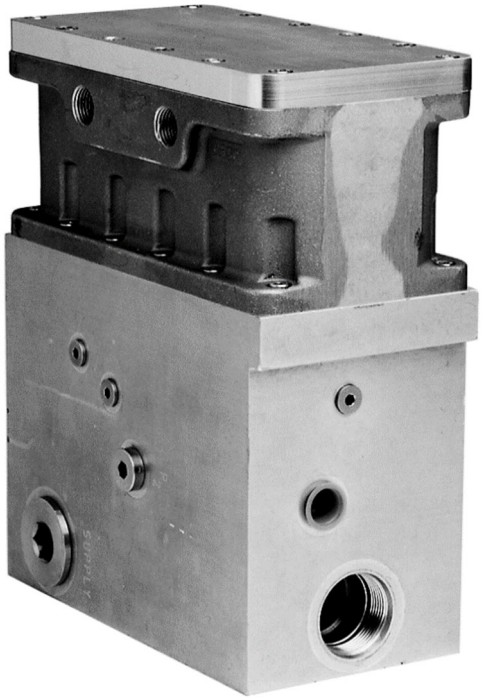
WOODWARD

Product Manual 40148
(Revision AB, 03/2023)

Original Instructions



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

http://www.woodward.com

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.

www.woodward.com/publications

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 40148

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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.

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 as 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. After removing the old PCB from the control cabinet, immediately 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. The declarations apply only to units marked, not all versions comply with each of these.

Pressure Equipment Directive: Directive 2014/68/EU on the harmonisation of the laws of the Member States related to making pressure equipment available on the market.
Product Type/Size: PED Category II
PED Module H – Full Quality Assurance,
CE-0062-PED-H-WDI 001-22-USA, Bureau Veritas SA (0062)

ATEX - Potentially Explosive Atmospheres Directive: Directive 2014/34/EU on the harmonisation of the laws of the Member States related to equipment and protective systems intended for use in potentially explosive atmospheres.

With Single Proximity Switch:
Zone 1: II 2 G, Ex db IIB T4 Gb, Sira 11ATEX1233X
Zone 2: II 3 G, Ex nA nC IIC T3 Gc

Without Proximity Switch:
Zone 1: II 2 G, Ex db IIB T4 Gb, Sira 11ATEX1233X
Zone 2: II 3 G, Ex nA IIC T3 Gc

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

ATEX Directive: Exempt from the ATEX Directive 2014/34/EU as non-electrical equipment bearing no potential ignition sources per EN ISO 80079-36:2016 for Zone 1.

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

United Kingdom Compliance for UKCA Marking
These listings are limited only to those units bearing the UKCA Marking. PENDING final approvals to all regulations.

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

UKEX: S.I. 2016 No.1107: Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016.
All Versions:
Zone 1: II 2 G, Ex db IIB T4 Gb, CSAE 23UKEX1006X
Versions with proximity switch:
Zone 2: II 3 G, Ex nA nC IIC T4 Gc
Versions without proximity switch:
Zone 2: II 3 G, Ex nA IIC T4 Gc
Note: UKEX Certificate is limited to Category 2 (Zone 1) and only for conduit entry versions. See Declaration of Conformity for clarification.

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

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

Hazardous Substances and Packaging: S.I. 2020 No. 1647: The Hazardous Substances and Packaging (Legislative Functions and Amendments) (EU Exit) Regulations 2020
Exemption in use: 6 (a), 6 (c), 7 (a), 7(c)-I

Other International Compliance
These listings are limited only to those units bearing the appropriate IECEx marking.

IECEx: Certified for use in explosive atmospheres per Certificate:
IECEx CSA 15.0052X Ex db IIB T4 Gb

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 T4
Class I, Division 2, Groups A, B, C, D
at 105°C Ambient and Fuel for use in Canada and the United States.
Certificate 1417839

Marine Compliance (9908-355 and 9908-365 stainless steel versions only):
Marine Type approval has been obtained on this product. The product has type approval for:

DNV-GL: DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV GL class programme CP-0186 – Type Approval of valves

ABS: Marine Main Propulsion and Electric Power Generation Applications - Liquid Fuel Shutoff Valve for Gas Turbine Engines 2016 Steel Vessels Rules

SIL Compliance:

LSOV25 Liquid Fuel Shutoff Valve – Certified SIL 3 Capable for fail-safe operation in safety instrumented systems. Evaluated to IEC 61508 Parts 1-7. Refer to the instructions of this Installation and Operation Manual, Chapter # 4 Safety Operations for LSOV25.
SIL Certificate WOO 1603100 C001

Special Conditions for Safe Use:

Wiring must be in accordance with North American Class I, Division 1 or Division 2, or European or other international Zone 1, Category 2 or Zone 2, Category 3 wiring methods as applicable, and in accordance with the authority having jurisdiction.

The LSOV25 must be installed upright (with the electrical enclosure on top) to maintain an IP54 rating.

Compliance with the Machinery Directive 2006/42/EC noise measurement and mitigation requirements is the responsibility of the manufacturer of the machinery into which this product is incorporated.

⚠CAUTION **Use supply wire suitable for at least 110°C.**

⚠ ATTENTION **Employer des fils d'alimentation qui comviennent pour au moins 110°C.**

⚠WARNING

Conduit seals must be installed within 18 inches (457 mm) of the conduit entry when the LSOV25 is used in Division 1 or Zone 1 hazardous locations.

A sealing device, such as a stopping box with setting compound, shall be provided, either as part of the flameproof enclosure or immediately at the entrance thereto when the LSOV25 is used in Zone 1 in Explosive Atmosphere. The sealing device is to be IECEx certified as Ex db IIB Gb minimum.

⚠AVERTISSEMENT

Les joints de conduit doivent être installés à moins de 457 mm (18 pouces) de l'entrée du conduit lorsque le LSOV25 est utilisé en Div. 1 ou zones 1 dangereuses

Un dispositif d'étanchéité tel qu'une boîte d'arrêt avec composé de prise doit être fourni, soit comme partie de l'enceinte antidéflagrante, soit immédiatement à l'entrée de celle-ci lorsque le LSOV25 est utilisé dans la zone 1 en atmosphère explosive. Le dispositif d'étanchéité doit être certifié IECEx au minimum Ex db IIB Gb.

⚠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.

Do not open when an explosive atmosphere is present

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.

Ne pas enlever les couvercles sans vous en assurez auparavant 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.

⚠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 nonhazardous.

⚠CAUTION

Flameproof joints are not intended to be repaired. If any repair is necessary, the product must be returned to the manufacturer

The dimensions of flameproof joints are stated on Woodard drawing 9989-7010, Revision A. Contact Woodward for more information.

⚠CAUTION

When replacing fasteners on the electrical enclosure or cover, use fasteners with class 12.9 (aluminum versions), or class A4-70 (316 stainless steel, for 9908-365 only)

See specifications for specific special fastener sizes, materials, and torque values.

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 is 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 µm (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 design of the shutoff valve protects the turbine if the normal fuel control becomes inoperative for any reason. Critical overspeed may occur if the valve fails 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 monitors 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

Table 1-1. Electrical Requirements

Voltage Available:	Nominal 24 VDC or 125 VDC
Power Consumption:	20 W nominal
Resistance to Ground:	10 MΩ minimum at 500 VDC
Dielectric Strength:	Leakage current less than 0.5 mA at 1000 VAC, plus twice the rated solenoid voltage for one minute.

Table 1-2. General Requirements

Fuel Compatibility:	The valve is compatible with most types of diesels, kerosene, gasoline, heavy and light distillates, including naphtha, gas turbine fuel and fuel oil, 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, but such substitutions are outside of the scope of the stated regulatory compliance. 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:	Filter liquid fuel 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.
Ambient Temperature:	(-28 to 105)°C / (-20 to 221)°F (-40 to 105)°C / (-40 to 221)°F part number 9908-364 only
Fuel Temperature:	(-28 to +105)°C / (-20 to 221)°F (-40 to 105)°C / (-40 to 221)°F part number 9908-364 only
Ingress Protection Rating:	IP54
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) (aluminum) 54.5 kg (120 lb.) (stainless steel)
Construction:	Anodized aluminum housing and enclosure with hardened stainless steel internal components or stainless steel housing and enclosure.
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 psig) inlet to discharge at 13 608 kg/h (30 000 lb/h) 958 kPa (139 psig) 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 cm³ maximum at 5516 kPa (800 psig)
Vibration:	Tested to MIL-STD-810C DNV – GL Vibration test 3.6.2 Class A (Stainless Steel Versions)
Reverse Pressure Condition:	6206 kPa (900 psig)
Special Fasteners:	Cover and Enclosure Screws: M6 x 1.0, 25mm long, alloy steel, class 12.9 (aluminum versions) M6 x 1.0, 25mm long, stainless steel, class A4-70 (9908-365 only) Tighten to 50.40 to 55.44 in.-lb. (5.69 to 6.26 n-m) of torque Valve Piston Cover Screws (all models): M10 x 1.5, 30mm long, stainless steel, class A4-70 (for the cover without position switch actuator rod) M10 x 1.5, 40mm long, stainless steel, class A4-70 (for the cover with position switch actuator rod) Tighten to 184.8 to 203.3 in.-lb. (20.88 to 22.97 n-m) of torque
Fluid Supply Pressure	
Maximum Working:	8274 kPa (1200 psig)

Proof:	12 411 kPa (1800 psig)
Burst:	41 370 kPa (6000 psig)
Maximum Bypass Pressure:	1724 kPa (250 psig)
Cracking Pressure:	690 kPa (100 psig) above reference pressure (bypass)

Chapter 2.
Installation

Receiving

The liquid fuel shutoff valve is tested with a non-corrosive liquid and is 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 user's responsibility 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 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

Conduit seals must be installed within 18 inches (457 mm) of the conduit entry when the LSOV25 is used in Division 1 or Zone 1 hazardous locations.

A sealing device such as a stopping box with a setting compound shall be provided, either as part of the flameproof enclosure or immediately at the entrance thereto when the LSOV25 is used in Zone 1 in Explosive Atmosphere. The sealing device is to be IECEx certified as Ex db IIB Gb minimum.

⚠AVERTISSEMENT

Les joints de conduit doivent être installés à moins de 457 mm (18 pouces) de l'entrée du conduit lorsque le LSOV25 est utilisé en Div. 1 ou zones 1 dangereuses

Un dispositif d'étanchéité tel qu'une boîte d'arrêt avec composé de prise doit être fourni, soit comme partie de l'enceinte antidéflagrante, soit immédiatement à l'entrée de celle-ci lorsque le LSOV25 est utilisé dans la zone 1 en atmosphère explosive. Le dispositif d'étanchéité doit être certifié IECEx au minimum Ex db IIB Gb.

⚠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.

Do not open when an explosive atmosphere is present

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.

Ne pas enlever les couvercles sans vous en assurez auparavant 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 threaded holes for the flameproof enclosure's critical fasteners use threaded inserts. When installing or removing the fasteners for the electrical enclosure cover, electrical enclosure, piston covers, or ground screw, make sure the threaded inserts are still in place and are not loose. If a loose insert is suspected, contact Woodward for repairs.

⚠AVERTISSEMENT

Les trous filetés des fixations critiques du boîtier antidéflagrant utilisent des inserts filetés. Lors de l'installation ou du retrait des fixations du couvercle du boîtier électrique, du boîtier électrique, des couvercles de piston ou de la vis de mise à la terre, assurez-vous que les inserts filetés sont toujours en place et ne sont pas desserrés. Si un insert lâche est suspecté, contactez Woodward pour les réparations.

The stainless steel version is equipped with eyebolts designed for safe lifting. Aluminum versions require 5/16”-18 eyebolts. See Figure 2.1 for the recommended method for lifting the valve using the eyebolts and lifting slings. Eyebolts provided to stainless steel version have a weight capacity of 400 lbs. per eyebolt. Use lifting straps with a weight capacity greater than the weight of the unit.

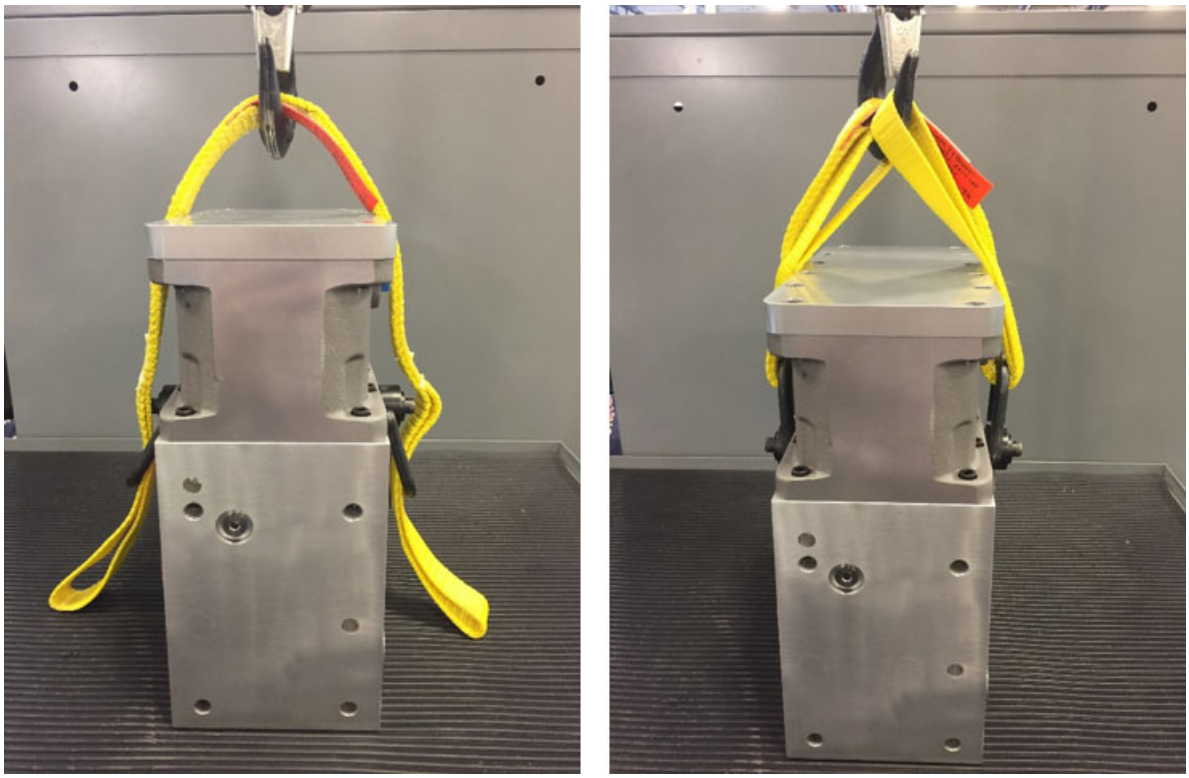

Figure 2-1. Lifting Sling Installation

⚠WARNING

Do not lift or handle the valve by any conduit. Lift or handle only by using both eyebolts (Woodward part number 1113-1020) [stainless steel version] 5/16” eyebolts (aluminum version).

⚠WARNING

SPECIAL CONDITIONS OF SAFE USE: The explosion protection of this product relies on the proper implementation of all applicable Special Conditions of Safe Use, as listed in the Regulatory Compliance section.

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 the valve).

The LSOV25 must be installed upright (with the electrical enclosure on top) to maintain the IP54 rating.

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.

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

⚠WARNING

EXPLOSION HAZARD – Do not plug or restrict flow from the overboard vent ports. These vent ports must be connected to a drain header in a safe area.

Fuel Vent Port

There is a fuel vent port that must be vented to a safe location. In normal operation, this vent should have zero leakage. However, if excessive leakage is detected from this vent port, contact a Woodward representative for assistance.

⚠WARNING

EXPLOSION HAZARD – Do not plug or restrict flow from the overboard vent ports. These vent ports must be connected to a drain header in a safe area.

Electrical

⚠WARNING

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

Field wiring must be suitable for at least 110 °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 solenoid pins on the terminal block (see the outline drawing). Polarity is not important.

Grounding connection must be made to the external and internal ground (via conduit ports). The grounding connection is suitable for wire size 8.4 to 3.3 mm2 (8 to 12 AWG).

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 in Figures 2-8a and 2-8b.

⚠WARNING

SWITCH INSTALLATION: For use in a Division 1 or 2 or Zone 1 or 2 environment, connect only resistive loads to the position switch (through the solenoid connector) that meet the limits of the specifications chapter. The making/breaking of highly inductive or capacitive loads has not been evaluated and may impair the suitability of the device.

⚠CAUTION

All electrical connections must be properly assembled and secured to prevent an electrical hazard.

⚠WARNING

Damage to sealing surfaces may result in moisture ingress, fire, or explosion. Clean the surface with rubbing alcohol if necessary. To ensure there is no damage or contamination to the LSOV25 joint surfaces, inspect thoroughly.

Although there are functions in the LSOV25 that are not directly safety related, perform a functional test after the wiring and installation are complete. The functional check requires that liquid fuel supply flow is present at the LSOV25 valve inlet port. Energize the LSOV25 solenoid valve and verify the valve opens

as indicated by the position switch (if applicable) and a change in fuel flow from Bypass to Outlet. De-energize the solenoid and verify the valve closes as indicated by the position switch and a change in fuel flow from Outlet to Bypass.

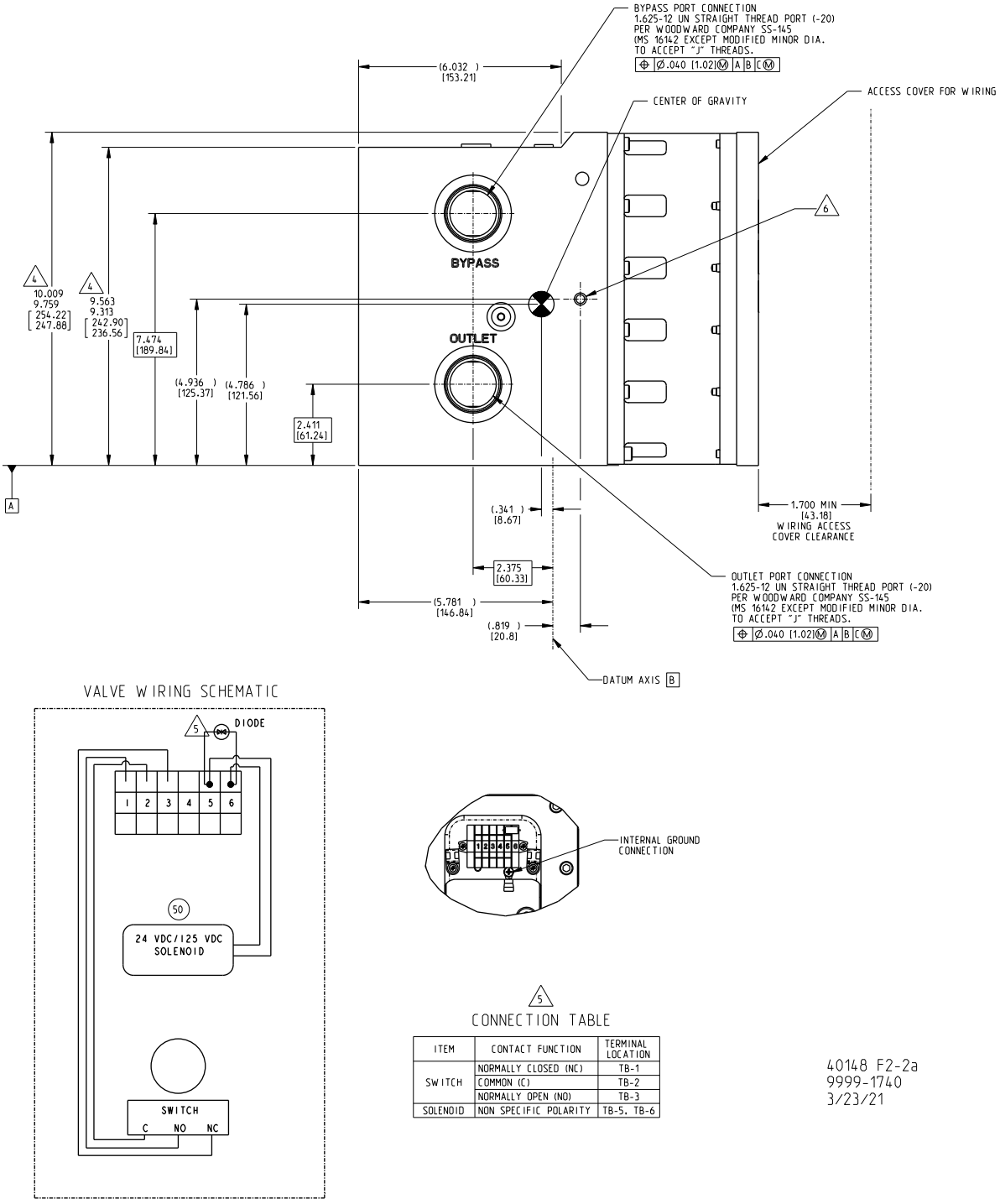

Figure 2-2a. Outline Drawing LSOV25 with Proximity Switch

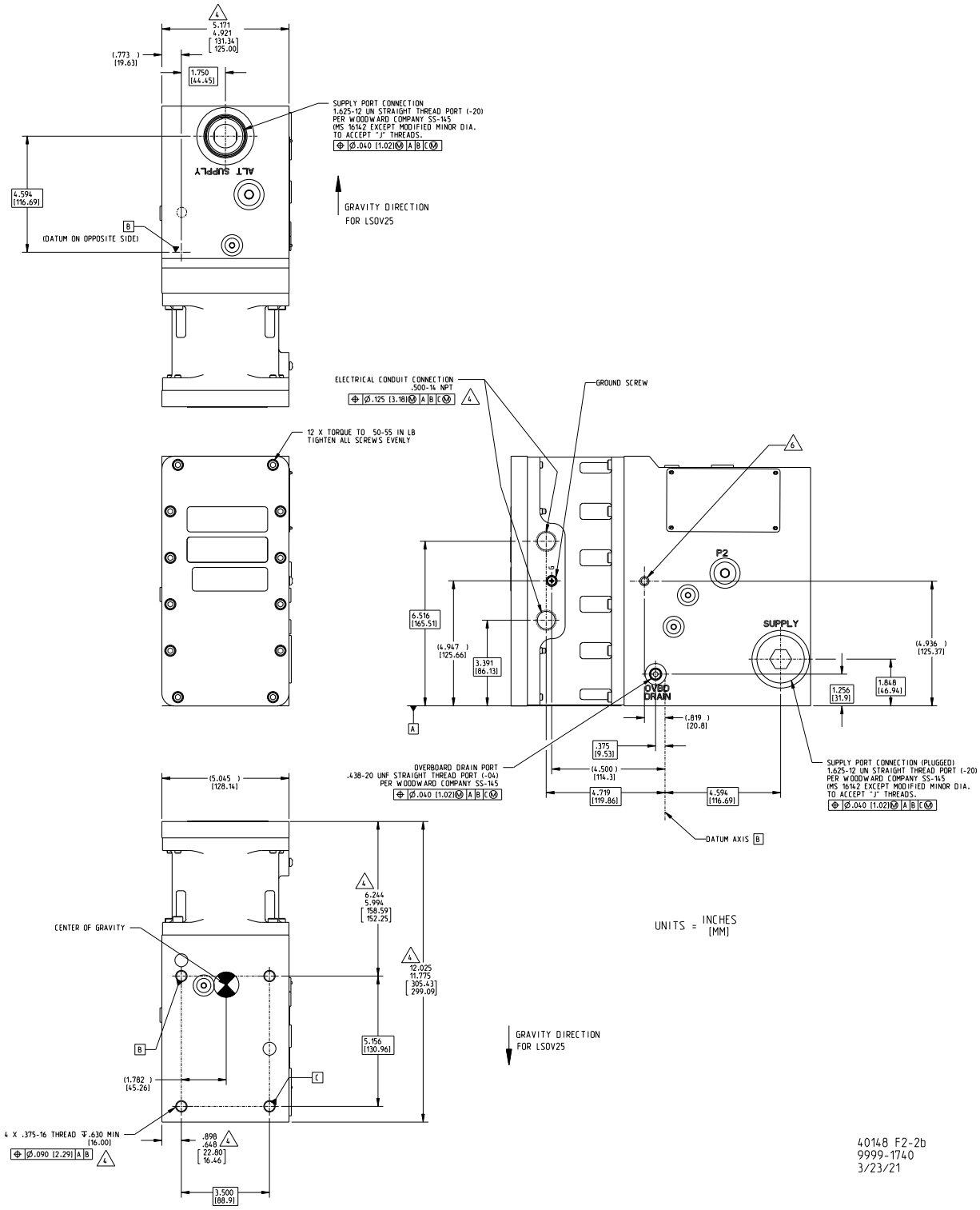

Figure 2-2b. Outline Drawing LSOV25 with Proximity Switch

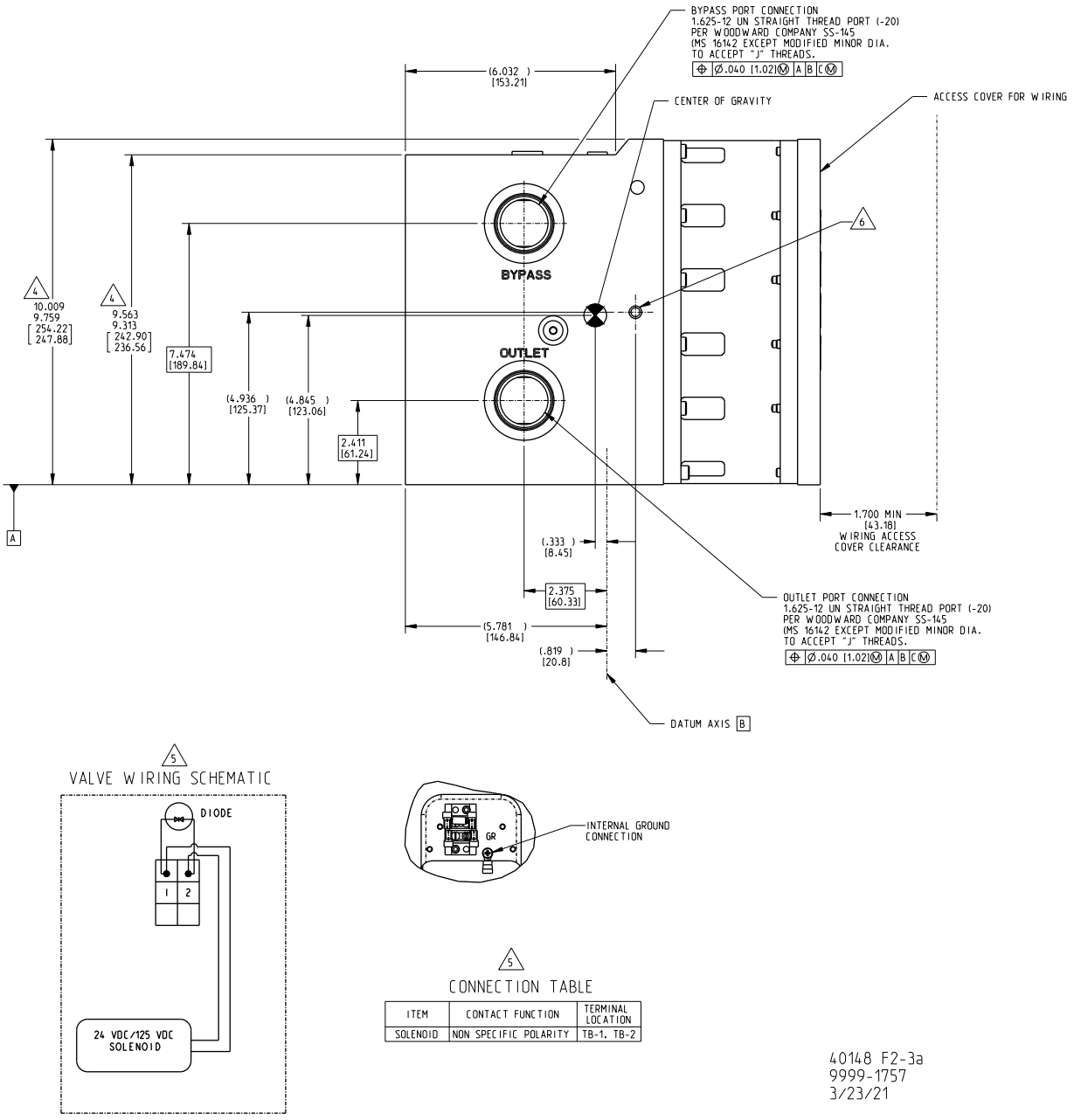

Figure 2-3a. Outline Drawing LSOV25, 24 VDC/125 VDC, 0.5 NPT Conduit

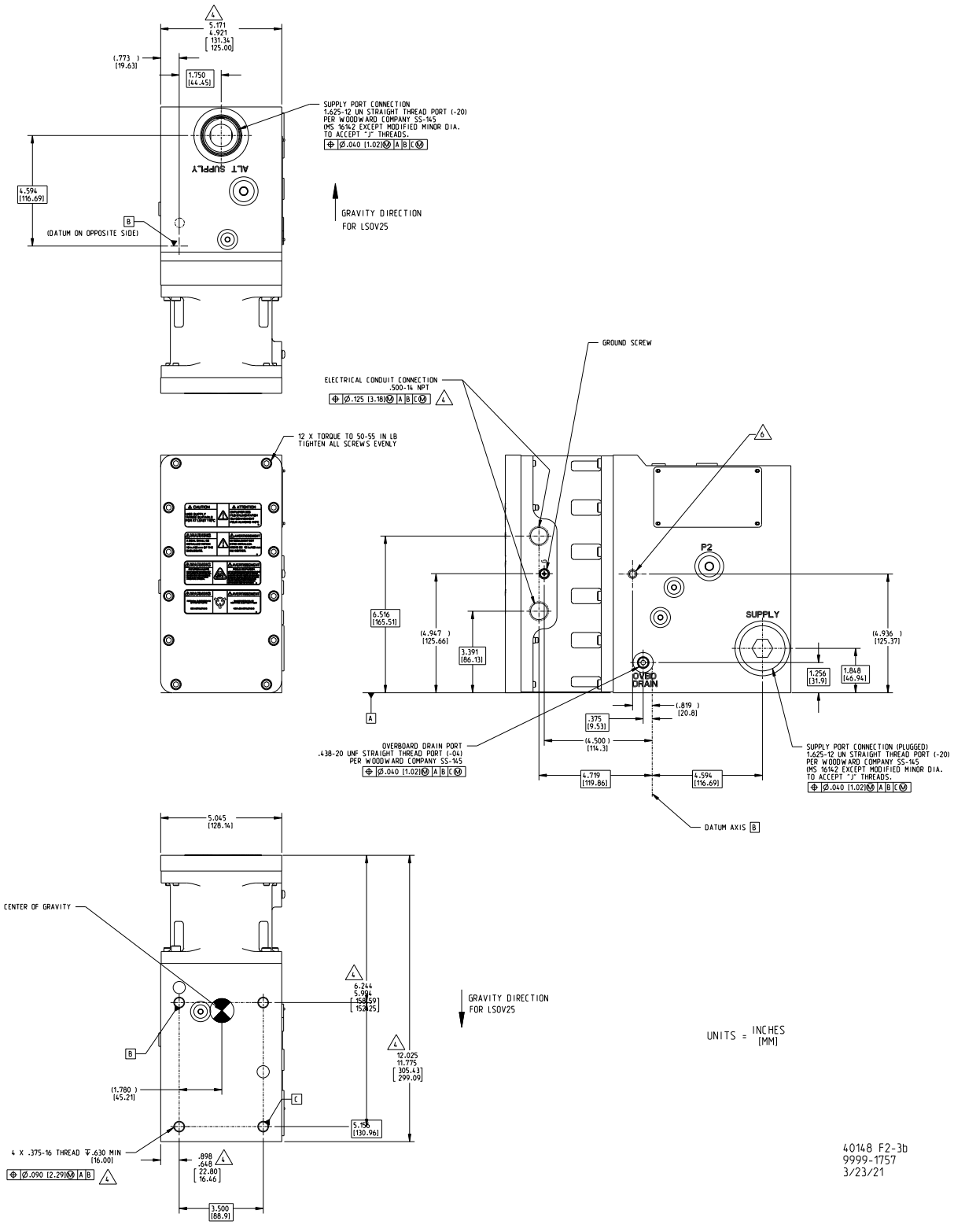

Figure 2-3b. Outline Drawing LSOV25, 24 VDC/125 VDC, 0.5 NPT Conduit

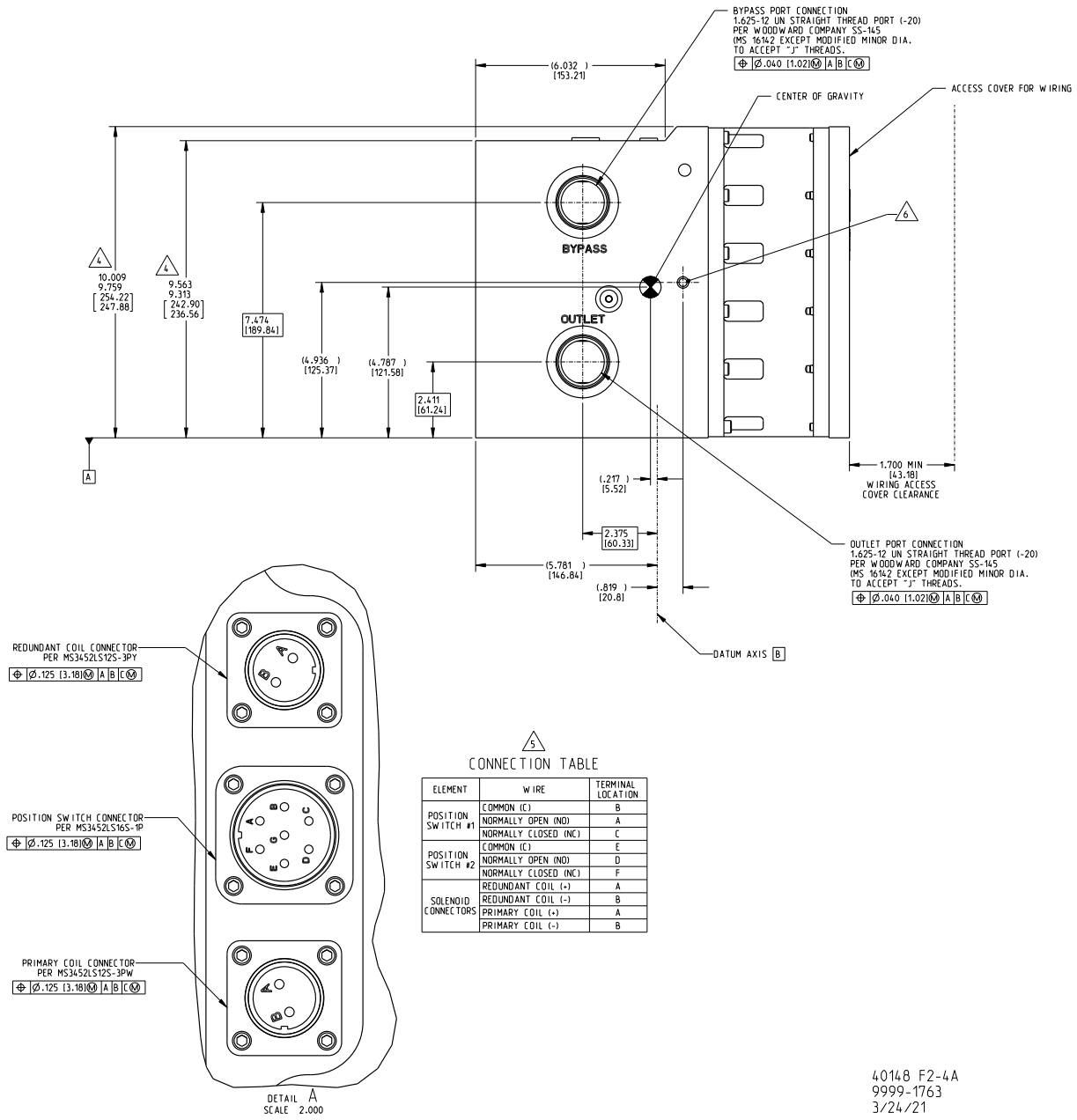

Figure 2-4a. Outline Drawing LSOV25 with Dual Proximity Switch and Dual Solenoid

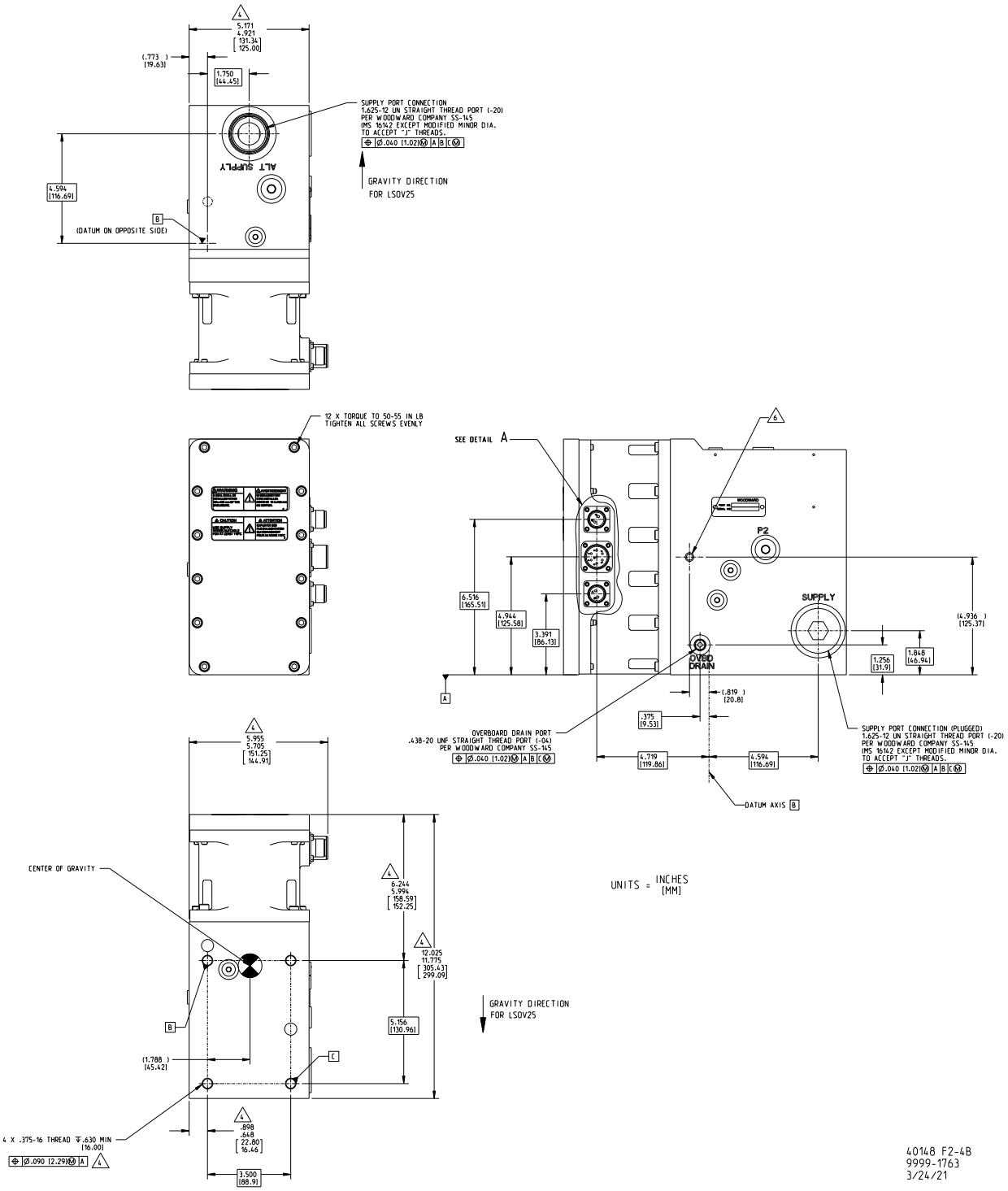

Figure 2-4b. Outline Drawing LSOV25 with Dual Proximity Switch and Dual Solenoid

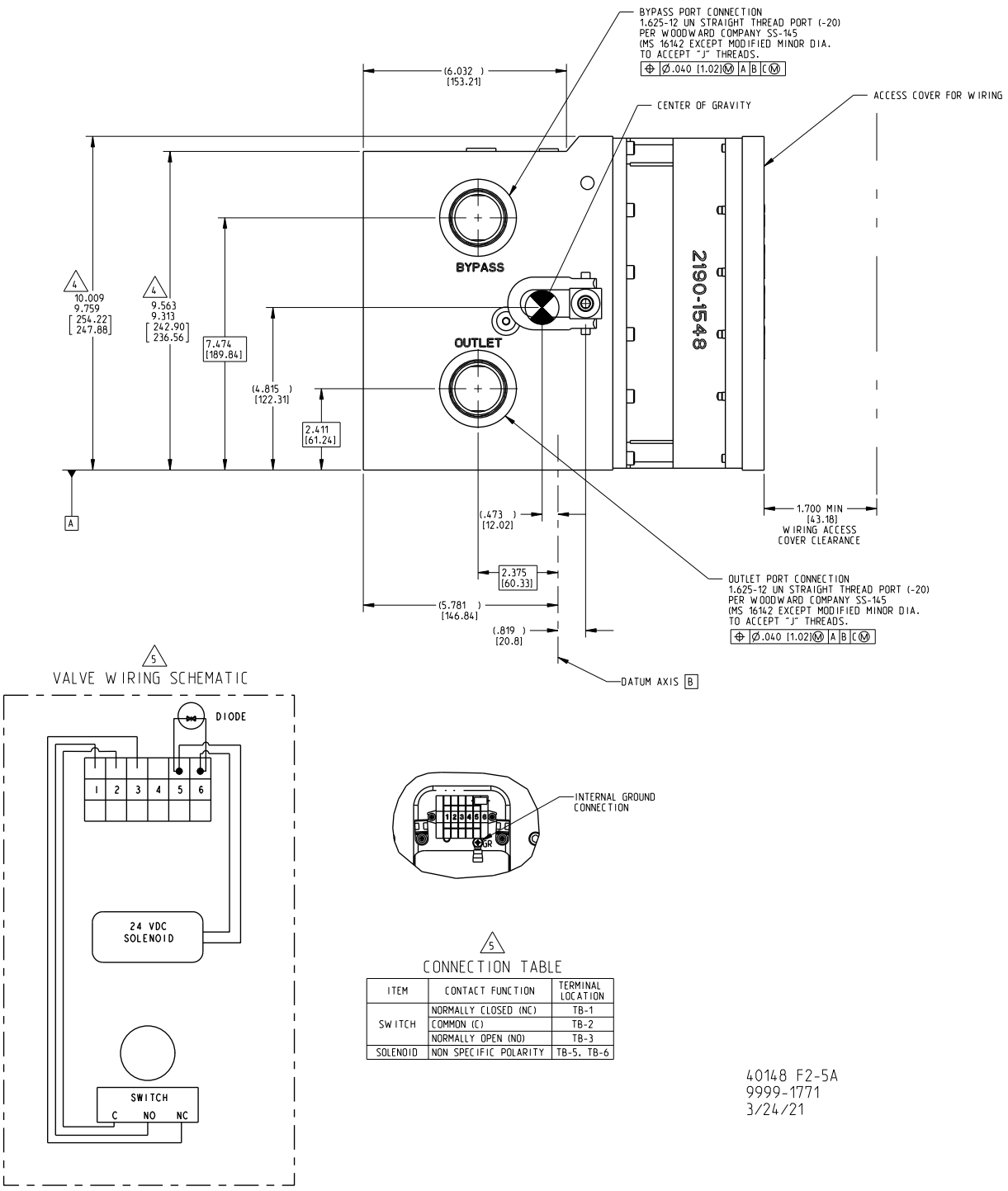

Figure 2-5a. Outline Drawing LSOV25, Stainless Steel, 24 VDC, with Single Proximity Switch

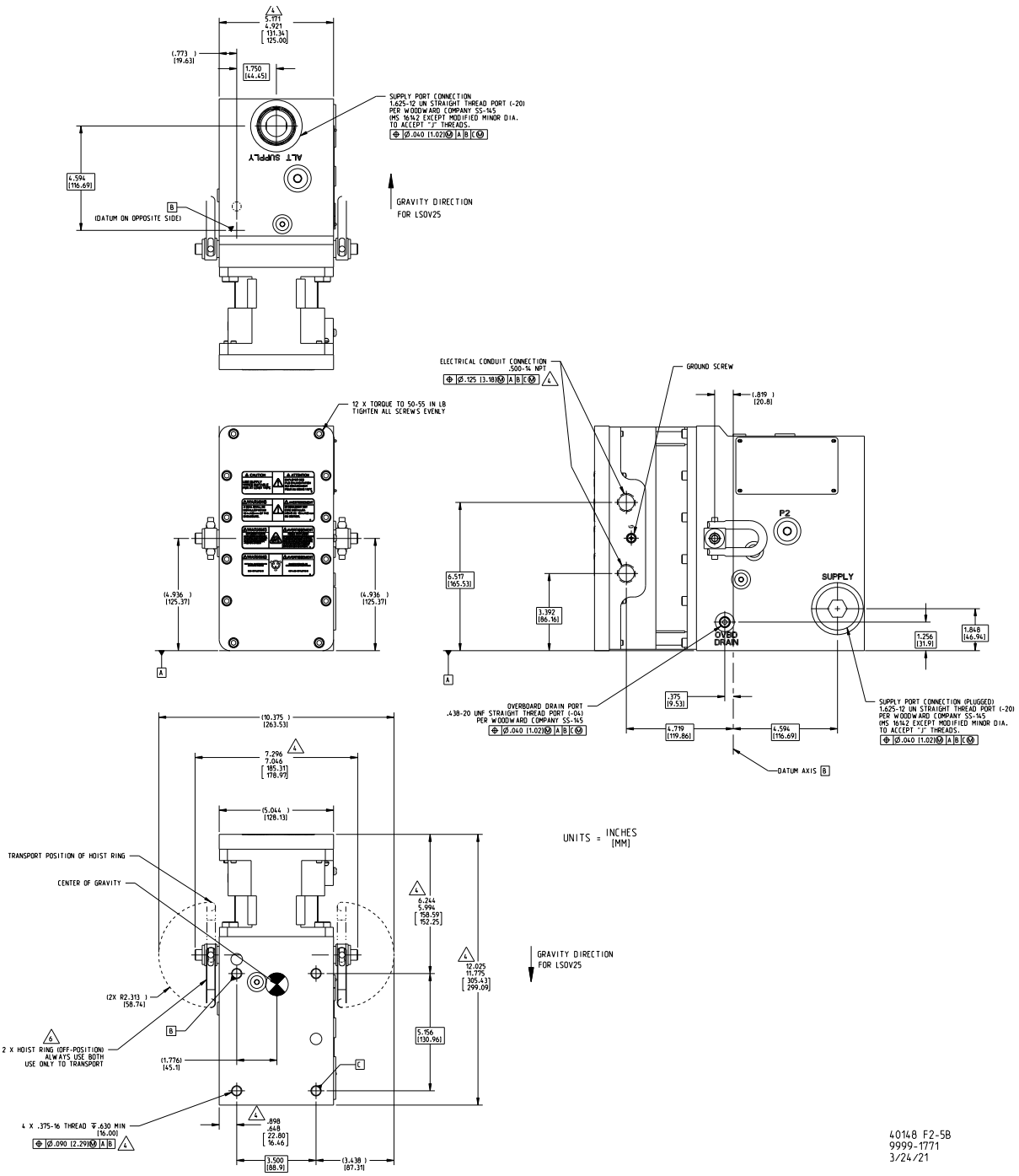

Figure 2-5b. Outline Drawing LSOV25, Stainless Steel, 24 VDC, with Single Proximity Switch

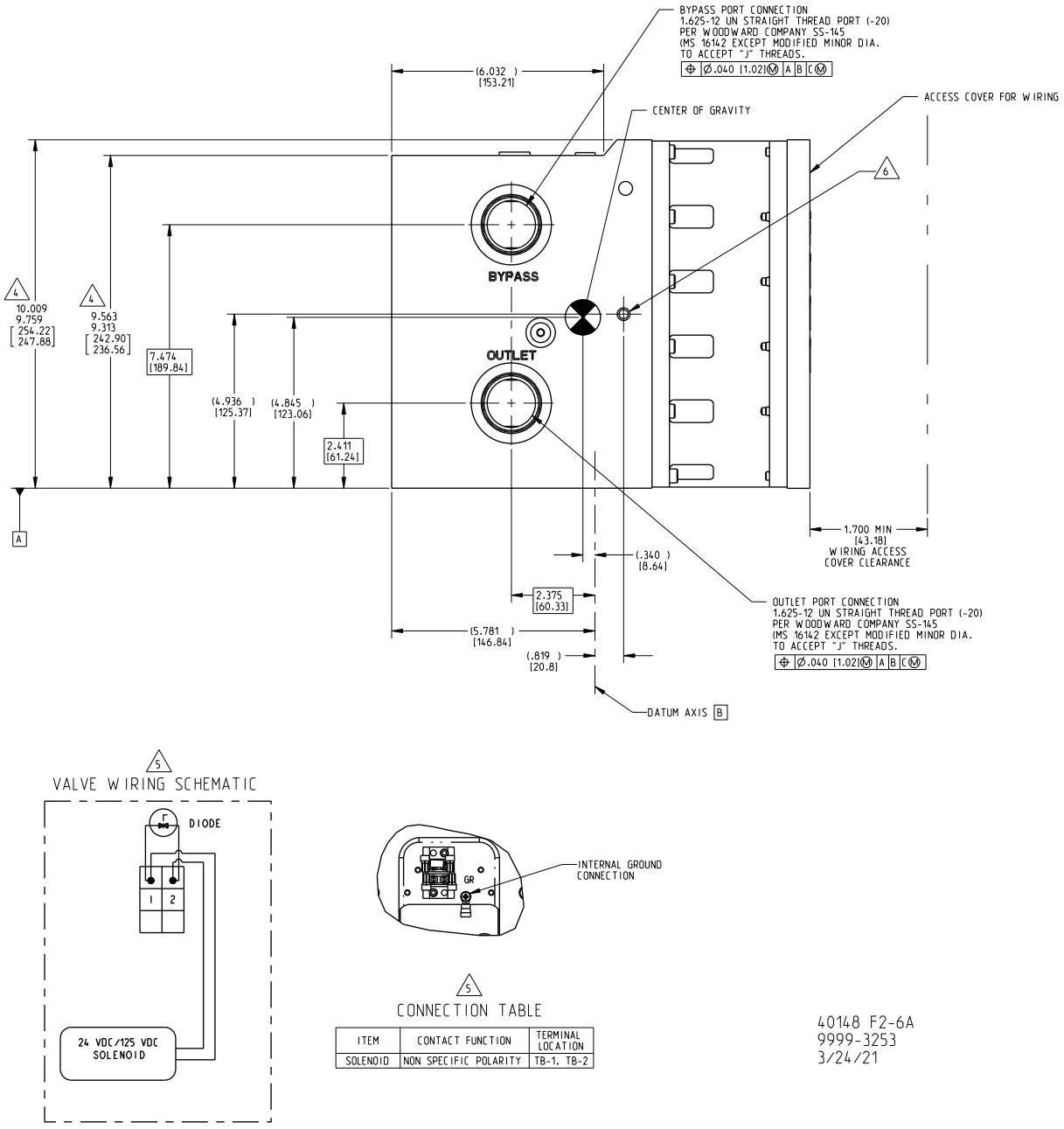

Figure 2-6a. Outline Drawing LSOV25, M20-1.5 Conduit

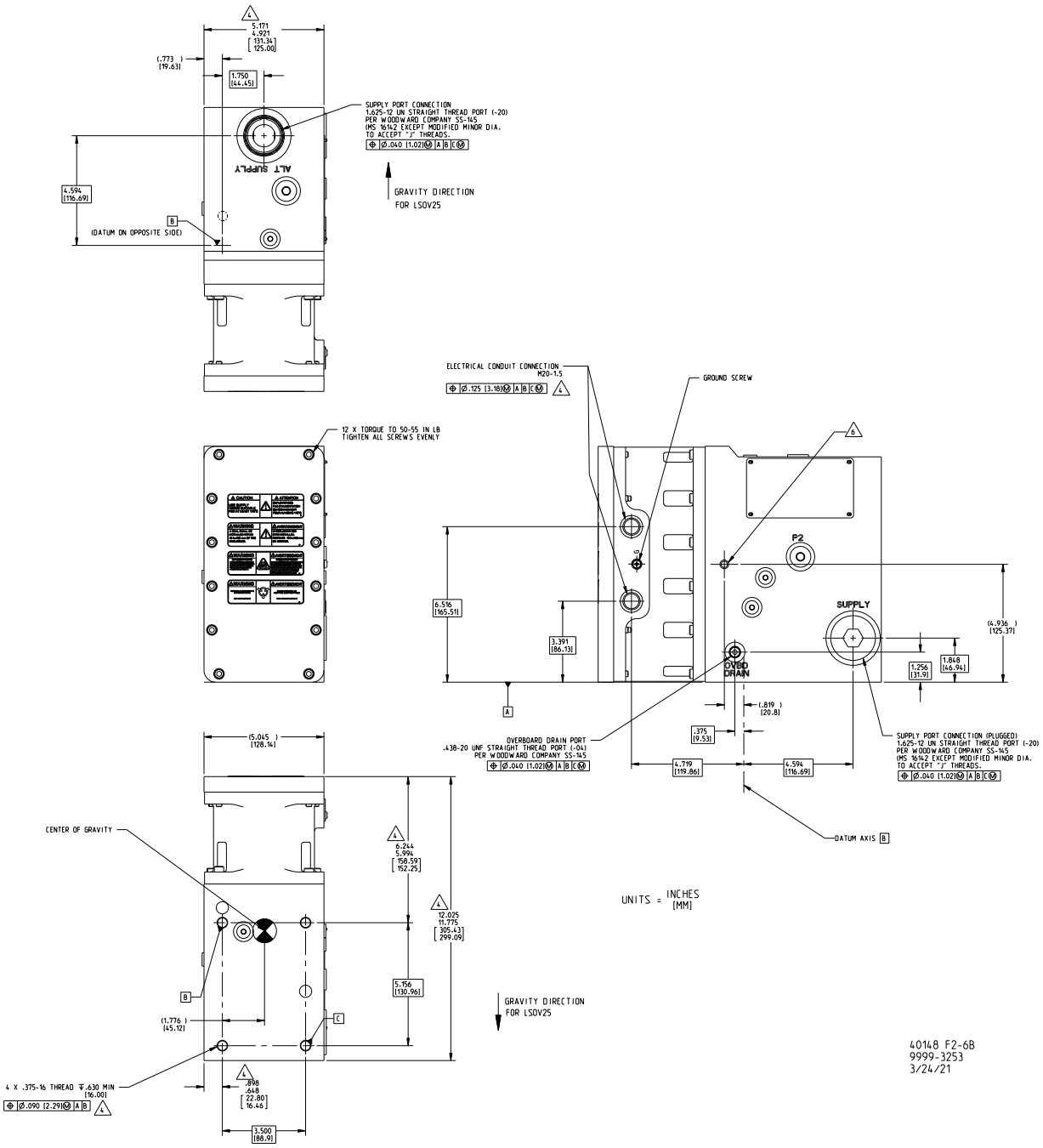

Figure 2-6b. Outline Drawing LSOV25, M20-1.5 Conduit

Maintenance

⚠WARNING

Take care not to damage the cover or enclosure, the enclosure or valve housing threads and screws, or the valve housing threads while removing or installing the cover and enclosure.
The specified fastener torque is very important to ensure that the unit is properly sealed. For imperial (inch) versions, the cover bolts must be tightened to (8.7 to 9.6) N·m / (77 to 85) lb-in. For versions with metric bolts tighten to (5.7 to 6.3 N·m / (50.4 to 55.4) lb-in

⚠WARNING

The threaded holes for the flameproof enclosure's critical fasteners use threaded inserts. When installing or removing the fasteners for the electrical enclosure cover, electrical enclosure, piston covers, or ground screw, make sure the threaded inserts are still in place and are not loose. If a loose insert is suspected, contact Woodward for repairs.

Les trous filetés des fixations critiques du boîtier antidéflagrant utilisent des inserts filetés. Lors de l'installation ou du retrait des fixations du couvercle du boîtier électrique, du boîtier électrique, des couvercles de piston ou de la vis de mise à la terre, assurez-vous que les inserts filetés sont toujours en place et ne sont pas desserrés. Si un insert lâche est suspecté, contactez Woodward pour les réparations.

Woodward recommends disassembling the product for cleaning and inspection every 10,000 cycles or three years of operation, whichever occurs first. In case of contamination of the interior passages, field disassembly and cleaning only by a trained service technician is authorized.

Routinely check the shutdown switches or relays to be sure that they can interrupt the electronic signal to the shutoff valve.

A functional test of the LSOV25 is required after making any changes that affect the safety system. Although there are functions in the LSOV25 that are not directly safety related, perform a functional test after any change. The functional check requires that liquid fuel supply flow is present at the LSOV25 valve Inlet port. Energize the LSOV25 solenoid valve and verify the valve opens as indicated by the position switch (if applicable) and a change in fuel flow from Bypass to Outlet. De-energize the solenoid and verify the valve closes as indicated by the position switch and a change in fuel flow from Outlet to Bypass.

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

The LSOV25 must be periodically leak tested to reveal dangerous faults that are undetected by automatic diagnostic tests. Perform this leak test at least once per year during shutdown conditions as follows:

1. Verify that the solenoid operator is de-energized and the valve is closed as indicated by the position switch (if applicable).
2. Verify that liquid fuel supply flow is present at the LSOV25 valve Inlet port. Verify that fuel flow is from Inlet to Bypass.
3. Throttle Bypass flow to raise Inlet pressure to 400 psig minimum, 1200 psig maximum. Check for leakage at the LSOV25 Outlet.

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 is proof of wear and/or possible malfunction. When there is proof of wear, immediately replace and return the valve for factory service.

You can expect a minimal amount of leakage through the bypass connection of the valve. When the volumes of leakage changes appreciably, replace the valve and return to a service facility.

⚠WARNING

Damage to sealing surfaces may result in moisture ingress, fire, or explosion. Clean the surface with rubbing alcohol if necessary. To ensure there is no damage or contamination to the LSOV25 joint surfaces, inspect thoroughly.

NOTICE

FREEZING HAZARD: Fluid supply lines should be thoroughly flushed prior to storage of the LSOV25 to prevent freezing damage.

⚠WARNING

Remove electrical power and pressure prior to performing any maintenance.

Chapter 3.
Principles of Operation

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 µm 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.

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).

Chapter 4.
Safety Operations for LSOV25

Product Variations Certified

The SIL rated LSOV25 Liquid Shutoff Valve is designed and certified to the functional safety standards according to IEC61508. Reference SIL certificate WOO 1603100 C001. Contact Woodward for a copy of the SIL certificate.

The functional safety requirement in this manual applies to all LSOV25 Liquid Shutoff Valves. The SIL rated valves will have a DU FIT of less 765 for Full Stroke versions.

The LSOV25 Liquid Shutoff Valve is certified for use in applications up to SIL 3 according to IEC 61508.

The LSOV25 Liquid Shutoff Valve is designed to provide fast shutoff of liquid fuel flow to an industrial gas turbine. Fuel flow to the engine is stopped when the valve is closed (de-energized), with zero leakage from the inlet to the outlet. The fuel inlet flow to the LSOV25 is directed to Bypass which leads back to the fuel pump or fuel reservoir.

The following version was considered in the FMEDA of the LSOV25 Liquid Shutoff Valve:

LSOV25 Liquid Shutoff Valve, Full Stroke: State where the valve is closed (de-energized) with fuel flow being directed from Inlet to Bypass. Fuel flow from Inlet to Outlet is closed.

SFF (Safe Failure Fraction) for the LSOV25

The LSOV25 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 LSOV25 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 LSOV25, 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 16-03-100 R001 for detailed information concerning the SFF.

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

Device	λ_{SD}	λ_{SU}[2]	λ_{DD}	λ_{DU}
Full Stroke	0	705	0	765

The LSOV25 Liquid Shutoff Valve is a Type A device. 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 LSOV25.

Response Time Data

The LSOV25 full stroke response time to close is as follows: less than 100 ms @ 1200 psig (8274 kPa) fuel pressure.

Limitations

When proper installation, maintenance, proof testing, and environmental limitations are observed, the useful life of the LSOV25 is 10,000 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 LSOV25 Liquid Shutoff Valve. For full functional safety certification purposes, consider all requirements of IEC 61508.

Restrictions

The user must complete a full functional check of the LSOV25 after initial installation, and after any modification of the overall safety system. No modification shall be made to the LSOV25 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 LSOV25 must be used within the published specification in this manual.

Competence of Personnel

All personnel involved in the installation and maintenance of the LSOV25 must have appropriate training. Training and guidance materials are included this manual.

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

Operation and Maintenance Practice

A periodic leak test of the LSOV25 is required to verify proper operation. More information is in the “Yearly Leak Test” section below. The frequency of the leak test is determined by the overall safety system design, of which the LSOV25 is part of the safety system. The safety numbers recorded in the following sections assist the system integrator determine the appropriate test interval.

The LSOV25 requires no special tools for operation or maintenance.

Installation and Site Acceptance Testing

Installation and use of the LSOV25 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 LSOV25 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 procedure below.

Functional Testing after Changes

A functional test of the LSOV25 is required after making any changes that affect the safety system. Although there are functions in the LSOV25 that are not directly safety related, recommend you perform a functional test after any change. The functional check requires that liquid fuel supply flow is present at the LSOV25 valve Inlet port. Energize the LSOV25 solenoid valve and verify the valve opens as indicated by the position switch (if applicable) and a change in fuel flow from Bypass to Outlet. De-energize the solenoid and verify the valve closes as indicated by the position switch and a change in fuel flow from Outlet to Bypass.

Yearly Leak Test

The LSOV25 must be periodically leak tested to reveal dangerous faults that are undetected by automatic diagnostic tests. Perform this leak test at least once per year during shutdown conditions as follows:

1. Verify that the solenoid operator is de-energized and the valve is closed as indicated by the position switch (if applicable).
2. Verify that liquid fuel supply flow is present at the LSOV25 valve Inlet port. Verify that fuel flow is from Inlet to Bypass.
3. Throttle Bypass flow to raise Inlet pressure to 400 psig minimum, 1200 psig maximum. Check for leakage at the LSOV25 Outlet. Any continuous measurable leakage may indicate valve seat wear or a possible malfunction. If you detect leakage, return valve to Woodward for service.

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 **www.woodward.com/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 (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 one of the Full-Service Distributors listed at www.woodward.com/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 (32) 422-5551
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 (32) 422-5551
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 (32) 422-5551
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 AB—
- Updated Regulatory Compliance section with new UKCA section
- Added UKCA Declarations

Changes in Revision AA—
- Updated the Regulatory Compliance section
- Replaced DoC and DoI

Changes in Revision Y—
- Revised PED and ATEX PEAD in Regulatory Compliance section
- Corrected and added Signal Word boxes in Special Conditions for Safe Use section
- Replaced Signal Word boxes at the end of Chapter 1.
- Added Ingress Protection Rating Vibration, and Special Fasteners rows to Table 1-2
- Corrected the temperature range in Ambient and Fuel Temperature rows on Table 1-2
- Added a paragraph to the Electrical section in Chapter 2
- Added a multiple Signal Word boxes in Chapter 2
- Replaced Figures 2-2 through 2-6
- Replaced Declarations

Changes in Revision W—
- Replaced SIL 2 with SIL 3 information in Regulatory Compliance section
- Replaced SIL 2 with SIL3 in Chapter 4
- Removed Table 4-1 then renumbered Table 4-1 into Table 4-2

Changes in Revision V—
- Removed paragraph immediately above Figure 2-1
- Replaced image in Figure 2-1

Changes in Revision U—
- Changes in Regulatory Compliance section include:
  - Added content to European Compliance
  - Added temperature code T3 to ATEX certification
  - Changed content in the IECEx certification
  - Changed temperature and other content in CSA certification
  - New content in Special Conditions for Safe Use Section
  - New Caution and Warning boxes
  - Added Marine Compliance content
- Changed Fuel Compatibility, Ambient Temperature, Fuel Temperature, and Weight in Table 2-1
- Added Warning boxes to page 8
- Added new paragraph immediately above new Figure 2-1, Lifting Sling Installation
- Added content to existing warning box and added warning box immediately above Mounting section
- Added paragraph to end of Mounting section
- Added Temperature to first paragraph in Electrical section
- Added two new warning boxes and updated content in existing warning boxes
- Added new figures 2-2 through 2-5
- Added additional content and new warning and notice boxed to Maintenance section
- Removed Cutaway drawings in Figures 3-1 and 3-2
- Added new part numbers to Table 4-1
- Added new DOC and DOI

Changes in Revision T—
- Added Other International Compliance to Regulatory Compliance section

Changes in Revision R—
- Updated Regulatory Compliance information
- Updated DOC and DOI
- Inserted SIL2 certification information
- Inserted Chapter 4 Safety Operations for LSOV25

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

EU DECLARATION OF CONFORMITY

EU DoC No.:	00119-04-EU-02-01
Manufacturer's Name:	WOODWARD INC.
Manufacturer's Contact Address:	1041 Woodward Way Fort Collins, CO 80524 USA
Model Name(s)/Number(s):	LSOV25 Liquid Shutoff Valve, with and without single proximity switch, aluminum or stainless steel construction
The object of the declaration described above is in conformity with the following relevant Union harmonization legislation:	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 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
Markings in addition to CE marking:	**For all versions:** Ⓔx II 2 G, Ex db IIB T4 Gb **With proximity switch:** Ⓔx II 3 G, Ex nA nC IIC T3 Gc **Without proximity switch:** Ⓔx II 3 G, Ex nA IIC T3 Gc
Applicable Standards:	EN IEC 60079-0:2018 Explosive atmospheres -Part 0: Equipment - General requirements EN 60079-1:2014 Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d" EN 60079-15:2010 Explosive atmospheres -- Part 15: Equipment protection by type of protection "n" ASME Boiler and Pressure Vessel Code VIII, Div. 2, 2015
Third Party Certification:	Category 2: Sira 11ATEX1233X CSA Group Netherlands B.V. Utrechtseweg 310 (B42), 6812 AR Arnhem NETHERLANDS
Conformity Assessment:	PED Module H – Full Quality Assurance, CE-0062-PED-H-WDI 001-22-USA, Bureau Veritas SAS (0062) 8 Cr du Triangle, 92800 Puteaux, FRANCE
(Category 2 only)	ATEX Annex IV - Production Quality Assessment, 01 220 113542 TUV Rheinland Industrie Service GmbH (0035) Am Grauen Stein 1, 51105 Köln, GERMANY

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

Annette Lynch	**Signature**
Annette Lynch	**Full Name**
Engineering Manager	**Position**
Woodward, Fort Collins, CO, USA	**Place**
March 4, 2022	**Date**

5-09-1183 Rev 33

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

File name:	00119-04-EU-02-02
Manufacturer's Name:	WOODWARD INC.
Manufacturer's Address:	1041 Woodward Way Fort Collins, CO 80524 USA
Model Names:	LSOV25 Liquid Shutoff Valve
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: Dominik Kania, Managing Director
Address: Woodward Poland Sp. z o.o., ul. Skarbowa 32, 32-005 Niepolomice, Poland

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

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

MANUFACTURER

Annette Lynch
Signature

Annette Lynch
Full Name

Engineering Manager
Position

Woodward Inc., Fort Collins, CO, USA
Place

March 4, 2022
Date

Document: 5-09-1182 (rev. 16)

UKCA DECLARATION OF CONFORMITY

UKCA DoC No.: 00119-04-EU-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): LSOV25 Liquid Shutoff Valve, with and without single proximity switch, aluminum or stainless steel construction

Markings in addition to UKCA marking:

With proximity switch:
II 2 G, Ex db IIB T4 Gb
II 3 G, Ex nA nC IIC T3 Gc

Without proximity:
II 2 G, Ex db IIB T4 Gb
II 3 G, Ex nA IIC T3 Gc

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

S.I. 2016/1107	Equipment and Protective Systems intended for Use in Potentially Explosive Atmospheres Regulations 2016
S.I. 2016/1105	Pressure Equipment (Safety) Regulations 2016, Category II

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

EN IEC 60079-0:2018	Explosive atmospheres - Part 0: Equipment - General requirements
EN 60079-1:2014	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures
EN 60079-15:2010	Explosive atmospheres - Part 15: Equipment protection by type of protection
ASME BPVC Sec. VIII, Div. 2, 2015	Boiler and Pressure Vessel Code
Third Party Certification (Category 2 Only)	CSAE 23UKEX1006X CSA Group Testing UK Ltd., Unit 6 Hawarden Industrial Park, Hawarden, CH5 3US, UK
Conformity Assessment	ATEX Annex IV - Production Quality Assessment, 01 220 113542 TUV Rheinland UK Ltd Friars Gate (Third Floor), 1011 Stratford Road, Shirley, Solihull, B90 4BN, Approved Body # 2571 PED Module H – Full Quality Assurance CE-0062-PED-H-WDI 001-22-USA Bureau Veritas SAS (0062) 8 Cours du Triangle, 92800 Puteaux – La Defense, FRANCE

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

Annette Lynch
Signature

Annette Lynch
Full Name

Engineering Manager
Position

Woodward, Fort Collins, CO, USA
Place

22 March 2023
Date

Page 1 of 1

5-09-1183 Rev 39

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

File name:	00119-04-EU-UKCA-02-02
Manufacturer's Name:	WOODWARD INC.
Manufacturer's Address:	1041 Woodward Way Fort Collins, CO 80524 USA
Model Names:	LSOV25 Liquid Shutoff Valve
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: 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

22 March 2023
Date

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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 40148.

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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.