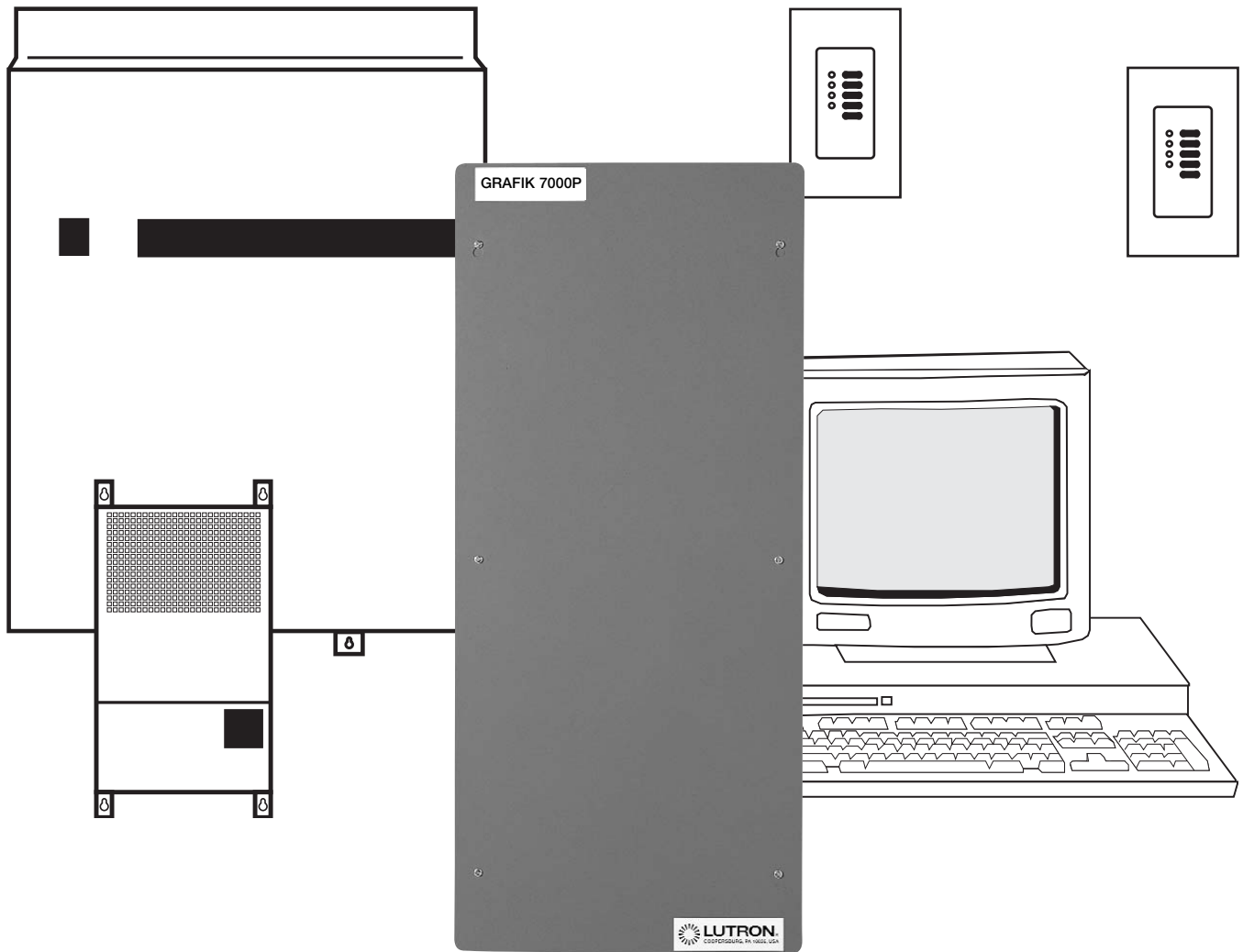


GRAFIK7000™

Lighting Control Systems



Including ...

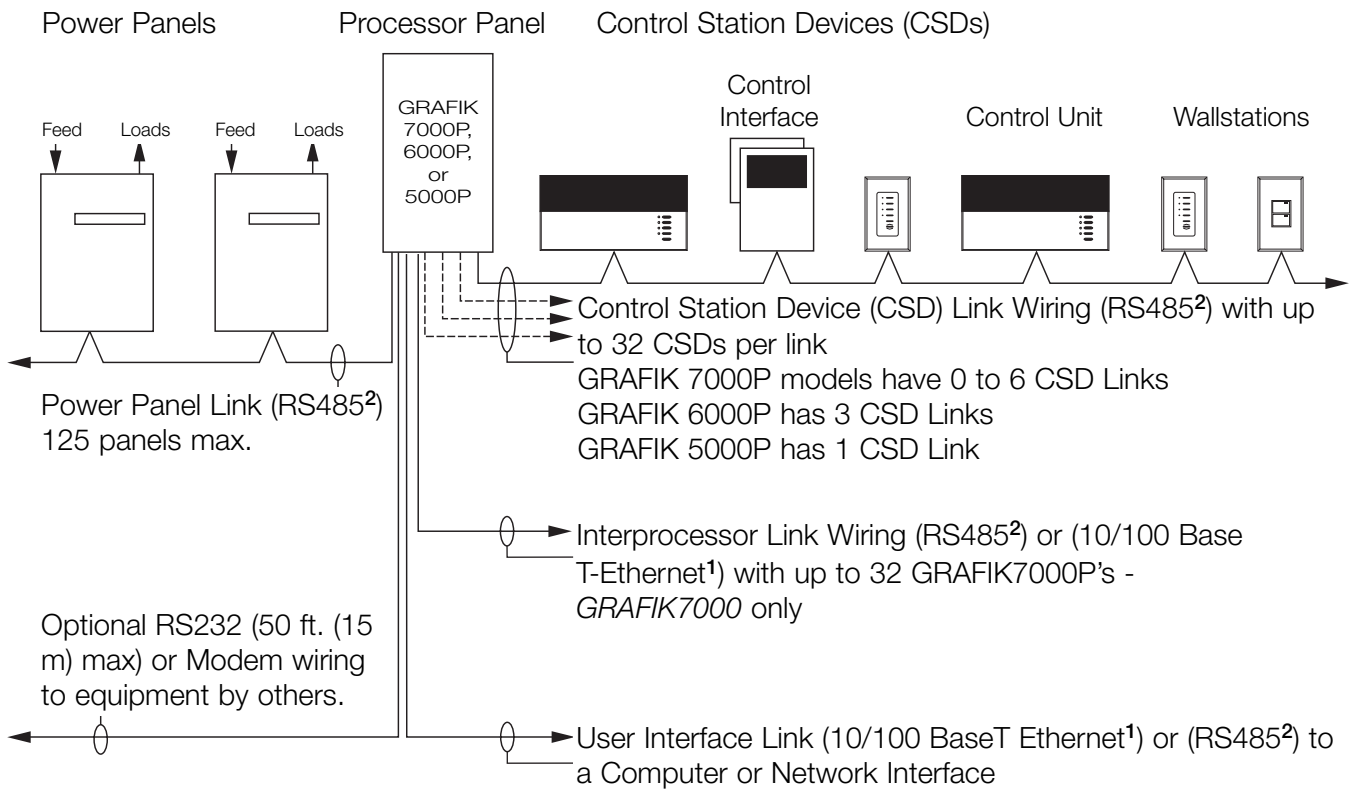
GRAFIK6000®
GRAFIK5000™



Installation and
Maintenance Guide

System Overview

Use this guide to successfully install a *GRAFIK7000*, *GRAFIK6000*, or *GRAFIK5000* lighting control system. This guide describes installing Processor Panels and running low-voltage type Class 2 / PELV wiring, such as the Control Station Device (CSD), Power Panel, User Interface, and Interprocessor Links. See instructions included with all Power Panels for running line (mains) voltage wiring. The *GRAFIK7000*, *GRAFIK6000*, and *GRAFIK5000* lighting control systems have a central processor that downloads circuit information to the Power Panel Link.



¹ The Interprocessor Link and the User Interface Link can both enter the processor panel on the same Ethernet wiring. There is only one Ethernet connector per processor panel. Ethernet wiring can be up to 300 ft. (90 m) long.

² RS485 Links can be up to 2000 ft. (610 m) long when using the correct wire. See the RS485 Wiring Overview for more details.

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Model Numbers of Processor Panels

G7-AR-0000-0-120

- 100: 100 V ~ 50/60 Hz, 15 A
- 120: 120 V ~ 50/60 Hz, 15 A
- 230: 220–240 V ~ 50/60 Hz, 10 A
- 0: No Modem option included - GRAFIK 7000P only
- M: Integrated modem and RS232 interface included
- 0000: No CSD Link - GRAFIK 7000P only
- W000: 3 CSD Links with 32 Control Station Devices max per link (96 total) - GRAFIK 5000P has only 1 CSD link
- WW00: 6 CSD Links with 32 Control Station Devices max per link (192 total) - GRAFIK 7000P only
- R: Retrofittable panel (includes subplate)
- ?: Other options available - contact Lutron
- A: U.S. English version
- ?: Multiple languages available - contact Lutron
- 7: GRAFIK 7000P Processor Panel
- 6: GRAFIK 6000P Processor Panel
- 5: GRAFIK 5000P Processor Panel

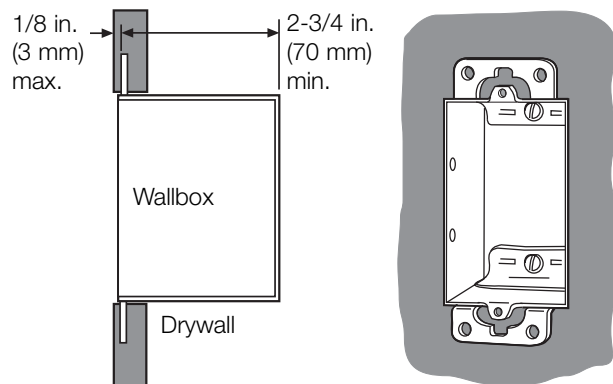
System Information		Processor Information		
Type	Processors	Name	CSD Links	Zones
<i>GRAFIK7000</i>	up to 32	GRAFIK 7000P	up to 6	up to 512
<i>GRAFIK6000</i>	1	GRAFIK 6000P	3	512
<i>GRAFIK5000</i>	1	GRAFIK 5000P	1	128



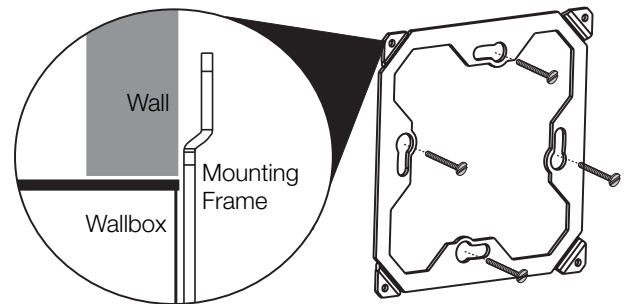
Step 1

Mount Wallboxes

- Use wallboxes with a minimum depth of 2-3/4 in. (70 mm) for Control Station Devices (CSDs)
- Multigang installations may require spacers between wallboxes
- Mount wallboxes between flush and 1/8 in. (3 mm) below finished wall surface
- Finished wall should not have gaps around the wallbox of greater than 1/8 in. (3 mm)
- Ground metal Wallboxes whenever possible



Mounting of a single-gang US wallbox shown. See the instructions sent with each individual CSD for mounting requirements and instructions.



Mounting frame orientation of a single-gang EGRX product shown.

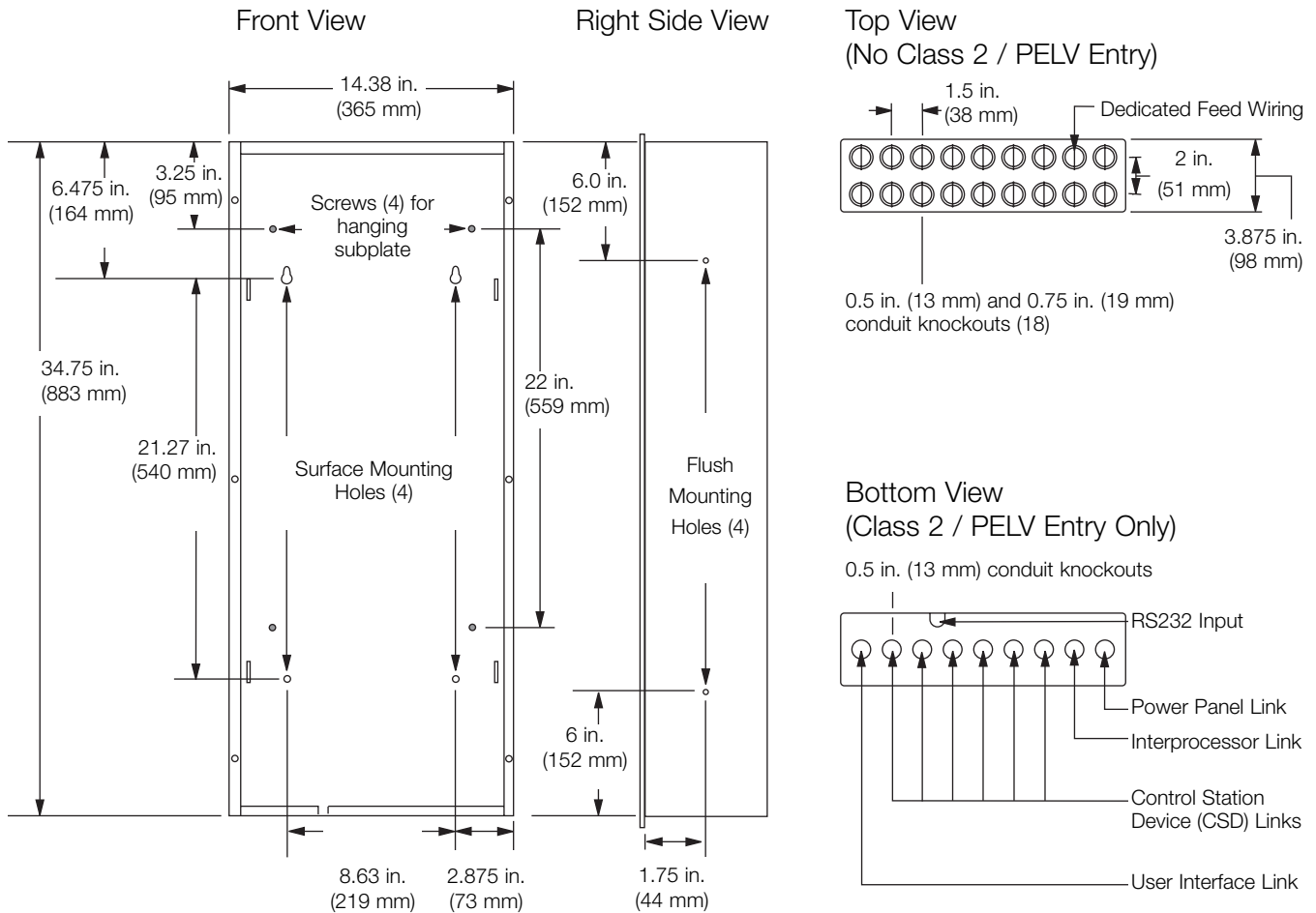


STEP 2

Mount Processor Panels

Remove the subplate, if applicable, to access mounting holes. Keep the screws and protect the subplate from damage and dirt until it is returned to the enclosure.

Dimensions and Conduit Entry



Notes -

- Not all processor panels use a subplate
- Make sure relative humidity is less than 90% non-condensing
- Reinforce wall structure, if necessary. A processor panel weighs up to 50 lbs. (22 kg)

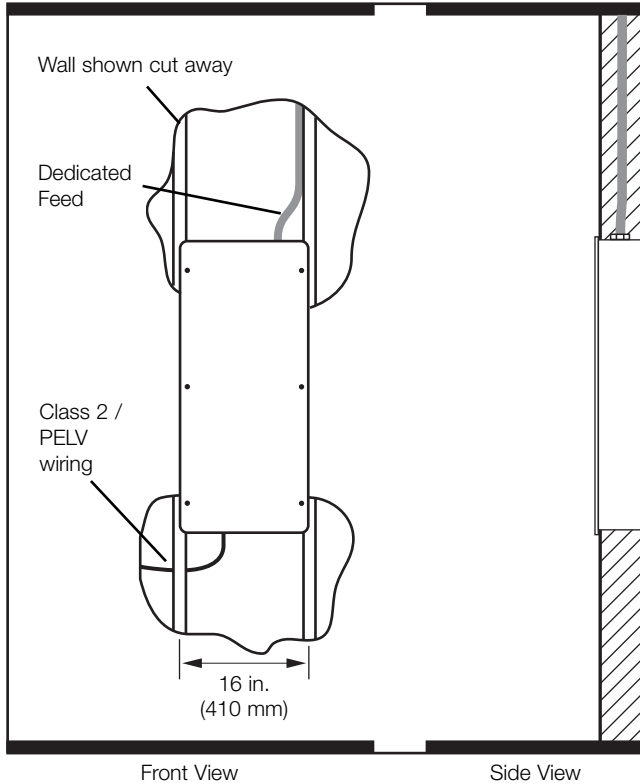


STEP 2 (Continued)

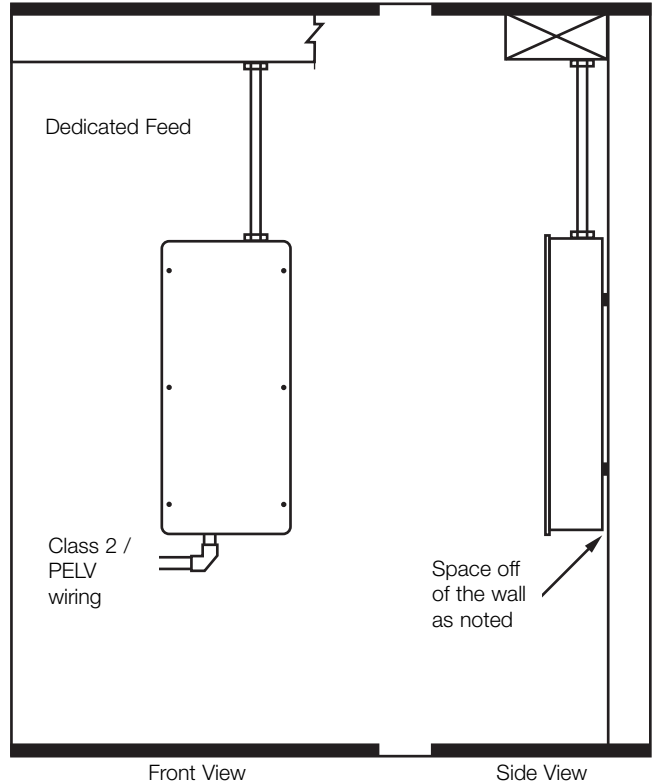
Mount Processor Panels

Recess or Surface Mount the enclosure as per the following diagrams.

Recess Mount



Surface Mount



Water Damages Processors!

Install this processor in a location where it will not get wet.



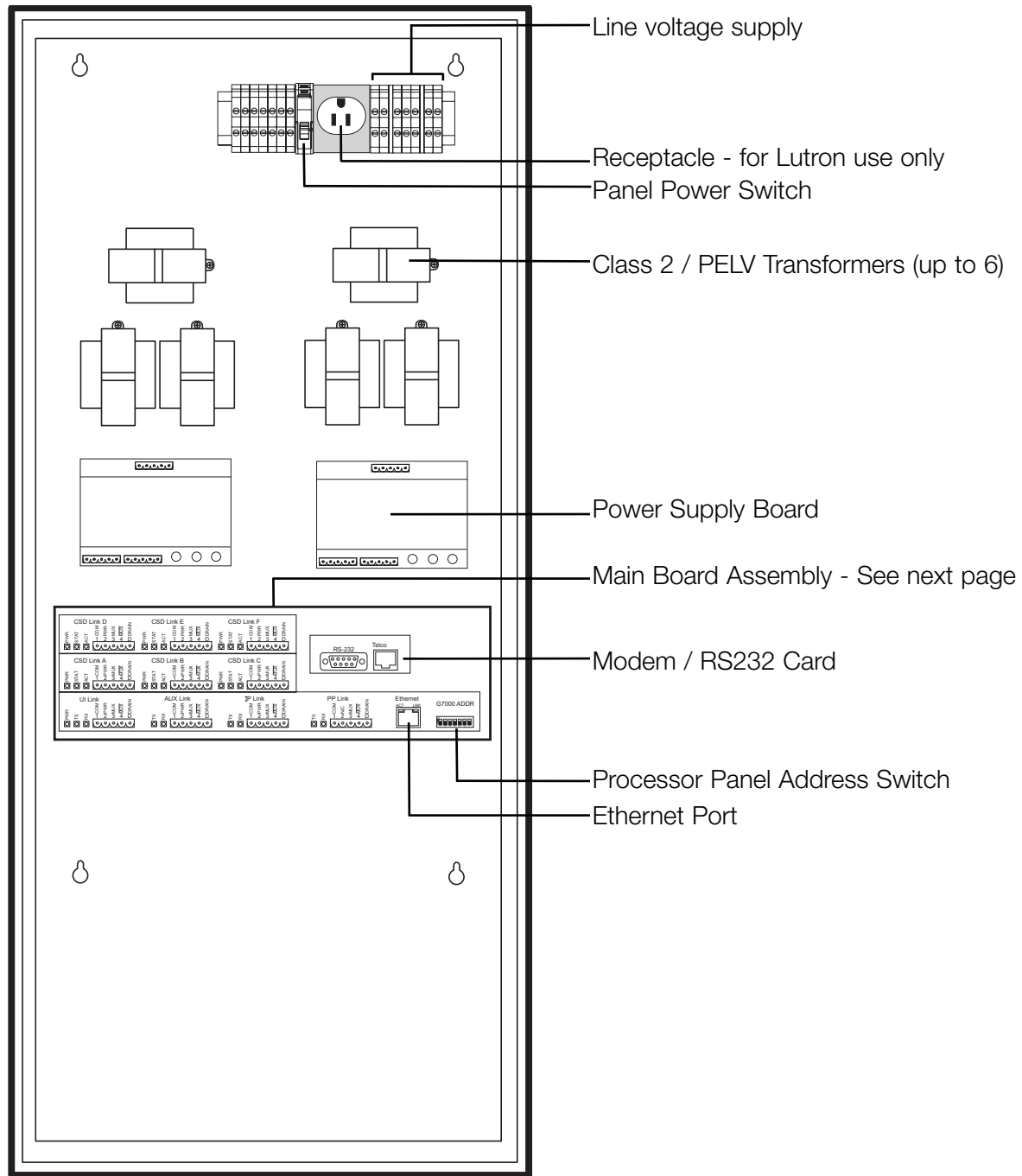
Surface mount as shown!

- Back surface must be 1/8 in. (3.2 mm) away from the wall. Subplate mounting screws will protrude 1/8 in. (3.2 mm) behind the panel
- Use only the four holes indicated when surface mounting - other holes are for mounting the subplate

Install Subplate

If there is a subplate, install it using the four screws shipped with the mounted enclosure.

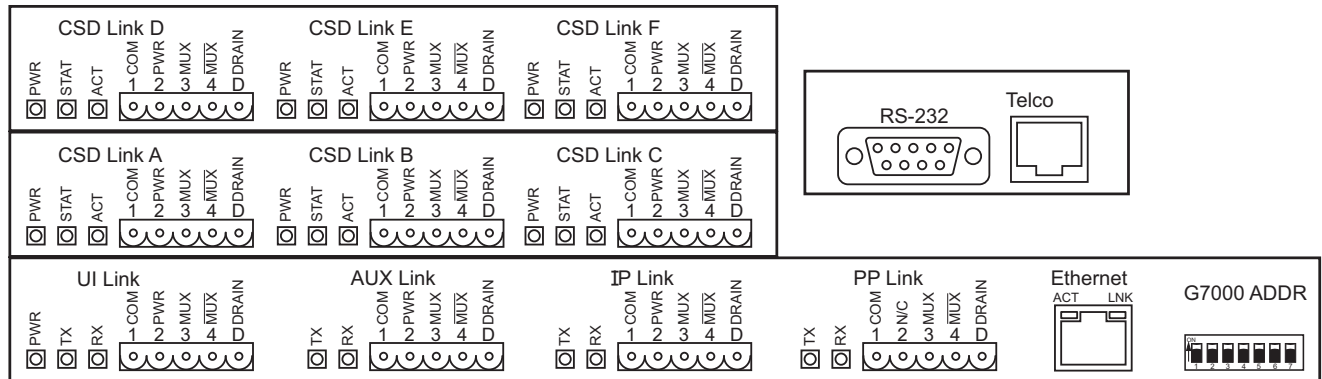
Processor Panel Overview



GRAFIK 7000P with six CSD Links and Modem / RS232 Interface shown

Processor Panel Overview

Main Board Assembly



Notes -

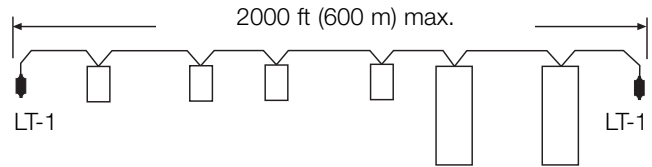
- Abbreviations are as follows:
 - CSD = Control Station Device
 - UI = User Interface
 - AUX = Auxilliary (no connection)
 - IP = Interprocessor
 - PP = Power Panel
- GRAFIK 7000P with six CSD Links and Modem / RS232 Interface shown

Warning - This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

RS485 Wiring Overview

RS485 wiring is the Class 2 / PELV wiring used for the following links:

- Control Station Device Link(s)
- Power Panel Link
- Interprocessor Link (if using the RS485 connection option)
- User Interface Link (if using the RS485 connection option)



Daisy chain wiring - do not home run wiring.

Specifications and Notes -

- Do not run RS485 wiring with line (mains) voltage wiring
- Each link must be daisy-chained. Do not home run wiring
- The Processor Panel does not need to be at an end of any RS485 Link
- Use a Link Terminator at the beginning and end of each RS485 Link
- Connections to numbered terminals are wired 1 to 1, 2 to 2, 3 to 3, etc... throughout the link
- Total length of any RS485 wiring may not be more than 2,000 ft. This distance is based on proper shielding on the twisted shielded pair, #12 AWG wire to terminal 1 and terminal 2 of the Control Station Device (CSD) Link, and the use of link terminators (LT-1s) at each end of each link. If smaller wire is used, the max CSD Link length must be de-rated - see chart

Terminal 1 & 2 Wires Sizes	Max. CSD Link Length
#12 AWG	2000 ft. (610 m)
#14 AWG	1400 ft. (425 m)
#16 AWG	900 ft. (275 m)
#18 AWG	600 ft. (180 m)
2.5 mm ²	450 m (1500 ft.)
1.0 mm ²	200 m (650 ft.)

- RS485 communication is a stream of 5V data that all of the products on the link understand. The details listed on this page help to keep the data understandable:
 - proper shielding blocks noise and has low capacitance (which would reduce the signal)
 - LT-1's stop the end of the link from bouncing the signal back onto the link
 - daisy-chaining prevents the data from being divided, and keeps the number of ends of the link to two
 - #12 AWG wire minimizes the voltage drop along the link



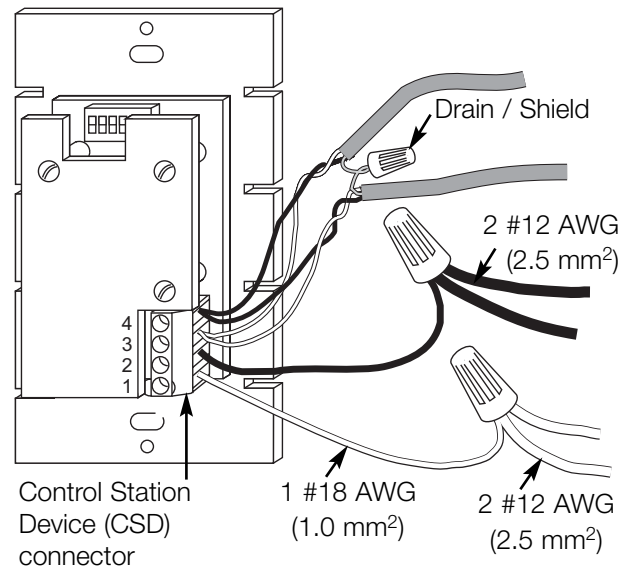
Notice

If Link Terminators (LT-1) are not used, or improper wiring topology is employed, the system will not communicate.

RS485 Wiring Overview

Wiring Notes:

- Two #12 AWG (2.5 mm²) wires cannot fit into most connectors on the RS485 link. Use a screw on connector (or other approved connector) to “T-tap” a #18 AWG (1.0 mm²) wire to each connector terminal, as needed. Make this “T-tap” in the Wallbox in order to keep the length of the new #18 AWG (1.0 mm²) wire(s) as short as possible
- Connect the uninsulated Drain/Shield wire(s) to terminal ‘D’ whenever present. If there is no terminal ‘D’, connect the two Drain/Shield wires together, making a continuous shield throughout the link. If the connector at the end of the link does not have a ‘D’ terminal, terminate the shield and let it ‘float’
- Do not allow any part of the shield to touch ground (earth) or any electrical circuitry
- CSDs are expected to mount into metal Wallboxes that are connected to grounded conduit. Grounding the metal mounting plate helps keep Electrostatic Discharge (ESD) from affecting the RS485 link



Approved sources of wire include:

Twisted-Shielded Pair (Data Link) only:

- Belden #9461
- Alpha #2211

One-cable solutions (Data Link, Control Wiring, and Sense Line in one cable):

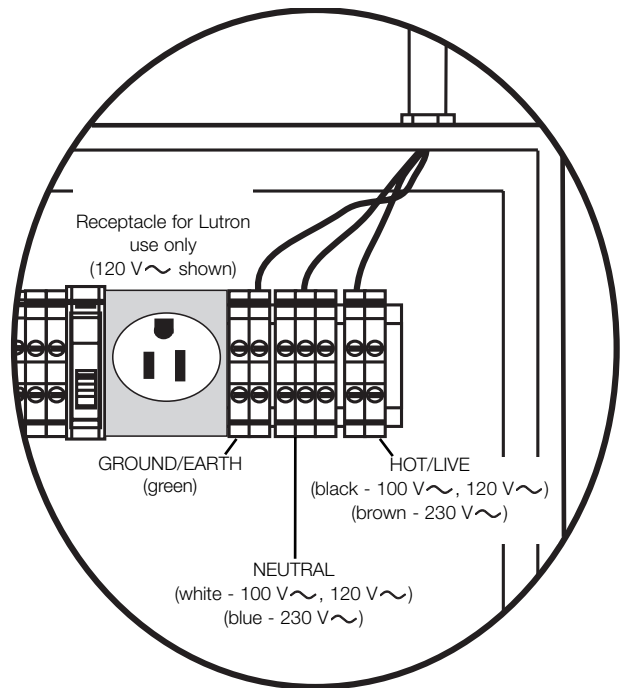
- Lutron GRX-CBL-46L-500 (non-plenum)
- Lutron GRX-PCBL-46L-500 (plenum)
- Belden, Alpha, Liberty, and Signature have approved cables. Ask for GRAFIK Eye® Cable



STEP 3

Line Voltage Wiring of Processor Panel

- Make sure line voltage feed wiring enters the processor from the top right
- Run a dedicated feed circuit - see model number for feed rating
- Run wiring so that line (mains) voltage is separate from Class 2 / PELV wiring

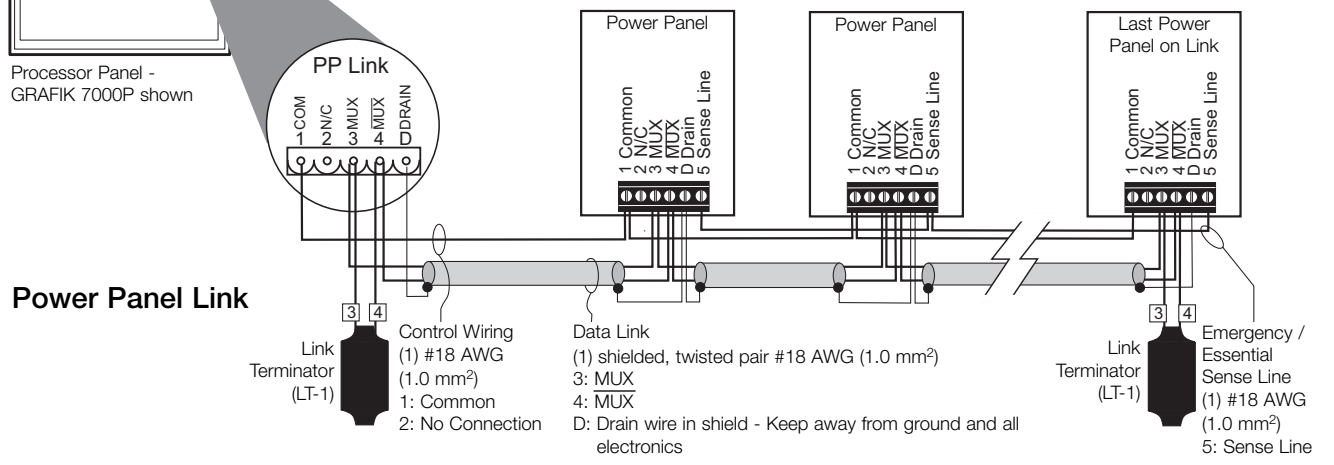
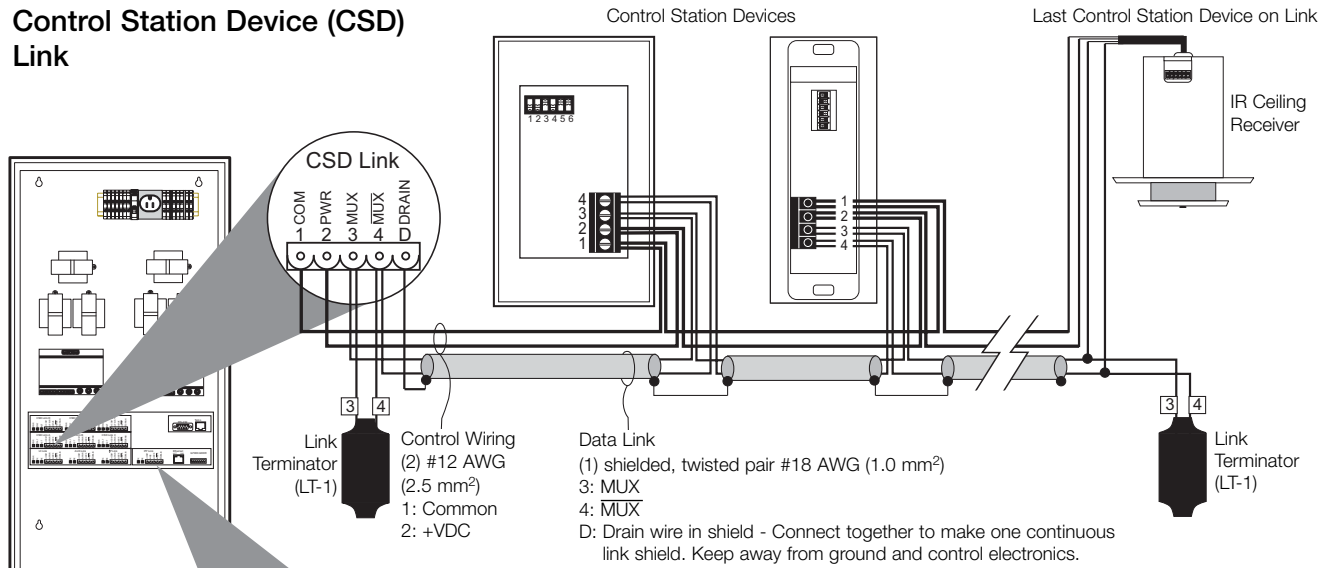




STEP 4

CSD and Power Panel Link Wiring

Control Station Device (CSD) Link



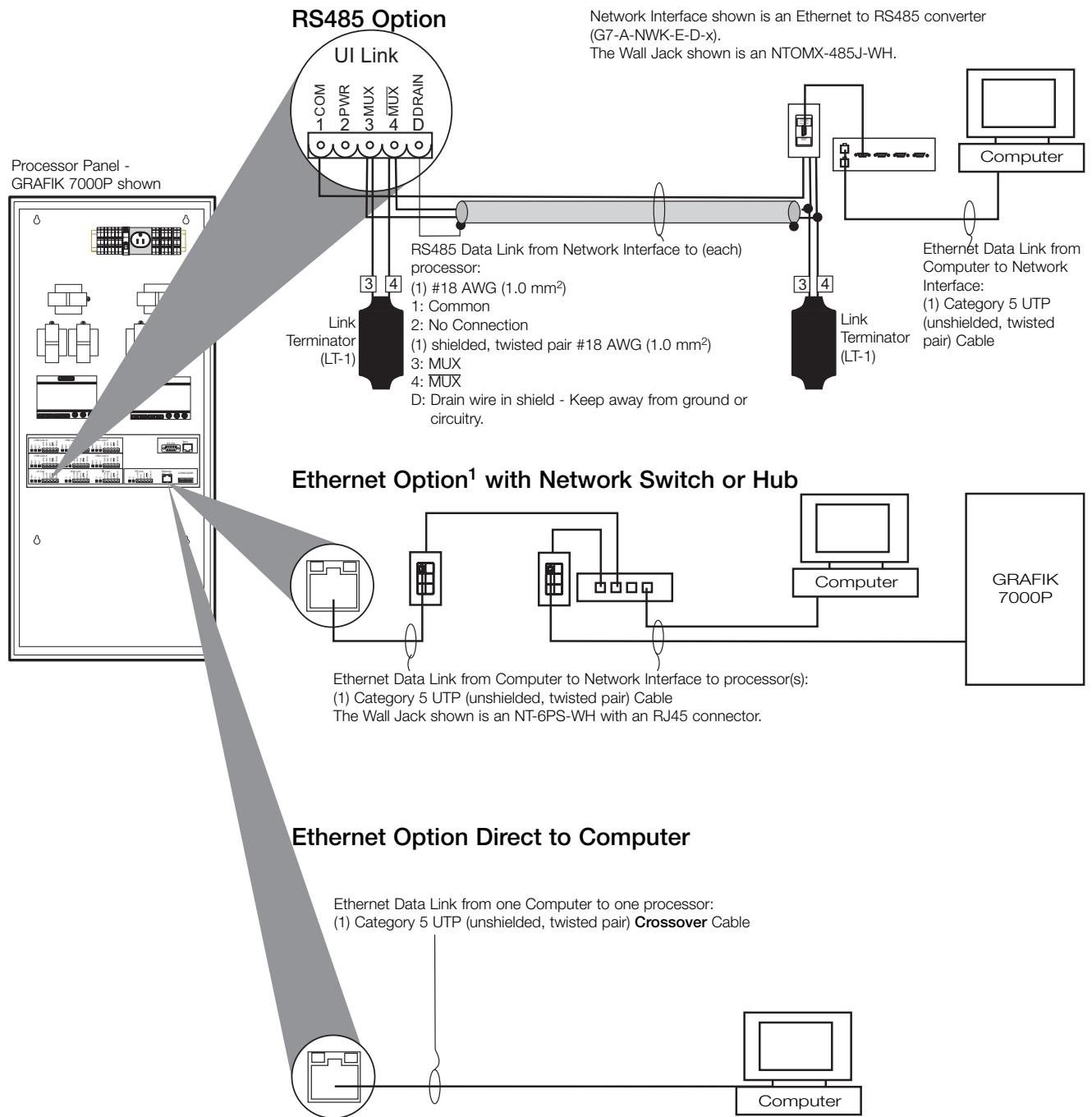
Notes:

- It is not necessary to have the processor panel at the end of any RS485 link
- The Power Panel Link's Sense Line is used whenever there is a panel being supplied by an Emergency / Essential feed. See Power Panel instructions for more details
- See RS485 Overview for approved cable options



STEP 5

User Interface Link Wiring



Notice

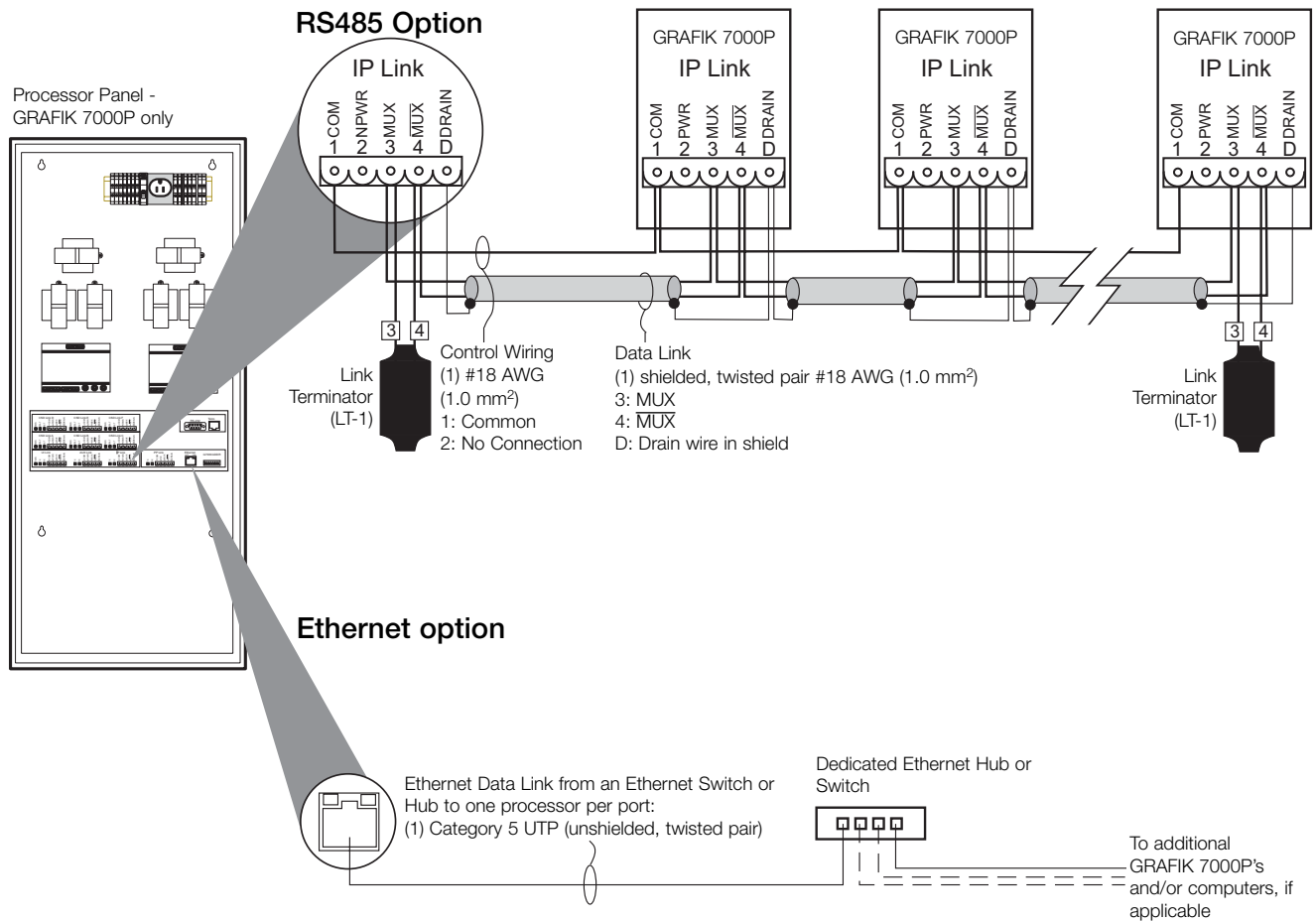
Wiring distance for any Ethernet Data Link is 300 ft. (90 m) max. Use the RS485 option for longer distances.

¹ The Interprocessor Link and the User Interface Link can both enter the processor panel on the same Ethernet wiring. There is only one Ethernet connector per processor panel.



STEP 6

Interprocessor Link Wiring



Notes:

- Each Ethernet Data Link can be a maximum of 300 ft. (90 m) long
- The Interprocessor Link and the User Interface Link can both enter the processor panel on the same Ethernet wiring. There is only one Ethernet connector per processor panel

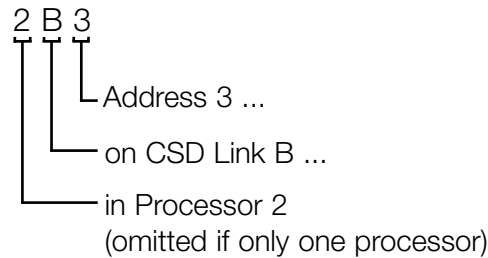


STEP 7

Set Control Station Device Address Switches

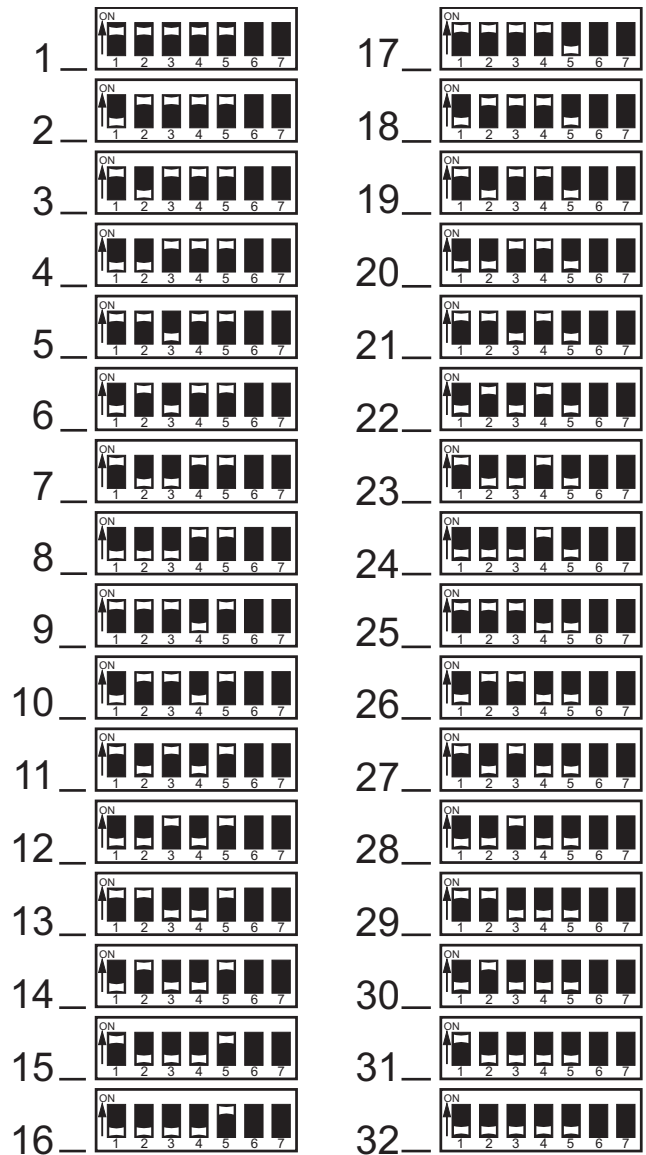
Each device along the Control Station Device (CSD) Link must have a unique address ranging from 1 to 32. The Address Switches may have been pre-set to give the address shown on the job drawings.

Job drawings may show:



If the Address Switches were not pre-set (all set to address 1), assign each CSD a unique address and document its location and description.

If needed, refer to the instructions for each CSD to help locate its Address Switches.



Address Switch Settings Chart - shows how to set the Address Switches to get a specific address.

Note

GRAFIK Eye® Control Units (GRX-46xx-x-xx) do not have Address Switches but must be programmed with a unique address(es). See separate instructions sent with each Control Unit.



Notice!

Do not install a CSD without confirming that the Address Switches have been set.

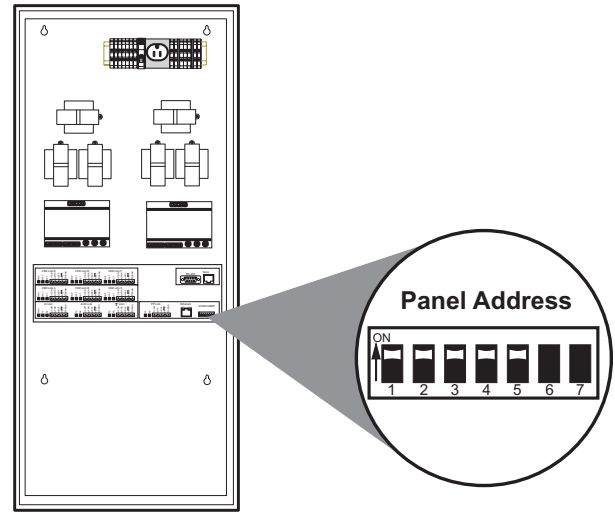


STEP 8

Set Processor Panel Address Switches

If there is only one processor panel in the system, leave its address as shipped (default is address 1).

If there are two or more processor panels on the Interprocessor Link, each must have a unique address, ranging from 1 to 32. The Address Switches may have been pre-set to give the address shown on the job drawings. Use the Address Switch Settings Chart, on the previous page, to see how to set the Address Switches to get a specific address.



Processor Panel - GRAFIK 7000P shown.



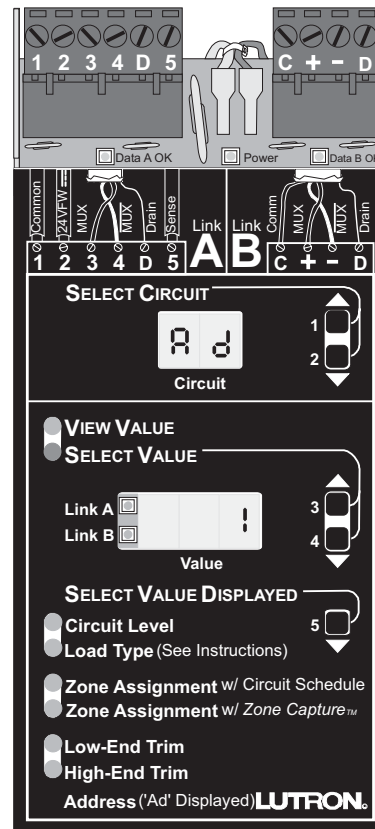
STEP 9

Address Power Panels

Each power panel must have a unique address on the Power Panel Link. Power Panels are not pre-addressed by the factory. Without the unique address, the Processor Panel cannot download system settings to the Power Panel.

Refer to job drawings to see the intended address of each power panel. Set the address by manually programming the Circuit Selector within each Power Panel. See instructions provided with each Power Panel for this procedure.

If the job drawings do not include an address, document the Power Panel's location and Model Number for each address. This information will be needed to set up the system properly.



Power Panel Address on a Circuit Selector

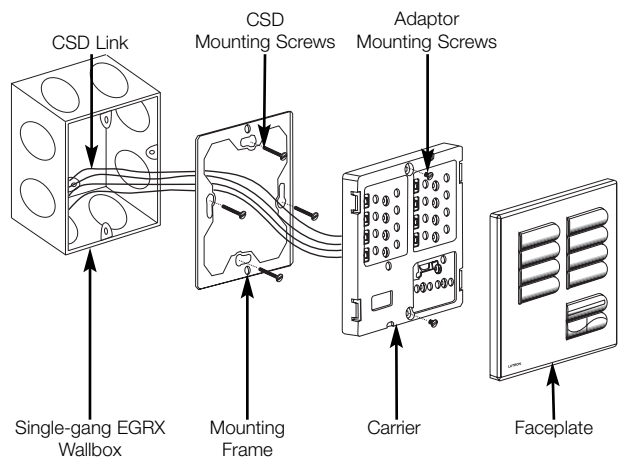
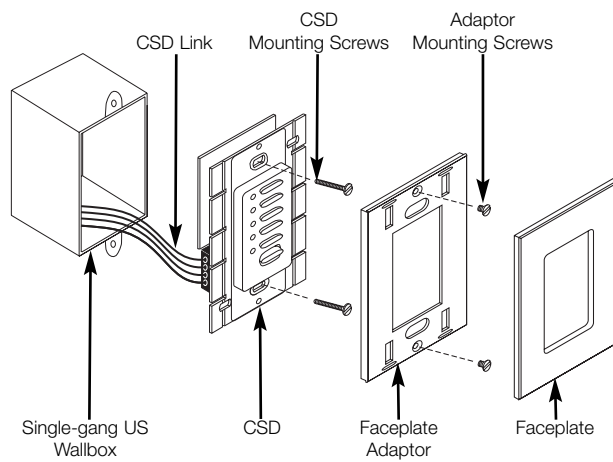


STEP 10

Install Control Station Devices

After confirming that each Control Station Device (CSD) is addressed, install them into the wallboxes.

See the instructions sent with each individual CSD for installation instructions.

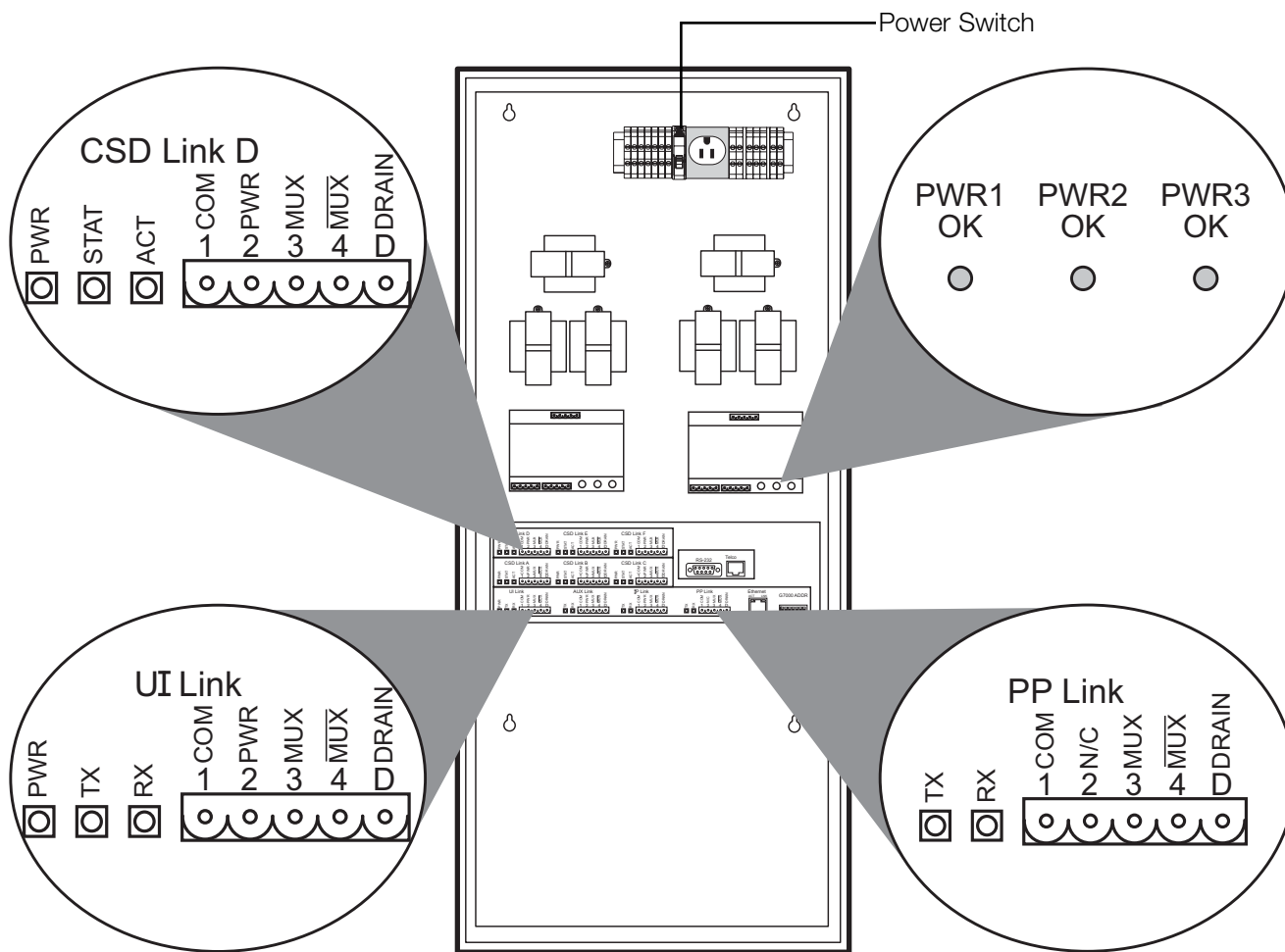




STEP 11

Activate System

Once all links are installed and wiring is verified, turn the Processor Panel power switch ON. After 10 seconds, compare the diagnostic LEDs to those listed in the Troubleshooting Guide.



GRAFIK 7000P with six CSD Links and Modem / RS232 Interface shown

Troubleshooting Guide

LED Diagnostics

	Location of LED	Name	Normal Operation	Problem Indicator / Possible Cause	
Processor Panel	Power Board	PWR	On	Off	<ul style="list-style-type: none"> No power from transformer - check if power feed and switch are On
	CSD Link	PWR STAT ACT	On Off Flashes Rapidly	Off On Off	<ul style="list-style-type: none"> Short on CSD Link - wire 2 to 1 or ground Processor in self-test - contact Lutron No database loaded
	PP Link	TX RX	Flashes Rapidly Flashes Dimly	Off Off	<ul style="list-style-type: none"> No database loaded No data received - Power Panel not addressed or check wires 1, 3, and 4
	IP Link	TX RX	On Dim On Dim	Off Off	<ul style="list-style-type: none"> No database loaded No data received - Link not used or check wires 1, 3, and 4
	UI Link	PWR TX RX	On Irregular Flash Irregular Flash	Off Off Off	<ul style="list-style-type: none"> Short on UI Link - wire 2 to 1 or ground No communication to computer No communication from computer
	Ethernet	ACT LNK	Irregular Flash On	Off Off	<ul style="list-style-type: none"> No activity on network, if connected No network detected - check wiring
	CSD	Front of CSD	none	On (if button pressed)	Off Flash
Power Panel		Circuit Selector	DATA PWR Value	Flashes 1 per sec On OK	Rapid Off Off
	Dimmer / Module	none	Flashes 1 per sec	Slow Rapid	<ul style="list-style-type: none"> No communication from Circuit Selector Shorted Triac - contact Lutron

LED problem indicators:

- 'Flash' on CSD is all LEDs turning On for approx. 1 second, then off 3 seconds
- 'Rapid' on a Circuit Selector is any rate faster than the "Heartbeat" of once per second
- 'Rapid' = "Flutter" on a Dimmer/Module is one LED turning On approx. 5 times per second
- 'Slow' on a Dimmer/Module is one LED turning On approx. once per 7 seconds

Maintain the System

Lutron products are designed to have minimal maintenance requirements.

Control Station Devices (CSDs)

Clean front surface with a soft towel moistened with a mild soap solution (non-ammonia based). Clean approximately every six months. Do not spray cleaning solution directly at any CSD.

Power Panels

Visually inspect installation periodically - keep air flow clear of obstructions. Power panels generally need 12 in. (300 mm) of clearance above, below, and in front of the enclosure.

Processor Panels

There are no maintenance requirements for these products. Clean the front cover as needed.

Other

See instructions supplied with individual products for any other recommendations for maintenance.



Danger

Turn power off before working on any load. See instructions supplied with individual Power Panels.



Warning

When working on any load (such as rewiring a load), replace the bypass jumpers to protect the Power Panels until the load is proven.



Danger

Any liquid entering products with line (mains) voltage may reach internal components, cause personal injury, damage the equipment, and void the warranty.

Notes -

Contact Information Warranty

Internet: www.lutron.com
E-mail: product@lutron.com

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Fax: +65.220.4333

LIMITED WARRANTY

Lutron will, at its option, repair or replace any unit that is defective in materials or manufacture within one year after purchase. For warranty service, return unit to place of purchase or mail to Lutron at 7200 Suter Rd., Coopersburg, PA 18036-1299, postage pre-paid.

This warranty is in lieu of all other express warranties, and the implied warranty of merchantability is limited to one year from purchase. This warranty does not cover the cost of installation, removal or reinstallation, or damage resulting from misuse, abuse, or improper or incorrect repair, or damage from improper wiring or installation. This warranty does not cover incidental or consequential damages. Lutron's liability on any claim for damages arising out of or in connection with the manufacture, sale, installation, delivery, or use of the unit shall never exceed the purchase price of the unit.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This product may be covered by one or more of the following U.S. patents: 4,797,599; 4,803,380; 4,825,075; 4,893,062; 5,030,893; 5,191,265; 5,430,356; 5,463,286; 5,530,322; 5,808,417; DES 308,647; DES 310,349; DES 311,170; DES 311,371; DES 311,382; DES 311,485; DES 311,678; DES 313,738; DES 335,867; DES 344,264; CES 370,663; DES 378,814 and corresponding foreign patents. U.S. and foreign patents pending.

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