Adjustment & Calibration Instructions

For

Dixon Bayco

2180 AND 3180 ADJUSTABLE AIR RELIEF VALVES

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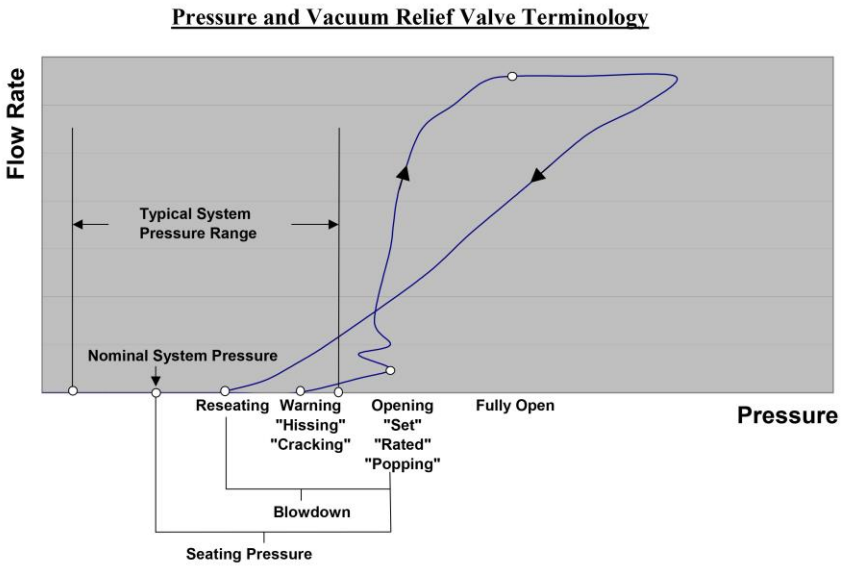
Air Relief Valve – Theory of Operation

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 reseat 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.



Valve Adjustment

⚠ Dixon Bayco adjustable air relief valves should be adjusted no more than +/- 3 PSI from the factory supplied setting. Adjustment in excess of +/- 3 PSI may result in a failure to vent or a significant loss of venting capacity.

1. Remove both top screws and small cap from the valve top cover.

2. To increase pressure setting - rotate threaded rod clockwise and tighten nut down to base.

To decrease pressure setting – rotate threaded rod counter clockwise and tighten nut down to base.

3. Place top cap onto the valve top cover and re-fasten both screws.

4. To Seal Valve for Tamper Proofing:
After settings have been selected, place the cup seal cap over the cup seal base (attached to one of the top screws) and press down firmly to lock. This cup seal is intended to ensure the valve will not be tampered with after the final pressure setting has been selected.

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 airflow 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 air.

2. Ensure that all supply lines and connections are at least ¾".

3. Ensure that all relevant instrumentation is correctly calibrated.

4. 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.

5. Screw the pressure relief valve to be tested into a 2" (for 2180), or 3" (for 3180), port on your test system using pipe sealant on the air relief valve threads.

6. Open supply pressure isolation valve and allow air receiver tank pressure to rise.

Tank pressure should be allowed to rise at a rate of approximately 2psi / 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.

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.

⚠ 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

Weekly visual inspection of the valve is recommended.

1. Ensure that the valve body and exhaust vents are kept clear of buildup.

2. Ensure that exhaust vents remain clear of all obstructions.

3. Inspect the valve regularly to ensure thread tightness. Excessive vibration may cause valve to loosen over time.

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5. 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.