Instruction Manual for AC Generators

QAS108 Pd(S)
QAS108 Pd(S) IT

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ATLAS COPCO - PORTABLE AIR DIVISION
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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.

Congratulations on the purchase of your QAS108 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

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

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

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

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

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

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

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

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

9 Never leave a load hanging on a hoist.

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

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

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

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

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

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

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 arrestor to trap incendiary sparks.

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

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

4 Never remove a filler cap of the 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 (175 °F) and which may be accidentally touched by personnel shall not be removed before the parts have cooled to room temperature.

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

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

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

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

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

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

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

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

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

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

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

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

23 Check the electric cables regularly. Damaged cables and insufficient lightening of connections may cause electric shocks. Whenever damaged wires or dangerous conditions are observed, switch the circuit breakers to OFF and stop the engine. Replace the damaged wires or correct the dangerous condition before restarting. Make sure that all electric connections are securely tightened.

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

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

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

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

1.5 SAFETY DURING MAINTENANCE AND REPAIR

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

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

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

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

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

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

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

7 Take safety precautions against toxic vapours of cleaning liquids.

8 Never use machine parts as a climbing aid.

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

10 Never weld on or perform any operation involving heat near the fuel or oil systems. Fuel and oil tanks must be completely purged, e.g. by steam-cleaning, before carrying out such operations. Never weld on, or in any way modify, pressure vessels. Disconnect the alternator cables during arc welding on the unit.

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

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

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

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

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

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

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

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

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

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

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

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

1.6 TOOL APPLICATIONS SAFETY

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

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

1.7 BATTERY SAFETY PRECAUTIONS

Batteries

When servicing batteries, always wear protecting clothing and glasses.

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

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

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

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

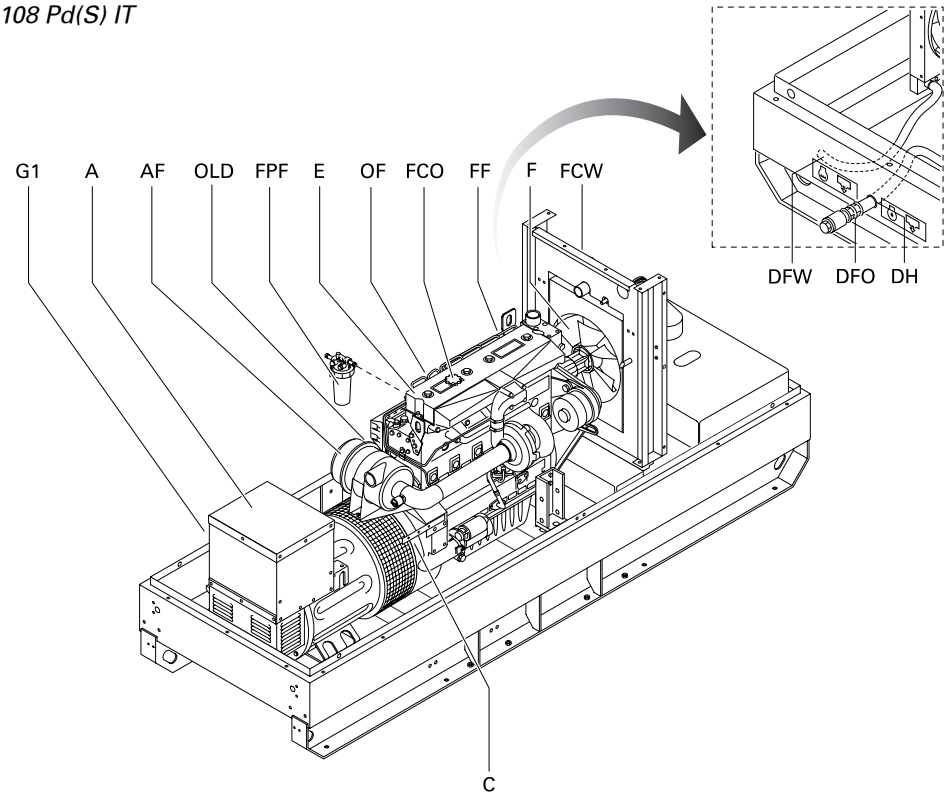
The QAS108 is an AC generator, built for continuous running at sites where no electricity is available or as stand-by in cases of interruption of the mains.

The generator operates at 50/60 Hz, 230/220 V in line-to-neutral mode and 400/440 V in line-to-line mode.

The QAS108 generator is driven by a fluid-cooled diesel engine, manufactured by PERKINS.

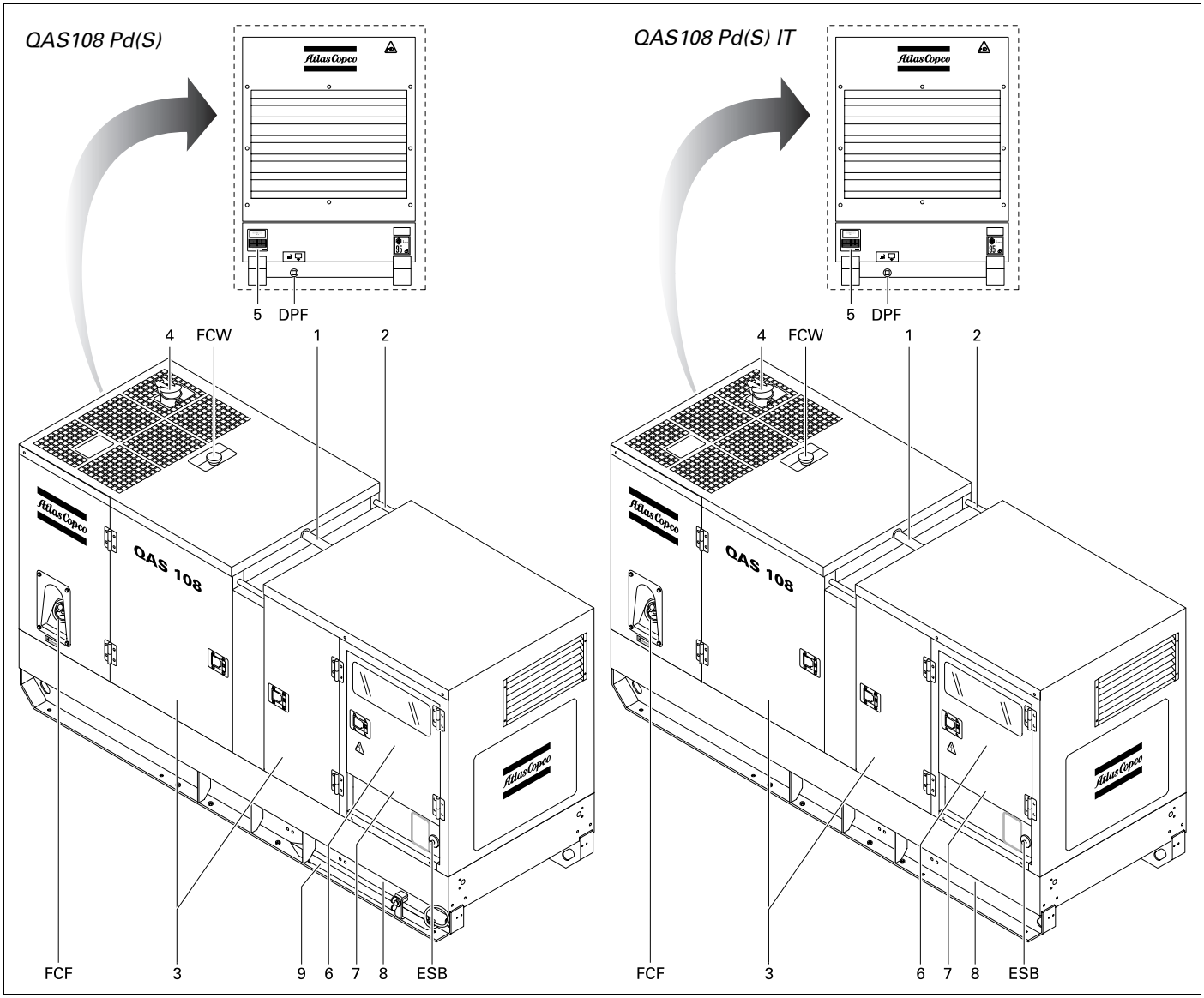
An overview of the main parts is given in the diagram below.

QAS108 Pd(S) & QAS108 Pd(S) IT



A	Alternator
AF	Air filter
C	Coupling
DFO	Drain flexible engine oil
DFW	Drain flexible coolant
DH	Drain and access hole (in the frame)
E	Engine
F	Fan
FCO	Filler cap engine oil
FCW	Filter cap coolant
FF	Fuel filter
FPF	Fuel pre-filter
G1	Battery
OF	Oil filter
OLD	Engine oil level dipstick

The QAS108 AC generator is available in 2 versions: QAS108 Pd(S) and QAS108 Pd(S) IT. Some parts of the unit are different, depending on which version.



QAS108 Pd(S)

1	Lifting rod
2	Guiding rod
3	Side doors
4	Engine exhaust
5	Data plate
6	Side door, access to control and indicator panel
7	Output terminal board
8	Hole for forklift
9	Earthing rod
DPF	Drain plug fuel
ESB	Emergency stop button
FCF	Filler cap fuel
FCW	Filler cap coolant

QAS108 Pd(S) IT

1	Lifting rod
2	Guiding rod
3	Side doors
4	Engine exhaust
5	Data plate
6	Side door, access to control and indicator panel
7	Output terminal board
8	Hole for forklift
DPF	Drain plug fuel
ESB	Emergency stop button
FCF	Filler cap fuel
FCW	Filler cap coolant

2.2 BODYWORK

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

The recess in the roof has a lifting rod in the middle and a guiding rod at both sides.

Never use the guiding rods to lift the generator.

To be able to lift the QAS108 by means of a forklift, rectangular holes are provided in the frame.

QAS108 Pd(S)

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

2.3 MARKINGS

A brief description of all markings provided on the QAS108 is given hereafter.

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

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

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

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

Indicates the lifting rod of the generator.

diesel

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.

PAROIL SAE 15W40

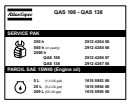
Use SAE 15W40 oil only

Indicates the different earthing connections on the generator.

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

Indicates the 3-way valve.

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



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

2.4 DRAIN PLUGS AND FILLER CAPS

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

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

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

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

2.5 EXTERNAL FUELTANK CONNECTION

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

When using this option, make sure to connect the fuel supply line as well as the fuel return line. Always put both valves in the same position (either internal or external tank) and make sure that they are in the extreme (horizontal) position. Connections to fuellines ought to be air-tight to prevent air from entering the fuel system.

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

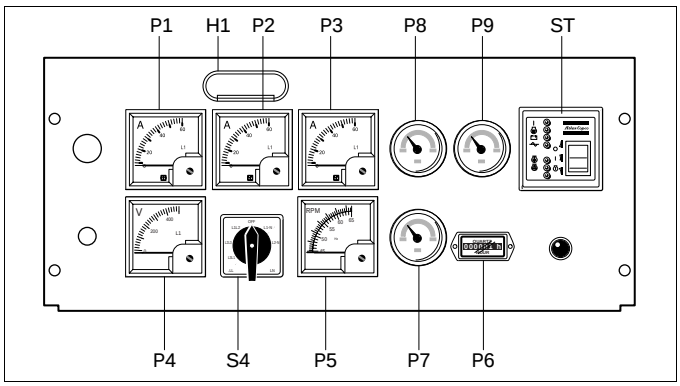
Indicates the fuel return line from the engine to the tank.

Indicates the internal fueltank.

Indicates the external fueltank.

2.6 CONTROL AND INDICATOR PANEL

The control and indicator panel is located behind a door in the side panel. The hinged door is partly transparent and allows easy access to the parts mounted behind it. Panel light H1 lights up as soon as the starter switch is turned into position I, indicating that the fuel solenoid is energized.



H1.....Panel light

2.6.1 Engine gauges

P6.....Hourmeter

P7.....Fuel level gauge

P8.....Engine coolant temperature gauge

P9.....Engine oil pressure gauge

2.6.2 Generator gauges

P1.....Ammeter line L1

Indicates the outgoing current in the first phase (L1).

P2.....Ammeter line L2

Indicates the outgoing current in the second phase (L2).

P3.....Ammeter line L3

Indicates the outgoing current in the third phase (L3).

P4.....Voltmeter

Indicates the voltage selected by means of voltage selector switch S4.

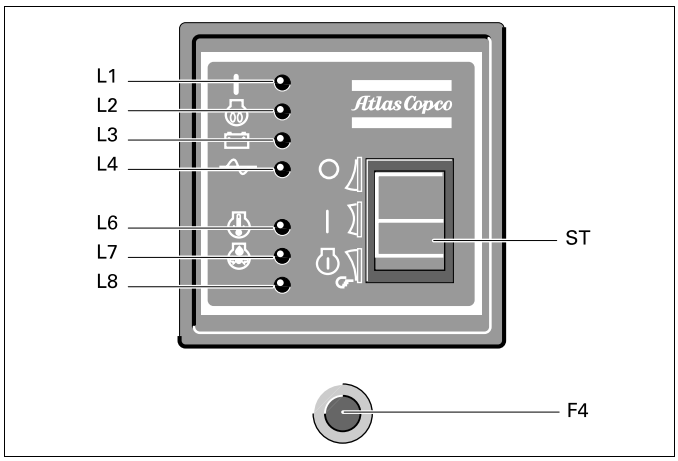
P5.....Frequency / RPM meter

Indicates the frequency of the supply voltage and the speed of the engine.

S4.....Voltmeter selector switch

Allows to measure the voltage between each of the phases and between each phase and the neutral. It also allows to switch off the voltmeter.

2.6.3 Engine controls and lamps



ST.....Starter switch

The starter switch is a three-position switch.

O: the voltage supply from the battery is switched off.

I: the electrical system of the engine, except the starting circuit is energized.

⏱: the starter motor is energized. As soon as the engine fires, the switch can be released. The switch automatically returns to position I.

After approximately 20 sec. in position ⏱ without starting, the control system will automatically shut down (battery saving purpose) indicating a low oil pressure failure. In this case, a reset of the control system by putting the switch in position O is necessary.

F4 ..... Fuse

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

L1 ..... Electrical system indicator

Lights up when the electrical system of the engine is energized.

L2 ..... Engine preheating system indicator

Lights up when the glow plugs in the engine, used to facilitate starting, are warming up. Extinguishes after approximately 10 seconds. Bypassing of the preheattime is allowed e.g. when starting a hot engine, but the preheat system remains active.

L3 ..... Alternator charging indicator

Goes out after starting, indicating that the alternator is charging. A failing alternator however will not shut the engine down.

L4 ..... AC shut down indicator

Lights up when no AC input (< 75 V line-to-neutral) is present.

L6 ..... Engine coolant temperature fault indicator

Lights up when the high engine coolant temperature was the cause of shut down.

L7 ..... Engine oil pressure fault indicator

Lights up when the low engine oil pressure was the cause of shut down.

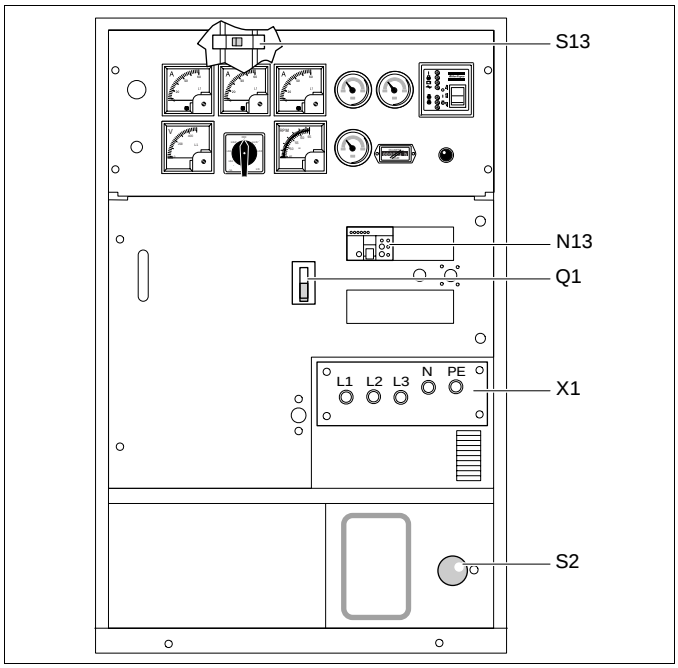
L8 ..... Spare shut down indicator

Can be used to wire an extra shut down, e.g. for low fuel level in case a switch is incorporated in the fuel tank.

2.7 OUTPUT TERMINAL BOARD

QAS108 Pd(S)

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 and minimum voltage relay

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 (150 A) is activated or when the DC hold coil is not 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.

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 IΔN) but has to be tested monthly (by pushing test button T).

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

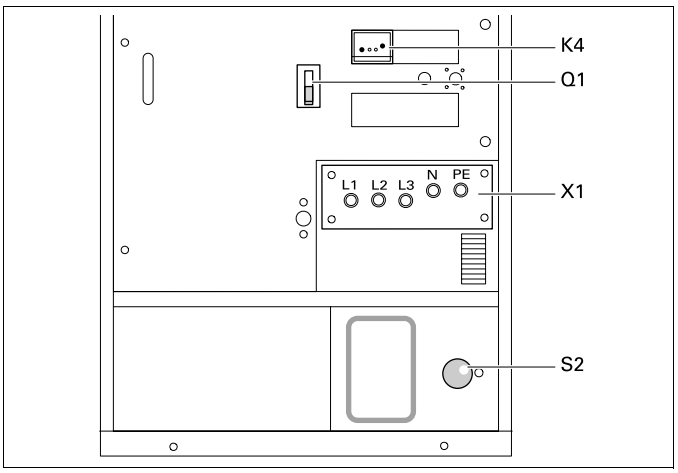
This switch is located inside the cubicle and is labelled IΔN.

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.

QAS108 Pd(S) IT

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 and minimum voltage relay

Interrupts the power supply to X1 when a short-circuit occurs at the load side, or when the overcurrent protection (150 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.

K4.....Insulation monitoring relay

Checks the insulation resistance and activates Q1 when the insulation resistance is too low.

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 1000 V) must be respected when connecting site distribution panels, switch gear or loads to the generator.

QAS108 Pd(S)

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.

QAS108 Pd(S) IT

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.

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.

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

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.

QAS108 Pd(S)

– 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.

QAS108 Pd(S) IT

– Check the setting of the insulation monitoring relay (factory set at 13 kΩ).

3.2 CONNECTING THE GENERATOR

3.2.1 Precautions for non-linear and sensitive loads

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

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

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

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

3.2.2 Quality, minimum section and maximum length of cables

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

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

Wire section (mm²)	*2,5*	*4*	*6*	*10*	*16*	*25*	*35*	*50*	*70*	*95*
Max. current (A)										
Multiple core	*22*	*30*	*38*	*53*	*71*	*94*	*114*	*138*	*176*	*212*
Single core	*25*	*33*	*42*	*57*	*76*	*101*	*123*	*155*	*191*	*228*
H07 RN-F	*21*	*28*	*36*	*50*	*67*	*88*	*110*	*138*	*170*	*205*

The lowest acceptable wire section and the corresponding maximum cable or conductor length for multiple core cable or H07 RN-F, at rated current (145 A), for a voltage drop e lower than 5 % and at a power factor of 0.80, are respectively 10 mm^2 and 146 m. In case electric motors must be started, oversizing the cable is advisable.

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

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

e = Voltage drop (V)

I = Rated current (A)

L = Length of conductors (m)

R = Resistance (Ω/km to VDE 0102)

X = Reactance (Ω/km to VDE 0102)

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 coolantdamp in a nearly empty tank from condensing.

– Check the vacuum indicator of the air filter. If the red part shows completely, replace the filter element.

– Press the vacuator valve of the air filter to remove dust.

– Check the generator for leakage, tightness of wire terminals, etc. Correct if necessary.

– Check that fuse F4 is not activated and that the emergency stop is in the "OUT" position.

– Check that the load is switched off.

– Check that circuit breaker Q1 is switched off.

QAS108 Pd(S)

– Check that the earth fault protection (N13) has not tripped (reset if necessary).

3.4 STARTING

– Put the starter switch in position I. The instrument panel lights light up, the fuel solenoid is energized and the preheating of the engine starts. After approximately 10 seconds, the preheat lamp on the engine control module goes out.

– Push down the starter switch into position ⏱ and release it as soon as the engine fires. The switch automatically returns to position I.

Do not keep the switch in its utmost position for more than 10 seconds (maximum 20 seconds in extremely cold conditions). Wait two minutes between each starting attempt.

When the ambient temperature is below 0 °C, start the engine as follows: put the starter switch in position I until the preheat lamp goes out. Put the switch back into position O and then immediately put it into position ⏱. Release the switch as soon as the engine fires.

If the engine fails to start and for starting in extremely cold conditions, consult your local Atlas Copco dealer.

– Check that the warning lamps on the control and indicator panel are out.

– Run the engine for approximately 5 minutes to warm up. Check the engine oil pressure (P9) and the coolant temperature (P8).

– Check the voltmeter P4 (with voltmeter selector switch S4 in different positions) and the frequency meter P5.

– Switch circuit breaker Q1 to off and then to on.

– Switch on the load and check the ammeter P1, P2 and P3, voltmeter P4 (with voltmeter selector switch S4 in different positions) and frequency meter P5.

3.5 DURING OPERATION

Following points should be carried out regularly:

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

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

– Check for leakage of oil, fuel or coolant.

– Avoid long low-load periods (< 30 %). In this case, an output drop and higher oil consumption of the engine could occur.

– Check, by means of the generator gauges, that the voltage between the phases is identical and that the rated current per phase is not exceeded.

– When single-phase loads are connected to the generator output terminals, keep all loads well-balanced.

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

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

3.6 STOPPING

– Switch off the load.

– Switch off circuit breakers.

– 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 control and indicator panel to avoid unauthorized access.

4. MAINTENANCE

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

4.1 MAINTENANCE SCHEDULE	Daily	Initial	Small	Normal	Yearly
		50 hours	*250 hours*	*500 hours*	*2000 hours*
SERVICE PAK	**-**	**With unit**	**2912 4264 05**	**2912 4265 06**	**2912 4266 07**
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.					
Coolant level	Check	Check	Check	Check	Check
Tension and condition of drive belt(s)		Check	Check	Check	Replace
Radiator and intercooler fins		Check/Clean	Check/Clean	Check/Clean	Check/Clean
Fuel pre-filter/Coolant separator	Check/Drain	Check/Drain	Check/Drain	Check/Drain	Check/Drain
Fuel filter element			Replace	Replace	Replace
Fuel injectors					Check
Oil level in sump	Check	Check	Check	Check	Check
Oil pressure on gauge	Check	Check	Check	Check	Check
Lubrication oil		Change	Change	Change	Change
Oil filter(s)		Replace	Replace	Replace	Replace
Air cleaner and dust bowl		Clean	Clean	Clean	Clean
Air filter element (1)			Clean	Replace	Replace
Safety cartridge					Replace
Valve clearance		Check/adjust	Check/adjust	Check/adjust	Check/adjust
Oil, fuel and coolant leaks		Check	Check	Check	Check
Mechanical links (e.g. fuel solenoid link)			Grease	Grease	Grease
Level battery electrolyte (2)		Check	Check	Check	Check
Condition of vibration dampers		Check	Check	Check	Check
Alternator insulation resistance (*)		Measure	Measure	Measure	Measure
Tightness of nuts and bolts		Check			Check
Door hinges and locks		Grease			Grease
Fixation of hoses, cables and pipes				Check	Check
Joints of height adjustable towbar (if installed)				Grease	Grease
Inspection by Atlas Copco Service technician					⚠

(1) More frequently when operating in a dusty environment. Evacuate dust from the airfilter valve daily.

(2) A Service Bulletin (ASB) dealing elaborately with batteries and due care is available on request.

4.2 ENGINE MAINTENANCE

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

4.3 (*) MEASURING THE ALTERNATOR INSULATION RESISTANCE

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

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

Connect the megger between the earth terminal and terminal L1 and generate a voltage of 500 V. The scale must indicate a resistance of at least 5 MΩ.

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

5. STORAGE OF THE GENERATOR

5.1 STORAGE

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

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

- Consult the engine's operator manual.
- Remove the battery. Store it in a dry, frost-free room. Keep the battery clean and its terminals lightly covered with petroleum jelly. Recharge the battery regularly.
- Clean the generator and protect all electrical components against moisture.
- Place silica gel bags, VCI paper (Volatile Corrosion Inhibitor) or another drying agent inside the generator and close the doors.
- Stick sheets of VCI paper with adhesive tape on the bodywork to close off all openings.
- Wrap the generator, except the bottom, with a plastic bag.

5.2 PREPARING FOR OPERATION AFTER STORAGE

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

– Consult the engine's operator manual.

– Check that the insulation resistance of the generator exceeds 5 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

Never perform a test run with connected power cables. Never touch an electrical connector without a voltage check.

When a failure occurs, always report what you experienced before, during and after the failure. Information with regard to the load (type, size, power factor, etc.), vibrations, exhaust gas colour, insulation check, odours, output voltage, leaks and damaged parts, ambient temperature, daily and normal maintenance and altitude might be helpful to quickly locate the problem. Also report any information regarding the humidity and location of the generator (e.g. close to sea).

6.1 CHECKING VOLTMETER P4

– Put a voltmeter in parallel with voltmeter P4 on the control panel.

– Check that the read-out of both voltmeters is the same.

– Stop the generator and disconnect one terminal.

– Check that the internal resistance of the voltmeter is high.

6.2 CHECKING FREQUENCY METER P5

– Run the unit at normal speed.

– Put a voltmeter in parallel with frequency meter P5.

– If the measured voltage is higher than 200 V, the frequency meter has to work properly.

– If not, remove the frequency meter, connect it with the mains (230 V) and check that it indicates 50 Hz.

6.3 CHECKING AMMETER P1, P2 AND P3

– Measure by means of a clamp-on probe the outgoing current, during the load.

– Compare the measured currents with the currents on the corresponding ammeters. Both readings should be the same.

6.4 ALTERNATOR TROUBLE SHOOTING

Symptom	Possible cause	Corrective action
Alternator does not excite.	Blown fuse.	Replace fuse.
	Insufficient residual voltage.	Increase the speed by 15 %.
	No residual voltage.	For an instant apply on the + and – terminals of the electronic regulator a 12 V battery voltage with a 30 Ω resistor in series respecting the polarities.
After being excited alternator does not excite.	Connections are interrupted.	Check connection cables as per attached drawings.
Low voltage at no load.	Voltage potentiometer out of setting.	Reset voltage potentiometer.
	Intervention of protection.	Check rpm.
	Winding failure.	Check windings.
High voltage at no load.	Voltage potentiometer out of setting.	Reset voltage potentiometer.
	Failed regulator.	Substitute regulator.
Lower than rated voltage at load.	Voltage potentiometer out of setting.	Reset voltage potentiometer.
	Intervention by protection.	Current too high, power factor lower than 0.8; speed lower than 4 % of rated speed.
	Failed regulator.	Substitute regulator.
	Rotating bridge failure.	Check diodes, disconnect cables.
Higher than rated voltage at load.	Voltage potentiometer out of setting.	Reset voltage potentiometer.
	Failed regulator.	Substitute regulator.
Unstable voltage.	Speed variation in engine.	Check regularity of rotation.
	Regulator out of setting.	Regulate stability of regulator by acting on “STABILITY” potentiometer.

6.5 ENGINE TROUBLE SHOOTING

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

6.5.1 The starter motor turns the engine too slowly

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

6.5.2 The engine does not start or is difficult to start

– Starter motor turns engine too slowly.
– Fuel tank empty.
– Fault in fuel control solenoid.
– Restriction in a fuel pipe.
– Fault in fuel lift pump.
– Dirty fuel filter element.
– Air in fuel system.
– Fault in atomisers.
– Cold start system used incorrectly.
– Fault in cold start system.
– Restriction in fuel tank vent.
– Wrong type or grade of fuel used.
– Restriction in exhaust pipe.

6.5.3 Not enough power

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

6.5.4 Misfire

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

6.5.5 The pressure of the lubricating oil is too low

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

6.5.6 High fuel consumption

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

6.5.7 Black exhaust smoke

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

6.5.8 Blue or white exhaust smoke

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

6.5.9 The engine knocks

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

6.5.10 The engine runs erratically

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

6.5.11 Vibration

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

6.5.12 The pressure of the lubricating oil is too high

- Wrong grade of lubricating oil.
- Defective gauge.

6.5.13 The engine temperature is too high

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

6.5.14 Crankcase pressure

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

6.5.15 Bad compression

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

6.5.16 The engine starts and stops

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

6.5.17 The engine shuts down after approx. 15 sec.

- Bad connection towards oil pressure switch/coolant temperature switch.
- DIP switch on back of module wrong positioned.

7. OPTIONS AVAILABLE FOR QAS108 UNITS

7.1 CIRCUIT DIAGRAMS

The engine control circuit diagrams and the power circuit diagrams for the standard QAS108 unit, for the units with options and for the units with combined options are:

Unit	*Power circuit*	*Engine control circuit*
QAS108 Pd (S) (standard unit)	9822 0888 41	9822 0888 47
QAS108 Pd (S) AMF	9822 0888 41	9822 0888 49
QAS108 Pd (S) EDF	9822 0888 43	9822 0888 47
QAS108 Pd AMF EDF	9822 0888 43	9822 0888 49
QAS108 Pd AMF EDF DF	9822 0981 03	9822 0888 49
QAS108 Pd AMF EDF SF	9822 0981 03	9822 0888 49
QAS108 Pd (S) AMF SF	9822 0981 01	9822 0888 49
QAS108 Pd DF	9822 0981 01	9822 0888 47
QAS108 Pd (S) EDF SF	9822 0981 03	9822 0888 47
QAS108 Pd (S) IT	9822 0888 42	9822 0888 47
QAS108 Pd (S) RS	9822 0888 41	9822 0888 48
QAS108 Pd RS DF	9822 0981 01	9822 0888 48
QAS108 Pd RS DF 3V	9822 0888 24	9822 0888 48
QAS108 Pd (S) RS SF	9822 0981 01	9822 0888 48
QAS108 Pd RS 50 HZ 3V	9822 0888 52	9822 0888 48
QAS108 Pd RS 50 HZ LV	9822 0888 46	9822 0888 48
QAS108 Pd RS 60 HZ 3V	9822 0888 50	9822 0888 48
QAS108 Pd RS 60 HZ LV	9822 0888 64	9822 0888 48
QAS108 Pd (S) SF	9822 0981 01	9822 0888 47
QAS108 Pd S IT SF	9822 0981 02	9822 0888 47
QAS108 Pd S RS IT	9822 0888 42	9822 0888 48
QAS108 Pd S OUR	9822 0888 42	9822 0888 47
	9822 0888 89	

7.2 OVERVIEW OF THE ELECTRICAL OPTIONS

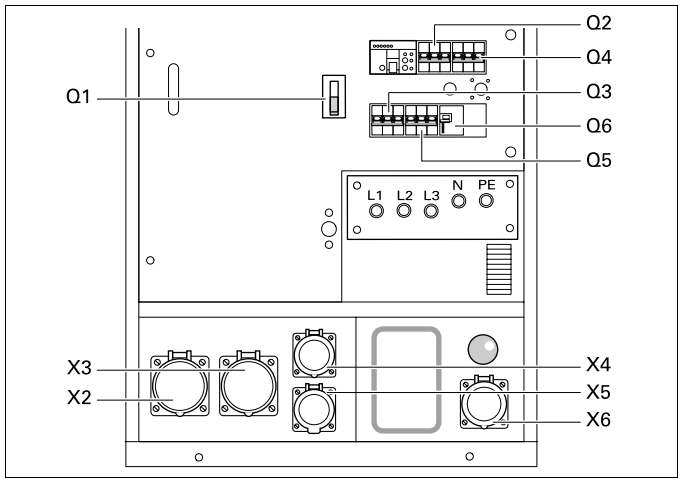
The following “electrical” options are available for the QAS108 unit:

- Outlet sockets (S)
- Remote start (RS)
- Automatic mains failure (AMF)
- Single frequency with electronic speed control (SF)
- Dual frequency with electronic speed control (DF)
- Low voltage (LV)
- Triple voltage with switch (TV)
- Over and undervoltage relay
- “Electricité de France” (EDF)
- IT-relay

7.3 DESCRIPTION OF THE ELECTRICAL OPTIONS

7.3.1 Outlet sockets (S)

The “Outlet sockets” option provides the following extra outlet sockets and circuit breakers:



X2.....3-phase outlet socket (400 V AC)

Provides phases L1, L2 and L3, neutral and earthing.

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.....Circuit breaker for X2

Interrupts the power supply to X2 when a short-circuit occurs at the load side, or when the overcurrent protection (63 A) is activated. When activated, Q2 interrupts the three phases towards X2. It can be activated again after eliminating the problem.

Q3.....Circuit breaker for X3

Interrupts the power supply to X3 when a short-circuit occurs at the load side, or when the overcurrent protection (63 A) is activated. When activated, Q3 interrupts the three phases towards X3. It can be activated again after eliminating the problem.

Q4 ..... Circuit breaker for X4

Interrupts the power supply to X4 when a short-circuit occurs at the load side, or when the overcurrent protection (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.

When the sockets-option is installed, circuit breaker Q1 does not only interrupt the power supply towards X1 but also towards X2, X3, X4, X5 and X6.

Make sure to switch on circuit breakers Q1, Q2, Q3, Q4, Q5 and Q6 after starting the generator when power supply is done by means of X2, X3, X4, X5 or X6.

7.3.2 Remote start (RS)

The “Remote start” option allows to switch the unit on or off without using the control panel located on the unit. The start module of the control panel is replaced by a special module which provides extra connections for the remote start/stop switch and the plant contactor (voltage free contact), both to be installed by the customer.

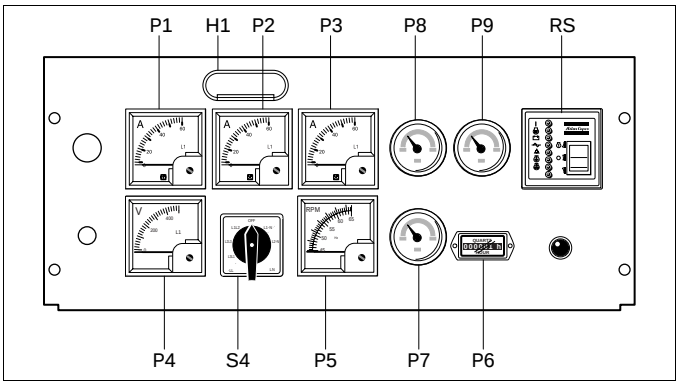
The plant contactor should be sized according to the load. The maximum current through the voltage free contact is 3 A.

The remote start/stop switch Sx has to meet the following specifications: 12 V DC, 4 A.

Refer to the circuit diagram for the correct connection of the plant contactor and the remote start/stop switch.

Control panel remote start (RS)

The control and indicator panel is located behind a door in the side panel. The hinged door is partly transparent and allows easy access to the parts mounted behind it. Panel light H1 lights up as soon as the starter switch is turned into position I, indicating that the fuel solenoid is energized.



H1..... Panel light

Engine gauges

P6..... Hourmeter

P7..... Fuel level gauge

P8..... Engine coolant temperature gauge

P9..... Engine oil pressure gauge

Generator gauges

P1..... Ammeter line L1

Indicates the outgoing current in the first phase (L1).

P2..... Ammeter line L2

Indicates the outgoing current in the second phase (L2).

P3..... Ammeter line L3

Indicates the outgoing current in the third phase (L3).

P4..... Voltmeter

Indicates the voltage selected by means of voltage selector switch S4.

P5..... Frequency / RPM meter

Indicates the frequency of the supply voltage and the speed of the engine.

S4..... Voltmeter selector switch

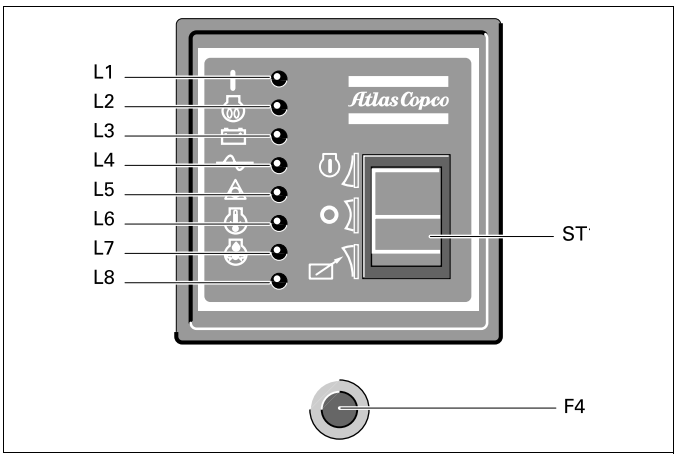
Allows to measure the voltage between each of the phases and between each phase and the neutral. It also allows to switch off the voltmeter.

The different positions of the starter switch ST are:

– ⏻ : used to select normal start and to disable remote start.

– O : used to switch off the power supply from the battery. The unit will not be able to start up.

– ✍ : used to select remote start.



F4 .....Fuse

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

L1 .....Electrical system indicator

Lights up when the electrical system of the engine is energized.

L2 .....Engine preheating system indicator

Lights up when the glow plugs in the engine, used to facilitate starting, are warming up. Extinguishes after approximately 10 seconds. Bypassing of the preheattime is allowed e.g. when starting a hot engine, but the preheat system remains active.

L3 .....Alternator charging indicator

Goes out after starting, indicating that the alternator is charging. A failing alternator however will not shut the engine down.

L4 .....AC shut down indicator

Lights up when no AC input (< 75 V line-to-neutral) is present.

L5 ..... Emergency stop indicator

L6 .....Engine coolant temperature fault indicator

Lights up when the high engine coolant temperature was the cause of shut down.

L7 .....Engine oil pressure fault indicator

Lights up when the low engine oil pressure was the cause of shut down.

L8 .....Spare shut down indicator

Can be used to wire an extra shut down, e.g. for low fuel level in case a switch is incorporated in the fuel tank.

To start up the unit locally, without using the remote start/stop switch, proceed as follows:

– 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 ⏻. 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.

– Approximately 15 seconds after starting (stabilization time for the generator), the timer relay closes the voltage free contact and the plant contactor is energized (if installed).

– Switch on circuit breaker Q1 in case no contactor is installed.

To stop the unit when the starter switch is in position ⏻, 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 start up the unit from a remote location using the remote start/stop switch, proceed as follows:

– Put the starter switch in position ✍ .

– 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.

– Approximately 15 seconds after starting (stabilization time for the generator), the timer relay closes the voltage free contact and the plant contactor is energized (if installed).

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

– Switch off the load.

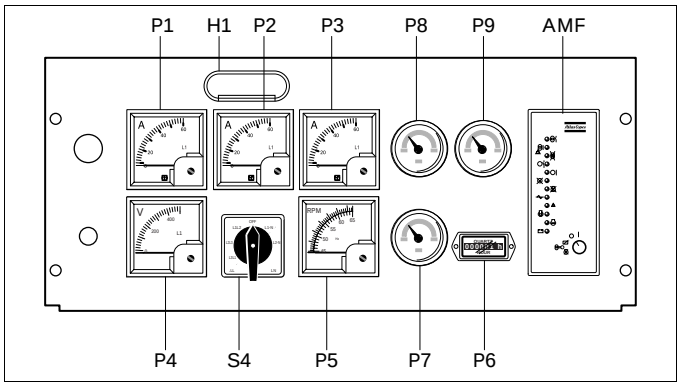
– Let the engine run for about 5 minutes.

– Stop the engine by putting the remote start/stop switch in position stop or by putting the starter switch in position O.

7.3.3 Automatic mains failure (AMF)

Control panel automatic mains failure (AMF)

The control and indicator panel is located behind a door in the side panel. The hinged door is partly transparent and allows easy access to the parts mounted behind it. Panel light H1 lights up as soon as the starter switch is turned into position I, indicating that the fuel solenoid is energized.



H1..... Panel light

Engine gauges

P6..... Hourmeter

P7..... Fuel level gauge

P8..... Engine coolant temperature gauge

P9..... Engine oil pressure gauge

Generator gauges

P1..... Ammeter line L1

Indicates the outgoing current in the first phase (L1).

P2..... Ammeter line L2

Indicates the outgoing current in the second phase (L2).

P3..... Ammeter line L3

Indicates the outgoing current in the third phase (L3).

P4..... Voltmeter

Indicates the voltage selected by means of voltage selector switch S4.

P5..... Frequency / RPM meter

Indicates the frequency of the supply voltage and the speed of the engine.

S4..... Voltmeter selector switch

Allows to measure the voltage between each of the phases and between each phase and the neutral. It also allows to switch off the voltmeter.

The "Automatic mains failure" option offers the following features:

– Continuous monitoring.

– Connection block for monitoring.

– Extended control module.

– Remote start possibility.

– Automatic battery charger.

– Engine coolant heater.

Continuous monitoring

The "Automatic mains failure" option continuously monitors four input lines of the main power supply: the three phases and neutral.

When the mains (one or all phases) is not available for approximately 0.5 seconds, the following timing applies:

– The mains contactor opens and disconnects the load from the mains.

– The unit starts 3 seconds (crank delay) after the mains failure. If the unit does not start immediately, it will carry out another 3 starting attempts, each consisting of 10 seconds cranking and 5 seconds interval (crank time).

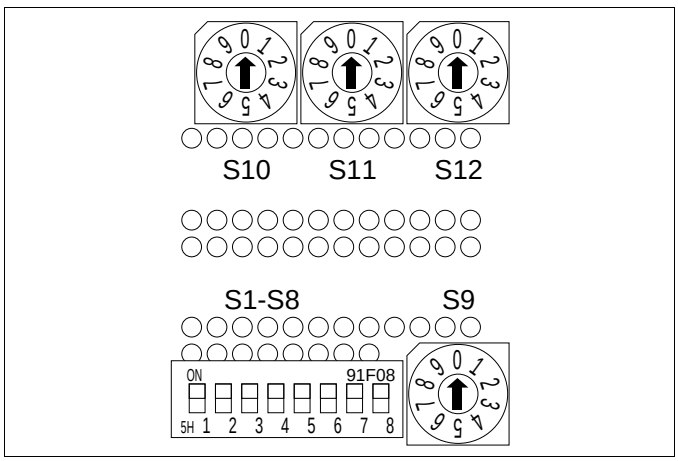
– After 10 seconds generator stabilization time (plant settle time), the generator contactor is energized and the generator supplies power towards the load.

When the mains (all phases) is available again for at least 10 seconds (mains restore time), the following timing applies:

– The generator contactor opens and the mains contactor closes (1 second change over time).

– The generator shuts down 1 minute later (delay run on time).

The timing can be adjusted by means of the potentiometers located at the back of the AMF control module:



S9..... Crank timer

S10.... Plant settle timer

S11.... Mains restore timer

S12.... Delay run on timer

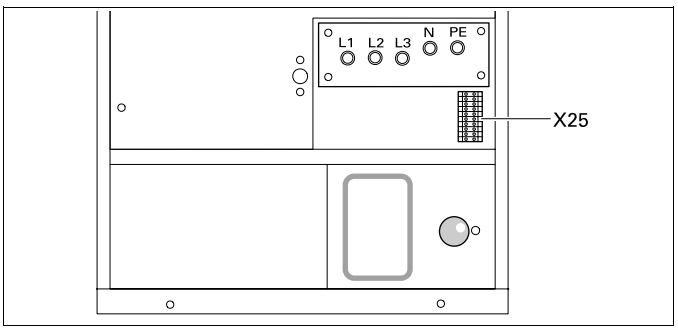
The table below summarises the relation between the position of the potentiometers and the value of the timers.

Potentiometer	S9		S10
Position	Crank delay	Crank time	Plant settle time
0	3 sec	10 sec	10 sec
1	10 sec	10 sec	15 sec
2	10 sec	15 sec	20 sec
3	15 sec	10 sec	25 sec
4	15 sec	15 sec	30 sec
5	25 sec	10 sec	35 sec
6	25 sec	15 sec	40 sec
7	25 sec	25 sec	45 sec
8	50 sec	15 sec	50 sec
9	50 sec	25 sec	60 sec

Potentiometer	S11	S12
Position	Mains restore time	Delay run on
0	10 sec	1 min
1	20 sec	2 min
2	40 sec	3 min
3	1 min	4 min
4	2 min	5 min
5	3 min	6 min
6	4 min	7.5 min
7	7.5 min	10 min
8	10 min	12.5 min
9	15 min	15 min

The timers are factory set at position O.

Connection block for monitoring



X25....Connection block

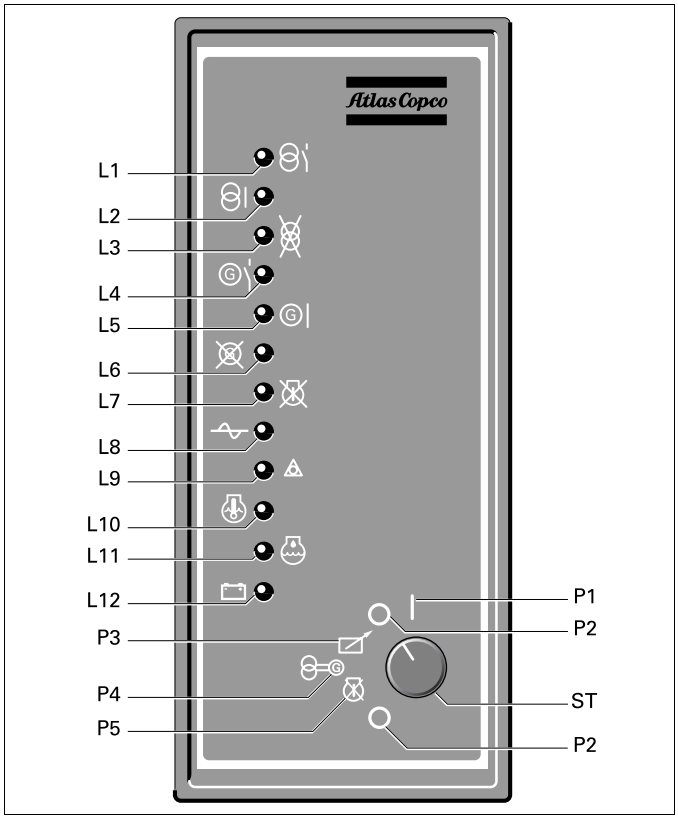
Allows easy connection for a remote start switch, for sensing of mains voltage and control of the mains and the plant contactor.

Refer to circuit diagram of the "Automatic mains failure" option for the correct connection.

Extended control module

The standard control module is replaced by an extended module which allows more detailed control of the unit.

The controls and indicators on the AMF control module are:



L1.....Mains available indicator

Lights up when the mains is available.

L2.....Mains on load indicator

Lights up when the mains supplies power towards the load.

L3.....Mains failed indicator

Lights up when a failure occurred on the mains.

L4.....Plant available indicator

Lights up when the generator is running.

L5.....Plant on load indicator

Lights up when the generator supplies power towards the load.

L6.....Plant fail indicator

Lights up when a failure occurred on the generator.

L7.....Start fail indicator

Indicates that four start attempts were not sufficient to start up the engine.

L8.....Undervoltage shut down indicator

Lights up when AC input interruption or failure was the cause of shut down.

L9 ..... Emergency stop

L10 .... Engine coolant temperature shut down indicator

Lights up when the high engine coolant temperature was the cause of shut down.

L11 .... Engine oil pressure shut down indicator

Lights up when the low oil pressure was the cause of shut down.

L12 .... Charge fail indicator

Goes out after starting, indicating that the alternator is charging. A failing alternator however will not shut the engine down.

ST..... Starter switch

P1..... Position P1

The generator starts immediately. The load will be transferred if a mains failure occurs.

P2..... Position P2

The generator will never start.

P3..... Position P3

The generator will start when the remote start/stop contact is closed.

P4..... Position P4

The generator will take over when a mains failure occurs.

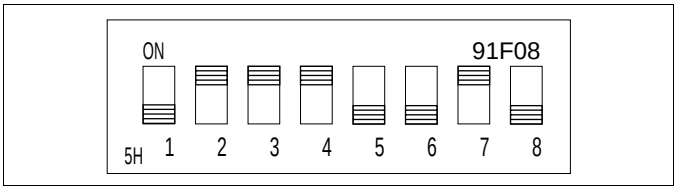
P5..... Position P5

The generator will not start when a mains failure occurs. Nevertheless, the mains remains monitored and the mains contactor will trip in case of a mains failure.

Besides dipswitch S8, located at the back of the control module and used for the selection of the nominal speed (50 Hz or 60 Hz), dipswitch S1 can be used for enabling or disabling a spare shut down contact.

The contactors between the mains, the unit and the load are not included in the option but should be sized according to the load. Nevertheless, they are also available as sales kit at Atlas Copco. Refer to circuit diagram 9822 0773 55 of the "Automatic mains failure" option for the correct connection.

For correct functioning of the module, the DIP switches at the back of the module should be positioned as follows:



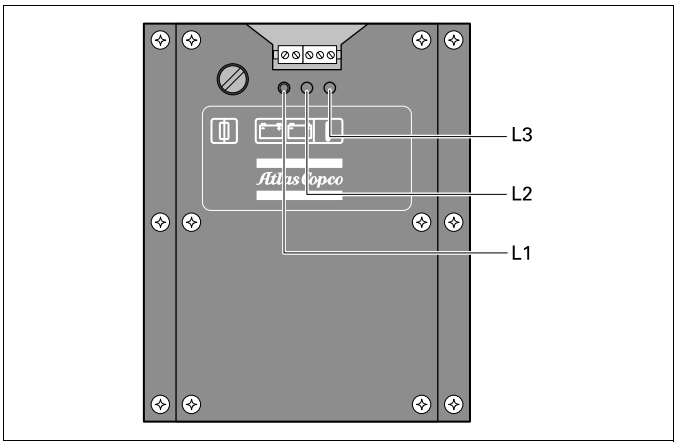
Remote start possibility

The "Remote start" feature of the "Automatic mains failure" option allows to switch the unit on or off without using the control panel located on the unit. For this purpose, the control module provides a voltage free contact for the connection of the remote start/stop switch (to be installed by the customer).

The unit will start in case the contact is closed (start/stop switch in position start) and the starter switch of the control module is in position ⊿ (position P3).

Automatic battery charger

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



– Provide the X7 connector, located inside the power cubicle, with external power to use the battery charger.

L1 ..... Red Led

Lights up when battery is charging.

L2 ..... Yellow Led

Lights up when battery is charged.

L3 ..... Green Led

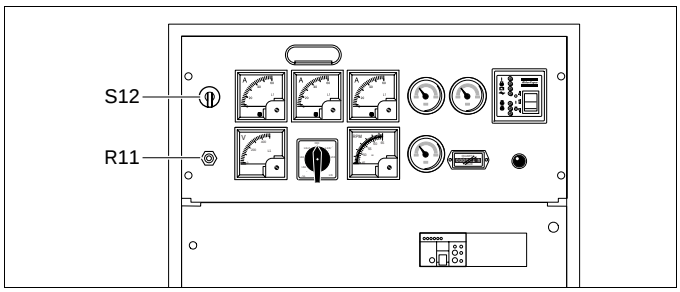
Lights up when AC power supply is available.

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 Single frequency with electronic speed control (SF)

The “Single frequency” option provides an electronic speed controller which makes sure that the output frequency of the generator is 50/60 Hz with an accuracy of 0.25 % at constant load.



R11....Supply voltage adjust potentiometer

Allows to adjust the output voltage.

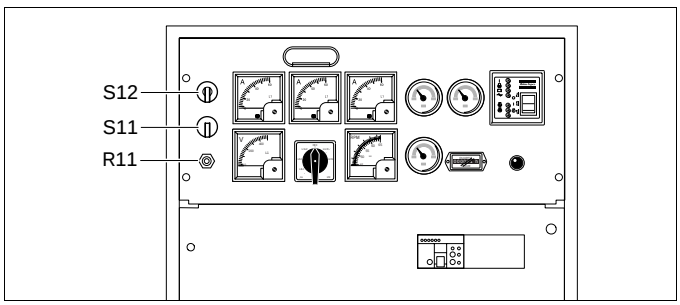
S12....Frequency adjust switch

Allows to adjust the frequency of the output voltage.
The frequency adjust switch is a three-position switch:

- Turn anticlockwise to obtain a lower frequency.
- Turn clockwise to obtain a higher frequency.
- The switch automatically returns to his central position.

7.3.5 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 accuracy of 0.25 % at constant load. The frequency selection is done by means of switch S11.



R11....Supply voltage adjust potentiometer

Allows to adjust the output voltage.

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

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

S12....Frequency adjust switch

Allows to adjust the frequency of the output voltage.
The frequency adjust switch is a three-position switch:

- Turn anticlockwise to obtain a lower frequency.
- Turn clockwise to obtain a higher frequency.
- The switch automatically returns to his central position.

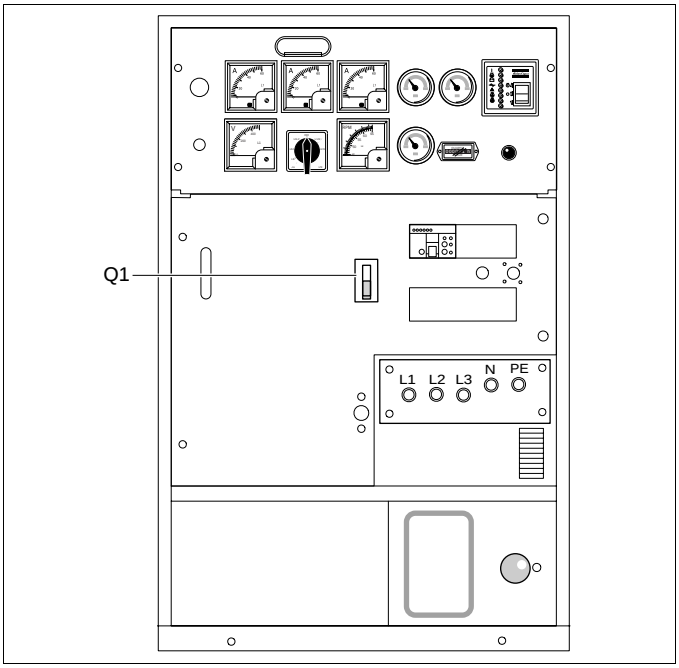
Changing the output frequency is only allowed after shutdown.

After changing the output frequency, adjust the output voltage by means of potentiometer R11 to the required value.

7.3.6 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 (50 Hz, 250 A/60 Hz, 320 A) is activated. It must be reset manually after eliminating the problem.

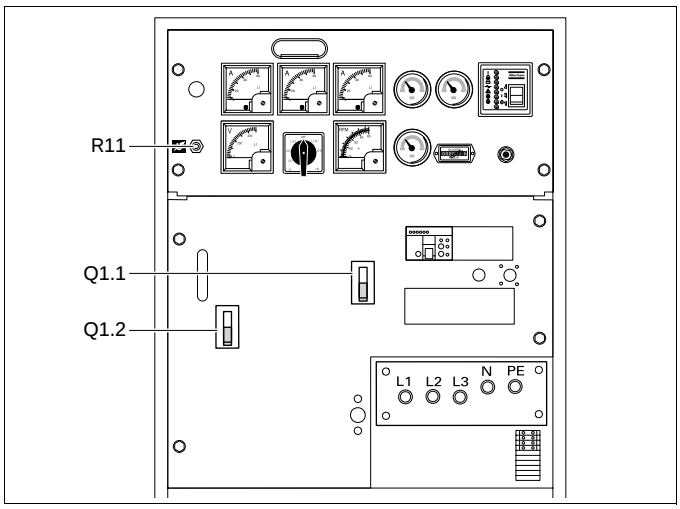
7.3.7 Triple voltage with switch (TV)

The generator can run in three different modes:

– 1 phase

– 3 phase, lower voltage

– 3 phase, higher voltage



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

Interrupts the low voltage power supply towards X1 when a short-circuit occurs at the load side or when the overcurrent protection (60 Hz, 320 A/50 Hz, 250 A) is activated. It must be reset manually after eliminating the problem.

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

Interrupts the high voltage power supply towards X1 when a short-circuit occurs at the load side or when the overcurrent protection (60 Hz, 160 A/50 Hz,150 A) is activated. It must be reset manually after eliminating the problem.

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

Circuit breakers Q1.1 and Q1.2 cannot be switched on at the same time. This is prevented by means of the auxiliary voltage selection relays K11 and K12 (refer to the circuit diagram).

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

R11.... Output voltage adjust potentiometer

Allows to adjust the output voltage.

S10.... Output voltage selection switch

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

Changing the output voltage is only allowed after shut-down.

After changing the output voltage by means of the selection switch S10, adjust the output voltage by means of potentiometer R11 to the required value.

The triple voltage with switch option cannot be combined with the sockets option because the sockets may not be used at low voltage.

1 phase

When using this selection, the generator provides a 220 V output voltage.

3 phase lower voltage

When using this selection, the generator provides a 230/220 V output voltage.

3 phase higher voltage

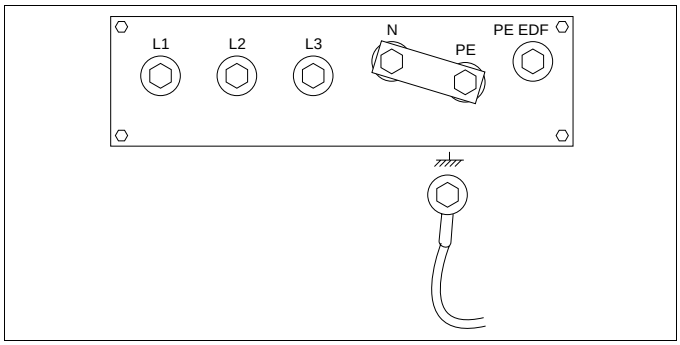
When using this selection, the generator provides a 400/440 V output voltage.

7.3.8 Over and undervoltage relay

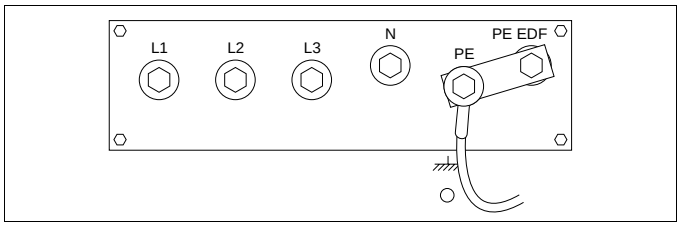
The settings of this relay can be adjusted by the customer via the dedicated potentiometers. Factory settings are +8% / –8% / 5 seconds. Outside these limits the generator will shut down (voltage LED of the module will light up).

7.3.9 "Electricité de France" (EDF)

When the EDF-option is installed, the unit operates as a standard unit when the neutral and the PE terminals are connected to each other (see figure below). In this case, an earth leakage at the side of the generator or at the side of the load will switch off the circuit breaker.



When EDF-option is installed, the unit operates as EDF-unit when the earthing, the PE and the PE EDF terminals are connected to each other (see figure below). In this case, an earth leakage at the side of the generator will switch off the circuit breaker. An earth leakage at the side of the load will not switch off the circuit breaker.



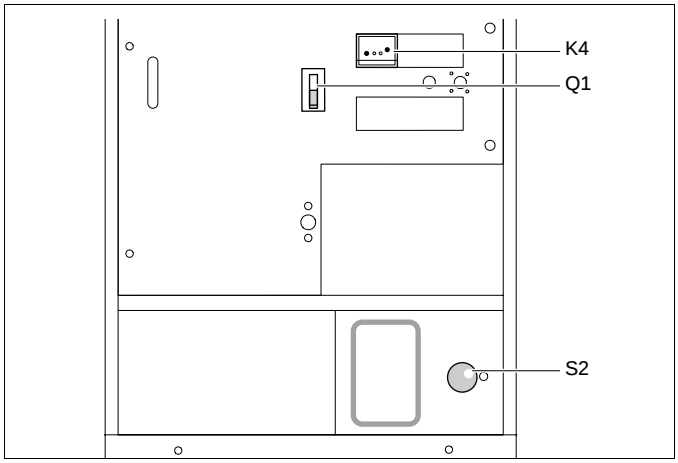
Changing the operation mode from standard unit to EDF-unit or vice versa has to be carried out by a qualified person from "Electricité de France".

7.3.10 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 a 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.

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)



K4.....Insulation monitoring relay

Checks the insulation resistance and activates Q1 when the insulation resistance is too low. It can be reset by pushing the reset button S15.

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. Use this button only in case of an emergency.

Q1.....Main circuit breaker

Interrupts the power supply when a short-circuit occurs at the load side, or when the overcurrent protection is activated, or when the emergency stop button is pushed. When activated, Q1 interrupts L1, L2 and L3. It can be activated again after eliminating the problem.

7.4 OVERVIEW OF THE MECHANICAL OPTIONS

The following "mechanical" options are available for the QAS108 units:

– Undercarriage (axle, towbar, towing eyes)

– Spillage free

7.5 DESCRIPTION OF THE MECHANICAL OPTIONS

7.5.1 Undercarriage (axle, towbar, towing eyes)

The undercarriage is equipped with an adjustable towbar with DIN-eye or NATO 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.

7.5.2 Spillage free

With this option, the frame is made spillage free. It is possible to drain the frame using the drain plugs.

8. TECHNICAL SPECIFICATIONS

8.1 READINGS ON GAUGES

Gauge		*Reading*	*Unit*
Ammeter L1 (P1)		Below max. rating	A
Ammeter L2 (P2)		Below max. rating	A
Ammeter L3 (P3)		Below max. rating	A
Voltmeter (P4)		Depends upon selector switch	V
Frequencymeter (P5)	50 Hz:	Between 50 and 52.5	Hz
	60 Hz:	Between 60 and 62.5	Hz
Hourmeter (P6)		Adding up	h
Fuel level (P7)		Above 0	Fuel tank full
Engine temperature (P8)		Below max. rating	°C
Engine oil pressure (P9)		Below max. rating	bar

8.2 SETTINGS OF SWITCHES

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

8.3 SPECIFICATIONS OF THE ENGINE/ALTERNATOR/UNIT

		50 Hz	*60 Hz*
Reference values 1)	Absolute air inlet pressure	100 kPa	100 kPa
	Air inlet temperature	25 °C	25°C
	Relative air humidity	30 %	30 %
	Generator service duty	Continuous	Continuous
	Rated speed (optional)	1500 rpm	1800 rpm
	Rated frequency	50 Hz	60 Hz
Limitations 2)	Maximum ambient temperature	40 °C	40 °C
	Maximum altitude	1000 m	1000 m
	Maximum relative air humidity	85 %	85 %
	Minimum starting temperature	-18 °C	-18 °C
Performance data 2) 3)	Rated continuous active power (COP) 3ph	80 kW	96 kW
	Rated continuous active power (COP) 1ph (optional)	-	72.7 kW
	Rated power factor (lagging) 3phase	0.8	0.8
	Rated power factor (lagging) 1phase (optional)	-	1.0
	Rated continuous apparent power 3ph	100 kVA	120 kVA
	Rated continuous apparent power 1ph	-	72.7 kVA
	Rated voltage 3ph. line to line	400 V	440 V
	Rated voltage 3ph. line to line lower voltage	230 V	220 V
	Rated voltage 1ph. line to line	-	220 V
	Rated current 3ph.	144.3 A	157.5 A
	Rated current 3ph. lower voltage	251 A	314.9 A
	Rated current 1ph.	-	330.7 A
	Performance class (acc.ISO 8528-5:1993)	G2	G2
	Frequency droop	<5	<5
	(optional)	isochronous	isochronous
	Fuel consumption at full load/no load	19.6/3.2 kg/h	23.8/3.8 kg/h
	Specific fuel consumption	0.24 kg/kWh	0.25 kg/kWh
	Fuel autonomy at full load	13 h	11 h
	Max. oil consumption at full load	40 g/h	48 g/h
	Maximum sound power level (LWA) measured according to 2000/14/EC OND	95 dB(A)	100 dB(A)
	Capacity of fuel tank	310 l	310 l
	Single step load acceptance	90 %	90 %

Application data	Mode of operation	continuous	continuous
	Site	land use	land use
	Operation	single	single
	Start-up and control mode (optional)	manual/auto.	manual/auto.
	Start-up time	unspecified	unspecified
	Mobility/ Config. acc. to ISO 8528-1:1993	transportable/D	transportable/D
	(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
	(optional)	insulated	
Alternator	Standard	IEC34-1	IEC34-1
	Make	MECC ALTE	MECC ALTE
	Model	ECO 34-2S	ECO 34-2S
	Rated output, class H temp. rise	105 kVA	126 kVA
	Degree of protection	IP 21	IP 21
	Insulation stator class	H	H
	Insulation rotor class	H	H
	Number of wires	12	12
Engine	Type PERKINS	1006-TG2	1006-TG2
	Rated net output	91.5 kW	107 kW
	Coolant	water	water
	Combustion system	direct injection	direct injection
	Aspiration	turbocharged	turbocharged
	Number of cylinders	6	6
	Swept volume	5.99 l	5.99 l
	Speed governing	mechanical	mechanical
	(optional)	electronic	electronic
	Oil circuit capacity	16 l	16 l
	Cooling circuit capacity	28 l	28 l
	Electrical system	12 Vdc	12 Vdc
Power circuit	**Circuit-breaker, 3ph**		
	Number of poles	4	4
	Thermal release It	150 A	160 A
	Magnetic release Im	625 A	625 A
	Circuit-breaker, 3ph, lower voltage		
	Number of poles	3	4
	Thermal release It	250 A	315 A
	Magnetic release Im	3..10xIn	3..10xIn
	Fault current protection		
	Residual current release IDn	0.025-25 A	0.025-25 A
	Insulation resistance (optional)	10-100 kOhm	-
Unit	Dimensions (LxWxH)	3112 x 1131 x 1607 mm	3112 x 1131 x 1607 mm
	Weight net mass	1986 kg	1986 kg
	Weight wet mass	2266 kg	2266 kg

Notes

1) For engine performance to ISO 3046/1-1995
2) For operating conditions beyond the stated limits, see derating diagram or consult the factory
3) At reference conditions unless otherwise stated

8.4 SPECIFICATIONS OF THE OPTIONS

8.4.1 Specifications of the sockets option

Setting of circuit breaker Q2	63 A	63 A
Setting of circuit breaker Q3	63 A	63 A
Setting of circuit breaker Q4	32 A	32 A
Setting of circuit breaker Q5	16 A	16 A
Setting of circuit breaker Q6	16 A	16 A

8.4.2 Low voltage option

Rated voltage 3ph line to line lower voltage	230 V	220 V
Setting of Q1	250 A	320 A

8.4.3 Triple voltage option

Rated voltage 3ph line to line higher voltage	400 V	440 V
Rated voltage 3ph line to line lower voltage	230 V	220 V
Rated voltage 1ph line to line	-	220 V
Setting of circuit breaker Q1.1	250 A	320 A
Setting of circuit breaker Q1.2	150 A	160 A

8.4.4 Triple voltage/dual frequency

Rated voltage 3ph line to line higher voltage	400 V	440 V
Rated voltage 3ph line to line lower voltage	230 V	220 V
Rated voltage 1ph line to line	-	220 V
Setting of circuit breaker Q1.1	250 A	250 A
Setting of circuit breaker Q1.2	150 A	150 A

8.4.5 Dual frequency option

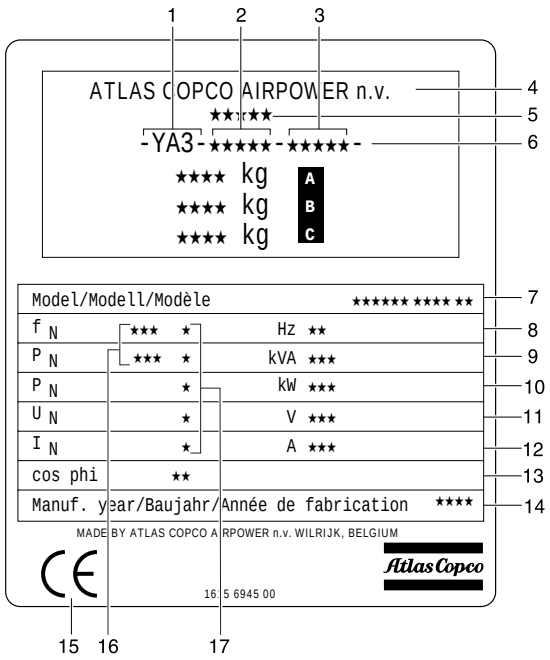
Frequency	50/60 Hz	50/60 Hz

8.5 CONVERSION LIST OF SI UNITS INTO BRITISH UNITS

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

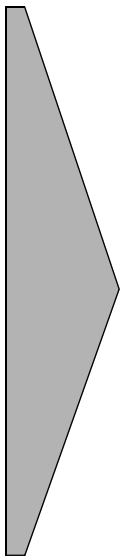
– A temperature difference of 1°C = a temperature difference of 1.8 °F.

8.6 DATAPLATE

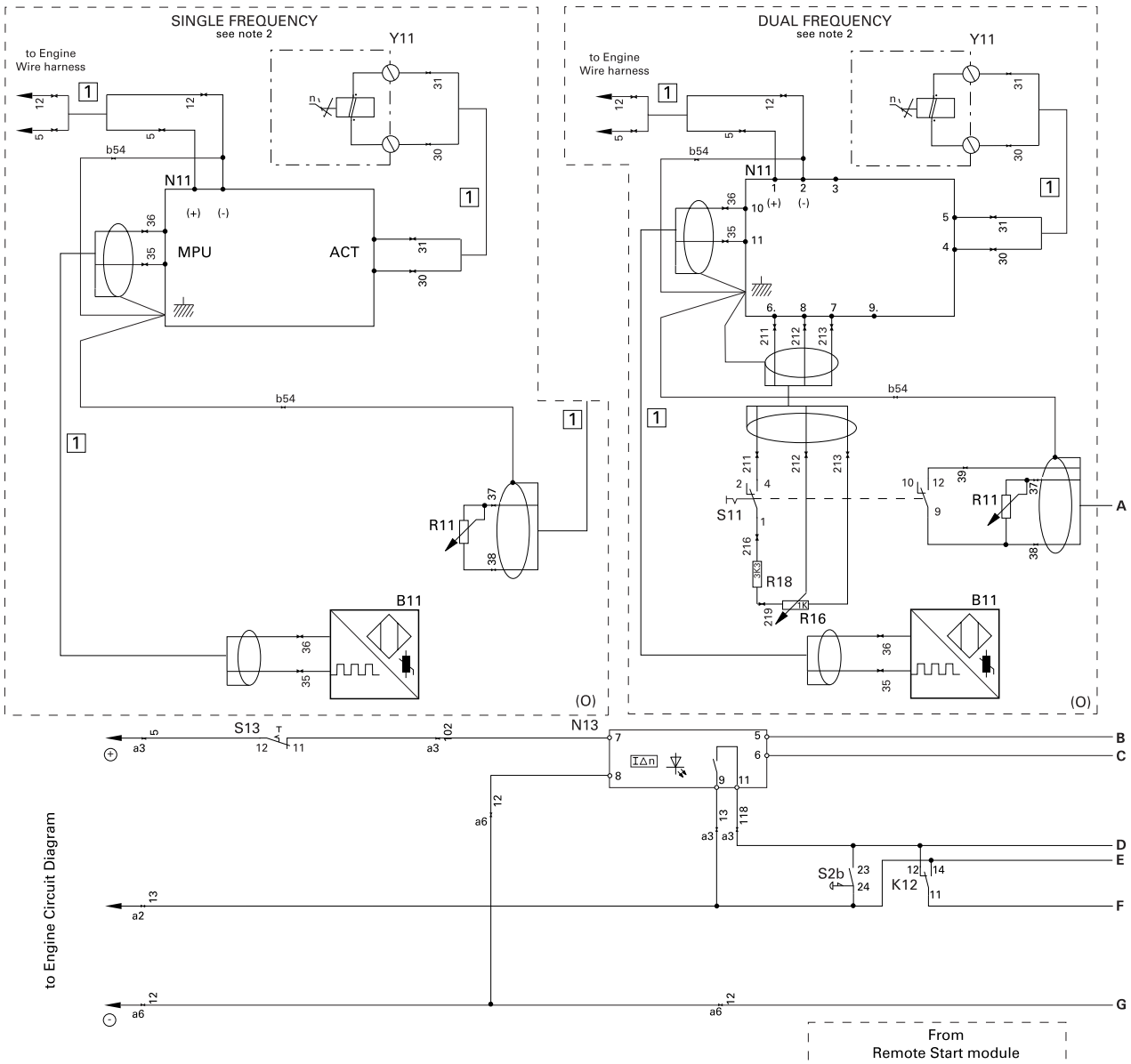


A	Maximum permitted loaden weight of the vehicle
B	Maximum permitted road weight of the front axle
C	Maximum permitted road weight of the rear axle
1	Company code
2	Product code
3	Unit serial number
4	Name of the manufacturer
5	EEC or national type approval number
6	Vehicle identification number
7	Model number
8	Frequency
9	Apparent power - COP
10	Active power - COP
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

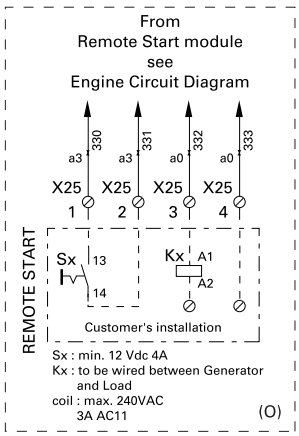
Circuit diagrams



9822 0888 24/06
Applicable for QAS108 Pd Remote Start, Triple Voltage, Dual Frequency

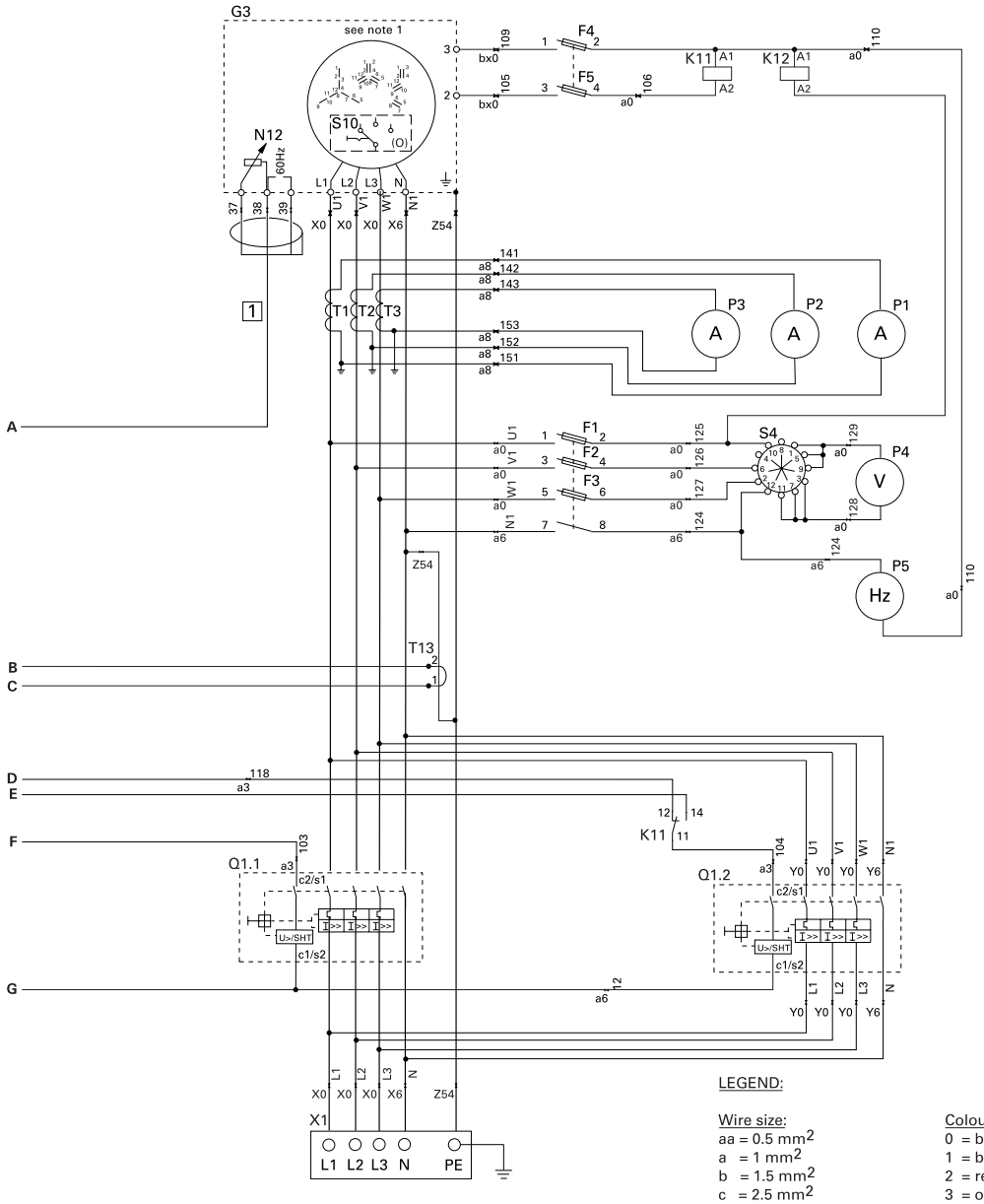


	Q1.1	Q1.2	P1	Wire size		
				X	Y	Z
QAS 48	100A	63A	0-200A	i	g	g
QAS 78	175A	100A	0-200A	k	i	i
QAS 108	250A	150A	0-400A	lx	j	j
QAS 138	310A	180A	0-400A	lx	k	k



B11	Speed sensor	P1-3	Amperemeter	P5	Frequencymeter 45-65Hz
F1-5	Fuse 4A	N11	Speed controller	Q1.1	Circuit breaker
G3	Alternator	N12	Automatic voltage regulator	Q1.2	Circuit breaker
K11	Aux. relay voltage select. (lower voltage)	N13	Earth fault-current relay	R11	Supply voltage adjust potentiometer
K12	Aux. relay voltage select. (higher voltage)	P4	Voltmeter 0-500V	S2b	Emergency stop

CIRCUIT DIAGRAM
QAS108 Pd



Note 1:
3ph higher voltage : connect 2-3 ; 6-7 ; 10-11 ; 4-8-12(N) 3ph lower voltage : connect 1-3 ; 5-7 ; 9-11 ; 2-4-6-8-10-12(N) 1ph lower voltage : connect 1-3 ; 5-7 ; 2-4-10-12(N) ; 6-8-9-11
Note 2:
The actuator replaces the Fuel stop solenoid valve (mentioned on the Engine Conrol Circuit diagram).

(O) : OPTIONAL EQUIPMENT

LEGEND:

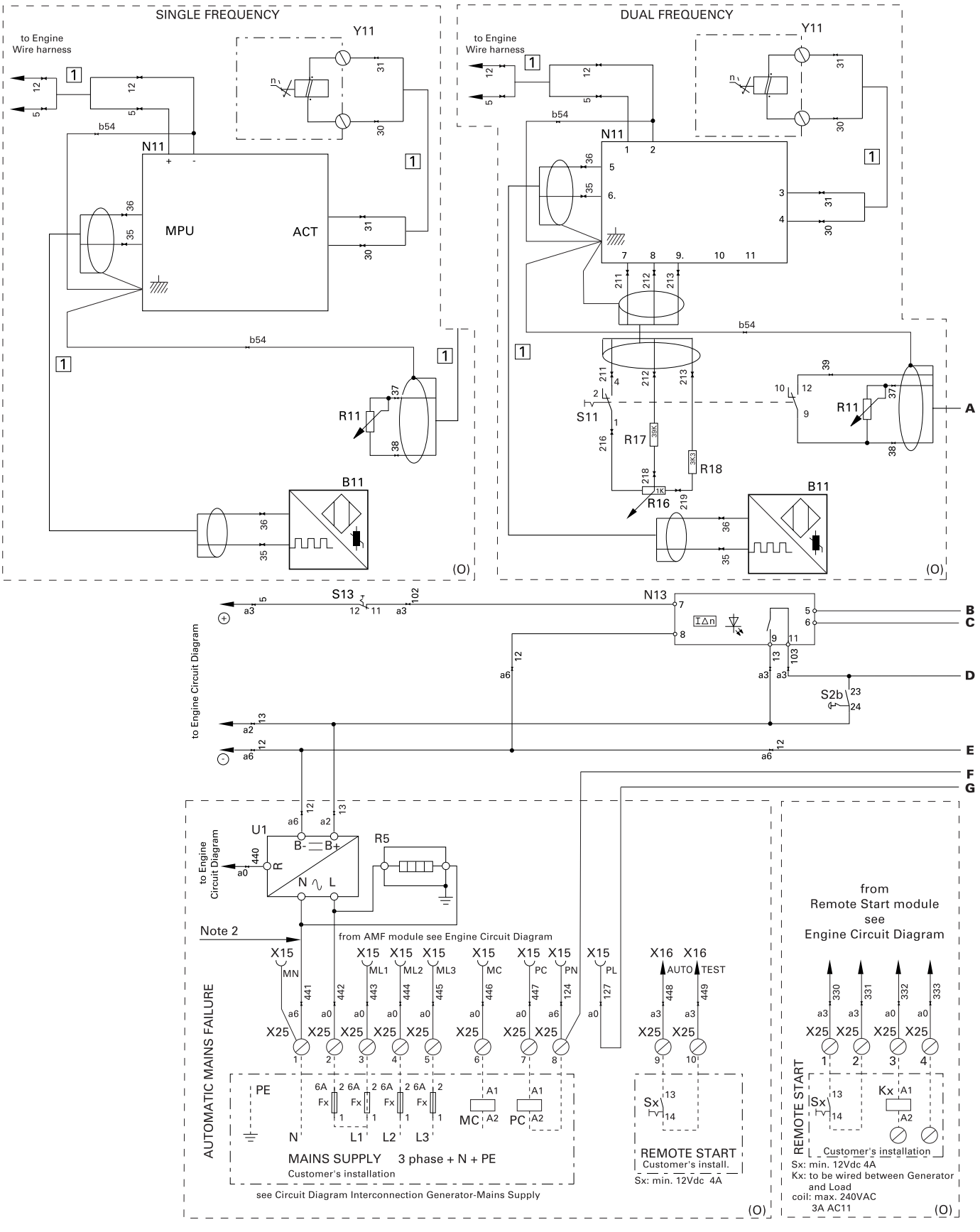
Wire size:
- aa = 0.5 mm²
- a = 1 mm²
- b = 1.5 mm²
- c = 2.5 mm²
- d = 4 mm²
- e = 6 mm²
- f = 10 mm²
- g = 16 mm²
- h = 25 mm²
- i = 35 mm²
- j = 50 mm²
- k = 70 mm²
- l = 95 mm²
- bx = 1.5 mm² NSGAFOeU
- lx = 95 mm² EPR-CSP to BS6195 4C

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

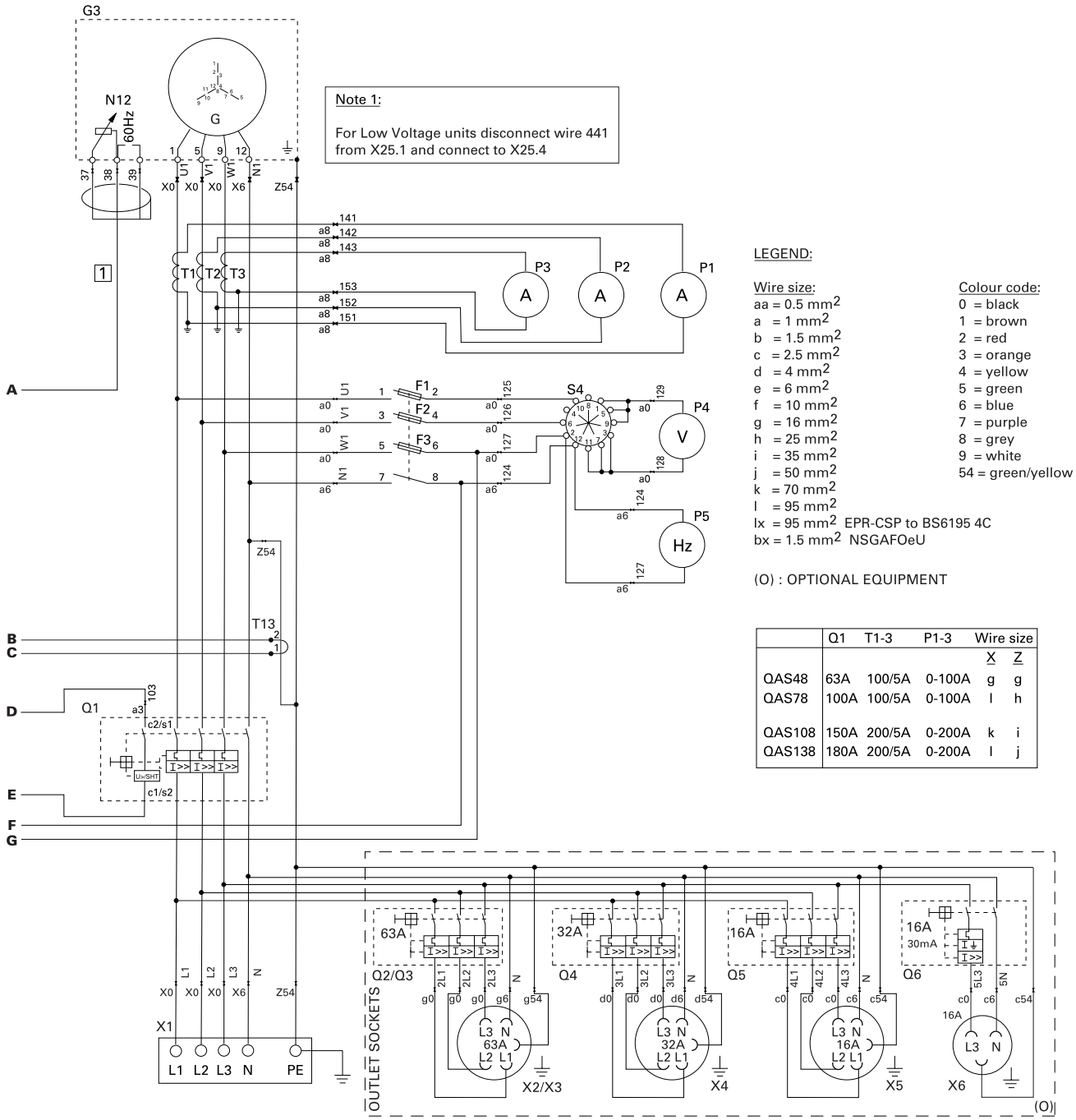
S4	Voltmeter change-over switch	T13	Earth fault transformer	Sx	Remote start/stop switch
S10	Output voltage selector switch	X1	Terminal board	Kx	Plant contactor
S13	Earth fault relay lock-out switch	X25	Terminal strip	1	Wire Harness
T1-3	Current transformer	Y11	Actuator		

CIRCUIT DIAGRAM
QAS108 Pd

9822 0888 41/07
Applicable for QAS108 Pd(S)



CIRCUIT DIAGRAM
QAS108 Pd



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 = 35 mm²
j = 50 mm²
k = 70 mm²
l = 95 mm²
lx = 95 mm² EPR-CSP to BS6195 4C
bx = 1.5 mm² NSGAFOeU

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

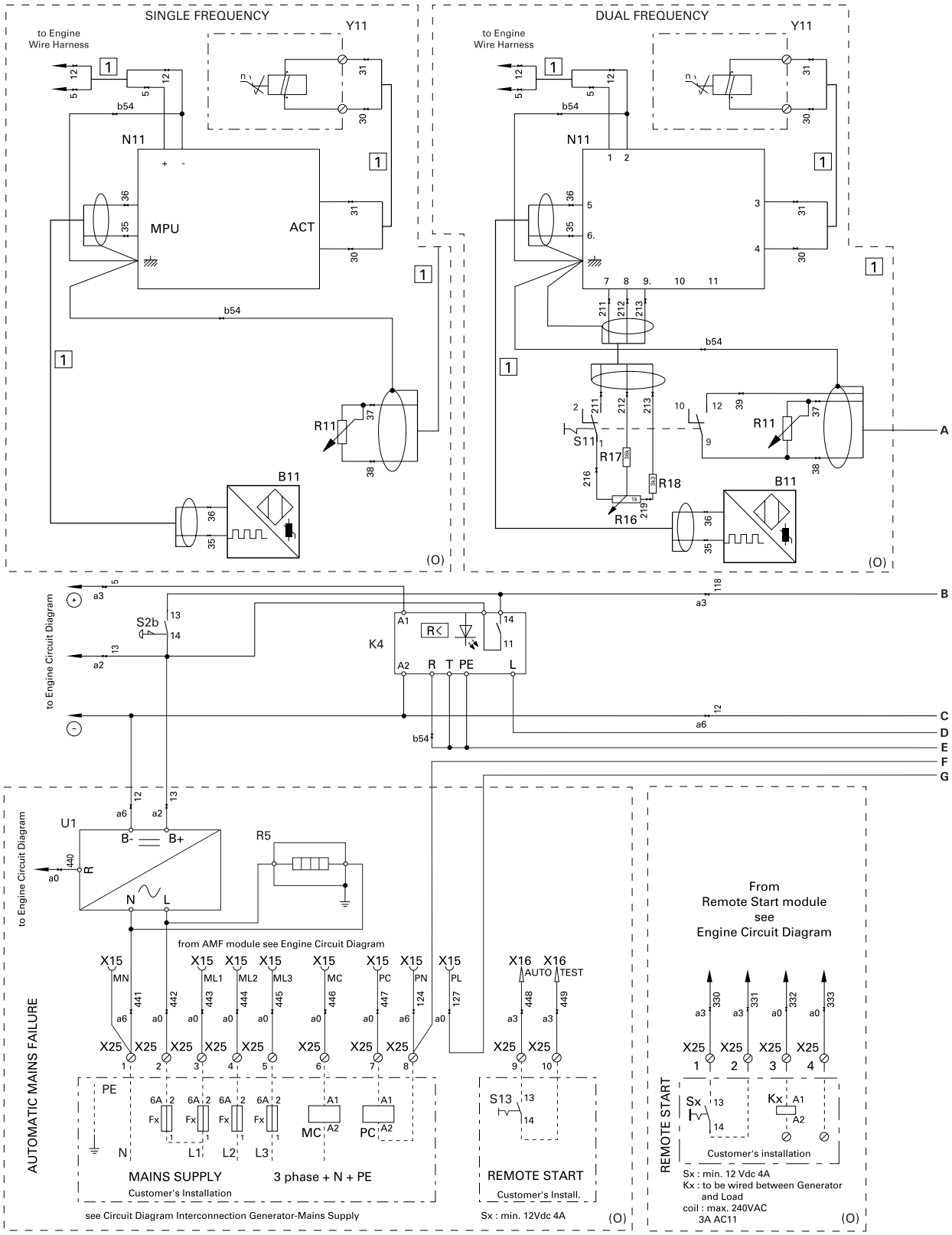
(O) : OPTIONAL EQUIPMENT

	Q1	T1-3	P1-3	Wire size	
				X	Z
QAS48	63A	100/5A	0-100A	g	g
QAS78	100A	100/5A	0-100A	l	h
QAS108	150A	200/5A	0-200A	k	i
QAS138	180A	200/5A	0-200A	l	j

B11	Speed sensor
F1-3	Fuse 4A
G3	Alternator
N11	Speed controller
N12	Automatic voltage regulator
N13	Earth fault-current relay
P1-3	Amperemeter
P4	Voltmeter 0-500V
P5	Frequencymeter 45-65Hz
Q1-6	Circuit breaker
R5	Coolant heater
R11	Supply voltage adjust potentiometer
R16	Speed adjust 60 Hz only
R17-18	Speed offset 60 Hz only
S2b	Emergency stop
S4	Voltmeter change-over switch
S11	Frequency selector switch 50Hz/60Hz
S13	Earth fault relay lock-out switch
T1-3	Current transformer
T13	Earth fault-current detector
U1	Static battery charger
X1	Terminal board
X2-6	Outlet socket
X15	10-pole connector
X25	Terminal strip
Y11	Actuator
Sx	Remote start/stop switch
Kx	Plant contactor
1	Wire Harness

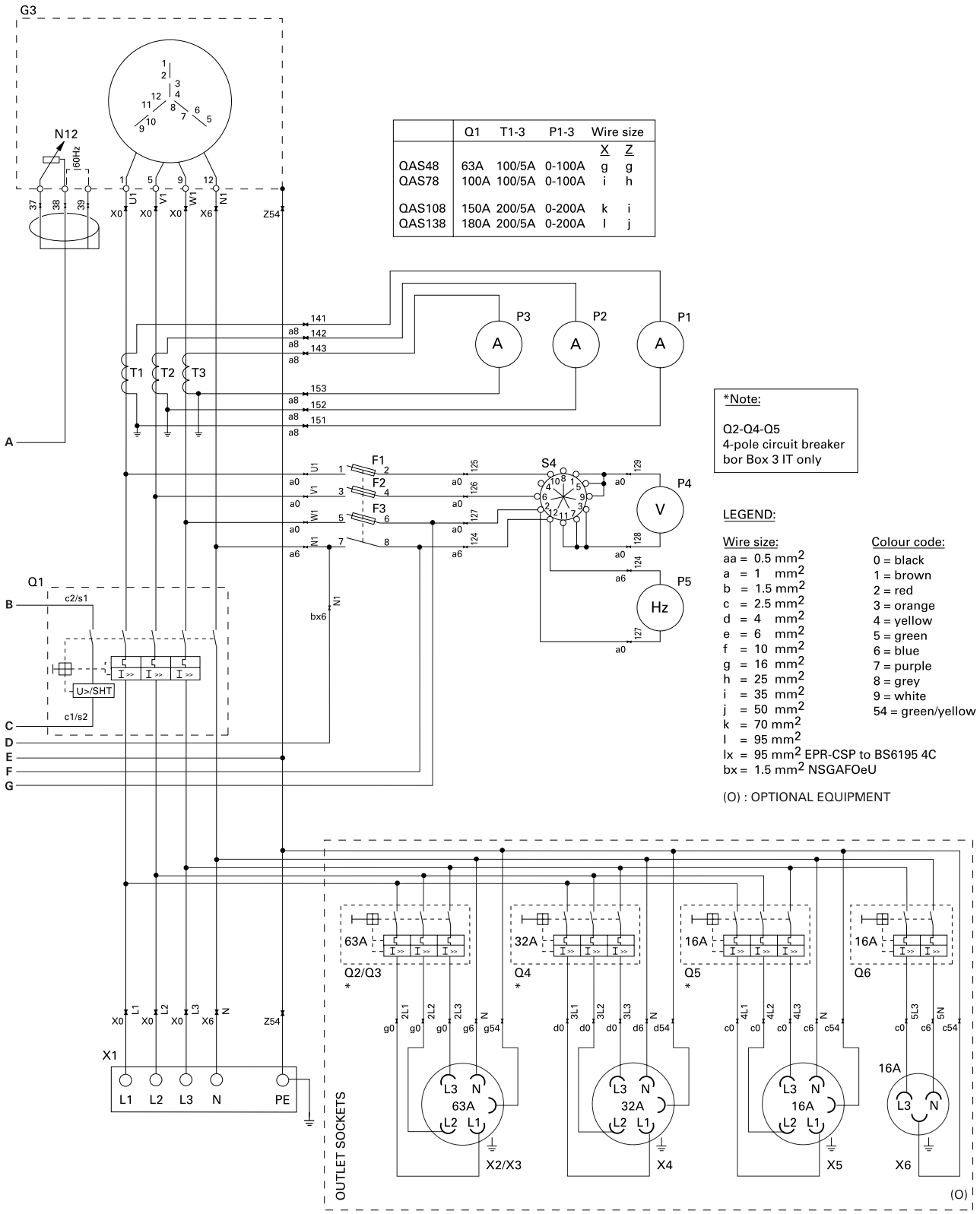
CIRCUIT DIAGRAM
QAS108 Pd

9822 0888 42/07
Applicable for QAS108 Pd(S) IT-system (Remote Start)



B11	Speed sensor	N12	Automatic voltage regulator	P5	Frequencymeter 45-65Hz
F1-3	Fuse 4A	K4	Insulation monitoring relay	Q1-6	Circuit breaker
G3	Alternator	P1-3	Amperemeter	R5	Coolant heater
N11	Speed controller	P4	Voltmeter 0-500V	R11	Supply voltage adjust potentiometer

CIRCUIT DIAGRAM
QAS108 Pd



	Q1	T1-3	P1-3	Wire size X	Wire size Z
QAS48	63A	100/5A	0-100A	g	g
QAS78	100A	100/5A	0-100A	i	h
QAS108	150A	200/5A	0-200A	k	i
QAS138	180A	200/5A	0-200A	l	j

*Note:

Q2-Q4-Q5
4-pole circuit breaker
bor Box 3 IT only

LEGEND:

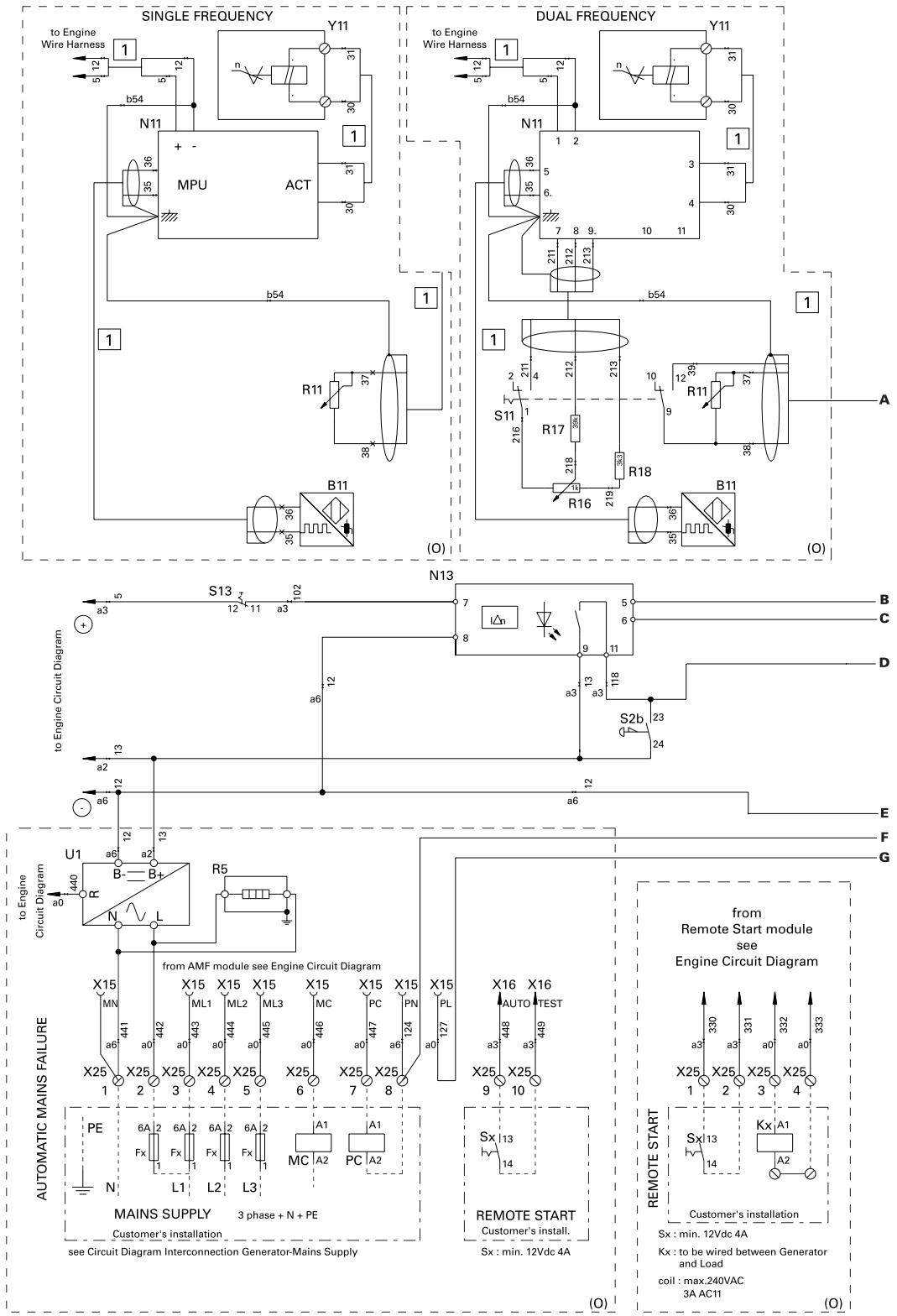
Wire size:
- aa = 0.5 mm²
- a = 1 mm²
- b = 1.5 mm²
- c = 2.5 mm²
- d = 4 mm²
- e = 6 mm²
- f = 10 mm²
- g = 16 mm²
- h = 25 mm²
- i = 35 mm²
- j = 50 mm²
- k = 70 mm²
- l = 95 mm²
- lx = 95 mm² EPR-CSP to BS6195 4C
- bx = 1.5 mm² NSGAFOeU

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

(O) : OPTIONAL EQUIPMENT

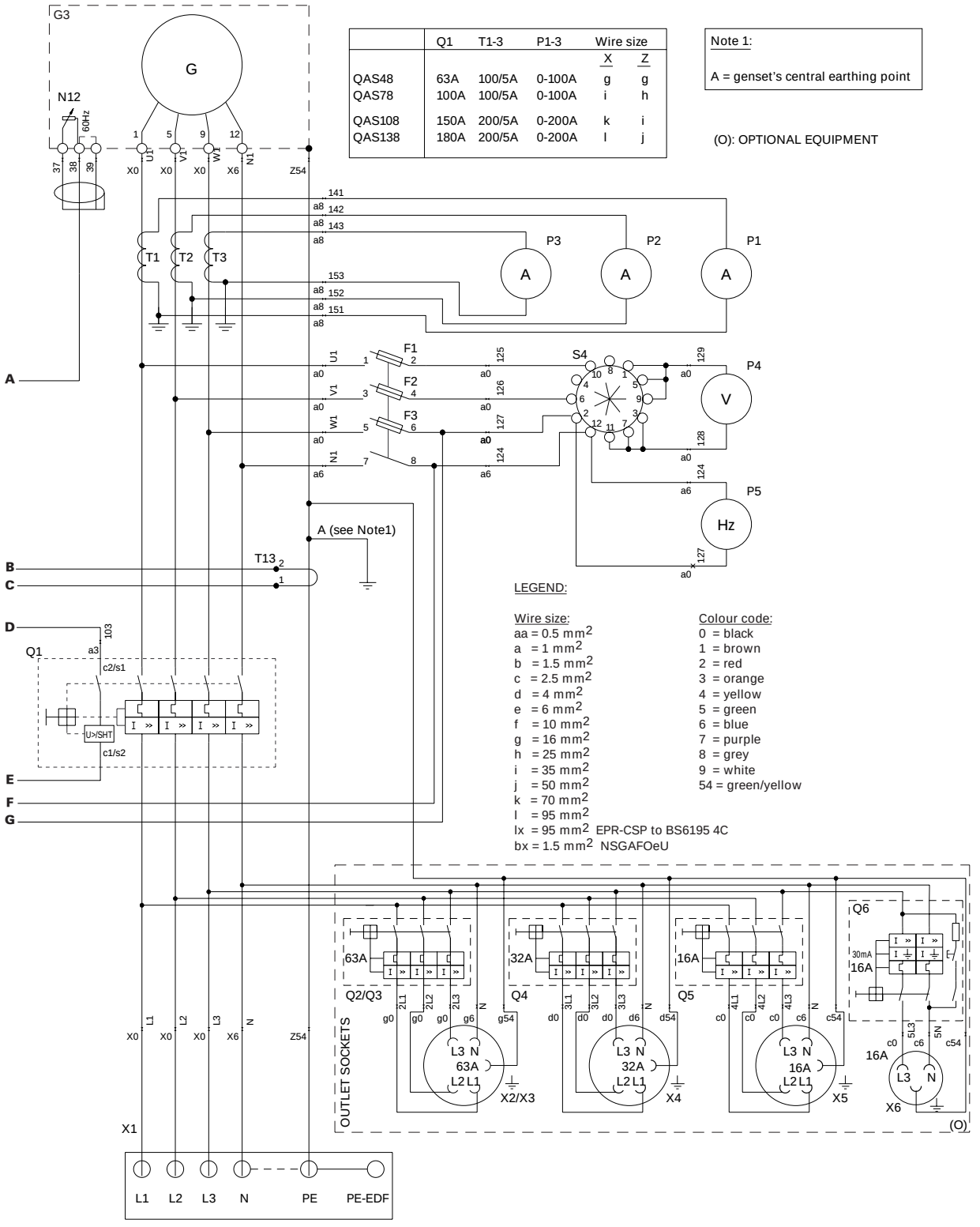
R16	Speed adjust 60 Hz only	T1-3	Current transformer	Y11	Actuator
R17-18	Speed offset 60 Hz only	U1	Static battery charger	Sx	Remote start/stop switch
S2b	Emergency stop	X1	Terminal board	Kx	Plant contactor
S4	Voltmeter change-over switch	X2-6	Outlet socket	1	Wire Harness
S11	Frequency selector switch 50Hz/60Hz	X15	10-pole connector		
S13	Earth fault relay lock-out switch	X25	Terminal strip		

9822 0888 43/06
Applicable for QAS108 Pd(S) Electricité de France (Automatic Mains Failure)



B11	Speed sensor	N13	Earth fault-current relay	R5	Coolant heater
F1-3	Fuse 4A	P1-3	Amperemeter	R11	Supply voltage adjust potentiometer
G3	Alternator	P4	Voltmeter 0-500V	R16	Speed adjust 60 Hz only
N11	Speed controller	P5	Frequencymeter 45-65Hz	R17-18	Speed offset 60 Hz only
N12	Automatic voltage regulator	Q1-6	Circuit breaker	S2b	Emergency stop

CIRCUIT DIAGRAM
QAS108 Pd



	Q1	T1-3	P1-3	Wire size X	Wire size Z
QAS48	63A	100/5A	0-100A	g	g
QAS78	100A	100/5A	0-100A	i	h
QAS108	150A	200/5A	0-200A	k	i
QAS138	180A	200/5A	0-200A	l	j

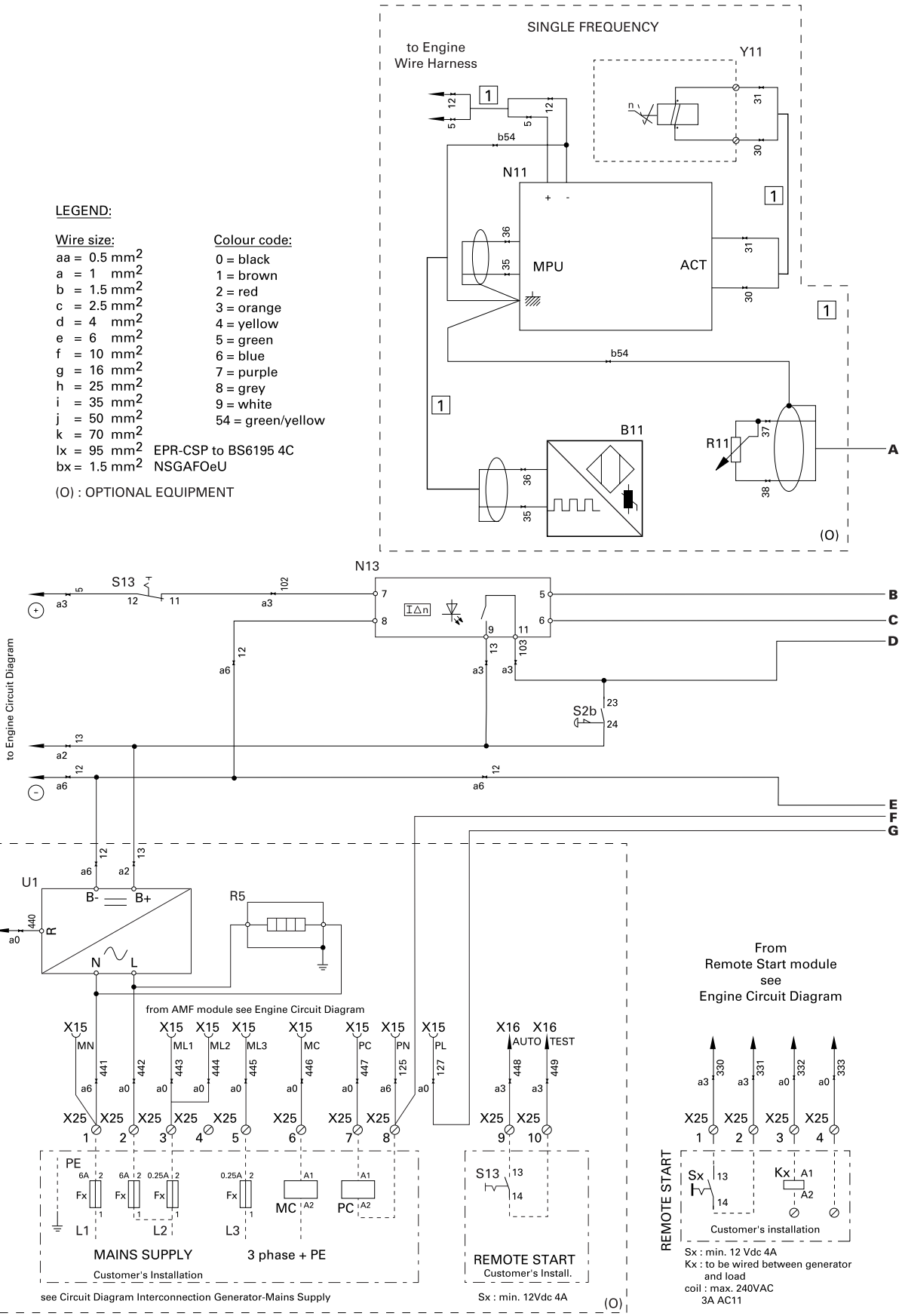
Note 1:

A = genset's central earthing point

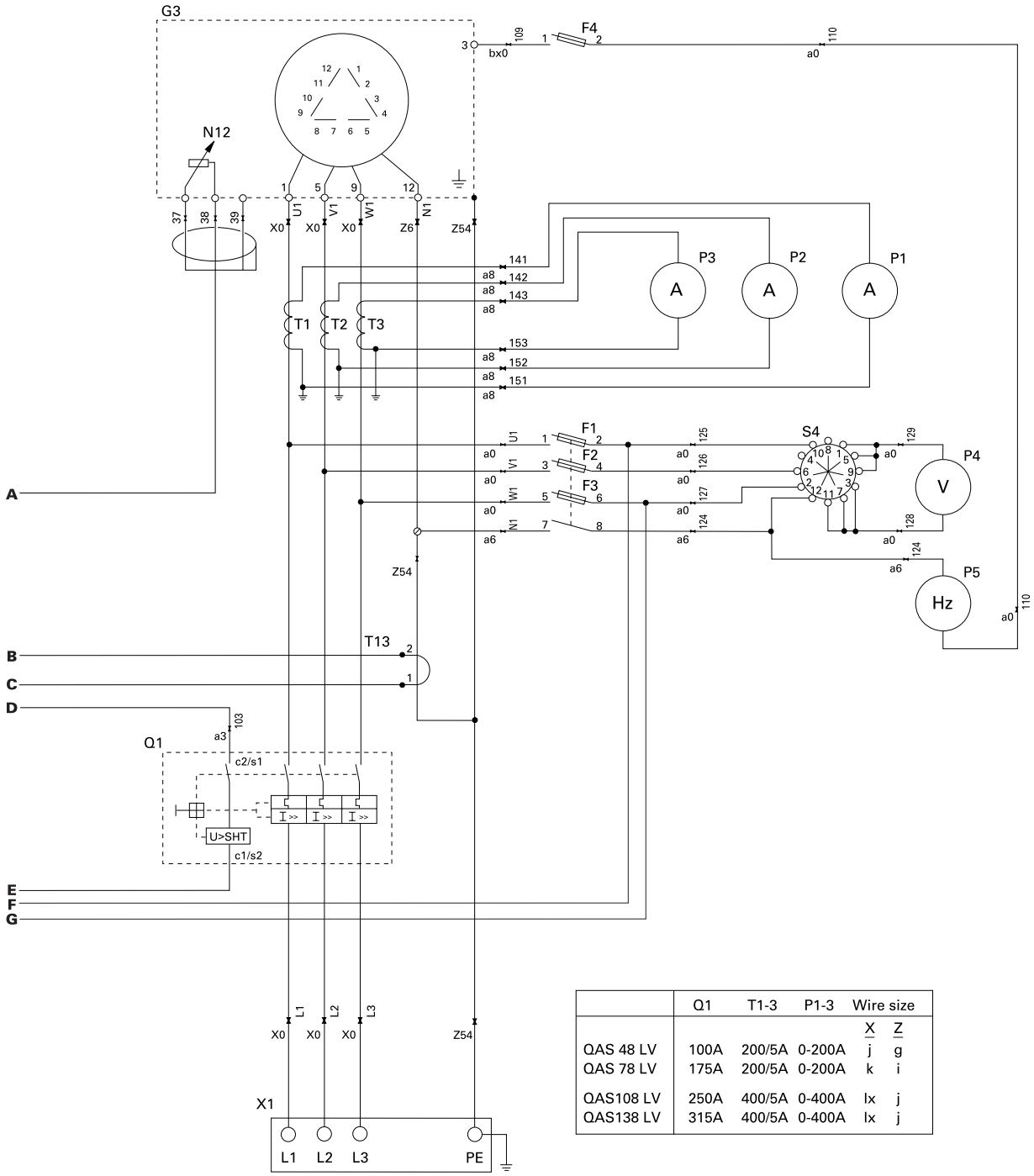
(O): OPTIONAL EQUIPMENT

S4	Voltmeter change-over switch	U1	Static battery charger	Y11	Actuator
S11	Frequency selector switch 50Hz/60Hz	X1	Terminal board	Sx	Remote start/stop switch
S13	Earth fault relay lock-out switch	X2-6	Outlet socket	Kx	Contactor generator ready (by voltage free contact, 15 sec. delayed)
T1-3	Current transformer	X15	10-pole connector		
T13	Toroid transformer for earth relay	X25	Terminal strip	1	Wire Harness

9822 0888 46/03
Applicable for QAS108 Pd Remote Start, Low voltage, 50Hz



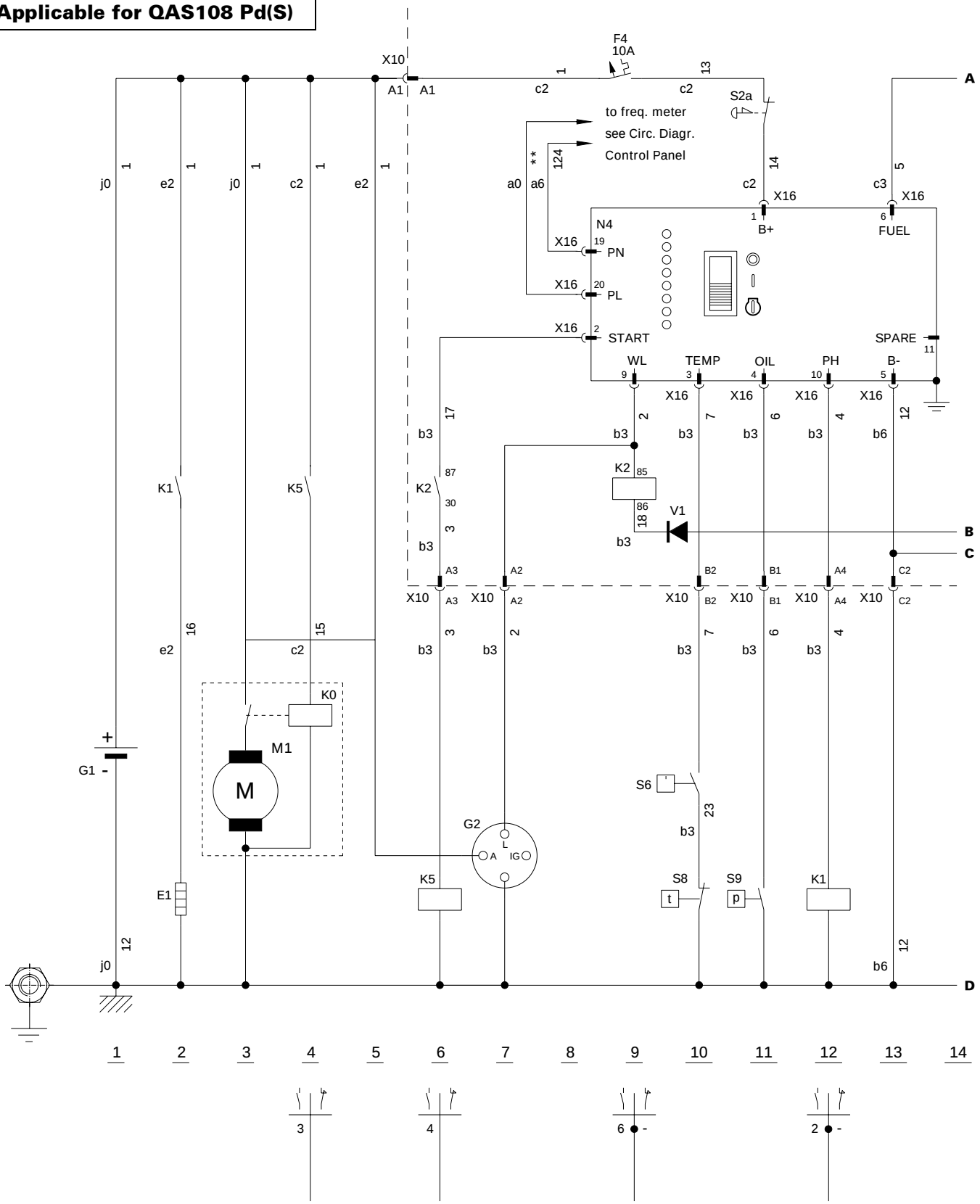
CIRCUIT DIAGRAM
QAS108 Pd



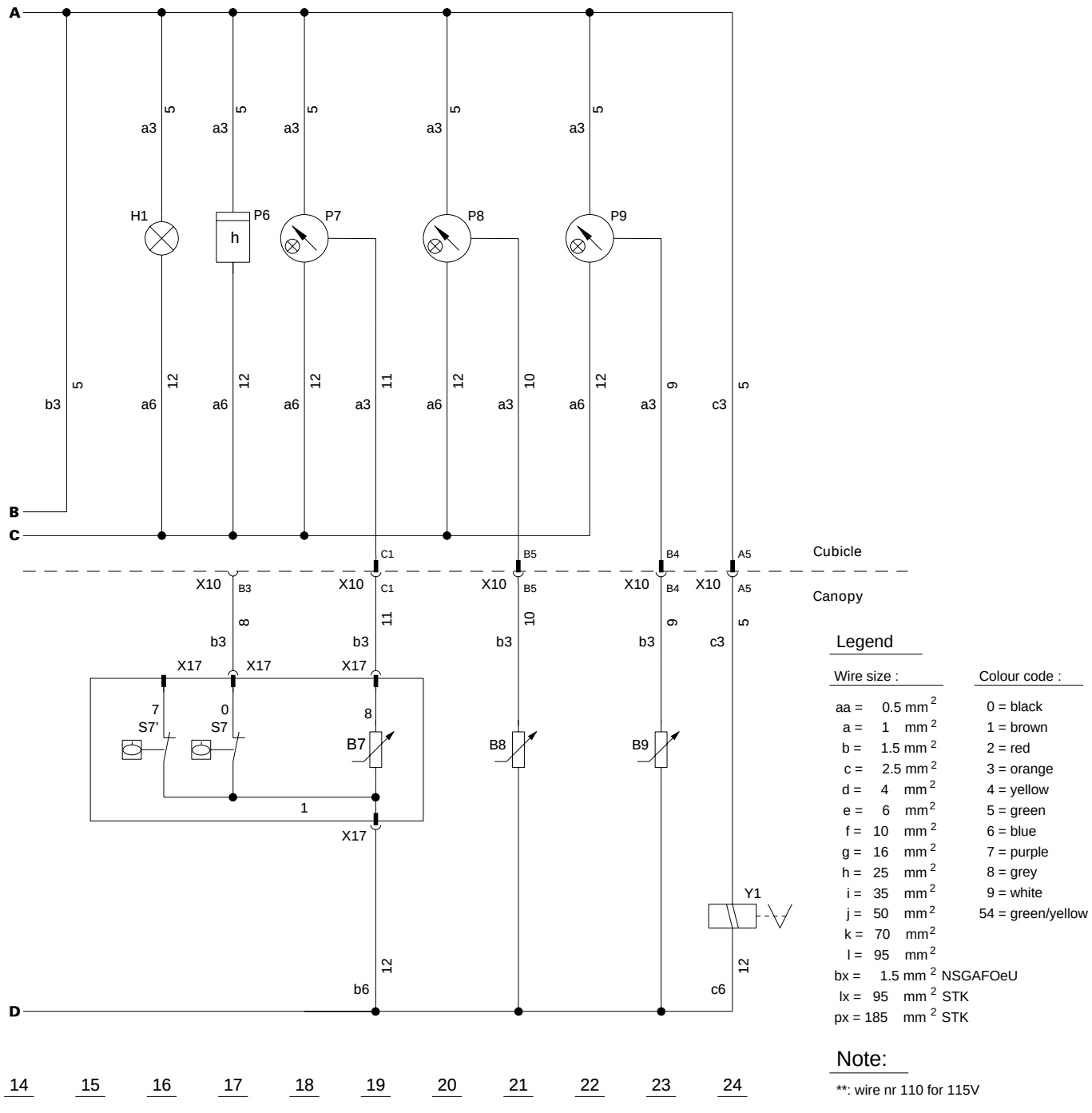
	Q1	T1-3	P1-3	Wire size	
				X	Z
QAS 48 LV	100A	200/5A	0-200A	j	g
QAS 78 LV	175A	200/5A	0-200A	k	i
QAS108 LV	250A	400/5A	0-400A	lx	j
QAS138 LV	315A	400/5A	0-400A	lx	j

B11	Speed sensor	Q1	Circuit breaker	U1	Static battery charger
F1-4	Fuse 4A	R5	Coolant heater	X1	Terminal board
G3	Alternator	R11	Supply voltage adjust potentiometer	X15	10-pole connector
N11	Speed controller	S2b	Emergency stop	X25	Terminal strip
N12	Automatic voltage regulator	S4	Voltmeter change-over switch	Y11	Actuator
N13	Earth fault-current relay	S13	Earth fault relay lock-out switch	Sx	Remote start/stop switch
P1-3	Amperemeter	T1-3	Current transformer	Kx	Contactor generator ready (by voltage free
P4	Voltmeter 0-500V	T13	Toroid transformer for earth relay		contact, 15 sec. delayed)
P5	Frequencymeter 45-65Hz	Q1	Circuit breaker	1	Wire Harness

9822 0888 47/01
Applicable for QAS108 Pd(S)



CIRCUIT DIAGRAM
QAS108 Pd



Legend

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

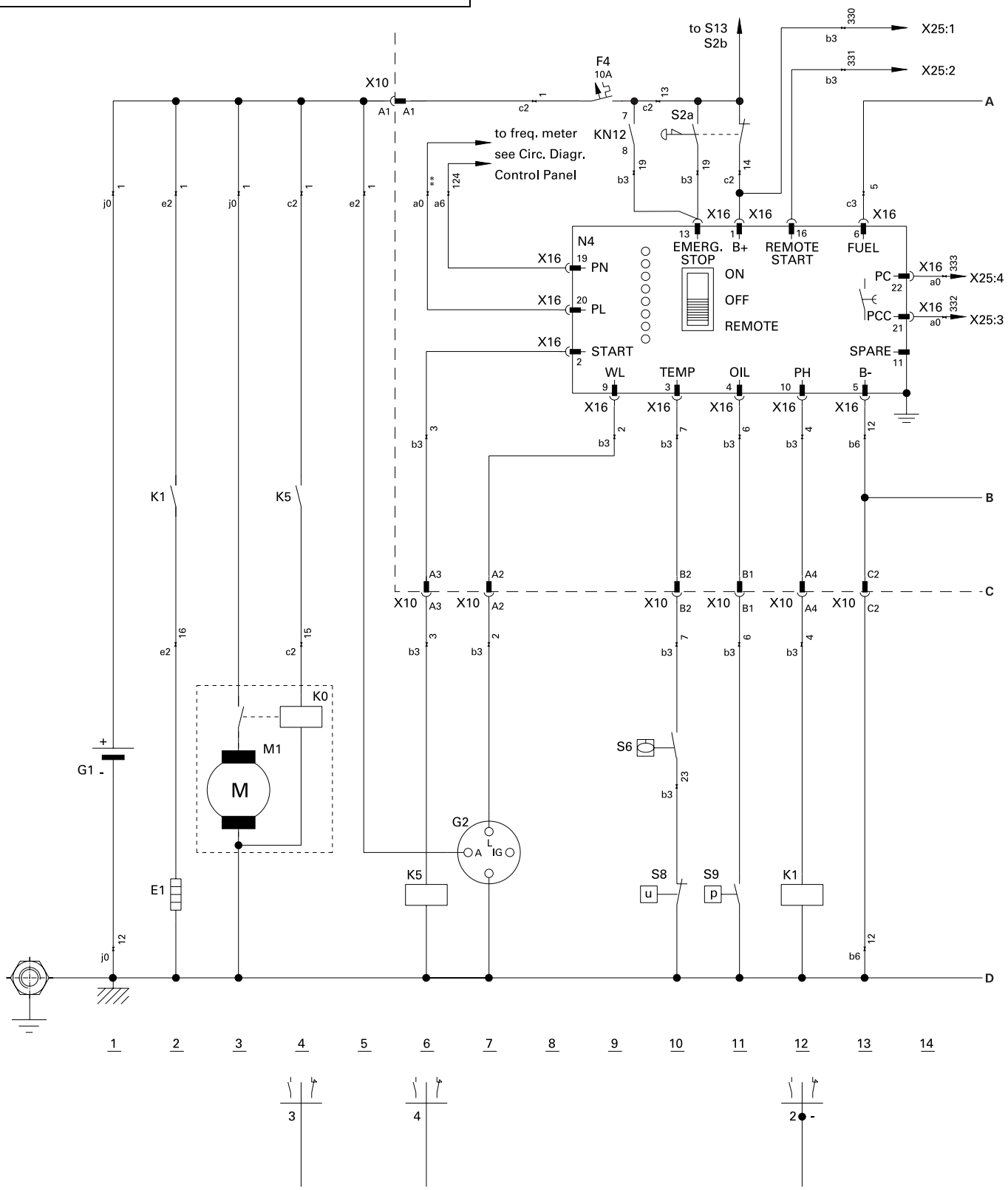
Note:

**: wire nr 110 for 115V

**: wire nr 127 for 230V

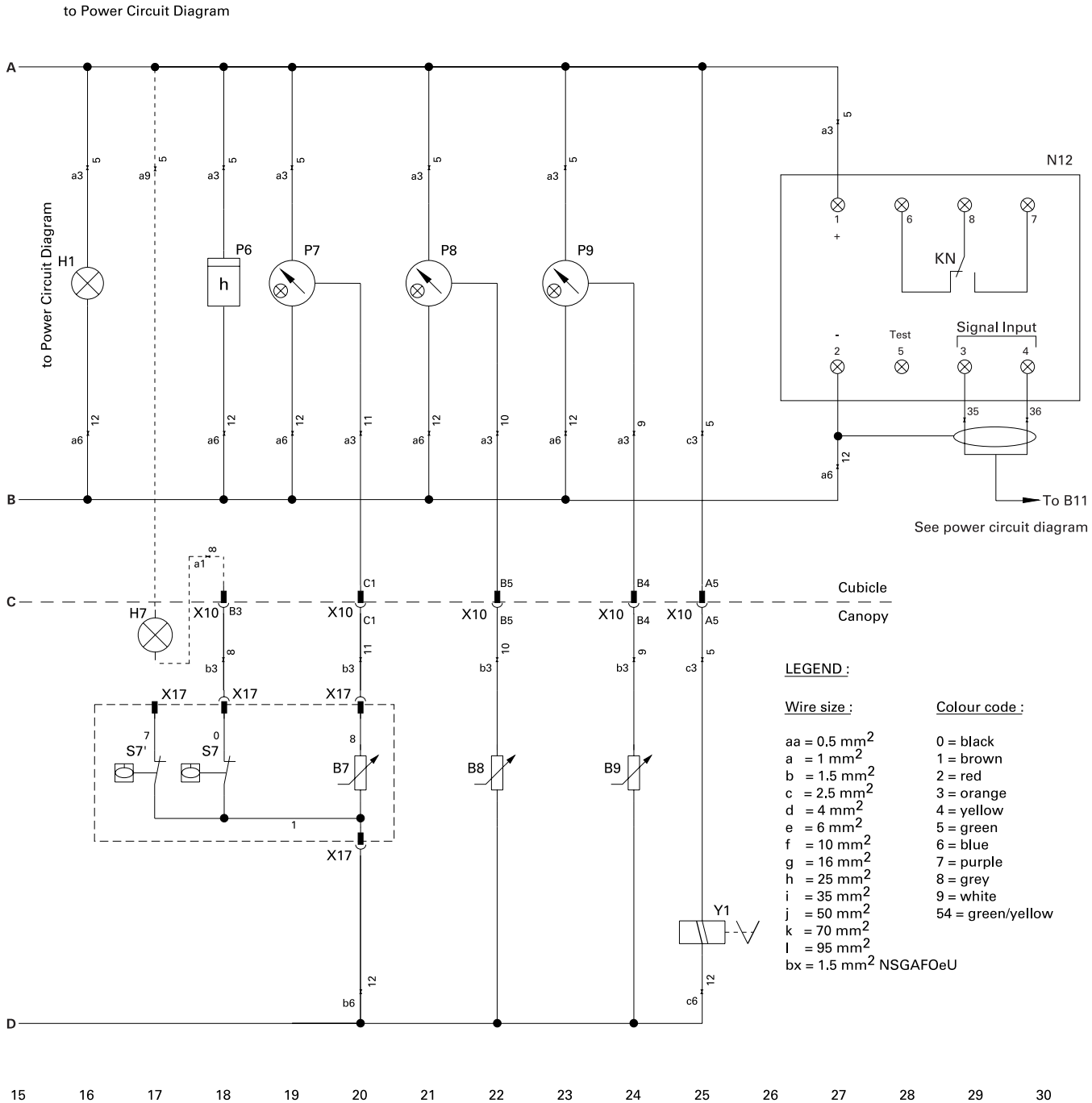
B7	Fuel level sensor	K2	Start prevention relay	S7	Low fuel level switch
B8	Coolant temperature sensor	K5	Starter relay	S7'	Low fuel level switch, warning
B9	Oil pressure sensor	M1	Starter motor	S8	Coolant high temperature switch
E1	Preheat resistor	N4	Control module	S9	Engine oil low pressure switch
F4	Fuse 10A	P6	Hourmeter	X10	15-pole connector
G1	Battery 24V	P7	Fuel level gauge	X16	Module connector
G2	Charging generator	P8	Coolant temperature gauge	X17	Fuel level unit connector
H1	Panel light	P9	Oil pressure gauge	Y1	Fuel stop solenoid
K0	Starter solenoid	S2a	Emergency stop button (S2a: Power Control)		
K1	Preheat relay	S6	Low coolant level switch		

9822 0888 48/04
Applicable for QAS108 Pd(S) Remote Start



B7	Fuel level sensor	G1	Battery 12V	K1	Preheat relay
B8	Coolant temperature sensor	G2	Charging generator	K5	Starter relay
B9	Oil pressure sensor	H1	Panel light	M1	Starter motor
E1	Preheat resistor	H7	Indicator lamp low fuel level (option)	N4	Control module
F4	Fuse 10A	K0	Starter solenoid	N12	Speed controller

CIRCUIT DIAGRAM
QAS108 Pd



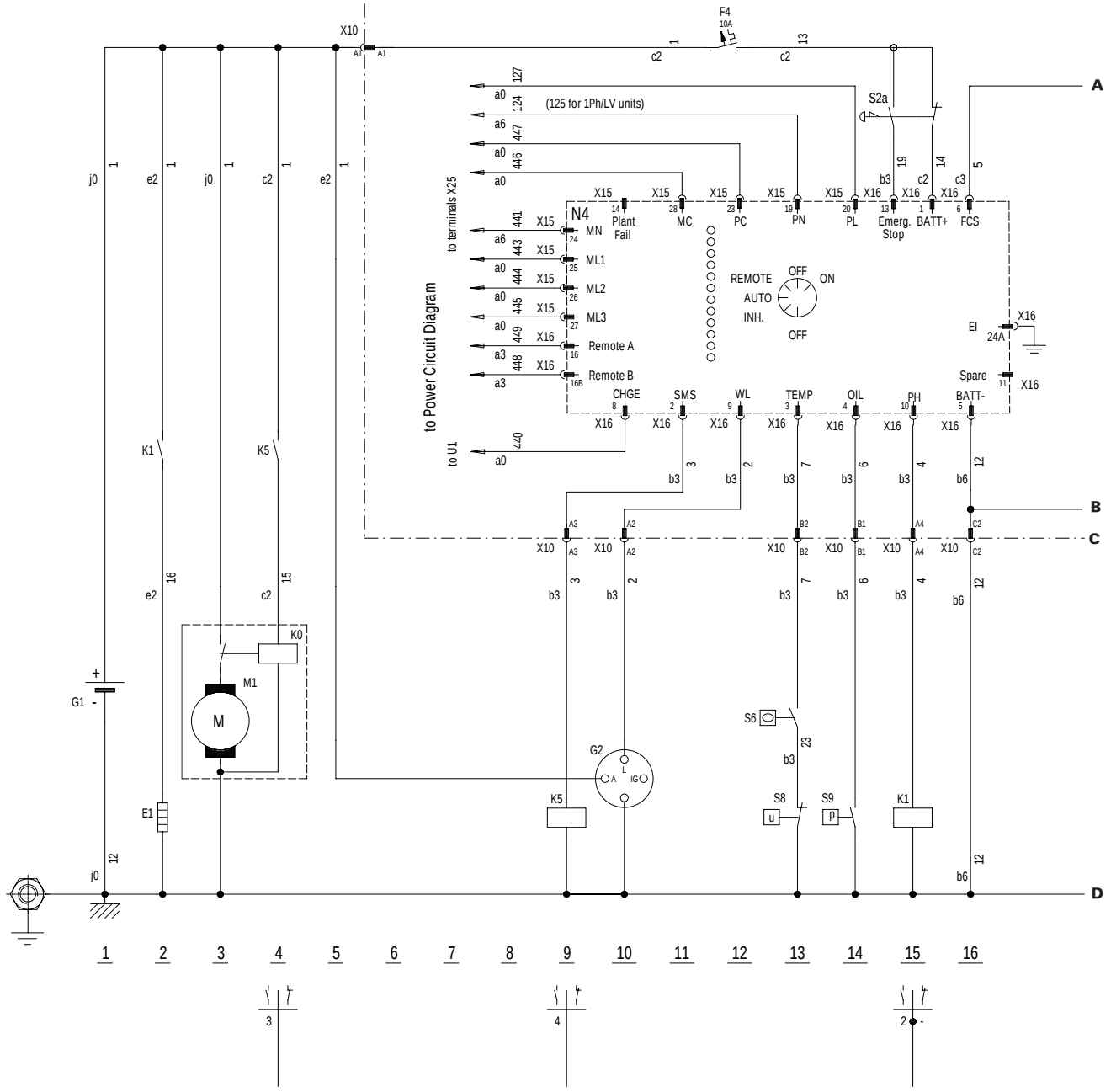
LEGEND :

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

Note:
**: wire nr 110 for 115V
**: wire nr 127 for 230V

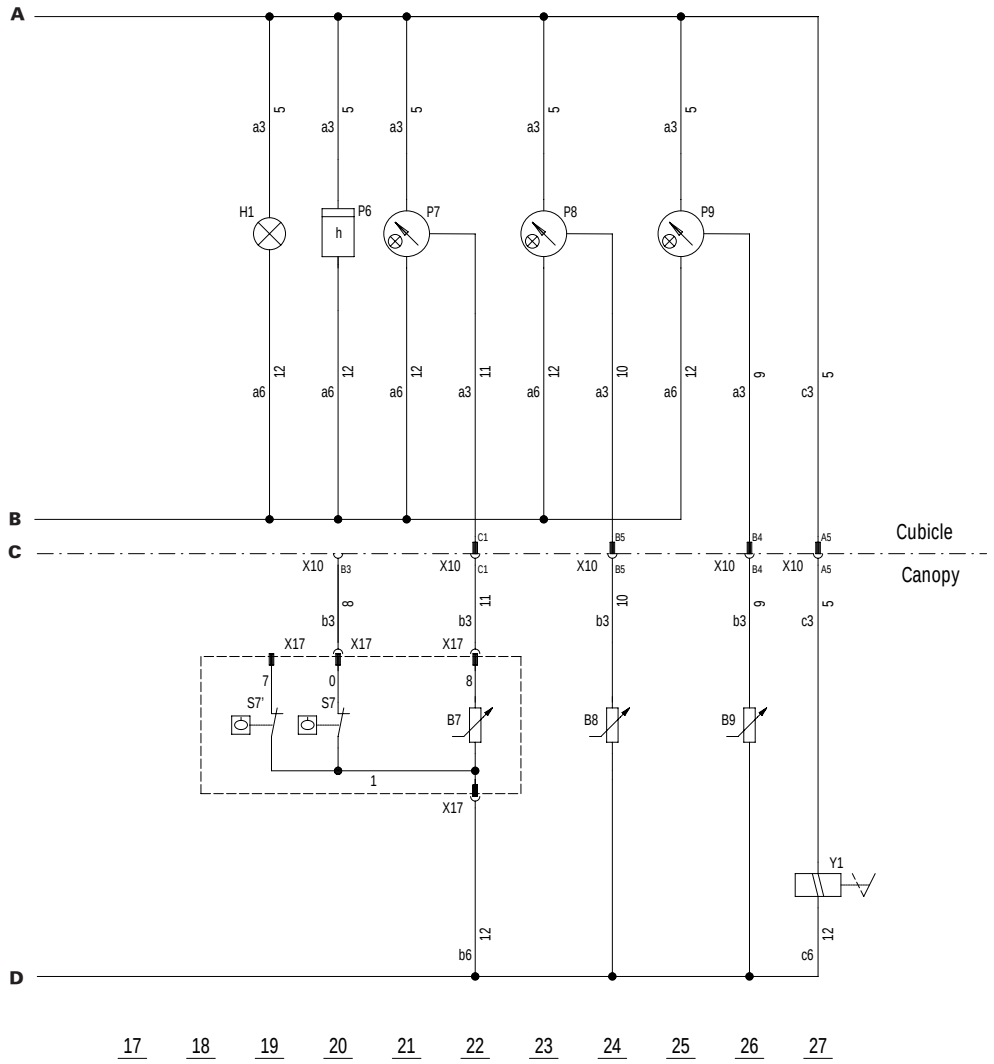
P6	Hourmeter	S6	Low coolant level switch	X10	15-pole connector
P7	Fuel level gauge	S7	Low fuel level switch	X16	Module connector
P8	Coolant temperature gauge	S7’	Low fuel level switch, warning	X17	Fuel level unit connector
P9	Oil pressure gauge	S8	Coolant high temperature switch	Y1	Fuel stop solenoid
S2a	Emergency stop button	S9	Engine oil low pressure switch	X10	15-pole connector

9822 0888 49/02
Applicable for QAS108 Pd(S) Automatic Mains Failure



B7	Fuel level sensor	K1	Preheat relay	S7	Low fuel level switch
B8	Coolant temperature sensor	K5	Starter relay	S7'	Low fuel level switch, warning
B9	Oil pressure sensor	M1	Starter motor	S8	Coolant high temperature switch
E1	Preheat resistor	N4	Control module	S9	Engine oil low pressure switch
F4	Fuse	P6	Hourmeter	X10	15-pole connector
G1	Battery 12 V	P7	Fuel level gauge	X16	Module connector
G2	Charging Alternator	P8	Coolant temperature gauge	X17	Fuel level unit connector
H1	Panel light	P9	Oil pressure gauge	Y1	Fuel stop solenoid
H7	Indicator lamp low fuel level (option)	S2a	Emergency stop button		
K0	Starter solenoid	S6	Low coolant level switch		

CIRCUIT DIAGRAM
QAS108 Pd



Legend

Wire size :

aa = 0.5mm 2
a = 1 mm 2
b = 1.5mm 2
c = 2.5mm 2
d = 4 mm 2
e = 6 mm 2
f = 10 mm 2
g = 16 mm 2
h = 25 mm 2
i = 35 mm 2
j = 50 mm 2
k = 70 mm 2
l = 95 mm 2
bx = 1.5 mm 2 NSGAFOeU
lx = 95 mm 2 STK
px = 185 mm 2 STK

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

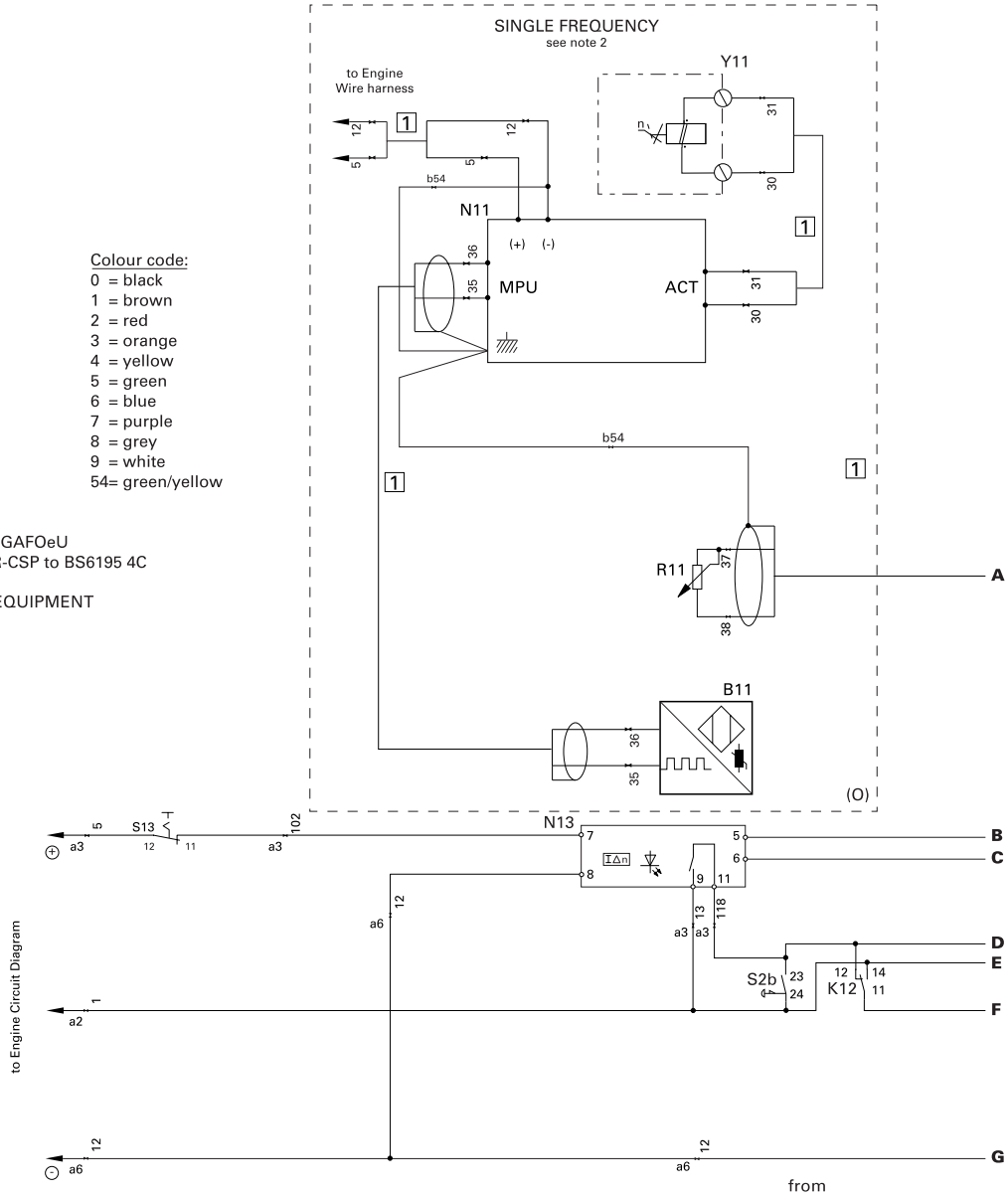
9822 0888 50/03
Applicable for QAS108 Pd Remote Start, Triple Voltage, 60Hz

LEGEND:

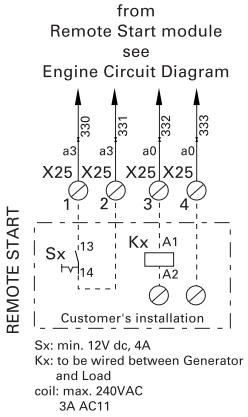
Wire size:
aa = 0.5 mm²
a = 1 mm²
b = 1.5 mm²
c = 2.5 mm²
d = 4 mm²
e = 6 mm²
f = 10 mm²
g = 16 mm²
h = 25 mm²
i = 35 mm²
j = 50 mm²
k = 70 mm²
l = 95 mm²
bx = 1.5 mm² NSGAFOeU
lx = 95 mm² EPR-CSP to BS6195 4C

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

(O) : OPTIONAL EQUIPMENT

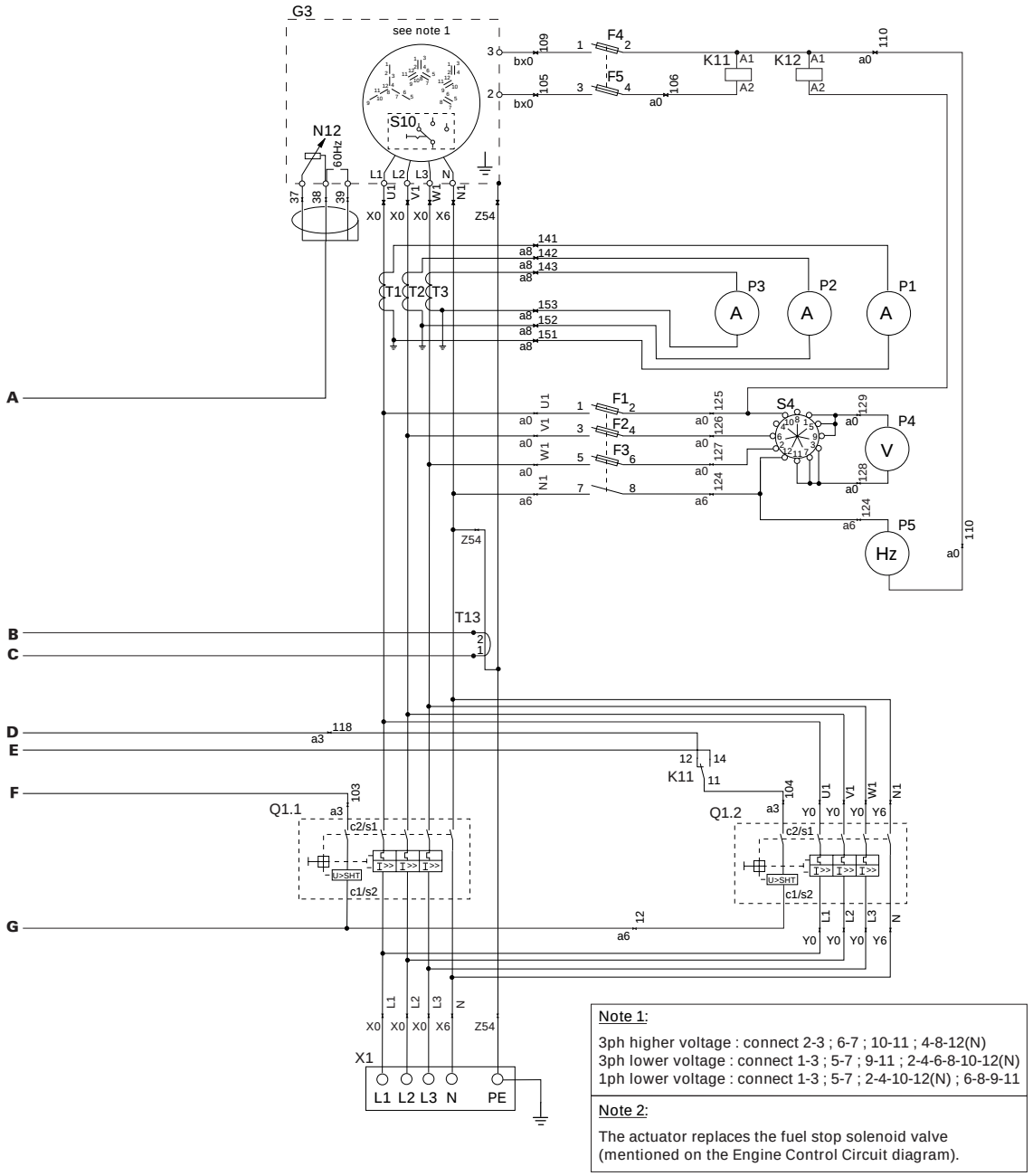


	Q1.1	Q1.2	P1	Wire size		
				X	Y	Z
QAS 48	142A	63A	0-200A	j	g	h
QAS 78	210A	100A	0-200A	lx	i	j
QAS 108	320A	160A	0-400A	lx	k	j
QAS 138	365A	185A	0-400A	lx	k	j



Sx: min. 12V dc, 4A
Kx: to be wired between Generator and Load
coil: max. 240VAC
3A AC11

CIRCUIT DIAGRAM
QAS108 Pd



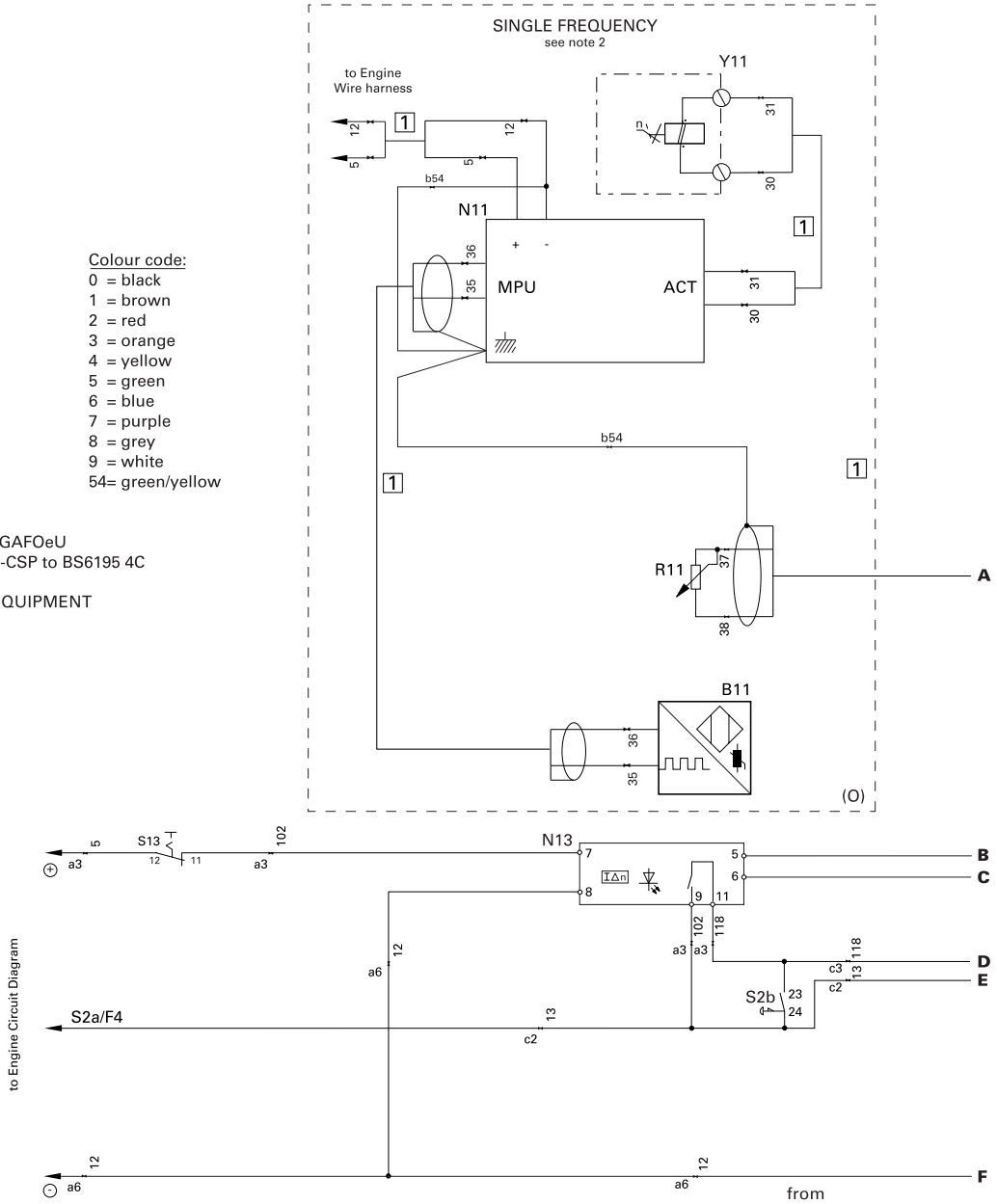
B7	Fuel level sensor	P4	Voltmeter 0-500V	T13	Earth fault transformer
B11	Speed sensor	P5	Frequencymeter 45-65Hz	X1	Terminal board
F1-5	Fuse 4A	Q1.1	Circuit breaker	X25	Terminal strip
G3	Alternator	Q1.2	Circuit breaker	Y11	Actuator
K11	Aux. relay voltage selection (lower voltage)	R11	Supply voltage adjust potentiometer	Sx	Remote start/stop switch
K12	Aux. relay voltage selection (higher voltage)	S2b	Emergency stop	Kx	Contactor generator ready (by voltage free contact, 15 sec. delayed)
N11	Speed controller	S4	Voltmeter change-over switch		
N12	Automatic voltage regulator	S10	Output voltage selector switch	1	Wire Harness
N13	Earth fault-current relay	S13	Earth fault relay lock-out switch		
P1-3	Amperemeter	T1-3	Current transformer		

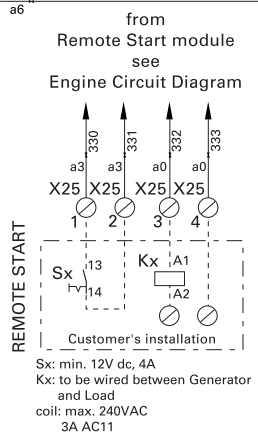
9822 0888 52/04
Applicable for QAS108 Pd Remote Start, Triple Voltage, 50Hz

LEGEND:

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

(O) : OPTIONAL EQUIPMENT

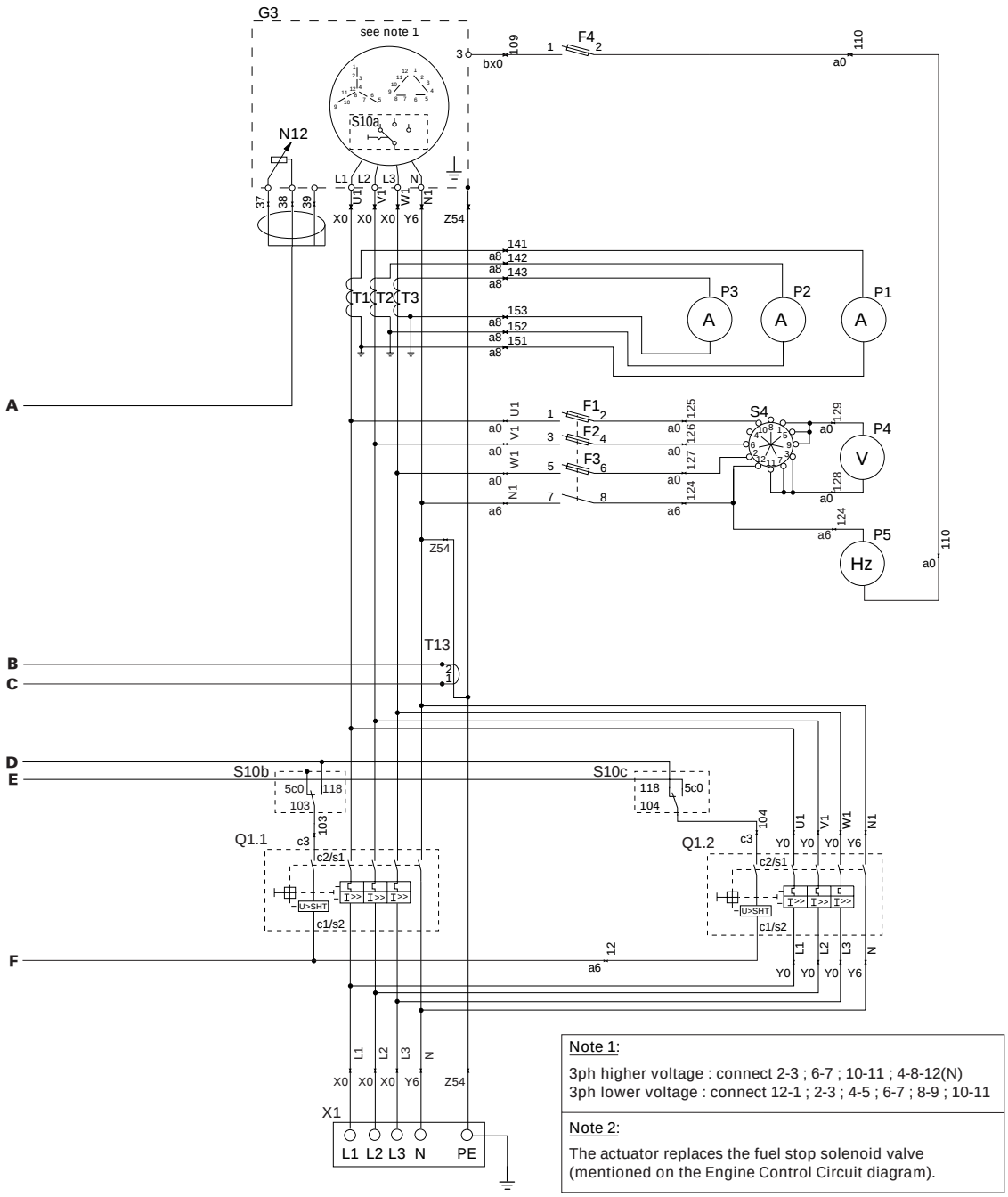




Sx: min. 12V dc, 4A
Kx: to be wired between Generator and Load
coil: max. 240VAC 3A AC11

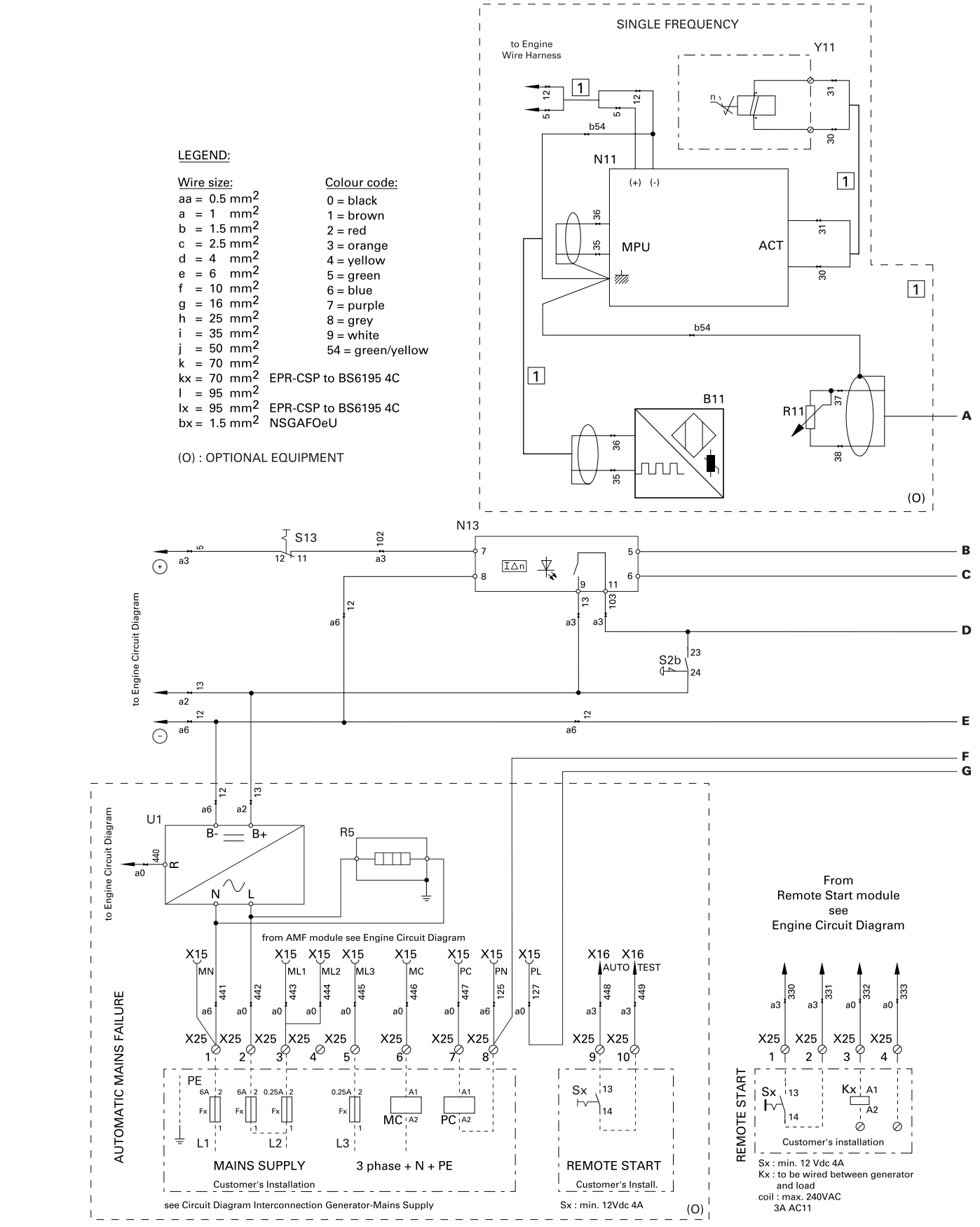
	Q1.1	Q1.2	P1	Wire size		
				X	Y	Z
QAS 48	100A	63A	0-200A	i	g	h
QAS 78	175A	100A	0-200A	k	i	i
QAS 108	250A	150A	0-400A	lx	j	j
QAS 138	315A	180A	0-400A	lx	k	j

CIRCUIT DIAGRAM
QAS108 Pd

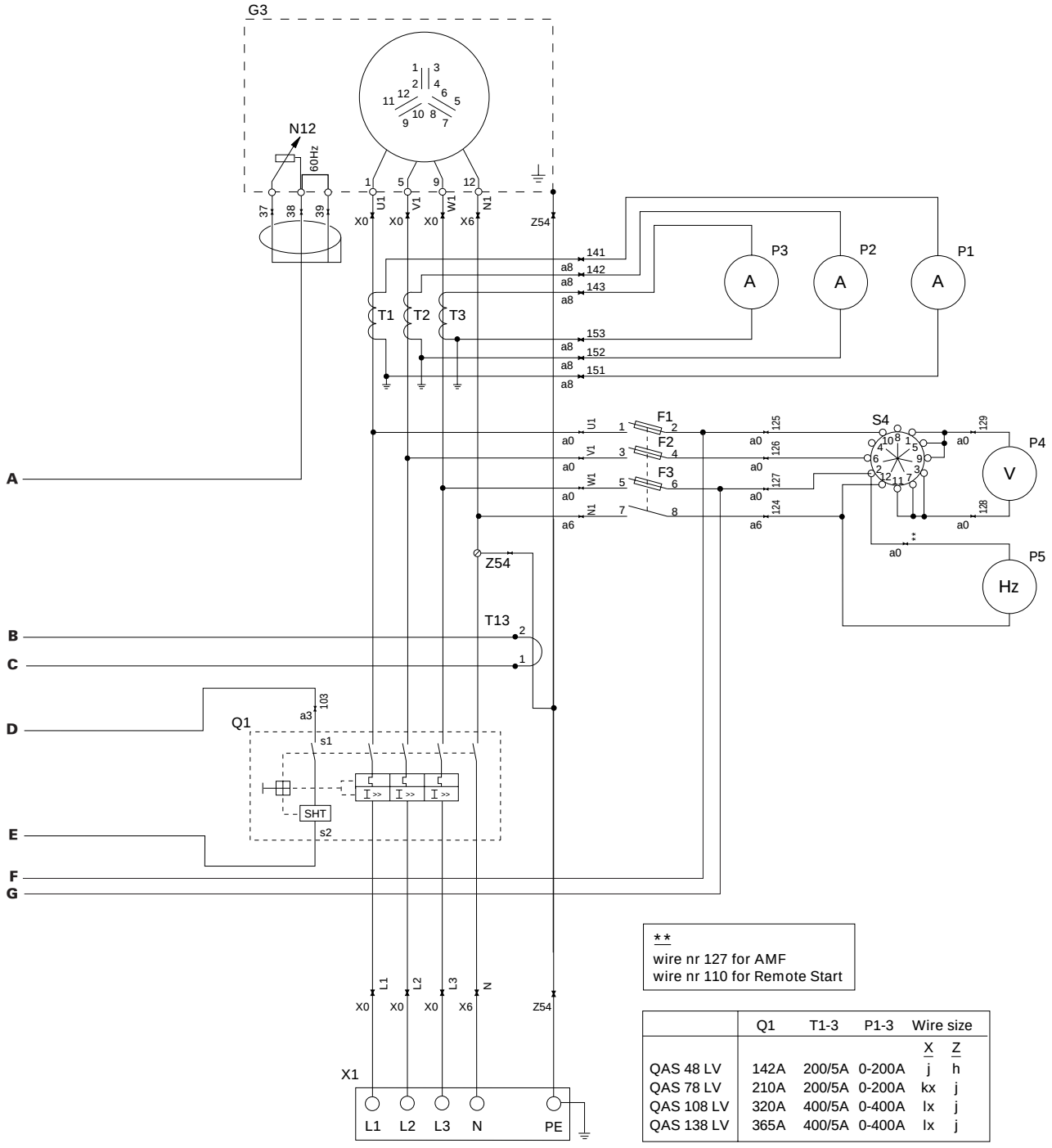


B11	Speed sensor	Q1.1	Circuit breaker (lower voltage)	X1	Terminal board
F1-4	Fuse 4A	Q1.2	Circuit breaker (higher voltage)	X25	Terminal strip
G3	Alternator	R11	Supply voltage adjust potentiometer	Y11	Actuator
N11	Speed controller	S2b	Emergency stop	Sx	Remote start/stop switch
N12	Automatic voltage regulator	S4	Voltmeter change-over switch	Kx	Contactor generator ready
N13	Earth fault-current relay	S10	Output voltage selector switch		(by voltage free contact, 15 sec. delayed)
P1-3	Amperemeter	S13	Earth fault relay lock-out switch	1	Wire Harness
P4	Voltmeter 0-500V	T1-3	Current transformer		
P5	Frequencymeter 45-65Hz	T13	Earth fault current detector		

9822 0888 64/08
Applicable for QAS108 Pd Remote Start, Low Voltage, 60Hz



CIRCUIT DIAGRAM
QAS108 Pd



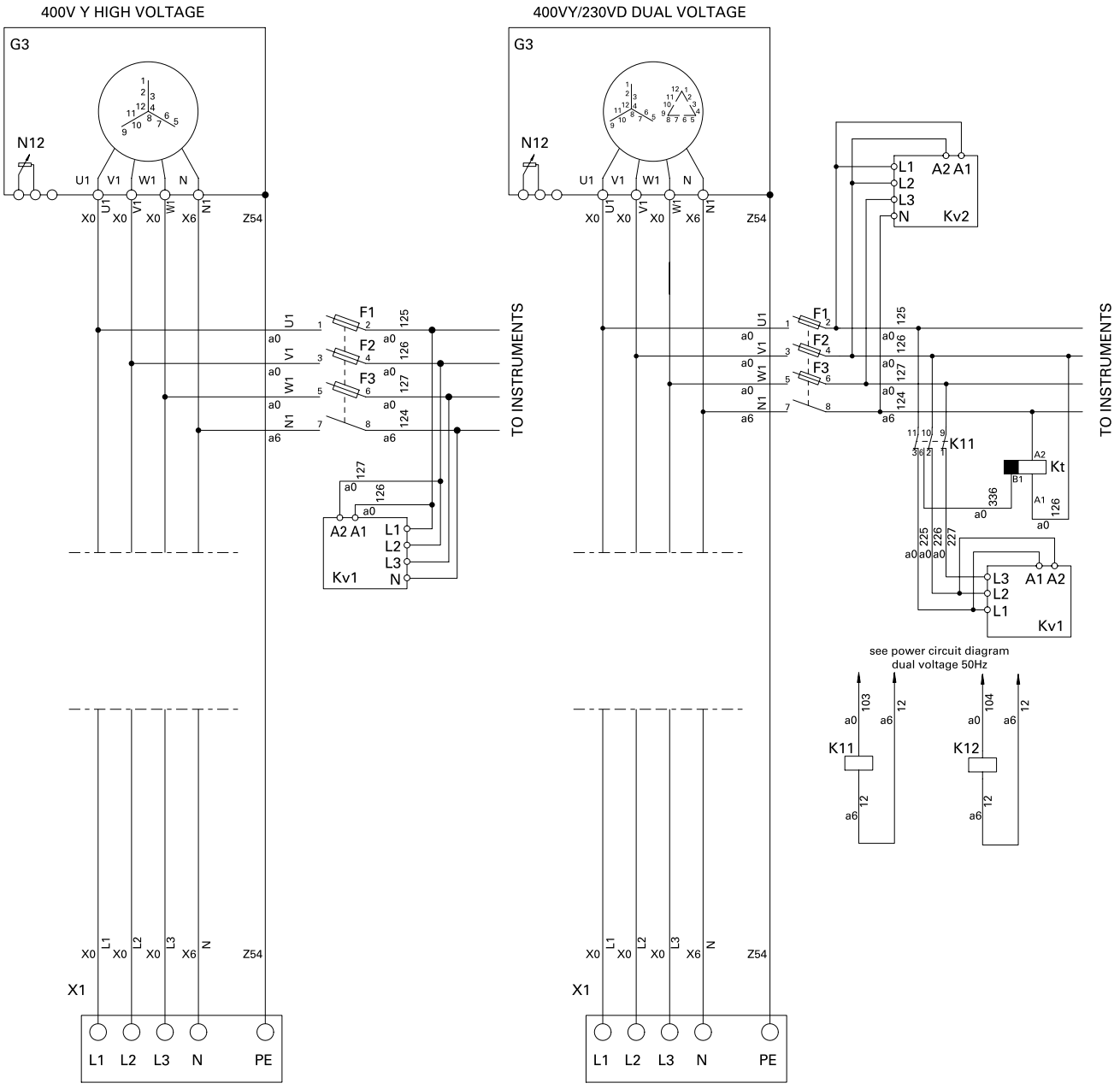
**
wire nr 127 for AMF
wire nr 110 for Remote Start

	Q1	T1-3	P1-3	Wire size	
				X	Z
QAS 48 LV	142A	200/5A	0-200A	j	h
QAS 78 LV	210A	200/5A	0-200A	kx	j
QAS 108 LV	320A	400/5A	0-400A	lx	j
QAS 138 LV	365A	400/5A	0-400A	lx	j

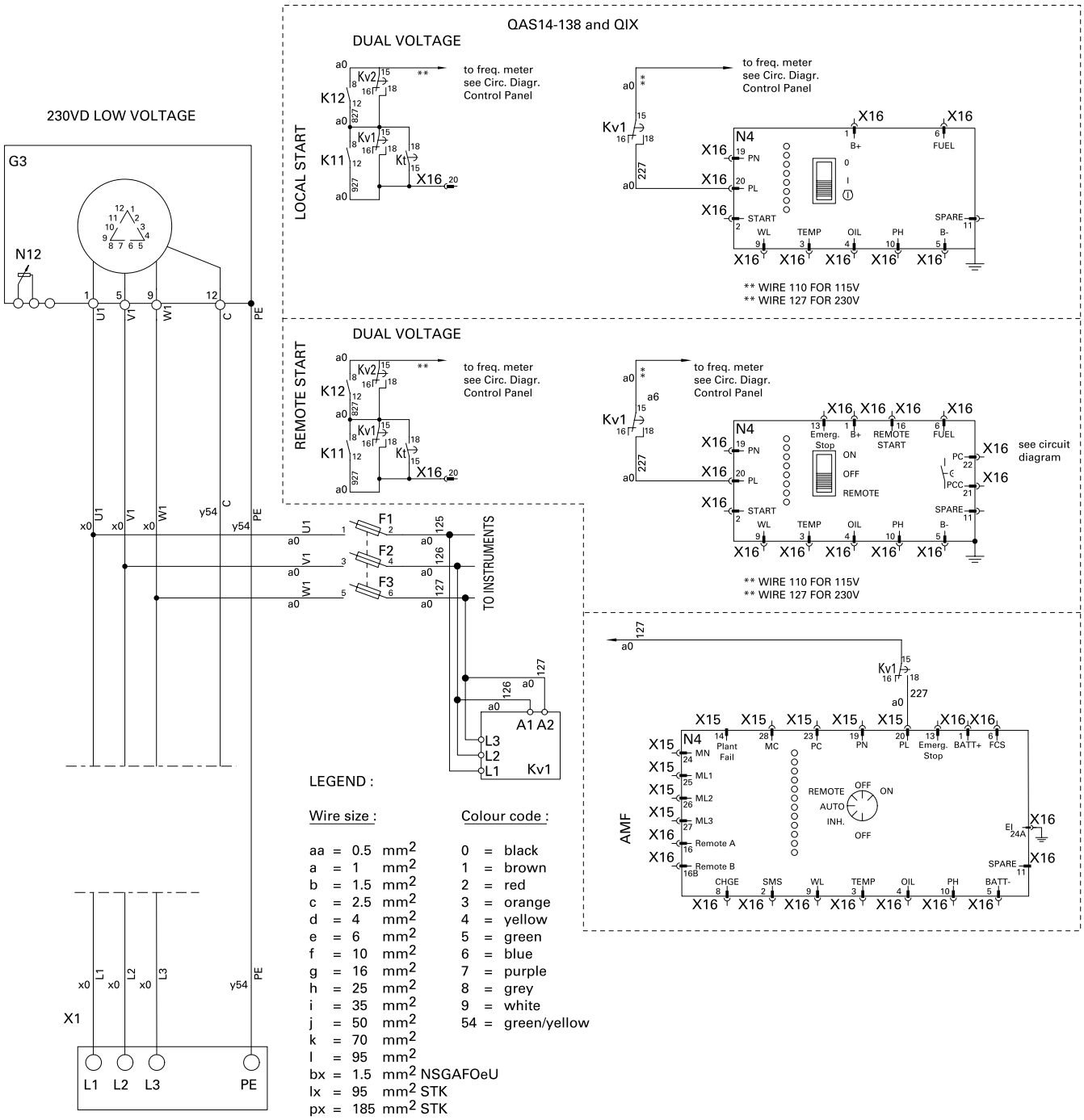
B11	Speed sensor	Q1	Circuit breaker	X1	Terminal board
F1-4	Fuse 4A	R5	Coolant heater	X15	10-pole connector
G3	Alternator	R11	Supply voltage adjust potentiometer	X25	Terminal strip
N11	Speed controller	S2b	Emergency stop	Y11	Actuator
N12	Automatic voltage regulator	S4	Voltmeter change-over switch	Sx	Remote start/stop switch
N13	Earth fault-current relay	S13	Earth fault relay lock-out switch	Kx	Contactor generator ready
P1-3	Amperemeter	T1-3	Current transformer		(by voltage free contact, 15 sec. delayed)
P4	Voltmeter 0-500V	T13	Toroid transformer for earth relay	1	Wire Harness
P5	Frequencymeter 45-65Hz	U1	Static battery charger		

CIRCUIT DIAGRAM
QAS108 Pd

9822 0888 89/01
Applicable for QAS108 PdS Over and Under voltage Relay

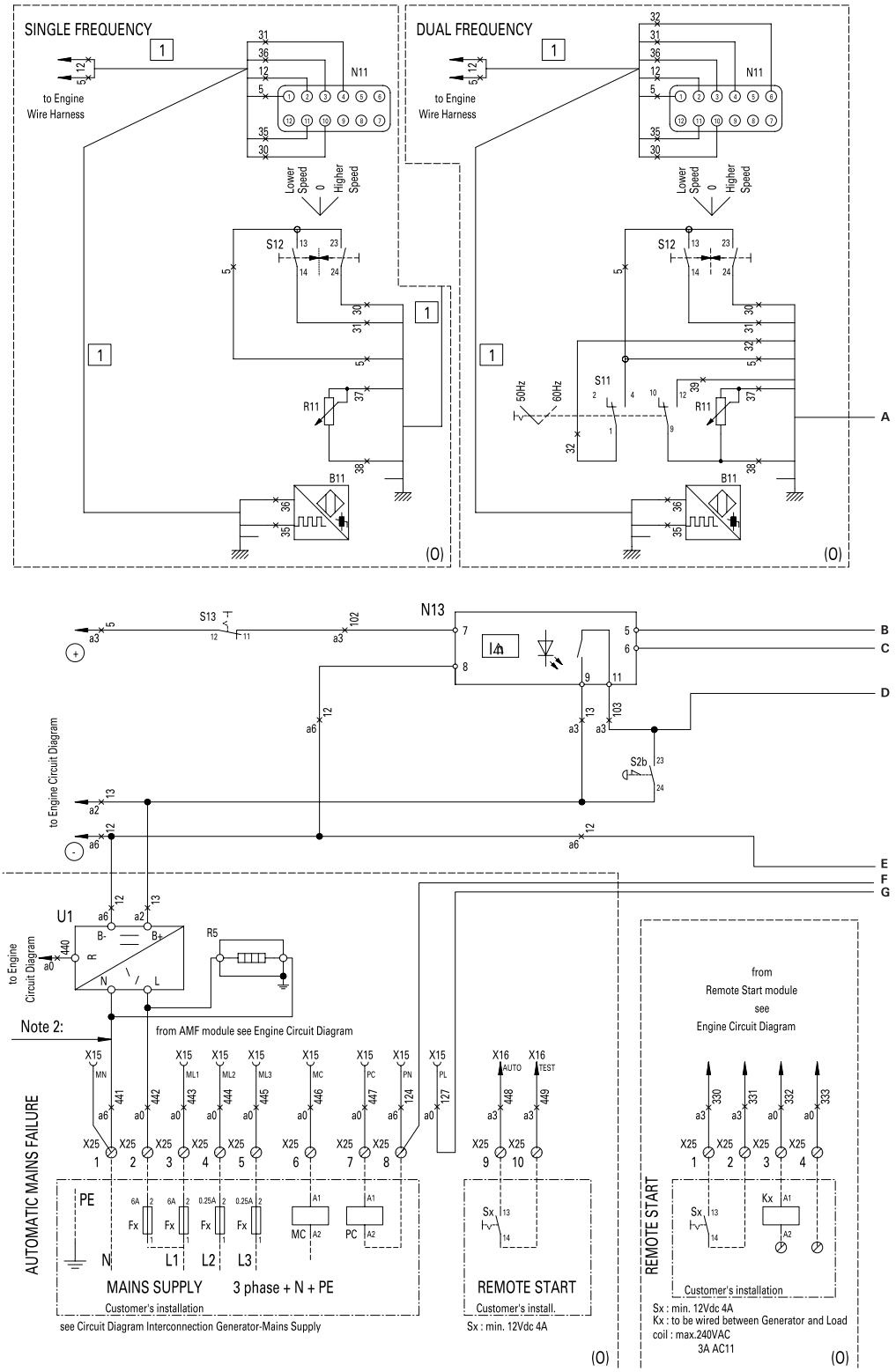


CIRCUIT DIAGRAM
QAS108 Pd



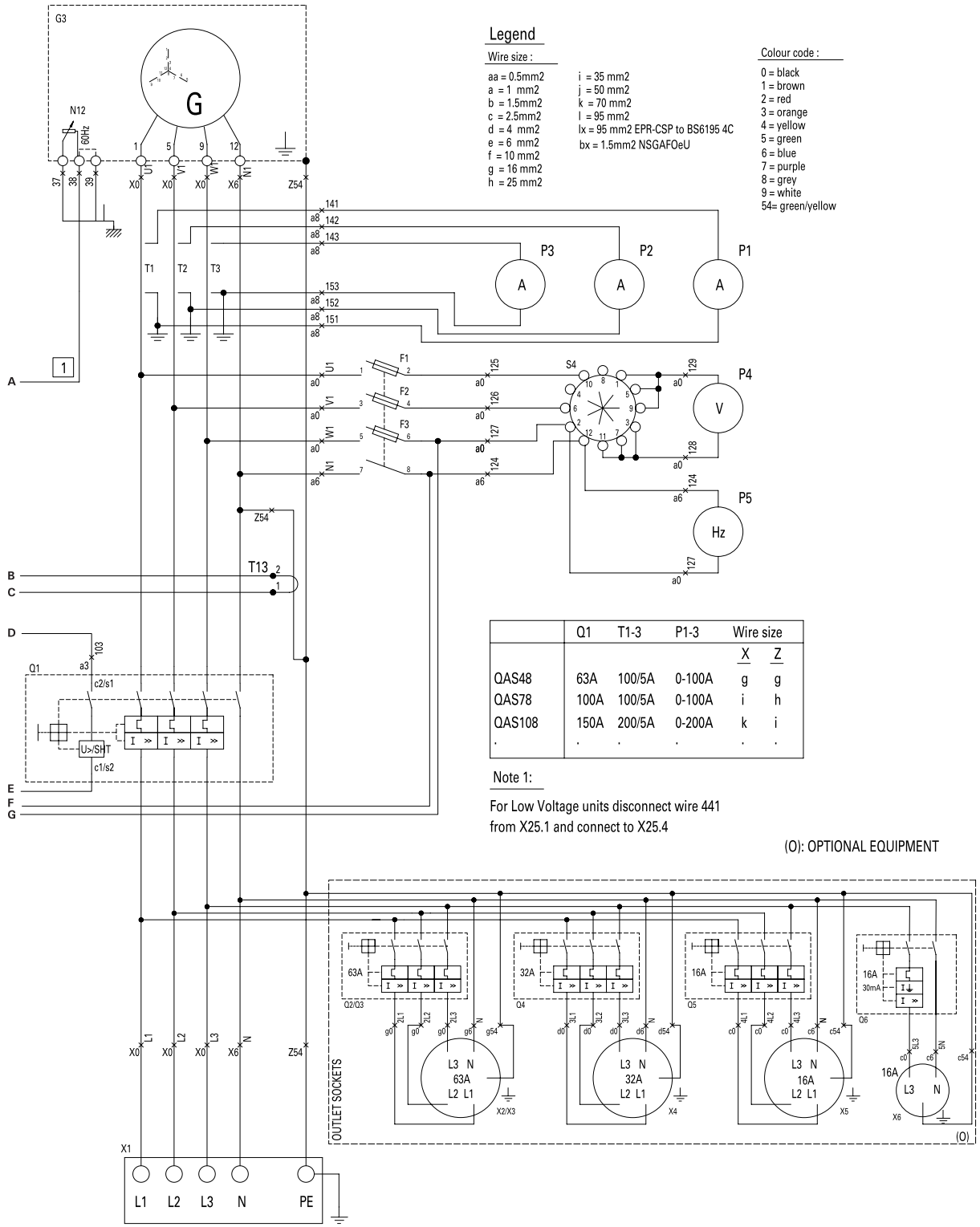
N4	Control module
K11	Aux. relay u/o voltage, low voltage
K12	Aux. relay u/o voltage, high voltage
Kv1	under/overvoltage relay (low voltage) Umax = +8% Umin = -8% t1 = 5s To be sealed after adjustment
Kv2	under/overvoltage relay (high voltage) Umax = +8% Umin = -8% t1 = 5s To be sealed after adjustment
Kt	Timer (delay = 10s)

9822 0981 01/00
Applicable for QAS108 Pd(S) Single Frequency/Dual Frequency (Remote Start) (Automatic Mains Failure)



B11	Speed sensor	N13	Earth fault-current relay	Q2	Circuit breaker (not for QAS48)
F1-3	Fuse 4A	P1-3	Amperemeter	Q3	Circuit breaker (only for box 4)
G3	Alternator	P4	Voltmeter 0-500V	Q4-6	Circuit breaker
N11	Speed controller	P5	Frequencymeter 45-65Hz	R5	Coolant heater
N12	Automatic voltage regulator	Q1	Circuit breaker	R11	Supply voltage adjust

CIRCUIT DIAGRAM
QAS108 Pd



	Q1	T1-3	P1-3	Wire size	
				X	Z
QAS48	63A	100/5A	0-100A	g	g
QAS78	100A	100/5A	0-100A	i	h
QAS108	150A	200/5A	0-200A	k	i
.	.	.	.	.	.

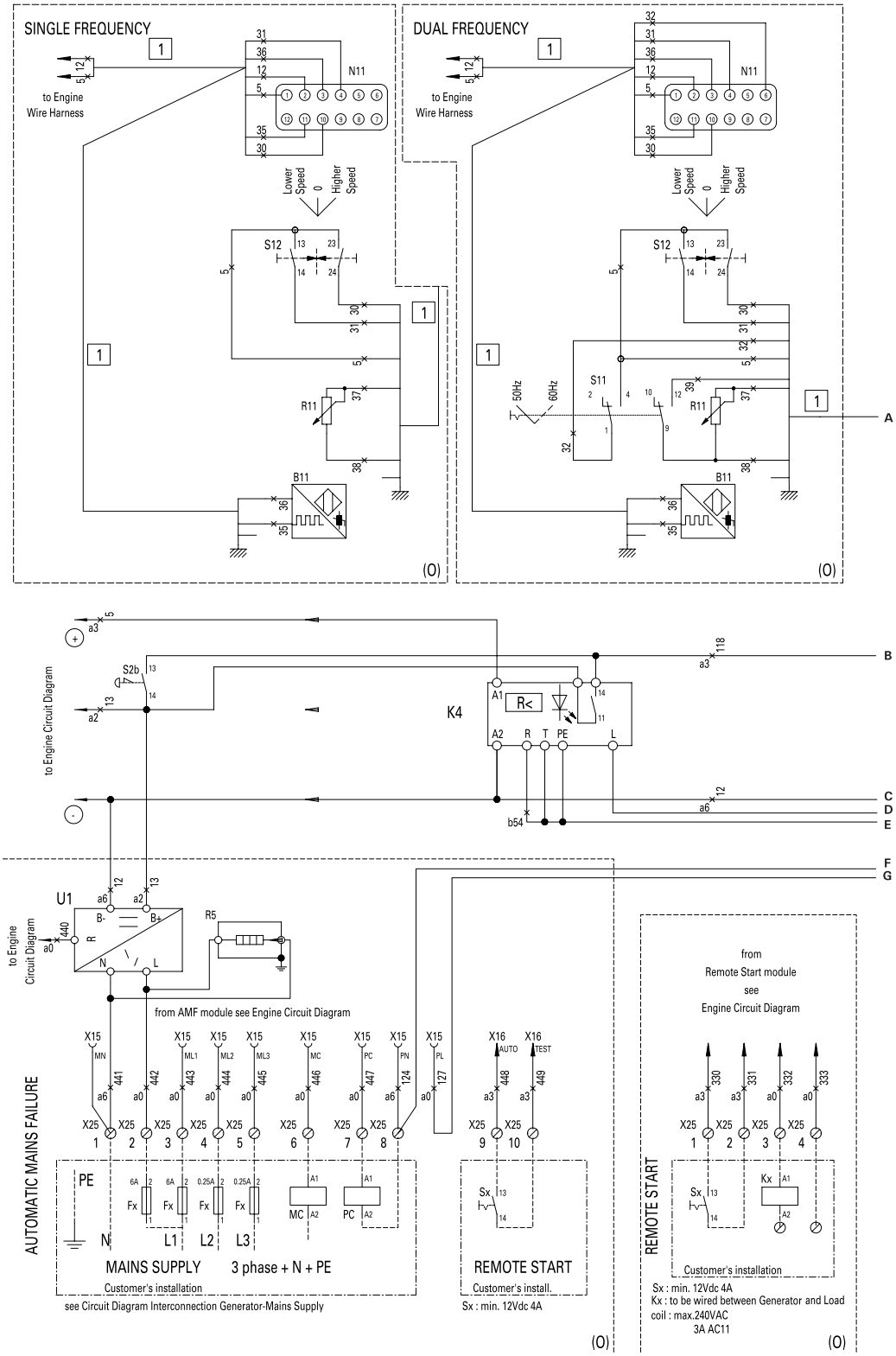
Note 1:

For Low Voltage units disconnect wire 441 from X25.1 and connect to X25.4

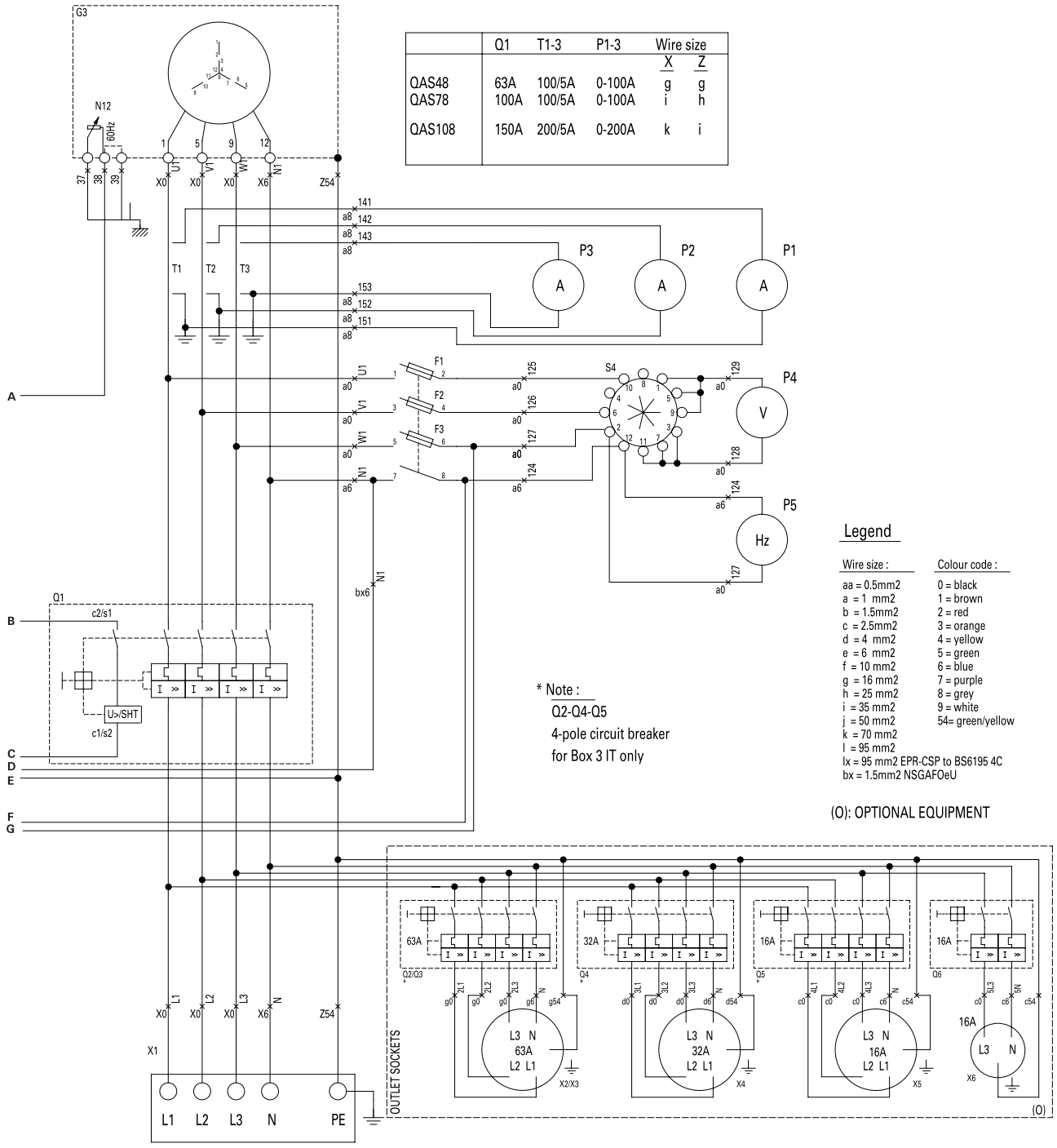
(O): OPTIONAL EQUIPMENT

S2b	Emergency stop (S2a: engine Circ.)	T13	Toroid transformer for earth relay	X15	10-pole connector
S4	Voltmeter change-over switch	U1	Static battery charger	X25	Terminal strip
S11	Selector switch 50/60 Hz	X1	Terminal board	Sx	Remote start/stop switch
S12	Selector switch speed adj. higher/lower	X2	Socket outlet	Kx	Contactor generator ready
S13	Earth relay lock-out switch	X3	Socket outlet (only for box 4)		(by voltage free contact, 15s delayed)
T1-3	Current transformer	X4-6	Socket outlet	1	Wire Harness

9822 0981 02/00
Applicable for QAS108 PdS Single Frequency, IT-System



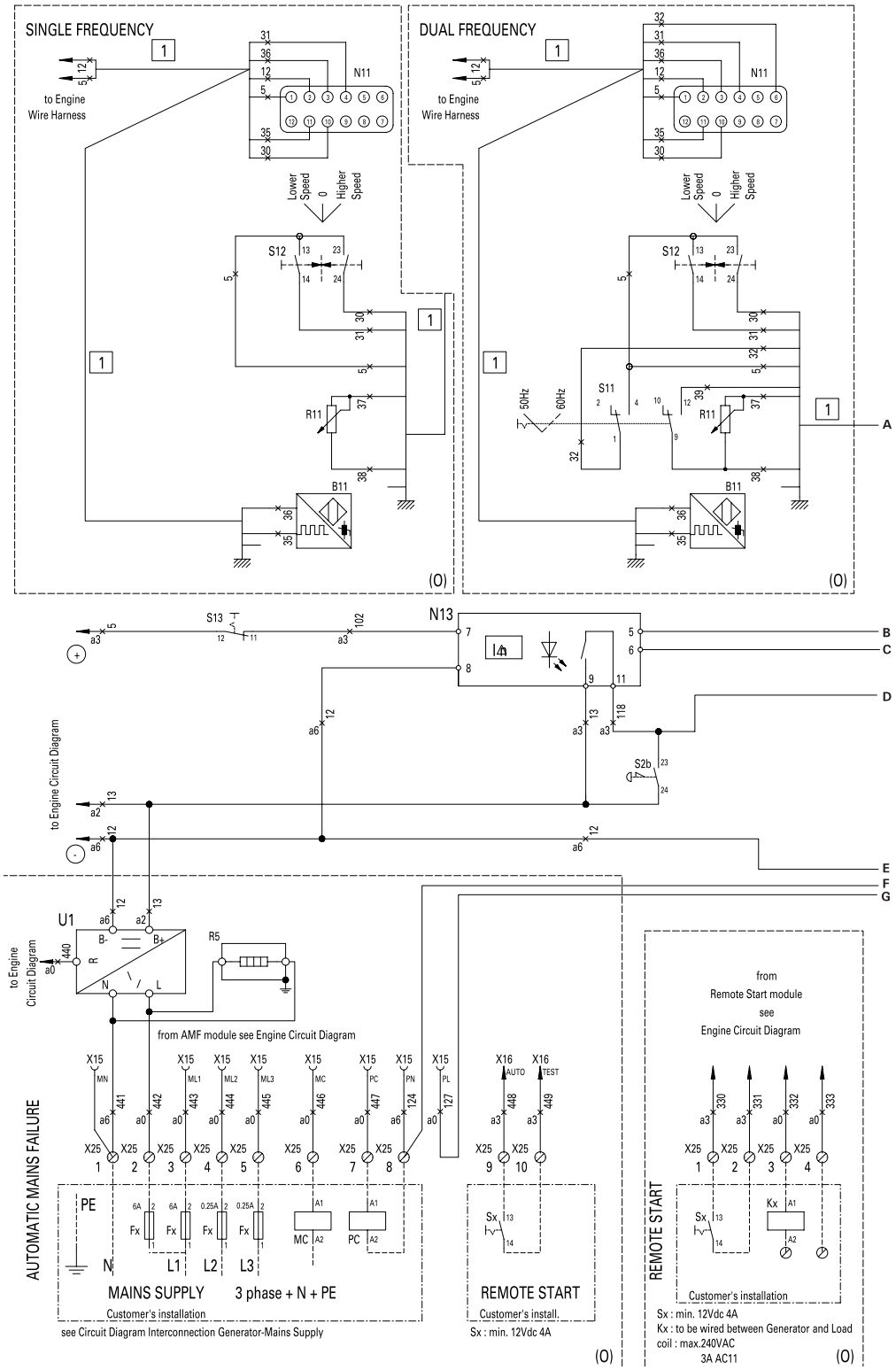
CIRCUIT DIAGRAM
QAS108 Pd



	Q1	T1-3	P1-3	Wire size X	Wire size Z
QAS48	63A	100/5A	0-100A	g	g
QAS78	100A	100/5A	0-100A	i	h
QAS108	150A	200/5A	0-200A	k	i

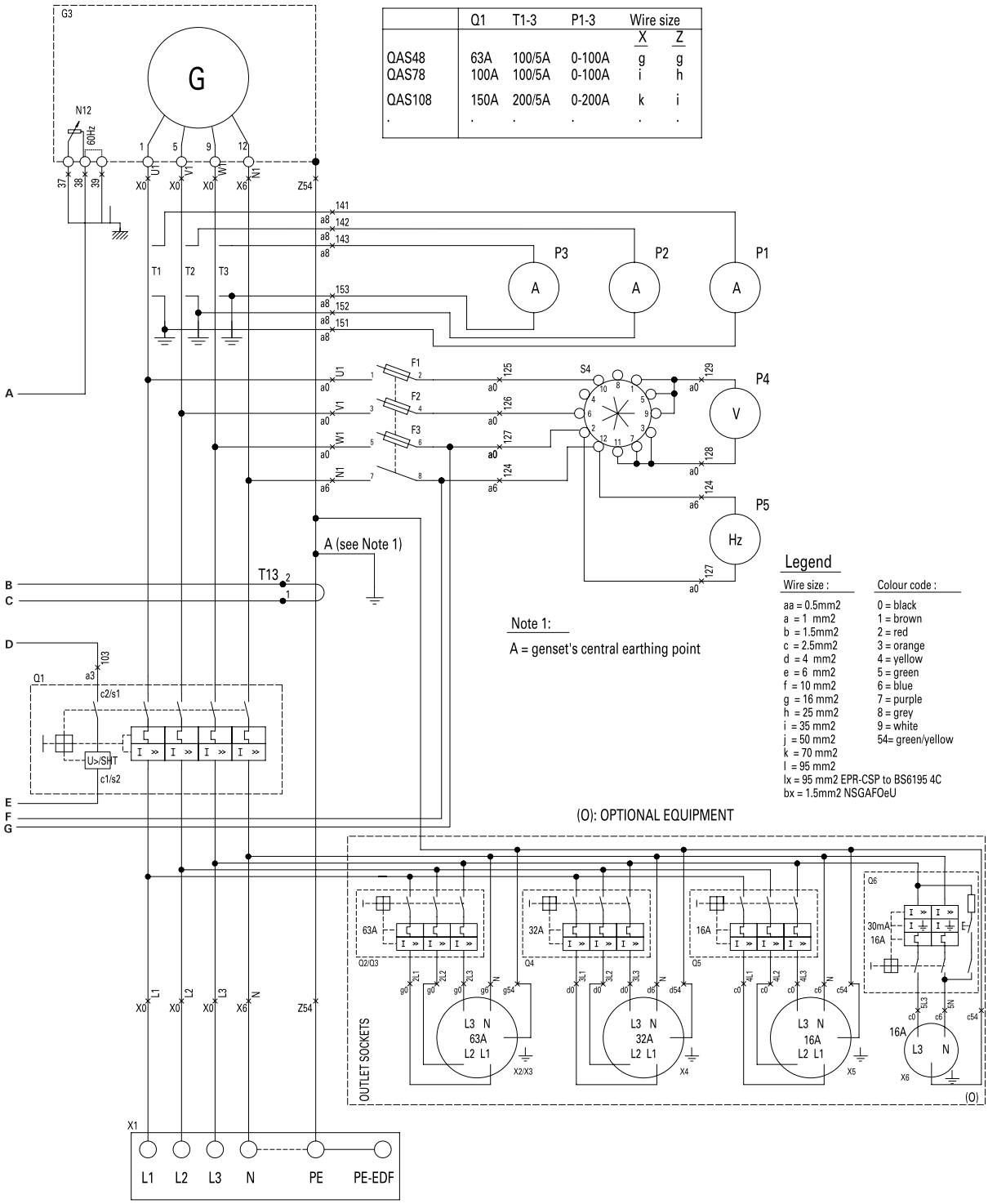
B11	Speed sensor	Q3	Circuit breaker (only for box 4)	X1	Terminal board
F1-3	Fuse 4A	Q4-6	Circuit breaker	X2	Socket outlet
G3	Alternator	R5	Coolant heater	X3	Socket outlet (only for box 4)
N11	Speed controller	R11	Supply voltage adjust	X4-6	Socket outlet
N12	Automatic voltage regulator	S2b	Emergency stop (S2a: engine Circ.)	X15	10-pole connector
K4	Isolation monitoring relay (set at 13 kOhm)	S4	Voltmeter change-over switch	X25	Terminal strip
P1-3	Amperemeter	S11	Selector switch 50/60 Hz	Sx	Remote start/stop switch
P4	Voltmeter 0-500V	S12	Selector switch speed adj. higher/lower	Kx	Contactor generator ready
P5	Frequencymeter 45-65Hz	S13	Earth relay lock-out switch		(by voltage free contact, 15s delayed)
Q1	Circuit breaker	T1-3	Current transformer	1	Wire Harnes
Q2	Circuit breaker (not for QAS48)	U1	Static battery charger		

9822 0981 03/00
Applicable for QAS108 Pd(S) Single Frequency/Dual Frequency Electricité de France (Automatic Mains Failure)



B11	Speed sensor	N11	Speed controller	P1-3	Amperemeter
F1-3	Fuse 4A	N12	Automatic voltage regulator	P4	Voltmeter 0-500V
G3	Alternator	N13	Earth fault-current relay	P5	Frequencymeter 45-65Hz

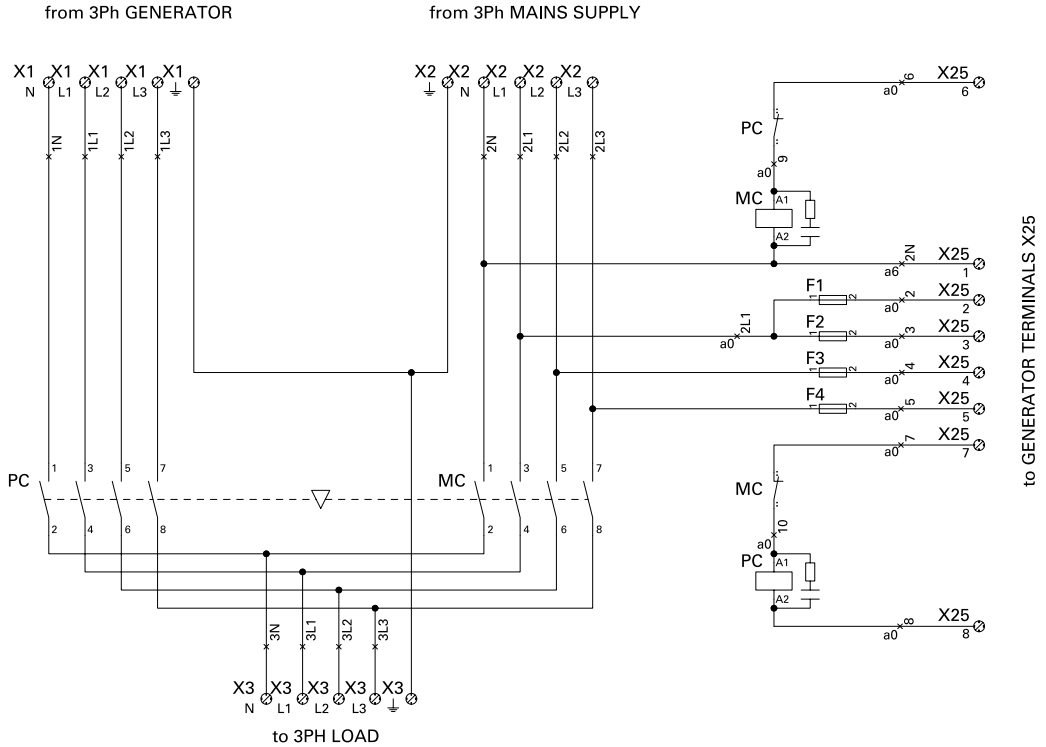
CIRCUIT DIAGRAM
QAS108 Pd



	Q1	T1-3	P1-3	Wire size X	Wire size Z
QAS48	63A	100/5A	0-100A	g	g
QAS78	100A	100/5A	0-100A	i	h
QAS108	150A	200/5A	0-200A	k	i
.	.	.	.	.	.

Q1	Circuit breaker (4-pole)	S11	Selector switch 50/60 Hz	X3	Socket outlet (only for box 4)
Q2	Circuit breaker (not for QAS48)	S12	Selector switch speed adj. higher/lower	X4-6	Socket outlet
Q3	Circuit breaker (only for box 4)	S13	Earth relay lock-out switch	X15	10-pole connector
Q4-6	Circuit breaker	T1-3	Current transformer	X25	Terminal strip
R5	Coolant heater	T13	Toroid transformer for earth relay	Sx	Remote start/stop switch
R11	Supply voltage adjust	U1	Static battery charger	Kx	Contactor generator ready
S2b	Emergency stop (S2a: engine Circ.)	X1	Terminal board		(by voltage free contact, 15s delayed)
S4	Voltmeter change-over switch	X2	Socket outlet	1	Wire Harnes

9822 0773 55/05
Applicable for Automatic Mains Failure (AMF)



LEGEND :

Wire size :

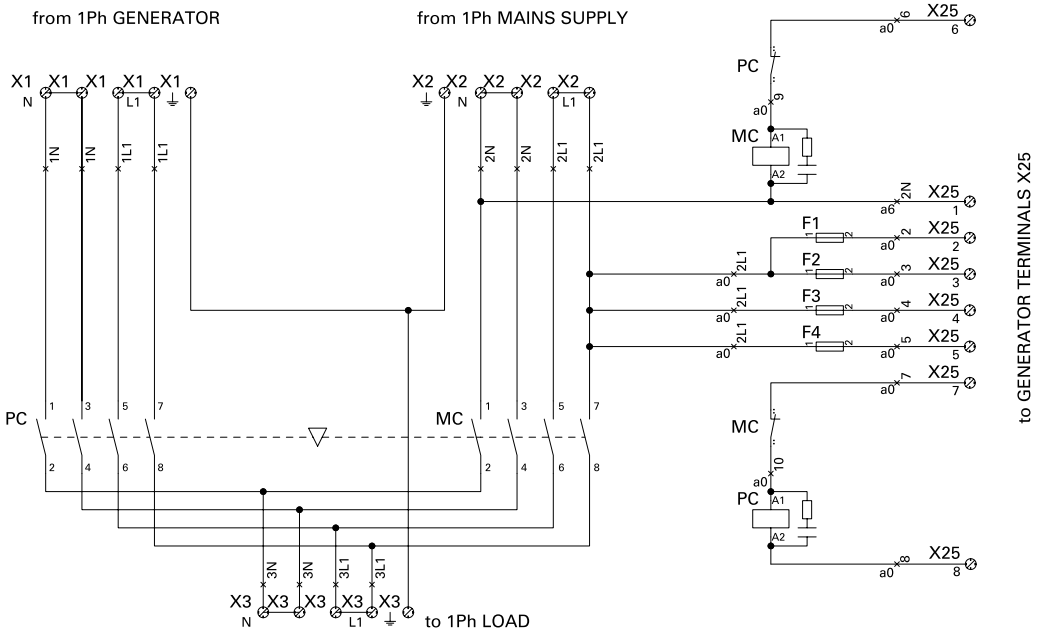
aa = 0.5 mm^2
a = 1 mm^2
b = 1.5 mm^2
c = 2.5 mm^2
d = 4 mm^2
e = 6 mm^2
f = 10 mm^2
g = 16 mm^2
h = 25 mm^2
i = 35 mm^2

Colour code :

0 = black
1 = brown
2 = red
3 = orange
4 = yellow
5 = green
6 = blue
7 = purple
8 = grey
9 = white

	Wire section ,N, ,L1-,L3	earth
60A (3ph) kit	16 mm^2	16 mm^2
110A (3ph) kit	50 mm^2	25 mm^2
200A (3ph) kit	95 mm^2	50 mm^2
325A (3ph) kit	Cu strips	central earth bolt
400A (3ph) kit	Cu strips	central earth bolt
500A (3ph) kit	Cu strips	central earth bolt

CIRCUIT DIAGRAM
QAS108 Pd



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 = 35 mm²

Colour code :

0 = black
1 = brown
2 = red
3 = orange
4 = yellow
5 = green
6 = blue
7 = purple
8 = grey
9 = white

NOTE :
for Single Phase applications :
Modifications to be done by the customer :

① Connect terminals X1, X2 and X3 - two by two - as indicated on the drawing. (for parallelling of the contacts)

② Rename terminals and wire numbers as indicated on the drawing.

③ Connect wire L1 (from Generator) to X1.N.
Connect wire L2 (from Generator) to X1.L1.
Connect wire L1 (from Mains Supply) to X2.N.
Connect wire L2 (from Mains Supply) to X2.L1.

④ Connect load between X3.N and X3.L1.

F1-2	Fuse (6 A or 10 A)
F3-4	Fuse (0.250 A)
MC	Contactor mains supply
PC	Contactor generator
X1	Terminal strip
X2	Terminal strip
X3	Terminal strip
X25	Terminal strip

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Instruction Manual
for AC Generators

QAS108 Pd(S)
QAS108 Pd(S) IT