All the modifications are within the existing “Group – Operational Faults” (around Page 1798)

1. 1 existing section is modified

* Operational Fault Objects

1. 2 new sections are added

* FaultModel:ThermostatOffset
* FaultModel:HumidistatOffset

Rongpeng Zhang, Mar. 4th, 2015

### Operational Fault Objects

EnergyPlus contains a number of objects to model operational faults of sensors, meters, equipment and systems. The current implementation allows the modeling of the following fault types: (1) sensor faults with air economizers, (2) thermostat/humidistat offset faults, and (3) heating and cooling coil fouling faults.

The objects used by EnergyPlus to model the faults are as follows:

* FaultModel:TemperatureSensorOffset:OutdoorAir
* FaultModel:HumiditySensorOffset:OutdoorAir
* FaultModel:EnthalpySensorOffset:OutdoorAir
* FaultModel:TemperatureSensorOffset:ReturnAir
* FaultModel:EnthalpySensorOffset:ReturnAir
* FaultModel:Fouling:Coil
* FaultModel:ThermostatOffset
* FaultModel:HumidistatOffset

FaultModel:ThermostatOffset

This object defines the offset fault of a thermostatthat leads to inappropriate operations of the HVAC system.

***Field: Name***

This is the user-defined name of the fault.

***Field: Availability Schedule Name***

This field provides the name of a schedule that will determine whether this fault is applicable or not. When a fault is not applicable it is not modeled in the simulations. When it is applicable, then a user-defined sensor offset and a severity schedule will be applied. This schedule should be set to “1.0” when a fault is applicable and “0.0” when it is not. If this field is blank, the schedule has values of 1.0 for all time periods.

***Field: Severity Schedule Name***

This field provides the name of a schedule that represents severity of a fault. This is used as a multiplier to the reference thermostat offset value. This schedule should be set to a non-zero value when a fault is applicable and “0.0” when it is not. If this field is blank, the schedule has values of 1.0 for all time periods.

***Field: Reference Thermostat Offset***

This field defines the reference offset value of the thermostat. A positive value means the zone air temperature reading is higher than the actual value. A negative value means the reading is lower than the actual value. A “0.0” value means no offset. Default is 2.0. The units are in degrees Celsius.

***Field: Thermostat Name***

This field defines the name of the thermostat object associated with the fault. It should be the name of a ZoneControl:Thermostat object.

FaultModel:HumidistatOffset

This object defines the offset fault of a humidistatthat leads to inappropriate operations of the HVAC system.

***Field: Name***

This is the user-defined name of the fault.

***Field: Humidistat Offset Type***

This choice field determines the humidistat offset fault type. Two fault types are available: (1) Type ThermostatOffsetIndependent: humidistat offset is not related with thermostat offset. For this type, user needs to specify the Reference Humidistat Offset, Availability Schedule, and Severity Schedule(2) Type ThermostatOffsetDependent: humidistat offset is caused by thermostat offset fault. For this type, user only needs to specify the Related Thermostat Offset Fault Name.

***Field: Availability Schedule Name***

This field provides the name of a schedule that will determine if this fault is applicable. This field is applicable for the Type ThermostatOffsetIndependent. When a fault is not applicable it is not modeled in the simulations. When it is applicable, then a user-defined sensor offset and a severity schedule will be applied. This schedule should be set to “1.0” when a fault is applicable and “0.0” when it is not. If this field is blank, the schedule has values of 1 for all time periods.

***Field: Severity Schedule Name***

This field provides the name of a schedule that represents severity of a fault. This field is applicable for the Type ThermostatOffsetIndependent. This is used as a multiplier to the reference humidistatoffset value. This schedule should be set to a non-zero value when a fault is applicable and “0.0” when it is not. If this field is blank, the schedule has values of 1.0 for all time periods.

***Field: Reference Humidistat Offset***

This field defines the reference offset value of the humidistat. This field is required for the Type ThermostatOffsetIndependent. A positive value means the zone air temperature reading is higher than the actual value. A negative value means the reading is lower than the actual value. A “0.0” value means no offset. Default is 5.0. The units are in percentage.

***Field: Related Thermostat Offset Fault Name***

This field provides the name of a Thermostat Offset Fault object that causes the humidistat offset fault. It should be the name of a FaultModel:ThermostatOffset object. This field is required for the Type ThermostatOffsetDependent. This is used as a multiplier to the reference humidistatoffset value. This schedule should be set to a non-zero value when a fault is applicable and “0.0” when it is not. If this field is blank, the schedule has values of 1.0 for all time periods.

***Field: Humidistat Name***

This field defines the name of the humidistat object associated with the fault. It should be the name of a ZoneControl:Humidistat object.