WOODWARD

Product Manual 82566
(Revision V, 12/2021)
Original Instructions

EG-6P, EG-6PC, EG-10P, EG-10PC Actuators

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 *26455*, *Customer Publication Cross Reference and Revision Status & Distribution Restrictions*, on the *publications page* of the Woodward website:

http://www.woodward.com

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

Proper Use

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

Translated Publications

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

The original source of this publication may have been updated since this translation was made. Be sure to check manual *26455*, *Customer Publication Cross Reference and Revision Status & Distribution Restrictions*, to verify whether this translation is up to date. Out-of-date translations are marked with ⚠. Always compare with the original for technical specifications and for proper and safe installation and operation procedures.

Revisions— A bold, black line alongside the text identifies changes in this publication since the last revision.

Manual 82566

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Important Definitions

This is the safety alert symbol 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.

Regulatory Compliance

The listings in this section are limited to EG-10P units.

European Compliance for CE Marking:

These listings are limited only to those units bearing the CE Marking.

ATEX – Potentially Explosive Atmospheres Directive: Directive 2014/34/EU on the harmonization of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres.
Zone 1, Category 2, Group IIG Ex e II T6
TUV 15 ATEX 7717X

Other European and International Compliance:

Compliance with the following European Directives or standards does not qualify this product for application of the CE Marking.

ATEX Directive: Exempt from the non-electrical portion of the ATEX Directive 2014/34/EU due to no potential ignition sources per EN 13463-1:2009 Category 2.

Pressure Equipment Directive: Compliant as “SEP” per Article 4.3 to Pressure Equipment Directive 2014/68/EU on the harmonization of the laws of the Member States relating to the making available on the market of pressure equipment.

Machinery Directive: Compliant at partly completed machinery with Directive 2006/42/EC of the European Parliament and the Council of 17 May 2006 on machinery.

IECEx: Certified for use in hazardous locations IECEx TUR 15.0024X
Ex e IIC T4 Gb

North American Compliance:

CSA: CSA Certified for Class I, Division 2, Groups B, C, D, T3 For use in Canada
Certificate LR 38640-4

UL: UL Listed for Class I, Division 1, Groups B, C, D, T3. For use in the United States.
UL File E49265

UL: UL Listed for Class I, Division 2, Groups B, C, D, T3. For use in the United States.
UL File E158654

IMPORTANT

These hazardous locations listings are limited to those units bearing the UL, CSA, or LCIE agency identification, specific hazardous locations markings, and the CE marking. If the unit will be used in hazardous locations, refer to the product nameplate or contact your Woodward account manager for more information.

Special Use

The EG-10P actuator is suitable for use in Class I, Division 1, Groups B, C, and D per UL for the US or non-hazardous locations only.

The EG-10P actuator is suitable for use in Class I, Division 2, Groups B, C, and D per UL for the US or non-hazardous locations only.

The EG-10P actuator is suitable for use in Class I, Division 2, Groups B, C, and D per CSA for Canada and UL for the US or non-hazardous locations only.

The EG-10P is suitable for use in European Zone 2, Groups A, B, C, and D environments.

The EG-10P is suitable for use in European Zone 1, Groups A, B, C, and D environments per LCIE.

Wiring must be in accordance with North American Class I, Division 1 or 2 or European Zone 1 or 2 wiring methods as applicable, and in accordance with the authority having jurisdiction.

Field wiring must be suitable for at least 90 °C.

Connect ground terminal to earth ground.

Each EG-10P Zone 1 actuator must be provided with a 900 mA maximum fuse to be installed before the actuator.

⚠WARNING

EXPLOSION HAZARD—Do not remove covers or connect/disconnect electrical connectors unless power has been switched off or the area is known to be non-hazardous.

Substitution of components may impair suitability for Class I, Division 2 or Zone 2.

⚠AVERTISSEMENT

RISQUE D'EXPLOSION—Ne pas enlever les couvercles, ni raccorder / débrancher les prises électriques, sans vous en assurez auparavant que le système a bien été mis hors tension; ou que vous vous situez bien dans une zone non explosive.

La substitution de composants peut rendre ce matériel inacceptable pour les emplacements de Classe I, Division 2 ou de Zone 2.

Chapter 1.
General Information

Description

The controlling element of the EG-6 and EG-10 Proportional Actuators is an electrohydraulic transducer which controls oil flow to and from the power piston through the action of a polarized solenoid. The position of the actuator output shaft is proportional to the input current of the solenoid coil controlling the hydraulic pilot-valve plunger.

The EG-6/10 Proportional Actuator is available with either a drive shaft or an oil motor. The drive shaft is driven by the prime mover to provide relative rotation between the pilot-valve plunger and bushing, and also to rotate the oil pump gears. The direction of rotation (clockwise or counterclockwise) is determined by the placement of plugs in oil passages in the actuator to maintain the operating oil pressure at about 1724 kPa (250 psi) above supply pressure in the EG-6 and about 2758 kPa (400 psi) above supply pressure in the EG-10.

The EG-10P actuators that do not have an oil pump are equipped with an oil motor. Oil under pressure must be supplied to the actuator: to provide working pressure for the actuator and to rotate the pilot-valve bushing. Work output of the EG-10P actuator equipped with an oil motor depends upon the pressure of the oil supplied to the actuator.

Table 1-1. Governor Oil Pressure vs Maximum Work Output

Governor Operating Oil Pressure	Maximum Work Capacity
2758 kPa (400 psi)	12.6 J (9.30 ft-lb)
2068 kPa (300 psi)	9.5 J (7.00 ft-lb)
1724 kPa (250 psi)	8.1 J (6.00 ft-lb)
1379 kPa (200 psi)	6.3 J (4.65 ft-lb)
690 kPa (100 psi)	3.1 J (2.30 ft-lb)

The EG-10P can be equipped with either a Pickering or Kearfott Rotary Variable Differential Transformer (RVDT) for operation of a gas valve, mechanical load sharing, pitch control, or any application where valve or fuel-rack position is a function of the control. A minimum-position switch is available for applications which require this protection.

Governor System

The governor system includes:

- Woodward electronic governor
- Magnetic pickup
- Speed-setting potentiometer (optional)
- Proportional electrohydraulic EG actuator described in this manual

Output pulses (proportional to prime mover speed) from the magnetic pickup are processed by the speed sensor section of the electric governor and are applied as a dc voltage (proportional to prime mover speed) to the summing point of the control amplifier section of the electric governor. This speed voltage is compared to a dc reference voltage from the speed-setting potentiometer, which corresponds to the prime mover speed desired. The governor output voltage increases, causing the actuator output shaft to rotate in the increase-fuel direction.

References

Manual 25071: *Oils for Hydraulic Controls*
Manual 56105: *EG-10P, EG-10PC Repair Procedure*
Manual 82510: *Magnetic Pickups and Proximity Switches for Electronic Controls*

Specifications

Radiation-resistant parts are available for special applications.

A position feedback transducer (RVDT) is available to monitor output shaft position.

IMPORTANT **Unless otherwise specified, these actuators are tested and shipped for vertical operation. When used in a horizontal application, these actuators will have an 8º shift in terminal shaft calibration.**

Oil Motor Model
An oil motor actuator requires a supply of 552 to 3448 kPa (80 to 500 psi) pressure oil from an external source to rotate the pilot valve bushing and to provide the required work. Work output and stalled torque of the oil motor model are in direct proportion to the supply pressure.

Compensation
Many EG actuators operate with oil supplied directly from the prime mover. Certain multi-viscosity motor oils require a compensation system within the actuator to provide needed stability. A needle valve is included in the compensation system to allow response adjustment.

IMPORTANT **EG-10P oil-motor models with Class 1, Groups C and D approval are limited to a maximum of 3448 kPa (500 psi) inlet pressure.**

Table 1-2. All Models Specifications

Output Shaft	0.375”-36 serrations (standard/EG-3P) both sides of the case; 0.500”-36 serrations (standard/ EG-6P/10P) either side of the case. Special output shafts are available.
Angular Travel	42° nominal travel available with 28° travel from no load to full load at rated speed recommended
Calibration	2° to 3° off minimum shaft position at 20 mA. 36° ±3° additional travel at 160 mA. Special calibrations are available with a minimum of 80 mA required for full stroke.
Hysteresis	Within 3% of maximum stroke
Linearity	Within 0.5%
Temperature Drift	Nominally ±1° of output per 56 °C/100 °F
Transducer Coil Resistance	30 to 35 Ω (at 20 °C/68 °F)
Nominal Coil Input Current Range	20 to 160 mA for single or two actuators operating from one electric control
Electrical Connector	4-pin MS-33682-14S-2P. UL design does not have connector
Hydraulic Oil Supply Fluid	Hydrocarbon oil. Consult Woodward for recommended synthetic oils. If multi-viscosity oils are used, the compensated model is suggested.
Hydraulic Oil Viscosity	100 to 200 SUS at operating temperature recommended. 50 SUS minimum, 3000 SUS maximum (7.5 cSt to 650 cSt)
Oil Temperatures of Continuous Operation	60 to 93 °C (140 to 200 °F) depending on oil viscosity
Ambient Temperature Range	–29 to +93 °C (–20 to +200 °F). The primary temperature concern is for the hydraulic fluid properties in the actuator.
Case and Base Construction	Cast or ductile iron
Cover, Subcap, and Drain Adapter	Cast aluminum
Mounting Configuration	Vertical (or horizontal with proper adjustments; non-interchangeable)
Mounting Studs	Four 5/16” diameter (approx. 7.9 mm)

Table 1-3. Oil Pump Models (EG-10P) Specifications

Work Output	Maximum 12.6 J (9.3 ft-lb). Travel is 2/3 full travel for a work output of 8.4 J (6.2 ft-lb). Stalled torque rating is 17.4 Nm (12.8 lb-ft)
Time Constant	0.17 second
Hydraulic Source	Engine lubricating system or a separate sump
Supply Pressure	300 mm (1 ft) of lift to a maximum of 345 kPa (50 psi)
Flow	Peak demand of 7.6 L/min (2 US gal/min) during transients; steady-state flow of 1.9 L/min (0.5 US gal/min) with 250 SUS oil supply
Filter	20 to 25 µm (nominal)
Pump Capacity	1519 cm^3 (92.7 in^3)/minute/1000 rpm
Pump Power Required	134 W (0.18 hp) at 1000 rpm required; 373 W (0.5 hp) at 1000 rpm recommended for motor drive
Supply Inlet	0.250”-18 NPTF (2). Use one or supply through mounting surface.
Drain	11/32” dia. base, must have free discharge. For horizontal mounting, use 0.250-18 NPTF in cover.
Mass/Weight	7.3 kg (16.0 lb)
Drive Rotation	Plugged for either clockwise or counterclockwise
Recommended Drive Speed	1500 to 4000 rpm
Drive Coupling	0.562-6 spline extends 0.562” (14.3 mm) from mounting surface (standard)
Enclosure Rating	IP54 per IEC60529:2001

Table 1-4a. Oil Motor Model (EG-10P) Specifications

Time Constant	1.06P–1/2 + 0.0059P1/2 s where P=supply pressure in psig (1 psig=6.895 kPa)
Supply Pressures	552 to 3448 kPa (80 to 500 psi). Pressures outside this range are not recommended.
Supply Flow	Peak demand of 15 L/min (4 US gal/min) during transients. Steady-state flow 5.3 L/min (1.4 US gal/min) maximum, depending on orifice size and operating pressure.
Filter	10 to 15 µm (nominal)
Pressure Inlet	0.250”-18 NPTF to pilot valve
Drain	0.75”-14 NPTF on drain adapter. Must have free discharge. For horizontal mounting, use 0.250”-18 NPTF in cover.
Mass/Weight	8 kg (17 lb)

Table 1-4b. Oil Motor Model (EG-10P) Specifications – Work Output

Recommended Output Shaft					
Actuator Operating Oil Pressure		**Maximum Work Output**		**Travel is 2/3 full travel for a work output of:**	
psi	**kPA**	**N-m**	**Ft-lb**	**N-m**	**Ft-lb**
400	2758	9.3	12.6	6.2	8.4
300	2068	7.0	9.5	4.7	6.4
200	1379	4.6	6.2	3.1	4.2
100	690	2.3	3.1	1.5	2.0

Table 1-4c. Oil Motor Model (EG-10P) Specifications – Orifice to Oil Motor Supply Pressure

Supply Pressure		**Orifice Diameter**	
psi	**kPa**	**in**	**mm**
80 to <100	552 to <690	0.076	1.93
100 to 175	690 to 1207	0.062	1.57
>175 to 300	>1207 to 2068	0.055	1.40
>300 to 500	>2068 to 3448	0.047	1.19

Chapter 2.
Installation

This chapter provides information for the receiving, storage, and installation of the EG-10P actuator. See Figures 2-2 and 2-3 for typical outline drawings.

Storage

For short-term storage, fill the actuator with a good rust and oxidation inhibited oil.

Installation

⚠WARNING

External fire protection is not provided in the scope of this product. It is the responsibility of the user to satisfy any applicable requirements for their system.

⚠CAUTION

Due to typical noise levels in turbine environments, hearing protection should be worn when working on or around the EG-10P.

⚠CAUTION

The surface of this product can become hot enough or cold enough to be a hazard. Use protective gear for product handling in these circumstances. Temperature ratings are included in the specification section of this manual.

⚠WARNING

To avoid personal injury from improper lifting or from dropping the actuator, be sure to use appropriate equipment and safe lifting techniques when handling the actuator. Dry weight of the actuator is approximately 8 kg (17 lb).

Attitude

For installation dimensions, see the outline drawing (Figures 2-2 and 2-3). The actuator must fit evenly on the mounting pad. The four mounting bolts must be evenly torqued, and there must be no movement or rocking of the actuator on its mounting surface.

The actuator can be installed in a vertical or horizontal position. In any attitude except vertical, the servo piston side of the actuator must be down to prevent air pockets in the hydraulic system.

Drive Connection

The drive shaft of the oil pump actuator must fit into the drive coupling with a free-slip fit. Do not apply external force. Be sure the drive does not bind or have too much side load or end play. Two types of couplings are available:

- 9/16-6 spline internal-to-external
- 9/16-6 spline internal-to-internal

The coupling is first installed on the engine drive, then the actuator is added to the internal spline on the coupling.

Control Linkage

The output shaft will rotate 42 degrees. Use 2/3 (28 degrees) travel between no load and full load. The additional “overtravel” should be split and used at both ends to provide overfuel for transients and to assure shutdown at minimum actuator position. The linkage must be free of binding, without backlash. If there is a collapsible member in the linkage, it must not yield when the actuator moves the linkage rapidly. The linkage may be spring-loaded to remove looseness.

Most applications require a linear linkage arrangement with each movement of the output shaft of the actuator creating a similar movement of the fuel rack or steam valve. If the actuator is providing control of a butterfly throttle valve, a non-linear linkage is necessary (see Application Note 50516, Governor Linkage for Butterfly Throttle Valves). The net result of any linkage arrangement should give a linear relationship between actuator movement and developed torque of the prime mover.

Electrical Connection

WARNING

Due to the hazardous location listings associated with this product, proper wire type and wiring practices are critical to operation.

NOTICE

Do not connect any cable grounds to “instrument ground”, “control ground”, or any non-earth ground system. Make all required electrical connections based on the wiring diagrams.

Each EG-10P actuator used in a Zone 2 environment must be provided with a 900 mA maximum fuse to be installed before the actuator.

Connect wiring to the actuator according to the plant wiring instructions included with the control and with the actuator. Most installations call for jumpering contacts C and D in the mating plug. RVDT or minimum-position switch features will require different electrical connections. Actuators designed for use in hazardous environments have conduit boxes permanently attached.

EG-6P, EG-10P Actuator (with Compensation)

Description

Many EG actuators operate with oil supplied directly from the prime mover. Certain multi-viscosity motor oils require a compensation system within the actuator to provide needed stability.

Needle Valve Adjustment

The needle valve is factory set at two turns out from closed. If instability is experienced during operation with cold multi-viscosity oils, the unit should not be run at a needle valve opening of less than one turn out from closed, as response would not be acceptable. A wider needle valve opening provides quicker actuator response but less stability. This adjustment must be made at start-up, before engine oil warms up.

Oil Supply

Clean Supply

Dirt in the oil can cause the actuator to malfunction.

Many oil pump model actuators are installed with a direct line from either the engine pressure oil system or from the engine oil sump. A 20 to 25 µm absolute filter should be installed in the line from the engine. Many units operate satisfactorily without this filter, depending upon the engine filter to protect against contamination. In case of control problems with an unfiltered oil supply, clean the actuator and install the prescribed filter in the oil supply line.

Install a 10 to 15 µm nominal filter in the supply line to the oil motor model.

No regular maintenance is required if oil filtration requirements are followed.

Oil Pump Actuator Connection

Connect a 0.375 OD (approx. 9.5+ mm) oil line from the supply to the 0.250 (approx. 6.4– mm) pipe-tapped inlet hole in the actuator. This oil line should include a 20 to 25 µm absolute filter. Oil supply to the actuator should not exceed 305 mm (12 inches) of lift to a maximum of 345 kPa (50 psig) boost pressure at the actuator end of the supply line.

Flow rates of a maximum demand of 7.6 L/min (2.0 US gal/min) during transients with a steady-state of 0.9 L/min (0.25 US gal/min) at 2758 kPa (400 psi) and 60 SUS are required.

Some engines have the oil supply built into the mounting pad. In these cases the 0.250 pipe-tapped connection is plugged. No filter can be installed in these units, and the actuator depends upon the engine filter for protection.

Most oil-pump actuators drain through the mounting base to sump. If a special drain is used, the drain line must be adequate to prevent any back pressure on the actuator.

IMPORTANT

Back pressure from the drain may cause jiggle or instability in the actuator.

Oil Motor Actuator Connection

Connect a 0.375 OD (approx. 9.5+ mm) oil line from the supply to the 0.250 (approx. 6.4– mm) tapped inlet hole supplying the actuator pilot valve. This line must include a 10 to 15 µm absolute filter.

The oil motor requires an orifice to restrict oil supply flow. Normally the orifice is internal in the actuator and comes with the actuator. When specified by the customer, the oil motor supply may be a separate external line with an appropriate orifice installed in the connection with the oil motor. The orifice size must be matched to the oil pressure supplied to the actuator (see Table 2-1). The 10 to 15 µm absolute filter must service this supply line as well as the pilot-valve supply line.

Adequate drain is important for dependable and stable operation of the oil motor actuator. A minimum of 25 mm (1 inch) ID drain is needed with a continuous drop for up to 3 m (10 ft) from the actuator. Drains longer than 3 m (10 ft) will probably require larger ID pipe. No oil traps can occur in this drain line. It is important that oil not back up to and into the actuator.

IMPORTANT

Back pressure from the oil drain may cause actuator jiggle as hydraulic resonance can occur.

Table 2-1. Orifice Size for Oil Motor Supply Pressure

Supply Pressure		Orifice Diameter	
psi	**kPa**	**in**	**mm**
80 to 90	552 to 621	0.076	1.93
100 to 175	690 to 1207	0.062	1.57
176 to 300	1214 to 2068	0.055	1.40
301 to 500	2075 to 3448	0.047	1.19

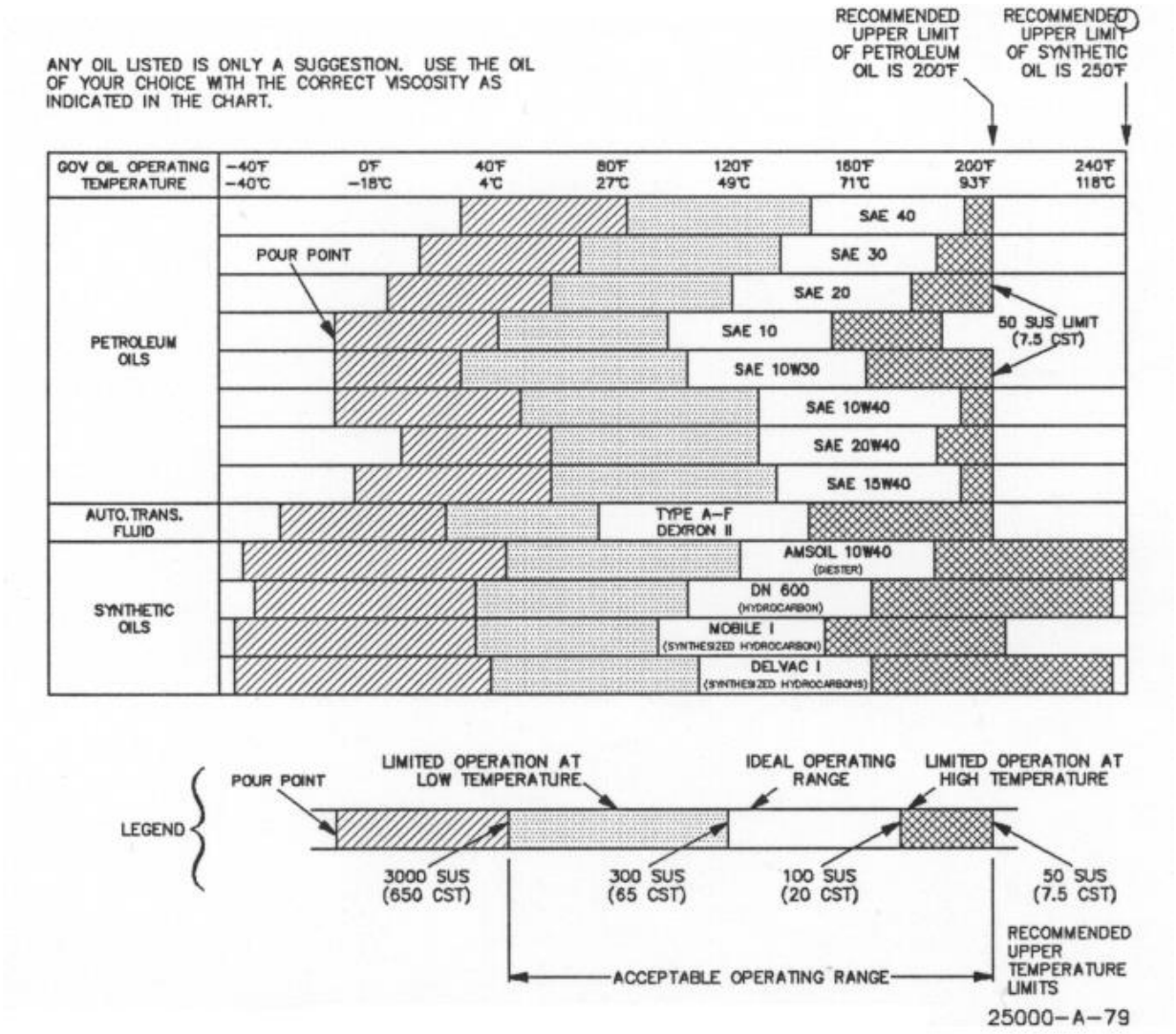
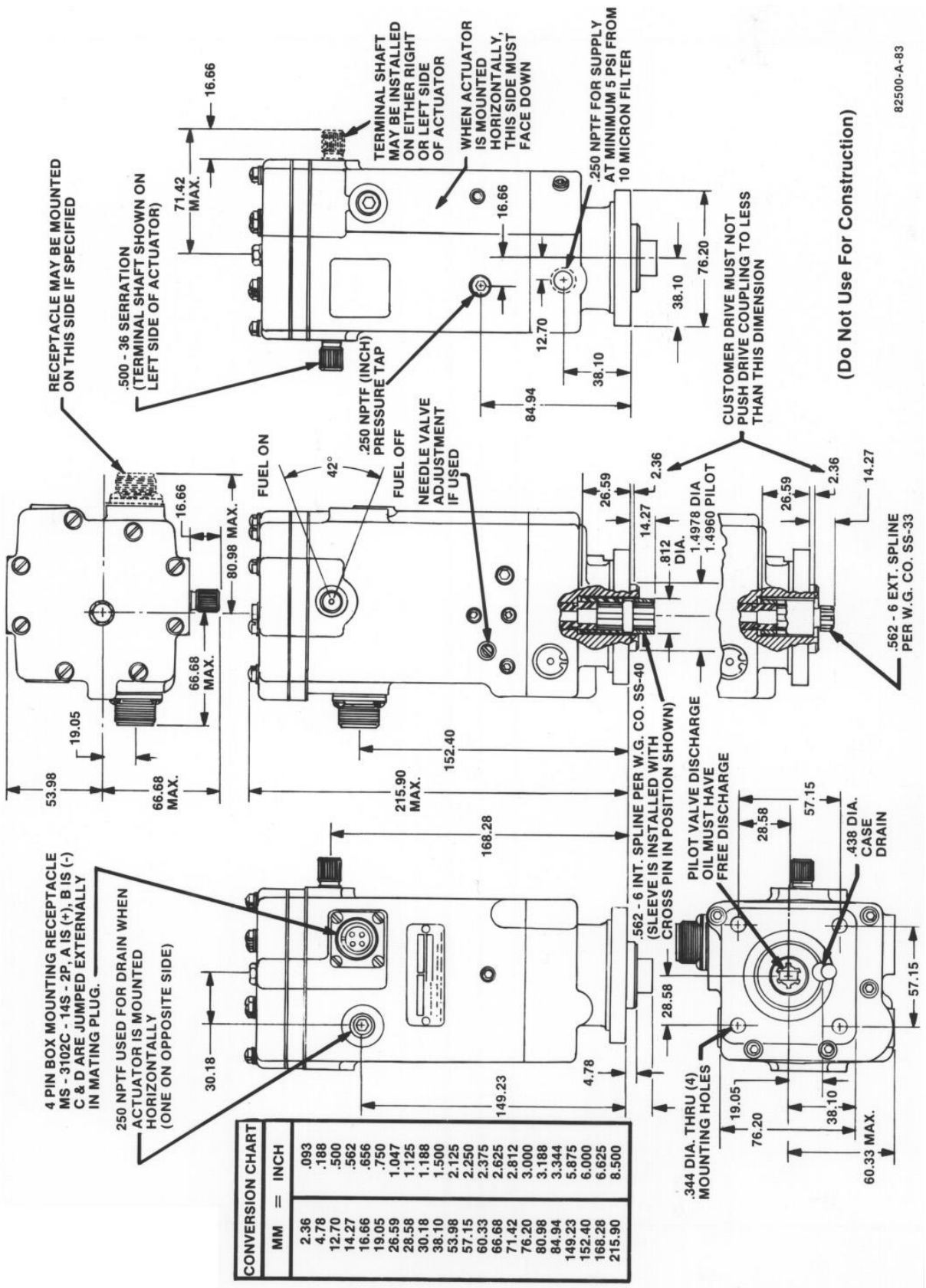
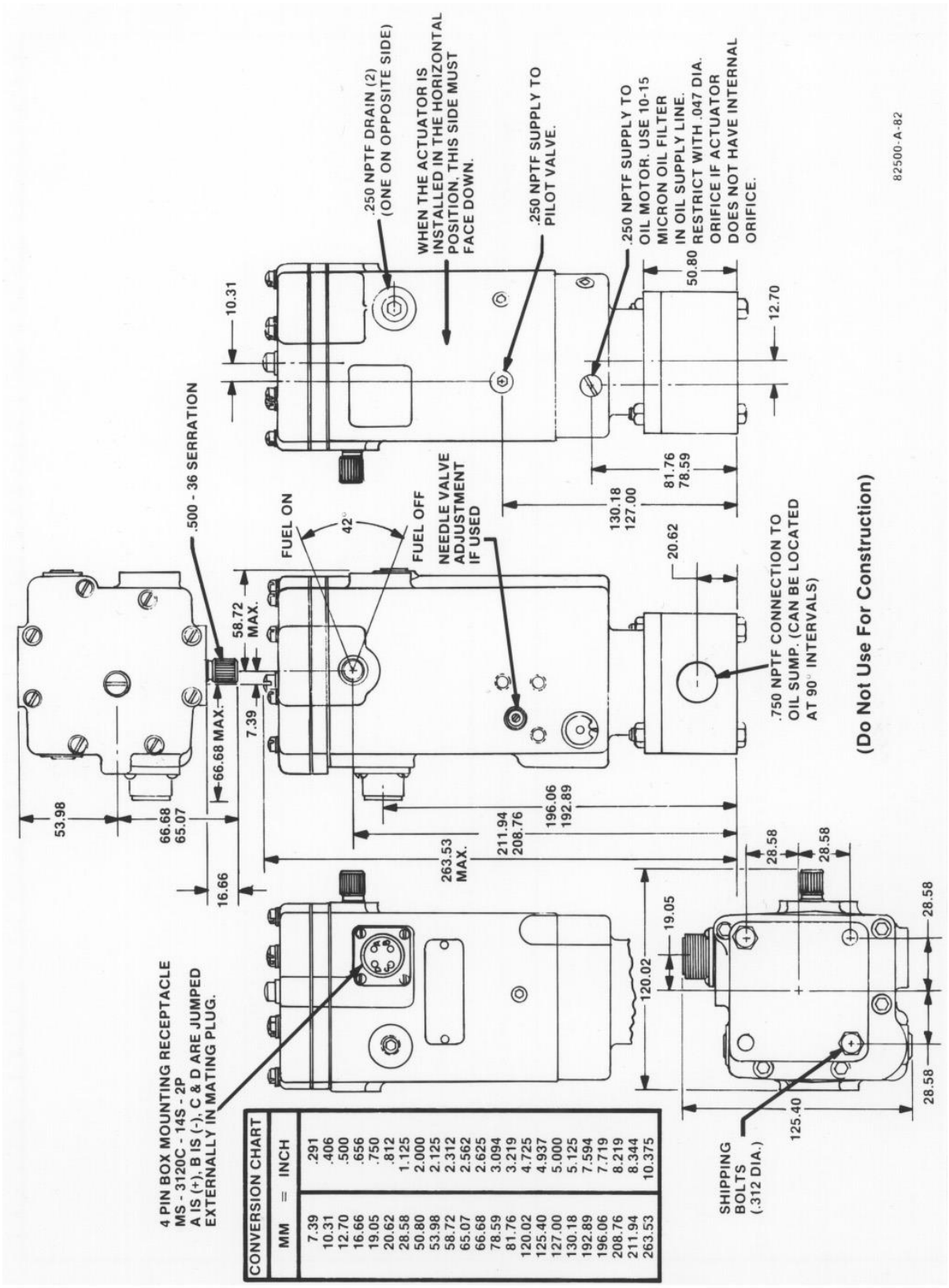


Figure 2-1. Oil Viscosity Chart



CONVERSION CHART	
MM	= INCH
2.36	.093
4.78	.188
12.70	.500
14.27	.562
16.66	.656
19.05	.750
26.59	1.047
28.58	1.125
30.18	1.188
38.10	1.500
53.98	2.125
57.15	2.250
60.33	2.375
66.68	2.625
71.42	2.812
76.20	3.000
80.98	3.188
84.94	3.344
149.23	5.875
152.40	6.000
168.28	6.625
215.90	8.500

Figure 2-2. Outline Drawing of Typical EG-P Actuator (Oil Pump Model)



CONVERSION CHART	
MM	= INCH
7.39	.291
10.31	.406
12.70	.500
16.66	.656
19.05	.750
20.62	.812
28.58	1.125
50.80	2.000
53.98	2.125
58.72	2.312
65.07	2.562
66.68	2.625
78.59	3.094
81.76	3.219
120.02	4.725
125.40	4.937
127.00	5.000
130.18	5.125
192.89	7.594
196.06	7.719
208.76	8.219
211.94	8.344
263.53	10.375

Figure 2-3. Outline Drawing of Typical EG-P Actuator (Oil Motor Model)

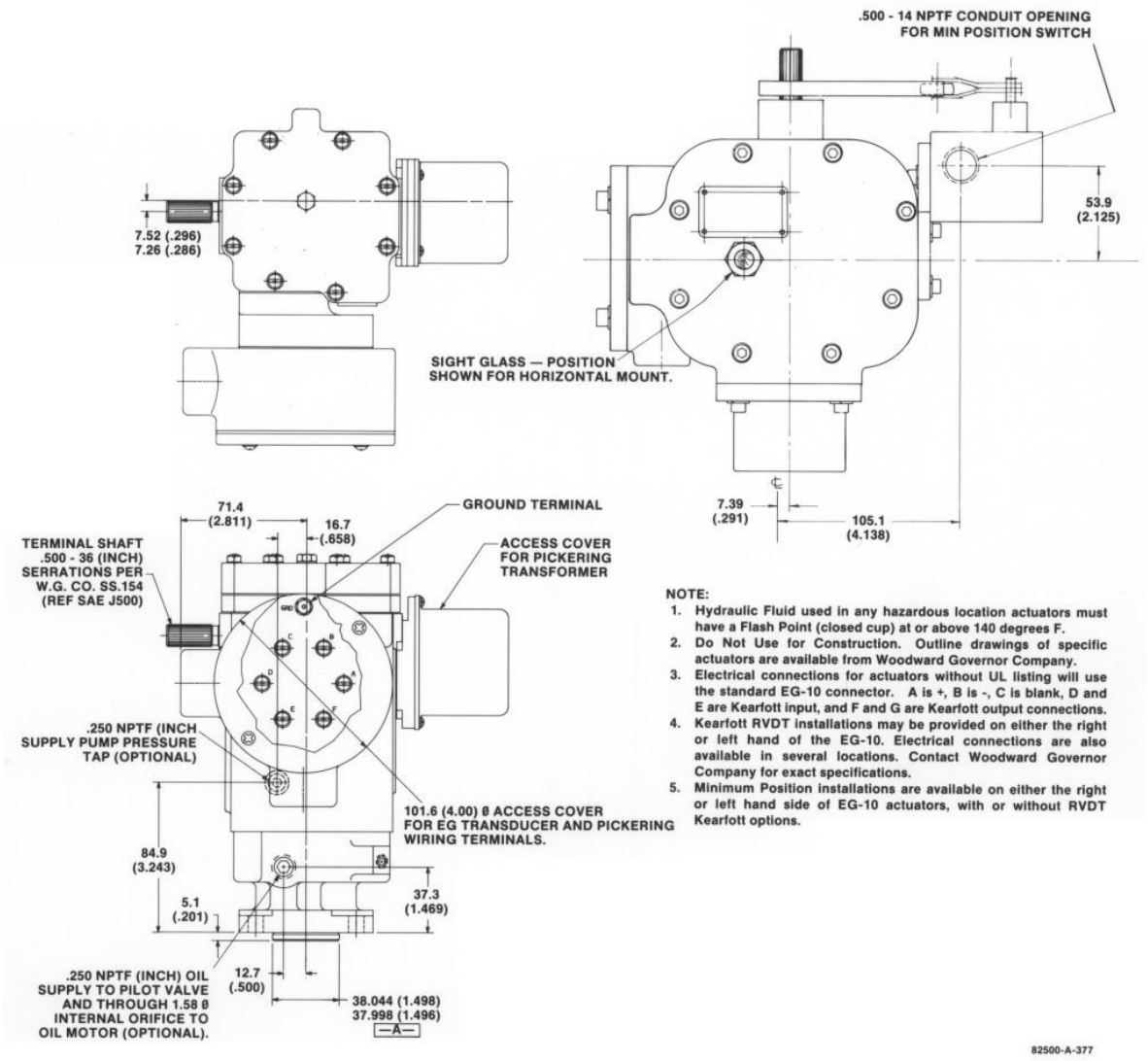


Figure 2-4. Outlines of Typical Applications
(Pickering RVDT options, minimum-position switch options,
and UL wiring options for installation in hazardous locations)

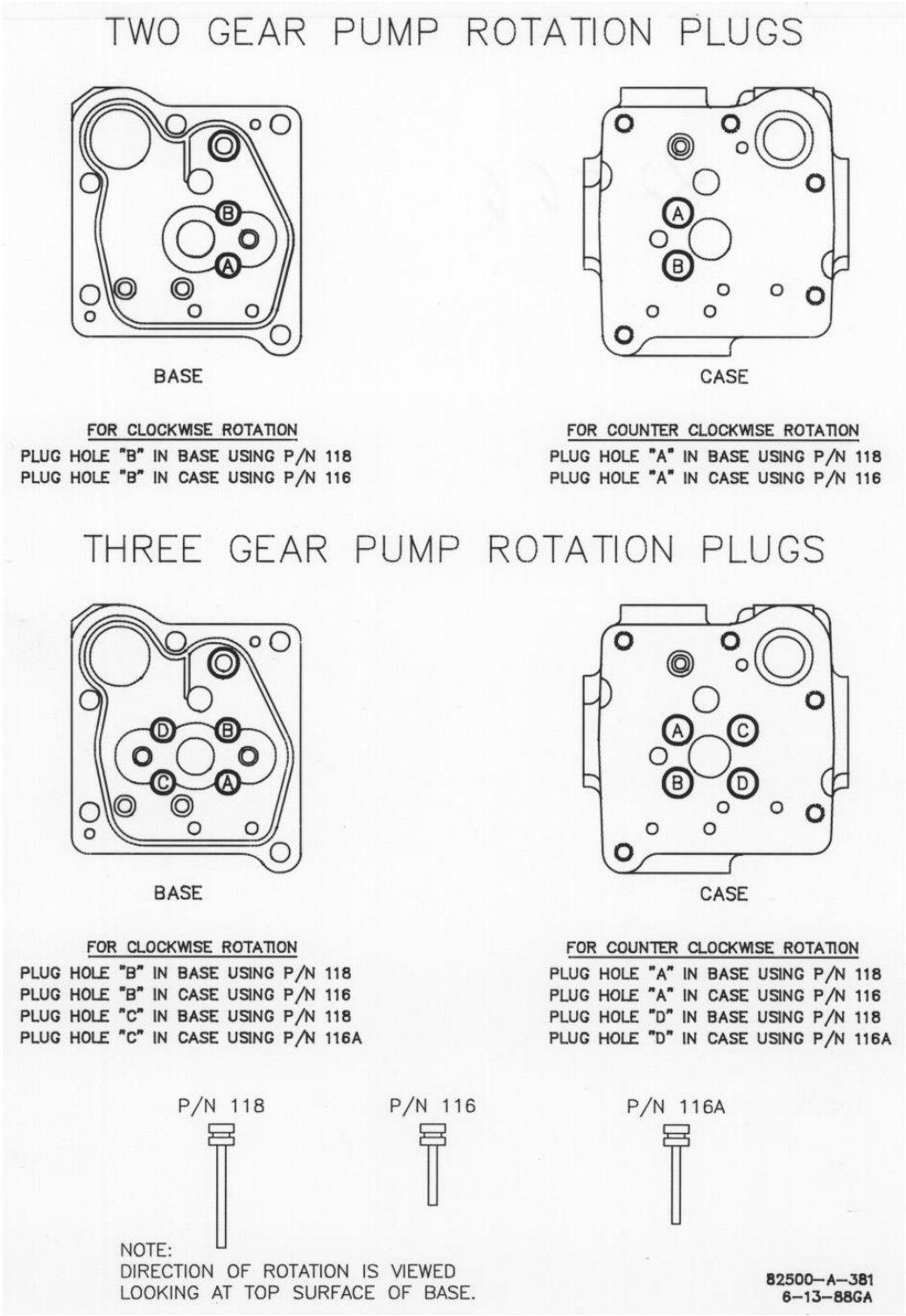


Figure 2-5. Oil Pump Rotation Plugs

Figure 2-6. EG-10P Oil Pump Actuator

Chapter 3.
Principles of Operation

Introduction

The EG actuator consists of the following basic items:

- Oil pump or oil motor
- Relief valve (oil pump model only)
- Pilot valve plunger and rotating bushing
- Magnet (transducer assembly)
- Feedback linkage
- Centering and restoring springs
- Power piston
- Output shaft

See Figure 3-1 for a better understanding of the operation of the EG actuator.

Oil Pump Model

This model of actuator is driven by the prime mover, or by a separate motor and oil-sump assembly. The drive coupling from the prime mover rotates the pilot-valve bushing. Rotating the pilot-valve bushing pumps oil and reduces friction between the stationary plunger and the bushing by creating relative motion between the parts.

Oil from the external supply source enters the suction side of the oil pump. The pump gears carry the oil to the pressure side of the pump. Internal pressure is maintained by the relief valve in the oil pump system.

The prime mover fuel or steam linkage is connected to the output shaft. The output shaft is connected, through linkage, to the power piston. Constant hydraulic pressure on top of the power piston tends to rotate the output shaft in the decrease-fuel direction. However, the power piston cannot move down unless control oil is released to sump.

The pilot-valve plunger regulates the flow of control oil to and from the power piston. The pilot-valve plunger is centered when its control land covers the control port in the pilot-valve bushing. Figure 3-1 shows the pilot-valve bushing.

The pilot-valve plunger is connected to a permanent magnet that is spring-suspended in the field of a two-coil solenoid. The output signal from the electric control box is applied to the solenoid coils to produce a force which is proportional to the magnet current in the coils. This force always tries to move the magnet and pilot-valve plunger down. The centering spring force always applies force trying to move the pilot-valve plunger and magnet up. The restoring spring exerts a downward force on the pilot-valve plunger. This downward force is dependent upon the position of the restoring lever. The restoring-spring lever moves up to decrease the restoring-spring force as the output shaft rotates in the “increase” direction. The opposing forces of the centering spring and restoring spring are always urging the pilot-valve plunger in the upward direction. This force increases as the output shaft moves in the “increase” direction.

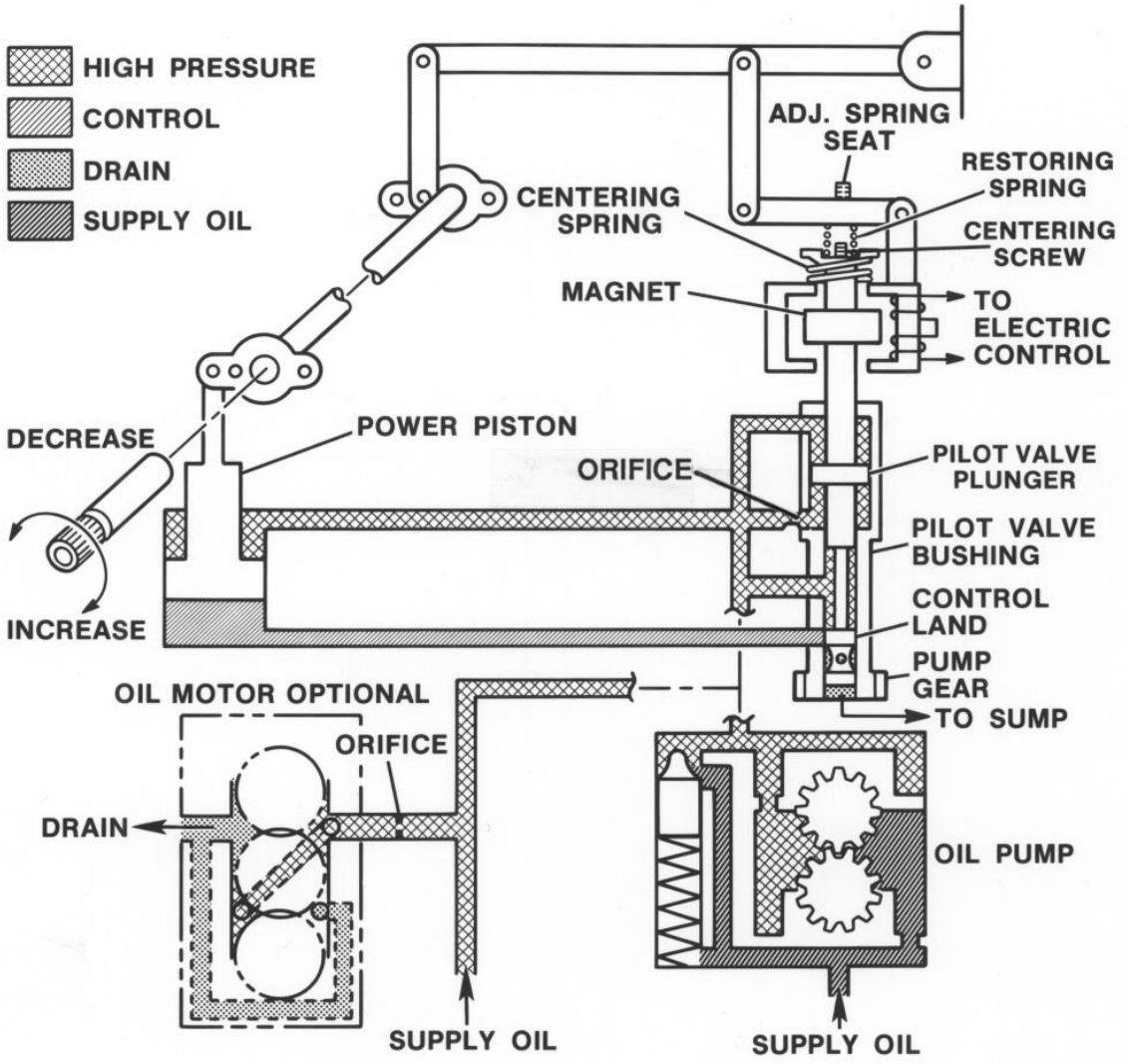


Figure 3-1. EG-P Schematic

With the unit running on-speed under steady-state conditions, the resulting spring force and the force from the current in the solenoid coils are equal but opposite. This keeps the output shaft at a position to maintain the engine at the required speed.

Oil Motor Model

The oil motor model operates the same as the oil pump model except for the oil supply system and the drive to the rotating pilot-valve bushing.

When equipped with an oil motor, the actuator does not require a drive shaft. An outside source of pressure oil supplies the working pressure for the actuator. This pressure oil also operates the oil motor, which rotates the pilot-valve bushing. The oil pressure required to supply the necessary work force is determined by the specified work requirement at the time the actuator is purchased (see Table 1-1).

The oil motor portion of the actuator operates with a restriction to the pressure oil supply in order to reduce the flow of pressure oil through the oil motor. The orifice is normally fitted internally in the actuator. Some actuators are built without an internal orifice and, in these cases, a separate oil supply and orifice is required.

Voltage Change

In operation, a voltage change to the magnet causes a temporary change in the location of the pilot-valve plunger in the rotating bushing and a resulting change in the location of the power piston and terminal shaft. If the voltage decreases, the magnetic force decreases, and the centering spring raises the pilot-valve plunger. This allows the power piston to be forced down, decreasing the fuel setting. As the terminal shaft rotates, it moves linkage which adds to the restoring spring force, urging the pilot-valve plunger to return to the centered position and stop the rotation of the terminal shaft. A voltage increase will cause the terminal shaft to increase fuel position. The increase in voltage forces the pilot-valve plunger down, sending pressure oil under the power piston and adding to the fuel setting. Again, the proportional linkage is moved, this time reducing the restoring spring force and allowing the centering spring to bring the pilot-valve plunger back to a centered position against the combined forces of the restoring spring and magnet.

Compensation System

The EG proportional actuator can be supplied from the factory with a compensation system. The compensation system will supply extra hydraulic pressure to the pilot-valve plunger to assist its return to a normal, centered position following a fuel change. Figure 3-2 shows a schematic of the compensation system. The floating piston in the system is moved against one of the springs any time the power piston moves, creating a slight difference in the oil pressures on the two sides of the buffer piston. The higher oil pressure is on the side of the piston opposite the spring being compressed. The oil pressure on one side of the buffer piston is transmitted to the lower side of the compensation land on the pilot-valve plunger—the pressure on the other side of the piston is transmitted to the upper side of the compensation land. The difference in oil pressures produces a net force upward or downward which assists the restoring or centering spring in re-centering the pilot-valve plunger whenever a fuel correction is made.

The compensation force is dissipated through the needle valve and the buffer piston re-centers between the two springs in preparation for the next fuel change.

The compensation system is necessary on certain actuators which are using multi-viscosity oil supplies which would otherwise be incompatible with the actuator. The needle-valve adjustment is primarily responsible for the amount of compensation available. The needle valve should never be run at less than one turn open.

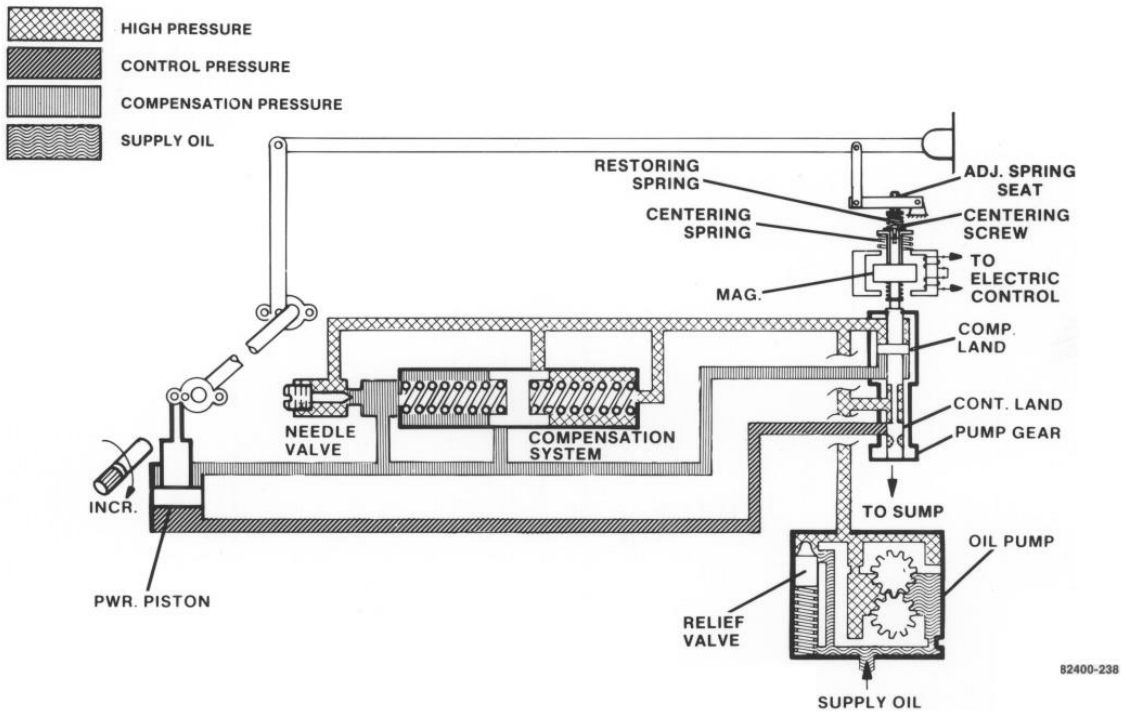


Figure 3-2. EG-P Compensation System

Chapter 4. Troubleshooting

This chapter gives instructions for checking the operation of the EG actuator. See the appropriate manual for troubleshooting your electronic governor system.

The problems encountered with a new or factory rebuilt actuator are usually limited to installation and supply oil problems. If you have an actuator problem, check the following.

1. Be sure the drive to the actuator is rotating the drive shaft and pump gears in the proper direction (see Figure 2-5).
2. Be sure the hydraulic supply pressure to the actuator is adequate, clean, and is not foaming. Be sure the lines are not clogged, and the filter is seated properly in its housing. If you have an oil motor model, it may be necessary to remove the drain adapter from the case to be sure the oil motor is rotating.
3. Check the linkage between actuator and prime mover for misalignment, binding, or excessive backlash.
4. Check the leads to the actuator for shorts or breaks.
5. Use the circuit outlined in Figure 4-1 to check the actuator output. The actuator should be at minimum fuel position at 0 mA, and it should be at maximum position at 200 mA. The movement from minimum to maximum should be even, and the output shaft should repeat to the exact same location at the same current setting.

To Check Actuator Operation:

With the engine or turbine shut down, remove the linkage between the actuator and the control valve or fuel rack. Start the prime mover under manual control if necessary to provide drive or oil pressure to the actuator.

⚠WARNING

The engine or turbine will not be under control of the governor system with the actuator linkage removed. TO PROTECT AGAINST POSSIBLE PERSONAL INJURY, LOSS OF LIFE and/or PROPERTY DAMAGE, BE PREPARED TO MAKE AN EMERGENCY SHUTDOWN to protect against runaway or overspeed.

Remain clear of the actuator arm when actuator is energized.

Rotate the potentiometer and watch the output shaft as it moves through its range of travel. The output shaft should take the same position each time the potentiometer is set at the same location. If the output shaft has an erratic movement, the problem may be caused by low oil pressure, dirty supply oil, plugged oil filters, or possibly a restricted drain line.

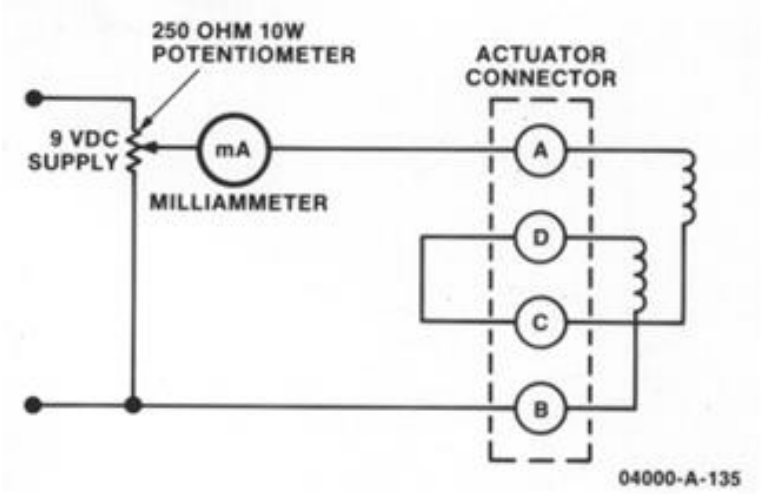


Figure 4-1. Wiring Diagram for Circuit to Test Actuator Output

⚠WARNING

Do not circumvent safety features of the actuator when servicing or troubleshooting an actuator designed for use in hazardous locations.

Chapter 5.
Replacement Parts

This chapter provides information for replacement parts for the EG-6P and EG-10P actuators. Figure 5-1 shows parts for the EG actuator with an oil motor. Figure 5-2 shows the EG actuator with an oil pump.

Parts Information

When ordering replacement parts, include the following information:
1. Serial number and part number shown on the nameplate.
2. Manual number (this is manual 82566).
3. Part number from parts list, and description or part name.

Table 5-1 Parts for EG Actuator (Oil Motor Model) as Shown in Figure 5-1

Ref. No.	Part Name	Qty	Ref. No.	Part Name	Qty
82566-1	EG-10P case and standpipe	1	82566-41	Centering screw 6-32 x .375	1
82566-2	Plug .250 PTF	3	82566-42	Connector gasket	1
82566-3	Soc. hd. plug .0625 NPTF	7	82566-43	4-pin receptacle	1
82566-4	Plug	1	82566-44	Lock washer # 6	4
82566-4A	Orifice	1	82566-45	Rd. hd. screw # 6-32	4
82566-5	Name plate	1	82566-46	Restoring spring lever	1
82566-6	Drive screw #2 x .1250	2	82566-47	Adjustable spring seat	1
82566-7	Oil seal .500 I.D.	1	82566-48	Link	1
82566-8	Needle bearing	1	82566-49	Drilled headed pin	1
82566-9	Closed end bearing .437 I.D.	1	82566-50	Washer .296 O.D.	2
82566-10	Plug	1	82566-51	Cotter pin .060 x .500	3
82566-11	O-ring .316 O.D.	1	82566-52	Feedback adjustment bracket	1
82566-12	Oil motor base	1	82566-53	Transducer clamp bracket	1
82566-13	Tapered pin	2	82566-54	Straight drilled pin	1
82566-14	Idler gear stud	2	82566-55	Lock washer #10	5
82566-15	Idler gear	2	82566-56	Socket head cap screw, 10 x 2.250”	2
82566-16	Drain adapter	1	82566-57	Loading lever	1
82566-17	Plastic plug. 750 NPTF	1	82566-58	Soc. hd. cap screw 10-32 x .625	1
82566-18	Drain adapter gasket	1	82566-59	Drilled pin .250 x .656	1
82566-19	Shipping bolt	2	82566-60	Pin	1
82566-20	Shipping nut	2	82566-61	Output shaft	1
82566-21	Base seal	1	82566-62	Output shaft collar	1
82566-22	Base plug	1	82566-63	Feedback lever	1
82566-23	Base plug	1	82566-64	Short link	1
82566-24	O-ring .070 x .379 O.D.	2	82566-65	Cover gasket	2
82566-25	Servo piston	1	82566-66	Sub cap	1
82566-26	Servo connecting link	1	82566-67	Roll pin	1
82566-27	Double dia. pin .250 x 860	1	82566-68	Steel washer .174 I.D.	2
82566-28	Pilot valve bushing	1	82566-69	Lock washer	2
82566-29	Pilot valve plunger	1	82566-70	Fill. hd. machine screw	2
82566-30	Compensation bushing	1	82566-71	Pin	2
82566-31	Retaining ring .508 O.D.	1	82566-72	Screw	2
82566-32	Magnet spring	1	82566-73	Cover	1
82566-33	Socket hd. screw .250-28 x 1.250	5	82566-74	Washer .375 O.D. x 195 I.D. x .031	8
82566-34	Lock washer .250	5	82566-75	Shakeproof washer #10	8
82566-35	Transducer	1	82566-76	Fill. dr. screw #10-1.500	8
82566-36	Washer .223 I.D.	1	82566-77	Copper washer .265 I.D.	1
82566-37	Magnet	1	82566-78	Hex screw .250-28 x .375	1
82566-38	Coil cover	1	82566-79	Shipping cap .875-20	1
82566-39	Centering spring assembly	1	82566-86	Orifice	1
82566-40	Washer	1			

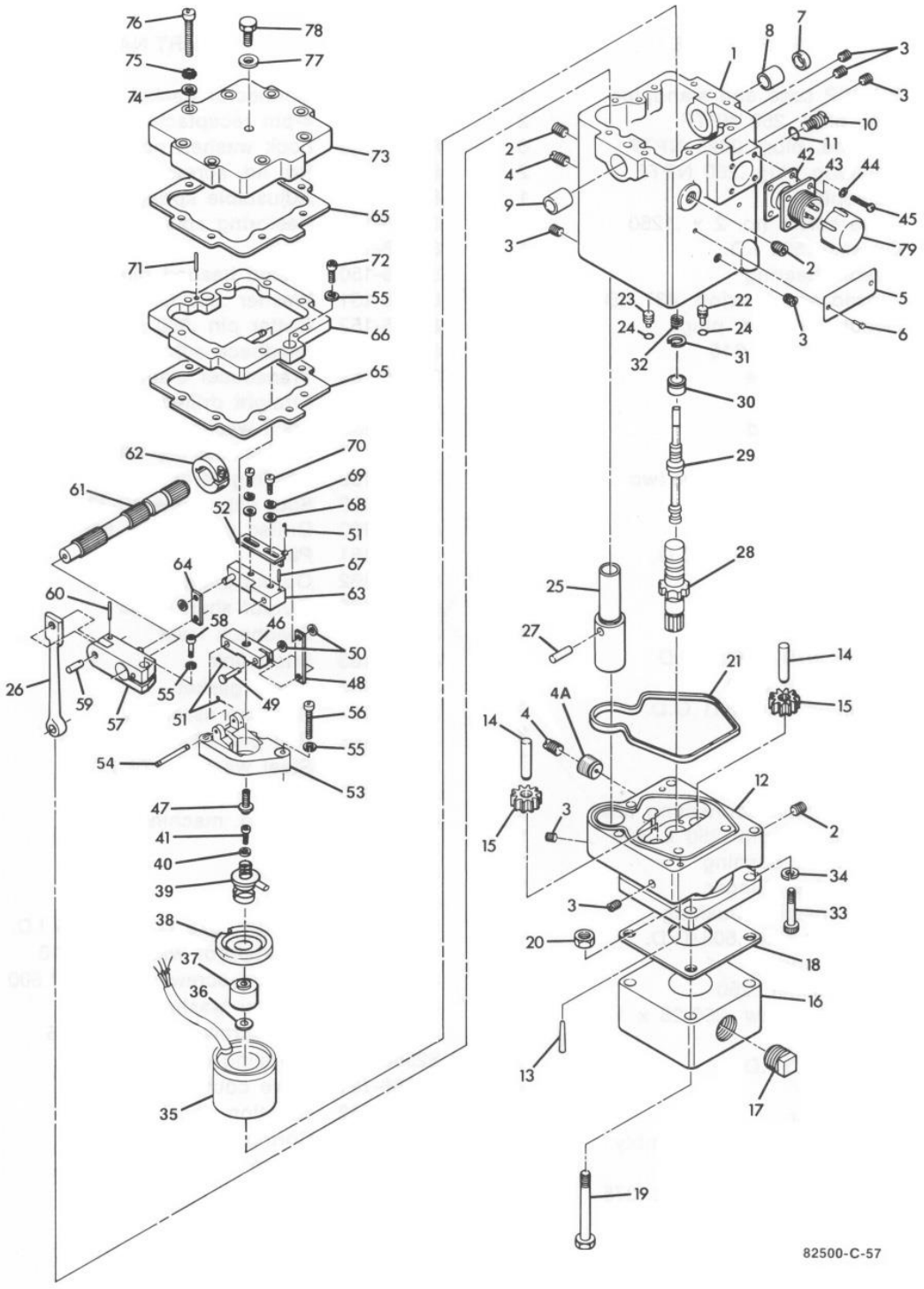


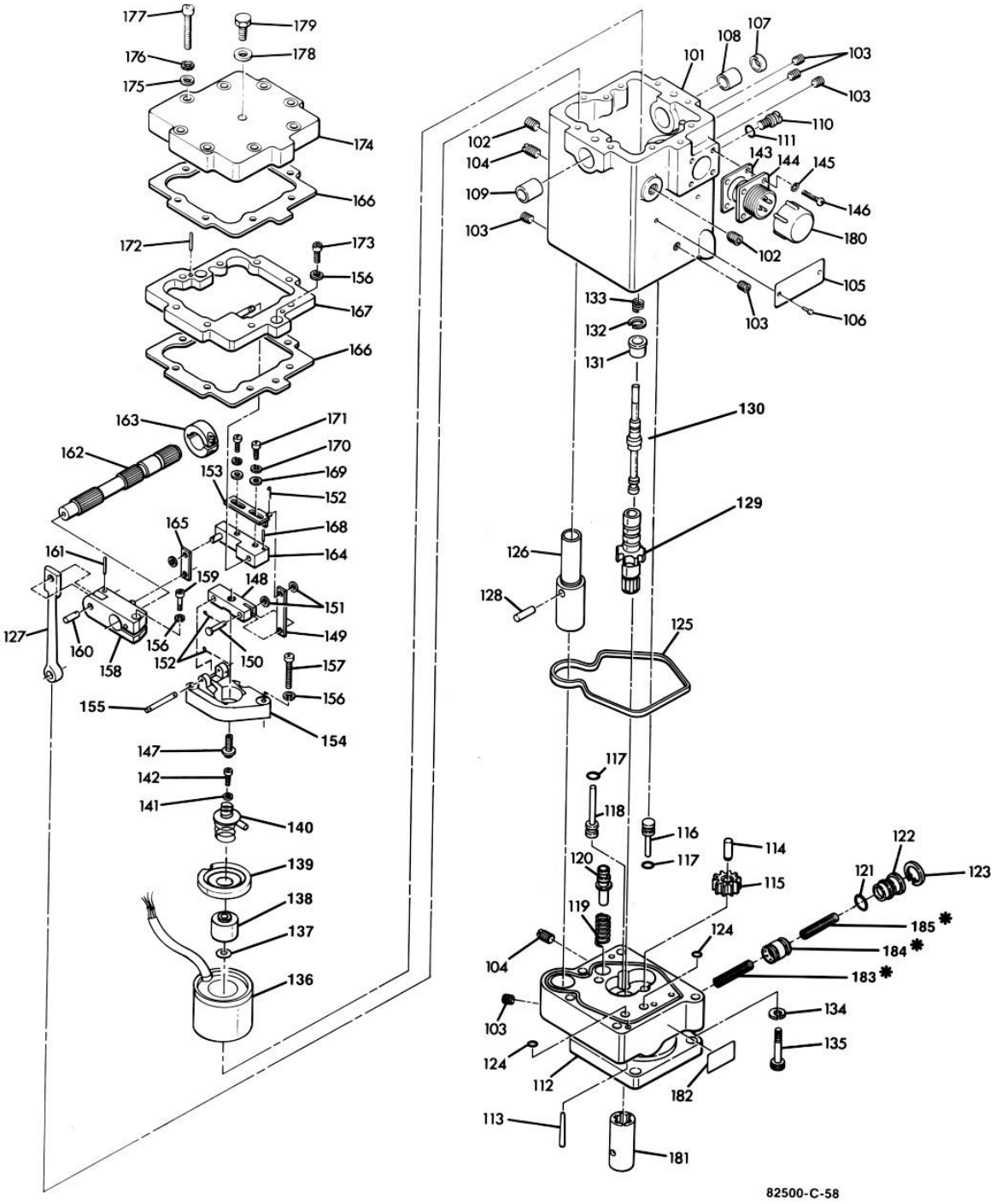
Figure 5-1. Parts for the EG Actuator (Oil Motor Model)

IMPORTANT

Parts for UL connections, Pickering or Kearfott RVDT options, and minimum position switch options, are not listed. Contact Woodward for information about these options. The serial number and part number shown on the nameplate of the individual control will determine the designs of these special features.

Table 5-2. Parts for EG Actuator EG-P Actuator (Oil Pump Model) as Shown in Figure 5-2

Ref. No.	Part Name	Qty	Ref. No.	Part Name	Qty
82566-101	EG-10P case and standpipe	1	82566-144	4-pin receptacle	1
82566-102	Pipe plug .250 NPTF	2	82566-145	Lock washer #6	4
82566-103	Soc. hd. plug .0625 NPTF	6	82566-146	Rd. hd. screw 6-32 x .31 2	4
82566-104	Shipping plug .250 NPTF	2	82566-147	Adjustable spring seat	1
82566-105	Nameplate	1	82566-148	Restoring spring lever	1
82566-106	Drive screw # 2 x .1250	2	82566-149	Link	1
82566-107	Oil seal .500 I.D.	1	82566-150	Drilled headed pin	1
82566-108	Needle bearing	1	82566-151	Washer .296 O.D.	2
82566-109	Closed end bearing .437 I.D.	1	82566-152	Cotter pin .060 x .500	3
82566-110	Needle valve or plug	1	82566-153	Feedback adjustment bracket	1
82566-111	O-ring .070 x .316	1	82566-154	Transducer clamp bracket	1
82566-112	Oil pump base	1	82566-155	Straight drilled pin	1
82566-113	Tapered pin	2	82566-156	Lock washer #10	5
82566-114	Idler gear stud	1	82566-157	Socket head cap screw, 10 x 2.250”	2
82566-115	Idler gear (some models will have two)	1	82566-158	Loading lever	1
82566-116	Case plug	1	82566-159	Soc. cap screw 10-32 x .625	1
82566-117	O-ring .070 x .379 O.D.	2	82566-160	Drilled pin .250 x .656	1
82566-118	Base plug	1	82566-161	Pin	1
82566-119	Relief valve spring	1	82566-162	Output shaft	1
82566-120	Relief valve plunger	1	82566-163	Output shaft collar	1
82566-121	O-ring .070 x .629 O.D.	1	82566-164	Feedback lever	1
82566-122	Buffer bore plug	1	82566-165	Short link	1
82566-123	Retaining ring .831 O.D.	1	82566-166	Cover gasket	2
82566-124	O-ring	2	82566-167	Sub cap assembly	1
82566-125	Base seal	1	82566-168	Roll pin .062 dia. x .312	1
82566-126	Servo piston	1	82566-169	Steel washer .174 I.D.	2
82566-127	Servo piston connecting link	1	82566-170	Lock washer	2
82566-128	Double dia. pin .250 x .860	1	82566-171	Fill. hd. machine screw	2
82566-129	Pilot valve bushing	1	82566-172	Pin	2
82566-130	Pilot valve plunger	1	82566-173	Screw	2
82566-131	Compensation bushing	1	82566-174	Cover	1
82566-132	Retaining ring .508 O.D.	1	82566-175	Washer .375 O.D. x .195 I.D.	8
82566-133	Magnet spring	1	82566-176	Shakeproof washer #10	8
82566-134	Lock washer .250	5	82566-177	Fill. dr. screw #10 x 1.500	8
82566-135	Soc. hd. screw .250-28 x 1.250	5	82566-178	Copper washer .265 I.D.	1
82566-136	Transducer	1	82566-179	Hex screw .250-28 x .375	1
82566-137	Washer .223 I.D.	1	82566-180	Shipping cap .875-20	1
82566-138	Magnet	1	82566-181	Drive coupling	1
82566-139	Coil cover	1	82566-182	Rotation decal	1
82566-140	Centering spring assembly	1	82566-183	Spring	1
82566-141	Washer	1	82566-184	Piston	1
82566-142	Centering screw 6-32 x .375	1	82566-185	Spring	1
82566-143	Connector gasket	1			



* NOTE–Used with EG-10P only

Figure 5-2. Parts for the EG-P Actuator (Oil Pump Model)

IMPORTANT

Parts for UL connections, Pickering or Kearfott RVDT options, and minimum-position switch options, are not listed. Contact Woodward for information about these options.

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 at **www.woodward.com/directory**, which also contains the most current product support and contact information.

You can also contact the Woodward Customer Service Department at one of the following Woodward facilities to obtain the address and phone number of the nearest facility at which you can obtain information and service.

Products Used in Electrical Power Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany:	
Kempen	+49 (0) 21 52 14 51
Stuttgart	+49 (711) 78954-510
India	+91 (124) 4399500
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 (124) 4399500
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 (124) 4399500
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

Technical Assistance

If you need to contact technical assistance, you will need to provide the following information. Please write it down here before contacting the Engine OEM, the Packager, a Woodward Business Partner, or the Woodward factory:

General

Your Name _____

Site Location _____

Phone Number _____

Fax Number _____

Prime Mover Information

Manufacturer _____

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.

Revision History

Changes in Revision V—
- Corrected specifications in Table 2-1

Changes in Revision U—
- Revised hydraulic oil viscosity specification

Changes in Revision T—
- Updated regulatory compliance section
- Updated Declaration of Conformity and Declaration of Incorporation

Changes in Revision R—
- Revision advanced to coordinate with new installation sheet.

Changes in Revision P—
- Corrected oil motor filter size to 'nominal' instead of 'absolute' (page 7)

Changes in Revision N—
- Updated regulatory compliance information

Declarations

EU DECLARATION OF CONFORMITY

EU DoC No.:	00252-04-EU-02-01
Manufacturer's Name:	WOODWARD INC.
Manufacturer's Contact Address:	1041 Woodward Way Fort Collins, CO 80524 USA
Model Name(s)/Number(s):	EG3P (In Hydraulic Amplifiers), EG10P Actuator
The object of the declaration described above is in conformity with the following relevant Union harmonization legislation:	Directive 2014/34/EU on the harmonization of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres
Markings in addition to CE marking:	II 2 G, Ex e IIC T4, Gb
Applicable Standards:	EN 60079-0: 2012 Electrical Apparatus for Explosive Gas Atmospheres Part 0 : General Requirements EN 60079-7: 2007 Electrical Apparatus for Explosive Gas Atmospheres Part 7 : Increased Safety "e" (A review against EN60079-7:2015, which is harmonized, shows no significant changes relevant to this equipment so EN60079-7:2007 continues to represent "State of the Art")
Third Party Certification:	TUV 15 ATEX 7717X TUV Rheinland Industrie Service GmbH (0035) Am Grauen Stein, D51105 Cologne
Conformity Assessment:	ATEX Annex IV - Production Quality Assessment, 01 220 113542 TUV Rheinland Industrie Service GmbH (0035) Am Grauen Stein, D51105 Cologne

This declaration of conformity is issued under the sole responsibility of the manufacturer
We, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s).

MANUFACTURER

Signature	
Full Name	**Mike Row**
Position	**Compliance Engineering Supervisor**
Place	**Woodward Inc., Fort Collins, CO, USA**
Date	10-September-2018

5-09-1183 Rev 28

DECLARATION OF INCORPORATION
Of Partly Completed Machinery
2006/42/EC

File name:	00252-04-EU-02-02
Manufacturer's Name:	WOODWARD INC.
Manufacturer's Contact Address:	1041 Woodward Way Fort Collins, CO. 80524
Model Names:	EG3P (In Hydraulic Amplifiers), EG10P Actuator
This product complies, where applicable, with the following Essential Requirements of Annex I:	1.1, 1.2, 1.3, 1.5, 1.6, 1.7

The relevant technical documentation is compiled in accordance with part B of Annex VII. Woodward shall transmit relevant information if required by a reasoned request by the national authorities. The method of transmittal shall be agreed upon by the applicable parties.

The person authorized to compile the technical documentation:

Name: Dominik Kania, Managing Director
Address: Woodward Poland Sp. z o.o., ul. Skarbowa 32, 32-005 Niepolomice, Poland

This product must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of this Directive, where appropriate.

The undersigned hereby declares, on behalf of Woodward Governor Company of Loveland and Fort Collins, Colorado that the above referenced product is in conformity with Directive 2006/42/EC as partly completed machinery:

MANUFACTURER

Signature

Mike Row

Full Name

Compliance Engineering Supervisor

Position

Woodward Inc., Fort Collins, CO, USA

Place

7-Aug-2018

Date

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