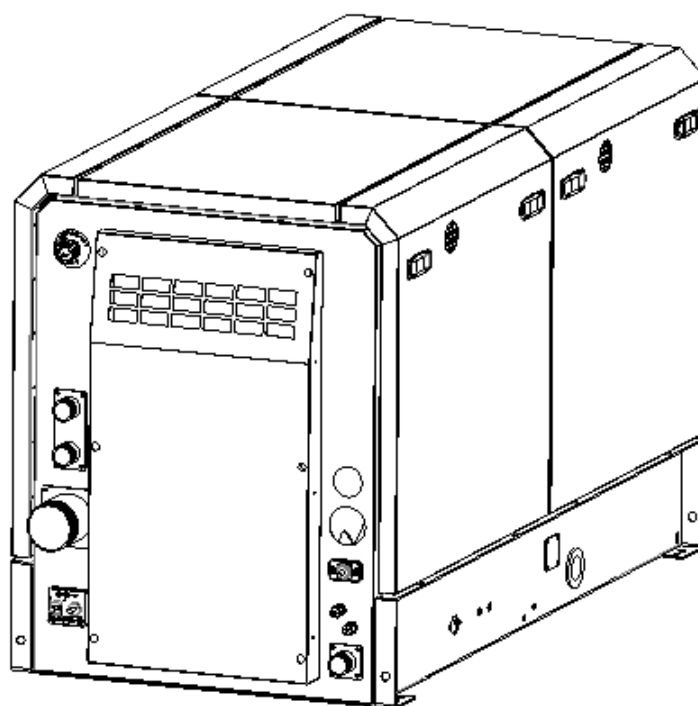


Installation Manual



Generator Set

<i>Models</i>	MN 305	TG 309
	MG 307	TG 313
	MG 311	TG 314
	MG 312	TG 320
	MG 316	TG 323
	MG 318	TG 330
	MG 324	TG 343



PLEASE READ AND KEEP THIS MANUAL CAREFULLY.

INSTALLATION MANUAL

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7.Maintenance Record

DATE	GENERATOR RUNNING TIME	EXPLANATION	SERVICE OFFICER

Keep a copy of the other pages by passing an empty page after the end of this maintenance records maintenance record form.

Maintenance Record

DATE	GENERATOR RUNNING TIME	EXPLANATION	SERVICE OFFICER

Keep taking a copy of the registration form before filling in this regard.

7.SAFETY PRECAUTIONS

Always read the MAINTENANCE – OPERATION AND USER’S MANUAL carefully before operating the generator set. The generator set you have purchased may operate safely and reach its performance when the proper operating conditions specified in the manufacturer’s instructions are provided; the generator set is operated and maintained under these conditions.

GENERAL DECLARATION

It is the responsibility of purchaser/installer/owner of the generator set to install the generator set properly to the vessel, and provides conformity of all health and safety precautions with the legislation before commissioning the generator set.

Following cautionary symbols and inscriptions are used in this manual to warn the users of the generator and service personnel against potential dangers of the generator set. Please read carefully until the end of the manual.

⚠ DANGER : *This warns against dangers that may cause serious personal injuries or death.*

⚠ WARNING : *This warns against dangers that may cause serious personal injuries or equipment damages or against operating conditions that require safety precautions.*

⚠ CAUTION : *This warns against dangers that may cause serious personal injuries or death or against operating conditions that require safety precautions.*

ENGINE EXHAUST IS LETHAL

Never sleep inside the vessel while the generator is operating unless your vessel is equipped with proper carbon monoxide detectors.

Generator Exhaust kit (exhaust muffler, exhaust gas-sea water separator, exhaust hose, clamps) shall be installed according to the manufacturer’s instructions.

Check for exhaust gas leaks in the first operation or every eight hours of operation. In case of detection of gas leaks, all passengers and staff present in the open portion of the vessel's atmosphere and will be eligible to be called an ambulance if necessary. After you run the generator exhaust gas leak repairs made.

GENERATOR VOLTAGE IS LETHAL

All live power, control cables and connecting elements that will be connected externally to the generator shall be connected by a trained and experienced technician as per the current legislation and manufacturer’s instructions.

Using the power generated by the generator at the same time with coastal (dock) power or any electric power source from a fixed point shall be prevented as the encounter of these powers will cause danger. Feedback to coastal (dock) supply may cause damage on the vessel equipment and electric shocks that may result as serious personal injuries or death.

Always be cautious when intervening on any electrical equipment. Take off any jewelry, ensure that your clothes and shoes are dry. Stand on a wooden or rubber platform and use insulated electric repair tools during your work.

DIESEL FUEL IS FLAMMABLE

Do not smoke in inadequately ventilated areas where fuel vapors may be present and do not turn the electrical switches in these areas on/off. Take any equipment that generate flames, sparks and arcs and all other flammable sources away from these areas.

MOVING PARTS MAY CAUSE SERIOUS INJURIES OR DEATH

Do not wear loose clothes and take off your jewelry if you need to work near moving parts. Wear clothes suitable for the operating conditions if possible. Keep away from all moving parts (fan, belt, pulley etc.) in your work.

BATTERY GAS IS EXPLOSIVE

Always wear safety goggles during works on the batteries. Battery acid is very corrosive, be very careful. Do not smoke while you are working. Take any equipment that generate flames, sparks and arcs and all other flammable sources away from these areas.

Always disconnect the negative (-) battery cable first, and re-connect the negative (-) battery cable last to decrease any arcs when you are disconnecting the battery cables.

DENSE FUEL VAPOR INSIDE CONFINED SPACES MAY CAUSE DIESEL ENGINE TO OVERSPEED

Always perform necessary checks before starting to operate the generator. Never operate your generator when there is a fuel leak, drip or dense fuel vapor inside confined areas. Dense fuel vapor inside closed spaces may cause diesel engine to overspeed, to stop roughly and late.

Explosions, fires and damages that may occur due to this may cause serious injuries, and even lethal accidents.

GENERAL PRECAUTIONS

- Keep the children away from generator set.
 - Do not use starting aids that provide ignition or explosion.
 - Do not step on the generator while entering to or exiting from generator room. Parts may be bent or broken and thus may cause electric shocks or fuel, coolant or exhaust leaks.
 - Remove the battery connection cables from terminals to prevent inadvertent operation of the engine while you are working on the generator set.
 - Let the engine cool down before opening the Engine Coolant Heat Exchanger filler cap. Engine Coolant Heat Exchanger under excessive temperature and pressure may spurt hot vapors and cause serious burns.
 - Keep the generator set, cabinet bottom flange and its area clean. Oiled fabric may be ignited.
 - Check all connection elements and ensure that they are not loose.
 - Do not work on the generator when you are physically or mentally tired or you have used drugs or alcohol.
 - Only authorized service personnel may intervene with the adjustments that shall be performed while the generator set is operated. These adjustments require training and experience. Excessively hot, moving and live parts may cause serious injuries, and even lethal accidents.
- Antifreeze (ethylene glycol) used in the engine coolant has poisonous properties on humans and animals. Dispose antifreeze waste spread over the area during filling or draining operations conforming with the laws and environmental regulations on poisonous waste.
 - Use multi-class ABC extinguishers to respond against generator fires. Class A fires are caused by ordinary combustible material like wood and rags; Class B fires are caused by quickly flammable and combustible liquid and gas fuels; Class C fires are caused by energized electrical equipment. (ref. NFPA No.10).

⚠WARNING : *Use the safety precautions article given above in proper places of your sea vessel so that it can be seen by other people.*

8. Introduction

ABOUT THIS MANUAL

This manual is provided as the Installation Manual for generator models listed on the front cover. All users who have purchased these products shall carefully read and understand this manual and follow all instructions and safety precautions specified in this manual. This manual includes information on some installation and operation features of the generator sets, how to obtain services from authorized service shops when required and conformity with some legislation and regulations. Installation and Operation Manual includes instructions required for the installation of the generator set. User is responsible to ensure that the installation of the generator set is performed by service personnel authorized by the manufacturer as specified in the manual.

Keep this manual near the generator to refer to it when required.

This manual includes general information on the following subjects.

- Placement and Installation
- Engine Exhaust Discharge and Muffler
- Cooling the Engine
- Ventilation of the Generator Set

Environment

- Fuel Installation Connections
- Wiring Connections
- Batteries
- Ground Connection
- Qualifications for Maintenance and

Operation

- Vibration and Noise

⚠ CAUTION : This installation manual includes general installation information for the generator set. This information is updated regularly. Therefore, contact authorized services for up-to-date information and operates the generator according to the instructions of authorized personnel when required.

SAFETY STANDARDS

⚠ WARNING : This generator set is not a life support system. It may be stopped abruptly without any warning. Children, persons with physical and mental disabilities and pets may be affected in this case with serious personal injuries or lethal accidents.

If the usage of generator set is critical, you shall have an authorized personnel accompanying the operation, use additional spare power supply and suitable alarm systems, and have all emergency precautions taken.

Always learn the Safety Standards that are mandatory in the areas where your vessel is cruising.

GENERATOR PLAN OUTLINES

Technical designs and outlines required for proper installation details (Page 18-1 and ff) are provided with explanations. Technical Designs and Outlines include places for retaining bolt holes, installation equipment and points (fuel, battery, sea water, exhaust, remote electronic control and AC outlet), dimensions and types of fittings, general dimensions etc. Contact the manufacturer for wide scale copies of the applicable drawings.

⚠ WARNING : This warns against dangers that may cause serious personal injuries or equipment damages or against operating conditions that require safety precautions that may occur when the generator set is installed improperly or incompletely. Technical service personnel that will perform the placement and installation of the generator shall have the required trainings for electrical and mechanical installations, and shall be certified and authorized by the manufacturer.

9. Placement and Installation

LIFTING

Open the cabinet doors completely on generators with cabinets for the generator set lifting operations. For a safe handling and lifting operation, connect the lifting hooks safely to the lifting eyes on the engine and alternator as specified in the technical drawing, and lift the generator set using proper lifting tools. (Page 18-1 and ff)

INSTALLATION PLACE

Read the installation information for Ventilation, Fuel Installation, Engine Cooling and Exhaust systems in other sections for the best placement operations and determine the installation place according to this information by considering the recommendations of the personnel authorized by the manufacturer.

Your generator set does not comply with “spark protection” standards. Therefore, it is forbidden to store fuel oil, and fuel oil equivalent fuel that may be combusted or similar flammable material in the operating environment of the generator as per the standards. If the main engine of the vessel is operated with fuel oil, generator set shall be placed to a position where it can be insulated from the fuel oil system by applying approved methods.

⚠ WARNING : Generator set may cause serious personal injuries or death by igniting the volatile fluid flammables in the operating environment.

Generator shall be placed as far as possible from the living compartments because of the noise, vibration and smoke.

Place the generator set to a place with adequate space for periodical maintenance and service. Non-serviceable sides shall have an opening of 100 mm (4 inches) minimum. Front side shall have an opening of 300 mm (12 inches) minimum for input air flow and an opening of 300 mm (12 inches) minimum for the output air flow from a proper place. (Page 18-1 and ff)

Following operations shall be easily accessible and performable in the installation place:

- Operating and stopping the generator set
- Intervening the circuit breakers
- Checking, filling and draining the engine oil
- Replacing the engine oil filter
- Replacing the fuel filter
- Checking, filling and draining the engine cooler
- Performing the fuel connections
- Performing the battery and ground connections
- Replacing the cooler and exhaust hoses
- Replacement of sea water pump internal gear
- Replacement of V-Belt

INSTALLATION

The connection of generator set on engine and alternator chassis is provided by vibration isolated rubber mounts. Thus, the vibrations that may occur are dampened by the mounts. The ground of the planned generator set installation place in the sea vessel shall be able to bear the weight of the generator. Otherwise, you shall make necessary ground improvements and supports. Determine the points required for the connection of the generator set with the ground according to the dimensions given in the drawing. (Page 18-1 and ff)

10. Ventilation

VENTILATION

⚠ WARNING : Exhaust gas is lethal. Fuel vapor is explosive. It gets hard to breathe in the compartment where the generator is placed if proper ventilation is not provided. Generator set may cause serious personal injuries or death by igniting the volatile fluid flammables in the operating environment. User shall provide that the ventilation system conforms with the standards specified by the manufacturer and local regulations where it is operated.

Ventilation is required to provide engine combustion air and prevent that exhaust fumes and operating environment temperatures reach dangerous levels. Highest operating environment temperatures are reached when your vessel docks to the port and engines are stopped.

Generator set with cabinet takes the air requires for the operation of the engine and cooling of alternator from air duct on the rear cover of the cabinet. Fresh air from this inlet provides cooling air for the alternator on one hand, and combustion air for the engine on the other hand over two ducts. Engine combustion air reaches the air filter with a separate duct and sent to the combustion room without being heated. The temperature of fresh air taken into the cabinet when the generator set is operating at full load shall not exceed 50°C (122°F). Always measure the temperature of the fresh air in the operating environment.

Operating the generator set with an ambient temperature over 40°C (104°F) may cause power loss. Operating a generator set with an ambient temperature over 50°C (122°F) will reduce the service life of electrical components, generator windings, rubber and other structural material.

Always contact the manufacturer for the calculation of the amount of the fresh air and air flow rate required for combustion and ventilation.

CARBON MONOXIDE WARNING

All spaces and holes for the supply, wiring ducts, pipes and hoses shall be closed to prevent exhaust gases from entering other compartments of the fuel. Wiring duct shall be closed from the outside as it is closed from the inside.

Cabinet piping system drain pipes shall accommodate plugs to prevent ingress exhaust gases from outside.

Carbon monoxide (CO) detectors for marine applications shall be installed to the living compartments of the vessel. It is possible to be subject to dangerous thickening of carbon monoxide because of wind shifts, movement of the vessel, exhaust gases of other vessels from the larboard and other conditions even when proper ventilation is provided and living areas fully separated from the engine rooms.

11. Fuel Installation

FUEL TANKS AND INSTALLATION

Refer to OPERATION MANUAL for the specifications of the required fuel.

⚠ WARNING : Diesel fuel may cause fire if it is spilt over when used or stored under improper conditions. Structure, placement, ground connection, ventilation, pipe installation, checks and leak tests of the fuel tank shall conform with the current standards and legislation and conditions of be located country. (Page 9-1)

⚠ WARNING : Do not use galvanized fuel tanks or pipe systems. Sulfide residues in the diesel fuel tanks may spoil galvanized (zinc) coatings. Thus, it may cause deposits that will block fuel filters, pumps and injectors.

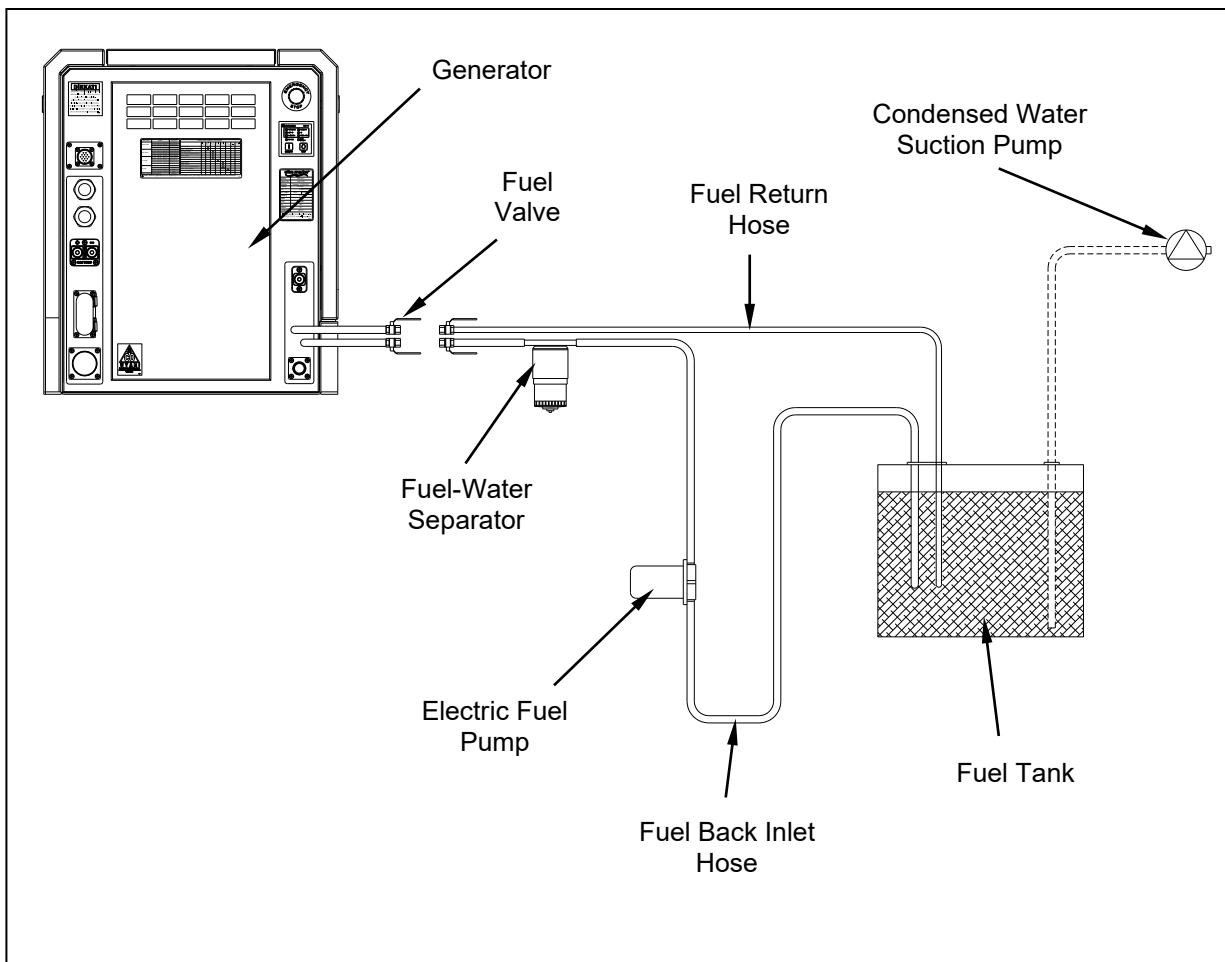


FIGURE 33 FUEL TANK AND INSTALLATION

FUEL FILTERS

Generator set is equipped with a fuel filter. It is recommended that a 10 – 30 micron water-separator fuel filter is installed to the fuel installation to protect the fuel pump.

FUEL INSTALLATION FITTINGS

Always refer to the OUTLINE DRAWINGS (Page 18-1 and ff) for the installation and return fittings between the fuel tank and the supply-return fuel pipe with a thickness of 4mm and internal diameter of Ø 8 mm used in the fuel installation. Fuel hose adapter fittings may also be acquired from the manufacturer.

FUEL INSTALLATION HOSES

Use fuel hoses conforming with Marine standards. Refer to the Fuel Installation Dimensions in this page for recommended dimensions.

Fuel hoses connected to the generator set shall not be conducting to prevent getting on with the starting current in fuel lines. (Because the fuel tanks shall be connected to the common negative (-) ground system of your vessel, conducting fuel lines connected to the generator set directly carry the starting currents.)

⚠ WARNING : Conducting fuel pipe lines may cause that the starting current is carried over the line. This may result in a fire. Use non-conducting fuel hoses for connection to the generator set to prevent creating a path for the starting current over the fuel lines.

DIMENSIONS OF THE HOSES IN THE FUEL INSTALLATION

An internal diameter of 8 mm (5/16 inches) is recommended for fuel pipe lines and hoses. An internal diameter of 6 mm (1/4 inches) may be considered for applications with short fuel lines with a lower flow rate. Refer to Fuel Lift in this section.

It is possible that operating efficiency of fuel supply installation may be lowered due to the air bubbles that may remain in gradients with radius and peak breaking points that may occur due to the differences of the hose levels. Therefore, fuel installations shall be designed to work without joints and elbows in a smooth surface as much as possible.

FUEL PICK-UP TYPE

Delivery line with separate electric pump is recommended for each generator set. Shared pump types and distribution manifolds cause less fuel supply and rough ignition.

Refer to the fuel pipe line dimensions in this section for recommended dimensions.

In an ordinary fuel supply tank, generator set pick-up tubes shall be smaller than drive engine pump types to prevent generator sets from emptying the fuel tanks.

Ensure that the fuel tank is big enough to cool the returned fuel.

FUEL CUT-OFF VALVES

A fuel cut-off is required if the end of the fuel line is placed under the highest level of the fuel in the tank.

An approved method shall be used to prevent flow when the engine is not operated if the highest level of the fuel in the supply tank is above the fuel injectors.

FUEL LIFT

Fuel lift pump on the generator set has a maximum 1.2 meter (4 feet) fuel lift (suction). Note that the real lift by resistance against fuel flow in hoses, tubes, connecting elements, valves and filters contribute to the "lift" that the pump has to overcome.

12. Cooling the Engine

COOLING SYSTEM

Generator pressurizes the coolant (ethylene glycol – water mixture) in the cooling ducts of the engine with the circulation pump and cools the engine with a closed-loop liquid cooling system between the exchanger and engine. (Figure 31, 32, 33, 34, 35, 36, 37, 38, 39). Many of the heat load generated by the engine is transferred by the coolant to the heat exchanger. Raw water (sea water) inside the exchanger takes the heat load carried by the coolant and discharges it via the exhaust to the ambient air. For the connecting elements, points and connection pipe dimensions of this system, refer to the drawings offered by the manufacturer. (Page 18-1 and ff)

ENGINE COOLANT SYSTEM EQUIPMENT

Sea water pump

Sea water pump may perform an efficient intake when it is maximum 122cm (4 feet) over the sea water level. Sea water pump operated in this condition can provide the raw water (sea water) flow rate required by the exchanger. The resistance of the connecting elements in the raw water intake installation shall also be calculated while determining the values affecting the intake power. Combination of resistances caused by hoses in the installation, filters, sea water tap and intermediate housing fixture shall be considered while calculating the total resistance.

Sea Water Hose

Use a hose conforming to SAE 20R4 standards or equivalent that may be used without causing sediment under low pressure. All hoses, pipes and fixtures in the sea water elevation line shall have the same width with the hose connected to the sea water pump inlet (diameter shall not be changed).

Sea Water Filter

Sea water filter shall be practically lower than sea water pump and placed next to it. Filter strainer may be opened to be cleaned. Filter shall not allow entering of particles bigger than 4.5 mm (3/16 inch) to the cooling system. If it is over the water line, fill the sea water filter to prepare it for use before operating it.

Sea Water Valve

Install the bronze alloyed, full-flow sea valve to the vessel body via a fixture.

Sea Water Outer Surface Strainer

Fixture installed to the surface of the sea vessel shall be as close to the generator set as possible. Openings of the strainer installed to the surface of the sea vessel shall be installed in parallel to the keel. Strainer installation method is specified in the installation drawing recommended by the manufacturer. (Figure 29)

⚠ WARNING : Wrong installation of the sea water outer surface strainer may cause filling of the generator set with sea water and damage to the equipment.

Engine Coolant Expansion Tank

Check the coolant level inside the Engine Coolant Expansion tank and re-fill the expansion tank with appropriate coolant up to the "FULL" level when the engine is cold. Engine Coolant Expansion tank is designed to keep coolant level inside the engine fixed during operation. Lack of coolant inside the engine cannot be resolved by filling this tank. If the Engine Coolant Expansion tank is empty, check if there is any leakage in the engine or the connection points.

To remove the shortage of coolant inside the cooling system, add coolant of the proper mixture up to the thermostat cover level on the Engine coolant heat exchanger. Use water-antifreeze mixture with the specified specifications and ratio when removing the lack of coolant inside the cooling system.

⚠ WARNING : Using the engine without coolant may cause damages that are not under warranty cover.

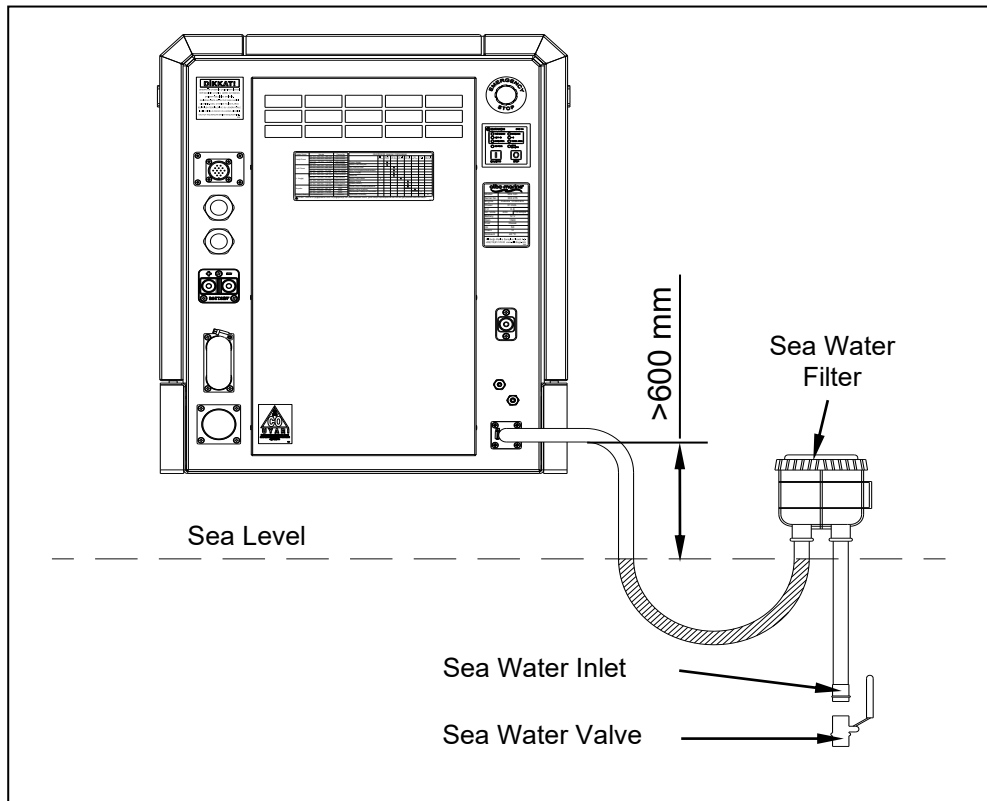


FIGURE 34 INSTALLATION OF SEA WATER FILTER

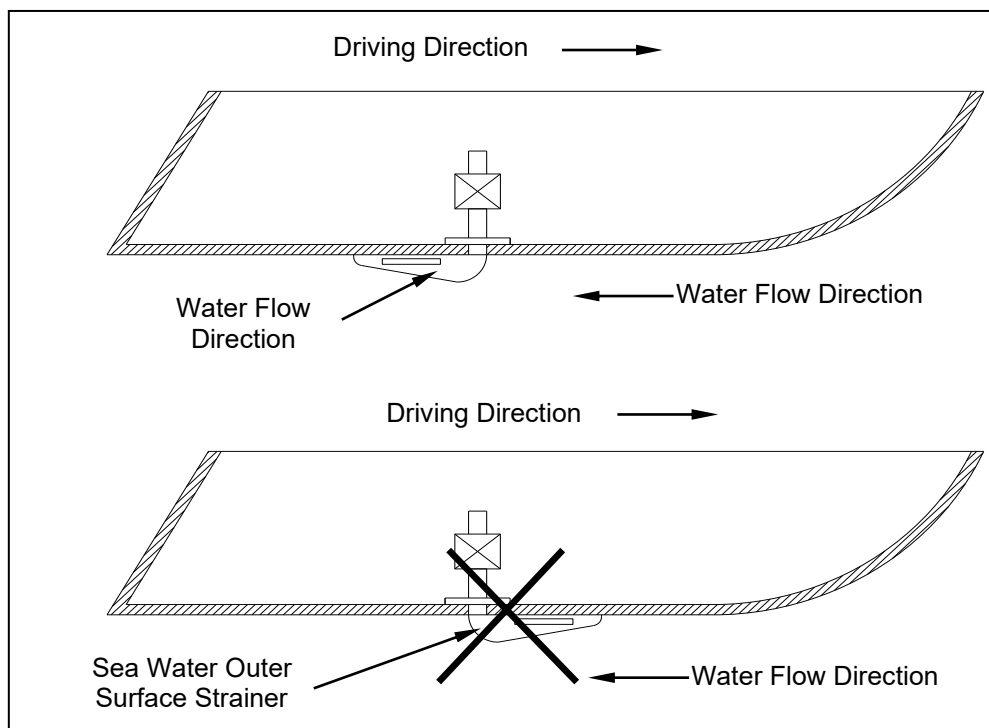


FIGURE 35 SEA WATER OUTER SURFACE STRAINER INSTALLATION POSITION

SIPHON KIT

⚠ CAUTION : Engine damage due to water ingress because a required siphon kit is not installed may cause damages that are not under warranty cover.

Perform the SEA WATER INTAKE TEST to determine whether a siphon kit required preventing flooding of muffler and engine with sea water. Generator sets with cabinets have the connecting points and elements that are required for the installation of siphon kit hoses. (Figure 30)

⚠ WARNING : Do not install the siphon kit over the generator set to prevent leaks dropping over the generator

SEAWATER CAPTURE TEST

Purpose: The purpose of this test is to determine the generator set installation place level and the height of the related sea water line under all usage conditions and speeds estimated for the sea vessel.

Method : Follow the instructions given below when the sea vessel is ready for tests under all usage conditions and speeds and is loaded with maximum capacity.

1. Close the sea water inlet (raw water inlet) valve and disconnect the sea water intake hose from the generator set. Replace this with a new transparent plastic hose to the filter or sea water valve.
2. Raise the end of the hose over the expected water level and open the sea water valve. Water line can be seen transparent plastic hose on the level that water starts to drip just when the hose is lowered.
3. Operate the vessel both in forward and backward directions until the required speed is achieved. Ensure that a technician watches the water level from the hose while the vessel is operated and mark the highest level on the generator set.

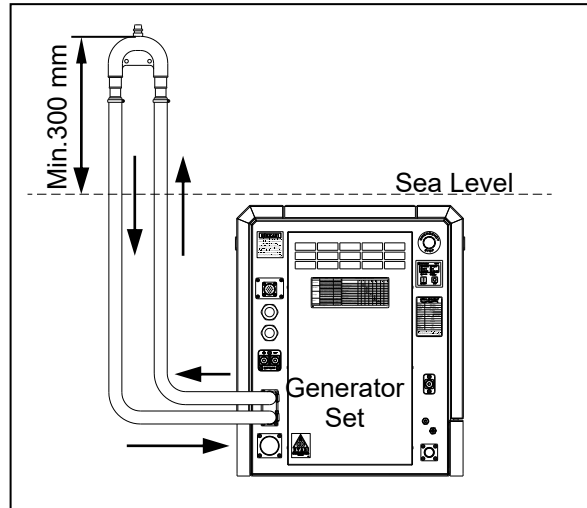


FIGURE 36. SIPHON KIT INSTALLATION POSITION

Requirements: The height of a siphon kit that shall be installed to an engine exhaust water mixer (Figure 40) shall be minimum 152 mm (6 inch) over the sea water line. (while the vessel is docked and moving)

Note: If the water line while the vessel is moving is very higher than it is docked, this difference may be caused by the fixture on the vessel surface or by the placement. If the fixture installed to the vessel surface is of the forward grab type that is designed to create ram pressure, replace it with a fixture of the spray type. Another alternative is to install the fixture to a position with a lower dynamic keel pressure.

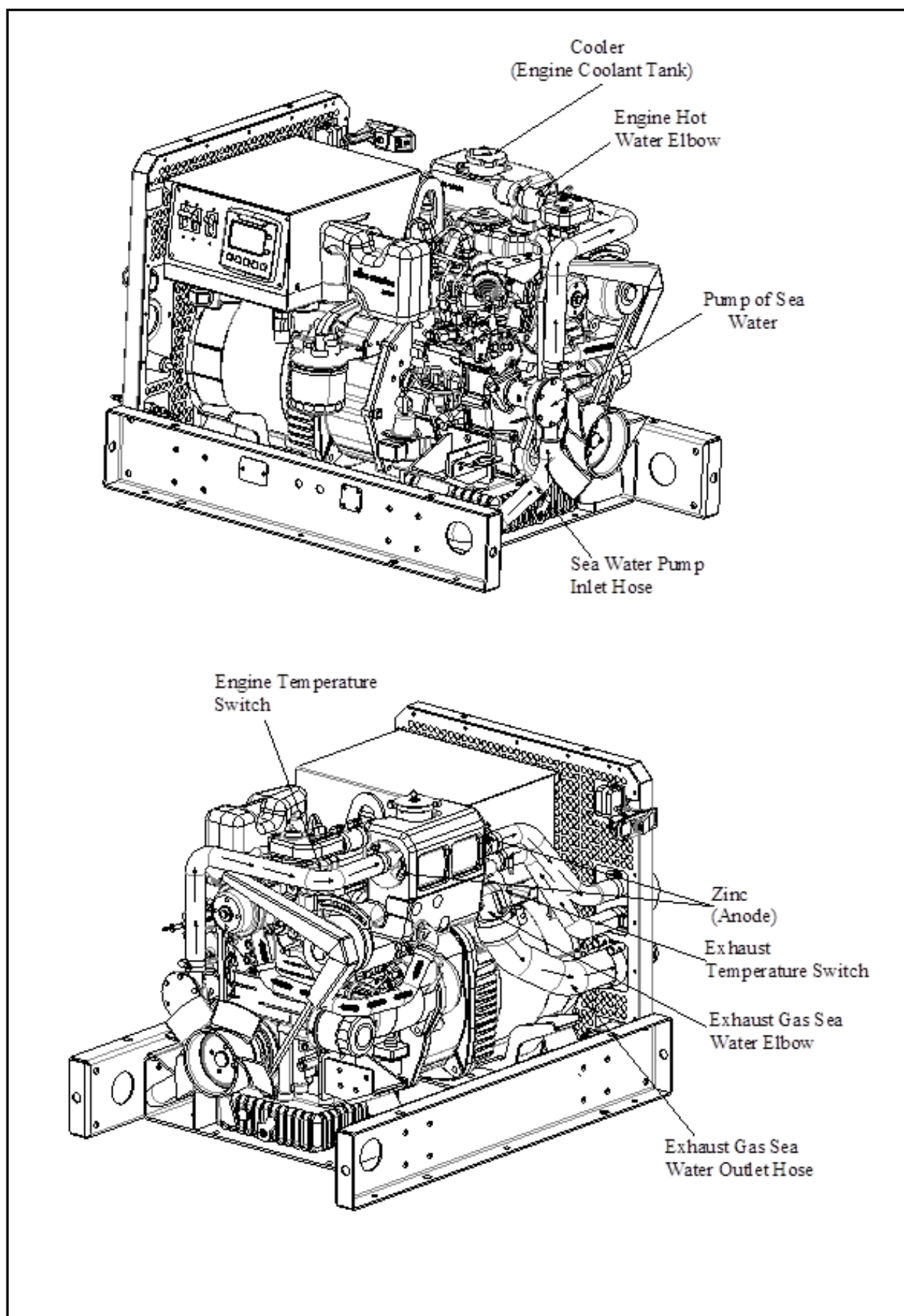


FIGURE 37 ENGINE COOLING SYSTEM – MN 305

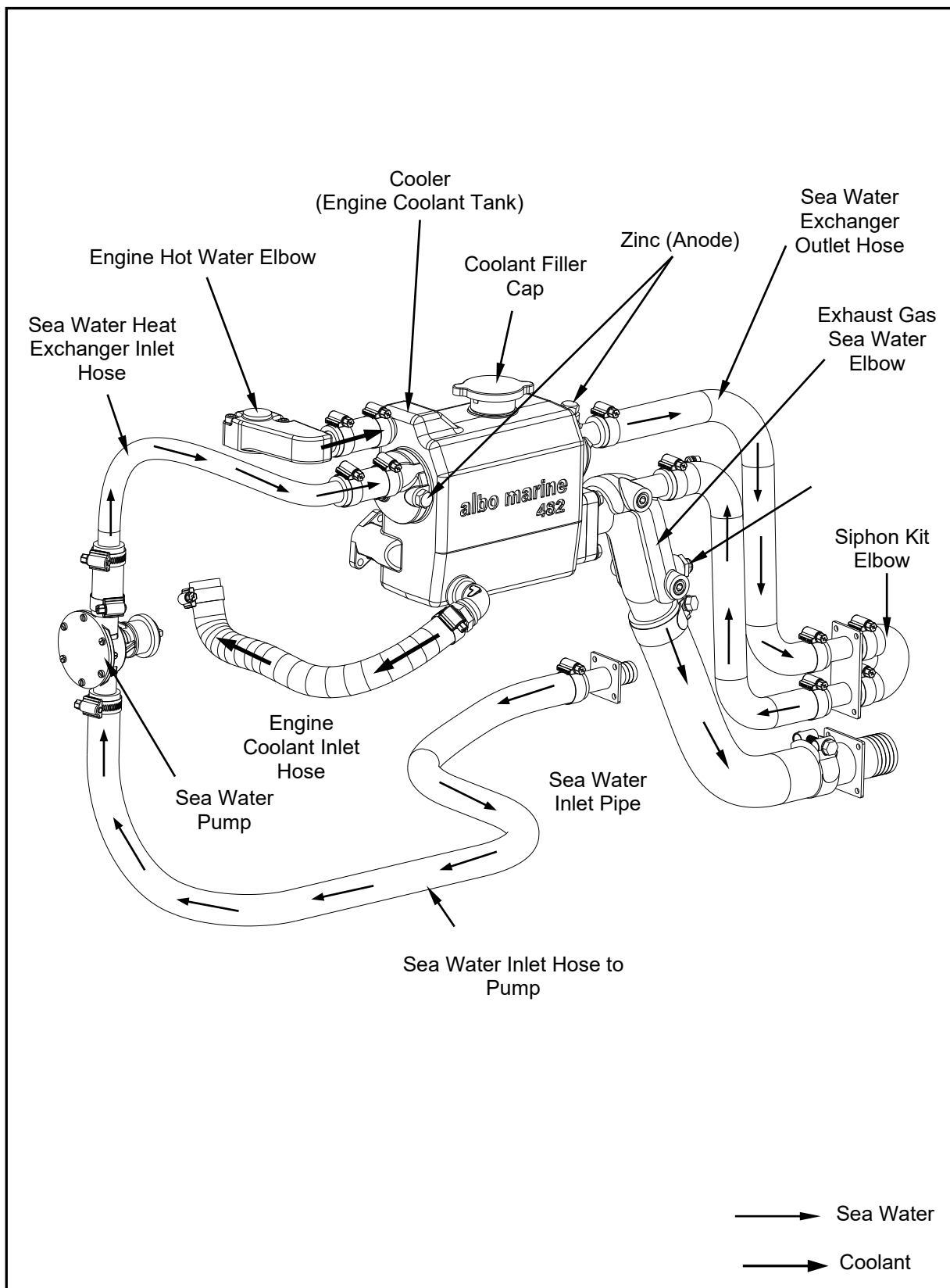


FIGURE 38. ENGINE COOLING SYSTEM (COOLER, SEA WATER PUMP, HOSES MN 305)

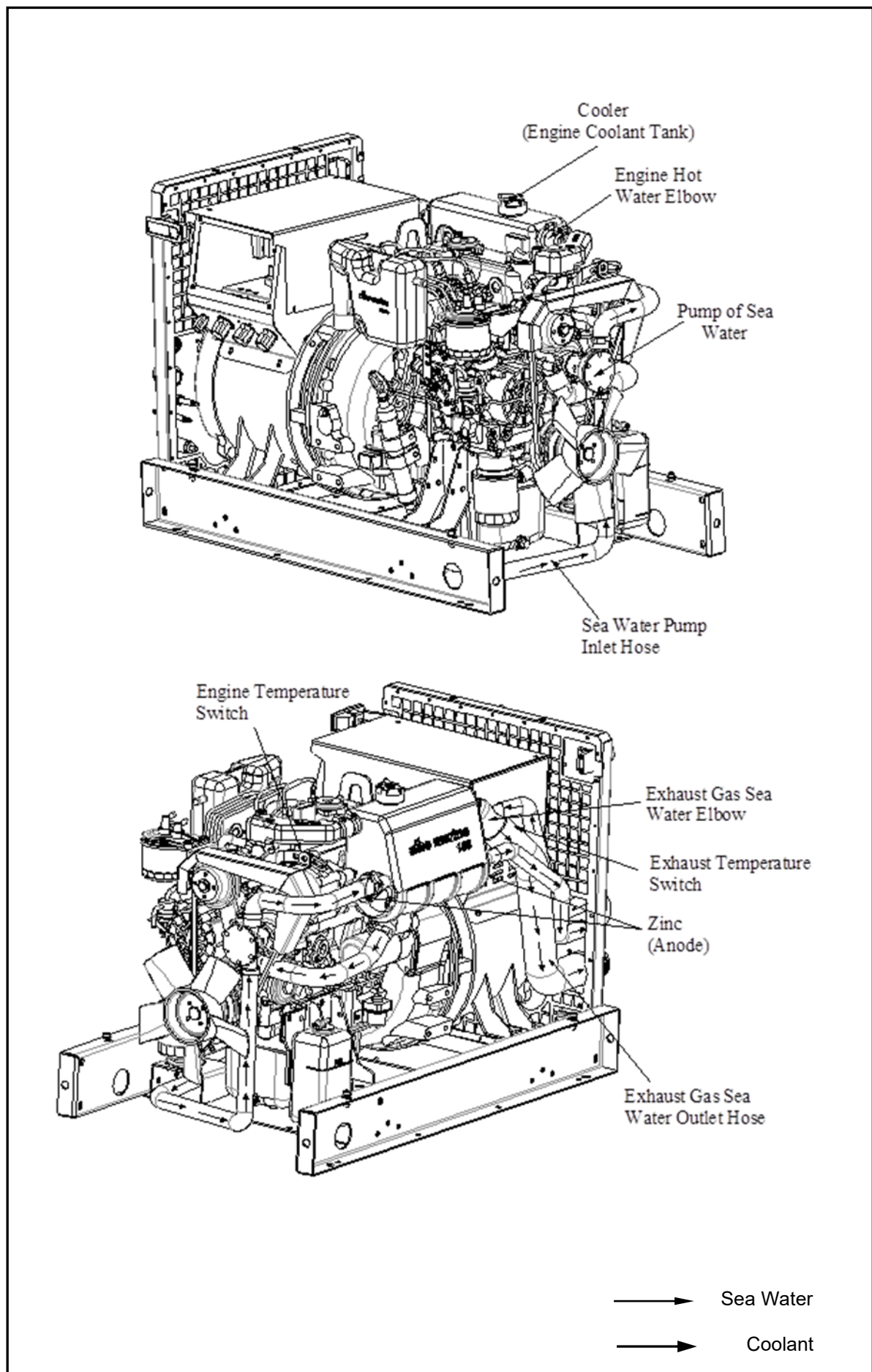


FIGURE 39. ENGINE COOLING SYSTEM – MG 307, TG 309

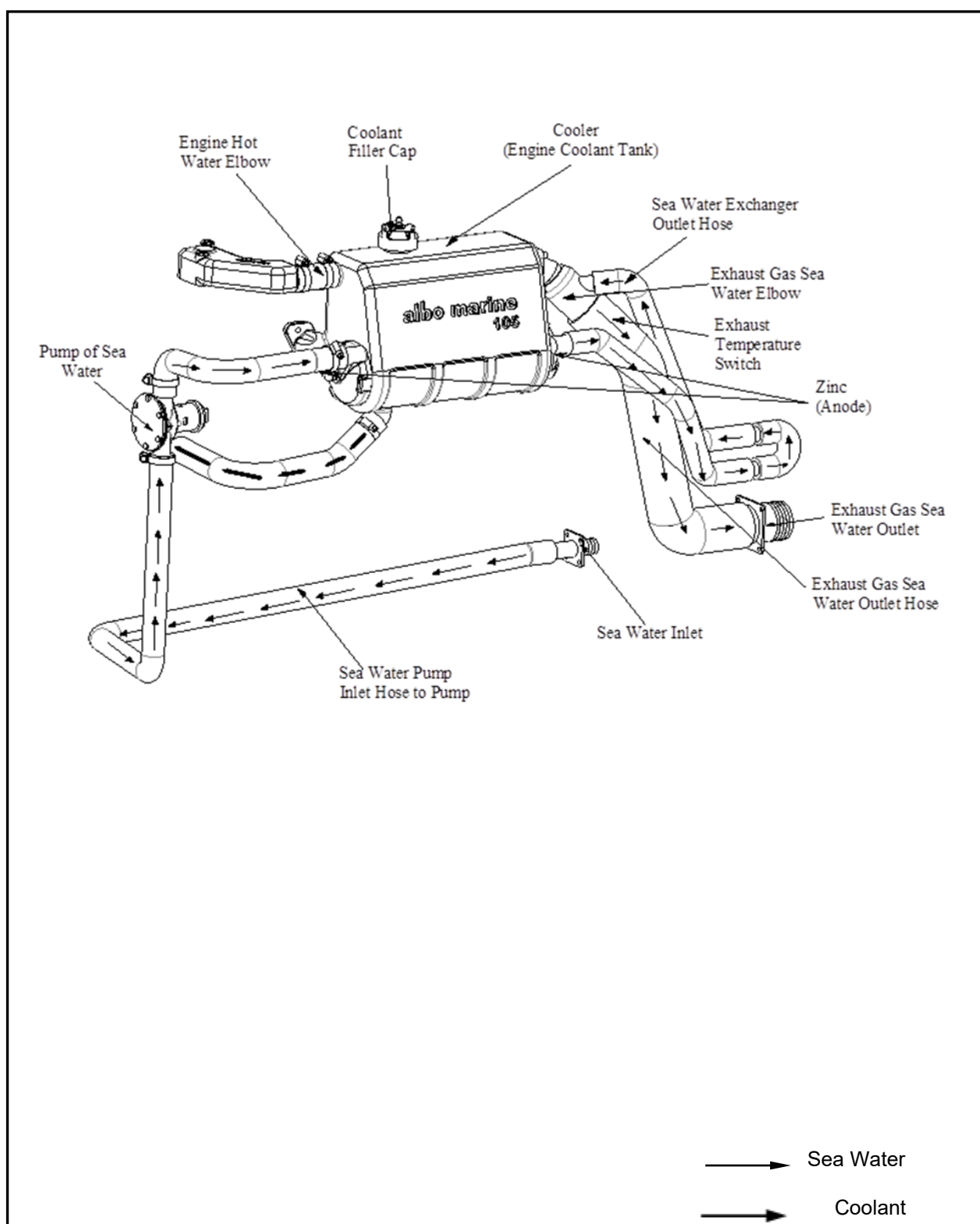


FIGURE 40. ENGINE COOLING SYSTEM (COOLER, SEA WATER PUMP, HOSES) MG 307 , TG 309

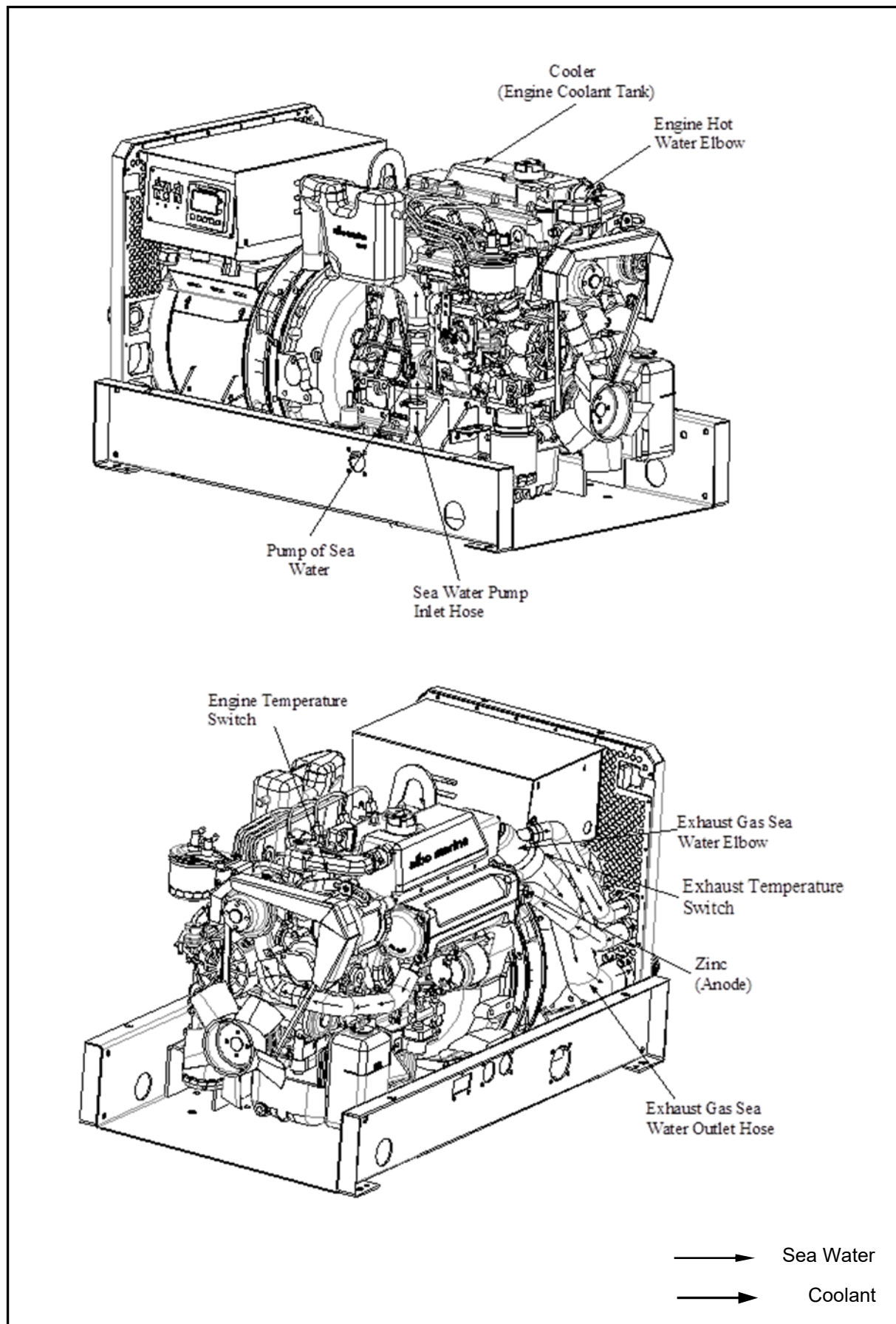


FIGURE 41. ENGINE COOLING SYSTEM - MG 311, TG 313

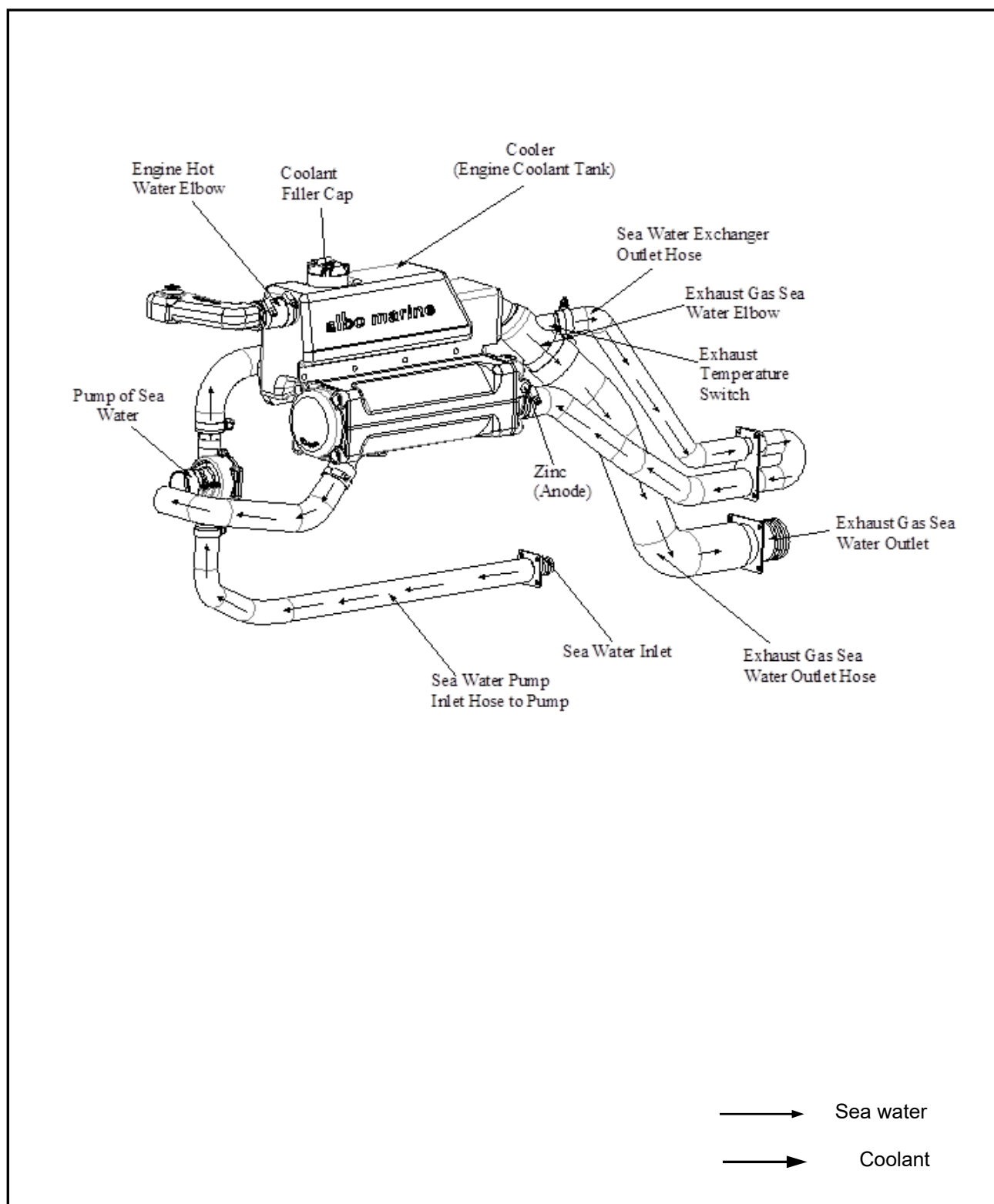


FIGURE 42. ENGINE COOLING SYSTEM (COOLER, SEA WATER PUMP, HOSES) MG 311, TG 313

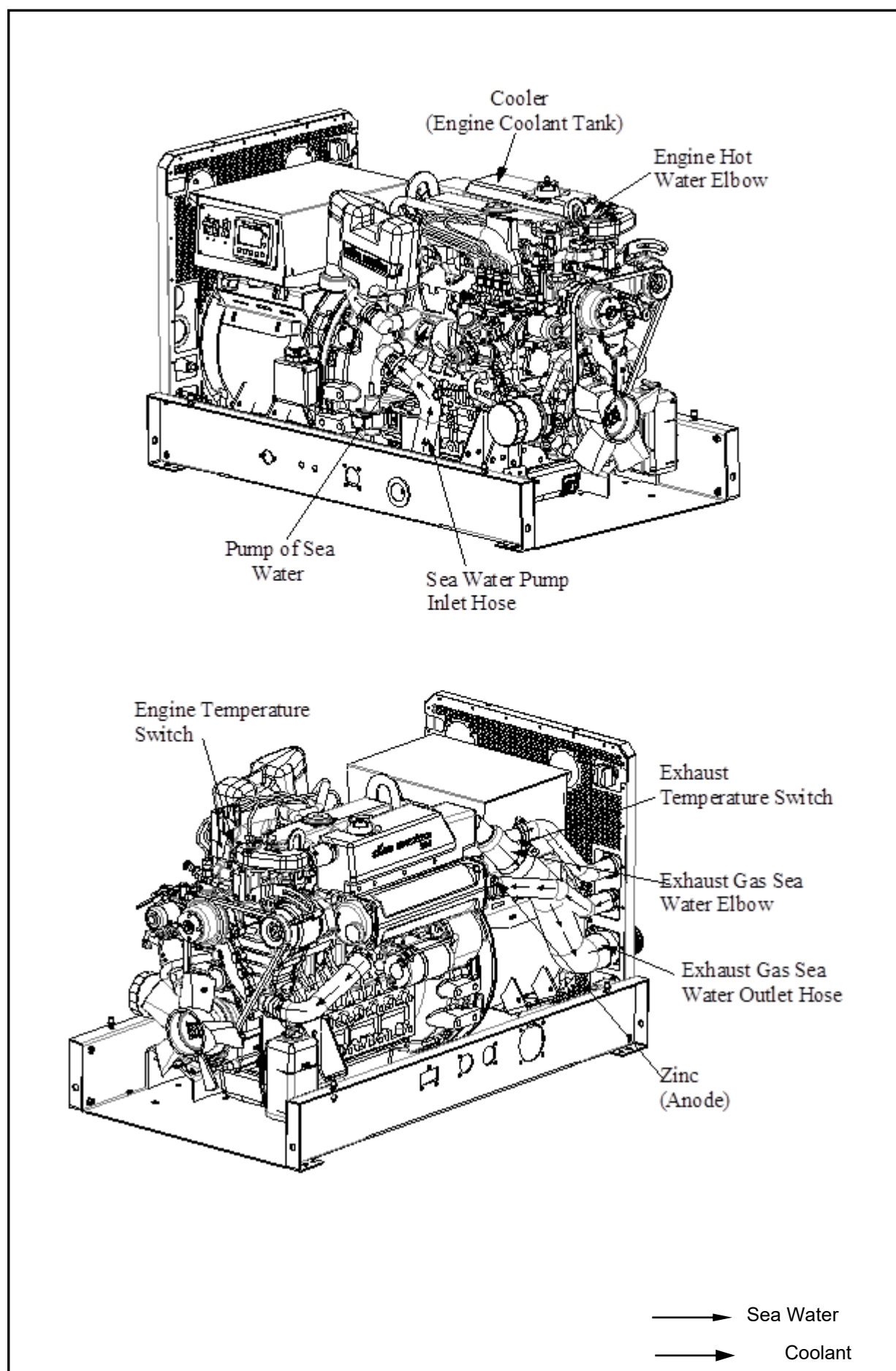


FIGURE 43. ENGINE COOLING SYSTEM - MG 312, TG 314

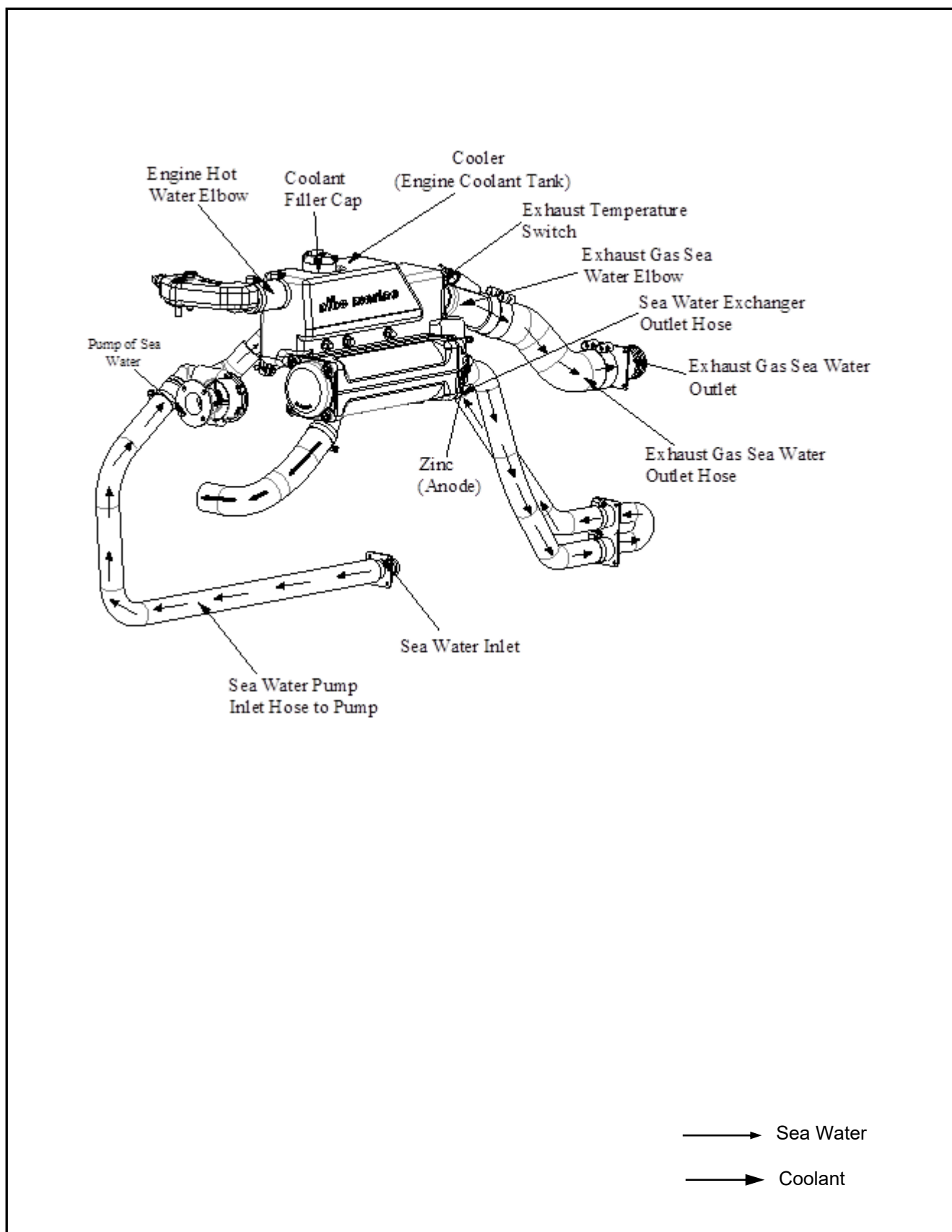


FIGURE 44. ENGINE COOLING SYSTEM (COOLER, SEA WATER PUMP, HOSES) MG 312, TG 314

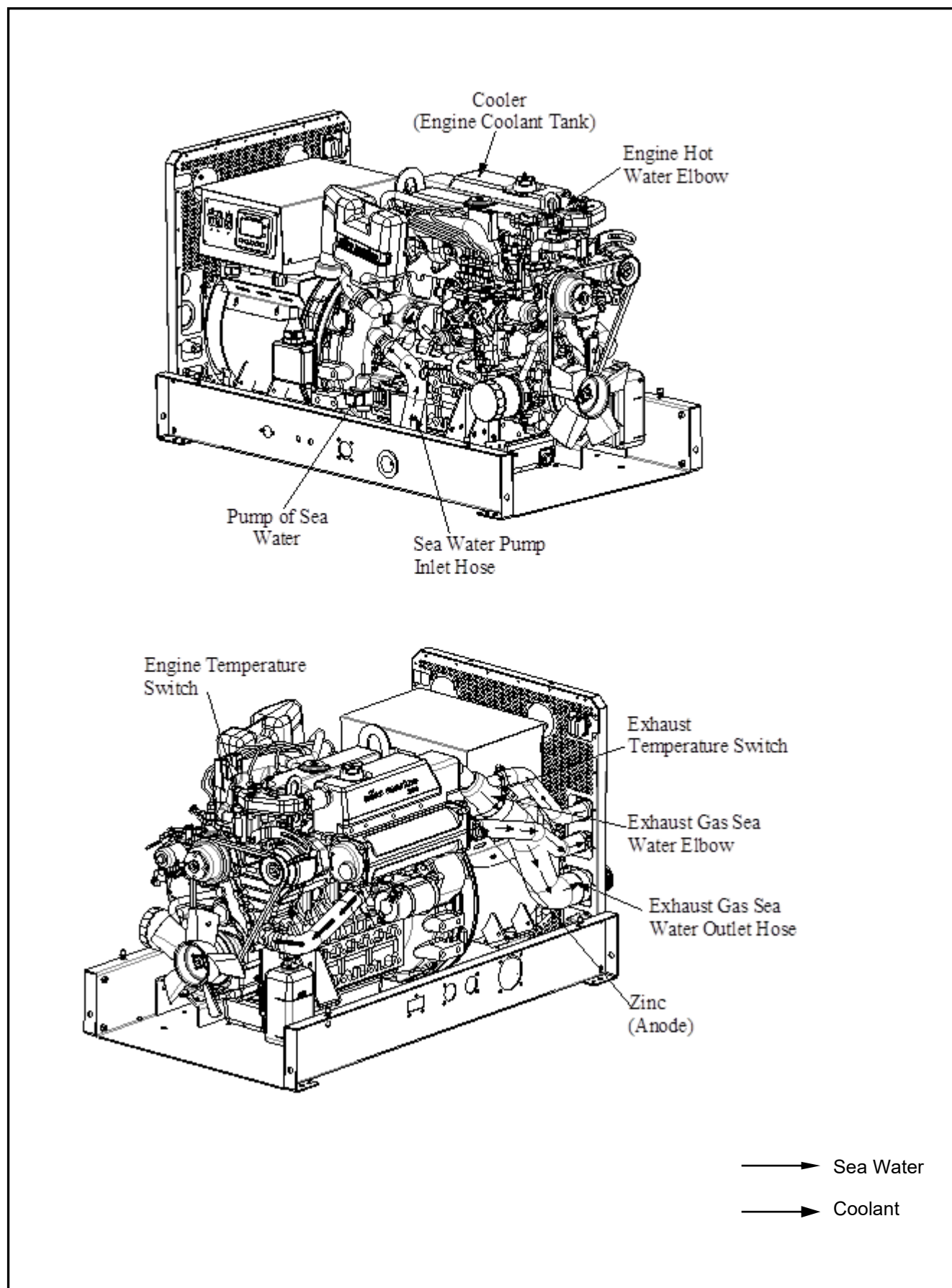


FIGURE 45. ENGINE COOLING SYSTEM (COOLER, SEA WATER PUMP, HOSES) MG 316, MG 318, TG 320, TG 323

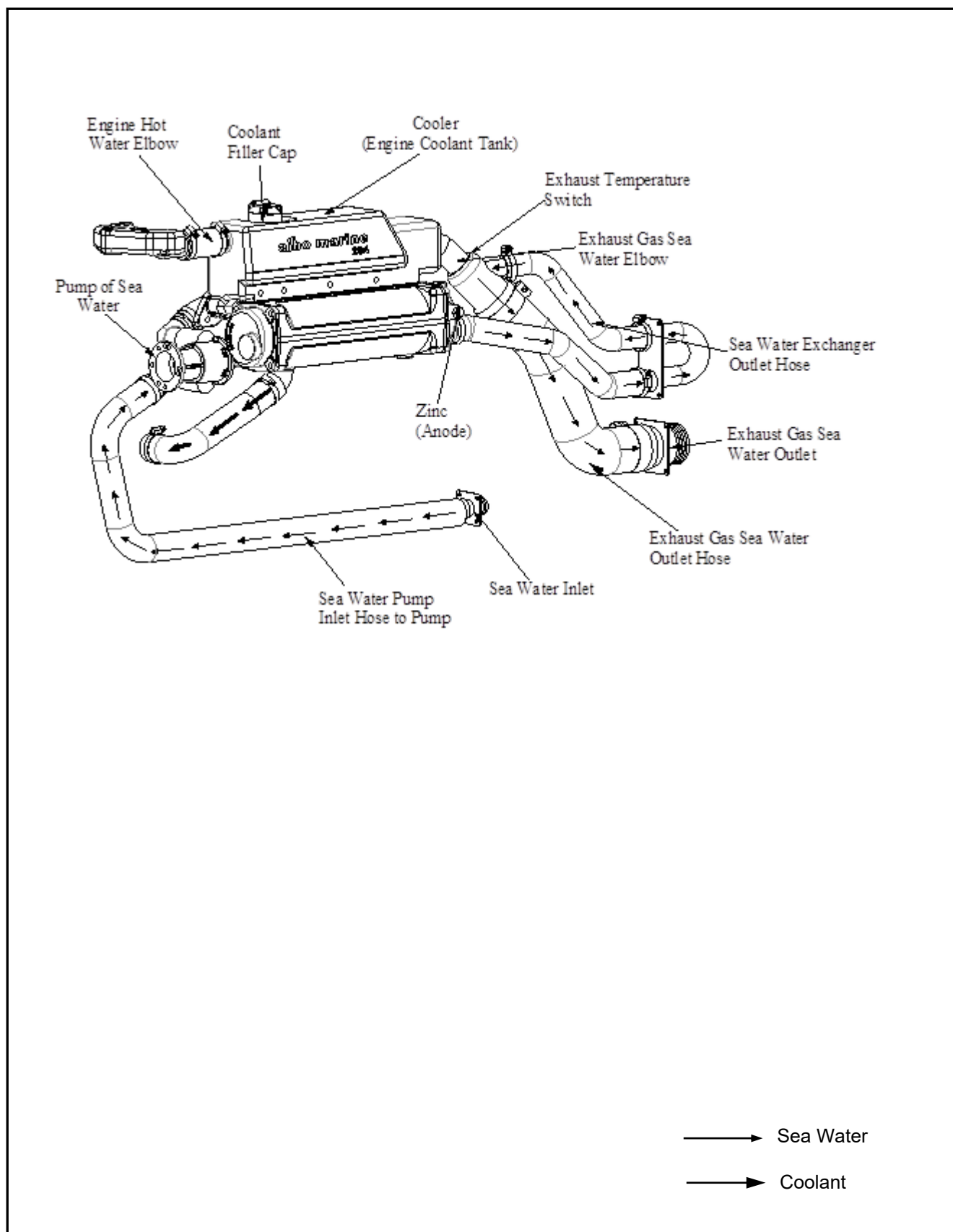


FIGURE 46. ENGINE COOLING SYSTEM (COOLER, SEA WATER PUMP, HOSES) MG 316, MG318, TG 320, TG323

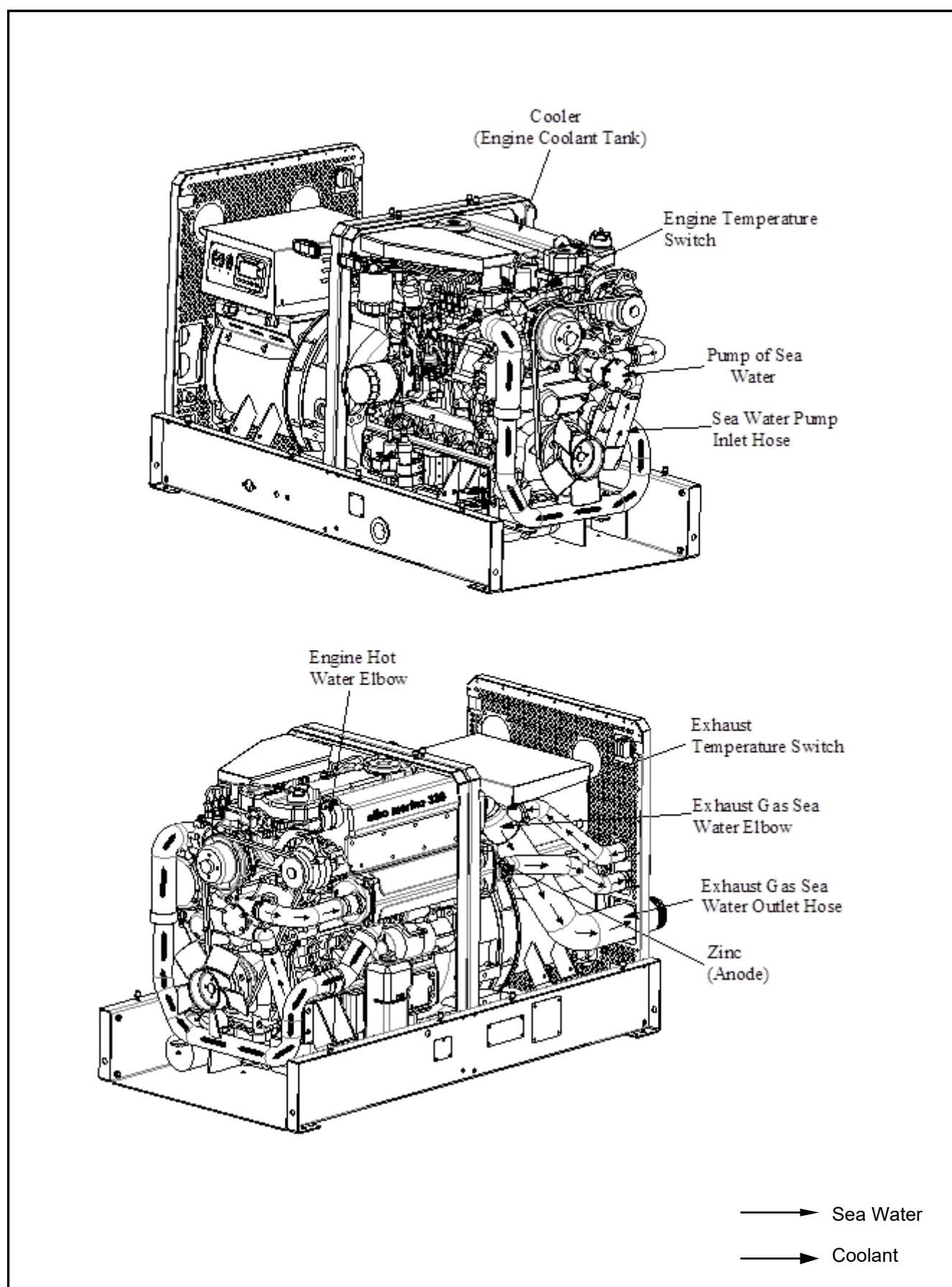


FIGURE 47. ENGINE COOLING SYSTEM (COOLER, SEA WATER PUMP, HOSES) MG 324, TG 330

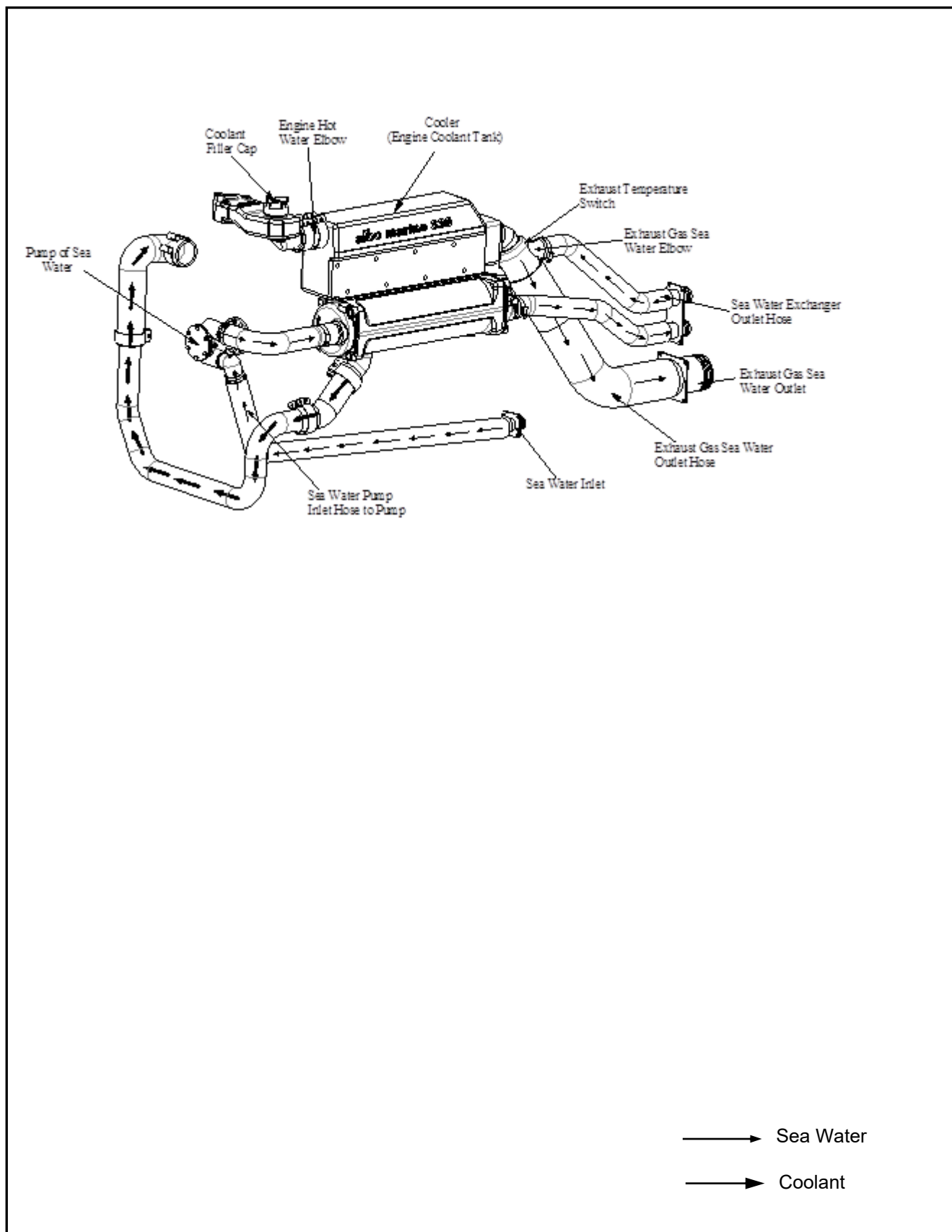


FIGURE 48 ENGINE COOLING SYSTEM (COOLER, SEA WATER PUMP, HOSES) MG 324, TG330

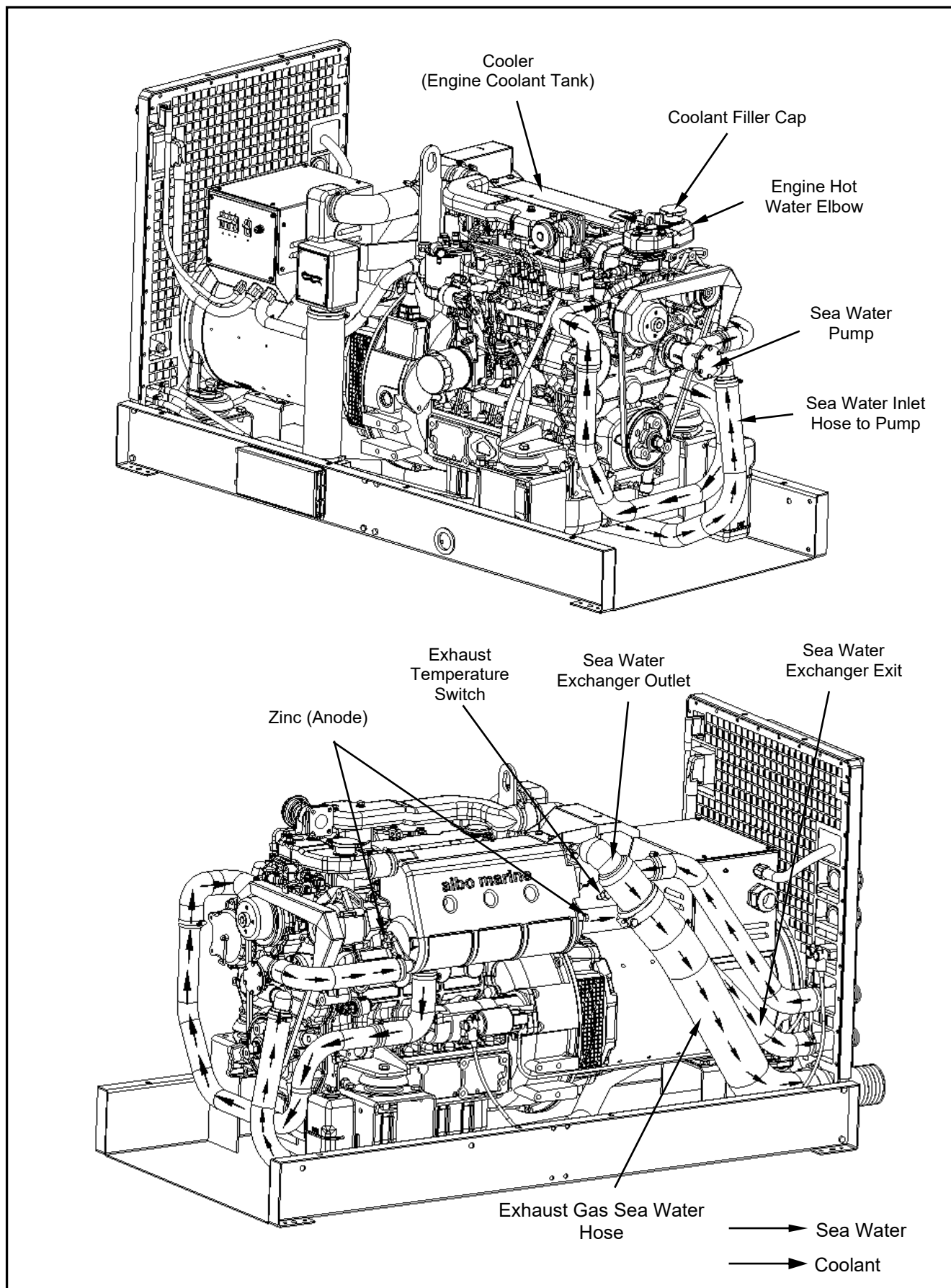


FIGURE 49. ENGINE COOLING SYSTEM (COOLER, SEA WATER PUMP, HOSES) TG 343

13. Engine Exhaust Systems

WET TYPE EXHAUST SYSTEMS

⚠WARNING : EXHAUST GAS IS LETHAL!
Ensure that exhaust system has no leaks and sealed. All exhaust gases shall be disposed away from windows, doors and ventilation compartments.

Figure 40 shows a typical exhaust system where the siphon point is above the sea water line. Refer to the Engine Cooling System section for sea water (raw water) connections. Installation methods for this generator shall comply with current standards and local legislations and standards. (Page 7-1)

A separate exhaust system shall be provided for every generator set on the sea vessel. Engine exhaust systems shall be separated from other exhaust systems and engine exhaust system shall be insulated against heat.

All installation equipment that may be required for the exhaust system (mufflers, water separators and siphon kits) may be procured from the manufacturer.

HOSE FITTINGS AND HOSE DIAMETERS

Hose fittings and hose diameters may not have a smaller internal diameter than the engine output. Measure the exhaust back pressure if the total length of the exhaust hose in the installation is over 6m (six meters). If the results exceed the Specifications, use exhaust hoses with wider diameter. Always refer to Specifications table on this subject.

EXHAUST HOSE

Use hoses and stainless steel elbows approved by standards to be used in wet type exhaust systems. You may contact the manufacturer to procure this equipment. Slant of the hose shall be minimum 42 mm per meter when the installation is laid horizontally. Necessary support shall be provided while the installation is laid. All points of the installation shall be accessible and observable.

HOSE CLAMPS

Use 2 stainless steel hose clamps with a minimum width of 12.7 mm to clamp both ends of the hose.

MUFFLER

Install a muffler approved by standards as close as possible to the engine. The distance between engine and muffler shall not exceed 2 m for the best muffler operation. The muffler entrance shall be minimum 30.5 cm under the exhaust-water mixer and its output shall be vertical.

Install a water separator (Figure 40), or install an elbow instead. Lowest point of the muffler shall not be 1.4 meter under the water separator or 1.2 under the elbow in the pipe installation.

Install the muffler so that air flow may pass under it. This will help preventing condensation and sedimentation.

EXHAUST WATER SEPARATOR

When an exhaust water separator is used (Figure 40), internal diameters of the muffler outlet and water separator shall be the same. Water separator shall be installed on the muffler to provide that it is raised vertically. Fitting installed on the vessel surface for the drainage hose shall be under the load line and shall have sea valve. Perform the EXHAUST WATER SEPARATOR BACK FLOW TEST during the test ride to ensure that there is no back flow and engine will not be flooded.

PASSAGE CONNECTION INSTALLED TO THE OUTER SURFACE OF THE SEA VESSEL

Passage connection installed to the outer surface of the sea vessel shall always be fully loaded and over the load line in all operating conditions and cruising speeds of the vessel. When a water separator is used, uppermost part of the water separator shall be min. 450 mm (18 inch) over the load line to reduce water ingress (Figure 40). When an elbow over the muffler outlet hose is used, the elbow shall be minimum 305 mm (12 inch) above the fitting installed to the vessel surface.

⚠ CAUTION : Flooding of the cylinders due to back flow may cause serious engine damage. It shall be observed that there is definitely no back flow in all tests.

EXHAUST WATER SEPARATOR BACK FLOW TEST

Purpose

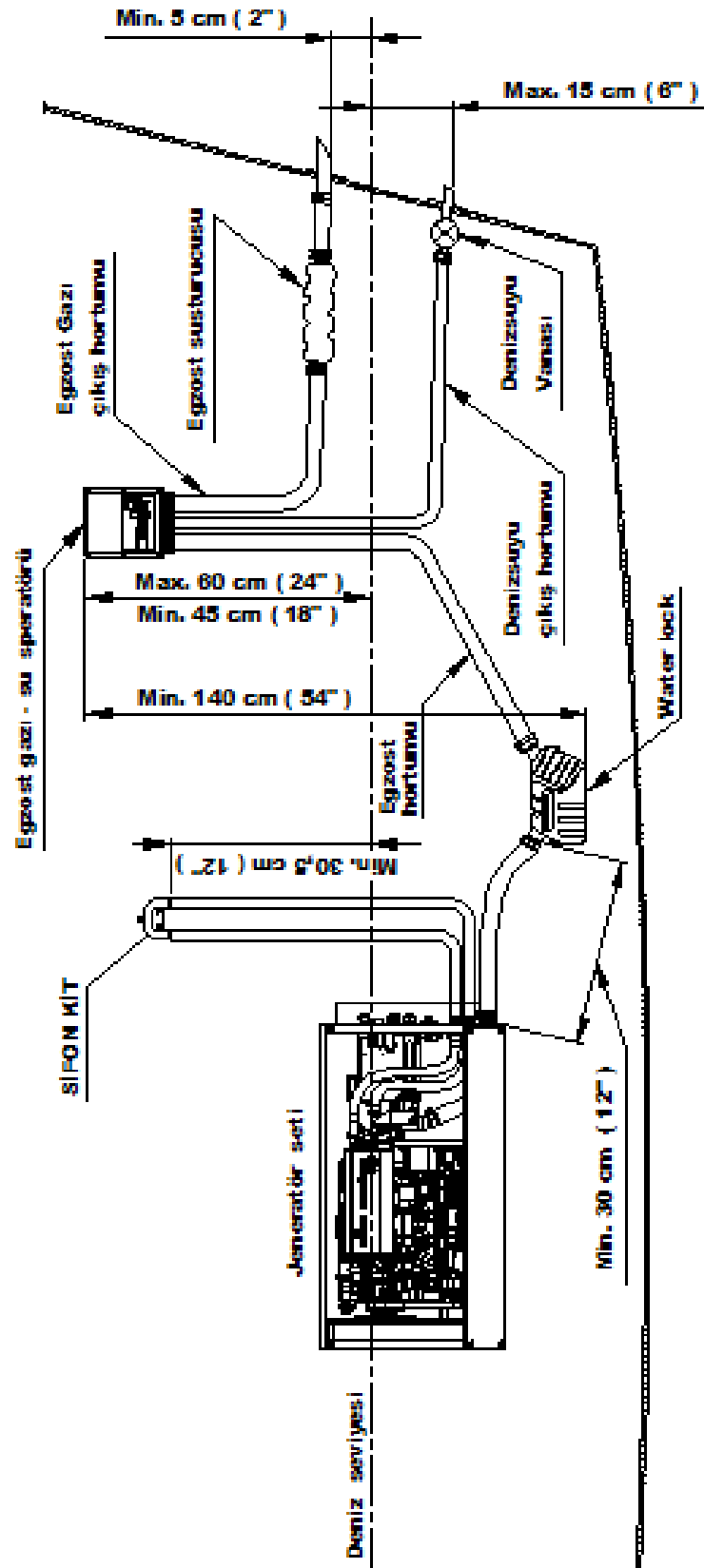
Determining that there is no back flow through exhaust water separator under any operating conditions (Figure 40).

Method

Perform this test with the SEA WATER INTAKE TEST during the test rides of your vessel. (Page 12-3). Close the sea water (raw water) intake valve and disconnect the hose from the sea water separator. Test by opening the sea valve while holding the hose over the water separator connection.

Requirement

You shall ensure that there is no back flow while operating the vessel in all speeds and conditions. Change the position of passage connection installed to the outer surface of the vessel if back flow is detected.



Notes:

- 1) All exhaust hoses and taps shall be slant. Hoses shall be connected without sagging. 42 mm / meter (1/2" inch per foot)
- 2) It is not possible to observe if the coolant of the engine used is flowing and whether the water comes out from the vessel. Nevertheless, temperature of the exhaust will be increased when the generator set water flow is stopped due to water loss. In this case, exhaust temperature switch is activated and it stops the generator set. Refer to the troubleshooting section of the operation manual.

FIGURE 50 EXHAUST GAS – WATER SEPARATOR AND INSTALLATION OF WATERLOCK

DRY EXHAUST SYSTEMS

In figure 41, is showed a typical dry exhaust system. A separate exhaust system shall be provided for every engine. Commonly used exhaust systems may cause several damages to the engines. Exhaust systems shall be supported independent of the engine.

Using a fixed-rigid installation after the turbocharger unit may cause several faults. Therefore, vibration-dampening exhaust installations shall be used.

You shall relieve the stress caused by thermal expansion and vibration on the exhaust outlet by connecting a flexible, at bendy type a stainless steel part with a minimum length of 300 mm between the engine and exhaust installation pipe.

When the exhaust pipes are floored very long (vertically or horizontally) a flexible, bendy type stainless steel fitting shall be used for compensating the thermal expansion. Flexible exhaust fittings shall not be used for compensating the misaligned pipe systems of the sections or curves.

Horizontal works on the exhaust pipe system shall be splayed downwards after the engine outlet and there shall be drain plugs on the points where the pipe system is turned to vertical direction.

Exhaust pipe system shall be insulated to prevent heating that may cause fires. Installation shall be laid with a minimum distance of 23 cm from the flammable vessel surfaces. On areas where it is not possible to provide a space, flammable surfaces shall be insulated with material resistant to 538°C. Outer surfaces of insulated areas shall not exceed 71 °C.

Insulate the exhaust pipe system and muffler areas where touching accidentally is probable to prevent burns. Surface of the protective insulation shall not exceed 93°C.

Entire exhaust system shall be reachable for visual inspections and repairs. To allow easier removal and repair, we recommend you to use liquid gasket compound resistant to high temperatures to all joints.

Refer to Specifications (Section 16) for maximum allowable exhaust back pressure.

⚠ CAUTION : Excessive exhaust back pressure reduces engine power by making the air-fuel mixture lean, causes black smoke, high exhaust temperature and reduces the service life of the engine.

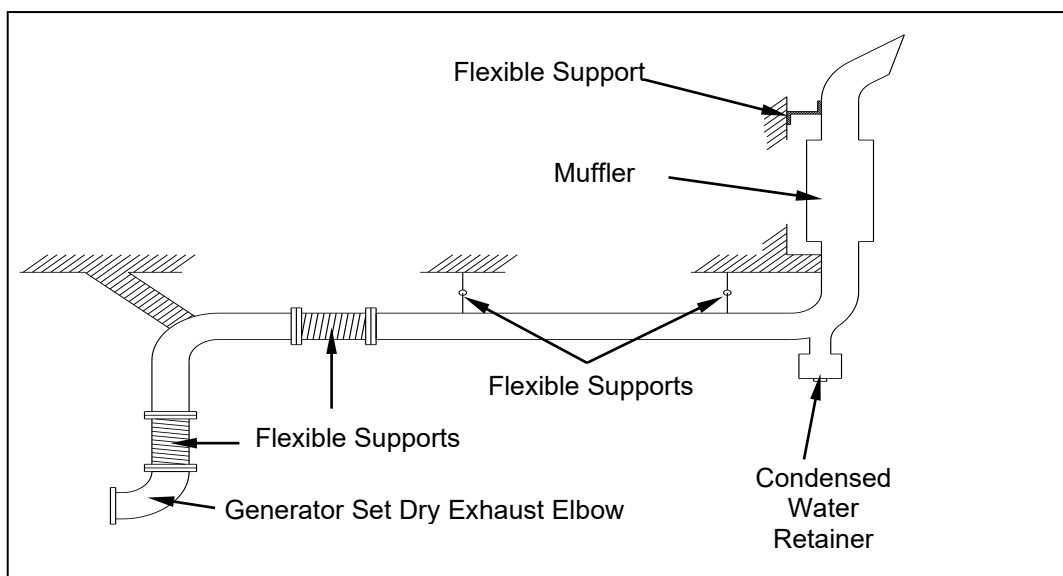


FIGURE 51. DRY EXHAUST SYSTEM DIAGRAM

14. Electrical Connections

AC Connections

⚠ WARNING : **Dangerous Voltage!** Touching the insulated live components inside the generator set may cause serious personal injuries or death. For your protection, stand on a dry wooden platform or rubber insulation pad, make sure that your clothes and shoes are dry, remove your jewelry and use tools with insulated handles. Secure with protective covers at the end of the installation.

Grounding

Generator set, power supply wiring and all connected electric equipment shall be connected to the common ground system of the vessel complying with the applicable legislation.

⚠ WARNING : Grounding the electrical equipment improperly may cause fires or electric shock that may cause serious personal injuries or death.

Transfer Switch

Use an approved transfer switch to connect the vessel to coastal power supply if available.

⚠ WARNING : **Feedback to coastal supply may cause electric shocks and cause serious personal injuries or death. Use an approved device to prevent connection of the generator set with coastal supply.**

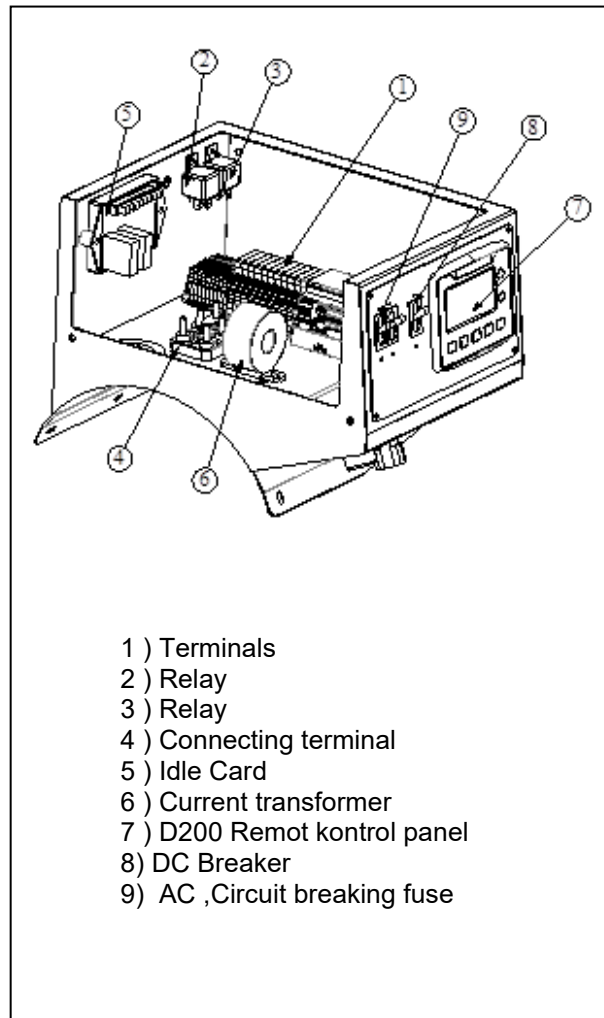


FIGURE 52. MANUAL CONTROL PANEL & CONDUIT BOX - MS, MG,TG,TS MODELS

Generator set ground line (Boat connection)

Generator set shall be connected to the common ground line of the boat complying with the applicable legislation. Connect the connection cable to the ground point next to battery cable terminals.

⚠ WARNING : Connecting the generator set improperly to the common ground line of the boat may cause serious personal injuries and death.

Remote Control Connector

Lock the cable plug after connecting it to the remote control connector on the rear cover of the cabin to prevent it from coming off.

Remote control switch and meter

Remote control panel kit: a remote control panel with control switches and a control switch is available in our meter as a kit. Follow the installation instructions on the kit. Refer to the wiring diagrams on page 17-1 to choose and connect the remote control panel components. Starting upper switch shall be in instant contact in both positions.

Remote control line equipment

Equipment : DKG 114 remote control panel is available with a ten-contact cable with a standard length of 10 m.

Note: All holes on the deck and boat compartments for the electrical installation shall be sealed to prevent exhaust gases and flammable vapors from entering other compartments of the boat. Pipe line shall be sealed both from inside and outside.

Note: Do not re-route the remote control cables near AC supply line. AC may cause signals that will make the generator set operate roughly.

15. Reviewing of the Installation and Commissioning

Before starting the generator set, review the following points that are required for the operation of the generator set using the check list given below.

Perform the re-connections, repairs and modifications required. Then, operate the generator set as per the Operation Manual considering all instructions and precautions specified.

Continue working on the check list while the generator set is operated, and perform the re-connections, repairs and modifications required. Do not get into use continuously the generator set until every article is checked.

[] SEA WATER INTAKE TEST shall be performed during test ride. Water line is checked in this test and a siphon blocking tap is installed when required.

[] Check whether the exhaust water separator is sustained to reverse flow during the forward and rearward movements of the boat in the test ride.

[] Ambient temperatures shall remain in an acceptable range for all operating conditions in the generator operation area.

[] Living areas shall be insulated from the effect of the exhaust gas and fuel vapors.

[] Installation of the generator in the operation area shall be resistant to physical effects (excessive vibrations).

[] There shall be service openings on the generator installation area to allow periodical service maintenances specified in the operation manual.

[] Check whether the engine coolant expansion tank is installed correctly. It shall be placed suitably for maintenance and filling operations.

[] Check whether entire exhaust system is installed so that it is reachable for maintenance and filling operations.

[] Check whether fuel tanks, connection elements and installations, all hoses and filters are installed so that they are reachable for maintenance and filling operations and complying with the legislations and standards.

[] Check whether the generator assembly is connected to the ground and chassis lines complying with the legislations and standards.

[] Check whether all grounded starter and engine circuits is connected to common grounding installation using cables with proper cross-sections.

[] Check whether the generator assembly is properly protected against any external liquid.

- [] Check whether the dock connection lines and generator installation is protected with transfer and protection switches complying with the standards.
- [] Check whether all electrical installation and elements used are complying with the legislations and standards.
- [] Check whether the generator set has a battery that shall allow starting and installed so that it is not affected by vibration. Check whether the battery (+) terminal is insulated to prevent short circuits. Its environment shall be ventilated adequately.
- [] Check whether the components and switches of remote control/control units are operating properly.
- [] Check whether the emergency and CO detectors are connected and in operating condition.
- [] Check whether the electrical values (voltage-frequency-current values) of the generator set provides the proper conditions. Load values between phases shall be compensated.
- [] Check whether the exhaust back pressure is in an acceptable range.
- [] Check the exhaust system for leaks.
- [] Check the fuel system for leaks.
- [] Check the engine coolant level and engine oil level.
- [] Perform sea water pre-supply and check whether the sea water inlet valve is open.
- [] Check for engine coolant and sea water installation leaks.
- [] Users are responsible to take all required measures as per the information specified in operation and installation manuals and all safety measures. Users are also responsible to take all measures not specified in manuals, but available in the legislation and standards. Users may contact the manufacturer for any kind of information they need in these subjects.

16. Specifications

MN 305		
Power	kVA Kw	
	Continuous	5,5 5,5
	Standby	6 6
ALTERNATOR: With single bearing, brushless Single-phase/Three-phase (MG models Single-phase: $\cos \varphi 1$ MG, TG Models Three-phase: $\cos \varphi 0,8$)		
ENGINE: Kubota Diesel Water Cooled with mechanical governor		
Model		Z482 STD1
Power	Continuous	5,5 kW / 3000 rpm
	Standby	6 kW / 3000 rpm
No. of Cylinders		2
Displacement		0.479 cm ³ (29.23 in ³)
Piston Bore		67 mm (2.64 in)
Stroke		68 mm (2.68 in)
Compression Ratio		23.5:1
Ignition		1-2
Diesel Fuel Injection Timing		20° BTDC
Fuel Consumption	At Full Load	2.3 L/hr (0,76 Gal/hr)
Oil Capacity		2,5 L (0,6 U.S. Gals)
Thermostat Opening Temperature		158° F (71° C)
Charging Alternator		12 V 150 W
Battery		12 V 65 AH
Governor		Mechanical
Fuel		No. 2-D Diesel Fuel: Spec EN 590 or ASTM D975
Engine Coolant		50% Antifreeze 50% Water
Fuel Pump Intake Distance		1.2 m (4 ft)
Sea water pump intake distance		1.2 m (4 ft)
HOSE CONNECTION DIMENSIONS:		
Fuel inlet hose diameter		8 mm. (0,31 in)
Fuel return hose diameter		8 mm. (0,31 in)
Sea water inlet hose diameter		21 mm. (0,82 in)
Sea Water and Exhaust Gas Outlet		40 mm. (1,57 in)
Siphon Kit Outlet Hose Diameter		21 mm. (0,82 in)
Siphon Kit Inlet Hose Diameter		21 mm. (0,82 in)
DIMENSIONS WITH THE CABIN, WEIGHT, NOISE LEVEL		
Noises Level Db	7m/3m/1m	61 / 65 / 69
Weight	171 kg.	
Dimensions: Length x Width x Height	mm	808 x 554 x 540

		MG 307		TG 309	
		kVA	Kw	kVA	Kw
Power	Continuous	7,5	7,5	7,5	9
	Standbye	9	8,5	9	8,5
ALTERNATOR: With single bearing, brushless Single-phase/Three-phase (ML, MS, MG models Single-phase: cos ϕ 1 MG, TG ,TS Models Three-phase: cos ϕ 0,8)					
ENGINE: Kubota Diesel Water Cooled with mechanical governor					
Model		D1105 BG		D1105 BG	
Power	Continuous	7,5 kW / 1500 rpm		7,5 kW / 1500 rpm	
	Standbye	9 kW / 1500 rpm		9 kW / 1500 rpm	
No. of Cylinders		3		3	
Displacement		1124 cm³ (68.58 in³)		1124 cm³ (68.58 in³)	
Piston Bore		78 mm (3,07 in)		78 mm (3,07 in)	
Stroke		78.4 mm (3.09 in)		78.4 mm (3.09 in)	
Compression Ratio		22:1		22:1	
Ignition		1-2-3		1-2-3	
Diesel Fuel Injection Timing		16.5° BTDC		16.5° BTDC	
Fuel Consumption	At Full Load	3 L/hr (0,70 Gal/hr)		0,70 Gal/hr (3 L/hr)	
Oil Capacity		5,1 L (1,3 U.S. Gals)		5,1 L (1,3 U.S. Gals)	
Thermostat Opening Temperature		158° F (71° C)			
Charging Alternator		12 V 360 W		12 V 360 W	
Battery		12 V 65 AH		12 V 65 AH	
Governor		Mechanical			
Fuel		No. 2-D Diesel Fuel: Spec EN 590 or ASTM D975			
Engine Coolant		50% Antifreeze 50% Water			
Fuel Pump Intake Distance		1.2 m (4 ft)		1.2 m (4 ft)	
Sea water pump intake distance		1.2 m (4 ft)		1.2 m (4 ft)	
HOSE CONNECTION DIMENSIONS:					
Fuel inlet hose diameter		8 mm. (0,31 in)		8 mm. (0,31 in)	
Fuel return hose diameter		8 mm. (0,31 in)		8 mm. (0,31 in)	
Sea water inlet hose diameter		21 mm. (0,82 in)		21 mm. (0,82 in)	
Sea Water and Exhaust Gas Outlet		51 mm. (2,00 in)		51 mm. (2,00 in)	
Siphon Kit Outlet Hose Diameter		21 mm. (0,82 in)		21 mm. (0,82 in)	
Siphon Kit Inlet Hose Diameter		21 mm. (0,82 in)		21 mm. (0,82 in)	
DIMENSIONS WITH THE CABIN, WEIGHT, NOISE LEVEL					
Noise Level Db	7m/3m/1m	59 / 63 / 67		59 / 63 / 67	
Weight	285 kg.		285 kg.		
Dimensions: Length x Width x Height mm		985 x 565 x 600		985 x 565 x 600	

		MG 311		TG 313	
		kVA	Kw	kVA	Kw
Power	Continous	11	11	15	12
	Standbye	13	12	13	13
ALTERNATOR: With single bearing, brushless Single-phase/Three-phase (MG models Single-phase: cos ϕ 1 MG, TG, Models Three-phase: cos ϕ 0,8)					
ENGINE: Kubota Diesel Water Cooled with mechanical governor					
Model		D1505 BG		D1505 BG	
Power	Continous	11 kW / 1500 rpm		12 kW / 1500 rpm	
	Standbye	12 kW / 1500 rpm		13 kW / 1500 rpm	
No. of Cylinders		4		4	
Displacement		1498 cm³ (91.41 in³)		1498 cm³ (91.41 in³)	
Piston Bore		78 mm (3,07 in)		78 mm (3,07 in)	
Stroke		78.4 mm (3.09 in)		78.4 mm (3.09 in)	
Compression Ratio		22:1		22:1	
Ignition		1-3-4-2		1-3-4-2	
Diesel Fuel Injection Timing		16,5° BTDC		16,5° BTDC	
Fuel Consumption	At Full Load	4,9 L/hr (1,14 Gal/hr)		4,9 L/hr (1,14 Gal/hr)	
Oil Capacity		6 L (1,3 U.S. Gals)		6 L (1,3 U.S. Gals)	
Thermostat Opening Temperature		158° F (71° C)			
Charging Alternator		12 V 360 W		12 V 480 W	
Battery		12 V 65 AH		12 V 65 AH	
Governor		Mechanical			
Fuel		No. 2-D Diesel Fuel: Spec EN 590 or ASTM D975			
Engine Coolant		50% Antifreeze 50% Water			
Fuel Pump Intake Distance		1.2 m (4 ft)		1.2 m (4 ft)	
Sea water pump intake distance		1.2 m (4 ft)		1.2 m (4 ft)	
HOSE CONNECTION DIMENSIONS:					
Fuel inlet hose diameter		8 mm. (0,31 in)		8 mm. (0,31 in)	
Fuel return hose diameter		8 mm. (0,31 in)		8 mm. (0,31 in)	
Sea water inlet hose diameter		21 mm. (0,82 in)		21 mm.(0,82 in)	
Sea Water and Exhaust Gas Outlet		51 mm. (1,57 in)		51 mm. (1,57 in)	
Siphon Kit Outlet Hose Diameter		21 mm. (0,82 in)		21 mm. (0,82 in)	
Siphon Kit Inlet Hose Diameter		21 mm. (0,82 in)		21 mm. (0,82 in)	
DIMENSIONS WITH THE CABIN, WEIGHT, NOISE LEVEL					
Noise Level Db 7m/3m/1m		59/63/67		59 / 63 / 67	
Weight	380 kg.		380 kg.		
Dimensions: Length x Width x Height mm		1045 x 564 x 600		1045 x 564 x 600	

		MG 312		TG 314	
		kVA	Kw	kVA	Kw
Power	Continous	14	12	16	14
	Standbye	16	12,8	16	14,8
ALTERNATOR: With single bearing, brushless Single-phase/Three-phase (MG models Single-phase: cos ϕ 1 TG, Models Three-phase: cos ϕ 0,8)					
ENGINE: Kubota Diesel Water Cooled with mechanical and Digital Electronic governor					
Model		D1703 BG		D1703 BG	
Power	Continous	12 kW / 1500 rpm		14 kW / 1500 rpm	
	Standbye	12,8 kW / 1500 rpm		14,8 kW / 1500 rpm	
No. of Cylinders		3		3	
Displacement		1647 cm³ (100.51 in³)		1647 cm³ (100.51 in³)	
Piston Bore		87 mm (3.43 in)		87 mm (3.43 in)	
Stroke		92.4 mm (3.64 in)		92.4 mm (3.64 in)	
Compression Ratio		22.0		22.0	
Ignition		1-2-3		1-2-3	
Diesel Fuel Injection Timing		15.25° BTDC		15.25° BTDC	
Fuel Consumption	At Full Load	4,25 L/hr (1,1 Gal/hr)		4,25 L/hr (1,1 Gal/hr)	
Oil Capacity		7 L (1,8 U.S. gals)		7 L (1,8 U.S. gals)	
Thermostat Opening Temperature		158° F (71° C)			
Charging Alternator		12 V 480 W		12 V 480 W	
Battery		12 V 65 AH		12 V 65 AH	
Governor		Electronic			
Fuel		No.2-D Diesel Fuel : Spec EN 590 or ASTM D975			
Engine Coolant		%50 Antifriz %50 Su			
Fuel Pump Intake Distance		1.2 m (4 ft)		1.2 m (4 ft)	
Sea water pump intake distance		1.2 m (4 ft)		1.2 m (4 ft)	
HOSE CONNECTION DIMENSIONS:					
Fuel inlet hose diameter		8 mm. (0,31 in)		8 mm. (0,31 in)	
Fuel return hose diameter		8 mm. (0,31 in)		8 mm. (0,31 in)	
Sea water inlet hose diameter		27 mm.(1,06 in)		27 mm.(1,06 in)	
Sea Water and Exhaust Gas Outlet		51 mm. (1,57 in)		51 mm. (1,57 in)	
Siphon Kit Outlet Hose Diameter		27 mm. (1,06 in)		27 mm. (1,06 in)	
Siphon Kit Inlet Hose Diameter		27 mm. (1,06 in)		27 mm. (1,06 in)	
DIMENSIONS WITH THE CABIN, WEIGHT, NOISE LEVEL					
Noise Level Db	7m/3m/1m	59 / 63 / 67		59 / 63 / 67	
Weight		391 kg.		391 kg.	
Dimensions: Length x Width x Height	mm	1030 x 600 x 700		1030 x 600 x 700	

		MG 316		TG 320	
		kVA	Kw	kVA	Kw
Power	Continous	16	16	20	16
	Standbye	18	17,6	22	18
ALTERNATOR: With single bearing, brushless Single-phase/Three-phase (ML, MS, MG models Single-phase: cos ϕ 1 MG, TG ,TS Models Three-phase: cos ϕ 0,8)					
ENGINE: Kubota Diesel Water Cooled with Electronic governor					
Model		V2203 BG		V2203 BG	
Power	Continous	16 kW / 1500 rpm		16 kW / 1500 rpm	
	Standbye	17,6 kW / 1500 rpm		18 kW / 1500 rpm	
No. of Cylinders		4		4	
Displacement		2197 cm³ (134.07 in³)		2197 cm³ (134.07 in³)	
Piston Bore		87 mm (3.47 in)		87mm (3.43 in)	
Stroke		92.4 mm (3.64 in)		92.4 mm (3.64 in)	
Compression Ratio		22.5:1		22.5:1	
Ignition		1-3-4-2		1-3-4-2	
Diesel Fuel Injection Timing		15.25° BTDC		15.25° BTDC	
Fuel Consumption	At Full Load	6,80 L/hr (1,7 Gal/hr)		6,80 L/hr (1,7 Gal/hr)	
Oil Capacity		9,5 L (2,5 U.S. Gals)		9,5 L (2,5 U.S. Gals)	
Thermostat Opening Temperature		76.5° C (170° F)			
Charging Alternator		12 V 480 W		12 V 480 W	
Battery		12 V 88 AH		12 V 88 AH	
Governor		Elektronik			
Fuel		No.2-D Diesel Fuel : Spec EN 590 or ASTM D975			
Engine Coolant		%50 Antifriz %50 Su			
Fuel Pump Intake Distance		1.2 m (4 ft)		1.2 m (4 ft)	
Sea water pump intake distance		1.2 m (4 ft)		1.2 m (4 ft)	
HOSE CONNECTION DIMENSIONS:					
Fuel inlet hose diameter		8 mm. (0,31 in)		8 mm. (0,31 in)	
Fuel return hose diameter		8 mm. (0,31 in)		8 mm. (0,31 in)	
Sea water inlet hose diameter		27 mm.(1,06 in)		27 mm.(1,06 in)	
Sea Water and Exhaust Gas Outlet		63,5 mm. (2,5 in)		63,5 mm. (2,5 in)	
Siphon Kit Outlet Hose Diameter		27 mm. (1,06 in)		27 mm. (1,06 in)	
Siphon Kit Inlet Hose Diameter		27 mm. (1,06 in)		27 mm. (1,06 in)	
DIMENSIONS WITH THE CABIN, WEIGHT, NOISE LEVEL:					
Noise Level Db 1m	7m/ 3m /	59 / 63 / 67		59 / 63 / 67	
Weight		450 kg		450 kg.	
Dimensions (mm): Length x Width x Height mm		1182 x 628 x 692		1182 x 628 x 692	

		MG 318		TG 323	
		kVA	Kw	kVA	Kw
Power	Continous	18	18	23	18
	Standbye	20	20	26	20,8
ALTERNATOR: With single bearing, brushless Single-phase/Three-phase (MG models Single-phase: cos ϕ 1 MG, TG Models Three-phase: cos ϕ 0,8)					
ENGINE: Kubota Diesel Water Cooled with Electronic governor					
Model		V2403 BG		V2403 BG	
Power	Continous	18 kW / 1500 rpm		18 kW / 1500 rpm	
	Standbye	20 kW / 1500 rpm		23 kW / 1500 rpm	
No. of Cylinders		4		4	
Displacement		2434 cm³(148.53 in³)		2434 cm³ (148.53 in³)	
Piston Bore		87 mm (3.47 in)		87 mm (3.43 in)	
Stroke		102.4 mm (4.04 in)		102.4 mm (4.04 in)	
Compression Ratio		22.5:1		22.5:1	
Ignition		1-3-4-2		1-3-4-2	
Diesel Fuel Injection Timing		15.25° BTDC		15.25° BTDC	
Fuel Consumption	At Full Load	6,80 L/hr (1,7 Gal/hr)		6,80 L/hr (1,79 Gal/hr)	
Oil Capacity		9,5 L (2,5 U.S. Gals)		9,5 L (2,5 U.S. Gals)	
Thermostat Opening Temperature		76.5° C (170° F)			
Charging Alternator		12 V 480 W		12 V 480 W	
Battery		12 V 88 AH		12 V 88 AH	
Governor		Elektronik			
Fuel		No.2-D Diesel Fuel : Spec EN 590 or ASTM D975			
Engine Coolant		%50 Antifriz %50 Su			
Fuel Pump Intake Distance		1.2 m (4 ft)		1.2 m (4 ft)	
Sea water pump intake distance		1.2 m (4 ft)		1.2 m (4 ft)	
HOSE CONNECTION DIMENSIONS:					
Fuel inlet hose diameter		8 mm. (0,31 in)		8 mm. (0,31 in)	
Fuel return hose diameter		8 mm. (0,31 in)		8 mm. (0,31 in)	
Sea water inlet hose diameter		33 mm.(1,25 in)		33 mm.(1,25 in)	
Sea Water and Exhaust Gas Outlet		63,5 mm. (2,5 in)		63,5 mm. (2,5 in)	
Siphon Kit Outlet Hose Diameter		33 mm. (1,25 in)		33 mm. (1,25 in)	
Siphon Kit Inlet Hose Diameter		33 mm. (1,25 in)		33 mm. (1,25 in)	
DIMENSIONS WITH THE CABIN, WEIGHT, NOISE LEVEL					
Noise Level Db 1m	7m/ 3m /	59 / 63 / 67		59 / 63 / 67	
Weight		490 kg.		490 kg.	
Dimensions (mm): Length x Width x Height mm		1182 x 628 x 692		1182 x 628 x 692	

		MG 324		TG 330	
Power		kVA	Kw	kVA	Kw
	Continous	24	24	30	24
	Standbye	26	26	32	26
ALTERNATOR: With single bearing, brushless Single-phase/Three-phase (MG models Single-phase: cos ϕ 1 MG, TG Models Three-phase: cos ϕ 0,8)					
ENGINE: Kubota Diesel Water Cooled with Electronic governor					
Model		V3300 BG		V3300 BG	
Power	Continous	24 kW / 1500 rpm		24 kW / 1500 rpm	
	Standbye	26 kW / 1500 rpm		26 kW / 1500 rpm	
No. of Cylinders		4		4	
Displacement		3318 cm³ (202.48 in³)		3318 cm³ (202.48 in³)	
Piston Bore		98 mm (3.86 in)		98 mm (3.86 in)	
Stroke		110 mm (4.33 in)		110 mm (4.33 in)	
Compression Ratio		22.5:1		22.5:1	
Ignition		1-3-4-2		1-3-4-2	
Diesel Fuel Injection Timing		12° BTDC		12° BTDC	
Fuel Consumption	At Full Load	2,21 Gal/hr (8,40 L/hr)		2,21 Gal/hr (8,40 L/hr)	
Oil Capacity		3,49 U.S. gals (13,2 L)		3,49 U.S. gals (13,2 L)	
Thermostat Opening Temperature		170° F (76.5° C)			
Charging Alternator		12 V 540 W		12 V 540 W	
Battery		12 V 136 AH		12 V 136 AH	
Governor		Mekanik			
Fuel		No.2-D Diesel Fuel : Spec EN 590 or ASTM D975			
Engine Coolant		%50 Antifreeze %50 Su			
Fuel Pump Intake Distance		1.2 m (4 ft)		1.2 m (4 ft)	
Sea water pump intake distance		1.2 m (4 ft)		1.2 m (4 ft)	
HOSE CONNECTION DIMENSIONS:					
Fuel inlet hose diameter		8 mm. (0,31 in)		8 mm. (0,31 in)	
Fuel return hose diameter		8 mm. (0,31 in)		8 mm. (0,31 in)	
Sea water inlet hose diameter		33 mm (1,25 in)		33 mm (1,25 in)	
Sea Water and Exhaust Gas Outlet		76,1 mm (3 in)		76,1 mm (3 in)	
Siphon Kit Outlet Hose Diameter		33 mm (1,25 in)		33 mm (1,25 in)	
Siphon Kit Inlet Hose Diameter		33 mm (1,25 in)		33 mm (1,25 in)	
DIMENSIONS WITH THE CABIN, WEIGHT, NOISE LEVEL :					
Noise Level Db 1m	7m/ 3m /	59/63/67		59/63/67	
Weight	648 kg.		612 kg.		
Dimensions (mm): Length x Width x Height mm		1315 x 648 x 793			

		TG 343	
		kVA	Kw
Power	Continous	43	34
	Standbye	45	45
ALTERNATOR: With single bearing, brushless Single-phase/Three-phase (MG models Single-phase: cos ϕ 1 MG, TG Models Three-phase: cos ϕ 0,8)			
ENGINE: Kubota Diesel Water Cooled with mechanical and Digital Electronic governor			
Model		V3800 DIT BG	
Power	Continous	34 kW / 1500 rpm	
	Standbye	43 kW / 1500 rpm	
No. of Cylinders		4	
Displacement		3.769 cm³ (230 in³)	
Piston Bore		100 mm (3.94 in)	
Stroke		120 mm (4.72 in)	
Compression Ratio		19.0	
Ignition		1-3-4-2	
Diesel Fuel Injection Timing		6.5° BTDC	
Fuel Consumption	At Full Load	2,21 Gal/hr (8,40 L/hr)	
Oil Capacity		3,49 U.S. gals (13,2 L)	
Thermostat Opening Temperature		76.5° C (170° F)	
Charging Alternator		12 V 540 W	
Battery		12 V 136 AH	
Governor		Elektronik	
Fuel		No.2-D Diesel Fuel : Spec EN 590 or ASTM D975	
Engine Coolant		%50 Antifriz %50 Su	
Fuel Pump Intake Distance		1.2 m (4 ft)	
Sea water pump intake distance		1.2 m (4 ft)	
HOSE CONNECTION DIMENSIONS:			
Fuel inlet hose diameter		8 mm. (0,31 in)	
Fuel return hose diameter		8 mm. (0,31 in)	
Sea water inlet hose diameter		42,4 mm (1,67 in)	
Sea Water and Exhaust Gas Outlet		88,9 mm (3,5 in)	
Siphon Kit Outlet Hose Diameter		42,4 mm (1,67 in)	
Siphon Kit Inlet Hose Diameter		42,4 mm (1,67 in)	
DIMENSIONS WITH THE CABIN, WEIGHT, NOISE LEVEL			
Noise Level Db	7m/ 3m / 1m	59/63/67	
Weight	730 kg.		
Dimensions (mm): Length x Width x Height mm		1505 x 750 x 900	



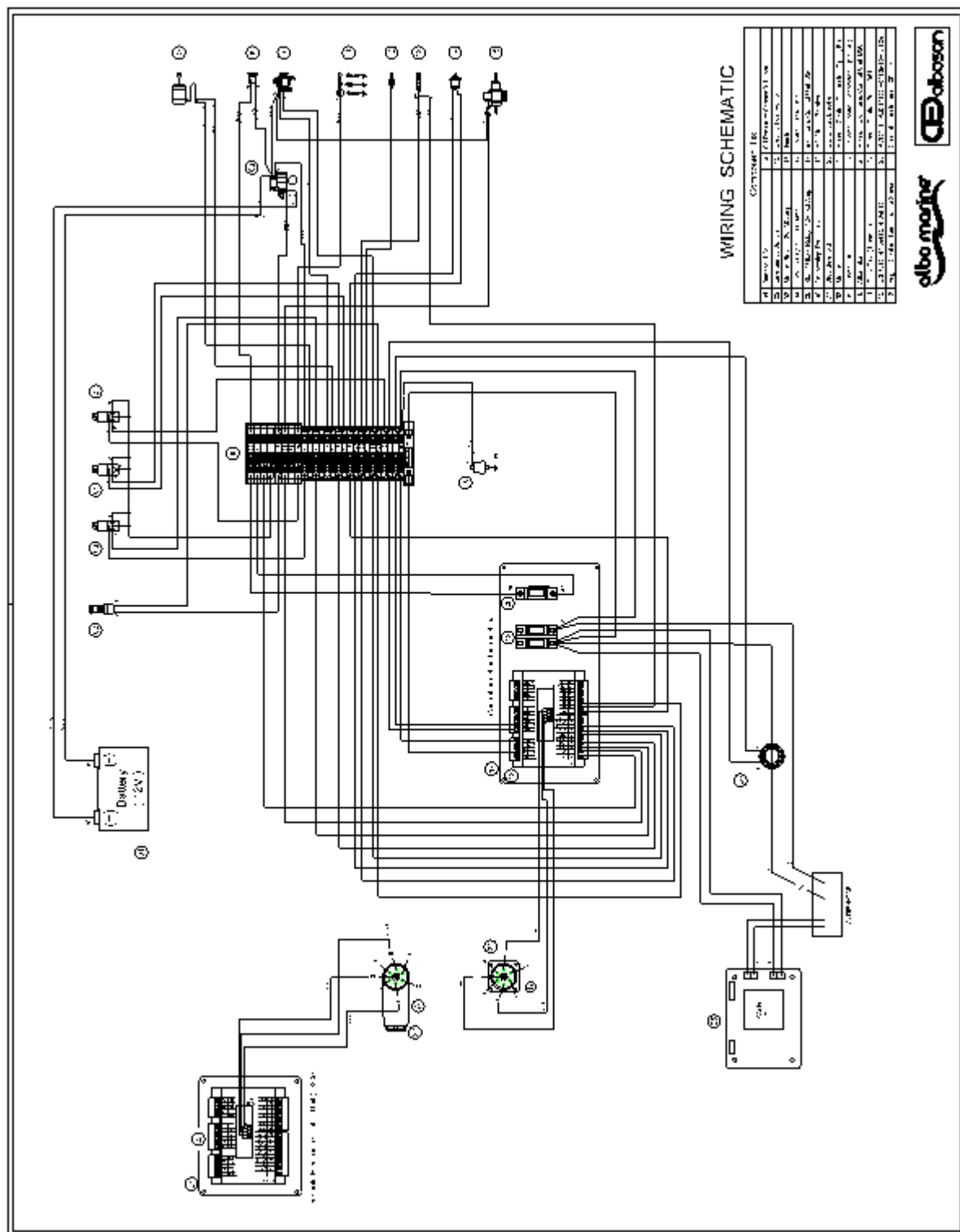
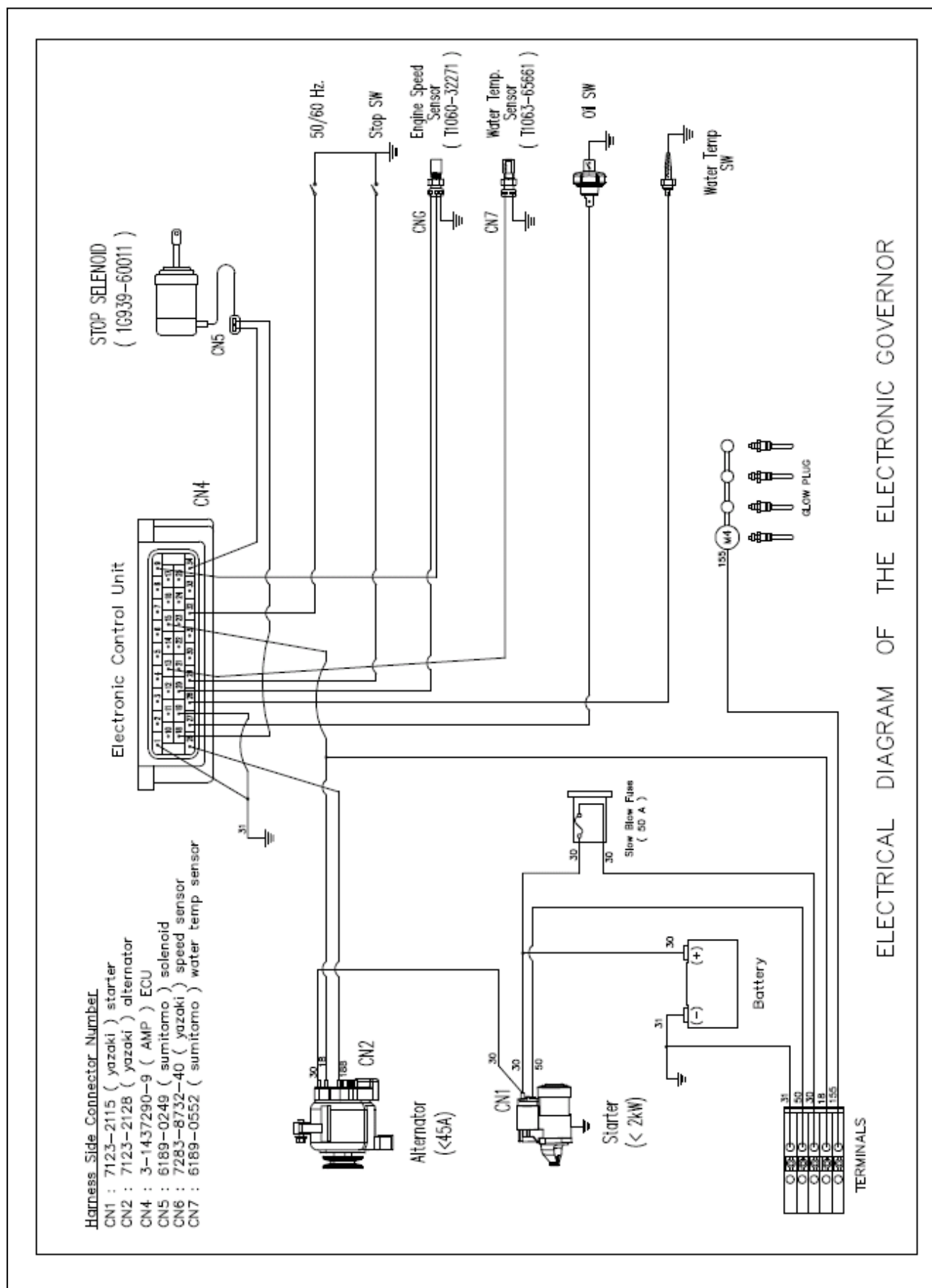


FIGURE 57. SINGLE PHAS ELECTRICAL DIAGRAM 02



ELECTRICAL DIAGRAM OF THE ELECTRONIC GOVERNOR

FIGURE 58. ELECTRICAL DIAGRAM OF THE ELECTRONIC GOVERNOR

18. GENERATOR SET DIMENSION

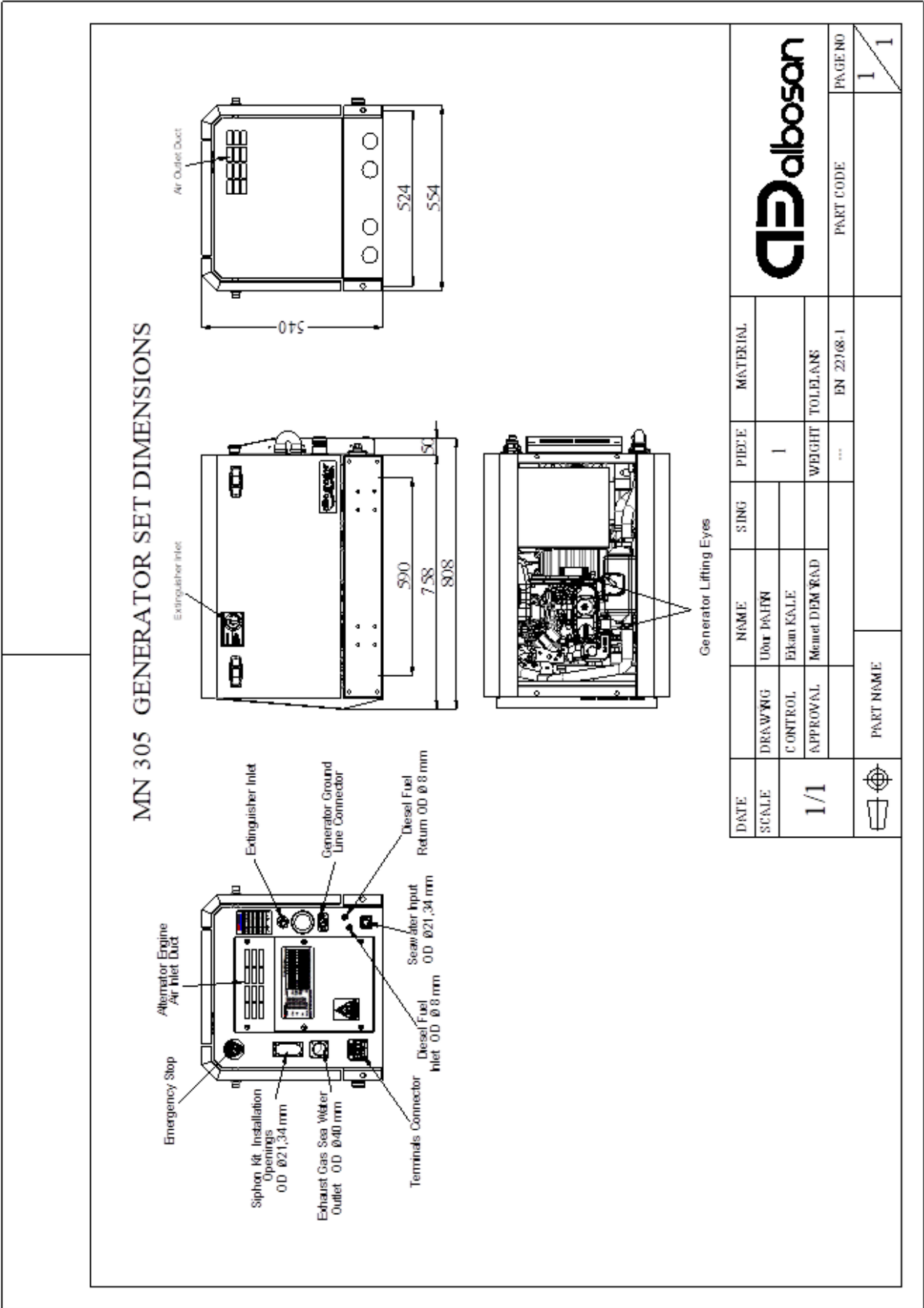


FIGURE 59. GENERATOR SET DIMENSIONS - MN 305

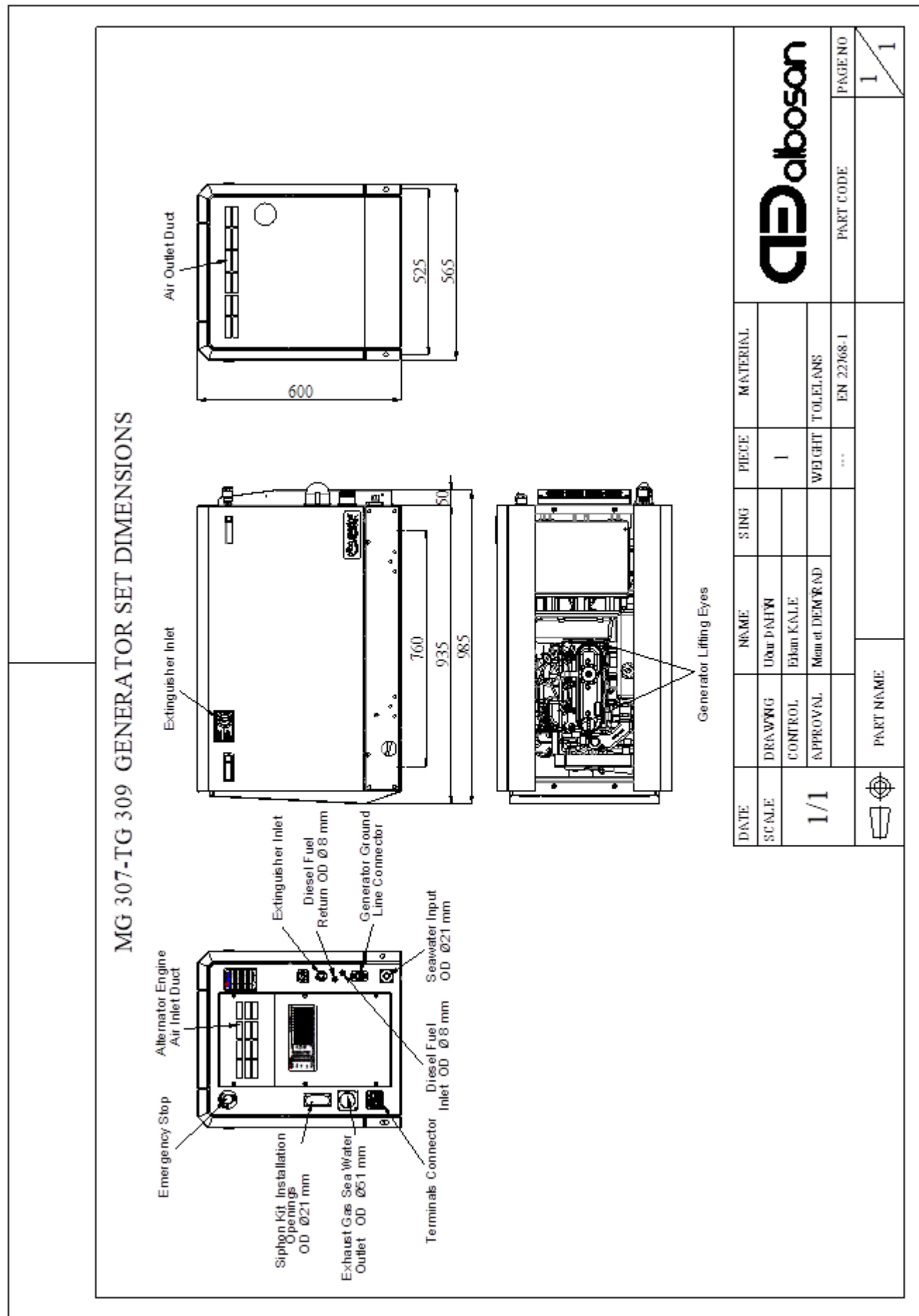
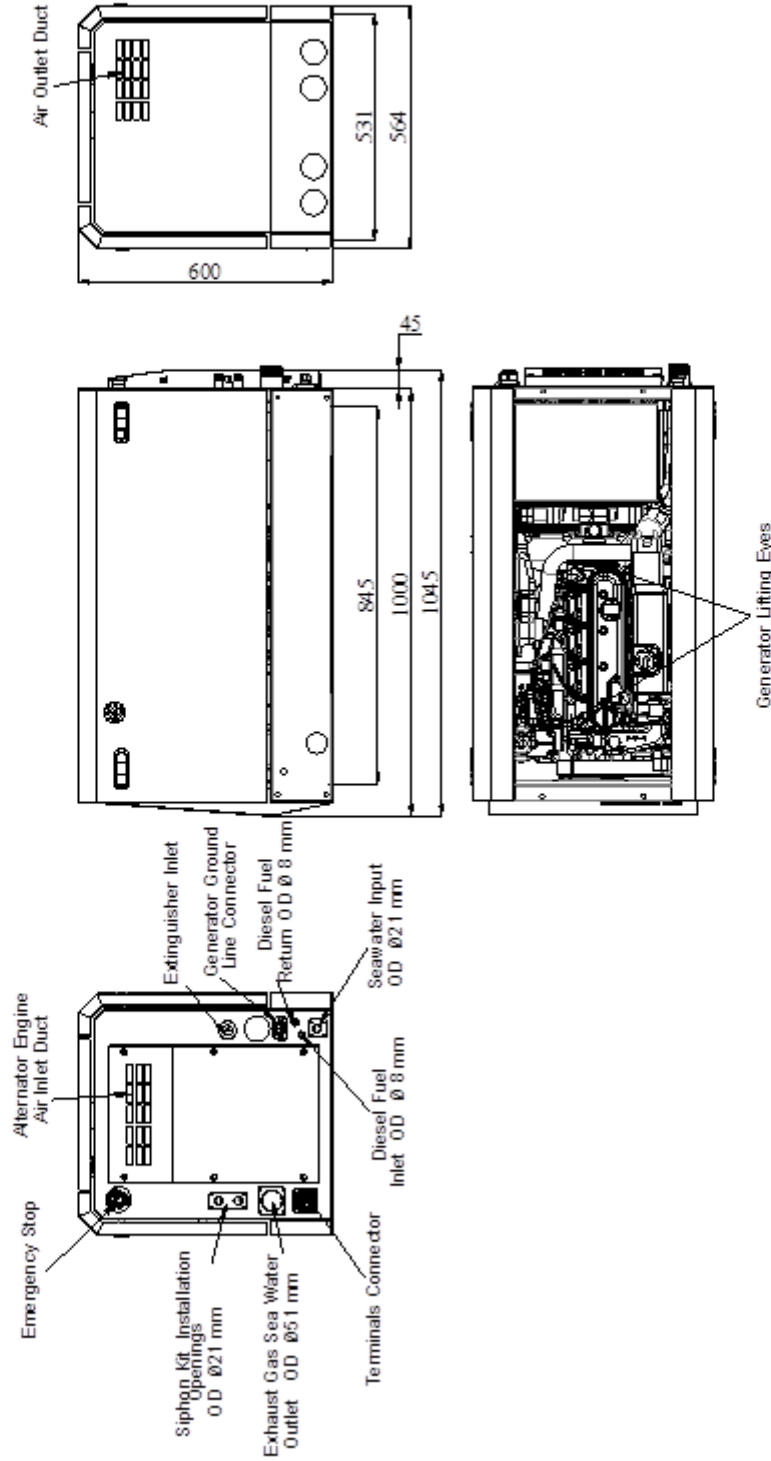


FIGURE 60. GENERATOR SET DIMENSIONS - MN 305

MG 311-TG 313 GENERATOR SET DIMENSIONS



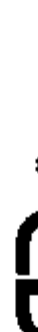
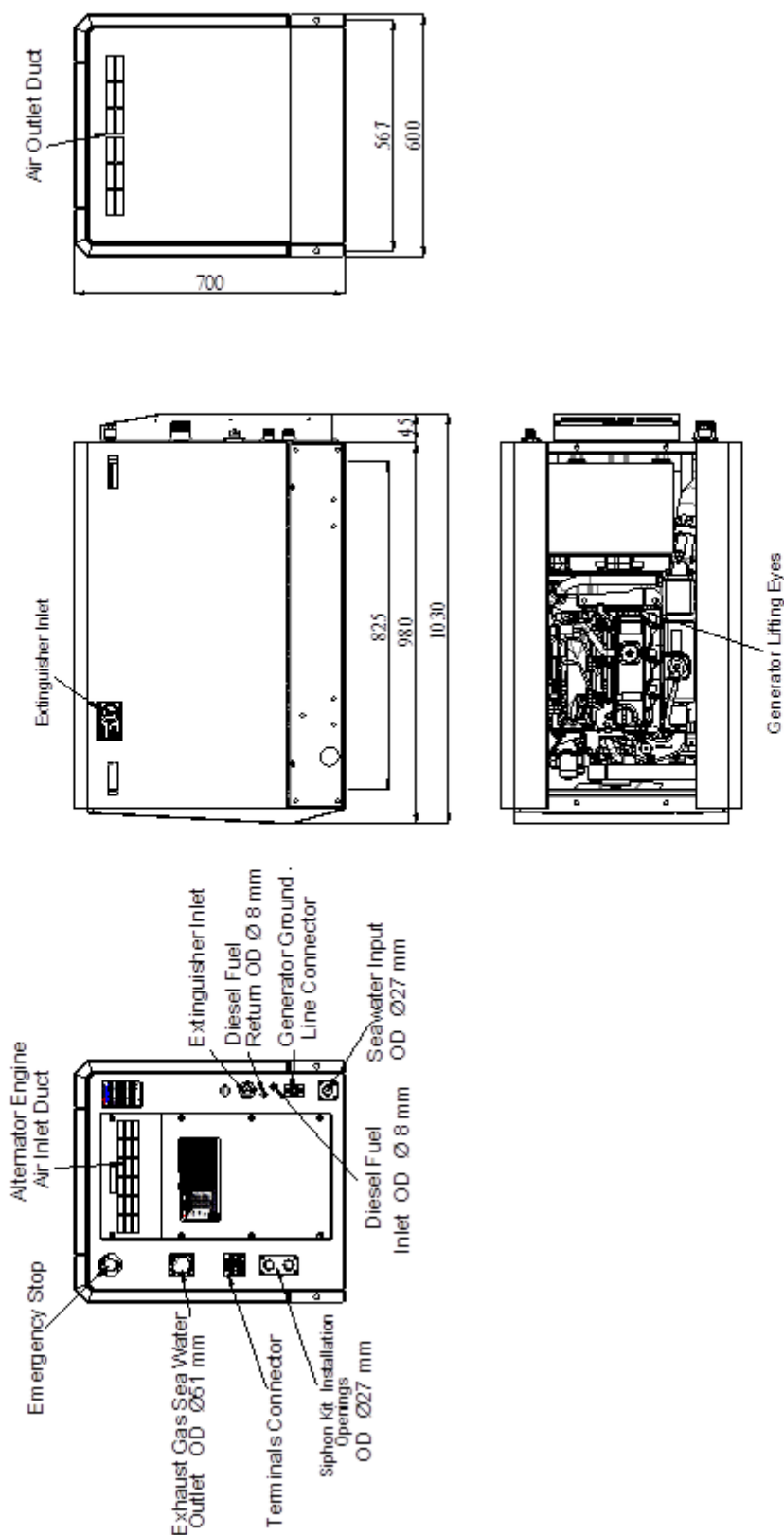
DATE		NAME	SING	PIECE	MATERIAL		PART CODE	PAGE NO	
SCALE	DRAWING	Uğur SAHİN					PART NAME	EN 2268-1	1 / 1
	CONTROL	Elhan KALE							
	APPROVAL	Memet DEMİRAG			WEIGHT				
1/1				...					
									

FIGURE 61 GENERATOR SET DIMENSIONS - MG 311, TG 313

MG 312-TG 314 GENERATOR SET DIMENSIONS



DATE	DRAWING	NAME	SING	PIECE	MATERIAL	dbosan	
SCALE	CONTROL	Ugur SAHIN					
1/1	APPROVAL	Ekan KALE			WEIGHT	TOLELANS	PAGE NO
		Mem et DEMIRAG		...	EN 22768-1	PART CODE	1 1

FIGURE 62. GENERATOR SET DIMENSIONS - MG 312, TG 314

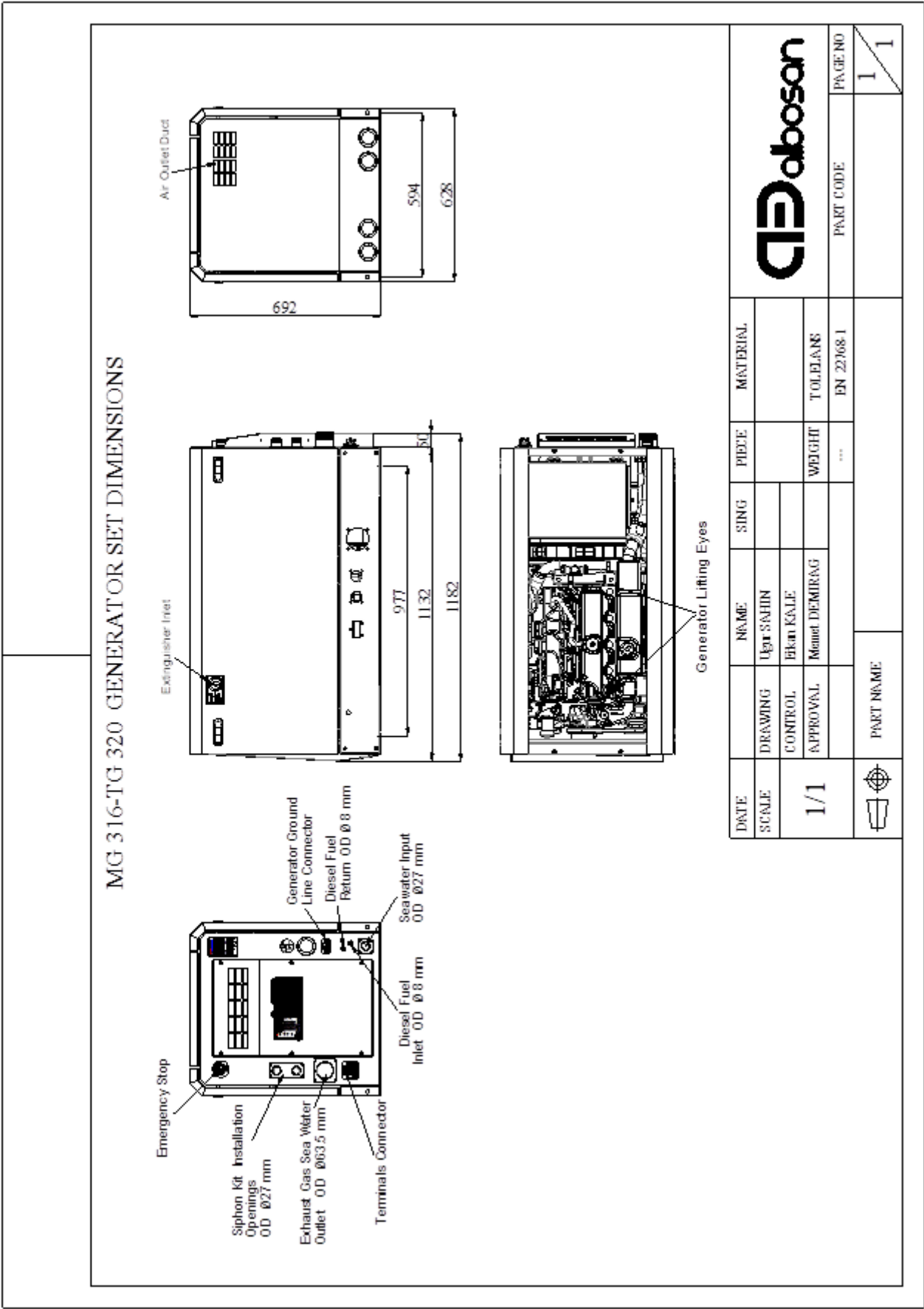


FIGURE 63 GENERATOR SET DIMENSIONS - MG 316, TG 320

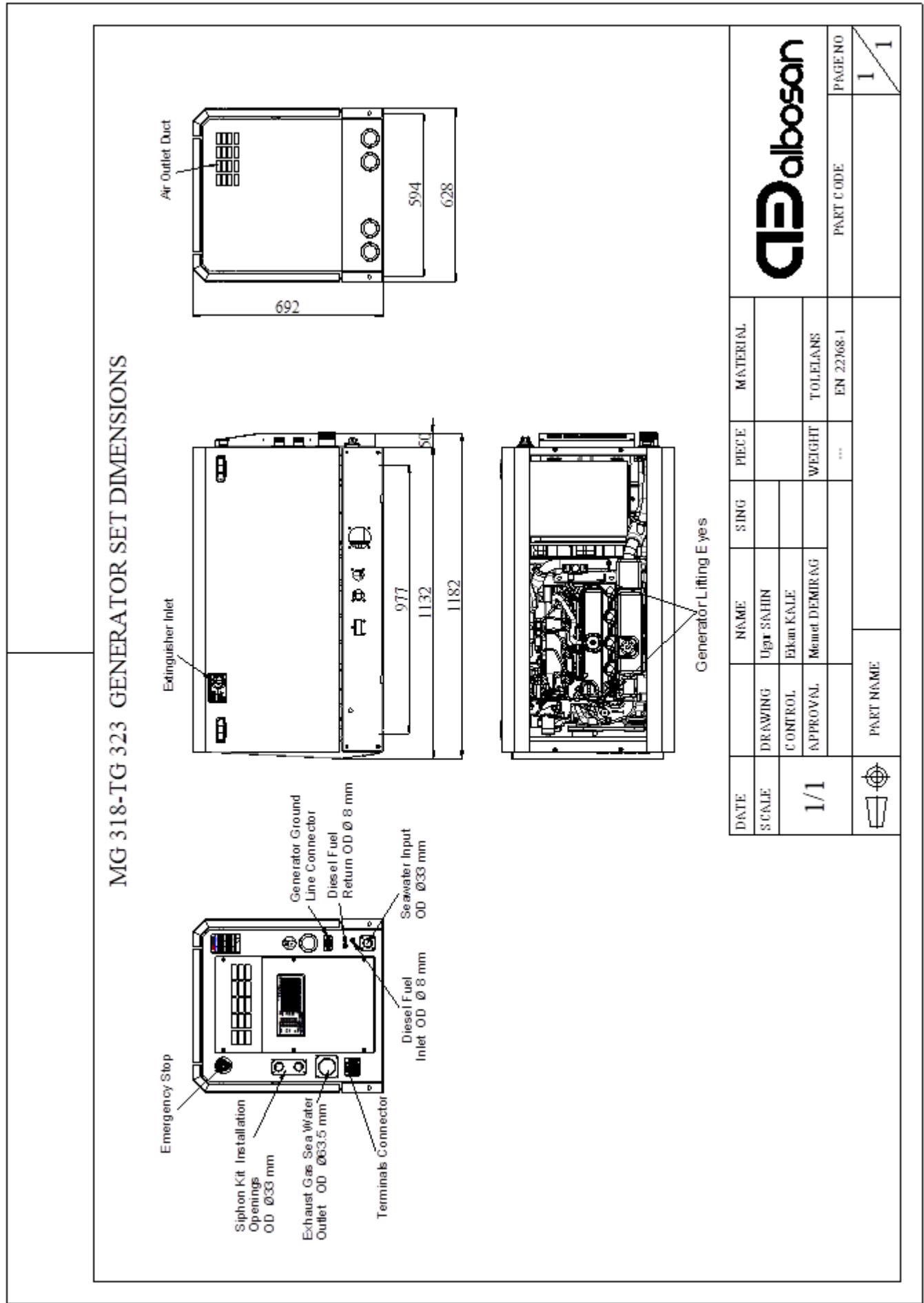
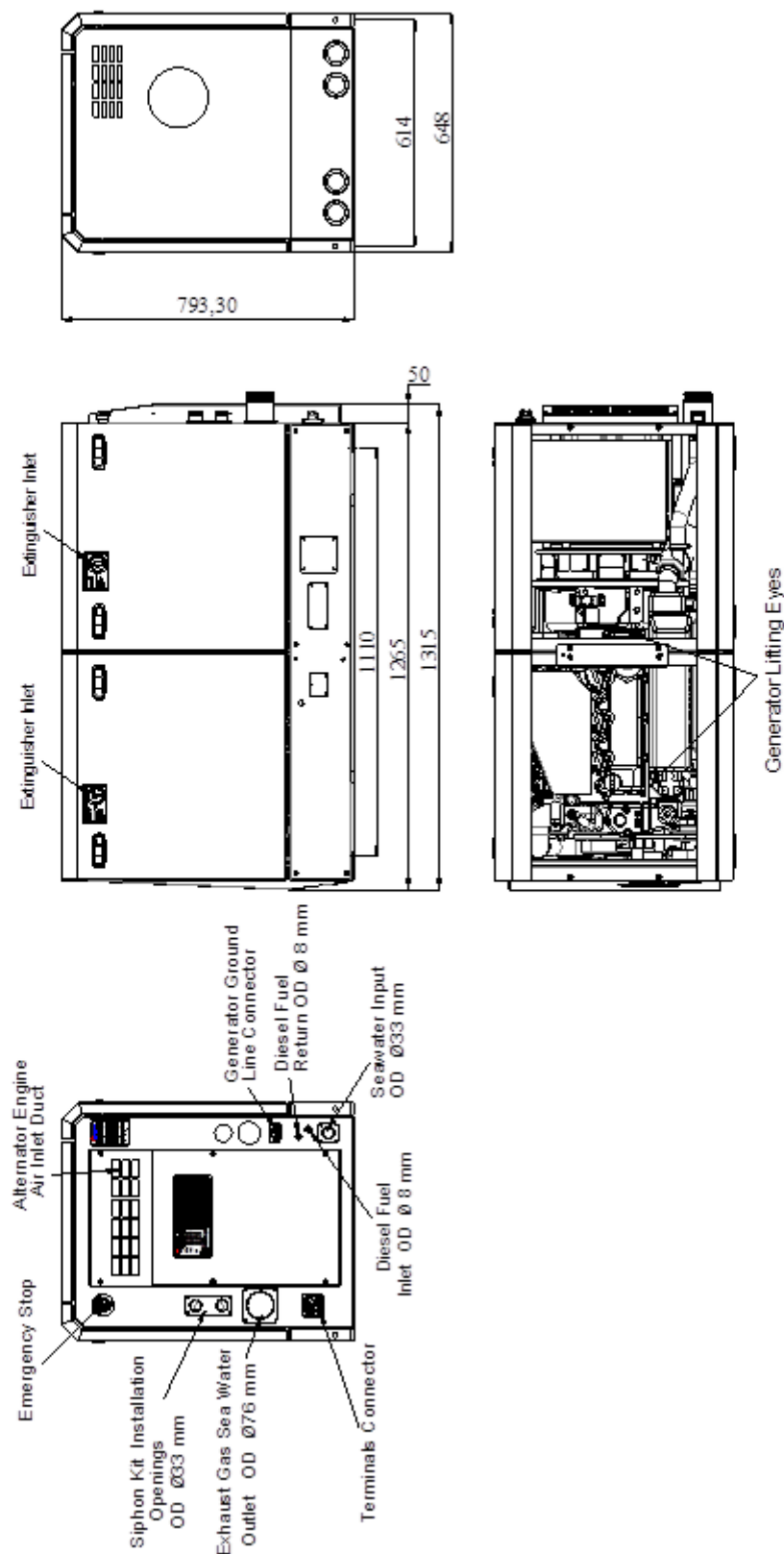


FIGURE 64. GENERATOR SET DIMENSIONS - MG 318, TG 323

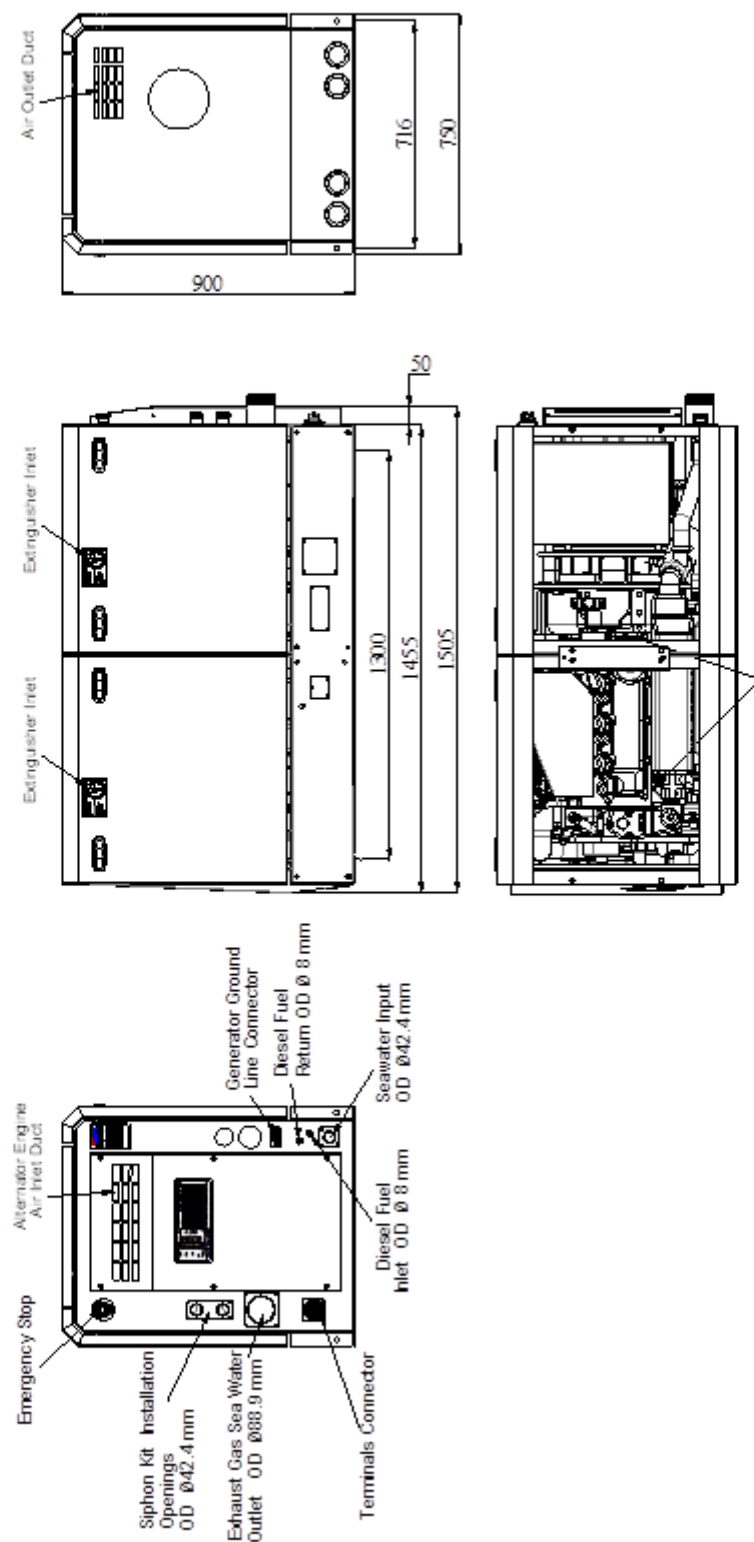
MG 324-TG 330 GENERATOR SET DIMENSIONS



DATE	DRAWING	NAME	SING	PIECE	MATERIAL	abosan	
SCALE	CONTROL	Uğur SAHİN					
1/1	APPROVAL	ERKAN KALE			TOLEANS		
		Memet DEMİRAG		WEIGHT	EN 22768-1	PART CODE	PAGENO
				...			1 / 1

FIGURE 65 GENERATOR SET DIMENSIONS - MG 324, TG 330

TG 343 GENERATOR SET DIMENSIONS



DATE	DRAWING	NAME	SING	PIECE	MATERIAL
SCALE	CONTROL	Uğur SAHİN			
1/1	APPROVAL	Ehram KALE			T OLELANS
		Mont et DEMIRAG			WEIGHT
				...	BN 22168-1
					PART CODE
					PAGE NO
					1 / 1

FIGURE 66. GENERATOR SET DIMENSIONS - TG 343