## 2SO160-500 Series Specifications

<table>
<thead>
<tr>
<th>Valve Model</th>
<th>2SO160-3/8</th>
<th>2SO160-1/2</th>
<th>2SO200-3/4</th>
<th>2SO250-1</th>
<th>2SO350-1 1/4</th>
<th>2SO400-1 1/2</th>
<th>2SO500-2</th>
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<tbody>
<tr>
<td>Port Size</td>
<td>3/8&quot; NPT</td>
<td>1/2&quot; NPT</td>
<td>3/4&quot; NPT</td>
<td>1&quot; NPT</td>
<td>1 1/4&quot; NPT</td>
<td>1 1/2&quot; NPT</td>
<td>2&quot; NPT</td>
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<tr>
<td>Orifice</td>
<td>16mm</td>
<td>16mm</td>
<td>20mm</td>
<td>25mm</td>
<td>35mm</td>
<td>40mm</td>
<td>50mm</td>
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<tr>
<td>Flow Coefficient (Cv)</td>
<td>4.8</td>
<td>4.8</td>
<td>7.6</td>
<td>12</td>
<td>24</td>
<td>29</td>
<td>48</td>
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<tr>
<td>Valve Type</td>
<td>2 Way, Normally Open (NO)</td>
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<tr>
<td>Action</td>
<td>Direct Lift Diaphragm, Uni-Directional, Zero Differential</td>
<td></td>
<td></td>
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<tr>
<td>Wetted Surfaces</td>
<td>Valve Body: 304 Stainless Steel</td>
<td>Seal: NBR (Buna N), Viton (FKM), or EPDM</td>
<td>Armature Assembly: Stainless Steel</td>
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<tr>
<td>Seal Material</td>
<td>Standard Option: NBR (Buna N)</td>
<td>Upgrade Options: Viton (FKM), EPDM</td>
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<tr>
<td>Operating Temperature</td>
<td>Media with NBR Seal: 14°F to 176°F (-10°C to 80°C)</td>
<td>Media with Viton Seal: 5°F to 248°F (-15°C to 120°C)</td>
<td>Ambient: 23°F to 113°F (-5°C to 45°C)</td>
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<tr>
<td>Operating Pressure</td>
<td>Standard Option: Vacuum to 90 PSI</td>
<td>Upgrade Option: Vacuum to 150 PSI</td>
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<tr>
<td>Electrical Connections</td>
<td>DIN 43650, Form A (2WO250C/2W350C)</td>
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<tr>
<td>Coil Power</td>
<td>Rectangular Coil (2WO250C)</td>
<td>Round Coil (2W350C)</td>
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<tr>
<td>AC Coil:</td>
<td>28VA</td>
<td>AC Coil:</td>
<td>28VA</td>
<td></td>
<td></td>
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<tr>
<td>DC Coil:</td>
<td>25-40W</td>
<td>DC Coil:</td>
<td>25-40W</td>
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<tr>
<td>Coil Duty</td>
<td>100% ED (Continuous Duty)</td>
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<tr>
<td>Voltage Options</td>
<td>12VDC, 24VDC, 24VAC, 110/120VAC (50/60Hz), 220/240VAC (50/60Hz)</td>
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<td>Voltage Tolerance</td>
<td>±10% of Specified Voltage</td>
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<td>Ingress Protection</td>
<td>IP65</td>
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<td>Insulation Class</td>
<td>H Class</td>
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<tr>
<td>Installation</td>
<td>No Orientation Requirement</td>
<td>Optimum Position: Flow Horizontal and Solenoid Vertical</td>
<td></td>
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<tr>
<td>Service</td>
<td>Liquid, Water, Oil, Air, Gas, Inert Gas, Vacuum</td>
<td></td>
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</tbody>
</table>
2SO160-500 Series Components

- DIN Housing
- Screw
- Strain Relief Connector
- Wiring Terminal
- Gasket
- Nut
- Encapsulated Solenoid Coil
- Armature Tube Assembly (Stainless Steel)
- Plunger & Pin (Stainless Steel)
- Spring (Stainless Steel)
- Screws (4x) (Stainless Steel)
- Diaphragm (NBR; Option: Viton/FKM)
- Upper Valve Body/Extension Nut (Stainless Steel)
  - Upper Valve Body (Stainless Steel)
  - Lower Valve Body (Stainless Steel)
- O-Ring (NBR; Option: Viton/FKM)
- Armature Assembly (Stainless Steel)
- 2SO160-500 Series Components

- Nut

- www.StcValve.com
- Version 2.0, 12/18/2018
Material Test Reports

This document certifies that STC products have been subjected to quality assurance procedures and meet the material and performance specifications published by Sizto Tech Corporation (STC). The products have been manufactured, processed, inspected, and tested according to STC internal requirements and ISO 9001 standards.

ISO 9001:2015 Certificate Number: Qnb17180318
Date of Issue: 01, March, 2018
Valid Until: 28, February, 2021

Individual materials and components used in this product have been tested and conform to applicable published standards according to chart below. Please be advised that STC does not conduct its own material analysis of all raw materials, rather, STC relies on the statements of its material suppliers & reserves the rights to independently test raw materials if necessary. Material Test Reports may be available for specific products upon request.

<table>
<thead>
<tr>
<th>Material</th>
<th>Use Location</th>
<th>Material Standard</th>
</tr>
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<tbody>
<tr>
<td>316 Stainless Steel</td>
<td>Metal Fittings, Valves, Air Cylinders</td>
<td>ASTM A240/A2666</td>
</tr>
<tr>
<td>304 Stainless Steel</td>
<td>Valves, Air Cylinders</td>
<td>ASTM A240/A666</td>
</tr>
<tr>
<td>CF8M Stainless Steel</td>
<td>Valves</td>
<td>ASTM A351/A743</td>
</tr>
<tr>
<td>Brass</td>
<td>Valves</td>
<td>ASTM B36/B62</td>
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<tr>
<td>Nickel-Plated Brass</td>
<td>Composite Fittings</td>
<td>ASTM B456/B927</td>
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<tr>
<td>Acetal Homopolymer (Delrin)</td>
<td>Valves</td>
<td>ASTM D4181/D6778—14</td>
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<tr>
<td>Acetal Copolymer (POM)</td>
<td>Composite Fittings</td>
<td>ASTM D4181/D6778—14</td>
</tr>
<tr>
<td>FKM (Viton)</td>
<td>Seals</td>
<td>ASTM D1418</td>
</tr>
<tr>
<td>PTFE (Teflon)</td>
<td>Valves, Seals</td>
<td>ASTM D3294—15</td>
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<tr>
<td>NBR (Buna N)</td>
<td>Seals</td>
<td>ASTM D1387—06</td>
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<tr>
<td>EPDM</td>
<td>Seals</td>
<td>ASTM D3568—03</td>
</tr>
<tr>
<td>Polybutylene Terephthalate (PBT)</td>
<td>Composite Fittings</td>
<td>ASTM D4000</td>
</tr>
</tbody>
</table>
 Installation & Operation

To Connect the Valve Inlet & Outlet:
- Connect the inlet & outlet to the valve ports according to the flow direction arrow marked on the valve.

To Install the Coil:
- Put the coils on to the armature tube of the valve. Place the lock washer & nut on to the armature tube. Hand tighten the nut, then use a wrench to tighten the nut another quarter-turn. Do not over-tighten the nut, as it may cause the armature tube to fail prematurely.

To Connect a DIN Coil:
1. Remove the Philips-head screw from the plastic DIN housing & unplug it from the DIN coil.
2. From the screw opening, push the terminal block out from the plastic DIN housing.
3. Note the “1”, “2”, and ground “…” symbols on the underside of the DIN enclosure.
4. For DC DIN Coils, connect “1” to your Positive Lead & “2” to your Negative lead.
5. For AC DIN Coils, connect “1” to your HOT lead, “2” to your Neutral lead, & “…” to your ground if required.

Do not energize the coil without installing it onto the valve or connect the coil to a different voltage than specified. This will burn the coil and could create fire hazards.

Safety Note: Standard valves are supplied with continuous duty coils. The proper class of insulation for the service is indicated on the coil body. The coil temperature may rise significantly if energized for extended periods—this is normal. Although the coil is made of flame-retardant material, misuse of the coil could create fire hazards & generate smoke and/or a burning odor. If these conditions are encountered, the coil temperature has risen above safe levels and the power should be disconnected immediately.

Operation: This valve is a two-way, normally open, direct-lift valve & does not require a minimum differential pressure to operate. As shown in the diagrams below, when the coil is de-energized (left diagram) the spring force holds the diaphragm in place above the main orifice, allowing the working medium to flow freely through the valve. When the valve is energized the diaphragm is pushed onto the main orifice, sealing the valve. The working medium supplies additional sealing pressure above the diaphragm, reducing strain on the solenoid coil. This is accomplished via a small bleed orifice in the diaphragm which allows the working medium to pass through & pressurize the diaphragm from above while the valve is closed. The working medium & flow direction are indicated in purple in the diagrams.

![De-Energized (Open)](image)

![Energized (Closed)](image)

Flow Direction
# 2SO160-500 Series Solenoid Valve Dimensions

![Diagram of 2SO160-500 Series Solenoid Valve Dimensions](image)

## 2SO160-500 Dimensions [mm]

<table>
<thead>
<tr>
<th>Model</th>
<th>Port Size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>Wt. (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2SO160</td>
<td>3/8” NPT</td>
<td>108</td>
<td>56</td>
<td>122</td>
<td>70</td>
<td>46</td>
<td>63</td>
<td>43</td>
<td>43</td>
<td>1.8</td>
</tr>
<tr>
<td>2SO160</td>
<td>1/2” NPT</td>
<td>109</td>
<td>56</td>
<td>122</td>
<td>70</td>
<td>46</td>
<td>63</td>
<td>43</td>
<td>43</td>
<td>1.8</td>
</tr>
<tr>
<td>2SO200</td>
<td>3/4” NPT</td>
<td>111</td>
<td>56</td>
<td>127</td>
<td>72</td>
<td>46</td>
<td>63</td>
<td>43</td>
<td>43</td>
<td>1.9</td>
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<tr>
<td>2SO250</td>
<td>1” NPT</td>
<td>117</td>
<td>77</td>
<td>137</td>
<td>100</td>
<td>46</td>
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<td>59</td>
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<tr>
<td>2SO350</td>
<td>1 1/4” NPT</td>
<td>149</td>
<td>85</td>
<td>176</td>
<td>114</td>
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<td>67</td>
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<tr>
<td>2SO400</td>
<td>1 1/2” NPT</td>
<td>156</td>
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<td>184</td>
<td>123</td>
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<td>2SO500</td>
<td>2” NPT</td>
<td>168</td>
<td>117</td>
<td>203</td>
<td>170</td>
<td>63</td>
<td>67</td>
<td>85</td>
<td>85</td>
<td>6.8</td>
</tr>
</tbody>
</table>

**Note:** Dimensions are for reference only. Field verify dimensions prior to installation for critical dimensions.
2-Way Direct-Lift Diaphragm Valves
Maintenance & Troubleshooting Guide

**Warning:** DO NOT over tighten the nut holding the coil to the armature tube. Over tightening may result in damage to the welded joint.

**Attaching a Coil to a Valve:**

- After wiring the coil, fit the coil assembly over the armature tube. Ensure that the threads of the tube are accessible.
- Fit the spring or lock washer over the assembly.
  - For spring washers, the concave side should be oriented toward the coil.
- Tighten the nut over the washer by hand.
  - For standard washers, tighten the nut an additional ¼ turn with a wrench if necessary.
  - For spring washers, continue to tighten the nut until the spring washer is almost completely compressed.

**Installation Procedure:**

- Connect the default outlet to the outlet port indicated by an arrow or the number “1” on the valve body.
- Connect the default inlet to the pressure port indicated by the tail of the arrow or a “P” on the valve body.
- The arrow marked on the valve body indicates the direction of flow.

**Notes:**

- After an extended period of operation, the solenoid coil may burn out. This commonly occurs when input voltages are higher than the coil’s specifications. If the valve does not make a clicking sound when energized/de-energized, the coil likely needs to be replaced.
- If you are using the valve at a low temperature, it may exhibit a small leak when first activated. To fix this, cycle the valve at the highest available operating pressure until there is no longer a leak. This process will create a proper mating surface between the seal and the orifice.

**Maintenance Procedure:**

1. Turn off the power supply to the valve & ensure it is safely locked-out.
2. Remove any coils attached to the valve.
3. Unscrew the upper valve body to remove the armature assembly & valve body.
4. Check for any debris that may have collected on the plunger and/or diaphragm. A buildup of particulates on the diaphragm (especially near the two orifices) can cause the valve to function poorly. Clean the diaphragm with water & make sure to use a clean working medium with the valve.
5. Place the diaphragm back onto the lower body, followed by the upper body & armature assembly.
6. Screw the upper valve body back onto the lower valve body, ensuring that the diaphragm is aligned correctly.
7. Please refer to the diagram on Page 2 of this document for a breakdown of individual components.

For tips, maintenance guides, & procedural videos, visit us at [www.youtube.com/users/STCValves](http://www.youtube.com/users/STCValves)
**Electrical Connections**

**To Connect a DIN Coil:**
- Remove the Philips screw from the plastic housing & unplug from the DIN coil.
- Use the removed screw to push the terminal block out of the plastic DIN housing.
- Note the “1”, “2”, and ground “ örgüt” symbols.
  - For DC DIN Coils, connect “1” to your positive lead & “2” to your negative lead.
  - For AC DIN Coils, connect “1” to your HOT lead, “2” to your NEUTRAL lead, and “ örgüt” to your ground lead, if required.

**To Connect a Grommet Coil:**
- For DC Coils, connect the red wire to your positive lead & the black wire to your negative lead.
- For AC Coils, connect the black wire to your HOT lead & the white wire to your NEUTRAL lead.
- For Coils provided with Molded Cables, the color of the wire indicates the type of lead:
  - GREEN = Ground Wire
  - BLUE = Positive or HOT Wire
  - BROWN = Negative or Neutral Wire
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All shipments are F.O.B. 892 Commercial Street, Palo Alto, CA 94303, USA. Most orders are shipped via UPS Standard Ground unless instructions accompany order. Outside the UPS zones, shipment will be made Best Way. The responsibility for goods delay, lost or damaged in transit rests with the carrier and purchaser. Purchaser may purchase shipping insurance to cover lost or damaged products caused by shipping.

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No merchandise is accepted for return 30 days after delivery date. No credit allowed on merchandise shipped as ordered and returned without obtaining an authorization number IN ADVANCE. A 20% restocking charge applies to all returns, and transportation charges must be fully prepaid. We will pay ground transportation charges on re-sent or returned merchandise due to STC’s error.

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Blanket orders can be canceled 90 days before scheduled ship date. There will be a 10% charge if a blanket order is canceled within 90 days of scheduled ship date, and a 20% charge if canceled within 60 days. Regular orders for non-custom parts can be canceled any time before the order is shipped. For custom parts, a 30% down payment is required either at the time of order or 90 days prior to scheduled ship date, whichever comes later.

Remittances should be sent to:
Sizto Tech Corporation, 892 Commercial Street, Palo Alto, CA 94303, USA
Credit Card Payments: Visa, MasterCard, Discover, or American Express accepted

International Customers: Advance Payment Required via Bank Wire, Cashier’s Check or Approved Credit Card.

Credit Application: To establish a net 30 day account, please mail or fax three trade references with complete mailing addresses and account numbers, or request an STC Credit Application.

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Sizto Tech Corporation (STC) only warrants this product to be free from defects in materials and workmanship at the time of shipment. This limited warranty expires one year after delivery to the end-user. STC’s entire obligation to the Purchaser for breach of this limited warranty shall be limited to replacement of the defective product or refund of the original purchase price of this product, at STC’s option. Purchaser has thirty (30) days to return the goods after STC has agreed to accept the return. All freight charges on returned material shall be paid by the Purchaser. STC’s limited warranty shall not apply, however, to the product that have been subjected to misuse, alteration, accident or negligence during handling or storage.

DISCLAIMER OF IMPLIED WARRANTIES:
All implied warranties, which may arise by implication of law or application of course of dealing or usage of trade, including, but not limited to, implied warranties of merchantability or fitness for a particular purpose are expressly excluded. There are no warranties, which extend beyond the description of the faced hereof. The end user is solely responsible for the suitability and fitness of this product selected for a particular application.

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You warrant, represent and agree: (1) to comply with all laws; (2) that our sale and shipment of the product will not, by export thereof, your legal status or otherwise, cause us to violate any law; and (3) to indemnify us against any losses from a failure by you or a third party to comply with law or these terms and conditions, or from use of the product.

SAFETY
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