TYPE 584: OUT OF SET POINT WATCHER

General Description

When operating in temperature level control, it is a fairly common occurrence for the temperature of a zone to exceed the cooling set point temperature or to be below the heating set point temperature. Type584 watches temperature conditions, records and (if desired) prints information on the time, duration and extent to which the set points were exceeded. While most often, this component is used in building applications, there is nothing inherent to it about buildings. Type584 may equally well be used in other situations in which a watched variable (mass flow rate, relative humidity, power, etc.) is intended to be maintained within an allowable range but may at times exceed that range.

Nomenclature

T_{zone}	[ºC]	Zone temperature
$T_{setpt,heating}$	[ºC]	Set point temperature for heating.
$T_{deadband,heating}$	[ΔC]	Heating dead band temperature difference.
$T_{setpt,cooling}$	[ºC]	Set point temperature for cooling.
$T_{deadband,cooling}$	[ΔC]	Cooling dead band temperature difference.

Detailed Description

Type584 is used to watch a variable and record instances of that variable exceeding a user defined allowable range. The component performs the simplistic tests shown in equation 584.1a and 584.1b to check whether each watched variable is within range.

$$T_{zone} < T_{setpt,heating} - T_{deadband,heating} \quad \text{(Eq. 584.1a)}$$

$$T_{zone} > T_{setpnt,cooling} + T_{deadband,cooling} \quad \text{(Eq. 584.2b)}$$

Multiple tests on multiple variables may be performed; the first parameter dictates how many variables are to be watched. The default maximum number of watched variables is set to 100. Users requiring more variables may either use a second instance of Type584 or may increase the limit in the Type584 Fortran source code. Increasing the coded limit will necessitate recompiling the code and relining the appropriate DLL. Normally, Type584 is used in temperature level control building applications and the watched variables are zone temperatures. It may, however, be used in other applications to watch other variable types.

If the third parameter (print mode) is set to 1, Type584 will print the time at which the zone temperature was out of range, the zone number that went out of range (if multiple zones are being monitored), the zone temperature and either the zone cooling set point plus cooling dead band or the zone heating set point plus the zone heating dead band. Following this instance by instance list, the cumulative time spent out of range by each zone is reported. Results are printed to a user specified output file. If the print mode parameter is set to 0 then the results will not be printed to an external file. In either case, two outputs are generated by Type584 for each zone; the cumulative number of time steps spent above the cooling set

point temperature plus the cooling dead band and the cumulative number of time steps spent below the heating set point minus the heating dead band.

Six INPUTS are cycled for each monitored zone; heating set point temperature, heating dead band temperature difference, cooling set point temperature, cooling dead band temperature difference, zone temperature and a control signal for monitoring. Type584 will monitor and record excursions of zone temperature outside the allowable range only when this last cycled input is set to 1. Using this control signal, it is possible to record off set point conditions only when a building is occupied and to ignore situations in which the building temperature is allowed to float.

Example

Type584 is used in the following Simulation Studio example:
\trnsys16\TESS Models\Studio Projects\Utility Library\Utility_Misc.tpf