



# Technical Service Bulletin

<b>Technical Service Bulletin:</b> TSB180078	<b>Released Date:</b> 20-Jun-2018
<b>TRP 3375: HGJAx Ducting Kits, Countermeasure for Fault Code 36 Shutdowns Due to Hot Air Recirculation</b>	

## TRP 3375: HGJAx Ducting Kits, Countermeasure for Fault Code 36 Shutdowns Due to Hot Air Recirculation

### Warranty Statement

The information in this document authorizes specific changes to the repair practice for failures covered under product warranty coverages.

### Contents

#### Product Affected

- HGJAA (Spec A-K)
- HGJAB (Spec A-L)
- HGJAD (Spec A-K)
- HGJAE (Spec A-L)

#### Issue

Symptom:

Cummins Power Systems has noticed an increase in nuisance fault code 36 (FC36) shutdowns, which many associate to overheat shutdowns. An overheat shutdown will usually first appear as a FC36 - Generator Set Stopped Without Fault Condition. This fault code represents a situation where the generator set has stopped without command from the control. Fault codes should always be properly diagnosed, and fully investigated before assuming root cause.

Overheating of a generator set can show up as a few different kinds of symptoms. All events of fault shutdown, unexpected shutdown, or unusual operation of the generator set should be properly diagnosed and serviced by a qualified technician. The following

should be referenced only as general guidelines. Refer to the generator set service manual, A035D011, for more information regarding troubleshooting, diagnosis, and repair.

#### Root Cause:

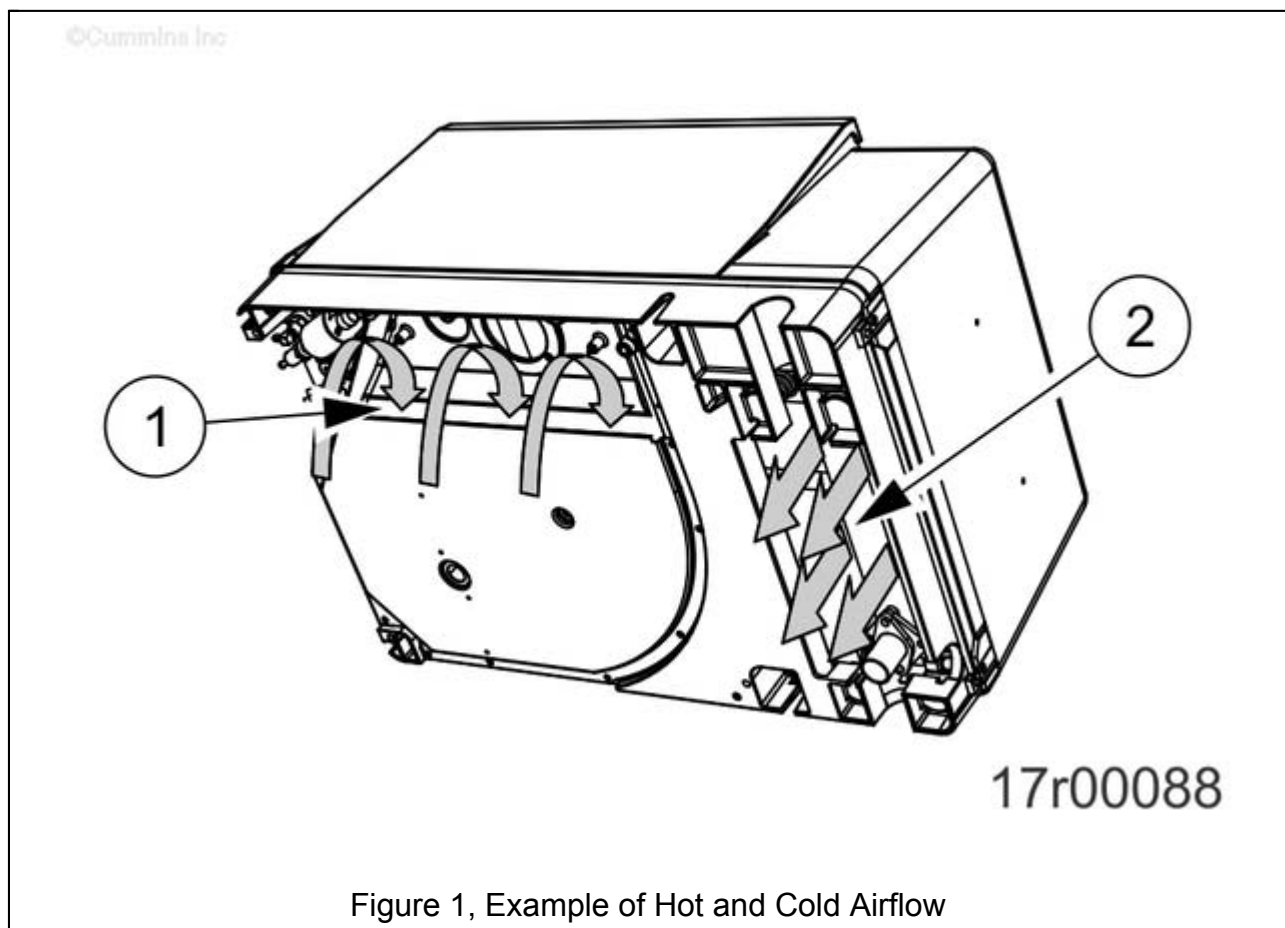
In certain situations, hot air coming from the ventilation exhaust can be recirculated back into the cool air intake. The recirculation continues and increases the internal temperatures of the generator set until the fuel begins to boil and vaporize, starving the engine of fuel which may shut the generator set down on FC36.

#### Verification/Confirmation

Below are steps that should be taken when faced with a nuisance FC36 shutdown.

1. Fault code 36 represents a situation where the generator set has stopped without a command from the control. However, FC36 does not always mean a temperature related shutdown. Be sure to fully complete the troubleshooting steps for FC36 laid out in the service manual. Document results and values for tests called out in this troubleshooting. Note: Troubleshooting results and values will be required before any further action can be taken.
2. The final step in FC36 troubleshooting is to perform the hot air recirculation test. Reference section 7.3.7 in the service manual for detailed instructions on performing this test. This test confirms if the generator set is experiencing hot air recirculation. Depending on the installation, the shutdowns may be happening while the coach is moving. Coach transit airflow can impact recirculation of the generator set hot air. If this is the case, it is recommended to conduct the hot air recirculation test both while the coach is stationary and in motion. See a short video on how this test should be performed at <http://tsb.cumminsvirtualcollege.com/A057X792.aspx>. Contact the authorized service provider generator set technical support group through 1-800-CUMMINS for questions regarding this test.
  - a. The hot air recirculation test is the best way to determine if hot air is finding its way to the generator set air intake. The test measures the air temperature going into the generator set versus the ambient air temperature.
3. The result of this test will be a rise over ambient temperature value (ROA). The service manual gives a recommended or preferred ROA value. If you are seeing a ROA value greater than that which is outlined in the service manual, air ventilation or ducting will be needed.
4. Determine how the air is flowing around and under the generator set. This knowledge will be used to ultimately select the best duct for the installation.
  - a. Several factors can restrict or redirect airflow, and should be considered when determining air management. Tall RV skirting, mud flaps, compartment and

- compartment doors, bumpers, and frame rails all can have an impact on airflow. While analyzing the airflow at hand, be sure to consider if any of these items may be obstructing the intended path of air flow.
- b. Understanding and visualizing air flow for a generator set is key to minimizing hot air recirculation. HGJAx generator sets draw all of the cooling air in and discharge hot air out of the bottom. As such, cool air in and hot air out are very close together. Figure 1 shows a visual example of hot and cold airflow for HGJAx generator sets.
  - c. A method to see how the air is flowing underneath the generator set is to tape some yarn, dental floss, or marker flags (figure 2) in various locations underneath the generator set.





### Resolution

1. Once you have a general idea of how air flows below and around the generator set, steps can be taken to reduce the amount of hot air that is recirculated. There are several ducting kits that Cummins Onan Elkhart sells that mitigate recirculation. Ducts can be ordered through Cummins Onan Elkhart by reaching the parts department at 574-262-4611. Refer to the "Part Identification" section of this bulletin for a list and information for these ducts.
  - a. Each of these ducts take a bit of understanding on air flow and handling to accurately decide which kit is best for the installation at hand. Be sure to consider all the items mentioned above when selecting a duct for the application.
2. Even with the installation of a kit, the installation must be reviewed per the installation manual and must pass the hot air recirculation test. In certain installations, the addition of a kit may result in an increase in hot air recirculation or ventilation restriction, resulting in reduced generator set cooling. If the installation fails the hot air recirculation test after the installation of a duct, escalate through 1-800-CUMMINS to the authorized service provider generator set technical support group.

3. For further information on generator set temperature concerns, visit [www.qsol.cummins.com](http://www.qsol.cummins.com) or the global customer engineering page at [www.gce.cummins.com](http://www.gce.cummins.com) (account registration may be needed. If this is the case and immediate assistance is needed, contact the authorized service provider generator set technical support group via 1-800-CUMMINS). Here you can find customer engineering bulletins (CEB's) that give other recommendations and practices on how to successfully manage airflow for your generator set. These CEB's, when used alongside generator set installation manuals, will give ideas to form an installation that application engineering believes will be successful. There are also documents on environmental factors and what you can discuss with the RV end user, to help them ensure their generator set is in an environment where proper cooling will occur.

### **Service Instructions**

TRP Filing Instructions:

Fail Code: OF CU ID

Account Code: 65

Authorization Code: 3375

Applicable SRT's:

00-901: 0.4 hours – Administrative Time

99-999: 2.0 hours – Air Circulation Troubleshooting

99-999: 0.5 hours – Duct Installation

Parts: Reimbursement for 1 duct is allowed

Travel: No travel is included

Expiration Date: January 15, 2020

Additional Instructions: When the claim is filed, please include the ducting part number and information about the generator set installation (RV make and model, generator set location, etc).

### **Service Parts Availability**

Ducts can be ordered through Cummins Onan Elkhart by reaching the parts department at 574-262-4611. See Table 1 for a list of part numbers and see the "Part Identification" section of this bulletin for a description of each part number

<b>Table 1, Service Parts</b>	
<b>Part Description</b>	<b>Part Number</b>

<b>Table 1, Service Parts</b>	
Side Air Discharge Kit	026-00202
Ducting Kit	026-00494
Ducting Kit	026-00495
Ducting Kit	026-00522
Ducting Kit	026-00531
Ducting Kit	026-00534
Ducting Kit	026-00535

## Part Identification

### 026-00202

#### Purpose:

- This kit completely seals off the normal exhaust opening, cuts a hole on the right side of the enclosure, and forces hot air out of this opening.

#### Do not use if:

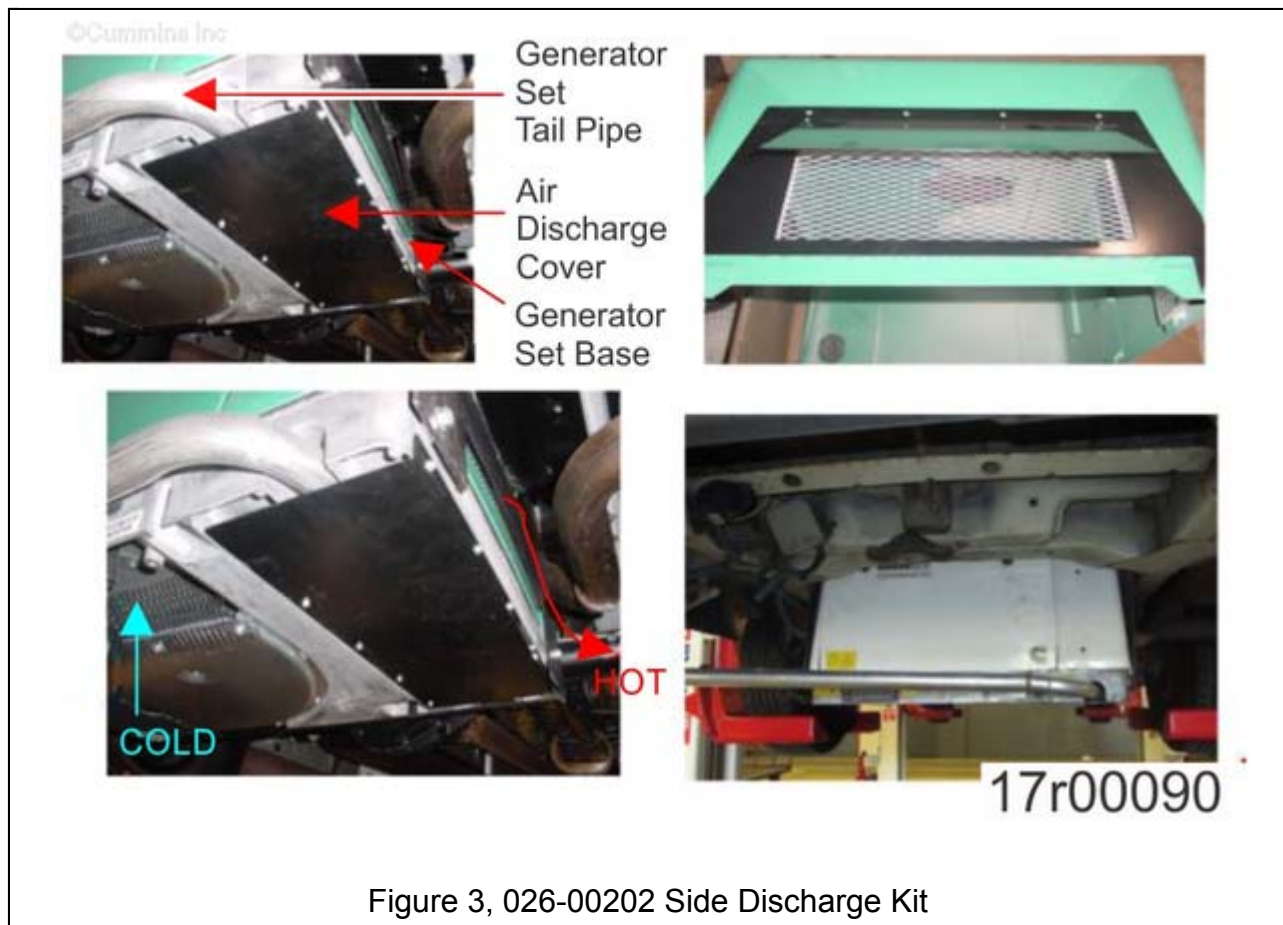
- There are obstructions to the right of the generator set, as this could cause hot air to circulate back towards the intake.

#### Applications where this may be used:

- When the generator set is very close to the ground
- If the generator set is installed under the chassis, in the middle of the coach

#### Installation:

- Instruction sheet 026-00209 (included with kit) gives detailed instructions on installing this kit.



**026-00494**

Purpose:

- Directs hot air to the rear of the generator set, or to the middle of the coach

Do not use if:

- There are obstructions to the rear of the generator set, as this could cause hot air to circulate back towards the intake

Applications where this may be used:

- When there are obstacles to the right of the generator set, such as a tire or mud flap

Installation:

- Four self-tapping screws, one in each corner of the duct (see arrows in figure 4)



Figure 4, 026-00494 Ducting Kit

### 026-00495

#### Purpose:

- Directs hot air to the right
- Similar to 026-00522, but 026-00495 is preferred if ground clearance could be an issue

#### Do not use if:

- There are obstructions to the right of the generator set, as this could cause hot air to circulate back towards the intake

#### Applications where this may be used:

- When the generator set is installed in such a way that ground clearance may be an issue

#### Installation:

- Four self-tapping screws, one in each corner of the duct (see arrows in figure 5)

**026-00522**

## Purpose:

- Directs hot air to the right

## Do not use if:

- Proper ground clearance will be an issue when the duct is installed
- There are obstructions to the right of the generator set, as this could cause hot air to circulate back towards the intake

## Applications where this may be used:

- When the generator set is installed in the front of a 5<sup>th</sup> wheel

## Installation:

- Four self-tapping screws, one in each corner of the duct (see arrows in figure 6)
- Be sure to cover both mouse holes (circled in red) with high temperature aluminum foil tape when using this duct
- If possible, cover all mating surfaces between the duct and the generator set with high temperature aluminum foil tape

**026-00531**

## Purpose:

- Used when the generator set is installed on the passenger side of the coach
- Can also be used to simply direct hot air towards the middle of the coach

## Do not use if:

- There are obstructions to the rear of the generator set, as this could cause hot air to circulate back towards the intake

## Applications where this may be used:

- When the generator set is installed on the passenger side of the coach

## Installation:

- Instruction sheet A053B542 (included with kit) gives detailed instructions on installing this kit
- 9 self-tapping screws (see arrows in figure 7)
- Be sure to cover the mouse hole at the front of the generator set (circled in red in figure 7) with high temperature aluminum foil tape when using this duct

- If possible, cover all mating surfaces between the duct and the generator set with high temperature aluminum foil tape



Figure 7, 026-00531 Ducting Kit

#### 026-00534

##### Purpose:

- Used when the generator set is installed on the passenger side of the coach
- Can also be used to simply direct hot air towards the middle of the coach
- Similar to 026-00531, but this duct has a wider opening in the instance that there is an obstruction behind the generator set

##### Applications where this may be used:

- When the generator set is installed on the passenger side of the coach

##### Installation:

- 9 self-tapping screws (see arrows in figure 8)
- Be sure to cover the mouse hole at the front of the generator set (circled in red in figure 8) with high temperature aluminum foil tape when using this duct
- If possible, cover all mating surfaces between the duct and the generator set with high temperature aluminum foil tape

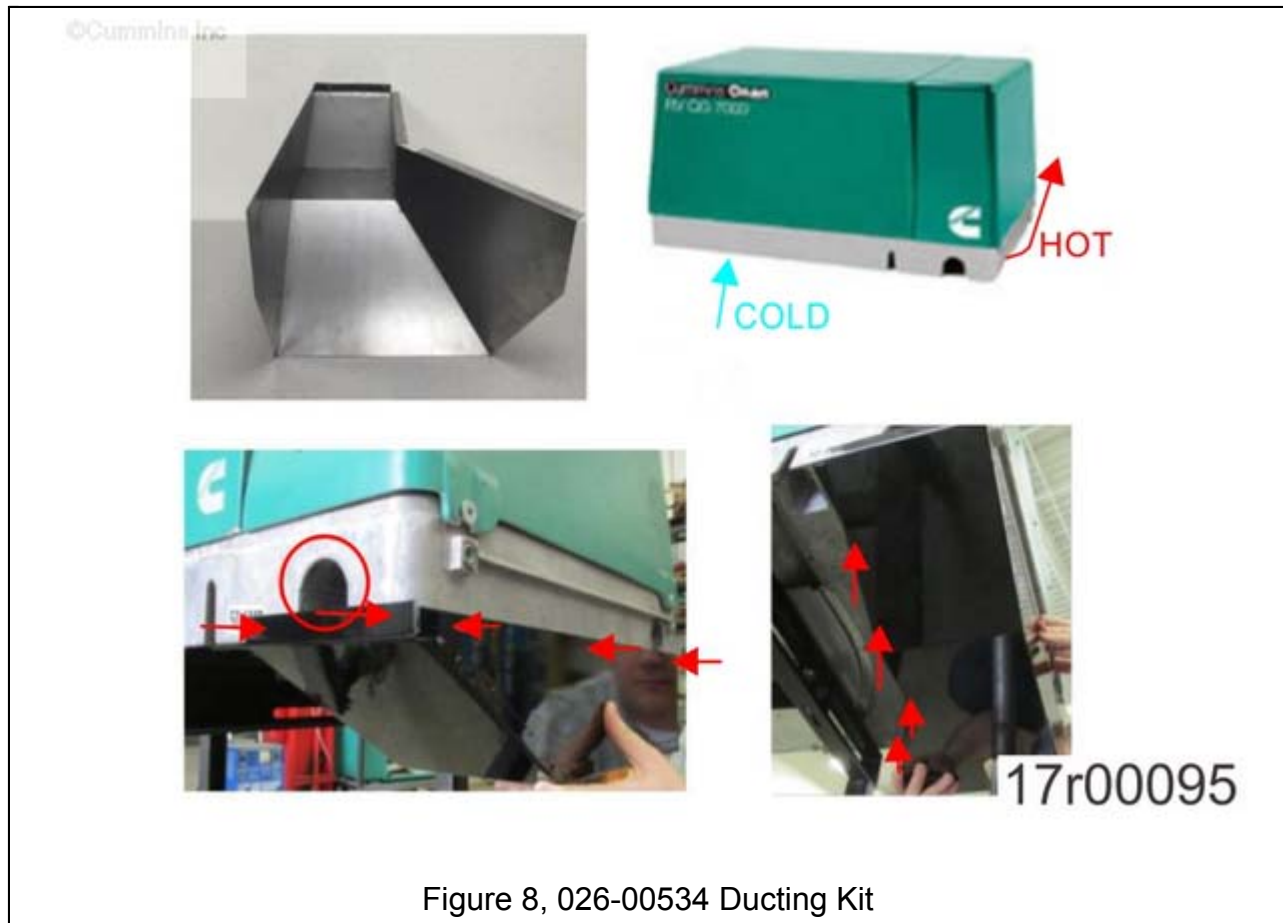


Figure 8, 026-00534 Ducting Kit

**026-00535**

## Purpose:

- Directs hot air to the right
- Can be used in place of 026-00522 if the tailpipe is an issue (this duct has a cutout for the tailpipe)

## Do not use if:

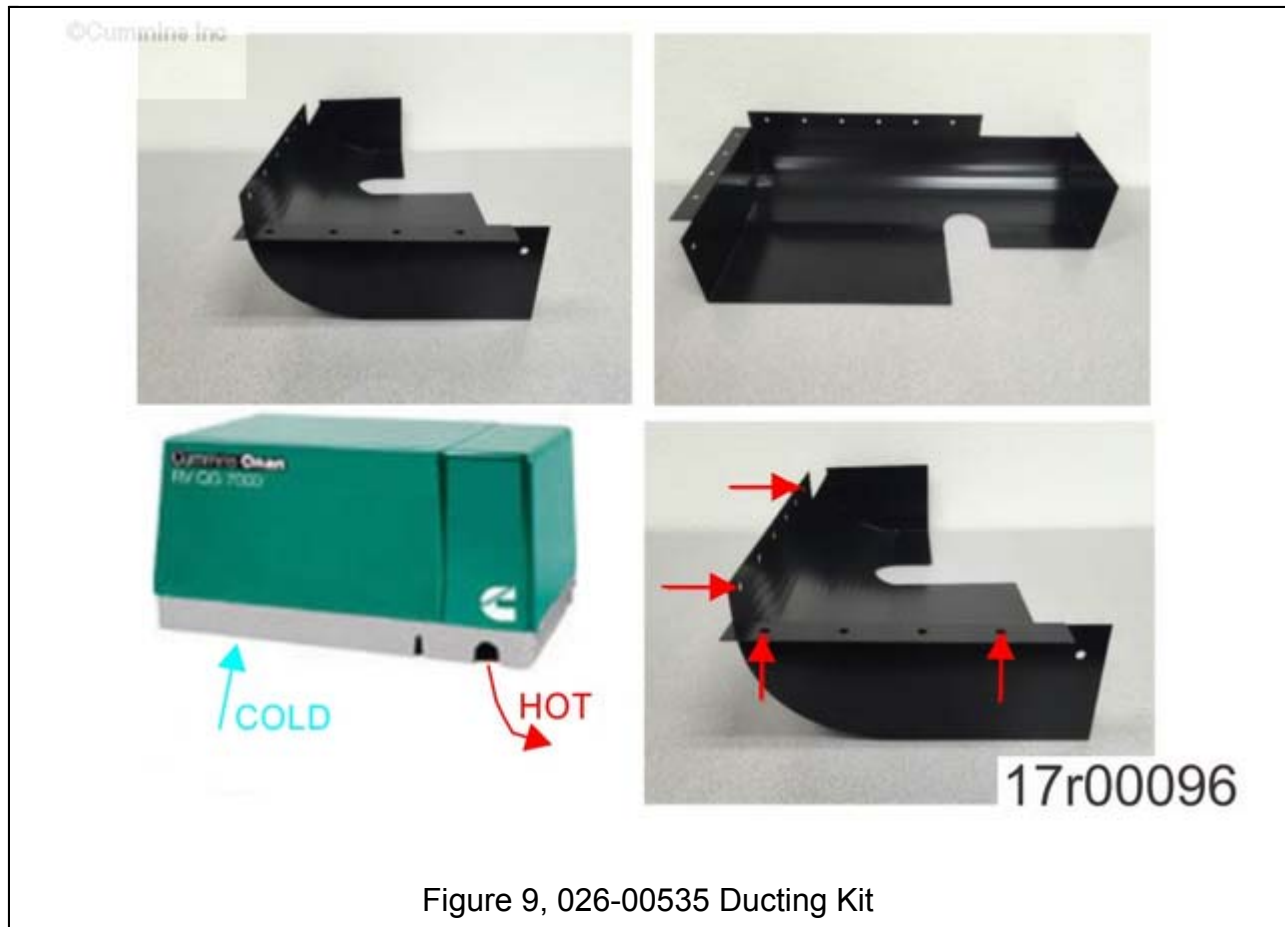
- Proper ground clearance will be an issue when the duct is installed
- There are obstructions to the right of the generator set, as this could cause hot air to circulate back towards the intake

## Applications where this may be used:

- When the generator set is installed in the front of a 5<sup>th</sup> wheel
- Designed for Raptor 5th Wheels, but can be used in other applications

## Installation:

- At least 4 self-tapping screws (see arrows in figure 9)
- If possible, cover all mating surfaces between the duct and generator set with high temperature aluminum foil tape



## Document History

Date	Details
2018-6-8	Module Created
2018-6-15	Non-Product Problem Solving (PPS)
2018-6-15	Removed a broken video link.

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**Last Modified: 20-Jun-2018**

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