



DELTA Series

DELTA LLD Generating Set Operators' Handbook



GL 1200

Abbreviations

The following are the abbreviations used in Lister Petter operators' handbooks.

AC	alternating current	FLP	electric fuel lift pump
AL	battery-charge alternator	LCD	liquid crystal display
ASU	automatic control module (5210)	LED	light-emitting diode
BC	battery charger	MC	mains contactor
CCR	charge circuit relay	MCB	AC circuit breaker
CT1	current transformers	MFR	mains failure relay
D1	diode	MOL	mains-on-load lamp
DC	direct current	OPX	oil pressure sender
DCCB	DC circuit breaker	PC	plant contactor
DCS	DC control switch	PCR	plant contactor relay
EPB	emergency stop pushbutton	POL	plant-on-load lamp
ETX	engine temperature sender	SB	starter battery
F1	fuses	SM	starter motor
FCS	fuel control solenoid	SS	starter solenoid
FD	flywheel diodes		

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1. Introduction and Precautions

This handbook covers the operation and routine maintenance of LLD 410 generating sets powered by Lister Petter Delta DWS4 engines in the following versions:

- Standards electric start sets;
 - Automatic Mains Failure (AMF) sets.
- There is a separate handbook for the engine.

Some features and facilities of the generating set are specific to certain models, as indicated in the text. To determine the version of generating set that you are using refer to the serial number stamped on the nameplate and read section **1.1 Nameplates**.

1.1 Nameplates

There are nameplates on the generating set, engine and alternator. They tell you what each item or equipment can do. The generating set nameplate defines the performance of the complete generating set and its limits.

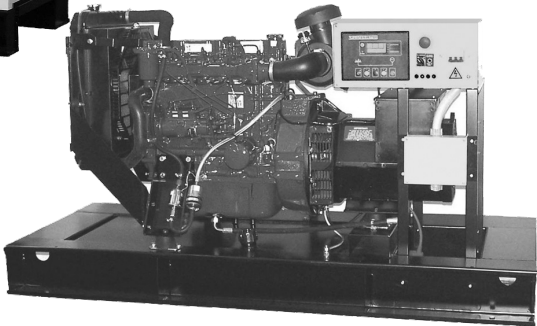
An example of a generating set serial number is:
07 12345 G DWS4 22 6

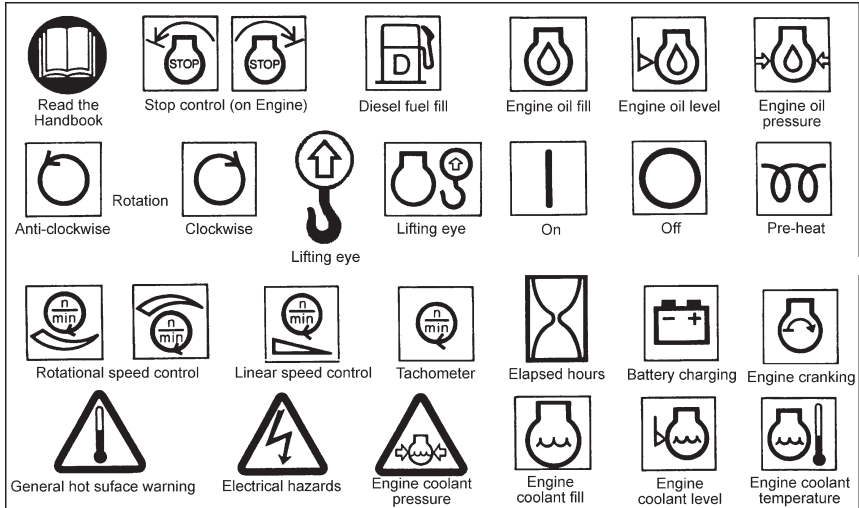
which is interpreted as follows:

07 Year of manufacture code
12345... Consecutive number of genset
G Lister Petter diesel genset
DWS4 Engine model
2 Starting mode 2 (electric start)
2 Electrical output mode 2
..... (3-phase, 4-wire, 50Hz)
6 Lister Petter alternator

For future reference write your genset serial number in the box below.

1. Delta DWS4 generating set: closed set (below) and open set (bottom right).





1.2. The ISO 8999 symbols used by Lister Petter.

The engine nameplate defines the capabilities of the engine.

The alternator nameplate defines the maximum capabilities of the alternator at specific power ratings for the voltage, frequency, connection arrangement, ambient temperature and conditions shown.

Where there are differences between the nameplates, the generating-set nameplate data should be used.

1.2 Safety Symbols

Take note of, and be familiar with, the ISO 8999 symbols used by Lister Petter, shown in figure 1.2.

1.3 Cautions and Warnings

When a diesel engine is being serviced there are risks that must be avoided. If you do not take proper safety precautions you may be injured or killed, or the product may be damaged. Warning messages are used throughout this publication to alert you, as follows:

CAUTION

This caution draws attention to special instructions or procedures which, if not correctly followed, can result in damage to, or destruction of, equipment.

WARNING

A warning with this type of text draws attention to special instructions or procedures which, if not correctly followed, can result in personal injury.

WARNING

A WARNING SYMBOL WITH THIS TYPE OF TEXT DRAWS ATTENTION TO SPECIAL INSTRUCTIONS OR PROCEDURES WHICH, IF NOT CORRECTLY FOLLOWED, CAN RESULT IN SEVERE PERSONAL INJURY, OR LOSS OF LIFE.

1. Introduction and Precautions

1.4 General Precautions

WARNING

Before your generating set can be used it must be correctly installed by qualified engineers. See Appendix: Installation and Commissioning.

WARNING

Untrained people must not start or operate any diesel generating set. It is dangerous. Operators must read and follow the instructions contained in this manual as well as the engine and alternator handbooks supplied.

Before the first start, and at regular intervals, check the fuel, lubricating oil and coolant levels. For full details refer to the **Engine Operators' Handbook**.

When the Set is Running

- Wear ear defenders.
- Do **not** touch any electrical connections.
- Do **not** run the set with any covers or guards removed or damaged.
- Do **not** smoke near the generating set.
- Do **not** touch any part of the exhaust system.
- Do **not** breathe exhaust fumes.

When the Set is at Rest

- Do **not** touch the exhaust system immediately after the engine has stopped. It will still be very hot.
- Do **not** attempt any maintenance or adjustments unless you have the necessary knowledge and qualifications. See 5. *Routine Maintenance* and read the precautions in this chapter.
- Do **not** work on the set before disconnecting the starter battery. Always disconnect the negative terminal first, reconnect the negative terminal last and use insulated tools.
- If work is to be carried out inside control or contactor cubicles they **must** be isolated from both AC and DC supplies.

1.5 Preparing the Battery

If batteries are supplied they can be supplied 'wet' or dry-charged. Wet batteries need to be charged. Dry-charged batteries can normally be used for operation after filling with battery acid without initial charging.

WARNING

Battery electrolyte is corrosive. Batteries must be handled with care, and protective clothing should be worn.

Preparing a Dry-Charged Battery

The following procedure should be used to prepare a battery with factory-sealed charge.

1. Remove the vent plugs.
2. Fill the individual cells of the battery with sulphuric acid in accordance with VDE 0510 of density 1.280 kg/l (for tropical countries 1.230 kg/l)¹ up to the maximum acid level mark, or 15 mm above upper edge of plates. The temperature of the battery and acid should be at least 10°C before filling.
3. Allow the batteries to stand for 20 minutes, tilt slightly several times and top up with acid to correct level if required.
4. Clean and dry the outside of the battery. Thinly coat the terminals with petroleum jelly and fit the vent plugs.
5. Clean the plant connections, thinly coat with petroleum jelly and connect the battery, making sure that the positive cable is connected to the positive terminal and the negative terminal cable to the negative terminal.

If the battery does not provide an adequate starting performance then it must be charged.

Charging a Battery

1. Use a charge rate of approximately 6A. Discontinue the charging if the

acid temperature exceeds 55°C. The battery is fully charged when the acid density and charging voltage have stopped rising for two hours.

2. After charging check the acid level and if required top up with distilled water to the maximum acid level mark, or 15 mm above the upper edge of the separators.
3. The battery should be checked within a week to ensure that the specific gravity is uniform throughout the battery and that no cell has a specific gravity below 1.280 kg/l¹. If this is not the case then the battery must be recharged as in steps 1. and 2. above.

Care of Batteries

- Never allow the battery to stand for long periods in the discharged state. Always recharge the battery promptly.
- Check the level of the battery acid at regular intervals and adjust by adding distilled or de-ionized water.

CAUTION

Do not use impure water or so-called 'improving agents'.

- Keep the top of the battery clean and dry. Inspect the terminals, and if necessary clean them and coat them with petroleum jelly.
4. Do not allow metal objects to short-circuit the cells. Take special care when using spanners near a battery.

WARNING

Never allow battery cells to become short-circuited by metal objects. Severe burns and electric shock can result.

1.6 Using this Handbook

Refer to the table of contents (page 3) to find the section you need.

It is recommended that the individual steps contained in the various maintenance or repair operations are followed in the sequence in which they appear.

When a diesel engine is operating or being overhauled there are a number of associated practices which may lead to personal injury or product damage. Your attention is drawn to the caution and warning messages used throughout this publication, as shown on page 5.

Work should be carried out only if the necessary hand and service tools are available. When the user has insufficient tools, experience or ability to carry out adjustments, maintenance or repairs, this work should not be attempted.

Where accurate measurements or torque values are required they can only be made using calibrated instruments.

WARNING

Under no circumstances should make-shift tools or equipment be used as their use may adversely affect safe working procedures and operation.

1. Tropical rates apply to those countries or areas where the average temperature of any month of the year exceeds 27°C (80°F).

2. The Control System

The generating set is governed by the control system (*figure 2.1*), the operation of which is described in 3. *Electric Start Sets* and 4. *Automatic Mains Failure Sets*. Automatic mains failure sets have an additional wall-mounted automatic transfer cubicle (see chapter 4).

The principal element in the control system is the control module (*figure 2.2.2*).

2.1 Control System Features

The set-mounted control system features:

- Automatic engine control module
- Emergency stop button
- DC control switch
- DC circuit breaker switch
- Battery supply DC circuit breaker
- 2-, 3- or 4-pole AC circuit breaker
- AC instrumentation protection fuses
- Current transformers
- Terminal connection points for the following remote input and output circuits:

Emergency stop

Common alarm

Control contact input

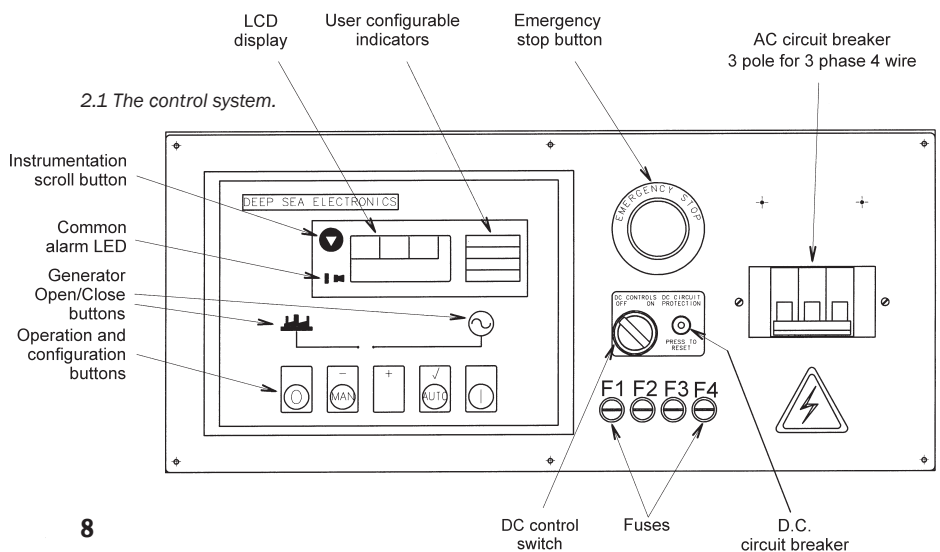
Load transfer signal

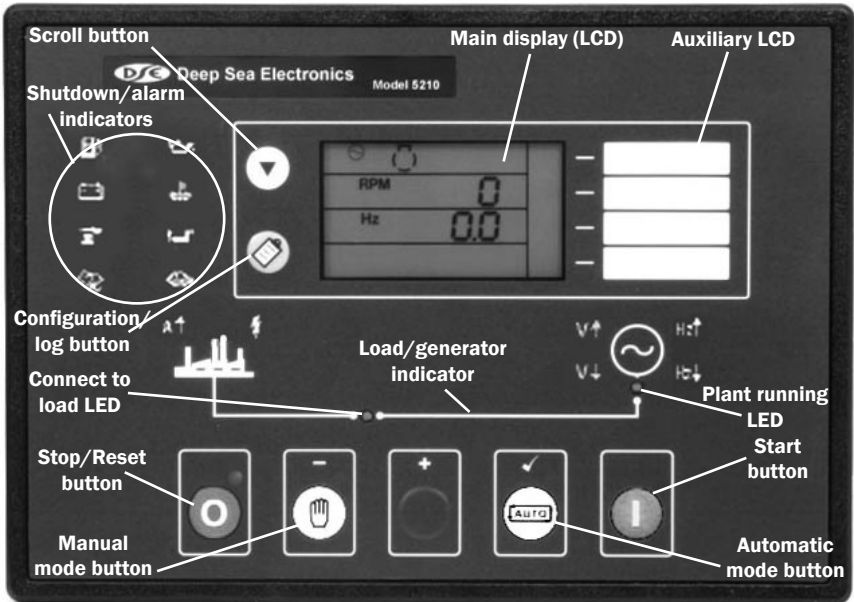
Automatic Mains Failure sets also have a battery charger and controls (see 4. *Automatic Mains Failure Sets*).

2.2 The Control Module

The **control module** (*figure 2.2*) is used to start and stop the engine, either manually or automatically, and to indicate operational status and fault conditions. This section identifies its functions. Instructions as to its specific use are given in the following two chapters.

The controls and indicators are illustrated and labelled in *figure 2.2*. In both standard electric start sets and automatic mains failure sets there is a choice between **manual mode** (see 3.3 *Manual Control*, 4.3 *Manual Operation*) and **automatic mode** (see 3.4 *Automatic Control*, 4.2 *Automatic Operation*). These controls are located near the **start** and **stop/reset** buttons. The generating set has a **load/generator indicator**, with LEDs indicating various circuit functions, depending on the application. It also has illuminated **shutdown/alarm** indicators (left side of the control module, see *figure 2.2*) to alert the operator of a fault.





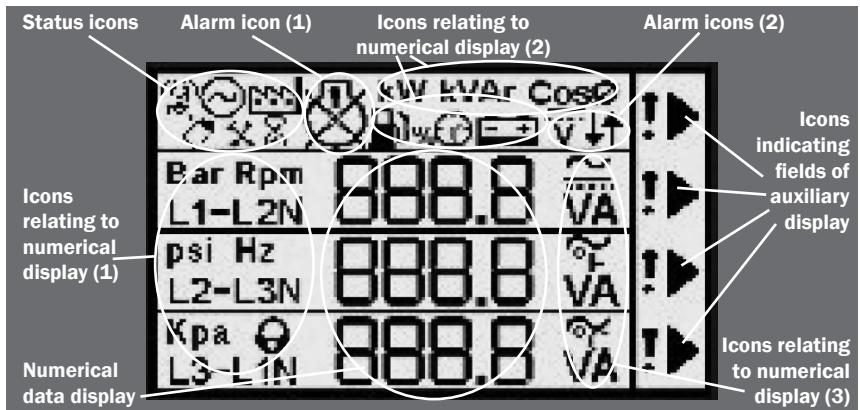
2.2 The control module (above), which forms the main component of the control system.

2.2.1 The Main Display (LCD)

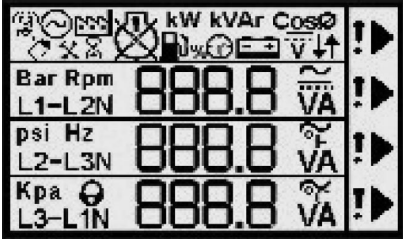
The main **liquid crystal display (LCD)** is shown in figure 2.2.1. The LCD has status and alarm icons and also monitors twelve engine and generator parameters in its three numerical fields.

Continued overleaf.


2.2.1a The key areas of the main liquid crystal display (LCD).



2. The Control System



2.2.1b The main liquid crystal display (LCD).

LCD Monitoring Facility. Twelve monitoring parameters are viewed in sequence using the scroll button , as follows:

- Generator rpm/frequency (rpm, Hz)
- Generator voltage, phase—neutral (V)
- Generator voltage, phase—phase (V)
- Oil pressure (bar/psi/kPa)
- Coolant temperature (°C, °F)
- Fuel level (optional)
- Engine hours run
- Battery voltage (DC)
- Generator line current (L1, L2, L3)
- Generator line power (kW)
- Generator line power (kVA)
- AC phase angle (Cos φ)

The numerical data is displayed for monitoring purposes in the three main lines of

the display. The parameters monitored, and the units of measurement, are identified by icons to the left, right and/or above (see figures 2.2.1a, b and c).

Alarm icons. Icons in the upper area of the LCD (figure 2.2.1a) supplement the module's alarm indicators (figure 2.2).

2.2.2 The Auxiliary LCD

The **auxiliary LCD** has four fields providing additional, verbal, information. Icons in the main LCD (see figure 2.2.1) draw attention to this auxiliary information.











2.3 Fault Alarm and Protection

Out-of-limit conditions are identified by the **shutdown/alarm indicators** (figure 2.2). A steady light is a **warning alarm** and a flashing light indicates **shutdown**.

2.3.1 Warning Alarm

Under non-critical fault conditions a warning icon (see figure 2.3.1) with a steady light is displayed. The set is self-resetting (activated by the alarm) and will not shut down. Such conditions include:

- Charge alternator failure. If no voltage is detected from the charge alternator warning light terminal, the **charge fail**

L1	Phase	L2	Phase	L3	Phase
L1-N	Phase - Neutral	L2-N	Phase - Neutral	L3-N	Phase -Neutral
L1- L2	Phase - Phase	L2- L3	Phase - Phase	L3- L1	Phase - Phase
BAR	Pressure	KPa	KPa Oil Pressure Units	PSI	Pressure
V	Voltage	°F	Temperature	Hz	Frequency
A	Amperes	°C	Temperature	RPM	Speed
kW	KiloWatts	kVA	Apparent power	Cosφ	KW divided by kVA
	Hours Run		AC		Generator
	Timer in progress		DC		Factory (load)
	Configuration mode active		Optional Fuel Level		Event log
	Panel locked by configurable input				

2.2.1c Icons supplementing the numerical data in the LCD.

symbol will be displayed. In addition the **warning alarm** icon will be displayed with a steady light.

- **Low fuel¹:** if the fuel level drops below 25% of the tank capacity, **low fuel** will be displayed in the auxiliary display.

2.3.2 Shutdown

These are latching and stop the generator. The **shutdown alarm** icon and another appropriate icon will be displayed, flashing (see figure 2.2.4):

- **Failure to start.** If the engine does not start after a maximum of three attempts, the **fail to start** symbol will be displayed.
- **Low oil pressure.** If the pressure drops below the pre-set level the engine will shut down and the **low oil pressure** symbol will be displayed.
- **High engine temperature.** If the engine coolant temperature rises above the pre-set level the engine will shut down and the **high coolant temperature** symbol will be displayed.
- **Over-frequency/under-frequency.** If the generator frequency rises or falls outside the preset levels the respective failure icon will be displayed.
- **Over-voltage/under-voltage.** If the generator voltage rises or falls outside the preset levels the respective failure icon will be displayed.
- **Overspeed.** If the engine speed exceeds the pre-set point the engine will

shut down and the **overspeed** symbol will be displayed.

- **Underspeed.** If the engine speed falls below the pre-set point the engine will shut down and the **underspeed** symbol will be displayed.
- **Emergency stop.** If the emergency stop button is pressed, a controlled shutdown of the generator will occur and the **emergency stop** symbol will be displayed. The generator cannot be restarted until the emergency stop button has been reset.





















2.3.3 Resetting Shutdown Condition

When the fault condition has been rectified, press the **stop/reset** button to reset the module.

2.3.4 The Electrical Trip

The electrical trips are latching but stop the generator in a controlled manner. The "Load Transfer" output is removed, which will disconnect the load from the generator if a contactor is fitted. Once this has occurred the module will start the cooling timer and allow the engine to cool before shutting it down. The electrical trip icon will be displayed.

- **Generator high current.** If the generator output current rises above the continuous rating for an excess period of time an electrical trip condition is initiated. The high current warning icon is displayed.

	Warning Alarm		Shutdown Alarm		Electrical Trip
	Fuel - option		Low Oil Pressure		High Current Warning
	Charge Fail		High Coolant Temperature		Over Voltage (AC)
	Emergency Stop		Fail to start (Over-crank)		Under Voltage (AC)
	Over Voltage (DC)		Over-speed		Over frequency
	Under Voltage (DC)		Under-speed		Under frequency
	Auxiliary Indication		Auxiliary Alarm (Warning or Shutdown)		

2.3.1 Icons warning of a fault.

1. If fitted.

3. Standard Electric Start Sets

3.1 Features

Standard electric start sets have the following features:

- Set-mounted control system (see 2. *The Control System*).
- Lister Petter water-cooled engine, close-coupled to a brushless alternator
- Fabricated steel base frame with anti-vibration mountings
- Starter battery and leads
- 12-volt starter motor and solenoid
- 12-volt charging alternator
- Fuel solenoid, energised to run
- Oil, air and fuel filters
- Fuel-lift pump
- Integral fuel tank
- Integral silencer

The features of the control system and the operation of the control module are described in 2.1 *Control System Features* and 2.2 *The Control Module*.

3.2 Emergency Stop

An **emergency stop button** is fitted to the control cubicle. On housed sets, an additional emergency stop button is fitted externally on the housing.

The operation of an emergency stop device will initiate a controlled shutdown. The condition will be indicated on the display accompanied by a flashing red LED.

Any attempt to restart the set will be prevented until the emergency stop device has been reset.

3.3 Manual Control

This section describes the manual control and operation of the generating set.

3.3.1 Starting

1. Ensure the **AC circuit breaker** is in the **off** position before starting.
2. Turn the **DC control switch** to the **on** position.

3. Press the **manual mode** button on the control module. An LED indicator by the side of the button will illuminate.

4. Press the **start** button on the control module.

5. The generating set will start and run up to speed and voltage.

6. When the **plant running LED** illuminates the set can be connected to the load circuit by closing the AC circuit breaker (switching to **on** position).

3.3.2 Monitoring

Electrical outputs and engine conditions can be monitored on the control module display by successive operation of the **scroll** button; see 2.2.2 *The Main Display (LCD)*.

3.3.3 Stopping

1. Open the **AC circuit breaker** (switch to **off**) to disconnect the load circuits.
2. Press the **stop** button on the control module. The engine will shut down and come to rest.
3. If the generating set is not going to be used again for more than eight hours the **DC control switch** should be turned to the **off** position.

3.3.4 Alarm and Fault Conditions

During the running period the engine control module monitors the set for the alarm and shutdown faults detailed in 2.3 *Fault Alarm and Protection*.

A 12v DC signal for remote indication of a common alarm can be taken across terminals B3(+) and B4(-).

3.3.5 AC Circuit-Breaker Trip

If the AC circuit breaker trips, investigate and rectify the cause, then wait two minutes before re-closing it. The set will continue to run.

3.4 Automatic Control

This section describes the automatic control and operation of the standard generating set.

A remote switch or contact has to be connected across terminals B5 and B6. The contact is arranged to **close** to start and run the set, and to **open** to stop it.

A 12v DC signal for remote indication of plant available (load transfer) can be taken across terminals B7(+) and B8(-).

3.4.1 Starting

1. Turn the **DC control switch** to the **on** position.
2. Press the **automatic mode** button on the control module. An LED indicator by the side of the button will illuminate.
3. On closure of the remote contact and after a short delay the set will start and run up to speed and voltage.
4. When the set is ready, **load transfer** will be indicated on the **auxiliary LCD** and the 12v DC signal becomes available at B7 and B8. At this point the load can be connected to the generating set.

3.4.2 Monitoring

Electrical outputs and engine conditions can be monitored on the control module

display by successive operation of the **scroll** button; refer to 2.2.2 *The Main Display (LCD)*.

3.4.3 Stopping

1. Disconnect the load from the generating set.
2. Open the remote contact.
3. After a one-minute cooling-down period the engine will shut down and come to rest.
4. If the generating set is not going to be used again for more than eight hours the **DC control switch** should be turned to the **off** position.

3.4.4 Alarm and Fault Conditions

During the running period the engine control module monitors the set for the alarm and shutdown faults detailed in 2.3 *Fault Alarm and Protection*.

A 12v DC signal for remote indication of a common alarm can be taken across terminals B3(+) and B4(-).

3.4.5 AC Circuit-Breaker Trip

If the AC circuit breaker trips, investigate and rectify the cause, then wait two minutes before re-closing it. The set will continue to run.

4. Automatic Mains Failure Sets

4.1 Features

Automatic Mains Failure (AMF) sets have the following features:

- Set-mounted control system. The features of the control system and the operation of the control module are described in *2.1 Control System Features* and *2.2 The Control Module*.
- Lister Petter water-cooled engine close-coupled to a brushless alternator
- Fabricated steel base frame with anti-vibration mountings
- Starter battery and leads
- 12-volt starter motor and solenoid
- 12-volt charging alternator
- Fuel solenoid, energised to run
- Oil, air and fuel filters
- Fuel-lift pump
- Integral fuel tank
- Integral silencer
- Battery charger (mains-operated, for battery maintenance)

In addition to these features, Automatic

Mains Failure sets also have a wall-mounted automatic transfer cubicle (see *figure 4.1*).

4.1.1 Automatic Start and Transfer System

The wall-mounted automatic transfer cubicle contains:

- Mechanically and electrically interlocked plant and mains contactors
- Mains failure sensing relay
- Plant-on-load and mains-on-load indicator lamps
- AC protection fuses
- DC control relay
- Terminal blocks for power and auxiliary circuits

4.1.2 Emergency Stop

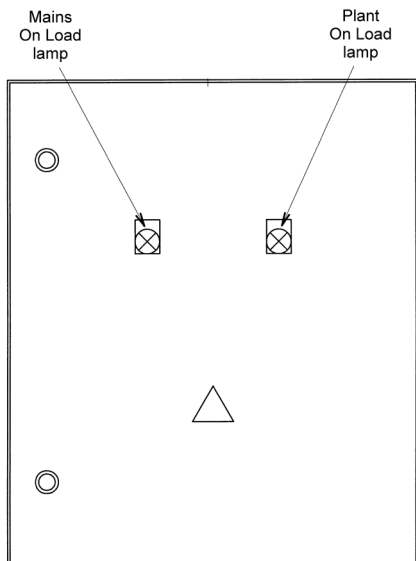
An **emergency stop button** is fitted to the control cubicle.

On housed sets, an additional emergency stop button is fitted externally on the housing.

Operation of the emergency stop button will initiate a controlled shutdown.

The condition will be indicated on the display.

Any attempt to restart the set will be prevented until the emergency stop device has been reset.



4.1 The wall-mounted automatic transfer cubicle, showing the mains-on-load and plant-on-load indicator lamps.

4.2 Automatic Operation

WARNING

Automatic sets can start without warning. Keep clear of the set at all times.

1. Turn the **DC control switch** to the **on** position.
2. Press the **automatic mode** button on the control module. An LED indicator by the side of the button will illuminate.

4.2.1 Mains (Utility) Failure

On receipt of a mains failure condition there is a ten-second start delay. The set will start and run up to speed and voltage.

When the set is ready the **changeover contactor** operates to isolate the mains (utilities) circuit and then transfers the load circuit on to the generator.

During this operation the **mains-on-load lamp** is extinguished and the **plant-on-load lamp** is illuminated.

4.2.2 Monitoring

Electrical outputs and engine conditions can be monitored on the control module display by successive operation of the **scroll** button; refer to 2.2.2 *The Main Display (LCD)*.

4.2.3 Mains (Utility) Returns

The mains (utility) supply must remain healthy for five minutes before the load circuit is transferred back to it from the set. At the end of this time the **plant-on-load lamp** is extinguished and the **mains-on-load lamp** is illuminated.

The set will continue to run for a further one minute on no load to allow for engine cooling.

4.2.4 Alarm and Fault Conditions

During the running period the engine control module monitors the set for the alarm and shutdown faults detailed in 2.3 *Fault Alarm and Protection*.

4.2.5 AC Circuit Breaker Trip

If the AC circuit breaker trips, investigate and rectify the cause, then wait two minutes before re-closing it. The set will continue to run.

4.3 Manual Operation

4.3.1 Starting

1. Turn the **DC control switch** to the **on** position.
2. Press the **manual mode** button on the control module. An LED indicator by the side of the button will illuminate.
3. Press the **start** button on the control module.

The generating set will then start and run up to speed and voltage. It will automatically connect to the load circuit if the mains (utility) supply has failed. Otherwise it will run off-load.

4.3.2 Stopping

1. Press the **stop** button on the control module. The engine will shut down and come to rest.

4.3.3 Mains (Utility) Failure

If the mains (utility) supply fails while the set is under manual control, the set will connect automatically to the load circuit.

On mains (utility) return, the set will continue to run on load until the **automatic mode** button is pressed. After a five-minute delay the load will then be transferred back to the mains supply.

The set will continue running on no load for the one-minute cooling period.

If the **stop** button on the control module is pressed before the mains returns, the set is immediately disconnected from the load and will shut down.

5. Routine Maintenance

WARNING

Only qualified engineers should attempt any maintenance or adjustments. Refer to 1.2 Safety Symbols, 1.3 Safety Precautions and the equivalent sections of your engine Operators' Handbook.

WARNING

Do not work on the set before disconnecting the starter battery. Always disconnect the negative terminal first, reconnect the negative terminal last and use insulated tools.

5.1 General

On a regular basis, check and replenish if necessary:

- The fuel level;
- The lubricating oil level;
- The coolant level.

WARNING

Do not check the coolant level when the engine is hot, or running.

Refer to the engine Operators' Handbook, P027-08194, supplied with the set, for capacities and specifications.

5.2 Diesel Engine

Refer to the **Engine Operators' Handbook**, P027-08194, supplied with the set, for details of routine maintenance to be carried out after prescribed periods.

5.3 Alternator

No routine maintenance by the user is required, nor should it be attempted.

The alternator manufacturer's manual is provided for use only by specialised personnel employed to undertake maintenance work on the alternator.

5.4 Battery

To keep terminals and connections free from corrosion, coat with petroleum jelly or other suitable protective.

Also refer to 2.4 *Preparing the Battery*.

WARNING

Battery electrolyte is corrosive and must not be splashed on your skin. Batteries must be handled with care, and protective clothing should be worn.

6. Troubleshooting

WARNING

Fault finding and rectification should be undertaken only by competent professional engineers.

6.1 Diesel Engine

The engine Operators' Handbook supplied with the set suggests possible causes for the most common faults, for the guidance of specialised diesel engine maintenance engineers.

6.2 Alternator

The alternator manual supplied with the set suggests possible causes for the most common faults, for the guidance of specialised electrical engineers.

6.3 Electrical System

In the case of a suspected fault employ a qualified professional electrical engineer to resolve the fault.

The wiring diagrams supplied with this manual are for use only by specialised electrical engineers.

7. Replacement Parts

7.1 Source of Supply

When purchasing parts or giving instructions for repairs users should, in their own interests, always specify genuine parts and quote the part number, description of the part and the serial number.

Replacement parts are available from the worldwide network of Lister Petter diesel gensets distributors. For the name and address of the distributor nearest to you, contact the manufacturer (see 7.5).

Always use genuine parts supplied by Lister Petter through our distribution network.

Use of non-genuine parts can damage your set and invalidates the warranty.



IMPORTANT

Your distributor will need to know the generating set type and serial number stamped on the generating set name-plate to ensure that the correct parts are supplied.

7.2 Engine Parts

A Master Parts Manual, P027-08042, is available from Lister Petter or your local distributor.

7.3 Alternator Parts

Consult Lister Petter (see 7.5).

7.4 Cubicle Parts

Consult Lister Petter (see 7.5).

7.5 Contacting Lister Petter

We are confident that you will obtain excellent safe service from your generating set. To achieve this however it is important that the installation, commissioning and maintenance of the set is undertaken by relevant competent engineers. If in doubt consult your local Lister Petter gensets distributor.

To obtain advice on any aspect of the ownership of your Lister Petter diesel generating set please contact your local distributor or the manufacturer:

Lister Petter Limited,
Dursley,
Gloucestershire
GL11 4HS
England.

Tel: +44 (0)1453 544141

Fax: +44 (0)1453 546732

E-mail: gensets@lister-petter.co.uk

<http://www.lister-petter.co.uk>

Appendix 1:

Installation and Commissioning

Site Installation

WARNING

All installation work should be undertaken by a competent professional engineer.

1. The generating set must be installed in a suitable building or enclosure. This is essential to attenuate noise; protect the generating set from the environment; and prevent unauthorised access. The enclosure must have sufficient and suitable means to provide air for combustion and cooling and to remove hot air and exhaust gases.
2. Foundations must be of solid construction (usually concrete), with adequate load-bearing capabilities. If in doubt, consult a structural engineer.
3. The base frame must be securely fixed to a level and solid foundation to limit vibration to the base frame and cubicle assemblies. Distortion of the fabricated base frame must not occur when tightening down the foundation bolts. Packing shims should be used to ensure there are no irregularities occurring between the base frame and the foundations.
4. Separate floor trenches must be provided for fuel pipework and cabling.
5. When the installation is indoors, ensure that combustion- and cooling-air inlets and hot-air outlets are provided with adequate ventilation. Heat from the engine must be expelled from the building, otherwise the engine can become damaged due to overheating.
5. Exhaust fumes are dangerous. Ensure that the fumes are safely piped to the outside of the building.

WARNING

DO NOT BREATHE EXHAUST GASES AS THEY CONTAIN CARBON MONOXIDE, A COLOURLESS, ODOURLESS AND POISONOUS GAS THAT CAN CAUSE UNCONSCIOUSNESS AND DEATH.

6. The bulk storage of fuel oil should be sited in outbuildings if possible.
7. Check that the fire precautions are adequate and that the installer provides appropriate warning notices to ensure the safety of all personnel regarding all aspects of generating set operation.
8. Only lift the set by means of the identified lifting points, using certified lifting equipment with spreaders as appropriate. **Open and housed sets** have holes in the base plate corners for lifting bars.

WARNING

Never attempt to lift the set by the engine or alternator lifting eyes.

Wiring and Commissioning

WARNING

All wiring installation, connecting up and commissioning of the generating set should be carried out by a competent electrical engineer.

1. It is the responsibility of the installer to ensure that the generating set is adequately earthed to a low-resistance earthing rod or earth plate.
2. Ensure that the battery is fully charged and serviceable, that the engine coolant level is correct and that the engine

3. Ensure that the battery connections are secure. Make the final battery connec-

4. Before starting read the safety section in the **Engine Operators' Handbook**.

California Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

**Delta DWS4 Generating Set Operators' Handbook,
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UK

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