



Installation Manual

8924-601 Installation Kit

**for EPG 1712/1724 Electric Actuator
on Caterpillar D3304 and D3306 Engines**

Manual 54087

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*.

8924-601 Installation Kit for EPG 1712/1724 on Caterpillar D3304 and D3306 Engines

Introduction

These instructions apply to the EPG 1712/1724 (12 or 24 V) electric actuator manufactured by Woodward as mounted on a Caterpillar D-3304 or D-3306 diesel engine driving a generator set. The mounting kit is Woodward part number 8924-601.

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

The actuator, when mounted on the diesel engine, operates the shutdown lever (C.T.Co. part number 3N2824). Prior to installation of the electric actuator, the top and rear cover plates to the shutdown adapter housing must be removed. The handle from the Cat 3N2825 shutdown lever (if present) must be removed. The optional solenoid shutdown or the solenoid shutdown cover plate must be removed and reinstalled after the conversion is complete.

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 (800) 523-2831 or +1 (970) 482-5811 and we will try to help.

Actuator Mounting

The following information should be used with Figure 2 to provide satisfactory installation of the actuator.

With the access plates to the shutdown adapter housing removed, assemble the 8-32 x 0.500 screw and lockwasher into the shutdown pin adapter. Add the link to the adapter and fit over the pin on the shutdown lever assembly. Adjust the location of the adapter assembly approximately as shown in the illustration and tighten the Allen screw.

Attach the mounting plate assembly as shown, with the link assembly coming through the hole in the mounting plate. Note the use of Caterpillar gaskets and the reinstallation of either the shutdown solenoid or solenoid cover plate. Add the rubber boot to the assembly, over the link assembly. Add the jam nut and the rod end to the link assembly, turning the shaft into the rod end at least 5 turns. Do not tighten the jam nut.

Attach the lever and spacer to the rod end as shown.

With the counterclockwise arrow toward the link assembly attach the actuator to the mounting plate. **Note the direction of the rotation arrow.** See the illustration for use of lockwashers. Do not tighten. Add the lever and adapter-link assembly to the output shaft of the actuator. The lever should point to between 10 and 11 o'clock when both the shutdown lever and actuator shaft are at minimum fuel or shutdown. Tighten the lever to the actuator shaft and rotate the assembly between minimum and maximum fuel. There must be no binding.

Torque the screws that hold the actuator to the mounting plate to 78 to 87 lb-in (8.8 to 9.8 N·m).

Linkage Instructions

The actuator will be at the minimum-fuel position and the shutdown lever will be at maximum fuel when both are at the relaxed position.

The actuator lever should move a minimum of 25 degrees between minimum and maximum fuel (30 degrees will provide better stability). Response can be delayed if too little shaft movement is used, as this creates a deadband in the electronic control between the electrical signal and actual location of the actuator. If less than optimal rotation of the actuator shaft must be used, locate the lever so the actuator shaft approaches maximum-fuel stop on maximum-fuel signal. The shutdown lever must provide the minimum fuel stop.

When establishing the final length of the threaded link be sure at least five full threads of the threaded link engage in the rod end. Do not cause the rod end to bind when tightening the jam nut after establishing the proper length.

The mechanical speed setting must be locked in the maximum position before using the EPG. The maximum governor setting must be high enough to allow the engine to accept full load.

Avoid pressure washing the EPG actuator, particularly the clockwise end, as water can enter the actuator through the sealed bearing.



WARNING

The threaded link could thread out of the rod end if it is not locked. It is extremely important that the jam nut on the threaded rod be kept tight.

Instructions for Figure 2

1. Remove top and rear cover plates from shutdown-adapter housing.
2. Remove handle from Cat PN 3N2825 shutdown lever.
3. Install screw 188898 and lockwasher 1011-947 on adapter 4682-065. Do not tighten. With link 3373-065 in adapter, slide adapter onto pin in shutdown lever assembly (Cat 3N2824).
4. Tighten adapter screw with Allen wrench.
5. Place rubber boot 1323-909 over bushing in mounting plate 4339-017. Using screws 1082-006 and washers as shown, install mounting plate assembly on shutdown housing with boot fitting over link assembly.
6. Place screw 1082-011 through hole in lever 3960-059 as shown and place lever on actuator output shaft. Install actuator on mounting plate, but do not tighten. Install jam nut and threaded rod end on link and adjust until actuator minimum stop and shutdown lever minimum stop coincide.
7. Attach rod end to lever, using screw 1082-011, spacer 3278-081, lockwashers 1011-935, and nut 1131-895 as shown.
8. Tighten actuator to plate assembly, clamp lever in place with screw 1082-008 and nut 189430.
9. Rotate lever on actuator output shaft manually and note if there is any binding. Binding will cause erratic speed control.
10. If unit has a Caterpillar mechanical governor, set it at 64 Hz or higher to avoid interference with the Woodward governor.
11. Parts with Woodward numbers are available in the 8924-601 mounting kit. Parts may be ordered separately.

Wiring Suggestions

If possible use 12 AWG (3.0 mm²), stranded, insulated wire in the circuit from the battery to the control and from the control to the actuator. 14 AWG (2.0 mm²) wire can be used but distances in the circuit must be shortened. Wires from the control to the actuator **must be shielded**. Use either shielded wire or twisted, three-conductor wire ***grounded at the control end only***.

Using 12 AWG (3.0 mm²) wire in the circuit for the 12 V actuator allows a maximum distance of 35 ft (11 m) from the control box to the actuator and 35 ft (11 m) from the battery to the control box. If 14 AWG (2.0 mm²) wire is used, the maximum distances are 10 ft (3 m) from the control box to the actuator and 10 ft (3 m) from the battery to the control box.

The 24 V actuator will allow a maximum distance of 75 ft (23 m) from the control box to the actuator and 75 ft (23 m) from the battery to the control box. If 14 AWG (2.0 mm²) wire is used in the 24 V system, the maximum distance will be 35 ft (11 m) from the control box to the actuator and 35 ft (11m) from the battery to the control box.

The wire from the battery to the control must be direct from the battery posts to the control, 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.

Wiring Terminal Fittings

Attach AMP 529141 or AMP 52961 crimp-on number 6, slotted, insulated terminals or equivalent on the control-box end of 12 AWG (3.0 mm²) wires from the actuator and the battery. If 14 AWG (2.0 mm²) wire is used, attach AMP 52935 or AMP 52955 crimp-on slotted, number 6, insulated terminals or equivalent.

The actuator end of the wires should be fitted with a number 8 ring terminal, AMP 35108 or equivalent for 12 AWG (3.0 mm²) wire, or AMP 32236 or equivalent for 14 AWG (2.0 mm²) wire.

Polarity of the actuator connections is not important, and the wires can be interchanged.

Protect the actuator electrical connections from accidental damage while servicing the engine.

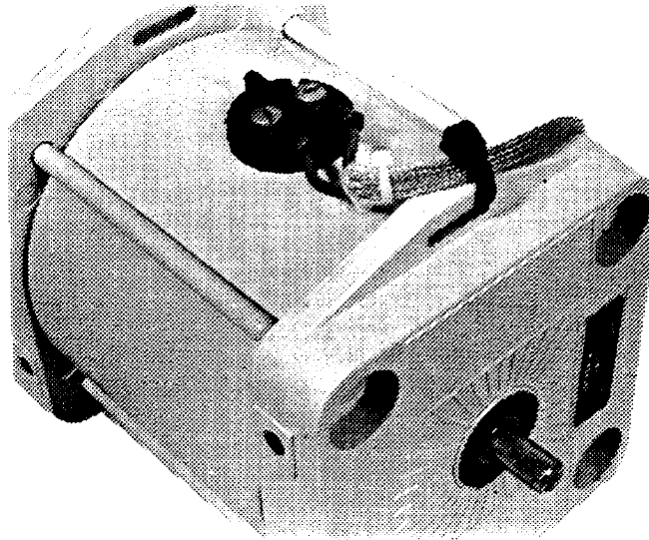


Figure 1. Actuator with Wiring Attached
 (Note the tie of the actuator wire to the slot in the side of the actuator. The high-temperature tie included with the actuator should be used.)

Parts List (Figure 2)

Item	Quantity
Screw, 8-32 x 0.500 Allen Hd.....	1
Nut, 0.250-20 Elastic Lock	1
Washer, 0.250 ID Spring Lock	8
Washer, 0.250 Hi Collar Lock	2
Washer, No. 8 Spring Lock	1
Screw, 0.250-20 x 0.625 Hex Hd	4
Screw, 0.250-20 x 0.875 Hex Hd	4
Screw, 0.250-20 x 1.250 Hex Hd	1
Screw, 0.250-20 x 1.750 Hex Hd	1
Nut, 0.250-28 Hex Jam	1
Nut, 0.250-20 Hex.....	1
Rubber Boot.....	1
Race, thrust bearing, used as a washer.....	2
Rod End, size 4.....	1
Spacer	1
Link	1
Lever, 75 mm	1
Shutdown Lever Adapter	1

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Send comments to: icinfo@woodward.com

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