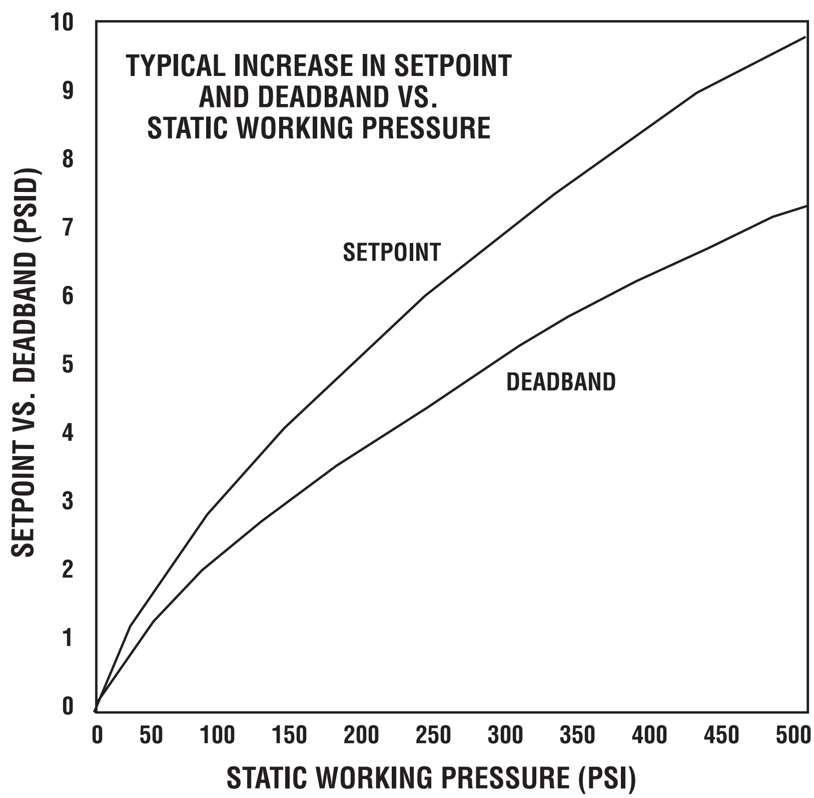
STATIC WORKING PRESSURE EFFECTS ON DIFFERENTIAL PRESSURE SWITCHES

Changes in static operating pressure will cause setpoint shift and deadband changes in Ashcroft differential pressure switches. This phenomenon is common in differential pressure switches manufactured by most competitors and is often a result of very small differences in parts or dimensions between the high and low side of the switch.

Fig. 1 will help you understand the type and magnitude of the changes expected. This will also illustrate why we need to know static operating pressure when we factory set a differential pressure switch. It can be used as a guideline in predicting switch performance under changing conditions.

The setpoint curve indicates directly the typical increase in setpoint value at corresponding static working pressures.
The deadband curve indicates the increase in deadband, also corresponding to static working pressure. This increase should be added to the initial deadband value (if it is known) or to the deadband value found in the product catalogs. Initial values will depend on switch element selected.
The following examples may be helpful in interpreting the chart:



The following examples may be helpful in interpreting the chart:

Ex. 1. **A B-Series** differential pressure switch, type 400, 60 psid range, code 24 microswitch has a setpoint of 50 psid and a deadband of 4 psid at 0 psi static working pressure. What change in setpoint and deadband could be expected if the static pressure was raised to 300 psi?

Ans: **a. Setpoint** – referring to the setpoint curve, at 300 psi static pressure, the typical increase in setpoint is approximately 7 psi. Therefore, the setpoint of the switch could be expected to rise to around (50 + 7) = 57 psid.

b. Deadband – referring to the deadband curve, at 300 psi static pressure, the typical increase in deadband is approximately 5 psid. Therefore, the deadband of the switch could be expected to increase to around (4 + 5) = 9 psid.

Note: If the exact deadband was not known, the catalog value of between 3.0 and 6.0 psi could be used to estimate the increase to around 8 to 11 psi.

Ex. 2. **An L-Series,** single setpoint, 60 psid range, with a type "G" switch element, has a setpoint of 50 psid and a deadband of 7 psid at 200 psi static working pressure. If the static pressure could vary up to 300 psi, what change in setpoint and deadband could be expected?

Ans: **a. Setpoint** – the increase in setpoint would be the difference of the points found on the curve. At 300 psi static pressure, the curve reads approximately 7 psid, and at 200 psi static pressure, the curve reads approximately 5.5 psi. Therefore, the expected increase would be (7 – 5.5) = 1.5 psi and the setpoint could be expected to rise to around 51.5 psid.

b. Deadband – following the same procedure as in "a," the deadband curve at 300 psi static reads approximately 5 psid, and at 200 psi static reads approximately 4 psid. Therefore, the deadband could be expected to increase (5 – 4) = 1 psid, resulting in a deadband value of around (7 + 1 =) 8 psid.

Note: This method leads to better results if the initial setpoint and deadband values are accurately known.