KAESER COMPRESSORS

THE PROPER APPLICATION OF PRESSURE/FLOW CONTROLS

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Abstract

Whether you call them intermediate controls, flow controls, pressure/flow controls, demand expanders, or any other name, the proper application of them has always been a bit confusing to users. Some people will say that they should be used in nearly every application and some say there is no need for them in any application. The truth, as usual, is somewhere in the middle. Although this white paper refers to flow controllers, it applies to most all pressure/flow controls. We will use the generic term "flow controller" to refer to this class of control.

Flow controllers go by a number of different names.

What Does a Flow Controller Do?

A flow controller is in essence a precise and rapidly responding pressure regulator that reacts very quickly to changes in downstream demand, releasing large volumes of air from storage to maintain system pressure. It is not uncommon for them to be able to maintain (with adequate storage upstream) system pressures within plus or minus 1 psig even with large swings in system demand. With such tight control, the downstream pressure setting can be reduced to the minimum required for the end uses of the compressed air.

This presents several significant benefits. By lowering the system pressure to its minimum, artificial demand is reduced and the volume of air the compressors must produce is also reduced. Leaks will leak less and unregulated uses will consume less air. This is especially advantageous for installations with older piping with known, heavier leak loads where it may not be feasible to repair or upgrade the air distribution system. Given that the average compressed air system will leak about one third of the total air volume and unregulated uses can account for another one third, or more, of the volume, this reduction in pressure can affect more than half of the total air supply. For example, if the downstream pressure can be dropped from 100 psig to 80 psig, and half of the demand is unregulated, the volume required to support the system will drop by about 10%. In a system using 2500 cfm, that drop in artificial demand (250 cfm) is equal to a 50 hp compressor. This is a conservative number since it is common that more than half of the system demand is unregulated.

In addition to reducing artificial demand, a flow controller can be used to support large intermittent demand events that might otherwise draw down the system pressure and even cause an additional compressor to start in order to rebuild the pressure (See Figure 1).