INSTRUCTION BOOK
REFRIGERANT COMPRESSED AIR DRYERS

FD 5, FD 10, FD 15, FD 20, FD 25, FD 30

Atlas Copco

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Refrigerant compressed air dryers

FD 5, FD 10, FD 15, FD 20, FD 25, FD 30

Instruction book

Original instructions

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1 Safety precautions

1.1 Safety icons

Explanation

	Danger to 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. For plug versions, remove the plug from the wall socket and secure it.
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 dryer 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 humidity in 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, vapors 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 (e.g. safety valve of compressor), full flow safety valves must be installed on the dryer vessels.

17. If the maximum pressure of the compressor is higher than the design pressure of the dryer, a full flow safety valve must be installed between the compressor and the dryer in order to blow off the excessive pressure. This is done in case the safety valve of the dryer is out of order or blocked.
18. When unit is not permanently secured to the floor in the vertical position or mounted horizontally, access to electrical equipment is feasible through the unit base. In this case, additional barriers must be provided during installation. Tag with "Warning: High Voltage" symbol

	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. On dryers using heat to regenerate the desiccant, some parts will become very hot.
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, vapors 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 dampening 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.

12. Yearly inspect the air receiver. Minimum wall thickness as specified in the instruction book must be respected. Local regulations remain applicable if they are more strict.

	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

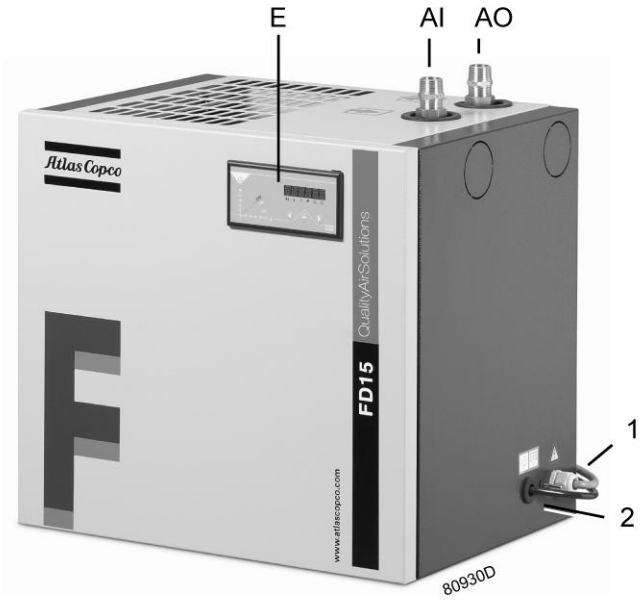
2.1 Introduction

Introduction

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 dried air is warmed up before leaving the dryer.

The dryers can be provided with optional (dust/oil) filters.

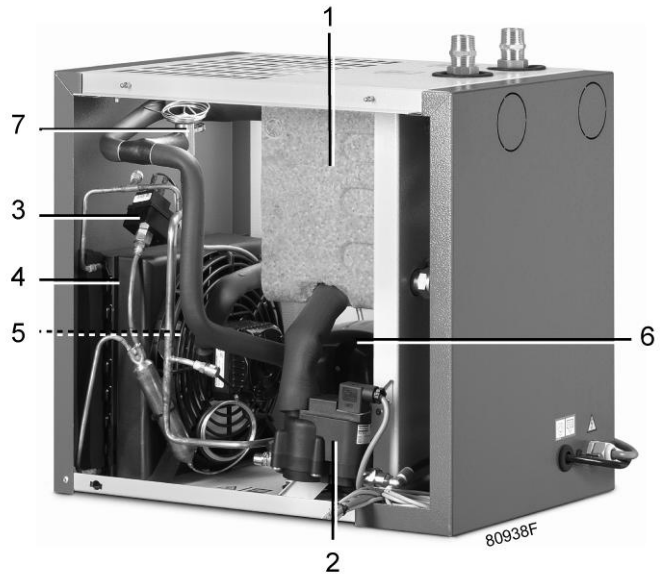
General view



FD 5 up to FD 30 - general view

AI	Air inlet
AO	Air outlet
E	Elektronikon® α controller
1	Supply cable entrance
2	Condensate drain

Detail views

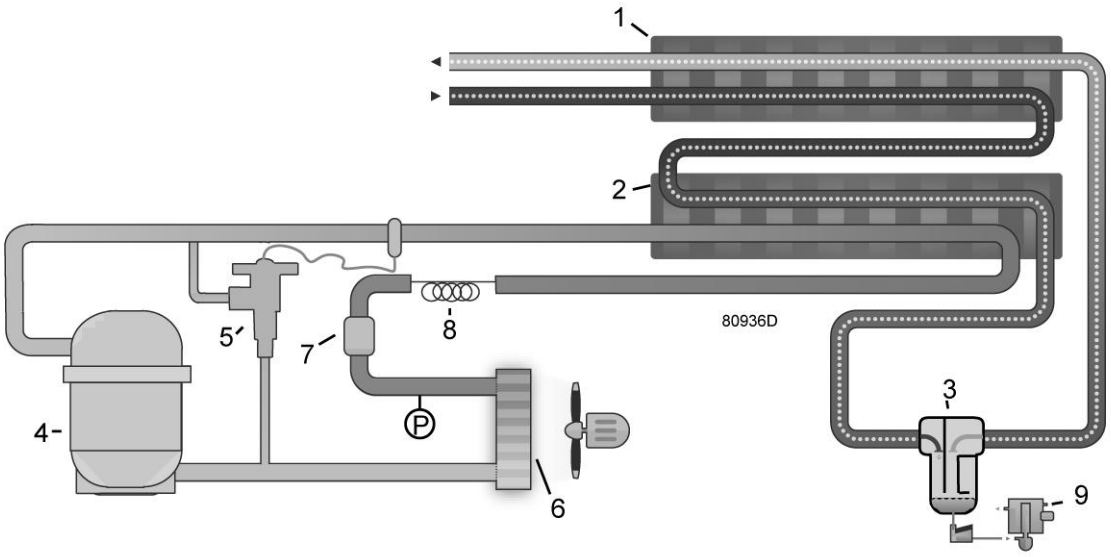


FD 5 up to FD 30

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

2.2 Air circuit

Air circuit flow diagram



Flow diagram

1	Heat exchanger
2	Evaporator
3	Water separator
4	Refrigerant compressor
5	Hot gas bypass valve
6	Condenser
7	Refrigerant dryer/filter
8	Capillary
9	Electronic condensate drain

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.

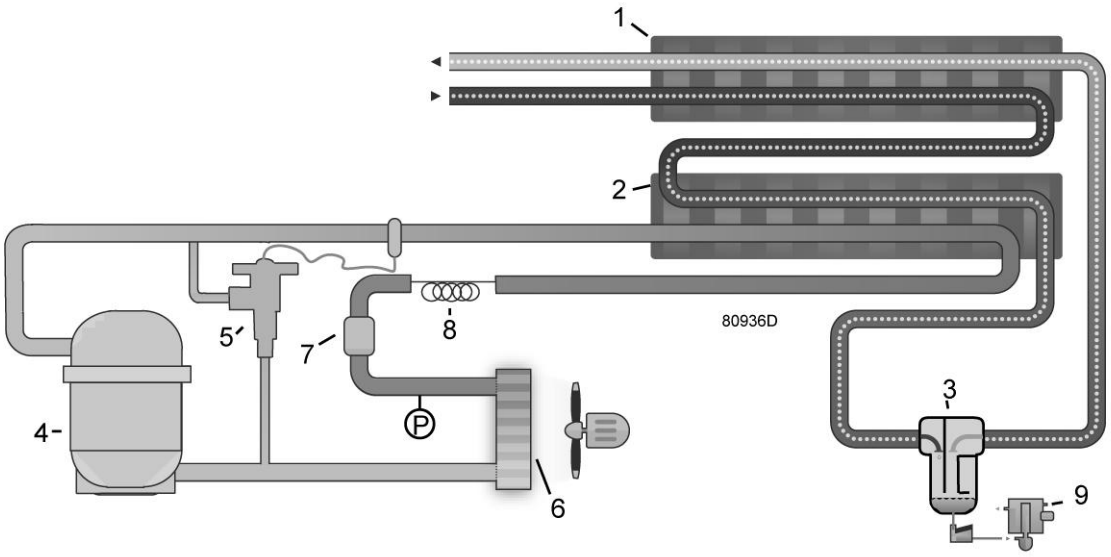
The condensate is automatically drained by electronic condensate drain (9).

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 dew point, indicated on the screen of the Elektronikon ® α regulator.

2.3 Refrigeration circuit

Refrigerant flow diagram



Flow diagram

1	Heat exchanger
2	Evaporator
3	Water separator
4	Refrigerant compressor
5	Hot gas bypass valve
6	Condenser
7	Refrigerent dryer/filter
8	Capillary
9	Electronic condensate drain

Description

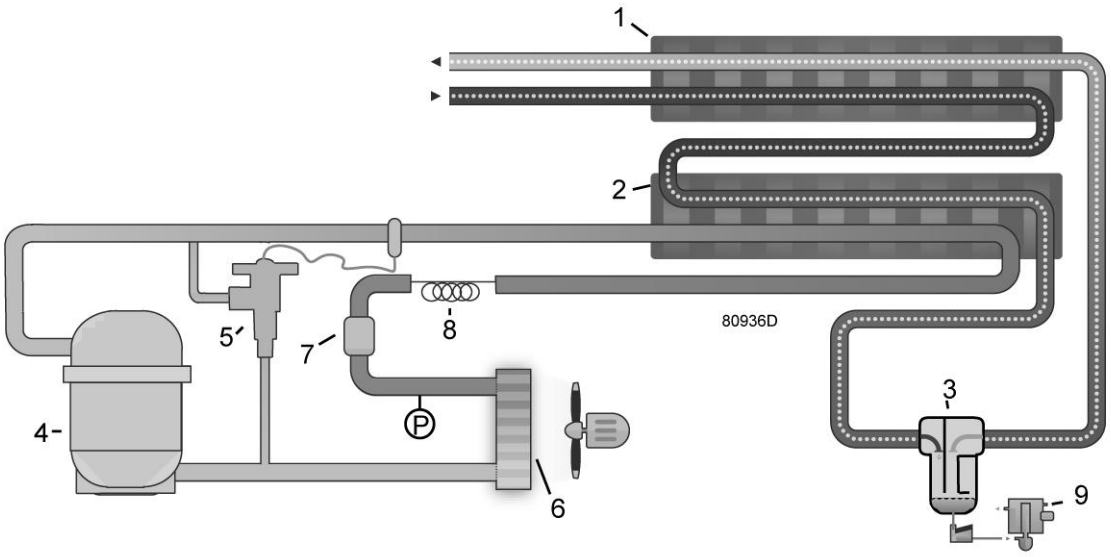
Compressor (4) delivers hot, high-pressure refrigerant gas which flows through condenser (6) where most of the refrigerant condenses.

The liquid refrigerant flows via the dryer/filter (7) to the capillary tube (8) and 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.

2.4 Automatic regulation system

Air and refrigerant flow diagram



Flow diagram

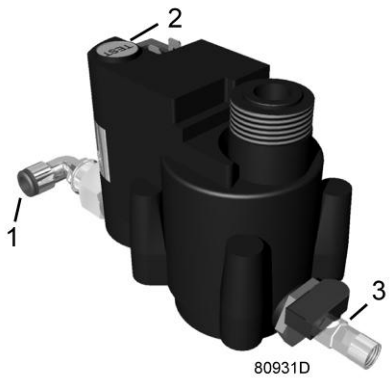
1	Heat exchanger
2	Evaporator
3	Water separator
4	Refrigerant compressor
5	Hot gas bypass valve
6	Condenser
7	Refrigerant dryer/filter
8	Capillary
9	Electronic condensate drain

Description

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

If, under partial or no load, the evaporator pressure drops to 2.25 bar(e) (32.63 psig), the hot gas bypass valve 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



Automatic drain

1	Drain outlet
2	Test button
3	Manual drain valve

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

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

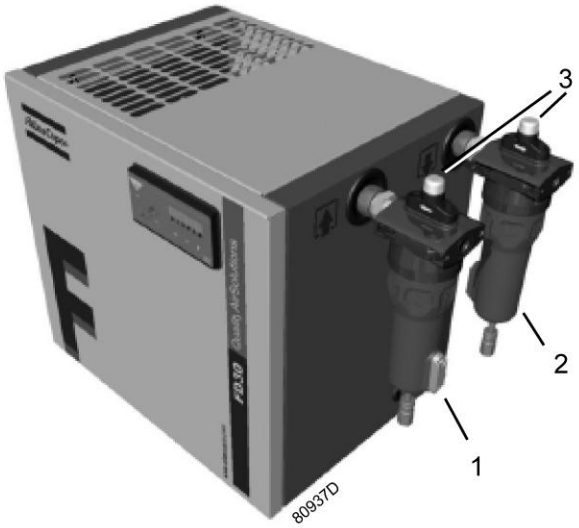
The drain filter can be cleaned by opening the manual drain valve (3), see section Maintenance instructions.

2.6 Available options

Following options are available for the FD 5 up to FD 30:

Filter option

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.



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

20 bar version

This is a special version of the dryer, capable to work at compressed air inlet pressures up to 20 bar(e) (290 psi(g)). See section Air dryer data for technical data.

Wall mounting kit

This option comprises a bracket, allowing to mount the FD dryer against a wall.

Control panel with IP 54 protection

This option comprises a cover, protecting the Elektronikon α 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 devices. See Electrical diagrams.

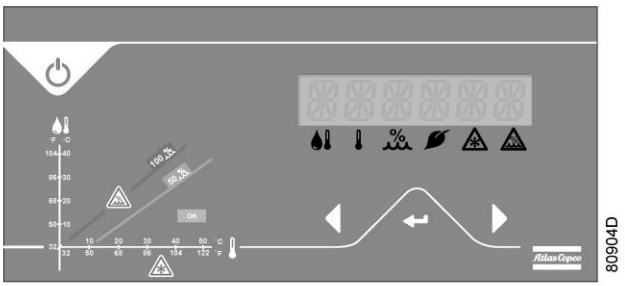
Fan control switch (P) starts fan motor (M2) as soon as the condenser pressure reaches the upper set point of the switch and will stop the fan motor when the condenser pressure decreases to its lower set point.

The refrigerant compressor motor has a built-in 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® α regulator

3.1 Elektronikon® α regulator

Control panel



Control panel

General description

The Elektronikon® α regulator automatically controls the dryer, i.e.:

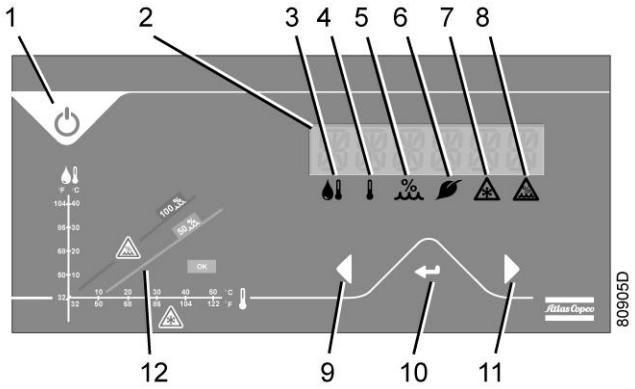
- It switches the dryer on and off in order to save energy (Energy Efficient Mode).
- It monitors the dew point temperature to ensure safe operation.
- It switches the dryer off in case of risk for freezing.
- It controls an alarm to notify a high relative humidity.

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



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

3.3 Starting and stopping the dryer

Procedure

When the voltage is switched on, the text “www.atlascopco.com” is rolling on the display (2).

When pushing the ON/OFF button (1), the dryer starts and the display of the Elektronikon® α 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 Main screen

Main screen

The display shows the dew point temperature and the dryer status.

The dryer status is indicated by means of pictographs underneath the display.

Typical screen example:

					3 °C

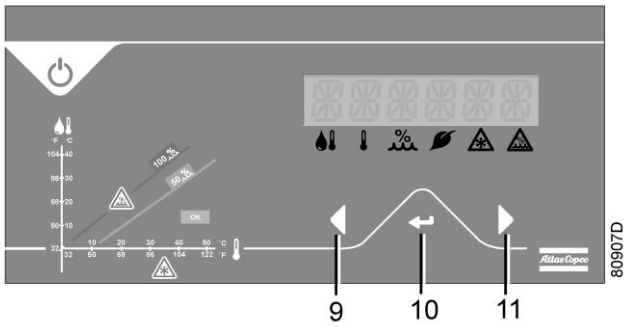
Explanation:

- The dew point is 3 °C (37.4 °F).
- The Energy Efficient Mode is active. See section Modifying dryer regulation mode to change.

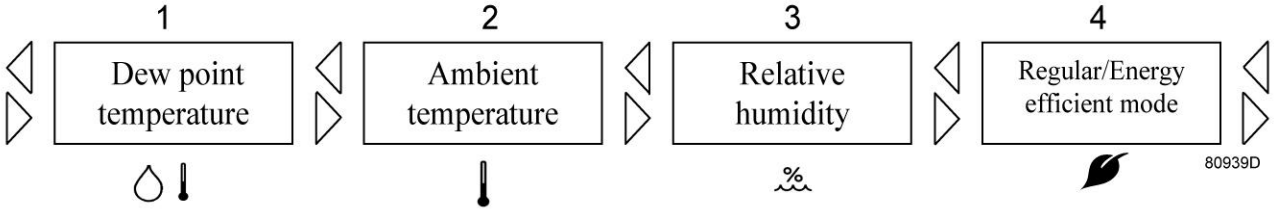
The display can also show all measured and programmed parameters, see section Scrolling through all screens.

3.5 Scrolling through all screens

Scrolling through all screens



Scrolling keys 9 and 11 can be used to select four different items:



Reference	Designation
1	Pictograph for dew point 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.

When selecting the fourth item, the regulation mode 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 the dryer regulation mode to change.

Examples of typical conditions:

1. The third pictograph is selected. The relative humidity is shown on the display (26%). The Energy Efficient Mode is not activated.

					26 %

2. The fourth pictograph is selected. The word “ON“ in the display means that the dryer is working in Energy Efficient Mode.

					ON

3.6 Alarm indicators

There are two pictographs to indicate an alarm situation:

1. Freezing alarm indicator
   If the dew point (LAT) reaches a value below 0.3 °C (32.54 °F) during more than one minute, typically following information will appear:

					-1 °C

   Result:
   - The dew point temperature value will flash on the display.
   - The freezing alarm indicator pictograph will light up.
   - 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 dew point (LAT) is again above 0.3 °C (32.54 °F).
2. High relative humidity alarm indicator

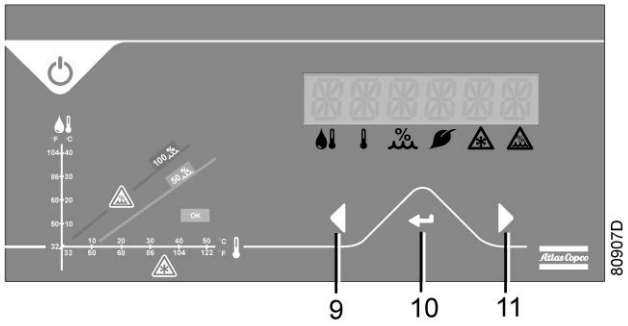
When a relative humidity value of more than 50 % (for a dew point temperature above 10 °C (50 °F)) is measured during more than one minute, typically following information will appear:

					56 %
		%			%

Result:

- The relative humidity value will flash on the display.
- The high relative humidity alarm indicator pictograph will light up.
- 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 (9) and right scroll key (11) simultaneously.

3.7 Modifying the temperature unit

Modifying unit of temperature

When selecting the dew point temperature or the ambient temperature (see section Scrolling through all screens), the temperature unit can be changed as follows:

- Press the enter key (10) once.
- Press the left scroll key (9) or the right scroll key (11) to choose between °C and °F.
- Press the enter key (10) again to confirm the selection.

3.8 Modifying ambient temperature offset

Description

The standard relative humidity calculation is based on the measured dew point (LAT) and the ambient temperature. The air temperature at the outlet of the dryer can however exceed the ambient temperature with a number of 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.

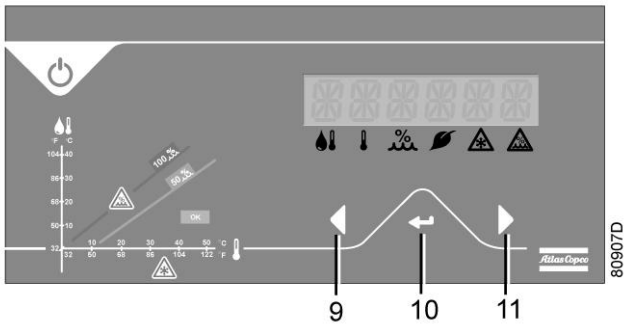
$T_{dryer\ outlet} = T_{ambient} + T_{offset}$

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).

Modifying the offset value

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



- Press the Enter key (10) once.
- Press the left scroll key (9) or the right scroll key (11) to change the offset value (negative values are not allowed).
- Press the Enter key (10) again to confirm the selection.

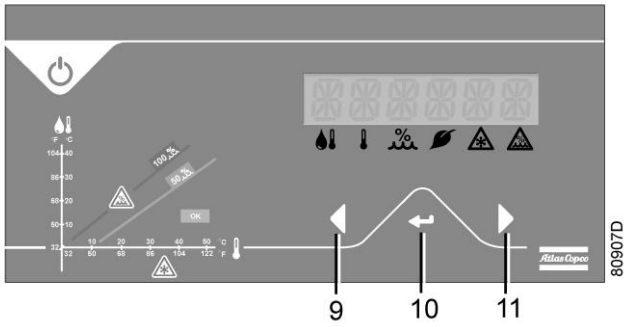
3.9 Modifying the dryer regulation mode

Description

The dryer has two regulation modes:

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

Modifying the regulation mode



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:

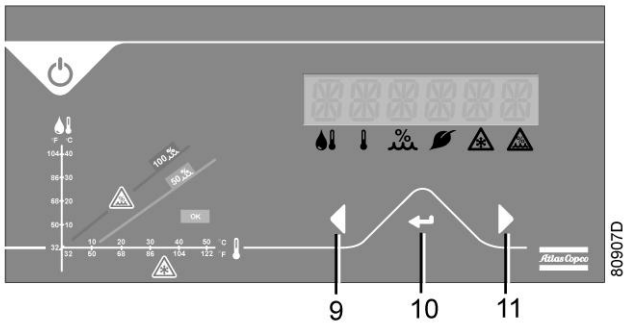
- Press the Enter key (10) once.
- Press the left scroll key (9) or the right scroll key (11) to choose between ‘ON’ and ‘OFF’.
- Press the Enter key (10) again to confirm the selection.

3.10 Automatic Restart After Voltage Failure (ARAVF)

When the function is activated, this feature allows the dryer to restart automatically after a voltage interruption. By default, the function is not activated.

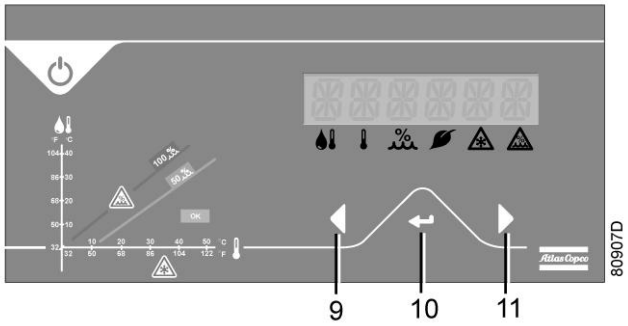
The function can be activated / deactivated by simultaneously pushing the left scroll key (9) and the Enter key (10).

- When the function is activated, ARAVF ON is displayed on the screen during a short time after pushing keys 9 and 10 simultaneously.
- When the function is deactivated, ARAVF OFF is displayed on the screen during a short time after pushing keys 9 and 10 simultaneously.



3.11 Remote start/stop function

The controller has a connection for a remote contact. If the contact is connected and the function is activated, the dryer can be started and stopped remotely via the remote contact.



Activation and deactivation of the remote start/stop function is done by pressing the right scroll key (11) and the Enter key (10) simultaneously.

Activation: press keys 10 and 11 simultaneously. The text REMOTE is displayed during a short time.

Deactivation: press keys 10 and 11 simultaneously. The text LOCAL is displayed during a short time.

Factory setting is local start/stop. If the remote start/stop function is activated and a voltage failure occurs, the setting will remain REMOTE when the voltage returns if the ARAVF function (see previous chapter) is active. The dryer will start automatically when the voltage is on again.

If the remote start/stop function is activated but the ARAVF function is not active, the setting will change into LOCAL when the voltage returns. The dryer will not start automatically when the voltage is on again.

3.12 Error messages

Error messages

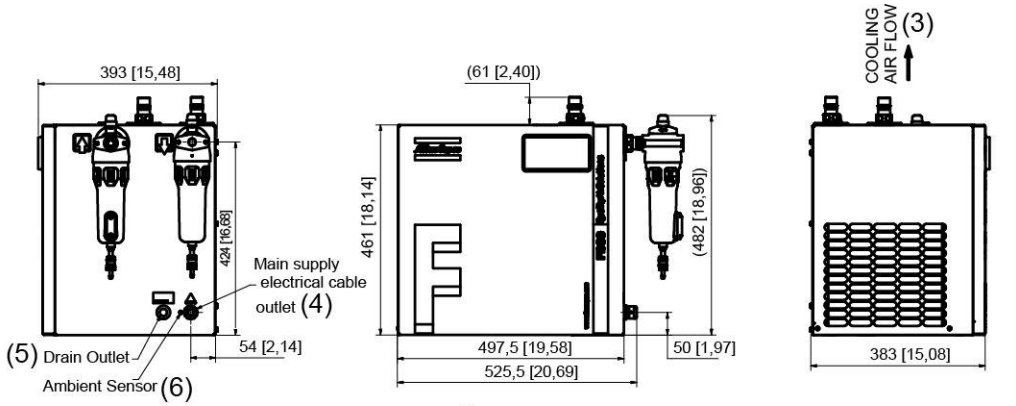
In case of an error of the temperature sensors, one or two pictographs may start flickering:

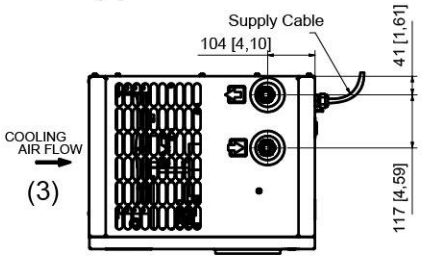
1. If the dew point temperature pictograph is blinking, the dew point temperature sensor is missing or not well connected (loose contact):

2. If the ambient temperature pictograph is blinking, the ambient temperature sensor is missing or not well connected (loose contact):

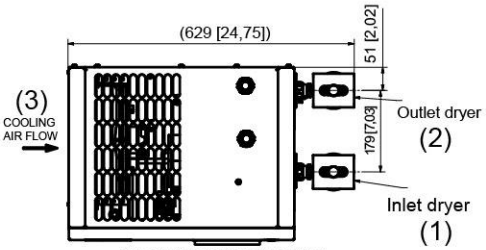
4 Installation

4.1 Dimension drawings



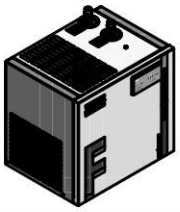


AIR INLET-OUTLET FD5-30



AIR INLET-OUTLET FD5-30 WITH FILTER OPTION (7)

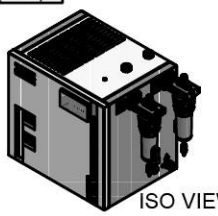
Type dryer	Air connection for 50 Hz dryer		Air connection for 60 Hz dryer		Weight:
	without filters: (male thread)	with filters: (female thread)	without filters: (male thread)	with filters: (female thread)	
FD5	ISO7 - R3/4"	G1/2"	NPT 3/4"	NPT 1/2"	27 kg (52,9 lb)
FD10	ISO7 - R3/4"	G1/2"	NPT 3/4"	NPT 1/2"	27 kg (52,9 lb)
FD15	ISO7 - R3/4"	G1/2"	NPT 3/4"	NPT 1/2"	32 kg (70,5 lb)
FD20	ISO7 - R3/4"	G1/2"	NPT 3/4"	NPT 1/2"	34 kg (75 lb)
FD25	ISO7 - R3/4"	G1/2"	NPT 3/4"	NPT 1/2"	34 kg (75 lb)
FD30	ISO7 - R3/4"	G1/2"	NPT 3/4"	NPT 1/2"	34 kg (75 lb)



ISO VIEW FD5-30 DRYER

9827 9728 00/Ed 01

80932D

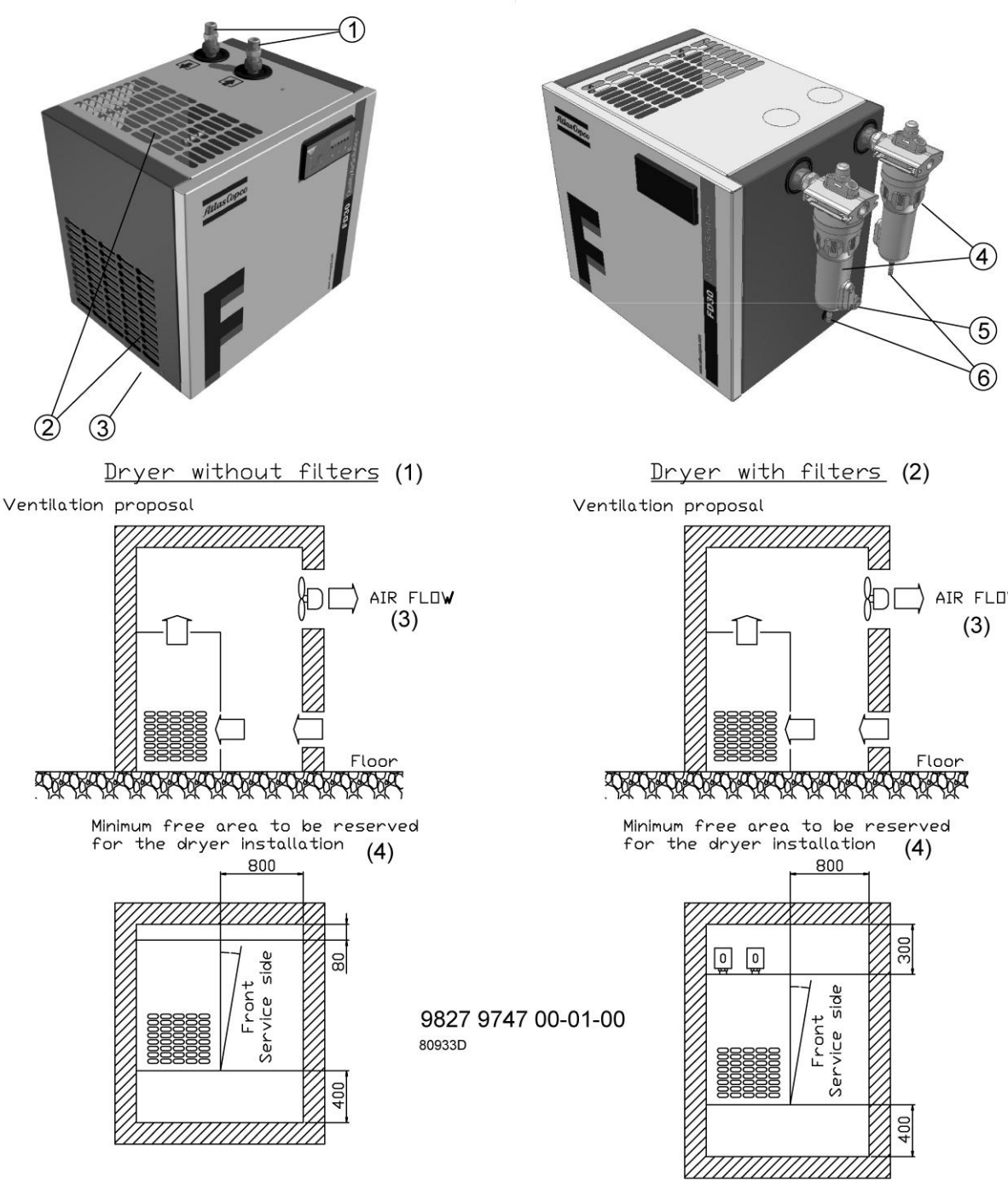


ISO VIEW FD5-30 DRYER WITH FILTER OPTION

Reference	Description
(1)	Dryer inlet
(2)	Dryer outlet
(3)	Cooling air flow
(4)	Main supply electrical cable outle
(5)	Drain outlet
(6)	Ambient sensor
(7)	With filter option

4.2 Installation proposal

FD 5 up to FD 30

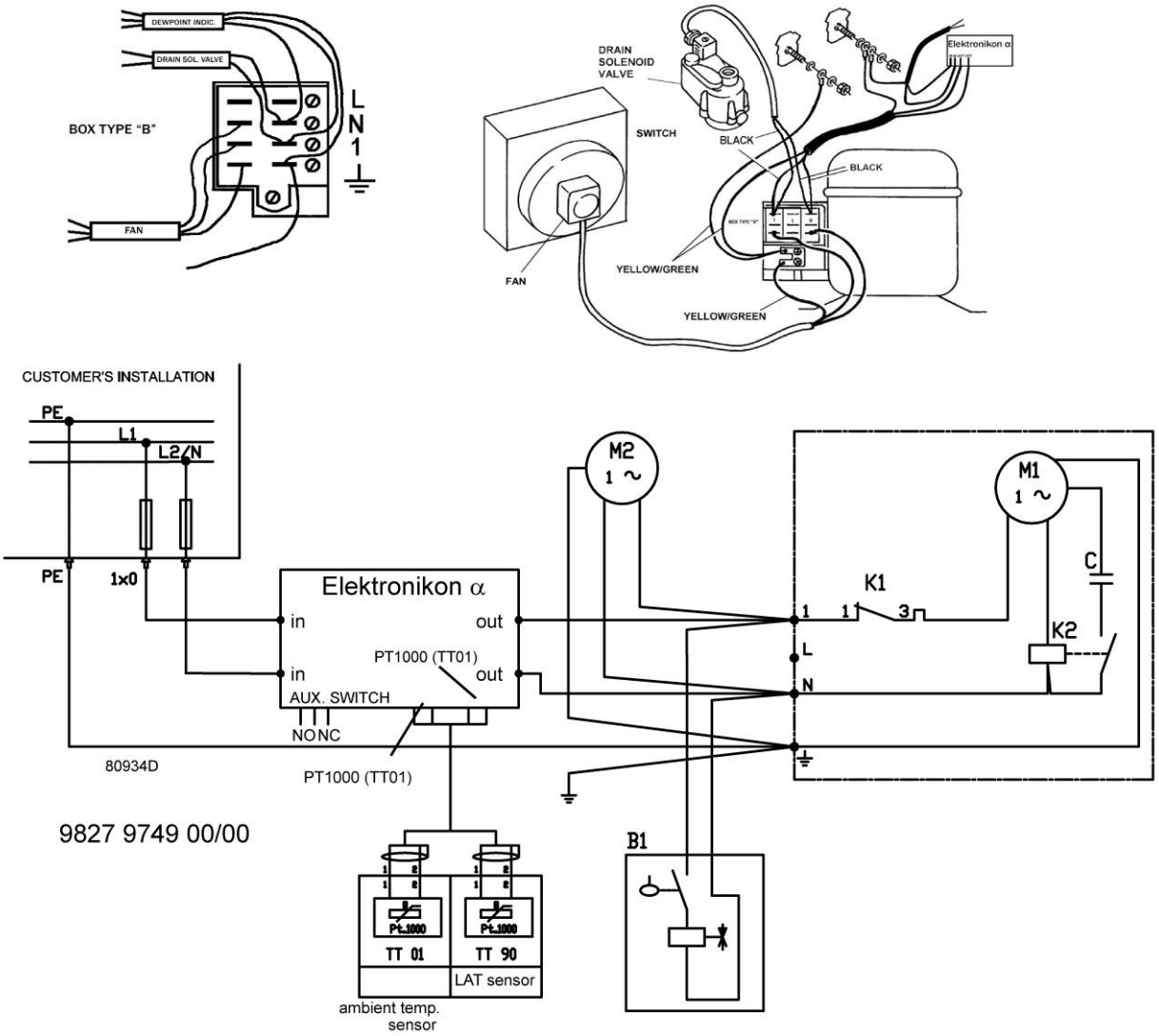


References to text on drawing	Description
(1)	Ventilation proposal for dryer without optional filters
(2)	Ventilation proposal for dryer with optional filters
(3)	Air flow
(4)	Minimum free area to be reserved for the dryer installation

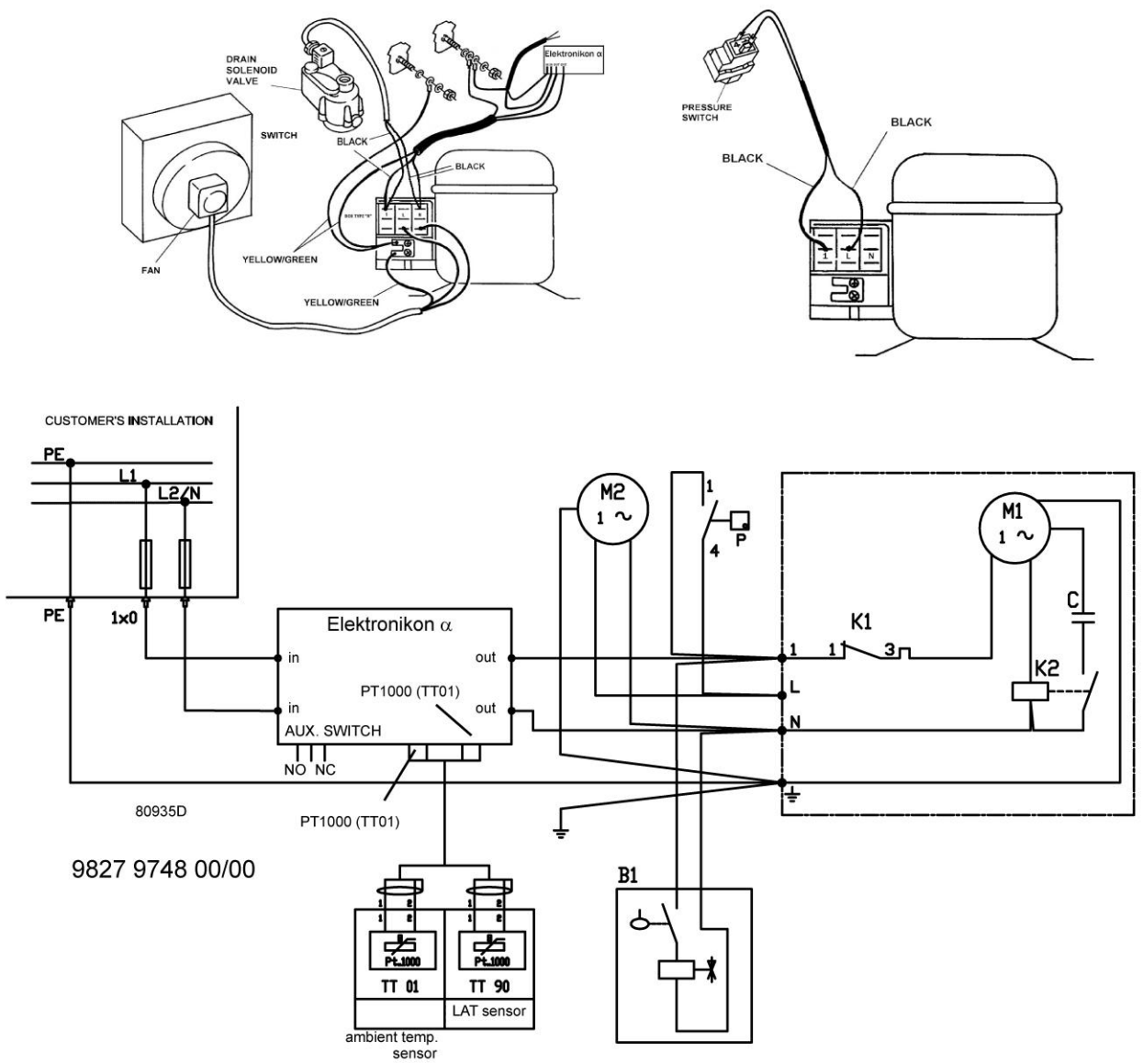
Instructions	Description
1	It is recommended to install bypass pipes over the dryer with ball valves to isolate the dryer during service operations without disturbing the compressed air delivery.
2	Ventilation: The inlet grid(s) and ventilation fan should be installed in such way that any recirculation 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.
3	Install the dryer on a level floor, suitable for taking the weight of the dryer.
4	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.
5	Power supply cable to be sized and installed by a qualified electrician. Fuses: see section Fuse values.
6	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.

	• All pipes to be installed stressless to the dryer. Do not use the dryer as support for external pipes. • Avoid installation of the dryer in corrosive atmosphere. • The dryer is not designed for outdoor use.

4.3 Electrical diagrams



Service diagram of FD 5 and FD 10

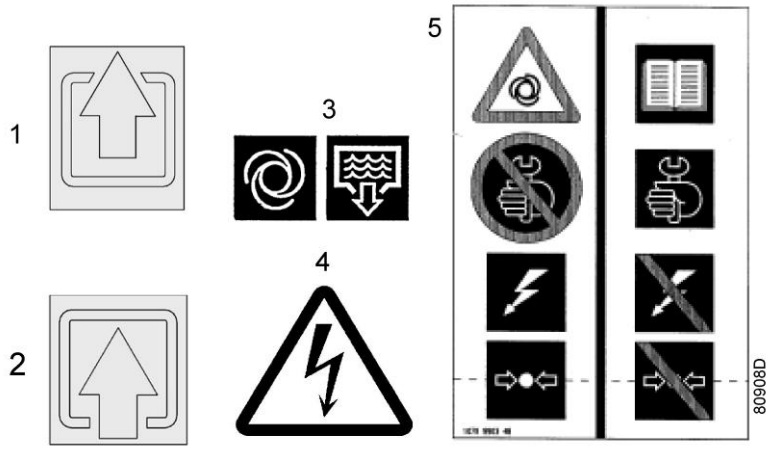


Service diagram FD 15 up to FD 30

Reference	Description
B1	Electronic condensate drain
P	Pressure switch, condenser fan
M1	Compressor motor
M2	Fan motor, condenser
K1	Thermic overload relay
K2	Starting relay
C	Starting capacitor
TT90	Temperature sensor, dew point (LAT)
TT01	Temperature sensor, ambient
1X0	Connector, supply voltage

4.4 Pictographs

Pictographs



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

5 Operating instructions

5.1 Warnings

Safety precautions

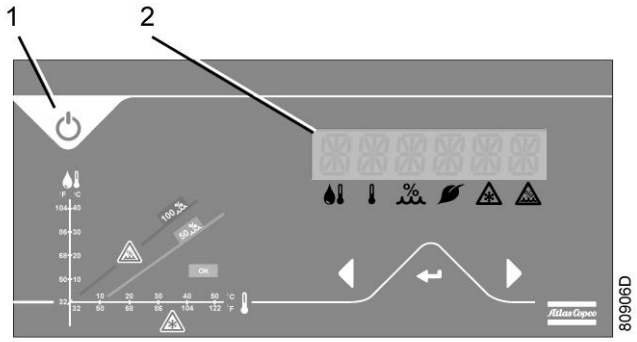
The operator must apply all relevant safety precautions, including those mentioned in this manual.

Altitude operation

Consult your supplier if operating above 3000 m (9843 ft).

5.2 Starting

Control panel



Control panel

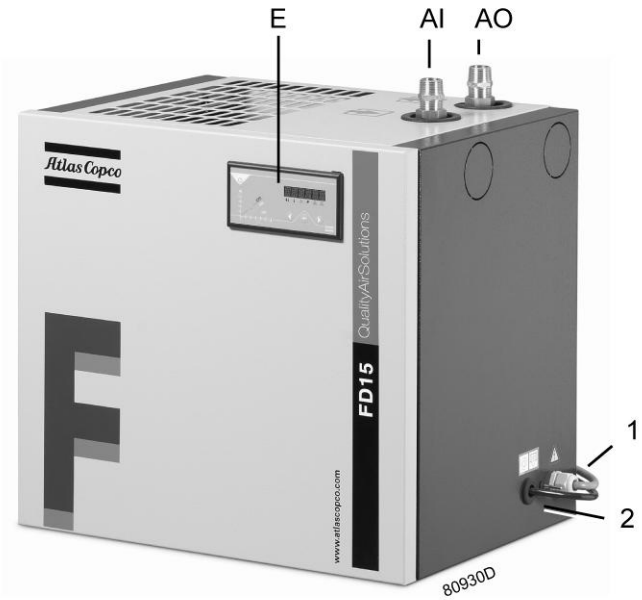
Procedure

Step	Action
1	If installed, close the dryer bypass valve.
2	Press the ON/OFF button (1) on the control panel.
3	Open the dryer air inlet valve (customer's installation).
4	Approx. 5 minutes later, open the 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 thermal protection of the compressor motor to trip.

5.3 During operation



FD 5 up to FD 30

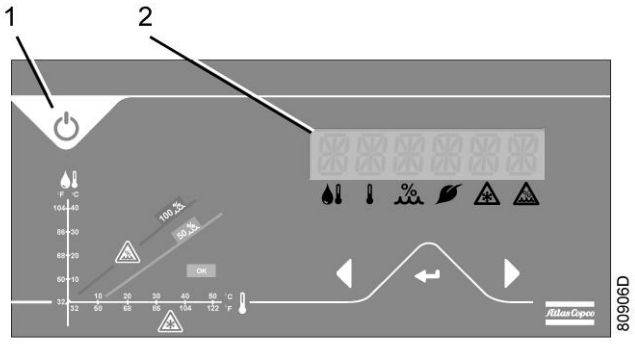
Procedure

Regularly check:

- The pressure dew point on the control panel of the Elektronikon® α regulator. The pressure dew point 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



Control panel

Procedure

Step	Action
1	Close the 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 thermal overload protection of the compressor motor to trip.

6 Maintenance instructions

Attention

The dryers described in this manual contain HFC based refrigerant.

Safety precautions

When handling refrigerant, 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 is harmful. Do not inhale refrigerant vapors. Check that the working area is adequately ventilated.

When removing bodywork panels, be aware that internal elements such as the pipes can become hot. Therefore, wait until the dryer has cooled down before removing the panels.

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 authorized control body.
- The installation should be checked once a year by an authorized control body.

General

For references see Introduction .

The following remarks should be kept in mind:

- Keep the dryer clean.
- Brush or blow off the finned surface of condenser regularly.
- Inspect and clean the electronic condensate drain weekly.
  - Functioning of the drain can be checked by pushing the TEST button of the drain, consult section Condensate drain system.
  - 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.
- Apply the drain wear kit once per year (see Spare Parts list for part number).

Note: these maintenance intervals are intended for well ventilated, not dusty and not high humidity environments. For particularly high humidity ambient conditions, the intervals should be halved.

For dryers equipped with (optional) filters

- Regularly check the differential pressure indicators on top of the DD and PD filter (if installed).

- 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.

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

	Apply all relevant safety precautions. See section Safety precautions. Consult also section Maintenance instructions. Use only genuine parts. Any damage or malfunction caused by the use of unauthorized parts is not covered by Warranty or Product Liability.

Faults and remedies

For all references hereafter, consult Air system or Refrigeration system.

Condition	Fault	Remedy
Pressure dew point 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 "Compressor stops or does not start".
	Evaporator pressure too high	See "Evaporator pressure is too high or too low at unload".
	Condenser pressure too high	See "Condenser pressure too high or too low".
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.
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.
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.

Condition	Fault	Remedy
Condensate drain continuously discharges air and water	Automatic drain out of order	Have system checked. If necessary, replace the automatic drain.
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.
	Condenser pressure too high or too low	See "Condenser pressure too high or too low".
	Shortage of refrigerant	Have circuit checked for leaks and recharged.
Ambient temperature pictograph or dew point temperature pictograph is flickering	Error of temperature sensors	Check if temperature sensors are well connected.
Freezing alarm indicator lights up and dryer switches off	Evaporator pressure is too low	See "Evaporator pressure is too high or too low at unload".. Reset the alarm when the problem is solved.
High relative humidity alarm indicator lights up	Pressure dew point too high	See "Pressure dew point too high". Reset the alarm when the problem is solved.
	Dew point 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 dyers, recommended fuse type is Class K5/HRCII-C.

Frequency	Voltage	FD 5	FD 10	FD 15	FD 20	FD 25	FD 30
IEC							
50 Hz	230 V	16 A	16 A	16 A	16 A	16 A	16 A
CSA/UL							
60 Hz	115 V	15 A	15 A	15 A	15 A	15 A	15 A
60 Hz	220 V	15 A	15 A	15 A	15 A	15 A	15 A

9.2 Reference conditions and limitations

Reference conditions

		50 Hz	60 Hz
Compressed air inlet pressure (16 bar versions)	bar(e)	7	7
Compressed air inlet pressure (16 bar versions)	psi(g)	101.53	101.53
Compressed air inlet pressure (20 bar versions)	bar(e)	20	20
Compressed air inlet pressure (20 bar versions)	psi(g)	290	290
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
Dew point	˚C	3	5
Dew point	˚F	37.4	41
Cooling air inlet temperature	˚C	25	38
Cooling air inlet temperature	˚F	77	100.4

Limitations

Maximum inlet pressure (16 bar versions)	bar(e)	16
Maximum inlet pressure (16 bar versions)	psi(g)	232.06
Maximum inlet pressure (20 bar versions)	bar(e)	20
Maximum inlet pressure (20 bar versions)	psi(g)	290.08
Minimum ambient temperature	°C	1
Minimum ambient temperature	°F	33.8

Maximum ambient temperature	°C	50
Maximum ambient temperature	°F	122
Maximum compressed air inlet temperature	°C	60
Maximum compressed air inlet temperature	°F	140

9.3 Air dryer data

16 bar version

All data are stated under nominal conditions, see section Reference conditions and limitations.

Air dryer type		Unit	FD 5	FD 10	FD 15	FD 20	FD 25	FD 30
Volume flow at dryer inlet		l/s	5	10	15	20	25	30
Volume flow at dryer inlet		cfm	10.6	21.1	31.8	42.4	53.0	63.6
Pressure drop over dryer (without filters)		bar	0.05	0.11	0.12	0.20	0.17	0.25
Pressure drop over dryer (without filters)		psi	0.73	1.60	1.74	2.90	2.47	3.63
Total power consumption, including cooler fan	50 Hz	W	200	200	330	410	410	410
Total power consumption, including cooler fan	50 Hz	hp	0.27	0.27	0.44	0.55	0.55	0.55
Total power consumption, including cooler fan	60 Hz	W	230	230	340	530	530	530
Total power consumption, including cooler fan	60 Hz	hp	0.31	0.31	0.46	0.71	0.71	0.71
Refrigerant								
Refrigerant type			R513A	R513A	R513A	R513A	R513A	R513A
Total charge (approx.)	50 Hz	kg	0.29	0.29	0.33	0.48	0.48	0.48
Total charge (approx.)	50 Hz	lb	0.64	0.64	0.73	1.06	1.06	1.06
Total charge (approx.)	60 Hz	kg	0.29	0.29	0.44	0.48	0.48	0.48
Total charge (approx.)	60 Hz	lb	0.64	0.64	0.97	1.06	1.06	1.06
Dryer mass (approx.)		kg	27	27	32	34	34	34
Dryer mass (approx.)		lb	59.5	59.5	70.5	75.0	75.0	75.0

20 bar version

All data are stated under nominal conditions, see section Reference conditions and limitations.

Air dryer type		Unit	FD 5	FD 10	FD 15	FD 20	FD 25	FD 30
Volume flow at dryer inlet		l/s	7.3	14.5	21.8	27.6	34.8	43.5
Volume flow at dryer inlet		cfm	15.5	30.7	46.2	58.5	73.7	92.2
Pressure drop over dryer (without filters)		bar	0.04	0.09	0.1	0.1	0.14	0.2
Pressure drop over dryer (without filters)		psi	0.58	1.30	1.45	1.45	2.03	2.90
Total power consumption, including cooler fan	50 Hz	W	200	200	330	410	410	410
Total power consumption, including cooler fan	50 Hz	hp	0.27	0.27	0.44	0.55	0.55	0.55
Total power consumption, including cooler fan	60 Hz	W	230	230	340	530	530	530
Total power consumption, including cooler fan	60 Hz	hp	0.31	0.31	0.46	0.71	0.71	0.71
Refrigerant								
Refrigerant type			R513A	R513A	R513A	R513A	R513A	R513A
Total charge (approx.)	50 Hz	kg	0.29	0.29	0.33	0.48	0.48	0.48
Total charge (approx.)	50 Hz	lb	0.64	0.64	0.73	1.06	1.06	1.06
Total charge (approx.)	60 Hz	kg	0.29	0.29	0.44	0.48	0.48	0.48
Total charge (approx.)	60 Hz	lb	0.64	0.64	0.97	1.06	1.06	1.06
Dryer mass (approx.)		kg	27	27	32	34	34	34
Dryer mass (approx.)		lb	59.5	59.5	70.5	75.0	75.0	75.0

10 Pressure equipment directives

Components subject to Pressure Equipment Directive

All pressure-bearing components are designed according to the European Directive 97/23/EC article 3, paragraph 3.

11 Declaration of conformity

Insert logo here

EU DECLARATION OF CONFORMITY

We, (1) declare under our sole responsibility, that the product
Machine name :
Machine type :
Serial number :

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.

	Directive on the approximation of laws of the Member States relating to		Harmonized and/or Technical Standards used		Att' mnt
a.	(2)		(3)		
b.					X
c.					
d.					X
e.					
f.					
g.					X

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

<1> is authorized to compile the technical file.

	Conformity of the specification to the directives	Conformity of the product to the specification and by implication to the directives
Issued by	Engineering	Manufacturing

Name
Signature
Date
Place

84560D

Typical example of a Declaration of Conformity document

(1): Contact address:

Atlas Copco Airpower n.v.

P.O. Box 100

B-2610 Wilrijk (Antwerp)

Belgium

(2): Applicable directives

(3): Standards used

On the Declaration of Conformity / Declaration by the Manufacturer, the harmonized and/or other standards that have been used for the design are shown and/or referred to.

The Declaration of Conformity / Declaration by the Manufacturer is part of the documentation that is supplied with this device.

COMMITTED TO SUSTAINABLE PRODUCTIVITY

We stand by our responsibilities towards our customers, towards the environment and the people around us. We make performance stand the test of time. This is what we call — Sustainable Productivity.

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