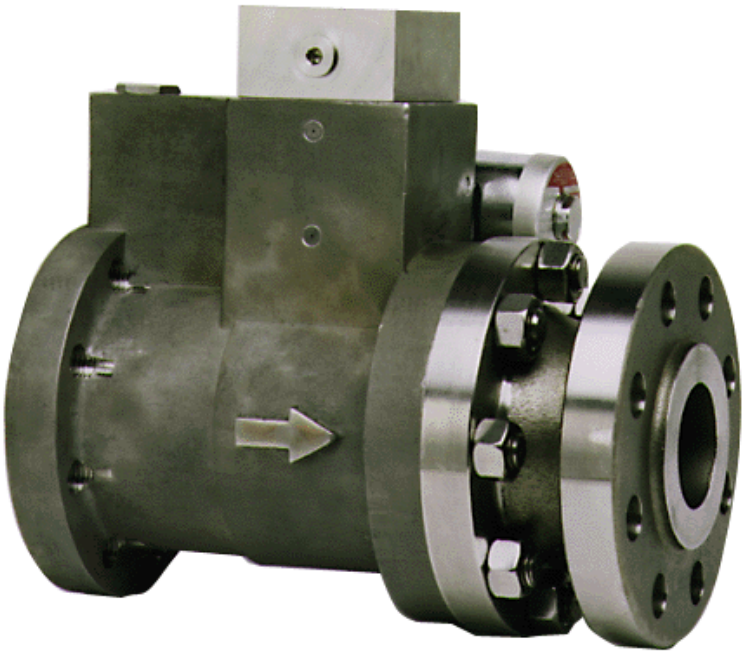
GSOV25 HT

Fuel Isolation Valve

Applications



The Woodward GSOV25 HT fuel isolation valve is designed to provide extremely fast shutoff of gaseous fuel flow to an industrial gas turbine engine. Gas flow is stopped when the valve is closed, with zero leakage from inlet to outlet. The HT version can withstand higher fuel temperatures and higher back pressures than the standard version. It is suitable for operation with gas temperatures between –4 and +350 °F (–20 and +177 °C). The valve can achieve ANSI Class VI shut-off capability in the reverse flow direction with a pressure differential of 500 psi (3448 kPa).

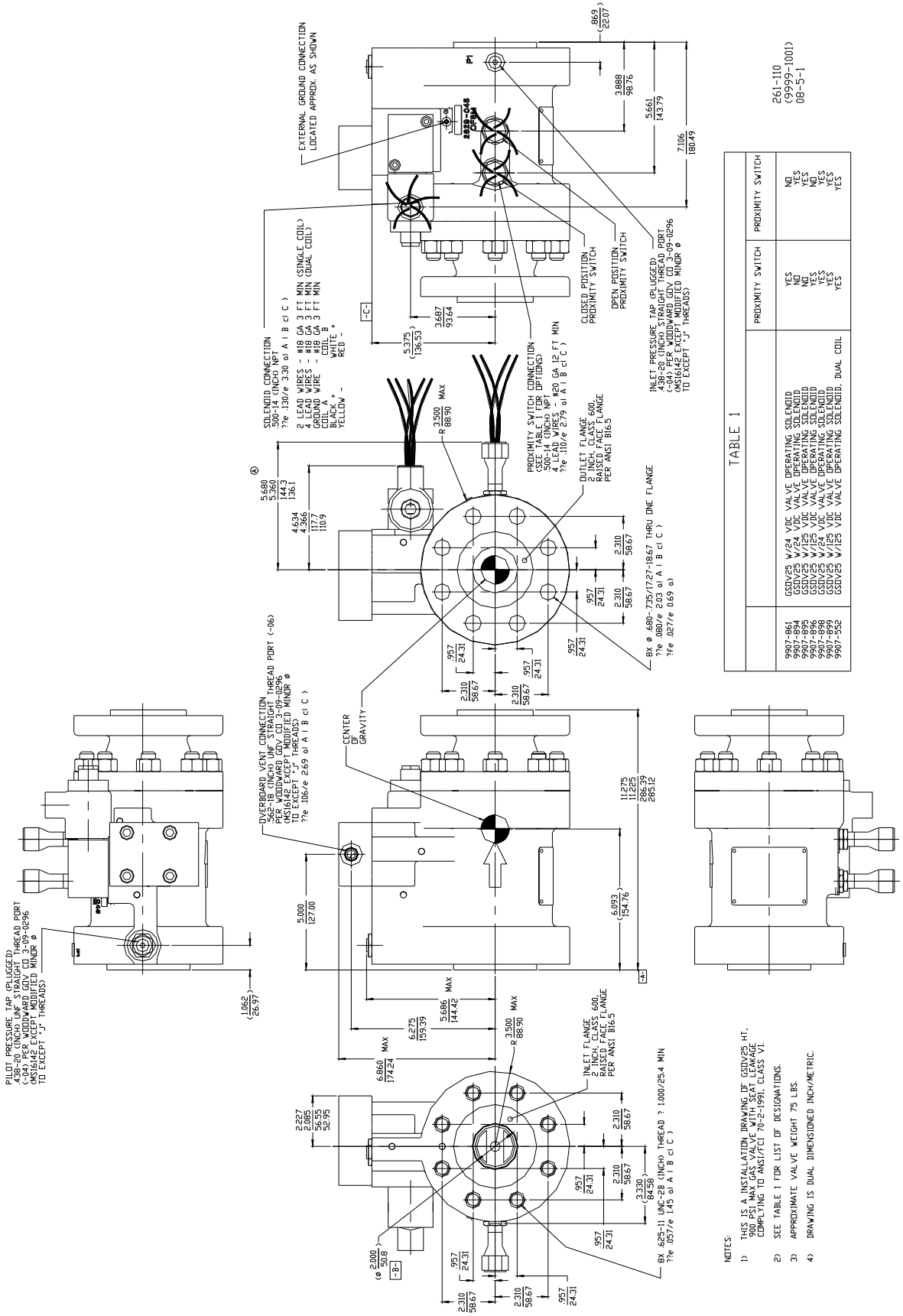
The normally-closed valve may be used for emergency and normal shutdown operation. The special seal design in the main piston valve allows long life and prevents leakage. Stainless steel construction assures availability of the valve in spite of corrosive service conditions.

This product is suitable for use on industrial turbines in the 10 to 50 MW power output range with single or multiple combustion fuel manifold systems.

Description

The GSOV25 HT fuel isolation valve provides shutdown on a gas turbine by rapidly halting the flow of gaseous fuel. The supply pressure is used to move a spring-loaded piston in the valve. When the valve is energized, gas pressure drives the spring-loaded piston open, admitting fuel to the turbine. When the current signal to the electrical solenoid is interrupted, the spring loaded second-stage piston changes states to vent off primary control pressure. The main spring then forces the primary piston to the seal, stopping all flow.

- Rated at <10 psi (69 kPa) pressure drop at flow of 25 000 lb/h (11 340 kg/h)
- Fuel temperature range –4 to +350 °F (–20 to +177 °C)
- Closes in <0.100 seconds at 900 psig (6200 kPa)
- Better than Class VI shutoff
- 100 to 900 psig (690 to 6200 kPa) operating pressure
- 500 psig (3448 kPa) reverse pressure capable
- Certified for North American Hazardous Locations
- Compliant with applicable CE Directives—ATEX, Pressure Equipment, Machinery, Low Voltage, and EMC
- Certified for use in explosive atmospheres within the Russian Federation
- Designed for natural gas, propane, ethane, or methane
- Operates from line pressure with no external connections required or with external pilot pressure



GSOV25 HT (Do not use for construction)

Specifications

Performance	Closing Time	Within 0.100 second at 900 psi (6200 kPa) supply pressure Within 0.085 second at 600 psi (4137 kPa) supply pressure
	Opening Time	0.300 second maximum at 100 psi (690 kPa) minimum supply pressure
	Pressure Drop	<10 psi (69 kPa) at 25 000 lb/hr (11 340 kg/hr) (see graph)
	Main Seat Forward Leakage	ANSI/FCI 70-2, Class VI
	Main Seat Reverse Leakage	ANSI/FCI 70-2 Class VI up to 500 psid (3448 kPa) reverse pressure differential
	Maximum Effective Area	2.4 in² (15.5 cm²)
	Cycle Life	20 000 cycles
	Pilot Valve Vent	Shall not exceed 400 SCCM
Operating Conditions/ Environment	Chemical Compatibility	NACE Compliant for all typical gas fuels; call Woodward for special applications
	Fuel Temperature	–4 to +350 °F (–20 to +177 °C)
	Ambient Temperature	–4 to +250 °F (–20 to +121 °C) [–4 to +221 °F (–20 to +105 °C) for dual coil version]
	Fuel Types	Natural gas, propane, ethane, methane
	Fuel Supply Pressure	Normal operation 100 to 900 psig (690 to 6205 kPa)
	Proof Pressure	1350 psig (9308 kPa)
	Burst Pressure	5000 psig (34 475 kPa)
	Fuel Solid Particle Contaminant	Less than 10 µm diameter, 30 ppm by volume maximum Greater than 10 µm diameter, 0.3 ppm by volume maximum
	Pilot Filtration	40 µm
	External Pilot Pressure (optional)	200 to 900 psig (1380 to 6200 kPa) [valve operates from 100 to 200 psig, however, opening slew time may exceed stated value]
Electrical Specifications	Voltages Available	Nominal 24 Vdc, 125 Vdc
	Power Consumption	10 W nominal
	Resistance to Ground	50 MΩ minimum at 500 Vdc
	Wiring Interface	Electrical 1/2-14 NPT for electrical conduit; interface 12-foot (3.7 m) leads on solenoid and on proximity switch
	Proximity Switch	SPDT switch or switches, each with Normally Open and Closed contacts. Options include a closed position switch (standard), Open position switch, or both.
Mechanical Specifications	Installation	Flange per ANSI B16.5; 600 lb (272 kg) rating dimension, 2 inch (51 mm) nominal pipe size (6.500 dia. flange with eight 0.625-11 UNC taps through on 5.000 bolt circle on inlet end; 6.500 diameter flange with eight 0.688 holes through on a 5.000 bolt circle on outlet end)
	Seal Overboard/Vent Connection	0.562-18 UNJF (-06) straight thread
	Weight	75 pounds (34 kg)
	Line Pressure Tap (removable plug)	0.438-20 UNJF (-04) straight thread
	External Pilot Connection	0.438-20 UNJF (-04) straight thread
	Construction	Stainless steel housing; precipitation-hardened stainless steel internal components
	Ingress Protection	IP54 per EN60529

Regulatory Compliance

European Compliance for CE Marking:

ATEX Directive: Suitability is the result of the compliance of the individual components. Zone 1: Ex d IIB T3 or Zone 2: Ex nA IIC T3.

EMC Directive: 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)

Low Voltage Directive: Directive 2014/35/EU on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits

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)

Other European Compliance:

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

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

North American Compliance:

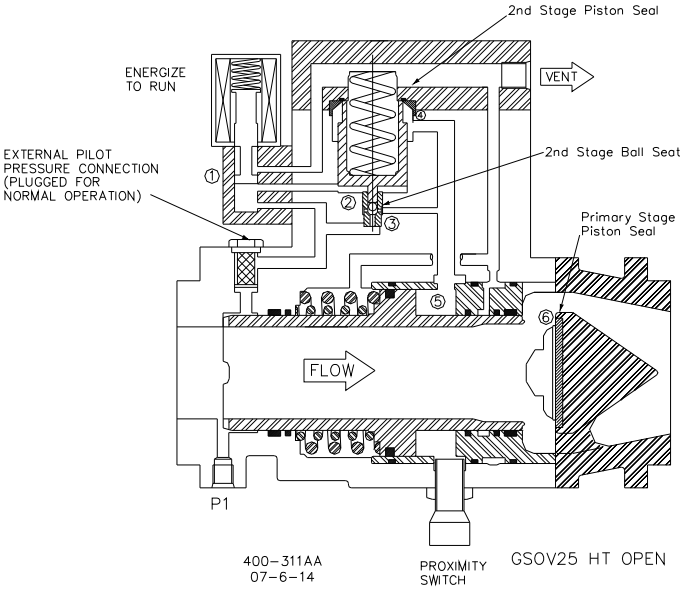
CSA: CSA Certified for Class I, Division 1, Groups C & D, T3 and Division 2, Groups A, B, C, & D T3 at 121 °C Ambient (105 °C dual coil version) for use in Canada and the United States

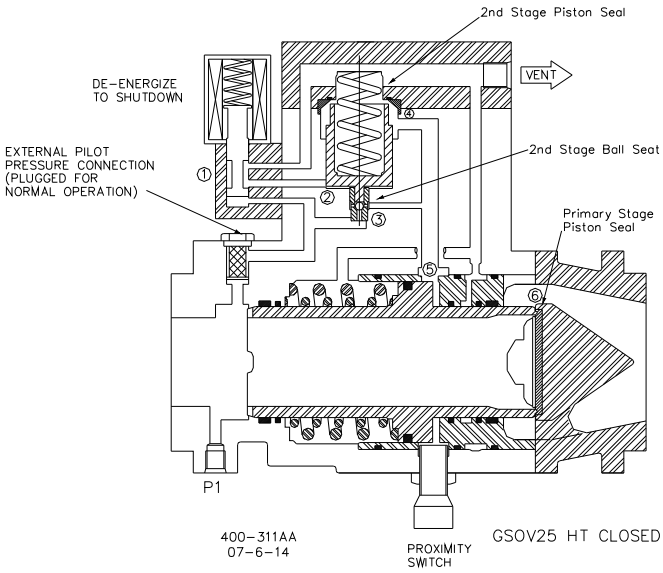
SIL: Safety Integrity Level:

Systematic Capability SC 2 (SIL 2 Capable)
IEC 61508 Failure Rates in FIT*

Application	λ_{SD}	λ_{SU}²	λ_{DD}	λ_{DU}
Tight Shut-off, Clean Service	0	766	0	1426
Full Stroke, Clean Service	0	766	0	867

*FIT = 1 failure / 10^9 hours





TO OPEN THE GSOV25 HT

- Energize the 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).

TO CLOSE THE GSOV25 HT

- De-energize the solenoid (both coils must be de-energized for the dual model solenoid to be de-energized).
- The 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).

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