Modulated damper economizer control based on outdoor air enthalpy and the economizer’s setpoint

**File Name**

ECONOE.CMP

**Path Name**

The following DOS path name indicates the location of the compound:

<FMS>\APPS\HVAC\LOGIC\ECON\ECONOE.CMP

**Main Function**

Modulated damper economizer control based on outdoor air enthalpy and the economizer’s setpoint. The outdoor air enthalpy (calculated from dry bulb temperature and relative humidity) is compared to the enthalpy economizer’s switchover setpoint:

- If the outdoor enthalpy is *less* than the setpoint, the economizer mode allows the dampers to modulate from the minimum position to the maximum position.
- If the outdoor enthalpy is *greater* than the setpoint, the dampers are limited to the minimum position needed to satisfy minimum ventilation requirements.

You can use the ECONOE compound with the following compounds: DMPLOGIC, DM, or ZHSDMCS.

**Accessories**

The following can be connected to the ECONOE compound as inputs:

- adjustable enthalpy economizer switchover setpoint
- economizer enable control, such as fan status
- economizer override control
Alternate Schemes

All the economizer compounds have the same output capabilities. Only the compare logic varies:

- **ECONDB compound**—modulated damper economizer control based on outdoor air dry bulb temperature and the economizer’s setpoint
- **ECONEN compound**—modulated damper economizer control based on comparison of outdoor and return air enthalpy
- **ECONRA compound**—modulated damper economizer control based on the comparison of the economizer’s setpoint and the difference between the return air temperature and outdoor air temperature

How It Works

When the outdoor air enthalpy (calculated from OA-T and OA-H) is *less than or equal to* the enthalpy setpoint (ECON-SPT), the mixed air dampers are in the economizer mode. In the economizer mode, the dampers are allowed to modulate from the minimum position to the maximum position.

When the outdoor air enthalpy (calculated from OA-T and OA-H) *exceeds* the enthalpy setpoint (ECON-SPT) by more than 1.0 Btu/lb (2.5 KJ/kg), the mixed air dampers are *not* in the economizer mode. The dampers are restricted to the minimum position.

The economizer override operates in the following manner:

- When the economizer enable (ECON-ENA) is False, only the economizer override (ECON-OVD) can place the dampers in the economizer mode.
- When the economizer override signal (ECON-OVD) is True, the dampers are in the economizer mode.

Guidelines

- You can find important instructions and guidelines for using compounds in *How to Use the Metasys GPL HVAC Library*, located at the beginning of the *App. Notes: GPL HVAC Library* section.
- For information on the definition and the initial configuration of the objects and the function blocks, use GPL to examine this compound.
- The enthalpy calculation uses barometric pressure of 29.000 in. Hg (97.930 kPa) (adjustable).
- The enthalpy differential is set at 1.0 Btu/lb (2.5 KJ/kg).
- You must define system and object names for all objects.
- You must define the hardware location for each object.
- When the ECON-ENA block is *not* used, substitute a binary constant block with a value of 1. (The default for the ECON-ENA block is 1, True.)
- When the ECON-OVD block is not used, substitute a binary constant block with a value of 0. (The default for the ECON-OVD block is 0, False.)

- If a BD object for indicating the economizer’s mode state is not desired, delete the following: 1) the ECON connection block, and 2) the command block configured as a SET BD command.

**I/O Requirements**

### Table 1: I/O Requirements

<table>
<thead>
<tr>
<th>Name Of Block</th>
<th>Type Of Data</th>
<th>Engineer Units</th>
<th>Req?</th>
<th>Range</th>
<th>Default Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OA-T</td>
<td>Analog</td>
<td>DEG F</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
<td>Outdoor air dry bulb temperature</td>
</tr>
<tr>
<td>OA-H</td>
<td>Analog</td>
<td>% RH</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
<td>Outdoor air relative humidity</td>
</tr>
<tr>
<td>ECON-SPT</td>
<td>Analog</td>
<td>Btu/lb</td>
<td>No</td>
<td>-</td>
<td>25 Btu/lb (58 KJ/kg)</td>
<td>Enthalpy economizer switchover setpoint</td>
</tr>
<tr>
<td>ECON-ENA</td>
<td>Binary</td>
<td></td>
<td>Yes</td>
<td>-</td>
<td>1 (True)</td>
<td>Economizer enable</td>
</tr>
<tr>
<td>ECON-OVD</td>
<td>Binary</td>
<td></td>
<td>Yes</td>
<td>-</td>
<td>0 (False)</td>
<td>Economizer override</td>
</tr>
<tr>
<td>MIN-POS</td>
<td>Analog</td>
<td>% OPN</td>
<td>Yes</td>
<td>-</td>
<td>10.0%</td>
<td>Minimum damper position</td>
</tr>
</tbody>
</table>

### Output Requirements

<table>
<thead>
<tr>
<th>Name Of Connection</th>
<th>Type Of Data</th>
<th>Engineer Units</th>
<th>Req?</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIN-DMP</td>
<td>Command</td>
<td>% OPN</td>
<td>Yes</td>
<td>Minimum damper output</td>
</tr>
<tr>
<td>MAX-DMP</td>
<td>Command</td>
<td>% OPN</td>
<td>Yes</td>
<td>Maximum damper output</td>
</tr>
<tr>
<td>ECON</td>
<td>Command</td>
<td>T/F</td>
<td>Yes</td>
<td>Preconfigured as the connection to the Binary Data (BD) object. The value of the BD object indicates the economizer mode’s state.</td>
</tr>
</tbody>
</table>

**Process?**

Yes, this is a process compound. To view the compound’s process information, click once on the compound block.

**Example**

To see how this compound could be used with other objects and compounds, view the GPL file AHU6. The following DOS path name indicates the location of the file:

<%FMS%>\APPS\AHU\AHU6.(GPL)