

# ONYX VALVE CO MODEL GSS

## Installation & Maintenance

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## STORAGE

Correct storage yields improved sleeve life. Rubber sleeves are perishable. Ideal storage temperature is 50° F. We recommend the following storage procedures:

1. Store valves and sleeves in the coolest location possible. They can be stored in unheated locations, but allow maximum ventilation in areas subject to high summer temperatures. Do **NOT** store valves or sleeves in trailers, sheds or other poorly ventilated areas.
2. Avoid sunlight. Ultra-violet destroys rubber. Leave valves and sleeves in their box, or cover with black plastic.
3. Avoid ozone. Do not store near active electrical equipment.
4. For long term storage, coat exposed rubber parts with silicone spray or liquid.

## OPERATION

The Onyx Series GSS valves operate very simply. Injecting compressed air into the aluminum housing collapses the rubber sleeve, stopping flow in the process pipe. Relieving air from the housing allows the rubber sleeve to open.

Although usually used for on/off service, the GSS can be used for throttling when combined with a transducer and booster relay. In process lines with vacuum conditions, we recommend a venturri pump to generate a counter-vacuum to pull the rubber sleeve open.

## DESIGN CRITERIA

The **maximum process temperature** that the valve can tolerate is based on the elastomer used to fabricate the sleeve.

Poly Isoprene	Chloroprene	EPDM Ethylene Propylene	Nitrile	Butyl	Fluorocarbon
<b>PGR</b> Pure Gum Rubber	<b>Neoprene</b>	<b>Nordel</b>	<b>Buna-N</b>	<b>Butyl</b>	<b>Viton</b>
-30°→+180° F -34°→+82° C	-20°→+220° F -29°→+104° C	-40°→+300° F -40°→+150° C	-30°→220° F -34°→104° C	-30°→+225° F -34°→+106° C	-15°→+375° F -26°→+190° C

The maximum safe **process pressure** that the valve sleeve can tolerate is based on valve flange size. For Onyx model GSS valves maximum process pressure:

Size	1-2	2½	3	4
Process P <sub>max</sub> psi	50	35	30	25
Compressed Air <sub>max</sub> psi	90	75	70	65

**INSPECTION:** Inspect the valve before installation. Report any shipping damage before installation. **DO NOT INSTALL A VALVE KNOWN TO HAVE BEEN DAMAGED IN SHIPMENT.** Check inside the valve to make sure no foreign objects are present.

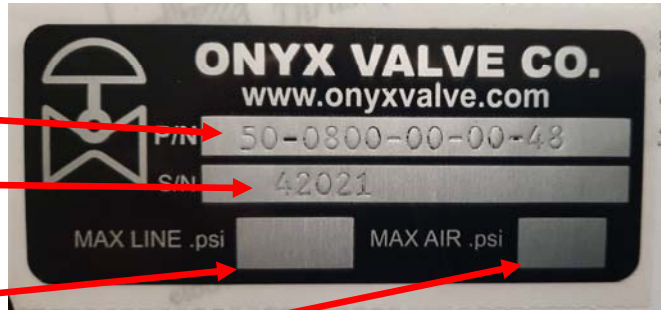
**IDENTIFICATION:**

**Part#.** Use this number when ordering spare/replacement parts.

**Serial#**

This is the pressure that the valve was tested at the factory prior to shipping.

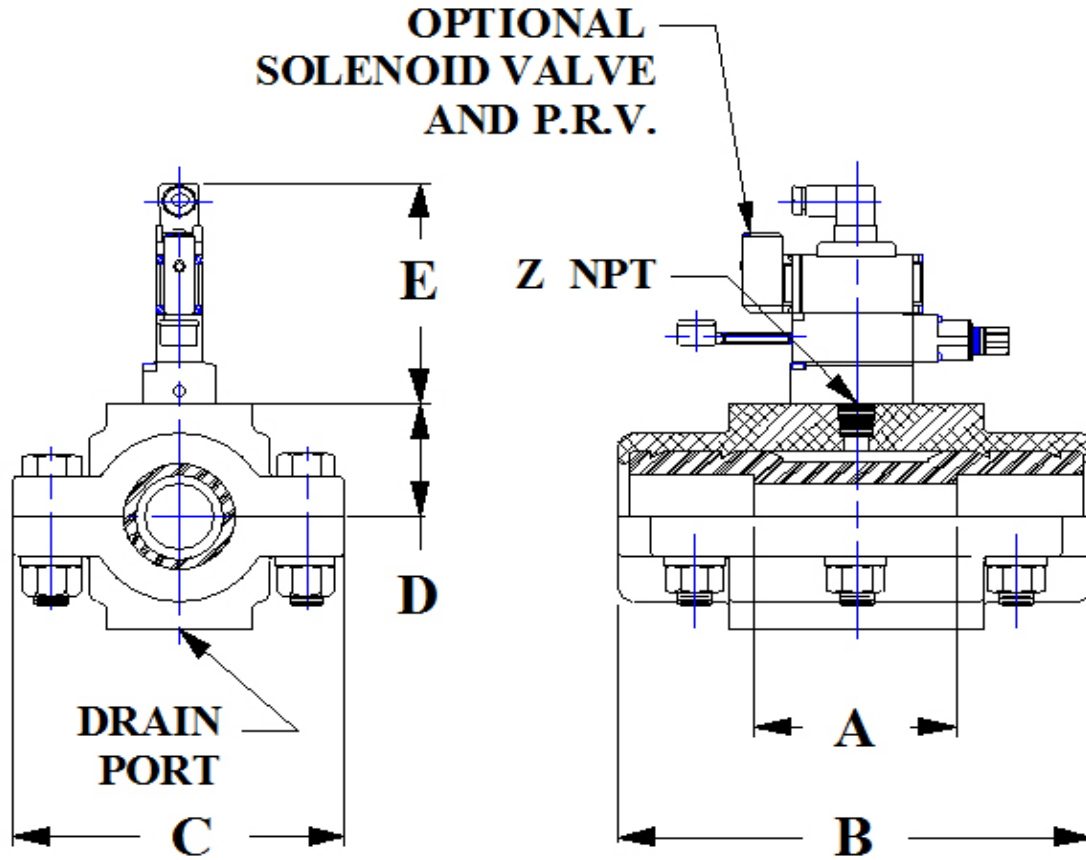
This is the maximum compressed air pressure.



**SAFETY:**

- a) Leakage: Consider the possibility of leakage due to improperly tightened bonnet bolts. Take precautions where liquids may drip onto electrical equipment or plant personnel, or combustible fluid may drain into a dangerous area.
- b) Pinch valve sleeves eventually wear out. When the sleeve fails, compressed air gets in the process pipe. Make sure that tanks, pumps, and other process equipment can safely withstand this additional pressure.
- c) Check the catalogue for max pressure rating for the valve. Do not exceed maximum recommended pressure for this valve.
- d) **Inlet and outlet pipe must be rigidly anchored!** Don't depend on friction between the rubber sleeve and the pipe to hold the pipes in place. If one of the pipes slip out of the socket, it probably won't kill you, but it'll give you a serious whack, and then, of course, your pumped fluid will blow all over the place, which is a major mess.
- e) After shutting down: Pinch valves can hold pressure in a system for a considerable length of time. Means should be provided to safely relieve pressure and drain lines.

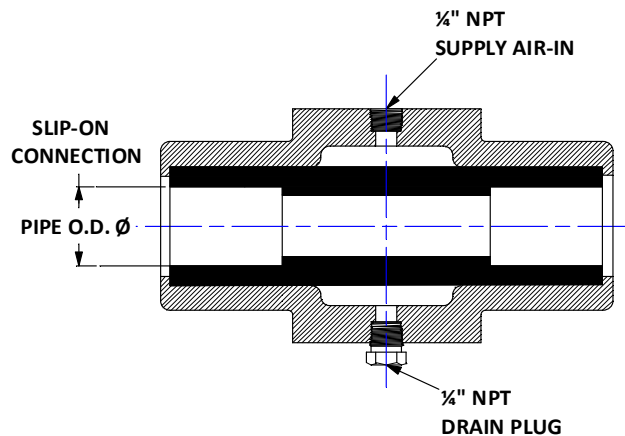
Model GSS :



All dimensions are in inches

SIZE	1/4	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4
A	2.00	2.38	3.12	3.00	3.50	4.25	5.50	7.00	8.00	10.00
B	4.75	5.50	6.00	7.00	8.25	10.00	11.50	14.00	16.00	20.00
C	3.62	4.00	4.25	4.87	5.31	5.56	7.18	7.81	9.12	10.31
D	1.18	1.37	1.56	1.75	2.00	2.18	2.56	3.06	3.50	4.43
E	4.62			6.82						8
Z	1/4 NPT									3/8 NPT
Wt,lb	1.5	2	3	5	7	11	15	21	25	44
P Max	50 psi							35 psi	30 psi	25 psi

NOMINAL VALVE SIZE	Pipe Size	EMT	OD Tubing
1/4	1/4 OD = 0.54"	N/A	N/A
1/2	1/2 OD = 0.84"	N/A	1/2 OD = 0.500"
3/4	3/4 OD = 1.05"	N/A	3/4 OD = 0.750"
1	1 OD = 1.315"	1 OD = 1.163"	1 OD = 1.00"
1 1/4	1 1/4 OD = 1.66"	1 1/2 OD = 1.74"	1 1/4 OD = 1.25"
1 1/2	1 1/2 OD = 1.90"	N/A	1 1/2 OD = 1.50"
2	2 OD = 2.375"	2 OD = 2.197"	2 OD = 2.000"
2 1/2	2 1/2 OD = 2.875"	2 1/2 OD = 2.875"	2 1/2 OD = 2.500"
3	3 OD = 3.50"	3 OD = 3.50"	3 OD = 3.00"
4	4 OD = 4.50"	4 OD = 4.50"	4 OD = 4.00"



## Installation:

### 2. Connections

- a) The GSS is available with sockets to mate with schedule-40 or schedule-80 pipe (iron, steel or PVC), OD tubing, or EMT. Make sure that the piping or tubing you ordered and the valve you ordered match up.
  - b) The pipe should be cut square. You don't need any grooves, serrations, or threads. Make sure that the pipe end is de-burred! A sharp pipe end will cut the rubber sleeve, damaging it. Make sure that the pipe is clean and free from grease, oil, or other residue.
  - c) To assemble the valve to the piping ... start by loosening the housing bolts.
  - d) The next step is to shove the pipe into each end of the valve until it hits the rubber stop.
  - c) Make sure that the rubber housing gasket is in place, then tighten the housing bolts to clamp down on the pipe. Turn the bolts down hard, at least 60 ft-lb. An impact wrench helps.
  - d) Design the installation so that the valve can be removed for service and reinstalled. Remember that pinch valve sleeves wear out and have to be replaced. If the mating pipes are rigidly anchored in concrete or permanently welded into a steel structure, you might be able to remove the valve from the line, but there will be hell to pay when you attempt to reinstall the valve. Connecting the pipe stubs to your process with a Victaulic or Dresser type coupling will facilitate removal and replacement of the valve.
3. Inspect the valve before installation. **Do not install a damaged valve.** Check inside valve to be sure no foreign objects are present.
  4. Do not install valve near a source of extreme heat.
  5. Locate the valve where it can be reached for service. Allow room to service auxiliary instrumentation. Orient the valve so operators can see gauges.
  6. Be sure pipe line is clean. Foreign material left in the pipe can damage valve. Remove any residual gasket material from mating flanges.
  7. Valve can be installed in any altitude with flow in either direction. Install valve with drain port facing down.
  8. Bolt the valve into the pipe line. Snug the bolts gently in a criss cross pattern. Do not use excessive torque on flange bolts. Max torque required is 40 ft lb.
  9. Attach air supply to the connection in valve housing.



**NO OIL OR GREASE**

**Important:** No Oil or Grease  
Do not use lubricated air

Oil in the system will attack the rubber sleeve, causing damage and reducing sleeve life.  
Do not allow any petroleum based oil or grease to contact the rubber sleeve.

10. **Important:**

Use a pressure regulator on the supply air to this valve. Correct air pressure increases sleeve life.

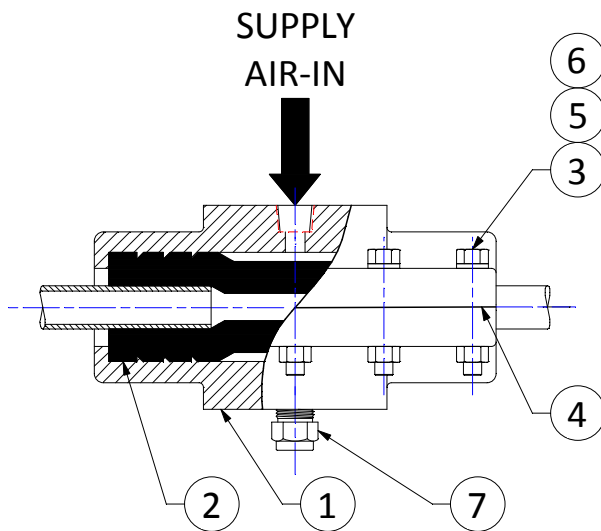
**Set air pressure regulator 40 to 50 psi over maximum process pressure that the valve has to close against.**

Too low pressure allows the valve to leak, causing erosion failure of the sleeve.

Too high pressure stresses reinforcing fabric, leading to premature collapse.

## Sleeve Replacement:

1. Relieve pressure and drain process pipe.
2. Turn off supply air.
3. Disconnect air and electric lines from valve.
4. Remove the valve from the pipe.
5. Remove the bonnet bolts (#3, 5, 6) and separate the bonnet sections (#1).
6. Remove the old rubber sleeve (#2).
7. Insert the new sleeve into the housing.
8. Replace housing gaskets (#4).
9. Reassemble the housing assembly. Replace the housing bolts, washers, and nuts.



NO	DESCRIPTION
1	BONNET ASSY
2	SLEEVE
3	BOLT
4	GASKET
5	LOCK WASHER
6	NUT
7	DRAIN PLUG

### AVAILABLE SLEEVE MATERIALS:

- 1) EPDM/NORDEL
- 2) PURE GUM RUBBER
- 3) NEOPREME
- 4) BUNA
- 5) VITON

Customers are encouraged to consult with us to help determine the best hybrid material to construct a sleeve to meet your engineering requirements.



## **Instructions for the Auxiliary Solenoid Valve**

Onyx pinch valves are available with a solenoid valve as a standard accessory.

On the model GSS, the solenoid valve mounts direct to the pinch valve eliminating tubing and fittings.

If the solenoid valve should fail for any reason, simply remove the socket head cap screws which attach it to the sub-plate, unplug the old solenoid valve, and plug in a new solenoid valve.

An optional pressure regulator is also available. If the pressure regulator is supplied, this will be nested between the manifold block and the solenoid valve.

For Shell & Tube type valves GSS set the regulator to 40 psi over the shut off pressure inside the pinch valve. For example: If the line pressure inside the pinch valve is 30 psi, set the pressure regulator to 70 psi.

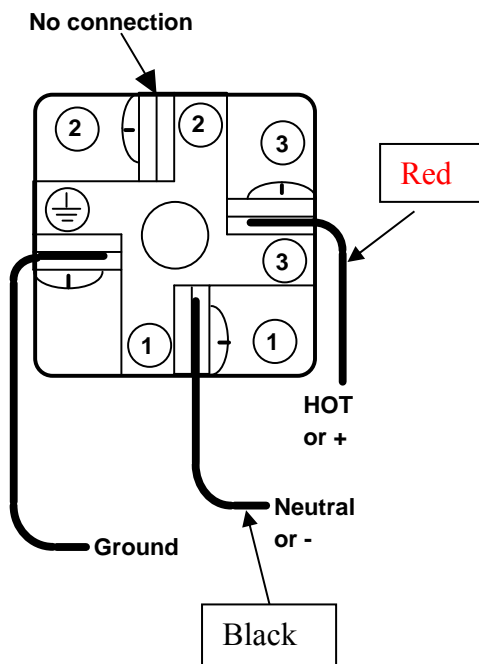
## Wiring:

The standard solenoid valve is weatherproof per NEMA-4, suitable for indoor or outdoor service.

Standard voltage: 110 VAC 50/60~  
Power consumption: Inrush: 5.0 VA  
Holding: 2.3 VA

Other voltages including DC power are available.

Electrical connection is via a DIN plug. There are 2 types in use. A DIN plug with terminal screws and a DIN plug with a molded in cord. The type with internal terminal screws is designed to work with an 8 to 10 mm (0.31 to 0.37") diameter 3-conductor flexible cord.

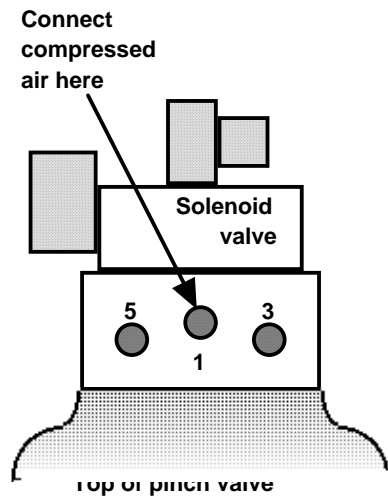


**For the plug with screw terminals:** Loosen the screw on top of the DIN plug. Using a small screwdriver, gently pry the plug base loose from the cover. Feed the flexible connecting wire through the grommet in the DIN plug cover. Connect the three wires to the plug as shown in figure 1. Connect the neutral wire to terminal #1, the hot (or +) wire to terminal #3, and the ground wire to the ground terminal. There is no connection to #2. Slide the cover over the plug front and snap in place. Re-attach the DIN plug to the solenoid valve and tighten the retaining screw.

**For the plug with a molded-on cord:** Connect the **Black** wire to your neutral, the **Red** wire to your hot (or +) and the **Green** wire to the ground.

Figure 1. Wiring connections

## Pneumatic Connections



Connect a source of compressed air to port #1 (under the "P") on the manifold block of the solenoid valve.

The pinch valve does not require filtered instrument grade air, but your compressed air should be free from condensation and other contaminants.

Figure 2. Compressed air connection.

Suggested minimum air line size:

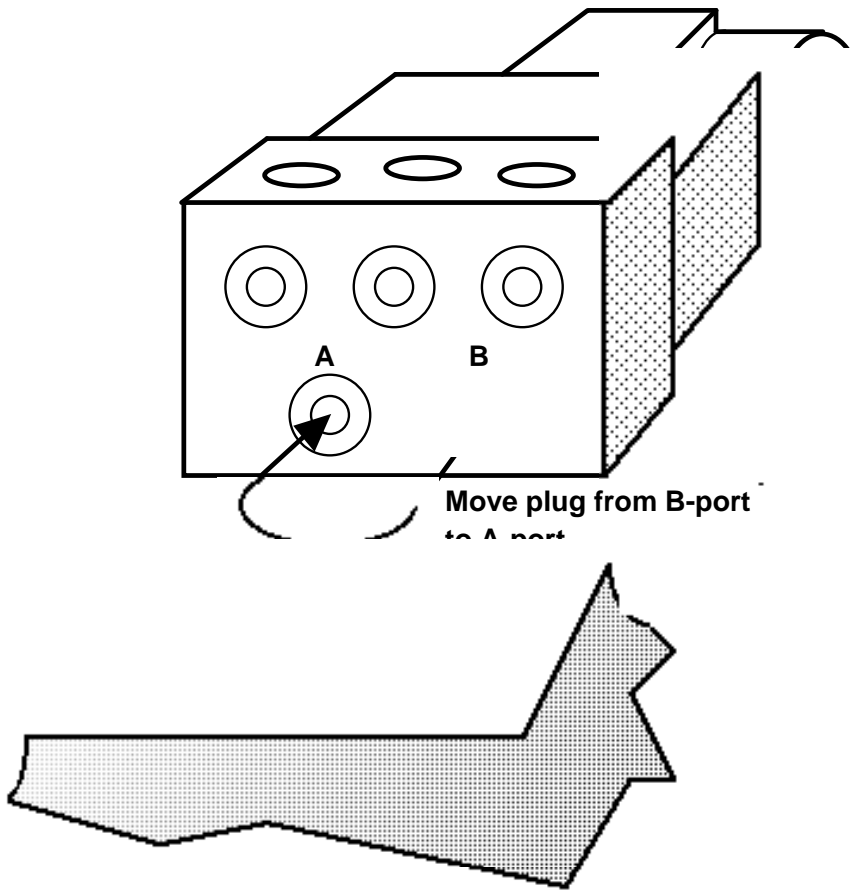
1" to 2"	0.250"
2.5" to 6"	0.375"
8" and larger	0.500"

### Configuration

When supplied with our standard solenoid valve, Onyx pinch valves can be configured either energize coil to open (Fail Close on loss of electric) or energize coil to close (fail open on loss of electric).

The standard configuration as shipped from the factory is energize-coil-to-open the pinch valve.

On **Shell & Tube** type pinch valves: To reverse this operation (energize coil to close pinch valve), remove the solenoid valve assembly (including the manifold block) from the pinch valve. In the base of the manifold is a 1/4" plug in the "A" port. Using a standard Allen key, remove this plug and transfer it to the opposite port. Reconnect the solenoid valve assembly to the pinch valve.



*Figure #3.*

*Pipe plug in "A" port = Energize Coil to OPEN pinch valve.*

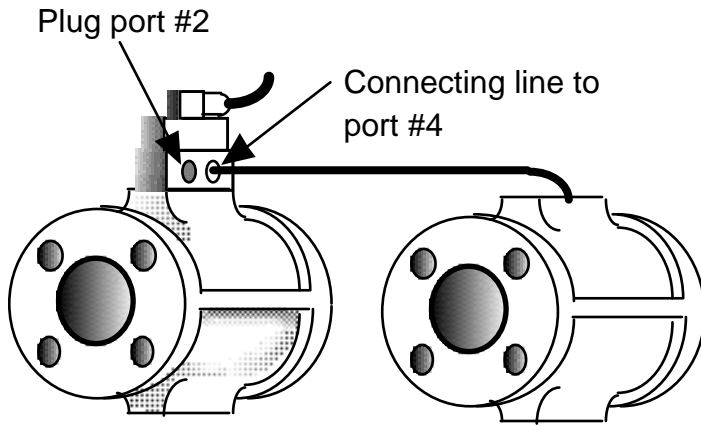
*Pipe plug in "B" port = Energize Coil to CLOSE pinch valve.*

### **Lock on Loss of Air**

You can configure the valve to stay in place during a compressed air failure. For this mode of operation, screw a check valve into port #1 (under the "P") on the manifold block. Orient the check valve so that the direction of flow is "into" the manifold block. On loss of air, the pinch valve will remain in last position so long as the solenoid status is unchanged.

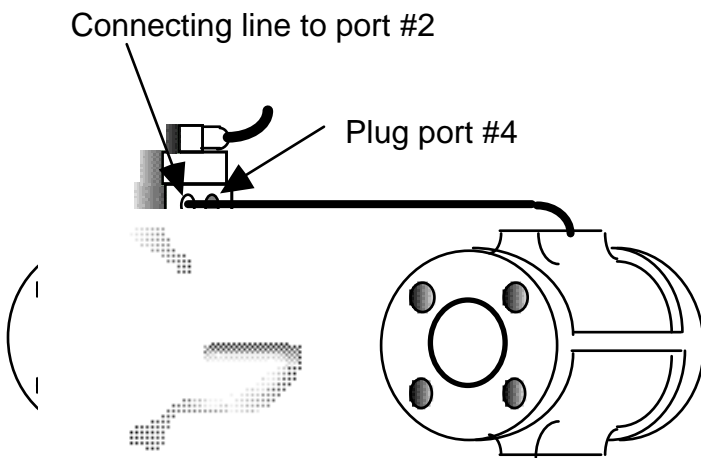
### **Multi Valve Operation**

You can operate more than one pinch valve with one solenoid valve. There are two ways to combine pinch valves:



Valves open and close in unison

Figure #4.



Diverter set-up. One valve opens as the other valve closes.

Figure #5.

They can operate in unison, where the pinch valves open and close at the same time.

To operate valves in unison, remove the plug from port #4 on the solenoid valve manifold block, and connect an air line from this port to the air port on the opposite valve.

The other method is to set up a diverter assembly, where one valve opens as the opposite valve closes. In this arrangement, there is always one open and one closed valve.

To operate the valves in a diverter mode, remove the plug from port #2 on the solenoid valve manifold block, and connect an air line from this port to the air port on the opposite valve.

### Trouble Shooting:

Symptom:	Diagnosis	How to fix:
Process fluid is leaking out from around the stem and guide rods.	Sleeve is ruptured	Replace sleeve. See page-15
Process fluid is leaking through valve when it's supposed to be fully closed. Limit switch shows valve is in full closed position.	Wire draw failure through sleeve.	Replace sleeve. See page-15
Leaking through valve seat when valve is supposed to be fully closed. Limit switch shows valve is <b>not</b> in full closed position.	Either the actuator limit switch or the actuator torque setting is not correct	Refer to Actuator I&M.
Actuator is running but valve is unable to open or close. Aux hand wheel can't move the valve either.	Actuator drive nut is stripped.	Replace the output drive nut in the electric actuator. See p-13 for why this happened.

# ONYX VALVE CO

## WARRANTY

The following statement of our Warranty and Claims Policy is intended to assist our customers in understanding the terms of our warranty, the circumstances under which we will honor claims, and the procedure for making claims.

### 1 Warranty on Products Manufactured by Us.

We warrant Products manufactured by us to be free from defects in material and workmanship for a period of one year from the date of shipment from our factory or warehouse.

Our liability under this warranty or in connection with any other claim relating to our Products is limited to the repair, or at our option, the replacement or refund of the purchase price of any products or parts or components which are returned to us freight prepaid which are defective in material or workmanship. Products or parts or components that are repaired or replaced by us will be returned to our customer freight collect.

With regards to rubber components, Onyx Valve does not guarantee resistance to erosion, abrasion or other sources of failure, nor does Onyx Valve guarantee a minimum length of service or that the product shall be fit for any particular service.

### 2. Products of Other Manufacturers.

We make no warranty with regard to any products not manufactured by us. The only warranty that attaches to such Products is that warranty, if any, of the manufacturer of such Products. Our Customer Service Department should be consulted if our customers have questions as to whether particular products are covered by our warranty or are separately warranted by their manufacturers.

### 3 Limitation of Liability.

The only warranty that we make to our customers is that summarized above.

WE DO NOT MAKE ANY OTHER EXPRESS WARRANTIES OR ANY IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE OR USE.

In addition, we do not assume and we expressly disclaim any liability for (i) any special, indirect, incidental, or consequential damages which anyone may suffer as the result of the sale, delivery, servicing, use, or loss of use, of any Product, or (ii) any charges or expenses of any nature that are incurred without our express written consent.

Our total liability under our warranty or in connection with any claim involving any Product is expressly limited to the purchase price of the Product in respect of which damages are claimed.

Failure of purchaser to give prompt written notice of any alleged defect under this guarantee forthwith upon its discovery, or use, and possession thereof after an attempt has been made and completed to remedy defects therein, or failure to return product or part for replacement as herein provided, or failure to install and operate said products and parts according to instructions furnished by Onyx Valve, or failure to pay entire contract price when due, shall be a waiver by purchaser of all rights under these representations. All orders accepted shall be deemed accepted subject to this warranty which shall be exclusive of any other or previous warranty, and shall be the only effective guarantee or warranty binding on Onyx Valve.

4. What Is Not Covered By Our Warranty; Types of Damages and Claims For Which We Are Not Responsible.

The following are examples of the kinds of defects which are not covered by our warranty: defects which are caused by improper installation, improper or abnormal use or operation, or improper storage or handling; defects caused by our customer's failure to perform normal preventive maintenance; defects caused by the use of replacement parts not manufactured or supplied by us; defects caused by repairs by persons not authorized by us; defects caused by modifications or alterations made by our customer, and any damage to our Product occurring while it is in our customer's possession. Since these are examples and not a complete list, we suggest that our customers contact our Customer Service Department if they have any questions concerning the scope of our warranty.

Additional costs incurred by our customers because of delays in delivery are consequential damages for which we are not responsible.

Risk of loss or damage to our Products passes to our customer when we tender our Products to the carrier. Although we cannot process transit damage claims with any carrier on a customer's behalf, we will provide reasonable assistance to our customers when such claims arise.

5. Consultations with Customers.

When so requested, our engineers and other personnel may consult with our customers concerning our Products. While our employees offer their best judgment on any question, the ultimate responsibility for selecting that Product which will perform the functions and applications desired by the customer rests with the customer. As noted above, we make no warranty, express or implied, as to the fitness of any Product for any particular purpose or use.

6. How to Make a Claim.

Within the limits of the terms and conditions set forth on our quotation and acknowledgment forms and in this Warranty and Claims Policy, we will honor reasonable and justified claims when adequate evidence is provided to show that our Product was defective.

Whenever a customer has a claim concerning a Product, the customer should contact the Customer Service Department. CUSTOMERS SHOULD NOT RETURN ANY PRODUCTS OR PARTS OR COMPONENTS TO US WITHOUT FIRST CONTACTING US.

When contacting us, customers should have the following information available:

1. Customer name, location, purchase order number and date of purchase.
2. Serial number.
3. Product/Model number.
4. Equipment installation date.
5. Equipment failure date.
6. Application or service of unit.
7. Details of claim.

We shall have the option of requiring the return of the defective product to our factory, with transportation charges prepaid, to establish the claim and our liability shall be limited to the repair or replacement of the defective product, F.O.B. our factory. Onyx Valve Co will not assume costs incurred to remove or install defective products nor shall we incur back charges or liquidated damages as a result of warranty work.



We will notify the customer whether it will be necessary to return the Product or part or component to us. If so, we will issue the customer an "AUTHORIZED RETURN GOODS NUMBER" that must be attached to the Product or part or component before returning it. All items returned to us must be returned freight prepaid.

If we determine that the Product or part or component is defective and that the defect is covered by our warranty, we will, as explained above, correct the defect or refund the purchase price.

Customers should promptly inspect all Products upon delivery. Customers must make claims for shortages within 20 days after the date of shipment from our factory or warehouse. We suggest that shortages be noted on the bill of lading or packing list, which should then be sent to our Customer Service Department for verification.

All other claims must be submitted within 60 days after the date of shipment from our factory or warehouse, or in the case of an alleged breach of warranty, within 60 days after the date within the warranty period on which the defect is or should have been discovered.

Claims may not be deducted from payments made to us unless we have so agreed in writing in advance.

## **Questions?**

### **Contact Onyx Valve Company**

**Phone: 1-856-829-2888 extension 112**

**Fax: 1-856-829-3080**

**Email: [david@onyxvalve.com](mailto:david@onyxvalve.com)**