

## Overview

Vantage's InFusion Main Power Enclosure (IMPE) and InFusion Secondary Power Enclosure (ISPE) are electrical enclosure centers composed of high voltage, low voltage communication, and control devices. All IMPE and ISPE enclosures contain dimming modules and/or relay modules in any combination. When setup as a **Main** power enclosure, in addition to modules, it contains a **Main Enclosure Terminal Board** (36V or 24V version) making it ready to receive an **InFusion Controller**. When setup as a **Secondary** power enclosure, in addition to modules, it contains a **Secondary Enclosure Terminal Board**. High voltage and low voltage connections inside enclosures are made via clearly labeled screw terminals. High voltage and low voltage are kept separate by a built-in barrier in the enclosure's design.

Main and Secondary Power enclosures are designed to fit perfectly between conventional framing, however, the enclosures may also be surface mounted. There are four Main Power enclosure models and two Secondary Power enclosure models available.

## Enclosure Models

Main Models	Description
IMPE-4-IC36	<ul style="list-style-type: none"> <li>Up to 4 Modules</li> <li>Main Enclosure Terminal Board (36V)</li> </ul>
IMPE-4-IC24	<ul style="list-style-type: none"> <li>Up to 4 Modules</li> <li>Main Enclosure Terminal Board (24V)</li> </ul>
IMPE-2-IC36	<ul style="list-style-type: none"> <li>Up to 2 Modules</li> <li>Main Enclosure Terminal Board (36V)</li> </ul>
IMPE-2-IC24	<ul style="list-style-type: none"> <li>Up to 2 Modules</li> <li>Main Enclosure Terminal Board (24V)</li> </ul>
Secondary Models	Description
ISPE-4-IC	<ul style="list-style-type: none"> <li>Up to 4 Modules</li> <li>Secondary Enclosure Terminal Board</li> </ul>
ISPE-2-IC	<ul style="list-style-type: none"> <li>Up to 2 Modules</li> <li>Secondary Enclosure Terminal Board</li> </ul>

## Specifications

Specifications	IMPE-2-ICxx / ISPE-2-IC	IMPE-4-ICxx / ISPE-4-IC
Cabinet Dimensions HWD	35" x 14.5" x 4" 88.9cm x 37cm x 10cm	52" x 14.5" x 4" 132cm x 37cm x 10cm
Door Dimensions HWD	36" x 15.5" x 0.13" 91.4cm x 39.4cm x 3.3mm	53" x 15.5" x 0.13" 134.6cm x 39.4cm x 3.3mm
Weight	29 lbs / 13.1 kg	42 lbs / 19.1 kg
Number of Modules	Up to 2	Up to 4
Line Feed Terminals (breaker feeds)	Up to 17	Up to 33
Load Out Terminals	Up to 24	Up to 48
Neutral Terminals	Up to 33	Up to 65
Ground Bar Terminals	Up to 36	Up to 72
*Flash Memory	(via controller)	
Color / Finish	Nickel / Powder Coated	
Cover	vented, hinged	
Wire	copper wire, minimum of 80°C / 176°F insulation	
Ventilation	maintained 36" front clearance	
Ambient Operating Temperature	0-40°C / 32-104°F	
Ambient Operating Humidity	5-95% non-condensing	
UL, CUL, and CE listed	yes	

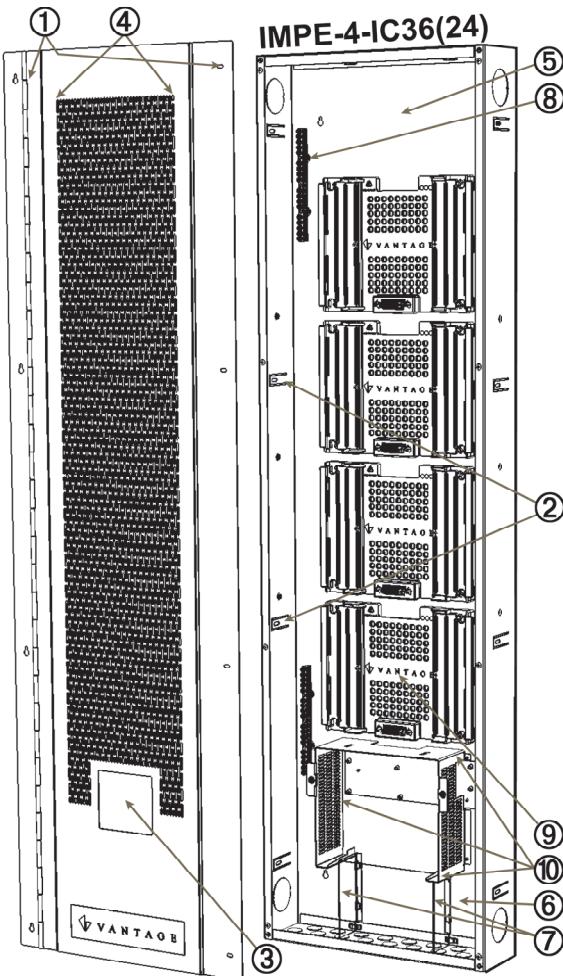
\* InFusion enclosures do not have a flash memory chip built into the enclosure's terminal board, instead the InFusion controller has an MMC/SD flash card port for memory backup of the project. The project can be backed up to the SD card when programmed from Design Center software.

## Enclosure Features

Identical features for both four and two module models include:

- Hinged door, screws down to lock, allowing easy access when servicing while helping to prevent unauthorized access;
- Metal flex-tabs to help prevent enclosure from warping when mounted to uneven framing;

- Cut out window in door for easy viewing of controller status;
- Vented for natural convection cooling;
- Extra room at the top for high voltage wiring;
- Extra room at the bottom for low voltage and high voltage wiring;
- Metal isolation barrier for low voltage wiring (Low voltage barrier is displayed in transparent format for illustration only);
- Convenient ground terminals;
- Screw panel boards for easy connection of new AC terminal boards via a single screw;
- Controller or Secondary Enclosure components cage.



## Installation / Enclosure Mounting Instructions

Installation of Vantage products should be performed or supervised by 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.

3. National Electrical Code requires a minimum frontal clearance of 36" for the enclosure.
4. Use eight 1 1/2" screws for mounting IMPE-4 or ISPE-4.
5. Use four 1 1/2" screws for IMPE-2 or ISPE-2.
6. The enclosure door has a 1/2" lip that extends past the enclosure sides, concealing the edge of the enclosure next to the wall. When surface mounting the enclosure leave sufficient space between multiple enclosures to allow the doors to be installed and swing free from each other.

### General Wiring

**Enclosure conduit knockouts:** Top and Bottom; 25 - 1/2" knockouts (50 total) for wiring in the top and bottom. In the bottom center of the enclosure, seven of the knockouts are separated by a low voltage barrier and must only be used for low voltage. This isolates all low voltage runs from high voltage runs. A metal cage surrounds the Controller area of the enclosure and is adjacent to the low voltage barrier. Left and Right; 2 - 2" knockouts (4 total) for wiring high voltage between enclosures through the left and right sides. Typically these knockouts are only used in surface mount installations.

#### 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-0113 - 2C, 16AWG / 1.31mm<sup>2</sup>, 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

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.

**NOTE:** InFusion Systems may also use Ethernet connections for Controller to Controller communication. Please see the InFusion Controller instruction sheet for additional information.

### 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 (see InFusion wiring below) per Main enclosure. 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. **Example:** In a five Main enclosure system, Main Controllers 1 and 5 may not be the first and last Controllers. The daisy-chain "wiring" order could be 2-1-3-5-4. In this example, Main enclosures 2 and 4 are the first and last Controllers, so only these two would have the *Network Termination* switch ON, the other three must be set to OFF.

### 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.

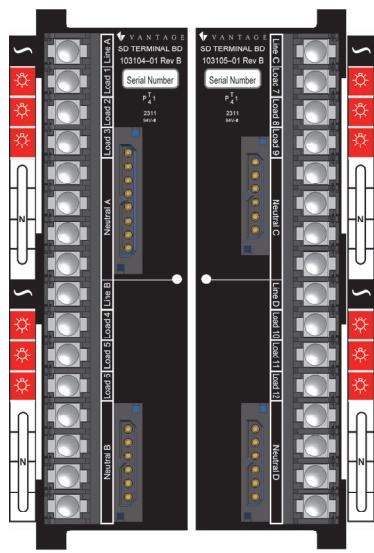
### Manual Override

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.

### Enclosure AC Terminal Board Types

AC Terminal boards are sold and installed separately. This allows the installer to use different module models inside the enclosure. Below are the different types of AC terminal boards that may be installed in this enclosure.

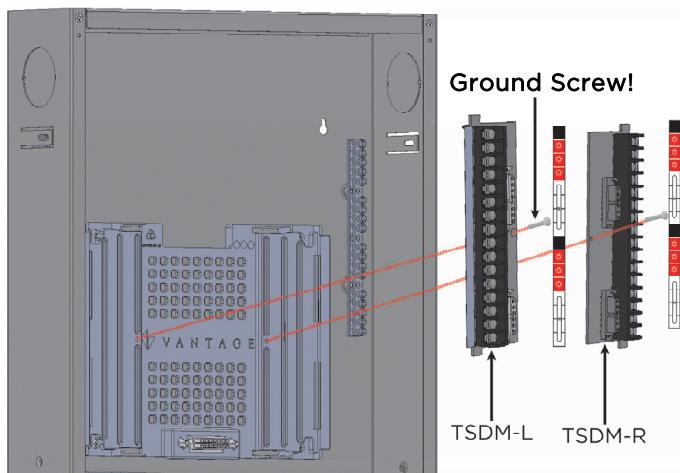
#### AC Terminal Boards For SDM12 Series Modules:



Order kit part #TSDM-KIT  
12 Load AC Boards TSDM-L (left) and TSDM-R (right). Be sure to install the LEFT board's center screw for this module's ground connection.

#### Installing SDM12 Series Module Load Boards - left and TSDM-R right:

1. Insert AC terminal boards- *TSDM-L* left and *TSDM-R* right to panel board and secure using 1, VHD-0082, #6-32 X 7/8" PHILLIPS PAN HEAD THREAD FORMING screws (TYPE-F) on each board.
  - a. Left board is also the ground connection for the SDM12-EM module - it must connect to the enclosure - be careful not to strip self-tapping threads or damage AC terminal board.
2. Place module load labels on left and right sides of the AC panel board using care to align with screw terminals.
3. Enclosure section is now ready for wiring.



### AC Terminal Boards For Legacy Modules:

MDS8RW101/102 Dimmers,  
MDR8RW101/102 Relays,  
EDIMMOD Electronic Dimmers,  
FANMOD Ceiling Fans,  
SD4008A-120 Dimmers,  
SD9008A-277 Dimmers  
AR8008-120 Relay,

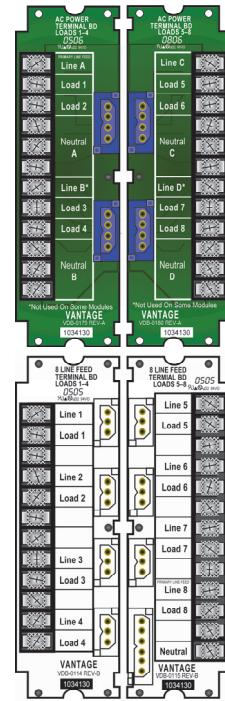
#### Order Kit part #TLM-KIT

8 Load AC Boards VSUB172 (left) and VSUB173 (right).\* Be sure to use top and bottom outside screws with this set to accommodate the top and bottom steel-spring module clips.

**MDR8CW301 Commercial 8-Line Feed:**

#### Order Kit part #T8LRM-KIT

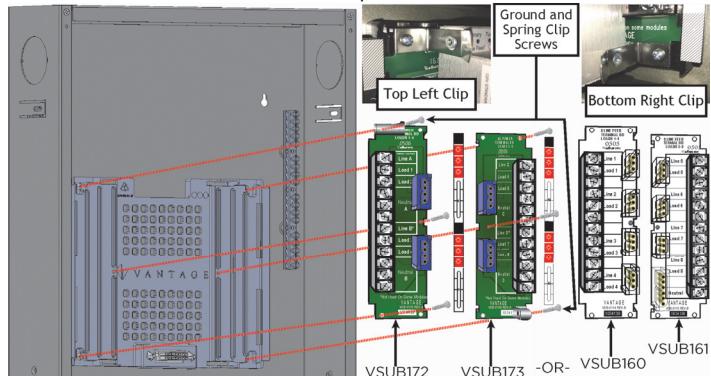
8 Load Relay AC Boards, VSUB160 (left) and VSUB161 (right).\* Be sure to use top and bottom outside screws with this set to accommodate the top and bottom steel-spring module clips.



#### Installing MDS/MDR/ED/FAN/SD or MDR8C Load Boards - left and right:

1. Insert AC terminal boards- Kit part #TLM-KIT, VSUB172 left and VSUB173 right or Kit part #T8LM-KIT, VSUB160 left and VSUB161 right to panel board and secure using 3, VHD-0082, #6-32 X 7/8" PHILLIPS PAN HEAD THREAD FORMING screws (TYPE-F) on each board. The top left and bottom right screws should also include the module spring-clip to lock the module in.

- a. The spring-clip locks and screws also make the ground connection for the modules. Note the orientation of the clip locks!



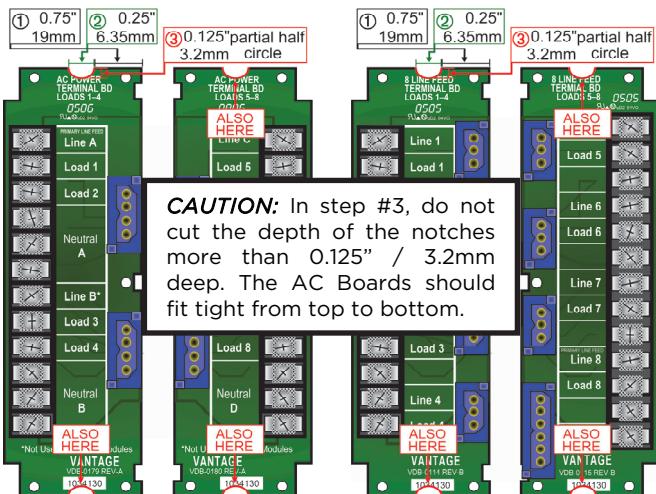
2. Enclosure section is now ready for wiring.

\*NOTE: If using a slightly older version of the VSUB172 (left) and VSUB173 (right) or the VSUB160 (left) and VSUB161 (right) AC Boards, it will be necessary to cut a slight notch out at the top and bottom of the board as illustrated below. This will allow the AC terminal boards to fit into the new *Terminal Board Module Platform*, part number 103160.

#### How To Notch Old Terminal Boards For Use In New Enclosures STEPS:

1. From the AC Board's (blue) connectors side measure in 0.75" / 19mm and mark;
2. From that mark measure another 0.25" / 6.35mm and mark;
3. Cut a 0.25" / 6.35mm X 0.125" / 3.2mm partial half-circle notch out of the board on the top and bottom of both the left and right hand AC boards as illustrated on next page.

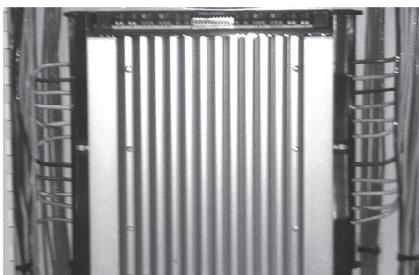
## Notching Old AC Terminal Boards



Make a small notch at the top and bottom as illustrated using directions on previous page

## Wiring AC Terminal Boards

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



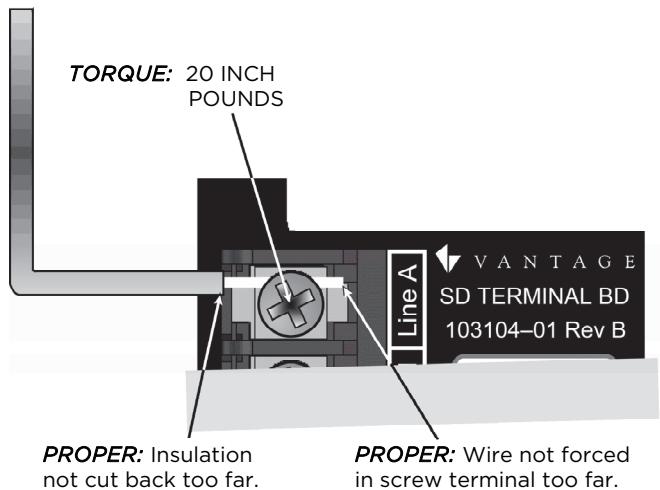
## Neutrals

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.

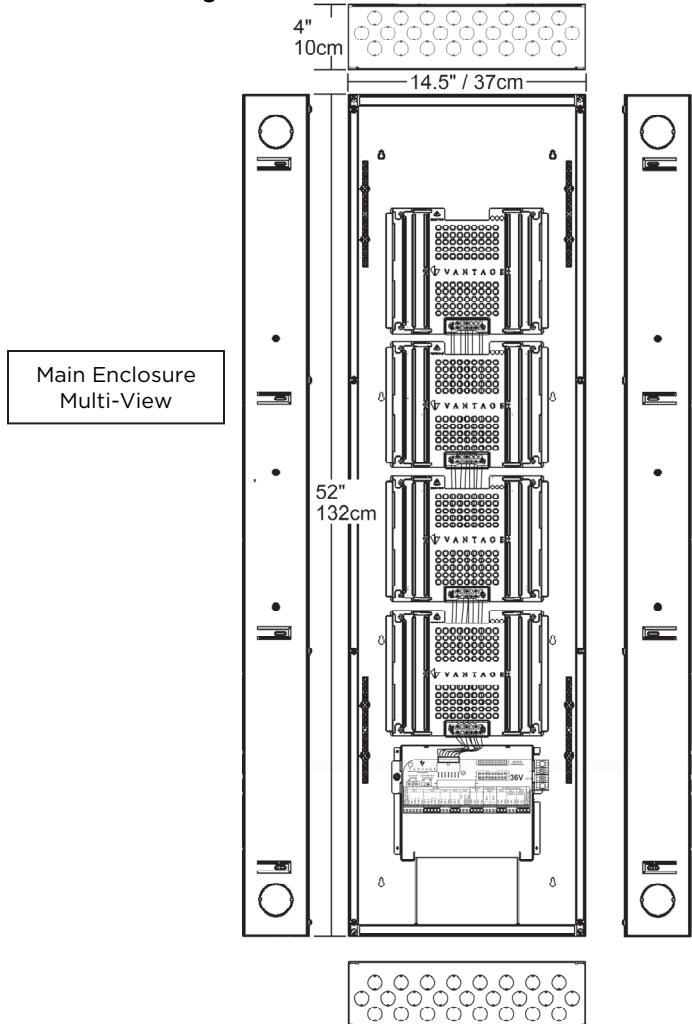
## Proper High Voltage Terminations / Proper Torque:

CONNECTOR	TORQUE	WIRE RANGE
MODULE TERMINAL	20 INCH POUNDS	14-10 AWG*
CONTROLLER POWER	20 INCH POUNDS	14-10 AWG*

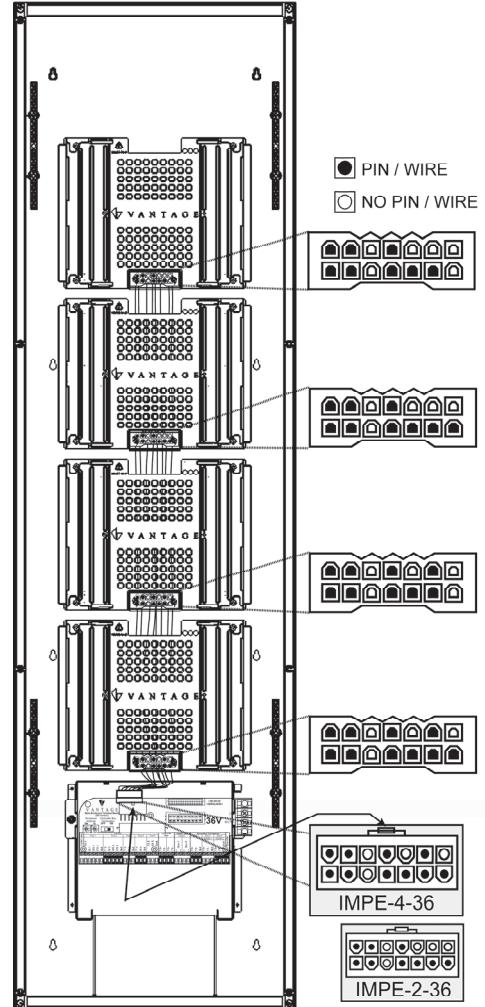
\*MUST MATCH BREAKER WIRE GAUGE



## Enclosure Drawings

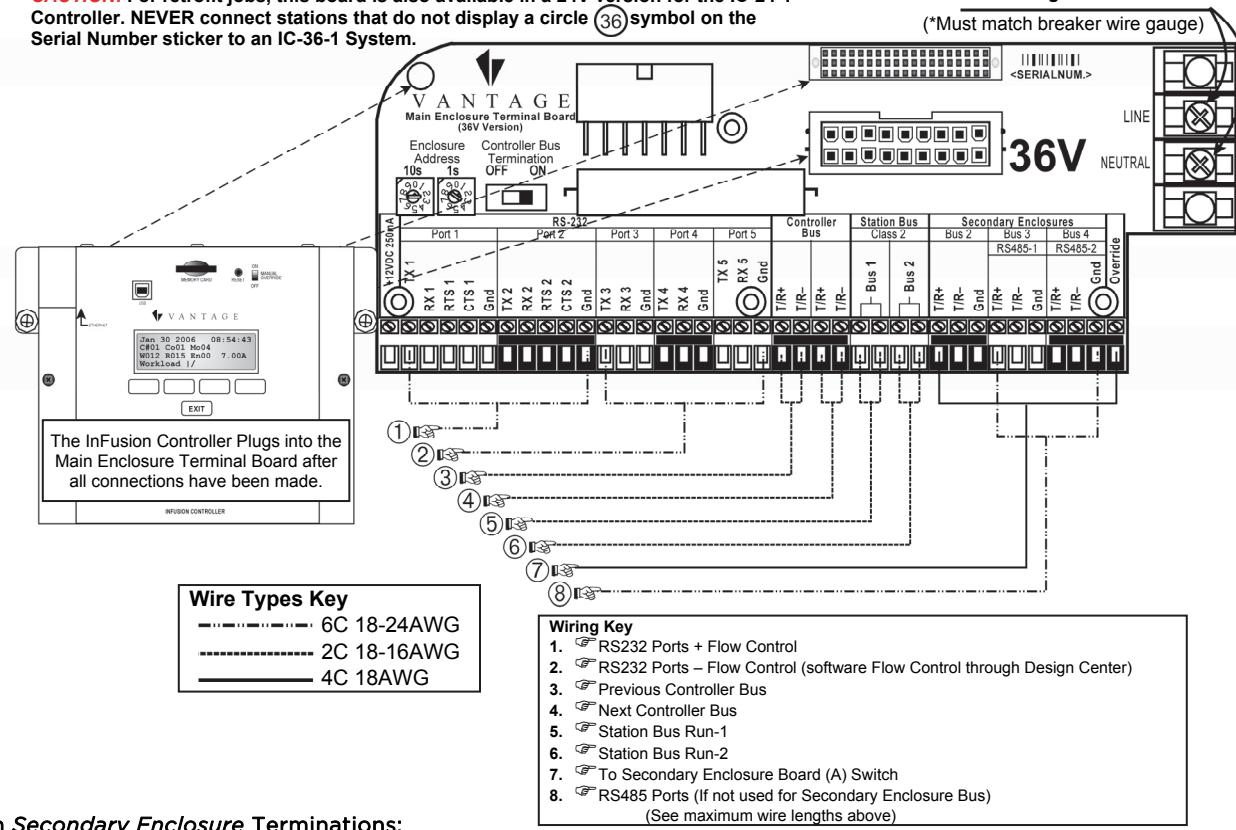
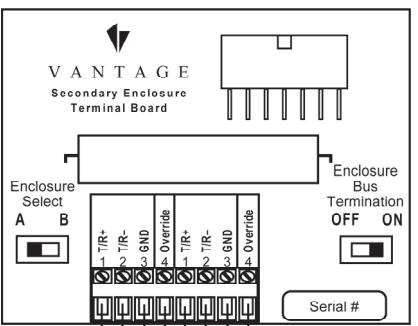


Shipping may have loosened Wiring Harness Pins. Please make sure they are securely inserted into the proper holes.

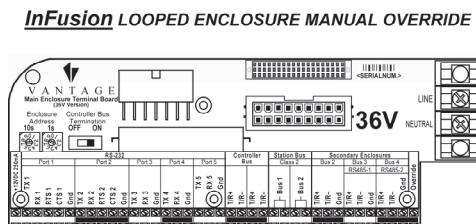
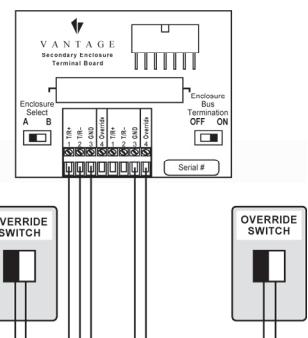
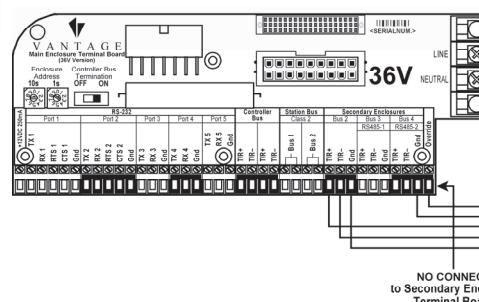


**InFusion Main Enclosure Terminations:**

**CAUTION:** For retrofit jobs, this board is also available in a 24V version for the IC-24-1 Controller. NEVER connect stations that do not display a circle (36) symbol on the Serial Number sticker to an IC-36-1 System.

**InFusion Secondary Enclosure Terminations:**

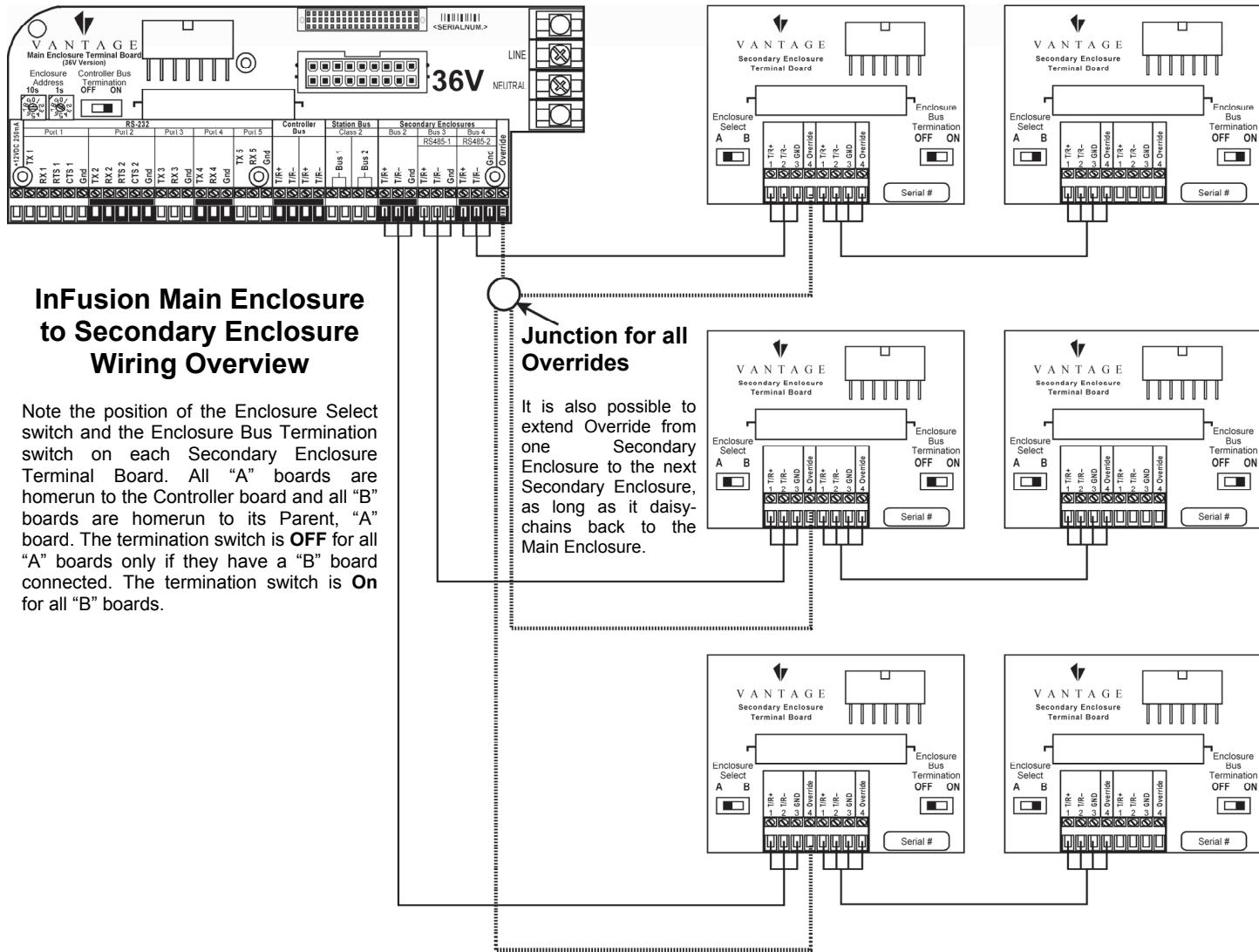
To InFusion Enclosure Board (4C 16-18AWG)      To InFusion Secondary Enclosure Board Switch-B (4C 16-18AWG)

**InFusion Override Wiring Examples:****InFusion INDIVIDUAL ENCLOSURE MANUAL OVERRIDE**

## Detail Wiring InFusion Main Enclosures to

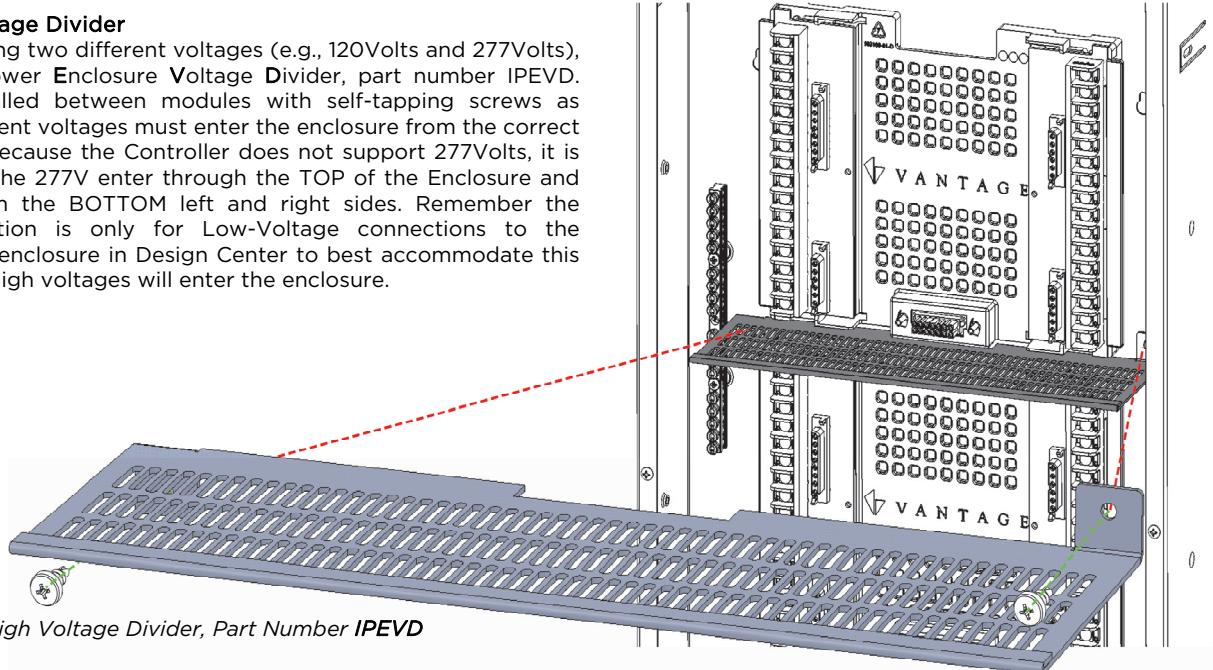
## InFusion Secondary Enclosures

(See wire specifications above)



## Enclosure High Voltage Divider

If an Enclosure is using two different voltages (e.g., 120Volts and 277Volts), use the InFusion Power Enclosure Voltage Divider, part number IPEVD. This barrier is installed between modules with self-tapping screws as illustrated. The different voltages must enter the enclosure from the correct side of the IPEVD. Because the Controller does not support 277Volts, it is recommended that the 277V enter through the TOP of the Enclosure and the 120V enter from the BOTTOM left and right sides. Remember the bottom center section is only for Low-Voltage connections to the controller. Build the enclosure in Design Center to best accommodate this part when different high voltages will enter the enclosure.



InFusion Enclosure High Voltage Divider, Part Number IPEVD