



Product Manual 35103
(Revision C, 12/2024)
Original Instructions

Re-Lubrication Procedure for LELA II Actuator

Maintenance Procedure



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.

[Woodward Industrial Support: Get Help](#)

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.

[Woodward Industrial Support: Get Help](#)

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.

Woodward reserves the right to update any portion of this publication at any time. Information provided by Woodward is believed to be correct and reliable. However, no responsibility is assumed by Woodward unless otherwise expressly undertaken.

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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

EXPLOSION HAZARD – Do not remove covers or connect/disconnect electrical connectors unless power has been switched off or the area is non-hazardous.

Substitution of components may impair suitability for Class I, Division 2, or Zone 3.

! WARNING

To prevent possible serious injury or damage to equipment, be sure all electric power, hydraulic pressure, and gas pressure have been removed from the valve and actuator before beginning any maintenance or repairs.

! WARNING

The surface of this product can become hot enough or cold enough to be a hazard. Use protective gear for product handling in these circumstances. Temperature ratings are included in the specification section of this manual.

! WARNING

The LESV II contains a mechanical spring under load. Do not disassemble as this spring can cause bodily harm.

NOTICE

Use only Woodward approved grease to lubricate the roller screw, gears, and bearing in this actuator. Use of any other grease will reduce performance and reliability. Woodward lubrication kits are available.

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.

Safety Symbols



Direct current



Alternating current



Both alternating and direct current



Caution, risk of electrical shock



Caution, refer to accompanying documents



Protective conductor terminal



Frame or chassis terminal

Chapter 1.

General Information

Introduction



Wear protective eyewear and gloves during this maintenance procedure to avoid contact with the lubrication.

IMPORTANT

Prior to starting this procedure, the actuator needs to be in the fully closed (0%) position.

NOTICE

This re-lubrication procedure should be performed on an annual basis.

Lubrication is required to keep the LELA2 Actuator working according to manufacturer's specifications. This manual contains instructions on the proper techniques and equipment to properly lubricate the Actuator. There are 5 lubrication ports labeled A, B, C, D, and E. Lubrication kit (Woodward PN: 8923-2557) is available that provides lubrication, applicators and tools needed for each lubrication port.

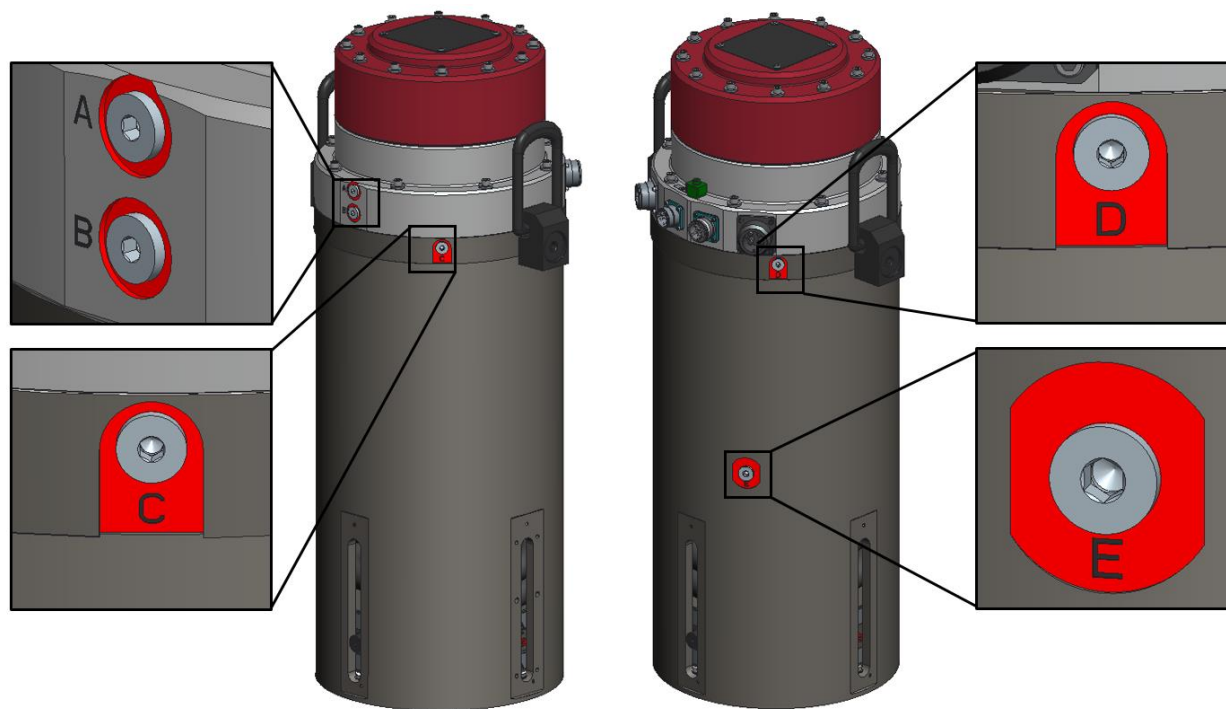


Figure 1-1. LELA II Lubrication Port Locations

Lubrication Kit

A lubrication kit is available that contains all the tools and lubrication required to service the actuator. The lubrication kit part number is **8923-2557** and contains the following:

Table 1-1. Lubrication Kit Contents

INDEX #	ITEM #	DESCRIPTION	QTY	ASSEMBLY INFO (See Notes)
1	8923-2566	KIT (GREASE SYRINGE, LELA2 LUBRICATION GREASE PORT A)	1	
2	8923-2567	KIT (GREASE SYRINGE, LELA2 LUBRICATION GREASE PORT B)	1	
3	8923-2568	KIT (GREASE SYRINGE, LELA2 LUBRICATION GREASE PORT C)	1	
4	8923-2569	KIT (GREASE SYRINGE, LELA2 LUBRICATION GREASE PORT D)	1	
5	8923-2570	KIT (GREASE GUN, LELA2 LUBRICATION GREASE PORT E)	1	
6	1249-1326	ADAPTER (ASSEMBLY ADAPTER WITH O-RING)	1	USE FOR PORTS: A, B, C, D
7	1249-301	PLUG (STR THD,[T-214],-4,.438-20.SOC,SST)	4	TORQUE TO 40±4 LBIN (SPARE PART)
8	1355-1092	O RING (VITON, LOW TEMP, [T-2000], 3-904, .072 W, .351 ID)	4	
9	1246-927	PLUG (STR THD,[T-214],-6,.562-18.SOC,SST)	1	TORQUE TO 75±7.5 LBIN (SPARE PART)
10	1355-1028	O RING (VITON, LOW TEMP, [T-2000], 3-906, .078 W, .468 ID)	1	
11	B35103	MANUAL (RE-LUBRICATION PROCEDURE FOR LELA2 ACTUATOR)	1	

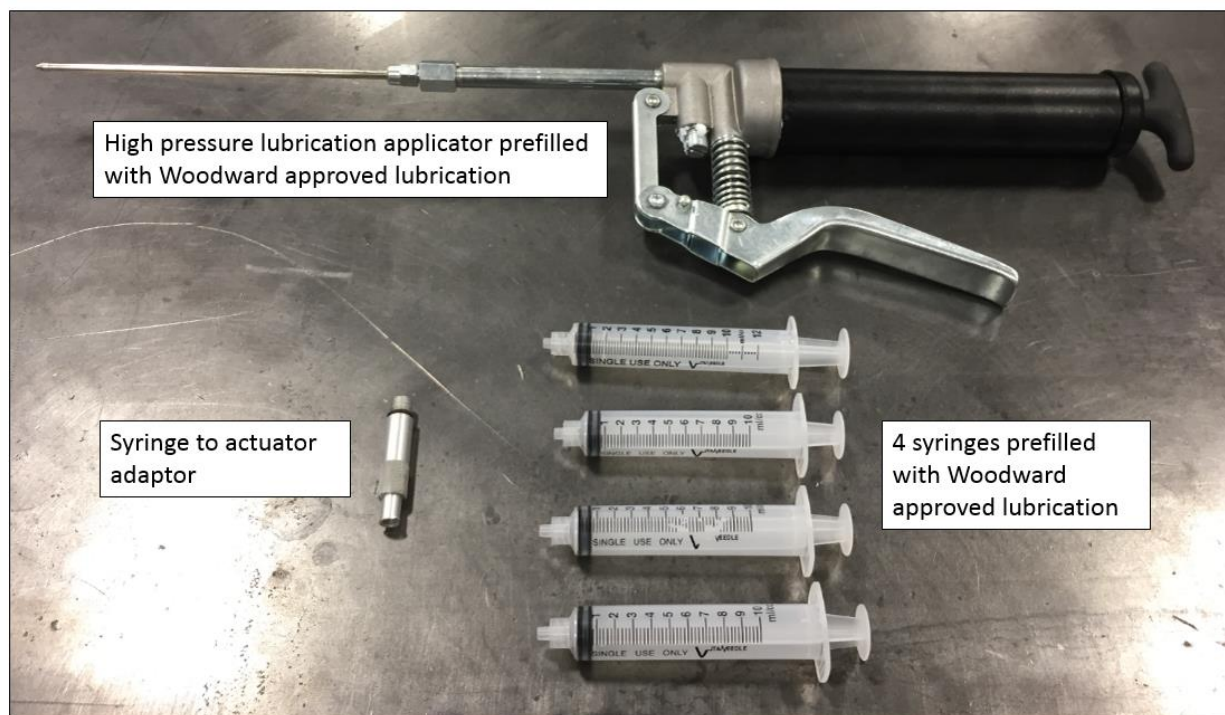


Figure 1-2. Lubrication Kit Illustration

The lubrication tool is supplied with the needle tip aligned with the tool body, as shown in Figure 1-2. In this configuration, a minimum of 25 inches (63.5 cm) of clearance is required at the roller screw grease port E to install the gun tip.

If the port E access clearance is limited, the lubrication tool can be converted to a 90 degree configuration by switching the locations of the needle tip and plug in the tool head. In this configuration, the clearance required at port E is reduced to a minimum of 12 inches (30.48 cm) to install the gun tip. See Figure 1-3.



Figure 1-3. Lubrication Tool – 90° Configuration

Chapter 2. Re-Lubrication Procedures

Introduction

There are two different procedures to lubricate the LELA2 Actuator. One is lubricating the Gears and Bearings the other is lubricating the roller screw assembly. These procedures are found below.

Lubricating the Gear and Bearing Assembly

1. Clean the outside of the actuator to ensure that no debris gets inside the actuator during the lubrication process. Any debris in the gears and bearings will reduce its life.
2. Remove the port plugs A, B, C, and D with a 3/16 inch hex wrench.

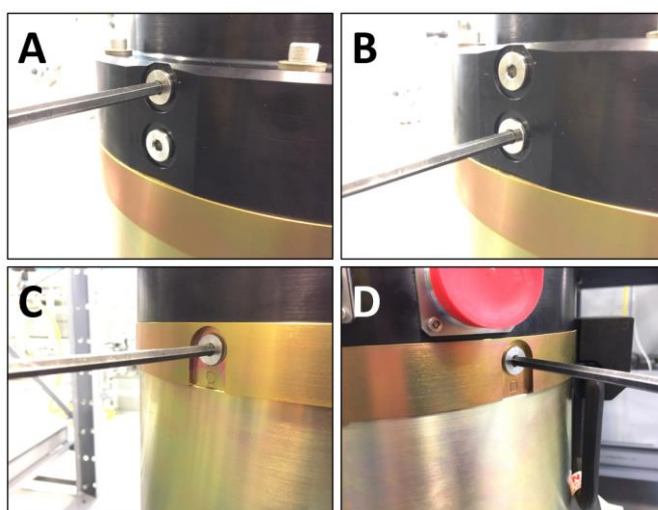


Figure 2-1. Port Plug Removal

3. Set the plugs aside and keep clean, ensuring that the inside plug surface is not scratched or marred.
4. The grease kit contains a syringe for each lubrication port and an adaptor to attach the syringe to the actuator. During lubrication the adaptor should be fully seated into the actuator to avoid leakage.



Figure 2-2. Adaptor and Syringe

5. Inject the prefilled amount of Woodward approved lubricant into each port. Each syringe should be marked with a letter and is pre-filled with the correct type and quantity of lubrication.
 - a. Using Syringe A, inject 6cc's of grease into port A of the actuator.
 - b. Using Syringe B, inject 6cc's of grease into port B of the actuator.
 - c. Using Syringe C, inject 6cc's of grease into port C of the actuator.
 - d. Using Syringe D, inject 6cc's of grease into port D of the actuator.

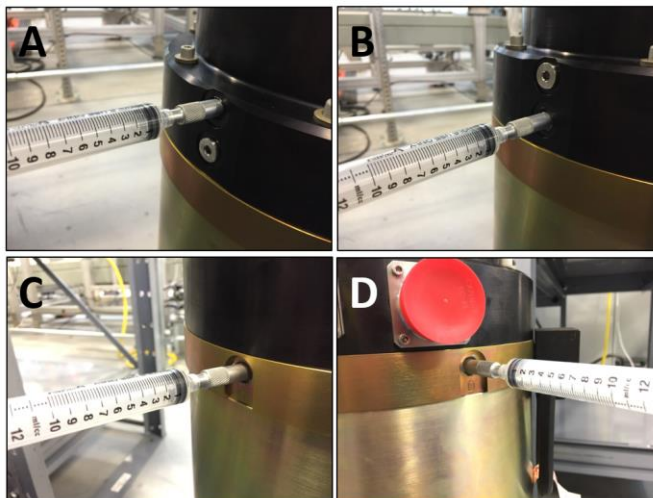


Figure 2-3. Syringe and Associated Port Locations

6. After lubricant is applied install the port plugs back into the actuator from where they were removed. Torque to 4.5 ± 0.5 N·m / 40 ± 4 lb.-in.

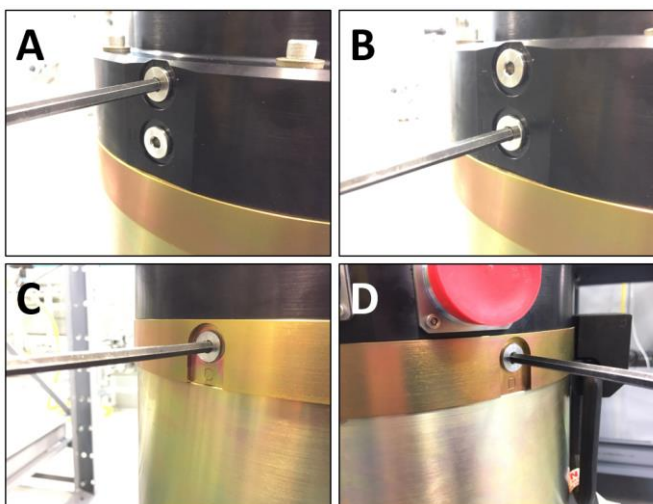


Figure 2-4. Install Port Plugs

Lubricating the Roller Screw Assembly

1. Clean the outside of the actuator to ensure that no debris gets inside the actuator during the lubrication process. Any debris on the internal components will reduce its life.
2. Prior to starting this procedure, the actuator needs to be in the fully closed (0%) position so that the Roller Screw Port Plug will align with the Lubrication Port on the side of the actuator (Figure 2-5).
3. Remove the roller screw port plug E with a 1/4 inch hex wrench.

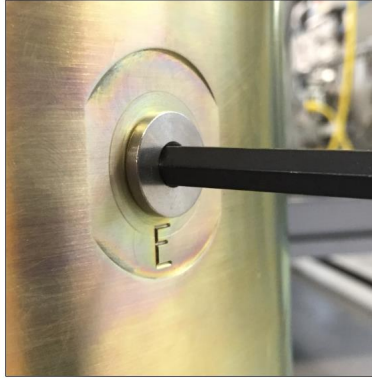


Figure 2-5. Roller Screw Port Plug Removal

4. Set the port plug aside and keep clean, ensuring that they are not scratched or marred.
5. Insert the needle tip lubrication tool into the access hole and press the tip of the lubrication needle into the flush mount grease fitting attached to the roller screw nut.
 - a. The flush mount grease fitting contains a check valve that only allows lubrication into the nut, and does not allow lubrication to eject during operation.
 - b. You should be able to feel the check valve open and close as the needle tool is pressed against the check valve. When you feel check valve move the tool is in the correct position.

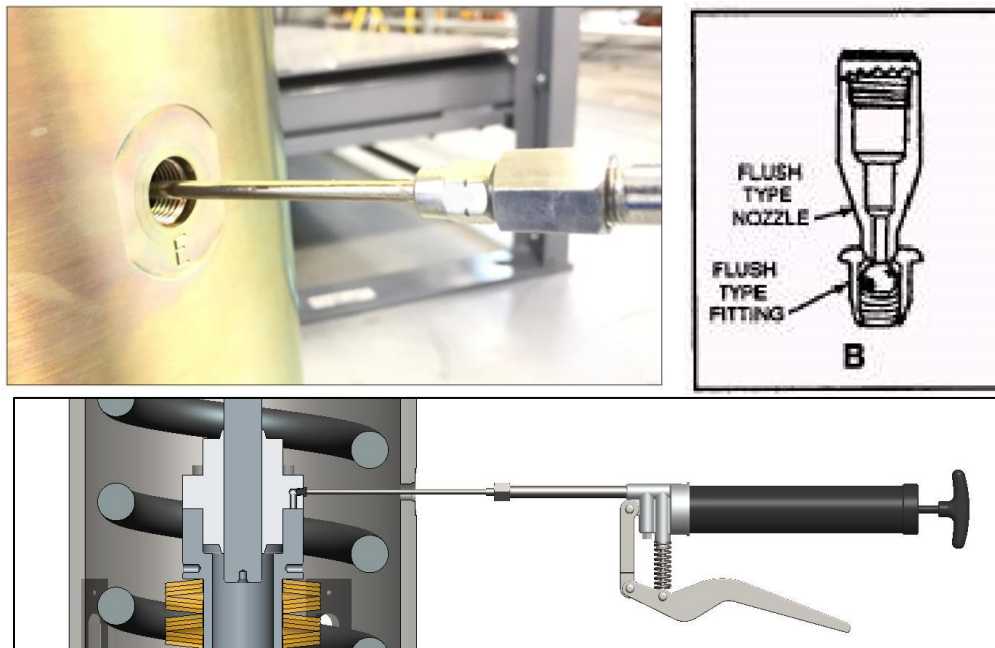


Figure 2-6. Proper Lubrication Tool to Flush Fitting Technique

6. Inject 33 pumps (14 cc's) of the Woodward approved lubrication into the roller screw grease fitting.
7. After lubricant is applied install the port plugs back into the actuator. Torque to 8.5 ± 1 N·m / 75 ± 7.5 lb.-in.

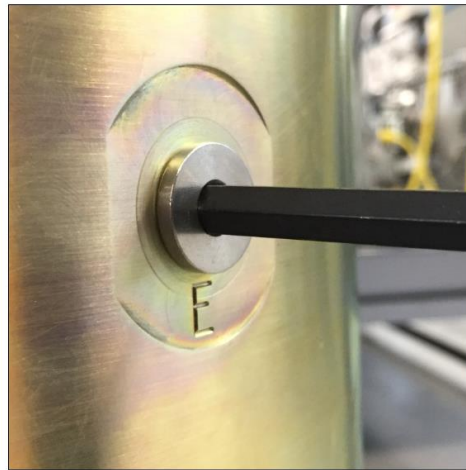


Figure 2-7. Port Plug Installation

Chapter 3.

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:

- 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:

<https://www.woodward.com/en/support/industrial/service-and-spare-parts/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 (Woodward North American Terms and Conditions of Sale 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 North American Terms and Conditions of Sale 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 North American Terms and Conditions of Sale 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 North American Terms and Conditions of Sale 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 <https://www.woodward.com/en/support/industrial/service-and-spares/find-a-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 <https://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.

Products Used in Electrical Power Systems

<u>Facility</u>	<u>Phone Number</u>
Brazil -----	+55 (19) 3708 4800
China -----	+86 (512) 8818 5515
Germany -----	+49 (711) 78954-510
India -----	+91 (124) 4399500
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

<u>Facility</u>	<u>Phone Number</u>
Brazil -----	+55 (19) 3708 4800
China -----	+86 (512) 8818 5515
Germany -----	+49 (711) 78954-510
India -----	+91 (124) 4399500
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

<u>Facility</u>	<u>Phone Number</u>
Brazil -----	+55 (19) 3708 4800
China -----	+86 (512) 8818 5515
India -----	+91 (124) 4399500
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

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

Revision C—

Revision B—

- Changed torque value in step 7 of Lubricating the Roller Screw Assembly

Revision A—

- Added new text and Figure 1-3 to Chapter 1
- Revised content in steps a through d in Step 5 on Pg. 8
- Removed image and added clarifying grease amount in Step 6 on Pg. 11

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We appreciate your comments about the content of our publications.

Send comments to: industrial.support@woodward.com

Please reference publication **35103**.



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