GATES UNDERWATER PRODUCTS

Seal Check

Setup, Use, and Care Guide

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This manual is available in 8.5 x 11 size and full color at

http://www.gateshousings.com/documentation.html

Gates Underwater Products, Inc.

13685 Stowe Drive
Poway, California 92064 USA

Phone: 800.875.1052 toll-free in the U.S.
858.391.0052 outside the U.S.
Fax: 858.391.0053
Web: http://gateshousings.com/

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1: **Introducing Seal Check**

Congratulations on owning a new ***Gates*** product: Seal Check. You've selected a product that will provide years of value and reliable service. We designed this test product specifically to enhance the reliability of your Gates underwater imaging system and protect your investment.

Please read through this entire guide to learn about Seal Check so you can get the most out of this valuable tool. In this section, we'll introduce you to the features of Seal Check so you can get started.

The sections that follow explain how to setup, unpack and prepare Seal Check for use.

Features

Seal Check has several key features:

Integrity Verification. As the name implies, Seal Check provides a means of testing the seal integrity of your Gates housing *before* entering the water.

Portable. A small Pelican 1200 case accompanies you to all corners of the globe.

Convenient and easy to use. Seal Check is straightforward & quickly draws a vacuum on even the largest Gates housings, revealing housing integrity in a few short minutes.

Warranty Disclaimer

Seal Check is a tool that, like any tool, requires knowledge and understanding to be effective. When used properly Seal Check virtually eliminates the possibility of water intrusion to your housing.

Your responsibility is to learn the proper setup, use and care of Seal Check. Because we can only provide you with the information necessary to do so, Gates does not warrant the contents of your housing (e.g. your camera and lenses) under any circumstance. We warrant Seal Check as a testing tool only for a period of 1 year. The body fitting installed on a Gates housing is warranted for 2 years.

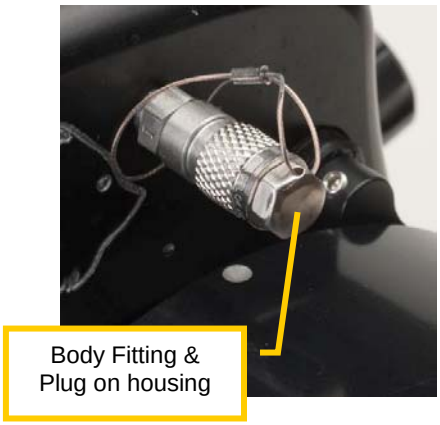
If you have any questions about the setup, use and care of Seal Check, contact Gates directly. Details are in section 6.

Unpacking Seal Check

After you remove Seal Check from its shipping container, carefully inspect it for missing parts or damage that may have occurred during shipment. If you discover any discrepancies, contact Gates or your dealer immediately for assistance.

Standard Parts

Seal Check comes with the following standard parts:



Body Fitting and Plug installed in your Gates housing

Pelican 1200 Case with Seal Check vacuum system

Vacuum Pump

Battery packs (2 ea of 4 AA batteries)

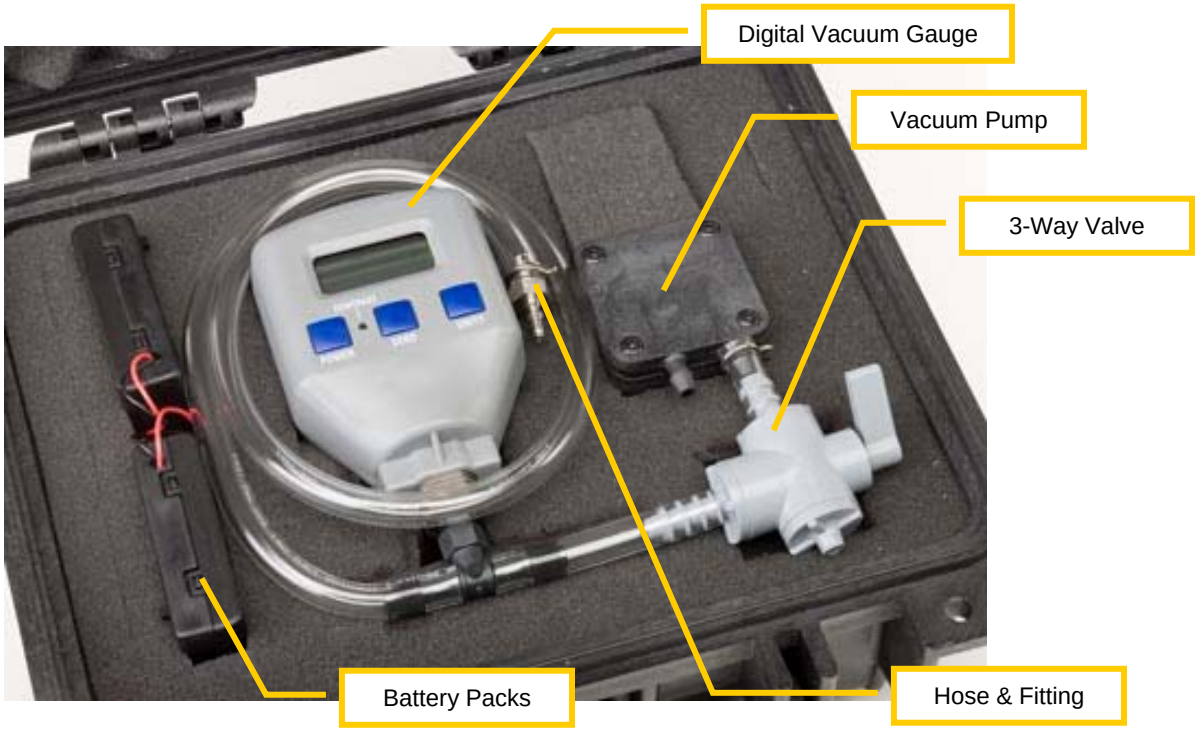
Digital Vacuum Gauge (DVG)

3-Way valve

24” PVC hose from DVG with Test Fitting

Quick Test and Troubleshooting Guide

This Setup, Use and Care Guide



Optional Parts

Your housing may also come with an optional self install kit:

Body Fitting and Plug

‘D’ size drill

1/16-27 NPT Tap

Q-Tip applicators (2)

Two part urethane adhesive

Adhesive mixing stick

For the self installation you will also require:

Rubbing alcohol or other non-residue solvent

Torque wrench with 7/16” head

Refer to section 5 for installation instructions.

2: **Using Seal Check**

Seal Check is straightforward to use, but we recommend you take time to become familiar with the system. This will help ensure operation will go smoothly at your dive location.

Setup and Preparation

Remove the stem plug from the body fitting on the housing. Do so by pulling back on the sleeve (much like your BC inflator hose) then remove the plug.

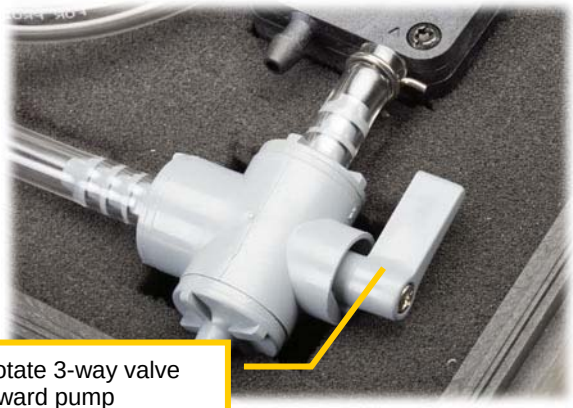
▶ **NOTE:** USE CARE TO ALIGN THE STEM & FITTING WHEN COUPLING AND UNCOUPLING.

Insert the test stem into the body fitting. The test stem is on the end of the 24" hose in the Seal Check kit.

Turn on the gauge. The unit measure must read 'InHg'. Press the Units button until it does.

Press 'ZERO' on the gauge to zero the reading.

Rotate the 3 way valve so the lever points toward the vacuum pump.



Test

Turn on the vacuum pump. Note there are two switches, one on each battery case. Both must be on to provide power to the vacuum pump.

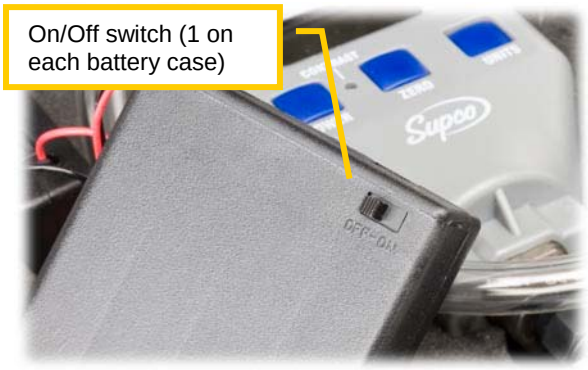
Watch the gauge until it reaches approximately 6 In Hg. At this time, rotate the 3-way valve lever to the center position.

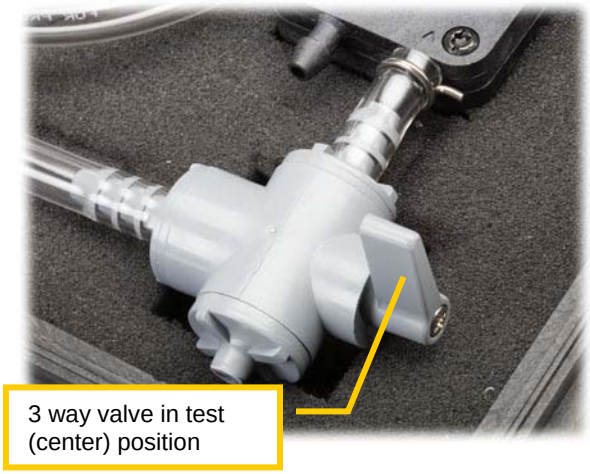
Turn off the vacuum pump.

Monitor the gauge. In a pass condition the Gage will 'settle', typically between 5 and 6 In Hg. It may take up to 60 seconds to do so.

If you are unable to draw a vacuum on the housing or if you see a steady and continuous drop in vacuum reading, this indicates a fail condition. Consult the troubleshooting section of this guide for more details.

▶ **NOTE: The Vacuum gauge may fluctuate slightly when settled. For example, a gauge indication of 5.48 → 5.42 → 5.37 → 5.42 → 5.48 is normal.**





Pre-Dive Final Check

Confirm a Test Pass when the gauge reads a consistent, stable reading. If the gauge reading drops consistently and steadily, refer to the troubleshooting section.

Remove the test stem from the body fitting.

Insert the stem plug. Pull on the plug to verify it is inserted and locked in position for water entry.

- **WARNING: THE STEM PLUG MUST BE INSERTED AND LOCKED PRIOR TO WATER ENTRY. FAILURE TO DO SO MAY RESULT IN A WET CAMERA.**
- **NOTE:** It is unnecessary to remove the vacuum from the system prior to diving. It is, in fact, beneficial to maintaining a seal prior to water entry.

Post Dive

Upon return from the dive, it is necessary to release the vacuum on the housing.

- **CAUTION:** Do not attempt to open the housing prior to releasing the vacuum. The small amount of vacuum (or more appropriately, the external pressure) exerted will prevent opening without the use of tools or other damaging measures.

Remove the stem plug.

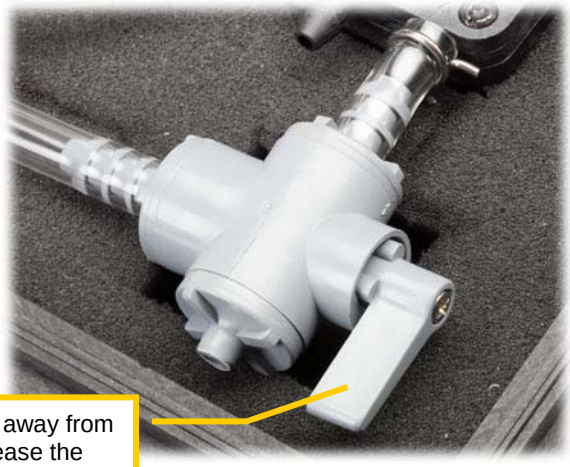
Insert the test fitting.

Release the vacuum. Rotate the 3 way valve to a position pointing away from the vacuum pump. This will open the housing to ambient air and release the vacuum. It may take up to 60 seconds to do so.

- **NOTE:** When releasing the vacuum the gauge may read zero before the vacuum is fully released. The vacuum is fully released when you can open the housing normally.

Remove the test fitting and re-insert the stem plug.

Open the housing and perform your usual post-dive procedures.



3: **Troubleshooting**

This section is a guide to finding a leak when Seal Check determines one is present. There are three types of leaks addressed here:

No vacuum i.e. a vacuum cannot be drawn on the housing.

Rapid loss of vacuum; and

Slow loss of vacuum.

No Vacuum

In this condition, no vacuum can be pulled on the housing. The vacuum gauge continues to read zero despite an operating vacuum pump. This indicates a complete compromise of a seal, or a missing seal. In most cases the cause will be evident, so look for the obvious.

First check that the 3 way valve is in the proper position and pointed toward the vacuum pump for proper testing.

Examine the main seal for an even line around the mating front and rear shells. An easy check is to run a slip of paper around the seal. It should not pass the o-ring. Look closely at the latches that they are tight and secure. (Refer to the photo in the next section.)

If this is the first use of the housing from storage or travel check for damage. Abusive handling, inspectors and excessive vibration can inflict harm.

Check the glands (the bolt-shaped component at the base of each control. Refer to the photo in the next section). Try to loosen with your fingers. They should be tight. If one has loosened, gently tighten with a 5/8 wrench.

Check for setup errors like a missing o-ring or misaligned port.

If the housing has been in use and now leaks, focus on any changes or service performed on the housing.

Lastly, examine Seal Check for detached or broken hoses.

At any point, you can re-test the housing for leaks to eliminate possibilities. This logical approach will rapidly narrow and help ID the cause.

Rapid loss of vacuum

In this condition, a vacuum can be drawn on the housing, but drops rapidly reaching zero within a few minutes. This indicates the o-rings are attempting to seal, but one or more are compromised by damage, foreign matter or poor mating of components. Finding this type of leak will require a little more investigation, but it should also be evident once identified.

Examine the main seal for an even line around the mating front and rear shells. Look for obvious gaps. An easy check is to run a slip of paper around the seal. It should not pass the o-ring. Look closely at the latches that they are tight and secure.

Check the main seal and port o-rings. These are most commonly susceptible to damage by handling. Inspect them carefully for nicks or cuts. Gently stretch them between your fingers to highlight any cracks or cuts.

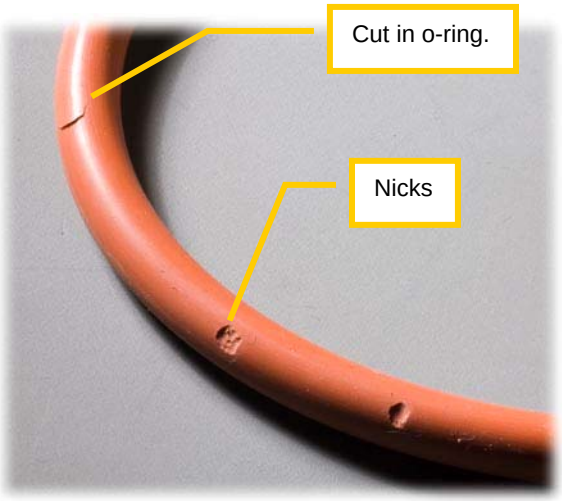
Ensure the o-ring is free of foreign matter (dirt, hair, etc) that can compromise the seal. Clean and lubricate the o-ring as needed, and re-install. (NOTE: DO NOT LUBRICATE THE ORANGE O-RINGS.)

If the housing has been in use and now leaks check for changes or service performed on the housing.

If this is the first use of the housing from storage or travel check for damage. Abusive handling, inspections and excessive vibration can inflict harm.

Check the glands (the bolt-shaped component at the base of each control). Try to loosen with your fingers. They should be tight. If one has loosened, gently tighten with a 5/8 wrench.

Examine all windows. A proper seal is indicated by a solid black line (which is the o-ring) around the perimeter. Also look for cracks. A flashlight may be necessary to illuminate more subtle cracks or damage.



Lastly, examine Seal Check for cracked or broken hoses.

At any point, you can re-test the housing for leaks to eliminate possibilities. This logical approach will rapidly narrow and help ID the cause. If necessary you can also take the housing in the water WITHOUT a camera and look inside the port or windows to see where water is entering.

Slow loss of vacuum

In this condition, a vacuum can be drawn on the housing, but drops slowly and consistently over time. The vacuum reading may or may not reach zero depending on the specific type of leak.

This type of leak indicates the o-rings are attempting to sea,l but one or more are compromised by a more subtle form of damage, foreign matter or poor mating of components. Finding this type of leak is more difficult and time consuming. Leaks of this nature are best identified by close examination and frequent re-test to eliminate possibilities. Taking this logical approach will be most efficient.

- **NOTE:** A false leak indication may occur if your housing is experiencing a significant temperature change. For example, if you move the housing from a cool, air-conditioned room to a warm tropical exterior, the gauge may indicate a slow loss of vacuum. This may be a false leak indication. It will be necessary to wait until the housing reaches ambient temperature before an accurate reading of the gauge can by made.

Examine the main seal for an even line around the mating front and rear shells. An easy check is to run a slip of paper around the seal. It should not pass the o-ring. Look closely at the latches that they are tight and secure. (Refer to the photo in the previous section)

Check the main seal and port o-rings. These are most commonly susceptible to damage by handling. Inspect them carefully for nicks or cuts. Gently stretch them between your fingers to highlight any cracks or cuts.

Ensure the o-ring is free of foreign matter (dirt, hair, etc) that can compromise the seal. Clean and lubricate the o-ring as needed, and re-install. (NOTE: DO NOT LUBRICATE THE ORANGE O-RING.)

If the housing has been in use and now leaks check for changes or service performed on the housing.

If this is the first use of the housing from storage or travel check for damage. Abusive handling, inspections and excessive vibration can inflict harm.

Examine all windows. A proper seal is indicated by a solid black line (which is the o-ring) around the perimeter. Also look for cracks. A flashlight may be necessary to illuminate more subtle cracks or damage.

Check the glands (the bolt-shaped component at the base of each control. Refer to the photo in the previous section.). Try to loosen with your fingers. They should be tight. If one has loosened, gently tighten with a 5/8 wrench.

Look closely at the surface where the main o-ring mates. Examine this surface for nicks, dings and scratches that could compromise the seal. Do the same for the port mating surface. This surface is the inner diameter of the port bore opening, immediately forward of the bayonet tabs.

Examine all controls. The stainless steel shafts should be free of nicks and scratches. A scratch of sufficient depth to compromise a seal can be felt with your fingernail.

Lastly, examine Seal Check for cracked or broken hoses.

At any point, you can re-test the housing for leaks to eliminate possibilities. This logical approach will rapidly narrow and help ID the cause.

If necessary, you can also take the housing in the water WITHOUT a camera and look inside the port or windows to see where water is entering.

What to do if you find the leak

Fortunately, nearly all leaks identified by Seal Check are readily remedied on the spot. O-rings, generally the cause of water intrusion, are easily replaced. Ports can be seated and housing shells mated more carefully. Glands can be tightened. It is very likely you will be 'up and running' quickly having identified the leak.

If circumstance requires parts or other support from Gates to fix a problem, please contact us immediately. We stand ready to assist and help you to get the underwater images you want.

Should you be in a remote location and must perform repairs to your Gates housing on the spot, our technical support team may be able to guide you through some unconventional but effective field repairs. Again, contact us directly with the information in section 6. .

4: **Maintaining Seal Check**

Seal Check requires virtually no maintenance. Follow these simple guidelines to keep Seal Check operating at full efficiency.

Store Seal Check in the Pelican case with lid closed when not in use. Be sure the foam is not wet.

Foreign contaminants. Keep Seal Check free from dirt, sand and other foreign matter. Avoid anything that might foul the vacuum pump or other components in the system.

Replace vacuum pump batteries when necessary. You can expect more than 50 cycles of vacuum tests on the 8 AA cells (in two battery cases) required for the vacuum pump. Replace them when the pump exhibits obvious signs of slowing down when drawing a vacuum on the housing.

Replace the vacuum gauge battery when a small 'B' appears in the display corner. The gauge will operate for more than 100 hours on a fresh alkaline cell but be sure to keep a spare handy to replace when the 'B' shows. The battery compartment is on the rear of the gauge. The gauge will automatically turn off after 1 hour of non-use.

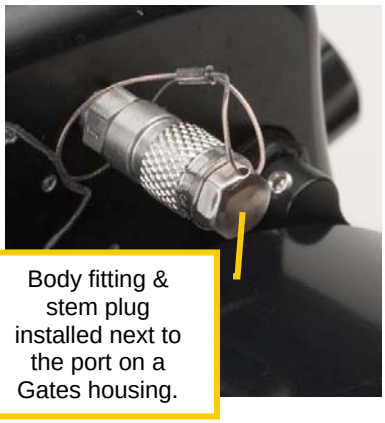
Lightly lubricate the stem plug every 20th use. This will in turn lubricate the o-ring inside the body fitting. Use a light silicone lubricant and apply sparingly.

Long term storage. When not in use for more than 30 days at a time, remove all batteries.

5: **Self Installation Kit**

This section outlines the steps necessary to install the test body fitting on an underwater housing.

It is highly recommended the installation be performed by an experienced machinist.



Body fitting & stem plug installed next to the port on a Gates housing.

Identify the location where the test body fitting will be installed. The wall must be a minimum 0.2” / 5mm thick.

If possible, pick a location that can protect the test body fitting. For example, installing next to a port or handle grip might protect it from impact.

The location should also be flat (not curved) to facilitate drilling and tapping perpendicular to the surface.

Drill a hole using the **‘D’** size drill.

Tap the hole with the 1/16-27 tap. Note that the tap is marked with white indicating the tap depth. Use care to tap up to, but not beyond this marker.

Clean the threads of both the test body fitting and the tapped hole with rubbing alcohol or other non-residue solvent cleaner.

Mix the two part adhesive thoroughly with the mixing stick per the instructions on the label.

Apply the urethane adhesive. Using the stick end of the Q-tip apply a light coat to the threads on the housing, and a similar light coat to the threads of the fitting

Insert the test body fitting in the tapped hole and tighten with a torque wrench to 55 In-lbs / 5.6 N-m. A properly installed fitting will have 1-2 threads visible at the base of the fitting.

Remove excess urethane adhesive inside the housing where the fitting extends through with rubbing alcohol.

Do not remove the adhesive from the exterior at the base of the fitting. Allow it to 'fillet' at the base.

Allow the adhesive to dry for 24 hours.

Insert the stem plug into the fitting and loop the retainer wire around the base of the fitting as shown in the photo.

Test the system as outlined in the previous sections.

- **NOTE:** Gates provides no warranty on the self installation of Seal Check fittings or any part of any housing or contents (e.g. a camera). The installation is your responsibility. If you have any questions about the installation contact Gates at the information provided in section 6.

1-2 threads are visible at the base of the body fitting when properly installed.

Allow adhesive/sealant to form a fillet at the base of the threads.

When dry, loop the stem retainer wire around the base of the fitting and insert the stem into the fitting.

6: **Customer Support**

Should you have any questions about Seal Check and its operation, please contact Gates at the numbers below.

Email: Customer.srvc@GatesHousings.com
Web: www.GatesHousings.com
Phone: 858.391.0052
Fax: 858.391.0053