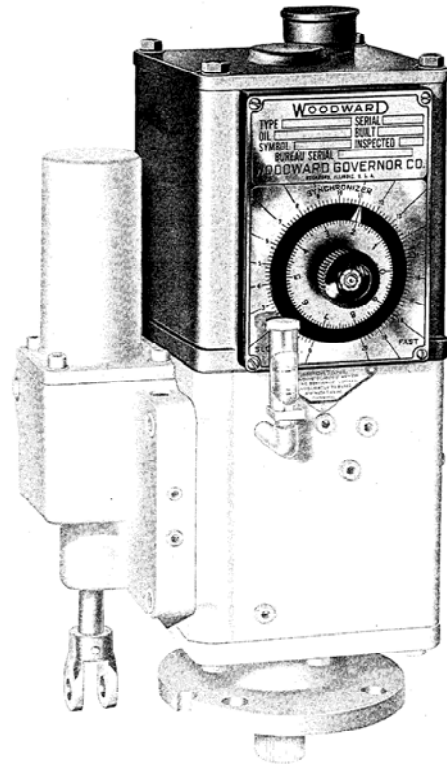




Operation and Maintenance Manual



PG Governor Dial Type Speed Setting

Manual 36614 (Revision D)

WARNING—DANGER OF DEATH OR PERSONAL INJURY



WARNING—FOLLOW INSTRUCTIONS

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.



WARNING—OUT-OF-DATE PUBLICATION

This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, be sure to check the Woodward website:

www.woodward.com/pubs/current.pdf

The revision level is shown at the bottom of the front cover after the publication number. The latest version of most publications is available at:

www.woodward.com/publications

If your publication is not there, please contact your customer service representative to get the latest copy.



WARNING—OVERSPEED PROTECTION

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—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.

CAUTION—POSSIBLE DAMAGE TO EQUIPMENT OR PROPERTY



CAUTION—BATTERY CHARGING

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.



CAUTION—ELECTROSTATIC DISCHARGE

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.

IMPORTANT DEFINITIONS

- A **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
- A **CAUTION** indicates a potentially hazardous situation which, if not avoided, could result in damage to equipment or property.
- A **NOTE** provides other helpful information that does not fall under the warning or caution categories.

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

Woodward Governor Company reserves the right to update any portion of this publication at any time. Information provided by Woodward Governor Company is believed to be correct and reliable. However, no responsibility is assumed by Woodward Governor Company unless otherwise expressly undertaken.

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Regulatory Compliance

European Compliance for CE Marking:

These listings are limited only to those units bearing the CE Marking.

ATEX – Potentially Explosive Atmospheres Directive:	Declared to 94/9/EEC COUNCIL DIRECTIVE of 23 March 1994 on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres. Zone 1, Category 2, Group II G, c II T3
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Other European and International Compliance:

Compliance with the following European Directives or standards does not qualify this product for application of the CE Marking:

Machinery Directive:	Compliant as a component with 98/37/EC COUNCIL DIRECTIVE of 23 July 1998 on the approximation of the laws of the Member States relating to machinery.
Pressure Equipment Directive:	Compliant as “SEP” per Article 3.3 to Pressure Equipment Directive 97/23/EC of 29 May 1997 on the approximation of the laws of the Member States concerning pressure equipment.



WARNING—EXPLOSION HAZARD

Substitution of components may impair suitability for Zone 1.

Chapter 1.

General Information

General

This manual covers operation, maintenance and a replacement parts list for the dial-type speed setting for short-column PG governors. This type speed setting (one of many arrangements available for use on PG governors) allows a precise means of manually adjusting speed at the governor. Additional manuals cover other components of the PG governor.

Refer to manual 54056, *PG Dial and Lever Governor Installation*, for installation instructions and safety information.

Operation

Refer to the schematic diagram (Figure 1-1). The governor speed setting is determined by the compression of the speeder spring. The speeder spring compression is determined by the position of the speeder plug, which is raised or lowered by rotation of the speed setting knob. Refer to the Woodward manual 36600, *PG Governor Basic Elements*, for a description of the effect of a speed setting change on the operation of the basic elements.



WARNING—OVERSPEED PROTECTION

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.

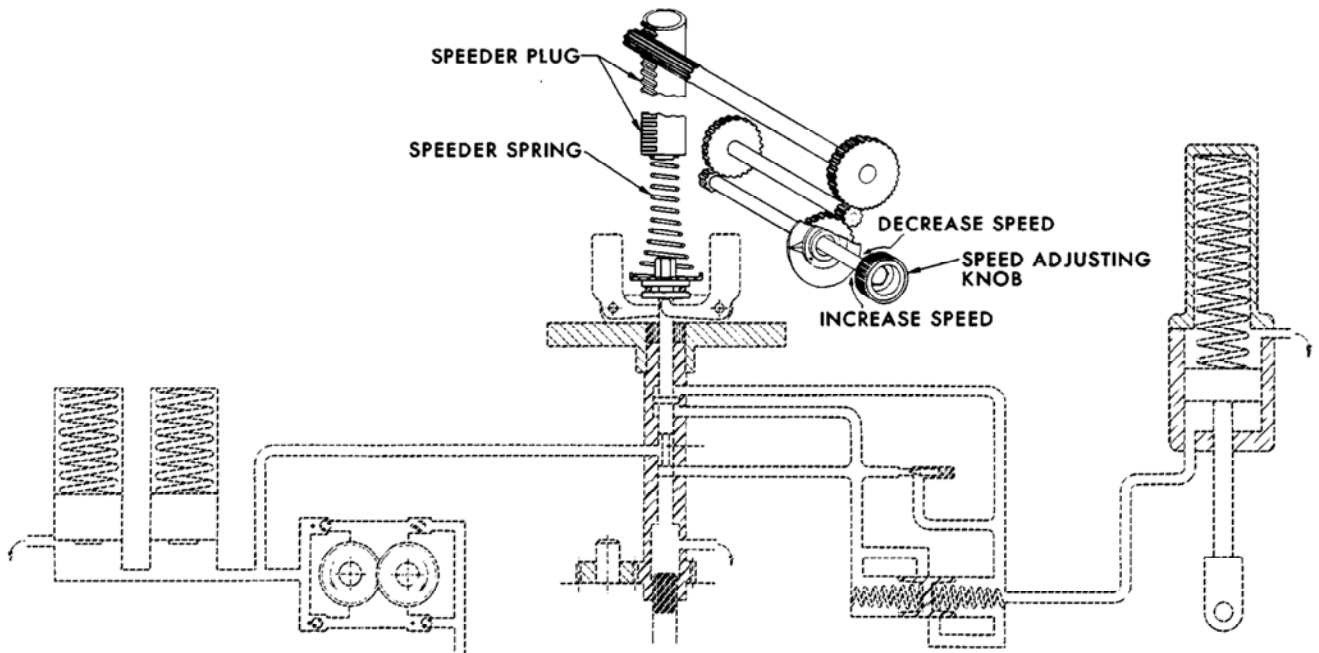


Figure 1-1. Schematic Diagram, PG Dial Speed Setting

Chapter 2. Maintenance

Introduction

This chapter provides information for the dial speed setting system. The main PG manual for the particular governor provides disassembly procedures for the basic governor. Manual 36692 provides disassembly instructions for the power cylinder. This chapter also provides assembly and adjustment procedures.

Disassembly

Refer to Figure 3-1, the exploded view of the dial speed setting, and the following for disassembly.

Top Cover

1. Remove cover screws (1) and washers (2).
2. Remove cover (4) and gasket (5).

Column Assembly

1. Back out four fillister head screws (6) (located at lower inside corners of column) and lift column (8), gasket (11), lockwashers (7), and screws (6) vertically from the power case, as shown in Figure 2-1.
2. Turn the speed indicating dial counterclockwise against the low speed stop.
3. Measure and record the distance from the top of the speeder plug (14) to the top of the column (8).
4. Remove round head screws (28) and take off dial plate (27).
5. Remove screws (23), panel (15), and panel gasket (9).
6. Taking care that speeder plug (14) does not slip out, back off elastic stop nut (34) and remove the speed setting knob (33), numbered disc (32), indicator gear (30) with pointer disc (31), dial shaft assembly (17), washer (18), spring (19), and pinion assembly (12). Turn gear shaft assembly (22) to run speeder plug (14) out of bore in column. Remove shaft assembly.

Cleaning

Immerse all parts in solvent and wash ultrasonically or by agitation. Remove all traces of contaminants from corners, holes, apertures and threads. Dry all parts with clean wipers or blow dry with a jet of clean dry air.

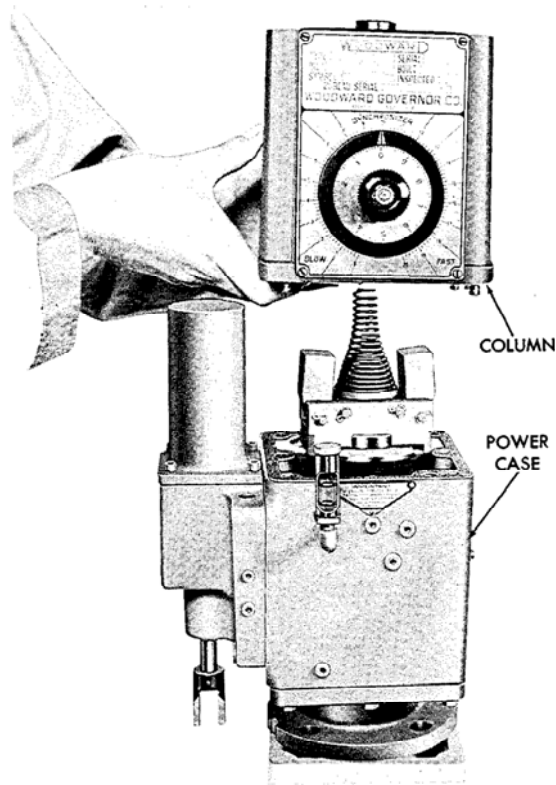


Figure 2-1. Column Removal

Parts Check

Check all parts for wear, corrosion, nicks, cracks, or other damage. Mating or rubbing surfaces must be particularly examined for nicks, burrs, scores or other roughness, and evidence of wear.

Check threads for stripping, cross-threading or other deformation.

Check for mis-match of serrations or other tooth damage.

Assembly

Replace all gaskets, 5, 9, and 11.

1. Install gear shaft assembly (22) and speeder plug (14).
2. Place the spring (19) and washer (18) in position with one hand, and with the other replace the dial shaft assembly (17) and the pinion assembly (12).
3. Holding the dial shaft assembly (17) in position, install indicator gear (30) with pointer disc (31), and turn the dial shaft until the speeder plug (14) is the same distance from the top of the column as recorded in disassembly.
4. Position the indicator gear against the low speed stop and install pointer disc (31), numbered disc (32), speed setting knob (33), and secure with elastic stop nut (34).

5. Replace dial plate (27) with round head screws (28).
6. Install panel (15) and new gasket (9) with screws (23).
7. Install new case-column gasket (11).
8. Place lockwashers (7) and fillister head screws (6) in holes in lower flange of the column (8). Align speeder spring check plug (shown in manual 36600 or 36602) so that it will seat properly in the bore in the speeder plug. Align dowel pins (in column) with the holes in the power case and place the column on the power case. Fasten with screws (6) and lockwashers (7).
9. Install cover (4) with new gasket (5). Secure with screws (1) and lockwashers (2).

Speed Limit Adjustment

When changing speed setting adjustments or the pointer indication, use the following procedure. Do not make these adjustments unless the linkage from the governor to the engine fuel racks (or metering valve) has been properly adjusted. Make certain that the engine is at idle speed or lower when the governor is set for low speed.



WARNING—SHUT DOWN ENGINE

Shut down the engine before performing any work on the governor.

Shut down the engine and remove the governor cover and dial plate. Back off the elastic stop nut securing the speed adjusting knob, as shown in Figure 2-2, until the fiber insert in the nut comes off the threads of the dial shaft. At this point, the nut will turn much easier.

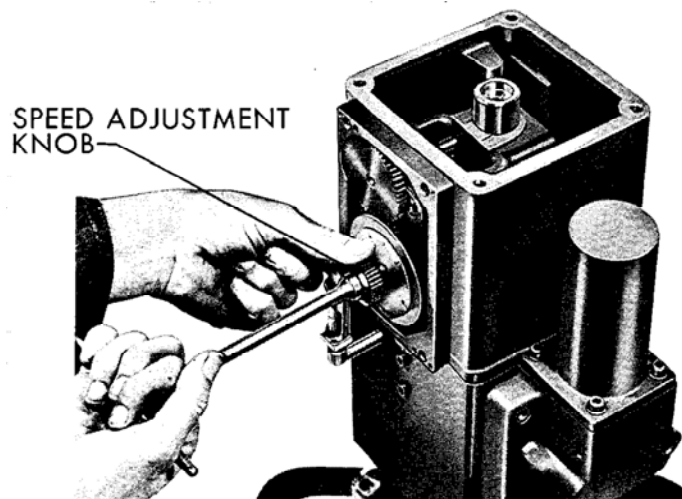


Figure 2-2. Speed Adjustment Knob Removal

Now, before the nut is turned off the shaft, hold the inside end of the shaft (pc. 17, Figure 3-1) with a screwdriver (Figure 2-3) to prevent its being forced back through the bushing by the dial shaft spring, and remove the elastic stop nut, speed adjusting knob, and numbered disc. Replace the knob (leaving numbered disc off) and turn the stop nut back on, using only about two threads. Do not tighten. Remove the screwdriver and pull the indicator gear (30) with pointer disc (31) out of mesh with the pinion assembly (Figure 2-4).

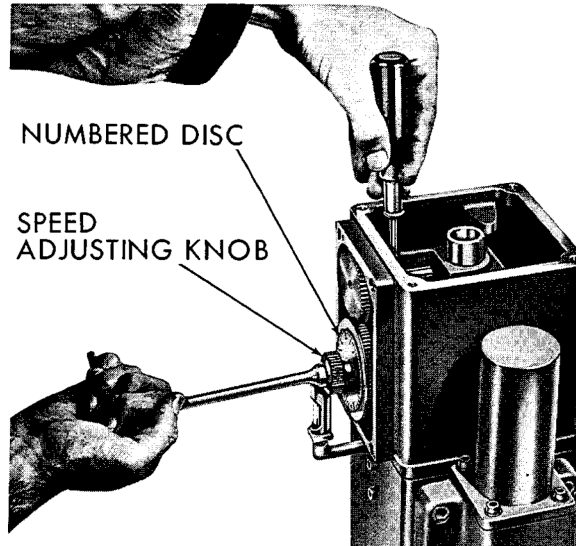


Figure 2-3. Holding Speed Adjusting Shaft

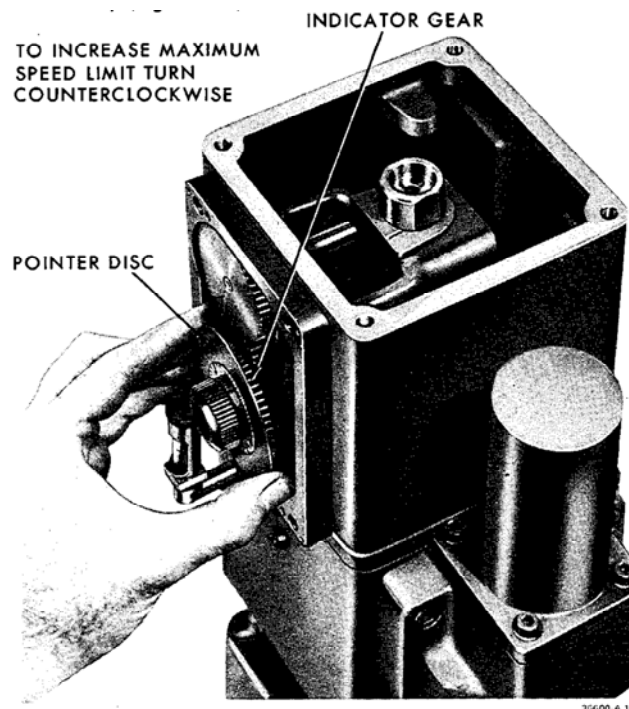


Figure 2-4. Disengagement of Indicator Gear

**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.

Start the engine and adjust to the desired high speed with the knob. Re-mesh the indicator gear with the high speed stop pin of the indicator gear against the stop pin (24) in the face of the panel. Replace the dial plate to check the pointer reading. If the pointer does not indicate the desired position on the dial plate, pry the pointer disc off and reposition it on the indicator gear.

Check the low speed by turning the speed adjusting knob until it contacts the low speed stop. (On dials calibrated in rpm, an error of 10% between engine speed and pointer reading may be expected at low speed.)

When the desired high and low speeds have been obtained, shut down the engine, remove the elastic stop nut and speed adjusting knob as before. Be sure to hold a screwdriver behind dial shaft when removing elastic stop nut and knob. Reassemble numbered disc, knob, and elastic stop nut. Tighten the nut.

Chapter 3. Replacement Parts

Replacement Parts Information

When ordering replacement parts, it is essential to include the following information:

- Governor serial number and part number shown on nameplate
- Manual number (this is manual 36614)
- Parts reference number in parts list and description of part or part name

Illustrated Parts Breakdown

The illustrated parts breakdown lists all the replaceable parts for the dial speed setting. The numbers assigned are used as reference numbers and are not specific Woodward part numbers. Woodward will determine the exact part number for your particular actuator.

Ref. No.	Part Name	Quantity
36614-1	5/16"–24x3/4" hex. hd. mach. screw	4
36614-2	5/16" shakeproof lockwasher.....	4
36614-3	Oil filler cup	1
36614-4	Cover.....	1
36614-5	Column-cover gasket	1
36614-6	5/16"–24 x 5/8" fil. hd. mach. screw.....	4
36614-7	5/16" split ring lockwasher	4
36614-8	Column.....	1
36614-9	Panel gasket	1
36614-10	1/4" x 9/16" dowel pin	2
36614-11	Case-column gasket.....	1
36614-12	Pinion assembly	1
36614-13	Spring check pin.....	1
36614-14	Speeder plug.....	1
36614-15	Dial panel	1
36614-16	Bushing	1
36614-17	Dial shaft assembly	1
36614-18	Washer.....	1
36614-19	Spring.....	1
36614-20	Plug.....	1
36614-21	Bushing	1
36614-22	Gear shaft assy.	1
36614-23	#10–24 x 1/2" fil. hd. screw	4
36614-24	Stop pin	1
36614-25	Dowel pin	2
36614-26	Bushing	1
36614-27	Dial plate	1
36614-28	#6–32 x 1/4" rd. hd. screw.....	4
36614-29	Stop pin.....	2
36614-30	Indicator gear	1
36614-31	Pointer disc	1
36614-32	Numbered disc	1
36614-33	Control knob	1
36614-34	1/4–20 elastic stop nut	1

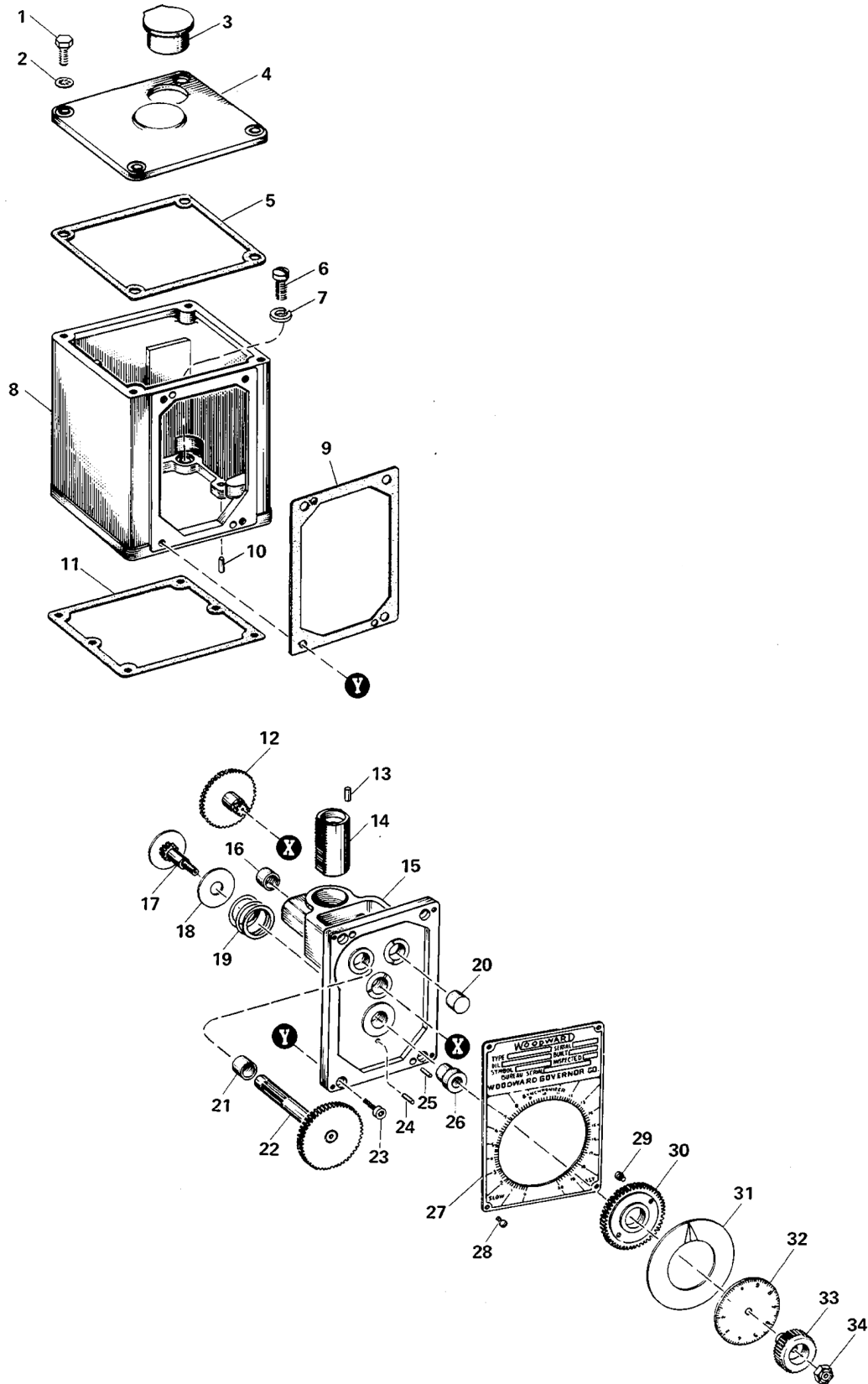


Figure 3-1. Exploded View, PG Dial Speed Setting

Chapter 4. Service Options

Product Service Options

The following factory options are available for servicing Woodward equipment, based on the standard Woodward Product and Service Warranty (5-01-1205) that is in effect at the time the product is purchased from Woodward or the service is performed:

- Replacement/Exchange (24-hour service)
- Flat Rate Repair
- Flat Rate Remanufacture

If you are experiencing problems with installation or unsatisfactory performance of an installed system, the following options are available:

- Consult the troubleshooting guide in the manual.
- Contact Woodward technical assistance (see “How to Contact Woodward” later in this chapter) and discuss your problem. In most cases, your problem can be resolved over the phone. If not, you can select which course of action you wish to pursue based on the available services listed in this section.

Replacement/Exchange

Replacement/Exchange is a premium program designed for the user who is in need of immediate service. It allows you to request and receive a like-new replacement unit in minimum time (usually within 24 hours of the request), providing a suitable unit is available at the time of the request, thereby minimizing costly downtime. This is also a flat rate structured program and includes the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205).

This option allows you to call in the event of an unexpected outage, or in advance of a scheduled outage, to request a replacement control unit. If the unit is available at the time of the call, it can usually be shipped out within 24 hours. You replace your field control unit with the like-new replacement and return the field unit to the Woodward facility as explained below (see “Returning Equipment for Repair” later in this chapter).

Charges for the Replacement/Exchange service are based on a flat rate plus shipping expenses. You are invoiced the flat rate replacement/exchange charge plus a core charge at the time the replacement unit is shipped. If the core (field unit) is returned to Woodward within 60 days, Woodward will issue a credit for the core charge. [The core charge is the average difference between the flat rate replacement/exchange charge and the current list price of a new unit.]

Return Shipment Authorization Label. To ensure prompt receipt of the core, and avoid additional charges, the package must be properly marked. A return authorization label is included with every Replacement/Exchange unit that leaves Woodward. The core should be repackaged and the return authorization label affixed to the outside of the package. Without the authorization label, receipt of the returned core could be delayed and cause additional charges to be applied.

Flat Rate Repair

Flat Rate Repair is available for the majority of standard products in the field. This program offers you repair service for your products with the advantage of knowing in advance what the cost will be. All repair work carries the standard Woodward service warranty (Woodward Product and Service Warranty 5-01-1205) on replaced parts and labor.

Flat Rate Remanufacture

Flat Rate Remanufacture is very similar to the Flat Rate Repair option with the exception that the unit will be returned to you in “like-new” condition and carry with it the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205). This option is applicable to mechanical products only.

Returning Equipment for Repair

If a control (or any part of an electronic control) is to be returned to Woodward for repair, please contact Woodward in advance to obtain a Return Authorization Number. When shipping the item(s), attach a tag with the following information:

- name and location where the control is installed;
- name and phone number of contact person;
- complete Woodward part number(s) and serial number(s);
- description of the problem;
- instructions describing the desired type of repair.



CAUTION—ELECTROSTATIC DISCHARGE

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*.

Packing a Control

Use the following materials when returning a complete control:

- protective caps on any connectors;
- antistatic protective bags on all electronic modules;
- packing materials that will not damage the surface of the unit;
- at least 100 mm (4 inches) of tightly packed, industry-approved packing material;
- a packing carton with double walls;
- a strong tape around the outside of the carton for increased strength.

Return Authorization Number

When returning equipment to Woodward, please telephone and ask for the Customer Service Department [1 (800) 523-2831 in North America or +1 (970) 482-5811]. They will help expedite the processing of your order through our distributors or local service facility. To expedite the repair process, contact Woodward in advance to obtain a Return Authorization Number, and arrange for issue of a purchase order for the item(s) to be repaired. No work can be started until a purchase order is received.



NOTE

We highly recommend that you make arrangement in advance for return shipments. Contact a Woodward customer service representative at 1 (800) 523-2831 in North America or +1 (970) 482-5811 for instructions and for a Return Authorization Number.

Replacement Parts

When ordering replacement parts for controls, include the following information:

- the part number(s) (XXXX-XXXX) that is on the enclosure nameplate;
- the unit serial number, which is also on the nameplate.

How to Contact Woodward

In North America use the following address when shipping or corresponding:

Woodward Governor Company
PO Box 1519
1000 East Drake Rd
Fort Collins CO 80522-1519, USA

Telephone—+1 (970) 482-5811 (24 hours a day)
Toll-free Phone (in North America)—1 (800) 523-2831
Fax—+1 (970) 498-3058

For assistance outside North America, call one of the following international Woodward facilities to obtain the address and phone number of the facility nearest your location where you will be able to get information and service.

<u>Facility</u>	<u>Phone Number</u>
Brazil	+55 (19) 3708 4800
India	+91 (129) 230 7111
Japan	+81 (476) 93-4661
The Netherlands	+31 (23) 5661111

You can also contact the Woodward Customer Service Department or consult our worldwide directory on Woodward's website (www.woodward.com) for the name of your nearest Woodward distributor or service facility.

Engineering Services

Woodward Industrial Controls Engineering Services offers the following after-sales support for Woodward products. For these services, you can contact us by telephone, by email, or through the Woodward website.

- Technical Support
- Product Training
- Field Service

Contact information:

Telephone—+1 (970) 482-5811

Toll-free Phone (in North America)—1 (800) 523-2831

Email—icinfo@woodward.com

Website—www.woodward.com

Technical Support is available through our many worldwide locations or our authorized distributors, depending upon the product. This service can assist you with technical questions or problem solving during normal business hours. Emergency assistance is also available during non-business hours by phoning our toll-free number and stating the urgency of your problem. For technical support, please contact us via telephone, email us, or use our website and reference **Customer Services** and then **Technical Support**.

Product Training is available at many of our worldwide locations (standard classes). We also offer customized classes, which can be tailored to your needs and can be held at one of our locations or at your site. This training, conducted by experienced personnel, will assure that you will be able to maintain system reliability and availability. For information concerning training, please contact us via telephone, email us, or use our website and reference **Customer Services** and then **Product Training**.

Field Service engineering on-site support is available, depending on the product and location, from one of our many worldwide locations or from one of our authorized distributors. The field engineers are experienced both on Woodward products as well as on much of the non-Woodward equipment with which our products interface. For field service engineering assistance, please contact us via telephone, email us, or use our website and reference **Customer Services** and then **Technical Support**.

Technical Assistance

If you need to telephone for technical assistance, you will need to provide the following information. Please write it down here before phoning:

General

Your Name _____
Site Location _____
Phone Number _____
Fax Number _____

Prime Mover Information

Engine/Turbine Model Number _____
Manufacturer _____
Number of Cylinders (if applicable) _____
Type of Fuel (gas, gaseous, steam, etc) _____
Rating _____
Application _____

Control/Governor Information

Please list all Woodward governors, actuators, and electronic controls in your system:

Woodward Part Number and Revision Letter _____
Control Description or Governor Type _____
Serial Number _____

Woodward Part Number and Revision Letter _____
Control Description or Governor Type _____
Serial Number _____

Woodward Part Number and Revision Letter _____
Control Description or Governor Type _____
Serial Number _____

If you have an electronic or programmable control, please have the adjustment setting positions or the menu settings written down and with you at the time of the call.

DECLARATION OF CONFORMITY

According to EN 45014

Manufacturer's Name: WOODWARD GOVERNOR COMPANY (WGC)
Industrial Controls Group

Manufacturer's Address: 1000 E. Drake Rd.
Fort Collins, CO, USA, 80525

Model Names/Numbers: PG Dial Governors with CE Marking
8577-XXX

Conformance to Directive: 94/9/EC Council Directive of 23 March 1994 on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres

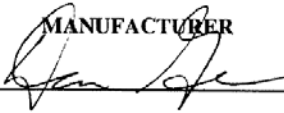
Markings: II 2G c II X

Applicable Standards: EN13463-1: Non-electrical equipment for potentially explosive atmospheres – Part 1: Basic method and requirements.
EN13463-5: Non-electrical equipment for use in potentially explosive atmospheres - Protection by constructional safety "c"

We, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s).

MANUFACTURER

Signature



Dan Gear

Full Name

Engineering Manager

Position

WIC, Fort Collins, CO, USA

Place

Date

10/10/06

Declaration of Incorporation

Woodward Governor Company
1000 E. Drake Road
Fort Collins, Colorado 80525
United States of America

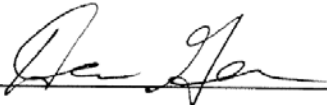
Product: PG Dial Governors (12ft.-lb., 17 ft.-lb., and 29 ft.-lb.)
Part Number: 8577-897 and similar

The undersigned hereby declares, on behalf of Woodward Governor Company of Loveland and Fort Collins, Colorado, that the above-referenced product is in conformity with the following EU Directives as they apply to a component:

98/37/EEC (Machinery)

This product is intended to be put into service only upon incorporation into an apparatus/system that itself will meet the requirements of the above Directives and bears the CE mark.

MANUFACTURER



Signature

Dan Gear
Full Name

Engineering Manager
Position

WGC, Fort Collins, CO, USA
Place

10/10/06
Date

We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

Please include the manual number from the front cover of this publication.



WOODWARD

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Email and Website—www.woodward.com

**Woodward has company-owned plants, subsidiaries, and branches,
as well as authorized distributors and other authorized service and sales facilities throughout the world.**

Complete address / phone / fax / email information for all locations is available on our website.