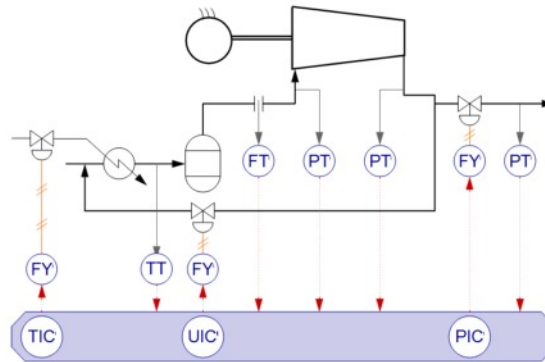




Antisurge & Performance Control

CCC Fact Sheet

An axial or centrifugal compressor can be severely damaged if process conditions reduce its gross flow below a minimum surge limit, and can also be damaged by conditions that would require flow rates in excess of a maximum choke limit. Each compressor needs an Antisurge Control Application to protect it from surge (and choke) and a Performance Control Application to regulate its capacity.



Antisurge Control Application (AS)

The only way to prevent surge is to recycle or blow off flow to keep the operating point away from the surge limit. Because compressing this extra flow entails an economic penalty, the control system must accurately determine how close the compressor is to surging and then maintain an adequate but not excessive flow rate. Our unique combination of surge prediction and antisurge control algorithms protect your machines with the smallest possible recycle rates.

The surge limit is not fixed relative to any one measurable variable. Instead, it is a complex function that depends on gas composition, temperatures, pressures, speed, and guide vane angle. Thus, the antisurge control program calculates proximity-to-surge using a multivariable function that is invariant to any process change it might encounter. Because that function depends on which conditions are fixed and the configuration of your compressor, we provide a flexible method for defining it.

The anti-surge control program also offers high or low limiting loops that maintain up to three single or multiple input process limiting variables.

A performance control application can regulate simple pressure or flow measurements, the compression ratio, or a pressure and temperature compensated mass flow. It can also implement high or low limiting loops for up to three single or multiple input variables.

In addition to decoupling its output from and coordinating start-up and shut-down sequences with those of designated antisurge and performance control applications, its pressure override control response use the recycle valve to more quickly counter capacity control deviations and minimize deviations from setpoint. For example, a performance control application controlling an air compressor's discharge pressure can reduce a severe over pressure by indirectly opening the blowoff valve.

For turbine-driven compressors, the controller performer can vary the speed set point of the turbine's speed or fuel control application; suspend its automatic actions when the turbine control application is limited, in manual, or otherwise unable to vary the train speed as needed to maintain the desired compressor throughput and coordinate start-up and shut-down sequences.

CCC Control systems implement any required antichoke control features as optional function blocks within the antisurge control program. More specifically, applications of that program can be configured to register an alarm, prevent manual increases in the recycle flow rate, and close an antichoke valve (if available) as the operating point approaches the choke limit.

Performance Control Application (PC)

The primary function of a compressor's performance controller is to regulate its throughput as required to keep a capacity control variable equal to a desired set point. CCC performance controllers offer unique features that differentiate them from general-purpose process controllers. These features are:

- ~ Calculation of the capacity control variable from multiple inputs
- ~ Limiting loops that can override the capacity control response to keep critical process conditions within acceptable bounds.
- ~ Integration with the compressor's antisurge, speed, and other controllers
- ~ Load-sharing control functions for multiple compressor networks.