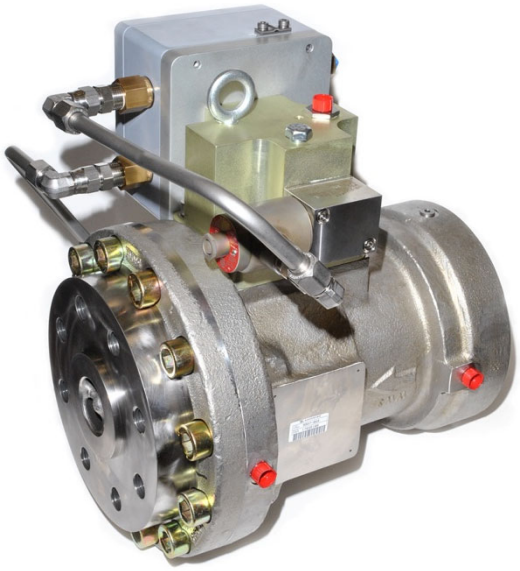
WOODWARD

Product Specification **03382**
(Revision E, 8/2020)

USOV 51 mm (2") & 76 mm (3")

Universal Shutoff Valves

Description



The Universal Shutoff Valves (USOVs) is a normally-closed, three-stage device, designed to terminate fuel flow in less than 100 ms after interruption of the electrical supply current. The 51 mm (2-inch) valve has a maximum operating pressure of 12 411 kPa (1800 psig), and the 76 mm (3-inch) valve has a maximum operating pressure of 6895 kPa (1000 psig). Valve closure is due to the stored energy of a coiled spring in the primary stage.

The liquid-only 51 mm valve is compatible with de-ionized water and most liquid fuels, including diesel fuel, methanol, ethanol, Jet "A", kerosene, #2 home heating oil, heated light crudes, and residuals.

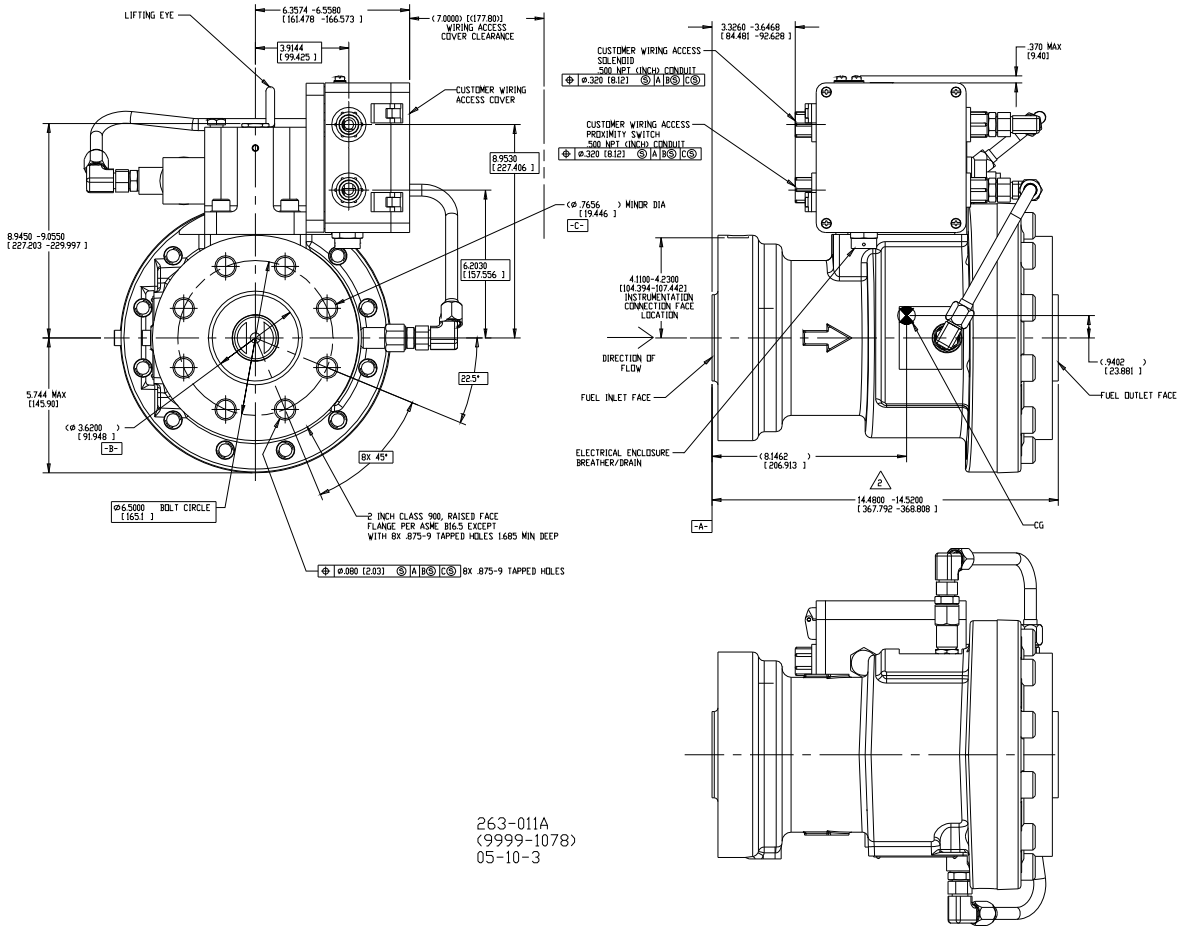
The gaseous or liquid 76 mm valve is compatible with most gaseous and liquid fuels, including natural gas, propane, ethane, methane, diesel fuel, methanol, ethanol, Jet "A", kerosene, #2 home heating oil, heated light crudes, and residuals.

All-stainless-steel components with Viton, Vespel, and PTFE seal materials accommodate most fuel contaminates.

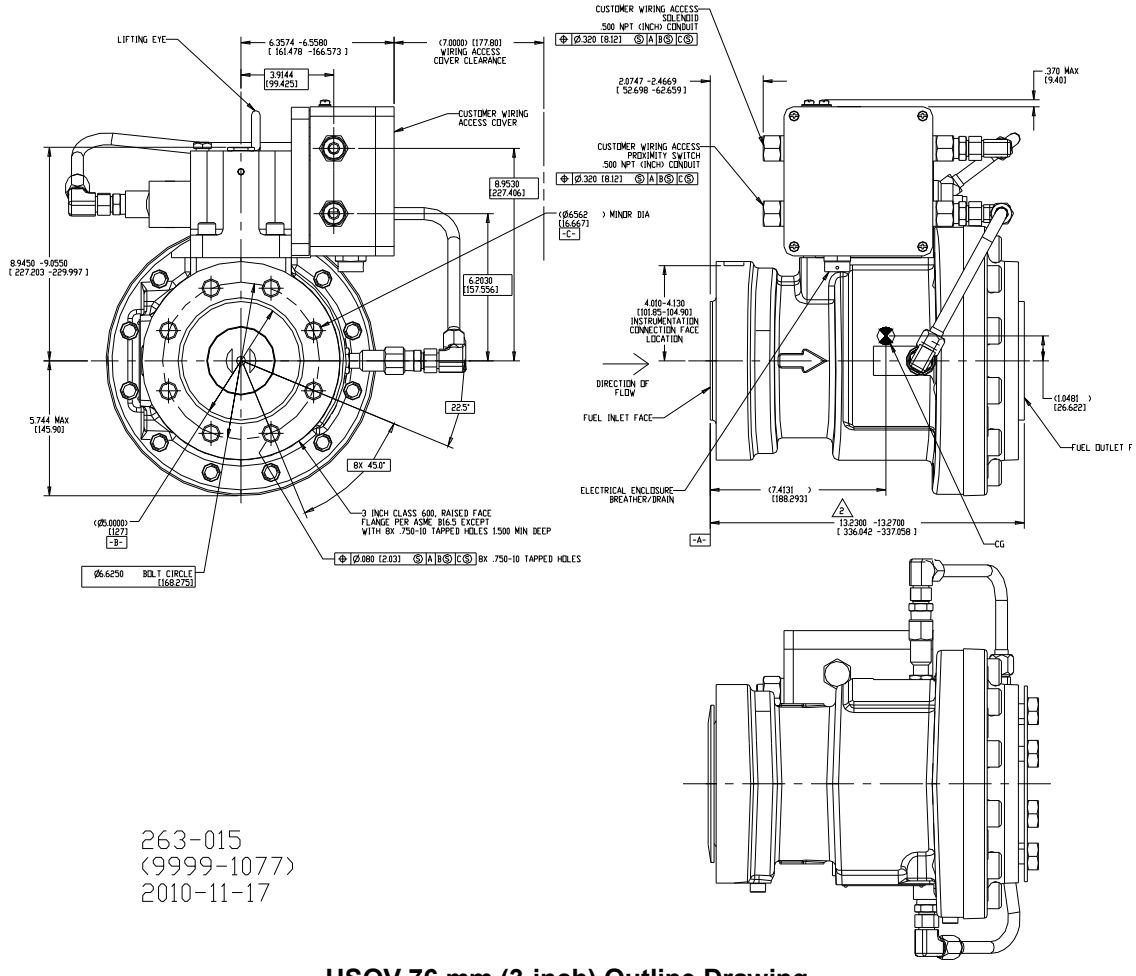
An integral 40 µm (nominal) filter screen protects the first and second stage components from damage due to particulate contamination. The fuel isolation valve is constructed of corrosion-resistant materials. Both USOVs will positively seal in a reverse-pressure condition up to 4482 kPa (650 psig).

The valve is designed to be NACE compliant per NACE MR0175-2000 sulfide stress cracking resistant metallic materials for oilfield equipment, NACE International.

- Gas or liquid fuel operation
- <0.100 second closing time
- Stainless steel construction
- ANSI/FCI 70-2 – 1991 Class VI Leakage (forward and reverse)
- Fuel temperature range (–40 to +193) °C / (–40 to +380) °F
- Ambient temperature range (–40 to +82) °C / (–40 to +180) °F



USOV 51 mm (2-inch) Outline Drawing



USOV 76 mm (3-inch) Outline Drawing

Specifications

USOV 51 mm (2-inch)

Closing Time:	Less than 100 ms at all conditions
Opening Time:	Less than 1 s at all conditions
Cycle Life:	2500 cycles
Minimum Allowed Actuation Pressure:	552 kPa (80 psig)
Maximum Allowed Actuation Pressure:	965 kPa (140 psig)
Maximum Allowed Operating Pressure:	12 411 kPa (1800 psig) from –40 °C to +66 °C / –40 °F to +150 °F 11 032 kPa (1600 psig) from 66 °C to 121 °C / 151 °F to 250 °F
Valve Proof Pressure:	18 616 kPa (2700 psig)
Valve Burst Pressure:	74 466 kPa (10 800 psig)
Maximum Allowed Vent Port Back Pressure:	345 kPa (50 psig)
Maximum Allowed Reverse Pressure:	4482 kPa (650 psig)
Valve Leakage Rating:	For new and refurbished valves: ANSI/FCI 70-2-1991 Class VI, forward and reverse and MSS SP-61. In the reverse direction, Class VI leakage is limited to 4482 kPa (650 psid).
Maximum Allowed Liquid Fuel/Actuation Air Overboard Vent Leakage:	5 cm³/min steady state at max operating pressure conditions (**NOTE**—Below –29 °C / –20 °F, overboard leakage may be higher)
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 Greater than 10 µm, 0.3 ppm by volume maximum
Valve Weight:	98 kg (216 lb)
Fuel Compatibility:	De-ionized water, diesel fuel, methanol, ethanol, Jet "A", kerosene, #2 home heating oil, heated light crudes, residuals or most typical liquid fuels
Ambient Temperature Range:	(–40 to +82) °C / (–40 to +180) °F
Fuel Temperature Range:	(–40 to +121) °C / (–40 to +250) °F
Nominal Pipe/Flange Size:	50.8 mm (2") Class 900, raised face per ASME B16.5 except with 8X 0.875-9 tapped holes
Proximity Switch Contact Ratings:	0.5 A @ 24 V (dc)
Solenoid Voltage:	(18 to 32) V (dc)
Solenoid Power Consumption:	10 W
Ingress Protection Rating:	IP66 per IEC 60529
Technical Manual:	26307 (liquid only)

USOV 76 mm (3-inch)

Closing Time:	Less than 100 ms
Opening Time:	Less than 1 s
Cycle Life:	2500 cycles
Minimum Allowed Actuation Pressure:	552 kPa (80 psig)
Maximum Allowed Actuation Pressure:	965 kPa (140 psig)
Maximum Allowed Operating Pressure:	6895 kPa (1000 psig)
Valve Proof Pressure:	15 000 kPa (2175 psig)
Valve Burst Pressure:	34 475 kPa (5000 psig)
Maximum Allowed Vent Port Back Pressure:	345 kPa (50 psig)
Maximum Allowed Reverse Pressure:	4482 kPa (650 psig)
Valve Leakage Rating:	For new and refurbished valves: ANSI/FCI 70-2-1991 Class VI, forward and reverse and MSS SP-61. Additionally, new and refurbished valves meet Class VI leakage at all conditions of pressure and temperature in the forward direction. In the reverse direction, Class VI leakage is limited to 4482 kPa (650 psig).
Maximum Allowed Liquid Fuel/Actuation Air Overboard Vent Leakage:	For new and refurbished valves: less than 5 cm³/min (for gas temperatures from –29 °C to +193 °C / –20 °F to +380 °F) and less than 500 cm³/min (for gas temperature between –29 °C and –40 °C / –20 °F and –40 °F).
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 Greater than 10 µm, 0.3 ppm by volume maximum
Valve Weight:	88 kg (194 lb)
Fuel Compatibility:	Natural gas, propane, ethane, methane, diesel fuel, methanol, ethanol, Jet "A", kerosene, #2 home heating oil, heated light crudes, residuals or most typical liquid fuels
Ambient Temperature Range:	(–40 to +82) °C / (–40 to +180) °F
Fuel Temperature Range:	(–40 to +193) °C / (–40 to +380) °F **NOTE**—For proper operation of the 3" USOV, the maximum differential between ambient and fuel temperatures must not exceed 167 °C (300 °F) concurrently. Exceeding this limit may result in slower operating times.
Nominal Pipe/Flange Size:	76.2 mm (3") Class 600, raised face per ASME B16.5 except with 8X 0.750-10 tapped holes
Proximity Switch Contact Ratings:	0.5 A @ 24 V (dc)
Solenoid Voltage:	(18 to 32) V (dc)
Solenoid Power Consumption:	10 W
Ingress Protection Rating:	IP66 per IEC 60529
Technical Manual:	26335 (gas or liquid)

Regulatory Compliance

European Compliance for CE Marking:

Pressure Equipment Directive: 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. PED Module H – Full Quality Assurance,
CE-0041-PED-H-WDI 001-16-USA, Bureau Veritas UK Ltd (0041)

ATEX – Potentially Explosive Atmospheres Directive: Directive 2014/34/EU on the harmonization of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres. Assembly is suitable for Zone 2, Category 3, Group II G, Ex nA IIC T3

Other European and International Compliance:

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

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.

ATEX: Exempt from the ATEX Directive 2014/34/EU as non-electrical equipment bearing no potential ignition sources per EN 13463-1. Suitable for Zone 2, Category 3 IIC T3.

North American Compliance:

CSA: CSA Certified for Class I, Division 2, Groups A, B, C, and D, T3 at 82 °C Ambient. For use in Canada and the United States.
Certificate 160584-1125151

SIL Compliance:

USOV – Universal Shutoff Valve – Certified SIL 3 Capable for Shutoff in safety instrumented systems. Evaluated to IEC 61508 Parts 1-7. Refer to the instructions of the Installation and Operation Manual, Chapter 4 Safety Management.
SIL Certificate WOO 1603100 C001

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Distributors & Service

Woodward has an international network of distributors and service facilities. For your nearest representative, call the Fort Collins plant or see the Worldwide Directory on our website.

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