

**Refrigerating air dryer**

**ACT VS  
3000 – 6000**

**Air – water cooled**

**EN - User's maintenance and spare parts manual**

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Dear Customer,

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

To avoid incorrect operation of the equipment and possible physical risk to the operator, please read and strictly follow the instructions contained in this manual.

Note, these instructions are in addition to the safety rules that apply in the country where the dryer is installed.

Before packing for shipment each **ACT VS** series refrigerated air dryer undergoes a rigorous test to ensure the absence of any manufacturing faults and to demonstrate that the device can perform all the functions for which it has been designed.

Once the dryer has been properly installed according to the instructions 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.

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### 1 Safety instructions



**Please check whether or not these instructions correspond to the device type.**

Please adhere to all advice given in these operating instructions. They include essential information which must be observed during installation, operation and maintenance. Therefore, it must be ensured that these operating instructions are read by the fitter and the responsible operator / certified skilled personnel prior to installation, start-up and maintenance.

The operating instructions must be accessible at all times at the place of application of the compressed-air refrigeration dryer.

In addition to these operating instructions, local and national regulations need to be observed, where required.

Ensure that operation of the compressed-air refrigeration dryer only takes place within the permissible limit values indicated on the name plate. Any deviation from these limit values involves a risk for persons and for the material, and may result in malfunction or a breakdown.

After installing the device correctly and in accordance with the instructions in this manual, the dryer is ready to operate, further settings are not required. Operation is fully automatic and maintenance is limited to several examinations and cleaning measures which are described in the following chapters.

This manual must be available at all times for future reference and is a constituent part of the dryer.

If you have any queries regarding these installation and operating instructions, please contact manufacturer.

## 2 Safety pictograms in accordance with DIN 4844



Observe operating instructions



General danger symbol



Supply voltage



Danger: component or system under pressure



Hot surfaces



Non-breathable air



Do not use water to extinguish the fire



Do not operate with open cover (housing)



Maintenance works or controlling measures must only be carried out by qualified personnel <sup>1</sup>



Do not smoke



Note



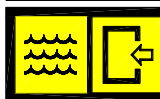
Connection point compressed-air inlet



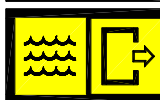
Connection point compressed-air outlet



Connection point condensate drain



Connection point cooling-water inlet (water-cooled)



Connection point cooling-water outlet (water-cooled)

<sup>1</sup> Certified skilled personnel are persons who are authorised by the manufacturer, with experience and technical training, who are well-grounded in the respective provisions and laws and capable of carrying out the required works and of identifying and avoiding any risks during the machine transport, installation, operation and maintenance.

Qualified and authorised operators are persons who are instructed by the manufacturer regarding the handling of the refrigeration system, with experience and technical training, and who are well-grounded in the respective provisions and law.



Works can be carried out by the operator of the plant, provided that they are skilled accordingly <sup>2</sup>.

**NOTE:** Text that contains important specifications to be considered – does not refer to safety precautions.



The device was carefully designed with particular attention paid to environmental protection:

- CFC-free refrigerants
- CFC-free insulation material
- Energy-saving design
- Limited acoustic emissions
- Dryer and packaging comprise reusable materials

This symbol advises the user to observe the environmental aspects and comply with the recommendations connected with this symbol.

### 2.1 Signal words in accordance with ANSI

<b>Danger!</b>	Imminent hazard Consequences of non-observance: serious injury or death
<b>Warning!</b>	Potential hazard Consequences of non-observance: possible serious injury or death
<b>Caution!</b>	Imminent hazard Consequences of non-observance: possible injury or property damage
<b>Notice!</b>	Potential hazard Consequences of non-observance: possible injury or property damage
<b>Important!</b>	Additional advice, info, hints Consequences of non-observance: disadvantages during operation and maintenance, no danger

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<sup>2</sup> Certified skilled personnel are persons who are authorised by the manufacturer, with experience and technical training, who are well-grounded in the respective provisions and laws and capable of carrying out the required works and of identifying and avoiding any risks during the machine transport, installation, operation and maintenance.

Qualified and authorised operators are persons who are instructed by the manufacturer regarding the handling of the refrigeration system, with experience and technical training, and who are well-grounded in the respective provisions and laws.

## 2.2 Overview of the safety instructions



### Certified skilled personnel

Installation works must exclusively be carried out by authorised and qualified skilled personnel. Prior to undertaking any measures on the compressed-air refrigeration dryer, the certified skilled personnel shall read up on the device by carefully studying the operating instructions. The operator is responsible for the adherence to these provisions. The respective directives in force apply to the qualification and expertise of the certified skilled personnel.

For safe operation, the device must only be installed and operated in accordance with the indications in the operating instructions. In addition, the national and operational statutory provisions and safety regulations, as well as the accident prevention regulations required for the respective case of application, need to be observed during employment. This applies accordingly when accessories are used.



### Danger!

#### Compressed air!

**Risk of serious injury or death through contact with quickly or suddenly escaping compressed air or through bursting and/or unsecured plant components.**

Compressed air is a highly dangerous energy source.

Never work on the dryer when the system is under pressure.

Never direct the compressed-air outlet or condensate drain hoses at persons.

The user is responsible for the proper installation of the dryer. Non-observance of the instructions in the "Installation" chapter leads to the expiration of the guarantee. Improper installation may result in dangerous situations for the personnel and/or the device.



### Danger!

#### Supply voltage!

**Contact with non-insulated parts carrying supply voltage involves the risk of an electric shock resulting in injuries and death.**

Only qualified and skilled personnel are authorised to run electrically-operated devices. Prior to undertaking maintenance measures at the device, the following requirements must be met:

Make sure that the power supply is switched off and that the device is off and marked for maintenance measures. Please also ensure that the power supply cannot be re-established during the works.



Prior to carrying out maintenance works at the dryer, switch it off main switch (control panel pos.1) and wait for at least 30 minutes.



### Caution!

#### Refrigerant!

The compressed-air refrigeration dryer uses HFC-containing refrigerants as a coolant. Please observe the corresponding paragraph entitled "Maintenance works at the refrigeration cycle".



### Warning!

#### Refrigerant leak!

**A refrigerant leak involves the danger of serious injury and damage to the environment.**



### Caution!

#### Hot surfaces!

**During operation, several components can reach surface temperatures of more than +60°C (140°F).**

**There is the risk of burns.**

All components concerned are installed inside of the closed housing. The housing must only be opened by certified skilled personnel <sup>3</sup>.

<sup>3</sup> Certified skilled personnel are persons who are authorised by the manufacturer, with experience and technical training, who are well-grounded in the respective provisions and laws and capable of carrying out the required works and of identifying and avoiding any risks during the machine transport, installation, operation and maintenance.





**Caution!**  
**Improper use!**



The device is intended for the separation of water in compressed air. The dried compressed air cannot be used for breathing-air purposes and is not suitable for the direct contact with food.

This dryer is not suitable for the treatment of contaminated air or of air containing solids.



**NOTE!**

Contaminated intake air!

In the event that the intake air is strongly contaminated (ISO 8573.1 class 3.-3 or poorer quality), we recommend the additional installation of a prefilter (5 micron minimum), to avoid clogging of the heat exchanger.



**Caution!**  
**Heating-up through fire!**

**In the event of a heating-up through fire, the containers and pipes of the refrigerant system can burst.**



In this case, please proceed as follows:

Switch off the refrigeration plant.

Switch off the mechanical ventilation of the machinery compartment.

Use ambient-air-independent respirators.

Containers and plants which are filled with refrigerant can burst violently in the event of fire.

The refrigerants themselves are incombustible, but they are degraded to very toxic products at high temperatures.

Remove the container/plant from the fire zone, as there is the risk of bursting!

Cool down containers and bottles via a directed water jet from a safe position.

In the event of fire, please use an approved fire extinguisher. Water is not a suitable agent to extinguish an electrical fire.

This must only be carried out by persons who are trained and informed about the hazards emanating from the product.



**Caution!**  
**Unauthorised intervention!**

**Unauthorised interventions may endanger persons and plants and lead to malfunction.**

Unauthorised interventions, modification and abuse of the pressure devices are prohibited.

The removal of sealings and leadings at safety devices is prohibited.

Operators of the devices must observe the local and national pressure equipment regulations in the country of installation.



**Note!**

**Ambient conditions!**

In the event that the dryer is not installed under suitable ambient conditions, the ability of the device to condense refrigerant gas is impaired. This can result in a higher load of the refrigerating compressor, and in a loss of efficiency and performance of the dryer.

This in turn leads to overheated condenser fan motors, to malfunction of electric components and to a breakdown of the dryer. Failures of this type will affect warranty considerations.

Do not install the dryer in an environment in which chemicals with a corrosive effect, explosive gases, toxic gases, evaporation heat, high ambient temperatures or extreme dust and dirt can be found.

### 3 Proper use of the dryer

This dryer has been designed, manufactured and tested for the purpose of separating 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 bear responsibility for any resulting damage.

Moreover, the correct use requires the adherence to the installation instructions, specifically:

- Voltage and frequency of the main power.
- Pressure, temperature and flow-rate of the inlet air.
- Pressure, temperature and cooling water capacity (Water-Cooled).
- 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.

### 4 Exclusion from a field of application



**Note!**  
**Improper use!**



The device is intended for the separation of water in compressed air. The dried compressed air cannot be used for breathing-air purposes and is not suitable for the direct contact with food. This dryer is not suitable for the treatment of contaminated air or of air containing solids.

### 5 Instructions for the use of pressure equipment according to PED directive 2014/68/EU

To ensure the safe operation of pressure equipments, the user must conform strictly to the above directive and the following:

1. The equipment must only be operated within the temperature and pressure limits stated on the manufacturer's data nameplate.
2. Welding on heat-exchanger is not recommended.
3. The equipment must not be stored in badly ventilated spaces, near a heat source or inflammable substances.
4. Vibration must be eliminated from the equipment to prevent fatigue failure.
5. Automatic condensate drains should be checked for operation every day to prevent a build up of condensate in the pressure equipment.
6. The maximum working pressure stated on the manufacturer's data nameplate must not be exceeded. Prior to use, the user must fit safety / pressure relief devices.
7. All documentation supplied with the equipment (manual, declaration of conformity etc.) must be kept for future reference.
8. Do not apply weights or external loads on the vessel or its connecting piping.



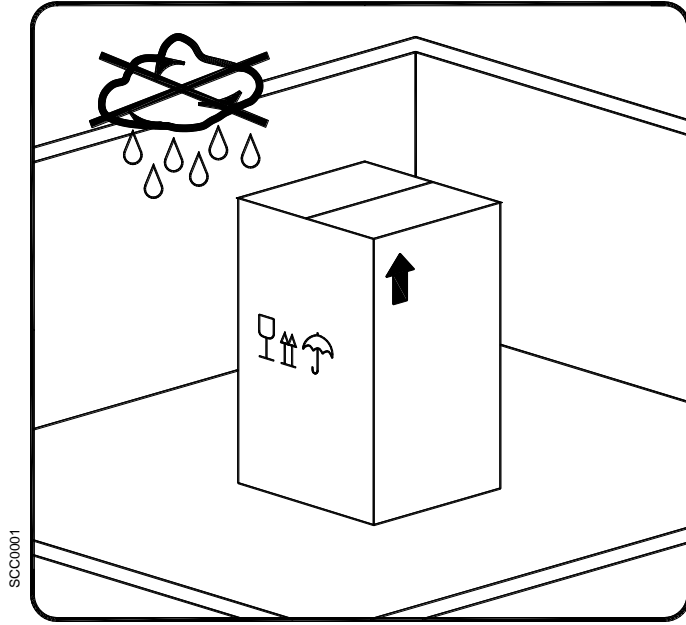
**TAMPERING, MODIFICATION AND IMPROPER USE OF THE PRESSURE EQUIPMENT ARE FORBIDDEN. Users of the equipment must comply with all local and national pressure equipment legislation in the country of installation.**

## 6 Transport

Check for visible loss or damage, if no visible damage is found place the unit near to the installation point and unpack the contents.

- To move the packaged unit we recommend using a suitable trolley or forklift truck. Hand carrying is not recommended
- Always keep the dryer in the upright vertical position. Damage to components could result if unit is laid on its side or if placed upside down.
- Handle with care. Heavy blows could cause irreparable damage.

## 7 Storage



Even when packaged, keep the machine protected from severity of the weather.

Keep the dryer in vertical position, also when stored. Turning it upside down some parts could be irreparably damaged.

If not in use, the dryer can be stored in its packaging in a dust free and protected site at a temperature of +1°C ... +50°C (34°F...122°F), and a specific humidity not exceeding 90%. Should the stocking time exceed 12 months, please contact the manufacturer.



The packaging materials are recyclable. Dispose of material in compliance with the rules and regulations in force in the destination country.

## 8 Installation

### 8.1 Place of installation



**Note!**

**Ambient conditions!**

In the event that the dryer is not installed under suitable ambient conditions, the ability of the device to condense refrigerant gas is impaired. This can result in a higher load of the refrigerating compressor, and in a loss of efficiency and performance of the dryer.

This in turn leads to overheated condenser fan motors, to malfunction of electric components and to a breakdown of the dryer. Failures of this type will affect warranty considerations.

Do not install the dryer in an environment in which chemicals with a corrosive effect, explosive gases, toxic gases, evaporation heat, high ambient temperatures or extreme dust and dirt can be found.

**Minimum installation requirements:**

- Choose an area which is clean and dry, free from dust and protected against atmospheric disturbances.
- The load-bearing zone must be even, horizontal and able to bear the weight of the dryer.
- Minimum ambient temperature +1°C (34°F).
- Maximum ambient temperature +45°C (113°F).
- Ensure a proper cooling air replacement.
- Allow a sufficient clearance on each side of the dryer for proper ventilation and to facilitate maintenance operations. The dryer does not require attachment to the floor surface.

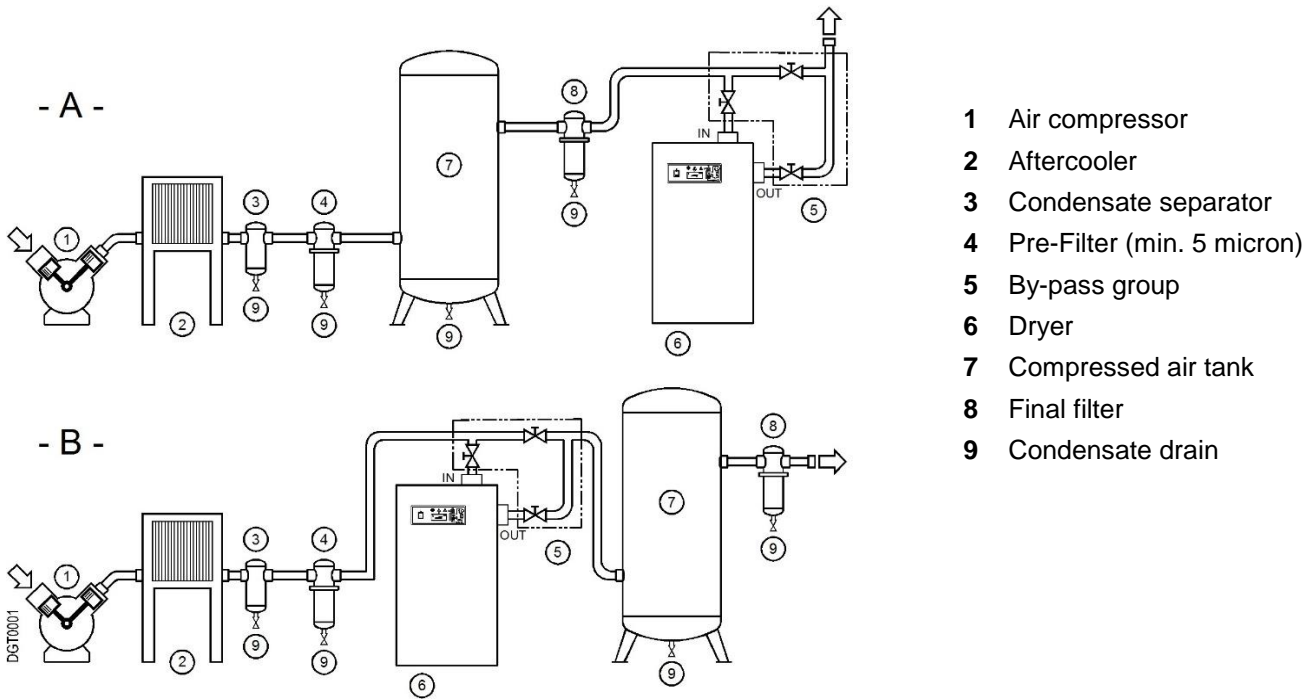


**Do not obstruct the ventilation grille (not even partially).**

Prevent any recirculation of the outgoing cooling air.

Protect the dryer against draughts.

## 8.2 Installation layout



Dryer's compressor and fan (air cooled) speed are adjusted to adapt power consumption to the dryer load. Although system is quite reactive, it cannot adapt its setting immediately to sudden load variation leading to dewpoint spikes/fluctuations.

To avoid this behaviour it is recommended to install the dryer in systems where load variations happens but are damped. Compressed air receivers can be used as dampers: installed before the dryer if compressors capacity varies suddenly and frequently, after the dryer if the air consumption variation is very wide, frequent and sudden or both to have the best load variation dampness.

Compressed air tanks can be installed as capacity dampers: installed before the dryer (Type A) if the compressor capacity varies suddenly and often, after the dryer (Type B) if the change in air consumption is very large, frequent and sudden or both to have the improved dampening of the flow variation.



**Do not obstruct the ventilation grille (not even partially).**

Prevent any recirculation of the outgoing cooling air.  
Protect the dryer against draughts.



**NOTE!**

**Contaminated intake air!**

In the event that the intake air is strongly contaminated (ISO 8573.1 class 3.-3 or poorer quality), we recommend the additional installation of a prefilter (5 micron minimum), to avoid clogging of the heat exchanger.

## Installation

### 8.3 Correction factors

Correction factor for operating pressure changes:									
Inlet air pressure	psig	60	80	100	120	140	160	180	203
	barg	4	5.5	7	8	10	11	12	14
Factor (F1)		0.79	0.91	1.00	1.07	1.13	1.18	1.23	1.27

Correction factor for ambient temperature changes (Air-Cooled):									
Ambient temperature	°F	≤ 80	90	95	100	105	110	115	
	°C	≤ 27	32	35	38	40	43	45	
Factor (F2)		1.11	1.09	1.06	1.00	0.94	0.87	0.78	

Correction factor for inlet air temperature changes:									
Air temperature	°F	≤ 90	100	110	122	130	140	150	158
	°C	≤ 32	38	43	50	55	60	65	70
Factor (F3)		1.16	1.00	0.82	0.68	0.61	0.52	0.45	0.40

Correction factor for DewPoint changes:									
DewPoint	°F	38	41	45	50				
	°C	3	5	7	10				
Factor (F4)		1.00	1.08	1.20	1.36				

#### 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 **ACT VS 3000** has a nominal duty of 3000 scfm (5097 m<sup>3</sup>/h). What is the maximum allowable flow through the dryer under the following operating conditions:

Inlet air pressure = 120 psig (8 barg)	Factor (F1) = 1.07
Ambient temperature = 115°F (45°C)	Factor (F2) = 0.78
Inlet air temperature = 122°F (50°C)	Factor (F3) = 0.68
Pressure DewPoint = 50°F (10°C)	Factor (F4) = 1.36

Each item of data has a corresponding numerical factor which multiplied by the design air flow is as follows:

**Air flow capacity = 3000 x 1.07 x 0.78 x 0.68 x 1.36 = 2316 scfm (3935 m<sup>3</sup>/h)**

**2316 scfm (3935 m<sup>3</sup>/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 =  $\frac{\text{Design air flow}}{\text{Factor (F1) x Factor (F2) x Factor (F3) x Factor (F4)}}$**

#### Example:

With the following operating parameters:

Design air flow = 3500 scfm (1274 m <sup>3</sup> /h)	Factor (F1) = 1.07
Inlet air pressure = 120 psig (8 barg)	Factor (F2) = 0.78
Ambient temperature = 115°F (45°C)	Factor (F3) = 0.68
Inlet air temperature = 122°F (50°C)	Factor (F4) = 1.36
Pressure DewPoint = 50°F (10°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 =  $\frac{3500}{1.07 \times 0.78 \times 0.68 \times 1.36} = 4535 \text{ scfm (7705 m}^3\text{/h)}$**

Therefore the model suitable for the conditions above is **ACT VS 5000 (5000 scfm [8490 m<sup>3</sup>/h] - nominal duty)**.

### 8.4 Connection to the compressed air system



**DANGER!**  
**Compressed air!**

All works must only be carried out by qualified skilled personnel.



Never work on compressed-air systems which are under pressure.

The operator or the user must ensure that the dryer is never operated with a pressure exceeding the maximum pressure value indicated on the name plate.

Exceeding the maximum operating pressure can be dangerous for the operator but also for the device.

The air temperature and the flow entering the dryer must comply within the limits stated on the data nameplate. The system connecting piping must be kept free from dust, rust, chips and other impurities, and must be consistent with the flow-rate of the dryer. In case of treatment of air at particularly high temperature, the installation of a final refrigerator could result necessary. In order to perform maintenance operations, it is recommended to install a dryer by-pass system. 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.).



**NOTE!**

Contaminated intake air!

In the event that the intake air is strongly contaminated (ISO 8573.1 class 3.-3) or poorer quality, we recommend the additional installation of a prefilter (5 micron minimum), to avoid clogging of the heat exchanger.

## 8.5 Electrical connections

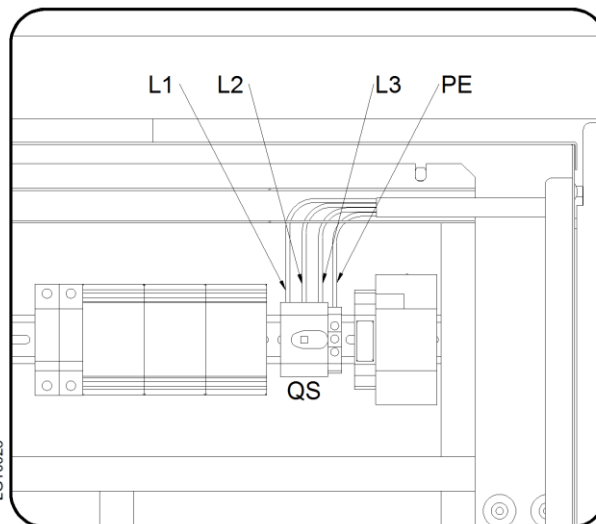
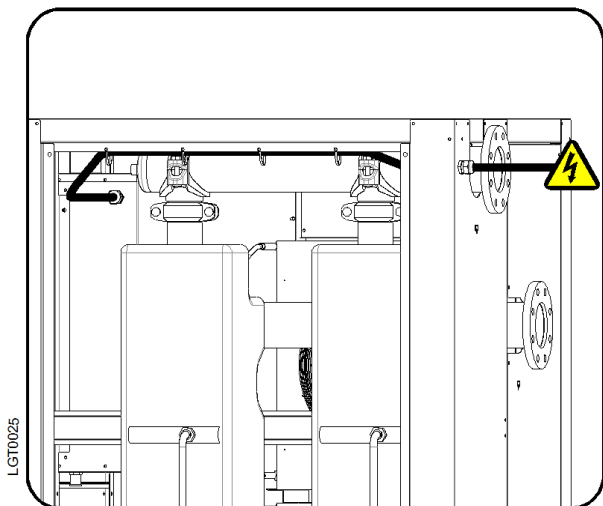


**Danger!**  
**Supply voltage!**

The connection to the electric mains should only be carried out by qualified skilled personnel and must correspond to the legal provisions in force in your region.

Prior to connecting the device, please check the name plate to avoid exceeding the indicated values. The voltage tolerance is +/- 10%.

The installer is responsible for supplying and installing the power cable. Be sure to provide the proper fuses or breakers based on the data information located on the nameplate.



A residual-current device (RCD) with  $I_{\Delta n} = 0.3A$  Class B is suggested. 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.



**CAUTION!**

**Please observe the direction of rotation of the fix speed compressors!**

**In this system, the direction of rotation of the fix speed compressors is supervised by a reverse-phase protector (RPP).**

When this guard is triggered, the DMC50 goes into alarm mode (the status bar flashes red and shows alarm n.5 "Compressor Protection"). In the event that the compressor does not run, the direction of rotation must be changed by interchanging two phases. These modifications must only be carried out by a qualified electrician.

**Do not by-pass the RPP protector: If the device is operated with the incorrect direction of rotation, the compressor will fail immediately. This will void the guarantee.**

**Danger!**

**Supply voltage and missing earth connection!**

Important: ensure that the plant is connected to earth.

Do not use plug adapters at the power plug.

Possible replacement of the power plug must only be carried out by a qualified electrician.



**Note!**

This dryer is not suitable for employment on IT-systems.

This dryer is not suitable for employment on grounded-delta systems





## 8.6 Connection to the cooling water network (Water-Cooled)



### **DANGER!** **Compressed air!**

All works must only be carried out by qualified skilled personnel.



Never work on compressed-air systems which are under pressure.

The operator or the user must ensure that the dryer is never operated with a pressure exceeding the maximum pressure value indicated on the name plate.

Exceeding the maximum operating pressure can be dangerous for the operator but also for the device.

The temperature and the amount of cooling water must comply with the limits indicated on the technical characteristics chart. The cross section of the connection pipes, preferably flexible, must be free from rust, chips and other impurities. We recommend to use connecting pipes able to insulate the dryer from possible vibrations originating from the line (flexible hoses, vibration damping fittings, etc.).

### **NOTE!**



Contaminated intake water!

In the event that the intake water is strongly contaminated we recommend the additional installation of a prefilter (500 micron), to avoid clogging of the heat exchanger.

## 8.7 Minimum cooling water requirements:

Temperature	15 ... 30°C (1)	HCO <sub>3</sub> / SO <sub>4</sub>	>1.0 mg/l or ppm
Pressure	3...10 barg (2)	NH <sub>3</sub>	<2 mg/l or ppm
Head pressure	> 3 bar (2) (3)	Cl <sup>-</sup>	<50 mg/l or ppm
Total hardness	6.0...15 °dH	Cl <sub>2</sub>	<0.5 mg/l or ppm
PH	7.5...9.0	H <sub>2</sub> S	<0.05 mg/l or ppm
Conductivity	10...500 µS/cm or µmho/cm	CO <sub>2</sub>	<5 mg/l or ppm
Residual solid particles	<30 mg/l or ppm	NO <sub>3</sub>	<100 mg/l or ppm
Saturation Index SI	-0.2 < 0 < 0.2	Fe	<0.2 mg/l or ppm
HCO <sub>3</sub>	70...300 mg/l or ppm	Al	<0.2 mg/l or ppm
SO <sub>4</sub> <sup>2-</sup>	<70 mg/l or ppm	Mn	<0.1 mg/l or ppm

Note : (1) – Other temperature on request - Check the data shown on the identification plate.

(2) – Other pressure on request - Check the data shown on the identification plate.

(3) – Pressure difference at dryer water connection points at maximum water flow - Other head pressure on request.

### **CAUTION!**



During the piping of the dryer, the inlet and outlet connections need to be supported as is shown in the illustration.

Non-observance will cause damage.

## 8.8 Condensate drain



### **Danger!** **Compressed air and condensate under pressure!**

The condensate is discharged at system pressure.



The drain pipe needs to be secured.

Never direct the condensate drain pipe at persons.

The dryer comes already fitted with an electronic condensate drainer.

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

## 9 Start-up

### 9.1 Preliminary operation



#### Note!

#### Exceeding of the operating parameters!

Ensure that the operating parameters comply with the nominal values indicated on the name plate of the dryer (voltage, frequency, air pressure, air temperature, ambient temperature etc.).

This dryer has been thoroughly tested, packaged and inspected prior to shipment. Nevertheless, the unit could be damaged during transportation, check the integrity of the dryer during first start-up and monitor operation during the first hours of operation.



The initial start-up must be carried out by qualified personnel.

During the installation and operation of this device, all national regulations regarding electronics and any other federal and state ordinances, as well as local provisions, need to be adhered to.



The operator and the user must ensure that the dryer is not operated without panels.

### 9.2 First start-up




The method below should be applied during the first start-up, after longer downtimes or subsequent to maintenance works.

The start-up must be carried out by certified skilled personnel.



#### Sequence of operations (refer to section 10.1 Control Panel).

- Ensure that all the steps of the “Installation” chapter have been observed.
- Ensure that the connection to the compressed air system is correct and that the piping is suitably fixed and supported.
- Ensure that the condensate drain pipe is properly fastened and connected to a collection system or container.
- Ensure that the by-pass system (if installed) is closed and the dryer is isolated.
- Ensure that the manual valve of the condensate drain circuit is open.
- Remove any packaging and other material which could obstruct the area around the dryer.
- Activate the mains switch.
- Turn on the main switch - pos. 1 on the control panel.
- Wait about 45 seconds the initialization of the electronic controller DMC50.
- Select the desired language and the current date and time (see sections 10.15.15 and 10.15.16)
- Wait at least two hours before starting the dryer (compressor crankcase heater must heat the oil of the compressor).
- Keep pressed the button  at least 3 seconds, the dryer starts and the display shows **ON** (ON).
- If the temperature shown on the display is sufficiently high, verify that the refrigerating compressor starts within a few minutes. **NOTE!** – With low temperatures, the refrigerating compressor will remain OFF.
- **NOTE!** – if the dryer doesn't start and the DMC50 shows the alarm n.5 (Compressor Protection), power phases are not connected properly. Change two of the three phases at the supply mains (see Section 7.6).
- Ensure the cooling water flow and temperature is adequate (Water-Cooled).
- Ensure the effective operation of the fan, watching its speed percentage on the display (Air-Cooled).
- 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 (if installed).
- Check the piping for air leakage.
- Ensure the drain is regularly cycling - wait for its first interventions.



### CAUTION!

**Please observe the direction of rotation of the fix speed compressors!**

**In this system, the direction of rotation of the fix speed compressors is supervised by a reverse-phase protector (RPP).**

When this guard is triggered, the DMC50 goes into alarm mode (the status bar flashes red and shows alarm n.5 "Compressor Protection"). In the event that the compressor does not run, the direction of rotation must be changed by interchanging two phases. These modifications must only be carried out by a qualified electrician.

**Do not by-pass the RPP protector: If the device is operated with the incorrect direction of rotation, the compressor will fail immediately. This will void the guarantee.**


### 9.3 Start-up and shut down



During short-term shut down (max. two to three days), it is advisable to leave the dryer and the control panel connected to the supply current circuit. Otherwise, it would be necessary at a restart of the dryer to wait two hours, until the oil in the compressor has reached the specified operating temperature.




#### Start-up (refer to section 10.1 Control Panel)

- Check the condenser for cleanliness (Air-Cooled).
- Ensure the fan filter of electrical panel is clean.
- Ensure the cooling water flow and temperature is adequate (Water-Cooled).
- The display of electronic controller shows **STANDBY** (STANDBY).
- Keep pressed the button  at least 3 seconds, the dryer starts and the display shows **ON** (ON).
- If the temperature shown on the display is sufficiently high, verify that the refrigerating compressor starts within a few minutes.
- **NOTE!** – With low temperatures, the refrigerating compressor will remain OFF.
- Wait few minutes; verify that the DewPoint temperature displayed on electronic controller is correct and that the condensate is regularly drained.
- Switch on the air compressor.



#### Shut down (refer to section 10.1 Control Panel)

- Check that the DewPoint temperature displayed on electronic controller is within range.
- Shut down the air compressor.
- Keep pressed the button  at least 3 seconds, the dryer stops and the display shows **STANDBY** (STANDBY).



#### Dryer remote control ON-OFF

- See instructions on section 10.15.11



### Note!

A dew point between 0°C and +10°C (34°F and 50°F) displayed on the electronic controller is considered to be correct according to the possible operating conditions (flow rate, air inlet temperature, ambient temperature etc.).

The electronic controller DMC50 adjusts compressor and fan(s) speed according to thermal load applied to the dryer. At very low or no load conditions, compressor is switched ON and OFF by the DMC50 to keep the temperature of the heat exchanger cold, allowing a consistent additional energy saving.

The dryer must remain **ON** (ON) during the full usage period of the compressed air, even if the air compressor works intermittently.

10 Technical data

10.1 Technical data 3000 – 6000

MODEL	ACT VS	3000-JR	3750-JR	4000-JR	5000-JR	6000-JR
Air flow rate at nominal condition (1)	[scfm] [m <sup>3</sup> /h] [l/min]	3000 5094 8490	3750 6367,5 106125	4000 6792 113200	5000 8490 141500	6000 10188 169800
Pressure DewPoint at nominal condition (1)	[°F (°C)]			38 (3)		
Nominal ambient temperature	[°F (°C)]			100 (38)		
Min...Max ambient temperature	[°F (°C)]			34...115 (1...45)		
Nominal inlet air temperature	[°F (°C)]			100 (38) max.158 (70)		
Nominal inlet air pressure	[psig (barg)]			100 (7)		
Max. inlet air pressure	[psig (barg)]			203 (14)		
Air pressure drop - Δp	[psi (bar)]	2.8 (0.19)	3.8 (0.26)	2.8 (0.19)	4.1 (0.28)	3.2 (0.22)
Inlet - Outlet connections	[FL ANSII]	6" # 150			8" # 150	

Air-Cooled		R407C					
Refrigerant type		R407C					
Refrigerant quantity (2)	[oz (kg)]	370 (10.50)	476 (13.50)	494 (14.00)	688 (19.50)	988 (28.00)	
Cooling air fan flow	[cfm (m <sup>3</sup> /h)]	12710 (21600)	13070 (22200)	16950 (28800)	17420 (29600)	26130 (44400)	
Heat Rejection	[btu/hr (kW)]	155700 (45.6)	193000 (56.5)	212800 (62.3)	249000 (72.9)	303900 (88.1)	
Standard Power Supply (2)	[PhV/Hz]	3/460/60					
Nominal electric consumption	[kW]	11,20	13,80	15,40	17,10	22,30	
Full Load Amperage FLA	[A]	13,8	17,2	18,1	22,3	28,7	
Max. noise level at 1 m	[dba]	25,1	29,8	34,3	38,0	41,6	
Weight	[lb (kg)]	1850 (840)	2090 (950)	2350 (1065)	2670 (1210)	3660 (1660)	

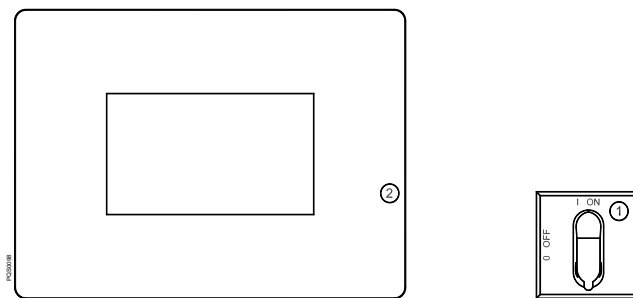
Water-Cooled		R407C					
Refrigerant type		R407C					
Refrigerant quantity (2)	[oz (kg)]	332 (9.40)	430 (12.20)	448 (12.70)	617 (17.50)	776 (22.00)	
Max. cooling water inlet temp (3)	[°F (°C)]	86 (30)					
Min...Max. cooling water inlet pressure	[psig (barg)]	45...145 (3...10)					
Cooling water flow at 30°C	[US gpm (m <sup>3</sup> /h)]	12.5 (2.84)	15.5 (3.51)	17.4 (3.95)	19.5 (4.42)	25.6 (5.82)	
Heat Rejection	[btu/hr (kW)]	155700 (45.6)	193000 (56.5)	212800 (62.3)	249000 (72.9)	303900 (88.1)	
Control of cooling water flow		Automatic by valve					
Cooling water connection	[NPT-F]	1.1/2"					
Standard Power Supply (2)	[PhV/Hz]	3/460/60					
Nominal electric consumption	[kW]	7,30	8,90	10,10	10,90	12,70	
Full Load Amperage FLA	[A]	8,5	10,1	10,9	13,2	15,9	
Max. noise level at 1 m	[dba]	19,4	24,1	26,8	30,5	35,9	
Weight	[lb (kg)]	1720 (780)	2090 (950)	2350 (1065)	2670 (1210)	3220 (1460)	

(1) The nominal condition refers to an ambient temperature of 100°F (38°C) with inlet air at 100 psig (7 barg) and 100°F (38°C).  
 (2) Check the data shown on the identification plate.  
 (3) Other temperature on request.

## 11 Technical description

### 11.1 Control panel

The control panel explained below is the only dryer user interface.



- 1 Main switch
- 2 Electronic instrument DMC50

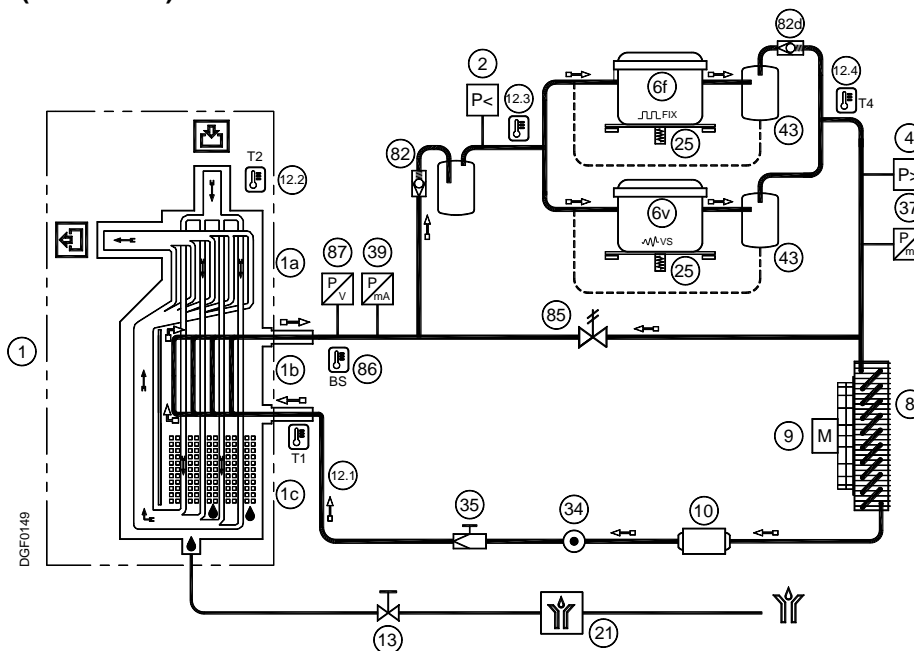
### 11.2 Operation

**Operating principle** - The dryer models described in this manual operate all on the same principle. The hot moisture laden air enters an air to air heat exchanger. The air then goes through the evaporator, also known as the air to refrigerant heat exchanger. The temperature of the air is reduced to approximately 2°C, causing water vapor to condense to liquid. The liquid is continuously coalesced and collected in the separator for removal by the condensate drain. The cool moisture free air then passes back through the air to air heat exchanger to be reheated to within 8 degrees lower than the incoming air to the dryer.

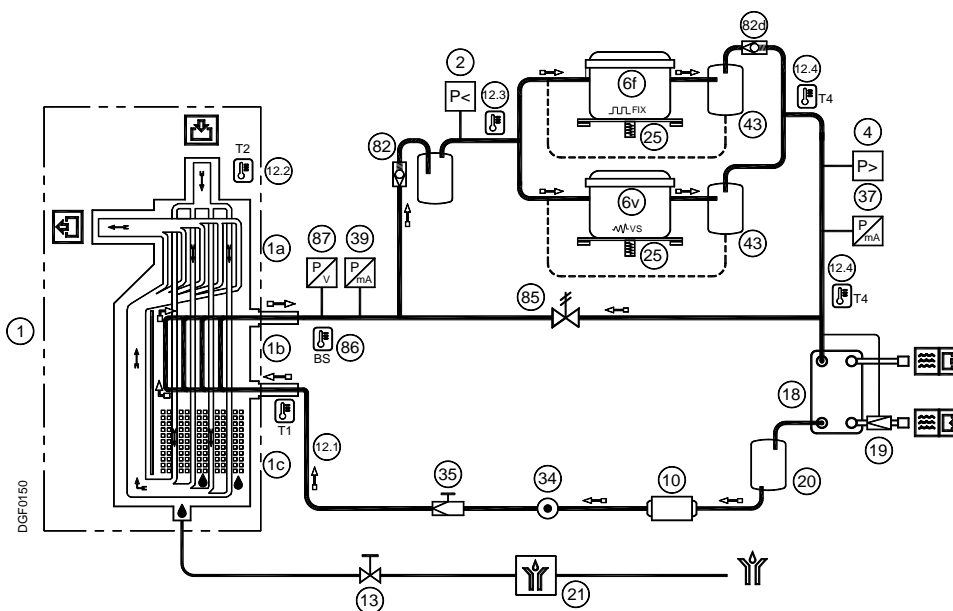
**Refrigerant circuit** - Refrigerant gas is exhausted by the compressor and exits at high pressure towards a condenser where heat is removed causing the refrigerant to condense to a high-pressure liquid state. The liquid is forced through an electronic expansion valve (EEV) where the resulting pressure drop allows the refrigerant to boil off at a predetermined temperature. Low-pressure liquid refrigerant enters the heat exchanger where heat from the incoming air is transferred causing the refrigerant to boil; the resulting phase change produces a low pressure and low temperature gas. Then the low-pressure gas goes back to the compressor, where it is re-compressed and begins the cycle again.

**Operation in eco mode (Variable Speed)** – The DMC50 electronic controller constantly monitors the evaporating pressure (BLP), the condensing pressure (BHP) and the temperature of the DewPoint (BT1). At each compressor start-up VS (Variable Speed) compressor's speed is forced to a fixed speed (approx. 40-50% of its maximum speed) for approx. 3 minutes to allow a proper oil circulation in the refrigerant circuit. During this period, if the evaporating pressure (BLP) falls too low, DMC50 will activate a solenoid valve EVB that will increase the evaporating pressure above the freezing point. Expired the first 3 minutes, DMC50 will adjust VS compressor's speed in order to keep the evaporating pressure almost constant, allowing a constant DewPoint even with dryer thermal load variation. Having an higher load to the dryer, the capacity of the VS compressor to its maximum speed is insufficient, the evaporation pressure tends to increase beyond the set-point, so the FIX speed (on-off) compressor is activated increasing the system cooling capacity. At this point VS compressor speed is automatically adjusted to maintain the evaporation pressure to the set-point. In 5000-6000 VS an additional FIX speed (on-off) compressor is installed to increase the system cooling capacity. When the load to the dryer decreases, with VS and FIX compressors turned on, the speed of the VS compressor is decreased up to its minimum value; if the cooling capacity is still too high, the FIX compressor is switched off and VS compressor speed is automatically adjusted to maintain the evaporation pressure to the set-point. In very low load conditions (or no load), VS compressor will run at its lowest allowable speed. Even if that speed is larger than load demand, the evaporating pressure will decrease from its setting point and when the temperature of the DewPoint tends to fall close to the freezing point, the DMC50 controls the switching off of the VS compressor. The VS compressor will be started again when the DewPoint temperature and evaporating pressure rises above a target value. The VS compressor is always the first to start and is always the last to stop. The check valve CHV in combination with the Electronic Expansion Valve (EEV) help to extend the off time of the compressor and avoid the immediate balancing of high and low pressures of the refrigerant circuit. The solenoid valve EVB is activated before the compressor start as long as refrigerant pressures (low and high) get balanced. Fan(s) speed will be controlled by the DMC50 in order to keep the condensing pressure measured by BHP almost constant (air cooled). With these dryers, the energy consumption will be adjusted closely proportional to the thermal load applied to the dryer itself, allowing considerable energy savings in the majority of applications.

11.3 Flow diagram (Air-Cooled)



11.4 Flow diagram (Water-Cooled)



- |      |   |    |   |
|------|---|----|---|
| 1    | Alu-Dry module                              | 18 | Condenser (Water-Cooled)                          |
| 1a   | Air-to-air heat exchanger                   | 19 | Condenser water regulating valve (Water-Cooled)   |
| 1b   | Air-to-refrigerant heat exchanger           | 20 | Refrigerant accumulator                           |
| 1c   | Condensate separator                        | 21 | Electronic drainer                                |
| 2    | Refrigerant pressure switch LPS             | 25 | Compressor crankcase heater                       |
| 4    | Refrigerant pressure switch HPS             | 34 | Liquid sight glass                                |
| 6f   | Compressor FIX                              | 35 | Electronic Expansion Valve EEV                    |
| 6v   | Compressor VS                               | 36 | Liquid separator                                  |
| 8    | Condenser (Air-Cooled)                      | 37 | Refrigerant pressure transducer BHP               |
| 9    | Condenser fan (Air-Cooled)                  | 39 | Refrigerant pressure transducer BLP               |
| 10   | Filter dryer                                | 43 | Oil separator                                     |
| 12.1 | T1 Temperature probe – DewPoint             | 82 | Check valve CHV                                   |
| 12.2 | T2 Temperature probe – Air IN               | 85 | Pressure balancing solenoid valve EVB             |
| 12.3 | T3 Temperature probe – Compressor suction   | 86 | Electronic Expansion Valve temperature sensor BS  |
| 12.4 | T4 Temperature probe – Compressor discharge | 87 | Electronic Expansion Valve pressure transducer BP |
| 13   | Condensate drain service valve              |    |   |

➡ Compressed air flow direction

⇨ Refrigerant gas flow direction

### 11.5 Refrigerating compressor

The refrigerating compressor is the pump of the system, gas coming from the evaporator (low pressure side) is compressed up to the condensation pressure (high pressure side). Dryer is equipped with multiple compressors, of which one in variable speed.

#### Variable speed compressor

It is used a scroll fully hermetic compressor encapsulated with a BLDC (Brush Less Direct Current) motor which is the latest and most efficient technology available for this application. Compressor motor speed is completely handled by an heavy duty variable speed drive, with a customized software capable to ensure a very wide capacity regulation. Compressor motor protection is completely managed by the variable speed driver.

#### FIX speed compressor

It is used a scroll fully hermetic compressor encapsulated with an AC motor. Compressor is activated ON/OFF according to the thermal load. The integrated safeguard protects the compressor against overheating and excess current. The protection is automatically reset as soon as the nominal conditions are reached again.

### 11.6 Condenser (Air-Cooled)

The condenser is the component in which the gas coming from the compressor is cooled down and condensed becoming a liquid. Mechanically, a serpentine copper tubing circuit (with the gas flowing inside) is encapsulated in an aluminium fin package.

3000-5000 VS: The cooling operation occurs via a high efficiency fan(s) AC motor, creating airflow within the dryer, moving air through the fin package. The fan(s) motor speed is completely handled by an heavy duty driver, with a customized software capable to ensure a very wide capacity regulation.

6000 VS: The cooling operation occurs via a high efficiency fan(s) DC motor with integrated driver, creating airflow within the dryer, moving air through the fin package. The fan(s) motor speed is completely handled by the fan integrated driver capable to ensure a very wide capacity regulation.

It's mandatory that the ambient air temperature does not exceed the nominal values. It is also important to keep the condenser unit free from dust and other impurities.

### 11.7 Condenser (Water-Cooled)

The condenser is the component in which the gas coming from the compressor is cooled down and condensed becoming a liquid. Basically it is a water/refrigerating gas exchanger where the cooling water lowers the temperature of the refrigerating gas.

The temperature of the inlet water must not exceed the nominal values. It must also guarantee an adequate flow and that the water entering the exchanger is free from dust and other impurities.

### 11.8 Condenser water regulating valve (Water-Cooled)

The condenser water regulating valve is used to keep the condensing pressure/temperature constant when the Water-Cooled is being used. Thanks to the capillary tube, the valve detects the pressure in the condenser and consequently adjusts the water flow. When the dryer stops the valve automatically closes the cooling water flow.



The condenser water regulating valve is an operating control device.

The closure of the water circuit from the pressure condenser water regulating valve cannot be used as a safety closure during service operations on the system.



#### **ADJUSTMENT**

The condenser water regulating valve is adjusted during the testing phase to a pre-set value that covers 90% of the applications. However, sometimes the extreme operating conditions of the dryer may require a more accurate calibration.

During start-up, a qualified technician should check the condensing pressure/temperature and if necessary adjust the valve by using the screws on the valve itself.

To increase the condensing temperature, turn the adjusting screws counter-clockwise; to lower it turn the screws clock-wise.

Water valve setting : R407C pressure 15 barg ( $\pm 0.5$  bar) / 218 psig ( $\pm 7$  psi)

### 11.9 Filter dryer

Traces of humidity and slag can accumulate inside the refrigerant circuit. Long periods of use can also produce sludge. This can limit the lubrication efficiency of the compressor and clog the expansion valve. The function of the filter drier, located before the expansion valve, is to eliminate any impurities from circulating through the system.

### 11.10 Electronic Expansion Valve (EEV)

The electronic expansion valve (EEV) is an expansion device which is composed by a valve body operated from a stepper motor. This component is managed from its driver according to heat exchanger superheating. This parameter is calculated from the driver using a temperature sensor BS and a pressure sensor BP installed at evaporator outlet refrigerant pipe. The driver operates the motor opening or closing the electronic expansion valve (EEV) in order to keep constant at the setpoint the superheating.

On this dryer type, every Alu-Dry module has its electronic expansion valve EEV which control its superheating independently.

In case of multiple Alu-Dry module (1...n), every group composed by electronic expansion valve EEV (1...n), every temperature sensor BS (1...n), every pressure sensor BP (1...n) and every driver DRV (1...n) is marked with a sticker. The number on the sticker (1...n) identify the valve group.

### 11.11 Alu-Dry module

The heat exchanger module houses the air-to-air, the air-to-refrigerant heat exchangers and the demister type condensate separator. The counter flow of compressed air in the air-to-air heat exchanger ensures maximum heat transfer. The generous cross section of flow channel within the heat exchanger module leads to low velocities and reduced power requirements. The generous dimensions of the air-to-refrigerant heat exchanger plus the counter flow gas flow allows full and complete evaporation of the refrigerant (preventing liquid flood back to the compressor). The high efficiency condensate separator is located within the heat exchanger module. No maintenance is required and the coalescing effect results in a high degree of moisture separation.

### 11.12 Refrigerant pressure switches LPS – HPS

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

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

Calibrated pressure: R407C Stop 1.7 barg / 24,7 psig - Restart 2.7 barg / 39,2 psig

**HPS:** This high-pressure controller device, located on the discharge side on the compressor, is activated when the pressure exceeds the pre-set value. It features a manual-resetting button mounted on the protection device.

Calibrated pressure: R407C Stop 30 barg / 435 psig - Manual reset (P<23 bar / 334 psig)

### 11.13 Compressor crankcase heater

At low temperatures oil can more easily be mixed with the refrigerant gas. So, when the compressor starts, oil can be drawn into the refrigeration circuit and liquid flood back to the compressor could occur.

To prevent this, an electrical resistance heater is installed in the bottom part of the compressor. When the system is powered and the compressor is not running, this heater keeps the oil at the correct temperature.



#### Note!

During short-term shut down (max. two to three days), it is advisable to leave the dryer and the control panel connected to the supply current circuit. Otherwise, it would be necessary at a restart of the dryer to wait two hours, until the oil in the compressor has reached the specified operating temperature.

### 11.14 Electrical panel fan

Drivers enclosed in the electrical panel dissipates a consistent amount of heat. If the electrical panel temperature rises above a set limit +40°C (104°F), a dedicated fan is activated to keep properly cooled the electrical panel and the drivers.

It is important to keep the electric panel air intake filter free from dust and other impurities, furthermore it must be regularly cleaned.

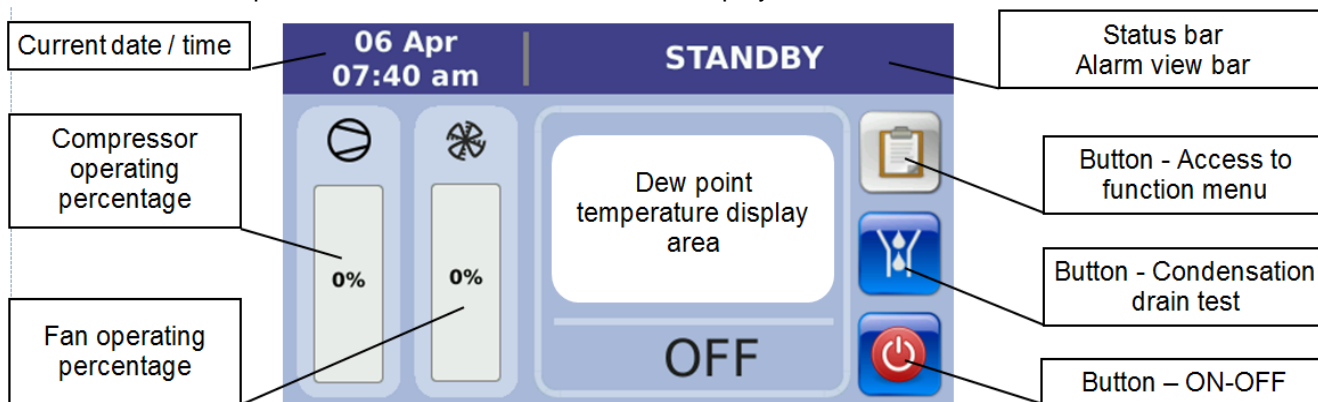
**NOTE!**- With low temperatures, the electric panel fan will remain OFF.




## 11.15 DMC50 electronic control unit


The DMC50 electronic control unit is a device which controls the dryer's functional processes, provides a dialogue interface for the operator, and consists of a power module within the control panel and a touch screen module positioned on the front panel of the dryer. Both modules are connected together via data communication and power supply cables. The operator can use the touch screen display to manage operating functions, view alerts/faul (service), and set dryer process parameters.

Switch ON the dryer by means of the main switch (pos.1 of control panel - see section 5.1) and wait for the DMC50 control unit initialisation process. After about 45 seconds the display will show the main screen :



### 11.15.1 Starting the dryer ("ON" mode)

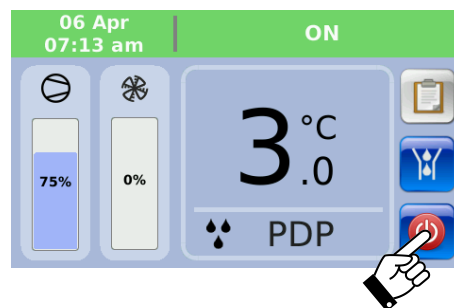
Hold the  button for 3 seconds to start the dryer.

The dryer will start up and the status bar will turn green and display  (ON).



**NOTE!** During the warm-up phase, which lasts about 3 minutes, the compressor works at a set speed to enable the lubricating oil to circulate correctly in the compressor at the beginning. This phase is illustrated with a bar symbol under the compressor icon, which gradually becomes blue and shows the time that has lapsed since the dryer started. Once the dryer has warmed up the bar symbol disappears and the dryer start to operate in load dependent mode.

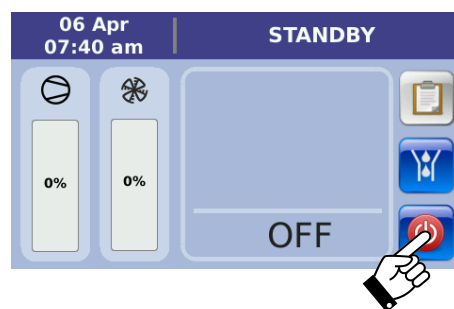
The display will show:

- ⇒ Compressor operating percentage (0-100%)
- ⇒ Fan operating percentage (0-100%) – Air-Cooled only
- ⇒ Dew point temperature
- ⇒ Dryer status and realtime clock / date




### 11.15.2 Stopping the dryer ("STANDBY" mode)

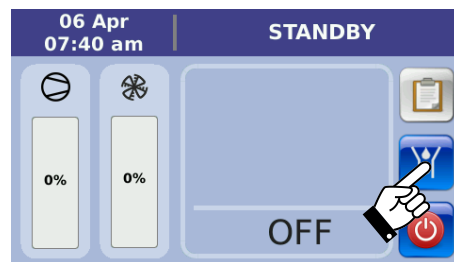
Hold the  button for 3 seconds to stop the dryer. The dryer will stop (STANDBY) and the status bar will turn blue and display  (STANDBY).



### 11.15.3 Performing the condensation drain test


Hold the  button to perform the condensation drain test. Release the button to finish the condensation drain test.


**NOTE!** The condensation drain test can be performed at any time, regardless of the dryer status displayed on the status bar (ON, STANDBY, ALARM, SERVICE WARNING).






## Technical data

### 11.15.4 Displaying process values T1, T2, T3, T4, HP, LP, %, %


1- With the dryer operating (ON mode) press the  button to access the dryer's menu.


2- Press the  button to display the refrigeration circuit diagram and the dryer's instantaneous process values:

- **T1** - Value measured by the BT1 probe in °C or °F (Dew Point temperature)
- **T2** - Value measured by the BT2 probe in °C or °F (Air temperature at exchanger inlet)
- **T3** - Value measured by the BT3 probe in °C or °F (Temperature of refrigerant gas on compressor suction side)
- **T4** - Value measured by the BT4 probe in °C or °F (Temperature of refrigerant gas on compressor discharge side)
- **HP** - Value measured by the BHP probe in bar or psi (Pressure of refrigerant gas on compressor discharge side)
- **LP** - Value measured by the BLP probe in bar or psi (Pressure of refrigerant gas on compressor suction side)
- % - Percentage value of compressor operation
- % - Percentage value of fan operation

➤  - Pressure balancing solenoid valve active (powered)



➤  - Pressure balancing solenoid valve not active (not powered)

3- Hold the  button to perform the condensation drain test. Release the button to finish the condensation drain test.


4- Press the  button to display the log file process values expressed graphically or numerically for the last 60 minutes of dryer operation. The default graph includes traces for all 8 process values.

5- Use the **T1 T2 T3 T4 HP LP**   buttons to display/hide the corresponding coloured traces.

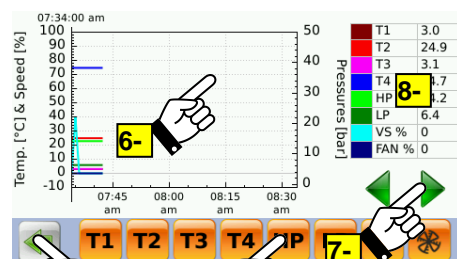
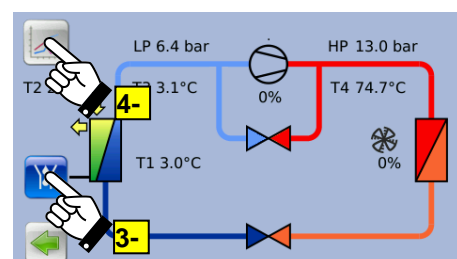
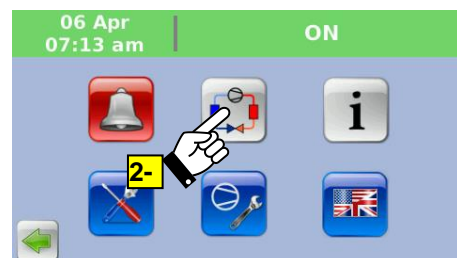
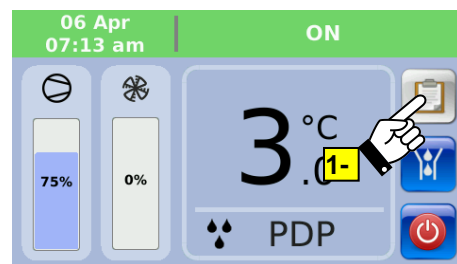
6- Touch the graph on the screen to position the cursor roughly near the required time.

7- Use the   buttons to fine tune the position of the graph cursor on the required time. Positioning accuracy is +/- 1 minute.

8- The table on the right of the screen displays the process values stored in the time period selected by the graph cursor in numerical format.

9- Press the  button to return to the previous screen.

**NOTE!** The stored process values, which are available in numerical or graph format, relate to the last 60 minutes of dryer operation. Stored process values that are not within this time frame are permanently deleted automatically.



## Technical data

### 11.15.5 How the DMC50 control unit displays and processes a service warning

The **service warning** is an irregular event that must be flagged to operators/maintenance technicians. It does not jeopardise the safety of the machine/operators and it does not stop the dryer, with the exception of the HdS parameter (STOP dryer due to high dew point), which can be set to stop the dryer.


In the presence of a service warning, the status bar shows a description of the event and turns flashing orange. In this condition it is not possible to reset the service warning as the cause is still present.

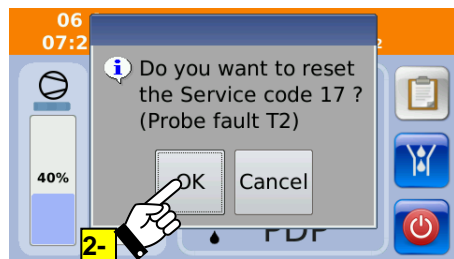
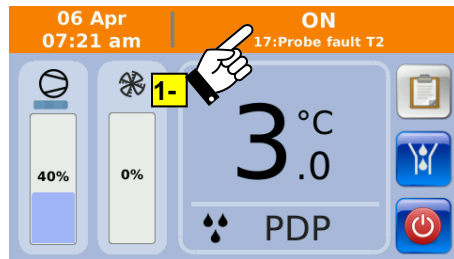
When a service warning is no longer active but has not been reset, the status bar shows a description of the event and is permanently lit (orange). In this condition the service warning can be reset as the cause has been removed.

**With dryer operating (ON):** the presence of one or more service warnings is flagged on the display with the status bar changing from green to orange.

**With the dryer stopped (STANDBY):** the presence of one or more service warnings is not flagged at all on the display.



It is only when the operator wants to start the dryer with the  button that the DMC50 control unit still enables the dryer to be started in the presence of a service warning, and displays the warning status by changing the colour of the status bar (orange).



#### **Resetting a service warning:**

- 1- Touch the screen on the status bar where the service warning is shown.
- 2- Confirm the service warning is to be reset with OK, or exit without resetting with Cancel.

**NOTE!** After resetting service warnings, the operator/maintenance technician must verify/solve the problem that caused the service warning.

Service warnings never reset automatically, with the exception of service warning no. 19 (malfunction of electronic condensation drainer), which is factory-set to enable automatic resetting (Ard parameter → Yes setting).

Service ID	Description	Set	Delay	Reset
15	- Low Dew Point - Dew point temperature T1 too low	T1 < -1°C (30.2°F)	5 minutes	T1 > 0°C (32°F)
16	- High Dew Point - Dew point temperature T1 too high	T1 > HdA parameter	Parameter Hdd	Parameter HdA-1°K
17	- Probe Fault T2 - T2 temperature probe fault	-	Flag immediately	Restore probe
18	- Probe Fault T3 - T3 temperature probe fault	-	Flag immediately	Restore probe
19	- Drainer - Malfunction of ELD electronic condensate drain	Contact open	20 minutes	Restore contact
20	- Programmed service - Scheduled service time expired	Parameter SrV	Flag immediately	-
21	- High Discharge Temperature - Temp. T4 compressor discharge over normal limits but within safe limits	T4 > 100°C (212°F)	60 seconds	T4 < 95°C (203°F)
22	- High Evaporating Pressure -	R134.a 4.0 barg (58,0 psig) R407C 6.8 barg (98,6 psig)	60 seconds	R134.a 4.0 barg (58,0 psig) R407C 6.8 barg (98,6 psig)
23	- Low Condensing Pressure -	Variable	180 seconds	Variable
24	- High Condensing Pressure -	Variable	180 seconds	Variable
169201 169318	Specific compressor variable speed drive service warnings Consult the variable speed drive manual			

**NOTE!** Service warning no. 19 (drainer) could appear if the dryer operates without compressed air pressure.

### 11.15.6 How the DMC50 control unit displays and processes an alarm


The **alarm** is an irregular event that always causes the dryer to stop to ensure the safety of operators and the machine.

In the presence of an alarm the status bar shows a description of the event and turns flashing red. In this condition it is not possible to reset the alarm as the cause is still present.

When an alarm is no longer active but has not been reset, the status bar shows a description of the event and is permanently lit (red). In this condition the alarm can be reset as the cause has been removed.

**With dryer operating (ON):** the presence of one or more alarms is flagged on the display with the status bar changing from green to red.

**With the dryer stopped (STANDBY):** the presence of one or more alarms is not flagged at all on the display, with the exception of alarm no. 6 (ICE) which is the only alarm which is displayed and automatically resets with the dryer stopped (STANDBY).

It is only when the operator wants to start the dryer with the  button that the DMC50 control unit prevents the dryer starting up in the presence of an alarm and displays the alarm status by changing the colour of the status bar (red).

Resetting an alarm:


1- Touch the screen on the status bar where the alarm is shown to display the list of stored alarms.


2- Touch the screen on the alarm to be reset.


3- Confirm the alarm is to be reset with OK, or exit without resetting with Cancel.

4- Touch the screen on the alarm just reset to display the dryer process values for the 60 minutes of operation immediately preceding the occurrence of the event.

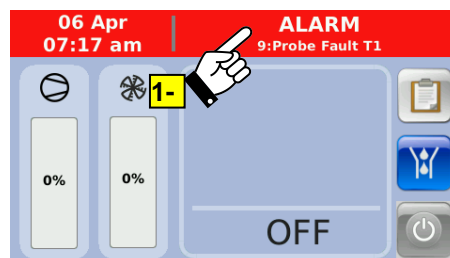
5- Scroll through the stored process values using the   buttons.

6- Press the  button to return to the previous screen.

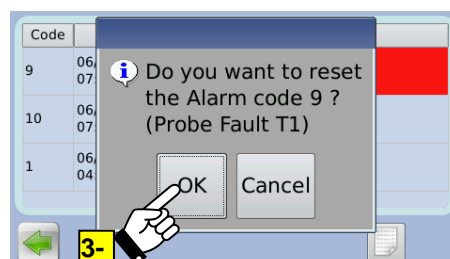
7- Use the  button to download process values in .txt format for possible analysis/diagnostics. See the detailed procedure for downloading values in the section **10.15.8**.

8- Press the  button to return to the previous screen at any time.

**NOTE!** The dryer must be restarted manually by the operator/maintenance technician after alarms are reset. Automatic restart is not available after an alarm has been reset. Before restarting, the operator/maintenance technician must verify/solve the problem that caused the alarm on the dryer. Alarms are never reset automatically (with the exception of alarm no. 6 ICE with the dryer stopped (STANDBY)).



Code	Start	End	Description
9	06/04 07:16am	06/04 07:16am	Probe Fault T1
10	06/04 07:00am	06/04 07:00am	Probe Fault T1
1	06/04 04:34am	06/04 04:34am	High Pressure switch



Code	Start	End	Description
9	06/04 07:16am	06/04 07:16am	Probe Fault T1
10	06/04 07:00am	06/04 07:00am	Probe Fault T1
1	06/04 04:34am	06/04 04:34am	High Pressure switch



No.	ID	Start	End	Description
11	9	07:16am	07:16am	Probe Fault T1

	Date/time	T1	T2	T3	T4	HP	LP	Cmp	Fan
1	06/04 06:36am	5.3	7.6	6.8	7.6	15...	46.3	0	0
2	06/04 06:37am	5.3	7.6	6.8	7.6	87.5	46.3	0	0
3	06/04 06:38am	5.3	7.6	6.8	7.6	89.0	46.3	0	0
4	06/04 06:39am	5.3	7.6	6.8	7.6	88.2	59.0	40	0





## Technical data



Alarm ID	Description	Set	Delay	Reset
1	- Pressure switches - Pressure switch HPS or LPS has triggered Refrigerant pressure High or LOW	Contact open	Flag immediately	Restore contact
2	- Expansion valve - Electronic Expansion Valve EEV fault	Contact open	Flag immediately	Restore contact
3	- Fan Protection - Fan electrical protection has triggered Fan motor overload	Contact open	Flag immediately	Restore contact
4	- High Discharge Temperature - Temperature T4 compressor discharge over safety limits	T4>110°C (230°F)	60 seconds	T4<100°C (212°F)
5	- Compressor Protection - QC1 circuit breaker has tripped Compressor overload	C. breaker tripped	Flag immediately	Restore C. breaker
6	- ICE - Temperature T1 exchanger too low. Condensation frozen	T1 < -3°C (26.6°F)	60 seconds	T1 > 0°C (32°F)
7	- Probe Fault LP - LP pressure transducer fault	-	Flag immediately	Restore transducer
8	- Probe Fault HP HP pressure transducer fault	-	Flag immediately	Restore transducer
9	- Probe Fault T1 - T1 temperature probe fault	-	Flag immediately	Restore probe
10	- Probe Fault T4 - T4 temperature probe fault	-	Flag immediately	Restore probe
11	- Low Differential Pressure - Low differential pressure between the values measured by BHP and BLP	HP-LP < 2.5 bar (96,3 psi)	60 seconds	HP-LP > 2.5 bar
12	- High Evaporating Pressure -	R134.a 4.5 barg (65,3 psig) R407C 7.3 barg (105,9 psi)	60...300 seconds	-
13	- Low Condensing Pressure -	Variable	180...300 seconds	-
1001	- Power Unit Communication Lost - Communication fault between the DMC50 power module and display module			
1002	- Variable speed drive Communication Lost - Communication fault between the DMC50 power module and the compressor variable speed drive			
169001 169118	Specific compressor variable speed drive alarms Consult the variable speed drive manual			

## 11.15.7 Displaying the log file of stored alarms

1- With the dryer stopped (STANDBY) or operating (ON mode), press the

 button to access the dryer's menu of functions.



2- Press the  button to display the log file for the last 50 alarms stored.


3- Scroll through the list of alarms using the   buttons.


Alarms are stored chronologically.


The most recent event is added to the top of the list and replaces the oldest which is removed from the bottom of the list.

4- Touch the screen on the alarm just reset to display the dryer process values for the 60 minutes of operation immediately preceding the occurrence of the alarm in question.

5- Scroll through the stored process values using the   buttons.

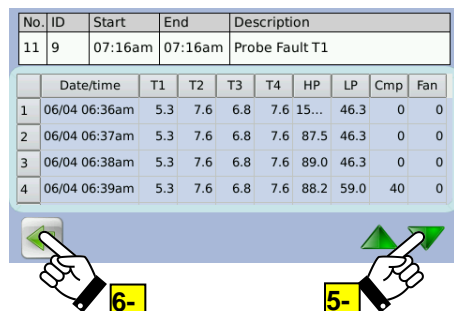
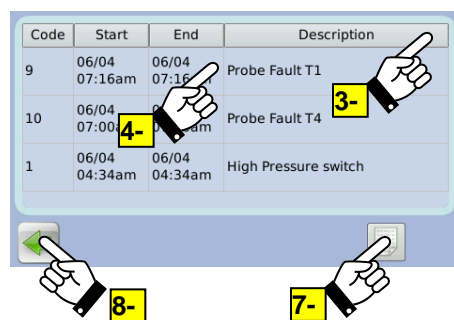
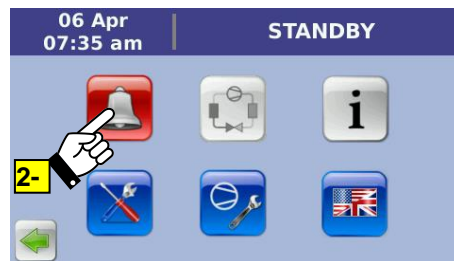
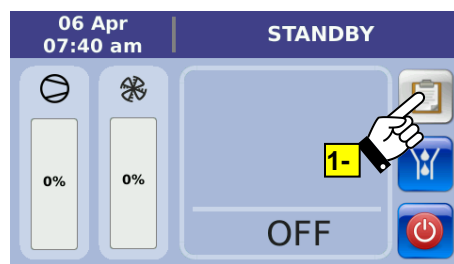
6- Press the  button to return to the previous screen.

7- Use the  button to download process values in .txt format for possible analysis/diagnostics. See the detailed procedure for downloading values in the section **10.15.8**.

8- Press the  button to return to the previous screen at any time.

### NOTE!

Only alarms are stored in the log file. Service warnings are not stored. If power is cut off from the dryer, the log file with the stored alarms will NOT be deleted.







## 11.15.8 Downloading the process values stored following an alarm

**NOTE! Only qualified skilled personnel should perform following operations.**

Process values for stored alarms can be downloaded in .txt format onto a USB stick after resetting an alarm (see section 10.15.6, step 7-), or from the screen for consulting the alarms log file (see section 10.15.7, step 7-).

### Preliminary steps

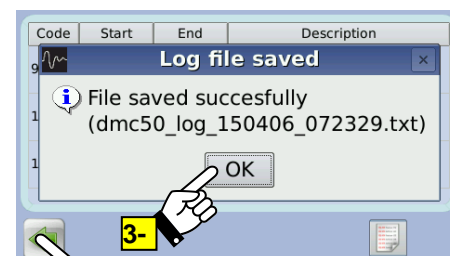
- Switch OFF the dryer by means of the main switch
- Open the control panel door with the special key provided with the dryer.
- Insert a formatted USB stick in the relevant port on the back of the touch screen module.
- Close the control panel door carefully.
- Switch ON the dryer.

- 1- Press the  button to access the process value download function.
- 2- Confirm that the process values are to be downloaded with OK, or exit the operation with Cancel.
- 3- Confirm the download operation was successful with OK.
- 4- Press the  button to return to the previous screens






### Final steps

- Switch OFF the dryer by means of the main switch
- Open the control panel door with the special key provided with the dryer.
- Remove the USB stick.
- Close the control panel door carefully.
- Switch ON the dryer.

Code	Start	End	Description
9	06/04 07:16am	06/04 07:16am	Probe Fault T1
10	06/04 07:00am	06/04 07:00am	Probe Fault T4
1	06/04 04:34am	06/04 04:34am	High Pressure switch



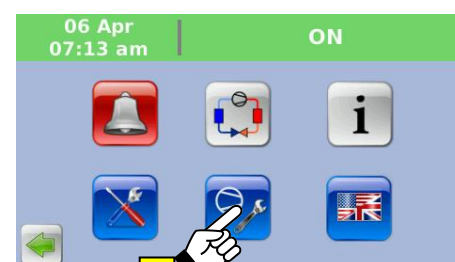
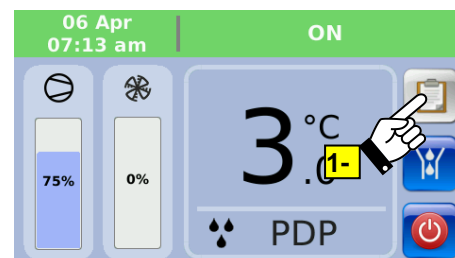
## 11.15.9 Displaying instantaneous process values for the compressor variable speed drive

- 1- With the dryer operating (ON mode), press the  button to access the dryer's menu of functions.
- 2- Press the  button to display the list of instantaneous process values for the compressor variable speed drive.
- 3- Scroll through the list of values using the   buttons.
- 4- Press the  button to return to the previous screen at any time.

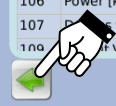
### NOTE!

The dryer must be started and the compressor running to show the current variable speed drive process values.

With dryer stopped (STANDBY) all values shown are "0"




Code	Description	Value
102	Speed [rpm]	3600
103	Output Freq [Hz]	16.00
104	Current [A]	77.70
105	Torque [%]	123.40
106	Power [kW]	32.10
107	Phase [V]	440
108	Phase [V]	550



### 11.15.10 Displaying technical maintenance and energy savings data

1- With the dryer stopped (STANDBY) or operating (ON mode), press the

 button to access the dryer's menu of functions.

2- Press the  button to display:

- **2a-** The total percentage of energy savings for the dryer, with respect to its continuous operation at 100%.
- **2b-** The partial percentage (starting from the last time the counter was zeroed) of energy savings for the dryer, with respect to its continuous operation at 100%.
- **2c-** The date the partial energy savings counter was last zeroed.
- **2d-** The total hours of dryer operation.
- **2e-** The total hours of variable speed compressor operation.
- **2f-** The total hours of 1st fixed speed compressor operation (if installed).
- **2g-** The total hours of 2nd fixed speed compressor operation (if installed).
- **2h-** The hours remaining till the next service.
- **2i-** The partial hours of dryer operation, starting from the last time the counter was zeroed.


#### NOTE!

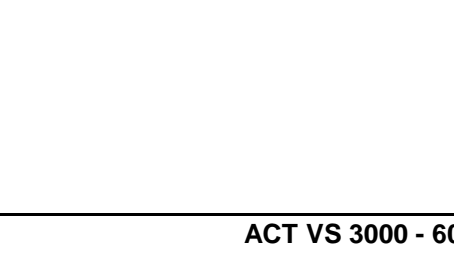
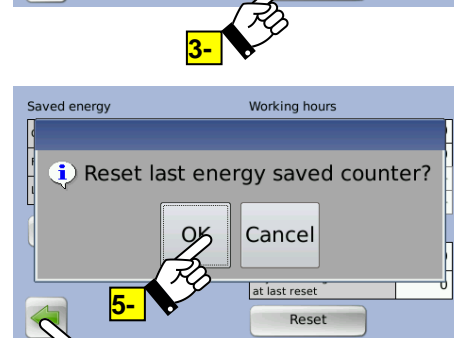
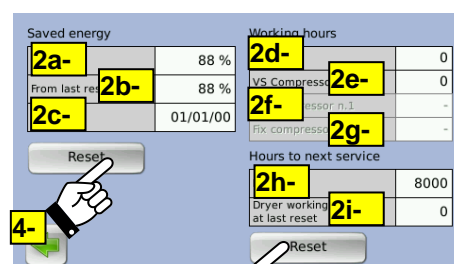
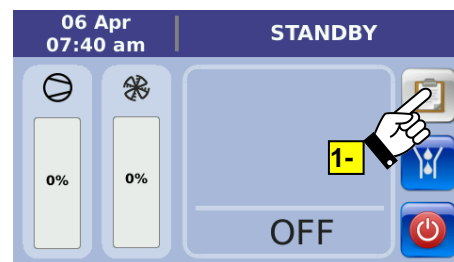
#### Only qualified skilled personnel should perform following operations

3- With dryer stopped (STANDBY mode), press the Reset button to reset the count of the hours remaining before the next service (parameter SrV → default 8000 hours). This function is useful in the case of maintenance carried out on the dryer before the hours remaining till the next service have lapsed. This is a password-protected function (password code 3333) to prevent the counter being reset accidentally.

4- Press the Reset button to zero the partial energy savings counter.

5- Confirm the counter is to be zeroed with OK, or exit without zeroing with Cancel.

6- Press the  button to return to the previous screen at any time.





## 11.15.11 Controlling the dryer from a remote workstation

DMC50 power module is provided with a digital input set up for dryer start up (ON) - stop (STANDBY) mode from a remote workstation.

1- Only qualified and skilled personnel are authorized to run electrically-operated devices. Prior to undertaking maintenance measures at the device, the following requirements must be met:

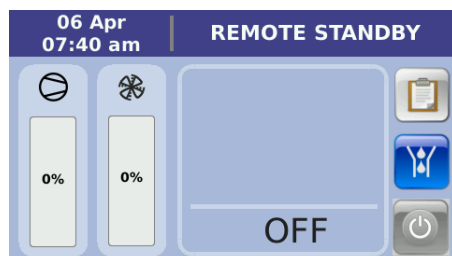
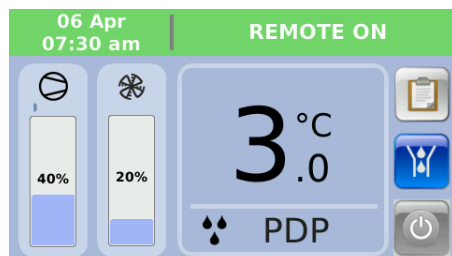
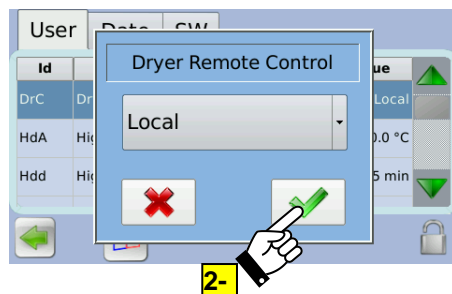
Make sure that the power supply is switched off and that the device is off and marked for maintenance measures. Please also ensure that the power supply cannot be re-established during the works

2- Wire a clean contact, free from electric potential, to terminals 17 and 18 to DMC50 power module.

3- Set the DrC parameter to REMOTE mode.

4- Close the contact. The dryer will start up and the status bar will turn green and display REMOTE ON.

5- Open the contact. The dryer will stop and the status bar will turn blue and display REMOTE STANDBY.



### NOTE!

The dryer cannot be started up and stopped from the touch screen display when in REMOTE mode. However it is possible to carry out all other operations, such as the condensation drain test, the management of alarms/service warnings, and access functions menus.

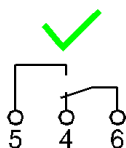


**Only a clean contact free from electric potential and suitable for low voltage must be used. Ensure there is adequate insulation on potentially hazardous live parts.**

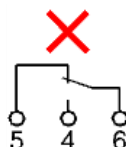
## 11.15.12 How the alarm / service warning flagging contact operates

DMC50 power module is provided with a clean contact, free from electric potential, for remotely flagging dryer alarm/warning conditions.

1- Set the ACM (Alarm Contact Management) parameter to the required mode (see section 10.15.14).



Dryer powered and absence of the conditions checked with the ACM parameter settings



Dryer not powered or presence of at least one of the conditions checked with the ACM parameter settings

## 11.15.13 How the RS485 serial communication port operates

DMC50 power module is provided with a data communication connection for remote dryer monitoring operations.

Contact the manufacturer for further information on using this application.


If the fieldbus is used, is mandatory to install a galvanic isolator between the DMC50 and the communication network, in order to guarantee the DMC50 safety.



### 11.15.14 Displaying / changing process user parameters

1- With the dryer stopped (STANDBY) or operating (ON mode), press the





button to access the dryer's menu of functions.


2- Press the  button to display the list of process user parameters and respective current settings.

3- Scroll through the list of parameters using the   buttons.



4- Touch the screen on the parameter to be changed to display the possible settings (see user parameter table), then select one of the settings. If the parameter to be changed requires a numerical value, set the new value using the numerical keypad within the max and min limits shown.

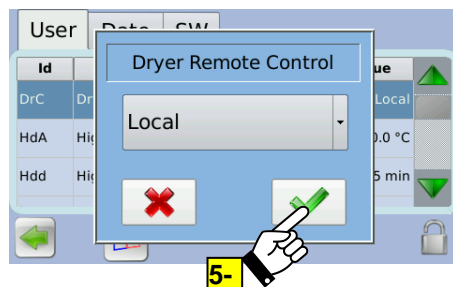
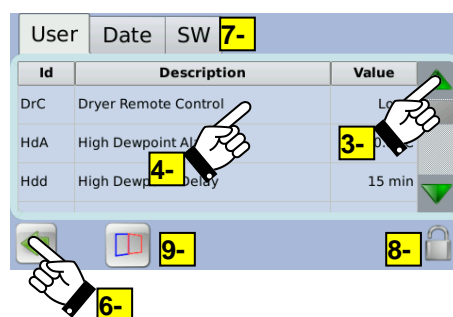
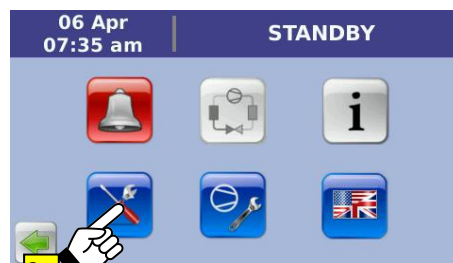
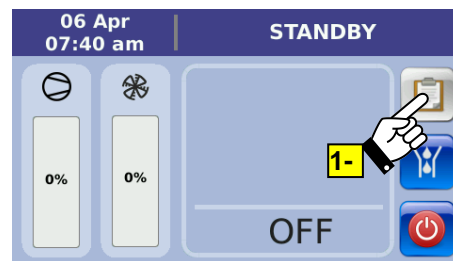
5- Confirm the setting or numerical value entered using the  button or

press the  button to return to the parameter list without making any changes. Repeat operations 3- 4- 5- for all parameters to be changed.


6- Press the  button to return to the previous screen at any time.

7- Press the SW tab to show the firmware version of DMC50 electronic control unit. All other functions included in the SW tab screen are password protected and they do not contain user functions

8-, 9- Buttons   are reserved for technical/diagnostic password-protected operations. They do not contain user functions.



## Technical data


ID	Description	Limits	Scale	Factory setting
<b>DrC</b>	- Dryer Remote Control - Enables/disables dryer remote control	Local / Remote	-	Local
<b>HdA</b>	- High Dewpoint Alarm - Sets the service warning intervention threshold high dew point	0...25.0°C or 32...77°F	0.5°C or 1°F	20.0°C or 68°F
<b>Hdd</b>	- High Dewpoint Delay - Sets the service warning delay time high dew point	1...20 minutes	1 minute	15 minutes
<b>HdS</b>	- High Dewpoint Alarm Stop - Select if high dew point service warning - Stops the dryer (Yes) - Does not stop the dryer (No)	Yes / No	-	No
<b>SrV</b>	- Service Setting - Sets the hours remaining till the next service <b>NOTA</b> : 00.0 = counter disabled	12.0 (x1000) hours	0.5 (x1000) hours	8.0 (x1000) hours
<b>SCL</b>	- Scale - Sets the temperature/pressure units of measurement °C = Temperature in °C and pressure in bar °F = Temperature in °F and pressure in psi	°C / °F	-	°C
<b>AS</b>	- Auto Restart - Enables/disables automatic dryer restart after restoring the electricity supply. Yes = the dryer restarts automatically after restoring the electricity supply (if it had been started) No = The dryer must be restarted using the  button.	Yes / No	-	No
<b>Ard</b>	- Auto Reset Service Warning Drain - Enables/disables the electronic condensation drain fault to be reset automatically. Yes = reset automatically No = reset manually	Yes / No	-	Yes
<b>ACM</b>	- Alarm Contact Management - Selects the switching logic for the alarm contact on the DMC50 power module: 1 = any alarm and high dew point 2 = any alarm and any service warning 3 = any alarm	1...3	1	1
<b>IPA</b>	- IP Address - Selects the IP address to use in the serial connection line	1...255	1	1

### 11.15.15 Changing the system date / time

1- With the dryer stopped (STANDBY) or operating (ON mode), press the






button to access the dryer's menu of functions.

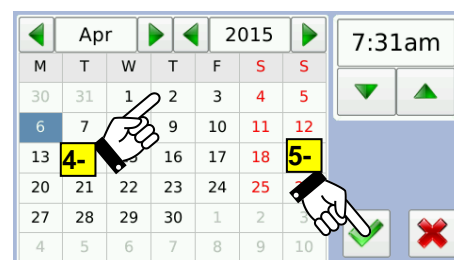
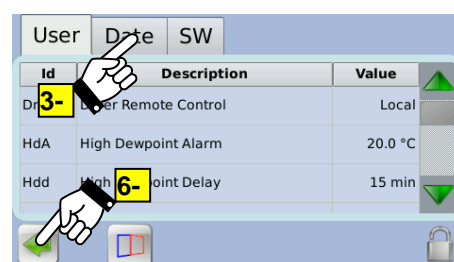
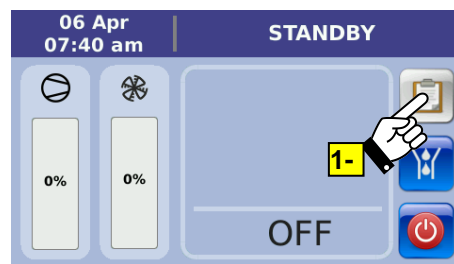
2- Press the  button to display the list of process user parameters and respective current settings.

3- Touch the Date tab on the screen.

4- Set the current date and time.

5- Confirm using the  button or press the  button to return to the parameter list without making any changes.

6- Press the  button to return to the previous screen at any time.



### 11.15.16 Changing the user interface language


1- With the dryer stopped (STANDBY) or operating (ON mode), press the

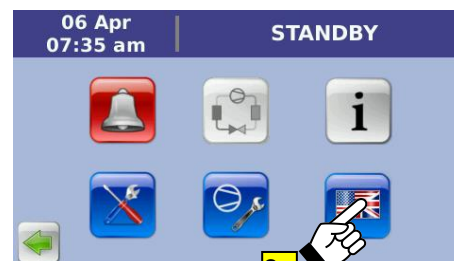
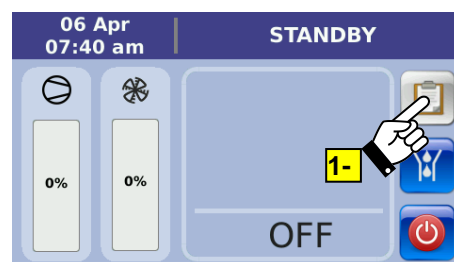


button to access the dryer's menu of functions.

2- Press the  button to display the list of available languages.

3- Choose the required language.

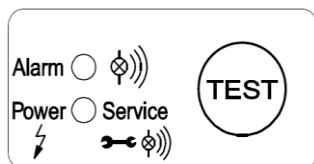
4- Press the  button to return to the previous screen at any time.



### 11.16 Electronic drainer

This drain consists of a condensate accumulator where a capacitive sensor checks the liquid level continuously: as soon as the accumulator is filled, the sensor passes a signal to the electronic control and a diaphragm solenoid valve will open to discharge the condensate. For a complete condensate discharge the valve opening time will be adjusted exactly for each single drain operation. No condensate strainers are installed. No adjusting is required. A service valve is installed before the electronic drain in order to make check and maintenance easily. **At dryer start-up verify that this valve is open.**

Control panel



Power / Service Led (green)	ON - ready to work / supplied Blinking – maintenance required
Alarm Led (red)	Blinking – alarm condition
Power+Alarm Led	ON - circuit board defect
TEST Button	Discharge test (keep pushed for 2 seconds)

### Troubleshooting



Only qualified personnel should perform troubleshooting and or maintenance operations.

Prior to performing any maintenance or service, be sure that :



- no part of the machine is powered and that it cannot be connected to the mains supply.
- no part of the machine is under pressure and that it cannot be connected to the compressed air system.
- maintenance personnel have read and understand the safety and operation instructions in this manual.

**PLEASE REFER TO INSTRUCTION MANUAL OF ELECTRONIC DRAINER**

### 12 Maintenance, troubleshooting, spare parts and dismantling

#### 12.1 Checks and maintenance



##### Certified skilled personnel

Installation works must exclusively be carried out by authorised and qualified skilled personnel. Prior to undertaking any measures on the compressed-air refrigeration dryer, the certified skilled personnel<sup>4</sup> shall read up on the device by carefully studying the operating instructions. The operator is responsible for the adherence to these provisions. The respective directives in force apply to the qualification and expertise of the certified skilled personnel.

For safe operation, the device must only be installed and operated in accordance with the indications in the operating instructions. In addition, the national and operational statutory provisions and safety regulations, as well as the accident prevention regulations required for the respective case of application, need to be observed during employment. This applies accordingly when accessories are used



##### Danger!

##### Compressed air!

**Risk of serious injury or death through contact with quickly or suddenly escaping compressed air or through bursting and/or unsecured plant components.**

Compressed air is a highly dangerous energy source.

Never work on the dryer when the system is under pressure.

Never direct the compressed-air outlet or condensate drain hoses at persons.

The user is responsible for the proper maintenance of the dryer. Non-observance of the instructions in the "Installation" and "Maintenance, troubleshooting, spare parts and dismantling" chapters leads to the expiration of the guarantee. Improper maintenance may result in dangerous situations for the personnel and/or the device.



##### Danger!

##### Supply voltage!

**Contact with non-insulated parts carrying supply voltage involves the risk of an electric shock resulting in injuries and death.**

Only qualified and skilled personnel are authorised to run electrically-operated devices. Prior to undertaking maintenance measures at the device, the following requirements must be met:

Make sure that the power supply is switched off and that the device is off and marked for maintenance measures. Please also ensure that the power supply cannot be re-established during the works.



Prior to carrying out maintenance works at the dryer, switch it off main switch (control panel pos.1) and wait for at least 30 minutes.



##### Caution!

##### Hot surfaces!

**During operation, several components can reach surface temperatures of more than +60°C (140°F). There is the risk of burns.**

All components concerned are installed inside of the closed housing. The housing must only be opened by certified skilled personnel.

Some components can reach high temperatures during operation. Avoid any contact until the system or the component has cooled down.

<sup>4</sup> Certified skilled personnel are persons who are authorised by the manufacturer, with experience and technical training, who are well-grounded in the respective provisions and laws and capable of carrying out the required works and of identifying and avoiding any risks during the machine transport, installation, operation and maintenance.

Qualified and authorised operators are persons who are instructed by the manufacturer regarding the handling of the refrigeration system, with experience and technical training, and who are well-grounded in the respective provisions and laws.



## DAILY:

- Check whether the dew point indicated on the electronics is correct.
- Ensure that the condensate drain system functions properly.
- Make sure that the condenser is clean.

## EVERY 200 HOURS OR MONTHLY



- Clean the condenser using an air jet (max. 2 bar / 30 psig) inside out. Make sure not to damage the aluminium lamellae of the cooling package.
- Remove the filter of the electrical panel and clean the filter material with a jet of compressed air. If necessary replace the filter material
- Finally, verify the operation of the device.



## EVERY 1,000 HOURS OR ANNUALLY

- Verify all screws, clamps and connections of the electric system to make sure that they are fastened securely. Check the device for broken and ruptured cables or cables without insulation.
- Check the refrigeration cycle for signs of oil and refrigerant leaks.
- Measure the current strength and note it down. Ensure that the read values are within the permissible limit values, as indicated in the specification table.
- Check the hose lines of the condensate drain and replace them, if required.
- Finally, verify the operation of the device.



## EVERY 8,000 HOURS

- Replace electronic drainer service unit.

## 12.2 Troubleshooting



### Certified skilled personnel

Installation works must exclusively be carried out by authorised and qualified skilled personnel. Prior to undertaking any measures on the compressed-air refrigeration dryer, the certified skilled personnel shall read up on the device by carefully studying the operating instructions. The operator is responsible for the adherence to these provisions. The respective directives in force apply to the qualification and expertise of the certified skilled personnel.

For safe operation, the device must only be installed and operated in accordance with the indications in the operating instructions. In addition, the national and operational statutory provisions and safety regulations, as well as the accident prevention regulations required for the respective case of application, need to be observed during employment. This applies accordingly when accessories are used.



### Danger!

#### Compressed air!

**Risk of serious injury or death through contact with quickly or suddenly escaping compressed air or through bursting and/or unsecured plant components.**

Compressed air is a highly dangerous energy source.

Never work on the dryer when the system is under pressure.

Never direct the compressed-air outlet or condensate drain hoses at persons.

The user is responsible for the proper maintenance of the dryer. Non-observance of the instructions in the "Installation" and "Maintenance, troubleshooting, spare parts and dismantling" chapters leads to the expiration of the guarantee. Improper maintenance may result in dangerous situations for the personnel and/or the device.



### Danger!

#### Supply voltage!

Contact with non-insulated parts carrying supply voltage involves the risk of an electric shock resulting in injuries and death.

Only qualified and skilled personnel are authorised to run electrically-operated devices. Prior to undertaking maintenance measures at the device, the following requirements must be met:

Make sure that the power supply is switched off and that the device is off and marked for maintenance measures. Please also ensure that the power supply cannot be re-established during the works.





Prior to carrying out maintenance works at the dryer, switch it off main switch (control panel pos.1) and wait for at least 30 minutes.



**Caution!**  
**Hot surfaces!**

During operation, several components can reach surface temperatures of more than +60°C. There is the risk of burns.

All components concerned are installed inside of the closed housing. The housing must only be opened by certified skilled personnel.

Some components can reach high temperatures during operation. Avoid any contact until the system or the component has cooled down.

SYMPTOM	POSSIBLE CAUSE - SUGGESTED ACTION
◆ The dryer doesn't start.	<ul style="list-style-type: none"> <li>⇒ Verify that the system is powered.</li> <li>⇒ Verify the electric wiring.</li> <li>⇒ Blow of fuse (see FU1/FU2/FU3 on the electric diagram) of the auxiliary circuit - replace it and check the proper operation of the dryer.</li> <li>⇒ Verify that dryer is in local mode.</li> <li>⇒ Electronic controller DMC50 in alarm condition – see the corresponding point.</li> </ul>
◆ The compressor doesn't work.	<ul style="list-style-type: none"> <li>⇒ The Dew Point displayed on DMC50 is sufficiently low, so the compressor is not active – wait that the temperature becomes higher</li> <li>⇒ Verify the electric wiring.</li> <li>⇒ Electronic controller DMC50 in alarm condition – see the corresponding point.</li> <li>⇒ Check that the compressor contactor (KC1) and/or circuit breaker (QC1) properly work.</li> <li>⇒ If the compressor still doesn't work, replace it and/or its variable speed drive.</li> </ul>
◆ Condenser's fan doesn't work properly (Air-Cooled).	<ul style="list-style-type: none"> <li>⇒ The condensing pressure (HP) measured is sufficiently low, so the fan is not active – wait that the condensing pressure becomes higher.</li> <li>⇒ Verify the electric wiring.</li> <li>⇒ Electronic controller DMC50 in alarm condition – see the corresponding point.</li> <li>⇒ If the fan still doesn't work, replace it and/or its variable speed drive.</li> <li>⇒ Condensing pressure measured with DMC50 and BHP pressure transducer is not correct. Contact a refrigeration engineer to verify and compare the correct condensing pressure value. If required replace BHP pressure transducer and/or DMC50 controller</li> </ul>
◆ DewPoint too high.	<ul style="list-style-type: none"> <li>⇒ The dryer doesn't start - see specific point.</li> <li>⇒ The DewPoint probe doesn't correctly detect the temperature - ensure the sensor is pushed into the bottom of probe well.</li> <li>⇒ Failure temperature probe BT1 – check the electrical cabling and/or replace the probe.</li> <li>⇒ The Compressor doesn't work - see specific point.</li> <li>⇒ The ambient temperature is too high or the room aeration is insufficient - provide proper ventilation (Air-Cooled).</li> <li>⇒ The inlet air is too hot - restore nominal conditions.</li> <li>⇒ The inlet air pressure is too low - restore nominal conditions.</li> <li>⇒ The inlet air flow rate is higher than the rate of the dryer - reduce the flow rate - restore nominal conditions.</li> <li>⇒ The condenser is dirty - clean it (Air-Cooled)</li> <li>⇒ The condenser fan doesn't work - see specific point (Air-Cooled).</li> <li>⇒ The cooling water is too hot - restore nominal conditions (Water-Cooled).</li> <li>⇒ The cooling water flow is insufficient - restore nominal conditions (Water-Cooled).</li> <li>⇒ The dryer doesn't drain the condensate - see specific point.</li> <li>⇒ There is a leak in the refrigerant circuit - contact a refrigeration engineer. In case of refrigerant leak, dewpoint could be high, compressor runs at low speed and does not stop even at no load and low ambient, BT3 (refrigerant compressor suction) temperature is high and condensing pressure is low.</li> <li>⇒ Evaporating pressure measured with DMC50 and BLP pressure transducer is not correct.</li> </ul>



## Maintenance, troubleshooting, spare parts and dismantling

	<p>Contact a refrigeration engineer to verify and compare the correct evaporating pressure value. If required replace BLP pressure transducer and/or DMC50 controller.</p> <p>⇒ One or more Electronic Expansion Valve EEV doesn't work properly - see specific point.</p>
◆ Dew Point too low	<p>NOTE: Slightly negative DewPoint peaks are normal with low loads and refrigerant compressor cycling ON/OFF</p> <p>⇒ The fan is always on – verify the correct operation pressure transducer (see BHP on the electric diagram) – (Air-Cooled).</p> <p>⇒ Ambient temperature is too low - restore nominal conditions (Air-Cooled).</p> <p>⇒ Evaporating pressure measured with DMC50 and BLP pressure transducer is not correct. Contact a refrigeration engineer to verify and compare the correct evaporating pressure value. If required replace BLP pressure transducer and/or DMC50 controller</p> <p>⇒ The DewPoint probe doesn't correctly detect the temperature - ensure the sensor is pushed into the bottom of probe well.</p>
◆ Excessive pressure drop within the dryer.	<p>⇒ The dryer doesn't drain the condensate - see specific point.</p> <p>⇒ The DewPoint is too low - the condensate is frost and blocks the air - see specific point.</p> <p>⇒ Check for throttling the flexible connection hoses.</p> <p>⇒ Check heat exchanger cleaning and prefilter installation.</p>
◆ The dryer doesn't drain the condensate	<p>⇒ The condensate drain service valve is closed - open it.</p> <p>⇒ Verify the electric wiring.</p> <p>⇒ The DewPoint is too low - the condensate is frost and blocks the air - see specific point.</p> <p>⇒ Inlet compressed air pressure is too low and condensate is not drained – restore nominal conditions.</p> <p>⇒ Electronic drainer is not operating correctly (see section 10.16).</p>
◆ The dryer continuously drains condensate.	<p>⇒ Electronic drainer is dirty (see section 10.16).</p>
◆ Water within the line.	<p>⇒ Verify that the air inlet and outlet connections are correctly connected to the compressed air system (not reversed connection).</p> <p>⇒ The dryer doesn't start - see specific point.</p> <p>⇒ <b>If installed</b> - Untreated air flows through the by-pass unit - close the by-pass.</p> <p>⇒ The dryer doesn't drain the condensate - see specific point.</p> <p>⇒ DewPoint too high - see specific point.</p>
◆ HPS high pressure switch has been activated.	<p>⇒ Check which of the following has caused the activation:</p> <ol style="list-style-type: none"> <li>1. The ambient temperature is too high or the room aeration is insufficient - provide proper ventilation (Air-Cooled).</li> <li>2. The condenser is dirty - clean it (Air-Cooled).</li> <li>3. Check HPS electrical wiring.</li> <li>4. The condenser fan doesn't work - see specific point (Air-Cooled).</li> <li>5. The cooling water is too hot - restore nominal conditions (Water-Cooled).</li> <li>6. The cooling water flow is insufficient - restore nominal conditions (Water-Cooled).</li> </ol> <p>⇒ Reset the pressure switch pressing the button on the controller itself - verify the dryer for correct operation.</p> <p>⇒ Condensing pressure measured with DMC50 and BHP pressure transducer is not correct. Contact a refrigeration engineer to verify and compare the correct condensing pressure value. If required replace BHP pressure transducer and/or DMC50 controller</p> <p>⇒ HPS pressure switch is faulty - contact a refrigeration engineer to replace it.</p>
◆ LPS low pressure switch has been activated.	<p>⇒ Check LPS electrical wiring.</p> <p>⇒ There is a leak in the refrigerating fluid circuit - contact a refrigeration engineer.</p> <p>⇒ The pressure switch reset automatically when normal conditions are restored - check the proper operation of the dryer.</p> <p>⇒ Evaporating pressure measured with DMC50 and BLP pressure transducer is not correct. Contact a refrigeration engineer to verify and compare the correct evaporating pressure value. If required replace BLP pressure transducer and/or DMC50 controller</p>

## Maintenance, troubleshooting, spare parts and dismantling

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| ◆ Compressor discharge temperature too high. | ⇒ Check which of the following has caused the failure: <ol style="list-style-type: none"><li>1. Excessive thermal load – restore nominal conditions.</li><li>2. The inlet air is too hot - restore nominal conditions.</li><li>3. The ambient temperature is too high or the room aeration is insufficient - provide proper ventilation (Air-Cooled).</li><li>4. The condenser unit is dirty - clean it (Air-Cooled).</li><li>5. The fan doesn't work - see specific point (Air-Cooled).</li><li>6. Refrigerant gas leak - contact a refrigeration engineer.</li><li>7. One or more Electronic Expansion Valve EEV doesn't work properly - see specific point.</li></ol>   |
| ◆ Condensing pressure too high               | ⇒ Check which of the following has caused the failure: <ol style="list-style-type: none"><li>1. The ambient temperature is too high or the room aeration is insufficient - provide proper ventilation (Air-Cooled).</li><li>2. The condenser unit is dirty - clean it (Air-Cooled).</li><li>3. Failure refrigerant pressure transducer BHP – verify condensing pressure (HP) measure from BHP (value available on DMC 50 display) with a pressure gauge and if they doesn't match replace the transducer.</li><li>4. The fan doesn't work properly - does not achieve the full speed- see specific point (Air-Cooled).</li><li>5. The temperature of the cooling water is too hot – restore nominal conditions (Water-Cooled).</li><li>6. Cooling water flow is not sufficient – restore nominal conditions (Water-Cooled).</li></ol>  |
| ◆ Condensing pressure too low                | ⇒ Check which of the following has caused the failure: <ol style="list-style-type: none"><li>1. Ambient temperature is too low - restore nominal conditions (Air-Cooled).</li><li>2. Air flows through the condenser even with fan off – protect dryer against wind or external air flows (not caused by dryer's fan) (Air-Cooled).</li><li>3. The temperature of the cooling water is too low – restore nominal conditions (Water-Cooled).</li><li>4. The cooling water flow adjusting valve requires re-adjusting - contact a specialized technician to restore nominal setting (Water-Cooled).</li><li>5. Failure refrigerant pressure transducer BHP – verify condensing pressure (HP) measure from BHP (value available on DMC 50 display) with a pressure gauge and if they doesn't match replace the transducer.</li><li>6. Refrigerant gas leak - contact a refrigeration engineer.</li><li>7. The fan doesn't work properly - it runs at speed too high - see specific point (Air-Cooled).</li><li>8. Compressor does not work – see specific point.</li></ol>  |
| ◆ Evaporating pressure too high              | ⇒ Find out the reason for the fault: <ol style="list-style-type: none"><li>1. Excessive thermal load – re-establish the nominal conditions.</li><li>2. The inlet air is too hot – re-establish the nominal conditions.</li><li>3. The ambient air temperature is too high or the room ventilation insufficient – ensure sufficient ventilation.</li><li>4. The condenser is dirty – please clean it (air-cooled).</li><li>5. The fan does not work – see the corresponding section (air-cooled).</li><li>6. Check by-pass solenoid valve proper functioning.</li><li>7. The adjusting valve for the cooling-water flow needs to be re-adjusted - contact a specialist to have the nominal calibration re-established (water-cooled).</li><li>8. Evaporating pressure measured with DMC50 and BLP pressure transducer is not correct. Contact a refrigeration engineer to verify and compare the correct evaporating pressure value. If required replace BLP pressure transducer and/or DMC50 controller</li><li>9. One or more Electronic Expansion Valve EEV doesn't work properly - see specific point.</li><li>10. Compressor does not work – see specific point.</li></ol> |
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- ◆ Electronic controller DMC50 in alarm condition (status area red colour) - See section 10.15.6
- ⇒ Status area blinking red : one or more alarms are active. The display shows the ID code and the description of the active alarm.
- ⇒ Status area steady red : one or more alarms need to be reset. The display shows the ID code and the description of alarm which is no longer active but which still need to be reset.
- ⇒ Alarms are shown by following codes and descriptions :
1. **High Pressure Switch** - HPS pressure switch triggered (refrigerant high pressure) because the refrigerant pressure is too high – see the specific point.
  2. **Low Pressure Switch** - LPS pressure switch triggered (low pressure) because the refrigerant pressure is too low – see the specific point.
  3. **Fan protection (air-cooled)** - At least one of electrical protections of the fan has triggered or the variable speed drive is in alarm condition or fault - see electric diagram.  
Circuit breaker QV1 has tripped - reset circuit breaker, restart and check the perfect functioning of the dryer.  
Variable speed drive INV2 in alarm condition – For complete information refer to the manual of the condenser fan drive. To reset the alarm conditions, switch off the dryer main switch (Control panel pos.1) wait at least 60 seconds, and then restore the power. If one or more alarms are active, the condenser fan drive's display will show active alarm code number.  
To reset the alarm, press the [Reset] button on the fan variable speed drive, the alarm LED will switch off.  
Fan variable speed drive has an internal alarm log accessible from the drive display as per following procedure:  
Push "Menù" button two times  
Push "UP" or "DOWN" button until display shows "15-\_\_" and push "OK" button  
Push "UP" or "DOWN" button until display shows "15-30" and push "OK" button  
The latest alarms are logged and displayed with their alarm code.  
The total alarm logged are 10, starting with number 0 to 9.  
Alarm code and description:  
2 – Fault in condenser fan drive, replace the driver.  
4 – Mains phase loss – Missing phase on supply side, or too high voltage imbalance.  
Check supply voltage.  
7 – DC over voltage – Intermediate circuit voltage exceeds limit.  
Check static or transient overvoltages in the input power supply. Restore it in the proper operating limits.  
8 – DC under voltage – Intermediate circuit voltage drops below "voltage warning low" limit.  
Check and correct:
    - missing phase in input power supply
    - blown fuse
    - undervoltage on mains9 – Fan driver overloaded – More than 100% load for too long time.  
Check and correct:
    - ambient temperature is too high - restore nominal conditions.
    - condenser cleaning or any obstruction to fan ventilation (condenser fan canalization not admitted)
    - fan motor current adsorption is higher than nominal – check proper fan motor functioning10 – Motor ETR over temperature – Motor is too hot due to more than 100% load for too long time.  
Wait 30 minutes, restart and check the perfect functioning of the dryer.  
11 – Motor thermistor over temperature – Thermistor or thermistor connection is disconnected.  
Check and correct fan motor internal thermal protection(s) and their connection to the fan driver. Wait 30 minutes, restart and check the perfect functioning of the dryer.  
12 – Fault in condenser fan drive, replace the driver.  
13 – Over current – Output current limit is exceeded.  
Check and correct:
    - fan cable or connections.
    - low input voltage to fan driver.
    - faulty fan.14 – Earth fault – Discharge from output phases to ground.  
Check and correct ground fault on motor or motor-to- fan driver cables.  
16 – Short Circuit – Short circuit in motor or on motor terminals/connections.  
Check and correct short circuit on motor or motor-to- fan driver cables.  
17 – Fault in condenser fan drive, replace the driver.  
25 – Fault in condenser fan drive, replace the driver.

- 27 – Fault in condenser fan drive, replace the driver.
- 28 – Fault in condenser fan drive, replace the driver.
- 29 – Power board over temp – Heatsink cut-out temperature has been reached.  
Check and correct:
  - ambient temperature is too high - restore nominal conditions (Air-Cooled).
  - obstruction in the fan driver cooling air flow.
  - dirt or dust coating in the fan driver heat sink.
  - excessive fan motor load.
  - fan driver cooling fan failure – replace the fan driver.
  - electrical box cooling fan failure – replace the electrical box cooling fan.
- 30 - Motor phase U missing – Motor phase U is missing. Check the phase.
- 31 – Motor phase V missing – Motor phase V is missing. Check the phase.
- 32 – Motor phase W missing – Motor phase W is missing. Check the phase.
- 38 – Fault in condenser fan drive, replace the driver.
- 44 – Earth fault – Discharge from output phases to ground.  
Check and correct ground fault on motor or motor-to-fan driver cables.
- 47 – Control Voltage Fault – 24 V DC may be overloaded. Check the fan driver 24 V DC output cables.
- 51 – Fault in condenser fan drive, replace the driver.
- 52 – Fault in condenser fan drive, replace the driver.
- 63 – Fault in condenser fan drive, replace the driver.
- 80 – Fault in condenser fan drive, replace the driver.

**Note** : “error 85” can appear trying to access a locked fan driver function pushing a display button. This error isn't related to a condenser fan drive malfunction.

Fault variable speed drive INV2 - Replace the variable speed drive.

- 4. **High Discharge Temperature** - The outlet temperature protection of the compressor has triggered as a result of a very high temperature, over safety limits (probe T4) – see the specific point.
  - 5. **Compressor protection** - The electrical protection of the compressor has tripped (see QC1 – QC3 on the electric diagram) – reset, restart and check the perfect functioning of the dryer. If RPP triggered – power phases are not connected properly. Change two of three phases at the supply main.
  - 6. **Ice**: The temperature inside the exchanger (probe BT1) is too low – the dew point is too low – see the specific point.  
**Note**: is the only alarm which is displayed and automatically resets with the dryer stopped (STANDBY).
  - 7. **Probe Fault LP** - Failure pressure transducer BLP - see electric diagram - check the electric cabling and/or replace the transducer.
  - 8. **Probe Fault HP** - Failure pressure transducer BHP - see electric diagram - check the electric cabling and/or replace the transducer.
  - 9. **Probe Fault T1** - Failure temperature probe BT1 - see electric diagram - check the electric cabling and/or replace the probe.
  - 10. **Probe Fault T4** - Failure temperature probe BT4 - see electric diagram - check the electric cabling and/or replace the probe.
  - 11. **Low Differential Pressure** - Low differential pressure between HP-LP values - see the corresponding paragraph.
  - 12. **High Evaporating Pressure** - The evaporating pressure is too high – see the corresponding paragraph.
  - 13. **Low Condensing Pressure** - The condensing pressure is too low - see the corresponding paragraph
  - 1001. **Power Unit Communication Fault** - Data communication between display and DMC50 power module is lost - Check the cable connection between two modules and / or replace the cable.
  - 1002. **Variable speed drive Communication Fault** - Data communication between DMC50 power module and compressor variable speed drive is lost.  
Variable speed drive INV 1 not powered - check that the compressor contactor (KC1) and/or circuit breaker (QC1) properly work/not triggered. Check proper variable speed drive wiring.  
Cable data connection broken - Check the cable connection between the two modules and / or replace the cable.  
DMC 50 power module failure – Replace the power module.  
Fault variable speed drive INV1 - Replace the variable speed drive.
- 169001 → 169118 **Variable speed drive INV1 in alarm condition** – For complete

## Maintenance, troubleshooting, spare parts and dismantling

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information refer to the manual of the refrigerant compressor driver. To reset the alarm conditions, switch off the dryer main switch (Control panel pos.1) wait at least 60 seconds, and then restore the power.

If one or more alarms are active, the compressor drive's display will show active alarm code number.

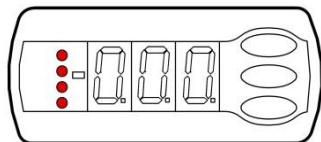
To reset the alarm, press the [Reset] button on the fan variable speed drive, the alarm LED will switch off.

169001. Pwr.Card Temp - FC 101 fault number: 69 – The temperature sensor on the power card exceeds the upper or lower limits.  
Check and correct:
- Ambient temperature is too high or too low - restore nominal conditions.
  - Obstruction in the compressor driver cooling air flow.
  - Dirt or dust coating in the compressor driver heat sink.
  - Excessive compressor load.
  - Compressor driver cooling fan failure – replace the compressor driver.
  - Check electrical box filter cleaning.
  - Electrical box cooling fan failure – replace the electrical box cooling fan.
169002. Earth Fault – FC 101 fault number: 14 – Discharge from output phases to ground.  
Check and correct ground fault on motor or motor-to-compressor driver cables
169004. Fault in compressor variable speed drive, replace the driver.
169005. Over Current – FC 101 fault number: 13– Output current limit is exceeded.  
Check and correct:
- Compressor cable or connections.
  - Low input voltage to compressor driver.
  - Faulty compressor.
169008. Fault in compressor variable speed drive, replace the driver.
169009. Inverter overld. - FC 101 fault number: 9 – More than 100% load for a long time.  
Check and correct:
- Excessive dryer thermal load – restore nominal conditions.
  - Compressor motor current adsorption is higher than nominal – check proper compressor motor functioning.
169010. DC under Volt - FC 101 fault number: 8 – Intermediate circuit voltage drops below “voltage warning low” limit.  
Check and correct:
- missing phase in input power supply.
  - blown fuse.
  - undervoltage on mains.
169011. DC over Volt - FC 101 fault number: 7 – Intermediate circuit voltage exceeds the limit.  
Check static or transient overvoltages in the input power supply. Restore it in the proper operating limits.
169012. Short Circuit - FC 101 fault number: 16 – Short-circuit in motor or on motor terminals/connections.  
Check and correct short circuit on motor or motor-to-compressor driver cables.
169014. Mains ph. loss - FC 101 fault number: 4 – Missing phase on the supply side or too high voltage imbalance.  
Check the supply voltage.
169015. Fault in compressor variable speed drive, replace the driver.
169016. Fault in compressor variable speed drive, replace the driver.
169017. Fault in compressor variable speed drive, replace the driver.
169019. U phase Loss - FC 101 fault number: 30 – Motor phase U is missing. Check phase.
169020. V phase Loss - FC 101 fault number: 31 – Motor phase V is missing. Check phase.
169021. W phase Loss - FC 101 fault number: 32 – Motor phase W is missing. Check phase.
169023. 24 V supply low - FC 101 fault number: 47 – 24 V DC may be overloaded. Check the compressor driver 24 V DC output cables.
169028. Earth fault - FC 101 fault number: 44 – Discharge from output phases to ground.  
Check and correct ground fault on motor or motor-to-compressor driver cables.
169029. Fault in compressor variable speed drive, replace the driver.
169100. Fault in compressor variable speed drive, replace the driver.
169104. Fault in compressor variable speed drive, replace the driver.
169108. Fault in compressor variable speed drive, replace the driver.
169112. Fault in compressor variable speed drive, replace the driver.
169118. Fault in compressor variable speed drive, replace the driver
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- ◆ Electronic controller DMC50 in service warning condition (status area orange colour) - See section **10.15.5**
    - ⇒ Status area blinking orange : one or more service warnings are active. The display shows the ID code and the description of the active warning.
    - ⇒ Status area steady orange : one or more service warnings need to be reset. The display shows the ID code and the description of warning which is no longer active but which still need to be reset
    - ⇒ Service warnings are shown by following codes and descriptions :
  - 15. **Low Dew Point** - Dew point too low – see the corresponding paragraph.
  - 16. **High Dew Point** - Dew point too high (higher than adjusted value on HdA parameter) – see the corresponding paragraph.
  - 17. **Probe Fault T2** - Failure temperature probe BT2 - see electric diagram - check the electric cabling and/or replace the probe.
  - 18. **Probe Fault T3** - Failure temperature probe BT3 - see electric diagram - check the electric cabling and/or replace the probe.
  - 19. **Drainer** - The condensate drain ELD (and/or ELD2 if installed) does not work properly (ALARM contact is open) – see electric diagram and corresponding paragraph.
  - 20. **Programmed service** - Maintenance notification time is expired (over than adjusted value on SrV parameter) – carry out the scheduled maintenance and reset the hour meter.
  - 21. **High discharge temperature** - The outlet temperature protection of the compressor has triggered as a result of a very high temperature but within safety limits (probe T4) – see the corresponding paragraph.
  - 22. **High Evaporating Pressure** - The evaporating pressure is too high – see the corresponding paragraph.
  - 23. **Low Condensing Pressure** - The condensing pressure is too low - see the corresponding paragraph.
  - 24. **High Condensing Pressure** - The condensing pressure is too high - see the corresponding paragraph.
  - 169201 → 169318 **Variable speed drive INV1 in warning condition** – For complete information refer to the manual of the refrigerant compressor driver. Compressor variable speed drive warning disappear when abnormal condition is removed.
  - 169201. Pwr.Card Temp - FC 101 fault number: 69 – The temperature sensor on the power card exceeds the upper or lower limits. See alarm “169001”
  - 169204. Fault in compressor variable speed drive, replace the driver.
  - 169205. Over Current - FC 101 fault number: 13 – Compressor variable speed drive peak current limit is exceeded. See alarm “169005”.
  - 169208. Fault in compressor variable speed drive, replace the driver.
  - 169209. Inverter overld. - FC 101 fault number: 9 – More than 100% load for a long time. See alarm “169009”.
  - 169210. DC under Volt - FC 101 fault number: 8 – Intermediate circuit voltage drops below voltage warning low limit. See alarm “169010”.
  - 169211. DC over Volt. - FC 101 fault number: 7 - Intermediate circuit voltage exceeds the limit. See alarm “169011”.
  - 169214. Mains ph. loss - FC 101 fault number: 4 – Missing phase on the supply side or too high voltage imbalance. See alarm “169014”.
  - 169216. Fault in compressor variable speed drive, replace the driver.
  - 169223. 24 V Supply Low - FC 101 fault number: 47 – 24 V DC supply may be overloaded. See alarm “169023”.
  - 169225. Current Limit - FC 101 fault number: 59 – The current exceeds the peak value. Check and correct:
    - Compressor cable or connections
    - Low input voltage to compressor driver
  - 169226. Low temp. - FC 101 fault number: 66 – Heat sink temperature too low. Restore nominal conditions.
  - 169308. Fault in compressor variable speed drive, replace the driver.
  - 169315. Fault in compressor variable speed drive, replace the driver..
  - 169318. Fans Warning - FC 101 fault number: 24 – Fault in compressor variable speed drive, replace the driver.
-

Electronic Expansion Valve EEV doesn't work properly

Each dryer is equipped with a DRVD display (display for DRV available in the following picture) required for DRV troubleshooting.



1. DRVD display

Connect the DRVD display to each DRV, one by one, in order to check which of the following has caused the activation:

1. DRVD display is not powered:
  - Verify the DRV(1...n) electric wiring power supply included.
  - Verify that all DRV connectors are properly tight.
  - Blow of fuse (see FU(4...n) according to dryer model) of DRV (EEV controller) power supply - Replace it and check the proper dryer operation.
2. DRVD display is powered and shows the four vertical led on the left part blinking.  
This condition means that one or more alarms are active.

Press once the upper button and display will show one or more of the following alarm code:

**E24** – Temperature sensor error – Failure temperature probe BS(1...n) - see electric diagram - check the electric cabling and/or replace the probe .

**E20** – Pressure sensor error – Failure pressure transducer BP(1...n) - see electric diagram - check the electric cabling and/or replace the transducer.

**A44** – Fault in controller – replace the DRV controller.

**E1** – Fault in controller – replace the DRV controller.

**A11** – Fault in controller – replace the DRV controller.

**E19** – Fault in controller – replace the DRV controller.

**E25** – Fault in controller – replace the DRV controller.

As soon as the problem is solved, the four led on the left of the display will be OFF (not blinking).

Verify that the actual evaporator refrigerant super-heating (in °K) shown by the DRV is matching with the effective super-heating of that evaporator.

**NOTE! – Never restart the dryer with one or more DRV still in alarm (four led on the left of the display are blinking). Non-observance will cause damage.**

3. DRVD display is powered and it is not in alarm (the four vertical led on the left part are not powered).

This condition means that the alarm contact on the DRV(1...n) was open but currently the DRV is not in alarm.

Press once the upper button, display shows “non” to confirm that no alarm is active.

- The relay KDA (1...n) is not powered - Check that all wires are properly connected and tight, verify that proper operation of the relay or replace it.
- Verify the DRV(1...n) electric wiring of (EEV controller).

Check that all DRV connectors are properly tight.

If the problem still persists, one or more DRV is defect – Find which one/s is defect and replace it/them.

## Maintenance, troubleshooting, spare parts and dismantling

### 12.3 Spare parts

Spare parts list is printed on a dedicated sticker applied inside the dryer. On this sticker each spare part is identified with its ID Number and related Spare Part Number. Here below the cross reference table between ID Numbers and exploded drawings Ref. with their description and quantity installed in the dryers.

ID N.	DESCRIPTION	ACT VS				
		3000	3750	4000	5000	6000
1 - 1.1	Heat exchanger replacement kit	3	3	4	4	6
2	LPS Pressure switch	1	1	1	1	1
4	HPS Pressure switch	1	1	1	1	1
6	MC1 Compressor (variable speed)	1	1	1	1	1
	MCn Compressor (fix speed)	1	1	1	2	2
6,1	Compressor crankcase heater	1	2	2	3	3
8	Condenser	3	3	4	4	1
9	MFn Complete fan	3	3	4	4	2
10	Filter drier (cartridge)	1	1	1	1	1
12	BTn Temperature probe	4	4	4	4	4
19	Water regulating valve	1	1	1	1	1
21	ELD Electronic condensate drain Electronic drain service unit	3	3	4	4	6
21,1		3	3	4	4	6
35	EEVn Electronic expansion valve Coil for electronic expansion valve	3	3	4	4	6
35,1		3	3	4	4	6
37	BHP Pressure transducer	1	1	1	1	1
39	BLP Pressure transducer	1	1	1	1	1
44	Suction strainer	1	1	1	1	1
67	Electrical panel filter	1	1	1	1	1
82	CHV Check valve	2	2	2	2	3
85	EVB Pressure balancing solenoid valve Coil for pressure balancing solenoid valve	1	1	1	1	1
85,1		1	1	1	1	1
86	BSn EEV temperature probe	3	3	4	4	6
87	BPn EEV pressure transducer	3	3	4	4	6
60	QS Main switch	1	1	1	1	1
	A1 DMC50 power module	1	1	1	1	1
	A2 DMC50 display (air cooled setup) DMC50 display (water cooled setup)	1	1	1	1	1
		1	1	1	1	1
	A1.1 DMC50 power cable - power module to display	1	1	1	1	1
	A1.2 DMC50 data cable - power module to display	1	1	1	1	1
	A1.3 DMC50 data cable - power module to compressor inverter	1	1	1	1	1
	INV1 Compressor inverter	1	1	1	1	1
	INV2 Condenser fan inverter	1	1	1	1	
	INV2D Operating panel for INV2	1	1	1	1	
	MCP Electrical panel fan	1	1	1	1	1
	DRVn EEV controller	3	3	4	4	6
	DRVD Operating panel for DRV	1	1	1	1	1
	QCn-QVn Circuit breaker	3	3	3	2	5
	FU Fuse kit	1	1	1	1	1
	KCn Contactor	2	2	2	2	3
	KCn.1 Auxiliary contact	1	1	1	1	3
	KDR Relay	1	1	1	1	2
		KDAn	3	3	4	4
	TF Transformer	1	1	1	1	1
RPP Reverse phase protector	1	1	1	1	1	
HT Thermostat	1	1	1	1	1	



### 13 Maintenance operation on the refrigeration circuit



**Caution!**  
**Refrigerant!**

Maintenance and repair works at refrigeration systems must only be carried out by certified refrigerating engineers only in accordance with the local provisions.

The total amount of refrigerant in the system must be collected for recycling purposes, resource recovery or disposal.

**The refrigerant must not be discharged into the environment.**

When delivered, the dryer is ready to operate and filled with a refrigerant of the R407C type.



Should you detect a refrigerant leak, please contact a certified refrigerating engineer. Prior to any intervention, the room needs to be ventilated.

When the refrigeration cycle needs to be refilled, please also contact a certified refrigerating engineer.

You will find the refrigerant type and amount on the name plate of the dryer.

Characteristics of refrigerants used:

Refrigerant	Chemical formula	TLV	GWP
R407C - HFC	R32/125/134a (23/25/52) CHF <sub>2</sub> CF <sub>3</sub> /CH <sub>2</sub> F <sub>2</sub> /CH <sub>2</sub> FCF <sub>3</sub>	1000 ppm	1773.85

#### 13.1 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	R407C, Oil
Canopy and Supports	Carbon steel, Epoxy paint
Refrigerating compressor	Steel, Copper, Aluminium, Oil
Alu-Dry Module	Aluminium
Condenser Unit	Aluminium, Copper, Carbon steel
Pipe	Copper
Fan	Aluminium, Copper, Steel
Valve	Brass, Steel
Electronic Level Drain	PVC, Aluminium, Steel
Insulation Material	Synthetic rubber without CFC, Polystyrene, 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.

Refrigerant 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.

## 14 Attachments

### Exploded views – List of components

<b>1</b>	Alu-Dry module	<b>41</b>	Condenser fan variable speed drive INV2
<b>1.1</b>	Insulation material	<b>42</b>	Electrical panel fan
<b>2</b>	Refrigerant pressure switch LPS	<b>43</b>	Oil separator
<b>4</b>	Refrigerant pressure switch HPS	<b>44</b>	Electrical panel filter
<b>6v</b>	Compressor MC1 VS	<b>51</b>	Front panel
<b>6f</b>	Compressor MC2 – MC3 FIX	<b>52</b>	Back panel
<b>8</b>	Condenser (Air-Cooled)	<b>53</b>	Right lateral panel
<b>9</b>	Condenser fan (Air-Cooled)	<b>54</b>	Left lateral panel
<b>10</b>	Filter dryer	<b>55</b>	Cover
<b>12</b>	BT1 temperature probe (dew point)	<b>56</b>	Base plate
<b>13</b>	Condensate drain service valve	<b>57</b>	Upper plate
<b>17</b>	Electronic instrument	<b>58</b>	Support beam
<b>18</b>	Condenser (Water-Cooled)	<b>59</b>	Support bracket
<b>19</b>	Condenser water-regulating valve (Water-Cooled)	<b>60</b>	Control panel
<b>20</b>	Refrigerant accumulator	<b>65</b>	Condenser filter
<b>21</b>	Electronic drainer	<b>66</b>	Control panel door
<b>22</b>	Main switch	<b>67</b>	Compressor suction strainer
<b>34</b>	Liquid sight glass	<b>82</b>	Check valve CHV
<b>35</b>	Electronic Expansion Valve EEV	<b>83</b>	Refrigerant service valve – H.P. side
<b>36</b>	Liquid separator	<b>84</b>	Refrigerant service valve – L.P. side
<b>37</b>	Refrigerant pressure transducer BHP	<b>85</b>	Pressure balancing solenoid valve EVB
<b>39</b>	Refrigerant pressure transducer BLP	<b>86</b>	EEV temperature sensor BS
<b>40</b>	Compressor variable speed drive INV1	<b>87</b>	EEV pressure transducer BP

### Electric diagrams – List of components

<b>MC1- MC3</b>	Compressor	<b>LPS</b>	Low pressure switch
<b>RC</b>	Compressor crankcase heater	<b>EEV1-6</b>	Electronic Expansion Valve
<b>MF1- MF4</b>	Condensers fans	<b>BS1-6</b>	EEV temperature sensor
<b>A1</b>	DMC50 – Power module	<b>BP1-6</b>	EEV pressure transduce
<b>A2</b>	DMC50 – Display module	<b>DRV1-6</b>	EEV controller
<b>INV1</b>	Compressor variable speed drive	<b>ELD</b>	Electronic condensate drain
<b>INV2</b>	Condenser fan drive	<b>EVB</b>	Pressure balancing solenoid valve
<b>BT1-4</b>	Temperature probes	<b>QS</b>	Main switch
<b>BHP</b>	Refrigerant High pressure transducer	<b>HT</b>	Electrical panel fan thermo switch
<b>HPS</b>	High pressure switch		
<b>NT1</b>	Air-Cooled only	<b>NT5</b>	Limit of equipment
<b>NT2</b>	Verify transformer connection according to power supply voltage	<b>NT6</b>	Timed drain output
<b>NT3</b>	Jump if not installed	<b>NT7</b>	Water Cooled only
<b>NT4</b>	Provided and wired by customer		
<b>BN</b>	Brown	<b>OR</b>	Orange
<b>BU</b>	Blue	<b>RD</b>	Red
<b>BK</b>	Black	<b>WH</b>	White
<b>YG</b>	Yellow / Green	<b>WH / BK</b>	White / Black

### 14.1 Dryers dimension

14.1.1 ACT VS 3000 - 3750

14.1.2 ACT VS 4000 - 5000

14.1.3 ACT VS 6000 Air-Cooled

14.1.4 ACT VS 6000 Water-Cooled

### 14.2 Exploded views

14.2.1 ACT VS 3000 – 3750 Air-Cooled

14.2.2 ACT VS 3000 – 3750 Water-Cooled

14.2.3 ACT VS 4000 – 5000 Air-Cooled

14.2.4 ACT VS 4000 – 5000 Water-Cooled

14.2.5 ACT VS 6000 Air-Cooled

14.2.6 ACT VS 6000 Water Cooled

### 14.3 Electric diagrams

14.3.1 ACT VS 3000 - 3750

14.3.2 ACT VS 4000

14.3.3 ACT VS 5000

14.3.4 ACT VS 6000





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