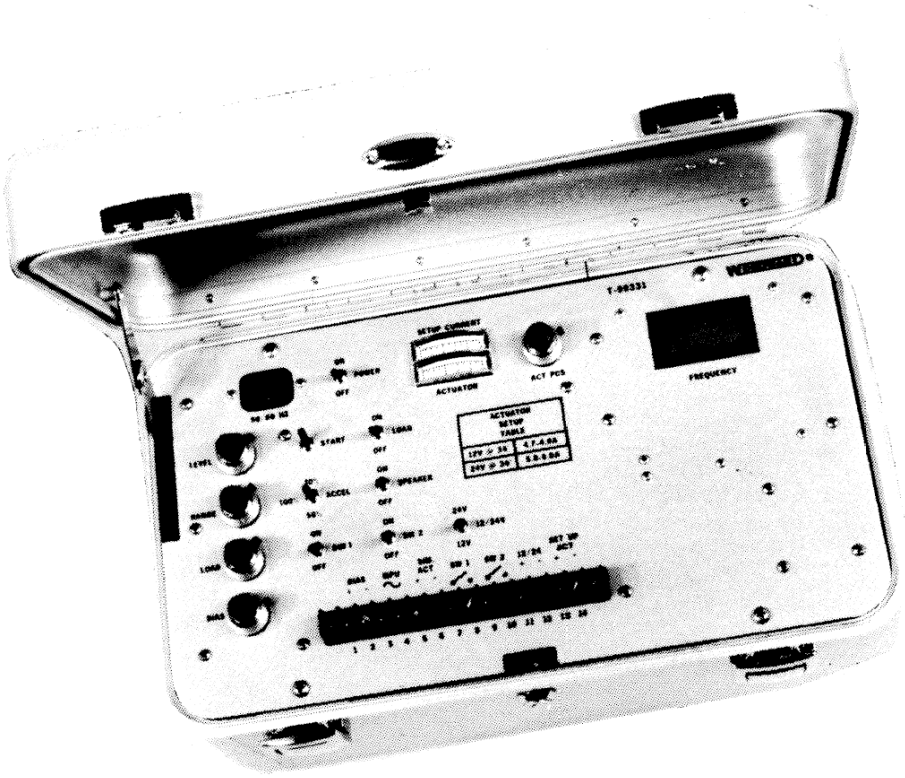
WOODWARD

Product Manual 55028
(Revision C)
Original Instructions



EPG Speed Loop Test Set
T99331

Operation Manual

IMPORTANT

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.

DEFINITIONS

- **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

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.

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.

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

www.woodward.com/publications

The current revision and distribution restriction of all publications are shown in manual *26311*.

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.

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.

NOTICE

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.

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*.

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

Contents

Illustrations and Tables

Chapter 1.
General Information

Introduction

WARNING

Because the EPG system can only be tested when disconnected from an engine, every precaution used with an untested governor should be observed when first using an EPG that has been tested on the Test Set. The Speed Loop Test Set will accurately test the ability of a given EPG governor to control speed of an engine or turbine and will enable the speed setting, droop setting, and stability setting to be adjusted within a range which should give safe initial operation. These items may have to be fine tuned on the engine to give optimum performance.

The Woodward T99331 EPG (Electrically Powered Governor) Speed Loop Test Set provides a convenient, portable engine and actuator simulator needed to test and adjust EPG governors (part number 8290-XXX) and 1712 or 1724 electric actuators.

The Test Set will provide both static and closed loop speed tests.

The Test Set will adequately test almost all functions of the governor system. It will not provide final adjustment of Gain and Stability as the final setting must be matched exactly to the engine to be controlled. The final settings are made on the operating engine.

Test Set Functions

The Test Set provides the following specific functions to check an EPG governor and an electric actuator.

- Actuator and control testing
- Production of an MPU signal to a governor under test
- Simulation of engine load to increase required actuator voltage
- Three different rates of simulated engine response
- Bias-voltage power supply to simulate biasing inputs to the control under test
- Speaker to simulate engine noise
- Start function to overcome an activated failsafe circuit in the control under test
- Actuator voltage meter to measure the voltage across the actuator
- Signal generator mode of operation to allow the checking of switch points or control set points
- Digital frequency meter for the exact setting of speed or closed- loop operating frequency
- 12 or 24 Vdc power supply to power the control under test

Principles of Operation

The EPG Speed Loop Portable Test Set has been created to provide a convenient way to certify operation of EPG controls (part number 8290-XXX) and actuators prior to placing them on an engine. The Test Set also provides means of presetting the Gain and Stability adjustments on the controls, although final settings of these must be made on the engine. A digital meter provides a frequency readout of the simulated MPU reading (engine speed) for greater accuracy.

Special testing features included in the Test Set are an engine start schedule and a response ramp which provides a realistic simulation of an engine in the acceleration mode.

The Test Set will also check the operation of the electric actuator, both through the EPG electronics and stand-alone.

Block Diagram

The block diagram (Figure 2-1) offers a picture of the Test Set operation. Starting with the actuator input from the control the Test Set adds an adjustable level or null signal, then further modifies the signal in the load adjust and the engine response areas before sending an adjusted magnetic pickup signal back to the control being tested. Meters provide readings of the actuator operation signal from the control and of the digital frequency being sent to the control.

Separate portions of the block diagram indicate the adjustable bias voltage source and the two optional switch signals provided by the Test Set.

Actuator Input Amplifier

The input amplifier receives the actuator signal from the EPG control and converts it into a voltage usable throughout the Test Set. A 0.05 ohm resistor is used in the Test Set to simulate an actuator, and a 0 to 10 Vdc meter is used to monitor the voltage across the actuator.

Actuator Response Amplifier

The LEVEL potentiometer on the front panel adds a signal to the actuator voltage received by the Test Set. The potentiometer adjusts the amount of actuator voltage the Test Set needs to create an MPU signal.

Engine Start/Load Amplifier

The engine start/load amplifier has inputs from the actuator simulation (total fuel flow), LOAD ADJ, LOAD ON/OFF switch, and the START switch. The total fuel flow signal is positive and causes the output to increase. The START switch is also positive, and when activated will cause the output to increase. The LOAD ADJ and the LOAD ON/OFF switch is a negative input and will cause the output to decrease in voltage. This will look like a load on the engine, and the control under test will increase actuator current to the Test Set, and to the actuator if it is attached to the Test Set.

Engine Response Amplifier

The ACCEL switch selects the response of the Test Set to a change in actuator signal from the control. In the upper position the response is slowed at 30 percent-per-second. At the lower position the response is slowed at 50 percent-per-second. In the center position the switch selects fast speed response to a change in actuator signal. The response rates will not exactly equal the response of any given engine and the Gain and Stability settings on the control will have to be set to the exact position after the engine is running.

Speaker

A small speaker in the Test Set provides an audible translation of the frequency of the MPU simulation. The audible signal allows tuning the control “by ear”. This is particularly valuable when establishing stability and response settings on the control. The speaker may be turned off, if desired.

Power Supply to the Control under Test

The 12/24 V switch selects the output voltage provided to the terminal strip outputs (TB-11 + and TB-12 –) and are used to power the control under test. If the output terminals are shorted, fuse 1 will blow, but will not cause permanent damage to the power supply.

Switches SW1 and SW2

These optional function switches can be wired to the control under test to simulate requirements such as input from shutdowns, overcurrent warnings or other discrete inputs to the control being tested.

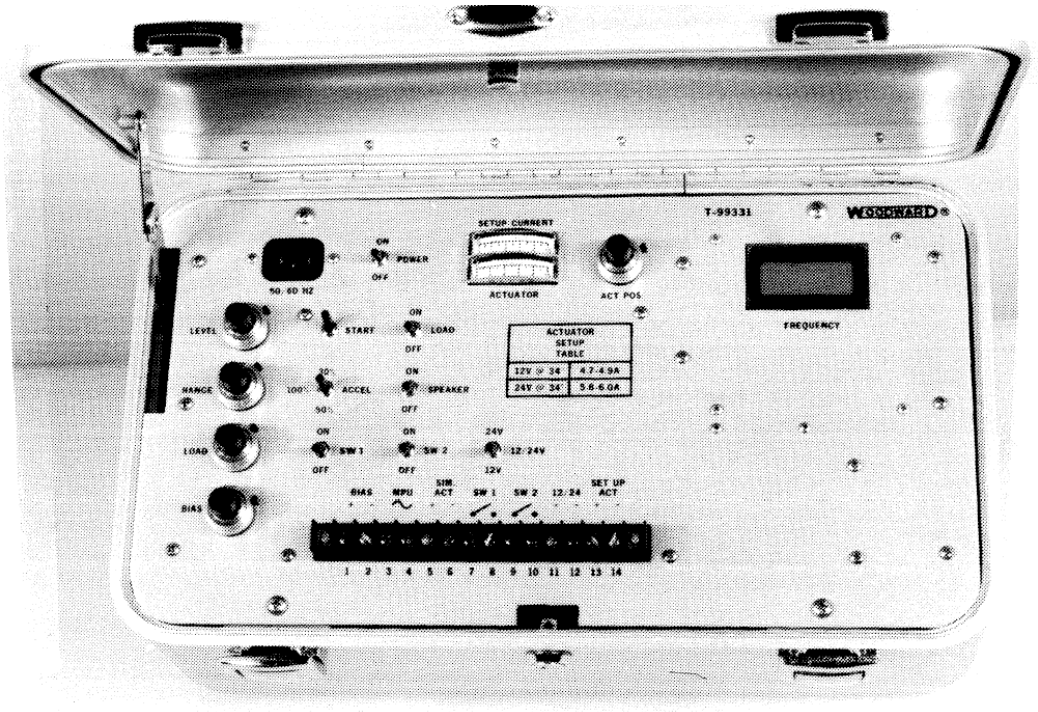


Figure 1-1. T9931 Speed Loop Test Set

Bias Voltage Supply

A ±5 Vdc supply is available through the terminal block on the front panel of the Test Set for use as a bias supply to the control under test. When the BIAS VOLTS potentiometer's adjust-counting dial is on 5, the output is 0 V. For a positive voltage, turn the dial counter clockwise. The setting of 0 equals +5 V. For a negative voltage, turn the dial clockwise from 5. The setting of 10 equals –5 V. The BIAS voltage is connected only to the terminal block and does not effect the Test Set operation.

Electrical Specifications

Line Input
115 or 230 Vac (switch selectable) 50 or 60 Hz

Power Supply Output
12 or 24 Vdc (switch selectable). 12 Vdc can range from 12 to 22 Vdc. 24 Vdc can range from 24 to 44 Vdc, depending on load

Actuator Input
0 to 200 mA maximum

Actuator Input Resistance
0.05 Ω

Magnetic Pickup (MPU) Output Voltage
2.0 Vrms at 5000 Hz

Magnetic Pickup (MPU) Frequency Range
0 to 19 kHz

Actuator Meter
0 to 10 Vdc ±2%

Digital Frequency Meter
19 999 ±1 Hz

Bias Volts Output
±5 Vdc, 20 mA

SW1 and SW2
125 Vac, 1 A maximum contact ratings
Single Pole Single Throw (SPST)

Setup Current Meter
0 to 10 A

Chapter 2.
Operating Procedures

Introduction

The following procedure is written to help you obtain the most use from your T99331 Speed Loop Test Set. It covers the setup procedures for testing EPG Speed Controls and 1712 or 1724 Electric Actuators. This procedure is written with the assumption the control under test is in working condition.

NOTICE

The input voltage selector switch must be set for the correct input voltage (115 or 230 Vac). Make sure this switch is set to match the input voltage before connecting power to the Test Set. Do not try to change this switch with the Test Set mounted in its case or powered up.

Input Voltage Selection

Make sure the input voltage selector switch is set correctly for the input voltage being used (see Figure 3-1). This switch can be seen through the cutout portion below the terminal strip on the front panel. If this switch is to the right, the input voltage selected is 230 Vac. If the switch is to the left, the input voltage selected is 115 Vac.

If this switch is not set correctly, the Test Set must be removed from its suitcase and the switch setting changed as follows:

1. Remove the four fasteners from the Test Set front panel (see Figure 3-1). Turn the fasteners counterclockwise to remove.

2. Carefully lift the Test Set out of its suitcase.

3. Pull the handle of the switch out (away from the plate it is mounted on) and move it to the correct position.

NOTICE

When installing the Test Set, be sure not to push any wires back into the suitcase.

4. Install the Test Set back in its suitcase and secure with the four fasteners.

EPG and Electric Actuator Closed Loop Setup Procedure

1. Before connecting the control under test to the Test Set, make the following settings:
   - LEVEL to dial setting 5.5
   - LOAD ADJ to 0
   - Select ACCEL switch to match engine
   - 12/24 V switch to setting required by the control to be tested
   - RANGE to dial setting 10.0

2. Place the POWER switch in the OFF position.

3. Connect the control under test to the terminal strip on the Test Set. Use the plant wiring diagram for the control under test. (See Figure 3-3 for all controls except 8290-081 to 8290-096; if one of these see Figure 3-4.)

4. Place the POWER switch in the ON position. If the control under test has an active failsafe circuit, hold down the START switch for about 1 second.

5. When the control under test is controlling the speed of the Test Set, adjust the LEVEL for about 2 V on the ACTUATOR meter.

6. Place the LOAD switch in the ON position and set the LOAD potentiometer for about 5 V on the ACTUATOR meter.

7. Adjust the control under test for the best stability and response of the system. The response is observed by watching the ACTUATOR meter and by turning the LOAD switch ON and OFF.

IMPORTANT

To obtain faster transient response, increase the gain setting (clockwise) until the ACTUATOR meter begins to oscillate or waver. Then adjust the stability as necessary to stabilize the meter indicator. Check control response and stability by loading and unloading. If stability cannot be obtained by the stability adjustment, reduce the gain setting and repeat the procedure.

Setup Procedure for the Actuator

1. With POWER switch OFF, select 12 or 24 volt power with the 12/24 V switch.

2. Connect the actuator to the SET UP ACT input terminals, TB-13 (+) and TB-14 (–) on the terminal strip.

3. Turn POWER switch ON.

4. Adjust ACT POS potentiometer for maximum degrees actuator rotation.

5. Read the actuator current on the ACTUATOR meter:
   - Model 1712 with 12 V selected, current will read 4.7 to 24.9 A
   - Model 512 with 12 V selected, current will read 5.0 to 5.2 A
   - Model 524 or 1724 with 24 V selected, current will read 5.8 to 6.0 A

6. Turn POWER switch OFF.

7. Disconnect the actuator.

Wire Harness

A wire harness with 18 AWG (0.8 mm²) wire and spade connectors should be constructed for use with the Test Set. For convenience the maximum wire length should be about 2 ft (60 cm). Different colored wires should be used throughout the harness to avoid confusion when attaching the control to the Test Set.

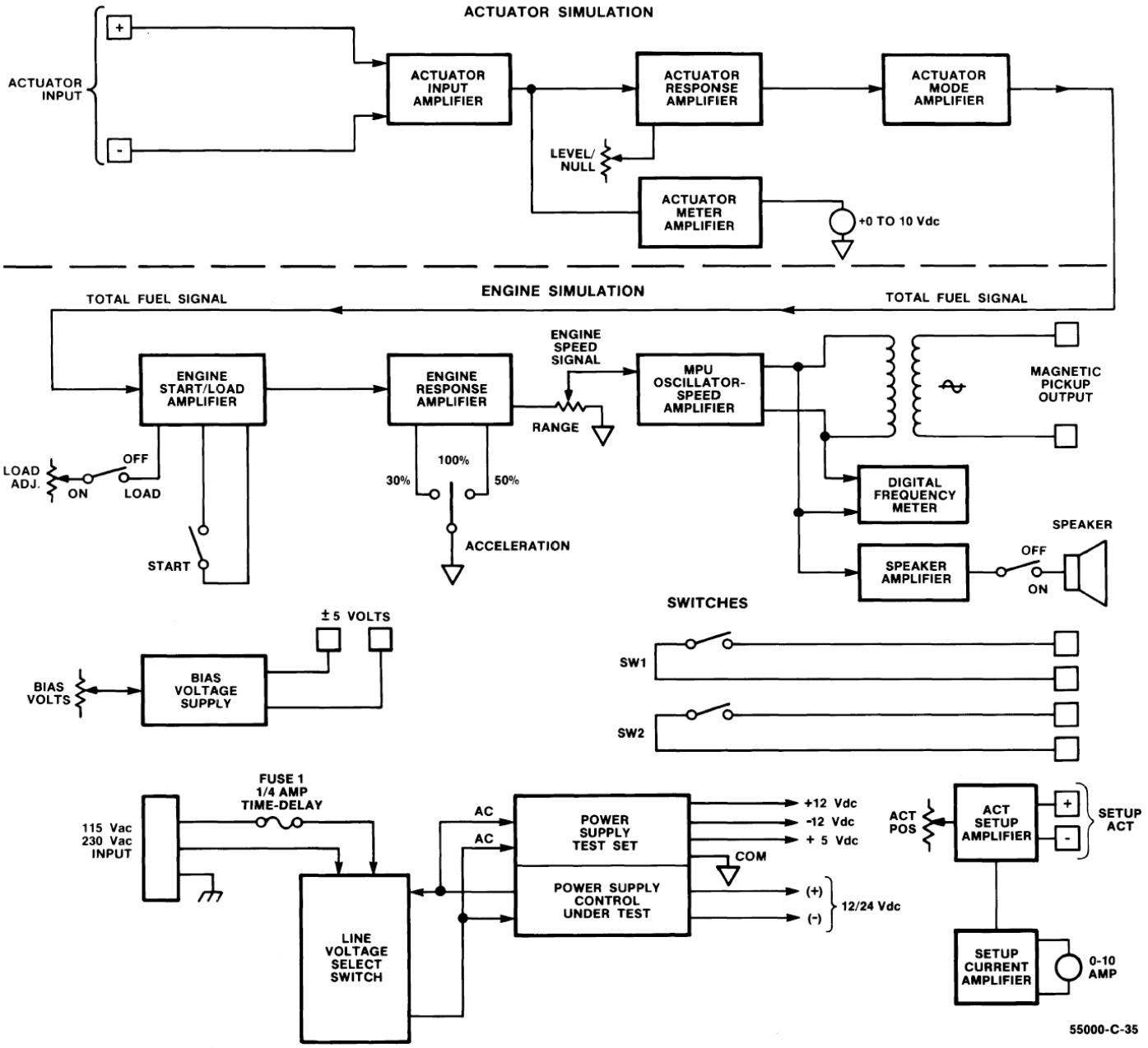


Figure 2-1. Block Diagram

Chapter 3.
Performance Check of the Portable Test Box

Required Test Equipment

Checking out the T99331 Test Set will require the following test equipment to verify the operation of various parts of the Test Set and provide verification that meters are providing consistent and correct results of governor operation.

- Digital Voltmeter with rms Capability (Fluke 8020 Or Equivalent)
- Oscilloscope with single trace capability
- Stop Watch

Performance Check

Initial Inspection

Open the suitcase and remove power cord. Inspect the power cord, the Test Set and any other equipment for obvious damage, Listen for rattling as the suitcase is tipped end to end and side to side. The Test Set should not rattle. Should there be any rattling, remove the Test Set from the suitcase by removing the four fasteners located along the top and bottom of the front panel.

Power Connection

Set the power supply switch inside the Test Set to either 115 or 230 Vac, as needed by the availability of electrical supply. Connect the power cord to the 50 or 60 cycle supply selected.

Test Set Setup for Beginning Adjustment

Preset the following:

LEVEL	5.5
RANGE	10.0
LOAD	0.0
BIAS	0.0
ACCEL	100%
SPEAKER	OFF
ACT POS	0.0
SW1	OFF
SW2	OFF
12/24 V	24 V

Test Set Setup Procedure

1. Turn POWER switch ON. The FREQUENCY meter will read less than 5 Hz after 5 seconds.
2. Measure the voltage at TB-12 (–) to TB-11 (+). It will read 38 Vdc. Switch 12/24 V switch to 12 V position. Voltage will read 18 Vdc. (Readings depend on the load but will be within 10%.)
3. Measure the resistance for SW1 at TB-7 to TB-8, and SW2 at TB-9 to TB-10. The resistance will be greater than 10 MΩ.
4. Place SW1 and SW2 in the ON position and measure the resistance for SW1 at TB-7 to TB-8, and SW2 at TB-9 to TB-10. The resistance will be 0.0 ±0.4 Ω.
5. Measure the SIM. ACT (internal simulated actuator) resistance between TB-5 and TB-6. The resistance will be less than 0.10 Ω. (This reading may be affected by the meter lead resistance.)
6. Place a 250 Ω load across the BIAS output TB-1 (+) and TB-2 (–). Set the BIAS potentiometer to 0.0.
7. Measure the voltage at the BIAS output TB-1 (+) and TB-2 (–). The voltage will be +4.8 to +5.3 V.
8. Set the BIAS potentiometer at 10.0. Measure the BIAS voltage. The voltage will be –4.8 to –5.3 V.
9. Set the BIAS potentiometer to 5.0. Remove resistor.
10. Turn POWER switch OFF.
11. Connect a known good 24 volt 8290-XXX control with a rated speed of 5000 Hz to the Test Set.
12. Connect a 24 volt actuator as shown in Figure 3-3 for all controls except 8290-081 to 8290-096 (for this see Figure 3-4). Place the 12/24 V switch to 24 V.
13. Turn POWER switch ON.
14. Press the START switch momentarily. The frequency will increase and the control should take command of the Test Set. Adjust the control for stable operation at a rated speed of 5000 Hz.
15. Adjust LEVEL for desired actuator position (usually 2 Vdc).
16. Connect an external voltmeter positive lead to TB-6 on the (–) side of the actuator and the negative lead to TB-12 (ground).
17. The ACTUATOR meter on the Test Set must have the same reading as the external meter, ±0.5 V for all controls except 8290-081 to 8290-096. For controls 8290-081 to 8290-096, connect positive lead of voltmeter to TB-11 (+V) and negative lead of voltmeter to TB-5 (Act +). The ACTUATOR meter on the Test Set must have same reading as the external meter, ±0.5 V.

18. Turn the LOAD switch ON and increase the LOAD potentiometer setting, the ACTUATOR meter will show an increase in actuator voltage. As the load is increased, the actuator voltage will reach a maximum value of about 8 V. As the load is increased further, the frequency will decrease and eventually go to zero. (The engine will die.)

19. Set the LOAD potentiometer to zero and restart the Test Set.

20. Adjust the load for 5 V on the ACTUATOR meter.

21. Turn the LOAD switch OFF.

22. Turn the SPEAKER switch ON, there should be an audible sound. Turn the SPEAKER switch OFF.

23. Measure the MPU output voltage at terminals TB-3 and TB-4. The voltage will be greater than 2 Vrms.

24. Turn POWER switch OFF.

25. Disconnect the control and actuator.

26. Connect a 24 volt actuator across SET UP ACT terminals TB-13 (+) and TB-14 (–).

27. Place the 12/24 V switch in the 24 volt position.

28. Turn POWER switch ON and adjust ACT POS potentiometer for 34 degrees actuator rotation. The SET UP current meter will read between 5.8 and 6.0 A.

29. Turn POWER switch OFF and disconnect actuator.

30. Select 12 V with the 12/24 V switch and connect a 12 V actuator to SET UP ACT terminals TB-13 (+) and TB-14 (–).

31. Turn POWER switch ON and adjust ACT POS potentiometer for 34 degrees of actuator rotation. Actuator SETUP CURRENT meter will read between 4.7 and 4.9 A.

32. Turn POWER switch OFF and disconnect the actuator.

33. Connect 12 V control and 12 V actuator to Test Set the same way as the 24 Volt control and actuator. (See Figure 3-3.)

314. Turn POWER switch ON and press START momentarily. The FREQUENCY should increase and the control should take command of the Test Set.

35. Adjust LEVEL for desired actuator position.

36. Turn LOAD switch ON and adjust LOAD potentiometer for desired actuator position. Turn LOAD switch OFF.

37. Turn POWER switch OFF and disconnect control and actuator.

38. Put the ACCEL switch in the 100% position and set LEVEL to 4.0.

39. Turn the POWER switch ON.

40. Connect an oscilloscope across the MPU output at TB-3 and TB-4.

41. Adjust the RANGE potentiometer for 5000 ±20 Hz on the internal FREQUENCY meter.

42. Adjust the oscilloscope for a single cycle across the screen.

43. Turn the POWER switch OFF.

44. Measure the time with a stop watch that it takes for the frequency to go from 0 to 5000 Hz when switching the POWER from OFF to ON while looking at the wave from on the oscilloscope. It will take 1.2 ±0.2 seconds to go from 0 to 5000 ±20 Hz.

45. Repeat steps 38 through 44 at 50% and 30% ACCEL. ACCEL schedules should require the following time periods:
    - 50%—2.00 ±0.65 s from 0 to 5000 ±20 Hz
    - 30%—3.00 ±0.85 s from 0 to 5000 ±20 Hz

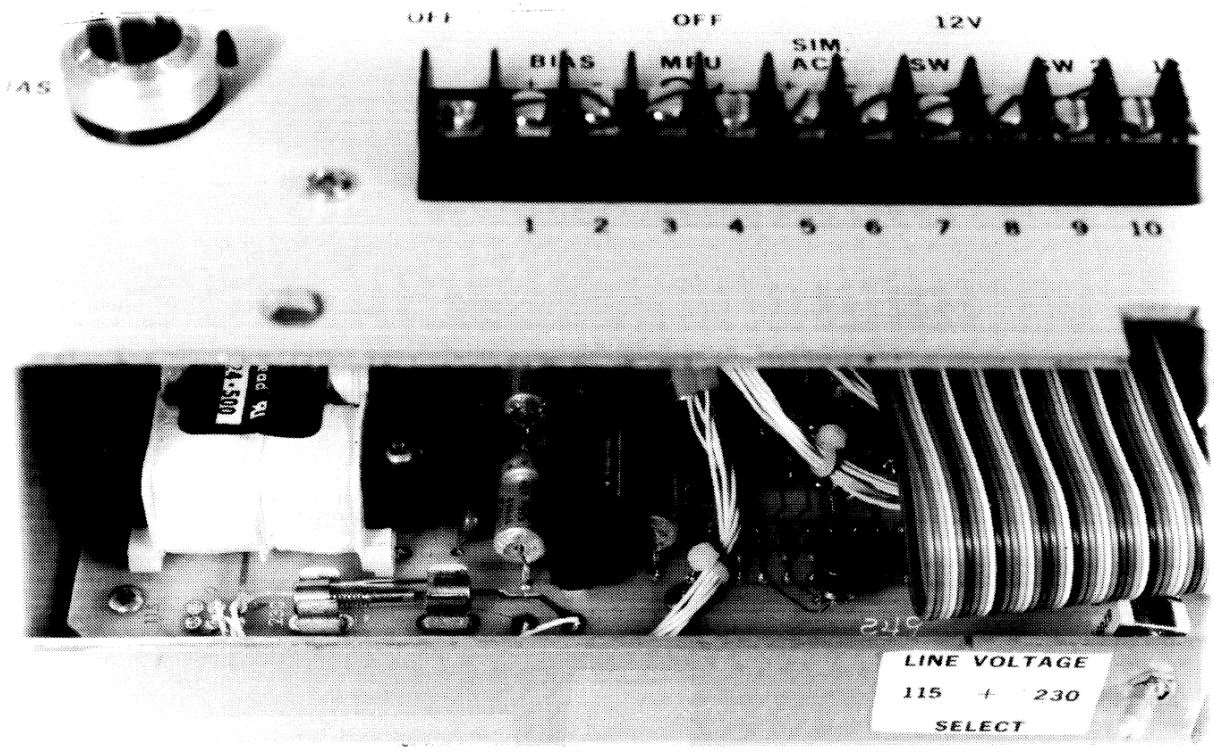


Figure 3-1. Fuse and Line Voltage Switch Locations

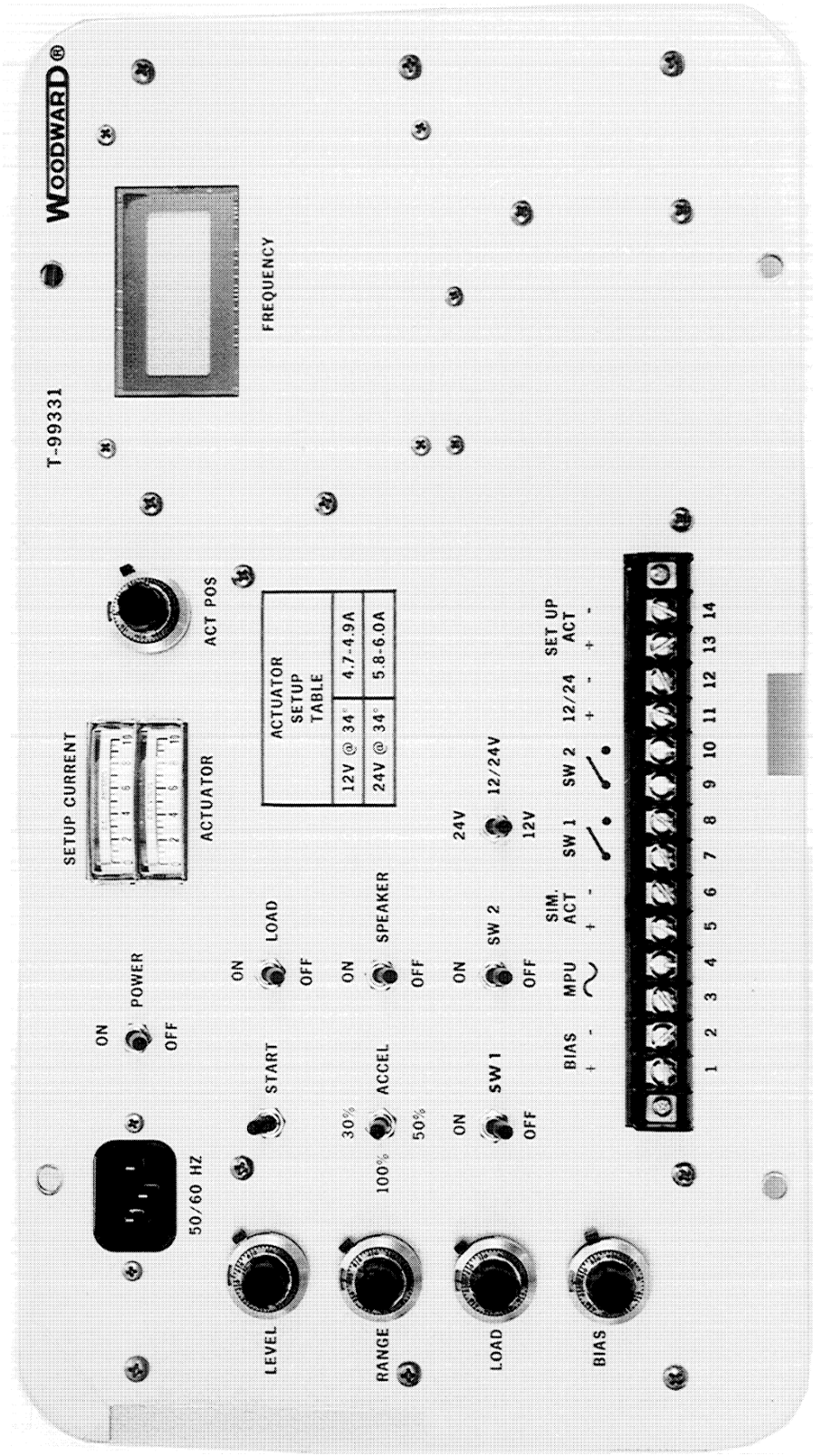


Figure 3-2. Test Set Front Panel

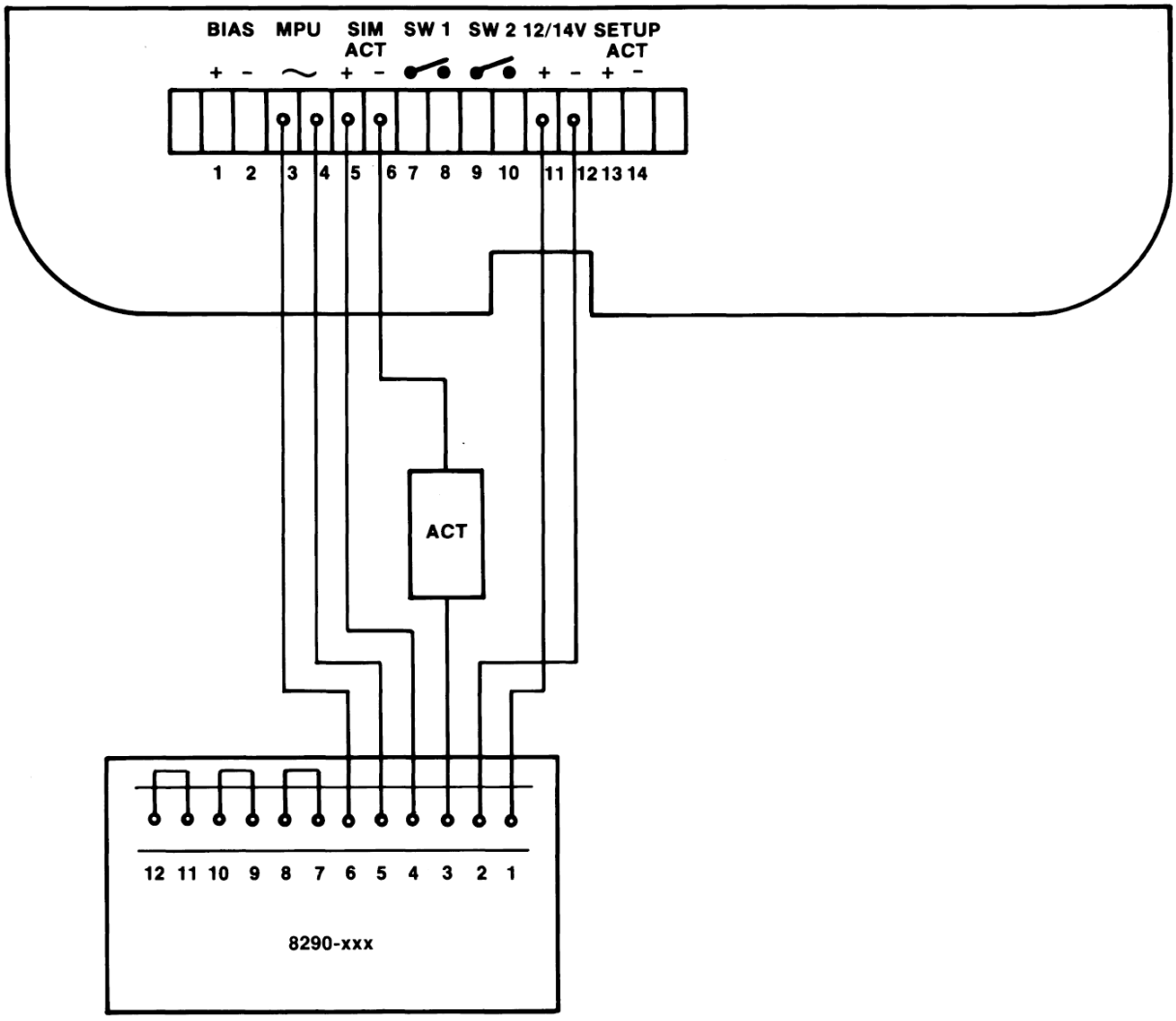


Figure 3-3. Interconnection Details

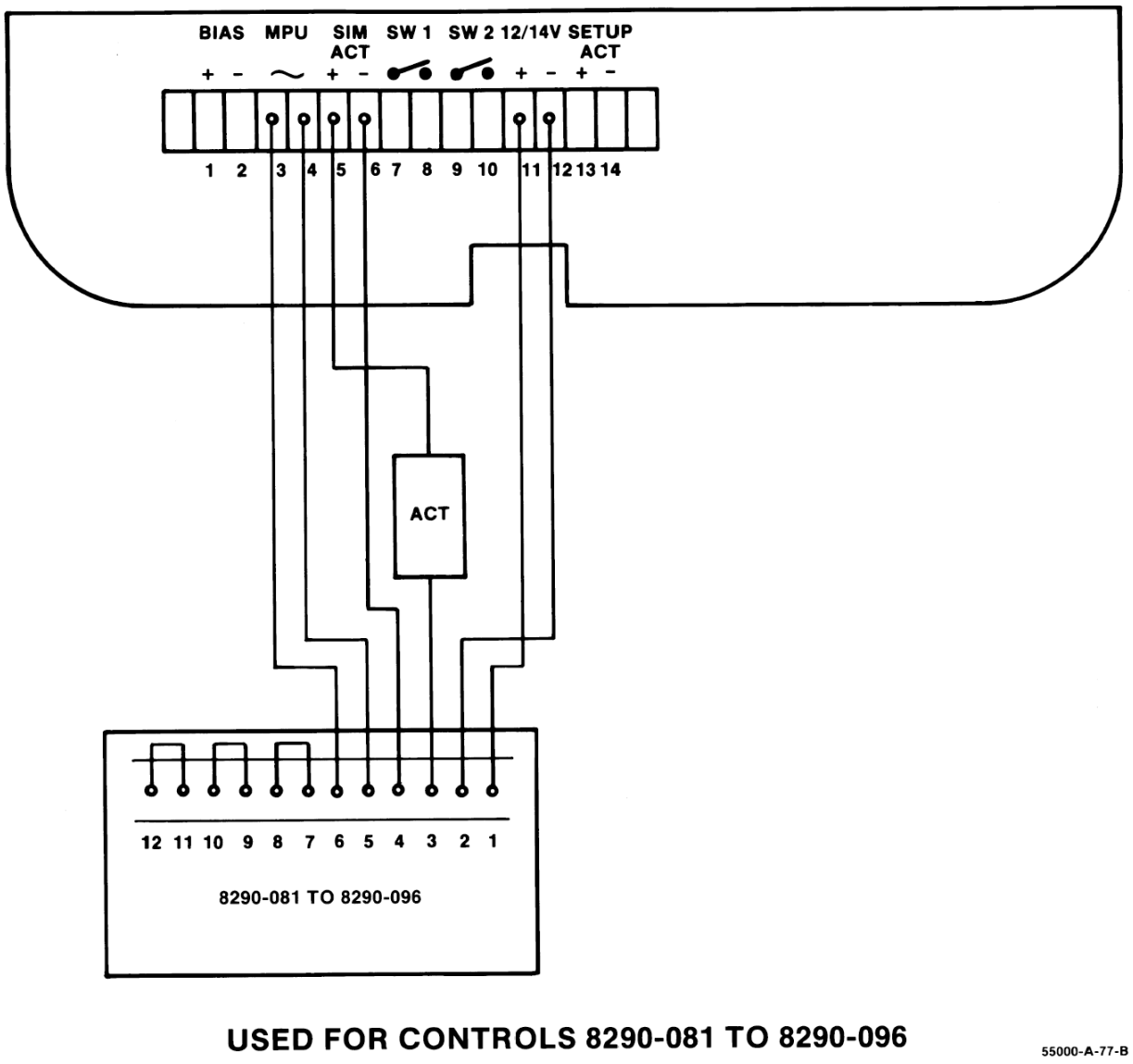


Figure 3-4. Interconnection Details

Chapter 4.
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 published at **www.woodward.com/directory**.

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

For the most current product support and contact information, please visit our website directory at **www.woodward.com/directory**.

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.

We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

Please reference publication 55028C.

PO Box 1519, Fort Collins CO 80522-1519, USA
1000 East Drake Road, Fort Collins CO 80525, USA
Phone +1 (970) 482-5811 • Fax +1 (970) 498-3058

Email and Website—www.woodward.com

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2012/9/Colorado