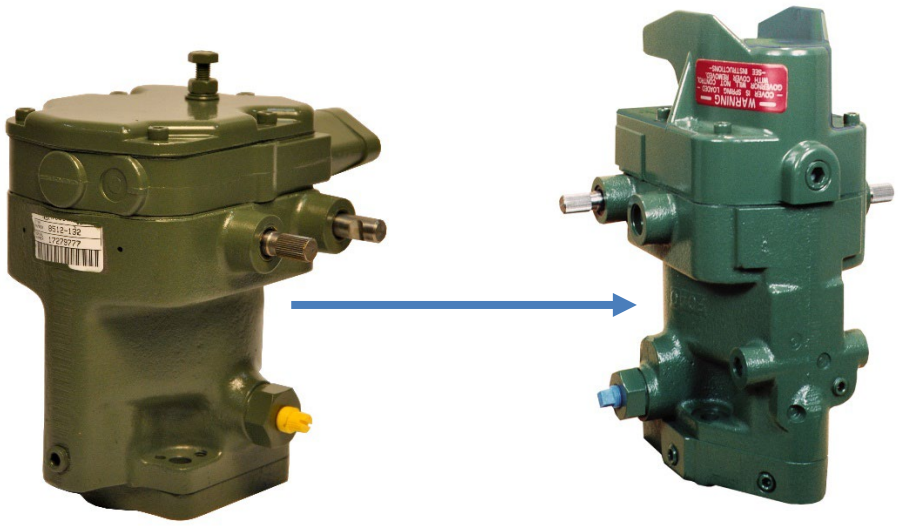
WOODWARD

# Application Note 51650
# (Revision -, 06/2024)

Original Instructions



# SG to PSG Governor Retrofit Guide

**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. The latest version of most publications is available on the Woodward website.**

**http://www.woodward.com**

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

**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. The latest version of most publications is available on the Woodward website.**

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**Always compare with the original for technical specifications and for proper and safe installation and operation procedures.**

**If your publication is not on the Woodward website, please contact your customer service representative to get the latest copy.**

**Revisions— A bold, black line alongside the text identifies changes in this publication since the last revision.**



**Application Note 51650**

# Contents



# Illustrations and Tables

# Warnings and Notices

## Important Definitions

This is the safety alert symbol 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*.**

# Chapter 1.
# Basic Differences

## Overview

The SG (Simple Governor) has been an important product line of Woodward's extensive mechanical hydraulic governor product offerings over the years. The SG governor has served the market for diesel engines, gasoline engines, steam turbines or gas turbines since the early 1940's. However, after more than 80 years of availability the market demand for new SG governor applications has diminished to the point Woodward can no longer cost effectively manufacture this product line. As the SG Governor can easily be replaced by the more advanced PSG (Pressure compensated Simple Governor), Woodward has decided to inactivate and stop all production of new SG Governors going forward.

The basic governor function of the SG governor is based on a fixed droop setting, which results in engine speed reducing (drooping) when load on the engine is increased. Like the SG governor, the PSG governor can also be configured to operate using a fixed droop setting or it can be configured to operate in a special isochronous mode (fixed speed operation when load on the engine is increased) using the PSG's special needle-valve compensation system.

The drive shaft and mounting base bolt pattern between the SG and PSG governors are identical. There is a small increase in thickness of the base to allow bidirectional operation of the PSG, which leads to a shift in position for oil inlet, terminal shafts, and fuel adjustment shafts. The slight differences between SG and PSG governors can be overcome with minor adaptions to the fuel rack linkage and oil routing (i.e. length).

Steps to retrofit your engine to a PSG governor from a SG governor are shown in Chapter 4. Retrofit options that have been investigated so far are listed at the end of Chapter 4, however due to decades of proliferation there are too many SG configurations to investigate the entire product line.

For more information, please refer to the SG Governor Support Statement.

## Definitions

| | |
|---|---|
| Customer Service Representative (CSR) | Woodward member responsible for the ASI/AISF account administration and daily interface with ASI/AISF (i.e., quotations and order administration) |
| Authorized Independent Service Facility (AISF) | Provides authorized service that includes repairs, repair parts, and warranty service on Woodward's behalf. |
| Authorized Systems Integrators (ASI) | Independent organizations approved by Woodward, which incorporate products as part of a complete solution for energy control technologies, and which will provide service and training as needed. |
| OEM | Original equipment manufacturer, which includes any related service organization or dealer network that manufactures engines, turbines, compressors, or generator sets. |
| End User | User who, in the ordinary course of business, uses the products in its own facility for its own needs, does not resell the Products, and takes "final & permanent" (i.e., not for the purpose of resale) title to the products |
| Help Desk | Woodward defined help desk application that will be used by ASI/AISFs |

# Chapter 2.
# SG Governor Overview

## SG Governor Overview

The SG governor is a mechanical hydraulic speed droop governor that is used on diesel engines, gasoline engines, steam turbines or gas turbines where isochronous (constant speed) control is not required. The design of a speed droop governor is such that as load is increased, the desired speed of the governor is decreased which achieves stability in the governed system.

The SG governor is distinguished from the PSG governor by not having a compensation system. Units are supplied with a useful net torque output of 11.3 and 28.8 in-lbs. over a terminal shaft travel of 36°. A return spring (internal or external, vertical or horizontal) must be used to move the power piston toward minimum fuel.

Normally, the SG governor operates at speeds between 2400 and 3600 rpm but special configurations are available to meet other speed requirements.

This SG governor can operate while mounted vertically or horizontally. In the horizontal position, the mount must be such that the terminal shaft is also horizontal and requires a drain on the lower side of the cover.

### Speed Adjustment

Several options are available to adjust the desired speed of the governor. Refer to below speed setting options.

#### Speed Setting Shaft

A speed adjusting shaft may be used to change the force on the speeder spring (desired speed). Stop screws can be used for limiting the speed range of the variable speed governor.

#### Speed Adjusting Motor

Motors may be fitted on the governor cover to enable an operator to adjust the speed of the governor from a remote location. Several types of motors are available: Groschopp, Pittman, and Sawamura types.

- Groschopp motor is a split field, series wound, reversible motor. Motors are available in the following voltages: 115V AC/DC, 125V DC, 64V DC, 48V DC, 32V DC, 24V DC, and 12V DC.
- Pittman motor is a permanent magnet motor and only available for supply voltages of 12V DC and 24V DC.
- Sawamura motor (S40, MM40, MM4A, SMM40) is a permanent magnet motor available in various speeds and the following voltages: 220V AC/DC, 110V AC/DC, 24V DC.

#### Pneumatic Speed Adjustment

The pneumatic speed setting assembly can be used to change the speed setting of the governor from a remote location and can be direct acting or reverse acting. The pneumatic speed setting mechanism replaces the screws normally used to set high and low speeds. The most common range is 3-15psi, but 6-30psi, 9-15psi, 3-20psi, and 5-60psi ranges are available.

This system consists of a diaphragm, housing, oil reservoir, return spring, and a pushrod that extends to the floating lever in the governor. Speed will change proportionally to the change in supply air pressure. As an example, assume that the operator wants to increase the speed of the engine. The desired speed is increased by the operator increasing the air pressure to the reservoir - oil is forced through the orifice to the top of the diaphragm. As the diaphragm and piston move downward, the upward force of the spring is increased as the spring is compressed, re-establishing the force balance. The downward movement of the rod extending to the floating lever increases the speeder spring force (desired speed) and thus increases speed.

## Pump and Relief Valve

Supply oil (usually engine oil pressure) is supplied to the oil pump. Oil is carried in the gears around the outside of the gear pocket to the pressure side. As pressure increases, the relief valve plunger moves against the relief valve spring until the plunger exposes the hole allowing pressurized oil to return to sump.

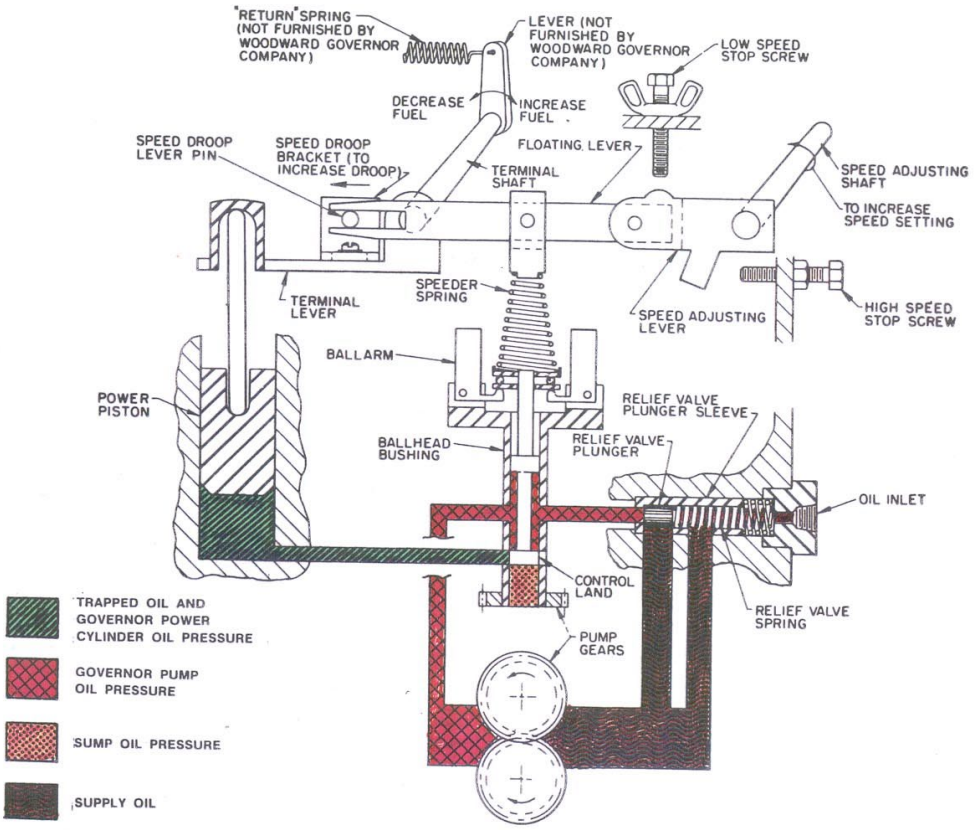


Figure 2-1. SG Governor

## Ballhead, Pilot Valve, Bushing, Speeder Spring Assembly

This assembly allows the governor to compare desired speed to actual speed and make a decision whether to add, decrease or make no change to the terminal shaft position, which controls fuel to the engine. A force balance exists between the ballhead and the speeder spring. The speeder spring force is the desired speed force and the centrifugal force of the ballhead (actual speed) acts opposite to the downward force of the speeder spring. During an on-speed condition, the forces balance and no oil is ported to or from the power piston. If the forces are not equal, pressure oil will be ported to or from the power piston, resulting in a change in terminal shaft position. The bushing rotates, driving the ballhead at a speed proportional to the engine speed. Its rotation reduces the frictional forces between the pilot valve and bushing. Different speeder springs, bushings, and ballheads are available for variations of speed and engine response.

## Power Piston

The power piston provides the force to move the terminal shaft to increase or decrease fuel to the engine. The piston is single acting, only exerting hydraulic force in the increase direction. When the pilot valve is lowered in the increase fuel direction, governor pressure oil is ported through the rotating bushing to the power piston, which moves upward. In a decrease fuel direction, the pilot valve raises allowing trapped oil to move from the power cylinder through the bushing to drain. The downward force that causes this movement comes from the return spring. The force applied to the lower side of the power piston during steady state operation is equal to the force applied by the return spring. In an increase transient or at blocked servo at max fuel the pressure will be equal to that generated by the pump plus the supply

pressure. At minimum fuel and blocked servo, the servo pressure will be zero with only the return spring force urging the power piston to minimum.

## Speed Droop Adjustment

Droop is defined as a decrease in speed with an increase in load. This is quantified as the change/decrease in rpm for an increase in output shaft position from minimum to maximum fuel position. Droop accomplishes three things:

1. Stability
2. Load limiting
3. Ability for multiple engines driving a common load to share load

The SG governor accomplishes this with a speed droop bracket and lever. As load increases and the power piston moves upward, the speed droop bracket and lever raise, lifting the floating lever which decreases the force on the speeder spring thus lowering the desired speed of the engine. As the droop slider is moved away from the terminal shaft, the amount of droop is increased.

A minimum amount of droop (0.5% to 7%) is necessary to stabilize an engine operated with a governor without a compensation system. If negative droop is present the governor will be unstable.

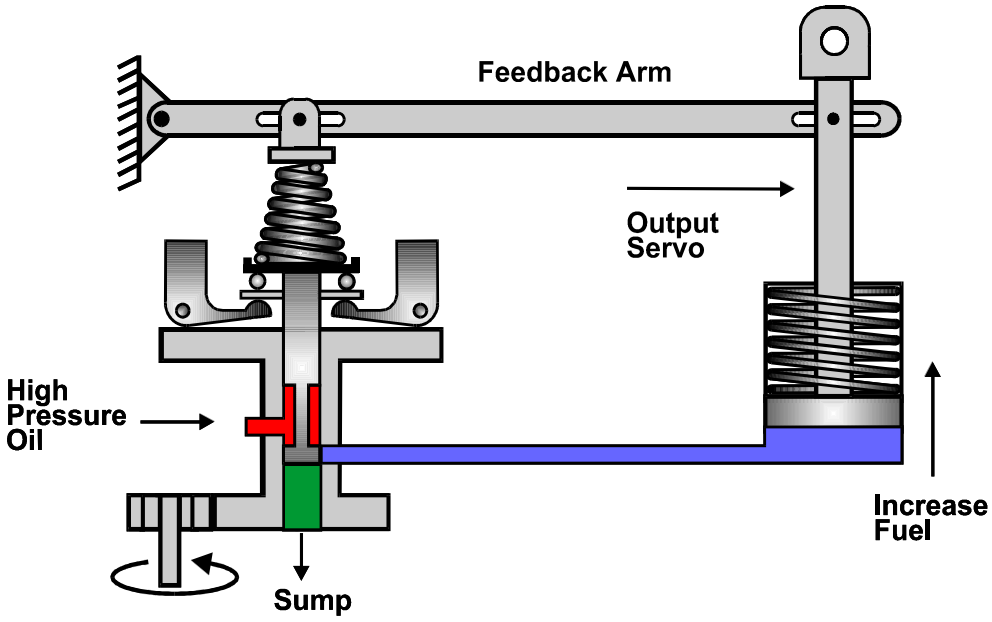


Figure 2-2. Basic Droop Governor

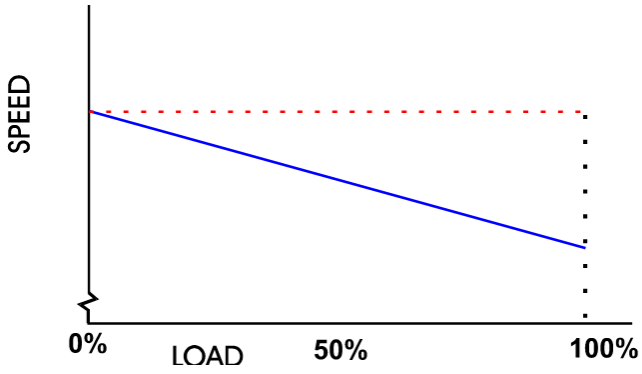


Figure 2-3. Speed Droop Curve

## Example of Operation

Assume that the operator wants to increase the speed of the engine, or an additional load is added to the system. The governor responds by:

1. The ballhead moves inward allowing the pilot valve to move downward below its “null” position.
2. Pressurized oil is ported through the bushing to the power piston moving it upward.
3. The terminal lever rotates clockwise increasing fuel to the engine.
4. As the engine accelerates from the added fuel, the flyweights move outward, lifting the pilot valve to its “null” position and stopping the increase of fuel.

The high-speed stop screw limits the top end speed of the engine and the low-speed stop screw controls the low speed. Setting these two controls the operating range of the engine.

# Chapter 3.
# PSG Governor Overview

The PSG governor differs from an SG governor in that it contains a compensation system. Since the SG governor has been previously described, only the compensation system will be discussed in this chapter.

The PSG's needle valve compensation system adds stability (temporary droop) to the governor during speed transients. There are 3 basic additions and differences that comprise the compensation system: the buffer piston, the needle valve, and the compensating land of the pilot valve.

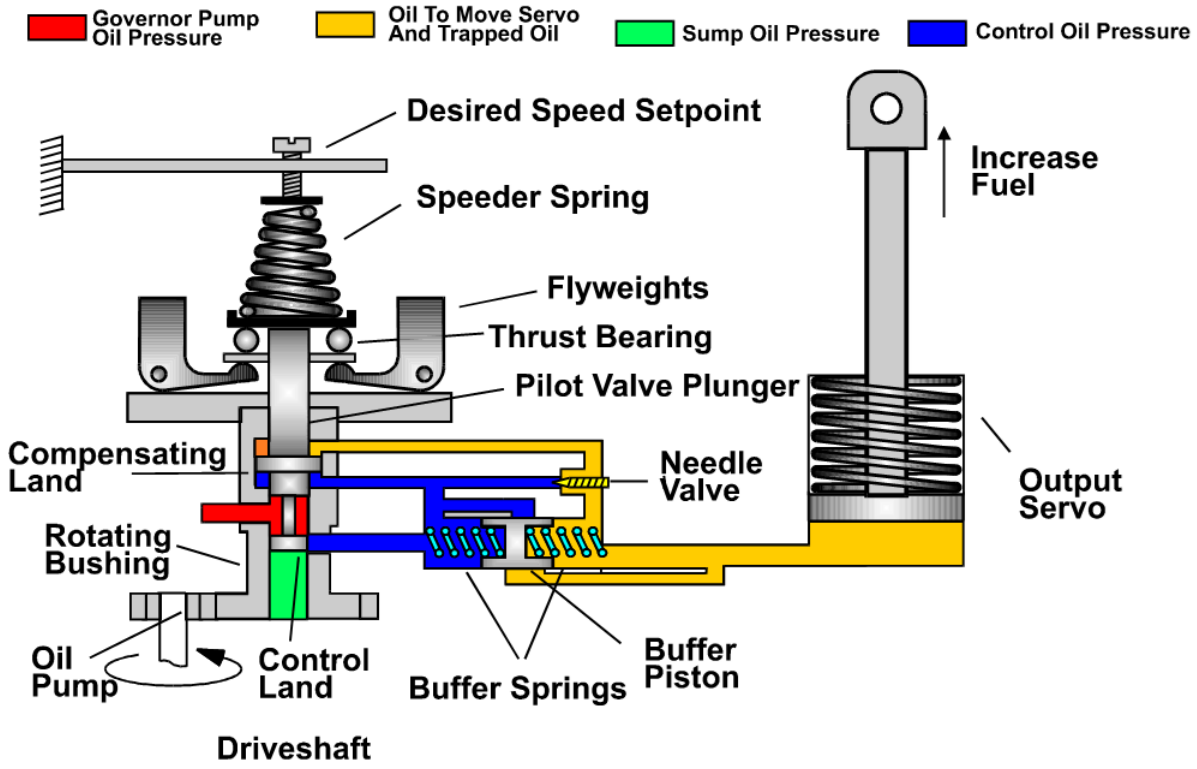


Figure 3-1. PSG Governor Functional Overview

Since all oil above the buffer piston is essentially trapped with the needle valve set at 1/8 to 1/4 open, the volume will remain approximately the same. The method to allow the buffer piston to move is that as the power piston moves upward, the volume increases in the path of the upper annulus of the piston. This volume increases at a faster rate than the decrease in volume as the buffer piston moves upward (to the right in this graphic). As a result, the pressure on the upper side may be 3/8 governor pressure and the lower side 5/8 governor pressure during a speed transient. This differential pressure applied to opposite sides of the compensation land of the pilot valve lend to the stability of the governor. It is noted that the compensation system always applies a force to the compensation land in the opposite direction that the pilot valve has moved during a transient in speed as well.

As an example, refer to Figure 3-2. Assume a load increase or an increase in desired speed. The ballhead moves inward as actual speed decreases or the speeder spring force increases. The pilot valve moves downward, porting governor pressure oil to the lower side of the power piston and to the lower side of the buffer piston. This causes the power piston and buffer piston to move upward.

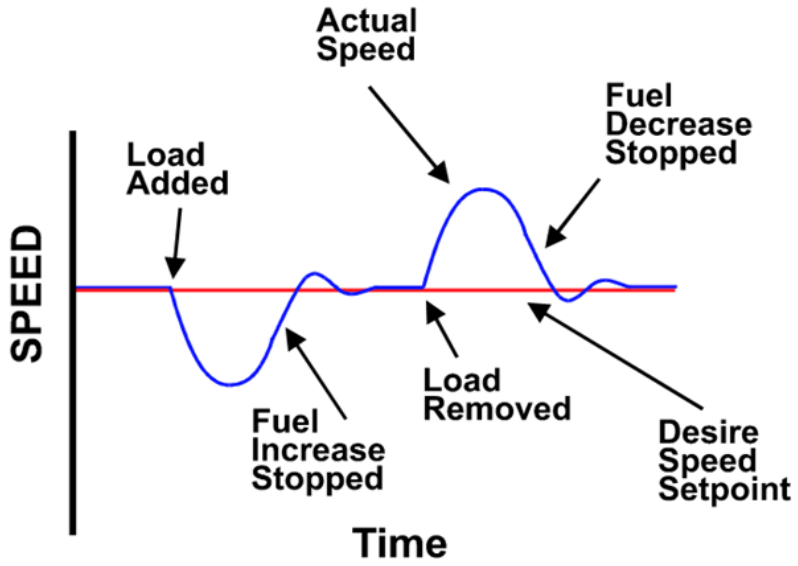


Figure 3-2. PSG Governor Isochronous Response Curve

# Chapter 4.
# SG to PSG Conversion Considerations

The basic governor function of the SG governor is based on a fixed droop setting. The engine/turbine speed will reduce when engine/turbine load increases. The PSG governor has a compensation system (i.e., in temporary droop) which allows it to run in isochronous mode. When a fixed droop operation is required for the engine operation, then this can also be achieved with the PSG governor by closing its compensation needle valve.

**Benefits of PSG over SG**

- Ability to operate in Droop or Isochronous Mode
- Reversible rotation possible
- Greater speed band available
- Higher Output
  - Additional 0.4 ft-lbs. at 175psi
  - Additional 0.8 ft-lbs. at 275psi

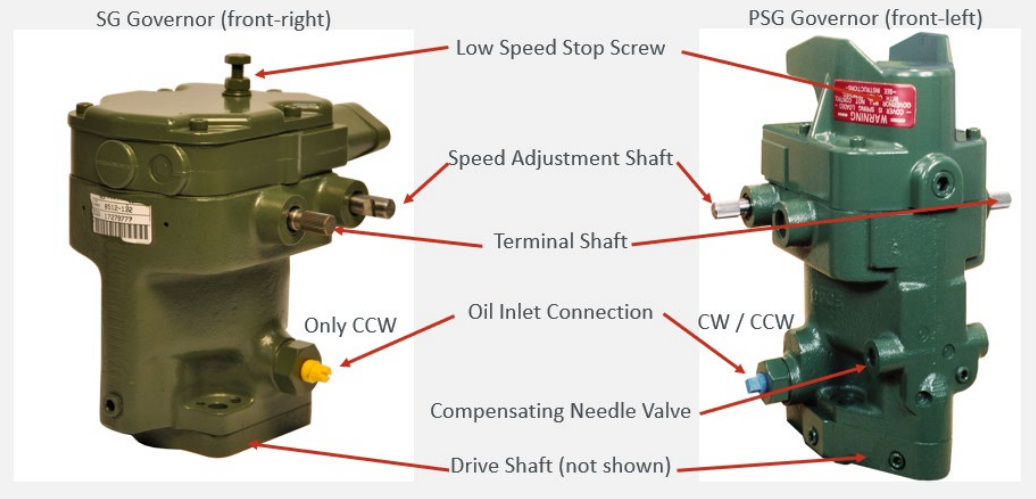


Figure 4-1. Comparison Diagram of SG & PSG Governor

## Setting Compensating Needle Valve

If using the PSG in Droop operation, simply close the needle valve completely by rotating CW.

To calibrate the needle valve for isochronous operation, follow these steps.

1. With the prime mover operating at idle, open the compensation needle valve 3-4 turns from complete closed (CW) direction. Allow several minutes of hunting to remove trapped air in the circuit.
2. Close the needle valve gradually until hunting is barely eliminated. Keep the needle valve open as far as possible to prevent sluggishness in the response of the governor.
3. Check the governor stability by manually disturbing the governor speed setting. Governor should respond with only a slight overshoot or undershoot and settle quickly at the new setpoint.
4. Once the needle valve adjustment is correct, it is not necessary to change the setting except when a large/permanent change in oil viscosity occurs. This can be due to a large change in temperature, oil being changed, etc.

# Typical SG to PSG Conversion Procedure

1. Reference Table 4-1 below for PSG retrofit availability.
   a. If there is already a PSG retrofit part number available for your SG, then simply request a quote for this corresponding PSG part number.
   b. If your SG part number is not shown, then move to Step 2.
2. Send a request to Woodward's HelpDesk team (**Contact Us - Woodward Technical Support**) with part number and serial number of the SG that needs a replacement.
3. Woodward Helpdesk Team will forward request to Woodward's upgrade team, who will determine if a compatible retrofit PSG governor part number is available.
   a. If a compatible retrofit PSG part number is available, the upgrade team will send this information to the respective customer.
   b. If a compatible retrofit PSG part number is not available, the upgrade team will provide a quotation for Woodward to create a compatible retrofit PSG part number and send this information to the respective customer. If customer desires to pay for the creation of a compatible retrofit PSG part number, the upgrade team will create a compatible retrofit PSG part number and send this information to the respective customer.
4. Customer retrofits SG governor with PSG governor and makes any necessary modifications to the linkages and oil inlet.

## Conversion Notes

- Drive shaft and mounting base bolt pattern between SG and PSG governor are identical.
- See Figure 4-2 showing a thicker base on the PSG resulting in:
  - Height of the terminal and speed adjusting shafts are about 1/2" (11mm) higher on the PSG
  - Mounting bolts need to be 1/2" (11mm) longer for PSG
  - Overall height of the PSG is about 1/2" (11mm) taller than the SG
- The PSG governor oil inlet connection is only on the left side. SG has inlet on right and left sides depending on the rotation of the drive shaft. See Figure 4-1.
- The minor differences between SG and PSG governors can be overcome with minor adaptions of the fuel rack linkage and oil connection (i.e., length).
- Due to decades of proliferations of different SG and PSG governor configurations not all may be summarized in Table 4-1. Contact your Woodward CSR for any questions or concerns.

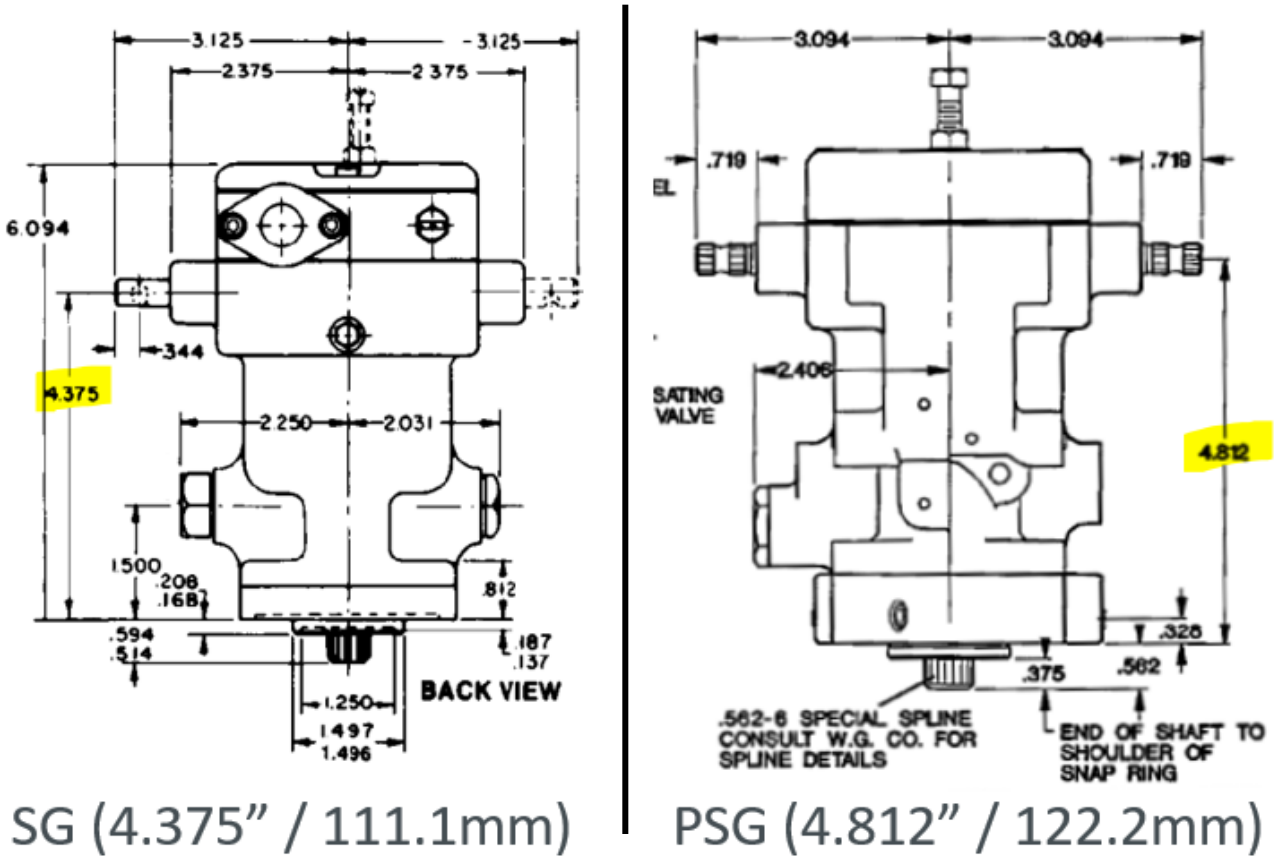


Figure 4-2. Height Differences for Terminal and Speed Shafts

Table 4-1. Retrofit SG to PSG Part Numbers

| SG Governor Part Number | SG Prefix | PSG Retrofit Part Number | Retrofit Comments | Speed Adjusting Shaft | Terminal Shaft | Ballhead | Porting | Drive Shaft | Governor Mounting | Rotation | Return Spring Type | High Speed Stop | Low Speed Stop | Speed Setting Motor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **41367** | | 8561-773 | | Single Notched - 66deg LH | RH Rod - Standard | Solid w/ 2 Weights | 4 Port | Std. Splined | Vertical | CW | Horizontal (RH) | 3800 | Adj. 0-1000 | None |
| **41817** | | 8561-773 | | Single Notched - 66deg LH | RH Rod - Standard | Solid w/ 2 Weights | 4 Port | Std. Splined | Vertical | CW | Horizontal (RH) | 3800 | Adj. 0-1000 | None |
| **41823** | | 8561-839 | | Single Notched - 19deg RH | Single Serrated -RH | Solid w/ 2 Weights | 1 Round | Std. Splined | Vertical | CCW | Vertical | 3900 | Adj. 0-1000 | None |
| **8510-214** | | Not Currently Available | | | | | | | | | | | | |
| **8510-486** | A | 8563-391 | | Single Plain -LH | Double Plain | Solid w/ 2 Weights | 1 Round | Std. Splined | Horizontal -Servo Down | Reversible | None | 4200 | Adj. 2600 | None |
| **8511-144** | | 8563-391 | | Single Plain -LH | Double Plain | Solid w/ 2 Weights | 1 Round | Std. Splined | Horizontal -Servo Down | Reversible | None | 4200 | Adj. 2600 | None |
| **8511-144** | A | 8563-391 | | Single Plain -LH | Double Plain | Solid w/ 2 Weights | 1 Round | Std. Splined | Horizontal -Servo Down | Reversible | None | 4200 | Adj. 2600 | None |
| **8511-145** | | 8563-628 | | Single Plain -LH | Double Plain | Solid w/ 2 Weights | 1 Round | Std. Splined | Horizontal -Servo Down | Reversible | None | 2600 | Adj. 2600 | None |
| **8511-155** | | A 8563-679 | 2 Slope Droop not available in PSG. Use compensation needle valve to make comparable reaction. | Single Plain -RH | Single Plain -LH | Solid w/ 2 Weights | 4 Round | Std. Splined | Vertical | CCW | None | 3800 | Adj. 3000 | None |

Table 4-1. Retrofit SG to PSG Part Numbers (cont'd.)

| SG Governor Part Number | SG Prefix | PSG Retrofit Part Number | Retrofit Comments | Speed Adjusting Shaft | Terminal Shaft | Ballhead | Porting | Drive Shaft | Governor Mounting | Rotation | Return Spring Type | High Speed Stop | Low Speed Stop | Speed Setting Motor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **8511-200** | | Not Currently Available | | | | | | | | | | | | |
| **8511-202** | | Not Currently Available | | | | | | | | | | | | |
| **8511-302** | | Not Currently Available | | | | | | | | | | | | |
| **8511-456** | | Not Currently Available | | | | | | | | | | | | |
| **8511-457** | | Not Currently Available | Telescoping Power Piston no longer available. | | | | | | | | | | | |
| **8511-551** | | A 8563-702 | Oil Drain needs to be rerouted to cover for PSG. | Single Serrated - LH | Double Serrated | Solid w/ 2 Weights | 1 Round | Std. Splined | Horizontal - Servo Down | Reversible | None | 1859 | Adj. 1505 | None |
| **8511-700** | | 8561-675 | | Single Serrated - LH | Double Serrated | Spring Driven Oil Damped | 3 Slot | Std. Splined | Horizontal -Servo Down | CW | Vertical | 2025 | Adj. 788 | None |
| **8512-070** | | Not Currently Available | | | | | | | | | | | | |
| **8512-083 GU** | A | Not Currently Available | | | | | | | | | | | | |
| **8512-110** | | 8561-761 | | Single Serrated - LH | Single Serrated -LH | Spring Driven Oil Damped | 4 Round | Std. Splined | Horizontal -Servo Down | CCW | Vertical | 3600 | Adj. 1500 | None |

Table 4-1. Retrofit SG to PSG Part Numbers (cont'd.)

| SG Governor Part Number | SG Prefix | PSG Retrofit Part Number | Retrofit Comments | Speed Adjusting Shaft | Terminal Shaft | Ballhead | Porting | Drive Shaft | Governor Mounting | Rotation | Return Spring Type | High Speed Stop | Low Speed Stop | Speed Setting Motor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **8512-131** | | 8561-773 | | Single Notched - 66deg LH | RH Rod - Standard | Solid w/ 2 Weights | 4 Port | Std. Splined | Vertical | CW | Horizontal (RH) | 3800 | Adj. 0-1000 | None |
| **8512-132** | | 8561-738 | High Speed Stop factory set at 4000. Needs High Speed Stop adjusted to 3900 upon installation. | Single Notched - 19deg RH | Single Serrated -RH | Solid w/ 2 Weights | 3 Slot | Std. Splined | Vertical | CCW | Horizontal (RH) | 4000 | Adj. 0-1000 | None |
| **8512-133** | | 8561-839 | Vertical return spring style, same speeds | Single Notched - 19deg RH | Single Serrated -RH | Solid w/ 2 Weights | 1 Round | Std. Splined | Vertical | CCW | Vertical | 3900 | Adj. 0-1000 | None |
| **8512-133** | | 8561-738 | Slightly Faster Response. High Speed Stop factory set at 4000. Needs High Speed Stop adjusted to 3900 upon installation. | Single Notched - 19deg RH | Single Serrated -RH | Solid w/ 2 Weights | 3 Slot | Std. Splined | Vertical | CCW | Horizontal (RH) | 4000 | Adj. 0-1000 | None |
| **8512-134** | | Not Currently Available | | | | | | | | | | | | |
| **8512-135** | | Not Currently Available | | | | | | | | | | | | |
| **8512-205** | | 8563-626 | | None | Single Plain -RH | Spring Driven Oil Damped | 2 Round | Std. Splined | Horizontal -Servo Down | Reversible | None | 3931 | 1668 | 24 VDC (Top) |

Table 4-1. Retrofit SG to PSG Part Numbers (cont'd.)

| SG Governor Part Number | SG Prefix | PSG Retrofit Part Number | Retrofit Comments | Speed Adjusting Shaft | Terminal Shaft | Ballhead | Porting | Drive Shaft | Governor Mounting | Rotation | Return Spring Type | High Speed Stop | Low Speed Stop | Speed Setting Motor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **8512-293** | | Not Currently Available | | | | | | | | | | | | |
| **8512-303** | | Not Currently Available | | | | | | | | | | | | |
| **8512-427** | | 8563-761 | | Single Serrated - RH | Double Serrated | Solid w/ 2 Weights | 1 Round | Std. Splined | Vertical | Reversible | None | 3066 | Adj. 2482 | None |
| **8512-428** | | 8563-701 | | Single Serrated - LH | Double Serrated | Solid w/ 2 Weights | 1 Round | Std. Splined | Horizontal -Servo Down | Reversible | None | 3098 | Adj. 2507 | None |
| **8512-435** | | Not Currently Available | | | | | | | | | | | | |

# Chapter 5.
# Product Support and Service Options

## Woodward Upgrade Team Contact Information

Woodward HelpDesk Team
Contact Us - Woodward Technical Support

OR

Kyle Weinmeister
Sales Support Engineer
Kyle.weinmeister@woodward.com
+1-970-814-3435

## Product Support Options

If you are experiencing problems with the installation, or unsatisfactory performance of a Woodward product, the following options are available:

- Consult the troubleshooting guide in the manual.
- Contact the manufacturer or packager of your system.
- Contact the Woodward Full Service Distributor serving your area.
- Contact Woodward technical assistance (see “How to Contact Woodward” later in this chapter) and discuss your problem. In many cases, your problem can be resolved over the phone. If not, you can select which course of action to pursue based on the available services listed in this chapter.

**OEM or Packager Support:** Many Woodward controls and control devices are installed into the equipment system and programmed by an Original Equipment Manufacturer (OEM) or Equipment Packager at their factory. In some cases, the programming is password-protected by the OEM or packager, and they are the best source for product service and support. Warranty service for Woodward products shipped with an equipment system should also be handled through the OEM or Packager. Please review your equipment system documentation for details.

**Woodward Business Partner Support:** Woodward works with and supports a global network of independent business partners whose mission is to serve the users of Woodward controls, as described here:

- A **Full Service Distributor** has the primary responsibility for sales, service, system integration solutions, technical desk support, and aftermarket marketing of standard Woodward products within a specific geographic area and market segment.
- An **Authorized Independent Service Facility (AISF)** provides authorized service that includes repairs, repair parts, and warranty service on Woodward's behalf. Service (not new unit sales) is an AISF's primary mission.

A current list of Woodward Business Partners is available at: **www.woodward.com/find-a-local-partner.**

## Product Service Options

The following factory options for servicing Woodward products are available through your local Full-Service Distributor or the OEM or Packager of the equipment system, based on the standard Woodward Product and Service Warranty (5-09-0690) that is in effect at the time the product is originally shipped from Woodward or a service is performed:

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

**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 a flat-rate program and includes the full standard Woodward product warranty (Woodward Product and Service Warranty 5-09-0690).

This option allows you to call your Full-Service Distributor 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 Full-Service Distributor.

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 within 60 days, a credit for the core charge will be issued.

**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 5-09-0690) 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 5-09-0690). 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 for repair, please contact your Full-Service Distributor in advance to obtain Return Authorization and shipping instructions.

When shipping the item(s), attach a tag with the following information:

- Return authorization number
- 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

### 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

**NOTICE**

**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*.**

## 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

## Engineering Services

Woodward offers various Engineering Services for our products. For these services, you can contact us by telephone, by email, or through the Woodward website.

- Technical Support
- Product Training
- Field Service

**Technical Support** is available from your equipment system supplier, your local Full-Service Distributor, or from many of Woodward's worldwide locations, depending upon the product and application. This service can assist you with technical questions or problem solving during the normal business hours of the Woodward location you contact. Emergency assistance is also available during non-business hours by phoning Woodward and stating the urgency of your problem.

**Product Training** is available as standard classes at many of our worldwide locations. 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.

**Field Service** engineering on-site support is available, depending on the product and location, from many of our worldwide locations or from one of our Full-Service 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 information on these services, please contact one of the Full-Service Distributors listed at **www.woodward.com/local-partner.**

## Contacting Woodward's Support Organization

For the name of your nearest Woodward Full-Service Distributor or service facility, please consult our worldwide directory at **www.woodward.com/support**, which also contains the most current product support and contact information.

You can also contact the Woodward Customer Service Department at one of the following Woodward facilities to obtain the address and phone number of the nearest facility at which you can obtain information and service.

# Technical Assistance

If you need to contact technical assistance, you will need to provide the following information. Please write it down here before contacting the Engine OEM, the Packager, a Woodward Business Partner, or the Woodward factory:

## General

Your Name _____

Site Location _____

Phone Number _____

Fax Number _____

## Prime Mover Information

Manufacturer _____

Turbine Model Number _____

Type of Fuel (gas, steam, etc.) _____

Power Output Rating _____

Application (power generation, marine, etc.) _____

## Control/Governor Information

**Control/Governor #1**

Woodward Part Number & Rev. Letter _____

Control Description or Governor Type _____

Serial Number _____

**Control/Governor #2**

Woodward Part Number & Rev. Letter _____

Control Description or Governor Type _____

Serial Number _____

**Control/Governor #3**

Woodward Part Number & Rev. Letter _____

Control Description or Governor Type _____

Serial Number _____

## Symptoms

Description _____

_____

*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.*

# Revision History

**New Manual—**

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Released

**We appreciate your comments about the content of our publications.**

**Send comments to: industrial.support@woodward.com**

**Please reference publication 51650.**

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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.**