

# Maintenance & Operating Instructions

For

**Dixon Bayco**

## 2180 Air Relief Valve, Authorized Repair Center Repair Kit

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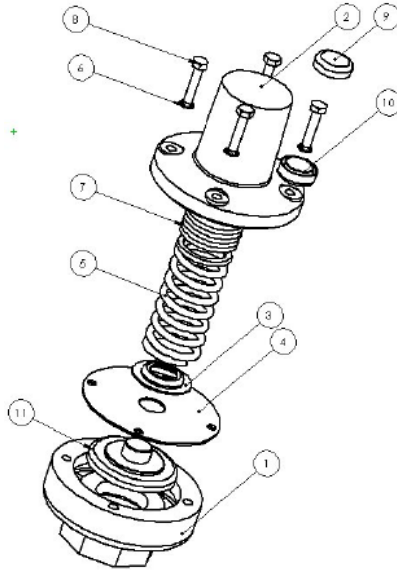
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*The Right Connection®*

## 2180 Air Relief Valve Repair Kits



No.	Description	Included in Repair Kit
1	Vent Cowl	No
2	Top Cover	No
3	Spring Seat	Yes
4	Diaphragm	Yes
5	Spring	Yes
6	Washer	Yes (4)
7	Spacers	No, Do not use with this kit
8	Bolt	Yes (4)
9	Cup Seal Upper Half	Yes
10	Cup Seal Lower Half	Yes
11	Valve Plate	Yes

Repair Kit Part Number	Description
2180RK15	15 (+2/-0) PSI Repair Kit
2180RK18	18 (+2/-0) PSI Repair Kit
2180RK15A	15 (+2/-0) PSI Repair Kit
2180RK18A	18 (+2/-0) PSI Repair Kit

To properly operate and maintain your Dixon Bayco 2180 air relief valve, the following instructions are provided. Please read with care as improper handling or maintenance may cause a hazardous condition. These instructions are intended for use with, and refer to, the 2180 air relief valve with set pressures of 15 PSIG and 18 PSIG. These instructions, and the contents of this kit should not be used with any other valve. Please ensure that you have the correct kit for your valve and note that the 15 PSIG spring and the 18 PSIG spring are not interchangeable.



**Do not modify your Dixon Bayco air relief valve in any manner other than as described in these instructions. Failure to comply with these instructions including disassembly, tampering or modifications using processes and parts not described in these instructions or supplied with this will void the product warranty and could result in personal injury and extensive property damage.**

**Replace and Report:** Immediately remove from service any air relief valve that is not performing satisfactorily. Return and report the problem to your Dixon Bayco distributor for warranty consideration.

### Air Relief Valve Repair Procedure

#### Disassembly

**Refer to attached parts diagram throughout the following procedure.**

1. Remove the air relief valve to a clean environment taking care not to damage the pipe thread during removal.
2. Remove any residual surface contamination, dirt, debris from the external surfaces before proceeding with disassembly.



**Dixon Bayco air relief valves are held together under considerable spring load. Ensure that the vent cowl (1) and top cover (2) are restrained, using a vice or similar clamping device, before attempting to undo the four bolts (8) securing the top cover (2) to the vent cowl (1). Ensure that appropriate personal protective equipment, including eye protection, is worn throughout. Failure to comply with these safety precautions may result in personal injury.**

4. With the air relief vent valve clamped, as described above, break the existing tamper proof seal.
  - For leaded wire seals: Cut the wire, remove wire from bolt and discard.
  - For cup seals (as shown in items 9 and 10): Carefully pry the cup seal away from the bolt using a flat bladed screw driver. Discard both cup seal halves.
5. With the air relief valve clamped, as described above, remove all four bolts (8) and washers (6).
6. When all bolts have been removed, the clamping arrangement holding the vent cowl to the top cover should be slowly and carefully released.
7. Fully disassemble and lay out all of the components of the valve.
8. Carefully inspect all components for signs of damage or wear. Items 3-6 and 8-11 are contained in this repair kit and must be replaced during rebuild.
9. Clean the inside of the top cover (2) and vent Cowl (1) taking particular care to ensure that the valve-seating surface on the vent cowl is free of surface contamination. Vent cowl seating surface must be clean and smooth to create proper sealing surface, sanding with 200-400 grit sandpaper is recommended. Ensure that all debris is removed from the interior of the top cover (2). Blow out as required, since, residual debris may prevent the valve from operating correctly.
10. Layout the contents of the valve and replace items 3-6 and 8-11 with the parts included in the kit.
11. Spacers may be found in your existing valve. These spacers are to be discarded. This repair kit contains a spring, with either a +2–0 PSI, or +/-1 PSI tolerance (dependent on kit purchased), that should provide the correct valve opening pressure without the use of spacers. **NO SPACERS ARE TO BE USED WITH THIS REPAIR KIT.** Please note that although the springs have been factory set to provide the required opening pressure, individual variables related to specific valves and their applications might result in a rebuilt valve having an opening pressure that falls outside of the expected tolerance band. . In the event that the required opening pressure (either 15 PSIG or 18 PSIG as noted on the kit) cannot be obtained through use of the spring alone, ensure that you have the correct repair kit and contact your Dixon Bayco sales representative immediately.

## Assembly

Assemble the valve using the following procedure, referring to the diagram as needed.

1. Place vent cowl (1) on the table with threaded portion lowermost.
2. Place valve plate (11) onto the seating surface of the vent cowl (1) ensuring that the flat sealing surface is facing down (as shown in the diagram) and in contact with the vent cowl seating surface.
3. Next place the diaphragm (4) onto the valve plate (11) so that the center hole of the diaphragm is aligned with the stem of the valve plate and the four cutouts on the outer edge of the diaphragm are aligned with the threaded holes in the vent cowl (1).
4. Place the spring seat (3) on to the diaphragm (4) and the stem of the valve plate (11).
5. Place spring (5) onto the stem of the valve plate (11) and on top of the spring seat (3).
6. Place top cover (2) onto the top of the spring and, using a suitable clamping device, bring the top cover and vent cowl (1) together, ensuring that the diaphragm (4) is still aligned with the threaded holes on the vent cowl. Check to ensure that the through holes in the top cover are also aligned with the threaded holes in the vent cowl.
7. When the valve assembly is satisfactorily clamped together, take the bottom half of the tamper proof cup seal (10) and place it on the top cover flange (2) so that the hole in the cup seal is aligned with one of the holes in the top cover flange.
8. Place a washer (6) on each of the four bolts (8) and thread each bolt in turn into the valve assembly, as shown. Ensure that one of the bolts passes through the tamper proof cup seal lower half (10) as described in the step above.
9. Place the upper half of the tamper proof cup seal (9) onto the assembled lower half (10) and press firmly to snap the two halves together.
10. When all four bolts have been securely fastened, the valve assembly may be unclamped and is now ready for testing.

## **Air Relief Valve – Theory of Operation**

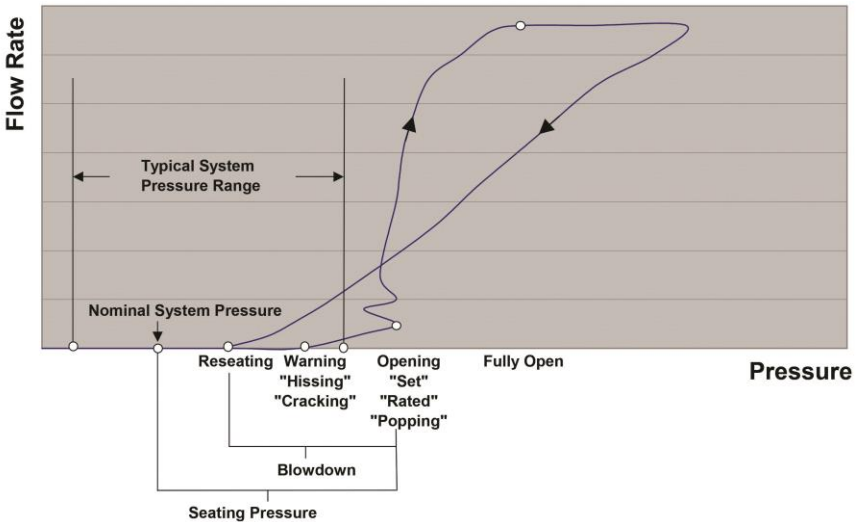
All Dixon Bayco air relief valves are spring-loaded system-pressure actuated devices consisting of a valve disc held in a closed position against a valve seat by means of spring pressure. The pressure in the system to be protected always acts on the valve disc and would tend to open the valve, however the spring load is set so as to ensure that the pressure in the system, at normal operating pressures, is insufficient to open the valve. However, when the system pressure builds to a level when the pressure load on the valve disc is equal to the load exerted by the spring, the valve will begin to open. If the pressure in the system were to be held at this level, the load acting to open the valve and the spring load acting to keep the valve closed would remain in equilibrium and the valve would be neither open nor closed. In such circumstances the valve will tend to flutter on the valve seat and may release a small amount of air but will not be relieving significant pressure from the system. This point is known as the warning pressure or cracking pressure.

If the pressure in the system continues to rise, the load acting on the face of the valve, and tending to open the valve will also continue to rise and will begin to exceed the load exerted by the spring, which tends to keep the valve closed. When the opening load, due to system pressure, exceeds the closing load, due to spring force, the valve will open, and, as long as the system pressure remains sufficient, will stay open. This point is known as the opening pressure or set pressure (also referred to as rated or popping pressure). The difference between the crack pressure and opening pressure varies between valves and is also related to the system flow rate. However the two should not be confused, as there is a significant difference in pressure between the two points.

If the system pressure continues to rise, the valve will continue to open and will relieve more and more air until the valve is fully open. At this point the valve will be relieving close to its maximum airflow rate, further increase in system pressure will show only relatively minor increases in flow rate. If the system pressure decreases the relieving airflow rate will reduce and the valve will start to close but will not fully reseal until some pressure below the opening pressure, this pressure is known as the reseating pressure and the difference between the two pressures is known as “blowdown”.

In practice the valve should be matched to the system to be protected such that the maximum airflow rate of the valve is never utilized, i.e. the valve should be capable of relieving a sufficient volume flow rate of air at the opening pressure to ensure that the system pressure drops significantly. If the valve is open and the system pressure continues to rise above the opening pressure then the valve is relieving less air than is being put into the system. This is a potentially dangerous situation that may lead to over pressurization. Air relief valves should always be matched to the system to be protected such that the relieving airflow rate of the valve at the maximum allowable system pressure, and ideally at the opening pressure, is well in excess of the system input flow rate at that same pressure.

## Pressure and Vacuum Relief Valve Terminology



## Testing

The opening pressure of this valve may indicate differently depending on the test equipment, instrumentation and air supply used. Where possible the valve should be tested using identical conditions and the same equipment as will be found on the system to be protected. When this is not practical the test set-up should, as closely as possible, approximate the conditions of the system to be protected. Additionally the calibration of your test system should be checked against your actual system by comparing the opening pressure of the same relief valve on both systems.

1. Ensure that your air supply is rated to at least 100 PSI and that at least 250 SCFM of air flow is available. If the air supply flow rate is much less than the rated flow rate of the relief valve, the relief valve will appear to relieve at a lower pressure than the rated value. This discrepancy arises because the relief valve is a spring device that is designed to lift slightly before the set relief (opening) pressure, but will not flow a significant volume of air until the air reaches the opening pressure. If the SCFM flow rate is low the air relief valve will relieve a volume of air at lift pressure that cannot be made up by the supply source, therefore the tester will not be able to reach the opening pressure setting. In this situation the maximum pressure read on the tester pressure gauge will be the initial lift pressure and not the rated opening pressure.



**All test equipment should be rated suitable for use with high pressure.**

2. Ensure that all supply lines and connections are at least ¾".
3. Ensure that all relevant instrumentation is correctly calibrated.


The most accurate results will be obtained when the relief valve to be tested is connected to an accumulator or air receiver tank such that the dynamic effect of the compressor system is reduced. Failure to do so may result in an indicated opening pressure lower than the actual.

4. Screw the pressure relief valve to be tested into a 2" port on your test system using pipe sealant on the air relief valve threads.
5. Open supply pressure isolation valve and allow air receiver tank pressure to rise.



6. Tank pressure should be allowed to rise at a rate of approximately 2 PSI / second. Flow rates greater than this will cause the relief valve to flutter rapidly. In this condition the valve plate inertia may cause the apparent opening pressure to be lower than the calibrated value and will make accurate testing impossible.

7. The relief valve will start to discharge at a pressure slightly below the rated value, at this pressure some hissing may be evident but the pressure in the tank should continue to rise (assuming air source provides a sufficient flow rate). The valve opening pressure (RATED VALUE) can be read on the tester pressure gauge when the valve plate (11) reaches an equilibrium (open) position.

8.  **If the air supply provides a flow rate in excess of the maximum flow rate capacity of the relief valve at the relieving pressure, the valve will not be able to relieve a sufficient volume of air to prevent tank pressure from continuing to rise. In this condition serious personal injury and extensive property damage may occur due to over pressurization of test components.**

### Valve Installation

1. Prior to installation, clean any dirt or foreign matter from threading surfaces.
2. Install air relief valve in positions ranging from vertical (0°) to horizontal (90°). Do not install valve in inverted position.
3. Install air relief valve with exhaust area positioned so exhaust vents safely (preferably down as shown in attached diagram). In horizontal applications, ensure that the small vent hole in the side of the top cover is facing downward. Downward venting helps prevent dirt or debris from entering the valve.
4. Apply pipe sealant to threading surfaces prior to installation.
5. Thread the valve into place by hand and tighten using a crescent wrench (or equivalent) across the hex flats.

### Care and Handling

Brand new Dixon Bayco air relief valves are tested at the factory and are in proper working condition when shipped. Air relief valves are designed to be tough and to provide long service with reasonable care and handling.

### Operation and Maintenance Instructions

1. Weekly visual inspection of the valve is recommended.
2. Ensure that the valve body and exhaust vents are kept clear of buildup.
3. Ensure that exhaust vents remain clear of all obstructions.
4. Inspect the valve regularly to ensure thread tightness. Excessive vibration may cause valve to loosen over time.

The Factory produced Dixon Bayco air relief valve is assembled with tamper resistant screws and is pre-set at the factory to customer requirements. Any attempt to disassemble or adjust settings for any reason will void the manufacturer's warranty. See warranty section below for warranty details related to the use of this.

Should any problems arise with the valve, remove from service immediately and contact your Dixon Bayco distributor.

### Dixon Bayco Warranty

For complete warranty information, please refer to the latest Dixon catalog.