Instruction Book

FD 120, FD 150, FD 185, FD 220, FD 245, FD 285

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Atlas Copco
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	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.

General precautions

1. The operator must employ safe working practices and observe all related local work safety requirements and regulations.
2. If any of the following statements does not comply with local legislation, the stricter of the two shall apply.
3. Installation, operation, maintenance and repair work must only be performed by authorised, trained, specialised personnel.
4. The compressor is not considered capable of producing air of breathing quality. For air of breathing quality, the compressed air must be adequately purified according to local legislation and standards.
5. Before any maintenance, repair work, adjustment or any other non-routine checks, stop the compressor, press the emergency stop button, switch off the voltage and depressurise the compressor. In addition, the power isolating switch must be opened and locked.
6. 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.

Precautions during installation

1. The machine must only be lifted using suitable equipment in accordance with local 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 machine 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 minimise the entry of moisture at the inlet air.
3. Any blanking flanges, plugs, caps and 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 the discharge pipe from the compressor to the aftercooler or air net 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 start 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 air does not recirculate to the compressor air inlet or cooling air inlet.
11. The electrical connections must correspond to the local 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 compressor.
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. In multiple compressor systems, manual valves must be installed to isolate each compressor. Non-return valves (check valves) must not be relied upon for isolating pressure systems.
14. 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.
15. Pipework or other parts with a temperature in excess of 80°C (176°F) and which may be accidentally touched by personnel in normal operation must be guarded or insulated. Other high-temperature pipework must be clearly marked.
16. 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.

17. If the ground is not level or can be subject to variable inclination, consult the manufacturer.

	Also consult following safety precautions: Safety precautions during operation and Safety precautions during maintenance. 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.

1.3 Safety precautions during operation

	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.

General precautions

1. The operator must employ safe working practices and observe all related local work safety requirements and regulations.
2. If any of the following statements does not comply with local legislation, the stricter of the two shall apply.
3. Installation, operation, maintenance and repair work must only be performed by authorised, trained, specialised personnel.
4. The compressor is not considered capable of producing air of breathing quality. For air of breathing quality, the compressed air must be adequately purified according to local legislation and standards.
5. Before any maintenance, repair work, adjustment or any other non-routine checks, stop the compressor, press the emergency stop button, switch off the voltage and depressurise the compressor. In addition, the power isolating switch must be opened and locked.
6. 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.

Precautions during operation

1. 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.
2. 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.
3. Never operate the machine when there is a possibility of taking in flammable or toxic fumes, vapours or particles.

4. Never operate the machine below or in excess of its limit ratings.
5. Keep all bodywork doors shut during operation. The doors may be opened for short periods only, e.g. to carry out routine checks. Wear ear protectors when opening a door.
6. People staying in environments or rooms where the sound pressure level reaches or exceeds 90 dB(A) shall wear ear protectors.
7. 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 repair, free of wear or abuse
8. If warm cooling air from compressors is used in air heating systems, e.g. to warm up a workroom, take precautions against air pollution and possible contamination of the breathing air.
9. Do not remove any of, or tamper with, the sound-damping material.
10. 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. 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 maintenance or repair

	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.

General precautions

1. The operator must employ safe working practices and observe all related local work safety requirements and regulations.

2. If any of the following statements does not comply with local legislation, the stricter of the two shall apply.
3. Installation, operation, maintenance and repair work must only be performed by authorised, trained, specialised personnel.
4. The compressor is not considered capable of producing air of breathing quality. For air of breathing quality, the compressed air must be adequately purified according to local legislation and standards.
5. Before any maintenance, repair work, adjustment or any other non-routine checks, stop the compressor, press the emergency stop button, switch off the voltage and depressurise the compressor. In addition, the power isolating switch must be opened and locked.
6. 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.

Precautions during maintenance or repair

1. Always wear safety glasses.
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 start equipment.
7. Close the compressor 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 or perform any operation involving heat near the oil system. Oil tanks must be completely purged, e.g. by steam-cleaning, before carrying out such operations. 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 vapour 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. If removed, check that the coupling guard of the compressor drive shaft has been reinstalled.
17. Every time the separator element is renewed, examine the discharge pipe and the inside of the oil separator vessel for carbon deposits; if excessive, the deposits should be removed.
18. Protect the motor, air filter, electrical and regulating components, etc. to prevent moisture from entering them, e.g. when steam-cleaning.
19. Make sure that all sound-damping material, e.g. on the bodywork and in the air inlet and outlet systems of the compressor, is in good condition. If damaged, replace it by genuine material from the manufacturer to prevent the sound pressure level from increasing.
20. Never use caustic solvents which can damage materials of the air net, e.g. polycarbonate bowls.
21. 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.
22. Protect hands to avoid injury from hot machine parts, e.g. during draining of oil.

	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.

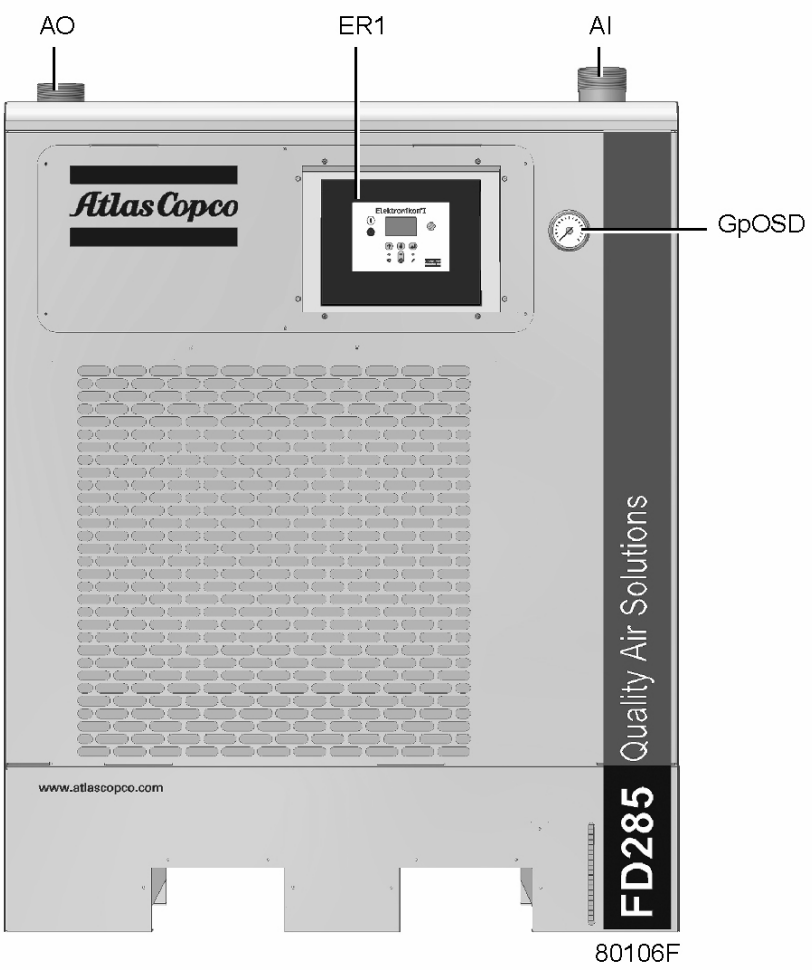
2 General description

2.1 Introduction

Description

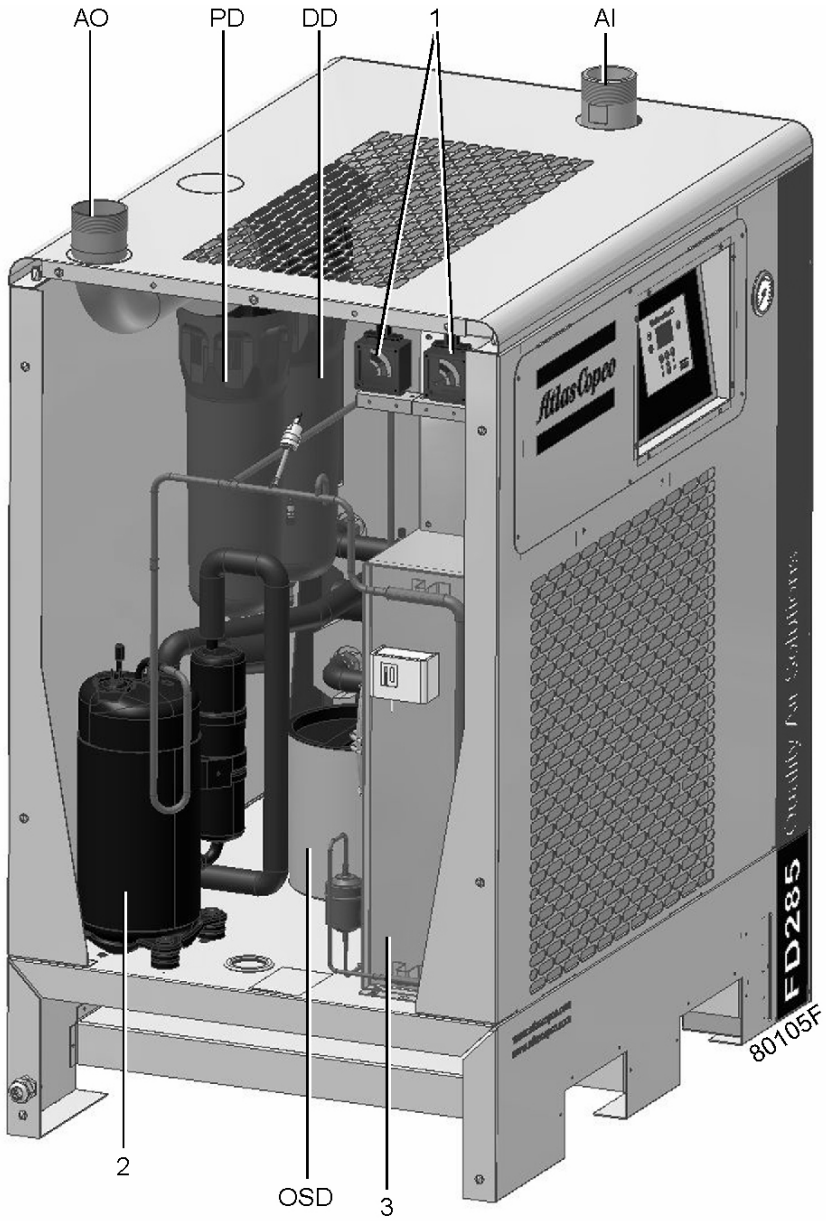
The FD air dryers remove moisture from compressed air by cooling the air to near freezing point. This causes water to condense. The condensate is automatically drained. The air is warmed up before leaving the dryer. The dryers can be provided with an optional OSD (oil/condensate separator) and/or optional (dust/oil) filters.

General view



Side views

View on condensate drain (EWD)

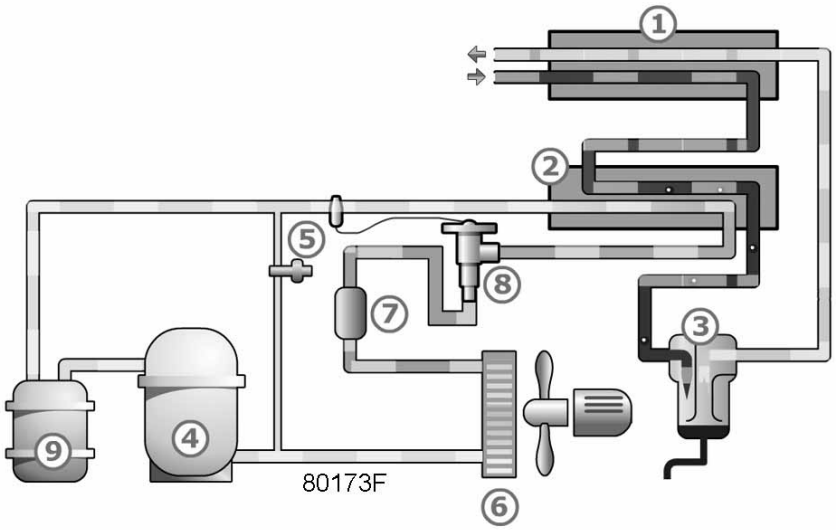


References	Name
AO	Air outlet
ER1	Elektronikon regulator
AI	Air inlet
GpOSD	Pressure gauge of OSD Option
EWD	Electronic water drain
1	Service indicator for DD and PD filter

References	Name
2	Compressor
3	Condenser
DD	DD filter
PD	PD filter
OSD	Oil/condensate separator

2.2 Air system

Air flow diagram



Air and refrigerant flow diagram

Description

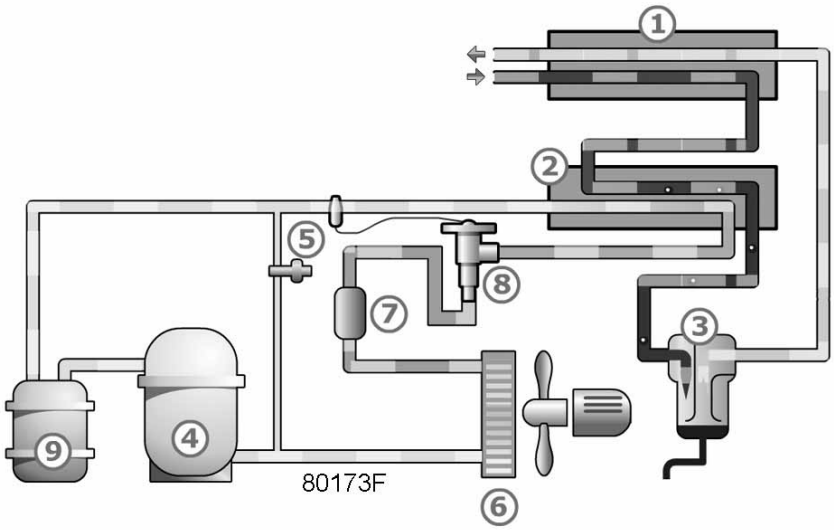
Compressed air enters heat exchanger (1) and is cooled by the outgoing, cold, dried air. Water in the incoming air starts to condense. The air then flows through heat exchanger/evaporator (2) where the refrigerant evaporates causing the air to be further cooled to close to the evaporating temperature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

The condensate collects in the Electronic Water Drain (EWD) and is automatically drained. The cold, dried air flows through heat exchanger (1), where it is warmed up by the incoming air to approx. 5 °C (9 °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 control panel.

2.3 Refrigeration system

Refrigerant flow diagram



Description

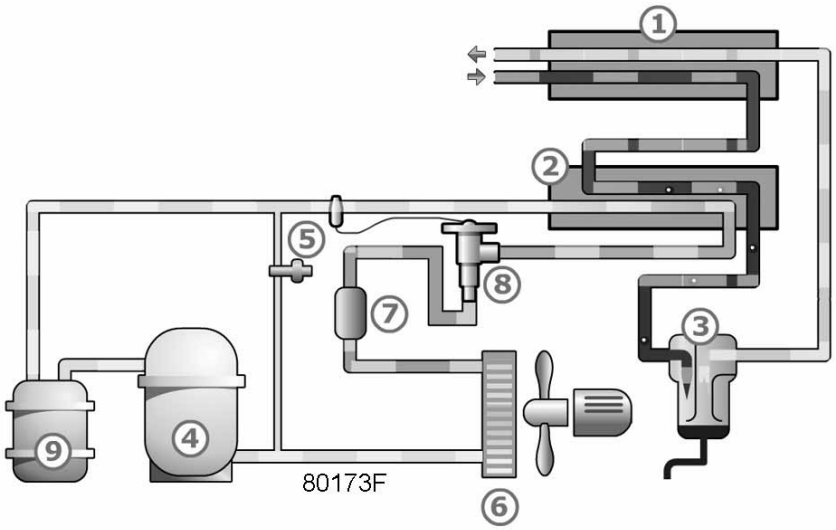
Compressor (4) delivers hot, high-pressure refrigerant gas which flows through condenser (6) where most of the refrigerant condenses.

The liquid flows through liquid refrigerant dryer/filter (3) to thermostatic expansion valve (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.

2.4 Automatic regulation system

Air and refrigerant flow diagram



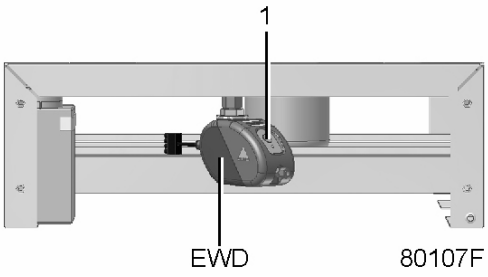
Description

The condenser pressure must be kept as constant as possible to obtain stable operation. The fan control switch therefore stops and starts the cooling fan.

If, under partial or no load, the evaporator pressure drops to 7.3 bar(e) (105.8 psig), the by-pass regulator (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

Description



Electronic water drain

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.

The condensate can also be drained by pressing the test button (1).

3 Elektronikon I regulator

3.1 Elektronikon I regulator

Control panel

General description

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

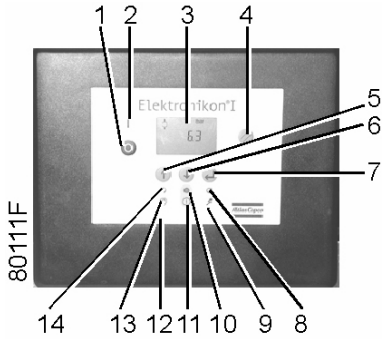
- keeps the pressure dewpoint stable
- monitors the pressure dewpoints and digital switches to ensure safe operation
- stops the dryer whenever necessary
- restarts the dryer when required

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

- LEDs indicating the status of the dryer
- a display (1) indicating the operating conditions or a fault
- keys to control the dryer and to access the data collected by the regulator
- buttons to manually start and stop the dryer

3.2 Control panel

Elektronikon I regulator



Ref.	Name	Function
1	Stop button	Push button to stop the dryer. LED (10) goes out.
2	Start button	Push button to start the dryer. LED (10) lights up indicating that the regulator is operative (in automatic operation).
3	Display	Indicates the compressor operating condition, actually measured values and programmed parameters.
4	Reset key	Key to reset the service timer, a shut-down condition, etc or to return to a previous display.
5	Upwards scroll key	Key to scroll upwards through the screens or to increase a setting.
6	Downwards scroll key	Key to scroll downwards through the screens or to decrease a setting.
7	Enter key	Key to select or validate a parameter, to open a sub-display.
8	Voltage on LED	Indicates that the voltage is switched on.
9	Pictograph	Voltage on.
10	General alarm LED	Is lit if a warning condition exists.
10	General alarm LED	Flashes in the event of a shut-down.
11	Pictograph	Alarm.
12	Pictograph	Remote operation
13	Pictograph	Automatic operation.
14	Automatic operation LED	Indicates that the regulator is automatically controlling the dryer. The LED is lit during automatic operation and flashes when the unit is remotely controlled.

3.3 Display

Description

Normally display (1) shows:

- The dryer status by means of pictographs
- The dewpoint temperature

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

3.4 Pictographs used on the screen

Pictographs

Pictograph	Description
	Ambient temperature.
	Dewpoint temperature.
	Energy efficient mode off, flow switch on.
	Energy efficient mode on, flow switch off.
	Energy efficient mode on, flow switch on.

Pictograph	Description
	Dryer running The pictograph is shown when the compressor motor is running.
	Service pictograph.
	LAN control or network setting.
	Warning symbol filters.
	Warning symbol condensate drain.

3.5 Main screen

Procedure

When the voltage is switched on, the Main screen is shown automatically, showing in short the operation status of the dryer and the outlet pressure:

Main screen, typical example

	°C 3	
		

The screen shows that the dryer is running (the motor pictograph is shown) and that the dewpoint temperature is 3 °C. The flow switch and efficient mode are active.

The dryer has 4 modes that control the dryer motor:

- Regular mode and flow switch off
- Energy efficient mode and flow switch off
- Regular mode and flow switch on
- Energy efficient mode and flow switch on

See sections Calling up/modifying dryer regulation mode and Calling up/modifying flow switch function.

	Always consult Atlas Copco if <test> appears on the display.

Also consult section Scrolling through all screens.

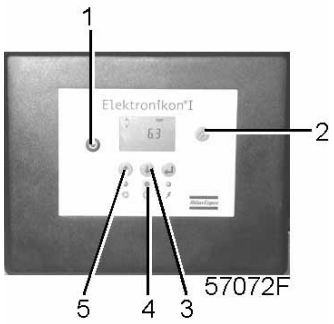
3.6 Shut-down warning

Description

A shut-down warning will appear in the event of:

- A too low dewpoint temperature
- A drain fault
- For units with filter option: pressure drop over the DD and PD filter too high.

Low dewpoint temperature



- If the dewpoint temperature exceeds the warning level (not programmable), alarm LED (4) will light up and the related pictograph will appear flashing.

Main screen with dewpoint temperature warning

	°C 1	
		flashing

The screen shows that the dewpoint temperature is 1 °C.

Drain alarm

The drain alarm appears when:

- During initial start-up it may indicate that the dryer is connected wrongly. See section Problem solving.
- The compressed air pressure is too low.
- The drain is not able to drain all the condensate.

Main screen with drain alarm

	°C 3	
	flashing	

Filter alarm

The filter alarm appears when:

- The pressure drop over the DD and PD filter is too high.

Main screen with filter alarm

	°C 3	
	flashing	

Remedy

- It remains possible to scroll through other screens (using keys 3 and 5) to check the actual status of other parameters.
- Press button (1) to stop the dryer.
- Switch off the voltage, inspect the dryer and remedy.
- The warning message will disappear as soon as the warning condition disappears.

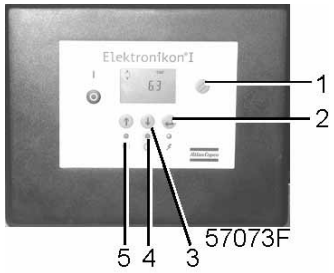
3.7 Shut-down

Description

The dryer will be shut down in case:

- LAT sensor is out of order

Motor overload



- The compressor will be shut-down, alarm LED (4) will flash, automatic operation LED (5) will go out and the following screen will appear:

Main screen with shut-down indication

	°C 2	
flashing		

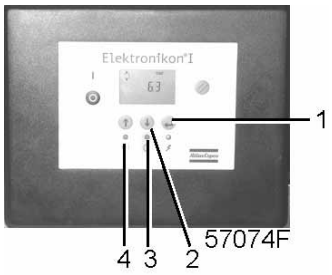
- Switch off the voltage and remedy the trouble.

- After remedying and when the shut-down condition has disappeared, switch on the voltage and restart the dryer.

3.8 Service warning

Description

A service warning will appear when the service timer has reached the programmed time interval.



- If the service timer exceeds the programmed time interval, alarm LED (3) will light up.
- Press arrow key (2) to scroll to <d04> and the service symbol is shown. Press key (1), the actual reading of the service timer appears and is shown in <hrs> or <x1000 hrs> (if the service timer value is higher than 9999).

Example of service timer screen

<d04>		
	<hrs> 4002	

The screen shows that the reading of the service timer is 4002.

- Press arrow key (2) to scroll to <d01> and the motor symbol is shown. Press key (1), the actual reading of the service timer appears and is shown in <hrs> or <x1000 hrs> (if the service timer value is higher than 9999).

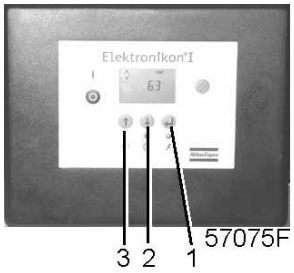
Example of running hours screen

<d01>		
	<hrs> 8000	

- Stop the dryer, switch off the voltage and carry out the service actions. See section Preventive maintenance schedule.
- After servicing, reset the service timer. See section Calling up/resetting service timer.

3.9 Scrolling through all screens

Control panel



Control panel

Scroll keys (2 and 3) can be used to scroll through all screens. The screens are divided into register screens; measured data screens, digital input screens (indicated as <d.in>, <d.01>, ...), parameter screens (indicated as <P.01>, <P.02>, ...) protections screens (indicated as <Pr.01>,...) and test screens (indicated as <t.01>,...).

During scrolling, the numbers of the screens appear consecutively. For most screens, the unit of measurement and the related pictograph are shown together with the screen number.

In the event of a warning or a shut-down, the corresponding pictograph is blinking on the main screen.

Example

	<hrs> <d.01>	

The screen shows the screen number <d.01>, the unit used <hrs> and the related pictograph for running hours. Press enter key (1) to call up the actual running hours.

In the event of a warning or a shut-down, the corresponding pictograph is blinking on the main screen.

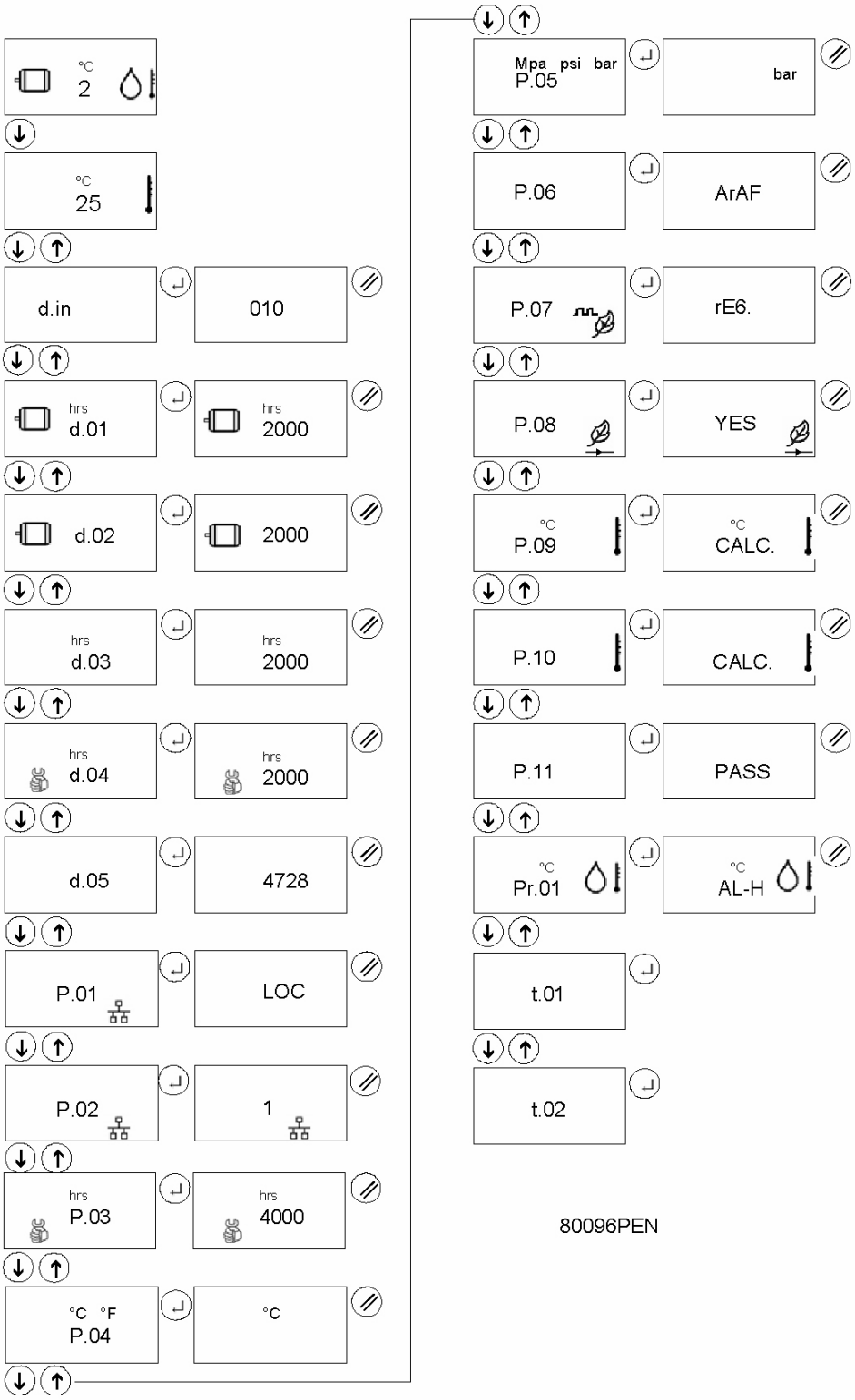
Overview of the screens

Digital input screen	Designation	Related topic
<d.in>	Digital input status	
<d.01>	Running hours (hrs or x1000 hrs)	See section Calling up running hours
<d.02>	Motor starts (x1 or x1000)	See section Calling up motor starts
<d.03>	Module hours (hrs or x1000 hrs)	See section Calling up module hours
<d.04>	Service timer reading (hrs or x1000 hrs)	See section Calling up/resetting service timer
<d.05>	Actual program version	

Parameter screen	Designation	Related topic
<P.01>	Selection between local, remote or LAN control	See section Selection between local, remote or LAN control
<P.02>	Setting a node ID for LAN control	See section Calling up/modifying node ID for LAN control
<P.03>	Modifying a service timer	See section Calling up/modifying service timer setting
<P.04>	Setting of unit for temperature	See section Calling up/modifying unit for temperature
<P.05>	Setting of unit for pressure	See section Calling up/modifying unit for pressure
<P.06>	Selection for function: Automatic restart after voltage failure (active or not, only for Atlas Copco)	See section Activating automatic restart after voltage failure
<P.07>	Setting dryer regulation mode	See section Calling up/modifying dryer regulation mode
<P.08>	Setting of flow switch	See section Calling up/modifying flow switch function
<P.09>	Setting compensation value for ambient temperature	See section Calling up/modifying compensation values for ambient temperature
<P.10>	Setting of ambient compensation method	See section Calling up/modifying ambient compensation method
<P.11>	Setting a password	See section Activating password protection

Test screen	Designation	Related topic
<t.01>	Display test	

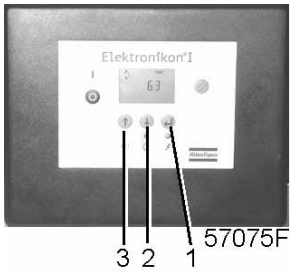
Menu flow



Simplified menu flow

3.10 Calling up ambient temperature

Control panel



Starting from the Main screen:

	°C 3	

- Press arrow key (2), the ambient temperature will be shown:
- The actual temperature is shown.
- Depending on the setting in <P.09> the ambient temperature will be shown with or without offset value.

	°C 25	

The screen shows that the ambient temperature is 25 °C.

- If <c> appears before the temperature the ambient temperature is shown with an offset to the actual ambient temperature. To call up the value for the temperature offset scroll to <P.09>.

c	°C 28	

The screen shows that the ambient temperature with offset is 28 °C.

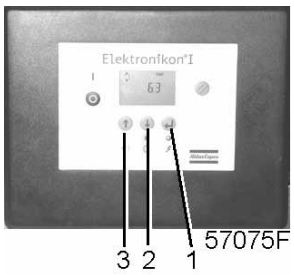
- If <F> appears before the temperature the ambient temperature is a fixed temperature. To call up the value for the ambient temperature scroll to <P.09>.

F	°C 20	

The screen shows that an ambient temperature of 20 °C is programmed.

3.11 Calling up running hours

Control panel



Starting from the Main screen:

	°C 3	

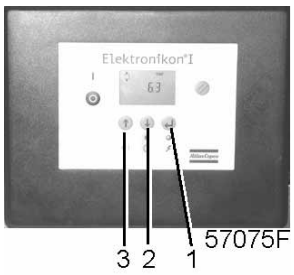
- Press arrow key (2) until <d.01> is shown and then press enter key (1):

	<x 1000 hrs> 11.25	

The screen shows the unit used <x1000 hrs> and the value <11.25>: the running hours of the dryer are 11250 hours.

3.12 Calling up motor starts

Control panel



Starting from the Main screen:

	°C 3	

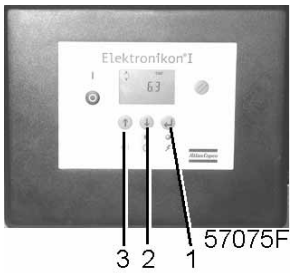
- Press arrow key (2) until <d.02> is shown and then press enter key (1):

	<x1000> 10.10	

This screen shows the number of motor starts times 1000 (times 1 or if <x1000> lits up times 1000). The number of motor starts is 10100.

3.13 Calling up module hours

Control panel



Starting from the Main screen:

	°C 3	

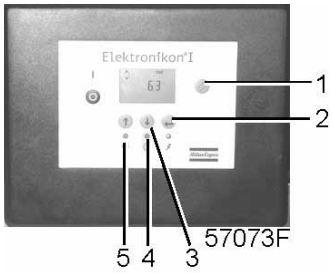
- Press arrow key (2) until <d.03> is shown and then press enter key (1):

	<hrs> 5000	

The screen shows the unit used <hrs> and the value <5000>: the module hours of the dryer are 5000 hours.

3.14 Calling up/resetting service timer

Control panel



Starting from the Main screen:

	°C 3	

- Press arrow key (3) until <d.04> is shown and then press enter key (2):

	<hrs> 1191	
		

This screen shows the unit used <hrs> (or <x1000> hours) and the value <1191>: the dryer has run 1191 hours since the previous service.

Resetting the service timer

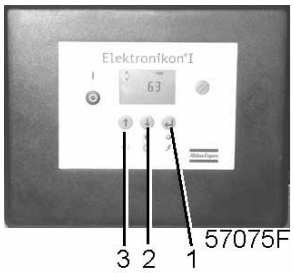
After servicing, see section Service warning, the timer has to be reset:

- Scroll to register screen <d.06> and press enter key (2).
- The reading (e.g. 4000) will appear.
- Press enter key (2), if a password is set enter the password.

  The reading will flash (indicating that resetting is possible).
- Press enter key (2) to reset the timer to <0.000> or press reset key (1) to cancel the operation.

3.15 Selection between local, remote or LAN control

Control panel



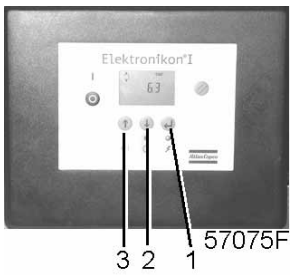
Starting from the Main screen:

	°C 3	

- Press arrow key (2) until <P.01> is shown and then press enter key (1). The actually used control mode is shown <LOC> for local control, <rE> for remote control or <LAn> for LAN control.
- Press enter key (1) and if necessary enter the password. The actually control mode is blinking. Use keys (2) and (3) to change the control mode.
- Press enter key (1) to program the new starting mode or press reset key to cancel.

3.16 Calling up/modifying node ID for LAN control

Control panel



Starting from the Main screen:

	°C 3	

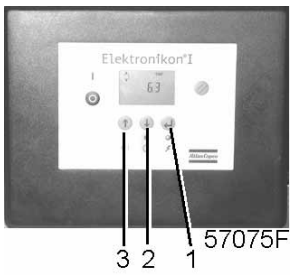
- Press arrow key (2) until <P.02> is shown and then press enter key (1). The actually used node ID is shown.

	1	
		

- Press enter key (1) and if necessary enter the password. The actually used node ID is blinking. Use keys (2) and (3) to change the node ID.
- Press enter key (1) to program the new node ID or press reset key to cancel.

3.17 Calling up/modifying service timer setting

Control panel



Starting from the Main screen:

	°C 3	

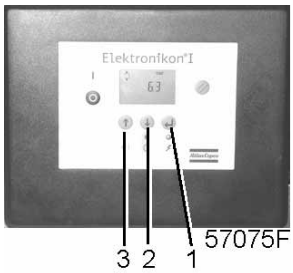
- Press arrow key (2) until <P.03> is shown and then press enter key (1): the setting of the service timer is shown in <hrs> (hours) or <x1000 hrs> (hours x 1000). Example: <4000 hrs> means the timer is set at 4000 running hours.

	hrs 4000	
		

- Press enter key (1) to modify this value (a password may be required), the value blinks. Use arrow keys (2 and 3) to modify this setting.
- Press enter key (1) to program the new value and to return to the parameter screen.

3.18 Calling up/modifying unit for temperature

Control panel



Starting from the Main screen:

	°C 3	

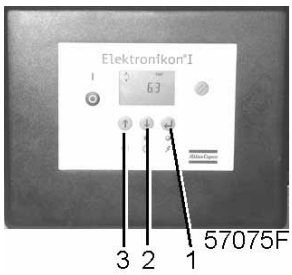
- Press arrow key (2) until <P.04> is shown and then press enter key (1). The possible settings are: <°C> and <°F>; the actually used unit is shown.

	°C	

- Press enter key (1) (unit blinks) and use arrow keys (2 and 3) to select another unit for temperature.
- Press enter key (1) to program the new unit and press reset key to return to the parameter screen.

3.19 Calling up/modifying unit for pressure

Control panel



Starting from the Main screen:

	°C 3	

- Press arrow key (2) until <P.05> and the possible settings are shown (<MPa>, <psi>, and <bar>); press enter key (1) and the actually used unit is shown.

	MPa	

- Press enter key (1) (unit starts blinking) and use arrow keys (2 and 3) to select another unit for pressure.
- Press enter key (1) to program the new unit for pressure and press reset key to return to the parameter screen.

3.20 Activating automatic restart after voltage failure

Description

This parameter, accessible in screen <P.06>, can only be modified after entering a code. Consult Atlas Copco if this function should be activated.

3.21 Calling up/modifying dryer regulation mode

Description

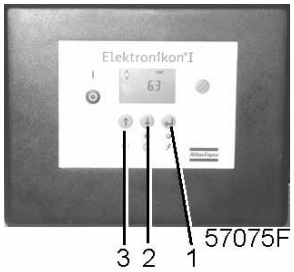
The dryer has two regulation modes:

- Regular mode

  The dryer regulates to a fixed dewpoint
- Energy efficient mode

  The dryer will regulate the dewpoint between best achievable dewpoint and safe dewpoint.

Control panel



Starting from the Main screen:

	°C 3	

- Press arrow key (2) until <P.07> is shown and then press enter key (1): the actual dryer regulation mode is shown <rEG> (regular mode) or <En.EF.> (Engergy efficient mode)

	<rEG.>	

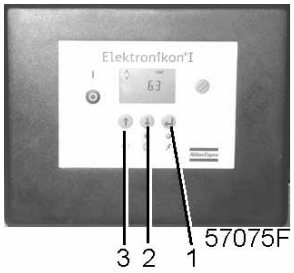
- Press enter key (1) to modify this value (a password may be required), the value blinks. Use arrow keys (2 and 3) to modify this setting.
- Press enter key (1) to program the new value and to return to the parameter screen.

3.22 Calling up/modifying flow switch function

Description

The flow switch monitors the compressed air flow through the dryer. When no flow is detected the regulator stops the dryer. The regulator will restart the dryer when air flows through the dryer.

Control panel



Starting from the Main screen:

	°C 3	

- Press arrow key (2) until <P.08> is shown and then press enter key (1): the actual flow switch parameter is shown <YES> (flow switch function is swiched on) or <no> (flow switch function is switched off)

	<YES>	
		

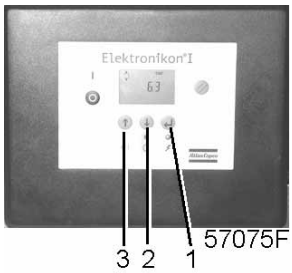
- Press enter key (1) to modify this value (a password may be required), the value blinks. Use arrow keys (2 and 3) to modify this setting.
- Press enter key (1) to program the new value and to return to the parameter screen.

3.23 Calling up/modifying compensation values for ambient temperature

Description

In this parameter an offset value for the ambient temperature or a fixed value for the ambient temperature can be programmed.

Control panel



Starting from the Main screen:

	°C 3	

- Press arrow key (2) until <P.09> is shown and then press enter key (1): <CALC.> (value for temperature offset) is shown on the screen.

	°C <CALC.>	

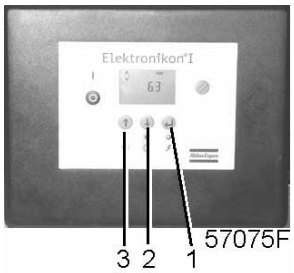
- By pressing the arrow key (2) <FAST> appears (fixed value for the ambient temperature).
- Select the parameter by pressing enter key (1) to modify this value (a password may be required), the value blinks. Use arrow keys (2 and 3) to modify this setting.
- Press enter key (1) to program the new value and to return to the parameter screen.

3.24 Calling up/modifying ambient compensation method

Description

This parameter defines which ambient temperature the regulator uses. The values are defined in screen <P.09>.

Control panel



Starting from the Main screen:

	°C 3	

- Press arrow key (2) until <P.10> is shown and then press enter key (1): the active compensation method appears <CALC.> (actual ambient temperature with or without temperature offset) or <FAST> (fixed value for the ambient temperature) is shown on the screen.

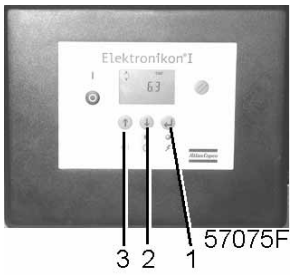
	<CALC.>	

- Press enter key (1) to modify this value (a password may be required), the value blinks. Use arrow keys (2 and 3) to modify this setting.
- Press enter key (1) to program the new value and to return to the parameter screen.

3.25 Activating password protection

Control panel

Important settings such as the setting of the service timer, pressure band setting, control mode settings,... can be protected by a password.



Starting from the Main screen:

	°C 3	

- Press arrow key (2) until <P.12> is shown and then press enter key (1):

	<PASS>	

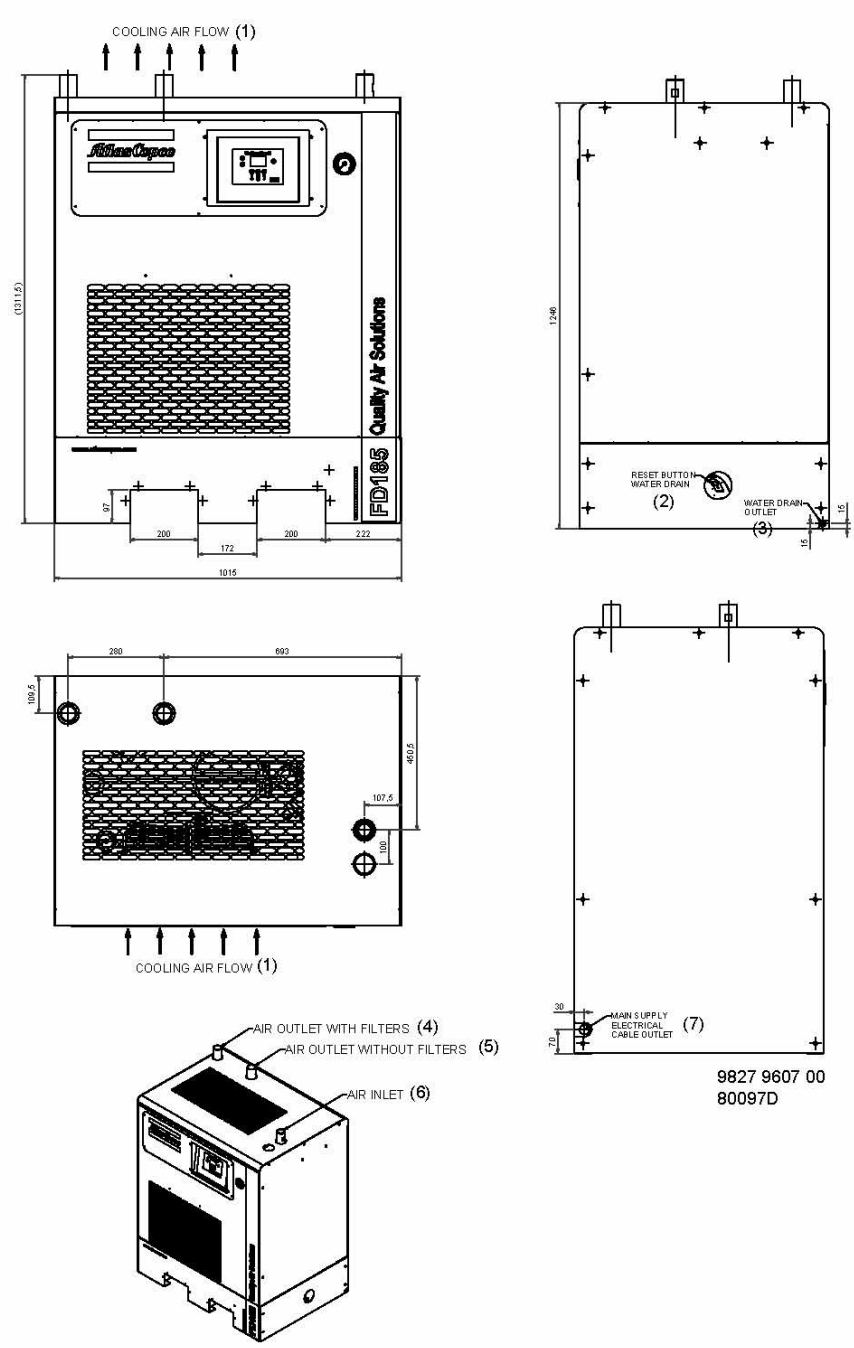
- Password <PASS> appears on the screen. Press enter key (1).
- The screen shows the password status: on <On> or off <OFF>. Press enter key (1) to modify.
- Change the value with scroll keys (2) and (3).
- Select <On> and press enter key (1).
- Enter the new password and press enter key (1) to confirm.
- Enter the password again and press enter key (1) to confirm.
- <On> appears on the display. Press reset key to return to the parameter screen.

	Lost passwords can not be recovered. Remember the password carefully.

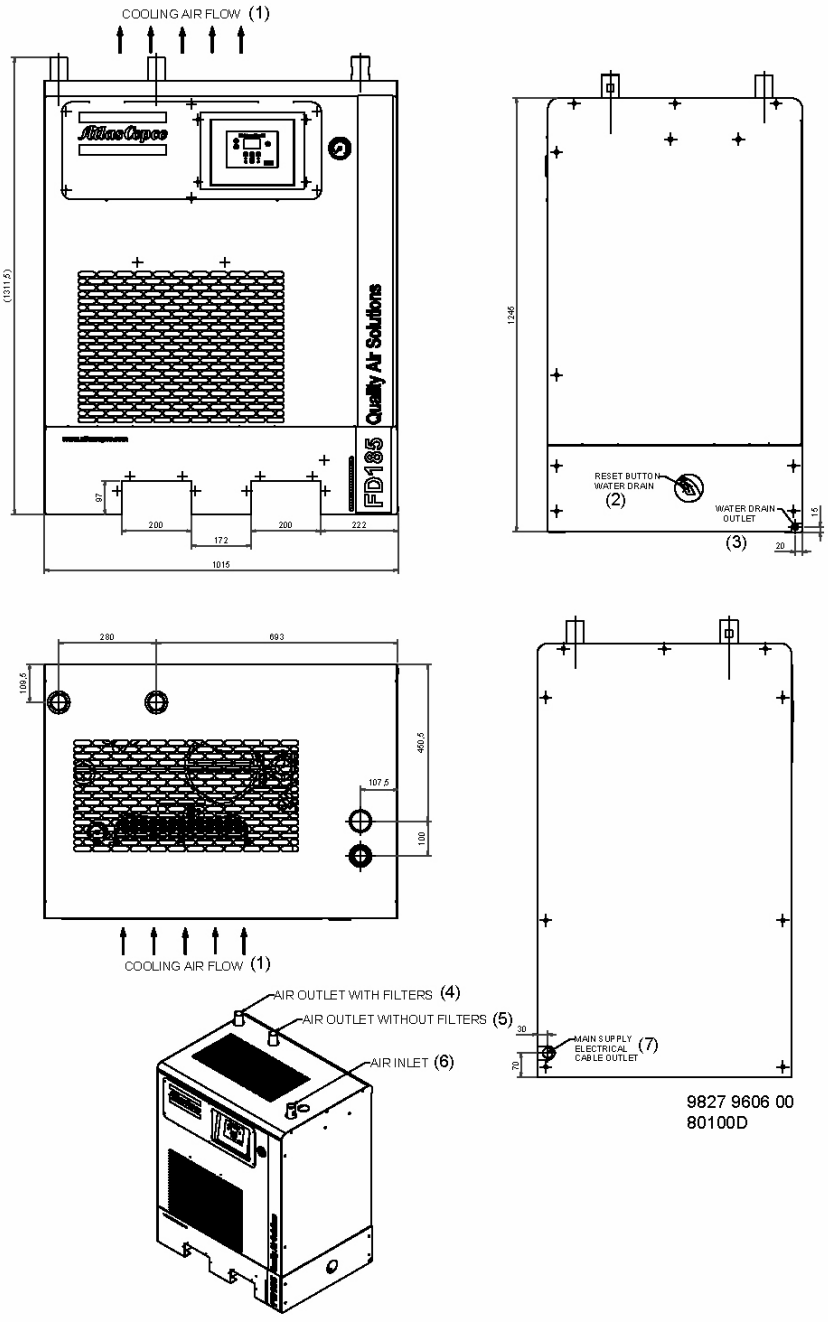
4 Installation

4.1 Dimension drawings

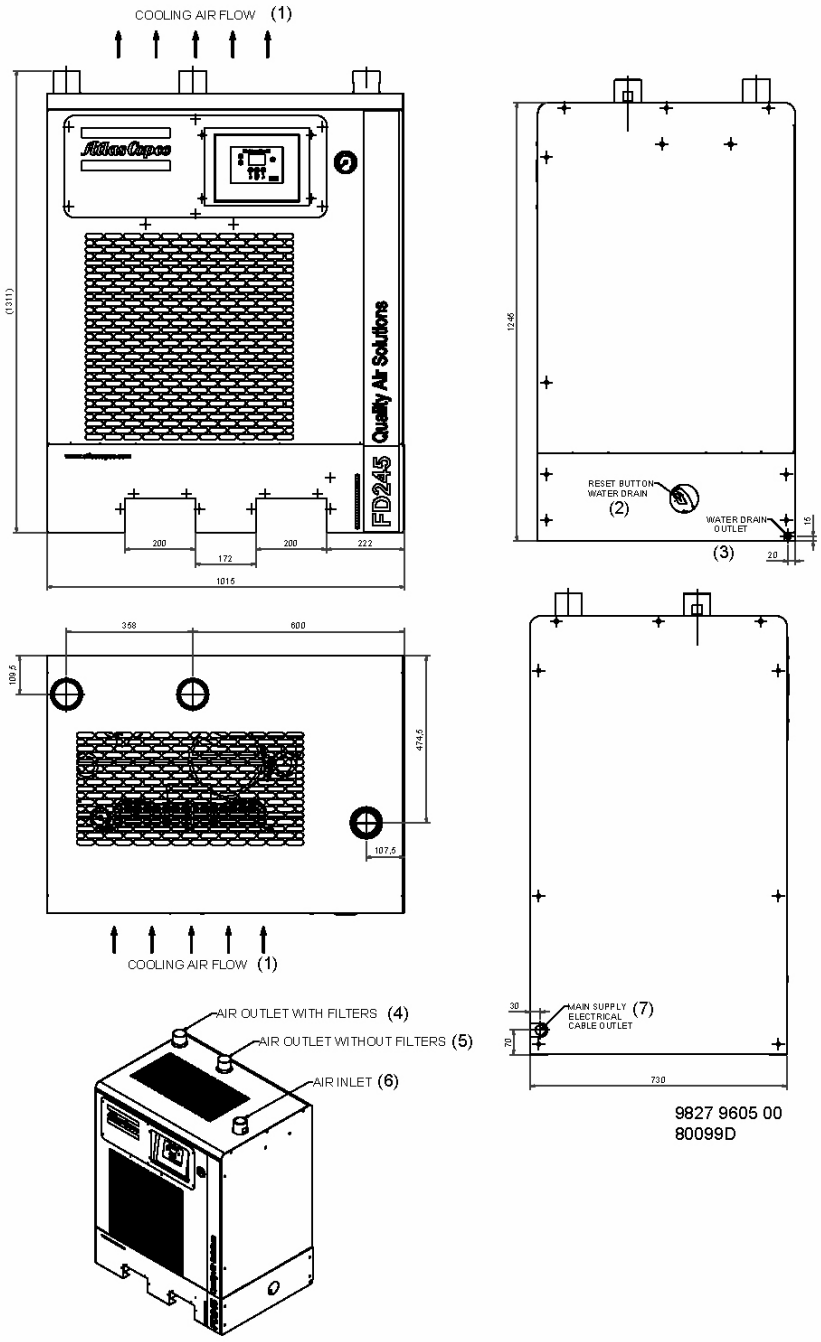
Drawings



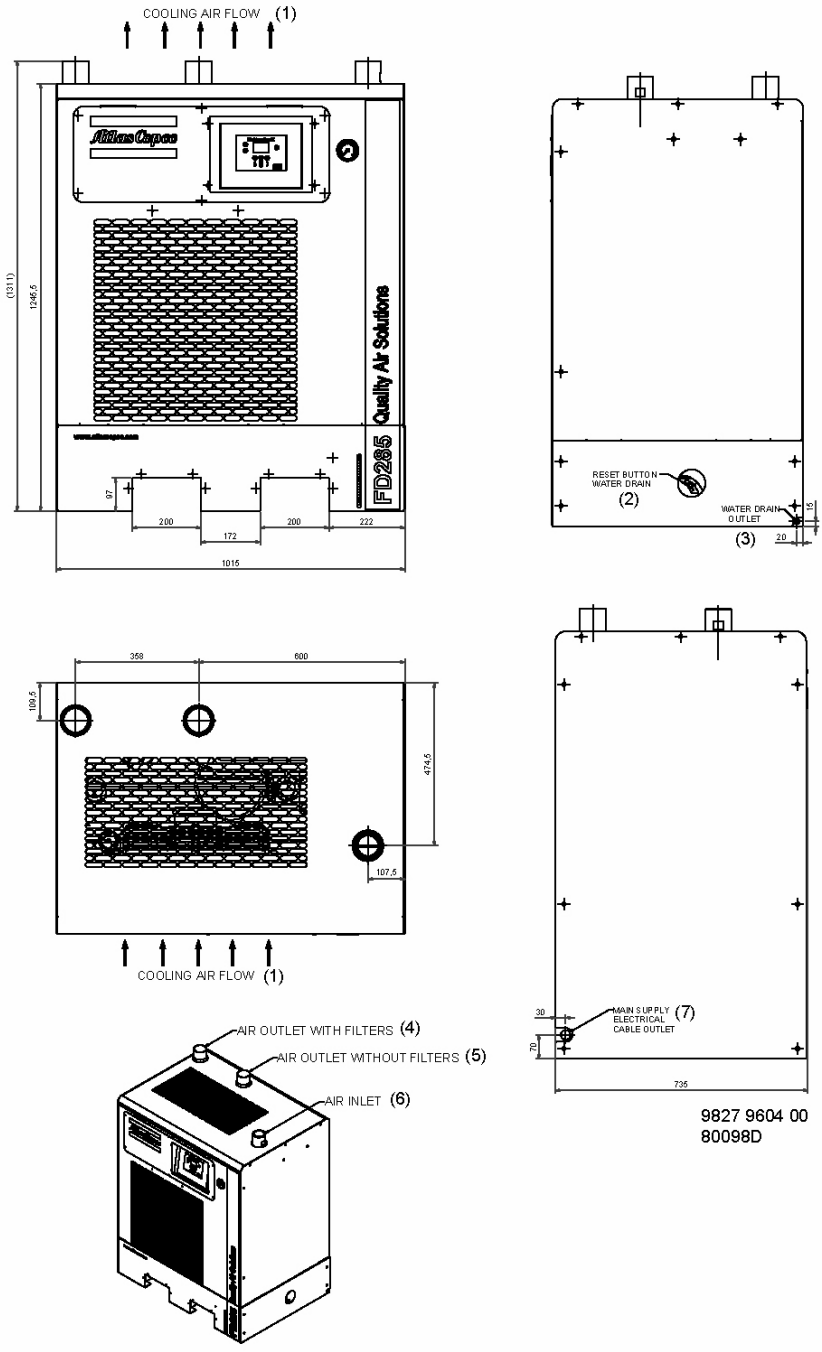
Dimension drawing of FD 120 and FD 150



Dimension drawing of FD 185



Dimension drawing of FD 220 and FD 245



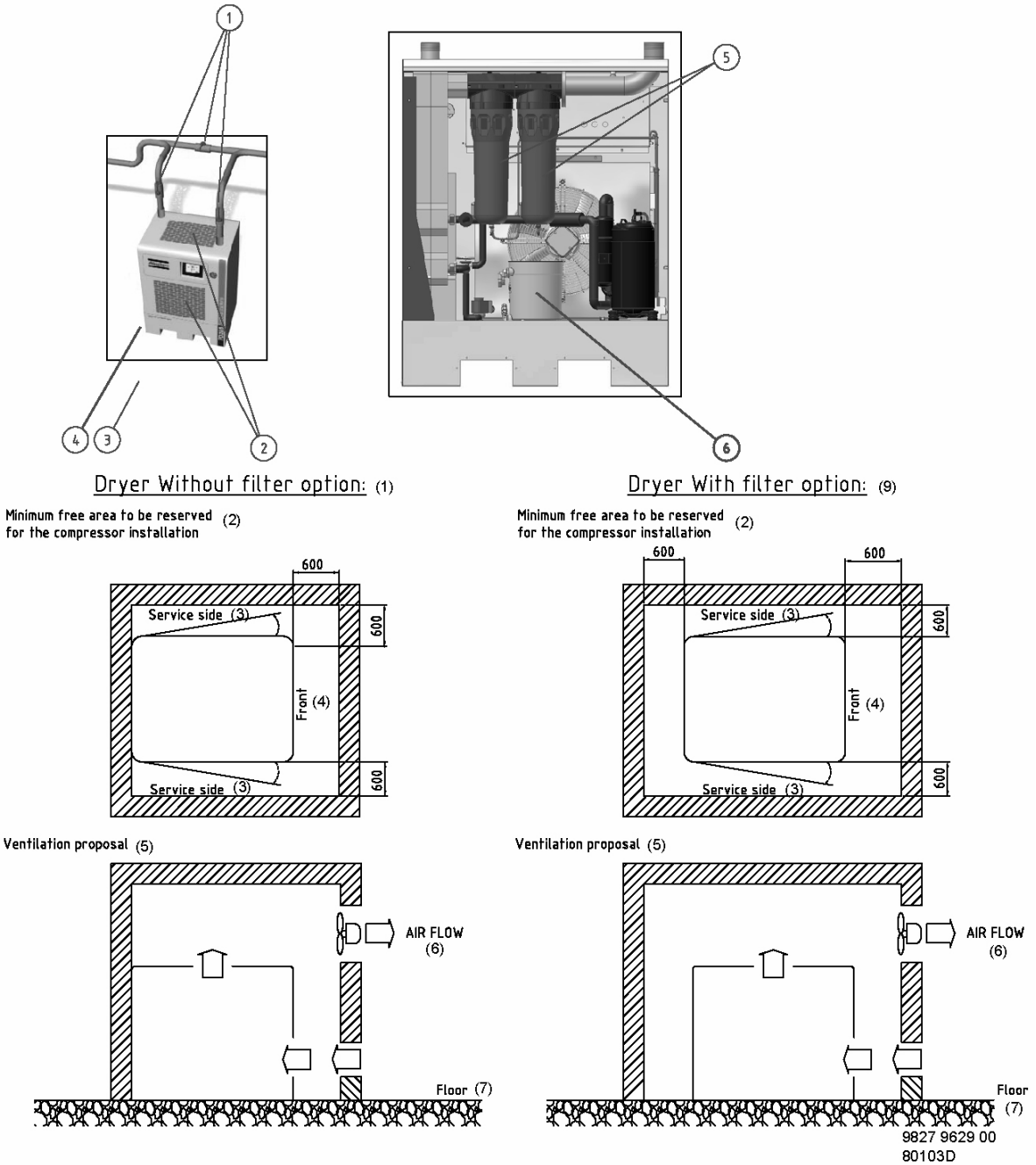
Dimension drawing of FD 285

Reference	Description
1	Cooling air flow
2	Test button, condensate drain

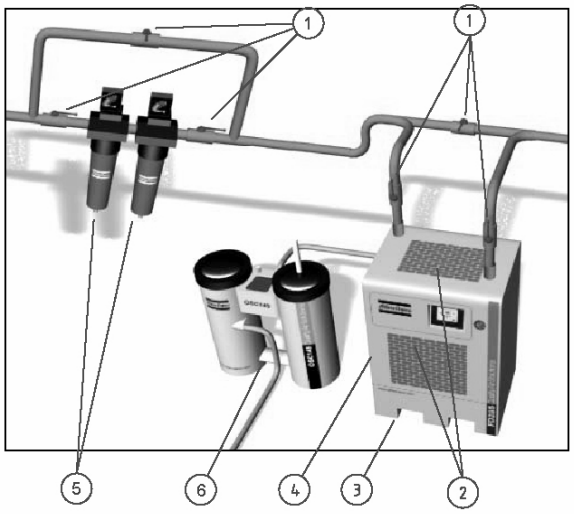
Reference	Description
3	Condensate drain outlet
4	Air outlet for units with filter option
5	Air outlet for units without filter option
6	Air inlet
7	Electrical cable entry

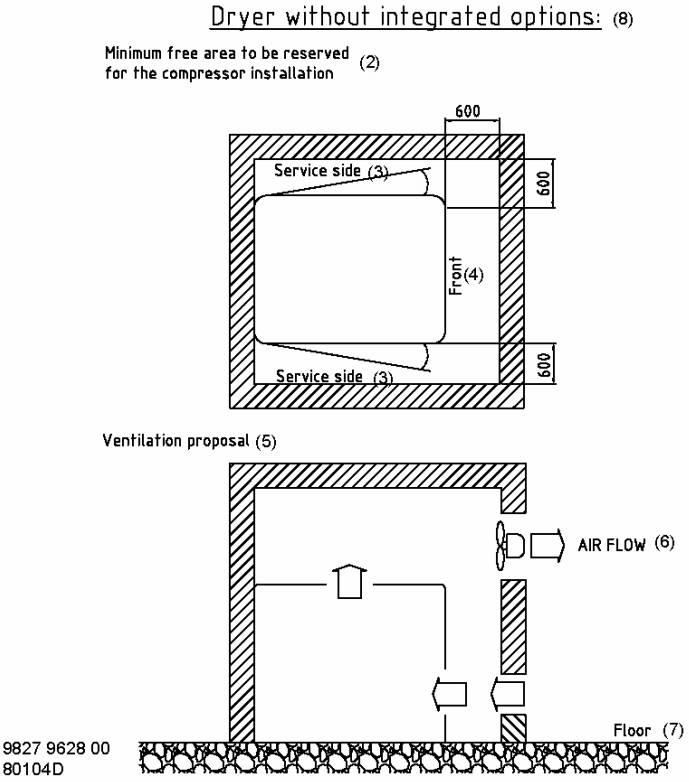
4.2 Installation proposal

Example of compressor room



Installation proposal with integrated options





Installation proposal without integrated options

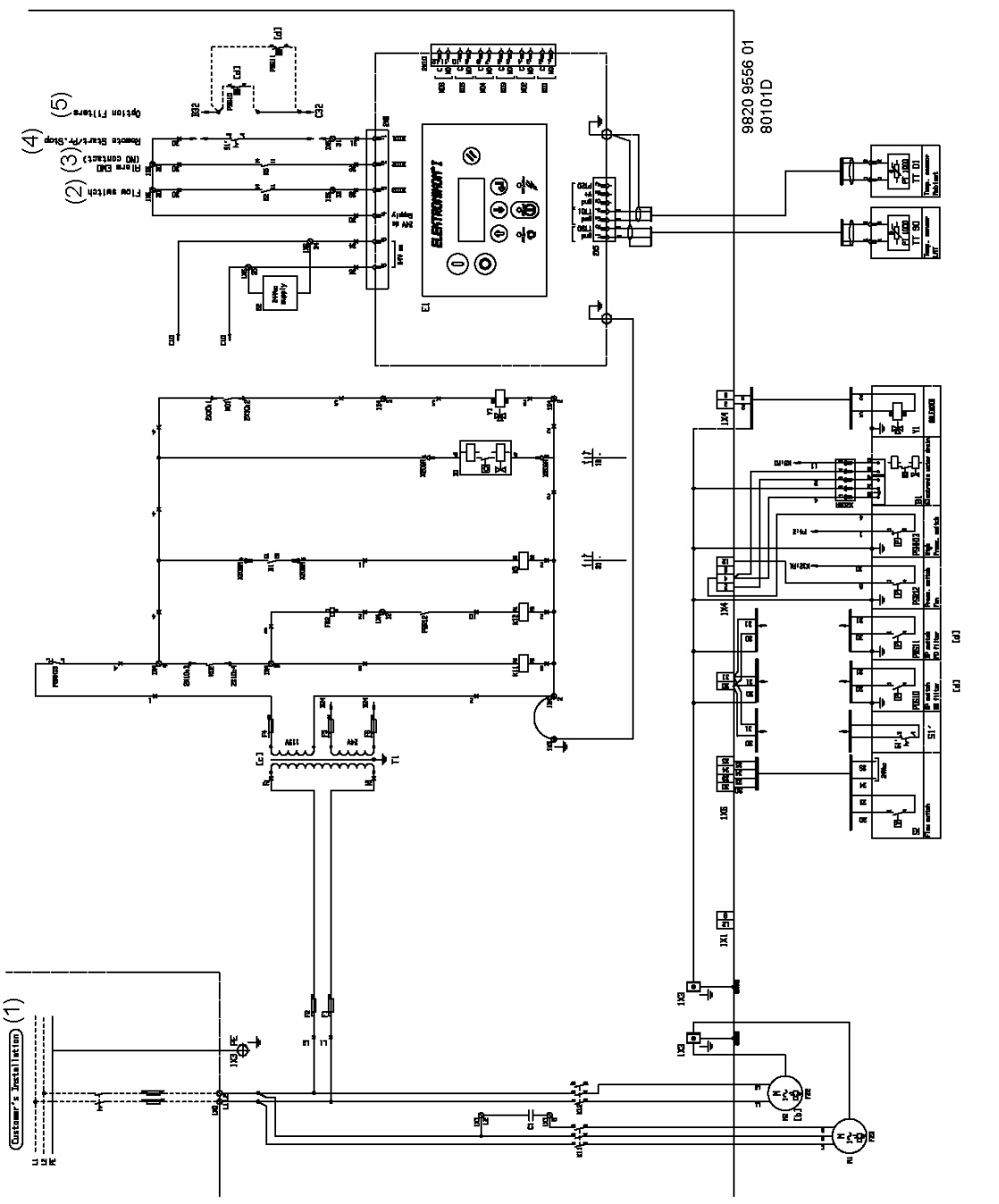
Reference	Description
1	It is recommended to install by-pass pipes over the dryer with by-pass valves in order to isolate the dryer during service operations, without disturbing the compressed air delivery. For dryers without integrated filters it is recommended to install the filters downstream the dryer with by-pass valves.
2	The inlet grids and ventilation fan should be installed in such way that any recirculation of the cooling air is avoided. The maximum air velocity through the grids is 5 m/s (16.5 ft/s). The maximum allowable pressure drop over the cooling air ducts is 30 Pa (0.12 in wc). When 30 Pa is exceeded a ventilation fan should be installed at the outlet of the cooling air ducts.
3	The refrigerant air dryer should be installed on a level floor suitable for taking the weight of the dryer.
4	Power supply cable to be sized and installed by a qualified electrician.
5	Optionally DD and PD filters can be provided. Filter, type DD for general purpose (optional). The filter traps solids particles down to 1 micron with a max. oil carry-over of 0.5 mg/m^3. A high-efficiency filter, type PD (optional), may be installed downstream of a DD filter. This filter traps solid particles down to 0.01 micron with a max. oil carry-over of 0.01 mg/m^3. If oil vapours and odours are undesirable, a QD type filter should be installed downstream of the PD filter.
6	The condensate drain pipes must not dip into the water of the drain collector. Do not allow untreated condensate to enter the draining system. Optionally an integrated OSD can be provided. For units without integrated OSD an OSC separator can be installed to separate the oil from the water.
(1)	Dryer without filter option
(2)	Minimum free area to be reserved for the compressor installation
(3)	Service side
(4)	Front
(5)	Ventilation proposal
(6)	Air flow
(7)	Floor
(8)	Dryer without integrated options
(9)	Dryer with filter option

4.3 Electrical connections

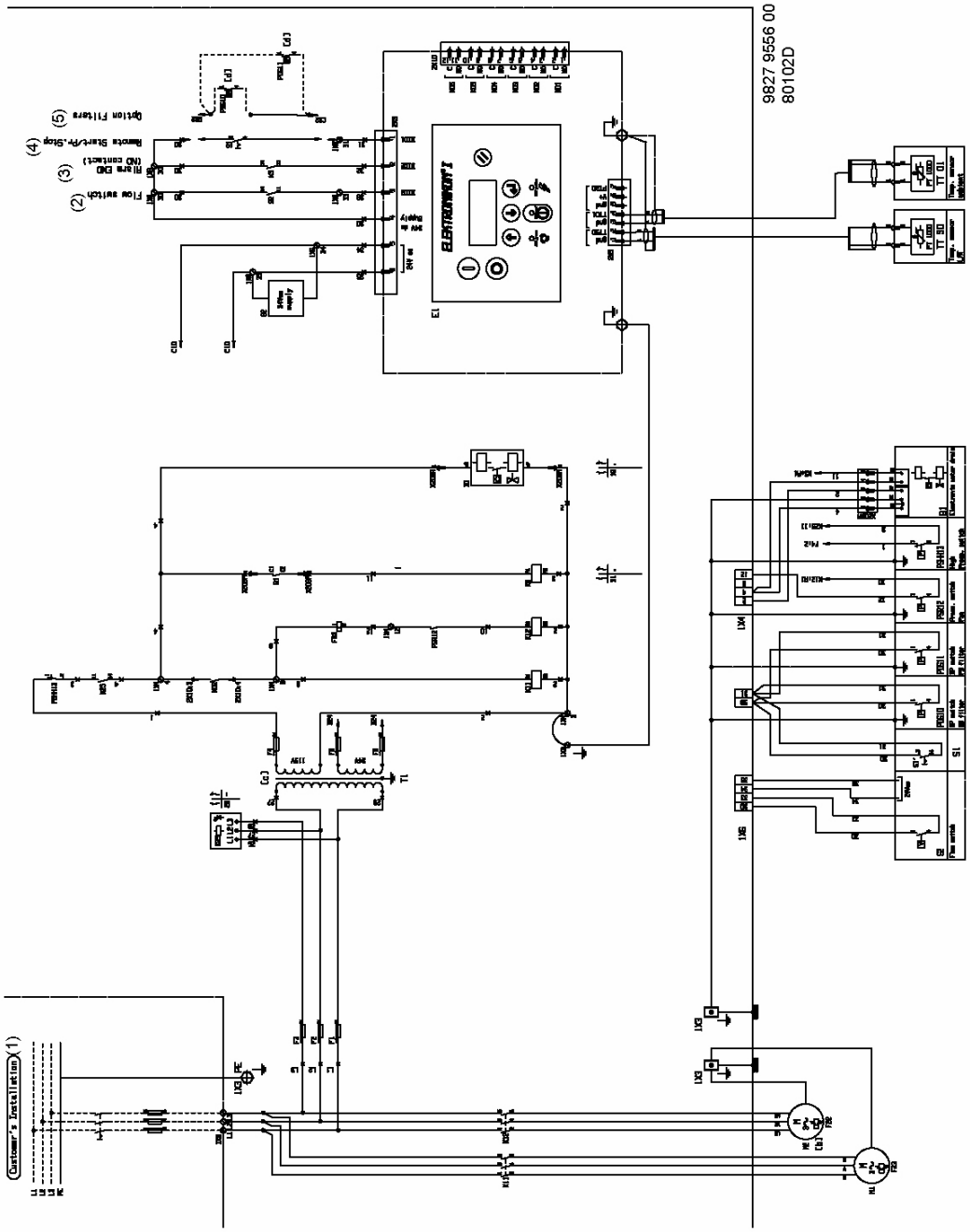
Electrical connections

1. Provide an isolating switch nearby the dryer.
2. Check that the electric cables and wires inside the electric cabinet are clamped tight to their terminals.
3. Check the fuses and the setting of the overload relay. See section Settings of fuses
4. On single-phase units: connect the power supply cables to terminals L1, L2 of terminal strip (1X0).

5. On three-phase units: connect the power supply cables to terminals L1, L2, L3 of terminal strip (1X0).
6. Connect the earth conductor to earth bolt (1X3).



Electrical diagram for single-phase units



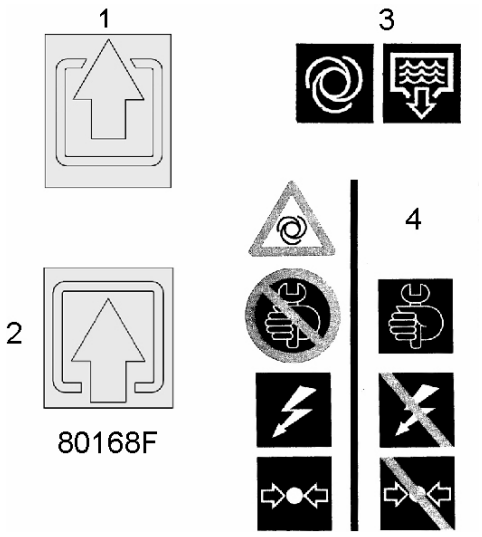
Electrical diagram for three-phase units

Reference	Designation
(1)	Customer's installation
(2)	Flow switch
(3)	Alarm EWD
(4)	Remote start/stop
(5)	Option filters

Reference	Designation
B1	Electronic drain
1X0/6	Terminals
DS10	Dp switch, DD filter
F1-6	Fuses
F23	Internal protection
K02	Relay ON/OFF compressor and fan
K03	Auxiliary relay, general warning
K04	Auxiliary relay, general shut-down
K05/6	Auxiliary relay, forced drain
K11	Contact compressor
K12	Contact fan motor
K25	Phase sequence relay
K5	Auxiliary relay (alarm functions)
M1	Compressor
M2	Fan motor
PDS11	Dp switch, PD filter
PSHH13	High pressure switch
PSR11	Fan switch
S1'	Remote start/stop
S2	Flow switch
X209	Connector

4.4 Pictographs

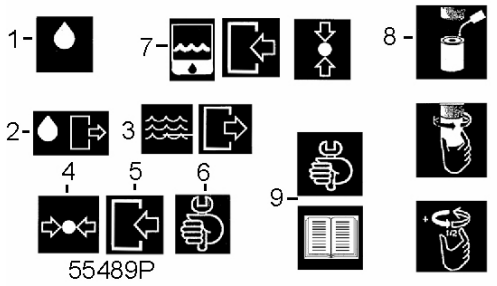
Pictographs



Pictographs

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

Pictographs shown on OSD



Reference	Description
1	Oil
2	Oil outlet
3	Condensate outlet
4	Pressure
5	Inlet
6	Service point drain
7	Separator inlet pressure
8	Oil gasket, screw on filter and tighten by hand (approx. half a turn)
9	Consult instruction leaflet before carrying out maintenance or repair

5 Operating instructions

5.1 Warnings

Safety precautions

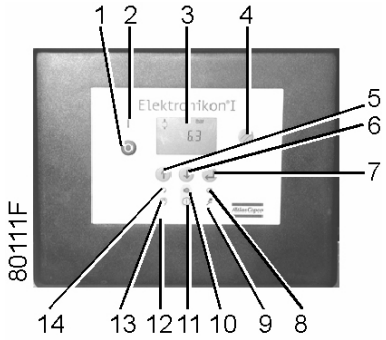
The operator must apply all relevant Safety precautions, including those mentioned in this manual.

Altitude operation

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

5.2 Initial start

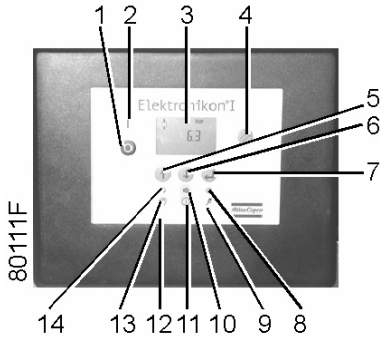
Procedure



Step	Action
1	At least 10 minutes before starting, the main supply to the dryer must be switched on to initialize the Elektronikon and flow switch.
2	Press start button (2). After a few seconds the dryer is started. • Three-phase units are provided with a phase sequence relay. When the dryer does not start, switch off the voltage and reverse two incoming electric lines.

5.3 Starting

Control panel

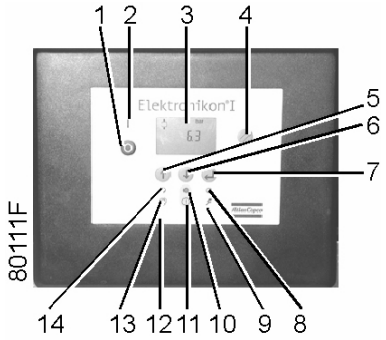


Procedure

Step	Action
-	At least 1 minute before starting, the main supply to the dryer must be switched on to initialize the Elektronikon and flow switch.
-	If installed, close the dryer by-pass valve.
-	Press start button (2). After a few seconds the dryer is started.
-	Open the dryer air inlet valve (customer's installation).
-	Approx. 5 minutes later, open the dryer air outlet valve (customer's installation).
-	Approx. 10 minutes later, the nominal dewpoint will be reached.

5.4 During operation

Description



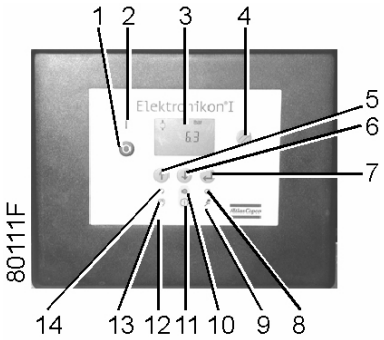
Control panel

Regularly check:

- The pressure dewpoint on the display of the control panel. The pressure dewpoint will deviate from nominal if the air inlet conditions or volume flow differ from nominal.
- That condensate is discharged. The amount depends on the operating conditions.

5.5 Stopping

Control panel



Procedure

Step	Action
1	Close dryer inlet and outlet valves (customer's installation).
2	Press stop button (1). The dryer stops. Voltage on LED (4) remains lit. Leave the voltage on if the dryer has to remain on stand-by.

6 Maintenance instructions

6.1 Maintenance instructions

Attention

Cooling dryers of FD type contain refrigerant HFC.

Safety precautions

When handling refrigerant R410a, 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. In case of contact 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 R410a is poisonous. Do not inhale refrigerant vapours. Check that the working area is adequately ventilated.

When removing the side panels of the dryer, be aware that internal elements such as the pipes can reach a temperature of 110°C (230°F). Therefore, wait until the dryer has cooled down before removing the side 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 authorised control body.
- The installation should be checked once a year by an authorised control body.

General

The following remarks should be kept in mind:

- Keep the dryer clean.
- Brush or blow off the finned surface of the condenser regularly.
- Inspect and clean the electronic condensate drain once a year.

For dryers equipped with optional filter(s) (DD and/or PD)

- Regularly check differential pressure indicators.
- Regularly check the oil level of the oil can. 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.
- For DD and PD filters, change the filter element yearly or when the pressure drop reaches approx. 0.35 bar (5 psi), as indicated by the differential pressure indicators.

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

- Regularly check the pressure gauge on the control panel.
- Regularly check the oil level of the oil can. 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 the oil separator every 6000 operating hours or when the pressure gauge on the control panel reaches a pressure differential of 2 bar (29 psi).

7 Problem solving

7.1 Problem solving

Faults and remedies

Condition	Fault	Remedy
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 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

Condition	Fault	Remedy
Condenser pressure too high or too low	Fan control switch out of order	Replace
	Fan 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 place or relocate dryer
	Condenser externally clogged	Clean condenser

Condition	Fault	Remedy
Compressor stops or does not start	Electric power supply to compressor is interrupted	Check and correct as necessary
	Thermic protection of refrigerant compressor motor has tripped	Motor will restart when motor windings have cooled down
	On three-phase units, phase sequence relay fault indication	Reverse two incoming electric lines.

Condition	Fault	Remedy
Condensate trap remains inoperative	Automatic drain system clogged	Flush the assembly by opening manual drain valve. Have system inspected
		Clean the inlet filter of the automaitc drain

Condition	Fault	Remedy
Condensate trap continuously discharges air and water	Automatic drain system out of order	Have system checked, if necessary replace automatic drain

Condition	Fault	Remedy
Evaporator pressure is too high or too low at unload	Hot gas by-pass valve incorrectly set or out of order	Have hot gas by-pass valve adjusted
	Shortage of refrigerant	Have circuit checked for leaks and recharged

Drain alarm visable (red light and blinking drain symbol)

Condition	Fault	Remedy
Drain alarm	No pressure in the air net	Error disappears when the pressure in the air net is restored
	Drain was not able to drain all the water	Push drain button manually. When this occurs frequently the drain should be replaced
	No voltage supply to the drain	Check and correct supply to the drain

Condition	Fault	Remedy
Phase sequence relay shut down	Voltage supply connected wrong	Reverse two incoming electric lines. Also correct the rotation direction of the fan motor; if necessary change wiring K12:1, K12:3

Condition	Fault	Remedy
High pressure switch has shut down the dryer	Condensing pressure too high	Push the small button of the high pressure switch
		Clean condenser
		Improve ventilation of the cooling air

Dewpoint alarm visable (red light and blinking dewpoint symbol)

Condition	Fault	Remedy
Dryer does not start	Circuit has not cooled down	Wait 1 minute before restarting the dryer

Condition	Fault	Remedy
Too high flow or inlet temperature too high	Dryer sizing too small	Try running in regular mode

Condition	Fault	Remedy
Phase sequence relay shut down	Voltage supply connected wrong	Reverse two incoming electric lines. Also correct the rotation direction of the fan motor if necessary change wiring K12:1, K12:3

Condition	Fault	Remedy
High pressure switch has shut down the dryer	Condensing pressure too high	Push the small button of the high pressure switch
		Clean condenser
		Improve ventilation of the cooling air

Condition	Fault	Remedy
Dewpoint alarm visable	LAT sensor in wrong position	Place the switch in the correct position

8 Technical data

8.1 Settings of fuses

Overload relay and fuses

		FD 120	FD 150	FD 185
Frequency (Hz)	**Voltage (V)**	**Main fuses, compressor supply (A)**	**Main fuses, compressor supply (A)**	**Main fuses, compressor supply (A)**
IEC		gL/gG	gL/gG	gL/gG
50	230	16	16	16
60	220	--	--	--
cUL				
50	230	--	--	--
60	220	15	15	15

		FD 220	FD 245	FD 285
Frequency (Hz)	**Voltage (V)**	**Main fuses, compressor supply (A)**	**Main fuses, compressor supply (A)**	**Main fuses, compressor supply (A)**
IEC		gL/gG	gL/gG	gL/gG
50	230	20	20	20
60	220	--	--	--
50	400	16	16	16
60	460	--	--	--
cUL				
50	230	--	--	--
60	220	20	20	20
50	400	--	--	--
60	460	15	15	15

8.2 Reference conditions and limitations

Reference conditions

	Unit	50 Hz	60 Hz
Compressed air inlet pressure	bar(e)	7	7
Compressed air inlet pressure	psig	101.53	101.53
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 dewpoint	°C	3	3
Pressure dewpoint	°F	37.4	37.4
Cooling air inlet temperature	°C	25	38
Cooling air inlet temperature	°F	77	100.4

Limits

	Unit	50 Hz	60 Hz
Maximum compressed air inlet pressure	bar(e)	13	13
Maximum compressed air inlet pressure	psig	188.55	188.55
Min.-max. ambient air temperature	°C	1-46	1-46
Min.-max. ambient air temperature	°F	34-115	34-115
Min.-max. compressed air inlet temperature	°C	1-61	1-61
Min.-max. compressed air inlet temperature	°F	34-142	34-142

8.3 Air dryer data

Specific data

Air dryer type		Units	FD 120	FD 150	FD 185
Volume flow at dryer inlet under nominal conditions	50 Hz	l/s	120	150	185
Volume flow at dryer inlet under nominal conditions	50 Hz	cfm	254	317.6	391.7
Volume flow at dryer inlet under nominal conditions	60 Hz	l/s	110	140	170
Volume flow at dryer inlet under nominal conditions	60 Hz	cfm	232.9	296.4	359.9
Pressure drop over dryer under nominal conditions without filters, approx.	50 Hz	bar	0.11	0.16	0.22

Air dryer type		Units	FD 120	FD 150	FD 185
Pressure drop over dryer under nominal conditions without filters, approx.	50 Hz	psi	1.60	2.32	3.19
Pressure drop over dryer under nominal conditions without filters, approx.	60 Hz	bar	0.11	0.16	0.22
Pressure drop over dryer under nominal conditions without filters, approx.	60 Hz	psi	1.60	2.32	3.19
Refrigerant					
Type			R410a	R410a	R410a
Total charge (approx.)		kg	0.90	0.90	1
Total charge (approx.)		lb	1.89	1.89	2.21
Dryer mass (approx.)		kg	157	157	165
Dryer mass (approx.)		lb	346	346	364

Air dryer type		Units	FD 220	FD 245	FD 285
Volume flow at dryer inlet under nominal conditions	50 Hz	l/s	220	245	285
Volume flow at dryer inlet under nominal conditions	50 Hz	cfm	465.7	518.7	603.4
Volume flow at dryer inlet under nominal conditions	60 Hz	l/s	220	230	285
Volume flow at dryer inlet under nominal conditions	60 Hz	cfm	465.7	486.9	603.4
Pressure drop over dryer under nominal conditions without filters, approx.	50 Hz	bar	0.12	0.18	0.22
Pressure drop over dryer under nominal conditions without filters, approx.	50 Hz	psi	1.74	2.61	3.19
Pressure drop over dryer under nominal conditions without filters, approx.	60 Hz	bar	0.12	0.18	0.22
Pressure drop over dryer under nominal conditions without filters, approx.	60 Hz	psi	1.74	2.61	3.19
Refrigerant					
Type			R410a	R410a	R410a
Total charge (approx.)		kg	1.40	1.40	1.40
Total charge (approx.)		lb	3.09	3.09	3.09
Dryer mass (approx.)		kg	185	185	185
Dryer mass (approx.)		lb	408	408	408

9 PED

9.1 Pressure equipment directives

Components subject to 97/23/EC Pressure Equipment Directive

Components subject to 97/23/EC Pressure Equipment Directive greater than or equal to category II

Dryer type	Part number	Description	PED Class
FD 120 up to FD 285	1089 9139 14	High pressure switch	IV

Overall rating

The dryer is conform to PED category I.

FD 120, FD 150, FD 185, FD 220, FD 245, FD 285

Instruction Book

What sets Atlas Copco apart as a company is our conviction that we can only excel in what we do if we provide the best possible know-how and technology to really help our customers produce, grow and succeed.

There is a unique way of achieving that - we simply call it the Atlas Copco way. It builds on **interaction**, on long-term relationships and involvement in the customers' process, needs and objectives. It means having the flexibility to adapt to the diverse demands of the people we cater for.

It's the **commitment** to our customers' business that drives our effort towards increasing their productivity through better solutions. It starts with fully supporting existing products and continuously doing things better, but it goes much further, creating advances in technology through **innovation**. Not for the sake of technology, but for the sake of our customer's bottom line and peace-of-mind.

That is how Atlas Copco will strive to remain the first choice, to succeed in attracting new business and to maintain our position as the industry leader.