Instruction book for

AC Generators
25 through 200 KW

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From Following Serial number onwards:

699 000

Atlas Copco

Atlas Copco Compressors Inc.
161 Lower Westfield Road
Holyoke, MA 01041-0431

OWNERSHIP DATA

Unit model: _____ Owner's machine no.: _____

Engine type: _____ Unit service no.: _____

Delivery date: _____ Engine serial no.: _____

Service plan: _____ First start-up date: _____

Printed Matter Nos.

Atlas Copco instruction book: _____ Atlas Copco logbook: _____

Atlas Copco parts list: _____ Engine parts list: _____

Local Atlas Copco Representative

Name: _____

Address: _____

Telephone: _____ Contact persons: Service: _____

Telefax: _____ Parts: _____

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1 Safety precautions for generators

To be read attentively and acted accordingly before towing, operating or repairing the unit.

In addition to normal safety rules which should be observed with portable generators, the following safety directions and precautions are of special importance.

When operating this generator set, the operator is expected to employ safe working practices and to observe all related local work safety requirements.

The owner is responsible for maintaining the generator set in a safe operating condition. Generator set parts and accessories shall be replaced if unsuitable for safe operation.

Handling, operation, maintenance and repair shall only be performed by authorized, trained, competent personnel.

Normal ratings (temperatures, speeds, etc.) shall be permanently marked.

If any statement in this book, especially with regard to safety, does not comply with local legislation, the stricter of the two shall apply.

These precautions are general and cover several machine types and equipment, hence some statements may not apply to the unit described in this book.

Handling and operation

To lift a unit, all loose or pivoting parts, e.g. doors and drawbar, 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 rules.

It is strictly forbidden to dwell or stay in the risk zone under a lifted load. Lifting acceleration and retardation shall be kept within safe limits.

1. Operate the machine strictly as described in the Instruction Book to ensure safe, efficient performance.
2. Do not operate the machine where there is the risk, however small, of penetration of moisture in any way.
3. Ground the machine and the load properly.
4. Place the machine on level ground where ventilation is abundant. The engine exhaust is a lethal gas! When the unit is used in a confined space, conduct the engine exhaust to the atmosphere by a suitable pipe or hose.
5. If the unit is to operate in a place where some dust or moisture cannot be avoided, clean and dry it periodically. Excessive moisture causes deterioration of the generator insulation. If required, clean and dry the unit frequently.
6. Whenever an abnormal or doubtful condition arises, e.g. excessive vibration, noise, odor, etc., shut down and disconnect the unit immediately. Trace and correct the faulty condition before re-starting.
7. Inspect electrical cables periodically. Whenever damaged wires or dangerous conditions are observed, stop the unit immediately and replace the damaged wire or correct the dangerous condition before re-starting.
8. Avoid overloading the generator, which is provided with a circuit breaker for overload protection. When the breaker has been actuated, reduce the load before re-starting the machine.
9. Never remove the cover of the output terminals during operation. Ensure that voltage cannot be supplied when removing the cover of the output terminals and connecting or disconnecting wires.
10. When cleaning the machine, take care that moisture does not penetrate any component.
11. Never refill fuel while the generator is running. Keep fuel away from hot pipes. Do not smoke when fueling. When fueling from an automatic pump, a ground cable must be connected to the unit to discharge static electricity.
12. Never operate the unit in surroundings where there is a possibility of taking in flammable or toxic fumes.
13. Never operate the unit at speeds below or in excess of the limit ratings stated on the Principal Data sheet.
14. On water-cooled engines with closed cooling circuit, allow the unit to cool before removing a pressure cap.
15. All canopy doors shall be shut during operation. Ensure that any door that opens upwards is securely fastened when in open position.
16. Wear ear protectors when environmental noise can reach or exceed 90 dB(A).
17. Periodically check that:

a. All guards are in place and securely fastened.
b. All hoses and/or pipes inside the unit are in good condition, secure and not rubbing.
c. There are no fuel, oil or coolant leaks.
d. The tension of drive belts is correct.
e. All fasteners are tight.
f. All electrical leads are secure and in good order.
g. The engine exhaust system is in good condition.
h. The wheel nuts are tightened to the proper torque.(94 ft. lb.)

Units supplied with wheeled frame assemblies.

1. Before towing the generator:

a. Check the drawbar, the coupling of the towing vehicle, the brake system and the towing eye.
b. Check that the pivot wheel or stand leg is safely locked in the raised position.
c. Check that the wheels are secure and that the tires are in good condition and inflated correctly.
d. Connect the signalization cable, check all lights and connect the pneumatic brake couplers.
e. Attach the safety break-away cable to the towing vehicle.
f. Disengage the parking brake.

2. If the unit is to be backed up by the towing vehicle, disengage the overrun brake mechanism.
3. Never exceed the maximum towing speed of the unit.

4. Place the unit on level ground and apply the parking brake before disconnecting the unit from the towing vehicle. Un-clip the safety breakaway cable.
   When the unit has to operate in a fire-hazardous environment, the engine exhaust has to be provided with a spark arrestor to trap incendiary sparks.
6. When the unit is used in a confined space, conduct the engine exhaust to the outside atmosphere by a suitable pipe or hose. The exhaust contains carbon monoxide which is a lethal gas.

Maintenance

Maintenance 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.
2. Use only genuine spare parts.
3. All maintenance work, other than routine attention, shall only be undertaken when the generator is stopped. Ensure that the unit cannot be started inadvertently.
4. Before removing any electrical cables, effectively isolate the unit from all sources of electrical power.
5. Never use flammable solvents or carbon tetrachloride for cleaning parts. Take safety precautions against toxic vapors of cleaning liquids.
6. Scrupulously observe cleanliness during maintenance and when performing repairs. Keep dirt away by covering the parts and exposed openings with a clean cloth, paper or tape.
7. 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. Disconnect the alternator cables during arc welding on the unit.
8. Support the drawbar and the axle(s) securely if working underneath the unit or when removing a wheel. Do not rely on jacks.
9. Make sure that no tools, loose parts or rags are left in or on the unit.
10. Before clearing the unit for use after maintenance or overhaul, check that operating voltages, temperatures and speeds are correct and that the control and shutdown devices function correctly.
11. Do not remove any of, or tamper with, the sound-damping material.
12. Protect the electrical and regulating components, the air filter, etc. to prevent moisture from entering them, e.g. when steam-cleaning.
13. Battery safety precautions:

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

b. When batteries are being charged, an explosive gas mixture forms in the cells and might escape though 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.

Take care when connecting or disconnecting booster leads or fast charge cable clamps.

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, even if not expressly mention in this book, will be disclaimed by Atlas Copco.

This instruction book describes how to handle and operate the subject machine(s) to ensure safe operation, optimum working economy and long service life.

Read this book before putting the machine into operation to ensure correct handling, operation and proper maintenance from the beginning. The maintenance schedule contains a summary of the measures for keeping the unit in good repair. The maintenance procedures are simple but must be carried out regularly.

Keep the book available for the operator(s) and make sure that the unit is operated and that the maintenance actions are carried out according to the instructions. Record all operating data, maintenance work effected, etc. in the operator's logbook. Follow all applicable safety precautions, amongst others those mentioned on the cover or on the first few pages of this book.

Repair operations should be performed by trained personnel, available at Atlas Copco Service Outlets, which should be contacted if any further information is desired.

In all correspondence always mention the unit type, product number, and the complete serial number, shown on the data plate.

For all specific data not mentioned in the text, consult sections "Preventive Maintenance Schedule" and "Principal Data".

The company reserves the right to make changes without prior notice.

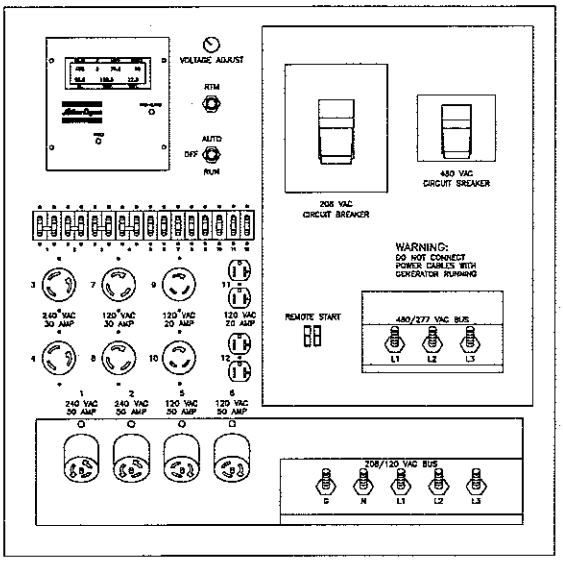

Fig. 1 Control panel

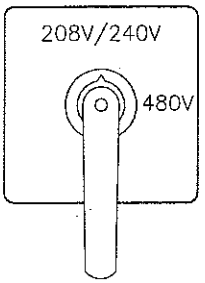

Fig. 2 Voltage Selector

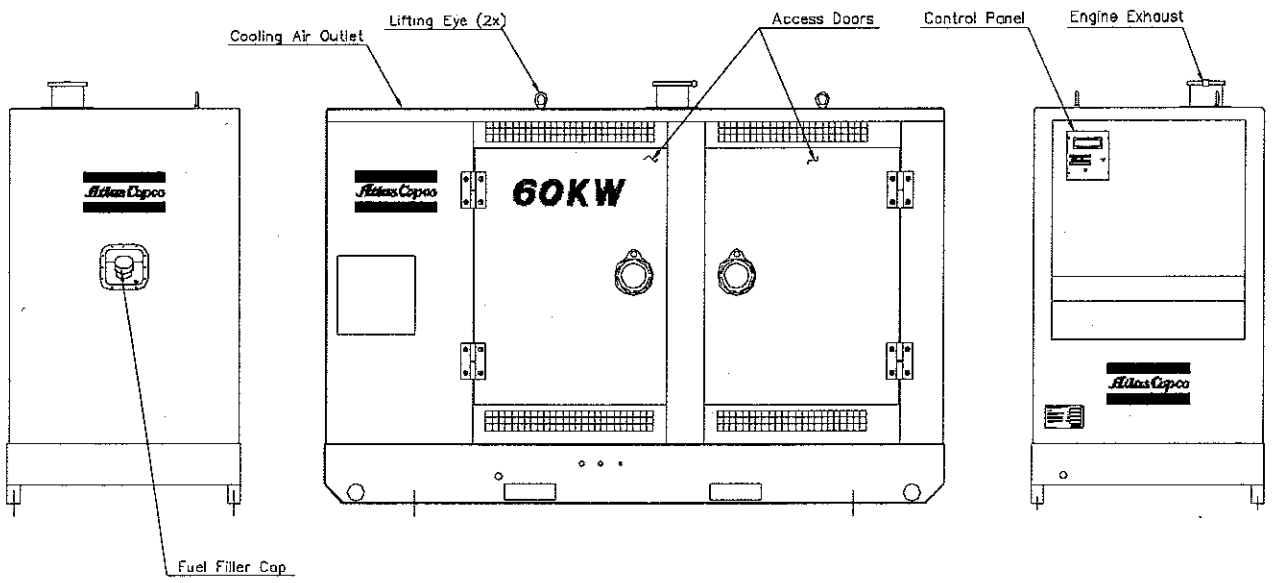

Fig. 3 Frame and Canopy

2 Leading Particulars

2.1 General Description

The Atlas Copco generators are of the synchronous type and can either operate at 50 or 60 Hz at different voltages. Generators are silenced and portable. Unit is designed to function as a stand-by unit or at locations where no electricity is available. The generator is a brushless type and has consequently no parts that wear out. The armature and field windings are of insulation class F, allowing a temperature rise in the windings of 105°C at a maximum ambient temperature of 120°F.

The control panel comprises (Fig. 1):

- Lighted LCD display panel with the following:
  - Running time hour meter
  - Amp
  - Voltage
  - Frequency
  - Fuel level
  - Engine oil pressure
  - Engine water temperature
  - Engine pre-alarm and shutdown indication for:
    - Overspeed
    - High water temperature
    - Low oil pressure
    - Low coolant level
    - Low fuel level
  - Factory programmed service name and telephone number
  - Voltage adjust rheostat
  - Main circuit breakers and individual circuit breakers for single phase receptacles
  - Lugs for three phase 480/277 VAC or 208/120 VAC connections
  - Starting switch
  - Terminal block for remote start connection

High (480/277 VAC) / low (208 -240/120 VAC) voltage selector switch located inside unit canopy (Fig.2). Power available at 120 and 480V three phase, 120 and 240V single phase simultaneously or 277 and 480V three phase. Main breakers (high and low voltage) are ground fault interupter (GFI) type.

2.2 Engine

The generator is driven by a liquid cooled diesel engine. Detailed description and instructions concerning the engine are compiled in the "Operation and Maintenance Manual" of the engine, supplied by its manufacturer. The generator stator is rigidly flanged to the engine casing via a coupling housing.

2.3 Power Transmission

The power from the engine is transmitted to the generator through a flexible steel disc type coupling. The generator housing is flanged/bolted to the engine flywheel housing for easy and permanent alignment.

2.4 Speed Regulation

Engine speed regulation is controlled by a mechanical governor. Speed regulation is maintained between 3-5%. Optional electronic governor yields speed regulation to within ± .25%.

2.5 Safety Devices

The engine is protected against overheating, low coolant level, and low oil pressure. Units are also equipped with a low fuel level shutdown switch. Generator is protected by an overspeed shutdown. All shutdowns are first out indication.

2.6 Frame and Axle (Optional)

The generator/engine assembly is supported by rubber buffers on the frame. Frame contains bulk head fittings for draining of coolant/water, oil, and fuel. Frame includes provisions for chain tie-downs and fork lift slots. Optional wheeled frame assembly is equipped with an axle with leaf springs. Wheeled frame assembly is painted with black polyurethane enamel. The drawbar is provided with a retractable prop to support the unit when parked, and with a towing eye or ball coupling. An optional auxiliary fuel tank can be mounted within the trailer frame perimeter for additional capacity. D.O.T. approved lights and safety chains for trailered units are supplied as standard. Wheeled units 100 KW and larger will be supplied on a tandem axle arrangement with surge brakes as standard.

2.7 Canopy

Reference Fig. 3

The generator/engine assembly, air intake filter, engine exhaust silencer, etc. are all enclosed in a rigid, sound insulated steel canopy. Sound levels will vary from 66 - 68 dB(A) depending on model, at 23 feet. All canopy parts are polyester powder coated prior to assembly. Lockable side doors provide easy access for routine operations and maintenance. The canopy is provided with ducts to distribute and expel cooling air, generated by the fan.

The side panels have openings for the air for cooling and combustion. The generator and engine cooling air is expelled through an opening in the rear roof panel, after passing through the radiator. Single point lifting eye protrudes through the roof. Fork lift slots are also provided for simplified rigging.

The instrument panel grouping with gauges, control switches, etc., is placed behind a lockable hinged door in the front panel.

2.8 General

The generator is furnished with a data plate showing the model, product number, serial number, maximum speed, and date of manufacture. Plate is located on lower left hand corner of unit front panel.(Fig. 3)

2.9 Range

The generator range comprises the following: 25, 35, 60, 100, 125, 150, 175, and 200 KW units. All ratings are for continuous duty 24 hour service.

3 Designation of parts

3.1 Operation of the Electrical System

Reference Fig. 7 & 8

1. Placing the selector switch in the "RUN" mode will initiate the start sequence:
   - The engine start contact will close the battery positive (+) to the motor starter relay.
   - Engine fuel contact will close battery positive (+) to the fuel solenoid.
   - LCD display will read "Starting Engine" during cranking.
   - Upon unit start-up, the start contact will open, disengaging the motor starter relay. Oil pressure, water temperature, frequency, and battery voltage are displayed on LCD display panel. AC volts and amperage values are scrolled through the three phases.
2. Placing the selector switch in the "AUTO" position sets the generator in remote start mode. LCD display will read "Unit in Auto", "Temperature", and "Battery Voltage". Closing the remote start terminal to ground will initiate the start sequence as noted in 3.1.1. If any faults occur in "AUTO", a manual reset is required before a restart can be initiated.

3.2 Electrical System and Shutdown Switches

The unit is equipped with a negative ground system.

The pressure, and temperature shutdown switches, fitted on the engine automatically stop the engine and thus prevent damage resulting from low engine oil pressure or high engine coolant temperature. A low fuel level shutdown switch prevents air from entering the fuel system from an empty fuel tank. Radiator contains a low coolant level switch that automatically stops the engine in the event of a coolant leak.

The solenoid of the engine fuel shutoff system is connected to the stop lever on the fuel injection pump. The solenoid must be energized for the engine to run.

Preset shutdown settings and limits are controlled by a microprocessor located on the pc board electronic controller. Settings and operating conditions are displayed on the lighted LCD display on the control panel.

3.3 Location and Function of the Shutdown Switches

3.3.1 Switch: Engine oil pressure

Location: Engine block.
Contact: Closes at rising oil pressure. (10-14 psig) Opens if oil pressure drops below 15 psig.
Result: Engine stops.

3.3.2 Switch: Engine coolant temperature

Location: Engine block.
Contact: Normally always closed. Opens if coolant temperature rises above 217°F.
Result: Engine stops.

3.3.3 Switch: Engine overspeed

Location: Engine coupling housing
Contact: Magnetic pick up. Converts engine RPM to frequency. Signals microprocessor to shutdown engine if frequency exceeds set point of 66 Hz.
Result: Engine stops.

3.3.4 Switch: Fuel level

Location: Fuel tank.
Contact: Sending unit, signals microprocessor to shutdown engine at a preset fuel level. LCD displays percentage of fuel remaining in tank. Warning indication at 10% fuel level. Prevents unit from running to a point where air enters the fuel system.
Result: Engine stops if unit continues to run until the 5% fuel level is reached.

3.3.5 Switch: Coolant level

Location: Radiator
Contact: Normally always open. Closes if coolant level becomes too low.
Result: Engine stops.

3.4 Control Panel

Set voltage selector switch located inside unit, to the desired voltage.

- Connect load cables to the correct stud terminals and/or receptacles.
- Set the main circuit breaker; which matches your voltage selection, to the "ON" position. Receptacle power is controlled by the individual circuit breakers.

4 Operating Instructions

4.1 Safety Precautions

The operator is expected to apply all related safety precautions, among others, those mentioned on the inside of the cover (or on the first few pages) of this book.

4.2 Installation, Parking, Towing and Lifting Instructions

1. Install the unit on a level and solid ground, floor, or base. When parking a unit, secure the nose wheel or prop to support the unit in a level position. Unit can be operated temporarily in an out-of-level position not exceeding 15°. Before towing the unit, ensure that the towing equipment of the vehicle matches the towing eye or ball connector of the unit. Secure wheel or prop in the "up" position. Unit is designed for a maximum towing speed of 50 MPH.
2. Locate the unit upwind, i.e. the control panel against the wind direction, away from contaminated and/or toxic enviroments.. Avoid recirculation of exhaust air from the engine. This causes overheating and engine power decrease.
3. For lifting the unit, the hoist has to be placed in such a way that lifting acceleration and retardation shall be kept within safe limits. Check the unit weight to ensure that properly sized lifting apparatus is used.
   For parking the unit, block the wheels and check that the pivot wheel or stand leg is securly positioned to support the unit drawbar, before disconnecting from the towing vehicle. Support the drawbar and the axle(s) securely if working underneath the unit or when removing a wheel. **Do not rely on jacks.**

4.3 Before Starting

1. Connect the battery for operation before initial start-up or after storage. Recharge if necessary.
2. With the unit standing level, check the engine oil. Add oil, if necessary, to the upper mark on the dipstick. Consult the Engine Instruction Manual for the type and viscosity grade of the engine oil.
3. Check the level of the engine coolant. The coolant level should be at the "Full cold" level on the overflow tank. Add coolant to the overflow tank, if necessary. Use a 50/50 glycol solution.
4. Check that the fuel tank contains sufficient fuel. Top up, if necessary. Consult the Engine Instruction Manual for the type of fuel. After initial filling, or if the unit has run out of fuel, vent the injection system as per Engine Manual. It is recommended to fill the tank after a day's operation to prevent moisture in a near empty tank from condensing.
5. Check the fan belt tension, correct as necessary. Refer to Engine Instruction Manual for proper tension.
6. Drain any water and sediment from the fuel/water separator.
7. Empty the dust trap of the air filter.
8. Check the air intake vacuum indicator. If the red part shows in the window, service or replace the filter element.
9. Open the side doors and visually inspect unit for traces of leakage, loose bolts and nuts, loose wire connections, etc.. Correct as necessary. Close and latch doors.
10. Turn the voltage selector switch located inside unit, to the desired voltage setting.
11. Connect load cables to the correct stud terminals and/or receptacles. **Note: The plexi-glass shields covering the connection stud terminals must be closed and latched before operation.** Opening the shields will activate the shunt circuit tripping the main circuit breaker.
12. The load should be switched off for initial start-up of the generator. Also, turn the generator circuit breaker to the "OFF" position. (For 3-Phase motor connections, check motor rotation, if incorrect, reconnect any two load leads to reverse rotation.)

4.4 Starting

1. Move "RUN-OFF-AUTO" toggle switch to "RUN" position to initiate the start sequence. (For Remote Start see section 4.4.2)
   - The engine start contact will close, connecting the positive side of the battery (+) to the starter motor relay.
   - Engine fuel contact will close, connecting the positive side of the battery (+) to the fuel solenoid.
   - LCD display will read "Starting Engine".

Control system features a built in over crank protection circuit.

- When the preset cranking cycle is reached, the start contact will open, disengaging the starter motor relay, and locking out the start circuit. Reset is required to reengage. There are 5 cranking cycles of 10 seconds duration. Should engine fail to start after the fifth cranking cycle, the crank contact and engine fuel contact will be opened and locked out. LCD display will read "Fault Over Crank". Check engine for faults. Reset by switching the toggle switch to "OFF" position and back to "ON".
- When engine starts, the built in "Start Check" feature monitors engine speed. If engine speed drops below crank termination speed, during the first 5 seconds of run, the engine fuel contact is opened, and engine speed is monitored while engine coasts to rest, preventing the starter motor from engaging. Restart sequence is initiated, after the engine speed equals zero.

- After "Start Check" feature the system enters an oil pressure bypass time delay.

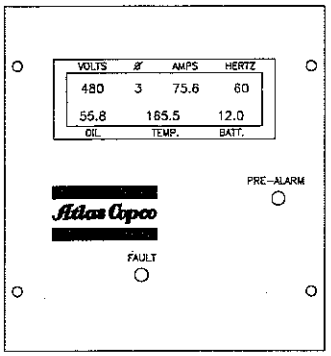

Fig. 4 LCD Display screen

- Oil pressure, water temperature, generator frequency (Hz), and battery voltage are continuously displayed on the LCD display, while AC volts and amperage values are scrolled (Fig. 4). Should a pre-alarm condition occur the pre-alarmed value will flash on the display, the amber LED will turn on, and prealarm relay closes.
- A shutdown fault such as low oil pressure, high engine temperature, overspeed, or overcrank will open and lock out the engine fuel contact. LCD display will display the fault condition, the red LED will turn on, and the fault relay will close. Manual reset is required before restarting.
- Depressing the "RTM" button will display the accumulated Running Time (Fig. 5). Continuing to hold the button will scroll shutdown set-points and sales and service information.

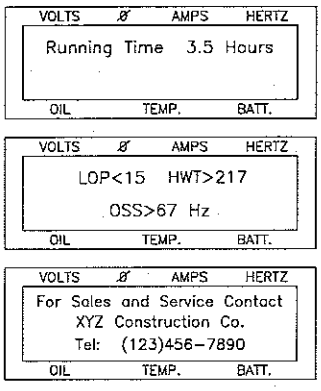

Fig. 5 Alternate LCD Display screens

2. Move "RUN-OFF-AUTO" toggle switch to "AUTO" for remote start capability.
   - LCD display will read "Unit in Auto" along with engine water temperature and battery voltage.
   - Closing the Remote Start Terminals by grounding will start the above described run sequence. Opening the circuit will stop the generator.
   - If any faults occur in "AUTO" mode, a manual reset; at the "RUN-OFF-AUTO" switch is required before restarting.

Notes:

a. If the engine fails to start consult the Engine Instruction Manual to localize the cause and remedy.
b. For starting in extremely cold conditions, consult the Engine Instruction Manual.

3. Run the engine for 1 - 2 minutes to warm up, prior to applying a load.
4. Check LCD display for any warnings. Check voltage indication on LCD display, and, if required, adjust the voltage rheostat located on the unit control panel. Turning clockwise increases the voltage and vice versa.
5. Close the unit main circuit breaker, i.e. move handle to "ON" position to start power transmission.
6. Check voltage indication once more and adjust if necessary.

4.5 During Operation

The side doors must be closed during operation and may be opened for short periods only (e.g. to carry out checks).
Regularly carry out following checks:

1. Check the LCD display for normal operating conditions.
2. Check for normal color of engine exhaust, any abnormal sound or vibration.
3. Check for any leakage of oil, fuel, or coolant.
4. Vacuum indicator. If the red part is full out, stop the unit. If it remains full out, service or replace the filter element.

4.6 Stopping

1. Open the disconnect switch in the load line.
2. Open the unit main circuit breaker, i.e. shift handle to "OFF" position.
3. Allow engine to run for at least 2 minutes.
4. Shift the "RUN - OFF - AUTO" toggle switch to the "OFF" position.

5 Maintenance

5.1 Preventive Maintenance Schedule

ie schedule contains a summary of the maintenance instructions. Read the respective section before taking maintenance measures.

When servicing, replace all disengaged packings (e.g. gaskets, O-rings, washers).

Some engine maintenance is also listed in the schedule. Refer to the Engine Instruction Manual for full maintenance.

The "longer interval" checks must include the "shorter interval" checks.

Period 1)	Running Hours 1)	Operation	Consult Section	See Note
		Before Starting		
Daily	-----	Check engine oil level	4.3	
	-----	Check engine coolant level	4.3	1
	-----	Empty air filter dust trap	5.3.1	
	-----	Check air intake vacuum indicator	5.3.1	
		Service filter element if an indicator shows red		
	-----	Drain water from fuel filter and tank if necessary.	5.5	2
	-----	Check that generator disconnect switch is in "OFF" position	4.3	
		During Operation		
	-----	Check control panel LCD display.	4.5/8.1	
	-----	Check engine exhaust.	4.5	
	-----	Check for leakage of fuel, oil, or coolant.		
		At End of Each Day's Operation		
	-----	Fill fuel tank		3
Weekly	-----	Clean unit externally.		7
	-----	Check terminals of battery.	5.2.6	
	-----	Check tire pressure. (If trailer mounted)		
	-----	Inspect for fuel, coolant, or oil leaks.		
	50	Service air filter elements.	5.3.2	4
Monthly	-----	Charge battery if necessary.	5.2.5	
3-Months	-----	Clean radiator, if necessary.	5.4	
	-----	Check wheel nuts for tightness. (If applicable)		
	200	Replace the fuel filter.	5.5	6
	400	Drain water and sediment from fuel tank.	5.5	2
Yearly	-----	Test air filter vacuum indicator.	5.3.1	
	-----	Test temperature, oil pressure shutdown switches.	5.6	
	-----	Repack wheel bearings. (If applicable)		5
	1000	Replace air filter element.	5.3.2	4
	3000	Have unit inspected by an Atlas Copco Service Representative.		

Recommendations: Keep the bolts of the bodywork, trailer, etc. securely tight.

1) Whichever interval comes first. The local sales company may overrule the maintenance schedule, especially the service intervals, depending upon the environmental and working conditions of the generator.

Notes:

1. Use soft water. If ambient temperature could drop to freezing point, add antifreeze. (50/50 Glycol solution)
2. Drain until clean fuel flows from the drain cock.
3. Filling at end of each day's operation prevents moisture condensing on inside walls of tank and contaminating fuel with water.
4. More frequently when operating in a dusty atmosphere.
5. Use ball bearing grease for the wheel bearings.
6. Replace the fuel filter regularly. Gummed or clogged filters mean starvation and reduced engine performance.
7. Clean with water and soap or by steam-cleaning.

5.2 Specifications

5.2.1 Engine

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

5.2.2 Battery Care

Before handling batteries, read the concerned safety precautions and act accordingly. An ASB (Service Bulletin) dealing elaborately with batteries and due care is available on request.

5.2.3 Battery Type

The battery is either a low maintenance or maintenance-free BCI group size 31.

5.2.4 Electrolyte

Electrolyte in batteries is a sulfuric acid solution in distilled water, the specific gravity of which shall be 1.280 for moderate climatic conditions, 1.230 for tropical conditions.

5.2.5 Recharging Battery

Use a commercial automatic battery charger according to its manufacturer's instructions.

The duration of charging depends upon the percentage of discharge. The battery can be considered charged when the battery voltage does not change in a period of 2 hours charging.

5.2.6 Battery Maintenance

Keep the battery clean and dry. Keep the terminals and clamps tight, clean, and lightly covered with petroleum jelly.

5.3 Air Filter

All air passes through the dry-type paper element to remove dust before entering the engine.

Filter is a two stage dry-type with a rubber dust evacuator.

Filter is provided with a vacuum indicator. Service the filter if an indicator shows completely red. Nevertheless, the filter is to be serviced or replaced at the prescribed intervals.

5.3.1 Recommendations

1. The indicator can be reset by pushing the knob in the extremity of the body.
2. Never remove an element while the compressor is running.
3. The elements may be washed not more than three times.
4. For minimum generator downtime, replace the dirty element by a new or cleaned one.
5. New elements must also be inspected for tears or punctures before installation.
6. Discard the element when damaged or torn.

5.3.2 Servicing

1. Remove retaining nut and withdraw the element from housing. If the element is to be serviced for immediate re-use, cover the open housing to protect the air intake system while cleaning the element.
2. Reassemble in reverse order of dismantling.
3. Inspect and tighten all air connections. If the filter has been dented or damaged, check all the connections immediately. In case of leakage and if adjustment does not correct the trouble, replace the necessary parts.

5.3.3 Cleaning the Element

Carefully knock the end faces on a flat surface to remove the dry contaminant. Never strike on a hard surface. Then blow dry air up and down the pleats in the reverse direction of normal flow; subsequently blow up and down the pleats on both sides of the element. The air pressure(e) may not exceed (100 psi) and a reasonable distance must be maintained between the hose nozzle and the pleats.

If contaminant is oily, soak the element for 10 minutes in lukewarm water in which a non-foaming detergent is dissolved. A recommended detergent is Donaldson D-1400. Then, move the element to and fro in the solution for 5 minutes.

Rinse with soft water until the drain water is clear. Let the element dry. Never use compressed air or heat to hasten drying.

Inspect the element by placing a light inside it. Spots or ruptures of the paper render the element unfit for further use.

5.4 Radiator

Keep the radiator clean to maintain the cooling efficiency.

Remove any dirt from the radiator with a fiber brush. Never use a wire brush or metal objects. Then clean by air jet in reverse direction of normal flow.

If the dirt is oily, wash radiator with fuel or a cleansing agent. A spray gun should preferably be used to apply the solvent to the fins. Rinse by means of a water jet after a soaking-in period. Steam cleaning may also be applied. Do not leave liquids behind.

Note: Protect the electrical and regulating equipment, air filters, etc. against penetration of moisture.

5.5 Fuel System

The fuel filter assembly strains out water and impurities from the fuel. The fuel system consists of a remote mounted primary and an engine mounted secondary filter elements. Both filter elements have a drain plug and a vent plug.

5.5.1 Draining the Filter

Consult the Engine Instruction Manual for engine mounted filter. Remote mounted filter is drained by opening the drain valve at the bottom of the see through bowl.

5.5.2 Replacing the Filter

Consult the Engine Instruction Manual.

5.5.3 Air-Venting the Fuel System

Whenever air has entered the system, it is necessary to air-vent, as otherwise the engine will either start with difficulty or not at all. For all particulars, consult the Engine Instruction Manual.

5.6 Testing of Shutdowns

5.6.1 Overcrank

Disconnect fuel system and starter motor. Place toggle switch in "RUN" position. Engine will operate through 5 crank cycles after which the crank relay and engine fuel relay will lock out, fault relay will close, red LED will turn on, and LCD display will read "Fault Overcrank". Manually reset, by switching the unit to the "OFF" position, then "ON" before restarting.

5.6.2 Overspeed

Place toggle switch in "RUN" position to start the engine. Manually increase engine speed until "Overspeed" is achieved. Fuel contact will open and lock out, fault relay will close, red LED will turn on, and LCD display will read "Fault Overspeed". Manually reset before restarting.

5.6.3 Temperature Shutdown Switch

Place toggle switch in "RUN" position to start the engine. Manually ground the engine temperature sender to the engine block. Fuel contact will open and lock out, fuel relay will close, red LED will turn on, and LCD display will read "Fault High Engine Temperature". There is a 5 second delay on this fault. Manually reset before restarting.

5.6.4 Engine Oil Pressure Shutdown Switch

Place toggle switch in "RUN" position to start the engine. Remove the wire from the oil pressure sender. Fuel contact will lock out, fault relay will close, red LED will turn on, and LCD display will read "Fault Low Oil Pressure". There is a 5 second delay on this fault. Manually reset before restarting.

6 Storage

If a unit is to be left standing idle or to be stored for a long period of time, the engine, generator, especially the armature and field windings, and the electrical control equipment must be protected against corrosion caused by dampness and condensation. The oil film should be renewed, e.g. once a week, by running the unit until warm. Keep the doors of the unit shut after warming up. If it is disadvantageous or impossible to run the unit once a week, special precautions must be taken to protect the unit form corrosion.

- Thoroughly clean the unit inside and outside.
- Drain the engine oil, fuel, and coolant.
- Replace oil and fuel filters.
- Disconnect and remove the battery. Store it where freezing cannot occur.
- Consult the "Operation and Maintenance Manual" for storing the engine.
- Affix a label to the control panel, clearly stating that oil, fuel and cooling systems are empty.
- Place a quantity of active silica gel bags, VCI (volatile corrosion inhibitor) paper or another drying agent of ample capacity, inside the unit and close the doors.
- Cover all openings in the bodywork with VCI paper.
- Cover the unit, except the bottom, with a plastic bag.
- Store the unit in a dry, ventilated area where the temperature fluctuations are as small as possible.
- Support the unit on wooden beams, evenly spaced to distribute the load over the total bearing surface.

Adherence to these precautions will protect the unit for up to one year in favorable climate conditions. In adverse conditions, the protection is valid for half a year at the most. Consult Engine/Generator Instruction Manuals for long term storage procedures.

7 Principal Data

ATLAS COPCO PORTABLE GENERATOR SPECIFICATION

MODEL	25 KW	35 KW	60 KW
GENERATOR:			
PRIME KW RATING	26	37	60
PRIME KVA RATING	32	46	75
GENERATOR MAKE	LIMA SER	LIMA SER	LIMA SER
GENERATOR MODEL	1209	1351	1354
RATED AMBIENT TEMPERATURE °F	120	120	120
RATED SPEED	1800	1800	1800
VOLTAGE REGULATION	1%	1%	1%
CIRCUIT BREAKER LOW VOLTAGE	90A	125A	225A
CIRCUIT BREAKER HIGH VOLTAGE	40A	50A	90A
MOTOR STARTING CAPABILITIES	10HP	15HP	30HP
DIESEL ENGINE			
ENGINE MAKE	JOHN DEERE	JOHN DEERE	JOHN DEERE
MODEL	3179D	4039D	4039T
HORSEPOWER @ 1800 RPM	47	66	102
ENGINE TYPE	INLINE	INLINE	INLINE
NUMBER OF CYLINDERS	3	4	4
ASPIRATION	NATURAL	NATURAL	TURBO-CHARGED
AIR FILTER TYPE	2-STAGE/DRY	2-STAGE/DRY	2-STAGE/DRY
DISPLACEMENT CID	179	239	239
BORE X STROKE in.	4.19 X 4.33	4.19 X 4.33	4.19 X 4.33
COMPRESSION RATIO	16.8:1	17.8:1	17.8:1
BATTERY VOLTAGE VDC	12	12	12
ALTERNATOR	78A	78A	78A
SPEED REGULATION	3-5 %	3-5 %	3-5 %
OIL SUMP CAPACITY qts.	6.3	10	14
FUEL CAPACITY gal.	30	50	50
RACOR WATER/FUEL SEPARATOR	STANDARD	STANDARD	STANDARD
FUEL CONSUMPTION			
25% LOAD gal./hr.	.8	1	1.4
50% LOAD gal./hr.	1.2	1.6	2.3
75% LOAD gal./hr.	1.7	2.2	3.2
100% LOAD gal./hr.	2.1	2.9	4.8
PRE-ALARM AND SAFETY SHUTDOWNS FOR:			
OVERSPEED	STANDARD	STANDARD	STANDARD
HIGH WATER TEMPERATURE	STANDARD	STANDARD	STANDARD
LOW WATER LEVEL	STANDARD	STANDARD	STANDARD
LOW OIL PRESSURE	STANDARD	STANDARD	STANDARD
OUTPUT VOLTAGE:			
120/240 SINGLE PHASE	STANDARD	STANDARD	STANDARD
120/208 THREE PHASE	STANDARD	STANDARD	STANDARD
277/480 THREE PHASE	STANDARD	STANDARD	STANDARD

MODEL	25 KW	35 KW	60 KW
OUTLET CONNECTIONS:			
1/2" STUDS 3 PHASE	STANDARD	STANDARD	STANDARD
20A-125V DUPLEX	2	2	2
20A-125V TWISTLOCK	1	1	1
30A-250V TWISTLOCK	1	1	1
50A-125V TEMP. POWER	1	1	1
50A-125/250V TEMP POWER	1	1	1
30A-125V.TWISTLOCK	1	1	1
SOUND LEVEL @23 FEET dB(A)	67	67	66
DIMENSIONS: (SKID MOUNTED)			
LENGTH ins.	84	96	96
WIDTH ins.	36	36	36
HEIGHT ins.	48	60	60
WEIGHT lbs.	1700	2150	2975
DIMENSIONS: (TRAILER MOUNTED)		SINGLE AXLE TRAILER*	
LENGTH ins.	133	157	157
WIDTH ins.	71	77	77
HEIGHT ins.	74	86	86
WEIGHT lbs.	2500	3025	3850

* SINGLE AXLE TRAILERS INCLUDE D.O.T. APPROVED LIGHTS AND SAFETY CHAINS. SURGE BRAKES ARE OPTIONAL.

MODEL	100KW	125KW	150KW	175KW	200KW
GENERATOR:					
PRIME KW RATING	100	126	150	180	200
PRIME KVA RATING	125	158	188	225	250
GENERATOR MAKE	Lima Ser	Lima Ser	Lima Ser	Lima Magna-Plus	Lima Magn-Plus
GENERATOR MODEL	811	812	813	1265	1266
RATED AMBIENT TEMP. °F	120	120	120	120	120
RATED SPEED	1800	1800	1800	1800	1800
VOLTAGE REGULATION	1%	1%	1%	1%	1%
CIRCUIT BREAKER LOW VOLTAGE	350A	450A	500A	600A	700A
CIRCUIT BREAKER HIGH VOLTAGE	150A	200A	225A	250A	300A
MOTOR STARTING CAPABILITIES	40 HP	50 HP	75 HP	75 HP	100 HP
DIESEL ENGINE					
ENGINE MAKE	JOHN DEERE	JOHN DEERE	JOHN DEERE	JOHN DEERE	JOHN DEERE
MODEL	6059T-166	6076T-211	6076A-250	6076A-300	6101H-375
HORSEPOWER @ 1800 RPM	166	211	250	300	375
ENGINE TYPE 4 CYCLE	INLINE	INLINE	INLINE	INLINE	INLINE
NUMBER OF CYLINDERS	6	6	6	6	6
ASPIRATION	TURBO	TURBO	TURBO-AFT	TURBO-AFT	TURBO-AFT
AIR FILTER TYPE	2-STAGE/DRY	2-STAGE/DRY	2-STAGE/DRY	2-STAGE/DRY	2-STAGE/DRY
DISPLACEMENT CID	359	466	466	466	466
BORE X STROKE in.	4.19 X 4.33	4.56 X 4.75	4.56 X 4.75	4.56 X 4.75	5.12 X 5.00
COMPRESSION RATIO	17.8:1	15.5:1	15.5:1	15.5:1	15.75:1
BATTERY VOLTAGE VDC	12	12	12	12	12
ALTERNATOR	78A	78A	78A	78A	78A
SPEED REGULATION	3-5 %	3-5 %	3-5 %	3-5 %	3-5 %
OIL SUMP CAPACITY qts.	18	26	26	26	37.5
FUEL CAPACITY gal.	80	80	80	80	80
RACOR WATER / FUEL SEPARATOR	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD

MODEL	100KW	125KW	150KW	175KW	200KW
FUEL CONSUMPTION					
25% LOAD . . . . . gal./hr.	2.4	3	3.4	4.2	4.8
50% LOAD . . . . . gal./hr.	4	5.6	6.2	7.3	8.4
75% LOAD . . . . . gal./hr.	5.9	8	9	10.8	12.4
100% LOAD . . . . . gal./hr.	7.9	10.5	11.7	14.4	16.6
PRE-ALARM AND SAFETY SHUTDOWNS FOR:					
OVERSPEED	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD
HIGH WATER TEMPERATURE .	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD
LOW WATER LEVEL	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD
LOW OIL PRESSURE	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD
OUTPUT VOLTAGE:					
120/240 SINGLE PHASE	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD
120/208 THREE PHASE	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD
277/480 THREE PHASE	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD
OUTLET CONNECTIONS:					
1/2" STUDS 3 PHASE	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD
20A-125V DUPLEX	4	4	4	4	4
20A-125V TWISTLOCK	2	2	2	2	2
30A-250V TWISTLOCK	2	2	2	2	2
50A-125V TEMP. POWER	2	2	2	2	2
50A-125/250V TEMP POWER . .	2	2	2	2	2
30A-125V. TWISTLOCK	2	2	2	2	2
SOUND LEVEL @23 FEET . . dB(A)	66	66	68	68	68
DIMENSIONS: (SKID MOUNTED)					
LENGTH . . . . . ins.	120	120	120	120	120
WIDTH . . . . . ins.	48	48	48	48	48
HEIGHT . . . . . ins.	66	66	66	66	66
WEIGHT . . . . . lbs.	4000	5075	5500	5800	5800
DIMENSIONS: (TRAILER MOUNTED)			TANDEM AXLE TRAILER**		
LENGTH . . . . . ins.	184	184	184	184	184
WIDTH . . . . . ins.	90	90	90	90	90
HEIGHT . . . . . ins.	93	93	93	93	93
WEIGHT . . . . . lbs.	5200	6275	6700	7000	7000

**TANDEM AXLES TRAILERS INCLUDE D.O.T. APPROVED LIGHTS,SAFETY CHAINS,WITH SURGE BRAKES AS STANDARD.

7.1 Settings of shutdown switches

	Makes	Pre-alarm	Breaks	Unit
Engine oil pressure, approx	10-14	20	15	psig
gine coolant	---	200	217	°F
w coolant temperature		0		°F
Battery voltage, high		15		VDC
Battery voltage, low		12.5		VDC
Overspeed			67	Hz

7.2 Generator formulas

To find	Known values	Three Phase
KW	Volts, Current, Power Factor	(E x I x 1.73 x PF) / 1000 = kVA x PF
KVA	Volts, Current	(E x I x 1.73) / 1000 = kW / PF
RKVA	Volts, Current, Power Factor	(E x I x 1.73 x $\sqrt{(1 - (PF)^2)}$) / 1000
Hp - Engine	Generator kW, Generator Eff. Radiator Fan Horsepower Battery Charging Generator hp	KW / (Efficiency x .746) + Fan hp + Alt. hp
Kw - Motor	Motor hp, Efficiency	(Hp x .746) / Efficiency
KVA - Motor	Motor hp, Eff., Power Factor	(Hp x .746) / (Efficiency x PF)
Amps	Hp, Volts	(Hp x .746) / (1.73 x E x Efficiency x PF)
Amps	KW, Volts, Power Factor	(KW x 1000) / (E x 1.73 x PF)
equency	Rpm, Poles	(Rpm x Poles) / (2 x 60)
oles	Frequency, rpm	(2 x 60 x Frequency) / rpm
Rpm	Frequency, Poles	(2 x 60 x Frequency) / Poles

7.3 Wiring

7.3.1 Trailer Lights

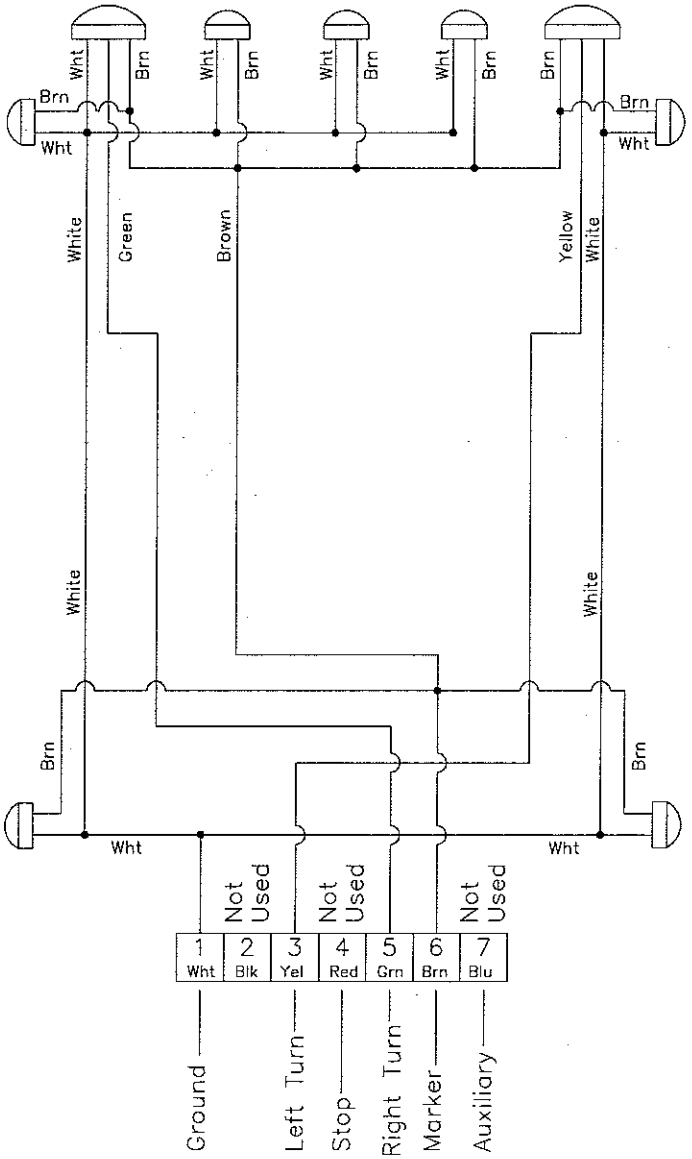

Fig. 6 Wiring Diagram - Trailer Lights

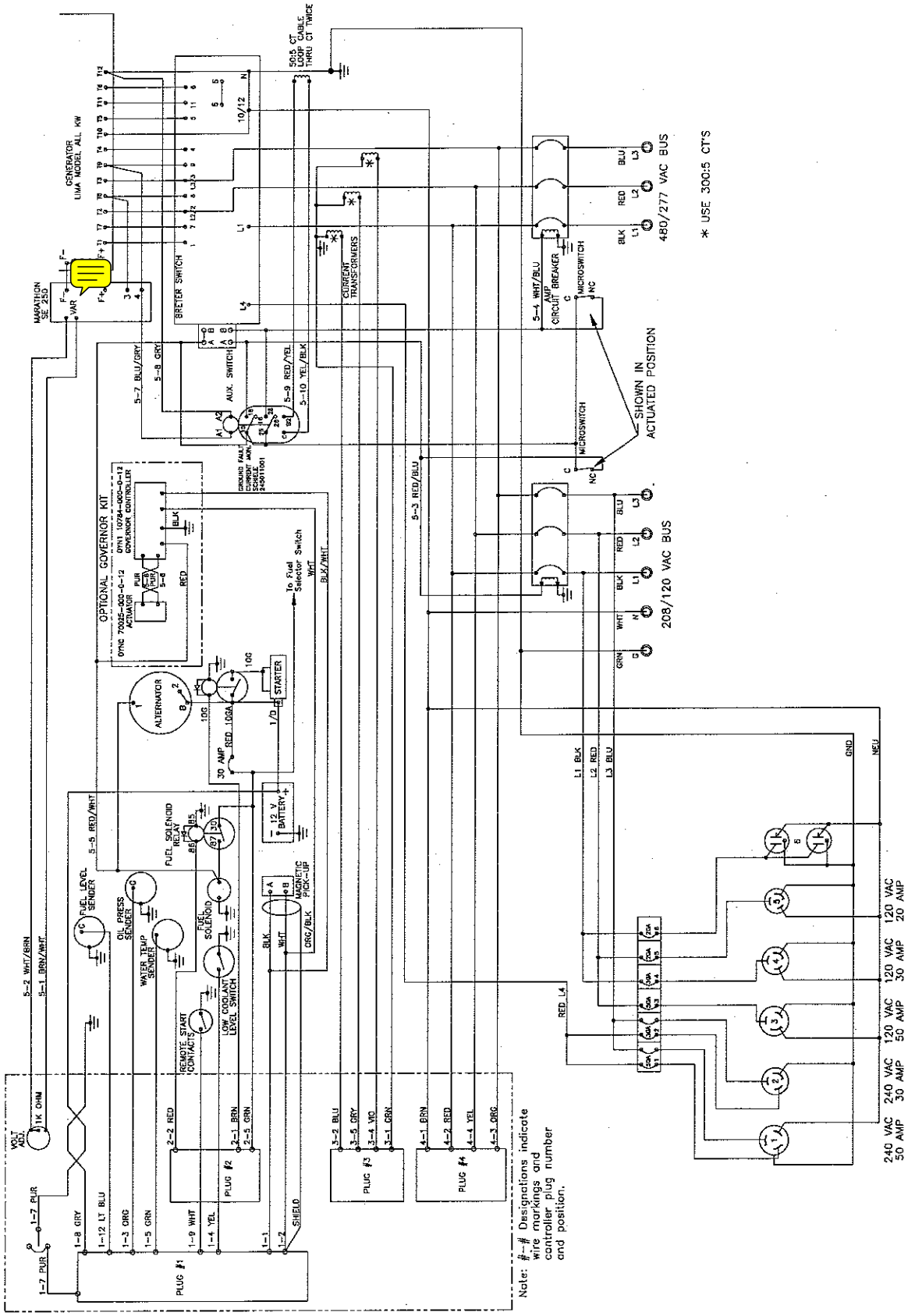

Fig. 7 Wiring Diagram 25, 35, 60 KW

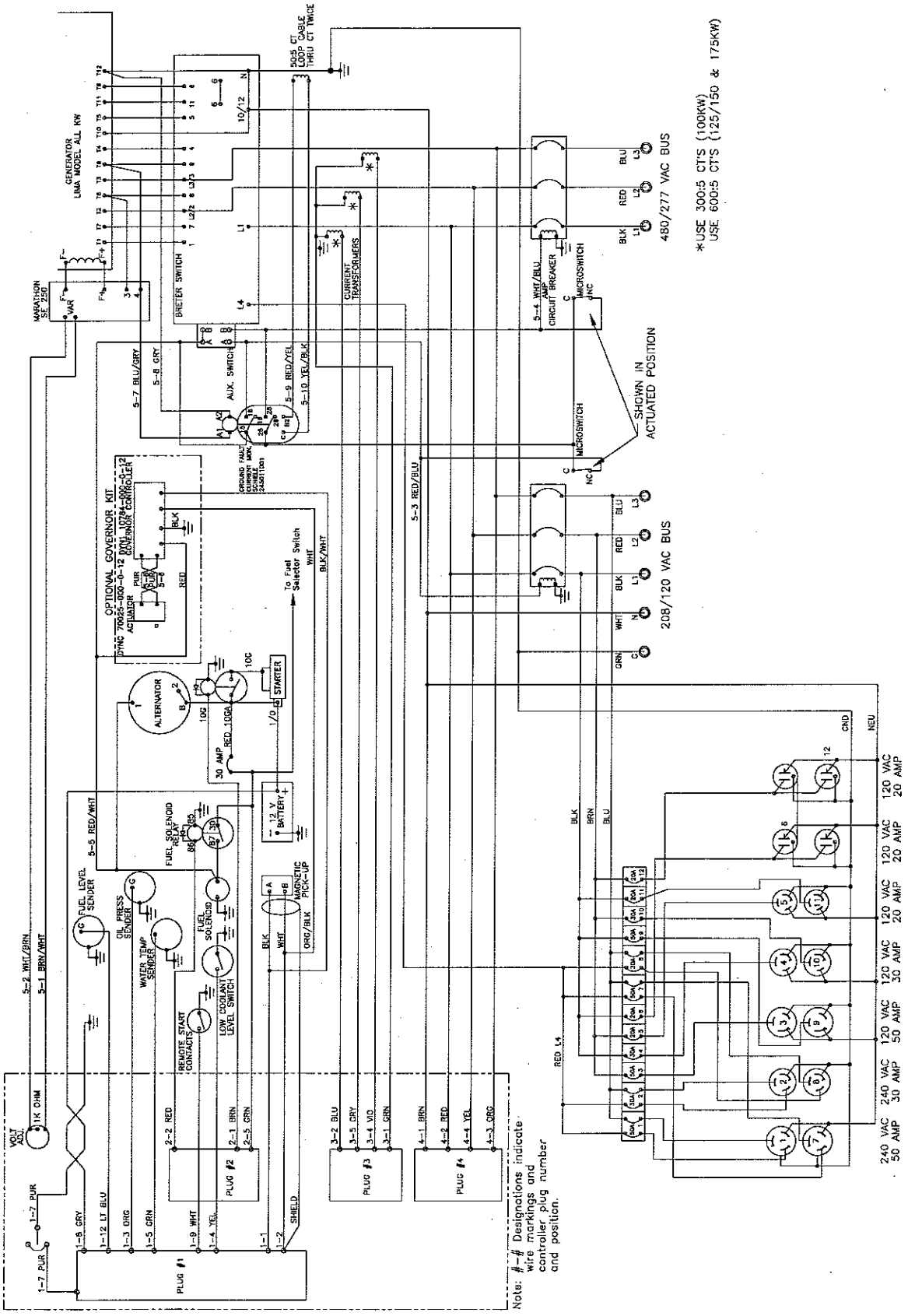

Fig. 8 Wiring Diagram 100, 125, 150, 175 KW

8 Problem Solving

The chart helps to solve problems. It is assumed that the engine is in good condition and that there is adequate fuel to the filters and injection equipment.

An electrical fault must be traced by an electrician. Make sure that the wires are not chafed, damaged or broken and that they are clamped tight to their terminals.

Alternator precautions

1. Never reverse the polarity of the battery(ies) or alternator.
2. Never break any alternator or battery connections while the engine in running.
3. When recharging the battery(ies), disconnect it (them) from the alternator. Before using booster cables to start the engine, be sure of the polarity and connect the batteries correctly.
4. Never operate the engine without the main or voltage-sensing cables connected in the circuit.

Mechanical faults and their suggested remedies

Conditions of the unit, always proceeded by a number, are printed in bold. Each possible fault is followed by its related suggested remedy and both are proceeded by the same letter.

1. Starting attempt fails; starter motor does not run
No, or insufficient ground connection
Check and correct as necessary
Discharged battery
b. Charge or replace battery
c. Starter switch out of order
c. Test switch, replace if defective
d. Starter motor out of order
d. Test motor, replace if defective

2. Starting attempt fail, starter motor runs
a. Fuel shortage of air locked
a. Fill tank and vent fuel system
b. Fuel filter choked
b. Replace filter
c. Air filter choked
c. Service filter

3. Engine starts but fails to reach normal speed
a. See caused 2a, 2b, and 2c
a. See remedies 2a, 2b, and 2c
b. Engine speed governor malfunctioning
b. Check and correct as necessary
c. Insufficient engine compression
c. Inspect engine, repair as necessary

4. Unit runs but produces abnormal noise and/or vibration
a. Improper tightening of components
a. Check bolts and nuts for tightness
b. Coupling bolts loose
b. Tighten coupling bolts
c. Coupling disc damaged or worn
c. Replace disc
d. Generator bearing worn or damaged
d. Replace bearing

5. Unit runs but voltage does not register
a. Volt meter defect
a. Replace meter
b. Automatic voltage regulator out of order
b. Replace regulator
c. Quenched residual magnetism
c. Have magnetism re-excited
d. Rotary rectifier defect or burned
d. Check and repair or replace as necessary
e. Disconnected rotor winding
e. Check and repair as necessary
f. Burned generator winding
f. Have generator winding repaired

6. Voltage registers but does not reach rated value
a. Engine speed too low
a. Check and correct, as necessary
b. See causes 5a, 5b, 5c, 5d, and 5e
b. See remedies 5a, 5b, 5c, 5d, and 5e
c. Burned generator wiring
c. Have generator winding repaired

7. Voltage exceeds rated valve
a. Voltage regulator maladjusted
a. Adjust manual voltage regulator
b. See causes 5c
b. See remedies 5c

8. Applied load causes excessive voltage drop
a. Load exceeds capacity of generator
a. Reduce load
b. See causes 5b and 5c
b. See remedies 5b and 5c
c. Burned main or exciter field winding
c. Have generator tested and repaired