

## **PG Rail Governor Enhancement Kit 8956-581 and Similar Kits**

**To convert specific governors to new environmentally  
enhanced governors which are identical in function  
to the 8572-517 and 8572-537 governors**

**Kit 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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### Proper Use

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 Instructions to Environmentally Enhance EMD Rail Governors

## Introduction

### **IMPORTANT**

#### EMD Governor Enhancement Program

The EMD enhancement program includes a number of different governor designations. Two different kits are packaged to accomplish enhancement procedures on different governors.

Most of the governors involved in the program carry the Woodward 8571-561 designation, and the detailed instructions in this manual are specifically designed for the 8956-581 kit. However, other governors included in the enhancement program are similar and the work described in this manual will be required for all conversions although the specific parts in the different kits vary.

EMD will provide the correct kit for the specific governors involved in the program.

Woodward PG Governor Kit 8956-581 contains the parts needed to convert a "C" 8571-561 PGE governor to a part number 8572-571. The enhanced governor will have the same vibration resistance as the 8572-517 governor. Other kits are designed to enhance additional governors as designated by EMD.

Installation of the kit requires extensive governor disassembly and assembly which can only be completed by technicians who are capable of rebuilding a PG Rail governor. No special tooling will be required. Following assembly the governor will have to be completely tested on a rail governor test stand according to the most current publication of: Test Specification (TSP) 329, Page 583, A through D. Enhanced governors other than "C" 8571-561 may require a different Test Specification.

When work is completed the governor designation on the name plate should be changed to a new designation provided by EMD so future rebuilding and repair will be done to the correct standards.

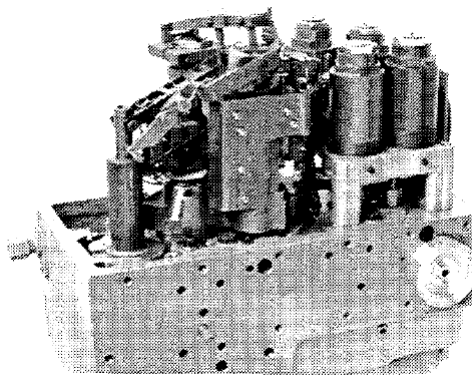


Figure 1a. Side Plate Removed

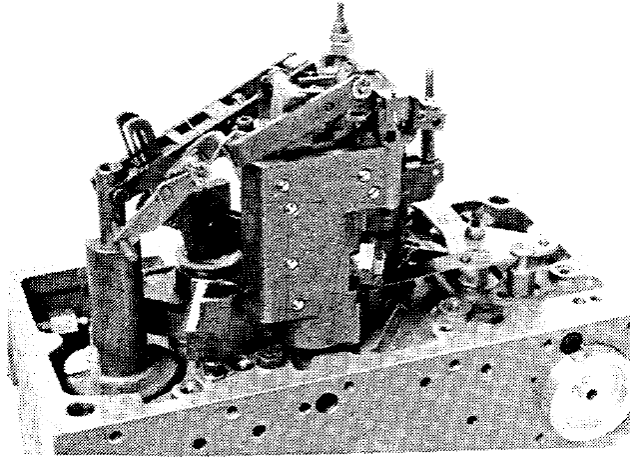


Figure 1b. Side Plate and Receiver Removed

## Governor Functions to be Enhanced

The enhancement procedure will change the resistor assembly from a "dry" resistor assembly to one which is submerged in oil. Parts in the kit for this conversion include a new side plate, new side plate cover assembly, a new ceramic resistor assembly, a new contact beam assembly, and new orange, gray, and brown wires, Teflon tubing, and slotted terminals to run from the side plate to the receiver assembly.

New preformed packings (O-rings), gaskets, and fittings are supplied as required for the new side plate installation.

Two different oil-seal sets are supplied for the oil filter housing. Use the one that fits your filter and discard the unused gasket or O-ring. A new oil failure diaphragm is included in the kit to replace the existing diaphragm which could be damaged during removal of the old side plate.

The enhancement kit will convert the standard solenoid assemblies to vibration resistant assemblies. All 5 coils on the receiver will be replaced. The replacement of the solenoid coils will require unsoldering the old coils and soldering in the new coils. Use existing wiring on the receiver. Soldering must be done according to Woodward standards.

The Load Control Bushing will be replaced, as will the Speed Setting Pilot Valve Plunger.

## Disassembly

### **IMPORTANT**

Take care to separate the Load Control Pilot Valve Bushing and the Speed Setting Pilot Valve Plunger removed from the old governor from the parts in the new kit. The replacement parts appear so similar that old parts could become confused with new parts. All O-rings and gaskets removed during disassembly will be replaced with new seals from the kit during reassembly.

The governor must be disassembled to the stage shown in Figure 1c. The side plate, resistor pack, and associated parts removed. The fuel limiter, the receiver assembly, speed-setting linkage and feedback linkage removed.

Disconnected the three wires from the terminal block on the receiver assembly before removal.

## Governor Conversion

The following parts are included in the 8956-581 kit. Part numbers will be different in other enhancement kits.

### Receiver Assembly (see Figure 2)

36053-1	Vdc Coil Assembly	5	To replace existing coils
36053-2	.500 OD Plastic Washers	10	Used on bottom of solenoid terminals
36053-3	Teflon 0 AWG Ins.	10	Use to insulate coils while soldering
36053-4	Plunger Assembly	5	To replace existing plungers
36053-5	Plunger Stop Plugs	5	To replace existing plunger stops
36053-6	Insulating Paper	5	Replaces insulation in solenoid cases

\* Reuse the existing Solenoid Cases and Plunger Stop Lock Nuts. Remove the existing insulating paper from inside the cases and replace with new insulating paper.

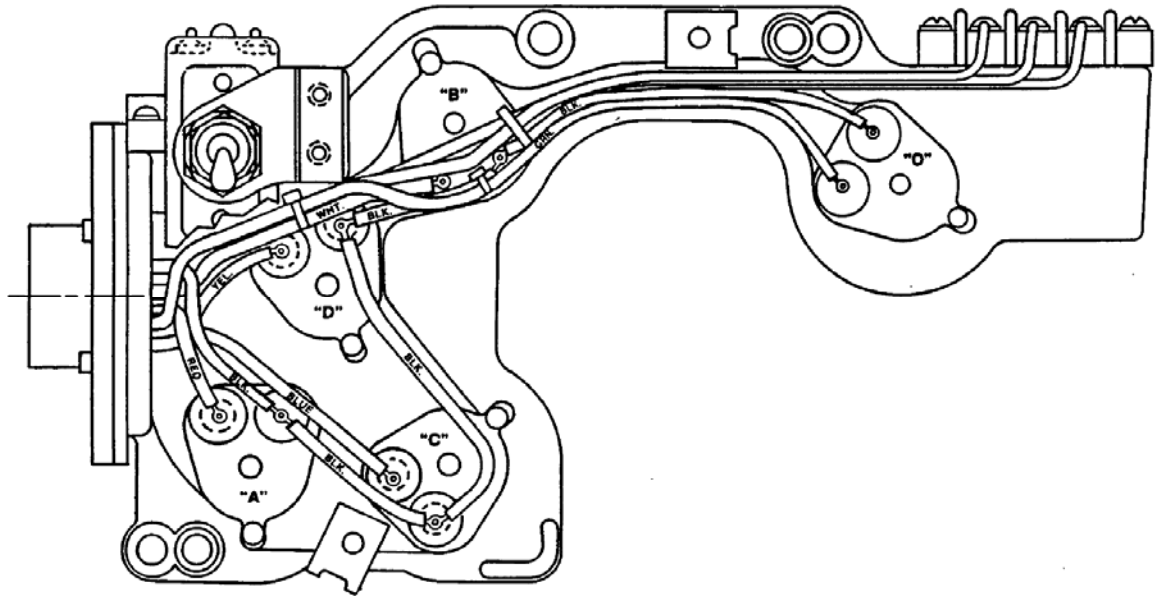


Figure 2. Underside of Receiver Assembly Showing Wire Colors

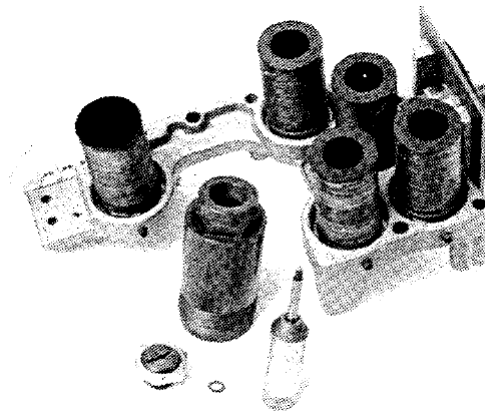


Figure 2a. Receiver Assembly with New Coils Attached



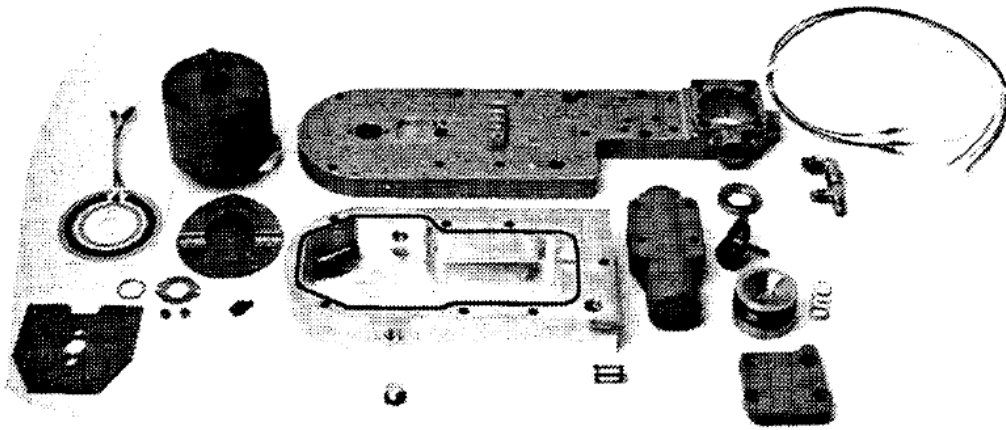


Figure 3. New Side Plate and Associated Parts

**Side Plate (see Figures 3 and 4)**

36053-7	Side Plate	1	Replaces existing side plate
36053-8	Side Plate Cover Assy.	1	Replaces existing side plate cover
36053-9	Contact Beam Spring Assy.	1	Replaces existing contact beam
36053-10	Resistor Assy.	1	Replaces existing resistor assy
36053-11	Wire Passage Sleeve	1	Fits in Side Plate Cover
36053-12	0.364 ID Preformed Packing	2	Use with wire passage sleeve
36053-13	7.237 ID Preformed Packing	1	Oil seal for side plate cover
36053-14	.562-18 Plug	1	Use in side plate cover
36053-15	.468 ID Preformed Packing	1	Use with 0.561-18 plug
36053-16	.487 ID Preformed Packing	2	Used between vane servo and side plate
36053-17	0.859 ID Preformed Packing	1	Used between vane servo and side plate
36053-18	0.250-28 x 1.250 Screw	2	Short screws used to hold on new side cover
36053-19	0.250-28 x 2.250 Screw	5	Long screws used to hold on new side cover
36053-20	0.250 Lock Washer	7	Lock washers for new side cover screws
36053-21	Seal Support	1	Supports Vane Servo shaft in side plate.
36053-22	Orange Wire	2 ft	Replaces existing wire.
36053-23	Gray Wire	2 ft	Replaces existing wire.
36053-24	Brown Wire	2 ft	Replaces existing wire.
36053-25	Teflon tubing, 6 AWG	2 ft	Use with new wires.
36053-26	#6 Slotted Terminals	6	use with new wires.
36053-27	Elbow, straight thread	1	Threads into side plate.
36053-28	0.351 ID Preformed Packing	1	Used on elbow between elbow and side plate.
36053-29	Swivel Nut Tee	1	Connects to elbow.
36053-30	Oil Failure Diaphragm	1	Replaces existing diaphragm.
36053-31	1.734 ID O-Ring	2	Replace o-rings on Lube Oil Shutdown Plug.
36053-32	Side Panel Gasket	1	Use with new side plate
36053-33	Gasket for Oil Filter	1	Use with old style filter.
36053-34	0.301 ID Preformed Packing	1	Use with new style filter
36053-35	1.051 ID Preformed Packing	1	Use with new style filter



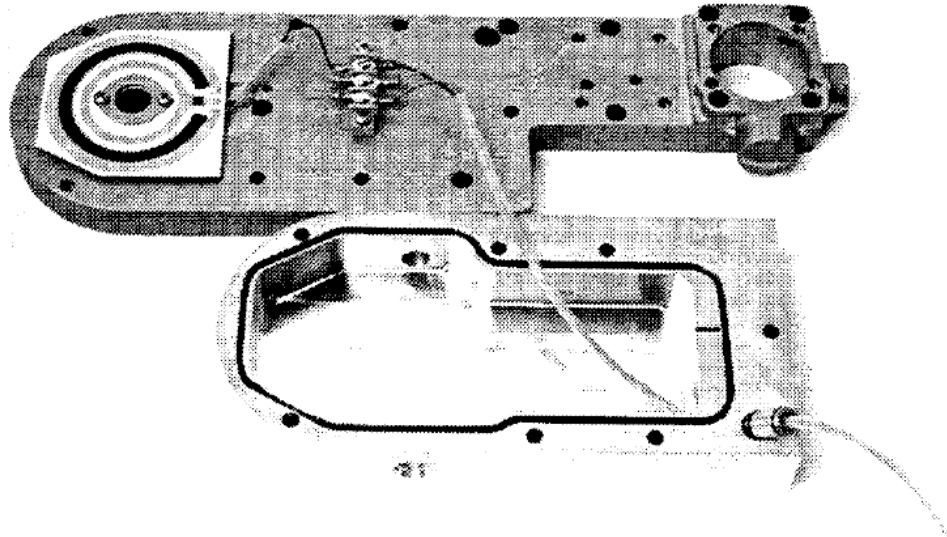


Figure 4. Side Plate and Side Plate Cover  
(showing new brown, orange, and gray wires in Teflon tube, installed through the wire passage sleeve)

Use existing terminal block and wire hold-down clamp from old side plate to new side plate. Use existing paper insulator between ceramic resistor assembly and side plate. Use existing wave washer, spacer, and screws to assemble resistor and vane servo.

### Miscellaneous Parts (see Figures 5, 6, and 7)

36053-36	Load Control P V Bushing	1	Replace bushing
36053-37	Gasket for Load Control	1	Use with new bushing
36053-38	Speed Setting P V Plunger	1	Replace P V plunger
36053-39	Governor Cover Gasket	1	Replace if necessary

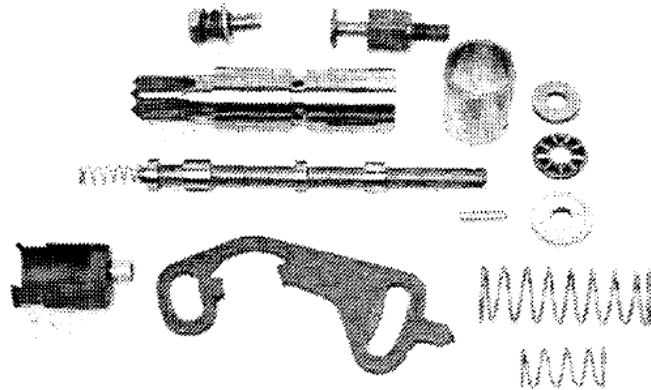


Figure 5. New Speed Setting PV Plunger and Associated Parts  
(which must be removed to install new plunger)



Figure 6. New Speed Setting PV Plunger

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**Please reference publication **36053A**.**



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