DEEPSEA® POWER & LIGHT

Pressure Relief Valve

Different Options for Different Applications.

Operator's Manual

Pressure Relief Valve

Record product serial number below as it appears on the nameplate.

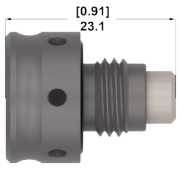
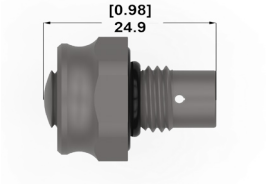
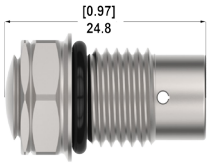
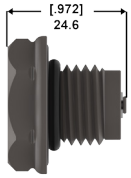
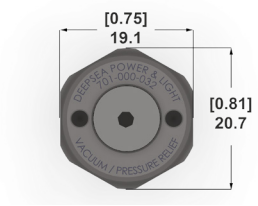
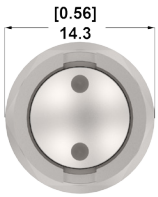
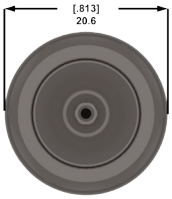
Serial #

T: (858) 576-1261
F: (858) 576-0219

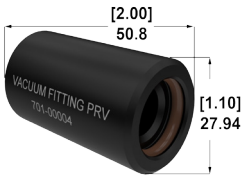
4033 Ruffin Road
San Diego, CA
92123- 1817 USA

www.deepsea.com
sales@deepsea.com

Specification Overview

	Single Face Seal	Dual O-Ring/SAE	SAE Port Only	True Dual O-Ring
Mechanical Specifications				
Material	Ti 6 Al-4V, 6061-T 6 Al, 316 SS (passivated)	Ti 6 Al-4V, 6061-T 6 Al, 316 SS (passivated)	316 SS (passivated)	Ti 6 Al-4V, PEEK
Diameter	18.4 mm (0.72 in)	19.1 mm (0.75 in.) Wrench Flats	14.3 mm (0.56 in.) Wrench Flats	20.65 mm (0.813 in) Wrench Flats
Length	23.1 mm (0.91 in)	24.9 mm (0.98 in.)	24.8 mm (0.97 in.)	24.68 mm (0.972 in)
Weight in Air	11.7 g (0.42 oz) for Titanium	14.1 g (0.49 oz.) for Titanium	12.89 g (0.46 oz)	7.70 g (0.27oz) for Titanium
Threads	7/16" - 20, with O-ring face seal	7/16"-20, with #4 SAE Port & O-Ring face seal	7/16"-20, with #4 SAE Port	7/16" - 20, with #4 SAE Port & O-Ring face seal
Environmental Specifications				
Depth	11 km (Ti) - 6 km (Al and SS)	11 km (Ti) - 6 km (Al and SS)	6 km	11 km (Ti) - 6 km (PEEK)
Temperature	-20° C to 200° C (-4° F to 392° F)	-20° C to 200° C (-4° F to 392° F)	-20° C to 200° C (-4° F to 392° F)	-20° C to 200° C (-4° F to 392° F)
Cracking Pressure	5 -15 psi	5 -15 psi	5 -15 psi	2 - 20 psi
				
				

Accessories

Vacuum Fitting	PRV Installation & Adjustment Tool
 • Available for 'Single Face' & 'Dual O-Ring' PRVs Only • To pull vacuum or to fill a housing unit with nitrogen.	• A convenient tool to install and adjust the cracking pressure. • Works on the 'Single Face Seal O-Ring' and the 'SAE Port Only' PRVs

[inch] mm

** Specifications subject to change without notice.*

Table of Contents

Specification Overview 2
Table of Contents 3
Safety Symbols 4
General Notes & Warning 4
Installation 4-5
Installation Warnings 5
Cracking Pressure Adjustment 5
Vacuum Port Instructions (Face Seal & Dual O-Ring Seal) 5
RMA Procedure for Repair 5-6
Warranty 6

Safety Symbol

In this operator's manual and on the product, safety symbols are used to communicate important safety information. This section is provided to improve understanding of these symbols.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER indicates a hazardous situation which, if not avoided, could result in death or serious injury.

WARNING indicates a hazardous situation which, if not avoided, could result in damage to the product or bodily harm.

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE indicates information that relates to the protection of property.

This symbol means read the operator's manual carefully before using the equipment. The operator's manual contains important information on the safe and proper operation of the equipment.

This symbol means always wear safety glasses with side shields or goggles when handling or using this equipment to reduce the risk of eye injury.

This symbol indicates the risk of electrical shock.

General Notes and Warnings

A Pressure Relief Valve is similar to a pop-off or in-line check valve in design and function. Internal pressure pushes against a piston that is held down by a spring force, plus any external pressure if the outside pressure is higher than the interior pressure. If internal pressure is generated, say in an air compensated system, and the system begins to rise to the surface, the interior pressure will become greater than the exterior. This will require the excess air pressure to be vented off.

The volume of gas expanding and the rate of pressure change will determine the amount of venting capacity needed. It is important to provide enough venting to meet or exceed the flow and pressure requirements of the system. The highest volumetric expansion will occur in the final 10m of ascent to the surface.

When considering where to place the PRV in your system, consider the difference in density between air and water: Air floats up, water sinks down. Designers use this principle by placing the access hatch to undersea habitats, Personnel Transfer Capsules, and diver lock-out spheres on the floor. Interior air at ambient pressure keeps water from entering the interior space.

Similarly, a designer should place their PRV at the low point of the system. This is because as the valve reaches the cracking pressure threshold, where forces are just about balanced; there is the opportunity for water to seep past the lightly loaded valve. This is also true as the valve is just about to close at its reseal pressure, after having vented excess internal pressure. Hysteresis will mean these two pressures will likely be slightly different. If your PRV has not been operated in a while, the initial cracking pressure may be slightly higher than the initial set value.

DANGER

Make certain there is no loose debris that may clog the PRV and prevent it from venting excess pressure. This could result in a potentially hazardous over-pressurization condition.

WARNING

If the venting of internal pressure includes debris (e.g., silica gel particles, metal shavings, battery chemicals, or other loose materials), the PRV may not reseal as debris may prevent a clean seal between the O-ring and the valve screw.

A fine mesh metal screen or filter covering the inlet port of the PRV is useful in preventing unwanted debris from entering the PRV.

Installation

1. Drill and tap 7/16 –20 hole into housing insuring that there is a minimum 3/8 of an inch thread depth.
2. Ensure that O-ring sealing surface is smooth and clean. (Requires O-ring seating surface finish of 32 or better)
    a. For all of the SAE port sealing PRV's,

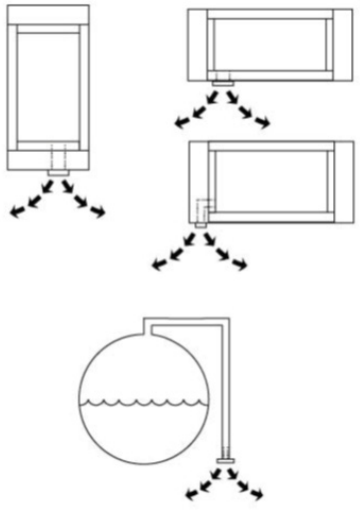
ensure the port conforms to SAE J1926-1 standards

3. Ensure that the O-rings are nick and dirt free before lubricating.
4. Grease O-ring using DC-111 or DC-4 silicone lubricant. Only a thin film of lubricant is necessary.
5. Apply a small amount of Loctite 242 on threads of pressure relief valve
6. Threading in the different PRV types:
    a. Single Face Seal O-ring PRV- Tighten using the PRV Installation and Adjustment Tool or a 3/32" spanner wrench.
    b. Dual Seal PRV- Tighten using a 3/4" wrench.
    c. SAE Only Seal PRV- Tighten using a 9/16" wrench
    d. True Dual O-ring PRV- Tighten using a 16mm wrench.

Installation Warnings

⚠WARNING

- For Aluminum, Stainless Steel and Titanium PRV's; tighten using hand torque to never exceed 100 in/lbs.
- For PEEK PRV's, tighten using hand torque to never exceed 20 in/lbs.
- Do not allow any Loctite to drip onto the O-rings



Recommended installation of the PRV is at the low point of system.

Cracking Pressure Adjustment

1. 1. Tools used for adjustment:
    a. SAE Only and Face Seal PRV's – PRV Installation and Adjustment Tool
    b. Dual Seal PRV- 2mm Allen Key
    c. True Dual Seal PRV- 2.5mm Socket Wrench
2. Gently rotate the PRV screw valve counter-clockwise to the desired setting.
3. Be careful to not exceed five turns as there is no stop and the screw valve will lose engagement with the valve nut. The spring will force the valve nut down. The customer will have to press the valve nut upward from inside the pressure case, or remove the entire PRV fitting, reassemble the PRV, then reinstall.

Vacuum Port Instructions (Face Seal and Dual O-Ring only)

1. A fine metal screen over the PRV interior intake will help prevent unwanted debris from entering the seal area.
2. If a full vacuum (about 30" Hg) is not needed, you can leave the valve set to ~2-4 psi and not have to loosen or tighten it.
3. If a higher vacuum is needed, loosen the valve stem so it is ~2 psi
4. Snap on the optional vacuum fitting (DSPL P/N 701-0004) and pull the amount of vacuum desired. Electronics are typically OK with 10" Hg.
5. Pull off the vacuum fitting. The valve will seat and seal due to the spring force and outside pressure differential. Listen for leaks that may be caused by debris on the O-ring drawn through the PRV during the pressure drawdown.
6. Tighten the valve stem back to the original desired cracking pressure if desired. Be sure to not over-tighten or the valve will be locked shut and will not vent.

RMA Procedure for Repair

For warranty and non-warranty repairs please contact DeepSea Power & Light for a RMA number prior to returning your item. Please have your Pressure Relief Valve serial number and any other pertinent information along with a description of the problem, on hand when you call, or include them in a fax or e-mail.

When shipping your item, be sure that the freight is pre-paid (CODs will not be accepted) and that the RMA number is clearly printed on the outside of the box.

All shipments should be sent to the address below:

DeepSea Power & Light
Attn: RMA ####
4033 Ruffin Road
San Diego, CA 92123-1817
U.S.A
Tel: (858) 576-1261
Fax: 858-576-0219
e-mail: RMA@deepsea.com

Limited Warranty

Seller warrants that the goods (except internal electronic components) sold under this contract will be free from defect in material and workmanship for a period of one year from the date of shipment from the factory, if they have been properly used. Internal electronic components are warranted for 90 days from the date of shipment from the factory, if they have been properly used. This warranty will be limited to the repair or replacement of parts and the necessary labor and services required to repair the goods. IT IS EXPRESSLY AGREED THAT THIS WARRANTY WILL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND IN LIEU OF THE WARRANTY OF MERCHANTABILITY. This warranty is the exclusive and only warranty to pass with the goods under this contract. No agent, employee, or representative of the Seller has any authority to bind Seller to any information, representation, or warranty concerning the goods sold under this contract, and unless an affirmation, representation, or warranty made by an agent, employee, or representative is specifically included within this contract, it will not be enforceable by Buyer. If notice of defect is given to DeepSea Power & Light, Inc. within such 90 day or one year warranty period, the sole obligation of DeepSea Power & Light, Inc. shall be to furnish new or repaired parts free of charge in exchange for parts which have been proved defective and does not include any other costs such as the cost of removal of the defective part, installation, labor, or consequential damages of any kind, the exclusive remedy being to require DeepSea Power & Light, Inc. to furnish such new parts. Under no circumstances shall the Buyer be entitled to recover any incidental damages as that term is defined in Commercial Code §2715.