Installation and Operation Manual

Hybrid Valve™ models are manufactured by BLACOH and use pressure bodies made in the USA to ensure quality. Prior to shipment, each and every model is factory tested to assure proper function and leak-free operation. (Patent pending.)

BLACOH™
FLUID CONTROL

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SAFETY Warnings

Hybrid Valve™ models should only be installed, operated and repaired by experienced and trained professional mechanics. Read and observe all instructions and safety warnings in this Manual before installing, operating or repairing models.

Safety Symbols

The following symbols indicate cautions, warnings and notes that must be observed for safe and satisfactory installation, operation and maintenance of Hybrid Valve™ models.

	WARNINGS	Danger of serious injury or death could occur if these warnings are ignored.
!	**CAUTIONS**	Equipment damage, injury or death could occur if these cautions are not observed.
△	**NOTES**	Special instructions for safe and satisfactory installation, operation and maintenance.

General Safety

! **CAUTION!**

- Observe all safety symbols in installation and operation instructions.
- The internal model pressure will equal the maximum fluid pressure of the system in which it is installed.
- **DO NOT** exceed maximum allowable working pressure (MAWP) specified on model serial tag or marked on model. If missing, **DO NOT** use model without consulting distributor or factory for maximum pressure rating.
- Always make sure safety shutoff valves, regulators, pressure relief valves, gauges, etc. are working properly before starting system or assembly.
- Verify model received against purchase order and shipper.
- Before starting a system or assembly make certain the discharge point of the piping system is clear and safe, and all persons have been warned to stand clear.
- **DO NOT** put your face or body near model when the system or assembly is operating or model is pressurized.
- **DO NOT** operate a model that is leaking, damaged, corroded or otherwise unable to contain internal fluid, air or gas pressure.
- **DO NOT** pump incompatible fluids through model. Consult distributor or factory if you are not sure of the compatibility of system fluids with model materials.
- The model's pulsation dampening side is designed to operate with compressed air or clean dry Nitrogen **only**. Other compressed gases have not been tested and may be unsafe to use. **DO NOT USE OXYGEN.**
- Always shut off air supply and remove internal dampener pressure before performing model maintenance or repair.
- Remove all pressure from model AND pumping system, and loosen adjustment screw until flush with bottom of spring housing before disassembly, removal or maintenance.

Equipment Misuse Hazard ⓘ CAUTION!

General Safety

DO NOT misuse model, including but not limited to over-pressurization, modification of parts, using incompatible chemicals, or operating with worn or damaged parts. **DO NOT** use any gases other than compressed air or clean dry Nitrogen to charge model dampener side. **DO NOT USE OXYGEN**. Any misuse could result in serious bodily injury, death, fire, explosion or property damage.

Over-Pressurization

Never exceed the maximum pressure rating for the model being used. Maximum allowable working pressure (MAWP) is specified on model serial tag or marked on model. Maximum allowable working pressure (MAWP) is rated at 70°F (21°C).

Temperature Limits

DO NOT exceed the operating temperature limits for the body and/or elastomer materials being used. Excessive temperature will result in model failure. For temperature limits, refer to the "Temperature Limits" section of this Manual. Temperature limits are stated at zero psi/bar.

Installation and Startup Hazards

Install model before charging or pressurizing. **DO NOT** start system or assembly without first charging or pressurizing model. Failure to charge may result in damage to the elastomeric bladder or PTFE bellows.

Temperature & Pressure Hazard

Temperature and pressure reduce the strength and chemical resistance of plastic, metal, elastomers and PTFE.

Charging / Pressurization

Charge or pressurize model dampener side with compressed air or clean dry Nitrogen only. **DO NOT USE OXYGEN.**

Dampener Bladder/Bellows Failure

Model dampener side utilizes an elastomeric membrane (bladder) or PTFE bellows to separate system fluid from the air supply or gas charge. When failure occurs, system fluid may be expelled from the air valve. Always perform preventive maintenance and replace bladder/bellows before excessive wear occurs. O-rings for PTFE bellows cannot be reused.

Maintenance Hazards

Never overtighten fasteners. This may cause leakage of system fluid and damage to model body. Bolts should not be reused as re-torquing reduces bolt strength. **After model maintenance or reassembly, use new fasteners and torque fasteners according to specification on model tag. If missing, consult distributor or factory for torque specifications.**

GENERAL Information

For safe and satisfactory operation of model read all safety warnings, caution statements and this complete Manual before installation, startup, operation or maintenance.

Must Read Before Installation

DO NOT use Oxygen to charge model dampener side. Use compressed air or clean dry Nitrogen only.

DO NOT exceed maximum allowable working pressure (MAWP) specified on model serial tag or marked on model.

Turn pump off and remove all pressure from system prior to model installation.

Always wear safety glasses and other appropriate safety equipment when installing, charging or repairing model.

DO NOT operate a model that is leaking, damaged, corroded or otherwise unable to contain internal fluid, air or gas pressure.

Temperature, pressure and chemicals affect the strength of plastic, elastomer and metal components.

Many plastics lose strength rapidly as temperature increases. Consult factory if in doubt.

Installation Notes

It is recommended that a BLACOH pressure relief valve be installed between the pump and the Hybrid Valve™ model to ensure compliance with pressure limits on system equipment.

To avoid possible damage to bladder/bellows from a system pressure test, charge model dampener side to 80% of the system test pressure prior to test.

Install model inline as close to the pump discharge as possible.

It is recommended that an isolation valve be installed between the dampener and system piping on both the inlet and outlet sides.

Maintenance

Remove all pressure from model AND pumping system, and loosen adjustment screw until flush with bottom of spring housing before disassembly, removal or maintenance.

Hybrid Valve™ models require very little maintenance. There is no need for lubrication with elastomeric bladder or PTFE bellows.

Elastomeric bladder replacement should be part of a preventive maintenance program. Models used in conjunction with diaphragm pumps should have the bladders replaced at least every second time the diaphragms in the pump are replaced. As with any pumping system, wear is dependent on many factors including material, temperature, chemicals, fluid abrasiveness and system design. This suggested maintenance program may need to be adjusted according to specific applications.

Periodic inspection of the hybrid valve and fasteners should be conducted to visually check for signs of over-pressurization, fatigue, stress or corrosion. Body housings and fasteners must be replaced at first indication of deterioration.

CAUTION! Replace nut and bolt fasteners at each reassembly with fasteners of equal grade/strength value. DO NOT reuse old nuts and bolts.

After the initial torque of fasteners, bolts may lose strength when re-torqued. Failure to replace both nuts and bolts upon each vessel reassembly will void the product warranty given by the manufacturer and the manufacturer will have no liability whatsoever for any vessel failure or malfunction.

Where models are used in corrosive environments, nut and bolt fasteners should be regularly inspected and replaced with nut and bolt fasteners of equal grade/strength value if corrosion is observed. Failure to conduct such regular inspections and replacement will void the product warranty given by the manufacturer and the manufacturer will have no liability whatsoever for any vessel failure or malfunction.

IMPORTANT! After maintenance or reassembly, use new fasteners and torque fasteners according to specification on model tag. If missing, consult distributor or factory for specifications.

DO NOT use model if the fasteners (nuts and bolts) are corroded. Check for fastener corrosion frequently, especially in atmospheres containing salt or corrosive chemicals, or if any leakage has occurred.

Temperature Limits

Operating temperatures are based on the maximum temperature of the wetted components only. Non-wetted components may have a lower temperature limit. Temperature and certain chemicals may reduce the maximum allowable working pressure (MAWP). Plastic (non-metallic) body materials lose strength as temperature increases, which reduces the maximum pressure sustainable by the material. All plastic materials must have an appropriate derating factor applied when working at elevated temperatures above 73.4°F (23°C) to determine maximum allowable working pressure (MAWP).

Elastomer Materials	Temperature Limits		Applications
Buna-N	+10°F to +180°F	(-12°C to +82°C)	Good flex life; use with petroleum, solvents and oil-based fluids.
FDA Buna-N	+10°F to +180°F	(-12°C to +82°C)	FDA-approved food grade; similar characteristics of regular Buna-N.
EPDM	-60°F to +280°F	(-51°C to +138°C)	Use in extreme cold; good chemical resistance with ketones, caustics.
Hypalon	-20°F to +275°F	(-29°C to +135°C)	Excellent abrasion resistance; good in aggressive acid applications.
Neoprene	0°F to +200°F	(-18°C to +93°C)	Good abrasion resistance and flex; use with moderate chemicals.
PTFE Diaphragm	+40°F to +220°F	(+4°C to +104°C)	Use with highly aggressive fluids.
PTFE Bellows	-20°F to +220°F	(-29°C to +104°C)	Exclusive bellows design with excellent flex life; use with highly aggressive fluids.
Santoprene	-20°F to +225°F	(-29°C to +107°C)	Excellent choice as a low cost alternative for PTFE in many applications.
FDA Silicone	-20°F to +300°F	(-29°C to +149°C)	FDA-approved food grade material; for use in food and pharmaceutical processing.
Viton®	-10°F to +350°F	(-23°C to +177°C)	Use in hot and aggressive fluids; good with aromatics, solvents, acids and oils.

Non-Metallic Body Materials	Temperature Limits		Applications
CPVC	+32°F to +180°F	(0°C to +82°C)	Chlorinated PVC (CPVC): Good general chemical resistance; loses strength as temperature rises.
PVC	+32°F to +140°F	(0°C to +60°C)	Good general chemical resistance; loses strength as temperature rises.

Installation & Operation Instructions: HYBRID VALVE™ Models

Hybrid Valve™ models are not recommended for use as Inlet Stabilizers at pump inlets or as Surge Suppressors at quick closing valves. Use Inlet Stabilizer models on the inlet side of pumps and metal Surge Suppressors for water hammer or quick closing valve applications. Consult factory for options.

Turn pump off and remove all pressure from system prior to model installation.

Remove all pressure from model AND pumping system, and loosen adjustment screw until flush with bottom of spring housing before disassembly, removal or maintenance.

Use compressed air or clean dry Nitrogen to charge model. **DO NOT USE OXYGEN.**

DO NOT exceed maximum allowable working pressure (MAWP) specified on model serial tag. If missing, consult distributor or factory for specifications.

DO NOT overtighten adjustment screw. This will fully compress spring resulting in loss of model performance. Never set charge pressure higher than model maximum allowable working pressure (MAWP).

Always wear safety glasses and other appropriate safety equipment when installing, charging or repairing model.

Read and observe all safety warnings and instructions in this Manual before installation, operation or repair.

IMPORTANT! After maintenance or reassembly, use new fasteners and torque fasteners according to specification on model tag. If missing, consult distributor or factory for specifications.

Before performing a system pressure test, model dampener side must be charged with 80% of system test pressure to avoid possible damage to bladder/bellows.

Always loosen model adjustment screw until flush with bottom of spring housing prior to reassembly.

Pre-Charge Notes

Read Before Installation

The following pre-charge notes are for all plastic models up to a maximum pressure of 150 psi (10.3 bar). Use compressed air or clean dry Nitrogen to charge model. DO NOT USE OXYGEN.

Pre-charge pressure should be checked at least monthly as gas molecules will diffuse through bladders/bellows, the speed of which depends on the material, temperature and pressure. Checks must occur when no system pressure is present or inaccurate readings will be recorded. If temperature is above 72°F (22°C) checks should be performed more frequently. **To prevent pre-charge loss through the fill valve, always replace the fill valve cap after charging.** A proper gas charge is the key to dampener effectiveness and bladder/bellows life.

Installation for Pump Discharge Pulsation

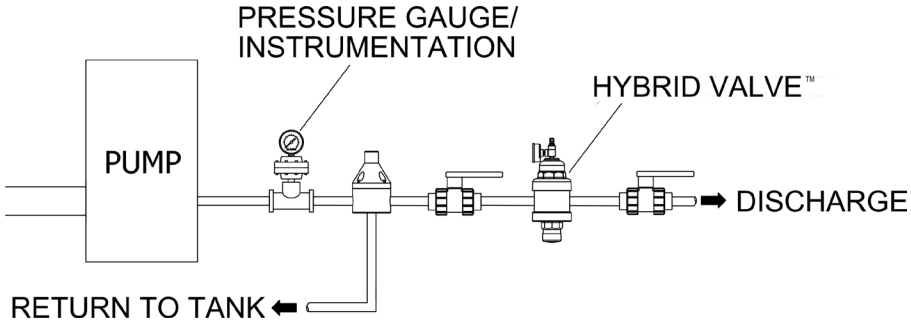
Read Before Installation

Step 1 — Installation Position

Install model inline as close to the pump discharge as possible to absorb the pulse at its source. Since pressure is equal in all directions, model can be installed in a horizontal or vertical position (see Figure 1). A horizontal installation with the dampener housing facing up is recommended for better drainage of the dampener side. Limitations for horizontal and upside-down mounting include high specific gravity, high viscosity, settling of solid material or possible air entrapment which could result in shortened bladder/bellows life and/or reduced dampening performance.

It is recommended that a BLACOH pressure relief valve be installed between the pump and the Hybrid Valve™ model to ensure compliance with pressure limits on system equipment.

FIGURE 1



Step 2 — Charging and Startup (see Pre-Charge Notes)

Chargeable models do not require an air line connection. Model can be pre-charged with compressed air up to a maximum pressure of 150 psi (10.3 bar). Use a hand pump, Nitrogen tank or air compressor to charge model. **DO NOT USE OXYGEN.** Charging kits are available from BLACOH.

Prior to starting the pump, pre-charge model to approximately 80% of expected system pressure and replace fill valve cap. **DO NOT USE OXYGEN.** The pre-charge pressure in the model must always be lower than pump discharge pressure. Generally, pulsation is most effectively minimized when the gas pre-charge is 80% of system pressure. Start the pump to generate system pressure. The model charge pressure may need to be adjusted up or down to be most effective in reducing pulsation. **NOTE:** The most effective method to set the proper model charge is to install a pressure gauge upstream of the model and adjust the model charge pressure to minimize needle movement on the gauge.

Once system pressure is in contact with the bladder/bellows, the gas charge will be compressed to the system pressure and the model gauge will read the system pressure, not the initial charge pressure. Once working pressure is achieved adjustment may be necessary. Gradually increase or decrease the gas charge in the model by bleeding or filling through the gas valve. Allow the system to respond to each adjustment (this may take a minute or two) before making further adjustments.

Step 3 — Adjusting Back Pressure

The back pressure valve side of the model contains a pressure adjustment screw which can be turned with a flat head screwdriver. Remove spring housing cover to expose adjustment screw. Turn adjustment screw clockwise to increase back pressure or, counterclockwise to decrease back pressure. On models with 10-150 psi springs, each full rotation of adjustment screw is approximately equal to 10 psi. Replace spring housing cover after adjustment.

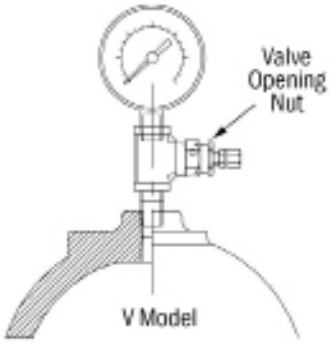
DO NOT overtighten adjustment screw. This will fully compress spring resulting in loss of model performance. Never set charge pressure higher than model maximum allowable working pressure (MAWP).

Back pressure can only be adjusted once the model has been charged to desired pre-charge pressure and the pump is running. Line pressure can be read on the air control assembly gauge.

Pre-Charge Instructions for V Model Air Controls

Read Before Installation

The Chargeable V Model air control assembly has a machined stainless steel charging valve and seal for rugged leak-proof operation in corrosive environments. To pre-charge models with V Model air control assemblies, turn the Valve Opening Nut counterclockwise to open for charging. The valve on these models has no valve core to prevent the air charge from escaping. Because there is no valve, the pressure in the dampener will escape if the valve is not closed prior to removing the charging hose. To close the valve, turn the Valve Opening Nut clockwise.



Maintenance and Repair

Read Before Installation

Refer to *Assembly & Maintenance Drawing* following this section for exploded view and parts listing.

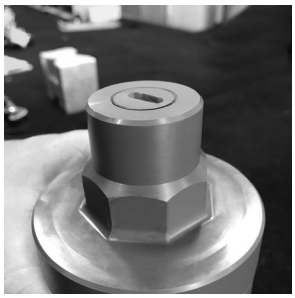
Disassembly

Remove all pressure from model AND pumping system, and loosen adjustment screw until flush with bottom of spring housing before disassembly, removal or maintenance.

IMPORTANT! Before disassembly, use a permanent marker to draw alignment marks across both the top and bottom of assembly where threads meet. This will ensure proper tightening upon reassembly.

Replacement parts are available from BLACOH. Consult factory for replacement part numbers.

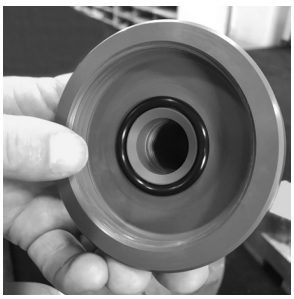
1. Remove cap from air control assembly Schrader valve ① and depress pin with a small screwdriver until all charge gas is vented from assembly. Check gauge to verify pressure is zero before proceeding.
2. Remove air control assembly ① by rotating counterclockwise. Take care not to damage gauge or Schrader valve. A wrench can be applied to tee section of assembly if necessary.
3. Remove cover ⑪ from spring housing ⑨ to expose adjustment screw ⑩. Using a large screwdriver, turn adjustment screw counterclockwise until face of adjustment screw is flush with bottom of spring housing. This will remove spring tension from assembly.



4. Place assembly in a vise with dampener housing ② up and clamp with soft jaws or wooden blocks. Apply a spanner wrench or large adjustable pliers to flats on dampener housing and turn counterclockwise to separate dampener housing from body ④. Inspect dampener housing and body threads for damage and replace as needed. Inspect bladder/bellows ③ for failure and replace as needed.

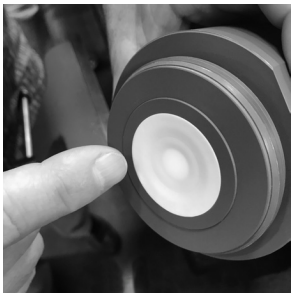
5. Remove assembly from vise and rotate so spring housing ⑨ is facing up. Replace in vise and clamp with soft jaws or wooden blocks.
6. Apply a spanner wrench or large adjustable pliers to flats on spring housing ⑨ and turn counterclockwise to separate spring housing from body ④. Carefully lift spring housing straight up leaving internal components in place. Observe location and orientation of internal components before proceeding. Take care to ensure internal components are not lost. Inspect threads on spring housing and body for damage and replace as needed.

7. Remove diaphragm O-ring ⑧ located in spring housing ⑨ groove. Inspect O-ring for signs of chemical attack, wear or compression-set and replace as needed.



8. Using a large flat head screwdriver, remove adjustment screw ⑩ from spring housing ⑨. Inspect adjustment screw and spring housing for signs of chemical attack, wear or damage. Pay particular attention to threads and replace parts as needed. Inspect spring ⑦ and spring seat ⑥ for signs of chemical attack, wear or damage and replace as needed. Note orientation of spring seat with regard to spring and diaphragm ⑤.

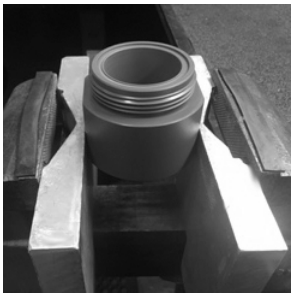
9. Remove assembly from vise. Remove diaphragm ⑤ from recess in body ④. If diaphragm is difficult to remove, invert body and insert a small blunt rod or tool in fluid port to push diaphragm from body. Take care not to damage diaphragm while removing. Inspect diaphragm and body for signs of chemical attack, wear or damage and replace as needed.



Assembly

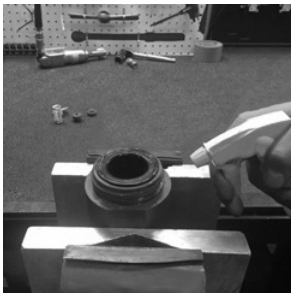
△ Make sure all parts are clean and undamaged. Order replacement parts as needed. Replacement parts are available from BLACOH. Consult factory for replacement part numbers.

1. Place body ④ in a vise with the deep recess for bladder/bellows ③ facing up and clamp at flats with soft jaws or wooden blocks. Apply solution of soap and water as a lubricant to bladder/bellows ③ sealing ring.



△ The bladder/bellows sealing ring is used to seal the body ④ and dampener housing ② together. Lubrication is critical so that the O-ring groove in each component will seat against the bladder/bellows sealing ring smoothly and without distortion.

2. Insert bladder/bellows ③ into recess in body ④. Run your fingers around bladder/bellows outer edge to ensure it is fully seated in recess. Apply solution of soap and water as a lubricant to body threads.



△ Models fitted with PTFE bellows use two O-rings. Ensure PTFE encapsulated O-ring is placed in the body bellows groove.

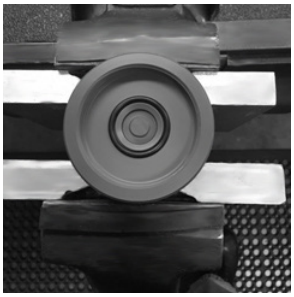
3. Place dampener housing ② on top of body assembly and hand tighten until snug. Use a spanner wrench or large adjustable pliers to tighten until lines marked before disassembly line up.

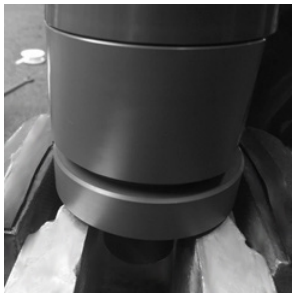
4. Insert new diaphragm ⑤ into recess on body ④ with conical protrusion inserted in the port in center of body. Run your fingers around diaphragm outer edge to ensure that it is fully seated in recess.

5. Insert new diaphragm O-ring ⑧ into groove in spring housing ⑨. Press O-ring into groove to ensure it is fully seated.

6. Insert spring seat ⑥ into recess in spring housing ⑨, ensuring side with the longer pin will be facing spring ⑦.

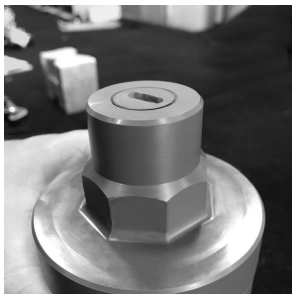
7. Place spring housing ⑨ in a vise with spring seat ⑥ facing up and clamp at flats with soft jaws or wooden blocks. Apply solution of soap and water as a lubricant to threads on spring housing and body ④. Hand tighten spring housing and body together until snug. Use a spanner wrench or large adjustable pliers to tighten until lines marked before disassembly line up. Insert spring ⑦ into threaded bore of spring housing.





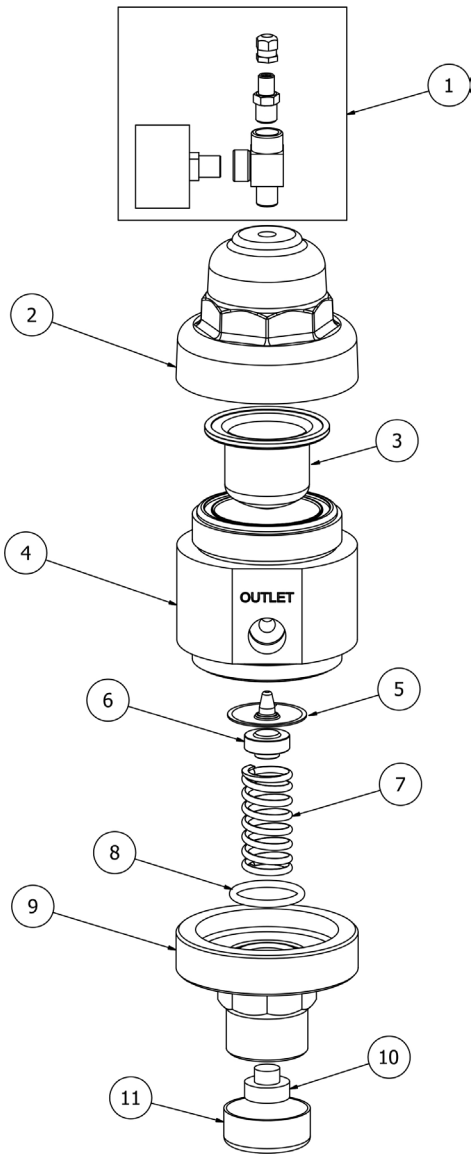
△ Use caution to ensure spring seat stays centered in spring housing recess during assembly. After tightening, remove assembly from vise and confirm spring seat is centered in spring housing recess by looking through threaded bore in spring housing.

8. Install adjustment screw ⑩ into threaded bore of spring housing ⑨. Using a large flat head screwdriver, turn adjustment screw until flush with bottom of spring housing. Replace spring housing cover ⑪.



9. Reinstall air control assembly ① if previously removed.
10. Refer to model installation instructions on charging, setting back pressure, testing and installation.

① Air Control Asy
② Dampener Housing
③ Bladder/Bellows
④ Body
⑤ Diaphragm
⑥ Spring Seat
⑦ Spring
⑧ Diaphragm O-Ring
⑨ Spring Housing
⑩ Adjustment Screw
⑪ Cover



Manufacturer's Limited Warranty & Return Policy

Standard Product Limited Warranty

Subject to the limitations set forth below, BLACOH Fluid Controls, Inc. ("BLACOH") warrants its products to be free from defects in material and workmanship under normal use, service, and maintenance in accord with BLACOH's published specifications for a period of two years from date of shipment by BLACOH (the "Warranty"). The EXCLUSIVE REMEDY for any product defect covered under this Warranty shall be one of the following, as determined by BLACOH in BLACOH's sole discretion: (a) refund of the purchase price; or (b) replacement or repair of the defective part or parts at BLACOH's facility. This Warranty will be null and void if the product is used in an inappropriate application or if the product has been altered, misapplied, improperly installed, or not properly inspected and maintained. To the maximum extent allowed by applicable law, BLACOH will not be responsible for nor have any liability for any "Damage," which means any of the following, whether the claim sounds in breach of contract, breach of warranty, tort, strict liability, implied contractual indemnity, or otherwise: (i) any damage, loss, or injury of any kind, or destruction, or death, whether or not caused by any defect in a BLACOH product and whether or not the BLACOH product is installed, used, operated, and/or maintained in accord with BLACOH instructions, to other products, machinery, buildings, property, or persons, and (ii) any costs, expenses, losses, or incidental, consequential, or special damages of any kind or nature, including but not limited to loss of profits, arising from or related to any BLACOH product, whether or not caused by any defect in a BLACOH product and whether or not the BLACOH product is installed, used, operated, and/or maintained in accord with BLACOH instructions. Damage resulting from chemical incompatibility or from over-pressurization of a product, whether from gas or fluid, is not covered under this Warranty, nor will BLACOH be responsible in any way for any such Damage. Because BLACOH does not determine and cannot anticipate or control the many different conditions under which its products may be used, BLACOH does not warranty the applicability, suitability, or fitness of any of its products for any particular use or purpose. Statements concerning the possible use of BLACOH products are not intended and shall not be interpreted as warranties of fitness for any specific use of such products. Each user of BLACOH products must conduct its own engineering analysis and tests to determine the suitability of each BLACOH product for the user's intended uses or purposes, including but not limited to chemical compatibility and pressurization, and any written or oral assistance from BLACOH in this regard does not relieve the user from exclusive responsibility for such engineering analysis and testing. BLACOH products are sold with only this limited Warranty, and each buyer assumes all responsibility for Damage (as defined above), including but not limited to, Damage arising from defects in BLACOH products and/or from the handling and use of BLACOH products whether used in accordance with BLACOH's directions or otherwise. Any products sold by BLACOH which are manufactured by and sold under the name of another company are NOT WARRANTED by BLACOH under the foregoing Warranty or otherwise. The buyer must rely exclusively on the product warranty, if any, given by such other company. Products manufactured by BLACOH as an original equipment manufacturer (OEM) to be sold by a customer under the customer's brand and name are warranted by BLACOH only under the above Warranty, and BLACOH shall have no liability whatsoever with respect to any representation or warranty given by such customer (or such customer's representatives, distributors, agents, employees, or independent contractors) to any of its buyers which is different in any respect whatsoever from the foregoing Warranty. EXCEPT FOR THE WARRANTY GIVEN ABOVE, WHICH IS SUBJECT TO THE ADDITIONAL LIMITATIONS STATED ABOVE, AND EXCEPT FOR THE ADDITIONAL LIMITED WARRANTY ON BLACOH'S PTFE BELLOWS STATED BELOW, BLACOH GIVES NO WARRANTY OF ANY NATURE WHATSOEVER, EXPRESS OR IMPLIED, WITH RESPECT TO ANY OF ITS PRODUCTS, INCLUDING WITHOUT LIMITATION NO WARRANTY OF MERCHANTABILITY AND NO WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. NO COURSE OF DEALING, USAGE OF TRADE, OR OTHER ORAL OR WRITTEN STATEMENTS SHALL MODIFY THE FOREGOING WARRANTY PROVISIONS AND LIMITATIONS IN ANY RESPECT WHATSOEVER. This Warranty shall be governed by and construed in accordance with the laws of the State of California.

PTFE Bellows Limited Warranty

In addition to BLACOH's Standard Product Limited Warranty and subject to the limitations set forth below, BLACOH warrants that its PTFE Bellows equipment ("PTFE Bellows") on BLACOH's PTFE Bellows-fitted pulsation dampener will perform in accordance with BLACOH's written product description for three years from date of shipment ("PTFE Bellows Warranty"). This PTFE Bellows Warranty applies only to PTFE Bellows that are sized, charged, installed, used, operated, and maintained strictly in accordance with all installation, use, operation, and maintenance instructions provided by BLACOH, and failure to properly size, charge, install, use, operate, and maintain the PTFE Bellows (or failure to do any of them) shall make the PTFE Bellows Warranty null and void. This PTFE Bellows Warranty does not include applications where failure of performance is due to an unbalanced pressure load or a transient pressure spike (sometimes called a water hammer). The EXCLUSIVE REMEDY for breach of this PTFE Bellows Warranty is replacement of the PTFE Bellows at BLACOH's facility, and not any other equipment or parts whatsoever, and BLACOH will not be responsible for any Damage or any other loss of any kind, including but not limited to incidental, consequential, or special damages (including but not limited to loss of profits), in any way arising from failure of the PTFE Bellows to perform in accordance with BLACOH's written product description. This PTFE Bellows Warranty shall be governed and construed in accordance with the laws of the State of California.

Warranty Claims

1. Prior to returning any product to BLACOH based on a claim of breach of Warranty or PTFE Bellows Warranty, a BLACOH Return Request form must be completed. The form will be reviewed by BLACOH to determine if a Return Merchandise Authorization (RMA) number will be issued. The issuance of an RMA number does not constitute BLACOH's acknowledgment or agreement that the warranty claim is justified or correct.
2. If an RMA number is issued by BLACOH, customer should then deliver the product in question to the address specified on the RMA, freight prepaid.
3. All products so returned to BLACOH based on a claim of breach of Warranty or of PTFE Bellows Warranty must be cleaned, sanitized

and neutralized prior to shipment to BLACOH. BLACOH will not accept any part that contains corrosive chemicals, organic cultures, blood, any harmful residue or air borne materials that might contaminate a breathable atmosphere or put at risk any person or property. Any shipment that does not comply will be returned at the expense of the customer, or the customer will be required to arrange for pickup.

4. HAZMAT SHIPMENTS WILL BE REMOVED AND PROCESSED AT CUSTOMER'S EXPENSE.
5. Receipt by BLACOH of a return does not constitute BLACOH's agreement that BLACOH is in breach of its Warranty or PTFE Bellows Warranty.
6. If BLACOH determines that a defect in workmanship or material of a part has occurred, customer is not entitled to a complete unit replacement. In the event of such a defect, BLACOH will repair or replace the defective part or parts or refund the purchase price, as BLACOH determines in BLACOH's sole discretion.

New Product Returns

1. If a customer wishes to return a new, unused product, the customer must first request a Return Merchandise Authorization (RMA) number from BLACOH. BLACOH will determine if the unit can be returned for possible credit.
2. Product to be returned must be new, unused, and of current design and purchased within thirty (30) days of the return request. In addition the product must not have been damaged after original shipment by BLACOH.
3. Product returns must be delivered, freight prepaid.
4. BLACOH has the right to inspect all returned products prior to acceptance or rejection.
5. ALL RETURNS are subject to a minimum $50.00 or 30% restocking fee, whichever is greater. (Higher restocking fees may be charged on special items and some models may not be eligible for return). Returns accepted by BLACOH will be credited to the customer's account less the re-stocking fee. Refunds will not be issued.
6. Any outsourced product supplied by BLACOH will be subject to the warranty, return policy and re-stock fee charged by the manufacturer of the outsourced product.

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BLACOH™ INDUSTRIES

BLACOH FLUID CONTROL

BLACOH SURGE CONTROL

BLACOH INDUSTRIES GmbH

BLACOH HYBRID VALVE™

PROUDLY MANUFACTURED IN THE USA

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