CROMMELINS
MACHINERY

CROMMELINS™ STANDBY GENERATOR

OPERATION AND MAINTENANCE MANUAL

Introduction

Thank you very much for purchasing a CROMMELINS™ STANDBY GENERATOR. This manual covers operation and maintenance of the CROMMELINS™GENERATOR.

This generator can be used in the agricultural, mining, construction, hire industries and general recreational appliances. Never use this generator for any other purpose.

Please take a moment to familiarise yourself with the proper operation and maintenance procedures in order to maximise the safe and efficient use of this product.

Keep this owner's manual at hand, so that you can refer to it at anytime.

When ordering spare parts please have handy your products model number and serial number.

Operation and maintenance should be carried on by the persons which have professional training.

Never operate, maintain or repair your generator sets if users don't take general safety precautions.

Due to constant efforts to improve our products, certain procedures and specifications are subject to change without notice. We reserve the right to make changes without prior notice.

Contents

1. General safety information

Read the safety regulations carefully before operating the generator sets. The users are responsible for maintaining the machine in a safe operation condition. Failure to follow the instructions in this manual may increase the possibility of injuries and accidents.
The operation, maintenance and repairs must be carried out only by authorized and experienced personnel.
Operate the machine only for the intended purpose and within its rated limits (including pressure, temperature, altitude and speeds and so on). Please read the safety symbols attached on the generator sets carefully and following all messages in the symbols to avoid possible injury or death.

1.1 Safety Precautions

(1). Children or animals are note allowed to enter into the operating area of the generator sets.
(2). Ensure that operate the generator sets is properly ventilated. As the exhaust gas from the engine contains many harmful elements to human and can lead to death.
(3). It must be carried out by specialized persons to responsible for the installation, operation, maintenance and repair of the generator sets .
(4)Please check all electrical connections whether they are correct and safety Insulated before starting the engine.
(5) Keep the room and the floor clean. Gensets and equipment shall be kept clean, as free as possible from oil, dust or other deposits.
(6). Ensure that all the ground wires are suitably earthed for proper operating safety.
(7). Check the level of the oil,fuel and coolant.
(8). Make sure there are no losses or leaks in the oil,fuel and coolant pipes.
(9). Check all doors are well locked and covers are fixed before operating the generator sets.
(10). Make sure that the poles has been disconnected from the battery when performing check or maintenance.
(11). Take precautions against fire, handle fuel, oil and anti-freeze with care because they are inflammable substances. Don’t smoke or approach with naked flame when handling such substances. Keep a fire-extinguisher in the vicinity.

1.2 Electrical

(1). The generator set will produce enough electric current to cause a serious shock or electrocution if misused.
The generator sets must be connected to the load only by trained and qualified electricians who are authorized to do so, and in compliance with relevant electrical codes, standards and other regulations.
(2). Failure to properly ground generator can result in electrocution. Ensure that generator sets is effectively grounded/earthed in accordance with all relevant regulations and operations.
(3). Failure to isolate generator from power utility can result in death or injury to electric utility workers.
(4). DO NOT handle generator or electrical cords while standing in water or on wet or soggy ground.
(5). Before performing any maintenance on the generator,disconnect the battery cable first. When finished,reconnect that cable last.

(6). Make sure all connections and disconnected wires insulated.
(7). Keep all electrical equipment clean and dry. Don't operate the generator sets without the cover securely in place.
(8). Don't touch electrically energized parts of generator sets.
(9). The generator set should be shutdown with the battery negative (-) terminal disconnected prior to attempting to connect or disconnect load connections.

1.3 Fire and burn prevention

(1). Fuel and fumes associated with generating sets can be flammable and potentially explosive. Proper care in handling these materials can dramatically limit the risk of fire or explosion. Keep flammable materials away from the generator set. If fuel or oil touches skin,immediately flush the area with water.
(2). Keep hands, arms, long hair and loose clothing away from pulleys, belts and other moving parts.
(3). Wearing protective clothing including gloves and hat to avoid contacting fuel or oil is very necessary when working around the generator sets.
(4). Do not add oil or fuel to a hot engine,and firstly just make the engine cooled.
(5). Never store flammable liquids near the engine.
(6). Safety dictated that fully charged BC and ABC fire extinguishers are kept on hand.
(7). Inspect the exhaust system regularly to ensure it is functioning properly. Leaky exhaust systems will increase noise levels.
(8). Generating sets that are not equipped with sound attenuating enclosures can produce noise levels in excess of 105dB(A). It is harmful to people's hearing when the noise reach to above 85dB(A)
(9). Inspect the spark arrestors periodically. Spark arrestors are required in some areas and minimize the risk of fire from sparks emitted from the exhaust.

1.4 Engine safety

(1). Do not fill the fuel tank near an open flame, or while smoking, or while engine is running.
(2). Do not fill the tank in an enclosed area with poor ventilation.
(3). Do not operate with the fuel tank cap loose or missing.
(4). Do not touch or lean against hot exhaust pipes or engine cylinders.
(5). Do not touch the engine and muffler during operation of just after the engine stops,because the temperature can reach extremely high.
(6). Do not clean air filter with gasoline or other types of low flash point solvents.
(7). Do not remove engine coolant cap while engine is hot.
(8). Keep area around exhaust pipes and air ducts free of debris to reduce the chance of an accidental fire.
(9). Prolonged exposure to sound levels in excess of 85 dabs can cause permanent hearing loss. Wear hearing protection when working around a running engine.
(10). Do not operate the unit without a functional exhaust system.

1.5 Poison gas hazards

Engine exhaust emissions are harmful to personnel. As exhaust gas contains poisonous carbon monoxide, which is a colorless and odorless poison gas. Breathing carbon monoxide can cause

headache,fatigue, dizziness, vomiting, confusion, seizures,nausea, loss of consciousness and fainting of death. If you run the generator set in unventilated or confined place,the air you breathe could contain a dangerous amount of exhaust gas. So make sure to keep the good ventilation to prevent the exhaust gas .
Make sure that hot exhaust silencers and piping are clear of combustible material and are guarded for personnel protection per safety requirements. Ensure that fumes from exhaust outlet will not be a hazard.

1.6 Battery safety

Storage batteries give off explosive hydrogen gas during recharging. The slightest spark, flame or burning ash can ignite these gases causing a serious explosion that could result in blindness or other serious injuries.
Please Wear eye protection, rubber apron and rubber gloves when working around a battery or performing battery service. If electrolyte contacts skin or eyes,immediately flush the area with water and seek medical attention quickly. Battery fluid is an extremely caustic sulfuric acid, which can cause severe burns.
Always disconnect the negative (-) battery cable from the battery before performing battery service or before performing any electrical service on the generator or engine.

1.7 Safety during using coolant

Before operating the generator set, always check the coolant level . Do not open the radiator cap during operation or just after stopping the engine, because the radiator fluid is hot and under pressure and may cause serious burns. Coolant level could be checked only when engine is cool.

1.8 Cleaning safety

(1). Always shut down the generator and allow it to cool completely before performing cleaning operations.
(2). Do not use high pressure water or a garden hose to clean your generator. Water introduced into the generator can cause electrical shorts, generator damage or personal injury.
(3). Compressed air (max. 25 psi) may be used to blow loose dirt and dust from your generator.
Do not direct compressed air directly into any opening in the generator or engine.
(4). Use a dampened cloth to wipe the exterior surfaces.
(5). Use a soft bristle brush to clean the heavy dirt, oil or grease deposits.
(6). Never insert rags, tools or any device into the generator or engine openings.

1.9 Grounding

Grounding should be made before running the generator set, and all the bonnets of the loads must be also grounded to the earth. Take extreme caution to avoid risk of fulguration, make sure the grounding has been fitted according to the regulations.

1.10 Storage guidelines

(1). Gasoline fumes are flammable. Do not store your genset in any area that is indoor or in poorly ventilated areas. Gasoline fumes can ignite in the presence of any open flame, pilot light, clothes dryer, water heater, etc.
(2). Your generator should be started and operated for several minutes at least every 30 days.
(3). If the generator cannot be operated every 30 days, follow the storage recommendations within the engine documentation.
(4). A fuel shut-off valve is positioned at the base of the fuel tank. The valve should be closed during storage periods.
(5). When performing check or maintenance,make sure that the engine has been stopped. Disconnect all external loads and the poles from battery before maintenance.

2. Generator set introduction

Read this manual carefully before attempting to use this generator. The potential for property damage, personal injury or death exists if this equipment is misused or installed incorrectly. When you used the generator set in correct manner, it is safe. Responsibility for safety based on the personnel who install, use and maintain the set. Before performing any procedure or operating technique, it is up to the user to insure that It is safe. The generator set should be operated by a disciplined person.
Generator set is a power station, the keyword is diesel engine. In additional, it includes the alternator and control system. The engine makes the alternator working and power supplying. To produce output electrical power while the control system controls the operation and output of the generator set. In additional , the generator set also includes accessories such as the control system, radiator, fuel tank, Battery, muffler and base frame and so on.

Continuous service: Used as main power supply to generate electricity for several purposes: motion force, lighting, heating etc. The generator sets can continue running and allow 10% over load for 1 hour per 12 hours under variable load, which is used for remote area.
Standby power: Used as standby power supply to provide continue electric power for non-invariable loads. The generator set is suitable for the area where must ensure continue power supply, such as hospital,industrial facilities, airports etc. Keep the generator set standby state at any time and start to run when the mains supply is abnormal.
Emergency service: Used as auxiliary power supply to solve energy interruptions that may cause serious problems to people, physical and / or financial damage or to face consumption peaks. The generator can start in short order.

To provide steady electric power for the loads when the mains supply happen abnormity, and switch to stop after the mains supply becomes normal.

2.1 Engine

The diesel engine powering the generator set has been chosen for its superior performance , reliability and the fact it has been specifically designed for powering generator set. The engine and engine-generator sets are normally provided with the primary subsystems necessary for engine operation, such as:
(1). Engine electrical system -- This system is 12 volts or 24 volts DC, negative ground/earth. DC electricity, the start Motor, battery and battery charger consist the engine electrical system. For DC 12 volts electrical system one battery is given. For 24 volt system two lead-acid batteries are given. Other types of batteries may be equipped if they were specified.
(2). Fuel supply and injection system
(3). Lubrication system
(4). Primary (engine) cooling system -- The engine water cooling system is comprised of radiator, pusher fan and a thermostat. Besides, the alternator cooling system is air cooled which consists of a fan to pull cool air across alternator to cool it.
(5). Speed control (governor) system
(6). Required instrumentation

2.2 Alternator

Alternators are used in modern automobiles to charge the battery and to power the electrical system when its engine is running. The alternator producing output electrical power has been chosen for its superior Performance, reliability and all the standard alternator are the machines without slip rings and the revolving field brushes are with class H insulation.

2.3 Control system

The control system is a panel that charge of controlling the operation and output , and protect the machine from possible malfunctions. The control module is always automatic one. The function includes the start and stop the engine, indicating the operational status and fault conditions. The indicating the failure and automatically shutting down the engine by alarm LEDs. They can show on the front panel. It also can display presenting all output values and various alarms information.

2.4 Fuel tank and Base frame

The engine and alternator are assembled together and mounted on a heavy duty steel base-frame. This base frame includes a fuel tank with capacity of almost 8 hours operation under variable loads. The tank is complete with filling cap and fuel level gauge and is connected by flexible joints to the intake piping and to the overflow piping containing fuel from the injector drain. High power gen-set's fuel tank is separate from gen-set.

2.5 Vibration isolator

The generator set is fitted with vibration isolators. And it is in order to reduce engine vibration being transmitted to the foundation on which the generator set is mounted. These vibration isolators are fitted between the engine/alternator feet and the base frame.

2.6 Silencer and exhaust system

Exhaust gases from the turbocharger are discharged toward atmosphere through a silencer. These should be vented as high as possible, and must be prevented from re-entering the engine via the charge air intake, or polluting the radiator fins. Its suitable material is carbon steel sheet, and recommended calculation temperature is 525℃. Rain and condensate permanent draining shall be provided to prevent water entering the silencer and the engine. The silencer and exhaust system can reduce the noise emission from the engine and can direct exhaust gases to safe outlets.

2.7 Ambient condition

(1). Temperature: -25℃to 45℃
(2). Humidity: less than 80%
(3). Altitude: less than one thousand meters above sea level

2.8 Power derating

It is very necessary to foresee an eventual loss of power, or derating for environmental conditions of installation and operation different from those above specified, not only in the provided by the

generator set. The user must establish the effective environmental conditions clearly. And the generator set will operate when placing the order, so that both the engine and the alternator are correctly sized.

2.9 Others

Except for above mentioned components, the diesel generator set has other main components such as: battery for start montor, battery cable, corrugated pipe, daily fuel tank, canopy and other parts specially requested by the customer etc. For the specific accessory parts, Please contact us.

3. Installation

3.1 General

Correct installation of generator set is the precondition which ensure the normal working status of the generator set. The working room for generator set shall be designed specifically to meet the expected functions and maintenance operations, and at the same time the design of generator set working room shall conform to local government's laws and regulations on architecture, fire protection laws and other appliance regulations. It is also necessary to check whether the generators you received matches the order. Besides, please also check that the machine is not damaged. If you find any flaw, please contact the shipping company immediately in order to report the accident to the insurance company.

3.2 Moving the generator set

The base frame of generator sets is designed to move easily. Don't allow to adopt improper handling, and it is highly possible to damage components seriously. The generator set can be lifted by a forklift, or carefully pushed or pulled by the base frame directly with fork. Always equip with wood between forks and the base to prevent damage.

3.3 Base and foundation

The foundation which used to install and fix the diesel generator set is very important, but special foundations are unnecessary. Normally, concrete foundation is reliable, simple and preferable. The responsibility for the foundation (including seismic considerations) should be placed with a civil or structural engineer specializing in this type of work. It must conform to the following requirements:
(1). Must have enough hardness and stability to avoid deformation
(2). Generator set's foundation is not allowed to connect to other surrounding structure's foundation
(3). To support the weight of the whole generator set
(4). To absorb the dynamic impact caused by unbalanced force and vibration during generator set's running period.
(5). Ensure foundation's levelness and smoothness
(6). If possible,waste discharge sink can be sued so that the waste oil can be discharged in a timely manner.

Concrete Foundations will require at least seven days between pouring the concrete and mounting the generating set to cure. The width and depth of the foundation need to meet the requirement. Typically the foundation should be 150mm to 200mm (6 to 8 inches) deep and at least as wide and long as the generator set. The following formula may be used to calculate the minimum foundation depth:

$$T=K/(D*W*L)$$

Noted: T=thickness of foundation in m ; K=net weight of generator set in Kg;
D=density of concrete (take 2403 Kg/m^2) ; W=width of foundation in m ;
L=length of foundation in m

The foundation strength may still vary depending on the safe bearing capacity of supporting materials and the soil bearing load of the installation site, therefore reinforced gauge steel wire mesh

or reinforcing bars or equivalent may be requiring to be used. And basically, the foundation should be level and preferably within $\pm 0.5^{o}$ of any horizontal plane. If the ground or floor may be wet from time such as in a boiler room, the foundation should be raised above the floor. This will provide a dry footing for generator set and for those who connect service or operate it .It will also minimize corrosive action on the base frame.

3.4 Room design

The dimensions as indicated A & B allow for good maintenance /escape access around the generator. Ideally you should allow a minimum distance of 1 meter from any wall, tank or panel within the room. The follow criteria must be accorded because of starting to consider the possible layouts for the room.

(1). Room should have one or two entrances. The one size should make allowance for the delivery and installation of the equipment, and afterwards for servicing and maintenance of the equipment.

(2). Ensure diesel generator set working room has good ventilation and good exhaust system, and the area for ventilation is sufficient, and at the same time use pipes to let out the hot air generated from the radiator and prevent the hot air from returning.

(3). Ensure the waste gas generated during generator set running period can be discharged to outside timely, and try to reduce the adverse effect caused to environment.

(4). Room dimension should allow for good maintenance and escape access around the generator: at least 2 meters headroom above the set and at least 1 meter around the set.

(5). The generator set working room shall be furnished with fire extinguish hydrant which conform to the specified standard.

(6). No combustible and explosive materials are allowed to be placed in the working room. Protection from exposure to airborne contaminants such as abrasive or conductive dust, Lint, smoke, oil vapors, engine exhaust fumes or other contaminants.

(7). Emergency lighting facilities shall be installed in the working room for the convenience of operation and maintenance

3.5 Installation of generator set

Warning:

!! All piping and electrical connections should be flexible to prevent Damage from the vibration of the generator set.

(1). Fix the vibration isolators to the base frame with provided bolts as below. And place the generator set at a level and sufficiently strong foundation. Use the anchor bolt to fix the generator to the foundation if necessary.

(2). When no special requirement is needed, we don’t suggest customers to install additional vibration reduction units.

(3). Tighten the lifting lug and the coolant inlet cap.

(4). Soft connection is needed to connect the parts of the generator set to outside. For example: Corrugated vibration reduction pipe has been used to connect exhaust pipes, air exhaust path, fuel inlet pipe, fuel return pipe and so on, all of these parts need to use soft connections. Only in this way we can reduce the adverse effect caused by the vibration of generator set to the minimum extent.

3.6 Utility power

Utility can provide power to critical components on the generator set, such as battery charger, water heater, oil heater and other devices. The battery naturally discharges while it is stored or not running. To maintain the generator set in good capability of starting, recharge it once a month in summer, and every 2 months in winter. The user can charge the battery through ATS equipment, or by connecting utility wirings to terminals of the battery charger.
The engine will be hard to start in the cold environment. It is need by heater unit. Before starting the engine, connect wirings of the heater to utility. The heater unit starts to work by the utility switch. When the temperature reaches the preset value or the engine has started; the heater unit will stop working automatically.

3.7 Load connections

3.7.1 Select load cable

Select the cable with proper diameter, based on its allowable amperage and the distance between the generator set and the lode.
Recommend to select the proper diameter and length of cable. There is maximum 5% marginal drop only for the rated voltage between the terminals of loads generator set via the cable. It should be considered while selecting the cable.

Warning:
!! If load exceeds allowable amperage, the cable may be damaged in over heating.
!! If the cable is either too long or too small, there will be greater voltage drop between cables which bring voltage drop to loads. It may result in reduced performance in the connected loads.

3.7.2 Connecting load cable

The generator set is ready for user connections. The user load cable should be connected to the corresponding wire terminal which is located inside the control cabinet or switch cabinet, then use a wrench to tighten cable connections and fix them. Power cables must be placed in suitable channel, tunnels or protective conduct-holder. Do not include AC and DC cables in the same channeling.

Warning :
!! Connection must be carried out only by a licensed electrician.

3.8 Ground connections

Metal parts of installation, which are exposed to human or have insulation flaw or other reasons, may get in contact with voltage. There must be connected to the ground.
The generator set and electric components have been equipped with their respective grounding terminals which are all connected to the ground terminal in the control cabinet.
The terminal is connected to the ground bolt on the base frame. Connect the ground bolt to the land-dispersion.
The connection to the land-dispersion must be made with bare copper wires conductors with a minimum section of 16 mm*2, or if not available, galvanized iron with a 50mm*2 section.

Warning

!! If the grounding terminal is unconnected by mistake or accident, it will be very dangerous for human because leaking current inevitably goes through the body.

!! All the bonnets of the loads must be grounded to the earth.

!! Grounding should be made before running the generator set.

3.9 ATS connections

The generator set is equipped with an automatic transfer switch receptacle on the control cabinet. The customer can select an appropriate ATS (automatic transfer switch) and connect it the generator set.

(1). Connect the control terminal on the generator set and ATS cabinet.

(2). Connect the output wiring terminals on the generator set and ATS cabinet.

(3). Connect the mains supply to the ATS cabinet.

(4). Connect the load to the ATS cabinet.

Warning

!! Stop the generator set before connecting the ATS.

!! Each phase line and the ground wire connect to the one correspondence.

The ATS is controlled by the PLC module which can monitor the incoming AC mains supply. If the mains supply is normal, the module will give a signal to the ATS. Then ATS transfers to the mains supply and make it before power for loads , and the generator set does not run. On the contrary the generator set will run and supply power if the mains supply is abnormal.

The ATS location is important, and several key considerations are following:

(1). The ATS should be located inside the building near the main breaker box or the disconnect box.

(2). Locate the ATS in a clean, dry, well ventilated location, away from excessive heat. Allow adequate working space around the transfer switch.

(3). If the ambient air is above 40℃,fuses and circuit breakers must be derated.

(4). Never install control wires in the same conduit as power conductors.

(5). Conduit, wire, circuit protective device sizes, insulation etc. Must conform to applicable local and national codes and regulations.

(6). The ATS must be kept away from any location that might allow water to get on it. Do not mount the ATS where flammable liquids or vapors are present.

(7). If the ATS is mounted outside, it must be protected from the environment.

(8). Do not mount the ATS on the generator set.

3.10 Battery connections

The battery cable should be disconnected to the posts when the generator set is required to transport or store for a long term. Before running the machine, connect the battery cables.

The energy storage capacity of the start battery will decide if the diesel engine generator set can smoothly start in a specified period. During the process of generator set running, the charging alternator installed in the engine will continuously charge battery to start battery.

Warning

!! Please ensure the connection for positive and negative polar is correct. Wrong connection will cause malfunction. As wrong connection will surely cause damage to the charging alternator.

!! When generator set is running, battery cables are not allowed to be cut down.

!! Do not dispose of battery in a fire. The battery is capable of exploding. If it explodes; electrolyte solution will be released in all directions. Battery electrolyte solution is extremely caustic and can cause serve chemical burns and blindness. If electrolyte contacts skin or eyes, immediately flush the area with water and seek medical attention quickly.

3.11 Grounding/Earthing requirements

The frame of generating set must be connected to an earth ground. Since the set is mounted on vibration isolators, the ground connection must be flexible to avoid possible breakage due to vibration. Ground connection cables or straps should have at least full load current carrying capacity and meet appliance regulations.

4. Operation

4.1 Pre-check before starting

4.1.1 Inspect before operation

After finished installation, our diesel engine generator set can be put into use. Each time before starting the generator set, following items shall be checked without fail:
(1). If there is foreign material exists in the surface of generator set or in the ambient environment which may hamper the generator set's operation
(2). If the air inlet and ventilation path in the generator set working room is expedite
(3). If the anti-freeze level is normal
(4). If the air filter indicator works well
(5). If the lubricant level is within the specified range
(6). If the fuel valve is open, if the fuel has been supplied to the engine normally
(7). If the cable has been connected to the battery in a correct way
(8). Check if the load equipment has been well prepared. When the generator set directly connects to the load, the air switch shall be cut off before start

Warning:
!! Operators shall establish good operation (maintenance) procedure, this is the precondition for generator set's smooth running in long time period.

4.1.2 Checking engine oil level

Keep the generator set level when checking engine oil , insert the oil gauge all the way in the appropriate level should be between the lower limit and upper limit on the oil gauge.
Add the engine oil if the level is below the lower limit :
(1). Select the proper engine oil .
(2). Loosen the oil inlet cap and remove it .
(3). Fill engine oil into the oil inlet through an oil filter until the level is slightly less than the upper limit by checking the oil gauge.
(4). Tighten the oil inlet cap.

Warning:
!! If the generator set is not level when checking the engine oil ,you can not obtain accurate oil level.
!! Do not overfill the engine oil. The level can not exceed the upper limit because the excessive amount of engine oil may damage the engine .
!! Do not smoke or make light fires near the generator set when filling the engine oil.

4.1.3 Checking coolant level

Remove the coolant inlet cap and radiators cap, check the radiator if full of the cooling water or not. Engine coolant must include antifreeze according to the coolest weather conditions in the area. A mixture of 50% antifreeze and 50% water is recommended.

Add coolant in case of shortage:
(1). select the proper coolant.

(2). Remove the coolant inlet cap.
(3). Remove the radiator cap.
(4). Fill coolant up to the radiator inlet top.
(5). Tighten the radiator cap and coolant inlet cap.

Warning:
!! Make sure that the gas is fully drained out of the cooling system .
!! Do not open the radiator cover when the engine is running of after the engine is stopped just for a while. Because the coolant temperature is very high in this time .The vapor and splashed coolant may scald you seriously.

4.1.4 Checking fuel level
Check the fuel level in the tank. Add fuel in case of shortage:
(1). select the proper fuel .
(2). Loosen the fuel cap and remove it.
(3). Fill the fuel through the inlet until the fuel is slightly less than the tank lever.
(4). Tighten the fuel cap.

Warning
1) **Do not smoke or make light fires near the generator set when filling the engine oil.**
2) **Often open the drain plug in the fuel tank to drain the sediment and impurity.**

4.1.5 Checking the fan belt
Check the tension and the extend length of the belt.Check the belt if good or not.Replace it if necessary. Refer to its engine manual for the regulation or replacement of the belt.

4.1.6 Checking the battery
Check if the battery is full charged. Check the battery connection cables.Take care to tighten the loosened battery terminal with spanner and keep clean in order to avoid oxidation.

4.1.7 Checking the grounding protection
The generator set frame and load must load must be installed grounding protection ,and make sure The grounding protection is ok.

4.1.8 Checking the coolant and oil leakage
Inspect the wholly unit and open the door to check if there is coolant leakage and oil leakage. If there is ,please contact with your dealer for service.

4.1.9 Check the looseness of the parts
Check the nuts and screws if loosened.If loosened ,tighten them .Specially inspect the air cleaner, muffler and charging alternator.Pay attention to the broken cables and loosened terminal.

4.1.10 Clean the dirty and dusty in the unit
Check the unit inner for dusty and clean it .Check the muffler and the place near the engine for trash and flammable materials and clean them.Check the intake and exhaust port if clogged by the dirty.Clean it if necessary.

4.1.11 electrical connection with load

Make sure that load does not exceed the power capacity of your unit.Connect electrical connections properly.

4.1.12 checking the emergency stop button

Make sure that the emergency stop button is not pressed.

4.2 Start

(1). turn off every circuit breaker and all switches of loads.
(2). Turn off the generator set main circuit breaker and other circuit breakers.
(3). Press the start button on the generator set panel and the engine begins to start. It will attempt to start about 10 seconds. If the engine fails to start,you need to wait at least 2 minutes before retry.
(4). After the engine starts successfully, allow the engine to warm up no more than 10 minutes.
(5). The control module will check the value of voltage and frequency. If the value is abnormal, the warning LED would flash.
(6). Once the generator is running at the correct voltage and frequency, turn on the generator set main circuit breaker and the circuit breaker of loads, send power to the load side.

Suggestion:

In order to extend the life expectancy of start battery and start motor, the duration for one time Start shall be controlled within 5 to 10 seconds.

Warning:

!! Before turning on the main circuit breaker, make sure any circuit breaker and switch of loads are positioned to OFF .Otherwise,it may cause electric shock to the operator.
!! Do not touch wires and connection to the alternator when the generator set is running because they are live.
!! For any start up which is made through force, not by control panel, the malfunction caused by it do not belong to the scope of warranty.

4.3 Running

When the generator set begins full speed running, and the alternator's voltage and frequency becomes normal and stable, operators can put the generator set into normal running.
During the generator set's running period, operators shall often watch and check the parameters Such as if the generator set is running normally, if the control panel instrument is indicating the right position, if the control panel has pre-warning indication, and the fuel level in the base frame etc, and make record for parameters. See the following details about general precautions during operation:
(1)**.** Check the value of voltage ,current and frequency,which should be desired.
(2). Check the value of engine oil pressure and the coolant temperature.
(3). Check for any leakage of coolant ,oil and fuel.
(4). Check for any unusual vibration or noise.
(5). Check for any unusual color from the exhaust.Under normal condition,the exhaust gas has no color or light bluish color.
(6). If engine speed is not stable or engine can not run because of no fuel,extract the air in the fuel

system.

Warning:
(1)<u>. Be sure to keep the tolerance among three phases less than 20%. The load for each phase must below the rated load as well as the current must less than rated rated current.</u>

4.4 stop

(1)**. Normal stop:** Before stop the generator set under normal condition, first separate the load from this generator set, then run the generator set with no load for a certain period of time(3 to 5 minutes), so that to make sure the generator set become fully cooled, after that the generator set can be stopped. Please do not make cooling running under idle speed. For some generator sets which have been installed with stop solenoid, it is impossible to stop the generator set by cutting off the key switch on the control panel. Correct operation is: to press the stop button when the power of the control panel being resumed, only in this way you can stop the generator set. Please also note that press the stop button until the generator set fully stop running.
(2). **Emergency stop**: In case the generator set was found to have severe malfunction or power distribution malfunction. Please press down the emergency stop on the control panel, so that to immediately shut down the generator set. Under normal condition, please do not use emergency stop to stop
the generator set.

4.5 After running

After the generator set stop running, it is necessary to carry on following jobs:
(1). To check if the generator set has “three leakage”(lubricant, fuel, anti-freeze leakage)
(2). Shut down fuel valve
(3). Shut down air inlet and air exhaust facility in the generator set’s working room when necessary
(4). Shut down the power key switch on the control panel, take out the key and keep it in good condition when necessary
(5). When the generator set need to be shut down for a long time or is under maintenance, please dis-connect the start battery’s negative polar cable, and fully discharge the fuel and anti-freeze liquid when necessary
(6). For the self-start generator set, some of the above terms are not applicable. After the self-start Generator set stops, please keep it in the same status as that of pre-start (ready to start), so that it can start at any time under emergency cases.

4.6 Attention

!! It is not allowed to run the generator set with overload in long time, otherwise malfunction will occur, which will decrease the generator set’s life expectancy.
!! It is forbidden to detach or change the components of the generator set when it is running.
!! It is not allowed to continuously run the generator set under empty or small load, otherwise it

will cause server carbon deposition and oil leakage in engine’s turbo-charger and exhaust system.
!! When discharge the high temperature lubricant oil, please avoid being burnt.
!! For these standby generator sets which haven’t been run for a long time, it is suggested that

these kinds of generator sets shall be run to working temperature at least one time a month. These Kinds of generator sets need to be continuously run with full load for 4 hours at least one time per year.

!! For the generator sets which are connected in parallel and controlled by manual, operators must make sure they are running synchronous (same frequency, same phase-sequence, same phase, and same voltage) before switch on.

5. Maintenance

For different types of generator sets, users need to refer to the matched engine's operation and maintenance manual to implement correct maintenance operation. In hot and dusty environments maintenance procedure of changing engine oil and oil filter should be performed more frequently.

In order to obtain maximum operation safety and life expectancy of the generator sets, periodic maintenance is very important. Strictly observance of the terms on generator set's maintenance can ensure generator set's performance and reduce its damage to environment.

Maintenance of the generator sets shall be made when it has been stopped and the cable which connect to the negative polar of the battery shall be dis-connected so that to ensure the generator set will not mistakenly start.

5.1 Engine

Each time before starting the engine, it is necessary to check lubricant oil level, coolant level, air filter indicator, the ventilation of radiator and ambient environment, engine's transmission belt and fuel supply status. For the generator sets which running frequency need to be checked one time every 6 to 8 hours. Backup generator sets need to be checked once more after being stopped.

5.1 .1 Lubrication oil

Oil system of diesel engine is one of the most important elements of the engine . Correctly made engine overhaul prolongs the life cost of the engine.
We recommend that high quality multi grade SAE 15w/40 high service engine oil in diesel engine is used . At ambient temperatures above -15℃ is15w/40.The minimum API oil quality levels recommended for use is CH/CI-4.

5.1.2 Engine coolant

Water for coolant should be clean and free from any corrosive chemicals such as chlorides, sulphates and acids. It should be kept slightly alkaline with a PH value in the range 8.5 to 10.5 .Antifreeze must be added to the coolant where is any possibility of freezing to protect the engine from damage due to coolant freezing .A 50% antifreeze/50% water mixture is recommended.

5.1.3 Fuel choice

It is very important that the fuel oil purchased for use in any engine be as clean and water -free as possible . Dirt in fuel ,the fuel can clog injector outlets and ruin the finely machined precision parts in the fuel injection system . Water in the fuel will accelerate corrosion of these parts .The fuel temperature is a critical factor for appropriate working

Ambient temperature ℃	＞12	4~12	-5~4	-14~-5	-29~-14	-44~-29
Fuel	10	0	-10	-20	-35	-50

5.2 Alternator

Inside and outside of the alternator shall be cleaned periodically. And the frequency of cleaning depends on the generator set's ambient environment. When the cleaning becomes necessary, following procedures can be followed: cut off all of the powers, wipe off the dirt, contaminant, oil stain, water or any other liquid from the surface. The ventilation mesh also needs to be cleaned. The adhesiveness of these materials to the coils will cause the coils overheat or damage the insulation.
The dirt and contaminant need to be absorbed by dust collector. Please don't use air blow or high pressure water spray to clean the alternator. The humidity of alternator will decrease insulation resistance. The alternator shall be dried. Please refer to alternator's operation and maintenance manual for the method of drying and detailed maintenance.

5.3 Daily check

Inspect the generator set daily or after every 8 hours of operation . Check the mechanical, exhaust , fuel and DC electrical system as described below.

5.3.1 New machine

(1)**.** Run the generator set at least 60-100% of continuous load for the first 100 hours
(2). Charge engine oil and replace oil filter after the first 50 hours.

5.3.2 Mechanical system

Inspect any signs of mechanical damage. Start the generator set and listen for any unusual noises, which may indicate mechanical problems. Repair them immediately. Inspect the mounting fasteners to make sure the generator set is secure in its compartment.
Check the generator set air inlet and outlet areas, make sure that they are not blocked with debris. Clean the machine whenever dust and dirt begin to accumulate.Usually remove dust and dirt with a damp cloth.

Warning:
(1). Do not clean the generator set when the engine is running.
(2). Protect the alternator, air cleaner ,control panel and electrical connections form cleaning solvents because cleaning solvents can damage electrical connections.

5.3.3 fuel system

Inspect the fuel supply lines ,return lines ,filters and fitting for leaks during the machine running . Replace worm fuel line components if necessary before leaks occur.

5.3.4 Exhaust system

Inspect the entire exhaust system including the exhaust manifold,exhaust elbow, muffler and exhaust pipe during the machine running . Visually and audibly check for leaks at all connections, welds, gaskets and joints. If any leaks are found out ,shut down the machine and do not operate until corrected. Replace corroded exhaust components if necessary before leaks occur.

5.3.5 DC electrical system

Inspect the battery terminals for clean and tight connections with the generator set off. Loose or corroded connections cause resistance which can impede staring.Clean and reconnect loose battery cables if necessary. In order to reduce the possibility of arcing,always disconnect the negative battery cable first and connect it last.

5.4 Periodic maintenance schedule

Following the maintenance schedule and using the machine properly will result in longer generator set life, better performance and safe operation. Perform each maintenance procedure at the time period indicated of after the number of operating hours indicated, which comes first.

Maintenance Item	every 10 working hours or 1 day	every 50 working hours or 1 month	every 250 working hours or 3 months	every 500 working hours or 6 months	every 1000 working hours or 1 year	every 1500 working hours	every 2000 working hours	when necessary
Overall Appearance	√							
Commissioning of Generator		√						
Checking of three leak phenomena of	√							
Checking of the surface of lubricant		√						
Checking of coolant and Filling-up	√							√
Checking diesel oil level	√							
Cleaning block of both radiator element and cooler	√							
Checking connective flexible pipes of air piping, water piping				√				
Checking connective electrical cables				√				
Checking battery electrolyte surface and specific gravity		√						
Checking blowing machine and belt tension of charger				√				
Replacing lubricant and lubricant filter (including feed-through,pass-by)		* (run-in period)	*					
Cleaning or replacing air filter		√		*				
Replacing diesel oil filter		* (run-in period)	*					
Replacing water filter			* (run-in period)	*				
Replacing coolant			* (run-in period)	*				
Checking air indicator	√							
exhaust the residual water in water trap		√						√
Checking all electrical and connective parts and supporting firmness				√				
Checking the sealing and add grease to sealing loop when necessary				√				
exhaust up and clean fuel tank				√				√
Checking the injector and replace it when necessary							√	
Checking the comprehensive situation of turbocharger							√	
Checking insulation of alternator							√	
Checking rotary diode (LED)							√	
Checking and adjusting valve clearance						√		

Note: This Form is only for your reference. The detailed maintenance items and maintenance cycle should be flexibly adjusted as per actual running situation and working environment. If the above items could not be maintained by user, contacts might be done to the supplier or directly to our company.

√: to represent the items necessary in maintenance cycle

*: to represent the articles necessary to be replaced when up to a certain maintenance cycle

5.5 Control panel

Daily maintenance for the control panel shall ensure the cleanness of its surface, make the indicator more clear and easy for reading, and the operation button flexible and reliable.
During the generator set's running period, vibration will cause the shift of "o" position in the instrument of control panel and loose of tightened parts, and therefore periodically check the instrument of the control panel and parts and cable's connections are very important. More details, please refer to control panel operation manual for details.

5.6 Batteries

Batteries which have been stored in a long time shall be properly charged before being used, so that to ensure normal capacitance of the battery. Normal operation and battery being vaporized. So constant fluid infusion is needed. Before fluid infusion, the contaminant around the adding hole shall be cleaned in order to avoid them falling into the battery. Then open the adding hole, add proper amount of purified water. Add water according to the indicating line in the battery polar plate. Otherwise the inside electrolyte will overflow from the adding hole when the battery is under discharge or charging, which will cause contamination to the ambient material and environment.

Please do not use the battery to start the generator set under low temperature because the battery capacitance can not output normally under low temperature, and long time discharge may cause battery malfunction. For the battery of the standby generator set, it should be maintained and charged periodically. In addition, it is suggested that users can buy floating charger for the battery.

6. Check the malfunction

There are many factors which may cause the generator set's malfunction, and these malfunctions are usually closely related to each other. This section mainly summarize and list the possible malfunctions. This is just for user's reference when they try to eliminate the malfunctions.

Warning
(1). Performing troubleshooting should be carried out by a licensed engineer.
(2). Before performing any troubleshooting, stop engine and always allow engine to cool because hot engine parts can cause severe burns.

6.1 Generator set trouble

Trouble	Cause	Solution
Low engine oil pressure	1.lubricant oil is insufficient	1.Add lubricant oil
	2.oil hose has leak	2.Tighten or change oil hose
	3.oil filter is clogged	3.Change oil filter
	4.wrong oil is used	4.Change to proper kind oil
High coolant temperature	1.coolant is insufficient	1.Add coolant
	2.coolant pipe has leak	2.Tighten or change coolant pipe
	3.fan belt is loose	3.Tighten the belt
	4.radiator core is clogged	4.Clean radiator core
	5.water temp sensor is defective	5.Repair or change the sensor
	6.engine thermostat is defective	6.Repair or change the thermostat
Low fuel level	1.fuel is insufficient	1.add fuel
	2.fuel pipe has leak	2.tighten or change fuel hose
	3.fuel tank has leak	3.repair or change fuel hose
	4.fuel filter is clogged	4.drain water/sediment or change fuel filter
Power drops after running a period of time	1.air filter element is clogged and air is insufficient	1.clean or change air filter element
	2.fuel filter is clogged and fuel is insufficient	2.drain water/sediment or change fuel filter
	3.engine ignition time is incorrect	3.adjust the ignition time as required

6.2 Engine trouble

Trouble	Cause	Solution
Starter motor can not drive or speed is low	1.battery switch is off	1.turn the switch to on
	2.battery output is weak	2.change the battery
	3.battery is deteriorate	3.change the battery
	4.battery terminal is loose	4.tighten the terminal
Starter motor drives,but engine can not start	1.fuel is insufficient	1.check fuel system and add fuel if necessary
	2.fuel hose has leak	2.tighten or change fuel hose
	3.fuel filter is clogged `	3.drain water/sediment or change fuel filter
	4.gauze filter is clogged	4.clean or change gauze filter
	5.air is mixed in fuel line	5.extract the air
Engine starts but stalls at once	1.fuel hose has leak	1.`tighten or change fuel hose
	2.fuel filter is clogged `	2.drain water/sediment or change fuel filter
	3.gauze filter is clogged	3.clean or change gauze filter
	4.air is mixed in fuel line	4.extract the air
	5.lubricant oil is insufficient	5.check oil level,add oil as required
	6.air filter element is clogged	6.clean or change air filter element
Output is insufficient	1.fuel is insufficient	1.check fuel system and add fuel if necessary
	2.overheating of moving parts	2.check to see if lubricating oil filter is working properly
	3.air filter element is dirty	3.clean or change air filter element
	4.injection pump wear	4.check the fuel injection pump element and delivery value assembly ,replace if necessary
Muffler release black smoke	1.fuel is of very poor quality	1.select good quality fuel
	2.air filter element is clogged	2.clean or change air filter element
	3.loads total exceeds the rated current	3.adjust the loads to meet the rated output
Engine surge at idle	1.fuel is insufficient	1.add fuel
	2.air is mixed in fuel line	2.extract the air in fuel system and check for suction leaks
	3.idle speed is set too low	3.check and adjust low idle screw
	4.fuel filter is clogged	4.drain water/sediment or change fuel filter

6.3 Alternator trouble

Trouble	Cause	Solution
No voltage or voltage is insufficient while generator set running	1.winding is cut	Intertwist the cut winding and weld firmly
	2.wiring terminal is loose	Tighten the wiring terminal
	3.wiring terminal is defective	Clean or replace the defective terminal
	4.speed is too low	Check the speed and keep the rated speed
Voltage is unstable	1.speed is unstable	Keep the rated speed
	2.AVR is defective	Check AVR and change if necessary
Alternator overheats	1.overload running	Reduce load
	2.vent-pipe inside the alternator is clogged	Blow and clean the inner
Voltage is too high	1.speed is too high	Keep the rated speed
	2.AVR is defective	Check AVR and change if necessary
Voltage is too low while running without load	1.speed is too low	Keep the rated speed
	2.AVR is defective	Check AVR and change if necessary
Voltage is correct without load,but too low under load	1.speed setting is incorrect	Check and adjust the speed
	2.short circuit on the rotor	Check resistance of the circuit
	3.armature of excitation is defective	Check resistance of the circuit
Voltage disappears while running	1.winding of magnetic field is cut	Check the cut winding ,intertwist and weld firmly
	2.rotor of excitation is defective	Check rotor,repair it and change if necessary
	3.AVR is defective	Check AVR and change if necessary

6.4 Control system trouble

Trouble	Cause	Solution
Main breaker can not be turn to on	1.the main breaker position is between on and off	Once turn the breaker to off,turn it to on
	2.short circuit on the load	Check and repair the load circuit
Control module can not run	1.control module cable is disconnected to the battery	Connect the module cable to the battery
	2.battery power is insufficient	Charge the battery with the utility power
	3.the fuse is damaged	Change the fuse
Voltage drops quickly when connecting	1.loads total exceeds the rated current	Decrease the loads to meet the rated output
	2.loads sharing to each terminal is unbalanced	Balance the loads sharing to each terminal
	3.AVR of alternator is defective	Check AVR and change it if necessary
	4.use wrong frequency	Adjust the frequency to the load frequency
Frequency is stable ,but voltage is unstable	1.AVR of alternator is defective	Check AVR and change it if necessary
After connecting to the load ,voltage and frequency is stable,but current is unstable	1.customer load is unstable	Check and adjust the customer load
Voltage can not go up to the rated value	1.AVR of alternator is defective	Check AVR and change it if necessary
	2.frequency is low	Adjust frequency as required
Voltage exceeds the rated value	1.AVR of alternator is defective	Check AVR and change it if necessary

7.Limited Quality Warranty

We provide warranty for our generating sets in warranty period according to the following clauses.

7.1 Warranty Coverage

Any defect of generating sets can be eliminated through repairing or replacing accessories and spare parts, Unless it is regulated by laws or specific regulations. The warranty stated in this manual by us is the only legitimate warranty applying to our products. This manual define the responsibilities and rights between the users and us regarding to product warranty, services and the agreement validity conditions. Please make sure you have read about it. If your generating sets are damaged by abuse, neglect, improper operation, insufficient maintenance, or unauthorized remodel, your claim for compensation or any direct or indirect claim for warranty repair will not be accepted by us After-sales Service Department, nor the authorized after-sales service centers.

The generating sets must be operated, maintained by staff having experience of operating similar machines. Regular maintenance is the main factor that guarantees normal operation of generating set. If you do not maintain your generating sets as required, your claim for quality warranty might be not accepted.

Warranty includes repairing or replacing defect accessories and spare parts. Principally the trouble is eliminated by repairing the trouble is eliminated by repairing the defect accessories and spare parts.
Only when the trouble is identified by us, or the supplier of us, or a legitimate third-part quality supervision organization as the trouble that can not be eliminated completely by repairing, can replacing accessories and spare parts be adopted.

7.2 User's Obligations

As a user, you should install, operate and maintain the generating sets correctly:
(1). You should operate and maintain your generating sets as required. All the records of maintenance and repair including replacing the lubricant oil and filter should be well kept. When the user is changed, complete records of maintenance and repair is the basic requirement that guarantee the new user get the remaining time of the warranty.
(2). You should establish a scientific operation and maintenance plan, which should include usage of fuel,oil,lubricating oil,etc. In addition, you should replace genuine accessories and spare parts in the right way.

You should report the defects in time:
(1). It is the customer's obligation to report any product defect to our distributor, dealers or repair workshop. The report should be delivered as soon as the defects are found. In any cases, the report should not be delivered later than the fourteenth days after the expiration of warranty. At least a general description of the defects should be included in the report.
(2). User must provide all the necessary files to prove the validity of the warranty.

7.3 Warranty Period

7.3.1 Whole Set Warranty Period

The whole set warranty period is based on the purchasing date and operation date. The one which is due first is used as the criterion, unless different specific regulations are made in this manual or in relevant commercial contracts.

7.3.2 Limited Warranty for New Generating Sets

Range	Contents	Warranty Period
Whole Set	All the accessories and spare parts in the coverage	* 1000 hours operation,or
		* 12 months from installation date,or
		* 15 months since the generating sets leave the factory. The time which is due first is used as the criterion

7.3.3 Repaired Parts Warranty Period

If the repaired or replaced accessories and spare parts are our genuine accessories and spare parts, six months warranty is period. If not, no warranty is provided.

All the period or replaced accessories and spare parts or generating sets can only enjoy the remaining time of warranty period of the original accessories, spare parts or generating sets.

7.4 Warranty Coverage

7.4.1 Repair Range

Repair range in warranty coverage covers the repair of damages caused by materials or craftworks. Damages are repaired through using new accessories and spare parts or re-manufactured accessories and spare parts.

7.4.2 Repair Fee

The fee (including spare part and labor work) caused by repairing damages in warranty coverage will not charged on the user.

7.4.3 Repair Time

We, or authorized distributors, or authorized service centers will respond quickly to your requirement for repairing damages under warranty and reasonable time is needed to repair the damages.

7.4.4 Damaged not in Warranty Coverage

Damages caused by any of the following reasons are not in the warranty coverage:

(1). Damages caused by accidental collision, burning, theft, freezing, devastation, prang, or natural disasters such as earthquake, lighting strike, fire,flood, etc, or other force majeure(for example, war);

(2). Damages caused by remodeling on the final assembled generating sets, replacing spare parts, including changing the canopy, engine, alternator, base tank and spare parts;

(3). The time can not be read due to time calculator is not powered for work on the time is purposely changed;

(4). Damages caused by radioactive air (chemistry, serum, etc), acid rain, stone, hailstone, earthquake, hurricane, lighting, chemistry, etc, are not in the coverage;

(5). Damages caused by transportation, improper installation, or repair unrecognized by us;
(6). Accessories or products are used in violation of the law or for obvious vicious purpose;
(7). Damages caused by man-made improper operation, insufficient maintenance, not maintaining the machine regularly as regulated in this manual, or not using the liquid, fuel,lubricant and coolant recommended are not in the warranty coverage. For example, the damages to the engines caused by not using proper fuel according to the environmental temperature are not in the warranty coverage;
(8). Damages directly or indirectly caused by improper repair and consequent malfunctions and damages are not in the warranty coverage;
(9). Those who are not able to provide us with required documents or some provided documents are invalid (Product warranty card is valid within three months after the products leave the factory) can not get the warranty;
(10). Those who are not able to provide us with the original records of maintenance and repair (when reporting troubles or if required by us) can not get the warranty;
(11). Vulnerable parts, daily used spare parts (for example engine oil cleaner, by-pass oil filter, diesel cleaner, water cooling cleaner, belt, battery, engine oil, antifreeze, anti-corrosion, fuse tube, nozzle tips, etc) are not in the warranty coverage;
(12). Spare parts (not including engine and alternator) specified by the customer but not covered by the standard spare parts range provided by us are not in the warranty coverage;
(13). Accessories or spare parts provided by the customer are not in the coverage;
(14). Damages caused directly or indirectly by not using our genuine spare parts or using spare parts not Recognized by us are not in the warranty coverage;
(15). Warranty does not include the economic loss or extra expenditure due to downtime, for example: economic loss and time loss due to unable to use generating sets, or expenditure for storing generating sets, loss due to inconvenience

7.5 Crommelins Warranty

Crommelins Machinery warrants their goods against defects in materials and workmanship under normal use and service.

The Crommelins warranty does not cover fair wear commensurate with the age of the product, any damage caused by accident, abuse, misuse, neglect or failure to observe proper operating instructions or proper machinery maintenance as described in the instruction manual.

It is the owners responsibility to regularly maintain a product in accordance with the owners manual and only use the equipment for its designed purpose.

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

7.5.1 Consumer Advice

Any claim under these warranties must be made within warranty period from the date of purchase of the product.

To make a claim under the warranty, you must return the product (with proof of purchase) to the closest warranty agent or to the place of purchase.

Where a failure does not amount to a major failure, Crommelins is entitled to choose between providing you with a repair, replacement or refund. To obtain compensation, you would need to provide documentary evidence of the loss or damage suffered, and documentary evidence that such loss or damage was a reasonably foreseeable consequence of a failure by Crommelins Machinery to comply with a consumer guarantee under the Australian Consumer Law.

7.5.2 Service Agents

There are over 185 national authorised service/repair agents available, visit www.crommelins.com.au for their locations and contact details. For engine brands (other than Robin) please contact the manufacturer for service agents.

7.5.3 Crommelins Products

Crommelins takes pride in all products sold and live by the company Mission Statement; “To be the supplier of choice to Hire and Construction Industry by providing high quality portable powered products.”

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