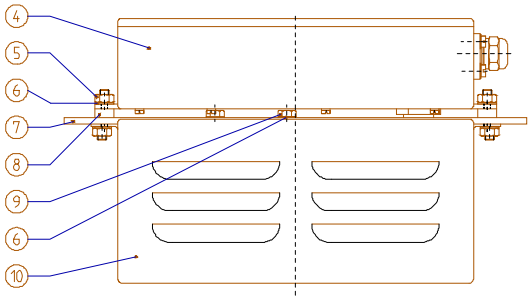
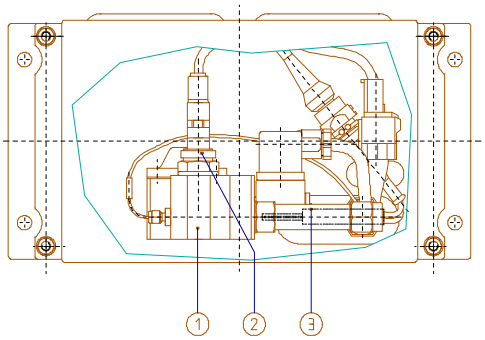
WOODWARD

Product Manual 26019
(Revision NEW)
Original Instructions





UEGO Burner

Deltec VM7956 Burner

Installation and Maintenance Manual

General Precautions

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.

Practice all plant and safety instructions and precautions.

Failure to follow instructions can cause personal injury and/or property damage.

Revisions

This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, check manual *26311* , *Revision Status & Distribution Restrictions of Woodward Technical Publications*, on the *publications page* of the Woodward website:

www.woodward.com/publications

The latest version of most publications is available on the *publications page*. If your publication is not there, please contact your customer service representative to get the latest copy.

Proper Use

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

Translated Publications

If the cover of this publication states "Translation of the Original Instructions" please note:

The original source of this publication may have been updated since this translation was made. Be sure to check manual *26311* , *Revision Status & Distribution Restrictions of Woodward Technical Publications*, to verify whether this translation is up to date. Out-of-date translations are marked with ⚠. Always compare with the original for technical specifications and for proper and safe installation and operation procedures.

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

Contents

Illustrations and Tables

Warnings and Notices

Important Definitions

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- **DANGER**—Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING**—Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**—Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE**—Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT**—Designates an operating tip or maintenance suggestion.

⚠WARNING

Overspeed / Overtemperature / Overpressure

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

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

⚠WARNING

Personal Protective Equipment

The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to:

- **Eye Protection**
- **Hearing Protection**
- **Hard Hat**
- **Gloves**
- **Safety Boots**
- **Respirator**

Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.

⚠WARNING

Start-up

Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

⚠WARNING

Automotive Applications

On- and off-highway Mobile Applications: Unless Woodward's control functions as the supervisory control, customer should install a system totally independent of the prime mover control system that monitors for supervisory control of engine (and takes appropriate action if supervisory control is lost) to protect against loss of engine control with possible personal injury, loss of life, or property damage.

NOTICE

Battery Charging Device

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

Electrostatic Discharge Awareness

NOTICE

Electrostatic Precautions

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

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

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

Follow these precautions when working with or near the control.

1. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
2. Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
   - Do not touch any part of the PCB except the edges.
   - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
   - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.

Chapter 1.
General Information

Introduction

In order to control the lambda of a lean burn gas engine, the VM7956 burner burns a small amount of mixture taken from the engine to determine the air/fuel ratio. Unlike the earlier VM7352/VM7356 burner systems, this new burner can also work with ultra lean mixtures (e.g., lambda = 2,3).

In a separate burner system the combustion is almost complete, in contrast to the combustion in a gas engine itself. The low concentration of unburned fuel improves the life expectancy of the UEGO lambda sensor significantly.

This new VM7956 burner system can be used in combination with any Deltec lean burn closed loop, lambda control.

The main advantages of this system are:

- Increased operating range of lambda 0,7 to lambda 2,3
- Ignition by hot surface igniter instead of ignition by spark plug and coil
- Rigid mounted electronic circuit board, in a protective aluminum box
- Fully microprocessor controlled system
- Diagnosis and monitoring with RS-232 signal possible

Please read the following warnings carefully before commissioning the burner system:

⚠WARNING **Make sure that no solvents or other easy ignitable fluids or gases can contact the hot surfaces of the burner system.**

⚠CAUTION **Note that very high temperatures can occur under the aluminum cover of the burner system. Be careful when opening this cover because some parts remain very hot, even after the system is switched off!**

Chapter 2. Specifications

Mixture Specification

The specifications mentioned below are based on natural gas mixtures.

Allowed pressure:	100 mbar—5 bar (10—500 kPa)
A/F ratio:	Lambda = 0,7—2,3
Mixture consumption:	Approximately 1 L/min (60 L/hr)
Allowed gases:	Natural gas, biogas, landfill gas, propane, LPG
Mixture connections:	1/8” BSP
Operating pressure:	60—70 mbar
Maximum back pressure:	+2 or –2 mbar

Electrical Specifications

The burner system needs a 24 Vdc supply and a 12 Vdc supply. The 12 Vdc supply usually will be taken from the 12 Vdc output of the Deltec lean burn control.

The minimum and maximum values of the supply voltages listed below, refer to values measured on the terminal strip (connector) of the burner system. The output voltage of the lambda sensor is available on a HI and LO terminal. To avoid inaccuracy in the measurement of the A/F ratio, the LO of the lambda signal should not be connected to the supply ground.

A potential free alarm contact is also available on the connector.

A serial RS-232 signal for monitoring or diagnosis is available on the circuit board. With cable VM6396.0019, a connection to any PC can be made. Monitor software will be delivered with this cable.

24 Vdc supply

Allowed range:	24,0—30,0 Vdc (advised: 26,0 Vdc)
Current during start up:	Approximately 2 A (8 A peak)
Current in operation:	1,2 A

12 Vdc supply

Allowed range:	12,5—14,5 Vdc (at connector)
Current in operation:	1,2 A—1,4 A

“Burner-ON” Signal

Allowed range:	8,0—30,0 Vdc

Dimensions and Weight

The dimensions of the burner system can be found in Figure 2-1.

The weight of the system is approximately 3,8 kg.

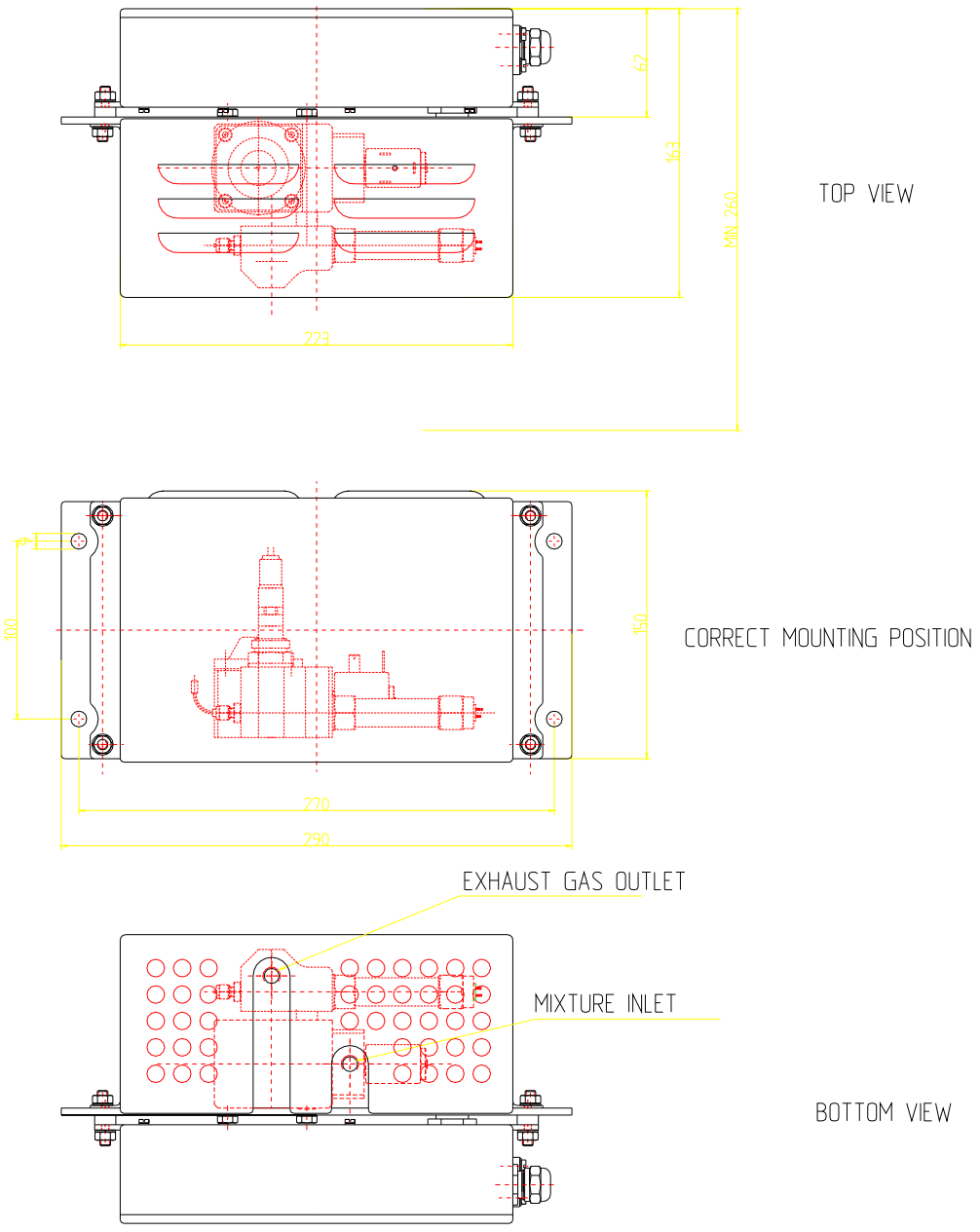


Figure 2-1. Dimensions of Burner System

Chapter 3.
Principles of Operation

Burner System

In the VM7956 burner, a small amount of mixture (approx. 1L/min) will be burned to measure the A/F ratio. The A/F ratio will be measured with the UEGO lambda sensor, which is mounted in the measuring chamber of the burner. Normally mixture will be taken from lean burn, turbocharged engines. The mixture can be taken upstream or downstream of the throttle valve. This depends on the type of engine and the application.

The burner system is *not* designed to be used as a part of a stoichiometric A/F control in combination with a three way catalyst.

The mixture supply line should be kept as short as possible and should have a small internal diameter to improve the response time of the system (see also installation information in Chapter 4).

The burner unit incorporates a solenoid valve and a pressure regulator. The pressure regulator is set at the factory and is not adjustable.

After applying the “Burner-ON” signal, the start cycle of the burner system begins. **The “Burner-ON” signal should only be applied if sufficient mixture pressure is present.**

The mixture is pre-heated, then passes the glowing igniter. After the igniter succeeds in igniting the mixture, the power dissipation of the heater will be reduced and controlled continuously to a programmed value. The igniter will be heating continuously to stabilize the combustion process.

Under normal conditions the burner will start quite fast, and the lambda signal will be available within 15 to 30 seconds.

If the burner does not start immediately, two more attempts will be carried out before the burner falls into the alarm state. These three attempts will take about five minutes.

The thermocouple (type K) checks continuously if the burner system is working properly. The lambda signal will be released only if the temperature in the combustion chamber is above a programmed value.

The circuitry continuously checks the igniter, the thermocouple, the combustion temperature, and the 24 Vdc supply voltage.

If measured values exceed programmed limits, the burner system will switch to the alarm status, and the lambda signal will be switched off. Reset of the alarm status can be done by switching the signal "Burner-ON" off and on.

If the combustion temperature drops under the programmed value, three new start attempts will be carried out before the system switches to alarm.

Burner Circuit Board LEDs

On the circuit board of the burner system you can find four status LEDs which cannot be seen when the aluminum control box is closed. These LEDs are marked as follows:

YELLOW "READY"	This LED is on when the burner system is working correctly and shows that the lambda signal is released.
YELLOW "VALVE OPEN"	This LED is on if the solenoid valve is open. This is the case if the burner is in its start cycle and also when the burner functions properly.
GREEN "MPU RUN"	This LED blinks continuously, to show that the micro processor runs properly.
RED "ALARM"	This LED lights up when the burner system is in the alarm status. In this case the alarm relays is switched over, the lambda signal is switched off, and the solenoid valve is closed.

UEGO Lambda Sensor Built-in Controller

The UEGO lambda sensor controller is incorporated in the aluminum control box of the VM7956 burner system. The three LEDs of the UEGO controller can be seen behind a small transparent plastic cover on the aluminum box.

On the aluminum control box, two 6 mm test terminals can be found, which can be used if the lambda sensor needs to be calibrated in ambient air.

The very small potentiometer for calibrating the sensor can be found on the (black) UEGO controller after opening the little transparent plastic cover. Use a suitable screwdriver when calibrating the lambda sensor controller, and be careful not to apply any force on this potentiometer, because it is easily damaged.

The functions of the three LEDs on the UEGO controller are:

YELLOW	This LED should blink continuously showing that the temperature control of the UEGO sensor works properly. If this LED is on, but does not blink, it means that the 12 Vdc supply is probably too low.
GREEN	This LED should be on continuously, showing that the lambda sensor and the controller are OK
RED	Alarm! If this LED lights up, the lambda sensor or the UEGO controller is not functioning properly.

Chapter 4. Installation

Mechanical Installation

To avoid any damage to the burner system, the burner should not be mounted directly on the engine. Suitable silent blocks should always be used.

The burner system should be mounted horizontally, with the mixture input and output connections pointing downwards.

The mixture line (input) should be kept as short as possible. For this reason the burner should be mounted close to the mixture connection at the engine. The internal diameter should be Ø 2 to Ø 4 mm, to obtain a fast response of the burner system.

The mixture can be taken upstream or downstream from the butterfly valve. Taking the mixture downstream from the butterfly valve often allows for better homogeneity. In this situation the burner can only work if the engine load is more then approximately 50%, because sufficient mixture pressure is needed.

To avoid condensation problems in the mixture line and to avoid accumulation of condensation in the burner, the input line should be mounted in a rising direction.

To avoid back pressure, the exhaust line should have the following dimensions:

- Length up to 3 meters—minimum internal diameter Ø 4 mm
- Length up to 20 meters—minimum internal diameter Ø 6 mm

The exhaust line should also be flowing down, to avoid condensation and function as a “water-seal”.

On landfill applications, choose a suitable material that can withstand the corrosive products in the condensation.

If the exhaust gas needs to be recirculated through the air cleaner, a T-piece can be used to let the condensation drop out, and the exhaust gas will be sucked into the air cleaner.

Avoid depressions in the exhaust line!

Electrical Installation

The burner system needs to be supplied with both 12 Vdc and 24 Vdc supply voltage. The supply grounds may be connected together. The 12 Vdc supply is normally provided by the Deltec lambda control. On the connector of the burner this voltage should be higher than 12.5 Vdc. The 24 Vdc supply should be at least 26 Vdc at the connector of the burner.

The Deltec lambda controller measures the lambda sensor signal and the output of the UEGO controller with a differential input, HI and LO. The LO of this signal should not be connected to the supply ground.

The burner should be connected as follows:

- 1: + 24 Vdc supply (burner)
- 2: GND (burner)
- 3: + 12 or 24 Vdc signal "Burner-ON"
- 4: + 12 Vdc supply (UEGO controller)
- 5: GND (UEGO controller)
- 6:
- 7: ALARM (common)
- 8: ALARM (normally closed)
- 9: ALARM (normally open)
- 10:
- 11: HI UEGO lambda sensor signal
- 12: LO UEGO lambda sensor signal

Chapter 5. Maintenance

Burner Maintenance

The burner can easily be taken apart to check and clean all components. The need to clean the burner depends strongly on the kind of gas that is used. Cleaning may be necessary more often particularly on engines with a recirculation system of the blow-by gases. A cleaning at every 8000 hours is advised.

If the burner is to be taken apart, a spare igniter or an overhaul kit should be available on-site, because some parts (e.g., the igniter) are very fragile!

NOTICE

Be especially careful when installing or removing the igniter or the lambda sensor, which are easily damaged.

All electronic parts are maintenance free.

UEGO Lambda Sensor Calibration

Check or adjust the calibration of the lambda sensor every 1500 hours. Normally this calibration will be carried out when the engine is not running. However it is also possible to calibrate the sensor with the engine running. In this situation, take care that the lambda control is on manual mode and that the lambda sensor is not in a strong airflow from the ventilation system.

The calibration is done as follows:

1. The 12 Vdc should be switched on to simulate the ignition-on signal using a bridge. The "Burner-ON" signal is not necessary.

2. The three LEDs on the UEGO controller should indicate that the sensor and controller are OK (this means a flashing yellow, and a continuous green LED).

⚠CAUTION

Note that very high temperatures can occur under the aluminum cover of the burner system. Be careful when opening this cover because some parts remain very hot, even after the system is switched off!

3. Open the slotted aluminum cover of the burner system, so the lambda sensor can be unscrewed from the burner system.

4. Take out the lambda sensor and leave it in ambient air for a minute. Be careful, the lambda sensor may be hot, and it is fragile.

5. Measure the output voltage on the terminals of the burner. The output voltage should be: 4,50 ± 0,02 Vdc. If the calibration is out of range, the controller should be adjusted.

6. Calibration: Open the transparent cover and adjust the output voltage on the UEGO controller to 4.50 Vdc, using the little potentiometer.

7. Mount the sensor in the burner and close the cover of the burner. Don't forget to remove the bridge that was used to simulate the ignition-on signal.

New sensors sometimes need a certain burn-in time, so check the 4.50 Vdc a few times after mounting a new sensor.

Chapter 6. Troubleshooting

Introduction

Errors can occur in the burner system or in the lambda sensor and the UEGO controller. If the system is not functioning properly, check the three LEDs of the UEGO controller behind the transparent cover.

Then check:
- Are all supply voltages OK?
- Is the "Burner-ON" signal present?
- Is all wiring OK?

UEGO Controller Errors

If the red LED is on, check the following items:
- Supply OK? (over 12.5 Vdc?)
- Lambda sensor OK?
- UEGO controller OK?
- Blue cable between sensor and controller OK?

Exchange various parts to find out which component is causing the problem.

Burner Circuit Board Errors

If the lambda sensor system is OK, there can be a problem with the burner system. In that case, open the electronic box and look at the four LEDs on the circuit board. If you think the burner system is not working properly, first remove the lambda sensor of the burner, to avoid damage to the sensor caused by unburned fuel.

⚠CAUTION

Note that very high temperatures can occur under the aluminum cover of the burner system. Be careful when opening this cover because some parts remain very hot, even after the system is switched off!

If the red LED is on, the RS-232 terminal plus the monitor program can be used to find the problem.

If the mixture can't be ignited the following items should be checked:
- Is sufficient mixture with a minimum of approximately 100 mbar available?
- Are the 24 Vdc supply and the "Burner-ON" signals OK?

If the problem is still not corrected, the following items should be checked:

- Check the igniter with the burner system switched off. The resistance of the igniter can be measured on terminal 3 and 4 on the connector with the 6 terminals. Also the resistance of the igniter can be measured at the connector of the igniter. The resistance should be approximately 3 Ω. Be careful, the igniter is very fragile!
- Check the mixture flow. This can be done easily by putting the exhaust line in a cup filled with water (for example). If the "valve open" LED is on, the gas flow should be visible in the water.

NOTICE **Be especially careful when installing or removing the igniter or the lambda sensor, which are easily damaged.**

If there is no mixture flow, check the following items:

- Is the mixture supply line leaking or blocked?
- Is the exhaust gas line blocked?
- Is the pressure regulator out of function? The pressure can be measured on the exhaust line of the burner, and should be 60–70 mbar.
- Is the solenoid valve out of function? Check the resistance of the coil at terminals 1 and 2 of the connector with the 6 terminals, with the burner system switched off. Normal value is approximately 108 Ω.

If the resistance is OK the valve itself is out of function, and needs to be replaced.

If the mixture flow is to high, resulting in a very high burner temperature, the following points should be checked:

- Pressure regulator out of function? Measure the pressure.
- No jet mounted behind the plug?
- Thermocouple out of function? Replace or test.

Chapter 7.
Service Options

Product Service 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 and 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 **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.

You can locate your nearest Woodward distributor, AISF, RER, or RTR on our website at:

www.woodward.com/directory

Woodward Factory Servicing 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**.

How to Contact Woodward

For assistance, call one of the following 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.

Electrical Power Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany	+49 (0) 21 52 14 51
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

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

Turbine 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

You can also locate your nearest Woodward distributor or service facility on our website at:

www.woodward.com/directory

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:

Your Name	
Site Location	
Phone Number	
Fax Number	
Engine/Turbine Model Number	
Manufacturer	
Number of Cylinders (if applicable)	
Type of Fuel (gas, gaseous, steam, etc)	
Rating	
Application	
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	

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 26019.

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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.

2013/2/Colorado