WOODWARD

Product Manual 36644
(Revision NEW)
Original Instructions

Motor Speed Setting for the PG 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:

www.woodward.com/publications

The latest version of most publications is available on the *publications page*. 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. 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 Out-of-date translations are marked with ⚠.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.

Contents

Illustrations and Tables

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.

Chapter 1.
General Information

Introduction

This manual describes the operation of the Permanent Magnet Motor Speed Setting option for PG governors. The PG governor, when equipped with this option, is called a PGM.

Description

The motor speed-setting option uses a 24 Vdc operated permanent-magnet motor to provide an infinitely variable speed setting with a high- and low-speed-setting limit. The motor also turns a manual speed-setting knob. The manual knob may be used to override the motor setting and to adjust the speed in the event of motor or wiring malfunctions.

A mechanical stop and clutch is provided to prevent jamming of the device. The governor also has internal speed-setting limits which limit the motor speed setting.

References

The motor-speed-setting option on PG governors is compatible with all PG type governors.

The information in this manual is designed to be used with the appropriate PG manual. In many cases the speed-setting options are included in the other manuals and these portions of the PG manuals should be ignored when the governor is equipped with the motor speed-setting option.

Chapter 2.
Field Wiring

The PGM governor is provided with a 7-pin connector. The motor speed setting uses the three pins marked C, D, and E. The other four pins, marked A, B, F, and G, are available for other electrical connections which may be needed for governor operation.

The plug assembly which will match the connector is Woodward part number 1631-043.

Use 18 AWG (0.8 mm²) or larger wire to connect a 24 V, 5 A supply to the speed-setting motor. Use a double throw, double post, center off switch in the speed-setting wiring. Connect the switch according to the wiring diagram.

Alternate wiring can indicate whether the device is at either minimum or maximum limits. Connect terminal "E" in the plug through the indicator to ground. The indicator will be activated only when one of the switches is activated. The indicator will not indicate if it is the high or the low switch that has been activated by the speed-control setting.

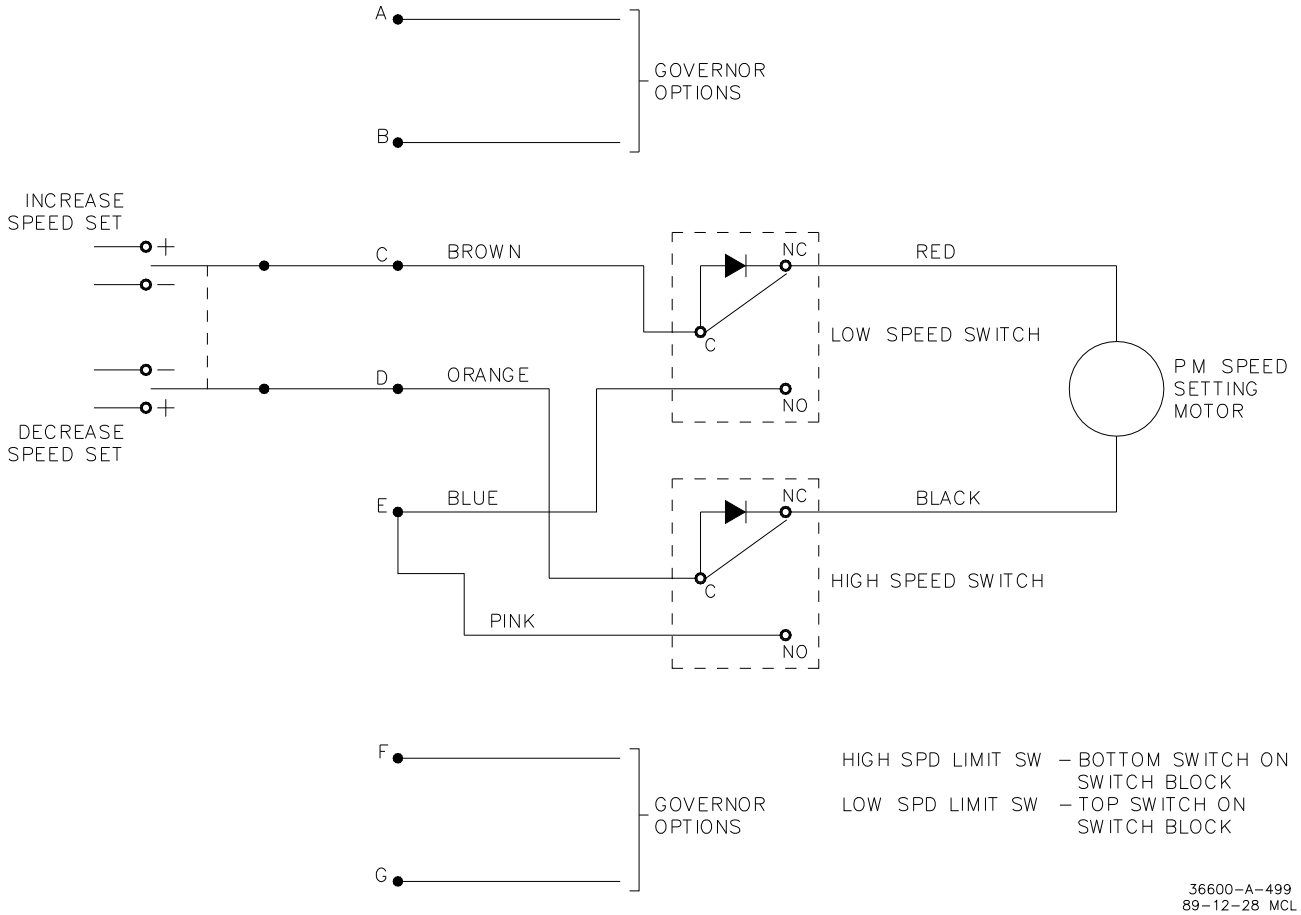

Figure 2-1. Switch Wiring Diagram

Chapter 3.
Operation of the Motor Speed Setting PG Governor

Governor speed setting is a function of the position of the speed-setting-servo piston. Increase speed setting is in the down direction.

The Motor Speed Setting Option controls the position of the speed-setting-servo piston and therefore the governor-speed setting.

For more detailed information on the operation of the PG governor and the speed-setting piston refer to manual 36604, PGA Governor.

The permanent-magnet motor is connected, through a friction clutch, to a bevel gear and screw. When the motor output turns the bevel gear the speed-setting screw moves the left end of the floating lever. (Refer to schematic diagram, Figure 3-2.)

In the case of an increase in speed setting, the screw lowers the left end of the speed-setting lever which lowers the pilot-valve plunger in the rotating bushing. This allows pressure oil to flow to the top of the speed-setting piston, causing the piston to move downward, increasing the speed setting of the governor. Downward motion of the speed setting piston causes the floating lever link to rise, lifting the right end of the floating lever and raising the pilot-valve plunger.

When the new set point is reached, the pilot-valve plunger nulls and the piston stops moving at its new set point.

The governor will recognize this increased pressure on the speeder spring as an underspeed condition and will cause the governor output to increase.

Motor speed-setting limits are controlled by the speed-setting-motor limit switches. When the speed setting reaches either the low- or high-speed limit switch, the motor stops. A diode circuit allows the motor to "back away" from the stops.

In the event of an electrical malfunction, speed setting can be set by the manual speed-setting knob. The knob drives the speed-setting screw through a bevel gear. The friction clutch allows the screw to be moved with a stopped motor. A mechanical indexing-wheel limit prevents jamming the mechanism with excessive manual-knob rotation. The indexing wheel limits the screw to a maximum of seven revolutions. The indexing wheel indexes one eighth of a turn for every turn of the bevel gear and speed-setting screw. The indexing wheel is limited by the stop pins to a maximum of 7/8 of a turn.

Backup speed-setting stops are located on the speed-setting cylinder. The maximum speed is limited with a relief valve actuated by the limiting-valve adjustment screw on the piston rod. The minimum speed is limited by a piston-stop adjustment on the cylinder.

These backup speed-setting limits are set to purchaser specifications at the factory and should not need adjustment. Any adjustment in the limiting system can prevent the governor from reaching desired speed settings.

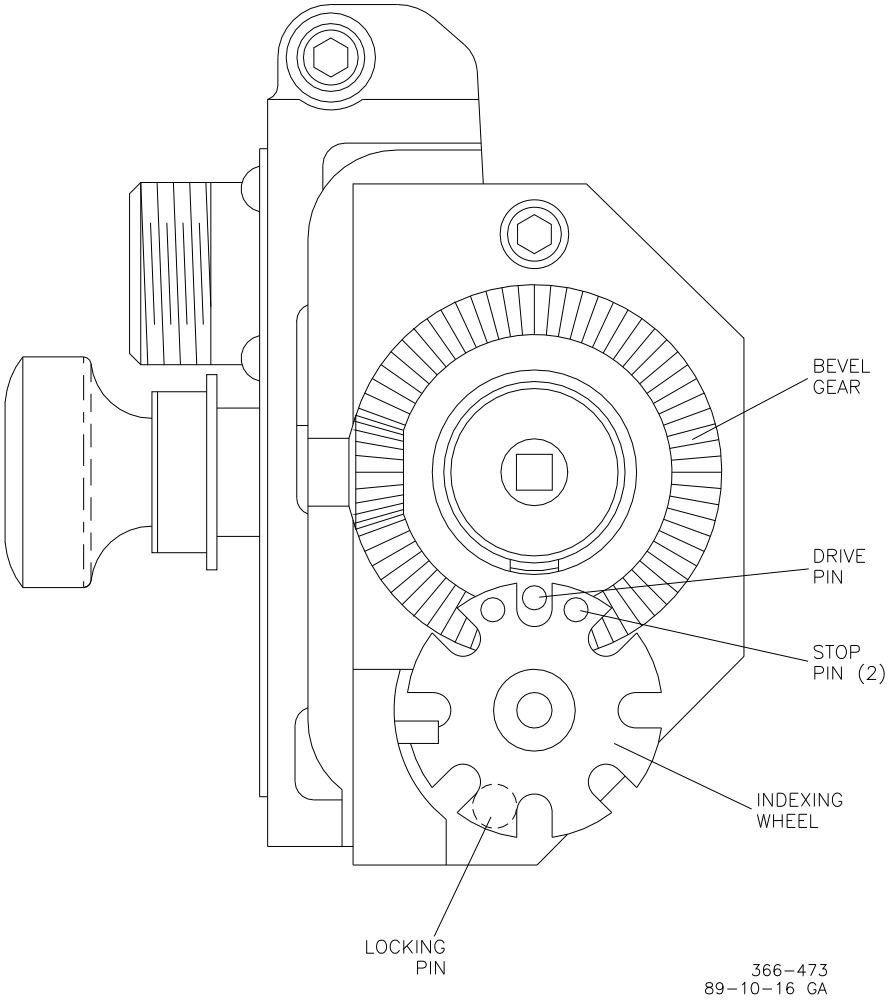

Figure 3-1. Manual Speed Setting Schematic

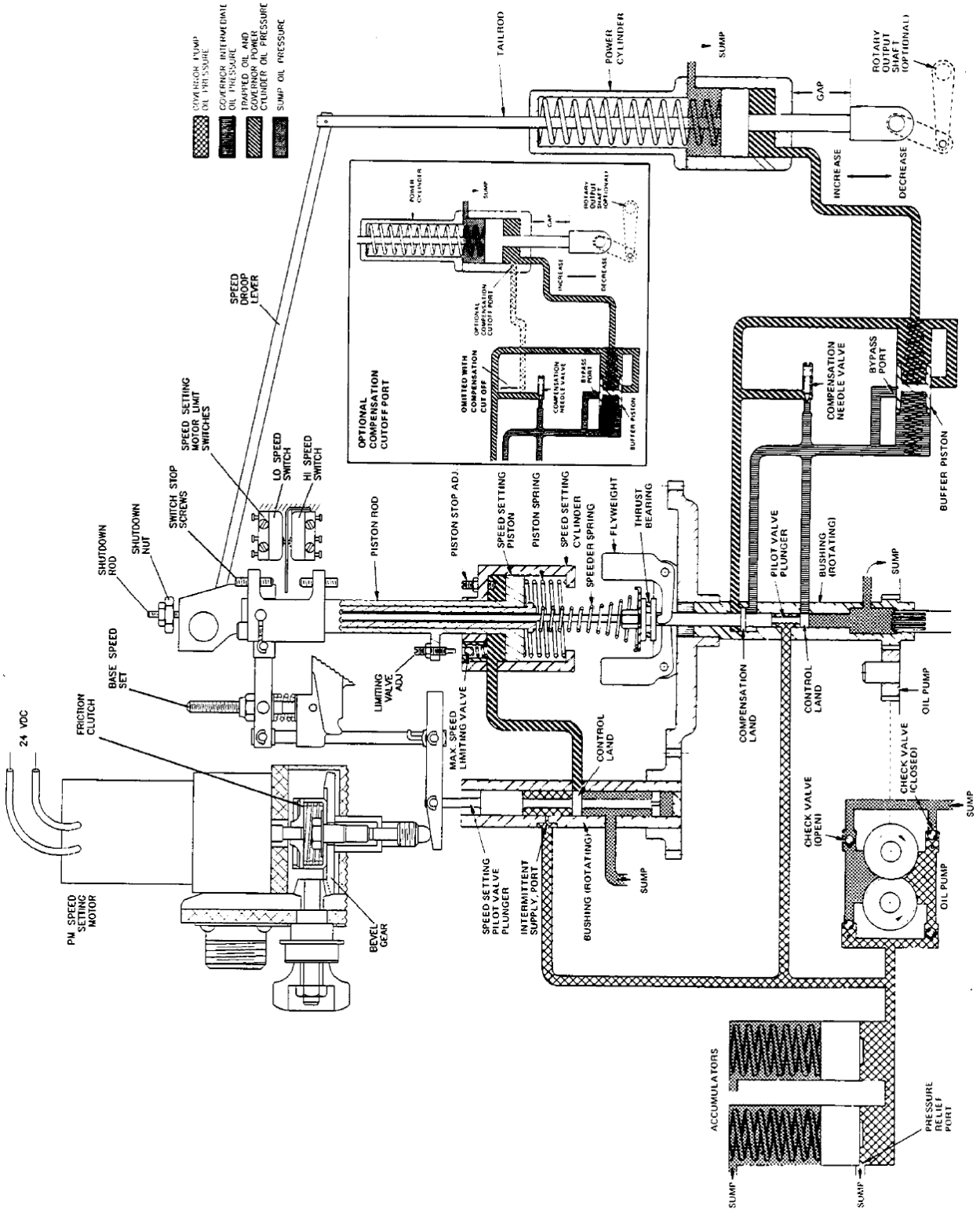

Figure 3-2. Schematic Diagram of PG Motor Speed Setting

Chapter 4.
Motor Speed Setting Maintenance and Repair

Introduction

When troubleshooting the inability to reach desired speed settings note that the motor speed-setting device is not always the cause. Before working on the speed-setting device check for problems in these areas:

Plant Wiring

- Is voltage and available current correct?
- Does Polarity Flip-Flop when the switch is toggled?
- Is connector wiring according to the plant-wiring diagram.

Limiting Devices Included in the Governor

- Is a normal limit function preventing high speed? (Torque limit or fuel limit are examples of limits often built into PG governors.)

Governor Fuel Linkage

- Is linkage friction excessive?
- Is a minimum or maximum stop being contacted?
- Is the governor output able to move the linkage to the minimum and maximum positions?

Specification Problems

- Have the governor drive-shaft speeds been correctly specified?
- Has the correct prime-mover speed to governor-speed ratio been considered?

Engine Condition

- Can the engine produce rated power?
- Is the load within the range of the engine?

⚠WARNING

If adjustments to the speed setting limits are to be made on an engine, be prepared to prevent overspeed of the engine by means other than the governor. Making speed setting adjustments while the engine is running risks causing an overspeed with resulting damage to the engine and possible personal injury or even death. A positive overspeed device, completely separate from the governor, must be in place and operating before making any internal adjustments or repairs to the governor.

Speed Setting Limits and Positive Stops

The motor speed-setting device incorporates a number of limits and positive stops which must be correctly set if the variable-speed governor is to reach its expected speed settings.

The best way to set the limits and stops is on a test stand. Using a test stand eliminates the possibility of engine overspeed while the adjustments are being made. The mechanic must set the various stops in the correct order and must understand the relationship of the various limits and stops.

The speed setting stops must be set in the following order to avoid a conflict between the stops.

1. Base Speed Setting
2. Mechanical stop (indexing) mechanism
3. Limit Switches
4. Minimum Stop and Check Valve (These two settings must be out of the way before any other settings can be accomplished. After the limit switches are set Minimum Stop and Check Valve should be set to provide absolute limits, beyond the motor-speed-setting limits.)

Base Speed Setting

The purpose of the Base Speed Setting adjustment (see Figure 3-2) is to get minimum and maximum motor speed settings to occur between the two mechanical stops.

Example:

- There is a span of 800 rpm between the minimum and maximum mechanical stops.
- As assembled the minimum- and maximum-speed mechanical stops give 150 and 950 rpm.
- The desired calibration is 700 to 1100 with the motor speed setting.
- Adjust the location of the bevel gear so the base speed stops are at about 500 and 1300 rpm.
- Then set the limit switches for 700 and 1100.
- Set the dump valve and limit screw slightly above and below 700 and 1100.

Mechanical Stop of the Bevel Gear and Base Speed Setting

A stop assembly, driven by a pin on the bevel gear (58), provides physical stops in the increase and decrease direction to prevent turning the speed-setting screw (59) in or out too far with the manual knob. These stops are not speed-setting stops. They are present only to prevent damaging the governor with the manual speed-setting knob.

To set the proper position of the stop assembly:

Be careful not to drop the detent ball (50) or spring (51) into the governor when removing or installing the stop assembly.

With the engine shutdown and the motor and stop assembly (49) removed, turn the speed-setting knob counterclockwise (toward minimum) until the speed-setting screw (59) just starts to lift the bevel gear (58). Then use the knob to turn the gear (58) and screw (59) down two full turns clockwise. This is usually the minimum speed of the base speed setting. Install the stop assembly against the minimum-position stop as shown. Be sure the ball (50) and spring (51) are installed below the stop assembly (49) Install the cover (44) to keep the device captive. The stop assembly (49) must index 1/8 turn for each revolution of the bevel gear (58).

Turn the gear clockwise until the stop assembly is against the maximum-speed stop. It is important that the speed-setting screw does not drop so low it will pull the square drive end of the screw out of the bevel gear. Should this happen the speed-setting screw and stop assembly must be repositioned.

IMPORTANT

The cover, permanent-magnet motor and motor plate must be removed to change the position or replace the stop assembly. Setting the mechanical stop position must be done with the engine stopped. When completed, the manual knob should be turned to minimum (as far counterclockwise as allowed).

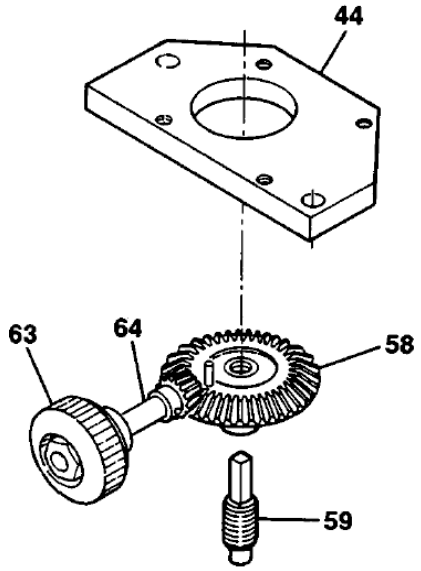

Figure 4-1. Bevel Gear Drive

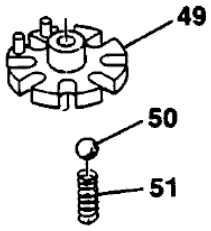

Figure 4-2. Indexing Wheel

Figure 4-3. Setting the Indexing Wheel

Minimum Stop Adjustment

A set screw (17) on top of the speed-setting-cylinder assembly (20) provides the absolute minimum-speed-setting stop for the governor.

The screw should be set and locked two full turns counterclockwise from the minimum speed-setting position (set by the limit switch).

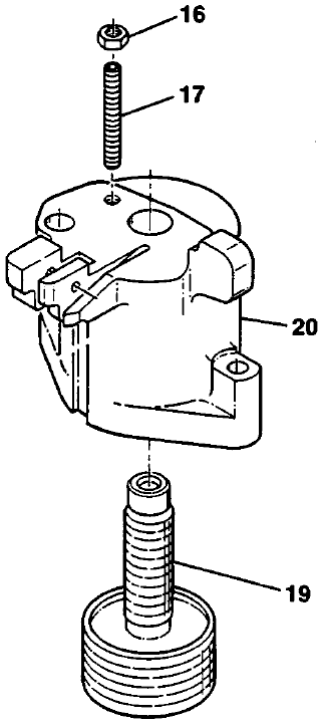

Figure 4-4. Minimum Stop Screw

Maximum Speed-Limiting Check-Valve Assembly

The maximum speed-setting position is limited by the check-valve assembly (18) in the top of the speed-setting cylinder (20). The check valve is opened by an 8-32 screw (21) on the fulcrum assembly (1). When the speed setting cylinder is at the desired maximum speed-limiting position, the screw mechanically unseats the check valve, providing a maximum position.

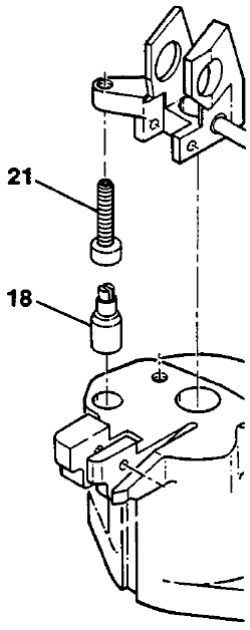

Figure 4-5. Maximum Check Valve

This maximum limit is normally set 10 rpm higher than the maximum limit switch setting.

WARNING

If the check valve setting is to be adjusted, make sure that engine overspeed is prevented by a device completely separate from the governor. Life threatening overspeed could occur while changing the setting of the maximum speed check valve.

Motor Speed Setting Limits

Maximum and minimum motor speed settings are provided by limit switches (6) activated by set screws (3) in the switch actuating block assembly (2). The block assembly goes up and down with the speed setting piston. The bottom screw sets the minimum limit for the motor speed setting and the top screw sets the maximum limit of the motor speed setting.

Note that these positions can be overcome by the manual speed setting. The diodes (5) on each switch allow the motor to reverse and back-off from an activated switch.

Motor speed setting limits must be reset whenever a micro switch is replaced. The diodes must always be installed as shown on the wiring diagram.

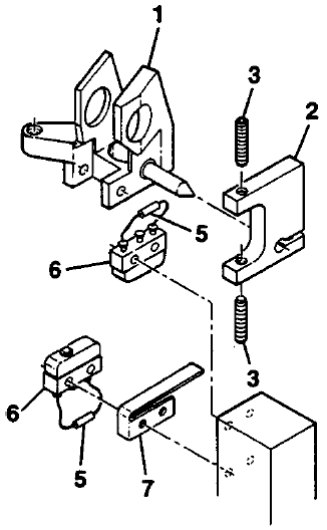

Figure 4-6. Motor Speed Setting Limits

Friction Clutch Adjustment

A friction drive is installed in the speed setting mechanical drive of the PGM to allow a manual override of the motor speed setting.

If the friction drive is too tight, the speed-setting knob can not be turned manually. If the friction drive is too loose the clutch will continually slip and the motor cannot change the set speed.

To adjust the friction on the friction drive, remove the PM motor flange and the motor. Remove the retaining ring on the friction drive (52) with a No. 1 Truarc pliers. The friction drive is spring loaded and the cover (53) can drop into the governor if care is not taken. This could require disassembly of the entire governor.

Place a torque wrench in the slots in top of the friction drive case (57) and check the torque of the drive at 12 to 15 in-lbs. (1.35 to 1.70 N-m). To increase friction, turn the bolt (55) clockwise. To decrease friction, turn the bolt counterclockwise. Lightly oil the surface between the clutch case (57) and the bevel gear (58).

Woodward assembly tool 97540 may be used to hold the square drive end of the bevel gear. Take special care not to damage the bevel gear while making the adjustment. A special socket wrench Woodward part number 8992-525 and torque wrench 8995-057 are recommended when checking or changing the setting of the friction clutch. The friction-clutch adjustment should be done before any other adjustments. The friction-clutch adjustment is difficult to accomplish on a test stand.

Take care when reassembling the friction drive not to drop any parts into the open governor.

The friction drive should not require adjustment except during major governor overhaul or rebuild. If the speed setting can be changed by the speed-setting knob and if the speed changes properly with the motor, the setting of the friction clutch is correct.

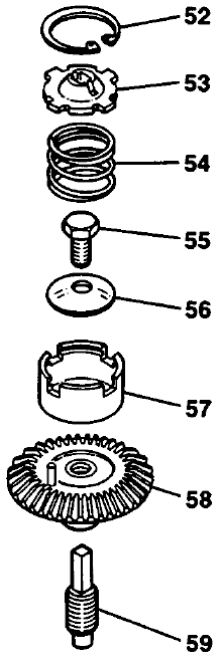

Figure 4-7. Friction Clutch Drive

Pressure Shutdowns

Air, oil, or water pressure shutdowns are available with the motor speed setting. These options install and function in the same manner as with other Woodward speed-setting devices with one exception:

> When a pressure shutdown is used, the pressure enters through the 0.125-27 NPT hole in the end of the column (normally used for speed-setting air pressure when pneumatic speed setting is used). Pressure passes through a series of cross holes to a 0.125-27 NPT tap on the inside of the PGM bracket. An internal "U" shaped tube then transfers the pressure to the shutdown device.

Chapter 5.
Replacement Parts

When ordering replacement parts, give the following information:

- Manual number (this is manual 36644)
- Part reference number, name of part, or description of part
- Serial number and part number of governor

IMPORTANT

Parts are listed with a reference number, not the actual Woodward part number. Woodward will provide the correct part for your particular installation after matching the reference description with the parts list for the particular governor.

Item	Part Name	Quantity
36644-1	Fulcrum Assembly	1
36644-2	Switch Actuating Block Assembly	1
36644-3	Set Screw, 6-32 x .625	2
36644-4	Screw, 8-32 x .500 Socket Head	1
36644-5	Diode	2
36644-6	Switch, Micro SPDT	2
36644-7	Switch Actuating Spring	1
36644-8	Lock Washer, No. 2	4
36644-9	Screw, Switch Mounting	4
36644-10	Block, Switch Mounting	1
36644-11	Washer, .265 ID	3
36644-12	Screw, .250-28 x 2.250	1
36644-13	Washer, Split Lock, .250	2
36644-14	Screw, .250-28 x 1.375	2
36644-15	Screw, .250-28 x 1	1
36644-16	Jam Nut, 10-32	1
36644-17	Screw, 10-32 x 1.750 Set	1
36644-18	Check Valve Assembly	1
36644-19	Piston Assembly	1
36644-20	Cylinder Assembly, Speed Set	1
36644-21	Screw Assembly, 8-32 Stop	1
36644-22	Pin, .125 Dia. Grooved	4
36644-23	Ring, .094 ID Retaining	8
36644-24	Lever, Power Piston	2
36644-25	Pin, Adjustable Fulcrum	1
36644-26	Washer, Spacer, .128 ID x .120	2
36644-27	Washer, No. 10 Flat	2
36644-28	Spring, Adj. Link Compensating.	1
36644-29	Screw, Adjustable Fulcrum	1
36644-30	Nut, 10-32 Speed Setting	1
36644-31	Speed Droop Fulcrum Pin	1
36644-32	Link, Floating Lever	1
36644-33	Spring, Loading	1
36644-34	Lever, Floating	1
36644-35	Bushing, Regulator	1
36644-36	Washer, .375 ID Special	1
36644-37	Bearing, Roller Thrust	1

Item	Part Name	Quantity
36644-38	PV Plunger, Speed Adjust	1
36644-39	Bushing, PV Speed Adjust	1
36644-40	Flange, PM Motor	1
36644-41	Screw, 8-32 x 2.000	4
36644-42	Washer, No. 8, Split Lock	4
36644-43	PM Motor, Vibration. Resistant	1
36644-44	Plate, Motor	1
36644-45	Screw, .250-28 x .750	2
36644-46	Screw, .250-28 x 2.00	1
36644-47	Bracket Assembly, Speed Control	1
36644-48	Needle Bearing	1
36644-49	Stop Assembly, Motor and Manual	1
36644-50	Ball, Steel, .250 Nominal	1
36644-51	Spring, PGM Motor Detente	1
36644-52	Ring, Internal Retaining	1
36644-53	Cover, Friction Drive	1
36644-54	Spring, Compression	1
36644-55	Screw, .250-28 x .375	1
36644-56	Spring, Friction Drive	1
36644-57	Cage, Friction Drive	1
36644-58	Gear Assembly, Manual Speed Set	1
36644-59	Screw, Speed Setting	1
36644-60	Roll Pin, .062 x .375	1
36644-61	Pinion Gear, Manual Speed Set	1
36644-62	Elastic Lock Nut, .250-28	1
36644-63	Knob	1
36644-64	Shaft, Manual Speed Setting	1
36644-65	Spring, Friction Drive	1
36644-66	Set Screw, 6-32 x .250	1
36644-67	Pointer, Dial	1
36644-68	Seal, .250 Shaft	1
36644-69	Bushing, Shaft	1
36644-70	Screw, 6-32 x .250	6
36644-71	Plate, Dial	1
36644-72	Screw, 6-32 x .250	4
36644-73	Receptacle, 7 Pin	1

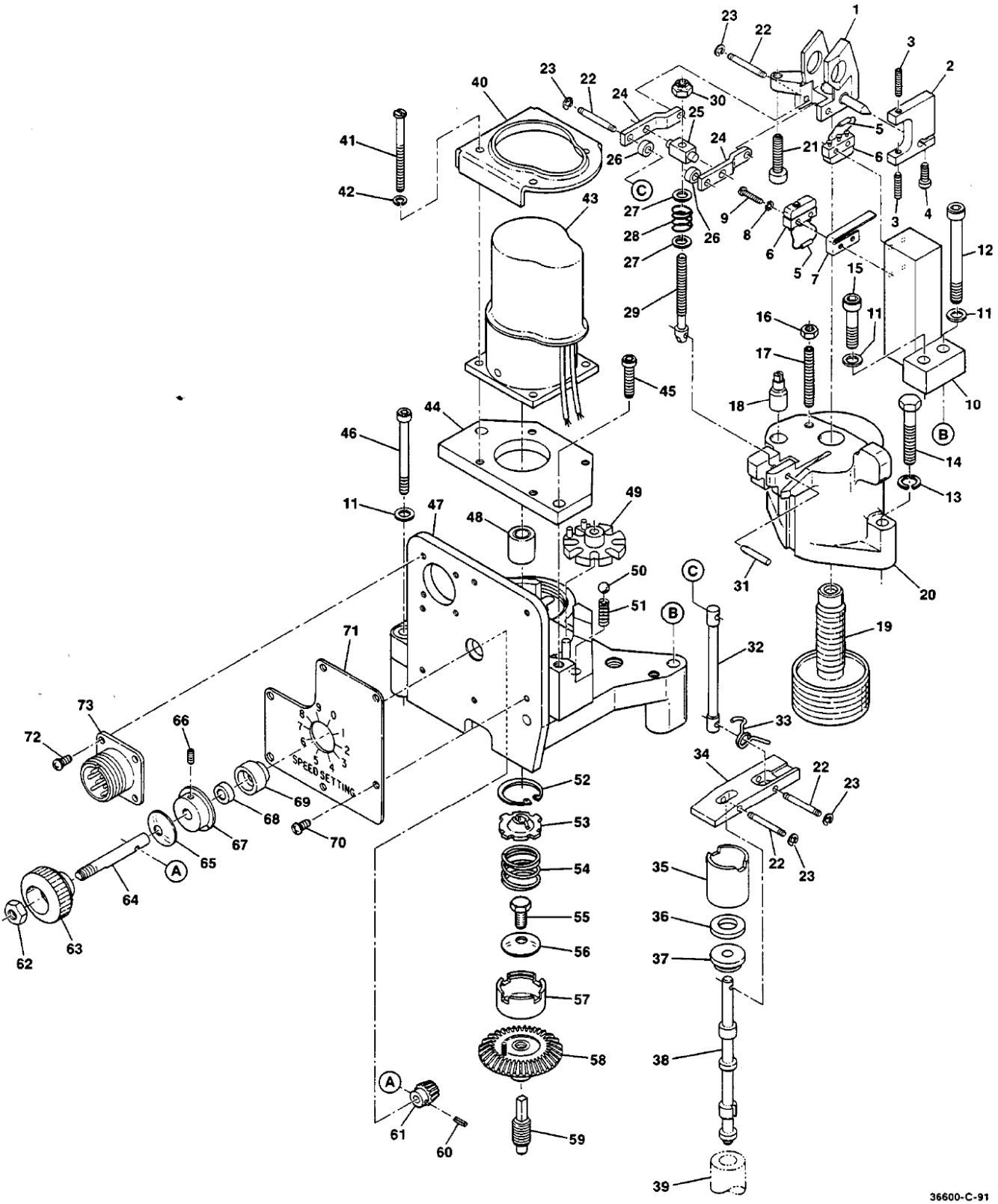

Figure 5-1. Exploded View of Motor Speed Setting Parts

Chapter 6.
Product Support and Service Options

Product Support Options

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

1. Consult the troubleshooting guide in the manual.
2. Contact the **OE Manufacturer or Packager** of your system.
3. Contact the **Woodward Business Partner** serving your area.
4. Contact Woodward technical assistance via email (**EngineHelpDesk@Woodward.com**) with detailed information on the product, application, and symptoms. Your email will be forwarded to an appropriate expert on the product and application to respond by telephone or return email.
5. If the issue cannot be resolved, you can select a further 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 **Recognized Engine Retrofitter (RER)** is an independent company that does retrofits and upgrades on reciprocating gas engines and dual-fuel conversions, and can provide the full line of Woodward systems and components for the retrofits and overhauls, emission compliance upgrades, long term service contracts, emergency repairs, etc.

A current list of Woodward Business Partners is available at **www.woodward.com/directory**.

Product Service Options

Depending on the type of product, the following options for servicing Woodward products may be available through your local Full-Service Distributor or the OEM or Packager of the equipment system.

- 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 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.

Flat Rate Repair: Flat Rate Repair is available for many of the standard mechanical products and some of the electronic 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.

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. 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 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's Full-Service Distributors offer various Engineering Services for our products. For these services, you can contact the Distributor by telephone or by email.

- 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.

Product Training is available as standard classes at many Distributor locations. Customized classes are also available, which can be tailored to your needs and held at one of our Distributor 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 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/directory**.

Contacting Woodward's Support Organization

For the name of your nearest Woodward Full-Service Distributor or service facility, please consult our worldwide directory published at **www.woodward.com/directory**.

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.

Products Used In Electrical Power Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany:	
Kempen	+49 (0) 21 52 14 51
Stuttgart	+49 (711) 78954-510
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

Products Used In Engine Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany	+49 (711) 78954-510
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
United States	+1 (970) 482-5811

Products Used In Industrial Turbomachinery Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

For the most current product support and contact information, please visit our website directory at **www.woodward.com/directory**.

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 _____

Engine Model Number _____

Number of Cylinders _____

Type of Fuel (gas, gaseous, diesel, dual-fuel, 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.

We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

Please reference publication 36644.

PO Box 1519, Fort Collins CO 80522-1519, USA
1000 East Drake Road, Fort Collins CO 80525, USA
Phone +1 (970) 482-5811 • Fax +1 (970) 498-3058

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.

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