Building Automation, Inc.

LONMARK 3.3

LX Breaker Control Panels

Installation and Setup Procedure

IMPORTANT SAFEGUARDS
READ AND FOLLOW ALL SAFETY INSTRUCTIONS.
SAVE THESE INSTRUCTIONS.

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Overview
These instructions are presented as a guideline for installing and setting up the LX Series Breaker Control Panel.

Contents
These instructions include information as follows:
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Description
The LXBC Series of Breaker Control Panels are a completely integrated lighting control system. They feature Cutler-Hammer GHQR latching remotely operated circuit breakers and Westinghouse Series C molded case circuit breakers for controlling building lighting systems. The LXBC panels are 100% compatible with all of HBA's LX Networked Lighting Control products and provide the same dynamic and versatile scheduling functions to meet facility requirements and maximize energy savings. Significant installation cost and space savings can be realized by combining the breaker and lighting relay controls into one package.

General Precautions
READ AND FOLLOW ALL SAFETY INSTRUCTIONS.
  • **RISK OF ELECTRICAL SHOCK. To prevent electrical shock, turn off power to the LXTB breaker control panel before installing or servicing unit.**
    Do not operate unit with panel door assembly or interior face plate removed.
  • For Indoor use only. Do not use outdoors.
  • Do not mount near gas or electric heaters.
  • Equipment should be mounted in locations where it will not readily be subjected to tampering by unauthorized personnel.
  • The use of accessory equipment not recommended by the manufacturer may cause an unsafe condition.
  • Do not use this equipment for other than intended use.
  • For installation by a licensed electrician in accordance with these instructions and National and/or local Electrical Codes.
  • The unit is divided into high voltage and low voltage sections as shown in Figure 1. Maintain the integrity of these sections by routing wires in and though the appropriate section only. Low voltage class 2 wiring must be routed through conduit access provided with panel from the low voltage section to the top of the enclosure.
  • Installation may involve heavy lifting. To prevent personal injury, two persons should perform lifting activities as necessary.
  • No user serviceable parts contained inside unit. Refer all service related questions to the factory.
  • Be sure to read and understand all instructions before installing or servicing unit.
  • **USE COPPER CONDUCTORS ONLY FOR BRANCH CIRCUIT WIRES.**
  • **NOTICE: Do not install or operate unit if any damage is noticed.**

Low Voltage
(Class 2)
Section

Line Voltage
Section

Input Power
Terminal Strip
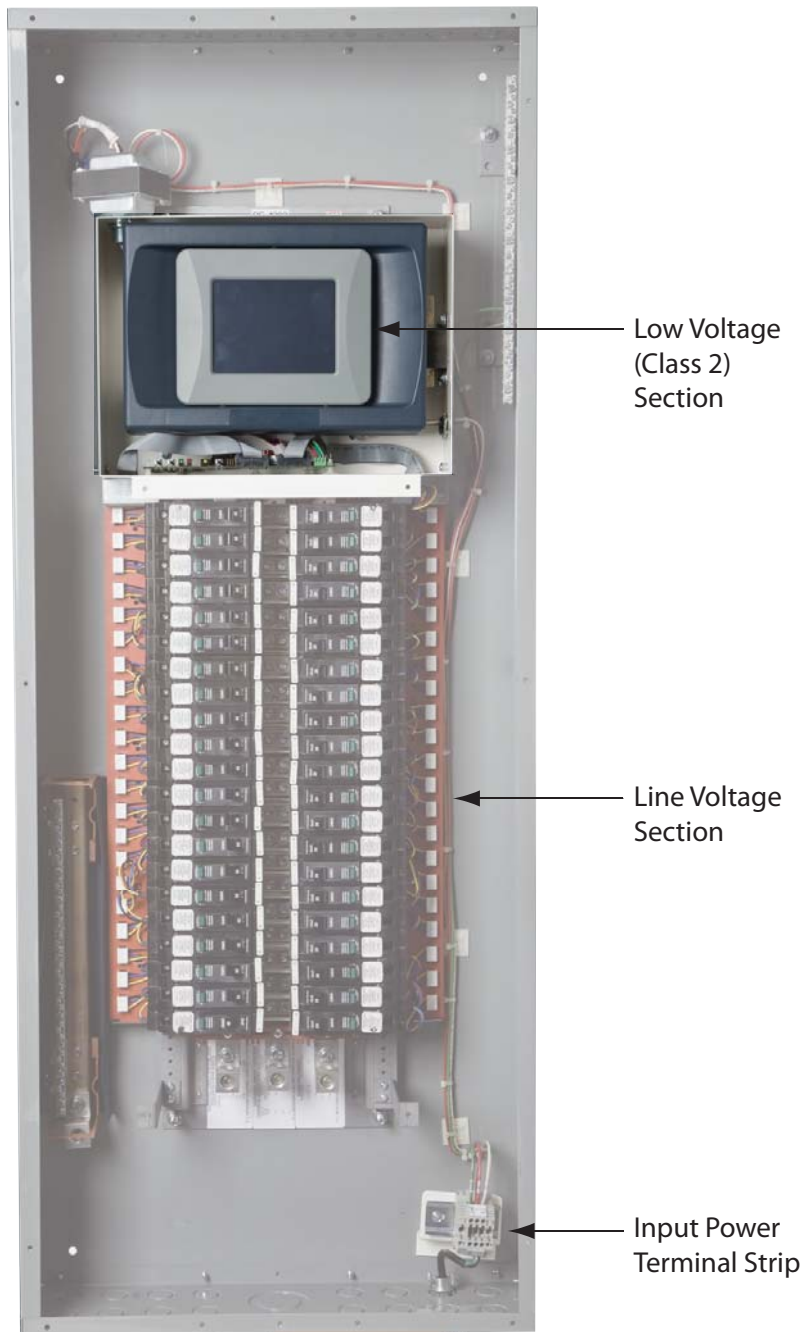
Figure1:
Panel High and Low Voltage Sections
(Panel door removed for clarity.)
Note: Route leads through appropriate section only.
LXTB Tablet is shown for location purposes
only. LXTB is not included with panel and must be
ordered seperately.

Pre-mounting Preparation

Select an appropriate location that meets the environmental conditions listed in the specification section of this document. The panel interior is divided into high voltage and low voltage sections as shown in Figure 1. Prior to mounting the enclosure, locate and cut an access hole (or holes) of appropriate size along the edge of the enclosure in the high voltage section to accept the incoming line voltage panel feeder and the lighting systems load leads as well as the panels dedicated power supply leads. Select an appropriate location for the hole(s) based on panels mounting location, incoming feeder location and the load side branch circuit conduits. If the panel is to be used in conjunction with the LonWorks® network and/or interconnected with other panels in a group, provide connection to the low voltage conduit at the top edge of the enclosure to accept the communication network and/or panel interconnection cables. After drilling, be sure to completely remove ALL metal cuttings and dust from the enclosure cavity. Failure to do so may result in damage to the panel and void its warranty.

NOTICE: The panel enclosure is shipped with interior assembly pre- installed. Follow Electrical Panel mounting instructions to safely mount enclosure.

BEFORE drilling and/or installing enclosure in the mounting location, remove panel door assembly from the enclosure.

Enclosure Mounting

For surface mount applications (i.e. the panel is mounted on the surface of the wall), locate the enclosure on the mounting surface and use a level to ensure that it is properly oriented/aligned. Secure the enclosure to the mounting surface with hardware as appropriate for the application using the pre-drilled mounting holes indicated in the Electrical Panel Mounting Instructions. This is a separate instruction sheet included with the panel.

For flush mount applications (i.e. the panel is recessed into the wall), create the necessary recess in the wall using the dimensional information contained in the Panel Specifications section as a guide. Insert the enclosure into the recess and secure with hardware as appropriate for the application using the four pre-drilled mounting holes indicated in the Electrical Panel Mounting Instructions. This is a separate instruction sheet included with the panel.

> *Notice: Reference Connecting Communication Network/Panel Groups procedure for information about the Communication Network including cable selection and length restrictions.*

Connecting Panel Power

The panel is designed to operate on 120VAC power that is supplied to a terminal strip located in the lower right corner of the panel as shown in figure 1. With the power turned off, route the dedicated panel power supply leads through the high voltage section of the panel interior to the terminal strip and connect them to the appropriate terminals. Connect the power supply ground lead to the ground terminal.

Connecting Lighting Loads

With the power turned off, route the lighting system branch circuit wires through the high voltage section of the panel. Connect load leads for each lighting circuit to the output terminal of the appropriate circuit breaker/relay as delineated in the project plans and/or Panel Load Schedule. Accurately record circuit load information on the panel schedule located in the holder on the inside of the panel door. After connecting the Circuit Breaker/Relays, install/reinstall the panel door assembly on the front of the panel enclosure.

> *Notice: If no Panel Load Schedule exists, make a copy of the Panel Load Schedule Form contained in this document and use it to record the lighting circuit relay assignments while connecting the relays.*

Connecting Communication Network/Panel Groups

> *Notice: The procedure described in this section is required only if the panel is to be connected to an LX/LonWorks network and/or interconnected to other panels or LX Devices in a network.*

Remove the Tablet Cradle by loosening its four mounting bolts as shown in Figure 2. Route the communication network lead(s) to an unused communication network terminal as shown in Figure 2. Insert communication network cable into the termials and secure by tightening screws Reinstall the Tablet Cradle and secure with mounting screws.

Setting Panel Network Address

Figure 7:
Processor Board
Controls and Interface
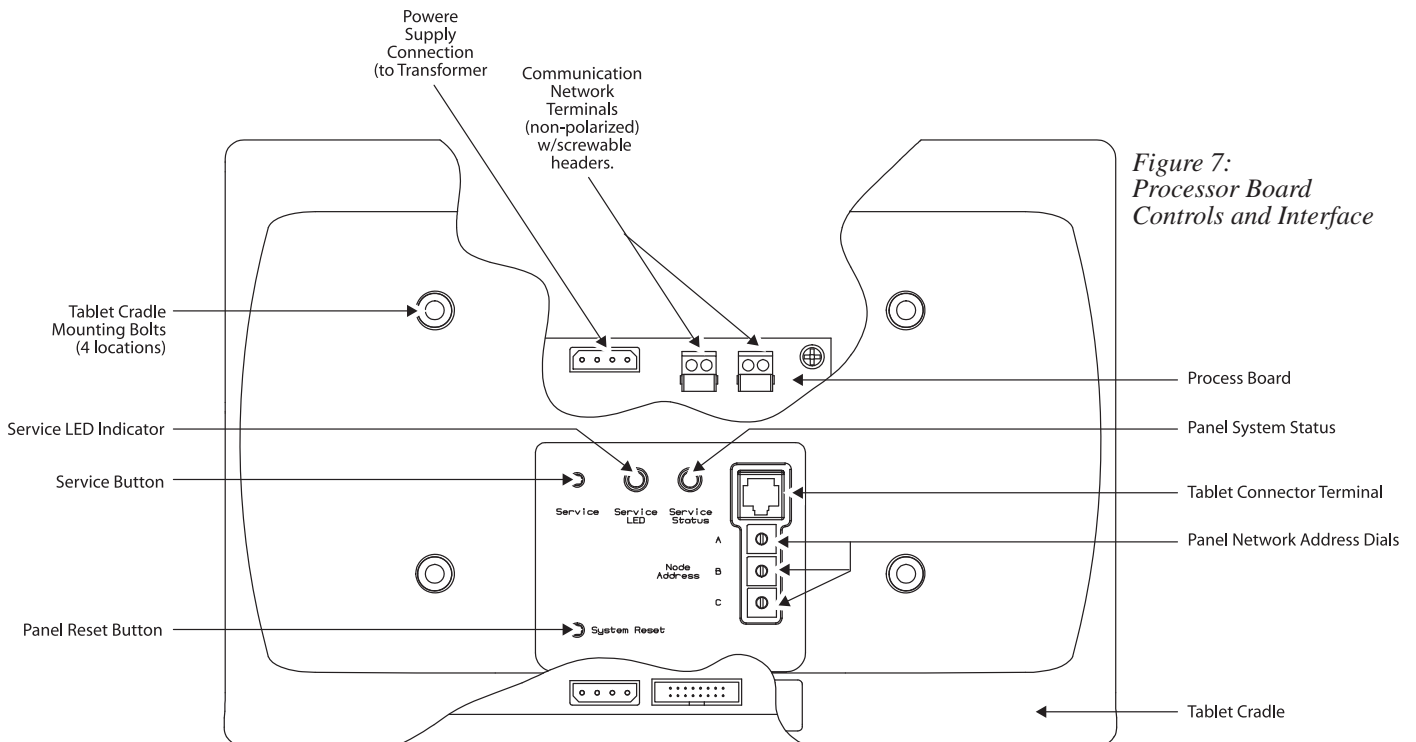
LX Communications Network

The LX network is a 2-wire communication network. It can operate using any topology (layout) or combination of topologies including Star and T-configurations.

Network cable shall be Belden 8471 or plenum rated Windy City wire 104500 ONLY. Maximum total wire length per network segment (without requiring the use of the LX Router/Repeater Module, p/n LXRRM) shall not exceed 1500 feet. Up to 56 devices can be supported per segment.

The panel network address is set via three rotary dials located in the Tablet Cradle as shown in Figure 2. Each panel is factory set to address 001 prior to shipping. For LX-only networks, each panel on the network will need to be assigned a unique network address. Addresses must be assigned in sequential order starting with address 001. For LonWorks Open System Networks, each panel on the network should be assigned address 000. This will place the panel(s) into LonMark compatible mode.

To set the panel address, rotate the appropriate dial(s) with the small, blade screwdriver till the indicator points to the appropriate number. Assign each panel its address as delineated in the project plans as applicable. Dial "A" sets the most significant digit of the network address and Dial "C" sets the least significant digit of the network address. For example, panel address 001 is set by Dial A = "0", Dial B = "0" and Dial C = "1".

Operating the Panel
Restore power to the lighting circuits and panel at the circuit breaker. The panel will take a few moments to initialize during which time the panel status light (shown in Figure 2) will be red. After initializing, the panel status light will turn green and begin blinking. The panel is now fully functional and ready to control the lighting loads.

The panel is designed to operate in stand-alone mode using the "open all" or "close all" button or in program mode through the use of the LX Tablet. Figure 3 contains a diagram of a typical lighting system application.
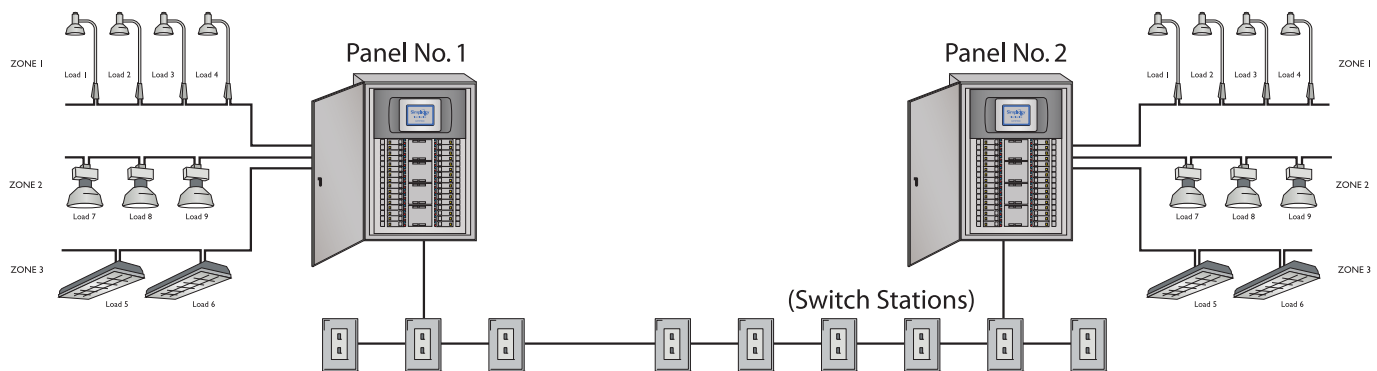
Figure 3:
Typical LX Lighting Control Panel Application

For program mode, attach the LX Tablet to the Tablet Terminal located on the Tablet Cradle as shown in Figure 2 using the CAT-5 connector cable provided within the Tablet. Follow the instructions contained in the LX Lighting Controls User's Manual to setup lighting circuit schedules and system functionality as desired. To program panel functionality within a LonWorks Open System network, a panel plug-in is available from www.hubbell-automation.com for use with LonMaker.

Troubleshooting
In the event of a problem with the panel's operation, use the procedures below to identify and correct the problem.

Panel Does Not Power-up, Status Light Does Not Turn On
1. Turn panel power off at the circuit breaker.
2. Step through the Connect Panel Power procedure above and verify that that the line voltage supplied to the panel is connected to the appropriate leads of the transformer.
3. Carefully remove the Tablet Cradle as shown in Figure 2 by loosening its four mounting screws. Verify that the secondary power leads are properly connected to the panel processor card as shown in Figure 2.
4. Using a voltmeter, verify that the transformer is supplying 12VAC between its Yellow and Red leads and 24VAC between its Blue and White leads. If the voltage between either set of leads is not correct, transformer is defective. If voltages are correct, but the panel processor is still not functioning then the panel processor is defective.

Relay Does Not Actuate in Response to Command (Programmed or Push Button)
1. If in program mode, verify relay assignment and program schedule and the Tablet clock settings.
2. Verify relay connector leads are properly connected at the relay and at the I/O control card.
3. Verify that all of the interconnection cables between the different circuit board cards are properly connected and seated. Carefully remove the Tablet cradle as shown in Figure 2 by loosening its mounting screws to access connector cables between the panel processor board and the first I/O control card.
4. Using a volt meter, measure the voltage across the input terminals of the relay. Voltage should be approximately 27VAC if the circuit is in the off condition and approximately 16.5VAC if the circuit is in the on condition.
5. If voltage levels differ, disconnect relay cable at the I/O control card and connect an adjacent relay's input control to the problem channel. Check functionality of the circuit with alternate relay connected by manually actuating the on and off buttons on the I/O control card. If the alternate relay functions, the problem is with the input stage of the non-functioning relay. If alternate relay does not function, I/O channel is defective.

Group of Relays Do Not Actuate in Response to Command (Programmed or Push Button)
1. If in program mode, verify relay assignment and program schedule and the Tablet clock settings.
2. Verify that all of the interconnection cables between the different circuit board cards are properly connected and seated. Carefully remove the Tablet cradle as shown in Figure 2 by loosening its mounting screws to access connector cables between panel processor board and first I/O control card.
3. If problem persist, either the panel processor board and/or an I/O control card are defective. This may also be an indication of communication errors on the network.

Relay Actuates but Lighting Load Does Not Turn On
1. Verify that circuit breaker for lighting load is closed.
2. Verify that lighting load lamp(s) are not burned out.
3. Review Panel Load Schedule assignments. Verify correlation between the relay being actuated and the lighting load that is being controlled.
4. Turn power off to the loads and relay panel. Remove panel door assembly. Carefully inspect line and load lead terminations are making good electrical contact to relay terminals.

Tablet Indicates "Duplicate Node Address Detected" While Programming Panel(s) (Applicable to LX-only Networks)
Two or more devices of the same device type (Panel, Switch Station, etc.) have the same network address. To correct this condition:
1. Review the device address settings for each device on the network and identify those devices of the same device type with the same address.
2. Change device address(es) as necessary so that each has a unique network address.

Notice: If, after stepping through applicable troubleshooting procedures described above, problem still persists or a defective condition is identified, contact factory Technical Support at (512) 450-1100 or (888) 698-3242 for further assistance.

Panel Specifications

Overall Dimensions:

			H	W	D
12 Breaker Panel	100 amp	Main Lugs Only	33"	20"	5.75"
		Main Breaker	36"	20"	5.75"
18 Breaker Panel	100 amp	Main Lugs Only	36"	20"	5.75"
		Main Breaker	42"	20"	5.75"
30 Breaker Panel	100 amp	Main Lugs Only	42"	20"	5.75"
		Main Breaker	48"	20"	5.75"
	225 amp	Main Lugs Only	45"	20"	5.75"
		Main Breaker	51"	20"	5.75"
42 Breaker Panel	225 amp	Main Lugs Only	51"	20"	5.75"
		Main Breaker	57"	20"	5.75"
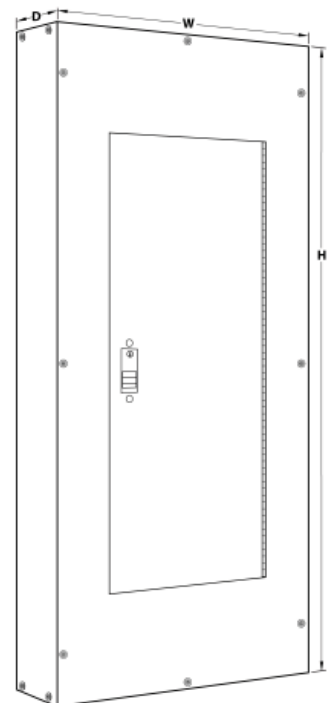
Supply Voltage (Control):   120VAC
Operating Environment: Operating Temperature 0 to 50°C
Relative Humidity   10 to 90%, non-condensing
Communications Network: LonWorks® "Open System" Architecture
Breaker/Relay Capacity:
    LXBC 12   Up to 12 Single Pole or 6 Double Pole Breaker/Relays
    LXBC 18   Up to 18 Single Pole or 8 Double Pole Breaker/Relays
    LXBC 30   Up to 30 Single Pole or 14 Double Pole Breaker/Relays
    LXBC 42   Up to 42 Single Pole or 20 Double Pole Breaker/Relays
(Note: Combinations of Single Pole and Double Pole relays are acceptable up to the limits of the enclosure size.)
Agency Approval   UL (Tested in accordance with UL 916)
        LonMark 3.3 Certified

LX Series Breaker/Control Panel
Panel Load Schedule

Panel Indentification: _____

Panel Location: _____

Panel Network Address: _____

Relay	Circuit #	Quadrant #	Zone #	Relay	Circuit #	Quadrant #	Zone #
1				2			
3				4			
5				6			
7				8			
9				10			
11				12			
13				14			
15				16			
17				18			
19				20			
21				22			
23				24			
25				26			
27				28			
29				30			
31				32			
33				34			
35				36			
37				38			
39				40			
41				42			

- Using a photocopy of this form, create a record of the relay lighting circuit assignments as necessary.
- Retain copy of the filled out schedule with Panel Users Manual and in the proximity of the panel for quick reference.
- Note: Double pole breaker/relays require two adjacent relay slots. Denote which input control channel is used to control the relay in schedule above.
- Not all panels have provisions for up to 42 breaker/relays. Maximum number of single pole relays is denoted by the Panel Type designation above.