Base Load Power Hub (BLPH)

INSTRUMENT AIR PACKAGE A-63000
INSTALLATION, OPERATING AND MAINTENANCE MANUAL
(INCLUDING SITE ERECTION INSTRUCTIONS AND PROCEDURES)

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1 INTRODUCTION

1.1 PROJECT OVERVIEW

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.

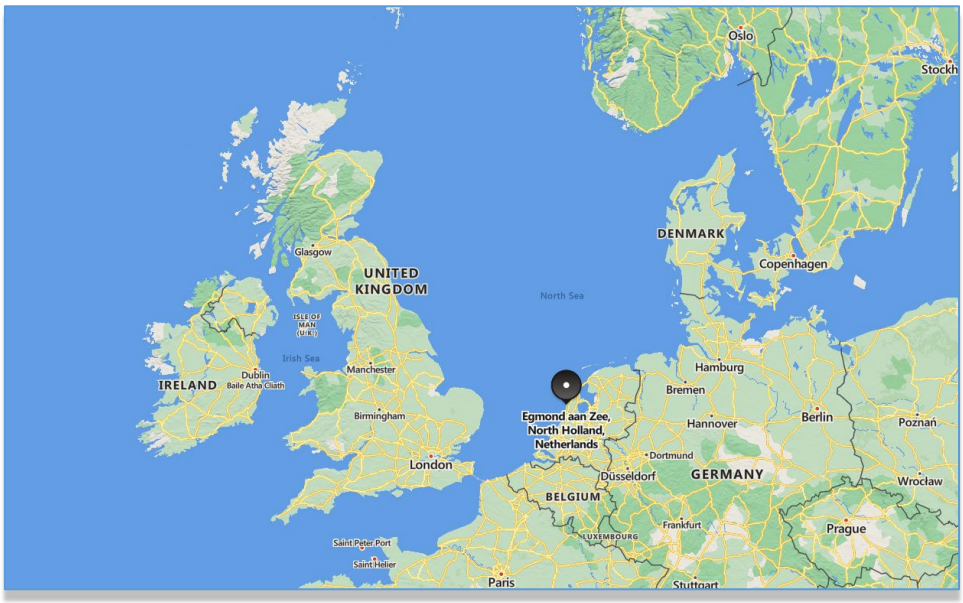


Figure 1 HOLLANDSE KUST NOORD WIND PARK Location Map

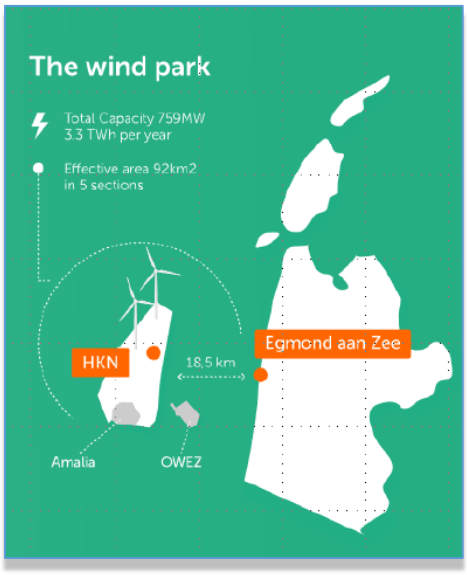


Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

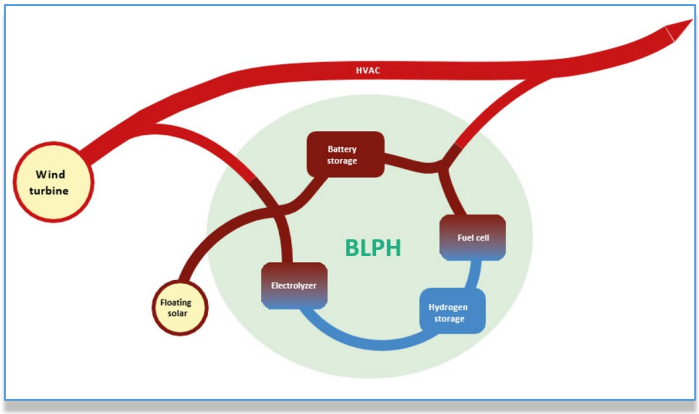


Figure 3 – BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

The purpose of the BLPH s to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

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2 DOCUMENT SCOPE

This document includes instructions for the installation, operating and maintenance of the instrument air package.

2.1 REFERENCES

Doc. No.	Description
1724000428-PR-PID-00019	PACKAGE P&ID
1724000428-MAC-DA-00005	CERTIFIED PACKAGE GENERAL ARRANGEMENT AND DIMENSIONAL OUTLINE DRAWINGS (INCLUDING : NAMEPLATE, BASEFRAME, FOUNDATION LOADS, NOZZLES LOADS, NOZZLES LIST, BATTERY LIMITS, CoG)
1724000428-ST-RE-00010	PACKAGE WIRING DIAGRAM INCLUDING LAYOUT OF PACKAGE CONTROL PANEL

Table 1 - Reference Documents

2.2 DEFINITIONS AND ABBREVIATIONS

COMPANY or Client (CPY):	Crosswind
CONTRACTOR (CTR):	ROSETTI MARINO S.p.A.
PROJECT:	HOLLANDSE KUST NOORD WIND PARK Project

Table 2 - Definitions and Abbreviations

3 SAFETY PRESCRIPTIONS

- The operators 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 only be performed by authorized, trained, specialized personnel.
- The owner is responsible for maintaining the unit in safe operating condition. Parts and accessories shall be replaced if unsuitable for safe operation.
- All responsibility for any damage or injury resulting from neglecting these precautions, or non observance of the normal caution and care required for transportation, installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.
- Before any maintenance, repair work, adjustment or any other non-routine checks, stop the unit, switch off the voltage and depressurize the dryer, the filters and the interconnecting piping. In addition, the power isolating switch must be opened and locked.
- Never remove or tamper with the safety devices, guards or insulation fitted on the machine
- The equipment 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
- Any blanking flanges must be removed before connecting the pipes
- The electrical connections must correspond to the applicable codes. The package must be earthed and protected against short circuits. A lockable power isolating switch must be installed
- Make sure that no tools, loose parts or rags are left in or on the machine.
- Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine.
- Never operate the package below or in excess of its limit ratings.

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4 PROCEDURE FOR ERECTION AND INSTALLATION OF THE EQUIPMENT

4.1 Remove the packing.

4.2 The instrument air package is shipped fully assembled: no loose supplied components are foreseen.

4.3 Lift the skid baseplate, using an adequate lifting device. Skid baseplate shall be lift by means of lifting lugs weldde on the skid baseframe, and placed in its final position, on a properly sized structure, taking care to avoid damages to any installed equipment.
Air dryer package is supplied with all the components already assembled.

WARNING
IT IS NECESSARY TO PROPERLY LEVEL THE BASEPLATES AND TO ASSURE THE CORRECT ALIGNMENT OF MATCHING FLANGES, TO AVOID UNEXPECTED LOADS ON INTERCONNECTING PIPING

4.4 Fix the skid baseplate to the structure by means of the anchor bolts, as shown in the reference drawings.

4.5 Lift the air instrument air receiver, using an adequate lifting device, by means of the lifting points welded on the vessel. Then place it in its final position, on a properly sized structure.

WARNING
IT IS NECESSARY TO PROPERLY LEVEL THE VESSEL AND TO ASSURE THE CORRECT ALIGNMENT OF MATCHING FLANGES, TO AVOID UNEXPECTED LOADS ON INTERCONNECTING PIPING

4.6 Fix the receiver to the structure by means of the anchor bolts, as shown in the reference drawings.

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4.7 All the components inside the package are cabled as per Wiring Diagram, document no. 1724000428-ST-RE-00010. Power and signal cables should be connected by others to the Local Control Panel following the previous mentioned wiring diagram.

WARNINGS

TURN OFF MAIN POWER SUPPLY BEFORE ATTEMPTING TO WIRE THE UNIT

IT IS MANDATORY TO WIRE THE UNIT IN COMPLIANCE WITH THE APPLICABLE ELECTRICAL CODES AND LAWS IN FORCE IN THE COUNTRY OF INSTALLATION

ELECTRICAL CHECKS MAY INVOLVE LIVE CONNECTIONS AND SHOULD BE PERFORMED ONLY BY QUALIFIED PERSONNEL

MAKE SURE THAT CABLES ARE PROPERLY SIZED TO HANDLE THE INSTALLED VOLTAGES.

THE UNIT MUST BE EARTHED AND PROTECTED AGAINST SHORT CIRCUITS. A LOCKABLE POWER ISOLATING SWITCH MUST BE INSTALLED

4.7 Recommendation for storage are included in document 1724000428-QC-PRO-00031

4.8 Instrument air package terminal points shall be connected as shown in P&ID, document no. 1724000428-PR-PID-00019.

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5 AIR DRYER, FILTERS MANUAL

5.1 AIR DRYER THEORY OF OPERATION

5.1.1 Heatless regeneration drying systems

Heatless regenerated dryers use the chemical-physical property of the adsorbent material (activated alumina) for adsorption of gas humidity and for its transfer during the subsequent regeneration cycle.

A small dry gas stream, drawn from the outlet, is used for regeneration. It drives off the moisture, retained in the desiccant bed, and it is vented to the atmosphere.

While the desiccant bed in one tower dries the wet gas stream, the other tower is being regenerated by a purge of dry gas expanded to atmospheric pressure.

5.1.2 Main features

This dryer consists in two twin towers, mounted on a common base-plate which includes all pneumatic components.

The special design of the dryer makes possible to easily remove the different elements for their possible inspection.

This dryer is designed for continuous operation and no control on its operation is needed

5.2 INSTALLATION

5.2.1 General location

Install the skid, on a level surface, with adequate load bearing capacity. To insure rated dew point, locate the dryer where ambient temperatures are between -8°C and +40°C. In any case they will not exceed the design temperature.

Higher or lower ambient temperatures may affect the thermal balance of the two towers and the rated dew point may not be achieved.

5.2.2 Electrical connection

CAUTION

BEFORE ATTEMPTING TO WIRE THE UNIT TURN OFF LINE POWER

Connect the line to the power terminals. Make sure power supplied corresponds to power shown on the wiring diagram.

CAUTION

MAKE SURE WIRINGS ARE PROPER SIZED TO HANDLE AMPERAGESù

SPECIFIED IN THE REFERENCE DOCUMENTS.

CHECK THAT THE UNIT IS WIRED IN ACCORDANCE WITH THE APPLICABLE ELECTRICAL CODES.

5.2.3 Pre-filters S-63001A/B

To avoid large amounts of condensed water may enter the system, an automatic drain trap with manual by-pass is installed ahead of each pre-filter, to prevent flooding of the coalescing elements and possible performance problems of the filter.

REMARKS

Pre-Filters group is equipped with a differential pressure transmitter 63-PDIT-051 in order to obtain the best performances of the filtration elements.

5.2.4 After-filters S-63002A/B

Desiccant particles are produced during the normal operation of the drying unit and they may be carried downstream.
To remove particles two after-filters are installed, one working and the other one in stand-by condition.

REMARKS

After-Filters group is equipped with a differential pressure transmitter 63-PDIT-062 in order to obtain the best performances of the filtration elements.

5.3 INSTRUMENT AIR PACKAGE OPERATION

5.3.1 Start-up

1 Cut power supply to the Local Control Panel : POWER ON light (pos. 63-XL-001 and 63-XL-002) are off.

2 Open manual valves BLPH-MV-700, BLPH-MV-701, BLPH-MV-702 and BLPH-MV-703 to pressurize the pre-filter group.

3 Slowly open manual valves BLPH-MV-704, BLPH-MV-705, BLPH-MV-712 and BLPH-MV-720 to pressurize the dryer.

4 Keep outlet manual valves BLPH-MV-719 and BLPH-MV-727 closed.

5 Press Start push button 63-HS-001: Running light 63-XL-003 is on.

6 After a few minutes check the pressure shown by one or both pressure gauges.

One pressure gauge (pos 63-PI-053 or 63-PI-055 and 63-PI-057 or 63-PI-059) will show the operating pressure, while the other the atmospheric pressure.

If the dryer is repressurizing, both pressure gauges will show pressure inside the tower.

7 Make sure the cycle is carried out properly. If not, go back to the start-up procedure and to the "Troubleshooting" section.

8 Now the dryer is ready for its operation, but we suggest to let it work for a few cycles with outlet flow off. This procedure will be followed specially when the dryer has been off stream for a long time.

9 Slowly open outlet valves BLPH-MV-719 and BLPH-MV-727, so that to pressurise the service up to the after-filter group. Never go beyond the maximum design flow.

10 Slowly open manual valves BLPH-MV-728 and BLPH-MV-729 to pressurize the after-filter group.

11 Slowly open manual valves BLPH-MV-730 and BLPH-MV-731 to pressurize the service up to the line.

General note: valves provided with locking device shall be kept open or closed as shown in the P&ID.

5.3.2 Description of the cycle

Tower (pos. D-63001A or D-63002A) is in the adsorption phase, while tower (pos. D-63001B or D-63002B) is regenerating.

ADSORPTION PHASE

Solenoid valve (pos. 63-XY-052 or 63-XY-054) is de-energized. Therefore valve (pos. 63-XV-052 or 63-XV-054) is in the position shown on the P&ID.

The gas to be dried enters tower (pos. D-63001A or D-63002A), flows on the desiccant bed in an upward direction and comes out from outlet valve, dried and ready for utilization.

REGENERATION PHASE

Solenoid valve (pos. 63-XY-052 or 63-XY-054) is energized. Therefore valve (pos. 63-XV-052 or 63-XV-054) is open.

A small percentage of the dry gas is drawn by calibrated orifice (pos. 63-FO-001 or 63-FO-002) from tower (pos. D-63001A or D-63002A) and will be expanded inside tower (pos. D-63001B or D-63002B).

The gas runs through the tower in a counter-current direction and regenerates it.

Afterwards it is vented to the atmosphere through valve (pos. 63-XV-052 or 63-XV-054).

PRESSURIZATION

Solenoid valve (pos. 63-XY-052 or 63-XY-054) is de-energized and it controls the closing of valve (pos. 63-XV-052 or 63-XV-054).

Therefore regeneration gas, coming from calibrated orifice (pos. 63-FO-001 or 63-FO-002) will pressurize tower (pos. D-63001B or D-63002B), since it is not vented to the atmosphere.

CHANGE-OVER

Solenoid valves (pos. 63-XY-051 or 63-XY-053 and 63-XY-052 or 63-XY-054) are energized

Therefore valve (pos. 63-XV-051 or 63-XV-053) shifts and the gas to be dried enters tower (pos. D-63001B or D-63002B).

Valve (pos. 63-XV-052 or 63-XV-054) opens causing the decompression of tower (pos. D-63001A or D-63002A) which starts its regeneration.

5.3.3 STOP

1 Close outlet and inlet manual valves (pos. BLPH-MV-712, BLPH-MV-719, BLPH-MV-720 and BLPH-MV-727), to isolate the dryer.

2 Press button 63-HS-002: DRYER ON light (Pos. H2) is off.

3 Cut the power supply to the Local Control Panel; POWER ON lights (Pos. 63-XL-001 and 63-XL-002) are off.

5.4 MAINTENANCE

WARNING

DEPRESSURIZE THE DRYER COMPLETELY AND DISCONNECT MAIN POWER BEFORE SERVICING ANY VALVE, FITTING OR COMPONENT UNDER PRESSURE.
ELECTRICAL CHECKS MAY INVOLVE LIVE CONNECTIONS AND SHOULD BE PERFORMED ONLY BY QUALIFIED PERSONNEL.

REMARKS

THIS DRYER USES NON-LUBRICATED VALVES. THEREFORE NO LUBRICATION IS NEEDED.

5.4.1 Six-monthly

1 Replace the cartridges of filters S-63001A/B and S-63002A/B.

2 Replace instrument air filter

5.4.2 Yearly

1 Check the conditions of the desiccant material, which should be clear.

If necessary replace it.

2 Proceed to the full servicing of process valves. Replace their gaskets, if needed.

5.5 TROUBLESHOOTING

WARNING

DEPRESSURIZE THE DRYER COMPLETELY AND DISCONNECT MAIN POWER BEFORE SERVICING ANY VALVE, FITTING OR COMPONENT UNDER PRESSURE.
ELECTRICAL CHECKS MAY INVOLVE LIVE CONNECTIONS AND SHOULD BE PERFORMED ONLY BY QUALIFIED PERSONNEL.

	PROBLEM	POSSIBLE CAUSE	SOLUTION
1	Poor dew point	Low inlet pressure	Make sure inlet pressure does not fall below design conditions
		Excessive flow	Check design conditions
		High inlet temperature	Make sure inlet temperature corresponds to or is lower than the design value
		Desiccant material saturated with moisture	Call the supplier. Desiccant must be regenerated or replaced. It may be caused by: - low purge gas flow - malfunctioning of the pre-filter S-63001A/B - dryer overloading Determine and remedy the cause before putting the unit back on stream.
		Towers not changing over	Watch operation. If towers do not operate see pos. 2 below.
2	Switching failure	Power failure	Check power on line, fuses and/or main switch
		Failure to repressurize	Check the operation of valves (pos. 63-XV-052 and 63-XV-054)
		Faulty programmer	Replace programmer
3	Regeneration does not occur	Drain valve does not open	Check the operation of pilot valve (pos. 63-XY-052 and 63-XY-054) and of repressurization valve (pos. 63-XV-052 and 63-XV-054)
4	Pressure inside the tower which is regenerating	Decompression valve not fully open	Check the operation of pilot valve (pos. 63-XY-052 and 63-XY-054) and of repressurization valve (pos. 63-XV-052 and 63-XV-054)
5	Pressure drops across the dryer	Excessive flow	Check rated flow versus operating conditions
		Low inlet pressure	Check rated pressure versus dryer features
		Clogged desiccant retainer and/or clogged internal filters	Disassemble and service (Call supplier if needed).
		Desiccant deterioration	Replace desiccant

REMARKS

When asking for spare parts the following information should be given:

- order no. referred to dryer supplied and for which spare parts are required

and/or

- our job ref. for the dryer mentioned here over
- description of parts required
- dwg no. of the parts required
- position of the parts required

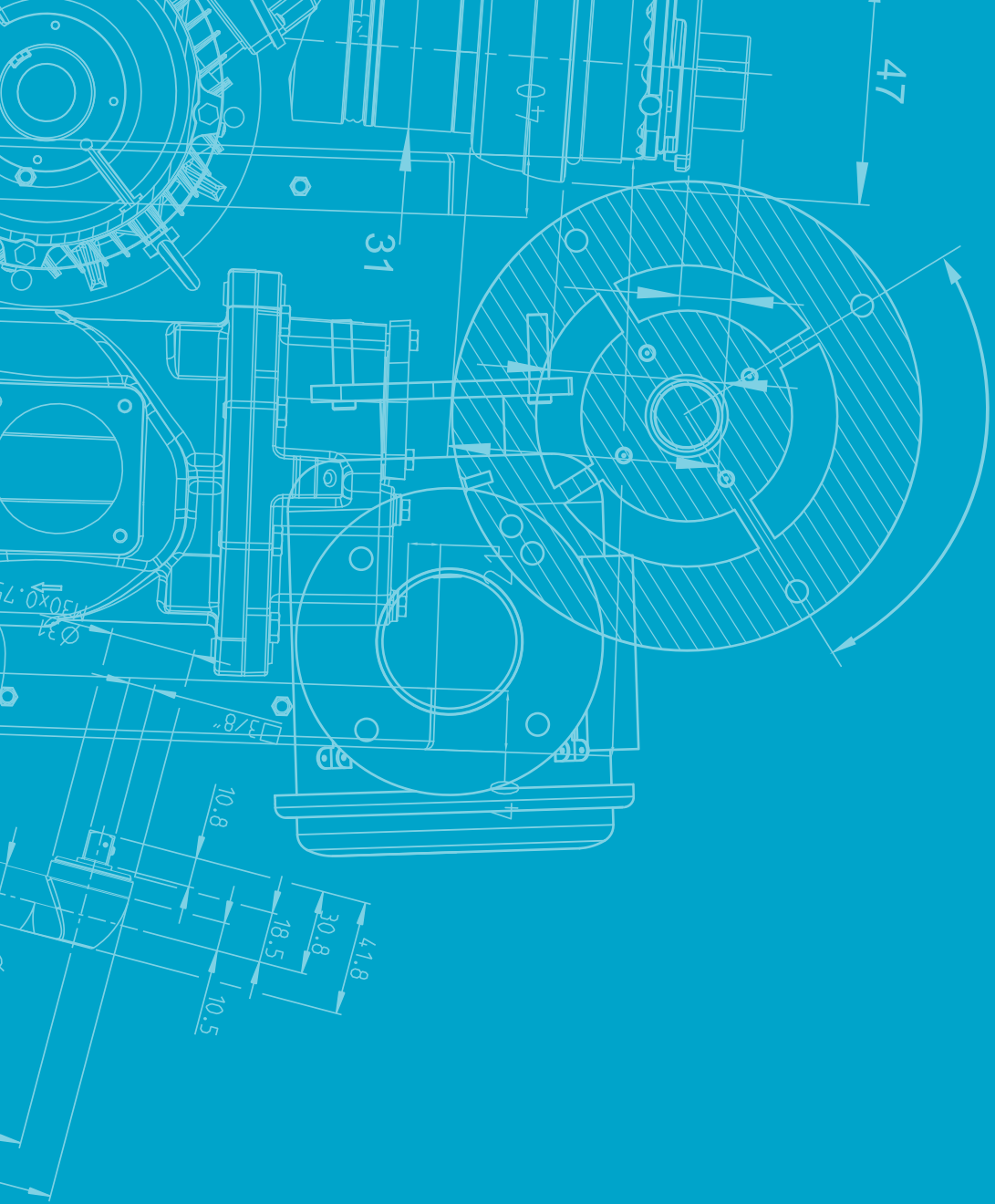
REMARKS

TO AVOID POSSIBLE DAMAGES AND INCORRECT OPERATION OF THE DRYING UNIT, WE SUGGEST TO USE ONLY ORIGINAL "COES" SPARE PARTS.

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6 AIR COMPRESSOR MANUAL

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Instruction book

Oil-free screw compressors

APF282471
ZT 55

Atlas Copco

Oil-free screw compressors

ZT 55

APF282471

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

April 2024

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1 Additional safety precautions

1.1 Safety icons

Explanation

	Danger to life
	Warning
	Important note

1.2 General safety precautions

1. The operator must employ safe working practices and observe all related work safety requirements and regulations.
2. If any of the following statements does not comply with the applicable legislation, the stricter of the two shall apply.
3. Installation, operation, maintenance and repair work must only be performed by authorized, trained, specialized personnel. The personnel should apply safe working practices by use of personal protection equipment, appropriate tools and defined procedures.
4. The compressor is not considered capable of producing air of breathing quality. For air of breathing quality, the compressed air must be adequately purified according to the applicable legislation and standards.
5. Before any maintenance, repair work, adjustment or any other non-routine checks:
    - Stop the machine
    - Press the emergency stop button
    - Switch off the voltage
    - Depressurize the machine
    - Lock Out - Tag Out (LOTO):
        - Open the power isolating switch and lock it with a personal lock
        - Tag the power isolating switch with the name of the service technician.
    - On units powered by a frequency converter, wait 10 minutes before starting any electrical repair.
    - Never rely on indicator lamps or electrical door locks before maintenance work, always disconnect and check with measuring device.

	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!

6. Never play with compressed air. Do not apply the air to your skin or direct an air stream at people. Never use the air to clean dirt from your clothes. When using the air to clean equipment, do so with extreme caution and wear eye protection.
7. The owner is responsible for maintaining the unit in safe operating condition. Parts and accessories shall be replaced if unsuitable for safe operation.
8. It is prohibited to walk or stand on the unit or on its components.
9. 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.
10. The service switch should only be operated by a trained service specialist from the manufacturer.

1.3 Safety precautions during installation

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

Precautions during installation

1. The machine must only be lifted using suitable equipment in accordance with the applicable safety regulations. Loose or pivoting parts must be securely fastened before lifting. It is strictly forbidden to dwell or stay in the risk zone under a lifted load. Lifting acceleration and deceleration must be kept within safe limits. Wear a safety helmet when working in the area of overhead or lifting equipment.
2. The unit is designed for indoor use. If the unit is installed outdoors, special precautions must be taken. Consult your supplier.
3. In case the device is a compressor, place the machine where the ambient air is as cool and clean as possible. If necessary, install a suction duct. Never obstruct the air inlet. Care must be taken to minimize the entry of moisture at the inlet air.
4. Any blanking flanges, plugs, caps and desiccant bags must be removed before connecting the pipes.
5. Air hoses must be of correct size and suitable for the working pressure. Never use frayed, damaged or worn hoses. Distribution pipes and connections must be of the correct size and suitable for the working pressure.
6. In case the device is a compressor, the aspirated air must be free of flammable fumes, vapors and particles, e.g. paint solvents, that can lead to internal fire or explosion.
7. In case the device is a compressor, arrange the air intake so that loose clothing worn by people cannot be drawn in.
8. Ensure that the discharge pipe from the compressor to the aftercooler or air net is free to expand under heat and that it is not in contact with or close to flammable materials.
9. No external force may be exerted on the air outlet valve; the connected pipe must be free of strain.
10. If remote control is installed, the machine must bear a clear sign stating: DANGER: This machine is remotely controlled and may start without warning.

The operator has to make sure that the machine is stopped and depressurized and that the electrical isolating switch is open, locked and labelled with a temporary warning before any maintenance or repair. 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.

11. 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.
12. 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.
13. On machines with automatic start/stop system or if the automatic restart function after voltage failure is activated, a sign stating "This machine may start without warning" must be affixed near the instrument panel.
14. 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.
15. 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.
16. Piping or other parts with a temperature in excess of 70˚C (158˚F) and which may be accidentally touched by personnel in normal operation must be guarded or insulated. Other high temperature piping must be clearly marked.
17. For water-cooled machines, the cooling water system installed outside the machine has to be protected by a safety device with set pressure according to the maximum cooling water inlet pressure.
18. If the ground is not level or can be subject to variable inclination, consult the manufacturer.
19. If the device is a dryer and no free extinguishing system is present in the air net close to the dryer, safety valves must be installed in the vessels of the dryer.

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

1.4 Safety precautions during operation

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

Precautions during operation

1. Never touch any piping or components of the machine during operation.

2. Use only the correct type and size of hose end fittings and connections. When blowing through a hose or air line, ensure that the open end is held securely. A free end will whip and may cause injury. Make sure that a hose is fully depressurized before disconnecting it.
3. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment.
4. Never operate the machine when there is a possibility of taking in flammable or toxic fumes, vapors or particles.
5. Never operate the machine below or in excess of its limit ratings.
6. Keep all bodywork doors shut during operation. The doors may be opened for short periods only, e.g. to carry out routine checks. Wear ear protectors when opening a door.

   On machines without bodywork, wear ear protection in the vicinity of the machine.
7. People staying in environments or rooms where the sound pressure level reaches or exceeds 80 dB(A) shall wear ear protectors.
8. Periodically check that:
   - All guards are in place and securely fastened
   - All hoses and/or pipes inside the machine are in good condition, secure and not rubbing
   - 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
   - Air cooling filters of the electrical cabinet are not clogged
9. If warm cooling air from compressors is used in air heating systems, e.g. to warm up a workroom, take precautions against air pollution and possible contamination of the breathing air.
10. On water-cooled compressors using open circuit cooling towers, protective measures must be taken to avoid the growth of harmful bacteria such as Legionella pneumophila bacteria.
11. Do not remove any of, or tamper with, the sound-damping material.
12. 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.
13. 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.
14. It is not allowed to directly use the hot water from the compressor cooling water circuit as process water in pollution-sensitive applications such as the food and pharmaceutical industry.

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

1.5 Safety precautions during maintenance or repair

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

Precautions during maintenance or repair

1. Always use the correct safety equipment (such as safety glasses, gloves, safety shoes, etc.).
2. Use only the correct tools for maintenance and repair work.
3. Use only genuine spare parts for maintenance or repair. The manufacturer will disclaim all damage or injuries caused by the use of non-genuine spare parts.
4. All maintenance work shall only be undertaken when the machine has cooled down.
5. A warning sign bearing a legend such as "Work in progress; do not start" shall be attached to the starting equipment.
6. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment.
7. Close the compressor air outlet valve and depressurize the compressor before connecting or disconnecting a pipe.
8. Before removing any pressurized component, effectively isolate the machine from all sources of pressure and relieve the entire system of pressure.
9. Never use flammable solvents or carbon tetrachloride for cleaning parts. Take safety precautions against toxic vapors of cleaning liquids.
10. Scrupulously observe cleanliness during maintenance and repair. Keep dirt away by covering the parts and exposed openings with a clean cloth, paper or tape.
11. Never weld or perform any operation involving heat near the oil system. Oil tanks must be completely purged, e.g. by steam cleaning, before carrying out such operations. Never weld on, or in any way modify, pressure vessels.
12. Whenever there is an indication or any suspicion that an internal part of a machine is overheated, the machine shall be stopped but no inspection covers shall be opened before sufficient cooling time has elapsed; this to avoid the risk of spontaneous ignition of the oil vapor when air is admitted.
13. Never use a light source with open flame for inspecting the interior of a machine, pressure vessel, etc.
14. Make sure that no tools, loose parts or rags are left in or on the machine.
15. All regulating and safety devices shall be maintained with due care to ensure that they function properly. They may not be put out of action.
16. Before clearing the machine for use after maintenance or overhaul, check that operating pressures, temperatures and time settings are correct. Check that all control and shut-down devices are fitted and that they function correctly. If removed, check that the coupling guard of the compressor drive shaft has been reinstalled.
17. Every time the separator element is renewed, examine the discharge pipe and the inside of the oil separator vessel for carbon deposits; if excessive, the deposits should be removed.
18. Protect the motor, air filter, electrical and regulating components, etc. to prevent moisture from entering them, e.g. when steam cleaning.

19. Make sure that all sound-damping material and vibration dampers, e.g. damping material on the bodywork and in the air inlet and outlet systems of the compressor, is in good condition. If damaged, replace it by genuine material from the manufacturer to prevent the sound pressure level from increasing.
20. Never use caustic solvents which can damage materials of the air net, e.g. polycarbonate bowls.
21. **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.

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

1.6 Dismantling and disposal

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, ...).
3. Separate the harmful from the safe components (e.g. drain oil from oil containing parts).
4. Refer to the disposal topic mentioned 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) and may not be disposed as unsorted waste.



The equipment is labelled in accordance with the European Directive 2012/19/EU with the crossed-out wheelie bin symbol.

At the end of life-time 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

General views



Figure 1: General view Pack compressor

Ref.	Name
MK5	Elektronikon Mk5–Touch regulator
S2	Emergency stop button

This unit is a two-stage, electric motor driven screw compressor which delivers oil-free, pulsation-free air.

ZT compressors are air-cooled.

The compressor is enclosed in a sound-insulated bodywork and includes mainly:

- Air filter
- Low-pressure compressor element
- Intercooler
- High-pressure compressor element
- Aftercooler
- Water separators
- Electronic water drain
- Electric motor
- Drive coupling
- Gear casing
- Elektronikon^{TM} control system
- Safety valves

Elektronikon^{TM} control system

The compressor is controlled by an electronic regulator which:

- Controls the operation of the compressor
- Reduces the power consumption
- Warns the operator in case of an abnormal operating condition
- Protects the compressor
- Monitors components subject to service
- If activated, the regulator can automatically restart the compressor after voltage failure
- Has an internal connectivity device

Anchor pads

Steel plates on the side of the frame can be turned over to be used as anchor pads. Anchor bolts are shipped loose with the compressor. With these plates and bolts the compressor frame can be fixed to the floor.

Connections

DIN flanges

2.2 Air system

Flow diagram

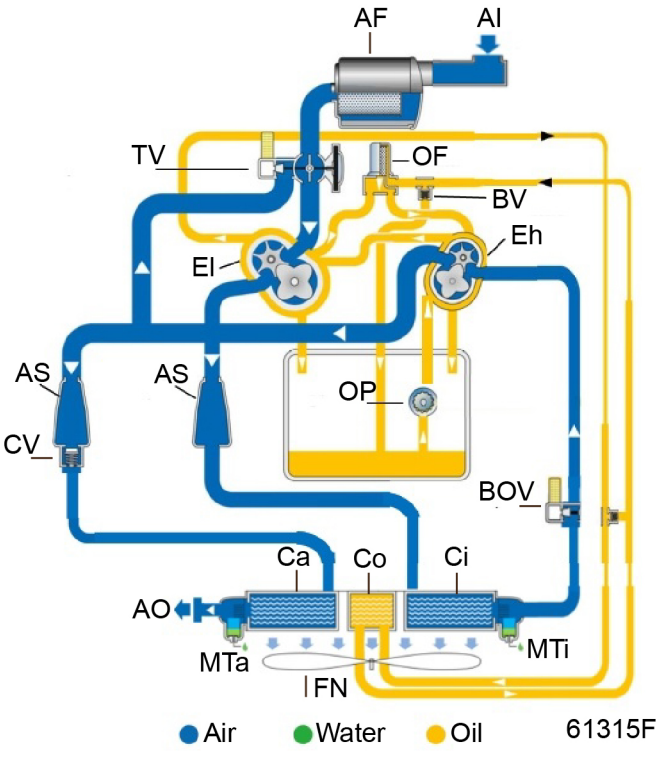


Figure 2: Flow diagram Pack compressor

Reference	Name
AF	Air filter
AO	Air outlet

Reference	Name
AS	Silencer
BV	By-pass valve
Ca	Aftercooler
Ci	Intercooler
Co	Oil cooler
CV	Check valve
Eh	High-pressure compressor element
El	Low-pressure compressor element
MTa	Moisture trap, aftercooler
MTi	Moisture trap, intercooler
OF	Oil filter
OP	Oil pump

Description

Air drawn through the filter (AF) is compressed in the low-pressure compressor element (El).

The cooled air is further compressed in the high-pressure compressor element (Eh) and discharged through the silencer (AS) and aftercooler (Ca).

The compressed air leaves the compressor via the air outlet (AO).

2.3 Cooling system

Cooling system for ZT compressors

The compressors are fitted with an oil cooler (Co), intercooler (Ci) and aftercooler (Ca). The coolers are air-cooled, the cooling air is generated by fan (FN).

2.4 Oil system

Description

Oil is circulated by pump (OP) from the sump of the gear casing through the cooling jackets of the compressor elements and then through the oil cooler (Co).

The oil passes through oil filter (OF) towards the bearings and timing gears.

By-pass valve (BV) opens if the oil pressure should rise above a given value.

2.5 Condensate drain system

Description

Two condensate traps are installed:

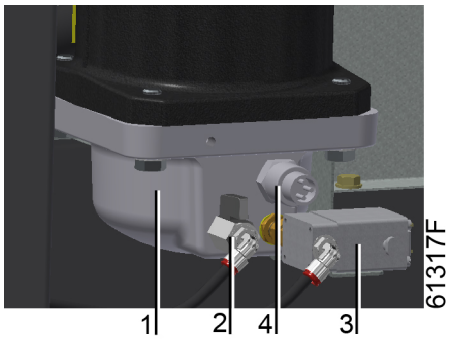
- one downstream of the intercooler, to prevent condensate from entering the compressor element
- one downstream of the aftercooler, to prevent condensate from entering the air outlet pipe

The condensate traps are connected to an ERD. Refer to *Elektronikon regulated drain (ERD)*

2.6 Elektronikon regulated drain (ERD)

Description

The drain consists of a capacitive sensor which is incorporated in the drain collector and of a pilot valve which is placed outside the drain collector. A drain opening delay timer is started when the collector is filled up to the level of the capacitive sensor. As long as the delay timer is running, extra condensate will be collected and the level will rise even higher than the position of the sensor. As soon as the delay timer has expired, the pilot valve (normally open) is deactivated and the diaphragm opens the outlet, discharging the condensate. From the moment that the sensor is not detecting any condensate anymore, a drain closing delay timer is started. The pilot valve will still drain the condensate during the run of this timer to make sure that the remaining amount of condensate is drained. The pilot valve is activated when the timer has expired, the outlet closes quickly without wasting compressed air.



Reference	Description
1	Drain receiver
2	Manual valve
3	Solenoid valve
4	Sensor

If the controller detects water in the intercooler or aftercooler drain receiver for too long a period, a shutdown is generated. If water is detected on the integrated dryer drain receiver for too long a period, a warning is generated.

The level switch is a capacitive sensor which generates a high signal when no water is present. The solenoid valves of the intercooler and aftercooler/integrated dryer drains are different. The solenoid valve of the intercooler drain has a high flow but cannot handle high pressures. The solenoid valve on the aftercooler/integrated dryer drains has less flow but can handle higher pressures. It is not allowed to open the valves as they can loose their set point. Special attention must be paid to the correct wiring of the different level switches and solenoid valves.

The output of the level switch can be called up on the screen of the Elektronikon regulator. The reading does not indicate whether the solenoid valve is open or closed, but indicates whether the level switch is detecting water in the collector. Since there is a drain opening delay timer, the display on the Elektronikon can show "Condensate Drain IC Open", while the solenoid valve is still closed. Changes to the Elektronikon settings are not allowed. The "Always pressurized" bit must be activated on aftercooler and integrated dryer drains. On the intercooler it is not allowed to activate this bit.

A functionality test is possible through the Elektronikon regulator. By performing this test, all solenoid valves will be opened for a short time (e.g. 15 seconds). Refer to the Elektronikon chapter for more details.

2.7 Electrical system

Main components



Figure 3: General view Pack compressor

Ref.	Name
1	Elektronikon™ regulator
2	Emergency button
3	Electric/converter cabinet

Electric cabinet

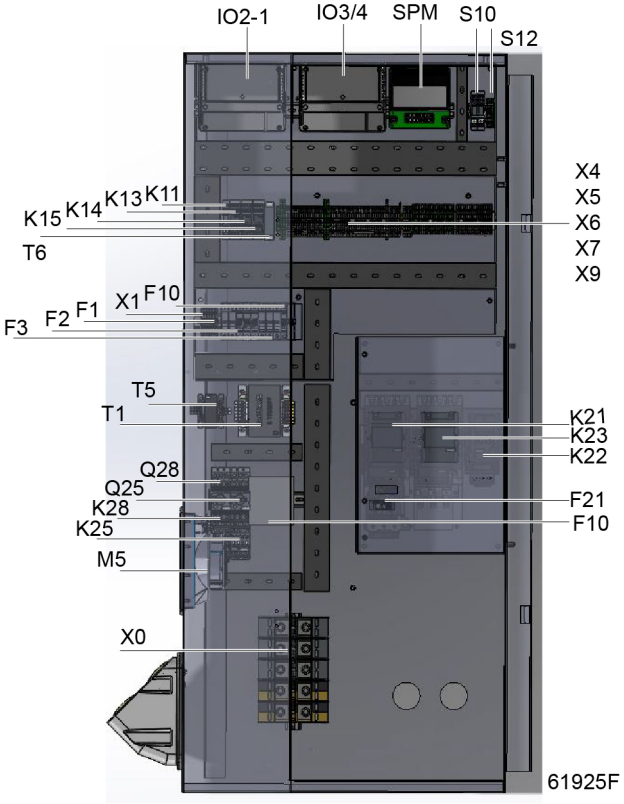


Figure 4: Electric cabinet

Reference	Description
IO2–1	Expansion module
IO3/4	Expansion module (optional)
SPM	Expansion module, for SPM (optional)
M5	Cubicle fan
F21	Overload relay
F10	Fuses, auxiliary circuit
K11-K13-K14-K15	Auxiliary relay, load indication
K28	Line contactor, heater (optional)
K21	Line contactor
K22	Wye contactor
K23	Delta contactor
K25	Line contactor, fan
T1	Main transformer
T5	Transformer, energy recovery (optional)
T6	Power supply, energy recovery (optional)
Q25	Circuit breaker, fan
Q28	Circuit breaker, heater
F1-F2-F3	Fuses, control circuit
F40/41	Circuit breakers, control circuit (optional)
F51	Circuit breakers, control circuit
X0	Terminals, power supply
X1-X4-X5-X6-X7-X9	Terminal strip

2.8 External compressor status indication

Warning

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

Connections for external compressor status indication

Terminal strip (1X7) is fitted with auxiliary contacts for external indication of:

Indication	Relay	Terminals on strip 1X7	Maximum load
Automatic operation	K05–1	1-2	10 A / 230 V AC
Warning	K06–1	3-4	10 A / 24 V AC
Shut-down	K07–1	5-6	10 A / 24 V AC
Compressor loaded	K11	9-10	8 A / 250 V AC
Compressor running	K13	7-8	6 A / 250 V AC
Warning ring type terminals	K55		8 A / 250 V AC
Shut-down ring type terminals	K56		8 A / 250 V AC

2.9 Connectivity and SMARTLINK

General

The machine comes with an Elektronikon Touch controller which has an internal connectivity device. The Touch controller allows read-out of a number of parameters of the machine on a user login-protected web site called **SMART**LINK. The Touch controller has an integrated antenna.

Safety precautions

It is important to follow all regulations regarding the use of radio equipment, in particular regarding the possibility of radio frequency (RF) interference. Please follow the safety advice given below carefully.

- Respect restrictions on the use of radio equipment in fuel depots, chemical plants or other explosive environments.
- Avoid operation close to inadequately protected personal medical devices such as hearing aids and pacemakers. Consult the manufacturers of the medical device to determine if it is adequately protected.
- Avoid operation close to other electronic equipment which may also cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturer recommendations.
- Respect a distance from the human body of at least 20 cm (8 inch) during operation.
- Do not operate the device in areas where cellular modems are not advised without proper device certifications. These areas include environments where cellular radio can interfere, such as explosive atmospheres, medical equipment, or any other equipment which may be susceptible to any form of radio interference. The modem can transmit signals that could interfere with this equipment.

SMARTLINK

The machine is **SMART**LINK-ready.

SMARTLINK is Atlas Copco's web-based platform to monitor compressed air installations. It is available in 3 product levels:

- **SMART**LINK Service

  SMARTLINK Service rules out all uncertainties. Scheduling maintenance visits becomes as simple and easy as it should be; the service log book is always just one click away and the online link with Atlas Copco allows to request and quickly receive quotes for spare parts or additional services.

  This product level is free of charge and available for 3 years following the machine purchase.
- **SMART**LINK Uptime

  SMARTLINK Uptime keeps your compressors up and running. By e-mail and/or text, you receive all relevant machine indications (warnings and shutdowns) in advance. Based on this information, you can then take all necessary actions and measures to avoid the risk of a breakdown.

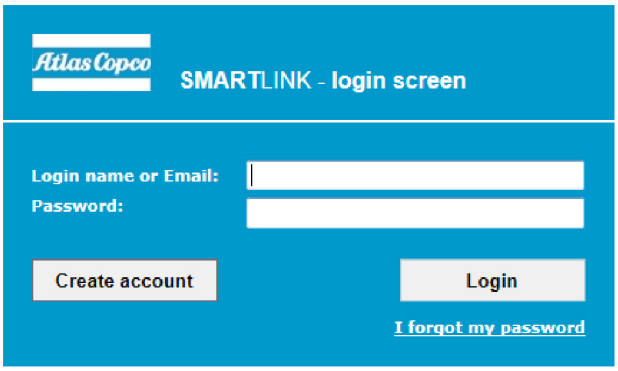
  This product level is available as a free of charge 3-month trial.
- **SMART**LINK Energy

  SMARTLINK Energy safeguards the performance of your equipment. It enables you to continuously monitor and analyze the energy efficiency of the compressor room. You decide which performance indicators, benchmarks and reports are created. You can make accurate and immediate improvements when needed. The results can be used for energy monitoring according to ISO50001.

  This product level is available as a free of charge 3-month trial.

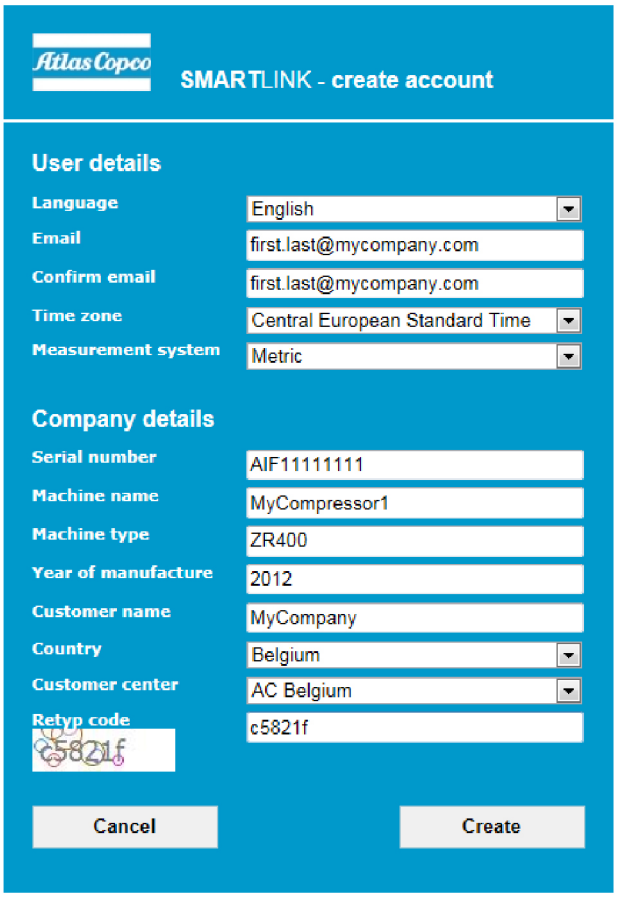
Once a **SMART**LINK level is chosen, gaining access is the next step. To gain access at least one machine **SMART**LINK-ready component (compressor, dryer, ...) is required. Follow the next steps:

- Gather the information about the **SMART**LINK-ready machine(s) (e.g. picture of the data plate; invoice,…)
- Go to the **SMART**LINK web site http://www.atlascopco.com/smartlink
- Click on the left button in the screen below.



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- Use the data of the **SMART**LINK–ready machine to register as a user.



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- You will receive an e-mail with login credentials.
- Go to the **SMART**LINK web site http://www.atlascopco.com/smartlink, log in with the user credentials.
- Enjoy **SMART**LINK!
- In case more **SMART**LINK-ready machines are available, you can add these via *My Profile*.

3 Elektronikon™ Touch controller

3.1 Controller



Figure 5: The 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)

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.

	It is possible to program a number of time-based commands for automatic start/stop. Take into account that a start command will be executed (if programmed and activated), even after manually stopping the unit.

Protecting 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 element outlet temperature 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.

	Before remedying, consult the *Safety precautions*. Before resetting a warning or shutdown message, always solve the problem. 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 stop button to stop the unit and wait until the unit has stopped. Switch off the voltage, inspect the unit and remedy if necessary. The warning message will disappear as soon as the warning condition disappears.

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 contact your supplier to schedule the necessary maintenance actions. See section **Preventive maintenance schedule**.

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.

	If the function is activated and provided the regulator was in the automatic operation mode, the unit will automatically restart if the supply voltage to the module is restored. The ARAVF label shall be glued next to the controller.

3.2 Control panel

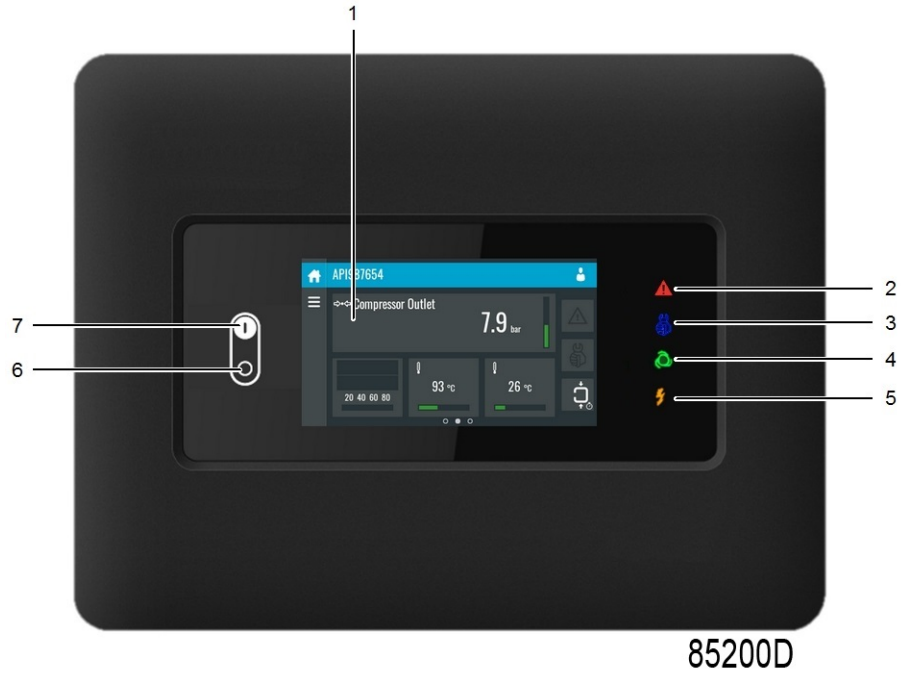


Figure 6: Control panel

Parts and functions

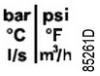
Reference	Designation	Function
1	Touch screen	Shows the unit operating condition and several icons to navigate through the menu. The screen can be operated by touch.
2	Warning sign	Flashes in case of a shut-down and is lit in case of a warning condition.
3	Service sign	Lit when service is needed.
4	Operation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

3.3 Icons used

Menu icons

Menu	Icon	Menu	Icon	Menu	Icon
Data	 85233D	Status	 85239D		
		Inputs	 85240D		

Menu	Icon	Menu	Icon	Menu	Icon
		Outputs	85241D		
		Counters	85242D		
		Aux. 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		
Machine Settings	85237D	Alarms	85239D		
		Regulation	85346D		
		Control Parameters	85347D		
		Aux. Equipment Parameters	85243D	Converter(s)	85251D
				Fan	85255D
				Internal SmartBox	85256D
		Auto Restart	85274D		
Controller Settings	85238D	Network Settings	85246D	Ethernet Settings	85257D
				CAN Settings	85258D

Menu	Icon	Menu	Icon	Menu	Icon
		Localisation	 85247D	Language	 85259D
				Date/Time	 85260D
				Units	 85261D
		User Password	 85248D		
		Help	 85249D		
		Information	 85250D		

Status icons

Icon	Description
 85262D	Motor Stopped
 85263D	Motor Stopped Wait
 85264D	Running Unloaded
 85265D	Manual Unload
 85266D	Running Unloaded Wait
 85267D	Running Loaded
 85268D	Failed to Load
 85269D	Running Loaded Wait
 85270D	Manual Stop
 85271D	Machine Control Mode, Local
 85272D	Machine Control Mode, Remote
 85273D	Machine Control Mode, LAN

 85274D	Automatic Restart After Voltage Failure
 85275D	Week Timer Active

System icons

Icon	Description
 85276D	Basic User
 85277D	Advanced User
 85278D	Service User
 85279D	Antenna 25%
 85280D	Antenna 50%
 85281D	Antenna 75%
 85282D	Antenna 100%
85283D	Change between screens (indication)
 85284D	Energy recovery
 85285D	Dryer
 85286D	Element
 85287D	Drain(s)
 85288D	Analogue Output
 85289D	Menu
 85290D	Reset
 85291D	Auto Restart

	Filter(s)
	Cooler
	Valve(s)
	Power Meter

Input icons

Icon	Description
	Pressure
	Temperature
	Special Protection
	Open
	Closed

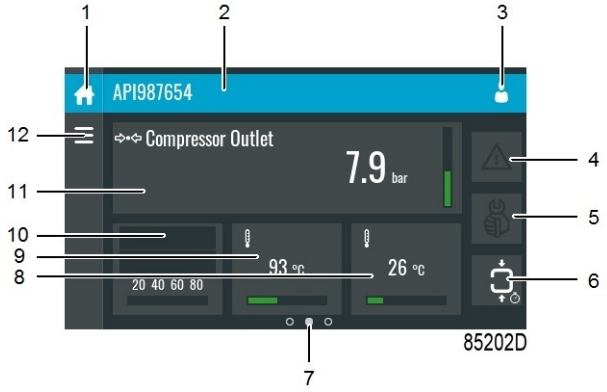
	This chapter gives a general survey of available icons. Not all icons mentioned in this chapter are applicable to every machine.

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.
2	Screen information	On the main screen, the screen information bar shows the serial number of the machine. When scrolling through menus, the name of the current menu is shown.
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	Indicates which page you currently see. The middle indication is the main screen, left is the menu screen and at the right the quick access screen. Swipe left or right to go to another screen.
8, 9, 10, 11	These fields can contain a history chart, an input or a counter value, depending on the type of the machine.	Tap the field to view the type of measurement. This will be shown in the screen information bar. Examples of inputs: • Ambient temp • Outlet • Dryer dewpoint Examples of counters: • Running hours • Load relay • Loaded hours
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.

Function	Description
Setpoints	Several setpoints can be modified by tapping this icon.
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.
Display language	The display language of the controller can be changed by tapping this icon.
Manual unload (only on fixed speed units)	When tapped, the machine will go in Manual unload mode until the icon is tapped again.
Week timer	Week timers can be set by tapping this icon.
Remaining running time	The Remaining running time can be set and modified by tapping this icon.
Internal SmartBox	The reception quality of the internal antenna can be monitored.  85256D 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%.
Auto restart	Auto restart can be activated by tapping this icon.

3.6 Menu screen

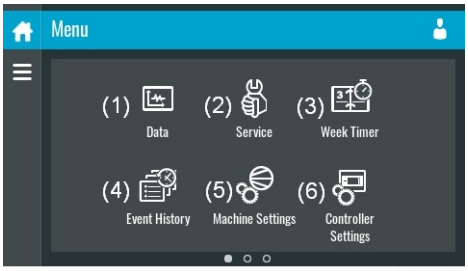
Function

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



85204D

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 Auto 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

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



This is the main menu structure. The structure can be different depending on the configuration of the unit.

3.7 Data menu

Function

This screen is used to display the following submenus:

- Status
- Inputs
- Outputs
- Counters
- Aux. Equipment

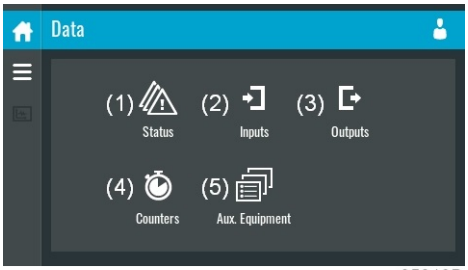
These submenus can be entered by tapping the icons.

Procedure

To enter the Data menu screen:

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

Description

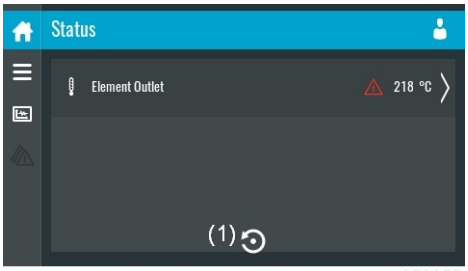


85210D

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

Status menu

Tap the Status icon to enter the Status menu.



85205D

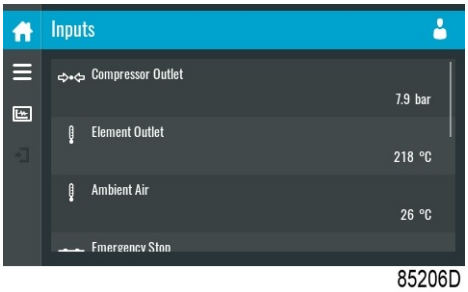
This menu shows the current status of the unit.

If an alarm is active, it can be viewed by tapping the alarm message. To reset an alarm, tap the reset button (1).

	Before remedying, consult the *Safety precautions*. Before resetting a warning or shutdown message, always solve the problem. Frequently resetting these messages without remedying may damage the unit.

Inputs menu

Tap the Inputs icon to enter the Inputs menu.



85206D

This menu shows information about all the inputs.

Outputs menu

Tap the Outputs icon to enter the Outputs menu.



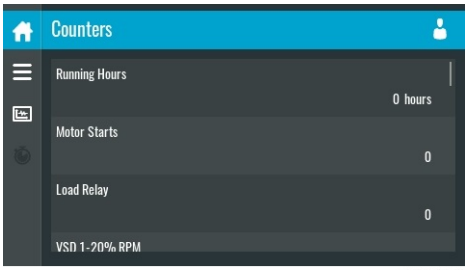
85207D

This menu shows information about all the outputs.

	Voltage-free outputs may only be used to control or monitor functional systems. They should NOT be used to control, switch or interrupt safety related circuits. Check the maximum allowed load on the label.
	Stop the unit and switch off the supply before connecting external equipment. Check the *Safety precautions*.

Counters menu

Tap the Counters icon to enter the Counters menu.

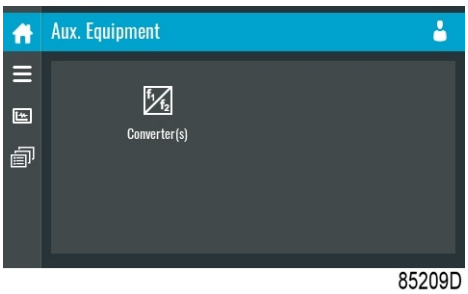


85208D

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

Auxiliary equipment menu

Tap the Aux. Equipment icon to enter the Aux. equipment menu.



85209D

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 (Only visible as advanced user)
- Clean screen

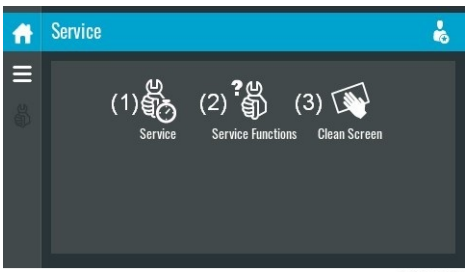
These submenus can be entered by tapping the icons.

Procedure

To enter the Service menu screen:

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

Description

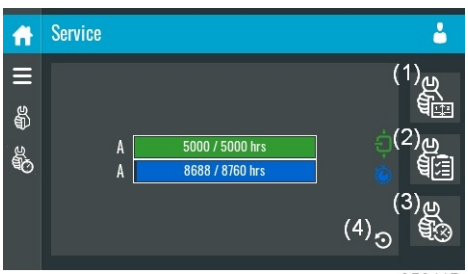


85213D

Reference	Designation
(1)	Service
(2)	Service functions (Only visible as advanced user)
(3)	Clean screen

Service menu

Tap the Service icon to enter the Service menu.



85211D

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)

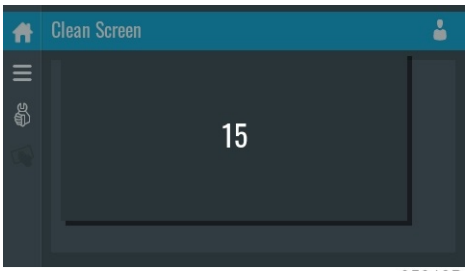
A service overview can be viewed by tapping icon (1).

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

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

Clean screen

Tap the Clean Screen icon to start the 15 seconds countdown to perform cleaning of the touchscreen.



85212D

The touchscreen 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 week timers with each up to 8 settings per day.

The week timers can be activated through this screen.

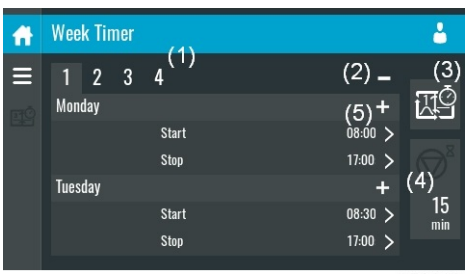
A Remaining Running Time can be set from 5 up to 240 minutes.

Procedure

To enter the Week Timer menu screen:

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

Description



85214D

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.

Reference	Designation	Function
(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.

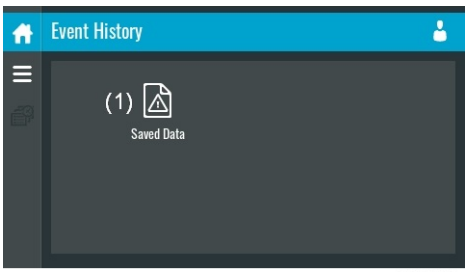
These submenus can be entered by tapping the icons.

Procedure

To enter the Event history menu screen:

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

Description

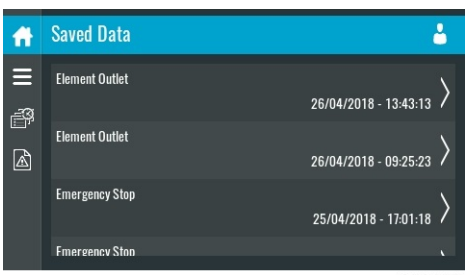


85216D

Reference	Designation
(1)	Saved Data

Saved data

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



85215D

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

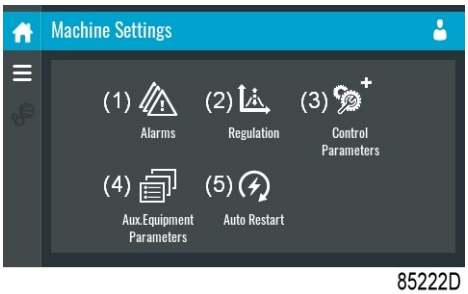
These submenus can be entered by tapping the icons.

Procedure

To enter the Machine settings menu screen:

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

Description

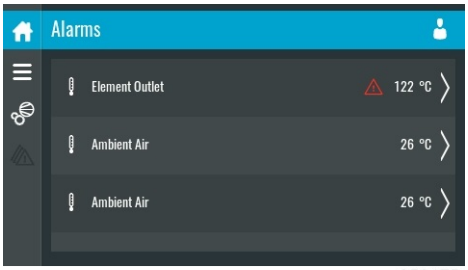


85222D

Reference	Designation
(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.



85217D

A list of all alarms is shown.

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

Regulation menu

Tap the Regulation icon to enter the Regulation menu.



85218D

Setpoints or pressure bands can be modified through this menu.

Modify a setting

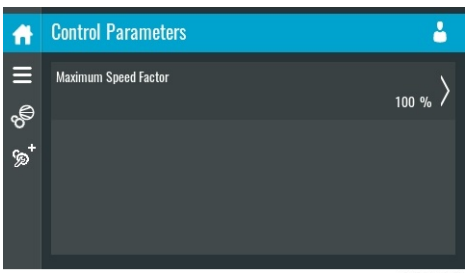
When tapping a list item, a selection screen pops up. The user can modify the setting by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.

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'.

Control parameters menu

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



85219D

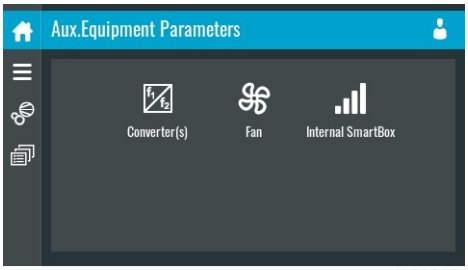
This menu shows information about the Control Parameters.

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 auxiliary equipment parameters menu.



85220D

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

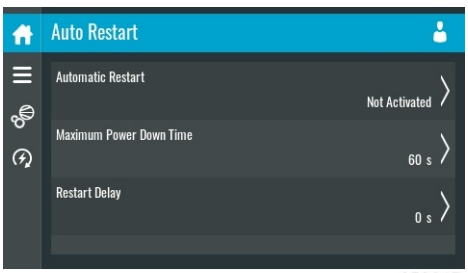
When tapping a list item, a selection screen pops up. The user can modify the setting by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.

Auto restart menu

	If the function is activated and provided the regulator was in the automatic operation mode, the unit will automatically restart if the supply voltage to the module is restored. The ARAVF label shall be glued next to the controller.

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

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.



85221D

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 clicking 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

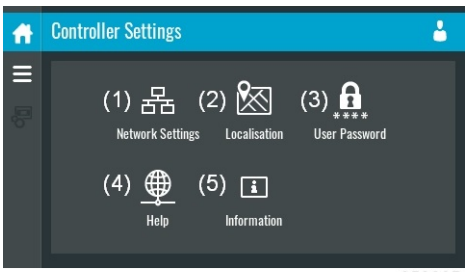
These submenus can be entered by tapping the icons.

Procedure

To enter the Controller Settings menu screen:

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

Description

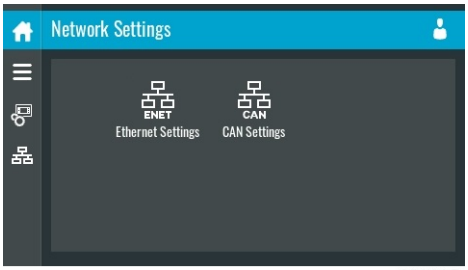


85228D

Reference	Designation
(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.



85223D

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

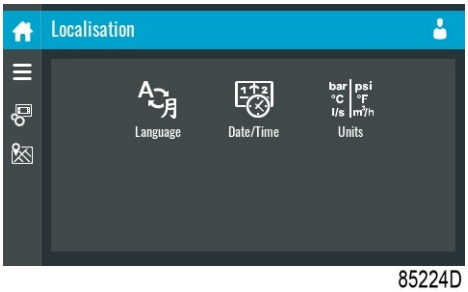
When tapping a list item, a selection screen pops up. The user can modify the setting by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.

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.



85224D

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

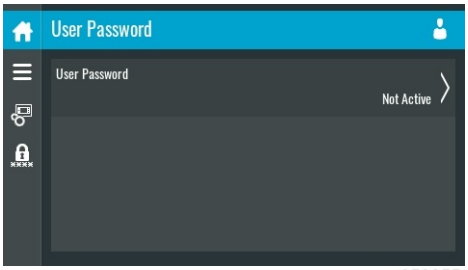
When tapping a list item, a selection screen pops up. The user can modify the setting by tapping '–' or '+' and can confirm by tapping 'V' or decline by tapping 'X'.

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.



85225D

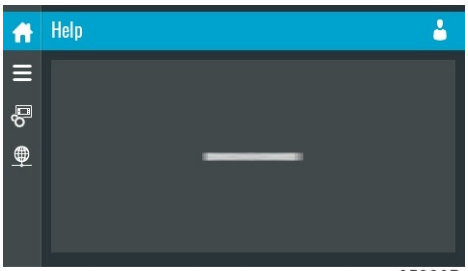
The user password can be activated or deactivated through this menu. Enter and confirm a user password to activate, repeat to deactivate.

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.

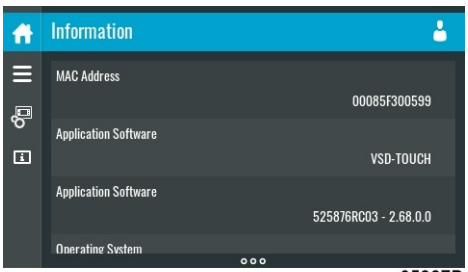


85226D

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.



85227D

This menu shows information about the controller.

3.13 Access level

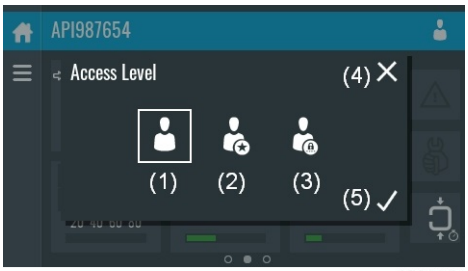
Function

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



85229D

Reference	Designation	Function
(1)	User	A basic set of parameters is visualized, no password required.
(2)	Service	This access level is only to be used by certified technicians.
(3)	Full	This access level is only to be used by certified technicians.
(4)	Decline	Tap to decline the selected user level.
(5)	Confirm	Tap to confirm the selected user level.

4 Installation

4.1 Installation warnings

	• The compressor is intended for indoor use only.
	• Working with machinery controlled by a frequency converter requires special safety precautions which depend on the type of network (TN, TT or IT). Consult Atlas Copco.
	• Consult the “Safety precautions during installation” before starting the installation.
	• Cooling air for starter cabinet:
	  • Contamination levels (ambient) according to IEC 60 721-3-3.
	  • Chemical gases: Class 3C2
	  • Solid particles: Class 3S2
	  • No conductive dust allowed
	  • No condensation allowed
	  • Maximum allowed relative humidity is 60 % in the presence of corrosive gases.
	• When good EMC practices for installation are followed, the compressor qualifies for installation in EMC category C3, according to EN61800-3, for use in a second environment (a second environment includes all establishments other than those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes).

	The compressor is not intended to be used on a low-voltage public network which supplies domestic premises. Radio frequency interference can be expected if used on such a network.

	The safety of the control system according ISO 13849 is based on 60000 motor starts per year.

4.2 Dimension drawing

Dimensions

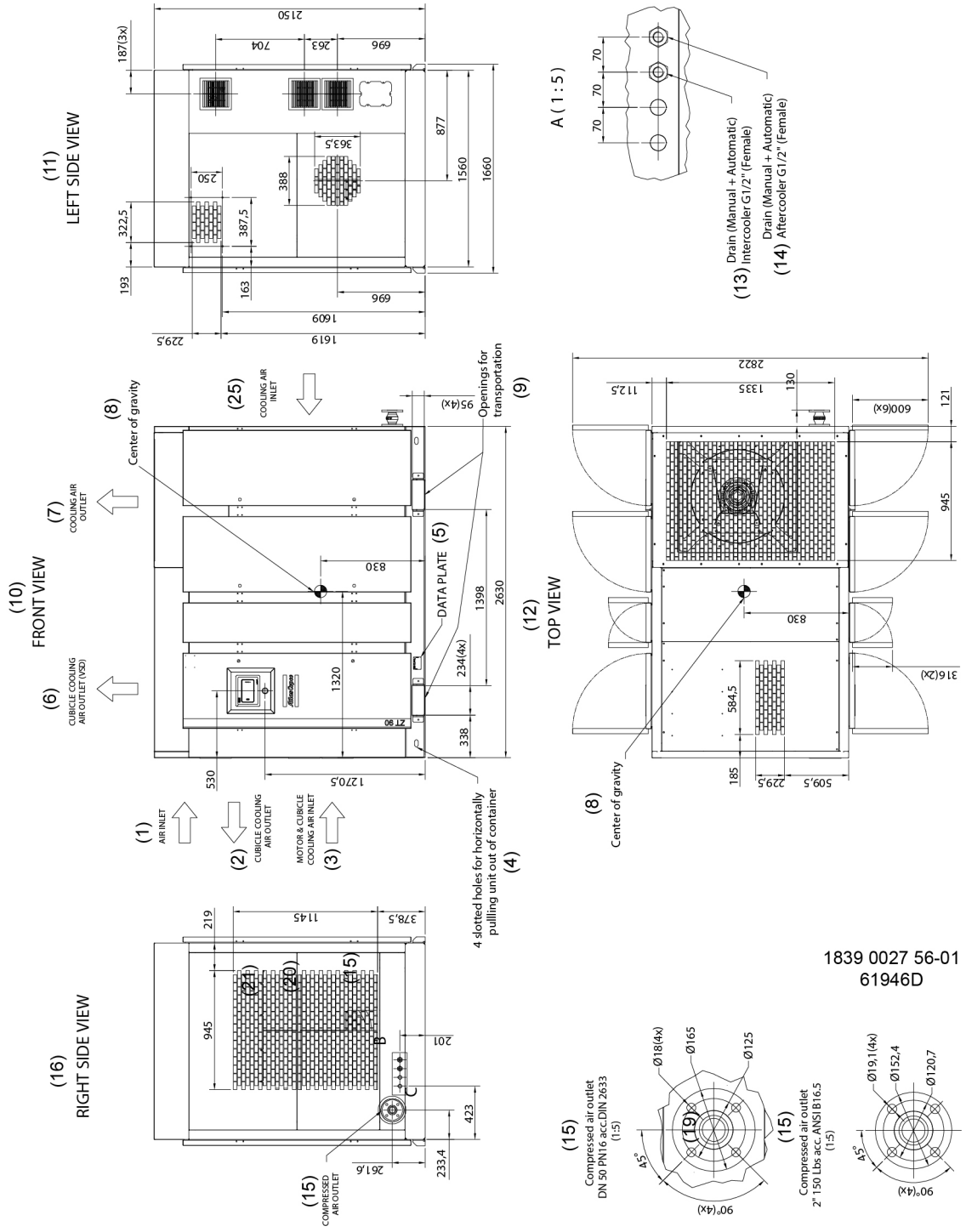


Figure 7: Dimension drawing, Pack compressor, metric units

Reference	Description
1	Air inlet

Reference	Description
2	Cubicle cooling air outlet
3	Motor and cubicle cooling air inlet
4	4 slotted holes
5	Data plate
6	Cubicle cooling air outlet (VSD)
7	Cooling air outlet
8	Center of gravity
9	Openings for transportation
10	Front view
11	Left side view
12	Top view
13	Drain (manual + automatic), intercooler
14	Drain (manual + automatic), aftercooler
15	Compressed air outlet
16	Right side view
25	Cooling air inlet

4.3 Installation proposal

Compressor room example

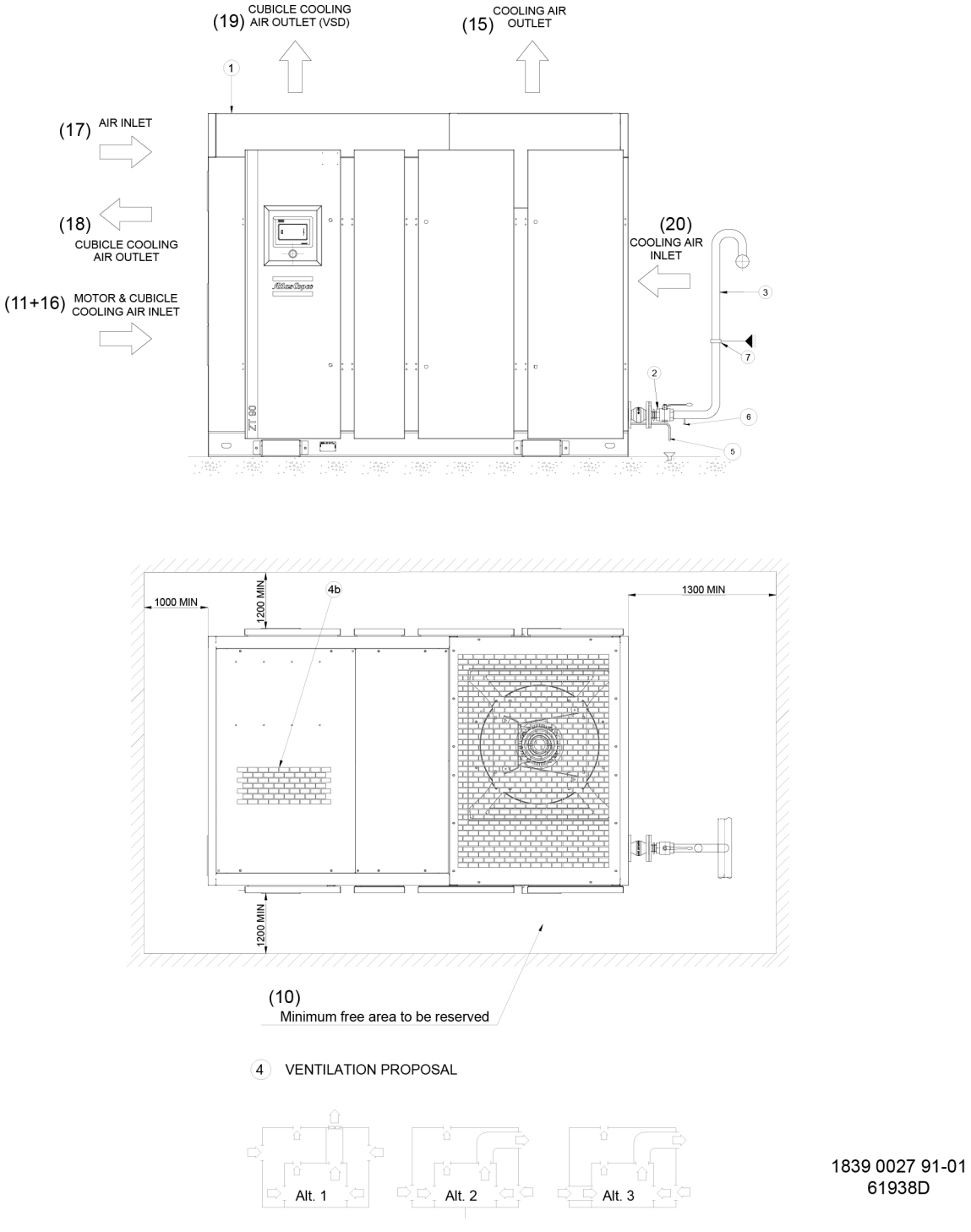


Figure 8: Installation proposal, Pack compressor in metric units

Description

1. Install the compressor on a level floor suitable for taking its weight. The recommended minimum distance between the top of the body and the ceiling is 1200 mm (47 in).
2. Compressed air outlet valve with lockout / TAG OUT system.
3. The maximum total length of the air delivery pipe can be calculated as follows:

   For SI Units:

   $L_{max} = (dp \times d^5 \times p) / (450 \times Qc^{1.85})$

Symbol	Explanation
d	Inner diameter of the outlet pipe in mm
dp	Pressure drop (recommended maximum = 0.1 bar)
L	Length of outlet pipe in m
p	Absolute pressure at the compressor outlet in bar(a)
Qc	Free air delivery of the compressor in l/s

   It is strongly recommended to make the connection of the compressor air outlet pipe on top of the main air net pipe in order to minimize carry-over of possible condensate residue.
4. The inlet grids and ventilation fan should be installed in such a way that any recirculation of cooling air to the compressor is avoided. The maximum air velocity through the grids is 5 m/s (16.5 ft/s).

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

   - **For SI Units:** Qv = 0.92 N/dT

Symbol	Explanation
dT	Temperature increase in compressor room • **For SI Units:** in °C
N	Shaft input of compressor • **For SI Units:** in kW
Qv	Required ventilation capacity • **For SI Units:** in m^3/s

   If cooling air ducts are installed, the maximum allowable pressure drop over the ducts is 100 Pa (0.40 in wc). Common ducting for several compressors is not allowed.
5. Lay out the drain piping from the condensate outlets towards the condensate collector. The drain pipes must not dip into the water in the collector. It is recommended to provide a funnel to allow visual inspection of the condensate flow.
6. Elektronikon control system with control panel.
7. Power supply cable entry.
8. Drain valve.
9. -
10. Minimum free area to be reserved.
11. Cubicle cooling air inlet.
12. Cooling air outlet.
13. Motor cooling air inlet.
14. Air inlet.

15. Cubicle cooling air outlet.
16. Cubicle cooling air outlet (VSD).
17. Cooling air inlet.

4.4 Installation requirements for rubber compensators

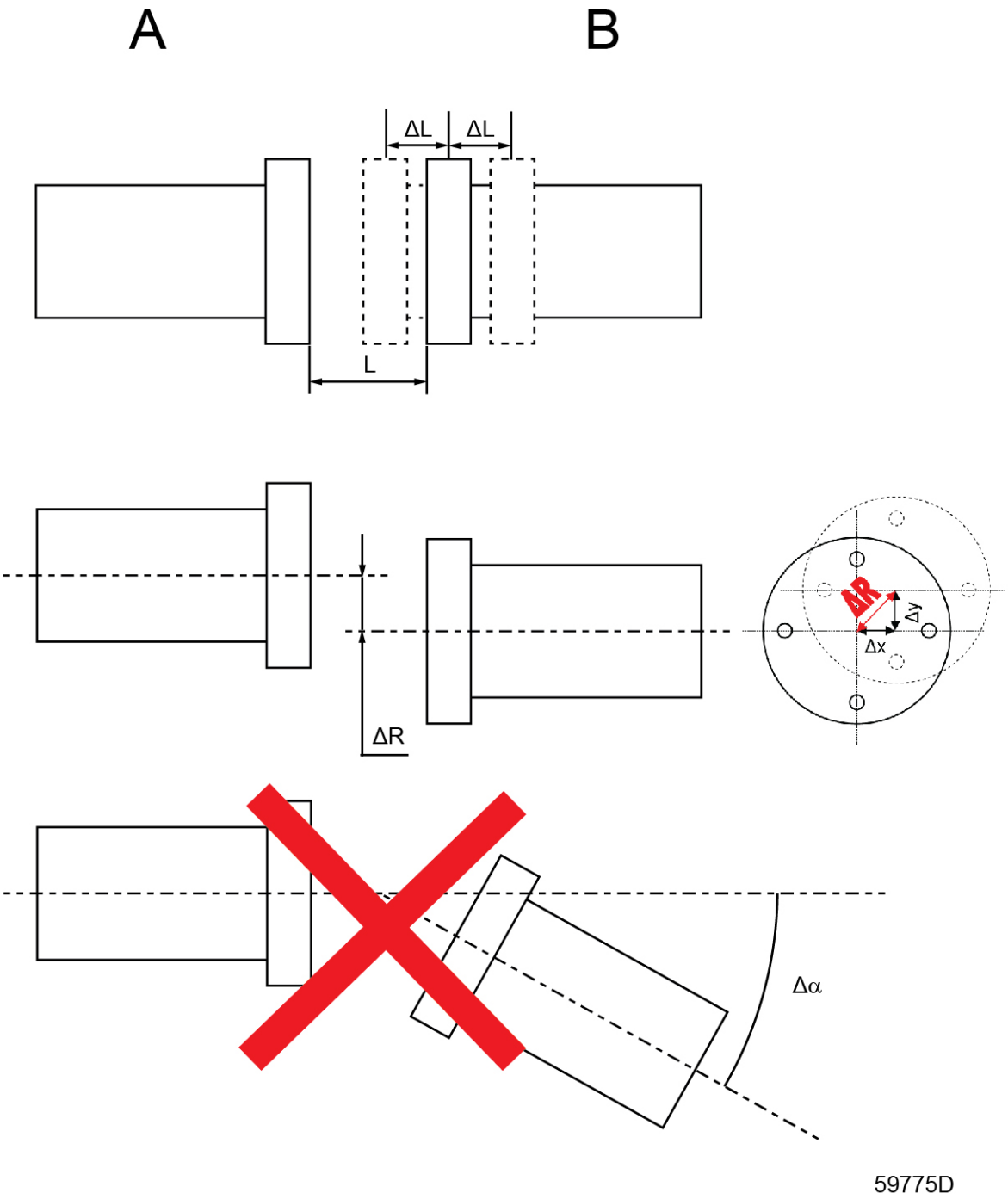
Types and sizes

Atlas Copco oil-free air products with aftercooler are equipped with rubber compensators on the air outlet and water connections.

Types of misalignments

The supplied compensators can cope with 2 types of minor misalignments when the customer pipe end is mounted:

- Axial ΔL
- Lateral ΔR



Drawing reference	Description
A	Atlas Copco compressor pipe end
B	Customer installation pipe end

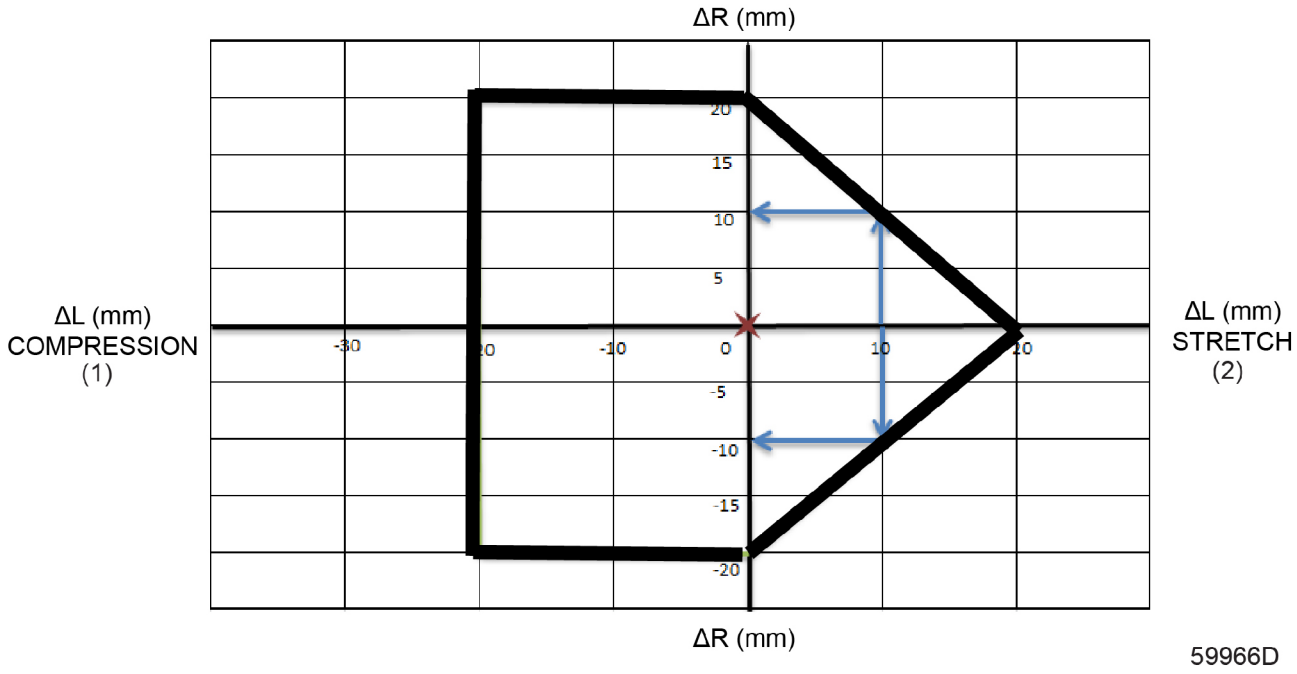
	Angular misalignments Δα are NOT allowed!

Misalignment tolerances

- Single direction misalignments

Axial $_1$: ΔL	mm	20
Lateral: ΔR	mm	20
$\Delta\alpha_2$	°	0
$_1$ = stretch or compression $_2$ = NO angular misalignment is tolerated!		

- Combined direction misalignments



Drawing reference	Description
(1)	Compression
(2)	Stretch

	Do NOT operate outside of the **black** polygon.

	Do NOT exceed the misalignment tolerances to avoid compensator damage! The piping system of the customer should be designed to fit the misalignment tolerances both during standstill and operation.

Temperature correction factors

Medium temperature (°C)	Correction factor for maximum working pressure of the compensator
0	1
50	1
80	1
85	0.92
90	0.83
95	0.75
100	0.67

Medium temperature (°C)	Correction factor for maximum working pressure of the compensator
105	0.6
110	0.54

Torque values

Compensator bolts should be torqued in 3 successive steps

- Step 1: Hand-tighten each bolt.
- Step 2: Torque the bolts crosswise up to the value mentioned in the table below and allow a stabilization period of 30 minutes before moving to step 3.
- Step 3: Torque the bolts crosswise up to the value mentioned in the table below.

	• Mind the parallelism of the sealing. • Excessive torque will damage the sealing.

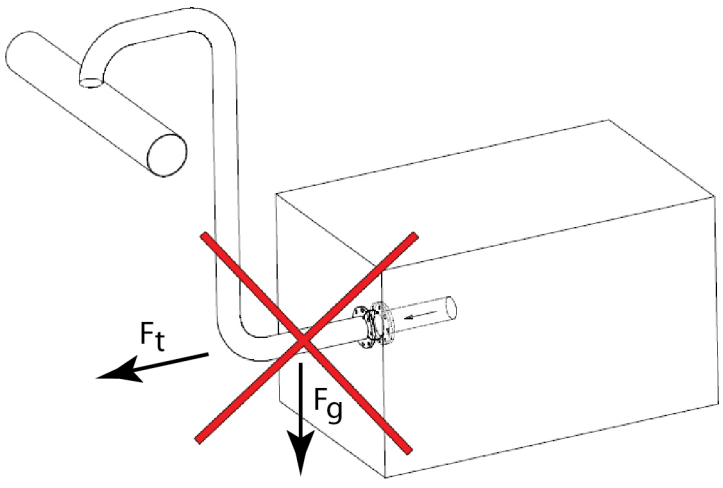
DN (mm)	Step 1	Step 2 (Nm)	Step 3 (Nm)
20 – 80	hand tight	50	80
100 – 300	hand tight	50	100
350 – 500	hand tight	50	130

Do's and don'ts

The supplied compensators are NOT designed:

- to carry the weight of the mounted customer pipe end.
- to work as a damper for unanchored pipe ends.
- to carry the thrust forces of the compressed air.

Therefore, adequate supporting and anchoring of the customer pipe end should be foreseen to avoid compensator damage.



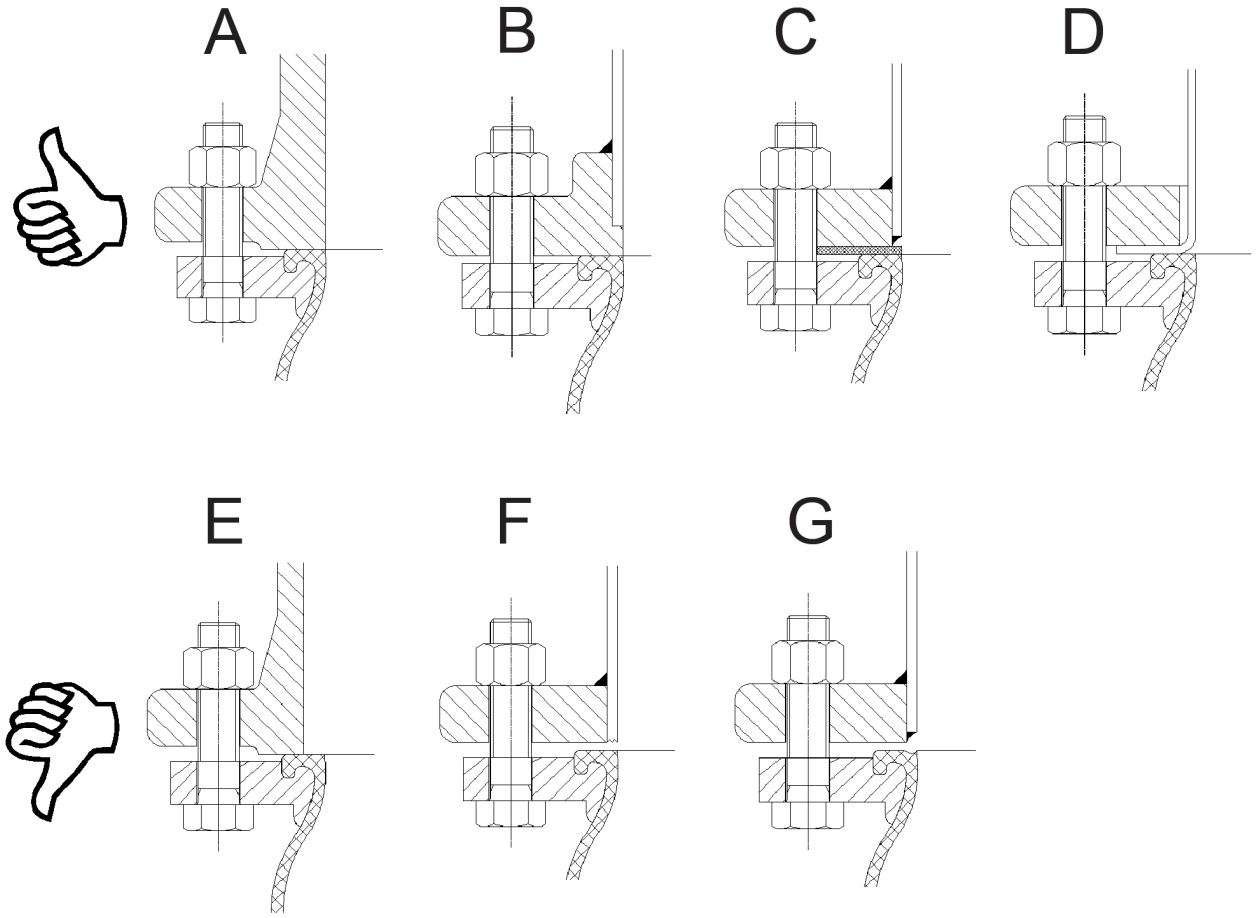
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	The compensator loads (F_g and F_t) that are mentioned on the drawing are strictly forbidden: • Weight loads F_g • Thrust forces F_t

For the design of piping and supporting structures, use an approved standard code (e.g. EN 13480 or ASME 16.5/B31.3).

	Mind that the connected pipe at customer side does not create any flow restriction caused by e.g. section reduction.

While installing the compensator, please mind the following check points to avoid sealing damage.

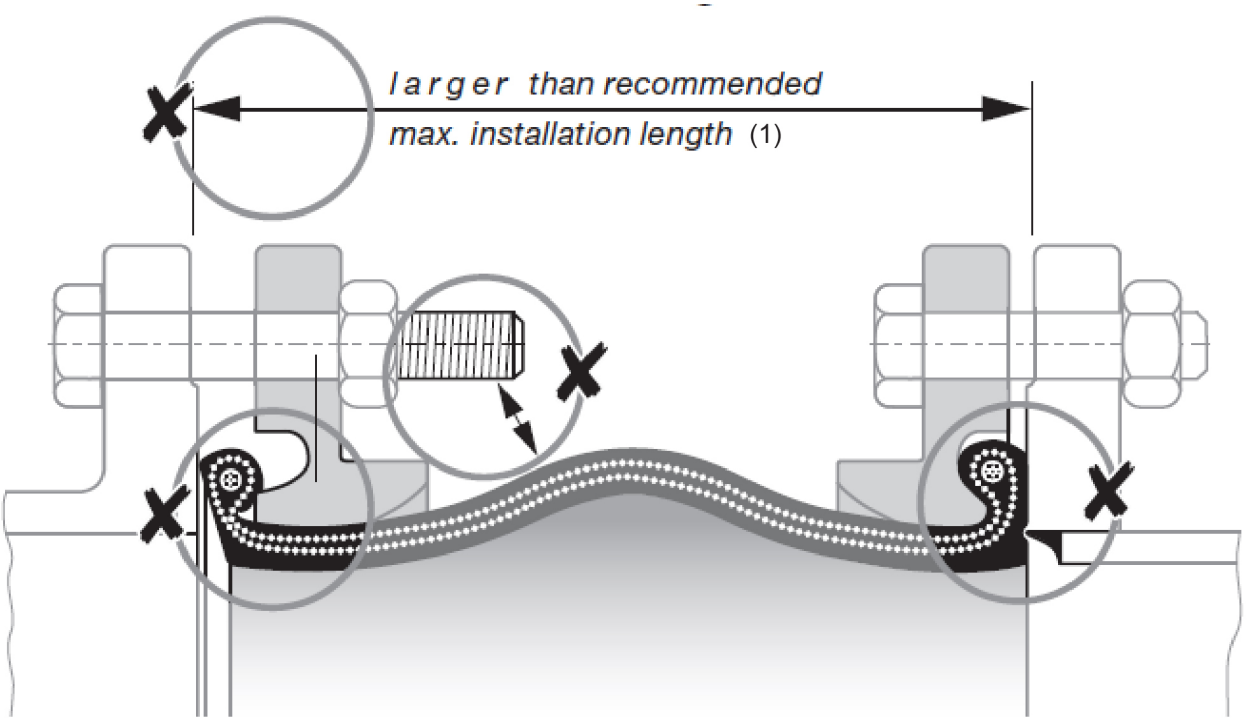


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Situation	Description
A	Flat DIN flanges prevent damage of the rubber sealings.
B	Collared flanges prevent premature wear.
C	Add a flat sealing or if necessary a metal disc with flat seal in case of damage risk.
D	Avoid excessive torque to prevent damage to the bended pipes or the sealings.
E	Rubber sealings will get damaged when the inner pipe diameter exceeds the inner sealing diameter.
F	Rough pipe ends will damage the rubber sealing.
G	Avoid contact between the pipe end and the rubber sealing.

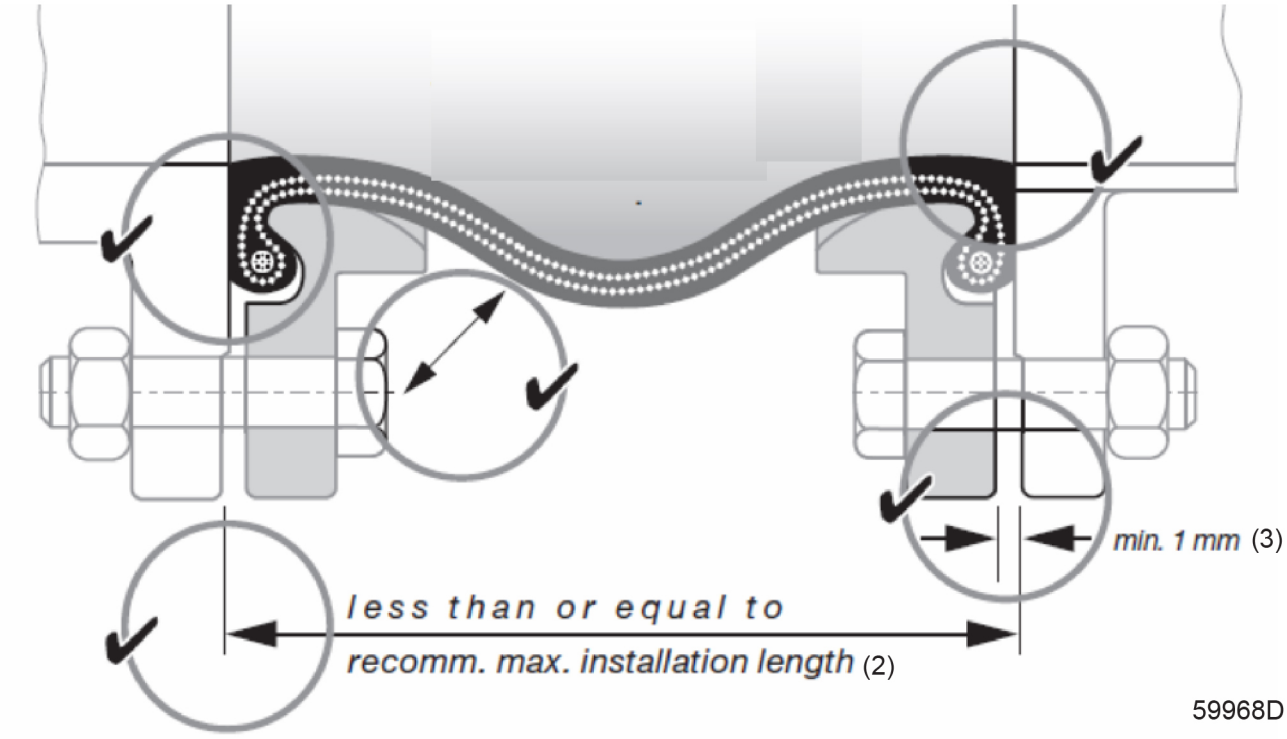
Refer to the pictures below for a visual overview of 5 do's and don't's when installing rubber compensators:

- **WRONG installation!**



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- **CORRECT installation!**



Drawing reference	Description
(1)	Larger than maximum allowed installation length.
(2)	Less than or equal to maximum allowed installation length
(3)	Minimum 1 mm of free space

	Do NOT:
	• Paint the rubber bellows of the expansion joint since:
	  • Solvents can damage the rubber cover.
	  • The colored coating avoids decent visual inspection of the rubber condition.
	• Weld, cut or grind without protecting the rubber bellows
	• Expose the compensator to permanent radiation heat above 90 °C (194 °F)

4.5 Electric connections

Diagram

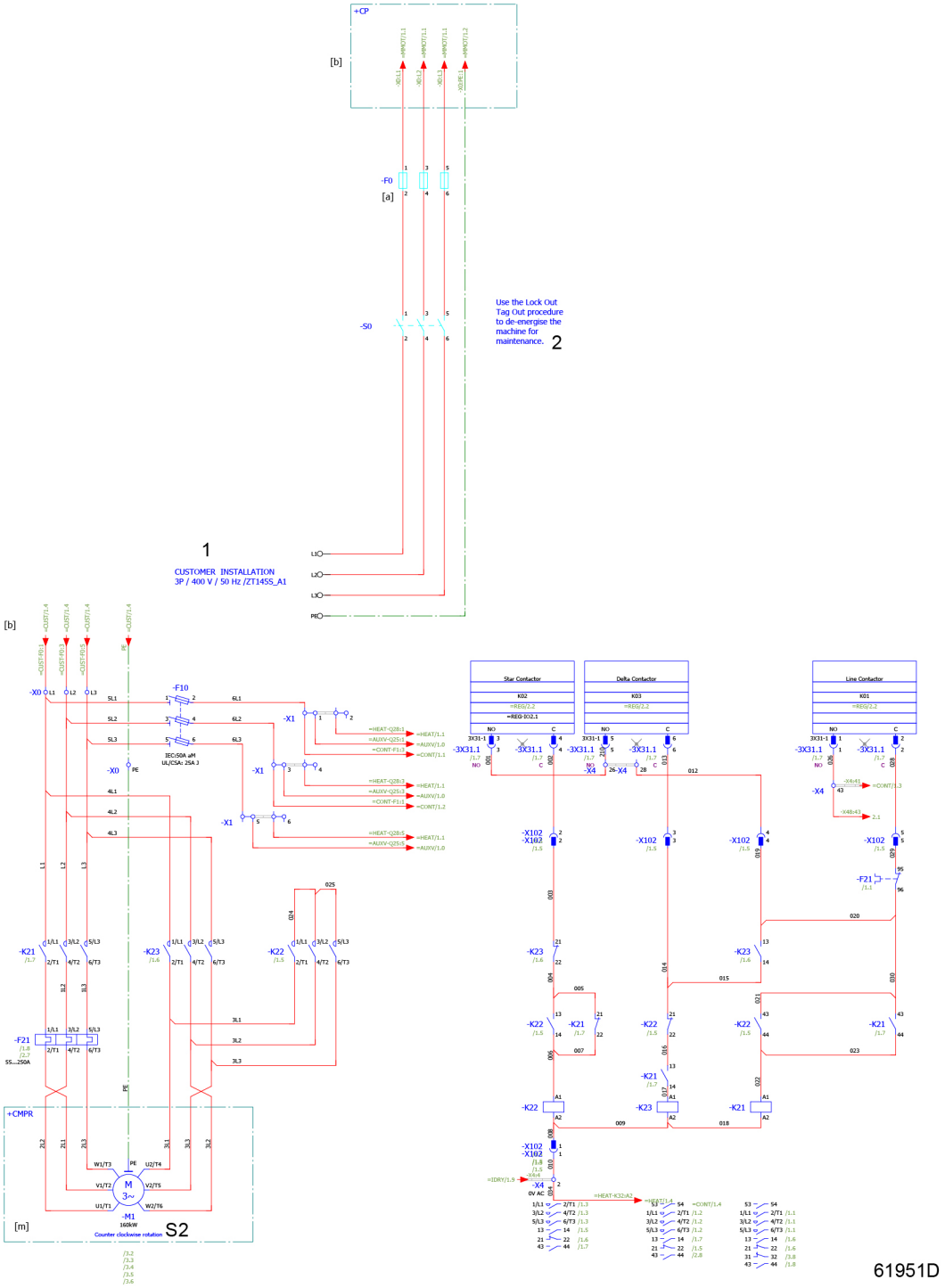


Figure 9: Electrical diagram

Ref.	Name
(1)	Customer’s installation

Ref.	Name
(2)	Use the Lock Out Tag Out procedure to de-energize the machine for maintenance

4.6 Electric cables

Electrical connections

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

	• Obey local regulations if they are stricter than the regulations mentioned in this document.
	• Obey the applicable electrical directives when installing and connecting the compressor to the power circuit :
	  • IEC 60204-1
	  • IEC 60364-5-52
	• An isolating switch and the required fuses must be installed before the compressor. This is indicated on the connection diagram as “customer’s installation” (customer’s installation).
	The fuses protect the supply cables against overload and short circuit. To select the required type and size of the isolator switch, the fuses and the package current (found in the technical data sheet) must be taken into account.
	• 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).
	• Use the original cable entry. (See section Dimension drawings).
	• Full load (compressor) package currents are calculated and available on the Technical data sheet. For cable section selection purposes, we suggest to add 10 % to compensate for any under-voltages that might occur in the installation.
	• Use copper wires only.
	• Fuses are maximum allowed values to protect installed compressor electrical panel, see chapter Circuit breakers and fuses.
	• Caution!
	  • Always double-check the fuse size versus the calculated cable size. If required, reduce the fuse size or enlarge the cable size.
	  • Cable length should not exceed the maximum length according to IEC 60204 (table.10).
	• Display the fuse type information next to the fuse holder of the mains branch.
	• Connect the power cable with the correct cable lugs on the terminals in the electrical cabinet.
	• Do not connect more than one (1) cable lug at one side of a contactor terminal or copper bar, unless specified otherwise.
	• Mount all cables on a horizontally ventilated cable tray.
	• Do not stack or group cables as this avoids heat dissipation.
	• Use only the prescribed cable types:
	  • IEC: XLPE 90 °C (194 °F)
	• Respect a minimum of 10 mm IEC between stripped cable ends for low voltage installations

Maximum fuse size

- The pre-described fuses mentioned in the Technical Data Sheet (TDS) or on the service diagram are the maximum main fuses to protect the installed compressor electrical panel.
- The pre-described fuse types are to be used.
- Final cable and fuse selection will depend on the customer’s installation and local legislation.
- Installing smaller fuses of the same type/class might lead to smaller main feeder cables.
- Always double-check the fuse size versus the calculated cable size. If required, reduce the fuse size or enlarge the cable size.
- Cable length should not exceed the maximum length according to IEC 60204 (table 10).

- Obey local regulations if they are stricter than the examples mentioned in this document.

Package current

The Package Current mentioned on the Technical Data Sheet is defined as follows:

Package current is the current the compressor uses:

- At reference conditions
- At 100% load
- At maximum pressure
- At nominal voltage
- Before service interval (so including fouled filters, etc)

The pre-described fuses on the Technical Data Sheet are the maximum main fuses to protect the installed compressor electrical panel.

- Supply cables: 1x(3+PE).
- Number of cables:
  - Feeder cables: maximum 3x(240 mm^2 or 500 kcmil).
  - Earth cable: maximum 240 mm^2 (500 kcmil).
- Torque:
  - Feeder cables: 14 Nm - 30 Nm (124 lbin - 265 lbin).
- Connection:
  - Feeder cables: M12 lugs required.

Cable configuration

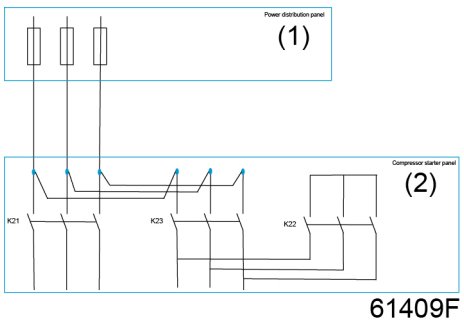


Figure 10: Single supply cables

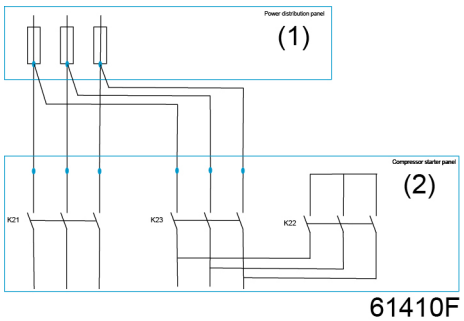


Figure 11: Parallel supply cables

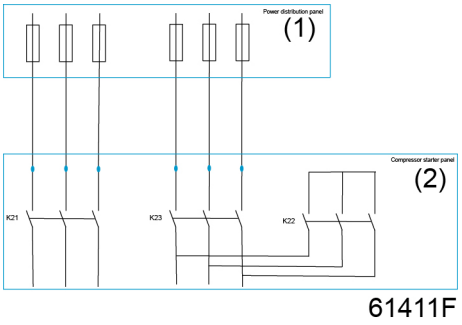


Figure 12: Phase supply cables (Only valid for Y-D versions)

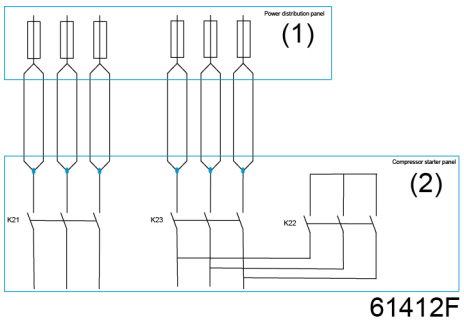


Figure 13: Parallel phase supply cables (Only valid for Y-D versions)

(1): Power distribution panel

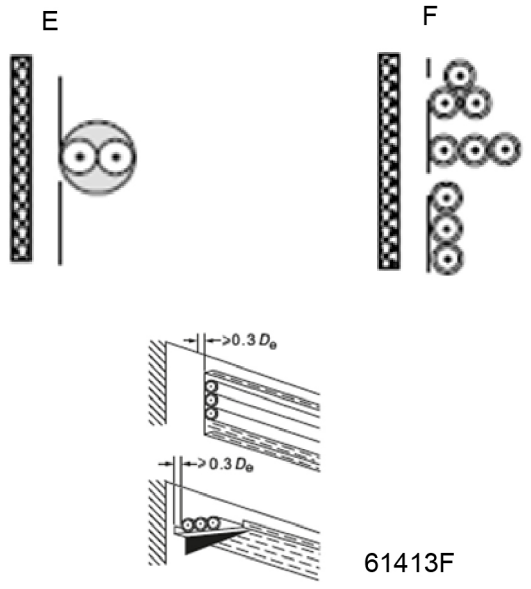
(2): Compressor starter panel

Fuse calculations for IEC are done according to IEC 60364–4–43 (Low voltage electrical installations — Part 4–43: protection against overcurrent).

Cable sizing according IEC

The tables below indicate the current carrying capacities of cables for commonly used installation methods, calculated according to standard IEC 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 (Cross-linked polyethylene) insulated cables with three loaded copper conductors and for maximum conductor temperature 90 °C, reference temperature 30 °C.



Installation method E or F, according to table B.52.1;

Single-core or multi-core cables, touching in free air;

Clearance to wall not less than 0,3 times cable diameter for method E or one cable diameter for method F.

Cable section	30 °C	40 °C	45 °C	50 °C	55 °C
25 mm²	< 127 A	< 116 A	< 110 A	< 104 A	< 97 A
35 mm²	< 158 A	< 144 A	< 137 A	< 130 A	< 120 A
50 mm²	< 192 A	< 175 A	< 167 A	< 157 A	< 146 A
70 mm²	< 246 A	< 224 A	< 214 A	< 202 A	< 187 A
95 mm²	< 298 A	< 271 A	< 259 A	< 244 A	< 226 A
120 mm²	< 346 A	< 315 A	< 301 A	< 284 A	< 263 A
150 mm²	< 399 A	< 363 A	< 347 A	< 327 A	< 303 A
185 mm²	< 456 A	< 415 A	< 397 A	< 374 A	< 347 A
240 mm²	< 538 A	< 490 A	< 468 A	< 441 A	< 409 A
300 mm²	< 621 A	< 565 A	< 540 A	< 509 A	< 472 A

Table 1: Maximum allowable current in function of the ambient temperature for installation method E (Multi-core cables with 3 loaded conductors and maximum conductor temperature 90 °C)

Cable section	30 °C	40 °C	45 °C	50 °C	55 °C
25 mm²	< 135 A	< 123 A	< 117 A	< 110 A	< 103 A
35 mm²	< 169 A	< 154 A	< 147 A	< 139 A	< 128 A
50 mm²	< 207 A	< 188 A	< 180 A	< 170 A	< 157 A
70 mm²	< 268 A	< 244 A	< 233 A	< 220 A	< 204 A
95 mm²	< 328 A	< 298 A	< 285 A	< 269 A	< 249 A
120 mm²	< 383 A	< 349 A	< 333 A	< 314 A	< 291 A
150 mm²	< 444 A	< 404 A	< 386 A	< 364 A	< 337 A
185 mm²	< 510 A	< 464 A	< 443 A	< 418 A	< 388 A
240 mm²	< 607 A	< 552 A	< 528 A	< 498 A	< 461 A
300 mm²	< 703 A	< 639 A	< 611 A	< 576 A	< 534 A
400 mm²	< 823 A	< 749 A	< 716 A	< 674 A	< 625 A

Table 2: Maximum allowable current in function of the ambient temperature for installation method F (Single-core cables with 3 loaded conductors and maximum conductor temperature 90 °C)

Cable calculation method for IEC

- Single supply cables (3 phases + PE):
  - Add 10 % to the total package current (Package current from the technical data sheets).
  - Install fuses on each supply cable which are smaller than or equal to the Max. fuse values from the technical data sheets or the instruction manual.
  - Connection between contactors must be made by means of copper bars.
- Parallel supply cables and phase supply cables (2 x (3 phases + PE)):
  - Add 10 % to the total package current (Package current from the technical data sheets) and divide by √3.
  - Multiply the ampacity of the cables with the reduction factor as per table B.52.17 of IEC 60364-5-52 (Method E or F), *(typically 0.8).*
  - Install fuses on each supply cable which are smaller than or equal to the Max. fuse values from the technical data sheets or the instruction manual.
- Parallel phase supply cables (4 x (3 phases + PE)):
  - Add 10 % to the total package current (Package current from the technical data sheets) and divide by √3 and then by 2.
  - Multiply the ampacity of the cables with the reduction factor as per table B.52.17 of IEC 60364-5-52 (Method E or F), *(typically 0.8).*
  - Install fuses which are smaller than or equal to the Max. fuse values of the technical data sheets or the instruction manual.
- Size of the PE cable:
  - For supply cables up to 16 mm²: same size as supply cables.
  - For supply cables between 16 mm² and 35 mm²: 16 mm².
  - 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 of supply cable calculation

Itot = 407 A, maximum ambient temperature is 45 °C, recommended fuse = 500 A.

- **Single supply cables** (3 phases + PE):
  - I = 407 A + 10 % = 407 x 1.1 = 447.7 A

  The table for method E (multi-core cable), 90 °C cable temperature and ambient temperature of 45 °C allows a maximum current of 468 A for a 240 mm² cable. So use a multi-core cable of 3 x 240 mm² + 120 mm².
- **Parallel supply cable and phase supply cable** 2 x (3 phases + PE):
  - I = (407 A + 10 %)/√3 = (407 x 1.1)/√3 = 259 A

  For a single-core cable of 120 mm², method F, 90 °C cable temperature and ambient temperature of 45°C, the maximum current is 333 A x 0.8 = 266 A. So two (2) parallel (single-core) cables of 3 x 120 mm² + 70 mm² are sufficient.

For a multi-core cable of 120 mm², method E, 90 °C cable temperature and ambient temperature of 45°C, the maximum current is 301 A x 0.8 = 240 A. This 120 mm² cable would be too small, so you need to install a cable with a bigger section.

Looking at a multi-core cable of 150 mm², method E, 90 °C cable temperature and ambient temperature of 45°C, the maximum current is 347 A x 0.8 = 277 A. The right selection in this case would then be two (2) parallel cables of 3 x 150 mm² + 95 mm².

- **Parallel phase supply cable** 4 x (3 phases + PE):
  - I = (407 A + 10 %)/(√3 x 2) = (407 x 1.1)/(√3 x 2) = 130 A

For a single-core cable of 50 mm², method F, 90 °C cable temperature and ambient temperature of 45°C, the maximum current is 180 A x 0.8 = 144 A. So two (2) parallel (single-core) cables of 3 x 50 mm² + 25 mm² are sufficient.

For a multi-core cable of 50 mm², method E, 90 °C cable temperature and ambient temperature of 45°C, the maximum current is 167 A x 0.8 = 133 A. So two (2) parallel (multi-core) cables of 3 x 50 mm² + 25 mm² are sufficient.

4.7 Quality of safety components

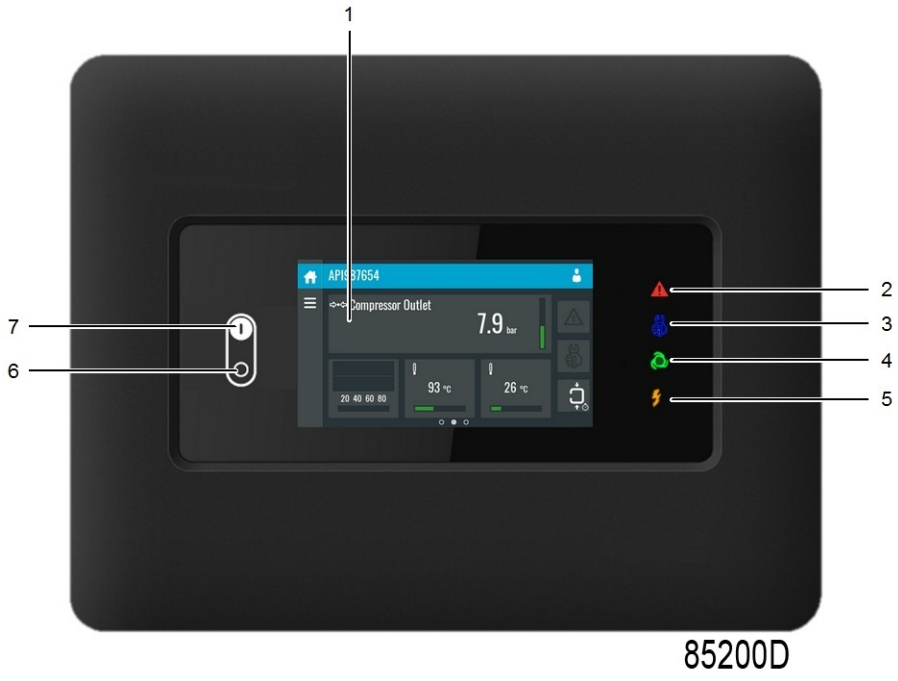
When installing a remote emergency stop button, the following B10d value is advised:

- Emergency stop button: **500 000**

Every three (3) years the emergency circuit shall be tested by pushing the emergency stop button of the unit and the remote emergency stop button.

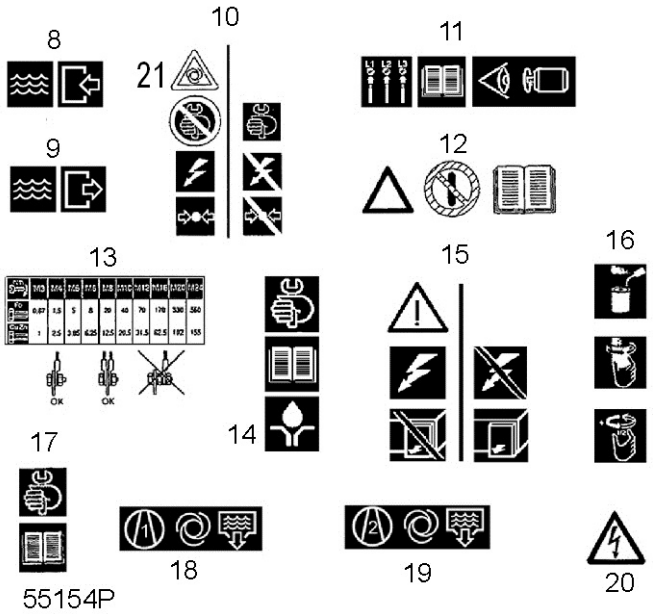
4.8 Pictographs

Pictographs on control panel



Reference	Designation	Function
1	Touchscreen	Shows the unit operating condition and a number of 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	Is lit when service is needed.
4	Operation sign	Is lit when the unit is running in automatic operation.
5	Voltage sign	Indicates that the voltage is switched on.
6	Stop button	This button stops the unit.
7	Start button	This button starts the unit. The operation sign (4) lights up. The controller is operative.

Pictographs at other locations



Ref.	Name
8	Cooling water inlet
9	Cooling water outlet
10	Switch off the voltage and depressurize the compressor before maintenance or repair
11	Before connecting the compressor electrically, consult the Instruction book for the motor rotation direction
12	Read Instruction book before starting the compressor
13	Torques for steel (Fe) or brass (CuZn) bolts
14	Consult the Instruction book before greasing
15	Switch off the voltage before removing the protecting cover inside the electric cabinet
16	Oil the gaskets, screw on the filters and tighten by hand (approx. one half turn)
17	Consult the Instruction book before maintenance or repair
18	Automatic condensate outlet, intercooler
19	Automatic condensate outlet, aftercooler
20	Warning: under tension
21	Unit is remotely controlled and can start without warning (ARAVF)

5 Operating instructions

5.1 Operation introduction

Warning

	The operator must apply all relevant “Safety precautions”.

Ambient conditions

Refer to *Limitations* for the limits of ambient conditions and altitude operation. If the compressor is operated beyond these limits, precautions must be taken. If this is the case, consult your Atlas Copco Customer Center.

Moving/lifting

In order not to damage the frame, the compressor must be moved either by a lift truck or by using lifting equipment as described below.

When moving the compressor with a lift truck, use the slots in the frame. Make sure that the forks protrude from the other side of the frame. When moving the compressor with a lifting device, insert beams in the slots. Make sure that the beams cannot slide and that they protrude from the frame equally. 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.

5.2 Initial start-up

Attention

	The operator must apply all relevant safety precautions.

General preparations

Make sure the compressor is installed correctly.

See “Electric cables”, “Installation proposal” and “Dimension drawing”.

A sticker summarizing the operating instructions is delivered with the literature set. Affix the sticker next to the control panel.

A number of VCI (Volatile Corrosion Inhibitor) plates are available inside the bodywork to protect the compressor against corrosion during transport. Remove these plates.

Protection during transport

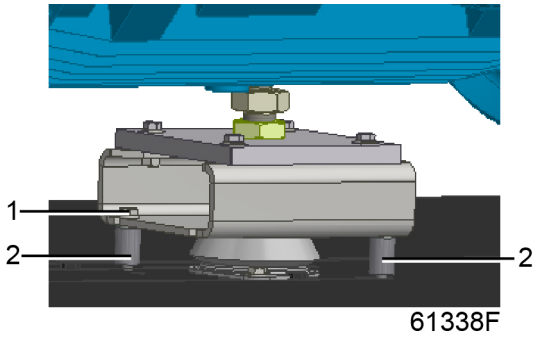


Figure 14: Motor transport spacers

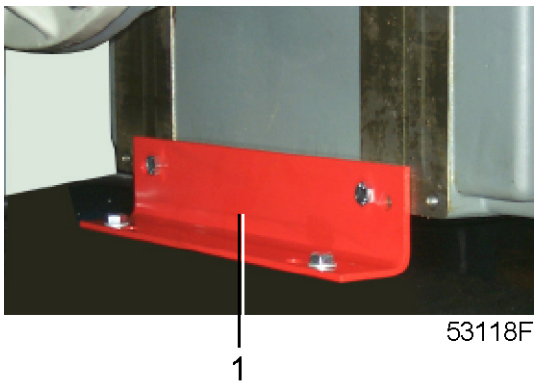


Figure 15: Gear casing transport support

The compressor and motor are secured to the frame immobilizing the vibration dampers during transport. The transport protection devices are painted red and must be removed:

Step	Action
1	On the motor side, remove bolts (1) and spacers (2).
2	Remove support (1) on the gear casing side.

Silica gel bags

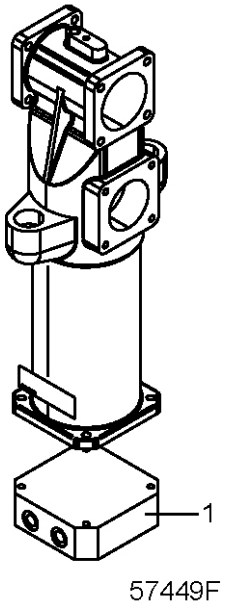


Figure 16: Side view

Remove flange (1) and take out the silica gel bags. Refit the flange.

Electrical system

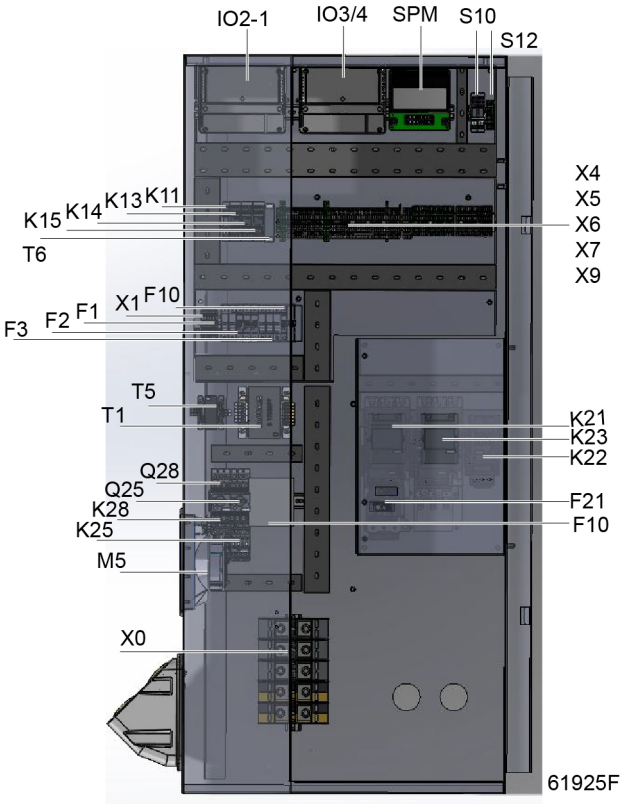


Figure 17: Electric cabinet

Step	Action
1	Check that the electrical connections correspond to the local codes. The installation must be earthed and protected by fuses in all phases. An isolating switch must be fitted.
2	Check the connections on the primary sides of transformers (T1).

Oil circuit

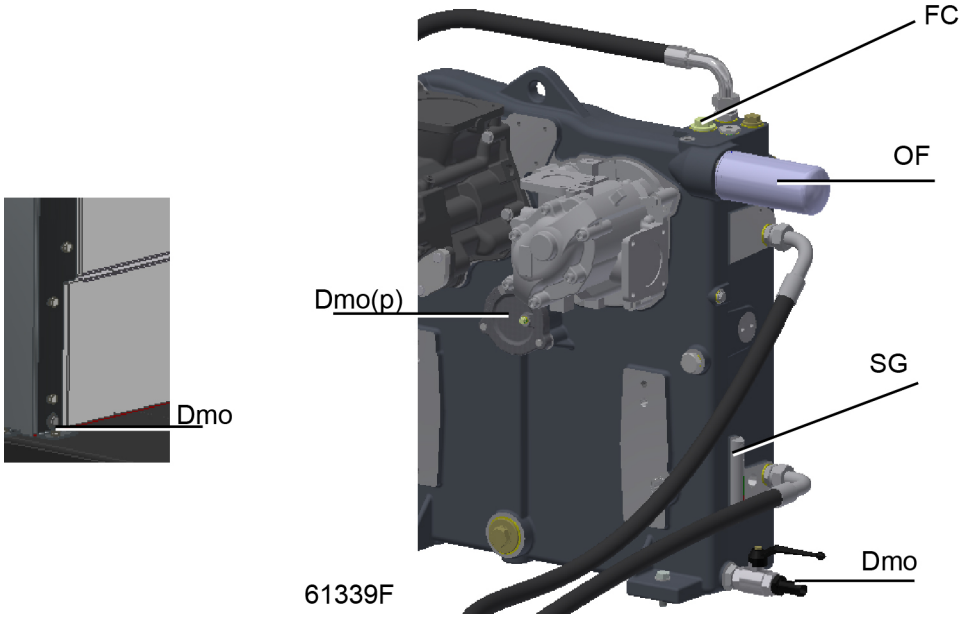


Figure 18: Position of the oil level sight-glass

Check that oil is visible in sight-glass (SG).

Start-up

Step	Action
1	Check that the gear casing is filled with oil.
2	Switch on the voltage.
3	Start the compressor and stop it immediately. Check for correct direction of rotation while the motor is coasting to a stop. The correct rotation direction is indicated by an arrow on the gear casing. Consult Atlas Copco if the rotation direction is wrong.
4	Run the compressor for a few minutes and check that it operates normally. Fill in the commissioning report.
5	Stop the compressor. The oil level after stopping must be in the middle of the sight-glass (SG) (in the case of longer standstill, the oil level in the sight-glass may increase).
6	Fill in the commissioning report.

5.3 Before starting

Attention

	• The operator must apply all relevant safety precautions. • It is mandatory to renew the preservative oil film before starting if the unit was stopped for more than 6 months or if the unit was produced more than 6 months before initial startup. To renew the preservative oil film please contact Atlas Copco for further instructions.

Procedure

Step	Action
1	Check the oil level. After stopping, the level must be in the middle of sight-glass (SG) or in the upper field of the green range. At longer standstill, the oil level may increase. Top up, if necessary, with the correct type of oil.

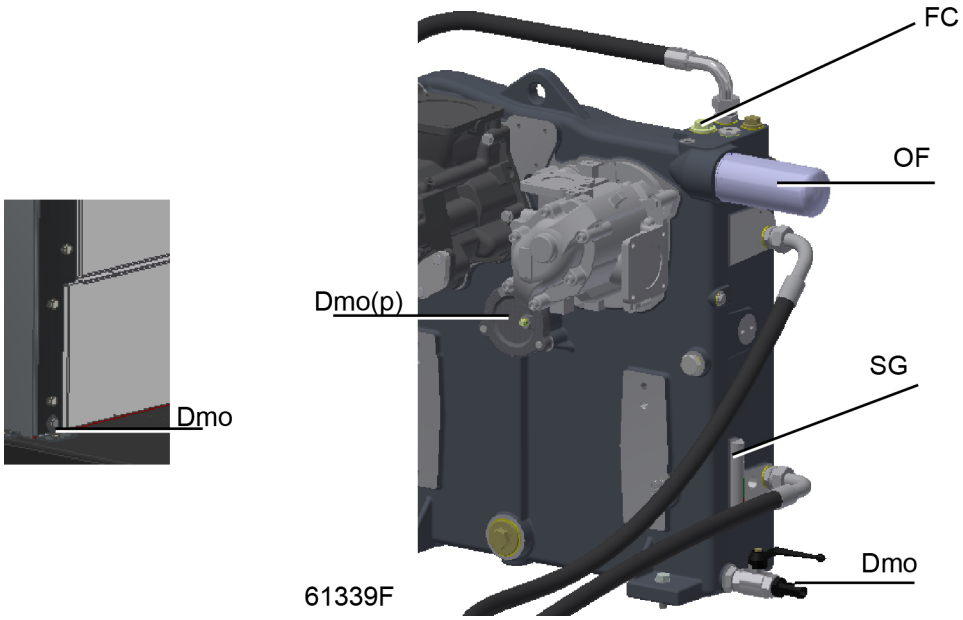


Figure 19: Position of oil level sight-glass

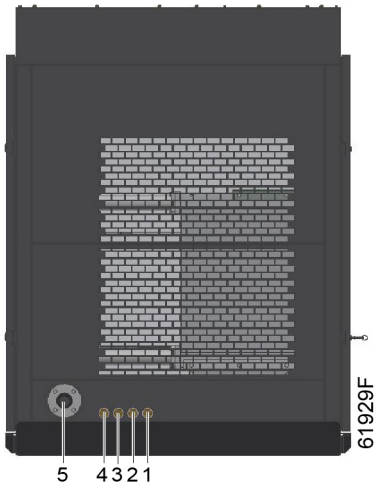


Figure 20: Drain connections

Reference	Description
1	Manual + automatic drain, aftercooler
2	Manual + automatic drain, intercooler
3	Manual + automatic drain, regeneration cooler (Full-Feature version)
4	Manual + automatic drain, dryer drum(Full-Feature version)
5	Compressed air outlet

5.4 Routine starting

Procedure

⚠	• The operator must apply all relevant safety precautions. • When the compressor is stopped and automatic operation sign (4) is alight, the compressor may start automatically. • If the start/stop timer is active, the compressor may start automatically, even if it was stopped manually.



Figure 21: Control panel

Step	Action
1	Open the air outlet valve (customer's installation).
2	Switch on the voltage and check that voltage on sign (5) lights up.
3	Press start button (7). The compressor starts running and automatic operation sign (4) lights up.

5.5 Starting after emergency stop or shutdown

Control panel

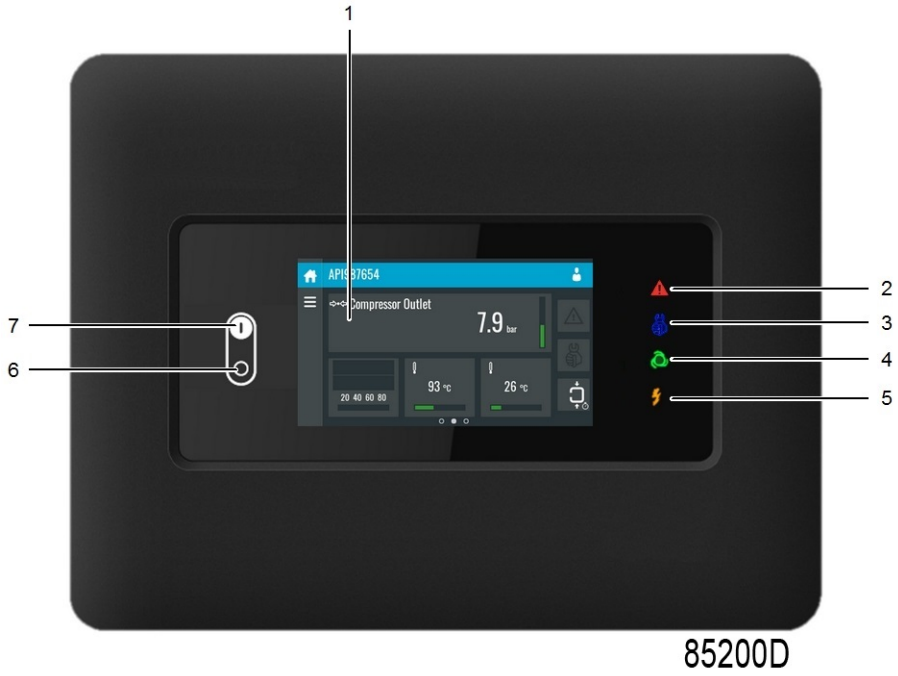


Figure 22: Control panel of controller

Procedure

Step	Action
1	Press the emergency stop button (if not yet done).
2	Switch off the voltage and then depressurize the compressor.
3	Remedy the fault.
4	Unlock the emergency stop button by pulling it back.
5	Reset the protection warning in the Elektronikon controller.
6	Restart the compressor. Check the section Routine starting.

	If the automatic restart function after voltage failure is activated and the duration of repair is shorter than the programmed power recovery time, reset the display after remedying the fault.

Minimum stop time

The compressor will not be allowed to restart within a programmed time after a stop for any reason at all. A start command given during the minimum stop time will be memorized; operation sign (4) lights up. The compressor will start when the minimum stop time has run out.

Manual restart

In automatic operation, the regulator limits the number of motor starts.

On compressors with a low-voltage motor, observe a minimum interval of 20 minutes between two manual starts.

5.6 During operation

Control panel

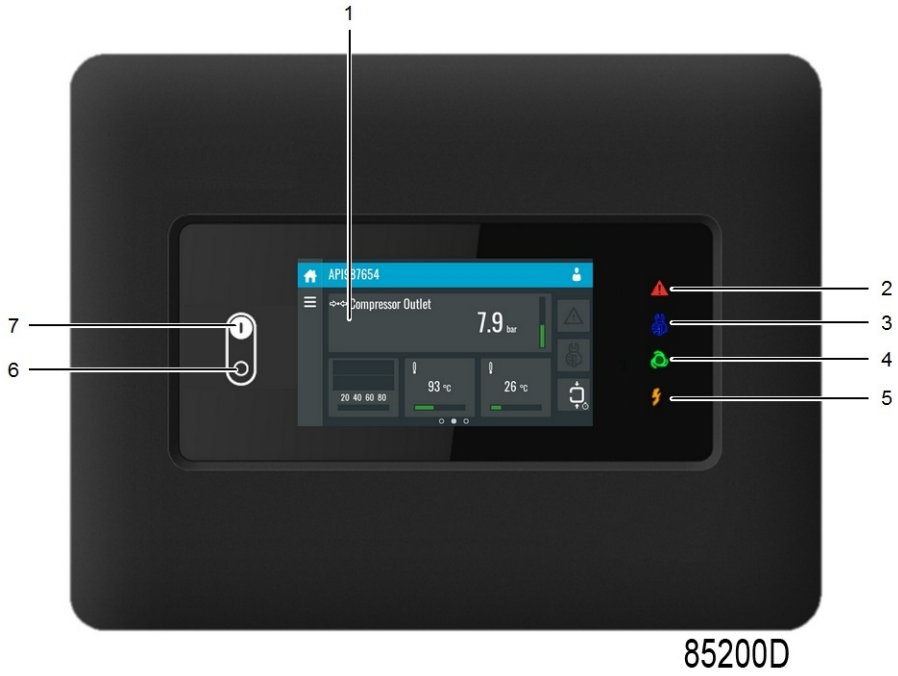


Figure 23: Control panel of Elektronikon controller

Procedure

	When operation sign (4) is alight, starting and stopping of the motor is automatically controlled: when the motor is stopped, it may restart automatically.

Step	Action
1	Check the readings on the touchscreen (1).
2	When reaching the preset unloading pressure, shown on the touchscreen (1), the compressor will start running unloaded. From now on, the electronic control module will calculate the optimum moment to stop and restart the compressor motor automatically, depending on the maximum permissible number of motor starts and on the air consumption.
3	To unload the compressor manually, select Unload on the touchscreen. To put the compressor back into automatic operation, select Load on the touchscreen.

5.7 Checking the display

Control panel

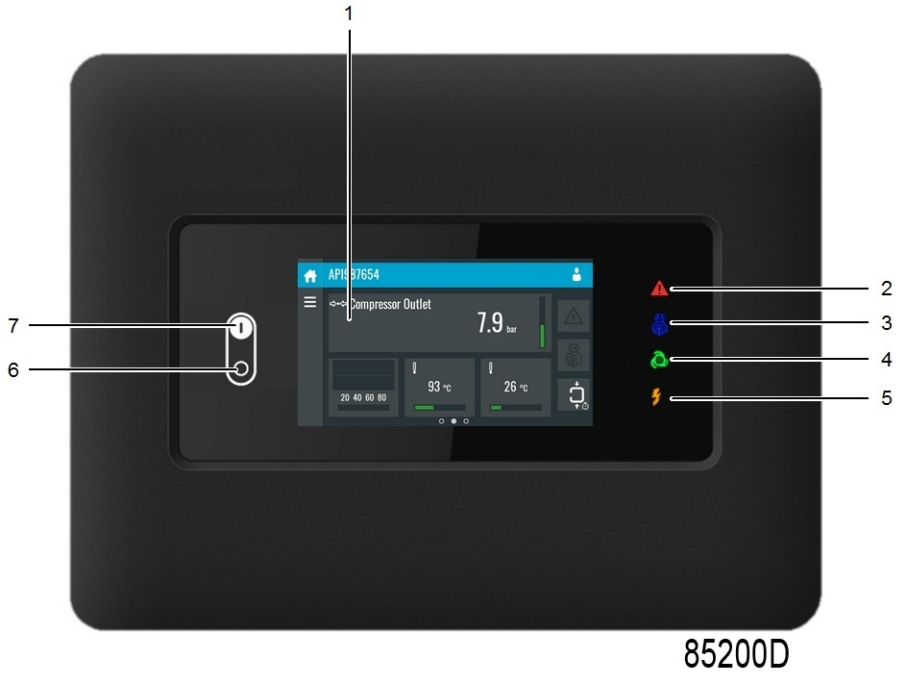


Figure 24: Control panel of controller

Procedure

1. Regularly check the display for readings and messages. Normally, the main display is shown.
2. Always check the display and remedy the trouble if warning sign (2) is alight or blinks.

   The display 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.

   Regularly check the Inputs and Outputs menus for a quick look at the compressor status.

5.8 Manual loading/unloading

Control panel

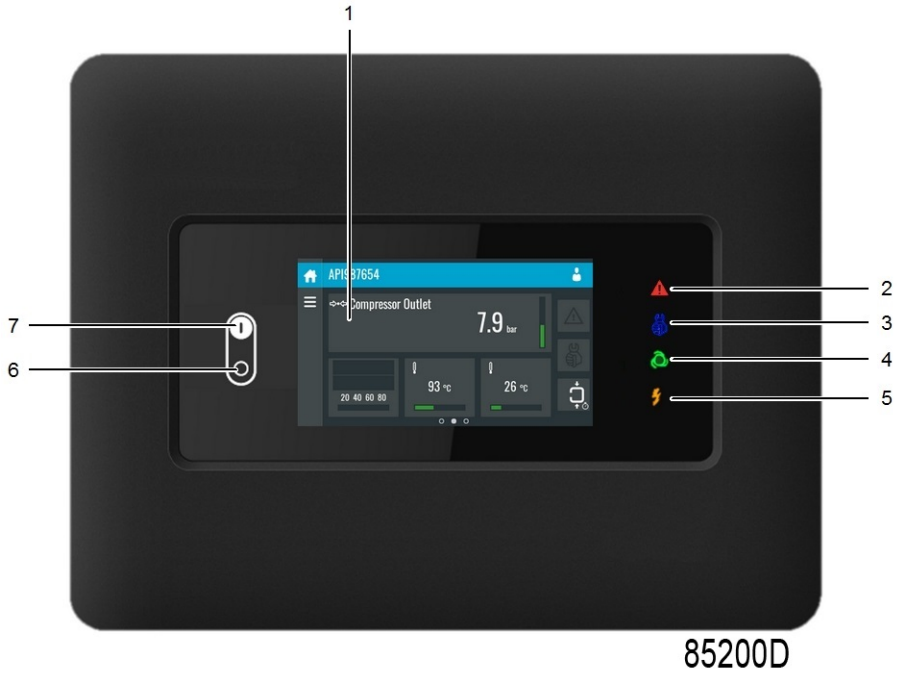


Figure 25: Control panel of controller

General

Normally, the compressor runs in automatic operation, i.e. the electronic regulator loads, unloads, stops and restarts the compressor automatically. Sign (4) is then alight.

If required, the compressor can be unloaded manually. In this case, the compressor is switched out of automatic operation i.e. the compressor remains running unloaded unless it is loaded again manually.

Manual unloading

Starting from the main screen, select Unload. The compressor starts running unloaded and sign (4) fades. The message *Manual Unload* appears on the display.

Manual loading

Starting from the main screen, select Load. Sign (4) lights up and the compressor starts running loaded in case the air net pressure drops below the programmed level. The message *Load* appears on the display.

5.9 Stopping

Procedure

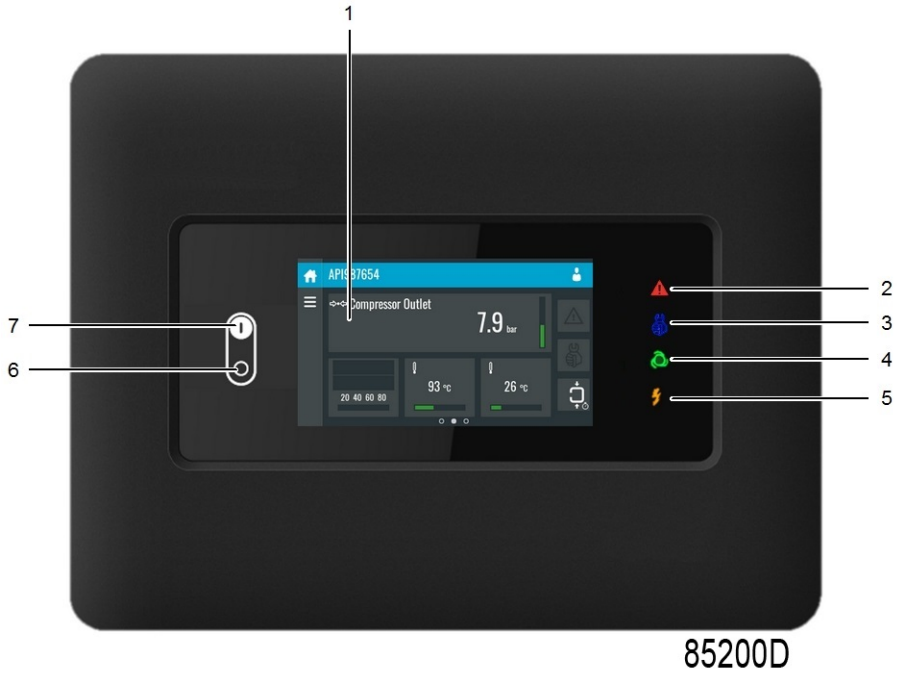


Figure 26: Control panel

	The operator must apply all relevant Safety precautions. Frequently stopping the compressor using the emergency stop button may damage the compressor. Only use the emergency stop button in case of emergency.

Step	Action
1	Press stop button (6). The compressor will stop and warning sign (2) will fade.
2	Close the air outlet valve.
3	To stop the compressor immediately in case of emergency, press the emergency stop button. When the problem is solved, unlock the emergency stop button, by pulling it back.
4	Close the cooling water inlet valve.

Attention

	If the compressor is installed in a room where freezing temperatures are expected, drain the cooling system completely: • By opening the main drain valves in the water inlet and outlet pipes (customer's installation). • By removing drain plugs.

5.10 Taking out of operation

Procedure

Step	Action
1	Close the air outlet valve and stop the compressor.
2	Switch off the voltage. Disconnect the compressor from the mains.
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 oil and condensate circuits.
5	Disconnect the compressor condensate piping from the condensate drain net.

6 Maintenance

6.1 Preventive maintenance schedule

Safety precautions

	• The operator must employ safe working practices and observe all related local work safety requirements and regulations. • Maintenance must only be performed by authorized, trained and specialized personnel. • Before maintenance, repair work, adjustment or any other non-routine checks, stop the compressor, press the emergency stop button, close the air outlet valve and depressurize the air system. • Open the isolating switch (customer's installation) to switch off the voltage to the compressor, and lock it (Lock Out - Tag Out procedure, LOTO). • Repairs inside the speed regulation cabinet must only be carried out by Atlas Copco. • Wait at least 6 minutes before starting any electrical repairs as hazardous high voltage remains on the condensers of the variable speed drive for 6 minutes after switching off the voltage. • Use only the correct tools for maintenance and repair work. • 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. • Scrupulously observe cleanliness during maintenance and repair. Keep dirt away by covering the parts and exposed openings with a clean cloth, paper or tape. • Make sure that no tools, loose parts or rags are left in or on the machine. • 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. • Always wear the following personal protective equipment: Work clothing, safety shoes, safety goggles, ear protection and safety gloves when there is a cutting risk or a risk for a heat injury.

Service agreements

Atlas Copco Customer Centers have a range of service agreements to suit your needs:

- An Inspection plan
- A Preventive maintenance plan
- A Total responsibility plan

Contact your Customer Center to agree on a tailor-made service agreement. It will ensure optimum operational efficiency, minimize downtime and reduce the total life cycle costs and ensure that all warranties are validated.

Warranty-Product Liability

Use only authorized parts at the correct intervals (check with your local Atlas Copco Service center). Any damage or malfunction caused by the use of unauthorized parts or unqualified personnel is not covered by Warranty or Product Liability. In the event of any extended warranty, the end user must ensure that all required maintenance actions are performed when indicated on the Elektronikon display (see table below) or, alternatively, use an Atlas Copco Service agreement.

Service kits

Atlas Copco Customer Centers will be glad to provide you with a wide range of service kits. Service kits comprise all parts needed for servicing components and offer the benefits of genuine Atlas Copco parts while keeping the maintenance budget low.

Regular checks

The following checks should be carried out regularly to ensure safe operation and long service life. Depending on the environmental and working conditions of the compressor, the local Atlas Copco Service center may overrule the standard maintenance schedule; always check if in doubt.

Please keep following checks in mind:

- Regularly test the water drains

Period	Running hours	Operation
--	At initial start	Check the dryer adjustment as specified in *Initial start-up*.
Daily	8	Check the Elektronikon display for warnings.
Daily	8	Check that condensate is discharged from the drain receivers during loading.
Daily	--	Before stopping: • Drain the aftercooler drain receiver • Drain the intercooler drain receiver
Weekly	--	Check the oil level. Refer to *Before starting*.
Weekly	--	Drain condensate from the air receiver, if installed.
Weekly	--	Check for leaks. Tighten leaking connections and replace damaged/leaking parts.
3-monthly	--	Clean compressor.
3-monthly	500	Check coolers, clean if necessary.
When displayed	--	Carry out service actions according to the displayed service warnings or service plans as shown below.

	• When operating in a dusty atmosphere, inspect the air filters more frequently. Always use Atlas Copco filters to guarantee the performance of your compressor. • Grease the motor bearings at the correct interval and with the correct grease type and quantity as mentioned on the motor data plate. If in doubt, consult your Atlas Copco Service center.

Service plan

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

When a level is reached, a message will appear on the screen. After carrying out all service actions, reset the interval timers using the "Reset" key in the "Service" menu.

Activities	Visit I 4000 hrs	Visit A 8000 hrs	Visit B 16000 hrs	Visit C 24000 hrs	Visit D 40000 hrs	Visit E 64000 hrs
Check air filter element(s)	x	x	x	x	x	
Check filter element of gear case breather	x	x	x	x	x	
Take service readings (temperature and pressure of air, oil and water)	x	x	x	x	x	
Check cooler functions (approach temperature)/ clean if necessary	x	x	x	x	x	
Check for air, water and oil leakage	x	x	x	x	x	
Check sensitive bolt/ coupling connections	x	x	x	x	x	
Check/adjust safety valve + switches	x	x	x	x	x	
Check for presence of water in lube oil	x	x	x	x	x	
Check condition of air intake chamber	x	x	x	x	x	
Check cycle of air intake throttle valve	x	x	x	x	x	
Check functioning of check valve	x	x	x	x	x	
Check/clean condensate drain(s)	x	x	x	x	x	
Take full set of S.P.M. readings	x	x	x	x	x	
Check oil quality and level	x	x	x	x	x	
Check for loose wiring and connections in the cubicle	x	x	x	x	x	
Check for loose wiring and connections in the motor box	x	x	x	x	x	
Check intercooler blow-off valve	x	x	x	x	x	
Change intercooler condensate check valve	x	x	x	x	x	
Inspect/change air filter element(s)	x	x	x	x	x	
Replace filter element of gear case breather	x	x	x	x	x	
Clean injector nozzle breather cover (with needle diameter <0.7 mm (0.02756 in))	x	x	x	x	x	
Clean fan cowl of electric motor	x	x	x	x	x	
Check rubber inserts of drive coupling (arr. E)	x	x	x	x	x	
Check blow-off valve	x	x	x	x	x	
Blast clean cubicle, dry air maximum 10 bar (145 psi)	x	x	x	x	x	
Clean air coolers and fan	x	x	x	x	x	
Clean ERD drains	x	x	x	x	x	
Grease main drive motor bearings (according to motor data plate)		x	x	x	x	
Replace cubicle filter		x	x	x	x	
Replace diaphragm of air throttle valve		x	x	x	x	
Overhaul oil filter		x	x	x	x	
Overhaul drains: solenoids, blue sponge		x	x	x	x	
Check condition of drive gear teeth		x	x	x	x	
Overhaul air intake valve			x		x	
Replace blow-off silencer of throttle valve			x		x	
Overhaul check valve (CV)			x		x	
Replace rubber inserts of drive coupling (arr. E)			x		x	
Change compressor oil (16000 hrs or 4-yearly)			x		x	
Change gear casing strainer			x		x	
Replace blow-off valve and silencer			x		x	
Replace flexibles (hose assemblies)					5 years	

Activities	Visit I 4000 hrs	Visit A 8000 hrs	Visit B 16000 hrs	Visit C 24000 hrs	Visit D 40000 hrs	Visit E 64000 hrs
Replace compensators					5 years	
Replace rubber buffers					5 years	
Replace converter cooling fan (Neos VSD)				x		
Replace cubicle fan				x		
Overhaul main drive motor: bearings, seal, grease						x
Replace main shaft bearings						x
Overhaul silencers						x
Overhaul oil pump						x
Overhaul oil-bypass						x

- *: ERD solenoids need to be replaced annually regardless running hours
- **: The temperature difference between the incoming water and the outgoing air of the cooler during the loading periods of the compressor should never exceed 10 °C (50 °F). A contact thermometer should be used to measure the temperature of the pipes. Have the cooler cleaned if the cooling efficiency is insufficient.
- ***: Dewpoint sensor needs to be replaced yearly for certification

Remarks:

- B-Visit: 8000 running hours or one year (whichever comes first)
- C-Visit: 16000 running hours or 2 years (whichever comes first)

6.2 Motor greasing

Warning

	Stop the compressor and switch off the voltage while following the LOTO procedure (Lock Out - Tag Out) before greasing. The operator must apply all relevant “Safety precautions”.
	Never mix greases of different brands or types.

Motor greasing

6.3 Storage after installation

Run the compressor at least once every 3 to 5 days, depending on environmental conditions (more often in hot and humid environment). The compressor must run for at least 20 minutes.

- If the compressor will not be started again for a period of several hours to several days:
  - Open or purge manual drains of intercooler and aftercooler, drain receivers or EWDs, during load just before stopping.
  - Check if drain pipes are free of water. Close the valves after the condensate is drained.
  - If frost can be expected, drain the cooling system carefully.
  - Inspect the compressor once a week. Turn the main coupling a few turns by hand, change the position of balls and rollers in the bearings and redistribute the oil film.

- If the compressor will not be started again for a period of several months to 6 months:
  - Consult Atlas Copco.
- If the compressor will not be started again for a period of more than 6 months:
  - Consult Atlas Copco.

6.4 Oil specifications

Roto-Z lubricating oil

Use Atlas Copco Roto-Z oil which is specially developed for oil-free rotary compressors. This oil has a long service life and ensures optimum lubrication.

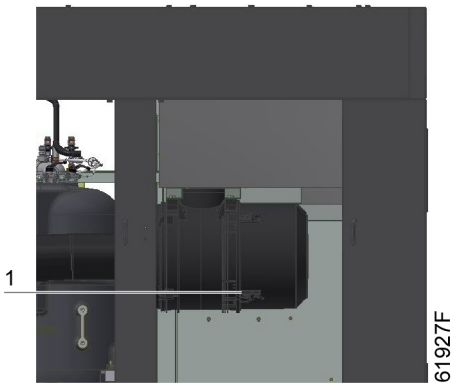
Atlas Copco Roto-Z oil can be ordered in following quantities:

Quantity (l)	Ordering number
5 l can	2908 8503 00
20 l can	2908 8501 01
209 l drum	2908 8500 00

7 Adjustments and servicing procedures

7.1 Air filters

Location of the air filters



Procedure

	The filters must be serviced regularly; consult section Preventive maintenance schedule. Never install damaged or clogged filters.

Step	Action
1	Stop the compressor and press the emergency stop button.
2	Switch off the voltage and follow the LOTO procedure. (Refer to the *Safety Precautions* before acting.)
3	Loosen clamps (1).
4	Take off the end cap of the air filter.
5	Replace the dirty filter element with a new one.
6	Re-install the end cap of the air filter.
7	Tighten clamps (1).
8	Switch on the voltage.
9	Unlock the emergency stop button and reset the air filter service warning.

Table 3: Procedure

7.2 Oil and oil filter change

Oil system

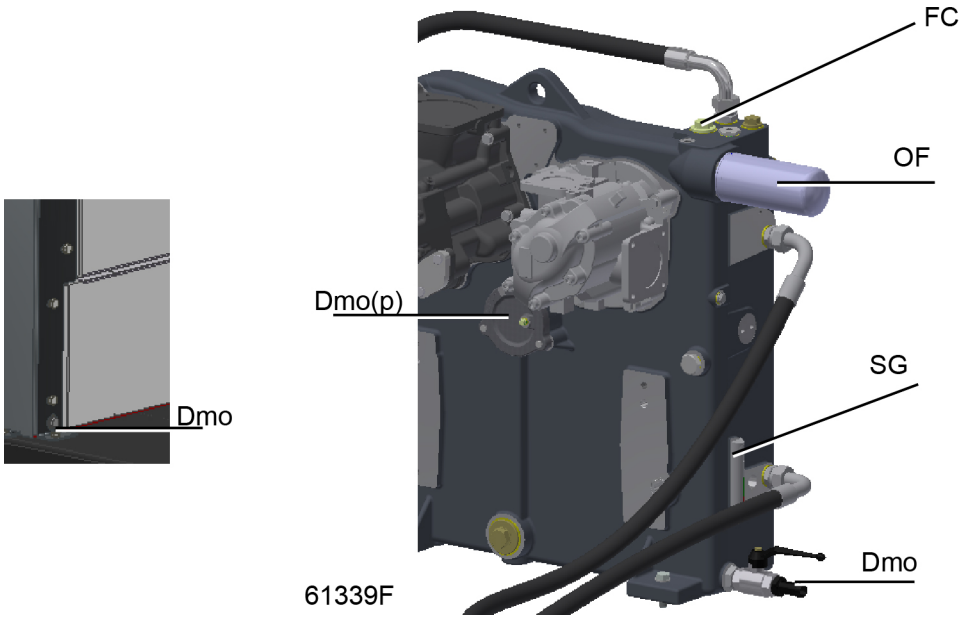


Figure 27: Oil system components

Procedure

Step	Action
1	Run the compressor until warm.
2	Stop the compressor. Press the emergency stop button.
3	Switch off the voltage and follow the LOTO procedure (Lock Out - Tag Out). Refer to the safety precautions before acting.
4	The filler plug and drain points are painted yellow. Remove filler plug (FC). Drain the compressor sump by opening drain valve (Dmo) and opening oil cooler bypass. Drain the oil cooler by opening drain valve (Dmc). Drain the element jackets by removing plug Dmo(p) on the pump cover. Close the drain valves. Fit plug Dmo(p) on the pump cover.
5	Push and turn the oil filters a quarter turn to remove the oil filters. Clean the filter seats, oil the gaskets on the new filters. Push and turn the new filter a quarter turn to mount the new filter.
6	Fill the compressor sump to the maximum mark of the oil level sight-glass. See Oil specifications for the correct type of oil. See Compressor data for the correct oil quantity.
7	Reinstall the filler plug.
8	Switch on the voltage. Unlock the emergency stop button and reset the oil and oil filter service warnings.
9	Run the compressor for a few minutes.
10	Stop the compressor.

Step	Action
11	Check the oil level. After stopping, the level must be in the middle of sight-glass (SG). After a longer standstill, the level may rise. Top up, if necessary.

7.3 Safety valves

Testing

The safety valves can be tested on a separate compressed air line. If the valves do not open at the pressure specified in Settings of safety valves, consult Atlas Copco.

	• Never run the compressor without safety valves. • No adjustments are allowed.

7.4 Coolers

Testing

	The coolers must be serviced regularly; refer to *Preventive maintenance schedule* . Never install damaged or clogged coolers.

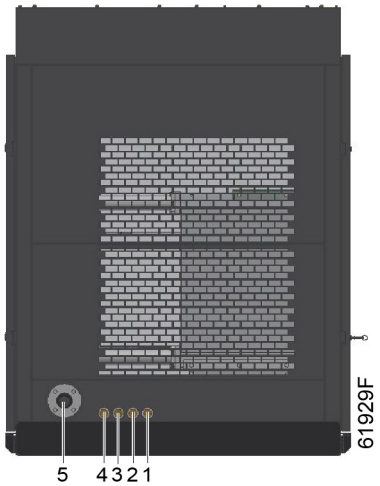


Figure 28: Cooler block (CB)

Keep the coolers clean to ensure cooling efficiency.

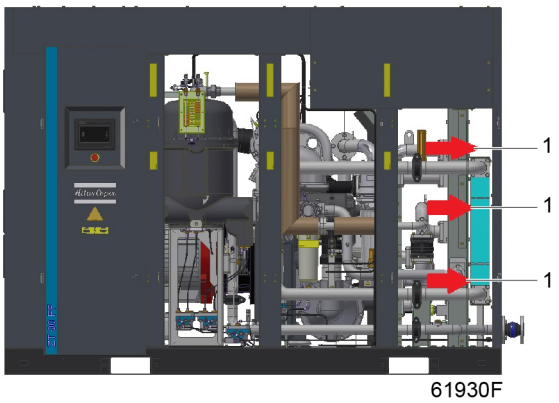


Figure 29: Air jet direction (1)

Step	Action
1	Stop the compressor.
2	Depressurize the air system as follows: • Close the air outlet valve. • Press the emergency stop button. • Open the isolating switch (customer's installation) to switch off the voltage to the compressor, and lock it (Lock Out - Tag Out procedure, LOTO).
3	-
4	Remove any dirt form the coolers with a fibre brush in the direction of the fins.
5	Remove dirt from the fans.
6	Clean the coolers with an air jet in the reverse direction to normal flow (i.e. from the outside to the inside of the compressor). Use low pressure air. If required, the pressure may be increased up to 6 bar(e) (87 psig).
7	If it is required to clean the coolers with a cleaning agent, consult your Atlas Copco Customer Center.

8 Problem solving

8.1 Problem solving

	• The operator must employ safe working practices and observe all related local work safety requirements and regulations. • Maintenance must only be performed by authorized, trained and specialized personnel. • Before maintenance, repair work, adjustment or any other non-routine checks, stop the compressor, press the emergency stop button, close the air outlet valve and depressurize the air system. • Open the isolating switch (customer's installation) to switch off the voltage to the compressor, and lock it (Lock Out - Tag Out procedure, LOTO). • Repairs inside the speed regulation cabinet must only be carried out by Atlas Copco. • Wait at least 6 minutes before starting any electrical repairs as hazardous high voltage remains on the condensers of the variable speed drive for 6 minutes after switching off the voltage. • Use only the correct tools for maintenance and repair work. • 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. • Scrupulously observe cleanliness during maintenance and repair. Keep dirt away by covering the parts and exposed openings with a clean cloth, paper or tape. • Make sure that no tools, loose parts or rags are left in or on the machine. • 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. • Always wear the following personal protective equipment: Work clothing, safety shoes, safety goggles, ear protection and safety gloves when there is a cutting risk or a risk for a heat injury.

Control panel

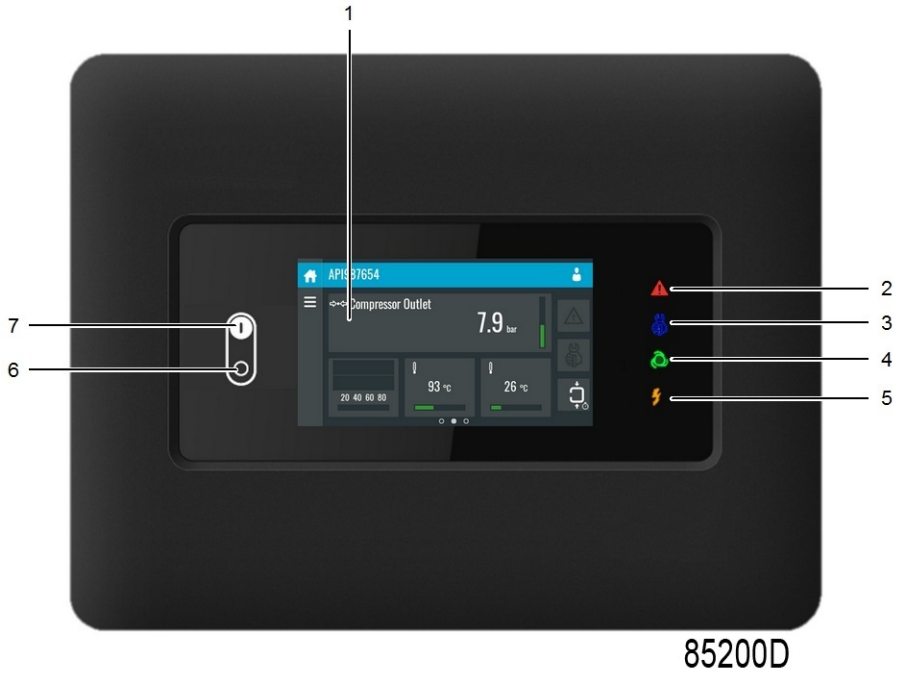


Figure 30: Control panel of controller

Faults and remedies

Condition	Fault	Remedy
Compressor starts running, but does not load after a delay time	Pressure in air net is above pre-set loading pressure	Compressor will load when pressure in air net drops to pre-set loading pressure
	Loading solenoid valve inoperative	Check and replace the valve as necessary
	Full-load/no-load valve malfunctioning	Have the valve inspected
Compressor capacity or working pressure lower than normal	Air consumption exceeds capacity of compressor	Check pneumatic plant
	Leaking connections and damaged/leaking parts	Check for leaks. Tighten leaking connections and replace damaged/leaking parts.
Oil pressure too low	Oil level too low	Top up level as described in section Before starting.
	Oil filters clogged	Replace filters
Air temperature above normal	Inlet temperature too high due to bad room ventilation or recirculation of cooling air	Improve ventilation in compressor room and prevent recirculation of cooling air
	Unloading pressure incorrectly set	Check the controller setting.
	Insufficient cooling air or cooling air temperature too high	Check and correct.

Condition	Fault	Remedy
Condensate is not discharged from condensate traps during operation	Drain/pipe clogged	Check and correct
	Frozen drain piping	Check and correct
	Venting lines not/badly assembled	Check and correct
	Only on IC drain : intercooler condensate check valve defect/dirty/wrongly assembled	Check and correct
	Solenoid valve defect/dirty	Check and correct
	Manually operated solenoid valve	Set valve to automatic operation
	Level sensor defect/dirty	Clean sensor or replace as necessary
Drain continuously discharges air	Damaged/poor assembled condensate drain (housing/ seals/valve/…)	Check and correct
	Solenoid valve defect/dirty	Check and correct
	Level sensor defect/dirty	Clean sensor or replace as necessary

9 Technical data

9.1 Readings on display

Important

	The readings below are indicative values when operating at reference conditions. Check the section Reference conditions. These values are no rejection limits. In case of doubt, consult your Atlas Copco Customer Center.

Common readings

	Unit	
Dp of air filter, approx.	bar	0.015

9.2 Settings of safety valves

	Unit
Low-pressure safety valve	3.7 bar(e)

9.3 Circuit breakers and fuses

Fuse	Size
F1	4 A
F3	S201M-C2
F4	S202M-C6
F10	25 A
F11	S201M-C2
F51	S201M-C2

Main voltage (V)	Frequency (Hz)	Setting (A)
400	50	10.8

Table 4: Circuit breakers Q25

Main voltage (V)	Frequency (Hz)	Setting (A)
400	50	8.7

Table 5: Circuit breakers Q28

Obey the applicable electrical directives when installing and connecting the compressor to the power circuit: IEC60364–5–52

For the selection of the customer fuses and /or circuit breaker (size/ type) and supply cables, the package current, specified in the technical data sheet, must be taken into account. For cable

section selection purposes we suggest to add 10% to the package current to compensate for any under-voltages that might occur in the installation. Always double-check the fuse size versus the calculated cable size. If required, reduce the fuse size or enlarge the cable size. Cable length should not exceed the maximum length according to IEC 60204 (table 10).

9.4 Reference conditions

Absolute inlet pressure	1 bar(a)
Ambient temperature	20 °C
Air inlet temperature	20 °C
Effective working pressure	9 bar(g) for 10 bar compressors
Motor shaft speed	2980 rpm for 50 Hz machines with 2–pole motors 1489 rpm for 50 Hz machines with 4–pole motors

9.5 Limitations

Minimum - maximum ambient temperature	0 - 40 °C
Minimum - maximum temperature of air inlet	0 - 40 °C
Maximum temperature at compressed air outlet	55 °C
Maximum temperature at outlet of compressor stage 1	235 °C
Minimum - maximum working pressure of compressor stage 1	1.0 – 2.8 bar(g)
Maximum temperature at outlet of compressor stage 2	235 °C
Minimum - maximum working pressure of compressor stage 2	3.5 – 10.4 bar(g)
Maximum altitude	1000 m
Minimum - maximum absolute inlet pressure	0.9–1.1 bar(a)
Maximum pressure over air filter	0.05 bar(a)
Minimum - maximum oil pressure	see graph–4.0 bar(g)
Minimum - maximum oil injection temperature	0-70 °C
Minimum - maximum motor shaft speed *	1000–3600 rpm

* : can be derated for Full-Feature compressors, High Ambient Temperature compressors.

	Pack	Pack
Working pressure (bar(g))	**Minimum**	**Maximum**
10.0 bar variant	6.0	10.0

9.6 Compressor data

l
45

Table 6: Oil quantity in the lubrication system of the compressor

Sound pressure level: see technical data sheet.

10 Pressure equipment directives

ZT 55 Pack up to ZT 90 Pack compressors are pressure assemblies of cat. I according to 2014/68/EU.

Parts of article 4.3 of 2014/68/EU are subject to Sound Engineering Practice (SEP).

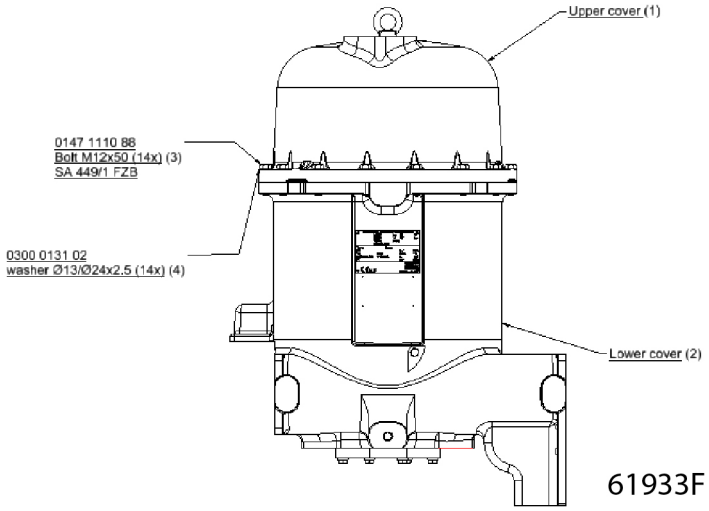
Parts subject to the Simple Pressure Vessel Directive 2014/29/EU are excluded from 2014/68/EU according to article I, section 4.3.

Parts of category I according to 2014/68/EU are integrated into the machine and fall under the exclusion of article 1.2 (f)(i).

The following pressure bearing parts are of category higher than I :

Compressor type	Pressure bearing part
ZT 55 up to ZT 90	**Safety valve: Category IV** • Design code: AD-Merkblätter, A2

Instructions for use (vessel)



Reference	Name
1	Upper cover
2	Lower cover
3	Bolt
4	Washer

- This vessel can contain pressurized air; please be aware of its potential danger in case of misuse.
- This vessel shall only be used as an air dryer to a compressor and operated within the specified limits as given on the data plate.
- Original bolts have to be used after opening for inspection. Specified torque has to be taken into consideration.
- This vessel has been designed and built to guarantee an operational lifetime in excess of 20 years. Therefore there is no intrinsic need for in-service inspection of the vessel when used

within its design limits and in its intended application. National legislation however may require in-service inspection.

Part number	**V in liter** (US gal/Imp gal/ cu.ft)	**MWT in mm**	**H in mm**	**D in mm**	**CF**
1617 5558 79 1617 5558 70	85.1 (52.57/443.77/7.03)	Upper cover: 8 Lower cover: 8	868	496	0.8

Used abbreviations

V: Internal volume (liter)

MWT: Minimum wall thickness as manufactured (mm)

H: Height of the vessel (mm)

D: Diameter of the vessel (mm)

CF: Casting factor (according ASME BPVC section VIII div 1)

11 Documentation

Declaration of conformity

Typical example of a Declaration of Conformity document

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)……		

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

……(4)…… 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	……	……

Form 5009 xxxx xx
ed. xx, xxxx-xx-xx

….(5)….

58397_3D

Figure 31:

(1): Manufacturer

(2): Applicable directives

(3): Standards used

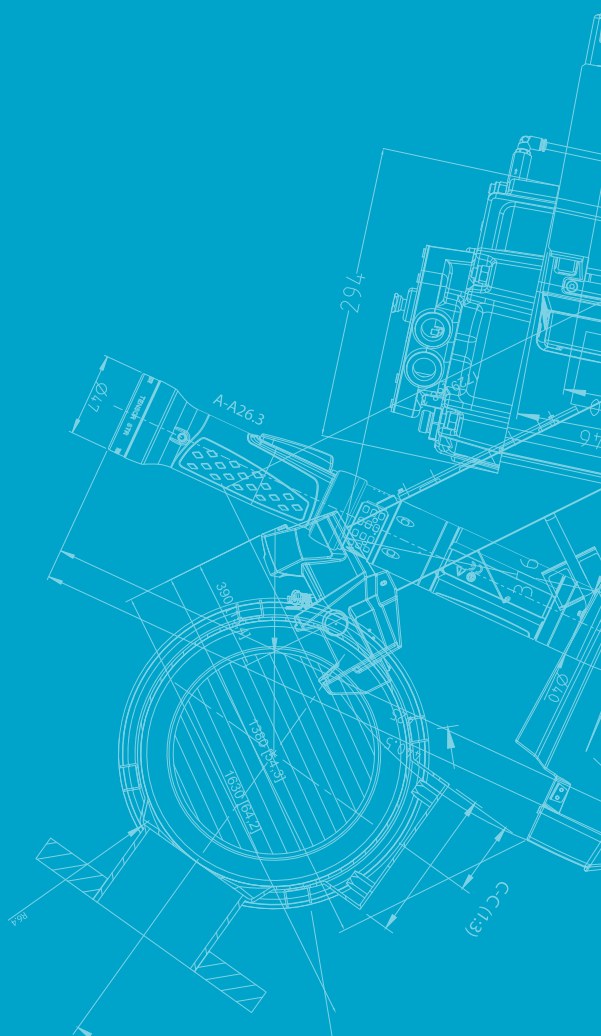
(4): Technical file holder

(5): Contact address of the manufacturer

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

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

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