WOODWARD

Product Manual 82310
(Revision D)
Original Instructions

Speed Switch and Integrated Speed Switch

Installation and Operation 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:

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 Out-of-date translations are marked with ⚠.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

Contents

Illustrations and Tables

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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

Description

The Speed Switch and the Integrated Speed Switch can be used with any Woodward electronic governing system. The Speed Switch is a single speed switch in one enclosure; the Integrated Speed Switch contains three individual speed switches in one enclosure. Figure 1-1 shows a typical system using an Integrated Speed Switch.

Whether an enclosure contains one or three speed switches, the speed switches operate in the same way. Each individual speed switch checks turbine or engine speed, and de-energizes or energizes its relay when a previously selected speed is reached. The Speed Switch monitors the MPU signal at the input of the electronic control.

All models of the Speed Switch and Integrated Speed Switch include a failsafe circuit. If the MPU signal is too low in amplitude or if the MPU signal is too low in frequency, the failsafe circuit causes the speed-switch relay(s) to go to its tripped position. If the power to the speed switch fails, all relays de-energize.

The Integrated Speed Switch can be ordered to operate on either 20 through 40 Vdc, or on 115/230 Vac. The Speed Switch (single) can be ordered to operate on 20 through 40 Vdc only.

The tachometer driver circuit is optional on the Speed Switch (single) units. The Integrated Speed Switch units may be ordered with either the tachometer driver circuit or the failsafe indication circuit as an option (not both).

The tachometer driver circuit generates a dc current signal proportional to engine or turbine speed; this signal is used to drive an external dc meter which indicates rpm. The tachometer-driver circuit can be ordered to drive either a 0 to 1 mA meter or a 0 to 50 µA meter. The meter can be either digital or analog.

The speed-failsafe-indication circuit energizes a relay when the failsafe circuit senses a failure. The normally-closed contact of this relay is connected to external terminals on the speed switch, and can be used to control an external device or to provide a signal when a failsafe trip occurs. The speed-failsafe-indication circuit is an option.

Tables 1-1 and 1-2 show the details of each model by part number.

⚠WARNING **Do not use a Speed Switch or Integrated Speed Switch as the sole or primary overspeed-trip device for an engine or turbine.**

Features and Options

The Integrated Speed Switch is available in many models. The speed-adjustment range for each switch may vary, and other options are available. The Speed Switch (single) is also available with different speed-adjustment ranges and other differences.

Table 1-1 shows all models of the single Speed Switch and the features and options of each. Table 1-2 shows all models of the Integrated Speed Switch and the features and options of each.

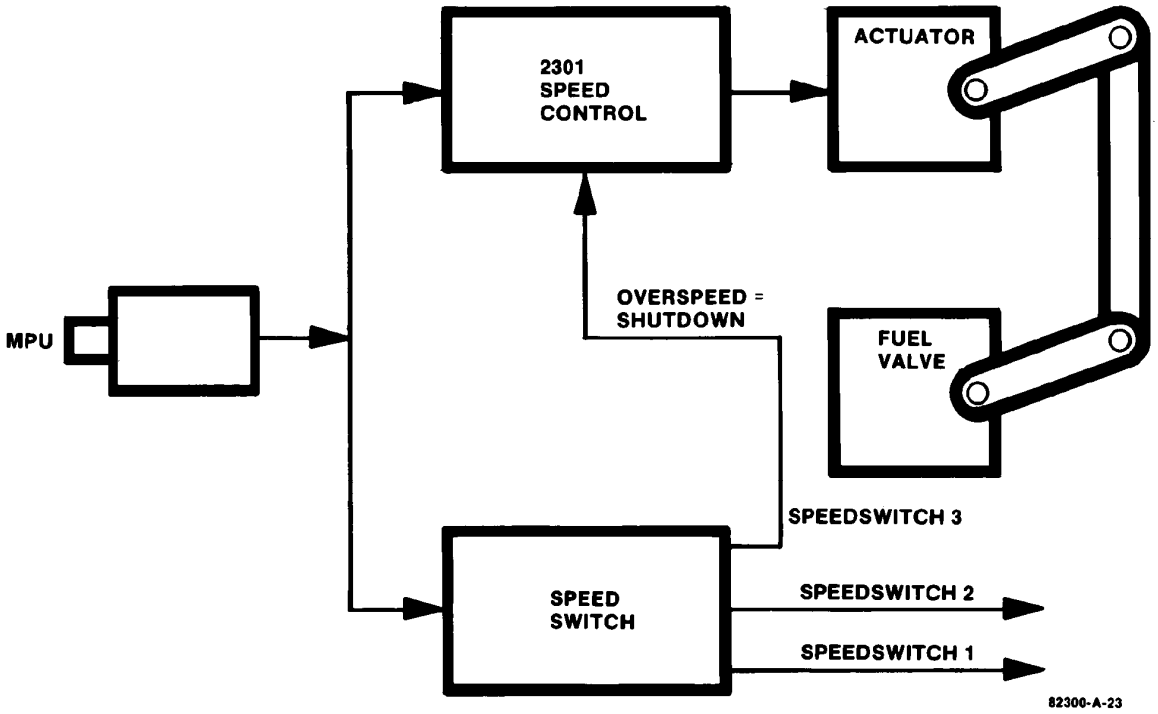


Figure 1-1. Typical System Using an Integrated Speed Switch

Table 1-1. Features of Single Speed Switch

Part Number	Switch Range	Overspeed/ Underspeed	Tach Output
8271-378	1150-22000	OVERSPEED	0-50 µA
8271-537	1100-11800	OVERSPEED	0-50 µA
8271-614	375-9500	OVERSPEED	0-50 µA
8271-617	1150-18200	OVERSPEED	0-50 µA
8271-914	11750-45400	OVERSPEED	0-50 µA
8271-988	11150-22000	OVERSPEED	0-1 mA
8271-995	375-9500	OVERSPEED	0-1 mA
8272-087	375-9500	OVERSPEED	0-1 mA
8272-098 **	375-9650	UNDERSPEED	0-50 µA
8272-187	375-9500	OVERSPEED	0-1 mA
8272-197	1750-45400	OVERSPEED	0-1 mA
8272-431 **	375-9650	UNDERSPEED	0-1 mA
8272-554	200-2500	OVERSPEED	0-1 mA

** A Failsafe Override Switch cannot be used on those units.

Table 1-2. Features of Integrated Speed Switches

Part Number	Supply Voltage	Tach Output	Failsafe Indication	K2 if Spd ⩾ Setpt	SW-1 Freq. Range	SW-2 Freq. Range	SW-3 Freq. Range
8271-372	20-40 Vdc	0-50 µA	OUT	DE-EN	300-1600	1025-6050	OUT
8271-430	20-40 Vdc	0-50 µA	OUT	DE-EN	OUT	1025-6050	1725-27200
8271-448	20-40 Vdc	OUT	IN	DE-EN	700-4100	1025-6050	1725-27200
8271-449	20-40 Vdc	OUT	IN	DE-EN	300-1600	1025-6050	1725-27200
8271-520	20-40 Vdc	0-50 µA	OUT	DE-EN	300-1600	1025-6050	1725-27200
8271-539	20-40 Vdc	0-50 µA	OUT	DE-EN	700-4100	1025-6050	1825-27200
8271-553	115 Vac	0-50 µA	OUT	DE-EN	300-1600	1025-6050	1725-27200
8271-636	20-40 Vdc	0-50 µA	OUT	DE-EN	300-1600	1550-9050	1725-27200
8271-661	20-40 Vdc	OUT	IN	DE-EN	700-4100	1025-6050	1725-27200
8271-704	24 Vdc	0-50 µA	OUT	DE-EN	300-1600	1550-9050	1725-27200
8271-718	20-40 Vdc	0-50 µA	OUT	DE-EN	1550-9050	1025-6050	1725-27200
8271-727	20-40 Vdc	0-50 µA	OUT	DE-EN	70-410	300-1600	375-5800
8271-738	115 Vac	OUT	OUT	DE-EN	700-4100	1875-11000	1725-27200
8271-746	115 Vac	OUT	OUT	DE-EN	OUT	700-4100	1725-27200
8271-821	20-40 Vdc	0-50 µA	OUT	DE-EN	300-1600	300-1600	1150-18000
8271-847	20-40 Vdc	OUT	OUT	DE-EN	OUT	350-1900	1725-27200
8271-881	24 Vdc	0-50 µA	OUT	DE-EN	OUT	700-4100	1725-27200
8271-900	20-40 Vdc	0-50 µA	OUT	DE-EN	OUT	350-1900	1725-27200
8271-990	20-40 Vdc	0-1 mA	OUT	DE-EN	OUT	350-1900	375-5800
8272-007	20-40 Vdc	OUT	OUT	DE-EN	OUT	300-1600	800-12400
8272-008	20-40 Vdc	OUT	OUT	DE-EN	OUT	700-4100	800-12400
8272-014	115 Vac	0-1 mA	OUT	DE-EN	155-900	70-410	325-4875
8272-034	115 Vac	OUT	IN	DE-EN	3300-19300	3300-19300	3750-58200
8272-036	20-40 Vdc	0-1 mA	OUT	DE-EN	1025-6050	1025-6050	1725-27200
8272-037	20-40 Vdc	0-50 µA	OUT	DE-EN	OUT	350-1900	375-5800
8272-125	20-40 Vdc	OUT	OUT	DE-EN	350-1900	700-4100	800-12400
8272-140	20-40 Vdc	0-1 mA	OUT	DE-EN	70-410	300-1600	800-12400
8272-141	20-40 Vdc	0-1 mA	OUT	DE-EN	700-4100	1025-6050	1725-27200
8272-156	115 Vac	0-1 mA	OUT	DE-EN	OUT	700-4100	1725-27200
8272-170	20-40 Vdc	OUT	IN	DE-EN	350-1900	700-4100	OUT
8272-234	115 Vac	0-1 mA	OUT	DE-EN	OUT	200-2700	1725-27200
8272-281	20-40 Vdc	0-50 µA	OUT	DE-EN	700-4100	700-4100	1725-27200
8272-285	20-40 Vdc	0-1 mA	OUT	DE-EN	700-4100	1025-6050	1725-27200
8272-320	20-40 Vdc	0-1 mA	OUT	DE-EN	300-1600	1025-6050	1725-27200
8272-330	20-40 Vdc	OUT	OUT	DE-EN	OUT	35-190	325-4875
8272-353	115 Vac	OUT	OUT	DE-EN	OUT	1550-9050	1725-27200
8272-354	115 Vac	OUT	OUT	DE-EN	700-4100	1025-6050	1150-18000
8272-356	20-40 Vdc	OUT	IN	DE-EN	OUT	1550-9050	1725-27200
8272-371	230 Vac	0-1 mA	OUT	DE-EN	350-1900	500-2700	325-4875
8272-379	20-40 Vdc	0-1 mA	OUT	DE-EN	350-1900	350-1900	375-5800
8272-395	115 Vac	0-1 mA	OUT	ENER	300-1600	700-4100	325-4875
8272-410	20-40 Vdc	0-1 mA	OUT	ENER	350-1900	1025-6050	1150-18000
8272-450	20-40 Vdc	0-50 µA	OUT	DE-EN	350-1900	1025-6050	1150-18000
8272-452	115 Vac	0-1 mA	OUT	ENER	1025-6050	1025-6050	325-4875
8272-465	20-40 Vdc	0-50 µA	OUT	ENER	350-1900	1025-6050	1150-18000
8272-538	20-40 Vdc	0-50 µA	OUT	DE-EN	1025-6050	1025-6050	1725-27200
8272.540	115 Vac	0-50 µA	OUT	DE-EN	1025-6050	1025-6050	1725-27200
8272-547	20-40 Vdc	0-1 mA	OUT	DE-EN	350-1900	350-1900	375-5800
8272-549	115 Vac	OUT	OUT	DE-EN	3300-19300	3300-19300	1150-18000
8272-568	20-40 Vdc	0-1 mA	OUT	DE-EN	1050-5000	3200-10800	1600-13200
8272-623	20-40 Vdc	OUT	IN	DE-EN	350-1900	3300-19300	1725-27200
8272-624	20-40 Vdc	OUT	IN	DE-EN	155-900	1875-11000	800-12400
8272-709	115 Vac	OUT	IN	DE-EN	155-900	1025-6050	375-8500
8272-770	115 Vac	OUT	IN	DE-EN	350-1900	350-1900	375-5800
8272-773	115 Vac	OUT	OUT	ENER	1550-9050	1550-9050	800-12400

Chapter 2.
Theory of Operation

Power Supply

The Integrated Speed Switch with three trip points is available as either a 20 to 40 Vdc model or a 115/230 Vac model. The ac model includes an internal ac-to-dc power supply. The plant wiring diagram (Figure 4-3) shows the power input connections.

The Speed Switch with a single trip-point is available in a 20 to 40 Vdc model, or a 115 Vac model which has an integral ac to dc power supply.

Speed Switch

Each of the speed switches monitors the frequency of the MPU signal, and each switch includes an adjustment which varies the frequency at which that particular switch activates. When the frequency of the MPU signal equals or exceeds the frequency that a switch is set for, that switch trips and the relay associated with that switch energizes or de-energizes (see Tables 1-1 and 1-2).

The speed switches used for sensing overspeed de-energize their relay when the speed is above the setpoint. The speed switches that sense underspeed energize their relay when the speed is above the setpoint.

Overspeed Test Circuit

The overspeed trip test circuit, when included, provides a means for testing the overspeed shutdown system at a frequency lower than that of an actual overspeed condition, without changing the setting of the trip adjusting potentiometer. Closing the CLOSE FOR OVERSPEED TRIP TEST contacts changes the setpoint of the overspeed trip frequency to a lower frequency. After the test is completed, opening these contacts restores the original set point.

Tachometer Circuit

The tachometer circuit drives an external meter to indicate rpm. The circuit monitors the MPU signal and generates a series of dc pulses of constant amplitude and width; the number of pulses varies proportionally with engine or turbine speed. This output is used to drive a meter which indicates rpm. The meter used can be either a digital or analog dc meter. Direct current meters integrate the pulses, indicating a dc current level.

Failsafe Circuit

The failsafe circuit checks the incoming MPU signal. If the MPU signal is below a safe value in either frequency or amplitude, the failsafe relay, if present, energizes. All other relays will de-energize.

Failsafe Indication

The optional failsafe indication circuit energizes a separate relay when a failsafe trip occurs. The normally closed contacts of this relay are connected to external terminals on the Integrated Speed Switch.

Failsafe Override

When the set of contacts connected to the FAILSAFE OVERRIDE terminals of the Speed Switch or the Integrated Speed Switch is closed, the speed switch relays affected by the failsafe circuit will be energized all the time whether the MPU signals are sensed or not (except when the speed is above the setpoint for that switch). Also, the failsafe indication relay (if present) will be de-energized.

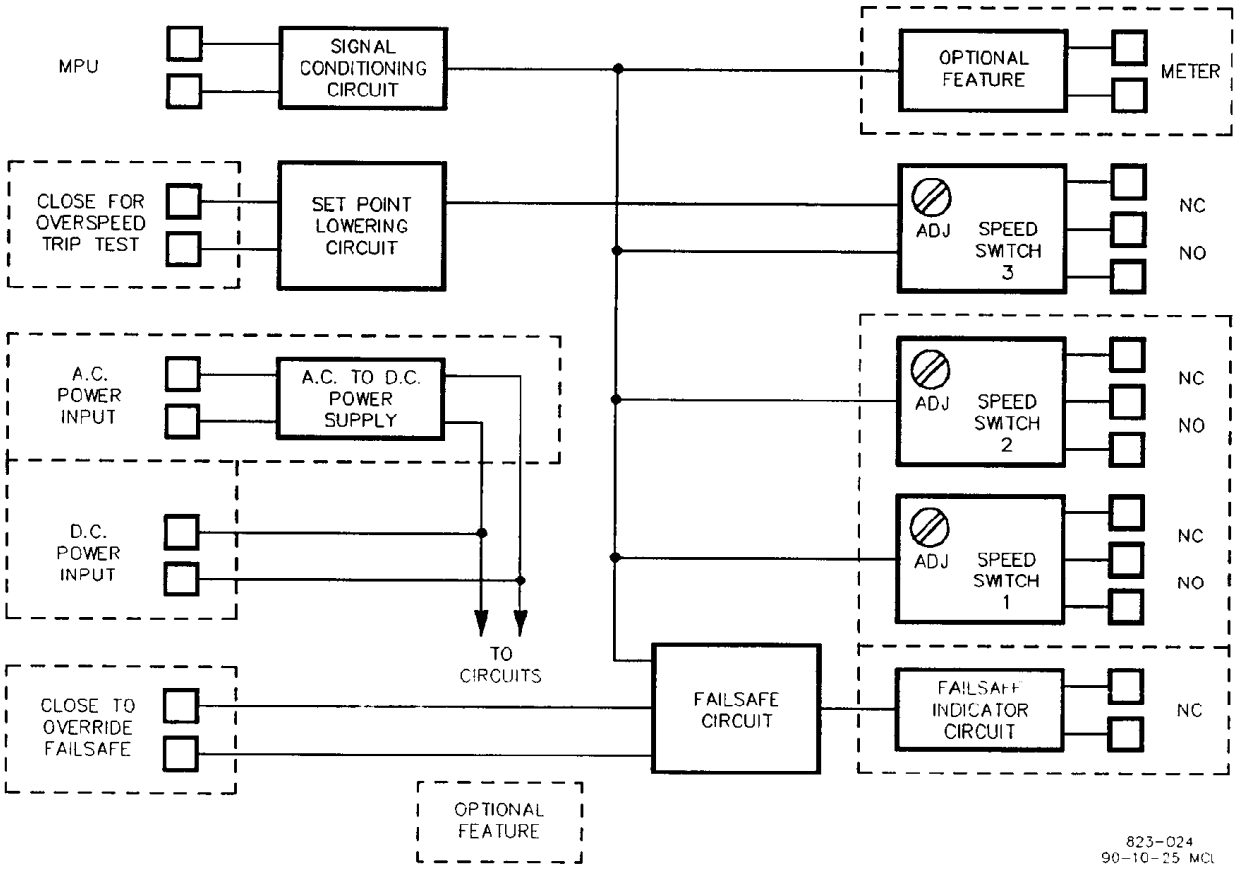


Figure 2-1. Block Diagram

Chapter 3. Installation

Mounting

Figure 4-1 is an outline drawing of the Integrated Speed Switch. Figure 4-2 is an outline drawing of the Speed Switch (single). Mount the unit near the electronic speed control. It may be mounted in any position. Provide adequate ventilation for cooling and space for installation and servicing. Ambient temperature must be between –40 and +85 °C (–40 and +185 °F).

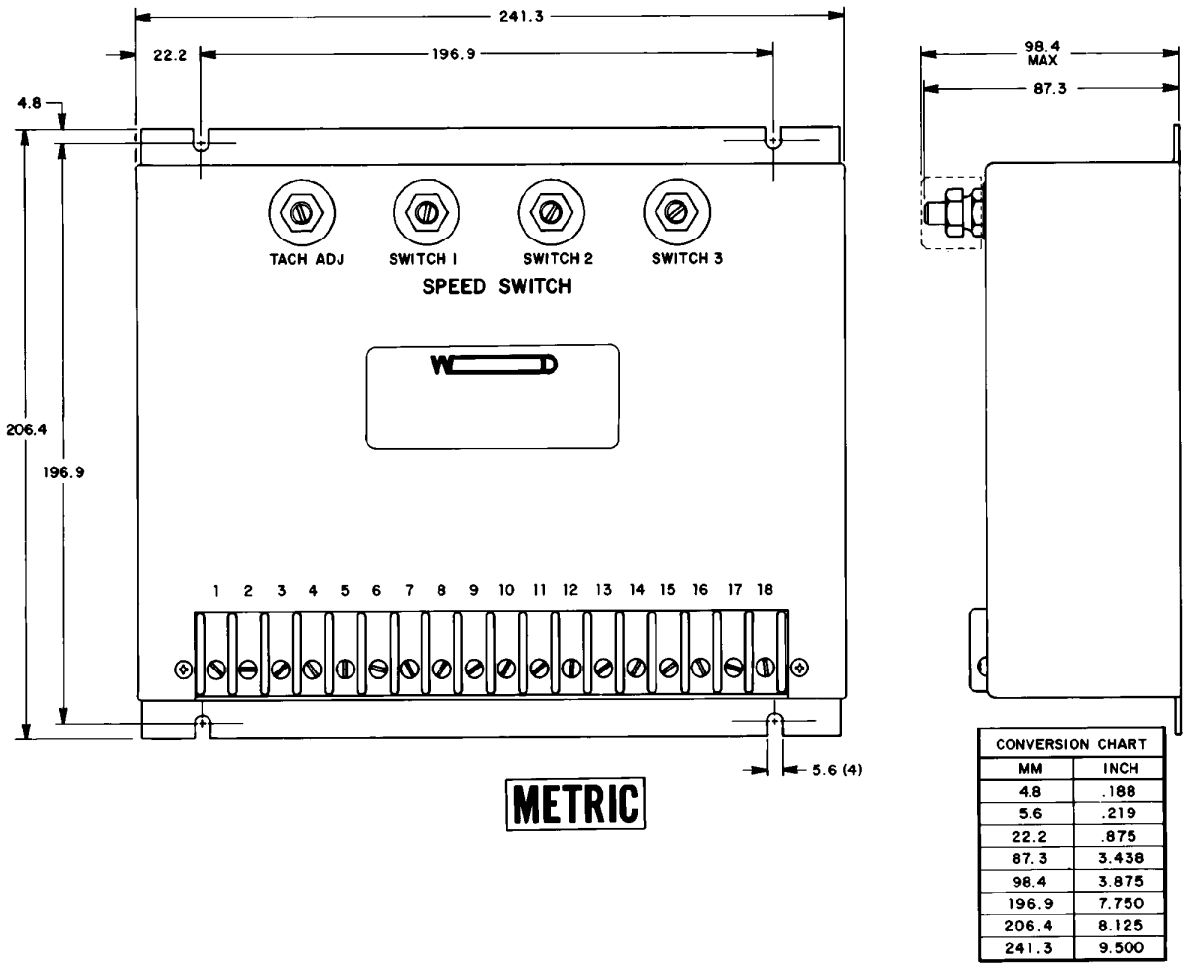
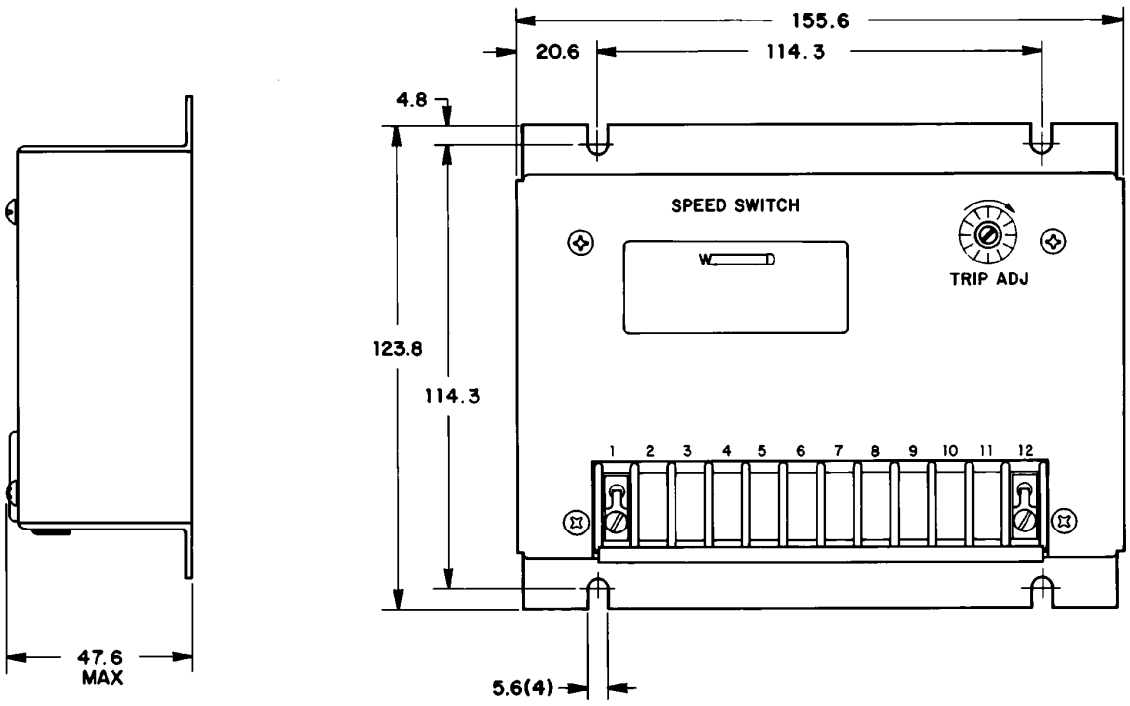


Figure 4-1. Outline Drawing–Integrated Speed Switch



CONVERSION CHART	
MM	INCH
4.8	.188
5.6	.219
20.6	.812
47.6	1.875
114.3	4.500
123.8	4.875
155.6	6.125

METRIC

Figure 4-2. Outline Drawing–Speed Switch

Electrical Wiring

Figure 4-3 is the plant wiring diagram for the Integrated Speed Switch. Figure 4-4 is the plant wiring diagram for the Speed Switch (single). These drawings show the connections that must be made to these units but do not show the actual wiring for a particular system. For this information, see the plant wiring diagram for your specific system. Woodward manual 25070, *Electronic Control Installation Guide*, also contains general information on wiring for electronic controls.

The wiring from the MPU must be twisted-pair, shielded; these wires are shown in Figures 4-3 and 4-4. This shielding prevents the wires from picking up stray signals which could cause erratic control operation. Ground the shield at terminal 10 as shown. The shield on a length of shielded wire must be connected to ground at one end only; do not ground the shields on both ends of a wire. Do not run a shielded wire inside a conduit with a wire which is carrying high current. Do not attempt to tin (solder) the braided shields.

NOTICE **Make all wiring connections with insulated terminals.**

Power Supply

Connect the power input wires to the Speed Switch or Integrated Speed Switch as shown in the appropriate plant wiring diagram.

Failsafe Indication

Connect any wires that the system includes for failsafe indication.

Failsafe Override

Connect the wires to the CLOSE TO OVERRIDE FAILSAFE terminals, if this option is present and is being used.

Overspeed Trip Test

Connect the wires to the CLOSE FOR OVERSPEED TRIP TEST terminals if this option is present and is being used.

MPU Inputs

Connect the wiring from the two MPUs to the proper terminals. Use twisted-pair shielded wire.

Output

Connect any wiring needed between the relay contact output terminals and external circuits.

Adjusting the Speed Switches

The Speed Switches are set for the proper trip speed by adjusting the potentiometers on their front panel. If the front-panel potentiometer will not vary the trip speed within the desired speed range, you will need to also adjust the Coarse Adjustment Potentiometer (on the single-speed models) or one of the Centering Potentiometers (on a multi-switch model).

These potentiometers are on the back of the controls. Figure 4-5 shows the locations of the Centering Potentiometers on the three-switch model.

Installation Check

Before initial operation of the Speed Switch or Integrated Speed Switch, make the following visual and electrical checks.

Visual Checks

1. Make sure that the control is securely mounted.

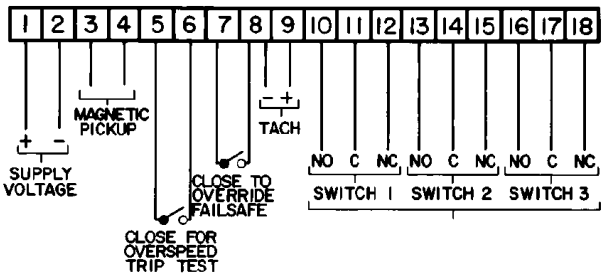
2. Verify that all electrical connections are correctly made and that all terminal screws are tight.

3. Make sure that shielded wire is installed on the wires from the MPU, and that all shields are grounded on one end only.

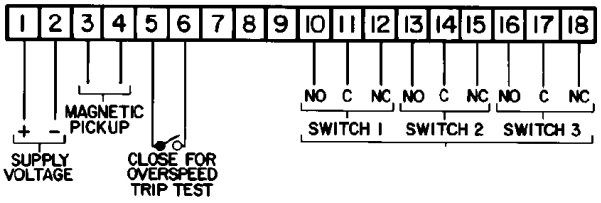
Electrical Checks

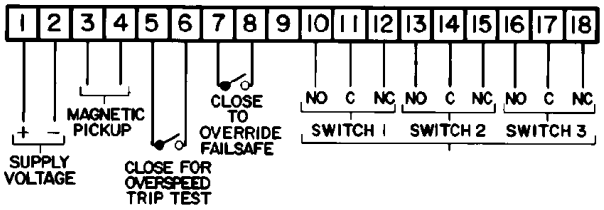
1. Make sure that the power connections are made correctly to terminals 1 and 2 of the Speed Switch or Integrated Speed Switch.

2. Measure for correct supply voltage at terminals 1 and 2 of the Speed Switch or Integrated Speed Switch.

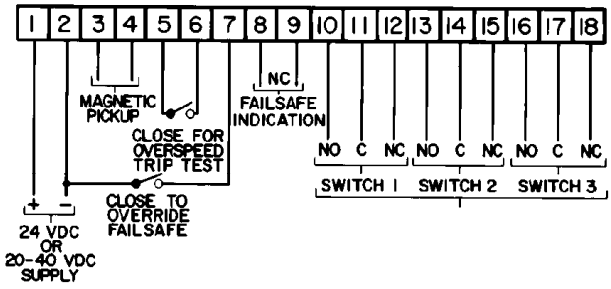


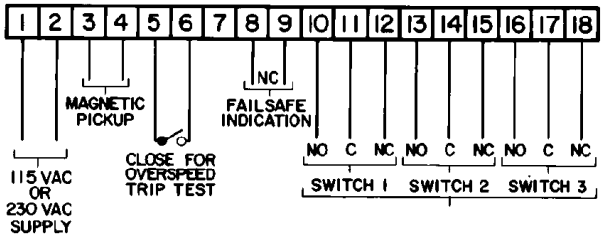
PLANT WIRING FOR UNITS HAVING TACHOMETER OUTPUT



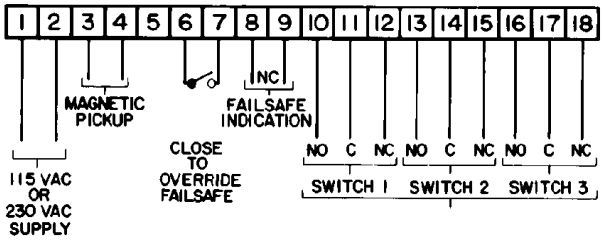


PLANT WIRING FOR UNITS WITHOUT FAILSAFE INDICATION OR TACHOMETER OUTPUT





PLANT WIRING FOR UNITS HAVING FAILSAFE INDICATION



PLANT WIRING FOR HIGH-VOLTAGE UNITS HAVING BOTH FAILSAFE INDICATION AND OVERRIDE (8272-509)

Figure 4-3. Plant Wiring Diagram–Integrated Speed Switch

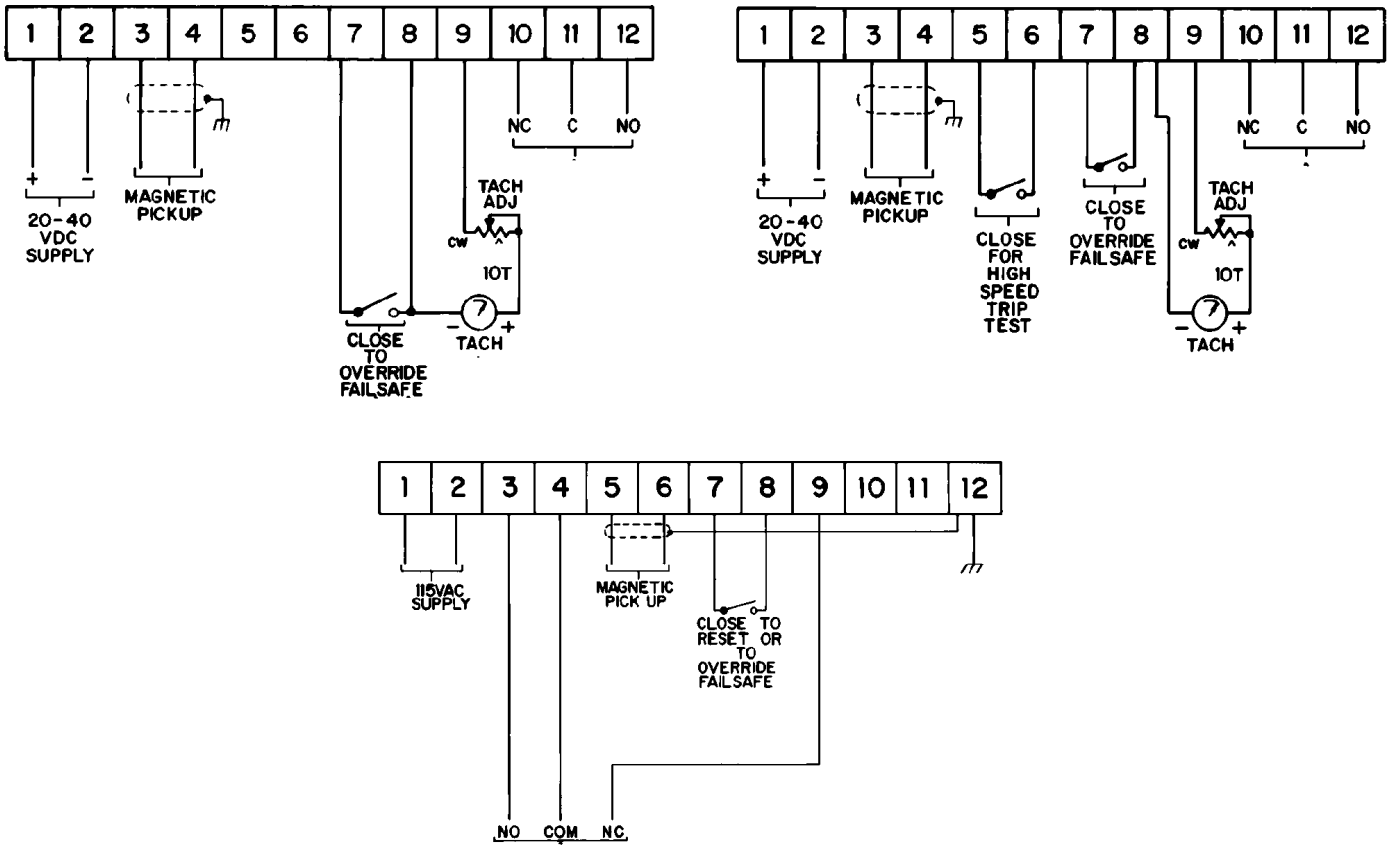


Figure 4-4. Plant Wiring Diagram–Speed Switch

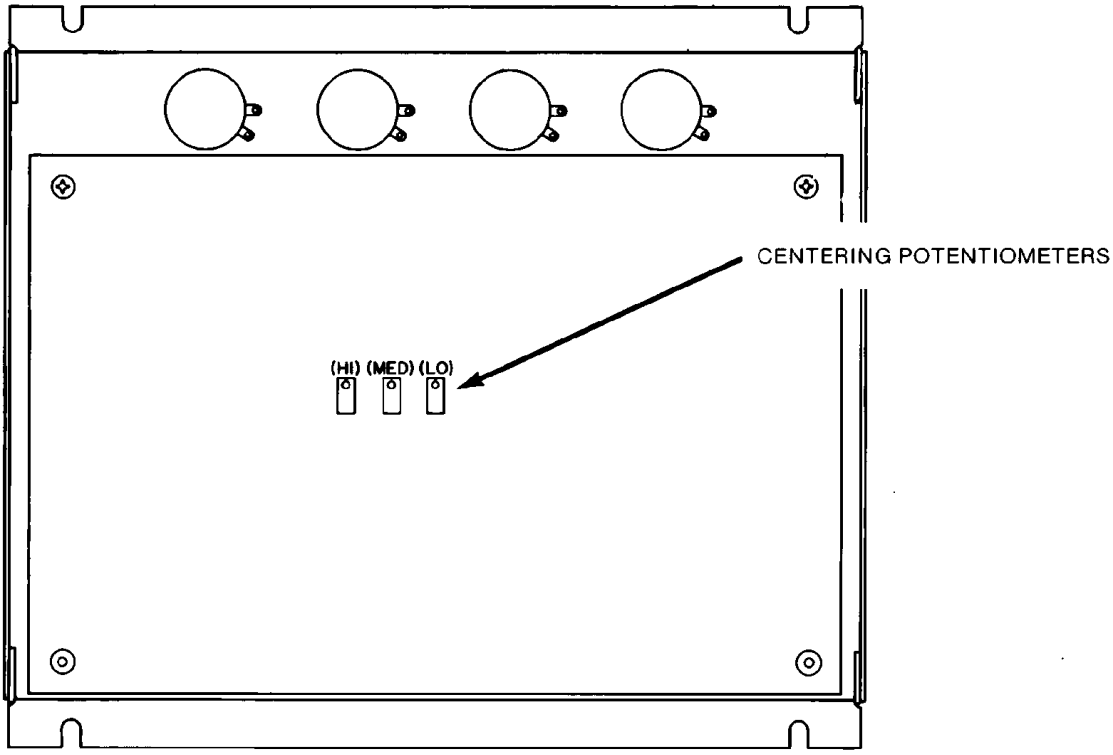


Figure 4-5. Centering Potentiometers

Chapter 4.
Operational Check and Calibration

The following procedure checks the Speed Switch or Integrated Speed Switch for proper operation. Perform this check procedure whenever it is necessary to determine if the unit is operating correctly

⚠WARNING

Do not start the engine or turbine until the control has been checked for correct installation and operation. To prevent the possibility of damage to equipment or injury to personnel, DO NOT permit the engine or turbine to start during either the power-supply check or any of the static check and calibration procedures.

1. Make sure that the CLOSE TO OVERRIDE FAILSAFE terminals (if present on this control) are open (remove a wire from one if necessary).

2. With the turbine or engine not turning, apply power to the Speed Switch and the Electronic Speed Control or Load Sharing and Speed Control.

3. Make sure that all relays in the Speed Switch or Integrated Speed Switch, except the failsafe indication relay, are in the proper state (see Table 1-1 or 1-2). All relays de-energize on trip except K2 in the Integrated Speed Switch and the relay in single underspeed switches (see Tables 1-1 and 1-2). Check for continuity at the appropriate terminals as shown in the plant wiring diagram for this control.

4. Make sure that a failsafe indication occurs, if present on this control. (Check for continuity at the appropriate terminals as shown in the plant wiring diagram for this control.)

IMPORTANT

If there is an indicator lamp or device connected to these failure indication terminals, that lamp or device can be used to indicate the state of the contacts rather than checking for continuity.

5.. Close the CLOSE TO OVERRIDE FAILSAFE terminals (if present on this control) and verify that the relay(s) are in the proper state. (Check for continuity at the appropriate terminals as shown in the plant wiring diagram for this control.)

6.. Open the CLOSE TO OVERRIDE FAILSAFE terminals (if present on this control).

7. Start the engine or turbine, following the manufacturer's instructions.

⚠WARNING

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.

8. Run the turbine or engine at idle speed and verify that the relay(s) are in the proper state (check for continuity at the appropriate terminals as shown in the plant wiring diagram for this control).

9. Monitor the relay contacts for the first set point (check for continuity at the appropriate terminals as shown in the plant wiring diagram for this control). Increase turbine or engine speed until the relay changes slate, and make sure that the set point is correct. If it is not, adjust the switch set point and recheck.

10. Repeat step 9 for the other set points (if there is more than one switch).

This completes the operational test of the Speed Switch or Integrated Speed Switch.

Chapter 5. Troubleshooting

If the Speed Switch or Integrated Speed Switch seems to be malfunctioning, use the operating checks given in Chapter 4 to determine whether or not the control is operating correctly.

If the unit is determined not to be operating correctly. use the following troubleshooting chart to find the problem. The causes for each symptom are given with the most likely cause first.

IMPORTANT

This troubleshooting chapter is intended only as a guide. There may be other causes for a symptom than those given, and there may be repairs not given which may be more suited to the particular situation.

Symptoms	Cause	Remedy
When power is applied to the unit, no relays energize (the engine or turbine is running).	The power source is not active or is not wired correctly. The Speed Switch unit is faulty. The MPU is faulty or out of adjustment. Wiring to the MPU is faulty.	Check and repair as necessary. Return unit for repair. Check the MPU for correct clearance and adjust or replace. Check and repair as necessary.
With power applied to the unit and the engine or turbine not running, the failsafe indication feature (if present) does not indicate a failure.	The CLOSE TO OVERRIDE FAILSAFE terminals are connected together, either because the switch connected to them is closed, or because the wires connected to them are shorted.	Check and repair as necessary (these two terminals may be connected together through external relay contacts).
The failsafe indication feature (if present) constantly indicates a failure.	The MPU is faulty or out of adjustment. Wiring to the MPU is faulty.	Check the MPU for correct clearance and adjust or replace. Check and repair as necessary.
One speed switch either won't transfer when its trip point is reached, or stays transferred continuously. The other speed switches work as they should (Integrated Speed Switch only).	The Integrated Speed Switch is faulty.	Return the unit for repair.

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:

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 82310D.

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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.

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