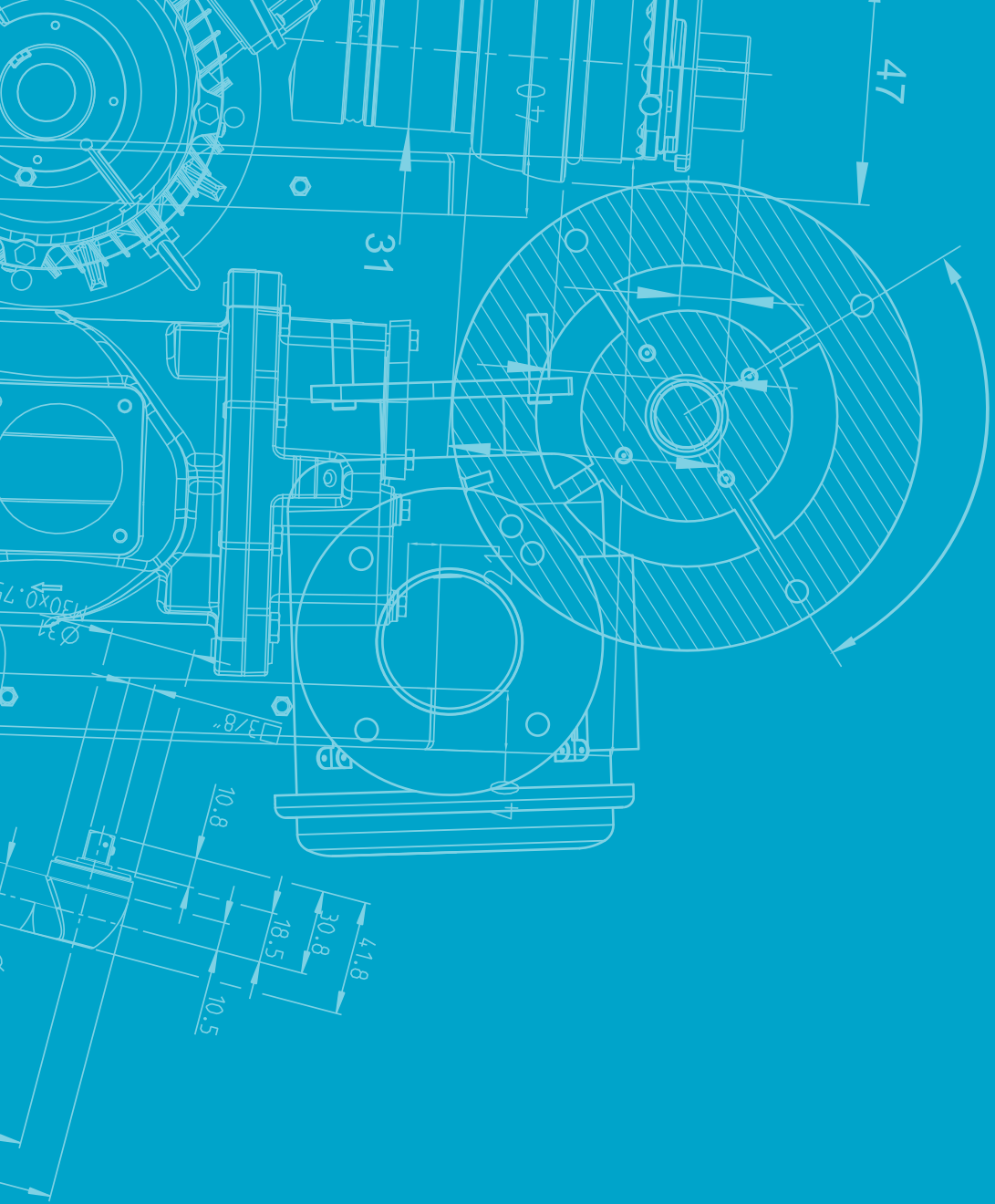

Instruction book

Oil-injected rotary screw compressors

GA 22 VSDs, GA 26 VSDs, GA 30 VSDs, GA 37 VSDs

Atlas Copco

Oil-injected rotary screw compressors

GA 22 VSDs, GA 26 VSDs, GA 30 VSDs, GA 37 VSDs

Instruction book

Original instructions

WARNING

Read all safety warnings, instructions, illustrations and specifications provided with this product. Failure to follow all instructions listed in this instruction book may result in personal injury, death and/or property damage.

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Table of contents

1 Safety precautions

1.1 Safety signal words

DANGER

Indicates a hazard with a high level of risk, which, if not avoided, will result in death, serious injury and/or property damage.

WARNING

Indicates a hazard with a medium level of risk, which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a hazard with a low level of risk, which, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates that a mandatory action shall be taken to avoid a hazard.

NOTE

Indicates important information.

1.2 General safety precautions

- The operator must employ safe working practices and observe all related work safety requirements and regulations.
- If any of the following statements does not comply with the applicable legislation, the stricter of the two shall apply.
- Installation, operation, maintenance and repair work must be performed only by authorized, trained and specialized personnel. The personnel should apply safe working practices by use of personal protection equipment, appropriate tools and defined procedures.
- 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.
- Before any maintenance, repair work, adjustment or any other non-routine checks, switch the controller to service mode (see section *Service mode*), 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. The process of locking, tagging and trying to turn on the equipment to confirm that it cannot operate is called Lock Out, Tag Out (LOTO).

  On units powered by a frequency converter, wait for 10 minutes after switching off the voltage, before starting any electrical repair.

WARNING

In a domestic environment, this product may cause radio interference, in which case supplementary mitigation measures are required.

DANGER

If the machine is equipped with an automatic restart after voltage failure function and if this function is active, be aware that the machine will restart automatically when the power is restored if it was running when the power was interrupted!

- 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.
- The owner is responsible for maintaining the unit in safe operating condition. Parts and accessories shall be replaced if unsuitable for safe operation.
- It is not allowed to walk or stand on the unit or on its components.
- If compressed air is used in the food industry and more specifically for direct food contact, it is recommended, for optimal safety, to use certified Class 0 compressors in combination with appropriate filtration depending on the application. Please contact your customer center for advice on specific filtration.
- The service switch should be operated by a trained service specialist from the manufacturer.

Residual risks

Based on the output of the Failure Mode and Effects Analysis (FMEA) and Safety Review, the following residual risks have been identified.

Residual risks are risks that remain at a certain level even after careful risk identification/ assessment and risk mitigation/elimination.

DANGER

Risk of fire

Timely service the filters, oil separator element and oil.

DANGER

Risk of fire

Use the recommended branded oil and grease.

DANGER

Risk of fire

Timely inspect the unit.

DANGER

Risk of electrocution

Follow the labels and maintenance instructions.

DANGER

Risk of electrocution or fire

Timely check the electrical insulation for damage.

DANGER

Risk of fire

Make sure the cable sizing is correct.

DANGER

Risk of fire

Timely check that the circuit breakers are working correctly. Make sure that the correct circuit breakers are used.

DANGER

Risk of fire

Timely check that the temperature switch is working correctly.

DANGER

Risk of fire

Make sure that the transformer setting is correct.

DANGER

Risk of electrocution or mechanical shock

Make sure that the procedures to relieve pneumatic and/or electric energy (e.g. Lock Out, Tag Out (LOTO), wait time, pressure relief actions) are followed correctly.

DANGER

Risk of fire or explosion

Make sure that the unit is not operated outside of the ambient condition limits (e.g. intake of flammable gases).

1.3 Safety precautions during installation

WARNING

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.

- 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.
- The unit is designed for indoor use. If the unit is installed outdoors, special precautions must be taken. Consult your supplier.
- 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 via the inlet air.
- Any blanking flanges, plugs, caps and desiccant bags must be removed before connecting the pipes.
- Air hoses must have the correct size and be suitable for the working pressure. Never use frayed, damaged or worn hoses. Distribution pipes and connections must have the correct size and be suitable for the working pressure.
- The aspirated air must be free of flammable fumes, vapors and particles, e.g. paint solvents, that can lead to internal fire or explosion.
- Arrange the air intake so that loose clothing worn by people cannot be drawn in.
- Ensure that the discharge pipe from the compressor to the air cooler or air net is free to expand under heat and that it is not in contact with or close to flammable materials.
- No external force may be exerted on the air outlet valve; the connected pipe must be free of strain.
- If remote control is installed, the machine must bear a clear sign stating: "DANGER: This machine is remotely controlled and may start without warning".

  Before any maintenance or repair, the operator has to make sure that the machine is stopped and depressurized as well as that the electrical isolating switch is open, locked and labelled with a temporary warning. As a further safeguard, persons switching on or off 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.
- 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.
- 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.
- On machines with an automatic start/stop system or if the automatic restart after voltage failure (ARAVF) function is activated, a sign stating "This machine may start without warning" must be affixed near the instrument panel.
- 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.
- 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.
- Piping or other parts with a temperature higher than 70 ˚C (158 ˚F) that can be touched accidentally by personnel in normal operation must be guarded or insulated. Other high temperature piping must be clearly marked.
- If the ground is not level or can be subject to variable inclination, consult the manufacturer.
- In an installation with multiple compressors, the outlet piping must be installed in such a way that condensate cannot flow back into the compressor. See section *Installation proposal*.

NOTE

Also consult the following safety precautions: *Safety precautions during operation* and *Safety precautions during maintenance or repair*.

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

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

1.4 Safety precautions during operation

WARNING

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.

- Never touch any piping or components of the machine during operation.
- 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.
- 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.
- Never operate the machine when there is a possibility of taking in flammable or toxic fumes, vapors or particles.
- Never operate the machine below or in excess of its limit ratings.
- 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 and eye protection when opening a door.

  On machines without bodywork, wear ear protection in the vicinity of the machine.
- People staying in environments or rooms where the sound pressure level reaches or exceeds 80 dB(A) shall wear ear protectors.
- 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
  - No leaks occur
  - 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
  - All pre-filters are not clogged
- 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.

- Do not remove any of, or tamper with, the sound-damping material.
- 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.
- Yearly inspect the air receiver. Minimum wall thickness as specified in the instruction book must be respected. Local regulations remain applicable if they are more strict.

NOTE

Also consult the following safety precautions: *Safety precautions during operation* and *Safety precautions during maintenance or repair*.

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

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

1.5 Safety precautions during maintenance or repair

WARNING

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.

- Always use the correct safety equipment (such as safety glasses, gloves, safety shoes, etc.).
- Use only the correct tools for maintenance and repair work.
- Use only genuine spare parts for maintenance or repair. The manufacturer will disclaim all damage or injuries caused by the use of non-genuine spare parts.
- All maintenance work shall only be undertaken when the machine has cooled down.
- A warning sign bearing a legend such as "Work in progress; do not start" shall be attached to the starting equipment.
- 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.
- Close the compressor air outlet valve and depressurize the compressor before connecting or disconnecting a pipe.
- Before removing any pressurized component, effectively isolate the machine from all sources of pressure and relieve the entire system of pressure. See section *Maintenance*.
- Never use flammable solvents or carbon tetrachloride for cleaning parts. Take safety precautions against toxic vapors of cleaning liquids.
- Scrupulously observe cleanliness during maintenance and repair. Keep dirt away by covering the parts and exposed openings with a clean cloth, paper or tape.
- 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.
- Whenever there is an indication or any suspicion that an internal part of a machine is overheated, the machine shall be stopped but no inspection covers shall be opened before

sufficient cooling time has elapsed; this to avoid the risk of spontaneous ignition of the oil vapor when air is admitted.

- Never use a light source with open flame for inspecting the interior of a machine, pressure vessel, etc.
- Make sure that no tools, loose parts or rags are left in or on the machine.
- When replacing the air filter, make sure no dirt, dust, rags, tools or loose parts can fall in the air inlet.
- 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.
- 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.
- 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.
- Protect the motor, air filter, electrical and regulating components, etc. to prevent moisture from entering them, e.g. when steam cleaning.
- 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.
- Never use caustic solvents which can damage materials of the air net, e.g. polycarbonate bowls.
- **Only if applicable, the following safety precautions are stressed when handling refrigerant:**
  - Never inhale refrigerant vapors. 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.
- Protect hands to avoid injury from hot machine parts, e.g. during draining of oil.
- Be aware of eventual sharp edges on certain parts of the machine.
- Only authorized, trained, specialized personnel should perform repairs and/or maintenance related activities.

NOTE

Also consult the following safety precautions: *Safety precautions during operation* and *Safety precautions during maintenance or repair*.

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

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

1.6 Dismantling and disposal

The device must be disposed according to local regulations. The product is not designed for refurbishing after finished lifecycle.

Dismantling

Once the end of life of the machine is reached, please follow next steps:

1. Stop the machine.
2. Check all safety precautions mentioned in the previous chapters to secure safe handling (e.g. LOTO, cool-down, depressurize, discharge, etc.).
3. Have trained personnel dismantle the installation.
4. Separate the harmful from the safe components (e.g. drain oil from parts containing oil).
5. Refer to the disposal topic below.

Disposal of electrical and electronic appliances (WEEE)

This equipment falls under the provisions of the European Directive 2012/19/EU on waste electrical and electronic appliances (WEEE) as well as under the UKCA Waste Electrical and Electronic Equipment regulations 2013 and may not be disposed as unsorted waste.

The equipment is labelled in accordance with the European Directive 2012/19/EU and the UKCA Waste Electrical and Electronic Equipment regulations 2013 with the crossed-out wheelie bin symbol.

At the end of lifetime of the electric and electronic equipment (EEE) it must be taken to separate collection.

For more information check with your local waste authority, customer center or distributor.

Disposal of other used material

Used filters or any other used material (e.g. filter bags, filter media, 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.

2 General description

2.1 Introduction

GA 22 VSD^s up to GA 37 VSD^s are single-stage, oil-injected screw compressors driven by a reluctance motor.

The compressors are controlled by the Elektronikon^{TM} Touch controller (ER).

The compressors use VSD (English: Variable Speed Drive) technology. This means that motor and fan speed are automatically adjusted, depending on compressed air demand.

The compressors are air-cooled and are enclosed in a sound-insulated bodywork.

There are 2 versions of the compressor: Pack (without integrated dryer) and Full-Feature (with integrated dryer). The dryer removes water from the compressed air by cooling the air to near freezing point.

When considering performance and condensate prevention, the VSD^s compressor has 2 important features:

- **Smart Temperature Control (STC) valve**: The STC valve is a thermostatic valve which is electronically regulated. The setpoint of the STC valve is calculated in the controller and sent to the STC valve through a CAN bus. This enables the compressor to regulate the machine to the most optimal temperature, best suited to its specific conditions. In contrast to a classic thermostat, where the temperature setpoint is always fixed at a certain value.
- **VSD fan**: In contrast to most air-cooled compressors, the main cooling fan of the VSD^s compressors is a VSD fan instead of a fixed speed fan. This means that the speed of the cooling fan may have any value between the minimum and maximum speed of the fan. This results in a more stable temperature regulation with less undershoots and overshoots compared to a fixed speed fan.

The STC valve and VSD fan will cooperate to make the compressor run at the most optimal temperature in all conditions while at the same time preventing the formation of condensate.

Relative humidity will determine the setpoint for the STC valve and the VSD fan.

Pack

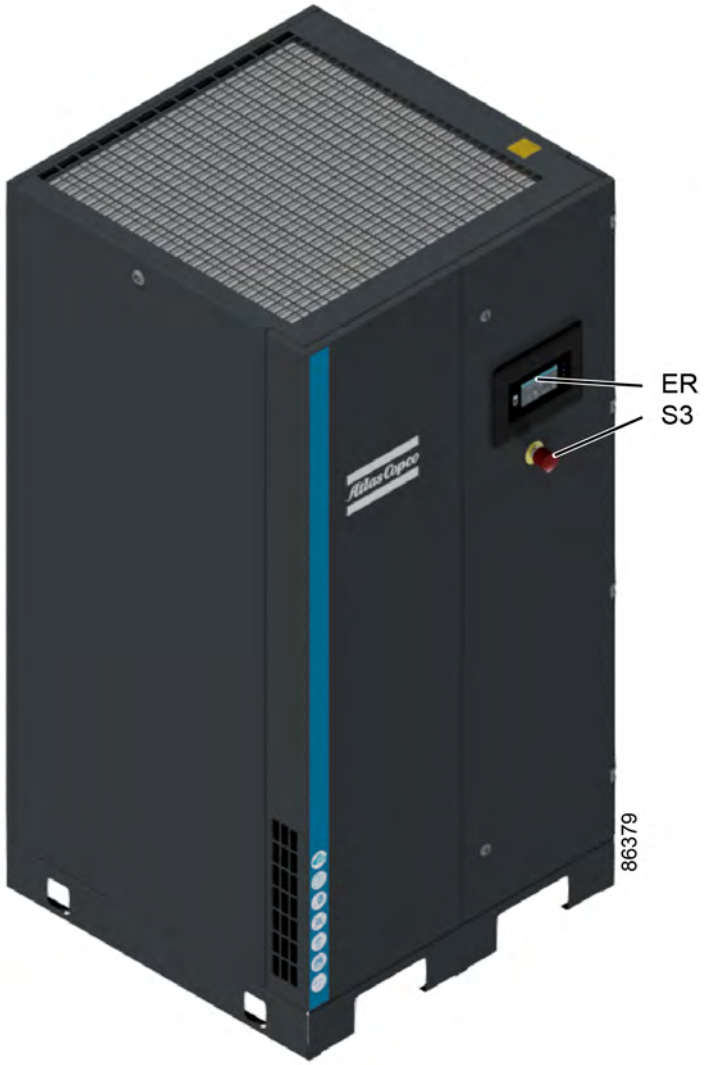


Figure 1: Front view, Pack

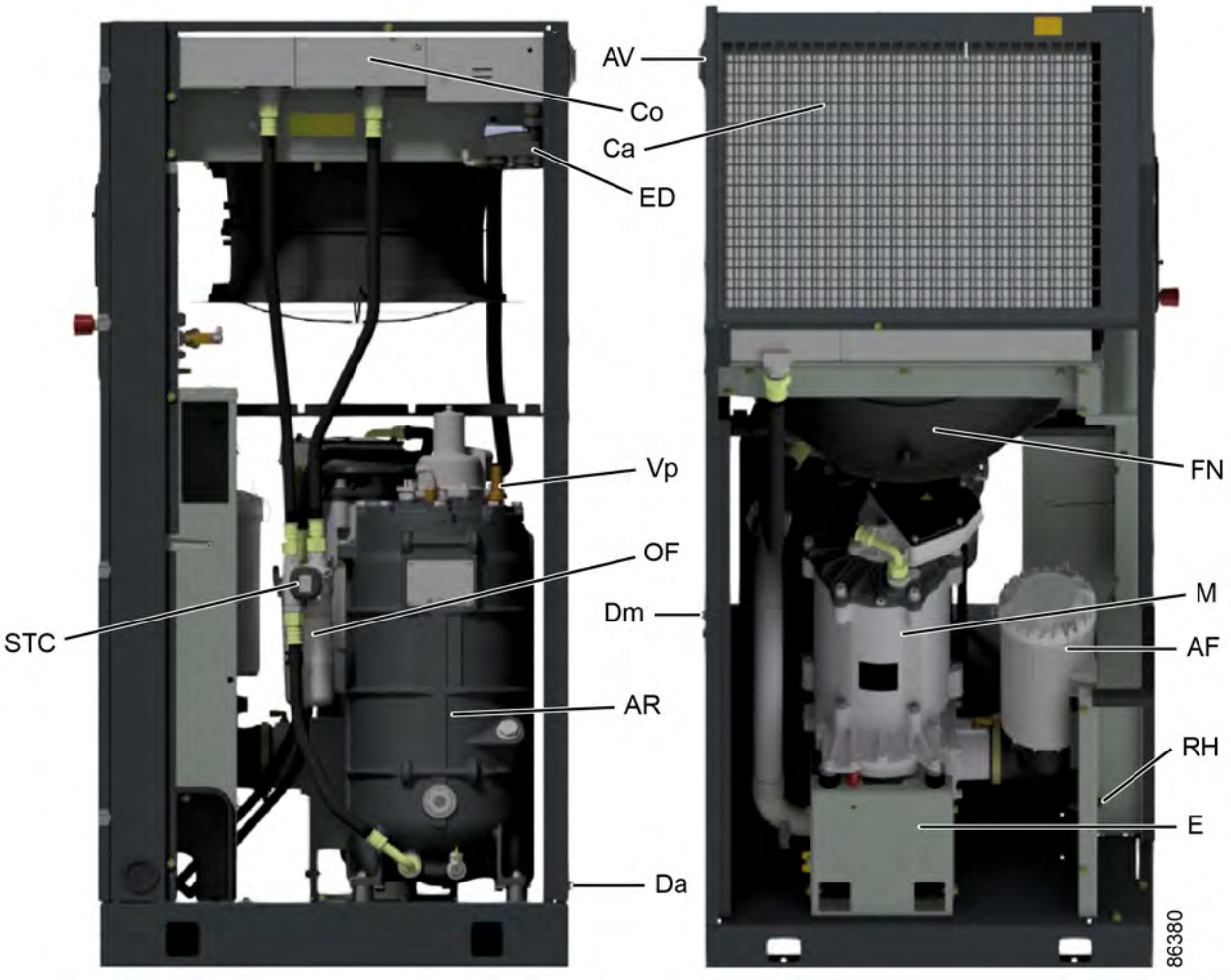


Figure 2: Open side view, Pack, Low pressure variant

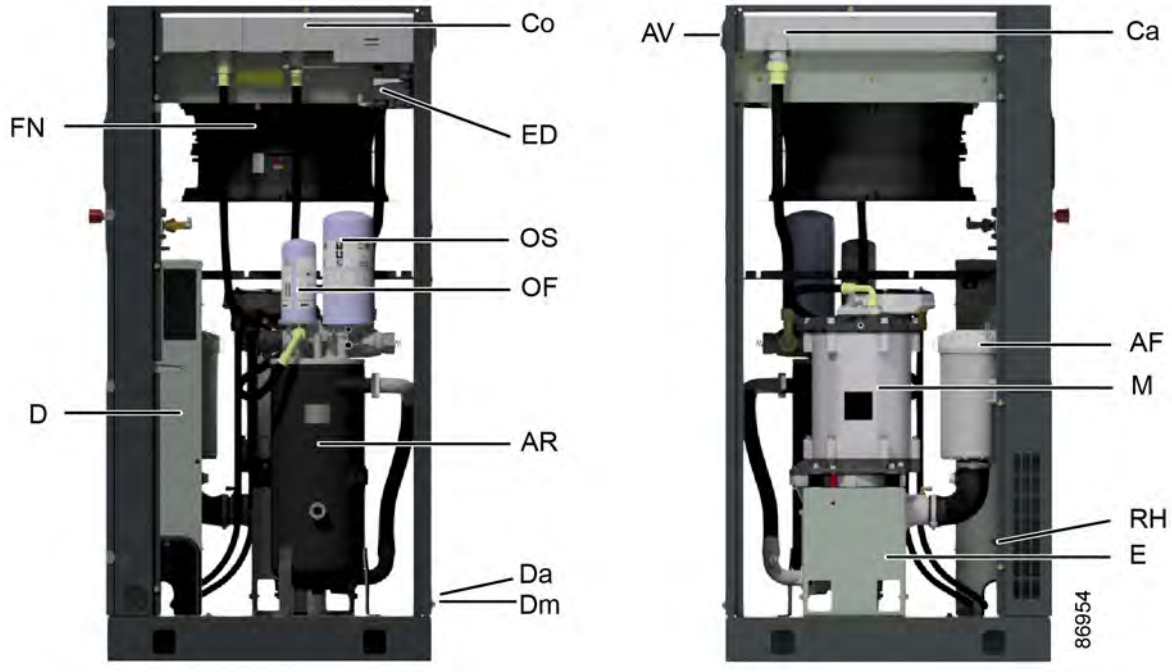


Figure 3: Open side view, Pack, High pressure variant

Full-Feature

The Full-Feature compressors have an air dryer which is integrated in the sound-insulated bodywork. The dryer removes condensate from the compressed air by cooling the air to near freezing point.

Figure 4: Front view, Full-Feature

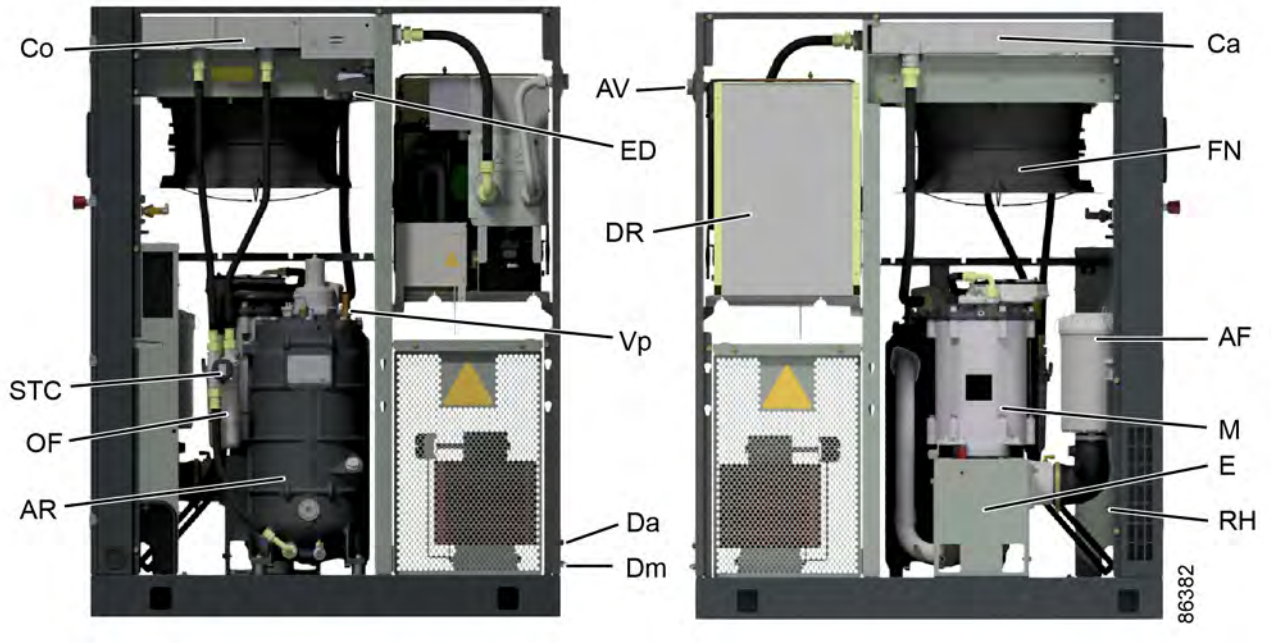


Figure 5: Open side view, Full-Feature, Low pressure variant

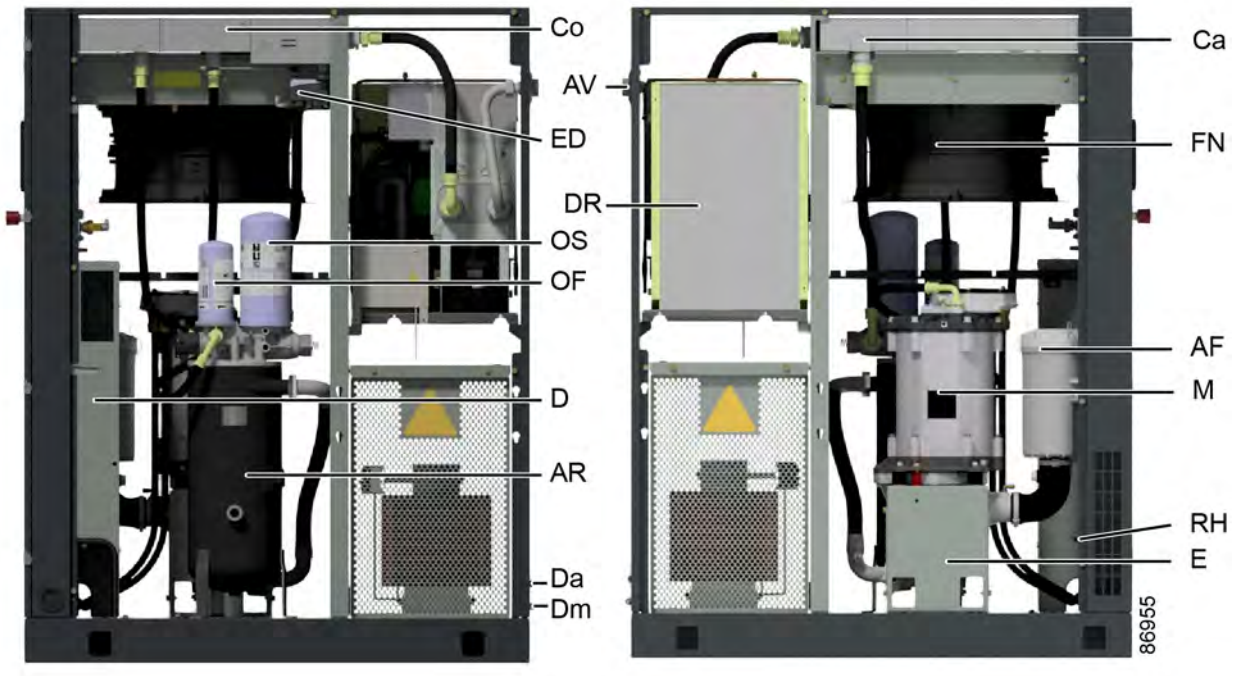


Figure 6: Open side view, Full-Feature, High pressure variant

Reference	Description
AF	Air filter
AR	Air receiver

Reference	Description
AV	Air outlet
Ca	Air cooler
Co	Oil cooler
D	Compressor drive / converter
Da	Automatic condensate outlet
Dm	Manual condensate outlet
DR	Refrigerant dryer
E	Compressor element
ED	Electronic water drain
ER	Elektronikon^{TM} Touch controller
FN	Cooling fan
M	Drive motor
OF	Oil filter
OS	Oil separator (element)
S3	Emergency stop button
STC	Smart temperature control valve
RH	Relative humidity sensor
Vp	Minimum pressure valve

2.2 Flow diagram

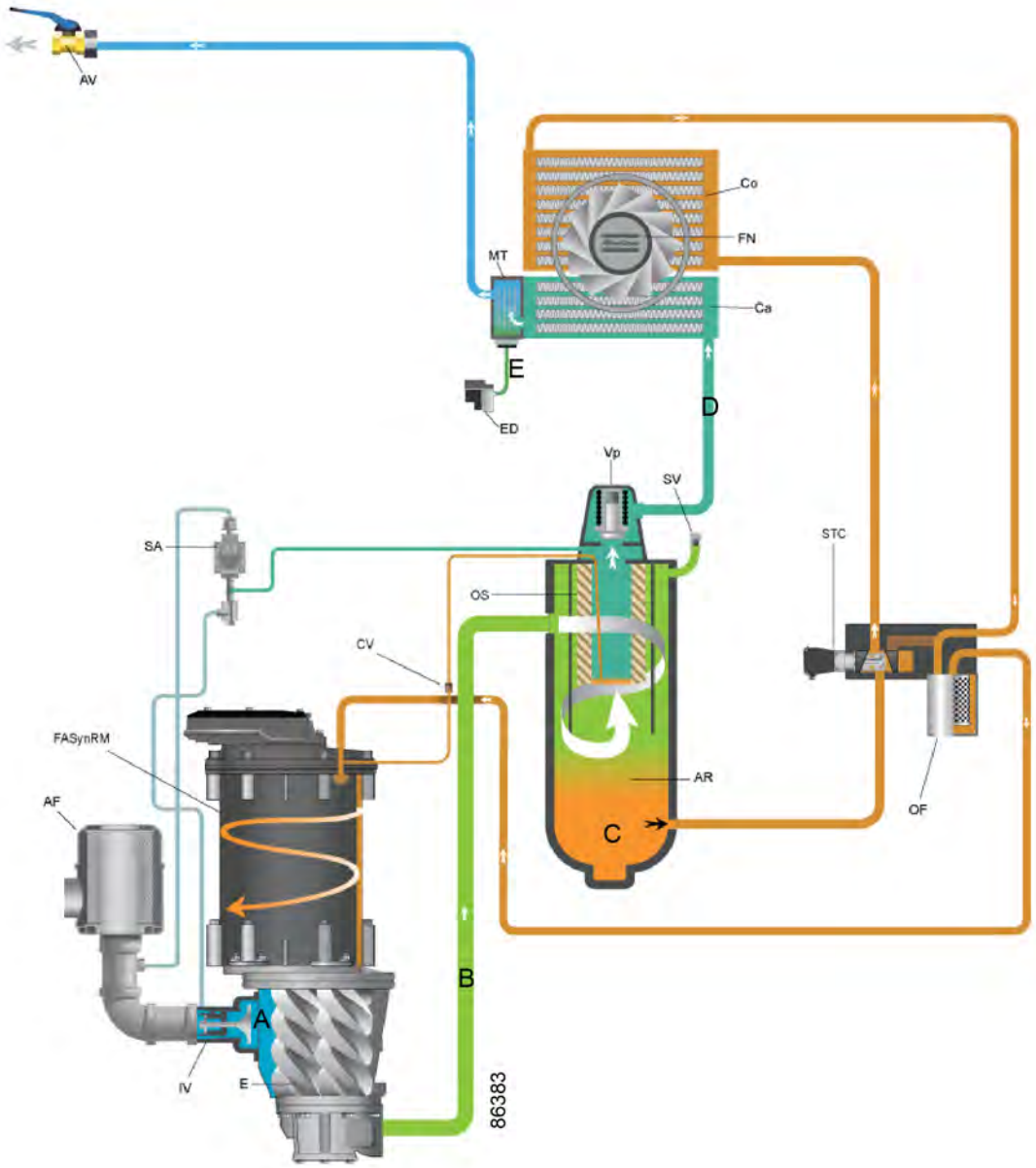


Figure 7: Pack, Low pressure variant

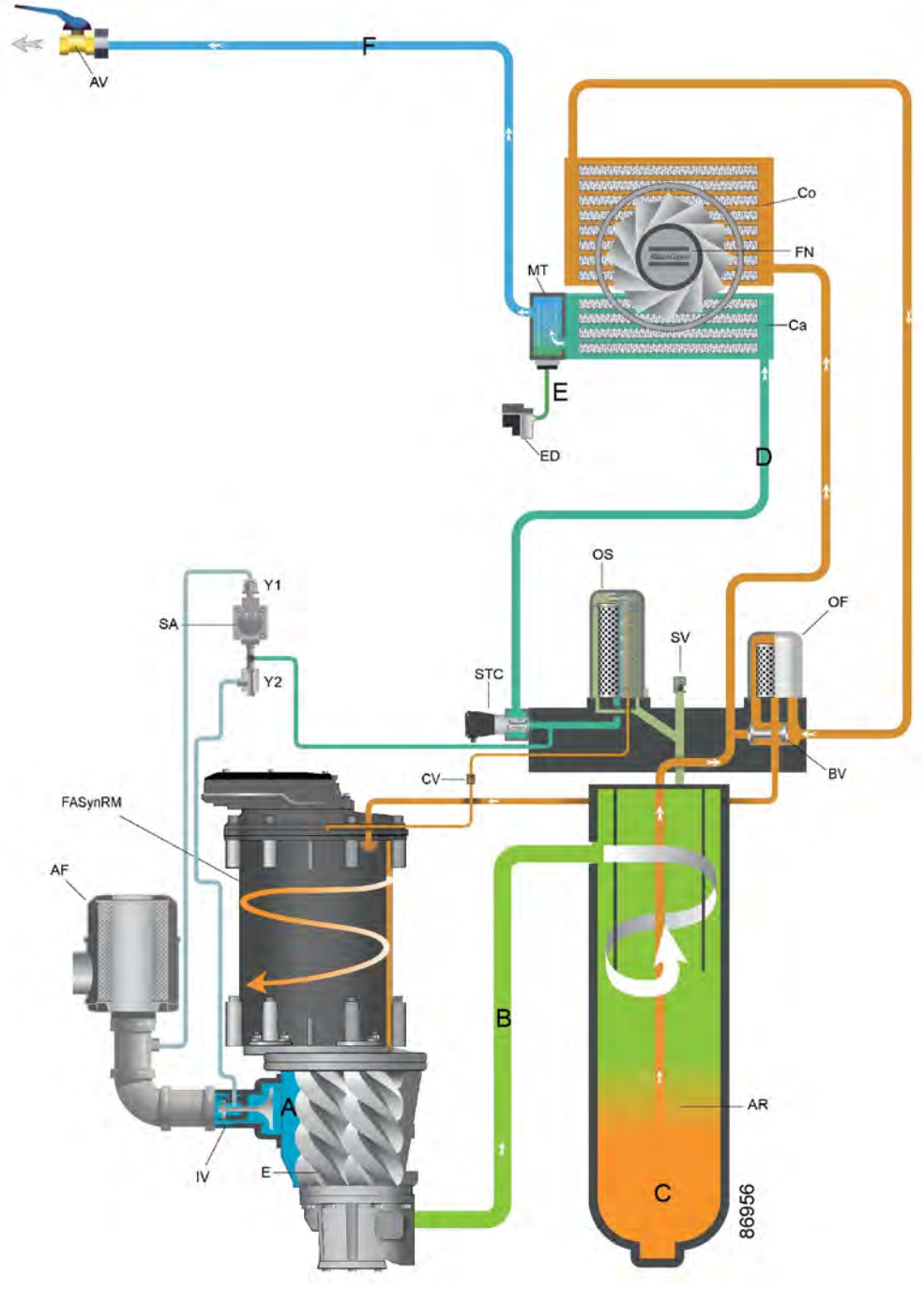


Figure 8: Pack, High pressure variant

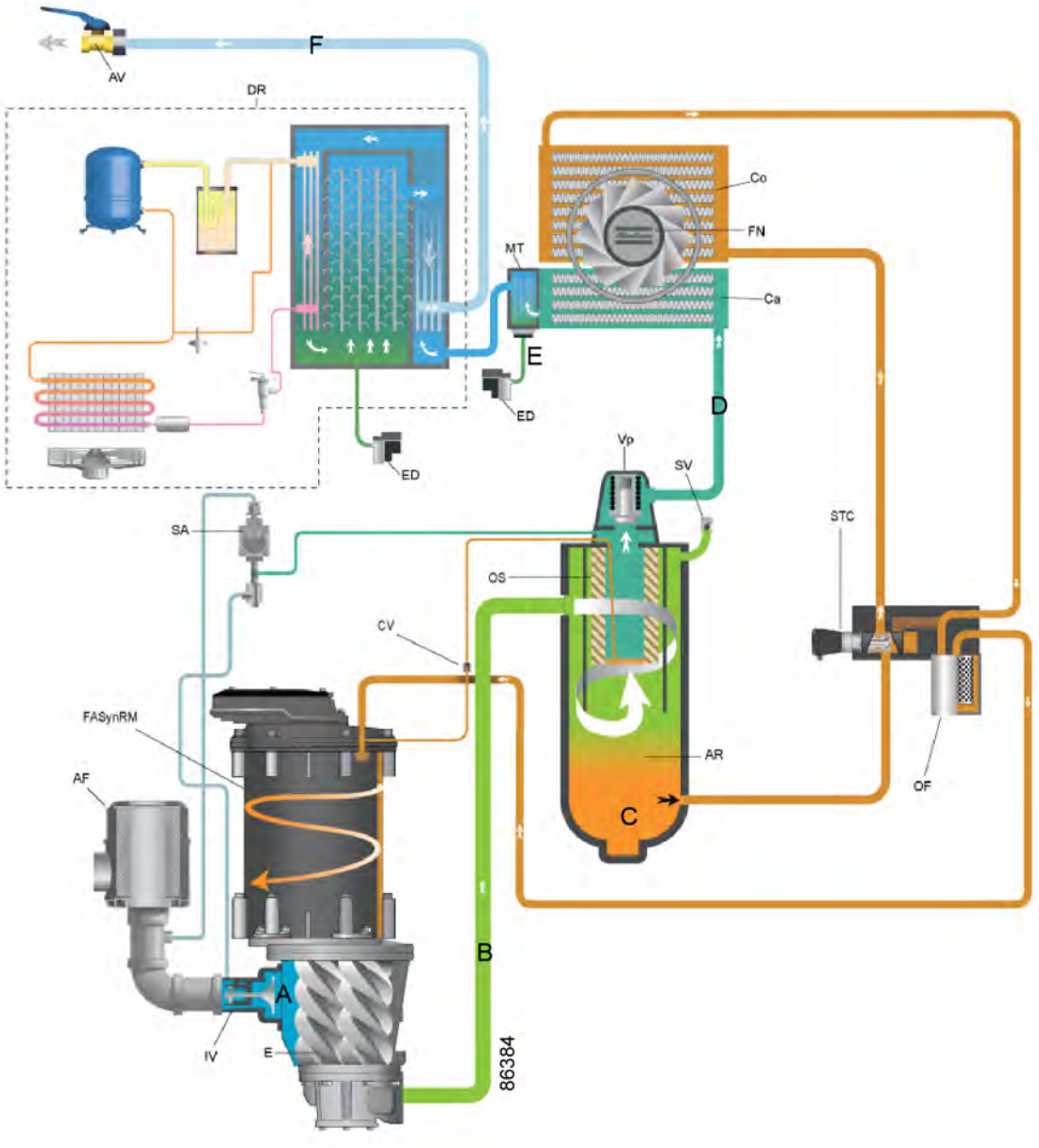


Figure 9: Full-Feature, Low pressure variant

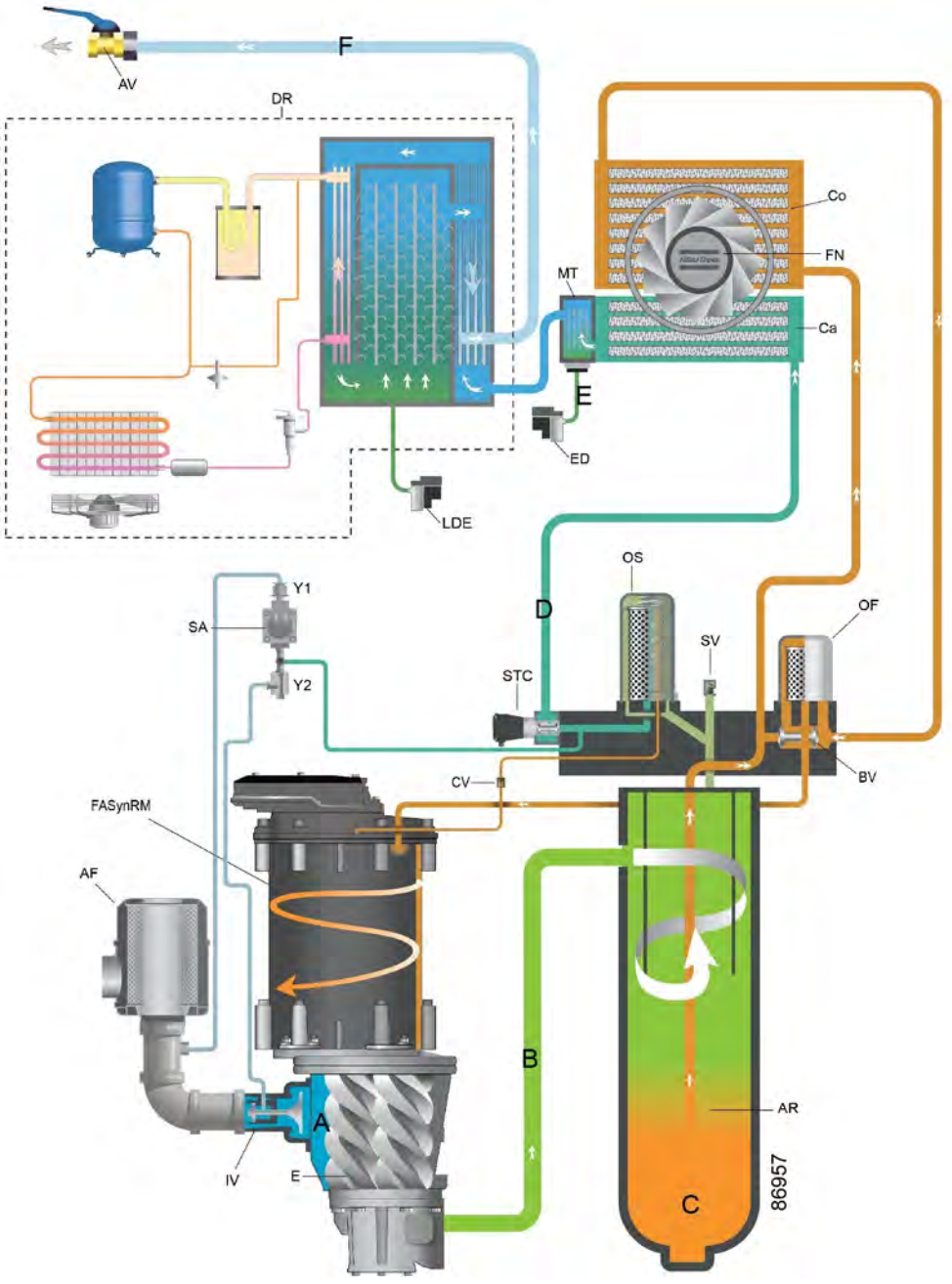


Figure 10: Full-Feature, High pressure variant

Reference	Description
A	Air inlet
B	Air/oil mixture
C	Oil
D	Wet compressed air
E	Condensate
F	Dry compressed air (Full-Feature)

Air flow

Air comes in through filter (AF) and inlet valve (IV) and is compressed in the compressor element (E).

A mixture of compressed air and oil flows into the air receiver/oil separator (AR) where oil and air are separated.

The air flows through the minimum pressure valve (Vp), the air cooler (Ca), and the condensate trap (MT) to the outlet valve (AV).

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

The air then flows trough the air cooler (Ca) where condensate is removed by the drain.

Full-Feature compressors have a dryer (DR) after the air cooler, which removes additional condensate from the compressed air.

Oil circuit

The air receiver (AR) removes most of the oil from the air/oil mixture by centrifugal action. The oil collects in the lower part of the air receiver (AR) which serves as oil tank.

The oil separator (OS) removes the remaining oil.

The remaining oil is injected into the motor. A check valve (CV) in the scavenge line circuit prevents back-flow.

The oil circuit has an electrically regulated Smart Temperature Control (STC) valve that prevents the oil from flowing through the oil cooler (Co) when the oil temperature is low.

Air pressure forces the oil from air receiver (AR) through the cooler if required, and then trough the oil filter (OF).

The filtered oil flows through the cooling channels of the motor to the compressor element (E).

Cooling on air-cooled compressors

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

The fan (FN) pulls air over the coolers. This fan is regulated in speed by the VSD drive, depending on the operating conditions, according to a specific algorithm.

2.3 Condensate system

Drain connections

The compressors have an electronic condensate drain (ED).

Figure 11: Location of the electronic condensate drain, Pack

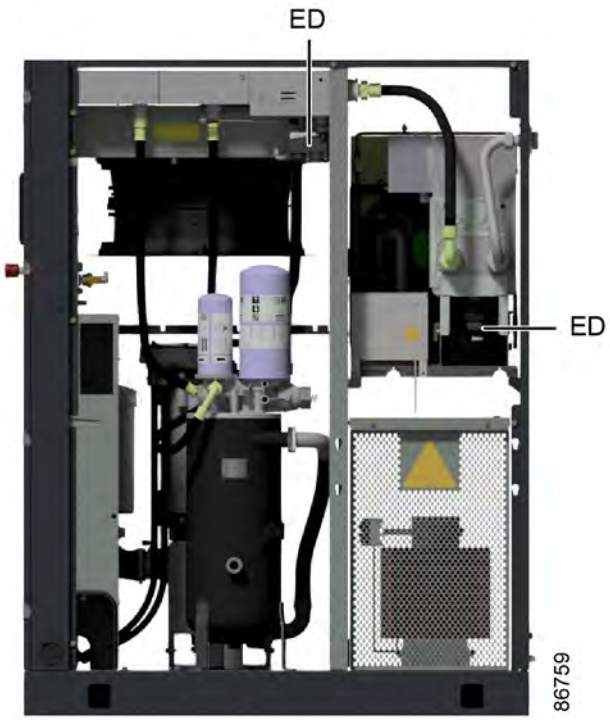


Figure 12: Location of the electronic condensate drain, Full-Feature

On Pack units, the condensate formed in the air cooler (Ca) is collected in the condensate trap (MT) and discharged by the electronic drain (ED).

On Full-Feature units, a second electronic drain removes the condensate formed in the dryer that is collected in the lower part of the heat exchanger/evaporator

When the condensate in the electronic drain reaches a certain level, it is drained via the automatic drain outlet (Da).

Figure 13: Condensate drain connections, Pack

Figure 14: Condensate drain connections, Full-Feature

Reference	Description
Da	Automatic drain connection
Dm	Manual drain connection

Figure 15: Electronic condensate drain (ED)

The Test button (2) on top of the drain can be used in three different ways, according the situation:

- When pressed during normal operation, it starts the manual drain test.

- When pressed during an alarm, it resets the control logic.
- By pressing the Test button for at least 5 seconds, the self diagnosis routine will start.

LED explanation

Operation		Description	RGB LED	Purge valve
0	Power on	The drain CPU starts up and loads internal data. LEDs show the firmware version installed.	**1.** Green LED blinks 3 times. **2.** Red LED blinks 2 times. **3.** Yellow LED stays on.	
1	Standby	The drain is ready to operate and is activated through floater movement. Every 30 minutes a routine is started to keep drain clean from oil/condensate residues.	Green LED stays on: connected mode. Yellow LED stays on: standalone mode.	**1.** 2 seconds on. **2.** 30 seconds off.
2	Automatic discharge	The drain discharges condensate when activated by the floater moving to the top of the housing. The valve opens after a 5 seconds delay in order to collect extra condensate. When the floater returns back to its original position, the valve closes.	Green LED stays on: connected mode. Yellow LED stays on: standalone mode.	On until the condensate chamber is almost empty (until the hall sensor signal drops out).
3	Cleaning routine	If the floater is stuck at the top of the housing for 10 seconds, the drain starts a cleaning operation. When the floater moves down, that routine stops immediately and the drain goes into standby.	Green LED blinking: connected mode. Yellow LED blinking: standalone mode.	**1.** 2 seconds on, 2 seconds off (repeat 30 times). **2.** 1 minute pause. **3.** Repeat.
4	Timer routine	If the floater is still stuck after the cleaning routine, the drain switches to the timer routine. When the floater moves down, that routine stops immediately and the	Green LED blinking: connected mode.	**1.** 1 second on. **2.** 1 minute off.

Operation		Description	RGB LED	Purge valve
		drain goes into standby.	Yellow LED blinking: standalone mode.	
5	Manual discharge	Push test button to discharge manually. The drain discharges condensate even if the test button remains pressed (for 3 seconds maximum).	Green LED blinking: connected mode. Yellow LED blinking: standalone mode.	On until the button is pushed (maximum 3 seconds).
6	Reset	Push test button for 5 seconds to reset the drain.	**1.** Both LEDs switch off for 1 second. **2.** Green LED blinks 3 times. **3.** Red LED blinks 2 times.	
7	Failure	Drain hardware failure.	Red LED stays on.	

(1) Connected mode means there is communication with the Elektronikon^{TM} controller.

(2) Standalone mode means there is no communication with the Elektronikon^{TM} controller. The drain can also work without communication, but you will get no notifications of failure, temperature, cycles, etc. to the Elektronikon^{TM} controller and SMARTLINK.

2.4 Regulating system

Description

When the compressor is started and the net pressure is below the setpoint, the motor speed increases until the net pressure reaches the setpoint or until the maximum motor speed is reached.

If the air consumption is less than the air delivery of the compressor, the net pressure increases further.

When the net pressure reaches the setpoint (desired net pressure) and continues to rise, the regulator decreases the motor speed.

When the pressure continues to increase although the motor already operates at minimum speed, the regulator stops the motor as soon the net pressure reaches a value, equal to the setpoint plus the indirect stop level (typically 0.3 bar above the setpoint).

Should the net pressure rise very quickly to a value equal to the setpoint plus the direct stop level (typically 1 bar above the setpoint), the compressor is stopped immediately (without first decreasing the motor speed).

No compressed air is lost when the compressor is stopped in automatic operation, thus saving valuable energy.

If the compressor was stopped in automatic operation and the net pressure approaches the setpoint, the regulator starts the motor again. The quicker the net pressure drops, the quicker the compressor will restart.

NOTE

The pressure in the oil separator vessel is only released to the atmosphere when the compressor is stopped manually, in case of an emergency stop or when the temperature becomes too low. See section *Stopping*.

2.5 Electrical system

Electrical components

The electrical system comprises the following components:

Figure 16: Electrical components

Reference	Description
R	Remote contacts (option)
O	OPC-UA (option)
N	Neos Next

Electrical diagrams

The complete electrical diagram can be found in the technical documentation, supplied with the unit.

2.6 Air dryer

Full-Feature units are equipped with an air dryer.

Flow diagram

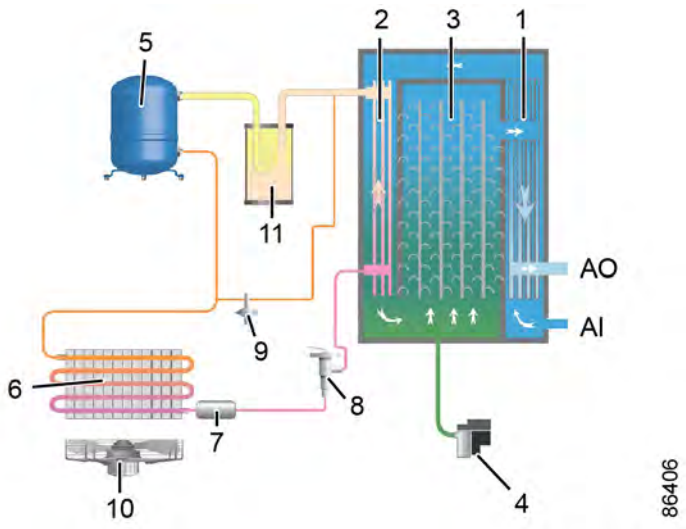


Figure 17: Flow diagram, air dryer

Reference	Description
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	Thermostatic bypass valve
9	Hot gas bypass valve
10	Condenser cooling fan
11	Liquid separator

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 condensate drain (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 capillary tube at about evaporating pressure.

The refrigerant enters evaporator (2) where it withdraws heat from the compressed air by further evaporation at about constant pressure. The heated refrigerant leaves the evaporator and is sucked in by the compressor (5) through a liquid separator (12).

Bypass valve (9) regulates the refrigerant flow. Fan (10) is regulated depending on the pressure degree of the condensate.

3 Controller

3.1 Controller functions

Figure 18: Elektronikon™ Touch controller

Introduction

The controller has the following functions:

- Controlling the unit.
- Protecting the unit.
- Monitoring components subject to service.
- Automatic restart after voltage failure (ARAVF).

  This function can only be activated by a service technician.

Automatic control of the unit

The controller maintains the net pressure between programmable limits by automatically loading and unloading the unit (fixed speed units) or by adapting the motor speed (units with frequency converter).

A number of programmable settings, e.g. the unloading and loading pressures (for fixed speed units), the setpoint (for units with frequency converter), the minimum stop time, the maximum number of motor starts and several other parameters are taken into account.

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

WARNING

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 unit.

Shutdown

Several sensors are provided on the unit. If one of the measured signals exceeds the programmed shutdown level, the unit will be stopped.

Example: If the outlet pressure exceeds the programmed shutdown level, the unit will be stopped. This will be indicated on the display of the controller.

The unit will also be stopped in case of overload of the drive motor or fan motor.

WARNING

Before remedying, consult the safety precautions.

Before resetting a warning or shutdown message, an authorized technician should solve the problem. If a warning or alarm persists to occur, consult your supplier. Frequently resetting these messages without remedying may damage the unit.

Shutdown warning

A shutdown warning level is a programmable level below the shutdown level.

If one of the measurements exceeds the programmed shutdown warning level, a message will appear on the display and the general alarm LED will light up to warn the operator before the shutdown level is reached.

The message disappears as soon as the warning condition disappears.

When the shutdown warning is shown, press the stop button to stop the unit and wait until the unit has stopped. Consult an authorized technician to solve the problem.

A warning will also appear if the dew point temperature is too high (on units with integrated dryer).

Service warning

A number of service operations are grouped as a Service Plan. Each Service Plan has a programmed time interval. If the service timer exceeds a programmed value, this will be indicated on the display to warn the operator to carry out the service actions belonging to that Service Plan.

When the service warning is shown, stop the unit, switch off the voltage and carry out the required service actions.

WARNING

Ignoring this service warning could severely damage your machine in the long term. The supplier is not liable for failures caused by neglecting service interval timings.

Automatic restart after voltage failure (ARAVF)

The controller has a built-in function to automatically restart the unit when the voltage is restored after voltage failure.

For units leaving the factory, this function is made inactive. If desired, the function can be activated. Consult your supplier.

WARNING

If the function is activated and the controller was in the automatic operation mode before the supply voltage was interrupted, the unit will automatically restart once the supply voltage to the unit is restored. The ARAVF label shall be attached near to the controller.

3.2 Control panel

Figure 19: Control panel

Reference	Designation	Function
1	Touch screen	Shows the unit operating condition and several icons to navigate through the menu. The screen can be operated by touch.
2	Warning sign	Flashes in case of a shut-down, is lit in case of a warning condition.
3	Service sign	Lit when service is needed.
4	Operation sign	Lit when the unit is running in automatic operation.
5	Voltage sign	Indicates that the voltage is switched on.
6	Stop button	Stops the unit.

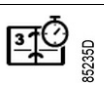
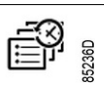
Reference	Designation	Function
7	Start button	This button starts the unit. The operation sign lights up. The controller is operative.

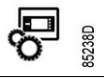
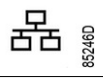
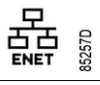
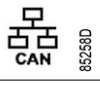
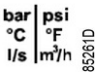
3.3 Icons used

NOTICE

This chapter gives a general overview of the available icons. Not all icons mentioned in this chapter are applicable to every machine.

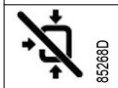
Menu icons

Menu	Icon	Menu	Icon	Menu	Icon
Data	 85233D	Status	 85239D		
		Inputs	 85240D		
		Outputs	 85241D		
		Counters	 85242D		
		Auxiliary Equipment Parameters	 85243D	Converters	 85251D
Service	 85234D	Service		Overview	 85252D
				Service Plan	 85253D
				Service History	 85254D
		Service Functions	 85244D		
		Clean Screen	 85302D		
Week Timer	 85235D			Week	 85303D
				Remaining Running Time	 85304D
Event History	 85236D	Saved Data	 85245D		

Menu	Icon	Menu	Icon	Menu	Icon
Machine Settings		Alarms			
		Regulation			
		Control Parameters			
		Auxiliary Equipment Parameters		Converters	
				Fan	
				Internal SmartBox	
				STC valve	
		Auto Restart			
Controller Settings		Network Settings		Ethernet Settings	
				CAN Settings	
		Localisation		Language	
				Date/Time	
				Units	
		User Password			
		Help			
		Information			

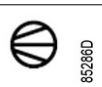
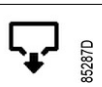
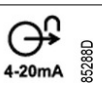
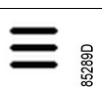
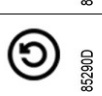
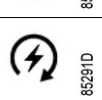
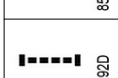
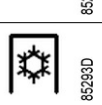
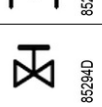
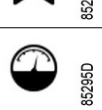
Status icons

Icon	Description
	Motor Stopped

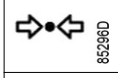
Icon	Description
	Motor Stopped Wait
	Running Unloaded
	Manual Unload
	Running Unloaded Wait
	Running Loaded
	Failed to Load
	Running Loaded Wait
	Manual Stop
	Machine Control Mode, Local
	Machine Control Mode, Remote
	Machine Control Mode, LAN
	Automatic Restart After Voltage Failure
	Week Timer Active

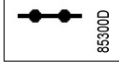
System icons

Icon	Description
	Basic User
	Advanced User
	Service User
	Antenna 25%
	Antenna 50%

Icon	Description
	Antenna 75%
	Antenna 100%
	Change between screens (indication)
	Energy recovery
	Dryer
	Element
	Drain(s)
	Analogue Output
	Menu
	Reset
	Auto Restart
	Filter(s)
	Cooler
	Valve(s)
	Power Meter

Input icons

Icon	Description
	Pressure
	Temperature
	Special Protection

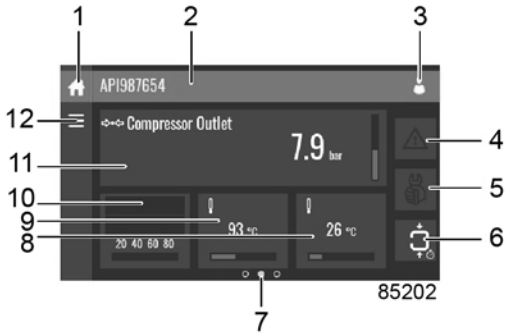
Icon	Description
	Open
	Closed

3.4 Main screen

Function

The main screen is the screen that is shown automatically when the voltage is switched on. It is switched off automatically after a few minutes when there is no touch input.

Description



Reference	Designation	Function
1	Home button	The home button is always shown and can be tapped to return to the main screen.
3	Access level button	The access level button is always shown and can be tapped to change the current user access level.
4	Alarm button	The alarm button can be tapped to show the current alarms. If an alarm occurs, the icon on the button will be red.
5	Service button	The service button can be tapped to show the service information.
6	Status	This icon shows the current status of the unit.
7	Page indicator	This indicates which page you are currently seeing. The middle indication is the main screen, left is the menu screen and the right the quick access screen. Swipe left or right to go to another screen.
12	Menu button	The menu button is always shown and can be tapped to go to the menu.

3.5 Quick access screen

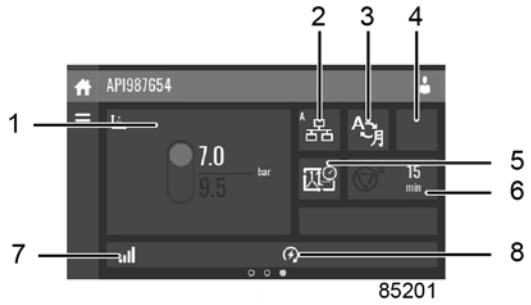
Function

The screen is used to directly access some frequently used functions.

Procedure

The quick access screen can be viewed by swiping left, starting from the main screen.

Description



Through this screen, several important settings can be viewed and modified.

Reference	Function	Description
1	Setpoints	Several setpoints can be modified by tapping this icon.
2	Control mode	The control mode can be changed by tapping this icon. • Local control via start/stop buttons • Remote control via digital input(s) • LAN control via the network. When in remote or LAN control, the start/stop buttons on the controller will not work.
3	Display language	The display language of the controller can be changed by tapping this icon.
4	Operation mode	When tapped, the operation mode can be chosen between manual and automatic. When manual mode is selected, the controller will switch to automatic mode automatically after 24 hours.
5	Week timer	Week timers can be set by tapping this icon.
6	Remaining running time	The remaining running time can be set and modified by tapping this icon.
7	Internal SmartBox	The reception quality of the internal antenna can be monitored. Each bar represents 25% reception strength. If the four bars are filled, the reception strength is 100%. If only one bar is filled, the reception strength is just 25%.
8	Auto Restart	Auto restart can be activated by tapping this icon.

3.6 Menu screen

Function

This screen is used to display the different menus where settings can be viewed or changed.

Procedure

The menu screen can be viewed by tapping the menu button or by swiping right, starting from the main screen.

Description

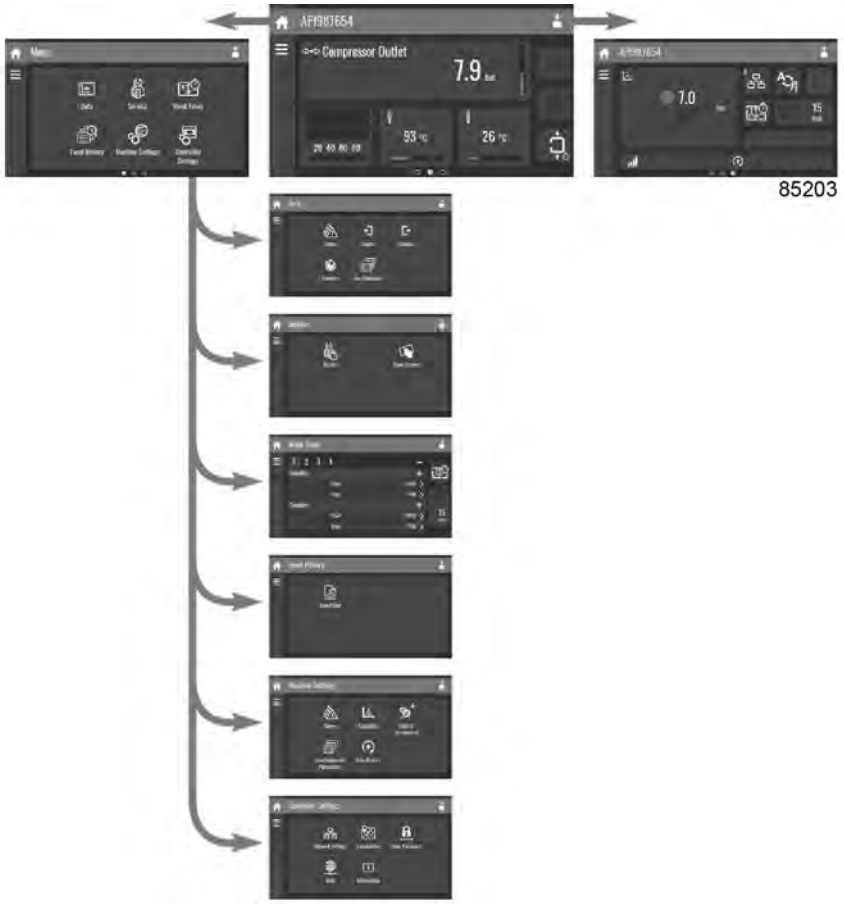
Reference	Designation	Function
(1)	Data	The data menu contains the status of the unit, information about the inputs, outputs and counters. The auxiliary equipment can also be viewed through this menu.
(2)	Service	The service menu contains the service information. The "clean screen" function can be used to clean the touchscreen.
(3)	Week timer	Multiple week timers and a remaining running time can be set through this menu.
(4)	Event history	In case of an alarm, the status information of the unit is saved and can be viewed through this menu.
(5)	Machine settings	Alarms settings, regulation settings and control parameters can be changed through this menu. Auxiliary equipment parameters can also be changed. The automatic restart function can be set through this menu. This function is password-protected.
(6)	Controller settings	Network settings, localisation settings and a user password can be set through this menu. There is also a help page available and the controller information can be shown.

Menu structure

NOTICE

This is the main structure. It can differ depending on the configuration of the unit.

Operating the controller can be done by swiping through screens and tapping icons or menu items.



3.7 Data menu

Function

This screen is used to display the following submenus:

- **Status**
- **Inputs**
- **Outputs**
- **Counters**
- **Auxiliary Equipment**

These submenus can be entered by tapping the icons.

Procedure

To enter the **Data** menu screen:

1. Tap the Menu button.
2. Tap the **Data** icon.

Description

85210

Reference	Description
(1)	**Status** menu
(2)	**Inputs** menu
(3)	**Outputs** menu
(4)	**Counters**
(5)	**Auxiliary equipment** menu

Status menu

Tap the **Status** icon to enter the **Status** menu.

This menu shows the current status of the unit.

If an alarm is active, it can be viewed by tapping the alarm message. To reset an alarm, tap the reset button.

Inputs menu

Tap the **Inputs** icon to enter the **Inputs** menu.

85206

This menu shows information about all the inputs.

Outputs menu

Tap the **Outputs** icon to enter the **Outputs** menu.

85207

This menu shows information about all the outputs.

Counters menu

Tap the **Counters** icon to enter the **Counters** menu.

85208

This menu shows an overview of all actual hours and counters of the unit and controller.

Auxiliary Equipment menu

Tap the **Auxiliary Equipment** icon to enter the **Auxiliary Equipment** menu.

85209

This menu shows an overview of all auxiliary equipment fitted.

3.8 Service menu

Function

This screen is used to display the following submenus:

- **Service**
- **Service Functions** (visible as advanced user)
- **Clean Screen**

These submenus can be entered by tapping the icons.

Procedure

To enter the **Service** menu screen:

1. Tap the Menu button.
2. Tap the **Service** icon.

Description

85213

Reference	Description
(1)	**Service**

Reference	Description
(2)	**Service Functions** (only visible as advanced user)
(3)	**Clean Screen**

Service menu

Tap the **Service** icon to enter the **Service** menu.

85211

This menu shows the remaining **Running Hours** and the remaining **Real Time Hours** until the next service. The first row (A) shows the **Running Hours** when the first service is needed (green), the second row shows the **Real Time Hours** (blue)

A service overview can be viewed by tapping icon (1).

The service plan can be viewed by tapping icon (2). Through this menu, the service plan can be modified:

1. Tap the desired service plan. A selection screen will pop up.
2. Change the Running Hours by tapping '–' or '+'.
3. Confirm by tapping 'V' or decline by tapping 'X'.

The service history can be viewed by tapping icon (3).

When a service plan interval is reached, a message will appear on the screen. When service has been performed, the service timer can be reset by tapping the reset button (4).

Service functions (visible for advanced user)

Tap the **Service Functions** icon to enter the **Service Functions** menu.

85232

Depending on the machine, this menu can have a different set of functions. Many of them are password protected, as they are only accessible for authorized personnel.

Clean screen

Tap the **Clean Screen** icon to start the 15 seconds countdown to perform cleaning of the touch screen.

The touch screen and the start and stop button become inactive for 15 seconds.

3.9 Week timer menu

Function

This screen is used to set up to 4 different timers with each up to 8 settings per day.

The week timers can be activated through this screen.

A **Remaining Running Time** can be set from 5 up to 240 minutes.

Procedure

To enter the **Week Timer** menu screen:

1. Tap the Menu button.
2. Tap the **Week Timer** icon.

Description

Reference	Designation	Function
(1)	Add or select week	If less than 4 weeks are programmed, tap the '+' button to add a week.
(2)	Remove week	Tap to remove a programmed week timer.
(3)	Activate week timer	A selection screen pops up. The user can choose the correct week by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.
(4)	Remaining running time	A selection screen pops up. The user can change the remaining time by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.
(5)	Add setting	A selection screen pops up. The user can change the setting by swiping up or down and confirm by tapping 'V' or decline by tapping 'X'.

3.10 Event history menu

Function

This screen is used to display the saved data in case of an alarm.

These submenus can be entered by tapping the icons.

Procedure

To enter the **Event History** menu screen:

1. Tap the Menu button.
2. Tap the **Event History** icon.

Description

Reference	Description
(1)	**Saved Data**

Saved data

Tap the **Saved Data** icon to enter the **Saved Data** menu.

Scroll through the items swiping up and down in this list. The event date and time is shown at the right side of the screen.

Press on one of the items in the list for more information reflecting the status of the unit when the shutdown occurred.

3.11 Machine settings menu

Function

This screen is used to display the following submenus:

- **Alarms**
- **Regulation**
- **Control Parameters**

  (Only visible if the machine has adaptable parameters.)
- **Aux. Equipment Parameters**
- **Auto Restart**

These submenus can be entered by tapping the icons.

Procedure

To enter the **Machine Settings** menu screen:

1. Tap the Menu button.
2. Tap the **Machine Settings** icon.

Description

85222

Reference	Description
(1)	**Alarms** menu
(2)	**Regulation** menu
(3)	**Control Parameters** menu
(4)	**Aux. Equipment Parameters** menu
(5)	**Auto Restart** menu

Alarms menu

Tap the **Alarms** icon to enter the **Alarms** menu.

85217

A list of all alarms is shown.

When pressing on one of the items in the underlying list, the warning and/or shutdown levels are shown for this alarm.

Regulation menu

Tap the **Regulation** icon to enter the **Regulation** menu.

85218

Setpoints can be modified and capacity control can be consulted through this menu.

Modify a setting

When tapping a list item, a selection screen pops up. The user can modify the setting by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.

Change a selection

When tapping a list item, a selection screen pops up. The user can change the selection by swiping up or down and confirm by tapping 'V' or decline by tapping 'X'.

Control parameters menu

Tap the **Control Parameters** icon to enter the **Control Parameters** menu.

This menu shows information about the **Control Parameters**.

Modify a setting

When tapping a list item, a selection screen pops up. The user can modify the setting by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.

Auxiliary equipment parameters menu

Tap the **Aux. Equipment Parameters** icon to enter the **Aux. Equipment Parameters** menu.

This menu shows an overview of all the auxiliary equipment fitted.

Through this menu, the parameters of the auxiliary equipment can be changed.

Modify a setting

When tapping a list item, a selection screen pops up. The user can modify the setting by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.

Auto restart menu

Tap the **Auto Restart** icon to enter the **Auto Restart** menu.

Through this menu, the automatic restart can be activated. The activation is password protected.

The automatic restart settings can also be changed.

Enter a password

When tapping a password-protected item, a selection screen pops up. The user can enter the password by swiping up or down to select the desired number. Once the 4 digits are entered, the user can confirm by tapping ‘V’ or decline by tapping ‘X’.

Modify a setting

When tapping a list item, a selection screen pops up. The user can modify the setting by tapping ‘–’ or ‘+’ and can confirm by tapping ‘V’ or decline by tapping ‘X’.

3.12 Controller settings menu

Function

This screen is used to display the following submenus:

- **Network Settings**
- **Localisation**
- **User Password**
- **Help**
- **Information**

These submenus can be entered by tapping the icons.

Procedure

To enter the **Controller Settings** menu screen:

1. Tap the Menu button.
2. Tap the **Controller Settings** icon.

Description

Reference	Description
(1)	**Network Settings** menu
(2)	**Localisation** menu
(3)	**User Password** menu
(4)	**Help** menu
(5)	**Information** menu

Network settings menu

Tap the **Network Settings** icon to enter the **Network Settings** menu.

Ethernet Settings

The list of **Ethernet Settings** is shown. When ethernet is turned off, the settings can be modified.

CAN Settings

The list of **CAN Settings** is shown. When CAN is turned off, the settings can be modified.

Modify a setting

When tapping a list item, a selection screen pops up. The user can modify the setting by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.

Change a selection

When tapping a list item, a selection screen pops up. The user can change the selection by swiping up or down and confirm by tapping 'V' or decline by tapping 'X'.

Localisation menu

Tap the **Localisation** icon to enter the **Localisation** menu.

Language

The language setting of the controller can be modified through this menu.

Date/Time

The date and time settings of the controller can be modified through this menu.

Units

The units displayed can be modified through this menu.

Modify a setting

When tapping a list item, a selection screen pops up. The user can modify the setting by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.

Change a selection

When tapping a list item, a selection screen pops up. The user can change the selection by swiping up or down and confirm by tapping 'V' or decline by tapping 'X'.

User password menu

Tap the **User Password** icon to enter the **User Password** menu.

The user password can be activated or deactivated through this menu. Enter and confirm a user password to activate, repeat to deactivate.

Enter a password

When tapping a password protected item, a selection screen pops up. The user can enter the password by swiping up or down to select the desired number. Once the 4 digits are entered, the user can confirm by tapping ‘V’ or decline by tapping ‘X’.

Help menu

Tap the **Help** icon to enter the **Help** menu.

This menu can show a link to the web page of your supplier, a helpdesk phone number or other helpful information.

Information menu

Tap the **Information** icon to enter the **Information** menu.

This menu shows information about the controller.

3.13 Access level

Function

Through this pop-up screen, the access level settings can be viewed or changed.

Procedure

The **Access Level** screen can be viewed or changed by tapping the **Access Level** button at the upper right corner of the screen.

Description

Reference	Designation	Function
(1)	Basic user	A basic set of parameters is visualized, no password required.
(2)	Advanced user	A basic set of parameters can be modified, no password required.
(3)	Service user	This access level is not accessible to end users.
(4)	Decline	Tap to decline the selected user level.
(5)	Confirm	Tap to confirm the selected user level.

Advanced access level

Tap the **Advanced** access level icon (1) and confirm (2).

The screen information bar (1) now shows the current status of the unit instead of the machine serial number.

The Received Signal Strength Indicator (RSSI) value is now shown in the Internal SmartBox menu. See section *Quick access screen*.

In the service menu, an extra menu item is now available. See section *Service menu*.

4 Installation

4.1 Dimension drawings

The dimension drawing can be found in the technical documentation, supplied with the unit.

Model	Pressure variant (bar(e))	Model variant	Voltage (V)	Weight (kg)
GA 22 VSD^s	10	Pack	380 / 400 / 460	458
			200 / 230	749
			500 / 575	619
		Full-Feature	380 / 400 / 460	587
			200 / 230	814
			500 / 575	684
GA 26 VSD^s	10	Pack	380 / 400 / 460	463
			200 / 230	799
			500 / 575	639
		Full-Feature	380 / 400 / 460	604
			200 / 230	876
			500 / 575	716
GA 30 VSD^s	10	Pack	380 / 400 / 460	476
			200 / 230	788
			500 / 575	691
		Full-Feature	380 / 400 / 460	616
			200 / 230	865
			500 / 575	768
GA 37 VSD^s	10	Pack	380 / 400 / 460	480
			200 / 230	796
			500 / 575	701
		Full-Feature	380 / 400 / 460	621
			200 / 230	873
			500 / 575	778

Table 1: Dimensions and weight (10 bar(e) units)

Model	Pressure variant (bar(e))	Model variant	Voltage (V)	Weight (kg)
GA 22 VSD^s	13	Pack	380 / 400 / 460	388
			200 / 230	679
			500 / 575	549
		Full-Feature	380 / 400 / 460	517
			200 / 230	744
			500 / 575	614
GA 26 VSD^s	13	Pack	380 / 400 / 460	393
			200 / 230	729
			500 / 575	569
		Full-Feature	380 / 400 / 460	534
			200 / 230	806
			500 / 575	646
GA 30 VSD^s	13	Pack	380 / 400 / 460	406
			200 / 230	718

Model	Pressure variant (bar(e))	Model variant	Voltage (V)	Weight (kg)
			500 / 575	621
		Full-Feature	380 / 400 / 460	546
			200 / 230	795
			500 / 575	698
GA 37 VSD^{s}	13	Pack	380 / 400 / 460	410
			200 / 230	726
			500 / 575	631
		Full-Feature	380 / 400 / 460	551
			200 / 230	803
			500 / 575	708

Table 2: Dimensions and weight (13 bar(e) units)

4.2 Installation proposal

Safety

WARNING

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

- **Read the manual before installing the compressor. The instruction book contains the necessary information regarding the detailed values.**
- **Check the situation.**
- **Use the correct tooling.**

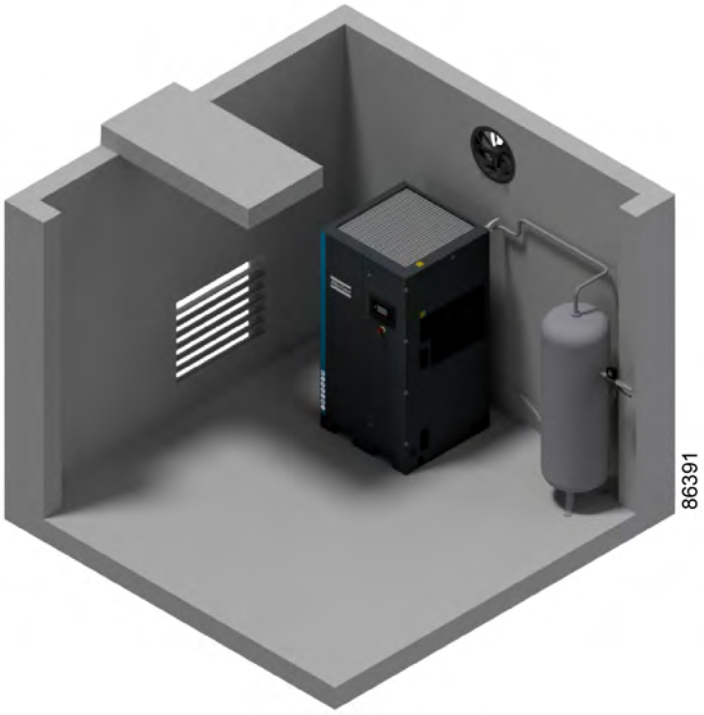


Figure 20: Compressor room example

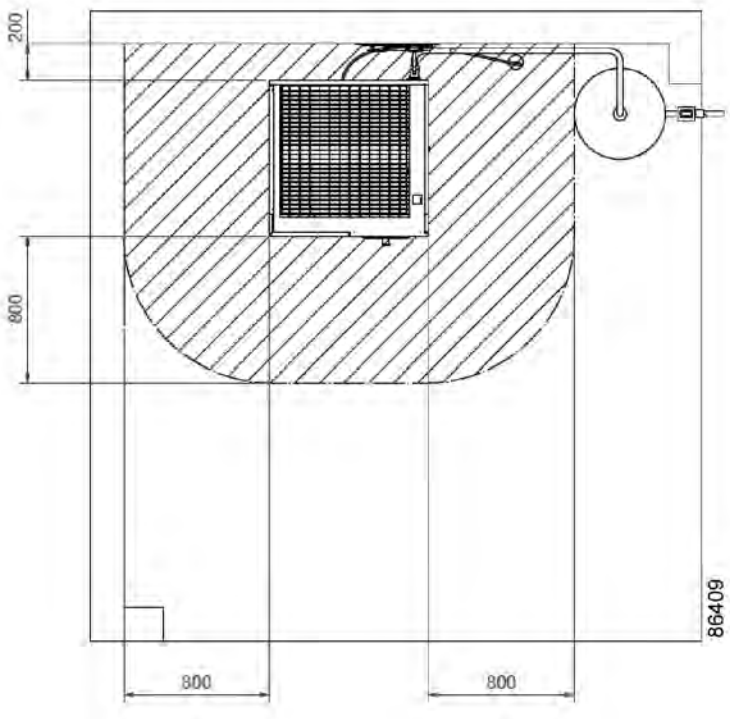
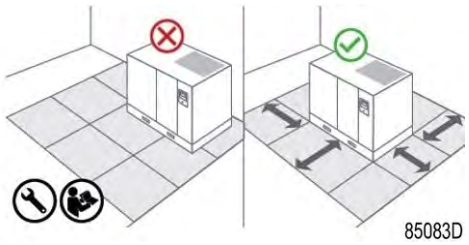


Figure 21: Minimum service room

Foundation, placement of the compressor unit

Install the compressor unit on a solid, level floor, suitable for the compressor mass. It is not allowed to place any extra (damping) material between the floor and the base frame so the frame is not supported on the complete surface.

Make sure enough space is available for proper maintenance and servicing. All dimensions can be found in the compressor room example in the drawing above.



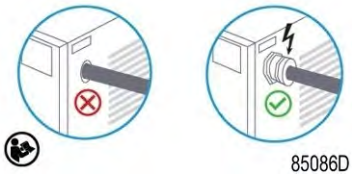
Transportation brackets

Before starting the compressor for the first time, check that all red-colored transportation brackets/ bolts have been removed. They can be under the drivetrain, separation vessel and the compressor of the integrated dryer (optional).

Electrical connections

- The supply voltage on the compressor terminals must not deviate more than 10% of the nominal voltage. It is highly recommended to keep the voltage drop over the supply cable at nominal current below 5% of the nominal voltage.
- Power supply cable must be sized and installed by a qualified electrician. Cable sizing examples according to IEC and UL can be found in the *Technical Data* section. 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. Local regulations remain applicable if they are stricter than the values proposed.
- A main switch and fuses are not included in the compressor unit and should be foreseen externally by a qualified electrician. For selecting the correct fuse type and size, refer to the service diagram or the *Technical Data* section. Note that different sizes exist for compressors with or without integrated dryer.

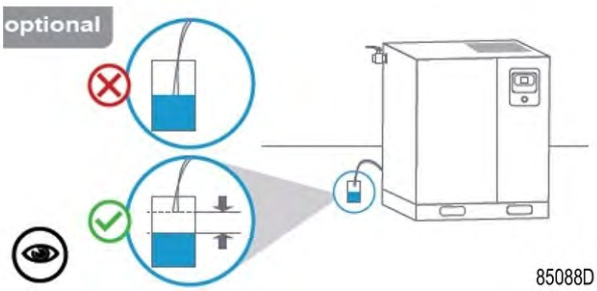
- Always double-check the fuse size versus the calculated cable size. If required, reduce fuse size or enlarge cable size.
- To preserve the protection degree and to protect the components from dust from the environment, it is mandatory to use a well sealing cable gland when connecting the supply cable to the compressor.



- For VSD compressors, fast reacting fuses should be installed as mentioned in the instruction book. The use of circuit breakers is not allowed.
- Electric screw connections need to be checked and torqued before initial start-up. Torque values can be found on the service diagram.

Condensate collection

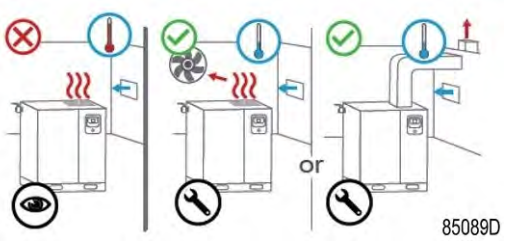
The drain pipes to the drain collector may not dip into the water of the drain collector.



Oil/water separators are used to separate oil from the condensate to ensure that the condensate meets the requirements of the environmental codes. Drain pipes of the same or different compressors may not be interconnected before the (atmospheric) collector as this can damage the electronic drains.

Ventilation

The compressor room should have proper ventilation in order to keep the air inlet temperature of the compressor under control. The maximum air temperature at the compressor intake is 46 °C (115 °F), the minimum temperature is 0 °C (32 °F). If the room temperature exceeds any of these limits, the compressor will automatically shut down.

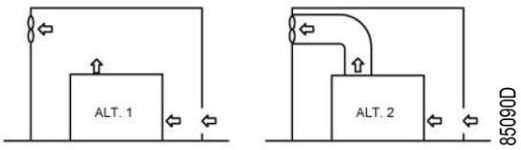


NOTE

If the unit is equipped with the option “High Ambient Version”, it is allowed to operate the unit up to 55°C (131°F). This option comes with Roto Synthetic Fluid XTEND DUTY oil filling. A compressor with the freeze protection option will shut down below -10°C (14°F).

The inlet grids, ducting and external ventilation fan should always be installed in such way that recirculation of cooling air to the integrated dryer and/or motor compartment is avoided. To prevent feedback of exhaust air into the cooling inlet, sufficient space should be foreseen above the unit to evacuate the exhaust air. Otherwise a duct for the exhaust air should be installed.

If ducting needs to be foreseen, a different cooling capacity may be required depending on the two alternative ducting configurations:



The direction of cooling flows may never be inverted.

The maximum air velocity through the ventilation grids is 5 m/s (16.5 ft/s). The maximum allowed pressure drop in ventilation ducts before or after the compressor is 20 Pa. If it exceeds this value, a fan is needed at the outlet of the ducts. When a duct is foreseen on the air inlet, the ambient temperature sensor needs to be repositioned in such way that the inlet temperature is correctly monitored.

Unit	Additional allowed pressure drop	Cooling air flow
GA 22 VSD^S	20 Pa	1 m^3/s
GA 26 VSD^S	20 Pa	1.2 m^3/s
GA 30 VSD^S	20 Pa	1.25 m^3/s
GA 37 VSD^S	20 Pa	1.7 m^3/s

Table 3: Duct sizing information

NOTE

If the pressure drop of the ducting is too big to be overcome by the standard fan, it is recommended to equip the unit with the “Power Duct Fan” option. This option increases the total allowable pressure drop through the ducts without the need to install an additional external fan.

For air-cooled compressors and ventilation alternative 1

The ventilation capacity required to limit the compressor room temperature can be calculated as follows:

- For compressors without dryer:

  $Q_v = 1.06\ N / \Delta T$
- For compressors with dryer:

  $Q_v = (1.06\ N + 1.2\ D) / \Delta T$

Q_v = required ventilation capacity in m^3/s

N = nominal power of the compressor motor in kW

D = electric power of the dryer in kW

ΔT = temperature increase in the compressor room in C

For air-cooled compressors and ventilation alternative 2

The fan capacity should match the compressor fan capacity at a pressure head equal to the pressure drop over the air ducts.

Make sure that the cooling air duct of the air/oil cooler is separated from the cooling air duct of the dryer.

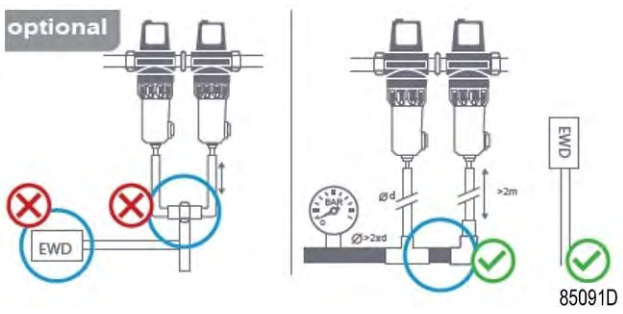
Air filtration

Filter DD to be installed for general-purpose filtration (particle removal down to 1 micron with a maximum oil carry-over of 0.5 mg/m³). 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/m3. An UD+ filter leads to the same air purity as a DD filter combined with a PD. If oil vapor and odors are undesirable, a QD type filter can be installed downstream of the PD filter. All filters should be preceded by a water separator if no water separator is integrated in the after cooler of the compressor. In case a dryer is preceding the filter, a water separator is no longer required.

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

The condensate collecting tubes should have a minimum length of two meter before they are interconnected. After the interconnecting point, the drain tube requires twice the diameter of the original tubes.

It is not allowed to connect pressurized electronic drains on the draining tubes of the filters.



Air delivery pipe

The pressure drop over the air delivery pipe can be calculated from:

$\Delta p = (L \times 450 \times Q_c^{1.85}) / (d^5 \times P)$

d = inner diameter of the pipe in mm

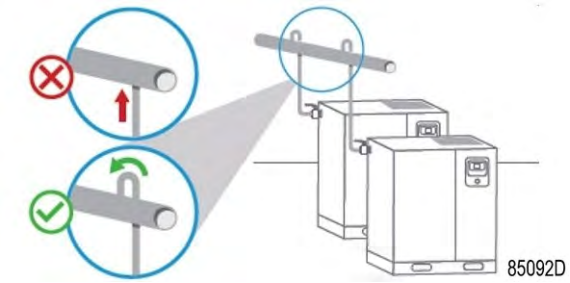
Δp = pressure drop in bar (recommended maximum: 0.1 bar (1.5 psi))

L = length of the pipe in m

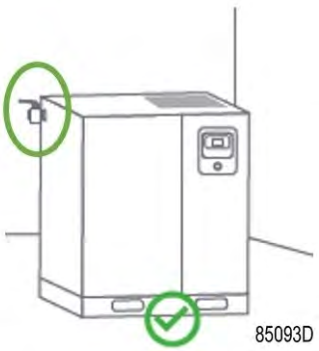
P = absolute pressure at the compressor outlet in bar(a)

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 minimize carry-over of possible condensate residue.



For proper maintenance, a manual controllable valve has to be installed on the compressed air outlet in order to isolate the compressor from the compressed air network.



Air tank

Install the air tank (if purchased separately) in a frost free room and on a solid level floor, suitable for its mass.

The air tank must be fitted with a correctly sized and approved safety valve that is directly connected with the vessel. At the bottom of the vessel, a drain needs to be installed to collect the condensate.

For normal air consumption, the volume of the air net (tank and piping) can be calculated from:

$V = (0.25 \times Q_c \times P_1 \times T_0) / (f_{max} \times \Delta P \times T_1)$

V = volume of the air net in l

Q_c = free air delivery of the compressor in l/s

P_1 = compressor air inlet pressure in bar(a)

f_{max} = maximum cycle frequency (recommended: 1 cycle / 30s)

ΔP = difference between unloading pressure and loading pressure in bar

T_1 = compressor air inlet temperature in K

T_0 = air tank temperature in K

Moving/ lifting

The compressor can be moved by a lift truck using the slots in the frame. Take care not to damage the bodywork during lifting or transport. The transport bolts cannot be removed until the unit is on its fixed and final position. Reinstall these each time the unit is moved.

Make sure that the forks protrude the other side of the frame. The compressor can also be lifted after inserting beams in the slots. Make sure that the beams cannot slide and that they equally protrude the frame. The chains must be held parallel to the bodywork by chain spreaders in order not to damage the compressor. The lifting equipment must be placed in such a way that the compressor is lifted perpendicularly. Lift gently and avoid twisting.

WARNING

In case of units equipped with the Lifting Device Option, it is not allowed to lift the compressor if the canopy parts or lifting supports are not completely installed. When the compressor is being lifted, it is forbidden to stand under the load or to perform maintenance activities on it.

Outdoor/ altitude operation

Compressors can be sold with the option rain protection. With this, the compressor can be installed outside under a shelter, in frost free conditions.

If frost might occur, the appropriate measures should be taken to avoid damage to the machine and its ancillary equipment. In combination with the *Freeze Protection* option, the unit can start up in ambient temperatures down to minus 20 °C (-4 °F) and can run continuously at minus 10 °C (14 °F). This option comes with Roto Synthetic Fluid XTEND DUTY oil filling.

Maximum operating altitude of the unit is 1000 m (3000 ft).

Quality of the intake air

The compressors intake air must be clean and free of solid and avoid gaseous contamination. Particles of dirt that cause wear and corrosive gases (SO2, NOx, chlorides, H2S, NH3, etc.) can be particularly damaging. Care must be taken to minimize the entry of moisture* at the inlet air. No water droplets should enter the air intake.

100% RH	35 °C (95 °F)
70% RH	40 °C (104 °F)
30% RH	46 °C (115 °F)

Table 4: Maximum acceptable relative humidity per ambient temperature

Use of generators and transformers

When installing the compressor connected to a generator or transformer, it is commended to have at least the indicated power available per compressor. If the generator or transformer is smaller than this recommendation, detailed calculations can be made to ensure the strength of the grid.

Please contact your supplier for more details on calculations (document reference 2646 2357 00).

4.3 Electrical connections

DANGER

Working with machinery controlled by a frequency converter requires special safety precautions.

These safety precautions depend on the kind of network used (TN, TT, IT system). Consult your supplier.

NOTE

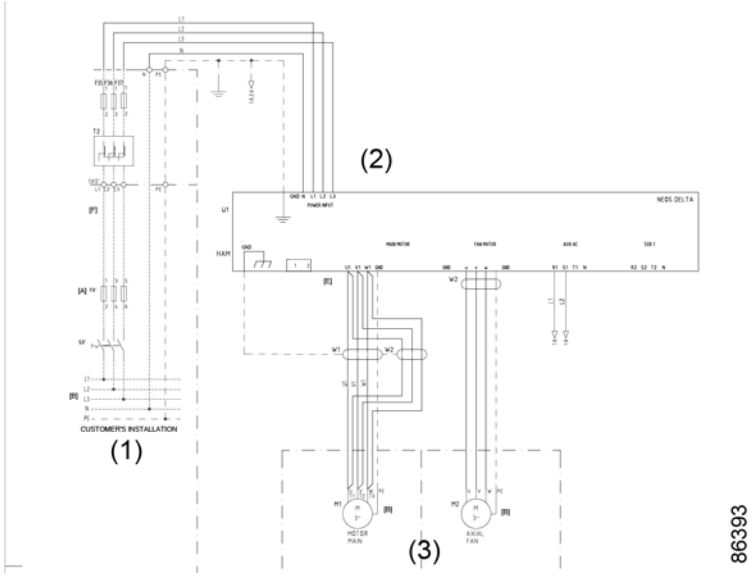
Most compressors are designed for use in TT/TN networks and are intended for industrial environments where the electrical supply is separated from the residential/commercial supply network.

To use the machine in light industrial, commercial or residential environments with a shared supply network or in an IT network, additional measures may be required. Contact your supplier.

IT Network

In case you have an IT earthing system, remove bolt (1), indicated in the picture below.

Electrical connections



Reference	Description
(1)	Customer's installation
(2)	Power circuit
(3)	Motor

The complete electrical diagram can be found in the technical documentation, supplied with the unit.

Description

NOTE

You can find the correct position for the electrical connections in the section *Dimension drawings*.

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. See section *Electric cable size and fuses*.
4. Connect the power supply cables to the terminals of the Neos Next.
5. Connect the earth conductor to the earth bolt (PE).

NOTE

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

Compressor control modes

The following control modes can be selected:

- **Local control:** The compressor will react to commands entered by means of 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.

NOTE

Have the modifications checked by your supplier.

Stop the compressor and switch off the voltage before connecting external equipment.

Only potential free contacts are allowed.

- **LAN control:** The compressor is controlled via a local network. Contact your supplier.

Compressor status indication

The controller is provided with potential free auxiliary NO contacts (NO = normally open) for remote indication of:

- Manual or automatic operation
- Warning condition
- Shutdown condition

Stop the compressor and switch off the voltage before connecting external equipment. Contact your supplier.

4.4 Pictographs

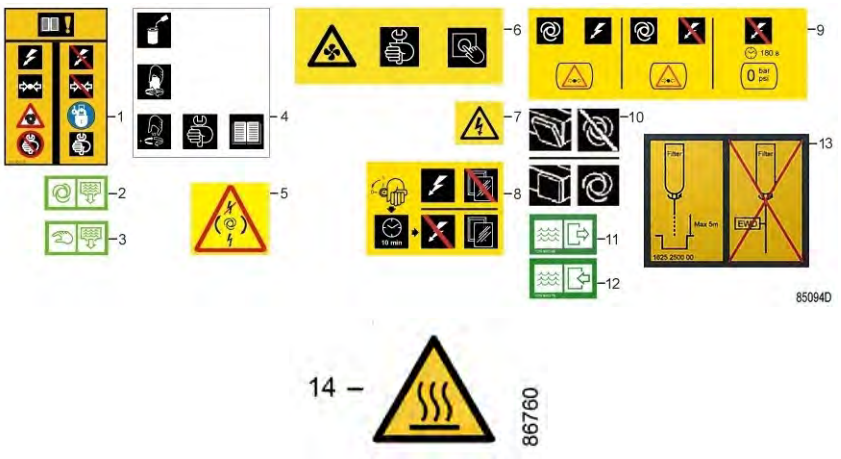


Figure 22: Pictographs

Reference	Description
1	Lock out, tag out the compressor before starting maintenance or repairs
2	Automatic condensate drain
3	Manual condensate drain
4	Lightly oil the gasket of the oil filter, screw it on and tighten by hand (approximately half a turn)
5	Automatic restart after voltage failure (ARAVF)
6	Stop the compressor before cleaning the coolers
7	Warning, voltage
8	Switch off the voltage and wait at least 10 minutes before maintenance

Reference	Description
9	Compressor remains pressurized for 180 seconds after switching off the voltage
10	Keep doors closed during operation
11	Cooling water inlet (option energy recovery)
12	Cooling water outlet (option energy recovery)
13	Electronic water drain (EWD) installation
14	Hot surface

4.5 Instructions for prolonged storage

Procedure

Run the compressor regularly, e.g. twice a week, until warm.

NOTE

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

5 Energy recovery

5.1 Energy recovery (ER) unit

Description

A large part of the energy required for any compression process is transformed into heat. The major part of the compression heat is dissipated through the oil system. Energy recovery (ER) systems are designed to recover most of this heat by transforming it into warm or hot water without any adverse effects on compressor performance. The water can be used for diverse applications.

Components

The energy recovery (ER) system is completely integrated and comprises the following:

- Stainless steel oil/water heat exchanger
- Thermostatic bypass valve for energy recovery heat exchanger (BV2)
- The necessary bolts, pipes, etc.
- Oil drain valve

Energy recovery (ER) unit

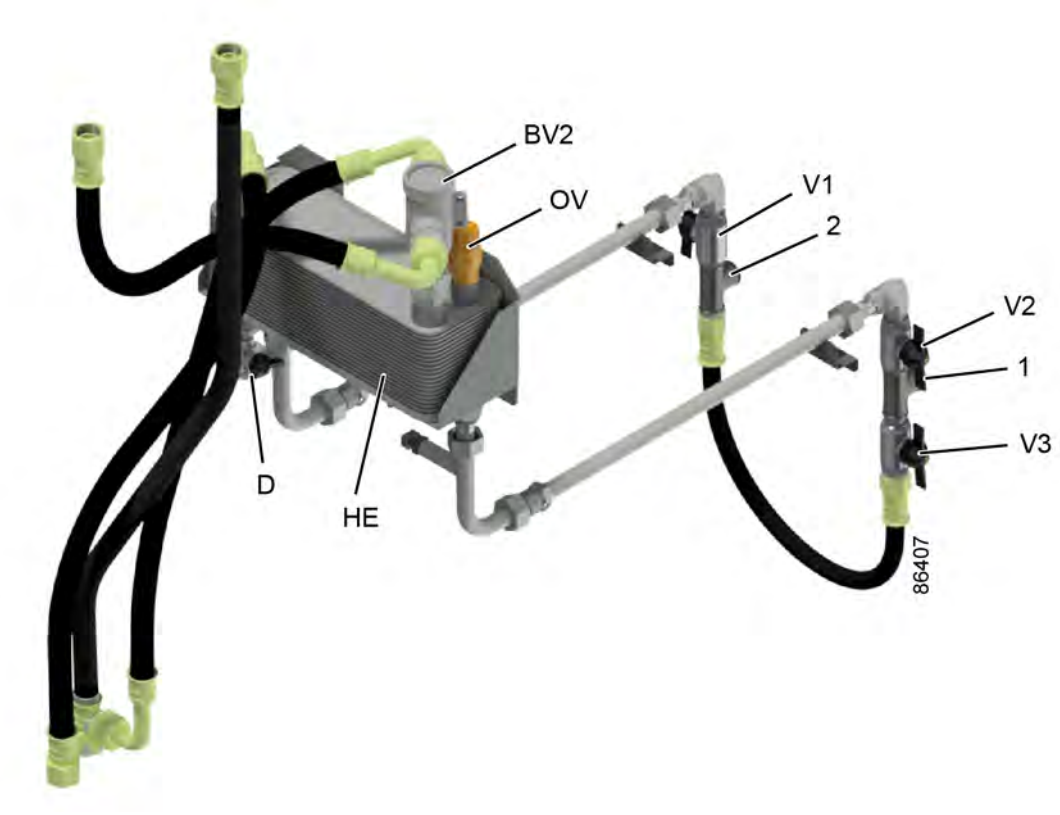


Figure 23: Main components

Reference	Description
1	Water inlet pipe
2	Water outlet pipe
V1	Valve 1
V2	Valve 2
V3	Valve 3
BV2	Thermostatic bypass valve
OV	Overpressure valve
HE	Heat exchanger
D	Oil drain valve

Field installation

The main components are assembled ex-factory as a compact unit which fits inside the bodywork of the compressor. Consult your supplier for installing and connecting the energy recovery (ER) unit.

5.2 Energy recovery (ER) systems

General

The energy recovery (ER) 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 (ER) 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 (ER) 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 (ER) system for use in a factory, e.g. pre-heating of boiler feed water.

Recovery water flow

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

Water requirements for closed water circuits

The use of a closed water circuit minimizes the need for additional water. Therefore, the use of soft or even demineralized 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.

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

In open, non-recirculating water circuits, major problems that are usually encountered are related to deposit control, corrosion control, and microbiological growth control. To minimize these problems, the water that is being used should meet a number of requirements.

5.3 Energy recovery (ER) operation

Description

The compressor oil flow is controlled by a Smart Temperature Control (STC) valve, ensuring reliable compressor operation and optimum energy recovery.

The Smart Temperature Control (STC) valve is integrated in the oil filter housing of the compressor and controls the oil flow to the oil/water heat exchanger (HE) of the compressor. The thermostat valve in the external housing behind the energy recovery (ER) heat exchanger, controls the oil flow through the main cooler (CO) of the compressor.

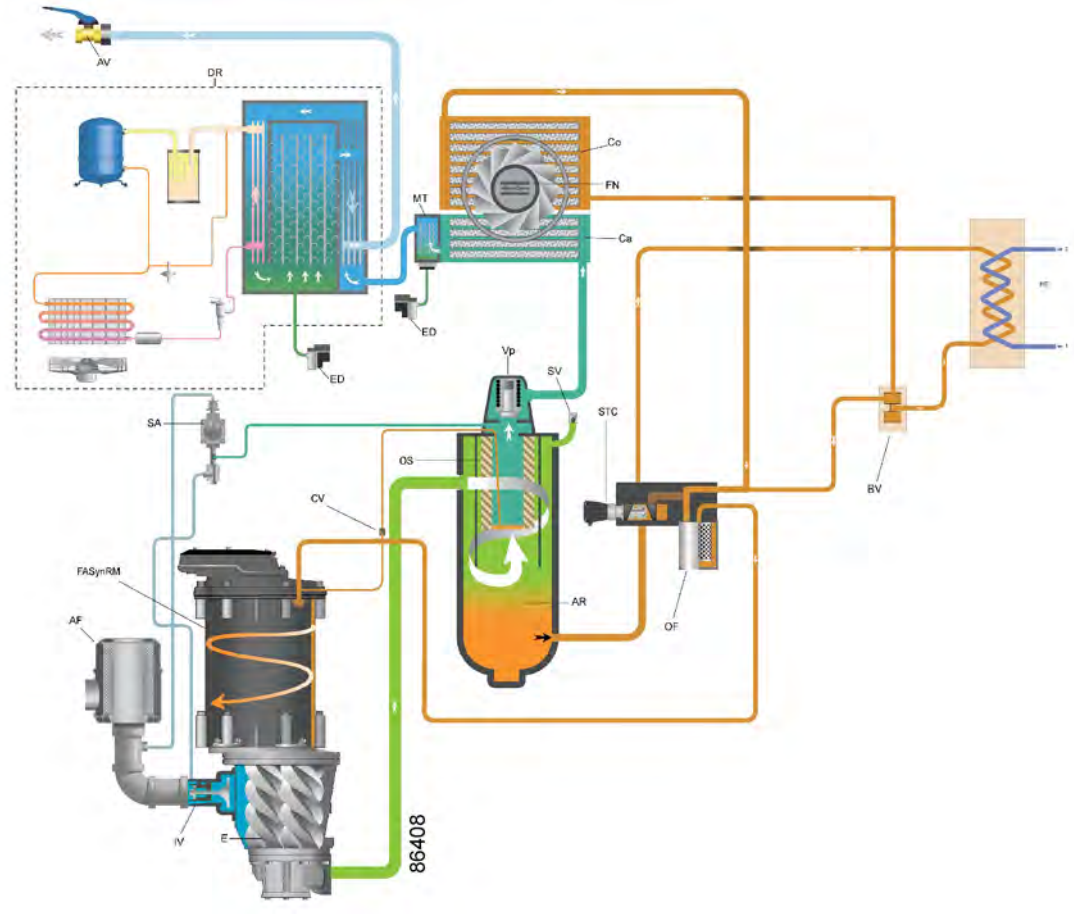


Figure 24: Unit with energy recovery (ER) system, Low pressure variant

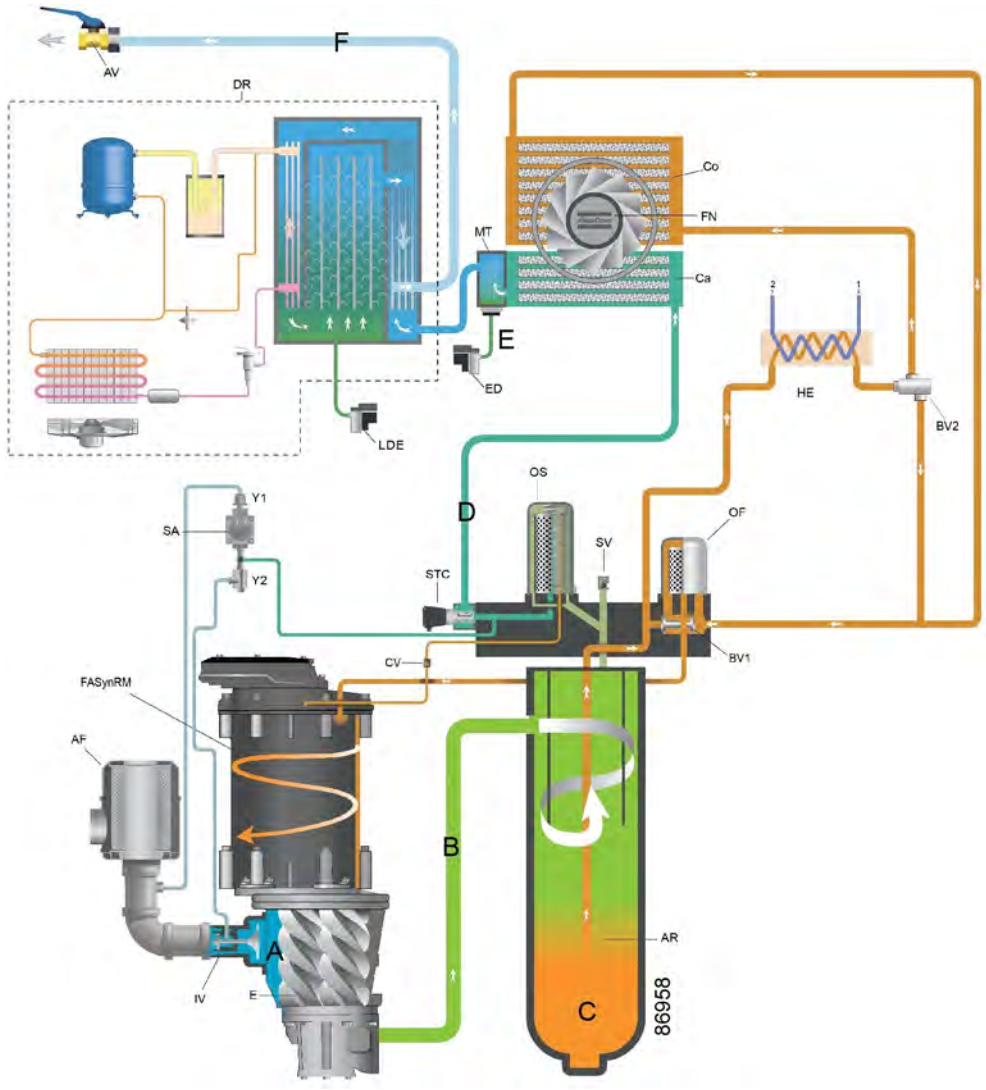


Figure 25: Unit with energy recovery (ER) system, High pressure variant

Reference	Description
HE	Oil / water heat exchanger
E	Compressor element
OF	Oil filter
AR	Oil separator vessel
STC	Smart Temperature Control valve
Co	Oil cooler
Ca	Aftercooler
1	Water inlet
2	Water outlet

The Smart Temperature Control (STC) valve starts directing the oil flow to the oil/water heat exchanger as soon as the compressor temperature is sufficiently high to avoid condensate formation and recover energy. Unlike a standard thermostat the temperature setpoint is variable, this to optimize the amount of recovered energy. When the cooling of the oil/water heat exchanger becomes insufficient the thermostatic bypass valve (BV2) starts opening, causing oil to flow through the main cooling module (Co) as well.

The energy recovery (ER) system is provided with bypass valves on the water side, which can be found on the backside of the unit. In order to bypass the water flow, valve 1 and 2 should be closed and valve 3 should be opened.

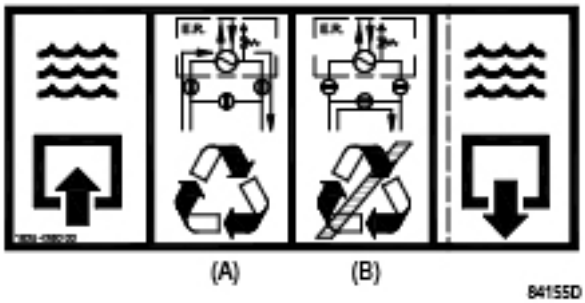


Figure 26: Energy recovery (ER) label

WARNING

It is NOT allowed to use the ball valves at an in-between position!

Energy recovery (ER) system in use

Bypass valves in position (A): the heat exchanger (HE) is integrated in the water side of the energy recovery (ER) system (see drawing).

- Compressor start-up

When the compressor is started up from cold, the oil temperature will be low. The Smart Temperature Control (STC) valve shuts off the oil supply to the oil cooling system 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 the compressor element (E).

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

- Maximum energy recovery

As soon as the oil temperature reaches the set point (opening temperature) of the Smart Temperature Control (STC) valve, the valve starts closing off the bypass over the oil cooling system, gradually allowing the oil to flow through the heat exchanger (HE). As the ambient conditions (temperature and humidity) allow the cooling of the compressor oil, all the oil passes through the cooling system. The exchange of heat between the compressor oil and the heat recovery water is maximum at 75°C (167 ˚F) oil temperature. The oil from the heat exchanger outlet flows via the oil filter (OF), compressor element (E) and separator (AR) back to the inlet of the heat exchanger (HE).

The bypass valve bypasses the main oil cooler (Co) as long as the oil temperature remains below its set point of 75°C.

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.

5.4 Energy recovery (ER) maintenance

Compressor oil

For references used consult section *Energy recovery (ER) unit*.

Oil change:

1. Run the unit until warm. Stop the unit, switch off the isolating switch and close the air outlet valve of the compressor.
2. Depressurize the compressor and drain the oil by opening the drain valve. Also drain the oil from the heat exchanger by opening the drain valve on the energy recovery heat exchanger (HE). Close the valve after draining.
3. Resume oil change as described in section *Oil, oil filter and oil separator change* in this book.

Smart Temperature Control (STC) valves

Change the thermostat of the energy recovery (ER) system at the same time interval as the thermostat of the unit.

Energy recovery heat exchanger (HE)

If the temperature rise over the energy recovery (ER) 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 your supplier.

5.5 Energy recovery (ER) cooling water requirements

General

NOTE

Cooling water needs to fulfill certain requirements in order to avoid problems of scaling, fouling, corrosion or bacterial growth.

In open circuit cooling towers, protective measures must be taken to avoid the growth of harmful bacteria such as legionella pneumophila when there is a risk of inhalation of the water droplets.

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. Therefore the recommendations formulated in our cooling water specifications are a general guideline for acceptable coolant quality. However, where strict limits apply, a statement is made in the specification.

The water requirements refer to untreated water. When water is treated, some parameters will change. Water treatments should be carried out by a specialized water treatment company, taking the responsibility for the performance of the treated cooling water and the compatibility with the materials in the cooling circuit. This includes not only the selection of the appropriate additives, but also the correct application, monitoring of concentrations and properties, prevention of sludge formation and maintenance of the system. This applies also to treatment with antifreeze products. They must be provided with suitable stabilizers and inhibitors. Specifications are also depending on the type of cooling circuit (open, once through / recirculating with tower / closed) and on the

application (standard – max 65 °C cooling water temperature at the outlet) or energy recovery (water temperature up to 95 °C).

In case water is not in line with recommended values or if any doubt, consult the manufacturer.

Cooling water parameters

1. pH

The effect of pH is already included in the Ryznar Stability Index (RSI - see item 4 below), but also the pH itself is subject to limitations:

		pH	
Type of cooling system	**Materials**	**Standard**	**Energy recovery (ER)**
Single pass	Containing copper	**6.8** - **9.3**	**6.8** - **9.3**
	Stainless steel with carbon steel and / or cast iron	**6.8** - 9.3	**6.8** - 9.3
	Stainless steel only	**6** - 9.3	**6** - 9.3
Recirculating (with tower)	Containing copper	**6.8** - **9.3**	not applicable
	Stainless steel with carbon steel and / or cast iron	**6.8** - 9.3	
	Stainless steel only	**6** - 9.3	
Closed loop	Containing copper	**7.5** - **9.3**	**7.5** - **9.3**
	Stainless steel with carbon steel and / or cast iron	**7.5** - 9.3	**7.5** - 9.3
	Stainless steel only	**6** - 9.3	**6** - 9.3

The values in **bold** are rejection limits.

When the system contains Zn or Al, the pH must be < 8.5.

2. Total dissolved solids (TDS) and conductivity

The conductivity is expressed in µS/cm, the TDS in ppm.

Both parameters are related with each other. The conductivity is convenient for quick monitoring of general water quality, but the TDS is required for calculating the RSI. If only one of both parameters is measured, an estimation can be obtained by using a theoretical conversion factor (0.67):

TDS = conductivity x 0.67

3. Hardness

Different types of hardness together with the pH and the alkalinity of the water determine the equilibrium situation of the water, specified by the RSI.

In addition, the calcium hardness must be limited to:

	Ca (ppm Ca CO_3)	
Type of cooling system	**Standard**	**Energy recovery (ER)**
Single pass	< 500	< 2
Recirculating (with tower)	< 500	not applicable
Closed loop	< 1000	< 50

4. The Ryznar Stability Index (RSI)

The Ryznar Stability Index 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 Ryznar Stability Index is calculated as follows:

$RSI = 2*pH_s - pH$,

in which

- pH = measured pH (at room temp) of the 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
- B: depends on the water temperature at the outlet of the heat exchanger
- C: depends on the calcium hardness ($CaCO_3$)
- D: depends on the HCO_3^- concentration or M-alkalinity

The values of A, B, C and D can be found in below table:

Total dissolved solids (mg/l)	**A**	**Temperature (°C)**	**B**	**Ca hardness (ppm $CaCO_3$)**	**C**	**M-Alkalinity (ppm $CaCO_3$)**	**D**
< 30	0.1	0 - 1	2.3	9 - 11	0.6	10 - 11	1.0
30 - 320	0.2	2 - 6	2.2	12 - 14	0.7	12 - 14	1.1
> 320	0.3	7 - 11	2.1	15 - 17	0.8	15 - 17	1.2
		12 - 16	2.0	18 - 22	0.9	18 - 22	1.3
		17 - 22	1.9	23 - 28	1.0	23 - 28	1.4
		23 - 27	1.8	29 - 35	1.1	29 - 35	1.5
		28 - 32	1.7	36 - 44	1.2	36 - 44	1.6
		33 - 38	1.6	45 - 56	1.3	45 - 56	1.7
		39 - 43	1.5	57 - 70	1.4	57 - 70	1.8
		44 - 49	1.4	71 - 89	1.5	71 - 89	1.9
		50 - 55	1.3	90 - 112	1.6	90 - 112	2.0
		56 - 61	1.2	113 - 141	1.7	113 - 141	2.1
		62 - 67	1.1	142 - 177	1.8	142 - 177	2.2
		68 - 73	1.0	178 - 223	1.9	178 - 223	2.3
		74 - 79	0.9	224 - 281	2.0	224 - 281	2.4
		80 - 85	0.8	282 - 355	2.1	282 - 355	2.5
		86 - 91	0.7	356 - 446	2.2	356 - 446	2.6
		92 - 95	0.6	447 - 563	2.3	447 - 563	2.7
				564 - 707	2.4	564 - 707	2.8
				708 - 892	2.5	708 - 892	2.9
				893 - 1000	2.6	893 - 1000	3.0

Interpretation of the values obtained:

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

NOTE

As a general rule, the RSI index should be between 5.6 and 7.5. If that is not the case, contact a specialist.

5. **Free chlorine (Cl_2)**

   Disinfecting with chlorine is **not done in closed systems, neither in energy recovery (ER) systems**.

   A continuous 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. **Chlorides (Cl^-)**

   Chloride ions will create pitting corrosion on stainless steel. Their concentration should be limited, depending from the RSI value.

	RSI < 5.5	5.6 < RSI < 6.2	6.3 < RSI < 6.8	6.9 < RSI < 7.5	7.6 < RSI
Cl^- (ppm)	200	350	500	350	200

   For energy recovery (ER) systems, the limit is 100 ppm.

7. **Sulphates (SO_4^{2-})**

	Sulphate (ppm)	
Type of cooling system	**Standard**	**Energy recovery (ER)**
Single pass	< 1000	< 200
Recirculating (with tower)	< 1000	not applicable
Closed loop	< 400	< 200

8. **Iron and Manganese**

	Dissolved iron (ppm)		**Dissolved manganese (ppm)**	
Type of cooling system	**Standard**	**Energy recovery (ER)**	**Standard**	**Energy recovery (ER)**
Single pass	< 1	< 0.2	< 0.2	< 0.05
Recirculating (with tower)	< **1**	not applicable	< **0.2**	not applicable
Closed loop	< 1	< 0.2	< 0.2	< 0.05

   The values in **bold** are rejection limits.

9. **Copper**

	Copper (ppm)	
Type of cooling system	**Standard**	**Energy recovery (ER)**
Single pass	< 1	< 0.2
Recirculating (with tower)	< 1	not applicable
Closed loop	< 1	< 0.2

10. **Ammonium**

    The limit of **0.5 ppm** is a rejection limit.

The limitation only applies for copper containing systems.

11. **Suspended solids**

    Large particles (size > 10 µm) should not be present as they can be filtered out.

    Small particles (< 0.5 µm) are not taken into account.

    For particles between 0.5 µm and 10 µm, the following limits apply:

	Suspended solids (ppm)	
Type of cooling system	**Standard**	**Energy recovery (ER)**
Single pass	< 10	< 1
Recirculating (with tower)	< 10	not applicable
Closed loop	< 10	< 1

12. **Oil or grease**

    < **1 ppm** (rejection value)

13. **Bacteria**

    If bacteria are present, they must be aerobic. Anaerobic bacteria (in closed systems) must be avoided.

	Biology (CFU/ml)	
Type of cooling system	**Standard**	**Energy recovery (ER)**
Single pass	< 10^5 / **< 10^7**	< 10^3 / **< 10^5**
Recirculating (with tower)	< 10^5 / **< 10^7**	not applicable
Closed loop	< 10^3 / **< 10^5**	< 10^3 / **< 10^5**

The table shows the recommended values. The values in **bold** are rejection limits.

NOTE

If additives are used 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

5.6 Energy recovery (ER) data

Reference conditions

See section *Reference conditions and limitations*.

Effective working pressure

See 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)

Pressure drop

Water flow (l/min)	Pressure drop (Bar)	
	Pack	Full-Feature
10.4	0.04	0.047
15	0.057	0.098
20	0.09	0.185
25	0.122	0.288
30	0.165	0.421
35	0.209	0.567
38	0.237	0.66

Pressure drop equation	
Pack	Full-Feature
$dp = 0.0013599891*Q^{1.4090458825}$	$dp = 0.0003851822*Q^{2.0528278582}$
dp (Bar) Q (l/min) Valid between 10-38 l/min	

Reading settings

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

Temperature input		Minimum setting	Nominal setting	Maximum setting
Water inlet temperature of energy recovery	˚C	0	70	99
Water inlet temperature of energy recovery	˚F	32	158	210
Energy recovery water outlet temperature	˚C	0	90	99
Energy recovery water outlet temperature	˚F	32	194	210

To modify a setting, consult the relevant section in the description of the controller.

Recoverable energy

The recoverable energy can be calculated by using the following formula:

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

The maximum recoverable energy is approx. 75 - 80% of the shaft power of the compressor.

If you compare the recoverable energy with the electrical input power, the percentage will be lower for air-cooled compressors because the fan also requires some electrical energy which is not recoverable.

For VSD compressors the recoverable energy is also a little lower because the drive requires some electrical energy which is not recoverable.

Data for low temperature rise/high water flow systems

In the tables below, typical values are given for the above mentioned type of water flow system.

Parameter	Unit	GA 22 VSD^s 7bar 4350 RPM	GA 26 VSD^s 7bar 5050 RPM	GA 30 VSD^s 7bar 5700 RPM	GA 37 VSD^s 7bar 6775 RPM
Recoverable energy	kW	19.72	21.67	23.48	26.47
Recoverable energy	hp	26.45	29.06	31.49	35.50
Water flow	l/min	28.3	31.1	33.7	38
Water flow	cfm	1.00	1.10	1.19	1.34
Temperature at inlet	˚C	50	50	50	50
Temperature at inlet	˚F	122	122	122	122
Temperature at outlet	˚C	60	60	60	60
Temperature at outlet	˚F	140	140	140	140
Power rating	kW	22	26	30	37
Water	kJ/kgK	4.18	4.18	4.18	4.18

Table 5: Low pressure variant

Parameter	Unit	GA 22 VSD^s 7bar 5650 RPM	GA 26 VSD^s 7bar 6100 RPM	GA 30 VSD^s 7bar 7300 RPM	GA 37 VSD^s 7bar 8680 RPM
Recoverable energy	kW	16.49	17.63	20.68	24.17
Recoverable energy	hp	22.11	23.64	27.73	34.41
Water flow	l/min	23.67	25.31	29.68	34.7
Water flow	cfm	0.84	0.89	1.05	1.23
Temperature at inlet	˚C	50	50	50	50
Temperature at inlet	˚F	122	122	122	122
Temperature at outlet	˚C	60	60	60	60
Temperature at outlet	˚F	140	140	140	140
Power rating	kW	22	26	30	37
Water	kJ/kgK	4.18	4.18	4.18	4.18

Table 6: High pressure variant

Data for high temperature rise/low water flow systems*

In the tables below, typical values are given for the above mentioned type of water flow system.

Parameter	Unit	GA 22 VSD^s 7bar 4350 RPM	GA 26 VSD^s 7bar 5050 RPM	GA 30 VSD^s 7bar 5700 RPM	GA 37 VSD^s 7bar 6775 RPM
Recoverable energy	kW	21.26	23.41	25.4	28.7
Recoverable energy	hp	28.51	31.39	34.06	38.49
Water flow	l/min	7.63	8.4	9.12	10.3
Water flow	cfm	0.27	0.30	0.32	0.36
Temperature at inlet	˚C	20	20	20	20
Temperature at inlet	˚F	68	68	68	68
Temperature at outlet	˚C	60	60	60	60
Temperature at outlet	˚F	140	140	140	140
Power rating	kW	22	26	30	37
Water	kJ/kgK	4.18	4.18	4.18	4.18

Table 7: Low pressure variant

Parameter	Unit	GA 22 VSD^s 7bar 5650 RPM	GA 26 VSD^s 7bar 6100 RPM	GA 30 VSD^s 7bar 7300 RPM	GA 37 VSD^s 7bar 8680 RPM
Recoverable energy	kW	19.73	21.11	24.77	28.98
Recoverable energy	hp	26.46	28.31	33.22	38.86
Water flow	l/min	7.08	7.57	8.89	10.4
Water flow	cfm	0.25	0.27	0.31	0.37
Temperature at inlet	˚C	20	20	20	20
Temperature at inlet	˚F	68	68	68	68
Temperature at outlet	˚C	60	60	60	60
Temperature at outlet	˚F	140	140	140	140
Power rating	kW	22	26	30	37
Water	kJ/kgK	4.18	4.18	4.18	4.18

Table 8: High pressure variant

* Please keep in mind that this type of application can have a negative effect on the compressor performance.

6 Operating instructions

6.1 Initial start-up

WARNING

The operator must apply all relevant safety precautions. Also consult section *Problem solving*.

NOTE

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

1. Remove the canopy panel(s) in order to get access to the internal components.
2. Remove the red transport spacers (1) and the related bolts under the air receiver (only present on the low pressure variant) and motor.

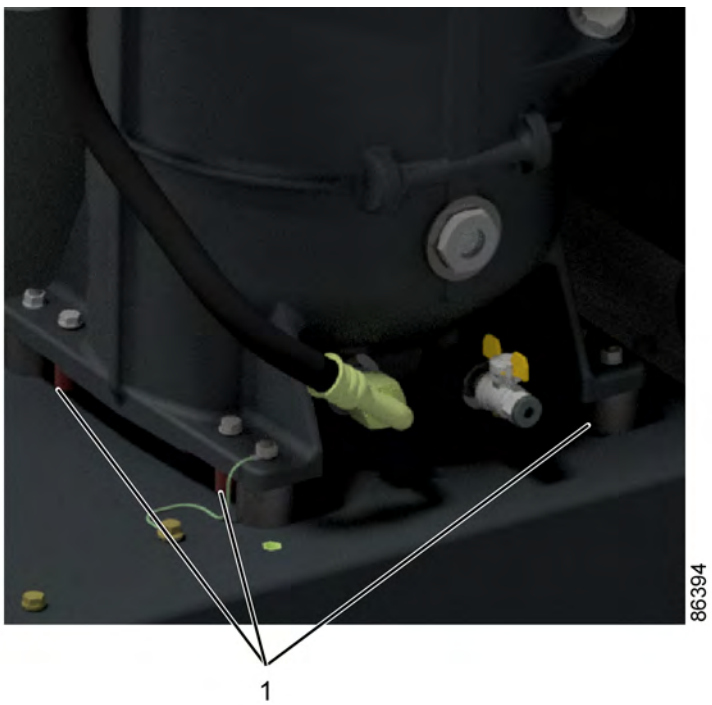


Figure 27: Low pressure variant

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. Re-tighten the connections according to the service diagram before start-up.
4. Check the voltage selecting wires at the primary side of transformer T1.
5. Fit the air outlet valve (AV). See section *Introduction* for the position of the valve.
6. Close the valve.
7. Connect the air net to the valve.
8. Fit the manual condensate drain valve (Dm).

9. Close the valve.
10. Check the oil level. The oil level should reach the bottom of the oil filler neck (FC).

Figure 28: Low pressure variant

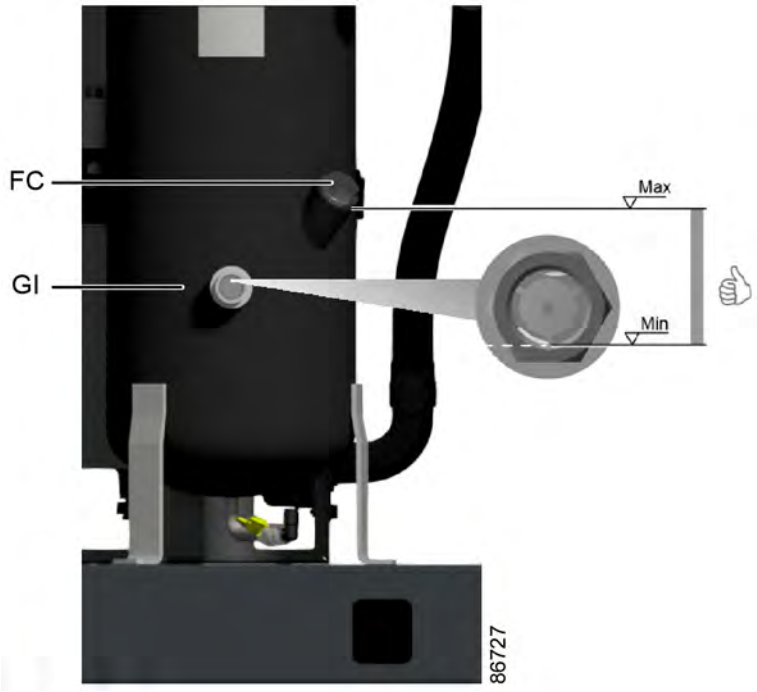


Figure 29: High pressure variant

Minimum level should reach the oil sight glass (GI) when the compressor is stopped.

If needed, top up the oil.

Take care that no dirt drops into the oil system.

Refit and tighten the filler plug (FC).

11. Provide labels, warning the operator that:

- The compressor may automatically restart after voltage failure (if activated, consult your supplier).
- The compressor is automatically controlled and may be restarted automatically.
- The compressor may be remotely controlled.

12. Switch on the voltage.

On Full-Feature compressors: switch on the voltage and check the rotation direction of the dryer fan, this is an indication of the rotation direction of the dryer compressor.

Rotation arrows, visible through the grating in the roof, are provided on the plate below the fan to indicate the correct rotation direction of the fan motor.

13. On compressors with optional energy recovery system, drain valves, shut-off valves and a regulating valve should be fitted by the customer in the cooling water piping.

14. Open the air outlet valve.

Start and run the compressor for a few minutes. Check that the compressor operates normally.

6.2 Starting

Figure 30: Control panel

1. Open the air outlet valve.
2. Switch on the voltage. Check that voltage on LED (5) lights up.
3. Press start button (7) on the control panel. The compressor starts running and the automatic operation LED (4) lights up.

6.3 During operation

NOTE

Keep the panels closed during operation.

DANGER

When the motors are stopped and the automatic operation LED is alight, the motors may start automatically.

WARNING

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

1. Check the oil level daily.

   A few minutes after stopping, the oil level should reach the bottom of the oil filler neck (FC).

   If the oil level is too low, wait until the compressor has depressurized. Push the emergency stop button to avoid the compressor to start unexpectedly. Next, close the air outlet valve and open the manual drain valve (Dm) until the air system between oil separator/air receiver vessel and

outlet valve is fully depressurized. See section *Condensate system* for location of the outlet valve and water drain.

Unscrew oil filler plug (FC) one turn to permit any pressure left in the system to escape. Wait a few minutes. Remove the plug and add oil until the level reaches the filler opening. Fit and tighten the plug (FC).

Unlock the emergency stop button, select the STOP icon on the display and press reset before restarting.

Regularly check that condensate is discharged during operation. See section *Condensate system*. The amount of condensate depends on environmental and working conditions.

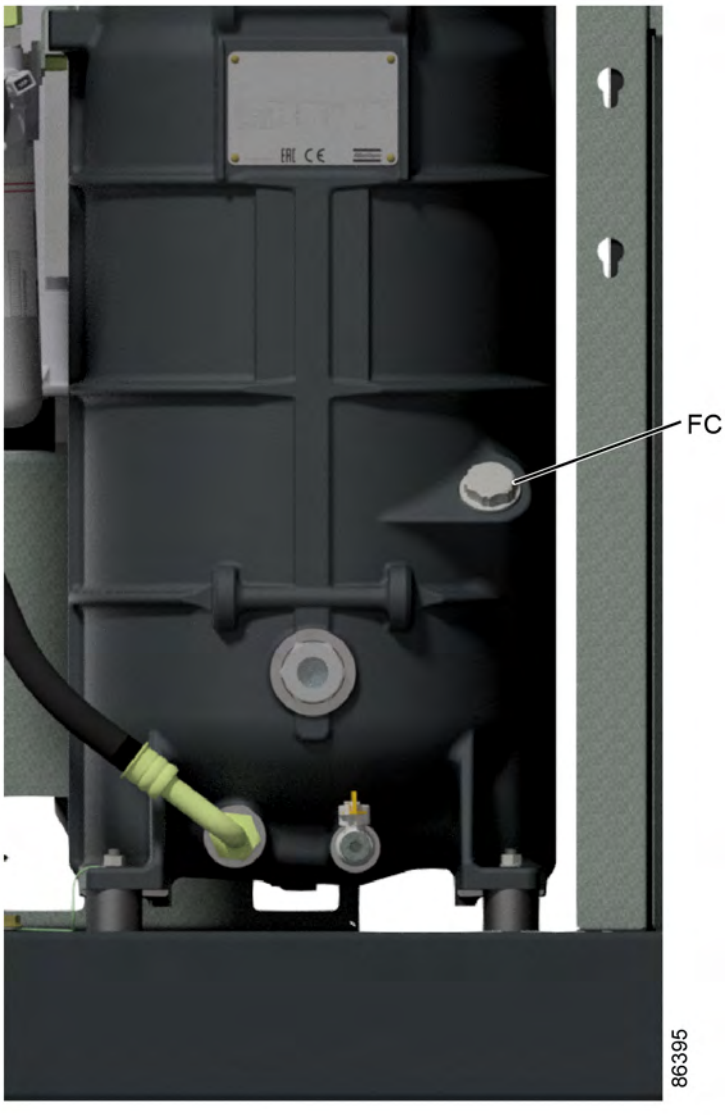


Figure 31: Low pressure variant

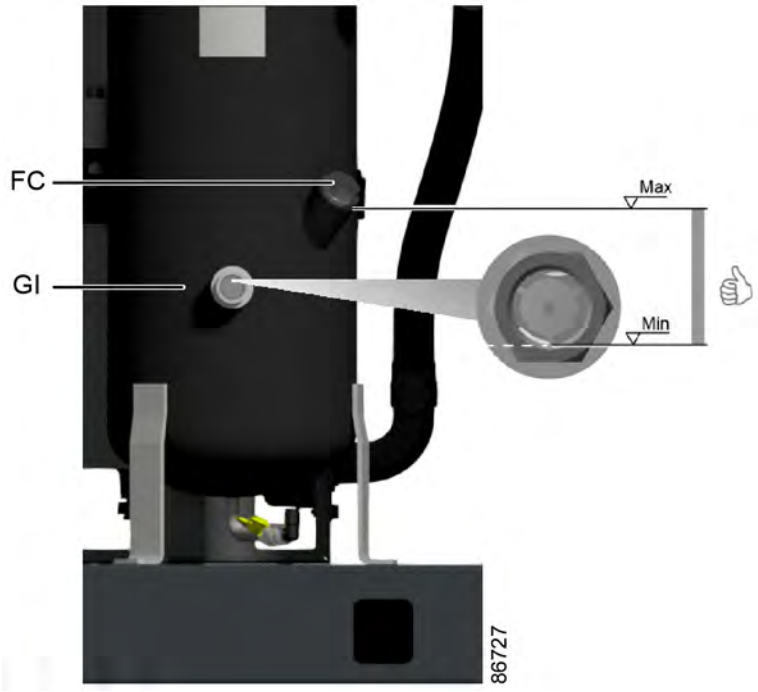


Figure 32: High pressure variant

2. Regularly check the controller display.

Check the display (1) 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 (see section *Problem solving*) if alarm LED (2) is lit or flashes, see section *Icons used*. The display (1) 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*.

6.4 Stopping

1. Press stop button on the control panel. Automatic operation LED goes out and the compressor stops.
2. Close the air outlet valve.
3. Press the test button on top of the electronic water drain(s) to the depressurize the piping between air receiver and outlet valve, next open the manual drain valve (Dm). See section *Condensate system*.
4. Switch off the voltage.
5. On compressors with optional energy recovery system:
   - Close the cooling water inlet valve.
   - If freezing temperatures can be expected, drain the cooling system completely.

WARNING

To stop the compressor in the event of an emergency, press the emergency stop button. Alarm LED flashes.

- **Remedy the problem cause.**
- **Next, unlock the button by pulling it out.**
- **Next, 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 the emergency stop button for normal stopping!

6.5 Taking out of operation

1. Disconnect the compressor from the mains.
2. Unscrew the oil filler plug only one turn to permit any pressure in the system to escape.
3. Shut off and depressurize the part of the air net which is connected to the outlet valve. Disconnect the compressor air outlet pipe from the air net.
4. Drain the oil.
5. Drain the condensate circuit and disconnect the condensate piping from the condensate net.
6. On compressors with optional energy recovery system:
   - Isolate and disconnect the water system from the cooling water net.
   - Drain the water circuit.

6.6 Boostflow

The unit comes with Boostflow Mode, allowing you to temporarily stretch the limit of your compressor without negative operational or reliability consequences. The extra boost delivers 5% more flow for a total period of 100 hours throughout the entire lifetime of the compressor.

The Boostflow feature improves the flexibility of a unit to provide the needed flow to the air net. No additional action is needed from end users, the function is as standard enabled and will automatically activate if needed.

The **Boostflow active** warning shows that the feature has been activated. This means that the unit has to compensate for a higher demand from the production process.

In practice, this feature increases the flow of the unit. Note however that there is a limit of 100 hours to the use of it. Therefore, in case the feature gets activated, we suggest contacting your supplier. They will help you investigate what is needed to guarantee everything is sized correctly in the air net to maintain the production process at the optimal level.

Please note that under certain conditions boostflow is not allowed to start. If, for example, the ambient temperature is too high; this is to protect the machine from damage.

In case you do not want to use this feature, you have the option to switch this off by tapping the **Boostflow** icon on the controller display. However we do not recommend disabling it as it will prevent your machine from optimally providing your required flow rate.

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Reference	Description
1	Boostflow enabled
2	Boostflow disabled

When tapping the icon you will see a pop up selection box where a selection between 2 modes can be made:

- Standard mode: the unit will never increase the flow beyond its nominal capacity.
- Boost mode: if a higher flow of air is needed and the ambient conditions are within the allowable limits, the unit will increase its flow.

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7 Maintenance

7.1 Preventive maintenance schedule

WARNING

Before carrying out any maintenance, repair work or adjustments, proceed as follows:

- **Stop the compressor.**
- **Close the air outlet valve.**
- **Open the condensate drain valve to depressurize the air system between air receiver and outlet valve.**
- **Press the emergency stop button.**
- **Switch off the voltage. Lock Out and Tag Out (LOTO).**
- **Wait 5 minutes for the vessel to depressurize.**
- **Wait 10 minutes for the converter capacitors to discharge before starting any electrical checks, work and/or repair.**

For detailed instructions, see section *Problem solving*.

The operator must apply all relevant safety precautions.

Residual risks

Residual risks are risks that remain at a certain level even after careful risk identification/ assessment and risk mitigation/elimination.

WARNING

Magnetism

The magnets used in the motor of the GA 45 VSD are samarium-cobalt magnets. These magnets are much stronger than normal magnets. A safe distance (at least 20 cm (7.87 inch)) should be kept between the magnets and all objects that can be damaged by magnetism (e.g. mechanical watches, heart pacemakers, CRT monitors and televisions, credit cards, diskettes, video tapes and other magnetically stored media).

Warranty - Product Liability

Use only authorized parts. Any damage or malfunction caused by the use of unauthorized 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 agreements

A range of service agreements are available to suit your needs :

- Inspection Plan
- Preventive Maintenance Plan
- Warranty+ Plan
- Total Responsibility Plan

Contact your supplier to set up a tailor-made service agreement. It will ensure optimum operational efficiency, minimize downtime and reduce the total life cycle cost.

General

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

Intervals

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

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

Service plans

Besides the daily and 3-monthly checks, preventive maintenance actions 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. After servicing, the intervals must be reset, see section *Service menu*.

Preventive maintenance schedule

Period	Action
Daily	Check oil level. If needed, top up the oil. See section *During operation*. Check readings on display. Visually check that condensate is automatically discharged during operation. You can use the test button on top of the electronic water drain to check the drain function.
Monthly(1)	Check and clean the relative humidity sensor. See section *RH sensor*.
3-monthly(1)	Check coolers, clean if necessary. Remove the air filter element and inspect. Replace damaged or heavily contaminated elements. Check the filter elements of the electric cabinet. Replace if necessary. Clean the NEOS Next heat sink with a vacuum cleaner.

Table 9: Checklist for compressors

Period	Action
Daily	Check that condensate is discharged by the dryer drain by waiting for some time during operation. You can use the test button on top of the electronic water drain to check the drain function.

Period	Action
Monthly[1]	Condenser cleaning: • Stop the compressor, close the air outlet valve and switch off the voltage. • Remove any dirt on the condenser inlet with a vacuum cleaner. • Next, clean with an air jet in the reverse direction to normal flow. Use low pressure air. Keep the compressed air nozzle more than 30 cm away from the condenser to avoid damaging the of condenser fins. • Remove dust from inside the dryer, e.g. with a vacuum cleaner. Do not use water or solvents to clean the condenser. Drive cleaning instructions: • Clean NEOS Next heat sink with a vacuum cleaner.

Table 10: Checklist for units with integrated dryer

[1]More frequently when operating in a dusty atmosphere.

	A-service every 4000 running hours[1]	B-service every 8000 running hours[2]	D-Service every 24000 running hours[3]
Check for water and oil leakages	x	x	x
Change the air filter		x	x
Check the prefilters	x	x	x
Change the drain(s) filter mesh	x	x	x
Change the oil	x[4][5]	x[5]	x
Change the oil filter	x[4][5]	x[5]	x
Change the oil separator element	x[6]	x	x
Overhaul non return valve of the scavenge line		x	x
Overhaul the minimum pressure valve		x	x
Overhaul the thermostatic valve		x[7]	x
Overhaul the condensate drain(s)		x	x
Change the motor top bearing			x
Overhaul the inlet valve			x[8]
Smart Temperature Control (STC) valve			x

Table 11: Preventive Maintenance schedule programmed in the controller

[1]Or yearly (indicated by real time counter), whichever comes first.

[2]Or every 2 years (indicated by real time counter), whichever comes first.

[3]For compressor elements used on operating pressures below or equal to 10 bar (145 psi), the service can be postponed to 32000 running hours.

(4)When Roto Synthetic Fluid XTEND DUTY is used, the oil and oil filter change are part of the B-service in mild condititons.

(5)The oil change intervals are only applicable in mild conditions. In demanding or extreme conditions, the life of the oil can be reduced (see table below). Please contact your supplier to guarantee the life of your product in these conditions (supplier reference 9845 0141 01).

(6)Only for high pressure units the oil separator element has to be serviced at 4000h, this extra oil separator element is included in the 8000h kit.

(7)If the unit is equipped with optional energy recovery (ER), the energy recovery (ER) thermostat should also be replaced.

(8)When the unit has over 300 000 start/stops (over 10 starts per hour) it's recommended to service the inlet valve and solenoid block.

Oils

In order to achieve the best machine performance and guarantee the reliability, it is required to use genuine Atlas Copco lubricants. Their tailor made formulation is the result of years of field experience, research and in-house development. Consult the Spare Parts list for part number information.

DANGER

Avoid mixing lubricants of different brands or types as they may not be compatible and the oil mix may have inferior properties. A label, indicating the type of oil filled ex factory is stuck on the air receiver/oil tank.

Ambient temperature	Humid	Dust	Duty type
Below 30 °C (86 °F)	No	No	Mild
Below 30 °C (86 °F)	Yes	No	Mild
Below 30 °C (86 °F)	No	Yes	Mild
Below 30 °C (86 °F)	Yes	Yes	Demanding
Between 30 °C (86 °F) and 40 °C (104 °F)	No	No	Demanding
Between 30 °C (86 °F)and 40 °C (104 °F)	Yes	No	Demanding
Between 30 °C (86 °F) and 40 °C (104 °F)	No	Yes	Demanding
Between 30 °C (86 °F) and 40 °C (104 °F)	Yes	Yes	Extreme
Above 40 °C (104 °F)	-	-	Extreme

Table 12: Relation between operating conditions and duty type

DANGER

Always consult your supplier if a timer setting has to be changed.

7.2 Oil specifications

See section *Preventive maintenance schedule* for the advised oil replacement intervals.

WARNING

Avoid mixing lubricants of different brands or types as they may not be compatible and the oil mix may have inferior properties. A label, indicating the type of oil filled ex-factory, is stuck on the air receiver/oil tank.

WARNING

Only genuine Atlas Copco oils to be used.

Oil level to be checked on a daily basis.

Timely service of consumables is needed.

Use the correct personal protection equipment (gloves and safety goggles).

Roto Synthetic Fluid ULTRA

Roto Synthetic Fluid ULTRA is a synthetic oil based lubricant, specially developed for use in single stage oil injected screw compressors running in demanding conditions. Roto Synthetic Fluid ULTRA can be used for compressors operating at ambient temperatures between 0 ˚C (32 ˚F) and 45 ˚C (113 ˚F). For more extreme conditions, or when longer oil life is required, it is recommended to use Roto Synthetic Fluid XTEND DUTY.

Roto Synthetic Fluid XTEND DUTY

Atlas Copco's Roto Synthetic Fluid XTEND DUTY 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 Synthetic Fluid XTEND DUTY can be used for compressors operating at ambient temperatures between 0 ˚C (32 ˚F) and 46 ˚C (115 ˚F). Roto Synthetic Fluid XTEND DUTY is the standard lubricant for oil injected screw compressors equipped with freeze protection or Energy Recovery.

If the compressor is regularly operating in ambient temperatures above 40 °C (104 °F), oil lifetime is reduced. See sections *Preventive maintenance schedule* and *Oil, oil filter and oil separator change*.

Roto Synthetic Foodgrade Ultra

Special oil, delivered as an option.

Atlas Copco's Roto Synthetic Foodgrade Ultra 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 Synthetic Foodgrade Ultra can be used for compressors operating at ambient temperatures between 0 ˚C (32 ˚F) and 46 ˚C (115 ˚F).

Roto Synthetic Foodgrade Ultra has all required certification for use in food & beverage industry: like NSFH1, Kosher, Halal and Allergen Free approvals.

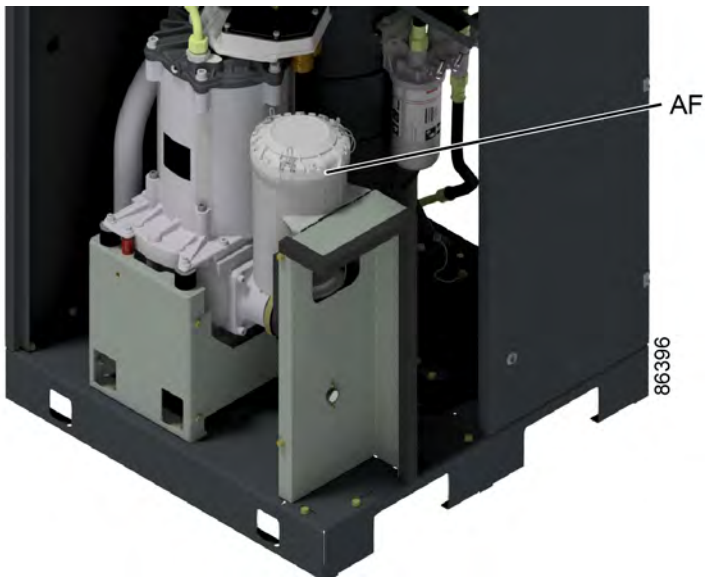
If the compressor is regularly operating in ambient temperatures above 35 °C (95 °F), oil lifetime is reduced. See sections *Preventive maintenance schedule* and *Oil, oil filter and oil separator change*.

7.3 Drive motor

Bearing maintenance

The motor bearing is lubricated by oil injection. Re-greasing is not necessary. See section *Preventive maintenance schedule* for bearing overhaul.

7.4 Air filter



Procedure

1. Stop the compressor. Switch off the voltage.
2. Remove the cover of the air filter (AF) by opening the clip system. Remove the filter element.
3. Fit the new element and the cover.

7.5 Oil, oil filter and oil separator change

WARNING

The operator must apply all relevant safety precautions.

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.

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.

If the compressor is equipped with an Energy Recovery unit, also consult section *Maintenance for energy recovery systems*.

WARNING

Only genuine Atlas Copco oils to be used.

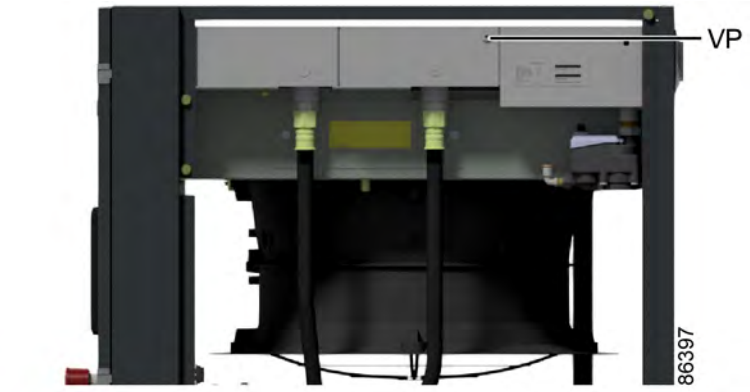
Oil level to be checked on a daily basis.

Timely service of consumables is needed.

Use the correct personal protection equipment (gloves and safety goggles).

Procedure

1. Run the compressor until warm and stop the compressor.
   - Close the air outlet valve.
   - Wait 5 minutes for the compressor to depressurize the vessel.
   - Open the condensate drain valve to depressurize the cooler (see condensate system) and close again.
   - Switch off the voltage.
   - Lock out, tag out.
   - Unscrew the oil filler plug (FC) just one turn to permit any remaining pressure in the system to escape.
2. Remove the vent plug (VP) of the oil cooler.



3. Open the oil drain valve (Do) and collect the oil in a collector.

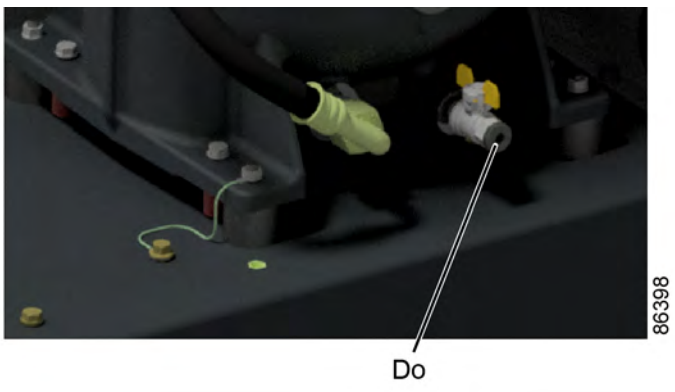


Figure 33: Low pressure variant

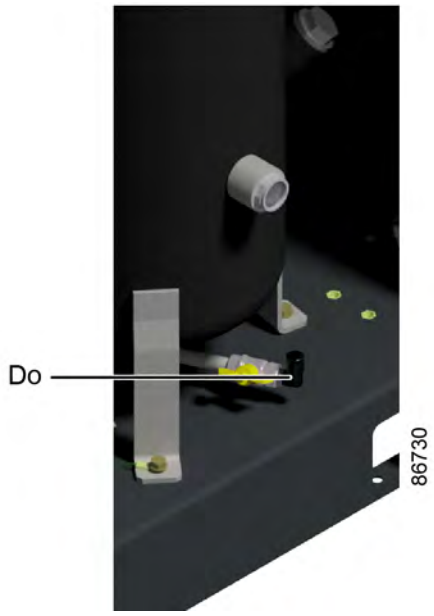


Figure 34: High pressure variant

4. Open the oil drain valve on the element outlet hose (DO1) and collect the oil in a collector.

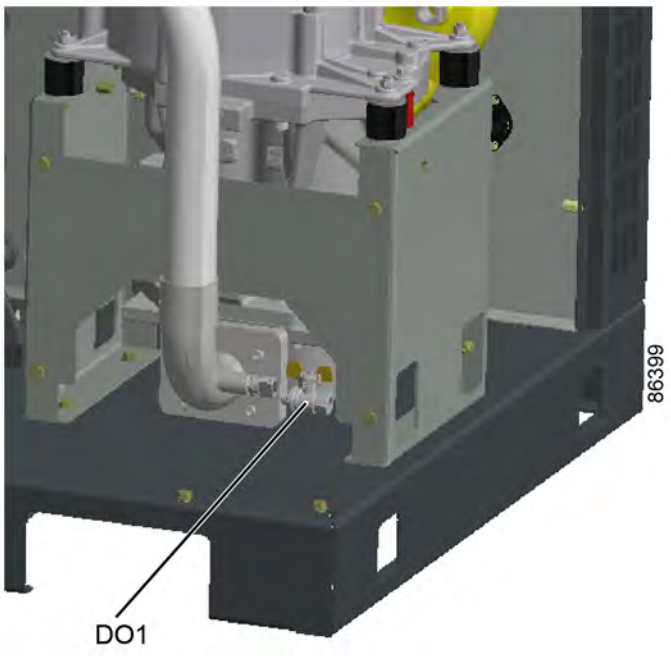


Figure 35: Low pressure variant

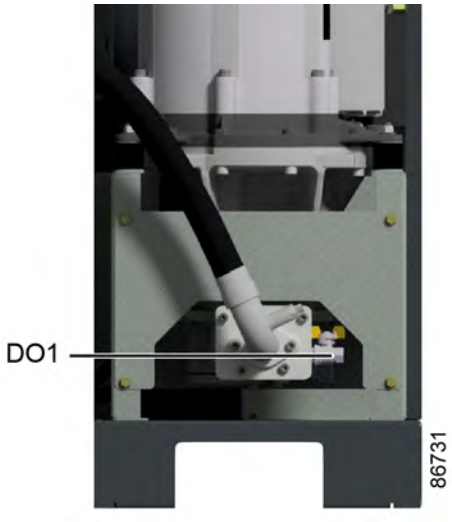


Figure 36: High pressure variant

- With the collector in place, open the drive train top cover.
- Rotate the motor in counter-clockwise direction for 5 rotations.
- Close the drive train top cover.
- Remove the oil filter (OF).
- Collect the oil in a collector and deliver it to the local collection service.
- Refit the vent plugs after draining.

5. Close the oil drain valves (Do, Do1).
6. Clean the seat on the manifold. Lubricate the O-ring and metal lips of the new oil filter and screw it into place. Tighten firmly by hand.
7. Remove the filler plug (FC).
8. Fill the air receiver with oil until the level reaches the filler neck.

Figure 37: Low pressure variant

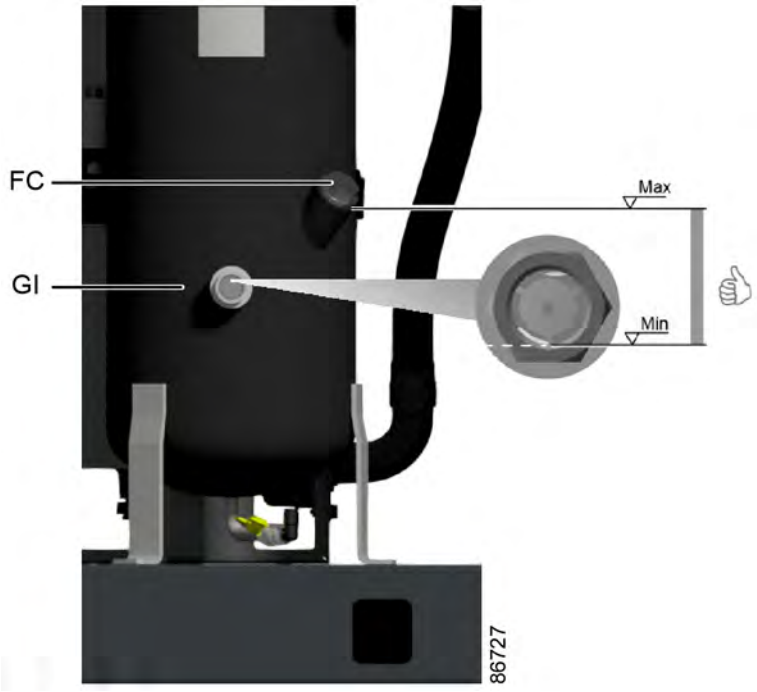


Figure 38: High pressure variant

Take care that no dirt drops into the system. Refit and tighten the filler plug (FC).

9. Run the compressor loaded for a few minutes.
10. Stop the compressor.
11. Close the air outlet valve and switch off the voltage.
    - Wait 3 minutes for the compressor to depressurize the vessel.
    - Open the condensate drain valve (Dm) to depressurize the cooler and close again. See section *Condensate system*.
    - Unscrew the oil filler plug (FC) just one turn to permit any remaining pressure in the system to escape.
12. Fill the air receiver (AR) with oil until the level reaches the filler neck. See section *During operation*.
13. Refit and tighten the filler plug (FC).
14. When the oil level is too low, go back to step 8.

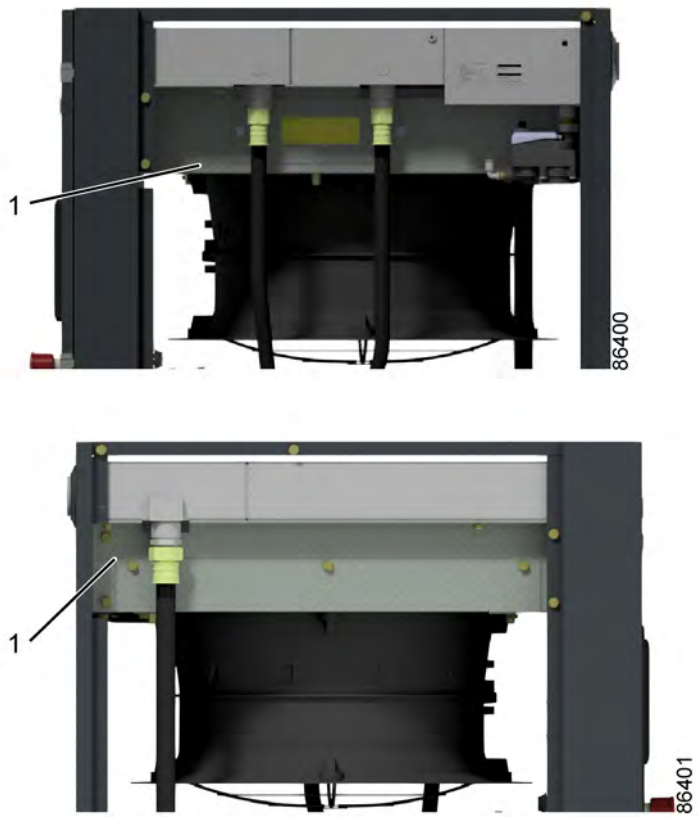
7.6 Coolers

General

Keep the coolers clean to maintain their efficiency.

Procedure

1. Stop the compressor, close the air outlet valve and switch off the voltage.
2. Cover all parts underneath the cooler.
3. Remove the service plate (1) at the fan compartment.



4. Remove dirt from the coolers with a fiber brush. Brush in the direction of the cooling fins.
5. Remove dirt from the fan with a fiber brush.
6. Clean with an air jet in the direction of the normal flow.
7. If it is necessary to wash the coolers with a cleaning agent, consult your supplier.

NOTE

After maintenance on the fan and on the coolers, remove the material that was used as cover.

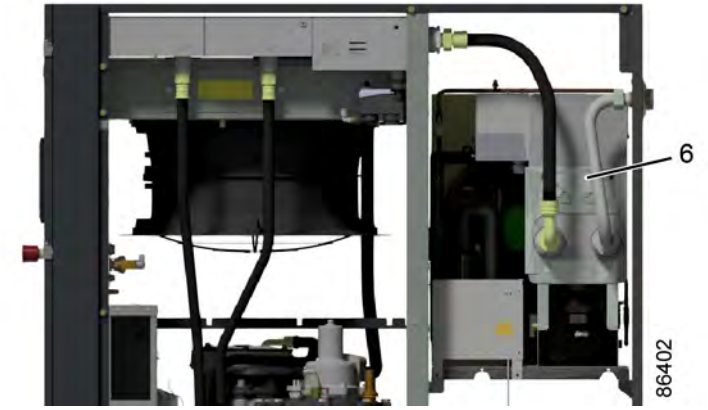
8. Mount the service plate (1) at the fan compartment.

Procedure for NEOS Next heat sink

1. Disassemble the fans at the bottom of the NEOS Next heat sink.
2. Remove dirt from the fans with a fiber brush.
3. If required, vacuum or blow trough the heat sink with clean, dry air.
4. Remove dirt from the heat sink at the bottom with a fiber brush.
5. Reinstall the fans.
6. Check the fan functionality after re-installation.

Procedure for compressors with dryer.

1. Remove dirt on the inlet of the condenser (6) with a fiber brush.



2. Clean with an air jet in the direction of the normal flow.
3. Clean the condenser area with a fiber brush.

7.7 Air dryer

Safety precautions

DANGER

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 vapors. Check that the working area is adequately ventilated.**

Be aware that certain components such as the refrigerant compressor and the discharge pipe can become quite hot (up to 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

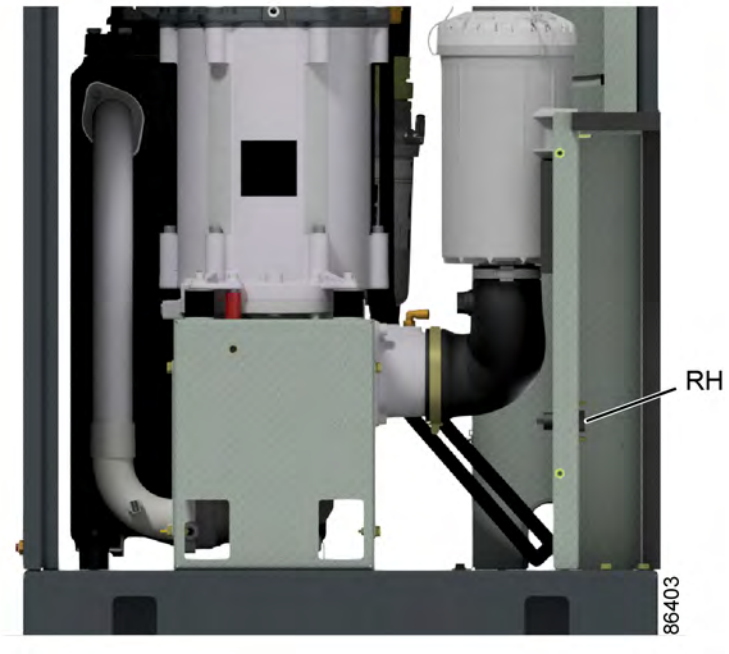
WARNING

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.**

7.8 RH sensor

Cleaning



Reference	Description
RH	Relative humidity sensor

1. Remove the front service panel with the key delivered with the compressor.
2. Disconnect the RH sensor and remove it from the panel by loosening the bolt.
3. Clean the RH sensor with isopropanol (fast solution) or de-mineralised water and let it dry.
4. Refit and reconnect the RH sensor.
5. Refit the service panel.

7.9 Safety valves

DANGER

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

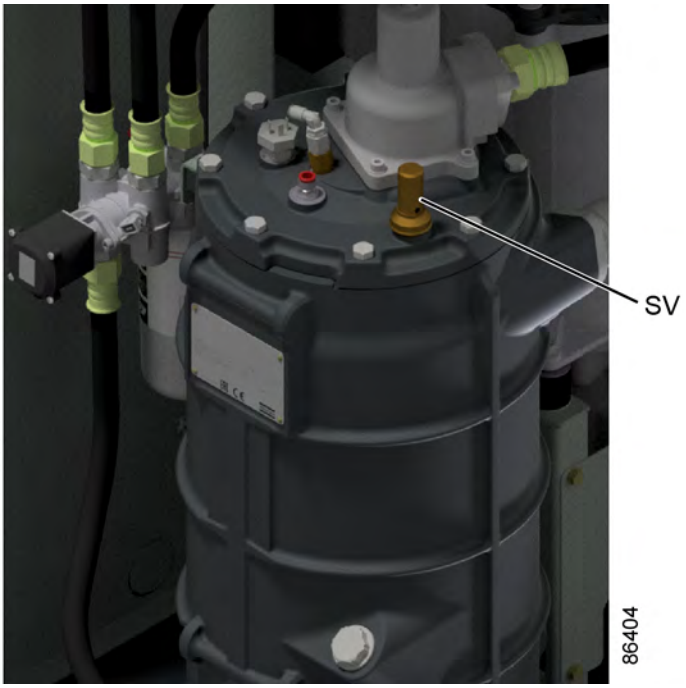


Figure 39: Low pressure variant

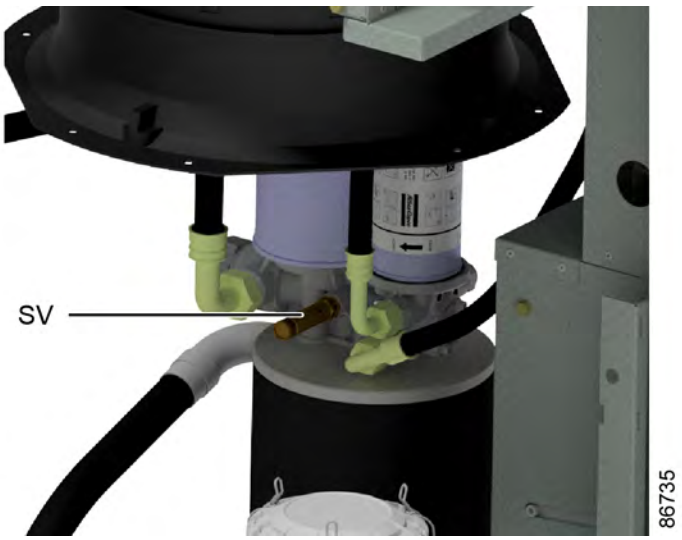


Figure 40: High pressure variant

Testing

WARNING

The safety valve (SV) test can only be performed by authorized personnel and is protected by a security code.

If the safety valve does not open at the set pressure stamped on the valve, it needs to be replaced.

7.10 Filters

UD+ filters

The filter elements of oil mist filters (UD+) should be replaced after 4000 hours. The gauge or pop-up is not a measure, as a typical oil mist filter operates in the steady state mode during its life and this mode is e.g. 200-250 mbar.

Note that the indicator or gauge will not move into the red area but will stay yellow or orange during operation.

Summarizing, the following service intervals should be observed (whatever comes first):

- 4000 operating hours
- 12 months in use
- Pressure drop: 350 mbar

7.11 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 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.

7.12 Drain replacement

User access level

To replace the drain, you need to be in expert mode. This can be done as follows:

1. Tap the **Access Level** button (1) at the upper right corner of the screen.
2. Select the **Expert mode** (2).
3. Tap the confirm button (3).

4. Type in the password to gain access.

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Drain replacement

1. In the **CAN Troubleshooting** menu press **Make Inoperative** and confirm. Make sure that the compressor is off and in local control. In the inoperative state you will have new menu options to install or remove devices.

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2. Choose **Remove Device** and select the drain you want to replace in the drop-down menu. The data will be cleared from the configuration. Reboot the controller.

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3. To check if the drain has been removed correctly, you can navigate to the **IO modules** menu. The word **Removed** should be displayed now.

86423

4. Navigate to **Install Device**. The drain you just removed should now be available in the list. Select it and confirm the installation.

   Confirm and restart the controller from the **CAN Troubleshooting** menu.
5. Verify drain communication in the **CAN Troubleshooting** > **IO modules** menu.
6. Restart the controller from the **CAN Troubleshooting** menu.

The easiest way to replace a drain is through the **CAN Troubleshooting** menu. Replacing drains should be done one by one. Removing multiple devices at the same time is not recommended.

8 Problem solving

WARNING

Before carrying out any maintenance, repair work or adjustment, stop the compressor, wait for 3 minutes and close the air outlet valve.

Press the emergency stop button and switch off the voltage. Lock Out Tag Out (LOTO) the electrical supply.

Press the test button on top of the electronic water drain until the air system between the air receiver and outlet valve is fully depressurized.

Depressurize the compressor by opening the oil filler plug one turn.

For the location of components, see sections:

- ***Introduction***
- ***Condensate system***
- ***Operating instructions***
- ***Maintenance***

Open and lock the isolating switch.

Lock the air outlet valve during maintenance or repair as follows:

- **Close the valve.**
- **Remove the screw fixing the handle with the wrench delivered with the compressor.**
- **Lift the handle and turn it until the slot of the handle fits over the blocking edge on the valve body.**
- **Fit the screw.**

WARNING

The operator must apply all relevant safety precautions.

WARNING

Wait for at least 10 minutes before starting any electrical repairs as dangerous high voltage remains on the capacitors of the start and speed regulation unit for some minutes after switching off the voltage.

Faults and remedies, compressor

Condition	Fault	Remedy
Condensate is not discharged from condensate separator during loading	Discharge flexible clogged	Check and correct as necessary.

Condition	Fault	Remedy
Compressor air output or pressure below normal	Air consumption exceeds air delivery of compressor	Check equipment connected.

Condition	Fault	Remedy
	Choked air filter element	Replace filter element.
	Solenoid valve malfunctioning	Replace valve.
	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
Safety valve blows	Minimum pressure valve malfunctioning	Check and have defective parts replaced.
	Oil separator clogged	Have element replaced.
	Safety valve out of order	Have valve checked. Replace if necessary.
	On Full-Feature compressors, dryer piping clogged due to formation of ice	Have system checked by your supplier.

Condition	Fault	Remedy
Compressor element outlet temperature or delivery air temperature above normal	Oil level too low	Check and correct, see section *During operation*.
	On air-cooled compressors, insufficient cooling air or cooling air temperature or relative humidity is too high	Check for cooling air restriction or improve ventilation of the compressor room. Avoid recirculating of cooling air. If installed, check capacity of compressor room fan.
	Oil cooler clogged	Clean cooler.
	By-pass valve malfunctioning	Have valve tested.
	Air cooler clogged	Clean cooler.
	Compressor element out of order	Consult your supplier.
	Degraded oil	Check service intervals, see section *Preventive maintenance schedule*.
	On compressors with optional energy recovery system, cooling water flow too low.	Increase flow.
	On compressors with optional energy recovery system, restriction in cooling water system.	Consult your supplier.

Condition	Fault	Remedy
Low Load Alarm triggered: Compressor running with too low oil temperature over a longer period of time	Solenoid valve malfunctioning	Replace valve.
	Extreme low usage of compressor	Increase loading profile (longer and/or more load cycles required). If not possible, consult your supplier.

Faults and remedies, NEOS converter

Controller alarm code (Decimal)	NEOS browser alarm code (Hexadecimal)	Fault description	Detailed description	Actions
	0x2000			
8978	0x2312	Main Motor overcurrent	Overcurrent detected at motor side.	Check motor, oil, valves and element. If the error returns, contact your supplier.
8979	0x2313	Main Motor overcurrent	High common mode current detected.	Check for shortcircuits or line-to-ground faults in the motor, motor cables and/or connections.
8980	0x2314	Main Motor overcurrent	Overcurrent detected at motor side.	Check motor, oil, valves and element. If the error returns, contact your supplier.
8981	0x2315	Main Motor overcurrent	Short circuit detected in U phase.	Try to reset the error. If the error returns, contact your supplier.
8982	0x2316	Main Motor overcurrent	Short circuit detected in V phase.	
8983	0x2317	Main Motor overcurrent	Short circuit detected in W phase.	
8992	0x2320	Fan Motor overcurrent	Overcurrent detected at motor side.	Check fan motor and coolers. If the error returns, contact your supplier.
8993	0x2321			
	0x3000			
12816	0x3210	Overvoltage	Overvoltage on DC bus detected.	Check if the main supply is within specifications. Check for transient voltage phenomena (e.g. voltage dips, surges, etc.). Check main fuses.
12817	0x3211	Overvoltage		
12833	0x3221	Undervoltage	Undervoltage on DC bus detected.	
12834	0x3222	Undervoltage		
	0x4000			
16385	0x4001	Drive overtemperature	Pt1000 Temperature measurements exceed 130°C.	Check which temperature measurement is too high in the controller.
16913	0x4211	Drive overtemperature	Overtemperature detected in fan inverter IGBT.	Let the drive cool off. Check for excessive ambient temperature. Clean heat sink with

Controller alarm code (Decimal)	NEOS browser alarm code (Hexadecimal)	Fault description	Detailed description	Actions
16914	0x4212	Drive overtemperature	Overtemperature detected in control board microcontroller.	compressed air. Clean inlet filter cubicle. Ensure proper flow of cooling air in compressor room.
16915	0x4213	Drive overtemperature	Overtemperature detected in bridge board microcontroller.	
17169	0x4311	Drive overtemperature	Overtemperature detected in main inverter IGBT.	Check for overloads. Let the drive cool off. Check for excessive ambient temperature. Clean the heat sink with compressed air. Clean the inlet filter of the cubicle. Ensure proper flow of cooling air in the compressor room.
17172	0x4314	Drive overtemperature	Overtemperature detected in IGBT junction UH (thermal model).	
17173	0x4315	Drive overtemperature	Overtemperature detected in IGBT junction UL (thermal model).	
17174	0x4316	Drive overtemperature	Overtemperature detected in IGBT junction VH (thermal model).	
17175	0x4317	Drive overtemperature	Overtemperature detected in IGBT junction VL (thermal model).	
17176	0x4318	Drive overtemperature	Overtemperature detected in IGBT junction WH (thermal model).	
17177	0x4319	Drive overtemperature	Overtemperature detected in IGBT junction WL (thermal model).	
17184	0x4320	Drive overtemperature	Overtemperature detected on powerboard PCB.	Let the drive cool off. Check for excessive ambient temperature. Clean the heat sink with compressed air. Clean the inlet filter of the cubicle. Ensure proper flow of cooling air in the compressor room.
17185	0x4321	Drive overtemperature	Overtemperature detected on control board PCB.	
17200	0x4330	Drive overtemperature	Overtemperature detected on bridge board PCB.	
17201	0x4331	Drive overtemperature	Overtemperature detected on PSU board PCB.	
17204	0x4334	Drive overtemperature	Overtemperature detected in rectifier.	

Controller alarm code (Decimal)	NEOS browser alarm code (Hexadecimal)	Fault description	Detailed description	Actions
17206	0x4336	Drive overtemperature	Overtemperature detected by simplified thermal model.	Check for overloads. Let the drive cool off. Check for excessive ambient temperature. Clean the heat sink with compressed air. Clean the inlet filter of the cubicle. Ensure proper flow of cooling air in the compressor room.
17207	0x4337	Drive overtemperature	Overtemperature detected in main IGBT.	Let the drive cool off. Check for excessive ambient temperature. Clean the heat sink with compressed air. Clean the inlet filter of the cubicle. Ensure proper flow of cooling air in the compressor room.
17208	0x4338	Drive overtemperature	Overtemperature detected in AC choke.	
17209	0x4339	Drive overtemperature	Overtemperature detected in fan IGBT.	
17219	0x4343	Drive overtemperature	Overtemperature detected in rectifier.	
17220	0x4344	Drive overtemperature	Main motor overload.	Check for overloads.
	0x5000			
20512	0x5020	Emergency off (STO)	Emergency stop circuit opened.	Check the emergency stop button. Check for loose connectors at the control unit of the converter.
20513	0x5021	Emergency off (STO)		
20756	0x5114	Drive failure (hardware)	Internal power supply tripped.	Check if the main supply is within specifications. Check for transient voltage phenomena (e.g. voltage dips, surges, etc.). Check main fuses.
21505	0x5401	Drive failure (hardware)	General fault detected in power section.	Try to reset the error. If the error returns, contact your supplier.
21507	0x5403	Drive failure (hardware)		

Controller alarm code (Decimal)	NEOS browser alarm code (Hexadecimal)	Fault description	Detailed description	Actions
21508	0x5404	Drive failure (hardware)	Internal power supply tripped.	Check if the main supply is within specifications. Check for transient voltage phenomena (e.g. voltage dips, surges, etc.). Check main fuses.
	0x6000			
24832	0x6100	Drive failure (hardware)	General software fault, conditions not respected inside the CB app FW code.	Reboot the system or turn off the unit and then turn it on again. If the error returns, contact your supplier.
24834	0x6102	Drive failure (hardware)	Failed temperature reading of power board. Time-out communication at initialization.	Try to reset the error. If the error returns, contact your supplier.
24840	0x6108	Drive failure (hardware)	Internal communication timeout.	
24846	0x610E	Drive failure (hardware)	Not able to identify power board.	
24851	0x6113	Drive failure (software)	CAN communication overload.	Check the CAN-cable connection between the controller and the converter. Check the position of the CAN termination switch at both sides of the CAN cable. Both should be OFF.
24853	0x6115	Drive failure (software)	Foreground part 2 runs out of time (not concluded before the next foreground part 1 updat event).	Try to reset the error. If the error returns, contact your supplier.
24854	0x6116	Drive failure (software)	BB MCU did not jump into bootloader state during the initialization phase.	Reboot the system or turn off the unit and then turn it on again. If the error returns, contact your supplier.
24855	0x6117	Drive failure (software)	BB MCU did not jump into application state during the initialization phase.	

Controller alarm code (Decimal)	NEOS browser alarm code (Hexadecimal)	Fault description	Detailed description	Actions
24856	0x6118	Drive failure (software)	Timeout, CB MCU not able to read the BB Boot firmware version.	
24857	0x6119	Drive failure (software)	Timeout, CB MCU not able to read the BB App firmware version.	
24858	0x611A	Drive failure (software)	Serializer 24 V for read/write of CB I/O's not properly configurated.	
24859	0x611B	Drive failure (software)	BB hardware revision is not recognized by CB MCU.	
24860	0x611C	Drive failure (software)	PB hardware revision is not recognized by CB MCU.	
24861	0x611D	Not used	Not used	Not used
24862	0x611E	Drive failure (software)	CB hardware revision is not recognized by CB MCU.	Reboot the system or turn off the unit and then turn it on again. If the error returns, contact your supplier.
24863	0x611F	Drive failure (software)	BB FW Boot version is not recognized by CB MCU.	
24864	0x6120	Drive failure (software)	BB FW App version is not recognized by CB MCU.	
24865	0x6121	Drive failure (software)	CB FW Boot version is not recognized by CB MCU.	
24866	0x6122	Drive failure (software)	CAN communication fault.	Check the CAN-cable connection between the controller and the converter. Check the position of the CAN termination switch at both sides of the CAN cable. Both should be OFF.
24867	0x6123	Drive failure (software)	V/F profile not correct.	Redownload the parameters to Neos. If the error returns, contact your supplier.

Controller alarm code (Decimal)	NEOS browser alarm code (Hexadecimal)	Fault description	Detailed description	Actions
24868	0x6124	Drive failure (software)	Error in read/write from/into BB EEPROM.	Reboot the system or turn off the unit and then turn it on again. If the error returns, contact your supplier.
24869	0x6125	Drive failure (software)	Error in read/write from/into CB EEPROM.	
24870	0x6126	Drive failure (software)	No reliable values obtained during inductance identification procedure.	Reset the error and repeat the procedure. If the error returns, contact your supplier.
24873	0x6129	Drive failure (software)	First ADC regular acquisition sequence not executed in time.	Try to reset the error. If the error returns, contact your supplier.
24874	0x612A	Drive failure (software)	Foreground part 1 not executed.	
24875	0x612B	Drive failure (software)	Voltage saturation during the inductance identifiaction procedure (more Vbus needed to conclude the procedure).	Reset the error and repeat the procedure. If the error returns, contact your supplier.
24876	0x612C	Drive failure (software)	No reliable values obtained by the ADC's during the Vbus oversampling.	Try to reset the error. If the error returns, contact your supplier.
24877	0x612D	Drive failure (software)	Error in read diagnostic from BB EEPROM.	Reboot the system or turn off the unit and then turn it on again. If the error returns, contact your supplier.
24878	0x612E	Drive failure (software)	Failure at initial position detection.	Reset and try again. If the problem stil persists, try to reduce the vessel pressure. If the error returns, contact your supplier.
24879	0x612F	Drive failure (software)	Foreground part 1 runs out of time (not concluded before the next foreground part 2 update event).	Try to reset the error. If the error returns, contact your supplier.
24880	0x6130	Drive failure (software)	Indutcion motor not magnitized.	

Controller alarm code (Decimal)	NEOS browser alarm code (Hexadecimal)	Fault description	Detailed description	Actions
24885	0x6135	Drive failure (software)	Negative value obtained for the rotor time during IM parameters identification procedure.	Reset the error and repeat the procedure. If the error returns, contact your supplier.
24886	0x6136	Drive failure (software)	The identification procedure was not completed within the time limit (5 minutes).	
24887	0x6137	Drive failure (software)	The reference current (P431) used for the identification procedure is not big enough.	Reset the error, increase P431 and repeat the procedure. If the error returns, contact your supplier.
24888	0x6138	Drive failure (software)	Foreground runs out of time (not concluded before the next foreground interrupt update event).	Try to reset the error. If the error returns, contact your supplier.
	0x7000			
28976	0x7130	Main Motor overtemperature	Motor overtemperature detected.	Let the motor cool off. Ensure that the main fan and the air flow in and out of the compressor is not obstructed. Ensure proper flow of cool air in the compressor room. Check for loose connectors at the control unit of the converter.
	0x8000			
33025	0x8101	Drive failure (software)	CAN communication fault.	Check the CAN-cable connection between the controller and the converter. Check the position of the CAN termination switch at both sides of the CAN cable. Both should be OFF.
33041	0x8111	Drive failure (software)		
33042	0x8112	Drive failure (software)		
33057	0x8121	Drive failure (software)		
33058	0x8122	Drive failure (software)		
33073	0x8131	Drive failure (software)		

Controller alarm code (Decimal)	NEOS browser alarm code (Hexadecimal)	Fault description	Detailed description	Actions
33089	0x8141	Drive failure (software)		
33793	0x8401	Drive failure (software)	Motor maximum speed exceeded.	Try to reset the error. If the error returns, contact your supplier.
33794	0x8402	Drive failure (software)	Motor stalled.	Check for blockages.
33795	0x8403	Negative speed	Electrical connection incorrect. Wrong rotation direction of the main motor.	Try again after reducing the pressure in the vessel. Swap two power cables.
	0x9000			
36866	0x9002	Hardware run enable missing	Hardware enable signal for fan inverter missing.	Reset and try again.
	0xA000			
40976	0xA010	Overload on digital outputs	Overload on digital outputs.	Check the wiring and connected devices to 24 VDC AUX PSU.
40977	0xA011	Overload on digital outputs		
40978	0xA012	Overload on digital outputs		Check the wiring and connected devices to 24 VDC digital outputs.
40979	0xA013	Overload on digital outputs		
	0xB000			
45056	0xB000	I/O disabled	Emergency stop circuit opened or "ALL_DEVICES" fault occured.	Check the emergency stop button. Reset and try again.

Faults and remedies, dryer

For all references hereafter, consult section *Air dryer*.

Condition	Fault	Remedy
Pressure dew point 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 does not run	See below.
	Evaporator pressure too high	See below.
	Condenser pressure too high	See below.
Condenser pressure too high or too low	Fan control switch out of order	Replace.
	Fan blades or fan motor out of order	Have checked fan/fan motor, if necessary replace.

Condition	Fault	Remedy
	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.
Compressor stops or does not start	Electric power supply to compressor is interrupted	Check and correct as necessary.
	Thermal protection of refrigerant compressor motor has tripped	Motor will restart when motor windings have cooled down.
Electronic condensate drain remains inoperative	Electronic drain system clogged	Have system inspected. Clean the filter of the automatic drain by opening the manual drain valve. Check functioning of the drain by pushing the test button.
Condensate trap continuously discharges air and water	Automatic drain out of order	Have system checked. If necessary, replace the automatic drain.
Evaporator pressure is too high or too low at unload	Hot gas bypass valve incorrectly set or out of order	Have hot gas bypass valve adjusted.
	Condenser pressure too high or too low	See above.
	Shortage of refrigerant	Have circuit checked for leaks and recharged if necessary.
No compressed air passes through the dryer outlet	The pipes are frozen inside	The bypass valve is broken or out of calibration.
		The room temperature is too low and the evaporator piping is obstructed with ice.
Presence of condensate in pipings	The condensate separator does not work properly	Clean the filter from the condensate drain.
		Check the condensate drain.

9 Technical data

9.1 Readings on display

Figure 41: Elektronikon™ Touch controller

NOTE

The data is valid under the reference conditions. See section *Reference conditions and limitations*.

Reference	Reading
Air outlet pressure	Depends on the setpoint (desired net pressure).
Compressor element outlet temperature	Approx. 80 ˚C (176 ˚F) (ambient temperature 20 °C + 60 °C)
Dewpoint temperature (on units with integrated dryer)	Approx. 4 ˚C (39 ˚F).

9.2 Electric cable size and fuses

WARNING

We only refer to existing norms or calculation methods but don't take any responsibility about them or the completeness of information, this is the responsibility of the customer. Failing to supply correct power or protection can void the warranty.

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*.

To preserve the IP protection degree of the electrical 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.

Local regulations remain applicable if they are stricter than the values proposed below.

Always double-check the fuse size versus the calculated cable size. If required, reduce fuse size or enlarge cable size.

Cable length should not exceed the maximum length according to IEC60204 table 10.

NOTE

The correct torque has to be applied on the supply cables.

Leakage breaker (optional)

If the installation requires a leakage breaker, always use an all current sensitive leakage breaker, RCM or RCD Type B (according to IEC / EN 60755) with a sufficient trip level.

Currents and fuses

Type			I_{max} (1)	Max fuse (1)		I_{max} (2)	Max fuse (2)	
				aR	gL / gG		aR	gL / gG
	V	Hz	A	A	A	A	A	A
GA 22 VSD^s	200	50 / 60	108		125	115		125
	230	50 / 60	96		125	101		125
	380	60	58	60		63	63	
	400	50	55	60		60	60	
	460	60	48	50		53	60	
	500	50	44		63	49		63

Table 13: IEC approval

Type			I_{max} (1)	Max fuse (1)		I_{max} (2)	Max fuse (2)	
				aR	gL / gG		aR	gL / gG
	V	Hz	A	A	A	A	A	A
GA 26 VSD^s	200	50 / 60	128		150	136		150
	230	50 / 60	113		150	119		150
	380	60	68	70		75	80	
	400	50	65	70		71	70	
	460	60	56	60		63	63	

Type			I_{max}(1)	Max fuse(1)		I_{max}(2)	Max fuse(2)	
				aR	gL / gG		aR	gL / gG
	V	Hz	A	A	A	A	A	A
	500	50	52		63	58		63

Table 14: IEC approval

Type			I_{max}(1)	Max fuse(1)		I_{max}(2)	Max fuse(2)	
				aR	gL / gG		aR	gL / gG
	V	Hz	A	A	A	A	A	A
GA 30 VSDs	200	50 / 60	147		200	156		200
	230	50 / 60	130		200	136		200
	380	60	79	80		85	90	
	400	50	75	80		81	80	
	460	60	65	70		71	70	
	500	50	60		80	66		80

Table 15: IEC approval

Type			I_{max}(1)	Max fuse(1)		I_{max}(2)	Max fuse(2)	
				aR	gL / gG		aR	gL / gG
	V	Hz	A	A	A	A	A	A
GA 37 VSDs	200	50 / 60	181		250	190		250
	230	50 / 60	160		250	166		250
	380	60	97	100		103	110	
	400	50	92	100		98	100	
	460	60	80	80		86	90	
	500	50	74		100	80		100

Table 16: IEC approval

Type			I_{max}(1)	Max fuse(1)		I_{max}(2)	Max fuse(2)	
				Class T	Class J		Class T	Class J
	V	Hz	A	A	A	A	A	A
GA 22 VSDs	200	50 / 60	108		125	115		125
	230	50 / 60	96		125	101		125
	575	60	38		60	44		60
	460	60	48	50		53	60	

Table 17: UL / cUL approval

Type			I_{max}(1)	Max fuse(1)		I_{max}(2)	Max fuse(2)	
				Class T	Class J		Class T	Class J
	V	Hz	A	A	A	A	A	A
GA 26 VSDs	200	50 / 60	128		150	136		150
	230	50 / 60	113		150	119		150
	575	60	45		60	52		60
	460	60	56	60		63	63	

Table 18: UL / cUL approval

Type			I_{max}(1)	Max fuse(1)		I_{max}(2)	Max fuse(2)	
				Class T	Class J		Class T	Class J
	V	Hz	A	A	A	A	A	A
GA 30 VSDs	200	50 / 60	147		200	156		200
	230	50 / 60	130		200	136		200
	575	60	51		80	58		80
	460	60	65	70		71	70	

Table 19: UL / cUL approval

Type			I_{max}(1)	Max fuse(1)		I_{max}(2)	Max fuse(2)	
				Class T	Class J		Class T	Class J
	V	Hz	A	A	A	A	A	A
GA 37 VSDs	200	50 / 60	181		250	190		250
	230	50 / 60	160		250	166		250
	575	60	63		100	70		100
	460	60	80	80		86	90	

Table 20: UL / cUL approval

I_{max}: Current in the supply lines at maximum load and 10% undervoltage.

(1)Compressors without integrated dryer.

(2)Compressors with integrated dryer.

Fuse calculations for IEC are done according to 60364-4-43 - *low-voltage electrical installations*, part 4-43: *protection against overcurrent*.

Fuse sizes and types are calculated in order to protect the supply cable and the VSD against short circuits. Type aR fuses are semiconductor type fuses designed for instantaneous tripping, whereas the gL / gG type fuses are generic fuses with an inherent delay in response which will allow transformer inrush to pass.

VSD controlled units without a transformer require fast acting type aR fuses to protect the internal components of the VSD.

While for VSD controlled units with a transformer fast acting type aR fuses cannot be used. Due to the fuses existing on the secondary side of the transformer providing the necessary short-circuit protection for the VSD's internal components and due to the inductance of the transformer. Instead gL / gG type of fuses should be used.

Fuse calculations for cUL and UL are done according to UL508A.

Fuse sizes and types are calculated in order to protect the supply cable and the VSD against short circuits. Type JJS fuses are semiconductor type fuses designed for instantaneous tripping, whereas the K5 / HRC form II type fuses are generic fuses with an inherent delay in response which will allow transformer inrush to pass.

VSD controlled units without a transformer require fast acting type JJS fuses to protect the internal components of the VSD.

While for VSD controlled units with a transformer fast acting type JJS fuses cannot be used. Due to the fuses existing on the secondary side of the transformer providing the necessary short-circuit protection for the VSD's internal components and due to the inductance of the transformer. Instead K5 / HRC form II type of fuses should be used.

Earthing

The earthing cable connected to the compressor (PE) should be minimum 10 mm^2 (according to EN 60204-1 section 828).

Motor cables

Model	Cable assembly number	Size	Quantity	Wire ends
GA 22 VSD^s	1649 8102 35	10	1	M8 Type B
GA 26 VSD^s	1649 8102 34	6	2	M8 Type B
GA 30 VSD^s	1649 8102 34	6	2	M8 Type B
GA 37 VSD^s	1649 8102 35	10	2	M8 Type B

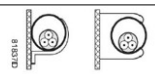
Cable sizing according to IEC

The tables below indicate the current carrying capacities of cables for 3 commonly used installation methods, calculated according to standard 60364-5-52 - electrical installations of buildings part 5 - selection and erection equipment and section 52 - current carrying capacities in wiring systems.

The allowed currents are valid for XLPE cables with three loaded copper conductors.

	Max Current IEC	90°C
22 kW (16mm²)	63 A	X
26 kW (25mm²)	75 A	X
30 kW (25mm²)	84 A	X
37 kW (35mm²)	103 A	X

Table 21: Maximum allowed current in function of the ambient temperature for installation method B2, conductor temperature 90°C

	Installation method B2 according table B.52.1. Multi-core cable in conduit on a wooden wall.

Calculation method for IEC:

- Single supply cables (3 phases + PE - configuration (1)):
  - Add 10 % to the total compressor current (I_{tot}Pack or I_{tot}FF from the tables)
  - Install the prescribed fuse on each cable
- Parallel supply cable (2 x 3 phases + PE - configuration (2)):
  - Add 10 % to the total compressor current (I_{tot}Pack or I_{tot}FF from the tables) and divide by 2
  - Multiply the ampacity of the cables with 0.8 (see table A.52.17 (52-E1))
  - Install fuses of half the size of the recommended maximum fuse size on each cable.
- Size of the PE cable:
  - For supply cables up to 35 mm²: same size as supply cables
  - For supply cables larger than 35 mm²: half the size of the supply wires

Always check the voltage drop over the cable (less than 5 % of the nominal voltage is recommended).

Example 1: I_{tot} = 178 A, maximum ambient temperature is 45 °C, recommended fuse = 200 A

- Single supply cables (3 phases + PE - configuration (1)):
- I = 178 A + 10 % = 178 x 1.1 = 196 A
- The table for method F 70° C conductor and ambient temperature = 45°C allows a maximum current of 209 A for a 95mm² cable.

  Therefore, use a 3 x 95 mm² + 50 mm² cable.

  If method F 90°C conductor is used, 70 mm² is sufficient.

  Therefore 3 x 50 mm² + 25mm² can be used.

Example 2: I_{tot} = 178 A, 424 A, maximum ambient temperature is 45 °C, recommended fuse = 500 A

With transformer

- Single supply cables with a maximum section of 150mm² (3 phases + PE – configuration (1)):
  - I = 424 A + 10 % = 424 x 1.1 = 466 A
  - The table for method F 90° C conductor and ambient temperature = 45 ° C allows a maximum current of 386 A for a 150mm² cable.
  - 150mm² is the maximum cable size that can be connected. So we need to use configuration (2)
- Parallel supply cable (2 x 3 phases + PE - configuration (2)):
  - I = (424 A + 10 %) / 2 = (424 x 1.1) / 2 = 233 A
  - For a cable of 120 mm², method F 90°C conductor at 45 °C, the maximum current is 333 A x 0.8 = 266 A. So 2 parallel cables of 3 x 120 mm² + 70 mm² are sufficient.
  - Install 250 A fuses on each cable.

Cable sizing according to UL / cUL

Calculation method according to UL 508A, table 28.1 column 5: allowable ampacities of insulated copper conductors (75 °C (167 °F)).

	Max Current UL	**90°C**
22 kW (4 AWG)	72 A	X
26 kW (3 AWG)	85 A	X
30 kW (2 AWG)	95 A	X
37 kW (1 AWG)	97 A (460 V) 117 A (380 V)	X

If a multi-core 1 AWG cable is to be used, the part of the cable on the inside of the unit should be stripped and tied to the frame of the unit using cable ties.

Make sure to mount the multi-seal gland after connecting the supply cable to safeguard the IP rating of the converter.

AWG or kcmil	Maximum current
10	< 30 A
8	< 50 A
6	< 65 A
4	< 85 A
3	< 100 A
2	< 115 A
1	< 130 A
1/0	< 150 A
2/0	< 175 A
3/0	< 200 A

Table 22: Maximum allowed current in function of the wire size

Calculation method for UL:

- Single supply cables (3 phases + 1 PE - configuration (1)):
  - Add 25 % to the total current from the tables (see UL 508A 28.3.2: "Ampacity shall have 125 % of the full load current")
  - Install the prescribed maximum fuse on each cable
- Parallel supply cable (2 x 3 phases + 2 PE - configuration (2)):
  - Add 25 % to the total current from the tables and divide by 2
  - Multiply the ampacity of the cables with 0.8 (see UL 508A table 28.1 continued)
  - Install fuses of half the size of the recommended maximum fuse size on each cable.
- When using 2 x 3 phase + 2 PE as in (3):
  - Add 25 % to the total current from the tables and divide by $\sqrt{3}$
  - Multiply the ampacity of the cables with 0.8 (see UL 508A table 28.1 continued)
  - Fuse size: the recommended maximum fuse size divided by $\sqrt{3}$ on each cable.
- Size PE cable:
  - For supply cables up to AWG8: same size as the supply cables
  - For supply cables larger than AWG8: use maximum allowed ampacity of the selected supply cables and compare with value in table below (see CEC Part 1 table 17)

< 100 A: use AWG8
< 200 A: use AWG6
< 300 A: use AWG4

Always check the voltage drop over the cable (less than 5 % of the nominal voltage is recommended).

Example 3: I_{tot} = 189 A, maximum ambient temperature is 45 °C, recommended fuse = 225 A

- Single supply cables(3 phases + PE – configuration (1)):
  - I = 189 A + 25 % = 189 x 1.25 = 207 A
  - For AWG 4/0, the maximum current is 230A, which is sufficient.
  - Install the prescribed maximum fuse 225A on each cable.

Cable sizing according to CSA

Most commonly installation will be done according to CEC part1 (C22.1-09): “Canadian Electrical Code, Part I Safety Standard for Electrical Installations”, but local electrical codes will prevail at the site that the equipment is installed.

Installation information on calculating minimum required ampacity for the conductors:

- According to local electrical codes which will generally require that the cable must be sized to provide at least 125% of the complete package amps.
- Use Itot FF or Itot pack and multiply with125%

Calculation method for CSA

According to CEC part1 (C22.1-09): Multiply the FLA of the main motor with 125% and add the sum of the FLA’s of all other motors and the additional loads.

Note that CEC part1 (C22.1-09) states that the 125% is minimum for motors with a 1.15 service factor, this is 10% above the service factor of the motor. For SF equal or less than 1.15, multiply FLA by 125%. For SF greater than 1.15, use actual service factor + 10% to calculate the minimum amperage requirement.

To determine the additional load, we subtract from I tot, the main motor FLA *SF.

Examples

Compressor Type: Full feature with Itot FF = 125A

- Additional load part of this = 125 - (91*1.2) = 125 - 109.2 = 15.8A
- FLA (Full Load Amps) main motor = 91A
- SF (Service Factor) main motor = 1.20
- Maximum operating ambient temperature is 50°C

In these examples we will use cables as described in CEC part1 (C22.1-09), Table 2 col.3.

Correction factor for other ambient temperature can be found in CEC part1 (C22.1-09), Table 5A.

For this example, this will be 0.75.

Correction factor for more than 3 current carrying cables can be found in CEC part1 (C22.1-09), Table 5C: for the use of 6 cables this will be 0.80.

SF is more than 1.15, so multiply FLA with SF+10% i.e., FLA *130%.

Single supply cables (3phases + 1PE – configuration (1)):

- According to CEC part1 (C22.1-09) we will need a cable suitable for:
  - Multiply FLA of the main motor with 120% +10% = 130%,

    91 * 130% = 118.3A

    Add the additional loads

    I cable = 118.3 + 15.8 = 134.1A
  - Cable AWG 2/0 is not suitable:

    Allowed amps on ambient 50°C = 175 * 0.75 = 131.25A

    131.25A < 134.1A, this cable section is too small.
  - At least cable AWG 3/0 must be used:

    Allowed amps on ambient 50°C = 200 * 0.75 = 150A

    150A > 134.1A, this cable section is ok.

Parallel supply cables (2 x 3phase + 1PE – configuration (2)):

- According to CEC part1 (C22.1-09) we will need a cable suitable for:
  - Multiplied FLA of the main motor with 120% +10% = 130%,

    91 * 130% = 118.3A
  - Add the additional loads

    I cable = 118.3 + 15.8 = 134.1A
  - Divide by 2 for the use of 6 cables as in fig 2

    134.1 / 2 = 67A
  - Cable AWG 3 is not suitable:

    Allowed amps on ambient 50°C = 100 * 0.75 = 75A

    Correction for 6 cables = 75 * 0.8 = 60A

    60A < 67A, this cable section is too small
  - At least cable AWG 2 must be used

    Allowed amps on ambient 50°C = 115 * 0.75 = 86.25A

    Correction for 6 cables = 86.25 * 0.8= 69A

    69A > 67A, this cable section is ok

9.3 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*.

Limitations

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 ambient temperature	˚C	0
Minimum ambient temperature	˚F	32

9.4 Compressor data

NOTE

The data is valid under the reference conditions. See section *Reference conditions and limitations*.

GA 22 VSD^{s} (10 bar(e))

Normal effective working pressure	bar(e)	4	7	10
Maximum effective working pressure, Pack	bar(e)	10.5	10.5	10.5
Maximum effective working pressure, Full-Feature	bar(e)	10.25	10.25	10.25
Maximum motor shaft speed	rpm	4350	4350	3536
Minimum motor shaft speed	rpm	1000	1000	1000
Nominal motor power	kW	22	22	22
Total amount of refrigerant, Full-Feature	kg	0.7	0.7	0.7
Oil capacity	l	18.4	18.4	18.4
Sound pressure level (according to ISO 2151 (2004))	dB(A)	63.1	63.1	63.1

GA 26 VSD^{s} (10 bar(e))

Normal effective working pressure	bar(e)	4	7	10
Maximum effective working pressure, Pack	bar(e)	10.5	10.5	10.5
Maximum effective working pressure, Full-Feature	bar(e)	10.25	10.25	10.25

Maximum motor shaft speed	rpm	5050	5050	4321
Minimum motor shaft speed	rpm	1000	1000	1000
Nominal motor power	kW	26	26	26
Total amount of refrigerant, Full-Feature	kg	0.8	0.8	0.8
Oil capacity	l	19.4	19.4	19.4
Sound pressure level (according to ISO 2151 (2004))	dB(A)	65.8	65.8	65.8

GA 30 VSD^{s} (10 bar(e))

Normal effective working pressure	bar(e)	4	7	10
Maximum effective working pressure, Pack	bar(e)	10.5	10.5	10.5
Maximum effective working pressure, Full-Feature	bar(e)	10.25	10.25	10.25
Maximum motor shaft speed	rpm	5700	5700	4671
Minimum motor shaft speed	rpm	1000	1000	1000
Nominal motor power	kW	30	30	30
Total amount of refrigerant, Full-Feature	kg	0.8	0.8	0.8
Oil capacity	l	20	20	20
Sound pressure level (according to ISO 2151 (2004))	dB(A)	67.3	67.3	67.3

GA 37 VSD^{s} (10 bar(e))

Normal effective working pressure	bar(e)	4	7	10
Maximum effective working pressure, Pack	bar(e)	10.5	10.5	10.5
Maximum effective working pressure, Full-Feature	bar(e)	10.25	10.25	10.25
Maximum motor shaft speed	rpm	6775	6775	5854
Minimum motor shaft speed	rpm	1000	1000	1000

Nominal motor power	kW	37	37	37
Total amount of refrigerant, Full-Feature	kg	0.8	0.8	0.8
Oil capacity	l	21.4	21.4	21.4
Sound pressure level (according to ISO 2151 (2004))	dB(A)	70.5	70.5	70.5

GA 22 VSD^{s} (13 bar(e))

Normal effective working pressure	bar(e)	4	7	10	13
Maximum effective working pressure, Pack	bar(e)	13	13	13	13
Maximum effective working pressure, Full-Feature	bar(e)	12.75	12.75	12.75	12.75
Maximum motor shaft speed	rpm	5080	5080	4969	4300
Minimum motor shaft speed	rpm	1300	1300	1300	1300
Nominal motor power	kW	22	22	22	22
Total amount of refrigerant, Full-Feature	kg	0.7	0.7	0.7	0.7
Oil capacity	l	18.4	18.4	18.4	18.4
Sound pressure level (according to ISO 2151 (2004))	dB(A)	68	68	68	68

GA 26 VSD^{s} (13 bar(e))

Normal effective working pressure	bar(e)	4	7	10	13
Maximum effective working pressure, Pack	bar(e)	13	13	13	13
Maximum effective working pressure, Full-Feature	bar(e)	12.75	12.75	12.75	12.75
Maximum motor shaft speed	rpm	6100	6100	5964	5150
Minimum motor shaft speed	rpm	1300	1300	1300	1300

Nominal motor power	kW	26	26	26	26
Total amount of refrigerant, Full-Feature	kg	0.8	0.8	0.8	0.8
Oil capacity	l	19.4	19.4	19.4	19.4
Sound pressure level (according to ISO 2151 (2004))	dB(A)	71	71	71	71

GA 30 VSD^{s} (13 bar(e))

Normal effective working pressure	bar(e)	4	7	10	13
Maximum effective working pressure, Pack	bar(e)	13	13	13	13
Maximum effective working pressure, Full-Feature	bar(e)	12.75	12.75	12.75	12.75
Maximum motor shaft speed	rpm	6570	6570	6439	5650
Minimum motor shaft speed	rpm	1300	1300	1300	1300
Nominal motor power	kW	30	30	30	30
Total amount of refrigerant, Full-Feature	kg	0.8	0.8	0.8	0.8
Oil capacity	l	20	20	20	20
Sound pressure level (according to ISO 2151 (2004))	dB(A)	71	71	71	71

GA 37 VSD^{s} (13 bar(e))

Normal effective working pressure	bar(e)	4	7	10	13
Maximum effective working pressure, Pack	bar(e)	13	13	13	13
Maximum effective working pressure, Full-Feature	bar(e)	12.75	12.75	12.75	12.75
Maximum motor shaft speed	rpm	8236	8236	8236	7142

Minimum motor shaft speed	rpm	1300	1300	1300	1300
Nominal motor power	kW	37	37	37	37
Total amount of refrigerant, Full-Feature	kg	0.8	0.8	0.8	0.8
Oil capacity	l	21.4	21.4	21.4	21.4
Sound pressure level (according to ISO 2151 (2004))	dB(A)	71	71	71	71

9.5 Protection settings

Protections

		Minimum setting	Factory setting	Maximum setting
Compressor element outlet temperature (shutdown warning level)	˚C	50	110	119
	˚F	122	230	246
Compressor element outlet temperature (shutdown level)	˚C	111	120	120
	˚F	232	248	248

9.6 Technical data controller

General

Supply voltage	24 V AC / 16 A, 50 / 60 Hz (+40% / -30%) 24 V DC / 0.7 A
Type of protection	IP54 (front) IP21 (back)
Operating temperature range	-10 °C - 60 °C (14 °F - 140 °F)
Storage temperature range	-30 °C - 70 °C (-22 °F - 158 °F)
Permissible humidity	Relative humidity 90%. No condensation.
Mounting	Cabinet door

9.7 Inputs and outputs

Digital input

Strip	Description	PIN	Tag
X3	DI01	1	Remote start/stop
	24V	2	
	DI02	3	Remote pressure selection
	24V	4	

Strip	Description	PIN	Tag
	DI03	5	Remote pressure sensing
	24V	6	
	DI04	7	Power duct fan alarm (option)
	24V	8	Empty
	DI05	9	Empty
	24V	10	Empty
	DI06	11	Empty
	24V	12	Empty
	DI07	13	Empty
	24V	14	Empty
	DI08	15	Empty
	24V	16	Empty
	DI09	17	Empty
	24V	18	Empty
	DI10	19	Empty
	24V	20	Empty

Digital output

Strip	Description	PIN	Tag
X4	NO1	1	Potential free contacts General Warning
	COM	2	
	NO2	3	Potential free contacts General Shutdown
	COM	4	
	NO3	5	Potential free contacts Automatic Operation
	COM	6	
	NO4	7	K04 Not Used
	COM	8	
	NO5	9	K05 Not Used
	COM	10	

Digital out

Strip	Description	PIN	Tag
X7	DO01	1	Empty
	24V	2	General warning
	DO02	3	Empty
	24V	4	General shutdown
	DO03	5	Empty
	24V	6	Automatic operation
	DO04	7	Empty
	24V	8	Empty
	DO05	9	Empty
	24V	10	Empty
	DO06	11	Empty
	24V	12	Empty
	DO07	13	Dryer (GND)
	24V	14	Dryer (24V)

Strip	Description	PIN	Tag
	DO08	15	Empty
	24V	16	Empty
	DO09	17	Y1 Blow-off Solenoid Valve
	24V	18	
	DO10	19	Y2 recirculation Solenoid Valve (CPC)
	24V	20	

Analog input PT1000

Strip	Description	PIN	Tag
X5	T01+	1	Empty
	T01-	2	
	T02+	3	TT90 - LAT dryer temperature
	T02-	4	
	T03+	5	TT11 - Element outlet temperature
	T03-	6	
	T04+	7	TT53 - Energy recovery inlet temperature (option)
	T04-	8	
	T05+	9	TT54 - Energy recovery outlet temperature (option)
	T05-	10	
	T06+	11	TT55 - Oil injection temperature (option*)
	T06-	12	
	T07+	13	TT56 - Oil cooler outlet temperature (option*)
	T07-	14	
	T08+	15	Empty
	T08-	16	

*These options are not released as standard options. Additional programming needs to be done in controller database to activate these.

Analog input pressure

Strip	Description	PIN	Tag
X6	GND	1	PT20 - Outlet pressure
	P01	3	
	5V	5	
	GND	2	PT12 - Vessel pressure (option*)
	P02	4	
	5V	6	
	GND	7	Empty
	P03	9	MT01/TT01 - Humidity temperature sensor (ambient temperature)
	5V	11	Empty
	GND	8	MT01/TT01 - Humidity temperature sensor (relative humidity)
	P04	10	
	5V	12	

*These options are not released as standard options. Additional programming needs to be done in controller database to activate these.

Analog in/out

Strip	Description	PIN	Tag
X9	GND	1	Empty
	AI01	2	Empty
	24V	3	Empty
	GND	4	Empty
	AI02	5	Empty
	24V	6	Empty
	GND	7	Power duct fan (option)
	AO03	8	Power duct fan (option)
	24V	9	Power duct fan (option)
	GND	10	Empty
	AO04	11	Empty
	24V	12	Empty

Neos Next control board cabling

Connector	Description	Wiring recommendations
J1/CN2	CAN	Refer to *CiA Draft recommendation proposal 303-1*
X1	Safe torque off (STO)	Wire size 1x1.5 mm^2 Input current: 9.8mA to 12mA
X2	Ethernet	Ethernet CAT5 cables
X3	24V digital input	Wire size 1x1.5 mm^2 Input current: 9.8mA to 12mA
X4	Digital output relay	Wire size 2.5mm^2 suitable for 250VAC, 8A
X5	Pt1000 temperature sensors	Wire size 1x1.5 mm^2 Shielded twisted pair
X6	Pressure sensor	Wire size 1x1.5 mm^2 Shielded twisted pair
X7	24V digital output	Wire size 1x1.5 mm^2 Output current: 2A max
X8	24VDC output	Wire size 1x1.5 mm^2 Output current: 1.67A max
X9	Analog inputs/outputs	Wire size 1x1.5 mm^2

10 Instructions for use

Air/oil separator vessel

This vessel can contain pressurised air; this can be potentially dangerous if the equipment is misused.

This vessel must only be used as a compressed air/oil separator and must be operated within the limits specified on the data plate.

No alterations must be made to this vessel by welding, drilling or any other mechanical methods without the written permission of the manufacturer.

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.

Use only oil as specified by the manufacturer.

This vessel has been designed and built to guarantee an operational lifetime in excess of 20 years.

The vessel needs a yearly visual inspection.

National legislation may require in service inspection.

11 Guidelines for inspection

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.

12 Pressure equipment directives (PED)

Components subject to 2014/68/EU 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 2014/68/EU and all pressure equipment according to the Simple Pressure Vessel Directive 2014/29/EU.

Compressor type	Component	Description	Number of cycles (1)	Minimum wall thickness	Visual inspection frequency (2)	Hydrostatic inspection frequency (2)
GA 22 VSD^s up to GA 37 VSD^s, Low pressure variant	1649 8109 54	Vessel	2 x 10^6	8 mm	1 year	10 years
GA 22 VSD^s up to GA 37 VSD^s, High pressure variant	2204 1070 08	Vessel	2 x 10^6	3.9 mm	1 year	10 years
	0830 1010 03	Safety valve	-	-	-	-

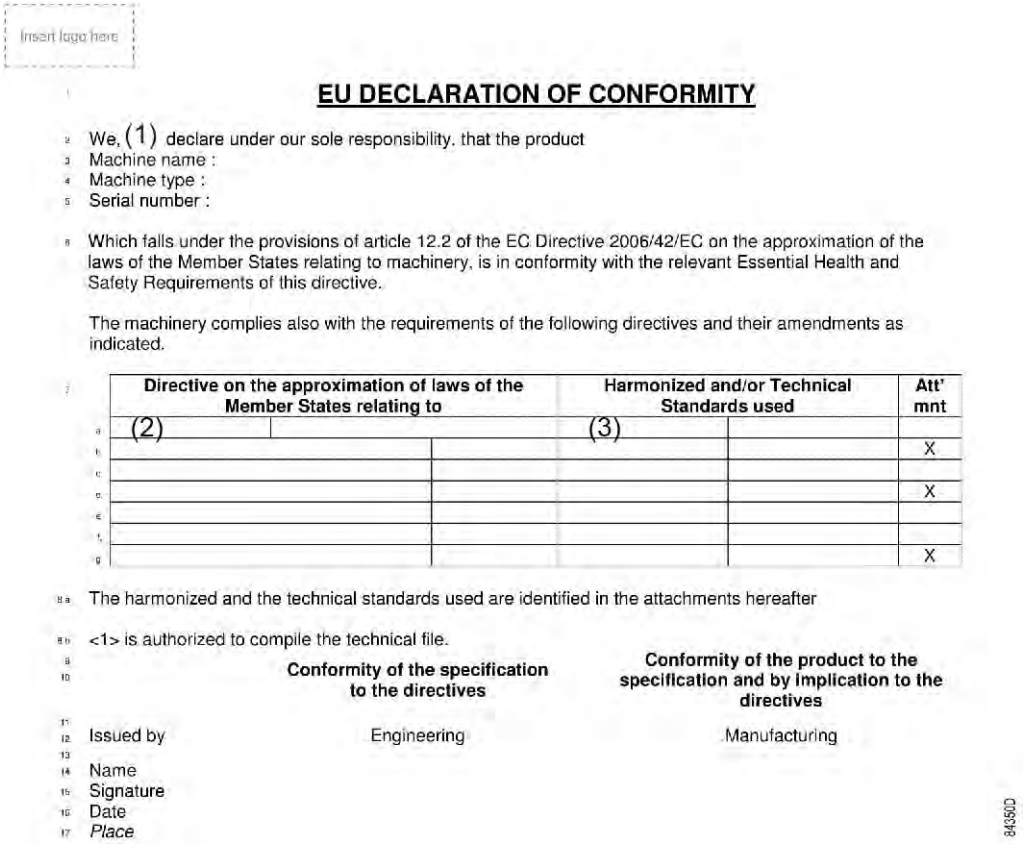
Compressor type	Component	Description	Volume	Design pressure	Minimum and maximum design temperature	PED Class
GA 22 VSD^s up to GA 37 VSD^s, Low pressure variant	1649 8105 04	Safety valve	-	14.5 bar(e)	-	IV
	1649 8105 04	Vessel	42 L	15 bar (e)	-10 / 120 °C	II
GA 22 VSD^s up to GA 37 VSD^s, High pressure variant	2204 1070 08	Vessel	28 L	15 bar(e)	-10 / 120 °C	-
	0830 1010 03	Safety valve	-	-	-	IV

The compressors conform to PED smaller than category III.

(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.

13 Declaration of conformity



Insert logo here

EU DECLARATION OF CONFORMITY

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

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

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

Directive on the approximation of laws of the Member States relating to		Harmonized and/or Technical Standards used		Att' mnt
(2)		(3)		
				X
				X
				X

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

<1> is authorized to compile the technical file.

	Conformity of the specification to the directives	Conformity of the product to the specification and by implication to the directives
Issued by	Engineering	Manufacturing
Name		
Signature		
Date		
Place		

843500

Figure 42: Typical example of a Declaration of Conformity document

(1) Contact address:
Atlas Copco Airpower n.v.
P.O. Box 100
B-2610 Wilrijk (Antwerp)
Belgium

(2) Applicable directives

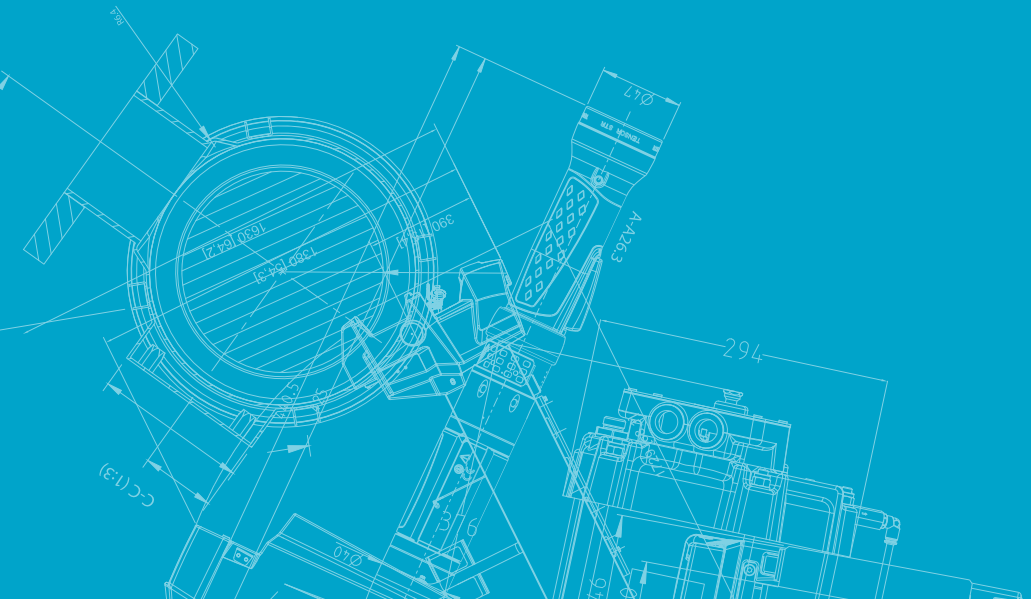
(3) Standards used

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

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

Atlas Copco

atlascopco.com



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