



***GE TLC ProSys™ Lighting Control System
Guideform Specification***

If you have any questions at all regarding this specification, please contact your local GE Total Lighting Control representative, or call the GE Total Lighting Control Applications group at **877-584-2685** (877-LTG-CNTL).

Thank you for allowing us to help with your project.



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SECTION 16xxx - LIGHTING CONTROL SYSTEM

PART 1 - General

1.01 SYSTEM DESCRIPTION

Install a Low Voltage Switching System consisting of relay panels and intelligent switches and/or photocells connected together by a dataline, as well as all associated wiring.

The system includes a DIN rail mounted timeclock, photosensor control module and/or other low voltage control devices. These devices are totally compatible with the manual operation of the softwired switches.

Requirements are indicated elsewhere in the specifications for work including, but not limited to, raceways and electrical boxes and fitting required for installation of control equipment and wiring.

1.02 QUALITY ASSURANCE

Manufacturers: Firms regularly engaged in manufacture of lighting control equipment and ancillary equipment, of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.

Component Pre-testing: All components and assemblies are to be factory pre-tested prior to installation.

System Support: Factory applications engineers shall be available for telephone support.

NEC Compliance: Comply with NEC as applicable to electrical wiring work.

NEMA Compliance: Comply with applicable portions of NEMA standards pertaining to types of electrical equipment and enclosures.

UL Approvals: Remote panels are to be UL listed under UL 916 Energy Management Equipment.

CSA Approvals: Remote panels are to be CSA listed.

FCC Emissions: All assemblies are to be in compliance with FCC emissions Standards specified in Part 15 Subpart J for Class A application.

1.03 SUBMITTALS

Shop Drawings: Submit dimensional drawings of all lighting control system components and accessories.

One Line Diagram: Submit a one line diagram of the system configuration proposed if it differs from that illustrated in the riser diagram included in the contract drawings.

Typical Wiring Diagrams: Submit typical wiring diagrams for all components including, but not limited to, relay panels, relays, dataline low voltage switches, occupancy sensors and daylighting controls.



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1.04 MANUFACTURERS

The basis of the specified system is the ProSys Lighting Control System manufactured by General Electric. Any other system wishing to be considered must submit descriptive information 10 days prior to bid. Prior approval does not guarantee final approval by the electrical engineer. The contractor shall be completely responsible for providing a system meeting this specification in its entirety. All deviations from this specification must be listed and individually signed off by the consultant.

PART 2 - PRODUCTS

2.01 – PROSYS II RELAY PANELS

A. Description

1. Modular Relay Panels shall be UL listed and consist of the following:
 - Tub: Empty NEMA 1 enclosure that can accept an interior sized to accept up to 12, 24, or 48 GE RR7P or RR9P relays.
 - Power Supply: Transformer assembly with two 40VA transformers with separate secondaries. Transformers include internal overcurrent protection with automatic reset and metal oxide varistor protection against power line spikes. **Specify:** (120) or (277) VAC, 50/60 Hz. +/- 10%.
 - Cover: **Specify:** (Surface) or (Flush) with captive screws in a hinged, lockable configuration. A wiring schedule directory card shall be affixed to the cover's back.
 - Interior: Bracket and intelligence board backplane with pre-mounted relays. Interiors shall be provided with up to 12, 24, or 48 installed and tested relays.
2. Panel shall be provided with an integral DIN rail mounting bar for easy installation of other system components (such as ProSys clock). Terminals shall be included in the interior to accept a dataline for the connection of softwired dataline switches to the system, or to allow a dataline to be run between multiple panels for network communications between the panels.
3. Panel shall be provided with individual ON/OFF switches for both panel and dataline power.
4. Eight channels shall be provided in each interior regardless of size, each with an associated pushbutton to toggle the channel ON/OFF, and a terminal block for a separate dry contact input. Any number of relays in the panel can be assigned to each channel, with overlapping allowed. Channels shall be set up via "Softwiring", i.e. no hand held programmer or keypad is required. Systems that require programmers or keypads, or that change relay states during set up are not acceptable. Each channel pushbutton shall provide LED state indication - RED shall indicate that all of the relays within the channel group are ON; NO LED shall indicate that all of the relays within the group are OFF, and GREEN shall indicate the channel's relays are in a MIXED state.
5. System shall accept future functionality upgrades without removal of the panel.

B. Features

1. Relays shall be momentary-pulsed mechanically latching contactors rated at 20 amps, 120 - 277 VAC. They shall attach to the Interior by a single plug-in connector.
2. Next to each relay shall be an individual override button and an LED to indicate state. LED shall indicate RELAY ON, RELAY OFF.
OPTIONAL: Next to each relay shall be an individual override button and an LED to indicate **status**. LED shall indicate RELAY ON, RELAY OFF.
3. Captive screw terminations will be provided for all wiring connections.

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4. Each channel button's dry control contact input terminal shall accept either 2 or 3-wire, maintained or momentary inputs. They shall also accept a 2-wire toggling input.
5. Each channel shall also have an associated 1 amp, 30 VDC isolated contact which may be used for status feedback or pilot light control.
6. The Relay Panel shall use an EEPROM to record the channel softwiring assignments and the current status of all relays, thus insuring a 40-year backup of information in the event of a power failure. Systems that require a chargeable battery with less than 10 year's life shall not be allowed.
7. The unit shall provide LED status indication of the power supply status. Access to 24VAC and 24V rectified power for accessory devices shall be provided within the panel.
8. **OPTIONAL** – Interior shall use relays with an optional pilot contact to provide individual relay feedback to other control systems. Also, terminal blocks will be located next to each relay to allow standard low voltage switching devices to control the relay state. Devices can be either 2 or 3-wire, maintained or momentary inputs. They shall also accept a 2-wire toggling input.
9. **OPTIONAL** – System shall comply with the LonMark® lighting controller profile and provide capability for network binding to LonMark compliant building automation system components without the use of dry contacts, gateways, protocol converters or additional systems devices.

2.02– NETWORK DATALINE

A. Description

1. The intelligence in multiple panels shall be linked over a single dataline that uses the open Echelon/LonTalk™ protocol for communications, and be fully LonMark® and LNS (LonWorks® Network Services) compliant. The dataline shall provide a highly reliable communications bus for transferring control and status between the relay panels. The dataline shall be self-powering at each relay panel and not require any ancillary equipment to function properly.
2. The dataline, in addition to linking together multiple relay panels, shall be capable of extending out from the electrical closet, and provide a single communications bus to allow softwired dataline switches to communicate with the panels.
3. The dataline can also connect to a single softwired dataline timeclock mounted in the interior of a relay panel or a separate enclosure at another location.

B. Features

1. Dataline shall be 18/4 twisted conductor with shield meeting Class 2P NEC code requirements. The dataline can be run in a loop, serial, or star configuration. Minimum 1 turn per 3 inches; 50 pf/ft. max.
2. Maximum length for all dataline wire in the system is 1,500 feet
3. Maximum number of devices (panels/switch modules/timeclocks) on a dataline is as following:
 - 3.1 Lighting panels – 30
 - 3.2 Softwired switches – 50
 - 3.3 ProSys time clock and programmer - 1**OPTIONAL:** The system shall be expandable to 32,000 nodes worldwide with the use of LonWorks® routers and repeaters.



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2.03 – SOFTWARED DATALINE SWITCHES

A. Description

1. To allow individual overrides, dataline switches shall be terminated to each panel's 4 wire "Local Dataline". Switches shall be available in either single, dual, quad, or octal (1 button, 2 button, 4 button, or 8 button) designs. The single, dual, and quad devices mount in a standard **single gang** box, while the octal version mounts in a **two-gang** box.
2. Each button in a switch module can be individually programmed. Programming is done by a "Softwiring Sequence" or with a handheld keypad. Each button can be assigned to any one of the following four functions:
 - Control any individual relay in any single panel
 - Control any group of relays in any single panel
 - Control any of the eight channels (A-H) in a single panel
 - Control the same channel letter (A-H) in any chosen group of panels in the system.
3. For applications that require pattern switching, any button can perform its function using a "ON/OFF/Not Controlled" pattern of relays instead of the normal All ON/All OFF.

B. Features

1. Switches shall have a non-breakable Lexan body and a matching screwless Lexan wallplate.
2. Each switch module shall use a bi-color LED pilot light for the individual buttons to indicate status of the controlled relay or group of relays. LED indications are Red for All ON, Green for Mixed State (some relays in the group ON and others OFF), and No LED for All OFF.
3. Switch shall also include a locator light.
4. Individual buttons shall have a removable clear cover to allow standard 3/8 inch tape to be used for labeling the controlled loads.
5. The dual, quad, and octal switches shall all include a single master button that will override all relays controlled by the individual buttons OFF, or Restore them to their original state. Each switch unit's master button function can be configured to perform a "Master On/Off", "OFF Only", or "Disabled" function if desired.
6. Dip switches on the back of the module shall allow switch units to be designated for "Cleaning Crew" Control. This prevents the switch from turning off the occupant's lights accidentally.
7. Each switch module is available in a Smart Keylock version. Once a key is inserted, the individual buttons will function for five minutes.

2.03– SOFTWARED CLOCK

A. Description

1. Using the same dataline as mentioned above, provide a softwired timeclock. From any plug-in point on the dataline, timeclock can be used to: (1) schedule any of the 8 channel groups (A-H) in the relay panel network and (2) program softwired dataline switches. Schedules are defined using "Occupied vs. Unoccupied" times to simplify data entry.
2. Timeclock shall include user-selectable intelligent scenarios to handle standard lighting control functions for each channel independently. Selectable scenarios shall include:
 - Scheduled ON / Scheduled OFF
 - Manual ON / Scheduled OFF
 - Astronomical ON / Astronomical OFF (with optional offset)
 - Astronomical ON / Scheduled OFF (with optional offset)

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3. Each channel can be assigned a standard time delay from 1-250 minutes. During “Occupied” hours, the time delays do not take effect. During “Unoccupied” hours, the time delays will ensure that overridden lights are automatically turned off.
4. Each channel can be assigned an automatic “blinking” of the lights before they are turned off to allow occupants the opportunity to enter an override without being put in the dark. The time interval between the blink warn and “off” operation shall be user configurable between 1 and 15 minutes.

B. Features

1. The timeclock will provide a clear 9-line, 22-character per line display and a simple user interface. A single button can be used to bring up a context sensitive help screen to assist the user.
2. Timeclock to take into account leap year, daylight savings dates, holidays, and be certified as “Year 2000 Approved”.

2.04 – (OPTIONAL) SOFTWARE

Manufacturer shall provide Windows®-based configuration “plug-ins” for system commissioning, programming, monitoring and control. Software shall be capable of functioning with any available LNS network tool.

Once the system parameters have been programmed, system shall allow any user-definable feature (schedules, relay groups, switch assignments) to be field modified without the need for configuration software or system integrator’s expertise.

2.05 – (OPTIONAL) BAS INTEGRATION

In addition to hardwired channel inputs, system shall provide for integration to building automation system components including, but not limited to, photocell controllers, HVAC controllers, security, access and fire safety systems without the use of dry contact, gateways or protocol converters. This integration shall be accomplished via network binding of LonMark variables for LNS compliant devices.

PART 3 – EXECUTION AND SUPPORT SERVICES

3.01 – Installation

Softwired Switches and/or photocells shall be mounted in the spaces as indicated on the Reflected Ceiling Plans. Each low voltage wire shall be labeled clearly indicating which relay panel it connects to. Use only properly color-coded, stranded #18 AWG (or larger) wire as indicated on the drawings. All relays and switches shall be tested after installation to confirm proper operation and the loads recorded on the directory card in each panel.

The relay panels shall be mounted in electrical closets as indicated on the drawings. The numbered relays in the panel shall be wired to control the power to each load as indicated on the Panel Wiring Schedules included in the drawings. All power wiring will be identified with the circuit breaker number controlling the load. If multiple circuit breaker panels are feeding into a relay panel, wires shall clearly indicate the originating panel’s designation.



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3.02 – (Option) System Startup

Manufacturer shall provide a factory authorized technician to confirm proper installation and operation of all system components.

3.02 – (Option) Training

Manufacturer shall provide factory authorized application engineer to train owner personnel in the operation and programming of the lighting control system.

3.03 – (Option) Documentation

Manufacturer shall provide system documentation including:

1. System 1-line showing all panels, number and type of switches, dataline, and network timeclock.
2. Drawings for each panel showing hardware configuration and numbering.
3. Panel wiring schedules
4. Typical wiring diagrams for each component.

3.04 – (Option) Extended Warranty

Manufacturer shall provide a (specify) ____ year extended warranty in addition to a required one-year warranty for all system components.