WOODWARD

**Product Manual 26190**
**(Revision AJ, 4/2025)**
**Original Instructions**

# GSOV50
# Gas Shutoff Valve
# (formerly GSOV25HT)

## Installation and Operation Manual

Released

**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. The latest version of most publications is available on the Woodward website.

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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. The latest version of most publications is available on the Woodward website.

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Always compare with the original for technical specifications and for proper and safe installation and operation procedures.

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

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



Manual 26190

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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.**

***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.

**ATEX Directive:** This assembly is ATEX compliant per the compliance of the individual components below:
Solenoid Valve – II 2G Ex db IIB T3 Gb, Sira 11ATEX1209X,
II 3G Ex ec IIC T3 Gc, Sira 11ATEX4201X
Proximity Switch – II 2G Ex db IIC T3 Gb, Baseefa 08ATEX0360X

**EMC Directive(Solenoid Valve and Switch):** Declared to Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility (EMC).

**Pressure Equipment Directive(Valve):** Directive 2014/68/EU on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment.
PED Category II

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

**ATEX 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.

This Combined ATEX Equipment Assembly is compliant per the separately assessed equipment below:

Solenoid Operated Valve Assembly (G.W. Lisk Type M3-XXXX-(XX) )
II 2G Ex db IIB T3 Gb, Sira 11ATEX1209X
II 3G Ex ec IIC T3 Gc, Sira 11ATEX4201X
Proximity Switch (Topworx Series 7)
II 2G Ex db IIC T3 Gb, Baseefa 08ATEX0360X
Non-electrical content manufactured by Woodward:
Exempt from the non-electrical portion of the ATEX Directive 2014/34/EU due to no potential ignition sources per EN ISO 80079-36:2016 for Zone 1 installation.

Therefore, the Equipment Assembly is suitable for the following areas:
II 2G IIB T3 Gb
II 3G IIC T3 Gc

**Machinery Directive:** Compliant as a safety component with Directive 2006/42/EC of the European Parliament and the Council of 17 the May 2006 on machinery.

**RoHS Directive:** Restriction of Hazardous Substances 2011/65/EU:
Woodward Turbomachinery Systems products are intended exclusively for sale and use only as a part of Large Scale Fixed Installations per the meaning of Art.2.4(e) of directive 2011/65/EU. This fulfills the requirements stated in Art.2.4(c) and as such the product is excluded from the scope of RoHS2.

**United Kingdom Compliance for UKCA Marking**
These listings are limited only to those units bearing the UKCA Marking.

**Pressure Equipment (Safety):** S.I. 2016 No. 1105: Pressure Equipment (Safety) Regulations 2016.
Category II Equipment
PED Module H – Full Quality Assurance

**UKEX:** S.I. 2016 No. 1107: Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016

**This combined UKCA equipment assembly is compliant per the separately assessed equipment below:**

**Solenoid Operated Valve Assembly (G.W. Lisk Type M3-XXX-(XX)**
II 2G Ex db IIB T3 Gb, Sira 11ATEX1209X
II 3G Ex ec IIC T3 Gc, Sira 11ATEX4201X

**Proximity Switch (Topworx Series 7)**
II 2G Ex db IIC T3 Gb, Baseefa 08ATEX0360X

Therefore, the Equipment Assembly is suitable for the following areas:
II 2G IIB T3 Gb
II 3G IIC T3 Gc

**Other UKCA Compliance**
Compliance with the following UKCA regulations or standards does not qualify this product for the application of the UKCA Marking:

**Machinery:** S.I. 2008 No. 1597: Supply of Machinery (Safety) Regulations 2008

**International Compliance**
Suitability for IECEx is the result of compliance of the individual components.

**Solenoid Operated Valve Assembly (G.W. Lisk Type M3-XXX-(XX):** Certified for use in explosive atmospheres per IECEx SIR 11.0102X, Ex db IIB T3 Gb or Ex ec IIC T3 Gc

**Proximity Switch (Topworx Series 7, PEEK leads):** Certified for use in explosive atmospheres per IECEx BAS 08.0122XX, Ex db IIC T3 Gb

**North American Compliance:**

**WARNING**

**The GSOV50 is not certified or intended to be used as a Safety Valve or Safety Shut-off Valve for the fuel supply to the prime mover (e.g. per NFPA 37 or CSA B149). It is intended as a high-speed shutoff valve for use in the overspeed protection system. Use of the product outside its intended use creates a serious risk to equipment and personal safety.**

Suitability for use in North American Hazardous Locations is the result of compliance of the individual components.

**Solenoid Operated Valve Assembly (G.W. Lisk Type M3-XXX-(XX):** CSA Certified for Class I, Div. 1 Groups C & D T3, Class I, Div. 2 Groups A, B, C & D T3. For use in Canada and the United States. CSA Certificate 1260548.

**Proximity Switch (Topworx Series 7):** CSA Certified for Class I, Div. 1, Groups A, B, C & D T3C. For use in Canada and the United States. CSA Certificate 1372905.

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

**Marine Compliance:**
Marine Type Approval has been obtained for certain models of this product. The applicable model numbers have type approval for:

**American Bureau of Shipping:** Certificate Number: 22-2269093-PDA

2022 Rules for Conditions of Classification, Part 1: 1-1-4/7.7, 1-1-A3, 1-1-A4.

2022 Rules for Conditions of Classification, Part 1: Offshore Units and Structures: 1-1-4/9.7, 1-1-A2, 1-1-A3.

For available Type approval certificates and applicable model numbers, please contact your sales representative for more information.

**SIL Compliance:**

GSOV50 (formerly GSOV25HT)– Certified SIL 3 Capable for Product Function in safety instrumented systems. Evaluated to IEC 61508 Parts 1-7. Refer to the instructions of this Installation and Operation Manual, Chapter 4 Safety Management.
SIL Certificate WOO 1503125 C002

| Device | $\lambda_{SD}$ | $\lambda_{SU}$[2] | $\lambda_{DD}$ | $\lambda_{DU}$ |
|---|---|---|---|---|
| Tight Shut-off, Clean Service | 0 | 766 | 0 | 1426 |
| Full Stroke, Clean Service | 0 | 766 | 0 | 867 |

**Special Conditions for Safe Use:**

1. Field Wiring must be suitable for 90°C and at least 20°C above the maximum ambient temperature.
2. Connect ground terminal to earth ground.
3. Ambient temperature range: GSOV50 (Single Coil): –20 to +121 °C
   GSOV25 (Dual Coil): –20 to +105 °C

**⚠WARNING**

**EXPLOSION HAZARD—Do not connect or disconnect while circuit is live unless area is known to be non-hazardous.**

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

**⚠AVERTISSEMENT**

**RISQUE D'EXPLOSION—Ne pas raccorder ni débrancher tant que l'installation est sous tension, sauf en cas l'ambiance est décidément non dangereuse.**

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

**⚠WARNING**

**POTENTIAL ELECTROSTATIC CHARGING HAZARD INSTRUCTIONS**

**The risk of electrostatic discharge for painted units is reduced by permanent installation, proper connection of the equipotential ground lugs, and care when cleaning. Painted units must not be cleaned or wiped off/against unless the area is known to be non-hazardous.**

# Chapter 1.
# General Information

## Introduction

**WARNING**

**The GSOV50 valve is a critical component for protection against equipment failure or turbine overspeed. Routine inspection is necessary for the protection of the turbine.**

The GSOV50 gas shutoff valve (formerly GSOV25HT) is designed to terminate the turbine fuel supply should the electronic fuel control or sequencer interrupt the permissive electrical signal.

Gas supply plumbing must ***not*** be pressure tested with water. Doing so may cause damage to the fuel isolation valve, resulting in a failure to actuate properly.

Because of the critical function of this component, it is mandatory that the turbine operators regularly monitor the condition of the valve. It should be inspected regularly during all turbine maintenance intervals.

To verify proper operation during shutdown conditions:

- Ensure that the solenoid operator is de-energized.
- Verify that gas supply pressure in excess of 100 psig (690 kPa) is present at the inlet flange.
- Check for leakage through the main valve mechanism by measuring the leakage flow rate from the vent connection. Leakage in excess of 400 $cm^3$/min may indicate valve seat wear or a possible malfunction. The valve should be removed from service and tested to ensure that the primary valve seat is not leaking.

## Gas Shutoff Valve Description

(Refer to Figures 3-1 and 3-2)

The GSOV50 is a normally-closed, three-stage device, designed to terminate fuel flow in less than 85 ms at 600 psig (4137 kPa), and in less than 100 ms at 900 psig (6200 kPa), after interruption of the electrical supply current. Valve closure is due to the stored energy of a coiled spring in the primary stage.

The valve is compatible with most gaseous fuels, including natural gas, propane, ethane, and methane. All stainless-steel components with Viton seal materials accommodate most fuel contaminates.

An integral 40 µm (nominal) filter protects the first- and second-stage components from damage due to particulate contamination. Flow through the primary stage is not filtered.

The fuel isolation valve is constructed of corrosion-resistant materials. The valve weighs 75 lb (34 kg). The valve will positively seal in a reverse-pressure condition up to 500 psig (3448 kPa).

The valve is designed to be NACE compliant per NACE MR0175-94 sulfide stress cracking resistant metallic materials for oilfield equipment, NACE International.

# GSOV50 Specifications

| | |
|---|---|
| Closing Time | less than 85 ms @ 600 psig (4137 kPa)<br>less than 100 ms @ 900 psig (6200 kPa) |
| Opening Time | less than 300 ms |
| Minimum Allowed Actuation Pressure | 100 psig (690 kPa) |
| Maximum Allowed Valve Gas Pressure | 900 psig (6200 kPa) |
| Valve Proof Pressure | 1350 psig (9308 kPa) |
| Valve Burst Pressure | 5000 psig (34 475 kPa) |
| Maximum Allowed Vent Back Pressure | 100 psig (690 kPa) but must be less than (Pinlet – 100 psig (690 kPa)) |
| Main Seat Leakage Rating | ANSI/FCI 70-2-1991 Class VI |
| Main Seat Reverse Leakage | ANSI/FCI 70-2 Class VI up to 500 psid (3448 kPa) reverse pressure differential |
| Maximum Allowed Vent Leakage | less than 400 $cm^3$/min steady state |
| Internal Filtration for Solenoid | 40 µm |
| Maximum Allowed Solid Particle Contaminants in Fuel | less than or equal to 10 µm, 30 ppm by volume maximum<br>greater than 10 µm, 0.3 ppm by volume maximum |
| Valve Weight | 75 lb (34 kg) |
| Fuel Compatibility | Natural gas, propane, ethane, methane, or most typical gas fuels |
| Ambient Temperature Range | –4 to +250 °F (–20 to +121 °C) Single Coil<br>–4 to +221 °F (–20 to +105 °C) Dual Coil* |
| Fuel Temperature Range | –4 to +350 °F (–20 to +177 °C) |
| Design Life | 20 000 cycles |
| Solenoid Power Consumption | 10 W per coil @ N.S.V @25 °C |
| Nominal Piping Size | 2” (50 mm) |
| Proximity Switch Contact Ratings | 0.5 A @ 24 VDC |

*Dual coil versions are limited to +221 °F (+105 °C) due to self-heating while operated on both coils simultaneously. On loss of a single coil above rated temperature, the valve will hold open with remaining coil but will not re-open if de-energized and then re-energized.

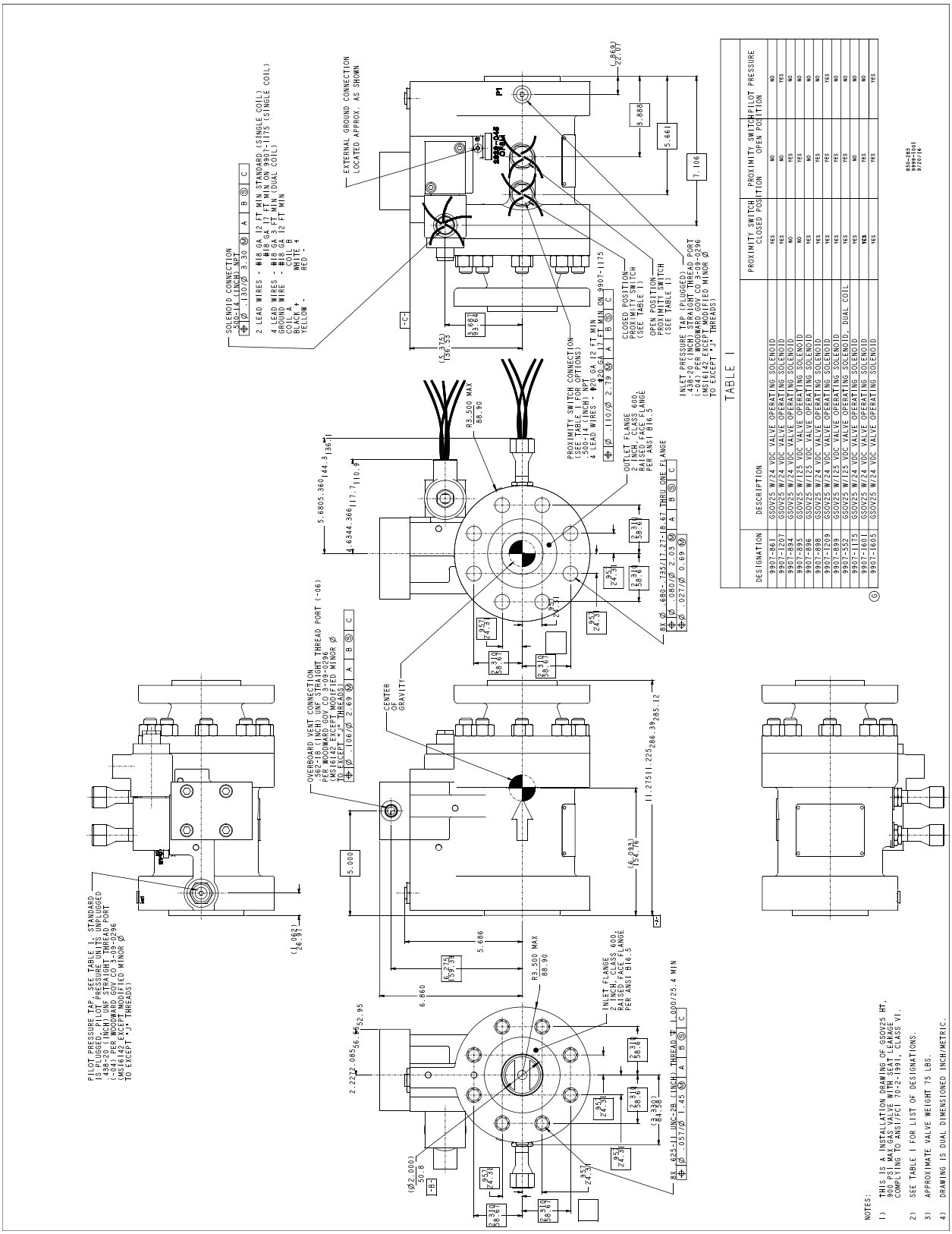


Figure 1-1. Outline Drawing of GSOV50 Gas Shutoff Valve

# Chapter 2.
# Installation

## Receiving

The GSOV50 gas shutoff valve is tested with dry air and then packed in a foam-filled box for shipment. The unit may be stored for an extended period in the original container.

## Installation

**WARNING**

**EXPLOSION HAZARD—Do not connect or disconnect while circuit is live unless area is known to be non-hazardous.**

**The surface temperature of this valve approaches the maximum temperature of the applied process media. It is the responsibility of the user to ensure that the external environment contains no hazardous gases capable of ignition in the range of the process media temperatures.**

**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**

**Due to typical noise levels in turbine environments, hearing protection should be worn when working on or around the GSOV50.**

**WARNING**

**External fire protection is not provided in the scope of this product. It is the responsibility of the user to satisfy an applicable requirement(s) for their system.**

The valve is designed for installation between two standard 2-inch (50 mm), 600-pound (272 kg) flanges per ANSI B16.5. The inlet flange is threaded for eight 0.625 inch-11 UNC x 3.5 or 4 inch (approx. 16 mm x 89–102 mm) bolts. The discharge flange has eight 0.688 inch (17.5 mm) through-holes. The installer must supply gaskets as required to assure a leak-proof seal at both inlet and outlet flanges. Refer to ASME B16.5 for details of flange, gasket, and bolt types and dimensions. Use appropriate lifting equipment during installation.

Piping loads that can be considered “typical” have been used in the design of the housing to ensure that there is not an adverse effect from the stresses applied to the housing from the inlet and outlet piping. The loads, which were used in the design of these housings, are (and should not be exceeded):

Table 2-1. Piping Loads According to Valve Size

| Valve Size | Max Pipe Axial Force | Max Pipe Shear Force | Max Pipe Moment | Max Flange Bolt Force (Per Bolt) |
|---|---|---|---|---|
| 50 mm (2 inch) | 3599 N (809 lbf) | 3599 N (809 lbf) | 2199 N·m (1622 lb-ft) | 29016 N (6523 lbf) |

The 0.438-20 (-04) port, located on the side of the inlet flange, is provided as a pressure tap. In systems where redundant fuel isolation valves are used, the port may be connected to a normally open vent valve.

This arrangement will relieve trapped fuel pressure between the fuel isolation valves as well as any leakage that may occur across the first fuel isolation valve.

The 0.562 inch-18 (-06) port on the pilot section boss should be connected to a gas-collection header and vented to a non-hazardous area.

During opening transients, flow can be expected from the -06-vent port. During steady-state operation (open or closed) flow from the vent port should not exceed 400 $cm^3$/min. Flow in excess of this may be a sign of primary-seal or pilot-stage leakage. Back pressure on the vent connection should not exceed 100 psig (690 kPa) for inlet pressures above 200 psig (1379 kPa) and should be 0 for inlet pressures less than 200 psig (1379 kPa).

## Electrical Connections

**⚠WARNING**

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

**NOTICE**

**Support conduit fittings while making conduit connections.**

**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.**

**NOTICE**

**For devices that list more than one method of protection, it is the installer’s responsibility to permanently mark all applicable nameplates to show which method of protection is used in the installation of that device (per IEC/EN 60079-0).**

### Solenoid Valve

The fuel isolation valve is available in 24 VDC (18–32 VDC) single coil, 125 VDC (90–140 VDC) single coil, and 125 VDC (90–140 VDC) dual coil models. A 0.500 inch-14 (12.7 mm) NPTF conduit adapter is provided for the electrical connection. For the single coil models, connect the two wires extending from the conduit connector to the proper supply voltage as shown in Figure 2-1 below; polarity is not important. For the dual coil model, connect the four wires extending from the conduit connector to the proper supply voltage as shown in Figure 2-2 below; the polarity must be the same for both coils. The green wire should be connected to earth ground. Power consumption for all models is 10 W maximum per coil See Figures 2-1 and 2-2.

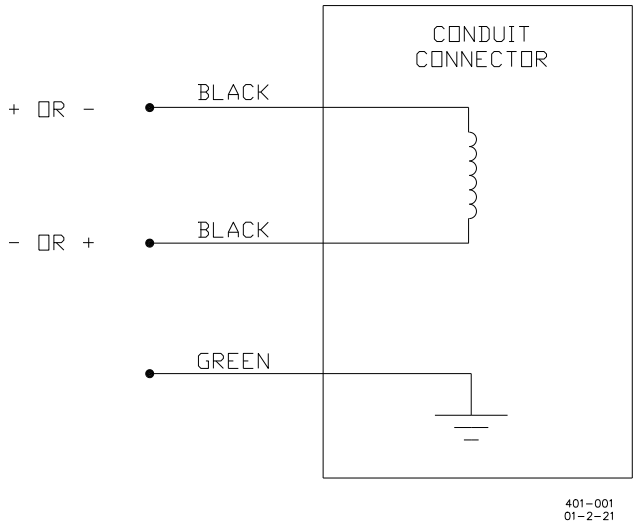


Figure 2-1. Solenoid Wiring Diagram–Single Coil

**IMPORTANT**

**To rotate or re-position the solenoid coil conduit housing: Remove the thin cap nut and loosen the large circular nut by turning it counterclockwise. Rotate the conduit housing to the desired position and tighten the circular nut by hand only. Do not use a tool on the circular nut, which could cause over-tightening. Re-install the thin cap nut and torque to 12–15 lb-ft (16–20 N•m).**

**IMPORTANT**

**The solenoid will actuate with one coil energized. If both coils are used, ensure that the polarity of each coil is the same. If the two coils are connected with opposite polarity, the solenoid will not reliably actuate because the magnetic fields will cancel each other out. If a single voltage source is used to drive both coils, the coils should be connected in parallel so that each coil receives the correct voltage.**

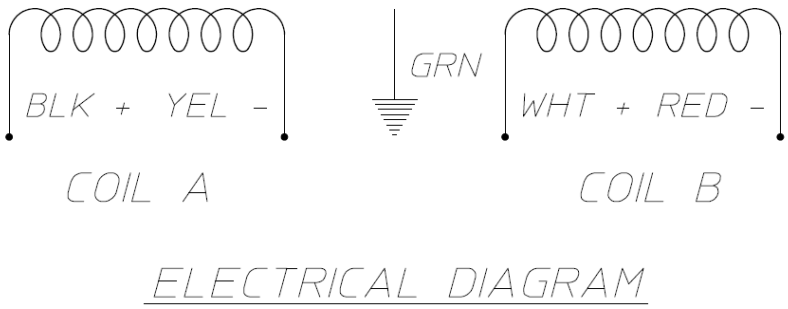


Figure 2-2. Solenoid Wiring Diagram–Dual Coil

## Proximity Switch

This valve is designed to offer the customer with the option of having the proximity switch in one of two positions or both. The proximity switch is designed to inform the operator when the valve is fully closed, fully open, or both. Any intermediate positions will be indicated as valve open. The proximity switch is a single-pole, dual-throw (SPDT) type with Form C contacts. The contacts are rated for 0.5 A at 24 VDC. There are four colored leads extending from the switch housing. Red is the normally-closed contact, blue is the normally-open contact, black is common, and green is the case ground. The switch may be wired to use one or both contacts.

See the Maintenance section below for more information on the proximity switch.

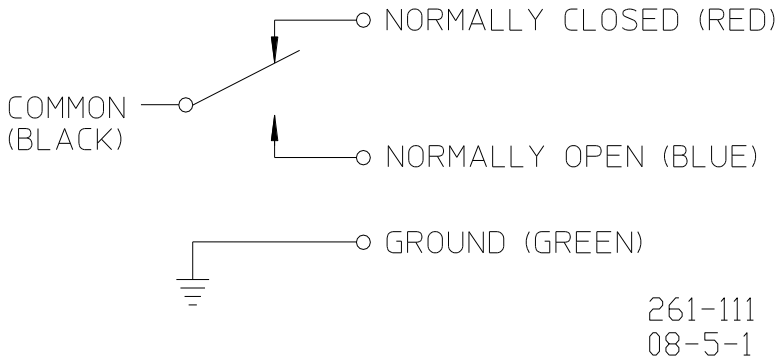


Figure 2-3. Proximity Switch Wiring Diagram

# Maintenance

If properly maintained and operated within its design limits, the GSOV50 will operate up to 50 000 hours or 20 000 cycles before requiring repair or overhaul. The following maintenance checks should be completed at the prescribed intervals.

**WARNING**

**Before doing any maintenance on the GSOV50, inlet and outlet gas pressure must be relieved. Failure to remove gas pressure from the inlet and discharge of the valve may result in equipment damage, personal injury, or death.**

Electrical power should be removed from the GSOV50 whenever working on or near the solenoid or proximity switch.

## Pilot Filter

To ensure optimum performance of the valve, the pilot-section filter should be removed and cleaned at least once per year, or more often if system contamination levels are higher than normal. See Figure 1-1 (outline drawing) for the location of the pilot filter. Remove the pilot filter by turning counterclockwise on the 1.000 inch (25.40 mm) hex head nut. The filter may be cleaned ultrasonically or back-flushed with light solvent. Inspect the O-ring seals and replace as necessary. The upper O-ring is Woodward part number 1355-169, and the lower O-ring is part number is 1355-111. Lightly lubricate the O-rings with petroleum jelly and torque pilot filter nut to 200 lb-in (23 N·m) after re-assembly.

## Vent Leakage

Diligent monitoring of the vent connection leakage can provide early warning of seal degradation or internal contamination of the valve, which may result in unreliable valve operation.

If vent leakage exceeds 400 $cm^3$/min when the valve is closed, either the solenoid, the second-stage ball seat, or the internal seals are leaking. If a spare solenoid is available, replace it to determine its effect on leakage. If replacing the solenoid does not correct the leakage problem, the valve should be returned to Woodward for repair.

If vent leakage exceeds 400 cm³/min when the valve is open, the most likely cause is a damaged second-stage face seal. The solenoid is a possible secondary cause and can be replaced to determine its effect.

## Solenoid Valve

No regular maintenance is required on the solenoid valve, but the following information can be used to troubleshoot problems related to the solenoid valve.

**IMPORTANT**

**Currently there are three solenoids available: 24 VDC single coil (Woodward part number 1311-933), 125 VDC single coil (part number 1311-1006), and 125 VDC dual coil (part number 1311-1031). Be sure to specify the correct part number, voltage rating, and number of coils when ordering a replacement solenoid.**

The typical dc resistance of the 24 VDC coil is 56 Ω and 1.5 kΩ for the 125 VDC version. Nominal current draw of the 24 VDC coil is 400 mA and 80 mA per coil for the 125 VDC coils.

The solenoid valve can be replaced in the field if necessary. Remove the solenoid from the GSOV50 by unscrewing the two 0.250-28 Allen head screws that hold the solenoid to the valve housing. Replace the three O-ring seals if necessary (Woodward part number 1355-101). The poppet section of the solenoid can be disassembled further and cleaned if necessary, but this action is beyond the scope of this manual. If further disassembly is undertaken, take extreme care to insure proper re-assembly. Lightly lubricate the O-rings with petroleum jelly and torque the solenoid mounting screws to 81 lb-in (9.2 N·m) after re-assembly.

Routinely check the shutdown switches or relays to be sure they are capable of terminating the electrical supply to the solenoid. The fuel isolation valve should be used whenever possible to be sure it is operating satisfactorily.

## Proximity Switch

There is no regular maintenance required on the proximity switch, but the following information can be used to troubleshoot problems related to the proximity switch.

The switch contains a Form C contact with four leads extending from the switch. Red is the normally-closed contact, blue is the normally-open contact, black is common, and green is the case ground.

If the valve has a proximity switch in the CLOSED position, then the following values apply:

- When the valve is closed, the dc resistance across the contacts should read:
  Normally closed (NC): open circuit
  Normally open (NO): 0.1–1.0 Ω
- When the valve is open, the dc resistance across the contacts should read:
  Normally closed (NC): 0.1–1.0 Ω
  Normally open (NO): open circuit

If the valve has a proximity switch in the OPEN position, then the following values apply:

- When the valve is open, the dc resistance across the contacts should read:
  Normally closed (NC): open circuit
  Normally open (NO): 0.1–1.0 Ω
- When the valve is closed, the dc resistance across the contacts should read:
  Normally closed (NC): 0.1–1.0 Ω
  Normally open (NO): open circuit

If an erroneous or intermittent switch indication is observed, check the continuity of each switch contact as described above. Lightly tap the proximity switch with a wrench or small hammer. The proximity switch should not be affected by these small mechanical disturbances. If the contacts change state with a light tap or do not read the correct dc resistance as given above, replace the switch.

The proximity switch can be replaced in the field if necessary. The valve must be in the closed position and have all pressure isolated from the valve to replace the switch(es).

1. Disconnect any wiring or conduit attached to the proximity switch.
2. Use an adjustable wrench on the 1.000 inch (25.40 mm) hex of the proximity switch head and back the switch out of the body by turning counterclockwise.
3. Remove thread seal, washer, and jam nuts from the old switch and install them on the new switch. The Woodward part number for the thread seal is 1386-181.
4. Apply a small amount of Loctite 242 (removable) to the new switch threads and thread into the valve body.
5. For the CLOSED position switch, thread the switch into the valve housing until it bottoms out on the main piston. For the OPEN switch, the valve must be cycled into the open position, then thread the switch into the valve housing until it bottoms out on the main piston.
6. Mark the position of the switch relative to the body and then back the switch out 1/2 to 5/8 of a turn.
7. Torque the first jam nut to 15 lb-ft (20 N·m) while holding the hex head on the end of the proximity switch. Apply Loctite 242 on the threads just after the first jam nut. Torque the second jam nut against the first to 15 lb-ft (20 N·m), again while holding the switch hex head.
8. Re-assemble the switch wiring and conduit connections.

## External Pilot Pressure Operation

The gas shutoff valve may be actuated open by either the inlet gas line supply pressure (normal operation) or by the optional Pilot Supply connection. The source of actuation pressure is determined by the position of a plug that can be installed on either side of the Pilot Filter. With the plug installed on the top (external side) of the Pilot Filter, the normal gas line supply pressure is used as the actuation media. If the plug is installed at the bottom (internal side) of the Pilot Filter, an external pilot pressure must be provided to the valve as the actuation media.

The minimum required pilot pressure to open the valve is 100 psig (690 kPa).

**IMPORTANT**

**A Pilot Supply pressure of 200 psig (1379 kPa) will assure proper valve actuation for all inlet gas supply pressures up to the maximum valve rating of 900 psig (6200 kPa).**

The Pilot Supply plug is normally installed on the top of the Pilot Filter. To switch to external Pilot Pressure operation, do the following:

1. Remove the 0.438-20 straight thread plug (-04) from the top of the Pilot Filter.
2. Remove the Pilot Filter itself from the valve housing.
3. Re-install the 0.438-20 plug into the lower side of the Pilot Filter. Verify that the O-ring seal on the plug is in good condition.
4. Re-install the Pilot Filter into the valve housing. Torque to 200 lb-in (23 N·m).
5. Plumb the external Pilot Pressure source to the 0.438-20 straight thread port connection on top of the Pilot Filter.

# Chapter 3.
# Principles of Operation

## Introduction

Figures 3-1 and 3-2 illustrate the operating principle of the GSOV50 gas shutoff valve.

## Valve Open

- Energize the first-stage solenoid (one or both coils for the dual model) with the appropriate voltage (24 VDC or 125 VDC).
- The three-way solenoid connects P1 pressure to the control land of the second-stage piston (1 >> 2).
- At pressures greater than 100 psig (690 kPa), the second-stage piston is driven to the end of its bore (4), opening the P1 pressure (3) to the control land of the primary-stage piston (5), while simultaneously sealing the passage from the vent connection (4).
- The P1 pressure on the primary-stage piston control land (5) overcomes the spring force of the return springs and drives the piston to the end of its bore, separating the piston from the primary seal (6).

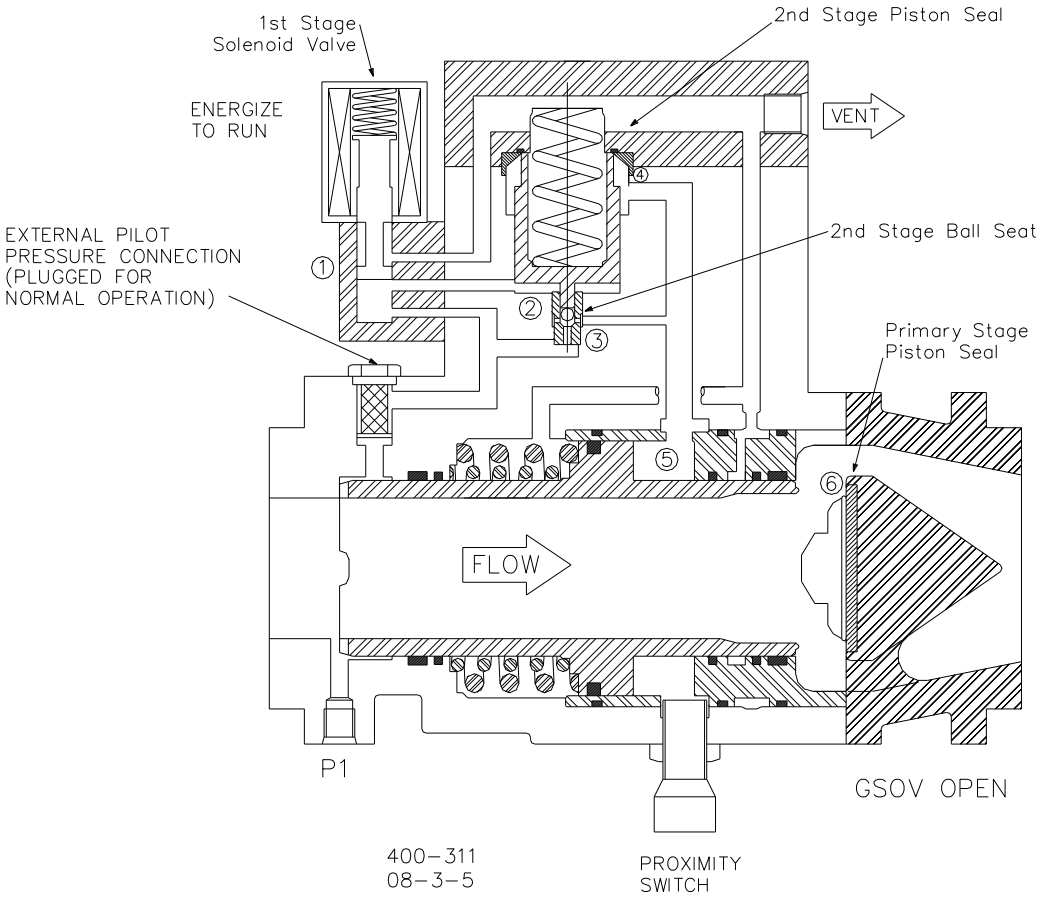


Figure 3-1. Energized—Valve Open

# Valve Closed

- De-energize the solenoid (both coils must be de-energized for the dual model solenoid to be de-energized).
- The first-stage, three-way solenoid connects the pressure on the control land of the second-stage piston to the vent (2 >> 1).
- The spring under the second-stage piston overcomes the pressure on the control land and drives the second-stage piston to the opposite end of its bore, seating the second-stage ball seat and sealing the P1 pressure from the primary-stage piston control land (3).
- As the second-stage piston moves to the opposite end of its bore, the piston separates from the second-stage piston seal and allows the pressure on the primary-stage control land to vent (5 >> 4).
- The primary-stage return spring overcomes the pressure on the control land and drives the primary-stage piston against the primary-stage piston seal (6).

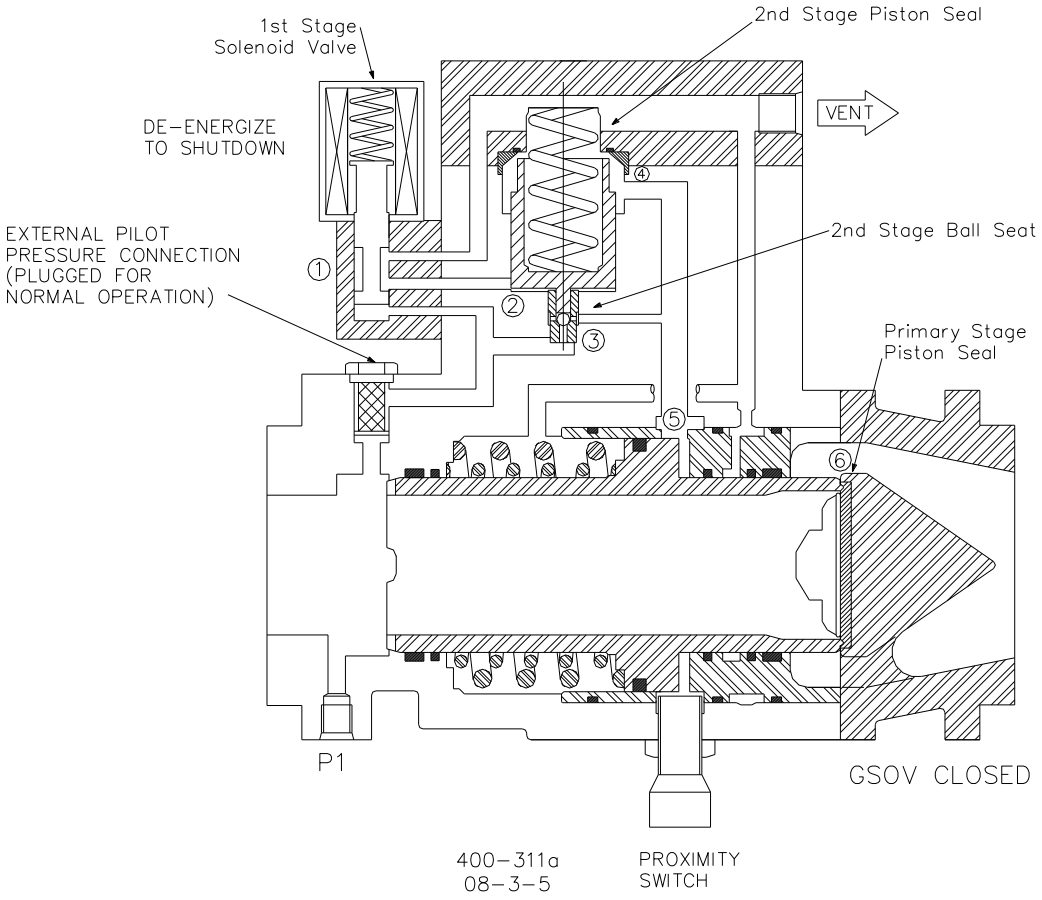


Figure 3-2. De-energized—Valve Closed

A 40 µm filter protects the pilot stage of the valve and the solenoid control valve from damage due to particulate contamination. No screen or filter is provided for the fuel flowing to the turbine.

The valve is either full ON or sealed tightly OFF.

# Failsafe Principle

The GSOV50 gas shutoff valve operates with three stages of valving. This design is necessary to ensure the high speed fuel isolation and maintain the low pressure drop/high flow rate valve. Each of the three stages is spring loaded with at least five times the force needed to ensure valve closure.

The first-stage solenoid valve is a poppet-style solenoid, spring loaded with an Inconel spring to the closed position, requiring a voltage supply to allow P1 pressure to the second-stage piston control land.

The second-stage piston assembly has a dual function for the valve. In the normally-closed position, the piston is spring loaded to seal P1 pressure from the primary stage by seating a stainless steel ball, while simultaneously opening a large vent that allows any pressure from the primary stage to vent through a customer connection. A P1 pressure of greater than 100 psig (690 kPa) is required at the second-stage control land to overcome the spring force and move the piston to the opposite end of its bore. In this position the vent connection is sealed by an encapsulated O-ring/face seal while simultaneously allowing P1 pressure to fill the primary-stage control land.

The primary-stage piston is spring loaded to the closed position and seated against a Viton face seal. A P1 pressure of greater than 100 psi (690 kPa) is required at the control land of the primary-stage piston to overcome the spring force and allow the piston to move to the open position.

Table 3-1. Failure Modes

| Failure | Result |
|---|---|
| Loss of P1 Pressure | When P1 is less than 100 psi (690 kPa), the spring force of the second-stage piston overcomes the area/pressure of the control land, moving the piston to seal the P1 pressure from the primary-stage piston, and opens the vent connection, which allows any trapped pressure at the primary-stage control land to vent through the customer-supplied connection. The spring loaded primary-stage piston will move to the closed position within the 85 ms time specification. |
| Loss of Voltage to Solenoid | As the voltage is removed from the solenoid, the spring-loaded poppet valve in the solenoid closes the P1 pressure to the second stage while opening a vent to allow any trapped pressure in this area to vent through a customer connection. When the spring loading of the second-stage piston overcomes the area/pressure of the control land, the piston moves to seal the P1 pressure from the primary-stage piston and opens the vent connection, which allows any trapped pressure at the primary-stage control land to vent through the customer-supplied connection. The spring-loaded primary-stage piston will move to the closed position within the 85 ms time specification. |

# Reliability

Woodward has extensively tested the GSOV50 to determine its reliability under extreme operating conditions. The GSOV50 has proven to be fully functional up to at least 25 000 cycles without overhaul. The valve will continue to function up to at least 100 000 cycles with increases in both main seal leakage and overboard vent leakage. We recommend that the valve be returned to Woodward for overhaul every 25 000 cycles to ensure full compliance to the specifications defined within this manual.

# Flow Characteristics of the GSOV50

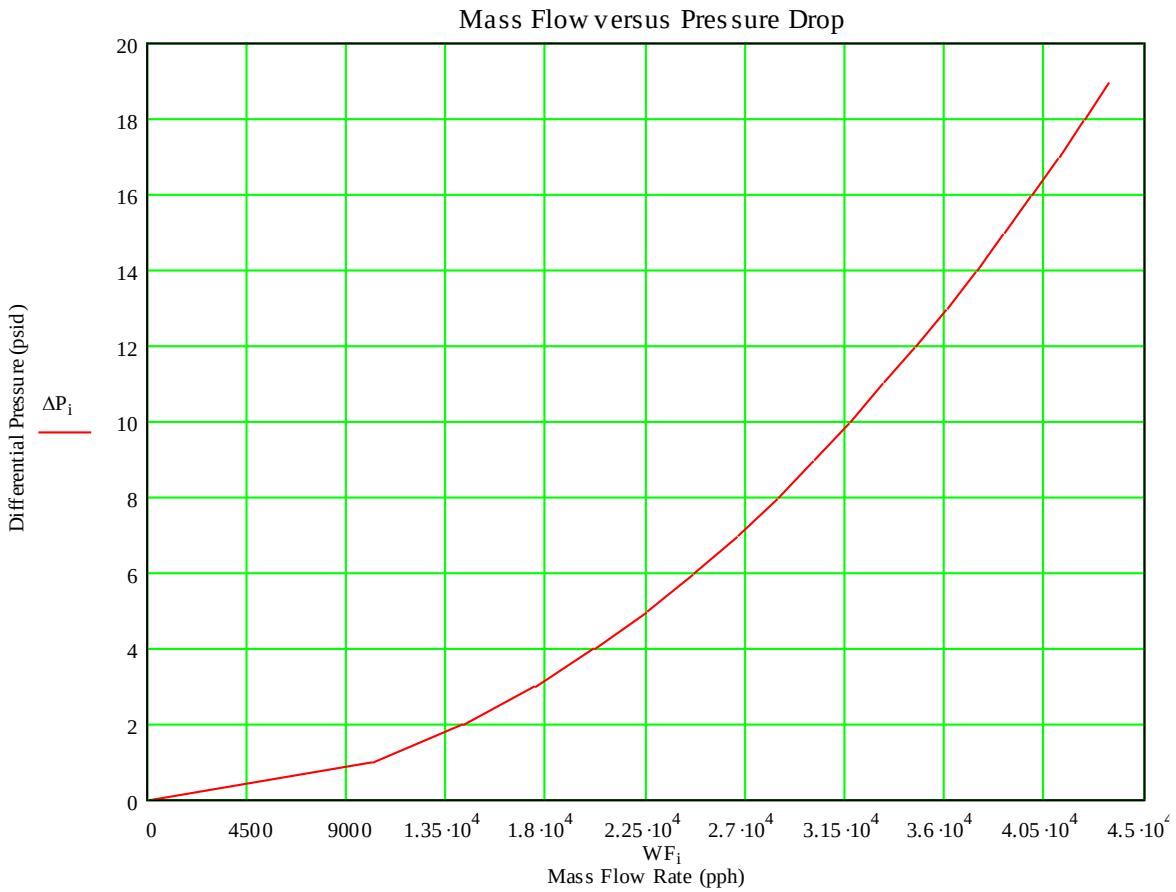


Figure 3-3. GSOV50 Delta P vs Flow
(Based on Air Flow at 600 psia, 502 deg R)
(The Valve Effective Area is 2.40 square inches [1548.4 mm²].)

# Chapter 4.
# Safety Management

## Product Variations Certified

The SIL rated GSOV50 gas shutoff valve is designed and certified to the functional safety standards according to IEC61508. Reference SIL certificate WOO 1503125 C002. Contact Woodward for a copy of the SIL certificate.

The functional safety requirement in this manual applies to all GSOV50 gas shutoff valves. The SIL rated valves will have a DU FIT of less than 1426 for Tight Shutoff and 867 for Full Stroke versions.

The GSOV50 gas shutoff valve is certified for use in applications up to SIL 3 according to IEC 61508.

The GSOV50 fuel isolation valve is designed to provide fast shutoff of gaseous fuel flow to an industrial gas turbine. Gas flow is stopped when the valve is closed, with zero leakage from the inlet to the outlet.

The following versions were considered in the FMEDA of the GSOV50 fuel isolation valve:

GSOV50 fuel isolation valve, full stroke: State where the valve is closed.

GSOV50 fuel isolation valve, tight shutoff: State where the valve is closed and sealed with leakage no greater than the defined leak rate. Tight shutoff requirements shall be specified according to the application. If shut-off requirements allow flow greater than ANSI class V, ANSI class IV, then full stroke numbers may be used.

## SFF (Safe Failure Fraction) for the GSOV50

The GSOV50 is only one part of a shutoff system that supports an over-speed shutdown SIF (Safety Instrumented Function). This system consists of a speed sensor, a processing unit and a fuel shutoff actuation sub-system of which the GSOV50 is a component.

The SFF (Safe Failure Fraction) for each subsystem should be calculated. The SFF summarizes the fraction of failures which lead to a safe state plus the fraction of failures which will be detected by diagnostic measures and lead to a defined safety action. This is reflected in the following formulas for SFF:

$$SFF = \lambda_{SD} + \lambda_{SU} + \lambda_{DD} / \lambda_{TOTAL}$$

where $\lambda_{TOTAL} = \lambda_{SD} + \lambda_{SU} + \lambda_{DD} + \lambda_{DU}$

The failure rates listed below, for only the GSOV50, do not include failures due to wear-out of any components. They reflect random failures and include failures due to external events such as unexpected use. Reference the FMEDA: WOO 13-10-089 for detailed information concerning the SFF.

Table 4-1. Failure Rates According to IEC61508 in FIT

| Device | $\lambda_{SD}$ | $\lambda_{SU}$ | $\lambda_{DD}$ | $\lambda_{DU}$ |
|---|---|---|---|---|
| Tight Shut-off, Clean Service | 0 | 766 | 0 | 1426 |
| Full Stroke, Clean Service | 0 | 766 | 0 | 867 |

According to IEC 61508 the architectural constraints of an element must be determined. This can be done by following the 1H approach according to 7.4.4.2 of IEC 61508 or the 2H approach according to 7.4.4.3 of IEC 61508. The 1H approach should be used for the GSOV50.

## Response Time Data

The GSOV50 full stroke response time to close is as follows:

- Less than 85 ms @ 600 psig (4137 kPa)
- Less than 100 ms @ 900 psig (6200 kPa)

## Limitations

When proper installation, maintenance, proof testing, and environmental limitations are observed, the useful life of the GSOV50 is 20,000 cycles.

## Management of Functional Safety

A Failure Modes, Effects and Diagnostic Analysis is one of the steps to be taken to achieve functional safety certification per IEC 61508 of a device. From the FMEDA, failure rates are determined. The FMEDA that is described in this report concerns only the hardware of the GSOV50 gas shutoff valve. For full functional safety certification purposes all requirements of IEC 61508 must be considered.

## Restrictions

The user must complete a full functional check of the GSOV50 after initial installation, and after any modification of the overall safety system. No modification shall be made to the GSOV50 unless directed by Woodward. This functional check should include as much of the safety system as possible, such as sensors, transmitters, actuators, and trip blocks. The results of any functional check shall be recorded for future review.

The GSOV50 must be used within the published specification in this manual.

## Competence of Personnel

All personnel involved in the installation and maintenance of the GSOV50 must have appropriate training. Training and guidance materials are included the SIL3 GSOV50 manual (26190).

These personnel shall report back to Woodward any failures detected during operation that may impact functional safety.

## Operation and Maintenance Practice

A periodic proof (functional) test of the GSOV50 is required to verify proper operation. More information is in the “Proof Test” section below. The frequency of the proof test is determined by the overall safety system design, of which the GSOV50 is part of the safety system. The safety numbers are given in the following sections to help the system integrator determine the appropriate test interval.

The GSOV50 requires no special tools for operation or maintenance.

## Installation and Site Acceptance Testing

Installation and use of the GSOV50 must conform to the guidelines and restrictions included in this manual. No other information is needed for installation, operation and maintenance.

## Functional Testing after Initial Installation

A functional test of the GSOV50 is required prior to use in a safety system. This should be done as part of the overall safety system installation check. For guidance on the functional test, see the Proof Test procedure below.

## Functional Testing after Changes

A functional test of the GSOV50 is required after making any changes that affect the safety system. Although there are functions in the GSOV50 that are not directly safety related, it is recommended that a functional test be performed after any change.

## Proof Test (Functional Test)

The GSOV50 must be periodically proof tested to reveal dangerous faults, which are undetected, by automatic diagnostic tests. This proof test should be performed at least once per year during shutdown conditions and should consist of a full stroke of the actuator and valve per the following:

1. Ensure that the solenoid operator is de-energized.
2. Of the Verify that gas supply pressure is excess of 100 psig (690 kPa) is present at the inlet flange.
3. Check for leakage through the main valve mechanism by measuring the leakage flow rate from the vent connection. Leakage in excess of 400 $cm^3$/min may indicate valve seat wear or a possible malfunction.

# Chapter 5.
# 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:

- 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 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 current list of Woodward Business Partners is available at:
**https://www.woodward.com/en/support/industrial/service-and-spare-parts/find-a-local-partner**

## Product Service 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 (Woodward North American Terms and Conditions of Sale 5-09-0690) 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 North American Terms and Conditions of Sale 5-09-0690).

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 North American Terms and Conditions of Sale 5-09-0690) 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 North American Terms and Conditions of Sale 5-09-0690). 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 one of the Full-Service Distributors listed at **https://www.woodward.com/en/support/industrial/service-and-spare-parts/find-a-local-partner**

# Contacting Woodward's Support Organization

For the name of your nearest Woodward Full-Service Distributor or service facility, please consult our worldwide directory at **https://www.woodward.com/support**, 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) 8818 5515 |
| Germany | +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) 8818 5515 |
| 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) 8818 5515 |
| 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 _____

Turbine Model Number _____

Type of Fuel (gas, steam, 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 AJ—**

- Product name change from GSOV25HT to GSOV50, multiple places. Notes for "formerly GSOV25HT" added where relevant.
- Product description change from "Fuel Isolation Valve" to "Gas Shutoff Valve", multiple places.
- In the Regulatory Compliance section, new Warning added.
- In the Regulatory Compliance section, removed GSOV25HT CSA certificate references and replaced with electrical component information only.
- IECEx component certifications added
- Marine certifications added.
- Changed Special Conditions to "Field Wiring must be suitable for 90C and 20C above the maximum ambient temperature".
- Updated EU DoC, UKCA DoC, EU DoI, UKCA DoI

**Changes in Revision AH—**

- Removed EAC section from Regulatory Compliance

**Changes in Revision AG—**

- Remove the PED NoBo number in the Regulatory Compliance section
- Updated EU DoC, UKCA DoC, and Topworx EU DoC

**Changes in Revision AF—**

- Added United Kingdom Compliance for UKCA Marking and Other UKCA Compliance
- Updated EU DoC
- Added UKCA DoC
- Added UKCA DoI

**Changes in Revision AE—**

- Updated Regulatory Compliance section
- Added Warning box (page 7)

**Changes in Revision AD—**

- Replaced parts of the PED (valve) and ATEX directives in the Regulatory Compliance
- Replaced three Declarations

**Changes in Revision AC—**

- Added Piping Load paragraph and Table 2-1 to page 10
- Corrected 51mm spec to 50 mm in the paragraph immediately below the signal word boxes on pg. 10

**Changes in Revision AB—**

- Replaced SIL 2 with SIL 3 reference in the Regulatory Compliance section
- Revised the PED and Machinery Directives in the Regulatory Compliance section
- Added the RoHS Directive to the Regulatory Compliance section
- Updated SIL 2 language and replaced SIL 2 with SIL 3 references in Chapter 4
- Removed Table 4-1 and renumbered remaining Table from 4-2 to 4-1
- Replaced SIL 2 reference with SIL 3 reference in Competence of Personal section in Chapter 4
- Replaced all of the Declarations

**Changes in Revision AA—**

- Updated Compliance Section
- Updated Declarations

**Changes in Revision Y—**

- Added SIL Certification
- Added Chapter 4 Safety Management

- Updated Figure 1-1

**Changes in Revision V—**

- Updated ATEX compliance information
- Updated Declarations

**Changes in Revision U—**

- Changed reverse seat leakage requirement from ANSI Class IV to Class VI (page 2)
- Added note on how to re-position the conduit entry (page 6)

**Changes in Revision T—**

- Updated Regulatory Compliance information

**Changes in Revision R—**

- Updated Regulatory Compliance information
- Updated Declarations
- Added Notice to mark nameplates (page 5)

**Changes in Revision P—**

- Updated Regulatory Compliance information
- Updated Declaration

# Declarations

## EU DECLARATION OF CONFORMITY

| | |
|---|---|
| **EU DoC No.:** | 00125-04-CE-02-07 |
| **Manufacturer's Name:** | WOODWARD INC. |
| **Manufacturer's Contact Address:** | 1041 Woodward Way<br>Fort Collins, CO 80524 USA |
| **Model Name(s)/Number(s):** | GSOV50 |
| **The object of the declaration described above is in conformity with the following relevant Union harmonization legislation:** | Directive 2014/34/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres<br>Combined ATEX Equipment Assembly – see items below.<br>No additional ignition hazards identified by risk assessment.<br>Directive 2014/68/EU of the European Parliament and of the Council of 15 May 2014 on the harmonization of the laws of the Member States relating to the making available on the market of pressure equipment<br>PED Category II |
| **Markings in addition to CE marking:** | II 2G IIB T3 Gb<br>II 3G IIC T3 Gc |
| **Applicable Standards:** | |
| **ATEX:** | EN ISO 80079-36:2016 |
| **PED:** | ASME Boiler and Pressure Vessel Code VIII, Div. 1, 2015 |
| **Conformity Assessment:** | PED Module H – Full Quality Assurance<br>CE-0062-PED-H-WDI 001-25-USA-rev-A Bureau Veritas SAS (0062)<br>4 Place des Saisons, 92400 COURBEVOIE, FRANCE<br><br>Solenoid Operated Valve Assembly (G.W. Lisk Type M3-XXX-(XX) )<br>II 2G Ex db IIB T3 Gb, Sira 11ATEX1209X<br>II 3G Ex ec IIC T3 Gc, Sira 11ATEX4201X<br>EN IEC 60079-0:2018<br>EN 60079-1:2014<br>EN IEC 60079-7:2015/A1:2018<br>Proximity Switch (Topworx Series 7)<br>II 2G Ex db IIC T3 Gb, Baseefa 08ATEX0360X<br>EN IEC 60079-0:2018<br>EN 60079-1:2014 |

**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

**Annette Lynch**
Full Name

**Engineering Manager**
Position

**Woodward, Fort Collins, CO, USA**
Place

28 March 2025
Date

Page 1 of 1

5-09-1183 Rev 43

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

**File name:** 00125-04-CE-MD-02-01
**Manufacturer's Name:** WOODWARD INC.
**Manufacturer's Address:** 1041 Woodward Way
Fort Collins, CO 80524 USA

**Model Names:** GSOV50

**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 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

Annette Lynch
Full Name

Engineering Manager
Position

Woodward Inc., Fort Collins, CO, USA
Place

28 March 2025
Date

**Document**: 5-09-1182 (rev. 22) **PAGE** 1 of 1

## UKCA DECLARATION OF CONFORMITY

**UKCA DoC No.:** 00125-04-CE-UKCA-02-01
**Manufacturer's Name:** WOODWARD INC.

**Manufacturer's Contact Address:** 1041 Woodward Way
Fort Collins, CO 80524 USA

**Model Name(s)/Number(s):** GSOV50

**Markings in addition to UKCA marking:** Ex II 2G IIB T3 Gb
Ex II 3G IIC T3 Gc

**The object of this Declaration is in full conformity with the following UK Statutory Instruments (and their amendments):**

S.I. 2016 No. 1107 Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016
Combined ATEX Equipment Assembly – see items below.
No additional ignition hazards identified by risk assessment.

S.I. 2016 No. 1105 Pressure Equipment (Safety) Regulations 2016
PED Category II

**The object of this Declaration is in conformity with the applicable requirements of the following designated standards and technical specifications.**

**Applicable Standards:** EN ISO 80079-36:2016
ASME Boiler and Pressure Vessel Code VIII, Div. 1, 2015

**Conformity Assessment:** PED Module H – Full Quality Assurance
CE-0062-PED-H-WDI 001-25-USA-rev-A Bureau Veritas SAS (0062)
4 Place des Saisons, 92400 COURBEVOIE, FRANCE

**Solenoid Operated Valve Assembly (G.W. Lisk Type M3-XXX-(XX)**
II 2G Ex db IIB T3 Gb, Sira 11ATEX1209X
II 3G Ex ec IIC T3 Gc, Sira 11ATEX4201X
EN IEC 60079-0:2018
EN 60079-1:2014
EN IEC 60079-7:2015/A1:2018

**Proximity Switch (Topworx Series 7)**
II 2G Ex db IIC T3 Gb, Baseefa 08ATEX0360X
EN IEC 60079-0:2018
EN 60079-1:2014

**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 Regulation(s).**

**MANUFACTURER**

**Signature**

**Annette Lynch**
**Full Name**

**Engineering Manager**
**Position**

**Woodward, Fort Collins, CO, USA**
**Place**

28 March 2025
**Date**

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5-09-1183 Rev 43

**DECLARATION OF INCORPORATION**
**Of Partly Completed Machinery**
**S.I. 2008 No. 1597**

| | |
|---|---|
| **File name:** | 00125-04-CE-UKCA-02-02 |
| **Manufacturer's Name:** | WOODWARD INC. |
| **Manufacturer's Address:** | 1041 Woodward Way<br>Fort Collins, CO 80524 USA |
| **Model Names:** | GSOV50 |
| **This product complies, where applicable, with the following Essential Requirements of Schedule 2, Part1:** | 1.1, 1.2, 1.3, 1.5, 1.6, 1.7 |

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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: Andy Marshall, General Manager at Woodward Prestwick
Address: 5 Shawfarm Road, Prestwick, Ayrshire, Scotland, United Kingdom KA9 2TR

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 Regulation S.I. 2008 No. 1597 as partly completed machinery:

**MANUFACTURER**

Annette Lynch
Signature

Annette Lynch
Full Name

Engineering Manager
Position

Woodward Inc., Fort Collins, CO, USA
Place

28 March 2025
Date

**Document**: 5-09-1182 (rev. 22) **PAGE** 1 of 1

CE

TOPWORX

## EU Declaration of Conformity

**We, the undersigned,**

**TopWorx**
3300 Fern Valley Road
Louisville, Kentucky 40213
United States of America

**With Notification:**

**CSA Group Netherlands B.V.**
Utrechtseweg 310, Building B42
6812 AR Arnhem
Netherlands
NB# 2813

**And Certificate:**

EC Type Examination Certificate:

**BASEEFA 08ATEX0360X**
*(by SGS Fimko Oy - NB# 0598)*

**Certify and declare that the following apparatus:**

**TopWorx 70-Series GO™ Switch - Hazardous Locations - Flameproof**

**Model 7X-XXXXX-XX1549**

Ex db IIC T* Ga
Ex tb IIIC T* Da

(Reference certificate for specific markings)

**Conforms to the essential requirements of the ATEX Directive 2014/34/EU, based on the following standards applied, of latest issues, including amendments:**

EN IEC 60079-0:2018 EN 60079-1:2014 EN 60079-31:2014

**The technical documentation is kept at the following address:**

TopWorx
3300 Fern Valley Road
Louisville, Kentucky 40213
United States of America
+1.502.969.8000

Robert Coale
Product Compliance Supervisor

12 June 2023
(Date of Issue)

ES-03660-1EN_AB

ISO 9001, ISO 14001, AS 9100
& TS 16949 CERTIFIED

# G. W. LISK COMPANY, INC. 81983

ESTABLISHED 1910 2 SOUTH ST. CLIFTON SPRINGS, NY 14432-1195 315-462-2611 FAX 315-462-7661 www.GWLISK.com

## EU DECLARATION OF CONFORMITY
According to ISO/IEC 17050

**Manufacturer's Name:** G.W. Lisk Co. Inc.

**Manufacturer's Address:** 2 South Street, Clifton Springs, NY, USA

**Model Name(s)/Number(s):** Solenoid Operated Valve Assemblies
Type: M3-XXXX-(XX)
II 2G Ex d IIB T3 Gb Sira11ATEX1209X 15-GA4BO-0124X
II 3G Ex ec IIC T3 Gc Sira11ATEX4210X 15-GA4Bo-0125X

**Conformance to Directive(s):** Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.

Directive 2014/34/EU on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres.

**Applicable Standards:** EN IEC 60079-0:2018 - Explosive Atmospheres – Part 0: Equipment General Requirements.

EN 60079-1:2014/AC:2018 – Explosive Atmospheres – Part 1: Equipment Protection by Flameproof Enclosures "D"

EN 60079-7:2015+A1:2018 - Explosive Atmospheres - Part 7: Equipment Protection by increased safety "e".

**Common Standards:** EN 61000-6-2: 2005/COR:2005 - Generic Standard - Immunity for Industrial Environments. Evaluation has determined that this design is inherently immune to electrostatic discharge and surge voltages.

**3rd Party Certifications:** IECEx – SIR 11.0102X

**Notified Body For Production:** **CSA Group Netherlands B.V.**
Notified Body number : 2813
Utrechtseweg 310 (B42)
6812AR ARNHEM
Country : Netherlands

**This Declaration of Conformity is issued under the sole responsibility of the manufacturer. I declare that, on the date the equipment accompanied by this declaration is placed on the market, the equipment specified above conforms with all technical and regulatory requirements of the above listed Directive(s).**

Signature

| Anthony J Green | Quality Engineer/Certified Product Authority |
|---|---|
| **Full Name** | **Position** |
| 18Aug20 | Clifton Springs |
| **Date** | **Place of Issue** |

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Released

**We appreciate your comments about the content of our publications.**

**Send comments to: industrial.support@woodward.com**

**Please reference publication 26190.**

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WOODWARD

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**Email and Website—www.woodward.com**


**Woodward has company-owned plants, subsidiaries, and branches, as well as authorized distributors and other authorized service and sales facilities throughout the world.**

**Complete address / phone / fax / email information for all locations is available on our website.**