

INSTALLATION/OPERATION INSTRUCTIONS

Original Issue Date: 3/12

Model: 6EKOD, 9-11EKOZD, 5EFKOD, and 7-9EFKOZD

Market: Marine

Subject: Keel Cooled with Dry Exhaust Kits

Introduction

Install this kit to convert unit from heat-exchanger cooled to a keel-cooled type.

Read the entire procedure including safety precautions before beginning installation. Perform the steps in the order shown. See Figure 1 for kit selection.

Model	Kit Number
6EKOD	GM78587-KP1
5EFKOD	
9EKOZD	
7EFKOZD	
11EKOZD (1 and 3 PH)	GM78587-KP2
9EFKOZD (1 and 3 PH)	

Figure 1 Kit Selection

NOTICE

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

Safety Precautions

Observe the following safety precautions while installing the keel cooling kit.

WARNING



Accidental starting.
Can cause severe injury or death.

Disconnect the battery cables before working on the generator set. Remove the negative (-) lead first when disconnecting the battery. Reconnect the negative (-) lead last when reconnecting the battery.

Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or connected equipment, disable the generator set as follows: (1) Move the generator set master switch to the OFF position. (2) Disconnect the power to the battery charger. (3) Remove the battery cables, negative (-) lead first. Reconnect the negative (-) lead last when reconnecting the battery. Follow these precautions to prevent starting of the generator set by an automatic transfer switch, remote start/stop switch, or engine start command from a remote computer.

WARNING

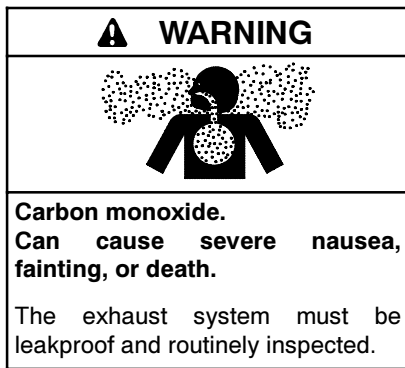


Hot coolant and steam.
Can cause severe injury or death.

Before removing the pressure cap, stop the generator set and allow it to cool. Then loosen the pressure cap to relieve pressure.

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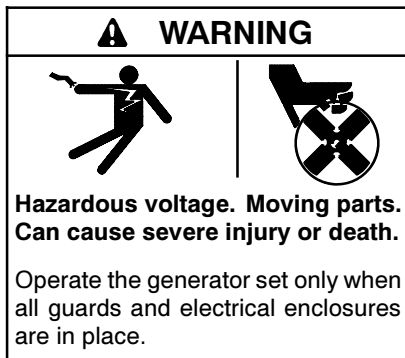
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Carbon monoxide symptoms. Carbon monoxide can cause severe nausea, fainting, or death. Carbon monoxide is a poisonous gas present in exhaust gases. Carbon monoxide is an odorless, colorless, tasteless, nonirritating gas that can cause death if inhaled for even a short time. Carbon monoxide poisoning symptoms include but are not limited to the following:

- Light-headedness, dizziness
- Physical fatigue, weakness in joints and muscles
- Sleepiness, mental fatigue, inability to concentrate or speak clearly, blurred vision
- Stomachache, vomiting, nausea

If experiencing any of these symptoms and carbon monoxide poisoning is possible, seek fresh air immediately and remain active. Do not sit, lie down, or fall asleep. Alert others to the possibility of carbon monoxide poisoning. Seek medical attention if the condition of affected persons does not improve within minutes of breathing fresh air.



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.

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

Dry-Exhaust Conversion

1. Disconnect Generator from Service

- 1.1 Place the generator set master switch in the OFF position.
- 1.2 Disconnect the generator set engine starting battery, negative (-) lead first.

2. Install Dry-Exhaust Keel Cooling

Note: Allow the engine to cool. Release pressure from the cooling system before removing the pressure cap. To release pressure, cover the pressure cap with a thick cloth and then slowly turn the cap counterclockwise to the first stop. Remove the cap after pressure has been completely released and the engine has cooled. Check the coolant level at the tank if the generator set has a coolant recovery tank.

- 2.1 Drain the engine coolant. Consult the generator operation manual for procedure.
- 2.2 Remove the molded seawater hose, 90° hose connector, and hose clamp from the exhaust mixer. See Figure 2, item 3.
- 2.3 Disconnect lead #37 at the high exhaust temperature switch.
- 2.4 Remove the exhaust mixer (with the high exhaust temperature switch). Save the mounting hardware.

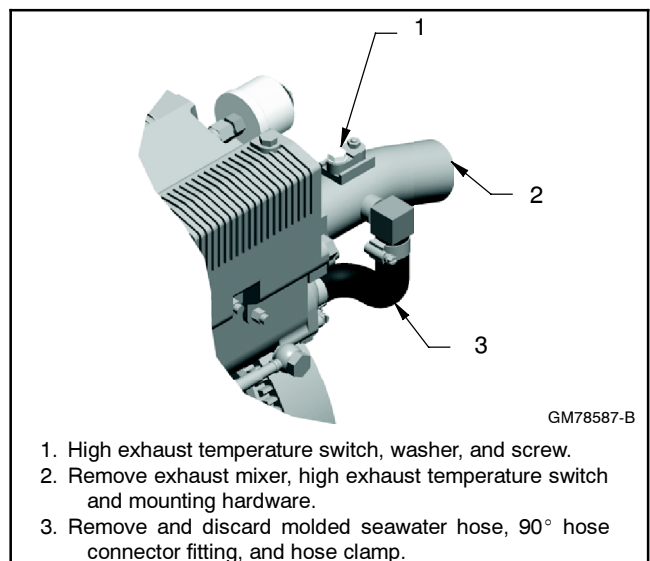


Figure 2 Exhaust Mixer Removal

- 2.5 Tape lead #37 (that was connected to the exhaust temperature switch) to insulate.

- 2.6 Remove the coolant hose and clamps (qty. 2). See Figure 3, item 1.
- 2.7 Remove the molded seawater hose, seawater tube, pressure switch, and hose clamps (qty. 3). See Figure 3, item 4.
- 2.8 Remove the belt guard pulley bracket and save the hardware. See Figure 3, item 2.
- 2.9 Remove the seawater pump, washers (qty. 2), nut, screws (qty. 2), and 90° hose connector fitting. See Figure 3, item 3.
- 2.10 Remove the V-belt. See Figure 3, item 5.

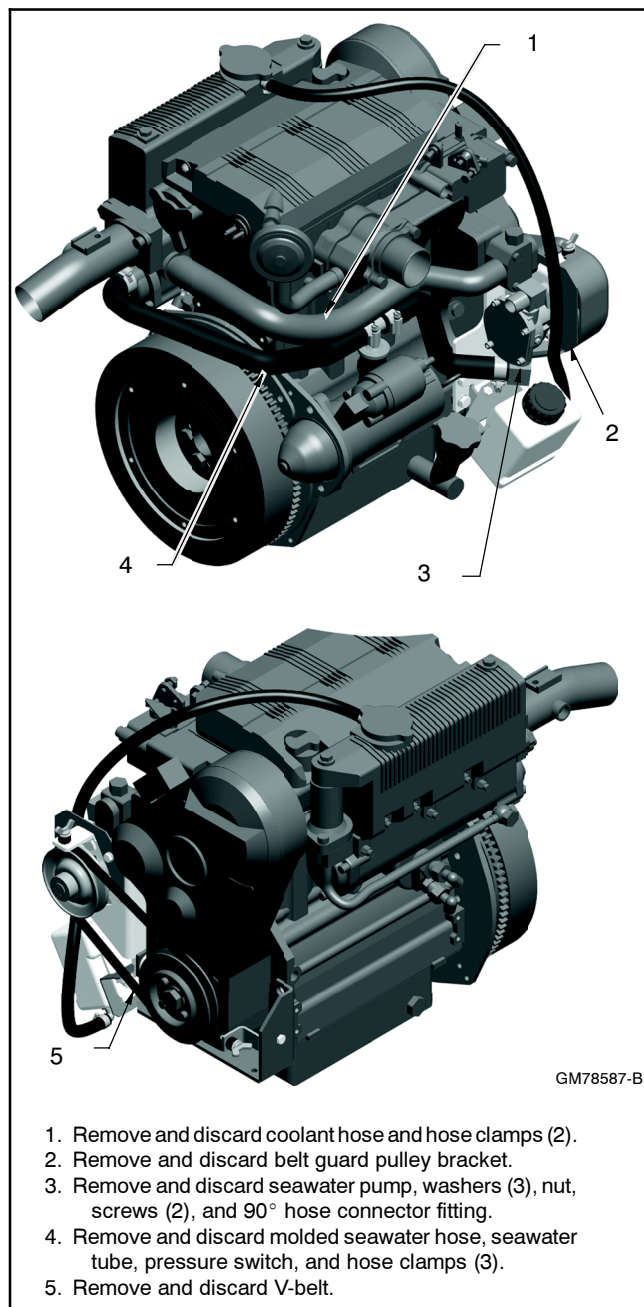


Figure 3 Assembly Drawing

- 2.11 Install the new exhaust flange (GM78586) and gasket (GM84806) reusing the existing hardware torqued to 23 Nm (17 ft. lbs.). See Figure 4, item 1. The customer must supply flexible stainless exhaust piping and fiberglass tape to insulate exhaust heat from the generator set.

Note: Exhaust temperatures can reach 538°C (1000°F) depending on load. Wrap the exhaust pipe to maintain a maximum of 93°C (200°F) surface temperature on the outer wrap.

- 2.12 Ensure the wiring harness is at a minimum of 76 mm (3 in.) away from the wrapped exhaust.
- 2.13 Install the two rubber caps (GM79490) using existing hose clamps. See Figure 4, item 2.
- 2.14 Install the pulley guard (GM82971) using existing hardware. See Figure 4, item 3.

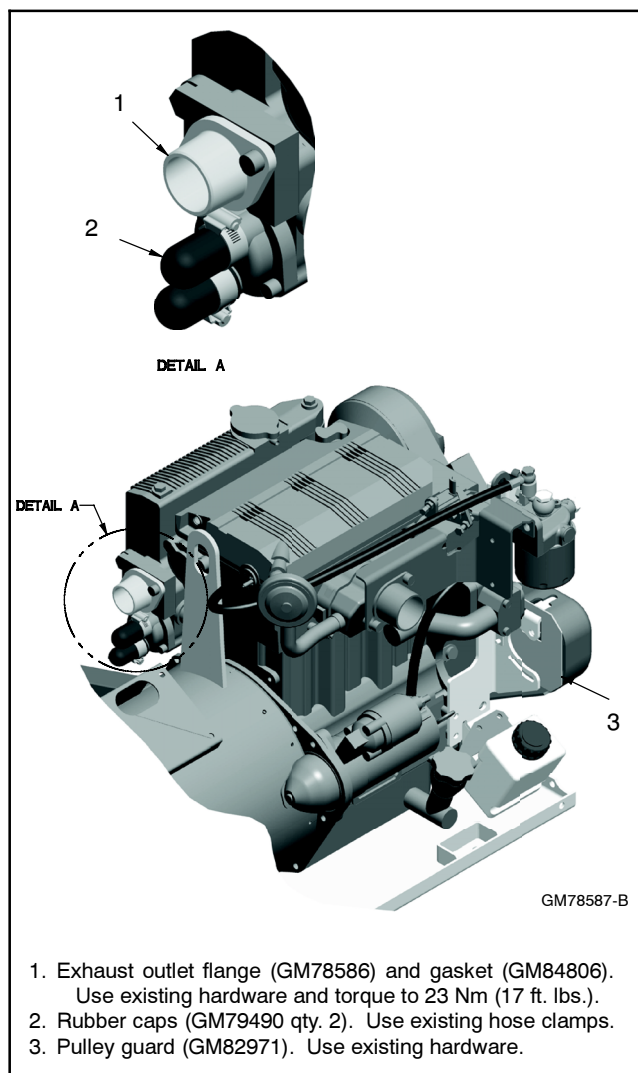


Figure 4 Assembly Drawing

- 2.15 Remove the end caps on both sides of the exhaust manifold for the heat exchanger bundle removal.

Note: Temporarily remove the thermostat housing in order to remove the end cap.

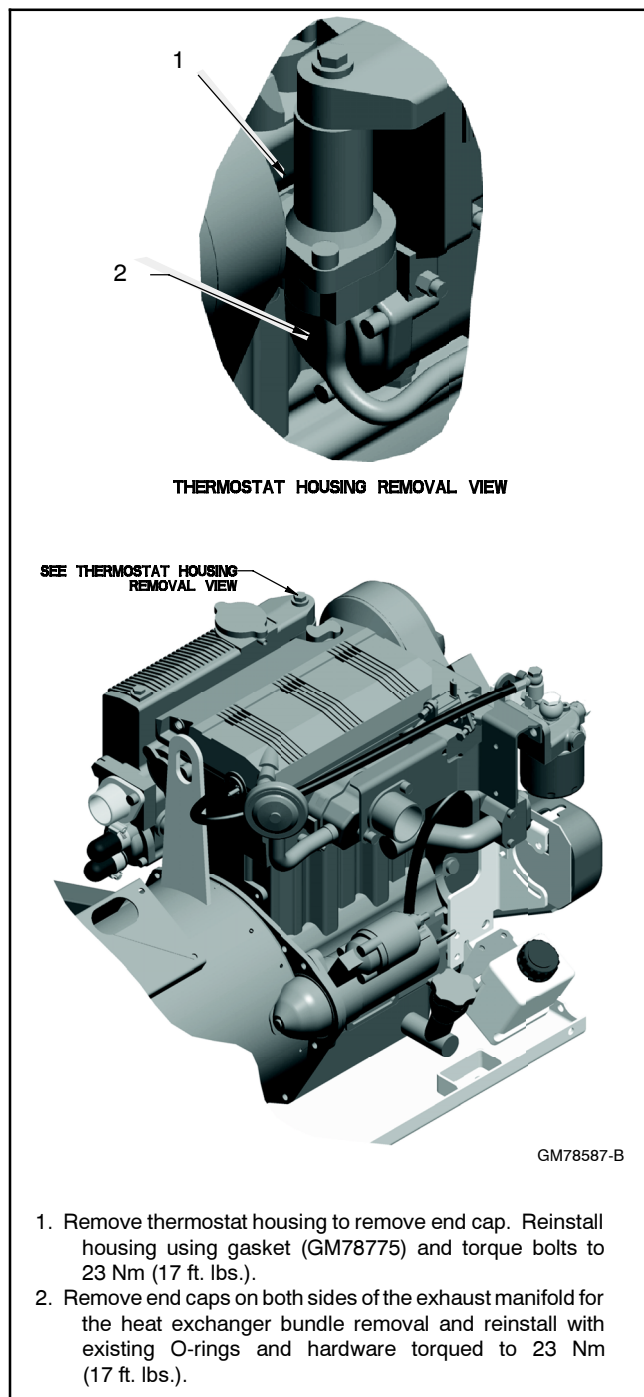


Figure 5 Exhaust Manifold End Cap Removal

- 2.16 Remove the heat exchanger bundle from inside the exhaust manifold. Discard the heat exchanger.

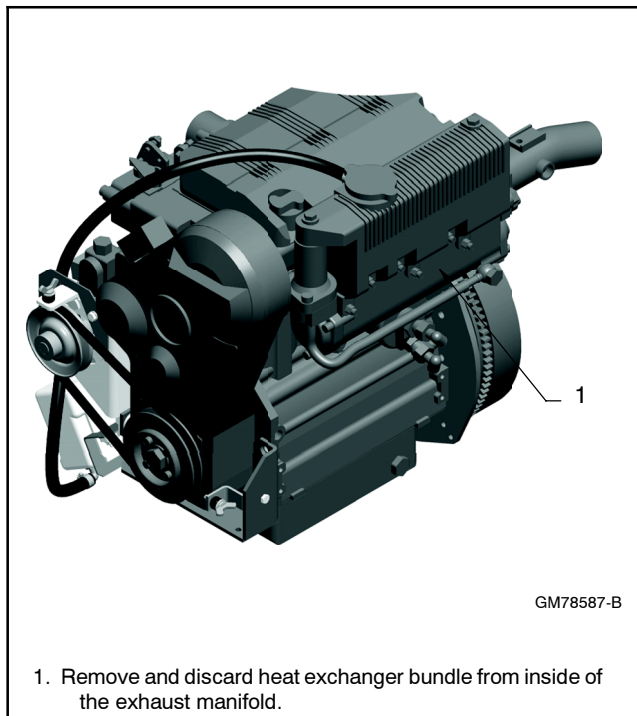


Figure 6 Heat Exchanger Bundle Removal

- 2.17 Replace the end caps on both sides of the exhaust manifold using the existing O-ring and hardware. Torque to 23 Nm (17 ft. lbs.).
- 2.18 Reinstall the thermostat housing using a new gasket (GM78775) and torque bolts to 23 Nm (17 ft. lbs.).
- 2.19 See Figure 10 for the vessel's keel cooler inlet/outlet locations and dimensions.

2.20 See Figure 7 and Figure 8 for engine heat rejections and engine block water flows for sizing keel coolers.

	5EFKOD	7EFKOZD	9EFKOZD
Heat rejected to cooling water at rated kW, wet exhaust, kW (Btu/min.)	9.5 (540)	11.1 (635)	18.7 (1067)
Engine water pump flow, Lpm (gpm)	21.2 (5.6)	21.2 (5.6)	21.2 (5.6)
Seawater pump flow, Lpm (gpm)	24.6 (6.5)	24.6 (6.5)	24.6 (6.5)
Engine coolant capacity, L (qt.), approx.	3 (3.2)	3 (3.2)	4.3 (4.5)

Figure 7 Cooling System Specifications, 50 Hz Models

	6EKOD	9EKOZD	11EKOZD
Heat rejected to cooling water at rated kW, wet exhaust, kW (Btu/min.)	10.9 (622)	12 (683)	19.6 (1119)
Engine water pump flow, Lpm (gpm)	21.6 (5.7)	21.6 (5.7)	21.6 (5.7)
Seawater pump flow, Lpm (gpm)	28.4 (7.5)	28.4 (7.5)	28.4 (7.5)
Engine coolant capacity, L (qt.), approx.	3 (3.2)	3 (3.2)	4.3 (4.5)

Figure 8 Cooling System Specifications, 60 Hz Models

2.21 Install the customer supplied keel cooler as shown in Figure 9.

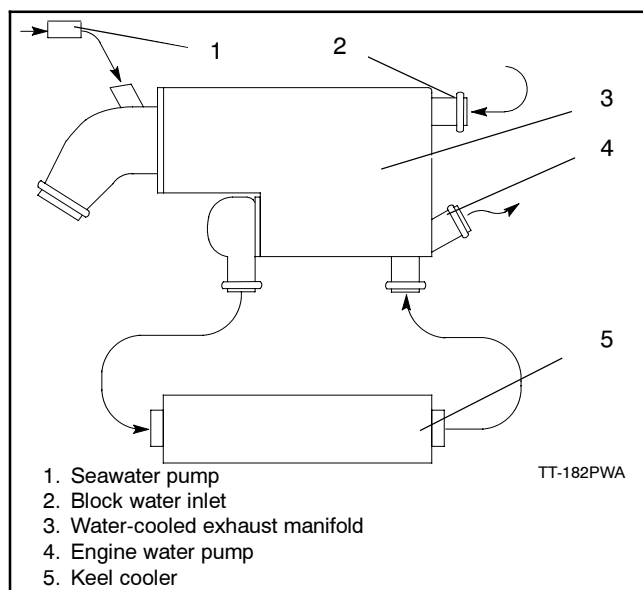


Figure 9 Keel Cooling Installation

2.22 Fill the engine with coolant. Consult the generator operation manual for procedure.

Note: Keel cooler is sized sufficiently if (in the highest engine operating ambient condition with generator set fully loaded) the lube oil temperature does not exceed 110°C (230°F) and the engine outlet temperature of the cooling water does not exceed 87°C (188.6°F).

3. Restore Generator Set Operation

3.1 Check that the generator set master switch is in the OFF position.

3.2 Reconnect the generator set engine starting battery, negative (-) lead last.

Parts List

Keel Cooling Kits		
Qty.	Description	Part Number
1	Flange, exhaust outlet	GM78586
1	Gasket, thermostat housing	GM78775
2	Cap, rubber	GM79490
1	Guard, pulley	GM82971
1	Gasket	GM84806

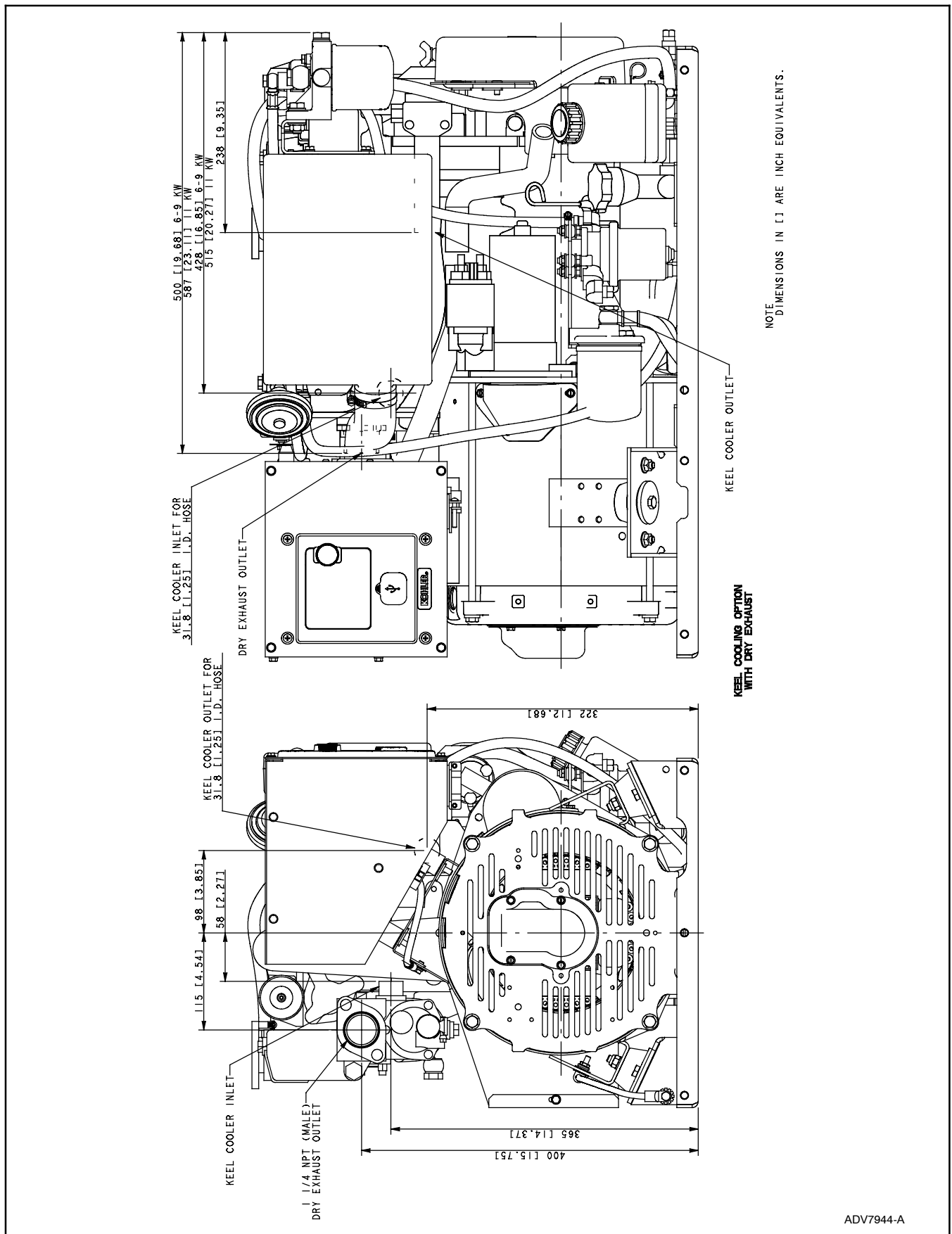


Figure 10 Dimension Print

Notes

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