Instruction Manual for AC Generators

QAS 30 Jd USA

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QAS 30 Jd

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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.

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1. Safety precautions for portable generators

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

1.1 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.

1.2 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, coolant 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.

$16b \ \textbf{Portable generators IT:}$

Note: This generator is built to supply a sheer alternating current IT network.

Earth the load properly.

1.3 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.

- 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.
- To tow a unit use a towing vehicle of ample capacity. Refer to the documentation of the towing vehicle.
- If the unit is to be backed up by the towing vehicle, disengage the overrun 3 brake mechanism (if it is not an automatic mechanism)
- 4 Never exceed the maximum towing speed of the unit (mind the local regulations).
- Place the unit on level ground and apply the parking brake before disconnecting the unit from the towing vehicle. Unclip the safety breakaway 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.
- To lift heavy parts, a hoist of ample capacity, tested and approved according to local safety regulations, shall be used.
- 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.
- 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.
- 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
- 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.

1.4 Safety during use and operation

- 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.
- 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
- 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.
- Never remove a filler cap of the coolant system of a hot engine. Wait until the engine has sufficiently cooled down.
- 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.
- 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.
- Periodically carry out maintenance works according to the maintenance schedule.
- 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.
- 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
- 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.
- 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.

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- 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.

1.5 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.
- 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.
- 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 nonflammable 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.

1.6 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.

1.7 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.
- 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.

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2. Leading particulars

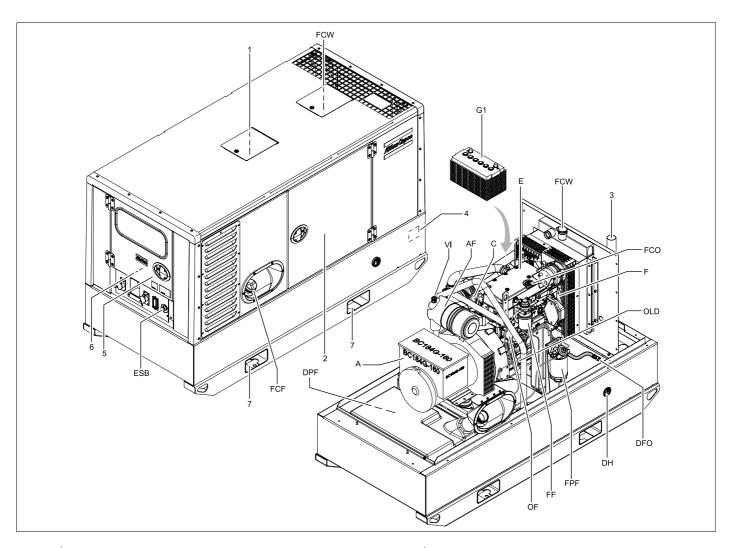
2.1 General description

The QAS 30 AC generator is 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, 240 V in line-to-line and 480 V in line-to-line.

The QAS 30 generator is driven by a fluid-cooled diesel engine, manufactured by JOHN DEERE.

An overview of the main parts is given in the diagram below.



1	Acces to lifting eye	DH	Drain and access hole (in the frame)
2	Side doors	DPF	Drain plug fuel
3	Engine exhaust	E	Engine
4	Data Plate	ESB	Emergency stop button
5	Door, access to control and indicator panel	F	Fan
6	Output terminal board	FCF	Filler cap fuel
7	Hole for forklift	FCO	Filler cap engine oil
A	Alternator	FCW	Filler cap coolant
AF	Air filter	FF	Fuel filter
C	Coupling	FPF	Fuel pre-filter
DFO	Drain flexible engine oil	G1	Battery
	'	OF	Oil filter
		OLD	Engine oil level dipstick
		VI	Vacuum indicator

2.2 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 recess in the roof has a lifting rod in the middle.



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 in the frame.

2.3 Markings

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



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 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 15W40 oil only.



Indicates the different earthing connections on the generator.



Indicates the lifting eye of the generator



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



Indicates the battery switch

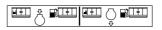




Indicates that the unit may start automatically and that the instruction book has to be consulted prior to use.



Read the instruction manual before using the lifting eye.



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.

2.4 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 flexible for engine oil can be brought to the outside of the generator through the drain hole.

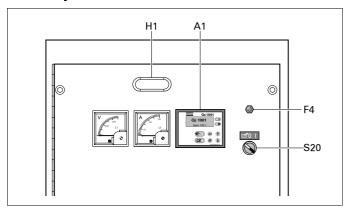


The drain hole can also be used to guide external fuel tank connections. When connecting an external fueltank, use the 3-way valves. Refer to "External fueltank connection (with/without quick couplings)".

The filler cap for the engine coolant is accessible via an opening in the roof. The fuel filler cap is located in the side panel.

2.5 Control and indicator panel Qc1001™

2.5.1 General description Qc1001™ control panel



H1..... Panel light

S20.... ON/OFF/REMOTE switch

To start up the unit (locally or remote).

DC-Fuse

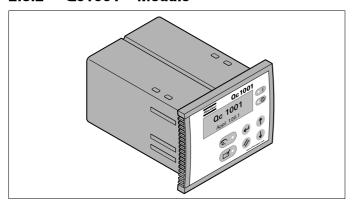
F4 Fuse

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.

Qc1001™ display

A1..... Qc1001™ display

2.5.2 Qc1001™ Module



The Qc1001TM 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 $Qc1001^{TM}$ module can be used for several applications.

2.5.3 Pushbutton and LED functions

Following pushbuttons are used on the Qc1001TM:



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



UP: Is used to scroll through the display information. This button is also active in Configuration Mode.



DOWN: Is used to scroll through the display information. This button is also active in Configuration Mode.



When **UP & DOWN** are pressed at the same time for 3s, Configuration Mode will be entered (see page 17).



BACK: Is used to leave/enter the Warnings pop-up window, to leave the Configuration Mode and to leave menu's without change.

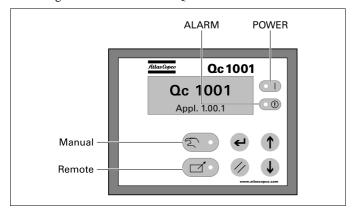


REMOTE MODE: The LED indicates if the gen-set is put in Remote Mode.



MANUAL MODE: The LED indicates if the gen-set is put in Manual Mode.

Following LEDs are used on the Qc1001TM:



Power: Green LED indicates that the unit is powered up.

Manual: Green LED indicates that the Manual Mode is

selected.

Remote: Green LED indicates that the Remote Mode is

selected.

Alarm: Flashing red LED indicates that a shutdown is

present. Continuous red LED indicates a warning. The exact warning/shutdown is shown at the

display.

2.5.4 Qc1001™ Menu Overview

At Qc1001TM, the LCD will show following information:

- in Normal condition (scroll through the information using UP and DOWN):
 - Status (eg: preheat, crank, run, cooldown, ext. stop, ...)
 - Running hours
 - Battery Voltage
 - Service Timer 1
 - Service Timer 2
 - Generator Frequency
- in Warning condition (scroll through the information using UP and DOWN):
 - a list of all active Warnings
- in Shutdown condition:
 - the cause of shutdown

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 a Warning comes up, the Warning Display is shown. If a Shutdown comes up, the Shutdown Display is shown.

View 0



This view will show the ASW version number.

When there has been no button activity for three minutes, the display will return to the Default View.

View 1 (Qc1001™-Default Display)



The frequency value is centered in the top-right corner area.

The running hours value is at the bottom-left corner. The service timer indication(s) are shown in the bottom-right corner when the service timer(s) have run out. They will disappear when the service timer(s) have been resetted.

View 2 (Fuel Level Display)



This view shows the fuel level icon.

When the English text view is selected, this view will mention: "FUEL LEVEL ***%".

When there has been no button activity for three minutes, the display will return to the Default View.

View 5 (Service Timers and Battery Voltage)

Y1	150 h
Y2	300 h
	24.0u

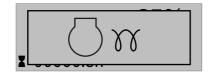
The service timer indications count upwards and give an alarm when the configured value is reached.

Resetting of the Service Timers is possible through a display Configuration Menu.

View 10 (reserved for normal English text)

In case that normal English text is selected i.s.o. icons, views 2 & 3 & 4 are changed into this three-row display format.

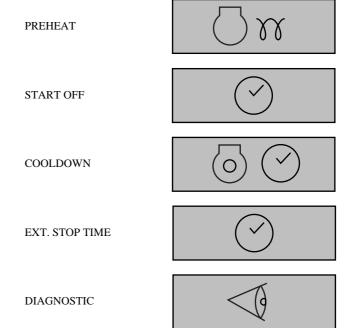
Status Display (pop-up window)



In case when 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:



If a special status has elapsed, the default view will be entered again automatically.

If a Warning comes up, the Warning Display is shown.

If a Shutdown comes up, the Shutdown Display is shown.

Warning Display (pop-up window)



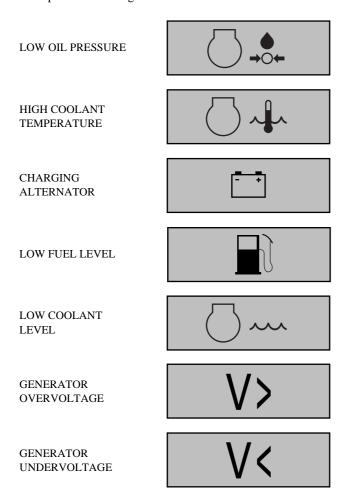
In case when a Warning occurs, a pop-up window will automatically be entered for as long as the warning is active, no matter which view is active. The warning icons will be shown (together with a continuous lit alarm LED at the fascia), which is centered at the display. The Warning Display can always be left or entered again by pushing the BACK button.

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

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

If a Shutdown comes up, the Shutdown Display is shown.

List of possible warnings:



GENERATOR OVERFREQUENCY

GENERATOR UNDERFREQUENCY

SERVICE TIMER 1

Y1

SERVICE TIMER 2

ALARM

Shutdown Display (pop-up window)



In case when a Shutdown occurs, a pop-up window will automatically be entered, no matter which view is active.

This pop-up window will stay present until the unit is put in OFF.

The shutdown icon will be shown (together with a flashing alarm LED at the fascia), which is centered at the display.

List of possible shutdowns:







LOW FUEL LEVEL

LOW COOLANT LEVEL

GENERATOR OVERVOLTAGE

GENERATOR UNDERVOLTAGE

GENERATOR OVERFREQUENCY

GENERATOR UNDERFREQUENCY











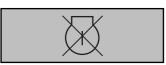
STOP FAILURE























Configuration Mode View



The Configuration Menu's are pre-programmed!

The Configuration Mode is entered by detection of activation of pushbuttons UP and DOWN at the same time for 3s.

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

By entering the configuration mode, pushbuttons MANUAL, REMOTE are disposed of their normal operations and won't perform any functionality.

Menu's shown on the LCD in Configuration Mode:

- Language selection
- Diagnostics Menu
- Running hours adjust

- Service Timer 2 reset
- Service Timer 1 reset
- Start Prepare Time
- Unit Menu
- Unit Type



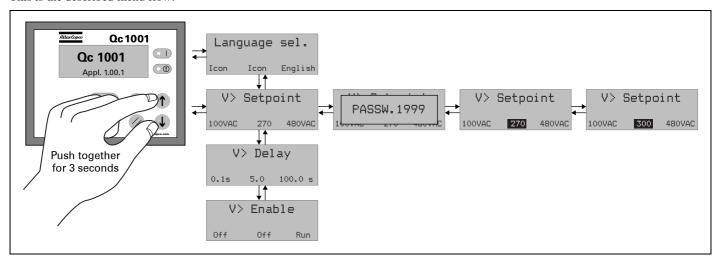
Unit type 3 for QAS 30!

- Generator Underfrequency: failclass, enable, delay, setpoint
- Generator Overfrequency: failclass, enable, delay, setpoint
- Generator Undervoltage: failclass, enable, delay, setpoint
- Generator Overvoltage: failclass, enable, delay, setpoint

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:



2.5.5 Fail classes

All the activated alarms of the Qc1001 $^{\text{TM}}$ have their own predefined 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)

2.5.6 Event Log

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

Events are:

- shutdowns
- service timer 1 reset
- service timer 2 reset
- unit type changes

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

The events can only be read by means of the QcUSW.

2.5.7 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 4971).

2.5.8 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.

4 different fail classes can be used:

	Action						
Fail Class	Alarm Horn Relay	Alarm Display	GB Trip	Gen-Set Stop	Shutdown		
1. Warning		X					
2. Trip of GB	X	X	X	X			
3. Trip & Stop	X	X	X	X			
4. Shutdown	X	X	X		X		

All alarms can be disabled or enabled as following:

- OFF: disabled alarm, inactive supervision.
- ON: enabled alarm, supervision of alarm all the time.
- RUN: generator running alarm, only supervision when the generator is running.

2.5.9 Languages

English is the default language ex-factory, but all the 12 European languages can be selected in channel 4241. It is possible to edit and/or add text and to edit and/or add languages.

1310 3011 71

2.6 Output Terminal Board

Q1,Q1.2..Main Circuit breaker

Interrupts the power supply to X1 when a short-circuit, occurs at the load side, or when the earth leak detector 40A, or the overcurrent protection (QAS 30) is activated or when the shunt trip is energized. It must be reset manually after eliminating the problem.

X1..... Main Power Supply (400 V AC)

Terminals L1, L2, L3, N (= neutral) and

PE (=earthing),hidden behind the control panel door and behind a small transparent door.

2.7 Outlet Sockets

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

X2,X31-phase outlet socket (240 V AC)

Provides phases L1, L2, neutral and earthing.

X4.....1-phase outlet socket (120 V AC)

Provides phase L1, neutral and earthing.



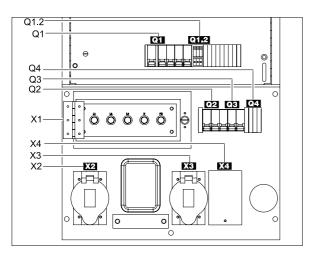
120V circuit is always live regardless of voltage selection.

Q1.2.....Circuit breaker for X1

Interrupts the power supply to X1 when a short-circuit occurs at the load side, or when the overcurrent protection (40 A) is activated. When activated, Q1.2 interrupts the three phases towards X1. 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 (40 A) is activated. When activated, Q4 interrupts phase L3 and the neutral towards X4. It can be activated again after eliminating the problem.





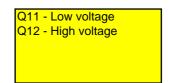
Circuit breaker Q1 does not only interrupt the power supply towards X1.2, but also towards X2 and X3.

Make sure to switch on circuit breakers Q1, Q3 and Q4 after starting the generator when power supply is done by means of X3 or X4.

2.8 Spillage Free

A Spillage free skid with forklift slots allows the customer to transport the generator easily with a forklift.

It avoids accidential spilling of engine fluids.



3. Operating instructions



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 1,000 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.

3.1 Installation

- Place the generator on a horizontal, even and solid floor.
- Protect the generator against dust and rain if it is operated outside.
- 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 measure its diffusion resistance (max. 1 k Ω) in order not to have a contact voltage higher than 25 V at 30 mA leakage current.
- Check that the cable end of the earthing rod is connected to the earth terminal.

3.2 Connecting the generator

3.2.1 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.

3.2.2 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 (mm ²)	2,5	4	6	10	16	25	35	50	70	95
Max. current (A)										
Multiple core	22	30	38	53	71	94	114	138	176	212
Single core	25	33	42	57	76	101	123	155	191	228
H07 RN-F	21	28	36	50	67	88	110	138	170	205

The lowest acceptable wire section and the corresponding maximum cable or conductor length for multiple core cable or H07 RN-F, at rated current (20 A), 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)

 $X = Reactance (\Omega/km to VDE 0102)$

3.2.3 Connecting the load

Site distribution panel

If outlet sockets are required, 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 X1.1.
- 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 X1.1.

3.3 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 fuse F4 is not activated and that the emergency stop is in the "OUT" position.
- Check that the load is switched off.
- Check that circuit breaker Q1 and Q 1.2 is switched off.
- Check that the earth fault protection (N13) has not tripped (reset if necessary).

3.4 Operating Qc1001™

3.4.1 Starting **Q**c1001[™]

To start up the unit locally, proceed as follows:

- Switch on the battery switch.
- Switch off circuit breaker Q1 or Q1.2 depending on which voltage setting (S10) is selected. This is not necessary when a plant contactor is installed between Q1 and the load.
- Put the starter switch in position (1). 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 or Q1.2 depending on which voltage setting (S10) is selected, in case no contactor is installed.

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

- Put the starter switch in position
- Switch on circuit breaker Q1or Q1.2.
- 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.

3.4.2 During operation Qc1001™

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.

3.4.3 Stopping Qc1001™

To stop the unit locally, proceed as follows:

- Switch off the load.
- Switch off circuit breaker Q1 and Q1.2.
- Let the engine run for about 5 minutes.
- Stop the engine by putting the starter switch in position O.
- 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 \square , proceed as follows:

- Switch off the load.
- Stop the engine by putting the remote start/stop switch in position stop or by putting the starter switch in position O.
- Cooldown period default 15 sec.
- Lock the side doors and the door of the indicators and control panel to avoid unauthorized access.

4. Maintenance



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

4.1 Maintenance schedule	Daily	Small	Normal	Yearly
		250 hours	1000 hours	2000 hours
Service pak	-	1310 3007 19	1310 3004 20	1310 3004 21
For the most important subassemblies, Atlas Copco has defits of genuine parts, save on administration costs and are more information on the contents of the service kits.	•			•
Air/fuel/coolant & oil leakage	Check	Check	Check	Check
Electrolyte level and terminals of battery (2)		Check	Check	Check
Fixation of hoses, cables and pipes		Check	Check	Check
Oil and coolant level	Check	Check	Check	Check
Coolers	Check and clean externally			
Condition of cooling fan assembly	Check	Check	Check	Check
Tension and condition of the drive belt		Check	Check	Check
Alternator drive belt			Replace	Replace
Door hinges and locks		Grease	Grease	Grease
Engine oil		Replace	Replace	Replace
Engine oil filter		Replace	Replace	Replace
Fuel filter element		Replace	Replace	Replace
Fuel prefilter element		Replace	Replace	Replace
Water in fuel filter	Drain	Drain	Drain	Drain
Turbocharger impeller casing and turbocharger compressor casing			Clean	Clean
Air cleaner and dust bowl		Clean	Clean	Clean
Air filter element (1)		Change	Change	Change
Safety cartridge		Replace	Replace	Replace
Engine breather				Renew
Engine inlet and outlet valves			Check/Adjust	Check/Adjust
Alternator and starter motor			Check	Check
Electrical system: security of cables and wear			Check	Check
Mechanical links		Grease	Grease	Grease
Condition of vibration dampers		Check	Check	Check
Alternator insulation resistance		Measure	Measure	Measure
Glycol level in coolant		Check	Check	Check
PH level of engine coolant		Check	Check	Check
Inspection by Atlas Copco Service technician				A

- (1) More frequently when operating in a dusty environment. Evacuate dust from the airfilter valve daily.
- (2) A Service Bulletin (ASB) dealing elaborately with batteries and due care is available on request.

4.2 Engine maintenance

Refer to the engine's operator manual for full maintenance, including instructions for changing the oil and coolant and replacing the fuel, oil and air filters.

4.3 (*) 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 5 $M\Omega$.

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

5. Storage of the generator

5.1 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.

5.2 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").

- Consult the engine's operator manual.
- Check that the insulation resistance of the generator exceeds 5 M Ω .
- 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.

6. 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).

6.1 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.

6.2 Checking frequency meter P5

- Run the unit at normal speed.
- Put a voltmeter in parallel with frequency meter P5.
- If the measured voltage is higher than 200 V, the frequency meter has to work properly.
- If not, remove the frequency meter, connect it with the mains (230 V) and check that it indicates 50 Hz.

6.3 Checking ammeter P1

- Measure during the load, by means of a clamp-on probe, the outgoing current in the third phase (L3).
- Compare the measured current with the current indicated on ammeter P1. Both readings should be the same.

6.4 Alternator trouble shooting

Symptom	Possible cause	Corrective action	
Alternator does not excite	Blown fuse.	Replace fuse.	
	Insufficient residual voltage.	Increase the speed by 15 %.	
	No residual voltage.	For an instant apply on the $+$ and $-$ terminals of the electronic regulator a 12 V battery voltage with a 30 Ω resistor in series respecting the polarities.	
After being excited alternator does not excite	Connections are interrupted.	Check connection cables as per attached drawings.	
Low voltage at no load	Voltage potentiometer out of setting.	Reset voltage potentiometer.	
	Intervention of protection.	Check rpm.	
	Winding failure.	Check windings.	
High voltage at no load	Voltage potentiometer out of setting.	Reset voltage potentiometer.	
	Failed regulator.	Substitute regulator.	
Lower than rated voltage at	Voltage potentiometer out of setting.	Reset voltage potentiometer.	
load	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	Voltage potentiometer out of setting.	Reset voltage potentiometer.	
load	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.	

6.5 Engine trouble shooting

The table below gives an overview of the possible engine problems and their possible causes.

6.5.1 The starter motor turns the engine too slowly

- Battery capacity too low.
- Bad electrical connection.
- Fault in starter motor.
- Wrong grade of lubricating oil.

6.5.2 The engine does not start or is difficult to start

- Starter motor turns engine too slowly.
- Fuel tank empty.
- Fault in fuel control solenoid.
- Restriction in a fuel pipe.
- Fault in fuel lift pump.
- Dirty fuel filter element.
- Air in fuel system.
- Fault in atomisers.

- Cold start system used incorrectly.
- Fault in cold start system.
- Restriction in fuel tank vent.
- Wrong type or grade of fuel used.
- Restriction in exhaust pipe.

6.5.3 Not enough power

- Restriction in a fuel pipe.
- Fault in fuel lift pump.
- Dirty fuel filter element.
- Restriction in air filter/cleaner or induction system.
- Air in fuel system.
- Fault in atomisers or atomisers of an incorrect type.
- Restriction in fuel tank vent.
- Wrong type or grade of fuel used.
- Restricted movement of engine speed control.
- Restriction in exhaust pipe.
- Engine temperature is too high.
- Engine temperature is too low.

6.5.4 Misfire

- Restriction in a fuel pipe.
- Fault in fuel lift pump.
- Dirty fuel filter element.
- Air in fuel system.
- Fault in atomisers or atomisers of an incorrect type.
- Fault in cold start system.
- Engine temperature is too high.
- Incorrect valve tip clearances.

6.5.5 The pressure of the lubricating oil is too low

- Wrong grade of lubricating oil.
- Not enough lubricating oil in sump.
- Defective gauge.
- Dirty lubricating oil filter element.

6.5.6 High fuel consumption

- Restriction in air filter/cleaner or induction system.
- Fault in atomisers or atomisers of an incorrect type.
- Fault in cold start system.
- Wrong type or grade of fuel used.
- Restricted movement of engine speed control.
- Restriction in exhaust pipe.
- Engine temperature is too low.
- Incorrect valve tip clearances.

6.5.7 Black exhaust smoke

- Restriction in air filter/cleaner or induction system.
- Fault in atomisers or atomisers of an incorrect type.
- Fault in cold start system.
- Wrong type or grade of fuel used.
- Restriction in exhaust pipe.
- Engine temperature is too low.
- Incorrect valve tip clearances.
- Engine overload.

6.5.8 Blue or white exhaust smoke

- Wrong grade of lubricating oil.
- Fault in cold start system.
- Engine temperature is too low.

6.5.9 The engine knocks

- Fault in fuel lift pump.
- Fault in atomisers or atomisers of an incorrect type.
- Fault in cold start system.
- Wrong type or grade of fuel used.
- Engine temperature is too high.
- Incorrect valve tip clearances.

6.5.10 The engine runs erratically

- Fault in fuel control.
- Restriction in a fuel pipe.

- Fault in fuel lift pump.
- Dirty fuel filter element.
- Restriction in air filter/cleaner or induction system.
- Air in fuel system.
- Fault in atomisers or atomisers of an incorrect type.
- Fault in cold start system.
- Restriction in fuel tank vent.
- Restricted movement of engine speed control.
- Engine temperature is too high.
- Incorrect valve tip clearances.

6.5.11 Vibration

- Fault in atomisers or atomisers of an incorrect type.
- Restricted movement of engine speed control.
- Engine temperature is too high.
- Fan damaged.
- Fault in engine mounting or flywheel housing.

6.5.12 The pressure of the lubricating oil is too high

- Wrong grade of lubricating oil.
- Defective gauge.

6.5.13 The engine temperature is too high

- Restriction in air filter/cleaner or induction system.
- Fault in atomisers or atomisers of an incorrect type.
- Fault in cold start system.
- Restriction in exhaust pipe.
- Fan damaged.
- Too much lubricating oil in sump.
- Restriction in air or coolant passages of radiator.
- Insufficient coolant in system.

6.5.14 Crankcase pressure

- Restriction in breather pipe.
- Vacuum pipe leaks or fault in exhauster.

6.5.15 Bad compression

- Restriction in air filter/cleaner or induction system.
- Incorrect valve tip clearances.

6.5.16 The engine starts and stops

- Dirty fuel filter element.
- Restriction in air filter/cleaner or induction system.
- Air in fuel system.

6.5.17 The engine shuts down after approx. 15 sec.

 Bad connection towards oil pressure switch/coolant temperature switch.

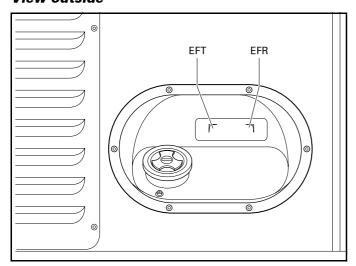
7. Options available for QAS 30 units

7.1 Description of the mechanical options

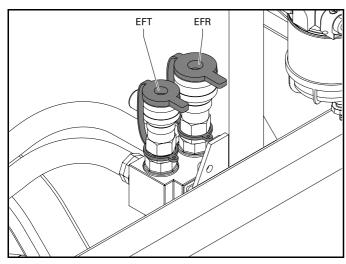
7.1.1 External fueltank connection (with/ without quick couplings)

The option "External fueltank connection" allows to bypass the internal fueltank and to connect an external fueltank to the unit.

View outside



View inside



EFT External fuel tank connection
EFR External fuel tank return connection

When using this option, 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.

Indicates the fuel supply line from the tank to the engine.

Indicates the fuel return line from the engine to the tank.

Indicates the internal fueltank.

Indicates the external fueltank.

7.1.2 Engine coolant heater



To make sure that the engine can start and accept load immediately, an external coolant heater (1000W) 120V is provided which keeps the engine temperature between 100° and 120° F.

8. Technical specifications

8.1 Technical specifications for QAS 30 units

8.1.1 Readings on gauges

Gauge		Reading	Unit
Ammeter L3 (P1)		Below max. rating	A
Voltmeter (P4)		Below max. rating	V
Frequencymeter (P5)	50 Hz:	Between 50 and 52.5	Hz
	60 Hz:	Between 60 and 62.5	Hz
Hourmeter (P6)		Adding up	h
Fuel level (P7)		Above 0	Fuel tank full

8.1.2 Settings of switches

Switch	Function	Activates a
Engine oil pressure	shut down	0.5 bar
Engine coolant temperature	shut down	105 °C

8.1.3 Specifications of the engine/alternator/unit

			60 Hz	Note
Reference	Rated frequency	Hz	60	
conditions 1)	Rated speed	rpm	1800	(a)
00/14/10/10 1/	Generator service duty	r	PRP	(-)
	Absolute air inlet pressure	kPa	100	
	Relative air humidity	%	30	
	Air inlet temperature	°C	25	
Limitations 2	Maximum ambient temperature	°C	50	
	Altitude capability	m	4000	
	Relative air humidity maximum	%	85	
	Minimum starting temperature unaided	$^{\circ}\mathrm{C}$	-18	
	Minimum starting temperature aided	$^{\circ}\mathrm{C}$	-25	(a)
Performance	1)Rated active power (PRP) 3ph	kW	25.0	
data 2) 3) 5)	Rated active power (PRP) 1ph	kW	18.0	
	2)Rated power factor (lagging) 3ph		0.8	
	Rated power factor (lagging) 1ph		1.0	
	3)Rated PRP power (PRP) 3ph	kVA	31.3	
	Rated PRP power (PRP) 1ph	kVA	18.0	
	4)Rated voltage 3ph line to line	V	480	
	Rated voltage 3ph line to line lower voltage	V	208	
	Rated voltage 1ph line to line	V	240	
	5)Rated current 3ph	A	37.6	
	Rated current 3ph lower voltage	A	80.0	
	Rated current 1ph	A	75.0	
	6)Performance class (acc.ISO 8528-5:1993)		G3	
	7)Frequency droop	%	<5	
	·/		isochronous	
	8)Fuel consumption at full load/no load	kg/h	718/1,4	
	9)Specific fuel consumption	kg/kWh	0.288	
	10)Fuel autonomy at full load with standard tank	h	25.1	
	11)Max. oil consumption at full load	g/h	-	
	12)Maximum sound power level (LWA)	C		
	measured according to 2000/14/EC OND	dB(A)		
	Sound Level @ 23 feet @ 75% Load	dB(A)	63	
	13)Capacity of fuel tank	1	210	
	14)Single step load acceptance	%	100	
Application	Mode of operation		PRP	
data	Site		land use	
	Operation		single	
	Start-up and control mode		manual/auto.	

	Start-up time		unspecified	
	Mobility/ Config. acc. to ISO 8528-1:1993		transportable/D	
	1.1361111J/ Coming. acc. to 15 0 00 20 1117/20		mobile/E	(a)
	Mounting		fully resilient	(u)
	Climatic exposure		open air	
	Degree of protection (cubicle)		IP 54	
	Status of neutral		earthed	
	Status of neutral		carticu	
Alternator 4)	Standard		IEC34-1	
			ISO 8528-3	
	Make		NEWAGE	
	Model		BCI 184 G	
	Rated output, class H temp. rise	13.5 kVA	16.9 kVA	
	rating type acc. ISO 8528-3		BR	
	Degree of protection	IP	23	
	Insulation stator	class	Н	
	Insulation rotor	class	Н	
	Number of wires		12	
				
Engine 4)	Standard		ISO 3046	
			ISO 8528-2	
	Make		JOHN DEERE	
	Model		TF4024270	
	Rated net output	kW	32	
	rating type acc. ISO 3046-7		ICXN	
	Coolant		water	
	Combustion system		direct injection	
	Aspiration		Turbo	
	Number of cylinders		4	
	Swept volume	1	2.4	
	Speed governing		Electronic	
	Capacity of oil sump	1	8	
	capacity of cooling system	1	8.1	
	Electrical system	Vdc	12	
Power airquit	Circuit-breaker, 3ph			
i ower circuit	Number of poles		3	
	Thermal release It	A	40	(b)
	Magnetic release Im	A	35xIn	(6)
		А	35AIII	
	Circuit-breaker, 3ph, lower voltage			
	Number of poles		3	(a)
	Thermal release It	A	80	(b)
	Magnetic release Im	A	35xIn	
	Outlet sockets		GFCI duplex(1x)	(a)
			2p + E	
			20A 125V	
			Temp Power (2x)	
			2p + N + E	
			50A 125/250V	

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 80%.
- 5) Specific mass fuel used: 0.86 kg/l.
- (a) Optional Equipment
- (b) Thermal release is higher at 25°C

Derating

Height					7	Temperatur	re				
(m)	0	5	10	15	20	(°C)	30	35	40	45	50
0	100	100	100	100	100	100	100	100	100	97	94
500	100	100	100	100	100	100	100	100	100	97	94
1000	100	100	100	100	100	100	100	100	100	97	94
1500	97	97	97	97	97	97	97	97	97	94	91
2000	94	94	94	94	94	94	94	94	94	91	88
2500	88	88	88	88	88	88	88	88	88	85	83
3000	88	88	88	88	88	88	88	88	88	85	83
3500	82	82	82	82	82	82	82	82	82	80	70
4000	82	82	82	82	82	82	82	82	82	80	77

8.2 Conversion list of SI units into British units

1 bar	=	14.504 psi	1 m	=	3.281 ft
1 g	=	0.035 oz	1 mm	=	0.039 in
1 kg	=	2.205 lb	1 m³/min	=	35.315 cfm
1 km/h	=	0.621 mile/h	1 mbar	=	0.401 in wc
1 kW	=	1.341 hp (UK and US)	1 N	=	0.225 lbf
11	=	0.264 US gal	1 Nm	=	0.738 lbf.ft
11	=	0.220 lmp gal (UK)	$t_{{}^{\circ}F}$	=	32 + (1.8 x t _° C)
11	=	0.035 cu.ft	$t_{{}^{\diamond}C}$	=	(t _{°F} - 32)/1.8

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

Circuit diagrams

