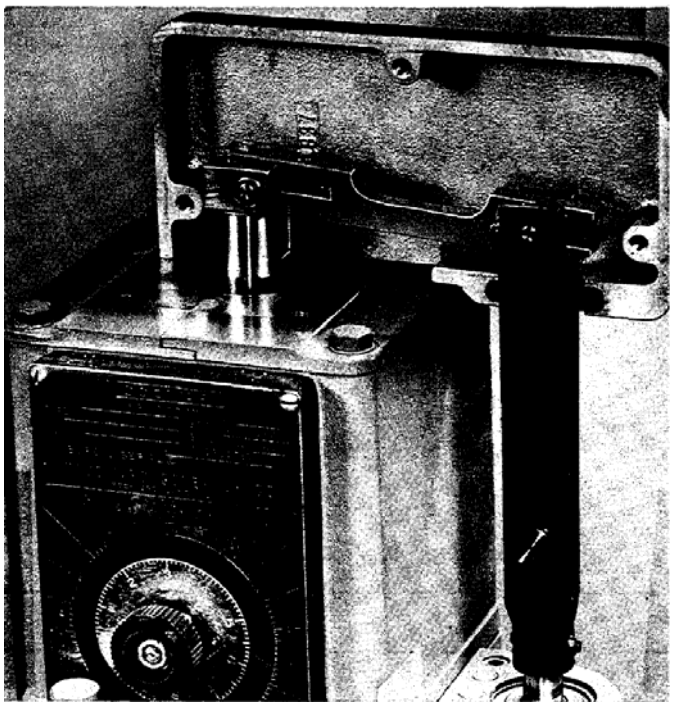
WOODWARD

Product Manual 36622
(Revision A)
Original Instructions



Speed Droop Mechanism for PG Dial Governor

Operation 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

This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, check manual *26311* , *Revision Status & Distribution Restrictions of Woodward Technical Publications*, on the *publications page* of the Woodward website:

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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.

Translated Publications

If the cover of this publication states "Translation of the Original Instructions" please note:

The original source of this publication may have been updated since this translation was made. Be sure to check manual *26311* , *Revision Status & Distribution Restrictions of Woodward Technical Publications*, to verify whether this translation is up to date. Out-of-date translations are marked with ⚠. Always compare with the original for technical specifications and for proper and safe installation and operation procedures.

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.

Speed Droop Mechanism for PG Dial Governor

General

Speed droop is used to balance and divide load between engines (or turbines) running in parallel. Speed droop is defined as the decrease in governor speed as its output connection to the engine fuel racks (or valve) moves from minimum to maximum fuel positions. Speed regulation of an engine is defined as the decrease in engine speed as its load is increased from no load to full load (invariably accomplished by using less than the full governor stroke available), and is expressed in rpm or as a percentage of normal speed. Since the normal speed of the governor is determined by the compression of the speeder spring, any change in compression of the speeder spring will change the normal speed of the governor.

Operation

The method of incorporating speed droop in a typical Woodward type PG governor is shown in Figure 1. In those governors in which the rod end is below the governor power cylinder, a tailrod, connected to the governor power piston, is attached to the speed droop lever instead of the rod end shown.

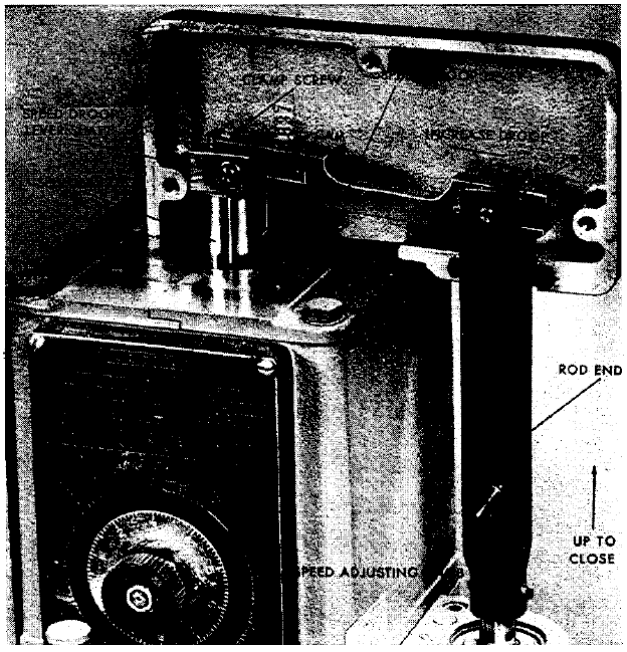

Figure 1, Speed Droop Mechanism Installed on a Typical PG Governor

For any given speed adjustment setting, the speeder plug is stationary. The position of the speeder plunger within the speeder plug is determined by the position of the cam on the speed droop lever.

The rod end (or tailrod) moves up and down with the governor power piston as it changes the fuel setting. The rod end movement raises or lowers the speed droop lever which, pivoting about the speed droop lever shaft, raises or lowers the cam on the speed droop lever. The speed droop lever shaft is positioned so that the speeder plunger is moved upward as the rod end moves in the direction to increase fuel. The shaft is between the cam and rod end on governors in which the rod end moves up (as shown in Figure 1) to decrease fuel. On governors arranged so that the rod end moves up to increase fuel, the cam is between the lever shaft and rod end.

The upward movement of the speeder plunger as the governor moves to increase fuel for increased loads thus decreases the compression on the speeder spring, and the governor—and engine—runs at a slower speed. Conversely, when the governor power piston moves to decrease fuel as load decreases, the speeder plunger increases the speeder spring compression, and the governor and engine run at a faster speed.

Adjustment

Adjustment of the speed droop setting is. accomplished by loosening the clamp screw and changing the position of the speed droop lever cam with respect to the speed droop lever shaft. Moving the cam away from the lever shaft increases the droop; moving the cam towards the lever shaft decreases the droop. If the center of the cam coincides with the center of the lever shaft, “zero droop” results and the governor will give isochronous (constant speed) operation. When decreasing the droop setting, take care not to move the cam beyond the zero droop point since “negative droop” (speed increasing with load increases) leads to an inherently unstable system.

Information and Parts Replacement

When requesting additional information concerning droop or governor operation, or when ordering repair parts, it is essential that the following information accompany the request:

- Governor serial number (shown on nameplate). The serial number is needed since the reference numbers given in this bulletin do not identify the exact part number required for any one governor.
- Manual number (this is manual 36622)
- Part reference number, name of part, or description of part

Ref. No.	Part Name	Quantity
36622-1	Spring Check Plug	1
36622-2	Cover	1
36622-3	Pin	1
36622-4	Speeder Plug Assembly	1
36622-5	Screw — 1/4”-20 x 1 1/2” Soc. Head	3
36622-6	Speeder Plug Plunger	1
36622-7	Speed Droop Lever Shaft	1
36622-8	Washer	2
36622-9	Screw — No. 8-32 x 5/8” Hex Head	2
36622-10	Needle Bearing	2
36622-11	Pin	1
36622-12	Pin	1
36622-13	Speed Droop Block	1
36622-14	Cotter Pin — 1/16” x 11/8”	1
36622-15	Speed Droop Lever	1
36622-16	Felt Wiper	1
36622-17	Cover	1
36622-18	Washer	4
36622-19	Screw— 3/8”-16 x 1” Soc. Head	4
36622-20	Cover	1
36622-21	Cover	1

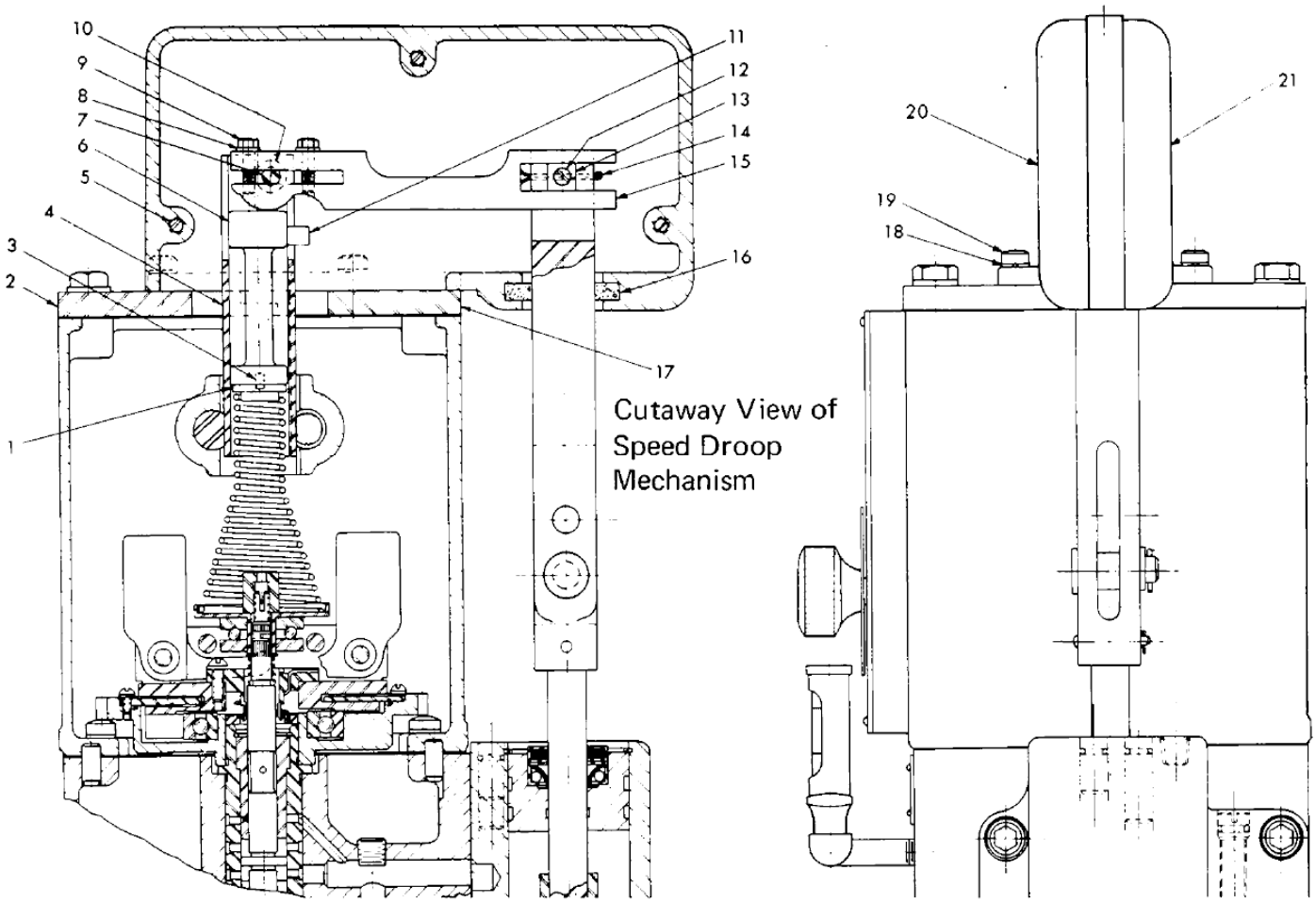

Figure 2. Speed Droop Mechanism Parts

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Send comments to: icinfo@woodward.com

Please reference publication 36622A.

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