

Overview

Vantage's *LCAP Series Commercial Enclosures* ship with pre-configured modular solutions for commercial, architectural load dimming and switching. The pre-configured designs save time in Design Center and installing.

The UL listed LCAP44H/HS panels are adaptable to medium and large spaces that have mixed 0-10V/PWM and HV dimming and relay loads. The LCAP44H/HS can be configured to control *forward* or *reverse* phase dimming loads. The included IC-36-II processor and POE (Power Over Ethernet) network switch provide an ideal platform for Equinox touchscreens, keypads, and integration with third party systems. The LCAP44H/HS enclosure may be connected to selected Vantage enclosures; scalable to virtually any size system.

Solution H/HS, LCAP Enclosures

Main Enclosure	Description					
LCAP44	44" Architectural Enclosure					
LCAP44H/HS Panel Configurations	Panel Upper Section:					
	• 1 to 2 LVOS-0-10-PWM stations					
	Panel Middle Section:					
	• 1 Module if LVOS stations are in upper section -OR- • Up to 2 Modules with no LVOS stations					
Possible Load Configurations are the same for H and HS models	Panel Controller Section:					
	• 1, IC-36-II Controller -OR- • 1, Secondary Terminal Board					
• LCAP44H (contains controller)	Panel Bottom Section:					
• LCAP44HS (contains Secondary Terminal Board)	• 8-Port Ethernet switch + power, 4 standard & 4 POE					
Part Number Breakdown	ENCLOSURE & LID ONLY	PANEL Type	LVOS- PWM Station Quantity	LCAP Optional Power Stations		
				LCAP44 with option	Module Type	Location 1 or 2
Actual PN	LCAP44	H- HS-	*	LCAP-OPT-	*	-*
Important	• - See Ordering Key on last page					
Optional Parts		Description				
VA-RRU-1-120V		Emergency Shunt Relay - 120V				
VA-RRU-1-277V		Emergency Shunt Relay - 277V				
VA-EPC-DFS-120V		Emergency Lighting Surface Mount Switch 120V				
VA-EPC-DFS-277V		Emergency Lighting Surface Mount Switch 277V				

Specifications

LCAP44H/HS		Specifications	
Cabinet Dimensions HWD	44.5" x 24" x 4.575" / 113cm x 61cm x 11.6cm		
Door Dimensions HWD	44.5" x 24" x 0.75" / 113cm x 61cm x 2cm		
Panel Insert HWD	42" x 21" x 4.175" / 106.7cm x 53.3cm x 10.6cm		
Weight Enclosure		41 lbs / 18.6 kg	
Weight Door		20.7 lbs / 9.39 kg	
Weight Panel Insert		23 lbs / 10.43 kg	
Number of LVOS-0-10-PWM* stations	Up to 2		
Number of Modules	1 (with up to 2 LVOS) or 2 (with no LVOS)		
Analog, 0-10DC/LV — Max. Outputs		Up to 8	Dependant On Configuration
PWM, LV — Max. Outputs		Up to 8	
HV Relay 120-277 VAC — Max. Outputs		Up to 16	
HV Dimmable 120-277 VAC — Max. Outputs		Up to 12	
Line Feeds (breakers) required		3 or 4 and Up	
**Flash Memory		(via controller)*	
Enclosure Finish		Galvanized Steel	
Door Finish		Black - Powder Coated	
Cover		vented, hinged	
Wire		copper wire, min of 80° C/176° F insulation	
Ventilation		maintained 36" front clearance	
Ambient Operating Temp.		0-40° C / 32-104° F	
Ambient Operating Humidity		5-95% non-condensing	
UL, CUL, and CE listed		yes	

* See these install sheets for important information:

Low Voltage Output Station Lighting LVOS-0-10-PWM-1
InFusion Controller instruction sheet

** InFusion controllers have a *micro*-SD flash card port for backup.

LCAP Enclosure Designs

LCAP Series Enclosure Facts.

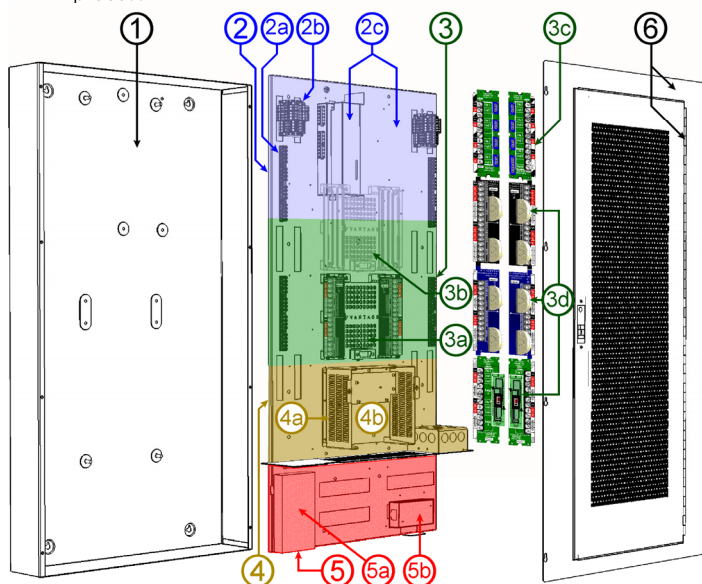
- Enclosures must be populated from *left to right* and *top down*.

- Blank module positions cannot be left between lighting modules in Design Center setup.
- Enclosures are pre-configured and wired (to the extent possible) using specific combinations of the following components. Installed components are dependent on the enclosure design.
 - Components using high voltage wiring.
 - Mixed high voltage wiring.
 - Components using low voltage control signal wiring.
 - Components using low voltage communication wiring.
 - Components using high voltage and low voltage connections made inside the enclosure.
- The enclosure uses built-in barriers to separate high and low voltage wiring.
 - Some designs include the barrier while other designs require the barrier be added by the designer.
 - High voltage barriers may be installed between 120V/240V/277V load modules.
- Enclosures may be setup as main or secondary enclosures.

Enclosure Features / Parts

- Enclosure can (order LCAP44 only).
- Panel Insert (**upper section**).
 - Ground terminals (*terminals 4 total*).
 - Wiring terminal blocks for **uppers section LVOS stations**.
 - Internal side pre-wired (*see Wiring Block pg. 2*).
 - External side wired in field (*see Wiring Block pg. 2*).
 - Up to 2 LVOS-0-10-PWM stations (**upper section**)
- Panel Insert (**middle section**).
 - 1 Module board if LVOS stations are in upper section.
-OR-
b. Up to 2 Modules with no LVOS stations in upper section.
 - A second module board is added above the first.
 - AC Terminal boards installed for module type ordered.
 - Terminal board jumpers are installed for lighting control via breakers during construction.

NOTE: MDR8CW301 commercial modules do not support either type of terminal jumper boards.
- Panel Insert (**controller section**).
 - Barrier for IC-36-II controller or secondary terminal board.
 - IC-36-II controller or secondary terminal board inside barrier.
- Panel Insert (**bottom section**).
 - 8 Port Ethernet switch. 4 standard and 4 POE.
 - Power supply for Ethernet switch
- Enclosure cover with hinged/vented door allowing easy access when servicing and proper ventilation for convection cooling process.



LCAP44H/HS Panel Basic Construction Parts

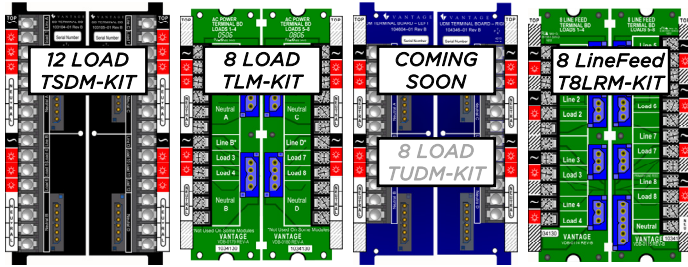
Terminal jumper boards are installed for use during construction to supply power to loads. Modules can then be installed when construction is finished.

NOTE:- 8 linefeed relay modules do not have a jumper board option.

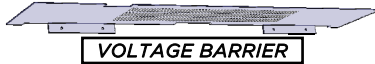
**JUMPER BOARDS
MJTB or QJUMPER**



Module Terminal Boards

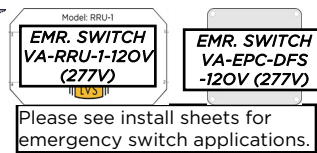


LCAP44H/HS Panel Optional Construction Parts



VOLTAGE BARRIER

When adjacent modules use different line voltage feeds (e.g., 120V and 277V) install a voltage barrier between the modules.



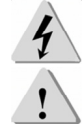
Please see install sheets for emergency switch applications.

Installation / Enclosure Mounting Instructions

Installation of Vantage LCAP products should be performed or supervised by the Vantage factory and/or a *Certified Vantage Installer*. Installation and maintenance of high voltage devices should only be performed by *licensed, qualified, and competent* personnel having appropriate training and experience.

CAUTION:

Turn Breakers OFF and Check that no Power is ON at the AC Terminal Boards when working in the enclosure or working on lighting fixtures connected to the Module's Loads, etc. Do not allow trimmed wire cuttings to fall into enclosure components as they may cause damage when power is restored. Damage from this type of short will void the warranty.



- Do not mount enclosures in attics, garages, or crawlspaces, unless room is properly conditioned to conform to ambient room temperature and humidity requirements.
- Mount enclosure a minimum of 18" from ceiling or floor.
- National Electrical Code requires a minimum frontal clearance of 36" for the enclosure.
- Use screws provide for mounting.

General Wiring

Drill proper size holes in can for running wires in and out of the enclosure. Separate high and low voltage wire run channels. All wire runs in and out of the enclosure should be secured using 2-screw connectors or equivalent as shown at the right →. Proper conduit or equivalent wire channels should be used according to local codes and regulations.



Proper High Voltage Terminations / Proper Torque:

Connector	Torque	Wire Range
MODULE TERMINAL	20 INCH POUNDS	14-10 AWG*
CONTROLLER POWER	20 INCH POUNDS	14-10 AWG*

Breaker Feeds to Controllers:

Vantage recommends that the Main Controller's power be wired to a dedicated circuit breaker. When multiple enclosures containing controllers are in close proximity to one another, it is recommended to share the same breaker to all Main Controllers; *no more than nine controllers may be connected to a 20amp breaker - allow up to 200W@120VAC per InFusion Controller*. Do not share the same breaker with controllers and modules.

Vantage Station Bus Wire Specification

Vantage wire, part #VDA-0143-BOX, or VPLENUM-CABLE - 2C, 16AWG / 1.31mm2, twisted, non-shielded, <30pF per foot. Separate a minimum of 12" / 30.5cm from other parallel communication and/or high voltage runs.

Main Controller to Main Controller Wiring



NOTE: Vantage recommends using Ethernet connections for Controller to Controller communication. Please see the InFusion Controller instruction sheet for additional information.

When connecting multiple Main enclosures via the *Main Enclosure Terminal Board's Controller Bus* screw terminals, Vantage recommends their own or an equivalent wire, (see *Vantage Station Bus Wire Specification* above) be used in runs between Main enclosures. *This is a polarized connection with two "+" and two "-" screw terminals for in and out wire runs.* The maximum wire length for all controllers

connected together on one bus should not exceed 2,000ft. using the above wire specification.

Station Bus Wiring

WireLink stations connect to the *Station Bus* screw terminals on the *Main Enclosure Terminal Board*. Use Vantage station bus wire, (above). Maximum total station bus wire for each run = 2,000 feet with no station more than 1,000 feet from enclosure (typically the second half of the station bus loops back to enclosure with only one end connected). Station Bus should be separated a minimum of 12" from other parallel communication and/or high voltage runs.

Main & Secondary Enclosure to Secondary Enclosure Wiring

Connecting a Main enclosure to a Secondary enclosure or Secondary enclosure A to Secondary enclosure B, requires 16/18-gauge 4-conductor twisted, non-shielded wire. Three of the wires are *always* used to connect a Main enclosure to a Secondary enclosure and chained secondary enclosures. This is a polarized connection with "+", "-", and "Gnd" screw terminals for communication. The 4th wire is for *Manual Override* and is optional. Each Secondary enclosure bus can support **two** Secondary enclosures for a maximum of six Secondary enclosures per Main enclosure (see InFusion wiring below). Maximum wiring distance from Main enclosure to Secondary enclosure is 200ft **including** an A/B Secondary system (e.g., 100ft from Main enclosure to Secondary enclosure A and an additional 100ft from Secondary enclosure A to Secondary enclosure B).

Main Terminal Board Terminator

If only one or two Main enclosures are used, the *Controller Bus Termination* switch must be ON. This switch is located on the *Enclosure Terminal Board*. If more than two Main enclosures are used **ONLY** the first and last Enclosure Terminal Boards on each controller bus should have the *Network Termination* switch set to ON.

RS-232 (Ports 1-5) for Main Enclosures

The *Main Enclosure Terminal Board* has five RS-232 ports. Use these ports to connect any device that uses RS-232 communication. Only connect one RS-232 device at a time to an RS-232 port. If additional RS-232 ports are needed, Vantage also manufactures an RS-232 Station or, some products like the IRX II, have built-in RS-232 ports.

Vantage typically uses RX, TX and GND for communication but does have RTS and CTS for some applications on RS-232 Ports 1 and 2. RS-232 Ports 3-5 only have TX, RX and GND., however, all five ports can use software flow control. The default communication protocol may be changed through Design Center software.

Communication protocol parameter settings:

- Standard baud rates 1200 - 115.2K
- 7-8 Data Bits
- Even, Odd, Forced or No Parity
- 200ft. maximum wiring distance

Default protocol for RS-232 communication is:

- Baud: 19200
- Parity: None
- Total bits: 8
- Stop bits: 1

RS-485 Connections

The *Main Enclosure Terminal Board* has two RS-485 ports. These ports are connected to the same screw terminals used for Secondary enclosure ports 3 and 4. *The ports may not be used for Secondary enclosure support and RS-485 support simultaneously.* However, if Secondary enclosure bus ports 3 and/or 4 are free they may be used as RS-485 communication ports. The RS-485 ports are *half-duplex*, meaning that each port can transmit and receive but not at the same time. Maximum wiring distance for RS-485 ports is 200ft.

Possible Ground Loop Issues

All RS-232/RS-485 connections between third party equipment and RS-232/RS-485 connections on the *Main Enclosure Terminal Board* may produce a ground loop. Most often, the connected RS-232/RS-485 device is not using the same power source or is far away from the Vantage enclosure resulting in a possible ground loop that may produce a data noise condition. If this condition is suspected, Vantage recommends a third party RS-232/RS-485 Opto (optical) Isolation Module. Opto Isolation provides a communications link and is an important consideration if a system uses different power sources, has noisy signals or must operate at different ground potentials.

Auxiliary Power

The enclosure, *Main Enclosure Terminal Board* has a 12VDC auxiliary power connection. The 12VDC connection is typically used for one RFE1000 RadioLink Enabler or one RFLC-V232 Enabler. Total power is

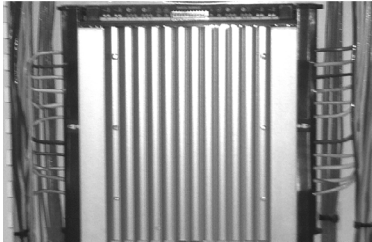
limited to 250ma. NOTE: Do not connect more than one auxiliary device at a time to this power source. If additional powered devices are needed they must be separately powered with an external, isolated type (usually no ground prong), power transformer.

Manual Override

In the unlikely event of a Main Controller failure, the *Manual Override* can be used to turn selected loads ON. If the system is in override, individual loads can be controlled by dip-switches located on each module in the enclosure. *Manual Override* control can be extended to other enclosures. It is common to extend *Manual Override* between a Main enclosure and its Secondary enclosures. It is not recommended to extend *Manual Override* between Main enclosures.

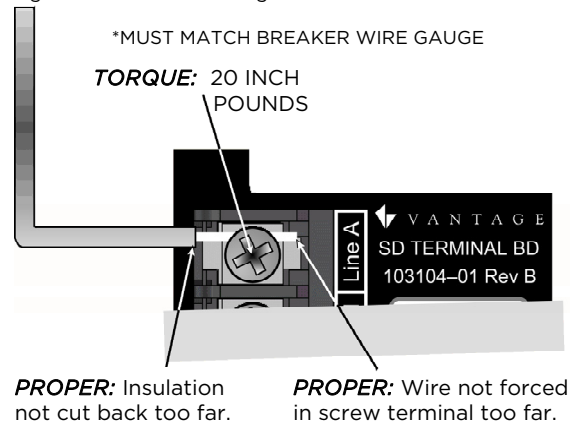
Wiring AC Terminals

Keep breaker and load wire runs organized and managed as illustrated.



Neutrals

Run a separate NEUTRAL for each load connected to dimming devices. Failure to do this may cause loads, sharing the same neutral, to flicker slightly while ramping or dimming a load. The potential for flickering occurs with all dimming systems due to the changing load level coupling to the fixed load through the neutral.

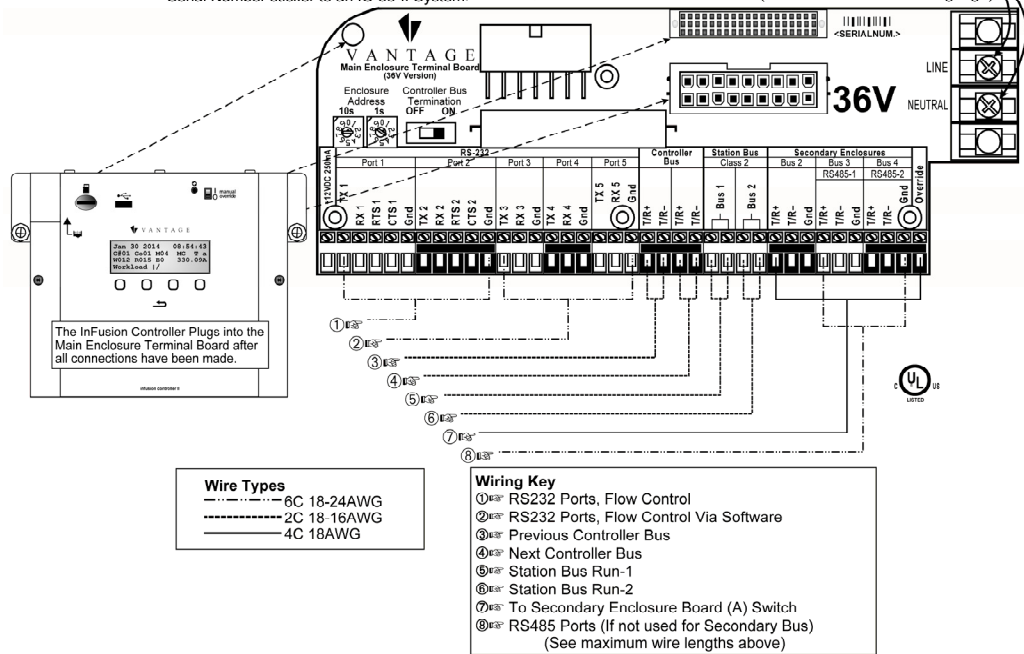


Enclosure Wiring Examples

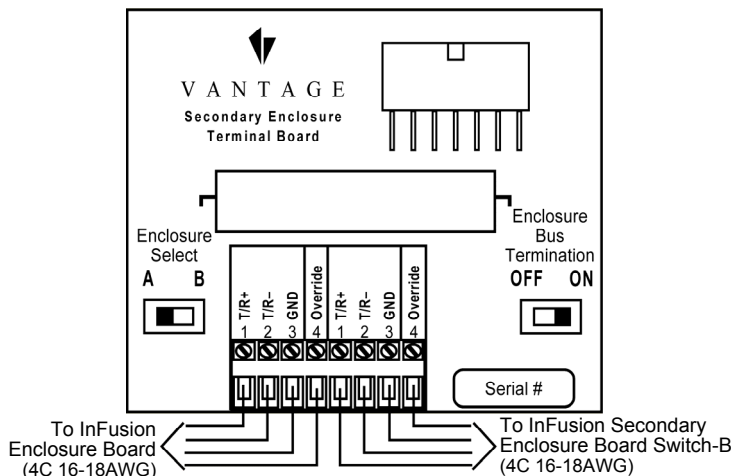
LCAPM Enclosure Terminations:

CAUTION: For retrofit jobs, this board is also available in a 24V version for the IC-24-II Controller. **NEVER** connect stations that do not display a circle 36 symbol on the Serial Number sticker to an IC-36-II System.

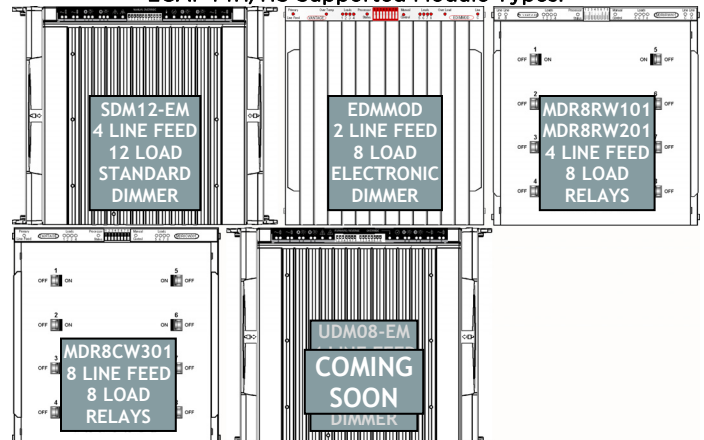
Torque: 20 inch pounds
Wire Range: 14-10 AWG*
(*Must match breaker wire gauge)



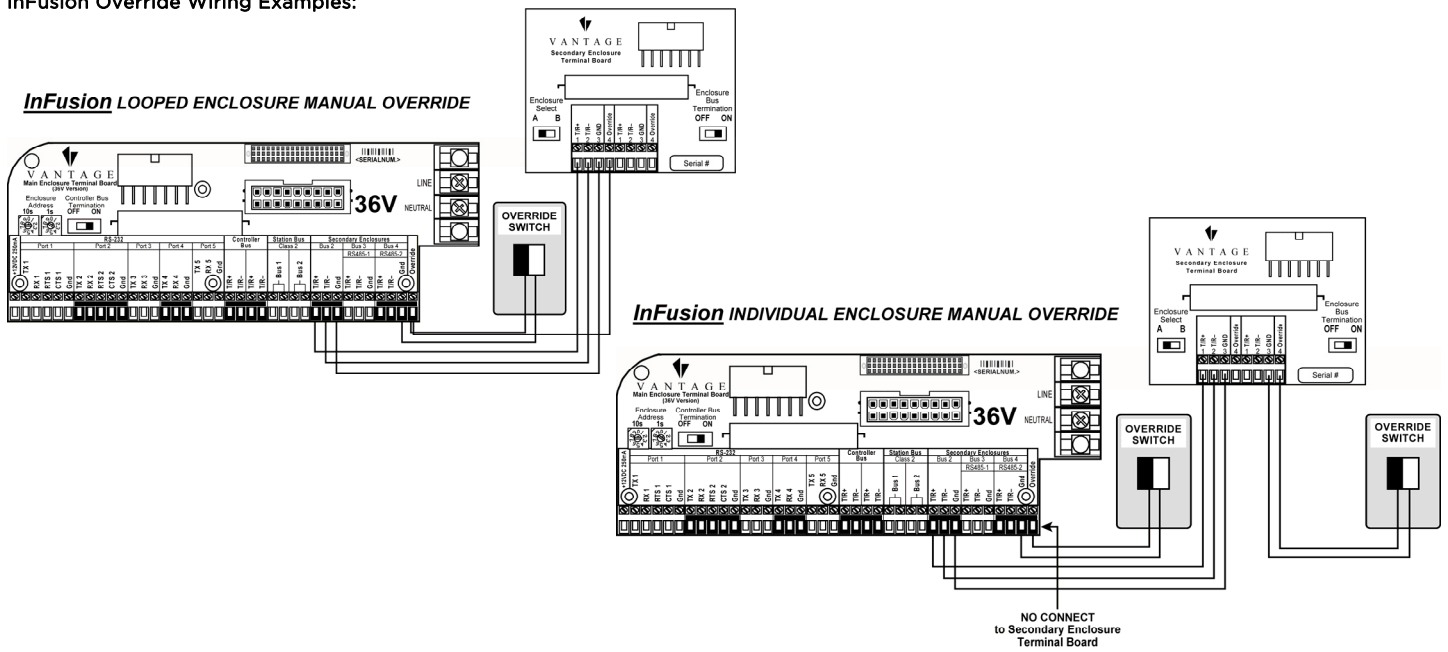
InFusion Secondary Enclosure Terminations:



LCAP44H/HS Supported Module Types:

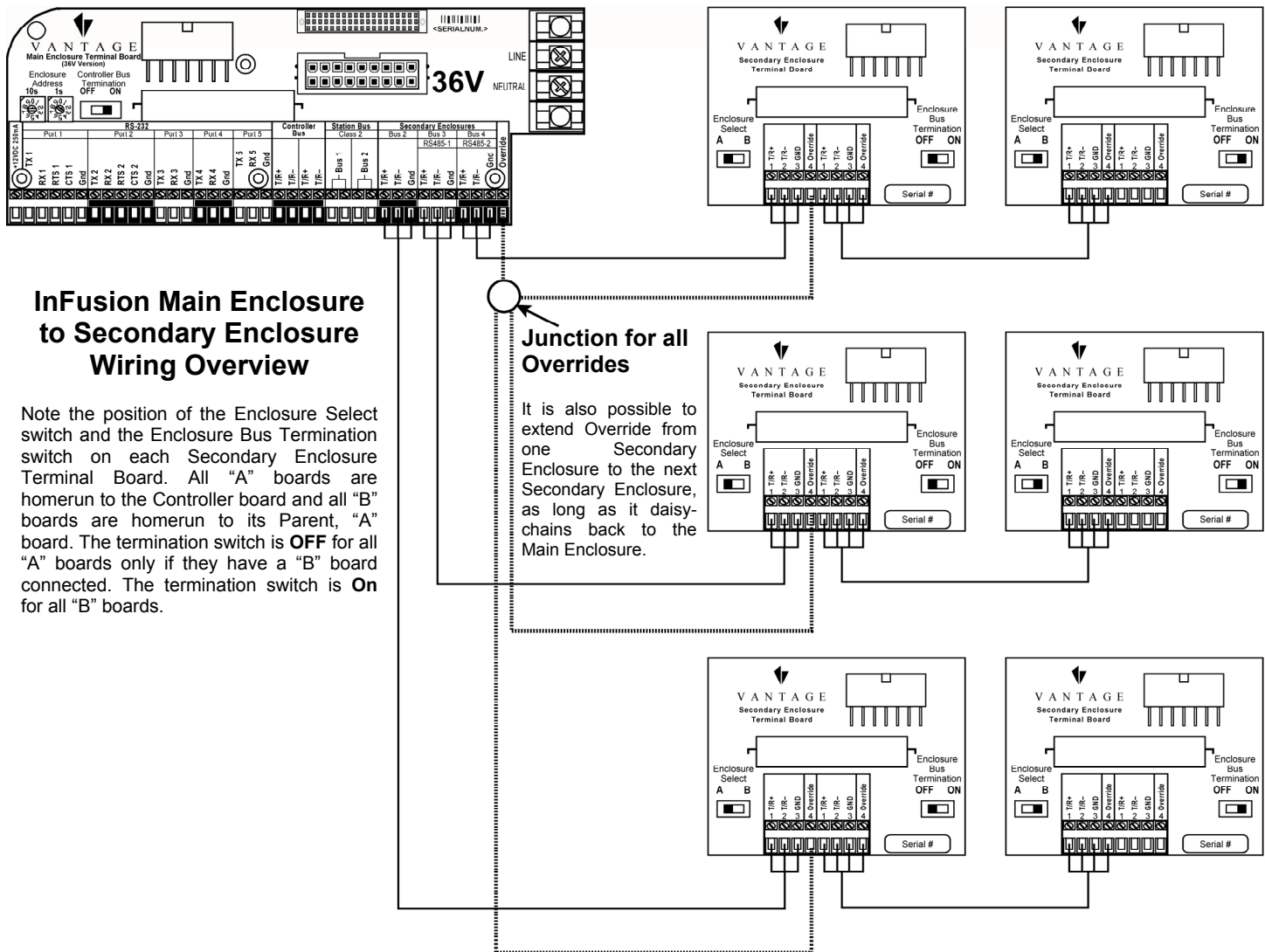


InFusion Override Wiring Examples:



Detail Wiring InFusion Main Enclosures to InFusion Secondary Enclosures

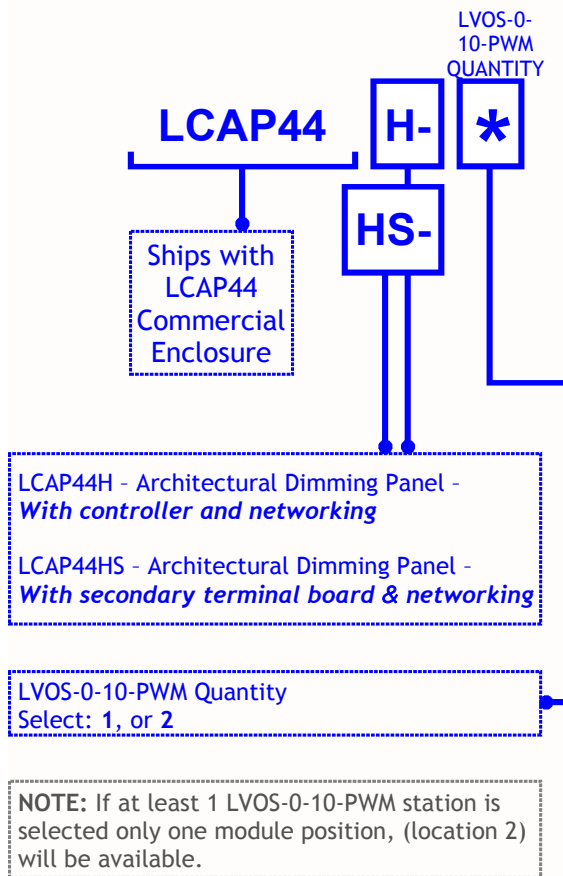
(See wire specifications earlier in these instructions)



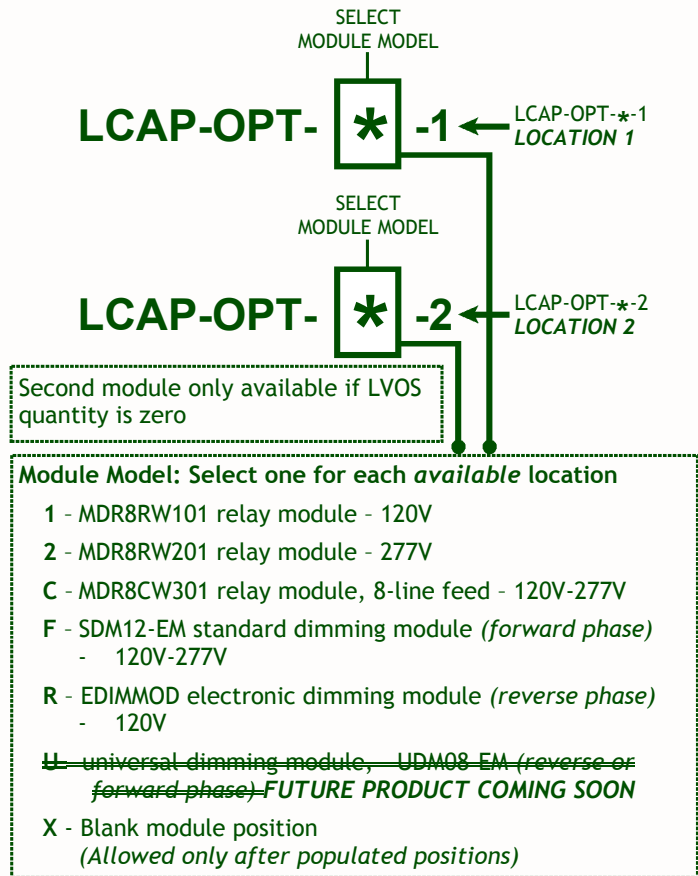
Part Number Ordering Key

Design Center will generate part numbers automatically as the enclosures are built. This key is for help creating manual orders if needed.

ordering key for LCAP44H/HS



part #s for modules & module placement



LCAP44H/HS Enclosure Multi-View

