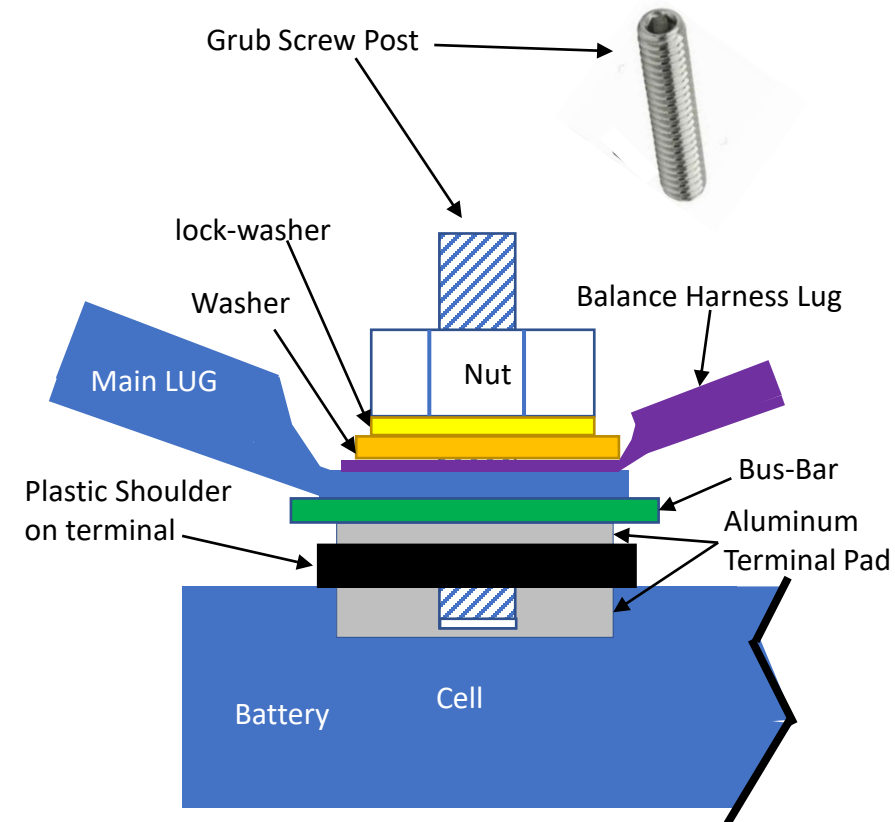


# Rules of Thumb for lugs on posts

# Lugs On LiFePO4 cell Post

- The order of the items (Bottom to top)
  1. Bus Bar (Bottom)
  2. Main Lug
  3. Balance Harness Lug
  4. Washer (This spreads the force down on the lug over a broader area)
  5. lock-washer (This keeps the nut from loosening)
  6. Nut (Top)
- Never put more than one main lug on a cell terminal. (Too much stress on the terminal)
- The primary current path is through the flat surfaces of the Pad and Lug
  - The Bus-Bar, Main Lug and Balance Harness Lug must all lay flat against each other
  - The Lug hole should match the size of the Grub Screw to maximize contact with the pad. (Do not use lugs with oversized holes)
  - The busbar or main lug should completely cover the Terminal Pad to Maximize contact
  - Lightly steel wool the lug and bus-bar fist to ensure good contact.
- I like NordLock or star lock-washers for cell terminals. (Split ring washers can take too much force to flatten.)
- I like Stainless steel for the Grub Screw, Nut, lock-washer and Washer.
- **Do not put the grub screw in and out of the terminal multiple times. Each time you do, it damages the soft aluminum threads of the terminal. Just a few times in and out can ruin the threads.**  
Because of this, it is best to put the grub screws in once with RED Loctite and never take them back out. (Even with the Loctite, always use an Allen wrench to keep the stud from turning)
- All threads of the nut should be engaged with the grub screw threads. If not, get a longer grub screw.
- I do not use the screws that often come with the cells.

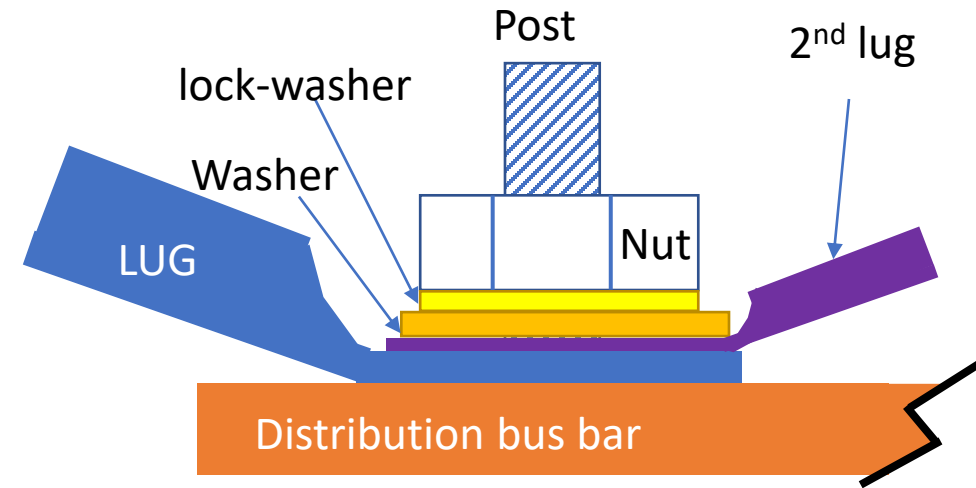


## Tightening procedure.

- 1) Hand screw the grub screw all of the way to bottom of terminal and then back it off  $\frac{1}{8}$  -  $\frac{1}{4}$  turn.
- 2) Put on the lugs, washers and nuts in proper order
- 3) With an Allen wrench holding the lug screw in place, tighten the nut. **Be careful not to strip out the terminal with too much force.**

## Lugs on Distribution Bus Bars.

- The order of the items on the post (Bottom to top)
  1. Highest Current Lug always goes on first.
  2. 2<sup>nd</sup> Highest Current Lug
  3. Washer
  4. lock-washer
  5. Nut (Top)
- I avoid putting 2 lugs on a post and I really do not like putting 3 lugs on a post.
- The primary current path is through the flat surfaces of the Distribution Bus-Bar and the Lug
  - The lugs must all lay flat against each other and the Bus-bar
  - The lug hole should match the size of the post to maximize contact with the Bus-Bar. (Do not use lugs with oversized holes)
  - I like to lightly steel wool the lugs and bus bar fist to ensure good contact.
- I like stainless steel for the nut, lock-washer and washer.
- All threads of the nut should be engaged with the post threads. If not, you are putting too many things on the post.
- If possible & reasonable, put high current lugs on adjacent posts and lower current lugs further out. This minimizes the resistance for the high current path(s)



## Lugs On 'Drop-In' LiFePO4 Batteries.

The terminals on Drop-In LiFePO4 batteries vary too much to generalize how to connect your lug to them. However, there are a few rules of thumb that can be applied to almost any type post.

- The terminals on the LiFePO4 batteries vary significantly in quality. Some of them have solid terminals that hold quite well, others have somewhat flimsy terminals so be careful with them.
- Avoid putting more than one main lug on a battery terminal. (Too much stress on the terminal)  
If you do put more than one lug on the battery post, the highest current lug should go first so it has the best contact with the battery. I would never put 3 lugs on a battery terminal.
- The primary current path is through the flat surfaces of the Lug and the flat part of the battery terminal.
  - The Main Lug must lay flat on the 'flat' of the battery terminal.
  - The Lug hole should match the size of the post on the battery terminal in order to maximize contact with the terminal. (Do not use lugs with oversized holes)
  - Lightly steel wool the lug and terminal fist to ensure good contact.
- It is best to have a washer, lock-washer and nut holding the lug down (In that order). This produces the most even force down on the lug and ensures the nut does not come off. (Even in a stationary system thermal expansion and contraction can loosen the nut)
- I like Stainless steel for the nut, lock-washer and washer.
- All threads of the nut should be engaged with the battery post threads. If not, you have too many lugs on the post.