Instruction Manual for AC Generators

QAS338 Gd

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ATLAS COPCO - PORTABLE AIR DIVISION
www.atlascopco.com

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Congratulations on the purchase of your QAS338 Gd 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, water jackets, etc.) regularly. See the maintenance schedule.

8 All regulating and safety devices shall be maintained with due care to ensure that they function properly. They may not be put out of action.

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

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

11 Mind the markings and information labels on the unit.

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

13 Keep the work area neet. 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 jewelry.

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 cooling water system of a hot engine. Wait until the engine has sufficiently cooled down.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

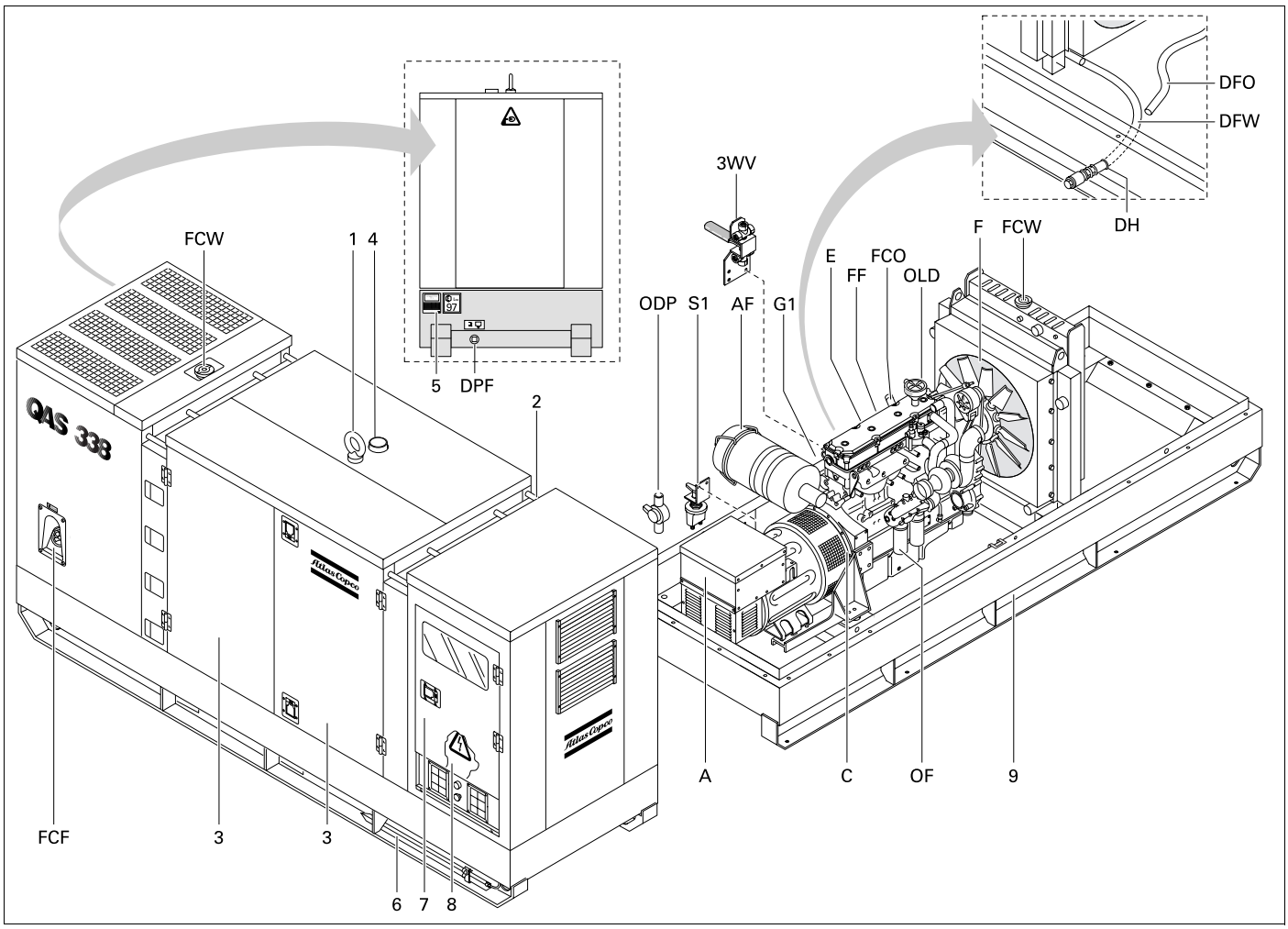
The QAS338 Gd is an AC generator, built for continuous running at sites where no electricity is available or as stand-by in cases of interruption of the mains.

The QAS338 Gd generator is driven by a water-cooled diesel engine, manufactured by DETROIT DIESEL.

The generator can run in five different modes:

3 phase - lower voltage	50 Hz	230 V	240 kW	300 kVA
3 phase - higher voltage	50 Hz	400 V	240 kW	300 kVA
1 phase - lower voltage	60 Hz	220 V	300 kW	360 kVA
3 phase - lower voltage	60 Hz	220 V	300 kW	360 kVA
3 phase - higher voltage	60 Hz	480 V	300 kW	360 kVA

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



1	Lifting rod	DH	Drain and access hole (in the frame)
2	Guiding rod	DPF	Drain plug fuel
3	Side doors	E	Engine
4	Engine exhaust	F	Fan
5	Data Plate	FCF	Filler cap fuel
6	Side door, access to control and indicator panel	FCO	Filler cap engine
7	Output terminal board	FCW	Filter cap cooling water
8	Hole for forklift	FF	Fuel filter
9	Earthing rod	G1	Battery
		ODP	Oil drain pump
A	Alternator	OF	Oil filter
AF	Air filter	OLD	Engine oil level dipstick
C	Coupling	S1	Battery switch
DFO	Drain flexible engine oil	3WV	3-way valve for external fueltank connection
DFW	Drain flexible cooling water		

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 generator's lifting eye is located in the middle of the roof. The recesses in the roof have guiding rods at both sides.

Never use the guiding rods to lift the generator.

To be able to lift the QAS338 Gd by means of a forklift, rectangular holes are provided in the frame.

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

2.3 MARKINGS

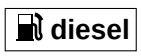
A brief description of all markings provided on the QAS338 Gd is given hereafter.

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 eye in the roof of the generator to lift it.



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

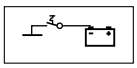
Indicates the drain for the engine oil.

Indicates the drain for the coolant.

Indicates the drain plug for the engine fuel.

Indicates the different earthing connections on the generator.

Indicates the lifting eye of the generator.



Indicates the battery switch.

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

Indicates the 3-way valve.

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

The drain hole can also be used to guide external fuel tank connections. When connecting an external fueltank, use the 3-way valves. Refer to 2.6 "External fueltank connection".

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 BATTERY SWITCH

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

Never turn the battery switch to OFF during operation.

2.6 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. 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.

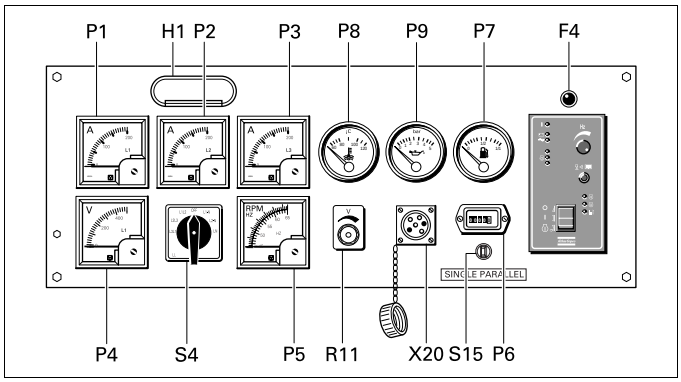
Indicates the fuel return line from the engine to the tank.

Indicates the internal fueltank.

Indicates the external fueltank.

2.7 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

2.7.1 Engine gauges

P6..... Hourmeter

P7..... Fuel level gauge

P8..... Engine coolant temperature gauge

P9..... Engine oil pressure gauge

2.7.2 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.

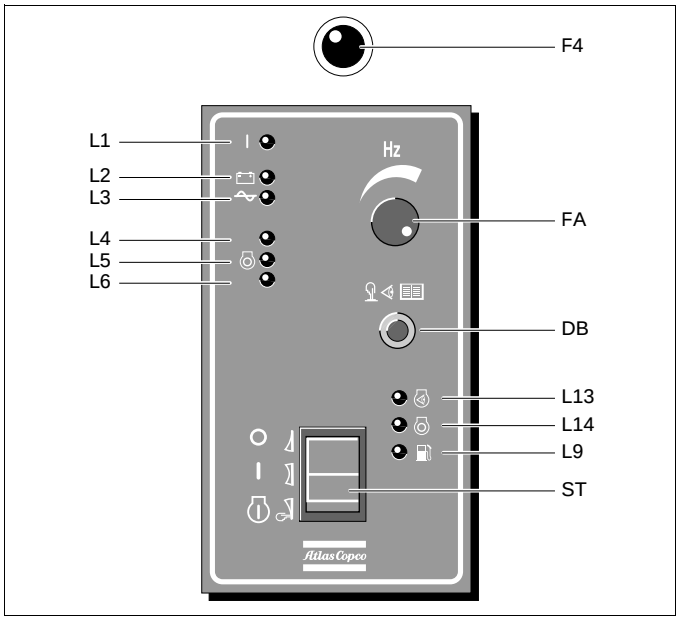
S4..... Voltmeter selector switch

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.

R11.... Supply voltage adjust potentiometer

Allows to adjust the output voltage.

2.7.3 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 seconds 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.

DB ..... Diagnostic request switch

With the ignition switch on and the engine at idle or not running, push and hold the switch to have the active codes flashing on the stop engine light (L14), followed by the inactive codes flashing on the check engine light (L13). For detailed information concerning the engine diagnostic codes, see chapter “Technical specifications – Engine diagnostic codes”.

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.

FA..... Frequency adjust potentiometer

Allows to adjust the frequency of the output voltage. This adjustment has no influence on the output voltage. Voltage adjustment is done by means of potentiometer R11.

Changing the output frequency is only allowed after disconnecting the load.

L1 .....Electrical system indicator

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

L2 .....Alternator charging indicator

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

L3 .....AC shut down indicator

Lights up when no AC input (< 75 V) is present.

L4 .....Spare shut down indicator

Can be used to wire an extra shut down.

L5 .....Engine shutdown

Lights up when a major fault occurred which shuts down the engine.

L6 .....Spare shut down indicator

Can be used to wire an extra shut down.

L9 .....Fuel level indicator

Lights up when the fuel level is below 20 % of the maximum fuel tank capacity.

L13 ....Check engine light

With the ignition switch on and the engine at idle or not running, push and hold the diagnostic request switch to have the inactive codes flashing on the check engine light.

L14 ....Stop engine light

With the ignition switch on and the engine at idle or not running, push and hold the diagnostic request switch to have the active codes flashing on the stop engine light.

2.7.4 Separate diagnostic socket

X20....Diagnostic data socket

Allows to connect the diagnostic data reader. Refer to chapter "Technical specifications – Engine diagnostic codes".

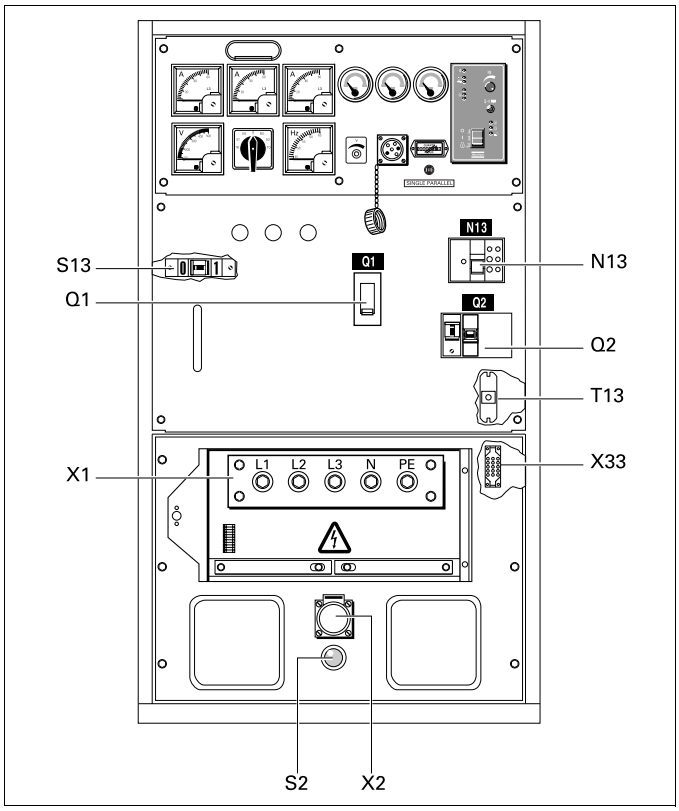
2.7.5 Parallel operation

S15....Single/Parallel switch

Enables the generator (combined with the SAPE unit) to operate in parallel mode. For details refer to the SAPE unit instruction manual.

2.8 OUTPUT TERMINAL BOARD

The output terminal board is situated below the control and indicator panel.



S2 .....Emergency stop button

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

Q1.....Circuit breaker for X1

Interrupts the power supply X1 when a short-circuit occurs at the load side, or when the overcurrent protection (433 A) is activated. When activated, Q1 interrupts the three phases towards X1. It must be reset manually after eliminating the problem.

Q2.....Circuit breaker for X2

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

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 T13.

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.

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

The earth fault protection on the single phase outlet socket is not affected by the switch S13.

If S13 is in position 0, proper earthing is of the utmost importance for the safety of the user. Eliminating any earth fault protection can lead to serious injury or even death for anybody touching the unit or the load.

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.

X2..... 1-phase outlet socket (230 V AC)

Provides phase L3, neutral and earthing. X2 only provides power at 50 Hz because Q2 cannot be activated at 60 Hz.

X33.... Connector X33

Connector for communication between the generator and a SAPE unit. For details refer to the SAPE unit instruction manual.

3. OPERATING INSTRUCTIONS

In your own interest, always strictly observe all relevant safety instructions.

Do not operate the generator in excess of the limitations mentioned in the Technical Specifications.

Local rules concerning the setting up of low voltage power installations (below 1,000 V) must be respected when connecting site distribution panels, switch gear or loads to the generator.

At each start-up and at any time a new load is connected, the earthing of the generator must be verified. Earthing must be done either by the earthing rod or, if available, by an existing, suitable earthing installation. The protective system against excessive contact voltage is not effective unless a suitable earthing is made.

The generator is wired for a TN-system to IEC 364-3, i.e. one point in the power source directly earthed - in this case the neutral. The exposed conductive parts of the electric installation must be directly connected to the functional earth.

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

3.1 INSTALLATION

- Place the generator on a horizontal, even and solid floor. The generator can operate in a slant position not exceeding 15° (in both senses: front/rear and left/right).
- Protect the generator against dust and rain if it is operated outside.
- Check that the engine exhaust is not directed towards people. If the generator is operated indoors, install an exhaust pipe of sufficient diameter to duct the engine exhaust towards the outside. Check for sufficient ventilation so that the cooling air is not recirculated. If necessary, consult Atlas Copco.
- Leave enough space for operation, inspection and maintenance (at least 1 meter at each side).
- Check that the inner earthing system is in compliance with the local legislation.
- Use coolant for the engine cooling system. Refer to the Engine instruction book for the proper coolant mixture.
- Check the tightness of the bolts and nuts.
- Install the earthing rod as near as possible to the generator and measure its diffusion resistance (max. 1 kΩ) in order not to have a contact voltage higher than 25 V at 30 mA leakage current.
- Check that the cable end of the earthing rod is connected to the earth terminal.

3.2 CONNECTING THE GENERATOR

3.2.1 Precautions for non-linear and sensitive loads

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

The most common non-linear, 3-phase loads are thyristor/rectifier-controlled loads, such as 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)	*25*	*35*	*50*	*70*	*95*	*120*	*150*	*185*	*240*	*300*
Max. current (A)										
Multiple core	*94*	*114*	*138*	*176*	*212*	*245*	*282*	*323*	*379*	*429*
Single core	*101*	*123*	*155*	*191*	*228*	*273*	*314*	*358*	*421*	*477*
H07 RN-F	*88*	*110*	*138*	*170*	*205*	*239*	*275*	*313*	*371*	*428*

The lowest acceptable wire section and the corresponding maximum cable or conductor length for multiple core cable or H07 RN-F, at rated current (433 A), for a voltage drop e lower than 5 % and at a power factor of 0.80, are respectively 300 mm^2 and 455 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 water level must be near to the FULL mark. Add coolant if necessary.
- Drain any water 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 waterdamp in a nearly empty tank from condensing.
- Check the vacuum indicator of the air filter. If the red part shows completely, replace the filter element.
- Press the vacuator valve of the air filter to remove dust.
- Check the generator for leakage, tightness of wire terminals, etc. Correct if necessary.
- Check that circuit breaker Q1 is switched off.
- 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 the earth fault protection (N13) has not tripped (reset if necessary).
- Check that the selector switch "Single/Parallel" (S15) on the generator is in the "Single" position, when not paralleling.

3.4 STARTING

- Turn the battery switch to ON.
- Put the starter switch in position I.
- 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.

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 cooling water temperature (P8).
- Check the voltmeter P4 (with voltmeter selector switch S4 in different positions) and the frequency meter (P5).
- Switch circuit breaker Q1 on by pushing the lever fully down from TRIPPED (mid-position/white flag) to OFF ("0"/green flag) followed by pushing the lever fully up to ON ("1"/red flag).
- 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 cooling water.
- 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.

Never turn the battery switch to OFF during operation.

If circuit breaker Q1 is 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 breaker Q1.
- Let the engine run for about 5 minutes.
- Stop the engine by putting the starter switch in position O.
- Turn the battery switch to OFF.

Lock the side doors and the door of the indicators and control panel to avoid unauthorized access.

4. MAINTENANCE

Before carrying out any maintenance activity, check that the start 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 4201 05**	**2912 4204 06**	**2912 4205 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/Water separator	Check/Drain	Check/Drain	Replace/Drain	Replace/Drain	Replace/Drain
Fuel filter element		Replace	Replace	Replace	Replace
Fuel injectors					Check
Oil level in sump	Check	Check	Check	Check	Check
Oil pressure on gauge (min. 1.5 bar)	Check	Check	Check	Check	Check
Lubrication oil		Change	Change	Change	Change
Oil filter(s)		Replace	Replace	Replace	Replace
Crankcase pressure (3mm WG at no load)				Check	Check
Vacuum indicator	Check	Check	Check	Check	Check
Air cleaner and dust bowl		Clean	Clean	Clean	Clean
Air filter element (1)			Clean	Replace	Replace
Safety cartridge					Replace
Turbocharger impeller and housing					Clean/inspect
Fan hub bearings					Lubricate
Oil, fuel and water 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
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 cooling water 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 silicagel 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 FREQUENCYMETER P5

– Run the unit at normal speed.

– Put a voltmeter in parallel with frequencymeter P5.

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

  If not, remove the frequencymeter, 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.
	Intervention of protection.	Check rpm.
	Winding failure.	Check windings.
High voltage at no load	Voltage potentiometer out of setting.	Reset voltage.
	Failed regulator.	Substitute regulator.
Lower than rated voltage at load	Voltage potentiometer out of setting.	Reset voltage potentiometer.
	Intervention by protection.	Current too high, power factor lower than 0.8; speed lower than 10 % of rated speed.
	Failed regulator.	Substitute regulator.
	Rotating bridge failure.	Check diodes, disconnect cables.
Higher than rated voltage at load	Voltage potentiometer out of setting.	Reset voltage potentiometer.
	Failed regulator.	Substitute regulator.
Unstable voltage	Speed variation in engine.	Check regularity of rotation.
	Regulator out of setting.	Regulate stability of regulator by acting on “STABILITY” potentiometer.

6.5 ENGINE TROUBLE SHOOTING

A first fault diagnose can be read on the check engine light (L13) and the engine stop light (L14), see chapter “Technical specifications – Engine diagnostic codes”.

The DDEC reader is a useful tool for troubleshooting.

For more detailed information refer to the Engine operating manual. An extensive Engine troubleshooting manual is available at Detroit Diesel. For more information contact Detroit Diesel.

7. OPTIONS AVAILABLE FOR QAS338 Gd UNITS

7.1 CIRCUIT DIAGRAMS

The engine control circuit diagrams and the power circuit diagrams for the standard QAS338 Gd unit, for the units with options and for the units with combined options are:

Unit	*Power circuit*	*Engine control circuit*
QAS338 Gd (standard unit)	9822 0889 01	9822 0889 07
QAS338 Gd RS	9822 0889 01	9822 0889 08
QAS338 Gd AMF	9822 0889 01	9822 0889 09
QAS338 Gd 60 Hz LV RS	9822 0889 02	9822 0889 08
QAS338 Gd 60 Hz LV AMF	9822 0889 02	9822 0889 09
QAS338 Gd EDF	9822 0889 03	9822 0889 07
QAS338 Gd EDF RS	9822 0889 03	9822 0889 08
QAS338 Gd EDF AMF	9822 0889 03	9822 0889 09
QAS338 Gd 60 Hz 2V/3V RS	9822 0889 04	9822 0889 08
QAS338 Gd 50 Hz LV RS	9822 0889 10	9822 0889 08
QAS338 Gd 50 Hz LV AMF	9822 0889 10	9822 0889 09
QAS338 Gd PAR	9822 0889 24	9822 0889 07
QAS338 Gd PAR RS	9822 0889 24	9822 0889 08
QAS338 Gd 50 Hz 2V RS	9822 0889 26	9822 0889 08

7.2 OVERVIEW OF THE ELECTRICAL OPTIONS

The following “electrical” options are available for the QAS338 Gd unit:

– 7.3.1. Remote start (RS).

– 7.3.2. Automatic mains failure (AMF).

– 7.3.3. Dual voltage (DV)

– 7.3.4. Triple voltage with switch (3V-SW)

– 7.3.5. Low voltage (LV)

– 7.3.6. “Electricité de France” (EDF)

– 7.3.7. Parallel operation (PAR)

7.3 DESCRIPTION OF THE ELECTRICAL OPTIONS

7.3.1 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

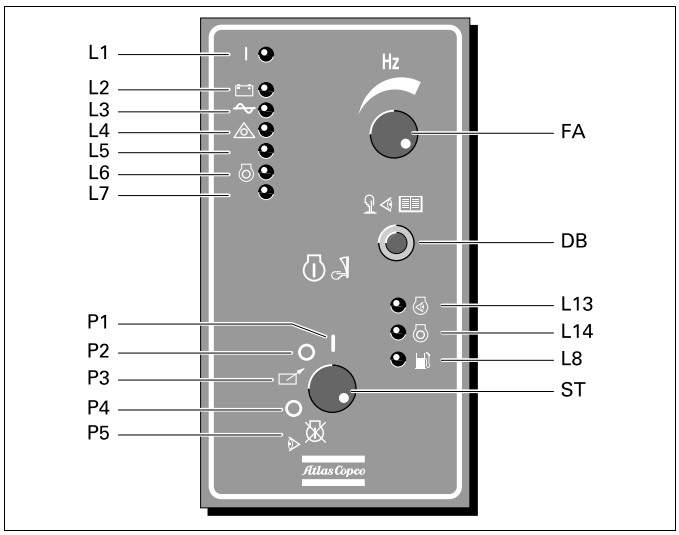
The plant contactor should be sized according to the load. The maximum current through the voltage free contact is 3 A.

The remote start/stop switch Sx has to meet the following specifications: 24 V DC, 4 A.

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

The minimum voltage relay on the main circuit breaker of the standard unit is eliminated and replaced by a current coil which switches off Q1 in case of an emergency stop or an earth fault.

The controls and indicators on the remote start control module are:



L1 ..... Electrical system indicator

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

L2 ..... Alternator charging indicator

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

L3 ..... AC shut down indicator

Lights up when no AC input (< 75 V) is present.

L4 ..... Emergency stop indicator

L5 ..... Spare shut down indicator

Can be used to wire an extra shut down.

L6 ..... Engine shutdown

Lights up when a major fault occurred which shuts down the engine.

L7 ..... Spare shut down indicator

Can be used to wire an extra shut down.

L8 ..... Fuel level indicator

Lights up when the fuel level is below 20 % of the maximum fuel tank capacity.

L13 ....Check engine light

With the starter switch into the P1/P5 position and the engine running, push and hold the diagnostic request switch to have the inactive codes flashing on the check engine light.

L14 ....Stop engine light

With the starter switch into the P1/P5 position and the engine running, push and hold the diagnostic request switch to have the active codes flashing on the stop engine light.

DB .....Diagnostic request button

With the starter switch into the P1/P5 position and the engine running, push and hold the switch to have the active codes flashing on the stop engine light (L14), followed by the inactive codes flashing on the check engine light (L13).

FA.....Frequency adjust potentiometer

Allows to adjust the frequency of the output voltage. This adjustment has no influence on the output voltage. Voltage adjustment is done by means of potentiometer R11.

Changing the output frequency is only allowed after disconnecting the load.

ST.....Starter switch

P1 .....Position P1

Used to select normal start and to disable remote start. If the unit fails to start the first time, two more starting attempts will take place with 12 seconds waiting time in between.

P2-4 ...Position P2/P4

Used to switch off the power supply from the battery or to reset after a shutdown due to a failure. The unit will not be able to start up.

P3 .....Position P3

Used to select remote start.

P5 .....Position P5

The generator will not start. When the starter switch is in this position, the engine faults can be read out by the diagnostic request button (DB).

Besides dipswitch S4, located at the back of the control module and used for the selection of the nominal speed (50 Hz or 60 Hz), dipswitch S2/S3 can be used for enabling or disabling a spare shut down contact.

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 P1. 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 (stabilisation 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 P1, 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 P2/P4.

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 P3.

– 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 (stabilisation 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 P3, 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 P2/P4.

7.3.2 Automatic mains failure (AMF)

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

– Continuous monitoring of four input lines

– Connection block for monitoring

– An extended control module

– A remote start possibility

– An automatic battery charger

– An engine cooling water heating

Continuous monitoring of four input lines

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).

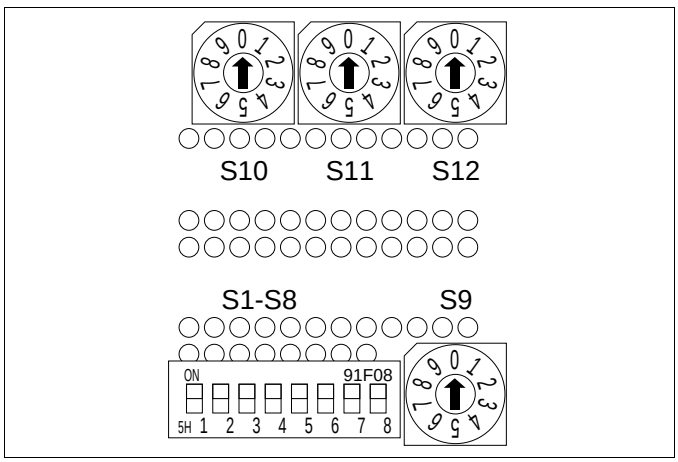
– After 10 seconds generator stabilisation time (plant settle time), the generator contactor is energized and the generator supplies power towards the load.

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

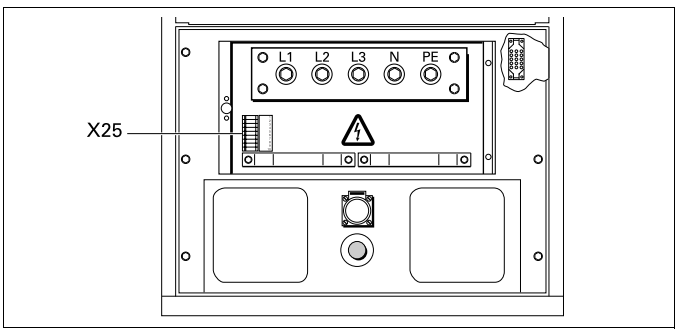
The table below summarises the relation between the position of the potentiometers and the value of the timers.

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

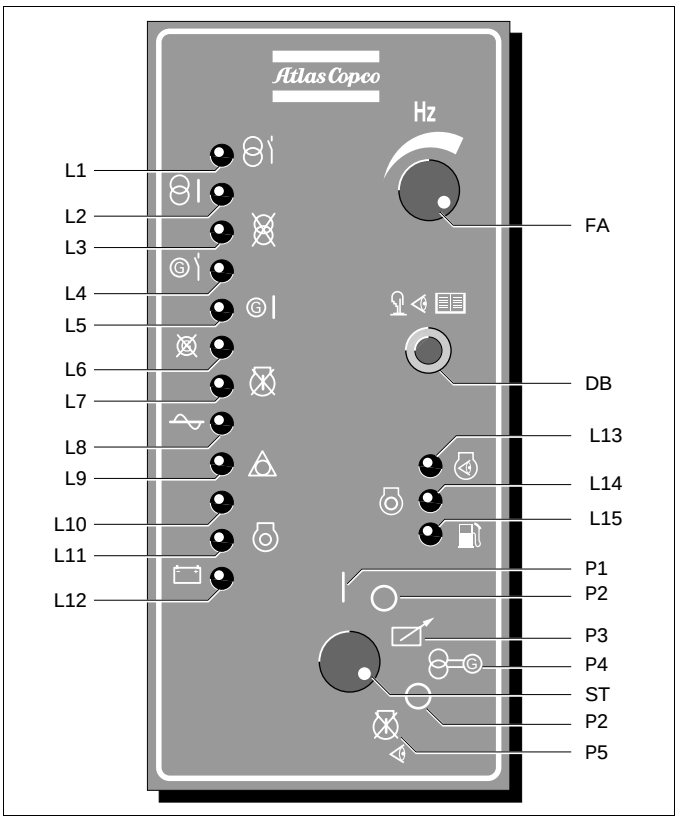
Allows easy connection for a remote start switch, for sensing of mains voltage and control of the mains and the plant contactor.

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

An 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

Lights up when the mains is available.

L2 .....Mains on load

Lights up when the mains supplies power towards the load.

L3 .....Mains failed

Lights up when a failure occurred on the mains.

L4 .....Plant available

Lights up when the generator is running.

L5 .....Plant on load

Lights up when the generator supplies power towards the load.

L6 .....Plant fail

Lights up when a failure occurred on the generator.

L7.....Start fail

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

L8.....Undervoltage shut down

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

L9.....Emergency stop indicator

L10.....Spare shutdown

Can be used to wire an extra shutdown. Delayed with 3 sec.

L11.....Engine shutdown

Lights up when a major fault occurred which shuts down the engine.

L12.....Alternator charging indicator

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

L13.....Check engine light

Lights up when a minor fault occurred. This indicates that the problem should be diagnosed as soon as possible. In combination with the diagnostic request switch all engine faults that occurred in the past can be read; provided that the starter switch is in the inhibit position (P5).

L14.....Stop engine light

Lights up when a major fault occurred which shut down the engine. The cause of an engine shutdown can be found using the diagnostic request procedure (see standard machine).

L15.....Fuel level indicator

Lights up when the fuel level is below 20 % of the maximum fuel tank capacity.

DB.....Diagnostic request button

With the starter switch into the P5 position, push and hold the switch to have the active codes flashing on the stop engine light (L14), followed by the inactive codes flashing on the check engine light (L13).

FA.....Frequency adjust potentiometer

Allows to adjust the frequency of the output voltage. This adjustment has no influence on the output voltage.

Changing the output frequency is only allowed after disconnecting the load.

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.

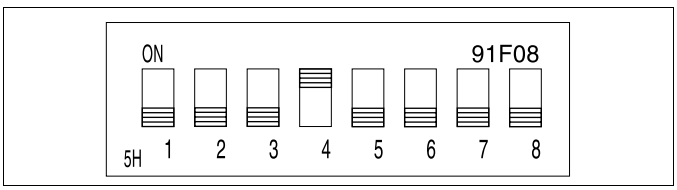
P5..... Position P5

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. When the starter switch is in this position, the engine faults can be read out by the diagnostic request button (DB).

Besides dipswitch S8, located at the back of the control module and used for long/short preheating, 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:



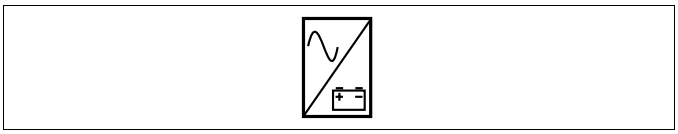
A remote start possibility

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).

An automatic battery charger

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



An engine cooling water heating

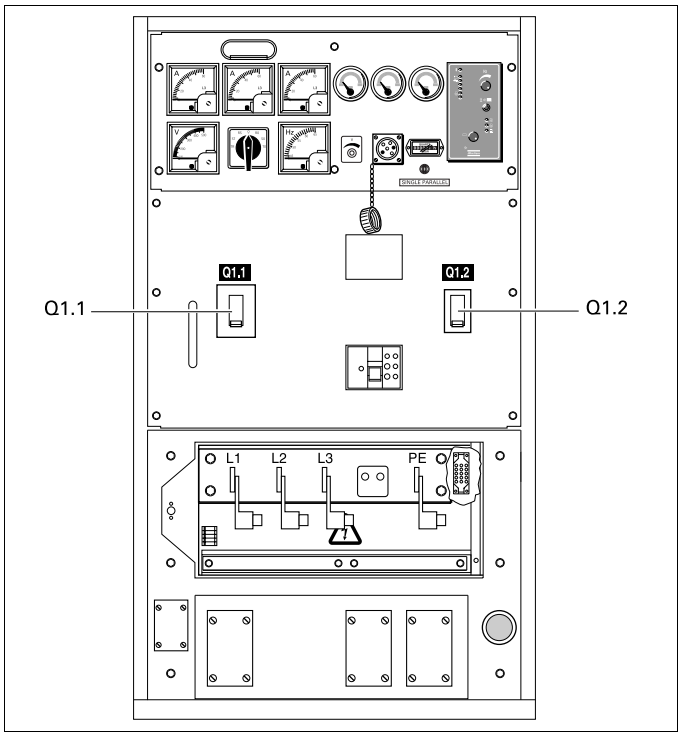
To make sure that the engine can start and accept load immediately, an external cooling water heater (2 x 1000 W, 240 V) is provided which keeps the engine temperature between 38 °C and 49 °C.

7.3.3 Dual voltage (DV)

The generator can run in two different modes:

– 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 (753/910 A; 50/60 Hz) is activated. It must be reset manually after eliminating the problem and after each start.

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 (433/455 A; 50/60 Hz) is activated. It must be reset manually after eliminating the problem and after each start.

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 two modes is done by means of S10.

S10.... Output voltage selector switch

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

Changing the output voltage is only allowed after shutdown.

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

3 phase lower voltage

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

3 phase higher voltage

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

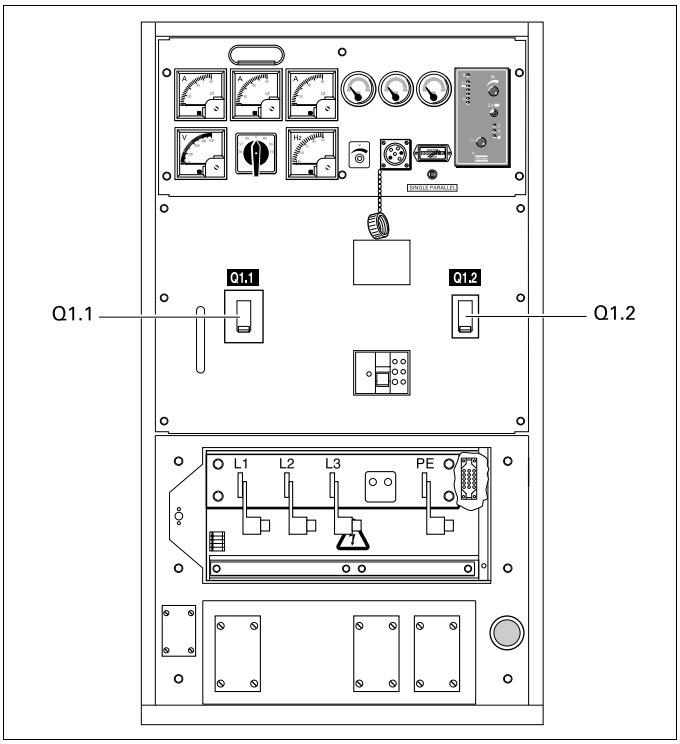
7.3.4 Triple voltage with switch (3V-SW)

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 (910 A) is activated. It must be reset manually after eliminating the problem and after each start.

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 (455 A) is activated. It must be reset manually after eliminating the problem and after each start.

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.

S10.... Output voltage selector 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 shutdown.

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.

1 phase

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

3 phase lower voltage

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

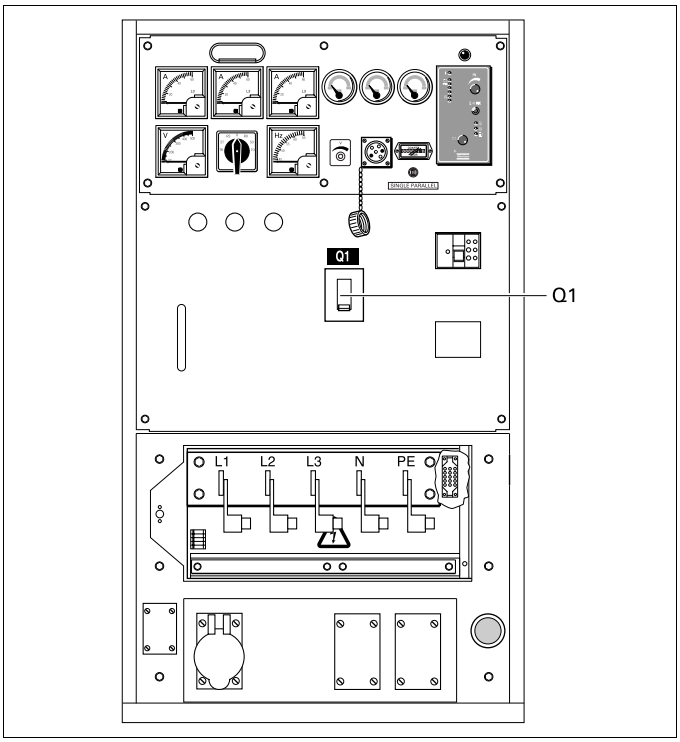
3 phase higher voltage

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

7.3.5 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.

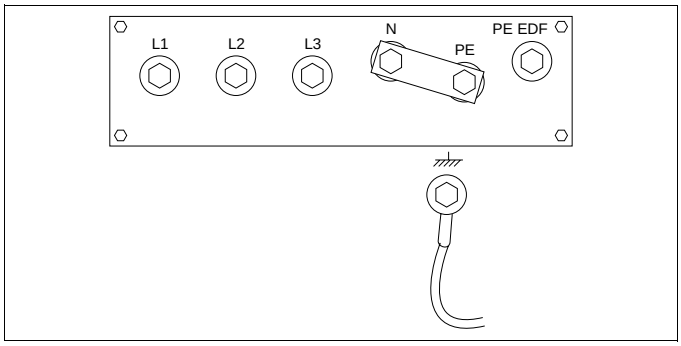


Q1 ..... Circuit breaker for low voltage, high current

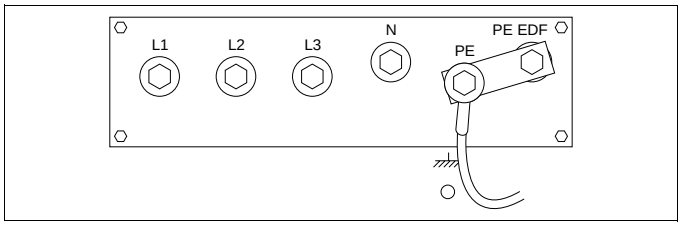
Interrupts the low voltage power supply towards X1 when a short-circuit occurs at the load side or when the overcurrent protection (753/910 A ; 50/60 Hz) is activated. It must be reset manually after eliminating the problem and after each start.

7.3.6 "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.



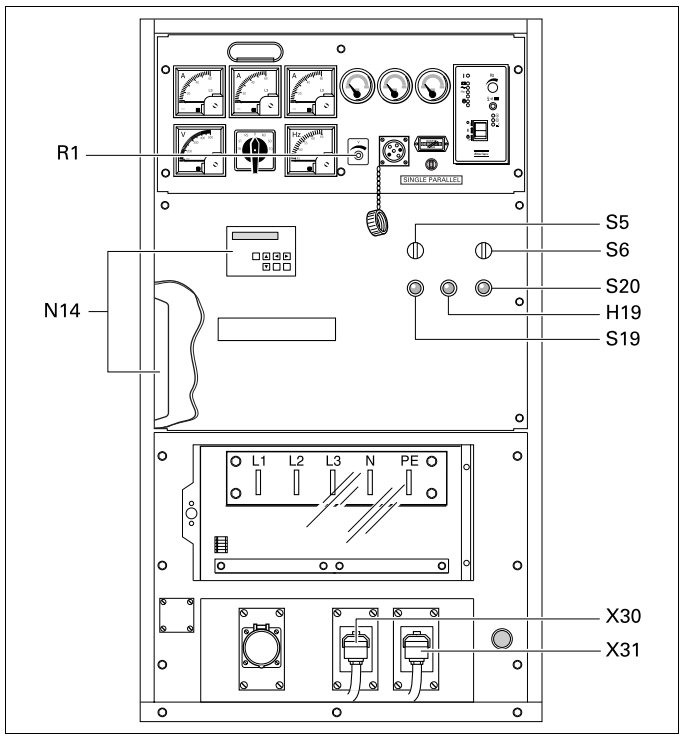
Changing the operation mode from standard unit to EDF-unit or vice versa has to be carried out by a qualified person from "Electricité de France".

7.3.7 Parallel operation (PAR)

The "Parallel operation" option is used in those cases where the load exceeds the nominal load of the generator in operation. Using this option, generators can be connected in parallel in order to share the load proportionally.

Each generator that is part of the parallel connection must be provided with the "Parallel operation" option (the base generator as well as each of the extra parallel generators). If this is not the case, one or more SAPE units must be used (for details refer to the SAPE unit instruction manual). The generators do not have to be of the same type: any combination between QAS168, QAS228, QAS278 or QAS338 generators is possible.

Extra components



N14....Paralleling control module

The following features are available with the paralleling control module:

– Measurement, Annunciation, and Control Setup

  The paralleling control module is provided with an integral Keypad/Display Panel.
  Parameters are monitored, and setup performed by means of this panel.

– Auto-Synchronizing

  The paralleling control module incorporates automatic synchronizing to match the frequency and phase of an incoming generator to the frequency and phase of the bus or another generator. The synchronizer compares the incoming generator to the frequency and phase to be matched and to assure synchronization within a minimum of time.

– Isochronous Load Sharing

The object of isochronous load sharing is to proportionally divide a common load between two or more generators in parallel while maintaining a fixed frequency. This means that the generators in the parallel connection will deliver equal percentages of their full load capacity. This also implies that due to the isochronous load sharing module and the proportional load sharing, the generators that are connected in parallel do not need to have the same rated output power.
The paralleling control module compares the load of its generator unit with the load applied to all other units in operation, through the paralleling lines, and either decreases or increases the engine fuel to maintain its proportional share of the total load.

– Load Commanding/Blending

Blending loads with the paralleling control module allows for soft loading, unloading and power setting of the controlled generator.

See the instruction manual of the Pow-R-Con for details.

H19.... Lamp Breaker Closed

This lamp lights when the circuit breaker/contactor of the generator is closed.

R1..... Potmeter genset voltage

Allows to adjust the output voltage.

S5..... Selector switch ILS/Blend/Command

This switch allows for three positions:

– **ILS (Isochronous Load Sharing):** both connected generators give their full proportional load immediately

– **Blend:** the proportional load of the brought in generator is slowly built up (time adjustable between 2 s and 5 min), after selector switch S6 has been set to 'Load'

– **Command:** allows a fixed power output of the generator, irrespective of the load

S6..... Selector switch Unload/Load

This switch only applies to the 'Blend' mode (selector switch ILS/Blend/Command in position 'Blend').

The central position of the three position selector switch is used for 'ILS' mode. The other two positions are:

– **Unload:** one generator is enough to supply the full load, but to prevent the other generator from idling, it still supplies ± 10 % (adjustable value) while the other one supplies ± 90 % of the full load

– **Load:** both connected generators deliver adjustable percentages of their full load capacity

S19.... Breaker/Contactor close

Manually closing of the circuit breaker/contactor of the first unit.

S20.... Breaker/Contactor open

Opens the circuit breaker/contactor of the unit.

X30.... Connector X30

Connector for communication with another QAS with integrated paralleling (or with a SAPE unit).

Up to 7 generators can be connected to each other, as each generator has got two connectors (X30 and X31).

X31.... Connector X31

Connector for communication with another QAS with integrated paralleling (or with a SAPE unit).

Connecting the generators

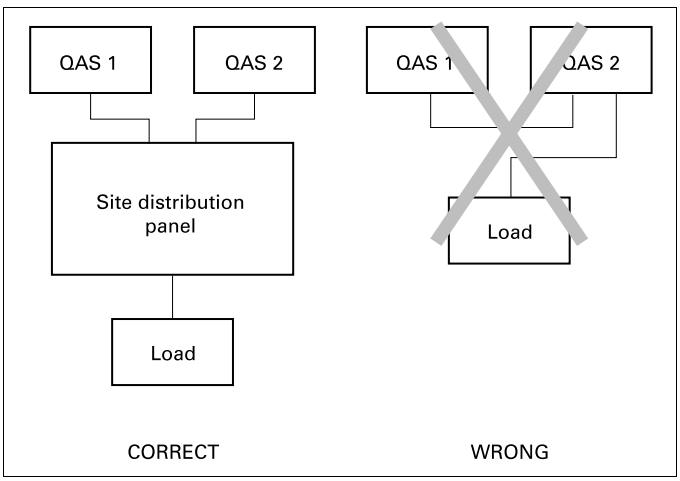
Prior to starting parallel operation of two generators, following connections need to be made:

1. Connect the communication cable between the generators (socket X30 or X31).

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

2. Connect the load with the generator.

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



Factory settings

The factory settings should not be changed.
If imperative, parameters can be adjusted however.

Changing Parameters

If parameters are to be changed in the paralleling control module, proceed as follows:

1. Select the SETUP mode: press SELECT, press SCROLL until SETUP is reached and press SELECT.
2. Enter password: successively press the ENT, DEC, SCROLL (left), and SELECT keys for the password.
3. Select the SYSTEM screen.
4. Select the desired parameter by using the SCROLL (left or right) key.
5. Press the SELECT key.
6. If applicable: choose the desired digit by using the SCROLL (left or right) key.
7. Change the digit by using the INCREASE (up) or DECREASE (down) key.
8. Press the ENTER key to place the value in the program.

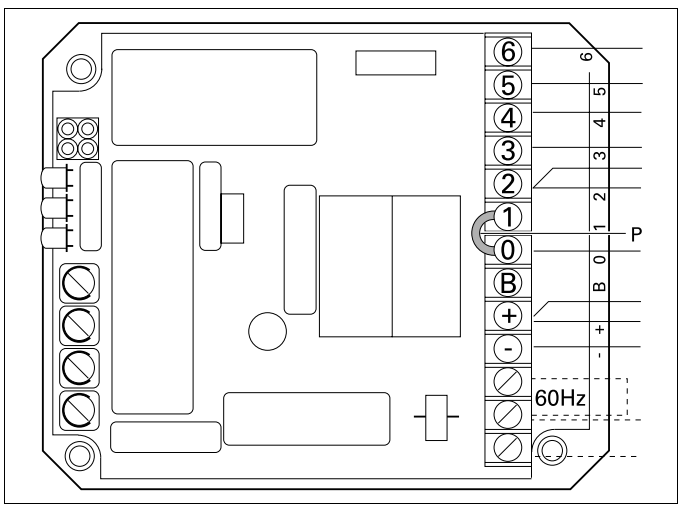
Pressing ESC allows for returning to the previous function at any time.

Generator Setup

– Set engine VSG min at 1425 rpm (for 50 Hz) or at 1710 rpm (for 60 Hz).
Set engine VSG max at 1575 rpm (for 50 Hz) or at 1810 rpm (for 60 Hz).

Use a DDEC reader to adjust the speed limits of a generator.

– Remove the bridge (between connections 0 and 1) on the AVR (Automatic Voltage Regulator) to activate the paralleling device.



Setup Procedure

Prior to starting up the system, the paralleling control module needs to know what size of QAS is going to be connected.

Therefore proceed as follows:

1. Go to ‘SETUP’ ⇒ ‘PROGRAM’ ⇒
2. Voltage match: set at 5 %
3. Freq match: set at 0.25 Hz
4. Phase match: set at 20 deg
5. Go to ‘SETUP’ ⇒ ‘SETUP’ ⇒
6. CT ratio A, B, C: primary current divided by secondary current

Note that the ratio needs to be entered, not the primary current rating,
e.g.: current transfo 600/5
→ ratio to be entered = 120

7. PT ratio: 1
8. Gen Power: xxx kW: see technical specifications for nominal values

Note the difference between 50 and 60Hz,
e.g.: QAS168 50Hz = 120kW
60Hz = 144kW

9. Sys Volt: Bus voltage: 208 – 240V ⇒ 240V
400 – 480V ⇒ 480V
10. Bus Freq: 50 or 60Hz depending on what frequency the QAS is set up.

Starting parallel operation

Make sure that the generators are connected correctly before starting operation.

– Put on both generators the selector switch “Single/Parallel” in the “Parallel” position.

– By-pass earth leakage relay (S13).

– Start both generators.

– Run the engines for approximately 5 minutes to warm up and stabilize speed and voltage.

– Try to match frequency and voltage of both generators as close as possible.

– Push the button “Breaker/Contactor close” on the control panel of the first generator.

When both generators are synchronized, the circuit breaker of the second generator is automatically closed and the second generator starts supplying power together with the first one.

The paralleling control modules will share the load evenly between the generators, according to the capacity of the units. It will also detect a circulating current and will deactivate one of the units if the circulating current exceeds the value set on the load sharing module. It is possible to lower the circulating current by better matching the voltages and/or frequency of the generators. Therefore adjust the voltage on one or more generators.

Parallel operation of more than two generators

After connecting two generators in parallel, more generators can be added.

Do not connect more than 7 generators in parallel.

Once two (or more) generators are connected in parallel, they can be treated as if they were one unit.

– Shut down or disconnect the load or make sure that the load is stable.

– Shut down the generators that are already in operation. Make sure not to change the settings on these generators.

– Connect the extra generator to the parallel connection of the first generators, treating these generators as one unit.

– Make sure that all main circuit breakers Q1 are switched OFF.

– Carry out the actions described in “Factory settings”.

– Start up the generators. Parallel the first 2. After this, follow the instructions as described in 'starting parallel operation' for the 3th unit.

Stopping parallel operation

– Switch off and disconnect the load.

– Push the buttons “Breaker/Contactor open” on both generators.

– Let the engines run for about 5 minutes to cool them down.

– Shut down the generators one by one.

Trouble Shooting

Symptom	Possible cause	Corrective action
Display does not function.	Connection between Pow-R-Con and display is faulty or absent.	Connect correctly.
Measured and actual power do not match.	CT ratio not entered correctly.	Enter the correct CT ratio.
Circulating current is too high.	Voltages of the generators are not matched.	Adjust the voltage on one or more generators until the circulating current is minimal.
	Parallel device is not or faulty connected.	Check the parallel device.
One generator supplies active power to the other.	Frequencies of the generators are not matched.	Adjust the frequency on a generator so that the power is zero.
	One of the connection cables is not connected.	Check all connections.

Keypad/Display Panel Menu Structure

MODE	SCROLL	DISPLAY READOUT	DESCRIPTION	RANGE	DEFAULT
Review	Sync	Phase Over = _%	Phase Overall Gain	0-100	15
		Phas Prop = _%	Phase Proportional Gain	0-100	35
		Phas Intg = _%	Phase Integral Gain	0-100	80
		Freq Over = _%	Frequency Overall Gain	0-100	20
		Freq Prop = _%	Frequency Proportional Gain	0-100	40
		Freq Intg = _%	Frequency Integral Gain	0-100	75
		Volt Match = _%	Voltage Match Window	±1-±15	5.0
		Freq Match = _ HZ	Frequency Match Window	±0.1-±25	.25
		Phase Match = DEG	Phase Match Windows	±2-±20	20
	Command	Pwr Input = POT	Power Set Select	Key,Pot	Pot
		Pwr LO Limit = _%	Power Limit Low	0-100	10
		Pwr HI Limit = _%	Power Limit High	0-120	100
		Pwr Set Lvl = _%	Power Set Level	0-120	50
		Trip Level= _%	Breaker Trip Level	0-120	15
		Ramp Up = _SEC	Ramp Up Time	0-300	40
		Ramp Down = _SEC	Ramp Down Time	0-300	40
	Blend	Pwr LO Limit= _%	Power Limit Low	0-100	10
		Trip Level= _%	Power Set Level	0-120	15
		Ramp Up = _SEC	Ramp Up Time	0-300	40
		Ramp Down = _SEC	Ramp Down Time	0-300	40
	L/s Setup	Parall Volt = _V	Parallel Voltage	1.5-4.5	3.000
		PT Ratio = _	Potential Transformer Ratio	1-600	1
		CT Ratio A = _	Current Transformer Ratio A	10-9999	(*)
		CT Ratio B = _	Current Transformer Ratio B	10-9999	(*)
		CT Ratio C = _	Current Transformer Ratio C	10-9999	(*)
		Gene Power = _KW	Nominal Generator Power	0-2500	(*)
	L/s Relay	Pwr ON Lvl = _%	Forward Preset Power Level On	20-120	90
		Pwr OFF Lvl= _%	Forward Preset Power Level Off	10-100	50
		Rev Pwr Lvl = _%	Reverse Preset Power Level	0-40	20
		Fpwr ON Del = _SEC	Forward Power On Time	0-300	10
		Fpwr OFF Del = SEC	Forward Power Off Time	0-300	10

(*) Depending on the size of generator (see Setup Procedure).

MODE	SCROLL	DISPLAY READOUT	DESCRIPTION	RANGE	DEFAULT
Program	Sync	Phas Over = _%	Phase Overall Gain	0-100	15
		Phas Prop = _%	Phase Proportional Gain	0-100	35
		Phas Intg = _%	Phase Integral Gain	0-100	30
		Freq Over = _%	Frequency Overall Gain	0-100	28
		Freq Prop = _%	Frequency Proportional Gain	0-100	50
		Freq Intg = _%	Frequency Integral Gain	0-100	75
		Volt Match = _%	Voltage Match Window	±1-±15	5.0
		Freq Match = _hz	Frequency Match Window	±0.1-±25	.2
		Phase Match = _DEG	Phase Match Windows	±2-±20	20
	Command	Pwr Input = _POT	Power Set Select	Key,Pot	Pot
		Pwr LO Limit = _%	Power Limit Low	0-100	10
		Pwr HI Limit = _%	Power Limit High	0-120	100
		Pwr Set Lvl = _%	Power Set Level	0-120	50
		Trip Level = _%	Breaker Trip Level	0-120	15
		Ramp Up = _SEC	Ramp Up Time	0-300	20
		Ramp Down = _SEC	Ramp Down Time	0-300	20
	Blend	Pwr LO Limit= _%	Power Limit Low	0-100	10
		Trip Level = _%	Power Set Level	0-120	15
		Ramp Up = _SEC	Ramp Up Time	0-300	20
		Ramp Down = _SEC	Ramp Down Time	0-300	20
	L/s Setup	Parall Volt = _V	Parallel Volt	0-4.5	3.000
		PT Ratio = _	Potential Transformer Ratio	1-600	1
		CT Ratio A = _	Current Transformer Ratio A	10-9999	(*)
		CT Ratio B = _	Current Transformer B	10-9999	(*)
		CT Ratio C = _	Current Transformer Ratio C	10-9999	(*)
		Gen Power = _KW	Nominal Gen Power	0-2500	(*)
	L/s Relay	Pwr ON Lvl = _%	Forward Preset Power Level On	20-120	90
		Power OFF Lvl = _%	Forward Preset Power Level Off	10-100	30
		Rev Pwr Lvl = _%	Reverse Preset Power Level	0-30	20
		Fpwr ON De= _SEC	Forward Power On Time	0-300	10
		Fpwr OFF De = _SEC	Forward Power Off Time	0-300	10
Setup	System	Gen Pwr = _KW	Generator Power	0-2500	(*)
		Sys Volt =_VAC	System Voltage	120,240,480	(*)
		Bus Freq =_Hz	Bus Frequency	50,60	(*)
		PT Ratio =_	Potential Transformer Ratio	1-600	1
		CT Ratio A =_	Current Transformer Ratio A	10-9999	(*)
		CT Ratio B =_	Current Transformer Ratio B	10-9999	(*)
		CT Ratio C =_	Current Transformer Ratio C	10-9999	(*)
		Bridge Int =	Bridge Integrator	On,Off	Off

(*) Depending on the size of generator (see Setup Procedure).

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	Absolute air inlet pressure	100 kPa	100 kPa
	Air inlet temperature	25 °C	25 °C
	Relative air humidity	30 %	30 %
	Generator load	Continuous	Continuous
Limitations without derating	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
Engine	Type DETROIT DIESEL	S60	S60
	Rated net output	261 kW	310 kW
	Load speed	1500 rpm	1800 rpm
	Electrical system	24 V	24 V
	Battery (2x)	12 V / 143 Ah	12 V / 143 Ah
	Oil circuit capacity	36 l	36 l
	Cooling circuit capacity	44 l	44 l
	Fuel tank capacity	530 l	530 l
	Fuse F4	10 A	10 A
	Fuel consumption at full load/no load	48.6/7.2 kg/h	59.6/9.9 kg/h
	Maximum run time with fuel tank	9 h	7.5 h
Alternator	Type	ECN 37 LD	ECN 37 LD
	Rated output, class H temp. rise	320 kVA	384 kVA
	Rated voltage 3ph line to line lower voltage	230 V	220 V
	Rated voltage 3ph line to line higher voltage	400 V	480 V
	Frequency	50 Hz	60 Hz
	Speed	1500 rpm	1800 rpm
	Power factor	0.8	0.8
	Number of phases	3 + neutral	3 + neutral
	Insulation armature winding, class	H	H
	Insulation field winding, class	H	H
	Sensitivity of earth leak detector	30 mA	30 mA
	Maximum diffusion resistance of earthing rod	1 kΩ	1 kΩ
	Setting of Q1	433 A	433 A
	Fuses F1 ... F3	4 A	4 A
	Sensitivity of insulation monitoring relay	10 .... 100 kΩ	10 .... 100 kΩ

Unit	Dimensions (L x W x H)	3955 x 1431 x 2128 mm	3955 x 1431 x 2128 mm
	Weight net mass	4280 kg	4280 kg
	Weight wet mass	4800 kg	4800 kg

8.4 SPECIFICATIONS OF THE OPTIONS

8.4.1 Specifications of the sockets option

Setting of circuit breaker Q2	16 A	16 A

8.4.2 Low voltage option

Rated voltage 3ph line to line lower voltage	230 V	220 V
Setting of circuit breaker Q1.1	753 A	910 A

8.4.3 Specifications of the dual/tripple voltage option

Rated voltage 3ph line to line higher voltage	400 V	480 V
Rated voltage 3ph line to line lower voltage	230 V	220 V
Rated voltage 1ph line to line lower voltage	230 V	220 V
Setting of circuit breaker Q1.1	753 A	910 A
Setting of circuit breaker Q1.2	433 A	455 A

8.4.4 Dual frequency

Frequency	50/60 Hz	50/60 Hz

8.5 ENGINE DIAGNOSTIC CODES

To read the engine diagnostic codes, connect the diagnostic data reader to the diagnostic data socket (X20) or depress and hold the diagnostic request switch with the ignition on, the engine at idle or not running. Press and hold the switch.

Active codes will be flashed on the stop engine light, followed by the inactive codes being flashed on the check engine light. The cycle will repeat until the diagnostic request switch is released.

The flash code contains 2 digits:

– the first digit is the number of times L13 or L14 flashes slowly

– the second digit is the number of times L13 or L14 flashes fast

Flash code	Code description
11	VSG input low
12	VSG input high
13	Coolant level circuit low
14	Intercooler, coolant or oil temperature circuit high
15	Intercooler, coolant or oil temperature circuit low
16	Coolant level circuit high
17	Bypass position circuit high
18	Bypass position circuit low
21	TPS circuit high
22	TPS circuit low
23	Fuel temperature circuit high
24	Fuel temperature circuit low
25	No codes
26	Auxiliary shutdown #1 or #2 active
27	Air temperature circuit high
28	Air temperature circuit low
31	Auxiliary output short or open circuit (high side)
32	SEL short or open circuit
33	Boost pressure circuit high
34	Boost pressure circuit low
35	Oil pressure circuit high
36	Oil pressure circuit low
37	Fuel pressure circuit high
38	Fuel pressure circuit low
41	Too many SRS (missing TRS)
42	Too few SRS (missing SRS)
43	Coolant level low
44	Intercooler, coolant or oil temperature high
45	Oil pressure low

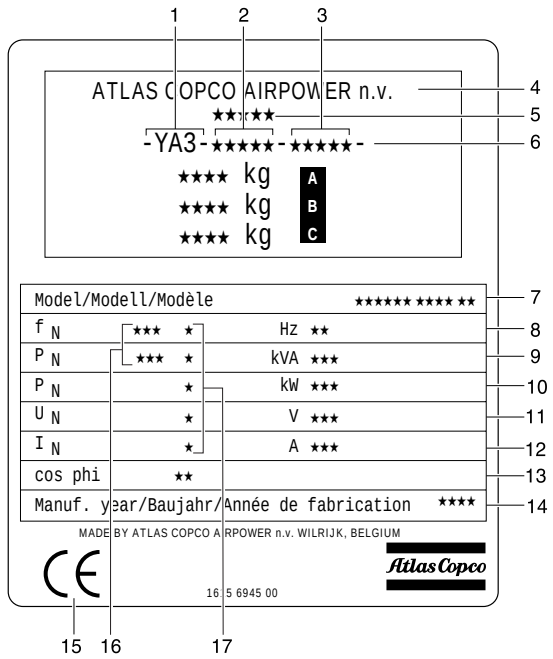
Flash code	Code description
46	Battery voltage low
47	Fuel pressure high
48	Fuel pressure low
52	A/D conversion fail
53	EEPROM write or nonvolatile checksum fail
54	Vehicle speed sensor fault
55	J1939 data link fault
56	J1587 data link fault
57	J1922 data link fault
58	Torque overload
61	Injector response time long
62	Auxiliary output open or short to battery
63	PWM open or short to battery
64	Turbo speed circuit failed
67	Coolant pressure circuit high or low
68	IVS switch fault, open or grounded circuit
71	Injector response time short
72	Vehicle overspeed
75	Battery voltage high
76	Engine overspeed with engine brake
81	Oil level or crankcase pressure circuit high
82	Oil level or crankcase pressure circuit low
83	Oil level or crankcase pressure high
84	Oil level or crankcase pressure low
85	Engine overspeed
86	Water pump or barometer pressure circuit high
87	Water pump or barometer pressure circuit low
88	Coolant pressure low

8.6 CONVERSION LIST OF SI UNITS INTO BRITISH UNITS

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

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

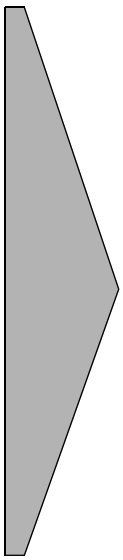
8.7 DATAPLATE



A Maximum permitted loaded weight of the vehicle
B Maximum permitted road weight of the front axle
C Maximum permitted road weight of the rear axle

1 Company code
2 Product code
3 Unit serial number
4 Name of the manufacturer
5 EEC or national type approval number
6 Vehicle identification number
7 Model number
8 Frequency
9 Apparent power - 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
Elektrisch schema
Schéma de circuit
Schaltpläne
Esquema de conexiones
Kopplingsscheman
Diagrammi dei circuiti
Kretsskjema
Kredsløbsdiagrammer
Διαγράμματα κυκλωμάτων
Esquemas eléctricos
Sähkökaaviot



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Applicable for QAS338 Gd (RS) (AMF)

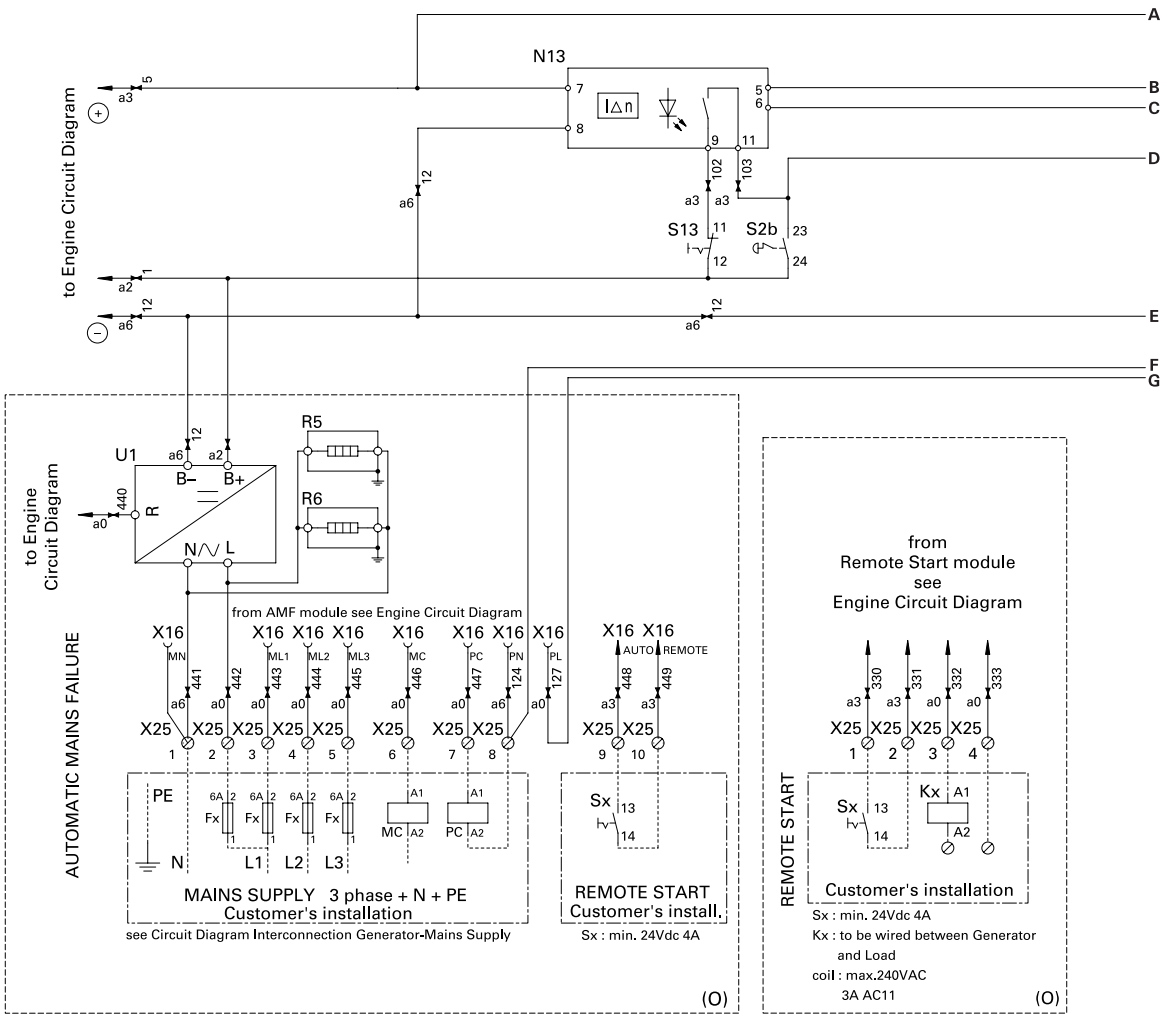
Legend :

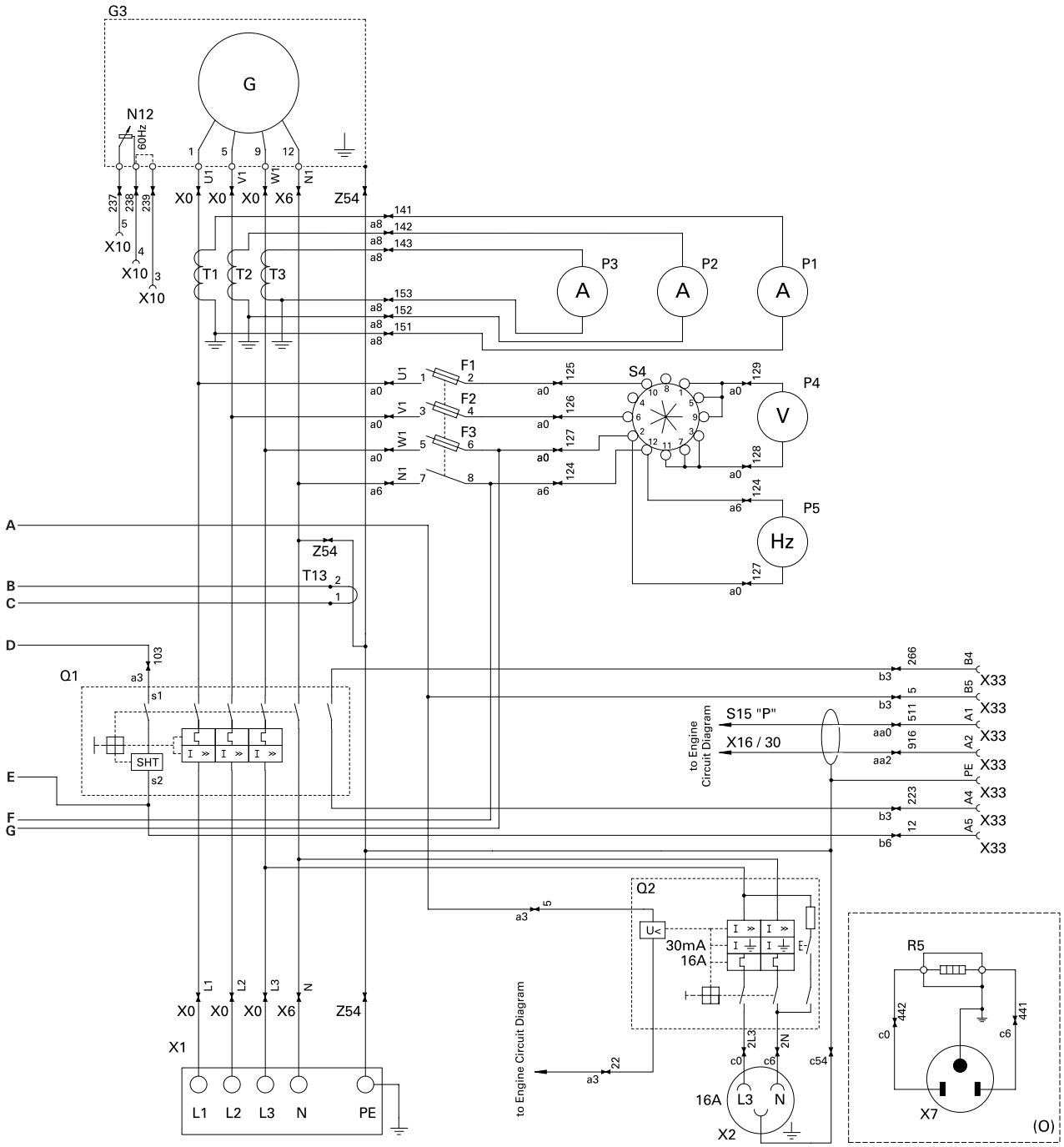
Wire size :	Colour code :
aa = 0.5mm²	0 = black
a = 1 mm²	1 = brown
b = 1.5mm²	2 = red
c = 2.5mm²	3 = orange
d = 4 mm²	4 = yellow
e = 6 mm²	5 = green
f = 10 mm²	6 = blue
g = 16 mm²	7 = purple
h = 25 mm²	8 = grey
i = 35 mm²	9 = white
j = 50 mm²	54 = green/yellow
k = 70 mm²	
l = 95 mm²	
lx = 95 mm² EPR-CSP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

	Q1	T1-3	P1-3	Wire size X	Wire size Z
QAS168	216A	300/5A	0-300A	2x i	i
QAS228	290A	300/5A	0-300A	2x k	k
QAS278	360A	600/5A	0-600A	2x l	l
QAS338	433A	600/5A	0-600A	2x lx	l

I > has to be set at a value between 3.5 and 4 times Ir.

(O): OPTIONAL EQUIPMENT




G3
G
N12
60Hz
1
5
9
12
U1
V1
W1
N1
X0
X0
X0
X6
Z54
237
238
239
X10
T1
T2
T3
141
142
143
153
152
151
a8
P3
P2
P1
A
F1
F2
F3
S4
P4
V
P5
Hz
a0
a6
A
B
C
D
E
F
G
Z54
T13
Q1
103
a3
s1
s2
SHT
I »
S15 "P"
X16 / 30
to Engine Circuit Diagram
266
511
916
223
12
B4
B5
A1
A2
PE
A4
A5
X33
Q2
U<
30mA
16A
L1
L2
L3
N
PE
X1
X2
22
2L3
2N
c0
c6
c54
16A
L3
N
R5
442
441
X7
(O)

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	ENGLISH	NEDERLANDS	FRANCAIS
F1-3	Fuse 4A	Zekering 4A	Fusible 4A
G3	Alternator	Alternateur	Groupe électrogène
N12	Automatic voltage regulator	Automatische spanningsregelaar	Régulateur de tension automatique
N13	Earth fault-current relay	Aardlekrelais	Relais de fuite à la terre
P1-3	Amperemeter	Ampèremeter	Ampèremètre
P4	Voltmeter 0-500V	Voltmeter 0-500V	Voltmètre 0-500V
P5	Frequencymeter 45-65Hz	Frekwentiemeter 45-65Hz	Fréquencemètre 45-65Hz
Q1	Circuit breaker	Vermogenschakelaar	Disjoncteur
Q2	Circuit breaker	Vermogenschakelaar	Disjoncteur
R5	Coolant heater	Verwarmer koelvloeistof	Réchauffeur de réfrigérant du moteur
R6	Coolant heater	Verwarmer koelvloeistof	Réchauffeur de réfrigérant du moteur
S2b	Emergency stop	Noodstopknop	Arrêt d'urgence
S4	Voltmeter selector switch	Voltmeter keuzeschakelaar	Sélécteur de voltmètre
S13	Earth fault relay lock-out switch	Blokkeerschakelaar verliesstroomrelais	Commutateur d'arrêt de relais des défauts à la terre
T1-3	Current transformer	Stroomtransformator	Transformateur de courant
T13	Earth fault-current detector	Aardlekdetector	Détecteur de fuite à la terre
U1	Static battery charger	Statische batterijlader	Chargeur de batterie statique
X1	Terminal board	Klemmenbord	Tablette à bornes
X2	Outlet socket	Uitlaatpunt	Prise femelle
X7	Flanged inlet	Geflensde inlaat	Entrée à bride
X10	15-pole connector	Konnektor, 15 stiften	Connecteur 15 broches
X25	Terminal strip	Klemmenstrook	Barrette de raccordement
X33	Par. connector to control cubicle (SAPE)	Par. connector naar vermogenkast (SAPE)	Connecteur parallèle vers armoire de commande (SAPE)
Sx	Remote start/stop switch	Afstands start-/stopschakelaar	Interrupteur de démarrage/arrêt à distance
Kx	Plant contactor	Installatiecontactor	Contacteur d'installation

	DEUTSCH	ESPAÑOL	SVENSKA
F1-3	Sicherung 4A	Fusible 4A	Säkring 4A
G3	Alternador	Generator	Generatore
N12	Automatischer Spannungsregler	Regulador automático de voltaje	Automatisk spänningsregulator
N13	Erdschlußrelais	Relé de pérdida a tierra	Relä för jordläckage
P1-3	Amperemeter	Amperímetro	Amperemätare
P4	Voltmeter 0-500 V	Voltímetro 0-500V	Spänningsmätare 0-500V
P5	Frequenzmesser 45-65 Hz	Frecuencímetro 45-65Hz	Frekvensmätare 45-65 Hz
Q1	Leistungsschalter	Disyuntor	Strömbrytare
Q2	Leistungsschalter	Disyuntor	Strömbrytare
R5	Heizelement Kühlmittel	Calentador del refrigerante	Kylvätskevärmare
R6	Heizelement Kühlmittel	Calentador del refrigerante	Kylvätskevärmare
S2b	Notabschaltung	Parada de emergencia	Nödstopp
S4	Voltmeter-Wahlschalter	Selector de voltímetro	Spänningsmätarens kopplingsväljare
S13	Riegelschalter Erdschlußrelais	Interruptor de bloqueo del relé de pérdida a tierra	Avstängningsbrytare för jordfelsrelä
T1-3	Stromwandler	Transformador de corriente	Strömtransformator
T13	Erdschlußanzeiger	Detector de pérdida a tierra	Detektor för jordläckage
U1	Feststehendes Batterieladegerät	Cargador estático de batería	Statisk batteriladdare
X1	Klemmenbrett	Cuadro de bornas	Anslutningsplint
X2	Anschlußdose	Casquillo de toma de corriente	Utloppshylsa
X7	Einlass mit Flansch	Entrada con brida	Flänsad ingång
X10	15-poliger Stecker	Conector de 15 polos	15-poligt kontaktdon
X25	Klemmenleiste	Bloque de terminales	Anslutningslist
X33	Parallelschaltungs-Anschluß zu Schaltkasten (SAPE)	Conector par. a cub. control (SAPE)	Rinnakkaisliitin SAPE-yksikön hallintaan
Sx	Schalter Fernstart/-stop	Interruptor remoto de arranque/parada	Start/stopp fjärrströmbrytare
kx	Anlagenseitiges Schütz	Contactor para instalación	Anläggningsanslutning

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	ITALIANO	NORSK	DANSK
F1-3	Fusibile 4A	Sikring 4A	Sikring 4A
G3	Generator	Generator	Generator
N12	Regolatore di tensione automatico	Automatisk spenningsregulator	Automatisk spændingsregulator
N13	Relè corrente di terra	Jordfeilrelé	Jordfejlstrømsrelæ
P1-3	Amperometro	Amperemeter	Amperemeter
P4	Voltimetro 0-500V	Spenningsmåler 0-500V	Voltmeter 0-500V
P5	Frequenziometro 45-65Hz	Frekvensmåler 45-65Hz	Frekvensmåler 45-65Hz
Q1	Interruttore	Kretsbryter	Afbryder
Q2	Interruttore	Kretsbryter	Afbryder
R5	Riscaldatore del liquido refrigerante	Kjølevæskevarmer	Kølemiddelopvarmer
R6	Riscaldatore del liquido refrigerante	Kjølevæskevarmer	Kølemiddelopvarmer
S2b	Arresto di emergenza	Nødstopp	Nødstop
S4	Interruttore di selezione del voltimetro	Valgbryter for spenningsmåler	Voltmeterets omskifterknap
S13	Interruttore chiusura relé guasto di terra	Avstengingsbryter for jordfeilrelé	Afbryderkontakt til jordfejlstrømsrelæ
T1-3	Transformatore di corrente	Strøm	Strømtransformere
T13	Rilevatore corrente di terra	Jordfeilføler	Jordfejlstrømsdetektor
U1	Carica batteria statica	Statisk batterilader	Statisk batterioplader
X1	Morsettiera	Koplingstavle	Klembrædt
X2	Presa esterna	Utløpshylse	Stikkontakt
X7	Entrata flangiata	Flensinnløp	Indtag med flange
X10	Connettore a 15 poli	15-polet kontakt	15-faset kontaktklemme
X25	Morsettiera	Koplingssplint	Klemliste
X33	Connettore in parallelo verso il modulo di comando cubico (SAPE)	Par. kontakt for å kontrollboks (SAPE)	Par. konnektor til kontrolskab (SAPE)
Sx	Interruttore a distanza avvio/arresto	Bryter for fjernstart/-stopp	Kontakt til fjernstyring af start/stop
Kx	Contattore dell'impianto	Anleggskontaktor	Maskinkontaktor

	ΕΛΛΗΝΙΚΑ	PORTUGUÊS	SUOMI
F1-3	Ασφάλεια 4A	Fusível 4A	Varoke 4A
G3	Γεννήτρια	Alternador	Vaihtovirtageneraattori
N12	Αυτόματος ρυθμιστής τάσης	Regulador automático da potência	Automaattinen jännitteensäädin
N13	ρεύματος γείωσης	Relé de detecção de falha de terra	Maavuotorele
P1-3	Αμπερόμετρο	Amperímetro	Ampeerimittari
P4	Βολτόμετρο 0-500V	Voltímetro 0-500V	Volttimittari 0-500V
P5	Μετρητής συχνότητας 45-65Hz	Frequencímetro 45-65Hz	Taajuusmittari 45-65Hz
Q1	Διακόπτης κυκλώματος	Disjuntor	Virrankatkaisin
Q2	Διακόπτης κυκλώματος	Disjuntor	Virrankatkaisin
R5	Θερμαντήρας ψυκτικού	Auqecedor do líquido de arrefecimento	Pysäytyssäätimen vastus
R6	Θερμαντήρας ψυκτικού	Auqecedor do líquido de arrefecimento	Pysäytyssäätimen vastus
S2b	Στοπ έκτακτης ανάγκης	Paragem de emergência	Hätäpysäytys
S4	Διακόπτης επιλογής βολτομέτρου	Comutador selector do voltímetro	Volttimittarin valintakytkin
S13	Διακόπτης αποκλεισμούμετάδοσης λάθους στη γείωση	Interruptor selector do relé de corrente de defeito à terra	Maavuodon tunnistimen sulkukytkin
T1-3	Μετασχηματιστής ρεύματος	Transformador de corrente	Virtamuuntaja
T13	Ανιχνευτής ρεύματος γείωσης	Detector de falha de corrente de terra	Maavuodon tunnistin
U1	Γομωτής στατικής μπαταρίας	Carregador de baterias estático	Kiinteä akkulaturi
X1	Πίνακας ακροδέκτη	Quadro de terminais	Liitäntälevy
X2	Ακροδέκτη εξόδου	Tomada de saída	Pistorasia
X7	Εισαγωγή με φλάντζα	Entrada de manilhas	Laipallinen tuloaukko
X10	15-πολικός σύνδεσμος	Ligação em 15 polos	15-napainen liitin
X25	Λωρίδα ακροδέκτη	Faixa de terminais	Liitäntärima
X33	Παράλληλη υποδοχή προς θάλαμο ελέγχου (SAPE)	Conector paralelo para cub. De controlo (SAPE)	Rinnakkaisliitin SAPE-yksikön hallintaan
Sx	Τηλεχειριζόμενος διακόπτης εκκίνησης/ανακοπής	Interruptor remoto de arranque/paragem	Kaukokäynnistys-/kaukopysäytyskytkin
Kx	Επαφέας εγκατάστασης	Contactor geral	Laitteiston liitin

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Applicable for QAS338 Gd LV 60Hz RS (AMF)

Legend :

Wire size :

aa = 0.5mm²
a = 1 mm²
b = 1.5mm²
c = 2.5mm²
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
px = 185mm² 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

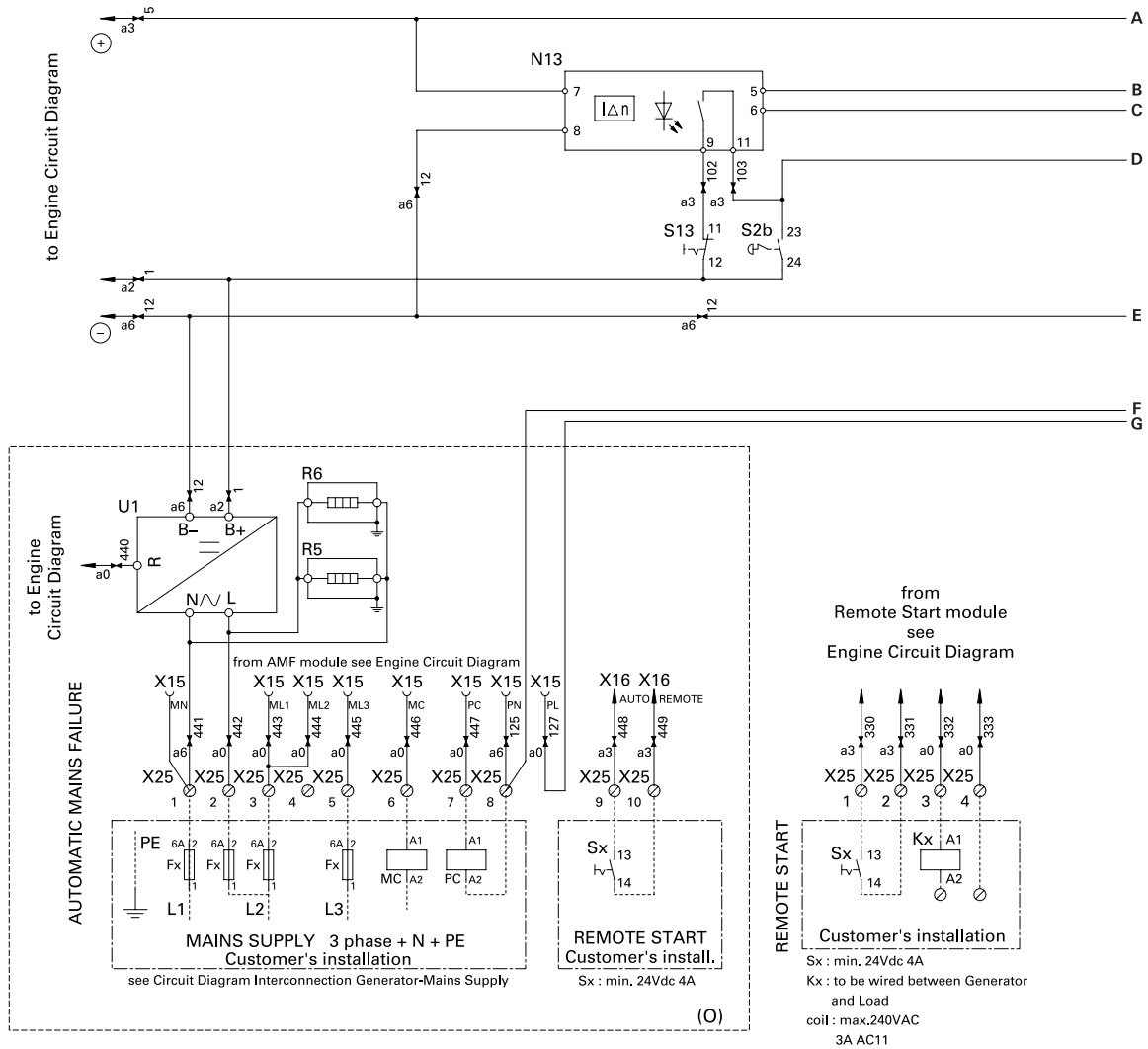
**

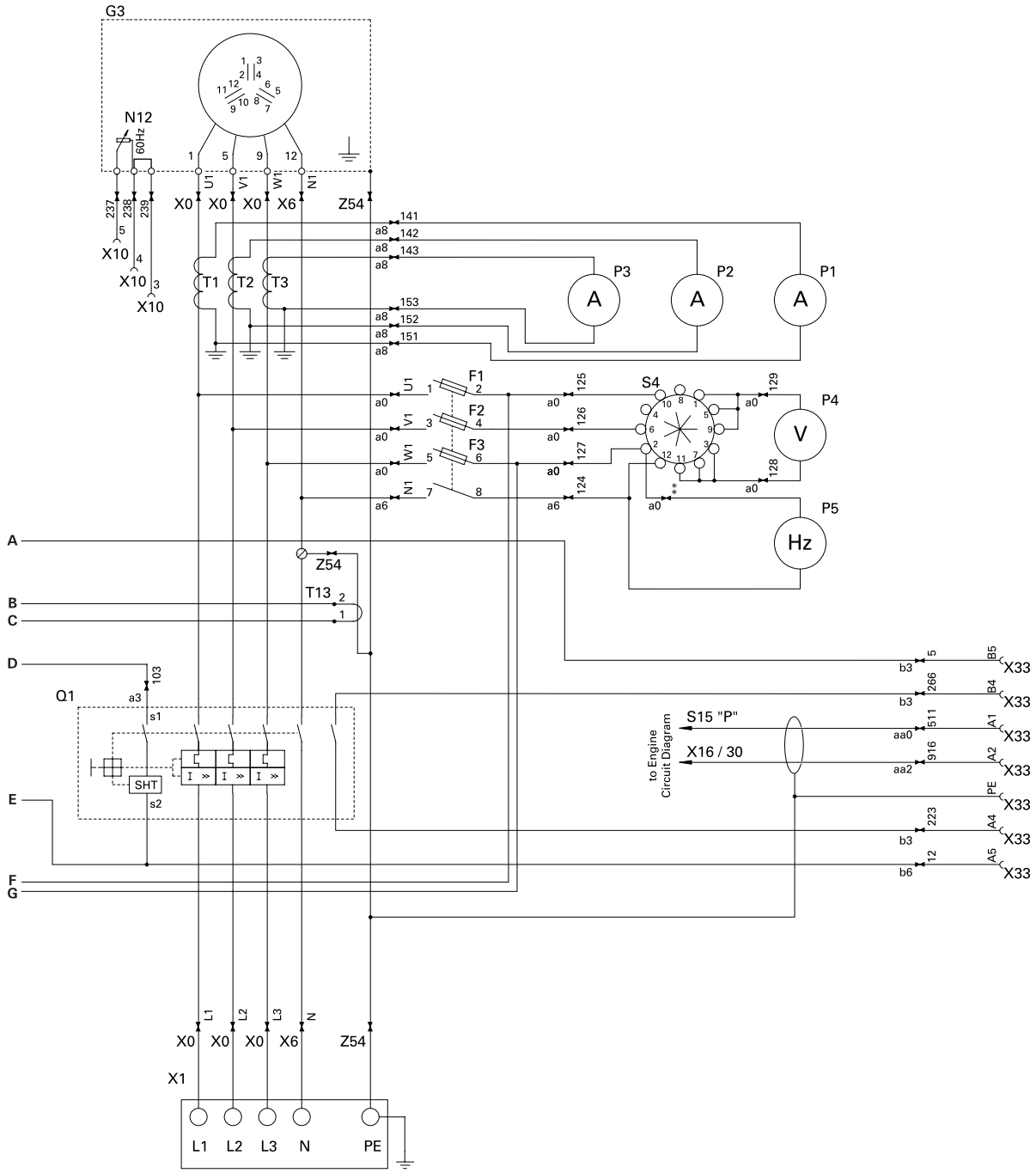
wire nr 127 for AMF
wire nr 110 for Remote Start

	Q1	T1-3	P1-3	Wire size	
				X	Z
QAS168 LV	473A	600/5A	0-600A	2x lx	l
QAS228 LV	630A	600/5A	0-600A	2x lx	lx
QAS278 LV	757A	1000/5A	0-1000A	2x px	px
QAS338 LV	910A	1000/5A	0-1000A	2x px	px

I > has to be set at a value between 3.5 and 4 times Ir.

(O): OPTIONAL EQUIPMENT




G3
N12
60Hz
U1
V1
W1
N1
X0
Z54
T1
T2
T3
P3
P2
P1
F1
F2
F3
S4
P4
V
P5
Hz
Z54
T13
Q1
SHT
S15 "P"
X16 / 30
to Engine Circuit Diagram
X33
L1
L2
L3
N
PE
X1

9822 0889 02/06

	ENGLISH	NEDERLANDS	FRANCAIS
F1-3	Fuse 4A	Zekering 4A	Fusible 4A
G3	Alternator	Alternateur	Groupe électrogène
N12	Automatic voltage regulator	Automatische spanningsregelaar	Régulateur de tension automatique
N13	Earth fault-current relay	Aardlekrelais	Relais de fuite à la terre
P1-3	Amperemeter	Ampèremeter	Ampèremètre
P4	Voltmeter 0-500V	Voltmeter 0-500V	Voltmètre 0-500V
P5	Frequencymeter 45-65Hz	Frekwentiemeter 45-65Hz	Fréquencemètre 45-65Hz
Q1	Circuit breaker	Vermogenschakelaar	Disjoncteur
R5	Coolant heater	Verwarmer koelvloeistof	Réchauffeur de réfrigérant du moteur
R6	Coolant heater	Verwarmer koelvloeistof	Réchauffeur de réfrigérant du moteur
S2b	Emergency stop	Noodstopknop	Arrêt d'urgence
S4	Voltmeter selector switch	Voltmeter keuzeschakelaar	Sélécteur de voltmètre
S13	Earth fault relay lock-out switch	Blokkeerschakelaar verliesstroomrelais	Commutateur d'arrêt de relais des défauts à la terre
T1-3	Current transformer	Stroomtransformator	Transformateur de courant
T13	Earth fault-current detector	Aardlekdetector	Détecteur de fuite à la terre
U1	Static battery charger	Statische batterijlader	Chargeur de batterie statique
X1	Terminal board	Klemmenbord	Tablette à bornes
X10	15-pole connector	Konnektor, 15 stiften	Connecteur 15 broches
X15	10-pole connector	Konnektor, 10 stiften	Connecteur 10 broches
X25	Terminal strip	Klemmenstrook	Barrette de raccordement
X33	Par. connector to control cubicle (SAPE)	Par. connector naar vermogenkast (SAPE)	Connecteur parallèle vers armoire de commande (SAPE)
Sx	Remote start/stop switch	Afstands start-/stopschakelaar	Interrupteur de démarrage/arrêt à distance
Kx	Plant contactor	Installatiecontactor	Contacteur d'installation

	DEUTSCH	ESPAÑOL	SVENSKA
F1-3	Sicherung 4A	Fusible 4A	Säkring 4A
G3	Alternador	Generator	Generatore
N12	Automatischer Spannungsregler	Regulador automático de voltaje	Automatisk spänningsregulator
N13	Erdschlußrelais	Relé de pérdida a tierra	Relä för jordläckage
P1-3	Amperemeter	Amperímetro	Amperemätare
P4	Voltmeter 0-500 V	Voltímetro 0-500V	Spänningsmätare 0-500V
P5	Frequenzmesser 45-65 Hz	Frecuencímetro 45-65Hz	Frekvensmätare 45-65 Hz
Q1	Leistungsschalter	Disyuntor	Strömbrytare
R5	Heizelement Kühlmittel	Calentador del refrigerante	Kylvätskevärmare
R6	Heizelement Kühlmittel	Calentador del refrigerante	Kylvätskevärmare
S2b	Notabschaltung	Parada de emergencia	Nödstopp
S4	Voltmeter-Wahlschalter	Selector de voltímetro	Spänningsmätarens kopplingsväljare
S13	Riegelschalter Erdschlußrelais	Interruptor de bloqueo del relé de pérdida a tierra	Avstängningsbrytare för jordfelsrelä
T1-3	Stromwandler	Transformador de corriente	Strömtransformator
T13	Erdschlußanzeiger	Detector de pérdida a tierra	Detektor för jordläckage
U1	Feststehendes Batterieladegerät	Cargador estático de batería	Statisk batteriladdare
X1	Klemmenbrett	Cuadro de bornas	Anslutningsplint
X10	15-poliger Stecker	Conector de 15 polos	15-poligt kontaktdon
X15	10-poliger Stecker	Conector 10-polos	10-poligt kontaktdon
X25	Klemmenleiste	Bloque de terminales	Anslutningslist
X33	Parallelschaltungs-Anschluß zu Schaltkasten (SAPE)	Conector par. a cub. control (SAPE)	Rinnakkaisliitin SAPE-yksikön hallintaan
Sx	Schalter Fernstart/-stop	Interruptor remoto de arranque/parada	Start/stopp fjärrströmbrytare
kx	Anlagenseitiges Schütz	Contactor para instalación	Anläggningsanslutning

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	ITALIANO	NORSK	DANSK
F1-3	Fusibile 4A	Sikring 4A	Sikring 4A
G3	Generator	Generator	Generator
N12	Regolatore di tensione automatico	Automatisk spenningsregulator	Automatisk spændingsregulator
N13	Relè corrente di terra	Jordfeilrelé	Jordfejlstrømsrelæ
P1-3	Amperometro	Amperemeter	Amperemeter
P4	Voltimetro 0-500V	Spenningsmåler 0-500V	Voltmeter 0-500V
P5	Frequenziometro 45-65Hz	Frekvensmåler 45-65Hz	Frekvensmåler 45-65Hz
Q1	Interruttore	Kretsbryter	Afbryder
R5	Riscaldatore del liquido refrigerante	Kjølevæskevarmer	Kølemiddelopvarmer
R6	Riscaldatore del liquido refrigerante	Kjølevæskevarmer	Kølemiddelopvarmer
S2b	Arresto di emergenza	Nødstopp	Nødstop
S4	Interruttore di selezione del voltimetro	Valgbryter for spenningsmåler	Voltmeterets omskifterknap
S13	Interruttore chiusura relé guasto di terra	Avstengingsbryter for jordfeilrelé	Afbryderkontakt til jordfejlstrømsrelæ
T1-3	Transformatore di corrente	Strøm	Strømtransformere
T13	Rilevatore corrente di terra	Jordfeilføler	Jordfejlstrømsdetektor
U1	Carica batteria statica	Statisk batterilader	Statisk batterioplader
X1	Morsettiera	Koplingstavle	Klembrædt
X10	Connettore a 15 poli	15-polet kontakt	15-faset kontaktklemme
X15	Connettore a 10 poli	10-polet kontakt	10 -faset kontaktklemme
X25	Morsettiera	Koplingssplint	Klemliste
X33	Connettore in parallelo verso il modulo di comando cubico (SAPE)	Par. kontakt for å kontrollboks (SAPE)	Par. konnektor til kontrolskab (SAPE)
Sx	Interruttore a distanza avvio/arresto	Bryter for fjernstart/-stopp	Kontakt til fjernstyring af start/stop
Kx	Contattore dell'impianto	Anleggskontaktor	Maskinkontaktor

	ΕΛΛΗΝΙΚΑ	PORTUGUÊS	SUOMI
F1-3	Ασφάλεια 4A	Fusível 4A	Varoke 4A
G3	Γεννήτρια	Alternador	Vaihtovirtageneraattori
N12	Αυτόματος ρυθμιστής τάσης	Regulador automático da potência	Automaattinen jännitteensäädin
N13	ρεύματος γείωσης	Relé de detecção de falha de terra	Maavuotorele
P1-3	Αμπερόμετρο	Amperímetro	Ampeerimittari
P4	Βολτόμετρο 0-500V	Voltímetro 0-500V	Volttimittari 0-500V
P5	Μετρητής συχνότητας 45-65Hz	Frequencímetro 45-65Hz	Taajuusmittari 45-65Hz
Q1	Διακόπτης κυκλώματος	Disjuntor	Virrankatkaisin
R5	Θερμαντήρας ψυκτικού	Auqecedor do líquido de arrefecimento	Pysäytyssäätimen vastus
R6	Θερμαντήρας ψυκτικού	Auqecedor do líquido de arrefecimento	Pysäytyssäätimen vastus
S2b	Στοπ έκτακτης ανάγκης	Paragem de emergência	Hätäpysäytys
S4	Διακόπτης επιλογής βολτομέτρου	Comutador selector do voltímetro	Volttimittarin valintakytkin
S13	Διακόπτης αποκλεισμούμετάδοσης λάθους στη γείωση	Interruptor selector do relé de corrente de defeito à terra	Maavuodon tunnistimen sulkukytkin
T1-3	Μετασχηματιστής ρεύματος	Transformador de corrente	Virtamuuntaja
T13	Ανιχνευτής ρεύματος γείωσης	Detector de falha de corrente de terra	Maavuodon tunnistin
U1	Γομωτής στατικής μπαταρίας	Carregador de baterias estático	Kiinteä akkulaturi
X1	Πίνακας ακροδέκτη	Quadro de terminais	Liitäntälevy
X10	15-πολικός σύνδεσμος	Ligação em 15 polos	15-napainen liitin
X15	10-πολικός σύνδεσμος	Ligação em 10 polos	10-napainen liitin
X25	Λωρίδα ακροδέκτη	Faixa de terminais	Liitäntärima
X33	Παράλληλη υποδοχή προς θάλαμο ελέγχου (SAPE)	Conector paralelo para cub. De controlo (SAPE)	Rinnakkaisliitin SAPE-yksikön hallintaan
Sx	Τηλεχειριζόμενος διακόπτης εκκίνησης/ανακοπής	Interruptor remoto de arranque/paragem	Kaukokäynnistys-/kaukopysäytyskytkin
Kx	Επαφέας εγκατάστασης	Contactor geral	Laitteiston liitin

9822 0889 03/06
Applicable for QAS338 Gd EDF (RS) (AMF)

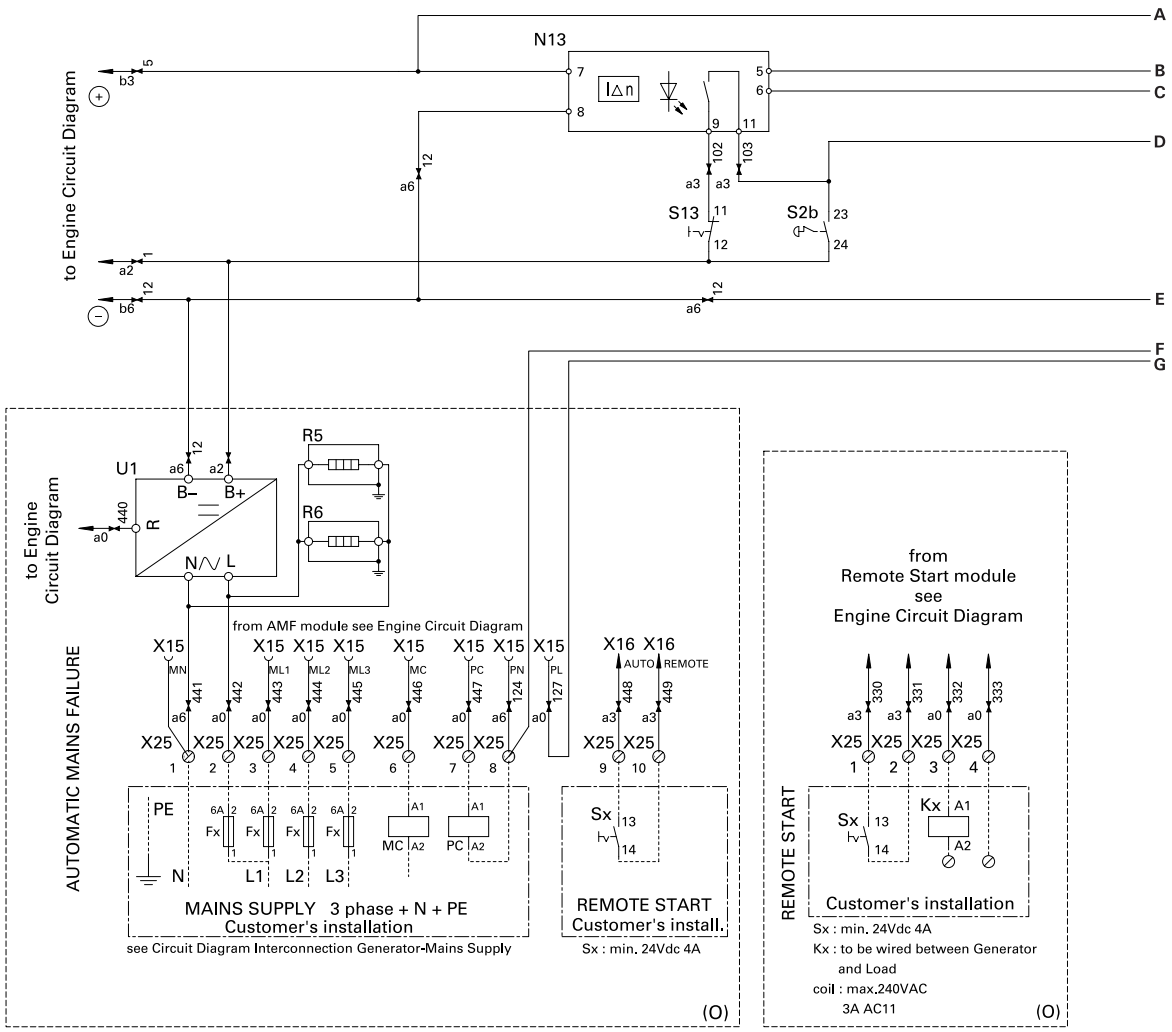
Legend :

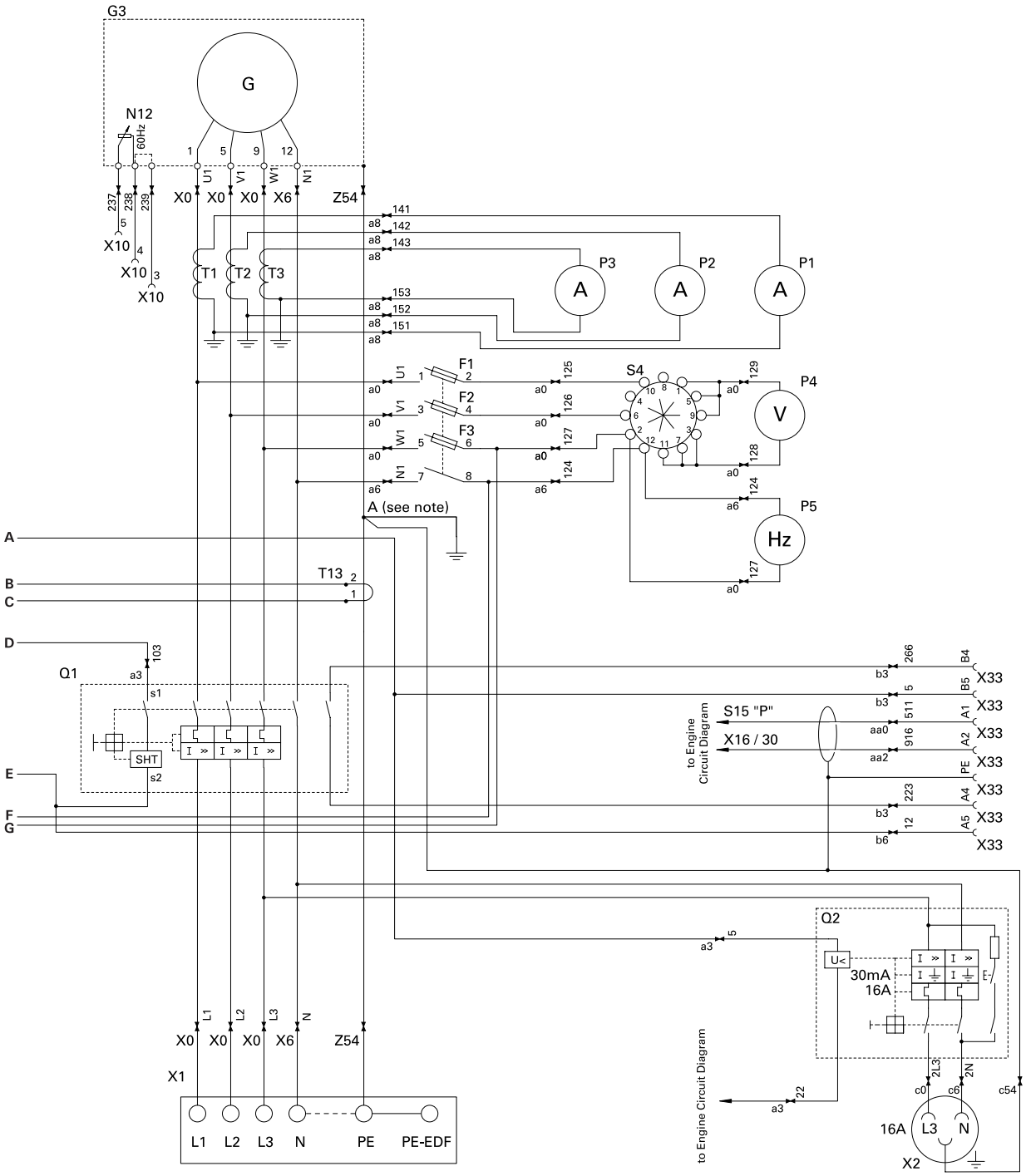
Wire size :	Colour code :
aa = 0.5mm²	0 = black
a = 1 mm²	1 = brown
b = 1.5mm²	2 = red
c = 2.5mm²	3 = orange
d = 4 mm²	4 = yellow
e = 6 mm²	5 = green
f = 10 mm²	6 = blue
g = 16 mm²	7 = purple
h = 25 mm²	8 = grey
i = 35 mm²	9 = white
j = 50 mm²	54 = green/yellow
k = 70 mm²	
l = 95 mm²	
lx = 95 mm² EPR-CSP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

	Q1	T1-3	P1-3	Wire size X	Wire size Z
QAS168	216A	300/5A	0-300A	2x i	i
QAS228	290A	300/5A	0-300A	2x k	k
QAS278	360A	600/5A	0-600A	2x l	l
QAS338	433A	600/5A	0-600A	2x lx	l

I > has to be set at a value between 3.5 and 4 times Ir.

(O): OPTIONAL EQUIPMENT





Note :

A = genset's central earthing point

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	ENGLISH	NEDERLANDS	FRANCAIS
F1-3	Fuse 4A	Zekering 4A	Fusible 4A
G3	Alternator	Alternateur	Groupe électrogène
N12	Automatic voltage regulator	Automatische spanningsregelaar	Régulateur de tension automatique
N13	Earth fault-current relay	Aardlekrelais	Relais de fuite à la terre
P1-3	Amperemeter	Ampèremeter	Ampèremètre
P4	Voltmeter 0-500V	Voltmeter 0-500V	Voltmètre 0-500V
P5	Frequencymeter 45-65Hz	Frekwentiemeter 45-65Hz	Fréquencemètre 45-65Hz
Q1	Circuit breaker	Vermogenschakelaar	Disjoncteur
Q2	Circuit breaker	Vermogenschakelaar	Disjoncteur
R5	Coolant heater	Verwarmer koelvloeistof	Réchauffeur de réfrigérant du moteur
R6	Coolant heater	Verwarmer koelvloeistof	Réchauffeur de réfrigérant du moteur
S2b	Emergency stop	Noodstopknop	Arrêt d'urgence
S4	Voltmeter selector switch	Voltmeter keuzeschakelaar	Sélécteur de voltmètre
S13	Earth fault relay lock-out switch	Blokkeerschakelaar verliesstroomrelais	Commutateur d'arrêt de relais des défauts à la terre
T1-3	Current transformer	Stroomtransformator	Transformateur de courant
T13	Earth fault-current detector	Aardlekdetector	Détecteur de fuite à la terre
U1	Static battery charger	Statische batterijlader	Chargeur de batterie statique
X1	Terminal board	Klemmenbord	Tablette à bornes
X2	Outlet socket	Uitlaatpunt	Prise femelle
X10	15-pole connector	Konnektor, 15 stiften	Connecteur 15 broches
X15	10-pole connector	Konnektor, 10 stiften	Connecteur 10 broches
X25	Terminal strip	Klemmenstrook	Barrette de raccordement
X33	Par. connector to control cubicle (SAPE)	Par. connector naar vermogenkast (SAPE)	Connecteur parallèle vers armoire de commande (SAPE)
Sx	Remote start/stop switch	Afstands start-/stopschakelaar	Interrupteur de démarrage/arrêt à distance
Kx	Plant contactor	Installatiecontactor	Contacteur d'installation

	DEUTSCH	ESPAÑOL	SVENSKA
F1-3	Sicherung 4A	Fusible 4A	Säkring 4A
G3	Alternador	Generator	Generatore
N12	Automatischer Spannungsregler	Regulador automático de voltaje	Automatisk spänningsregulator
N13	Erdschlußrelais	Relé de pérdida a tierra	Relä för jordläckage
P1-3	Amperemeter	Amperímetro	Amperemätare
P4	Voltmeter 0-500 V	Voltímetro 0-500V	Spänningsmätare 0-500V
P5	Frequenzmesser 45-65 Hz	Frecuencímetro 45-65Hz	Frekvensmätare 45-65 Hz
Q1	Leistungsschalter	Disyuntor	Strömbrytare
Q2	Leistungsschalter	Disyuntor	Strömbrytare
R5	Heizelement Kühlmittel	Calentador del refrigerante	Kylvätskevärmare
R6	Heizelement Kühlmittel	Calentador del refrigerante	Kylvätskevärmare
S2b	Notabschaltung	Parada de emergencia	Nödstopp
S4	Voltmeter-Wahlschalter	Selector de voltímetro	Spänningsmätarens kopplingsväljare
S13	Riegelschalter Erdschlußrelais	Interruptor de bloqueo del relé de pérdida a tierra	Avstängningsbrytare för jordfelsrelä
T1-3	Stromwandler	Transformador de corriente	Strömtransformator
T13	Erdschlußanzeiger	Detector de pérdida a tierra	Detektor för jordläckage
U1	Feststehendes Batterieladegerät	Cargador estático de batería	Statisk batteriladdare
X1	Klemmenbrett	Cuadro de bornas	Anslutningsplint
X2	Anschlußdose	Casquillo de toma de corriente	Utloppshylsa
X10	15-poliger Stecker	Conector de 15 polos	15-poligt kontaktdon
X15	10-poliger Stecker	Conector 10-polar	10-poligt kontaktdon
X25	Klemmenleiste	Bloque de terminales	Anslutningslist
X33	Parallelschaltungs-Anschluß zu Schaltkasten (SAPE)	Conector par. a cub. control (SAPE)	Rinnakkaisliitin SAPE-yksikön hallintaan
Sx	Schalter Fernstart/-stop	Interruptor remoto de arranque/parada	Start/stopp fjärrströmbrytare
kx	Anlagenseitiges Schütz	Contactor para instalación	Anläggningsanslutning

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	ITALIANO	NORSK	DANSK
F1-3	Fusibile 4A	Sikring 4A	Sikring 4A
G3	Generator	Generator	Generator
N12	Regolatore di tensione automatico	Automatisk spenningsregulator	Automatisk spændingsregulator
N13	Relè corrente di terra	Jordfeilrelé	Jordfejlstrømsrelæ
P1-3	Amperometro	Amperemeter	Amperemeter
P4	Voltimetro 0-500V	Spenningsmåler 0-500V	Voltmeter 0-500V
P5	Frequenziometro 45-65Hz	Frekvensmåler 45-65Hz	Frekvensmåler 45-65Hz
Q1	Interruttore	Kretsbryter	Afbryder
Q2	Interruttore	Kretsbryter	Afbryder
R5	Riscaldatore del liquido refrigerante	Kjølevæskevarmer	Kølemiddelopvarmer
R6	Riscaldatore del liquido refrigerante	Kjølevæskevarmer	Kølemiddelopvarmer
S2b	Arresto di emergenza	Nødstopp	Nødstop
S4	Interruttore di selezione del voltimetro	Valgbryter for spenningsmåler	Voltmeterets omskifterknap
S13	Interruttore chiusura relé guasto di terra	Avstengingsbryter for jordfeilrelé	Afbryderkontakt til jordfejlstrømsrelæ
T1-3	Transformatore di corrente	Strøm	Strømtransformere
T13	Rilevatore corrente di terra	Jordfeilføler	Jordfejlstrømsdetektor
U1	Carica batteria statica	Statisk batterilader	Statisk batterioplader
X1	Morsettiera	Koplingstavle	Klembrædt
X2	Presa esterna	Utløpshylse	Stikkontakt
X10	Connettore a 15 poli	15-polet kontakt	15-faset kontaktklemme
X15	Connettore a 10 poli	10-polet kontakt	10 -faset kontaktklemme
X25	Morsettiera	Koplingssplint	Klemliste
X33	Connettore in parallelo verso il modulo di comando cubico (SAPE)	Par. kontakt for å kontrollboks (SAPE)	Par. konnektor til kontrolskab (SAPE)
Sx	Interruttore a distanza avvio/arresto	Bryter for fjernstart/-stopp	Kontakt til fjernstyring af start/stop
Kx	Contattore dell'impianto	Anleggskontaktor	Maskinkontaktor

	ΕΛΛΗΝΙΚΑ	PORTUGUÊS	SUOMI
F1-3	Ασφάλεια 4A	Fusível 4A	Varoke 4A
G3	Γεννήτρια	Alternador	Vaihtovirtageneraattori
N12	Αυτόματος ρυθμιστής τάσης	Regulador automático da potência	Automaattinen jännitteensäädin
N13	ρεύματος γείωσης	Relé de detecção de falha de terra	Maavuotorele
P1-3	Αμπερόμετρο	Amperímetro	Ampeerimittari
P4	Βολτόμετρο 0-500V	Voltímetro 0-500V	Volttimittari 0-500V
P5	Μετρητής συχνότητας 45-65Hz	Frequencímetro 45-65Hz	Taajuusmittari 45-65Hz
Q1	Διακόπτης κυκλώματος	Disjuntor	Virrankatkaisin
Q2	Διακόπτης κυκλώματος	Disjuntor	Virrankatkaisin
R5	Θερμαντήρας ψυκτικού	Auqecedor do líquido de arrefecimento	Pysäytyssäätimen vastus
R6	Θερμαντήρας ψυκτικού	Auqecedor do líquido de arrefecimento	Pysäytyssäätimen vastus
S2b	Στοπ έκτακτης ανάγκης	Paragem de emergência	Hätäpysäytys
S4	Διακόπτης επιλογής βολτομέτρου	Comutador selector do voltímetro	Volttimittarin valintakytkin
S13	Διακόπτης αποκλεισμούμετάδοσης λάθους στη γείωση	Interruptor selector do relé de corrente de defeito à terra	Maavuodon tunnistimen sulkukytkin
T1-3	Μετασχηματιστής ρεύματος	Transformador de corrente	Virtamuuntaja
T13	Ανιχνευτής ρεύματος γείωσης	Detector de falha de corrente de terra	Maavuodon tunnistin
U1	Γομωτής στατικής μπαταρίας	Carregador de baterias estático	Kiinteä akkulaturi
X1	Πίνακας ακροδέκτη	Quadro de terminais	Liitäntälevy
X2	ακροδέκτη εξόδου	Tomada de saída	Pistorasia
X10	15-πολικός σύνδεσμος	Ligação em 15 polos	15-napainen liitin
X15	10-πολικός σύνδεσμος	Ligação em 10 polos	10-napainen liitin
X25	Λωρίδα ακροδέκτη	Faixa de terminais	Liitäntärima
X33	Παράλληλη υποδοχή προς θάλαμο ελέγχου (SAPE)	Conector paralelo para cub. De controlo (SAPE)	Rinnakkaisliitin SAPE-yksikön hallintaan
Sx	Τηλεχειριζόμενος διακόπτης εκκίνησης/ανακοπής	Interruptor remoto de arranque/paragem	Kaukokäynnistys-/kaukopysäytyskytkin
Kx	Επαφέας εγκατάστασης	Contactor geral	Laitteiston liitin

9822 0889 04/06
Applicable for QAS338 Gd 2/3V 60Hz RS

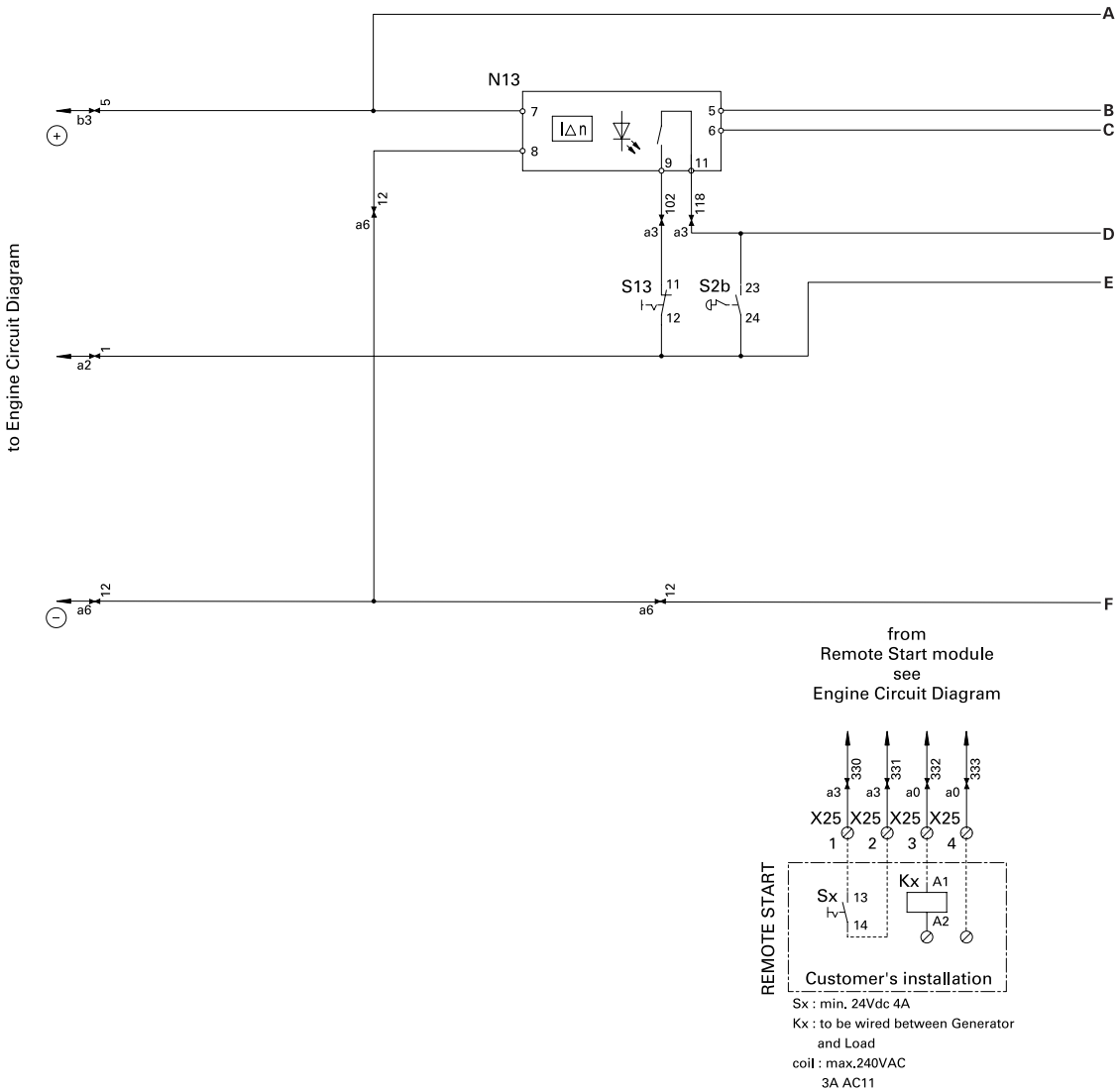
Legend :

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

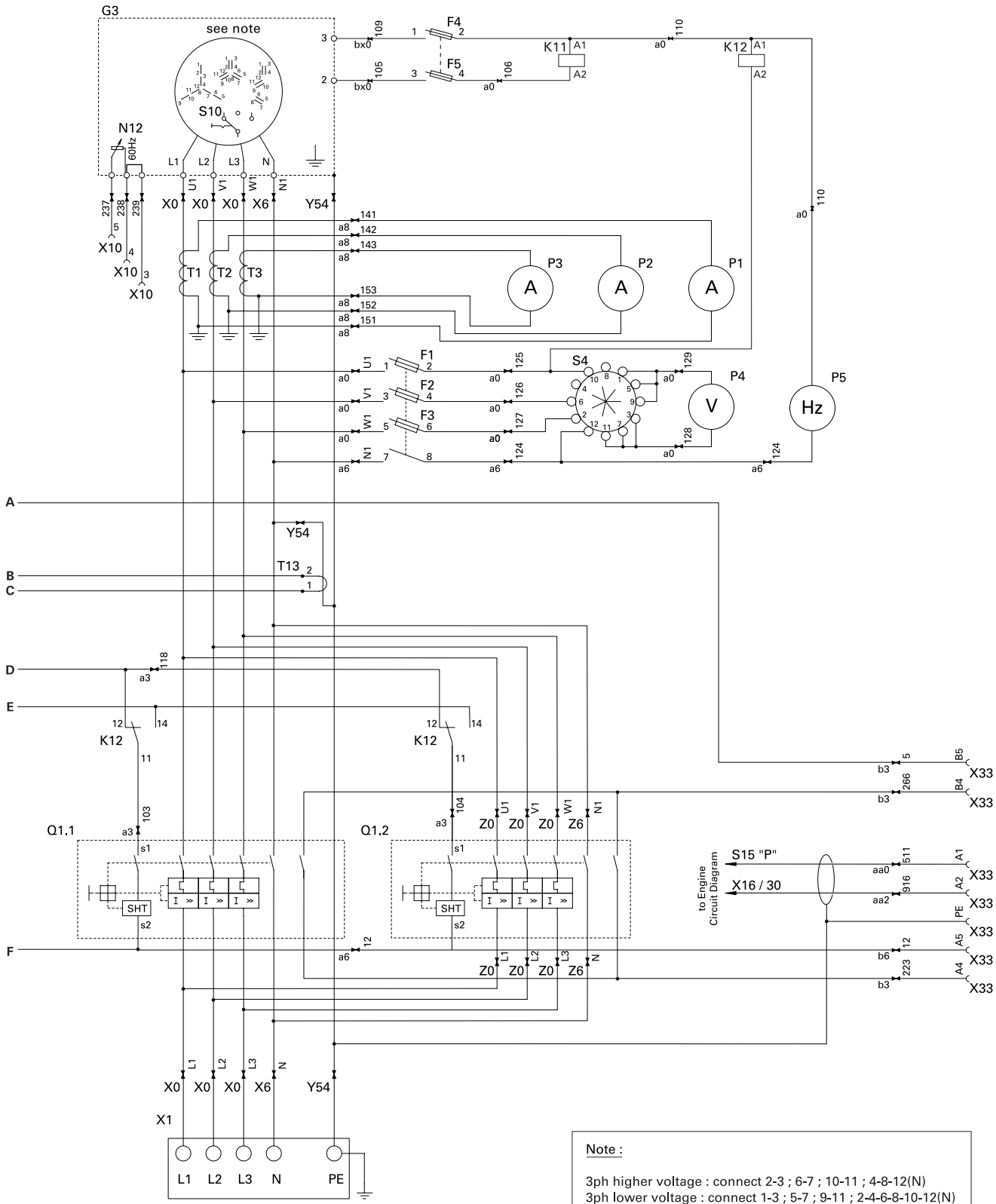
bx = 1.5 mm² NSGAFOeU
lx = 95 mm² EPR-CSP to BS6195 4C
px = 185mm² EPR-CSP to BS6195 4C

	Q1.1	Q1.2	P1	Wire size		
				X	Y	Z
QAS168	471A	235A	0-600A	2x lx	lx	lx
QAS228	628A	314A	0-600A	2x lx	lx	lx
QAS278	757A	379A	0-1000A	2x px	px	px
QAS338	910A	455A	0-1000A	2x px	px	px

I > has to be set at a value between 3.5 and 4 times Ir.



Sx : min. 24Vdc 4A
Kx : to be wired between Generator and Load
coil : max.240VAC 3A AC11



Note :

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
1ph lower voltage : only for box 5.

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	ENGLISH	NEDERLANDS	FRANCAIS
F1-5	Fuse 4A	Zekering 4A	Fusible 4A
G3	Alternator	Alternateur	Groupe électrogène
K11	Auxiliary relay voltage selection (lower voltage)	Bijkomende relais spanningskeuze (lage spanning)	Sélection de tension de relais auxiliaire (tension inférieure)
K12	Auxiliary relay voltage selection (higher voltage)	Bijkomende relais spanningskeuze (hoge spanning)	Sélection de tension de relais auxiliaire (tension supérieure)
N12	Automatic voltage regulator	Automatische spanningsregelaar	Régulateur de tension automatique
N13	Earth fault-current relay	Aardlekrelais	Relais de fuite à la terre
P1-3	Amperemeter	Ampèremeter	Ampèremètre
P4	Voltmeter 0-500V	Voltmeter 0-500V	Voltmètre 0-500V
P5	Frequencymeter 45-65Hz	Frekwentiemeter 45-65Hz	Fréquencemètre 45-65Hz
Q1.1	Circuit breaker	Vermogenschakelaar	Disjoncteur
Q1.2	Circuit breaker	Vermogenschakelaar	Disjoncteur
S2b	Emergency stop	Noodstopknop	Arrêt d'urgence
S4	Voltmeter selector switch	Voltmeter keuzeschakelaar	Sélécteur de voltmètre
S10	Output voltage selector switch	Keuzeschakelaar uitgangsspanning	Sélecteur de tension de sortie
S13	Earth fault relay lock-out switch	Blokkeerschakelaar verliesstroomrelais	Commutateur d'arrêt de relais des défauts à la terre
T1-3	Current transformer	Stroomtransformator	Transformateur de courant
T13	Earth fault-current detector	Aardlekdetector	Détecteur de fuite à la terre
X1	Terminal board	Klemmenbord	Tablette à bornes
X10	15-pole connector	Konnektor, 15 stiften	Connecteur 15 broches
X25	Terminal strip	Klemmenstrook	Barrette de raccordement
X33	Par. connector to control cubicle (SAPE)	Par. connector naar vermogenkast (SAPE)	Connecteur parallèle vers armoire de commande (SAPE)
Sx	Remote start/stop switch	Afstands start-/stopschakelaar	Interrupteur de démarrage/arrêt à distance
Kx	Plant contactor	Installatiecontactor	Contacteur d'installation

	DEUTSCH	ESPAÑOL	SVENSKA
F1-5	Sicherung 4A	Fusible 4A	Säkring 4A
G3	Alternador	Generator	Generatore
K11	Hilfsrelais Spannungswahl (niedrigere Spannung)	Selección de voltaje del relé auxiliar (bajo voltaje)	Väljare för hjälpreläspänning (lägre spänning)
K12	Hilfsrelais Spannungswahl (höhere Spannung)	Selección de voltaje de relé auxiliar (alto voltaje)	Väljare för hjälpreläspänning (högre spänning)
N12	Automatischer Spannungsregler	Regulador automático de voltaje	Automatisk spänningsregulator
N13	Erdschlußrelais	Relé de pérdida a tierra	Relä för jordläckage
P1-3	Amperemeter	Amperímetro	Amperemätare
P4	Voltmeter 0-500 V	Voltímetro 0-500V	Spänningsmätare 0-500V
P5	Frequenzmesser 45-65 Hz	Frecuencímetro 45-65Hz	Frekvensmätare 45-65 Hz
Q1.1	Leistungsschalter	Disyuntor	Strömbrytare
Q1.2	Leistungsschalter	Disyuntor	Strömbrytare
S2b	Notabschaltung	Parada de emergencia	Nödstopp
S4	Voltmeter-Wahlschalter	Selector de voltímetro	Spänningsmätarens kopplingsväljare
S10	Wahlschalter Ausgangsspannung	Uniselector de voltaje de salida	Utspänningens väljaromkopplare
S13	Riegelschalter Erdschlußrelais	Interruptor de bloqueo del relé de pérdida a tierra	Avstängningsbrytare för jordfelsrelä
T1-3	Stromwandler	Transformador de corriente	Strömtransformator
T13	Erdschlußanzeiger	Detector de pérdida a tierra	Detektor för jordläckage
X1	Klemmenbrett	Cuadro de bornas	Anslutningsplint
X10	15-poliger Stecker	Conector de 15 polos	15-poligt kontaktdon
X25	Klemmenleiste	Bloque de terminales	Anslutningslist
X33	Parallelschaltungs-Anschluß zu Schaltkasten (SAPE)	Conector par. a cub. control (SAPE)	Rinnakkaisliitin SAPE-yksikön hallintaan
Sx	Schalter Fernstart/-stop	Interruptor remoto de arranque/parada	Start/stopp fjärrströmbrytare
kx	Anlagenseitiges Schütz	Contactor para instalación	Anläggningsanslutning

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	ITALIANO	NORSK	DANSK
F1-5	Fusibile 4A	Sikring 4A	Sikring 4A
G3	Generator	Generator	Generator
K11	Selezione voltaggio relé ausiliario (voltaggio superiore)	Spenningsvalg for hjelperelé (lavere spenning)	Hjælperelæ for spændingsudsnit (nedre spænding)
K12	Selezione voltaggio relé ausiliario (voltaggio inferiore)	Spenningsvalg for hjelperelé (høyere spenning)	Hjælperelæ for spændingsudsnit (øvre spænding)
N12	Regolatore di tensione automatico	Automatisk spenningsregulator	Automatisk spændingsregulator
N13	Relè corrente di terra	Jordfeilrelé	Jordfejlstrømsrelæ
P1-3	Amperometro	Amperemeter	Amperemeter
P4	Voltimetro 0-500V	Spenningsmåler 0-500V	Voltmeter 0-500V
P5	Frequenziometro 45-65Hz	Frekvensmåler 45-65Hz	Frekvensmåler 45-65Hz
Q1.1	Interruttore	Kretsbryter	Afbryder
Q1.2	Interruttore	Kretsbryter	Afbryder
S2b	Arresto di emergenza	Nødstopp	Nødstop
S4	Interruttore di selezione del voltimetro	Valgbryter for spenningsmåler	Voltmeterets omskifterknap
S10	Interruttore selettore di voltaggio di uscita	Valgbryter for utgangsspenning	Omskifterkontakt til udgangsspænding
S13	Interruttore chiusura relé guasto di terra	Avstengingsbryter for jordfeilrelé	Afbryderkontakt til jordfejlstrømsrelæ
T1-3	Transformatore di corrente	Strøm	Strømtransformere
T13	Rilevatore corrente di terra	Jordfeilføler	Jordfejlstrømsdetektor
X1	Morsettiera	Koplingstavle	Klembrædt
X10	Connettore a 15 poli	15-polet kontakt	15-faset kontaktklemme
X25	Morsettiera	Koplingssplint	Klemliste
X33	Connettore in parallelo verso il modulo di comando cubico (SAPE)	Par. kontakt for å kontrollboks (SAPE)	Par. konnektor til kontrolskab (SAPE)
Sx	Interruttore a distanza avvio/arresto	Bryter for fjernstart/-stopp	Kontakt til fjernstyring af start/stop
Kx	Contattore dell'impianto	Anleggskontaktor	Maskinkontaktor

	ΕΛΛΗΝΙΚΑ	PORTUGUÊS	SUOMI
F1-5	Ασφάλεια 4A	Fusível 4A	Varoke 4A
G3	Γεννήτρια	Alternador	Vaihtovirtageneraattori
K11	Βοηθητική επιλογή τάσης ρελέ (χαμηλότερη τάση)	Relé auxiliar de selecção de voltagem (menor voltagem)	Apureleen jännitteenvalitsin (matalampi jännite)
K12	Βοηθητική επιλογή τάσης ρελέ (υψηλότερη τάση)	Relé auxiliar de selecção de voltagem (maior voltagem)	Apureleen jännitteenvalitsin (korkeampi jännite)
N12	Αυτόματος ρυθμιστής τάσης	Regulador automático da potência	Automaattinen jännitteensäädin
N13	ρεύματος γείωσης	Relé de detecção de falha de terra	Maavuotorele
P1-3	Αμπερόμετρο	Amperímetro	Ampeerimittari
P4	Βολτόμετρο 0-500V	Voltímetro 0-500V	Volttimittari 0-500V
P5	Μετρητής συχνότητας 45-65Hz	Frequencímetro 45-65Hz	Taajuusmittari 45-65Hz
Q1.1	Διακόπτης κυκλώματος	Disjuntor	Virrankatkaisin
Q1.2	Διακόπτης κυκλώματος	Disjuntor	Virrankatkaisin
S2b	Στοπ έκτακτης ανάγκης	Paragem de emergência	Hätäpysäytys
S4	Διακόπτης επιλογής βολτομέτρου	Comutador selector do voltímetro	Volttimittarin valintakytkin
S10	Διακόπτης επιλογής τάσης εξόδου	Interruptor selector de voltagem de saída	Lähtöjännitteen valintakytkin
S13	Διακόπτης αποκλεισμούμετάδοσης λάθους στη γείωση	Interruptor selector do relé de corrente de defeito à terra	Maavuodon tunnistimen sulkukytkin
T1-3	Μετασχηματιστής ρεύματος	Transformador de corrente	Virtamuuntaja
T13	Ανιχνευτής ρεύματος γείωσης	Detector de falha de corrente de terra	Maavuodon tunnistin
X10	15-πολικός σύνδεσμος	Ligação em 15 polos	15-napainen liitin
X1	Πίνακας ακροδέκτη	Quadro de terminais	Liitäntälevy
X25	Λωρίδα ακροδέκτη	Faixa de terminais	Liitäntärima
X33	Παράλληλη υποδοχή προς θάλαμο ελέγχου (SAPE)	Conector paralelo para cub. De controlo (SAPE)	Rinnakkaisliitin SAPE-yksikön hallintaan
Sx	Τηλεχειριζόμενος διακόπτης εκκίνησης/ανακοπής	Interruptor remoto de arranque/paragem	Kaukokäynnistys-/kaukopysäytyskytkin
Kx	Επαφέας εγκατάστασης	Contactor geral	Laitteiston liitin

9822 0889 10/04
Applicable for QAS338 Gd LV 50Hz RS (AMF)

Legend :

Wire size :

aa = 0.5mm²
a = 1 mm²
b = 1.5mm²
c = 2.5mm²
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 = 1.5mm² NSGAFOeU
lx = 95 mm² EPR-CSP to BS6195 4C
px = 185 mm² EPR-CSP to BS6195 4C

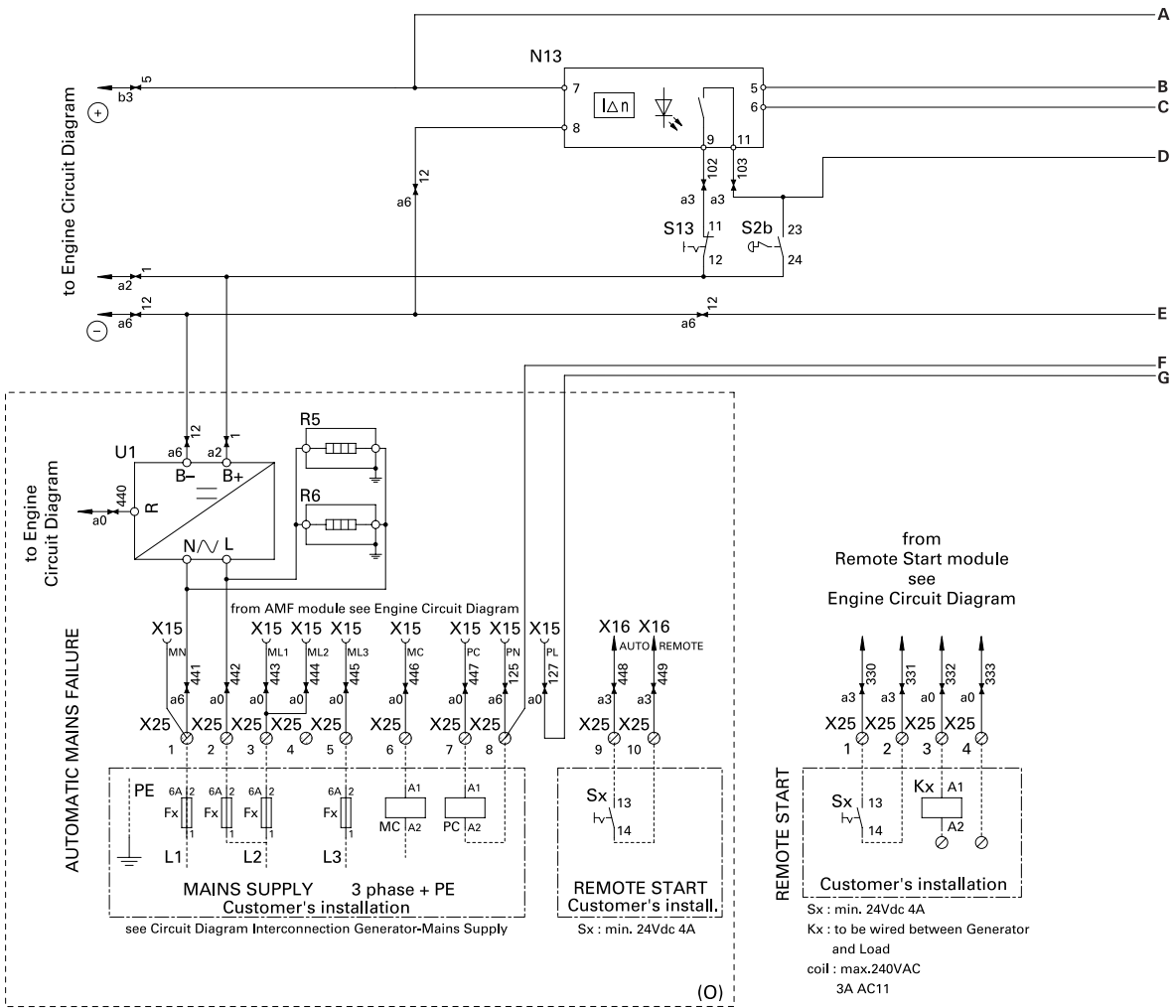
Colour code :

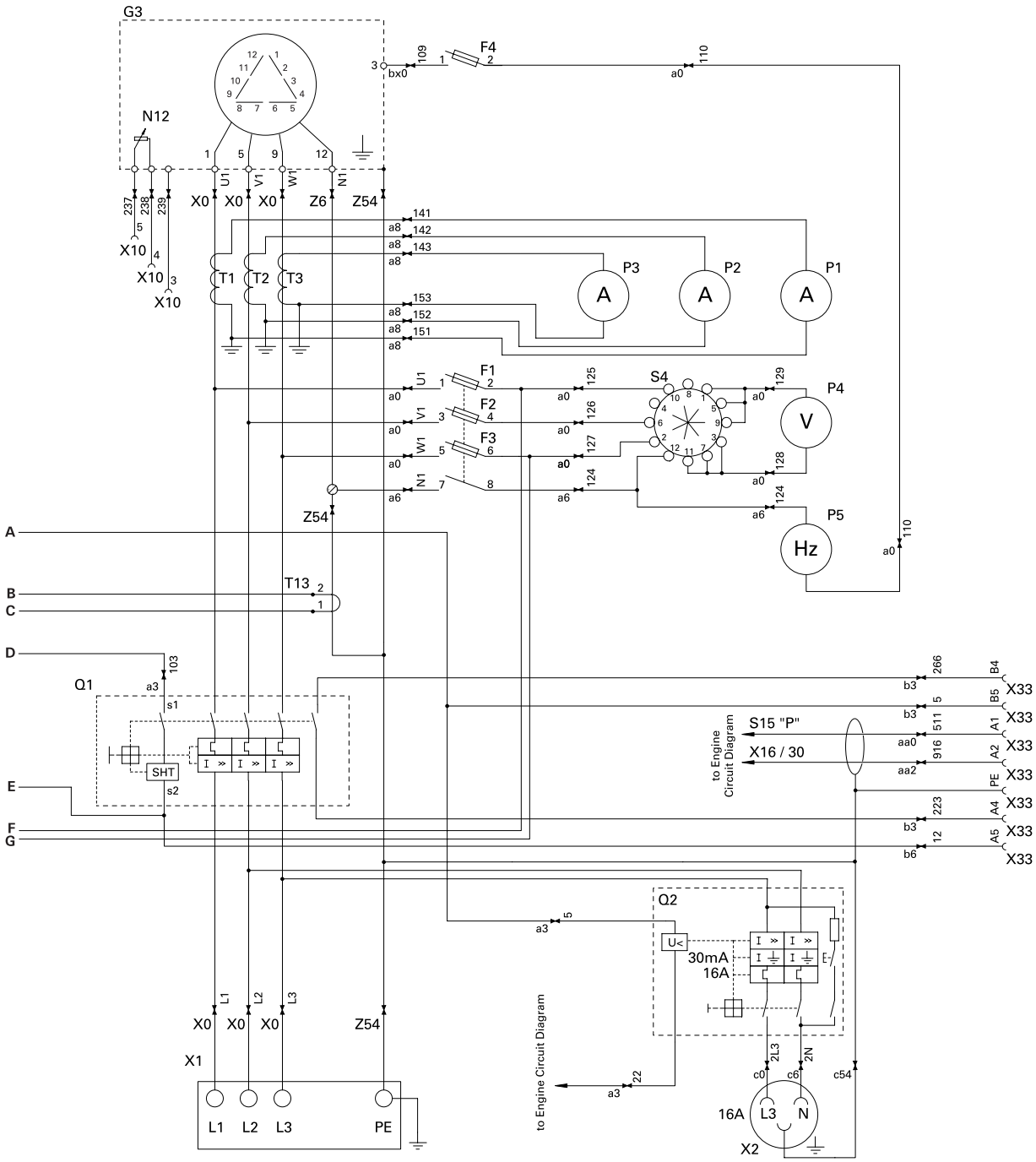
0 = black
1 = brown
2 = red
3 = orange
4 = yellow
5 = green
6 = blue
7 = purple
8 = grey
9 = white
54 = green/yellow

	Q1	T1-3	P1-3	Wire size	
				X	Z
QAS168 LV	375A	600/5A	0-600A	2x l	l
QAS228 LV	500A	600/5A	0-600A	2x lx	lx
QAS278 LV	626A	600/5A	0-600A	2x lx	lx
QAS338 LV	753A	1000/5A	0-1000A	2x px	px

I > has to be set at a value between 3.5 and 4 times Ir.

(O): OPTIONAL EQUIPMENT




G3
N12
F4
F1
F2
F3
S4
P1
P2
P3
P4
P5
T1
T2
T3
T13
Q1
Q2
SHT
S15 "P"
X16 / 30
to Engine Circuit Diagram
30mA
16A
X1
X2
L1
L2
L3
PE
N
X33

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	ENGLISH	NEDERLANDS	FRANCAIS
F1-4	Fuse 4A	Zekering 4A	Fusible 4A
G3	Alternator	Alternateur	Groupe électrogène
N12	Automatic voltage regulator	Automatische spanningsregelaar	Régulateur de tension automatique
N13	Earth fault-current relay	Aardlekrelais	Relais de fuite à la terre
P1-3	Amperemeter	Ampèremeter	Ampèremètre
P4	Voltmeter 0-500V	Voltmeter 0-500V	Voltmètre 0-500V
P5	Frequencymeter 45-65Hz	Frekwentiemeter 45-65Hz	Fréquencemètre 45-65Hz
Q1	Circuit breaker	Vermogenschakelaar	Disjoncteur
Q2	Circuit breaker	Vermogenschakelaar	Disjoncteur
R5	Coolant heater	Verwarmer koelvloeistof	Réchauffeur de réfrigérant du moteur
R6	Coolant heater	Verwarmer koelvloeistof	Réchauffeur de réfrigérant du moteur
S2b	Emergency stop	Noodstopknop	Arrêt d'urgence
S4	Voltmeter selector switch	Voltmeter keuzeschakelaar	Sélécteur de voltmètre
S13	Earth fault relay lock-out switch	Blokkeerschakelaar verliesstroomrelais	Commutateur d'arrêt de relais des défauts à la terre
T1-3	Current transformer	Stroomtransformator	Transformateur de courant
T13	Earth fault-current detector	Aardlekdetector	Détecteur de fuite à la terre
U1	Static battery charger	Statische batterijlader	Chargeur de batterie statique
X1	Terminal board	Klemmenbord	Tablette à bornes
X2	Outlet socket	Uitlaatpunt	Prise femelle
X10	15-pole connector	Konnektor, 15 stiften	Connecteur 15 broches
X15	10-pole connector	Konnektor, 10 stiften	Connecteur 10 broches
X25	Terminal strip	Klemmenstrook	Barrette de raccordement
X33	Par. connector to control cubicle (SAPE)	Par. connector naar vermogenkast (SAPE)	Connecteur parallèle vers armoire de commande (SAPE)
Sx	Remote start/stop switch	Afstands start-/stopschakelaar	Interrupteur de démarrage/arrêt à distance
Kx	Plant contactor	Installatiecontactor	Contacteur d'installation

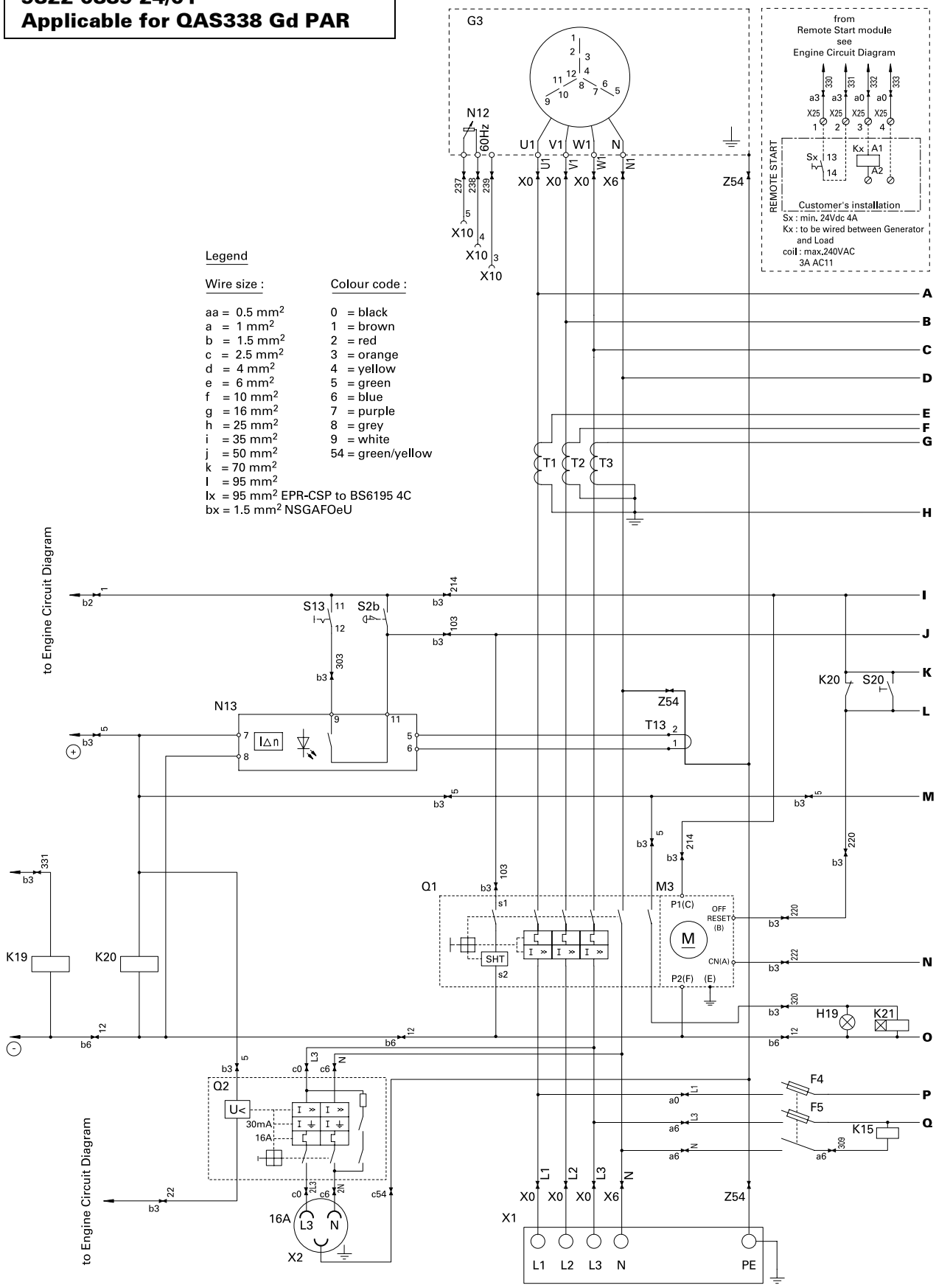
	DEUTSCH	ESPAÑOL	SVENSKA
F1-4	Sicherung 4A	Fusible 4A	Säkring 4A
G3	Alternador	Generator	Generatore
N12	Automatischer Spannungsregler	Regulador automático de voltaje	Automatisk spänningsregulator
N13	Erdschlußrelais	Relé de pérdida a tierra	Relä för jordläckage
P1-3	Amperemeter	Amperímetro	Amperemätare
P4	Voltmeter 0-500 V	Voltímetro 0-500V	Spänningsmätare 0-500V
P5	Frequenzmesser 45-65 Hz	Frecuencímetro 45-65Hz	Frekvensmätare 45-65 Hz
Q1	Leistungsschalter	Disyuntor	Strömbrytare
Q2	Leistungsschalter	Disyuntor	Strömbrytare
R5	Heizelement Kühlmittel	Calentador del refrigerante	Kylvätskevärmare
R6	Heizelement Kühlmittel	Calentador del refrigerante	Kylvätskevärmare
S2b	Notabschaltung	Parada de emergencia	Nödstopp
S4	Voltmeter-Wahlschalter	Selector de voltímetro	Spänningsmätarens kopplingsväljare
S13	Riegelschalter Erdschlußrelais	Interruptor de bloqueo del relé de pérdida a tierra	Avstängningsbrytare för jordfelsrelä
T1-3	Stromwandler	Transformador de corriente	Strömtransformator
T13	Erdschlußanzeiger	Detector de pérdida a tierra	Detektor för jordläckage
U1	Feststehendes Batterieladegerät	Cargador estático de batería	Statisk batteriladdare
X1	Klemmenbrett	Cuadro de bornas	Anslutningsplint
X2	Anschlußdose	Casquillo de toma de corriente	Utloppshylsa
X10	15-poliger Stecker	Conector de 15 polos	15-poligt kontaktdon
X15	10-poliger Stecker	Conector de 10 polos	10-poligt kontaktdon
X25	Klemmenleiste	Bloque de terminales	Anslutningslist
X33	Parallelschaltungs-Anschluß zu Schaltkasten (SAPE)	Conector par. a cub. control (SAPE)	Rinnakkaisliitin SAPE-yksikön hallintaan
Sx	Schalter Fernstart/-stop	Interruptor remoto de arranque/parada	Start/stopp fjärrströmbrytare
kx	Anlagenseitiges Schütz	Contactor para instalación	Anläggningsanslutning

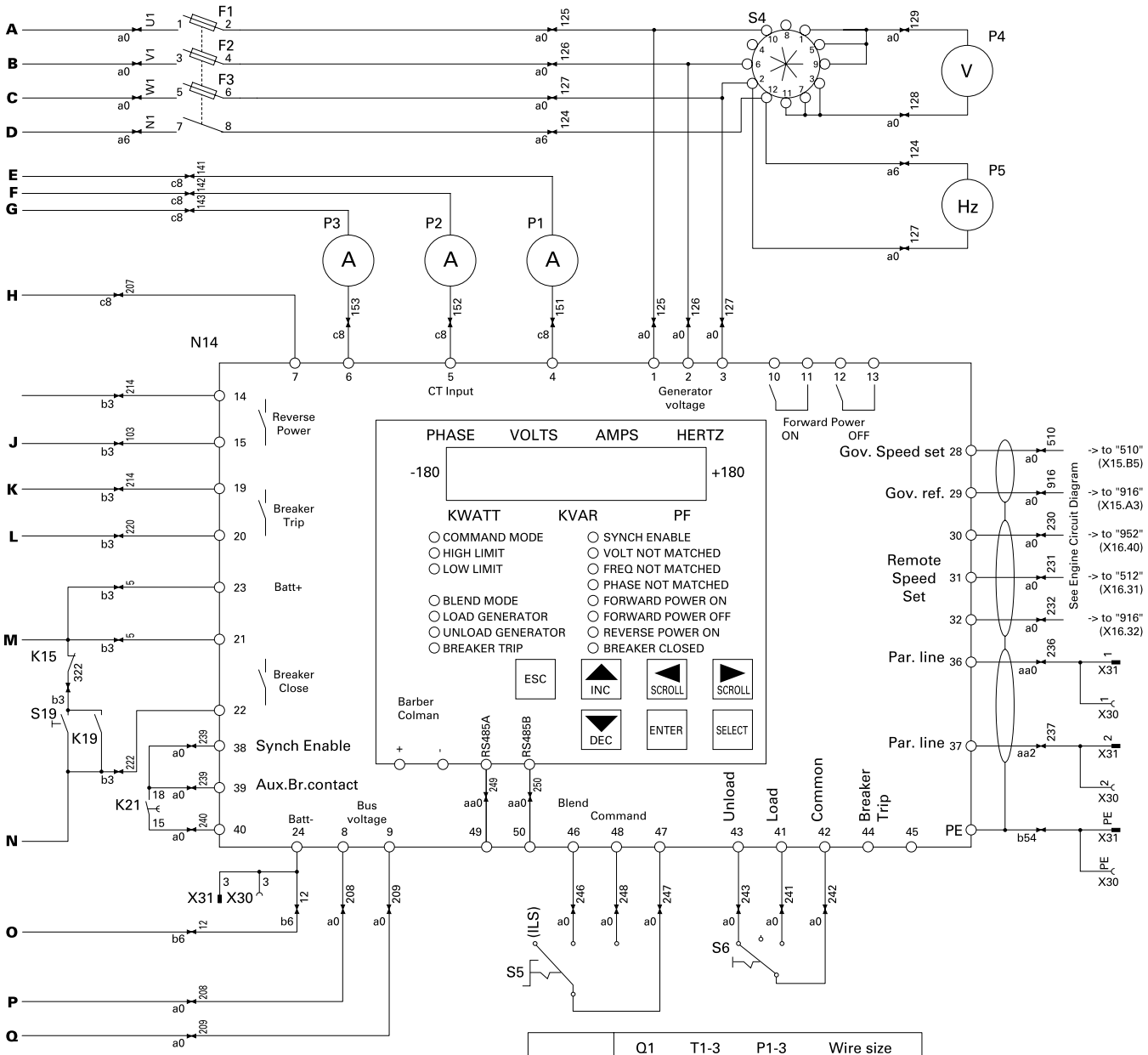
9822 0889 10/04

	ITALIANO	NORSK	DANSK
F1-4	Fusibile 4A	Sikring 4A	Sikring 4A
G3	Generator	Generator	Generator
N12	Regolatore di tensione automatico	Automatisk spenningsregulator	Automatisk spændingsregulator
N13	Relè corrente di terra	Jordfeilrelé	Jordfejlstrømsrelæ
P1-3	Amperometro	Amperemeter	Amperemeter
P4	Voltimetro 0-500V	Spenningsmåler 0-500V	Voltmeter 0-500V
P5	Frequenziometro 45-65Hz	Frekvensmåler 45-65Hz	Frekvensmåler 45-65Hz
Q1	Interruttore	Kretsbryter	Afbryder
Q2	Interruttore	Kretsbryter	Afbryder
R5	Riscaldatore del liquido refrigerante	Kjølevæskevarmer	Kølemiddelopvarmer
R6	Riscaldatore del liquido refrigerante	Kjølevæskevarmer	Kølemiddelopvarmer
S2b	Arresto di emergenza	Nødstopp	Nødstop
S4	Interruttore di selezione del voltimetro	Valgbryter for spenningsmåler	Voltmeterets omskifterknap
S13	Interruttore chiusura relé guasto di terra	Avstengingsbryter for jordfeilrelé	Afbryderkontakt til jordfejlstrømsrelæ
T1-3	Transformatore di corrente	Strøm	Strømtransformere
T13	Rilevatore corrente di terra	Jordfeilføler	Jordfejlstrømsdetektor
U1	Carica batteria statica	Statisk batterilader	Statisk batterioplader
X1	Morsettiera	Koplingstavle	Klembrædt
X2	Presa esterna	Utløpshylse	Stikkontakt
X10	Connettore a 15 poli	15-polet kontakt	15-faset kontaktklemme
X15	Connettore a 10 poli	10-polet kontakt	10-faset kontaktklemme
X25	Morsettiera	Koplingssplint	Klemliste
X33	Connettore in parallelo verso il modulo di comando cubico (SAPE)	Par. kontakt for å kontrollboks (SAPE)	Par. konnektor til kontrolskab (SAPE)
Sx	Interruttore a distanza avvio/arresto	Bryter for fjernstart/-stopp	Kontakt til fjernstyring af start/stop
Kx	Contattore dell'impianto	Anleggskontaktor	Maskinkontaktor

	ΕΛΛΗΝΙΚΑ	PORTUGUÊS	SUOMI
F1-4	Ασφάλεια 4Α	Fusível 4A	Varoke 4A
G3	Γεννήτρια	Alternador	Vaihtovirtageneraattori
N12	Αυτόματος ρυθμιστής τάσης	Regulador automático da potência	Automaattinen jännitteensäädin
N13	ρεύματος γείωσης	Relé de detecção de falha de terra	Maavuotorele
P1-3	Αμπερόμετρο	Amperímetro	Ampeerimittari
P4	Βολτόμετρο 0-500V	Voltímetro 0-500V	Volttimittari 0-500V
P5	Μετρητής συχνότητας 45-65Hz	Frequencímetro 45-65Hz	Taajuusmittari 45-65Hz
Q1	Διακόπτης κυκλώματος	Disjuntor	Virrankatkaisin
Q2	Διακόπτης κυκλώματος	Disjuntor	Virrankatkaisin
R5	Θερμαντήρας ψυκτικού	Auqecedor do líquido de arrefecimento	Pysäytyssäätimen vastus
R6	Θερμαντήρας ψυκτικού	Auqecedor do líquido de arrefecimento	Pysäytyssäätimen vastus
S2b	Στοπ έκτακτης ανάγκης	Paragem de emergência	Hätäpysäytys
S4	Διακόπτης επιλογής βολτομέτρου	Comutador selector do voltímetro	Volttimittarin valintakytkin
S13	Διακόπτης αποκλεισμούμετάδοσης λάθους στη γείωση	Interruptor selector do relé de corrente de defeito à terra	Maavuodon tunnistimen sulkukytkin
T1-3	Μετασχηματιστής ρεύματος	Transformador de corrente	Virtamuuntaja
T13	Ανιχνευτής ρεύματος γείωσης	Detector de falha de corrente de terra	Maavuodon tunnistin
U1	Γομωτής στατικής μπαταρίας	Carregador de baterias estático	Kiinteä akkulaturi
X1	Πίνακας ακροδέκτη	Quadro de terminais	Liitäntälevy
X2	Ακροδέκτη εξόδου	Tomada de saída	Pistorasia
X10	15-πολικός σύνδεσμος	Ligação em 15 polos	15-napainen liitin
X15	10-πολικός σύνδεσμος	Ligação em 10 polos	10-napainen liitin
X25	Λωρίδα ακροδέκτη	Faixa de terminais	Liitäntärima
X33	Παράλληλη υποδοχή προς θάλαμο ελέγχου (SAPE)	Conector paralelo para cub. De controlo (SAPE)	Rinnakkaisliitin SAPE-yksikön hallintaan
Sx	Τηλεχειριζόμενος διακόπτης εκκίνησης/ανακοπής	Interruptor remoto de arranque/paragem	Kaukokäynnistys-/kaukopysäytyskytkin
Kx	Επαφέας εγκατάστασης	Contactor geral	Laitteiston liitin

9822 0889 24/01
Applicable for QAS338 Gd PAR





	Q1	T1-3	P1-3	Wire size	
				X	Z
QAS168	216A	300/5A	0-300A	2x i	i
QAS228	290A	300/5A	0-300A	2x k	k
QAS278	360A	600/5A	0-600A	2x I	I
QAS338	433A	600/5A	0-600A	2x Ix	I

I> has to be set at a value between 3.5 and 4 times Ir.

9822 0889 24/01

	ENGLISH	NEDERLANDS	FRANCAIS
F1-5	Fuse 4A	Zekering 4A	Fusible 4A
F6	Fuse 6A	Zekering 6A	Fusible 6A
G3	Alternator	Alternateur	Groupe électrogène
H19	Lamp breaker closed	Lamp stroomonderbreker gesloten	Lampe Disjoncteur fermé
K15	Relay bus voltage	Relais busspanning	Relais tension bus
K19	Relay breaker close on remote start	Relais sluiten stroomonderbreker bij start op afstand	Relais Disjoncteur fermé lors d'un démarrage à distance
K20	Relay breaker off/reset	Relais stroomonderbreker off/reset	Relais Disjoncteur fermé/remise à zéro
K21	Timer relay (set at 2 sec.)	Tijdrelais (ingesteld op 2 s)	Temporisateur relais (réglé sur 2 sec.)
M3	Motor drive for Q1	Motoraandrijving voor Q1	Entraînement moteur pour Q1
N12	Automatic voltage regulator	Automatische spanningsregelaar	Régulateur de tension automatique
N13	Earth fault-current relay	Aardlekrelais	Relais de fuite à la terre
N14	Paralleling module	Parallelschakelingsmodule	Module de mise en parallèle
P1-3	Amperemeter	Ampèremeter	Ampèremètre
P4	Voltmeter 0-500V	Voltmeter 0-500V	Voltmètre 0-500V
P5	Frequencymeter 45-65Hz	Frekwentiemeter 45-65Hz	Fréquencemètre 45-65Hz
Q1	Circuit breaker 4 pole	Vermogenschakelaar 4-polig	Disjoncteur 4 pôles
Q2	Circuit breaker 16A 2 pole	Vermogenschakelaar 16A 2-polig	Disjoncteur 16A 4 pôles
S2b	Emergency stop	Noodstopknop	Arrêt d'urgence
S4	Voltmeter change-over switch	Voltmeterkeuzeschakelaar	Commutateur voltmètre
S5	Selector switch ILS/Blend/Command	Keuzeschakelaar ILS/Mengen/Opleggen	Sélecteur PCI/Mélange/Commande
S6	Selector switch load/unload	Keuzeschakelaar Ontlasten/Belasten	Sélecteur Décharge/Charge
S13	Earth fault relay lock-out swich	Blokkeerschakelaar verliesstroomrelais	Commutateur d'arrêt de relais des défauts à la terre
S19	'Breaker close'push button	Drukknop "Stroomonderbreker sluiten"	Bouton poussoir "Disjoncteur fermé"
S20	'Breaker trip' push button	Drukknop "Stroomonderbreker openen"	Bouton poussoir "Déclenchement disjoncteur"
T1-3	Current transformer	Stroomtransformator	Transformateur de courant
T13	Earth fault transformer	Aardlekdetector	Détecteur de fuite à la terre
X1	Terminal board	Klemmenbord	Tablette à bornes
X2	Socket outlet	Uitlaatpunt	Prise femelle
X10	15-pole connector	Konnektor, 15 stiften	Connecteur 15 broches
X25	Terminal strip 4 pole	Klemmenstrook 4 stiften	Barrette de raccordement 4 broches
X30-31	4 pole connector for par. lines	4-polige connector voor par. lijnen	Connecteur 4 pôles pour lignes parallèles
Sx	Remote start/stop switch	Afstands start-/stopschakelaar	Interrupteur de démarrage/arrêt à distance
Kx	Plant contactor	Installatiecontactor	Contacteur d'installation

	DEUTSCH	ESPAÑOL	SVENSKA
F1-5	Sicherung 4A	Fusible 4A	Säkring 4A
F6	Sicherung 6A	Fusible 6A	Säkring 6A
G3	Alternador	Generator	Generatore
H19	Leistungsschalter Lampe geschlossen	Disyuntor de lámpara cerrado	Lampa - Brytaren stängd
K15	Relais-Busspannung	Voltaje de bus de relé	Relä - Ledningsspänning
K19	Leistungsschalter Relais bei Fernstart schließen	Cierre de disyuntor de relé en arranque remoto	Avstängningsrelä för fjärrstyrning
K20	Leistungsschalter Relais Aus/Rücksetzen	Desactivación/Reinicio de disyuntor de relé	Relä - Brytare av/nollställ
K21	Zeitrelais (eingestellt auf 2 Sek.)	Relé de temporizador (ajustado a 2 seg.)	Timerrelä (inställd för 2 sek)
M3	Motorantrieb für Q1	Motor para Q1	Motordrivning för Q1
N12	Automatischer Spannungsregler	Regulador automático de voltaje	Automatisk spänningsregulator
N13	Erdschlußrelais	Relé de pérdida a tierra	Relä för jordläckage
N14	Parallelschaltungs-Modul	Módulo para el funcionamiento en paralelo	Parallellstyrningsmodul
P1-3	Amperemeter	Amperímetro	Amperemätare
P4	Voltmeter 0-500 V	Voltímetro 0-500V	Spänningsmätare 0-500V
P5	Frequenzmesser 45-65 Hz	Frecuencímetro 45-65Hz	Frekvensmätare 45-65 Hz
Q1	Leistungsschalter 4 polig	Disyuntor 4-polar	Strömbrytare 4-polig
Q2	Leistungsschalter 16A/2 polig	Disyuntor 16A/2-polar	Strömbrytare 16A/2-polig
S2b	Notabschaltung	Parada de emergencia	Nödstopp
S4	Voltmeter-Wahlschalter	Selector de voltímetro	Spänningsmätarens kopplingsväljare
S5	Wahlschalter IBT/Abgleich/Regelung	Selector ILS/Combinación/Control	Väljare - ILS/Blend/Command (ILS/Blandning/Aktivering)
S6	Wahlschalter Entlasten/Belasten	Selector de Descarga/Carga	Väljare - Unload/Load (Avlastning/Pålastning)
S13	Riegelschalter Erdschlußrelais	Interruptor de bloqueo del relé de pérdida a tierra	Avstängningsbrytare för jordfelsrelä
S19	Taste "Leistungsschalter schließen"	Pulsador de "Cierre de disyuntor"	Knapp - "Stäng brytare"
S20	Taste "Leistungsschalter auslösen"	Pulsador de "Disparo del disyuntor"	Knapp - "Brytarens utlösningsnivå"
T1-3	Stromwandler	Transformador de corriente	Strömtransformator
T13	Erdschlußanzeiger	Detector de pérdida a tierra	Detektor för jordläckage
X1	Klemmenbrett	Cuadro de bornas	Anslutningsplint
X2	Anschlußdose	Casquillo de toma de corriente	Utloppshylsa
X10	15-poliger Stecker	Conector de 15 polos	15-poligt kontaktdon
X25	Klemmenleiste	Bloque de terminales	Anslutningslist
X30-31	Vierpoliger Anschluß für Parallelschaltungsleitungen	Conector de 4 polos para líneas par.	4-poligt kopplingsdon för parallellledningar
Sx	Schalter Fernstart/-stop	Interruptor remoto de arranque/parada	Start/stopp fjärrströmbrytare
kx	Anlagenseitiges Schütz	Contactor para instalación	Anläggningsanslutning

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	ITALIANO	NORSK	DANSK
F1-5	Fusibile 4A	Sikring 4A	Sikring 4A
F6	Fusibile 6A	Sikring 6A	Sikring 6A
G3	Generator	Generator	Generator
H19	Spia Tagliacircuito chiuso	Lampe for lukket krets	Lampeafbryder lukket
K15	Relé tensione bus	Koplingsspenning hjelperelé	Relæ busspænding
K19	Relé Tagliacircuito chiuso sull' avviamento a distanza	Bryter for lukket hjelperelé ved ekstern start	Relæ afbryder lukket ved fjernstart
K20	Relé Tagliacircuito off/reset	Bryter for hjelperelé av/tilbakestill	Relæ afbryder fra/nulstilling
K21	Relé del Timer (impostato su 2 sec.)	Tidsrelé (settes til 2 sek.)	Timerrelæ (indstillet til 2 sek.)
M3	Motore per Q1	Motordrift for Q1	Motordrev for Q1
N12	Regolatore di tensione automatico	Automatisk spenningsregulator	Automatisk spændingsregulator
N13	Relè corrente di terra	Jordfeilrelé	Jordfejlstrømsrelæ
N14	Modulo di messa in parallelo	Modul for parallellkopling	Paralleliseringsmodul
P1-3	Amperometro	Amperemeter	Amperemeter
P4	Voltimetro 0-500V	Spenningsmåler 0-500V	Voltmeter 0-500V
P5	Frequenziometro 45-65Hz	Frekvensmåler 45-65Hz	Frekvensmåler 45-65Hz
Q1	Interruttore 4 poli	Kretsbryter 4-polet	Afbryder 4-polig
Q2	Interruttore 16A/2 poli	Kretsbryter 16 A/2-polet	Afbryder 16A/2-polig
S4	Cambiamento voltimetro sull'interruttore	Omkoplingsbryter for voltmeter	Voltmeter ændringskontakt
S2b	Arresto di emergenza	Nødstopp	Nødstop
S5	Interruttore di selezione ILS/Mescolanza/Comando	Bryter for isokron fordeling av belastning / gradvis blanding / kommando	Omskifter ILS/bland/kommando
S6	Interruttore di selezione Scarica/carica	Bryter for avlastning/belastning	Omskifter aflast/belast
S13	Interruttore chiusura relé guasto di terra	Avstengingsbryter for jordfeilrelé	Afbryderkontakt til jordfejlstrømsrelæ
S19	Pulsante a pressione " Tagliacircuito chiuso"	Trykknapp for "lukket bryter"	Trykknap "Luk afbryder"
S20	Pulsante a pressione "Scatto Tagliacircuito"	Trykknapp for "utløsning av bryter"	Trykknap "Afbryder udløst"
T1-3	Transformatore di corrente	Strøm	Strømtransformere
T13	Rilevatore corrente di terra	Jordfeilføler	Jordfejlstrømsdetektor
X1	Morsettiera	Koplingstavle	Klembrædt
X2	Presa esterna	Utløpshylse	Stikkontakt
X10	Connettore a 15 poli	15-polet kontakt	15-faset kontaktklemme
X25	Morsettiera	Koplingssplint	Klemliste
X30-31	Connettore quadripolare per linee in parallelo	4-polet kontakt for par. linjer	4-polet konnektor for par. linier
Sx	Interruttore a distanza avvio/arresto	Bryter for fjernstart/-stopp	Kontakt til fjernstyring af start/stop
Kx	Contattore dell'impianto	Anleggskontaktor	Maskinkontaktor

	ΕΛΛΗΝΙΚΑ	PORTUGUÊS	SUOMI
F1-5	Ασφάλεια 4A	Fusível 4A	Varoke 4A
F6	Ασφάλεια 6A	Fusível 6A	Varoke 6A
G3	Γεννήτρια	Alternador	Vaihtovirtageneraattori
H19	Διακόπτης λυχνίας κλειστός	Lâmpada de circuito fechado	Lampun katkaisin kiinni
K15	Τάση διαύλου ρελέ	Tensão Bus auxiliar	Releväylän jännite
K19	Κλείσιμο διακόπτη ρελέ με απομακρυσμένη έναρξη	Circuito auxiliar fechado no arranque remoto	Relekatkaisin kiinni etäkäynnistyksessä
K20	Απενεργοποίηση/επαναφορά διακόπτη ρελέ	Circuito auxiliar desligado/reset	Relekatkaisin pois päältä/nollattu
K21	Ρελέ χρονοδιακόπτη (ρυθμισμένο στα 2 δευτ.)	Cronómetro auxiliar (ajustado para 2 seg.)	Ajastinrele (asetettu 2 sek.)
M3	Κινητήρας του Q1	Motor de circulação para Q1	Moottorin voimansiirto Q1:lle
N12	Αυτόματος ρυθμιστής τάσης	Regulador automático da potência	Automaattinen jännitteensäädin
N13	ρεύματος γείωσης	Relé de detecção de falha de terra	Maavuotorele
N14	Μονάδα παραλληλισμού	Módulo de sincronização	Rinnakkaismoduuli
P1-3	Αμπερόμετρο	Amperímetro	Ampeerimittari
P4	Βολτόμετρο 0-500V	Voltímetro 0-500V	Volttimittari 0-500V
P5	Μετρητής συχνότητας 45-65Hz	Frequencímetro 45-65Hz	Taajuusmittari 45-65Hz
Q1	Διακόπτης κυκλώματος 4πολικός	Disjuntor 4-polar	Virrankatkaisin 4-napainen
Q2	Διακόπτης κυκλώματος 16A - 2πολικός	Disjuntor 16A/2-polar	Virrankatkaisin 16 A/2-napainen
S2b	Στοπ έκτακτης ανάγκης	Paragem de emergência	Hätäpysäytys
S4	Διακόπτης εναλλαγής βολτομέτρου	Interruptor de alteração de tensão	Jännitemittarin vaihtokytkin
S5	Διακόπτης επιλογής ILS/Ανάμιξης/Εντολής	Interruptor de selecção ILS/Junção/Comando	Valintakytkin ILS/Blend/Command
S6	Διακόπτης επιλογής Εκφόρτωσης/Φόρτωσης	Interruptor de selecção Descarga/Carga	Valintakytkin load/unload
S13	Διακόπτης αποκλεισμούμετάδοσης λάθους στη γείωση	Interruptor selector do relé de corrente de defeito à terra	Maavuodon tunnistimen sulkukytkin
S19	Κουμπί "Breaker Close" (Κλείσιμο διακόπτη)	Botão "Breaker Close"	"Virrankatkaisin kiinni" -painike
S20	Κουμπί "Breaker Trip" (Βραχυκύκλωση διακόπτη)	Botão "Breaker Trip"	"Laukaise virrankatkaisin " -painike
T1-3	Μετασχηματιστής ρεύματος	Transformador de corrente	Virtamuuntaja
T13	Ανιχνευτής ρεύματος γείωσης	Detector de falha de corrente de terra	Maavuodon tunnistin
X1	Πίνακας ακροδέκτη	Quadro de terminais	Liitäntälevy
X2	Ακροδέκτη εξόδου	Tomada de saída	Pistorasia
X10	15-πολικός σύνδεσμος	Ligação em 15 polos	15-napainen liitin
X25	Λωρίδα ακροδέκτη	Faixa de terminais	Liitäntärima
X30-31	4πολική υποδοχή για παράλληλες γραμμές	Conector de 4 pólos para linhas paralelas	4-napainen liitin rinnakkaislinjoille
Sx	Τηλεχειριζόμενος διακόπτης εκκίνησης/ανακοπής	Interruptor remoto de arranque/paragem	Kaukokäynnistys-/kaukopysäytyskytkin
Kx	Επαφέας εγκατάστασης	Contactor geral	Laitteiston liitin

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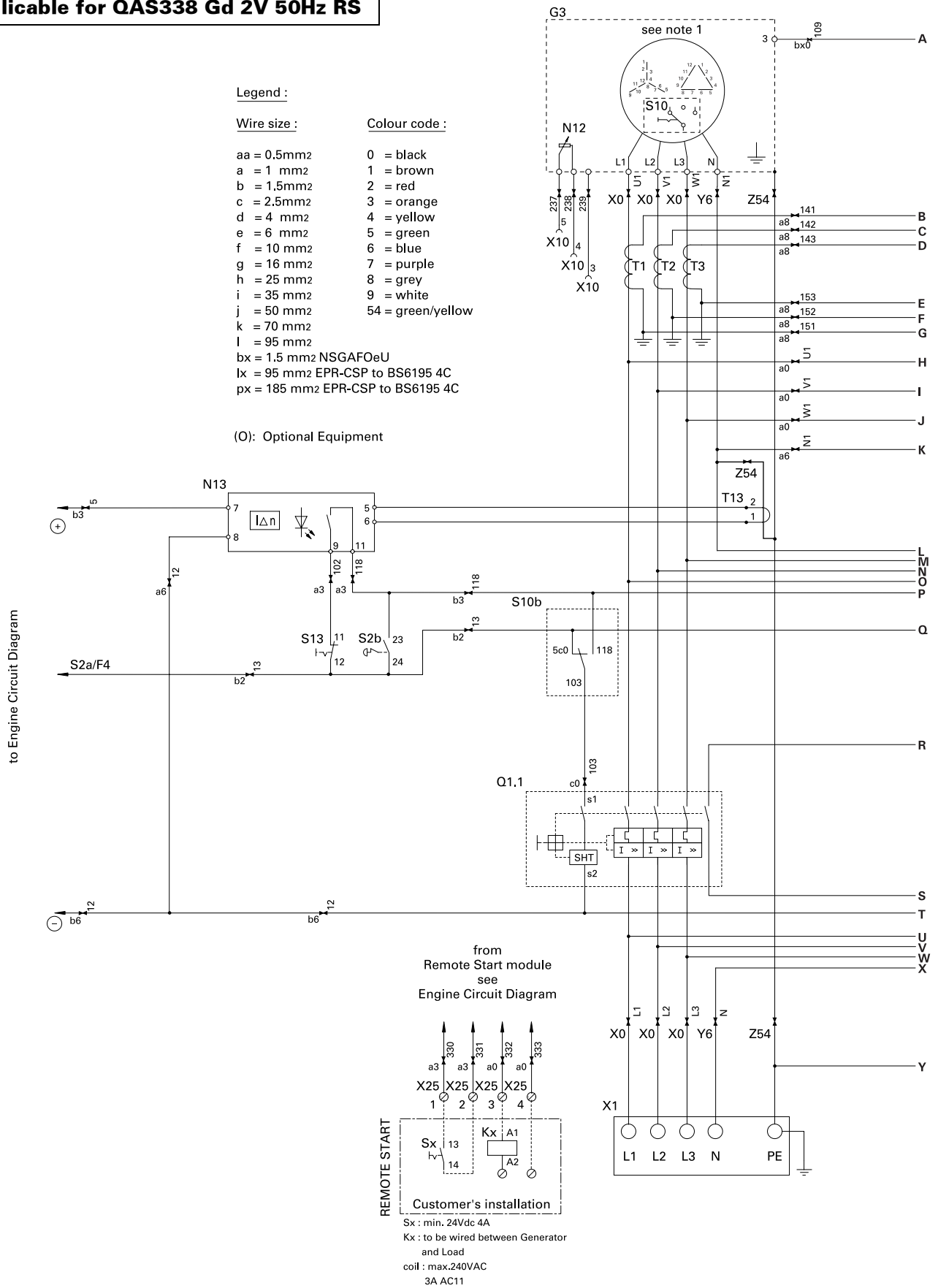

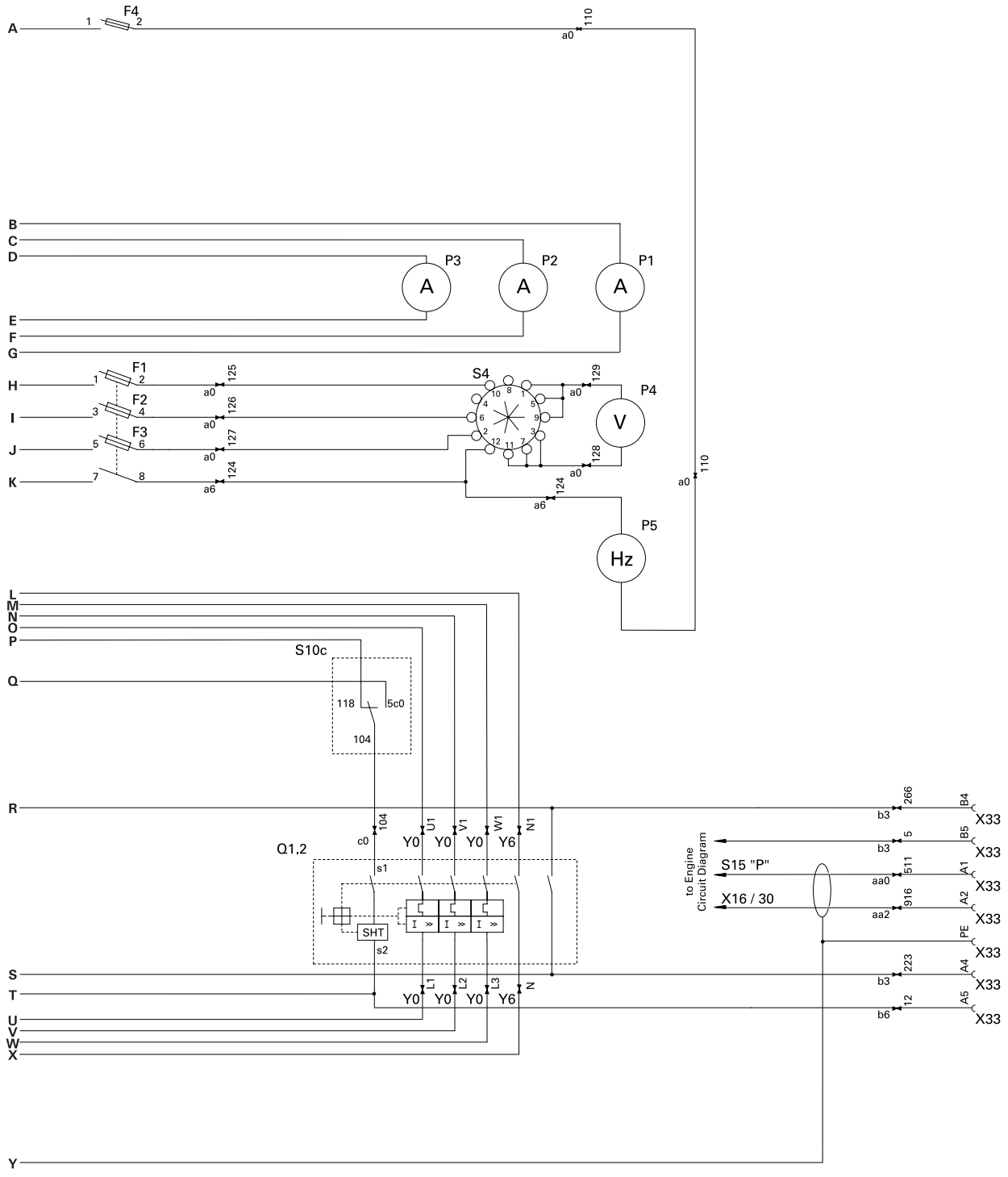

	Q1.1	Q1.2	P1	Wire size		
				X	Y	Z
QAS168	377A	217A	0-600A	2x I	I	I
QAS228	500A	289A	0-600A	2x Ix	Ix	Ix
QAS278	626A	360A	0-600A	2x Ix	2x I	Ix
QAS338	753A	433A	0-1000A	2x px	2x I	px

Note 1 :

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

Note 2 :

The actuator replaces the fuel stop solenoid valve (mentioned on the Engine Control Circuit diagram).

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	ENGLISH	NEDERLANDS	FRANCAIS
F1-4	Fuse 4A	Zekering 4A	Fusible 4A
G3	Alternator	Alternateur	Groupe électrogène
N12	Automatic voltage regulator	Automatische spanningsregelaar	Régulateur de tension automatique
N13	Earth fault-current relay	Aardlekrelais	Relais de fuite à la terre
P1-3	Amperemeter	Ampèremeter	Ampèremètre
P4	Voltmeter 0-500V	Voltmeter 0-500V	Voltmètre 0-500V
P5	Frequencymeter 45-65Hz	Frekwentiemeter 45-65Hz	Fréquencemètre 45-65Hz
Q1.1	Circuit breaker (lower voltage)	Vermogenschakelaar (lage spanning)	Disjoncteur (tension inférieure)
Q1.2	Circuit breaker (higher voltage)	Vermogenschakelaar (hoge spanning)	Disjoncteur (tension supérieure)
S2b	Emergency stop	Noodstopknop	Arrêt d'urgence
S4	Voltmeter selector switch	Voltmeter keuzeschakelaar	Sélécteur de voltmètre
S10b	Output voltage selector switch	Keuzeschakelaar uitgangsspanning	Sélecteur de tension de sortie
S13	Earth fault relay lock-out switch	Blokkeerschakelaar verliesstroomrelais	Commutateur d'arrêt de relais des défauts à la terre
T1-3	Current transformer	Stroomtransformator	Transformateur de courant
T13	Earth fault-current detector	Aardlekdetector	Détecteur de fuite à la terre
X1	Terminal board	Klemmenbord	Tablette à bornes
X10	15-pole connector	Konnektor, 15 stiften	Connecteur 15 broches
X25	Terminal strip	Klemmenstrook	Barrette de raccordement
X33	Par.connector to control cubicle (SAPE)	Par. connector naar vermogenkast (SAPE)	Connecteur parallèle vers armoire de commande (SAPE)
Sx	Remote start/stop switch	Afstands start-/stopschakelaar	Interrupteur de démarrage/arrêt à distance
Kx	Plant contactor	Installatiecontactor	Contacteur d'installation

	DEUTSCH	ESPAÑOL	SVENSKA
F1-4	Sicherung 4A	Fusible 4A	Säkring 4A
G3	Alternador	Generator	Generatore
N12	Automatischer Spannungsregler	Regulador automático de voltaje	Automatisk spänningsregulator
N13	Erdschlußrelais	Relé de pérdida a tierra	Relä för jordläckage
P1-3	Amperemeter	Amperímetro	Amperemätare
P4	Voltmeter 0-500 V	Voltímetro 0-500V	Spänningsmätare 0-500V
P5	Frequenzmesser 45-65 Hz	Frecuencímetro 45-65Hz	Frekvensmätare 45-65 Hz
Q1.1	Leistungsschalter (niedrigere Spannung)	Disyuntor (bajo voltaje)	Strömbrytare (lägre spänning)
Q1.2	Leistungsschalter (höhere Spannung)	Disyuntor (alto voltaje)	Strömbrytare (högre spänning)
S2b	Notabschaltung	Parada de emergencia	Nödstopp
S4	Voltmeter-Wahlschalter	Selector de voltímetro	Spänningsmätarens kopplingsväljare
S10	Wahlschalter Ausgangsspannung	Uniselector de voltaje de salida	Utspänningens väljaromkopplare
S13	Riegelschalter Erdschlußrelais	Interruptor de bloqueo del relé de pérdida a tierra	Avstängningsbrytare för jordfelsrelä
T1-3	Stromwandler	Transformador de corriente	Strömtransformator
T13	Erdschlußanzeiger	Detector de pérdida a tierra	Detektor för jordläckage
X1	Klemmenbrett	Cuadro de bornas	Anslutningsplint
X10b	15-poliger Stecker	Conector de 15 polos	15-poligt kontaktdon
X25	Klemmenleiste	Bloque de terminales	Anslutningslist
X33	Parallelschaltungs-Anschluß zu Schaltkasten (SAPE)	Conector par. a cub. control (SAPE)	Parallellanslutning till kontrollmodul (SAPE)
Sx	Schalter Fernstart/-stop	Interruptor remoto de arranque/parada	Start/stopp fjärrströmbrytare
Kx	Anlagenseitiges Schütz	Contactor para instalación	Anläggningsanslutning

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	ITALIANO	NORSK	DANSK
F1-4	Fusibile 4A	Sikring 4A	Sikring 4A
G3	Generator	Generator	Generator
N12	Regolatore di tensione automatico	Automatisk spenningsregulator	Automatisk spændingsregulator
N13	Relè corrente di terra	Jordfeilrelé	Jordfejlstrømsrelæ
P1-3	Amperometro	Amperemeter	Amperemeter
P4	Voltimetro 0-500V	Spenningsmåler 0-500V	Voltmeter 0-500V
P5	Frequenziometro 45-65Hz	Frekvensmåler 45-65Hz	Frekvensmåler 45-65Hz
Q1.1	Interruttore (voltaggio inferiore)	Kretsbryter (lavere spenning)	Afbryder (nedre spænding)
Q1.2	Interruttore (voltaggio superiore)	Kretsbryter (høyere spenning)	Afbryder (øvre spænding)
S2b	Arresto di emergenza	Nødstopp	Nødstop
S4	Interruttore di selezione del voltimetro	Valgbryter for spenningsmåler	Voltmeterets omskifterknap
S10b	Interruttore selettore di voltaggio di uscita	Valgbryter for utgangsspenning	Omskifterkontakt til udgangsspænding
S13	Interruttore chiusura relé guasto di terra	Avstengingsbryter for jordfeilrelé	Afbryderkontakt til jordfejlstrømsrelæ
T1-3	Transformatore di corrente	Strøm	Strømtransformere
T13	Rilevatore corrente di terra	Jordfeilføler	Jordfejlstrømsdetektor
X1	Morsettiera	Koplingstavle	Klembrædt
X10	Connettore a 15 poli	15-polet kontakt	15-faset kontaktklemme
X25	Morsettiera	Koplingssplint	Klemliste
X33	Connettore in parallelo verso il modulo di comando cubico (SAPE)	Par. kontakt for å kontrollboks (SAPE)	Par. konnektor til kontrolskab (SAPE)
Sx	Interruttore a distanza avvio/arresto	Bryter for fjernstart/-stopp	Kontakt til fjernstyring af start/stop
Kx	Contattore dell'impianto	Anleggskontaktor	Maskinkontaktor

	ΕΛΛΗΝΙΚΑ	PORTUGUÊS	SUOMI
F1-4	Ασφάλεια 4A	Fusível 4A	Varoke 4A
G3	Γεννήτρια	Alternador	Vaihtovirtageneraattori
N12	Αυτόματος ρυθμιστής τάσης	Regulador automático da potência	Automaattinen jännitteensäädin
N13	ρεύματος γείωσης	Relé de detecção de falha de terra	Maavuotorele
P1-3	Αμπερόμετρο	Amperímetro	Ampeerimittari
P4	Βολτόμετρο 0-500V	Voltímetro 0-500V	Volttimittari 0-500V
P5	Μετρητής συχνότητας 45-65Hz	Frequencímetro 45-65Hz	Taajuusmittari 45-65Hz
Q1.1	Διακόπτης κυκλώματος (χαμηλότερης τάσης)	Disjuntor (menor voltagem)	Virrankatkaisin (matalampi jännite)
Q1.2	Διακόπτης κυκλώματος (υψηλότερης τάσης)	Disjuntor (maior voltagem)	Virrankatkaisin (korkeampi jännite)
S2b	Στοπ έκτακτης ανάγκης	Paragem de emergência	Hätäpysäytys
S4	Διακόπτης επιλογής βολτομέτρου	Comutador selector do voltímetro	Volttimittarin valintakytkin
S10b	Διακόπτης επιλογής τάσης εξόδου	Interruptor selector de voltagem de saída	Lähtöjännitteen valintakytkin
S13	Διακόπτης αποκλεισμούμετάδοσης λάθους στη γείωση	Interruptor selector do relé de corrente de defeito à terra	Maavuodon tunnistimen sulkukytkin
T1-3	Μετασχηματιστής ρεύματος	Transformador de corrente	Virtamuuntaja
T13	Ανιχνευτής ρεύματος γείωσης	Detector de falha de corrente de terra	Maavuodon tunnistin
X1	Πίνακας ακροδέκτη	Quadro de terminais	Liitäntälevy
X10	15-πολικός σύνδεσμος	Ligação em 15 polos	15-napainen liitin
X25	Λωρίδα ακροδέκτη	Faixa de terminais	Liitäntärima
X33	Παράλληλη υποδοχή προς θάλαμο ελέγχου (SAPE)	Conector paralelo para cub. De controlo (SAPE)	Rinnakkaisliitin SAPE-yksikön hallintaan
Sx	Τηλεχειριζόμενος διακόπτης εκκίνησης/ανακοπής	Interruptor remoto de arranque/paragem	Kaukokäynnistys-/kaukopysäytyskytkin
Kx	Επαφέας εγκατάστασης	Contactor geral	Laitteiston liitin

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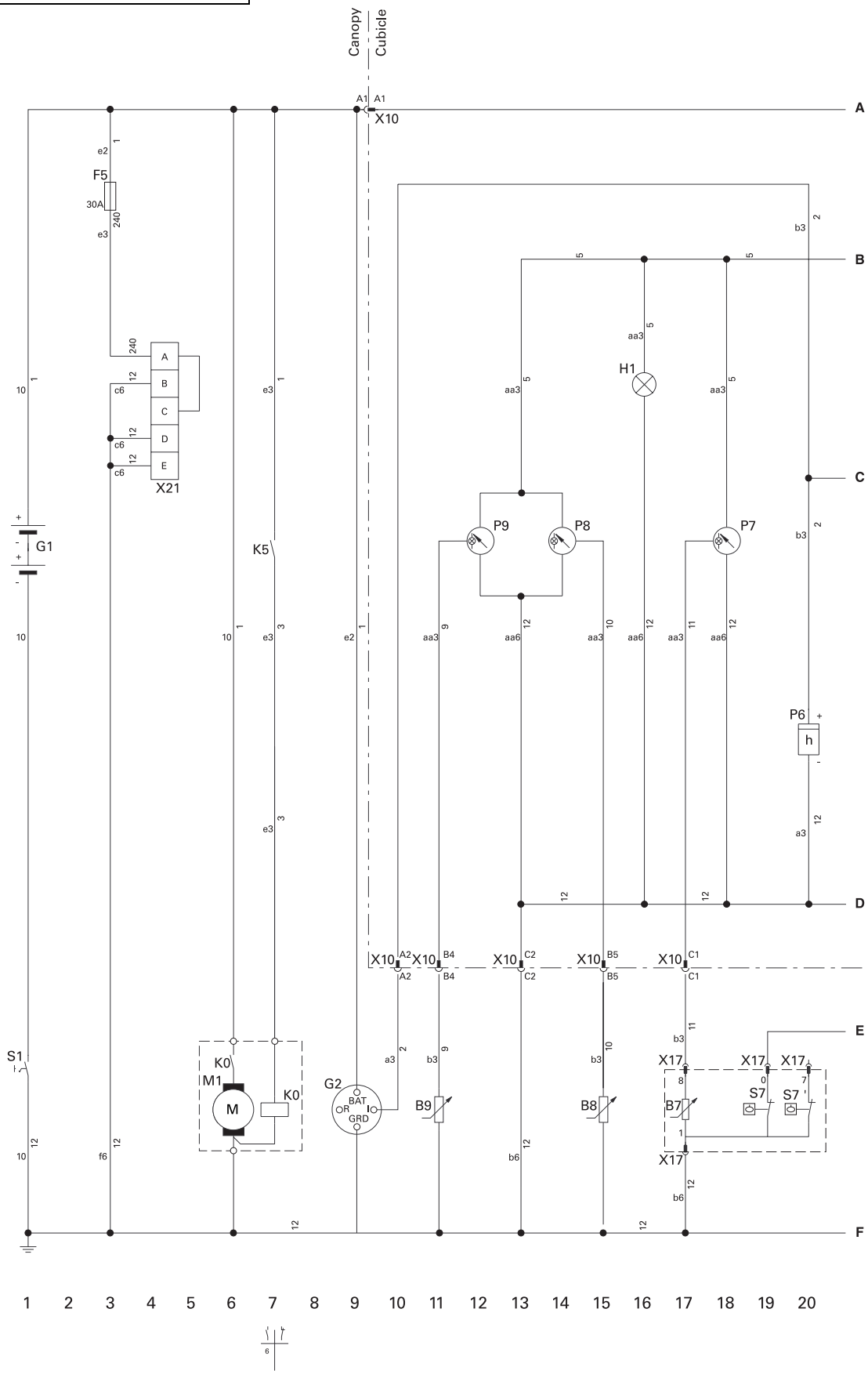
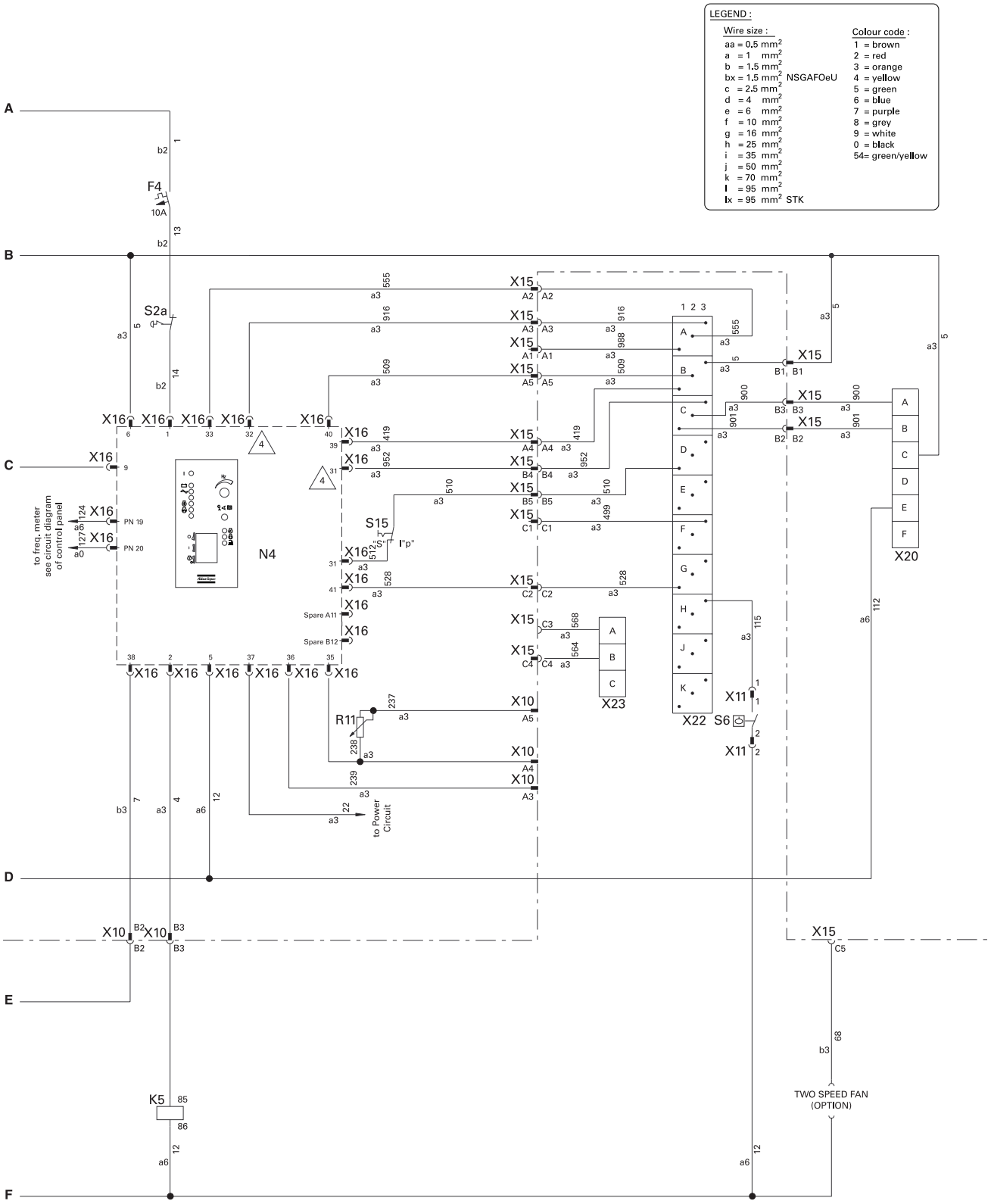
Applicable for QAS338 Gd





21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

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	ENGLISH	NEDERLANDS	FRANCAIS
B7	Fuel level sensor	Sensor, brandstofpeil	Capteur, niveau de carburant
B8	Coolant temperature sensor	Sensor, koelwatertemperatuur	Capteur, température eau de refroidissement
B9	Oil pressure sensor	Sensor, oliedruk	Capteur, pression d'huile
F4	Fuse 10A	Zekering 10A	Fusible 10A
F5	Fuse 30A	Zekering 30A	Fusible 30A
G1	Battery 24V	Batterij 24V	Batterie 24V
G2	Charging generator	Laad alternator	Alternateur, charge
H1	Panel light	Paneelverlichting	Eclairage panneau
K0	Starter solenoid	Startersolenoïde	Solénoide du démarreur
K5	Starter relay	Starterrelais	Relais de démarreur
M1	Starter motor	Startermotor	Démarreur
N4	Control module	Stuurmodule	Module de commande
P6	Hourmeter	Urenteller	Compteur d'heures
P7	Fuel level gauge	Brandstofpeilindicator	Indicateur de niveau de carburant
P8	Coolant temperature gauge	Koelwater temperatuurmeter	Indicateur de temp., eau de refroid.
P9	Oil pressure gauge	Manometer, oliedruk	Indicateur, pression d'huile
R11	Voltage adjust potentiometer	Spanningsinstelpotentiometer	Potentiomètre de réglage de tension
S1	Battery switch	Batterijschakelaar	Interrupteur de batterie
S2a	Emergency stop button	Noodstopknop	Bouton arrêt d'urgence
S6	Low coolant level switch	Schakelaar laag koelwaterpeil	Commutateur de niveau de réfrigérant bas
S7	Low fuel level switch	Schakelaar, laag brandstofpeil	Interrupteur niveau de carburant bas
S7'	Low fuel level switch, warning	Schakelaar, laag brandstofpeil, waarschuwing	Interrupteur niveau de carburant bas, avertissement
S15	Single/parallel switch	Schakelaar 'Enkel/Parallel'	Interrupteur 'Single/parallel'
X10	15-pole connector	Konnektor, 15 stiften	Connecteur 15 broches
X11	Coolant level switch connector	Connector schakelaar koelwaterpeil	Connecteur du commutateur du niveau de réfrigérant
X15	15-pole connector	Konnektor, 15 stiften	Connecteur 15 broches
X16	Control module connector	Connector besturingsmodule	Connecteur du module de commande
X17	Fuel level unit connector	Konnektor brandstofpeil module	Connecteur du module de niveau de carburant
X20	Diagnostic data socket (DDEC)	Contactdoos diagnosegegevens (DDEC)	Prise pour données de diagnostic (DDEC)
X21	Power connector (DDEC)	Vermogensconnector (DDEC)	Connecteur de puissance (DDEC)
X22	30-pole connector (DDEC)	30-polige connector (DDEC)	Connecteur 30 broches (DDEC)
X23	Engine sensor harness connector (DDEC)	Connector motorsensor harnas (DDEC)	Connecteur du harnais de capteur de moteur (DDEC)

	DEUTSCH	ESPAÑOL	SVENSKA
B7	Kraftstoffstandfühler	Sensor del nivel de combustible	Sensor - bränslenivå
B8	Kühlwassertemperaturfühler	Sensor de temperatura del refrigerante	Sensor - kylvätskans temperatur
B9	Öldruckfühler	Sensor de presión de aceite	Oljetryckssensor
F4	Sicherung 10A	Fusible 10A	Säkring 10A
F5	Sicherung 30A	Fusible 30A	Säkring 30A
G1	Batterie 24V	Batería de 24V	Batteri 24V
G2	Lademaschine	Generador de carga	Laddningsgenerator
H1	Instrumentenleuchte	Luz de panel	Panelljus
K0	Startermagnet	Solenoide de arranque	Startsolenoid
K5	Startrelais	Relé arrancador	Startrelä
M1	Startmotor	Motor de arranque	Startmotor
N4	Steuermodul	Módulo de control	Kontrollmodul
P6	Stundenzähler	Cuentahoras	Timmätare
P7	Meßinstrument für Kraftstoffstand	Indicador del nivel de combustible	Bränslenivåmätare
P8	Meßinstrument für Kühlwassertemperatur	Indicador de temperatura del refrigerante	Kylvätsketemperaturmätare
P9	Meßinstrument für Öldruck	Indicador de la presión de aceite	Oljetrycksmätare
R11	Spannungseinstellpotentiometer	Potenciómetro de ajuste de voltaje	Potentiometer för spänningsjustering
S1	Batterieschalter	Interruptor de batería	Batteriströmställare
S2a	Not-Aus-Taste	Botón de parada de emergencia	Knapp för nödstopp
S6	Schalter für niedrigen Kühlmittelstand	Interruptor de nivel de refrigerante bajo	Brytare för låg kylvätskenivå
S7	Schalter für niedrigen Kraftstoffstand	Interruptor bajo nivel de combustible	Brytare för låg bränslenivå
S7'	Schalter für niedrigen Kraftstoffstand, Warnung	Interruptor bajo nivel de combustible, aviso	Brytare för låg bränslenivå, varning
S15	'Single/parallel'-Schalter	Interruptor Individual/Paralelo	Single/Parallel väljare
X10	15-poliger Stecker	Conector de 15 polos	15-poligt kontaktdon
X11	Stecker Kühlmittelstandschalter	Conector del interruptor de nivel de refrigerante	Brytaranslutning för låg kylvätskenivå
X15	15-poliger Stecker	Conector de 15 polos	15-poligt kontaktdon
X16	Stecker Steuermodul	Conector de módulo	Modul-kontaktdon
X17	Stecker für Kraftstoffstandeinheit	Conector unidad nivel de combustible	Bränslenivåenhetens kontaktdon
X20	Diagnosedatenbuchse (DDEC)	Casquillo para datos de diagnóstico (DDEC)	Uttag för diagnostikdata (DDEC)
X21	Starkstromstecker (DDEC)	Conector de alimentación (DDEC)	Strömanslutning (DDEC)
X22	30poliger Stecker (DDEC)	Conector con 30 polos (DDEC)	30-polig anslutning (DDEC)
X23	Stecker Motorsensorkabel (DDEC)	Conector de cableado sensor del motor (DDEC)	Anslutning för motorns sensorkabel (DDEC)

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	ITALIANO	NORSK	DANSK
B7	Sensore del livello di combustibile	Føler for drivstoffnivå	Brændstofniveauføler
B8	Sensore della temperatura del refrigerante	Føler for kjølevæsketemperatur	Kølevandstemperaturføler
B9	Sensore della pressionde dell'olio	Oljetrykkføler	Olietryksføler
F4	Fusibile 10A	Sikring 10A	Sikring 10A
F5	Fusibile 30A	Sikring 30A	Sikring 30A
G1	Batteria a 24V	Batteri 24 V	Batteri 24V
G2	Generatore di carica	Ladegenerator	Ladegenerator
H1	Luci del pannello	Panellys	Lampe
K0	Solenoide dell'avviatore	Magnetkontakt for starter	Startmagnet
K5	Relé di avviamento	Startrelé	Startrelæ
M1	Motore dell'avviatore	Starter	Startermotor
N4	Modulo di controllo	Kontrollmodul	Kontrolmodul
P6	Contaore	Timeteller	Timetæller
P7	Indicatore di livello del combustibile	Drivstoffmåler	Brændstofniveaumeter
P8	Indicatore della temperatura del refrigerante	Måler for kjølevæsketemperatur	Kølevandstermometer
P9	Indicatore della pressione dell'olio	Oljetrykkmåler	Manometer, olietryk
R11	Potenziometro regolazione voltaggio	Potensiometer for spenningskorrigering	Potentiometer til justering af spændingen
S2a	Pulsante di arresto di emergenza	Knapp for sikkerhetsstopp	Nødstopknap
S6	Interruttore basso livello del liquido refrigerante	Bryter for lavt kjølevæskenivå	Kontakt for lavt kølevæskeniveau
S7	Interruttore di basso livello del combustibile	Bryter for lavt drivstoffnivå	Brændstofniveaukontakt
S7'	Interruttore di basso livello del combustibile, avvertimento	Bryter for lavt drivstoffnivå, varsel	Brændstofniveaukontakt, advarsel
S15	Interruttore singolo/in parallelo	Enkel/parallell-bryter	Enkelt/parallel-kontakt
X10	Connettore a 15 poli	15-polet kontakt	15 -faset kontaktklemme
X11	Connettore interruttore livello liquido refrigerante	Kontakt for kjølevæskenivåbryter	Kontaktkonnektor for kølevæskeniveau
X15	Connettore a 15 poli	15-polet kontakt	15 -faset kontaktklemme
X16	Connettore del modulo	Modulkontakt	Modulkontaktklemme
X17	Connettore dell'unitá livello del combustibile	Kontakt for drivstoffnivåenhet	Kontaktklemme for brændstofniveau
X20	Presa dati diagnostici (DDEC)	Feilsøkingskontakt (DDEC)	Fejlfindingsstikkontakt (DDEC)
X21	Connettore di alimentazione (DDEC)	Strømkontakt (DDEC)	Strømkonnektor (DDEC)
X22	Connettore a 30 poli (DDEC)	30-polet kontakt (DDEC)	30-pols konnektor (DDEC)
X23	Connettore cablaggio sensore motore (DDEC)	Kontakt for maskinføler (DDEC)	Følekonnektor ved motorens ledningsnet (DDEC)

	ΕΛΛΗΝΙΚΑ	PORTUGUÊS	SUOMI
B7	Αισθητήρας στάθμης καυσίμου	Sensor do nível de combustível	Polttoainemäärän anturi
B8	Αισθητήρας θερμοκρασίας ψυκτικού	Sensor da temperatura do refrigerante	Jäähdytysnesteen lämpötilan anturi
B9	Αισθητήρας πίεσης λαδιού	Sensor da pressão do óleo	Öljynpaineanturi
F4	Ασφάλεια 10A	Fusível 10A	Varoke 10A
F5	Ασφάλεια 30A	Fusível 30A	Varoke 30A
G1	Μπαταρία 24V	Bateria 24V	Akku 24V
G2	Φορτιστής γεννήτριας	Gerador de carga	Latausgeneraattori
H1	Λυχνία πίνακα	Luz do painel	Kojetaulun valo
K0	Σωληνοειδές εκκίνησης	Solenóide do motor de arranque	Käynnistyssolenoidi
K5	Αναμετάδοση Μίζας	Relé do motor de arranque	Käynnistysrele
M1	Μίζα	Motor de arranque	Käynnistysmoottori
N4	Στοιχείο ελέγχου	Módulo de controlo	Ohjainmoduli
P6	Ωρομετρητής	Contador de horas	Käyttötuntimittari
P7	Οργανο μέτρησης στάθμης καυσίμου	Indicador do nível de combustível	Polttoainemittari
P8	Οργανο μέτρησης θερμοκρασίας ψυκτικού	Indicador da temperatura do refrigerante	Jäähdytysnesteen lämpömittari
P9	Οργανο μέτρησης πίεσης λαδιού	Indicador da pressão de óleo	Öljynpainemittari
R11	Μετρητής δυνατότητας προσαρμογής τάσης	Potenciómetro de ajustamento da voltagem	Jäähdytysnesteen lämmitysvastus
S1	Διακόπτης μπαταρίας	Comutador da bateria	Akkukytkin
S2a	Μπουτόν σβησίματος έκτακτης ανάγκης	Botão de paragem de emergência	Hätäpysäytyskytkin
S6	Διακόπτης χαμηλής στάθμης ψυκτικού	Interruptor do nível baixo do líquido de arrefecimento	Alhaisen jäähdytysnestemäärän kytkin
S7	Διακόπτης χαμηλής σταθμής καυσίμου	Comutador do nível baixo de combustível	Alhaisen polttoainemäärän merkkivalon kytkin
S7'	Διακόπτης χαμηλής σταθμής καυσίμου	Comutador do nível baixo de combustível, aviso	Alhaisen polttoainemäärän merkkivalon kytkin, varoitus
S15	Διακόπτης μεμονωμένης/παράλληλης λειτουργίας	Interruptor Único/Paralelo	Yksin/rinnan-kytkin
X10	15-πολικός σύνδεσμος	Ligação em 15 polos	15-napainen liitin
X11	Συνδεσμος διακόπτη στάθμης ψυκτικού	Dispositivo de ligação do interruptor do nível do líquido de arrefecimento	Jäähdytysnestemäärän kytkin
X15	15-πολικός σύνδεσμος	Ligação em 15 polos	15-napainen liitin
X16	Αναλογικός σύνδεσμος	Ligação do módulo	Moduliliitin
X17	Σύνδεσμος μονάδος στάθμης καυσίμου	Ligação da unidade do nível de combustível	Polttoainemäärän ilmaisimen liitin
X20	Υποδοχή διαγνωστικών πληροφοριών (DDEC)	Ficha de dados de diagnóstico (DDEC)	Diagnoosipistorasia (DDEC)
X21	Συνδεσμος ενέργειας (DDEC)	Ligação da corrente (DDEC)	Virtaliitin (DDEC)
X22	Συνδεσμος 30 πόλων (DDEC)	Dispositivo de ligação de 30 pinos (DDEC)	30-napainen liitin (DDEC)
X23	Συνδεσμος αισθητήρα στήριξης μηχανής (DDEC)	Dispositivo de ligação da instalação eléctrica do sensor do motor (DDEC)	Moottorintunnistinjohtosarjan liitin (DDEC)

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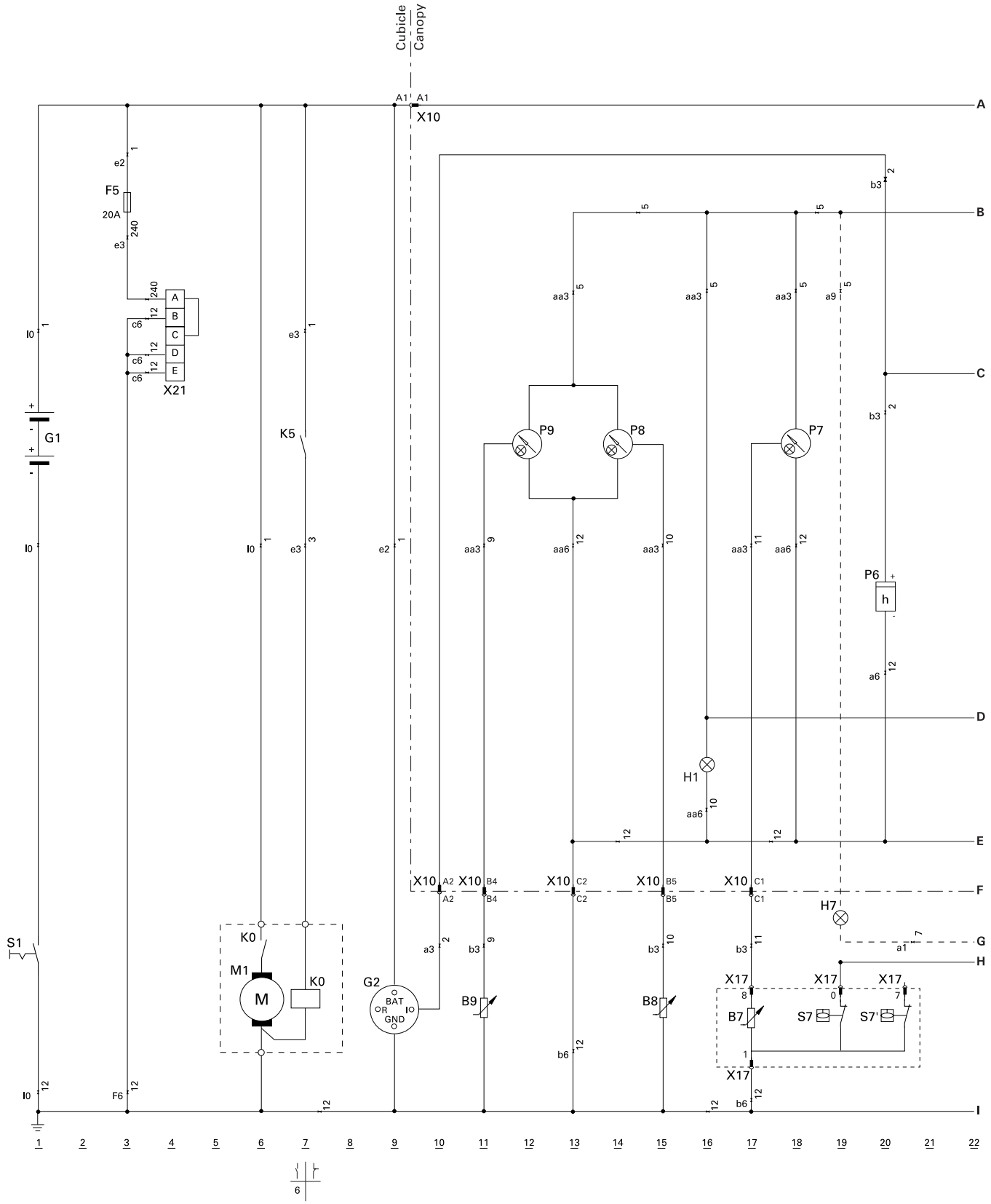
Applicable for QAS338 RS



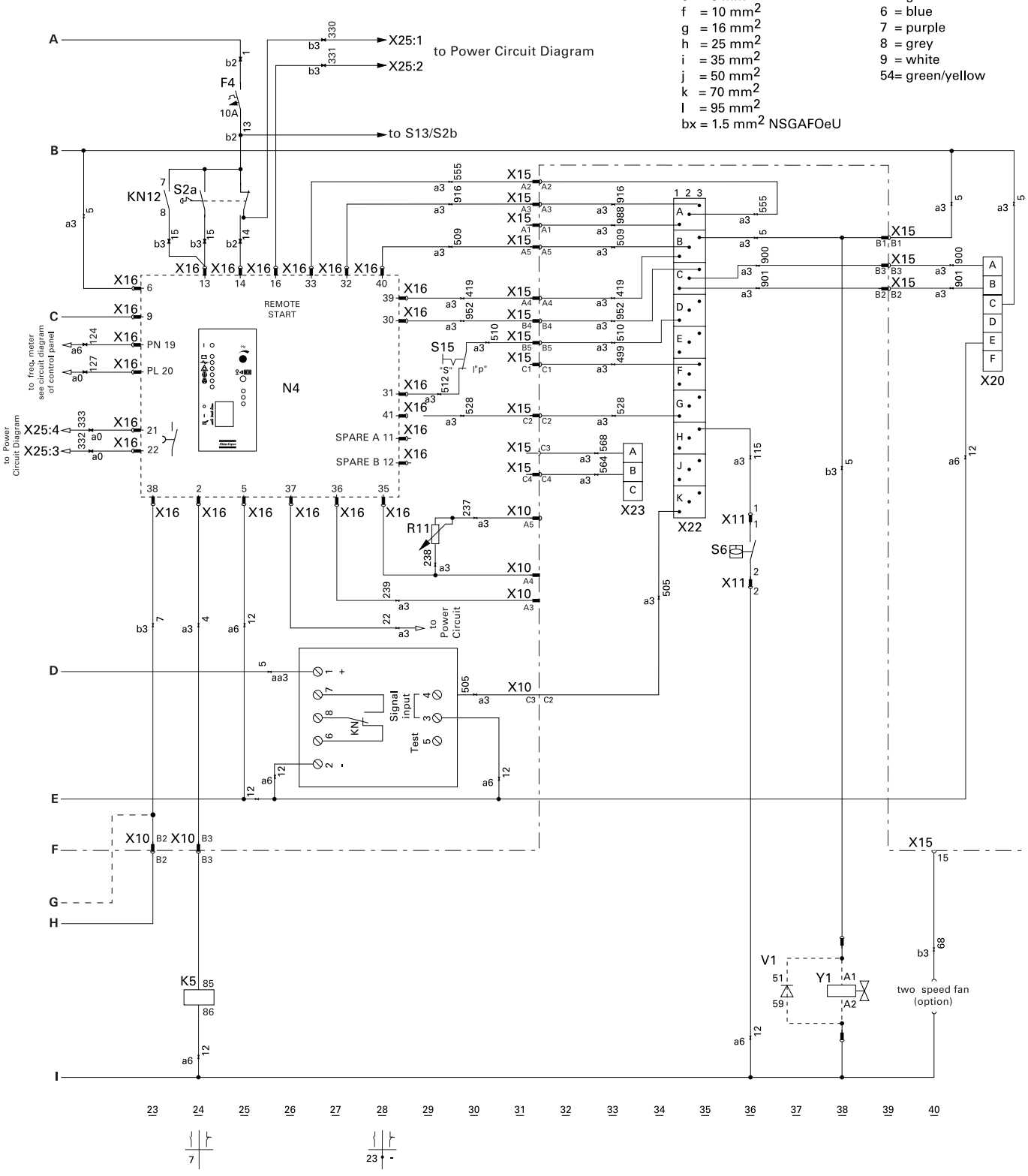
LEGEND:

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

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



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	ENGLISH	NEDERLANDS	FRANCAIS
B7	Fuel level sensor	Sensor, brandstofpeil	Capteur, niveau de carburant
B8	Coolant temperature sensor	Sensor, koelwatertemperatuur	Capteur, température eau de refroidissement
B9	Oil pressure sensor	Sensor, oliedruk	Capteur, pression d'huile
F4	Fuse 10A	Zekering 10A	Fusible 10A
F5	Fuse 30A	Zekering 30A	Fusible 30A
G1	Battery 24V	Batterij 24V	Batterie 24V
G2	Charging generator	Laad alternator	Alternateur, charge
H1	Panel light	Paneelverlichting	Eclairage panneau
H7	Indic. lamp low fuel level (optional)	Verklikker lamp, laag brandstofpeil (optie)	Lampe, niveau de carburant bas (option)
K0	Starter solenoid	Startersolenoïde	Solénoide du démarreur
K5	Starter relay	Starterrelais	Relais de démarreur
M1	Starter motor	Startermotor	Démarreur
N4	Control module	Stuurmodule	Module de commande
P6	Hourmeter	Urenteller	Compteur d'heures
P7	Fuel level gauge	Brandstofpeilindicator	Indicateur de niveau de carburant
P8	Coolant temperature gauge	Koelwater temperatuurmeter	Indicateur de temp., eau de refroid.
P9	Oil pressure gauge	Manometer, oliedruk	Indicateur, pression d'huile
R11	Voltage adjust	Spanningsregeling	Réglage de tension
S1	Battery switch	Batterijschakelaar	Interrupteur de batterie
S2a	Emergency stop button	Noodstopknop	Bouton arrêt d'urgence
S6	Low coolant level switch	Schakelaar laag koelwaterpeil	Commutateur de niveau de réfrigérant bas
S7	Low fuel level switch	Schakelaar, laag brandstofpeil	Interrupteur niveau de carburant bas
S7´	Low fuel level switch, warning	Schakelaar, laag brandstofpeil, waarschuwing	Interrupteur niveau de carburant bas, avertissement
S15	Single/parallel switch	Parallel schakelaar	Interrupteure parallele
V1	Diode	Diode	Diode
X10	15-pole connector	Konnektor, 15 stiften	Connecteur 15 broches
X11	Coolant level switch connector	Connector schakelaar koelwaterpeil	Connecteur du commutateur du niveau de réfrigérant
X15	15-pole connector	Konnektor, 15 stiften	Connecteur 15 broches
X16	Control module connector	Connector besturingsmodule	Connecteur du module de commande
X17	Fuel level unit connector	Konnektor brandstofpeil module	Connecteur du module de niveau de carburant
X20	Diagnostic data socket (DDEC)	Contactdoos diagnosegegevens (DDEC)	Prise pour données de diagnostic (DDEC)
X21	Power connector (DDEC)	Vermogensconnector (DDEC)	Connecteur de puissance (DDEC)
X22	30-pole connector (DDEC)	30-polige connector (DDEC)	Connecteur 30 broches (DDEC)
X23	Engine sensor harness connector (DDEC)	Connector motorsensor harnas (DDEC)	Connecteur du harnais de capteur de moteur (DDEC)
Y1	Solenoid valve for automatic oiler	Te vertalen	Te vertalen

	DEUTSCH	ESPAÑOL	SVENSKA
B7	Kraftstoffstandfühler	Sensor del nivel de combustible	Sensor - bränslenivå
B8	Kühlwassertemperaturfühler	Sensor de temperatura del refrigerante	Sensor - kylvätskans temperatur
B9	Öldruckfühler	Sensor de presión de aceite	Oljetryckssensor
F4	Sicherung 10A	Fusible 10A	Säkring 10A
F5	Sicherung 30A	Fusible 30A	Säkring 30A
G1	Batterie 24V	Batería de 24V	Batteri 24V
G2	Lademaschine	Generador de carga	Laddningsgenerator
H1	Instrumentenleuchte	Luz de panel	Panelljus
H7	Anzeiger Lampe für niedrigen Kraftstoffstand (optional)	Indicador, bajo nivel de combustible (opcíon)	Indikator lampa för låg bränslenivå (optionen)
K0	Startermagnet	Solenoide de arranque	Startsolenoid
K5	Startrelais	Relé arrancador	Startrelä
M1	Startmotor	Motor de arranque	Startmotor
N4	Steuermodul	Módulo de control	Kontrollmodul
P6	Stundenzähler	Cuentahoras	Timmätare
P7	Meßinstrument für Kraftstoffstand	Indicador del nivel de combustible	Bränslenivåmätare
P8	Meßinstrument für Kühlwassertemperatur	Indicador de temperatura del refrigerante	Kylvätsketemperaturmätare
P9	Meßinstrument für Öldruck	Indicador de la presión de aceite	Oljetrycksmätare
R11	Spannungseinstellung	Ajuste de voltaje	Spänningsjustering
S1	Batterieschalter	Interruptor de batería	Batteriströmställare
S2a	Not-Aus-Taste	Botón de parada de emergencia	Knapp för nödstopp
S6	Schalter für niedrigen Kühlmittelstand	Interruptor de nivel de refrigerante bajo	Brytare för låg kylvätskenivå
S7	Schalter für niedrigen Kraftstoffstand	Interruptor bajo nivel de combustible	Brytare för låg bränslenivå
S7´	Schalter für niedrigen Kraftstoffstand, Warnung	Interruptor bajo nivel de combustible, aviso	Brytare för låg bränslenivå, varning
S15	'Single/parallel'-Schalter	Interruptor Individual/Paralelo	Single/Parallel väljare
V1	Diode	Diodo	Diod
X10	15-poliger Stecker	Conector de 12 polos	12-poligt kontaktdon
X11	Stecker Kühlmittelstandschalter	Conector del interruptor de nivel de refrigerante	Brytaranslutning för låg kylvätskenivå
X15	15-poliger Stecker	Conector 15-polar	15-poligt kontaktdon
X16	Stecker Steuermodul	Conector del módulo de control	Anslutning för kontrollmodul
X17	Stecker für Kraftstoffstandeinheit	Conector unidad nivel de combustible	Bränslenivåenhetens kontaktdon
X20	Stecker Steuermodul	Conector del módulo de control	Anslutning för kontrollmodul
X21	Diagnosedatenbuchse (DDEC)	Casquillo para datos de diagnóstico (DDEC)	Uttag för diagnostikdata (DDEC)
X22	Starkstromstecker (DDEC)	Conector de alimentación (DDEC)	Strömanslutning (DDEC)
X23	30poliger Stecker (DDEC)	Conector con 30 polos (DDEC)	30-polig anslutning (DDEC)
Y1	Te vertalen	Te vertalen	Te vertalen

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	ITALIANO	NORSK	DANSK
B7	Sensore del livello di combustibile	Føler for drivstoffnivå	Brændstofniveauføler
B8	Sensore della temperatura del refrigerante	Føler for kjølevæsketemperatur	Kølevandstemperaturføler
B9	Sensore della pressionde dell'olio	Oljetrykkføler	Olietryksføler
F4	Fusibile 10A	Sikring 10A	Sikring 10A
F5	Fusibile 30A	Sikring 30A	Sikring 30A
G1	Batteria a 24V	Batteri 24 V	Batteri 24V
G2	Generatore di carica	Ladegenerator	Ladegenerator
H1	Luci del pannello	Panellys	Lampe
H7	Indicatore lampada di basso livello del combustibile (l'opzione)	Indikator lampe for lavt drivstoffnivå (ekstrautstyr)	Indikator lampe, brændstofniveau (ekstraudstyr)
K0	Solenoide dell'avviatore	Magnetkontakt for starter	Startmagnet
K5	Relé di avviamento	Startrelé	Startrelæ
M1	Motore dell'avviatore	Starter	Startermotor
N4	Modulo di controllo	Kontrollmodul	Kontrolmodul
P6	Contaore	Timeteller	Timetæller
P7	Indicatore di livello del combustibile	Drivstoffmåler	Brændstofniveaumeter
P8	Indicatore della temperatura del refrigerante	Måler for kjølevæsketemperatur	Kølevandstermometer
P9	Indicatore della pressione dell'olio	Oljetrykkmåler	Manometer, olietryk
R11	Regolazione del voltaggio	Spenningsjustering	Spændingsjustering
S1	Interruttore della batteria	Batteribryter	Batterikontakt
S2a	Pulsante di arresto di emergenza	Knapp for sikkerhetsstopp	Nødstopknap
S6	Interruttore basso livello del liquido refrigerante	Bryter for lavt kjølevæskenivå	Kontakt for lavt kølevæskeniveau
S7	Interruttore di basso livello del combustibile	Bryter for lavt drivstoffnivå	Brændstofniveaukontakt
S7´	Inter. di basso livello del combustibile, avvertimento	Bryter for lavt drivstoffnivå, varsel	Brændstofniveaukontakt, advarsel
S15	Interruttore singolo/in parallelo	Enkel/parallell-bryter	Enkelt/parallel-kontakt
V1	Diodo	Diode	Diode
X10	Connettore a 12 poli	12-polet kontakt	12 -faset kontaktklemme
X11	Connettore interruttore livello liquido refrigerante	Kontakt for kjølevæskenivåbryter	Kontaktkonnektor for kølevæskeniveau
X15	Connettore a 15 poli	15-polet kontakt	15 -faset kontaktklemme
X16	Connettore modulo di controllo	Kontakt for kontrollmodul	Kontrolmodulkonnektor
X17	Connettore dell'unitá livello del combustibile	Kontakt for drivstoffnivåenhet	Kontaktklemme for brændstofniveau
X20	Presa dati diagnostici (DDEC)	Feilsøkingskontakt (DDEC)	Fejlfindingsstikkontakt (DDEC)
X21	Connettore di alimentazione (DDEC)	Strømkontakt (DDEC)	Strømkonnektor (DDEC)
X22	Connettore a 30 poli (DDEC)	30-polet kontakt (DDEC)	30-pols konnektor
X23	Connettore cablaggio sensore motore (DDEC)	Kontakt for maskinføler (DDEC)	Følekonnektor ved motorens ledningsnet
Y1	Te vertalen	Te vertalen	Te vertalen

	ΕΛΛΗΝΙΚΑ	PORTUGUÊS	SUOMI
B7	Αισθητήρας στάθμης καυσίμου	Sensor do nível de combustível	Polttoainemäärän anturi
B8	Αισθητήρας θερμοκρασίας ψυκτικού	Sensor da temperatura do refrigerante	Jäähdytysnesteen lämpötilan anturi
B9	Αισθητήρας πίεσης λαδιού	Sensor da pressão do óleo	Öljynpaineanturi
F4	Ασφάλεια 10Α	Fusível 10A	Varoke 10A
F5	Ασφάλεια 30Α	Fusível 30A	Varoke 30A
G1	Μπαταρία 24V	Bateria 24V	Akku 24 V
G2	Φορτιστής γεννήτριας	Gerador de carga	Latausgeneraattori
H1	Λυχνία πίνακα	Luz do painel	Kojetaulun valo
H7	Δείκτης Λαμπτηρας χαμηλής σταθμής καυσίμου (επιλογής)	Indicador de baixo nível de combustível (Opção)	Osoitin lamppu alhaisen polttoainemäärän merkkivalon (lisävaruste)
K0	Σωληνοειδές εκκίνησης	Solenóide do motor de arranque	Käynnistyssolenoidi
K5	Αναμετάδοση Μίζας	Relé do motor de arranque	Käynnistysrele
M1	Μίζα	Motor de arranque	Käynnistysmoottori
N4	Στοιχείο ελέγχου	Módulo de controlo	Ohjainmoduli
P6	Ωρομετρητής	Contador de horas	Käyttötuntimittari
P7	Οργανο μέτρησης στάθμης καυσίμου	Indicador do nível de combustível	Polttoainemittari
P8	Οργανο μέτρησης θερμοκρασίας ψυκτικού	Indicador da temperatura do refrigerante	Jäähdytysnesteen lämpömittari
P9	Οργανο μέτρησης πίεσης λαδιού	Indicador da pressão de óleo	Öljynpainemittari
R11	Ρύθμιση τάσης	Ajuste da voltagem	Jännitteensäätö
S1	Διακόπτης μπαταρίας	Comutador da bateria	Akkukytkin
S2a	Μπουτόν σβησίματος έκτακτης ανάγκης	Botão de paragem de emergência	Hätäpysäytyskytkin
S6	Διακόπτης χαμηλής στάθμης ψυκτικού	Interruptor do nível baixo do líquido de arrefecimento	Alhaisen jäähdytysnestemäärän kytkin
S7	Διακόπτης χαμηλής σταθμής καυσίμου	Comutador do nível baixo de combustível	Alhaisen polttoainemäärän merkkivalon kytkin
S7´	Διακόπτης χαμηλής σταθμής καυσίμου, προειλοποιητικη	Comutador do nível baixo de combustível, aviso	Alhaisen polttoainemäärän merkkivalon kytkin, varoitus
S15	Διακόπτης μεμονωμένης/παράλληλης λειτουργίας	Interruptor Único/Paralelo	Yksin/rinnan-kytkin
V1	Διοδοε	Diodo	Diodi
X10	12-πολικός σύνδεσμος	Ligação em 12 polos	12-napainen liitin
X11	Συνδεσμος διακόπτη στάθμης ψυκτικού	Dispositivo de ligação do interruptor do nível do líquido de arrefecimento	Jäähdytysnestemäärän kytkin
X15	15-πολικός σύνδεσμος	Ligação em 15 polos	15-napainen liitin
X16	Αναλογικός σύνδεσμος	Ligação do módulo	Moduliliitin
X16	Συνδεσμος ελέγχου κατεύθυνσης	Dispositivo de ligação do módulo de controlo	Ohjauslaitteen liitin
X17	Σύνδεσμος μονάδος στάθμης καυσίμου	Ligação da unidade do nível de combustível	Polttoainemäärän ilmaisimen liitin
X20	Υποδοχή διαγνωστικών πληροφοριών (DDEC)	Ficha de dados de diagnóstico (DDEC)	Diagnoosipistorasia (DDEC)
X21	Συνδεσμος ενέργειας (DDEC)	Ligação da corrente (DDEC)	Virtaliitin (DDEC)
X22	Συνδεσμος 30 πόλων (DDEC)	Dispositivo de ligação de 30 pinos (DDEC)	30-napainen liitin
X23	Συνδεσμος αισθητήρα στήριξης μηχανής (DDEC)	Dispositivo de ligação da instalação eléctrica do sensor do motor (DDEC)	Moottorintunnistinjohtosarjan liitin (DDEC)
Y1	Te vertalen	Te vertalen	Te vertalen

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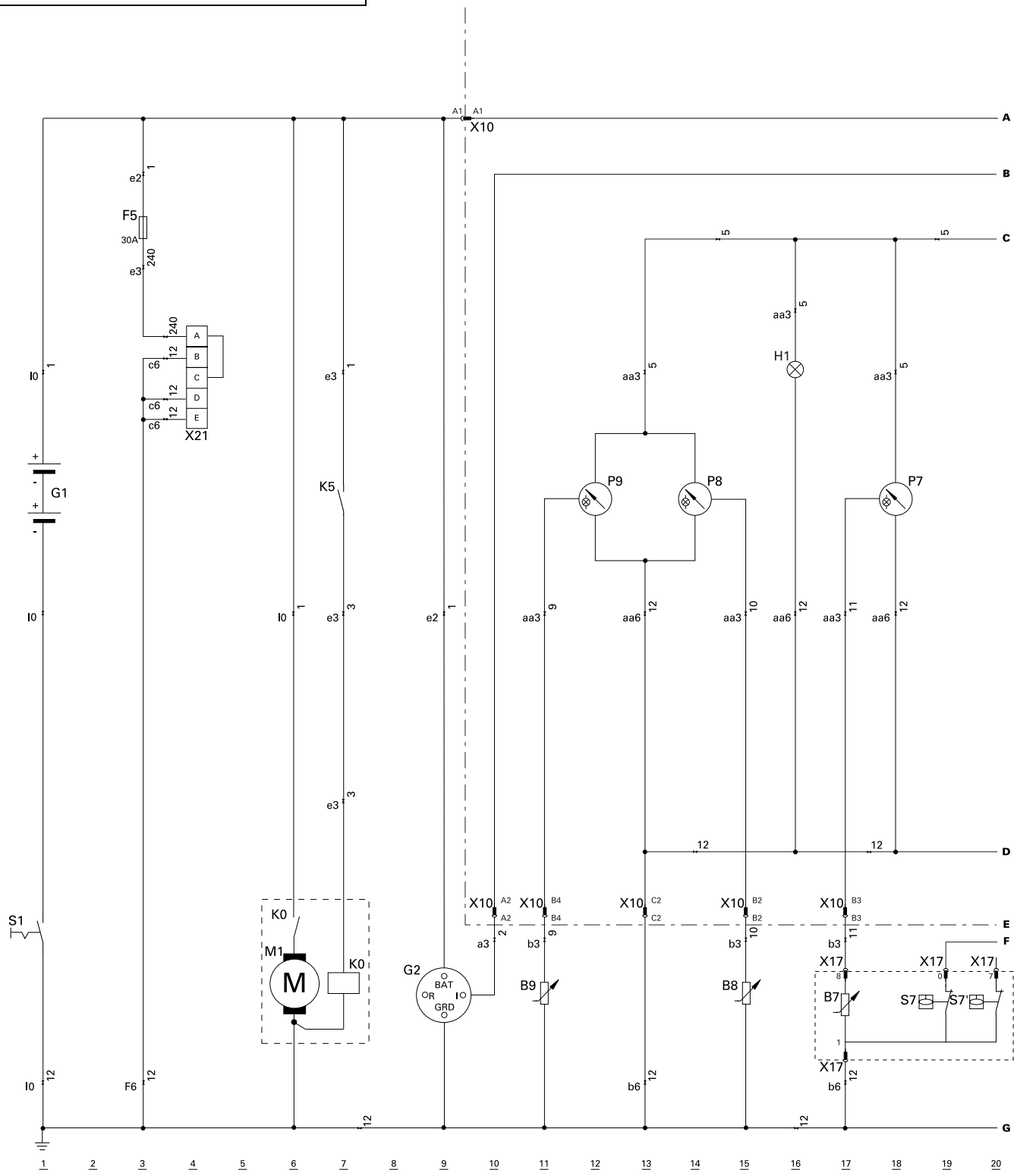
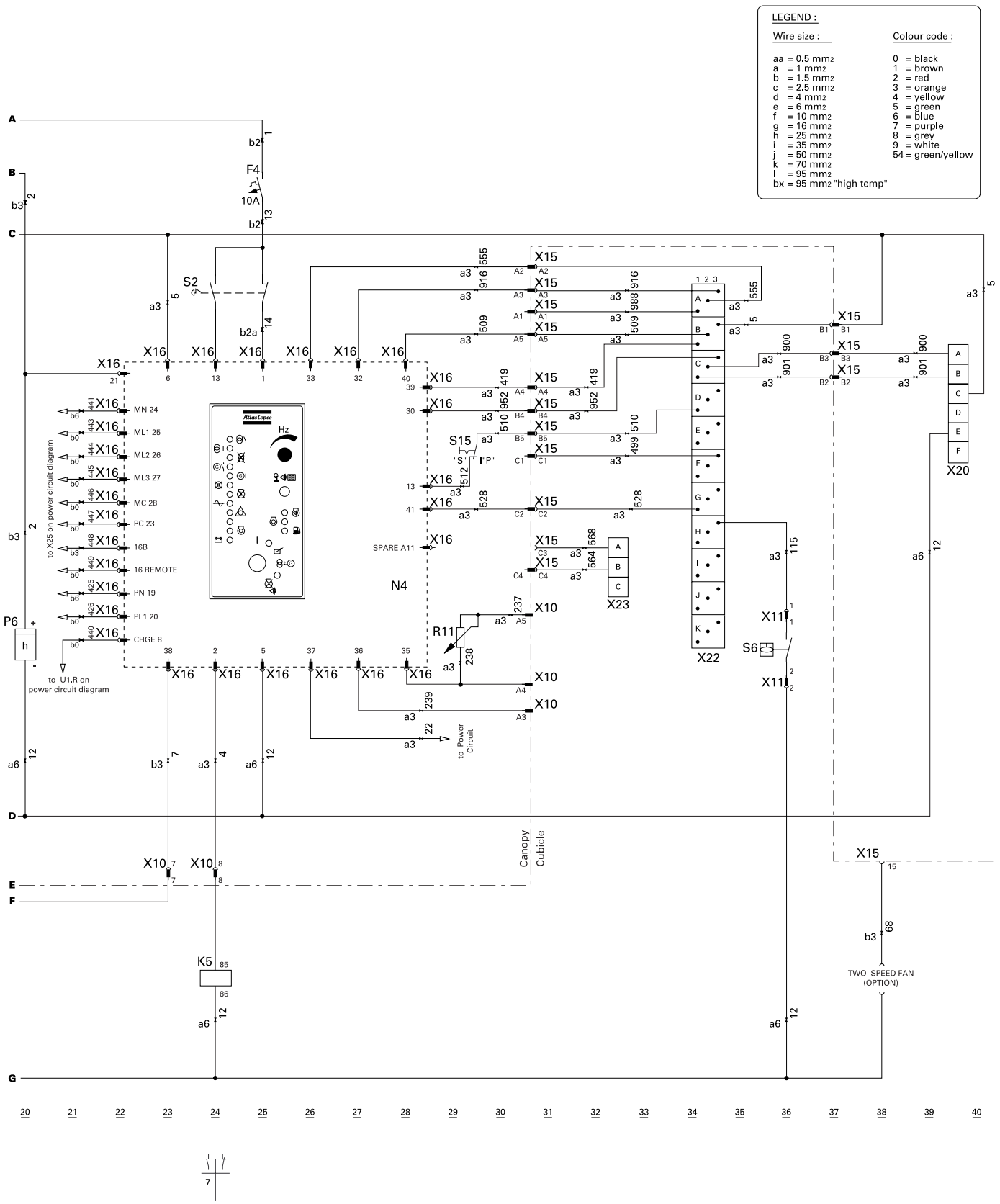
Applicable for QAS338 Gd AMF




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 = 95 mm2 "high temp"
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
F4
10A
S2
S15
"S"
"P"
N4
R11
S6
K5
P6
MN 24
ML1 25
ML2 26
ML3 27
MC 28
PC 23
16B
16 REMOTE
PN 19
PL1 20
CHGE 8
SPARE A11
to X25 on power circuit diagram
to U1.R on power circuit diagram
to Power Circuit
Canopy Cubicle
TWO SPEED FAN (OPTION)
X10
X11
X15
X16
X20
X22
X23

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	ENGLISH	NEDERLANDS	FRANCAIS
B7	Fuel level sensor	Sensor, brandstofpeil	Capteur, niveau de carburant
B8	Coolant temperature sensor	Sensor, koelwatertemperatuur	Capteur, température eau de refroidissement
B9	Oil pressure sensor	Sensor, oliedruk	Capteur, pression d'huile
F4	Fuse 10A	Zekering 10A	Fusible 10A
F5	Fuse 30A	Zekering 30A	Fusible 30A
G1	Battery 24V	Batterij 24V	Batterie 24V
G2	Charging generator	Laad alternator	Alternateur, charge
H1	Panel light	Paneelverlichting	Eclairage panneau
K0	Starter solenoid	Startersolenoïde	Solénoide du démarreur
K5	Starter relay	Starterrelais	Relais de démarreur
M1	Starter motor	Startermotor	Démarreur
N4	Control module	Stuurmodule	Module de commande
P6	Hourmeter	Urenteller	Compteur d'heures
P7	Fuel level gauge	Brandstofpeilindicator	Indicateur de niveau de carburant
P8	Coolant temperature gauge	Koelwater temperatuurmeter	Indicateur de temp., eau de refroid.
P9	Oil pressure gauge	Manometer, oliedruk	Indicateur, pression d'huile
R11	Voltage adjust potentiometer	Spanningsinstelpotentiometer	Potentiomètre de réglage de tension
S1	Battery switch	Batterijschakelaar	Interrupteur de batterie
S2	Emergency stop button	Noodstopknop	Bouton arrêt d'urgence
S6	Low coolant level switch	Schakelaar laag koelwaterpeil	Commutateur de niveau de réfrigérant bas
S7	Low fuel level switch	Schakelaar, laag brandstofpeil	Interrupteur niveau de carburant bas
S7'	Low fuel level switch, warning	Schakelaar, laag brandstofpeil, waarschuwing	Interrupteur niveau de carburant bas, avertissement
S15	Single/parallel switch	Schakelaar 'Enkel/Parallel'	Interrupteur 'Single/parallel'
X10	15-pole connector	Konnektor, 15 stiften	Connecteur 15 broches
X11	Coolant level switch connector	Connector schakelaar koelwaterpeil	Connecteur du commutateur du niveau de réfrigérant
X15	15-pole connector	Konnektor, 15 stiften	Connecteur 15 broches
X16	Control module connector	Connector besturingsmodule	Connecteur du module de commande
X17	Fuel level unit connector	Konnektor brandstofpeil module	Connecteur du module de niveau de carburant
X20	Diagnostic data socket (DDEC)	Contactdoos diagnosegegevens (DDEC)	Prise pour données de diagnostic (DDEC)
X21	Power connector (DDEC)	Vermogensconnector (DDEC)	Connecteur de puissance (DDEC)
X22	30-pole connector (DDEC)	30-polige connector (DDEC)	Connecteur 30 broches (DDEC)
X23	Engine sensor harness connector (DDEC)	Connector motorsensor harnas (DDEC)	Connecteur du harnais de capteur de moteur (DDEC)

	DEUTSCH	ESPAÑOL	SVENSKA
B7	Kraftstoffstandfühler	Sensor del nivel de combustible	Sensor - bränslenivå
B8	Kühlwassertemperaturfühler	Sensor de temperatura del refrigerante	Sensor - kylvätskans temperatur
B9	Öldruckfühler	Sensor de presión de aceite	Oljetryckssensor
F4	Sicherung 10A	Fusible 10A	Säkring 10A
F5	Sicherung 30A	Fusible 30A	Säkring 30A
G1	Batterie 24V	Batería de 24V	Batteri 24V
G2	Lademaschine	Generador de carga	Laddningsgenerator
H1	Instrumentenleuchte	Luz de panel	Panelljus
K0	Startermagnet	Solenoide de arranque	Startsolenoid
K5	Startrelais	Relé arrancador	Startrelä
M1	Startmotor	Motor de arranque	Startmotor
N4	Steuermodul	Módulo de control	Kontrollmodul
P6	Stundenzähler	Cuentahoras	Timmätare
P7	Meßinstrument für Kraftstoffstand	Indicador del nivel de combustible	Bränslenivåmätare
P8	Meßinstrument für Kühlwassertemperatur	Indicador de temperatura del refrigerante	Kylvätsketemperaturmätare
P9	Meßinstrument für Öldruck	Indicador de la presión de aceite	Oljetrycksmätare
R11	Spannungseinstellpotentiometer	Potenciómetro de ajuste de voltaje	Potentiometer för spänningsjustering
S1	Batterieschalter	Interruptor de batería	Batteriströmställare
S2	Not-Aus-Taste	Botón de parada de emergencia	Knapp för nödstopp
S6	Schalter für niedrigen Kühlmittelstand	Interruptor de nivel de refrigerante bajo	Brytare för låg kylvätskenivå
S7	Schalter für niedrigen Kraftstoffstand	Interruptor bajo nivel de combustible	Brytare för låg bränslenivå
S7'	Schalter für niedrigen Kraftstoffstand, Warnung	Interruptor bajo nivel de combustible, aviso	Brytare för låg bränslenivå, varning
S15	'Single/parallel'-Schalter	Interruptor Individual/Paralelo	Single/Parallel väljare
X10	15-poliger Stecker	Conector de 15 polos	15-poligt kontaktdon
X11	Stecker Kühlmittelstandschalter	Conector del interruptor de nivel de refrigerante	Brytaranslutning för låg kylvätskenivå
X15	15-poliger Stecker	Conector de 15 polos	15-poligt kontaktdon
X16	Stecker Steuermodul	Conector de módulo	Modul-kontaktdon
X17	Stecker für Kraftstoffstandeinheit	Conector unidad nivel de combustible	Bränslenivåenhetens kontaktdon
X20	Diagnosedatenbuchse (DDEC)	Casquillo para datos de diagnóstico (DDEC)	Uttag för diagnostikdata (DDEC)
X21	Starkstromstecker (DDEC)	Conector de alimentación (DDEC)	Strömanslutning (DDEC)
X22	30poliger Stecker (DDEC)	Conector con 30 polos (DDEC)	30-polig anslutning (DDEC)
X23	Stecker Motorsensorkabel (DDEC)	Conector de cableado sensor del motor (DDEC)	Anslutning för motorns sensorkabel (DDEC)

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	ITALIANO	NORSK	DANSK
B7	Sensore del livello di combustibile	Føler for drivstoffnivå	Brændstofniveauføler
B8	Sensore della temperatura del refrigerante	Føler for kjølevæsketemperatur	Kølevandstemperaturføler
B9	Sensore della pressionde dell'olio	Oljetrykkføler	Olietryksføler
F4	Fusibile 10A	Sikring 10A	Sikring 10A
F5	Fusibile 30A	Sikring 30A	Sikring 30A
G1	Batteria a 24V	Batteri 24 V	Batteri 24V
G2	Generatore di carica	Ladegenerator	Ladegenerator
H1	Luci del pannello	Panellys	Lampe
K0	Solenoide dell'avviatore	Magnetkontakt for starter	Startmagnet
K5	Relé di avviamento	Startrelé	Startrelæ
M1	Motore dell'avviatore	Starter	Startermotor
N4	Modulo di controllo	Kontrollmodul	Kontrolmodul
P6	Contaore	Timeteller	Timetæller
P7	Indicatore di livello del combustibile	Drivstoffmåler	Brændstofniveaumeter
P8	Indicatore della temperatura del refrigerante	Måler for kjølevæsketemperatur	Kølevandstermometer
P9	Indicatore della pressione dell'olio	Oljetrykkmåler	Manometer, olietryk
R11	Potenziometro regolazione voltaggio	Potensiometer for spenningskorrigering	Potentiometer til justering af spændingen
S2	Pulsante di arresto di emergenza	Knapp for sikkerhetsstopp	Nødstopknap
S6	Interruttore basso livello del liquido refrigerante	Bryter for lavt kjølevæskenivå	Kontakt for lavt kølevæskeniveau
S7	Interruttore di basso livello del combustibile	Bryter for lavt drivstoffnivå	Brændstofniveaukontakt
S7'	Interruttore di basso livello del combustibile, avvertimento	Bryter for lavt drivstoffnivå, varsel	Brændstofniveaukontakt, advarsel
S15	Interruttore singolo/in parallelo	Enkel/parallell-bryter	Enkelt/parallel-kontakt
X10	Connettore a 15 poli	15-polet kontakt	15 -faset kontaktklemme
X11	Connettore interruttore livello liquido refrigerante	Kontakt for kjølevæskenivåbryter	Kontaktkonnektor for kølevæskeniveau
X15	Connettore a 15 poli	15-polet kontakt	15 -faset kontaktklemme
X16	Connettore del modulo	Modulkontakt	Modulkontaktklemme
X17	Connettore dell'unitá livello del combustibile	Kontakt for drivstoffnivåenhet	Kontaktklemme for brændstofniveau
X20	Presa dati diagnostici (DDEC)	Feilsøkingskontakt (DDEC)	Fejlfindingsstikkontakt (DDEC)
X21	Connettore di alimentazione (DDEC)	Strømkontakt (DDEC)	Strømkonnektor (DDEC)
X22	Connettore a 30 poli (DDEC)	30-polet kontakt (DDEC)	30-pols konnektor (DDEC)
X23	Connettore cablaggio sensore motore (DDEC)	Kontakt for maskinføler (DDEC)	Følekonnektor ved motorens ledningsnet (DDEC)

	ΕΛΛΗΝΙΚΑ	PORTUGUÊS	SUOMI
B7	Αισθητήρας στάθμης καυσίμου	Sensor do nível de combustível	Polttoainemäärän anturi
B8	Αισθητήρας θερμοκρασίας ψυκτικού	Sensor da temperatura do refrigerante	Jäähdytysnesteen lämpötilan anturi
B9	Αισθητήρας πίεσης λαδιού	Sensor da pressão do óleo	Öljynpaineanturi
F4	Ασφάλεια 10Α	Fusível 10A	Varoke 10A
F5	Ασφάλεια 30Α	Fusível 30A	Varoke 30A
G1	Μπαταρία 24V	Bateria 24V	Akku 24V
G2	Φορτιστής γεννήτριας	Gerador de carga	Latausgeneraattori
H1	Λυχνία πίνακα	Luz do painel	Kojetaulun valo
K0	Σωληνοειδές εκκίνησης	Solenóide do motor de arranque	Käynnistyssolenoidi
K5	Αναμετάδοση Μίζας	Relé do motor de arranque	Käynnistysrele
M1	Μίζα	Motor de arranque	Käynnistysmoottori
N4	Στοιχείο ελέγχου	Módulo de controlo	Ohjainmoduli
P6	Ωρομετρητής	Contador de horas	Käyttötuntimittari
P7	Οργανο μέτρησης στάθμης καυσίμου	Indicador do nível de combustível	Polttoainemittari
P8	Οργανο μέτρησης θερμοκρασίας ψυκτικού	Indicador da temperatura do refrigerante	Jäähdytysnesteen lämpömittari
P9	Οργανο μέτρησης πίεσης λαδιού	Indicador da pressão de óleo	Öljynpainemittari
R11	Μετρητής δυνατότητας προσαρμογής τάσης	Potenciómetro de ajustamento da voltagem	Jäähdytysnesteen lämmitysvastus
S1	Διακόπτης μπαταρίας	Comutador da bateria	Akkukytkin
S2	Μπουτόν σβησίματος έκτακτης ανάγκης	Botão de paragem de emergência	Hätäpysäytyskytkin
S6	Διακόπτης χαμηλής στάθμης ψυκτικού	Interruptor do nível baixo do líquido de arrefecimento	Alhaisen jäähdytysnestemäärän kytkin
S7	Διακόπτης χαμηλής σταθμής καυσίμου	Comutador do nível baixo de combustível	Alhaisen polttoainemäärän merkkivalon kytkin
S7'	Διακόπτης χαμηλής σταθμής καυσίμου	Comutador do nível baixo de combustível, aviso	Alhaisen polttoainemäärän merkkivalon kytkin, varoitus
S15	Διακόπτης μεμονωμένης/παράλληλης λειτουργίας	Interruptor Único/Paralelo	Yksin/rinnan-kytkin
X10	15-πολικός σύνδεσμος	Ligação em 15 polos	15-napainen liitin
X11	Συνδεσμος διακόπτη στάθμης ψυκτικού	Dispositivo de ligação do interruptor do nível do líquido de arrefecimento	Jäähdytysnestemäärän kytkin
X15	15-πολικός σύνδεσμος	Ligação em 15 polos	15-napainen liitin
X16	Αναλογικός σύνδεσμος	Ligação do módulo	Moduliliitin
X17	Σύνδεσμος μονάδος στάθμης καυσίμου	Ligação da unidade do nível de combustível	Polttoainemäärän ilmaisimen liitin
X20	Υποδοχή διαγνωστικών πληροφοριών (DDEC)	Ficha de dados de diagnóstico (DDEC)	Diagnoosipistorasia (DDEC)
X21	Συνδεσμος ενέργειας (DDEC)	Ligação da corrente (DDEC)	Virtaliitin (DDEC)
X22	Συνδεσμος 30 πόλων (DDEC)	Dispositivo de ligação de 30 pinos (DDEC)	30-napainen liitin (DDEC)
X23	Συνδεσμος αισθητήρα στήριξης μηχανής (DDEC)	Dispositivo de ligação da instalação eléctrica do sensor do motor (DDEC)	Moottorintunnistinjohtosarjan liitin (DDEC)

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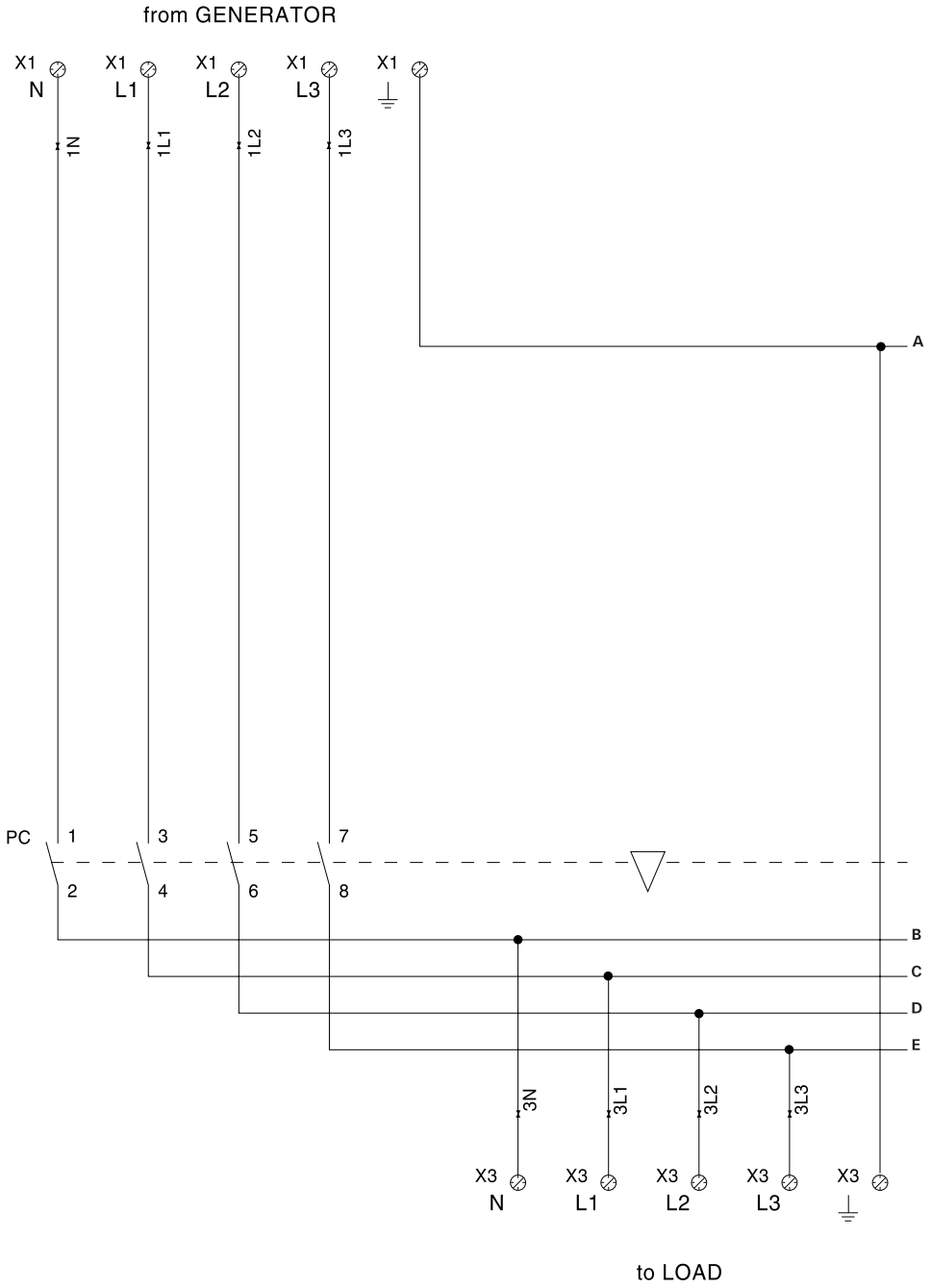
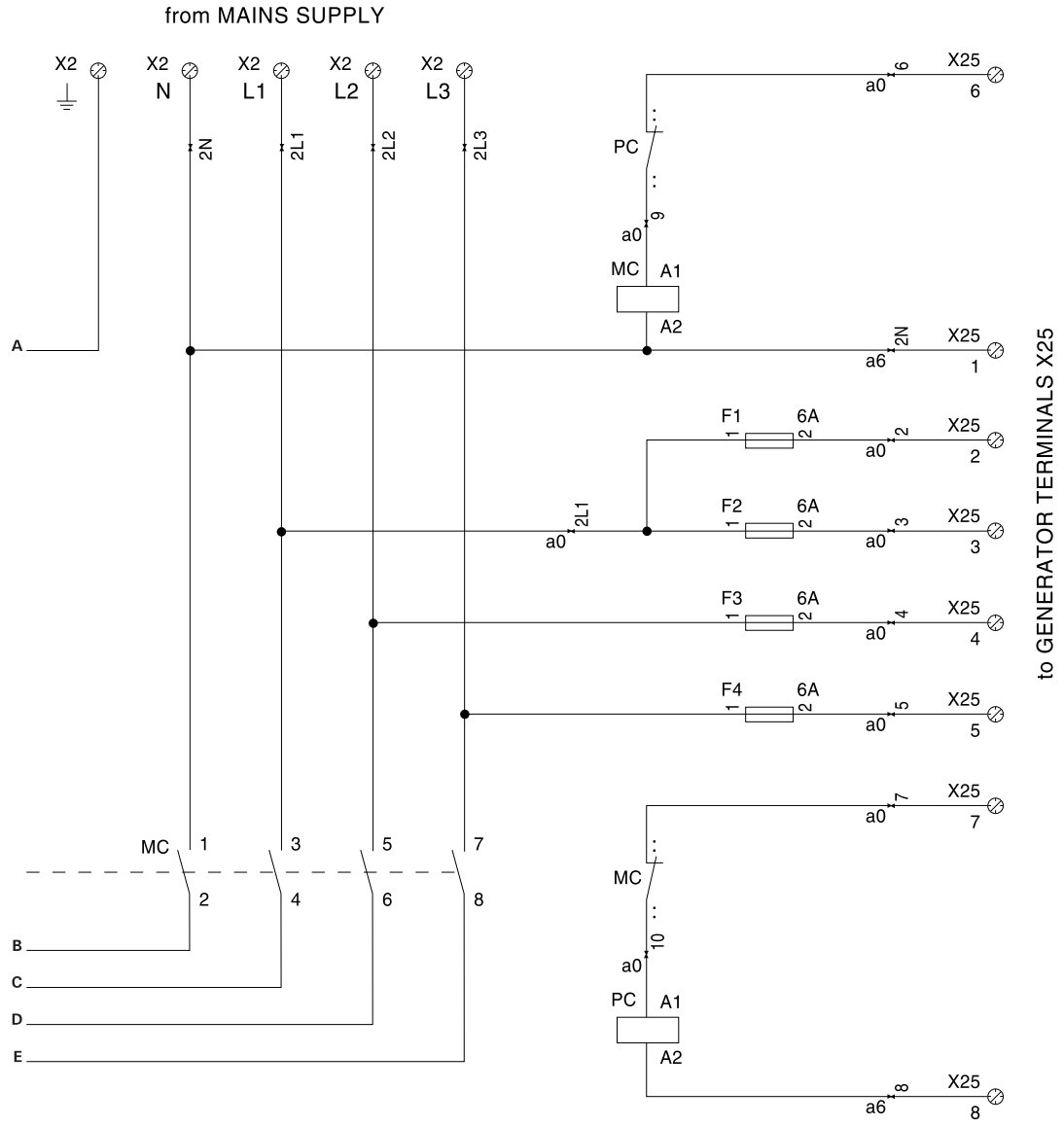
Applicable for Automatic Mains Failure (AMF)



NOTE:
For Single Phase applications:
*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.
*Disregard connections on L2 and L3.
Disregard connections on X25.4 and X25.5.
*connect LOAD between X3.N and X3.L1



for use with	Wire section .N, .l1-.L3	earth
QAS 14-38	16 mm²	16 mm²
QAS 48-78	50 mm²	25 mm²
QAS 108-138	70 mm²	35 mm²

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	ENGLISH	NEDERLANDS	FRANCAIS
F1-4	Fuse 6A	Zekering 6A	Fusible 6A
MC	Contactor mains supply	Contactor voor de netspanning	Alimentation secteur de contacteur
PC	Contactor generator	Contactor voor de generator	Générateur de contacteur
X1	Terminal strip	Klemmenstrook	Barrette de raccordement
X2	Terminal strip	Klemmenstrook	Barrette de raccordement
X3	Terminal strip	Klemmenstrook	Barrette de raccordement
X25	Terminal strip	Klemmenstrook	Barrette de raccordement

	DEUTSCH	ESPAÑOL	SVENSKA
F1-4	Sicherung 6A	Fusible 6A	Säkring 6A
MC	Schütz Netzanschlub	Suministro principal del contactor	Nätströmsanslutning
PC	Schütz Generator	Dínamo del contactor	Generatoranslutning
X1	Klemmenleiste	Bloque de terminales	Anslutningslist
X2	Klemmenleiste	Bloque de terminales	Anslutningslist
X3	Klemmenleiste	Bloque de terminales	Anslutningslist
X25	Klemmenleiste	Bloque de terminales	Anslutningslist

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	ITALIANO	NORSK	DANSK
F1-4	Fusibile 6A	Sikring 6A	Sikring 6A
MC	Alimentazione contattore	Kontaktorstrømforsyning	Kontaktor til strømforsyning
PC	Generatore del contattore	Kontaktorgenerator	Kontaktor til generator
X1	Morsettiera	Koplingssplint	Klemliste
X2	Morsettiera	Koplingssplint	Klemliste
X3	Morsettiera	Koplingssplint	Klemliste
X25	Morsettiera	Koplingssplint	Klemliste

	ΕΛΛΗΝΙΚΑ	PORTUGUÊS	SUOMI
F1-4	Ασφάλεια 6 A	Fusível 6A	Varoke 6A
MC	Παροχή ηλεκτρικών αγωγών επαφέα	Contactor de corrente principal	Verkkosyötön liitin
PC	Γεννήτρια επαφέα	Contactor do gerador	Generaattorin liitin
X1	Λωρίδα ακροδέκτη	Cablagem de terminais	Liitäntärima
X2	Λωρίδα ακροδέκτη	Cablagem de terminais	Liitäntärima
X3	Λωρίδα ακροδέκτη	Cablagem de terminais	Liitäntärima
X25	Λωρίδα ακροδέκτη	Cablagem de terminais	Liitäntärima

CIRCUIT DIAGRAM
ELEKTRISCH SCHEMA
SCHEMA DE CIRCUIT
VERDRAHTUNGSPLAN
DIAGRAMA DE CIRCUITOS
KOPPLINGSSCHEMA

DIAGRAMMA DEL CIRCUITO
KRETSSKJEMA
STRØMDIAGRAM
ΔΙΑΓΡΑΜΜΑ ΚΥΚΛΩΜΑΤΟΣ
DIAGRAMMA DOS CIRCUÍTOS
SÄHKÖKAAVIO