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 LCAP32/44M/S series offers the highest amperage dimming and switching options in the LCAP line. Vantage's own forward and reverse phase dimming, use, *patent pending,* individual load linearization curve settings. Each dimmed load's starting/stopping points can also be set. This technology is exclusive with Vantage and allows for smooth dimming and consistent lighting using mixed lighting types and brands. The LCAP32/44M/S enclosure may be connected to other Vantage enclosures making this design scalable to virtually any size system.

Solution 1 – Parent-level Enclosure Models

Main Enclosure	Description
LCAP44	44" Architectural Enclosure
LCAP32	32" Architectural Enclosure
LCAP32/44M/S Panel Configurations •LCAP32/44M *(contains controller)* •LCAP32/44S *(contains Secondary Terminal Board)*	**Panel *Power* Section:** • LCAP44M/S, up to 4 Modules • LCAP32M/S, up to 2 Modules **Panel *Controller* Section:** • 1, IC-36-II Controller *-OR-* • 1, Secondary Terminal Board

Part Number Breakdown	ENCLOSURE & LID Only	PANEL Type	LCAP32/44M/S Optional Modules		
			LCAP32/44M/S with module options	Module Type	Location 1 - 4
Actual PN	LCAP32/44	M S	LCAP-OPT-	*	1-4
Important	• - See Ordering Key on last page				

Optional Parts	Description
COM-HV-BARRIER	Low-Voltage Barrier
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

Specifications	LCAP32M / LCAP32S	LCAP44M / LCAP44S
Cabinet Dimensions HWD	32" x 24" x 4.575" 81cm x 61cm x 11.6cm	44.5" x 24" x 4.575" 113cm x 61cm x 11.6cm
Door Dimensions HWD	32" x 24" x 0.75" 81cm x 61cm x 2cm	44.5" x 24" x 0.75" 113cm x 61cm x 2cm
Panel Insert HWD	29.5" x 21" x 4.175" 75cm x 53.3cm x 10.6cm	42" x 21" x 4.175" 106.7cm x 53.3cm x 10.6cm
Weight Enclosure	30 lbs / 13.61 kg	41 lbs / 18.6 kg
Weight Door	15.5 lbs / 7.03 kg	20.7 lbs / 9.39 kg
Weight Panel Insert	18.7 lbs / 8.48 kg	23 lbs / 10.43 kg
Number of Modules	Up to 2	Up to 4
Load Capacity	Up to 24	Up to 48
Line Feeds (breakers)	Up to 17	Up to 33
*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 Oper. Humidity	5-95% non-condensing	
UL, CUL, and CE listed	yes	

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

Please see: InFusion Controller instruction sheet
Visit the *Vantage Dealer Site* for modules, and emergency switch install sheets.

LCAP Enclosure Designs

LCAP Series Enclosure Facts.

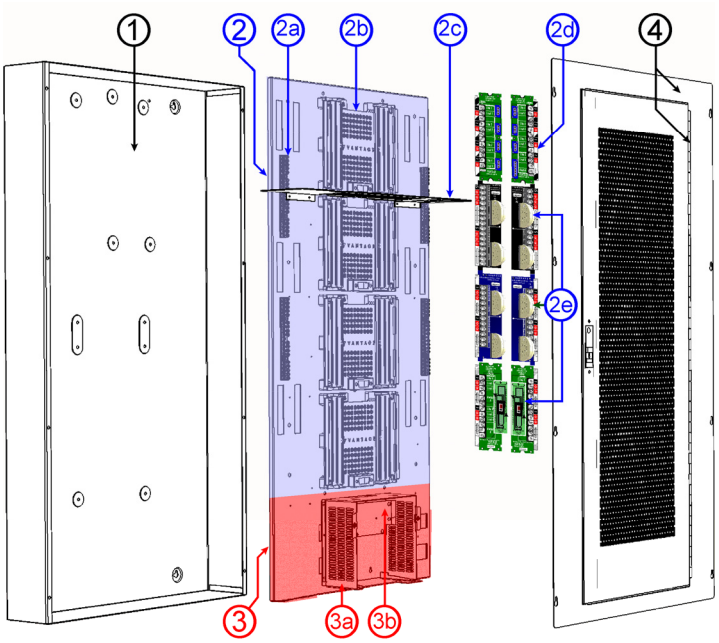
- Enclosures must be populated from *left to right* and *top down*.
  - Blank module positions cannot be left between lighting modules in Design Center setup.
- Enclosures are pre-configured and wired (to the extent possible) using specific combinations of the following components. Installed components 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 follows.
  - *Main Enclosures* Containing: One *Main Enclosure Terminal Board (36V)* and one IC-36-II InFusion Controller,

-OR-

  - *Secondary Enclosures* Containing: One *Secondary Enclosure Terminal Board*.

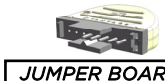
Enclosure Features / Parts

1. Enclosure can (order *LCAP32/44* only *(44" shown)*).
2. Panel Insert ***(power section)***.
   a. Ground terminals *(terminals for upper and lower sections)*.
   b. Module Panel Boards – 103160-1. Up to 4 modules for 44" and up to 2 Modules for 32".
   c. Metal isolation barrier between varying voltages. Should be added in Design Center's project design as part of enclosure setup, giving it the correct part number via the position (optional).
   d. AC Terminal boards installed for module type ordered.
   e. 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.
3. Panel Insert ***(controller section)***.
   a. Barrier for IC-36-II controller or secondary terminal board.
   b. IC-36-II controller or secondary terminal board inside barrier.
4. Enclosure cover, with hinged/vented door allowing easy access when servicing and proper ventilation for convection cooling process.



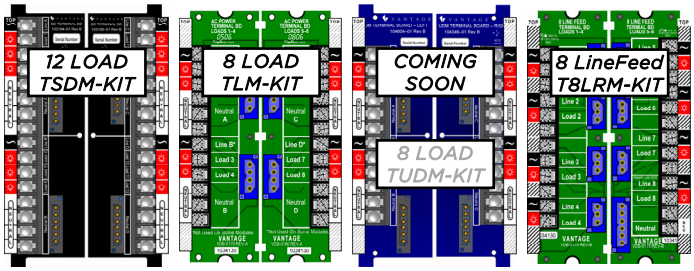
LCAP32/44M/S Panel Basic Construction Parts

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 line feed relay modules do not have a jumper board option.

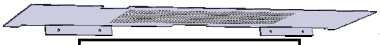


Reminder: visit the *Vantage Dealer Site* for modules, and emergency switch install sheets.

Module Terminal Boards

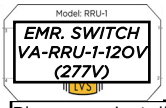


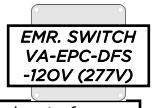
LCAP32/44M Panel Optional Construction Parts



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

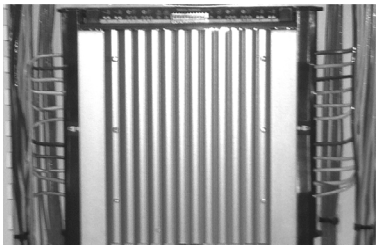
The enclosure, *Main Enclosure Terminal Board* has a 12VDC auxiliary power connection. The 12VDC connection is typically used for *one* RFE1000 RadioLink Enabler or *one* RFLC-V232 Enabler. Total power is limited to 250ma. NOTE: Do not connect more than one auxiliary device at a time to this power source. 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.

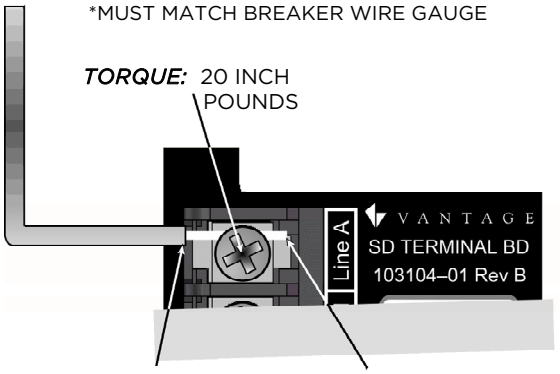
Wiring AC Terminals

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



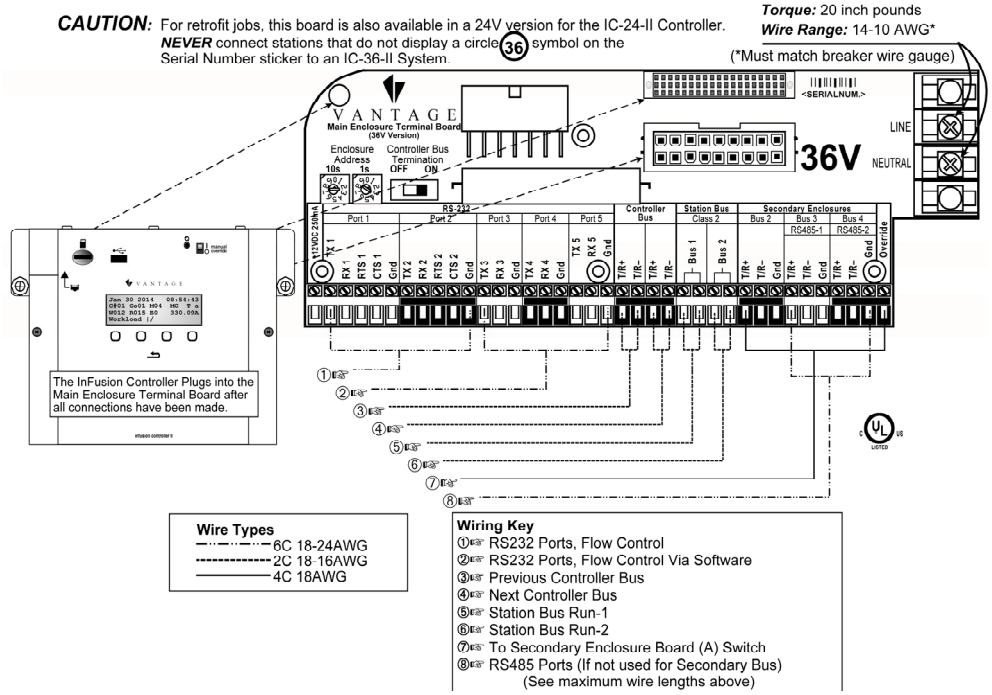
Neutrals

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.

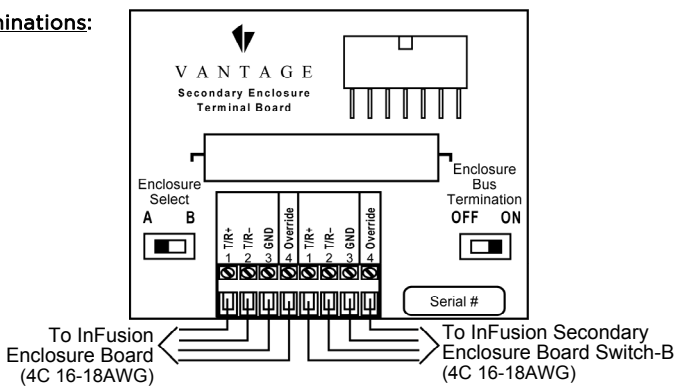


Enclosure Wiring Examples

LCAPM Enclosure Terminations:

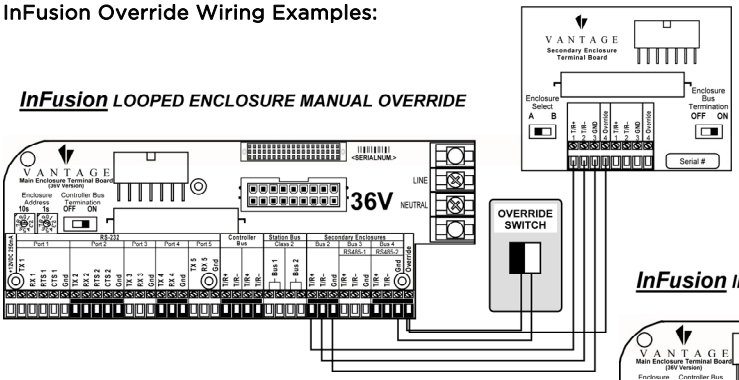


InFusion *Secondary Enclosure* Terminations:

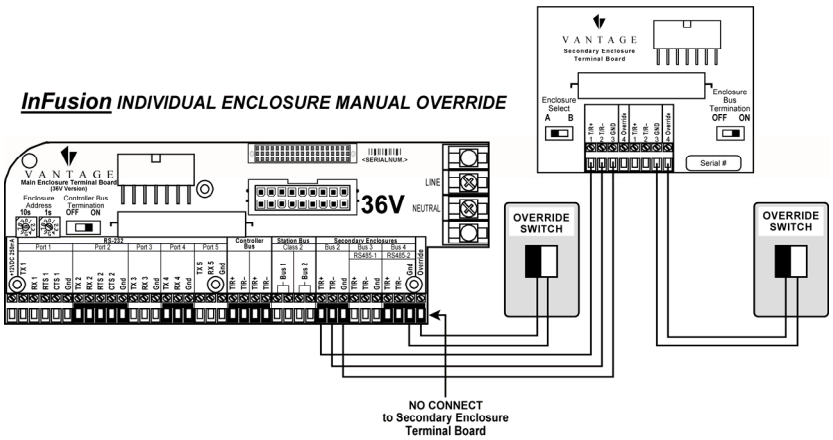


InFusion Override Wiring Examples:

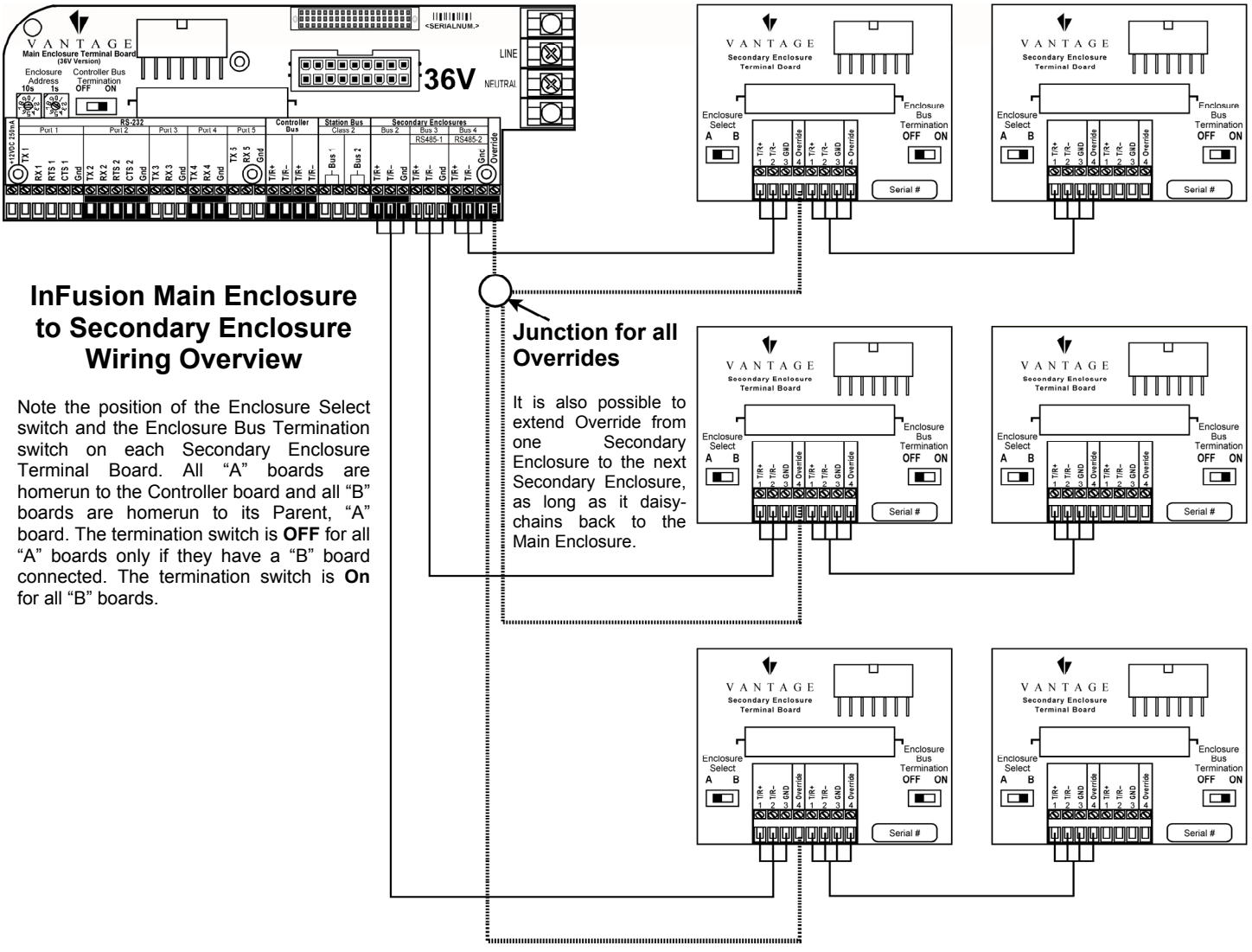
InFusion ***LOOPED ENCLOSURE MANUAL OVERRIDE***



InFusion ***INDIVIDUAL ENCLOSURE MANUAL OVERRIDE***



Detail Wiring InFusion Main Enclosures to InFusion Secondary Enclosures
(See wire specifications above)



InFusion Main Enclosure to Secondary Enclosure Wiring Overview

Note the position of the Enclosure Select switch and the Enclosure Bus Termination switch on each Secondary Enclosure Terminal Board. All “A” boards are homerun to the Controller board and all “B” boards are homerun to its Parent, “A” board. The termination switch is **OFF** for all “A” boards only if they have a “B” board connected. The termination switch is **On** for all “B” boards.

Junction for all Overrides

It is also possible to extend Override from one Secondary Enclosure to the next Secondary Enclosure, as long as it daisy-chains back to the Main Enclosure.

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 LCAP32/44M/S

LCAP32/44 M

Ships with LCAP32/44 Commercial Enclosure

LCAP32/44M - Architectural Dimming Panel -Main, 2 or 4 module capacity with controller terminal board

S

LCAP32/44S - Architectural Dimming Panel - Secondary, 2 or 4 module capacity with secondary terminal board

part #s for modules & module placement

SELECT MODULE MODEL
LCAP-OPT- * -1

SELECT MODULE MODEL
LCAP-OPT- * -2

SELECT MODULE MODEL
LCAP-OPT- * -3

SELECT MODULE MODEL
LCAP-OPT- * -4

Module Model: Select one module for each location

Replace the asterisk with one of the following:

1 - MDR8RW101 relay module - 120V

2 - MDR8RW201 relay module - 277V

C - MDR8CW301 relay module, 8-line feed - 120V-277V

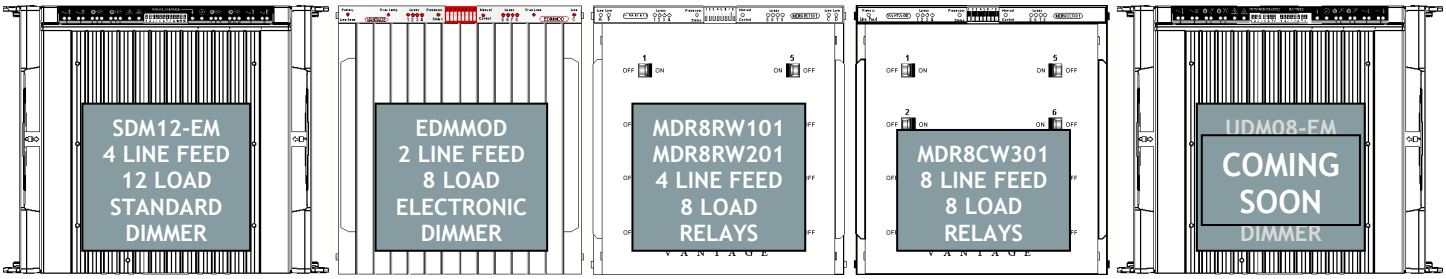
F - SDM12-EM standard dimming module *(forward phase)* - 120V-277V

R - EDIMMOD electronic dimming module *(reverse phase)* - 120V

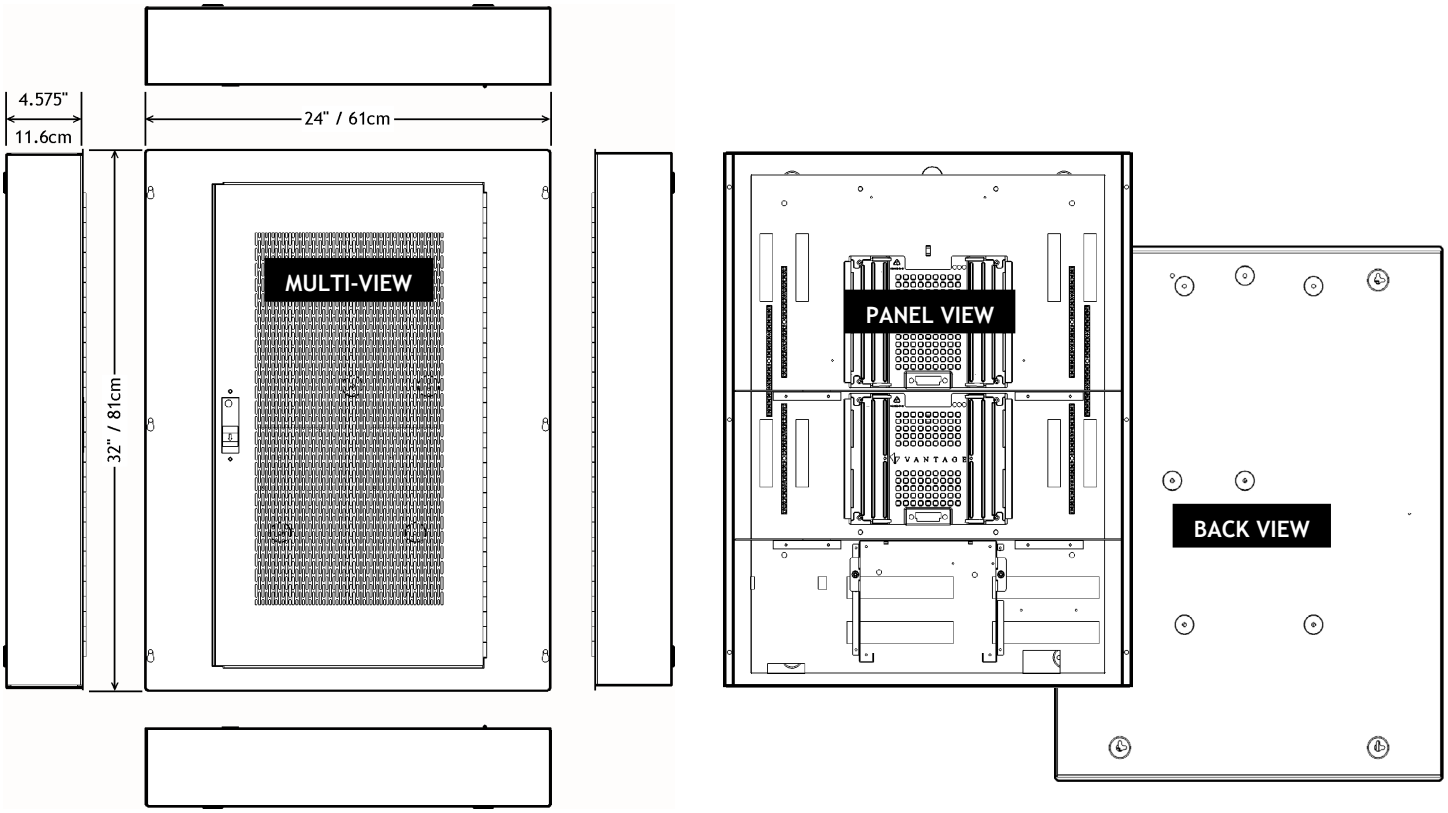
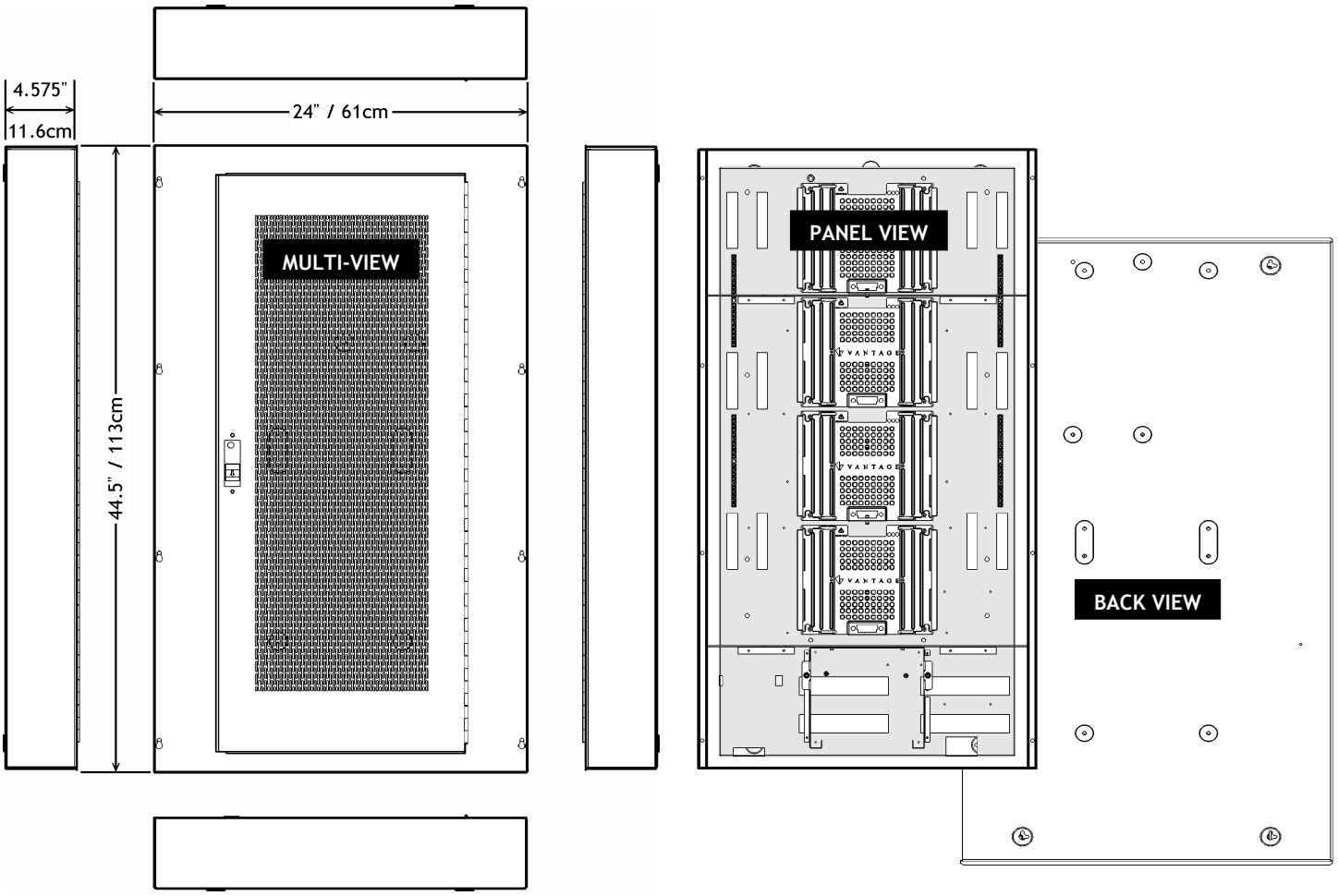
~~**U**- UDM08-EM universal dimming module *(reverse or forward phase)* - 120V-277V~~ ***FUTURE PRODUCT COMING SOON***

X - Blank module position
(Allowed only after populated positions)

LCAP32/44M/S Supported Module Types:



LCAP32M Enclosure Multi-View



LCAP44M Enclosure Multi-View