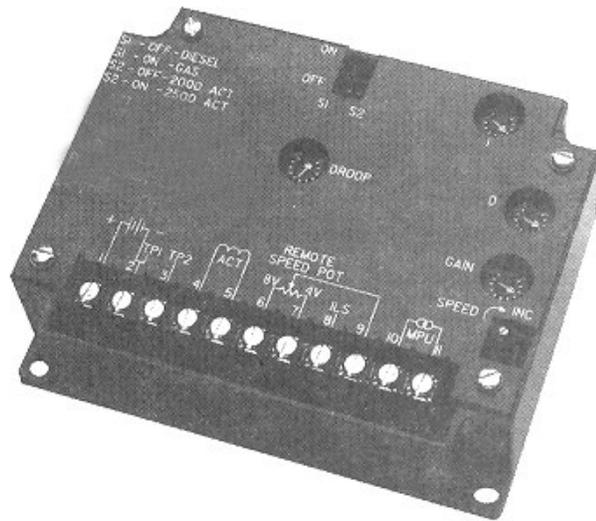




## User Manual



## APECS DYN1-1075X Controllers for DYNA 2000 and 2500 Linear Actuators

**DYN1-10752 / DYN1-10753 / DYN1-10754 / DYN1-10756**

**Manual 36538**

## WARNING—DANGER OF DEATH OR PERSONAL INJURY



### WARNING—FOLLOW INSTRUCTIONS

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.



### WARNING—OUT-OF-DATE PUBLICATION

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 Woodward website:

[www.woodward.com/pubs/current.pdf](http://www.woodward.com/pubs/current.pdf)

The revision level is shown at the bottom of the front cover after the publication number. The latest version of most publications is available at:

[www.woodward.com/publications](http://www.woodward.com/publications)

If your publication is not there, please contact your customer service representative to get the latest copy.



### WARNING—OVERSPEED PROTECTION

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—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.

## CAUTION—POSSIBLE DAMAGE TO EQUIPMENT OR PROPERTY



### CAUTION—BATTERY CHARGING

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.



### CAUTION—ELECTROSTATIC DISCHARGE

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.

## IMPORTANT DEFINITIONS

- A **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
- A **CAUTION** indicates a potentially hazardous situation which, if not avoided, could result in damage to equipment or property.
- A **NOTE** provides other helpful information that does not fall under the warning or caution categories.

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

Woodward Governor Company reserves the right to update any portion of this publication at any time. Information provided by Woodward Governor Company is believed to be correct and reliable. However, no responsibility is assumed by Woodward Governor Company unless otherwise expressly undertaken.

© Woodward 2006  
All Rights Reserved

# Contents

<b>ELECTROSTATIC DISCHARGE AWARENESS .....</b>	<b>III</b>
<b>CHAPTER 1. GENERAL INFORMATION.....</b>	<b>1</b>
Introduction .....	1
Switches S1 and S2.....	2
Speed Sensing.....	2
Adjustments .....	2
<b>CHAPTER 2. SPECIFICATIONS .....</b>	<b>3</b>
<b>CHAPTER 3. CALIBRATION .....</b>	<b>4</b>
Potentiometer Settings & Adjustments .....	4
S1 and S2 Settings .....	5
<b>CHAPTER 4. WIRING &amp; INSTALLATION .....</b>	<b>6</b>
Wiring.....	6
<b>CHAPTER 5. TROUBLESHOOTING.....</b>	<b>8</b>
General Checklist.....	8
Battery Voltage Check .....	8
Linkage Check .....	8
Magnetic Pickup Check .....	8
Troubleshooting Charts.....	9
<b>CHAPTER 6. SERVICE OPTIONS .....</b>	<b>12</b>
Product Service Options .....	12
Returning Equipment for Repair .....	13
Replacement Parts .....	14
How to Contact Woodward .....	14
Engineering Services .....	15
Technical Assistance .....	16

---

## Illustrations and Tables

---

Figure 1. Electronic Control Box Adjustments, Configuration and Typical  
Wiring Diagram .....6

Figure 2. Typical Wiring for CE Models .....7

## Electrostatic Discharge Awareness

All electronic equipment is static-sensitive, some components more than others. To protect these components from static damage, you must take special precautions to minimize or eliminate electrostatic discharges.

Follow these precautions when working with or near the control.

1. Before doing maintenance on the electronic control, discharge the static electricity on your body to ground by touching and holding a grounded metal object (pipes, cabinets, equipment, etc.).
2. 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.
3. Keep plastic, vinyl, and Styrofoam materials (such as plastic or Styrofoam cups, cup holders, cigarette packages, cellophane wrappers, vinyl books or folders, plastic bottles, and plastic ash trays) away from the control, the modules, and the work area as much as possible.
4. 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.



### **CAUTION—ELECTROSTATIC DISCHARGE**

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*.



# Chapter 1.

## General Information

### Introduction

This manual provides information on the following controllers:

CE	PART NUMBER		INPUT SIGNAL FREQUENCY	
	Previous P/N	Current P/N		
	DYN1-10752-000-0-12	Replaced by DPG-2201-002 and DPG-2223-002	250-1200 Hz	
	DYN1-10752-000-0-24			
	YES			DYN1-10752-001-0-12
	DYN1-10752-001-0-24			
	DYN1-10753-000-0-12	Replaced by DPG-2201-002 and DPG-2223-002	1200-2500 Hz	
	DYN1-10753-000-0-24			
	YES			DYN1-10753-001-0-12
	DYN1-10753-001-0-24			
	DYN1-10754-000-0-12	8270-1015	2500-5000 Hz	
	DYN1-10754-000-0-24	8270-1038		
	YES	DYN1-10754-001-0-12		8270-1018
	DYN1-10754-001-0-24	8270-1036		
	DYN1-10756-000-0-12	8270-1051	5000-9000 Hz	
	DYN1-10756-000-0-24	Replaced by DPG-2201-002 and DPG-2223-002		
	YES			DYN1-10756-001-0-12
	DYN1-10756-001-0-24			

NOTE: Select the controller for the correct input signal frequency range generated by the magnetic pickup at the maximum engine speed and for the required DC voltage, 12 or 24.

### Description & Features

Woodward DYNA I controllers for DYNA 2000 and 2500 linear actuators provide cost-effective, precision control of diesel, gasoline, or natural gas engines.

Separate circuits measure the PROPORTIONAL (amount of OFF speed), INTEGRAL (time of OFF speed), and DERIVATIVE (rate of change of OFF speed) values. These parameters all work together to provide a control that results in fast and stable engine response to load changes while maintaining precise speed regulation.

**Features**

- All electric
- All engine compatible
- Generator paralleling option
- Temperature stable
- High reliability
- Mounts in any position

Features that can be added at initial installation or when the need arises include:

- Remote speed setting (DYNS 10000 potentiometer)
- Isochronous load sharing
- Automatic synchronizing
- Ramp generator
- Single phase load pulse
- Kw limits

**Switches S1 and S2**

Switch S1 allows two response ranges for matching either diesel or gas engine dynamics. The diesel version integrates at twice the rate of the gas version. Set S1 to the OFF position for diesel engine applications. Set to the ON position for gas/gasoline engine applications.

Switch S2 selects the point at which the actuator coil current level causes the integrator limit to be actuated. This level varies for 12 and 24 volt as shown below.

S2 Switch Position	Actuator		Coil Current @:	
	Model	Part No.	12V	24V
OFF	DYNA 2000	DC-10200	5.1A	2.3A
		DC 10202		
ON	DYNA 2500 <sup>†</sup>	DC-10500	7.2A	3.4A
		DC 10502		

(†) Actuators not equipped with a potentiometer feedback transducer.

**Speed Sensing**

Typically the engine speed reference signal is obtained from a magnetic pickup mounted in the flywheel housing perpendicular to the ring gear. The number of teeth sensed per revolution is converted into an engine speed signal. Other techniques may be used to obtain speed reference.

**Adjustments**

- **Speed Setting:** 20-turn potentiometer
- **Gain:** Single-turn potentiometer. 0 to 100%
- **Integral:** Single-turn pot. 0 to 100%
- **Derivative:** Single-turn pot. 0 to 100%
- **Droop:** Single-turn pot. 0 to 15%

## Chapter 2. Specifications

<b>Operating Voltage</b>	12 or 24 volts $\pm$ 20%
<b>Steady State Speed Band</b>	$\pm$ 0.25%
<b>Ambient Operating Temperature</b>	-40°F to + 180°F (-40°C to + 85°C)
<b>Temperature Stability</b>	Better than $\pm$ 0.5% over temperatures of -40°F to +167°F (-40°C to +75°C)
<b>Mechanical Vibration</b>	Withstands the following vibration without failure or degraded performance: 0.06 inch double amplitude at 5 to 18 Hz 1 G at 18 to 30 Hz; 0.02 inch double amplitude at 30 to 48 Hz 2.5 G's at 48 to 70 Hz
<b>Output Signal</b>	PWM current to 6 A max.
<b>Connections</b>	Terminal strip
<b>Circuit Boards</b>	Heavy conformal coating for moisture and vibration protection
<b>Enclosure</b>	Die cast aluminum
<b>Weight</b>	1.4 lb (635 g)

# Chapter 3.

## Calibration

### Potentiometer Settings & Adjustments

Observe that potentiometer settings are adjustable from zero to 100%. Each small division is 10%. The speed potentiometer is 10K, 20-turn.

Set the small dip switch (S1) for the correct engine (see Chapter 1: Switches S1 and S2). Set switch S2 in the "OFF" position for actuator DC 10200 and DC 10202 or in the "ON" position for DC 10500 and DC 10502.

If a remote speed potentiometer is used for narrow range, set to mid range.

Initial Potentiometer Settings:

GAIN	20%
I	20%
D	30%
DROOP	Zero

For isochronous operation, set DROOP counterclockwise to minimum position as shown in **Figure 1**.

For DROOP operation, set DROOP potentiometer clockwise to obtain desired amount of DROOP from no-load to full load. Turning potentiometer clockwise increases DROOP.

#### START ENGINE (NO LOAD)

1. Adjust the controller speed potentiometer for desired engine speed.
2. Adjust the GAIN potentiometer clockwise until the engine begins to hunt. (If the engine remains stable at 100% GAIN, disrupt the actuator linkage by hand.) With the engine hunting, turn the GAIN potentiometer counterclockwise until stable.



#### NOTE

**A warm engine is normally more stable than a cold one. If the governor is adjusted on a warm engine, turn the adjustment potentiometers counterclockwise 5% (1/2 div.) to ensure a stable engine when started cold.**

3. Repeat Step 2 for the "D" setting.
4. Repeat Step 2 for the "I" setting.
5. After calibration, it may be necessary to readjust the speed.
6. If the engine is a diesel, using the above calibration conduct the following test. With the engine operating at rated speed, turn the electric governor off. When engine speed slows to approximately half of rated speed, turn the electric governor back on. Observe the overshoot. If the overshoot is too great, turn the "I" potentiometer counterclockwise to lessen the overshoot. If there is a small hunt at steady state, slightly turn the "I" potentiometer counterclockwise until stable. In some cases, 2 to 5 Hz overshoot may be acceptable.

7. If the engine is an ignition type using compressed fuel such as natural gas or LP, stop the engine and restart in the normal manner to check overshoot.

If possible, operate the unit through various load ranges up to 100% to ensure stability.

## **S1 and S2 Settings**

For diesel engine applications set S1 to the OFF position.

For gas/gasoline engine applications set S1 to the ON position.

When using a DYNA 2000 actuator (DYN1-1020X), set S2 to the OFF position.

When using a DYNA 2500 actuator (DYN1-1050X), set S2 to the ON position.

To insure accurate setting of ON / OFF switches, simply apply pressure with a small pointed object until the switch clicks into position.



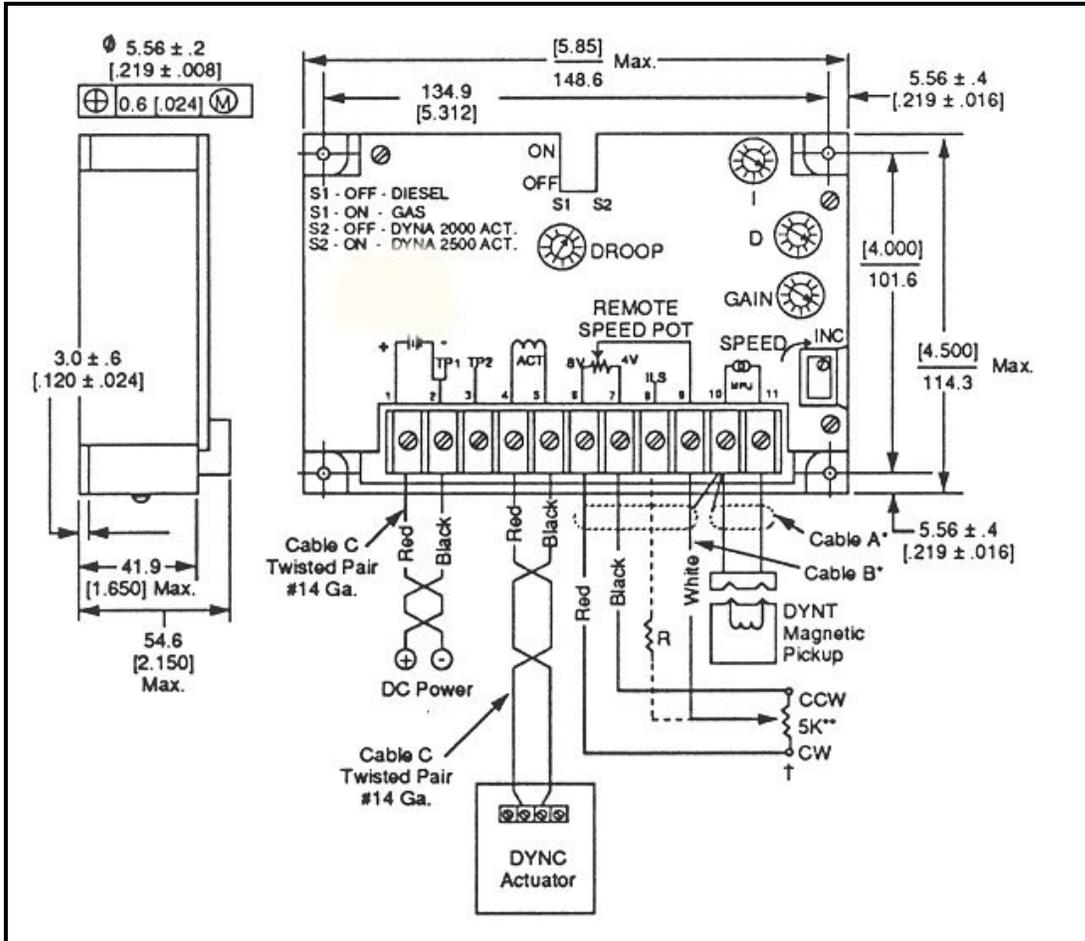
### **CAUTION**

### **POSSIBLE DAMAGE TO EQUIPMENT OR PROPERTY**

**As a safety measure, the engine should be equipped with an independent overspeed shutdown device in the event of failure, which may render the governor inoperative.**

# Chapter 4. Wiring & Installation

## Wiring



**Figure 1. Electronic Control Box Adjustments, Configuration and Typical Wiring Diagram**

**NOTES:**

Cable A—DYNK 44-XX (specify length), 90° connector

Cable B—E26-22 (specify length)

Cable C—DYNZ 70-4 (specify length)

(\*) Shielded Cable—customer supplied. Should be a cable with a wrapped mylar supported aluminum foil shield with a drain wire.

(\*\*) Remote speed potentiometer (DYNS 10000)

(†) The 5K remote speed potentiometer can be wired two ways:

1. As shown by the solid line from the wiper of the 5K pot and then connected to Terminal 9 (no resistor required). Adjustable range is approximately ± 5% at 1800 rpm.
2. As shown by the dashed line from the wiper of the 5K pot through resistor "R" and then connected to Terminal 8. Reducing the value of "R" increases the remote adjustable speed range.

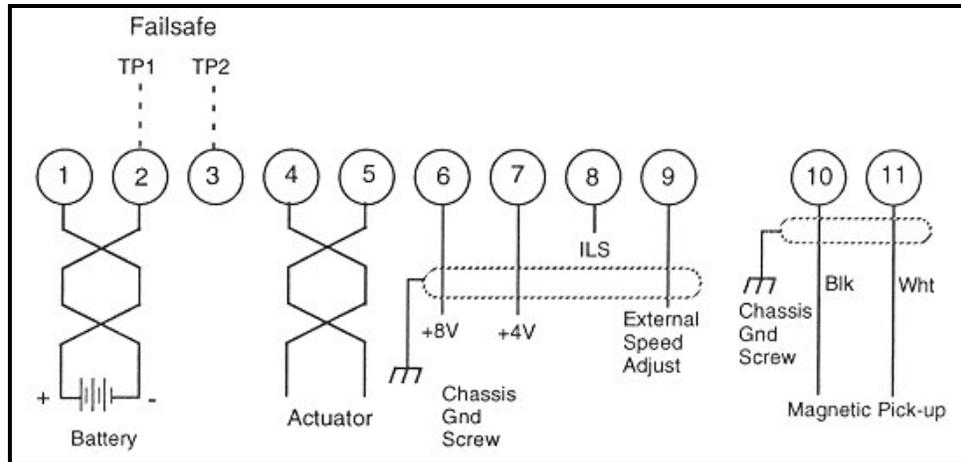


Figure 2. Typical Wiring for CE Models



**CAUTION:**  
**POSSIBLE DAMAGE TO EQUIPMENT OR PROPERTY**

To prevent damage to the controller, make sure that it is wired in accordance with the wiring instructions and diagrams in this manual.

- Do not tin the leads before placing them into the terminals.
- Ensure the terminals are tightened properly to secure wires.



**CAUTION:**  
**POSSIBLE DAMAGE TO EQUIPMENT OR PROPERTY**

As a safety measure, the engine should be equipped with an independent overspeed shutdown device in the event of failure, which may render the governor inoperative.

# Chapter 5.

## Troubleshooting

### General Checklist

#### Battery Voltage Check

1. Set multimeter dial to read DC volts.
2. Connect the meter leads across the Red (battery positive) and Black (battery negative) wires of controller. With power to the controller ON, check the voltage during cranking and engine running. Voltage should be within range of engine manufacturer's specifications.
3. If voltage is low, check the battery, charging system and/or wiring.

#### Linkage Check

Many problems can be traced to linkage binding confining motion due to tight settings and/or linkage backlash (backward motion due to loose connections).

Linkage must have minimal friction, binding and backlash in order to assure accurate, responsive performance of the application.

1. With engine OFF, check for bent or misaligned linkage.
2. With engine OFF, manually operate linkage to see that it is not sticking, binding or has any backlash.
3. With engine OFF, ensure full travel of the linkage by manually moving it from idle/shutdown to maximum fuel. Travel should be smooth and should not exceed specified actuator stroke.
4. With engine OFF, check for worn out rod end bearings. Hardened steel races are recommended.
5. Correct linkage as needed.

#### Magnetic Pickup Check

1. Set multimeter dial to read AC volts
2. Connect the meter leads to the magnetic pickup White and Black/White wire of the controller. Check the voltage during cranking and running. Voltage should be 2.5 volts RMS or greater during cranking and running. (AC input impedance of meter must be 5000 ohms/volt or greater).
3. Check the magnetic pickup harness for an open circuit or short.
4. Check for damage to or improper adjustment of magnetic pickup. Replace or readjust. Too large of an air gap between the sensed gear and magnetic pickup could cause a weak signal. Adjust as needed, while avoiding damage to the magnetic pickup (magnetic pickup coming in the sensed gear).
5. Check wiring from the magnetic pickup to the controller. Twisted shielded cable is recommended. The cable should only be grounded at one end of the harness.
6. Check the mounting of the magnetic pickup. Mounting should be rigid; excessive vibration could cause spurious signals and unacceptable performance.
7. Make sure the sensed gear is not missing any teeth.
8. Check coil resistance of the magnetic pickup. Call the manufacturer of the magnetic pickup for specifications.

## Troubleshooting Charts

**PROBLEM: System is completely dead. Actuator lever stays at minimum.**

MEANS OF DETECTION	CORRECTIVE ACTION
Check for battery voltage at controller on terminals 1 and 2. Terminal 1 is positive.	Check battery connections and contacts for turning power "ON" to the controllers.
Check for proper linkage set up.	Correct and free linkage.
Magnetic pickup signal absent or too low. Measure AC volt across terminals 10 & 11 while cranking the engine. Voltage should be at least 2.5 Vac. <b>NOTE:</b> The voltmeter should have an impedance of 5000 ohms/volts or higher.	Check pole tip gap over gear tooth. It should be $0.37 \pm 0.127\text{mm}$ ( $0.015" \pm 0.005"$ ) or adjusted to obtain 2.5 Vac or greater. Verify magnetic pickup wiring.
Measure the resistance of the magnetic pickup coil. This should be from 150 ohms (250 ohms max).	If there is an open or shorted coil, replace the magnetic pickup.
Measure the resistance of each pin to the metal case of the magnetic pickup. No continuity should be evident.	If there is continuity to case, replace the magnetic pickup.
<b>DC SUPPLY OFF.</b> Place an insulated jumper between terminals 2 & 3 (TP1 & TP2). With DC "ON" the actuator should go to full stroke. DC voltage at terminals 4 & 5 should be within 3 volts of the supply.	If the actuator still does not move to full stroke, continue with steps below.
Measure actuator coil resistance: <ul style="list-style-type: none"> <li>• 12 Vdc unit: Coil resistance <math>1.8 \pm 0.2</math> ohms</li> <li>• 24 Vdc unit: Coil resistance <math>7.3 \pm 1.0</math> ohms</li> </ul>	If actuator coil is open or shorted to case, replace actuator. If governor still does not operate, continue with steps below.
Measuring the resistance of each coil lead to the actuator case should indicate an open circuit on a low scale of the ohmmeter.	If continuity is detected, replace the actuator.
With the DC to the governor "ON" and the engine "OFF" measure the DC voltage from terminal 6 (+) to 2 (-). Voltage should be approx. 8 Vdc.	If 8 Vdc is not present, replace the controller.
Between terminal 7 (+) to 2 (-), the voltage should be approximately 4 Vdc.	If 4 Vdc is not present, replace the controller.
The following should be found when measuring current in series with one of the actuator leads from terminal 4 or 5: <ul style="list-style-type: none"> <li>• 12 V actuator--2.5A to 5.9A</li> <li>• 24 V actuator--1.0A to 3.0A</li> </ul> (Values may indicate negative if polarity of meter reversed.)	If no output current, replace the controller.

**Troubleshooting (cont'd.)**

**PROBLEM: Actuator lever goes to full stroke when DC power is turned ON.  
(Engine is not operating.)**

MEANS OF DETECTION	CORRECTIVE ACTION
Check magnetic pickup leads for proper shielded wire or open shield.	Verify and correct wiring as necessary.
Be sure there is no jumper between terminals 2 & 3.	Verify and correct wiring as necessary.
Fail-safe circuit in the controller may be damaged or defective.	Replace controller.
With DC power "OFF" remove leads at actuator. Check continuity of each terminal to case. There should be no continuity between any terminal and case of the controller.	If continuity is detected, replace the controller.
Check for shorted actuator lead.	Correct or replace actuator leads as necessary.
If remote speed potentiometer has been connected to terminals 6, 7 and 8, or 9 of the controller, DISCONNECT THESE LEADS.	Turn DC power to the governor ON if the actuator is now normal. Proceed as follows.

**PROBLEM: Improper operation with remote speed potentiometer connected**

MEANS OF DETECTION	CORRECTIVE ACTION
Investigate wiring to remote speed potentiometer for open or shorted circuits.	Check wiring.
If the leads at terminals 6 & 7 to the remote speed potentiometer are reversed, speed control by the remote speed potentiometer will be reversed.	Correct wiring.
Lead wire to remote speed setting potentiometer should be 3-wire shielded cable.	Verify that the drain shield wire is isolated from ground at the potentiometer.
If terminal 7 lead to the remote speed potentiometer is open, engine speed will go high.	Correct wiring.
If wiper lead to remote potentiometer is open, there will be no control by the remote speed potentiometer.	Verify and correct wiring.
If terminal 6 lead to the clockwise terminal of the remote speed potentiometer is open, speed will remain at the value set in the controller.	Verify and correct wiring.

**PROBLEM: Erratic governor operation**

MEANS OF DETECTION	CORRECTIVE ACTION
Measure DC voltage at 1 & 2 on controller terminal strip. Nominal battery voltage should be indicated.	If nominal voltage is present, wiring is correct.
Battery voltage must be 80% or greater for governor to operate.	Check battery and charging system.
RFI noise due to incorrect shielding.	Correct wiring per applicable wiring diagram.
RFI noise fed through power supply leads.	Connect twisted pair power leads direct to the battery.

**PROBLEM: Slow, small amplitude, hunting of speed or frequency**

<b>MEANS OF DETECTION</b>	<b>CORRECTIVE ACTION</b>
Sticking or very loose linkage.	Correct linkage.
Improper linkage arrangement (stroke too short or improper.)	See "Linkage Check" in General Checklist

**PROBLEM: Erratic governor operation**

<b>MEANS OF DETECTION</b>	<b>CORRECTIVE ACTION</b>
Measure DC voltage at 1 & 2 on controller terminal strip. Nominal battery voltage should be indicated.	If nominal voltage is present, wiring is correct.
Battery voltage must be 80% or greater for governor to operate.	Check battery and charging system.
RFI noise due to incorrect shielding.	Correct wiring per applicable wiring diagram.
RFI noise fed through power supply leads.	Connect twisted pair power leads direct to the battery.

**PROBLEM: Fast oscillation of governor linkage**

<b>MEANS OF DETECTION</b>	<b>CORRECTIVE ACTION</b>
Verify calibration settings of the controller.	Readjust settings.

**PROBLEM: Engine will not start—actuator at full stroke during cranking**

<b>MEANS OF DETECTION</b>	<b>CORRECTIVE ACTION</b>
Make sure fuel is available. Air may be trapped in fuel line. Try to operate engine manually.	Check fuel to engine and check for correct wiring to shut downs..

# Chapter 6.

## Service Options

### Product Service Options

The following factory options are available for servicing Woodward equipment, based on the standard Woodward Product and Service Warranty (5-01-1205) that is in effect at the time the product is purchased from Woodward or the service is performed:

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

If you are experiencing problems with installation or unsatisfactory performance of an installed system, the following options are available:

- Consult the troubleshooting guide in the manual.
- Contact Woodward technical assistance (see “How to Contact Woodward” later in this chapter) and discuss your problem. In most cases, your problem can be resolved over the phone. If not, you can select which course of action you wish to pursue based on the available services listed in this section.

### 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 also a flat rate structured program and includes the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205).

This option allows you to call 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 Woodward facility as explained below (see “Returning Equipment for Repair” later in this chapter).

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 to Woodward within 60 days, Woodward will issue a credit for the core charge. [The core charge is the average difference between the flat rate replacement/exchange charge and the current list price of a new unit.]

**Return Shipment Authorization Label.** To ensure prompt receipt of the core, and avoid additional charges, the package must be properly marked. A return authorization label is included with every Replacement/Exchange unit that leaves Woodward. The core should be repackaged and the return authorization label affixed to the outside of the package. Without the authorization label, receipt of the returned core could be delayed and cause additional charges to be applied.

## 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 to Woodward for repair, please contact Woodward in advance to obtain a Return Authorization Number. When shipping the item(s), attach a tag with the following information:

- 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.



### **CAUTION—ELECTROSTATIC DISCHARGE**

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*.

## 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.

## Return Authorization Number

When returning equipment to Woodward, please telephone and ask for the Customer Service Department [1 (800) 523-2831 in North America or +1 (970) 482-5811]. They will help expedite the processing of your order through our distributors or local service facility. To expedite the repair process, contact Woodward in advance to obtain a Return Authorization Number, and arrange for issue of a purchase order for the item(s) to be repaired. No work can be started until a purchase order is received.



### NOTE

**We highly recommend that you make arrangement in advance for return shipments. Contact a Woodward customer service representative at 1 (800) 523-2831 in North America or +1 (970) 482-5811 for instructions and for a Return Authorization Number.**

## 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.

## How to Contact Woodward

In North America use the following address when shipping or corresponding:

Woodward Governor Company  
PO Box 1519  
1000 East Drake Rd  
Fort Collins CO 80522-1519, USA

Telephone—+1 (970) 482-5811 (24 hours a day)  
Toll-free Phone (in North America)—1 (800) 523-2831  
Fax—+1 (970) 498-3058

For assistance outside North America, call one of the following international 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.

<u>Facility</u>	<u>Phone Number</u>
Brazil	+55 (19) 3708 4800
India	+91 (129) 230 7111
Japan	+81 (476) 93-4661
The Netherlands	+31 (23) 5661111

You can also contact the Woodward Customer Service Department or consult our worldwide directory on Woodward's website ([www.woodward.com](http://www.woodward.com)) for the name of your nearest Woodward distributor or service facility.

## Engineering Services

Woodward Industrial Controls Engineering Services offers the following after-sales support for Woodward products. For these services, you can contact us by telephone, by email, or through the Woodward website.

- Technical Support
- Product Training
- Field Service

Contact information:

Telephone—+1 (970) 482-5811

Toll-free Phone (in North America)—1 (800) 523-2831

Email—[icinfo@woodward.com](mailto:icinfo@woodward.com)

Website—[www.woodward.com](http://www.woodward.com)

**Technical Support** is available through our many worldwide locations or our authorized distributors, depending upon the product. This service can assist you with technical questions or problem solving during normal business hours. Emergency assistance is also available during non-business hours by phoning our toll-free number and stating the urgency of your problem. For technical support, please contact us via telephone, email us, or use our website and reference **Customer Services** and then **Technical Support**.

**Product Training** is available at many of our worldwide locations (standard classes). 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. For information concerning training, please contact us via telephone, email us, or use our website and reference **Customer Services** and then **Product Training**.

**Field Service** engineering on-site support is available, depending on the product and location, from one of our many worldwide locations or from one of our authorized 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 field service engineering assistance, please contact us via telephone, email us, or use our website and reference **Customer Services** and then **Technical Support**.

## 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:

### General

Your Name \_\_\_\_\_  
 Site Location \_\_\_\_\_  
 Phone Number \_\_\_\_\_  
 Fax Number \_\_\_\_\_

### Prime Mover Information

Engine/Turbine Model Number \_\_\_\_\_  
 Manufacturer \_\_\_\_\_  
 Number of Cylinders (if applicable) \_\_\_\_\_  
 Type of Fuel (gas, gaseous, steam, etc) \_\_\_\_\_  
 Rating \_\_\_\_\_  
 Application \_\_\_\_\_

### Control/Governor Information

Please list all Woodward governors, actuators, and electronic controls in your system:

Woodward Part Number and Revision Letter \_\_\_\_\_  
 Control Description or Governor Type \_\_\_\_\_  
 Serial Number \_\_\_\_\_

Woodward Part Number and Revision Letter \_\_\_\_\_  
 Control Description or Governor Type \_\_\_\_\_  
 Serial Number \_\_\_\_\_

Woodward Part Number and Revision 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](mailto:icinfo@woodward.com)

Please include the manual number from the front cover of this publication.



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](http://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.**