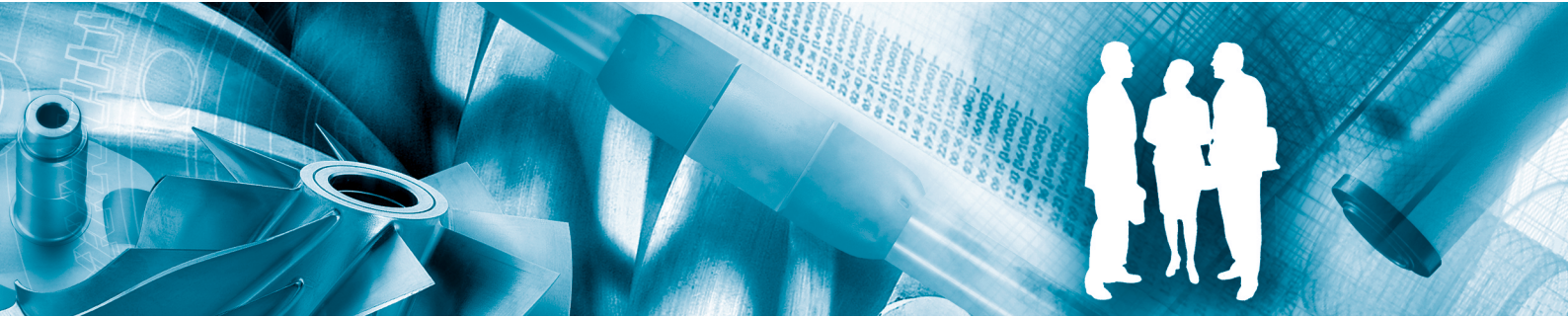


# Atlas Copco

## Refrigerant compressed air dryers



**FD 40, FD 50, FD 60, FD 70, FD 95**

Instruction book



**AERO**

*Atlas Copco*

# Atlas Copco

## Refrigerant compressed air dryers

FD 40, FD 50, FD 60, FD 70, FD 95

### Instruction book

Original instructions

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This applies in particular to trademarks, model denominations, part numbers and drawings.

This instruction book is valid for CE as well as non-CE labelled machines. It meets the requirements for instructions specified by the applicable European directives as identified in the Declaration of Conformity.



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# 1 Safety precautions


## 1.1 Safety icons

### Explanation

	Danger for life
	Warning
	Important note

## 1.2 Safety precautions, general

### General precautions

	All responsibility for any damage or injury resulting from neglecting these precautions, or non-observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.
---	---

1. The dryers are designed for normal indoor use.
2. The operator must employ safe working practices and observe all related work safety requirements and regulations.
3. If any of the following statements does not comply with the applicable legislation, the stricter of the two shall apply.
4. Installation, operation, maintenance and repair work must only be performed by authorized, trained, specialized personnel.
5. The dryer is not considered capable of producing air of breathing quality. To obtain air of breathing quality, the compressed air must be adequately purified according to the applicable legislation and standards.
6. Before any maintenance, repair work, adjustment or any other non-routine checks, stop the dryer, press the emergency stop button, switch off the voltage and depressurize the dryer. In addition, the power isolating switch must be opened and locked.
7. Never play with compressed air. Do not apply the air to your skin or direct an air stream at people. Never use the air to clean dirt from your clothes. When using the air to clean equipment, do so with extreme caution and wear eye protection.
8. The owner is responsible for maintaining the unit in safe operating condition. Parts and accessories shall be replaced if unsuitable for safe operation.
9. It is not allowed to walk or stand on the dryer or its components.

## 1.3 Safety precautions during installation

### Precautions during installation

1. The dryer must only be lifted using suitable equipment and in accordance with the applicable safety regulations. Loose or pivoting parts must be securely fastened before lifting. It is strictly forbidden to dwell or stay in the risk zone under a lifted load. Lifting acceleration and deceleration must be kept within safe limits. Wear a safety helmet when working in the area of overhead or lifting equipment.
2. Place the dryer where the ambient air is as cool and clean as possible. If necessary, install a suction duct. Never obstruct the air inlet. Care must be taken to minimize the entry of moisture at the inlet air.
3. Any blanking flanges, plugs, caps or desiccant bags must be removed before connecting the pipes.
4. Air hoses must be of correct size and suitable for the working pressure. Never use frayed, damaged or worn hoses. Distribution pipes and connections must be of the correct size and suitable for the working pressure.
5. The aspirated air must be free of flammable fumes, vapours and particles, e.g. paint solvents, that can lead to internal fire or explosion.
6. Arrange the air intake so that loose clothing worn by people cannot be sucked in.
7. Ensure that all piping is free to expand under heat and that it is not in contact with or close to flammable materials.
8. No external force may be exerted on the air outlet valve. The connected pipe must be free of strain.
9. If remote control is installed, the machine must bear a clear sign stating "Danger: This machine is remotely controlled and may start without warning".  
The operator has to make sure that the machine is stopped and that the isolating switch is open and locked before any maintenance or repair. As a further safeguard, persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the starting equipment.
10. Air-cooled machines must be installed in such a way that an adequate flow of cooling air is available and that the exhausted cooling air does not recirculate to the inlet.
11. The electrical connections must correspond to the applicable codes. The machines must be earthed and protected against short circuits by fuses in all phases. A lockable power isolating switch must be installed near the equipment.
12. On machines with automatic start-stop system or if the automatic restart function after voltage failure is activated, a sign stating "This machine may start without warning" must be affixed near the instrument panel.
13. Never remove or tamper with the safety devices, guards or insulation fitted on the machine. Every pressure vessel or auxiliary installed outside the machine to contain air above atmospheric pressure must be protected by a pressure-relieving device or devices as required.
14. Piping or other parts with a temperature in excess of 80°C (176°F) and which may be accidentally touched by personnel during normal operation must be guarded or insulated. Other high-temperature piping must be clearly marked.
15. For water-cooled machines, the cooling water system installed outside the machine has to be protected by a safety device with set pressure according to the maximum cooling water inlet pressure.
16. If no safety valve is present in the air net close to the desiccant dryer, safety valves must be installed on the dryer vessels.



Also consult following safety precautions: [Safety precautions during operation](#) and [Safety precautions during maintenance or repair](#).

These precautions apply to machinery processing or consuming air or inert gas. Processing of any other gas requires additional safety precautions typical to the application which are not included herein.

Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

## 1.4 Safety precautions during operation

### Precautions during operation

1. Always be careful when touching any piping or components of the dryer during operation.
2. Use only the correct type and size of hose end fittings and connections. When blowing through a hose or air line, ensure that the open end is held securely. A free end will whip and may cause injury. Make sure that a hose is fully depressurized before disconnecting it.
3. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment.
4. Never operate the machine when there is a possibility of taking in flammable or toxic fumes, vapours or particles.
5. Never operate the machine below or in excess of its limit ratings.
6. Keep all bodywork closed during operation. Bodywork should be opened for short periods only, e.g. to carry out routine checks. Wear ear protectors when removing a panel.
7. People staying in environments or rooms where the sound pressure level reaches or exceeds 90 dB(A) shall wear ear protectors.
8. Periodically check that:
  - All guards are in place and securely fastened
  - All hoses and/or pipes inside the machine are in good condition, secure and not rubbing
  - There are no leaks
  - All fasteners are tight
  - All electrical leads are secure and in good order
  - Safety valves and other pressure-relief devices are not obstructed by dirt or paint
  - Air outlet valve and air net, i.e. pipes, couplings, manifolds, valves, hoses, etc. are in good condition, free of wear or abuse
9. If warm cooling air from dryers is used in air heating systems, e.g. to warm up a working area, take precautions against air pollution and possible contamination of the breathing air.
10. Do not remove any of, or tamper with, the sound-damping material.
11. Never remove or tamper with the safety devices, guards or insulations fitted on the machine. Every pressure vessel or auxiliary installed outside the machine to contain air above atmospheric pressure shall be protected by a pressure-relieving device or devices as required.



Also consult following safety precautions: [Safety precautions during installation](#) and [Safety precautions during maintenance or repair](#).  
These precautions apply to machinery processing or consuming air or inert gas. Processing of any other gas requires additional safety precautions typical to the application which are not included herein.  
Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

## 1.5 Safety precautions during maintenance or repair

### Precautions during maintenance or repair

1. Always use the correct safety equipment (such as safety glasses, gloves, safety shoes, etc.).
2. Use only the correct tools for maintenance and repair work.
3. Use only genuine spare parts.
4. All maintenance work shall only be undertaken when the machine has cooled down.
5. A warning sign bearing a legend such as "Work in progress - do not start" shall be attached to the starting equipment.
6. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote starting equipment.
7. Close the dryer air outlet valve before connecting or disconnecting a pipe.
8. Before removing any pressurized component, effectively isolate the machine from all sources of pressure and relieve the entire system of pressure.
9. Never use flammable solvents or carbon tetrachloride for cleaning parts. Take safety precautions against toxic vapours of cleaning liquids.
10. Scrupulously observe cleanliness during maintenance and repair. Keep dirt away by covering the parts and exposed openings with a clean cloth, paper or tape.
11. Never weld on, or in any way modify, pressure vessels.
12. Whenever there is an indication or any suspicion that an internal part of a machine is overheated, the machine shall be stopped but no inspection covers shall be opened before sufficient cooling time has elapsed; this to avoid the risk of spontaneous ignition of the oil vapor when air is admitted.
13. Never use a light source with open flame for inspecting the interior of a machine, pressure vessel, etc.
14. Make sure that no tools, loose parts or rags are left in or on the machine.
15. All regulating and safety devices shall be maintained with due care to ensure that they function properly. They may not be put out of action.
16. Before clearing the machine for use after maintenance or overhaul, check that operating pressures, temperatures and time settings are correct. Check that all control and shut-down devices are fitted and that they function correctly.
17. Protect the motor, electrical and regulating components, etc. to prevent moisture from entering them, e.g. when steam-cleaning.
18. Make sure that all sound-damping material and vibration dampers, e.g. damping material on the bodywork, is in good condition. If damaged, replace it by genuine material from the manufacturer to prevent the sound pressure level from increasing.
19. Never use caustic solvents which can damage materials of the air net, e.g. polycarbonate bowls.
20. **The following safety precautions are stressed when handling refrigerant:**
  - Never inhale refrigerant vapours. Check that the working area is adequately ventilated; if required, use breathing protection.



- Always wear special gloves. In case of refrigerant contact with the skin, rinse the skin with water. If liquid refrigerant contacts the skin through clothing, never tear off or remove the latter; flush abundantly with fresh water over the clothing until all refrigerant is flushed away; then seek medical first aid.
21. **The following safety precautions are stressed when handling desiccant:**
- Take precautions not to inhale desiccant dust.
  - Check that the working area is adequately ventilated; if required, use breathing protection.
  - Do not overfill the dryer when replacing desiccant.



Also consult following safety precautions: [Safety precautions during installation](#) and [Safety precautions during operation](#).  
These precautions apply to machinery processing or consuming air or inert gas. Processing of any other gas requires additional safety precautions typical to the application which are not included herein.  
Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

## 2 General description

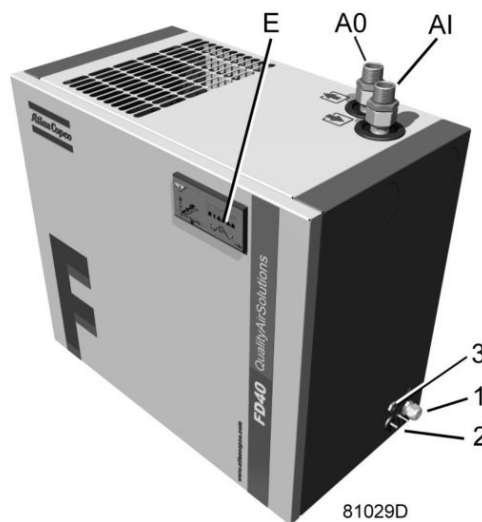
### 2.1 Introduction

#### Introduction

The FD air dryers remove moisture from compressed air by cooling the air to near freezing point. This causes water to condense. The condensate is automatically drained. The air is warmed up before leaving the dryer.

The dryers can be provided with the options as described in section [Available options](#).

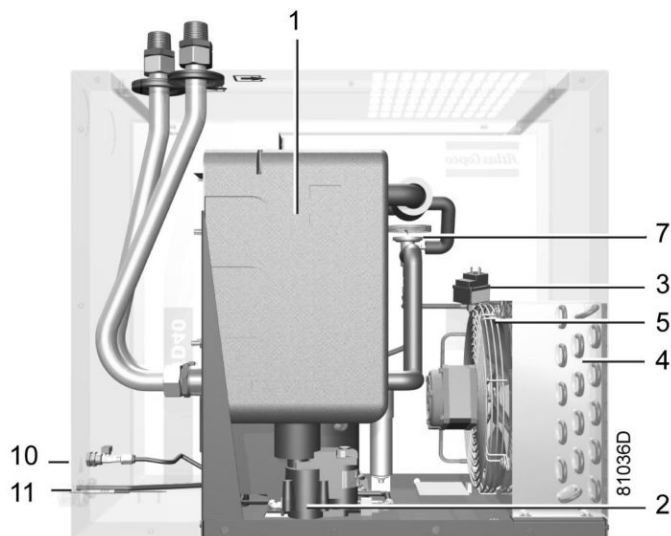
#### General view



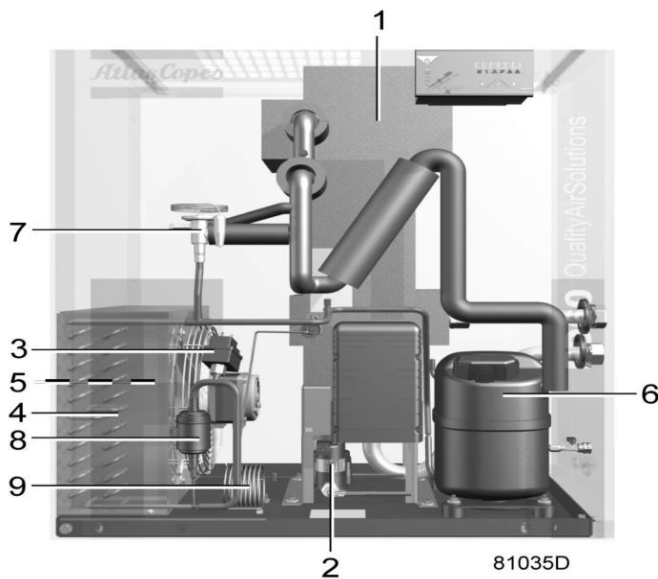
*FD 40 / FD 50 - general view*

Reference	Name
AI	Air inlet
AO	Air outlet
E	Elektronikon® $\alpha$ controller
1	Supply cable
2	Condensate drain
3	Manual drain valve

Side views



FD 40 and FD 50 - back view



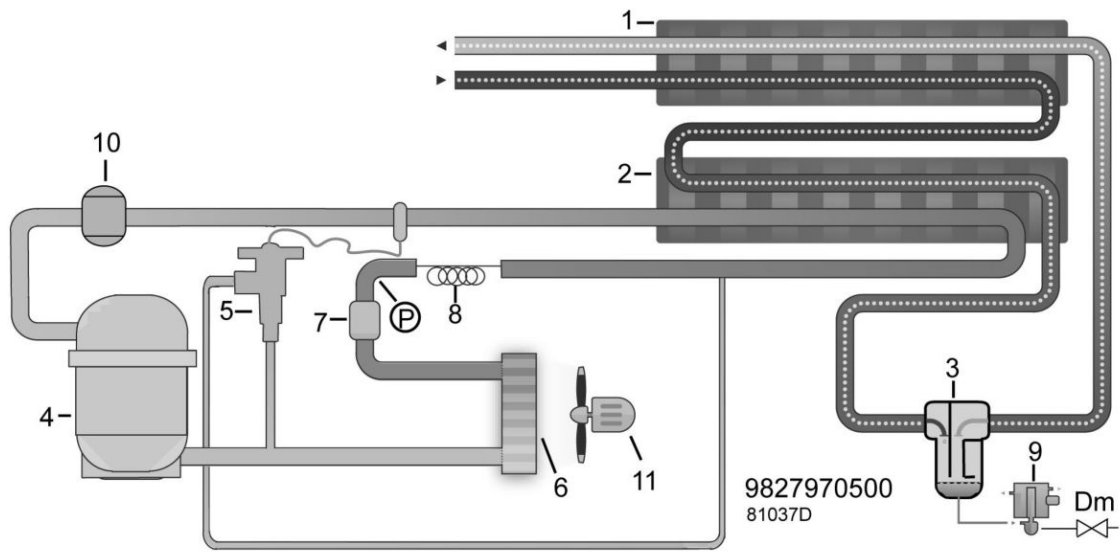
FD 60 up to FD 95 - front view

Reference	Name
1	Insulating block with heat exchangers
2	Electronic condensate drain
3	Pressure switch, fan control
4	Condenser
5	Condenser cooling fan
6	Refrigerant compressor
7	Hot gas bypass valve

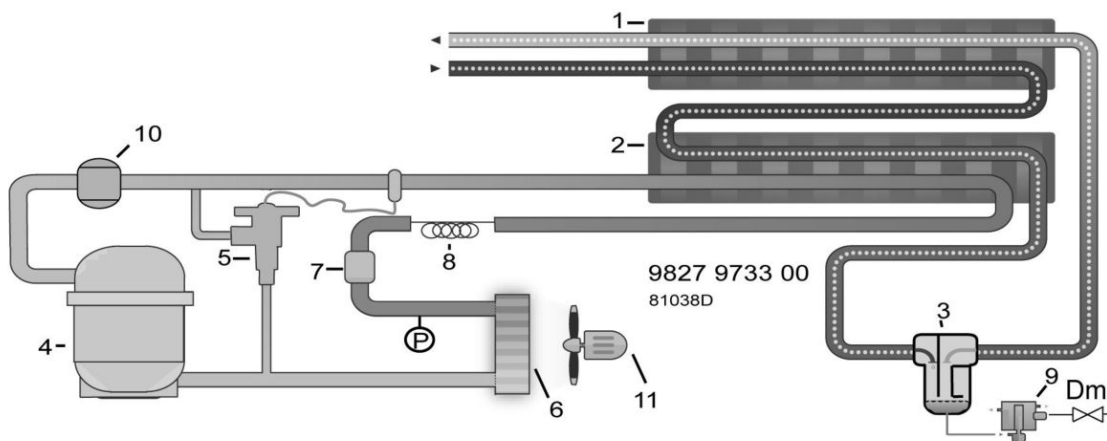
Reference	Name
8	Filter dryer
9	Capillary
10	Manual condensate drain outlet
11	Automatic drain outlet

## 2.2 Air circuit

### Flow diagram



Flow diagram FD 40 and FD 50



Flow diagram FD 60 up to FD 95

## Description

Compressed air enters heat exchanger (1) and is cooled by the outgoing, cold, dried air. Water in the incoming air starts to condense. The air then flows through heat exchanger/evaporator (2) where the refrigerant evaporates, causing the air to be cooled further to close to the evaporating temperature of the refrigerant. More water in the air condenses. The cold air then flows through the water separator (3) where all the condensate is separated from the air.

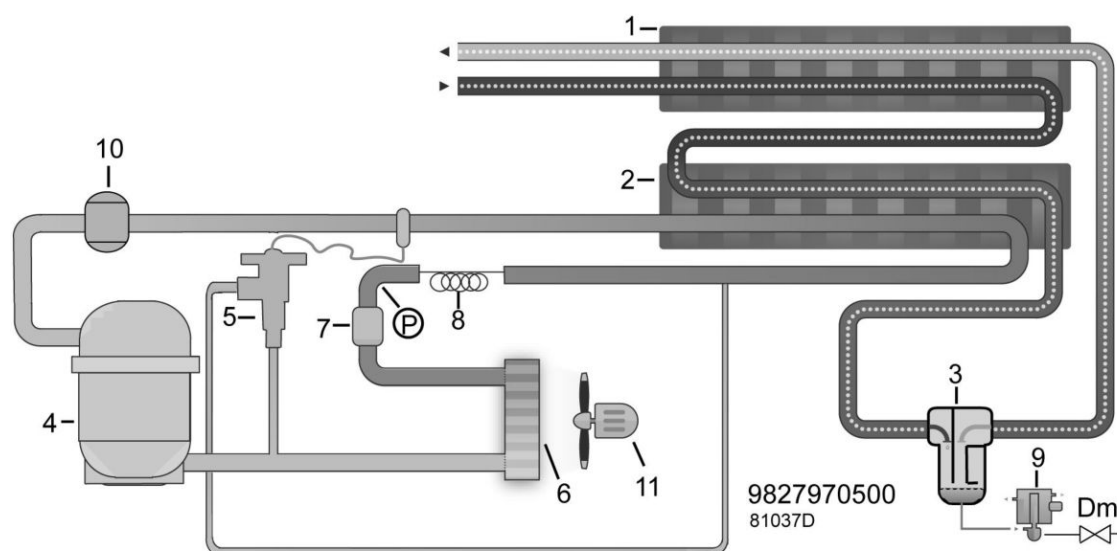
The condensate is automatically drained by electronic condensate drain (9).

The cold, dried air flows through heat exchanger (1) where it is warmed up by the incoming air to approximately 10°C (18°F) below the incoming air temperature.

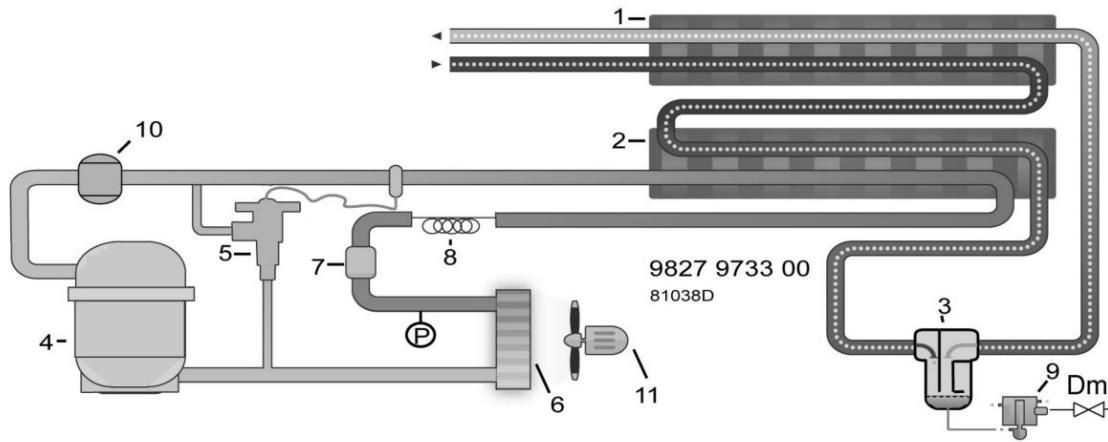
Condensation in the air net cannot occur unless the air is cooled to below the pressure dewpoint, indicated on the screen of the Elektronikon<sup>®</sup>  $\alpha$  regulator.

## 2.3 Refrigeration circuit

### Refrigerant flow diagram



Flow diagram FD 40 up to FD 50



Flow diagram FD 60 up to FD 95

**Description**

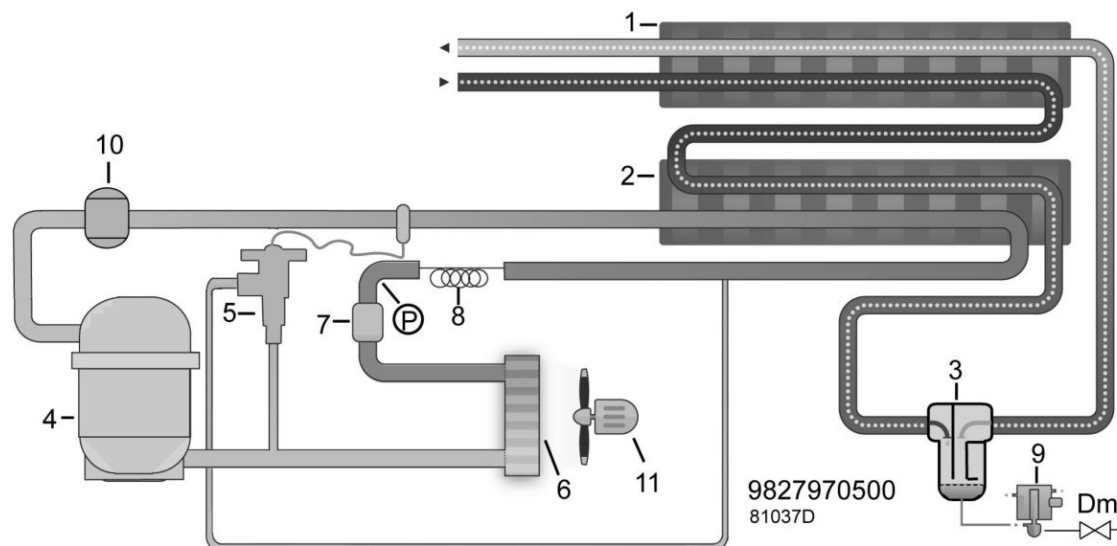
Compressor (4) delivers hot, high-pressure refrigerant gas which flows through condenser (6) where most of the refrigerant condenses.

The liquid flows through liquid refrigerant dryer/filter (7) to capillary tube (8). The refrigerant leaves the capillary tube at evaporating pressure.

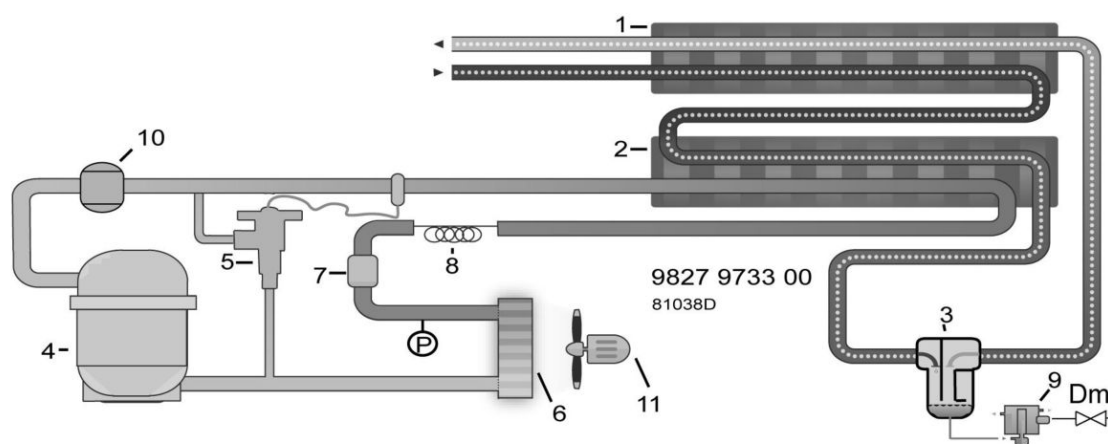
The refrigerant enters evaporator (2) where it withdraws heat from the compressed air by further evaporation at constant pressure. The heated refrigerant leaves the evaporator and is sucked in by the compressor. Before the compressor there is a liquid separator (10) which protects the compressor against liquid knock.

## 2.4 Automatic regulation system

### Air and refrigerant flow diagram



Flow diagram FD 40 up to FD 50



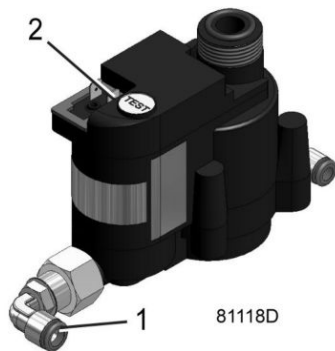
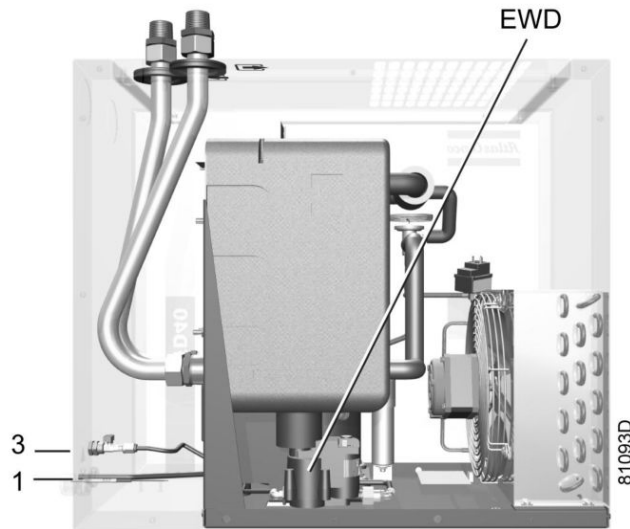
Flow diagram FD 60 up to FD 95

### Description

The condenser (6) pressure must be kept as constant as possible to obtain stable operation. Fan control switch (P) therefore stops and starts the condenser cooling fan (11).

If, under partial or no load, the evaporator (2) pressure drops to 2.25 bar(e) (32.63 psig), the hot gas bypass valve (5) opens and hot, high-pressure gas is fed to the evaporator circuit to prevent the evaporator pressure from dropping any further.

## 2.5 Condensate drain system



The dryers are equipped with an electronic condensate drain (EWD). The condensate from the condensate trap accumulates in a collector. When the condensate reaches a certain level, it is discharged through the drain outlet (1).

The condensate can also be drained by pressing the test button (2).

The drain filter can be cleaned by opening the manual drain valve, see section [Maintenance instructions](#).

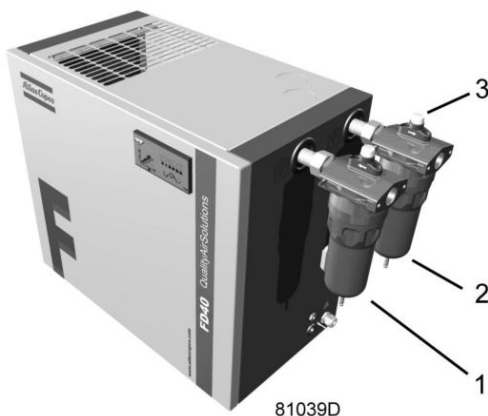
## 2.6 Available options

Following options are available :

### Filter option

*FD 40 and FD 50:* This option comprises a DD filter, mounted at the dryer inlet and a PD filter, mounted at the dryer outlet. Both filters are equipped with a pressure drop indicator.





FD 40 with optional filters

FD 60 up to FD 95: This option comprises a DD filter, mounted at the dryer inlet and a PD filter, mounted at the dryer outlet. Both filters are integrated in the dryer volume. Both filters are equipped with a pressure drop indicator, which is visible through the top panel grating. Dryer inlet and outlet connections are on top of the unit allowing easy installation against the wall.



FD 95 with integrated filters option

Reference	Description
1	DD filter at dryer inlet
2	PD filter at dryer outlet
3	Pressure drop indicator

**20 bar version**

FD 40 and FD 50 can be supplied in a special version, capable to work at compressed air inlet pressures up to 20 bar(e) (290 psi(g)). See [Air dryer data](#) for technical data.

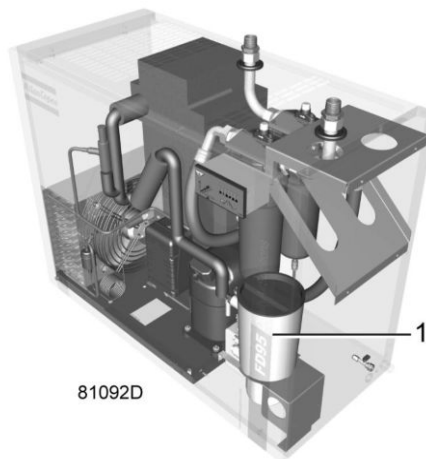
## Dryer inlet and outlet connections on top

FD 60 up to FD 95 can be supplied with the dryer inlet (1) and dryer outlet (2) connections on top (for standard dryers only). Inlet and outlet connections on top allows easy installation of the dryer against the wall.



## OSD option (In combination with filter option only)

*FD 60 up to FD 95:* When the dryer is used after an oil injected compressor, oil containing condensate is leaving the drain system. OSD (1) are designed to separate the major part of this oil from the condensate and to collect the oil in a collector. The condensate drained through OSD meets the requirements of the environmental codes (oil content <10 mg/l).



## Control panel with IP 54 protection

This option comprises a cover, protecting the Elektronikon  $\alpha$  regulator from dust and water splashing against the enclosure from any direction.



The dryer is not designed for outdoor installation!

## 2.7 Electrical system

### Description

FD dryers are single-phase electrical units. See [Electrical diagrams](#).

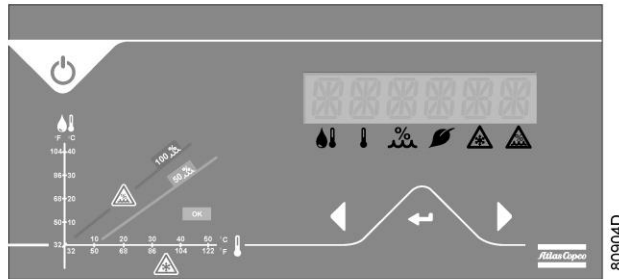
Fan control switch (P) starts fan motor (M2) as soon as the condenser pressure reaches the upper set point of the switch and will stop the fan motor when the condenser pressure decreases to its lower set point.

The compressor motor has a built-in thermic protection. If the compressor motor stops without apparent reason, it will probably be the thermal protection which has tripped. In such a case, the compressor will restart when the motor windings have cooled down, which may take up to 2 hours.

### 3 Elektronikon® $\alpha$ regulator

#### 3.1 Elektronikon® $\alpha$ regulator

##### Control panel



##### General description

The Elektronikon®  $\alpha$  regulator automatically controls the dryer, i.e.:

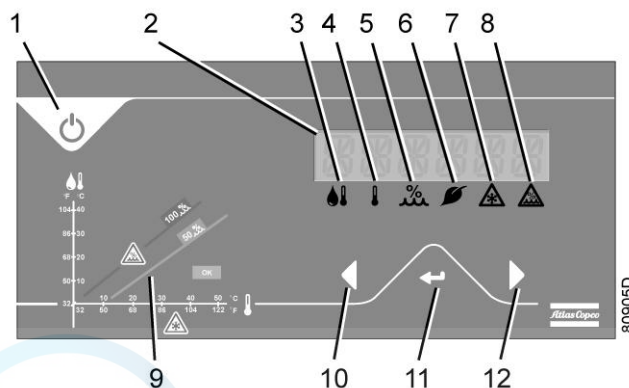
- It switches the dryer on and off in order to save energy (Energy Efficient Mode)
- It monitors the dewpoint temperature to ensure safe operation
- It switches the dryer off in case of risk for freezing
- It controls an alarm to notify a high relative humidity

In order to control the dryer and to read and modify programmable parameters, the regulator has a control panel provided with:

- 4 pictographs to indicate what is shown on the display
- 2 alarm pictographs that become alight when critical values are reached
- 2 keys to go through the menu of the regulator
- a key to enter a menu or to validate values
- a button to manually start and stop the dryer

#### 3.2 Control panel layout

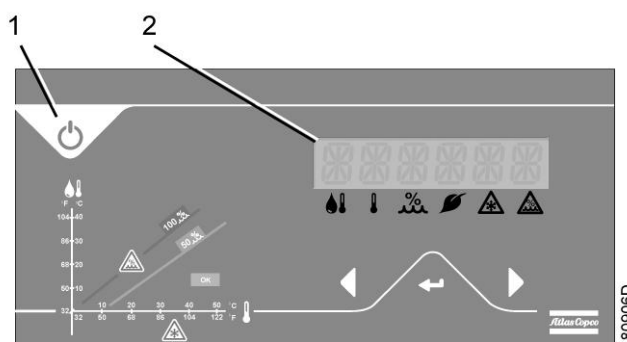
##### Control panel



Ref	Name	Function
1	Start/Stop button	Push button to start and stop the dryer
2	Display	Indicates the dryer operating condition, actually measured values and programmed parameters
3	Pictograph	Dewpoint temperature (measured)
4	Pictograph	Ambient temperature (measured)
5	Pictograph	Relative humidity (calculated, based on ambient air temperature and dewpoint temperature)
6	Pictograph	Energy efficient mode
7	Pictograph	Freezing alarm
8	Pictograph	High relative humidity alarm
9	Function chart	Shows the relation between relative humidity, dewpoint temperature and ambient temperature
10	Left scroll key	Key to scroll leftwards through the menu or to decrease values
11	Enter key	Key to select or validate a parameter
12	Right scroll key	Key to scroll rightwards through the menu or to increase values

### 3.3 Starting and stopping the dryer

#### Control panel



#### Procedure

When the voltage is switched on, text [www.atlascopco.com](http://www.atlascopco.com) is rolling on the display (2). When pushing the ON/OFF button (1), the following will occur:

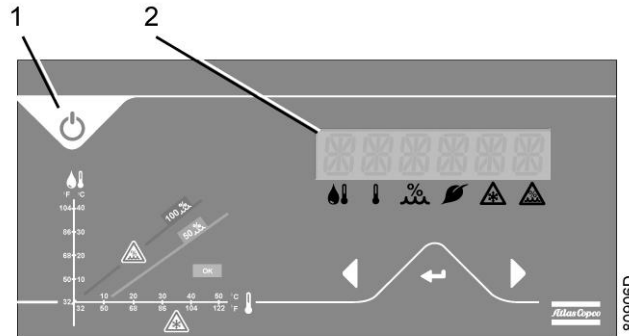
- The dryer starts
- The display of the Elektronikon®  $\alpha$  regulator becomes active, see next section



When an external power failure occurs, the dryer will automatically return to its original working condition, i.e. the condition from before the power failure.

### 3.4 Screen

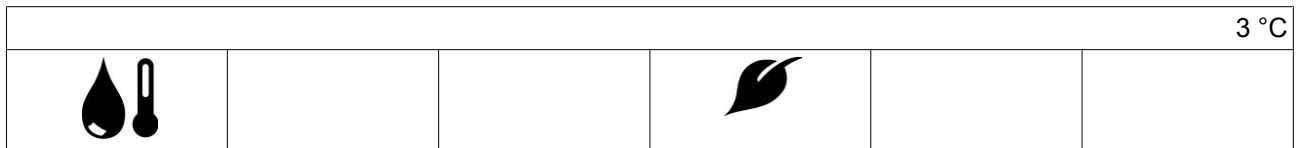
#### Control panel



Normally the screen shows:

- The dewpoint temperature on the display (2)
- The dryer status by means of pictographs underneath the display

Typical screen example:



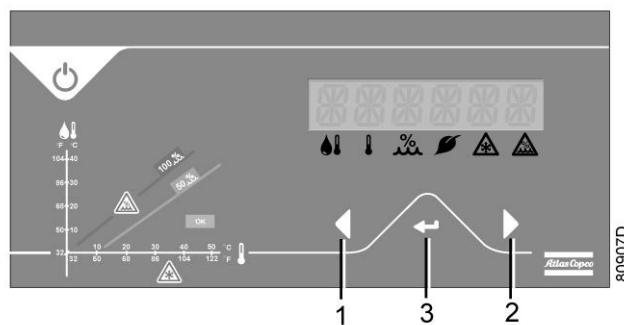
Explanation:

- The dewpoint temperature is shown on the display (3°C)
- The Energy Efficient Mode is active. See section [Modifying dryer regulation mode](#) to change.

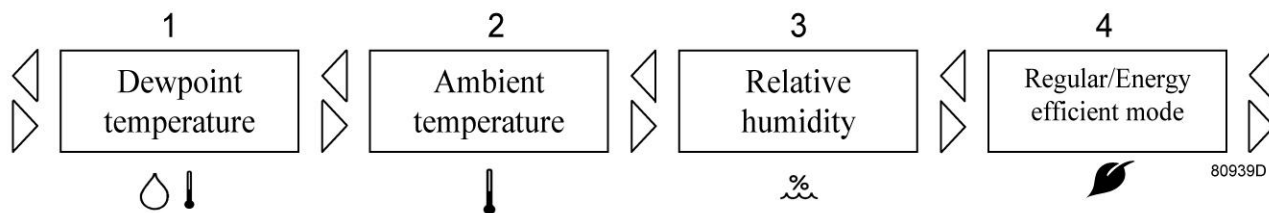
The display can also show all measured and programmed parameters, see section [Scrolling through all screens](#).

### 3.5 Scrolling through all screens

#### Control panel



The scrolling keys 1 and 2 can be used to select four different items:



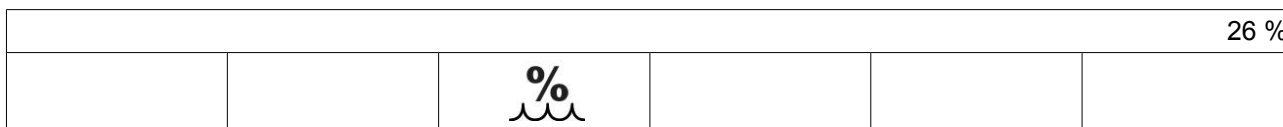
Reference	Designation
1	Pictograph for dewpoint temperature
2	Pictograph for ambient temperature
3	Pictograph for relative humidity
4	Pictograph for indication of regular operation mode or energy efficient mode

When selecting one of the first three items, the corresponding actual value is shown on the display. See section [Modifying dewpoint/ambient temperature unit](#) to change between °C and °F.

When selecting the fourth item, the working mode status of the regulator is shown on the display. ‘ON’ means that the dryer is working in an Energy Efficient Mode, ‘OFF’ means that Energy Efficient Mode is not selected and dryer is working in Regular Mode. See section [Modifying dryer operation mode](#) to change.

Examples of typical conditions:

- The third pictograph is selected. The relative humidity is shown on the display, for which the actual value is 26%. The Energy Efficient Mode is not activated.



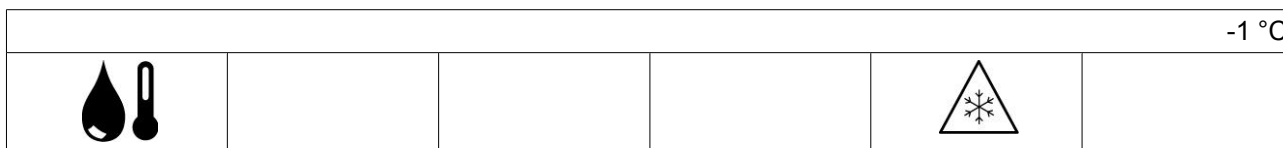
- The fourth pictograph is selected. The display shows that dryer is working in Energy Efficient Mode.



### 3.6 Alarm indicators

There are two pictographs to indicate an alarm situation:

- Freezing alarm indicator  
If the dewpoint (LAT) reaches a value below 0,3 °C (32.54 °F) during more than one minute, following information will appear:



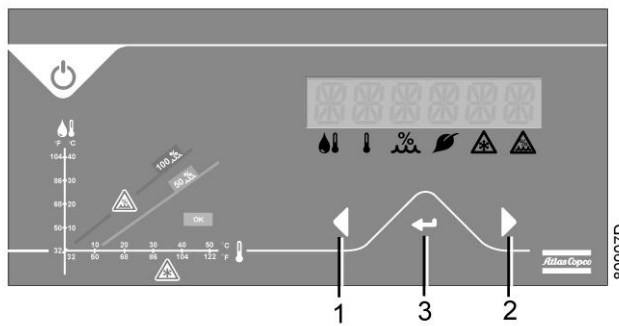
- The freezing alarm indicator pictograph will light up
- The dewpoint temperature value will flash on the display

- The dryer will switch off
  - The voltage free contact will switch (can be used as an external alarm)
- The dryer will restart automatically as soon as the LAT is again above 0.3 °C (32.54 °F).
2. High relative humidity alarm indicator
- When a relative humidity value of more than 50% (for a dewpoint temperature above 10°C (50 °F)) is measured during more than one minute, the following will occur:

					56 %
		%			

- The high relative humidity alarm indicator pictograph will light up
- The relative humidity value will flash on the display
- The voltage free contact will switch (can be used for an external alarm)

**Alarm reset:**

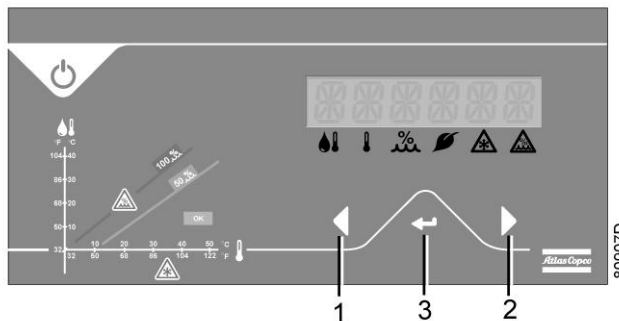


*Control panel*

After an alarm situation the regulator can be reset by pushing the left (1) and right scroll key (2) simultaneously.

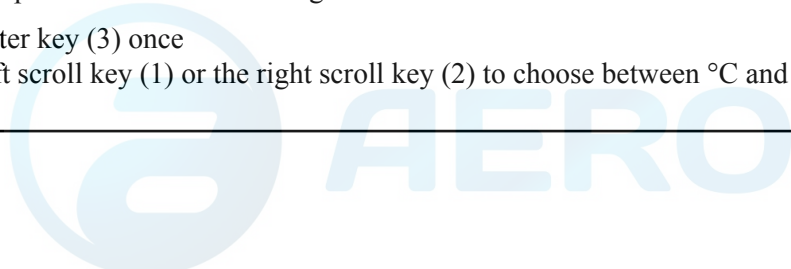
### 3.7 Modifying the temperature unit

**Control panel**



When selecting the dewpoint temperature or the ambient temperature (see section [Scrolling through all screens](#)), the temperature unit can be changed as follows:

- Press the enter key (3) once
- Press the left scroll key (1) or the right scroll key (2) to choose between °C and °F





- Press the enter key (3) again to confirm the selection

## 3.8 Modifying ambient temperature offset

### Description

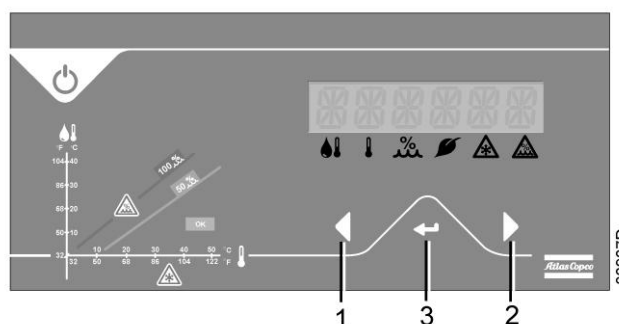
Standard relative humidity calculation is based on measured dewpoint (LAT) and ambient temperature. The air temperature at the outlet of the dryer can however exceed the ambient temperature with some degrees. This has a positive impact on the real relative humidity of the air. To take this into account, a positive offset can be added to the ambient temperature.

$$T_{\text{dryer outlet}} = T_{\text{ambient}} + T_{\text{offset}}$$

**Remark:** The calculation used for the high relative humidity alarm indicator (see section [Scrolling through all screens](#)) is independent of this offset value and is always based on ambient temperature, which is the most severe condition.

The standard offset value is 0 °C (0 °F).

### Control panel



When selecting the relative humidity item (see section [Scrolling through all screens](#)), the value of ambient temperature offset can be changed as follows:

- Press the enter key (3) once
- Press the left scroll key (1) or the right scroll key (2) to change the offset value (negative values are not allowed)
- Press the enter key (3) again to confirm the selection

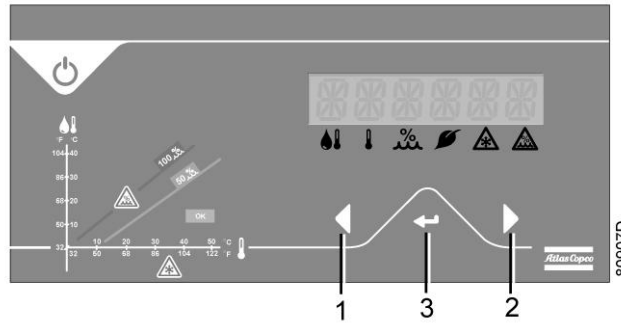
## 3.9 Modifying the dryer regulation mode

### Description

The dryer has two regulation modes:

- Regular Mode.  
The dryer regulates to a fixed dewpoint
- Energy Efficient Mode  
The dryer regulates the dewpoint between best achievable dewpoint and safe dewpoint.

## Control panel



When selecting the Regular/Energy Efficient Mode item (see section [Scrolling through all screens](#)), the dryer regulation mode can be changed as follows:

- Press the enter key (3) once
- Press the left scroll key (1) or the right scroll key (2) to choose between ‘ON’ and ‘OFF’
- Press the enter key (3) again to confirm the selection

### 3.10 Error messages

In case of an error of the temperature sensors, one or two pictographs may start flickering:

1. If the dewpoint temperature pictograph is blinking, the sensor for dewpoint temperature measurement is missing or not well connected:

.					

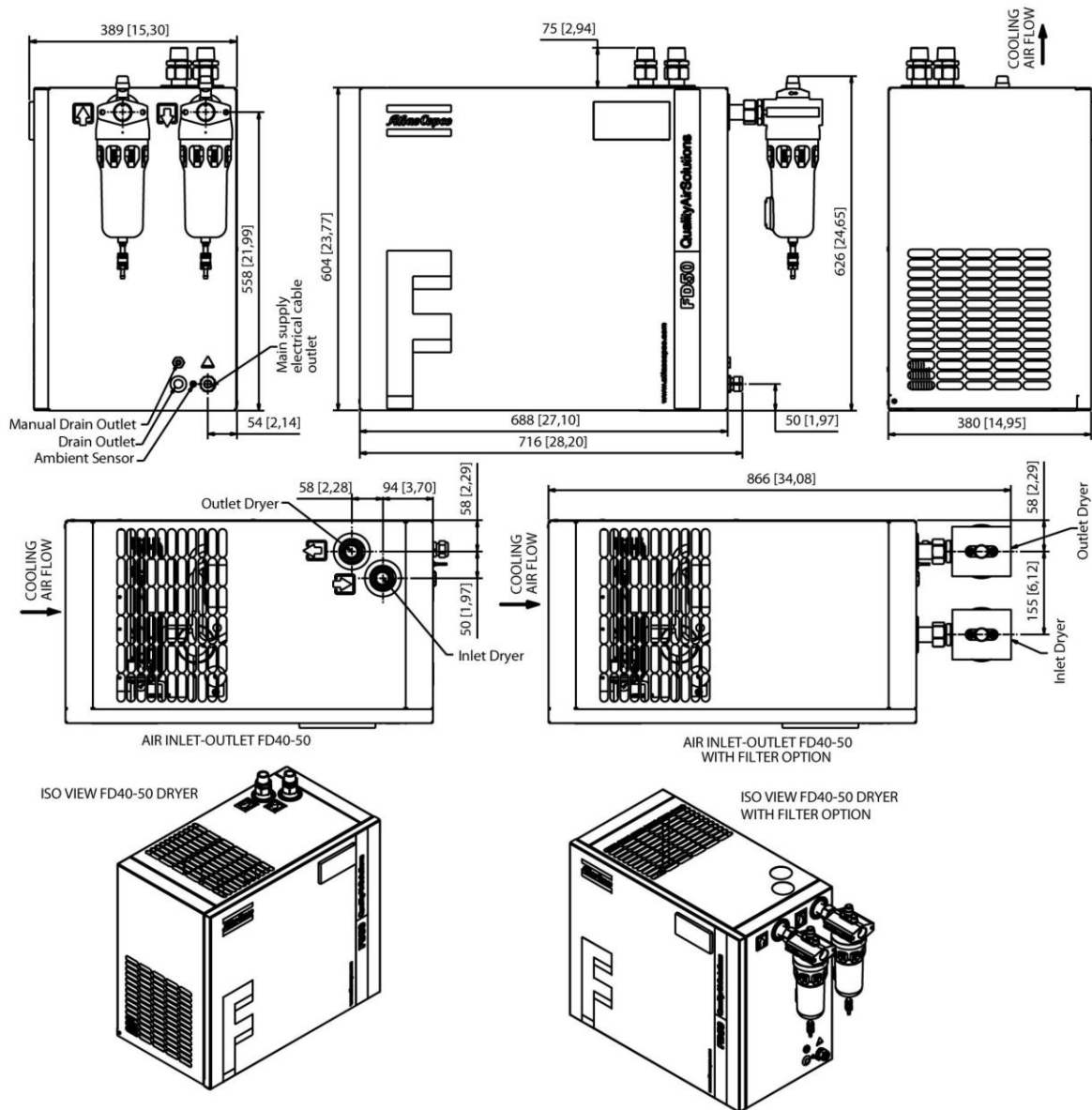
2. If the ambient temperature pictograph is blinking, the sensor for ambient measurement is missing or not well connected:

.					

## 4 Installation

### 4.1 Dimension drawings

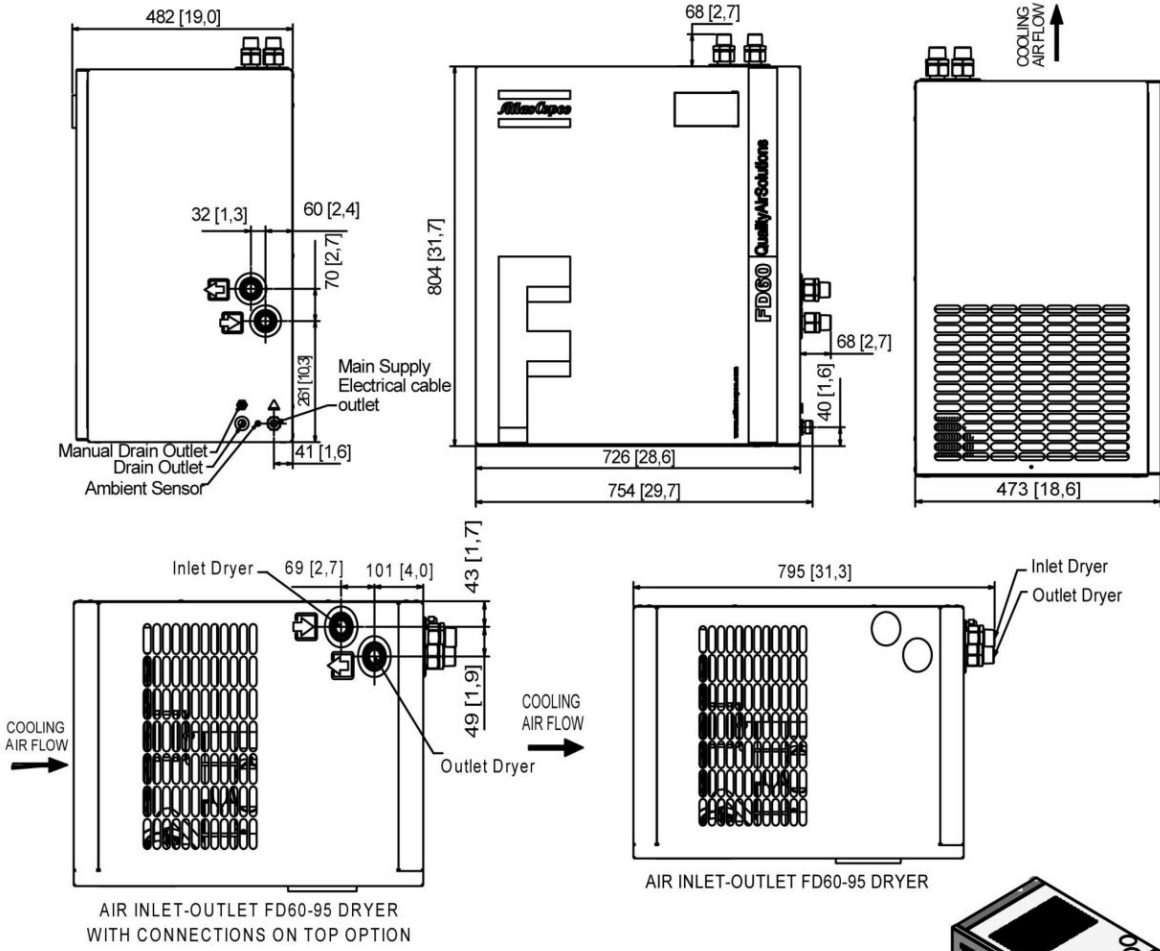
#### FD 40 and FD 50



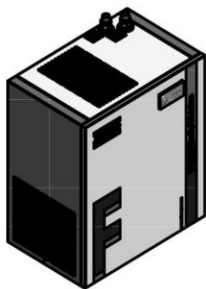
Type dryer	Air Connection for 50hz dryer		Air Connection for 60hz dryer		Weight:
	without filters: (male thread)	with filters: (female thread)	without filters: (male thread)	with filters: (female thread)	
FD40	ISO7 - R1"	G1"	NPT 1"	NPT 1"	56.5kg (124.6 lb)
FD50	ISO7 - R1"	G1"	NPT 1"	NPT 1"	57.5kg (126.8 lb)

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81032D

FD 60 up to FD 95



ISO VIEW FD60-95 DRYER WITH CONNECTION ON TOP OPTION



9827 9729 00 - 01 -00  
81033D

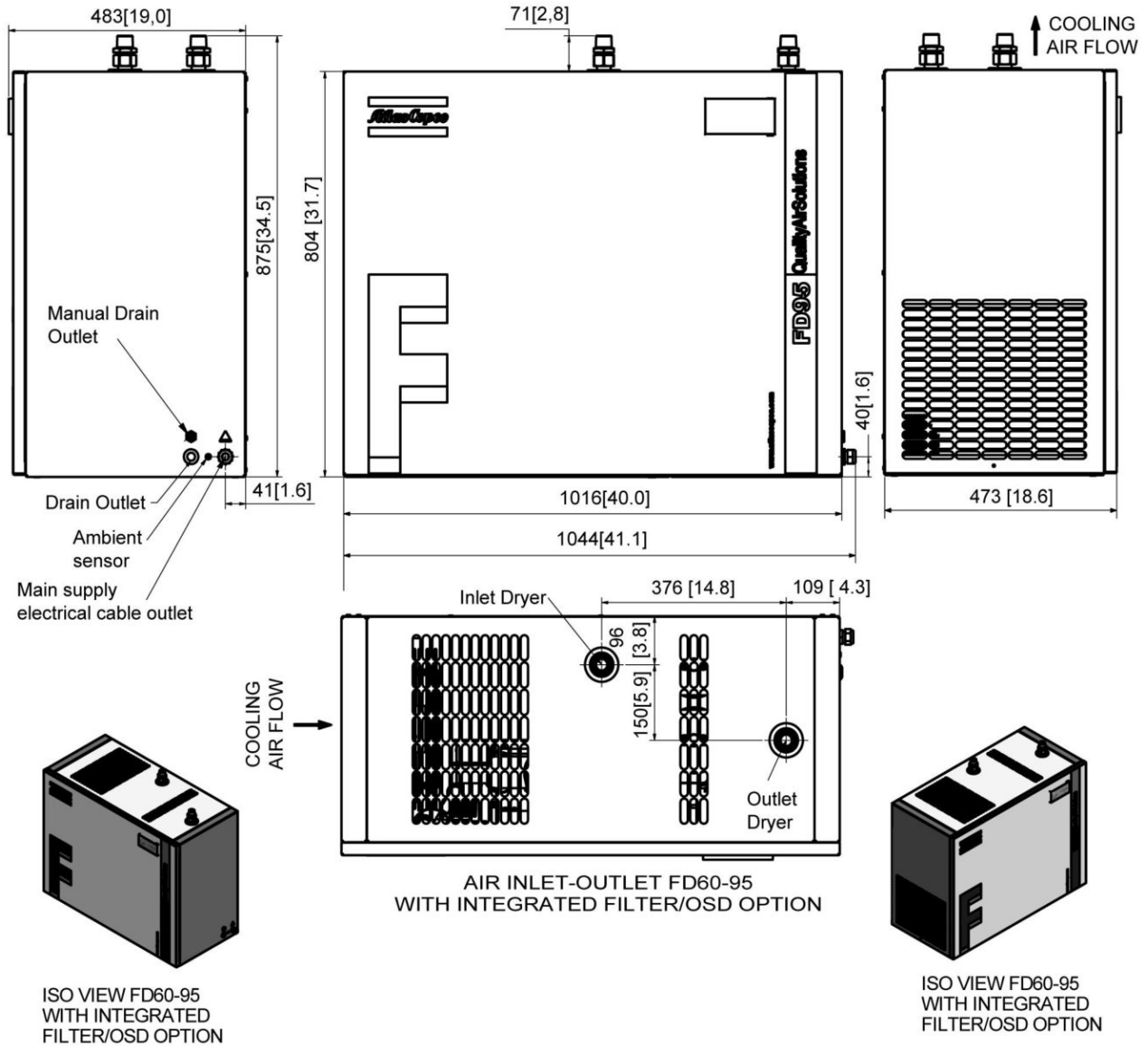


ISO VIEW FD60-95 DRYER

Type dryer	Air Connection for 50hz dryer		Air Connection for 60hz dryer		Weight:
	on side: (male thread)	at top: (male thread)	on side: (male thread)	at top: (male thread)	
FD60	ISO7 - R1"	ISO7 - R1"	NPT 1"	NPT 1"	79.6kg (175.5lb)
FD70	ISO7 - R1"	ISO7 - R1"	NPT 1"	NPT 1"	80.6kg (177.7lb)
FD95	ISO7 - R1"	ISO7 - R1"	NPT 1"	NPT 1"	87.2kg (192.2lb)

Dimension drawing of standard FD65 and FD95





Type dryer	Air Connection for 50hz dryer	Air Connection for 60hz dryer	Weight:
	with integrated filter/OSD option: (male thread)	with integrated filter/OSD option: (male thread)	
FD60	ISO7 - R1"	NPT 1"	110.4g (243.4lb)
FD70	ISO7 - R1"	NPT 1"	111.4kg (245.6lb)
FD95	ISO7 - R1"	NPT 1"	118kg (260.1lb)

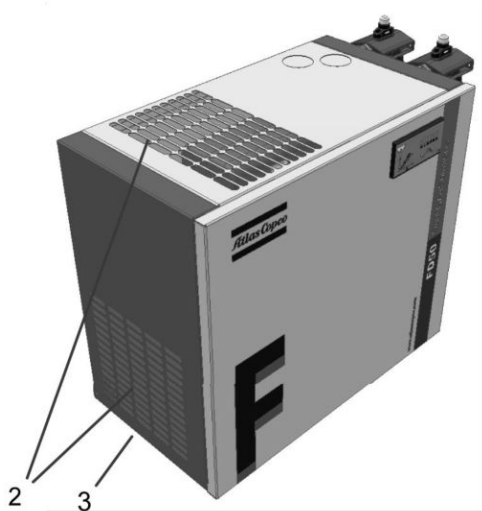
81034D

9827 9729 00 - 02 - 00

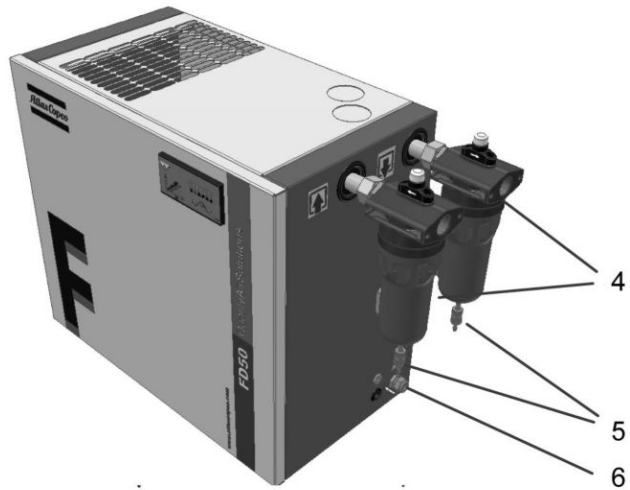
Dimension drawing of FD60 up to FD95 with integrated filter option (and OSD)

## 4.2 Installation proposal

### FD 40 and FD 50

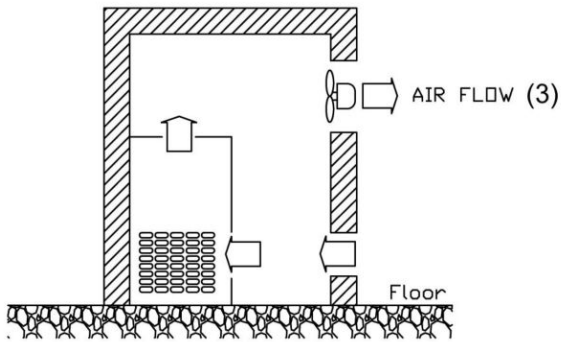


Dryer without filter (1)



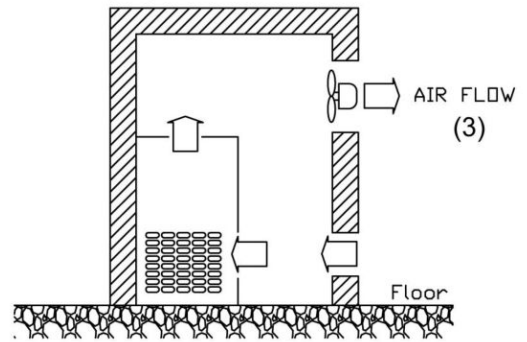
Dryer with filters (2)

Ventilation proposal

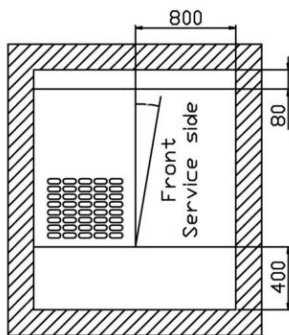


Minimum free area to be reserved for the dryer installation (4)

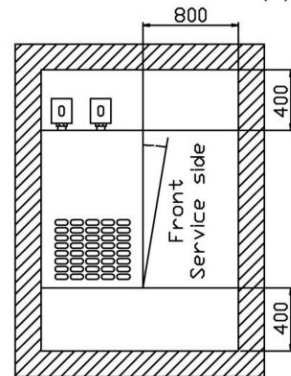
Ventilation proposal



Minimum free area to be reserved for the dryer installation (4)

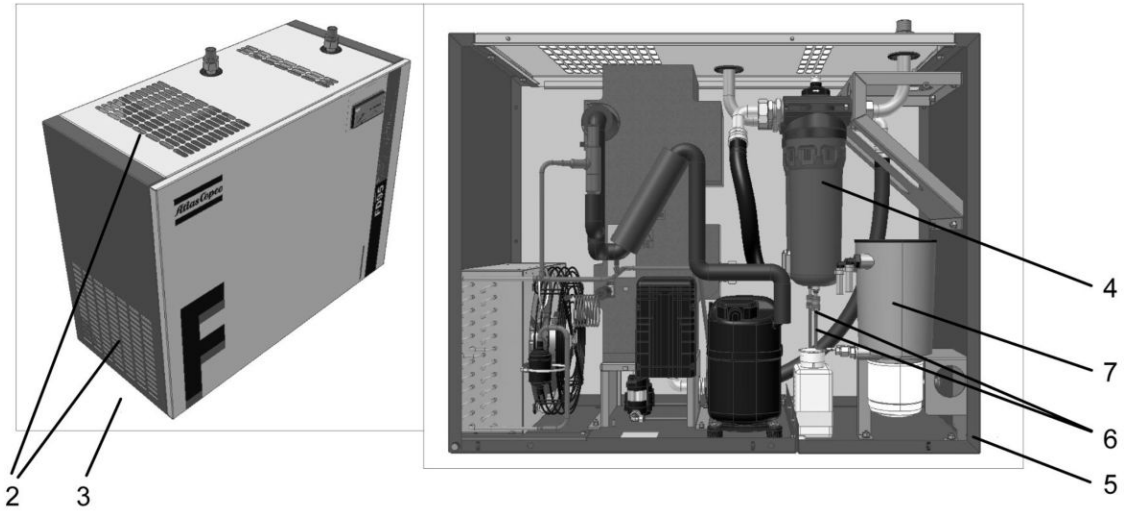


9827 9796 00 - 01



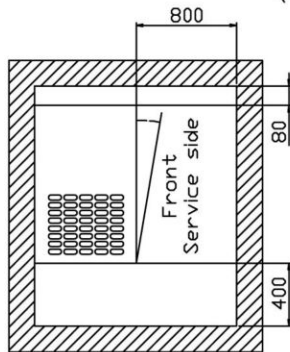
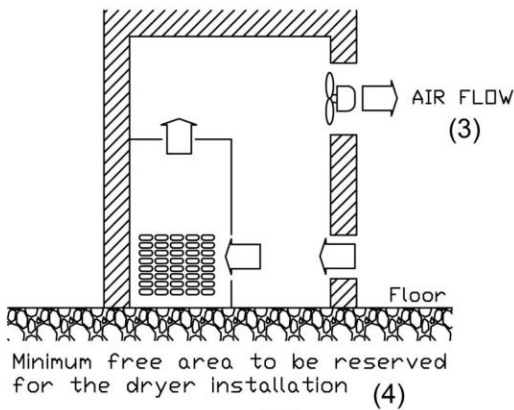
81030D

FD 60 up to FD 95

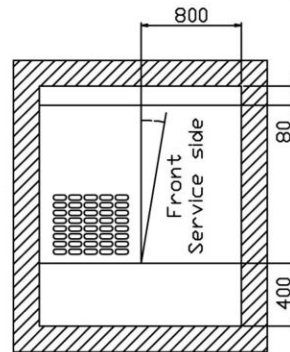
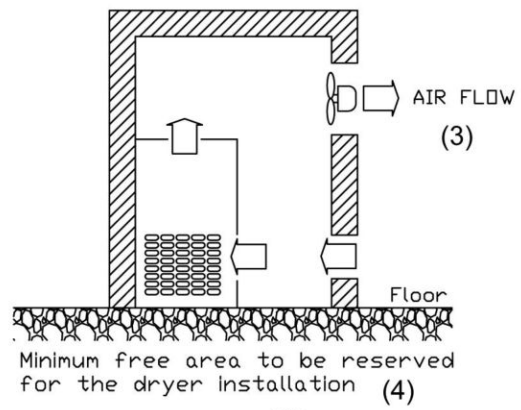


Dryer without filters/OSD (1)    Dryer with filters/OSD (2)

Ventilation proposal




Ventilation proposal



9827 9797 00 - 01 - 00  
81031D

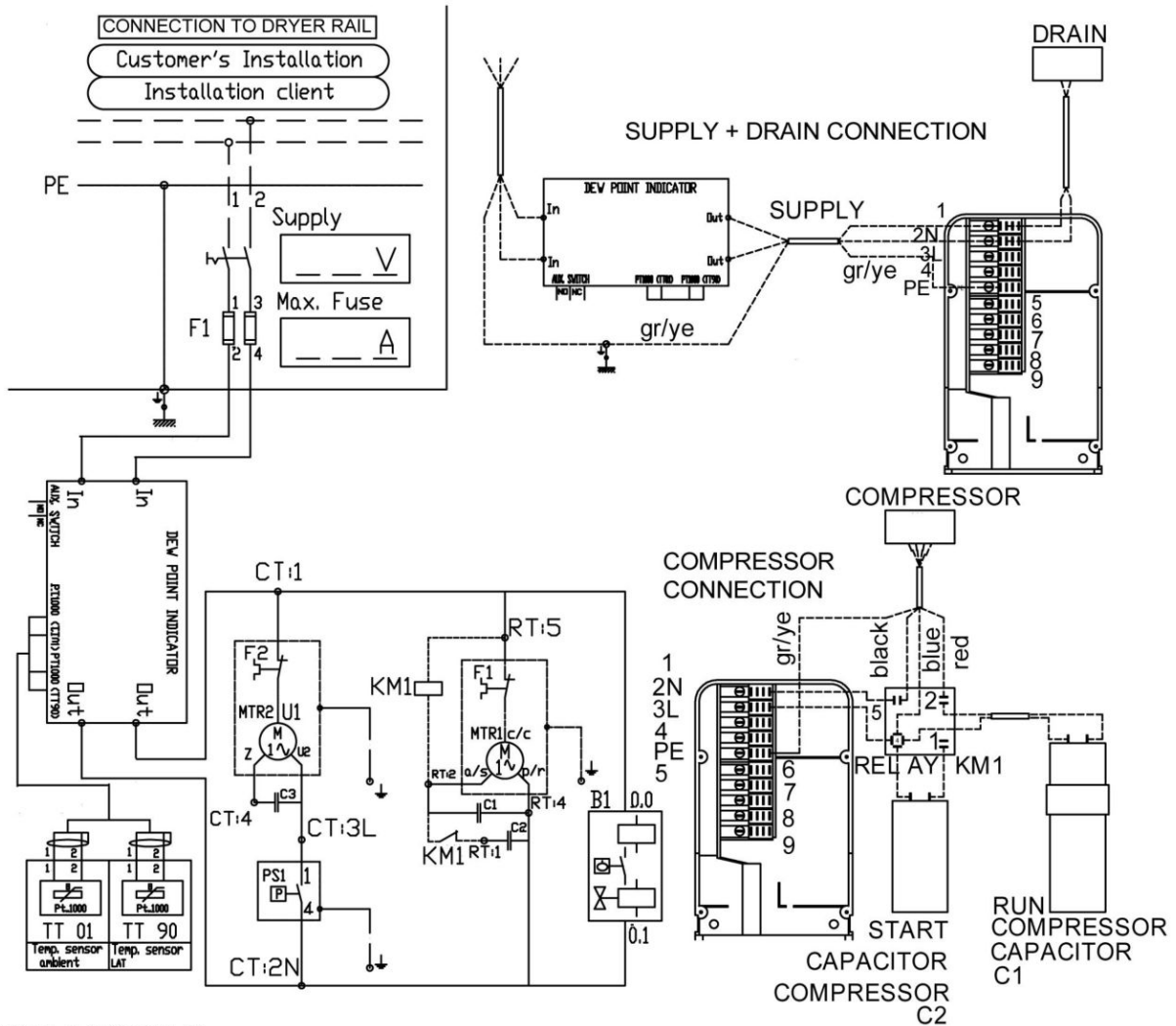
References to text on the drawing	Description
(1)	Ventilation proposal for dryer without optional filters
(2)	Ventilation proposal for dryer with optional filters
(3)	Air flow
(4)	Minimum free area to be reserved for the dryer installation

Instructions	
1	It is recommended to install bypass pipes over the dryer with ball valves to isolate the dryer during service operations without disturbing the compressed air delivery.
2	<p>Ventilation:                      The inlet grid(s) and ventilation fan should be installed in such way that any recirculation of the cooling air to the inlet gratings of the dryer is avoided.                      The air velocity to the grid(s) must to be limited to 5 m/s.                      Maximum allowable pressure drop over the cooling air ducts is 30 Pa (0.12 in WC).                      If 30 Pa is exceeded, a ventilation fan is required at the outlet of the cooling air ducts.</p>
3	Install the dryer on a level floor, suitable for taking the weight of the dryer.
4	<p>Filter type DD for general purpose filtration at the inlet of the dryer (particle removal down to 1 micron with a maximum of oil carry-over of 0.5 ppm) and high efficiency PD filter at the dryer outlet (particle removal down to 0.01 micron, maximum of oil carry-over 0.01 ppm).                      If applicable, a QD active carbon filter can be installed downstream of the PD filter to remove undesired oil vapours and odours.                      The standard dryers FD 40 up to FD 95 are supplied without filters.</p>
5	Power supply cable to be sized and installed by a qualified electrician. Fuses: see section <a href="#">Fuse settings</a> .
6	<p>The condensate drain pipes from the dryer to the collection point must not become submerged in the collected condensate.                      If the condensate contains oil, do not allow untreated condensate to enter the sewer.</p>
7	<p>As an option an integrated OSD can be added to separate the oil from the water that is coming from the drain of the dryer.                      The standard dryers FD 60 up to FD 95 are delivered without OSD.</p>

	<ul style="list-style-type: none"> <li>• All pipes to be installed stress-free to the dryer. Do not use the dryer as support for external pipes.</li> <li>• Avoid installation of the dryer in corrosive atmosphere.</li> <li>• The dryer is not designed for outdoor use.</li> </ul>
---	---



### 4.3 Electrical diagrams



DRYER / SECHEUR A1:

- MTR1: compressor motor  
moteur du compresseur
- F1: compressor overload  
thermique du compresseur
- F2: fan overload  
thermique du ventilateur  
du compresseur
- C1: compressor run capacitor  
condensateur de déroulement  
du compresseur

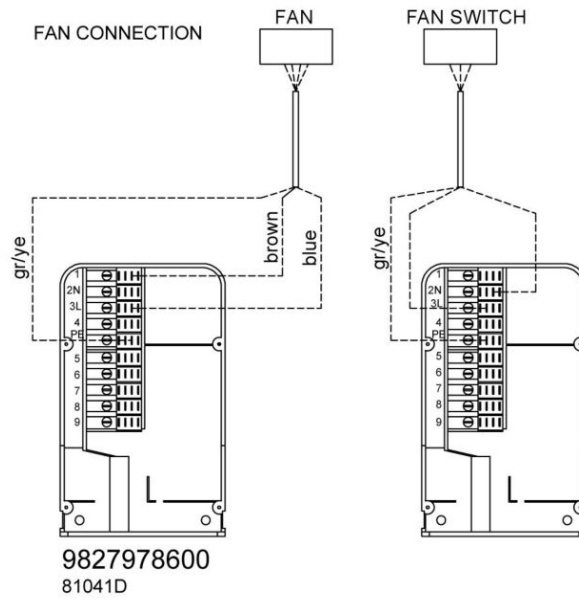
- C2: compressor start capacitor  
condensateur de démarrage  
du compresseur
- C3: fan run capacitor  
condensateur de déroulement  
du ventilateur
- KM1: relay  
relais
- MTR2: fan motor (condensor)  
moteur du ventilateur  
(condenseur)

- PS1: pressure switch condensor fan  
interrupteur de pression  
(ventilateur du condenseur)
- CT: compressor terminal  
boîte terminaux du compresseur
- RT: relay terminal KM1  
boîte terminaux du relais KM1
- B1: electronic water drain  
séparateur d'eau électronique

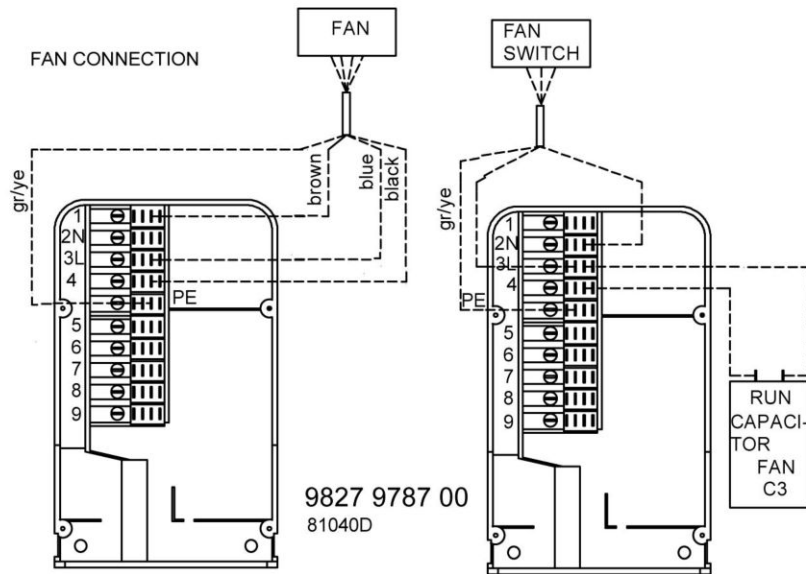
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81044D

Service diagram of FD 40 and FD 50

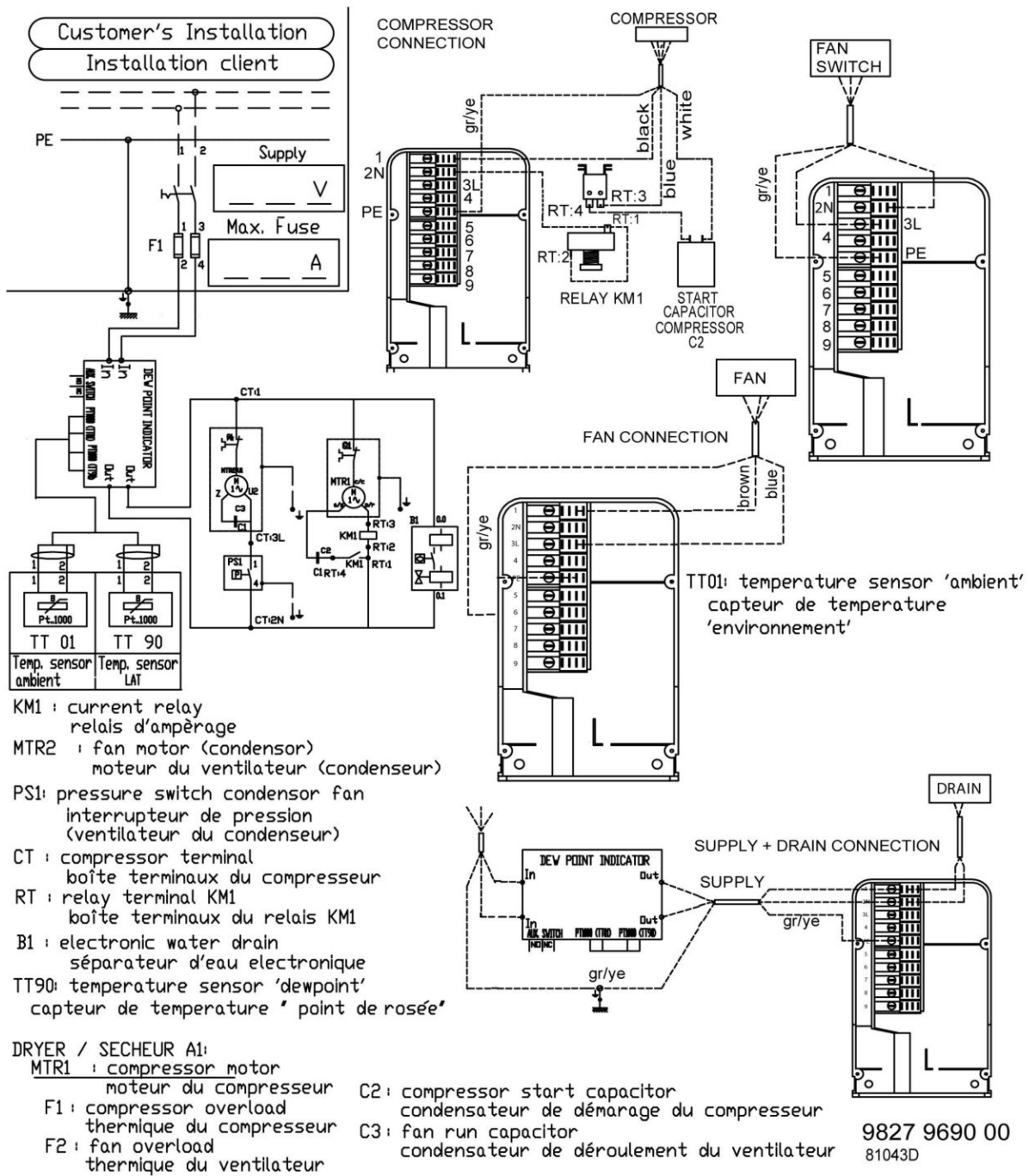




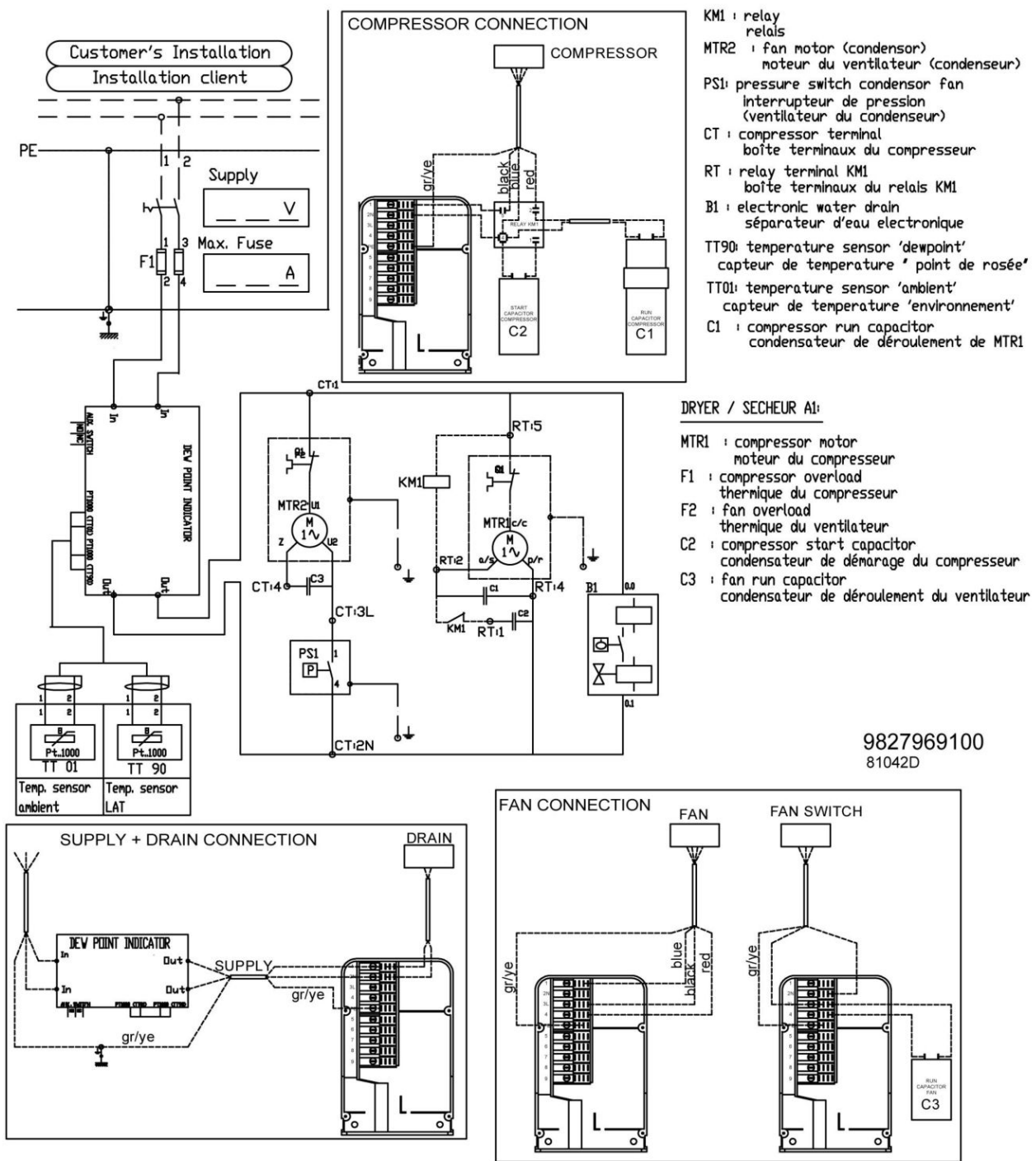
Service diagram of FD 40



Service diagram of FD 50



Service diagram FD 60 up to FD 70



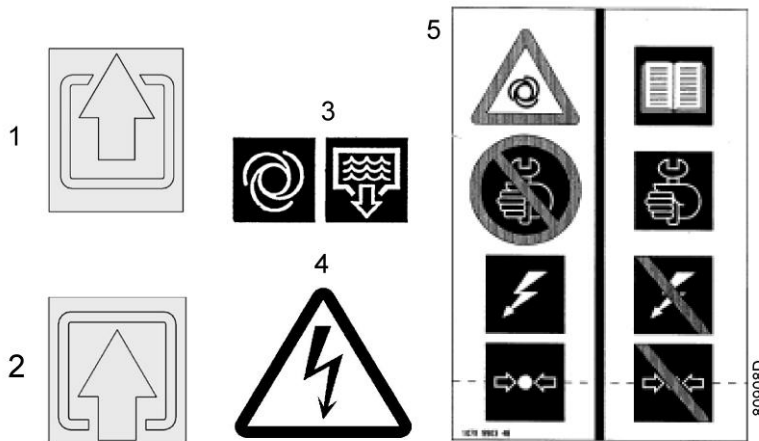
9827969100  
81042D

Service diagram FD 95



## 4.4 Pictographs

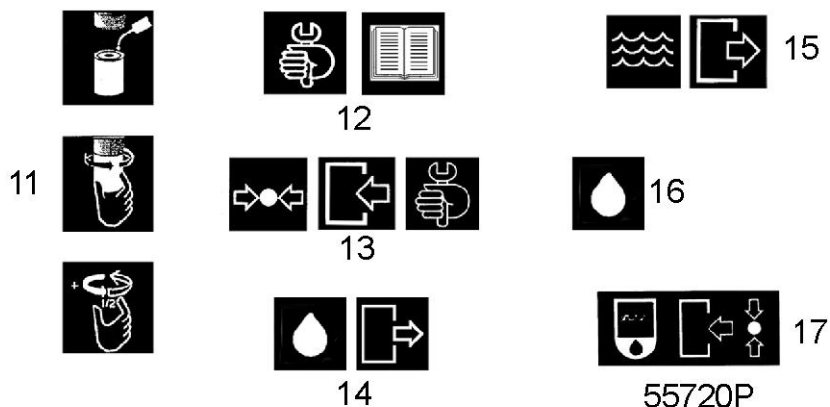
### Pictographs



Pictographs for FD 40 up to FD 95

Reference	Description
1	Dryer outlet
2	Dryer inlet
3	Automatic condensate drain
4	Warning, voltage
5	Warning: switch off the voltage, depressurise the compressor and read the instruction book before carrying out maintenance work

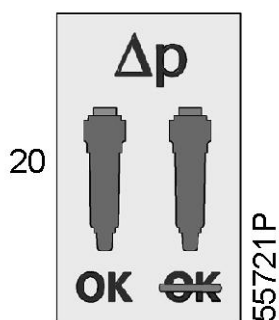
### Pictographs for the oil/condensate separator (OSD) (optional)



On the OSD

Reference	Name
11	Oil the gasket, screw on the filter and tighten by hand (approx. one half turn)
12	Consult the instruction manual before carrying out maintenance or repair work
13	Pressure inlet, service point
14	Oil outlet
15	Condensate outlet
16	Oil
17	Separator inlet pressure

### Pictograph for the filters (optional)



Reference	Name
20	Status indication of dust/oil filters

## 5 Operating instructions

### 5.1 Warnings

#### Safety precautions

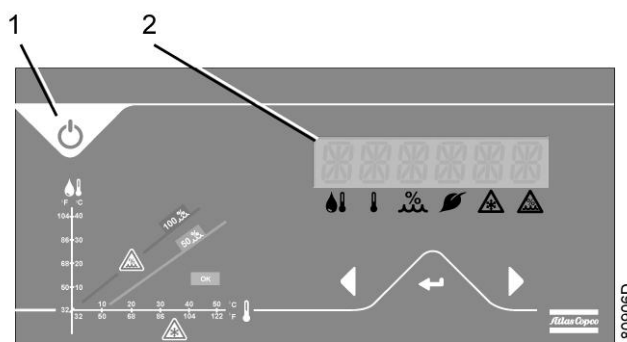
The operator must apply all relevant safety precautions, including those mentioned in this manual.

#### Altitude operation

Consult Atlas Copco if operating above 3000 m (9843 ft).

### 5.2 Starting

#### Control panel



Control panel FD 40 up to FD 95

#### Procedure

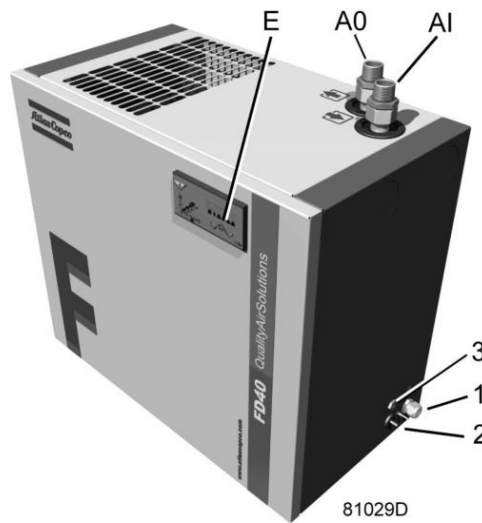
Step	Action
1	If installed, close the dryer bypass valve.
2	Press the ON/OFF button (1) on the control panel.
3	Open dryer air inlet valve (customer's installation).
4	Approx. 5 minutes later, open dryer air outlet valve (customer's installation).
5	Approx. 10 minutes later, the nominal dew-point will be reached.

#### Attention

	Avoid using the ON/OFF button repeatedly within a short time period, as this could cause the thermic protection of the compressor motor to trip.
--	--

## 5.3 During operation

### Condensate drain



*FD 40 up to FD 95*

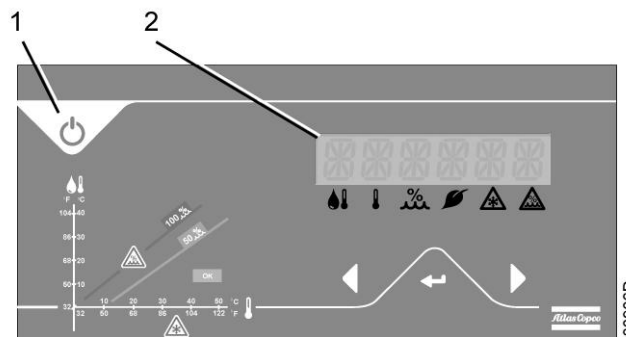
### Procedure

**Regularly check:**

- The pressure dewpoint on the control panel of the Elektronikon®  $\alpha$  regulator. The pressure dewpoint will deviate from nominal if the air inlet conditions or volume flow differ from nominal.
- That condensate is discharged via condensate outlet (2). The amount of discharged condensate depends on the operating conditions.

## 5.4 Stopping

### Control panel






**Procedure**

Step	Action
1	Close dryer inlet and outlet valves (customer's installation).
2	Press the ON/OFF button (1) on the control panel.

**Attention**

	Avoid using the ON/OFF button repeatedly within a short time period, as this could cause the thermic protection of the compressor motor to trip.
---	--

## 6 Maintenance instructions

### Attention

Cooling dryers of FD type contain refrigerant HFC.

### Safety precautions

**When handling refrigerant R134a, all applicable safety precautions must be observed. Please be aware of the following points:**

- Contact of refrigerant with the skin will cause freezing. Special gloves must be worn. If contacted with the skin, the skin should be rinsed with water. On no account may clothing be removed.
- Fluid refrigerant will also cause freezing of the eyes; safety glasses must hence be worn.
- Refrigerant R134a is harmful. Do not inhale refrigerant vapours. Check that the working area is adequately ventilated.

When removing the front panel of the dryer, be aware that internal elements such as the pipes can reach a temperature up to 110°C (230°F). Therefore, wait until the dryer has cooled down before removing the front panel.

Before starting any maintenance or repair work, switch off the voltage and close the air inlet and outlet valves.

### Local legislation

**Local legislation may stipulate that:**

- Work on the refrigerant circuit of the cooling dryer or on any equipment which influences its function must be undertaken by an authorised control body.
- The installation should be checked once a year by an authorised control body.

### General

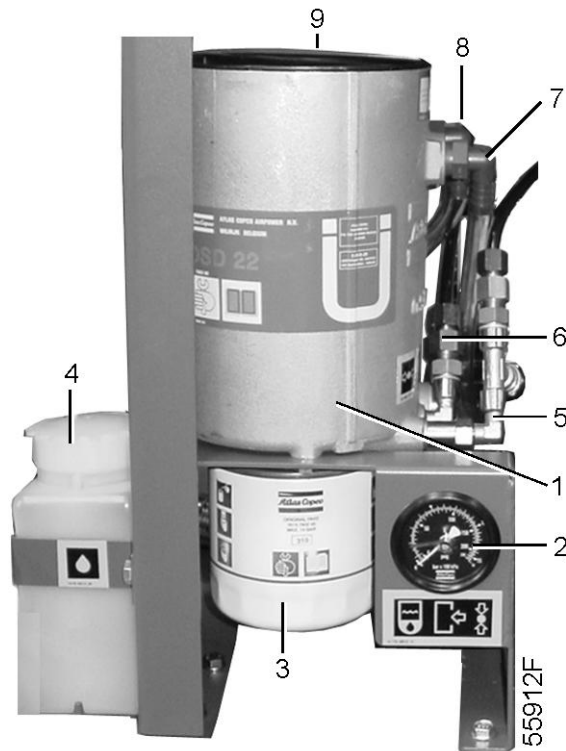
For all references see [Introduction](#) or when mentioned see [Control panel](#).

**The following remarks should be kept in mind:**

- Keep the dryer clean.
- Brush or blow off the finned surface of condenser (4) regularly.
- Inspect and clean electronic condensate drain (2) regularly.
  - a. Functioning of the drain can be checked by pushing the TEST button of the drain, consult section [Condensate drain system](#).
  - b. Cleaning of the drain filter can be done by opening the manual drain valve during a few seconds. Hold a towel against the drain outlet when opening.

### For dryers equipped with (optional) filters

- Regularly check the differential pressure indicators on top of the DD and PD filter.
- Replace the filter elements yearly or when the pressure drop becomes too high, as indicated by the differential pressure indicators on top of the filter.

**For dryers equipped with optional oil/condensate separator (OSD)**

*General view of OSD 22, typical example*

- Regularly check pressure gauge (2) on the control panel.
- Regularly check the oil level of oil can (4). If the oil can is filled with oil, take the can out of the bracket and deliver the oil to the local oil collection service.
- Change oil separator (3) every 6000 operating hours or when pressure gauge (2) on the control panel reaches a pressure differential of 2 bar (29 psi).


## 7 Device settings

### Regulating and safety devices

The regulating and safety devices are factory-adjusted to obtain optimum performance of the dryer. Do not alter the setting of any of the devices.

## 8 Problem solving

### Precautions

	<p>Apply all relevant safety precautions. See section <a href="#">Safety precautions</a>. Consult also section <a href="#">Maintenance instructions</a>.</p> <p>Use only authorised parts. Any damage or malfunction caused by the use of unauthorised parts is not covered by Warranty or Product Liability.</p>
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### Faults and remedies

For all references hereafter, consult [Air system](#) or [Refrigeration system](#).

	Condition	Fault	Remedy
1	Pressure dewpoint too high	Air inlet temperature too high	Check and correct; if necessary, install a pre-cooler
		Ambient temperature too high	Check and correct; if necessary, draw cooling air via a duct from a cooler place or relocate the dryer
		Air inlet pressure too low	Increase inlet pressure
		Dryer capacity exceeded	Reduce air flow
		Shortage of refrigerant	Have circuit checked for leaks and recharged
		Refrigerant compressor (M1) does not run	See 3
		Evaporator pressure too high	See 5
		Condenser pressure too high	See 2
2	Condenser pressure too high or too low	Fan control switch out of order	Replace
		Fan blades or fan motor out of order	Check fan/fan motor
		Ambient temperature too high	Check and correct; if necessary, draw cooling air via a duct from a cooler room or relocate the dryer
		Condenser externally clogged	Clean condenser
3	Compressor stops or does not start	Electric power supply to compressor is interrupted	Check and correct as necessary
		Thermal protection of refrigerant compressor motor has tripped	Motor will restart when motor windings have cooled down
4	Electronic condensate drain remains inoperative	Electronic drain system clogged	Have system inspected Clean the filter of the automatic drain by opening the manual drain valve. Check functioning of the drain by pushing the test button.
	Condensate trap continuously discharges air and water	Automatic drain out of order	Have system checked. If necessary, replace the automatic drain.
5	Evaporator pressure is too high or too low at unload	Hot gas bypass valve incorrectly set or out of order	Have hot gas bypass valve adjusted

	Condition	Fault	Remedy
		Condenser pressure too high or too low	See 2
		Shortage of refrigerant	Have circuit checked for leaks and recharged
6	Ambient temperature pictograph or dewpoint temperature pictograph is flickering	Error of temperature sensors	Check if temperature sensors are well connected
7	Freezing alarm indicator lights up and dryer switches off	Evaporator pressure is too low	See 5. Reset the alarm when the problem is solved.
8	High relative humidity alarm indicator lights up	Pressure dewpoint too high	See 1. Reset the alarm when the problem is solved.
		Dewpoint temperature sensor in wrong position	Place the sensor in the correct position. Reset the alarm when the problem is solved.

## 9 Technical data

### 9.1 Fuse rating

The table below indicates maximal fuse ratings to be used for the dryer supply.

For IEC approved dryers, recommended fuse type is gL/gG.

For CSA/UL approved dryers, recommended fuse type is Class K5/HRCII-C.

Frequency	Voltage	FD 40	FD 50
IEC			
50 Hz	230 V	16 A	16 A
60 Hz	115 V	--	--
60 Hz	220 V	--	--
CSA/UL			
50 Hz	230 V	--	--
60 Hz	115 V	15 A	15 A
60 Hz	230 V	15 A	15 A

Frequency	Voltage	FD 60	FD 70	FD 95
IEC				
50 Hz	230 V	20 A	20 A	20 A
60 Hz	115 V	--	--	--
60 Hz	230 V	--	--	--
CSA/UL				
50 Hz	230 V	--	--	--
60 Hz	115 V	Not applicable	Not applicable	Not applicable
60 Hz	230 V	20 A	20 A	20 A

### 9.2 Reference conditions and limitations

#### Reference conditions

For standard version:

	Units	50 Hz	60 Hz
Compressed air inlet pressure	bar(e)	7	7
Compressed air inlet pressure	psig	101.53	101.53

For 20 bar versions:

	<b>Units</b>	<b>50 Hz</b>	<b>60 Hz</b>
Compressed air inlet pressure	bar(e)	20	20
Compressed air inlet pressure	psig	290.08	290.08

Reference conditions for all versions:

	<b>Units</b>	<b>50 Hz</b>	<b>60 Hz</b>
Compressed air inlet temperature	°C	35	38
Compressed air inlet temperature	°F	95	100.4
Ambient temperature	°C	25	38
Ambient temperature	°F	77	100.4
Inlet relative vapour pressure		1	1
Pressure dew-point	°C	3	4
Pressure dew-point	°F	37.4	39.2
Cooling air inlet temperature	°C	25	38
Cooling air inlet temperature	°F	77	100.4

## Limitations

For FD 40 and FD 50:

	<b>Units</b>	<b>50 Hz</b>	<b>60 Hz</b>
Maximum compressed air inlet pressure	bar(e)	16	16
Maximum compressed air inlet pressure	psig	232.06	232.06

For FD 60 up to FD 95:

	<b>Units</b>	<b>50 Hz</b>	<b>60 Hz</b>
Maximum compressed air inlet pressure	bar(e)	13	13
Maximum compressed air inlet pressure	psig	188.55	188.55

For 20 bar versions:

	<b>Units</b>	<b>50 Hz</b>	<b>60 Hz</b>
Maximum compressed air inlet pressure	bar(e)	20	20
Maximum compressed air inlet pressure	psig	290.08	290.08

For all versions:

	<b>Units</b>	<b>50 Hz</b>	<b>60 Hz</b>
Min.-max. ambient air temperature	°C	1-50	1-50
Min.-max. ambient air temperature	°F	33.8-122	33.8-122



	Units	50 Hz	60 Hz
Max. compressed air inlet temperature	°C	60	60
Max. compressed air inlet temperature	°F	140	140

## 9.3 Air dryer data

### Standard version

All data are stated under nominal conditions, see section [Reference conditions and limitations](#).

Air dryer type		unit	FD 40	FD 50	FD 60	FD 70	FD 95
Volume flow at dryer inlet		l/s	40	50	60	70	95
Volume flow at dryer inlet		cfm	84.76	105.94	127.13	148.32	201.29
Pressure drop over dryer (without filters)		bar	0.20	0.20	0.22	0.22	0.22
Pressure drop over dryer (without filters)		psi	2.90	2.90	3.19	3.19	3.19
Total power consumption, including cooler fan	50 Hz	kW	0.57	0.54	0.63	0.87	1.18
Total power consumption, including cooler fan	50 Hz	hp	0.76	0.72	0.84	1.17	1.58
Total power consumption, including cooler fan	60 Hz	kW	0.73	0.79	1.02	1.01	1.48
Total power consumption, including cooler fan	60 Hz	hp	0.98	1.06	1.37	1.35	1.98
Refrigerant type			R134a	R134a	R134a	R134a	R134a
Refrigerant charge (approx.)	50 Hz	kg	0.40	0.47	0.61	0.59	0.64
Refrigerant charge (approx.)	50 Hz	lb	0.88	1.04	1.34	1.3	1.41
Refrigerant charge (approx.)	60 Hz	kg	0.40	0.47	0.70	0.71	0.66
Refrigerant charge (approx.)	60 Hz	lb	0.88	1.04	1.54	1.57	1.46
Dryer shipping mass (approx.)		kg	56.5	57.5	79.6	80.6	87.2
Dryer shipping mass (approx.)		lb	124.56	131.17	175.49	177.69	192.24

### 20 bar version

All data are stated under nominal conditions, see section [Reference conditions and limitations](#).

Air dryer type		unit	FD 40	FD 50
Volume flow at dryer inlet		l/s	58	72.5
Volume flow at dryer inlet		cfm	122.9	153.62
Pressure drop over dryer (without filters)		bar	0.16	0.16
Pressure drop over dryer (without filters)		psi	2.32	2.32

<b>Air dryer type</b>		<b>unit</b>	<b>FD 40</b>	<b>FD 50</b>
Total power consumption, including cooler fan	50 Hz	kW	0.57	0.54
Total power consumption, including cooler fan	50 Hz	hp	0.76	0.72
Total power consumption, including cooler fan	60 Hz	kW	0.73	0.79
Total power consumption, including cooler fan	60 Hz	hp	0.98	1.06
Refrigerant type			R134a	R134a
Refrigerant charge (approx.)	50 Hz	kg	0.40	0.47
Refrigerant charge (approx.)	50 Hz	lb	0.88	1.04
Refrigerant charge (approx.)	60 Hz	kg	0.40	0.47
Refrigerant charge (approx.)	60 Hz	lb	0.88	1.04
Dryer mass (approx.)		kg	56.5	57.5
Dryer mass (approx.)		lb	124.56	131.17

## 10 Pressure equipment directives

### Components subject to 97/23/EC Pressure Equipment Directive

All pressure-bearing components are designed according to the European Directive 97/23/EC category I.

# 11 Declaration of conformity

## EC DECLARATION OF CONFORMITY

- 1
- 2 We, <sup>(1)</sup> declare under our sole responsibility, that the product
- 3 Machine name
- 4 Machine type
- 5 Serial number
- 6 Which falls under the provisions of article 12.2 of the EC Directive 2006/42/EC on the approximation of the laws of the Member States relating to machinery, is in conformity with the relevant Essential Health and Safety Requirements of this directive.

The machinery complies also with the requirements of the following directives and their amendments as indicated.

7	Directive on the approximation of laws of the Member States relating to	Harmonized and/or Technical Standards used	Att'mnt
a.	Pressure equipment	97/23/EC	
b.	Machinery safety	2006/42/EC	EN ISO 12100 – 1 EN ISO 12100 – 2 EN 1012 – 1
c.	Simple pressure vessel	87/404/EEC	
d.	Electromagnetic compatibility	2004/108/EC	EN 61000-6-2 EN 61000-6-4
e.	Low voltage equipment	2006/95/EC	EN 60034 EN 60204-1 EN 60439
f.	Outdoor noise emission	2000/14/EC	
g.	Equipment and protective systems in potentially explosive atmospheres	94/9/EC	
h.	Medical devices General	93/42/EEC	EN ISO 13845 EN ISO 14971 EN 737-3
i.			

8.a The harmonized and the technical standards used are identified in the attachments hereafter

8.b (Product company) is authorized to compile the technical file.

9		<b>Conformity of the specification to the directives</b>	<b>Conformity of the product to the specification and by implication to the directives</b>
10			

11	Issued by	Product engineering	Manufacturing
----	-----------	---------------------	---------------

12 Name

13 Signature

14 Date

81679D

*Typical example of a Declaration of Conformity document*



• **ПОСТАВКИ**

- компрессоров,
- генераторов,
- строительного оборудования,
- систем подготовки сжатого воздуха,
- генераторов азота, водорода, кислорода,
- пневматического инструмента,
- оборудования для пескоструйной очистки,
- окрасочного оборудования и прочего.

• **СПЕЦПРОЕКТЫ, МОДУЛЬНЫЕ КОМПРЕССОРНЫЕ СТАНЦИИ.**

• **АРЕНДА ВИНТОВЫХ КОМПРЕССОРОВ.**

• **ПУСКОНАЛАДКА, СЕРВИСНОЕ ОБСЛУЖИВАНИЕ, МОНТАЖ ТРУБОПРОВОДОВ.**

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ДАТА

ВИД РАБОТ

СЛЕДУЮЩИЕ РАБОТЫ

ИСПОЛНИТЕЛЬ

1		ТО по плану Ремонт	Не позднее	
2		ТО по плану Ремонт	Не позднее	
3		ТО по плану Ремонт	Не позднее	
4		ТО по плану Ремонт	Не позднее	
5		ТО по плану Ремонт	Не позднее	
6		ТО по плану Ремонт	Не позднее	
7		ТО по плану Ремонт	Не позднее	
8		ТО по плану Ремонт	Не позднее	



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