



**Product Manual 04101**  
**(Revision A)**  
Original Instructions

**Installation Kit 8923-071 for EPG 4024**  
**on Detroit Diesel V-149 Engine**

**Kit Installation Manual**

## IMPORTANT



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

## DEFINITIONS

- **DANGER**—Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING**—Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**—Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE**—Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT**—Designates an operating tip or maintenance suggestion.

## WARNING

The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.

The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.



Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment. Practice all plant and safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage.



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Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

## NOTICE

To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.

## NOTICE

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual **82715**, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

# Installation Kit 8923-071 for EPG 4024 on Detroit Diesel V-149 Engine

## Introduction

### NOTICE

To the best of our knowledge, this kit will fit the engine for which it is designed. However, engine manufacturers may make changes and add engine options without notifying us. If problems arise, call our Technical Assistance Group, phone +1 (970) 482-5811 and we will try to help.

These instructions apply to the Woodward EPG 4024 electric actuator as installed on a Detroit Diesel V-149 engine. The mounting kit is Woodward part number 8923-071.

The 4024 actuator will provide excellent control of all V-149 Detroit Diesel engines.

The actuator, when mounted on the engine, operates the bell crank in the governor control housing. The vertical link from the actuator will attach directly to the ball arm on the bell crank. The rod end will be replaced during the installation.

The kit does not include the actuator, the wiring harness, or the magnetic pickup used by the electronic control system.

Actuator number 8256-080 can be used with this kit. Actuator number 8256-060 will **not** work with this kit.

The kit is designed to replace the hydraulic governor or the all-electric actuator supplied by Detroit Diesel. The plate used with the governor or actuator to cover the governor control housing should be removed. Remove and save the vertical-link cover and boot from the cover plate.

When the installation is completed, the linkage at minimum fuel should look about as it does in Figure 1, with the output lever at about 11 o'clock. The actuator should be held about 2 degrees counterclockwise from minimum fuel by the linkage. The actuator must be able to rotate the bell crank to the maximum fuel stop, preferably about 2 degrees before the actuator will reach the maximum fuel stop. The length of the vertical link should be adjusted to supply the desired rotation of the bell crank during the rotation of the actuator shaft.

Rotating the actuator output against the actuator spring load will not damage the actuator.

## Actuator Mounting

1. Remove the upper rod end from an existing governor. Remove the upper rod end from the vertical link. Remove the governor. If supplied with a hydraulic governor, remove the oil reservoir/filter and associated oil lines. Plug the oil lines. Remove the governor control housing cover. Reserve the gasket for reuse. Remove the vertical link cover and boot from the governor control housing cover.

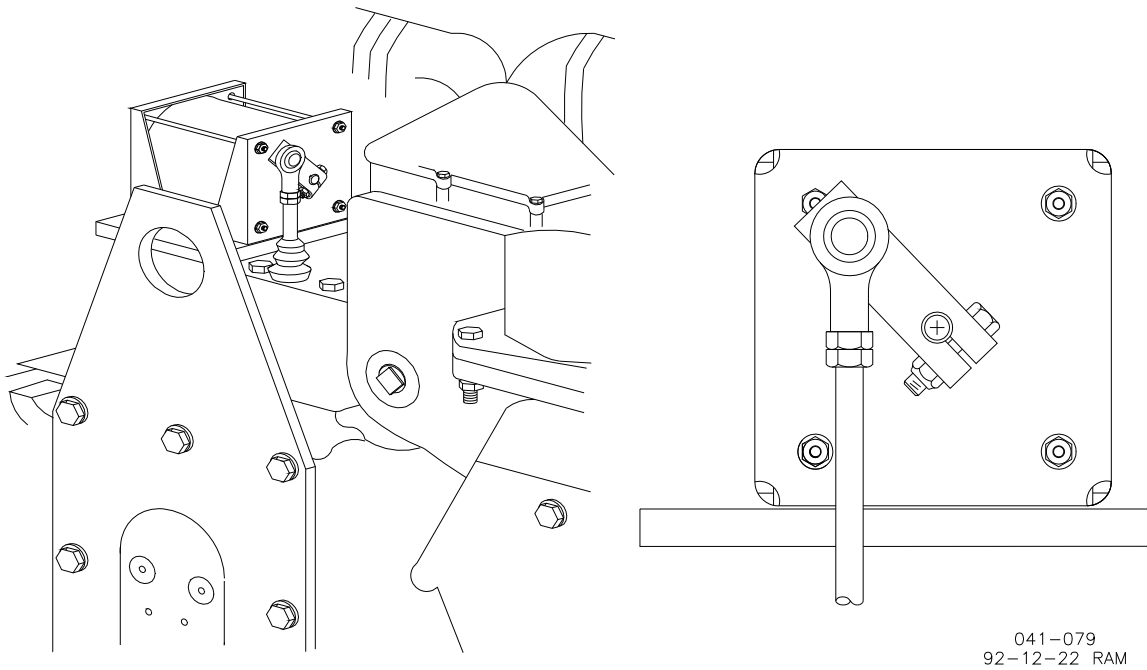


Figure 1. Linkage at Minimum Fuel

2. If a hydraulic governor has been removed, remove the governor drive adapter from the governor drive sleeve.
3. Remove the existing rod end from the left bank operating lever. This is a left-hand rod end and will not work with the new vertical link (connecting rod).
4. Assemble a new rod end and jam nut on the long end from the bend in the new threaded rod (vertical link). Turn the threaded rod 10 turns into the rod end. Do not tighten the jam nut at this time. Attach this rod end to the left-bank operating lever. Attach with 0.312-18 x 0.875 screw (18) and two hi-collar lock washers (19), one on each side of the rod end ball.
5. If present, remove locating pins from the top of the governor control housing.
6. Install the new cover plate (1) and the gasket salvaged when the old governor system was removed. If the gasket is not in good shape, replace it with a new Detroit Diesel gasket 5143148. Cover the governor control housing so the new vertical link comes through the hole in the plate. The "V" cut in the plate goes toward the front of the engine. The bent end of the vertical link will point toward the back of the engine. Attach the cover plate with the five counter-sunk 0.250-20 x 0.750 screws (7).
7. Attach the actuator to the upper mounting plate (2) with four 0.375-16 x 1.000 screws (3) and lock washers (4). See the assembly drawing for the correct location of the actuator output in relation to the upper mounting plate. The counter-bored side of the plate goes down.
8. Install the actuator/upper mounting plate assembly on the lower mounting plate (governor housing cover) with two 0.250-20 x 1.500 screws and lock washers (10) toward the back of the engine and five 0.312-18 x 1.500 screws (11), flat washers (12), lock washers (13), and nuts (14).

9. Install the vertical link cover gasket (Detroit Diesel 5143622) and the vertical link cover (Detroit Diesel 5144529) over the vertical link. Do not attach the cover at this time. The lock nut on the vertical link must be tightened as one of the last steps of the installation. (Use of an incorrect vertical link cover can cause interference with the fuel setting linkage.)
10. Assemble the actuator lever (25), spacer (22), lock washers (19), and rod end (21). Use the 0.312-24 x 1.750 bolt (20) and Nylock nut (21) as shown. The lever connects in the first hole (marked 149).

**IMPORTANT**

The rod end must be turned on the rod to change the length of the connecting link (rod). This will require removing the entire lever from the actuator. It is important that the final rod length provide the desired 2° ccw rotation of the actuator. Do not use more than 5° ccw rotation or less than 1° of actuator shaft rotation. Too little rotation could prevent the electric governor from shutting down the engine. Too much rotation could make it impossible to achieve stable engine performance.

Should the rod touch the vertical link cover, you have a different part than the required Detroit Diesel 5144529.

11. Add a 0.312-24 jam nut (16) to the connecting link (17) and thread on the rod end. Adjust the direction of the bend in the rod and the length of the assembly so the lever will attach to the actuator output shaft at about 11 o'clock. Turn the rod end/lever assembly one turn to shorten the connecting link and assemble the lever onto the output shaft. This should hold the shaft about 2° from the min-fuel stop with the engine linkage against its min-fuel stop. Check the assembly to make sure that it can move the fuel linkage from minimum to maximum without binding.

Make sure that the actuator moves the linkage to a complete min-fuel position.

12. When the rod length is correct, fasten the lever to the actuator shaft with the 0.250-28 x 1.500 cap screw (23), 2 flat washers (24), and an elastic lock nut (25). Tighten both of the jam nuts.
13. Complete the assembly by bolting on the lower mounting plate and the vertical link cover with 0.250-20 screws (5) and lock washers (6) as shown on the assembly drawing.
14. Check again that the actuator returns the fuel linkage to the minimum location and that the linkage moves from minimum to maximum fuel and back without binding.

**IMPORTANT**

If properly attached, the actuator shaft will move at least 25 degrees (preferably more than 30 degrees) between the minimum- and maximum-fuel stops, which are determined by the engine, not the actuator. Check the installation to make sure the fuel-setting rod moves from minimum- to maximum-fuel stops without binding.

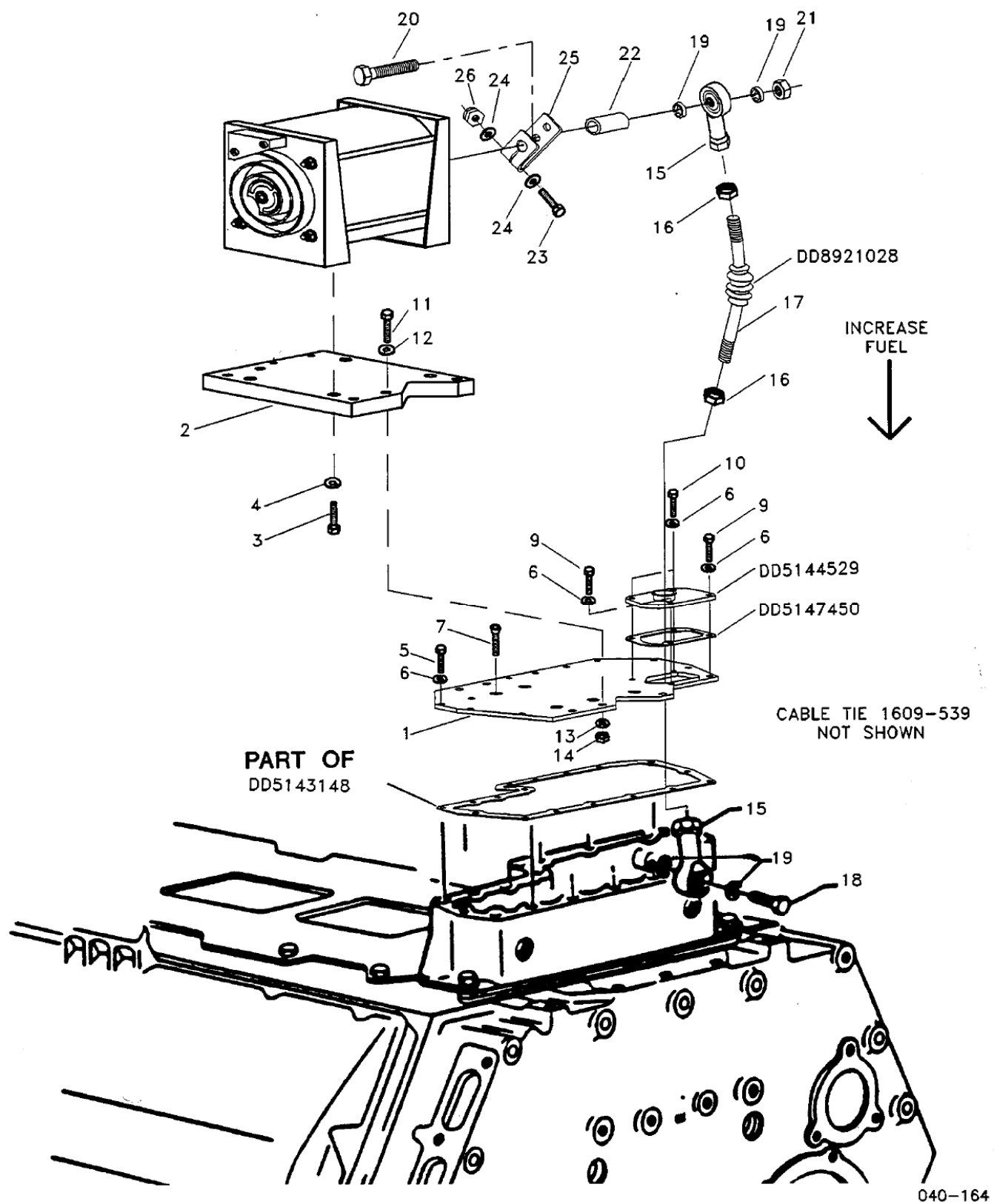


Figure 2. Woodward EPG Assembly on DD V-149 Engine

## Parts List for Kit 8923-071

Number	Item.....	Quantity
04101-1	Plate, V-149 Lower Mounting .....	1
04101-2	Plate, V-149 Upper Mounting .....	1
04101-3	Screw, 0.375-16 x 1.000 Cap .....	4
04101-4	Washer, 0.375 Spring Lock .....	4
04101-5	Screw, 0.250-20 x 0.750 Cap .....	10
04101-6	Washer, 0.250 Spring Lock .....	14
04101-7	Screw, 0.250-20 x 0.750 Countersunk Cap .....	5
04101-9	Screw, 0.250-20 x 1.000 Cap .....	2
04101-10	Screw, 0.250-20 x 1.500 Cap .....	2
04101-11	Screw, 0.312-18 x 1.500 Cap .....	5
04101-12	Washer, 0.312-64 Flat .....	5
04101-13	Washer, 0.312 Split Lock .....	8
04101-14	Nut, 0.312-18 .....	5
04101-15	Rod End, Size 5 .....	2
04101-16	Nut, 0.312-24 Thin, Hex Jam .....	2
04101-17	Rod, 0.312-24 Threaded, Bent .....	1
04101-18	Screw, 0.312-18 x 0.875 .....	1
04101-19	Washer, 0.312 Hi-collar Lock .....	4
04101-20	Screw, 0.312-24 x 1.750 Cap .....	1
04101-21	Nut, 0.312-24 Elastic Lock .....	1
04101-22	Spacer, 0.344 ID by 0.610 Inch Long .....	1
04101-23	Screw, 0.250-28 x 1.500 Cap .....	1
04101-24	Washer, 0.265 x 0.500 x 0.064 .....	2
04101-25	Lever .....	1
04101-26	Nut, 0.250-28 Elastic Lock .....	1
04101-27	Cable Tie (not shown) .....	1

### Detroit Diesel Parts

(These parts will be present if the conversion is from a mechanical governor)

5147450	Gasket .....	1
5143148	Gasket .....	1
5144529	Boot Adapter Plate .....	1
8921028	Boot, Rubber .....	1

## Wiring Suggestions

Use 12 AWG (3 mm<sup>2</sup>), stranded, insulated wire from the battery to the control box to the actuator. Using 12 AWG wire, the actuator will operate with a maximum of 22 feet (6.7 m) between the control box and the actuator. The total distance in the wiring circuit, from the battery to the control box to the actuator, must not exceed 53 feet (16.2 m). This length can be extended to a maximum of 60 feet (18.3 m) with 10 AWG (5 mm<sup>2</sup>) wire.

The feed from the battery to the control box must be direct, not through a distribution point.

The wire used must not be kinked, and ties should be of a non-conducting material. Use only new, well insulated, stranded wire in the installation. The wire is not supplied in the mounting kit, but special harnesses are available from Woodward.

**We appreciate your comments about the content of our publications.**

**Send comments to: [icinfo@woodward.com](mailto:icinfo@woodward.com)**

**Please reference publication 04101A.**



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