

ESS SEISMIC BATTERY RACKS

ASSEMBLY INSTRUCTIONS



Electronic Systems Support
www.ess.to

This manual provides instructions regarding safety, installation, and operation. Failure to observe the precautions as presented may result in injury and/or damage to the seismic racks.

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1. GENERAL INFORMATION

- 1.1. ESS seismic racks are rated for high seismic areas as defined in the IBC 2006 Edition. The racks are supplied unassembled. A SPEC sheet is provided with each rack showing a Bill Of Materials for the specific rack ordered and general views of the rack showing overall footprint of the rack and other dimensions such as anchor placements and height.

2. SAFETY PRECAUTIONS

- 2.1. Assemble racks in accordance with the instructions contained in this document.
- 2.2. Refer to national and local regulations and ordinances that pertain to battery installation and storage.
- 2.3. Racks are loaded from the front of the rack. Seismic racks are supplied with front and rear cross braces. Racks will be loaded with the front cross braces removed. However, the rear cross braces **MUST** be installed at the time of loading the rack. Failure to do this may result in the collapse of the rack and possible injury.

3. GROUNDING

- 3.1. Ground racks as required per NEC and local codes. Grounding provisions are located at the top of each upright.

4. INSPECTION UPON RECEIPT OF GOODS

- 4.1. Special precautions and care have been taken to ensure the rack arrives safe and undamaged. However, upon receipt, you should inspect the entire shipment, including the crate and any boxes for evidence of damage that may have occurred during transit.
- 4.2. Visible Damage: It is the responsibility of the person receiving the shipment to inventory and fully inspect all materials against the bill of lading or way bill IMMEDIATELY, while the carrier representative is still present. Ensure that all items are accounted for, including number of skids and quantity of boxes. Also note any visible external damage that may have occurred during transit. Make all applicable notations on the delivery receipt before signing and file a damage report with the carrier.
- 4.3. Concealed Damage: Within 30 days of receipt, unpack the cabinet system and check for any concealed damage. Check the materials received against the detailed packing list to verify the quantity and the condition as complete and satisfactory.

Note any damage to the internal packaging, then request an inspection by the carrier and file a concealed damage claim. If there is a material shortage, contact ESS at the number listed at the end of this manual.

Please contact your shipping company for all shipping damage. ESS is not responsible for any shipping damage.

5. RACK LOCATION

- 5.1. Special consideration should be taken when determining the location of the rack installation. Locate racks in a clean, cool, and dry location away from sunlight, radiant heat, etc. Cells in top tiers tend to operate at a slightly higher temperature than cells in lower tiers. Always provide adequate space and ventilation for racks.
- 5.2. Consider available floor space, including aisles for cell installation, maintenance, and possible cell replacement. Aisle spacing should be in accordance with local CODE requirements and the NEC.
- 5.3. Weight of the loaded racks and all auxiliary equipment should be considered, as floor must be able to handle both.



5.4. Floor must be reasonably level. Racks may be shimmed a maximum of 0.25 inches.

5.5. Minimum clearance between racks and any objects such as walls and other racks is to be 4 inches. DO NOT INSTALL RACKS END TO END OR BACK TO BACK.

6. TOOLS AND REQUIRED FOR THE INSTALLATION

Prior to begin the installation of the battery rack, ensure the tools listed below are readily available.

- Torque Wrench
- SAE ratchet/socket set
- SAE open end-box wrenches
- Concrete drill
- Tape Measure
- Square
- Level
- Chalk line
- Floor anchors
- Floor shims
- Ohmmeter

TORQUE SPECIFICATIONS

The table below contains torque information for each of the bolt diameters used in the assembly of the rack. Failure to follow the specifications therein may result in possible damage or failure of the rack system.

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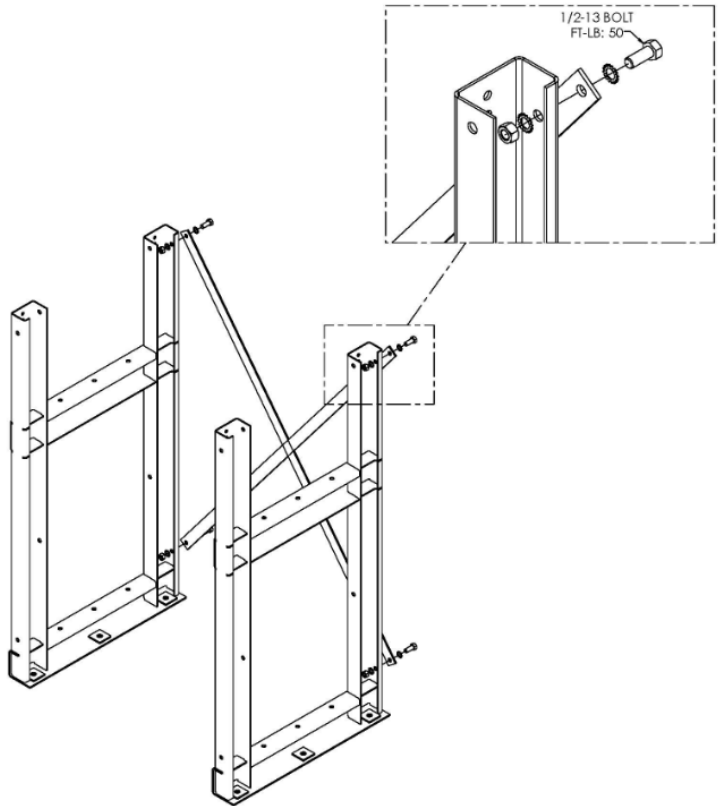
BOLT DIA.		TORQUE	
in	mm	ft-lb.	Nm
3/8	9.5	20	27
1/2	12.7	50	68
5/8	15.9	100	136

7. RACK ASSEMBLY

7.1. REAR RACK FRAME ASSEMBLY

Stand frames up and space accordingly to install rear cross braces as illustrated on Figure 1.

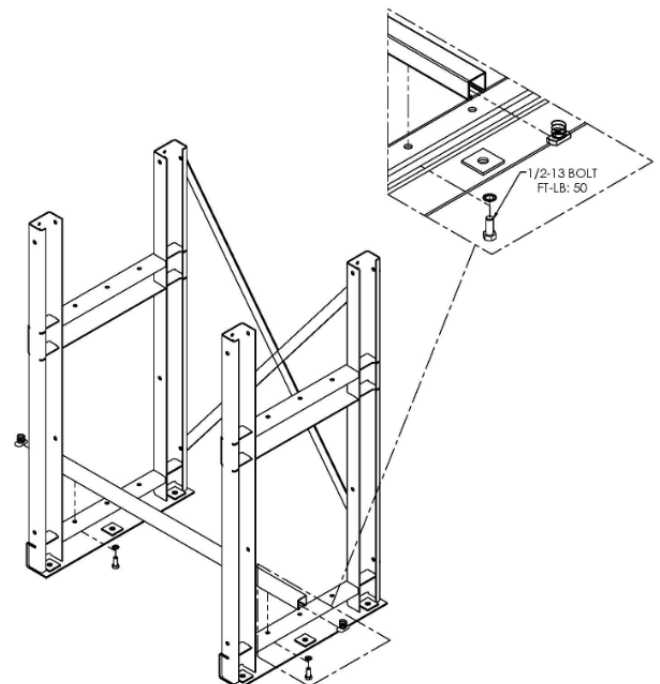
Figure 1



7.2. BOTTOM TIER RAIL SUPPORT INSTALLATION

Bolt support rails to the bottom tier of the rack assembly as illustrated on Figure 2.

Figure 2



7.3. PLASTIC CHANNEL COVER

Plastic covers are supplied pre-cut to the length of the rack. Apply double-sided tape to the outside surface of each support rail and install the plastic covers so that the full length of the strut rail is covered. End braces made of strut will also need plastic covers. Installation of covers and double sided tape is illustrated on Figure 3 and Figure 4.

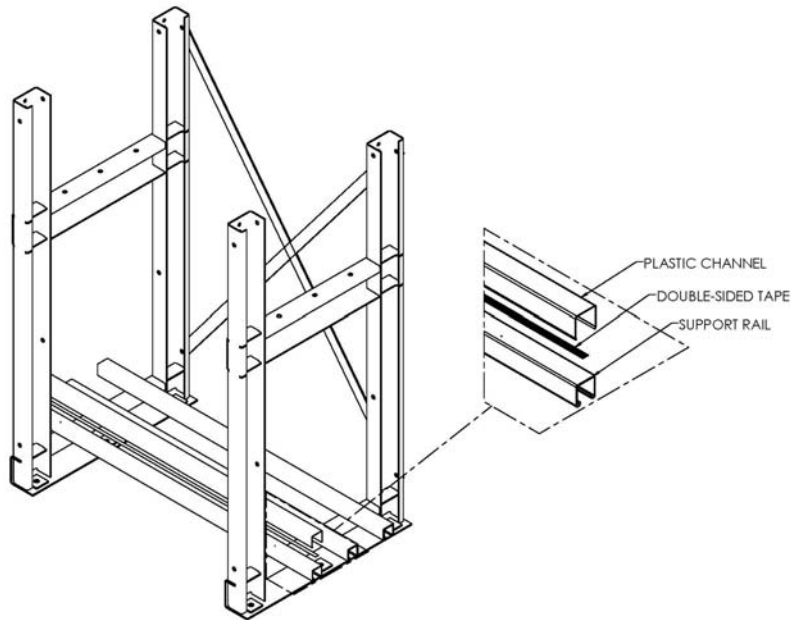


Figure 3

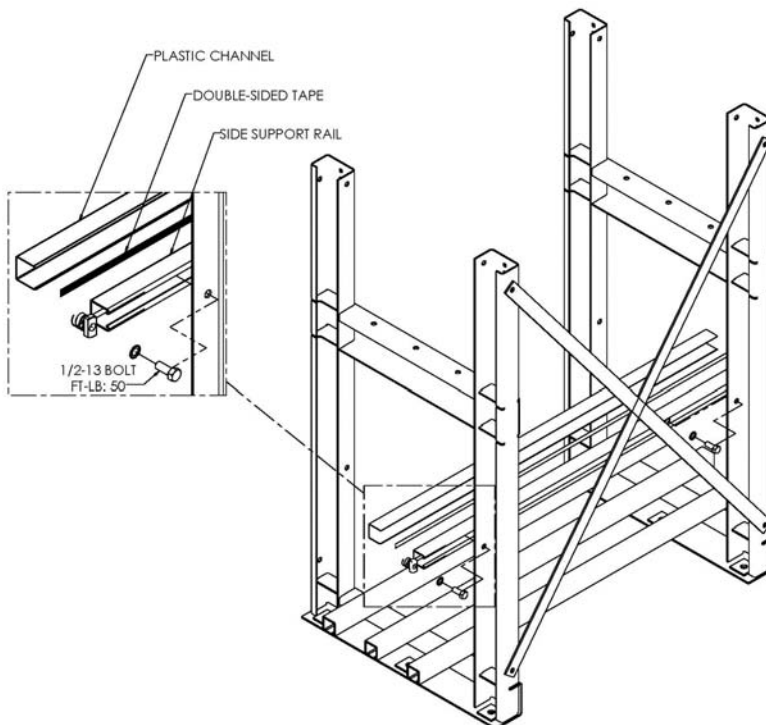
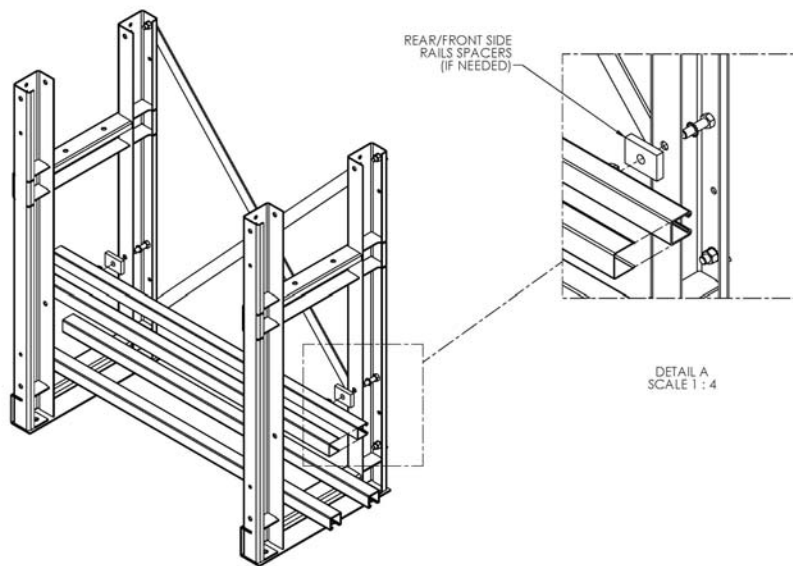


Figure 4



7.4. SIDE SUPPORT RAIL SPACERS

Depending on the battery being installed, spacers may be required to achieve a tight fit between rear and front side support rails and the battery without putting pressure on the battery jars. Spacers will be installed on rear and front side support rails so that batteries are centered on the rack. See Figure 5.



7.5. ANCHORING

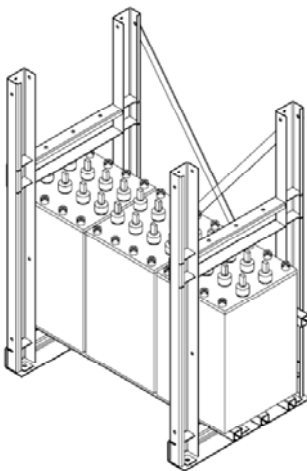
Floor anchoring and design are the responsibility of the installer. All frame holes must be used in order to maintain seismic certification. ESS does not provide anchoring hardware with the rack sold. All floor mounting hardware must be determined in accordance with local building codes.

Reference the rack assembly drawing included in with the rack to determine frame and anchoring holes layout. Mark hole locations using the holes at the bottom of each frame as a template. It may be necessary to move frames out of the way to drill anchor holes. Installation on 3000 psi concrete or greater recommended. Install anchors per manufacturer's instructions.

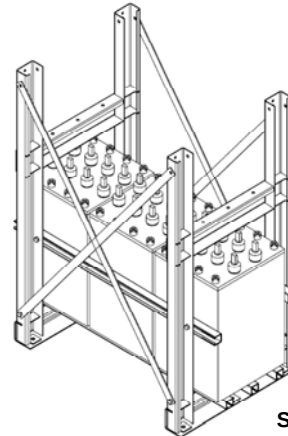
8. Battery installation sequence.

This page is to be used as visual reference of how the installation of the batteries should progress as the rack is assembled. Follow the step-by-step instructions in the following pages to begin the rack assembly. It is important to determine the polarity of each cell prior to installation.

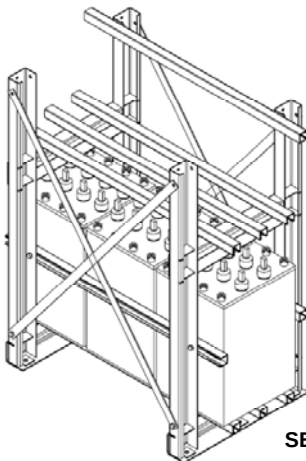
- 8.1. Install the rear side rail prior to installing cells. Reference assembly drawing included with rack for how much each rail extends past the frame. The rails will extend the same on both ends.
- 8.2. Install plastic channel.
- 8.3. All bolts should be torqued per Table 1 prior to installing cells.
- 8.4. Install bottom tiers first. Bottom tiers should have the largest number of cells.
- 8.5. Install all bottom tier cells, front side rail and cross braces prior to installing cells on other tiers.



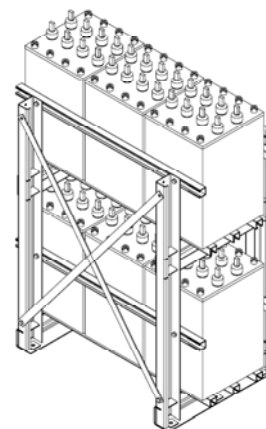
SEQUENCE 1



SEQUENCE 2



SEQUENCE 3



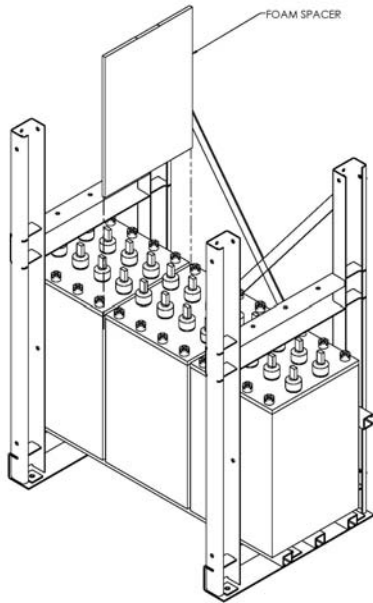
SEQUENCE 4



9. END BRACES AND OTHER ACCESSORIES

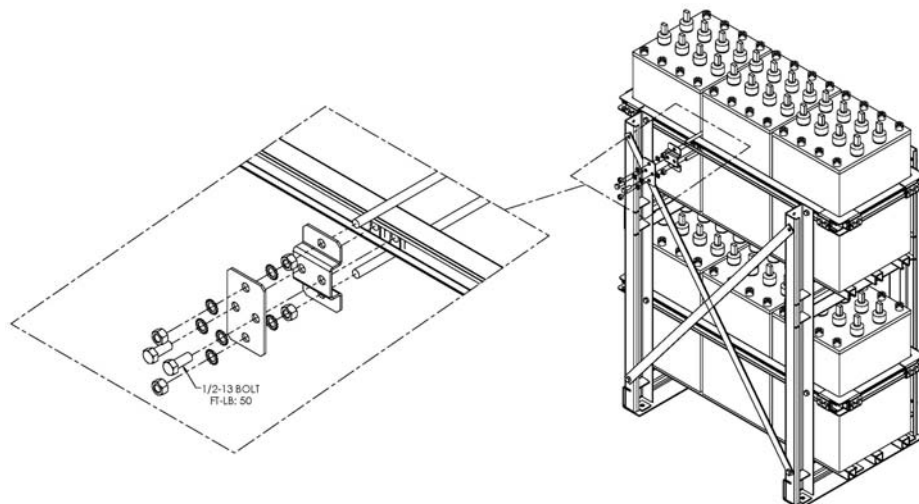
9.1. Foam Spacers

- 9.1.1. If present, install foam spacers between batteries except where Intermediate Rod Supports are installed. See Figure 6.



9.2. Intermediate Rod Supports

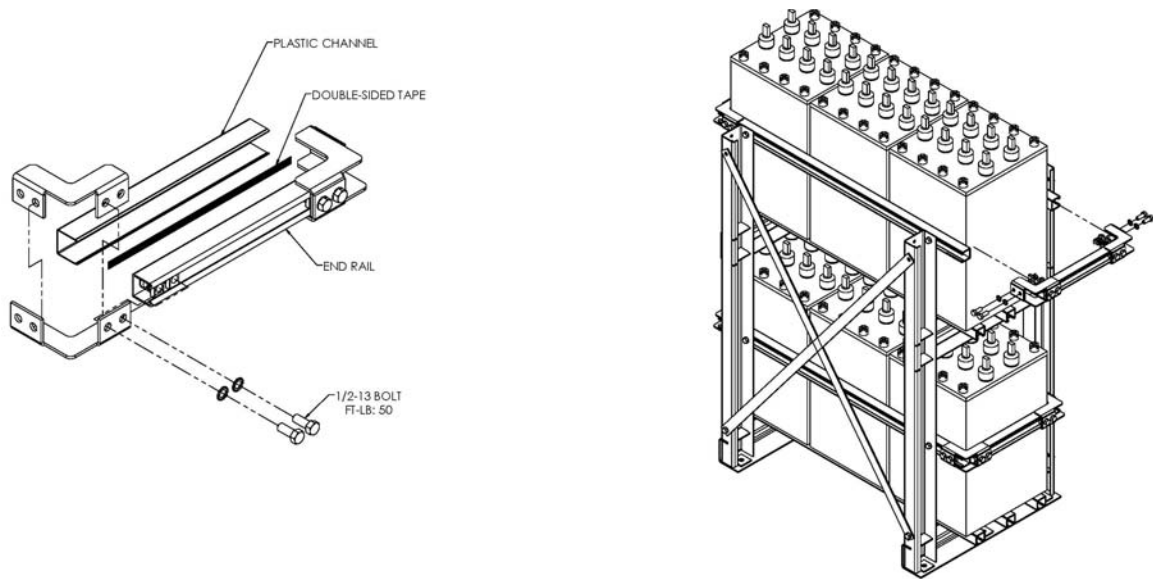
- 9.2.1. Depending on the length of the racks, Intermediate Rod Supports help distribute the load of the batteries on the rack during a seismic event. These Intermediate Rod Supports **MUST** be installed if they are shipped with the rack. A drawing for the specific rack being installed will be included in the shipment indicates the approximate location where each of the Intermediate Rod Support. When torquing the rod support assembly, the nuts outside the plate clamp the rear and front side rails. The inside nuts lock against the outside plate. See Figure 7 for installation.





9.3. End Braces and Corner Brackets

9.3.1. Install End Braces and Corner Brackets as shown in Figure 8. The corner brackets configuration will depend on the rack being installed. Some installations will require only one bracket per corner. Other installations of heavy batteries, require two brackets per corner. The brackets need to be installed properly. An assembly drawing ships with each rack being installed. The drawing will show details of this part of the installation. Each end braces needs to have a plastic cover. After torquing all hardware, make sure the End Braces are not putting any force on the battery jars.



9.4. Grounding

9.4.1. All racks have a grounding provision at the top of each frame. Reference assembly drawing shipped with each rack for correct location of grounding provision. If masking is not present, it may be necessary to remove powder coat finish from the ground location prior to connecting ground strap to rack. Ground all rack installations as required by NEC/local codes.



NOTES



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