

**Liquid Shutoff Valve 25**  
**(LSOV25)**

**Installation and Operation Manual**



### General Precautions

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.

Practice all plant and safety instructions and precautions.

Failure to follow instructions can cause personal injury and/or property damage.



### Revisions

This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, check manual **26311**, *Revision Status & Distribution Restrictions of Woodward Technical Publications*, on the *publications page* of the Woodward website:

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

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 **26311**, *Revision Status & Distribution Restrictions of Woodward Technical Publications*, to verify whether this translation is up to date. Out-of-date translations are marked with . Always compare with the original for technical specifications and for proper and safe installation and operation procedures.

**Revisions**—Changes in this publication since the last revision are indicated by a black line alongside the text.

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

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## Warnings and Notices

### Important Definitions



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

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

#### **WARNING**

**Overspeed /  
Overtemperature /  
Overpressure**

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

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

#### **WARNING**

**Personal Protective  
Equipment**

The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to:

- Eye Protection
- Hearing Protection
- Hard Hat
- Gloves
- Safety Boots
- Respirator

Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.

#### **WARNING**

**Start-up**

Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

#### **WARNING**

**Automotive  
Applications**

On- and off-highway Mobile Applications: Unless Woodward's control functions as the supervisory control, customer should install a system totally independent of the prime mover control system that monitors for supervisory control of engine (and takes appropriate action if supervisory control is lost) to protect against loss of engine control with possible personal injury, loss of life, or property damage.

**NOTICE****Battery Charging  
Device**

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

## Electrostatic Discharge Awareness

**NOTICE****Electrostatic  
Precautions**

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts:

- Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).
- Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.
- Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.

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

Follow these precautions when working with or near the control.

1. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
2. Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
  - Do not touch any part of the PCB except the edges.
  - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
  - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.

## Regulatory Compliance

### European Compliance for CE Marking:

These listings are limited only to those units bearing the CE marking and/or the LCIE agency identification.

**Pressure Equipment Directive:** Certified to Pressure Equipment Directive 97/23/EC of 29 May 1997 on the approximation of the laws of the Member States concerning pressure equipment, Category II.  
TUV Rheinland Certificate 01 202 USA/Q-11 6617

**ATEX - Potentially Explosive Atmospheres Directive:** Declared to 94/9/EC COUNCIL DIRECTIVE of 23 March 1994 on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres.  
Sira 11ATEX1233X  
Zone 1, Category 2, Group II G, Ex d IIB T4 Gb

Self-declared (9908-354 only)  
Zone 2, Category 3, Group II G, Ex nC IIC T3 X

### Other European Compliance:

Compliance with the following European Directive does not qualify this product for application of the CE Marking:

**Machinery Directive:** Compliant as a component with 2006/42/EC COUNCIL DIRECTIVE of 17 May 2006 on the approximation of the laws of the Member States relating to machinery.

### North American Compliance:

These listings are limited only to those units bearing the CSA agency identification.

**CSA:** CSA Certified for Class I, Division 1, Groups C & D, and Class I, Division 2, Groups B, C, & D, T4 at 121 °C Ambient for use in Canada and the United States.

**Proximity Switch Version:** CSA Certified for Class I, Division 1, Group D and Class I, Division 2, Groups B, C, & D, T4 at 121 °C Ambient for use in Canada and the United States.

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

**Special Conditions For Safe Use:**

Field wiring must be suitable for at least 130 °C.

Connect ground terminal to earth ground.

The LSOV25 is certified to a Zone 1-Category 2/ method of protection. Wiring methods must comply with the Zone 1-Category 2 method of protection when installed in a Zone 2 classified atmosphere.

The LSOV25 Valve, part number 9908-354, must be installed in an area providing adequate protection against the entry of dust or water. A minimum ingress protection rating of IP54 is required for the enclosure.

 **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 situez bien dans une zone non explosive.**

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

 **WARNING**

**The shutoff valve is a critical component for protection against equipment failure and turbine overspeed. Routine inspection is necessary for the protection of the turbine and the turbine operators.**





# Chapter 1.

## General Information

### Shutoff Valve Description

The Woodward High Speed Liquid Fuel Shutoff Valve is a three-way, two-stage valve, designed to provide fuel bypass in 0.100 second or less after termination of the solenoid current. The valve has been designed for fail-safe operation. Loss or termination of the electrical signal will result in all fuel delivery to the valve being bypassed to the return system.

A wash flow filter screen in the valve prevents contaminants in excess of 40  $\mu\text{m}$  (nominal) from damaging the pilot-valve section.

The shutoff valve housing is constructed of anodized aluminum. All moving internal parts are hardened stainless steel.

There is no filtration of normal fuel flow through the valve.

The shutoff valve is designed to protect the turbine should the normal fuel control become inoperative for any reason. Critical overspeed may occur should the valve fail to shut off fuel to the turbine. Engine overspeed can cause serious mechanical damage as well as personal injury or death.

Always use the shutoff valve to stop the turbine. This exercise provides proof of the proper operation of the safety equipment.

Because of the critical function of the valve, it is mandatory that the operator regularly monitor the valve whenever the turbine is shut down as well as during normal operation.

Woodward recommends the installation of two shutoff valves per API-616.

### Specifications

#### Electrical Requirements

Voltage Available	Nominal 24 V (dc) or 115 V (dc)
Power Consumption	20 W nominal
Resistance to Ground	10 M $\Omega$ minimum at 500 V (dc)
Dielectric Strength	Leakage current less than 0.5 mA at 1000 V (ac) plus twice the rated solenoid voltage for one minute

**General**

Fuel Compatibility	The valve is compatible with most types of diesels, kerosenes, gasolines, heavy and light distillates including naphtha, gas turbine fuels and fuel oils, and other liquid fuels such as biodiesel that are compatible with fluorocarbon (FKM) type elastomers and conform to international standards for utility, marine, and aviation gas turbine service. Ultra low sulfur diesels are also acceptable with proper lubricity additives. Other fuels such as ethanol or methanol may be acceptable with internal seal compound substitutions. Contact Woodward for these and other special fuel applications.
Fuel Viscosity	Fuel viscosity must be between 0.5 cSt and 12.0 cSt
Fuel Cleanliness	Liquid fuel must be filtered to limit particulate size to 20 µm or smaller. Water and sediment must be limited to 0.1% by volume. Total particulate concentration must be limited to 2.64 mg/L of fuel.
Fuel Temperature	(-18 to +120) °C / (0 to +250) °F
Rated Flow	13 608 kg/h (30 000 lb/h based on US MIL-C-7024 calibrating fluid at 21 °C (70 °F)
Cycle Life	10 000 cycles
Weight	20 kg (45 lb)
Construction	Anodized aluminum housing. Hardened stainless steel internal components.
Fuel Connections	Fuel inlet, fuel outlet, and bypass ports machined to accept -20 (SAE 070120) straight thread fittings. -04 (SAE 070120) straight thread for overboard drain on versions with proximity switch.
Nominal Diameter	41 mm
Electrical	0.500-14 NPTF conduit connector or M20-1.5 cable entries
Proximity Switch	5 A, 250 V (ac), 60 Hz
Opening Time	Maximum of 0.400 second after admission of fuel and solenoid current
Closing Time	Within 0.100 s after the solenoid is de-energized with (690 to 8274) kPa / (100 to 1200) psig fuel applied to the inlet
Pressure Drop	365 kPa (53 psid) inlet to discharge at 13 608 kg/h (30 000 lb/h) 958 kPa (139 psid) inlet to bypass at 13 608 kg/h (30 000 lb/h)
Internal Leakage Shutoff	From inlet to discharge: None From inlet to bypass: 500 cm <sup>3</sup> maximum at 5516 kPa (800 psid)
Reverse Pressure Condition	6206 kPa (900 psig)
Fluid Supply Pressure:	
Maximum Working	8274 kPa (1200 psig)
Proof	12 411 kPa (1800 psig)
Burst	41 370 kPa (6000 psi)
Maximum Bypass Pressure	1724 kPa (250 psig)
Cracking Pressure	690 kPa (100 psi) above reference pressure (bypass)

 **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 1 or Zone 1.

 **AVERTISSEMENT**

**RISQUE D'EXPLOSION**—Ne pas enlever les couvercles, ni raccorder / débrancher les prises électriques, sans vous en assurer 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 1 ou de Zone 1.

## Chapter 2. Installation

### Receiving

The liquid fuel shutoff valve is tested with a non-corrosive liquid, drained and packed in a foam filled box for shipment. The unit may be stored for an extended period in the original container.

**! 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.

**! WARNING**

Due to typical noise levels in turbine environments, hearing protection should be worn when working on or around the LSOV25.

**! WARNING**

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**

Do not lift or handle the valve by any conduit.

### Mounting

The valve is designed for installation in any attitude with four 3/8 inch bolts. (See the outline drawing for location of the mounting holes and of the valve.)

1.625-12 UNF (-20) straight thread ports are provided for inlet, bypass and outlet pipe connections. When applicable, the "P2 main" port is supplied with a (-06) fitting. The bypass plumbing must be of equal size to the inlet and unobstructed to assure positive shutoff by the valve.

0.438-20 UNF (-04) straight thread port provided for overboard drain connection on versions with proximity switch.

## Electrical

**⚠ 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 instructions.

Field wiring must be suitable for at least 130 °C. A 0.500 inch-14 NPTF or an M20 x 1.5 conduit adapter is provided for the electrical connection. Connect the proper voltage to the two pins on the terminal block (see the outline drawing). Polarity is not important.

Damage to sealing surfaces may result in moisture ingress, fire or explosion. Clean the surface with rubbing alcohol if necessary. Inspect the LSOV25 joint surfaces to ensure that they are not damaged or contaminated.

**⚠ WARNING**

Take care not to damage the cover seal, the cover surface, or the valve surface while removing or replacing the cover. The cover bolts must be torqued to (8.7 to 9.6) N·m / (77 to 85) lb-in.

**⚠ WARNING**

For Zone 1 / Division 1 products: Proper torque is very important to ensure that the unit is sealed properly.

## Maintenance

Recommended: Disassembly for cleaning and inspection every 10 000 cycles or three years of operation, whichever occurs first. In case of contamination of the interior passages, the valve may be disassembled and cleaned in the field by a trained service technician.

Routinely check the shutdown switches or relays to be sure they are capable of interrupting the electronic signal to the shutoff valve.

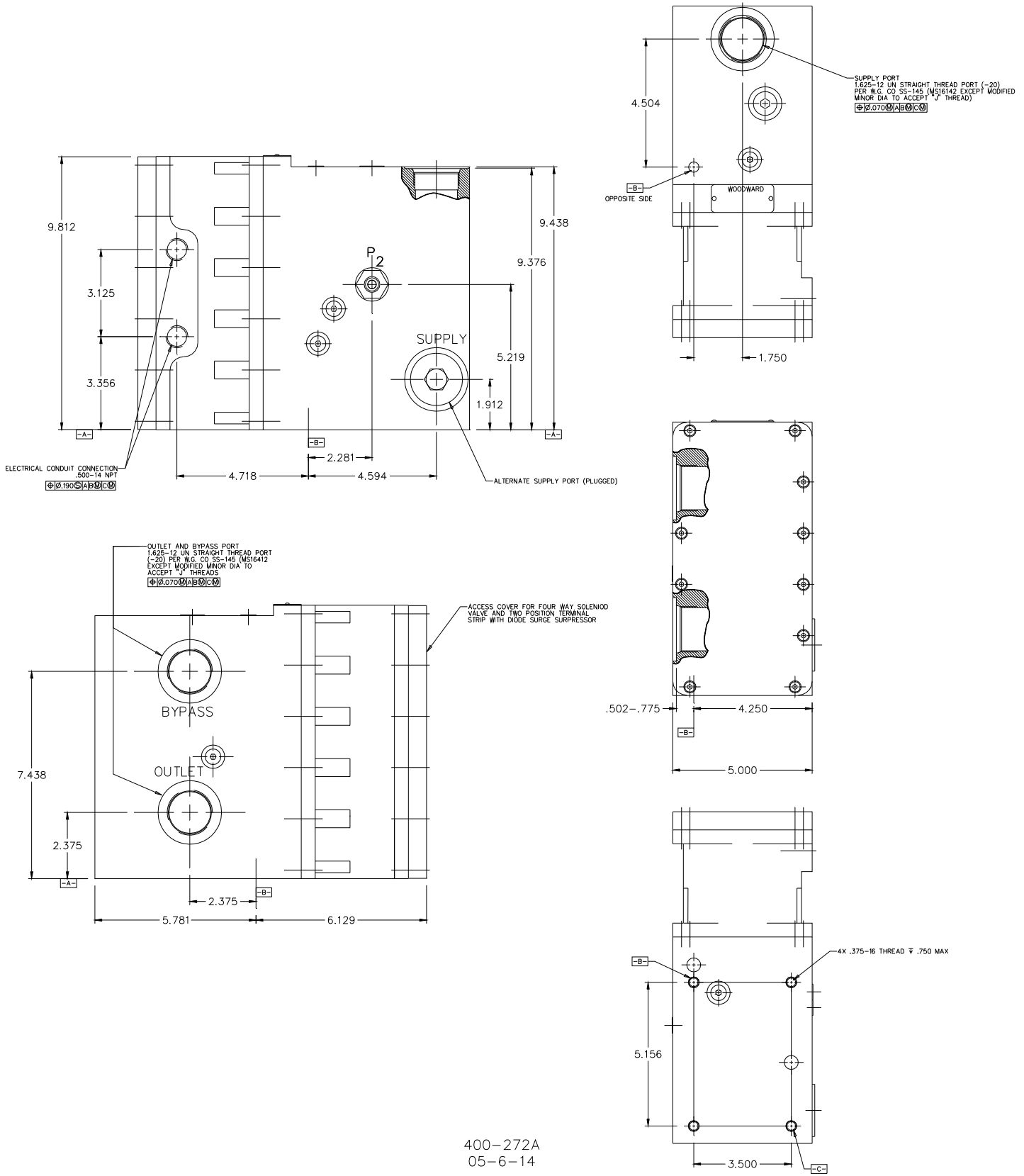
Always use the valve for routine shutdown as a check for continued operation.

While the valve is closed, check for excessive leakage, either through the valve or through the vent. Any leakage through the valve to the turbine should be considered proof of wear and/or possible malfunction. The valve should be immediately replaced and returned for factory service.

A minimal amount of leakage can be expected through the bypass connection of the valve. Should the volume of leakage change appreciably, the valve should be replaced and returned to a service facility.

**⚠ WARNING**

For Zone 1 / Division 1 products: Proper torque is very important to ensure that the unit is properly sealed. Cover bolts should be torqued to (8.7 to 9.6) N·m / (77 to 85) lb-in.



400-272A  
05-6-14

Figure 2-1. Outline Drawing of Liquid Fuel Shutoff Valve without Position Switch



## Chapter 3.

# Principles of Operation

Figures 3-1 and 3-2 illustrates the operating principle of the shutoff valve.

The shutoff valve is designed to be the last element in the fuel-supply line to the turbine. Its rapid closure time of less than 0.1 second, and opening time of 0.4 second, makes it an ideal valve for both routine and emergency shutoff of the fuel supply to the controlled device.

In the full open (valve energized) mode, a very small amount of leakage will occur to bypass. Termination of the electrical signal will result in all fuel delivery to the valve being bypassed to the fuel return system.

Fuel pressure and flow must be present to ensure proper operation of the valve. Springs on the control plunger in the valve will cause the valve to close itself should the fuel flow drop below a nominal amount.

The regulator generates a working pressure within the valve. In the de-energized state, the working pressure supplements the return spring force on the outlet piston to provide a positive no-leak seal at the turbine fuel manifold. This ensures rapid shutdown capability and prevents nozzle contamination when dual-fuel turbines are operated on gaseous fuel.

When energized, the first stage solenoid valve directs full pressure to the bottom of the bypass piston and away from the bottom of the outlet piston. The combination of fuel pressure and spring pressure drives the bypass piston up. This closes the bypass port and drives the outlet piston away from the seal, opening the fuel passage through the valve to the turbine.

As soon as fuel system pressures reach 690 kPa (100 psi) above bypass (reference) pressure, the outlet piston opens completely. This results in a minimum pressure drop through the valve and assures that maximum fuel flow can be achieved through the valve.

When the electrical signal is removed from the solenoid inlet pressure is directed below the outlet piston. simultaneously, the pressure below the bypass piston is vented to bypass. The combination of fuel pressure and spring pressure drives the outlet piston tightly against the seal and allows the bypass piston to open, allowing fuel to return to the supply system.

A 40  $\mu\text{m}$  wash-flow filter is provided between inlet pressure and the solenoid control valve to assure trouble free operation of the shutoff valve. In the shutoff position all inlet flow is directed to bypass. This prevents buildup of pressure in the positive-flow fuel system which could cause damage to the pump or plumbing. For optimum dynamic response, it is important that the bypass fuel plumbing be sized large enough to accommodate the maximum expected pump delivery with less than 1724 kPa (250 psi) head measured at the valve bypass port. Also, inlet pressure should be at least 690 kPa (100 psi) higher than bypass pressure in all operating conditions.

Polarity is unimportant in the dc operated valve.



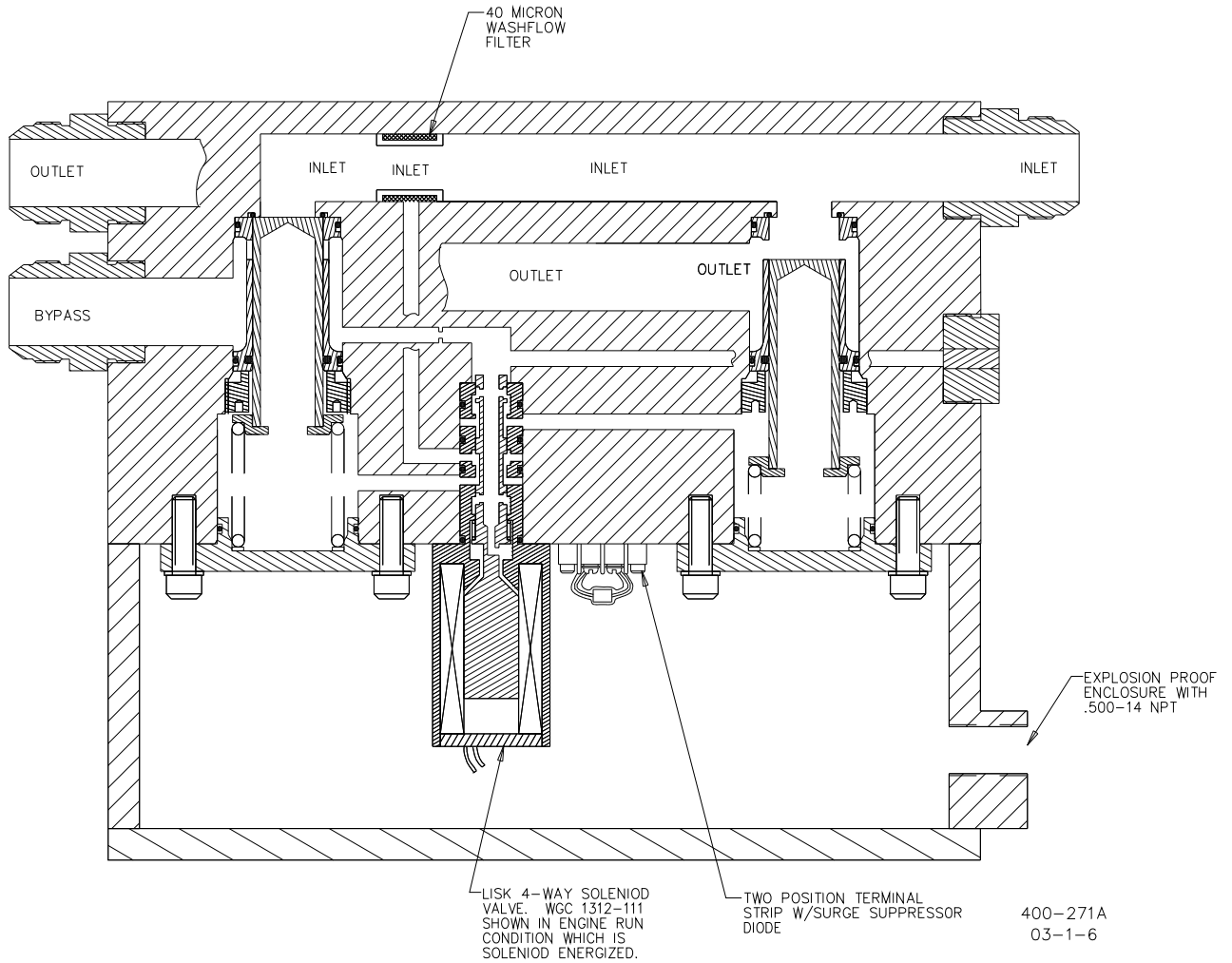


Figure 3-1. Schematic of Liquid Fuel Shutoff Valve without Position Switch

The maximum power consumption of the valve is 25 W. A bipolar zener diode is provided in the solenoid wiring to prevent voltage spikes during operation and to prevent the generation of electromagnetic interference (EMI).

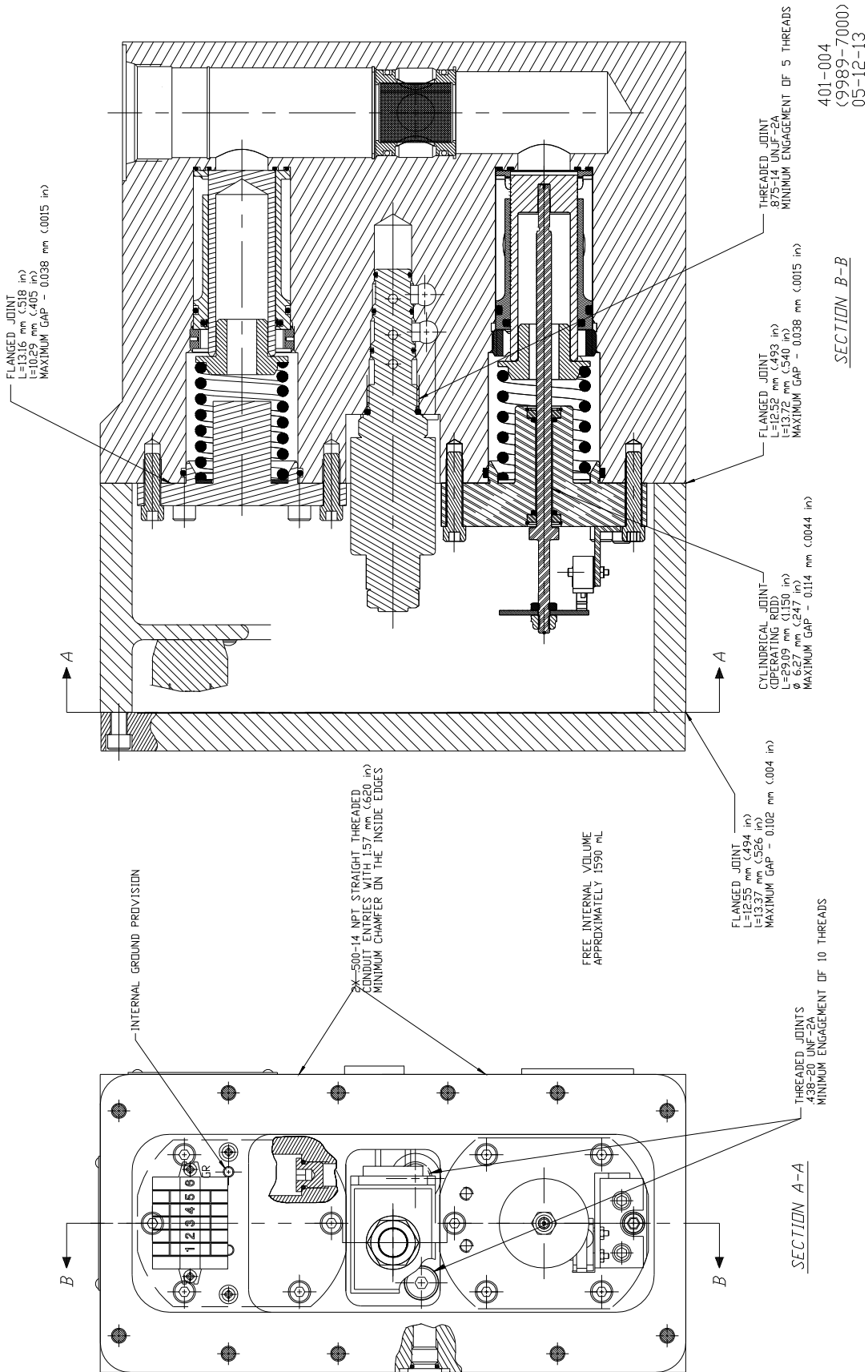


Figure 3-2. Schematic of Liquid Fuel Shutoff Valve with Position Switch

## Chapter 4. Service Options

### Product Service Options

If you are experiencing problems with the installation, or unsatisfactory performance of a Woodward product, the following options are available:

- Consult the troubleshooting guide in the manual.
- Contact the manufacturer or packager of your system.
- Contact the Woodward Full Service Distributor serving your area.
- Contact Woodward technical assistance (see “How to Contact Woodward” later in this chapter) and discuss your problem. In many cases, your problem can be resolved over the phone. If not, you can select which course of action to pursue based on the available services listed in this chapter.

**OEM and 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 **Recognized Turbine Retrofitter (RTR)** is an independent company that does both steam and gas turbine control retrofits and upgrades globally, and can provide the full line of Woodward systems and components for the retrofits and overhauls, long term service contracts, emergency repairs, etc.

You can locate your nearest Woodward distributor, AISF, RER, or RTR on our website at:

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

## Woodward Factory Servicing Options

The following factory options for servicing Woodward products are available through your local Full-Service Distributor or the OEM or Packager of the equipment system, based on the standard Woodward Product and Service Warranty (5-01-1205) that is in effect at the time the product is originally shipped from Woodward or a service is performed:

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

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.

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 within 60 days, a credit for the core charge will be issued.

**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 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 authorization 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 offers various Engineering Services for our products. For these services, you can contact us by telephone, by email, or through the Woodward website.

- 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. Emergency assistance is also available during non-business hours by phoning Woodward and stating the urgency of your problem.

**Product Training** is available as standard classes at many of our worldwide locations. 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.

**Field Service** engineering on-site support is available, depending on the product and location, from many of our worldwide locations or 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 us via telephone, email us, or use our website: [www.woodward.com](http://www.woodward.com).

## How to Contact Woodward

For assistance, call one of the following 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.

### Electrical Power Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany	+49 (0) 21 52 14 51
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

### Engine Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany	+49 (711) 78954-510
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
United States	+1 (970) 482-5811

### Turbine Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
India	+91 (129) 4097100
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

You can also locate your nearest Woodward distributor or service facility on our website at:

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

## 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:

Your Name \_\_\_\_\_

Site Location \_\_\_\_\_

Phone Number \_\_\_\_\_

Fax Number \_\_\_\_\_

Engine/Turbine Model Number \_\_\_\_\_

Manufacturer \_\_\_\_\_

Number of Cylinders (if applicable) \_\_\_\_\_

Type of Fuel (gas, gaseous, steam, etc) \_\_\_\_\_

Rating \_\_\_\_\_

Application \_\_\_\_\_

### 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 \_\_\_\_\_

*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.*

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## Revision History

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**Changes in Revision P—**

- Updated Regulatory Compliance information

**Changes in Revision N—**

- Updated fuel particulate concentration to 2.64 mg/L

**Changes in Revision M—**


- Added DOC and Compliance information specific to part number 9908-354

**Changes in Revision L—**


- Updated Figure 2-2 to latest drawing
- Updated Regulatory Compliance information
- Added new DOC

# Declarations

## DECLARATION OF CONFORMITY

**DoC No.:** 00119-04-EU-02-01.DOCX  
**Manufacturer's Name:** WOODWARD INC  
**Manufacturer's Address:** 1000 E. Drake Rd.  
 Fort Collins, CO, USA, 80525  
**Model Name(s)/Number(s):** LSOV25 Valve 9904-516, 9907-997, 9908-350, 9908-352, 9908-353,  
 9904-1281, 9908-1284 and similar  
**Conformance to Directive(s):** 97/23/EC COUNCIL DIRECTIVE of 29 May 1997 on the  
 approximation of the laws of the Member States concerning  
 Pressure Equipment  
**The object of the declaration described  
 above is in conformity with the following  
 Directives of the European Parliament  
 and of the Council:** 94/9/EC COUNCIL DIRECTIVE of 23 March 1994 on the  
 approximation of the laws of the Member States concerning  
 equipment and protective systems intended for use in  
 potentially explosive atmospheres  
**Markings in addition to CE mark:**  Category 2 Group II G, Ex d IIB T4 Gb  
**Applicable Standards:** ASME B31.3 Process Piping, 2012  
 ASME Boiler and Pressure Vessel Code VIII, Div. 1, 2010  
 ASME Boiler and Pressure Vessel Code II, Part D, 2010  
 EN 1503-2 : 2000 Valves – Materials for bodies, bonnets, and covers – Part  
 2 : Steels other than those specified in European Standards  
 EN 60079-0: 2009 Explosive atmospheres – Part 0 – General Requirements  
 EN 60079-1: 2007 Equipment Protection by Flameproof Enclosures 'D'  
**Conformity Assessment:** PED Module H – Full Quality Assurance,  
 Certificate 01 202 USA/Q-11 6617  
 ATEX Production Quality Assessment  
 Certificate 01 220 113542  
**Third Party Certification:** Sira 11ATEX1233X  
 Sira  
 Rake Lane, Eccleston, Chester  
 CH49JN, England  
**Conformity Assessment:** PED Module H – Full Quality Assurance,  
 Certificate 01 202 USA/Q-11 6617  
 ATEX Production Quality Assessment  
 Certificate 01 220 113542

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  
 Christopher Perkins  
 \_\_\_\_\_  
 Full Name  
 Engineering Support Manager  
 \_\_\_\_\_  
 Position  
 Woodward, Fort Collins, CO, USA  
 \_\_\_\_\_  
 Place  
 7/18/13  
 \_\_\_\_\_  
 Date

5-09-1183 Rev 18, 3-Feb-2012



<b>DECLARATION OF CONFORMITY</b>
----------------------------------

**Manufacturer's Name:** WOODWARD, INC.  
**Address:** 1000 E. Drake Rd.  
 Fort Collins, CO, USA, 80525

**Model Name(s)/Number(s):** LSOV25 / 9908-354

**Conformance to Directive(s):** 97/23/EC COUNCIL DIRECTIVE of 29 May 1997 on the approximation of the laws of the Member States concerning Pressure Equipment.  
 94/9/EC COUNCIL DIRECTIVE of 23 March 1994 on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres

**Marking(s):** Category 3 Group II G, Ex nC IIC T3 X

**Applicable Standards:** ASME B31.3 Process Piping, 2004  
 ASME Boiler and Pressure Vessel Code VIII, Div. 1, 2004  
 ASME Boiler and Pressure Vessel Code II, Part D, 2004  
 BS EN 1503-2: 2000  
 EN60079-0, 2004 Electrical Apparatus for Explosive Gas Atmospheres - Part 0: General Requirements  
 EN60079-15, 2005: Electrical apparatus for explosive gas atmospheres - Part 15: Construction, test, and marking of type of protection 'n' electrical apparatus

**Conformity Assessment:** PED Module H – Full Quality Assurance  
 Certificate 01 202 USA/Q-11 6617

**Notified Body** TUV Rheinland Industrie Service GmbH (0035)  
**For Pressure Equipment** Am Grauen Stein, D-51105 Köln

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**We, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s).**

**MANUFACTURER**

Signature

*Suhail Horan*

Suhail Horan

Full Name

Quality Manager

Position

Woodward, Inc., Fort Collins, CO, USA

Place

13-mar-2012

Date

5-09-1182 (REV. 14)

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

**Manufacturer's Name:** WOODWARD INC.

**Manufacturer's Address:** 1000 E. Drake Rd. 3800 N. Wilson Ave.  
Fort Collins, CO, USA, 80525 Loveland, CO, USA 80538

**Model Names:** LSOV25 Valves 9904-516, 9907-997, 9908-350, 9908-352, 9908-353,  
9908-354, 9904-1281, 9908-1284 and similar

**This product complies, where applicable, with the following Essential Requirements of Annex I:** 1.1, 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.

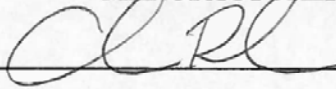
The person authorized to compile the technical documentation:

**Name:** Ralf Friedrich, Group Quality Director  
**Address:** Woodward GmbH, Handwerkstraße 29, 70565 Stuttgart, Germany

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 Inc. 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

Christopher Perkins

\_\_\_\_\_  
Full Name

Engineering Support Manager

\_\_\_\_\_  
Position

Woodward Inc., Fort Collins, CO, USA

\_\_\_\_\_  
Place

7/16/13

\_\_\_\_\_  
Date



B40148:P

**ТОВ «ТЕХНОЕЛЕКТРО»**

*61166, м Харків, пр.Науки, 40, к.530а.*

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*skype: alex19749*



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**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.**