

# Overpressure Relief Valve

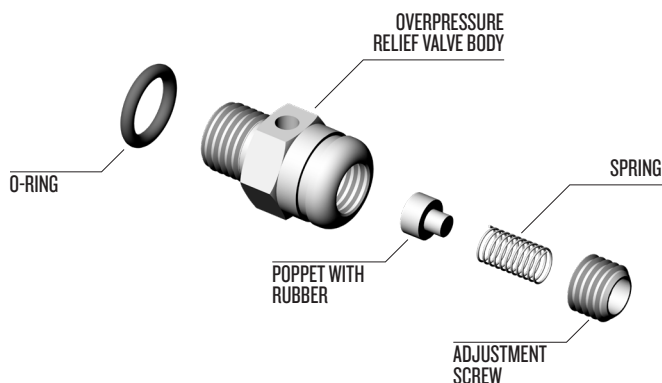
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## 1.1 Overpressure Relief Valve Overhaul Procedures

### 1.1.1 Overpressure Relief Valve

The overpressure relief valve should *always* be used on all Emergency Gas Supply (EGS/bail-out) first stage regulators to prevent the hose from rupturing if the first stage happens to develop a slight leak, causing the pressure to creep. The Kirby Morgan relief valve body is made of stainless steel.



#### Overpressure Relief Valve Component Breakdown

The basic components last a long time, but the valve should be disassembled, cleaned, and inspected at least once a year or whenever it fails testing. The valve should be tested monthly. Cleaning and overhaul is easily performed using a nylon toothbrush and a solution of 50% vinegar and 50% fresh water. Cleaning for 15 minutes in an ultrasonic sink, if available, with the 50% vinegar and 50% fresh water solution is highly recommended.

Repair parts are available by purchasing P/N 225-017 overpressure relief valve rebuild kit. Replacement parts include the O-ring, poppet with

rubber, spring, and adjustment screw. The O-ring should be replaced at least annually. The other parts require replacement only if worn or damaged. An exploded view of the valve is located in all KMDSI Helmet and Band Mask Operations and Maintenance Manuals. The text on the next three pages refers to the drawing "Overpressure Relief Valve Component Breakdown" on page OPRV-1.

#### Tools Required:

- Torque Wrench
- ½" Open-End Wrench Attachment for Torque Wrench
- ⅛" Allen Wrench
- Nylon Toothbrush
- Vinegar and Fresh Water
- Mild Dish Soap
- Ultrasonic Sink, if Available
- Magnifying Glass

### 1.1.2 Overpressure Relief Valve Disassembly and Cleaning

1. Turn off the gas supply to the first stage regulator, then bleed off any remaining pressure. Remove the first stage regulator from the air/breathing gas source so it cannot be accidentally turned on, i.e., pressurized. Make sure the intermediate pressure in the regulator hose is also fully drained of pressure.

2. Remove the overpressure relief valve from the regulator body using the ½" open-end wrench.

3. Remove, cut, and discard the overpressure relief valve body O-ring.

4. Using the ½" open-end wrench to hold the overpressure relief body, use the ⅛" Allen wrench to remove the Allen head adjustment screw. Then, shake out the spring and poppet.

5. Place all parts in the solution of 50% vinegar and 50% fresh water and allow to soak for 15 to 30 minutes. If using an ultrasonic sink, reduce time to 15 minutes.

### **⚠ WARNING**

**Do not use cleaning solvents (i.e. mineral spirits, bleach, etc.) when cleaning the overpressure relief valve. The use of cleaning solvents may lead to failure of the overpressure relief valve.**

6. Using the nylon toothbrush, brush all components to remove corrosion and mineral deposits. Then, rinse with fresh water and blow or air dry.

7. Using the magnifying glass, carefully inspect all components for excessive corrosion and/or damage. Replace the spring and/or adjustment screw if either part is excessively corroded or shows signs of wear and/or damage.

Inspect the poppet for nicks, cuts, and wear and replace if any damage is found. If the overpressure relief valve body is damaged, then the entire overpressure relief valve (P/N 200-017) should be replaced.



A deep groove in the poppet is normal. Replacement is only necessary if the rubber seat is deteriorated, cut, and/or chipped.

### **1.1.3 Overpressure Relief Valve Reassembly**

1. After cleaning, inspection and/or parts replacement, reassemble the valve by installing the poppet, spring, and adjustment screw. Tighten the adjustment screw down until it is approximately ½ thread from being flush with the top of the valve body.

2. Lightly lubricate the new O-ring, then install on the valve body.

3. Test the overpressure relief valve according to the test procedure below.

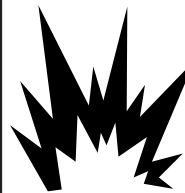
### **1.1.4 Overpressure Relief Valve Lift Check/Setting**

#### **Tools Required:**

- Adjustable First Stage Scuba Regulator or Controlled Adjustable Pressure Source
- Intermediate Pressure Test Gauge
- Torque Wrench
- ½" Open-End Wrench Adapter for Torque Wrench
- ⅛" Allen Wrench
- HP Air Source (Scuba Tank) with at Least 500 p.s.i.g. (34.4 Bar).
- Mild Dish Soap

The purpose of lift checking the overpressure relief valve is to ensure it operates properly, allowing excess pressure to escape if the first stage develops a slight leak. Without the overpressure relief valve, high-pressure gas will continue to build until the emergency supply hose ruptures, possibly causing injury and a complete loss of gas from the Emergency Gas System (EGS).

### **⚠ WARNING**



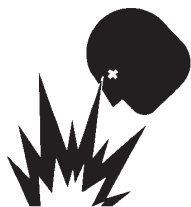
**Ensure the overpressure relief valve is only installed in a low-pressure port of the first stage regulator. Installation in a high-pressure port will lead to loss of EGS supply and possible serious personal injury if the valve fails.**

This procedure explains the steps necessary for readjusting the overpressure relief valve after it is cleaned, overhauled or any time the valve is tested.



**NOTE**

The overpressure relief valve is lift checked and/or adjusted using an adjustable first stage regulator, equipped with a low-pressure test gauge, which is used for adjusting the intermediate pressure of scuba regulators. The check/adjustment can be performed using a standard scuba test stand, or a gas control console, using air or mixed gas with an oxygen content below 23% by volume.

**⚠ WARNING**

**Do not use oxygen, or mixed gas containing more than 23% oxygen by volume, for lift checking the overpressure relief valve. The use of oxygen, or mixed gas, in a high-pressure supply system not designed and cleaned for oxygen service, can result in a fire or explosion causing serious injury or death.**

If a first stage scuba regulator is used, it must be able to be adjusted to the desired lifting pressure. The pressure gauge should be compared to a gauge of known accuracy.

**NOTE**

If the Allen screw on the overpressure relief valve hex nut is rotated too far, too fast, the overpressure relief valve will pop open. This could possibly require the air to be secured at the cylinder or supply source to reset the seat before the adjustment can be accomplished.

**NOTE**

The overpressure relief valve can be installed in any first stage regulator, providing the first stage has an intermediate setting of 135-165 p.s.i.g. (9.3-11.4 bar).

1. Install the relief valve in a low-pressure port on an adjustable 1st stage regulator. Or install on the scuba test stand.

2. Install the intermediate pressure gauge in one of the low-pressure ports of the first stage regulator.

3. Install the 1st stage regulator on the cylinder. Ensure the relief valve and intermediate pressure gauge are attached to low-pressure ports.

4. Wet the relief valve with soapy water to help indicate gas flow

5. Slowly bring up air pressure while watching the intermediate pressure gauge until the pressure gauge indicates 180- 200 p.s.i.g. (12.40-13.78 bar). If the relief valve starts venting at a pressure below 180- 200 p.s.i.g. (12.40-13.78 bar), secure the air supply and adjust the adjustment screw in (clockwise) 1/8th turn. Slowly bring up pressure and recheck.

Continue this procedure as necessary until the

relief valve consistently vents at a pressure between 180- p.s.i.g. (12.40-13.78 bar). If the valve does not start venting when the gauge reads 200 p.s.i.g. (13.78 bar), slowly back out on the adjustment screw (counter clockwise) until the valve starts venting, forming bubbles in the soap solution.

6. After the valve has been adjusted, adjust the 1st stage regulator intermediate setting to 135 p.s.i.g. (9.3 bar), re-wet the valve, then slowly increase the intermediate pressure on the 1st stage regulator one last time to recheck the lift pressure. The valve should start forming bubbles or venting between 180- 200 p.s.i.g. (12.40-13.78 bar). Back the 1st stage pressure to 180 p.s.i.g. and observe the bubbles. They should stop just under 190 p.s.i.g.

7. After final lift check reset the regulator to the appropriate over bottom setting. Remove the intermediate pressure gauge.

### 1.1.5 Troubleshooting The Overpressure Relief Valve

**PROBLEM**

Valve pops open and will not stop flowing.

**CHECK**

If while setting the overpressure relief valve the valve pops open and will not stop flowing, secure the air supply valve and allow the overpressure relief valve to reseal. Try the procedure again, ensuring that the supply valve is only slightly cracked open, allowing full test pressure but minimizing high flow potential.

**PROBLEM**

After resetting the first stage to 135 p.s.i.g. (9.3 bar), the valve continues to leak.

**CHECK**

This indicates the seating surface of the relief valve body or the poppet is either dirty or damaged. Usually, cleaning both the metal seating surface in the valve body and cleaning the poppet will fix the problem.

If, after cleaning, the problem persists, replace the poppet and spring then retest the unit. If the seat continues to leak, then replacement of the overpressure relief valve, P/N 200-017, will be necessary.