



Application Note 51578
(Revision NEW, 7/2017)
Original Instructions

Software Update Procedure for EM80/300 Stöber Drivers

MDS5150/LIT



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 **26455**, *Customer Publication Cross Reference and Revision Status & Distribution Restrictions*, 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 **26455**, *Customer Publication Cross Reference and Revision Status & Distribution Restrictions*, 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 Out-of-date translations are marked with .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.

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.

Contents

WARNINGS AND NOTICES	2
ELECTROSTATIC DISCHARGE AWARENESS	3
CHAPTER 1. GENERAL INFORMATION.....	4
Introduction	4
References	4
General Safety Precautions.....	5
CHAPTER 2. PREPARATIONS	6
First Steps before Update.....	6
CHAPTER 3. PREPARATION FOR SOFTWARE UPDATE	8
Precautions	8
3-Phase Input / Output Power	8
System under Work Conditions	8
CHAPTER 4. EM-80/ EM-300 DRIVER UPDATE	9
Paramodule Installation	9
Software Update with Paramodule	9
Safety Checks before Starting the Prime Mover	14
CHAPTER 5. PRODUCT SUPPORT AND SERVICE OPTIONS.....	15
Product Support Options	15
Product Service Options	15
Returning Equipment for Repair	16
Replacement Parts	16
Engineering Services.....	17
Contacting Woodward's Support Organization	17
Technical Assistance.....	18

Illustrations and Tables

Figure 2-1. Part Number Locations on Product Label	6
Figure 4-1. Keypad Description	9

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EM-80 and EM-300

The following are trademarks of their respective companies:
Paramodule (STÖBER ANTRIEBSTECHNIK GmbH)

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

The information in this application note is intended for the EM-80 or EM-300 actuator system driver module (**Woodward: 1687-700, Stöber: MDS5150/LIT**). This document does not include operating instructions for the prime mover or the driven devices or processes.

Please read this document completely and follow all the necessary steps. This will minimize delays during the application update process of the new software.

The EM-80/EM-300 driver controls the EM-80/EM-300 actuator position proportional to a position demand signal received from a controlling device. The EM-80/EM-300 actuator consists of a high-performance, three-phase brushless AC motor that drives a planetary gearbox.

For specific operating information such as start-up, shutdown, and the prime mover's response to signals from the Woodward control, refer to the prime mover manufacturer's manual.

References

The publications below are available on the Woodward website (www.woodward.com/publications).

Publication

36173	EM-80 / EM-300 Actuator
26761	EM-80 / EM-300 Actuator System
51492	EM-80 / EM-300 Driver Field Retrofit

General Safety Precautions



Read and follow these safety precautions before you operate the equipment or perform maintenance.

- Obey all cautions or warnings given in all applicable procedures.
- Never bypass or override machine safety devices.
- Always use sufficient personnel and/or lifting equipment to move the actuator.
- Do not contact the actuator drive shaft, either directly or indirectly, unless the system is de-energized, as injury may occur.
- This equipment contains high voltage and rotating parts (fans). Ignoring the safety and warning information may result in death, severe personal injury, or damage to property.
- Do not conduct maintenance procedures unless the equipment is de-energized.
- Do not begin work on the power stage and the connections until you have made sure that the system has been de-energized.
- Observe all applicable regulations and verify the proper operation of all safety devices when performing installation, repair, or maintenance procedures.
- Due to technical requirements, devices or motors may include individual components that contain dangerous materials.
- Do not replace or substitute Woodward products and components with non-Woodward devices without authorization from Woodward.
- Observe all applicable regulations during installation.
- PE (protective earth [ground]) connections as shown in this document are required to avoid personal injuries caused by high voltages.
- This driver may not be compatible with earth leakage circuit breakers (E.L.C.B.s, sometimes called ground fault breakers) due to high current leakage to ground in the converter and the motor.
- During operation, the power converter and motor work can lead to leakage currents to earth that are dissipated via the specified protective earths and may result in a current-operated E.L.C.B. on the input side blowing prematurely.
- To operate the driver in an IT ground network environment, the IT EMI Filter type must be installed.
- Make sure the plastic covers over the power supply connections are in place before applying power.
- Before switching on the driver, you must carefully check the functions of all higher safety equipment to prevent injury to people.
- Some movement of the actuator drive shaft is possible during the initial application of power. Proper precautions should be taken to avoid personal injury or damage to property.

Chapter 2. Preparations

This manual provides the necessary information for customers to perform a successful Stöber driver software update using a custom prepared Paramodule memory module supplied by Woodward.

First Steps before Update

For Woodward to correctly prepare and send a Paramodule, the customer shall record the following data and provide this to Woodward:

1. EM-80/EM-300 part number (**green** area noted in Figure 2-1)
2. Stöber MDS driver part number and serial number (**yellow** area noted in Figure 2-1)
3. Configuration settings of the EM-80/EM-300 (if applicable)

Physically locate the existing driver and record the Woodward part number. The Woodward part number is located on a decal on the side of the driver housing and typically is shown as P/N 3522-10XX. To locate the necessary information on driver see picture below.

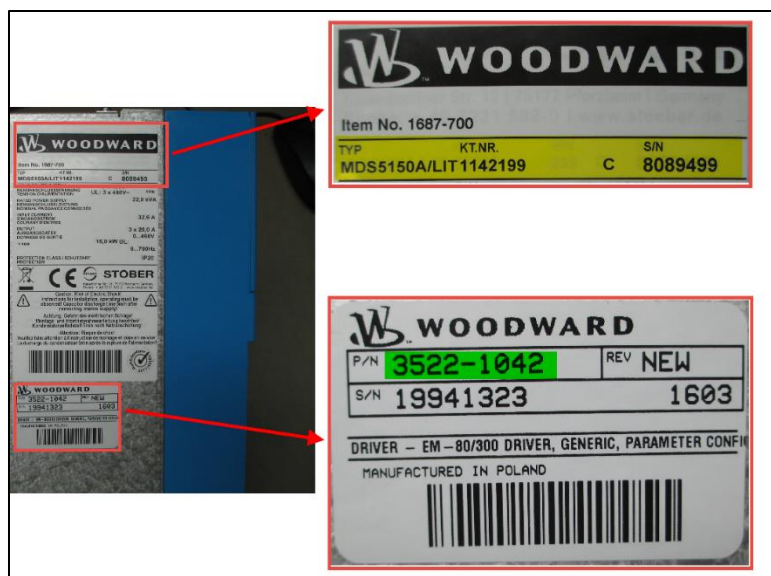


Figure 2-1. Part Number Locations on Product Label

With the part number of the existing driver, you can determine the type and rotation sense of your installation from the table below. Listed are the most common driver part numbers.

If your part number is not listed, contact Woodward.

Existing EM-80/EM-300 Driver	
Woodward P/N	Configuration
3522-1041	Driver EM-300, CCW
3522-1042	Driver with configurable option EM-80/EM-300, CW/CCW
3522-1045	Driver EM-80, CW

NOTICE

In addition to configuration info, it is important to verify and record the rotation sense of the actuator: clockwise (CW) or counterclockwise (CCW).

The rotation sense of each actuator may vary, as applications may vary.

Physically locate the actuator on the prime mover.

- Clockwise and counterclockwise rotations are defined looking at the stop and indicator plate end of the actuator where the output lever is attached.
- Determine the rotation sense going from minimum to maximum fuel.

Verify that the rotation sense of the actuator meets the description of the existing driver. If it does not, please contact your nearest Woodward distributor or service facility.



Chapter 3.

Preparation for Software Update

Precautions

The prime mover or driven device controlled by the EM-80/EM-300 system needs to be stopped and secured according to the prime mover manufacturer's procedures. Also, the applicable plant procedures must be followed carefully in order to create a safe environment for the machinery and its operators.



WARNING

Serious personal injury or death, or property damage, can result if the following precautions are not observed:

- The power to the EM-80/EM-300 driver must be completely off.
- Local safety precautions must be followed.
- Only qualified personnel can perform the update process.

3-Phase Input / Output Power

The three-phase input power connected to the driver at the X10 connector needs to be powered down. Make sure that the connections are disconnected from the main bus-bars.

System under Work Conditions

Before the driver's software can be updated, the prime mover system in which the EM-80 / EM-300 is installed must be stopped and secured to prevent potentially dangerous unintended circumstances.



WARNING

Serious personal injury or death, or property damage, can result if the applicable prime mover installation is not properly shut down and secured prior to making software changes to the EM-80 / EM-300 driver

Chapter 4.

EM-80/ EM-300 Driver Update

Paramodule Installation

Paramodule is a removable data storage device designed by Stöber. Your new Paramodule contains configuration settings calculated to the driver for which it was ordered. This preprogrammed memory module cannot be connected to other drivers.

IMPORTANT

Make sure the new Paramodule is connected to the driver for which it was ordered. Compare serial number packaging label of Paramodule with serial number on driver decal. This will prevent delays during the update process.

Review the “First Steps before Update” section in Chapter 2 to verify matching serial numbers.

WARNING

Woodward strongly recommends that the following procedure is performed only by a qualified installer possessing a solid working knowledge of the system in which this product is utilized. If the application update described in this manual is performed without full consideration of the prime mover system, the result may be serious personal injury or death, or property damage.

Software Update with Paramodule

WARNING

Make sure that the prime mover or other systems controlled by EM-80 / EM-300 i.e. engines, turbines, valves are shut down and secured from unattended startup before during the software update.

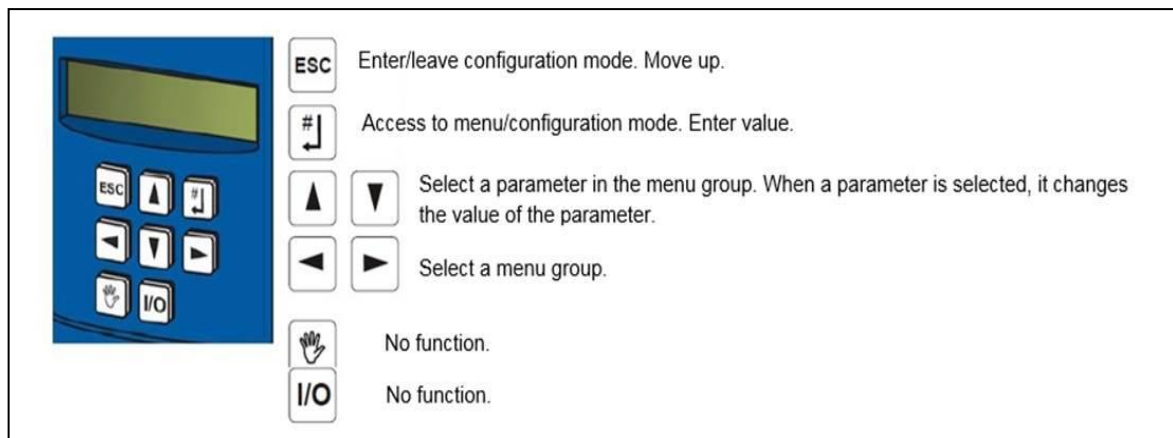


Figure 4-1. Keypad Description

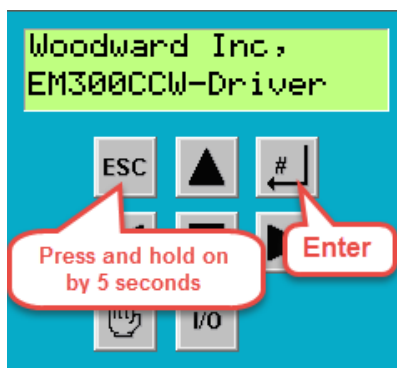
1. Turn OFF power supply of driver or disconnect X11 plug on top side of driver. Make sure that the driver is not enabled (the enable input is de-energized).
2. Carefully remove the old Paramodule (pink memory module) located on front panel right side below keys.



3. Carefully insert the new pre-programmed Paramodule. This shouldn't require much force; if it does, stop and try again, adjusting the insertion angle slightly for example.
4. Turn on the power supply of driver. The Stöber driver will boot up and load the new software and configuration from the Paramodule.



5. In the driver's front panel, press and hold the ESC key for five seconds and then press the Enter key to access configuration mode.



6. After the Enter key is pressed, the LCD will display A..inverter group parameters.



7. Press Enter key to enter the A..inverter configuration parameter.



8. Navigate to the parameter A00 using the Up and Down keys if needed, then press Enter.
"0:inactive" should appear blinking on the second line of display.

Blinking →



9. Press the Up key to save the values. This will update software and configurations made to the control.



10. After a few seconds, the driver displays "0: error free" if the update performs without errors.



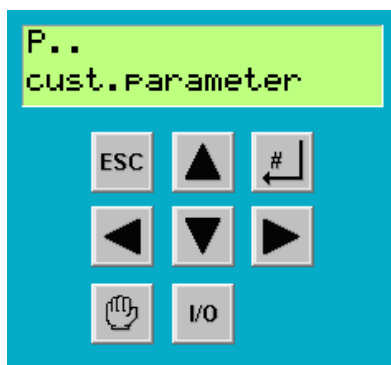
11. If values are not saved correctly proceed to step 5 and repeat steps 5 thru 10 until the values are saved correctly.
12. Press ESC to leave configuration mode. If there is a fault present after saving the values, ESC needs to be pressed three times.

Verify software part number & revision.

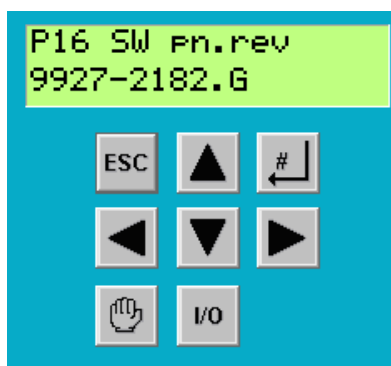
13. Cycle power on the driver.
14. Press and hold ESC for at least 5 seconds, then press the Enter key. This display should show parameter group "A.. inverter".



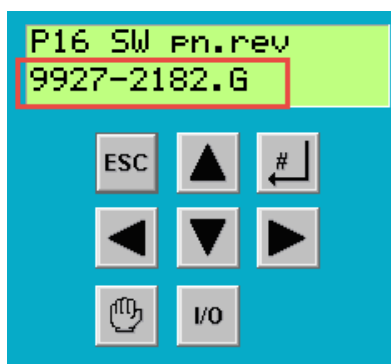
15. Navigate to parameter group “P.. cust. Parameter” with the Left and Right arrow keys.



16. Press Enter to enter the P group parameters, and navigate with the Up and Down keys to parameter “P16 SW pn.rev”.



17. Verify that correct software part number and revision are displayed; for example 9927-2182.G.



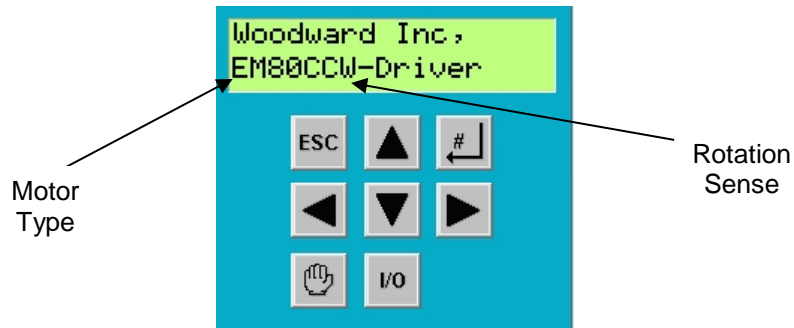
Safety Checks before Starting the Prime Mover

Once the driver application has been updated, Woodward recommends stroking the actuator to verify the rotation sense.

**WARNING**

Make sure the actuator is not connected to any linkage and that there are no potential hazards to personnel and/or equipment during the stroke test.

The current configuration is displayed on the driver's front display, provided that there are no faults. See example below:

**WARNING**

Failure to follow this procedure may result in serious personal injury or death, or property damage.

Chapter 5.

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 at www.woodward.com/directory, 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		Products Used in Engine Systems		Products Used in Industrial Turbomachinery Systems	
<u>Facility</u> -----	<u>Phone Number</u>	<u>Facility</u> -----	<u>Phone Number</u>	<u>Facility</u> -----	<u>Phone Number</u>
Brazil -----	+55 (19) 3708 4800	Brazil -----	+55 (19) 3708 4800	Brazil -----	+55 (19) 3708 4800
China -----	+86 (512) 6762 6727	China -----	+86 (512) 6762 6727	China -----	+86 (512) 6762 6727
Germany:		Germany -----	+49 (711) 78954-510	India -----	+91 (129) 4097100
Kempen----	+49 (0) 21 52 14 51	India -----	+91 (129) 4097100	Japan-----	+81 (43) 213-2191
Stuttgart -	+49 (711) 78954-510	Japan-----	+81 (43) 213-2191	Korea-----	+82 (51) 636-7080
India -----	+91 (129) 4097100	Korea-----	+82 (51) 636-7080	The Netherlands--	+31 (23) 5661111
Japan-----	+81 (43) 213-2191	The Netherlands--	+31 (23) 5661111	Poland -----	+48 12 295 13 00
Korea-----	+82 (51) 636-7080	United States-----	+1 (970) 482-5811	United States-----	+1 (970) 482-5811
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 _____

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.

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We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

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