INSTALLATION INSTRUCTIONS

Original Issue Date: **12/15**
Model: **500REZK, 750REZK, 1000REZK**
Market: **Industrial**
Subject: **Remote Radiator Kits GM94906-KP1, GM99318-KP1, GM99319-KP1,**

Introduction

The remote radiators covered in these instructions are supplied with a Secondary Expansion Deaeration and Drawdown (SEDD) tank. See Figure 1 for generator set model and radiator application data. See Figure 2 and Figure 3 for tank connection details.

An electric motor-driven fan mounted on the radiator circulates air across the radiator's cooling fins. A motor starter is required to control the fan motor. The use of a motor starter control panel reduces wear on the fan motor and V–belt and also reduces maximum load during fan motor startup. See Figure 1.

Remote Radiator Kit	Generator Set Model	Motor Starter Kit	Voltage
GM99318-KP1	500REZK	GM99164-KP1	230/460
GM99319-KP1	750REZK	GM99295-KP1	230/460
GM94906-KP1	1000REZK	GM98861-KP1	230/460

Figure 1 Remote Radiator Kits

Note: When installing a motor starter control panel, connect the motor starter control panel leads to the designated connections in the generator set control panel. Follow the NEC and local codes when wiring the remote radiator. Refer to the radiator specification sheet, generator set installation instructions, and wiring diagrams.

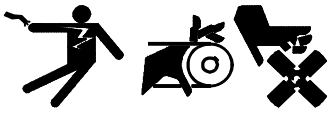
There is no need for thermostatic control of the fan motor because the engine thermostat prevents overcooling as it does on generator set-mounted radiator systems.

Cooling systems are limited by 96 kPa (14 psi) radiator cap ratings. Maximum radiator operating pressure is 241 kPa (35 psi) and maximum operating temperature is 90°C (194°F).

Safety Precautions

Observe the following safety precautions while installing the 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 equipment connected to the set, disable the generator set as follows: (1) If the controller is not already in the MAN (manual) mode, press the Controller Mode button and then press the MAN mode button. (2) If the generator set is running, press and hold the Manual-Stop button for at least 2 seconds to stop the generator set. (3) Press the Controller Mode button and then press the controller Off mode button. (4) Disconnect the power to the battery charger, if equipped. (5) Remove the battery cables, negative (–) lead first. Reconnect the negative (–) lead last when reconnecting the battery. Follow these precautions to prevent the starting of the generator set by the remote start/stop switch.

⚠ WARNING

Hazardous voltage. Moving parts.
Can cause severe injury or death.

Operate the generator set only when all guards and electrical enclosures are in place.

⚠ DANGER

Hazardous voltage.
Will cause severe injury or death.

This equipment must be installed and serviced by qualified electrical personnel.

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.

⚠ WARNING

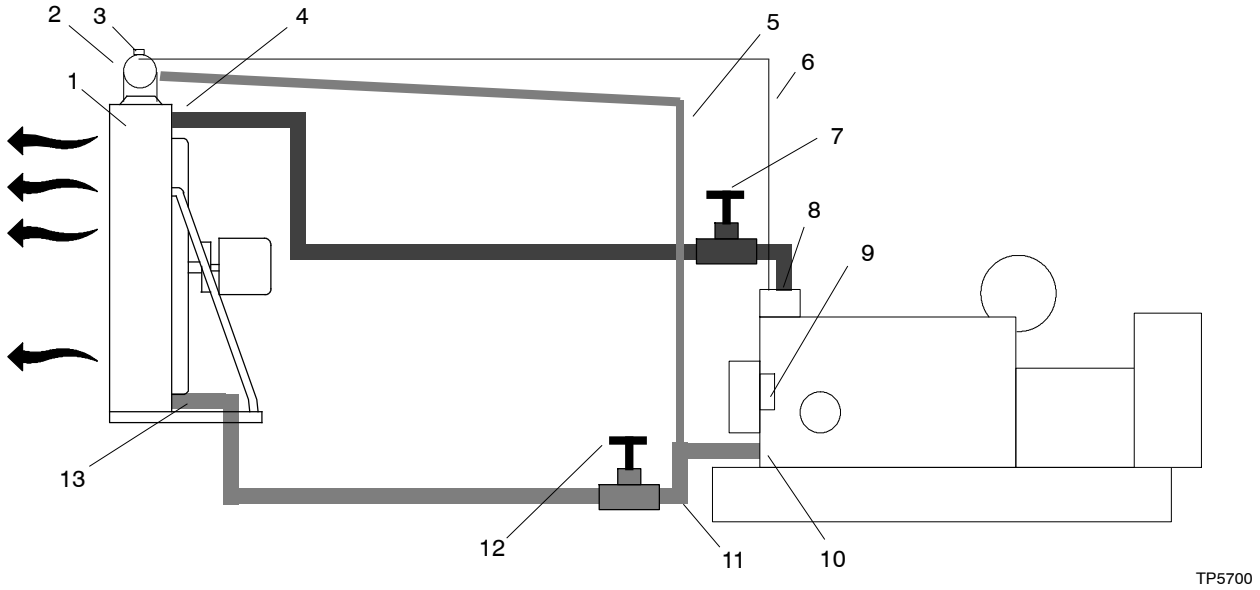
Unbalanced weight.
Improper lifting can cause severe injury or death and equipment damage.

Use adequate lifting capacity.
Always maintain a safe distance from the equipment being lifted. Never stand under the equipment.

⚠ WARNING

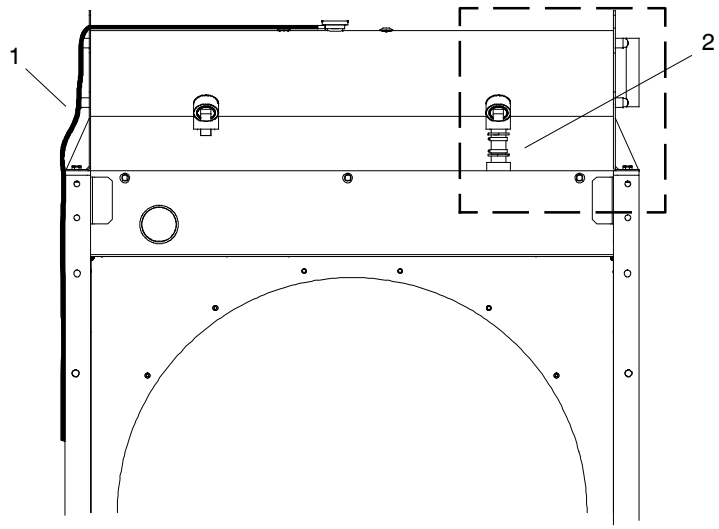
Hot coolant and steam.
Can cause severe injury or death.

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

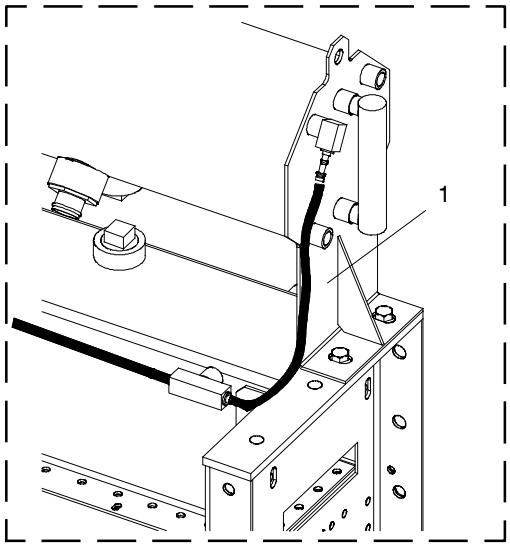


1. Remote radiator (horizontal discharge)
2. Secondary expansion deaeration and drawdown (SEDD) tank
3. Pressure cap
4. Radiator inlet
5. Fill line
6. Vent line
7. Shutoff Valve
8. Engine outlet
9. Engine water pump
10. Suction side
11. Fill/drain (lowest point of engine)
12. Shutoff valve
13. Radiator outlet

Figure 2 Remote Vertical Radiator (Horizontal Discharge) System (Typical)

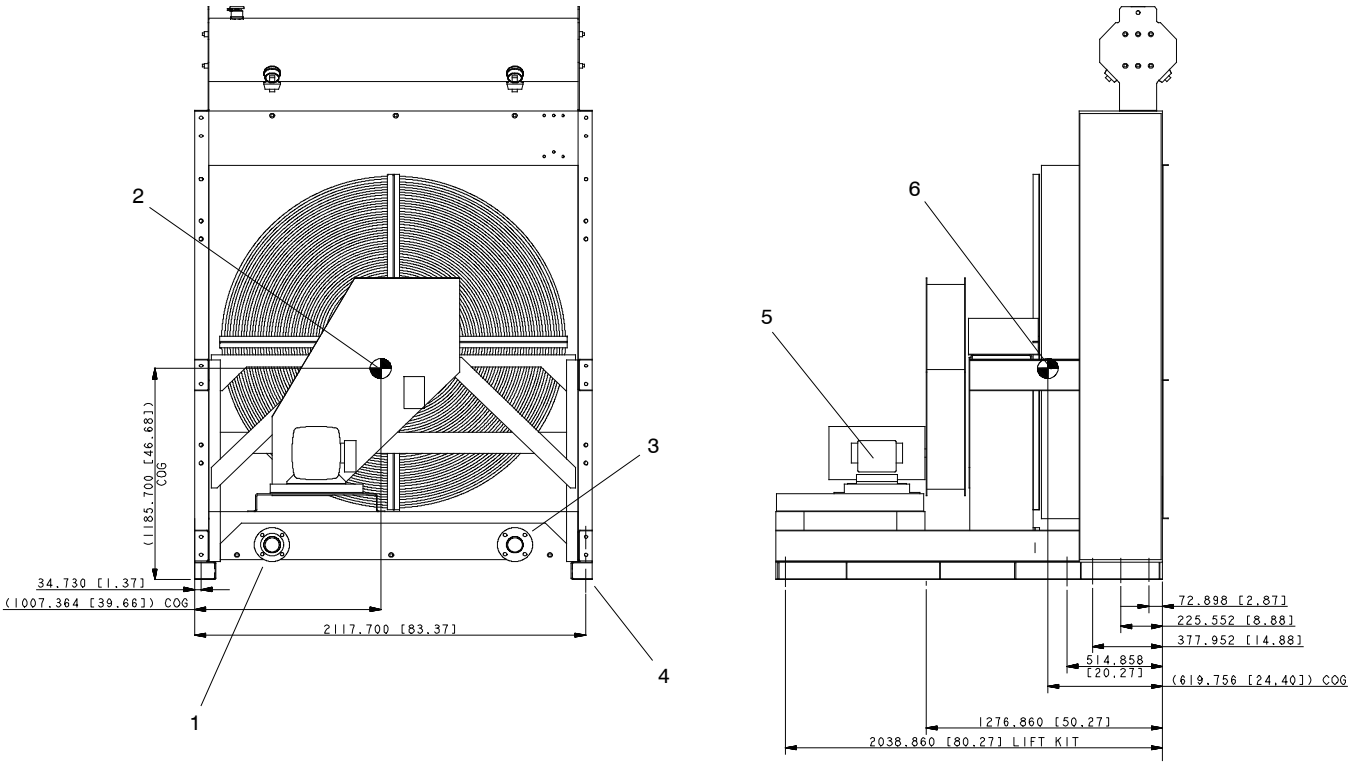


1. Vent line
2. Tank connection



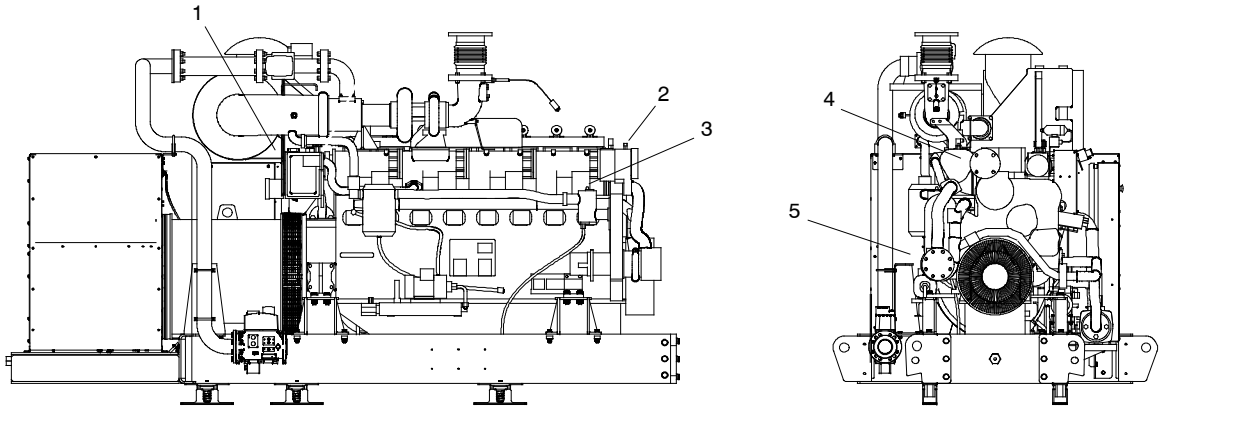
Vent Connection Detail

Figure 3 Tank Connections



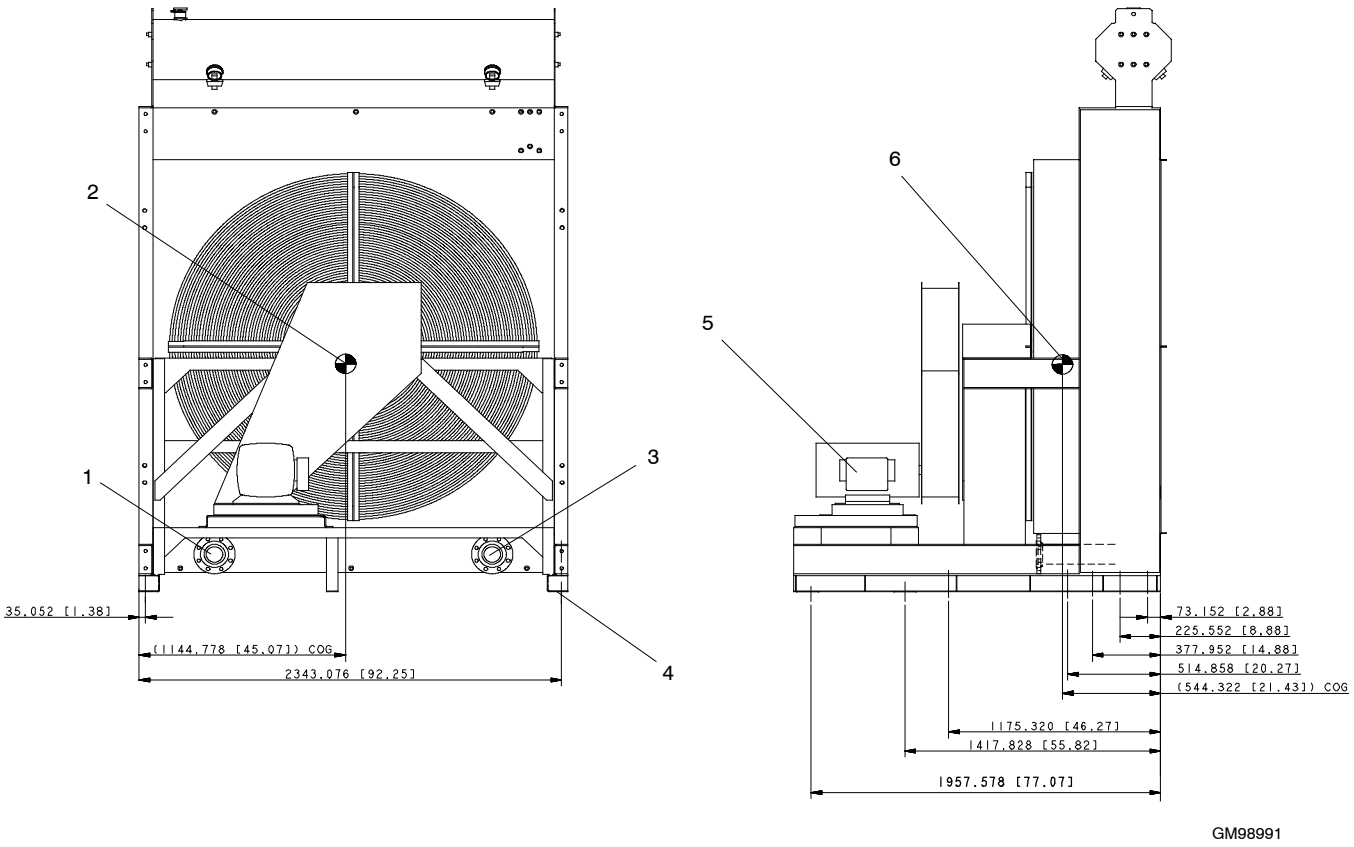
1. Inlet flange; 3 in. ANSI
2. Center of gravity
3. Outlet flange; 3 in ANSI
4. 12 mounting hole locations, diameter = 19 mm (.75 in.)
5. Motor; 30 HP, 3-phase, 230/460 V, 60 Hz
6. Center of gravity

Note: Dimensions are shown in millimeters and inches. Inches are in brackets.



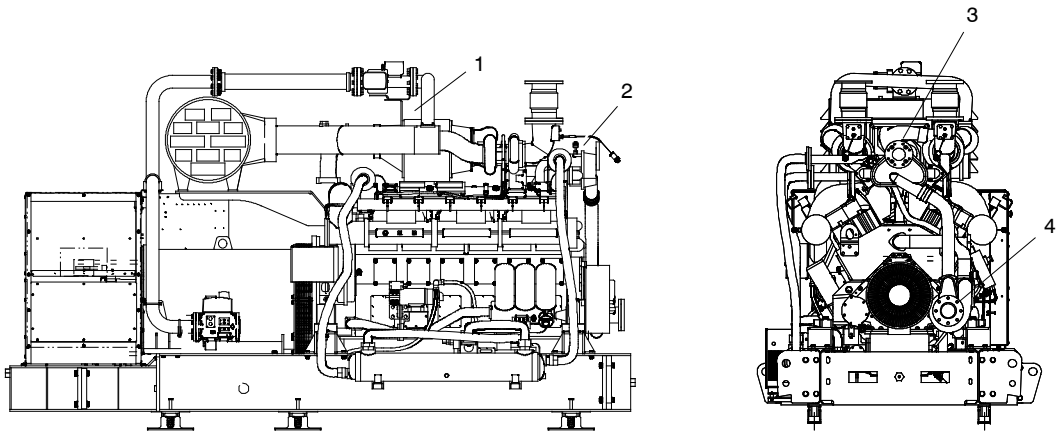
1. Main circuit vent plug
2. Thermostat housing vent plug
3. Water manifold vent plug
4. Water outlet: DN65
5. Water inlet: DN80

Figure 4 500REZK Remote Radiator Setup



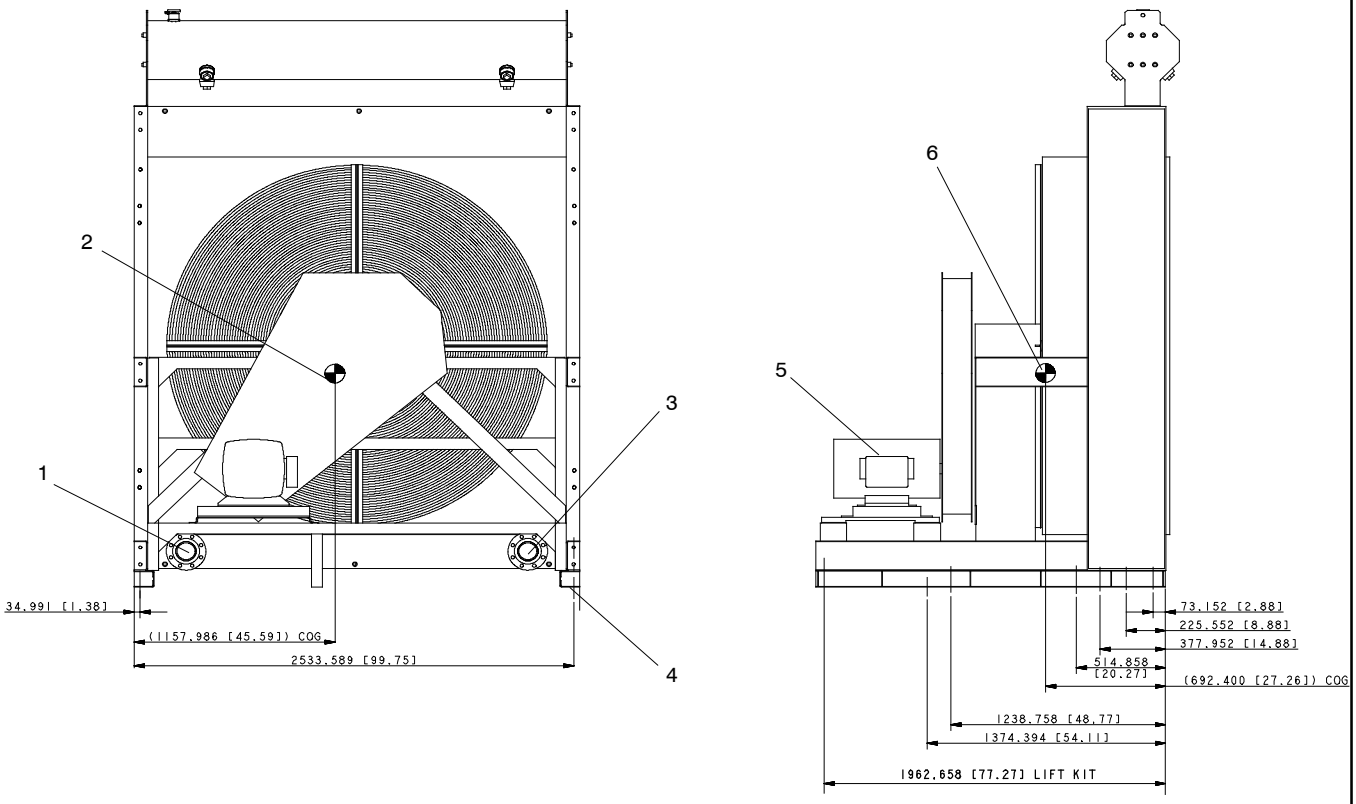
1. Inlet flange; 4 in. ANSI
2. Center of gravity
3. Outlet flange; 4 in. ANSI
4. 14 mounting hole locations, diameter = 19 mm (.75 in.)
5. Motor; 50 HP, 3-phase, 230/460 V, 60 Hz
6. Center of gravity

Note: Dimensions are shown in millimeters and inches. Inches are in brackets.



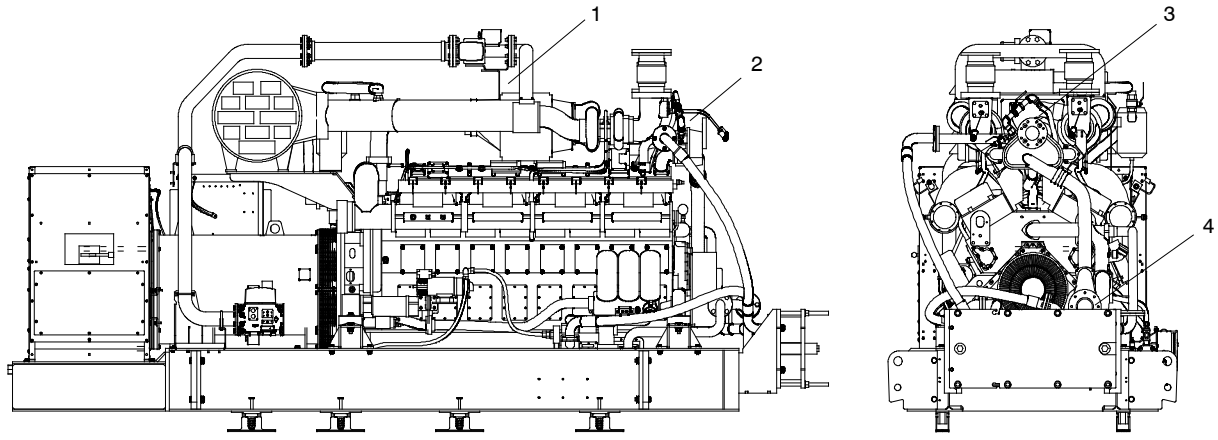
1. Main circuit vent plug
2. Thermostat housing vent plug
3. Water outlet: DN80
4. Water inlet: DN100

Figure 5 750REZK Remote Radiator Setup



1. Inlet flange; 4 in. ANSI
2. Center of gravity
3. Outlet flange; 4 in ANSI
4. 14 mounting hole locations, diameter = 19 mm (.75 in.)
5. Motor; 40 HP, 3-phase, 230/460 V, 60 Hz
6. Center of gravity

Note: Dimensions are shown in millimeters and inches. Inches are in brackets.

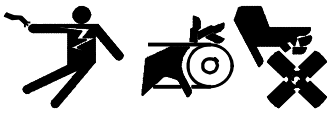


1. Main circuit vent plug
2. Thermostat housing vent plug
3. Water outlet: DN80
4. Water inlet: DN100

Figure 6 1000REZK Remote Radiator Setup

Installation

⚠ 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 equipment connected to the set, disable the generator set as follows: (1) If the controller is not already in the MAN (manual) mode, press the Controller Mode button and then press the MAN mode button. (2) If the generator set is running, press and hold the Manual-Stop button for at least 2 seconds to stop the generator set. (3) Press the Controller Mode button and then press the controller Off mode button. (4) Disconnect the power to the battery charger, if equipped. (5) Remove the battery cables, negative (-) lead first. Reconnect the negative (-) lead last when reconnecting the battery. Follow these precautions to prevent the starting of the generator set by the remote start/stop switch.

⚠ DANGER

Hazardous voltage.
Will cause severe injury or death.

This equipment must be installed and serviced by qualified electrical personnel.

⚠ WARNING

Unbalanced weight.
Improper lifting can cause severe injury or death and equipment damage.

Use adequate lifting capacity.
Always maintain a safe distance from the equipment being lifted. Never stand under the equipment.

⚠ WARNING

Unbalanced weight.
Improper lifting can cause severe injury or death and equipment damage.

Use adequate lifting capacity.
Always maintain a safe distance from the equipment being lifted. Never stand under the equipment.

Depending on the location, accessories, and usage, remote radiator installations can have specific installation requirements. Listed below are some basic recommendations that apply to most installations. Use them for installing a remote radiator system and to ensure correct operation and long life.

1. Install the radiator in a location which prevents prevailing winds from affecting the free air flow.

   Note: Using a forklift is the preferred method for lifting the remote radiators.

2. Level the radiator assembly on a firm, solid foundation.

3. Securely bolt the assembly to foundation. See Figure Figure 4 through Figure 6 for mounting hole locations.

4. Follow the wiring diagram on the fan motor according to site application (230 V or 460 V). Motor rotation must match fan blade design. The manufacturer typically supplies units with counterclockwise fan rotation as viewed from motor side. The fan is a blower type, blowing air from the fan side of the radiator, through the core and out the front side.

5. Connect the piping to the engine and radiator. See Figure 4 through Figure 6 for connection locations.

   Support piping externally, not from the radiator or engine. Use piping of ample size and with as few bends or elbows as possible. Use the radiator and generator set spec sheets as well as Figure 4 through Figure 6 to determine the correct pipe size for the coolant flow requirements. Use long sweep elbows or long bends, if required. Avoid using elbows, tees, and couplings.

   On standard remote radiators, connect the radiator bottom outlets only to the suction side of the pump. Plumb lines to prevent air from becoming trapped in the lines. Route piping in one general direction, either upward or downward. A combination of both upward and downward piping creates air pockets in the piping. Route vent lines to the expansion/surge tank without creating low spots in the lines.

   Flexible Connections. Provide flexible connections when connecting piping to the radiator assembly and generator set. Use hose clamps at all non-threaded connections.

   Shutoff Valve. Locate shutoff valves between the engine and cooling system to allow for isolation of both the radiator and the engine. A shutoff valve eliminates the need to drain the entire cooling system during service.

6. Install the vent lines from the radiator to the engine.

   a. Route the vent lines at a continuous upward slope from the engine connection exit to the expansion tank. Port all vent lines individually into the expansion tank above the coolant level.

   b. Locate the vent lines in the expansion tank to prevent splash on the coolant level sensor. Thoroughly vent the systems by installing vent lines to all the vent points on the engine and the charge air cooler circuits including the radiator core. Refer to the installation drawings for vent points.

   c. Size the vent line the same as the connection point on the engine. The vent lines may be slightly larger; however, vent lines sized too large will increase fill line flow.

7. Connect the fill line to the bottom of the expansion tank. Make the lines as short as possible, continuously descending, and connected directly before the engine water pump.

8. Connect the low coolant level switch to the designated connection on the dry contact board. See Figure 7.

9. Install the motor starter control panel following the manufacturer's instructions.

10. Connect the motor starter control panel leads to the designated Fan Control Enable relay on the dry contact board. See Figure 7.

Note: The dry contact board is located in the bottom compartment of the control panel. See Figure 7.

11. Follow the NEC and local codes when connecting the power supply to the remote radiator. Refer to the motor starter control panel manufacturer's instructions and the generator set wiring diagram.

12. Fill the radiator according to the following procedure:

    a. Remove the filler cap.

    b. Fill the cooling system from the bottom when possible. Otherwise, fill the radiator at the filler neck.

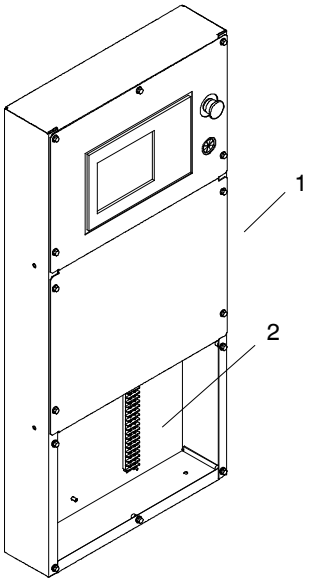
    c. Next, fill the radiator through one of the top tank or expansion/surge tank inlets located before the final hose connection.

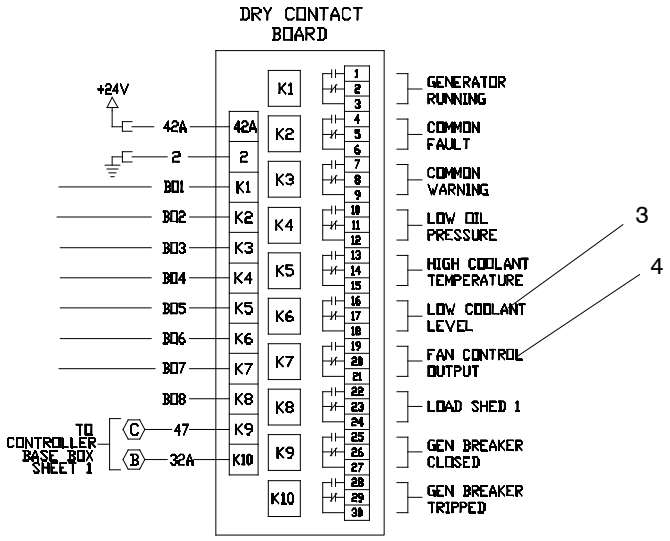
    d. Continue filling the system to cover the filler neck bottom until coolant appears in the sight glass located in the radiator top tank.

    e. Check and correct any leaks in the system.

13. Check the fan belt tension. See Figure 8.

14. Follow the start-up checklist for the initial startup.





1. Control Panel
2. Bottom compartment
3. Low coolant level relay
4. Fan control enable relay (motor starter connection)

ADV-8865

Figure 7 Dry Contact Board

Coolant/Antifreeze

⚠ 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.

Reliable engine operation depends upon coolant maintenance. Use a proper mixture of glycol (ethylene, propylene, or extended life organic acid), water, and supplemental coolant additive (SCA) based on the engine manufacturer's recommendations.

Use coolant containing corrosion and scale inhibitors as required by the engine manufacturer. Use coolant inhibitors compatible with the coolant. Keep the coolant mixture neutral or slightly akaline with a PH value of 8 or more at all times.

Install a strainer or sediment trap to eliminate foreign matter in coolant.

V-Belt Tension

⚠ 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 equipment connected to the set, disable the generator set as follows: (1) If the controller is not already in the MAN (manual) mode, press the Controller Mode button and then press the MAN mode button. (2) If the generator set is running, press and hold the Manual-Stop button for at least 2 seconds to stop the generator set. (3) Press the Controller Mode button and then press the controller Off mode button. (4) Disconnect the power to the battery charger, if equipped. (5) Remove the battery cables, negative (-) lead first. Reconnect the negative (-) lead last when reconnecting the battery. Follow these precautions to prevent the starting of the generator set by the remote start/stop switch.

⚠ WARNING

Hazardous voltage. Moving parts.
Can cause severe injury or death.

Operate the generator set only when all guards and electrical enclosures are in place.

Make periodic V-belt checks for tension and condition. Never use belt dressing to prevent belt slippage. The dressing material causes the fabrics and rubber components in the belts to physically deteriorate.

In general, check belt tension by using a belt tension gauge. See Figure 8 for the recommended belt tension and deflection. Most belt manufacturers recommend checking belt tension at least twice during the first day of operation. Then check belt tension periodically.

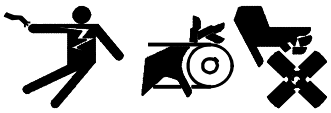
Model	Tension N (lbs)	Deflection mm (in)
GM99318-KP1 (500REZK)	40.4 (9.08)	11.68 (0.46)
GM99319-KP1 (750REZK)	39.7 (8.93)	13.76 (0.54)
GM94906-KP1 (1000REZK)	43.9 (9.87)	14.98 (0.59)

Note: Belt Tension shown is for used belt(s). Multiply the Newtons/pounds of Force shown by 1.5 for new belt installation.

Figure 8 Belt Tension and Deflection

Startup

⚠ 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 equipment connected to the set, disable the generator set as follows: (1) If the controller is not already in the MAN (manual) mode, press the Controller Mode button and then press the MAN mode button. (2) If the generator set is running, press and hold the Manual-Stop button for at least 2 seconds to stop the generator set. (3) Press the Controller Mode button and then press the controller Off mode button. (4) Disconnect the power to the battery charger, if equipped. (5) Remove the battery cables, negative (-) lead first. Reconnect the negative (-) lead last when reconnecting the battery. Follow these precautions to prevent the starting of the generator set by the remote start/stop switch.

⚠ WARNING

Hazardous voltage. Moving parts.
Can cause severe injury or death.

Operate the generator set only when all guards and electrical enclosures are in place.

⚠ 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.

If any problems arise during startup, immediately shut down generator set. Even after a successful startup, shut down generator set after 5–10 minutes and recheck belt tension to make sure hardware has not loosened during startup operation. Perform another recheck after 8–12 hours of operation.

✓	Operation
	Verify cooling fan position in the fan shroud
	Check mounting hardware
	Check fan motor for free rotation
	Check V-belts for alignment and tension
	Fill system with coolant and check all connections for tightness and leaks
	Verify that all electrical connections are secure and that power source matches motor nameplate
	Verify that no foreign material is loose in fan air stream
	With unit running, check for:
	fan clearance
	excessive vibration
	excessive noise
	coolant leaks

Figure 9 Startup Checklist

KOHLER CO., Kohler, Wisconsin 53044 USA
Phone 920-457-4441, Fax 920-459-1646
For the nearest sales and service outlet in the
US and Canada, phone 1-800-544-2444
KOHLERPower.com

Kohler Power Systems
Asia Pacific Headquarters
7 Jurong Pier Road
Singapore 619159
Phone (65) 6264-6422, Fax (65) 6264-6455

Availability is subject to change without notice. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local Kohler® generator set distributor for availability.