

Vivarium Lighting Sequence of Operation

Technical Bulletin

Vivarium/Animal Holding rooms require timer sequencing of the day & night lights to maintain the test subject's circadian rhythm within the test lab. This can be provided using a lighting control system that provides 3 load relays for the Day lighting, Procedure/Additional Day lighting, and Night lighting (that is typically a red lamped source). Local switches allow for procedure lighting on/off control or night lighting on/off control based on time of day, these local controls must not disrupt the day/night cycle. Optional interface modules provide communication to a BAS system allowing day/night cycle tracking of the rooms and optional light level conformation from a photosensor.

Specified Sequence of Operation:

Day Cycle:

Day cycle lighting relay is turned on by internal timer or BAS system signal.

Local switch input for procedure lighting relay to be active for day cycle only, this input provides on/off control with a timed-on duration of 30-minutes. Operator can turn procedure light off at any time or restart the 30-minute period.

End of Day Cycle Transition:

Internal timer or BAS signal to trigger start of night cycle, disable procedure light switch input, enable night light switch input and sweep day light off with blink alert & procedure lighting relays off.

Night Cycle:

Night cycle light switch input controls red lamped night lighting only and cannot command day cycle lighting relays. This input provides on/off control with a timed-on duration of 30-minutes.

Operator can turn night cycle light off at any time or restart the 30-minute period.

End of Night Cycle Transition:

Internal timer or BAS signal to trigger start the day cycle, disable night light switch input, sweep on day cycle lights, sweep off night cycle lighting relay, or be allowed to time out from its 30-minute timed-on, enable procedure light switch input.

General Notes:

Relay control panel to provide 3 load relays per room controlled.

System shall provide Individual timer control for each room.

Day cycle white lights to be controlled by internal timer or BAS signal only.

Procedure light relay operation during day cycle only.

Procedure light switch and night light switch to provide an internally timed on operation for 30 minutes,

Optional Blink warn to off can be selected for day cycle, procedure, or night light relays.

Timed on duration and 5-minute blink warn to off time settings can be field adjusted.

Lighting control system shall be capable of providing all operations independent from BAS control.

Optional BAS interface module for ModBUS, BACnet or LonWorks modules shall provide relay status and control, input disable control, and optional photosensor level tracking.

Tracking and logging of room control is provided by BAS.

When programming a LightLEEDer control panel for this sequence of operation the ILC system will provide individual timers for each room and all sequencing for the switch inputs, the BAS system will track relay on/off state and log the photosensor levels to verify operation.

This example is for 8 Test labs with 3 relays each, and 2 corridors with 2 relays each. One LightLEEDer 32 relay panel populated with 28 active relays and 4 spare relays. 20 Timers are used, 2 per room and 2 per corridor. 4 LightSync Input modules for 8 SPDT momentary switches. 8 LightSync photosensor control modules with indoor ceiling mount sensors.

The 2 entry corridors have fixtures with normal day and red night lighting that is timer controlled at the same schedule as the adjoining rooms, this will prevent light contamination of the adjoining rooms. No switches are required in the corridor.

Each room has 3 relays for day, procedure, and red night lighting. A single switch station is provided for the procedure/night light timed on operation.

A LightSync Input module is provided for every 2 rooms with the SPDT momentary switch from each room connected to 2 inputs, one for day procedure light and one for night light timed on control. The inputs are programmed with a "Conditional - Input Disable" to disabled based on the current state of the day cycle relay, when on the night light input is disabled, when off the day procedure light input is disabled.

When the panels timer turns on the day light relay it will also turn off the night light relay.

A relay conditional statement can be used to Force Off the day procedure relay when the day light relay is Off. At the end of the day a second timer will blink the day cycle light off/on twice to give a blink warning of a pending off sweep, if the procedure lights are on they will be shut off. 5 minutes after the blink warning the day lights will turn off. The Blink Alert operation is set for each relay output under: Timer Off – Turn Off or Timer Off – Single Blink. When a Blink Alert operation is used the off timer is set for 5 minutes before the intended end of day.

If an operator uses the local room timed-on switch after the final off sweep, then it will only allow the red lights to be turned on for 30 minutes.

The timer set points, blink alert duration (relay can be set to turn off or use the blink warning) and timed-on duration for each lighting load can all be adjusted onsite at the panel keypad or using the ILC LightLEEDer pro software.

Daylight Savings time is normally disabled to prevent a 1-hour jump in time twice a year, the system operator would need to adjust the panels clock time manually if desired, typically this is done over several days, during the night cycle of each day to maintain the day cycle duration.

A building Automation System will connect to the ILC panel via ModBUS, BACnet, or LonWorks and track the relay on/off cycle and log the data for review. They can also track an ILC LightSync photosensor and log room light levels to verify operation and provide failure or maintenance warnings for the operator.