

CEyesSQ1 – Sequencer Module Engineering Guide

• Overview

- The CEyesSQ1 module is a sequencer analysis and diagnostics component used used for custom applications.
 - Typical applications:
 - Pump sequencing and lead/lag analysis.
 - Boiler staging analysis.
 - Cooling tower staging analysis.
 - Can be linked to any of the other CEyes modules to expand their capabilities.

• 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 CEyesSQ1 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**

- **[SeqLoopAlarm]**

- Description
 - Indication of an unacceptable modulation or cycling of the control loop.
 - Inputs and Parameters
 - Required connections
 - [SeqLoopSig]
 - Parameters
 - [SeqLoopAlarmSetpoint]
 - [SeqLoopAlarmDelay] in seconds.
 - [SeqLoopSampleRate] in seconds. This is the rate at which the input is read. Use higher values on slower control loops.
 - [SeqLoopFilterUpdateTime] in seconds. This is the rate at which the [SeqLoopError] is updated. Use higher values on slower control loops.
 - [SeqLoopFilterStepSize] This is the maximum amount of change in the [SeqLoopError] at each [SeqLoopFilterUpdateTime].
 - Calculated values or other parameters
 - [SeqLoopError] (Read Only)

- **[SeqRotationAlarm]**

- Description
 - Indication that not all sequencer stages are sharing rotation properly within the expected period of time.
 - Inputs and Parameters
 - Connections
 - [Seq1]
 - [Seq2]
 - [Seq3] Optional
 - [Seq4] Optional
 - [Seq5] Optional
 - [Seq6] Optional
 - [Seq7] Optional
 - [Seq8] Optional
 - Parameters
 - [EnableSeqRotationAlarm]
 - [SeqRotTimer] in hours.
 - [SeqQtyStages] (number of stages)

- **[CtrlVarOverStptAlarm]**

- Description

- Indication that the control variable is higher than the control variable setpoint.
- Inputs and Parameters
 - Required connections
 - [CtrlVar]
 - [CtrlSetpoint]
 - Parameters
 - [CtrlVarOverStptMult]
 - [CtrlVarStptAlarmsEnable]
 - [CtrlVarStptAlarmDelay] in seconds.
- **[CtrlVarUnderStptAlarm]**
 - Description
 - Indication that the control variable is lower than the control variable setpoint.
 - Inputs and Parameters
 - Required connections
 - [CtrlVar]
 - [CtrlSetpoint]
 - Parameters
 - [CtrlVarUnderStptMult]
 - [CtrlVarStptAlarmsEnable]
 - [CtrlVarStptAlarmDelay] in seconds.
- **[MaxDeltaSeq(#)] (Where # = 1 thru 8)**
 - Description
 - Indication of a high differential between the common inlet control variable and the Seq(#)'s outlet variable. (Ex: Common inlet is Building HW Return Temp and the Seq3 outlet variable is the Boiler 3 Supply Temp).
 - Inputs and Parameters
 - Required connections
 - [Seq(#)]
 - [DeltaCommonInletVar]
 - [Seq(#)OutletVar]
 - Parameters
 - [DeltaAction] true = Direct Acting / false = Reverse Acting
 - [EnableDeltaAlarms]
 - [DeltaAlarmDelay] in seconds.
 - [MaxDelta]
 - [SeqQtyStages]
- **[MinDeltaSeq(#)] (Where # = 1 thru 8)**
 - Description

- Indication of a low differential between the common inlet control variable and the Seq(#)'s outlet variable. (Ex: Common inlet is Building HW Return Temp and the Seq3 outlet variable is the Boiler 3 Supply Temp).
- Inputs and Parameters
 - Required connections
 - [Seq(#)]
 - [DeltaCommonInletVar]
 - [Seq(#)OutletVar]
 - Parameters
 - [DeltaAction] true = Direct Acting / false = Reverse Acting
 - [EnableDeltaAlarms]
 - [DeltaAlarmDelay] in seconds.
 - [MinDelta]
 - [SeqQtyStages]
- **[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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