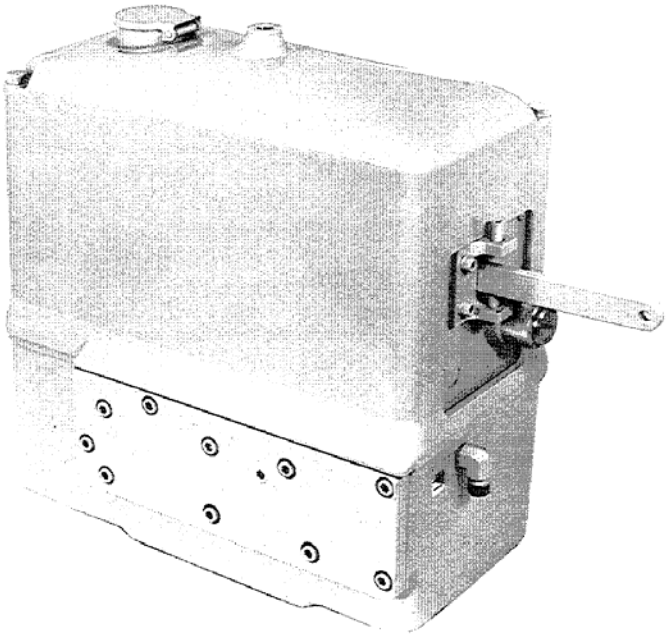
WOODWARD

Product Manual 36643
(Revision NEW)
Original Instructions



PGA Governor
Lever Speed Setting

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

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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 Out-of-date translations are marked with ⚠.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.

Revisions—Changes in this publication since the last revision are indicated by a black line alongside the text.

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.

PGA Governor
Lever Speed Setting

Introduction

This manual describes the Lever Speed Setting for the PGA Governor. Pneumatic and manual speed setting system operations are shown in the main PGA governor manual 36604.

Figure 1 shows the parts of the lever speed setting section of the PGA receiver assembly. Figure 2 is the schematic diagram of the pneumatic, manual, and lever speed setting on the PGA marine governor. Figure 3 shows the parts for the lever speed setting equipment.

⚠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.

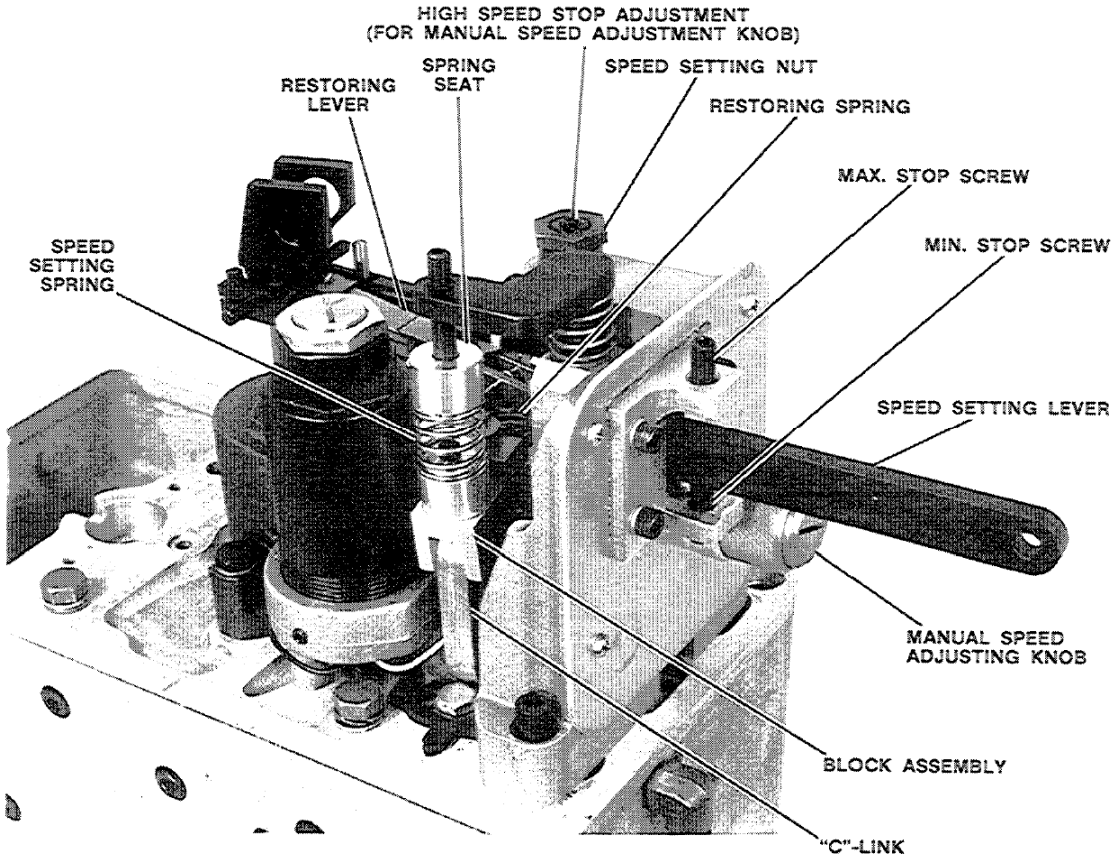

Figure 1. Lever Speed Setting Equipment for PGA Governor

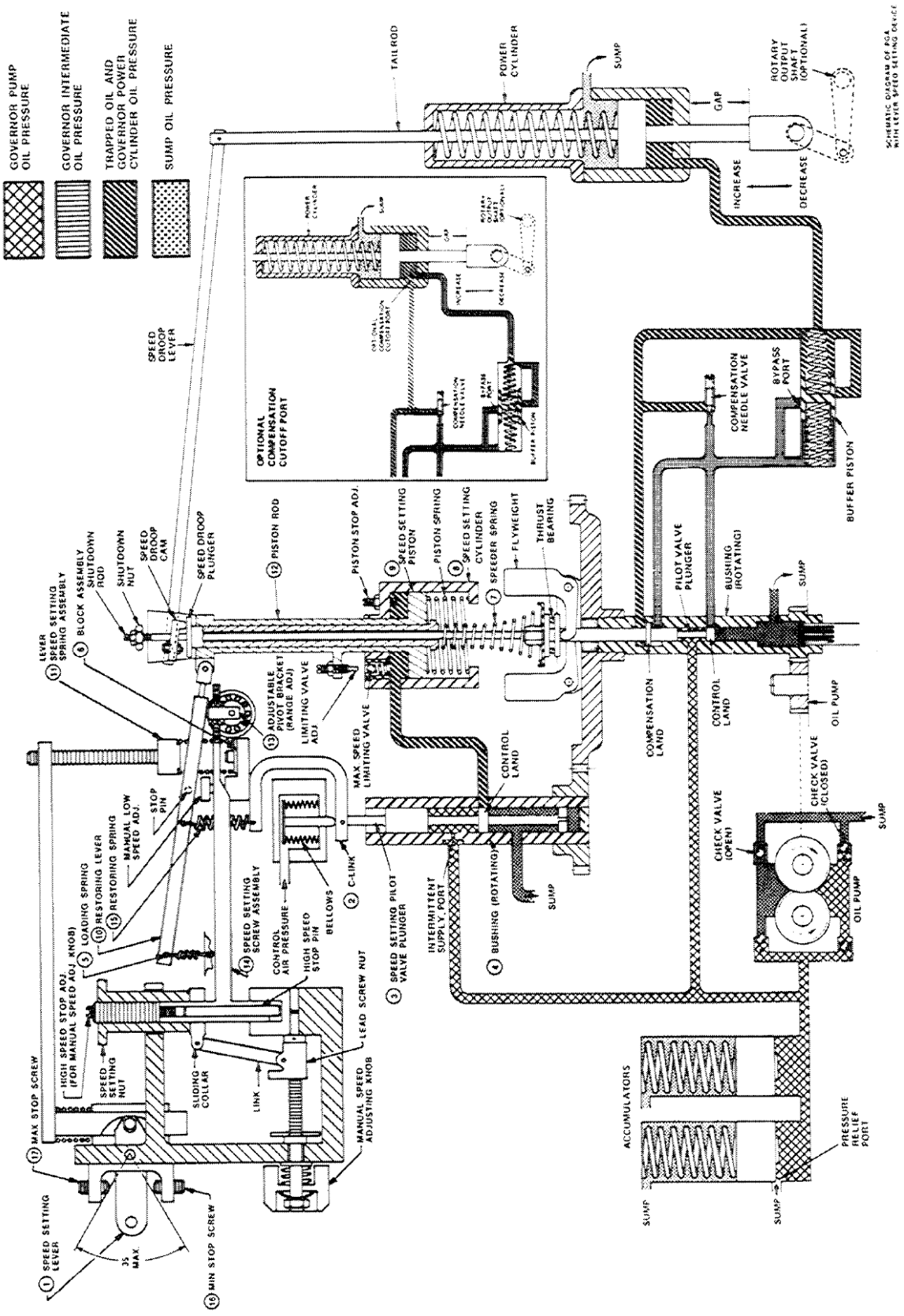

Figure 2. Schematic of Lever Speed Setting Equipment for PGA Governor

Operation of the Lever Speed Setting Control

(see Figures 2 and 3)

Introduction

Use the lever speed setting to adjust speed to any point within the normal speed range when control air pressure is not used.

IMPORTANT

When operating with pneumatic or lever speed setting, turn the manual speed setting knob fully counterclockwise. This positions manual speed at minimum or low speed position.

If the manual speed screw is set at any position other than minimum speed, it will raise the base speed of the governor and prevent normal operation at speeds below this setting.

Changing the minimum stop screw (16) to move the lever (1) toward maximum fuel also changes the base speed of the pneumatic speed control. Turning the speed setting assembly screw (11) will also change the base speed.

Description of Operation

When raising the speed setting lever (1) (increase speed), spring assembly (11) and block assembly (6) move down. Block assembly (6) is connected directly through C-link (2) to pilot valve plunger (3). As the plunger moves off center in rotating bushing (4), pressure oil flows into speed setting cylinder (8). This pressure forces piston (9) down, increasing the speed.

As piston (9) moves down, restoring lever (10), attached to the upper end of piston rod (12), pivots on adjustable pivot bracket (13). Pivot bracket (13) is on the extended arm of manual speed setting screw assembly (14).

The left end of restoring lever (10) is connected to restoring spring (15). Movement of the lever increases the force of restoring spring (15). This force, acting through C-link (2), overcomes the force of spring (11) and at the same time lifts plunger (3).

When the increase in the force of restoring spring (15) equals the increase in the force of spring assembly (11), plunger (3) is centered with the control land covering the metering port in bushing (4). This stops the flow of oil into cylinder (8) stopping movement of piston (9). At the same time, the force of speeder spring (7) reaches its higher value, equal to the higher position of lever (1). Spring (5) applies tension to lever (10) to maintain positive contact between lever (10) and adjustable bracket (13) at all times.

Replacement Parts

When ordering parts, give the following information:

- Manual number 36643
- Part reference number, name of part or description of part
- Serial number and part number of governor

Ref. No.	Part Name	Quantity
36643-1	Lever	1
36643-2	Screw	2
36643-3	Plate Assembly-Pneumatic & Lever S.S. Dial	1
36643-4	Spring Loading	1
36643-5	Plunger Assembly	1
36643-6	Block Assembly	1
36643-7	Screw - 10-32 x 0.375	1
36643-8	Bracket	1
36643-9	Screw - 0.250-28 x 1.500 Oval	1
36643-10	Spring Seat	1
36643-11	Spring Speed Bias	1
36643-12	Washer 0.149 x 0.275 OD	1
36643-13	Spring Seat	1
36643-14	Screw - 6-32 x 0.250	1
36643-15	Special Screw - 10-32	1
36643-16	Pin - 0.248 x 1.000	1
36643-17	Gasket	1
36643-18	Bracket Assembly	1
36643-19	Screw - 10-32 x 0.500	4
36643-20	Washer - Spring Lock 10-0.190 ID	4
36643-21	Screw - 6-32 x 0.500	4
36643-22	Washer	4

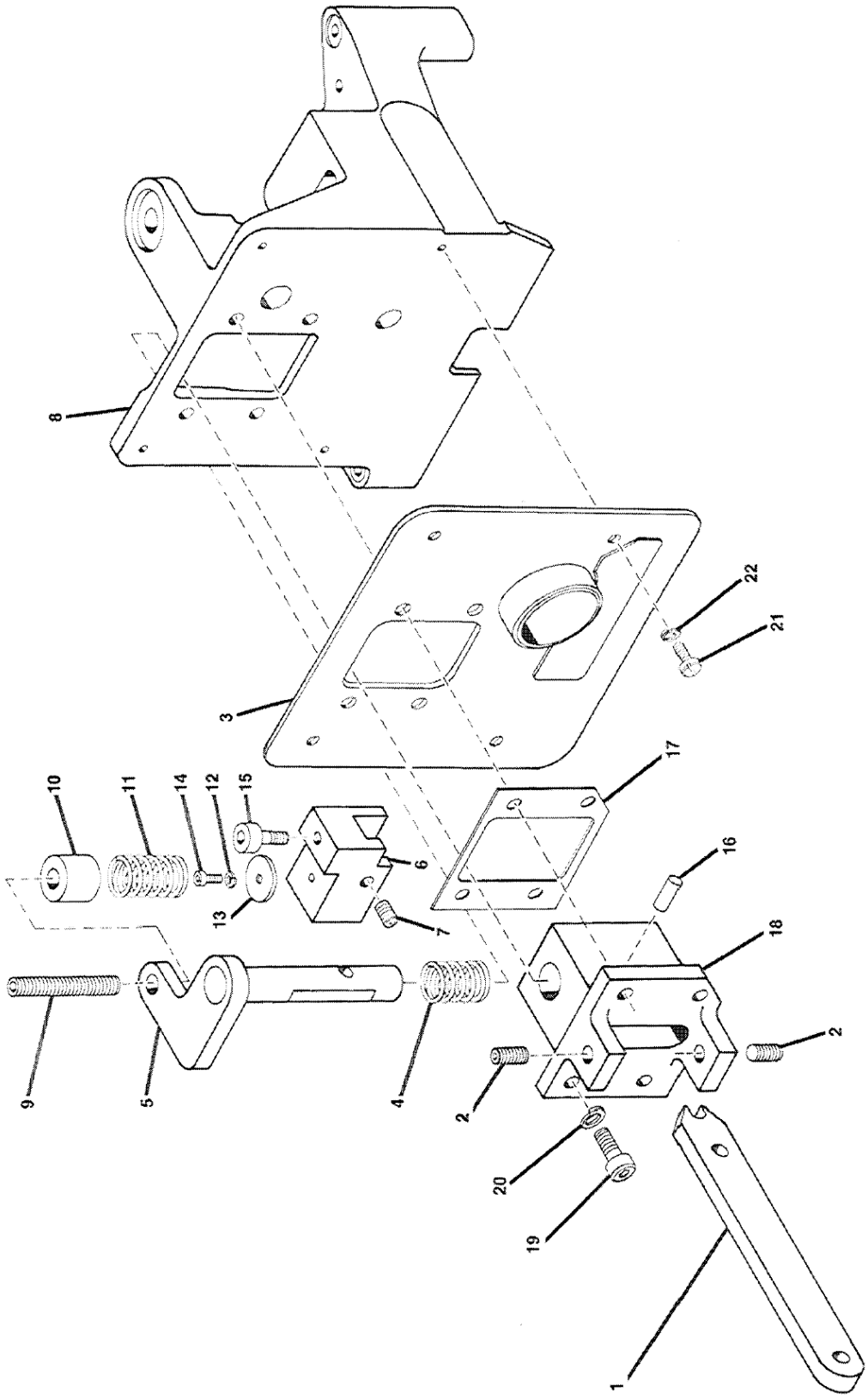

Figure 3. Parts for the Lever Speed Setting Equipment for the PGA Governor

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Send comments to: icinfo@woodward.com

Please reference publication 36643.

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