



Installation Manual

8924-608 Installation Kit

**for EPG 1712/1724 Electric Actuator
on the Caterpillar 3208 Engine**

Manual 54092 (Revision A)

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*.

Revisions—Text changes are indicated by a black line alongside the text.

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Introduction

These instructions apply to the EPG 1712/1724 (12 or 24 V) electric actuator manufactured by Woodward as mounted on a Caterpillar 3208 diesel engine driving a generator set. The mounting kit is Woodward part number 8924-608.

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 speed-setting lever on the Caterpillar mechanical governor. No modification of either the speed-setting lever or the shutdown linkage is required when attaching the 1724 actuator.

In operation, the 1724 actuator and the EPG electric governor will give acceptable isochronous control of the generator set, holding the engine speed at 1800 rpm \pm 4.5 rpm.

The lever which operates the speed setting shaft on the Caterpillar speed control is not supplied in the mounting kit. This lever must be obtained from Caterpillar or from some other source.

Actuator Mounting

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

Install the actuator on the adapter plate, then install the mounting plate on the engine, and finally install the actuator-adapter-plate assembly onto the mounting plate.

No gasket or washer is used between the actuator and the bracket surface. Torque the 0.250-20 x 0.625 screws used to attach the actuator to the adapter plate to 80 to 100 lb-in (9.0 to 11.3 N·m). Use Loctite 242 on the screws. **Note the direction of the rotation arrow.** The lever will attach to counterclockwise side of the actuator.

Linkage Instructions

Assemble the rod ends and jam nuts on the 0.250-28 threaded rod. Do not tighten the jam nuts at this time. The rod does not work as a turnbuckle and it is necessary to turn a rod end for final adjustment of the length.

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.

When establishing the final length of the threaded rod, be sure about the same amount of rod is threaded into each rod end. At least five full threads of the threaded rod should be engaged in each rod end. Do not cause the rod ends to bind when tightening the jam nuts after establishing the proper rod length.

Refer to the drawing included in this manual before connecting the linkage to the actuator and governor control lever. Note particularly the angles of the control lever and the actuator lever.

Refer to Woodward Application Note 50528 for additional information about installation of EPG actuators to control engine speed through existing mechanical governor speed-setting devices.

Use the Caterpillar speed-setting device to physically set the engine speed at about 1750 rpm no-load for 60 Hz generator sets (about 1450 rpm for 50 Hz generator sets). Shut down the engine with the shutdown lever, leaving the speed-setting shaft at the about 1750 or 11450 rpm.

Attach the governor control lever and the actuator lever with rod ends as shown. Make sure that the actuator rod does not interfere with engine-injection tubing.

At minimum-fuel actuator position and no load on a 10% droop Caterpillar governor, engine speed should be 59 Hz on a 60 cycle generator (49 Hz on a 50 cycle generator). At maximum actuator position, the engine should run at 67 Hz no load on a 60 cycle generator and 56 Hz on a 50 cycle generator.

With a 3% droop mechanical governor, the minimum actuator position should produce a no load engine speed of 59.5 Hz on a 60 cycle generator and 49.5 Hz on a 50 cycle generator. The maximum actuator position should produce a no load engine speed of 62 Hz on a 60 Hz generator and 52 Hz on a 50 cycle generator.

When the actuator lever and governor lever are installed, release the manual speed-setting device on the engine. Make sure the device will not drop back into a speed-setting position during operation of the generator set under control of the electric governor and actuator.

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



The threaded rod could thread out of a rod end if it is not locked. Since the rod could move without changing speed control or stability until it comes loose, it is extremely important that the jam nuts on the threaded rod be kept tight.

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 (11 m) 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 52941 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.

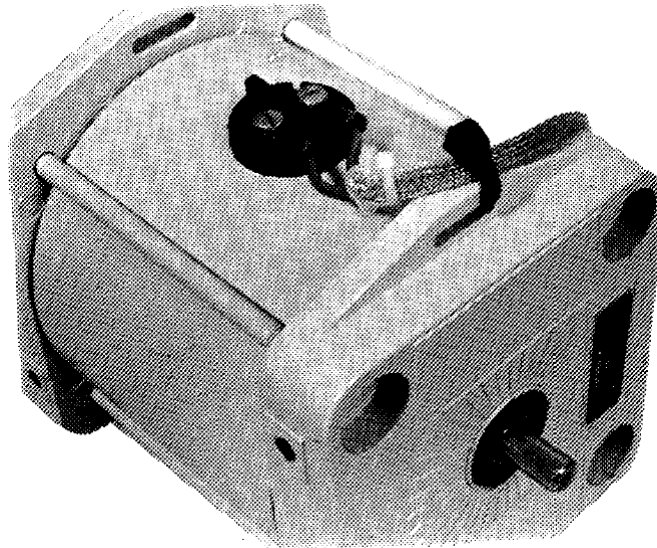


Figure 1. Actuator with Wiring Attached
(Note the tie of the actuator wire to the slot in the side of the actuator. The high-temperature tie included with the actuator should be used.)

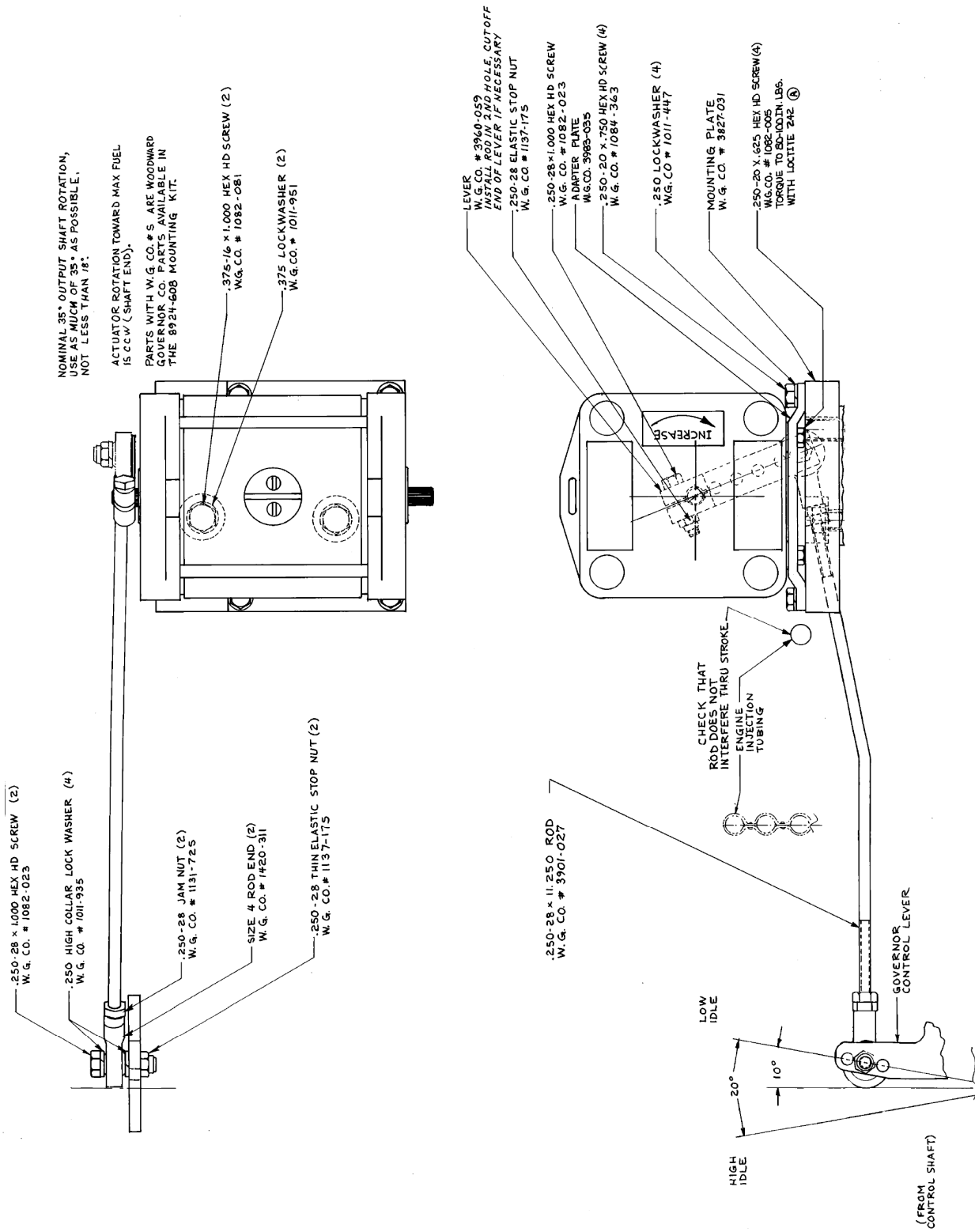


Figure 2. Wiring Schematic

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Please reference publication **54092A**.



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