



Product Manual 54008
(Revision NEW)
Original Instructions

EG-3P Actuator

**Installation of the Woodward EG-3P Actuator
on the Detroit Diesel I-71 Engine**

Installation Manual



General Precautions

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.



Revisions

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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.



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Warnings and Notices

Important Definitions



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.

- **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

**Overspeed /
Overtemperature /
Overpressure**

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.

WARNING

**Personal Protective
Equipment**

The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to:

- Eye Protection
- Hearing Protection
- Hard Hat
- Gloves
- Safety Boots
- Respirator

Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.

WARNING

Start-up

Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

WARNING

**Automotive
Applications**

On- and off-highway Mobile Applications: Unless Woodward's control functions as the supervisory control, customer should install a system totally independent of the prime mover control system that monitors for supervisory control of engine (and takes appropriate action if supervisory control is lost) to protect against loss of engine control with possible personal injury, loss of life, or property damage.

NOTICE**Battery Charging
Device**

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.

Electrostatic Discharge Awareness

NOTICE**Electrostatic
Precautions**

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts:

- Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).
- Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.
- Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.

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*.

Follow these precautions when working with or near the control.

1. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
2. Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
 - Do not touch any part of the PCB except the edges.
 - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
 - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.

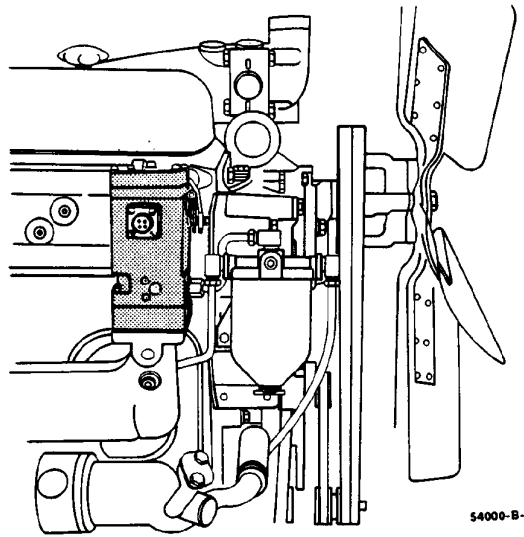
Installation of the EG-3P Actuator on the Detroit Diesel I-71 Engine

Introduction

These instructions are for the conversion from the Woodward SG governor to the Woodward EG-3P actuator.

For information concerning electric controls, see manuals:

25070 *Electronic Control Installation Guide*
82510 *Magnetic Pickups and Proximity Switches for Electronic Controls*
82560 *EG-3P Actuator*



Parts List

The installation kit is for use on the Detroit Diesel I-71 engine with drives designed for the SG governor. The parts are sold in kit number 8956-166 which includes items 1 through 15. Items may be purchased separately.

IMPORTANT

When ordering installation replacement parts, give the following information.

1. Manual number 54008
2. Part reference number, name of part, or description of part.

Linkage Kit

(see Figures 1 & 2)

| Item | Description | Quantity |
|---------------------------|--|----------|
| 54008-1 | Washer .250 Hi Collar Lock | 2 |
| 54008-2 | Screw - .250-28 x 100 Hex Head Cap | 2 |
| 54008-3 | Lever | 1 |
| 54008-4 | Nut .250-28 Elastic Hex (Thin) | 2 |
| 54008-5 | Rod End - Size 4 | 1 |
| 54008-6 | Nut Hex .250-28 | 1 |
| 54008-7 | Rod | 1 |
| 54008-8 | Boot – Rubber | 1 |
| 54008-9 | Boot Adapter Assy | 1 |
| 54008-10 | Stud - .312 x 2.500 Body | 2 |
| 54008-11 | Washer .312 Helical Spring Lock | 2 |
| 54008-12 | Nut .312-24 Hex (.438 AF) | 2 |
| 54008-13 | Drain Adapter Gasket | 1 |
| 54008-14 | Cotter Pin 062 x .500 Long | 1 |
| 54008-15 | Bushing - Magnetic Pickup | 1 |
| 54008-16 through 19 | Not Used | |

Optional EG-3P Connector Assembly Kit

(see Figure 3)

| Item | Description | Quantity |
|----------|--|----------|
| 54008-20 | Kit - EG-3P Connector Assembly | 1 |
| | Kit includes the following parts which may be ordered separately: | |
| 54008-21 | Plug – Elec. Conn. Size 14.S Straight | 1 |
| 54008-22 | Clamp - MS 3057-6A Cable | 1 |
| 04008-23 | Bushing - MX 3420-6 Cable Clamp | 1 |

Optional MPU Assembly Kit

(see Figure 4)

| Item | Description | Quantity |
|----------|--|----------|
| 54008-24 | Magnetic Pickup Assembly | 1 |
| | Kit includes the following parts which may be ordered separately: | |
| 54008-25 | Plug - MS 3106-A 105-L-45 | 1 |
| 54008-28 | Clamp - MS 3057-4A Cable | 1 |
| 04008-27 | Bushing - MS 3420-4 Cable Clamp | 1 |
| 04008-28 | Magnetic Pickup | 1 |

Figures 1 and 2 show the recommended linkage connections and part reference numbers. Figure 3 shows the four-pin connector assembly. Figure 4 shows the magnetic pickup assembly.

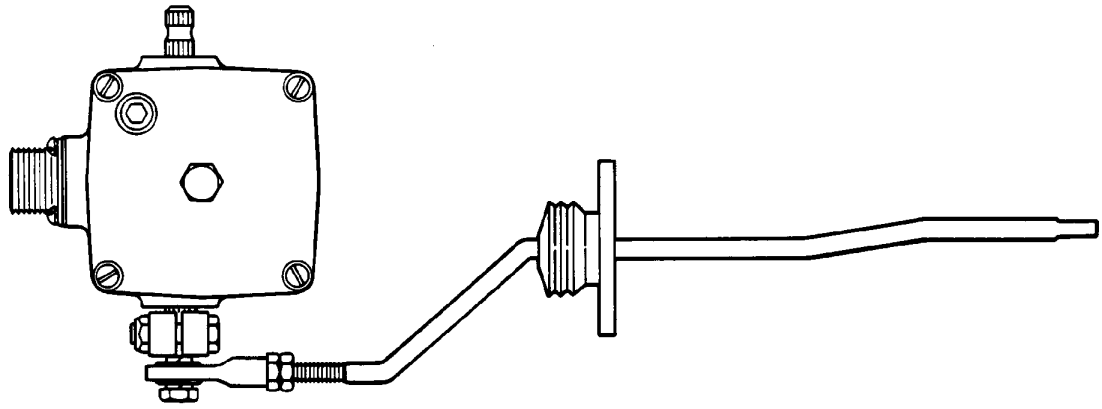


Figure 1. Fuel Rod and Boot Assembly

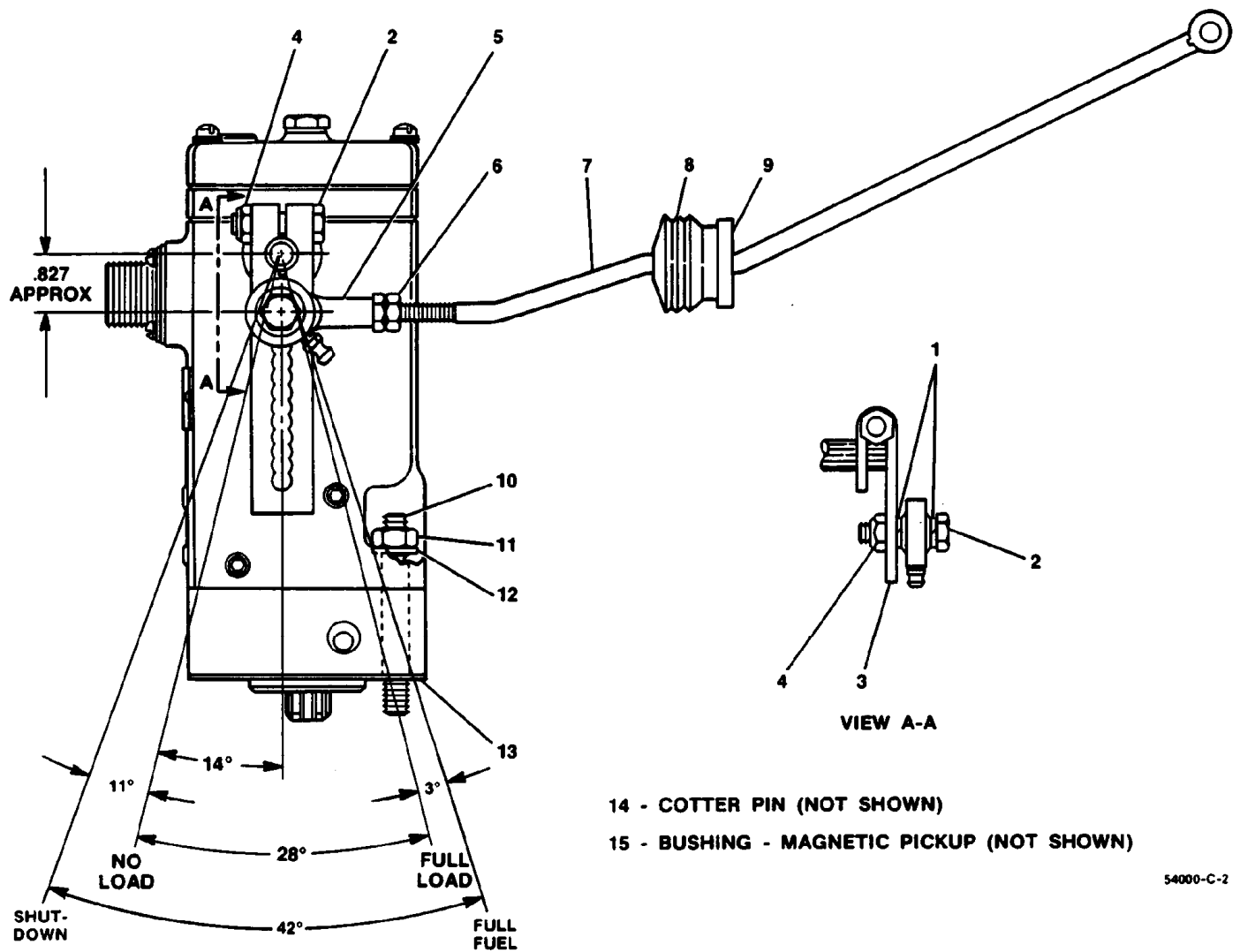
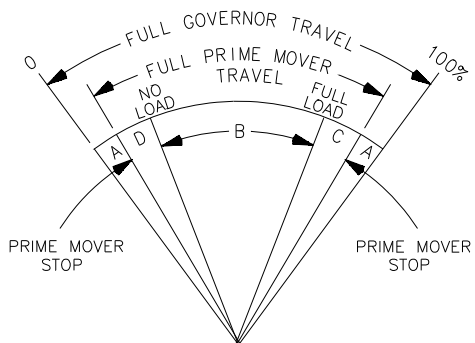


Figure 2. Linkage Connections to EG-3P Actuator

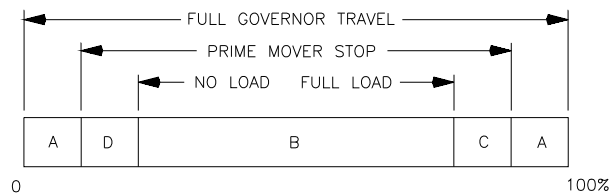
Actuator Installation

See Figures 1 and 2 to install the EG-3P actuator on the engine.

1. Remove the SG governor from the engine.
2. Install hold down studs (10) in the actuator pad.
3. Install drain adapter gasket (13) and the EG-3P actuator on the hold down studs.
4. Install boot adapter assembly (9), boot (8), jam nut (6), and rod end (5) on new fuel rod (7).
5. Attach fuel rod (7) to the engine fuel rack. Use cotter pin (14).
6. Install the actuator on the engine. The linkage must move freely.
7. Attach the terminal lever to the actuator, and adjust travel.



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- A - OVERTRAVEL TO INSURE PRIME MOVER STOPS ARE REACHED.
 B - NO LOAD TO FULL LOAD TRAVEL - NORMALLY 2/3 OF FULL GOVERNOR TRAVEL IS RECOMMENDED.
 C - TRAVEL REQUIRED TO ACCELERATE THE PRIME MOVER.
 D - TRAVEL REQUIRED TO DECELERATE OR SHUT DOWN PRIME MOVER.

Maximum work capacity over full governor travel of 42 degrees is 4.5 ft-lbs. See above for recommended governor output travel. In special applications min and max prime mover stops may be outside the governor stops.



Be sure to allow sufficient undertravel at the min-fuel position so the governor can create a shutdown, and also 3 to 4 degrees overtravel between full load and maximum fuel to ensure better transient performance.

Adjustment of the fuel linkage must provide for control of fuel from SHUTDOWN to FULL FUEL within the limits of the 42 degrees of governor output shaft travel. It must also provide for approximately 28 degrees output shaft travel between NO LOAD and FULL LOAD. Adjust the linkage so the maximum stop of the actuator will prevent the fuel rack from traveling beyond the full fuel position. The fuel injectors must move freely.

8. Install the oil line from the oil reservoir to either of two 1/8" pipe tapped inlet holes of the actuator. A minimum of 5 psi (34 kPa) oil supply pressure is recommended. The supply should be filtered engine oil.
9. Include overspeed shutdown equipment separate from the speed control governor.

Magnetic Pickup Installation

1. Remove the pipe plug in the flywheel housing adjacent to the flywheel teeth.
2. Install the 1.000 - 11 1/2 NPTF magnetic pickup bushing (15) in the flywheel housing.
3. Install the magnetic pickup (24) in the bushing. The magnetic pickup is listed in the optional parts list.
4. The distance between the pickup and the outside diameter of the gear should be approximately 0.040" (1.02 mm) at the closest point. This clearance must be kept through one full turn of the flywheel.

IMPORTANT

Determine the distance by turning the magnetic pickup in until it just touches the gear tooth. Back it out about 3/4 turn (0.0555" [1.410 mm] per one 360° turn ccw).

5. Tighten the jam nut. Be careful not to turn the magnetic pickup.

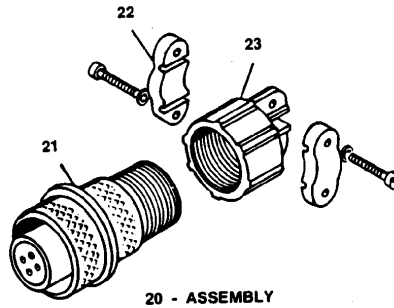


Figure 3. EG-3P Connector Assembly

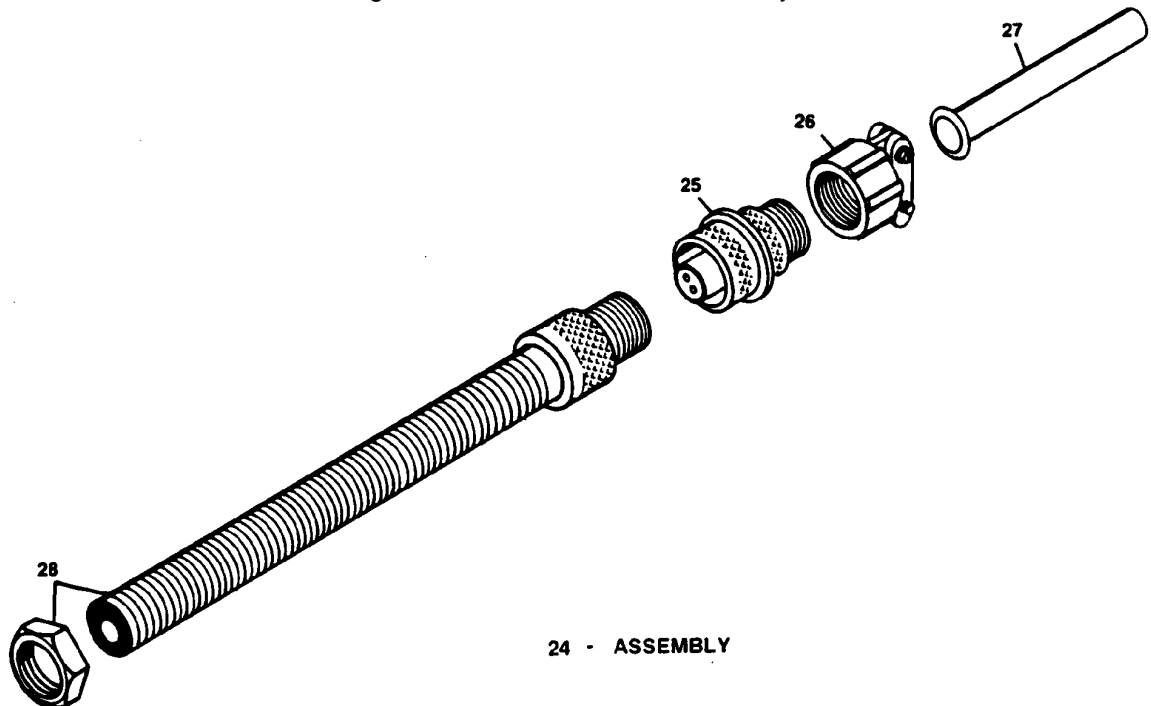


Figure 4. Magnetic Pickup Assembly

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Please reference publication **54008.**



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