

CEyesTU1 – Terminal Unit Engineering Guide

• Overview

- The CEyesTU1 module is the analysis and diagnostics component used on terminal units.
 - Typical applications:
 - VAV Boxes
 - Reheat Boxes
 - Multi-zone Dampers
 - Two CEyesTU1 modules may be used together for Dual-Duct applications.

• Licensing

- Continual-Eyes™ may be licensed on any NiagaraAX® station.
- The base license includes a capacity of 15 points (or modules)
- Additional points (or modules) may be licensed.

• Module Execution Properties

- Module execution rate and duration.
 - Continuous execution:
 - The default settings will enable the CEyesTU1 module to execute at all times after initial execution period. (The beginning of the first hour after the placement of the module or after station restart).
 - Execution properties:
 - [ExecutionPeriod] specifies the amount of time that will pass between successive starts of the execution of the logic within this object. If [ExecutionPeriod] is set to 600 seconds (5 minutes), then the logic will be started at 0 minutes past each hour, 5 minutes past and so on until 55 minutes past. If [ExecutionPeriod] is set to 7200 seconds (2 hours), then the logic will be started at midnight, 2AM, 4AM and so on until 10PM.
 - [ExecutionOffset] allows for the modification of the timing of the execution. It specifies the amount of time into the execution period to wait until executing the logic. If [ExecutionPeriod] is set to 600 seconds (5 minutes) and [ExecutionOffset] is set to 60 seconds (1 minute), then the logic will be started at 1 minute past each hour, 6 minutes past, and so on until 56 minutes past. This allows the “staggering” of object execution.
 - [ExecutionDuration] specifies how long a period of time within each execution period the logic will run. If [ExecutionPeriod] and [ExecutionOffset] are set to 5 minutes and 1 minute, respectively and [ExecutionDuration] is set to 2 minutes, then the logic will run continuously from 1 minute past the hour until 3 minutes past the hour, from 6 minutes past until 8 minutes past, etc.
 - [IterationPeriod] is the rate at which the logic inside the object will execute.
 - [Executing] is a read property to view the current status of the module execution.

- **Alarms**

- **[FlowLoopAlarm]**

- Description
 - Indication of an unacceptable modulation or cycling of the control loop.
- Inputs and Parameters
 - Required connections
 - [DamperPosition]
 - Parameters
 - [FlowLoopAlarmSetpoint]
 - [FlowLoopAlarmDelay] in seconds.
 - [FlowLoopSampleRate] in seconds. This is the rate at which the input is read. Use higher values on slower control loops.
 - [FlowLoopFilterUpdateTime] in seconds. This is the rate at which the [FlowLoopError] is updated. Use higher values on slower control loops.
 - [FlowLoopFilterStepSize] This is the maximum amount of change in the [FlowLoopError] at each [FlowLoopFilterUpdateTime].
 - Calculated values or other parameters
 - [FlowLoopError] (Read Only)

- **[FlowAtZeroAlarm]**

- Description
 - Indication of measured airflow when the control damper is closed.
- Inputs and Parameters
 - Required connections
 - [DamperPosition]
 - [Flow]
 - Parameters
 - [FlowAlarmEnable]
 - [FlowAlarmDelay] in seconds.
 - [DamperEffectiveZero]
 - [MaxFlowAtZero]

- **[UnderflowAlarm]**

- Description
 - Indication of airflow below the current airflow setpoint.
- Inputs and Parameters
 - Required connections
 - [Flow]
 - [FlowSetpoint]
 - Parameters
 - [Occupied] true = Occupied, false = Unoccupied

- [FlowAlarmEnable]
- [UnderflowMultiplier]
- [FlowAlarmDelay] in seconds.
- [BoxFlowDeadband]

- **[OverflowAlarm]**
 - Description
 - Indication of airflow above the current airflow setpoint.
 - Inputs and Parameters
 - Required connections
 - [Flow]
 - [FlowSetpoint]
 - Parameters
 - [Occupied] true = Occupied, false = Unoccupied
 - [FlowAlarmEnable]
 - [OverflowMultiplier]
 - [FlowAlarmDelay] in seconds.
 - [BoxFlowDeadband]

- **[HeatLoopAlarm]**
 - Description
 - Indication of an unacceptable modulation or cycling of the control loop.
 - Inputs and Parameters
 - Required connections
 - [HeatPosition]
 - Parameters
 - [HeatLoopAlarmSetpoint]
 - [HeatLoopAlarmDelay] in seconds.
 - [HeatLoopSampleRate] in seconds. This is the rate at which the input is read. Use higher values on slower control loops.
 - [HeatLoopFilterUpdateTime] in seconds. This is the rate at which the [HeatLoopError] is updated. Use higher values on slower control loops.
 - [HeatLoopFilterStepSize] This is the maximum amount of change in the [HeatLoopError] at each [HeatLoopFilterUpdateTime].
 - Calculated values or other parameters
 - [HeatLoopError] (Read Only)

- **[HeatAtZeroAlarm]**
 - Description
 - Indication of excessive discharge air temperature when the heat is off (or closed).
 - Inputs and Parameters
 - Required connections

- [Occupied]
- [HeatPosition]
- [InletTemp]
- [DischargeTemp]
- Parameters
 - [HeatAlarmEnable]
 - [HeatAlarmDelay] in seconds.
 - [HeatEffectiveZero]
 - [HeatZeroMaxDeltaT]
- **[UnderheatAlarm]**
 - Description
 - Indication of low discharge air temperature with the heat fully open (or on).
 - Inputs and Parameters
 - Required connections
 - [Occupied]
 - [HeatPosition]
 - [InletTemp]
 - [DischargeTemp]
 - Parameters
 - [Occupied]
 - [HeatAlarmEnable]
 - [HeatAlarmDelay] in seconds.
 - [HeatEffectiveOpen]
 - [HeatOpenMinDeltaT]
- **[AnyAlarm]**
 - Description
 - Indication of any alarm active with this module. Primarily used for system alarm indication or to share into an associated module's [AssocAlarm] input.
 - Optional Input
 - [AssocAlarm] is used to indicate alarm condition of associated modules.
 - Operation
 - [AnyAlarm] will be initiated:
 - When any of the alarms above are initiated
 - OR
 - [AssocAlarm] = true

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