WOODWARD

Application Note 51532
(Revision NEW, 5/2015)
Original Instructions

Flex505 I/O Calibration
GAP Application AutoStart
GAP and GUI File Updates

Part Numbers 8200-1300, 8200-1301

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 Out-of-date translations are marked with ⚠.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.

Revisions—Changes in this publication since the last revision are indicated by a black line alongside the text.

Application Note 51532

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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

Overview of Issues Detected and Resolved

This application note document is a consolidation of 4 minor issues that have been discovered and resolved on the 505 control.

As an overview, these issues affect the following:

- Issue 1—Analog I/O accuracy – channels would need external calibration (typically this is not needed)
- Issue 2—The ability to configure the unit
- Issue 3—Accuracy of translations if using Chinese for display language
- Issue 4—Local display could lock up, requiring a restart of the GUI application

It is important to note that none of these issues affect control operation of any turbine in service. All control and I/O functionality and communication interfacing (such as Modbus and/or service tool interfacing) to other devices is unaffected.

If the 505 is not in operation, it is strongly recommended that the procedure to correct issue #4 be completed. Completing this procedure will complete the corrections for Issues 2 and 3 also.

Chapter 2.
Issue 1: Calibration Fault

Introduction

A small number of new released Flex505 controllers in the field may have a faulty I/O calibration value. The calibration values were input at the production level to table memory. During the boot and initialization process, the controller loads the value into RAM for use. In this case, the controller software points to the default value instead of the calibration table and causes the “Flex Calibration Fault”. This Application Note covers the specific procedure that will allow the user to correct the Flex505 I/O calibration in the field.

Units Affected

Five units were shipped with this issue:

- 8200-1300, serial number 19854409
- 8200-1300, serial number 19854410
- 8200-1300, serial number 19854411
- 8200-1301, serial number 19854412 (problem already corrected)
- 8200-1301, serial number 19854413 (problem already corrected)

Equipment Need

- Debug Cable p/n: 5417-1344 – USB to Serial debug
- Software Terminal Emulator program (such as TeraTerm, Hyperterminal, or other)
- A desktop computer or laptop

Potential Issue

The Flex505 controller will not operate its I/O functions at the most accurate level. The Flex505 will load the default values instead of production calibrated values, and it could impact the Analog I/O and Actuator outputs accuracy.

If this problem exists on the control, the Alarm Summary (VIEW button from front display) will have a continuous “Chassis Summary Alarm“ that will not clear, and the following will be seen in the AppManager status window.

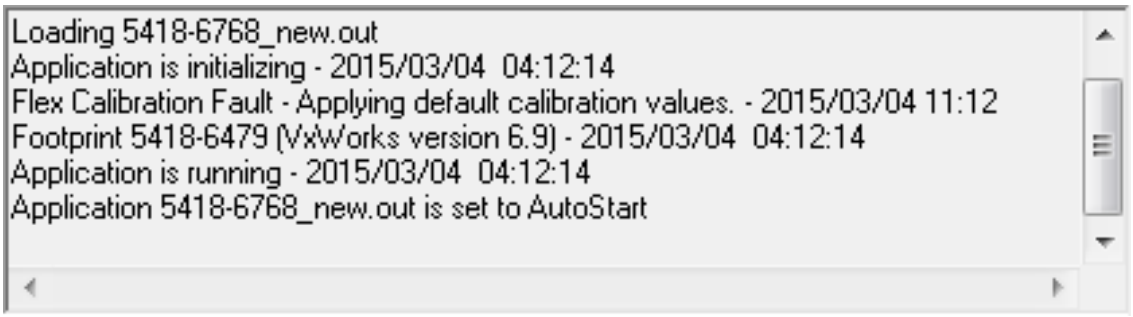

Figure 2-1. AppManager message for Calibration Fault

Solution

Woodward has identified the failure and has provided the following procedure to correct the field concerns.

1. Connect the Debug Cable to the debug port—this port is located on the top of the control where there is a small access cover with a thumb screw that secures it closed. Open this cover to reveal a small white 3-pin connector that is keyed and has a small locking tab for the cable connector.

IMPORTANT **Be careful not to change any of the DIP switches that are beside this white connector when inserting or removing the cable.**

2. Place the USB connector end of the cable into a laptop PC and launch a terminal emulator program. The serial connection port setup is:
   - Baud Rate 115200
   - Data 8 bit
   - Parity none
   - Stop 1 bit
   - Flow Control none
3. Type Enter, and you should see the following prompt:
   VxWorks login:
4. Type “ServiceUser”, and you will be prompted for a password. Enter “ServiceUser@1”.
5. You will now be prompted with a “ -> “ symbol.
6. Type these commands in this order:
   - ReadCalValues <Enter>
   - SetSpdCalDefaults <Enter>
   - WriteCalValues <Enter>
7. After each <Enter> you will be prompted with the following: value = 0 = 0x0
8. Procedure complete. Disconnect the cable and re-secure port cover.

Conclusion

The Flex505 I/O calibration fault does not force the unit to a shutdown mode. However, the I/O function may not operate to its intended accuracy level. External calibration using traditional gains and offsets for each channel can be done.

Production is correcting all affected products.

Chapter 3.
Issue 2: GAP not in AutoStart

Introduction

A small number of new released Flex505 controllers were shipped without the control application software in AutoStart. This application note covers the specific procedure that will allow the user to correct this issue. If the unit has not yet been placed into operation, it is suggested that the unit have the GAP application file updated to Revision A.

Units Affected

Six units were shipped with this issue:

- 8200-1301, serial number 19918112
- 8200-1301, serial number 19919722
- 8200-1301, serial number 19928130
- 8200-1301, serial number 19928131
- 8200-1301, serial number 19929718
- 8200-1301, serial number 19929719

Equipment Need

- Woodward AppManager Software (version 3.07 or later)
- A desktop computer or laptop
- Obtain updated GAP application file 5418-6768.OBJ_A.zip

Potential Issue

The Flex505 controller will not operate without the control application (GAP) running. Whenever the control application (GAP) is not running, the display screens will look like the following with either RED X's or RED Lock icons for all values. Also the IOLOCK (RED LED) will be illuminated.

Figure 3-1. 505 Display When GAP Application is NOT Running

Solution

To launch the application, connect to the control via an Ethernet cable, and use AppManager to start the GAP application and restart the GUI application.

1. If unfamiliar with using AppManager, refer to 505 manual 26839V2, Appendix F for step-by-step instructions.
2. In the control application view panel select (click on) the application- **5418-6768_new.out**. (It should be the only application available, and its current status should be Stopped.)
3. Start the application by selecting Control/Start Application or the Blue Triangle button on the right side Toolbar.
4. In the status panel, you should see the application start with a message indicating it is now in AutoStart.
5. Switch to the GUI application view panel (brown background) and select the following file (which should have status Running): **5418-6947_new_build01.wgui** (should be the only application available).
6. Restart this application by selecting Control/Restart Application or the restart button on the right side Toolbar.
7. The display on the control will switch to the 505 splash screen while the GUI file initializes (about 2 minutes).
8. Procedure complete. Disconnect the cable and re-secure port cover. Both application files are now in AutoStart, and the control will boot-up normally after any power cycle.

Chapter 4.
Issue 3: GUI File Update

Introduction

A small number of new released Flex505 controllers were shipped without the final, updated graphical user interface application software installed. The primary difference between the final release and the version installed on the units below concerns translations for Chinese. This section covers the specific procedure that will allow the user to correct this issue.

Units Affected

Six units were shipped with this issue:

- 8200-1301, serial number 19918112
- 8200-1301, serial number 19919722
- 8200-1301, serial number 19928130
- 8200-1301, serial number 19928131
- 8200-1301, serial number 19929718
- 8200-1301, serial number 19929719

Equipment Need

- Woodward AppManager Software (version 3.07 or later)
- A desktop computer or laptop
- Obtain Updated GUI application file 5418-6947.OBJ_NEW.zip

Potential Issue

If you are using the Flex505 feature that allows all screens to be displayed in Chinese instead of English, you will want to perform this update.

Figure 4-1. Selecting Chinese from Mode screen using Globe Icon

Solution

If the turbine can be shut down, do not follow this procedure. Instead, perform the procedure detailed in Chapter 5 (Issue 4) below.

To install an updated GUI application on the control, connect to the control via an Ethernet cable and use AppManager to transfer the GUI application and restart the GUI application. Obtain the updated GUI file and unzip this file to a folder on the PC to be used for this procedure.

1. If unfamiliar with using AppManager, refer to 505 manual 26839V2, Appendix F for step-by-step instructions.
2. Switch to the GUI application view panel (brown background) by using the Swap button on the right side Toolbar (or Control/Show GUI Applications View) and select the following file (which should have status Running): **5418-6947_new_build01.wgui** (should be the only application available).
3. Stop the application by selecting Control/Stop Application or the Maroon Square button on the right side Toolbar.
4. The status of this application will now say Stopped.
5. The display on the control will switch to the 505 splash screen while the GUI file initializes (about 2 minutes).
6. Under Control menu, select Delete GUI application.
7. In the dialog box that opens, select the folder named **5418-6947_new_build01** and click Delete.
8. Under Control menu, select Transfer GUI application.
9. In the dialog box that opens, browse to find the new GUI file named: **5418-6947_NEW_Build01.wgui**.
10. When transfer is complete (takes about a minute), select the file and start the application by selecting Control/Start Application or the Blue Triangle button on the right side Toolbar.
11. GUI initialization will take about 2 minutes. When completed, if Chinese language is desired for the display, select Chinese from the MODE screen. Then use AppManager to Stop/Restart the GUI or power cycle the control. Now all pages will appear in Chinese.
12. Procedure complete. Disconnect the cable. Both application files are now in AutoStart, and the control will boot-up normally after any power cycle.

Chapter 5.
Issue 4: GAP/GUI Update to Revision A

Introduction

With GUI application software revision NEW, it is possible to inadvertently place the GUI application in a state that will cause the display to lock up. This chapter covers the specific procedure that will allow the user to correct this issue.

It is recommended that all units be upgraded to Revision A of both the GAP and GUI application files. If the unit has already been placed into operation, this can be done at the site's earliest convenience. While running with Revision NEW, be sure to avoid the keystrokes that create the problem.

Units Affected

All 505 units that were shipped at Revision NEW have this issue. The 505 Remote View tool running on a PC will experience a runtime fault with this same key sequence.

Equipment Need

- Woodward AppManager Software (version 3.07 or later)
- A desktop computer or laptop
- Obtain Updated GUI application file 5418-6947.OBJ_A.zip
- Obtain Updated GAP application file 5418-6768.OBJ_A.zip

Potential Issue

If the user is in either Operation or Calibration Modes (no problem in Configuration mode) and then navigates to the Configuration Menu / Speed Control / Next page button, you will arrive at the following screen. It does not matter whether Use Speed Input Channel 2 is checked or not.

Figure 4-1. Speed Input Channel 2 Page

If while on this page the Navigate Down button is pressed (circled in RED in Figure 4-1), the GUI application will experience a lock-up, and no further keypad commands will allow it to leave this page.

This event affects only the local display. All control operation, I/O function, and communication interfacing (such as Modbus and/or service tool interfacing) are unaffected by this event. The RESET key will still function normally; however, the Start and Stop keys, which require confirmation, will not.

Solution

To correct this problem, the GUI application (filename.wgui file) must be re-started using AppManager.

If unit is in operation—

Use AppManager to re-start the **5418-6947_new_build01.wgui** file.

If unfamiliar with using AppManager, refer to 505 manual 26839V2, Appendix F for step-by-step instructions to “Start/Stop Applications”.

If unit is Not in operation—

IMPORTANT **The turbine must be shut down to perform the following procedure. If it is not, the AppManager program will not allow the application to be stopped, which will prevent the procedure from being performed.**

Update the GAP and GUI applications to Revision A using the follow procedure.

1. If unit has been configured: Download the current tunable settings file from the control. If unfamiliar with using Control Assistant, refer to 505 manual 26839V2, Appendix E for step-by-step instructions on “Retrieving Control Tunables” from the 505.
2. If unfamiliar with using AppManager, refer to 505 manual 26839V2, Appendix F for step-by-step instructions.
3. In the Control application view panel, select (click on) the following file: **5418-6768_new.out** (this should be the only application available, and its current status should be Running).
4. Stop the application by selecting Control/Stop Application or the Maroon Square button on the right side Toolbar.
5. Switch to the GUI application view panel (brown background) and select the following file (which should have status Running): **5418-6947_new_build01.wgui** (should be the only application available).
6. Stop the application by selecting Control/Stop Application or the Maroon Square button on the right side Toolbar. The status of this application will now say Stopped.
7. The display on the control will switch to the 505 splash screen when no GUI is running.
8. Switch back to the Control application view panel.
9. Under Control menu, select Transfer Application Files.
10. In the dialog box that opens browse to find the new GAP executable file named: **5418-6768_a.out**.

11. When transfer is complete, select the file and start the application by selecting Control/Start Application or the Blue Triangle button on the right side Toolbar.
12. Switch to the GUI application view panel (brown background) by using the Swap button on the right side Toolbar (or Control/Show GUI Applications View).
13. Under Control menu select Transfer GUI applications.
14. In the dialog box that opens browse to find the new GUI file named: **5418-6947_a_build01.wgui**.
15. When transfer is complete (takes about a minute), select the file and start the application by selecting Control/Start Application or the Blue Triangle button on the right side Toolbar.
16. GUI initialization will take about 2 minutes.
17. If unit was configured: Upload the current tunable settings file (from step 1) from your PC into the control. Refer to 505 manual 26839V2, Appendix E, “Sending Control Tunables”.
18. Procedure complete. Both application files are now in AutoStart, and the control will boot up normally after any power cycle.

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:

- 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 **Recognized Turbine Retrofitter (RTR)** is an independent company that does both steam and gas turbine control retrofits and upgrades globally, and can provide the full line of Woodward systems and components for the retrofits and overhauls, long term service contracts, emergency repairs, etc.

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

Product Service Options

The following factory options for servicing Woodward products are available through your local Full-Service Distributor or the OEM or Packager of the equipment system, based on the standard Woodward Product and Service Warranty (5-01-1205) that is in effect at the time the product is originally shipped from Woodward or a service is performed:

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

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

This option allows you to call your Full-Service Distributor in the event of an unexpected outage, or in advance of a scheduled outage, to request a replacement control unit. If the unit is available at the time of the call, it can usually be shipped out within 24 hours. You replace your field control unit with the like-new replacement and return the field unit to the Full-Service Distributor.

Charges for the Replacement/Exchange service are based on a flat rate plus shipping expenses. You are invoiced the flat rate replacement/exchange charge plus a core charge at the time the replacement unit is shipped. If the core (field unit) is returned within 60 days, a credit for the core charge will be issued.

Flat Rate Repair: Flat Rate Repair is available for the majority of standard products in the field. This program offers you repair service for your products with the advantage of knowing in advance what the cost will be. All repair work carries the standard Woodward service warranty (Woodward Product and Service Warranty 5-01-1205) 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 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 us via telephone, email us, or use our website: **www.woodward.com**.

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

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

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.

We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

Please reference publication 51532.

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Email and Website—www.woodward.com

Woodward has company-owned plants, subsidiaries, and branches, as well as authorized distributors and other authorized service and sales facilities throughout the world.

Complete address / phone / fax / email information for all locations is available on our website.