WOODWARD

Installation Instructions

Bosch RQV-K Governor Shutdown Kit

with 1752ES Solenoid

Manual 36712

(Replaces SE-3023 Rev C)

WARNING—DANGER OF DEATH OR PERSONAL INJURY

WARNING—FOLLOW INSTRUCTIONS

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment. Practice all plant and safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage.

WARNING—OUT-OF-DATE PUBLICATION

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

www.woodward.com/pubs/current.pdf

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

www.woodward.com/publications

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

WARNING—OVERSPEED PROTECTION

The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.

The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.

WARNING—PROPER USE

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

CAUTION—POSSIBLE DAMAGE TO EQUIPMENT OR PROPERTY

CAUTION—BATTERY CHARGING

To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.

CAUTION—ELECTROSTATIC DISCHARGE

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts.

- **Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).**
- **Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.**
- **Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.**

IMPORTANT DEFINITIONS

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

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

Contents

Electrostatic Discharge Awareness

All electronic equipment is static-sensitive, some components more than others. To protect these components from static damage, you must take special precautions to minimize or eliminate electrostatic discharges.

Follow these precautions when working with or near the control.

1. Before doing maintenance on the electronic control, discharge the static electricity on your body to ground by touching and holding a grounded metal object (pipes, cabinets, equipment, etc.).

2. 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.

3. Keep plastic, vinyl, and Styrofoam materials (such as plastic or Styrofoam cups, cup holders, cigarette packages, cellophane wrappers, vinyl books or folders, plastic bottles, and plastic ash trays) away from the control, the modules, and the work area as much as possible.

4. 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.

CAUTION
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*.

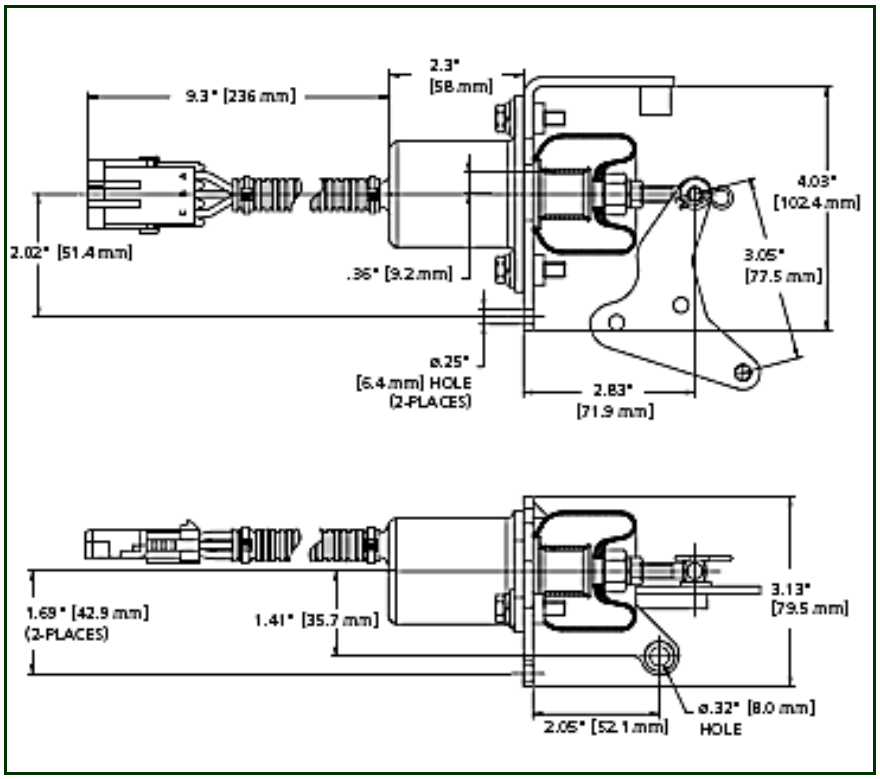
Chapter 1.
General Information

Description

The Woodward RQV-K Shutdown Kit is designed for engines using Bosch pumps with an RQV-K governor. The kit comes as a left-hand mounting style. The solenoid included in the kit is the 1752ES externally switched (3 wire) solenoid with built-in Packard Weather Pack connector.

PART NO.	SOLENOID MODEL	VOLTAGE
SA-4026-12	1752ES	12 Vdc
SA-4026-24	1752ES	24 Vdc

Dimensions



Parts List

Refer to **Figure 1** for parts identification.

REF NO.	DESCRIPTION	QTY.
1	Mounting Bracket	1
2	Shut-Off Lever	1
3	M6 x 40MM Socket Head Cap Screw	1
4	M6 x 25MM Hex Screw	6
5	Cotter Pin	1
6	M6 Hex Nut	1
7	M6 Split Lock Washer	7
8	M6 Flat Washer	2
9	1752ES Solenoid	1

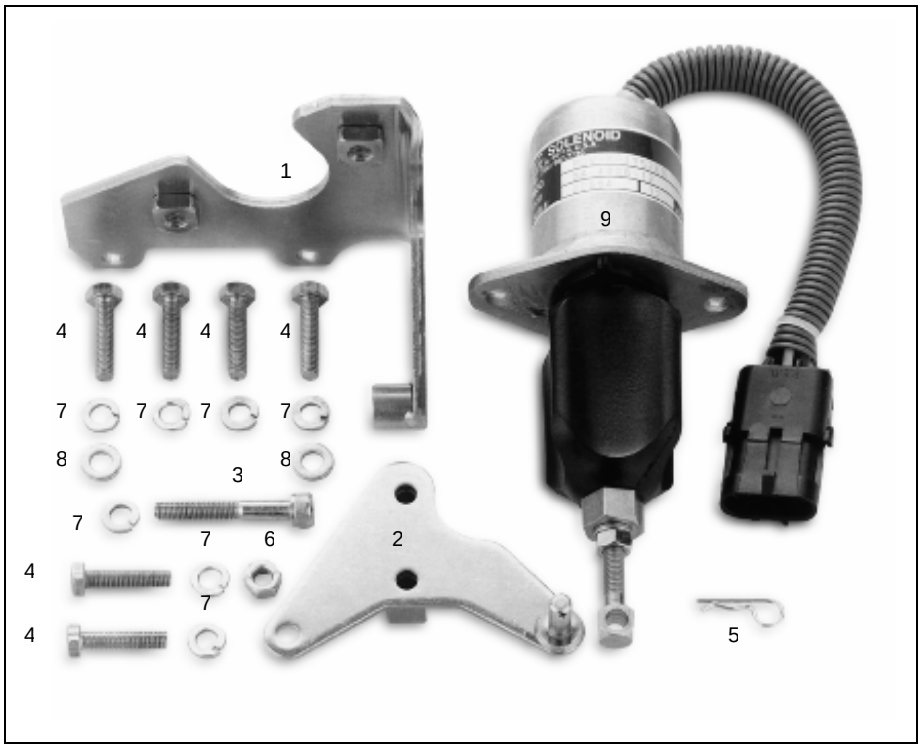


Figure 1. Kit Components

NOTE
The Bosch stop lever (Bosch P/N 2422002082 [see Figure 3]) is required and is *not* included in this kit. If this lever is not included on your Bosch governor, you must order it from Bosch.

Chapter 2.
Installation

NOTE
Before removing old parts or installing new ones, ensure that the engine is turned off and the battery is disconnected. Always use proper tools for the installation.

Shutoff Lever Installation

Refer to **Figure 2**.

1. Mount the Woodward shutoff lever (2) onto the Bosch stop lever.
2. Tighten M6 x 25 mm bolt (4) and M6 lock washer (7) onto the bottom ***tapped*** hole of the Bosch lever. Torque to 7–9 Nm (5–6.6 ft-lb).
3. Tighten a M6 x 25 mm bolt, M6 lock washer, and M6 hex nut (6) together in the top ***untapped*** hole of the Bosch lever. Torque these to 7–9 Nm (5–6.6 ft-lb).

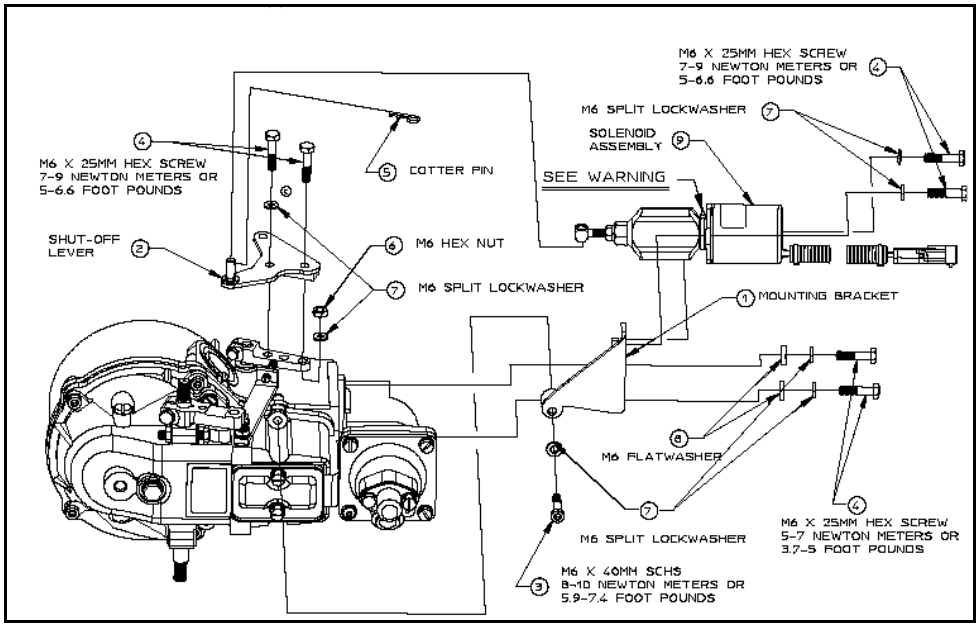


Figure 2. Exploded Assembly View

WARNING
The solenoid must be installed with the nameplate and boot cable tie clamp facing *away* from the engine. If the solenoid is installed 180° backwards, the boot cable tie clamp will interfere with the mounting bracket.

Solenoid Bracket Installation

Refer to **Figure 2** and **Figure 3**.

1. Remove and discard the two top cap screws (A) that bolt the aneroid to the top outboard side of the governor.
2. Remove and discard the single socket head cap screw (B) from the governor housing.
3. Position the mounting bracket (1) onto the governor housing as shown in **Figures 2 & 4**.
4. Finger tighten two M6 x 25 mm hex screws (4), two M6 split lock washers (7), and two M6 flat washers (8) into the top two holes of the mounting bracket to fasten the bracket to the governor housing.
5. Assemble a M6 x 40 mm socket head cap screw (3) and a M6 split lock washer together and bolt these into the lower rear of the mount bracket. Torque these to 8–10 Nm (5.9–7.4 ft-lb).
6. Torque the two M6 x 25 mm hex screws to 5–7 Nm (3.7–5 ft-lb).
7. Slip the solenoid linkage rod end onto the shutoff lever pin.
8. Position the solenoid onto the mounting bracket yoke with the solenoid nameplate and boot cable tie clamp facing away from the engine.

NOTE

If the solenoid is installed 180° backwards, the boot cable tie clamp will interfere with the mounting bracket.

9. Install two M6 x 25 mm hex screws and two M6 split lock washers through the solenoid flange and into the mounting bracket.
10. Tighten these screws to 7–9 Nm (5–6.6 ft-lb.

Figure 4 shows the kit completely installed.

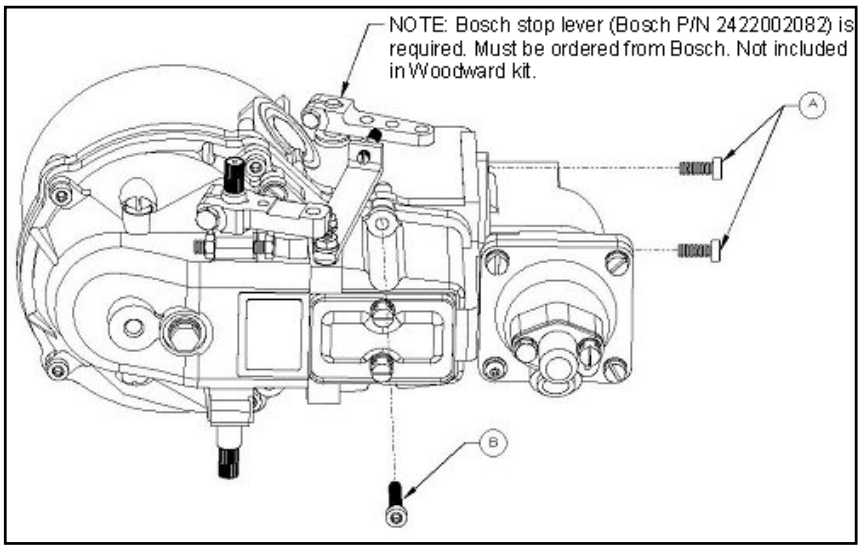


Figure 3. Preparation Prior to Installing Solenoid and Bracket

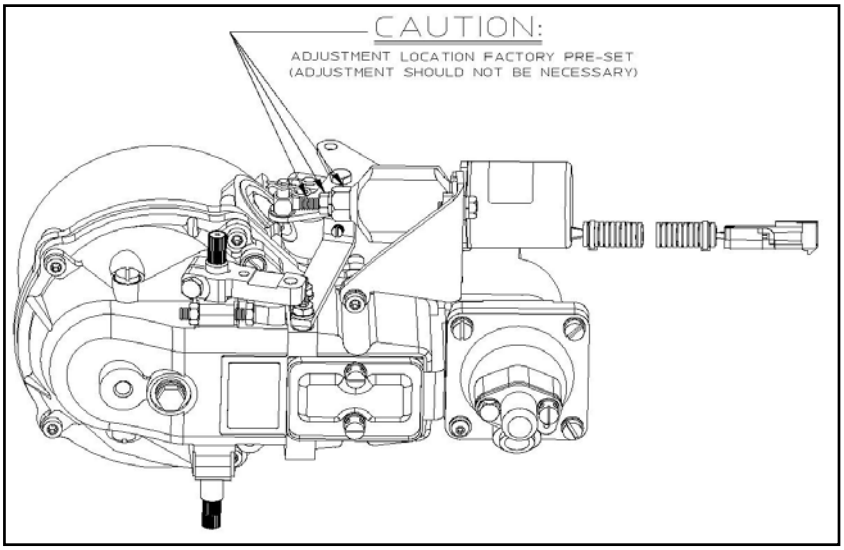


Figure 4. Completely Installed Kit

Solenoid Linkage Adjustment

The solenoid linkage rod end has already been factory preset and tightened. If it is not out of alignment—as signified by a loose linkage set or an out of spec preset—do not make any further adjustments! Skip Steps 1–7 below and install the cotter pin (5) through the hole in the shutoff lever pin.

If the linkage rod end has been misaligned from factory preset, proceed with the following steps:

1. The solenoid's voltage rating is indicated on the label: The 12V solenoid has a hold current of 1.1 amps; the 24V volt solenoid has a hold current of 0.6 amps. Use this amp spec and the volt rated spec to set the hold current power for Step 2.
2. **Energize the solenoid hold-in coil** by attaching continuous rated spec power to the red (Hold) and black (Common) wires. **Do not energize the high current pull-in coil (White wire) for this procedure phase! Remember: Red is (+);Black is (-) ground.**
3. Manually move the shutoff lever to the Full Run position. Loosen the solenoid linkage as necessary to ensure that the shutoff lever is in the Full Run position against the internal pump/governor stop. Adjust the solenoid linkage as necessary so that the plunger is magnetically held in with the shutoff lever in the absolute Full Run position. Turn the large hex nut on the end of the plunger to make adjustments.

   This step is important because it is critical that the plunger of an externally switched solenoid "bottoms out." When only the hold coil is energized, the solenoid's magnetic hold action is strong enough only when the solenoid's internal plunger end contacts the internal solenoid end plate.
4. With the solenoid still magnetically held in, turn the large hex nut on the solenoid plunger one turn to the right (clockwise). This will move the shutoff lever slightly away from the Full Run position. The desired result is to provide approximately 1mm gap on the internal pump/ governor stop.

This step is important because all of the impact force from the action of the solenoid plunger and governor stop lever going to the Full Run position will be absorbed by the solenoid.

5. After proper linkage adjustment has been achieved, tighten the small hex nut on the solenoid linkage rod against the large hex end of the swivel/plunger.
6. Install the cotter pin clip through the hole in the shutoff lever pin.
7. Detach the power from the solenoid hold-in coil.

Solenoid Wiring

1752ES SOLENOID

NOTE
For wiring and installation instructions refer to Manual 36542 *Externally Switched Dual Coil Solenoid Wiring Guide* available on www.woodward.com.

- Because this kit is designed only for fuel shutdown applications, refer to the *Electric Shut-Off Applications* chapter in Manual 36542 for installation and wiring instructions.
- The 1752ES model can use all the relay, coil commander, and PCTM wiring methods mentioned in the wiring guide**. Do not use "S" Terminal wiring!**

Optional Connectors

For varied connection requirements, Woodward has many optional connectors available: ES system connectors, Packard Weather Pack connectors, Metri-Pack sealed connectors, etc.

Checking the Installation

NOTE
For detailed troubleshooting information on the solenoid refer to Manual 36541 *Solenoid Troubleshooting Guide* available on www.woodward.com.

To perform a solenoid installation final check:

1. Start and stop the engine to check for proper operation of the shutdown system.
2. If the solenoid fails to hold after an initial pull in, the culprit may be failure to achieve solenoid plunger “bottoming.” Repeat the instructions in the Solenoid Linkage Adjustment” section above if the hold coil power input is not at fault
3. Follow the suggested wiring sizes and overload protection instructions listed in the wiring guides mentioned above.

Chapter 3.
Service Options

Product Service Options

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

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

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

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

Replacement/Exchange

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

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

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

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

Flat Rate Repair

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

Flat Rate Remanufacture

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

Returning Equipment for Repair

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

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

CAUTION

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual 82715, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Packing a Control

Use the following materials when returning a complete control:

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

Return Authorization Number

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

NOTE

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

Replacement Parts

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

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

How to Contact Woodward

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

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

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

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

Facility	Phone Number
Brazil	+55 (19) 3708 4800
India	+91 (129) 4097100
Japan	+81 (476) 93-4661
The Netherlands	+31 (23) 5661111

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

Engineering Services

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

- Technical Support
- Product Training
- Field Service

Contact information:

Telephone—+1 (970) 482-5811
Toll-free Phone (in North America)—1 (800) 523-2831
Email—icinfo@woodward.com
Website—**www.woodward.com**

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

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

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

Technical Assistance

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

General

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

Prime Mover Information

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

Control/Governor Information

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

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

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

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

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

We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

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

WOODWARD

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