REFRIGERATED AIR DRYER
SÉCHEUR A CYCLE FRIGORIFIQUE

ADE 5-8 COMPACT
ADE 8÷75

GB

USER'S MAINTENANCE AND SPARE PARTS MANUAL

GB

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MANUEL D'INSTRUCTIONS ENTRETIEN PIECES DE RECHANGE

F

AIR - COOLED
REFROIDISSEMENT A AIR

ISSUE • EDITION
2003

CE

Dear Customer**,**

Thank you for choosing our product. In order to get the best performance from this product, please read this manual carefully. 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 **ADE** 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.

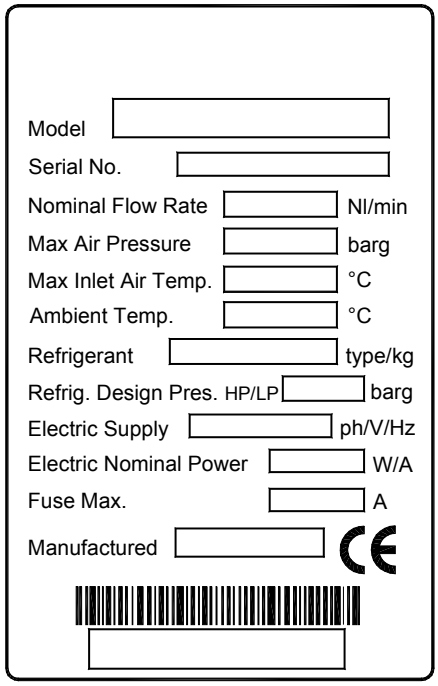
IDENTIFICATION PLATE

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. This data must always be provided 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.

Model ⇨
Serial No. ⇨
Nominal Flow Rate ⇨
Max Air Pressure ⇨
Max Inlet Air Temp. ⇨
Ambient temp. ⇨
Refrigerant ⇨
Refrig. Design Pres. HP/LP ⇨
Electric Supply ⇨
Electric Nominal Power ⇨
Fuse Max. ⇨
Manufactured ⇨



WARRANTY CONDITIONS

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

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 initiate repairs during the warranty period, the data reported on the identification plate must be provided.

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 protection of the environment:

- CFC free refrigerants
- Foamed insulation parts produced 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 no part of the machine is under voltage and that it cannot be connected to the mains.
- Be sure that no part of the dryer is under pressure and that it cannot be connected to the compressed air system

These refrigeration air dryers contain R134.a type refrigerant fluid, not considered potential ozone depleting. Maintenance on refrigeration systems must be carried out only by refrigeration engineers according to local rules. R134.a may be dangerous for men only if it is present in bulk concentrations. In case of leaks the room is to be aired before any intervention.

Any change to the machine or to the relevant operating parameters, if not previously verified and authorized 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 on 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 respect 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 TRANSPORT

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

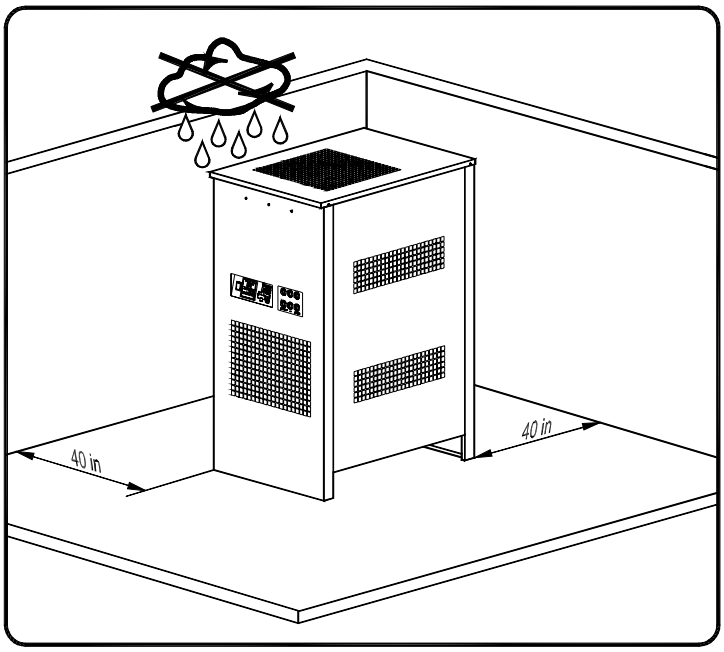
- To move the packaged unit we suggest to use a suitable trolley or forklift. Transportation by hands is discouraged.
- Keep the dryer always in vertical position. Turning it upside down some parts could be irreparably damaged.
- Handle with care. Heavy blows could cause irreparable damage.
- Even when 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 jeopardize the proper operation of the dryer.
This unit is not suitable for use in an explosive atmosphere, where risk of fire could exist, or in the presence of gaseous or solid polluting material.

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

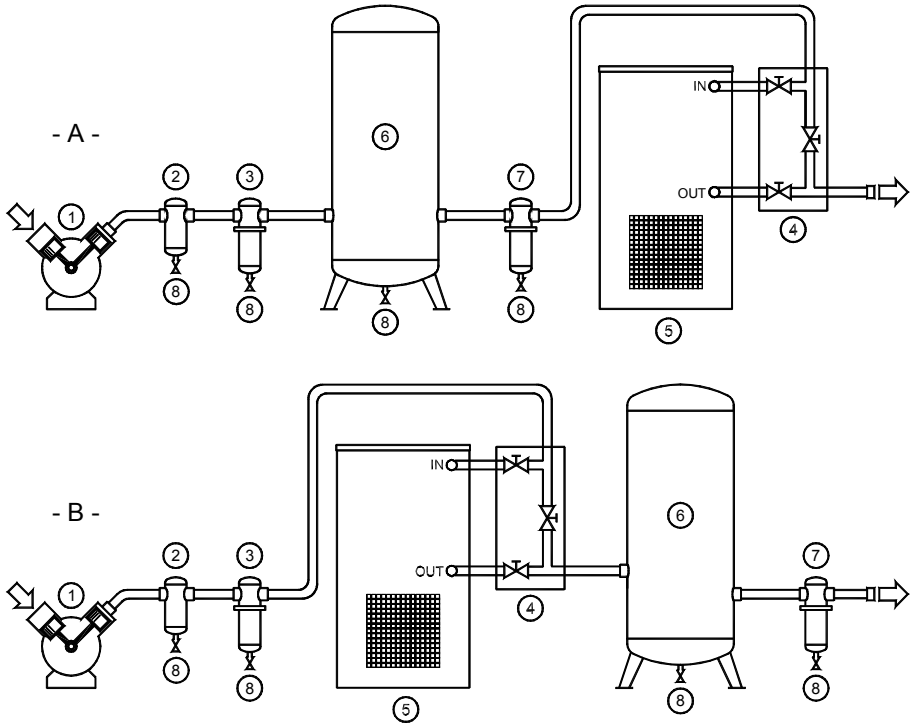


Minimal installation requirements :

- Select a clean room dry, free from dust, and protected from atmospheric disturbances.
- The supporting area must be smooth, horizontal and able to hold the weight of the dryer.
- Minimum ambient temperature +34 °F (1 °C).
- Maximum ambient temperature +113°F (45 °C).
- Allow at least a clearance of 40 in (1 m) on each side of the dryer for proper ventilation and to facilitate eventual maintenance operations.

The dryer does not need to be fixed to the supporting surface.

2.3 INSTALLATION LAYOUT



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

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 CORRECTION FACTORS

Correction factor for operating pressure changes :											
Inlet air pressure	psig	60	70	85	100	115	130	140	155	170	200	218
	barg	4.1	4.8	5.9	6.9	7.9	9.0	9.7	10.7	11.7	13.8	15.0
Factor (F1)		0.70	0.85	0.93	1.00	1.06	1.11	1.15	1.18	1.21	1.25	1.28

Correction factor for ambient temperature changes :					
Ambient temperature	ºF	90	100	110	113
	ºC	32.2	37.8	43.3	45.0
Factor (F2)		1.15	1.00	0.82	0.75

Correction factor for inlet air temperature changes:						
Air temperature	ºF	130	150	180	190	200
	ºC	54.4	65.6	82.2	87.8	93.3
Factor (F3)		1.15	1.10	1.00	0.80	0.65

Correction factor for DewPoint changes:						
DewPoint	ºF	38	40	41	46	50
	ºC	3.3	4.4	5.0	7.8	10.0
Factor (F4)		0.75	0.90	1.00	1.05	1.15

How to find the air flow capacity:

Air flow capacity = Nominal duty X Factor (F1) X Factor (F2) X Factor (F3) X Factor (F4)

Example:

An ADE 31 has a nominal duty of 109 scfm (185 Nm^3/h). What is the maximum allowable flow through the dryer under the following operating conditions:

- Inlet air pressure = 115 psig (7.9 barg)
- Ambient temperature = 100 °F (37.8 °C)
- Inlet air temperature = 150 °F (65.6 °C)
- Pressure DewPoint = 38 °F (3.3 °C)

Each item of data has a corresponding numerical factor as follows:

Air flow capacity = 109 x 1.06 x 1.00 x 1.10 x 0.75

= 95 scfm (160 Nm^3/h) → This is the maximum flow rate that the dryer can accept under these operating conditions.

How to select a suitable dryer for a given duty:

Minimum Std. air flow rate = Design air flow ÷ Factor (F1) ÷ Factor (F2) ÷ Factor (F3) ÷ Factor (F4)

Example:

The procedure here is to list the operating conditions and then to locate the corresponding numerical factors:

- Design air flow = 118 scfm (200 Nm^3/h)
- Inlet air pressure = 115 psig (7.9 barg)
- Ambient temperature = 100 °F (37.8 °C)
- Inlet air temperature = 150 °F (65.6 °C)
- Pressure DewPoint = 38 °F (3.3 °C)

In order to select the correct dryer model the required flow rate is to be divided by the correction factors relating to above mentioned parameters:

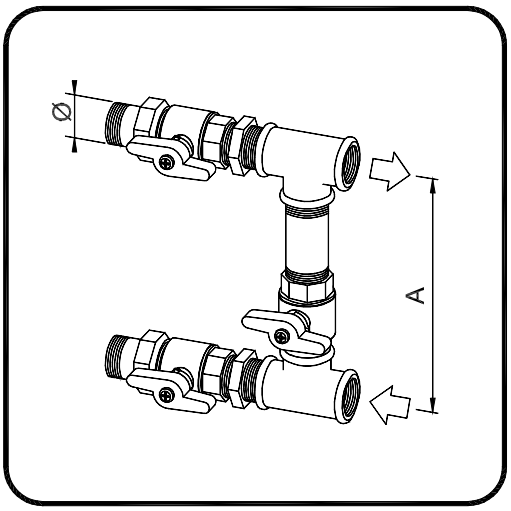
Minimum Std. air flow rate = 118 ÷ 1.06 ÷ 1.00 ÷ 1.10 ÷ 0.75

= 135 scfm (230 Nm^3/h) → Therefore the model suitable for the conditions above is ADE 43 (152 scfm, 258 Nm^3/h - nominal duty).

2.5 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 be necessary.
The cross section of the connecting piping, which must be free from dust, rust, chips and other impurities, must In order to facilitate the maintenance operations, it has been installed a by-pass group, as shown in the following illustration.



Dryers Model	Ø [NPT-F]	A [mm]	By-Pass Code
ADE 5-8 Compact	3/4"	405	2240GBP201
ADE 8÷18	3/4”	305	2240GBP308
ADE 23	1”	305	2240GBP309
ADE 31	1”	420	2240GBP322
ADE 43	1.1/4”	405	2240GBP323
ADE 52	1.1/2”	405	2240GBP324
ADE 61-75	2”	405	2240GBP325

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

2.6 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 ±5% tolerance is allowed.
The dryer (115/1/60 ADE 5÷23) comes with a mains connecting cable already installed and ending with a VDE 16A - Shucko plug. The dryer (230/1/60 ADE 31÷75) comes with box for the connections to the mains.
The mains socket must be provided with a **mains magneto-thermal differential breaker** (IΔn=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 also taking into account the ambient temperature, the conditions of the mains installation, the length of the cables, and the requirements enforced by the local Power Provider.

It is mandatory to ensure the connection to the ground terminal.
Don’t use adapters on the mains socket. If necessary, have the pug replaced by qualified personnel.

2.7 CONDENSATE DRAIN

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

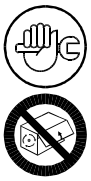
The dryer comes already fitted with tubing in flexible plastics 1/4" in (6 mm) diameter and 59.1/16" in (1500 mm) long for the connection to the collection plant.
Condensate drain operates through two separate circuits. The first circuit eliminates the condensate through a 5 micron filter installed at the exit of the final refrigerator (aftercooler). The drainage occurs by means of an automatic system. In the second circuit, the condensate collected from the separator, is first filtered and than expelled by means of a solenoid valve controlled by the DMC11 Air Dryer Controller or ADS93 Controller.
Connect and properly fasten the condensate drain to a collecting plant or container.
The drain cannot be connected to pressurized systems.

Don't dispose the condensate to 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 the installation of water-oil separator where to collect all the condensate coming from compressors, dryers, tanks, filters, etc.

3.1 PRELIMINARY OPERATION

Verify that the operating parameters match 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 that you check the integrity of the dryer upon arrival and to keep it under close watch 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 stabilize 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 :

DMC11 Air Dryer Controller

- Check the condenser for cleanliness.
- Check the aftercooler 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 set 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 signaled by the on the DMC11.

Operation :

ADS93 Controller

- Check the condenser for cleanliness.
- Check the aftercooler 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 display of the ADS93 device pos. 2 - are glowing.
- Wait a few minutes, verify that the DewPoint displayed on the ADS93 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 by-pass hot gas solenoid valve, signaled by the glowing of green light on the front panel of the ADS93 device - pos. 2.

Switching off :

DMC11 Air Dryer Controller

- 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.

Switching off :

ADS93 Controller

- Verify that the temperature indicated by the ADS93 device - pos. 2 - 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 :

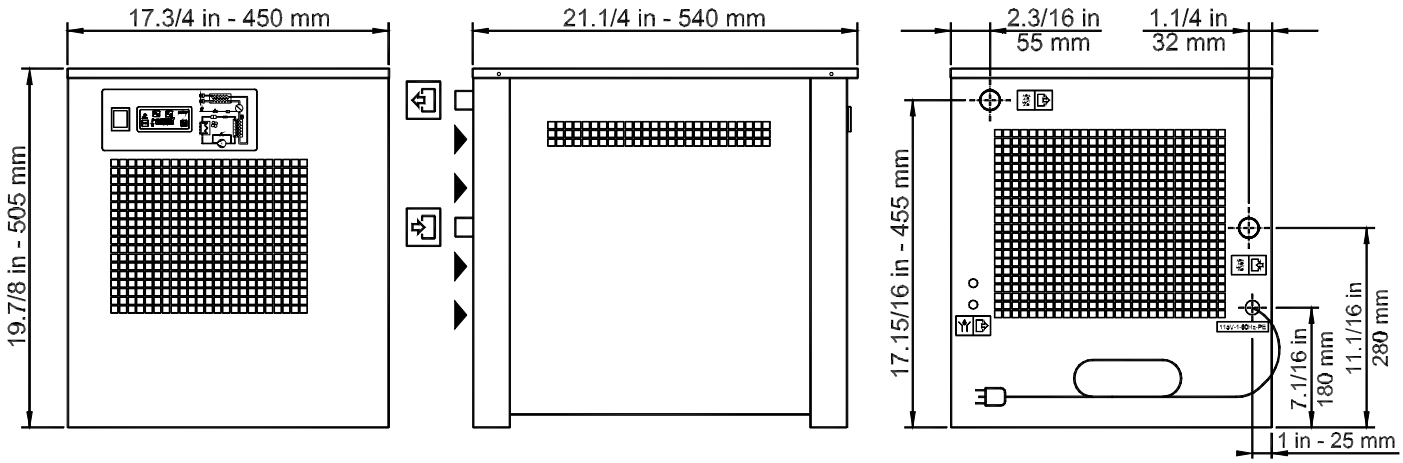
A DewPoint included in the green operating area of the DMC11 is correct according to the possible working conditions (flow-rate, temperature of the incoming air, ambient temperature, etc.).

Note :

Taking into account the possible operating conditions (flow-rate, temperature of the incoming air, ambient temperature, etc.) a temperature within 0 ºC and +8 ºC (+ 32 °F and +46 °F) can be considered correct.

During the operation, the refrigerating compressor will run continuously. The dryer must remain on during the full usage period of the compressed air, even if the air compressor works intermittently.

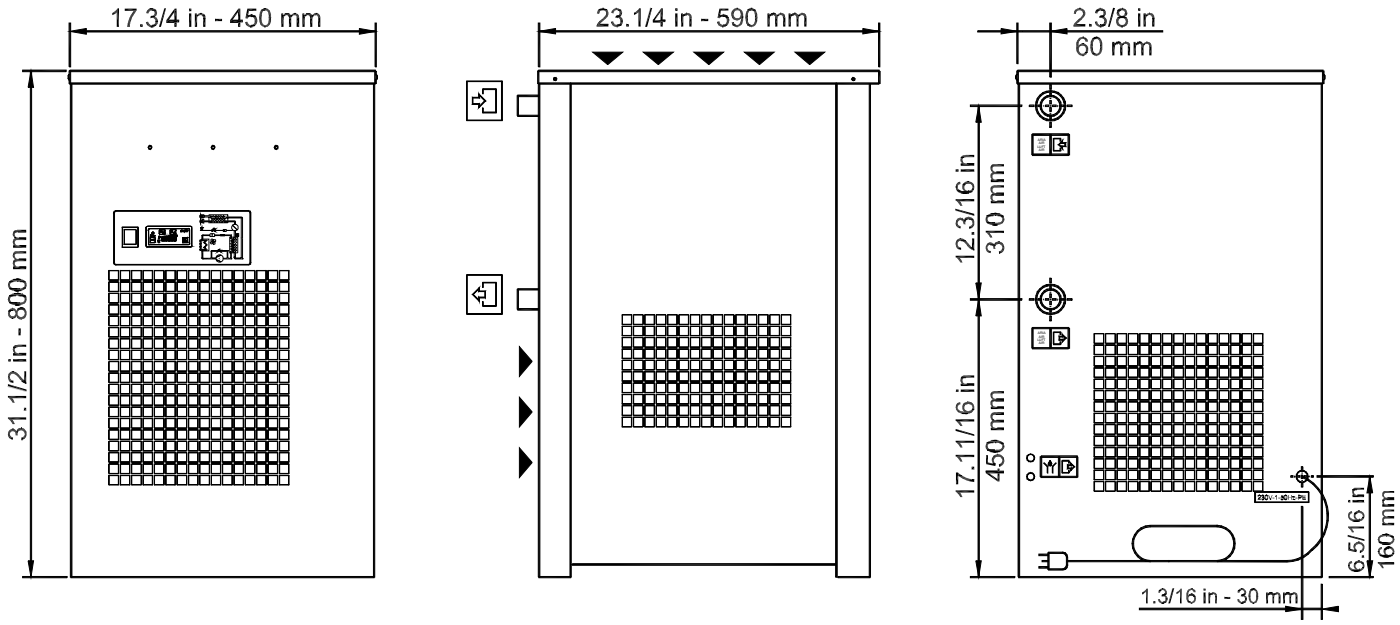
4.1 TECHNICAL FEATURES OF DRYERS SERIES ADE 5-8 COMPACT



MODEL		ADE 5 COMPACT	ADE 8 COMPACT
Air flow at nominal condition *	[scfm]	20	30
	[Nl/min]	565	850
	[Nm³/h]	34	51
Pressure DewPoint at nominal condition *		+41°F (+5°C) equal to 0.86 g/Nm³ of H_2O	
Ambient temperature nominal (maximum)	[°F / °C]	+100 (+113) / +38 (+45)	
Minimum ambient temperature	[°F / °C]	+34 / +1	
Nominal (maximum) inlet air temperature	[°F / °C]	+180 (+218) / +82 (+100)	
Nominal inlet air pressure	[psig / barg]	100 / 7	
Maximum inlet air pressure	[psig / barg]	218 / 15	
Maximum outlet air pressure drop - Δp	[psi / bar]	5.1 / 0.35	
Inlet - outlet connections	[NPT-F]	3/4”	
Refrigerant type		R134.a(HFC) - CH_2F-CF_3	
Refrigerant quantity	[oz]	11.1/2	10.1/2
	[kg]	0.325	0.300
Electric power supply	[V/Phase/Hz]	115/1/60	
Nominal electric absorption	[A / W]	4.6 / 360	4.4 / 400
Maximum electric absorption	[A / W]	5.5 / 430	5.2 / 500
Fan electric power	[A / W]	0.85 / 70	
Acoustic pressure level at 40 in (1 m)	[dbA]	< 70	
Weight	[lb / kg]	88 / 40	90 / 41

***** The nominal condition refers to an ambient temperature of +100 °F (+38 °C) with inlet air at 100 psig (7 barg) and +180 °F (+82 °C).

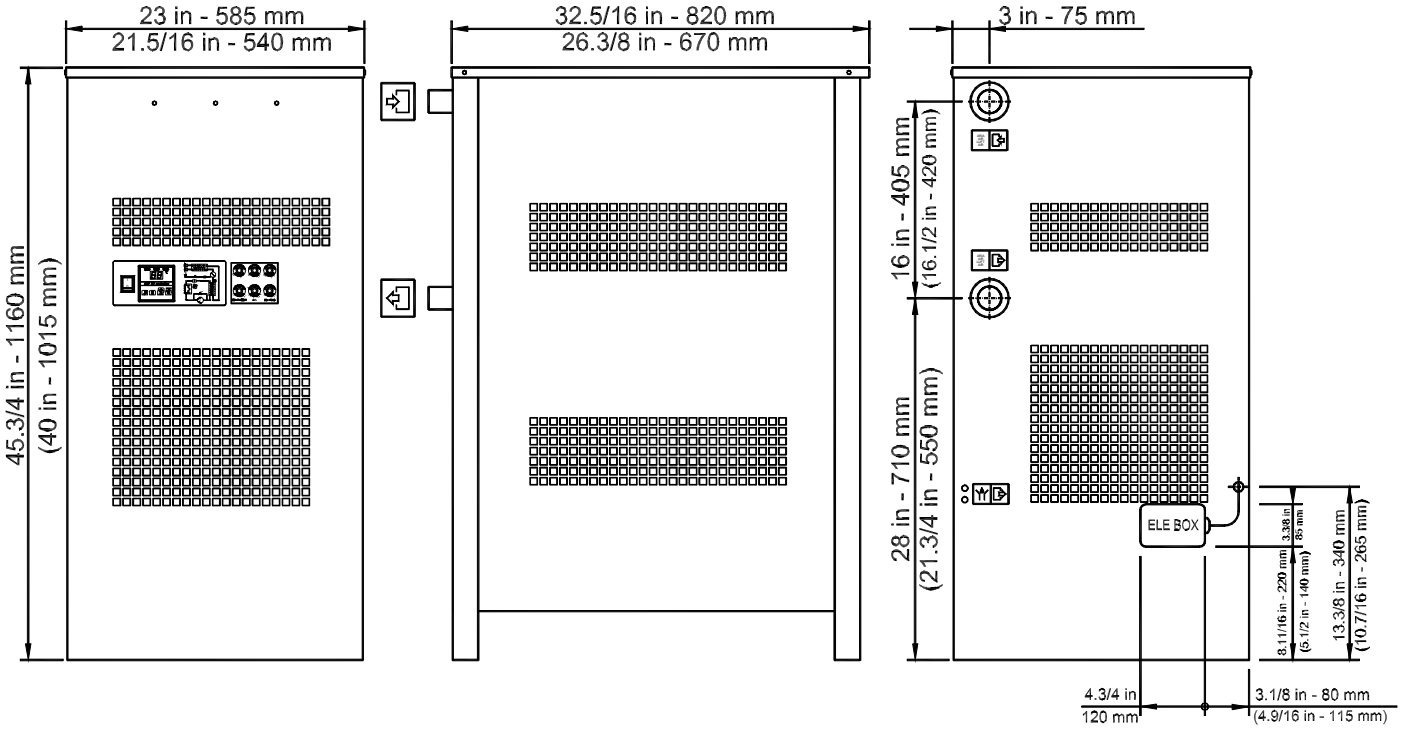
4.2 TECHNICAL FEATURES OF DRYERS SERIES ADE 8÷23



MODEL		ADE 8	ADE 11	ADE 18	ADE 23
Air flow at nominal condition *	[scfm]	30	39	64	81
	[Nl/min]	850	1100	1800	2300
	[Nm³/h]	51	66	109	138
Pressure DewPoint at nominal condition *		+41°F (+5°C) equal to 0.86 g/Nm³ of H_2O			
Ambient temperature nominal (maximum)	[°F / °C]	+100 (+113) / +38 (+45)			
Minimum ambient temperature	[°F / °C]	+34 / +1			
Nominal (maximum) inlet air temperature	[°F / °C]	+180 (+200) / +82 (+93)			
Nominal inlet air pressure	[psig / barg]	100 / 7			
Maximum inlet air pressure	[psig / barg]	218 / 15			
Maximum outlet air pressure drop - Δp	[psi / bar]	5.1 / 0.35			
Inlet - outlet connections	[NPT-F]	3/4”			1”
Refrigerant type		R134.a(HFC) - CH_2F-CF_3			
Refrigerant quantity	[oz]	12.3/8	9.3/4	13.1/4	15
	[kg]	0.350	0.275	0.375	0.425
Electric power supply	[V/Phase/Hz]	115/1/60			
Nominal electric absorption	[A / W]	5.1 / 400	4.9 / 450	5.7 / 500	7.6 / 660
Maximum electric absorption	[A / W]	6.0 / 480	5.8 / 540	6.6 / 600	8.8 / 800
Electric power of condenser fan	[A / W]	0.54 / 45			
Electric power of aftercooler fan	[A / W]	0.85 / 70			
Acoustic pressure level at 40 in (1 m)	[dbA]	< 70			
Weight	[lb / kg]	99 / 45	104 / 47	108 / 49	112 / 51

***** The nominal condition refers to an ambient temperature of +100 °F (+38 °C) with inlet air at 100 psig (7 barg) and +180 °F (+82 °C).

4.3 TECHNICAL FEATURES OF DRYERS SERIES ADE 31÷75



( ) ADE 31

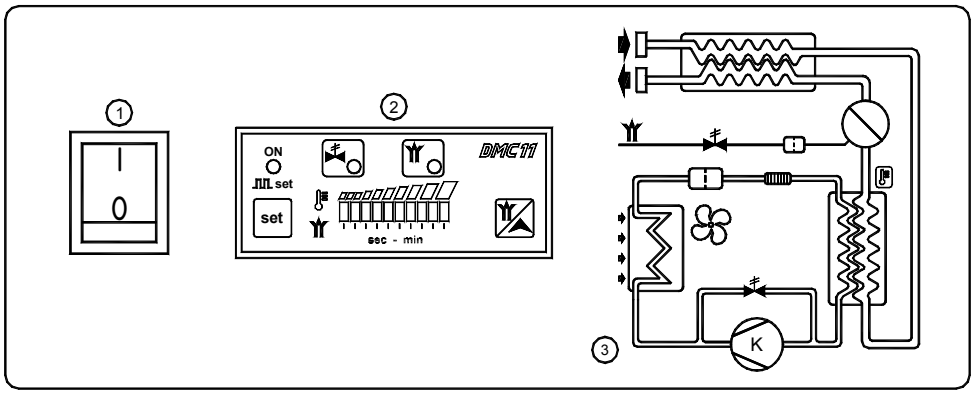
MODEL		ADE 31	ADE 43	ADE 52	ADE 61	ADE 75
Air flow at nominal condition *	[scfm]	109	152	184	215	265
	[Nl/min]	3100	4300	5200	6100	7500
	[Nm³/h]	185	258	313	365	450
Pressure DewPoint at nominal condition *		+41°F (+5°C) equal to 0.86 g/Nm³ of H_2O				
Ambient temperature nominal (max)	[°F/°C]	+100 (+113) / +38 (+45)				
Minimum ambient temperature	[°F/°C]	+34 / +1				
Nominal (max) inlet air temperature	[°F/°C]	+180 (+200) / +82 (+93)				
Nominal inlet air pressure	[psig / barg]	100 / 7				
Maximum inlet air pressure	[psig / barg]	218 / 15			200 / 14	160 / 11
Max. outlet air pressure drop - Δp	[psi / bar]	5.1 / 0.35				
Inlet - outlet connections	[NPT-F]	1”	1.1/4”	1.1/2”	2”	
Refrigerant type		R134.a(HFC) - CH_2F-CF_3				
Refrigerant quantity	[oz]	20.1/4	23	23.7/8	26.1/2	28.1/4
	[kg]	0.575	0.650	0.675	0.750	0.800
Electric power supply	[V/Phase/Hz]	230/1/60				
Nominal electric absorption	[A / W]	4.9 / 800	5.6 / 940	7.6 / 1240	7.9 / 1500	8.1 / 1600
Maximum electric absorption	[A / W]	5.9 / 1000	7.0 / 1250	9.1 / 1580	9.8 / 2000	11.2 / 2100
Condenser fan electric absorption	[A / W]	0.43 / 70		0.35 / 87		
Aftercooler fan electric absorption	[A / W]	0.35 / 87		0.83 / 190		
Acoustic pressure level at 40 in (1 m)	[dbA]	< 70				
Weight	[lb / kg]	150 / 68	194 / 88	249 / 113	269 / 122	273 / 124

***** The nominal condition refers to an ambient temperature of +100 °F (+38 °C) with inlet air at 100 psig (7 barg) and +180 °F (+82 °C).

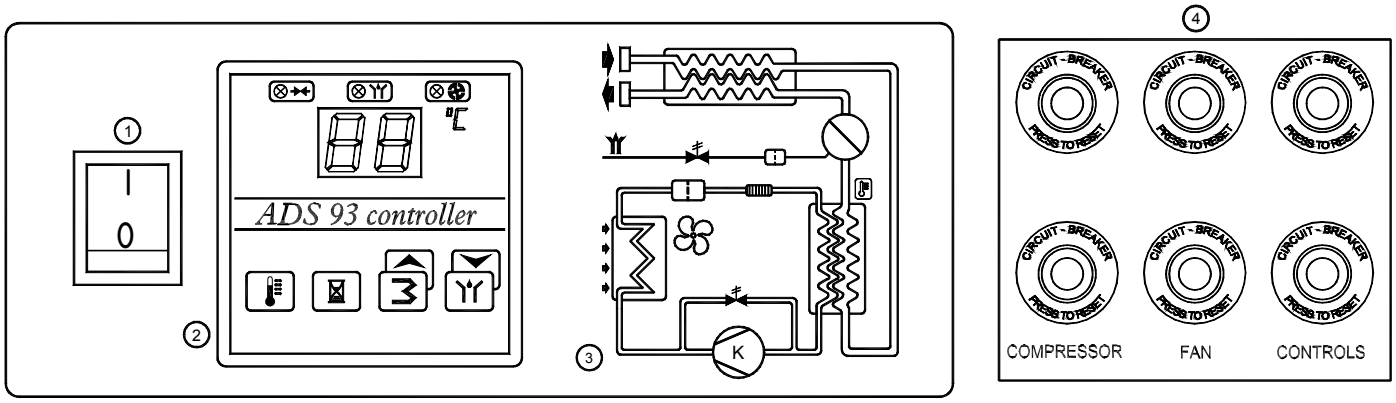
5.1 CONTROL PANEL

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

ADE 5÷23



ADE 31÷75

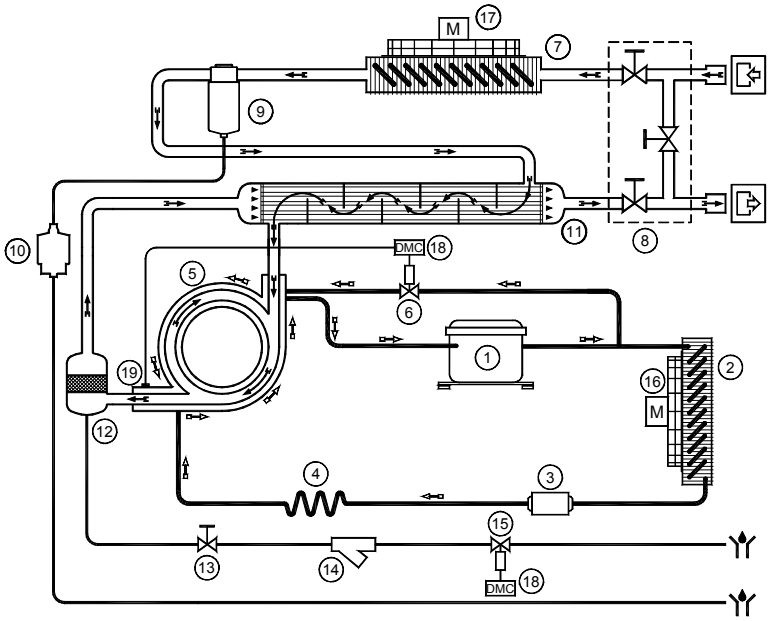


(1) Main switch
(2) DMC11 or ADS93 Controller
(3) Air and refrigerating gas flow diagram
(4) Circuit breaker

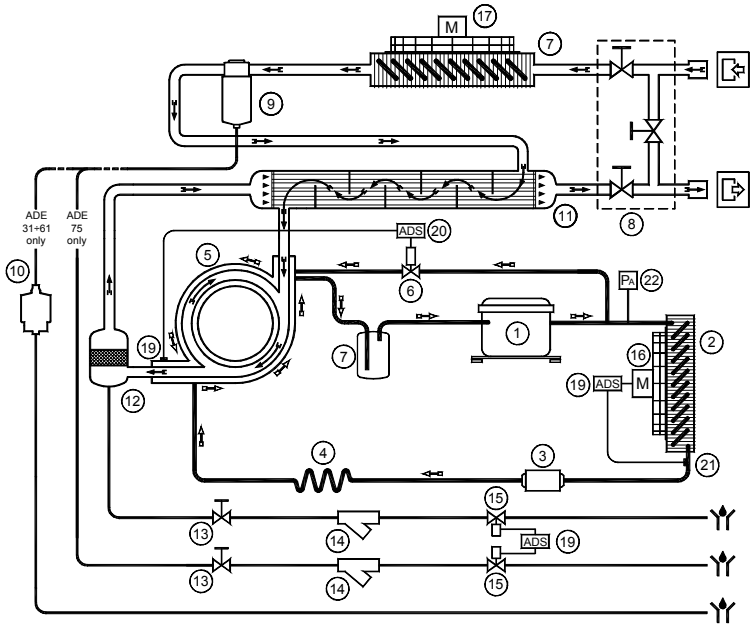
5.2 OPERATION

The dryer described in this manual basically consists of two separated circuits: a compressed air circuit, divided into three heat exchangers, and a refrigerating circuit.
The incoming warm and humid air, initially goes through the final refrigerator where it undergoes to a first temperature drop so loosing part of the humidity it contains, than through the 5 micron filter where it is purified and separated before being discharged by an automatic system. Thus it goes trough an air-to-air exchanger before entering the evaporator (air-to-refrigerant exchanger) where, getting in contact with the refrigerating circuit, it further cools down, so allowing the condensation of the residual humidity. This condensed humidity is separated and ejected in the separator located after the evaporator.
The cooled air now goes through the air-to-air exchanger where, thanks to its low temperature, it cools down the warmer air coming from the final refrigerator, operating a pre-cooling process.
The refrigerating circuit necessary for this process basically consists of a refrigerating compressor, a condenser and the evaporator, also called air-to-refrigerant exchanger.

5.3 FLOW DIAGRAM FOR DRYERS SERIES ADE 5÷23



5.4 FLOW DIAGRAM FOR DRYERS SERIES ADE 31÷75



1. Refrigerating compressor
2. Condenser
3. Dehydration filter
4. Capillary tube
5. Evaporator
6. Hot gas by-pass solenoid valve
7. Liquid separator (ADE 31÷75)
8. By-pass system (optional)
9. 5 micron filter
10. Automatic drain
11. Air-to-air exchanger
12. Condensate separator
13. Condensate drain service valve
14. Condensate strainer
15. Condensate drain solenoid valve
16. Condenser unit fan
17. Air aftercooler unit fan
18. DMC11 Air Dryer Controller
19. DewPoint probe
20. ADS93 Controller
21. Fan control probe
22. Refrigerant pressure-switch P_A (ADE 75)

Air flow direction

Refrigerating gas flow direction

5.5 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 internal 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.

5.6 CONDENSER UNIT

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 aluminum 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**.

5.7 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.

5.8 CAPILLARY TUBE

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.

5.9 EVAPORATOR

Also called an air-to-refrigerant 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.

5.10 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 32 °F (0 °C). Temperature below 32 °F (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 DMC11 Air Dryer Controller or ADS93 Controller.

5.11 AFTERCOOLER

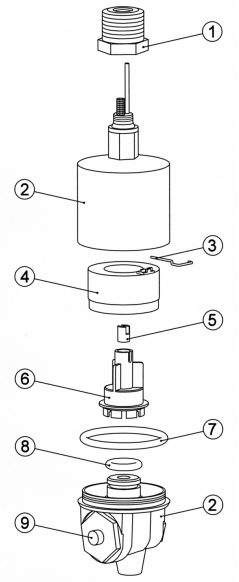
The air aftercooler is the component where the hot air entering the dryer undergoes to a preliminary cooling down. It consists of a circuit of copper tubing, supporting the circulation o compressed air, immersed in an aluminum body provided with cooling blades. A high efficiency axial fan conveying ambient air onto these blades provides the necessary cooling down of the system.
It is mandatory that the ambient temperature will not exceed the nominal value for the dryer. It is equally important to **KEEP THIS SYSTEM FREE FROM DUST AND FOREIGN MATERIALS** eventually introduced by the fan.

5.12 5-MICRON FILTER

Positioned at the outlet of the aftercooler, the 5-micron filter ensures a good degree of purification of the treated air. The filter unit is embodied in the container so as to ensure rapid and easy replacement.

5.13 AUTOMATIC DRAIN

In order to discharge all the condensate separated by the 5-micron filter without air loss, an automatic drain is installed. The drain is provided with a valve drive by a float. When the condensate level, inside the drain, reaches the right level, the float is lifted in order to allow the drainage.
Maintenance: once a mouth, push the drain test button and wait few seconds. If the volume of the discharged water exceeds 1,8 oz (50 cc), dismount completely the drain and clean accurately all its components (refer to assembly).



ASSEMBLY

Pos.	*Description*
1	Connection nipple
2	Drain body
3	Clip
4	Float
5	Shutter
6	Float guide
7	O - ring (body)
8	O - ring
9	Drain test button

5.14 AIR-TO-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.

5.15 CONDENSATE SEPARATOR

The cold air exiting the evaporator goes through the hi-efficiency condensate separator featuring a stainless steel mesh. As the condensate transported by the air gets in contact with the mesh net it is separated and expelled by means of the draining device. The resulting cold and dry air is then conveyed into the air-to-air heat exchanger. The mesh type mist separator offers the benefit to be highly efficient even with variable flow rates.

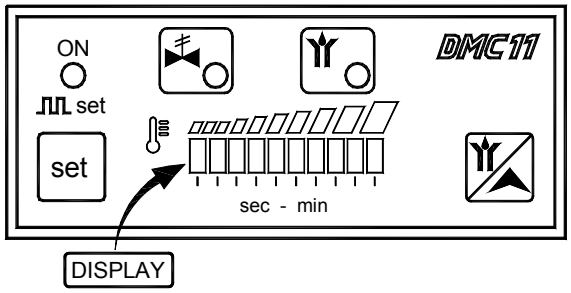
5.16 REFRIGERANT PRESSURE SWITCH PA (ADE 75)

As operation safety and protection of the dryer a series of pressure switches are installed in gas circuit.

PA : This high-pressure switch, located on the pushing side on the compressor, is activated when the pressure exceeds the pre-set value. It features a manual resetting button mounted on the controller itself.

Calibrated pressure : R 134.a Stop 290 psig (20 barg) - Restart Manual

5.17 DMC11 AIR DRYER CONTROLLER



set Button - Access the set-up.

Button - Condensate drain test / value increment.

ON set 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 ON set is on.

The 10 LED display indicates the current operating DewPoint, shown by means of a three colors (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 (38 °F) (Set-point) - LED on - and is deactivated when the DewPoint goes at least over 4.5 °C (40 °F) (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 °C, 3 °F).
- 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 set button for at least 2 seconds; ON set LED flashing confirms the command.

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

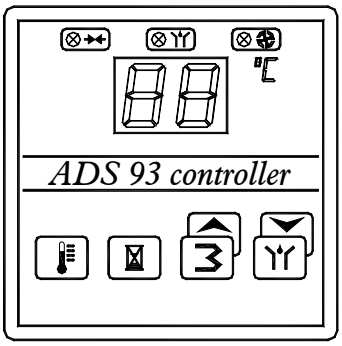
To change the value of the selected parameter, keep pressed the set button and operate on button ; The current value is shown on the LED display. For the value range and the resolution (value of each single LED), see the following table :

Parameter	Description	Display	Value range	Resol.	Set value
Set-point	Activation of the hot-gas solenoid valve	Synchronous flashing LED ON set +LED	2.0 - 6.5 ºC 36 - 44 °F	0.5 ºC 1 °F	3 ºC 38 °F
T_{ON}	Activation time of the condensate drain solenoid valve	Synchronous flashing LED ON set +LED	1 - 10 sec	1 sec	2 sec
T_{OFF}	Pause time of the condensate drain solenoid valve	Non-synchronous flashing LED ON set +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.

5.18 ADS93 CONTROLLER



Key - It displays the Set-Point (activation temp. of the hot gas solenoid valve).

Key - It displays the pause period of the condensate drain.

Key - It displays the condensation temp. /increments the displayed value.

Key - Condensate drain test / reduction of the displayed value.

Green LED - Hot gas by-pass solenoid valve on.

Yellow LED - Condensate drain solenoid valve on.

Green LED - Condenser fan on.

The ADS93 device controls all the functions of the dryer, allowing also the calibration of all the parameters. A probe located at the end of the evaporator pilots the activation of the hot gas by-pass solenoid valve. A second probe, located at the end of the condenser, activate the relevant fan. Moreover, the ADS93 controller acts as a timer controlling the activation at regular intervals of the condensate drain solenoid valve. During the final test, the following values are factory set:

- The hot gas by-pass solenoid valve is activated when a temperature below the SetPoint (+2ºC, 36°F) is detected, and it is deactivated at a temperature equal to the SetPoint + Differential SetPoint (2 + 2 = +4ºC, 36 + 4 = +40°F). To modify the Set-Point (within the limits SL and Sh set while programming), hold down the key and change the value with the keys and .
- Fan of the condenser: It is active when the temperature exceeds FS + FH (25 + 5 = +30 ºC, 77 + 9 = +86°F) and goes out when the temperature goes back to FS (+25 ºC, +77°F).
- Condensate drain solenoid valve: It remains on for a period equal to dr (3 seconds) with a 60 seconds pause. To change the pause time between two successive drainage (within the limits rL and rh set while programming) hold down the key and modify the value with the keys and .

SET-UP (PROGRAMMING)

At the start up, the dryer displays the current dew point temperature.

Pressing the key the condensation temperature will be visualized.

Holding down simultaneously the keys and for at leas 5 seconds **the programming is initiated** and on the display will appear SL .

To select the desired parameter, press sequentially the key .

To change the value of the selected parameter, use the keys and .

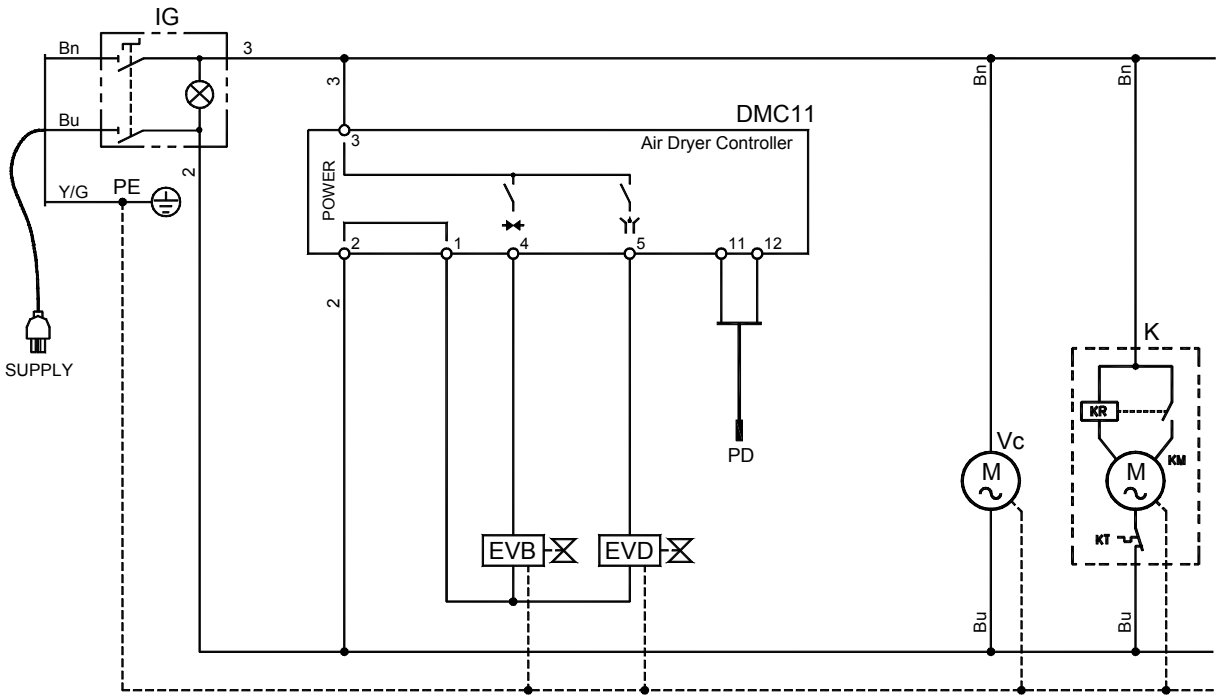
All the parameters can be modified referring the following table.

Display	Description	Adjustment Range	Pre-set value	Equal to
SL	Minimum limit of the Set-Point	-9 ÷ 30	02	+2ºC(36°F)
Sh	Max. limit of the Set-Point	SL ÷ 30	05	+5ºC (41°F)
FH	Differential value of the Set-Point	1 ÷ 7	02	2ºC (4°F)
rL	Minimum limit for the condensate drain pause	01 ÷ 99	06	60 sec
rh	Max. limit for the condensate drain pause	rL ÷ 99	18	180 sec
dr	Duration of the condensate drainage	01 ÷ 99	30	3 sec
FS	STOP temperature for the condenser fan	00 ÷ 99	25	+25ºC(77°F)
FH	Differential value for the condenser fan	00 ÷ 15	05	5ºC (9°F)
o1	Not in use	-9 ÷ 09	-	-
o2	Not in use	-9 ÷ 09	-	-

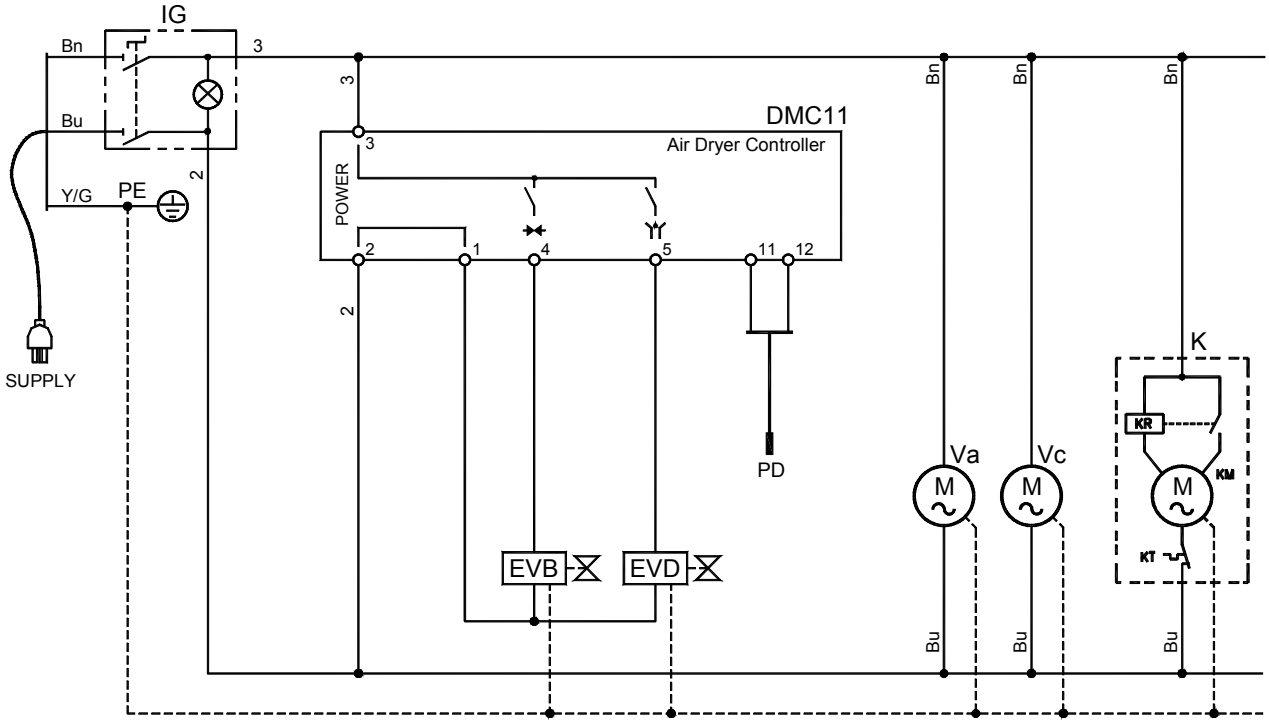
To exit the programming mode, press any time the key .

In case any entry is made within 10 seconds, the system exits automatically the programming mode.

5.19 ELECTRICAL LAYOUT OF DRYERS SERIES ADE 5-8 COMPACT



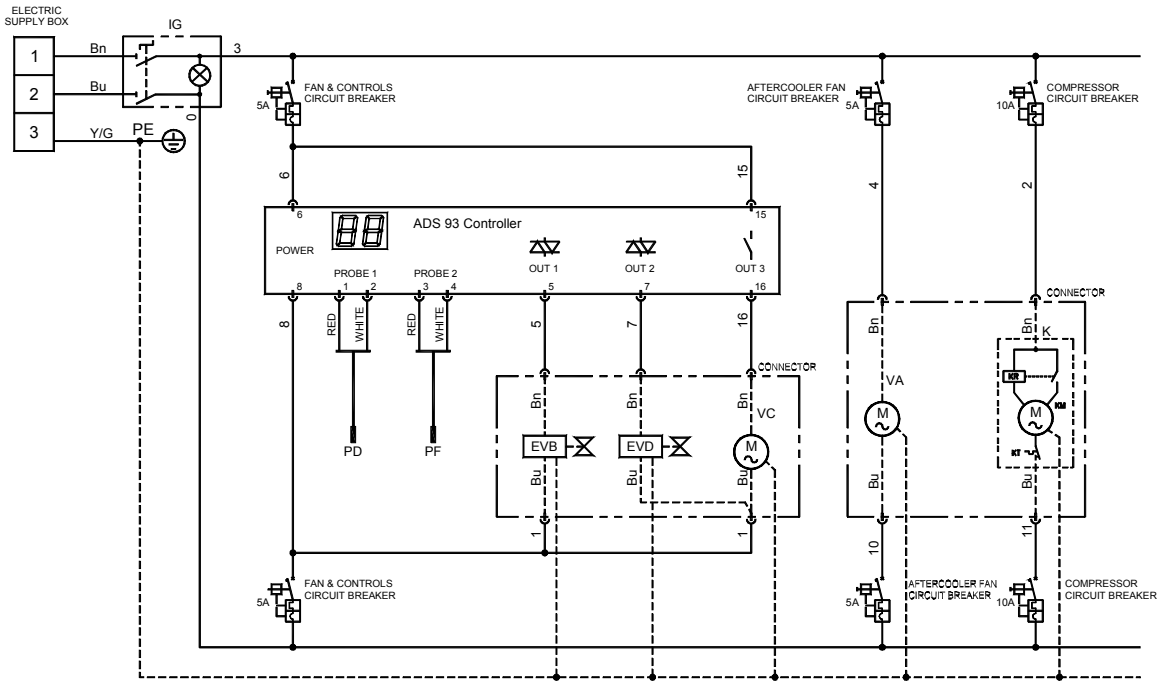
5.20 ELECTRICAL LAYOUT OF DRYERS SERIES ADE 8÷23



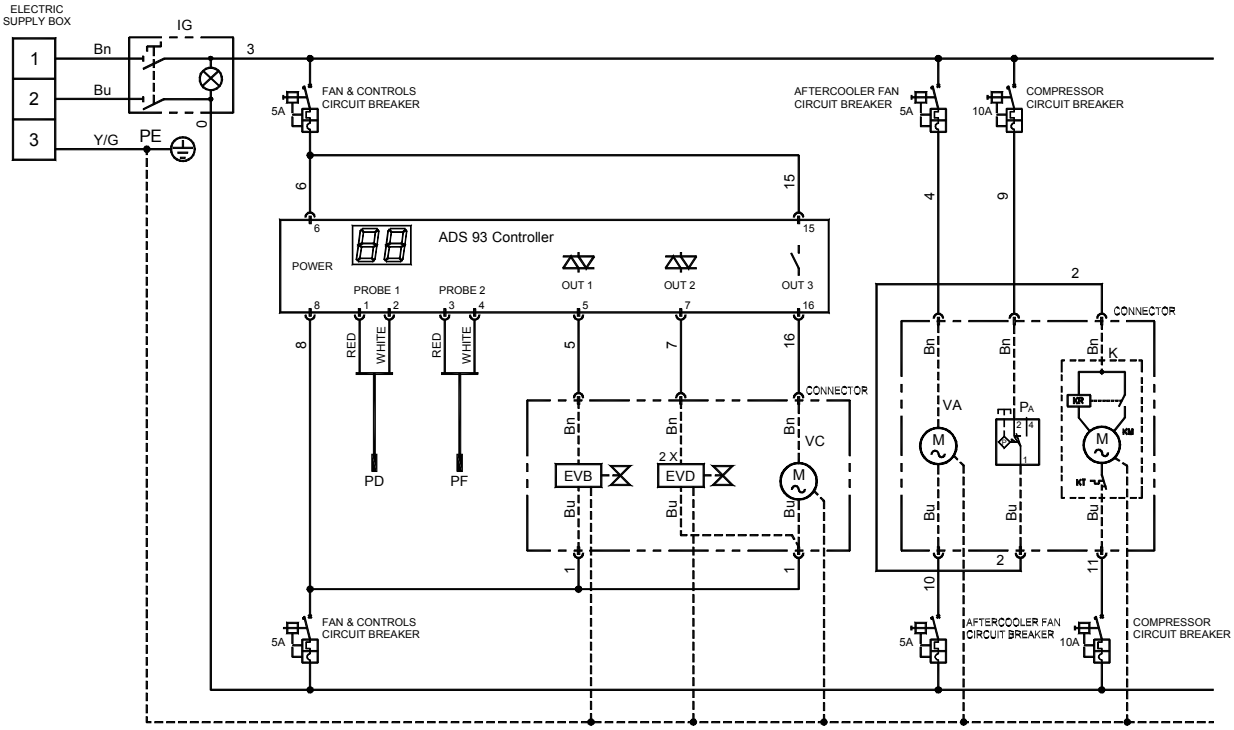
Legend :

IG : Main switch
K : Refrigerating compressor
KR : Compressor start-up relay
KM : Compressor electric motor
KT : Compressor thermal protection
VC : Condenser/Aftercooler unit fan
VA : Aftercooler unit fan
PD : DewPoint probe
EVB : Hot gas by-pass solenoid valve
EVD : Condensate drain solenoid valve

5.21 ELECTRICAL LAYOUT OF DRYERS SERIES ADE 31÷61



5.22 ELECTRICAL LAYOUT OF DRYERS SERIES ADE 75



Legend :

- **IG** : Main switch
- **P_A** : Refrigerant pressure switch
- **K** : Refrigerating compressor
  - **KR** : Compressor start-up relay
  - **KM** : Compressor electric motor
  - **KT** : Compressor thermal protection
- **VC** : Condenser/Aftercooler unit fan
- **VA** : Aftercooler unit fan
- **PD** : DewPoint probe
- **PF** : Fan probe
- **EVB** : Hot gas by-pass solenoid valve
- **EVD** : Condensate drain solenoid valve

6.1 CONTROLS AND MAINTENANCE

The maintenance and the service operations for all dryers must be performed by qualified personnel only.

Before performing any service or maintenance on the equipment the technician must insure the following :

- **must take every precaution to insure that no part of the machine being serviced or maintained has live power to it**. The main disconnect on the unit and from the main power supply must be switched off before performing service. In order to insure safety it is also recommended that the main power wiring leading to the equipment be disconnected.
- **must depressurize the equipment in order to insure a safe working environment**. It is also recommended that a by-pass be used in order to isolate the unit under service and prevent any unwanted pressurizing to occur during service and maintenance. If required the unit may also be disconnected at the air inlet and outlet to insure safety.

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 controller is correct.
- Check the proper operation of the condensate drain systems.
- Verify that the condenser and the aftercooler are clean.

EVERY 200 HOURS OR MONTHLY

- With an air jet (Max. 29 psig, 2 barg) blowing from inside towards outside clean the condenser and the aftercooler; repeat this operation blowing from outside towards inside; be careful not to damage the aluminum 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.
- Verify the automatic drain function, eventually clean it.

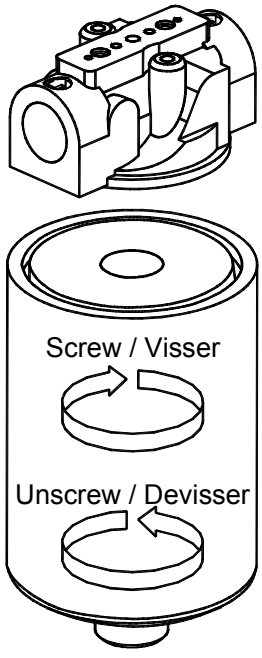
EVERY 1000 HOURS OR YEARLY

- 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.

5 MICRON FILTER

ONCE A YEAR OR MORE FREQUENTLY IF NECESSARY

- Disconnect the 5-micron filter from the relevant condensate drainage circuit.
- Unscrew the clogged cartridge.
- Apply a silicon lubricant to the grommet of the new cartridge.
- Screw the new cartridge firmly by hand to the head of the filter.
- Connect the relevant condensate drainage circuit.



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.

		ADE COMPACT		ADE								
DESCRIPTION OF THE SPARE PARTS	**CODE**	**5**	**8**	**8**	**11**	**18**	**23**	**31**	**43**	**52**	**61**	**75**
Condensate Y type drain filter	64355FF011	1	1	1	1	1	1	1	1	1	1	2
Fan motor	5210135015	1	1	1*	1*	1*	1*					
Fan motor	5210135010			1	1	1	1					
Fan motor	5210115015							1	1			
Fan motor	5210110022							1*	1*	1	1	1
Complete fan	5250110071									1*	1*	1*
Fan of the fan motor	5215000022	1	1	1*	1*	1*	1*					
Fan of the fan motor	5215000019			1	1	1	1					
Fan of the fan motor	5215000025							1	1			
Fan of the fan motor	5215000032							1*	1*			
Fan of the fan motor	5215000034									1	1	1
Fan grid	5225000015	1	1	1*	1*	1*	1*					
Fan grid	5225000010			1	1	1	1					
Fan grid	5225000027							1	1			
Fan grid	5225000025							1*	1*			
Fan grid	5225000030									1	1	1
DMC11 Air Dryer Controller	5620130100	1♦	1♦	1♦	1♦	1♦	1♦					
DMC11 probe	5625NNN020	1♦	1♦	1♦	1♦	1♦	1♦					
ADS93 Controller	5620110001							1♦	1♦	1♦	1♦	1♦
ADS93 probe (DewPoint)	5625NNN021							1♦	1♦	1♦	1♦	1♦
ADS93 probe (Fan)	5625NNN023							1♦	1♦	1♦	1♦	1♦
Condensate drain solenoid valve	64320FF005	1♦	1♦	1♦	1♦	1♦	1♦					
Condensate drain solenoid valve	64320FF011							1♦	1♦	1♦	1♦	2♦
Coil for cond. drain solenoid valve	64N22MM035	1♦	1♦	1♦	1♦	1♦	1♦					
Coil for cond. drain solenoid valve	64N22MM021							1♦	1♦	1♦	1♦	2♦
5 micron filtering cartridge	15000FP006	1♦										
5 micron filtering cartridge	15000FP012		1♦	1♦	1♦							
5 micron filtering cartridge	15000FP018					1♦						
5 micron filtering cartridge	15000FP023						1♦					
5 micron filtering cartridge	15000FP039							1♦				
5 micron filtering cartridge	15000FP045								1♦			
5 micron filtering cartridge	15000FP061									1♦	1♦	
5 micron filtering cartridge	15000FP100											1♦
By-pass solenoid valve	64120SS005	1		1								
By-pass solenoid valve	64120SS010		1		1	1	1	1				
By-pass solenoid valve	64120SS015								1	1	1	1
Coil for by-pass solenoid valve	64N22MM055	1♦	1♦	1♦	1♦	1♦	1♦					
Coil for by-pass solenoid valve	64N22MM060							1♦	1♦	1♦	1♦	1♦
Glowing switch 2P 0/1	5450SZN005	1	1	1	1	1	1	1	1	1	1	1
Panel circuit breaker 5A	54441K7005							4♦	4♦	4♦	4♦	4♦
Panel circuit breaker 10A	54441K7010							2♦	2♦	2♦	2♦	2♦
Refrigerating compressor	5015135005	1		1								
Refrigerating compressor	5015135007		1		1							
Refrigerating compressor	5015135009					1						
Refrigerating compressor	5015135011						1					
Refrigerating compressor	5015115020							1				
Refrigerating compressor	5015115023								1			
Refrigerating compressor	5015115026									1		
Refrigerating compressor	5015115029										1	1
Automatic drain	2230ATD002	1	1	1	1	1	1	1	1	1	1	
Refrigerant pressure switch	5655NNN092											1

*** Aftercooler**

♦ 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
◆ The dryer doesn't start.	⇨ Check for mains failure. ⇨ Verify the electric wiring.
◆ The compressor doesn't work.	⇨ **Where installed -** The "compressor" circuit breaker(s) on the control panel was enabled - reset it pressing the button. ⇨ Activation of the internal thermal protection - wait for 30 minutes, then retry. ⇨ Verify the electric wiring. ⇨ Replace the internal thermal protection. ⇨ **Where installed -** Replace the start-up relay. ⇨ **Where installed -** Replace the start-up capacitor. ⇨ **Where installed -** Replace the operation capacitor. ⇨ **Where installed -** The pressure switch PA has been activated - see specific point. ⇨ If the compressor still doesn't work, replace it.
◆ The fan of the condenser doesn't work.	⇨ **Where installed -** The "compressor" circuit breaker(s) on the control panel was enabled - reset it pressing the button. ⇨ Verify the electric wiring. ⇨ **ADS93 -** The ADS93 Controller doesn't work - replace it. ⇨ If the fan still doesn't work - replace it.
◆ The fan of the final refrigerant doesn't work.	⇨ **Where installed -** The "compressor" circuit breaker(s) on the control panel was enabled - reset it pressing the button. ⇨ Verify the electric wiring. ⇨ If the fan still doesn't work, replace it.
◆ The dryer doesn't drain the condensate.	⇨ 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 -** The DMC11 Air Dryer Controller doesn't work - replace it. ⇨ **ADS93 -** The ADS93 Controller doesn't work - replace it. ⇨ The DewPoint is too low - the condensate is frost - see specific point. ⇨ **Where installed -** The automatic drain on the 5-micron filter is clogged - remove and clean it.
◆ The dryer continuously drains condensate.	⇨ The drain solenoid valve is jammed - remove and clean it. ⇨ Verify the electric wiring. ⇨ **DMC11 -** The DMC11 Air Dryer Controller doesn't work - replace it. ⇨ **ADS93 -** The ADS93 Controller doesn't work - replace it. ⇨ The automatic drain on the 5-micron filter is jammed - remove and clean it.
◆ Water within the line.	⇨ The dryer is off - switch it on. ⇨ **Where installed -** Untreated air flows through the by-pass unit - close the by-pass. ⇨ The dryer doesn't drain condensate - see specific point. ⇨ DewPoint too high - see specific point.

◆ The refrigerant pressure switch has been activated (ADE 75).

⇨ Check which of he following causes has driven the activation :
1. The ambient temperature is too high, or poor ventilation; restore a proper ventilation.
2. The condenser is dirty - clean it.
3. The fan is not operating - see specific point.
4. There is a leak in the refrigerating fluid circuit - contact a refrigerating systems engineer.

⇨ Reset the pressure switch pressing the button on the controller itself - verify the dryer for correct operation.

◆ DewPoint too high.

⇨ The dryer is off - switch it on.
⇨ The refrigerating compressor doesn't work - see specific point.
⇨ The fan of the condenser doesn't work - see specific point.
⇨ The fan of the aftercooler doesn't work - see specific point.
⇨ 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 aftercooler is dirty - clean it.
⇨ The dryer doesn't drain the condensate - see specific point.
⇨ **DMC11 -** LED of the DMC11 is always on - see specific point.
⇨ **DMC11 -** The set-point of the DMC11 is very high - see paragraph SET-UP of the DMC11.
⇨ **ADS93 -** The green LED on the front of the ADS93 device is glowing continuously - see specific point.
⇨ **ADS93 -** The ADS93 device is set at a DewPoint too high - see specific point.
⇨ There is a leak in the refrigerating fluid circuit - contact a refrigerating systems engineer.

◆ Excessive pressure drop within the dryer.

⇨ The DewPoint is too low - the condensate is frost and blocks the air - see specific point.
⇨ 5 micron filters is clogged - replace the cartridges.
⇨ Check for throttling the flexible connection hoses.

◆ DewPoint too low.

⇨ **DMC11 -** Verify the electric wiring of the DMC11.
⇨ **ADS93 -** Verify the electric wiring of the ADS93.
⇨ 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 (DewPoint) does not properly detect the temperature of the evaporator - push the probe until it reaches the bottom of the measurement well.
⇨ **DMC11 -** The set-point of the DMC11 is very low - see paragraph SET-UP of the DMC11.
⇨ **ADS93 -** The set-point of the ADS93 is very low - see paragraph SET-UP of the ADS93.
⇨ **DMC11 -** The DMC11 Air Dryer Controller doesn't work - replace it.
⇨ **ADS93 -** The ADS93 Controller doesn't work - replace it.
⇨ The hot gas solenoid valve is blocked - contact a refrigerating systems engineer.

- **DMC11 -** 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.
  - ⇨ DMC11 Air Dryer Controller doesn't work - replace it.
- **ADS93 -** The green LED on the front of the ADS93 device is constantly on and on the display appears the message
  - ⇨ Check the electric wiring of the probe (dew point) of the ADS93 device.
  - ⇨ The probe (dew point) of the electronic device ADS93 is faulty - replace it.
  - ⇨ The device ADS93 is faulty - replace it.
- **ADS93 -** The green LED on the front of the ADS93 device is constantly on and on the display appears the message
  - ⇨ Check the electric wiring of the probe (fan) of the ADS93 device.
  - ⇨ The probe (fan) of the electronic device ADS93 is faulty - replace it.
  - ⇨ The device ADS93 is faulty - replace it.

7.2 DISMANTLING OF THE DRYER

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

Part	**Material**
Refrigerant fluid	R134.a – HFC, Oil
Canopy and Supports	Carbon steel, Epoxy paint
Refrigeration Compressor	Steel, Copper, Aluminum, Oil
Heat-Exchanger and Condensate Separator	Copper, Steel
Condenser Unit	Aluminum, Copper, Carbon steel
Pipe	Copper
Fan	Aluminum, Copper, Steel
Valve	Brass, Steel
Insulation Material	Synthetic gum without CFC, Polyurethane
Electric cable	Copper, PVC
Electric Parts	PVC, Copper, Brass

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. Is 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.