Instruction Manual
for AC Generators

QAS 30 - 45 - 60 Pd

Instruction manual.......................................................................................... 3

Circuit diagrams.......................................................................................... 57
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 for modifications, additions or conversions made without the manufacturer’s approval in writing.

Any unauthorized use or copying of the contents or any part thereof is prohibited.
This applies in particular to trademarks, model denominations, part numbers and drawings.
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

1. Safety precautions for portable generators ......................................................... 4

2. Leading particulars ............................................................................................... 8
   2.1. General description QAS 30 Pd .......................................................... 8
   2.2. General description QAS 45 Pd and QAS 60 Pd ............................................... 9
   2.3. Bodywork ................................................................................................. 10
   2.4. Markings ................................................................................................... 10
   2.5. Drain plugs and filler caps ........................................................................ 10
   2.6. Control and indicator panel Qc1001™ .................................................. 11
   2.7. Control and indicator panel Qc3001™ .................................................. 18
   2.8. Output terminal board ............................................................................. 28
   2.9. Spillage free ............................................................................................. 28

3. Operating instructions ........................................................................................ 29
   3.1. Installation ............................................................................................... 29
   3.2. Connecting the generator ........................................................................ 29
   3.3. Before starting .......................................................................................... 30
   3.4. Operating Qc1001™ ............................................................................. 30
   3.5. Operating Qc3001™ ............................................................................. 31

4. Maintenance ......................................................................................................... 32
   4.1. Maintenance schedule for QAS 30 Pd .................................................. 32
   4.2. Maintenance schedule for QAS 45 Pd and QAS 60 Pd .................................. 33
   4.3. Engine maintenance ................................................................................. 33
   4.4. (*) Measuring the alternator insulation resistance ................................. 33
   4.5. Engine oil specifications .......................................................................... 34
   4.6. Engine oil level check ............................................................................. 34
   4.7. Engine oil and oil filter change ................................................................. 34
   4.8. Engine coolant specifications .................................................................... 35
   4.9. Coolant check .......................................................................................... 35

5. Storage of the generator .................................................................................... 37
   5.1. Storage .................................................................................................... 37
   5.2. Preparing for operation after storage ...................................................... 37

6. Checks and trouble shooting .............................................................................. 37
   6.1. Checking voltmeter P4 ........................................................................... 37
   6.2. Checking ammeters P1, P2, P3 ................................................................. 37
   6.3. Alternator trouble shooting ....................................................................... 38
   6.4. Engine trouble shooting .......................................................................... 38

7. Options available for QAS 30 Pd, QAS 45 Pd and QAS 60 Pd units ............... 40
   7.1. Circuit diagrams ...................................................................................... 40
   7.2. Overview of the electrical options ........................................................... 40
   7.3. Description of the electrical options ......................................................... 40
   7.4. Overview of the mechanical options ....................................................... 45
   7.5. Description of the mechanical options ..................................................... 45

8. Technical specifications ....................................................................................... 46
   8.1. Technical specifications for QAS 30 Pd units ......................................... 46
   8.2. Technical specifications for QAS 45 Pd units ......................................... 49
   8.3. Technical specifications for QAS 60 Pd units ......................................... 52
   8.4. Conversion list of SI units into British units ......................................... 55
   8.5. Dataplate ................................................................................................. 55
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 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.

1. Before connecting a load, switch off the corresponding circuit breaker, and

Never connect the generator outlets to an installation which is also

The electrical connections shall correspond to local codes. The machines

Generators shall be stalled on an even, solid floor, in a clean location with

Locate the unit away from walls. Take all precautions to ensure that hot air

cooling fan, this may cause overheating of the unit; if taken in for

recirculated. If such hot air is taken in by the engine or driven machine

ducts.

To attend, is:

When the sound pressure level, at any point where personnel normally has

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.

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 85 dB(A): no action needs to be taken for occasional visitors

staying a limited time only.

above 70 dB(A): noise-protective devices should be provided for people

continuously being present in the room.

above 65 dB(A): noise-protective devices should be provided for people

staying a limited time only.

above 60 dB(A): noise-protective devices should be provided for people

continuously being present in the room.

1.4 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 arrester 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 coolant 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 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.
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.
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.
4. On engine-driven units the battery shall be disconnected and removed or the terminals covered by insulating caps.
5. Make sure that no tools, loose parts or rags are left in or on the machine.
6. Never leave rags or loose clothing near the engine air intake.
7. Never use flammable solvents for cleaning (fire-risk).
8. Take safety precautions against toxic vapours of cleaning liquids.
9. Never use machine parts as a climbing aid.
10. Observe scrupulous cleanliness during maintenance and repair. Keep away dirt, cover the parts and exposed openings with a clean cloth, paper or tape.
11. 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.
12. Support the towbar and the axle(s) securely if working underneath the unit or when removing a wheel. Do not rely on jacks.
13. 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.
14. 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.
15. Protect the engine, alternator, air intake filter, electrical and regulating components, etc., to prevent moisture ingress, e.g. when steam-cleaning.
16. When performing any operation involving heat, flames or sparks on a machine, the surrounding components shall first be screened with non-flammable material.
17. Never use a light source with open flame for inspecting the interior of a machine.
18. 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.
19. Maintenance and repair work should be recorded in an operator’s logbook for all machinery. Frequency and nature of repairs can reveal unsafe conditions.
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.
Before clearing the generator for use after maintenance or overhaul, submit it to a test run, 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

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.
2. **Leading particulars**

### 2.1 General description QAS 30 Pd

The QAS 30 Pd 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 50/60 Hz, 230/240 V in line-to-neutral mode and 400/480 V in line-to-line mode.

The QAS 30 Pd generator is driven by a water-cooled diesel engine, manufactured by PERKINS.

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

---

1. **Access to lifting eye**
2. **Side doors**
3. **Engine exhaust**
4. **Data Plate**
5. **Door, access to control and indicator panel**
6. **Output terminal board**
7. **Hole for forklift**
8. **Earthing rod (Not available in combination with an IT-relay)**

- **A**: Alternator
- **AF**: Air filter
- **BS**: Battery switch
- **C**: Coupling
- **DFO**: Drain flexible engine oil
- **DFW**: Drain flexible coolant

- **DH**: Drain and access hole (in the frame)
- **DPF**: Drain plug fuel
- **E**: Engine
- **ESB**: Emergency stop button
- **F**: Fan
- **FCF**: Filler cap fuel
- **FCO**: Filler cap engine oil
- **FCW**: Filler cap coolant
- **FF**: Fuel filter
- **FPF**: Fuel pre-filter
- **G1**: Battery
- **OF**: Oil filter
- **OLD**: Engine oil level dipstick
- **SOF**: Side oilfiller
- **VI**: Vacuum indicator
2.2 General description QAS 45 Pd and QAS 60 Pd

The QAS 45 Pd and QAS 60 Pd are AC generators, 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 50/60 Hz, 230/240 V in line-to-neutral mode and 400/480 V in line-to-line mode.

The QAS 45 Pd and QAS 60 Pd generators are driven by a water-cooled diesel engine, manufactured by PERKINS.

An overview of the main parts is given in the diagram below.
2.3 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).

To be able to lift the generator by means of a crane, open the door in the middle of the roof to get access to the lifting beam.

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

The earthing rod, connected to the generator’s earth terminal is located at the inside of the cubicle door.

2.4 Markings

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

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 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.

2.5 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 bottom of the frame cubicle side, 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 fuel tank, use the 3-way valves. Refer to “External fuel tank 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.

Indicates the partnumbers of the different service packs and of the engine oil.

These parts can be ordered to the factory.
2.6 Control and indicator panel Qc1001™

2.6.1 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

2.6.2 Qc1001™ Module

The Qc1001™ 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™ module can be used for several applications.

2.6.3 Pushbutton and LED functions

Following pushbuttons are used on the Qc1001™:

- **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.
- **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 Qc1001™:

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 reseted.

**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.

---

**2.6.4 Qc1001™ Menu Overview**

At Qc1001™, 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, …)
  - 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

---

**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.
**View 3 (Engine Oil Pressure Display)**

![5.4bar OIL PRESSURE 00000.7h]

This view shows the oil pressure icons.

When the English text view is selected, this view will mention: "OIL PRESSURE **.*bar".

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

See also “Configuration Mode View” on page 16 for selection between bar and psi.

**View 4 (Engine Coolant Temperature Display)**

![79°C COOLANT TEMP. 00000.7h]

This view shows the coolant temperature icons.

When the English text view is selected, this view will mention: "COOLANT TEMP. ***°C".

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

“Configuration Mode View” on page 16 for selection between °C and °F.

**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:

- PREHEAT
- START OFF
- COOLDOWN
- EXTENTED STOP TIME
- DIAGNOSTIC

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:

**LOW OIL PRESSURE**

**HIGH COOLANT TEMPERATURE**

**CHARGING ALTERNATOR**

**LOW FUEL LEVEL**

**LOW COOLANT LEVEL**

**GENERATOR OVERVOLTAGE**

**GENERATOR UNDERVOLTAGE**

**GENERATOR OVERFREQUENCY**

**GENERATOR UNDERFREQUENCY**

**SERVICE TIMER 1**

**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 OIL PRESSURE**
- **HIGH COOLANT TEMPERATURE**
- **CHARGING ALTERNATOR**
- **LOW FUEL LEVEL**
- **LOW COOLANT LEVEL**
- **GENERATOR OVERVOLTAGE**
- **GENERATOR UNDERVOLTAGE**
- **GENERATOR OVERFREQUENCY**
- **GENERATOR UNDERFREQUENCY**

![Service Timer 1](image1)
![Service Timer 2](image2)
![Alarm](image3)
![Emergency Stop](image4)
![Start Failure](image5)
![Stop Failure](image6)
**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

This is the described menu flow:

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

⚠️ **Unit type 2 for QAS 30 - 45 - 60 Pd**

- 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.


2.6.5  **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).

2.6.6  **Fail classes**

All the activated alarms of the Qc1001™ 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)

2.6.7  **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.
2.7 Control and indicator panel Qc3001™

2.7.1 General description Qc3001™ control panel

The Qc3001™ 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 Qc3001™ module can be used for several applications.

2.7.2 Qc3001™ Module

2.7.3 Pushbutton functions

There are 16 pushbuttons on the display unit.

- **ALARM**: Shows the active alarm list (up to 30 alarms can be listed).
- **JUMP**: Each programmable parameter has a channel number in the menu. 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. E.g. if the user wants to change 'language', he can jump directly to channel 4241.
- **LEFT**: Moves the cursor left for scrolling in the menus.
- **UP**: Increases the value of the selected set-point (in the setting menus). Allows the user to scroll upwards (in the daily use display).
- **SELECT**: Is used to select the chosen function. A function can be chosen by the cursor.
- **DOWN**: Decreases the value of the selected set-point (in the setting menus). Allows the user to scroll downwards (in the daily use display).
- **RIGHT**: Moves the cursor right for scrolling in the menus.
- **BACK**: Jumps one step backwards in the menu (until the daily use display is reached).
- **START**: Manual Start of the generator (only enabled if the SEMI-AUTO mode is selected).
- **STOP**: Manual Stop of the generator (only enabled if the SEMI-AUTO mode is selected).
2.7.4 LED functions

9 LEDs are used on the display unit. The colour is green or red or a combination in different situations.

- **AUTO**: Allows the user to set the generator in AUTO mode.
- **SEMI-AUTO**: Allows the user to set the generator in SEMI-AUTO mode.
- **TEST**: Allows the user to set the generator in TEST mode. To enter the TEST mode, a password needs to be entered.
- **VIEW LOG**: Shows the latest event. The user can scroll through the event & historical alarm list with the scroll buttons. (Up to 150 events & historical alarms can be listed).

### 2.7.5 Qc3001™ 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 / S3 / S2 / S1.

#### Setup view

The SETUP view shows the module name, the software version, the date and the time.

#### S3 view

The S3 view shows operational status and selectable measurements.

#### S2 view

The S2 view shows some selectable measurements.

#### S1 view

In the S1 view the user can scroll up and down to 15 configurable screens showing different selectable measurements.

The configuration of the 15 different screens is done through the Qc3001™ Utility Software. It is not possible to configure the windows through the display. The screen shown when leaving “S1” will be the screen shown when returning to “S1”.

---

**Alarm:**
- Red LED flashing indicates that unacknowledged alarms are present.
- Red LED fixed indicates that ALL alarms are acknowledged.

**Power:**
- Green LED indicates that the voltage supply is switched on.

**Run:**
- Green LED indicates that the generator is running.

**U/f OK:**
- Green LED indicates that voltage/frequency is present and OK.

**GB ON:**
- Green LED indicates that the generator breaker is closed.

**MB ON:**
- Green LED indicates that the mains breaker is closed.

**Mains OK:**
- LED is green if the Mains is present and OK.
- LED is red at a mains failure.
- LED is flashing green when the mains return during the “MAINS Ok” delay time.

**Auto:**
- Green LED indicates that AUTO mode is selected.

**Semi-Auto:**
- Green LED indicates that SEMI-AUTO mode is selected.
**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 1090 to 1890 (steps of 10)
- Control Setup (CTRL): Channel 2050
- Power Setup (POWER): Channel 3070
- System Setup (SYST): Channels from 4010 to 4920 (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 SELECT 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 "Gen high-volt 1" setting. Scrolling down will give all the protection parameters.

- The first line shows some generator data. The user can scroll through with the VIEW button.

<table>
<thead>
<tr>
<th>G</th>
<th>0.001 PF</th>
<th>0 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>0 kVA</td>
<td>0 kvar</td>
</tr>
<tr>
<td>G-L1</td>
<td>0.0 Hz</td>
<td>0 V</td>
</tr>
<tr>
<td>B-L1</td>
<td>0.0 Hz</td>
<td>0 V</td>
</tr>
<tr>
<td>G</td>
<td>0</td>
<td>00 V</td>
</tr>
<tr>
<td>B</td>
<td>0</td>
<td>00 V</td>
</tr>
<tr>
<td>G</td>
<td>0</td>
<td>00 A</td>
</tr>
</tbody>
</table>

- 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:

  | “LIM” | LIMIT, setting of switch point |
  | “DEL” | DELAY, setting of time delay |
  | “OA” | OUTPUT A, selection of which relay the function must activate |
  | “OB” | OUTPUT B, selection of which relay the function must activate |
  | “ACT” | ACTION, activate/de-activate the function |
  | “FC” | FAIL CLASS, fail class setting. |

The user can scroll to these choices and select one choice with the SELECT button. After selection of “LIM” the following view will be visible:

A password is needed in order to change the settings. There are three different password levels.

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

Now the user can change the “LIM” of parameter “Gen high-volt 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.
This is the described menu flow:

![Menu Flow Diagram]

The menu flow is similar in the CONTROL SETUP, POWER SETUP and SYSTEM SETUP.

⚠️ For more details on the Setup menu we refer to the Qc3001™ User Manual.

**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:

- 4910 Service Timer 1
- 4920 Service Timer 2
- 4930 Diagnostics Menu
- 4940 Reset Eventlog
- 4950 Single/Split/Three phase
- 4971 User Password Change
  Level 2 and Level 3 passwords can only be set through the Atlas Copco Utility Software® PC Software.
- 4980 Service Menu

Use the "up" and "down" buttons to change the settings and the "SELECT" button to store the new setting.
### Protection setup: overview of parameters (for correct values refer to controller)

#### 1090 Reverse Power

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>OFF</td>
</tr>
<tr>
<td>Delay</td>
<td>0.5s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Trip + Stop</td>
</tr>
</tbody>
</table>

#### 1100 Over Current 1

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>OFF</td>
</tr>
<tr>
<td>Delay</td>
<td>10.00s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Trip + Stop</td>
</tr>
</tbody>
</table>

#### 1110 Over Current 2

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>OFF</td>
</tr>
<tr>
<td>Delay</td>
<td>5.00s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Trip + Stop</td>
</tr>
</tbody>
</table>

#### 1120 Over Load 1

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>OFF</td>
</tr>
<tr>
<td>Delay</td>
<td>0.50s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Trip + Stop</td>
</tr>
</tbody>
</table>

#### 1130 Over Load 2

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>OFF</td>
</tr>
<tr>
<td>Delay</td>
<td>10.00s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Trip + Stop</td>
</tr>
</tbody>
</table>

#### 1140 Current Unbalance

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>OFF</td>
</tr>
<tr>
<td>Delay</td>
<td>0.00s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Trip + Stop</td>
</tr>
</tbody>
</table>

#### 1150 Voltage Unbalance

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>OFF</td>
</tr>
<tr>
<td>Delay</td>
<td>0.00s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Trip + Stop</td>
</tr>
</tbody>
</table>

#### 1210 Gen High Voltage 1

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>OFF</td>
</tr>
<tr>
<td>Delay</td>
<td>5.0s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>ON</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Warning</td>
</tr>
</tbody>
</table>

#### 1220 Gen High Voltage 2

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>OFF</td>
</tr>
<tr>
<td>Delay</td>
<td>1.0s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>ON</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Shutdown</td>
</tr>
</tbody>
</table>

#### 1230 Gen Low Voltage 1

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>90.0%</td>
</tr>
<tr>
<td>Delay</td>
<td>15.0s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>RUN</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Warning</td>
</tr>
</tbody>
</table>

#### 1240 Gen Low Voltage 2

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>75.0%</td>
</tr>
<tr>
<td>Delay</td>
<td>10.0s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>RUN</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Shutdown</td>
</tr>
</tbody>
</table>

#### 1250 Gen High Frequency 1

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>OFF</td>
</tr>
<tr>
<td>Delay</td>
<td>5.0s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Warning</td>
</tr>
</tbody>
</table>

#### 1260 Gen High Frequency 2

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>OFF</td>
</tr>
<tr>
<td>Delay</td>
<td>1.0s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Shutdown</td>
</tr>
</tbody>
</table>

#### 1270 Gen Low Frequency 1

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>OFF</td>
</tr>
<tr>
<td>Delay</td>
<td>10.00s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Warning</td>
</tr>
</tbody>
</table>

#### 1280 Gen Low Frequency 2

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>OFF</td>
</tr>
<tr>
<td>Delay</td>
<td>5.0s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Shutdown</td>
</tr>
</tbody>
</table>

#### 1290 Peak Current 1

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>OFF</td>
</tr>
<tr>
<td>Delay</td>
<td>5.0s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Shutdown</td>
</tr>
</tbody>
</table>

#### 1300 Peak Current 2

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>OFF</td>
</tr>
<tr>
<td>Delay</td>
<td>3.0s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Shutdown</td>
</tr>
</tbody>
</table>

#### 1350 VDO 1.1

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>N/A</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Warning</td>
</tr>
</tbody>
</table>

#### 1360 VDO 1.2

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>N/A</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Warning</td>
</tr>
</tbody>
</table>

#### 1370 VDO 2.1

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>N/A</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Warning</td>
</tr>
</tbody>
</table>

#### 1380 VDO 2.2

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>N/A</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
<tr>
<td>Fail Class</td>
<td>Warning</td>
</tr>
</tbody>
</table>
### Control setup: overview parameters

#### 2050 EU Limits

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OL max.</td>
<td>4.0Hz</td>
</tr>
<tr>
<td>UU max.</td>
<td>5%</td>
</tr>
</tbody>
</table>

#### 2954 2370 00

### Power setup: overview parameters

#### 3070 Test

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>50%</td>
</tr>
<tr>
<td>Delay</td>
<td>308.6s</td>
</tr>
<tr>
<td>Test timer</td>
<td>OFF</td>
</tr>
</tbody>
</table>
## System setup: overview of parameters

### Nominal Settings

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>50Hz</td>
</tr>
<tr>
<td>Generator Power</td>
<td>13kW</td>
</tr>
<tr>
<td>Generator Current</td>
<td>42A</td>
</tr>
<tr>
<td>Generator Voltage</td>
<td>230V</td>
</tr>
</tbody>
</table>

### Nominal Settings 2

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>50Hz</td>
</tr>
<tr>
<td>Generator Power</td>
<td>13kW</td>
</tr>
<tr>
<td>Generator Current</td>
<td>42A</td>
</tr>
<tr>
<td>Generator Voltage</td>
<td>230V</td>
</tr>
</tbody>
</table>

### Transformer Gen-set

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volt. Prim.</td>
<td>440V</td>
</tr>
<tr>
<td>Volt. Sec.</td>
<td>440V</td>
</tr>
<tr>
<td>Current Prim.</td>
<td>60A</td>
</tr>
<tr>
<td>Current Sec.</td>
<td>5A</td>
</tr>
</tbody>
</table>

### Transformer Bus

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volt. Prim.</td>
<td>440V</td>
</tr>
<tr>
<td>Volt. Sec.</td>
<td>440V</td>
</tr>
</tbody>
</table>

### Engine Comms.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td></td>
</tr>
</tbody>
</table>

### Date & Time (internal clock)

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>0905mmYYYY</td>
</tr>
<tr>
<td>Time</td>
<td>hh:mm</td>
</tr>
</tbody>
</table>

### Counters

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running Time</td>
<td>0</td>
</tr>
<tr>
<td>OB Operations</td>
<td>0</td>
</tr>
<tr>
<td>MI Operations</td>
<td>0</td>
</tr>
<tr>
<td>MC Operations</td>
<td></td>
</tr>
</tbody>
</table>

### Battery Low

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>9.0V</td>
</tr>
<tr>
<td>Delay</td>
<td>3.0s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>ON</td>
</tr>
</tbody>
</table>

### Battery High

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>15.0V</td>
</tr>
<tr>
<td>Delay</td>
<td>0.5s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>ON</td>
</tr>
</tbody>
</table>

### Battery Low 2

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>N/A</td>
</tr>
<tr>
<td>Delay</td>
<td>10.0s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
</tbody>
</table>

### Battery High 2

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>N/A</td>
</tr>
<tr>
<td>Delay</td>
<td>10.0s</td>
</tr>
<tr>
<td>Output Relay A</td>
<td>R0</td>
</tr>
<tr>
<td>Output Relay B</td>
<td>R0</td>
</tr>
<tr>
<td>Enable</td>
<td>OFF</td>
</tr>
</tbody>
</table>

### Mode Relay

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test</td>
<td>R0</td>
</tr>
<tr>
<td>Auto</td>
<td>R0</td>
</tr>
<tr>
<td>Semi</td>
<td>R0</td>
</tr>
</tbody>
</table>

### Engine Type

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Diesel</td>
</tr>
</tbody>
</table>

### Gen-Set Mode

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gen-Set Mode</td>
<td>Island</td>
</tr>
</tbody>
</table>

### CAN Unit

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAN Unit</td>
<td>bar-celsius</td>
</tr>
</tbody>
</table>

### Tacho Configuration

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setpoint</td>
<td>5000rpm</td>
</tr>
<tr>
<td>Teeth</td>
<td>0</td>
</tr>
</tbody>
</table>
4730 Start/Stop Cmd. 3  CUSTOMER LEVEL
4731 Enable  OFF
4732 START/STOP  STOP
4733 Day(s)  10
4734 Hour  10
4735 Minute  0

4740 Start/Stop Cmd. 4  CUSTOMER LEVEL
4741 Enable  OFF
4742 START/STOP  STOP
4743 Day(s)  10
4744 Hour  10
4745 Minute  0

4750 Start/Stop Cmd. 5  CUSTOMER LEVEL
4751 Enable  OFF
4752 START/STOP  STOP
4753 Day(s)  10
4754 Hour  10
4755 Minute  0

4760 Start/Stop Cmd. 6  CUSTOMER LEVEL
4761 Enable  OFF
4762 START/STOP  STOP
4763 Day(s)  10
4764 Hour  10
4765 Minute  0

4770 Start/Stop Cmd. 7  CUSTOMER LEVEL
4771 Enable  OFF
4772 START/STOP  STOP
4773 Day(s)  10
4774 Hour  10
4775 Minute  0

4780 Start/Stop Cmd. 8  CUSTOMER LEVEL
4781 Enable  OFF
4782 START/STOP  STOP
4783 Day(s)  10
4784 Hour  10
4785 Minute  0

4790 GSM Pin Code  CUSTOMER LEVEL
4791 Pin code  0000

4910 Service Timer 1  SERVICE LEVEL
4911 Enable  ON
4912 Run Hours  500h
4913 Elapsed Days  365 days
4914 Fail Class  Warning
4915 Output Relay A  R0
4916 Reset

4920 Service Timer 2  SERVICE LEVEL
4921 Enable  ON
4922 Run Hours  1000h
4923 Elapsed Days  365 days
4924 Fail Class  Warning
4925 Output Relay A  R0
4926 Reset

4930 Diagnostics Mode  CUSTOMER LEVEL
4931 Diagnostics  Normal

4940 Reset Eventlog  MASTER LEVEL
4941 Reset  OFF

4971 Level 1 Password  CUSTOMER LEVEL
4972 Setting  2003

4972 Level 2 Password  SERVICE LEVEL
4973 Setting  ****

4973 Level 3 Password  MASTER LEVEL
4974 Setting  ****
2.7.6 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).

2.7.7 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:

<table>
<thead>
<tr>
<th>Fail Class</th>
<th>Alarm Horn</th>
<th>Alarm Display</th>
<th>GB Trip</th>
<th>Gen-Set Stop</th>
<th>Shutdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Warning</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Trip of GB</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Trip &amp; Stop</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>4. Shutdown</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

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.

2.7.9 Standard modes

The following modes can be selected (push the dedicated button on the display unit).

Test mode

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

Semi-Auto mode

Enables the user to have manual control and activation of the sequences with the buttons on the Qc3001™ control panel. The generator can be started/stopped manually.

Auto mode

The module controls the generator and the circuit breakers (generator breaker GB and mains breaker MB) automatically according to the operational state.

Diagnostics menu

This diagnostics menu can only be entered using the "JUMP" pushbutton, and going to channel 4930. This menu is used in 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, normal operation has to be selected again in this menu.

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

2.7.8 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.
2.7.10 Standard applications

In the Qc3001™ module 3 application types can be selected (in channel 4320). A combination of each application type with the running mode results in a specific application.

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 9822 0992 19/01 for the correct connections.

Island operation

This operation type is selected for installations with one or more generators, but always without the Mains (= stand-alone).

- Combined with Semi-auto mode = Local Start operation. The sequences start/stop can be activated manually.
- Combined with Auto mode = Remote Start operation.

The remote start signal can be given with an external switch or with the internal real time clock. (8 start/stop commands can be defined in channels 4710-4780).

⚠️ The generator cannot be started with an external signal, if the internal real time clock commands are enabled!

Installation wirings:

- For Remote Start operation: wire the RS switch between X25.9 & X25.10.

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!

When the Mains exceeds the defined voltage/frequency/current/speed limits for a defined delay time, the generator will take over the load automatically.

When the mains is restored within the defined limits for a defined time, the generator will go into cool down and stop.

Installation wirings:

- The Mains sensing lines L1 / L2 / L3 have to be wired to terminals X25.3 / X25.4 / X25.5 (Mains neutral is not sensed). If the busbar sensing lines are wired, they have to be removed.

Load Take Over (LTO) operation

This application is normally used in combination with Semi-auto or Auto mode in installations with the Mains. The generator will start-up and take over the load from the Mains.

Installation wirings:

- The Mains sensing lines L1 / L2 / L3 have to be wired to terminals X25.3 / X25.4 / X25.5 (Mains neutral is not sensed). If the busbar sensing lines are wired, they have to be removed.

2.7.11 Overview of applications

<table>
<thead>
<tr>
<th>Single gen-set</th>
<th>Island operation</th>
<th>AMF operation</th>
<th>Load Take Over</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SEMI-AUTO mode</td>
<td>(SEMI-AUTO mode)</td>
<td>SEMI-AUTO mode</td>
</tr>
<tr>
<td></td>
<td>AUTO mode</td>
<td>AUTO mode</td>
<td>AUTO mode</td>
</tr>
</tbody>
</table>

From each of the above applications the module can jump into the Test mode, by pushing the dedicated Test button on the LCD display. The generator will follow the defined Test sequences and afterwards the generator will return in its previous application, always in combination with the AUTO mode.

⚠️ 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:
   - Test / Semi-auto / Auto mode
   - Island / AMF / LTO application type

3. For more information on the Qc3001™ module and its applications, we refer to the Qc3001™ User Manual. If you need more assistance, please contact Atlas Copco.
2.8 Output terminal board

The output terminal board 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 ..... Main circuit breaker**

Interrupts the power supply to X1 when a short-circuit occurs at the load side, or when the earth leak detector (30 mA) or the overcurrent protection (QAS 30: 50 A, QAS 45: 63 A, QAS 60: 100 A) 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.

2.9 Spillage free

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

It avoids accidental 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 kΩ) 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 converters 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.

<table>
<thead>
<tr>
<th>Wire section (mm²)</th>
<th>2,5</th>
<th>4</th>
<th>6</th>
<th>10</th>
<th>16</th>
<th>25</th>
<th>35</th>
<th>50</th>
<th>70</th>
<th>95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. current (A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple core</td>
<td>22</td>
<td>30</td>
<td>38</td>
<td>71</td>
<td>94</td>
<td>114</td>
<td>138</td>
<td>176</td>
<td>212</td>
<td></td>
</tr>
<tr>
<td>Single core</td>
<td>25</td>
<td>33</td>
<td>42</td>
<td>57</td>
<td>76</td>
<td>101</td>
<td>123</td>
<td>155</td>
<td>191</td>
<td>228</td>
</tr>
<tr>
<td>H07 RN-F</td>
<td>21</td>
<td>28</td>
<td>36</td>
<td>50</td>
<td>67</td>
<td>88</td>
<td>110</td>
<td>138</td>
<td>170</td>
<td>205</td>
</tr>
</tbody>
</table>

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 < 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:

\[
e = \sqrt{3} \cdot I \cdot L \cdot \left( R \cdot \cos \phi + X \cdot \sin \phi \right) \cdot \frac{1}{1000}
\]

- \( e \) = Voltage drop (V)
- \( I \) = Rated current (A)
- \( L \) = Length of conductors (m)
- \( R \) = Resistance (\( \Omega/km \) 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.
- 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.

### 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 coolant damp 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.
- 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 is switched off.
- Check that the earth fault protection (N13) has not tripped (reset if necessary).

### 3.4 Operating Qc1001™

#### 3.4.1 Starting Qc1001™

**To start up the unit locally, proceed as follows:**

- Switch on the battery switch.
- Switch off circuit breaker Q1. This is not necessary when a plant contactor is installed between Q1 and the load.
- Put the starter switch in position (i). 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 in case no contactor is installed.

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

- Put the starter switch in position (j).
- Switch on circuit breaker Q1.
- 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.
- 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.

3.4.3 Stopping Qc1001™

To stop the unit locally, proceed as follows:

- Switch off the load.
- Switch off circuit breaker Q1.
- 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 🔒, 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.
- Cool down period default 15 sec.
- Lock the side doors and the door of the indicators and control panel to avoid unauthorized access.

3.5 Operating Qc3001™

3.5.1 Starting Qc3001™

- Turn the optional battery switch to ON.
- Turn the S20 button to the ON position, this will activate the Qc3001™ Controller.
- Select the correct application type and the correct mode on the Qc3001™ module (see Overview of applications for the possible selections).
- Make the correct wirings and program the applicable parameters (see Standard applications 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.

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

3.5.2 During operation Qc3001™

Following points should be carried out regularly:

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

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 putting the starter switch in position O.
- Cool down period default 15 sec.
- Lock the side doors and the door of the indicators and control panel to avoid unauthorized access.

3.5.3 Stopping Qc3001™

- When in SEMI-AUTO mode, use the STOP button to stop the generator. The GB button will not 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.
4. Maintenance

4.1 Maintenance schedule for QAS 30 Pd

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.

### 4.1.1 Maintenance schedule

<table>
<thead>
<tr>
<th>Daily</th>
<th>500 hours or yearly</th>
<th>1000 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service pak</td>
<td>-</td>
<td>2912 4410 05</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Task</th>
<th>Daily</th>
<th>500 hours or yearly</th>
<th>1000 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air/fuel/coolant &amp; oil leakage</td>
<td>Check</td>
<td>Check</td>
<td>Check</td>
</tr>
<tr>
<td>Electrolyte level and terminals of battery</td>
<td>Check</td>
<td>Check</td>
<td>Check</td>
</tr>
<tr>
<td>Fixation of hoses, cables and pipes</td>
<td>Check</td>
<td>Check</td>
<td>Check</td>
</tr>
<tr>
<td>Oil and coolant level</td>
<td>Check</td>
<td>Check</td>
<td>Check</td>
</tr>
<tr>
<td>Coolers</td>
<td>Check and clean externally</td>
<td>Check and clean externally</td>
<td>Check and clean externally</td>
</tr>
<tr>
<td>Condition of cooling fan assembly</td>
<td>Check</td>
<td>Check</td>
<td>Check</td>
</tr>
<tr>
<td>Tension and condition of the drive belt</td>
<td>Check</td>
<td>Check</td>
<td>Check</td>
</tr>
<tr>
<td>Door hinges and locks</td>
<td>Grease</td>
<td>Grease</td>
<td>Grease</td>
</tr>
<tr>
<td>Engine oil</td>
<td>Replace</td>
<td>Replace</td>
<td>Replace</td>
</tr>
<tr>
<td>Engine oil filter</td>
<td>Replace</td>
<td>Replace</td>
<td>Replace</td>
</tr>
<tr>
<td>Fuel filter element</td>
<td>Replace</td>
<td>Replace</td>
<td>Replace</td>
</tr>
<tr>
<td>Fuel prefilter element</td>
<td>Replace</td>
<td>Replace</td>
<td>Replace</td>
</tr>
<tr>
<td>Water in fuel filter</td>
<td>Drain</td>
<td>Drain</td>
<td>Drain</td>
</tr>
<tr>
<td>Air cleaner and dust bowl</td>
<td>Clean</td>
<td>Clean</td>
<td>Clean</td>
</tr>
<tr>
<td>Air filter element</td>
<td>Change</td>
<td>Change</td>
<td>Change</td>
</tr>
<tr>
<td>Safety cartridge</td>
<td>Replace</td>
<td>Replace</td>
<td>Replace</td>
</tr>
<tr>
<td>Engine inlet and outlet valves (2)</td>
<td></td>
<td></td>
<td>Check/Adjust if necessary</td>
</tr>
<tr>
<td>Alternator and starter motor</td>
<td>Check</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical system: security of cables and wear</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical links</td>
<td>Grease</td>
<td>Grease</td>
<td>Grease</td>
</tr>
<tr>
<td>Condition of vibration dampers</td>
<td>Check</td>
<td>Check</td>
<td>Check</td>
</tr>
<tr>
<td>Alternator insulation resistance</td>
<td>Measure</td>
<td>Measure</td>
<td>Measure</td>
</tr>
<tr>
<td>Glycol level in coolant (1)</td>
<td>Check</td>
<td>Check</td>
<td>Check</td>
</tr>
<tr>
<td>PH level of engine coolant</td>
<td>Check</td>
<td>Check</td>
<td>Check</td>
</tr>
<tr>
<td>Filter closed breather system</td>
<td>Replace</td>
<td>Replace</td>
<td></td>
</tr>
</tbody>
</table>

**Inspection by Atlas Copco Service technician**

(1) Change coolant every 5 years.

(2) Gaskets rocker cover can be re-used. New gasket can be ordered with part number 2914 9845 00.
4.2 Maintenance schedule for QAS 45 Pd and QAS 60 Pd

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.

4.2.1 Maintenance schedule

<table>
<thead>
<tr>
<th>Service pak</th>
<th>Daily</th>
<th>500 hours or yearly</th>
<th>1000 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>2912 4411 05</td>
<td>Check</td>
<td>Check</td>
<td>Check</td>
</tr>
</tbody>
</table>

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.

Air/fuel/coolant & oil leakage: Check
Electrolyte level and terminals of battery: Check
Fixation of hoses, cables and pipes: Check
Oil and coolant level: Check
Coolers: Check and clean externally
Condition of cooling fan assembly: Check
Tension and condition of the drive belt: Check
Door hinges and locks: Grease
Engine oil: Replace
Engine oil filter: Replace
Fuel filter element: Replace
Fuel prefilter element: Replace
Water in fuel filter: Drain
Air cleaner and dust bowl: Clean
Air filter element: Change
Safety cartridge: Replace
Engine inlet and outlet valves (2): Check
Alternator and starter motor: Check
Electrical system: security of cables and wear: Check
Mechanical links: Grease
Condition of vibration dampers: Check
Alternator insulation resistance: Measure
Glycol level in coolant (1): Check
PH level of engine coolant: Check
Filter closed breather system: Replace

Inspection by Atlas Copco Service technician: Check/Adjust if necessary

4.4 (*) 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 MΩ.
Refer to the alternator operating and maintenance instructions for more details.

4.3 Engine maintenance

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

(1) Change coolant every 5 years.
(2) Gaskets rocker cover can be re-used. New gasket can be ordered with partnumber 2914 9845 00.
4.5 Engine oil specifications

It is strongly recommended to use Atlas Copco branded lubrication oils.

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:

<table>
<thead>
<tr>
<th>Engine</th>
<th>Type of lubricant</th>
</tr>
</thead>
<tbody>
<tr>
<td>between -15°C and 40°C</td>
<td>PAROIL 15W40</td>
</tr>
<tr>
<td>between -25°C and 30°C</td>
<td>PAROIL 5W30</td>
</tr>
</tbody>
</table>

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.

4.5.1 Specifications PAROIL

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

4.5.2 PAROIL 5W30 and PAROIL 15W40

Synthetic engine oil PAROIL 5W30

PAROIL 5W30 is a Synthetic ultra high performance diesel engine oil with a high viscosity- index. Atlas Copco PAROIL 5W30 is designed to provide excellent lubrication from start-up in temperatures as low as -25°C.

<table>
<thead>
<tr>
<th>Liter</th>
<th>US gal</th>
<th>Imp gal</th>
<th>cu.ft</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>can</td>
<td>5</td>
<td>1.3</td>
<td>1.1</td>
<td>0.175</td>
</tr>
<tr>
<td>barrel</td>
<td>210</td>
<td>55.2</td>
<td>46</td>
<td>7.35</td>
</tr>
</tbody>
</table>

Mineral engine oil PAROIL 15W40

PAROIL 15W40 is a mineral based high performance diesel engine oil with a high viscosity- index. Atlas Copco PAROIL 15W40 is designed to provide a high level of performance and protection in 'standard' ambient conditions as from -15°C.

<table>
<thead>
<tr>
<th>Liter</th>
<th>US gal</th>
<th>Imp gal</th>
<th>cu.ft</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>can</td>
<td>5</td>
<td>1.3</td>
<td>1.1</td>
<td>0.175</td>
</tr>
<tr>
<td>can</td>
<td>20</td>
<td>5.3</td>
<td>4.4</td>
<td>0.7</td>
</tr>
<tr>
<td>barrel</td>
<td>210</td>
<td>55.2</td>
<td>46</td>
<td>7.35</td>
</tr>
</tbody>
</table>

4.6 Engine oil level check

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

For intervals, see “Maintenance schedule”.

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

4.7 Engine oil and oil filter change

See section “Maintenance schedule”.
4.8 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.

4.8.1 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.

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.

<table>
<thead>
<tr>
<th></th>
<th>Liter</th>
<th>US gal</th>
<th>Imp gal</th>
<th>cu.ft</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>can 5</td>
<td>5</td>
<td>1.3</td>
<td>1.1</td>
<td>0.175</td>
<td>1604 5308 00</td>
</tr>
<tr>
<td>can 20</td>
<td>5.3</td>
<td>4.4</td>
<td>0.7</td>
<td>1604 5307 01</td>
<td></td>
</tr>
<tr>
<td>barrel 210</td>
<td>55.2</td>
<td>46</td>
<td>7.35</td>
<td>1604 5306 00</td>
<td></td>
</tr>
</tbody>
</table>

4.9 Coolant check

4.9.1 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.

**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.
4.9.2 **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.

4.9.3 **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.
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 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.

6. Checks and trouble shooting

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 ammeters P1, P2, 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.
6.3 Alternator trouble shooting

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternator does not excite</td>
<td>Blown fuse.</td>
<td>Replace fuse.</td>
</tr>
<tr>
<td></td>
<td>Insufficient residual voltage.</td>
<td>Increase the speed by 15%.</td>
</tr>
<tr>
<td></td>
<td>No residual voltage.</td>
<td>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.</td>
</tr>
<tr>
<td>After being excited alternator</td>
<td>Connections are interrupted.</td>
<td>Check connection cables as per attached drawings.</td>
</tr>
<tr>
<td>does not excite</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low voltage at no load</td>
<td>Voltage potentiometer out of setting.</td>
<td>Reset voltage potentiometer.</td>
</tr>
<tr>
<td></td>
<td>Intervention of protection.</td>
<td>Check rpm.</td>
</tr>
<tr>
<td></td>
<td>Winding failure.</td>
<td>Check windings.</td>
</tr>
<tr>
<td>High voltage at no load</td>
<td>Voltage potentiometer out of setting.</td>
<td>Reset voltage potentiometer.</td>
</tr>
<tr>
<td></td>
<td>Failed regulator.</td>
<td>Substitute regulator.</td>
</tr>
<tr>
<td>Lower than rated voltage at load</td>
<td>Voltage potentiometer out of setting.</td>
<td>Reset voltage potentiometer.</td>
</tr>
<tr>
<td></td>
<td>Intervention by protection.</td>
<td>Current too high, power factor lower than 0.8; speed lower than 10% of rated speed.</td>
</tr>
<tr>
<td></td>
<td>Failed regulator.</td>
<td>Substitute regulator.</td>
</tr>
<tr>
<td></td>
<td>Rotating bridge failure.</td>
<td>Check diodes, disconnect cables.</td>
</tr>
<tr>
<td>Higher than rated voltage at load</td>
<td>Voltage potentiometer out of setting.</td>
<td>Reset voltage potentiometer.</td>
</tr>
<tr>
<td></td>
<td>Failed regulator.</td>
<td>Substitute regulator.</td>
</tr>
<tr>
<td>Unstable voltage</td>
<td>Speed variation in engine.</td>
<td>Check regularity of rotation.</td>
</tr>
<tr>
<td></td>
<td>Regulator out of setting.</td>
<td>Regulate stability of regulator by acting on “STABILITY” potentiometer.</td>
</tr>
</tbody>
</table>

6.4 Engine trouble shooting

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

6.4.1 The starter motor turns the engine too slowly
- Battery capacity too low.
- Bad electrical connection.
- Fault in starter motor.
- Wrong grade of lubricating oil.

6.4.2 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.

6.4.3 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.
6.4.4 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.

6.4.5 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.

6.4.6 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.

6.4.7 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.

6.4.8 Blue or white exhaust smoke
- Wrong grade of lubricating oil.
- Fault in cold start system.
- Engine temperature is too low.

6.4.9 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.

6.4.10 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.

6.4.11 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.

6.4.12 The pressure of the lubricating oil is too high
- Wrong grade of lubricating oil.
- Defective gauge.

6.4.13 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.

6.4.14 Crankcase pressure
- Restriction in breather pipe.
- Vacuum pipe leaks or fault in exhauster.

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

6.4.16 The engine starts and stops
- Dirty fuel filter element.
- Restriction in air filter/cleaner or induction system.
- Air in fuel system.

6.4.17 The engine shuts down after approx. 15 sec.
- Bad connection towards oil pressure switch/coolant temperature switch.
7. Options available for QAS 30 Pd, QAS 45 Pd and QAS 60 Pd units

7.1 Circuit diagrams

The engine control circuit diagrams and the power circuit diagrams for the standard QAS 30, QAS 45 and QAS 60 Pd units:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Power circuit</th>
<th>Engine control circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>QAS 30 Pd Qc1001™</td>
<td>9822 0992 10</td>
<td>9822 0992 18</td>
</tr>
<tr>
<td>QAS 45 - 60 Pd Qc1001™</td>
<td>9822 0992 20</td>
<td>9822 0992 18</td>
</tr>
<tr>
<td>QAS 30 Pd Qc3001™</td>
<td>9822 0992 10</td>
<td>9822 0992 19</td>
</tr>
<tr>
<td>QAS 45 - 60 Pd Qc3001™</td>
<td>9822 0992 20</td>
<td>9822 0992 19</td>
</tr>
<tr>
<td>QAS 30 Pd Low voltage</td>
<td>9822 0992 11</td>
<td></td>
</tr>
<tr>
<td>QAS 45 - 60 Pd Low voltage</td>
<td>9822 0992 21</td>
<td></td>
</tr>
</tbody>
</table>

7.2 Overview of the electrical options

The following “electrical” options are available for the QAS 30, QAS 45 and QAS 60 Pd units:

- Automatic battery charger
- Battery switch
- Engine coolant heater
- Outlet sockets (S)
- Single frequency with electronic speed control (SF)
- Dual frequency with electronic speed control (DF)
- Electronic speed regulator
- Low voltage (LV)
- Single phase (1 Ph)
- Earth leakage relay
- IT-relay
- Refinery equipment pack

7.3 Description of the electrical options

7.3.1 Automatic battery charger

The “trickle charger” charges the battery completely and is disconnected once the unit starts up.

Besides the output terminals (secondary side) the automatic battery charger has a trim potentiometer for setting of the output voltage. By means of an insulated slotted screwdriver or adjusting pin the output voltage can be set in the range.

The LED on the front indicates that the unit is operational.

Setting:
- Lower output voltage = Counterclockwise rotation
- Higher output voltage = Clockwise rotation

To use the battery charger:
- Provide the X25 connector, located at the side of the power cubicle, with external power to use the battery charger.

7.3.2 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.

7.3.3 Engine coolant heater

To make sure that the engine can start and accept load immediately, an external coolant heater (1000 W, 240 V) is provided which keeps the engine temperature between 38°C and 49°C.
7.3.4 Outlet sockets (S)

Outlet sockets QAS 30 Pd

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

**X2**........ 3-phase outlet socket (400 V AC)
Provides phases L1, L2 and L3, neutral and earthing.

**X4**........ 3-phase outlet socket (400 V AC)
Provides phases L1, L2 and L3, neutral and earthing.

**X5**........ 3-phase outlet socket (400 V AC)
Provides phases L1, L2 and L3, neutral and earthing.

**X6**........ 1-phase outlet socket (230 V AC)
Provides phase L3, neutral and earthing.

**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 (32 A) 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 (16 A) is activated. When activated, Q5 interrupts the three phases towards X5. It can be activated again after eliminating the problem.

**Q6**........ Circuit breaker for X6
Interrupts the power supply to X6 when a short-circuit occurs at the load side, or when the overcurrent protection (16 A) is activated. When activated, Q6 interrupts phase L3 and the neutral towards X6. It can be activated again after eliminating the problem.

Outlet sockets QAS 45 - 60 Pd

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

**X2-X3** .. 3-phase outlet socket (400 V AC)
Provides phases L1, L2 and L3, neutral and earthing.

**X4**........ 3-phase outlet socket (400 V AC)
Provides phases L1, L2 and L3, neutral and earthing.

**X5**........ 3-phase outlet socket (400 V AC)
Provides phases L1, L2 and L3, neutral and earthing.

**X6**........ 1-phase outlet socket (230 V AC)
Provides phase L3, neutral and earthing.

**Q2-Q3**.. Circuit breaker for X2-X3
Interrupts the power supply to X2-X3 when a short-circuit occurs at the load side, or when the overcurrent protection (63 A) is activated. When activated, Q2-Q3 interrupts the three phases towards X2-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 (32 A) 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 (16 A) is activated. When activated, Q5 interrupts the three phases towards X5. It can be activated again after eliminating the problem.

**Q6**........ Circuit breaker for X6
Interrupts the power supply to X6 when a short-circuit occurs at the load side, or when the overcurrent protection (16 A) is activated. When activated, Q6 interrupts phase L3 and the neutral towards X6. It can be activated again after eliminating the problem.

---

Circuit breaker Q1 does not only interrupt the power supply towards X1, but also towards X2, X4, X5 and X6.

Make sure to switch on circuit breakers Q1, Q4, Q5 and Q6 after starting the generator when power supply is done by means of X4, X5 or X6.
7.3.5 Single frequency with electronic speed control (SF)

The “Single frequency” option provides an electronic speed controller which improves the output frequency of the generator at 50/60 Hz at a constant load.

R11.... Speed adjustment
See “Electronic speed regulator”.

R12.... Voltage adjustment
Allows to adjust the output voltage.

R11.... Speed adjustment

See “Electronic speed regulator”.

R12.... Voltage adjustment
Allows to adjust the output voltage.

7.3.6 Dual frequency with electronic speed control (DF)

The “Dual frequency with electronic speed control” option allows the unit to work at 50 Hz or at 60 Hz with an improved accuracy at constant load. The frequency selection is done by means of switch S12.

R11.... Speed adjustment
See “Electronic speed regulator”.

R12.... Voltage adjustment
Allows to adjust the output voltage.

S12.... 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.

After changing the output frequency, adjust the output voltage by means of potentiometer R12 to the required value.

7.3.7 Electronic speed regulator

The electronic speed regulator makes sure that the output frequency of the generator is 50/60 Hz, independent of the amount of load.
7.3.8 Low voltage (LV)

The "Low voltage" option allows to run the unit at low voltage (= high current).

All the cables that are used must be suitable for high current.

Q1......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 (QAS 30: 80 A, QAS 45: 125 A, QAS 60: 152 A) is activated. It must be reset manually after eliminating the problem.

7.3.9 Single phase (1 Ph)

The "Single phase" option provides single phase output voltage (e.g. 230 V).

X1......Main power supply (230 V AC)

Terminals L1, L2, N (= neutral) and PE (= earthing), hidden behind the control panel door and behind a small transparent door.

Q1......Circuit breaker for single phase operation

Interrupts phases L1, L2 and N 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.

7.3.10 Earth leakage relay

The “Earth relay” option provides a detector that will trip the main circuit breaker Q1 when an earth fault current is detected.

N13....Earth leak detector

Detects and indicates an earth fault current and activates the main circuit breaker Q1. The detection level can be set at 0.03 A fixed with instantaneous trip but can also be adjusted between 0.1 A and 1 A with time delayed (0 - 0.5 sec) trip. N13 has to be reset manually after eliminating the problem (reset button marked R). It can be overridden by means of the earth leak switch (S13, labelled I∆N) but has to be tested monthly (by pushing test button T).

S13....Lock-out switch for earth fault protection (N13)

This switch is located inside the cubicle and is labelled IAN.

Position O: No de-energising of the main circuit breaker Q1 when an earth fault occurs.

Position 1: De-energising of the main circuit breaker Q1 when an earth fault occurs.

Position O will only be used in conjunction with an external earth fault protection unit (e.g. integrated in a distribution board).

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.
7.3.11 IT-relay

The generator is wired for an IT network i.e. no supply lines of the power supply are directly earthed. A failure in insulation resulting in too low insulation resistance, is detected by the insulation monitoring relay.

The generator shall not be operated with other networks (such as TT or TN). Doing so will cause tripping of the insulation monitoring relay.

The generator is wired for an IT network i.e. no supply lines of the power supply are directly earthed. A failure in insulation resulting in too low an insulation resistance, is detected by the insulation monitoring relay.

At each start-up and any time a new load is connected, the insulation resistance must be verified. Check for the correct setting of the insulation monitoring relay (factory set at 13 kΩ).

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.

7.3.12 Refinery equipment pack

This refinery equipment option consists of:

- Integrated spark arrestor
- Engine air inlet shut-off valve

Air inlet shut-off valve

The engine air inlet shut-off valve option will prevent over-speeding of the engine due to combustible gases being traced within the normal engine air intake.

Q1 ..... Circuit breaker for X1

Interrupts the power supply X1 when a short-circuit occurs at the load side, or when the overcurrent protection (QAS 30: 50 A, QAS 45: 63 A, QAS 60: 100 A) is activated. When activated, Q1 interrupts the three phases towards X1. 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.

N14 ... Insulation monitoring relay

Checks the insulation resistance and activates Q1 when the insulation resistance is too low.
7.4 Overview of the mechanical options

The following "mechanical" options are available for the QAS 30, QAS 45 and QAS 60 Pd units:

– External fuel tank connection (with/without quick couplings)
– Undercarriage (axle, towbar, towing eyes)
– Skid fuel tank

7.5 Description of the mechanical options

7.5.1 External fuel tank connection (with/without quick couplings)

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

When using this option, make sure to connect the fuel supply line as well as the fuel return line. Connections to fuel lines 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 fuel tank.

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 fuel tank.

7.5.2 Undercarriage (axle, towbar, towing eyes)

The undercarriage is equipped with an adjustable towbar with brakes, with DIN-eye, AC-eye, NATO-eye, GB-eye, ITA-eye or ball coupling and with road signalisation which is approved by EC legislation.

When using this option

– Make sure that the towing equipment of the vehicle matches the towing eye before towing the generator.
– Never move the generator while electrical cables are connected to the unit.
– Always apply the hand brake when parking the generator.
– Leave enough space for operation, inspection and maintenance (at least 1 meter at each side).

To maintain the undercarriage

– Check the tightness of the towbar bolts, the axle bolts and the wheel nuts at least twice a year and after the initial 50 hours of operation.
– Grease the wheel axle suspension bearings, the drawbar to the steering gear shaft and the spindle of the brake handle at least twice a year. Use ball bearing grease for the wheel bearings and graphite grease for the drawbar and spindle.
– Check the brake system twice a year.
– Check the condition of the vibration dampers twice a year.
– Repack the wheel hub bearings once a year using grease.
– Wheel chocks allows to park the generator on sloping ground. Place wheel chocks in front of or behind the wheels to immobilize the generator.
8. Technical specifications

8.1 Technical specifications for QAS 30 Pd units

8.1.1 Readings on gauges

<table>
<thead>
<tr>
<th>Gauge</th>
<th>Reading</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammeter L1-L3 (P1-P3)</td>
<td>Below max. rating</td>
<td>A</td>
</tr>
<tr>
<td>Voltmeter (P4)</td>
<td>Below max. rating</td>
<td>V</td>
</tr>
</tbody>
</table>

8.1.2 Settings of switches

<table>
<thead>
<tr>
<th>Switch</th>
<th>Function</th>
<th>Activates at</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine oil pressure</td>
<td>shut down</td>
<td>0.5 bar</td>
</tr>
<tr>
<td>Engine coolant temperature</td>
<td>shut down</td>
<td>105°C</td>
</tr>
</tbody>
</table>

8.1.3 Specifications of the engine/alternator/unit

<table>
<thead>
<tr>
<th>Reference conditions 1)</th>
<th>50 Hz</th>
<th>60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated frequency</td>
<td>50 Hz</td>
<td>60 Hz</td>
</tr>
<tr>
<td>Rated speed (optional)</td>
<td>1500 rpm</td>
<td>1800 rpm</td>
</tr>
<tr>
<td>Generator service duty</td>
<td>PRP</td>
<td>PRP</td>
</tr>
<tr>
<td>Absolute air inlet pressure</td>
<td>100 kPa</td>
<td>100 kPa</td>
</tr>
<tr>
<td>Relative air humidity</td>
<td>30 %</td>
<td>30 %</td>
</tr>
<tr>
<td>Air inlet temperature</td>
<td>25°C</td>
<td>25°C</td>
</tr>
</tbody>
</table>

| Limitations 2)                |                    |                |
| Maximum ambient temperature   | 40°C               | 40°C           |
| Altitude capability           | 1000 m             | 1000 m         |
| Maximum relative air humidity | 85 %               | 85 %           |
| Minimum starting temperature unaided | -18°C     | -18°C          |
| Minimum starting temperature aided (optional) | -25°C | -25°C |

| Performance data 2) 3) 5)    |                    |                |
| Rated active power (PRP) 3ph | 24 kW              | 28 kW          |
| Rated power factor (lagging) 3ph | 0.8               | 0.8            |
| Rated PRP power 3ph          | 30 kVA             | 35 kVA         |
| Rated voltage 3ph line to line | 400 V            | 480 V          |
| Rated voltage 3ph line to line lower voltage | 230 V | 240 V |
| Rated current 3ph            | 43.3 A             | 39.7 A         |
| Rated current 3ph lower voltage | 75.3 A           | 79.4 A         |
| Performance class (acc.ISO 8528-5:1993) | G3           | G3             |
| Frequency droop               | <5 %               | <5 %           |
| Fuel consumption at full load/no load | 5.5/1.5 kg/h | 6.3/1.7 kg/h |
| Specific fuel consumption    | 0.23 kg/kWh        | 0.24 kg/kWh   |
| Fuel autonomy at full load with standard tank | 21 h       | 18 h           |
| Fuel autonomy at full load with standard tank and optional skid fuel tank | 51 h       | 45 h           |
| Max. oil consumption at full load | 8.3 g/h         | 9.5 g/h       |
| Maximum sound power level (LWA @ 75% PRP load) measured according to 2000/14/EC OND | 89 dB(A) | 92 dB(A) |
| Capacity of fuel tank         | 134 l              | 134 l          |
| Capacity of optional skid fuel tank | 326 l           | 326 l          |
| Single step load acceptance  | 100 %              | 100 %          |

| Application data              |                    |                |
| Mode of operation             | PRP                | PRP            |
| Site                          | land use           | land use       |
| Operation                     | manual/automatic   | manual/automatic|
| Start-up and control mode     | unspecified        | unspecified    |
| Start-up time                 | transportable/D    | transportable/D|
| Mobility/ Config. acc. to ISO 8528-1:1993 (optional) | mobile/E | mobile/E |
| Mounting                      | fully resilient    | fully resilient|
| Climatic exposure             | open air           | open air       |
| Degree of protection (cubicle) | IP54              | IP54           |
| Status of neutral             | earthed            | earthed        |
Alternator 4) Standard

- Make: NEWAGE
- Model: BCI 184 H
- Rated output, class H temp. rise
  - Rating type acc. ISO 8528-3: 37.5 kVA, 46.9 kVA
  - Degree of protection: IP 23, IP 23
  - Insulation stator class: H, H
  - Insulation rotor class: H, H
  - Number of wires: 12, 12

Engine 4)

- Make: NEWAGE
- Model: BCI 184 H
- Rated net output
  - Rating type acc. ISO 3046-7: 27 kW, 30.5 kW
  - Coolant: water, water
  - Aspiration: natural aspirated, natural aspirated
  - Number of cylinders: 3, 3
  - Swept volume: 3.3 l, 3.3 l
  - Speed governing
    - Mechanical: 3.3 l, 3.3 l
    - Electronic: 7.4 l, 7.4 l
  - Capacity of oil sump: 10.1 l, 10.1 l
  - Capacity of cooling system: 10.1 l, 10.1 l
  - Electrical system: 12 Vdc, 12 Vdc

Power circuit

- Circuit-breaker, 3ph
  - Number of poles: 4, 4
  - Thermal release Ith (thermal release is higher at 25°C): 50 A, 50 A
  - Magnetic release Im: 3.5xIn, 3.5xIn

- Circuit-breaker, 3ph, lower voltage
  - Number of poles (optional): 3, 4
  - Thermal release Ith (thermal release is higher at 25°C): 80 A, TBA
  - Magnetic release Im: 3.5xIn, 3.5xIn

Fault current protection

- Residual current release IDn: 0.030-30 A, 0.030-30 A
- Insulation resistance (optional)
  - Domestic (1x): 2p + E, 16 A + 230 V
  - CEE form (1x)
    - 3p + N + E: 16 A + 400 V
  - CEE form (1x)
    - 3p + N + E: 32 A + 400 V
  - CEE form (1x)
    - 3p + N + E: 63 A + 400 V

Outlet sockets (optional)

- 2p + E, 16 A + 230 V
- CEE form (1x)
  - 3p + N + E: 16 A + 400 V
  - CEE form (1x)
    - 3p + N + E: 32 A + 400 V
  - CEE form (1x)
    - 3p + N + E: 63 A + 400 V

Unit

- Dimensions (LxWxH): 2450 x 1100 x 1483 mm, 2450 x 1100 x 1483 mm
- Weight net mass: 1352 kg, 1352 kg
- Weight wet mass: 1460 kg, 1460 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 80%.
5) Specific mass fuel used: 0.86 kg/l.

Derating

<table>
<thead>
<tr>
<th>Height (m)</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>500</td>
<td>100</td>
</tr>
<tr>
<td>1000</td>
<td>99</td>
</tr>
<tr>
<td>1500</td>
<td>94</td>
</tr>
<tr>
<td>2000</td>
<td>90</td>
</tr>
<tr>
<td>2500</td>
<td>84</td>
</tr>
<tr>
<td>3000</td>
<td>77</td>
</tr>
<tr>
<td>3500</td>
<td>71</td>
</tr>
<tr>
<td>4000</td>
<td>64</td>
</tr>
</tbody>
</table>

For use of generator outside these conditions, please contact Atlas Copco.
8.2 Technical specifications for QAS 45 Pd units

8.2.1 Readings on gauges

<table>
<thead>
<tr>
<th>Gauge</th>
<th>Reading</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammeter L1-L3 (P1-P3)</td>
<td>Below max. rating</td>
<td>A</td>
</tr>
<tr>
<td>Voltmeter (P4)</td>
<td>Below max. rating</td>
<td>V</td>
</tr>
</tbody>
</table>

8.2.2 Settings of switches

<table>
<thead>
<tr>
<th>Switch</th>
<th>Function</th>
<th>Activates at</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine oil pressure</td>
<td>shut down</td>
<td>0.5 bar</td>
</tr>
<tr>
<td>Engine coolant temperature</td>
<td>shut down</td>
<td>105°C</td>
</tr>
</tbody>
</table>

8.2.3 Specifications of the engine/alternator/unit

<table>
<thead>
<tr>
<th>Reference conditions 1)</th>
<th>Rated frequency</th>
<th>50 Hz</th>
<th>60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Generator service duty</td>
<td>PRP</td>
<td>PRP</td>
</tr>
<tr>
<td>Absolute air inlet pressure</td>
<td>100 kPa</td>
<td>100 kPa</td>
<td></td>
</tr>
<tr>
<td>Relative air humidity</td>
<td>30 %</td>
<td>30 %</td>
<td></td>
</tr>
<tr>
<td>Air inlet temperature</td>
<td>25°C</td>
<td>25°C</td>
<td></td>
</tr>
</tbody>
</table>

| Limitations 2)          | Maximum ambient temperature | 40°C | 40°C |
|                         | Altitude capability        | 1000 m | 1000 m |
|                         | Maximum relative air humidity | 85 % | 85 % |
|                         | Minimum starting temperature unaided | -18°C | -18°C |
|                         | Minimum starting temperature aided (optional) | -25°C | -25°C |

| Performance data 2) 3) 5) | Rated active power (PRP) 3ph | 36 kW | 44 kW |
|                          | Rated power factor (lagging) 3ph | 0.8 | 0.8 |
|                          | Rated PRP power 3ph | 45 kVA | 55 kVA |
|                          | Rated voltage 3ph, line to line | 400 V | 480 V |
|                          | Rated voltage 3ph, line to line lower voltage | 230 V | 240 V |
|                          | Rated current 3ph | 65 A | 66 A |
|                          | Rated current 3ph, lower voltage | 113 A | 132 A |
|                          | Frequency droop | <5 % | <5 % |
|                          | Fuel consumption at full load/no load | 8.3/1.5 kg/h | 11.3/2.2 kg/h |
|                          | Specific fuel consumption | 0.21 kg/kWh | 0.24 kg/kWh |
|                          | Fuel autonomy at full load with standard tank | 14 h | 10 h |
|                          | Fuel autonomy at full load with standard tank and optional skid fueltank | 47 h | 35 h |
|                          | Max. oil consumption at full load | 12.5 g/h | 17.0 g/h |
|                          | Maximum sound power level (LWA) measured according to 2000/14/EC OND | 88 dB(A) | 92 dB(A) |
|                          | Capacity of fuel tank | 134 l | 134 l |
|                          | Capacity of optional skid fuel tank | 326 l | 326 l |
|                          | Single step load acceptance | 100 % | 100 % |

<table>
<thead>
<tr>
<th>Application data</th>
<th>Mode of operation</th>
<th>PRP</th>
<th>PRP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Site</td>
<td>land use</td>
<td>land use</td>
</tr>
<tr>
<td></td>
<td>Operation</td>
<td>single</td>
<td>single</td>
</tr>
<tr>
<td></td>
<td>Start-up and control mode</td>
<td>manual/automatic</td>
<td>manual/automatic</td>
</tr>
<tr>
<td></td>
<td>Start-up time</td>
<td>unspecified</td>
<td>unspecified</td>
</tr>
<tr>
<td></td>
<td>Mobility/ Config. acc. to ISO 8528-1:1993 (optional)</td>
<td>mobile/D</td>
<td>mobile/E</td>
</tr>
<tr>
<td></td>
<td>Mounting</td>
<td>fully resilient</td>
<td>fully resilient</td>
</tr>
<tr>
<td></td>
<td>Climatic exposure</td>
<td>open air</td>
<td>open air</td>
</tr>
<tr>
<td></td>
<td>Degree of protection (cubicle)</td>
<td>IP54</td>
<td>IP54</td>
</tr>
<tr>
<td></td>
<td>Status of neutral</td>
<td>earthed</td>
<td>earthed</td>
</tr>
<tr>
<td>Alternator 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>----------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Make</strong></td>
<td>NEWAGE</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Model</strong></td>
<td>UCI 224 D</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rated output, class H temp. rise</strong></td>
<td>50 kVA</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Degree of protection</strong></td>
<td>IP 23</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Insulation stator class</strong></td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Insulation rotor class</strong></td>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of wires</strong></td>
<td>12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Engine 4</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Make</strong></td>
<td>NEWAGE</td>
</tr>
<tr>
<td><strong>Model</strong></td>
<td>UCI 224 D</td>
</tr>
<tr>
<td><strong>Rated output</strong></td>
<td>62.5 kVA</td>
</tr>
<tr>
<td><strong>Degree of protection</strong></td>
<td>IP 23</td>
</tr>
<tr>
<td><strong>Insulation stator class</strong></td>
<td>H</td>
</tr>
<tr>
<td><strong>Insulation rotor class</strong></td>
<td>H</td>
</tr>
<tr>
<td><strong>Number of wires</strong></td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power circuit</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Circuit-breaker, 3ph</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Number of poles</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>Thermal release It (thermal release is higher at 25°C)</strong></td>
<td>63 A</td>
</tr>
<tr>
<td><strong>Magnetic release Im</strong></td>
<td>3.5xIn</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Circuit-breaker, 3ph, lower voltage</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of poles (optional)</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Thermal release It (thermal release is higher at 25°C)</strong></td>
<td>128 A</td>
</tr>
<tr>
<td><strong>Magnetic release Im</strong></td>
<td>3.5xIn</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fault current protection</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Residual current release IDn</strong></td>
<td>0.030-30 A</td>
</tr>
<tr>
<td><strong>Insulation resistance (optional)</strong></td>
<td>10-100 kOhm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outlet sockets (optional)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2p + E</strong> 16 A + 230 V</td>
<td></td>
</tr>
<tr>
<td><strong>3p + N + E</strong> 16 A + 400 V</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unit</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions (LxWxH)</strong></td>
<td>2450 x 1100 x 1483 mm</td>
</tr>
<tr>
<td><strong>Weight net mass</strong></td>
<td>1454 kg</td>
</tr>
<tr>
<td><strong>Weight wet mass</strong></td>
<td>1547 kg</td>
</tr>
</tbody>
</table>
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.

Derating

<table>
<thead>
<tr>
<th>Height (m)</th>
<th>0</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>98</td>
<td>97</td>
</tr>
<tr>
<td>500</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>99</td>
<td>98</td>
</tr>
<tr>
<td>1000</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>99</td>
<td>98</td>
<td>97</td>
<td>96</td>
</tr>
<tr>
<td>1500</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>99</td>
<td>98</td>
<td>97</td>
<td>96</td>
<td>95</td>
</tr>
<tr>
<td>2000</td>
<td>100</td>
<td>99</td>
<td>98</td>
<td>97</td>
<td>96</td>
<td>95</td>
<td>94</td>
<td>93</td>
<td>93</td>
</tr>
<tr>
<td>2500</td>
<td>97</td>
<td>97</td>
<td>97</td>
<td>97</td>
<td>96</td>
<td>95</td>
<td>94</td>
<td>93</td>
<td>92</td>
</tr>
<tr>
<td>3000</td>
<td>97</td>
<td>96</td>
<td>96</td>
<td>95</td>
<td>94</td>
<td>93</td>
<td>92</td>
<td>91</td>
<td>90</td>
</tr>
<tr>
<td>3500</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>89</td>
<td>89</td>
<td>88</td>
<td>87</td>
</tr>
<tr>
<td>4000</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>89</td>
<td>88</td>
<td>87</td>
<td>86</td>
<td>84</td>
<td>83</td>
</tr>
</tbody>
</table>

For use of generator outside these conditions, please contact Atlas Copco.
8.3 Technical specifications for QAS 60 Pd units

8.3.1 Readings on gauges

<table>
<thead>
<tr>
<th>Gauge</th>
<th>Reading</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammeter L1-L3 (P1-P3)</td>
<td>Below max. rating</td>
<td>A</td>
</tr>
<tr>
<td>Voltmeter (P4)</td>
<td>Below max. rating</td>
<td>V</td>
</tr>
</tbody>
</table>

8.3.2 Settings of switches

<table>
<thead>
<tr>
<th>Switch</th>
<th>Function</th>
<th>Activates at</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine oil pressure</td>
<td>shut down</td>
<td>0.5 bar</td>
</tr>
<tr>
<td>Engine coolant temperature</td>
<td>shut down</td>
<td>105°C</td>
</tr>
</tbody>
</table>

8.3.3 Specifications of the engine/alternator/unit

Reference conditions 1)

- Rated frequency: 50 Hz, 60 Hz
- Rated speed (optional): 1500 rpm, 1800 rpm
- Generator service duty: PRP, PRP
- Absolute air inlet pressure: 100 kPa, 100 kPa
- Relative air humidity: 30 %, 30 %
- Air inlet temperature: 25°C, 25°C

Limitations 2)

- Maximum ambient temperature: 40°C, 40°C
- Altitude capability: 1000 m, 1000 m
- Maximum relative air humidity: 85 %, 85 %
- Minimum starting temperature unaided: -18°C, -18°C

Performance data 2) 3) 5)

- Rated active power (PRP) 3ph: 48 kW, 56 kW
- Rated power factor (lagging) 3ph: 0.8, 0.8
- Rated PRP power 3ph: 60 kVA, 70 kVA
- Rated voltage 3ph. line to line: 400 V, 480 V
- Rated voltage 3ph. line to line lower voltage: 230 V, 240 V
- Rated current PRP: 87 A, 84 A
- Rated current 3ph.: 151 A, 168 A
- Frequency droop: <5 %, <5 %
- Fuel consumption at full load/no load: 10.8/1.7 kg/h, 13.4/2.2 kg/h
- Specific fuel consumption: 0.23 kg/kWh, 0.24 kg/kWh
- Fuel autonomy at full load with standard tank: 11 h, 9 h
- Fuel autonomy at full load with standard tank and optional skid fuel tank: 37 h, 30 h
- Max. oil consumption at full load: 16.2 g/h, 20.1 g/h
- Maximum sound power level (LWA) measured according to 2000/14/EC OND: 90 dB(A), 94 dB(A)
- Capacity of fuel tank: 134 l, 134 l
- Capacity of optional skid fuel tank: 326 l, 326 l
- Single step load acceptance: 95 %, 100 %

Application data

- Mode of operation: PRP, PRP
- Site: land use, land use
- Operation: single, single
- Start-up and control mode: manual/automatic, manual/automatic
- Start-up time: unspecified, unspecified
- Mobile/E: mobile/E, mobile/E
- Mounting: fully resilient, fully resilient
- Climatic exposure: open air, open air
- Degree of protection (cubicle): IP54, IP54
- Status of neutral: earthed, earthed
### Alternator 4)

<table>
<thead>
<tr>
<th><strong>Standard</strong></th>
<th>IEC34-1</th>
<th>IEC34-1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Make</strong></td>
<td>NEWAGE</td>
<td>NEWAGE</td>
</tr>
<tr>
<td><strong>Model</strong></td>
<td>UCI 224 E</td>
<td>UCI 224 E</td>
</tr>
<tr>
<td><strong>Rated output, class H temp. rise</strong></td>
<td>60 kVA</td>
<td>70 kVA</td>
</tr>
<tr>
<td>rating type acc. ISO 8528-3</td>
<td>BR</td>
<td>BR</td>
</tr>
<tr>
<td><strong>Degree of protection</strong></td>
<td>IP 23</td>
<td>IP 23</td>
</tr>
<tr>
<td><strong>Insulation stator class</strong></td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td><strong>Insulation rotor class</strong></td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td><strong>Number of wires</strong></td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

### Engine 4)

<table>
<thead>
<tr>
<th><strong>Standard</strong></th>
<th>ISO 3046</th>
<th>ISO 3046</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type PERKINS</strong></td>
<td>1103A-33TG2</td>
<td>1103A-33TG2</td>
</tr>
<tr>
<td><strong>Rated net output</strong></td>
<td>59.3 kW</td>
<td>69.2 kW</td>
</tr>
<tr>
<td>rating type acc. ISO 3046-7</td>
<td>ICXN</td>
<td>ICXN</td>
</tr>
<tr>
<td><strong>Coolant</strong></td>
<td>water</td>
<td>water</td>
</tr>
<tr>
<td><strong>Combustion system</strong></td>
<td>direct injection</td>
<td>direct injection</td>
</tr>
<tr>
<td><strong>Aspiration</strong></td>
<td>turbo</td>
<td>turbo</td>
</tr>
<tr>
<td><strong>Number of cylinders</strong></td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Swept volume</strong></td>
<td>3.3 l</td>
<td>3.3 l</td>
</tr>
<tr>
<td><strong>Speed governing</strong></td>
<td>mechanical</td>
<td>mechanical</td>
</tr>
<tr>
<td>(optional)</td>
<td>electronic</td>
<td>electronic</td>
</tr>
<tr>
<td><strong>Capacity of oil sump</strong></td>
<td>8 l</td>
<td>8 l</td>
</tr>
<tr>
<td><strong>Capacity of cooling system</strong></td>
<td>12.6 l</td>
<td>12.6 l</td>
</tr>
<tr>
<td><strong>Electrical system</strong></td>
<td>12 Vdc</td>
<td>12 Vdc</td>
</tr>
</tbody>
</table>

### Power circuit

#### Circuit-breaker, 3ph

| **Number of poles** | 4 | 4 |
| **Thermal release It (thermal release is higher at 25°C)** | 100 A | 100 A |
| **Magnetic release Im** | 3.5xIn | 3.5xIn |

#### Circuit-breaker, 3ph, lower voltage

| **Number of poles (optional)** | 3 | 4 |
| **Thermal release It (thermal release is higher at 25°C)** | 152 A | TBA |
| **Magnetic release Im** | 3.5xIn | 3.5xIn |

#### Fault current protection

- **Residual current release IDn**
  - 0.030-30 A
- **Insulation resistance (optional)**
  - 10-100 kOhm
  - domestic (1x) 2p + E
    - 16 A + 230 V
  - CEE form (1x) 3p + N + E
    - 16 A + 400 V
  - CEE form (1x) 3p + N + E
    - 32 A + 400 V
  - CEE form (1x) 3p + N + E
    - 63 A + 400 V

### Outlet sockets (optional)

| **Dimensions (LxWxH)** | 2450 x 1100 x 1483 mm | 2450 x 1100 x 1483 mm |
| **Weight net mass** | 1456 kg | 1456 kg |
| **Weight wet mass** | 1566 kg | 1566 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 80%.
5) Specific mass fuel used: 0.86 kg/l.

Derating

<table>
<thead>
<tr>
<th>Height (m)</th>
<th>Temperature (°C) 0</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>98</td>
<td>97</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>99</td>
<td>98</td>
<td>97</td>
</tr>
<tr>
<td>1000</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>99</td>
<td>98</td>
<td>97</td>
<td>96</td>
</tr>
<tr>
<td>1500</td>
<td>97</td>
<td>97</td>
<td>97</td>
<td>97</td>
<td>97</td>
<td>97</td>
<td>97</td>
<td>96</td>
<td>95</td>
</tr>
<tr>
<td>2000</td>
<td>94</td>
<td>94</td>
<td>94</td>
<td>94</td>
<td>94</td>
<td>94</td>
<td>94</td>
<td>93</td>
<td></td>
</tr>
<tr>
<td>2500</td>
<td>88</td>
<td>88</td>
<td>88</td>
<td>88</td>
<td>88</td>
<td>88</td>
<td>88</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td>3000</td>
<td>88</td>
<td>88</td>
<td>88</td>
<td>88</td>
<td>88</td>
<td>88</td>
<td>88</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td>3500</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>4000</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td></td>
</tr>
</tbody>
</table>

For use of generator outside these conditions, please contact Atlas Copco.
8.4 Conversion list of SI units into British units

- 1 bar = 14.504 psi
- 1 g = 0.035 oz
- 1 kg = 2.205 lb
- 1 km/h = 0.621 mile/h
- 1 kW = 1.341 hp (UK and US)
- 1 l = 0.264 US gal
- 1 l = 14.504 psi
- 1 m = 3.281 ft
- 1 mm = 0.039 in
- 1 m³/min = 35.315 cfm
- 1 N = 0.225 lbf
- 1 Nm = 0.738 lbf ft
- 1 mbar = 0.401 in wc
- 1 kg = 2.205 lb
- 1 m³/min = 35.315 cfm
- 1 km/h = 0.621 mile/h
- 1 N = 0.225 lbf
- 1 Nm = 0.738 lbf ft
- 1 mbar = 0.401 in wc
- 1 kW = 1.341 hp (UK and US)
- 1 l = 0.264 US gal
- 1 l = 14.504 psi
- 1 m = 3.281 ft
- 1 mm = 0.039 in
- 1 m³/min = 35.315 cfm
- 1 N = 0.225 lbf
- 1 Nm = 0.738 lbf ft
- 1 mbar = 0.401 in wc
- 1 kg = 2.205 lb
- 1 m³/min = 35.315 cfm
- 1 km/h = 0.621 mile/h
- 1 N = 0.225 lbf
- 1 Nm = 0.738 lbf ft
- 1 mbar = 0.401 in wc
- 1 kg = 2.205 lb
- 1 m³/min = 35.315 cfm
- 1 km/h = 0.621 mile/h
- 1 N = 0.225 lbf
- 1 Nm = 0.738 lbf ft
- 1 mbar = 0.401 in wc
- A temperature difference of 1°C = a temperature difference of 1.8°F.

8.5 Dataplate

- A Maximum permitted loaded weight of the vehicle
- B Maximum permitted road weight of the front axle
- C Maximum permitted road weight of the rear axle
- 1 Company code
- 2 Product code
- 3 Unit serial number
- 4 Name of the manufacturer
- 5 EEC or national type approval number
- 6 Vehicle identification number
- 7 Model number
- 8 Frequency
- 9 Apparent power - PRP
- 10 Active power - PRP
- 11 Nominal rated voltage
- 12 Nominal rated current
- 13 Power factor
- 14 Manufacturing year
- 15 EEC mark in accordance with Machine Directive 89/392E
- 16 Mode of operation
- 17 Winding connections
Circuit diagrams
9822 0992 10/01
Applicable for QAS 30  Power Circuit diagram
Notes

Note 1: The PE-N connection has to be made at the alternator-side of main Circuit Breaker Q1.
Note 2: Link N12.1 to N12.2 on gen-sets without Electronic Speed Regulation (= no potentiometer R12).
Note 3: With "TB EDF", do NOT connect (N) to (PE) at Q1.

T13 is to be mounted on the (PE)-conductor, instead of on the PE-N connection in the cubicle.

Legend

Wire size:
- aa = 0.5 mm²
- a = 1 mm²
- b = 1.5 mm²
- c = 2.5 mm²
- d = 4 mm²
- e = 6 mm²
- f = 10 mm²
- g = 16 mm²
- h = 25 mm²
- i = 50 mm²
- j = 70 mm²
- k = 70 mm²
- bx = 1.5 mm²

Colour code:
- 0 = black
- 1 = brown
- 2 = red
- 3 = orange
- 4 = yellow
- 5 = green
- 6 = blue
- 7 = purple
- 8 = grey
- 9 = white
- 10 = green/yel.

Wire Size x
- 10 mm²
- 2.5 mm²
- 16 mm²
- 50 mm²

Wire Size y
- 1.5 mm²
- 5 mm²
- 10 mm²
- 16 mm²

Notes:

B11 Speed sensor MPU (O)
F1-F3 Fuses 4 A
G3 Alternator
K7 Auxiliary relay for Y7 (O)
N11 Speed controller (O)
N12 Automatic voltage regulator
N13 Earth leakage relay (O)
N14 IT-relay (O)
Q1 Circuit breaker
Q4 Circuit breaker 32 A
Q5 Circuit breaker 16 A
Q6 Circuit breaker 16 A/30 mA
R1 Current transformer T1
R11 Speed adjustment (O)
R12 Voltage adjustment (O)
R13 E.L.R. Disable-switch (O)
S2b Emergency stop
S12 50/60 Hz switch (O)
S13 Voltage adjustment (O)
T1-T3 Current transformers (O)
T13 Torus earth leakage (O)
U1 Battery charger (O)
V7 Free-wheeling diode Y7
X1 Terminal board
X2 Outlet socket 63 A
X4 Outlet socket 32 A
X5 Outlet socket 16 A
X6 Outlet socket 16 A
X9 Terminal strip
X7 Air inlet shutdown valve (O)
Y7 Air inlet shutdown valve (O)
W1 Ampere-meter
V-meter & Control Module
X2 63 A
X4 32 A
X1 63 A
CIRCUIT DIAGRAM

Legend

Wire size:
- aa = 0.5 mm
- a = 1 mm
- b = 1.5 mm
- c = 2.5 mm
- d = 4 mm
- e = 6 mm
- f = 10 mm
- g = 16 mm
- h = 25 mm
- i = 35 mm
- j = 50 mm
- bx = 1.5 mm

Colour code:
- 0 = black
- 1 = brown
- 2 = red
- 3 = orange
- 4 = yellow
- 5 = green
- 6 = blue
- 7 = purple
- 8 = grey
- 9 = white
- 54 = green/yellow

Notes

Note 1: The PE-N connection has to be made at the alternator-side of main Circuit Breaker Q1.
Note 2: Link N12.1 to N12.2 on gen-sets without Electronic Speed Regulation (= no potentiometer R12).

B11 Speed sensor MPU (O)
F1-F3 Fuses 4 A
G3 Alternator
K7 Aux. relay for Y7 (O)
N11 Speed controller (O)
N12 Automatic voltage regulator
N13 Earth leakage relay (O)
N14 JT-relay (O)
Q1 Circuit breaker
R5 Coolant heater (O)
R11 Speed adjustment 5 K (O)
R12 Voltage adjustment 1 K (O)
S2b Emergency stop
(S2a: see Engine Circuit)
S13 E.L.R. Disable-switch (O)
T1-T3 Current transformers
T13 Torus earth leakage (O)
U1 Battery charger (O)
V7 Free-wheeling diode Y7
X1 Terminal board
X9 Terminal strip
Y7 Air inlet shutdown valve (O)
(O) Optional equipment
A1 Generator control unit
B7 Fuel level sensor
B8 Coolant temperature sensor
B9 Oil pressure sensor
E1 Preheat resistor

F4 Fuse 10 A
G1 Battery 12 Vdc
G2 Charging alternator
H1 Panel light
K0 Starter solenoid

K1 Preheat relay
K4 W/L-inverter relay
K5 Starter relay
M1 Starter motor
M6 Fuel feed pump

9822 0992 18/01
Applicable for QAS 30 - 45 - 60 Qc1001™
A1 Generator control unit  E1 Preheat resistor  K0 Starter solenoid  
B7 Fuel level sensor  F4 Fuse 10 A  K1 Preheat relay  
B8 Coolant temperature sensor  G1 Battery 12 Vdc  K4 W/L Inverter relay  
B9 Oil pressure sensor  G2 Charging alternator  K5 Starter relay  

CIRCUIT DIAGRAM
CIRCUIT DIAGRAM

Legend

<table>
<thead>
<tr>
<th>Wire size</th>
<th>Colour code</th>
</tr>
</thead>
<tbody>
<tr>
<td>aa</td>
<td>0 = black</td>
</tr>
<tr>
<td>a</td>
<td>1 = red</td>
</tr>
<tr>
<td>b</td>
<td>2 = orange</td>
</tr>
<tr>
<td>c</td>
<td>3 = yellow</td>
</tr>
<tr>
<td>d</td>
<td>4 = green</td>
</tr>
<tr>
<td>e</td>
<td>5 = blue</td>
</tr>
<tr>
<td>f</td>
<td>6 = grey</td>
</tr>
<tr>
<td>g</td>
<td>7 = purple</td>
</tr>
<tr>
<td>h</td>
<td>8 = green/yellow</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Position of Relay Cont.</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

K6 Fuel solenoid relay  
M1 Starter motor  
M6 Fuel feed pump  
R2 Excitat. resistor 47 Ohm  
S2a Emergency stop  
S2b Low coolant level switch  
S6 Low coolant temperature switch  
S8 High coolant temperature switch  
S9 Low oil pressure switch  
S20 ON-OFF-switch  
V2 Diode  
X10 Connector wire harness  
X25 Customer’s terminal strip  
Y1 Fuel stop solenoid

2954 2370 00 65
Applicable for QAS 45 - 60 Power Circuit diagram

<table>
<thead>
<tr>
<th>B11</th>
<th>F1-F3</th>
<th>N13</th>
<th>N14</th>
<th>Q6</th>
<th>R5</th>
<th>R11</th>
<th>R12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed sensor MPU (O)</td>
<td>Fuses 4 A</td>
<td>Earth leakage relay (O)</td>
<td>IT-relay (O)</td>
<td>Circuit breaker 16 A/30 mA</td>
<td>Coolant heater (O)</td>
<td>Speed adjustment 5 K (O)</td>
<td>Speed adjustment 1 K (O)</td>
</tr>
<tr>
<td>N13</td>
<td>N14</td>
<td>Q1</td>
<td>Q2-Q3</td>
<td>Q6</td>
<td>R5</td>
<td>R11</td>
<td>R12</td>
</tr>
<tr>
<td>Earth leakage relay (O)</td>
<td>IT-relay (O)</td>
<td>Circuit breaker</td>
<td>Circuit breaker 63 A</td>
<td>Circuit breaker 16 A/30 mA</td>
<td>Circuit breaker 63 A</td>
<td>Circuit breaker 16 A</td>
<td>Circuit breaker 16 A</td>
</tr>
</tbody>
</table>

Note 4: Do NOT connect (N) to (PE)
CIRCUIT DIAGRAM

Legend

Wire size: Colour code:

aa = 0.5 mm²   0 = black
a = 1 mm²     1 = brown
b = 1.5 mm²   2 = red
c = 2.5 mm²   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 = 15 mm² N.S.G.A.F.OeU

Notes

Note 1: The PE-N connection has to be made at the alternator-side of main Circuit Breaker Q1.

Note 2: Link N12.1 to N12.2 on gensets without Electronic Speed Regulation

Note 3: With "B EDP": do NOT connect N to PE at Q1.

T13 is to be mounted on the PE conductor, instead of on the PE-N connection in the cubicle.

S12  50/60 Hz switch (O)
S13  E.L.R. Disable-switch (O)
T1-T3 Current transformers
T13  Torus earth leakage (O)
U1  Battery charger (O)

V7  Free-wheeling diode Y7
X1  Terminal board
X2-X3 Outlet socket 63 A
X4  Outlet socket 32 A
X5  Outlet socket 16 A
X6  Outlet socket 16 A
X7  Terminal strip
Y7  Air inlet shutdown valve (O)

(O)  Optional equipment
CIRCUIT DIAGRAM

9822 0992 21/01
Applicable for QAS 45 - 60 Low voltage
Instruction Manual
for AC Generators

QAS 30 - 45 - 60 Pd