U.S. Solid USS2-00001

U.S. Solid 1/2 inch Brass Electric Solenoid Valve 24VAC VITON Seal N.C. Instruction Manual

Model: USS2-00001

1. Introduction

This manual provides essential information for the safe and effective installation, operation, and maintenance of your U.S. Solid 1/2 inch Brass Electric Solenoid Valve. This valve features durable brass construction and a VITON seal, designed for use with various media including air, gas, and fuel. It operates as a Normally Closed (N.C.) valve, meaning it remains closed when de-energized and opens when electrical power is applied.

Figure 1: U.S. Solid 1/2 inch Brass Electric Solenoid Valve (Model USS2-00001).

2. Safety Information

Please read all safety warnings and instructions carefully before installing or operating this valve. Failure to do so may result in property damage, injury, or death.

- **Lead Exposure Warning:** This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, visit www.P65Warnings.ca.gov.
- **Non-Potable Water Use:** Due to the chemical composition of brass, this valve should NOT be used with projects involving drinking water or other potable water systems. It is not allowed to be installed in potable water pipelines.
- **Duty Cycle:** This valve is NOT a continuous duty valve. It should NOT be in continuous use for more than 8 hours in a single cycle. Exceeding this duration will shorten the valve's lifespan and may cause the coil to burn out. If continuous duty is required, consider U.S. Solid Motorized Ball Valves.
- **Electrical Safety:** Ensure all electrical connections are made by a qualified professional and comply with local

electrical codes. Disconnect power before installation or maintenance.

- **Pressure Limits:** Do not exceed the maximum operating pressure of 101.52 PSI (7 Bar) for air/water or 72.5 PSI (5 Bar) for oil.
- **Temperature Limits:** Operate within the specified temperature range of -10°C to 120°C (14°F to 248°F).

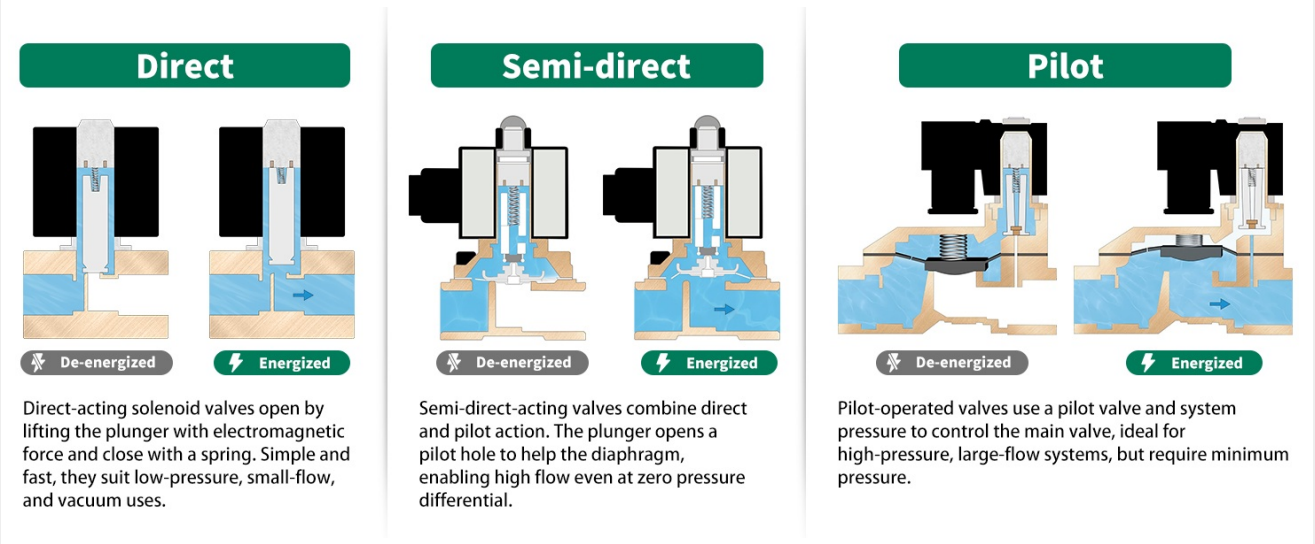


Figure 2: Safety warnings and product ratings, including the California Prop 65 warning and a note on continuous operation.

3. Product Overview

3.1 Components

The product package includes:

- 1 x U.S. Solid 1/2 inch Brass Electric Solenoid Valve
- 1 x User Manual

3.2 Key Features

- **Material:** Industrial grade brass for corrosion resistance and suitability for higher temperature projects.
- **Seal:** VITON seal, offering superior durability and resistance to high temperatures and corrosive chemicals (e.g., gasoline, diesel fuel, oils, lubricants).
- **Operation:** Normally Closed (N.C.) - valve is closed when de-energized, open when energized.
- **Voltage:** 24VAC.
- **Response Time:** Opens and closes in less than 1 second when actuated.
- **Durability:** Engineered for over a million cycles under proper operating conditions and maintenance.
- **Ingress Protection:** IP65 rated, indicating dust-tight protection and protection against water jets from any direction.

Figure 3: Front view.

Figure 4: Side view.

Figure 5: Solenoid coil label with specifications.

3.3 Seal Material Comparison (VITON vs. NBR)

The VITON seal in this valve offers superior performance compared to NBR (Nitrile Butadiene Rubber) in certain applications, particularly those involving higher temperatures and more aggressive chemicals.

Figure 6: VITON vs. NBR Seal Material Compatibility and Temperature Ranges.

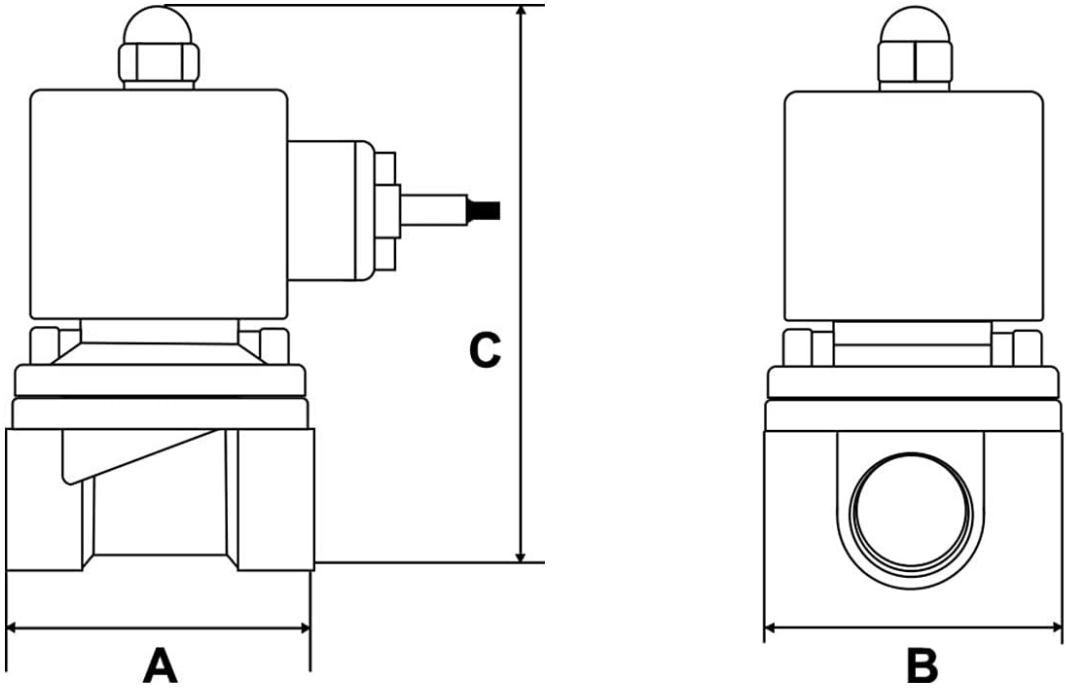
3.4 Solenoid Valve Types

This valve operates on a direct-acting principle, which means it opens by lifting the plunger with electromagnetic force and closes with a spring. This design is suitable for low-pressure, small-flow, and vacuum applications, offering fast response.

Figure 7: Solenoid Valve Operating Principles.

4. Specifications

Specification	Value
Model Number	USS2-00001
Material	Brass
Seal Material	VITON
Valve Type	Electric Solenoid Valve, Normally Closed (N.C.)
Voltage	24VAC
Inlet/Outlet Connection Size	1/2 inch NPT
Inlet Connection Type	Threaded
Outlet Connection Type	G Connector
Maximum Operating Pressure (Air/Water)	101.52 PSI (7 Bar)
Maximum Operating Pressure (Oil)	72.5 PSI (5 Bar)
Operating Temperature Range	-10°C to 120°C (14°F to 248°F)
Item Dimensions (L x W x H)	4.13 x 2.36 x 2.36 inches
Ingress Protection (IP) Rating	IP65
UPC	853996003261
GTIN	853996003261
Certification	CE



Thread Size	1/8″	1/4″	3/8″	1/2″	3/4″	1″	1¼″	1½″	2″
A (mm)	41	41	52	60	70	86	110	115	135
B (mm)	42	42	50	50	56	66	87	93	94
C (mm)	75	75	88	105	114	118	156	165	180
Weight (kg)	0.30	0.28	0.47	0.60	0.71	0.92	2.20	2.60	3.00

Figure 8: Dimensional drawing of the solenoid valve (refer to 1/2 inch NPT for this model).

5. Installation

Proper installation is crucial for the safe and efficient operation of the solenoid valve.

1. **Preparation:** Ensure the system is depressurized and drained before installation. Clean all pipe threads to remove debris.
2. **Thread Sealant:** Apply an appropriate thread sealant (e.g., PTFE tape or pipe dope) to the male pipe threads. Ensure the sealant is compatible with the media being controlled.

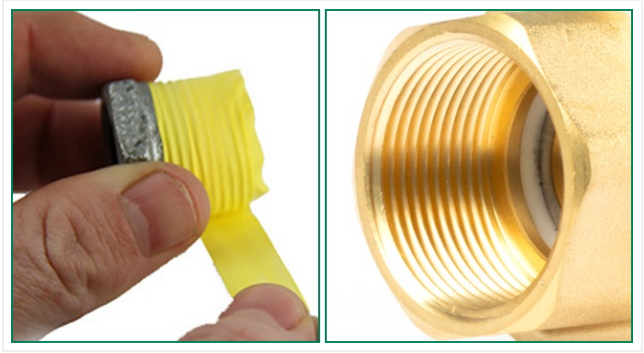


Figure 9: Applying thread sealant.

3. **Mounting:** Install the valve in the desired position, ensuring the flow direction matches the arrow on the valve body. The valve can be mounted in any orientation, but for optimal performance and lifespan, it is generally recommended to mount the coil vertically upwards.
4. **Tightening:** Hand-tighten the valve onto the pipe, then use a wrench to tighten an additional 1 to 2 turns. Do not overtighten, as this can damage the valve or threads.
5. **Filtration:** It is recommended to install a filter upstream of the solenoid valve to prevent debris from entering and potentially obstructing the valve's operation. (Filter not included).

Figure 10: External filter and hose are not included and may be required for certain applications.

6. **Electrical Connection:** Connect the valve to a 24VAC power source. Ensure the power supply matches the valve's voltage rating. All electrical work should be performed by a qualified electrician and adhere to local codes.
7. **Leak Check:** After installation, slowly pressurize the system and check for any leaks at the connections.

6. Operation

This U.S. Solid solenoid valve is a Normally Closed (N.C.) type. Its operation is straightforward:

- **De-energized State:** When no electrical power is supplied to the coil, the valve remains closed, preventing fluid flow.
- **Energized State:** When 24VAC electrical power is applied to the coil, the electromagnetic force lifts the plunger, opening the valve and allowing fluid flow.
- **Response:** The valve opens and closes rapidly, typically in less than 1 second.

Important Operating Note: As stated in the safety section, this valve is not designed for continuous duty. Avoid keeping the valve energized for more than 8 hours in a single cycle to prevent overheating and premature failure of the coil.

7. Maintenance

Regular maintenance helps ensure the longevity and reliable performance of your solenoid valve.

- **Periodic Inspection:** Periodically inspect the valve for any signs of leaks, corrosion, or damage to the wiring.
- **Cleanliness:** Ensure the area around the valve is kept clean and free of debris that could interfere with its operation.
- **Coil Condition:** Check the solenoid coil for any signs of overheating (discoloration, melting). If detected, review operating conditions, especially the duty cycle.
- **Seal Integrity:** While VITON seals are highly durable, extreme conditions or incompatible media can degrade them over time. If leaks occur, inspect the seal for damage.

Always disconnect power and depressurize the system before performing any maintenance.

8. Troubleshooting

If you encounter issues with your solenoid valve, refer to the following troubleshooting guide:

Problem	Possible Cause(s)	Solution
Valve does not open when energized.	• No power or incorrect voltage. • Clogged orifice or debris in valve. • Damaged coil. • Excessive pressure differential.	• Verify 24VAC power supply and connections. • Depressurize and inspect valve for obstructions. • Test coil for continuity; replace if open circuit. • Ensure operating pressure is within specifications.
Valve does not close when de-energized.	• Debris preventing plunger from seating. • Weak or broken return spring. • Residual magnetism in core.	• Depressurize and clean valve internals. • Inspect and replace spring if necessary. • Ensure proper power cycling.
Valve leaks externally.	• Loose pipe connections. • Damaged valve body or seals.	• Tighten connections (do not overtighten). • Inspect valve body and seals; replace if damaged.
Humming or buzzing noise.	• Coil cover vibrating against the coil. • Insufficient power supply.	• Gently adjust or bend the black metal coil cover to prevent contact. • Ensure the power supply provides adequate current for the coil.
Coil overheats.	• Continuous operation exceeding 8 hours. • Incorrect voltage.	• Adhere to the recommended duty cycle (max 8 hours continuous). • Verify correct 24VAC input voltage.

9. Warranty and Support

U.S. Solid stands behind the quality of its products.

- **One-Year Warranty:** This valve comes with a ONE YEAR WARRANTY from the date of purchase. If the valve becomes defective within this period, U.S. Solid will replace it.
- **Customer Support:** For technical assistance, warranty claims, or further inquiries, please visit the official U.S. Solid Store or contact customer service.

Visit the U.S. Solid Store for more information and product offerings.