

**OVERVIEW**

Due to the flexible and modular nature of FlexPower systems, determining how much battery space is available in an enclosure isn't always straightforward. This application note will give some general guidelines for determining the available battery space.

Note that the images in this document are for illustration purposes only and are not 100% to scale.

 Batteries contain an enormous amount of energy which can cause fire or injury. Use caution to avoid shorting the battery terminals on the enclosure, backplate, or any other metal object.



**Factors Affecting Available Battery Space**

Several factors can affect the available battery space in a given FlexPower system:

**Enclosure Size**

Aside from the enclosure's length and width, the depth of the enclosure can also affect the battery space, especially in fully-loaded enclosures where the battery set is placed in front of boards mounted in the enclosure.

**Power Supply Configuration**

The number of power supply components installed in the enclosure can impact the available space. Larger systems in smaller enclosures could place power components at the bottom of the enclosure, negatively affecting battery space.

**Access Control Panel Mounting**

Like power the power components, any access control panels mounted in the bottom of a Unified Power or ProWire system can reduce battery space.

**Door Mounting**

Door mounting of access control panels or other components can reduce battery space.

**Wire Management / Channel**

Wire channel such as Panduit near the bottom of the enclosure can affect the available battery space.

**Backplate Size**

Most Unified Power enclosure types have backplates that run all the way to the bottom of the enclosure, however some have backplates that stop several inches above the bottom, providing dedicated battery space.

**Battery Orientation**

Today's sealed batteries can safely be placed in the enclosure in any orientation (taking care to not short the battery's terminals). By laying batteries on the side, or standing them on end, the number and type of battery options increases.



### Battery Sizes

Battery sizes referenced in this document assume the following dimensions:

4AH (4.5AH, 5AH) 3.6"L x 2.8"W x 4"H

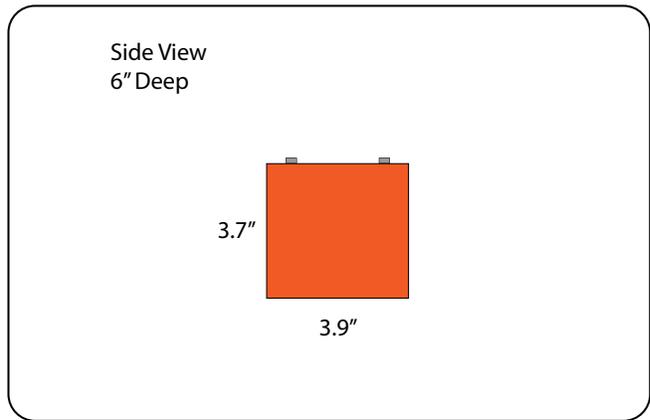
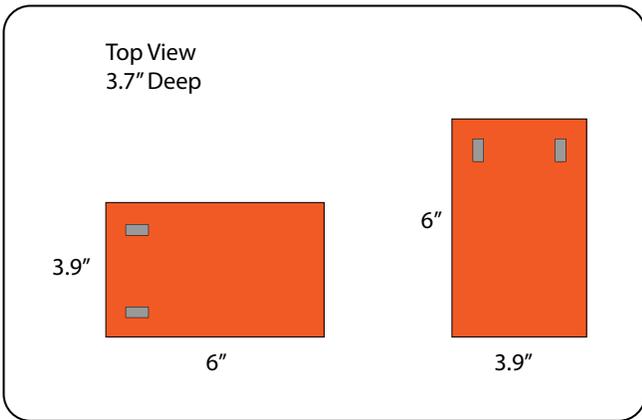
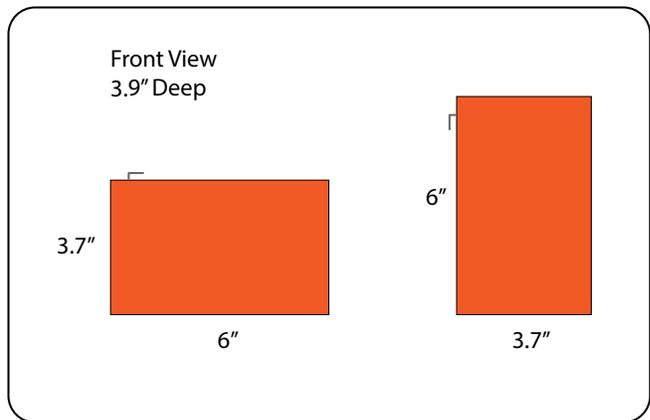
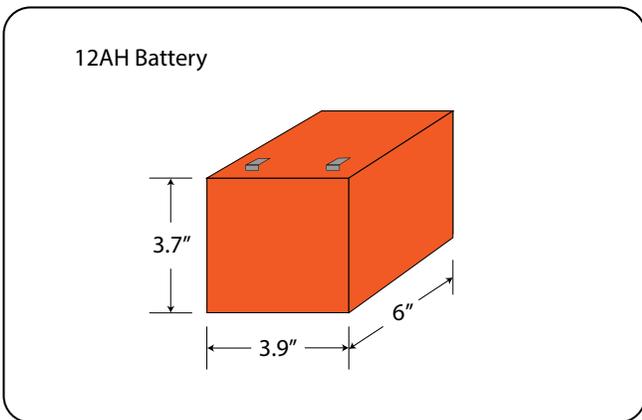
7AH (8AH, 9AH) 6"L x 2.6"W x 3.7"H

12AH (12.5AH, 14AH) 6"L x 3.9"W x 3.7"H

NOTE: These are the most common battery sizes used in access control installations. Other battery sizes may be used - check your battery manufacturer's website for battery dimensions.

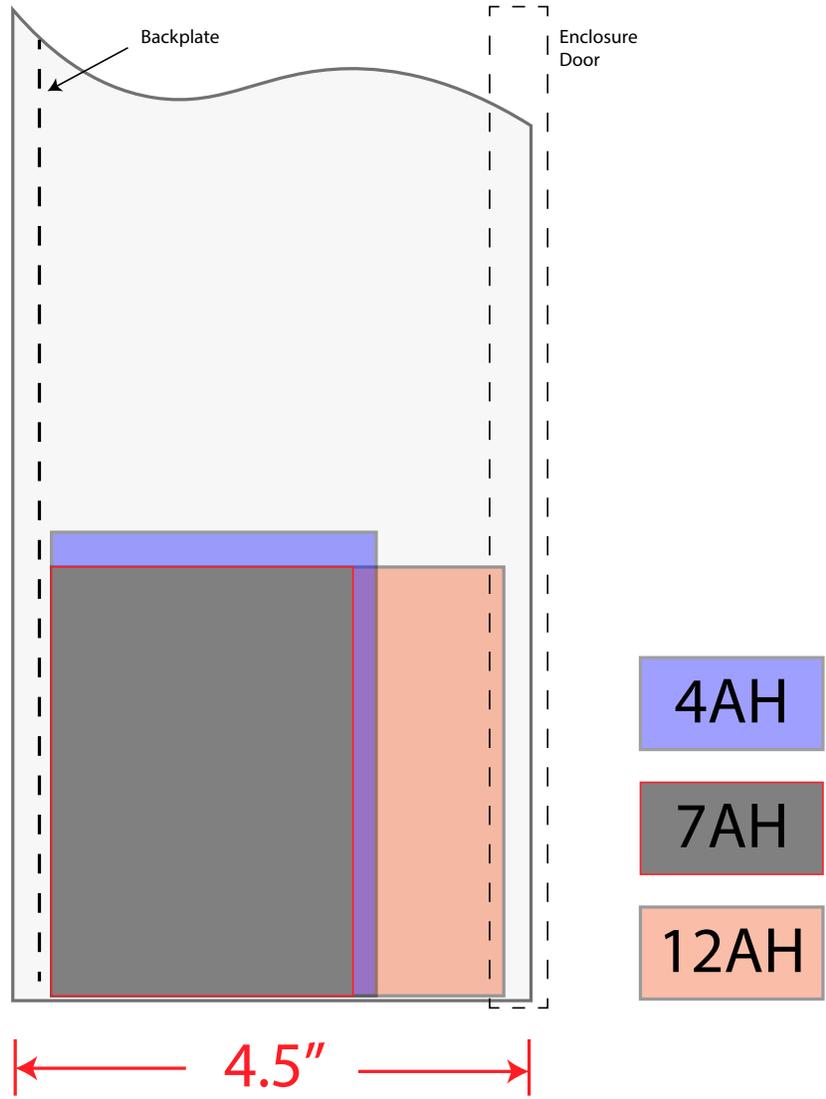
### Battery Orientation

Today's sealed batteries can be used in any orientation if care is taken to not short the battery terminals. This can be used to great advantage in maximizing the potential battery capacity in an enclosure. Batteries may be placed on their side, standing up on end, rotated, or a combination of these orientations. Below is an example of different battery orientations of a 12AH battery.



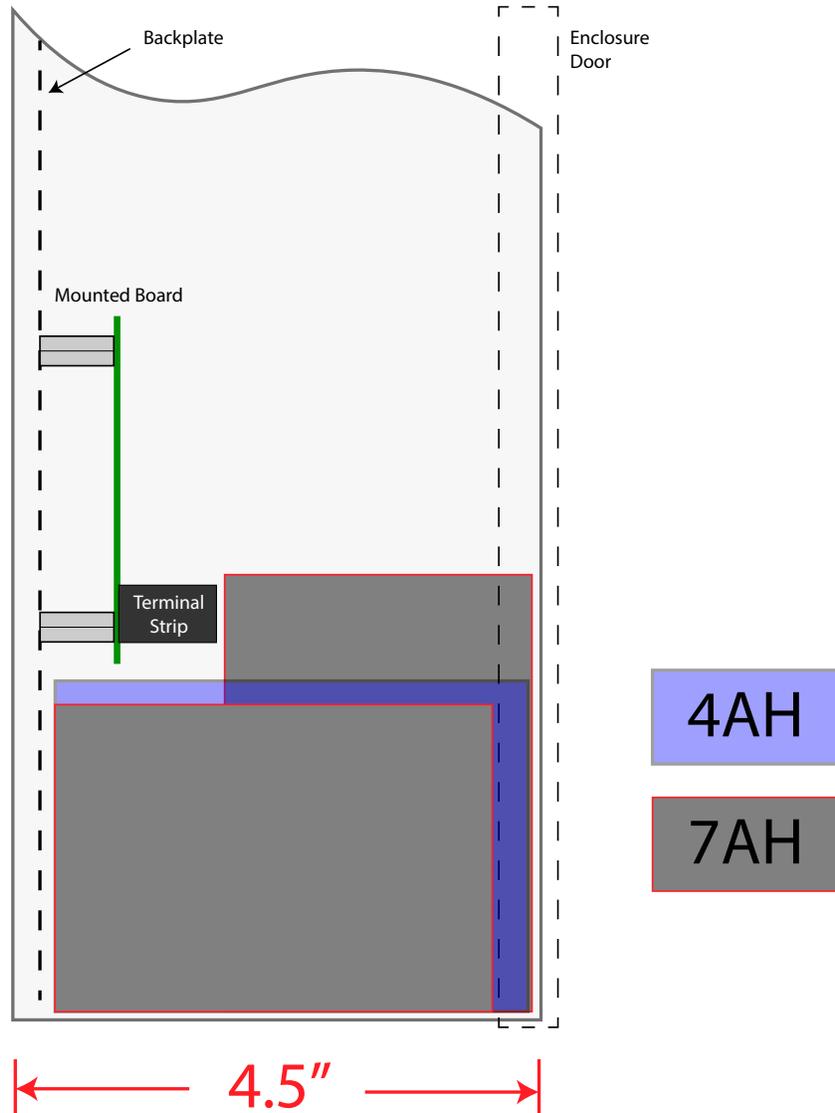
### 4.5" Deep Enclosures (E1, E2) - No Obstructions

In LSP's 4.5" depth wall mount enclosures, the actual measured depth of the interior of the enclosure is 4.4". This depth will allow 4AH, 8AH, or 12AH batteries to fit where there are no obstructions.



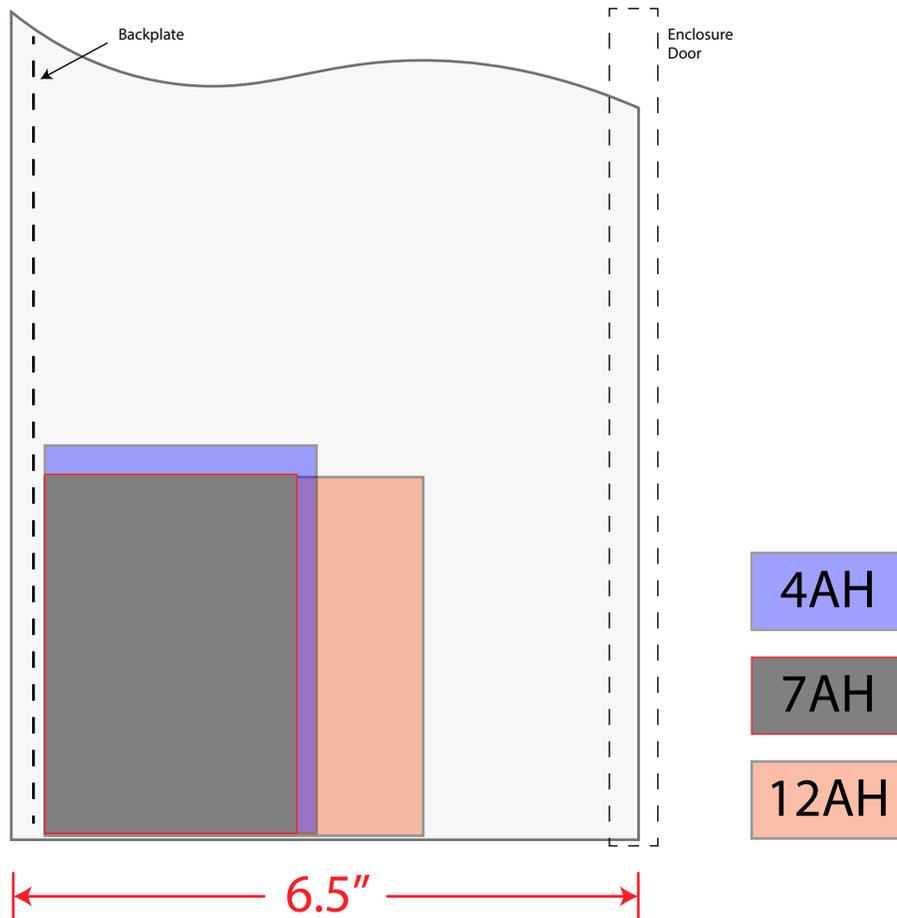
### 4.5" Deep Enclosures (E1, E2) - Boards Mounted Near Bottom

When board assemblies are mounted near the bottom of 4.5" depth enclosures, the total height of these board assemblies must be taken into consideration. In some cases, 7AH batteries will fit between the board assembly and the enclosure's door. If there are no board assemblies at the very bottom of the enclosure, the 4AH or 7AH batteries may be laid on side, under the board assemblies as shown below. See the section of this document on height and width considerations for more information.



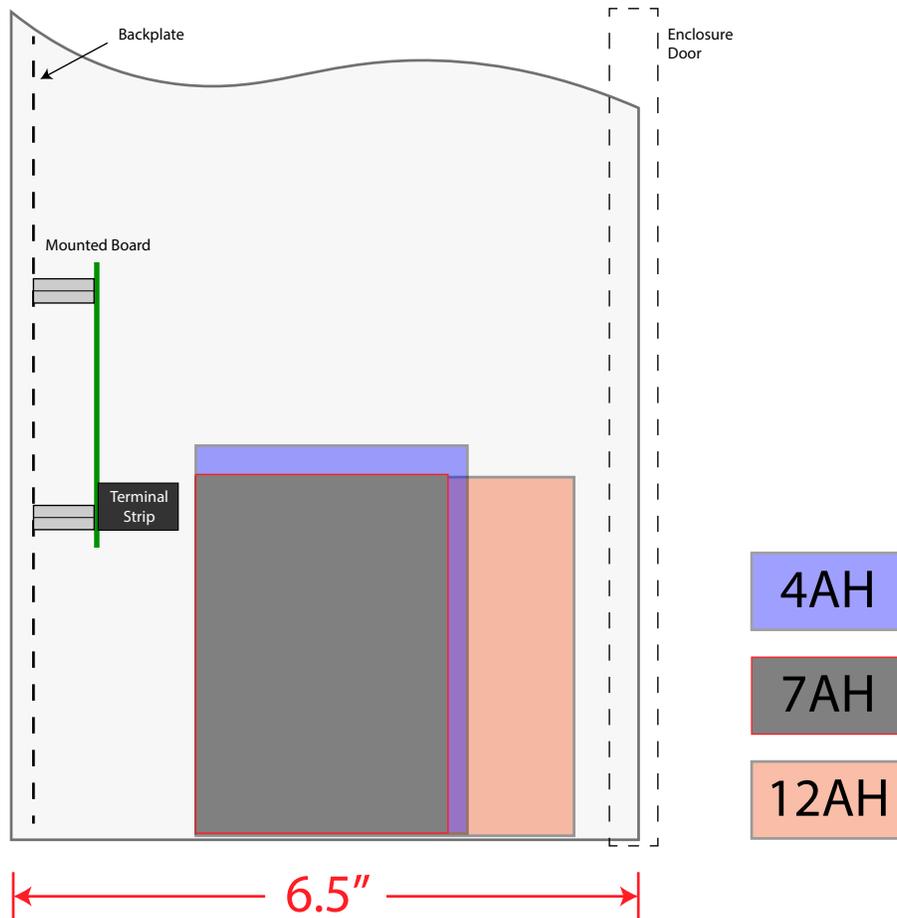
### 6.5" Deep Enclosures (E4, E6, E8) - No Obstructions

In LSP's 6.5" depth wall mount enclosures, the actual measured depth on the interior of the enclosure is 6.4". This depth will allow 4AH, 8AH, or 12AH batteries to fit where there are no obstructions.



**6.5" Deep Enclosures (E4, E6, E8) - Boards Mounted Near Bottom, Inside Only**

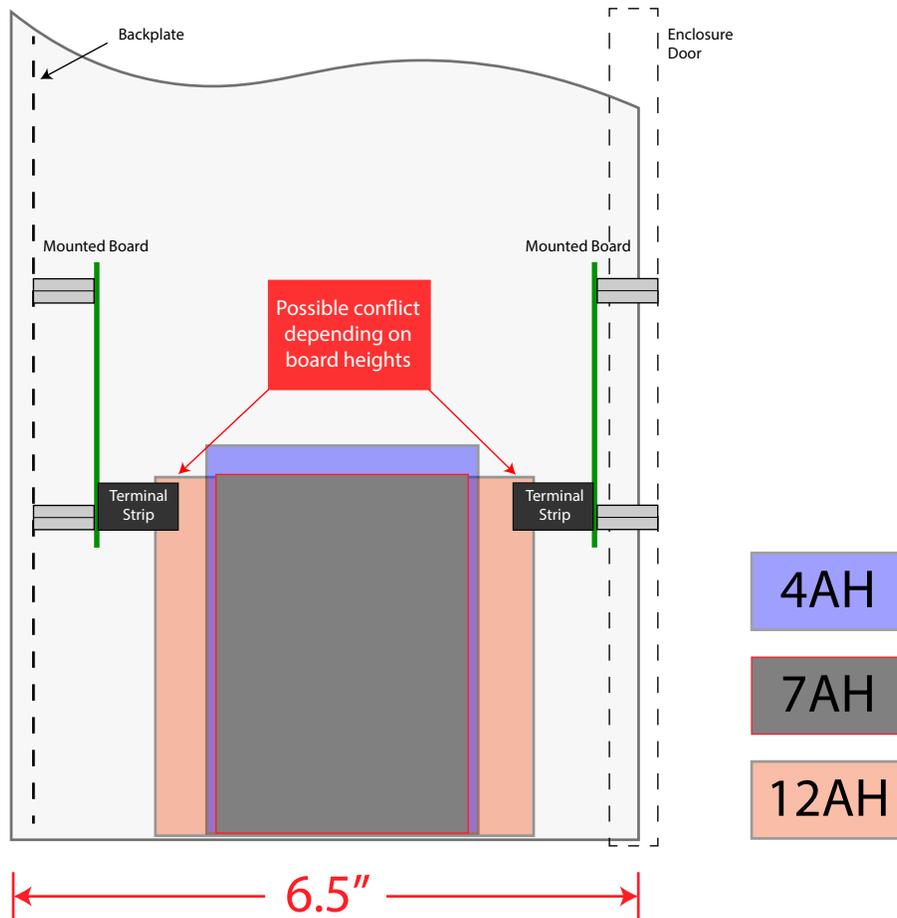
Even when board assemblies are mounted near the bottom of 6.5" depth enclosures, 4AH, 7AH, or 12AH batteries will fit easily. Note that this drawing shows the terminal strip as the highest obstruction on the board, but any tall component on the board should be considered.



### 6.5" Deep Enclosures (E4, E6, E8) - Boards Mounted on Door and Inside

When access control board assemblies are mounted on the door and on the inside near the bottom of 6.5" depth enclosures, there could be depth considerations to take into account. This will depend on the height of the boards mounted to the door and backplate. In general, 4AH or 7AH batteries will fit in most any application. If the height of the board assemblies is too great, 12AH batteries may not fit. Like in the 4.5" depth enclosures, the batteries may be laid on their sides to fit under the board assemblies, if possible.

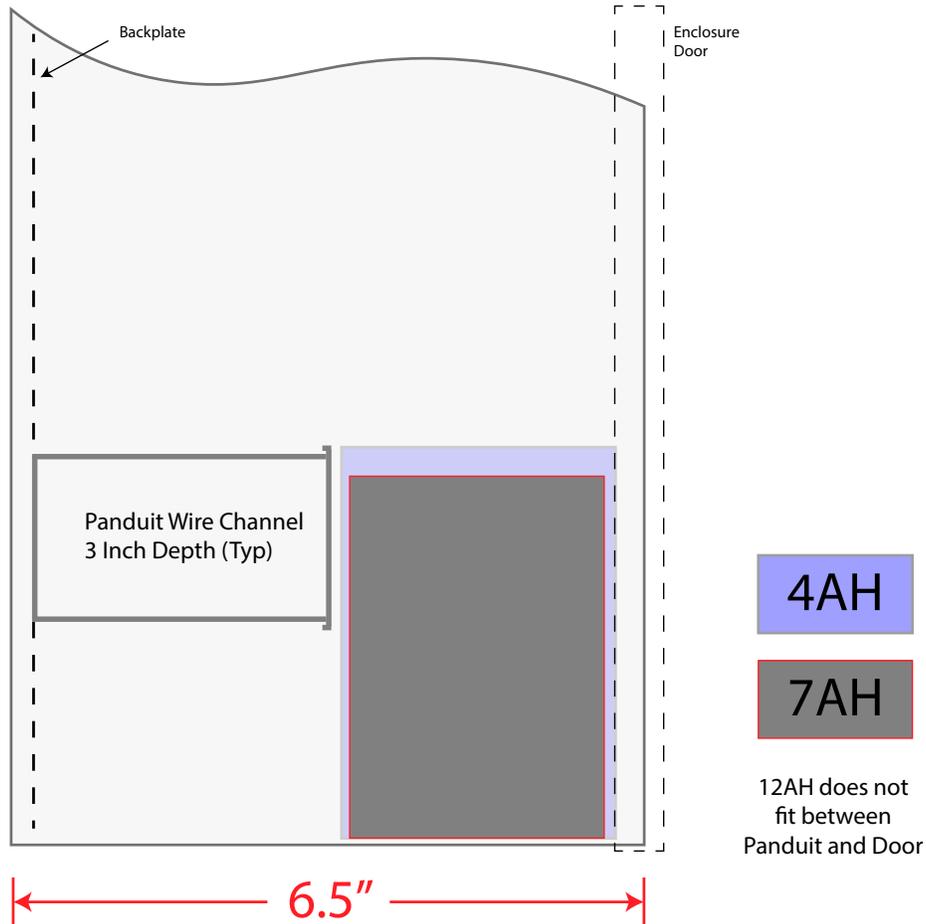
Note that this drawing shows the terminal strips as the highest obstruction on the boards, but any tall component on the boards should be considered.



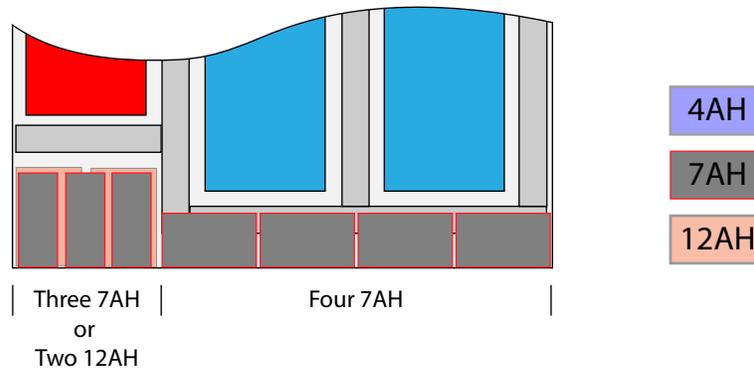
### 6.5" Deep Enclosures (E4, E6, E8) - Panduit Near Bottom, Inside

When 3" depth Panduit wire channel is mounted near the bottom of 6.5" depth enclosures, 4AH or 7AH batteries will fit between the Panduit and the door of the enclosure. Many E8 enclosures with Panduit also have a "compartment" in the bottom left where additional, deeper batteries will fit.

NOTE - Enclosures with Panduit **and** boards mounted to the door near the bottom, typically will not fit any batteries. To fit batteries, leave the bottom mounting locations of the door empty.



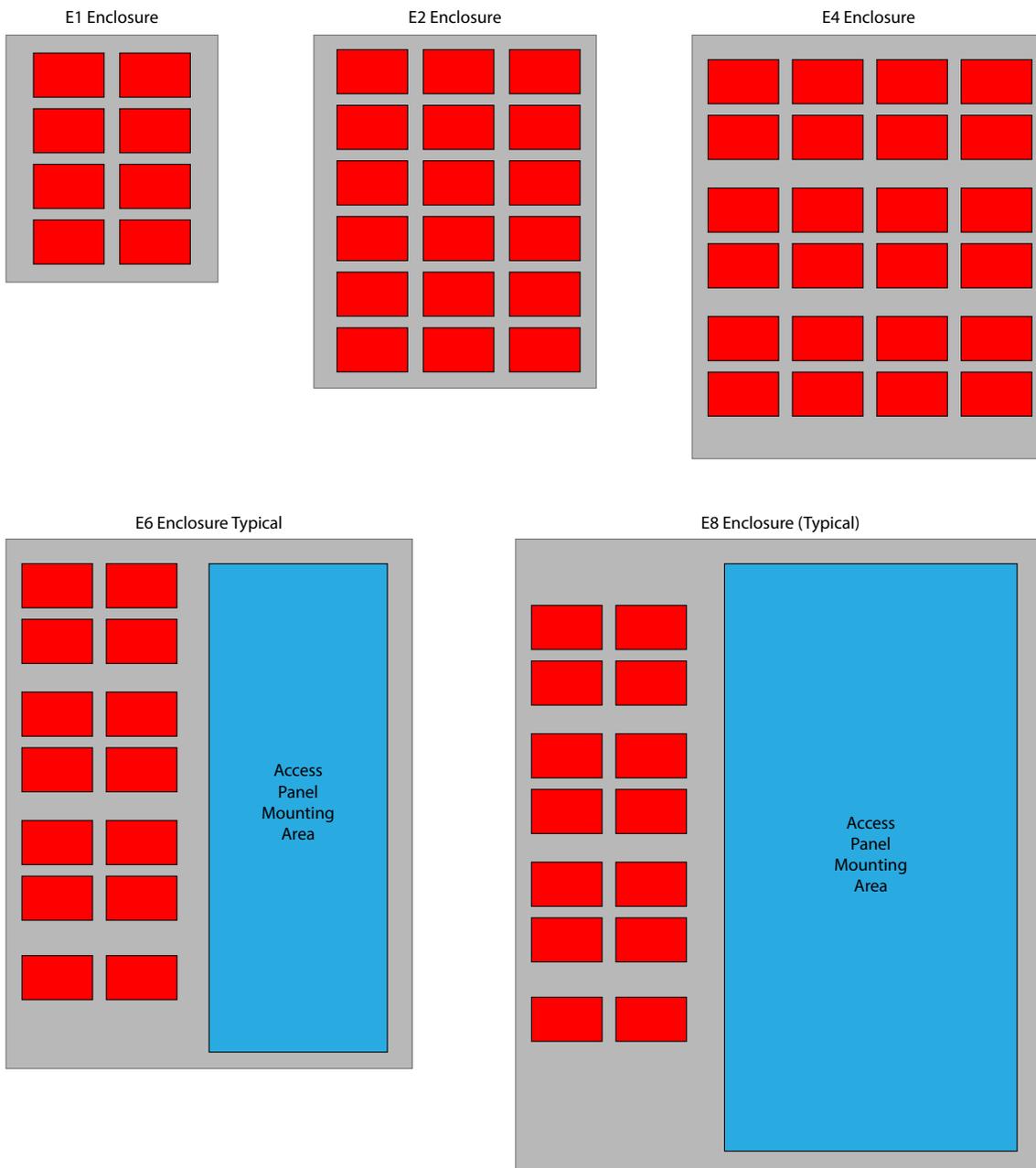
### E8M2 Enclosure - Example



### All Enclosures - Height and Width Considerations

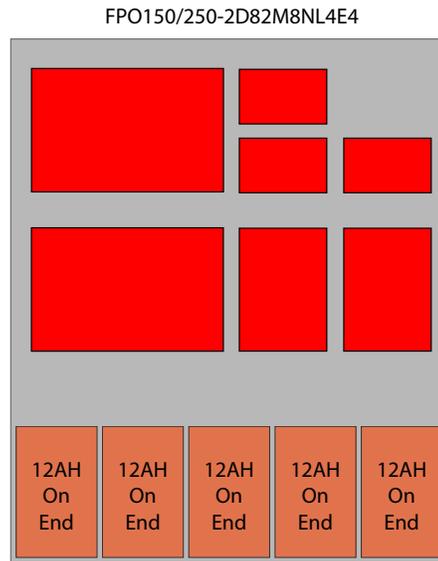
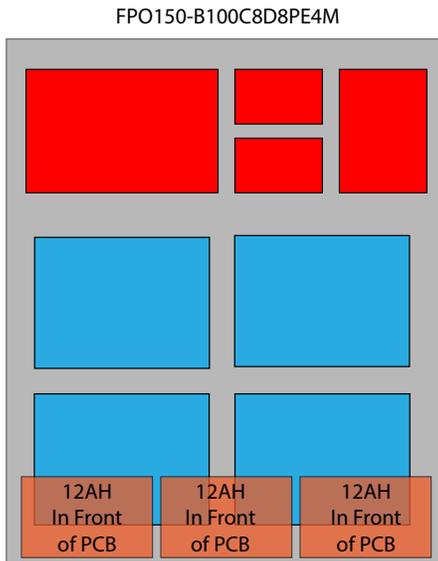
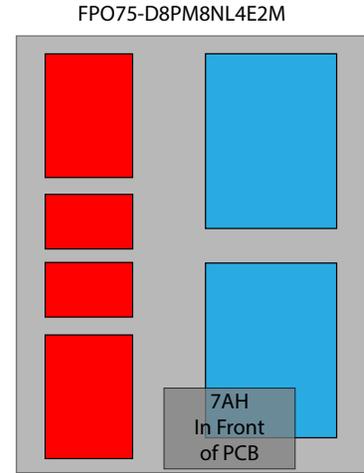
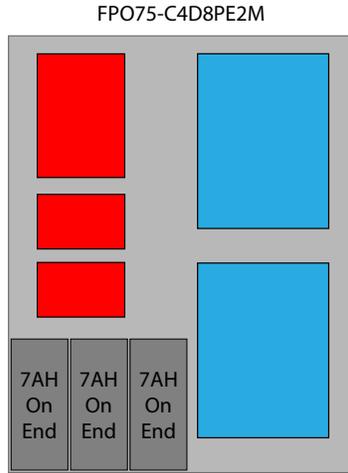
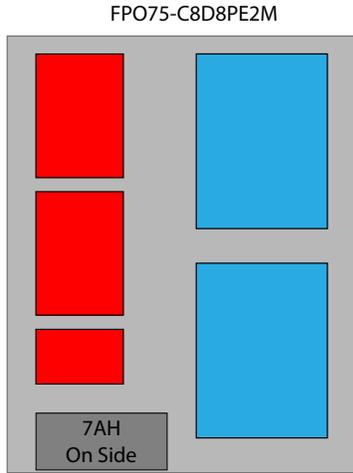
Most LSP wall mount enclosures have board mounting locations from top to bottom and left to right. Depending on the power system and access control module configuration, some board assemblies could conflict with battery space. If the enclosure depth is not sufficient to place the batteries between the boards and the door, the shape and size of the leftover space must be evaluated for battery space. The following sections will provide some examples and some general guidelines - see the enclosure's datasheet and LSP's online system configurator (<http://lspower.com/#/configurator/configurator>) for more information.

In order to understand the available battery space in these situations, you need to first understand the board mounting patterns. The images below show *TYPICAL* mounting patterns for various enclosure sizes. The mounting pattern for LSP boards is a modular grid and the images below show the smallest board size in each grid location. Note that not all locations can actually mount the smallest board sizes - this is only shown for illustration purposes. Unified Power and ProWire systems also have access control panel mounting locations - in the E1, E2, and E4, these often overlay the LSP mounting patterns. The E6 and E8 enclosures always have a dedicated access control panel mounting area with no overlapping LSP pattern. Again, see the enclosure's datasheet or the LSP online system configurator for details on a specific enclosure.



### Examples

Below are some examples of possible battery placements in various configurations. Note that this is only a small sample of the possible configurations and battery combinations.



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