Instruction Manual
for AC Generators
English

QAS 250-330 JD T4i

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Atlas Copco

ATLAS COPCO - PORTABLE ENERGY DIVISION
www.atlascopco.com

Warranty and Liability Limitation

Use only authorized parts.
Any damage or malfunction caused by the use of unauthorized parts is not covered by Warranty or Product Liability.
The manufacturer does not accept any liability for any damage arising from modifications, additions or conversions made without the manufacturer's approval in writing.
Neglecting maintenance or making changes to the setup of the machine can result in major hazards, including fire risk.
While every effort has been made to ensure that the information in this manual is correct, Atlas Copco does not assume responsibility for possible errors.

Congratulations on the purchase of your AC generator. It is a solid, safe and reliable machine, built according to the latest technology. Follow the instructions in this booklet and we guarantee you years of troublefree operation. Please read the following instructions carefully before starting to use your machine.
While every effort has been made to ensure that the information in this manual is correct, Atlas Copco does not assume responsibility for possible errors. Atlas Copco reserves the right to make changes without prior notice.

Contents

Atlas Copco

Safety precautions for portable generators

To be read attentively and acted accordingly before towing, lifting, operating, performing maintenance or repairing the generator.

Introduction

The policy of Atlas Copco is to provide the users of their equipment with safe, reliable and efficient products. Factors taken into account are among others:

- the intended and predictable future use of the products, and the environments in which they are expected to operate,
- applicable rules, codes and regulations,
- the expected useful product life, assuming proper service and maintenance,
- providing the manual with up-to-date information.

Before handling any product, take time to read the relevant instruction manual. Besides giving detailed operating instructions, it also gives specific information about safety, preventive maintenance, etc.
Keep the manual always at the unit location, easy accessible to the operating personnel.

See also the safety precautions of the engine and possible other equipment, which are separately sent along or are mentioned on the equipment or parts of the unit.

These safety precautions are general and some statements will therefore not always apply to a particular unit.

Only people that have the right skills should be allowed to operate, adjust, perform maintenance or repair on Atlas Copco equipment. It is the responsibility of management to appoint operators with the appropriate training and skill for each category of job.

Skill level 1: Operator

An operator is trained in all aspects of operating the unit with the push-buttons, and is trained to know the safety aspects.

Skill level 2: Mechanical technician

A mechanical technician is trained to operate the unit the same as the operator. In addition, the mechanical technician is also trained to perform maintenance and repair, as described in the instruction manual, and is allowed to change settings of the control and safety system. A mechanical technician does not work on live electrical components.

Skill level 3: Electrical technician

An electrical technician is trained and has the same qualifications as both the operator and the mechanical technician. In addition, the electrical technician may carry out electrical repairs within the various enclosures of the unit. This includes work on live electrical components.

Skill level 4: Specialist from the manufacturer

This is a skilled specialist sent by the manufacturer or its agent to perform complex repairs or modifications to the equipment.

In general it is recommended that not more than two people operate the unit, more operators could lead to unsafe operating conditions. Take necessary steps to keep unauthorized persons away from the unit and eliminate all possible sources of danger at the unit.

When handling, operating, overhauling and/or performing maintenance or repair on Atlas Copco equipment, the mechanics are expected to use safe engineering practices and to observe all relevant local safety requirements and ordinances. The following list is a reminder of special safety directives and precautions mainly applicable to Atlas Copco equipment.

Neglecting the safety precautions may endanger people as well as environment and machinery:

- endanger people due to electrical, mechanical or chemical influences,
- endanger the environment due to leakage of oil, solvents or other substances,
- endanger the machinery due to function failures.

All responsibility for any damage or injury resulting from neglecting these precautions or by non-observance of ordinary caution and due care required in handling, operating, maintenance or repair, also if not expressly mentioned in this instruction manual, is disclaimed by Atlas Copco.

The manufacturer does not accept any liability for any damage arising from the use of non-original parts and for modifications, additions or conversions made without the manufacturer's approval in writing.

If any statement in this manual does not comply with local legislation, the stricter of the two shall be applied.

Statements in these safety precautions should not be interpreted as suggestions, recommendations or inducements that it should be used in violation of any applicable laws or regulations.

General safety precautions

1 The owner is responsible for maintaining the unit in a safe operating condition. Unit parts and accessories must be replaced if missing or unsuitable for safe operation.

2 The supervisor, or the responsible person, shall at all times make sure that all instructions regarding machinery and equipment operation and maintenance are strictly followed and that the machines with all accessories and safety devices, as well as the consuming devices, are in good repair, free of abnormal wear or abuse, and are not tampered with.

3 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 oil vapour when air is admitted.

4 Normal ratings (pressures, temperatures, speeds, etc.) shall be durably marked.

5 Operate the unit only for the intended purpose and within its rated limits (pressure, temperature, speeds, etc.).

6 The machinery and equipment shall be kept clean, i.e. as free as possible from oil, dust or other deposits.

7 To prevent an increase in working temperature, inspect and clean heat transfer surfaces (cooler fins, intercoolers, water jackets, etc.) regularly. See the maintenance schedule.

8 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.

9 Pressure and temperature gauges shall be checked regularly with regard to their accuracy. They shall be replaced whenever outside acceptable tolerances.

10 Safety devices shall be tested as described in the maintenance schedule of the instruction manual to determine that they are in good operating condition.

11 Mind the markings and information labels on the unit.

12 In the event the safety labels are damaged or destroyed, they must be replaced to ensure operator safety.

13 Keep the work area neat. Lack of order will increase the risk of accidents.

14 When working on the unit, wear safety clothing. Depending on the kind of activities these are: safety glasses, ear protection, safety helmet (including visor), safety gloves, protective clothing, safety shoes. Do not wear the hair long and loose (protect long hair with a hairnet), or wear loose clothing or jewellery.

15 Take precautions against fire. Handle fuel, oil and anti-freeze with care because they are inflammable substances. Do not smoke or approach with naked flame when handling such substances. Keep a fire-extinguisher in the vicinity.

16a **Portable generators (with earthing pin):**

Earth the generator as well as the load properly.

16b **Portable generators IT:**

Note: This generator is built to supply a sheer alternating current IT network.
Earth the load properly.

Safety during transport and installation

To lift a unit, all loose or pivoting parts, e.g. doors and towbar, shall first be securely fastened.

Do not attach cables, chains or ropes directly to the lifting eye; apply a crane hook or lifting shackle meeting local safety regulations. Never allow sharp bends in lifting cables, chains or ropes.

Helicopter lifting is not allowed.
It is strictly forbidden to dwell or stay in the risk zone under a lifted load. Never lift the unit over people or residential areas. Lifting acceleration and retardation shall be kept within safe limits.

1 Before towing the unit:
- check the towbar, the brake system and the towing eye. Also check the coupling of the towing vehicle,
- check the towing and brake capability of the towing vehicle,
- check that the towbar, jockey wheel or stand leg is safely locked in the raised position,
- ascertain that the towing eye can swivel freely on the hook,
- check that the wheels are secure and that the tyres are in good condition and inflated correctly,
- connect the signalisation cable, check all lights and connect the pneumatic brake couplers,
- attach the safety break-away cable or safety chain to the towing vehicle,
- remove wheel chocks, if applied, and disengage the parking brake.

2 To tow a unit use a towing vehicle of ample capacity. Refer to the documentation of the towing vehicle.

3 If the unit is to be backed up by the towing vehicle, disengage the overrun brake mechanism (if it is not an automatic mechanism).

4 Never exceed the maximum towing speed of the unit (mind the local regulations).

5 Place the unit on level ground and apply the parking brake before disconnecting the unit from the towing vehicle. Unclip the safety break-away cable or safety chain. If the unit has no parking brake or jockey wheel, immobilize the unit by placing chocks in front of and/or behind the wheels. When the towbar can be positioned vertically, the locking device must be applied and kept in good order.

6 To lift heavy parts, a hoist of ample capacity, tested and approved according to local safety regulations, shall be used.

7 Lifting hooks, eyes, shackles, etc., shall never be bent and shall only have stress in line with their design load axis. The capacity of a lifting device diminishes when the lifting force is applied at an angle to its load axis.

8 For maximum safety and efficiency of the lifting apparatus all lifting members shall be applied as near to perpendicular as possible. If required, a lifting beam shall be applied between hoist and load.

9 Never leave a load hanging on a hoist.

10 A hoist has to be installed in such a way that the object will be lifted perpendicular. If that is not possible, the necessary precautions must be taken to prevent load-swinging, e.g. by using two hoists, each at approximately the same angle not exceeding 30° from the vertical.

11 Locate the unit away from walls. Take all precautions to ensure that hot air exhausted from the engine and driven machine cooling systems cannot be recirculated. If such hot air is taken in by the engine or driven machine cooling fan, this may cause overheating of the unit; if taken in for combustion, the engine power will be reduced.

12 Generators shall be stalled on an even, solid floor, in a clean location with sufficient ventilation. If the floor is not level or can vary in inclination, consult Atlas Copco.

13 The electrical connections shall correspond to local codes. The machines shall be earthed and protected against short circuits by fuses or circuit breakers.

14 Never connect the generator outlets to an installation which is also connected to a public mains.

15 Before connecting a load, switch off the corresponding circuit breaker, and check whether frequency, voltage, current and power factor comply with the ratings of the generator.

16 Before transportation of the unit, switch off all the circuit breakers.

Safety during use and operation

1 When the unit has to operate in a fire-hazardous environment, each engine exhaust has to be provided with a spark arrestor to trap incendiary sparks.

2 The exhaust contains carbon monoxide which is a lethal gas. When the unit is used in a confined space, conduct the engine exhaust to the outside atmosphere by a pipe of sufficient diameter; do this in such a way that no extra back pressure is created for the engine. If necessary, install an extractor. Observe any existing local regulations.

Make sure that the unit has sufficient air intake for operation. If necessary, install extra air intake ducts.

3 When operating in a dust-laden atmosphere, place the unit so that dust is not carried towards it by the wind. Operation in clean surroundings considerably extends the intervals for cleaning the air intake filters and the cores of the coolers.

4 Never remove a filler cap of the cooling water system of a hot engine. Wait until the engine has sufficiently cooled down.

5 Never refill fuel while the unit is running, unless otherwise stated in the Atlas Copco Instruction Book (AIB). Keep fuel away from hot parts such as air outlet pipes or the engine exhaust. Do not smoke when fuelling. When fuelling from an automatic pump, an earthing cable should be connected to the unit to discharge static electricity. Never spill nor leave oil, fuel, coolant or cleansing agent in or around the unit.

6 All doors shall be shut during operation so as not to disturb the cooling air flow inside the bodywork and/ or render the silencing less effective. A door should be kept open for a short period only e.g. for inspection or adjustment.

7 Periodically carry out maintenance works according to the maintenance schedule.

8 Stationary housing guards are provided on all rotating or reciprocating parts not otherwise protected and which may be hazardous to personnel. Machinery shall never be put into operation, when such guards have been removed, before the guards are securely reinstalled.

9 Noise, even at reasonable levels, can cause irritation and disturbance which, over a long period of time, may cause severe injuries to the nervous system of human beings.
When the sound pressure level, at any point where personnel normally has to attend, is:
- below 70 dB(A): no action needs to be taken,
- above 70 dB(A): noise-protective devices should be provided for people continuously being present in the room,
- below 85 dB(A): no action needs to be taken for occasional visitors staying a limited time only,
- above 85 dB(A): room to be classified as a noise-hazardous area and an obvious warning shall be placed permanently at each entrance to alert people entering the room, for even relatively short times, about the need to wear ear protectors,
- above 95 dB(A): the warning(s) at the entrance(s) shall be completed with the recommendation that also occasional visitors shall wear ear protectors,
- above 105 dB(A): special ear protectors that are adequate for this noise level and the spectral composition of the noise shall be provided and a special warning to that effect shall be placed at each entrance.

10 Insulation or safety guards of parts the temperature of which can be in excess of 80°C (175°F) and which may be accidentally touched by personnel shall not be removed before the parts have cooled to room temperature.

11 Never operate the unit in surroundings where there is a possibility of taking in flammable or toxic fumes.

12 If the working process produces fumes, dust or vibration hazards, etc., take the necessary steps to eliminate the risk of personnel injury.

13 When using compressed air or inert gas to clean down equipment, do so with caution and use the appropriate protection, at least safety glasses, for the operator as well as for any bystander. Do not apply compressed air or inert gas to your skin or direct an air or gas stream at people. Never use it to clean dirt from your clothes.

14 When washing parts in or with a cleaning solvent, provide the required ventilation and use appropriate protection such as a breathing filter, safety glasses, rubber apron and gloves, etc.

15 Safety shoes should be compulsory in any workshop and if there is a risk, however small, of falling objects, wearing of a safety helmet should be included.

16 If there is a risk of inhaling hazardous gases, fumes or dust, the respiratory organs must be protected and depending on the nature of the hazard, so must the eyes and skin.

17 Remember that where there is visible dust, the finer, invisible particles will almost certainly be present too; but the fact that no dust can be seen is not a reliable indication that dangerous, invisible dust is not present in the air.

18 Never operate the generator in excess of its limits as indicated in the technical specifications and avoid long no-load sequences.

19 Never operate the generator in a humid atmosphere. Excessive moisture causes worsening of the generator insulation.

20 Do not open electrical cabinets, cubicles or other equipment while voltage is supplied. If such cannot be avoided, e.g. for measurements, tests or adjustments, have the action carried out by a qualified electrician only, with appropriate tools, and ascertain that the required bodily protection against electrical hazards is applied.

21 Never touch the power terminals during operation of the machine.

22 Whenever an abnormal condition arises, e.g. excessive vibration, noise, odour, etc., switch the circuit breakers to OFF and stop the engine. Correct the faulty condition before restarting.

23 Check the electric cables regularly. Damaged cables and insufficient tightening of connections may cause electric shocks. Whenever damaged wires or dangerous conditions are observed, switch the circuit breakers to OFF and stop the engine. Replace the damaged wires or correct the dangerous condition

before restarting. Make sure that all electric connections are securely tightened.

24 Avoid overloading the generator. The generator is provided with circuit breakers for overload protection. When a breaker has tripped, reduce the concerned load before restarting.

25 If the generator is used as stand-by for the mains supply, it must not be operated without control system which automatically disconnects the generator from the mains when the mains supply is restored.

26 Never remove the cover of the output terminals during operation. Before connecting or disconnecting wires, switch off the load and the circuit breakers, stop the machine and make sure that the machine cannot be started inadvertently or there is any residual voltage on the power circuit.

27 Running the generator at low load for long periods will reduce the lifetime of the engine.

Safety during maintenance and repair

Maintenance, overhaul and repair work shall only be carried out by adequately trained personnel; if required, under supervision of someone qualified for the job.

1 Use only the correct tools for maintenance and repair work, and only tools which are in good condition.

2 Parts shall only be replaced by genuine Atlas Copco replacement parts.

3 All maintenance work, other than routine attention, shall only be undertaken when the unit is stopped. Steps shall be taken to prevent inadvertent starting. In addition, a warning sign bearing a legend such as “work in progress; do not start” shall be attached to the starting equipment.
On engine-driven units the battery shall be disconnected and removed or the terminals covered by insulating caps.
On electrically driven units the main switch shall be locked in open position and the fuses shall be taken out. A warning sign bearing a legend such as “work in progress; do not supply voltage” shall be attached to the fuse box or main switch.

4 Prior to stripping an engine or other machine or undertaking major overhaul on it, prevent all movable parts from rolling over or moving.

5 Make sure that no tools, loose parts or rags are left in or on the machine. Never leave rags or loose clothing near the engine air intake.

6 Never use flammable solvents for cleaning (fire-risk).

7 Take safety precautions against toxic vapours of cleaning liquids.

8 Never use machine parts as a climbing aid.

9 Observe scrupulous cleanliness during maintenance and repair. Keep away dirt, cover the parts and exposed openings with a clean cloth, paper or tape.

10 Never weld on or perform any operation involving heat near the fuel or oil systems. Fuel and 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. Disconnect the alternator cables during arc welding on the unit.

11 Support the towbar and the axle(s) securely if working underneath the unit or when removing a wheel. Do not rely on jacks.

12 Do not remove any of, or tamper with, the sound-damping material. Keep the material free of dirt and liquids such as fuel, oil and cleansing agents. If any sound-damping material is damaged, replace it to prevent the sound pressure level from increasing.

13 Use only lubricating oils and greases recommended or approved by Atlas Copco or the machine manufacturer. Ascertain that the selected lubricants comply with all applicable safety regulations, especially with regard to explosion or fire-risk and the possibility of decomposition or generation of hazardous gases. Never mix synthetic with mineral oil.

14 Protect the engine, alternator, air intake filter, electrical and regulating components, etc., to prevent moisture ingress, e.g. when steam-cleaning.

15 When performing any operation involving heat, flames or sparks on a machine, the surrounding components shall first be screened with non-flammable material.

16 Never use a light source with open flame for inspecting the interior of a machine.

17 When repair has been completed, the machine shall be barred over at least one revolution for reciprocating machines, several revolutions for rotary ones to ensure that there is no mechanical interference within the machine or driver. Check the direction of rotation of electric motors when starting up the machine initially and after any alteration to the electrical connection(s) or switch gear, to check that the oil pump and the fan function properly.

18 Maintenance and repair work should be recorded in an operator’s logbook for all machinery. Frequency and nature of repairs can reveal unsafe conditions.

19 When hot parts have to be handled, e.g. shrink fitting, special heat-resistant gloves shall be used and, if required, other body protection shall be applied.

20 When using cartridge type breathing filter equipment, ascertain that the correct type of cartridge is used and that its useful service life is not surpassed.

21 Make sure that oil, solvents and other substances likely to pollute the environment are properly disposed of.

22 Before clearing the generator for use after maintenance or overhaul, submit it to a testrun, check that the AC power performance is correct and that the control and shutdown devices function correctly.

Tool applications safety

Apply the proper tool for each job. With the knowledge of correct tool use and knowing the limitations of tools, along with some common sense, many accidents can be prevented.

Special service tools are available for specific jobs and should be used when recommended. The use of these tools will save time and prevent damage to parts.

Battery safety precautions

Batteries

When servicing batteries, always wear protecting clothing and glasses.

1 The electrolyte in batteries is a sulphuric acid solution which is fatal if it hits your eyes, and which can cause burns if it contacts your skin. Therefore, be careful when handling batteries, e.g. when checking the charge condition.

2 Install a sign prohibiting fire, open flame and smoking at the post where batteries are being charged.

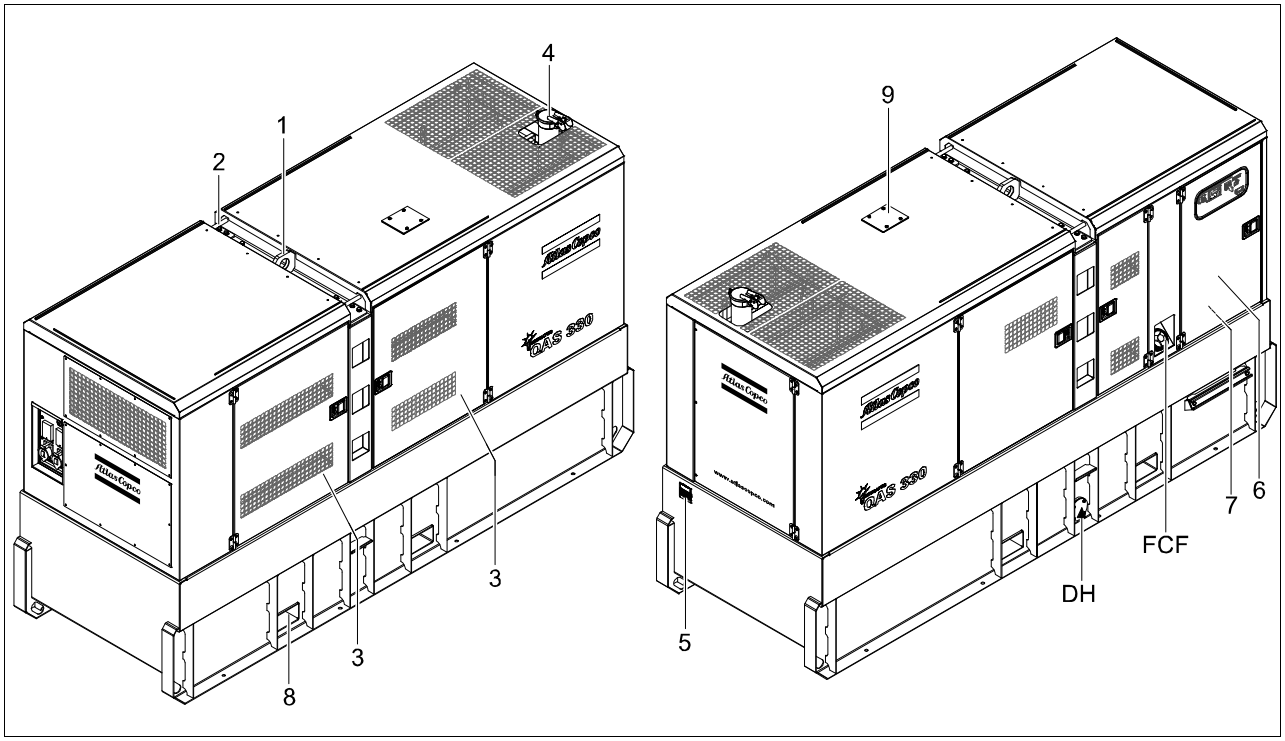
3 When batteries are being charged, an explosive gas mixture forms in the cells and might escape through the vent holes in the plugs.
Thus an explosive atmosphere may form around the battery if ventilation is poor, and can remain in and around the battery for several hours after it has been charged. Therefore:
- never smoke near batteries being, or having recently been, charged,
- never break live circuits at battery terminals, because a spark usually occurs.

4 When connecting an auxiliary battery (AB) in parallel to the unit battery (CB) with booster cables: connect the + pole of AB to the + pole of CB, then connect the - pole of CB to the mass of the unit. Disconnect in the reverse order.

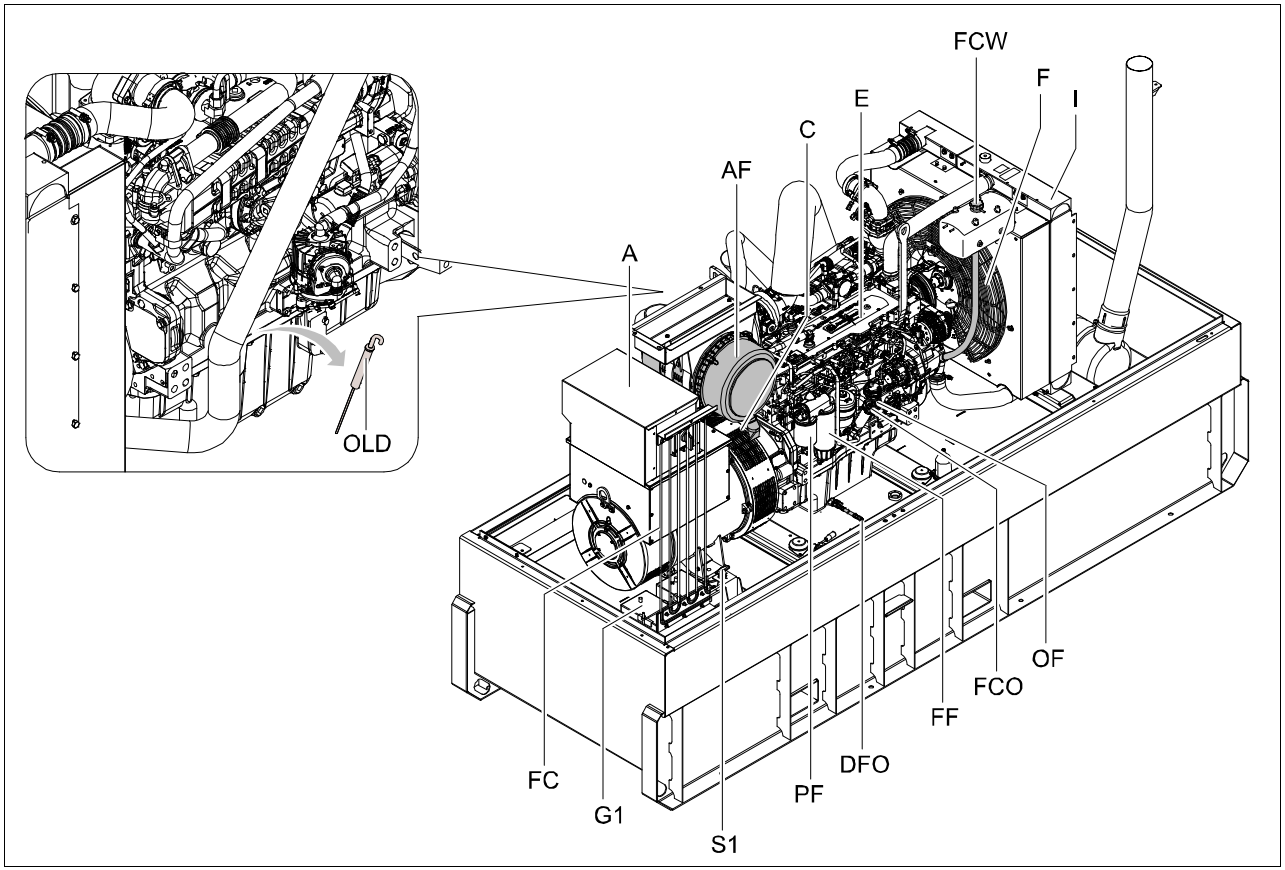
Leading particulars

General description

The QAS 250-330 is an AC generator, built for continuous running at sites where no electricity is available or as stand-by in cases of interruption of the mains. The generator operates at 60 Hz, 480 V - 3 phase, 240 V - 3 phase and 240 V 1 phase. The QAS 250-330 generator is driven by a water-cooled diesel engine, manufactured by John Deere. An overview of the main parts is given in the diagram below.



1	Lifting beam
2	Guiding rod
3	Side doors
4	Engine exhaust
5	Data plate
6	Door, access to control and indicator panel
7	Output terminal board
8	Hole for forklift
9	Coolant filler access
DH	Drain and access hole (in the frame)
FCF	Filler cap fuel



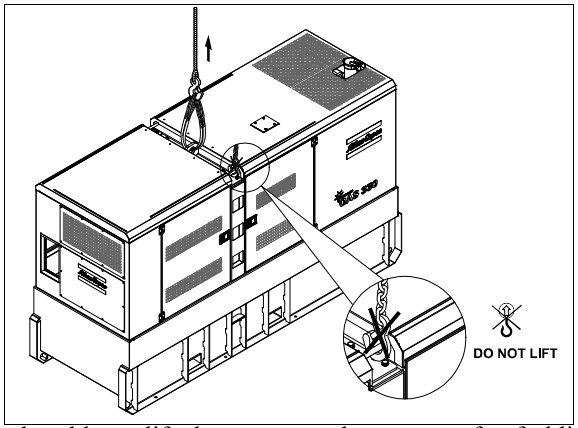
A	Alternator
AF	Air filter
C	Coupling
DFO	Drain flexible engine oil
E	Engine
F	Fan
FC	Fuel Cooler
FCO	Filler cap engine oil
FCW	Filler cap cooling water
FF	Fuel filter
G1	Battery
I	Intercooler
OF	Oil filter
OLD	Engine oil level dipstick
PF	Pre-Filter
S1	Battery switch

Bodywork

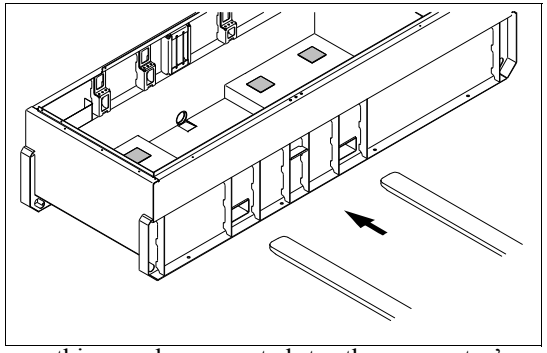
The alternator, the engine, the cooling system, etc. are enclosed in a sound-insulated bodywork that can be opened by means of side doors (and service plates).

The lifting beam, to lift the generator by means of a crane, is integrated in the bodywork and easily accessible from the outside. The recesses in the roof have guiding rods at both sides.

Never use the guiding rods to lift the generator.



To be able to lift the generator by means of a forklift, rectangular holes are provided at the bottom of the frame.



The earthing rod, connected to the generator's earth terminal is located at the bottom of the frame on the outside.

Markings

A brief description of all markings provided on the generator is given hereafter.

Indicates that an electric voltage, dangerous to life, is present. Never touch the electric terminals during operation.

Indicates that the engine exhaust is a hot and harmful gas, which is toxic in case of inhalation. Always make sure that the unit is operated outside or in a well-ventilated room.

Indicates that these parts can become very hot during operation (e.g. engine, cooler, etc.). Always make sure that these parts are cooled down before touching them.

Indicates that the guiding rods may not be used to lift the generator. Always use the lifting rod in the roof of the generator to lift it.

Indicates a lifting point of the generator.

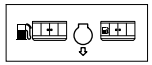
Indicates that the generator may be refuelled with diesel fuel only.

Indicates the drain for the engine oil.

Indicates the drain for the coolant.

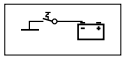
Indicates the drain plug for the engine fuel.

Use PAROIL E only.



Indicates the external fueltank.

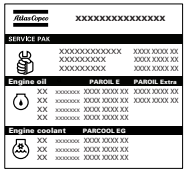
Indicates that the alternator should not be cleaned with high pressurised water.



Indicates the battery switch.

Indicates that the unit may start automatically and that the instruction book has to be consulted prior to use.

Indicates the 3-way valve.



Indicates the partnumbers of the different service packs and of the engine oil. These parts can be ordered to the factory.

Drain plugs and filler caps

The drain holes for the engine oil, the coolant and the plug for the fuel, are located and labelled on the frame, the fuel drain plug at the front, the others at the service side.

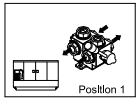
The drain flexibles for the engine oil and the engine coolant can be brought to the outside of the generator through the drain hole.

The drain hole can also be used to guide external fueltank connections. When connecting an external fueltank, use the 3-way valves.

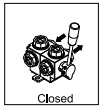
External fuel tank connection

The external fuel tank connection allows to bypass the internal fuel tank and to connect an external fuel tank to the unit.

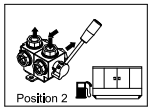
Make sure to connect the fuel supply line as well as the fuel return line. Connections to fuellines ought to be air-tight to prevent air from entering the fuel system.



Position 1: Indicates that the fuel supply line to the engine is connected to the internal fueltank.



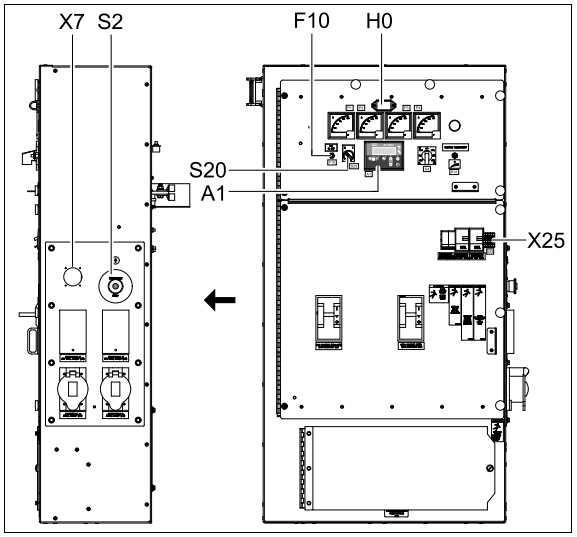
Position closed: Indicates that the fuel supply line to the engine is closed.



Position 2: Indicates that the fuel supply line to the engine is connected to the external fueltank.

Control and indicator panel Qc1002™

General description Qc1002™ control panel



A1..... Qc1002™ display

F10 ... Fuse

The fuse activates when the current from the battery to the engine control circuit exceeds its setting. The fuse can be reset by pushing the button.

H0..... Panel light

S2..... Emergency stop button

Push the button to stop the generator in case of an emergency. When the button is pressed, it must be unlocked, before the generator can be restarted. The emergency stop button can be secured in the locked position with the key, to avoid unauthorized use.

S20... ON/OFF switch

Position O: No voltage is applied to the Qc1002™ module, the generator will not start.

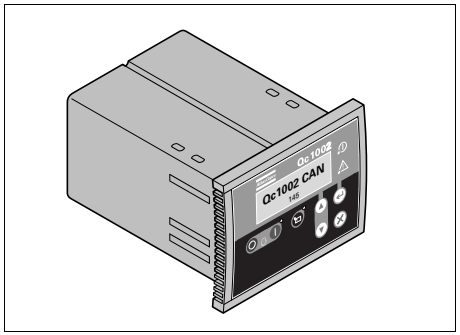
Position I: Voltage is applied to the Qc1002™ module, it is possible to start up the generator.

X7 ... Flanged Inlet

Used to supply power to the available coolant heater or battery charger (if ordered).

X25 .. Terminal strip

Qc1002™ Module



The Qc1002™ module is located inside the control panel. This control module will carry out all necessary tasks to control and protect a generator, regardless of the use of the generator.

This means that the Qc1002™ module can be used for several applications.

Pushbutton and LED functions

Following pushbuttons are used on the Qc1002™

ENTER: Is used to select and confirm changed settings in the Parameter list.

UP: Is used to scroll through the display information and to adjust parameter value upwards.

DOWN: Is used to scroll through the display information and to adjust parameter value downwards.

BACK: Is used to leave the Alarm pop-up window, to leave the Parameter list and to leave menu's without change.

REMOTE MODE: Is used to activate the remote mode. The LED indicates if the gen-set is put in Remote Mode.

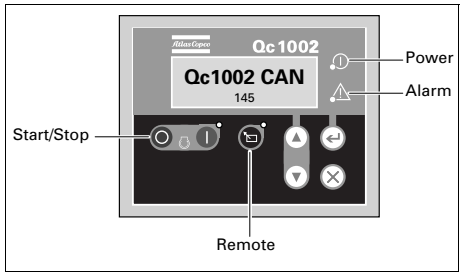
START: Is used to start the unit in Manual Mode.

STOP: Is used to stop the unit in Manual or Remote Mode (always with shutdown!). When the unit is stopped with the STOP button in Remote mode, it will automatically go to Manual Mode.

QC1002 - Battery charge setting is defaulted to 27.12 volts
Adjustment is on channel 4222 so this is set at 113% - This can be changed to 107%
This will keep the no charge code from coming up.
This is for 1.60.1 program and is for the 24 volt charging system.

Battery Voltage has to be at 22 V for starting for JDEC. When running the ECU will work but between 10-18 V some degradation of functionality can occur. The QC1002 initiates the start sequence on our generators

Following LEDs are used on the Qc1002™



Power	Green LED indicates that the unit is powered up.
Remote	Green LED indicates that the Remote Mode is selected.
Start/Stop	Green LED indicates that the engine is running.
Alarm	Flashing red LED indicates that an alarm is present. A continuous red LED indicates that the alarm has been acknowledged by the user. The exact alarm is shown on the display.

Qc1002™ Menu Overview

At Qc1002™, the LCD will show following information:

– in **Normal** condition (scroll through the information using **UP** and **DOWN**):
  - Status (eg: preheat, crank, run, cooldown, extended stop time, …)
  - Controller type & version
  - Parameter list
  - Alarm list
  - LOG list
  - Service Timer 1 & Service Timer 2
  - Battery Voltage
  - Coolant temperature
  - Oil pressure
  - RPM (speed)
  - Fuel level
  - Voltage - frequency - running hours
– in **Alarm** condition (scroll through the information using **UP** and **DOWN**):
  - a list of all active Alarms

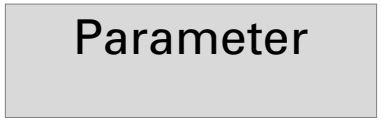
It's possible to scroll through the views, using the **UP** and **DOWN** buttons. The scrolling is continuous.

If a Special status comes up, the Status Display is shown. If an Alarm comes up, the Alarm Display is shown.

Controller type and version display

This view shows the controller type and the ASW version number.

Parameter display



This view shows a number of Parameter settings and gives access to them.

An overview is given in “Parameter list” on page 18.

Alarm list display

This view shows the number of active alarms and gives access to them.

An overview is given in “Control and indicator panel Qc1002™” on page 14.

LOG list display

This view shows the alarm memory and gives access to it.

An overview is given in “LOG list” on page 21.

Service timer 1 & Service timer 2 display

This view shows both Service timers. The service timer indication is shown when service time has run out. It can be removed by resetting the timers or acknowledging the Service timer indication.

The service timer indications count upwards and give an alarm when the set value is reached.

Resetting the Service Timers can be done through the Parameter display.

Battery Voltage display

This view shows the Battery voltage and the running hours.

Coolant temperature display

This view shows the Coolant temperature and the running hours.

See also “Parameter list” on page 18 for selection between °C and °F.

Oil pressure display

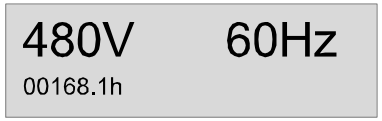
This view shows the Oil pressure and the running hours.

See also “Parameter list” on page 18 for selection between bar and psi.

Fuel level display

This view shows the Fuel level and the running hours.

Voltage - frequency - running hours display



This view shows the voltage, frequency and running hours.

Engine speed display

This view shows the engine speed and running hours.

Diagnostic menu

This menu is used to power up the engine electronics without starting the engine. When this setting is switched on, electric power will be supplied to the engine electronics after half a minute delay. The unit can not be started as long as this parameter is swiched on.

DPF - Diesel Particulate Filter

This view shows the DPF mode selected. When AUTO is selected the DPF will regenerate automatically. When OFF is selected, regeneration is disabled. When ON is selected manual regeneration is partially enabled (see STATION REGEN).

It is highly recommended that the genset be left in the AUTO mode at all times to prevent engine de-rate and possible shutdown due to high soot level.

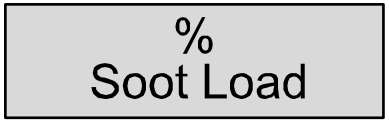
Station Regen.

Stationary or manual DPF regeneration. This view shows the stationary regeneration mode selected. When OFF is selected, manual regeneration is disabled. When ON is selected manual regeneration is enabled. The views DPF and STATION REGEN. must be set to ON for the unit to perform a stationary (manual) regeneration.

DPF and STATION REGEN. are password protected.

Note: Unit will not regenerate until soot level is ~72%

Soot Load Indicator

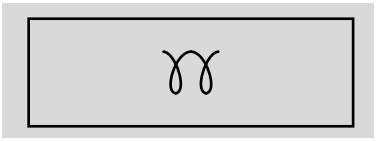


Available in EXTRA VIEWS on control panel

Only visible when unit is operating. This screen has been provided for the operator to monitor the soot load of the DPF (read in percent of load)

For stationary/manual regeneration instructions See page 22.

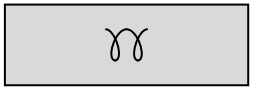
Status Display (pop-up window)

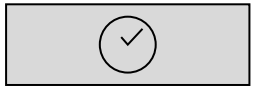


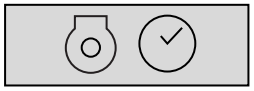
In case special statuses are entered, a pop-up window will automatically be entered for as long as the status is active.

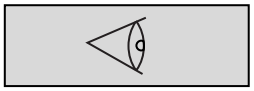
The background screen is not updated when the status pop-up window is active.

These special statuses are:

PREHEAT 

START OFF/ EXTENDED STOP TIMER 

COOLDOWN 

DIAGNOSTIC 

If a special status has elapsed, the active view will be entered again automatically.
If an Alarm comes up, the Alarm Display is shown.

Parameter list

The Parameter Menu's are pre-programmed!

A password will be asked for when an attempt to change a setting is about to be done (user password = 2003).

Menu's shown on the Parameter list LCD:

– Running hours adjust

  This menu is used to adjust the amount of running hours. The running hours can only be highered, not lowered.

– Unit Type

Unit type 6 for QAS 250-330 John Deere!

– Service Timer 2 reset

– Service Timer 1 reset

  These menus are used to reset the service timers. When a service timer alarm occurs and is acknowledged, the service timer will be reset automatically.

– Diagnostic Menu

  This menu is used to power up the engine electronics without starting the engine. When this setting is switched on, electric power will be supplied to the engine electronics after half a minute delay. The unit can not be started as long as this parameter is switched on.

– Unit Menu

  This menu is used to select whether tempreature and pressure should appear in °C/bar or °F/psi.

– Language selection

  Icons is the default factory set language, but 6 other languages can be selected: English, French, German, Italian, Spanish and Cyrillic (Russian). All information in the Parameter List display is always in English.

– Generator Underfrequency: failclass, enable, delay, setpoint

– Generator Overfrequency: failclass, enable, delay, setpoint

– Generator Undervoltage: failclass, enable, delay, setpoint

– Generator Overvoltage: failclass, enable, delay, setpoint

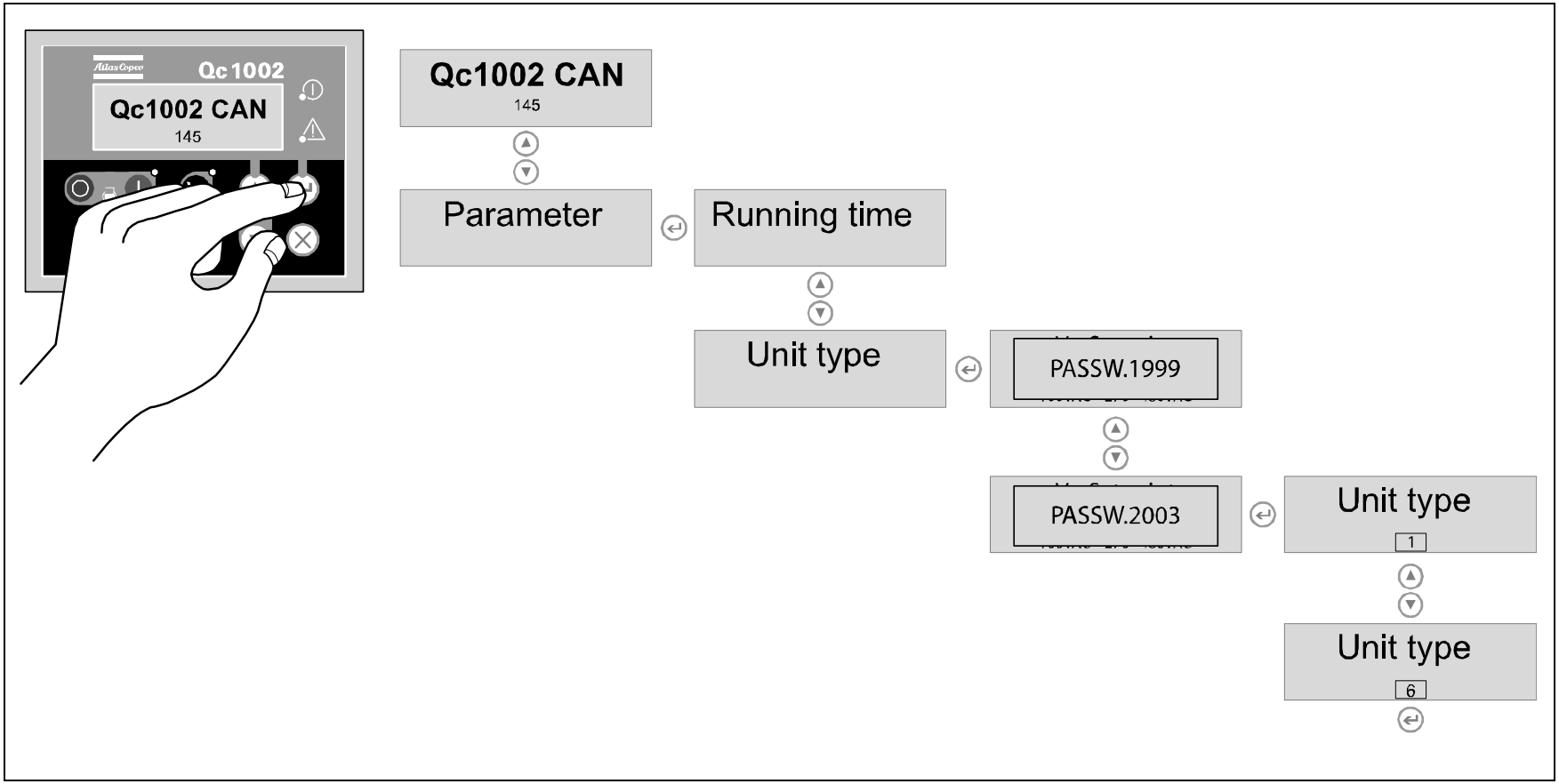
– Engine CAN communication

  This menu is used to select the type of engine electronics, the Qc1002™ controller should communicate with via the Canbus.

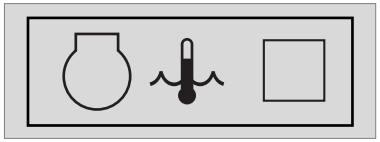
It's possible to scroll between configuration menu's by using the pushbuttons UP and DOWN.

Pushing the ENTER button activates the configuration menu which is shown at the display.

This is the described menu flow for changing the unit type:



Alarm Display (pop-up window)



In case an Alarm occurs, a pop-up window will automatically be displayed for as long as the alarm is active, no matter which view is active. The flashing red alarm LED will light up. The alarm icons will be shown together with an acknowledgement check-box. Push the ENTER button to acknowledge the alarm. When the alarm has been acknowledged, a V-marking will appear in the check-box and the red alarm LED will light up continuously.

An alarm should always be acknowledged before solving the problem that causes the alarm.

The Alarm Display can always be left or entered again by pushing the BACK button.

If more than one alarm comes up, it's possible to scroll through the alarm messages with the UP and DOWN pushbuttons. The newest alarm will be placed at the bottom of the list (meaning that the older alarm stays at the display when a newer alarm comes up).

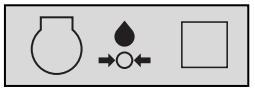
If one or more than one alarm is present, an arrow at the right of the display will be shown.

Following general groups of Alarms exist:

- Warning: Alarm LED lights up + Alarm pop-up appears on the display + Alarm relay is empowered (if configured)
- Trip of GB: 'Warning' actions + Generator Contactor opens
- Trip and Stop: 'Trip of GB' actions + unit stops after Cooldown
- Shutdown: 'Trip of GB' actions + unit stops immediately

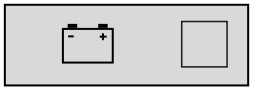
List of possible alarms:

LOW OIL PRESSURE

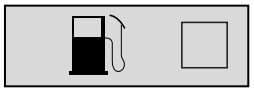


HIGH COOLANT TEMPERATURE

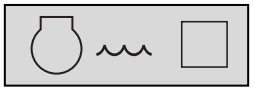
CHARGING ALTERNATOR



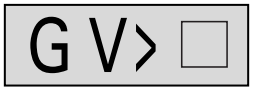
LOW FUEL LEVEL



LOW COOLANT LEVEL

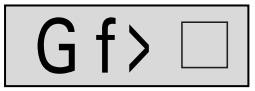


GENERATOR OVERVOLTAGE



GENERATOR UNDER-VOLTAGE

GENERATOR OVER-FREQUENCY



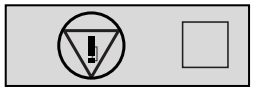
GENERATOR UNDER-FREQUENCY

SERVICE TIMER 1

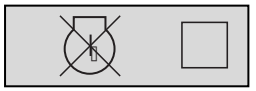
SERVICE TIMER 2

ENGINE ALARM

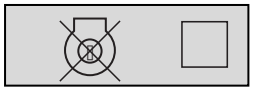
EMERGENCY STOP



START FAILURE



STOP FAILURE



Displaying the engine DM1 alarm

Besides some engine specific alarms shown in the standard alarm list, also all Diagnostic messages DM1 (active alarms) can be shown on the display.

Use the **UP** or **DOWN** buttons until DM1 is shown on the display and press **ENTER**. The DM1 alarm log will be shown on the display.

Use the **UP** and **DOWN** buttons to scroll through the list.

The DM1 alarm log will always show the SPN code (Diagnostics Codes) and the FMI code (Failure Modes) of every engine failure.

For example, the error code for “Low Coolant Level Shutdown” will be 111/01 (111 for “Coolant level” and 01 for “Low level shutdown”).

The list below shows the most common error codes. The DM1 alarm log for these codes will also show the alarm text:

SPN16	"FUEL FILTER DIFF P"
	pressure difference over fuel filter
SPN51	"THROTTLE POS"
	throttle position
SPN52	"INTERCOOL TEMP"
	intercooler temperature
SPN94	"FUEL PRESS"
	fuel pressure
SPN95	"FUEL FILTER DIFF P"
	pressure difference over fuel filter
SPN97	"WATER IN FUEL"
	water in fuel
SPN98	"OIL LEVEL"
	oil level
SPN99	"OIL FILTER DIFF P"
	pressure difference over oil filter
SPN100	"OIL PRESSURE"
	oil pressure
SPN101	"CRANKCASE PRESS"
	crankcase pressure
SPN102	"TURBO BOOST PRESS"
	turbo boost pressure
SPN104	"TURBO OIL PRESS"
	turbo oil pressure
SPN105	"INTAKE MANIF TEMP"
	intake manifold temperature
SPN106	"AIR INLET PRESSURE"
	air inlet pressure
SPN110	"COOLANT TEMP"
	coolant temperature
SPN111	"COOLANT LEVEL"
	coolant level
SPN158	"BATT VOLTAGE"
	battery voltage
SPN171	"AMBIENT AIR TEMP"
	ambient air temperature
SPN172	"AIR IN TEMP"
	air in temperature
SPN174	"FUEL TEMP"
	fuel temperature
SPN175	"OIL TEMP"
	oil temperature
SPN190	"SPEED"
	speed
FMI00	"HIGH LEVEL SHUTDOWN"
	high level shutdown
FMI01	"LOW LEVEL SHUTDOWN"
	low level shutdown
FMI15	"HIGH LEVEL WARNING"
	high level warning
FMI16	"HIGH LEVEL ALARM"
	high level alarm
FMI17	"LOW LEVEL WARNING"
	low level warning
FMI18	"LOW LEVEL ALARM"
	low level alarm

LOG list

The unit will keep an event log of the latest 30 events.

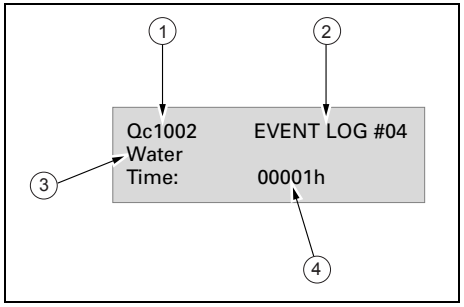
Events are:

– shutdowns

– service timer 1/2 reset

– unit type changes

Together with each event, the running hours at the time of the event will be stored.



1	Controller type
2	Event number
3	Event
4	Running hours

Remote start operation

Installation wirings:

– X25.1 & X25.2 to be wired for the remote start switch.

– X25.3 & X25.4 to be wired for the remote contactor (open/ close).

Fail classes

All the activated alarms of the Qc1002™ have their own pre-defined fail class.

All alarms are enabled according to one of these three statuses:

– disabled alarm, no supervision of alarm (OFF).

– enabled alarm, supervision of alarm all the time (ON).

– running alarm, only supervision when the machine is running (RUN).

Stationary Regeneration Procedure

Atlas Copco recommends that the DPF configuration be left in the AUTO mode at all times, however in the event that a stationary or manual regeneration in desired the following process should be followed.

– Go to the "STATION REGEN" screen. For normal operation this should be in OFF mode.

§ Press the enter button, this function is password protected contact Atlas Copco service department.

§ Use the up or down arrow to change the selection to ON and press the enter button.

– Go to the "DPF" screen. For normal operation this should be in the AUTO mode.

§ Press the enter button

§ Use the up or down arrow to change the selection to ON and press the enter button.

§ This will set the unit up for regeneration, after a few moments the regeneration icon should appear confirming the unit is regenerating.

Upon completion of the stationary/forced regeneration it is highly recommended to reset the unit to automatically regenerate to prevent engine derate & shutdown due to high soot load. Follow the process below to return the unit to AUTO mode for normal operation.

– Go to the "STATION REGEN" screen. (For normal operation this should be in OFF mode).

§ Press the enter button, this function is password protected contact Atlas Copco service department.

§ Use the up or down arrow to change the selection to OFF and press the enter button.

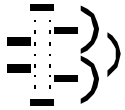
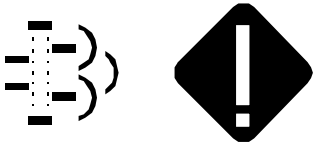
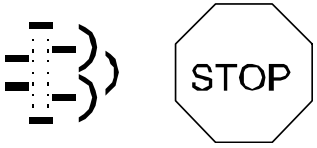
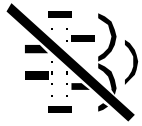
– Go to the "DPF" screen. For normal operation this should be in the AUTO mode.

§ Press the enter button,

§ Use the up or down arrow to change the selection to AUTO and press the enter button.

§ The unit is now ready for normal operation.

DPF INFORMATION - INDICATORS

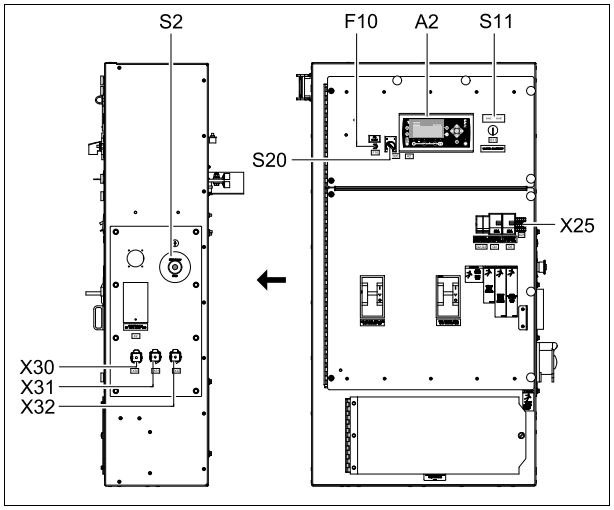
Indicators	Discription	Operator Action
Exhaust Filter Cleaning Indicator 	Active when: 1. Exhaust gas temperature is high. 2. Elevated idle is active. 3. Exhaust filter cleaning is in process.	Machine can be operated as normal. If operating in an area where high exhaust temperature may be an issue, abort exhaust filter cleaning by using the disable feature. Only use disable feature in emergency situation.
Exhaust Filter Indicator 	Active when: Soot level in the exhaust filter indicates need for an exhaust filter cleaning. Warning will be present on controller	Enable auto filter cleaning to allow a cleaning cycle. OR Begin a manual cleaning.
Exhaust Filter and Warning Indicators 	Active when: Machine performance is reduced due to moderately high soot level. Warning will be present on controller	Begin a manual cleaning.
Exhaust Filter and Stop Indicators 	Active when: Exhaust filter requires service, Machine performance is reduced due to Extremely High soot level and a stop engine request is made.	Service the exhaust filter. Contact your servicing dealer.
Auto Cleaning Disabled Indicator 	Active when: Auto exhaust filter cleaning is disabled.	If possible, enable auto cleaning.

Always leave machine in auto cleaning mode unless forced to use a manual cleaning.

Do not let machine operate unloaded excessively, exhaust filter performance is reduced.

Control and indicator panel Qc4002™

General description Qc4002™ control panel



A2..... Qc4002™ display

F10 ... Fuse

The fuse (10 A) activates when the current from the battery to the engine control circuit exceeds its setting. The fuse can be reset by pushing the button.

S2..... Emergency stop button

Push the button to stop the generator in case of an emergency. When the button is pressed, it must be unlocked, before the generator can be restarted. The emergency stop button can be secured in the locked position with the key, to avoid unauthorized use.

S11... Frequency selector switch (50 Hz/60 Hz)

Allows to choose the frequency of the output voltage: 50 Hz or 60 Hz.

Changing the output frequency is only allowed after shutdown.

S20... ON/OFF switch

Position O: No voltage is applied to the Qc4002™ module, the generator will not start.

Position I: Voltage is applied to the Qc4002™ module, it is possible to start up the generator.

X25... Connection block

Inside the cubicle. Allows customer connections.

Refer to circuit diagram for the correct connection.

X30... Connector X30

Connector for communication with other generators with Qc4002™ when paralleling.

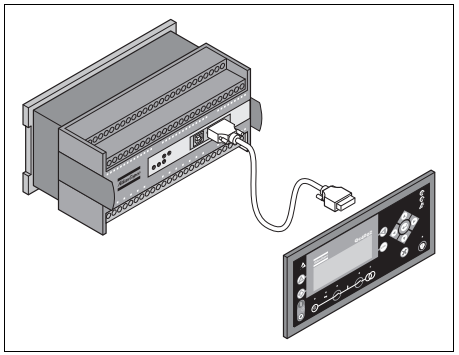
X31... Connector X31

Connector for communication with other generators with Qc4002™ when paralleling.

X32... Connector X32

Connector for PMS communication with other generators with Qc4002™ when paralleling.

Qc4002™ module



The Qc4002™ module is located inside the control panel, and communicates with a display unit, located in front of the control panel. This control module will carry out all necessary tasks to control and protect a generator, regardless of the use of the generator.

This means that the Qc4002™ module can be used for several applications.

Pushbutton and LED functions

Following pushbuttons are used on the Qc4002™

INFO: Shifts the display 3 lower lines to show the alarm list.

JUMP: Enters a specific menu number selection. All settings have a specific number attached to them. The JUMP button enables the user to select and display any setting without having to navigate through the menus.

START: Start of the gen-set if SEMI-AUTO or MANUAL is selected.

STOP: Stop of the gen-set if SEMI-AUTO or MANUAL is selected.

GB: Manual activation of close breaker and open breaker sequence if SEMI-AUTO is selected.

MB: Manual activation of close breaker and open breaker sequence if SEMI-AUTO is selected.

VIEW: Shifts the first line displaying in the setup menus.

LOG: Displays the LOG SETUP window where you can choose between the Event, Alarm and Battery logs. The logs are not deleted when the auxiliary supply is switched off.

BACK: Jumps one step backwards in the menu (to previous display or to the entry window).

MODE: Changes the menu line (line 4) in the display to mode selection.

SEL: Is used to select the underscored entry in the fourth line of the display.

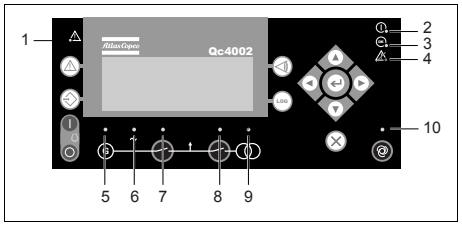
UP: Increases the value of the selected set point (in the setup menu). In the daily use display, this button function is used for scrolling the View lines in V1 or the second line (in the setup menu) displaying of generator values.

DOWN: Decreases the value of the selected set point (in the setup menu). In the daily use display, this button function is used for scrolling the View lines in V1 or the second line (in the setup menu) displaying of generator values.

LEFT: Moves the cursor left for manoeuvring in the menus.

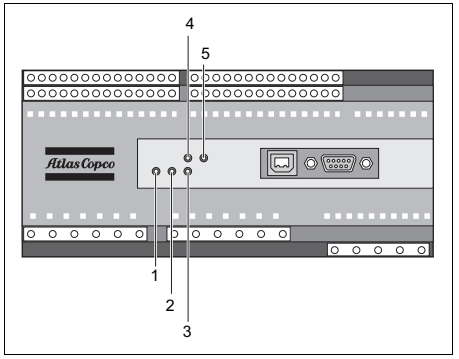
RIGHT: Moves the cursor right for manoeuvring in the menus.

Following LEDs are used on the Qc4002™



1	**Alarm**	LED flashing indicates that unacknowledged alarms are present. LED fixed light indicates that ALL alarms are acknowledged.
2	**Power**	LED indicates that the auxiliary supply is switched on.
3	**Self check OK**	LED indicates that the self check is OK.
4	**Alarm inhibit**	Please refer to Alarm inhibit in the chapter 'Additional functions'.
5	**Run**	LED indicates that the generator is running.
6	**Generator voltage**	LED green light indicates that the voltage/ frequency is present and OK.
7	**(GB) ON**	LED green light indicates that the generator breaker is closed. LED yellow light indicates that the generator breaker has received a command to close on a black BUS, but the breaker is not yet closed due to interlocking of the GB. LED is flashing orange if the 'Spring load time' signal from the breaker is missing.
8	**(MB) ON**	LED indicates that the mains breaker is closed.
9	**Mains voltage**	LED is green, if the mains is present and OK. LED is red at a measured mains failure. LED is flashing green when the mains returns during the 'mains OK delay' time.
10	**Auto**	LED indicates that auto mode is selected.

The main Qc4002™ control unit includes 5 LEDs



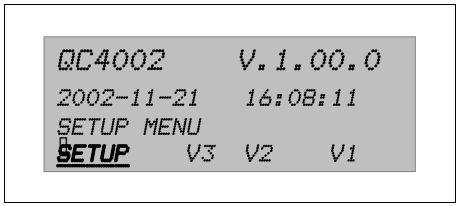
1	**Power**	Green LED indicates that the voltage supply is switched on.
2	**Self check OK**	Green LED indicates that the unit is OK.
3	**Alarm inhibit**	Green LED indicates that the inhibit input is ON.
4	**CAN 2**	
5	**CAN 1**	

Qc4002™ menu overview

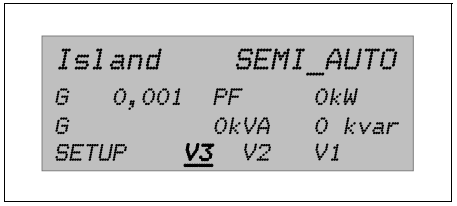
Main View

The display has 4 different lines. The information on these lines can change, depending on which view is used. There are 4 different main views possible: SETUP / V3 / V2 / V1.

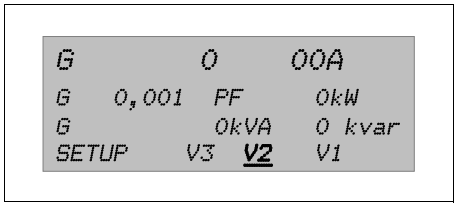
Setup view



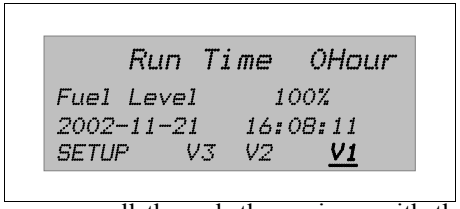
V3 view



V2 view



V1 view



The user can scroll through these views with the scroll buttons:

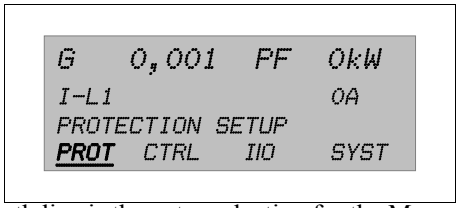
- The SETUP view shows the module name, the software version, the date and the time.
- The V3 view shows the application type and the mode, and some generator measurements. During synchronisation the V3 view will show a synchronoscope in the first line.
- The V2 view shows some generator measurements.
- In the V1 view the user can scroll up and down to 15 configurable screens showing different measurements of the generator, the bus and the Mains.

SETUP menu

The control and protection parameters can be programmed according the application. This can be done by scrolling through the setup menu to the appropriate parameter. Each parameter has a specific channel number and is listed in one of the 4 main SETUP menus:

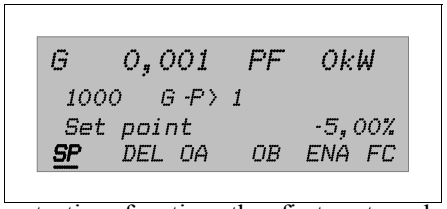
- Protection Setup (PROT): Channels from 1000 to 1999 (steps of 10).
- Control Setup (CTRL): Channels from 2000 to 2999 (steps of 10).
- Input/Output Setup (I/O): Channels from 3000 to 5999 (steps of 10).
- System Setup (SYST): Channels from 6000 and up (steps of 10).

If you select SETUP then you get the following view:



The fourth line is the entry selection for the Menu system. If the SEL button is pressed, the menu indicated with an underscore will be entered.

If PROT is selected, the following view will appear (example of parameter):



For a protective function the first entry shows the "Generator reverse power (G-P>1)" setting.

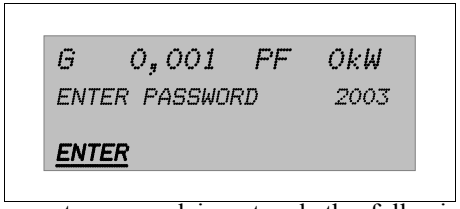
Scrolling down will give all the protection parameters:

- The first line shows some generator data.
- The second line shows the channel number and the name of the parameter.
- The third line shows the value of a set point of this parameter.
- The fourth line shows the different possible set points. In this example:

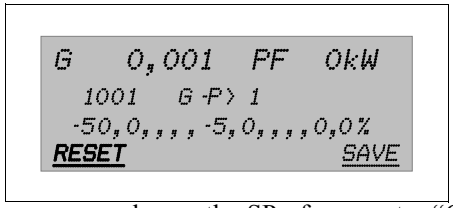
SP	SET POINT, the alarm set point is adjusted in the set point menu. The setting is a percentage of the nominal values.
DEL	DELAY, the timer setting is the time that must expire from the alarm level is reached until the alarm occurs.
OA	OUTPUT A, a relay can be activated by output A.
OB	OUTPUT B, a relay can be activated by output B.
ENA	ENABLE, the alarm can be activated or deactivated. ON means always activated, RUN means that the alarm has run status. This means it is activated when the running signal is present.
FC	FAIL CLASS, when the alarm occurs the unit will react depending on the selected fail class.

The user can scroll to these choices and select one choice with the SEL button.

After selection of SP the following view will be visible:



If the correct password is entered, the following view appears:



Now the user can change the SP of parameter “G-P>1”. This can be done with the scroll buttons. Then the user has to select SAVE to save the new settings.
To exit the user has to press the BACK button several times, until the main view appears.

The JUMP button

Instead of navigating through the entire menu, the user can jump directly to the required parameter, if he knows the channel number of that specific parameter.

If the JUMP button is pushed the password view will appear. Not all parameters can be changed by the end-user. The required password level for each parameter is given in the set point list.

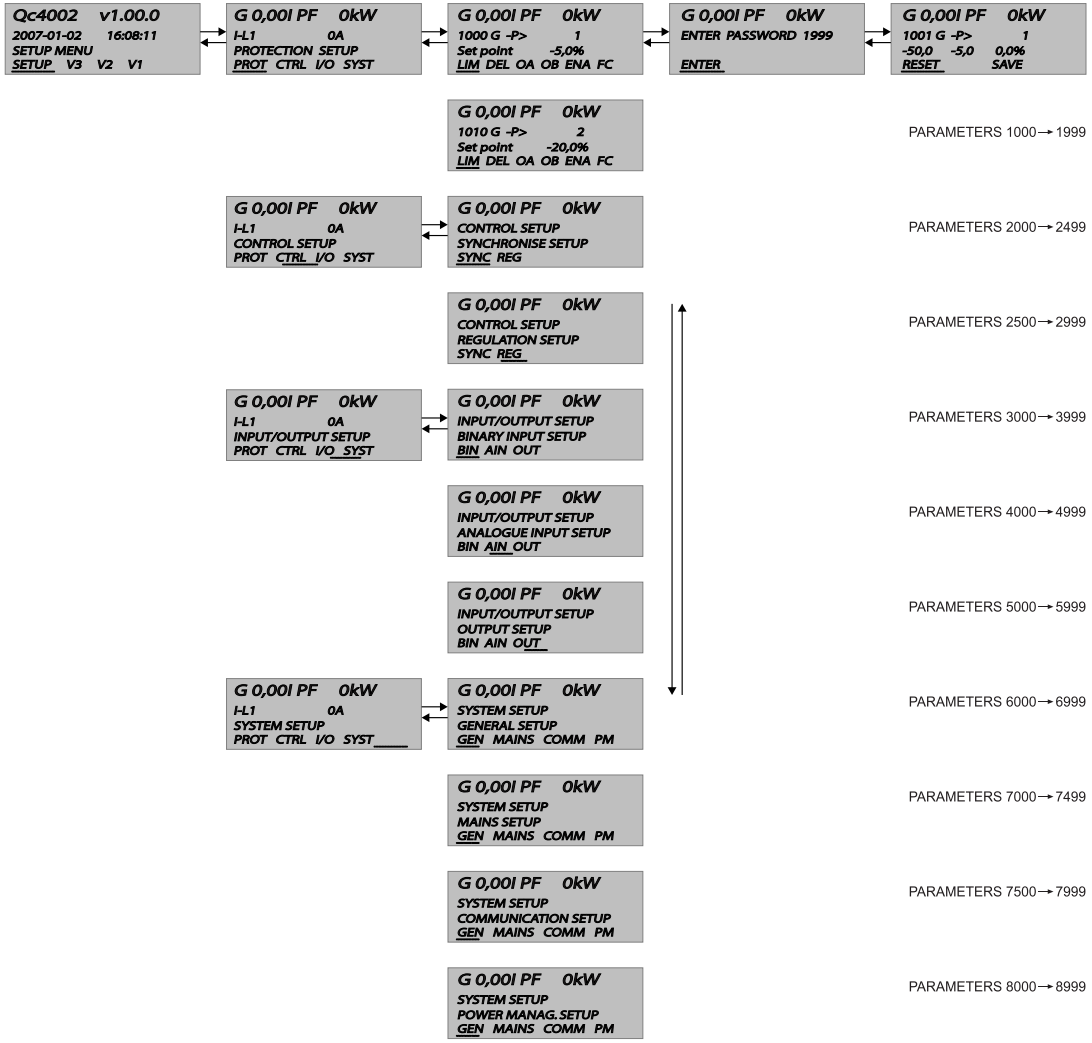
The following menus can only be reached using the JUMP button:

- 9000Software version
- 9020Service port
- 911XUser password

  Level 2 and Level 3 passwords can only be set through the Atlas Copco Utility Software PC Software.
- 9120Service menu
- 9130Single/Split/Three phase
- 9140Angle comp. BB/G

Use the UP and DOWN buttons to change the settings and the SEL button to store the new setting.

This is the described menu flow:



The menu flow is similar in the CONTROL SETUP, I/O SETUP and SYSTEM SETUP.

For more details on the Setup menu we refer to the Qc4002™ User Manual.

Languages

English is the default language ex-factory.

Passwords

Changing different parameters requires different password levels. Some parameters cannot be changed by the end-customer because of safety reasons.

There are 4 different password levels:

- No password
- User password (default setting 2003)
- Service password
- Master password

Once the password has been entered, the user can change all the accessible set points.

The user can change the User password (go with JUMP button to channel 9116).

Changing parameters

Consult the Qc4002™ user manual for all customer level parameters, which can be accessed using password "2003".

In order to receive the default parameters for your unit, please contact Atlas Copco Service staff.

Fail Classes

All the activated alarms of the module are configured with a fail class. The fail class defines the category of the alarm and the subsequent action.

6 different fail classes can be used:

Engine running:

- **Alarm:** Alarm Horn Relay, Alarm Display.
- **Warning:** Alarm Horn Relay, Alarm Display.
- **Trip of GB:** Alarm Horn Relay, Alarm Display, GB Trip.
- **Trip & Stop:** Alarm Horn Relay, Alarm Display, (Deload), GB Trip, Gen-Set cooling down, Gen-Set stop.
- **Shutdown:** Alarm Horn Relay, Alarm Display, GB Trip, Gen-Set stop.
- **Trip of MB:** Alarm Horn Relay, Alarm Display, MB Trip.

Engine stopped:

- **Alarm:** Block engine start.
- **Warning:** -
- **Trip of GB:** Block engine start, Block GB sequence.
- **Trip & Stop:** Block engine start, Block GB sequence.
- **Shutdown:** Block engine start, Block GB sequence.
- **Trip of MB:** Block MB sequence.

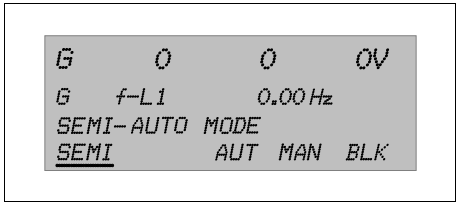
All alarms can be disabled or enabled as following:

- **OFF**: disabled alarm, inactive supervision.
- **ON**: enabled alarm.

Standard modes

The unit has four different running modes and one block mode. The required mode can be selected via the MODE puhbutton. Repeat pushing the button until the required mode appears on the display, then press SEL to select or BACK to cancel.

This screen appears when pressing the MODE puhbutton.



Auto mode

In this mode the Qc4002™ controls the gen-set and the circuit breakers (generator breaker GB and mains breaker MB) automatically according to the operational state.

Semi-Auto mode

In semi-auto mode the operator has to initiate all sequences. This can be done via the pushbutton functions, modbus commands or digital inputs. When started in semi-automatic mode, the gen-set will run at nominal values.

Test mode

Enables the user to test the generator on a regular basis. The generator will follow a predefined sequence of actions.

In this mode it is possible to perform the following tests:

- Simple test
- Load test
- Full test

Manual mode

When manual mode is selected, the gen-set can be controlled with digital inputs.

MAN mode cannot be selected, when AUTO mode is selected. To go from AUTO to MAN it is necessary to go to SEMI-AUTO to make MAN available.

Block mode

When the block mode is selected, the unit is locked for certain actions. This means that it cannot start the gen-set or perform any breaker operations.

To change the running mode from the display, the user will be asked for a password before the change can be made. It is not possible to select ‘block mode’ when running feedback is present.

The purpose of the block mode is to make sure that the gen-set does not start for instance during maintenance work. If the digital inputs are used to change the mode, then it is important to know that the input configured to block mode is a constant signal. So, when it is ON the unit is in a blocked state, and when it is OFF, it returns to the mode it was in before block mode was selected.

Diagnostics menu

This diagnostics menu can be entered via channel 6700. This menu is used for engine diagnostics situations.

If diagnostics is selected in this menu, the fuel solenoid relay output will be de-energized for 30 seconds (to make sure that the unit is completely stopped), and then gets energized again. Then engine diagnostics can take place.

To leave this status, disable diagnostics in channel 6700, or press stop, or start the machine (not during the first 30 s).

It's only possible to start the generator when Normal is selected.

Standard applications

In the Qc4002™ module 9 application types can be selected. A combination of each application type with the running mode results in a specific application.

Gen-set mode	Running mode				
	Auto	Semi	Test	Man	Block
Automatic Mains Failure (no back sync.)	X	(X)	X	X	X
Automatic Mains Failure (with back sync.)	X	(X)	X	X	X
Island operation	X	X		X	X
Fixed power/base load	X	X	X	X	X
Peak shaving	X	X	X	X	X
Load take over	X	X	X	X	X
Mains power export	X	X	X	X	X
Multiple gen-sets, load sharing	X	X		X	X
Multiple gen-sets, power management	X	(X)	X	X	X

Depending on the application the user has to connect extra wirings to terminal blocks X25. These terminal blocks can be found inside the control box on a DIN-rail. We refer to the circuit diagram 1310 3200 12/00 for the correct connections.

Island operation

This application is possible in combination with SEMI-AUTO mode or AUTO mode. The internal real time clock timer can only be used in AUTO

This operation type is selected for installations with one or more generators, but always without the Mains (= stand-alone). In practice up to 16 generators can be installed in parallel.

Installation wirings

– Terminals X25.10/X25.11 have to be linked. The module always needs a feedback signal from the Mains Breaker MB. In Island mode there is no MB in the system. In this case the MB opened signal is simulated with this link.

– The busbar sensing lines have to be wired to the corresponding control module inputs. Place bridge between:

- X25.33 (L1) => X25.3
- X25.34 (L2) => X25.4
- X25.35 (L3) => X25.5
- X25.36 (N) => X25.6

(The busbar = power cables between GB and load)

– For Remote Start operation:

- wire the RS switch between X25.9 & X25.10.

– For Paralleling applications with other generators:

- See “Paralleling” to set up generator for paralleling.

Automatic Mains Failure (AMF) operation

This application is only possible in combination with the AUTO mode. If the SEMI-AUTO mode is selected the AMF operation will NOT function!

The unit automatically starts the gen-set and switches to generator supply at a mains failure after an adjustable delay time.

– AMF no back synchronisation:

When the mains returns, the unit will switch back to mains supply and cool down and stop the gen-set. The switching back to mains supply is done without back synchronisation when the adjusted ‘Mains OK delay’ has expired.

– AMF with back synchronisation:

When the mains returns, the unit will synchronise the mains breaker to the busbar when the ‘Mains OK delay’ has expired. Then the gen-set cools down and stops.

Installation wirings

– The link between X25.10/X25.11 has to be removed.

– Mains breaker feedback lines have to be wired to X25.10/ X25.11/X25.12.

– Mains breaker control lines have to be wired to X25.13/ X25.14/X25.15/X25.16. These terminals are voltage free contacts. The power for the MB has to be supplied by the customer (24 Vdc/230 Vac) (max. contact rating K11, K12 = 250 V/16 A).

– The Mains sensing lines L1/L2/L3/N have to be wired to terminals X25.3/X25.4/X25.5/X25.6.

– Make sure the connections between X25.33 & X25.3; X25.34 & X25.4; X25.35 & X25.5; X25.36 & X25.6 are removed.

– If back synchronisation is enabled, all settings for paralleling set up (see “Paralleling”) must be verified also.

Peak Shaving (PS) operation

This application is normally used in combination with the AUTO mode. Installation with the Mains.

The generator will start up when the mains imported power (measured through an optional Power Transducer = PT) exceeds a defined level. The generator will synchronise with the bus, and will take load until the defined allowable mains imported power level is reached.

When the mains imported power decreases below the defined mains imported power level for a defined time, the generator will unload and disconnect from the bus. Then the generator will go into cool down.

Installation wirings

– The link between X25.10/X25.11 has to be removed.

– Mains breaker feedback lines have to be wired to X25.10/ X25.11/X25.12.

– Mains breaker control lines have to be wired to X25.13/ X25.14/X25.15/X25.16. These terminals are voltage free contacts. The power for the MB has to be supplied by the customer (24 Vdc/230 Vac) (max. contact rating K11, K12 = 250 V /16 A).
– The Mains sensing lines L1/L2/L3/N have to be wired to terminals X25.3/X25.4/X25.5/X25.6.
– Make sure the connections between X25.33 & X25.3; X25.34 & X25.4; X25.35 & X25.5; X25.36 & X25.6 are removed.
– Power Transducer lines have to be wired to X25.21 (input) and X25.22 (GND).
– Verify all settings for paralleling set up (see "Paralleling").

Fixed Power (FP) operation

This application is possible in combination with SEMI-AUTO mode or AUTO mode. Normally it is used in combination with SEMI-AUTO mode in installations with the Mains. The internal real time clock timer can only be used in AUTO mode.

The generator will deliver a defined fixed power to the load or to the Mains.

Installation wirings

– The link between X25.10/X25.11 has to be removed.
– Mains breaker feedback lines have to be wired to X25.10/ X25.11/X25.12.
– Mains breaker control lines have to be wired to X25.13/ X25.14/X25.15/X25.16. These terminals are voltage free contacts. The power for the MB has to be supplied by the customer (24 Vdc/230 Vac) (max. contact rating K11, K12 = 250 V/16 A).
– The Mains sensing lines L1/L2/L3/N have to be wired to terminals X25.3/X25.4/X25.5/X25.6.
– Make sure the connections between X25.33 & X25.3; X25.34 & X25.4; X25.35 & X25.5; X25.36 & X25.6 are removed.
– Verify all settings for paralleling set up (see "Paralleling").

Load Take Over (LTO) operation

This application is normally used in combination with SEMI-AUTO mode or AUTO mode in installations with the Mains.

The purpose of the load take over mode is to transfer the load imported from the mains to the gen-set for operation on generator supply only.

The generator will start-up, synchronise and take over the load from the Mains gradually, before opening the Mains Breaker. To know if the load is completely taken over from the mains, an optional Power Transducer is necessary.

Installation wirings

– The link between X25.10 & X25.11 has to be removed.
– Mains breaker feedback lines have to be wired to X25.10/ X25.11/X25.12.
– Mains breaker control lines have to be wired to X25.13/ X25.14/X25.15/X25.16. These terminals are voltage free contacts. The power for the MB has to be supplied by the customer (24 Vdc/230 Vac) (max. contact rating K11, K12 = 250 V/16 A).
– The Mains sensing lines L1/L2/L3/N have to be wired to terminals X25.3/X25.4/X25.5/X25.6.
– Make sure the connections between X25.33 & X25.3; X25.34 & X25.4; X25.35 & X25.5; X25.36 & X25.6 are removed.
– Power Transducer lines have to be wired to X25.21 (input) and X25.22 (GND).
– Verify all settings for paralleling set up (see "Paralleling").

Mains power export (MPE) operation

This application is possible in combination with SEMI-AUTO mode or AUTO mode. The internal real time clock timer can only be used in AUTO mode. Installation is with the Mains.

The mains power export mode can be used to maintain a constant level of power through the mains breaker. The power can be exported to the mains or imported from the mains, but always at a constant level.

Installation wirings

– The link between X25.10 & X25.11 has to be removed.
– Mains breaker feedback lines have to be wired to X25.10/ X25.11/X25.12.
– Mains breaker control lines have to be wired to X25.13/ X25.14/X25.15/X25.16. These terminals are voltage free contacts. The power for the MB has to be supplied by the customer (24 Vdc/230 Vac) (max. contact rating K11, K12 = 250 V/16 A).
– The Mains sensing lines L1/L2/L3/N have to be wired to terminals X25.3/X25.4/X25.5/X25.6.
– Make sure the connections between X25.33 & X25.3; X25.34 & X25.4; X25.35 & X25.5; X25.36 & X25.6 are removed.
– Power Transducer lines have to be wired to X25.21 (input) and X25.22 (GND).
– Verify all settings for paralleling set up (see "Paralleling").

Multiple gen-sets with load sharing

In this application the units are enabled to share the active and reactive load equally in percentage of the nominal power. The load sharing is active when each gen-set is running in island mode and the generator breaker is closed.

Multiple gen-sets with power management (PMS)

PMS (= Power Management System) is a system that will automatically start & stop generators based on the actual load dependency. This will be done through a PMS communication between the different units connected.

PMS applications are always in combination with AUTO mode. If the SEMI-AUTO mode is selected, the PMS operation will NOT function! The Qc4002™ controllers from the gensets need to be programmed as PMS in AUTO mode. When a Qc Mains controller is installed this

needs to be programmed in the application that is required (AMF, LTO, FP, MPE) and AUTO mode.

By programming the parameters in AUTO mode, the generator can start up immediately. It is recommended to place the generator in SEMI-AUTO mode while programming all the PMS parameters !

Installations are possible with stand-alone generators or with the Mains (extra Qc4002™ Mains is then needed). A number of Qc4002™ units are being used in the power management application, i.e. one for each mains breaker (Qc4002™ mains controller), if installed, and one for each generator (Qc4002™ genset controller). All units communicate by means of an internal CANbus connection.

In an application with PMS it is important to program correctly the Start & Stop signals between the different generators because of the following reasons:

– The maximum load step needs to be programmed in the Qc4002™ controllers. This never may exceeds the power reserve of the running generators. Otherwise the gensets will go in overload with a sudden max. load increase before the next generator is started up and connected to the busbar.
– To prevent the gensets to run in a start - stop loop.

The start signal is the value of the maximum required load step.

The stop signal is the value when the generator should be stopped automatically.

Example: Installation with 3 gensets

G1 = 300 kW; G2 = 200 kW; G3 = 200 kW.

– Start signal is set at 90 kW (maximum load step < 90 kW).

  Start signal if:

  Total Power needed > (total available power of running gensets -set point start signal).

  • Only G1 is running; at 210 kW load (300 kW - 90 kW) => G2 will be started.
  • G1 & G2 are running; at 410 kW load (200 kW + 300 kW - 90 kW) => G3 will be started.

– Stop signal is set at 100 kW and priority is set as (high) G1 > G2 > G3 (low).

  Stop signal if:

  Total Power needed < (Total available power of running gensets - Power of generator with lowest priority - set point stop signal).

  • G1 & G2 & G3 are running; at 400 kW (700 kW - 200 kW - 100 kW) => G3 will be stopped.
  • G1 & G2 are running; at 200 kW (500 kW - 200 kW - 100 kW) => G2 will be stopped.

The priority on starting & stopping the generators can be chosen on priority settings or on the amount of running hours. In manual mode the start & stop sequence is determent by the chosen priority between the generators. The generator with the lowest priority will start as the latest genset and will stop as first. If running hours are chosen as priority the start & stop sequence will be defined based on the actual running hours of the different generators. The lowest running hours will get the highest priority.

When paralleling generators with PMS, it is no longer necessary to use the analogue load sharing lines. This will be done through the PMS communication lines. Use a screened CAN communication cable with a maximum total distance of 200 meters. Do not connect the cable screen to the ground! Use a 120 Ohm resistor at both end controllers of the PMS.

For more information on this option, see User Manual Qc4002™.

Paralleling

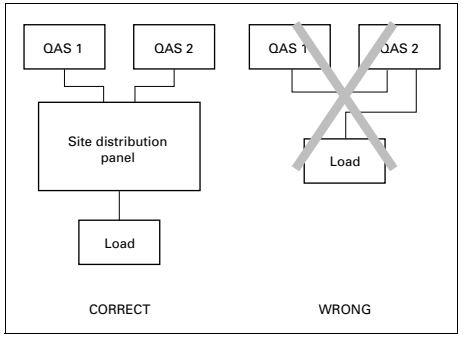
Prior to starting parallel operation of two generators, following connections need to be made:

– Connect the communication cable between the generators (sockets X30 & X31).

  Each dedicated generator or SAPE has two of these connections, to enable paralleling more than two generators.

– Connect the load with the generator.

  Go via the site distribution panel (to be installed by the customer) to connect the generator(s) and/or the SAPE unit(s) with the load. Always connect generator with the load, and never directly with second generator.



When paralleling, make sure to disable the Earth leakage relay by putting switch S13 into off position.

Overview of applications

Installations with only 1 generator

Application type	Mode	Comments
Island operation	*SEMI-AUTO mode*	*= Local start*
	AUTO mode	*= Remote start*
AMF operation	*(SEMI-AUTO mode)*	*AMF operation will not function properly !*
	AUTO mode	*= Emergency start @ Mains Failure*
Peak shaving	*SEMI-AUTO mode*	*Only with Power Transducer (*)*
	AUTO mode	*Only with Power Transducer (*)*
Fixed Power	*SEMI-AUTO mode*	
	AUTO mode	
Load Take Over	*SEMI-AUTO mode*	*Only with Power Transducer (*)*
	AUTO mode	*Only with Power Transducer (*)*
Mains Power Export	*SEMI-AUTO mode*	*Only with Power Transducer (*)*
	AUTO mode	*Only with Power Transducer (*)*

(*) A Power Transducer is a device that measures the actual power of the mains and which translates this into a 4...20 mA signal towards the Qc4002™ module. For details, please contact Atlas Copco.

Installations with more generators

Application type	Mode	Comments
Island operation	*SEMI-AUTO mode*	*= Manual paralleling between generators*
	AUTO mode	*= Remote paralleling between generators*
AMF operation	*(SEMI-AUTO mode)*	*AMF operation will not function properly !*
	AUTO mode	*PMS + Qc4002™ Mains module (**)*
Peak shaving	*SEMI-AUTO mode*	*PMS + Qc4002™ Mains module (**)*
	AUTO mode	*PMS + Qc4002™ Mains module (**)*
Fixed Power	*SEMI-AUTO mode*	*PMS + Qc4002™ Mains module (**)*
	AUTO mode	*PMS + Qc4002™ Mains module (**)*
Load Take Over	*SEMI-AUTO mode*	*PMS + Qc4002™ Mains module (**)*
	AUTO mode	*PMS + Qc4002™ Mains module (**)*

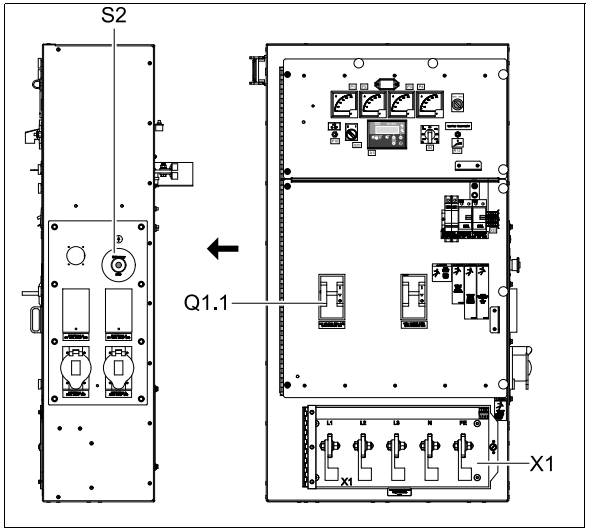
Main Power Export	*SEMI-AUTO mode*	*PMS + Qc4002™ Mains module (**)*
	AUTO mode	*PMS + Qc4002™ Mains module (**)*
Power Management System	*(SEMI-AUTO mode)*	*PMS + Qc4002™ Mains module (**)*
	AUTO mode	*PMS + Qc4002™ Mains module (**)*

(**) The power management system (PMS) allows communication between the Qc4002™ modules over CAN-bus. It has a fully intelligent system, which will start/load/stop the generator according to the actual load and to the status of each generator. The installation can contain up to 16 Qc4002™ modules. If the Mains is included in the installation, then an extra Qc4002™ module is required. The installation can be monitored and controlled via the PMS Software Package. For details on this application, please contact Atlas Copco.

1.Each installation has to be prepared and reviewed very carefully before start-up. Wrong or incomplete wirings can damage the installation brutally !
2.Each application requires a specific combination of the following parameters:
- Auto/ Semi-auto / Test / Manual / Block mode.
- Island / AMF / PS / FP / LTO / MPE / PMS application type (in AUTO mode PS / FP / LTO can be combined with AMF).
- Back synchronising enabled/disabled (parameter channel 7080).
Wrong parameter settings can damage the installation brutally !
3.To be able to start up in cold conditions, parameter 6181 (Start prepare) can be changed to a higher value to have some preheating. Do not put this value above 60 seconds to avoid any possible damage.
4.For more information on the Qc4002™ module and its applications, we refer to the Qc4002™ User manual. If you need more assistance, please contact Atlas Copco.

Output terminal board

The cubicle provides a terminal board for easier connection of cables. It is situated below the control and indicator panel.



S2..... Emergency stop button

Push the button to stop the generator in case of an emergency. When the button is pressed, it must be unlocked, by turning it anti-clockwise, before the generator can be restarted. The emergency stop button can be secured in the locked position with the key, to avoid unauthorized use.

Q1.1. Main circuit breaker

Interrupts the power supply X1 when a short-circuit occurs at the load side, or when the overcurrent (QAS 250: 400 A/ QAS 330: 470 A) protection is activated. When activated, Q1.1 interrupts the three phases towards X1. It must be reset manually after eliminating the problem.

X1 .... Main power supply

Terminals L1, L2, L3, N (= neutral) and PE (= earthing), behind a small transparent door.

Position O on switch S13 will only be used in conjunction with an external earth fault protection unit (e.g. integrated in a distribution board) or when the generator is used in parallel.
The earth fault protection on the single phase outlet socket is not affected by the switch S13.
If S13 is in position O, proper earthing is of the utmost importance for the safety of the user. Eliminating any earth fault protection can lead to serious injury or even death for anybody touching the unit or the load.

Battery switch

The battery switch is situated inside the sound-insulated bodywork. It allows to open or to close the electrical connection between the battery and the engine circuits.

Never turn the battery switch to OFF during operation.

Spillage free frame

A spillage free frame with forklift slots allows the customer to transport the generator easily with a forklift.

It avoids accidental spilling of engine fluids.

In your own interest, always strictly observe all relevant safety instructions.
Do not operate the generator in excess of the limitations mentioned in the Technical Specifications.
Local rules concerning the setting up of low voltage power installations (below 1000 V) must be respected when connecting site distribution panels, switch gear or loads to the generator.
At each start-up and at any time a new load is connected, the earthing of the generator must be verified. Earthing must be done either by the earthing rod or, if available, by an existing, suitable earthing installation. The protective system against excessive contact voltage is not effective unless a suitable earthing is made.
The generator is wired for a TN-system to IEC 364-3, i.e. one point in the power source directly earthed - in this case the neutral. The exposed conductive parts of the electric installation must be directly connected to the functional earth.

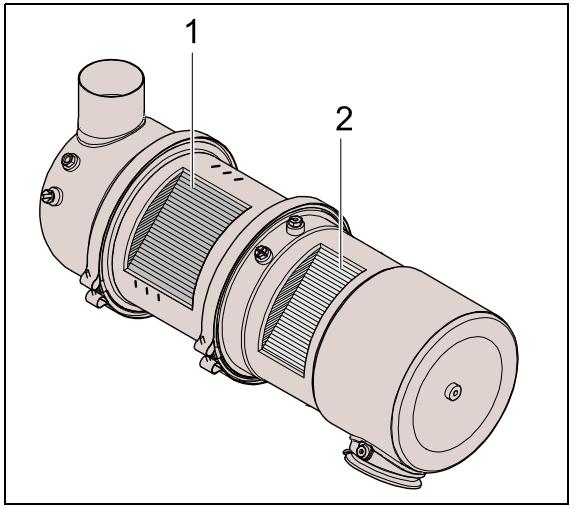
If operating the generator in another power system, e.g. an IT-system, other protective devices required for these types must be installed. In any case only a qualified electrician is authorized to remove the connection between the neutral (N) and earth terminals in the terminal box of the alternator.

Installation

For information about indoor installation, consult your local Atlas Copco dealer.

- Place the generator on a horizontal, even and solid floor. The generator can operate in a slant position not exceeding 15° (in both senses: front/rear and left/right).
- The generator should be kept with the doors closed, in order to avoid the ingress of water and dust. Dust ingress reduces the lifetime of filters and may reduce your generator's performance.
- Check that the engine exhaust is not directed towards people. If the generator is operated indoors, install an exhaust pipe of sufficient diameter to duct the engine exhaust towards the outside. Check for sufficient ventilation so that the cooling air is not recirculated. If necessary, consult Atlas Copco.
- Leave enough space for operation, inspection and maintenance (at least 1 meter at each side).
- Check that the inner earthing system is in compliance with the local legislation.
- Use coolant for the engine cooling system. Refer to the Engine instruction book for the proper coolant mixture.
- Check the tightness of the bolts and nuts.
- Install the earthing rod as near as possible to the generator and make sure not to have a contact voltage higher than 25 V.
- Check that the cable end of the earthing rod is connected to the earth terminal.

EXHAUST FILTER



1. Diesel Particulate Filter (DPF)
2. Diesel Oxidation Catalyst (DOC)

EXHAUST FILTER SYSTEM

An exhaust filter consisting of a diesel oxidation catalyst (DOC) and a diesel particulate filter (DPF) specifically to meet the demands of offhighway applications. The DOC reduces carbon monoxide, hydrocarbons, and some particulate matter. The downstream DPF traps and holds particulates remaining in the exhaust stream. Trapped particles are eventually oxidized within the DPF through a process known as regeneration or exhaust filter cleaning.

Under normal machine operation and with the system in AUTO mode, the exhaust filter system requires minimal operator interaction.

To avoid unnecessary buildup of diesel particulates or soot in the exhaust filter system;

1. Utilize the Automatic (AUTO) Exhaust Filter Cleaning mode.
2. Avoid operating for extended periods unloaded.
3. Use Atlas copco “PAROIL E mission Green Low SAPS” engine oil.
4. Use only ultra low sulfur fuel.

In addition to soot, ash deposits will also slowly build up in the DPF and cannot be removed through the engine exhaust filter cleaning process.

When the exhaust filter has run several thousand hours, these ash deposits can restrict engine performance due to increased back pressure.

To correct this situation, replace the exhaust filter or have the exhaust filter cleaned in specialized equipment.

Do not power wash the filter assembly when external skin temperature of assembly exceeds 50° C (120° F).

DIESEL PARTICULATE FILTER MAINTENANCE AND SERVICE

The Exhaust Filter includes the Diesel Oxidation Catalyst (DOC) and Diesel Particulate Filter (DPF). The DPF is designed to retain residual ash, which is a noncombustible result of additives used in crankcase lubrication oils and the fuel. The DPF provides many hours of maintenance free operation. At some point the DPF will require professional service to remove the accumulated ash. The exact number of hours of operation before service is required will vary depending upon the engine’s power category, duty cycle and operating conditions, engine oil ash content, and fuel quality.

The exhaust filter’s dash lamp indicator or the dignostic codes will indicate when the DPF needs ash removal service.

The removal of DPF ash must be done by removing the DPF from the machine and placing it into specialized equipment. Do not remove ash by using water or other chemicals. Removing ash by these methods may damage the material securing the DPF in its canister, resulting in the loosening of the DPF element in the canister and subjecting it to damage from vibration.

EXHAUST FILTER / DIESEL PARTICULATE FILTER ASH HANDLING AND DISPOSAL

Under federal, state, and/or local laws or regulations, Diesel Particulate Filter ash may be classified as a hazardous waste. Hazardous wastes must be disposed of in accordance with all applicable federal, state and local laws or regulations governing hazardous waste disposal. Only a qualified service provider should remove ash from the DPF. Personal protective equipment and clothing, maintained in a sanitary and reliable condition, should be used when handling and cleaning a DPF. See your John Deere dealer or qualified service provider for assistance.

EXHAUST FILTER DISPOSAL

Proper management of an Exhaust Filter that has reached the end of its useful life is required, since the ash or catalyst material in the device may be classified as hazardous waste under federal, state, and/orlocal laws or regulations. Used Exhaust Filters,which include the Diesel Particulate Filter,may be exchanged at any Engine manufacturer’s dealeror qualified service provider.

See Engine operator’s manual for further information regarding the Exhaust Filter.

Connecting the generator

Precautions for non-linear and sensitive loads

Non-linear loads draw currents with high contents in harmonics, causing distortion in the wave form of the voltage generated by the alternator.

The most common non-linear, 3-phase loads are thyristor/ rectifier-controlled loads, such as convertors supplying voltage to variable speed motors, uninterruptable power supplies and Telecom supplies. Gas-discharge lighting arranged in single-phase circuits generate high 3rd harmonics and risk for excessive neutral current.

Loads most sensitive to voltage distortion include incandescent lamps, discharge lamps, computers, X-ray equipment, audio amplifiers and elevators.

Consult Atlas Copco for measures against the adverse influence of non-linear loads.

Quality, minimum section and maximum length of cables

The cable connected to the terminal board of the generator must be selected in accordance with local legislation. The type of cable, its rated voltage and current carrying capacity are determined by installation conditions, stress and ambient temperature. For flexible wiring, rubber-sheathed, flexible core conductors of the type H07 RN-F (Cenelec HD.22) or better must be used.

The following table indicates the maximum allowable 3-phase currents (in A), in an ambient temperature of 40°C, for cable types (multiple and single core PVC insulated conductors and H07 RN-F multiple core conductors) and wire sections as listed, in accordance with VDE 0298 installation method C3. Local regulations remain applicable if they are stricter than those proposed below.

Wire section	*Max. current (A)*		
(mm^2)	*Multiple core*	*Single core*	*H07 RN-F*
25	*94*	*101*	*88*
35	*114*	*123*	*110*
50	*138*	*155*	*138*
70	*176*	*191*	*170*
95	*212*	*228*	*205*
120	*245*	*273*	*239*
150	*282*	*314*	*250*
185	*323*	*358*	*313*
240	*379*	*421*	*371*
300	*429*	*477*	*428*

The lowest acceptable wire section and the corresponding maximum cable or conductor length for multiple core cable or H07 RN-F, at rated current, for a voltage drop e lower than 5% and at a power factor of 0.80, are respectively 2.5 mm² and 144 m. In case electric motors must be started, oversizing the cable is advisable.

The voltage drop across a cable can be determined as follows:

$$e = \frac{\sqrt{3} \cdot I \cdot L \cdot (R \cdot \cos\varphi + X \cdot \sin\varphi)}{1000}$$

e = Voltage drop (V)

I = Rated current (A)

L = Length of conductors (m)

R = Resistance (Ω/km to VDE 0102)

X = Reactance (Ω/km to VDE 0102)

Connecting the load

Site distribution panel

If outlet sockets are provided, they must be mounted on a site distribution panel supplied from the terminal board of the generator and in compliance with local regulations for power installations on building sites.

Protection

For safety reasons, it is necessary to provide an isolating switch or circuit breaker in each load circuit. Local legislation may impose the use of isolating devices which can be locked.

- Check whether frequency, voltage and current comply with the ratings of the generator.
- Provide for the load cable, without excessive length, and lay it out in a safe way without forming coils.
- Open the door of the control and indicator panel and the transparent door in front of the terminal board X1.
- Provide the wire ends with cable lugs suited for the cable terminals.
- Loosen the cable clamp and push the wire ends of the load cable through the orifice and clamp.
- Connect the wires to the proper terminals (L1, L2, L3, N and PE) of X1 and tighten the bolts securely.
- Tighten the cable clamp.
- Close the transparent door in front of X1.

Before starting

- With the generator standing level, check the engine oil level and top up if necessary. The oil level must be near to, but not exceed the high mark on the engine oil level dipstick.
- Check the coolant level in the expansion tank of the engine cooling system. The coolant level must be near to the FULL mark. Add coolant if necessary.
- Drain any coolant and sediment from the fuel pre-filter. Check the fuel level and top up if necessary. It is recommended to fill the tank after the day's operation to prevent coolantdamp in a nearly empty tank from condensing.
- Check the vacuum indicator of the air filter. If the red part shows completely, replace the filter element.
- Press the vacuator valve of the air filter to remove dust.
- Check the generator for leakage, tightness of wire terminals, etc. Correct if necessary.
- Check that circuit breaker Q1.1 is switched off.
- Check that fuse F10 has not tripped and that the emergency stop is in the OUT position.
- Check that the load is switched off.
- Check that the earth fault protection (N13) has not tripped (reset if necessary).

Operating Qc1002™

Starting Qc1002™

To start up the unit locally, proceed as follows:

- Switch on the battery switch.
- Switch off circuit breaker Q1.1. This is not necessary when a plant contactor is installed between Q1.1 and the load.
- Put the starter switch S20 in position I (ON). Voltage is applied to the Qc1002™ module.
- The unit can be started manually by pressing the START button on the Qc1002™ module.
- The unit starts a preheating cycle which takes 12 seconds.
- After the preheating period, the unit will start. The starting attempt will take maximum 12 seconds.
- Switch on circuit breaker Q1.1 in case no contactor is installed.

To start up the unit from a remote location, proceed as follows:

- Put the starter switch S20 in position I (ON). Voltage is applied to the Qc1002™ module.
- The unit can be started from a remote location by pressing the remote mode button  on the Qc1002™ module.
- Switch on circuit breaker Q1.1.
- Put the remote start/stop switch in position start.
- The unit starts a preheating cycle which takes 12 seconds.
- After the preheating period, the unit will start. The starting attempt will take maximum 12 seconds.

During operation Qc1002™

Following points should be carried out regularly:

- Check the engine gauges and the lamps for normal readings.

Avoid to let the engine run out of fuel. If it happened, priming will speed up the starting.

- Check for leakage of oil, fuel or coolant.
- Avoid long low-load periods (< 30%). In this case, an output drop and higher oil consumption of the engine could occur.
- Check, by means of the generator gauges, that the voltage between the phases is identical and that the rated current in the third phase (L3) is not exceeded.
- When single-phase loads are connected to the generator output terminals, keep all loads well-balanced.

If circuit breakers are activated during operation, switch off the load and stop the generator. Check and, if necessary, decrease the load.

The generator's doors may only remain opened for short periods during operation, to carry out checks for example.

Stopping Qc1002™

To stop the unit locally, proceed as follows:

- Switch off the load.
- Switch off circuit breaker Q1.1.
- Let the engine run for about 5 minutes.
- Stop the engine by using the STOP button on the Qc1002™ module.
- Put the starter switch S20 in position O (OFF) to shut down the voltage apply towards the Qc1002™ module.
- Lock the side doors and the door of the indicators and control panel to avoid unauthorized access.

To stop the unit when the starter switch is in position  , proceed as follows:

- Switch off the load.
- Stop the engine by putting the remote start/stop switch in position stop or by using the STOP button on the Qc1002™ module. When the unit is stopped with the STOP button in Remote Mode, it will automatically go to Manual Mode.
- Put the starter switch S20 in position O (OFF) to shut down the voltage apply towards the Qc1002™ module.
- Lock the side doors and the door of the indicators and control panel to avoid unauthorized access.

Operating Qc4002™

Starting Qc4002™

- Turn the battery switch to ON.
- Turn the S20 button to the ON position, this will activate the Qc4002™ Controller.
- Select the correct application type and the correct mode on the Qc4002™ module (see "Overview of applications" on page 33 for the possible selections).
- Make the correct wirings and program the applicable parameters (see "Standard applications" on page 30 for more details).
- When in SEMI-AUTO mode, use the START button to start-up the generator. The GB button cannot be used to close the generator breaker.
- When in AUTO mode, the generator will start-up automatically and close the contactors depending on the selected application.

The START button, the GB-close button and the MB-close button cannot be used in AUTO mode.

During operation Qc4002™

Following points should be carried out regularly:

- Check the display for normal readings.

Avoid letting the engine run out of fuel. If this happens, priming will speed up the starting.

- Check for leakage of oil, fuel or cooling water.
- Avoid long low-load periods (< 30%). In this case, an output power drop and higher oil consumption of the engine could occur. It is recommended to operate the generator at full load capacity immediately after any low load operating period.
- When single-phase loads are connected to the generator output terminals, keep all loads well-balanced.

Never turn the optional battery switch to OFF during operation.

If circuit breaker Q1.1 trips off during operation, switch off the load and stop the generator. Check and, if necessary, decrease the load.

The generator's side doors may only remain opened for short periods during operation, to carry out checks for example.

Stopping Qc4002™

- When in SEMI-AUTO mode, use the STOP button to stop the generator. The GB button will work to open the GB.
- When in AUTO mode, the STOP and GB button will not function. The generator shuts down automatically depending on the selected application

If you want to stop the generator manually, use the S20 button or the emergency stop button.

Maintenance

Maintenance schedule

Before carrying out any maintenance activity, check that the start switch is in position O and that no electrical power is present on the terminals.

Maintenance schedule	Daily	Every 500 hours or yearly	Every 1000 hours
Service pak	-	1310 3129 83	1310 3129 84
For the most important subassemblies, Atlas Copco has developed service kits that combine all wear parts. These service kits offer you the benefits of genuine parts, save on administration costs and are offered at reduced price, compared to the loose components. Refer to the parts list for more information on the contents of the service kits.			
Check air/fuel/coolant & oil leakage	x	x	x
Check oil and coolant level	x	x	x
Check coolers	x	x	x
Clean coolers externally	x	x	x
Check condition of cooling fan assembly	x	x	x
Drain water in fuel filter	x	x	x
Clean air cleaner and dust bowl	x	x	x
Check electrolyte level and terminals of battery		x	x
Check oil and coolant level		x	x
Check tension and condition of the drive belt		x	x
Check conditions of the engine drive belts (1)		x	x
Grease door hinges and locks		x	x
Replace engine oil (2)		x	x
Replace engine oil filters		x	x
Replace engine oil filter (bypass)		x	x
Replace engine fuel filter element		x	x
Replace engine fuel prefilter element		x	x
Replace fuel prefilter element (3)		x	x
Replace fueltank filter (3)		x	x
Change air filter element		x	x
Replace safety cartridge		x	x
Check alternator and starter motor		x	x
Check electrical system: security of cables and wear		x	x
Grease mechanical links		x	x
Check condition of vibration dampers		x	x

Measure alternator insulation resistance		x	x
Check glycol level in coolant (4)		x	x
Check PH level of engine coolant (4)		x	x
Clean turbocharger impeller casing and turbocharger compressor casing			x
Check valve clearance (5)			x
Inspection by Atlas Copco Service technician	⚠	**Generators in standby application have to be tested on a regular basis. At least once a month the engine should run for one hour. If possible a high load (> 30%) should be applied so that the engine reaches its operating temperature.**	

Notes:

In highly dusty environments, these service intervals do not apply. Check and/or replace filters and clean radiator on a regular basis.

(1) Drive belts need to be replaced every 2000 running hours or 36 months:
Alternator belt: AC partnumber 2914 9848 00
Fan belt: AC partnumber 2914 8398 00

(2) It is also recommanded to replace the engine oil after the first 150 running hours.

(3) On the 24 hrs fuel tank, a fueltank breather filter is installed: 2914 9975 00.
This should be replaced on 2000 hours or earlier when working in dusty environments.

(4) Renew PARcoolant every 5 years or after 10.000 running hours.
Never replace the coolant filter on the engine!

(5) When opening the rocker cover it is necessary to replace the gasket. This gasket can be ordered with AC partnumber 2914 9852 00.

Valve Clearance:

Inlet: $0.20^{+/-0.05}$ mm

Exhaust: $0.50^{+/-0.05}$ mm

Control and adjustment of valve clearance is done with an engine oil temperature between 20°C-80°C.

Engine maintenance

Refer to the engine's operator manual for full maintenance schedule.

(*) Measuring the alternator insulation resistance

A 500 V megger is required to measure the alternator insulation resistance.

If the N-terminal is connected to the earthing system, it must be disconnected from the earth terminal. Disconnect the AVR.

Connect the megger between the earth terminal and terminal L1 and generate a voltage of 500 V. The scale must indicate a resistance of at least 2 MΩ.

Refer to the alternator operating and maintenance instructions for more details.

Engine fuel specifications

For fuel specifications, please contact your Atlas Copco Customer Center.

Engine oil specifications

It is strongly recommended to use Atlas copco branded lubrication oils for both compressor and engine.

High-quality, mineral, hydraulic or synthesized hydrocarbon oil with rust and oxidation inhibitors, anti-foam and anti-wear properties is recommended.
The viscosity grade should correspond to the ambient temperature and ISO 3448, as follows.

Never mix synthetic with mineral oil.
Remark:
When changing from mineral to synthetic oil (or the other way around), you will need to do an extra rinse.
After doing the complete change procedure to synthetic oil, run the unit for a few minutes to allow good and complete circulation of the synthetic oil. Then drain the synthetic oil again and fill again with new synthetic oil. To set correct oil levels, proceed as in normal instruction.

Type of lubricant	Engine
between -10°C (14°F) and 50°C (122°F)	PAROIL E mission Green

ENGINE OIL

PAROIL from Atlas copco is the ONLY oil tested and approved for use in all engines built into Atlas copco compressors and generators.

Extensive laboratory and field endurance tests on Atlas copco equipment have proven PAROIL to match all lubrication demands in varied conditions. It meets stringent quality control specifications to ensure your equipment will run smoothly and reliably.

The quality lubricant additives in PAROIL allow for extended oil change intervals without any loss in performance or longevity.

PAROIL provides wear protection under extreme conditions. Powerful oxidation resistance, high chemical stability and rust- inhibiting additives help reduce corrosion, even within engines left idle for extended periods.

PAROIL contains high quality anti-oxidants to control deposits, sludge and contaminants that tend to build up under very high temperatures. PAROIL's detergent additives keep sludge forming particles in a fine suspension instead of allowing them to clog your filter and accumulate in the valve/rocker cover area.

PAROIL releases excess heat efficiently, whilst maintaining excellent bore-polish protection to limit oil consumption.

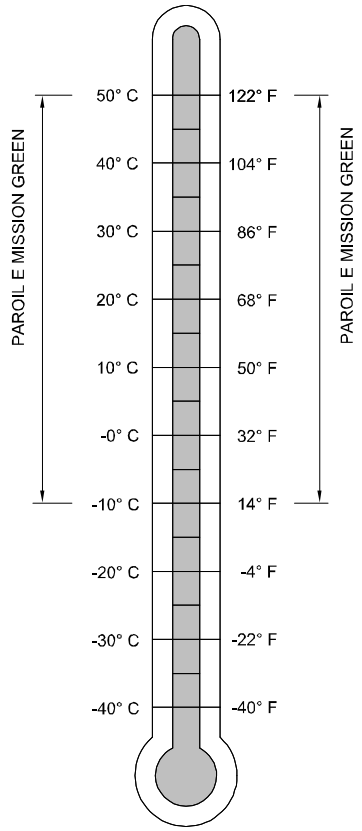
PAROIL has an excellent Total Base Number (TBN) retention and more alkalinity to control acid formation.

PAROIL prevents soot build-up.

PAROIL E mission Green is optimized for the latest low emission EURO -3 & -2, EPA TIER II & TIER III & IT4 engines running on low sulphur diesel for lower oil and fuel consumption.

Mineral engine oil PAROIL E mission Green Low SAPS Engine oil.

	Liter	US gal	Order number
can	5	1.3	1630 0471 00
can	20	5.3	1630 0472 00
barrel	210	55.2	1630 0473 00



Engine oil level check

Consult the Engine Operation Manual for the oil specifications, viscosity recommendations and oil change intervals.

For intervals, see section “Maintenance schedule” on page 42.

Check engine oil level according to the instructions in the Engine Operation Manual and if necessary top up with oil.

Engine oil and oil filter change

The table below shows the oil change interval according to the sulfur content in the fuel.

Sulfur content in fuel, by weight		
<0.5%	*0.5-1.0%*	*>1.0%*
Oil change interval, reached first in operation		
500h / 12 months	*250h / 12 months*	*125h / 12 months*

Engine coolant specifications

Never remove the cooling system filler cap while coolant is hot.
The system may be under pressure. Remove the cap slowly and only when coolant is at ambient temperature. A sudden release of pressure from a heated cooling system can result in personal injury from the splash of hot coolant.
It is strongly recommended to use Atlas Copco branded coolant.

The use of the correct coolant is important for good heat transfer and protection of liquid-cooled engines. Coolants used in these engines must be mixtures of good quality water (distilled or de-ionised), special coolant additives and if necessary freeze protection. Coolant that is not to manufacturer's specification will result in mechanical damage of the engine.

The freezing point of the coolant must be lower than the freezing point that can occur in the area. The difference must be at least 5°C. If the coolant freezes, it may crack the cylinder block, radiator or coolant pump.

Consult the engine's operation manual and follow the manufacturer's directions.

Never mix different coolants and mix the coolant components outside the cooling system.

Never replace the coolant filter on the engine! Just replace the coolant every 5 years or after 10.000 running hours.

Specifications PARCOOL EG

PARCOOL EG is the only coolant that has been tested and approved by all engine manufacturers currently in use in Atlas Copco compressors and generators.

Atlas Copco's PARCOOL EG extended life coolant is the new range of organic coolants purpose designed to meet the needs of modern engines. PARCOOL EG can help prevent leaks caused by corrosion. PARCOOL EG is also fully compatible with all sealants and gasket types developed to join different materials used within an engine.

PARCOOL EG is a ready to use Ethylene Glycol based coolant, premixed in an optimum 50/50 dilution ratio, for antifreeze protection guaranteed to -40°C.

Because PARCOOL EG inhibits corrosion, deposit formation is minimized. This effectively eliminates the problem of restricted flow through the engine coolant ducts and the radiator, minimizing the risk for engine overheating and possible failure.

It reduces water pump seal wear and has excellent stability when subjected to sustained high operating temperatures.

PARCOOL EG is free of nitride and amines to protect your health and the environment. Longer service life reduces the amount of coolant produced and needing disposal to minimise environmental impact.

	Liter	US gal	Imp gal	cu.ft	Order number
can	*5*	*1.3*	*1.1*	*0.175*	*1604 5308 00*
can	*20*	*5.3*	*4.4*	*0.7*	*1604 5307 01*
barrel	*210*	*55.2*	*46*	*7.35*	*1604 5306 00*

To ensure protection against corrosion, cavitation and formation of deposits, the concentration of the additives in the coolant must be kept between certain limits, as stated by the manufacturer's guidelines. Topping up the coolant with water only, changes the concentration and is therefore not allowed.

Liquid-cooled engines are factory-filled with this type of coolant mixture.

Coolant check

Monitoring coolant condition

In order to guarantee the lifetime and quality of the product, thus to optimise engine protection, regular coolant-condition-analysis is advisable.

The quality of the product can be determined by three parameters.

Visual check

– Verify the outlook of the coolant regarding colour and make sure that no loose particles are floating around.

Long service intervals
5-year drain interval to minimize service costs (when used in accordance with the instructions).

pH measurement

– Check the pH value of the coolant using a pH-measuring device.
– The pH-meter can be ordered from Atlas Copco with part number 2913 0029 00.
– Typical value for EG = 8.6.
– If the pH-level is below 7 or above 9.5, the coolant should be replaced.

Glycol concentration measurement

– To optimise the unique engine protection features of the PARCOOL EG the concentration of the Glycol in the water should be always above 33 vol.%.
– Mixtures with more than 68 vol.% mix ratio in water are not recommended, as this will lead to high engine operating temperatures.
– A refractometer can be ordered from Atlas Copco with part number 2913 0028 00.

In case of a mix of different coolant products this type of measurement might provide incorrect values.

Topping up of coolant

– Verify if the engine cooling system is in a good condition (no leaks, clean,...).
– Check the condition of the coolant.
– If the condition of the coolant is outside the limits, the complete coolant should be replaced (see section “Replacing the coolant”).
– Always top-up with PARCOOL EG.
– Topping up the coolant with water only, changes the concentration of additives and is therefore not allowed.

Replacing the coolant

Drain

– Completely drain the entire cooling system.
– Used coolant must be disposed or recycled in accordance with laws and local regulations.

Flush

– Flush twice with clean water. Used coolant must be disposed or recycled in accordance with laws and local regulations.
– From the Atlas Copco Instruction book, determine the amount of PARCOOL EG required and pour into the radiator top tank.
– It should be clearly understood that the risk for contamination is reduced in case of proper cleaning.
– In case a certain content of ‘other’ coolant remains in the system, the coolant with the lowest properties influences the quality of the ‘mixed’ coolant.

Fill

– To assure proper operation and the release of trapped air, run the engine until normal engine operation temperature is reached. Turn off the engine and allow to cool.
– Recheck coolant level and add if necessary.

Storage of the generator

Storage

– Store the generator in a dry, frost-free room which is well ventilated.

– Run the engine regularly, e.g. once a week, until it is warmed up. If this is impossible, extra precautions must be taken:

  • Consult the engine's operator manual.

  • Remove the battery. Store it in a dry, frost-free room. Keep the battery clean and its terminals lightly covered with petroleum jelly. Recharge the battery regularly.

  • Clean the generator and protect all electrical components against moisture.

  • Place silica gel bags, VCI paper (Volatile Corrosion Inhibitor) or another drying agent inside the generator and close the doors.

  • Stick sheets of VCI paper with adhesive tape on the bodywork to close off all openings.

  • Wrap the generator, except the bottom, with a plastic bag.

Preparing for operation after storage

Before operating the generator again, remove the wrapping, VCI paper and silica gel bags and check the generator thoroughly (go through the checklist "Before starting" on page 39).

– Consult the engine's operator manual.

– Check that the insulation resistance of the generator exceeds 2 MΩ.

– Replace the fuel filter and fill the fuel tank. Vent the fuel system.

– Reinstall and connect the battery, if necessary after being recharged.

– Submit the generator to a test run.

Checks and trouble shooting

Never perform a test run with connected power cables. Never touch an electrical connector without a voltage check.
When a failure occurs, always report what you experienced before, during and after the failure. Information with regard to the load (type, size, power factor, etc.), vibrations, exhaust gas colour, insulation check, odours, output voltage, leaks and damaged parts, ambient temperature, daily and normal maintenance and altitude might be helpful to quickly locate the problem. Also report any information regarding the humidity and location of the generator (e.g. close to sea).

Checking voltmeter P4

- Put a voltmeter in parallel with voltmeter P4 on the control panel.
- Check that the read-out of both voltmeters is the same.
- Stop the generator and disconnect one terminal.
- Check that the internal resistance of the voltmeter is high.

Checking ammeters P1, P2 and P3

- Measure the outgoing current during the load, by means of a clamp-on probe.
- Compare the measured current with the current indicated on ammeter. Both readings should be the same.

Engine troubleshooting

- Refer to the engine's operator manual for the engine troubleshooting. An extensive Engine troubleshooting manual is available at John Deere Penta. For more information contact John Deere Penta.

Alternator troubleshooting

Symptom	*Possible cause*	*Corrective action*
Alternator gives 0 Volt	Blown fuse.	Replace fuse.
	No residual voltage.	Excite the alternator by applying a 12V battery voltage with a 30 Ω resistor in series on the + and - terminals of the electronic regulator, respecting the polarities.
After being excited the alternator still gives 0 Volt.	Connections are interrupted.	Check connection cables, measure winding resistances and compare with values mentioned in the alternator manual.
Low voltage at no load	Voltage potentiometer out of setting.	Reset voltage.
	Intervention of protection.	Check frequency/voltage regulator.
	Winding failure.	Check windings.
High voltage at no load	Voltage potentiometer out of setting.	Reset voltage.
	Failed regulator.	Substitute regulator.
Lower than rated voltage at load	Voltage potentiometer out of setting.	Reset voltage potentiometer.
	Intervention by protection.	Current too high, power factor lower than 0.8; speed lower than 10% of rated speed.
	Failed regulator.	Substitute regulator.
	Rotating bridge failure.	Check diodes, disconnect cables.
Higher than rated voltage at load	Voltage potentiometer out of setting.	Reset voltage potentiometer.
	Failed regulator.	Substitute regulator.
Unstable voltage	Speed variation in engine.	Check regularity of rotation.
	Regulator out of setting.	Regulate stability of regulator by acting on STABILITY potentiometer.

Options available for QAS 250-330 John Deere units

Circuit diagrams

The engine control circuit diagrams and the power circuit diagrams for the standard QAS 250-330 John Deere units, for the units with options and for the units with combined options are:

Power circuit

Unit	*Circuit*
QAS 250-330	1310 3200 11
QAS 250-330 Qc4002™	1310 3200 24

Controller circuit

Unit	*Circuit*
QAS 250-330 Qc1002™	1310 3200 12
QAS 250-330 Qc4002™	1310 3200 25

Overview of the electrical options

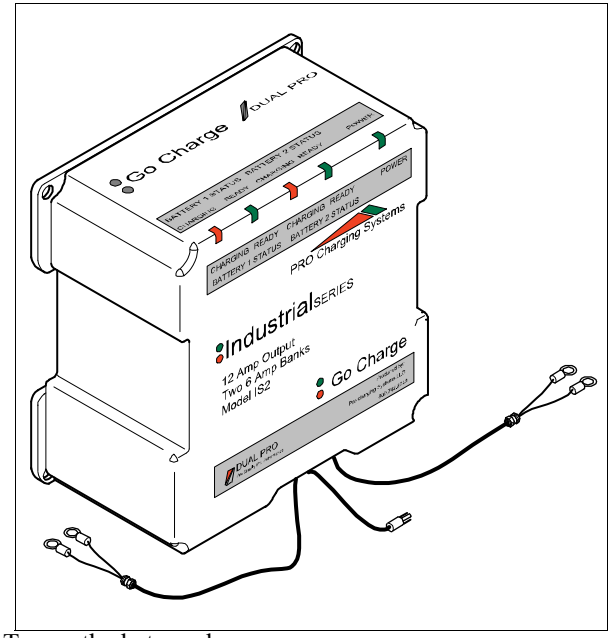
The following electrical options are available:

- Automatic battery charger
- Engine coolant heater
- Outlet sockets (S)
- Triple voltage (3V)

Description of the electrical options

Automatic battery charger

The automatic battery charger charges the battery when external power is provided via the X7 connection. When the battery is fully charged the charger automatically changes to maintenance mode and provides a trickle charge to maintain the battery level. The charger has LED's on the front panel to identify when power is applied to the charger and when the batteries are being charged.



To use the batery charger:

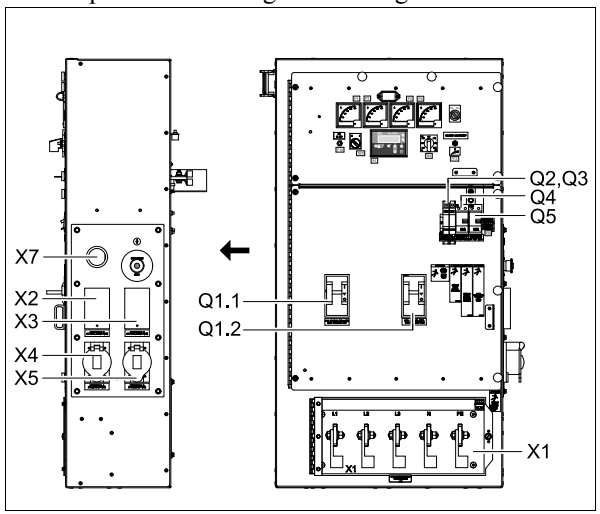
- Provide external power (120V) to the X7 connector, located on the side of the power cubicle.

Engine coolant heater

To make sure that the engine can start and accept load immediately, an external cooling water heater (1500 W, 120 V) is provided which keeps the engine temperature between 38°C and 49°C.

Outlet sockets (S)

A brief description of all outlet sockets and circuit breakers provided on the generator is given hereafter:



Q1.1 and Q1.2 Circuit breaker for X1

Interrupts the power supply X1 when a short-circuit occurs at the load side, or when the overcurrent protection is activated. When activated, Q1.1 and Q1.2 interrupts the three phases towards X1. It must be reset manuallly after eliminating the problem.

Q2.....Circuit breaker for X2

Interrupts the power supply to X2 when a short-circuit occurs at the load side, or when the overcurrent protection (16 A) is activated. When activated, Q2 interrupts one phase (L3) towards X2. It can be activated again after eliminating the problem.

Q3.....Circuit breaker for X3

Interrupts the power supply to X3 when a short-circuit occurs at the load side, or when the overcurrent protection (125 A) is activated. When

activated, Q3 interrupts the three phases towards X3. It can be activated again after eliminating the problem.

Q4 .... Circuit breaker for X4

Interrupts the power supply to X4 when a short-circuit occurs at the load side, or when the overcurrent protection is activated. When activated, Q4 interrupts the three phases towards X4. It can be activated again after eliminating the problem.

Q5 .... Circuit breaker for X5

Interrupts the power supply to X5 when a short-circuit occurs at the load side, or when the overcurrent protection is activated. When activated, Q5 interrupts the three phases towards X5. It can be activated again after eliminating the problem.

X1..... Terminal board

Provides a more easy connection of cables.

X2..... 1-phase outlet socket (120 V)

Provides phase L2, neutral and earthing.

X3..... 1-phase outlet socket (120 V)

Provides phase L1, neutral and earthing.

X4..... 2-phase outlet socket (120/240 V)

Provides phases L1, L2, neutral and earthing.

X5..... 2-phase outlet socket (120/240 V)

X7..... External Power connection. 120V power used to provide power to the factory standard coolant heater and the optional battery charger.

Circuit breaker Q1.1 and Q1.2 does not only interrupt the power supply towards socket X1 but also towards X2, X3, X4 and X5.
Make sure to switch on circuit breakers Q1.1 and Q1.2, Q2, Q3, Q4 and Q5 after starting the generator when power supply is done by means of X2, X3, X4 and X5.

Triple voltage (3V)

The generator can run in three different modes:

– 1 phase

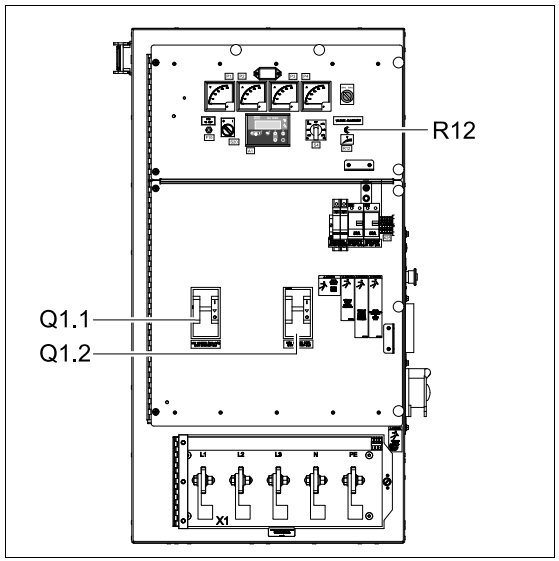
When using this selection, the generator provides a 120/240 V output voltage.

– 3 phase, lower voltage

When using this selection, the generator provides a 208/240 V output voltage.

– 3 phase, higher voltage

When using this selection, the generator provides a 416/480 V output voltage.



Q1.1 . Circuit breaker for low voltage, high current

Interrupts the low voltage power supply towards X1 when a short-circuit occurs at the load side or when the overcurrent protection is activated. It must be reset manually after eliminating the problem.

Q1.2 . Circuit breaker for high voltage, low current

Interrupts the high voltage power supply towards X1 when a short-circuit occurs at the load side or when the overcurrent protection is activated. It must be reset manually after eliminating the problem.

R12... Output voltage adjust potentiometer

Allows to adjust the output voltage.

Depending on which mode the generator is running in, circuit breaker Q1.1 or Q1.2 will be operational.

Circuit breakers Q1.1 and Q1.2 cannot be switched on at the same time. This is prevented by means of the auxiliary voltage selection relays S10b and S10c (refer to the circuit diagram).

The selection between the three modes is done by means of S10.

S10... Output voltage selection switch

Allows to select a 1 phase output voltage, a 3 phase high output voltage or a 3 phase low output voltage. Selector switch S10 is located on the alternator.

Changing the output voltage is only allowed after shutdown.
After changing the output voltage by means of the selection switch S10, adjust the output voltage by means of potentiometer R12 to the required value.

Overview of the mechanical options

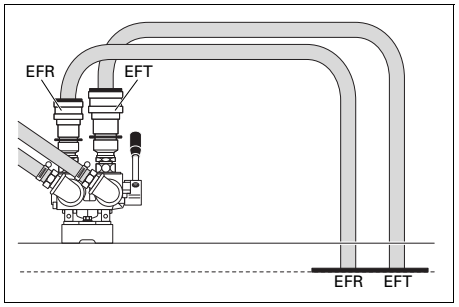
The following mechanical options are available:

– Quick couplings
– Technical specifications
– Technical specifications

Desciption of the mechanical options

Quick couplings

The option Quick couplings allows to bypass the internal fueltank and to connect an external fueltank to the unit.



EFT	External fuel tank connection
EFR	External fuel tank return connection

Make sure that:

– the big size coupling is used for the inlet.
– the small size coupling is used for the outlet.

An extra clamp needs to be used to guide the fuellines.

Technical specifications

Technical specifications for QAS 250 JD T4i

Readings on gauges

Gauge	*Reading*	*Unit*
Ammeter L1-L3 (P1-P3)	Below max. rating	A
Voltmeter (P4)	Below max. rating	V

Settings of switches

Switch	*Function*	*Activates at*
Engine oil pressure	Shut down	0.5 bar
Engine coolant temperature	Shut down	103°C

Specifications of the engine/alternator/unit

		60 Hz
Reference conditions 1) 4)	Rated frequency	60 Hz
	Rated speed	1800 rpm
	Generator service duty	PRP
	Absolute air inlet pressure	100 kPa
	Relative air humidity	30%
	Air inlet temperature	25°C
Limitations 2)	Maximum ambient temperature	50°C
	Altitude capability	4000 m
	Maximum relative air humidity	85%
	Minimum starting temperature unaided	0°C
	Minimum starting temperature with coolant heater	-25°C
Performance data 2) 3) 4) 5)	Rated active power (PRP) 3ph	182.4 kW
	Rated active power (PRP) 3ph, lower voltage (optional)	182.4 kW
	Rated active power (PRP) 1ph	131.6 kW
	Rated power factor (lagging) 3ph	0.8 cos ϕ
	Rated power factor (lagging) 1ph	1.0 cos ϕ
	Rated apparent power (PRP) 3ph	228 kVA
	Rated apparent power (PRP) 3ph, lower voltage (optional)	228 kVA
	Rated apparent power (PRP) 1ph	131.6 kVA
	Rated voltage 3ph line to line	480 V
	Rated voltage 3ph line to line lower voltage (optional)	208 V
	Rated voltage 1ph	240 V
	Rated current 3ph	274.2 A

		60 Hz
	Rated current 3ph lower voltage (optional)	632.9
	Rated current 1ph	549
	Performance class (acc.ISO 8528-5:1993)	G2
	Single step load acceptance (0-PRP)	70% 78.4 kW
	Frequency droop	isochronous
	Fuel consumption at 0% load	5.77 kg/h
	Fuel consumption at 50% load	21.45 kg/h
	Fuel consumption at 75% load	29.61 kg/h
	Fuel consumption at full load (100%)	38.86 kg/h
	Specific fuel consumption at full load (100%)	0.22 kg/kWh
	Fuel autonomy at full load	37 h
	Max. oil consumption at full load	-
	Maximum sound power level (LPA) measured according to Atlas copco spec. 9822087700	74 dB(A)
	Useful capacity of fuel tank	450 gal
	Single step load capability (O-PRP)	100% 182.4 kW
Application data	Mode of operation	PRP
	Site	land use
	Operation	single/parallel
	Start-up and control mode	manual/automatic
	Start-up time	unspecified
	Mobility/Config. acc. to ISO 8528-1:1993	transportable/D mobile/E
	Mounting	fully resilient
	Climatic exposure	open air
	Degree of protection (Cubicle)	IP 54
	Status of neutral	earthed
Alternator	Standard	IEC 60034 ISO 8528-3
	Make	LEROY SOMER
	Model	LSA 46.2 M5
	Rated output, class H temperature rise	250 kVA
	rating type acc. ISO 8528-3	“BR” 125/40°C
	Degree of protection	IP 23
	Insulation stator class	H
	Insulation rotor class	H
	Number of wires	12

Technical specifications for QAS 250 JD T4i

		60 Hz
Engine	Standard	ISO 3046 ISO 8528-2
	Make	John Deere
	Model	6090HFG94
	Rated net output	237 kW
	rating type acc. ISO 3046-7	ICXN
	Coolant	water
	Combustion system	direct injection
	Aspiration	turbocharged intercooled
	Number of cylinders	6
	Swept volume	9
	Speed governing	electronic HPCR
	Capacity of oil sump	40
	Capacity of cooling system	45.42
	Electrical system	24 Vdc
	Emission compliance	EPA TIER 4i
Power circuit	Circuit-breaker, 3ph.	
	Number of poles	3
	Thermal release It (thermal release is higher at 25°C)	275 A
	Magnetic release Im	3 x In
	Circuit-breaker, 3ph., lower voltage (optional)	
	Number of poles	3
	Thermal release It (thermal release is higher at 25°C)	633 A
	Magnetic release Im	3,5 x In
	Outlet sockets (optional)	GFCL duplex (2x) 2p+E 20A 125V Temp Power (2x) 2p+N+E 50A 125/250V
Unit	Dimensions (LxWxH)	4020 x 1390 x 2016,8 mm
	Weight net mass	3628 kg
	Weight wet mass	4296 kg
	Dimensions (LxWxH) (optional big fuel tank)	4020 x 1390 x 2314,6 mm
	Weight net mass (optional big fuel tank)	3978 kg
	Weight wet mass (optional big fuel tank)	5472 kg

Notes

1) Reference conditions for engine performance to ISO 3046-1.

2) See derating diagram or consult the factory for other conditions.

3) At reference conditions unless otherwise stated.

4) Rating definition (ISO 8528-1):
LTP: Limited Time Power is the maximum electrical power which a generating set is capable of delivering (at variable load), in the event of a utility power failure (for up to 500 hours per year of which a maximum of 300 hours is continuous running). No overload is permitted on these ratings. The alternator is peak continuous rated (as defined in ISO 8528-3) at 25°C.
PRP: Prime Power is the maximum power available during a variable power sequence, which may be run for an unlimited number of hours per year, between stated maintenance intervals and under the stated ambient conditions. A 10% overload is permitted for 1 hour in 12 hours. The permissible average power output during a 24h period shall not exceed the stated load factor of 70%.

5) Specific mass fuel used: 0.86 kg/l.

6) Unless stated otherwise, data are given for 3ph 480 V
(a) optional equipment
(b) thermal release is higher at 25°C

Derating table (in %, 100% is declarated power at "Performance data")

Height (m)	Temperature (°C)										
	0	5	10	15	20	25	30	35	40	45	50
0	100	100	100	100	100	100	100	100	100	95	90
500	100	100	100	100	100	100	100	100	100	95	90
1000	100	100	100	100	100	100	100	100	100	95	90
1500	100	100	100	100	100	100	100	100	95	95	85
2000	95	95	95	95	95	95	95	95	95	90	85
2500	90	90	90	90	90	90	90	90	90	85	80
3000	90	90	90	90	90	90	90	90	90	85	80
3500	85	85	85	85	85	85	85	85	85	75	75
4000	85	85	85	85	85	85	85	85	85	75	75

For use of generator outside these conditions, please contact Atlas Copco.

Technical specifications for QAS 330 JD T4i

Readings on gauges

Gauge	*Reading*	*Unit*
Ammeter L1-L3 (P1-P3)	Below max. rating	A
Voltmeter (P4)	Below max. rating	V

Settings of switches

Switch	*Function*	*Activates at*
Engine oil pressure	Shut down	0.5 bar
Engine coolant temperature	Shut down	103°C

Specifications of the engine/alternator/unit

		60 Hz
Reference conditions 1) 4)	Rated frequency	60 Hz
	Rated speed	1800 rpm
	Generator service duty	PRP
	Absolute air inlet pressure	100 kPa
	Relative air humidity	30%
	Air inlet temperature	25°C
Limitations 2)	Maximum ambient temperature	50°C
	Altitude capability	4000 m
	Maximum relative air humidity	85%
	Minimum starting temperature unaided	0°C
	Minimum starting temperature with coolant heater	-25°C
Performance data 2) 3) 4) 5)	Rated active power (PRP) 3ph	264 kW
	Rated active power (PRP) 3ph, lower voltage (optional)	259 kW
	Rated active power (PRP) 1ph	198 kW
	Rated power factor (lagging) 3ph	0.8 cos ϕ
	Rated power factor (lagging) 1ph	1.0 cos ϕ
	Rated apparent power (PRP) 3ph	330 kVA
	Rated apparent power (PRP) 3ph, lower voltage (optional)	323.7 kVA
	Rated apparent power (PRP) 1ph	198 kVA
	Rated voltage 3ph line to line	480 V
	Rated voltage 3ph line to line lower voltage (optional)	208 V
	Rated voltage 1ph	240 A
	Rated current 3ph	397 A
	Rated current 3ph lower voltage (optional)	916
	Rated current 1ph	413

		60 Hz
	Performance class (acc.ISO 8528-5:1993)	G2
	Single step load acceptance (0-PRP)	70% 78.4 kW
	Frequency droop	isochronous
	Fuel consumption at 0% load	6.50 kg/h
	Fuel consumption at 50% load	30.84 kg/h
	Fuel consumption at 75% load	43 kg/h
	Fuel consumption at full load (100%)	59.26 kg/h
	Specific fuel consumption at full load (100%)	0.224 kg/kWh
	Fuel autonomy at full load	24.4 h
	Max. oil consumption at full load	-
	Maximum sound power level (LPA) measured according to Atlas copco spec. 9822087700	74 dB(A)
	Useful capacity of fuel tank	430 gal
	Single step load capability (O-PRP)	100% 264 kW
Application data	Mode of operation	PRP
	Site	land use
	Operation	single/parallel
	Start-up and control mode	manual/automatic
	Start-up time	unspecified
	Mobility/Config. acc. to ISO 8528-1:1993	transportable/D mobile/E
	Mounting	fully resilient
	Climatic exposure	open air
	Degree of protection (Cubicle)	IP 54
	Status of neutral	earthed
Alternator	Standard	IEC 60034 ISO 8528-3
	Make	LEROY SOMER
	Model	LSA 46.2 L9
	Rated output, class H temperature rise	343 kVA
	rating type acc. ISO 8528-3	“BR” 125/40°C
	Degree of protection	IP 23
	Insulation stator class	H
	Insulation rotor class	H
	Number of wires	12
Engine	Standard	ISO 3046 ISO 8528-2

		60 Hz
	Make	John Deere
	Model	6090HFG95
	Rated net output	323 kW
	rating type acc. ISO 3046-7	ICXN
	Coolant	water
	Combustion system	direct injection
	Aspiration	turbocharged
		intercooled
	Number of cylinders	6
	Swept volume	9
	Speed governing	electronic
		HPCR
	Capacity of oil sump	40
	Capacity of cooling system	45.42
	Electrical system	24 Vdc
	Emission compliance	USA TIER 4i
Power circuit	Circuit-breaker, 3ph.	
	Number of poles	3
	Thermal release It (thermal release is higher at 25°C)	400 A
	Magnetic release Im	3 x In
	Circuit-breaker, 3ph., lower voltage (optional)	
	Number of poles	3
	Thermal release It (thermal release is higher at 25°C)	900 A
	Magnetic release Im	3,5 x In
	Outlet sockets (optional)	GFCL duplex (2x) 2p+E 20A 125V Temp Power (2x) 2p+N+E 50A 125/250V
Unit	Dimensions (LxWxH)	4020 x 1390 x 2016,8 mm
	Weight net mass	3628 kg
	Weight wet mass	4296 kg
	Dimensions (LxWxH) (optional big fuel tank)	4020 x 1390 x 2314,6 mm
	Weight net mass (optional big fuel tank)	3978 kg
	Weight wet mass (optional big fuel tank)	5472 kg

Notes

1) Reference conditions for engine performance to ISO 3046-1.

2) See derating diagram or consult the factory for other conditions.

3) At reference conditions unless otherwise stated.

4) Rating definition (ISO 8528-1):
LTP: Limited Time Power is the maximum electrical power which a generating set is capable of delivering (at variable load), in the event of a utility power failure (for up to 500 hours per year of which a maximum of 300 hours is continuous running). No overload is permitted on these ratings. The alternator is peak continuous rated (as defined in ISO 8528-3) at 25°C.
PRP: Prime Power is the maximum power available during a variable power sequence, which may be run for an unlimited number of hours per year, between stated maintenance intervals and under the stated ambient conditions. A 10% overload is permitted for 1 hour in 12 hours. The permissible average power output during a 24h period shall not exceed the stated load factor of 70%.

5) Specific mass fuel used: 0.86 kg/l.

6) Unless stated otherwise, data are given for 3ph 480 V
(a) optional equipment
(b) thermal release is higher at 25°C

Derating table (in %, 100% is declarated power at "Performance data")

Height (m)	Temperature (°C)										
	0	5	10	15	20	25	30	35	40	45	50
0	100	100	100	100	100	100	100	100	100	95	90
500	100	100	100	100	100	100	100	100	100	95	90
1000	100	100	100	100	100	100	100	100	100	95	90
1500	100	100	100	100	100	100	100	100	95	95	85
2000	95	95	95	95	95	95	95	95	95	90	85
2500	90	90	90	90	90	90	90	90	90	85	80
3000	90	90	90	90	90	90	90	90	90	85	80
3500	85	85	85	85	85	85	85	85	85	75	75
4000	85	85	85	85	85	85	85	85	85	75	75

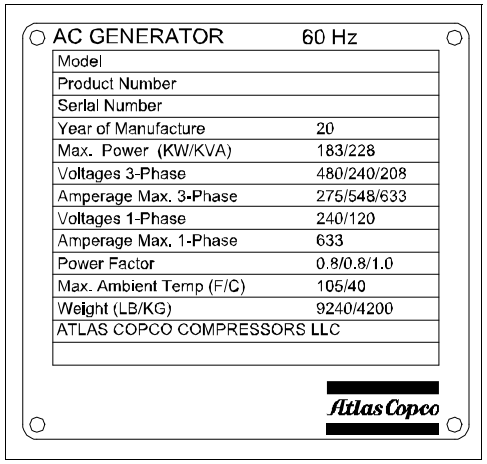
For use of generator outside these conditions, please contact Atlas Copco.

Conversion list of SI units into British units

1 bar	=	14.504 psi
1 g	=	0.035 oz
1 kg	=	2.205 lbs
1 km/h	=	0.621 mile/h
1 kW	=	1.341 hp (UK and US)
1 l	=	0.264 US gal
1 l	=	0.220 lmp gal (UK)
1 l	=	0.035 cu.ft
1 m	=	3.281 ft
1 mm	=	0.039 in
1 m^3/min	=	35.315 cfm
1 mbar	=	0.401 in wc
1 N	=	0.225 lbf
1 Nm	=	0.738 lbf.ft
$t_{°F}$	=	$32 + (1.8 \times t_{°C})$
$t_{°C}$	=	$(t_{°F} - 32)/1.8$

A temperature difference of 1°C = a temperature difference of 1.8°F.

Dataplate


AC GENERATOR
60 Hz
Model
Product Number
Serial Number
Year of Manufacture
20
Max. Power (KW/KVA)
183/228
Voltages 3-Phase
480/240/208
Amperage Max. 3-Phase
275/548/633
Voltages 1-Phase
240/120
Amperage Max. 1-Phase
633
Power Factor
0.8/0.8/1.0
Max. Ambient Temp (F/C)
105/40
Weight (LB/KG)
9240/4200
ATLAS COPCO COMPRESSORS LLC
Atlas Copco

Disposal

General

When developing products and services, Atlas Copco tries to understand, address, and minimize the negative environmental effects that the products and services may have, when being manufactured, distributed, and used, as well as at their disposal.

Recycling and disposal policy are part of the development of all Atlas Copco products. Atlas Copco company standards determine strict requirements.

Selecting materials the substantial recyclability, the disassembly possibilities and the separability of materials and assemblies are considered as well as the environmental perils and dangers to health during the recycling and disposal of the unavoidable rates of not recyclable materials.

Your Atlas Copco generator consists for the most part of metallic materials, that can be remelted in steelworks and smelting works and that is therefore almost infinite recyclable. The plastic used is labelled; sorting and fractioning of the materials for recycling in the future is forseen.

This concept can only succeed with your help. Support us by disposing professionally. By assuring a correct disposal of the product you help to prevent possible negative consequences for environment and health, that can occur with an inappropriate waste handling.
Recycling and re-usage of material helps to preserve natural resources.

Disposal of materials

Dispose contaminated substances and material separately, according to local applicable environmental legislations.

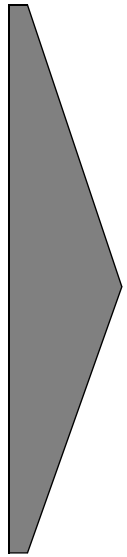
Before dismantling a machine at the end of its operating lifetime drain all fluids and dispose of according the applicable local disposal regulations.

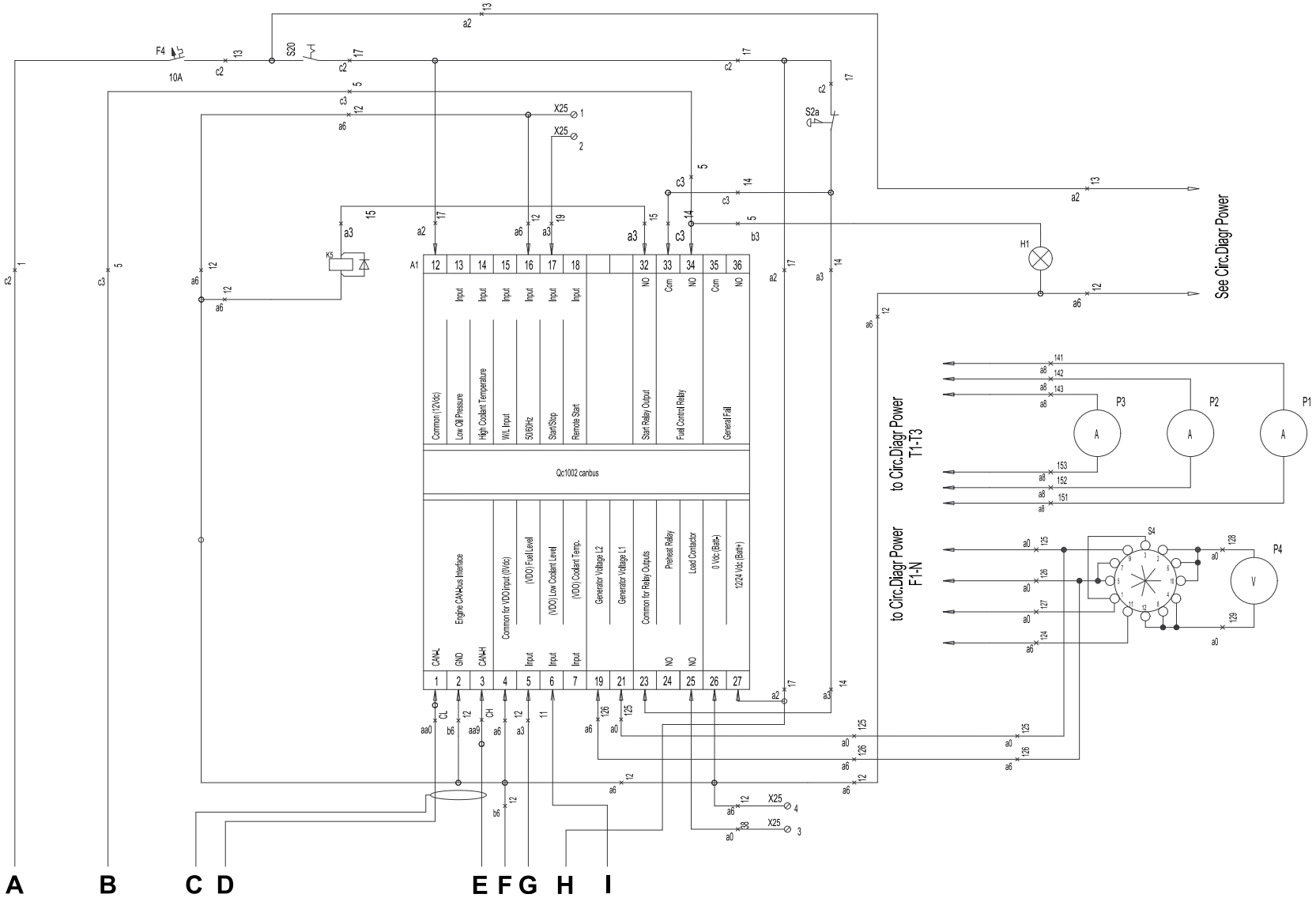
Remove the batteries. Do not throw batteries into the fire (explosion risk) or into the residual waste. Separate the machine into metal, electronics, wiring, hoses, insulation and plastic parts.

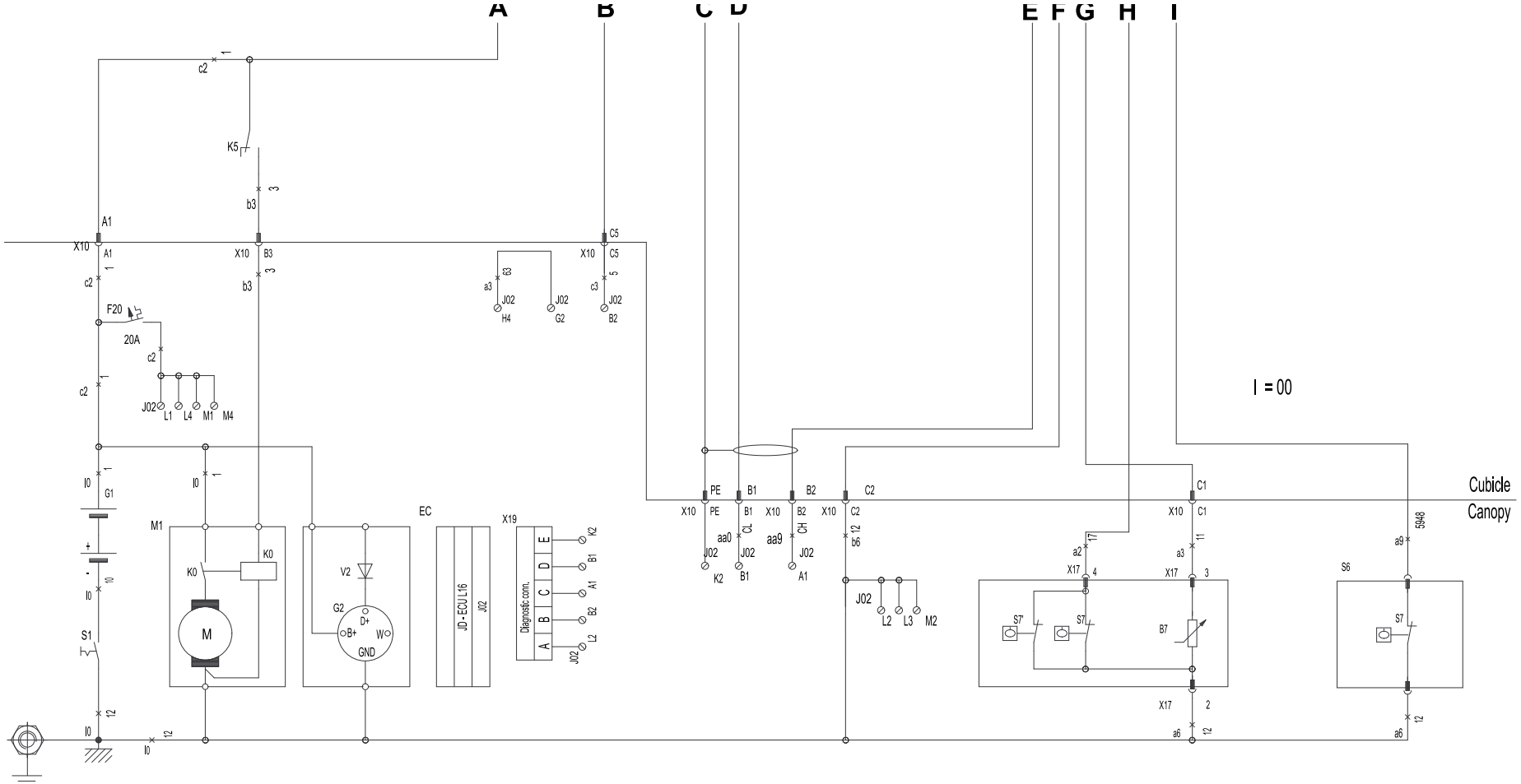
Dispose all components according to the applicable disposal regulations.

Remove spilled fluid mechanically; pick up the rest with absorbing agent (for example sand, sawdust) and dispose it according the applicable local disposal regulations. Do not drain into the sewage system or surface water.

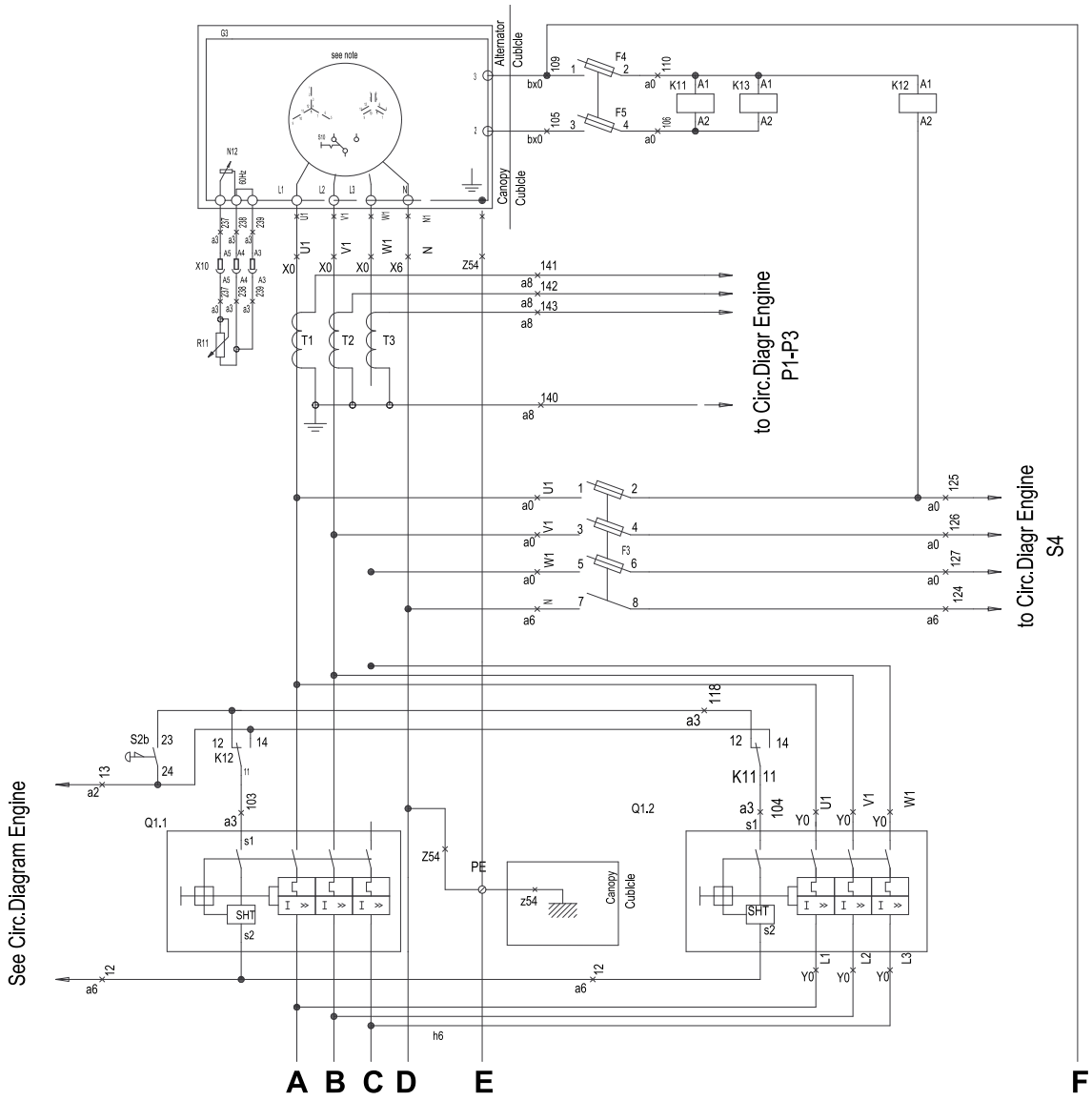
Circuit diagrams




F4
10A
S20
S2a
X25
K5
A1
Common (12Vdc)
Low Oil Pressure
High Coolant Temperature
W/L Input
50/60Hz
Start/Stop
Remote Start
Start Relay Output
Fuel Control Relay
General Fail
Qc1002 canbus
CAN-L
GND
CAN-H
Engine CANbus Interface
Common for VDO input (0Vdc)
(VDO) Fuel Level
(VDO) Low Coolant Level
(VDO) Coolant Temp.
Generator Voltage L2
Generator Voltage L1
Common for Relay Outputs
Preheat Relay
Load Contactor
0 Vdc (Batt-)
12/24 Vdc (Batt+)
H1
See Circ.Diagr Power
to Circ.Diagr Power T1-T3
to Circ.Diagr Power F1-N
P1
P2
P3
P4
S4
A
B
C D
E F G H I


A
B
C
D
E
F
G
H
I
I = 00
Cubicle
Canopy
K5
F20
20A
J02
L1
L4
M1
M4
G1
M1
K0
M
S1
V2
G2
B+
D+
W
GND
EC
JD - ECU L16
X19
Diagnostic comm.
PE
B1
B2
C2
C1
X10
X17
aa0
aa9
CL
CH
K2
A1
L2
L3
M2
B7
S7
S6
5948

Mark	Name
A1	Control Module (Configure in UNIT-type 6)
B7	Fuel Level Sensor
EC	Engine controller
F4	Fuse
F20	Fuse
G1	Battery 24V
H1	Panel Light
J02	Engine connector
K5	Starter Relay
M1	Starter Motor
P1-3	A-Meters
P4	V-meter
S1	Battery switch
S2a	Emergency Stop Button (S2b: see Power Circuit)
S4	Voltmeter change-over switch
S6	Coolant Level Switch
S7	Low Fuel Level Switch
S7	Low Fuel Level Switch, Warning
S20	ON/OFF Switch
V2	Diode
X10	Terminal strip
X17	Fuel Level Unit Connector
X19	Motor Diagnostic Plug
X25	Terminal strip

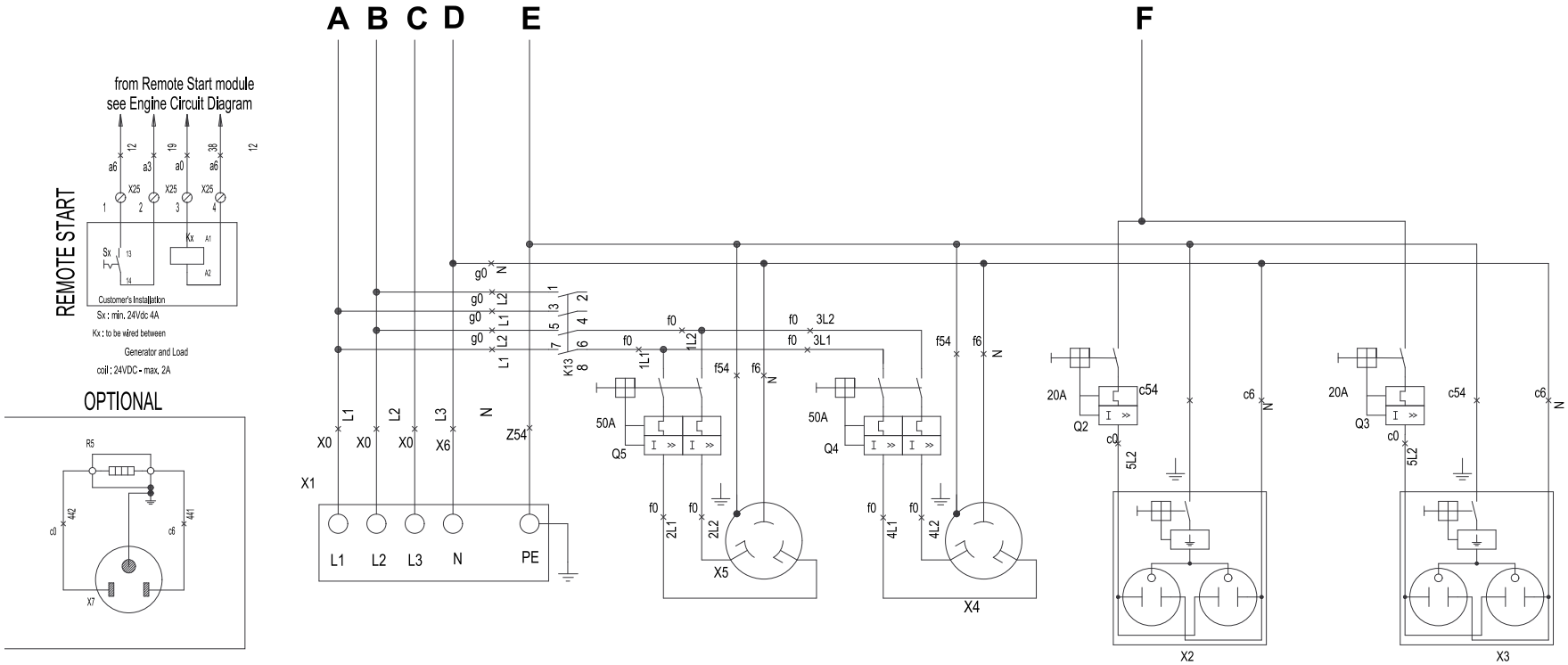


Legend

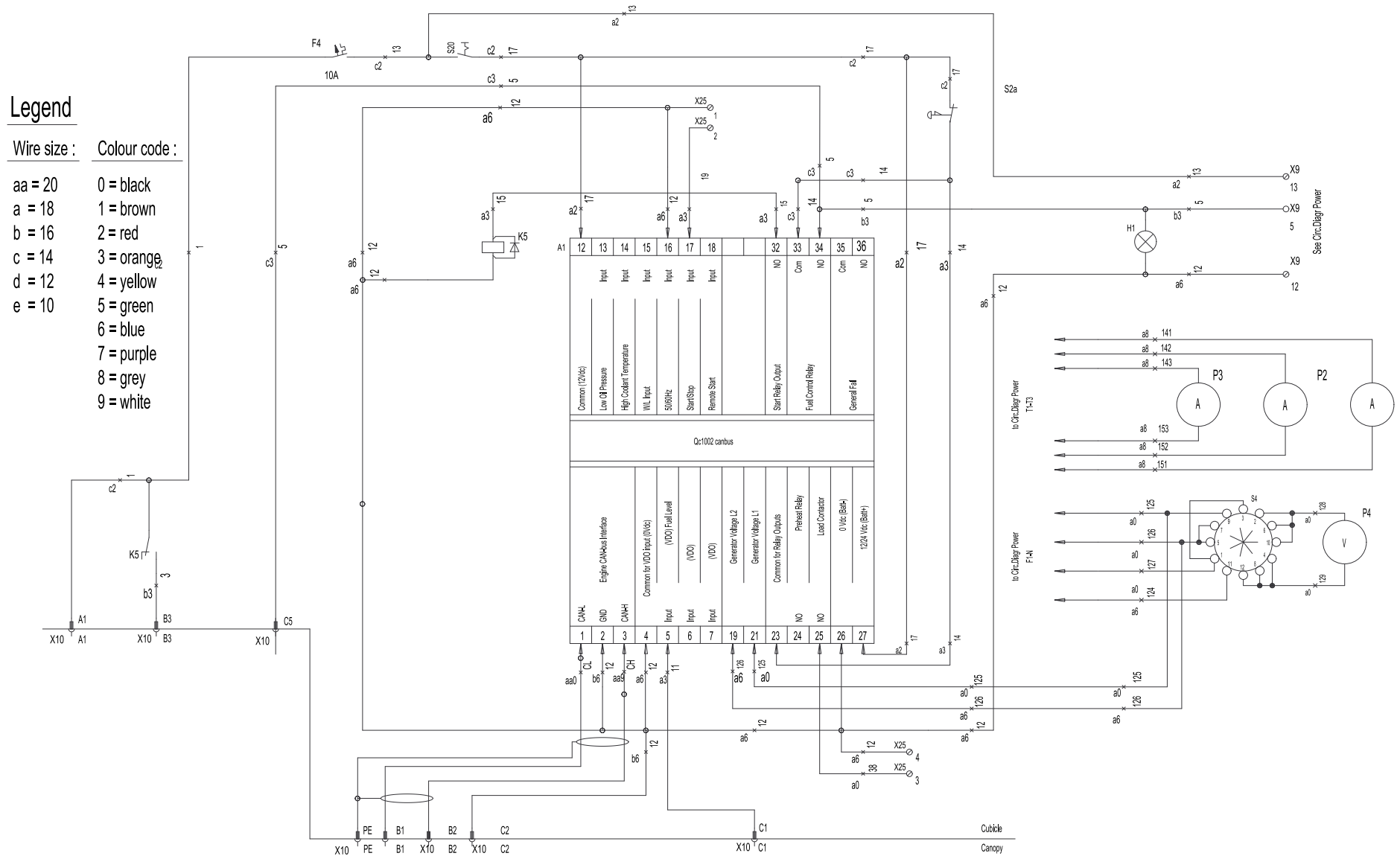
Wire size :	Colour code :
aa = 0.5mm²	0 = black
a = 1 mm²	1 = brown
b = 1.5mm²	2 = red
c = 2.5mm²	3 = orange
d = 4 mm²	4 = yellow
e = 6 mm²	5 = green
f = 10 mm²	6 = blue
g = 16 mm²	7 = purple
h = 25 mm²	8 = grey
i = 35 mm²	9 = white
j = 50 mm²	54= green/yellow
k = 70 mm²	
l = 95 mm²	
bx = 1.5 mm²	NSGAFOeU
lx = 95 mm²	EPR-CSP to BS6195 4C
px = 185 mm²	EPR-CSP to BS6195 4C

NOTE
3ph higher voltage : connect 4,7 ; 5,8 ; 6,9 ; 10, 11, 12 (N)
3ph lower voltage : connect 1,7 ; 2,8 ; 3,9 ; 4, 5, 6, 10, 11, 12 (N)

	Q1.1	Q1.2	T1-3	P1-3	Wire size		
QAS 250	300A	600A	600/5A	0-600A	X px	Y l	Z l
QAS 330	400A	900A	1000/5A	0-1000A	X px	Y l	Z l


A B C D E F
from Remote Start module
see Engine Circuit Diagram
REMOTE START
Customer's Installation
Sx : min. 24Vdc 4A
Kx : to be wired between
Generator and Load
coil : 24VDC - max. 2A
OPTIONAL
L1 L2 L3 N PE
X1
X0 X0 X0 X6 Z54
g0 N
L1 L2 L3 N
50A
Q5
Q4
Q2
Q3
20A
c54
c6
5L2
X2
X3
X4
X5
X7
R5

Mark	Name
F1,,5	Fuse 4A
G3	Alternator
K11	Aux, relay (lower volt,)
K12	Aux, relay (higher volt,)
K13	Contactor
N12	Automatic Voltage Regulator
P1-3	A-Meters
P4	V-meter
Q1,1	Circuit breaker 3pole
Q1,2	Circuit breaker 1pole
Q2	Circuit breaker 1pole
Q3	Circuit breaker 2pole
Q4	Circuit breaker 2pole
Q5	Circuit breaker 2pole
R5	Coolant Heater
R11	Voltage Adjustnent Potmeter
S2b	Emergency stop (S2a see Engine Circ.)
S4	Voltmeter change-over switch
S10	Supply voltage switch
T1,3	Current transforner
X1	Terminal board
X2	Socket outlet
X3	Socket outlet
X4	Socket outlet
X5	Socket outlet
X7	Flanged inlet
X25	Terminal strip
Sx	Remote Start/Stop
Kx	Contactor Generator Ready (15s. Delayed)


Legend
Wire size :
aa = 20
a = 18
b = 16
c = 14
d = 12
e = 10
Colour code :
0 = black
1 = brown
2 = red
3 = orange
4 = yellow
5 = green
6 = blue
7 = purple
8 = grey
9 = white
F4
10A
S20
S2a
K5
H1
P3
P2
P4
S4
Qc1002 canbus
Common (12Vdc)
Low Oil Pressure
High Coolant Temperature
W/L Input
50/60Hz
Start/Stop
Remote Start
Start Relay Output
Fuel Control Relay
General Fail
Engine CANbus Interface
Common for VDO Input (0Vdc)
(VDO) Fuel Level
Generator Voltage L2
Generator Voltage L1
Common for Relay Outputs
Preheat Relay
Load Contactor
0 Vdc (Batt-)
12/24 Vdc (Batt+)
See Circ.Diagr Power
to Circ.Diagr Power T1-T3
to Circ.Diagr Power F1-N
Cubicle
Canopy

Atlas Copco

Mark	Name
A1	Control Module
EC	Engine controller
F4	Fuse
F20	Fuse
H1	Panel Light
K5	Starter Relay
P1-3	A-Meters
P4	V-meter
S2a	Emergency Stop Button
S4	Voltmeter change-over switch
S20	ON/OFF Switch
X10	Terminal strip
X25	Terminal strip

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