THE DRYER

This dryer has been designed, manufactured and tested only to be used to separate the humidity normally contained in compressed air. Any other use has to be considered improper.

The Manufacturer will not be responsible for any problem arising from improper use; the user will be in any case responsible for any resulting damage.

Moreover, the correct use requires the respectation of the installation conditions, in particular :

- Voltage and frequency of the mains.
- Pressure, temperature and flow-rate of the incoming air.
- Ambient temperature.

This dryer is supplied tested and fully assembled. The only operation left to the user is the connection to the plant in compliance with the instructions given in the following chapters.



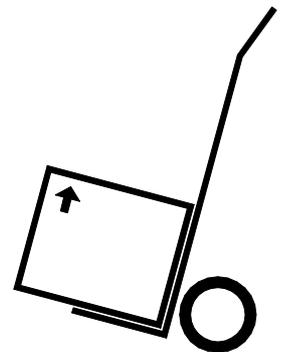
The purpose of the machine is the separation of water and eventual oil particles present in compressed air. The dried air cannot be used for respiration purposes or for operations leading to direct contact with foodstuff.

This dryer is not suitable for the treatment of dirty air or of air containing solid particles.

2.1 TRASPORT

Once verified the integrity of the packaging, place the unit near to the installation point and unpack the contents.

- To move the packaged unit we suggest to use a suitable trolley. Transportation by hands is discouraged.
- Keep the dryer always in vertical position. Turning it upside down some parts could be irreparably damaged.
- Even when packaged, keep the machine protected from severity of the weather.



The packaging materials are recyclable. Each single material must be properly disposed in a manner complying with the rules in force in the destination country.

2.2 INSTALLATION SITE



Particular care is required in selecting the installation site, as an improper location could jeopardise the proper operation of the dryer.

This unit is not suitable to be used in explosive atmosphere, where risk of fire could exist, or in presence of gaseous or solid polluting material.

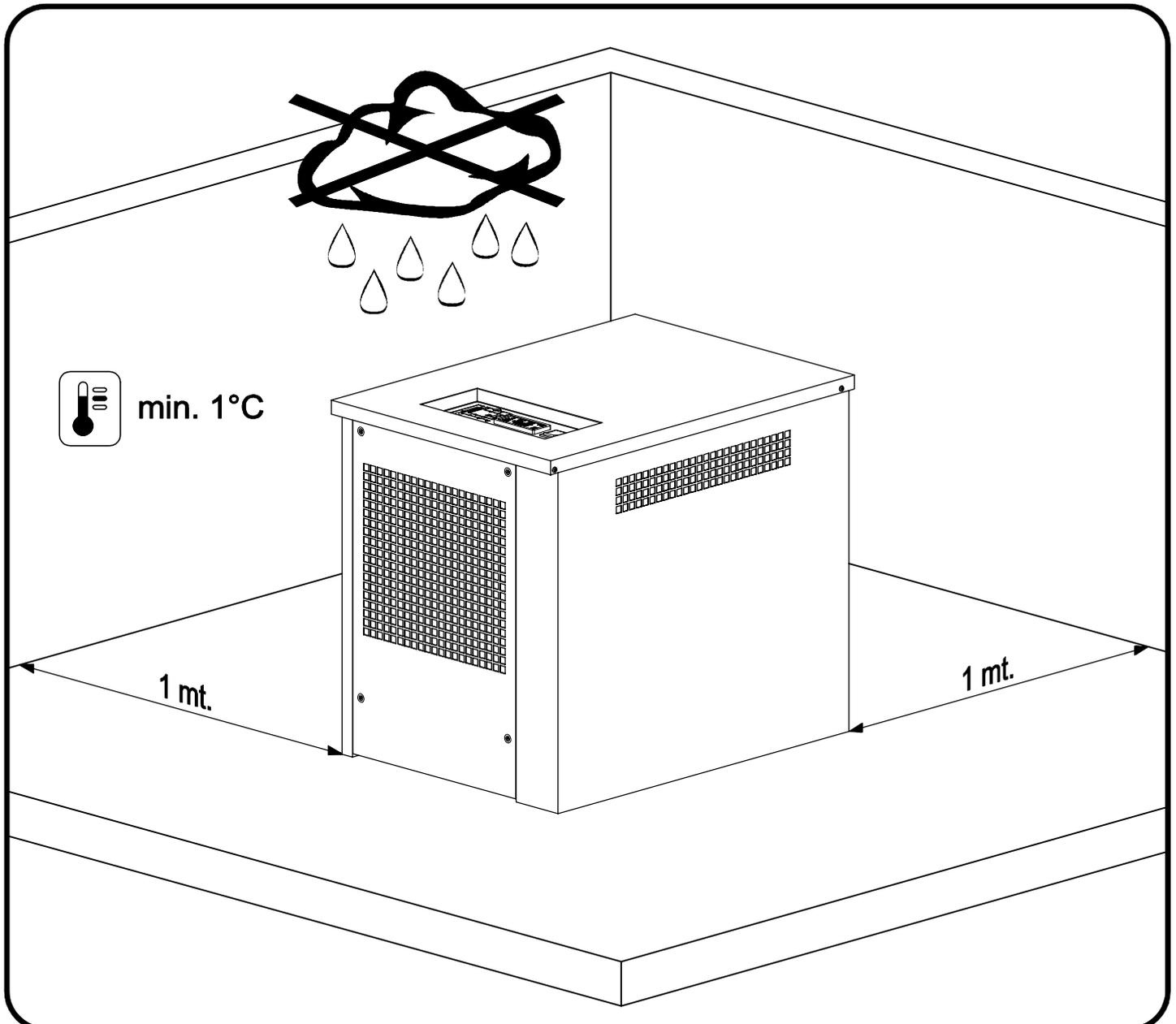


Don't use water to extinguish fire on the dryer or in the surrounding area.

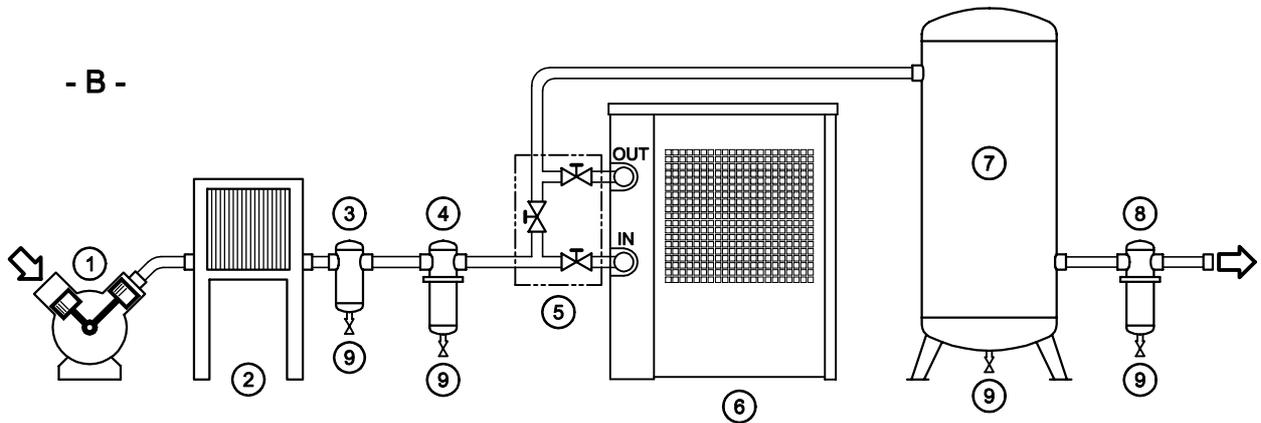
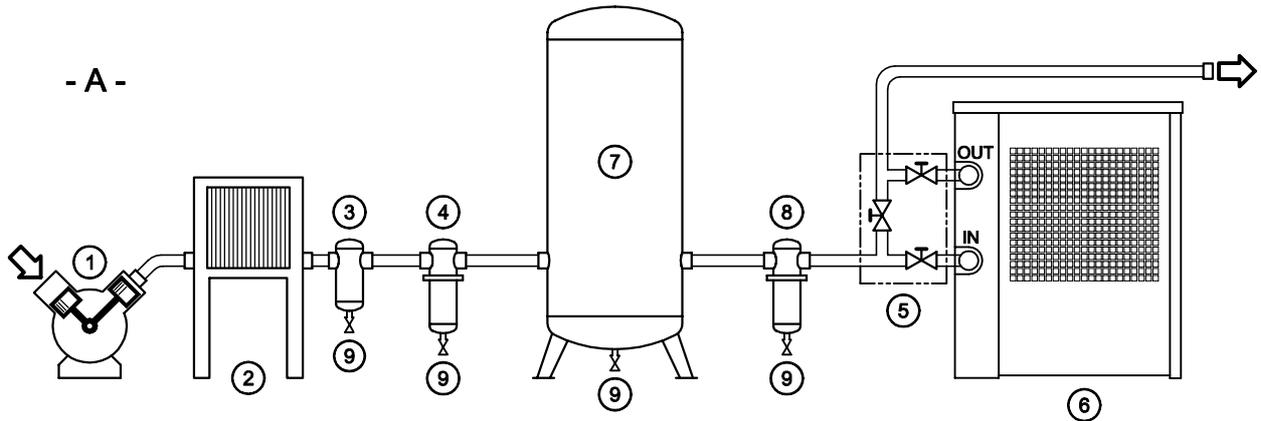
Minimal installation requirements :

- Select a clean room dry, free from dust, and protected from atmospheric disturbances.
- The supporting plate must be smooth, horizontal and able to hold the weight of the dryer.
- Minimum ambient temperature +1 °C, see the data plate for maximum temperature.
- Allow at list a clearance of 1 m on each side of the dryer for proper ventilation and to facilitate eventual maintenance operations.

The dryer doesn't require to be fixed to the supporting surface. Eventual locks will be required for special installations (on brackets, hanging, etc.).



2.3 INSTALLATION LAYOUT



- | | |
|------------------------|-----------------------|
| ① Air compressor | ⑥ Dryer |
| ② Final refrigerator | ⑦ Compressed air tank |
| ③ Condensate separator | ⑧ Final filter |
| ④ Pre-Filter | ⑨ Condensate drain |
| ⑤ By-pass group | |

Type A installation is suggested when the compressor operates at reduced intermittence and the total consumption equals the compressor flow rate.

Type B installation is suggested when the air consumption can consistently change with peak values highly exceeding the flow rate of the compressors. The capacity of the tank must be sized in order to compensate eventual instantaneous demanding conditions (peak air consumption).

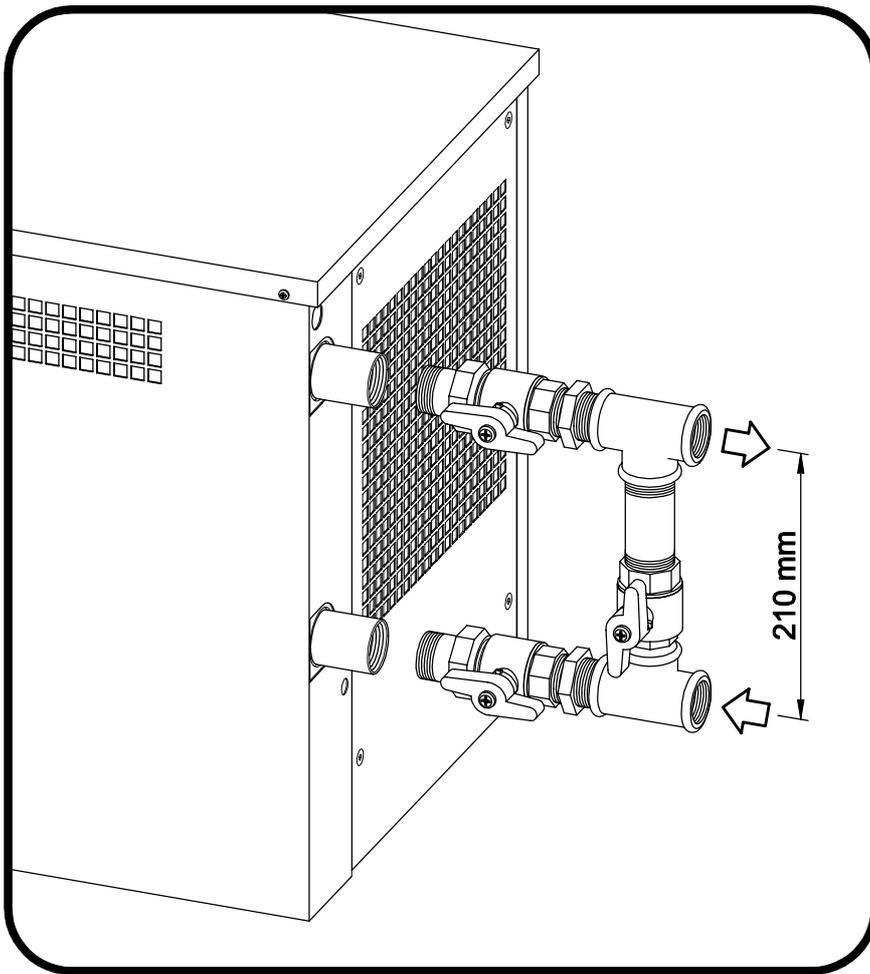
2.4 CONNECTION TO THE COMPRESSED AIR SYSTEM



Operations to be performed by qualified personnel. Never operate with plants under pressure. The user is responsible to ensure that the dryer will never be operated with pressure exceeding the nominal values. Eventual over-pressure could be dangerous both for the operator and the machine.

The temperature and the amount of air entering the dryer must comply with the limits reported on the data plate. In case of treatment of air at particularly high temperature, the installation of a final refrigerator could result necessary. The cross section of the connecting piping, which must be free from dust, rust, chips and other impurities, must be consistent with the flow-rate of the dryer.

In order to facilitate the maintenance operations, it has been installed a by-pass group, as shown in the following illustration.



Dryers	Ø	Code By-Pass
PDE 3 ÷ 5 -S	1/2"	2240GBP301
PDE 8 ÷ 15 -S	3/4"	2240GBP302
PDE 20-S	1"	2240GBP303

In realising the dryer, particular measures have been taken in order to limit the vibration which could occur during the operation. Therefore we recommend to use connecting pipes able to insulate the dryer from possible vibrations originating from the line (flexible hoses, vibration damping fittings, etc.).

2.5 CONNECTION TO THE MAINS



The connection to the mains, to be carried out by qualified personnel, and the safety systems must comply with local rules and laws.

Before connecting the unit to the electric power, verify that the voltage and the frequency available on the mains correspond to the data reported on the data plate of the dryer. In terms of voltage, a $\pm 5\%$ tolerance is allowed.

The dryer comes with a mains connecting cable already installed and ending with a VDE 16A - Shucko plug.

The mains socket must be provided with a **mains magneto-thermal differential breaker** ($I_{\Delta n}=0.03A$), adjusted on the basis of the consumption of the dryer (see the nominal values on the data plate of the dryer).

The cross section of the power supply cables must comply with the consumption of the dryer, while keeping into account also the ambient temperature, the conditions of the mains installation, the length of the cables, and the requirements enforced by the local Power Provider.



It's mandatory ensure the connection to the ground terminal.

Don't use adapters on the mains socket. If necessary, have the pug replaced by qualified personnel.

2.6 CONDENSATE DRAIN



The condensate is discharged at the same pressure of the air entering the dryer.
Never point the condensate drain jet towards anybody.

The dryer comes already fitted with tubing in flexible plastics (6 mm in diameter and 1500 mm long) for the connection to the collection plant.

The condensate drain occurs through a solenoid valve protected with a mechanical filter. In order to avoid clogging of the solenoid valve, the condensate coming from the cyclone separator is previously filtered, than discharged. The solenoid valve coil is operated by an adjustable electronic timer.

Connect and properly fasten the condensate drain to a collecting plant or container.

The drain cannot be connected to pressurised systems.



Don't dispose the condensate in the environment.

The condensate collected in the dryer contains oil particles released in the air by the compressor. Dispose the condensate in compliance with the local rules.

We suggest to install a water-oil separator where to convey all the condensate drain coming from compressors, dryers, tanks, filters, etc.

3.1 PRELIMINARY OPERATION



Verify that the operating parameters matches with the nominal values reported on the data plate of the dryer (voltage, frequency, air pressure, air temperature, ambient temperature, etc.).

Before delivery, each dryer is submitted to accurate tests simulating real operating conditions. Nevertheless, the unit could be damaged during transportation. We therefore suggest to check the integrity of the dryer upon arrival and to keep it under control during the first hours of operation.



The start-up must be performed by qualified personnel.

It's mandatory that the engineer in charge will adopt safety operational conditions complying with the local safety and accident prevention requirements.



The same engineer will be responsible for the proper and safe operation of the dryer.

Never operate the dryer if their panels are not in place.

3.2 FIRST START-UP



At the first start-up, or in case of start-up after a long inactivity period or following to maintenance operations, respect the instructions given below.
The start-up must be performed by qualified personnel.

Sequence of operations :

- Be sure that all the steps of the “Installation” chapter have been respected.
- Be sure that the connections to the compressed air system are properly fastened and that the piping are suitably fixed.
- Be sure that the condensate drains are properly fastened and connected to a collection plant or container.
- Be sure that the by-pass system is closed.
- Be sure that the manual valves mounted on condensate drain circuit are open.
- Remove all the packaging and other material which could obstruct the area around the dryer.
- Activate the mains switch.
- Activate the main switch on the control panel (pos. 1).
- Be sure that the consumption matches with the values of the data plate.
- Verify the operation of the condensate drain circuit - wait for its first interventions.
- Allow the dryer temperature to stabilise at the pre-set value.
- Slowly open the air inlet valve.
- Slowly open the air outlet valve.
- Slowly close the central by-pass valve of the system
- Check the piping for air leakage.

3.3 OPERATION AND SWITCHING OFF



Operation :

- Check the condenser for cleanliness.
- Verify that the system is powered.
- Activate the main switch on the control panel (pos. 1).
- Check that both the main switch - pos. 1 - and the LED  on the DMC11 are glowing.
- Wait a few minutes, verify that the DewPoint displayed on the DMC11 is correct and that the condensate is regularly drained.
- Switch on the air compressor.
- The anti-freezing function is ensured by the intervention of the hot gas by-pass solenoid valve signalled by the  on the DMC11.



Switching off :

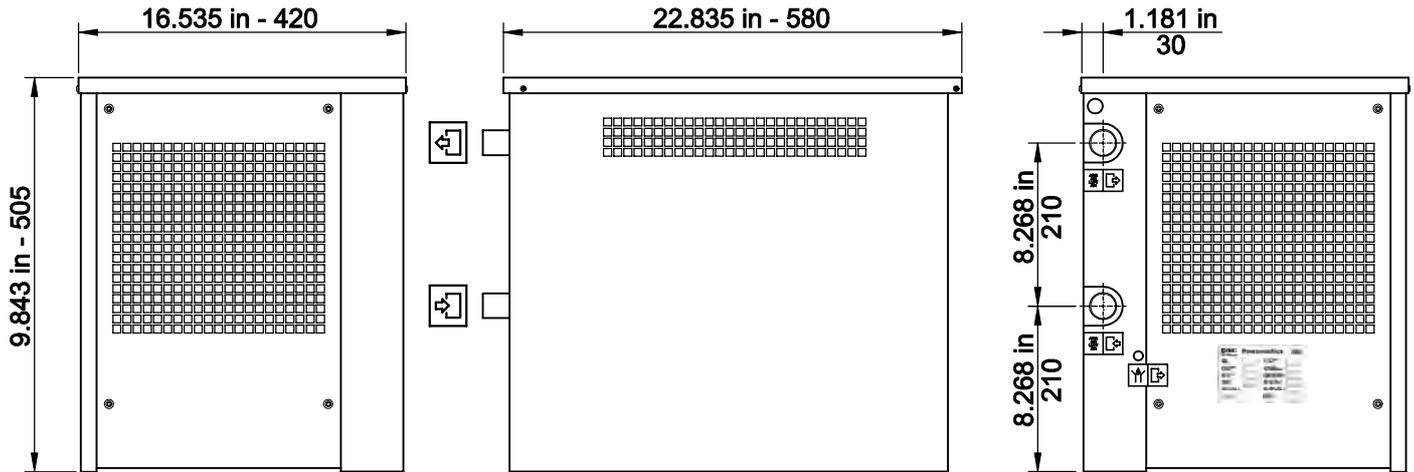
- Verify that the DewPoint displayed on the DMC11 is correct.
- Switch off the air compressor.
- After few minutes, switch off the main switch on the control panel of the dryer (pos. 1).

NOTE : A DewPoint included in the green operating area of the DMC11 is correct according to the possible working conditions (capacity, temperature air entrance, temperature of area, etc.).

During the operation, the refrigerating compressor, the fan of the condenser and the aftercooler fan will be continuously on.

The dryer must remain on during the full usage period of the compressed air, even if the air compressor works intermittently.

4.1 TECHNICAL FEATURES OF DRYERS SERIES PDE 3 ÷ 20 -S



MODEL		PDE3-S	PDE5-S	PDE8-S	PDE10-S	PDE15-S	PDE20-S
Flow rate at 35°C 7 bar	[l/min]	350	550	850	1100	1800	2300
	[m³/h]	21	33	51	66	108	138
	[Scfm]	12	19	30	39	64	81
Dew point*		+37.8°F (+3°C) equal to 0.73 gr/Nm³ di H ₂ O					
Ambient temperature nom (max)	[°F/°C]	+100 (+115) / +37.8 (+45)					
Min. ambient temperature	[°F/°C]	+34 / +1					
Nom (max) inlet air temperature	[°F/°C]	+100 (+115) / +37.8 (+45)					
Nominal inlet air pressure	[psig / bar]	34 / 7					
Max. inlet air pressure	[psig / bar]	232 / 16					
Exit pressure drop - Δp	[psig / bar]	2.9 / 0.2					
Inlet - outlet connections	NPT-F	1/2"		3/4"			1"
Type of refrigerant		HFA 134.a					
Refrigerant loading	[oz / gr]	7.1 / 200		9.7 / 275	7.1 / 200	11.5 / 325	
Nominal electric absorption	[A / W]	2.2 / 170	2.7 / 210	3.3 / 250	4.3 / 330	5.9 / 450	6.1 / 470
Max. electric absorption	[A / W]	2.9 / 220	3.4 / 260	4.3 / 330	5.6 / 430	7.8 / 600	8.0 / 620
Fan electric absorption	[A / W]	0.30 / 27		0.54 / 40			
Acoustic pressure level at 1 mt	[dbA]	< 70					
Weight	[lb / Kg]	75 / 34	82 / 37	86 / 39	90 / 41	95 / 43	99 / 45

Correction factor for operating pressure changes :

psig	30	44	58	72	86	100	114	128	142	156	170	184	198	212	232
factor	0.54	0.67	0.77	0.85	0.93	1.00	1.06	1.11	1.15	1.18	1.21	1.23	1.25	1.27	1.28

Correction factor for ambient temperature changes :

ambient temperature °F	80	90	100	110	115
factor	1.09	1.06	1.00	0.90	0.83

Correction factor for inlet air temperature changes :

air temperature °F	90	100	110	115
factor	1.15	1.00	0.86	0.78

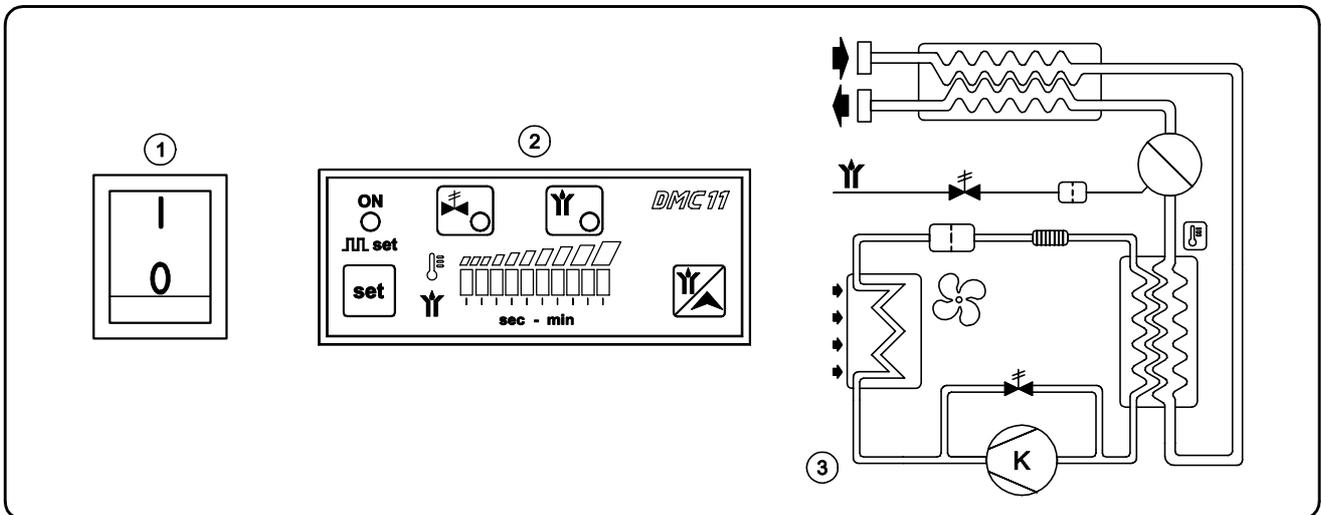
Correction factor for dew point changes :

DewPoint °F	37.8	39.2	41.0	42.8	44.6	46.4	48.2	50.0
factor	1.00	1.02	1.05	1.07	1.10	1.12	1.15	1.18

* The DewPoint refers to an ambient temperature of +100°F with inlet air at 100 psig and +100 °F.

5.1 CONTROL PANEL

The control panel illustrated below is the only dryer-operator interface.



- ① Glowing general switch
- ② DMC11 Air Dryer Controller
- ③ Air and refrigerating gas flow diagram

5.2 OPERATION

The dryer described in this manual basically consists of two separated circuits: a compressed air circuit, divided into two heat exchangers, and a refrigerating circuit.

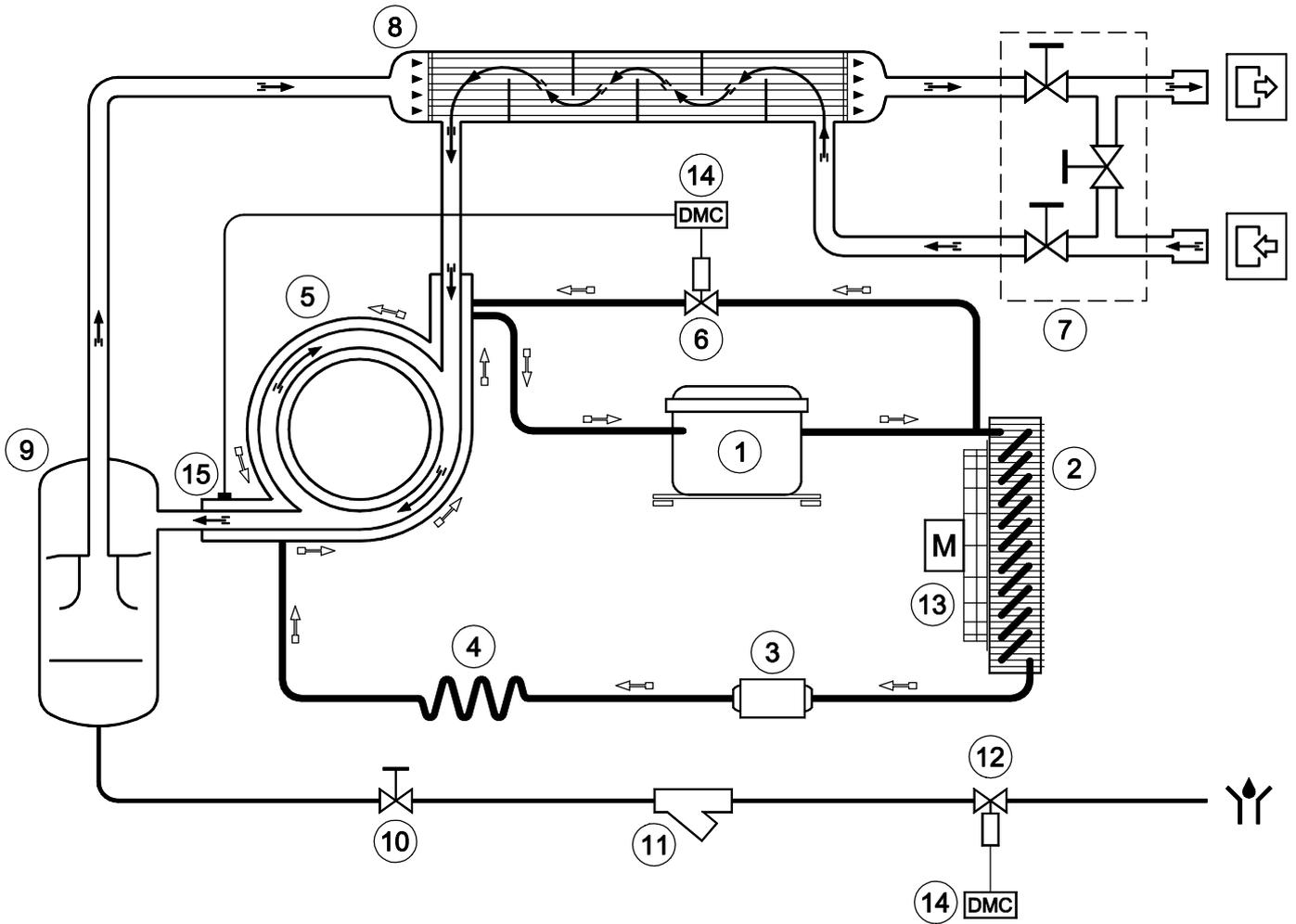
The warm and humid entering air goes through an air-air exchanger before entering the evaporator (air-freon exchanger) where, due to the contact with the refrigerating circuit, it cools down to allow the condensation of the humidity it contains.

The condensed humidity is then separated and expelled into the cyclone separator.

The cooled air goes through the air-air exchanger, where it partially warms up in cooling down the entering warm air (pre-refrigeration).

The refrigerating circuit needed for these operations is basically composed of a refrigerating compressor, a condenser and the evaporator, also called air-freon exchanger.

5.3 FLOW DIAGRAM



- | | |
|----------------------------------|------------------------------------|
| ① Refrigerating compressor | ⑨ Condensate separator |
| ② Condenser unit | ⑩ Condensate drain service valve |
| ③ Dehydration filter | ⑪ Condensate mechanical filter |
| ④ Capillary tube | ⑫ Condensate drain solenoid valve |
| ⑤ Evaporator | ⑬ Condenser unit fan |
| ⑥ Hot gas by-pass solenoid valve | ⑭ DMC11 Air Dryer Controller |
| ⑦ By-pass system (optional) | ⑮ DMC11 Air Dryer Controller probe |
| ⑧ Air-air exchanger | |

⇒ Air flow direction

⇨ Refrigerating gas flow direction

5.4 REFRIGERATING COMPRESSOR

The refrigerating compressor is the pump of the system where the gas coming from the evaporator (low pressure side) is compressed up to the condensation pressure (high pressure side).

All the compressor used are manufactured by primary companies and are designed for applications where high compression ratios and wide temperature changes are present.

The fully sealed construction is perfectly gas tight, so ensuring high energy efficiency and long useful life.

The pumping unit is supported by dumping springs, in order to consistently reduce the acoustic emission and the vibration diffusion.

The electric motor is cooled down by the aspirated refrigerating gas, which goes through the coils before reaching the compression cylinders. The "Klixon" type thermal protection protects the compressor from over heating and over currents. The protection is automatically restored as soon as the nominal temperature conditions are reached.

5.5 CONDENSER

The condenser is the element in which the gas coming from the compressor is cooled down and condensed becoming a liquid. Mechanically, it is formed by a copper tubing circuit (with the gas flowing inside) immersed in an aluminium blades package. The cooling operation occurs via a high efficiency axial ventilator which, in applying pressure on the air contained within the dryer, forces it into the blades package. It's mandatory that the temperature of the ambient air will not exceed the nominal values. It's as well important **TO KEEP THE UNIT FREE FORM DUST AND OTHER IMPURITIES.**

5.6 DEHYDRATION FILTER

Traces of humidity and slag which could accumulate inside the chilling plant, or smudge which could occur after a long use of the dryer, could limit the lubrication of the compressor and clog the expansion valves or the capillary tube.

The function of the dehydration filter, located before the capillary tubing, is to stop the impurities, so avoiding their circulation within the system.

5.7 CAPILLARY TUBING

It consists of a piece of reduced cross section copper tubing located between the capacitor and the evaporator to form a throttling against the flow of the refrigerating fluid. This throttling creates a pressure drop, which is a function of the temperature to be reached within the evaporator : the less is the capillary tube outlet pressure, the less is the evaporation temperature.

The length and the diameter of the capillary tubing are accurately sized with the performance to be reached by the dryer; no maintenance/adjustment operations are necessary.

5.8 EVAPORATOR

Also called an air-freon exchanger. The liquid formed in the condenser is evaporated in this part of the circuit. In the evaporation phase the refrigerator tends to absorb the heat from the compressed air present in the other side of the exchanger. The evaporator is immersed in the base of the dryer and insulated with non-CFC expanded insulating foam. The part is entirely constructed in copper and the cooler goes in the opposite direction to the air, thus contributing to limit pressure loss and to provide efficient thermal exchange.

5.9 HOT GAS BY-PASS SOLENOID VALVE

This valve is located between the pressure side of the compressor and the terminal side of the evaporator. Its purpose is to avoid that in conditions of low thermal charge in the dryer (low air flow or relatively cold air) the temperature inside the evaporators will drop below 0 °C. Temperature below 0 °C would eventually allow the formation of ice inside the evaporator, with the consequent clogging of the air port and, in the worst of the cases, the rupture of the evaporator itself. The coil of the solenoid valve is piloted by the DMC11 Air Dryer Controller.

5.10 AIR/AIR EXCHANGER

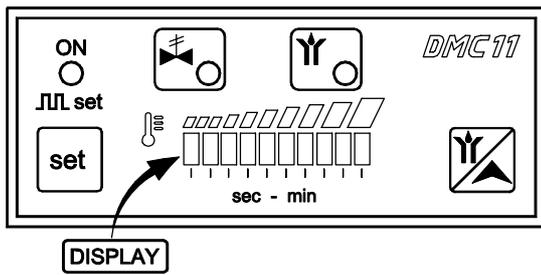
The purpose of this exchanger is the transmission of the heat of the incoming air to the exiting cold air. The benefits of this solution are basically two : the incoming air is partially cooled down, therefore the chilling system can be sized for a lower thermal drop, thus allowing a 40÷50% energy saving; moreover, as cool air will never reach the compressed air circuit, no condensate will form on the external surface of the piping.

5.11 CONDENSATE SEPARATOR

The cold air exiting the evaporator is conveyed in the centrifugal type condensate separator. By means of a winged diaphragm, the entering air assumes a high speed rotary motion. Therefore, due the centrifugal force, the condensed particles are projected on the lateral surface, where from they will be collected on the bottom, that is an accumulation reservoir for the separated condensate, the latter being expelled by the drain solenoid valve at regular intervals. The resulting condensate free air will reach the exit and then it is driven into the air-air exchanger.

The centrifugal type separator offers the advantage of a high efficiency, even with variable flow-rates. It doesn't require maintenance, it doesn't clog and it's able to separate solid particles as well.

5.12 DMC11 AIR DRYER CONTROLLER



- Button - access the set-up.
- Button - condensate drain test / value increment.
- LED - glowing = power on.
- flashing = set-up condition.
- LED - hot-gas solenoid valve on.
- LED - condensate drain solenoid valve on.

The DMC11 device controls the whole operation of the dryer, and allows the calibration of the operating parameters. The activation of the hot-gas solenoid valve is driven by means of a probe located at the end of the evaporator, while a cyclic electronic timer drives the condensate drain solenoid valve at regular intervals.

OPERATION - During the dryer operation, the LED is on.

The 10 LED display indicates the current operating DewPoint, shown by means of a three colours (blue-green-red) bar over the display itself.

- Blue section - the operative DewPoint of the dryer is too low: freeze risk ;
- Green section - operating conditions ensuring an optimal DewPoint ;
- Red section - DewPoint of the dryer too high, the treatment of the compressed air may be improper.

The hot-gas solenoid valve is activated when the DewPoint goes below 3 °C (Set-point) - LED on - and is deactivated when the DewPoint goes at least over 4.5 °C (Set-point + Δt) - LED off.

The condensate drain solenoid valve is activated for 2 seconds (T_{ON}) - LED on - each minute (T_{OFF}).

To perform the manual test for the condensate drain, press the button.

SET-UP - The DMC11 is adjusted during the final test of the dryer. In case of particular requirements concerning the operation management, the user can change the setting of the programmed parameters. The parameters which can be set up are the following :

- Set-point - activation temperature of the hot-gas solenoid valve (fix hysteresis - Δt - equal to 1.5 °K).
- T_{ON} - activation time of the condensate drain solenoid valve.
- T_{OFF} - pause time between two consecutive activation of the condensate drain solenoid valve.

To access the set-up, keep pressed the button for at least 2 seconds; LED flashing confirms the command.

First appears the Set-Point parameter; to access the other parameters, press sequentially the button.

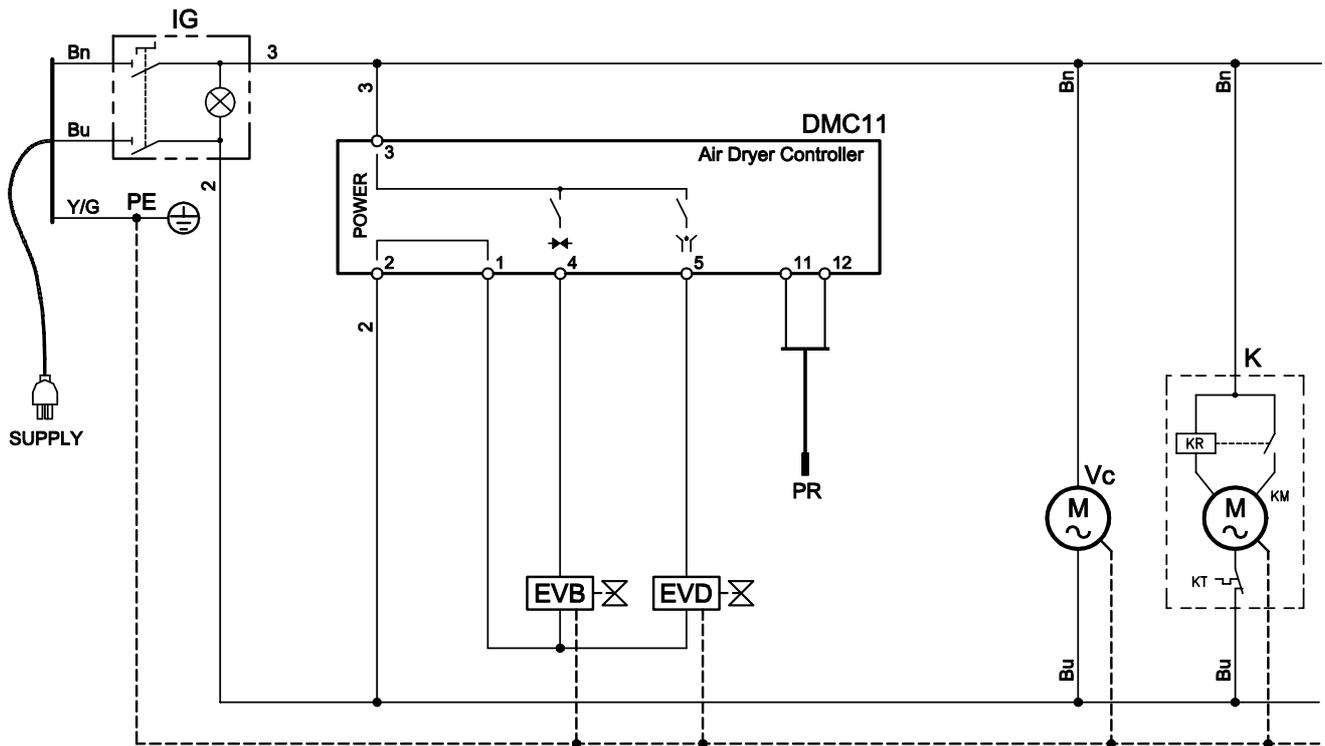
To change the value of the selected parameter, keep pressed the button and operate on button ; The current value is shown on the LED display. For the value range and the resolution (value of each single LED), see the following table :

Parameter	Description	Display	Value range	Resolution	Set value
Set-point	Activation of the hot-gas solenoid valve	Synchronous flashing LED + LED	2.0 - 6.5 °C	0.5 °C	3 °C
T _{ON}	Activation time of the condensate drain solenoid valve	Synchronous flashing LED + LED	1 - 10 sec	1 sec	2 sec
T _{OFF}	Pause time of the condensate drain solenoid valve	Non-synchronous flashing LED + LED	1 - 10 min	1 min	1 min

The "out of scale" conditions are indicated by the intermittent flashing of the first and the last LED of the display, respectively showing the exceeding of the lower or the upper range.

To exit the set-up condition in any moment, press the button. In case no operations are made during 2 minutes, the system exits automatically the set-up condition.

5.13 ELECTRICAL LAYOUT



Legend :

- | | |
|---|--|
| IG : Main switch | VC : Condenser fan |
| K : Refrigerating compressor | PR : DMC11 probe |
| KR : Compressor start-up relay | EVB : Hot gas by-pass solenoid valve |
| KM : Compressor electric motor | EVD : Condensate drain solenoid valve |
| KT : Compressor thermal protection | |

6.1 CONTROLS AND MAINTENANCE



The maintenance operations must be worked out by qualified personnel.



Before any intervention, be sure that:

any part of the machine is powered and that it cannot be connected to the mains supply.

any part of the machine is under pressure and that it cannot be connected to the compressed air system.



Before attempting any maintenance operation on the dryer, switch it off and wait at least 30 minutes. During operation the copper piping connecting the compressor to the condenser can reach dangerous temperature able to burn the skin.



DAILY

- Verify that the DewPoint displayed on the DMC11 is correct.
- Check the proper operation of the condensate drain systems.
- Verify the condenser for cleanliness.



EVERY 200 HOURS OR MONTHLY

- With an air jet (Max. 2 bars) blowing from inside towards outside clean the condenser; repeat this operation blowing from outside towards inside; be careful not to damage the aluminium blades of the cooling package.
- Close the manual condensate drain valve, unscrew the mechanical filter and clean it with compressed air and a brush. Reinstall the filter properly tight, then open the manual valve.
- At the end, check the operation of the machine.



EVERY 1000 HOURS OR YEARLY

- Verify for tightness all the screws of the electric system and that all the "Faston" type connections are in their proper position.
- Check the conditions of the condensate drain flexible hoses, and replace if necessary.
- At the end, check the operation of the machine.

6.2 SUGGESTED SPARE PARTS

The suggested spare parts list will enable you to promptly intervene in case of abnormal operation, so avoiding to wait for the spares delivery. In case of failure of other parts, for example inside the refrigerating circuit, the replacement must mandatory be worked out by a refrigerating systems specialist or in our factory.

DESCRIPTION	CODE	PDE3-S	PDE5-S	PDE8-S	PDE10-S	PDE15-S	PDE20-S
Condensate Y type drain filter	64355FF011	1	1	1	1	1	1
Fan motor	5210135005	1	1				
Fan motor	5210135010			1	1	1	1
Fan of the fan motor	5215000005	1	1				
Fan of the fan motor	5215000019			1	1	1	1
Fan grid	5225000010			1	1	1	1
DMC11 Air Dryer Controller	5620130100	1♦	1♦	1♦	1♦	1♦	1♦
Dmc11 probe	5625NNN020	1♦	1♦	1♦	1♦	1♦	1♦
Condensate drain solenoid valve	64320FF005	1♦	1♦	1♦	1♦	1♦	1♦
Coil for cond. drain solenoid valve	64N22MM035	1♦	1♦	1♦	1♦	1♦	1♦
By-pass solenoid valve	64120SS005	1	1	1			
By-pass solenoid valve	64120SS010				1	1	1
Coil for by-pass solenoid valve	64N22MM055	1♦	1♦	1♦	1♦	1♦	1♦
Glowing switch 2P 0/1	5450SZN005	1	1	1	1	1	1
Refrigerating compressor	5015135001	1					
Refrigerating compressor	5015135003		1				
Refrigerating compressor	5015135005			1			
Refrigerating compressor	5015135007				1		
Refrigerating compressor	5015135009					1	
Refrigerating compressor	5015135011						1

♦ Suggested spare part.

NOTE : To order the suggested spare parts or any other part, it's necessary to quote the data reported on the identification plate.

7.1 TROUBLESHOOTING



The troubleshooting and the eventual checks have to be worked out by qualified personnel. Pay particular attention in case of interventions on the refrigerating circuit. The refrigerating fluid, if under pressure, while expanding could cause congelation burns and serious damage to the eyes, should it gets in contact with them.

SYMPTOM

POSSIBLE CAUSE - SUGGESTED ACTION

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. The machine doesn't start. 2. The compressor doesn't work. 3. The fan of the condenser doesn't work. 4. The dryer doesn't drain the condensate. 5. The dryer continuously drains condensate. 6. Water within the line. 7. DewPoint too high. | <ul style="list-style-type: none"> • Check for mains failure. • Verify the electric wiring. • Activation of the internal "klixon" protection - wait for 30 minutes, then retry. • Verify the electric wiring. • Replace the "klixon" protection. • If present, replace the start-up relay. • If present, replace the start-up capacitor. • If present, replace the operation capacitor. • If the compressor doesn't work yet, replace it. • Verify the electric wiring. • If the fan still doesn't work, replace it. • Verify the electric wiring. • The condensate drain mechanical filter is clogged - remove and clean it. • The drain solenoid valve is jammed - remove and clean it. • The coil of the condensate drain solenoid valve burned out- replace it. • DMC11 doesn't work - replace it. • The DewPoint is too low - the condensate is frost - see the specific section. • The drain solenoid valve is jammed - remove and clean it. • DMC11 doesn't work - replace it. • The dryer is off - switch it on. • Untreated air flows through the by-pass unit (if installed) - close the by-pass. • The dryer doesn't drain condensate - see the specific section. • DewPoint too high - see the specific section. • The dryer is off - switch it on. • The refrigerating compressor doesn't work - see the specific section. • The fan of the condenser doesn't work - see the specific section. • The inlet air is too hot - restore the nominal conditions. • The inlet air flow rate is higher than the rate of the dryer - reduce the flow rate - restore the normal conditions. • The ambient temperature is too high or the room aeration is insufficient - provide proper ventilation. • The condenser is dirty - clean it. • The dryer doesn't drain the condensate - see the specific section. • LED  of the DMC11 is always on - see specific paragraph. • The set-point of the DMC11 is very high - see paragraph SET-UP of the DMC11. • There is a leak in the refrigerating fluid circuit - contact a refrigerating systems engineer. |
|---|--|

8. Excessive pressure drop within the dryer.
- The DewPoint is too low - the condensate is frost and blocks the air - see the specific section.
 - Check for throttling the flexible connection hoses.
9. DewPoint too low.
- Verify the electric wiring of the DMC11.
 - Verify the wiring of the hot gas by pass solenoid valve.
 - The coil of the hot gas by-pass solenoid valve burned out - replace it.
 - The probe of the DMC11 does not properly detect the temperature of the evaporator - push the probe until it reaches the bottom of the measurement well.
 - The set-point of the DMC11 is very low - see paragraph SET-UP of the DMC11.
 - DMC 11 Air Dryer Controller doesn't work - replace it.
 - The hot gas solenoid valve is blocked - contact a refrigerating systems engineer.
10. LED  of the DMC11 is always on.
- Verify the electric wiring of the probe of the DMC 11.
 - The first and the last led of the display of DMC11 blink simultaneously, the probe doesn't work - replace it.
 - DMC 11 Air Dryer Controller doesn't work - replace it.

7.2 DISMANTELING OF THE DRYER

If the dryer is to be dismantled, it has to be split into homogeneous groups of materials.



We recommend to comply with the safety rules in force for the disposal of each type of material. The chilling fluid contains droplets of lubrication oil released by the refrigerating compressor. Do not dispose this fluid in the environment.

It has to be discharged from the dryer with a suitable device and then delivered to a collection centre where it will be processed to make it reusable.

8.1 TABLE OF COMPONENTS - EXPLODED VIEW

- | | |
|----------------------------|--|
| ① Control panel | ⑪ Fan grid |
| ② Refrigerating compressor | ⑫ By-pass solenoid valve |
| ③ Lateral panel | ⑬ By-pass solenoid valve coil |
| ④ Cover | ⑭ Condensate drain solenoid valve |
| ⑤ Dehydration filter | ⑮ Condensate drain solenoid valve coil |
| ⑥ Condenser | ⑯ Y type condensate drain filter |
| ⑦ Front panel | ⑰ Condensate drain valve |
| ⑧ Air/air pre-exchanger | ⑱ Condensate separator |
| ⑨ Fan blade | ⑲ Foamed material basement |
| ⑩ Fan motor | |

**DRYER MODEL
PDE 8 ÷ 20 -S**

