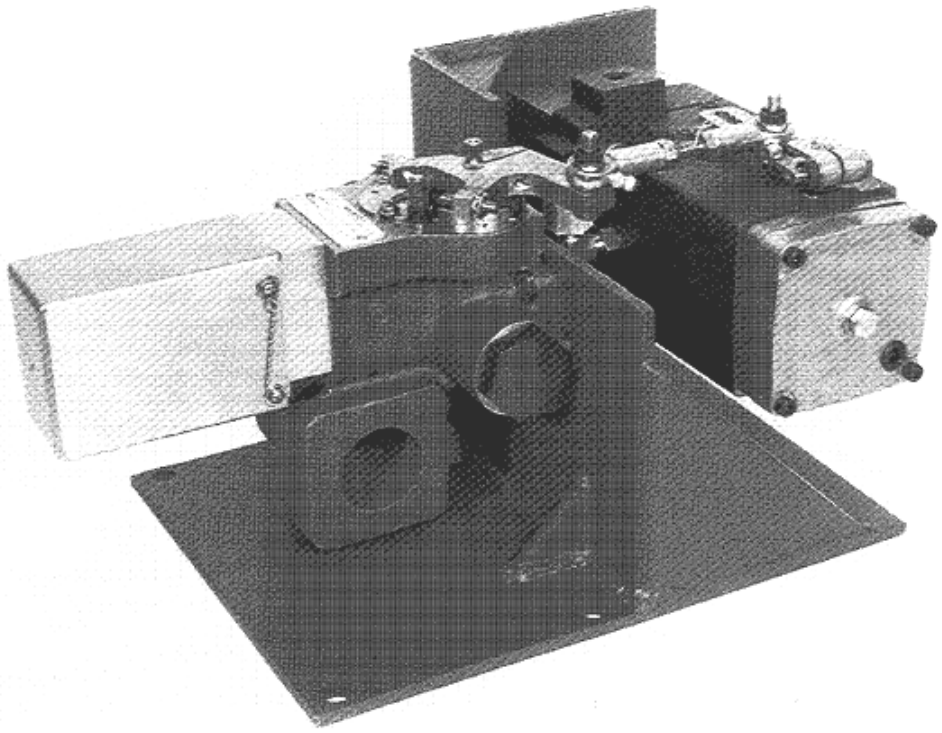
WOODWARD

Operation Manual



EG-3P and Small 1907 Liquid Fuel Valve Assembly

9904-143

Manual 55723

IMPORTANT

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

DEFINITIONS

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

WARNING

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

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

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment. Practice all plant and safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage.

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

NOTICE

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

NOTICE

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

EG-3P and Small 1907 Liquid Fuel Valve Assembly

Introduction

This manual provides Information on the Woodward 9904-143 assembly, which consists of an EG-3P actuator and a 1907 small liquid fuel valve with LVDT. The assembly includes the linkage between the actuator and the fuel valve and provisions for approved wiring of the assembly, allowing use in NEC Class 2 circuits and in UL Class I, Division 2, Groups C and D.

Manual 40131 provides detailed information on the 1907 fuel valve. Manual 82560 provides detailed information on the EG3P actuator. These two manuals are needed to service the assembly.

Installation Instructions

The fuel valve and actuator are assembled onto an installation bracket at the factory. All linkage is attached at the factory and sealed into position with lock wires. The linkage positions should not be changed during installation of the assembly.

Install the assembly with four 10 mm or 3/8 inch bolts according to the turbine manufacturer's instructions. The unit should have minimal vibration and heat. The assembly is designed to locate so the bracket mounting surface is down and the linkage and oil motor drain port are up.

Oil Supply

Plumb the pressure oil supply to the EG-3P actuator. The EG-3P is designed for a US MIL-L-23699 or equivalent oil supply of at least 450 psig (3103 kPa) at 150 °F (66 °C). It is important that the drain connection to the oil motor and to the cover be direct to sump, with no back pressure. Failure to provide uninterrupted drain from the actuator can cause instability. Oil supply is through a 3/8" OD (~9.5 mm) tube. Oil motor drain is through a 0.750-14 NPTF port, and the case drain is through a 0.230-18 NPTF port. (See outline drawing of assembly.)

Electrical

Two conduit connections are supplied on the actuator. The wires from the electronic control attach through the most convenient conduit connection (+) to terminal A (black wire), and (–) to terminal B (red wire). A ground connection is supplied to ground the conduit. Do not ground the shield on the control wire at the actuator. The shield must be grounded only at the control. The unused conduit connection must be plugged if the control is used in a hazardous area.

About 2 ft (60 cm) of 18 AWG (0.8 mm^2) wire extends from the fuel valve in two cables. Connect the cable with two conductors to the input frequency from the electronic control. The input must be shielded, with the shield grounded only at the control.

The cable with three conductors is to be connected to the input to the electronic control (the location signal from the LVDT). The red wire is common in the output circuit. Connect according to the accompanying drawing.

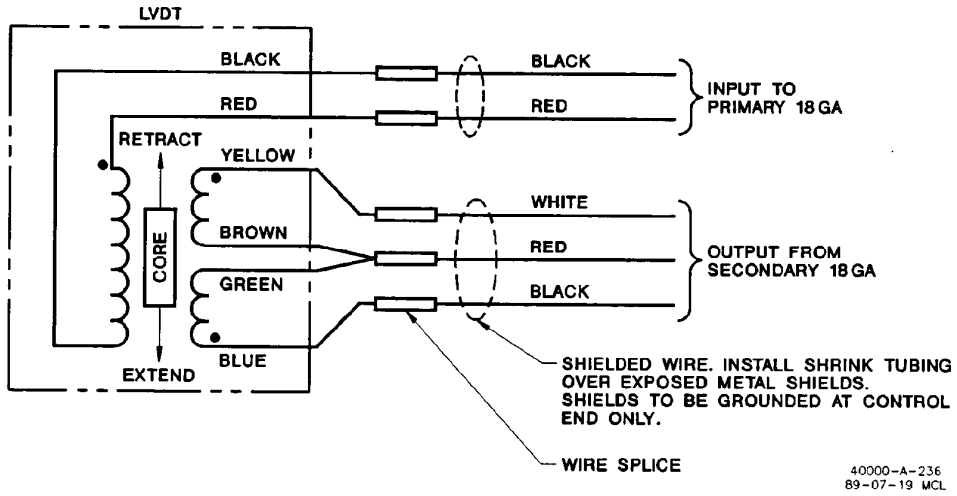

Figure 1. Plant Wiring for Fuel Valve

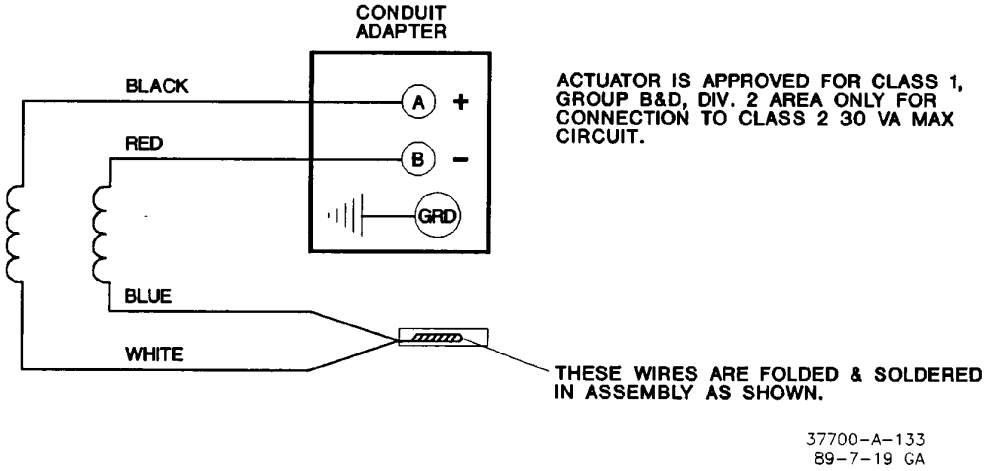

Figure 2. Wiring for the EG-3P Conduit Connector

Fuel Connections

Connect the pressure fuel supply to the fuel inlet port at the 1.062-12 straight thread port. Connect a line back to the fuel supply (fuel bypass) to the 0.750-16 straight thread port. The bypass line should not have any pressure from the fuel pump. Metered fuel to the turbine connects to the 0.875-14 straight thread port. All three connections must be made according to the turbine manufacturer's instructions to provide unrestricted, safe, leak-free joints.

Linkage

The linkage between the actuator and the fuel valve portions of the assembly is set at the factory to provide the proper metered fuel flow for turbine operation. The following procedure may be used to cheek that the actuator/fuel valve relationship is correct:

With the turbine shut down and the actuator removed from the electronic control, attach a current source, adjustable from 0 to 160 mA, to the actuator leads. You must be able to measure the current from the source to the actuator. Provide a 450 psi (3103 kPa) supply of pressure oil to the actuator.

With the fuel valve at the minimum stop, apply a 20 mA current to the actuator leads. Slowly increase the current to 22 mA and observe the valve leave the minimum stop.

Continue to increase the current to the actuator and observe the valve reach the maximum slop as the current reaches 155 mA ±5 mA.

With the fuel valve at the maximum stop, decrease the current slowly. Observe the fuel valve leave the maximum stop before the current decreases by 2 mA.

IMPORTANT

This procedure does not check the ability of the fuel valve to measure fuel, or of the actuator to provide stable control of the fuel valve. Troubleshooting information on the actuator and fuel valve is provided in the manuals on the individual devices.

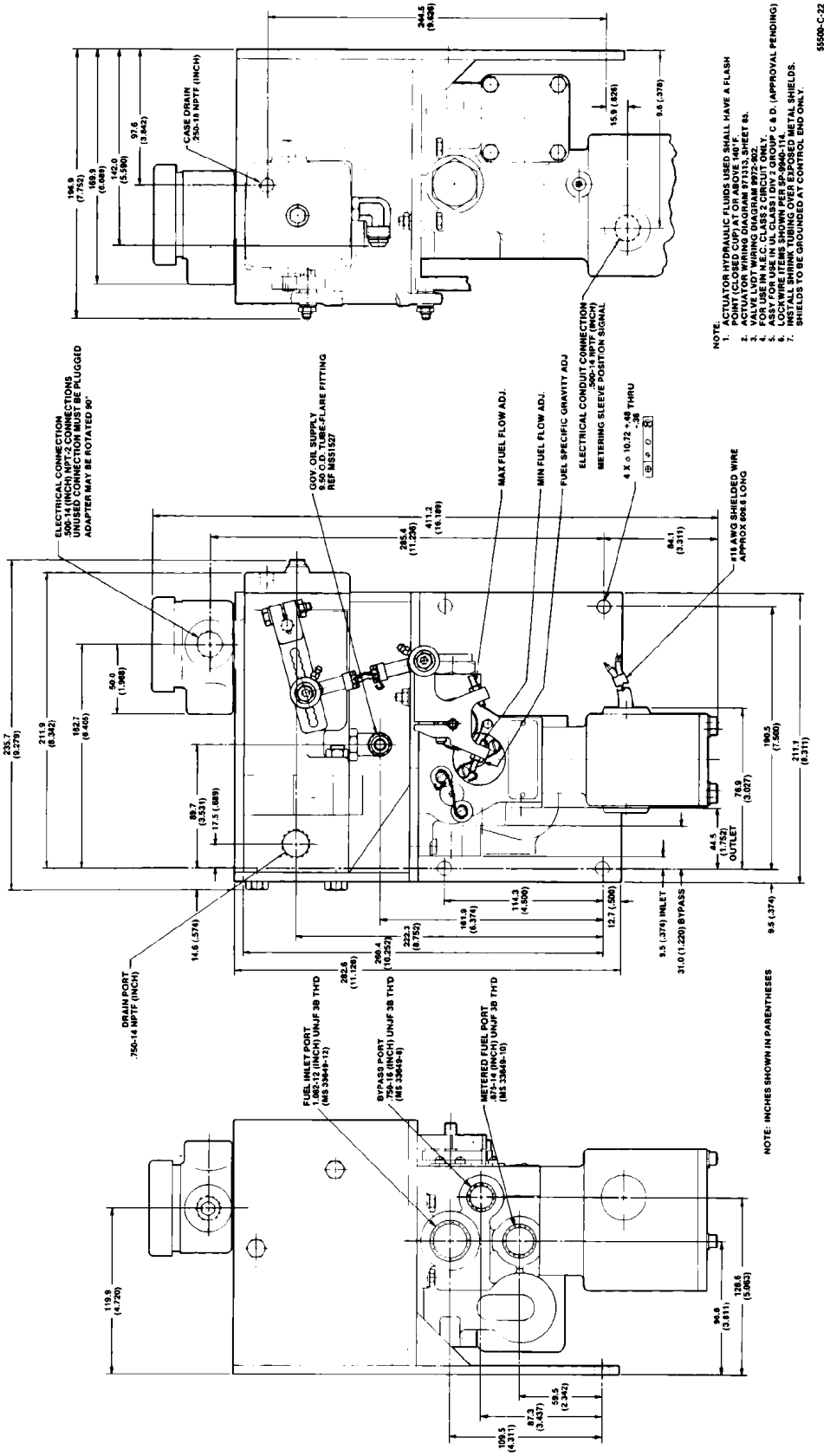

Figure 3. Outline Drawing of 9904-143 EG-3P Actuator and Liquid Fuel Valve Assembly

Parts Information

Give the following information when ordering parts:

- The equipment type, serial number, and part number (shown on the nameplate)
- Manual number (this is manual 55723)
- Part reference number given in the parts list and part name or description

Ref. No.	Part Name	Quantity
55723-1	Screw, 0.312-24 x 4, Hex Hd. Cap	2
55723-2	Nut, 0.312-14 Hex	2
55723-3	Washer, 0.312 Split Lock	2
55723-4	Elbow, Straight Thread	1
55723-4a	O-Ring, 0.468 x 0.078	1
55723-5	Screw, 0.250-28 x 1, Hex Hd. Cap	4
55723-6	Nut, 0.230-28 Hex	4
55723-7	Screw, No. 2 x 0.125, Drive	2
55723-8	Nameplate	1
55723-9	Washer, 0.250 Split Lock	4
55723-10	1907 Liquid Valve Assy with LVDT	1
55723-11	Bracket, EG-3P and Fuel Vlv Mntng	1
55723-12	Screw, 0.230-28 x 1.230 Hex Hd. Cap	1
55723-13	Washer, 0.265 x 0.500 x 0.064, Flat	2
55723-14	Nut, 0.250-28 Hex Kaylock	1
55723-15	Lever,75 mm	1
55723-16	Actuator Assy, EG-3P with Oil Motor	1
55723-17	Nut, 0.250-28 Hex Kaylock	1
55723-18	Washer,0.265 x 0.500 x 0.032 SS	3
55723-19	Screw, 0.230-28 x 1.000 Hex Hd. Cap	1
55723-20	Rod End, Size 4, RH Thread	1
55723-21	Nut, 0.230-28, RH Thread, Jam	1
55723-22	Link, Lever Adjusting	1
55723-23	Nut, 0.230-28, LH Thread, Jam	1
55723-24	Rod End, Size 4, LH Thread	1
55723-25	Screw, 0.250-28 x 1.250 Hex Hd. Cap	1
55723-26	Washer, 0.25 x 0.500 x 0.032 SS	2
55723-27	Nut, 0.250-28 Hex Kaylock	1

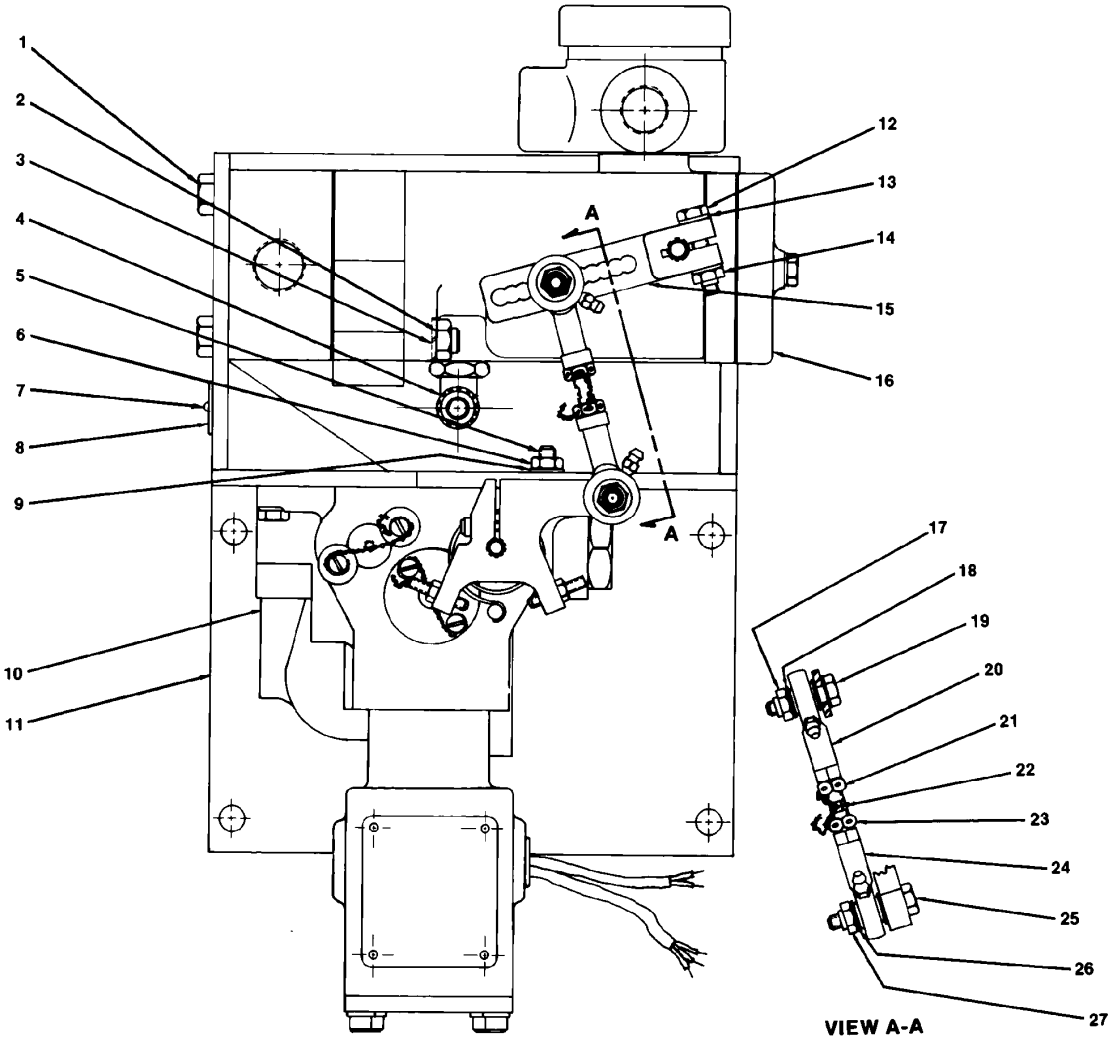

Figure 4. Exploded View of Parts Included in 9904-143 Assembly

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Send comments to: icinfo@woodward.com

Please reference publication 55723.

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