Instruction manual

Marine generator set

QMF3.5M

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nanni diesel

energy in blue

Contents

Safety precautions

Read this chapter carefully as it concerns the safety. Most accidents are caused by failing to follow basic safety rules. Be aware of the possible risks involved in handling the generator set and make sure you take the necessary precautions to protect theself, those around you and the equipment.

This manual contains important safety indications and information.

They are as follows:

⚠ **Warning! :** This symbol indicates the risk of accidents and serious personal injury, substantial property damage or serious mechanical faults if the instructions are not followed.

⚠ **Caution! :** Indicates a risk of personal injury and/or property damage when handling a component.

Notice: Indicates that important information must be known in order to facilitate handling or in particular cases.

Using and handling a generator set entails risks that could prove to be extremely dangerous. Some work requires specific knowledge and equipment. This work should be carried out by Nanni Diesel authorised personnel or by a professional. If you have to work on the generator set, carefully follow the safety instructions set down in this manual.

⚠ Hazardous Voltage/ Electrical Shock starting

Hazardous voltage and moving rotor can cause severe injury or death. Operate the generator set only when all guards and electrical enclosures are in place.

Hazardous voltage can cause severe injury or death. Electrocution is possible whenever electricity is present. Open the main circuit breakers of all power sources before servicing the equipment. Configure the installation to electrically ground the generator set, transfer switch, and related equipment and electrical circuits to comply with applicable codes and standards. Never contact electrical leads or appliances when standing in water or on wet ground because these conditions increase the risk of electrocution.

Disconnecting the electrical load. Hazardous voltage can cause severe injury or death. Disconnect the generator set from the load by opening the line circuit breaker or by disconnecting the generator set output leads from the transfer switch and heavily taping the ends of the leads.

High voltage transferred to the load during testing may cause personal injury and equipment damage. Do not use the safeguard circuit breaker in place of the line circuit breaker. The safeguard circuit breaker does not disconnect the generator set from the load.

Short circuits. Hazardous voltage/current can cause severe injury or death. Short circuits can cause bodily injury and/or equipment damage. Do not contact electrical connections with tools or jewelry while making adjustments or repairs. Remove all jewelry before servicing the equipment.

Handling the capacitor. Hazardous voltage can cause severe injury or death. Electrical shock results from touching the charged capacitor terminals. Discharge the capacitor by shorting the terminals together.

Electrical backfeed to the utility. Hazardous backfeed voltage can cause severe injury or death.

Connect the generator set to the building/marina electrical system only through an approved device and after the building/marina main switch is opened. Backfeed connections can cause severe injury or death to utility personnel working on power lines and/or personnel near the work area. Some states and localities prohibit unauthorized connection to the utility electrical system. Install a ship-to-shore transfer switch to prevent interconnection of the generator set power and shore power.

Testing live electrical circuits. Hazardous voltage or current can cause severe injury or death. Have trained and qualified personnel take diagnostic measurements of live circuits. Use adequately rated test equipment with electrically insulated probes and follow the instructions of the test equipment manufacturer when performing voltage tests. Observe the following precautions when performing voltage tests:

- Remove all jewelry.
- Stand on a dry, approved electrically insulated mat.
- Do not touch the enclosure or components inside the enclosure.
- Be prepared for the system to operate automatically.

⚠ Exhaust gas

Exhaust gases contain carbon monoxide. This colourless and odourless gas is extremely harmful and could lead to poisoning which could result in loss of consciousness or death. The first symptoms of carbon monoxide intoxication are as follows:

- Dizziness
- Nausea
- Headache
- Throbbing temples
- Vomiting
- Fatigue and falling asleep
- Tense muscles

If you or anyone else in the vicinity of the generator set experiences any of these symptoms, leave the area of operation of the generator set and find fresh air. If the symptoms persist, consult a doctor and have the generator set checked.

⚠ Risk of burns

Never touch the hot parts of the generator set or the exhaust circuit.

An operational generator set gets very hot: the exhaust elbow and pipe, turbocompressor, starter, oil sump, oil, coolant in the hoses and pipes are hot and can burn.

Fluids ejected under pressure can cause serious injury.

Release all the pressure in the circuits before removing the caps.

Never open the oil circuit caps when the generator set is operational and/or hot.

Never start or run the generator set when the oil fill cap is not screwed on as hot oil could spray out.

If you come into contact with any of these fluids, consult a doctor immediately.

If the generator set gets too hot, switch it off and disconnect it and wait for it to cool down before handling.

⚠ Risk of fire

Do not smoke near the generator set and keep it away from sources of ignition (flames or sparks) or any other potential flammable vapour or liquid sources.

Do not run the generator set without an air filter.

Do not run the generator set in an area in which flammable or explosive materials are stored or where gas is present. Ensure there are no flammable liquids in the engine compartment.

Immediately clean up any liquids spilled over theself or the floor and keep the engine compartment clean and accessible so as to minimise the risk of fire. Be careful as fuel can burn.

⚠ Risk of explosion

Explosions caused by fuel vapour can cause serious injury! Carefully follow the safety rules when filling the fuel.

Open and ventilate the storage area of the generator set after filling. Check that there are no fuel vapours or leaks before starting the fan (if fitted). Switch the fan on for 5 minutes before starting the generator set.

All fuel vapours are flammable and explosive. Be careful when handling and storing fuel. Store the fuel in a ventilated area away from sources of ignition (sparks or flames) and out of the reach of children.

Stop the generator set before filling with fuel or lubricant. Do not smoke near the generator set and keep it away from sources of ignition (flames) when filling with fuel and/or lubricant. Wear gloves when investigating possible leaks.

Do not alter or damage the fuel circuit. Close the fuel circuit whenever you work on it.

Ensure you always have an appropriate working extinguisher to hand.

⚠ Accidental starting

Accidental starting can cause serious injury and even death!

Disconnect the battery before working on the generator set.

Ensure no one is alongside the generator set or working on the set before starting it.

Ensure all the protection mechanisms are in place before starting the generator set.

⚠ Risk of battery explosion

A battery explosion can cause serious injury and even death!

Do not smoke near the batteries and keep them away from sources of ignition (flames or sparks). They produce hydrogen which could ignite or explode on contact with an electrical arc or a flame. Switch off all electrical appliances in the vicinity when you are working on the batteries. Ensure the battery storage compartment is corrected ventilated.

Avoid touching the battery terminals with metal tools so that no sparks are created which could cause an explosion. Remove the rings, bracelets and necklaces before handing the batteries.

⚠ Battery acid

The acid in batteries can cause serious injury and even death!

When servicing the batteries, wear protective gloves and goggles. Batteries contain sulphuric acid which is highly corrosive.

Acid can spurt from batteries when they are handled. If the acid comes into contact with the skin, rinse thoroughly in fresh water and consult a doctor.

⚠ Exhaust gas

Ensure the exhaust circuit correctly expels the gas produced by the generator set.

Regularly check that the exhaust circuit is free of leaks and that the exhaust elbow is correctly affixed.

Operate the generator set in a well aerated and ventilated area away from other people. Run the fan when the generator set is operational.

⚠ Rotating parts

Rotating parts can be extremely dangerous and cause serious injury and even death!

Do not work on the generator set when it is operational. If work on the engine when running is absolutely necessary, do not touch any hot or rotating parts.

Baggy clothing, hair or objects could be pulled in and/or caught and cause serious injury or substantial property damage.

Do not wear bracelets, necklaces or rings when working on a generator set.

Check that the bolts and screws are properly tightened and that the protection mechanisms are in place.

Do not check the fluid levels or tension of the alternator belt when the generator set is operational.

⚠ Lifting the generator set

To lift the generator set, use the hoisting eyes on the appliance.

Always check the robustness and overall condition of the lifting equipment. Use suitable gear (cables, beams, machines, etc.) to lift the generator set. Check that the gear is capable of lifting the set.

Lifting cables and chains must be able to move parallel to each other.

Do not forget that any additional equipment mounted on the generator set could alter its centre of gravity. When lifting the set, it should remain as parallel as possible to the ground.

⚠ Maintenance and spare parts

Nanni Diesel engines are designed to meet the different emission standards while delivering maximum service life and reliability.

Regularly servicing and replacing parts with original Nanni Diesel parts will ensure the generator set continues to function optimally.

These parts can be ordered from all Nanni Diesel dealers throughout the world.

⚠ Chemical products

The different fluids used to run the generator set are a health hazard.

Carefully read the instructions on the packaging of these products and always check that the ventilation in the hold space is adequate.

⚠ Boats with metal hulls

Generator sets installed on vessels whose hull is made of metal must be bipolar. If the hull is made of metal alloy and the generator is not bipolar, stop the generator and contact an authorized dealer.

Presentation

Thank you for choosing a Nanni Diesel generator set!

Contact a Nanni Diesel authorised dealer for the servicing of the equipment. A list of dealers can be found on our web site:

www.nannidiesel.com

Nanni Diesel generator sets are the product of many years of experience in the development of marine engines and equipment designed for use in open seas.

Before using, ensure you have the correct manual for the set. We will explain how to identify the equipment and its principal specifications in the chapters to follow. If you don't have the correct manual, please contact a Nanni Diesel authorised dealer.

Carefully read all of this generator set instruction manual before starting the engine.

Pay particular attention to the information on personal safety. This manual must always be to hand where the generator set is used.

Check the overall condition of the generator set before and after using it each time so that you familiarise with the different components and can more easily detect any fuel, oil or coolant leaks or abnormal wearing of the principal parts.

All the information and specifications in this manual are based on the technical data applicable at the time of its publication. Changes and updates may be made by Nanni Diesel without notice.

Certain images, diagrams or equipment described in this manual may not exactly represent (or be part of) the generator set order.

Fuel supply

Ensure that the fuel contains no residues. If it does, use special filters.

Avoid using fuel mixed with water or other substances as you may damage the engine.

The engine performances are influenced by the fuel temperature, the temperature and relative humidity of the exhaust air and by the altitude.

Environmental responsibility

Nanni Diesel designs its engines to have minimum environmental impact and a maximum service life. This objective, however, can only be achieved with the full cooperation of the user. Our operating and maintenance instructions are to help you to protect the generator set and adopt responsible behaviour vis-to-vis the environment.

Observe the warning and caution labels affixed to the generator set.

Ensure you only use the fuels and oils recommended in this manual. Using another type of fuel or oil could cause major generator malfunctions: higher consumption, reduced engine service life, greater discharge of exhaust gases.

When draining the oil and changing the oil or fuel filter, dispose of the waste in the appropriate container. These fluids cause major damage to flora and fauna if discharged into nature.

The different fluids used to run the engine are a health hazard. Carefully read the instructions on the packaging of these products and always check that the ventilation in the storage compartment is adequate.

Spare parts

You can order the emergency parts below from any Nanni Diesel authorised dealer. Keep a copy of the list of parts with the set.

These emergency parts could allow you to repair the engine in the event of a fault.

- Seawater pump rotor kit
- Fuel filter (filtering part)
- Injection tube
- Glow plug
- Air filter
- Nanni Diesel blue paint

Certain items may vary depending on the order. Contact a authorised dealer for more information.

This instruction manual is for the Nanni Diesel generator set QMF3.5M.

This set is based on a 1 cylinder Diesel engine. Refer to the “Technical specifications” section for the specifications of the generator set.

Identification numbers

The generator set has 2 identification plates: one for the generator set in its whole and one for the engine.

Keep these plates accessible and in good condition. Record and keep the engine and generator serial number, designation and code. These numbers will be useful when working on the generator set, for ordering parts or warranty claim.

The plate shown below is on the generator. It contains all the information identifying the generator in accordance with ISO 8528 Standard and CE mark.

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Marine Generating Set CE

CODE SN

Model:	Year:	RPM:
3.5 kW*	cosφ 1	1F+N
230V	15A	50Hz
Engine		SN
Alternator		SN
Protection device		
Neutral state		

Rating according to ISO 8528

Checks before commissioning

⚠ **Caution! :** The generator set must be installed by a shipyard or authorised representative following the on-board assembly instructions.

The electrical connections must also be carried out by qualified personnel. The electrical installation must be equipped with all the mechanisms for protecting people and property in accordance with the applicable standards.

Preparations before starting

When the set has been installed on board and before removing the protective elements covering the different orifices, clean the exterior surface of the generator set.

For transportation reasons, some of our generator sets are delivered without their operating fluids. In all cases, you must:

- Check the levels and fill the engine oil if necessary.
- Prime the seawater system.
- Check the tightness of the different connections and drain caps (coolant and oil).
- Check the tightness of the alternator electrical lugs (check the cabling by referring to the corresponding documentation), battery terminals, circuit breaker, connection of extension sections, battery electrolyte level.
- Make a final check of the fixing elements and a visual check of the generator set as a whole.

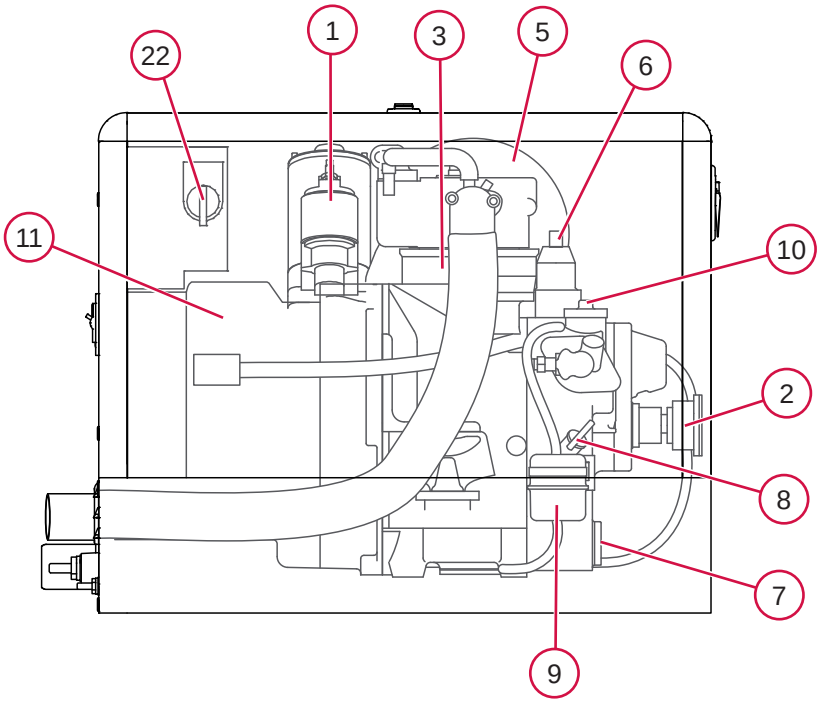
Some of these operations are explained in more detail later in this manual.

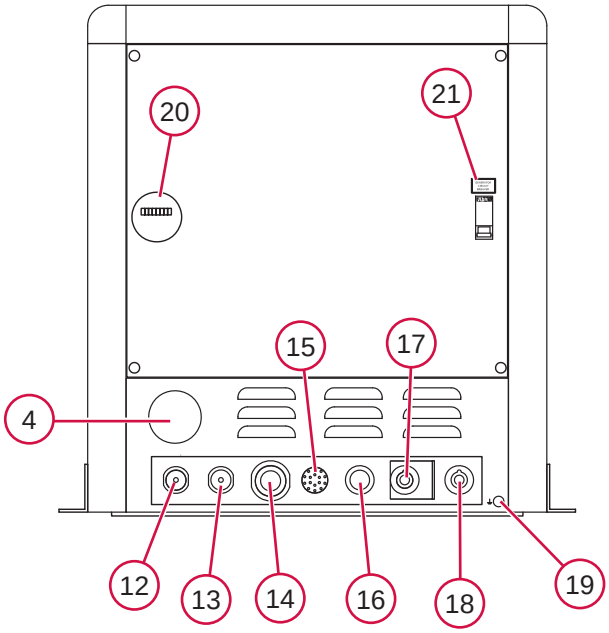
⚠ **Caution! :** The modern fuel engine is precision equipment that requires the use of a high-quality fuel and lubricant.

Principal parts of the generator set

Some equipment may not be part of the generator set.

1. Starter
2. Seawater pump
3. Mixing elbow
4. Exhaust outlet
5. Air filter
6. Oil filler cap
7. Oil strainer
8. Oil gauge
9. Fuel filter
10. Fuel injection pump
11. Generator
12. Fuel outlet connection
13. Fuel inlet connection
14. Seawater inlet connection
15. Power cables connection
16. Instrument panel extension harness connection
17. Positive (+) battery connection
18. Negative (-) battery connection
19. Ground connection
20. Hourmeter
21. Circuit breaker
22. Local/remote starting switch





Instrument panel

⚠ **Caution! :** The local/remote starting switch located inside the sound shield must be in ***Remote*** position to start the generator set using the wheelhouse instrument panel.

The instrument panel provides you with important information about the generator set when operating. Check this information regularly when the generator set is under operation. The position or appearance of the instruments represented here may vary depending on the type of instrument panel. Depending the boat, the warning lamps, the instruments, etc., can be mounted separately. Contact an authorized Nanni Diesel dealer if the boat is equipped with different instruments than those described in this chapter.

An hourmeter and a circuit breaker are integrated to the sound shield.

⚠ **Caution! :** If one these indicators illuminate, stop the generator set, except in extreme emergencies, and contact an authorized Nanni Diesel dealer.

1. Heating. This indicator illuminates when the glow plugs are heating the combustion chambers (if fitted on the generator set).

2. Temperature. This indicator illuminates, an audible alarm sounds and the generator stops if the temperature of the exhaust elbow is too high.

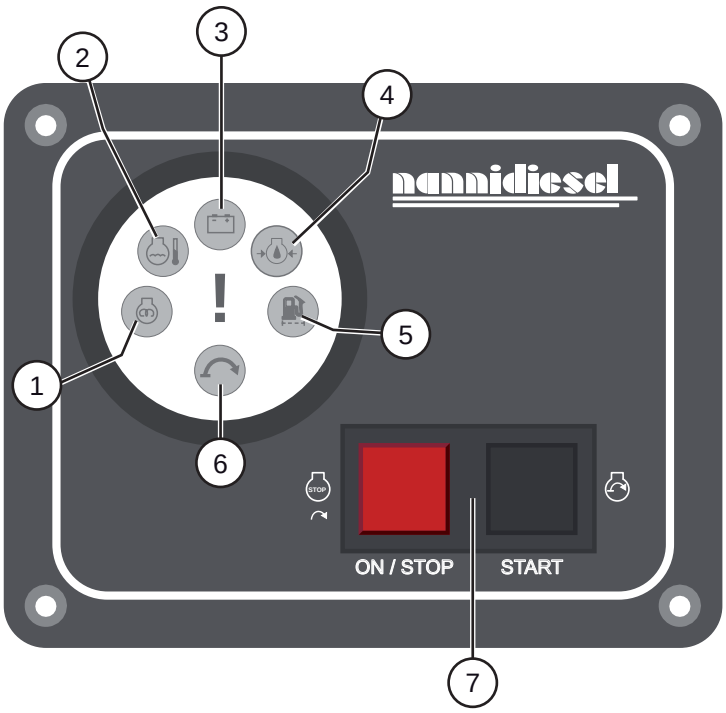
3. Battery charge. This indicator illuminates when the set is switched on. If it lights when the generator set is running, this indicates an engine alternator charging fault.

4. Oil pressure. This indicator illuminates, an audible alarm sounds and the generator stops if the oil pressure in the lubrication system is too low.

5. Indicator showing presence of water in fuel filter (if fitted). This indicator illuminates when there is too much water in the fuel filter.

6. On indicator. This indicator shows that the generator set is powered (ignition).

7. Start/Stop buttons. This component starts and stops the generator set. The ON/STOP button switch powers up and stops the generator set. The START button starts the generator set.



Operation of the generator set

Before starting

⚠ **Caution! :** Before starting, ensure that the seacock is open as the seawater pump impeller can be damaged if run dry for just a few seconds.

Never use a starting aerosol or any other equivalent product. These products are highly flammable.

Before starting the generator set and before each time it is used:

- Check the fuel level.
- Check for clean and unobstructed air intake.
- Check for securely installed and positioned air shrouding.
- Check for tight battery connections. Consult the battery manufacturer's instructions regarding battery care and maintenance.
- Check for exhaust leaks and blockages. Check the silencer and piping condition and check for tight exhaust system connections.
- Open the fuel shutoff valve.
- Check the engine oil level and fill with the recommended oil if necessary. See the "Maintenance" section for more information.
- Close the battery switch (ON position) and check that the emergency stop is not activated.

Inspect the exhaust system components (exhaust manifold, mixing elbow, exhaust line, hose clamps, silencer, and outlet flapper) for cracks, leaks, and corrosion.

Check for obstructions that could block the flow of cooling air. Keep the air intake area clean. Do not leave rags, tools, or debris in the sound shield.

Prime the seawater system before initial startup. To prime the system:

- Close the seacock,
- Remove the seawater filter coverplate.
- Fill seawater filter with 3 litres of water,
- Replace the seawater filter coverplate,
- Open the seacock. Check that water discharge from the exhaust outlet.

Starting the generator set

⚠ **Caution! :** To start the generator set using the wheelhouse instrument panel, the local/remote starting switch located inside the sound shield must be in ***remote*** position.

Check that the marine ship-to-shore transfer switch, if equipped, is in the ship position.

Carry out the following operations to start the generator set in complete safety:

1. Press the ON/STOP button. All of the indicators illuminate and an audible signal sounds. This stage allows you to check that these elements are working properly. After a few moments, only the oil and battery charge indicators will remain lit.

2. Hold the START button fully until the generator set starts.

⚠ **Caution! :** If the generator set does not start on the first attempt, repeat the manoeuvre, waiting 5 to 15 seconds between each attempt, with the generator set switched off and the seacock closed as there is a risk of water backflow into the engine via the exhaust system.

Check the indicators on the instrument panel after starting and when the generator set is under operation.

Check also that the seawater is running through the exhaust and check there are no fuel or water leaks.

⚠ **Caution! :** If one of the indicators illuminate, stop the generator set, except in extreme emergencies, and contact an authorized Nanni Diesel dealer. The generator set will stop automatically if the oil pressure drops or if the temperature of the exhaust is too high.

Identify and eliminate the cause before restarting the generator. See the "Fault-finding" section for more information.

During operation

Regularly check the indicators on the generator set instrument panel.

Notice: If the generator set runs continuously, the oil level should be checked every 8 hours.

Never press the START button when the generator set is under operation.

Engine safety shutdown switches

The generator automatically stops if the oil pressure drops or the water temperature is too high while operating it.

Notice: The low oil pressure shutdown is not a low oil level shutdown.

Check and correct the default before restarting the generator set .

⚠ **Warning! :** Never open the oil circuit cap when the generator set is under operation and/or hot.

If the voltage supplied by the engine alternator drops, the “Battery charge” indicator illuminates.

See the “Fault-finding” section for the basic checks to make in the event of a fault.

In all cases, if one or more of these problems persist, stop the generator set except in emergencies and contact a Nanni Diesel authorised dealer.

Circuit Protection

The AC circuit breaker trips when a fault is detected in the output circuit. After correcting the fault, reset the AC circuit breaker by placing in the ON position.

Stopping the generator set

Before stopping the generator set, stop the electrical appliances connected to the craft’s on-board electrical circuit.

Let the generator cooldown by running it at no load for 5 minutes.

Press the ON/STOP button and release it.

Emergency stop

You can stop the engine manually if the standard shutdown procedure is not working or in an emergency by closing the fuel cock and opening the main circuit breaker (battery supply closed).

⚠ **Warning! :** Working on a running engine is extremely dangerous.

After the engine has stopped

Open the circuit breaker (battery supply closed), close the seacock (if fitted) and the fuel shutoff valve. Check the condition of the compartment in order to identify any leaks.

⚠ **Warning! :** Even after the generator set has stopped, elements remain hot and pressurised for several minutes. As far as possible, limit work on the generator set immediately after stopping it.

⚠ **Caution! :** If the craft is being towed, stop the generator set and always close the seacock to prevent the generator set from accidentally filling with seawater.

Maintenance

The regular maintenance of the generator set is essential for ensuring optimal reliability and service life. The following operations allow to extend the service life of the engine and reduce its impact on the environment.

During the warranty period, it is essential that all work is carried out by a Nanni Diesel authorised dealer. However, some regular checks, particularly those made each time the engine is used, can only be made by the user.

Some operations are explained further on so that you can work on the engine in an emergency or if there is no repair centre nearby. However, all work must be checked by a Nanni Diesel authorised dealer.

⚠ **Caution! :** As far as possible, limit work on the engine when it is under operation and/or when sailing.

These instructions only describe a part of the maintenance operations to be carried out. Some operations must be carried out by an authorised Nanni Diesel technician.

Notice: Some equipments are optional and may not be part of the generator set.

In order to preserve the mechanical qualities of the generator set and prolong its service life, follow the instructions below:

The cooling system allow the engine to operate at a optimal temperature. A faulty operation of the cooling system reduces the engine's efficiency and therefore its service life. Pay particular attention to the condition of the cooling system.

Do not engage the starter motor for more than 15 seconds: The continuous use of the starter for more than 15 seconds will damage the system.

Choose a diesel fuel meeting standard DIN-EN 590. A lower quality fuel will result in poor combustion, which may cause starting problems and heavy smoke emissions.

Draining the fuel tank: Remove the deposits in the fuel regularly. The first time after 50 hours of operation and then every 300 hours.

Use a good-quality lubricant: Poor-quality lubricating oil will damage the engine in terms of the wear of the parts, jamming, etc., or rather reduce its service life. Use an API-CD mini type oil adapted to the climatic conditions and temperature (Contact the local dealer for further informations). The oil viscosity must be selected depending on the atmospheric temperature in °C.

Saltwater quickly deteriorates metals. Wipe up saltwater on and around the generator set and remove salt deposits from metal surfaces.

Independent repair and adjustment work on the engine beyond a very limited scope is forbidden for safety reasons. Improper work on components relevant for safety endangers you and others.

This particularly applies to work on the valve adjustment, diesel injection system and for the engine repair.

Do not tighten cylinder head nuts! In the case of use where there is an excessive occurrence of dust, shorten the maintenance intervals by at least half.

If the generator set operates under dusty or dirty conditions, use dry compressed air to blow dust out of the alternator. With the generator set running, direct the stream of air in through the cooling slots at the alternator end.

Check the condition of the generator set and its compartment before and after it is used: check for the presence or not of fuel or oil leaks, the tightness of the different clamps and bolts, the condition of the belts, hoses and the various electrical cables, the wear of the zinc anode (if fitted), the battery electrolyte level.

These relatively simple checks can help you to detect possible faults before major work on the set is required.

⚠ **Caution! :** Do not let oil, fuel or grease deposits build up around the generator set as they may increase the risk of fire in the engine compartment.

Take care not to get the indicators on the sound shield wet.

Service Schedule

Components	Work to be performed	Daily before every start-up	Every 100 operating hours	Every 200 hours or every year	Every 400 hours or every 2 years
Lubrication system	Check the crankcase oil level and add oil as necessary	X			
	Replace the oil in the crankcase *			X	
	Clean the oil strainer, replace as necessary *			X	
Cooling system	Check/clean the seawater outlet	X			
	Check/replace the siphon break, if equipped		X		
	Check/replace the anticorrosion zinc anode *			X	
	Check/replace the seawater pump impeller and the seal *			X	
	Check and clean the seawater filter *	X			
	Replace the thermostat				X
	Check the exchanger tube stack. Clean or replace as necessary				X
Fuel system	Drain water from the fuel filter and strainer *	X			
	Replace the fuel filter *		X		
	Check/replace the fuel injection nozzles & injection spray condition				X
	Check valve clearance, adjust if necessary (engine cold)				X
Intake / Exhaust system	Clean/replace the intake silencer element *		X		
	Clean the exhaust/water mixing elbow			X	
	Inspect the complete exhaust system				X
Electrical system	Condition of the battery & electrolyte level	X			
	Check/replace the warning lamps *	X			
	Check the assessment of winding			X	
Generator set conditions	Check for water, fuel, and oil leakage. Repair or adjust as necessary *	X			
	Mechanical inspection: tightening of screw and clamps, electrical connections *			X	
	Internal and external cleaning *			X	

*A first maintenance inspection after 50 operating hours or 60 days.

Fuel system

⚠ **Warning! :** Total cleanliness must be guaranteed when working on the fuel circuit. No impurities must enter the injection pump and the injectors. Carry out each of these operations with the engine cold and stopped.

The quality and condition of the fuel largely determine the filter's useful life.

Bleeding the fuel system

The fuel system must be bled after fuel filters have been replaced or after refilling the fuel tank after it has been run dry.

- Loose the vent screw on top of the fuel injection pump. Use rags around the venting point.
- Operate the generator set until fuel, free of air bubbles, flows from the vent screw.
- Tighten the screw.

⚠ **Caution! :** Avoid draining all the fuel in the filter when venting. If so, remove the filter and replenish with fuel before replacing it and repeat the venting operations.

Replacing the fuel filter

The fuel filter prevents the entry of dirt into the fuel system and preserves the injector and fuel injection pump.

- Close the fuel supply valve.
- To avoid fuel leakage, clamp off the fuel supply line near the filter.
- Disconnect the inlet and outlet lines to the fuel filter. Ensure that dirt does not enter the fuel system.
- Using a rag, clean the fuel line.
- Remove and discard the fuel filter.
- Replace the fuel filter with the arrow on the fuel filter housing indicating the direction of fuel flow.
- Reconnect the pipes to the fuel filter.
- Remove the clamp from the fuel supply line.
- Open the fuel supply valve.
- Bleed the system.
- Start the engine and check the assembly is leak-tight.

⚠ **Caution! :** Used filters must be disposed of in an appropriate container.

Replacing the fuel prefilter

The fuel prefilter is a component that purifies the fuel before it is injected in the engine. These instructions are given as an example only.

- Close the fuel valve on the fuel tank.
- Place a pail under the fuel prefilter. Remove the filter bowl.
- Drain and clean the filter and the bowl.
- Replace the cartridge and re-install the bowl.
- Open the fuel cock. Vent the fuel system then start the engine to check the leak-tightness.

Draining the water from the fuel prefilter

Before starting the engine each time, ensure there is no water in the fuel prefilter. If there is water, place a tray under the fuel prefilter and then drain the water and impurities using the bottom cap/valve.

Lubrication system

Checking the oil level

⚠ **Caution! :** Carry out these operations with the engine stopped. Hot oil and hot surfaces can burn.

Check the oil level in the crankcase before each startup to ensure that the level is in the safe range. The oil level should be within the range indicated on the oil gauge. To check the oil level:

- Remove and wipe down the gauge rod.
- Re-insert it and then remove it.
- Check whether the oil level is between the two marks. If the level is too low, add more oil until reaching the specified level.

Add the oil slowly and wait few minutes before checking the level again. This allows the oil to run into the crankcase.

⚠ **Caution! :** Do not fill the crankcase above the maximum level indicated on the gauge. Do not operate the generator set if the oil level is below the Min mark or above the Max mark.

Drain the engine oil

⚠ **Warning! :** Carry out these operations with the engine stopped. Hot oil and hot surfaces can burn.

- Start the generator set and run at no load for 5 minutes so that oil suction is easier.
- Stop the generator set.
- Disconnect the power to the battery charger, if equipped
- Disconnect the generator set engine starting battery, negative (-) lead first.
- Place a container under the drain hose.
- Screw out the oil drain plug by hand.
- Remove the oil gauge.
- Drain the engine oil completely.
- Check the oil drain plug for damage. Replace if necessary. Always replace the copper seal.
- Screw in the oil drain plug.
- Release the oil filler cap with a flat wrench. Fill with new oil.

Clean the oil strainer

- Drain the engine oil as described above and place a container underneath the strainer.
- Remove the flange on the crankcase and the oil drain hose connected to the flange.
- Remove the oil strainer.
- Clean the oil strainer with diesel oil. Replace the strainer if it is deformed or damaged.
- Install clean or new oil strainer with a new gasket. Screw both bolts with new copper seals and tighten (3-4 Nm).
- Replace the oil drain plug with a copper seal, tighten with spanner (torque 12 Nm).
- Fill with new oil according the specifications given in the technical specifications. Release oil filler cap with a flat wrench.
- Check for leaks
- Reconnect the power to the battery.

Direct cooling system

The cooling system enables the engine to operate at its optimal temperature. The cooling is ensure by a direct seawater cooling system. A seawater pump with a neoprene impeller circulates the seawater around the cylinder, through the cylinder head and the generator. The temperature of the cooling water is regulated by a thermostat located in the cylinder head.

⚠ **Caution! :** When the craft is in the water, water can penetrate via components located below the waterline. Close the seacock or prevent water discharge before working on the seawater system ! Let the engine cooldown and disconnect the power to the battery before working on the cooling system.

Cleaning the seawater system is essential to prevent the formation of deposits and salt crystals.

Cleaning the seawater filter

The seawater filter is an additional component. These instructions are given as an example only.

- Check the condition of the seawater filter with the engine stopped. If deposits have formed, remove the filter in order to clean it.
- Remove the cover and then the filtering part. Remove all the debris in the housing.
- Rinse the filter and the housing with fresh water and check the condition of the seal, then re-install all the components and check there are no water and/or air leaks in the circuit when operational.

Seawater pump and impeller

The seawater pump impeller is an essential component of the generator set. It must be replaced regularly along with the seal. A worn impeller could crack and damage the cooling system. Always have a replacement impeller on board.

⚠ **Caution! :** The service life of the neoprene impeller can be extremely different and depends over all on the operating conditions.

To inspect or replace the impeller :

- Close the seacock.
- Unscrew the 4 bolts on the cooling water pump coverplate.
- Remove the coverplate and the gasket
- Mark the position of the neoprene impeller inside the pump in order to install the it in the correct position in case of reinstallation.
- Carefully remove the impeller using two screwdrivers.
- Inspect the impeller for damaged, cracked, broken missing or flattened vanes. Vanes should be straight and flexible. Replace the impeller if it is damaged. The seawater system must be drained and cleaned if parts of the impeller are missing.
- Remove deposits and residues from the cooling water pump case. Inspect the coverplate and the gasket for corrosion or damage. Replace components as necessary.
- Lubricate the inside of the pump and the coverplate with waterproof grease for rubber.
- Install the impeller. If reinstalling the old one, place it at the same location using the mark done previously. Rotate the impeller in the same direction as the engine rotation.
- Attach the gasket and the coverplate to the pump housing.
- Open the seacock, check for leaks. Prime the seawater system by adding water through the seawater filter.
- Start the generator and check for leaks.

Siphon break

The siphon break prevents seawater entry into the engine by the exhaust system. Inspect it regularly and clean it following the instructions included with the kit.

Anti corrosion Zinc anode

The generator set includes a sacrificial zinc anode to prevent electrolytic corrosion by seawater.

When at least two different kinds of metal are immersed in seawater, polluted water or water with a high mineral content, a chemical reaction occurs and an electrical current is established between the metals.

Intervals given in the service schedule are recommendations. Depending upon operating conditions and seawater properties, it might be necessary to check and/or replace the anode more frequently.

To remove the anode:

- Close the seacock.
- Remove the anode and with glass paper remove the loose corrosion on it. If more than 50% of the anode is corroded, replace it.
- Replace the anode and prime the seawater pump.
- Start the generator, check that water flows from the exhaust outlet and check for leaks.

Intake and exhaust system

⚠ **Caution! :** Carry out these operations when the generating set is stopped and cold. Disconnect the power to the battery.

Ensure that no dirt gets into the intake manifold when working on the air filter.

Intervals given in the service schedule are recommendations. Clean the filter more frequently if the generator operates in dusty conditions.

Air filter

The air filter reduce the noise and filter the intake air. The air intake silencer assembly is connected to the intake manifold via a flexible hose.

To replace the air filter:

- Unscrew and remove the wing nut.
- Remove the cover.
- Remove the filter element.
- Clean the suction area and the filter cover.
- Replace the new filter and all the elements.

Exhaust system

Inspect all exhaust system components (hoses, clamps, mixing elbow, manifold, etc.) for cracks, leaks and corrosion. Replace them as needed.

Check for loose, corroded or missing clamps. Tighten or replace it as necessary.

Check for carbon or soot residue on exhaust components as it indicate an exhaust leak.

Inspect the mixing elbow for corrosion inside the pipe. If any defect appears on an exhaust component, replace it as there's a risk exhaust leakage.

Engine electrical system

Battery

Consult the battery manufacturer's instructions regarding battery care and maintenance.

The generator set starter battery must remain clean and dry. Oxidation or the deposit of impurities on the battery and on its terminals may lead to short circuits, voltage drops and premature discharging, notably in wet weather.

The battery terminals and the cables must be cleaned with a brass brush in order to remove any oxidation. Tighten the cable terminals and lubricate them with appropriate grease.

If the battery is replaced, use a battery with similar specifications to the previous one.

Wires and connectors

Check that command connectors and wires are in good conditions. It must be away from any water projection.

Replace it if any defect appear.

Alternator Excitation

As a result of disassembling the generator set, the alternator can get deenergized. It might be necessary to excite the alternator (after reassembly to the engine). This must be done by a authorized Nanni Diesel dealer.

Generator set storage procedure

Preservation procedure

Perform the following storage procedure before taking a generator set out of service for three months or longer.

- Run the generator set for a minimum of 30 minutes to bring it to normal operating temperature.
- Stop the generator set.
- Drain the oil from the crankcase. Clean the oil strainer and replace it.
- Refill with new corrosion protection oil.
- Run the generator few minutes to distribute the clean oil.
- Stop the generator set, check oil level and add oil if needed.
- Fill the fuel tank with storage fuel.
- Change the fuel filter.
- Bleed the fuel system.
- Close the seacock.
- Drain the water from the seawater cooling system. Rinse the system with clean water.
- Remove the impeller from the seawater pump
- Clean the generator.
- Seal all openings. Secure the air intake with a cloth.
- Mask electrical connections.
- Store the engine in a dry place and protected against the effects of weather.

For prolonged storage before or after the commissioning, a specific set of measures must be performed. Contact the Nanni Diesel dealer.

Refer to the Silverwake warranty booklet for more informations about these operations.

We recommend that you have all preservation operations carried out by a Nanni Diesel authorised workshop.

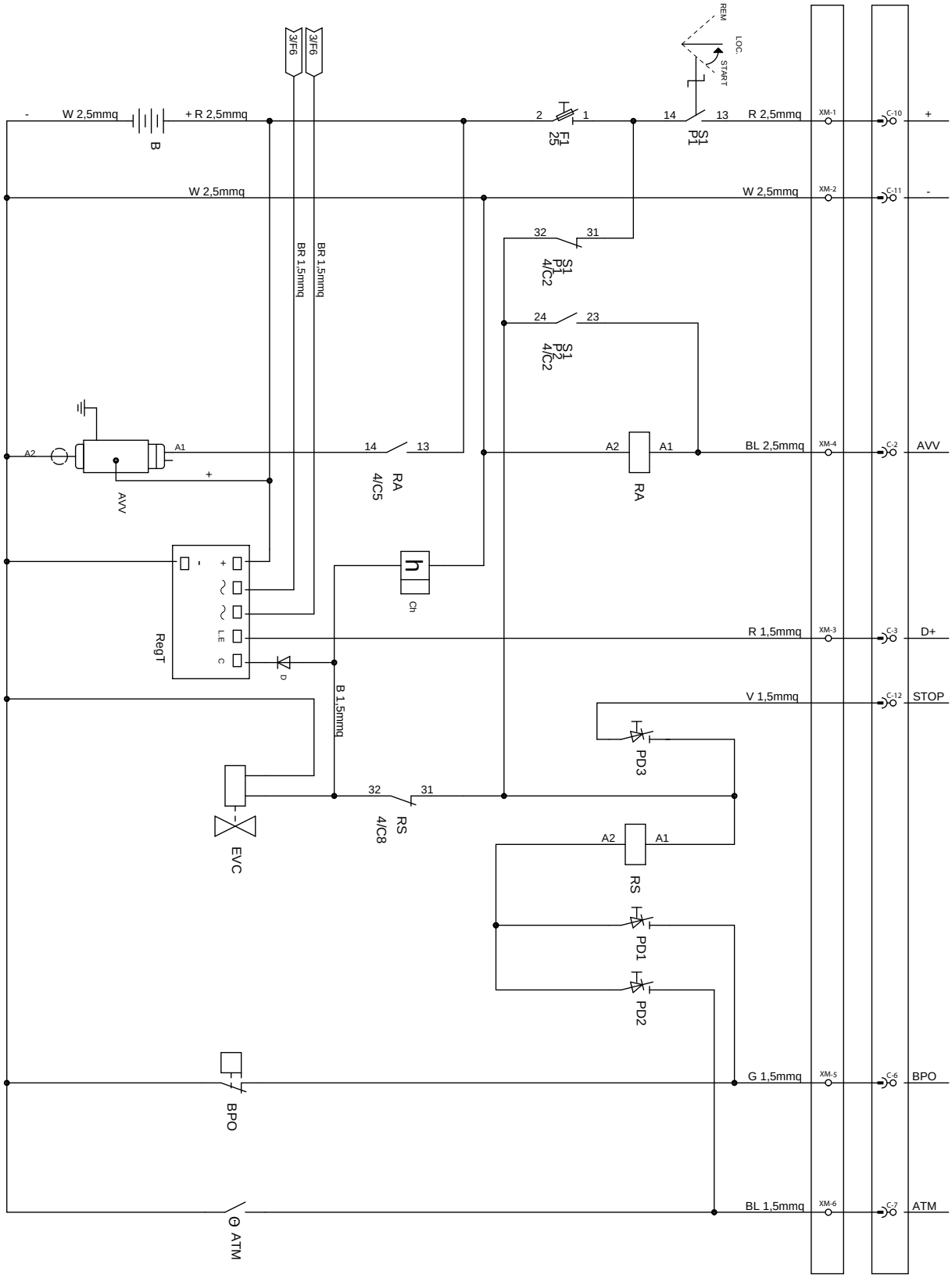
Restarting the generator set

After operations of winterization, a list of operation lust be performed before restarting the generator set.

- Perform thorough external cleaning of the engine.
- Remove cloth and tape from openings.
- Drain corrosion protection oil.
- Add new oil as necessary.
- Change the fuel filter.
- Bleed the fuel system with fresh fuel.
- Replace the air filter.
- Check that all parts are in place.
- Open the seacock and prime the cooling system.

We recommend that you have all restarting operations carried out by a Nanni Diesel authorised workshop.

Wiring diagram



RegT: Voltage regulator / Charging battery
EVC: Fuel valve
BPO: Oil pressure switch contact (N.C.)
ATM: Temperature switch contact (N.O.)

AVV: Starter
LOC: Local/Remote start command
B: Battery

Troubleshooting

This section helps you to understand the different problems that may arise on the generator set. The safest way to correct the problems you may encounter, however, is to contact a qualified person. Some operations must be carried out by a qualified Nanni Diesel authorised engineer. These operations are marked in bold in the tables below.

This non-exhaustive list serves as a tool in emergencies and should never be considered a repair procedure. Some of the components listed may not be part of the engine.

Faults and probable causes	
Engine does not start / starter does not turn	
Faults	**Solution**
Circuit breaker is open or fuse has blown	**Check and re-install the circuit breaker or replace the fuse or replace the circuit breaker**
Electrical circuit breaker is not working	
Electrical connections are faulty	Check the electrical connections and wires (especially the battery cables) Clean and tighten the connections
Battery faulty	Test and charge or replace the battery if faulty
Starting procedure defective	Read and implement the starting procedure
Fuel tank empty or fuel cock closed	Fill the tank or open the cock
Fuel pump faulty	**Replace the pump**
Fuel filters clogged or water present	Clean or replace the fuel filters or drain the water from the prefilter then drain the circuit
Fuel contaminated or too old	Drain the tank if contaminated and fill with clean fuel
Fuel pipe or air pipe of tank blocked or bent	**Replace the bent pipes or blow in compressed air to remove the obstruction**
Air present in fuel injection system	Drain the injection system

Faults and probable causes	
Engine overheats / Engine temperature is too high	
Faults	**Solution**
Seacock is closed	Open the Seacock
Seawater filter is clogged	Close the Seacock and clean the filter
Seawater pump is sucking air	Check the position and seal of the seawater filter cover and the suction hose
Seawater pump rotor is faulty	Replace the rotor
Insufficient seawater flow	Check the seawater system for leaks. Check the seawater filter
Thermostat is malfunctioning	**Replace the thermostat**
Cooling system is blocked	Locate the problem and clean
Cooling system is dirty	Clean and rinse
Loss of pressure in the cooling circuit	Check there are no leaks. Clean, inspect and check the fill cap

Technical specifications

ELECTRICAL CHARACTERISTICS	QMF3.5M
Continuous / Max power (kW)*	3.2 / 3.5
Volts / Number of phases	230 / 1
Continuous / maxi current (A)	13.9 / 15.2
Frequency (hz)	50
SPECIFICATIONS OF THE ENGINE	**QMF3.5M**
Number of cylinders	1
Capacity (cm^3)	290
Bore/stroke (mm)	82 x 55
Engine speed (rpm)*	3000
Weight (kg)	128
INJECTION SYSTEM	**QMF3.5M**
Combustion principle	Directe
Intake	Natural
Injector setting - nozzle opening pressure (bar)	200
Fuel type	Type gazole NF-EN 590 / DIN 51601-OK
LUBRICATION	**QMF3.5M**
Oil pressure at max. revolutions (bar)	5
Type	API-CD mini.
Grade	10W40
Capacity in litres (flat four engine)	1.1
ELECTRICAL CIRCUIT	**QMF3.5M**
Alternator	12V
Battery mini capacity (Ah)	36

* Continuous (COP) and Max (LTP) power rating according to ISO 8528-1
Certain specifications may vary depending on the order.

Installation recommendations

The recommendations given in this chapter do not cover all the installation possibilities, but offer recommendations and guidelines for installing a Nanni Diesel generator set. Certain equipment may not be part of the order or installation.

Installation

The generator set and the coupled equipment must be accessible for maintenance work. The generator set must be mounted on a rigid and solid structure on the hull that is capable of withstanding all the dynamic stresses and the weight of the set as a whole. The generator set must not be inclined by more than 10° when the craft is stopped.

Avoid installing the generator set too close to walls that are too thin that could reverberate. In all cases, the generator set should not be installed directly on a wood or plywood surface or in contact with walls. A solid steel support will reduce the vibrations and noise produced by the generator set.

The various cables and electrical extension sections must be securely affixed to the generator set and/or to the compartment walls (do not let them hang in the hold).

Ventilation

The temperature inside the compartment must not exceed 50°C with a maximum difference of 20°C in relation to the ambient temperature.

For slow craft, ventilation must be provided by a fan. Fresh air must circulate from front to back. The air intake should be situated at the bottom front of the engine compartment and the exhaust at the top back in order to ensure optimal air circulation.

Electrical installation

An incorrect or faulty electrical installation could cause leakage currents that could affect the galvanic protection of the generator set and consequently the generator set itself. The installer should ensure that all the necessary precautions are taken to guarantee the corrosion protection of the generator set.

Fuel feed system

The generator set must have its own fuel feed system. The tanks must be placed as far as possible at the same height as or slightly higher than the engine.

The fuel return pipe must always be situated under the minimum tank fill level.

The maximum height between the fuel pump and the minimum tank level is of 0.5 m. An electrical pump must be installed above this value.

Cooling system

The generator set must have its own seawater cooling system with no connection to the engine system or other equipment. The seawater intake must always face the back of the craft (regardless of the type of craft) and must be as close as possible to the genset. Use static type seawater strainer.

The height of the seawater filter and the exhaust outlet must be 150 mm above the waterline at full load.

A siphon breaker must always be installed if there's a risk of water penetrating the engine via the exhaust system. It should be placed at least 500 mm and at most 2 metres above the waterline at full load.

The waterlock box must be positioned as close to the engine and as low as possible.

The exhaust pipe situated between the waterlock and the hull outlet should form a gooseneck. The highest point of the gooseneck should be at a maximum distance of 3 metres from the waterlock and at a maximum height of 1.5 metres in relation to the waterlock.