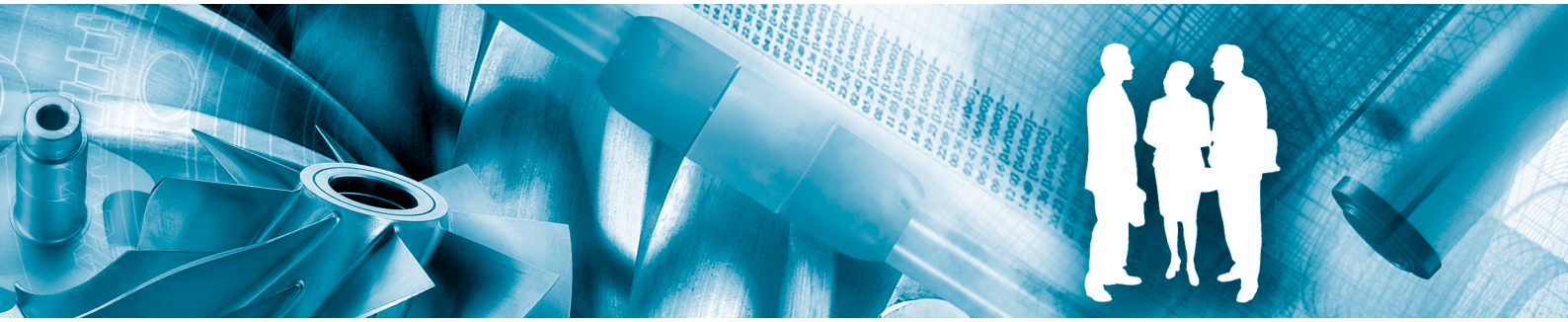
Atlas Copco

Oil-injected rotary screw compressors



GA 11+, GA 15+, GA 18+, GA 22+, GA 26+, GA 30

Instruction book

Atlas Copco

Atlas Copco

Oil-injected rotary screw compressors

GA 11+, GA 15+, GA 18+, GA 22+, GA 26+, GA 30

From following serial No. onwards: API 310 000

Instruction book

Original instructions

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

2009 - 12

No. 2920 7082 81
Replaces No. 2920 7082 80

www.atlascopco.com

Table of contents

1 Safety precautions

1.1 Safety icons

Explanation

	Danger for life
	Warning
	Important note

1.2 Safety precautions, general

General precautions

1. The operator must employ safe working practices and observe all related work safety requirements and regulations.
2. If any of the following statements does not comply with the applicable legislation, the stricter of the two shall apply.
3. Installation, operation, maintenance and repair work must only be performed by authorized, trained, specialized 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 the applicable 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 depressurize 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.
7. The owner is responsible for maintaining the unit in safe operating condition. Parts and accessories shall be replaced if unsuitable for safe operation.
8. It is not allowed to walk or stand on the roof of the compressor canopy.

1.3 Safety precautions during installation

	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.

Precautions during installation

1. The machine must only be lifted using suitable equipment 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 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 minimize 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 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 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. Piping 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 piping 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.

1.4 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.

Precautions during operation

1. Never touch any piping or components of the compressor during operation.
2. Use only the correct type and size of hose end fittings and connections. When blowing through a hose or air line, ensure that the open end is held securely. A free end will whip and may cause injury. Make sure that a hose is fully depressurized before disconnecting it.
3. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment.
4. Never operate the machine when there is a possibility of taking in flammable or toxic fumes, vapours or particles.
5. Never operate the machine below or in excess of its limit ratings.
6. Keep all bodywork 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.
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 repair, free of wear or abuse
9. 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.
10. Do not remove any of, or tamper with, the sound-damping material.
11. Never remove or tamper with the safety devices, guards or insulations fitted on the machine. Every pressure vessel or auxiliary installed outside the machine to contain air above atmospheric pressure shall be protected by a pressure-relieving device or devices as required.

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

	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.

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 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 and vibration dampers, e.g. damping material 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.

	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

General

GA 11+ up to GA 30 are single-stage, oil-injected screw compressors driven by an electric motor. The compressors are air-cooled. The compressors are enclosed in sound-insulated bodywork.

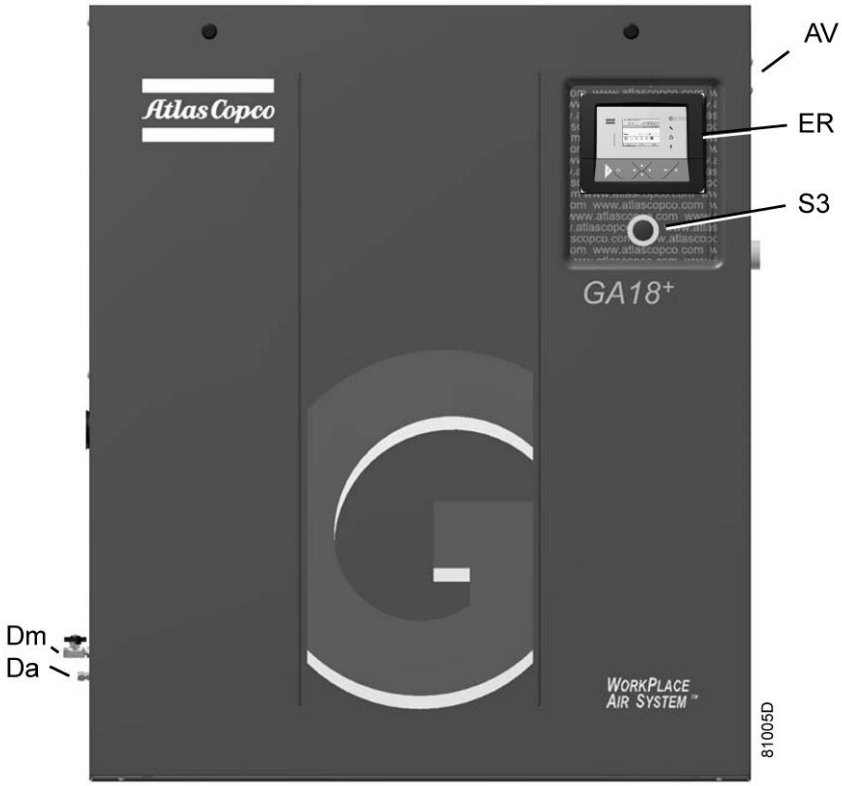
Workplace compressors have no dryer, while **Workplace Full-Feature (FF)** compressors are provided with an integrated air dryer.

GA 11+up to GA 26+ are controlled by the Elektronikon® Graphic controller (see section Elektronikon graphic controller), while GA 30 are equipped with an Elektronikon® controller (see section Elektronikon controller). For the GA 30, the Elektronikon® Graphic controller is available as option.

The Elektronikon® controller and the emergency stop button are integrated in the door panel of the electric cubicle. An electric cabinet comprising the motor starter is located behind this panel.

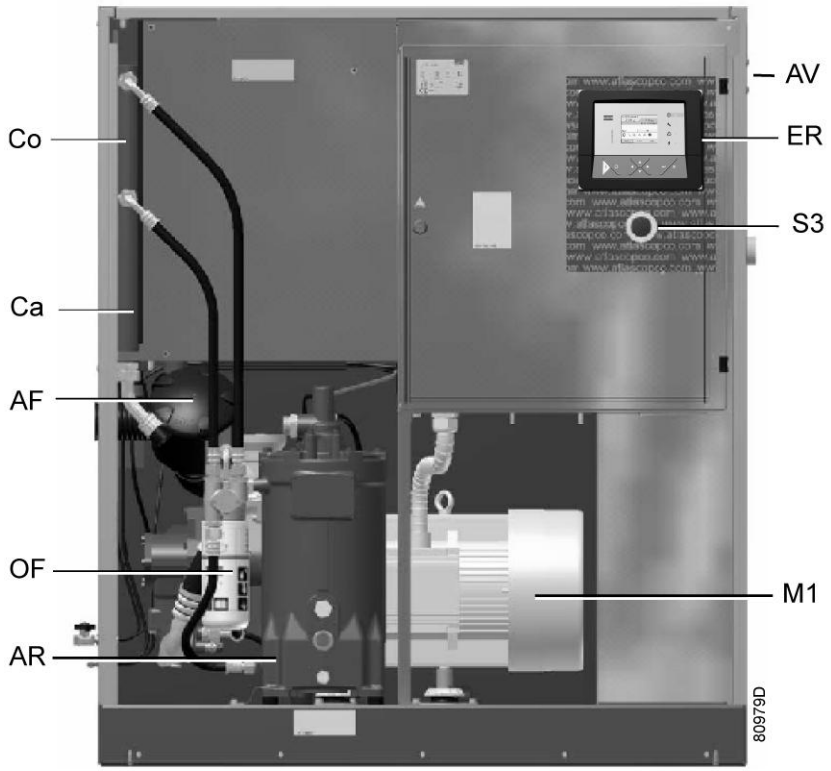
A condensate trap with automatic drain system is provided.

GA Workplace



Front view, GA 18+ Workplace

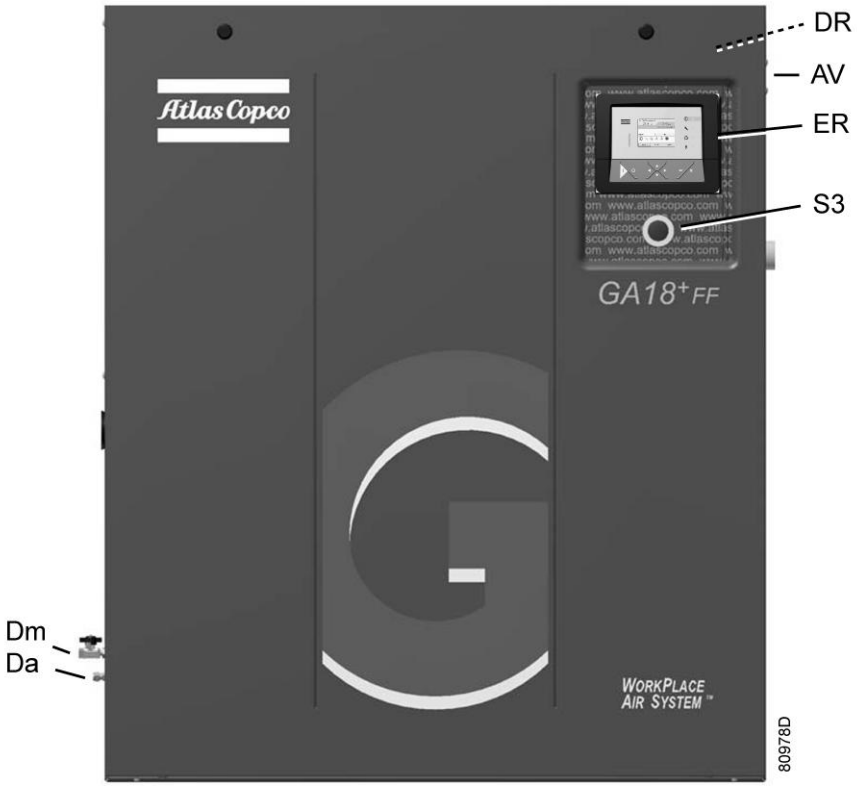
AV	Location of air outlet valve
ER	Elektronikon® controller
S3	Emergency stop button
Dm	Manual condensate drain
Da	Automatic condensate drain



Front view, GA 11+ up to GA 30 Workplace

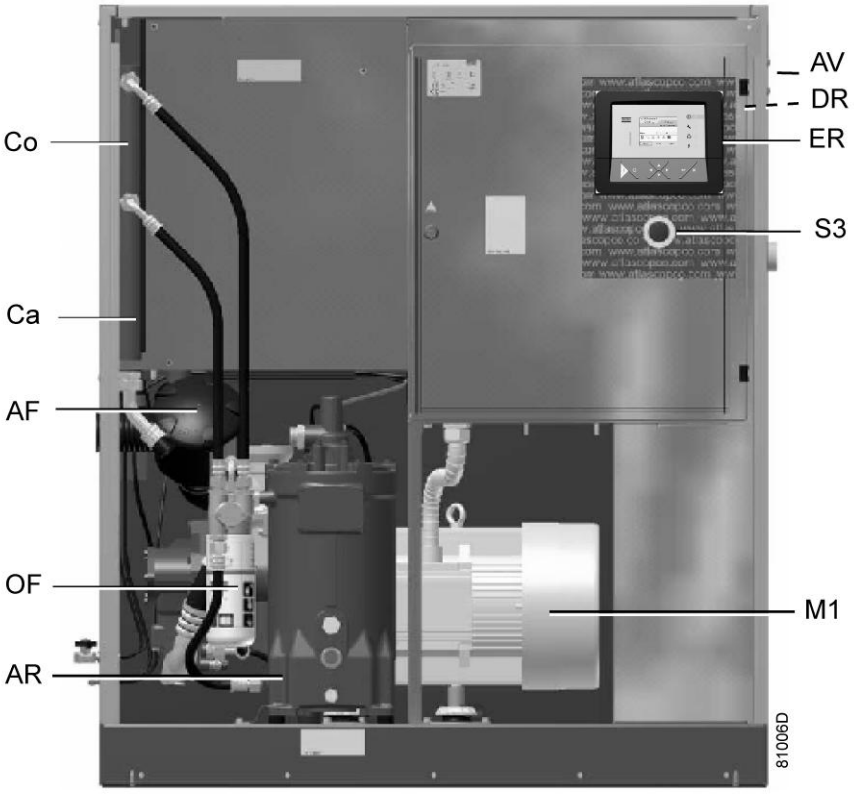
Ref.	**Name**
AF	Air filter
AR	Air receiver
AV	Location of air outlet valve
Ca	Air cooler
Co	Oil cooler
ER	Elektronikon® controller
M1	Drive motor
OF	Oil filter
S3	Emergency stop button

GA Workplace Full-Feature



Front view, GA 18+ Workplace Full-Feature

Ref.	Name
AV	Location of air outlet valve
DR	Dryer
ER	Elektronikon® controller
S3	Emergency stop button
Dm	Manual condensate drain
Da	Automatic condensate drain

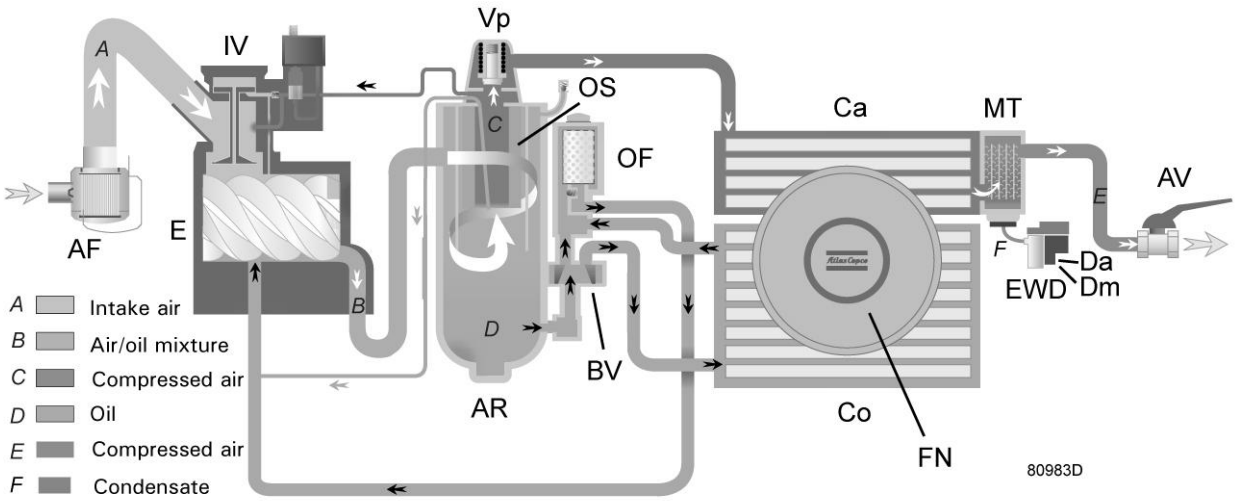


Front view, GA 11+ up to GA 30 Workplace Full-Feature

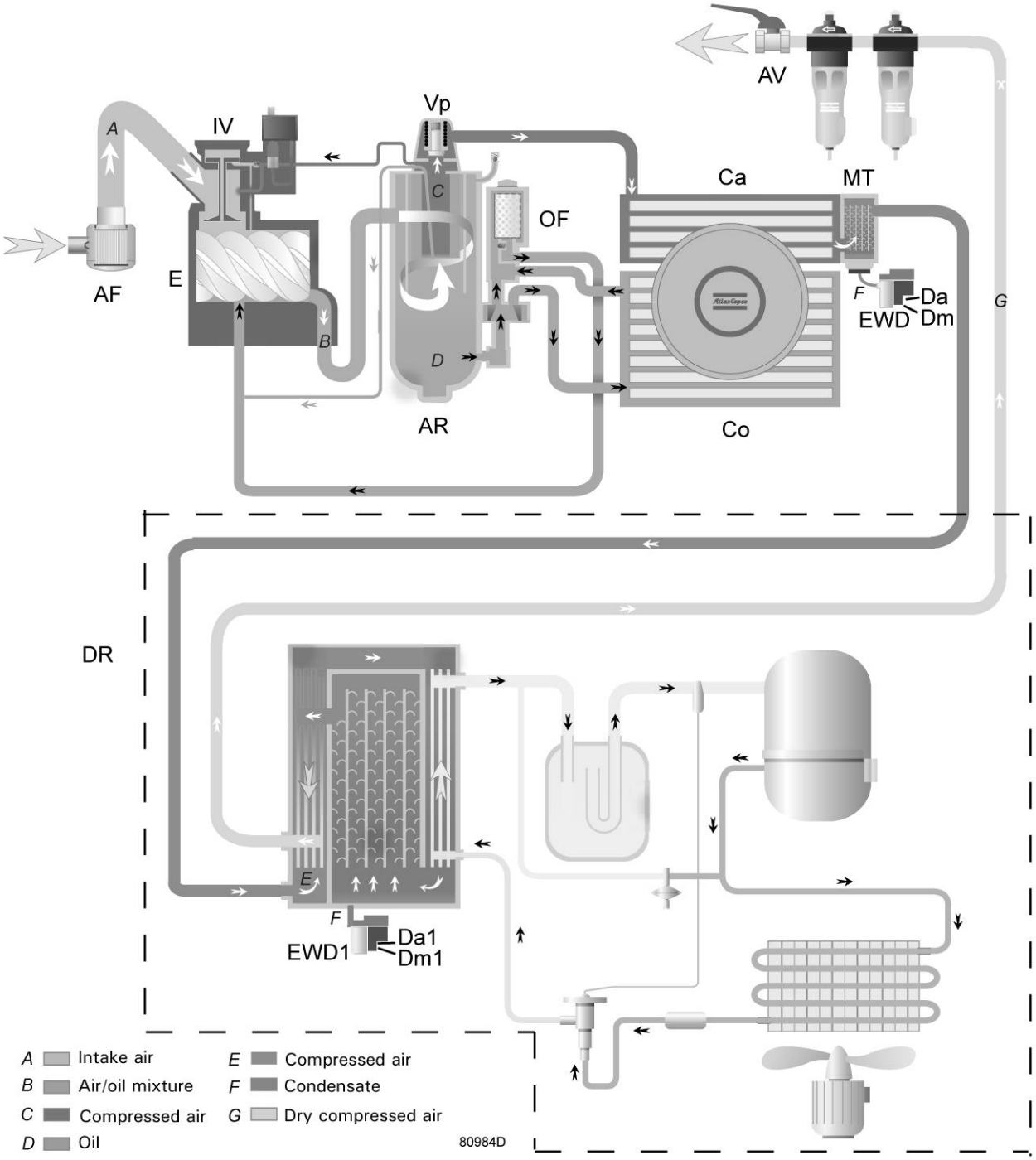
Ref.	Name
AF	Air filter
AR	Air receiver
AV	Location of air outlet valve
Ca	Air cooler
Co	Oil cooler
DR	Dryer
ER	Elektronikon® controller
M1	Drive motor
OF	Oil filter
S3	Emergency stop button

2.2 Air flow

Flow diagrams



GA 11+ up to GA 30 Workplace



GA 11⁺ up to GA 30 Workplace Full-Feature

References

Ref.	Description
A	Intake air
B	Air/oil mixture
C	Hot compressed air

Ref.	Description
D	Oil
E	Wet (100 % saturated) compressed air
F	Condensate
G	Dry air (compressors with integrated dryer)

Description

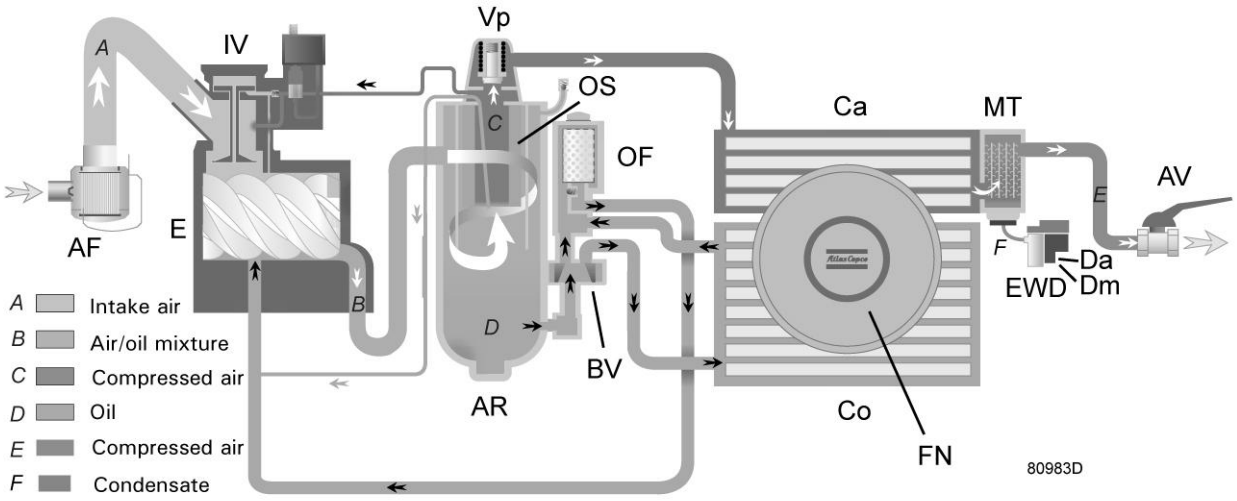
Air drawn through air inlet filter (AF) and open inlet valve (IV) into compressor element (E) is compressed. Compressed air and oil flow into the air receiver/oil separator (AR). The air is discharged through minimum pressure valve (Vp) and air cooler (Ca).

Minimum pressure valve (Vp) prevents the receiver pressure from dropping below a minimum pressure and includes a check valve which prevents blow-back of compressed air from the net.

On Workplace compressors the air flows through condensate trap (MT) before it passes outlet valve (AV). On Workplace Full-Feature compressors the air flows through condensate trap (MT) and air dryer (DR) before it is discharged through outlet valve (AV).

2.3 Oil system

Flow diagram



Oil system

References	Description
A	Intake air
B	Air/oil mixture
C	Compressed air
D	Oil
E	Wet (100 % saturated) compressed air

References	Description
F	Condensate

Description

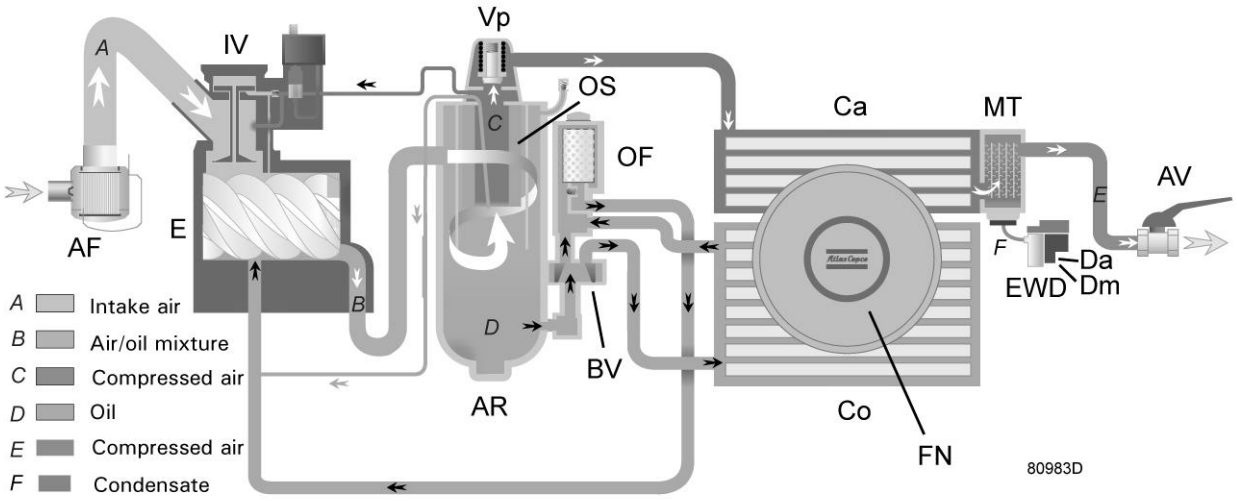
The air/oil mixture coming from the compressor element flows into the oil separator/tank, where most of the oil is separated by centrifugal action. The oil collects in the lower part of air receiver/oil separator (AR) which serves as oil tank. The remaining oil is removed by oil separator (OS).

Air pressure forces the oil from air receiver (AR) through oil cooler (Co) and filter (OF) towards compressor element (E).

The system comprises a thermostatic bypass valve (BV). Only when the oil is warm, the valve allows the oil to pass through the oil cooler.

2.4 Cooling system

Flow diagram



Cooling circuit

References	Description
A	Intake air
B	Compressed air/oil
C	Compressed air
D	Oil
E	Wet (100 % saturated) compressed air
F	Condensate

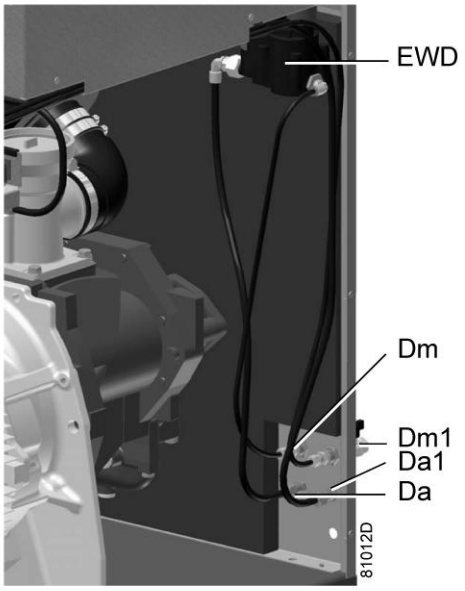
Description

The cooling system comprises air cooler (Ca) and oil cooler (Co).

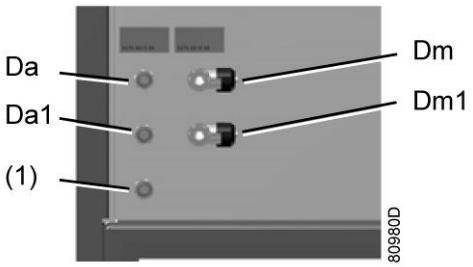
On air-cooled compressors, the cooling air flow is generated by fan (FN).

2.5 Condensate system

Condensate drains



Drain on air cooler



Drain connections, Workplace Full-Feature

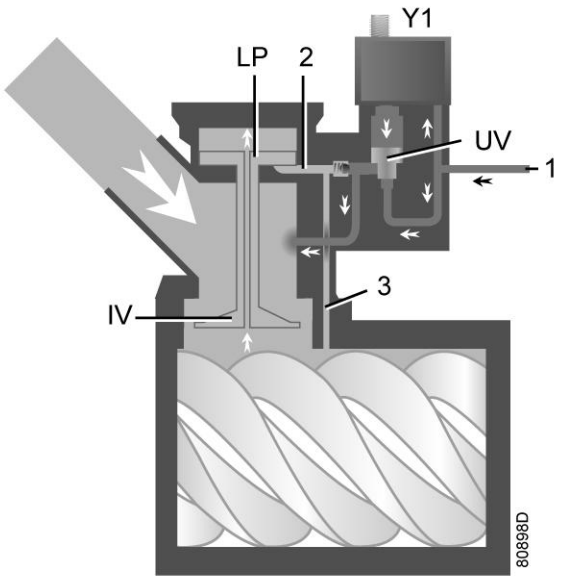
Reference	Designation
Da	Automatic drain connection, compressor
Da1	Automatic drain connection, dryer (only on Full-Feature units)
Dm	Manual drain connection, compressor
Dm1	Manual drain connection, dryer (only on Full-Feature units)
(1)	Drain connection of the filters (option)

GA Workplace compressors are equipped with a condensate trap, integrated in the air cooler. The condensate trap is equipped with an electronic drain (EWD) for automatic draining of the condensate during operation. The electronic water drain is connected to automatic drain outlet (Da) and to a manually operated valve (Dm) for draining after stopping the compressor.

GA Workplace Full-Feature compressors have an integrated condensate trap after the air cooler and a condensate trap on the integrated dryer. Both condensate traps are connected to an electronic drain (EWD) for automatic draining of the condensate. The drains are respectively connected to automatic drain outlets (Da and Da1) and to manually operated valves (Dm and Dm1) for draining after stopping the compressor.

2.6 Regulating system

Flow diagram



Regulating system (loaded condition)

Loading

When the net pressure is below the loading pressure, solenoid valve (Y1) is energised. Results:

- The space above unloading valve/blow-off valve (UV) is connected with the oil separator tank pressure (1) via the solenoid valve.
- Unloading valve/blow-off valve (UV) moves downwards, closing off the connection to channels (2) and (3).
- Underpressure from the compressor element causes loading plunger (LP) to move downwards and inlet valve (IV) to open fully.

Air delivery is 100%, the compressor runs loaded.

Unloading

If the air consumption is less than the air output of the compressor, the net pressure increases. When the net pressure reaches the unloading pressure, solenoid valve (Y1) is de-energised. Results:

- The pressure above unloading valve/blow-off valve (UV) is released to atmosphere and the space above valve (UV) is no longer in connection with the oil separator tank pressure (1).
- Unloading valve/blow-off valve (UV) moves upwards, connecting the oil separator tank pressure (1) with channels (2) and (3).
- The pressure in channel (2) causes the loading plunger (LP) to move upwards, causing inlet valve (IV) to close, while the pressure is gradually released to atmosphere.
- The pressure in the separator tank stabilises at low value. A small amount of air is kept drawn in to guarantee a minimal pressure, required for lubrication during unloaded operation.

Air output is stopped, the compressor runs unloaded.

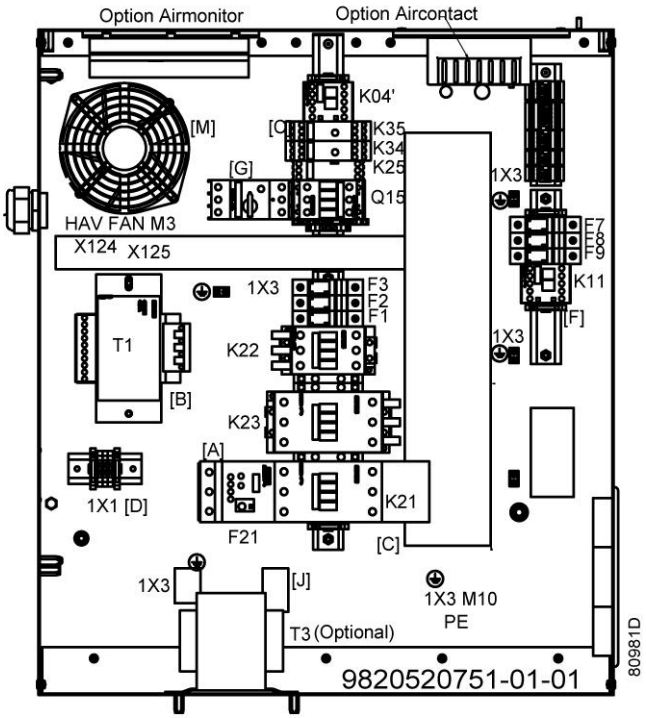
2.7 Electrical system

General

Also consult sections Electrical diagrams and Electrical connections.

Description

The electrical system comprises following components:

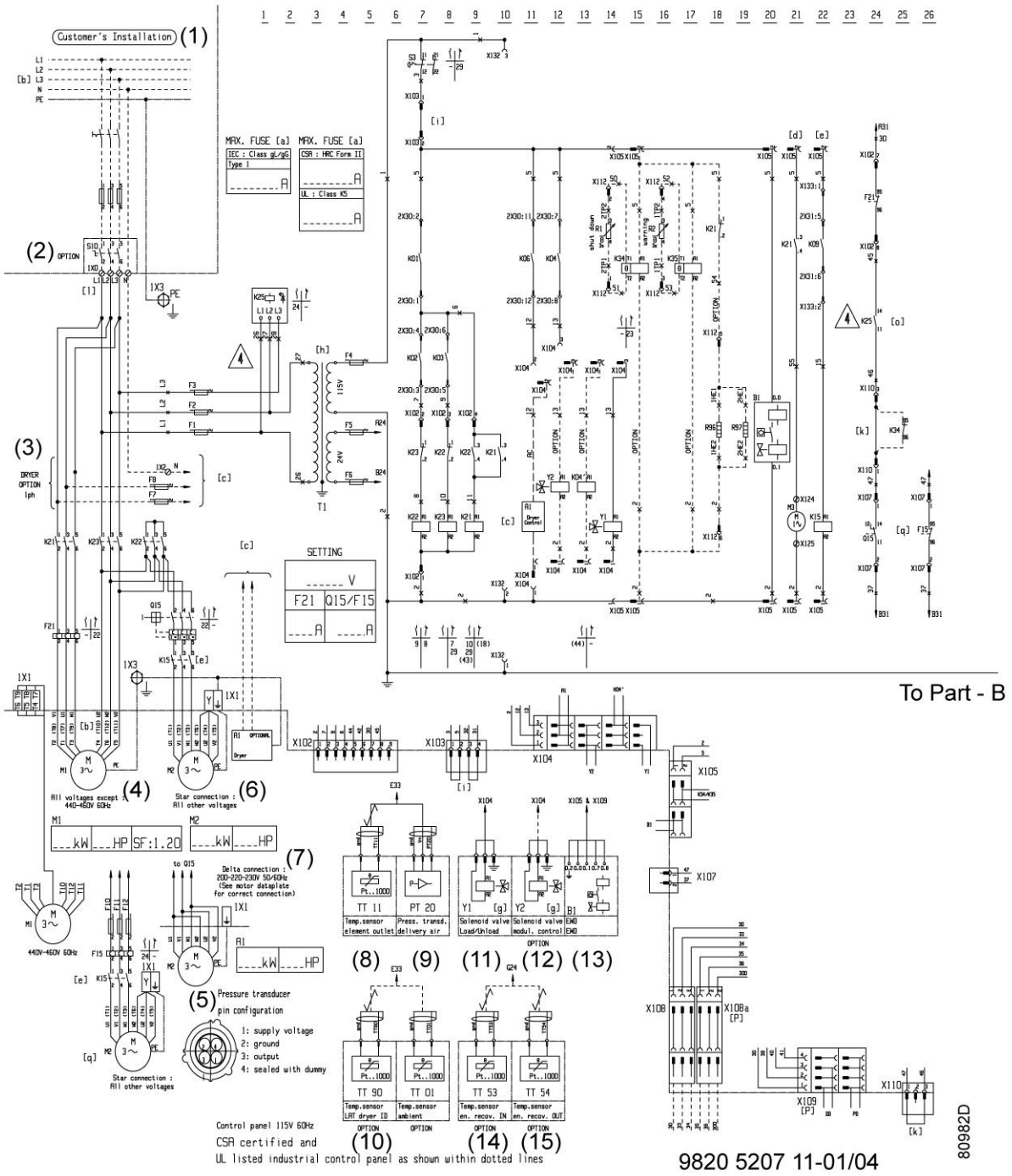


Electric cubicle, typical example

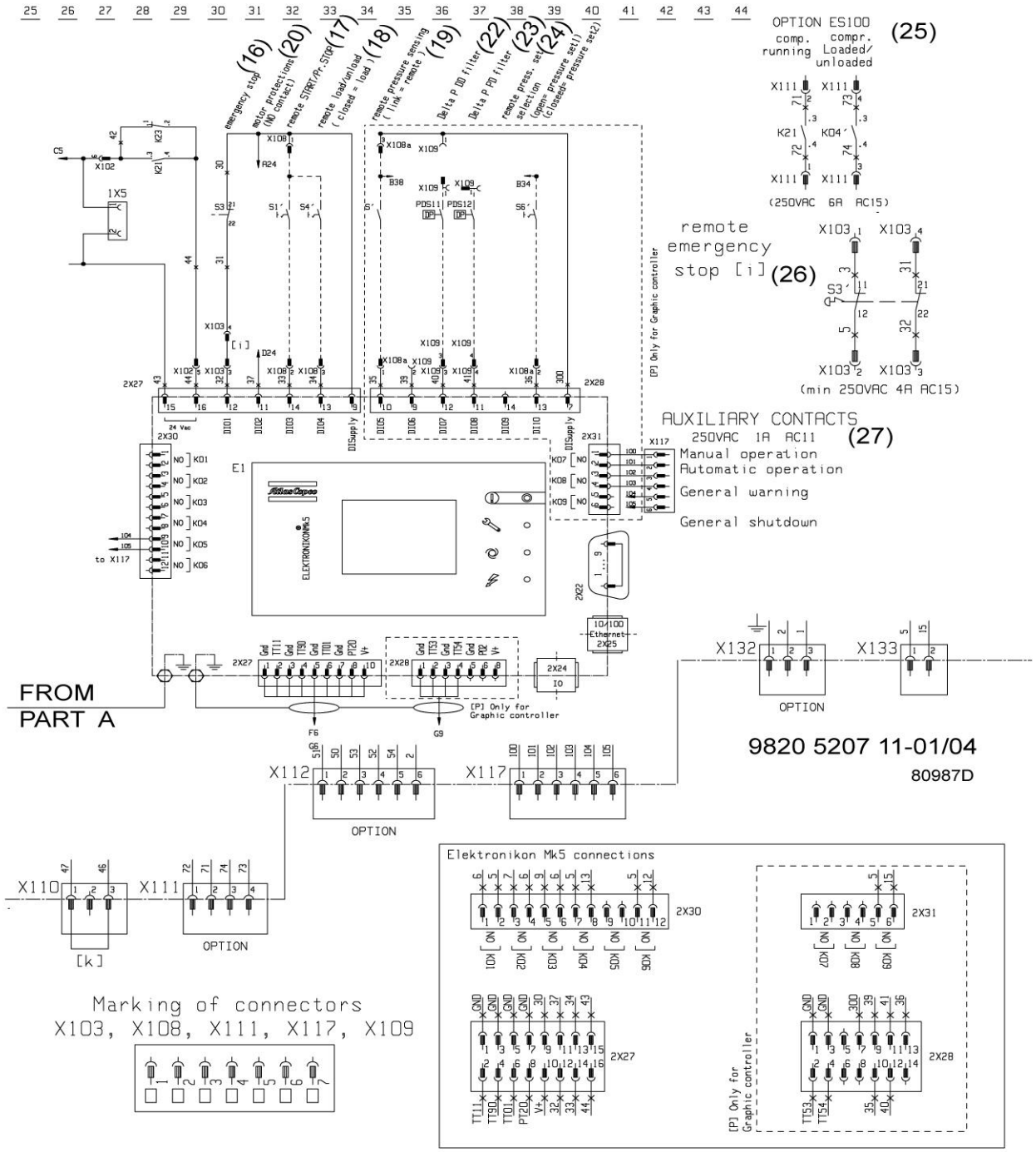
Reference	Designation
F1/2/3	Fuses
F4/5/6	Fuses
F21	Overload relay, compressor motor

Reference	Designation
Q15	Circuit breaker, fan motor (on air-cooled compressors)
K11	Auxiliary contactor for dryer (only on Full-Feature compressors)
K21	Line contactor
K22	Star contactor
K23	Delta contactor
K25	Phase sequence relay
T1/T3	Transformer
1X0	Terminal strip (voltage supply)
X103/X108	Connectors
PE	Earthing terminal

2.8 Electrical diagrams



Service diagram (part A)



Service diagram (part B)

Reference	Designation
(1)	Customer's installation
(2)	Main switch (option)
(3)	Dryer option (1 phase)
(4)	Motor connection (M1) for all voltages, except 440-460 V - 60 Hz
(5)	Motor connection (M1) for 440-460 V - 60 Hz

Reference	Designation
(6)	Star connection (M2) for all other voltages
(7)	Delta connection (M2) for 200-220-230 V - 50/60 Hz - See motor data plate for correct connection
(8)	Temperature sensor, element outlet
(9)	Pressure transducer, delivery air
(10)	Temperature sensor LAT ID dryer (option)
(11)	Solenoid valve Load/Unload
(12)	Solenoid valve modulating control (option)
(13)	EWD
(14)	Temperature sensor water in (Energy recovery - option)
(15)	Temperature sensor water out (Energy recovery - option)
(16)	Emergency stop
(17)	Remote start/stop
(18)	Remote load/unload (closed = load)
(19)	Remote pressure sensing (link = remote)
(20)	Motor protections (NO contact)
(22)	Pressure drop over DD filter (option)
(23)	Pressure drop over PD filter (option)
(24)	Remote pressure set selection (open = press. set 1, closed = press. set 2) (Only on compressors with Elektronikon® Graphic controller)
(25)	ES 100 (option)
(26)	Remote emergency stop
(27)	Auxiliary contacts (Only on compressors with Elektronikon® Graphic controller)

Designations used

Reference	Sensors / solenoid valves / electronic water drain
PT20	Pressure sensor, air outlet
TT11	Temperature sensor, element outlet
TT90	Temperature sensor, dew-point (Full-Feature compressors)
TT01	Temperature sensor, ambient temperature
Y1	Loading solenoid valve

Reference	Motors
M1	Drive motor
M2	Fan motor (on air-cooled compressors)

Reference	Electric cabinet
B1	EWD (electronic water drain)
M3	cubicle fan
F1/9	Fuses

Reference	Electric cabinet
F21	Overload relay, drive motor
K21	Line contactor
K22	Star contactor
K23	Delta contactor
K25	Phase sequence relay
K15	Contactor, cooling fan
Q15	Circuit breaker, fan motor
T1	Transformer
1X0 -1X7	Terminal strips

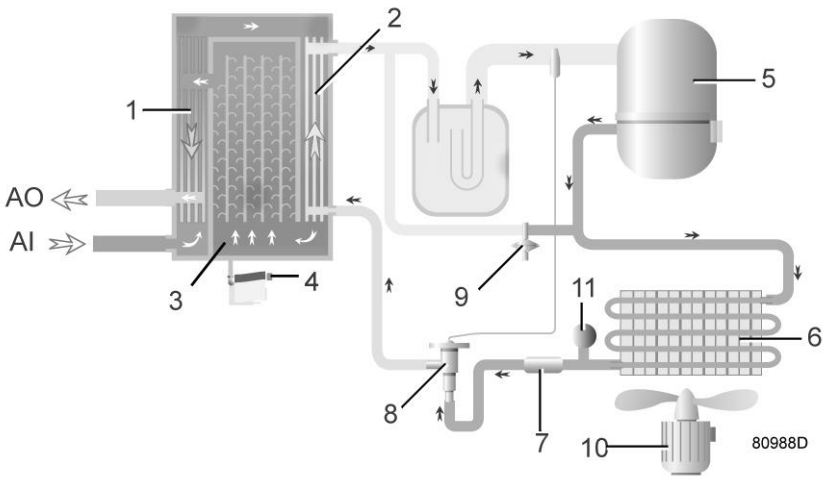
Reference	Control module
E1	Elektronikon module
K01	Blocking relay
K02	Auxiliary relay, star contactor
K03	Auxiliary relay, delta contactor
K04	Auxiliary relay, loading/unloading
K05	Auxiliary relay, general shutdown
K06	Auxiliary relay, dryer
K07	Auxiliary relay, manual/automatic operation
K08	Auxiliary relay, warning
K09	Auxiliary relay, fan control compressor (option)
I	Start button
O	Stop button
S3	Emergency stop button

Reference	Optional equipment
A1	Dryer (Full-Feature)
K11	Dryer contactor
K04’	Auxiliary relay, load/unload (option ES100)
K21	Auxiliary contact, compressor running (option ES100)
PDS11	Dp switch for DD filter
PDS12	Dp switch for PD filter
R1/K34	Drive motor thermistor protection, shut-down
R2/K35	Drive motor thermistor protection, warning
R3/R4/R5/R7	Heaters, freeze protection
R96/97	Anti-condensation heaters
S10	Main power isolating switch
T3	Transformer, dryer
TSLL91	Thermostat, cubicle freeze protection
TT53/54	Temperature sensors, energy recovery

Reference	Optional equipment
Y2	Solenoid valve, modulating control

2.9 Air dryer

Flow diagram



Air dryer

Reference	Name
AI	Air inlet
AO	Air outlet
1	Air/air heat exchanger
2	Air/refrigerant heat exchanger/evaporator
3	Condensate separator
4	Automatic drain / condensate outlet
5	Refrigerant compressor
6	Refrigerant condenser
7	Liquid refrigerant dryer/filter
8	
9	Hot gas by-pass valve
10	Condenser cooling fan
11	Pressure switch, fan control

Compressed air circuit

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 separator (3) where all the condensate is separated from the air. The condensate is automatically drained through outlet (4).

The cold, dried air flows through heat exchanger (1) where it is warmed up by the incoming air.

Refrigerant circuit

Compressor (5) delivers hot, high-pressure refrigerant gas which flows through condenser (6) where most of the refrigerant condenses.

The liquid refrigerant flows through liquid refrigerant dryer/filter (7) to thermostatic expansion valve (8). The refrigerant leaves the thermostatic expansion valve 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 (5).

By-pass valve (9) regulates the refrigerant flow. Fan (10) is switched on or off by switch (11) depending on the loading degree of the refrigerant circuit.

	The refrigerant compressor motor has a built-in thermic protection. If the motor stops after tripping of the thermic protection, it may take up to 2 hours for the motor windings to cool down and before the motor can restart.

3 Elektronikon® controller

3.1 Elektronikon® regulator

Control panel

Introduction

In general, the Elektronikon® regulator has following functions:

- Controlling the compressor
- Protecting the compressor
- Monitoring components subject to service
- Automatic restart after voltage failure (made inactive)

Automatic control of the compressor

The regulator maintains the net pressure between programmable limits by automatically loading and unloading the compressor. A number of programmable settings, e.g. the unloading and loading pressures, the minimum stop time and the maximum number of motor starts are taken into account.

The regulator stops the compressor whenever possible to reduce the power consumption and restarts it automatically when the net pressure decreases. If the expected unloading period is to short, the compressor is kept running to prevent too short stand-still periods.

Protecting the compressor

Shut-down

If the compressor element outlet temperature exceeds the programmed shut-down level, the compressor will be stopped. This will be indicated on the display of the regulator. The compressor will also be stopped in case of overload of the drive motor.

Air-cooled compressors will also be stopped in the event of overload of the fan motor.

	Before remedying, consult the Safety precautions.

Shut-down warning

A shut-down warning level is a programmable level below the shut-down level.

If one of the measurements exceeds the programmed shut-down warning level, this will also be indicated to warn the operator before the shut-down level is reached.

Service warning

If the service timer exceeds a programmed value, this will be indicated on the display to warn the operator to carry out some service actions.

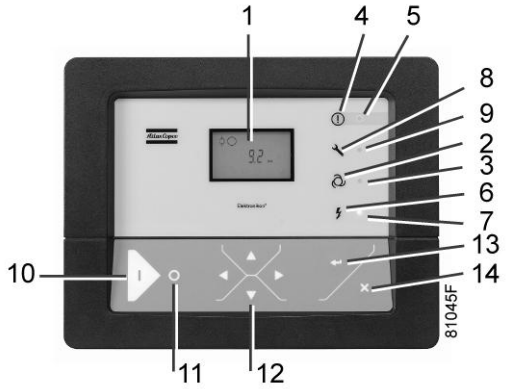
Automatic restart after voltage failure

The regulator has a built-in function to automatically restart the compressor when the voltage is restored after voltage failure. This function is deactivated in compressors leaving the factory. If desired, the function can be activated. Consult the Atlas Copco Customer Centre.

	If activated, and if the regulator was in the automatic operation mode, the compressor will automatically restart when the supply voltage to the module is restored!

3.2 Control panel

Detailed description

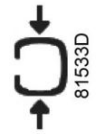
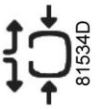
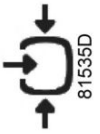


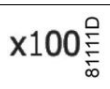
Control panel of the Elektronikon with standard display

Reference	Designation	Function
1	Display	Shows icons and operating conditions.
2	Automatic operation symbol	
3	LED, Automatic operation	Indicates that the regulator is automatically controlling the compressor: the compressor is loaded, unloaded, stopped and restarted depending on the air consumption and the limitations programmed in the regulator.
4	Warning symbol	
5	LED, Warning	Is lit if a warning condition exists.
6	Voltage symbol	
7	LED, Voltage on	Indicates that the voltage is switched on.
8	Service symbol	

Reference	Designation	Function
9	LED, Service	Is lit when service is needed.
10	Start button	This button starts the compressor. Automatic operation LED (3) lights up. The Elektronikon is operative.
11	Stop button	This button is used to stop the compressor. Automatic operation LED (3) goes out.
12	Scroll buttons	Use these buttons to scroll trough the menu .
13	Enter button	Use this button to confirm the last action
14	Escape button	Use this button to go to previous screen or to end the current action.

3.3 Icons used on the display

Function	Icon	Description
Compressor status	 81532D	When the compressor is stopped, the icon stands still. When the compressor is running, the icon is rotating.
	 81533D	Motor stopped
	 81534D	Running unloaded
	 81535D	Running loaded
Machine control mode	 81536D	Remote start / stop
	 81537D	LAN control
Automatic restart after voltage failure	 81538D	Automatic restart after voltage failure is active
Timer	 81539D	
Active protection functions	 81540D	Emergency stop
Service	 81541D	Service required

Function	Icon	Description
Units		Pressure unit (Mega Pascal)
		Pressure unit (pounds per square inch)
		Pressure unit (bar)
		Temperature unit
		Temperature unit
		Hours (always shown together with seconds)
		Percent
		The value shown must be multiplied by 10 to get the actual value
		The value shown must be multiplied by 100 to get the actual value
		The value shown must be multiplied by 1000 to get the actual value
		Motor (overload)
		Element outlet temperature.
		Filter
		Drain
		Energy saving (dryer)
		Ambient temperature

Function	Icon	Description
		Dewpoint temperature

3.4 Main screen

When the voltage is switched on, the first screen is a test screen. The next screen is the Main screen, shown automatically.

The Main screen shows:

- The compressor status by means of pictographs
- The air outlet pressure

	Always consult Atlas Copco if the pressure on the display is preceded by a "t".

3.5 Shut-down warning

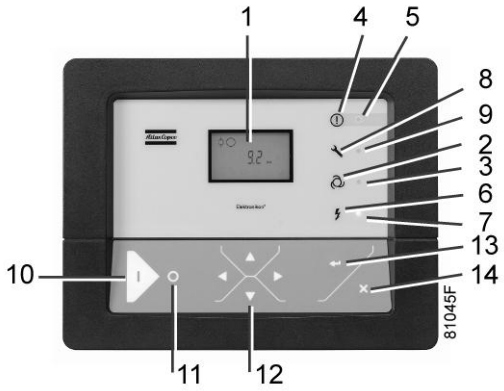
Description

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

- Too high a temperature at the outlet of the compressor element
- Too high a dewpoint temperature (Full-Feature compressors)

Compressor element outlet temperature

- If the outlet temperature of the compressor element exceeds the shut-down warning level (factory set at 110 ˚C / 230 ˚F), warning LED (5) starts blinking.



- Press Scroll down button (12). The screen shows the temperature at the compressor element outlet:

The screen shows that the temperature at the element outlet is 122 °C

It remains possible to scroll through other screens, using the Scroll buttons up and down (12) to check the actual status of other parameters. Press button (11) to stop the compressor and wait until the compressor has stopped. Switch off the voltage, inspect the compressor and remedy. The warning message will disappear as soon if the warning condition disappears.

Dewpoint temperature

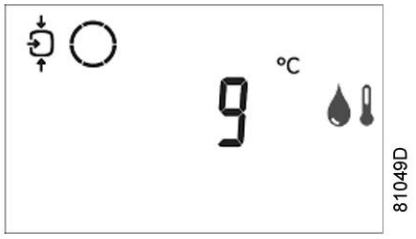
On compressors with integrated dryer, alarm LED (5) will light up and the related pictograph will appear flashing if the dewpoint temperature exceeds the warning level (programmable).

Main screen with the dewpoint temperature warning

The related pictograph

will appear flashing

Press the Scroll button (12) until the actual dewpoint temperature appears.



Warning screen, dewpoint temperature

The screen shows that the dewpoint temperature is 9˚C.

- It remains possible to scroll through other screens (using Scroll buttons 12) to check the actual status of other parameters.
- Press button (11) to stop the compressor and wait until the compressor has stopped.
- Switch off the voltage, inspect the compressor and remedy.
- The warning message will disappear as soon as the warning condition disappears.

3.6 Shut-down

Description

The compressor will be shut down:

- In case the temperature at the outlet of the compressor element exceeds the shut-down level
- In case of error of the outlet pressure sensor
- In case of overload of the drive motor
- In case of overload of the fan motor on air-cooled compressors

Compressor element outlet temperature

- If the outlet temperature of the compressor element exceeds the shut-down level (factory setting 120 ˚C / 248 ˚F, programmable) the compressor will be shut-down, alarm LED (5) will flash, automatic operation LED (3) will go out and the following screen will appear:

Main screen with shut-down indication, element outlet temperature

The related pictograph

will appear flashing.

- Press Scroll buttons (12) until the actual compressor element temperature appears.

Shut-down screen, element outlet temperature

The screen shows that the temperature at the outlet of the compressor element is 122 ˚C.

- 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 compressor.

Motor overload

- In the event of motor overload, the compressor will be shut-down, alarm LED (5) will flash, automatic operation LED (3) will go out and the following screen will appear:

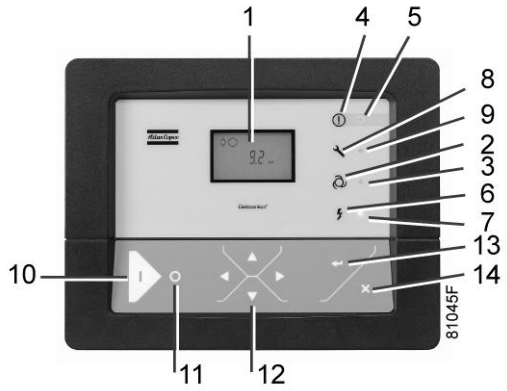
Main screen with shut-down indication, motor overload

- 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 compressor.

3.7 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 (5) will light up.
- Press Scroll buttons (12) to scroll to <d.6> and the service symbol is shown. Press button (13): 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

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

- Press Scroll button (12) to scroll to <d.1> and the running hours symbol is shown. Press button (13): 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

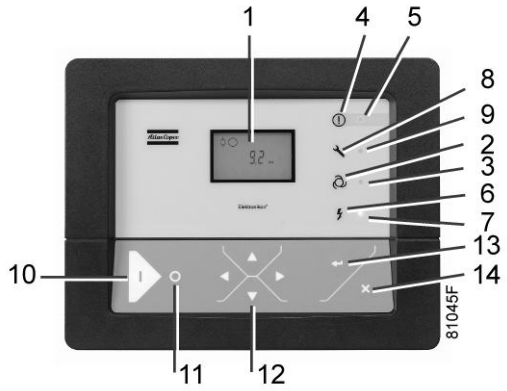
- Stop the compressor, switch off the voltage and carry out the required service actions. See section Preventive Maintenance.

	• The longer interval service actions must also include the shorter interval actions. In the example above, carry out all service operations belonging to the 8000 running hours interval as well as those belonging to the 4000 running hours interval. • If using mineral oil instead of Atlas Copco Roto-Inject Fluid, the service timer has to be decreased. See section Preventive maintenance schedule.

- After servicing, reset the service timer. See section Calling up/resetting the service timer

3.8 Scrolling through all screens

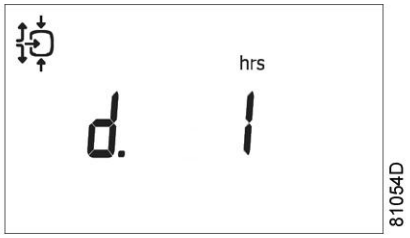
Control panel



Control panel

Scroll buttons (12) can be used to scroll through all screens. The screens are divided into register screens, measured data screens, digital input screens (numbered as <d.in>, <d.1>, ...), parameter screens (numbered as <P.01>, <P.02>, ...), protections screens (numbered as <Pr.01>,...) and test screens (numbered 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.



Example

The screen shows the screen number <d.1>, the unit used <hrs> and the related symbol for running hours. Press Enter key (13) to call up the actual running hours.

Overview of the screens

Digital input screens	Designation	Related topic
<d.in>	Digital input status	
<d.1>	Running hours (hrs or x 1000 hrs)	See section Calling-up running hours
<d.2>	Motor starts (x 1 or x 1000)	See section Calling up motor starts
<d.3>	Module hours (hrs or x 1000 hrs)	See section Calling up module hours

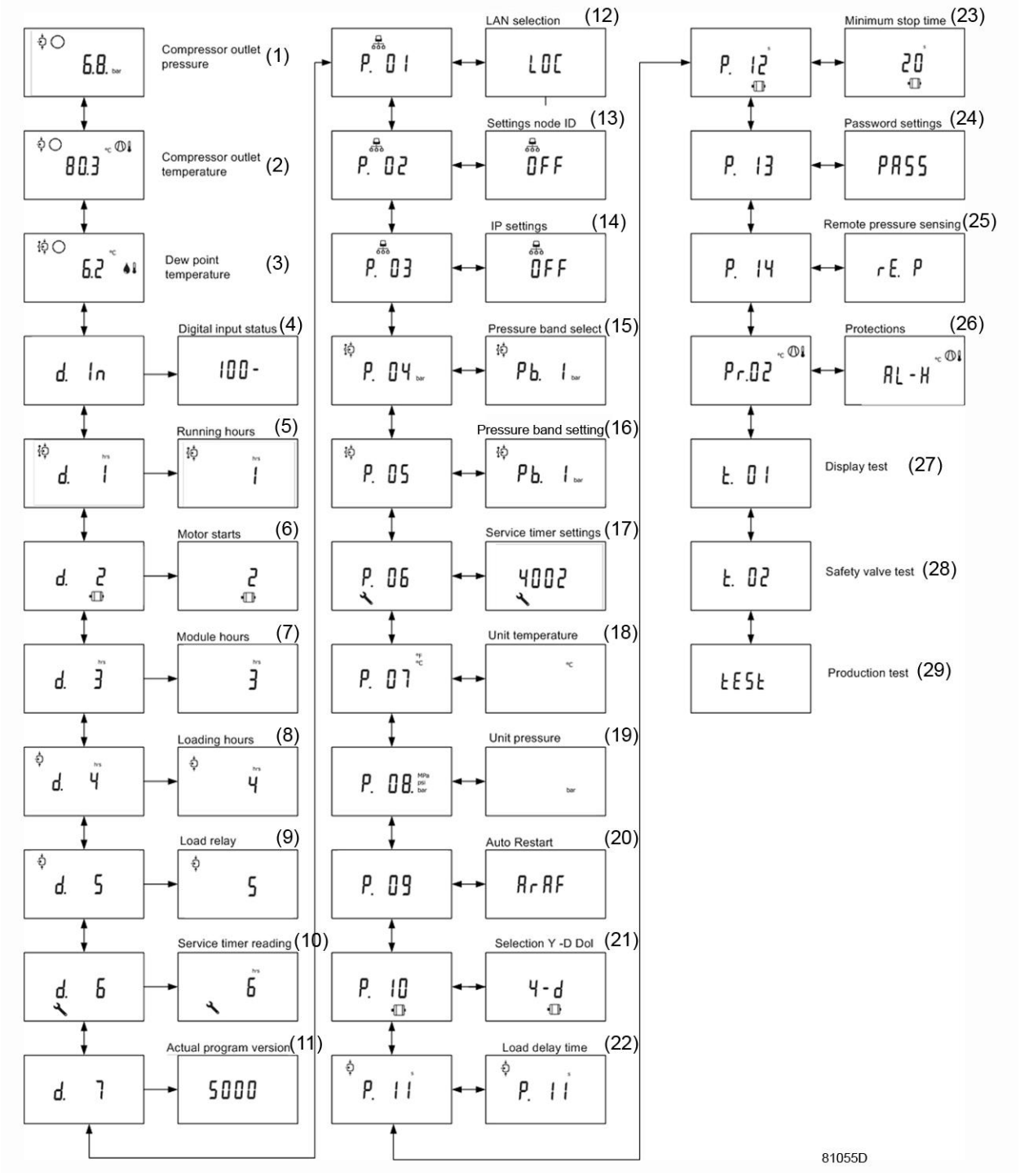
Digital input screens	Designation	Related topic
<d.4>	Loading hours (hrs or x1000 hrs)	See section Calling up loading hours
<d.5>	Load relay (x1 or x 1000)	See section Calling up Calling up load relay
<d.6>	Service timer reading (hrs or x 1000 hrs)	See section Calling up/resetting the service timer
<d.7>	Actual program version	

Parameter screens	Designation	Related topic
<P.01>	Selection between local, remote or LAN control	See section Selection between Local Remote and LAN control
<P.02>	Setting a node ID for LAN control and the channels for Mk 4 and Mk 5	See section Calling up/modifying CAN address control
<P.03>	Settings for IP, gateway and Subnet mask	See section Calling up/modifying IP, Gateway and Subnetmask
<P.04>	Pressure band settings	See section Calling up/modifying pressure band settings
<P.05>	Setting a pressure band selection	See section Modifying pressure band selection
<P.06>	Modifying a service timer	See section Calling up/modifying service timer settings
<P.07>	Setting of unit for temperature	See section Calling up/modifying unit of temperature
<P.08>	Setting of unit for pressure	See section Calling up/modifying unit of pressure
<P.09>	Selection for function: Automatic restart after voltage failure (active or not, only for Atlas Copco)	See section Activating automatic restart
<P.10>	Selection between Y-D or DOL starting	See section Selection between Y-D or DOL starting
<P.11>	Setting of load delay time	See section Calling up/modifying load delay time
<P.12>	Setting of minimum stop time	See section Calling up/Modifying minimum stop time
<P.13>	Setting a password	See section Activating password protection
<P.14>	Remote pressure sensing	See section Activate Load/Unload remote sensing

Protections screens	Designation	Related topic
<Pr.01> <Pr.02> <Pr.03>	Protections screens	See section Calling up/modifying protection settings

Test screens	Designation	Related topic
<t.01>	Display test	See sections Test screens
<t.02>	Safety valve test	See sections Test screens
<t.03>	Production test	See sections Test screens

Menu flow

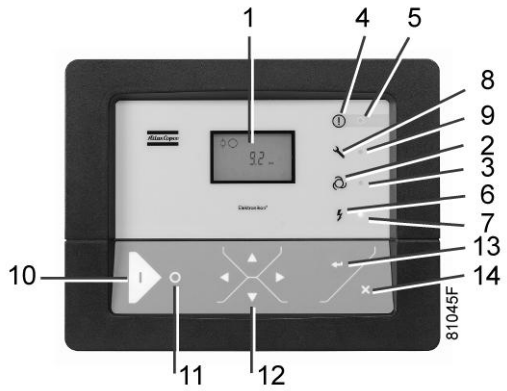


Simplified menu flow

Ref.	Description	Ref.	Description
(1)	Compressor outlet pressure	(16)	Pressure band setting
(2)	Compressor outlet temperature	(17)	Service timer settings
(3)	Dewpoint temperature	(18)	Temperature unit
(4)	Digital input status	(19)	Unit pressure
(5)	Running hours	(20)	Auto restart
(6)	Motor starts	(21)	Selection Y-D/DOL
(7)	Module hours	(22)	Load delay time
(8)	Loading hours	(23)	Minimum stop time
(9)	Load relay	(24)	Password settings
(10)	Service timer reading	(25)	Remote pressure sensing
(11)	Actual program version	(26)	Protections
(12)	LAN selection	(27)	Display test
(13)	Settings node ID	(28)	Safety valve test
(14)	IP settings	(29)	Production test
(15)	Pressure band selection		

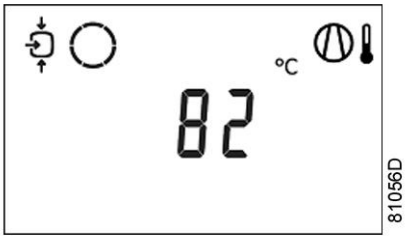
3.9 Calling up outlet and dewpoint temperatures

Control panel



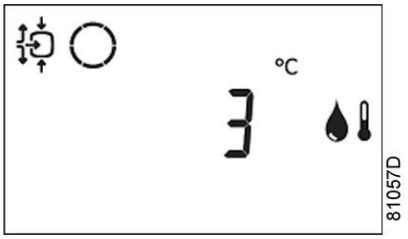
Starting from the Main screen:

- Press Scroll button (12). The outlet temperature will be shown:



The screen shows that the outlet temperature is 82 ˚C.

- For Full-Feature compressors:
  Press Scroll button (12). The dewpoint temperature will be shown:

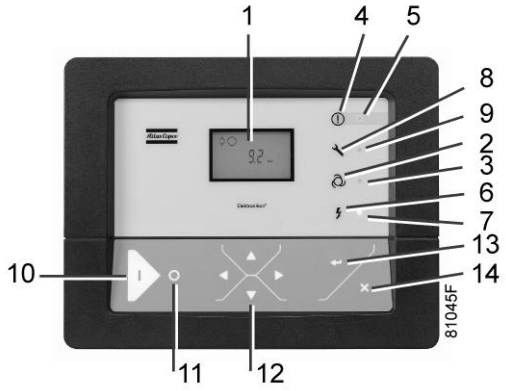


The screen shows that the dewpoint temperature is 3 ˚C.

- Press Scroll button (12) to scroll downwards or upwards through the screens.

3.10 Calling up running hours

Control panel



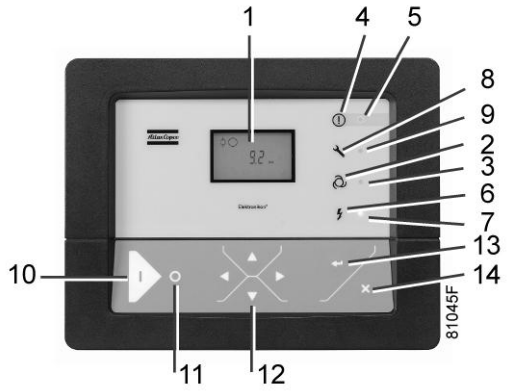
Starting from the Main screen:

- Press Scroll button (12) until <d.1> is shown and then press Enter button (13):

The screen shows the unit used (x1000 hrs) and the value (11.25): the running hours of the compressor are 11250 hours.

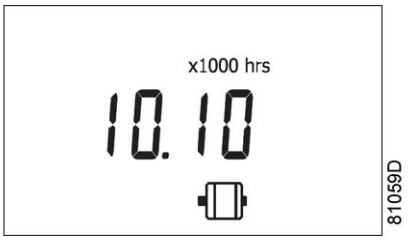
3.11 Calling up motor starts

Control panel



Starting from the Main screen:

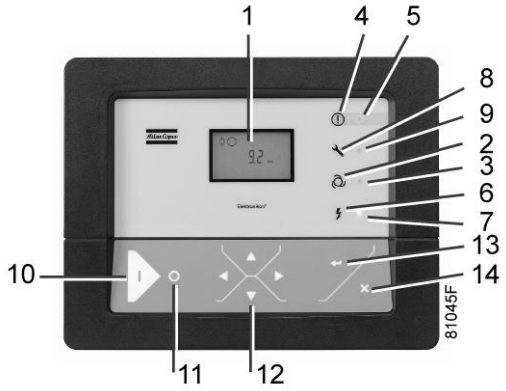
- Press Scroll button (12) until <d.2> is shown and then press Enter button (13):



This screen shows the number of motor starts (x 1 or - if <x1000> lights up - x 1000). In the above example, the number of motor starts is 10100.

3.12 Calling up module hours

Control panel



Starting from the Main screen:

- Press Scroll button (12) until <d.3> is shown and then press Enter button (13):

In the example shown, the screen shows the unit used (hrs) and the value (5000): the regulator module has been in service during 5000 hours.

3.13 Calling up loading hours

Starting from the Main screen:

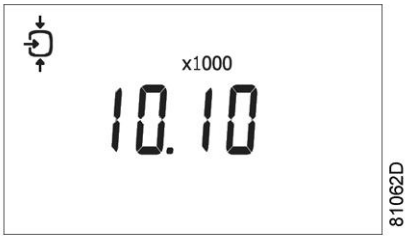
- Press Scroll button (12) until <d.4> is shown and then press Enter button (13):

The screen shows the unit used <hrs> (or <x1000 hrs>) and the value <1755>: the compressor has been running loaded during 1755 hours.

3.14 Calling up load relay

Starting from the Main screen:

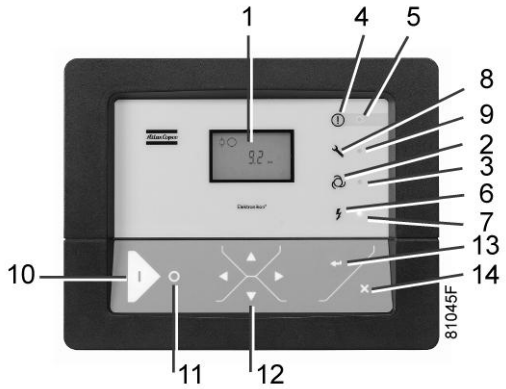
- Press Scroll button (12) until <d.5> is shown and then press Enter button (13):



This screen shows the number of unload to load actions (x 1 or - if <x1000> lights up - x 1000). In the above example, the number of unload to load actions is 10100.

3.15 Calling up/resetting the service timer

Calling up the service timer



Starting from the Main screen:

- Press Scroll button (12) until <d.6> is shown and then press Enter button (13):

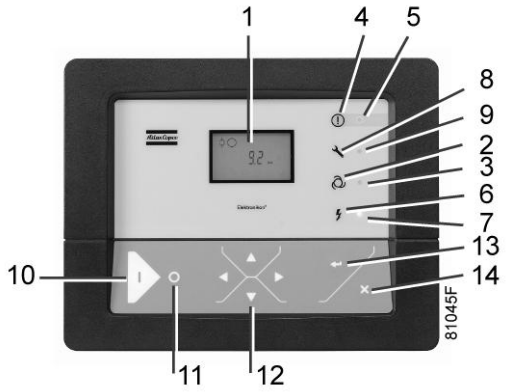
This screen shows the unit used <hrs> (or <x1000 hrs>) and the value <1191>. In the example shown, the compressor has run 1191 hours since the previous service.

Resetting the service timer

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

- Scroll to register screen <d.6> and press Enter button (13).
- The reading (e.g. 4000) will appear.
- Press Enter button (13) and - if a password is set - enter the password.
  The icon will flash (indicating that resetting is possible).
- Press Enter button (13) to reset the timer to <0.000> or press the Escape button (14) to cancel the operation.

3.16 Selection between local, remote or LAN control



Starting from the Main screen:

- Press Scroll button (12) until <P.01> is shown and then press Enter button (13). The actually used control mode is shown: <LOC> for local control, <rE> for remote control or <LAn> for LAN control.
- Press Enter button (13) and if necessary enter the password. The actually used control mode is blinking. Use Scroll button (12) to change the control mode.
- Press Enter button (13) to program the new starting mode or press Escape button (14) to cancel.

3.17 Calling up/modifying CAN address control

Calling up

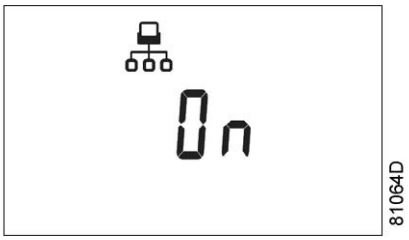
Starting from the main screen,

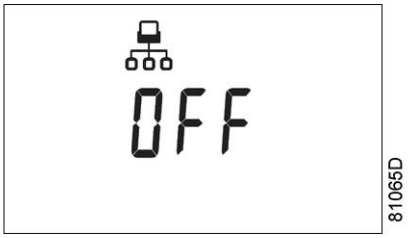
Press the Scroll button (12) until <P.02> is shown and then press Enter button (13).

If necessary enter the password. The next screen shows that the function is “ON or OFF” Press the Enter button (13) to change this mode Use the Scroll buttons (12) to select ON or OFF.

When this function is ON, use the Scroll buttons up or down (12) to see the node ID.

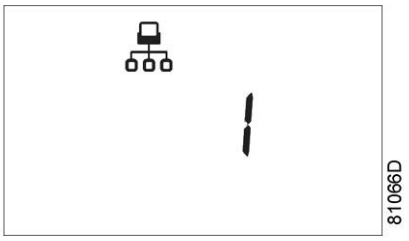
If desired the user can change this ID. Press the Enter button (13): the node ID value starts blinking. Use the Scroll buttons (12) to change the node ID. Press the Enter button (13) to program the new node ID or press the Escape button (14) to leave this screen or to cancel this operation.

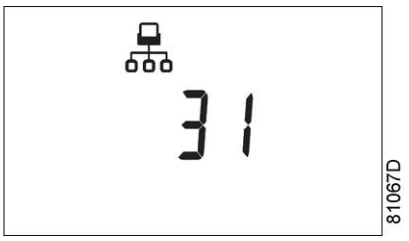




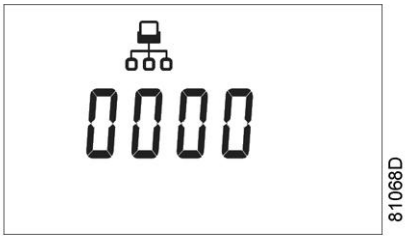
Modifying the Node ID

The Node ID can be changed; use a value between 1 and 31. When the function is ON, the parameters cannot be modified. Change the function to OFF to change the node ID.





It is also possible to change the channels. The controller has 4 channels. When changing the channels, the controller can act as a Mk IV controller. To set the channels, go to the screen where the node ID is visible. Press the Scroll button down (12). The following screen appears:

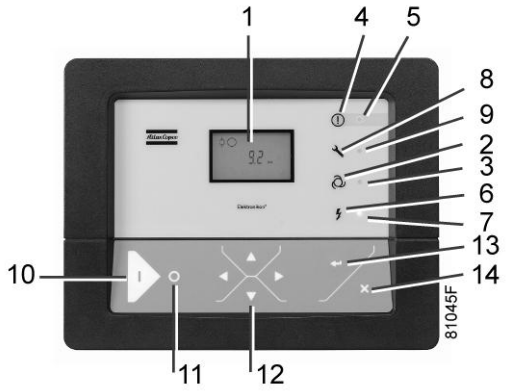


Press the Enter button (13) to modify the setting. The utmost left value will blink. Change this value by using the Scroll buttons (12). Press the Enter button (13) to confirm. Change the other values in the same way, as required.

After modifying the settings, the screen may look as follows:

3.18 Calling up/modifying IP, Gateway and Subnetmask

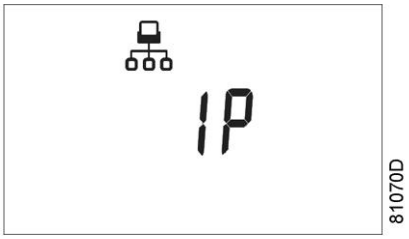
Calling up

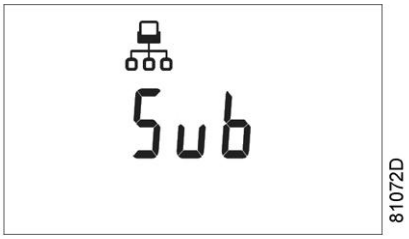


Starting from the Main screen:

Press the Scroll button (12) until <P.03> is shown and then press Enter button (13).

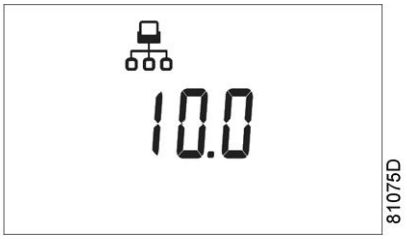
The next screen shows either OFF or ON. If ON, press the Enter button (13) to modify it to OFF. Use the Scroll buttons Up or Down (12) to scroll between the items in this list (<IP> for IP address, <SUB> for Subnetmask or <GATE> for Gateway):

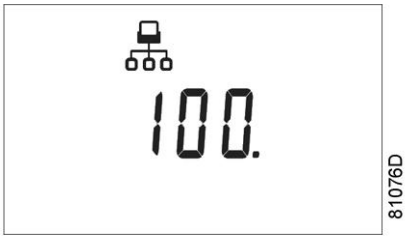




Modification

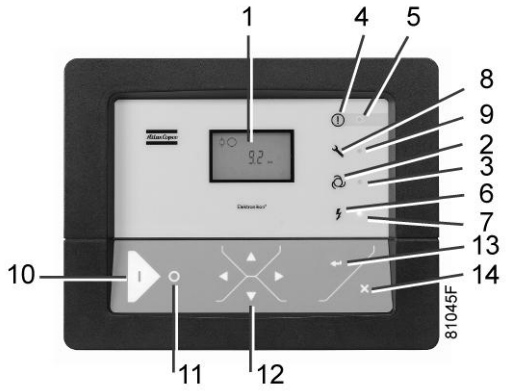
Press the Enter button (13) and if necessary enter the password. The first digits are blinking. Use the Scroll buttons Up or Down (12) to modify the settings and press Enter (13) to confirm. Modify the next digits the same way. The standard IP address is set as 192.168.100.100.





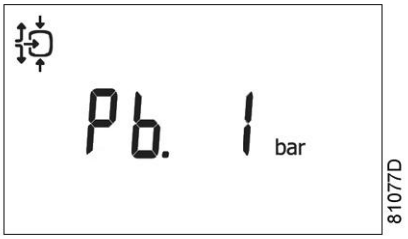
3.19 Calling up/modifying pressure band settings

Calling up the settings



Starting from the Main screen:

- Press Scroll button (12) until <P.04> is shown and then press Enter button (13). Pressure band 1 (<Pb.1>) is shown on the display. Button (12) can be used to scroll to pressure band 2 (<Pb.2>).
- Press Enter button (13) on the desired pressure band. The load level of the selected pressure band appears. Button (12) can be used to scroll to the unload level.



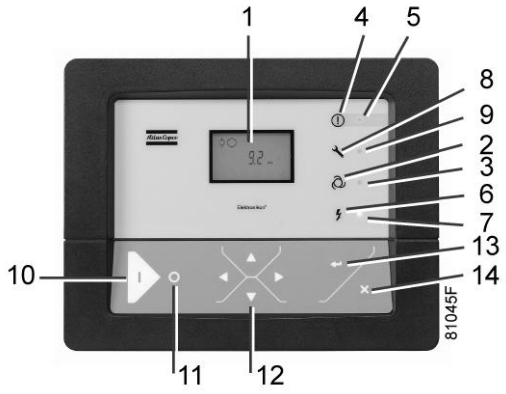
Loading pressure

Unloading pressure

- Press Enter button (13) to modify the load level (value starts blinking). A password may be required. Use Scroll buttons (12) to change the loading pressure.
- Press Enter button (13) to program the new values or press the Escape button (14) to cancel.

3.20 Modifying the pressure band selection

Control panel

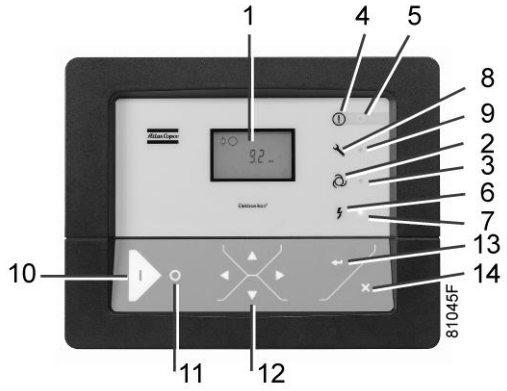


Starting from the Main screen:

- Press Scroll button (12) until <P.05> is shown and then press Enter button (13). The active pressure band 1 (<Pb.1>) is shown on the display.
- Press Enter button (13) to modify the pressure band selection (a password may be required). The active pressure band <Pb.1> starts blinking.
- Press button (12) to modify the active pressure band. Press Enter button (13) to confirm or the Escape button (14) to cancel.

3.21 Calling up/modifying service timer settings

Control panel



Starting from the Main screen:

- Press Scroll button (12) until <P.06> is shown and then press Enter button (13): 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.
- Press Enter button (13) to modify this value (a password may be required): the value blinks. Use the Scroll buttons (12) to modify the setting.
- Press Enter button (13) to program the new value.

3.22 Calling up/modifying the unit of temperature

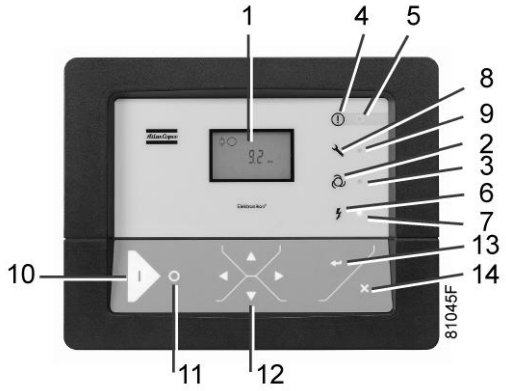
Control panel

Starting from the Main screen:

- Press Scroll button (12) until <P.07> is shown and then press Enter button (13). The actually used unit is shown. Possible settings are <˚C> and <˚F>.
- Press Enter button (13) (unit blinks) and use the Scroll buttons (12) to select another unit of temperature.
- Press Enter button (13) to program the new unit or press Escape button (14) to return to the parameter screen without changes.

3.23 Calling up/modifying unit of pressure

Control panel



Starting from the Main screen:

- Press Scroll button (12) until <P.08> and the possible settings are shown (<Mpa>, <psi>, and <bar>). Press Enter button (13) and the actually used unit is shown.
- Press Enter button (13) (unit starts blinking) and use the Scroll buttons (12) to select another unit of pressure.
- Press Enter button (13) to program the new unit of pressure. Press the escape button (14) to return to the parameter screens.

3.24 Activating automatic restart after voltage failure

Description

This parameter, accessible in screen <P.09>, can only be modified after entering a code. Consult Atlas Copco if this function is to be activated.

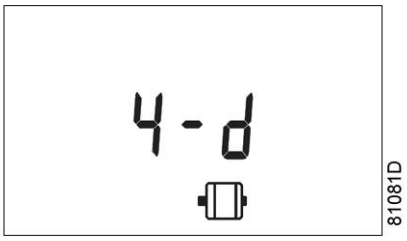
3.25 Selection between Y-D or DOL starting

Control panel

Starting from the Main screen:

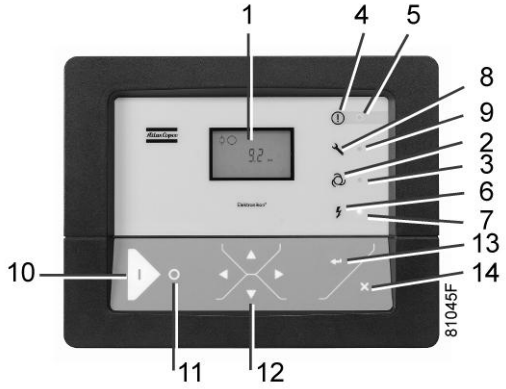
- Press Scroll button (12) until <P.10> and the motor pictograph is shown and then press Enter button (13). The actually used starting mode is shown: <Y-D> (star-delta) or <doL> (Direct-On Line).

- This parameter can only be modified after entering a code. Consult Atlas Copco if the parameter is to be changed.



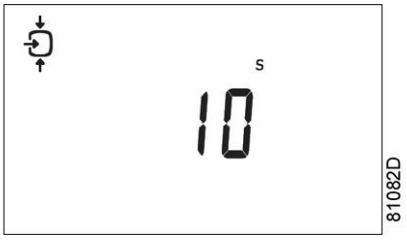
3.26 Calling up modifying load delay time

Control panel



Starting from the Main screen:

- Press Scroll button (12) until <P.11> and the compressor load pictograph is shown and press the Enter button (13):



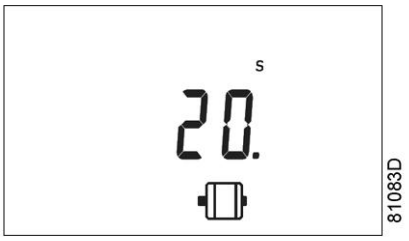
- This screen shows the load delay time 10 and the unit <s> seconds. To modify this value press the Enter button (13) (a password may be required).
- The value starts blinking and Scroll buttons (12) can be used to modify the value.
- Press the Enter button (13) to program the new value.

The minimum and maximum value depends on the parameters.

3.27 Calling up modifying minimum stop time

Starting from the Main screen:

- Press the Scroll button (12) until <P.12> and the motor pictograph is shown and press the Enter button (13):



- This screen shows the minimum stop time (20) and the unit <s> (seconds).
- To modify this value press the Enter button (13). The value starts blinking and Scroll buttons (12) can be used to modify this value.
- Press Enter button (13) to program the new value.
  The minimum and maximum values depend on the parameters.

3.28 Activating password protection

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:

- Press Scroll buttons (12) until <P.13> is shown and press Enter button (13):

- Password (<PASS>) appears on the screen. Press the Enter button (13).
- The screen shows the password status (ON (<On>) or OFF (<OFF>). Press Enter button (13) to modify.
- Change the value with Scroll buttons (12).
- Select <On> and press Enter button (13).
- Enter the new password and press Enter button (13) to confirm.
- Enter the password again and press Enter button (13) to confirm.
- <On> appears on the display. Press reset key to return to the parameter screen.

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

3.29 Activate load/unload remote pressure sensing

Starting from the Main screen:

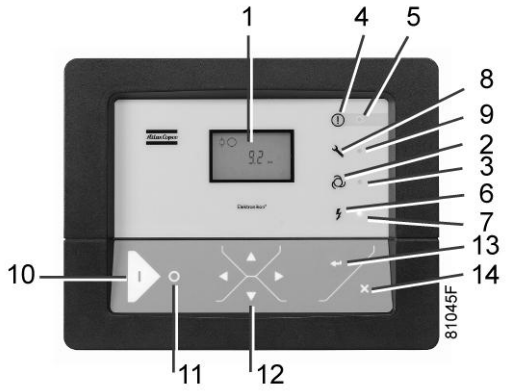
- Press the Scroll button (12) until <P.14> appears
  .

- Press the Enter button (13).

- The function of this screen is to activate the remote load/unload relay. To be able to activate this remote Load/Unload functionality, a physical digital input with function Load/Unload is required.
  Once this parameter is activated, the physical digital input can be used to switch the compressor between Load and Unload.

3.30 Calling up/modifying protection settings

Available protections



A number of protection settings are provided. The protection screens are labelled <Pr.>. The pictograph shown with the protection screen indicates the purpose of the protection.

Possible combinations are <Pr.> followed by a number and one of the next pictographs:

Pictograph	Designation
	<Pr.> shown with the pressure pictograph shows the pressure protections.
	<Pr.> shown with the element outlet temperature pictograph shows the element outlet temperature protections.
	<Pr.> shown with the dewpoint temperature pictograph shows the dewpoint temperature protections.
	<Pr.> shown with the ambient temperature pictograph shows the ambient temperature protections.

Following protection settings are available:

- A low warning level, shown on the display as <AL-L>.
- A high warning level, shown on the display as <AL-H>.
- A low shut-down level, shown on the display as <Sd-L>.
- A high shut-down level, shown on the display as <Sd-H>.
- Service level shown on the display as <SE-L>.
- Service level shown on the display as <SE-H>.

Example of protection screens

Changing the settings

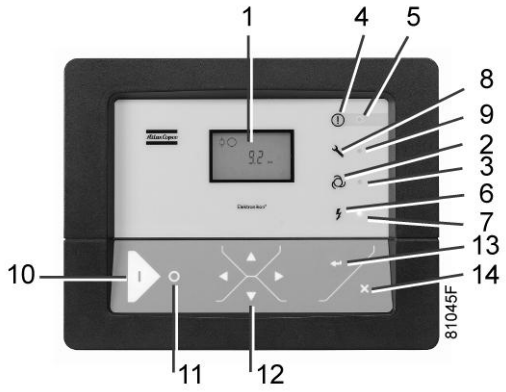
Starting from the Main screen (the example given describes the protection of the element outlet temperatures):

Press Scroll buttons (12) until <Pr.> followed by a number and the element outlet temperature pictograph is shown and press Enter button (13):

- The warning level for the high temperature warning level <AL-H> and the high temperature shut-down level <Sd-H> become visible. Use Scroll keys (12) to move between the warning level (<AL>) and the shut-down level (<Sd>), press the Enter button (13) to modify the value.
- An optional password may be required, the value starts blinking and Scroll buttons (12) can be used to modify the value.
- Press the Enter button (13) to program the new value.

	Programmable settings can only be modified within allowed limits.

3.31 Test screens



Display test

Starting from the Main screen:

- Press Scroll buttons (12) until <t.01> is shown and then press Enter button (13).

Safety valve test

In the test screen <t.02> a safety valve test is provided. The safety valves can only be tested after entering a code. Consult Atlas Copco if the safety valves are to be tested.

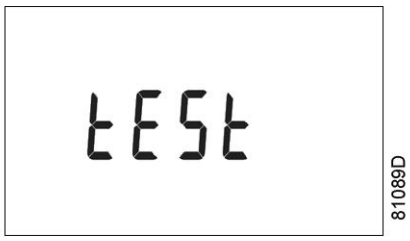
Production test

Test screen <t.03> is only intended for production test. If the Main screen shows following screen, the controller is in production test mode:

How to solve?

Use the Scroll buttons (12) and scroll to menu <t.03>.

The screen shows:



Press the Enter button (13): the text starts blinking. Press enter again and the menu disappears.

3.32 Web server

All Elektronikon controllers have a built-in web server that allows direct connection to a PC via a local area network (LAN). This allows to consult certain data and settings via the PC instead of via the display of the controller.

Getting started

Make sure you are logged in as administrator.

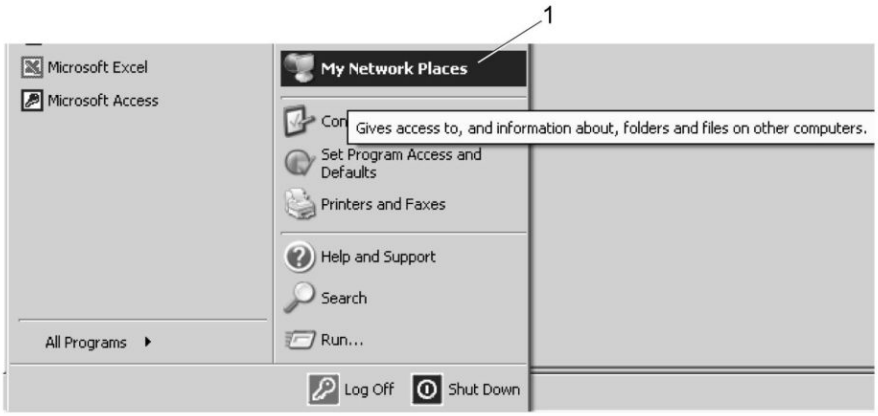
- Use the internal network card from your computer or an USB to LAN adapter (see picture below).

USB to LAN adapter

- Use an UTP cable (CAT 5e) to connect to the controller (see picture below).

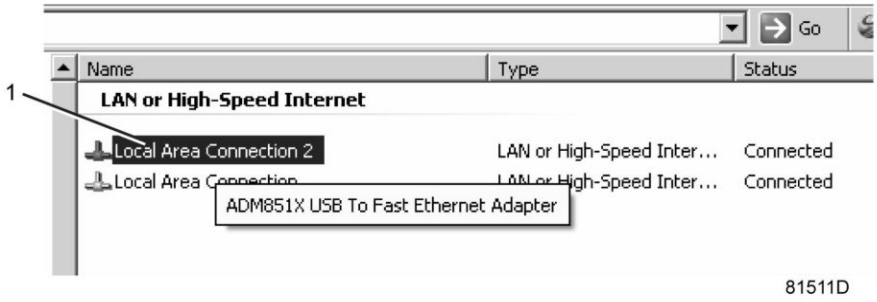
Configuration of the network card

- Go to My Network places (1).

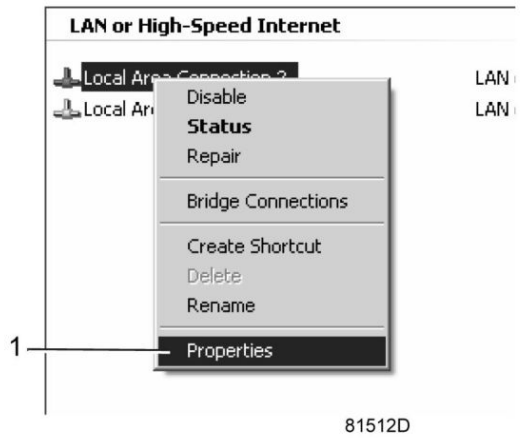


- Click on View Network connections (1).

- Select the Local Area connection (1), which is connected to the controller.



- Click with the right button and select properties (1).



- Use the checkbox Internet Protocol (TCP/IP) (1) (see picture). To avoid conflicts, de-select other properties if they are selected. After selecting TCP/IP, click on the Properties button (2) to change the settings.

- Use the following settings:
  - IP Address 192.168.100.200
  - Subnetmask 255.255.255.0

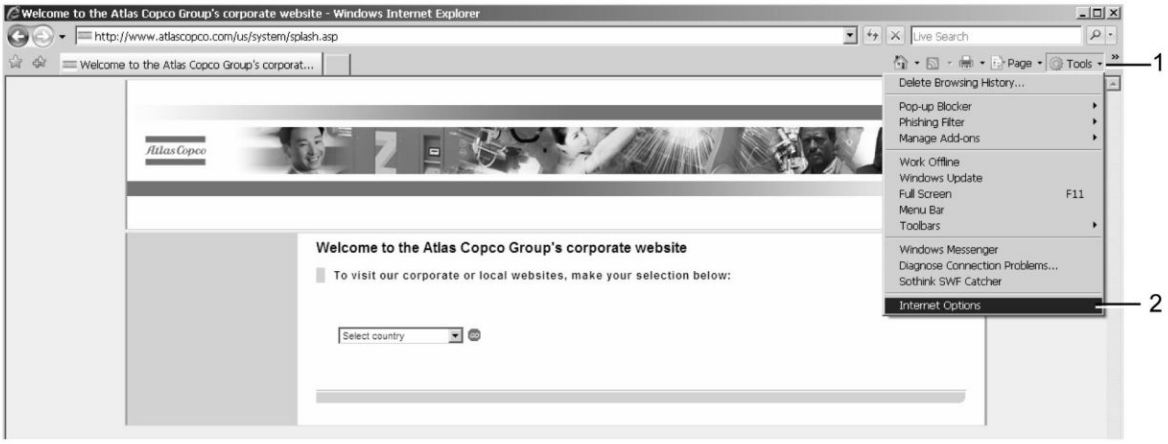
  Click OK and close network connections.

Configuration of the web server

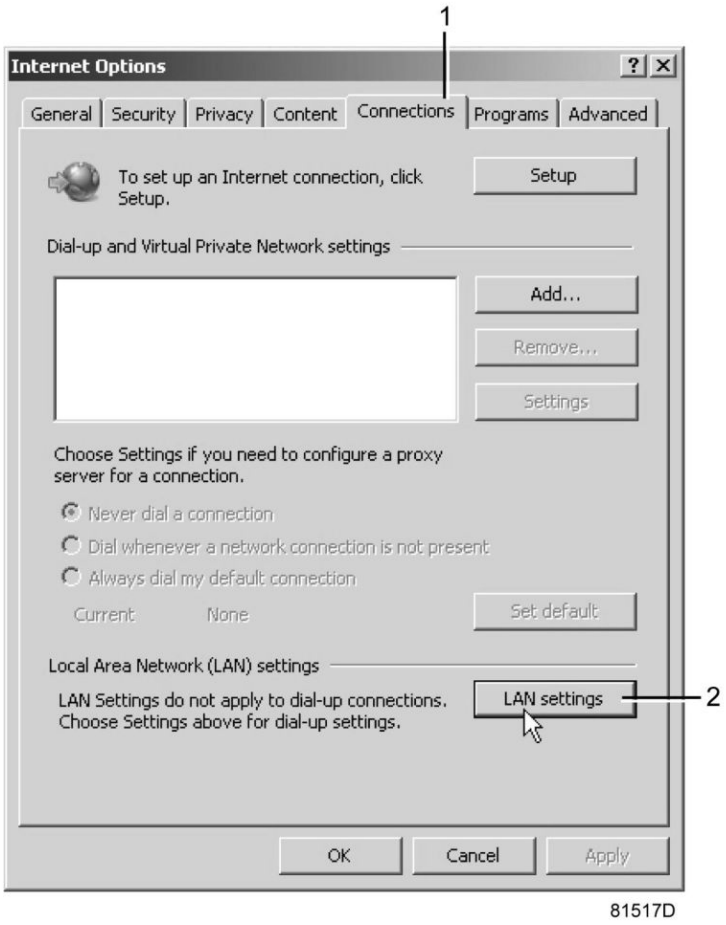
Configure the web interface

	The internal web server is designed and tested for Microsoft® Internet Explorer 6, 7 and 8. Other web browsers like Opera and Firefox do not support this internal web server. When using Opera or Firefox, a redirect page opens. Click on the hyperlink to connect to the download server from Microsoft® to download the latest version of Internet Explorer, and install this software.

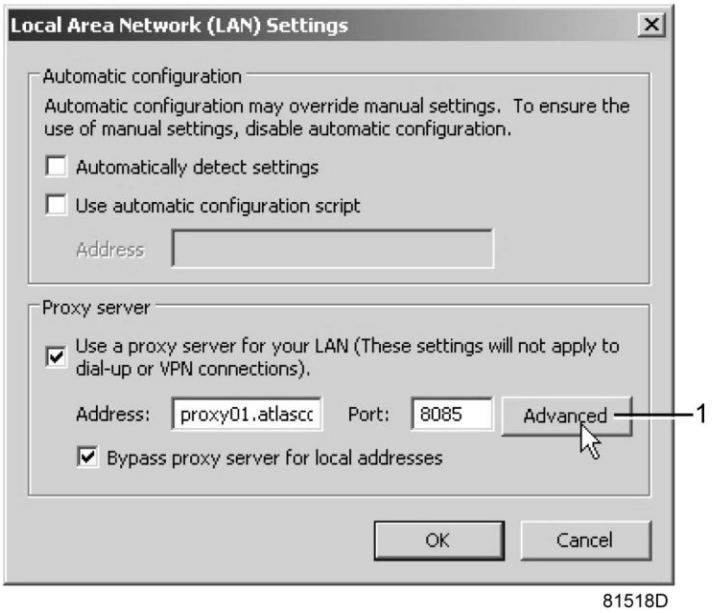
- When using Internet Explorer:
  Open Internet Explorer and click on Tools - Internet options (2).



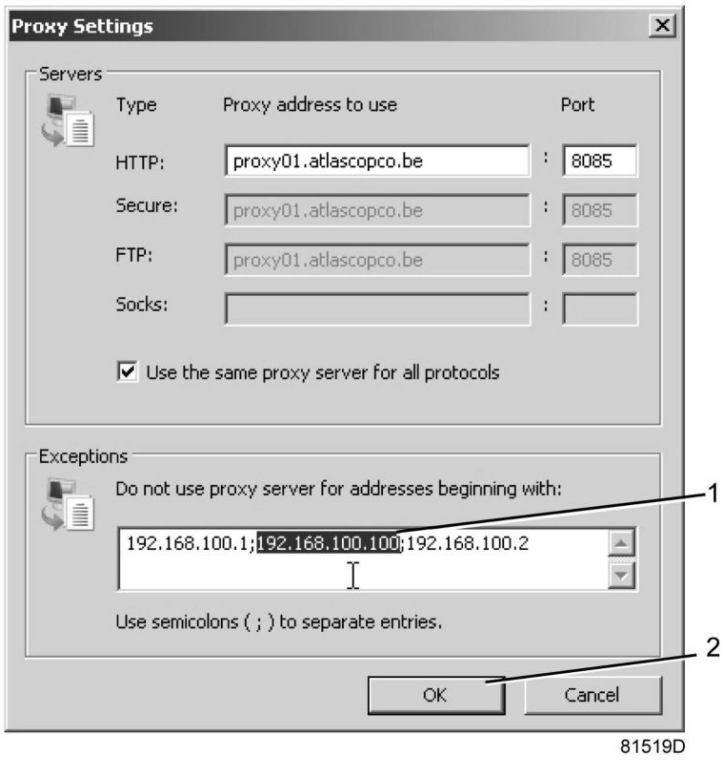
- Click on the Connections tab (1) and then click on the LAN settings button (2).



- In the Proxy server Group box, click on the Advanced button (1).

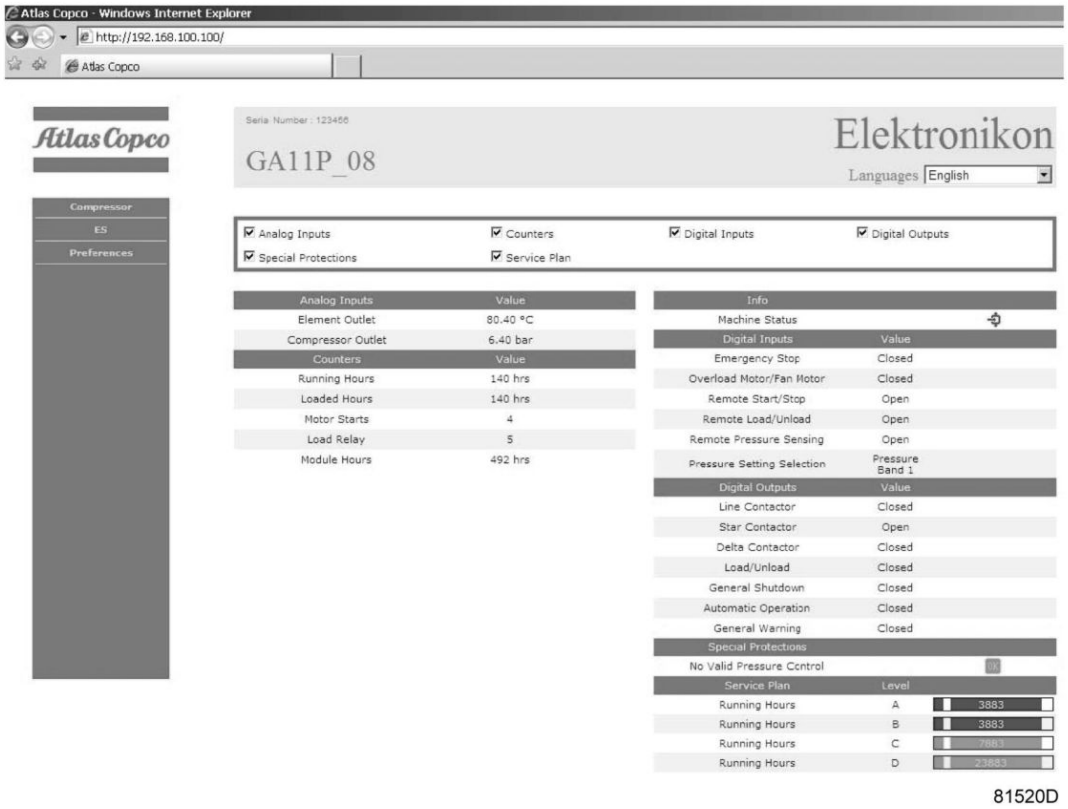


- In the Exceptions Group box, enter the IP address of your controller. Multiple IP addresses can be given but they must be separated with semicolons (;).
  Example: Suppose that you already added two IP addresses (192.168.100.1 and 192.168.100.2). Now you add 192.168.100.100 and separate the 3 IP addresses by putting semicolons between them (1) (see picture). Click OK (2) to close the window.



Viewing the controller data

- Open your browser and type the IP address of the controller you want to view in your browser (in this example http://192.168.100.100). The interface opens:



81520D

Navigation and options

- The banner shows the compressor type and the language selector. In this example, three languages are installed on the controller.

81521D

- On the left site of the interface you can find the navigation menu (see picture below).
  If a license for ESi is foreseen, the menu contains 3 buttons.
  - Compressor: shows all compressor settings.
  - Es: shows the ESi status (if a license is provided).
  - Preferences: allows to change temperature and pressure unit.

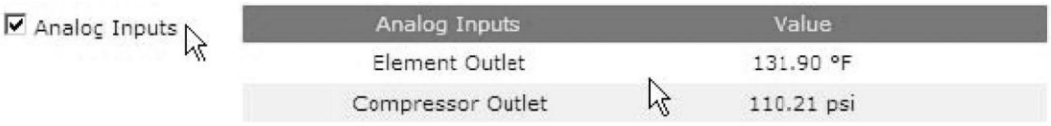
81522D

Compressor settings

All compressor settings can be hidden or shown. Put a mark for each setting. Only the machine status is fixed and can not be removed from the main screen.

Analog inputs

(The units of measure can be changed in the preference button from the navigation menu).



81523D

Counters

Counters give an overview of all actual counters from controller and compressor.

81524D

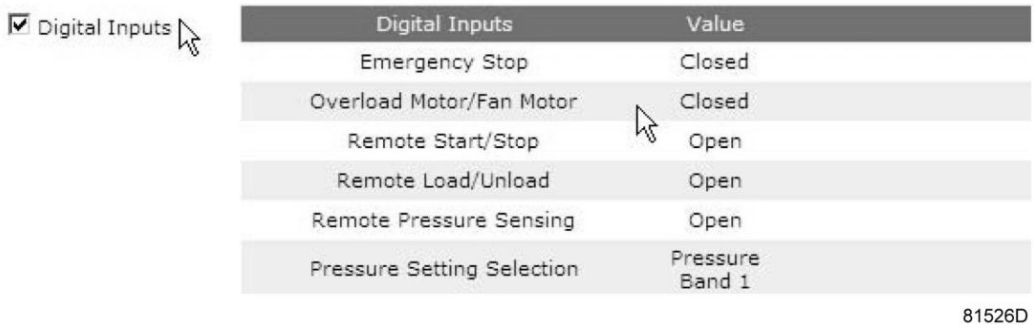
Info status

Machine status is always shown on the web interface.

81525D

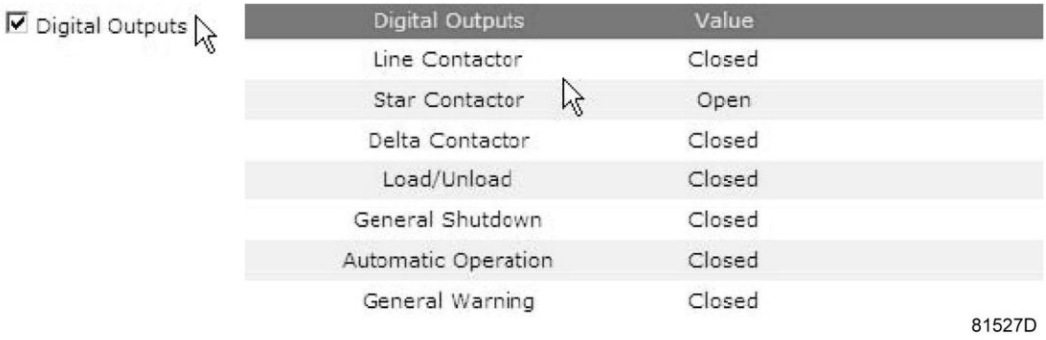
Digital inputs

Gives an overview of all Digital inputs and status.



Digital outputs

Shows a list of all digital outputs and their status.

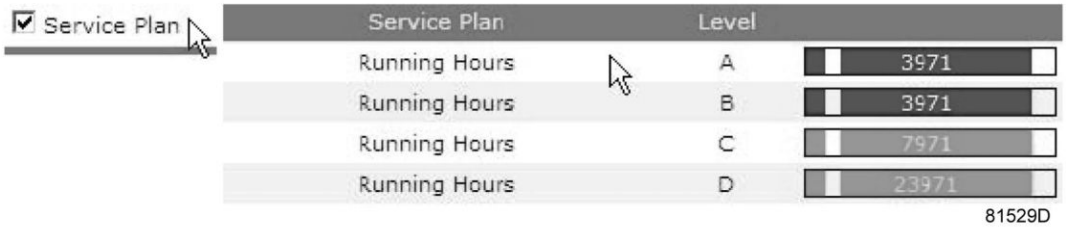


Special protections

Give an overview of all special protections of the compressor.

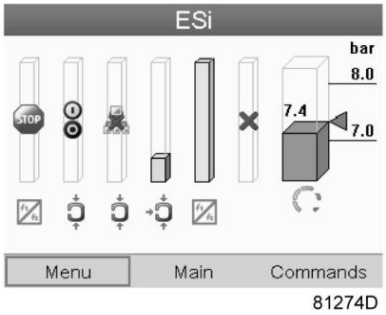
Service plan

Shows all levels of the service plan and status. This screen only shows the running hours. It is also possible to show the actual status of the service interval.



ES screen controller

If a ESi license is provided, the button ES is shown in the navigation menu. At the left all compressors in the ES and at the right the ES status is shown.



A possible ESi screen

3.33 Programmable settings

Parameters: unloading/loading pressures for compressors without built-in refrigeration dryer

		Minimum setting	Factory setting	Maximum setting
Unloading pressures				
Unloading pressure (7.5 bar compressors)	bar(e)	4.1	7	7.5
Unloading pressure (7.5 bar compressors)	psig	59.5	101.5	108.8
Unloading pressure (8.5 bar compressors)	bar(e)	4.1	8	8.5
Unloading pressure (8.5 bar compressors)	psig	59.5	116	123.5
Unloading pressure (10 bar compressors)	bar(e)	4.1	9.5	10
Unloading pressure (10 bar compressors)	psig	59.5	137.8	145.0
Unloading pressure (13 bar compressors)	bar(e)	4.1	12.5	13
Unloading pressure (13 bar compressors)	psig	59.5	181.3	188.6
Unloading pressure (100 psi compressors)	bar(e)	4.1	6.9	7.4
Unloading pressure (100 psi compressors)	psig	59.5	100	107.3
Unloading pressure (125 psi compressors)	bar(e)	4.1	8.6	9.1
Unloading pressure (125 psi compressors)	psig	59.5	125	132
Unloading pressure (150 psi compressors)	bar(e)	4.1	10.3	10.8
Unloading pressure (150 psi compressors)	psig	59.5	150	156.6
Unloading pressure (175 psi compressors)	bar(e)	4.1	12	12.5
Unloading pressure (175 psi compressors)	psig	59.5	175	181.2
Loading pressures				
Loading pressure (7.5 bar compressors)	bar(e)	4	6.4	7.4
Loading pressure (7.5 bar compressors)	psig	58	92.8	107.3
Loading pressure (8.5 bar compressors)	bar(e)	4	7.4	8.4
Loading pressure (8.5 bar compressors)	psig	58	107.3	121.8
Loading pressure (10 bar compressors)	bar(e)	4	8.9	9.9
Loading pressure (10 bar compressors)	psig	58	129.1	143.6
Loading pressure (13 bar compressors)	bar(e)	4	11.9	12.9

		Minimum setting	Factory setting	Maximum setting
Loading pressure (13 bar compressors)	psig	58	172.6	187.1
Loading pressure (100 psi compressors)	bar(e)	4	6.3	7.3
Loading pressure (100 psi compressors)	psig	58	91.4	105.9
Loading pressure (125 psi compressors)	bar(e)	4	8	9
Loading pressure (125 psi compressors)	psig	58	116	130.5
Loading pressure (150 psi compressors)	bar(e)	4	9.7	10.7
Loading pressure (150 psi compressors)	psig	58	140.7	155.2
Loading pressure (175 psi compressors)	bar(e)	4	11.4	12.4
Loading pressure (175 psi compressors)	psig	58	165.3	179.8

Parameters: unloading/loading pressures for compressors with built-in refrigeration dryer

		Minimum setting	Factory setting	Maximum setting
Unloading pressures				
Unloading pressure (7.5 bar compressors)	bar(e)	4.1	7	7.2
Unloading pressure (7.5 bar compressors)	psig	59.5	101.5	104.4
Unloading pressure (8.5 bar compressors)	bar(e)	4.1	8	8.3
Unloading pressure (8.5 bar compressors)	psig	59.5	116	120
Unloading pressure (10 bar compressors)	bar(e)	4.1	9.5	9.7
Unloading pressure (10 bar compressors)	psig	59.5	137.8	140.7
Unloading pressure (13 bar compressors)	bar(e)	4.1	12.5	12.7
Unloading pressure (13 bar compressors)	psig	59.5	181.3	184.2
Unloading pressure (100 psi compressors)	bar(e)	4.1	6.9	7.1
Unloading pressure (100 psi compressors)	psig	59.5	100	103
Unloading pressure (125 psi compressors)	bar(e)	4.1	8.6	8.8
Unloading pressure (125 psi compressors)	psig	59.5	125	127.6
Unloading pressure (150 psi compressors)	bar(e)	4.1	10.3	10.5
Unloading pressure (150 psi compressors)	psig	59.5	150	152.3
Unloading pressure (175 psi compressors)	bar(e)	4.1	12	12.2
Unloading pressure (175 psi compressors)	psig	59.5	175	177
Loading pressures				
Loading pressure (7.5 bar compressors)	bar(e)	4	6.4	7.1
Loading pressure (7.5 bar compressors)	psig	58	92.8	103
Loading pressure (8.5 bar compressors)	bar(e)	4	7.4	8.2
Loading pressure (8.5 bar compressors)	psig	58	107	119
Loading pressure (10 bar compressors)	bar(e)	4	8.9	9.6
Loading pressure (10 bar compressors)	psig	58	129.1	139.2
Loading pressure (13 bar compressors)	bar(e)	4	11.9	12.6
Loading pressure (13 bar compressors)	psig	58	172.6	182.8
Loading pressure (100 psi compressors)	bar(e)	4	6.3	7

		Minimum setting	Factory setting	Maximum setting
Loading pressure (100 psi compressors)	psig	58	91.4	101.5
Loading pressure (125 psi compressors)	bar(e)	4	8	8.7
Loading pressure (125 psi compressors)	psig	58	116	126.2
Loading pressure (150 psi compressors)	bar(e)	4	9.7	10.4
Loading pressure (150 psi compressors)	psig	58	140.7	150.8
Loading pressure (175 psi compressors)	bar(e)	4	11.4	12.1
Loading pressure (175 psi compressors)	psig	58	165.3	175.5

Parameters

		Minimum setting	Factory setting	Maximum setting
Motor running time in star	sec	5	10	10
Load delay time (star-delta)	sec	0	0	10
Number of motor starts	starts/day	0	240	480
Minimum stop time	sec	10	20	30
Programmed stop time	sec	0	3	20
Power recovery time (ARAVF)	sec	10	10	3600
Restart delay	sec	0	0	1200
Communication time-out	sec	10	30	60

Protections

		Minimum setting	Factory setting	Maximum setting
Compressor element outlet temperature (shut-down warning level)	˚C	50	112 (GA 11^{+} up to GA 26^{+}) 114 (GA 30)	119
Compressor element outlet temperature (shut-down warning level)	˚F	122	233 (GA 11^{+} up to GA 26^{+}) 237 (GA 30)	246
Compressor element outlet temperature (shut-down level)	˚C	111	120	120
Compressor element outlet temperature (shut-down level)	˚F	232	248	248

Service plan

The built-in service timer will give a Service warning message after a preprogrammed time interval has elapsed.

Also see section Preventive maintenance schedule.

Consult Atlas Copco if a timer setting has to be changed. See section Calling up/modifying service timer settings. The intervals must not exceed the nominal intervals and must coincide logically.

Terminology

Term	Explanation
ARAVF	Automatic restart after voltage failure. See section Elektronikon regulator and Activating automatic restart.
Power recovery time	Is the period within which the voltage must be restored to have an automatic restart. Is accessible if the automatic restart is activated. To activate the automatic restart function, consult Atlas Copco.
Restart delay	This parameter allows to programme that not all compressors are restarted at the same time after a power failure (ARAVF active).
Compressor element outlet	The regulator does not accept inconsistent settings, e.g. if the warning level is programmed at 95 ˚C (203 ˚F), the minimum limit for the shut-down level changes to 96 ˚C (204 ˚F). The recommended difference between the warning level and shut-down level is 10 ˚C (18 ˚F).
Delay at shut-down signal	Is the time for which the signal must exist before the compressor is shut down. If it is required to program this setting to another value, consult Atlas Copco.
Minimum stop time	Once the compressor has automatically stopped, it will remain stopped for the minimum stop time, whatever happens with the net air pressure. Consult Atlas Copco if a setting lower than 20 seconds is required.
Unloading/ Loading pressure	The regulator does not accept illogical settings, e.g. if the unloading pressure is programmed at 7.0 bar(e) (101 psi(g)), the maximum limit for the loading pressure changes to 6.9 bar(e) (100 psi(g)). The recommended minimum pressure difference between loading and unloading is 0.6 bar (9 psi(g)).

4 Elektronikon® Graphic controller

4.1 Elektronikon® Graphic controller

Control panel

Display of the Elektronikon® Graphic controller

Introduction

The Elektronikon controller has following functions:

- Controlling the compressor
- Protecting the compressor
- Monitoring components subject to service
- Automatic restart after voltage failure (made inactive)

Automatic control of the compressor operation

The regulator maintains the net pressure between programmable limits by automatically loading and unloading the compressor. A number of programmable settings, e.g. the unloading and loading pressures, the minimum stop time and the maximum number of motor starts are taken into account.

The regulator stops the compressor whenever possible to reduce the power consumption and restarts it automatically when the net pressure decreases. In case the expected unloading period is too short, the compressor is kept running to prevent too short standstill periods.

	A number of time based automatic start/stop commands may be programmed. Take into account that a start command will be executed (if programmed and activated), even after manually stopping the compressor.

Protecting the compressor

Shut-down

Several sensors are provided on the compressor. If one of these measurements exceeds the programmed shut-down level, the compressor will be stopped. This will be indicated on display (1) and general alarm LED (2) will blink.

Remedy the trouble and reset the message. See also the Inputs menu.

	Before remedying, consult the applicable safety precautions.

Shut-down warning

A shut-down warning level is a programmable level below the shut-down level.

If one of the measurements exceeds the programmed shut-down warning level, a message will appear on display (1) and general alarm LED (2) will light up, to warn the operator that the shut-down warning level is exceeded.

The message disappears as soon as the warning condition disappears.

Warning

A warning message will appear if, on full-Feature compressors, the Dewpoint temperature is too high in relation to the ambient temperature

Service warning

A number of service operations are grouped (called Service Plans). Each Service Plan has a programmed time interval. If a time interval is exceeded, a message will appear on display (1) to warn the operator to carry out the service actions belonging to that Service Plan.

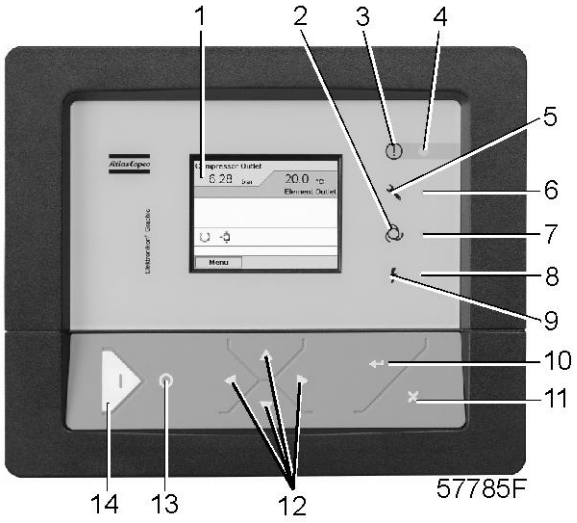
Automatic restart after voltage failure

The regulator has a built-in function to automatically restart the compressor if the voltage is restored after voltage failure. For compressors leaving the factory, this function is made inactive. If desired, the function can be activated. Consult the Atlas Copco Customer Centre.

	If activated and provided the regulator was in the automatic operation mode, the compressor will automatically restart if the supply voltage to the module is restored.

4.2 Control panel

Elektronikon regulator



Control panel

Parts and functions

Reference	Designation	Function
1	Display	Shows the compressor operating condition and a number of icons to navigate through the menu.
2	Pictograph	Automatic operation
3	Pictograph	General alarm
4	General alarm LED	Flashes if a shut-down warning condition exists.
5	Pictograph	Service
6	Service LED	Lights up if service is needed
7	Automatic operation LED	Indicates that the regulator is automatically controlling the compressor.
8	Voltage on LED	Indicates that the voltage is switched on.
9	Pictograph	Voltage on
10	Enter key	Key to select the parameter indicated by the horizontal arrow. Only the parameters followed by an arrow pointing to the right can be modified.
11	Escape key	To go to previous screen or to end the current action
12	Scroll keys	Keys to scroll through the menu.
13	Stop button	Button to stop the compressor. LED (7) goes out.
14	Start button	Button to start the compressor. LED (7) lights up indicating that the Elektronikon regulator is operative.

4.3 Icons used

Status icons

Name	Icon	Description
Stopped / Running	 57786F	When the compressor is stopped, the icon stands still. When the compressor is running, the icon is rotating.
Compressor status	 57787F	Motor stopped
	 57788F	Running unloaded
	 57789F	Running loaded
Machine control mode	 57790F	Local start / stop
	 57791F	Remote start / stop
	 57792F	Network control
Automatic restart after voltage failure	 57793F	Automatic restart after voltage failure is active
Week timer	 57794F	Week timer is active
Active protection functions	 57795F	Emergency stop
	 57796F	Shutdown
	 57797F	Warning
Service	 57798F	Service required

Input icons

Icon	Description
	Pressure
	temperature
	Digital input
	Special protection

System icons

Icon	Description
	Compressor element (LP, HP, ...)
	Dryer
	Fan
	Frequency converter
	Drain
	Filter
	Motor
	Failure expansion module
	Network problem
	General alarm

Menu icons

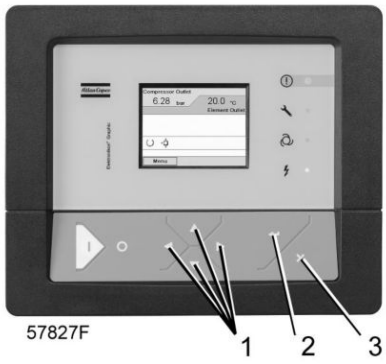
Icon	Description
 57813F	Inputs
 57814F	Outputs
 57812F	Alarms (Warnings, shutdowns)
 57815F	Counters
 57816F	Test
 57817F	Settings
 57798F	Service
 57818F	Event history (saved data)
 57819F	Access key / User password
 57792F	Network
 57820F	Setpoint
 57867F	Info

Navigation arrows

Icon	Description
 57821F	Up
 57822F	Down

4.4 Main screen

Control panel

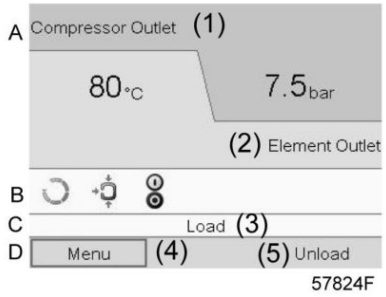


(1)	Scroll keys
(2)	Enter key
(3)	Escape key

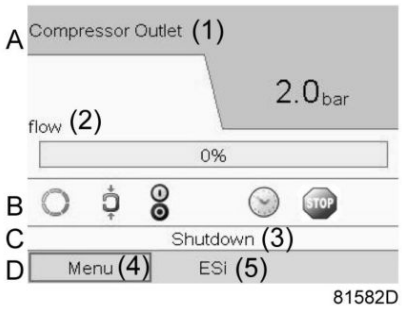
Function

The Main screen shows the status of the compressor operation and is the gateway to all functions implemented in the controller.

The Main screen is shown automatically when the voltage is switched on and one of the keys is pushed. It is switched off automatically after a few minutes when no keys are pushed.



Typical Main screen, fixed speed compressors



Typical Main screen, compressors with frequency converter

Text on figures

(1)	Compressor Outlet
(2)	Element Outlet (fixed speed compressors) Flow in % (compressors with frequency converter)
(3)	Load (text varies upon the compressors actual condition)
(4)	Menu
(5)	Unload (text varies upon the compressors actual condition)

- **Section A** shows information regarding the compressor operation (e.g. the outlet pressure (1), the temperature at the compressor outlet (2)). On compressors with a frequency converter, the load degree (flow) is given in % of the maximum flow.
- **Section B** shows Status icons. Following icon types are shown in this field:
  - Fixed icons
    These icons are always shown in the main screen and cannot be selected by the cursor (e.g. Compressor stopped or running, Compressor status (running, running unloaded or motor stopped).
  - Optional icons
    These icons are only shown if their corresponding function is activated (e.g. week timer, automatic restart after voltage failure , etc.)
  - Pop up icons
    These icons pop up if an abnormal condition occurs (warnings, shutdowns, service,...)

  To call up more information about the icons shown, select the icon using the scroll keys and press the enter key.
- **Section C** is called the Status bar
  This bar shows the text that corresponds to the selected icon.
- **Section D** shows the Action buttons. These buttons are used:
  - to call-up or program settings
  - to reset a motor overload, service message or emergency stop
  - to have access to all data collected by the regulator

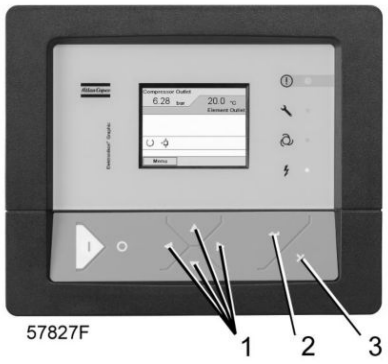
  The function of the buttons depends on the displayed menu. The most common functions are:

Designation	**Function**
Menu	To go to the menu
Modify	To modify programmable settings
Reset	To reset a timer or message

To activate an action button, highlight the button by using the Scroll keys and press the Enter key.
To go back to the previous menu, press the Escape key.

4.5 Calling up menus

Control panel

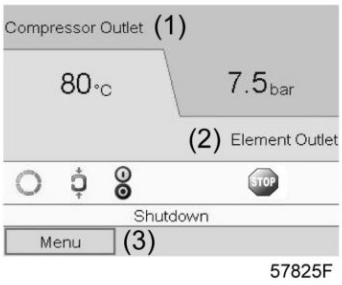


Control panel

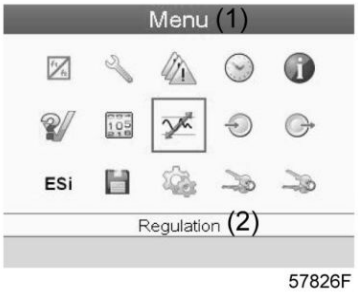
(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Description

When the voltage is switched on, the main screen is shown automatically (see section Main screen):



- To go to the Menu screen, highlight the Menu button (3), using the Scroll keys.
- Press the Enter key to select the menu. Following screen appears:

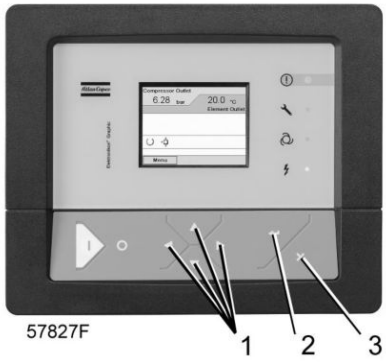


- The screen shows a number of icons. Each icon indicates a menu item. By default, the Pressure Settings (Regulation) icon is selected. The status bar shows the name of the menu that corresponds with the selected icon.
- Use the Scroll keys to select an icon.

- Press the Escape key to return to the Main screen.

4.6 Inputs menu

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Inputs

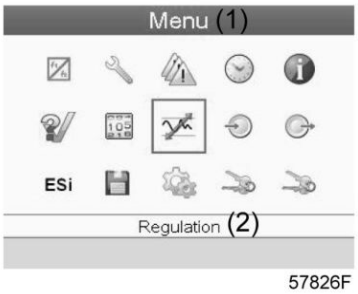
Function

To call up information regarding the actually measured data and the status of some inputs such as the emergency stop switch.

Procedure

Starting from the main screen (see Main screen),

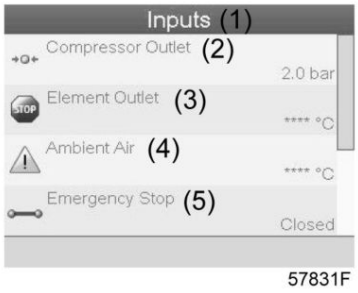
- Move the cursor to the action button Menu and press the Enter key. Following screen appears:



Text on figure

(1)	Menu
(2)	Regulation

- Using the Scroll keys, move the cursor to the Inputs icon (see above, section Menu icon).
- Press the Enter key. A screen similar to the one below appears:



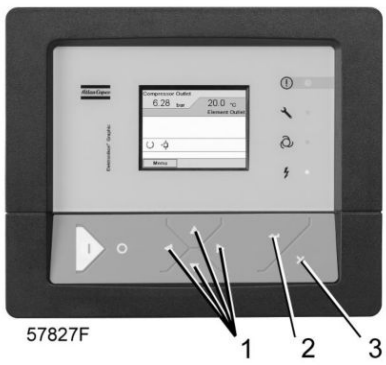
Text on figure

(1)	Inputs
(2)	Compressor outlet
(3)	Element outlet
(4)	Ambient air
(5)	Emergency stop

- The screen shows a list of all inputs with their corresponding icons and readings.
- If an input is in warning or shutdown, the original icon is replaced by the warning or shutdown icon respectively (i.e. the Stop icon and the Warning icon in the screen shown above).

4.7 Outputs menu

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Outputs

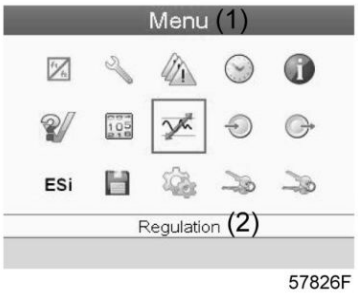
Function

To call up information regarding the actual status of some outputs such as the condition of the Fan overload contact (on air cooled compressors), the Emergency stop contact, etc.

Procedure

Starting from the Main screen (see Main screen),

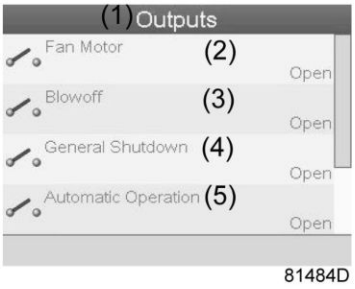
- Move the cursor to the action button Menu and press the Enter key. Following screen appears:



Text on figure

(1)	Menu
(2)	Regulation

- Move the cursor to the Outputs icon (see above, section Menu icon, using the Scroll keys.
- Press the Enter key. A screen similar to the one below appears:

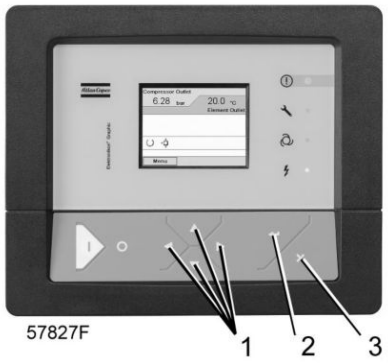


(1)	Outputs
(2)	Fan motor contact
(3)	Blow-off contact
(4)	General shutdown
(5)	Automatic operation

- The screen shows a list of all outputs with their corresponding icons and readings.
- If an input is in warning or shutdown, the original icon is replaced by the warning or shutdown icon respectively.

4.8 Counters

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Counters

Function

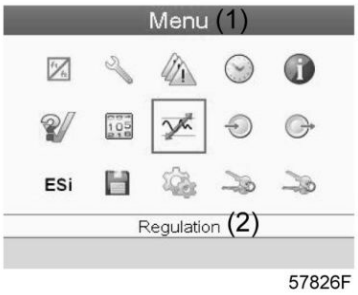
To call up:

- The running hours
- The loaded hours
- The number of motor starts
- The number of hours that the regulator has been powered
- The number of load cycles

Procedure

Starting from the Main screen (see Main screen),

- Move the cursor to the action button Menu and press the Enter key. Following screen appears:



Text on figure

(1)	Menu
(2)	Regulation

- Using the Scroll keys, move the cursor to the Counters icon (see above, section Menu icon)
- Press the Enter key. Following screen appears:

Text on figure

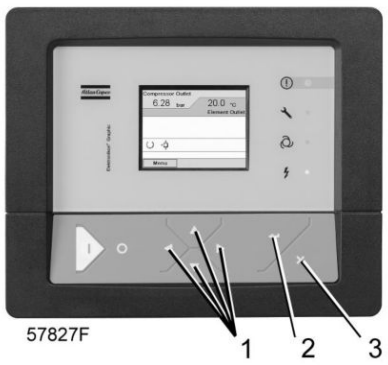
(1)	Counters
(2)	Running hours
(3)	Motor starts
(4)	Load relay
(5)	VSD 1-20 % rpm in % (the percentage of the time during which the motor speed was between 1 and 20 %) (compressors with frequency converter)

The screen shows a list of all counters with their actual readings.

Note: the example above is for a frequency converter driven compressor. For a fixed speed compressor, the actual screen will be somewhat different.

4.9 Service menu

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Service

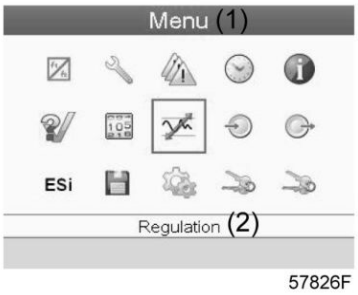
Function

- To reset the service plans which are carried out.
- To check when the next service plans are to be carried out.
- To find out which service plans were carried out in the past.
- To modify the programmed service intervals.

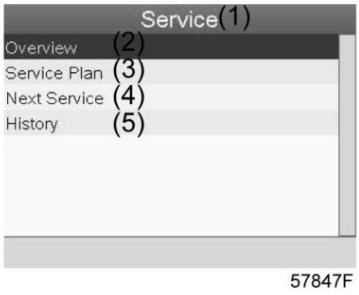
Procedure

Starting from the Main screen (see Main screen),

- Move the cursor to the action button Menu and press the Enter key. Following screen appears:



- Using the Scroll keys, move the cursor to the Service icon (see above, section Menu icon).
- Press the Enter key. Following screen appears:

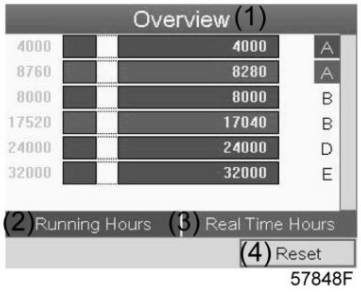


Text on figure

(1)	Service
(2)	Overview
(3)	Service plan
(4)	Next service
(5)	History

- Scroll through the items to select the desired item and press the Enter key to see the details as explained below.

Overview



Text on figure

(1)	Overview
(2)	Running Hours (green)
(3)	Real Time hours (blue)
(4)	Reset

Example for service level (A):

The figures at the left are the programmed service intervals. For Service interval A, the programmed number of running hours is 4000 hours (upper row, green) and the programmed number of real time hours is 8760 hours, which corresponds to one year (second row, blue). This means that the controller will launch a service warning when either 4000 running hours or 8760 real hours are reached, whichever comes first. Note that the real time hours counter keeps counting, also when the controller is not powered.

The figures within the bars are the number of hours to go till the next service intervention. In the example above, the compressor was just started up, which means it still has 4000 running hours or 8280 hours to go before the next Service intervention.

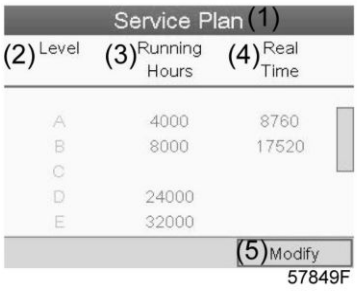
Service plans

A number of service operations are grouped (called Level A, Level B, etc...). Each level stands for a number of service actions to be carried out at the time intervals programmed in the Elektronikon controller.

When a service plan interval is reached, a message will appear on the screen.

After carrying out the service actions related to the indicated levels, the timers must be reset.

From the Service menu above, select Service plan (3) and press Enter. Following screen appears:

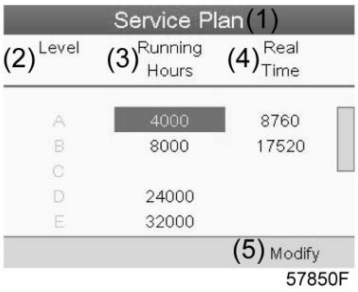


Text on figure

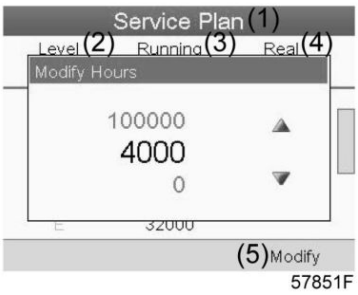
(1)	Service plan
(2)	Level
(3)	Running hours
(4)	Real time hours
(5)	Modify

Modifying a service plan

Dependant on the operating conditions, it can be necessary to modify the service intervals. To do so, use the Scroll keys to select the value to be modified. A screen similar to the one below appears:



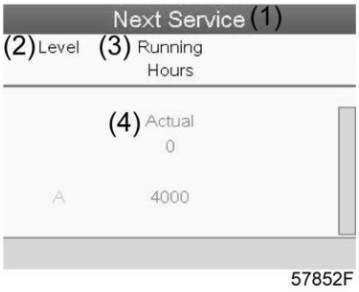
Press the Enter key. Following screen appears:



Modify the value as required using the ↑ or ↓ scroll key and press the Enter key to confirm.

Note: Running hours can be modified in steps of 100 hours, real time hours can be modified in steps of 1 hour.

Next Service



Text on figure

(1)	Next service
(2)	Level
(3)	Running hours
(4)	Actual

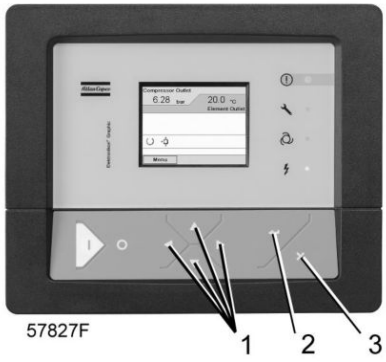
In the example above, the A Service level is programmed at 4000 running hours, of which 0 hours have passed.

History

The History screen shows a list of all service actions done in the past, sorted by date. The date at the top is the most recent service action. To see the details of a completed service action (e.g. Service level, Running hours or Real time hours), use the Scroll keys to select the desired action and press the Enter key.

4.10 Setpoint menu

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Setpoint

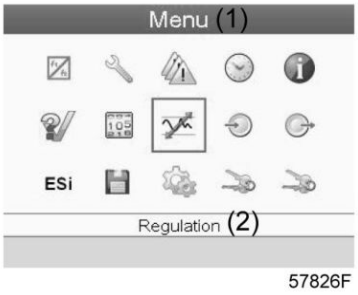
Function

On fixed speed compressors , the operator can program two different pressure bands. This menu is also used to select the active pressure band.

Procedure

Starting from the Main screen (see Main screen),

- Move the cursor to the action button Menu and press the Enter key. Following screen appears:



Text on figure

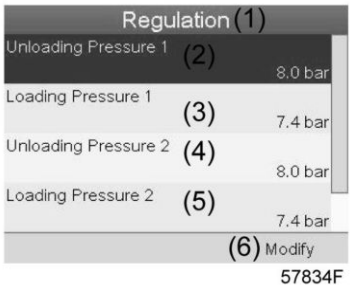
(1)	Menu
(2)	Regulation

- Move the cursor to the Setpoint icon (see above, section menu icon) using the Scroll keys.
- Press the Enter key. Following screen appears:

Text on figure

(1)	Regulation
(2)	Unloading pressure 1
(3)	Loading pressure 1
(4)	Unloading pressure 2
(5)	Loading pressure 2
(6)	Modify

- The screen shows the actual unloading and loading pressure settings for both pressure bands.
  To modify the settings, move the cursor to the action button Modify and press the Enter key. Following screen appears:



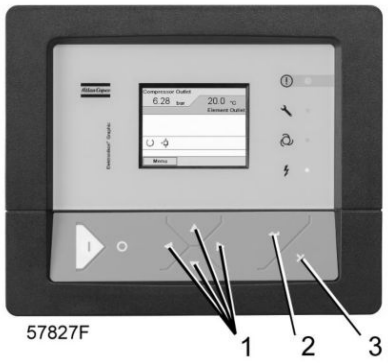
- The first line of the screen is highlighted in red. Use the Scroll keys to highlight the setting to be modified and press the Enter key. Following screen appears:

- The upper and lower limit of the setting is shown in grey, the actual setting is shown in black. Use the ↑ or ↓ key of the Scroll keys to modify the settings as required and press the Enter key to accept.

If necessary, change the other settings as required in the same way as described above.

4.11 Event history menu

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Event History

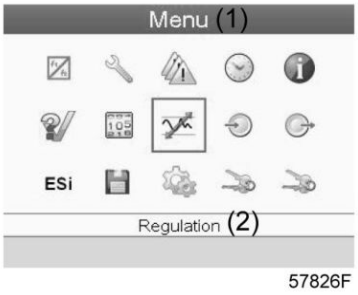
Function

To call up the last shut-down and last emergency stop data.

Procedure

Starting from the Main screen (see Main screen),

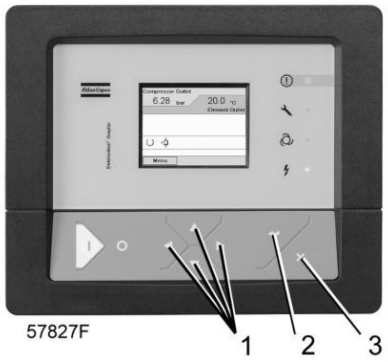
- Move the cursor to the action button Menu and press the Enter key. Following screen appears:



- Using the Scroll keys, move the cursor to the Event History icon (see above, section Menu icon)
- The list of last shut-down and emergency stop cases is shown.
- Scroll through the items to select the desired shut-down or emergency stop event.
- Press the Enter key to find the date, time and other data reflecting the status of the compressor when that shut-down or emergency stop occurred.

4.12 Modifying general settings

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Settings

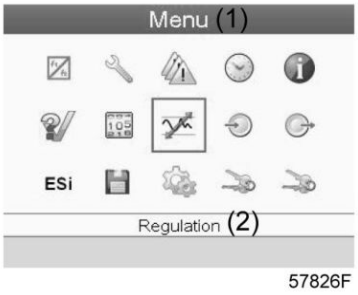
Function

To display and modify a number of general settings (e.g. Time, Date, Date format, Language, units ...)

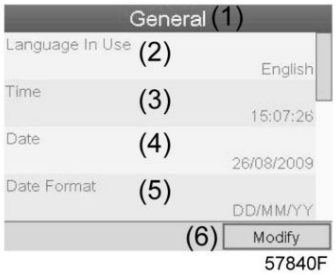
Procedure

Starting from the Main screen (see Main screen),

- Move the cursor to the action button Menu and press the Enter key. Following screen appears:



- Using the Scroll keys, move the cursor to the Settings icon (see above, section menu icon).
- Press the Enter key. Following screen appears:



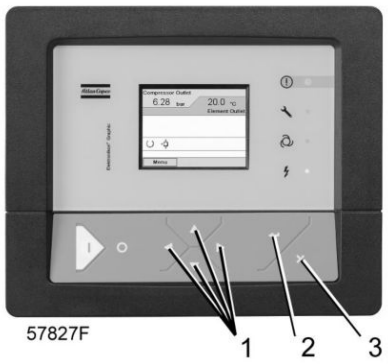
Text on figure

(1)	General
(2)	Language used
(3)	Time
(4)	Date
(5)	Date format
(6)	Modify

- To modify, select the Modify button using the Scroll keys and press the Enter key.
- A screen similar to the one above is shown, a red selection bar is covering the first item (Language). Use the ↓ key of the Scroll keys to select the setting to be modified and press the Enter key.
- A pop-up screen appears. Use the ↑ or ↓ key to select the required parameter and press the Enter key to confirm.

4.13 Info menu

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Info

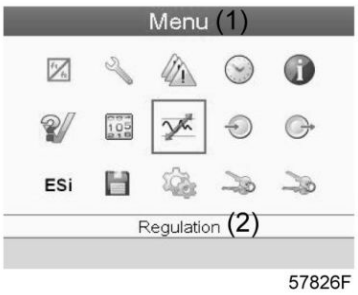
Function

To show the Atlas Copco internet address.

Procedure

Starting from the Main screen (see Main screen),

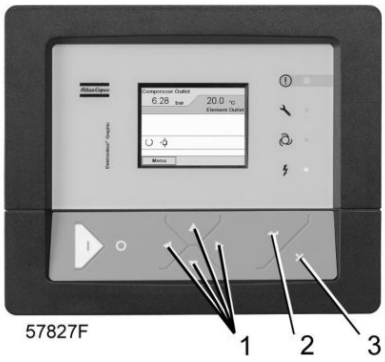
- Move the cursor to the action button Menu and press the Enter key. Following screen appears:



- Using the Scroll keys, move the cursor to the Info icon (see above, section Menu icon).
- Press the Enter key. The Atlas Copco internet address appears on the screen.

4.14 Week timer menu

Control panel



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Week timer

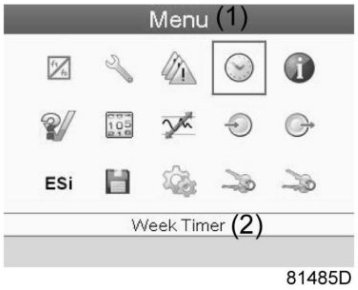
Function

- To program time-based start/stop commands for the compressor
- To program time-based change-over commands for the net pressure band
- Four different week schemes can be programmed.
- A week cycle can be programmed, a week cycle is a sequence of 10 weeks. For each week in the cycle, one of the four programmed week schemes can be chosen.

Procedure

Starting from the Main screen (see Main screen),

- Move the cursor to the action button Menu and press the Enter key. Use the Scroll buttons to select the Timer icon.



Text on figure

(1)	Menu
(2)	Week Timer

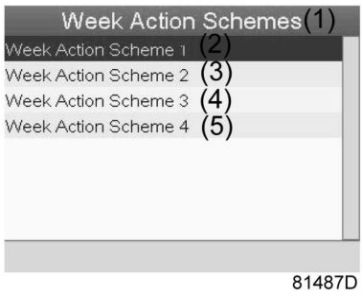
- Press the Enter key on the controller. Following screen appears:

(1)	Week Timer
(2)	Week Action Schemes
(3)	Week Cycle
(4)	Status
(5)	Week Timer Inactive
(6)	Remaining Running Time

The first item in this list is highlighted in red. Select the item requested and press the Enter key on the controller to modify.

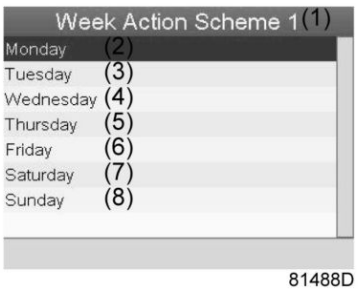
Programming week schemes

- Select Week action schemes and press Enter. A new window opens. The first item in the list is highlighted in red. Press the Enter key on the controller to modify Week Action Scheme 1.



(1)	Week Action Schemes
(2)	Week Action Scheme 1
(3)	Week Action Scheme 2
(4)	Week Action Scheme 3
(5)	Week Action Scheme 4

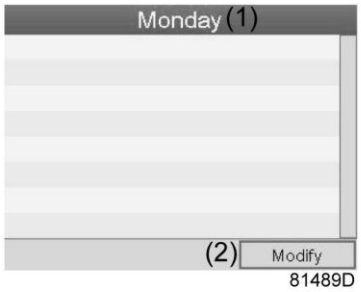
- A weekly list is shown. Monday is automatically selected and highlighted in red. Press the Enter key on the controller to set an action for this day.



(1)	Week Action Scheme 1
(2)	Monday
(3)	Tuesday
(4)	Wednesday
(5)	Thursday

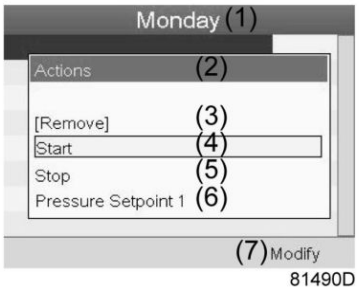
(6)	Friday
(7)	Saturday
(8)	Sunday

- A new window opens. The Modify action button is selected. Press the enter button on the controller to create an action.



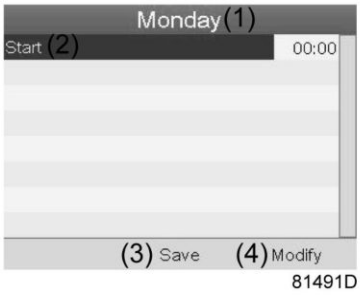
(1)	Monday
(2)	Modify

- A new pop-up window opens. Select an action from this list by using the Scroll keys on the controller. When ready press the Enter key to confirm.



(1)	Monday
(2)	Actions
(3)	Remove
(4)	Start
(5)	Stop
(6)	Pressure Setpoint 1
(7)	Modify

- A new window opens. The action is now visible in the first day of the week.



(1)	Monday
(2)	Start
(3)	Save
(4)	Modify

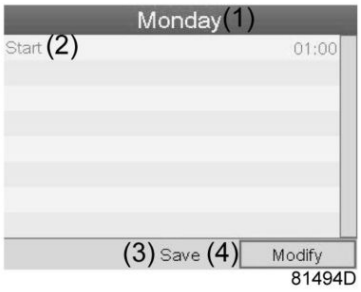
- To adjust the time, use the Scroll keys on the controller and press the Enter key to confirm.

(1)	Monday
(2)	Start
(3)	Save
(4)	Modify

- A pop-up window opens. Use the ↑ or ↓ key of Scroll keys to modify the values of the hours. Use the ← or → Scroll keys to modify the minutes.

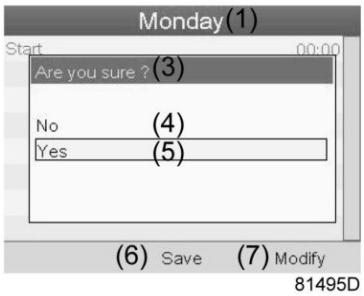
(1)	Monday
(2)	Time
(3)	Save
(4)	Modify

- Press the Escape key on the controller. The action button Modify is selected. Use the Scroll keys to select the action Save.



(1)	Monday
(2)	Start
(3)	Save
(4)	Modify

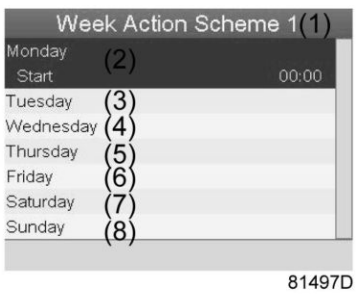
- A new pop-up window opens. Use the Scroll keys on the controller to select the correct actions. Press the Enter key to confirm.



(1)	Monday
(3)	Are you sure?
(4)	No
(5)	Yes
(6)	Save
(7)	Modify

Press the Escape key to leave this window.

- The action is shown below the day the action is planned.



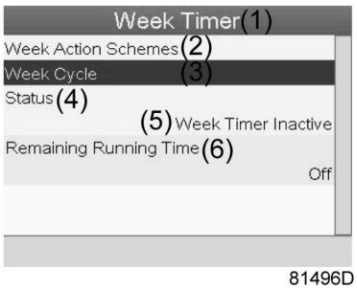
(1)	Week Action Scheme 1
(2)	Monday - Start
(3)	Tuesday
(4)	Wednesday
(5)	Thursday
(6)	Friday
(7)	Saturday
(8)	Sunday

Press the Escape key on the controller to leave this screen.

Programming the week cycle

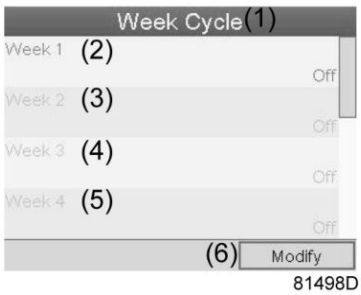
A week cycle is a sequence of 10 weeks. For each week in the cycle, one of the four programmed week schemes can be chosen.

- Select Week Cycle from the main Week Timer menu list.



(1)	Week Timer
(2)	Week Action Schemes
(3)	Week Cycle
(4)	Status
(5)	Week Timer Inactive
(6)	Remaining Running Time

- A list of 10 weeks is shown.

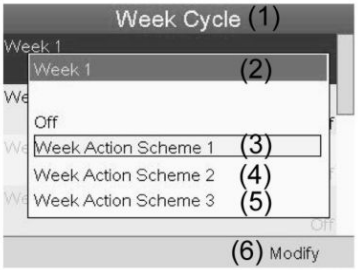


(1)	Week Cycle
(2)	Week 1

(3)	Week 2
(4)	Week 3
(5)	Week 4
(6)	Modify

Press twice the Enter key on the controller to modify the first week.

- A new window opens. Select the action, example: Week Action Scheme 1



81500D

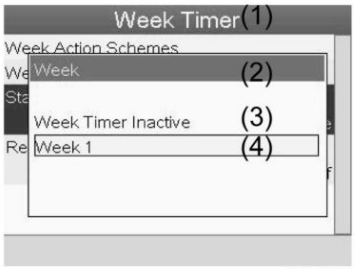
(1)	Week Cycle
(2)	Week 1
(3)	Week Action Scheme 1
(4)	Week Action Scheme 2
(5)	Week Action Scheme 3
(6)	Modify

- Check the status of the Week Timer
  Use the Escape key on the controller to go back to the main Week Timer menu. Select the status of the Week Timer.

81501D

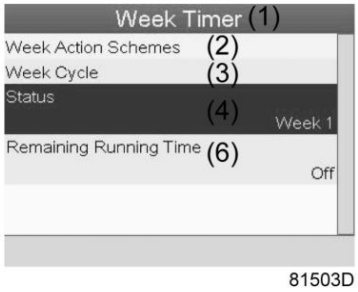
(1)	Week Timer
(2)	Week Action Schemes
(3)	Week Cycle
(4)	Status
(5)	Week Timer Inactive
(6)	Remaining Running Time

- A new window opens. Select Week 1 to set the Week Timer active.



(1)	Week Timer
(2)	Week
(3)	Week Timer Inactive
(4)	Week 1

- Press the Escape key on the controller to leave this window. The status shows that week 1 is active.



(1)	Week Timer
(2)	Week Action Schemes
(3)	Week Cycle
(4)	Status
(5)	Remaining Running Time

- Press the Escape key on the controller to go to the main Week Timer menu. Select Remaining Running Time from the list and press the Enter key on the controller to Modify.

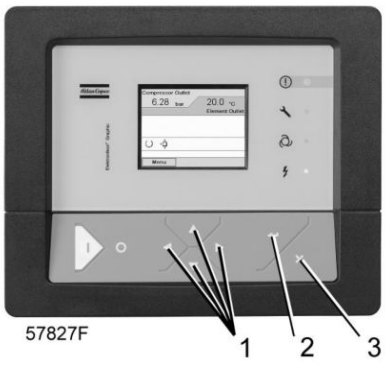
(1)	Week Timer
(2)	Week Action Schemes
(3)	Week Cycle
(4)	Status
(5)	Remaining Running Time

- This timer is used when the week timer is set and for certain reasons the compressor must continue working, for example, 1 hour, it can be set in this screen. This timer is prior to the Week Timer action.

(1)	Week Timer
(2)	Week action schemes
(3)	Remaining Running Time

4.15 Test menu

Control panel



Menu icon, Test

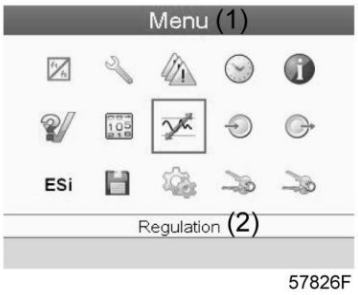
Function

- To carry out a display test, i.e. to check whether the display and LEDs are still intact.

Procedure

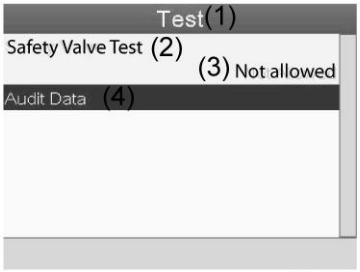
Starting from the Main screen (see Main screen):

- Move the cursor to the action button Menu and press the enter key (2), following screen appears:



57826F

- Using the scroll keys (1), move the cursor to the test icon (see above, section Menu icon)
- Press the enter key (2), following screen appears:

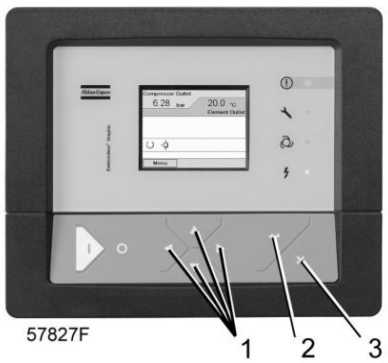


57866F

- The safety valve test can only be performed by authorized personnel and is protected by a security code.
- Select the item display test and press the enter key. A screen is shown to inspect the display, at the same time all LED's are lit.

4.16 User password menu

Control panel



57827F

(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Password

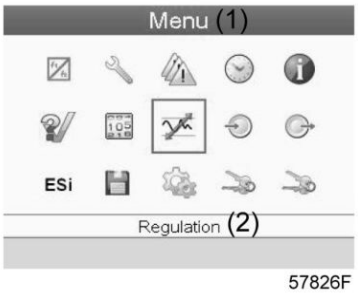
Function

If the password option is activated, it is impossible for not authorized persons to modify any setting.

Procedure

Starting from the Main screen (see Main screen),

- Move the cursor to the action button Menu and press the Enter key. Following screen appears:



- Using the Scroll keys, move the cursor to the Password icon (see above, section Menu icon)
- Press the Enter key.
- Select the Modify button using the Scroll keys and press the Enter key. Next, modify the password as required.

4.17 Web server

All Elektronikon controllers have a built-in web server that allows direct connection to a PC via a local area network (LAN). This allows to consult certain data and settings via the PC instead of via the display of the controller.

Getting started

Make sure you are logged in as administrator.

- Use the internal network card from your computer or an USB to LAN adapter (see picture below).

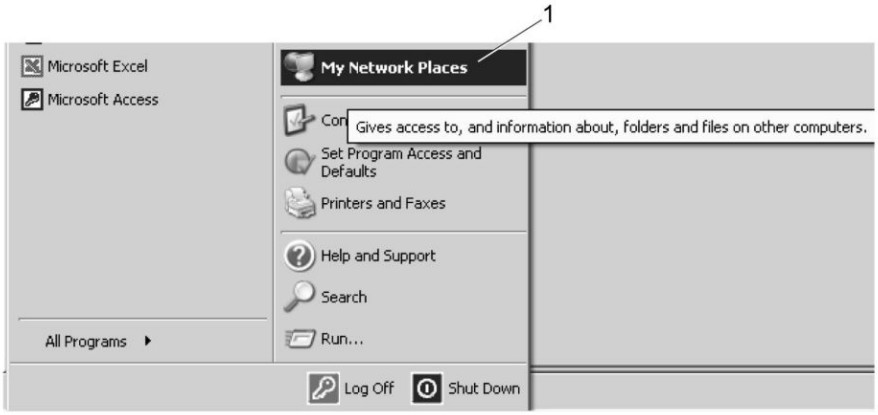
USB to LAN adapter

- Use an UTP cable (CAT 5e) to connect to the controller (see picture below).


81508D

Configuration of the network card

- Go to My Network places (1).

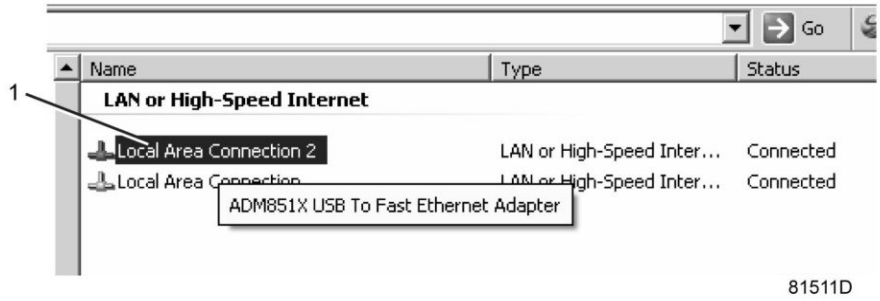


81509D

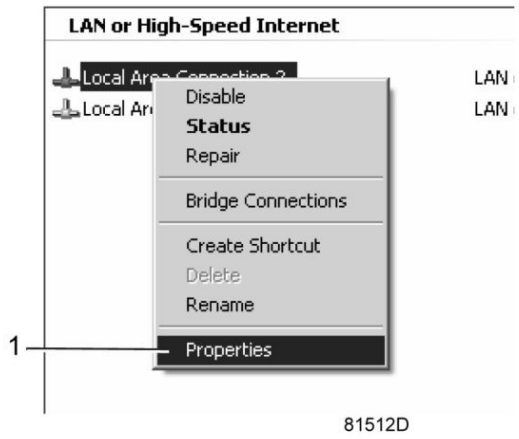
- Click on View Network connections (1).

81510D

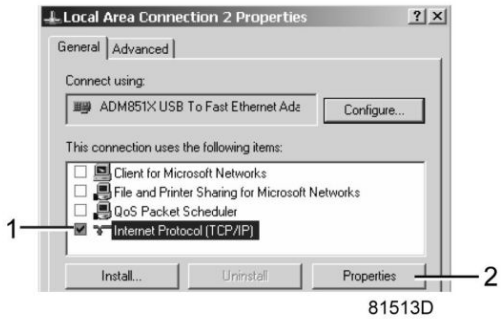
- Select the Local Area connection (1), which is connected to the controller.



- Click with the right button and select properties (1).



- Use the checkbox Internet Protocol (TCP/IP) (1) (see picture). To avoid conflicts, de-select other properties if they are selected. After selecting TCP/IP, click on the Properties button (2) to change the settings.



- Use the following settings:
  - IP Address 192.168.100.200
  - Subnetmask 255.255.255.0

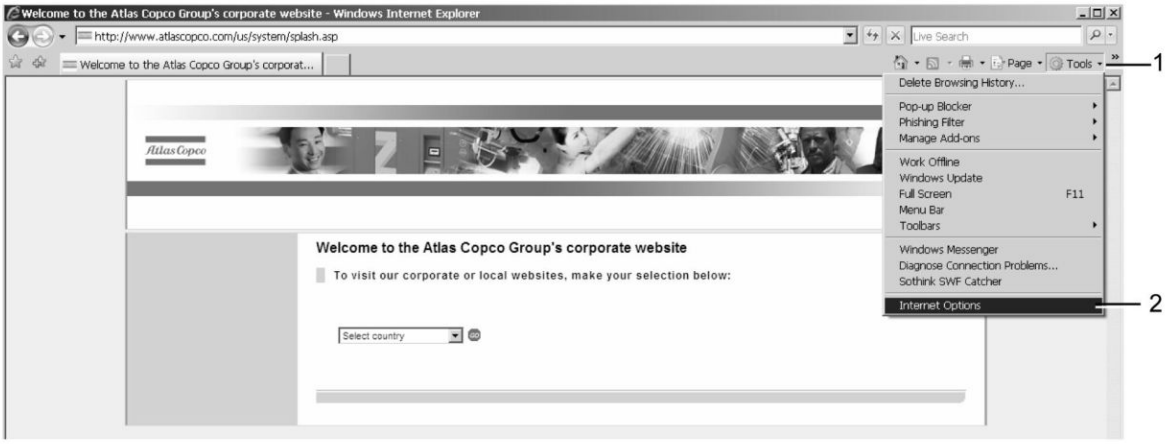
  Click OK and close network connections.

Configuration of the web server

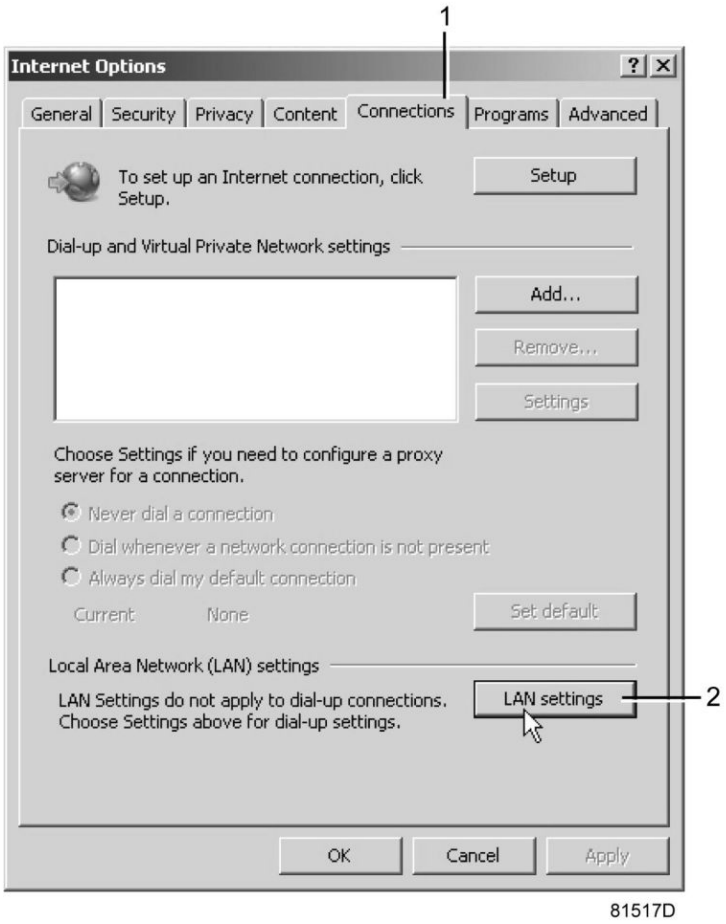
Configure the web interface

	The internal web server is designed and tested for Microsoft® Internet Explorer 6, 7 and 8. Other web browsers like Opera and Firefox do not support this internal web server. When using Opera or Firefox, a redirect page opens. Click on the hyperlink to connect to the download server from Microsoft® to download the latest version of Internet Explorer, and install this software.

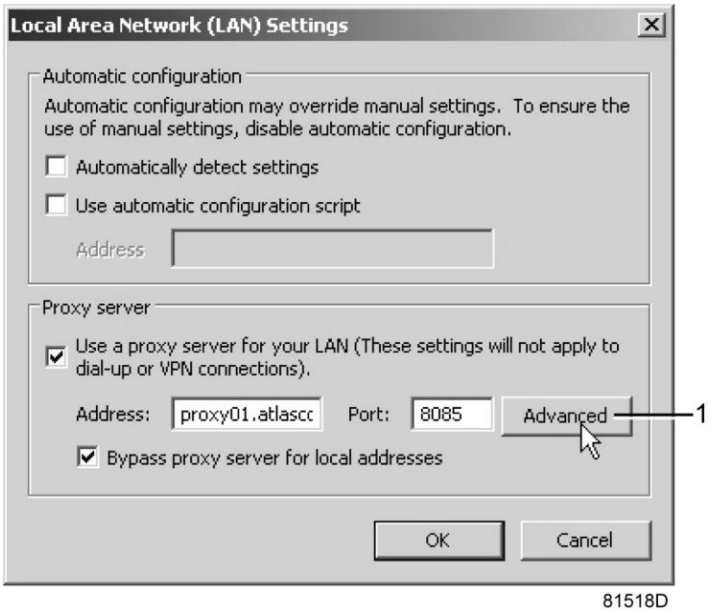
- When using Internet Explorer:
  Open Internet Explorer and click on Tools - Internet options (2).



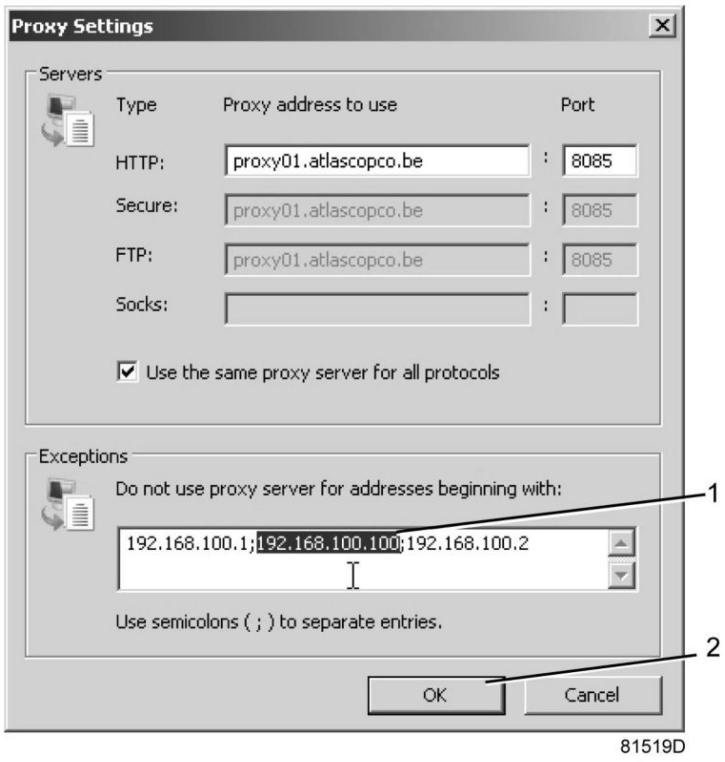
- Click on the Connections tab (1) and then click on the LAN settings button (2).



- In the Proxy server Group box, click on the Advanced button (1).

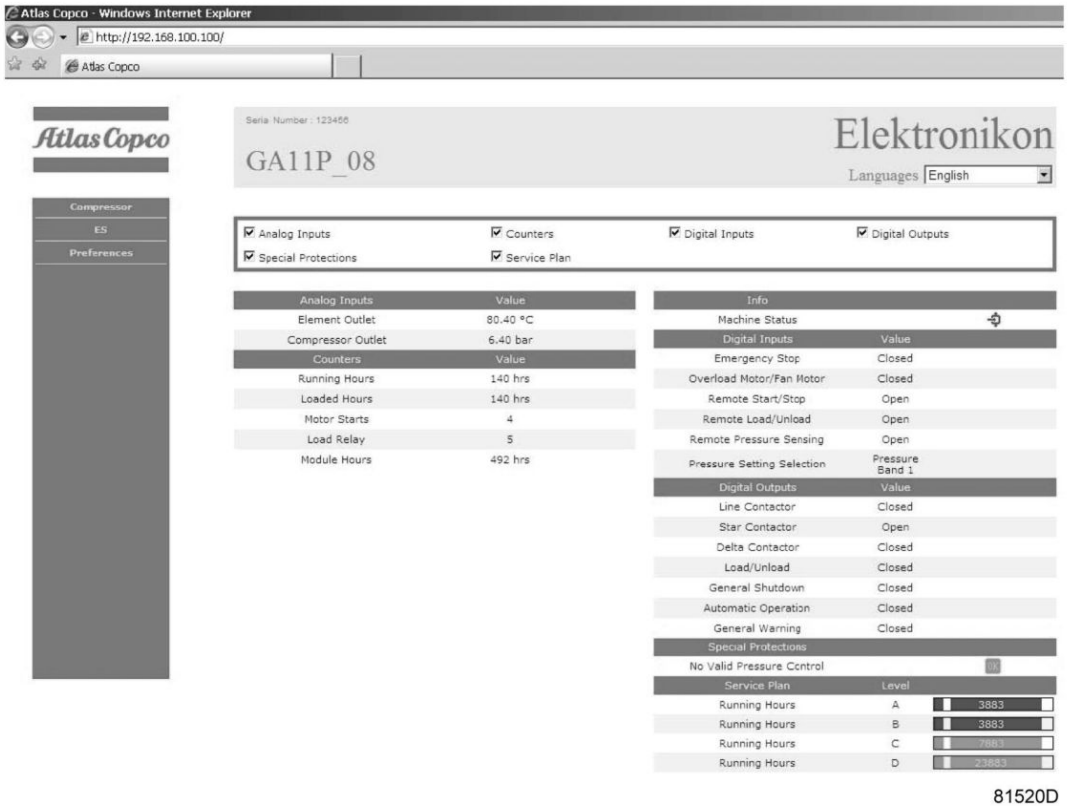


- In the Exceptions Group box, enter the IP address of your controller. Multiple IP addresses can be given but they must be separated with semicolons (;).
  Example: Suppose that you already added two IP addresses (192.168.100.1 and 192.168.100.2). Now you add 192.168.100.100 and separate the 3 IP addresses by putting semicolons between them (1) (see picture). Click OK (2) to close the window.



Viewing the controller data

- Open your browser and type the IP address of the controller you want to view in your browser (in this example http://192.168.100.100). The interface opens:



81520D

Navigation and options

- The banner shows the compressor type and the language selector. In this example, three languages are installed on the controller.

81521D

- On the left site of the interface you can find the navigation menu (see picture below).
  If a license for ESi is foreseen, the menu contains 3 buttons.
  - Compressor: shows all compressor settings.
  - Es: shows the ESi status (if a license is provided).
  - Preferences: allows to change temperature and pressure unit.

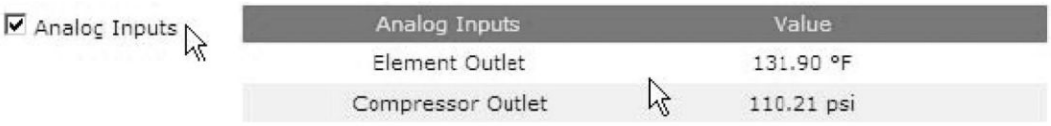
81522D

Compressor settings

All compressor settings can be hidden or shown. Put a mark for each setting. Only the machine status is fixed and can not be removed from the main screen.

Analog inputs

(The units of measure can be changed in the preference button from the navigation menu).



81523D

Counters

Counters give an overview of all actual counters from controller and compressor.

81524D

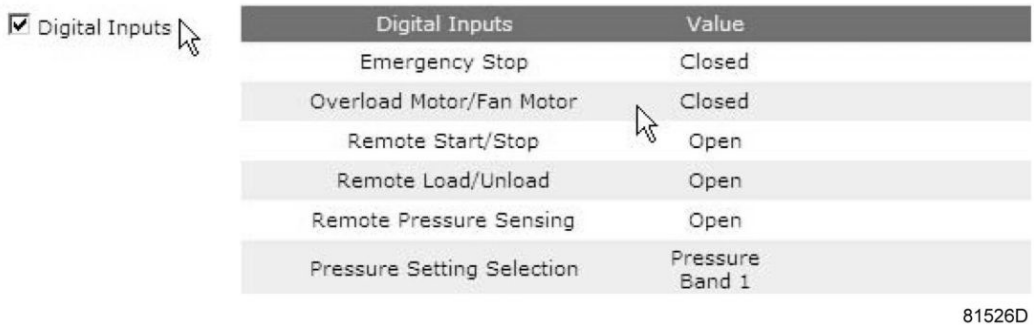
Info status

Machine status is always shown on the web interface.

81525D

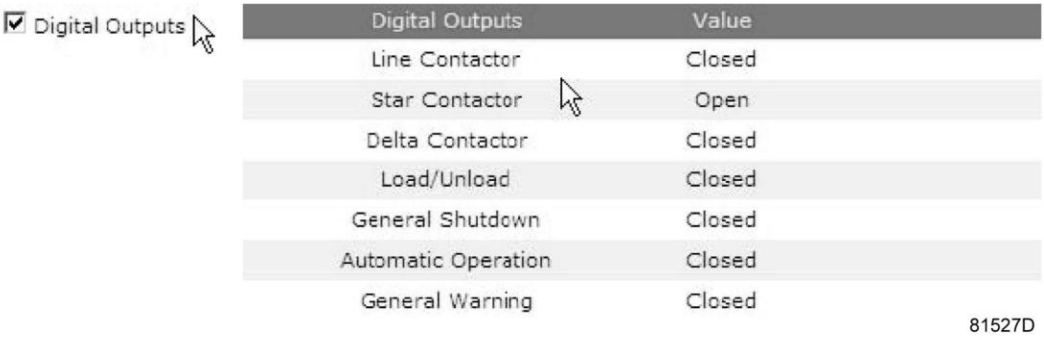
Digital inputs

Gives an overview of all Digital inputs and status.



Digital outputs

Shows a list of all digital outputs and their status.

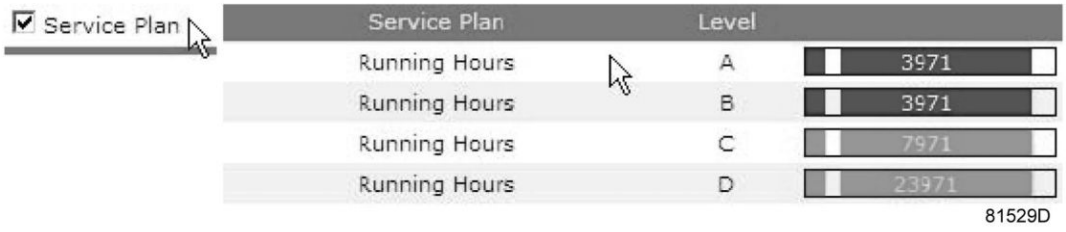


Special protections

Give an overview of all special protections of the compressor.

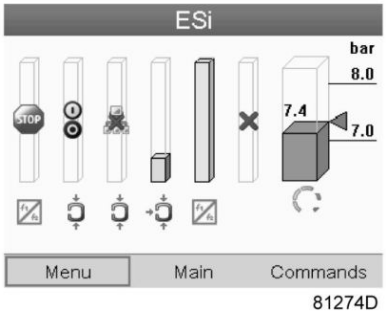
Service plan

Shows all levels of the service plan and status. This screen only shows the running hours. It is also possible to show the actual status of the service interval.



ES screen controller

If a ESi license is provided, the button ES is shown in the navigation menu. At the left all compressors in the ES and at the right the ES status is shown.



A possible ESi screen

4.18 Programmable settings

Parameters: unloading/loading pressures for compressors without built-in refrigeration dryer

		Minimum setting	Factory setting	Maximum setting
Unloading pressures				
Unloading pressure (7.5 bar compressors)	bar(e)	4.1	7	7.5
Unloading pressure (7.5 bar compressors)	psig	59.5	101.5	108.8
Unloading pressure (8.5 bar compressors)	bar(e)	4.1	8.0	8.5
Unloading pressure (8.5 bar compressors)	psig	59.5	116.0	123.3
Unloading pressure (10 bar compressors)	bar(e)	4.1	9.5	10
Unloading pressure (10 bar compressors)	psig	59.5	137.8	145.0
Unloading pressure (13 bar compressors)	bar(e)	4.1	12.5	13
Unloading pressure (13 bar compressors)	psig	59.5	181.3	188.6
Unloading pressure (100 psi compressors)	bar(e)	4.1	6.9	7.4
Unloading pressure (100 psi compressors)	psig	59.5	100	107.3
Unloading pressure (125 psi compressors)	bar(e)	4.1	8.6	9.1
Unloading pressure (125 psi compressors)	psig	59.5	125	132
Unloading pressure (150 psi compressors)	bar(e)	4.1	10.3	10.8
Unloading pressure (150 psi compressors)	psig	59.5	150	156.6
Unloading pressure (175 psi compressors)	bar(e)	4.1	12	12.5
Unloading pressure (175 psi compressors)	psig	59.5	175	181.2
Loading pressures				
Loading pressure (7.5 bar compressors)	bar(e)	4	6.4	7.4
Loading pressure (7.5 bar compressors)	psig	58	92.8	107.3
Loading pressure (8.5 bar compressors)	bar(e)	4	7.4	8.4
Loading pressure (8.5 bar compressors)	psig	58	107.3	121.8
Loading pressure (10 bar compressors)	bar(e)	4	8.9	9.9
Loading pressure (10 bar compressors)	psig	58	129.1	143.6
Loading pressure (13 bar compressors)	bar(e)	4	11.9	12.9

		Minimum setting	Factory setting	Maximum setting
Loading pressure (13 bar compressors)	psig	58	172.6	187.1
Loading pressure (100 psi compressors)	bar(e)	4	6.3	7.3
Loading pressure (100 psi compressors)	psig	58	91.4	105.9
Loading pressure (125 psi compressors)	bar(e)	4	8	9
Loading pressure (125 psi compressors)	psig	58	116	130.5
Loading pressure (150 psi compressors)	bar(e)	4	9.7	10.7
Loading pressure (150 psi compressors)	psig	58	140.7	155.2
Loading pressure (175 psi compressors)	bar(e)	4	11.4	12.4
Loading pressure (175 psi compressors)	psig	58	165.3	179.8

Parameters: unloading/loading pressures for compressors with built-in refrigeration dryer

		Minimum setting	Factory setting	Maximum setting
Unloading pressures				
Unloading pressure (7.5 bar compressors)	bar(e)	4.1	7	7.3
Unloading pressure (7.5 bar compressors)	psig	59.5	101.5	105.8
Unloading pressure (8.5 bar compressors)	bar(e)	4.1	8.0	8.25
Unloading pressure (8.5 bar compressors)	psig	59.5	116.0	119.7
Unloading pressure (10 bar compressors)	bar(e)	4.1	9.5	9.7
Unloading pressure (10 bar compressors)	psig	59.5	137.8	140.7
Unloading pressure (13 bar compressors)	bar(e)	4.1	12.5	12.7
Unloading pressure (13 bar compressors)	psig	59.5	181.3	184.2
Unloading pressure (100 psi compressors)	bar(e)	4.1	6.9	7.1
Unloading pressure (100 psi compressors)	psig	59.5	100	103
Unloading pressure (125 psi compressors)	bar(e)	4.1	8.6	8.8
Unloading pressure (125 psi compressors)	psig	59.5	125	127.6
Unloading pressure (150 psi compressors)	bar(e)	4.1	10.3	10.5
Unloading pressure (150 psi compressors)	psig	59.5	150	152.3
Unloading pressure (175 psi compressors)	bar(e)	4.1	12	12.2
Unloading pressure (175 psi compressors)	psig	59.5	175	177
Loading pressures				
Loading pressure (7.5 bar compressors)	bar(e)	4	6.4	7.2
Loading pressure (7.5 bar compressors)	psig	58	92.8	104.4
Loading pressure (8.5 bar compressors)	bar(e)	4	7.4	8.1
Loading pressure (8.5 bar compressors)	psig	58	107.3	117.5
Loading pressure (10 bar compressors)	bar(e)	4	8.9	9.6
Loading pressure (10 bar compressors)	psig	58	129.1	139.2
Loading pressure (13 bar compressors)	bar(e)	4	11.9	12.6
Loading pressure (13 bar compressors)	psig	58	172.6	182.8
Loading pressure (100 psi compressors)	bar(e)	4	6.3	7

		Minimum setting	Factory setting	Maximum setting
Loading pressure (100 psi compressors)	psig	58	91.4	101.5
Loading pressure (125 psi compressors)	bar(e)	4	8	8.7
Loading pressure (125 psi compressors)	psig	58	116	126.2
Loading pressure (150 psi compressors)	bar(e)	4	9.7	10.4
Loading pressure (150 psi compressors)	psig	58	140.7	150.8
Loading pressure (175 psi compressors)	bar(e)	4	11.4	12.1
Loading pressure (175 psi compressors)	psig	58	165.3	175.5

Parameters

		Minimum setting	Factory setting	Maximum setting
Motor running time in star	sec	5	10	10
Load delay time (star-delta)	sec	0	0	10
Number of motor starts	starts/day	0	240	480
Minimum stop time	sec	10	20	30
Programmed stop time	sec	0	3	20
Power recovery time (ARAVF)	sec	10	10	3600
Restart delay	sec	0	0	1200
Communication time-out	sec	10	30	60

Protections

		Minimum setting	Factory setting	Maximum setting
Compressor element outlet temperature (shut-down warning level)	˚C	50	112 (GA 11^{+} up to GA 26^{+}) 114 (GA 30)	119
Compressor element outlet temperature (shut-down warning level)	˚F	122	233 (GA 11^{+} up to GA 26^{+}) 237 (GA 30)	246
Compressor element outlet temperature (shut-down level)	˚C	111	120	120
Compressor element outlet temperature (shut-down level)	˚F	232	248	248

Service plan

The built-in service timers will give a Service warning message after their respective preprogrammed time interval has elapsed.

Also see section Preventive maintenance schedule.

Consult Atlas Copco if a timer setting has to be changed. The intervals must not exceed the nominal intervals and must coincide logically. See section Modifying general settings.

Terminology

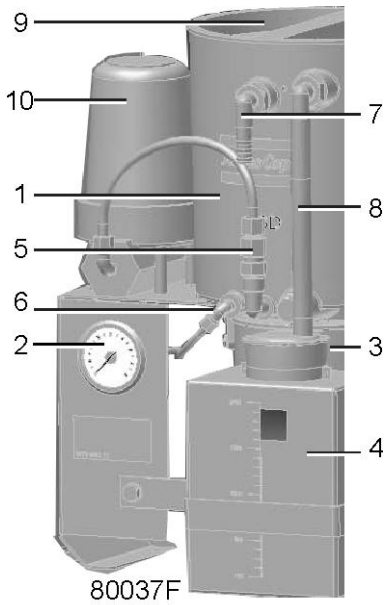
Term	Explanation
ARAVF	Automatic Restart After Voltage Failure. See section Elektronikon regulator.
Power recovery time	Is the period within which the voltage must be restored to have an automatic restart. Is accessible if the automatic restart is activated. To activate the automatic restart function, consult Atlas Copco.
Restart delay	This parameter allows to programme that not all compressors are restarted at the same time after a power failure (ARAVF active).
Compressor element outlet	The recommended minimum setting is 70 ˚C (158 ˚F). For testing the temperature sensor the setting can be decreased to 50 ˚C (122 ˚F). Reset the value after testing. The regulator does not accept illogical settings, e.g. if the warning level is programmed at 95 ˚C (203 ˚F), the minimum limit for the shut-down level changes to 96 ˚C (204 ˚F). The recommended difference between the warning level and shut-down level is 10 ˚C (18 ˚F).
Delay at shut-down signal	Is the time for which the signal must exist before the compressor is shut down. If it is required to program this setting to another value, consult Atlas Copco.
Oil separator	Use only Atlas Copco oil separators. The recommended maximum pressure drop over the oil separator element is 1 bar (15 psi).
Minimum stop time	Once the compressor has automatically stopped, it will remain stopped for the minimum stop time, whatever happens with the net air pressure. Consult Atlas Copco if a setting lower than 20 seconds is required.
Unloading/ Loading pressure	The regulator does not accept inconsistent settings, e.g. if the unloading pressure is programmed at 7.0 bar(e) (101 psi(g)), the maximum limit for the loading pressure changes to 6.9 bar(e) (100 psi(g)). The recommended minimum pressure difference between loading and unloading is 0.6 bar (9 psi(g)).

5 OSD oil/condensate separator (optional)

5.1 OSD unit

Oil/condensate separators

Compressed air leaving oil-injected compressors contains oil. During cooling of this air, oil-containing condensate is formed. OSD are designed to separate the major part of this oil from the condensate and to catch the oil in a collector. The condensate meets the requirements of the environmental codes.



OSD - typical view

Reference	Designation
1	Condensate vessel
2	Pressure gauge
3	Oil removal filter
4	Oil collector
5	Condensate inlet
6	Dp of filter
7	Clean condensate outlet
8	Oil outlet
9	Cover
10	Pre-filter

Operation

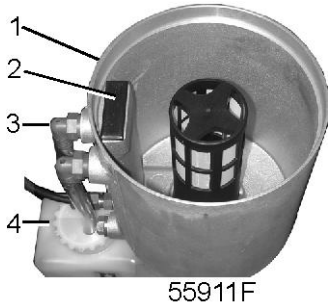
Condensate containing fine oil droplets flows through a pre-filter (10) towards strainer (5). The condensate flows through filter (3) in which the droplets coalesce into larger drops. Next, the condensate flows to vessel (1) where the oil rises due to the difference in specific mass. The vessel is provided with two separated outlets: one for condensate (7), which is led outside the bodywork, and one for the separated oil (8), which is caught in collector (4).

5.2 Operating and maintenance instructions

Safety precautions

	**Before carrying out any maintenance, repair work or adjustments, proceed as follows:** • Stop the compressor. • Close the air outlet valve and open, if provided, the manual condensate drain valve. • Press the emergency stop button. • Switch off the voltage. The operator must apply all relevant Safety precautions.

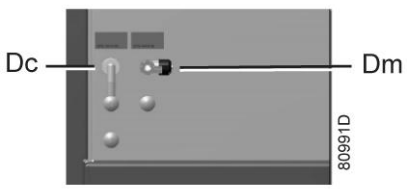
Operating instructions



Inside of OSD

- Before starting, check that vessel (1) is filled. If necessary, gently pour water into filler pipe (2) or vessel (1) until it flows through tube (3). Reinstall the cover.
- During operation of the compressor, an oil layer is built up above the water level in vessel (1). Depending on the capacity of the compressor and its operation cycle, the humidity of the inlet air and the oil content of the compressed air, it may take several weeks or months before an oil level is observed in collector (4).
- Regularly check that vessel (1) is filled. If necessary, gently pour water into filler pipe (2) or vessel (1) until it flows through tube (3). Keep the cover installed during operation.

Condensate drains



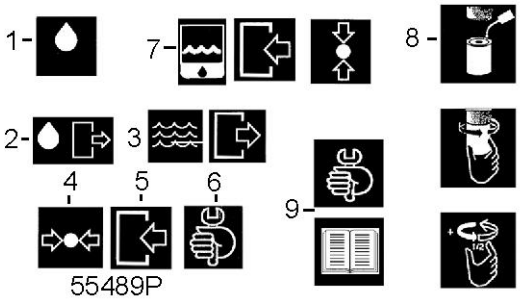
Maintenance instructions

Consult section OSD unit for the references.

Interval	Running hours	Operation
Weekly	50	Check pressure gauge (2). If the pressure reaches 2 bar(e) (29 psig) or every 6000 operating hours, replace filter (3): Unscrew the filter. Fill the new filter with water, lightly oil its gasket, screw it on and tighten by hand (approx. half a turn). Check strainer (5); if necessary, clean it.
Monthly	200	Check the oil level in collector (4). If nearly full, disconnect oil tube (8) and deliver the oil to the local oil collection service. Reinstall an empty collector.
Monthly	200	Check pre-filter (10), clean it if necessary.

5.3 Pictographs

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 book before maintenance or repair

6 Energy recovery (optional)

6.1 Energy recovery unit

Description

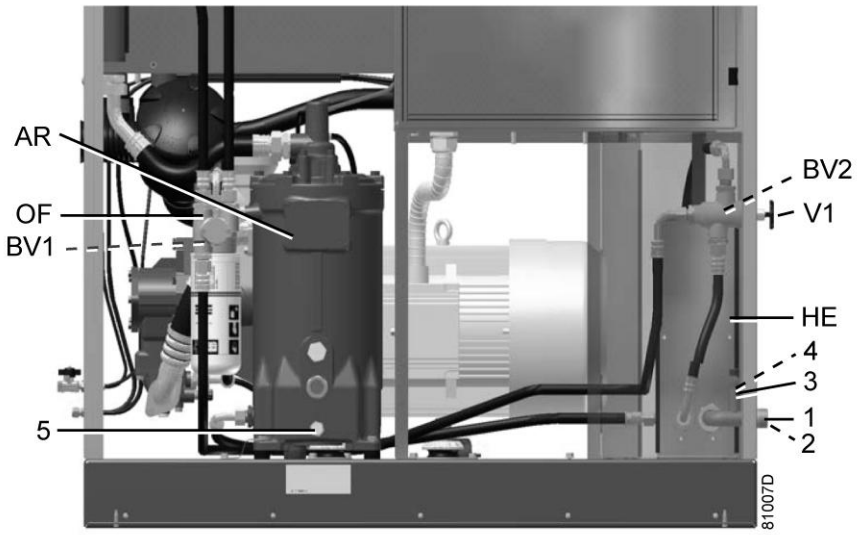
A large part of the energy required for any compression process is transformed into heat. For GA oil-injected screw compressors, the major part of the compression heat is dissipated through the oil system. The Atlas Copco energy recovery (ER) systems are designed to recover most of the above-mentioned heat by transforming it into warm or hot water without any adverse influence on the compressor performance. The water can be used for diverse applications.

Components

The energy recovery system is completely integrated and mainly comprises:

- Stainless steel oil/water heat exchanger
- Selector handle (V1) to enable/disable Energy Recovery
- Thermostatic by-pass valve for energy recovery heat exchanger(s) (BV2)
- Two temperature sensors for water inlet and outlet control (3 and 4)
- The necessary bolts, flexibles, etc.

Energy recovery unit (ER-unit)



Components of the ER unit

Reference	Designation
1	Water inlet pipe
2	Water outlet pipe
3	Temperature sensor, water inlet pipe
4	Temperature sensor, water outlet pipe

Reference	Designation
5	Oil drain plug
BV2	Location of heat exchanger by-pass valve (BV2)
HE	Heat exchanger
V1	Selector valve
AR	Oil separator vessel
OF	Oil filter housing
BV1	Location of oil cooler bypass valve (BV1)

Field installation

The main components are assembled ex-factory as a compact unit which fits inside the bodywork of the compressor. Consult Atlas Copco for installing and connecting the energy recovery unit.

6.2 Energy recovery systems

General

The energy recovery systems can be applied as low temperature rise/high water flow systems or as high temperature rise/low water flow systems.

Low temperature rise/high water flow systems

For this type of application, the temperature difference between the water in the energy recovery system and the compressor oil is low. As a consequence, a high water flow is needed for maximum energy recovery.

Example: The heated water is used to keep another medium at a moderately high temperature, in a closed circuit, e.g. central heating.

High temperature rise/low water flow systems

For this type of application, a high water temperature rise in the energy recovery system is obtained, which consequently brings on a low flow rate.

Example: An open circuit where cold water from a main supply is heated by the energy recovery system for use in a factory, e.g. pre-heating of boiler feed water.

Recovery water flow

For the references, see section Energy recovery data.

The recovery water enters the unit at inlet connection (1). In heat exchanger (HE) the compression heat is transferred from the compressor oil to the water. The water leaves heat exchanger (HE) via outlet connection (2).

Water requirements for closed water circuits

The use of a closed water circuit minimises make-up water requirements. Therefore, the use of soft or even demineralised water is economically feasible and eliminates the problem of scale deposits. Although the heat exchanger is made of stainless steel, the water circuit connected to the compressor may require corrosion

inhibitors. Consult section Cooling water requirements to minimise problems due to bad water quality. If in any doubt, consult Atlas Copco.

Add an anti-freeze product such as ethylene-glycol to the water in proportion to the expected temperature to avoid freezing.

Water requirements for open water circuits

For open, non-recirculation water circuits, the major problems usually encountered are related to deposit control, corrosion control and microbiological growth control. To minimize these problems, the water should meet a number of requirements. See section Cooling water requirements. If in any doubt, consult Atlas Copco.

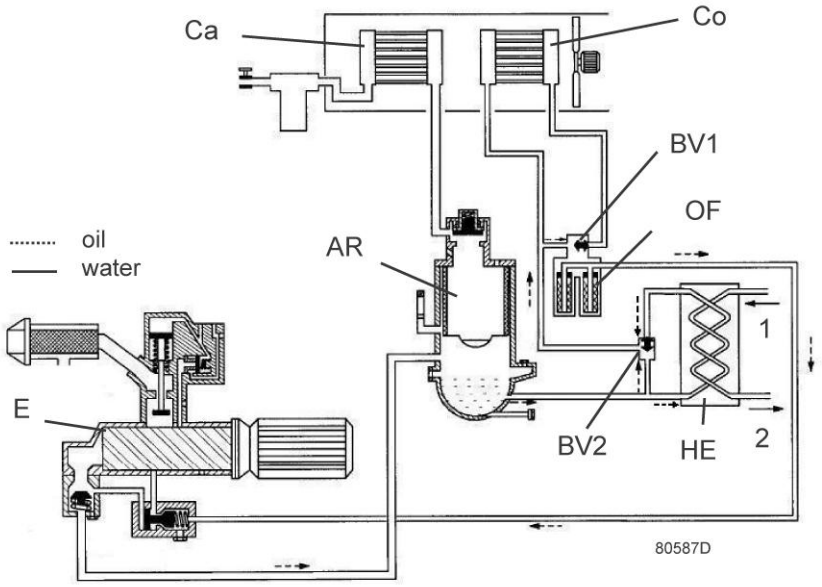
6.3 Operation

General

The compressor oil flow is controlled by two thermostatic valves (BV1 and BV2), ensuring reliable compressor operation and optimum energy recovery.

Detailed description

Bypass valve (BV2) is integrated in the ER unit and controls the working of the oil/water heat exchanger (HE) of the ER unit. Bypass valve (BV1) is integrated in the oil filter housing of the compressor and controls the working of the main oil cooler (Co) of the compressor. Both bypass valves consist of an insert (thermostat) mounted in a housing. Bypass valve BV2 has a separate housing, while BV1 is integrated in the oil filter housing.



Flow diagram of compressor with energy recovery system

Reference	Designation	Reference	Designation
BV2	Thermostatic bypass valve of ER unit	OF	Oil filter
HE	Oil/water heat exchanger (ER unit)	AR	Oil separator vessel
E	Compressor element	BV1	Thermostatic bypass valve in oil filter housing
Co	Oil cooler (compressor)	Ca	Aftercooler (compressor)
1	Water inlet	2	Water outlet

BV2 starts closing the bypass line and opening the oil supply line from the ER heat exchanger (HE) at the lower limit of its temperature range. At the upper limit of its temperature range, the bypass line is completely closed and all the oil flows through the ER heat exchanger.

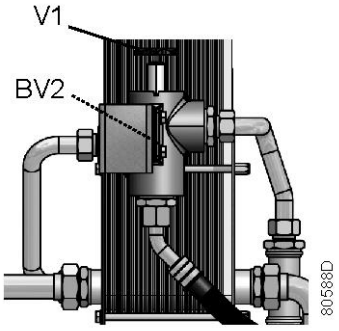
On compressors versions with a maximum pressure lower than 13 bar (175 psi), BV2 starts opening at 40 ˚C (104 ˚F) and is completely open at 55 ˚C (131 ˚F).

On compressors with a maximal pressure of 13 bar (175 psi), BV2 starts opening at 60 ˚C (140 ˚F) and is completely open at 75 ˚C (167 ˚F).

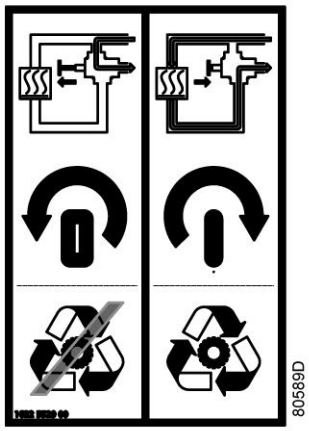
The housing of BV2 is provided with a special handle (V1), allowing to control the working of the energy recovery system.

As can be seen on the ER label, the ER unit is integrated in the oil circuit and will recover energy when the handle is completely turned in clockwise.

When the handle is turned out anticlockwise, the heat exchanger (HE) is bypassed and no energy will be recovered.



Detail of valve housing of BV2 with handle V1 (typical example)



ER label

	Attention: It is only allowed to turn the handle completely in or out. No in-between position is allowed!

The oil cooler bypass valve (BV1) starts closing the bypass line and opening the oil supply line from the main oil cooler (Co) at the lower limit of its temperature range. At the upper limit of its temperature range, the bypass line is completely closed and all the oil flows through the main oil cooler.

BV1 must have a higher opening temperature (set point) than BV2 in order to prevent the heat from being dissipated in the compressor oil cooler (Co) before the warm oil is fed to the oil/water heat exchanger when using the compression heat as source for energy recovery. Thermostat BV1 starts to open at 75 ˚C (167 ˚F) and is completely open at 90 ˚C (194 ˚F).

Energy recovery system in use (see drawing)

The handle (V1) of BV2 (bypass valve of the HE) is totally **turned in clockwise**.

- Compressor start-up

When the compressor is started up from cold, the oil temperature will be low. Bypass valve (BV2) shuts off the oil supply from the heat exchanger (HE) and bypass valve (BV1) shuts off the oil supply from the oil cooler (Co) to prevent the compressor oil from being cooled. The oil flows from the oil separator vessel (AR) through the oil filter(s) (OF) back to compressor element (E).

All energy input is used to rapidly warm up the compressor oil. No energy is recovered.

- Maximum energy recovery

As soon the oil temperature reaches the set point (opening temperature) of bypass valve (BV2), the valve starts closing off the bypass over the heat exchanger (HE) oil line, while gradually allowing the oil to flow through the heat exchanger (HE). As the oil temperature rises to approx. 15 ˚C (27 ˚F) above the set point, all the oil passes through the heat exchanger. The exchange of heat between the compressor oil and the heat recovery water is maximum. The oil from the heat exchanger outlet flows via oil filter (OF), oil stop valve (Vs - if present), compressor element (E) and separator (AR) back to the inlet of heat exchanger (HE). Bypass valve (BV1) bypasses the oil cooler (Co) as long as the oil temperature remains below its set point.

Operation principle at different loads:

- Low consumption of recovered energy

In this case, the temperature of the oil leaving heat exchanger (HE) would become too high for the oil to be injected into compressor element (E). Oil cooler bypass valve (BV1) will open the supply line to the compressor oil cooler to allow the hot oil to be cooled in cooler (Co).
The amount of energy supplied to the water is adapted to the need of energy.

- Recovery water flow too high/temperature too low
  In this case, bypass valve (BV2) will open the bypass line of the oil separator vessel, allowing colder oil from heat exchanger (HE) to be mixed with hot oil from separator (AR). Energy is transferred from the compressor oil to the water, but at a relatively low temperature level.

Energy recovery system not in use

The handle (V1) is **completely turned out anti-clockwise**.

The oil circuit is the same as without installation of the energy recovery system.

No energy is recovered.

This situation should be considered as exceptional, e.g. in case of maintenance of the energy recovery system or when no energy is required for a long period.

On fixed speed compressors, run the unit unloaded for a few minutes before isolating the energy recovery system from the compressor.

Stopping the unit for a long period

In case of an open water system and/or if freezing temperatures can be expected, isolate the compressor water system and blow it through with compressed air.

6.4 Maintenance

Compressor oil

For references used consult section Energy recovery unit.

Oil change:

1. Check if handle (V1) is totally turned in clockwise (energy recovery in use).
2. Run the unit until warm. Stop the unit, switch off the isolating switch and close the air outlet valve of the compressor.
3. Depressurize the compressor and drain the oil. See section Oil and oil filter change.
4. Resume oil change as described in section Oil and Filter Change in this book.

Thermostatic bypass valves

The inserts (thermostats) must be replaced by new ones when abnormal function is noticed. Examples: regulating temperature is not within the normal range, ER heat exchanger remains cold,...

Heat exchanger (HE)

If the temperature rise over the energy recovery system declines over a period of time with the same basic working conditions, the heat exchanger should be inspected. To clean the oil side, soak the heat exchanger in a degreasing solution. To remove scale formation in the water compartment, a proper descaling process should be applied. Consult Atlas Copco.

6.5 Energy recovery data

Reference conditions

See section Reference conditions and limitations.

Effective working pressure

Consult section Compressor data for the normal working pressure.

Maximum allowed pressure of the heat exchanger

Oil side	15 bar (217 psi)
Water side	10 bar (145 psi)

Reading settings

In addition to other data, the following temperatures can be read on the Elektronikon display:

For air-cooled units:

- The water inlet temperature of the energy recovery system
- The water outlet temperature of the energy recovery system

Modifying settings

If the programmed warning settings for the water temperatures are exceeded, a warning indication is shown on the Elektronikon:

Temperature input	Units	Minimum setting	Nominal setting	Maximum setting
Water inlet temperature of energy recovery	˚C	0	50	99
Water inlet temperature of energy recovery	˚F	32	122	210
Energy recovery water outlet temperature	˚C	0	Depends on application	99
Energy recovery water outlet temperature	˚F	32	Depends on application	210

To modify a setting, consult section Settings menu.

Recoverable energy

The recoverable energy can be calculated from:

RECOVERED ENERGY (kW) = 4.2 x water flow (l/s) x water temperature rise (˚C)

In the tables below, typical examples are given, except for the recovered energy.

Data for low temperature rise/high water flow systems

Parameter	Unit	GA 11+	GA 15+	GA 18+	GA 22+	GA 26+	GA 30
Recoverable energy	kW	8.25	11.2	13.5	16.5	19.5	22.5
Recoverable energy	hp	11.06	15.02	18.1	22.13	26.15	30.17
Water flow	l/min	12	16	19	24	28	32
Water flow	cfm	0.42	0.57	0.67	0.85	0.99	1.13
Temperature at inlet	˚C	50	50	50	50	50	50
Temperature at inlet	˚F	122	122	122	122	122	122
Temperature at outlet	˚C	60	60	60	60	60	60
Temperature at outlet	˚F	140	140	140	140	140	140

Data for high temperature rise/low water flow systems

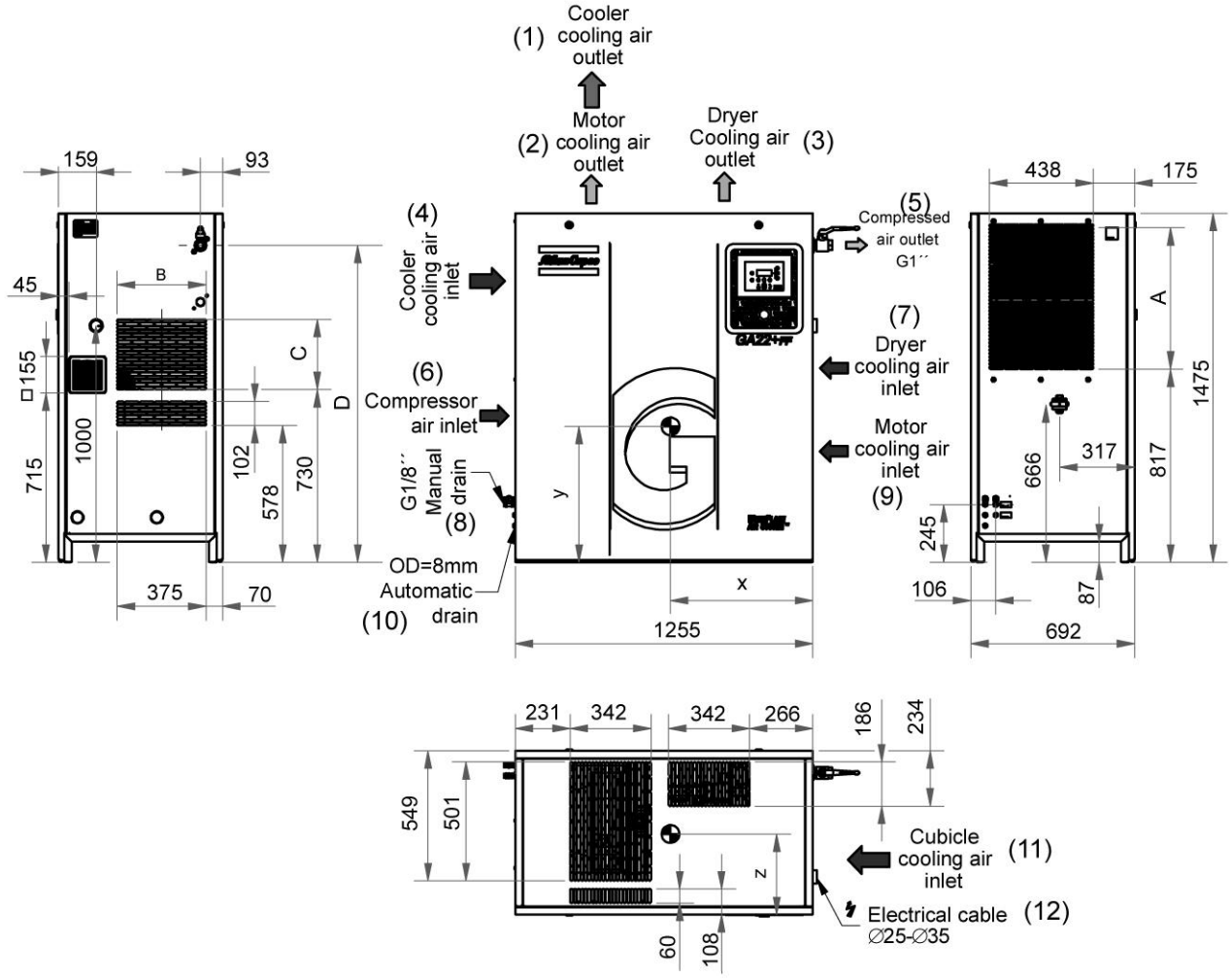
Parameter	Unit	GA 11+	GA 15+	GA 18+	GA 22+	GA 26+	GA 30
Recoverable energy	kW	8.25	11.2	13.5	16.5	19.5	22.5
Recoverable energy	hp	11.06	15.02	18.1	22.13	26.5	30.17
Water flow	l/min	2	2.6	3.2	3.8	4.2	4.6
Water flow	cfm	0.07	0.09	0.11	0.13	0.15	0.16
Temperature at inlet	˚C	23	23	23	23	23	23
Temperature at inlet	˚F	73	73	73	73	73	73
Temperature at outlet	˚C	81	84	83	85	89	93
Temperature at outlet	˚F	178	183	181	185	192	199

7 Installation

7.1 Dimension drawings

Dimension drawings

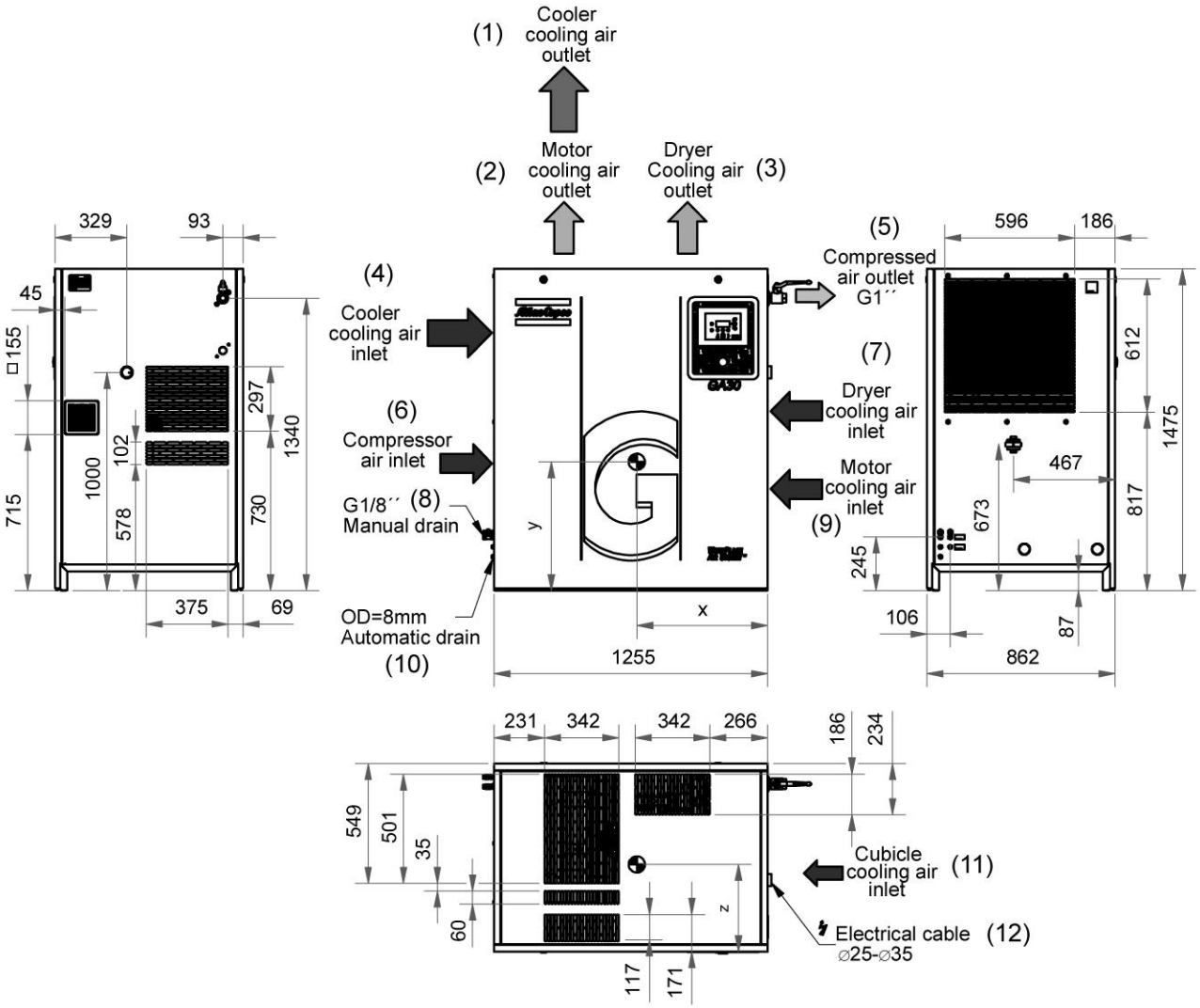
Dimensions GA 11+ up to GA 22+



	GA11+	GA11+FF	GA15+	GA15+FF	GA18+	GA18+FF	GA22+	GA22+FF
A	432	432	432	432	612	612	612	612
B	281	281	281	281	375	375	375	375
C	267	267	267	267	297	297	297	297
D	1310	1310	1310	1310	1340	1340	1340	1340
X	695	670	695	670	695	660	695	660
Y	570	600	565	595	560	595	555	590
Z	325	330	325	330	335	340	335	340
Weight (kg)	410	455	420	470	440	500	455	515

(13)

9820542600-01-01
80992D



	GA26+	GA26+FF	GA30	GA30FF
X	665	640	660	635
Y	555	590	550	585
Z	455	465	460	470
Weight (kg)	525	595	540	610

(13)

9820542610-01-01
80993D

Dimensions GA 26+ and GA 30

Reference	Designation	Reference	Designation
1	Cooling air outlet, cooler	8	Manual drain
2	Cooling air outlet, motor	9	Cooling air inlet, motor
3	Cooling air outlet, dryer	10	Automatic drain
4	Cooling air inlet, cooler	11	Cooling air inlet, cubicle
5	Compressed air outlet	12	Supply cable
6	Compressor air inlet	13	Dimensions in mm, weight in kg (X = centre of gravity)
7	Cooling air inlet, dryer		

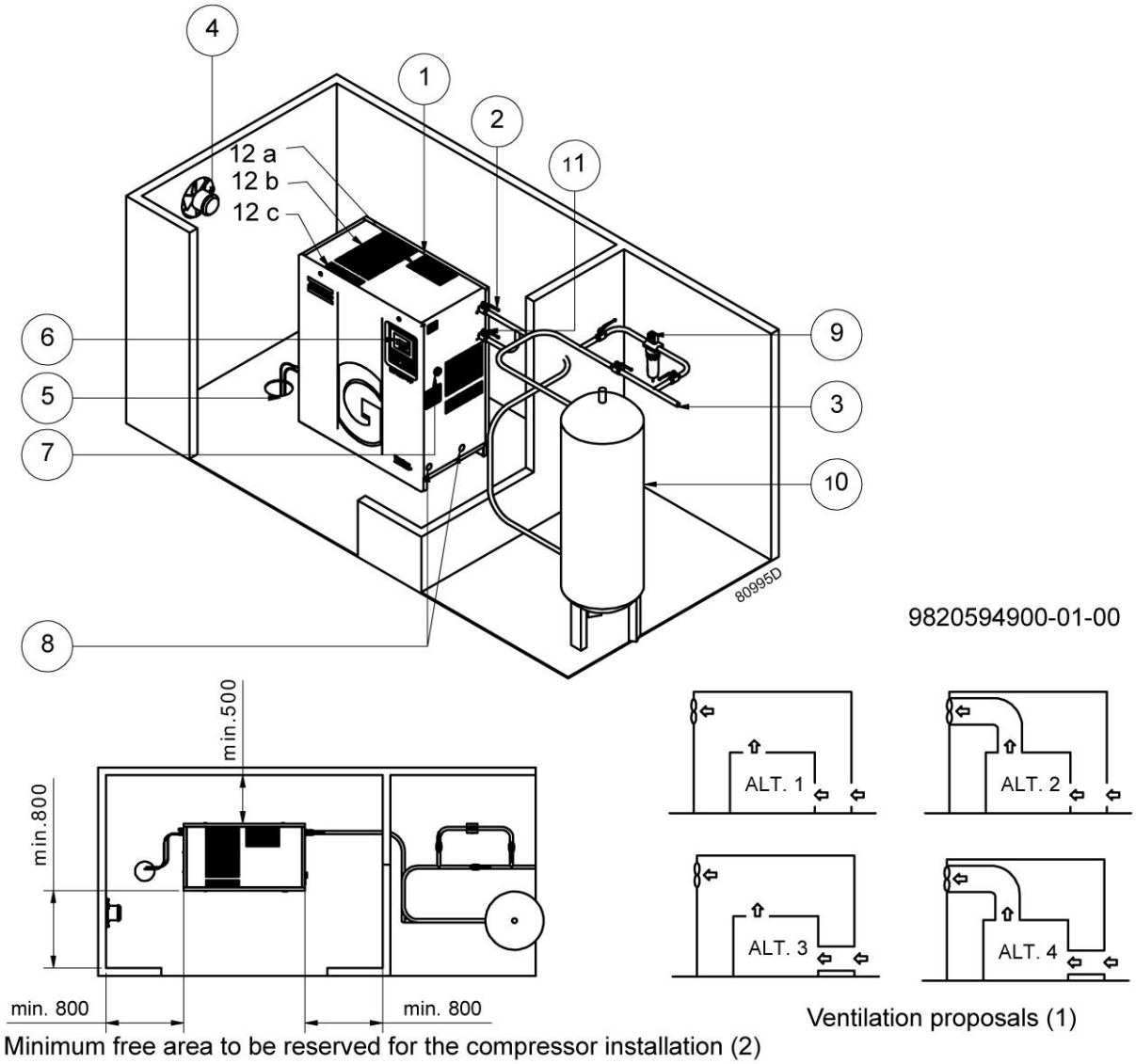
7.2 Installation proposal

Outdoor/altitude operation

If the compressor is installed outdoors or if the air inlet temperature can be below 0 ˚C (32 ˚F), precautions must be taken. In this case, and also if operating above 1000 m (3300 ft), consult Atlas Copco.

Moving/lifting

The compressor can be moved by a lift truck on the side of the frame. Take care not to damage the bodywork during lifting or transport. Make sure that the forks support the frame sufficiently.



Text on drawing

Reference	Designation
(1)	Ventilation proposals
(2)	Minimum free area to be reserved for the compressor installation

	All piping to be connected stress free to the compressor.

Installation guidelines

1. Install the compressor unit on a solid, level floor suitable for taking its weight.
2. Position of the compressed air outlet valve.
3. The pressure drop over the air delivery pipe can be calculated from:
   $\Delta p = (L \times 450 \times Q_c^{1.85}) / (d^5 \times P)$, with
   d = Inner diameter of the pipe in mm
   Δp = Pressure drop in bar (recommended maximum: 0.1 bar (1.5 psi))
   L = Length of the pipe in m
   P = Absolute pressure at the compressor outlet in bar
   Q_c= Free air delivery of the compressor in l/s
   It is recommended that the connection of the compressor air outlet pipe is made on top of the main air net pipe in order to minimise carry-over of possible condensate residue.
4. Ventilation: the inlet grids and ventilation fan should be installed in such a way that any recirculation of cooling air to the compressor or dryer 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). If it exceeds this value, a fan is needed at the outlet of the ducts. Consult Atlas Copco.
   For ventilation alternatives 1 and 3, the required ventilation capacity to limit the compressor room temperature can be calculated as follows:
   - $Q_v = 1.06\ N/\Delta T$ for Workplace versions
   - $Q_v = (1.06\ N + 1.3)/\Delta T$ for Workplace Full-Feature versions

   Q_v = Required ventilation capacity in m^3/s
   N = Shaft input of compressor in kW
   ΔT = Temperature increase in the compressor room in °C
   For ventilation alternatives 2 and 4: the fan capacity should match the compressor fan capacity at a pressure head equal to the pressure drop across the cooling air ducts.
   The ducting for the air outlet of the dryer (12a) also should be separated from the ducting for the cooling air outlet of the coolers (12b) and the cooling air outlet of the compressor compartement (12c). The maximum allowable pressure drop in ducting before or after the compressor is 30 Pa.
5. The drain pipes to the drain collector must not dip into the water of the drain collector. Atlas Copco has oil/water separators to separate the major part of the oil from the condensate to ensure that the condensate meets the requirements of the environmental codes.
6. Position of control panel.
7. Position of the main cable entry. Power supply cable to be sized and installed by a qualified electrician.

	To preserve the protection degree of the electric cubicle and to protect its components from dust from the environment, it is mandatory to use a proper cable gland when connecting the supply cable to the compressor.

8. Provision for inlet and outlet of the energy recovery system (system is optional).
9. Filter, type DD for general purpose filtration. The filter traps solid particles down to 1 micron with a maximum oil carry-over of 0.5 mg/m^3. A high-efficiency filter, type PD, may be installed downstream of a DD filter. This filter traps solid particles down to 0.01 micron with a maximum 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.

It is recommended to install bypass pipes over each filter together with ball valves, in order to isolate the filters during service operations without disturbing the compressed air delivery.

- On GA compressors without dryer and Full-Feature compressors with IFD dryer, the filters for general purpose are optional.

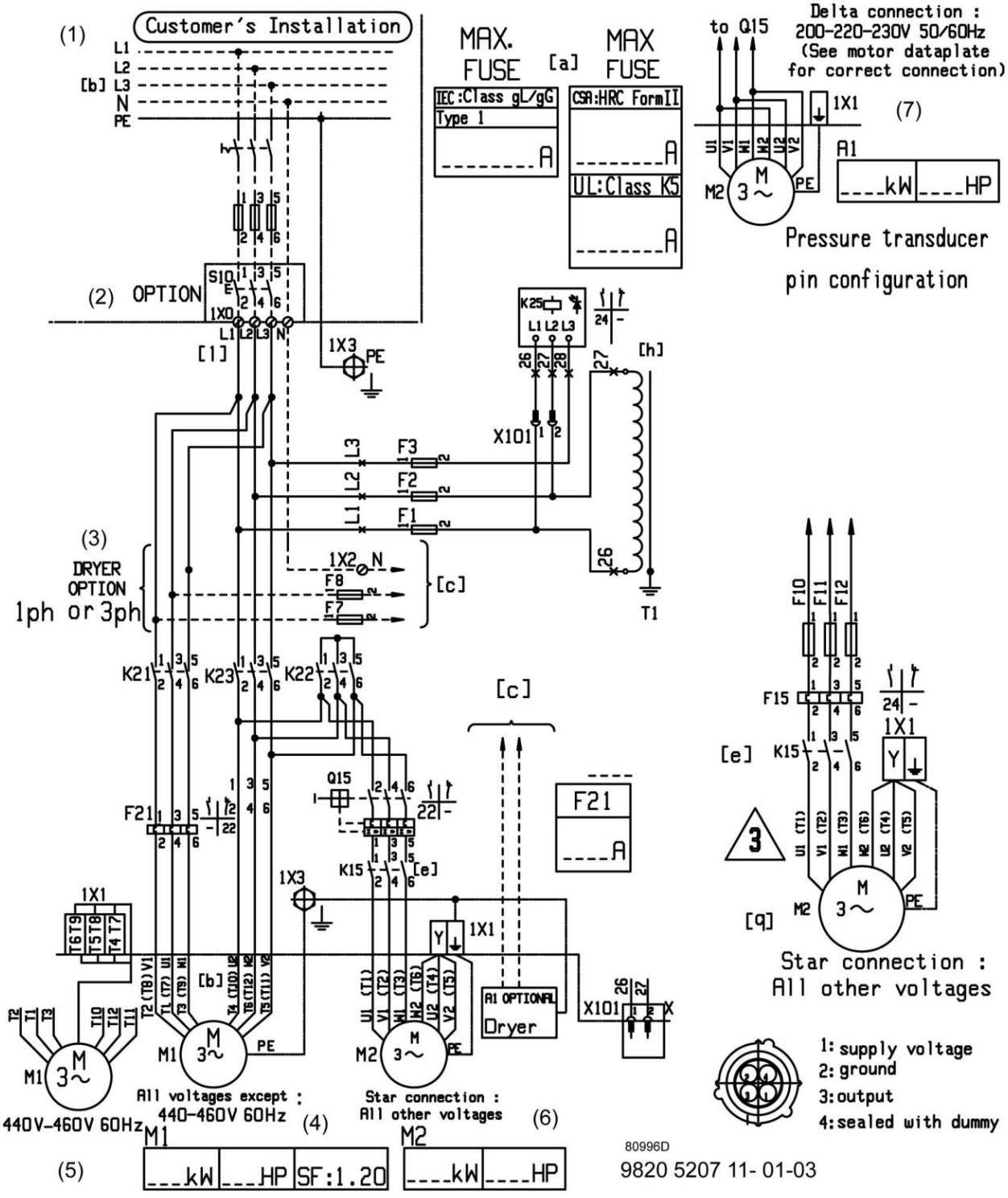
10. The air receiver (optional) should be installed in a frost-free room on a solid, level floor.
    For normal air consumption, the volume of the air net (receiver and piping) can be calculated as follows:
    $V = (0.25 \times Q_c \times P1 \times To)/ (f_{max} \times \Delta P \times Ti)$, with
    V = volume of the air net in l
    Q_c = free air delivery of the compressor in l/s
    P1 = compressor air inlet pressure in bar absolute
    f_{max} = cycle frequency = 1 cycle/ 30 s
    $\Delta P = P_{unload} - P_{load}$ in bar
    Ti = compressor air inlet temperature in K
    To = air receiver temperature in K
11. **Dryer bypass**
    A set of pipes to bypass the dryer during service operations is available as standard option. Consult Atlas Copco.

7.3 Electrical connections

Important remark

	To preserve the protection degree of the electric cubicle and to protect its components from dust from the environment, it is mandatory to use a proper cable gland when connecting the supply cable to the compressor.

Electrical connections



Reference	Designation
(1)	Customer's installation
(2)	Main switch (option)
(3)	Dryer option (1 phase)
(4)	Motor connection (M1) for all voltages, except 440-460 V - 60 Hz

Reference	Designation
(5)	Motor connection (M1) for 440-460 V - 60 Hz
(6)	Star connection (M2) for all other voltages
(7)	Delta connection (M2) for 200-220-230 V - 50/60 Hz - See motor data plate for correct connection

Instructions

1. Provide an isolating switch.
2. Check that the motor 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 overload relay and fuses.
4. Connect the power supply cables to their terminals L1, L2, L3.
5. Connect neutral conductor to connector (N).
6. Connect earth conductor bolt (PE).

Compressor status indication on compressors equipped with an Elektronikon® controller

The Elektronikon regulator is provided with an auxiliary relay (K05) for remote indication of a shutdown.

Maximum load for the contacts: 10 A / 250 V AC. Stop the compressor and switch off the voltage before connecting external equipment. Consult Atlas Copco.

Compressor status indication on compressors equipped with an Elektronikon® Graphic controller

The Elektronikon regulator is provided with auxiliary contacts (K05, K07 and K08) for remote indication of:

- manual load/unload or automatic operation (K07)
- warning condition (K08)
- shut-down condition (K05)

Maximum load for the contacts: 10 A / 250 V AC. Stop the compressor and switch off the voltage before connecting external equipment. Consult Atlas Copco.

Compressor control modes

	Stop the compressor and switch off the voltage before connecting external equipment. Only voltage-free contacts are allowed.

The following control modes can be selected:

- Local control: The compressor will react to commands entered by the buttons on the control panel. Compressor start/stop commands via Clock function are active, if programmed.
- Remote control: The compressor will react to commands from external switches. Emergency stop remains active. Compressor start/stop commands via Clock function are still possible.
  For remote starting and stopping:
  - Connect a Start/Programmed Stop button (S1') between terminals 1 and 2 of connector (X108) (= input DIO3 on the controller).
  - Bridge terminals 1 and 3 of connector (X108) (= DIO4 on the controller) or connect a load/unload switch (S4').
    In this mode, the outlet pressure is still sensed by pressure transducer (PT20), resulting in loading and unloading of the compressor at the pressures programmed in the Elektronikon regulator. If the

mentioned terminals are not bridged, the compressor is switched out of automatic load/unload operation and remains running unloaded.

For remote loading/unloading (via external pressure switch):
Compressors with an Elektronikon Graphic controller can also be wired to load and unload depending from the status of a pressure switch: Bridge terminals 1 and 3 of connector (X108a) (=DIO5 on the controller) and connect a load/unload (pressure) switch (S4') between terminals 1 and 3 of connector strip (X108) (= DIO4 on the controller). This results in loading and unloading of the compressor at the closing and opening pressures of the external pressure switch respectively.

- LAN control: The compressor is controlled via a local network. Consult Atlas Copco.

See section Electrical system to locate the connectors.

7.4 Cooling water requirements

General

For water-cooled compressors or when energy recovery is involved, the cooling water quality must meet certain minimum requirements. No general recommendation can encompass the effects of all combinations of the various compounds, solids and gases typically found in cooling water in interaction with different materials. This recommendation is a general guide line for acceptable coolant quality.

It is very important to make a distinction between a closed system or an open system. In a closed system, the same cooling water is circulating through a system without contact with air. An open system is a pass through system, or a circulating system with a cooling tower. In the latter case, one has to consider the composition of the water as it enters the cooler, and not rely on the composition of the make-up water. Due to the evaporation effect in the cooling tower, much higher concentrations of ions can be obtained in the circulating water than in the make-up water.

Cooling water parameters

1. **The Rysnar stability index (RSI)**
   The Rysnar Index (RSI) is a parameter for predicting whether water will tend to dissolve or precipitate calcium carbonate. The adhesion of scaling depositions and their effect are different on different materials, but the equilibrium of the water (scaling or corrosive) is only determined by its actual pH value and by the saturation pH value (pH_s). The saturation pH value is determined by the relationship between the calcium hardness, the total alkalinity, the total solids concentration and the temperature.
   The Rysnar Index is calculated as follows:
   $RSI = 2*pH_s - pH$,
   in which
   - pH = measured pH (at room temp) of water sample
   - pH_s= pH at saturation

   pH_s is calculated from:
   $pH_s = (9.3 + A + B) - (C + D)$,
   in which
   - A : depends on the total solids concentration (mg/l)
   - B : depends on the highest cooling water temperature (°C); for GA/GR units, assume temperature = 75°C
   - C : depends on the calcium hardness (ppm $CaCO_3$)
   - D : depends on the HCO_3- concentration or M-alkalinity (mval/l)

   The values from A, B, C and D are found in below table:

Total dissolved solids (mg/l)	A	Temperature (°C)	B	Ca hardness (ppm $CaCo_3$)	C	M-Alkalinity (mval/l	D
50-300	0.1	0-1	2.6	10-11	0.6	0.20-0.22	1.0
400-1000	0.2	2-6	2.5	12-13	0.7	0.24-0.26	1.1
		7-9	2.4	14-17	0.8	0.28-0.34	1.2
		10-13	2.3	18-22	0.9	0.36-0.44	1.3
		14-17	2.2	23-27	1.0	0.46-0.54	1.4
		18-21	2.1	28-34	1.1	0.56-0.70	1.5
		22-27	2.0	35-42	1.2	0.72-0.88	1.6
		28-31	1.9	44-55	1.3	0.90-1.10	1.7
		32-37	1.8	56-69	1.4	1.12-1.38	1.8
		38-44	1.7	70-87	1.5	1.40-1.76	1.9
		45-50	1.6	88-110	1.6	1.78-2.20	2.0
		51-56	1.5	111-138	1.7	2.22-2.78	2.1
		57-63	1.4	139-174	1.8	2.80-3.54	2.2
		64-71	1.3	175-220	1.9	3.54-4.40	2.3
		72-80	1.2	230-270	2.0	4.6-5.4	2.4
				280-340	2.1	5.6-7.0	2.5
				350-430	2.2	7.2-8.8	2.6
				440-550	2.3	9.0-11.0	2.7
				560-690	2.4	11.2-13.8	2.8
				700-870	2.5	14.0-17.6	2.9
				880-1000	2.6	17.8-20.0	3.0

Interpretation of the values obtained:

- RSI < 6: boiler scale formation
- RSI between 6 - 7: neutral water
- RSI > 7: corrosive water

A more detailed interpretation is given in following table:

RSI	Tendency of the water	Action
RSI < 3.9	Very high scale formation	Water cannot be used
4.0 < RSI < 5.5	High boiler scale formation	Regular control and descaling is necessary
5.6 < RSI < 6.2	Slight boiler scale formation	Water treatment not necessary Occasional inspection recommended
6.3 < RSI < 6.8	Neutral water	
6.9 < RSI < 7.5	Slight corrosion at higher temperature	
7.6 < RSI < 9.0	Strong corrosion	Regular control necessary, use of corrosion inhibitor recommended
9.1 < RSI < 11	Very strong corrosion	Regular control necessary, use of corrosion inhibitor required

RSI	Tendency of the water	Action
RSI > 11	Very strong corrosion in the complete water circuit	Water should not be used

This table indicates that distilled or demineralised water should never be used, as their RSI is >11.

- The RSI is only indicating the equilibrium of scaling – descaling. A cooling water showing good RSI conditions can still be unsuitable due to other factors.
- From the above table, the RSI index should be between 5.6 and 7.5. If that is not the case, contact a specialist.

2. **pH**
   The effect of pH is already included in the Rysnar index, but the pH itself has some additional limitations: For GA units, the pH should be > 6.8.
3. **Total dissolved solids (TDS)**
   This is the sum of all ions in the water. It can be derived from the dry residue after evaporation (but not including suspended solids), or it can be estimated from the electrical conductivity.
   - In a **closed** system, the limit is described by:
     TDS < 3000 mg/l (< 3800 µS/cm)
   - In an **open** system, the limit is described by:
     TDS < 450 mg/l (< 580 µS/cm)
4. **Chlorides (Cl^-)**
   Chloride ions will create pitting corrosion on stainless steel. Their concentration should be limited:
   - Closed cooling system: Chlorides < 500 ppm
   - Open cooling system: Chlorides < 150 ppm

   However, if the water is scaling, lower limits should be used. (See the Rysnar stability index (RSI)).
5. **Free chlorine (Cl_2)**
   Continuously, a level of 0.5 ppm should not be exceeded. For shock treatments, a maximum limit of 2 ppm for maximum 30 minutes/day applies.
6. **Sulphates ($SO4^{--}$)**
   - Closed cooling system: Sulphates < 400 ppm
   - Open cooling system: Sulphates < 150 ppm
7. **Carbonate hardness**
   - Closed cooling system: 50-1000 ppm $CaCO^3$
   - Open cooling system: 50-500 ppm $CaCO^3$

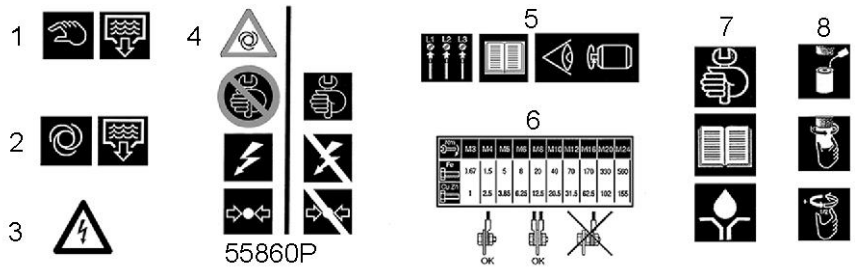
   $HCO3^-$ / $SO4^{2-}$ should be > 1
8. **Ammonia**
   < 0.5 ppm
9. **Copper**
   < 0.5 ppm
10. **Iron and Manganese**
    Iron < 0.2 ppm
    Manganese < 0.1 ppm
11. **Organics**
    No algae.
    No oil.
12. **Suspended solids**
    Non-soluble particles, size < 1mm:
    < 10 ppm
13. **Oxygen**
    < 0.2 ppm

14. **Additives**
    If it should be necessary to use additives in the cooling water, take into account that the cooling capacity will change.
    $\Delta m = ((C_{pw} - C_{pa}) * X) / (C_{pw} *(1-X) + X*C_{pa}) * 100\ \%$
    with
    Δm: change of mass flow of the coolant
    C_{pw}: specific heat capacity of water
    C_{pa}: specific heat capacity of the additives
    X: the percentage of additives
15. **$KMnO_4$**
    - Closed system: < 25 mg/l
    - Open system: < 10 mg/l

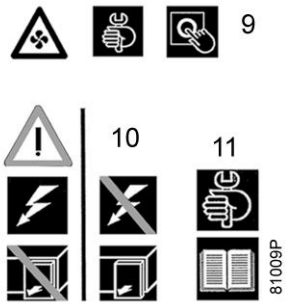
	Chloride and sulphate are interactive. In pass-through systems the sum of the squares must not exceed 85000. For recirculating systems with proper controls and treatment, the sum of the squares may be up to 520000. Note that the sulphate value must include any sulphite present.

7.5 Pictographs

Description



Pictographs



Reference	Designation
1	Manual condensate drain
2	Automatic condensate drain
3	Warning: voltage

Reference	Designation
4	Warning: switch off the voltage and depressurise compressor before repairing
5	Warning: before connecting compressor electrically, consult Instruction book for motor rotation direction
6	Torques for steel (Fe) or brass (CuZn) bolts
7	Consult instruction book before greasing
8	Lightly oil gasket of oil filter, screw it on and tighten by hand (approx. half a turn)
9	Warning: stop the compressor before repairing fans
10	Warning: switch off the voltage before removing protecting cover inside electric cubicle
11	Consult the instruction book before carrying out maintenance

8 Operating instructions

8.1 Initial start-up

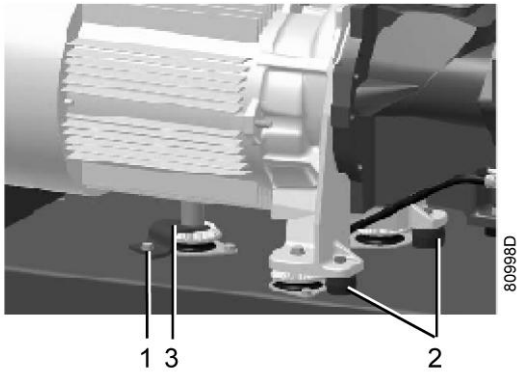
Safety

	The operator must apply all relevant Safety precautions.

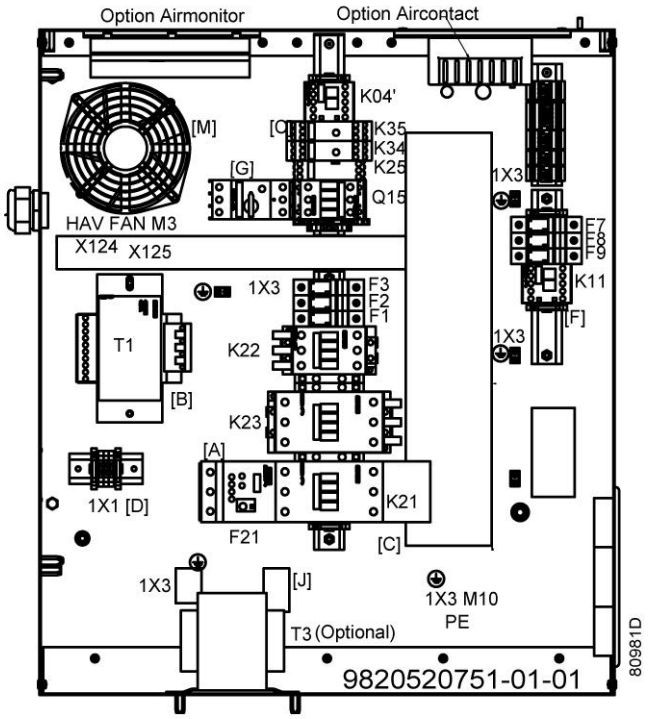
Procedure

	For the position of the air outlet valve and the drain connections, see sections Introduction and Condensate system.

1. Consult the sections Electric cable size,Installation proposals and Dimension drawings
2. **The following transport fixtures, painted red, must be removed:**
   - Bolts (1)
   - Bushes (2)
   - Supports (3)

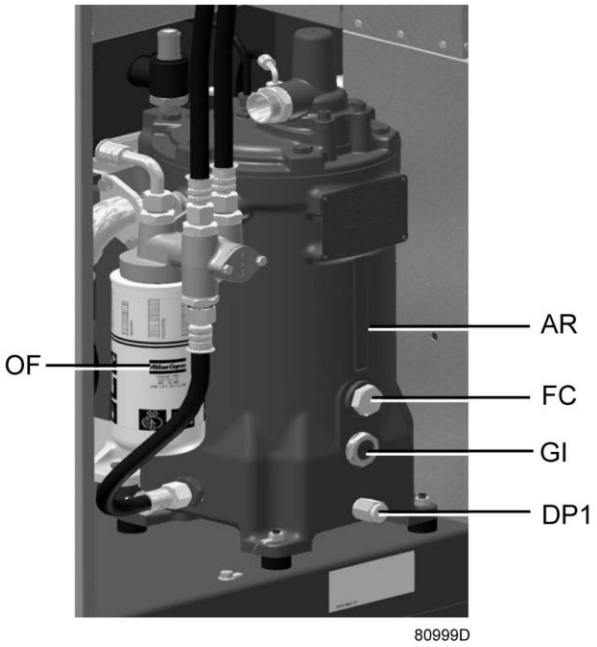


   On GA Full-Feature and for a voltage supply different from 200 V, 230 V or 400V+N, a transformer (T3) is provided. See Electrical connections.
3. Check that the electrical connections correspond to the local codes and that all wires are clamped tight to their terminals.
   The installation must be earthed and protected against short circuits by fuses of the inert type in all phases.
   An isolating switch must be installed near the compressor.
4. Check transformer (T1) for correct connection.
   Check the settings of drive motor overload relay (F21).
   Check that the motor overload relay is set for manual resetting.
   Check the setting of circuit breaker Q15. Also check that the switch on the circuit breaker is in position I.



Cubicle GA 11 + up to GA 30

5. Fit the air outlet valve (AV); see section Introduction for the position of the valve.
   Close the valve.
   Connect the air net to the valve.
   On compressors equipped with a dryer bypass, fit the air outlet valve to the dryer bypass pipe.
6. Fit the manual condensate drain valve (Dm). Close the valve. Connect the valve to a drain collector.
7. Connect the automatic drain outlet (Da) to a drain collector.
   The drain pipes to the drain collector must not dip into the water. If the pipes have been fitted outside the room where freezing is possible, they must be insulated. For draining of pure condensate water, install an oil/water separator which is available from Atlas Copco as an option. See section OSD unit.
8. Check the oil level.
   The oil level in the sight glass should be in the upper region or higher.



Position of oil level sight-glass

9. **Provide labels, warning the operator that:**
   - The compressor may automatically restart after voltage failure (if activated, consult Atlas Copco).
   - The compressor is automatically controlled and may be restarted automatically.
10. Switch on the voltage. Start the compressor and stop it immediately. Check the rotation direction of the drive motor (M1) while the motor is coasting to a stop.
    Incorrect rotation direction of the drive motor may cause damage to the compressor.
    The compressors are provided with a phase sequence relay.
    If the compressor fails to start, check the display.
    If the display shows the message Overload Motor (compressors with an Elektronikon® controller - see section Shutdown), check the phase sequence relay:
    If the display shows the motor icon and the Alarm LED is lit (compressors with an Elektronikon® Graphic controller), check the phase sequence relay:
    If the yellow LED is off, the rotation direction is wrong; if the LED is lit, reset the overload relay (F21).
    The correct rotation direction of the drive motor is clockwise when looking at the motor fan (seen from the non-drive end of the motor). An arrow is stuck on the motor.
    If the rotation direction of the drive motor is incorrect, switch off the voltage and reverse two incoming electric lines.
    On air-cooled compressors, check also the rotation direction of the **fan motor**.
    The correct rotation direction of the fan motor is counter-clockwise when looking at the fan from the top of the compressor. An arrow indicates the correct direction of rotation.
    If the rotation direction of the fan motor is incorrect, switch off the voltage and reverse two incoming electric connections at the terminals of circuit breaker (Q15).
11. Check the programmed settings. Consult section Programmable settings.
12. Start and run the compressor for a few minutes. Check that the compressor operates normally.
    During operation, the oil level should be in the centre of the sight glass.

8.2 Before starting

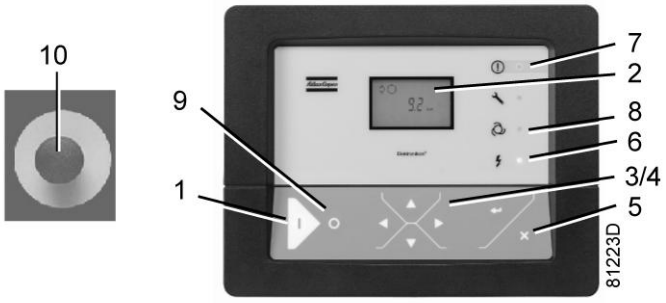
Procedure

-	Check the oil level, top up if necessary. See section Initial start-up.

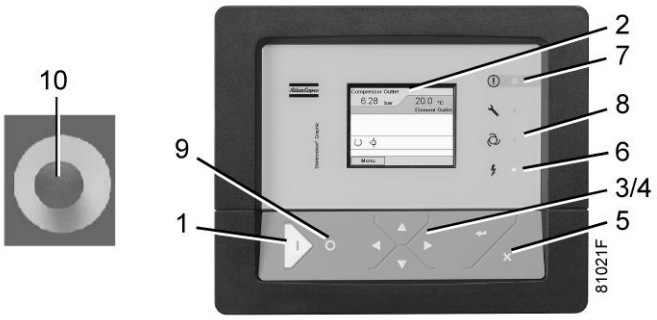
8.3 Starting

Procedure

	For the position of the air outlet valve and the drain connections, see sections Introduction and Condensate system



Control panel of the Elektronikon® controller

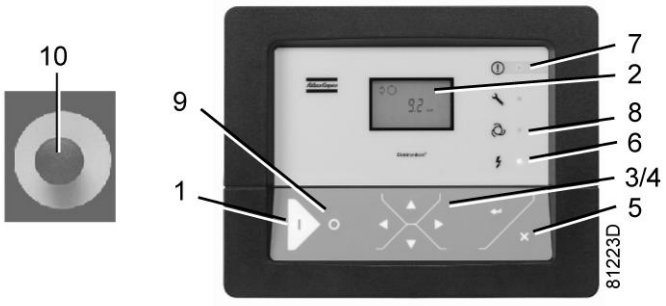


Control panel of the Elektronikon® Graphic controller

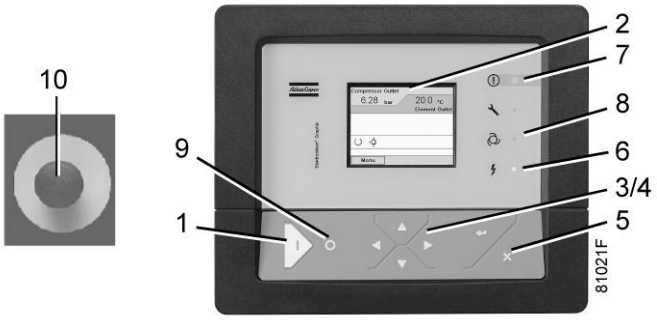
Step	Action
-	Switch on the voltage. Check that voltage on LED (6) lights up.
-	Open the air outlet valve.
-	Close the condensate drain valve(s) (Dm).
-	Press start button (1) on the control panel. The compressor starts running and the automatic operation LED (8) lights up. Ten seconds after starting, the drive motor switches over from star to delta and the compressor starts running loaded.

8.4 During operation

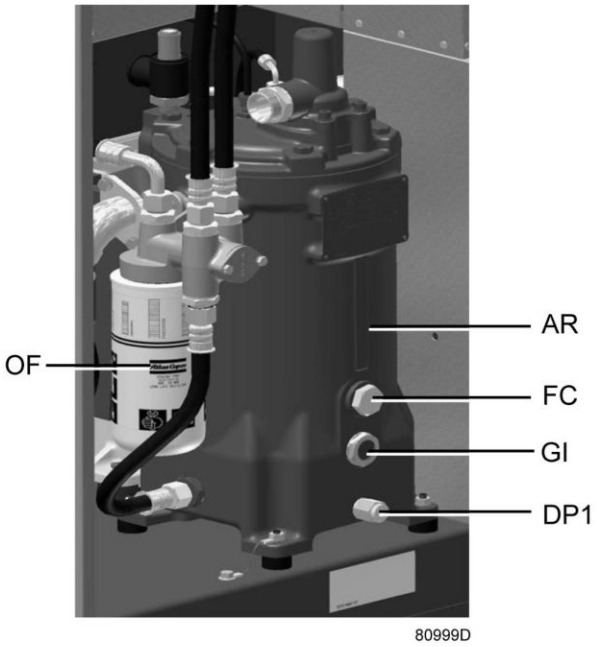
Procedure



Control panel of the Elektronikon® controller



Control panel of the Elektronikon® Graphic controller



Position of the oil level sight glass

Regularly check the oil level. During operation, the oil level should be in the centre of the sight glass. If the level is too low: stop the compressor, wait until the compressor has stopped, depressurise the oil system by unscrewing oil filler plug (FC) one turn and wait a few minutes. Remove the plug and top up oil, until the sight-glass is full. Fit and tighten the plug (FC).

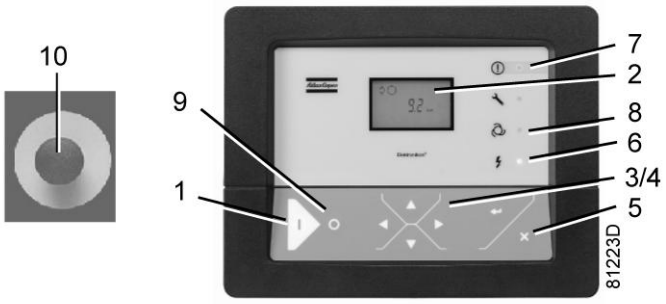
When automatic operation LED (8) is lit, the regulator is automatically controlling the compressor, i.e. loading, unloading, stopping of the motors and restarting.

If provided, regularly check that condensate is discharged by the automatic drain(s) during operation. See section Condensate system. The amount of condensate depends on environmental and working conditions.

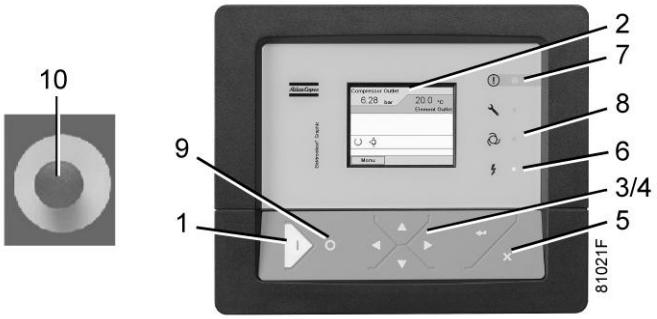
If an OSD is installed, also check the level in the oil collector; see section OSD Maintenance and operating instructions.

8.5 Checking the display

Procedure



Control panel of the Elektronikon® controller



Control panel of the Elektronikon® Graphic controller

Compressors with Elektronikon® controller:

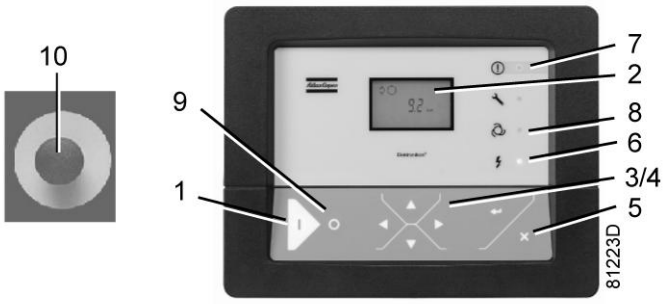
Check the display (2) regularly for readings and messages. The display normally shows the compressor outlet pressure, while the status of the compressor is indicated by pictographs. Remedy the trouble if alarm LED (7) is lit or flashes, see section Shutdown warning , Shutdown and Problem solving. The display (2) will show a service message if a service plan interval has been exceeded or if a service level for a monitored component has been exceeded. Carry out the service actions of the indicated plans or replace the component and reset the relevant timer, see section Service warning.

Compressors with Elektronikon® Graphic controller:

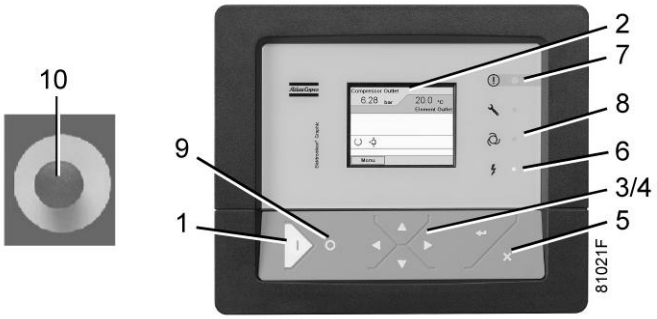
Check the display (2) regularly for readings and messages. The display normally shows the compressor outlet pressure,while the status of the compressor is indicated by means of a number of icons. Remedy the trouble if alarm LED (7) is lit or flashes, see section Icons used. The display (2) will show a service message if a service plan interval has been exceeded or if a service level for a monitored component has been exceeded. Carry out the service actions of the indicated plans or replace the component and reset the relevant timer, see section Service menu.

8.6 Stopping

Elektronikon regulator



Control panel of the Elektronikon® controller



Control panel of the Elektronikon® Graphic controller

Procedure

Step	Action
-	Press stop button (9). Automatic operation LED (8) goes out and the compressor stops after 30 seconds of unloaded operation.
-	**To stop the compressor in the event of an emergency,** press emergency stop button (10). Alarm LED flashes (7). On compressors with an Elektronikon® controller: remedy the problem cause, unlock the button by pulling it out and press the Escape button (5) to reset. On compressors with an Elektronikon® Graphic controller: • Remedy the problem cause and unlock the button by pulling it out. • Navigate to the Stop icon on the display by means of the navigation keys (3/4) and press the Select key. Press reset. **Do not use emergency stop button (10) for normal stopping!**
-	Close the air outlet valve (AV).
-	Open the condensate drain valve (Dm). See section Condensate system.

8.7 Taking out of operation

Procedure

Step	Action
-	Stop the compressor and close the air outlet valve.
-	Switch off the voltage and disconnect the compressor from the mains.
-	Depressurise the compressor by opening plug (FC). Consult section Oil and oil filter change to locate the filler plug.
-	Open the condensate drain valve (Dm). Consult section Condensate system to locate the drain valve.
-	Shut off and depressurise the part of the air net which is connected to the outlet valve. Disconnect the compressor air outlet pipe from the air net.
-	Drain the oil.
-	Drain the condensate circuit and disconnect the condensate piping from the condensate net.

9 Maintenance

9.1 Preventive maintenance schedule

Warning

	**Before carrying out any maintenance, repair work or adjustments, proceed as follows:** • Stop the compressor. • Press the emergency stop button. • Switch off the voltage. • Close the air outlet valve and open, if provided, the manual condensate drain valve. • Depressurise the compressor. For detailed instructions, see section Problem solving. The operator must apply all relevant Safety precautions.

Warranty - Product Liability

Use only authorised parts. Any damage or malfunction caused by the use of unauthorised parts is not covered by Warranty or Product Liability.

Service kits

For overhauling or carrying out preventive maintenance, service kits are available (see section Service kits).

Service contracts

Atlas Copco offers several types of service contracts, relieving you of all preventive maintenance work. Consult your Atlas Copco Customer Centre.

General

When servicing, replace all removed gaskets, O-rings and washers.

Intervals

The local Atlas Copco Customer Centre may overrule the maintenance schedule, especially the service intervals, depending on the environmental and working conditions of the compressor.

The longer interval actions and checks must also include the shorter interval actions and checks.

Service actions for compressors with an Elektronikon® controller

Besides the daily and 3-monthly checks, the service operations are grouped in time intervals (running hours). The regulator has a programmable service timer. A service warning will appear when the service timer has reached the programmed time interval; see section Programmable settings and section Service warning. In this case, check the running hours. Carry out the service operations corresponding to the running hours as specified in the schedule below. Reset the service timer after servicing; see section Calling up/resetting the service timer.

Service plans for compressors with an Elektronikon® Graphic controller

Besides the daily and 3-monthly checks, preventive service operations are specified in the schedule below.

Each plan has a programmed time interval at which all service actions belonging to that plan are to be carried out. When reaching the interval, a message will appear on the screen indicating which service plans are to be carried out; see section Programmable settings and section Service menu. After servicing, the intervals must be reset.

Preventive maintenance schedule

Check list

Period	Operation
Daily	Check oil level. Check readings on display. Check that condensate is discharged during loaded operation. Drain condensate (compressed air receiver). Check the pressure dew-point temperature (compressors with integrated dryer).
3-monthly (1)	Check coolers, clean if necessary. On Full-Feature units: check condenser of dryer and clean if necessary. Remove the air filter element and inspect. If necessary, clean using an air jet. Replace damaged or heavily contaminated elements. Check the filter element of the electric cabinet (if applicable). Replace if necessary Press the test button on top of the electronic water drain (EWD). Open the manual drain valve(s) (Dm, Dm1) to clean the filter inside the EWD.

(1): More frequently when operating in a dusty atmosphere.

Programmed service intervals

Frequency (running hours)	Operation
4000 (1)	If Atlas Copco Roto-Foodgrade Fluid is used, change oil and oil filter. If Atlas Copco Roto-Inject Fluid is used, change oil and oil filter. Replace the air filter element. Replace the filter element of the electric cabinet (where applicable). Clean coolers. Check pressure and temperature readings. Carry out a LED/display test. Check for leakages. Open the manual drain valve (Dm) to clean the filter of the automatic drain. See section Condensate system. Test temperature shut-down function.
yearly	Test safety valve.
8000 (2)	If Atlas Copco Roto-Xtend Duty Fluid is used, change oil and oil filter. Have the oil separator element replaced. Test safety valves. Replace the separator element also if the pressure drop over the separator exceeds 1 bar (14.5 psi). Check the pressure drop when the compressor is running loaded and preferably with a stable working pressure.

(1): or yearly, whichever comes first

(2): or every 2 years, whichever comes first

Important

	• Always consult Atlas Copco if a service timer setting has to be changed. • For the change interval of oil and oil filter in extreme conditions, consult your Atlas Copco Customer Centre. • Any leakage should be attended to immediately. Damaged hoses or flexible joints must be replaced.

9.2 Oil specifications

	Never mix lubricants of different brands or types as they may not be compatible and the oil mix will have inferior properties. A label, indicating the type of oil filled ex-factory, is stuck on the air receiver/oil tank. Always drain the compressor oil at all drain points. Used oil left in the compressor can contaminate the oil system and can shorten the lifetime of the new oil.

It is strongly recommended to use genuine Atlas Copco Lubricants. They are the result of years of field experience and research in our labs. See section Preventive maintenance schedule for replacement intervals and section Service Kits for part number information.

Roto-Inject Fluid

Atlas Copco's Roto-Inject Fluid is a specially developed lubricant for use in single stage oil-injected screw compressors. Its specific composition keeps the compressor in excellent condition. Roto-Inject Fluid can be used for compressors operating at ambient temperatures between 0 ˚C (32 ˚F) and 40 ˚C (104 ˚F). If the compressor is regularly operating in ambient temperatures between 40 °C and 46 °C (115 °F), oil lifetime is reduced significantly. In such case it is recommended to use Roto-Xtend Duty Fluid.

Roto-Xtend Duty Fluid

Atlas Copco's Roto-Xtend Duty Fluid is a high-quality synthetic lubricant for oil-injected screw compressors which keeps the compressor in excellent condition. Because of its excellent oxidation stability, Roto-Xtend Duty Fluid can be used for compressors operating at ambient temperatures between 0 ˚C (32 ˚F) and 46 ˚C (115 ˚F).

Roto-Xtend Duty Fluid is the standard oil for compressors equipped with freeze protection.

Roto-Foodgrade Fluid

Special oil, delivered as an option.

Atlas Copco's Roto-Foodgrade fluid is a unique high-quality synthetic lubricant, specially created for oil-injected screw compressors that provide air for the food industry. This lubricant keeps the compressor in excellent condition. Roto-Foodgrade Fluid can be used for compressors operating at ambient temperatures between 0 ˚C (32 ˚F) and 40 ˚C (104 ˚F).

9.3 Storage after installation

Procedure

Run the compressor, e.g. twice a week, until warm. Load and unload the compressor a few times.

	If the compressor is going to be stored without running from time to time, protective measures must be taken. Consult Atlas Copco.

9.4 Service kits

Service kits

For overhauling and for preventive maintenance, a wide range of service kits is available. Service kits comprise all parts required for servicing the component and offer the benefits of genuine Atlas Copco parts while keeping the maintenance budget low.

Also a full range of extensively tested lubricants, suitable for your specific needs is available to keep the compressor in excellent condition.

Consult the Spare Parts List for part numbers.

9.5 Disposal of used material

Used filters or any other used material (e.g. desiccant, lubricants, cleaning rags, machine parts, etc.) must be disposed of in an environmentally friendly and safe manner, and in line with the local recommendations and environmental legislation.

10 Adjustments and servicing procedures

10.1 Drive motor

General

Keep the outside of the electric motor clean for efficient cooling. If necessary, remove dust with a brush and/or compressed air jet.

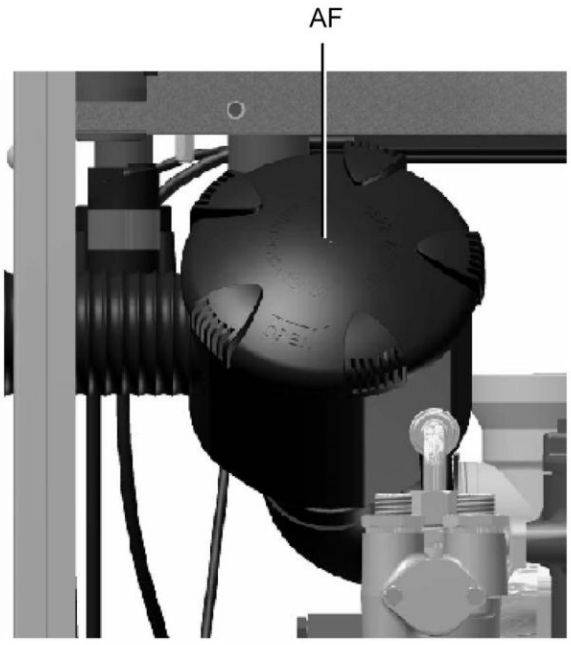
Bearing maintenance

The bearing at the non-drive end side is greased for life.

The bearing at the drive end side is lubricated by the oil system.

10.2 Air filter

Location of air filter



81000D

Recommendations

1. Never remove the element while the compressor is running.
2. For minimum downtime, replace the dirty element by a new one.
3. Discard the element when damaged.

Procedure

1. Stop the compressor. Switch off the voltage.

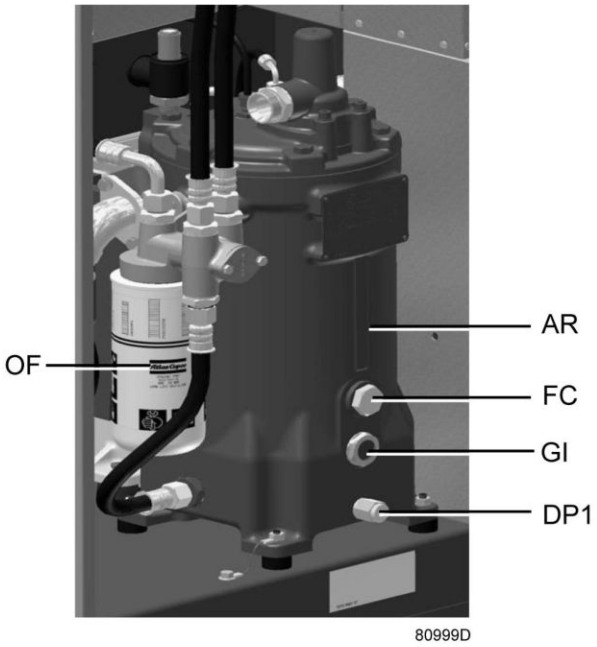
2. Remove the cover of air filter (AF) by turning it anti-clockwise. Remove the filter element. If necessary, clean the cover.
3. Fit the new element and the cover.
4. Reset the air filter service warning.
   For compressors equipped with an Elektronikon® regulator, see section Service warning.
   For compressors equipped with an Elektronikon® Graphic regulator, see section Service menu.

10.3 Oil and oil filter change

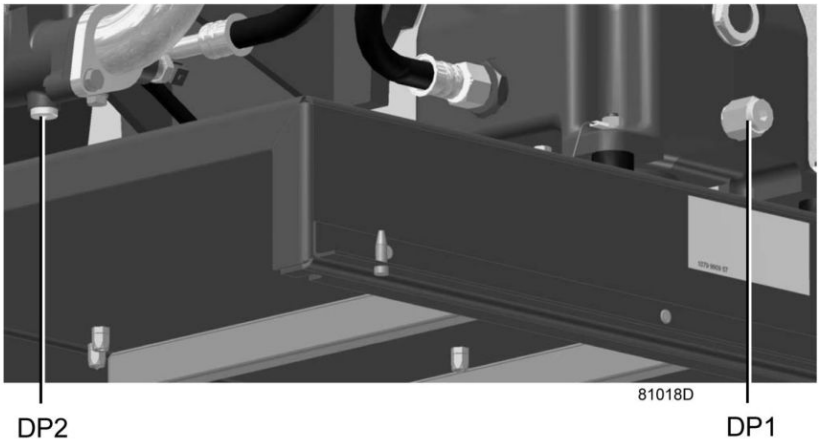
Warning

	The operator must apply all relevant Safety precautions. If the compressor is equipped with an Energy Recovery unit, also consult Maintenance for Energy Recovery Systems.

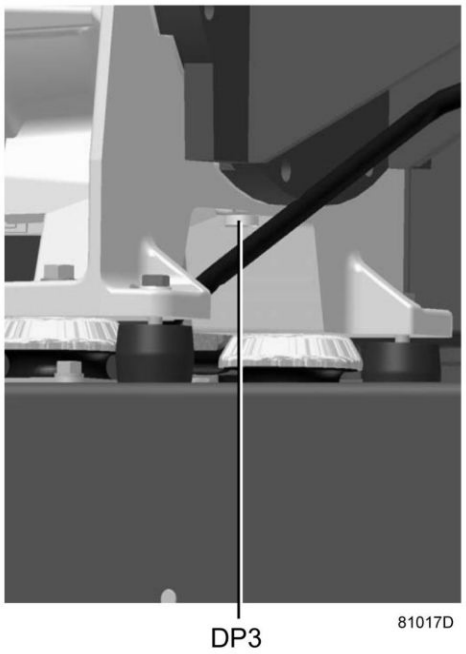
Procedure



Oil system components



Oil drain plugs



Oil drain plug, gear casing

1. Run the compressor until warm. Stop the compressor. Close the air outlet valve and switch off the voltage. Depressurise the compressor by opening manual drain valve(s) (Dm, Dm1). Wait a few minutes and depressurise the air receiver/oil (AR) tank by unscrewing oil filler plug (FC) just one turn to permit any pressure in the system to escape.
2. Loosen the top connection of the oil cooler and wait for 5 minutes.
3. Drain the oil by removing the drain plug on the air receiver (DP1).
   Also drain the oil on the element outlet housing (DP2) and on the gearbox (DP3)
4. Collect the oil and deliver it to the local collection service. Refit and tighten the drain and vent plugs after draining.
   Re-tighten the top connection of the oil cooler.

5. Remove the oil filter (OF). Clean the seat on the manifold. Oil the gasket of the new filter and screw it into place. Tighten firmly by hand.
6. Remove filler plug (FC).
   Fill the air receiver (AR) with oil until the level reaches the filler neck.
   Take care that no dirt drops into the system. Refit and tighten filler plug (FC).
7. Run the compressor loaded for a few minutes. Stop the compressor and wait a few minutes to allow the oil to settle.
8. Depressurise the system by unscrewing filler plug (FC) just one turn to permit any pressure in the system to escape. Remove the plug.
   Add oil until the level reaches the filler neck.
   Tighten the filler plug.
9. Reset the service warning after carrying out all service actions in the relevant Service Plan:
   For compressors with Elektronikon® controller, see section Calling up/resetting the service timer.
   For compressors with Elektronikon® Graphic controller, see section Service menu.

10.4 Coolers

General

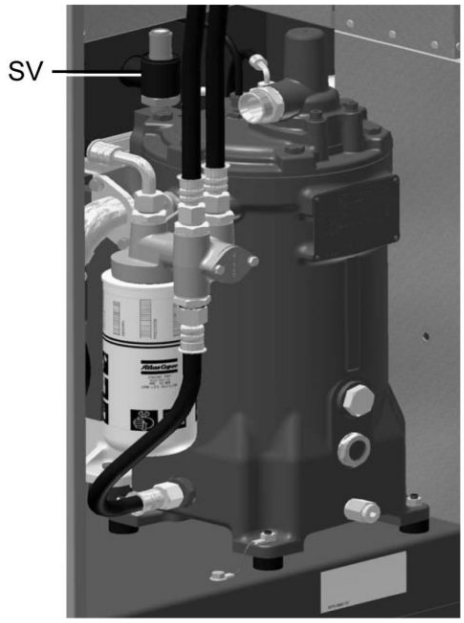
Keep the coolers clean to maintain their efficiency.

Instructions for air-cooled compressors

- Stop the compressor, close the air outlet valve and switch off the voltage.
- Remove the side baffle that encloses the fan compartment.
- Remove any dirt from the coolers with a fibre brush. Brush in the direction of the cooling fins.
  Also remove any dirt from the fan with a fibre brush.
- Next, clean with an air jet in the reverse direction to normal flow. Use low pressure air. If necessary, the pressure may be increased up to 6 bar(e) (87 psig).
- If it is necessary to wash the coolers with a cleaning agent, consult Atlas Copco.
- Mount the side baffle that encloses the fan compartment.

10.5 Safety valves

Location of safety valve



Operating

Operate the safety valve by unscrewing the cap one or two turns and retighten it.

Testing

Before removing the valve, depressurise the compressor.

See section Problem solving.

Valve (SV) can be tested on a separate air line. If the valve does not open at the set pressure stamped on the valve, it needs to be replaced.

Warning

No adjustments are allowed. Never run the compressor without safety valve.

10.6 Dryer maintenance instructions

Safety precautions

Refrigeration dryers of ID type contain refrigerant HFC.

When handling refrigerant, all applicable safety precautions must be observed. Please be specifically 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; always wear safety glasses.

- Refrigerant is harmful. Do not inhale refrigerant vapours. Check that the working area is adequately ventilated.

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 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

For all references see section Introduction.

The following remarks should be kept in mind:

- Keep the dryer clean.
- Brush or blow off the finned surface of condenser monthly.
- Inspect and clean the electronic condensate drain monthly.
  - Functioning of the drains can be checked by pushing the TEST button of the drain.
  - Cleaning of the drain filter can be done by opening the manual drain valve during a few seconds.

11 Problem solving

Warning

	Before carrying out any maintenance, repair work or adjustment, press the stop button, wait until the compressor has stopped, press the emergency stop button and switch off the voltage. Close the air outlet valve and lock it if necessary. If provided, open the manual condensate drain valves. Depressurise the compressor by opening the oil filler plug one turn. **For location of components, see sections:**Introduction, Condensate system and Initial start-up.
	Open and lock the isolating switch.
	The operator must apply all relevant Safety precautions.

Compressor

On compressors equipped with an Elektronikon® controller, if the alarm LED is lit or flashes, consult sections Shutdown warning and following

On compressors equipped with an Elektronikon® Graphic controller, if the alarm LED is lit or flashes, consult sections Main screen and following

-	Condition	Fault	Remedy
	Compressor starts running, but does not load after a delay time	Solenoid valve out of order	Replace valve
		Inlet valve stuck in closed position	Have valve checked
		Leak in control air flexibles	Replace leaking flexible
		Minimum pressure valve leaking (when net is depressurised)	Have valve checked

-	Condition	Fault	Remedy
	Compressor does not unload, safety valve blows	Solenoid valve out of order	Replace valve
		Inlet valve does not close	Have valve checked

-	Condition	Fault	Remedy
	Condensate is not discharged from condensate separator during loaded operation	Discharge flexible clogged	Check and correct as necessary
		Automatic drain malfunctioning	Open the manual drain valve(s) to clean the filter of the EWD. If necessary, disassemble and check.

-	Condition	Fault	Remedy
	Compressor air output or pressure below normal	Air consumption exceeds air delivery of compressor	Check equipment connected
		Choked air filter element	Replace filter element

-	Condition	Fault	Remedy
		Solenoid valve malfunctioning	Replace valve
		Leak in control air flexibles	Replace leaking flexibles
		Inlet valve does not fully open	Have valve checked
		Oil separator clogged	Have element replaced
		Air leakage	Have leaks repaired
		Safety valve leaking	Have valve replaced
		Compressor element out of order	Consult Atlas Copco

-	Condition	Fault	Remedy
	Excessive oil consumption; oil carry-over through discharge line	Oil level too high	Check for overfilling. Release pressure and drain oil to correct level
		Incorrect oil causing foam	Change to correct oil
		Oil separator defective	Have element checked. Replace if necessary.
		Scavenge line clogged	Check and remedy

-	Condition	Fault	Remedy
	Safety valve blows after loading	Inlet valve malfunctioning	Have valve checked
		Minimum pressure valve malfunctioning	Have valve checked
		Safety valve out of order	Have valve replaced
		Compressor element out of order	Consult Atlas Copco
		Oil separator element clogged	Have element replaced

-	Condition	Fault	Remedy
	Compressor element outlet temperature or delivery air temperature above normal	Oil level too low	Check and correct
		On air-cooled compressors, insufficient cooling air or cooling air temperature too high	Check for cooling air restriction or improve ventilation of the compressor room. Avoid recirculation of cooling air. If installed, check capacity of compressor room fan
		Oil cooler clogged	Clean cooler
		Thermostatic bypass valve malfunctioning	Have valve tested
		Air cooler clogged	Clean cooler
		Compressor element out of order	Consult Atlas Copco Customer Centre
		Oil filter clogged	Replace

Dryer

For all references hereafter, consult section Air dryer.

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

12 Technical data

12.1 Readings on display

Elektronikon

Control panel of the Elektronikon® controller

Control panel of the Elektronikon® Graphic controller

Important

	The readings mentioned below are valid under the reference conditions (see section Reference conditions and limitations).

Reference	Reading
Air outlet pressure	Modulates between programmed unloading and loading pressures.
Compressor element outlet temperature	50-60 ˚C (90-108 ˚F) above cooling air temperature.
Dewpoint	See section Compressor data.

12.2 Electric cable size

Important warning

	To preserve the protection degree of the electric cubicle and to protect its components from dust from the environment, it is mandatory to use a proper cable gland when connecting the supply cable to the compressor.

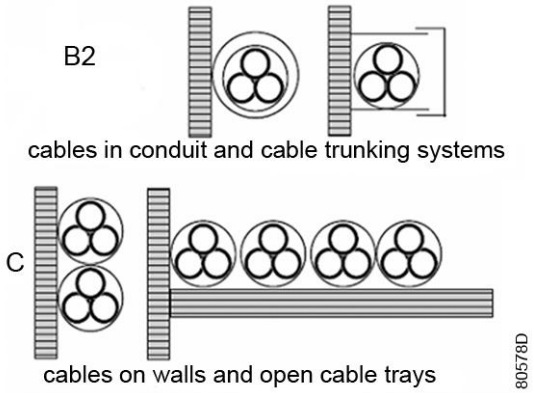
	• The voltage on the compressor terminals must not deviate more than 10% of the nominal voltage. It is however highly recommended to keep the voltage drop over the supply cables at nominal current below 5% of the nominal voltage (IEC 60204-1). If cables are grouped together with other power cables, it may be necessary to use cables of a larger size than those calculated for the standard operating conditions. • Use the original cable entry. See section Dimension drawings. • Local regulations remain applicable if they are stricter than the values proposed below.

IEC versions

For **IEC** designed control panels, the below suggested **cable sections** are calculated according to 60364-5-52 electrical installations of buildings, part 5: selection and erection equipment, section 52: current-carrying capacities in wiring systems.

Standard conditions refer to loose copper conductors or multicore cable with 70˚C PVC insulation in free air or on open cable trays (installation method C) at 30˚C ambient temperature and operating at nominal voltage. The cables may not be grouped with other power circuits or cables.

Worst case conditions refer to loose copper conductors or multicore cable with 70˚C PVC insulation, but with ambient temperature above 30˚C (86 ˚F), cables in closed raceway, conduit or trunking system (installation method B2), or with cables grouped with other cables.



Fuse calculations for IEC are done according to 60364-4-43 electrical installations of buildings, part 4: protection for safety- section 43: protection against overcurrent. Fuse sizes are calculated in order to protect the cable against short circuit. Fuse type aM is recommended but gG/gL is also allowed.

UL/cUL versions

For **UL** designed industrial control panels, calculations for **cable sections and fuses** are done according to UL508a (Industrial control panels).

For **cUL**, calculations for **cable sections and fuses** are done according to CSA22.2 (Canadian electrical code).

Standard conditions: maximum 3 copper conductors in raceway or cable with 85-90˚C (185-194 ˚F) insulation at ambient temperature 30 ˚C (86 ˚F), operating at nominal voltage; cables not grouped with other cables.

Worst case conditions: ambient temperature > 30 ˚C (86 ˚F), max. 3 copper conductors in raceway or cable with 85-90 ˚C (185-194 ˚F) insulation at 46 ˚C (115 ˚F) ambient temperature and operating at nominal voltage. Cables grouped with other cables.

Fuse size is the maximum fuse size in order to protect the motor against short circuit. For cUL fuse HRC form II, for UL fuse class RK5.

If the local conditions are more severe then the described standard conditions, the cables and fuses for worst case conditions should be used.

Cable size

Type	V	Hz	Approval	I_{tot} P (1)	I_{tot} FF (1)	Recommended wire section (2)	Recommended wire section (3)	Main fuses (A) (4)
GA 11+	200	50	IEC	55	60	4 x 16 mm^2	4 x 25 mm^2	63
GA 11+	230	50	IEC	48	53	4 x 16 mm^2	4 x 25 mm^2	63
GA 11+	400	50	IEC	27	32	4 x 6 mm^2	4 x 10 mm^2	50
GA 11+	500	50	IEC	22	27	4 x 4 mm^2	4 x 6 mm^2	32
GA 11+	230	60	IEC	47	52	4 x 16 mm^2	4 x 16 mm^2	63
GA 11+	380	60	IEC	27	33	4 x 6 mm^2	4 x 10 mm^2	50
GA 11+	460	60	IEC	23	29	4 x 6 mm^2	4 x 10 mm^2	50
GA 11+	200	60	UL/cUL	51	57	4 x AWG6	4 x AWG4	100
GA 11+	230	60	UL/cUL	46	51	4 x AWG6	4 x AWG6	100
GA 11+	460	60	UL/cUL	23	29	4 x AWG10	4 x AWG10	50
GA 11+	575	60	UL/cUL	18	24	4 x AWG12	4 x AWG10	40
GA 15+	200	50	IEC	67	73	4 x 25 mm^2	4 x 35 mm^2	80
GA 15+	230	50	IEC	58	63	4 x 25 mm^2	4 x 25 mm^2	80
GA 15+	400	50	IEC	34	38	4 x 10 mm^2	4 x 10 mm^2	50
GA 15+	500	50	IEC	27	32	4 x 6 mm^2	4 x 10 mm^2	50
GA 15+	230	60	IEC	57	63	4 x 25 mm^2	4 x 25 mm^2	80
GA 15+	380	60	IEC	35	41	4 x 10 mm^2	4 x 16 mm^2	50
GA 15+	460	60	IEC	29	35	4 x 6 mm^2	4 x 10 mm^2	50
GA 15+	200	60	UL/cUL	64	70	4 x AWG3	4 x AWG3	125
GA 15+	230	60	UL/cUL	57	63	4 x AWG4	4 x AWG3	100
GA 15+	460	60	UL/cUL	29	35	4 x AWG8	4 x AWG6	60
GA 15+	575	60	UL/cUL	23	29	4 x AWG8	4 x AWG8	50

Type	V	Hz	Approval	I_{tot} P (1)	I_{tot} FF (1)	Recommended wire section (2)	Recommended wire section (3)	Main fuses (A) (4)
GA 18+	200	50	IEC	81	90	4 x 35 mm^2	4 x 50 mm^2	100
GA 18+	230	50	IEC	70	78	4 x 35 mm^2	4 x 35 mm^2	100
GA 18+	400	50	IEC	41	48	4 x 16 mm^2	4 x 16 mm^2	63
GA 18+	500	50	IEC	32	40	4 x 10 mm^2	4 x 16 mm^2	50
GA 18+	230	60	IEC	71	81	4 x 35 mm^2	4 x 50 mm^2	100
GA 18+	380	60	IEC	42	51	4 x 16 mm^2	4 x 25 mm^2	63
GA 18+	460	60	IEC	36	45	4 x 10 mm^2	4 x 16 mm^2	50
GA 18+	200	60	UL/cUL	78	87	4 x AWG2	4 X AWG1	150
GA 18+	230	60	UL/cUL	71	81	4 x AWG3	4 x AWG2	125
GA 18+	460	60	UL/cUL	36	45	4 x AWG6	4 x AWG4	60
GA 18+	575	60	UL/cUL	28	38	4 x AWG6	4 x AWG6	60
GA 22+	200	50	IEC	103	112	4 x 50 mm^2	4 x 70 mm^2	125
GA 22+	230	50	IEC	89	98	4 x 50 mm^2	4 x 70 mm^2	125
GA 22+	400	50	IEC	52	60	4 x 16 mm^2	4 x 25 mm^2	63
GA 22+	500	50	IEC	42	51	4 x 16 mm^2	4 x 25 mm^2	63
GA 22+	230	60	IEC	86	95	4 x 50 mm^2	4 x 70 mm^2	125
GA 22+	380	60	IEC	50	60	4 x 25 mm^2	4 x 35 mm^2	80
GA 22+	460	60	IEC	43	52	4 x 16 mm^2	4 x 25 mm^2	63
GA 22+	200	60	UL/cUL	94	104	4 x AWG1	4 x AWG1/0	150
GA 22+	230	60	UL/cUL	86	95	4 x AWG2	4 x AWG1	150
GA 22+	460	60	UL/cUL	43	52	4 x AWG6	4 x AWG4	80
GA 22+	575	60	UL/cUL	33	42	4 x AWG6	4 x AWG6	60
GA 26+	200	50	IEC	124	133	4 x 70 mm^2 (7 x 35 mm^2)	4 x 95 mm^2 (7 x 50 mm^2)	160 (100)
GA 26+	230	50	IEC	108	117	4 x 70 mm^2 (7 x 35 mm^2)	4 x 70 mm^2 (7 x 50 mm^2)	160 (100)
GA 26+	400	50	IEC	62	71	4 x 25 mm^2	4 x 35 mm^2	80
GA 26+	500	50	IEC	50	59	4 x 25 mm^2	4 x 35 mm^2	80
GA 26+	230	60	IEC	104	115	4 x 70 mm^2 (7 x 35 mm^2)	4 x 70 mm^2 (7 x 50 mm^2)	160 (100)
GA 26+	380	60	IEC	60	71	4 x 25 mm^2	4 x 35 mm^2	80
GA 26+	460	60	IEC	52	63	4 x 25 mm^2	4 x 35 mm^2	80
GA 26+	200	60	UL/cUL	112	123	4 x AWG1/0 (8 x AWG3)	4 x AWG2/0 (8 x AWG2)	200 (100)
GA 26+	230	60	UL/cUL	104	115	4 x AWG1/0 (8 x AWG3)	4 x AWG2/0 (8 x AWG2)	200 (100)
GA 26+	460	60	UL/cUL	52	63	4 x AWG4	4 x AWG3	100
GA 26+	575	60	UL/cUL	40	51	4 x AWG6	4 x AWG4	80

Type	V	Hz	Approval	I_{tot} P (1)	I_{tot} FF (1)	Recommended wire section (2)	Recommended wire section (3)	Main fuses (A) (4)
GA 30	200	50	IEC	141	150	4 x 95 mm^2 (7 x 35 mm^2)	7 x 50 mm^2	200 (100)
GA 30	230	50	IEC	122	131	4 x 70 mm^2 (7 x 35 mm^2)	4 x 95 mm^2 (7 x 50 mm^2)	160 (100)
GA 30	400	50	IEC	70	80	4 x 35 mm^2	4 x 50 mm^2	100
GA 30	500	50	IEC	57	66	4 x 25 mm^2	4 x 35 mm^2	80
GA 30	230	60	IEC	124	134	4 x 70 mm^2 (7 x 35 mm^2)	4 x 95 mm^2 (7 x 50 mm^2)	160 (100)
GA 30	380	60	IEC	72	83	4 x 35 mm^2	4 x 50 mm^2	100
GA 30	460	60	IEC	62	73	4 x 25 mm^2	4 x 35 mm^2	80
GA 30	200	60	UL/cUL	130	141	4 x AWG2/0 (8 x AWG2)	8 x AWG1	225 (110)
GA 30	230	60	UL/cUL	124	134	4 x AWG2/0 (8 x AWG4)	8 x AWG1	225 (110)
GA 30	460	60	UL/cUL	62	73	4 x AWG3	4 x AWG2	125
GA 30	575	60	UL/cUL	47	58	4 x AWG4	4 x AWG4	100

Remarks :

(1): Current in the supply lines at maximum load (P: units without dryer, FF: units with integrated dryer)

(2): Minimal recommended wire section under standard conditions. Values between () valid in case of parallel supply cables where specified.

(3): Minimal recommended wire section under worst case conditions. Values between () valid in case of parallel supply cables where specified.

(4): Recommended maximum fuse value. Value between () valid in case of 6 fuses for parallel supply cables where specified.

12.3 Settings of fan motor circuit breaker

Circuit breaker

		GA 11^+ up to GA 22^+	GA 26^+ and GA 30
Frequency (Hz)	**Voltage (V)**	**Fan motor circuit breaker Q15 (A)**	**Fan motor circuit breaker Q15 (A)**
IEC			
50	200	2.3	4.6
50	230	2.0	4.2
50	400	1.2	2.4
50	500	0.9	1.9
60	230	2.0	3.7

		GA 11+ up to GA 22+	GA 26+ and GA 30
Frequency (Hz)	**Voltage (V)**	**Fan motor circuit breaker Q15 (A)**	**Fan motor circuit breaker Q15 (A)**
60	380	1.1	1.8
60	460	1.2	1.9
UL/cUL			
60	200	2.5	4.0
60	230	2.0	3.7
60	460	1.2	1.9
60	575	0.9	1.5
60	200-230-460	2.1 / 2.1 / 1.3	3.3 / 3.1 / 2.0

12.4 Settings for overload relay and fuses

Overload relay and fuses

		GA 11+	GA 15+	GA 18+	GA 22+	GA 26+	GA 30
Frequency (Hz)	**Voltage (V)**	**Setting F21 (A)**	**Setting F21 (A)**	**Setting F21 (A)**	**Setting F21 (A)**	**Setting F21 (A)**	**Setting F21 (A)**
IEC							
50	200	33.3	41.2	50.3	64.0	76.2	86.9
50	230	29.4	35.8	43.4	55.6	66.3	75.4
50	400	16.7	20.6	25.1	32.0	38.1	43.4
50	500	13.5	16.4	19.8	25.9	30.5	35.1
60	230	28.6	35.1	44.2	53.3	64.0	76.2
60	380	16.7	21.3	25.9	31.2	36.6	44.2
60	460	13.9	17.5	22.1	26.7	32.0	38.1
UL/cUL							
60	200	31.0	39.6	48.0	58.7	68.6	80.0
60	230	27.8	35.1	44.2	53.3	64.0	76.2
60	460	13.9	17.5	22.1	26.7	32.0	38.1
60	575	11.1	14.1	17.5	20.6	24.4	29

12.5 Dryer switches

General

The regulating and safety devices are factory-adjusted to give optimum performance of the dryer.

Do not alter the setting of any of the devices.

Settings

Condenser fan control switch		
Cut-out pressure	bar(e)	8.5
Switch-on pressure	bar(e)	10.5

12.6 Reference conditions and limitations

Reference conditions

Air inlet pressure (absolute)	bar	1
Air inlet pressure (absolute)	psi	14.5
Air inlet temperature	˚C	20
Air inlet temperature	˚F	68
Relative humidity	%	0
Working pressure		See section Compressor data

Limits

Maximum working pressure		See section Compressor data
Minimum working pressure	bar(e)	4
Minimum working pressure	psig	58
Maximum air inlet temperature	˚C	46
Maximum air inlet temperature	˚F	115
Minimum air inlet temperature	˚C	0
Minimum air inlet temperature	˚F	32

12.7 Compressor data

Reference conditions

	All data specified below apply under reference conditions, see section Reference conditions and limitations.

GA 11+

	Units	7.5 bar	8.5 bar	10 bar	13 bar	100 psi	125 psi	150 psi	175 psi
Frequency	Hz	50	50	50	50	60	60	60	60
Maximum unloading pressure	bar(e)	7.5	8.5	10	13	7.4	9.1	10.8	12.5

	Units	7.5 bar	8.5 bar	10 bar	13 bar	100 psi	125 psi	150 psi	175 psi
Maximum unloading pressure	psig	109	123	145	189	107	132	157	181
Maximum unloading pressure, Full-Feature units	bar(e)	7.25	8.25	9.75	12.75	7.15	8.85	10.55	12.25
Maximum unloading pressure, Full-Feature units	psig	105	120	141	185	104	128	153	178
Nominal working pressure	bar(e)	7	8	9.5	12.5	6.9	8.6	10.3	12
Nominal working pressure	psig	102	116	138	181	100	125	150	175
Pressure drop over dryer, Full-Feature units	bar(e)	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Pressure drop over dryer, Full-Feature units	psig	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Motor shaft speed	r/min	2940	2940	2940	2940	3545	3545	3545	3545
Set point, thermostatic valve	˚C	40	40	40	60	40	40	40	60
Set point, thermostatic valve	˚F	104	104	104	140	104	104	104	140
Temperature of air leaving outlet valve (approx.)	˚C	25	25	25	25	25	25	25	25
Temperature of air leaving outlet valve (approx.)	˚F	77	77	77	77	77	77	77	77
Temperature of air leaving outlet valve (approx.), Full-Feature units	˚C	20	20	20	20	20	20	20	20
Temperature of air leaving outlet valve (approx.), Full-Feature units	˚F	68	68	68	68	68	68	68	68
Pressure dew-point, Full-Feature units	˚C	3	3	3	3	3	3	3	3
Pressure dew-point, Full-Feature units	˚F	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4
Nominal motor rating	kW	11	11	11	11	11	11	11	11
Nominal motor rating	hp	14.75	14.75	14.75	14.75	14.75	14.75	14.75	14.75
Power consumption (dryer at full load), Full-Feature units	kW	0.57	0.57	0.57	0.57	0.63	0.63	0.63	0.63
Power consumption (dryer at full load), Full-Feature units	hp	0.76	0.76	0.76	0.76	0.84	0.84	0.84	0.84

	Units	7.5 bar	8.5 bar	10 bar	13 bar	100 psi	125 psi	150 psi	175 psi
Refrigerant type, Full-Feature units		R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Total amount (refrigerant), Full-Feature units	kg	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Total amount (refrigerant), Full-Feature units	lb	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Oil capacity	l	6.75	6.75	6.75	6.75	6.75	6.75	6.75	6.75
Oil capacity	US gal	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
Oil capacity	Imp gal	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48
Oil capacity	cu.ft	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Sound pressure level, Workplace and Workplace Full-Feature (according to ISO 2151 (2004))	dB(A)	63	63	63	63	63	63	63	63

GA 15+

	Units	7.5 bar	8.5 bar	10 bar	13 bar	100 psi	125 psi	150 psi	175 psi
Frequency	Hz	50	50	50	50	60	60	60	60
Maximum unloading pressure	bar(e)	7.5	8.5	10	13	7.4	9.1	10.8	12.5
Maximum unloading pressure	psig	109	123	145	189	107	132	157	181
Maximum unloading pressure, Full-Feature units	bar(e)	7.25	8.25	9.75	12.75	7.15	8.85	10.55	12.25
Maximum unloading pressure, Full-Feature units	psig	105	120	141	185	104	128	153	178
Nominal working pressure	bar(e)	7	8	9.5	12.5	6.9	8.6	10.3	12
Nominal working pressure	psig	102	116	138	181	100	125	150	175
Pressure drop over dryer, Full-Feature units	bar(e)	0.15	0.15	0.16	0.16	0.15	0.15	0.16	0.16
Pressure drop over dryer, Full-Feature units	psig	2.18	2.18	2.32	2.32	2.18	2.18	2.32	2.32
Motor shaft speed	r/min	2940	2940	2940	2940	3540	3540	3540	3540
Set point, thermostatic valve	˚C	40	40	40	60	40	40	40	60
Set point, thermostatic valve	˚F	104	104	104	140	104	104	104	140

	Units	7.5 bar	8.5 bar	10 bar	13 bar	100 psi	125 psi	150 psi	175 psi
Temperature of air leaving outlet valve (approx.)	˚C	25	25	25	25	25	25	25	25
Temperature of air leaving outlet valve (approx.)	˚F	77	77	77	77	77	77	77	77
Temperature of air leaving outlet valve (approx.), Full-Feature units	˚C	20	20	20	20	20	20	20	20
Temperature of air leaving outlet valve (approx.), Full-Feature units	˚F	68	68	68	68	68	68	68	68
Pressure dew-point, Full-Feature units	˚C	3	3	3	3	3	3	3	3
Pressure dew-point, Full-Feature units	˚F	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4
Nominal motor rating	kW	15	15	15	15	15	15	15	15
Nominal motor rating	hp	20.12	20.12	20.12	20.12	20.12	20.12	20.12	20.12
Power consumption (dryer at full load), Full-Feature units	kW	0.54	0.54	0.57	0.57	0.76	0.76	0.63	0.63
Power consumption (dryer at full load), Full-Feature units	hp	0.72	0.72	0.76	0.76	1.02	1.02	0.84	0.84
Refrigerant type, Full-Feature units		R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Total amount (refrigerant), Full-Feature units	kg	0.47	0.47	0.40	0.40	0.47	0.47	0.40	0.40
Total amount (refrigerant), Full-Feature units	lb	1.04	1.04	0.88	0.88	1.04	1.04	0.88	0.88
Oil capacity	l	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25
Oil capacity	US gal	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92
Oil capacity	Imp gal	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59
Oil capacity	cu.ft	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Sound pressure level, Workplace and Workplace Full-Feature (according to ISO 2151 (2004))	dB(A)	64	64	64	64	64	64	64	64

GA 18+

	Units	7.5 bar	8.5 bar	10 bar	13 bar	100 psi	125 psi	150 psi	175 psi
Frequency	Hz	50	50	50	50	60	60	60	60

	Units	7.5 bar	8.5 bar	10 bar	13 bar	100 psi	125 psi	150 psi	175 psi
Maximum (unloading) pressure	bar(e)	7.5	8.5	10	13	7.4	9.1	10.8	12.5
Maximum (unloading) pressure	psig	109	123	145	189	107	132	157	181
Maximum (unloading) pressure, Full-Feature units	bar(e)	7.25	8.25	9.75	12.75	7.15	8.85	10.55	12.25
Maximum (unloading) pressure, Full-Feature units	psig	105	120	141	185	104	128	153	178
Nominal working pressure	bar(e)	7	8	9.5	12.5	6.9	8.6	10.3	12
Nominal working pressure	psig	102	116	138	181	100	125	150	175
Pressure drop over dryer, Full-Feature units	bar(e)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Pressure drop over dryer, Full-Feature units	psig	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
Motor shaft speed	r/min	2940	2940	2940	2940	3550	3550	3550	3550
Set point, thermostatic valve	˚C	40	40	40	60	40	40	40	40
Set point, thermostatic valve	˚F	104	104	104	140	104	104	104	104
Temperature of air leaving outlet valve (approx.)	˚C	26	26	26	26	26	26	26	26
Temperature of air leaving outlet valve (approx.)	˚F	78.8	78.8	78.8	78.8	78.8	78.8	78.8	78.8
Temperature of air leaving outlet valve (approx.), Full-Feature units	˚C	23	23	23	23	23	23	23	23
Temperature of air leaving outlet valve (approx.), Full-Feature units	˚F	73.4	73.4	73.4	73.4	73.4	73.4	73.4	73.4
Pressure dew-point, Full-Feature units	˚C	3	3	3	3	3	3	3	3
Pressure dew-point, Full-Feature units	˚F	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4
Nominal motor rating	kW	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5
Nominal motor rating	hp	25	25	25	25	25	25	25	25

	Units	7.5 bar	8.5 bar	10 bar	13 bar	100 psi	125 psi	150 psi	175 psi
Power consumption dryer at full load (Full-Feature units)	kW	0.63	0.63	0.63	0.63	0.84	0.84	0.84	0.84
Power consumption dryer at full load (Full-Feature units)	hp	0.84	0.84	0.84	0.84	1.13	1.13	1.13	1.13
Refrigerant type, Full-Feature units		R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Total amount of refrigerant, Full-Feature units	kg	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Total amount of refrigerant, Full-Feature units	lb	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34
Oil capacity	l	7.55	7.55	7.55	7.55	7.55	7.55	7.55	7.55
Oil capacity	US gal	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99
Oil capacity	Imp gal	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66
Oil capacity	cu.ft	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Sound pressure level, Workplace and Workplace Full-Feature (according to ISO 2151 (2004))	dB(A)	65	65	65	65	65	65	65	65

GA 22+

	Units	7.5 bar	8.5 bar	10 bar	13 bar	100 psi	125 psi	150 psi	175 psi
Frequency	Hz	50	50	50	50	60	60	60	60
Maximum unloading pressure	bar(e)	7.5	8.5	10	13	7.4	9.1	10.8	12.5
Maximum unloading pressure	psig	109	123	145	189	107	132	157	181
Maximum unloading pressure, Full-Feature units	bar(e)	7.25	8.25	9.75	12.75	7.15	8.85	10.55	12.25
Maximum unloading pressure, Full-Feature units	psig	105	120	141	185	104	128	153	178
Nominal working pressure	bar(e)	7	8	9.5	12.5	6.9	8.6	10.3	12
Nominal working pressure	psig	102	116	138	181	100	125	150	175
Pressure drop over dryer, Full-Feature units	bar(e)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Pressure drop over dryer, Full-Feature units	psig	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9

	Units	7.5 bar	8.5 bar	10 bar	13 bar	100 psi	125 psi	150 psi	175 psi
Motor shaft speed	r/min	2940	2940	2940	2940	3550	3550	3550	3550
Set point, thermostatic valve	˚C	40	40	40	60	40	40	40	60
Set point, thermostatic valve	˚F	104	104	104	140	104	104	104	140
Temperature of air leaving outlet valve (approx.)	˚C	26	26	26	26	26	26	26	26
Temperature of air leaving outlet valve (approx.)	˚F	78.8	78.8	78.8	78.8	78.8	78.8	78.8	78.8
Temperature of air leaving outlet valve (approx.), Full-Feature units	˚C	23	23	23	23	23	23	23	23
Temperature of air leaving outlet valve (approx.), Full-Feature units	˚F	73.4	73.4	73.4	73.4	73.4	73.4	73.4	73.4
Pressure dew-point, Full-Feature units	˚C	3	3	3	3	3	3	3	3
Pressure dew-point, Full-Feature units	˚F	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4
Nominal motor rating	kW	22	22	22	22	22	22	22	22
Nominal motor rating	hp	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5
Power consumption dryer at full load, Full-Feature units	kW	0.87	0.87	0.63	0.63	0.86	0.86	0.84	0.84
Power consumption dryer at full load, Full-Feature units	hp	1.17	1.17	0.84	0.84	1.15	1.15	1.13	1.13
Refrigerant type, Full-Feature units		R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Total amount of refrigerant, Full-Feature units	kg	0.53	0.53	0.61	0.61	0.53	0.53	0.61	0.61
Total amount of refrigerant, Full-Feature units	lb	1.17	1.17	1.34	1.34	1.17	1.17	1.34	1.34
Oil capacity	l	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95
Oil capacity	US gal	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
Oil capacity	Imp gal	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
Oil capacity	cu.ft	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Sound pressure level, Workplace and Workplace Full-Feature (according to ISO 2151 (2004))	dB(A)	66	66	66	66	67	67	67	67

GA 26+

	Units	7.5 bar	8.5 bar	10 bar	13 bar	100 psi	125 psi	150 psi	175 psi
Frequency	Hz	50	50	50	50	60	60	60	60
Maximum unloading pressure	bar(e)	7.5	8.5	10	13	7.4	9.1	10.8	12.5
Maximum unloading pressure	psig	109	123	145	189	107	132	157	181
Maximum unloading pressure, Full-Feature units	bar(e)	7.25	8.25	9.75	12.75	7.15	8.85	10.55	12.25
Maximum unloading pressure, Full-Feature units	psig	105	120	141	185	104	128	153	178
Nominal working pressure	bar(e)	7	8	9.5	12.5	6.9	8.6	10.3	12
Nominal working pressure	psig	102	116	138	181	100	125	150	175
Pressure drop over dryer, Full-Feature units	bar(e)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Pressure drop over dryer, Full-Feature units	psig	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
Motor shaft speed	r/min	2960	2960	2960	2960	3560	3560	3560	3560
Set point, thermostatic valve	˚C	40	40	40	60	40	40	40	60
Set point, thermostatic valve	˚F	104	104	104	140	104	104	104	140
Temperature of air leaving outlet valve (approx.)	˚C	27	27	27	27	27	27	27	27
Temperature of air leaving outlet valve (approx.)	˚F	80.6	80.6	80.6	80.6	80.6	80.6	80.6	80.6
Temperature of air leaving outlet valve (approx.), Full-Feature units	˚C	23	23	23	23	23	23	23	23
Temperature of air leaving outlet valve (approx.), Full-Feature units	˚F	73.4	73.4	73.4	73.4	73.4	73.4	73.4	73.4
Pressure dew-point, Full-Feature units	˚C	3	3	3	3	3	3	3	3
Pressure dew-point, Full-Feature units	˚F	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4
Nominal motor rating	kW	26	26	26	26	26	26	26	26
Nominal motor rating	hp	34.87	34.87	34.87	34.87	34.87	34.87	34.87	34.87

	Units	7.5 bar	8.5 bar	10 bar	13 bar	100 psi	125 psi	150 psi	175 psi
Power consumption dryer at full load, Full-Feature units	kW	1.18	1.18	0.87	0.87	1.2	1.2	0.86	0.86
Power consumption dryer at full load, Full-Feature units	hp	1.58	1.58	1.17	1.17	1.61	1.61	1.15	1.15
Refrigerant type, Full-Feature units		R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Total amount of refrigerant, Full-Feature units	kg	0.66	0.66	0.74	0.74	0.66	0.66	0.74	0.74
Total amount of refrigerant, Full-Feature units	lb	1.46	1.46	1.63	1.63	1.46	1.46	1.63	1.63
Oil capacity	l	8.55	8.55	8.55	8.55	8.55	8.55	8.55	8.55
Oil capacity	US gal	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26
Oil capacity	Imp gal	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88
Oil capacity	cu.ft	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Sound pressure level, Workplace and Workplace Full-Feature (according to ISO 2151 (2004))	dB(A)	67	67	67	67	67	67	67	67

GA 30

	Units	7.5 bar	8.5 bar	10 bar	13 bar	100 psi	125 psi	150 psi	175 psi
Frequency	Hz	50	50	50	50	60	60	60	60
Maximum unloading pressure	bar(e)	7.5	8.5	10	13	7.4	9.1	10.8	12.5
Maximum unloading pressure	psig	109	123	145	189	107	132	157	181
Maximum unloading pressure, Full-Feature units	bar(e)	7.25	8.25	9.75	12.75	7.15	8.85	10.55	12.25
Maximum unloading pressure, Full-Feature units	psig	105	120	141	185	104	128	153	178
Nominal working pressure	bar(e)	7	8	9.5	12.5	6.9	8.6	10.3	12
Nominal working pressure	psig	102	116	138	181	100	125	150	175
Pressure drop over dryer, Full-Feature units	bar(e)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Pressure drop over dryer, Full-Feature units	psig	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90

	Units	7.5 bar	8.5 bar	10 bar	13 bar	100 psi	125 psi	150 psi	175 psi
Motor shaft speed	r/min	2960	2960	2960	2960	3560	3560	3560	3560
Set point, thermostatic valve	˚C	40	40	40	60	40	40	40	60
Set point, thermostatic valve	˚F	104	104	104	140	104	104	104	140
Temperature of air leaving outlet valve (approx.)	˚C	27	27	27	27	27	27	27	27
Temperature of air leaving outlet valve (approx.)	˚F	80.6	80.6	80.6	80.6	80.6	80.6	80.6	80.6
Temperature of air leaving outlet valve (approx.), Full-Feature units	˚C	23	23	23	23	23	23	23	23
Temperature of air leaving outlet valve (approx.), Full-Feature units	˚F	73.4	73.4	73.4	73.4	73.4	73.4	73.4	73.4
Pressure dew-point, Full-Feature units	˚C	3	3	3	3	3	3	3	3
Pressure dew-point, Full-Feature units	˚F	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4
Nominal motor rating	kW	30	30	30	30	30	30	30	30
Nominal motor rating	hp	40.23	40.23	40.23	40.23	40.23	40.23	40.23	40.23
Power consumption dryer at full load, Full-Feature units	kW	1.18	1.18	1.18	1.18	1.2	1.2	1.2	1.2
Power consumption dryer at full load, Full-Feature units	hp	1.58	1.58	1.58	1.58	1.61	1.61	1.61	1.61
Refrigerant type, Full-Feature units		R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Total amount of refrigerant, Full-Feature units	kg	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Total amount of refrigerant, Full-Feature units	lb	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46
Oil capacity	l	8.55	8.55	8.55	8.55	8.55	8.55	8.55	8.55
Oil capacity	US gal	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26
Oil capacity	Imp gal	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88
Oil capacity	cu.ft	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Sound pressure level, Workplace and Workplace Full-Feature (according to ISO 2151 (2004))	dB(A)	68	68	68	68	68	68	68	68

12.8 Technical data Elektronikon® controller

General

Parameter	Value
Supply voltage	24 V AC /16 VA 50/60Hz (+40%/-30%) 24 V DC/0.7 A
Type of protection	IP54 (front) IP21 (back)
Ambient and temperature conditions	IEC60068-2
Temperature range • Operating • Storage	• -10°C…..+60°C • -30°C…..+70°C
Permissible humidity	Relative humidity 90% No condensation
Noise emission	IEC61000-6-3
Noise immunity	IEC61000-6-2
Mounting	Cabinet door

Digital outputs

Parameter	Value
Number of outputs	6 (Elektronikon® controller - p.n. 1900 5200 00 …. 1900 5200 09) 9 (Elektronikon® Graphic controller - p.n. 1900 5200 10 …. 1900 5200 19)
Type	Relay (voltage free contacts)
Rated voltage AC	250 V AC / 10 A max.
Rated voltage DC	30 V DC / 10 A max.

Digital inputs

Parameter	Value
Number of inputs	4 (Elektronikon® controller - p.n. 1900 5200 00 …. 1900 5200 09) 10 (Elektronikon® Graphic controller - p.n. 1900 5200 10 …. 1900 5200 19)
Supply by controller	24 V DC
Supply protection	Short circuit protected to ground
Input protection	Not isolated

Analog inputs

Parameter	Value
Pressure inputs	1 (Elektronikon® controller - p.n. 1900 5200 00 …. 1900 5200 09) 2 (Elektronikon® Graphic controller - p.n. 1900 5200 10 …. 1900 5200 19)
Temperature inputs	3 (Elektronikon® controller - p.n. 1900 5200 00 …. 1900 5200 09) 5 (Elektronikon® Graphic controller - p.n. 1900 5200 10 …. 1900 5200 19)

13 Instructions for use

Oil separator vessel

1	This vessel can contain pressurised air; this can be potentially dangerous if the equipment is misused.
2	This vessel must only be used as a compressed air/oil separator tank and must be operated within the limits specified on the data plate.
3	No alterations must be made to this vessel by welding, drilling or other mechanical methods without the written permission of the manufacturer.
4	The pressure and temperature of this vessel must be clearly indicated.
5	The safety valve must correspond with pressure surges of 1.1 times the maximum allowable operating pressure. It should guarantee that the pressure will not permanently exceed the maximum allowable operating pressure of the vessel.
6	Use only oil as specified by the manufacturer.
8	Original bolts have to be used after opening for inspection. The maximum torque has to be taken into consideration: for M12 bolts 73 Nm (53.8 lbf.ft)), for M16 bolts 185 Nm (136.4 lbf.ft).

14 Guidelines for inspection

Guidelines

On the Declaration of Conformity / Declaration by the Manufacturer, the harmonised 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 compressor.

Local legal requirements and/or use outside the limits and/or conditions as specified by the manufacturer may require other inspection periods as mentioned below.

15 Pressure equipment directives

Components subject to 97/23/EC Pressure Equipment Directive

The following table contains the necessary information for the inspection of all pressure equipment of category II and higher according to the Pressure Equipment Directive 97/23/EC and all pressure equipment according to the Simple Pressure Vessel Directive 87/404/EEC.

Compressor type	Component	Description	Volume	Design pressure	Minimum and maximum design temperature	PED Class
GA 11+ up to GA 30	1622 6912 99	Vessel	16 l	15 bar(e)	0 ˚C/ 120 ˚C	II
	0830 1009 87	Safety valve	-	-	-	IV
	0830 1010 02	Safety valve	-	-	-	IV
	0830 1010 03	Safety valve	-	-	-	IV

Compressor type	Component	Description	Number of cycles (1)	Min. wall thickness	Visual inspection require-ments (2)	Hydrostatic inspection requirements (2)
GA 11+ up to GA 30	1622 6912 99	Vessel	2 x 10^6	6 mm	10 years	10 years
	0830 1009 87	Safety valve	-	-	-	-
	0830 1010 02	Safety valve	-	-	-	-
	0830 1010 03	Safety valve	-	-	-	-

(1) The number of cycles refers to the number of cycles from 0 bar(e) to maximum pressure.

(2) Other inspection techniques such as ultrasonic or X-ray are equivalent to hydrostatic testing for this equipment.

Overall rating

The compressors conform to PED smaller than category II.

16 Declaration of conformity

Typical example of a Declaration of Conformity document

1 **EC DECLARATION OF CONFORMITY**

2 We, ….., declare under our sole responsibility, that the product
3 Machine name
4 Machine type
5 Serial number

6 Which falls under the provisions of article 12.2 of the EC Directive 2006/42/EC on the approximation of the laws of the Member States relating to machinery, is in conformity with the relevant Essential Health and Safety Requirements of this directive.

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

7

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

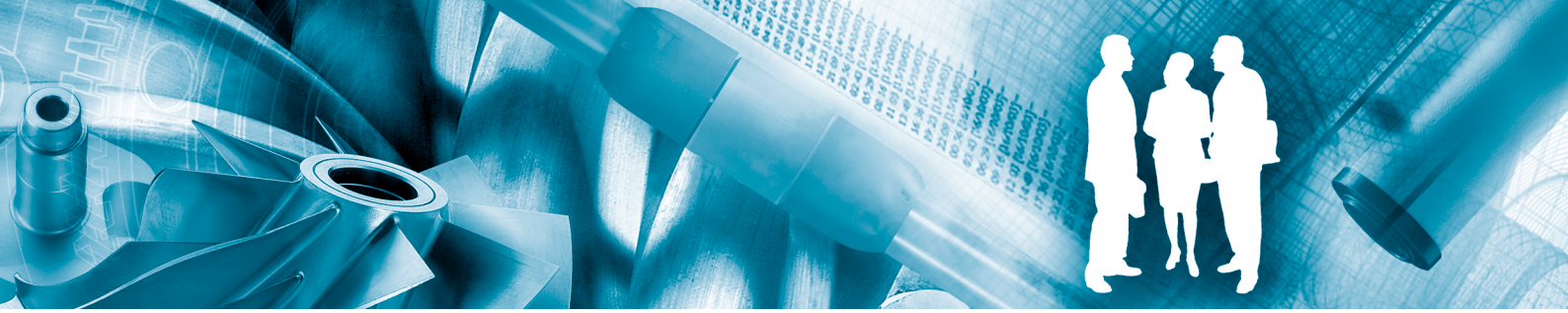
8.a The harmonized and the technical standards used are identified in the attachments hereafter

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

9
10

	Conformity of the specification to the directives	Conformity of the product to the specification and by implication to the directives
11 12 Issued by	Product engineering	Manufacturing
13 14 Name		
15 Signature		
16 Date		

81679D



In order to be First in Mind-First in Choice® for all your quality compressed air needs, Atlas Copco delivers the products and services that help to increase your business' efficiency and profitability.

Atlas Copco's pursuit of innovation never ceases, driven by our need for reliability and efficiency. Always working with you, we are committed to providing you the customized quality air solution that is the driving force behind your business.

No 2920 7082 81 / 2009 - 12 - Printed in Belgium

Atlas Copco

www.atlascopco.com