Sample Damper Control Sequence w/Channel Blender

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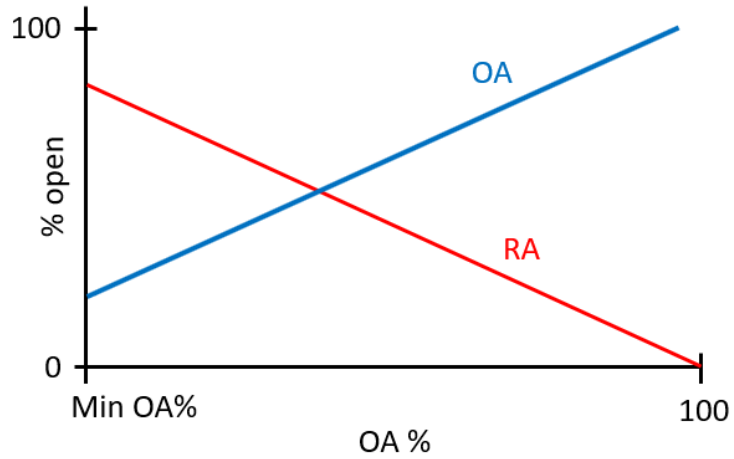
Control of a Standard Channel Blender:

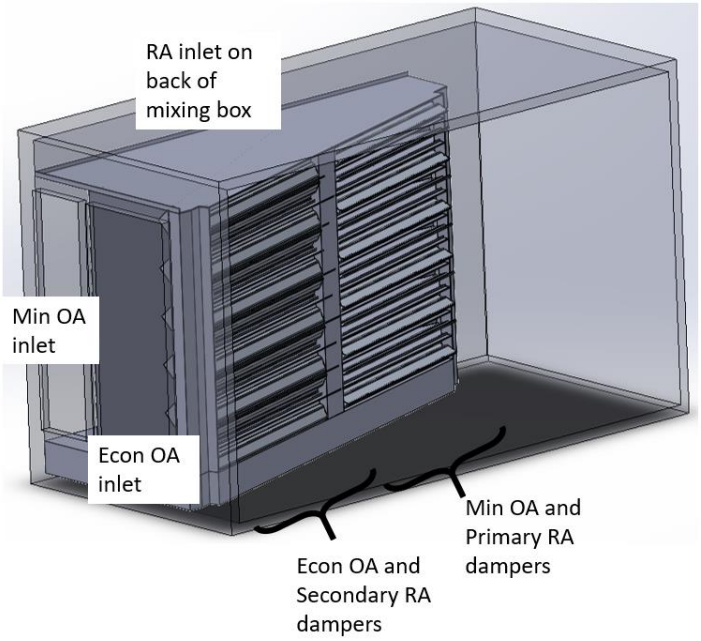
For a Channel Blender without a dedicated minimum OA duct the damper control sequence is similar to a standard mixing box. The OA damper actuator is provided with the inverse of the signal provided to the RA damper actuator. A graphical representation of this control scheme is presented below. Note that the dampers start partially open since the Min OA for this case is 30%. The exact position of these dampers to provide the correct Min OA% will vary based on the system (RA fans, duct work pressure drop, OA hoods and louvers, etc.). If the damper banks are large enough to require multiple actuators for each airstream, all of the actuators for each airstream (all OA or all RA) should receive the same signal.



Control of a Channel Blender with a Dedicated Minimum Outdoor Air Opening:

The following is an example of the control scheme for a Channel Blender with a dedicated minimum OA duct. The mixer has been designed to operate with a control scheme that includes independent control of all four damper banks. The figures below describe the four damper banks. The Minimum OA duct is sent to one set of dampers in the mixer. The dampers in this portion of the mixer are alternating between the Min OA and one of the RA damper banks, referred to here as the Primary RA dampers. Similarly, the remaining OA (Econ OA) is directed to the other portion of the mixer and paired with the Secondary RA dampers.

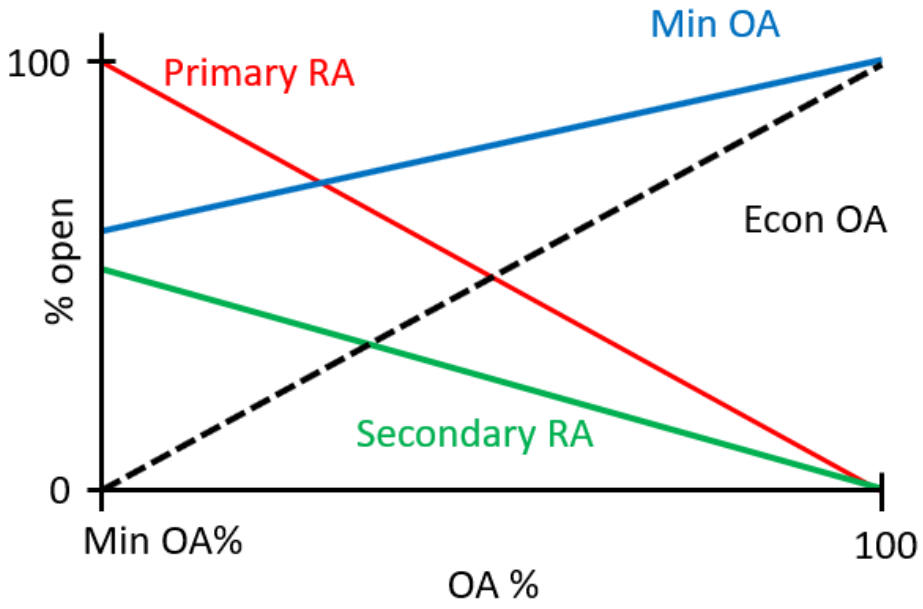
Sample Damper Control Sequence w/Channel Blender



The control scheme for the mixer has been designed such that the when the unit is operating under Min OA airflow a larger portion of the RA is diverted to the Primary RA dampers to provide more warm air to that region of the mixing box. When operating at Min OA, the Primary RA damper is fully open and the Econ OA damper is fully shut. The Min OA damper and Secondary RA receive inverse control signals from one another and move through the remainder of their respective ranges as more OA is needed. **Under conditions where mixing is needed to protect the cooling coil, the Min OA dampers must be partially closed to assist with mixing.** A graphical representation of this control scheme is presented in the figure below.

This control scheme may be unintuitive but is needed to provide adequate mixing while minimizing pressure drop. It also should ensure that the incoming Outside Air will preferentially bias to the Min OA channel throughout the entire operating range thus ensuring that the specified Min OA flow rate (or greater) is always achieved.

Note that due to unknown details regarding the RA fans, OA duct inlet geometry (bird screen, hoods, etc.), and other small modifications to the flow, the exact damper positions of the Econ OA and Secondary RA at point A may need to be slightly adjusted during commissioning.


Min OA
100
Primary RA
% open
Econ OA
Secondary RA
0
Min OA%
100
OA %