LINEAGE POWER

Electro-Tyte RC and Round Cell Battery Stands

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Notice:
The information, specifications, and procedures in this manual are subject to change without notice. Lineage Power assumes no responsibility for any errors that may appear in this document.

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1 Product Summary

Electro-Tyte RC Battery Stand

This product manual provides information on Lineage Power Electro-Tyte RC Battery Stand (For List 1S Round Cell batteries only) and the Round Cell Battery Stand (For list 2S, 3S and 4S Round Cell batteries only). These battery stands are specifically designed for use with the Lineage Power Round Cell Battery (see Figure 1-5). Just like the round cell battery the original Round Cell Battery Stand has enjoyed an un-paralleled record of experience, service and ease of installation. Now revised and renamed this stand takes the service and ease of installation to a new level.

Designed to provide long, maintenance free, reliable service life, and ease of installation these battery stands have now been enhanced to include integral spill containment along with other feature improvements. The containment system is designed to exceed the requirements defined in the many codes (fire, building, mechanical, electrical, environmental, and worker safety) that recognize the need for hazard risk management associated with leaking batteries. Lineage Power has taken a proactive step to incorporate what it has deemed a prudent and necessary change to its product family. The Electro-Tyte RC Battery Stands (for List 1S Round Cell Batteries Only) will now fully contain all the liquid from a leaking battery within the footprint of the battery stand.

Other enhanced features of the Electro-Tyte RC and Round Cell Battery Stands include material certification to UL 94 5VA, simplified and enhanced (including greater safety margin) seismic bracing, better fit of mating components, reduced parts count, elimination of the need for a glued assembly, one piece dovetail keys, only one size torque wrench required for the assembly of all hardware. Assembly time for all common stands is less than ¾ hour and can be performed by one installer. Seismic bracing and anchoring of components to the building floor will add additional time to the assembly, but overall assembly time will still be less than the time required to install even the simplest metal battery stand.

The Round Cell Battery Stand (for List 2S, 3S and 4S batteries only) has also been enhanced, but does not include an option for spill containment. The seismic bracing has been simplified, but glued joints for seismic applications are still required.

The battery stand can be assembled into many varying configurations. Typical installations are one and two row (wide), 1 through 4 tiers (high), and varying lengths depending on the number of cells required to meet the system voltage requirements (see Figures 1-1 through 1-4). All configurations of battery stands for the List 1S Round Cell battery are available in non-seismic, seismic and spill containment versions. Configurations of battery stands for List 2S, 3S and 4S Round Cell batteries do not include the Spill Containment option. Seismic requirements as defined by the Network Equipment Buildings Systems (NEBs) requirements. Non-linear arrangements (around corners) are also possible, but are not certified to meet NEBs seismic requirements.

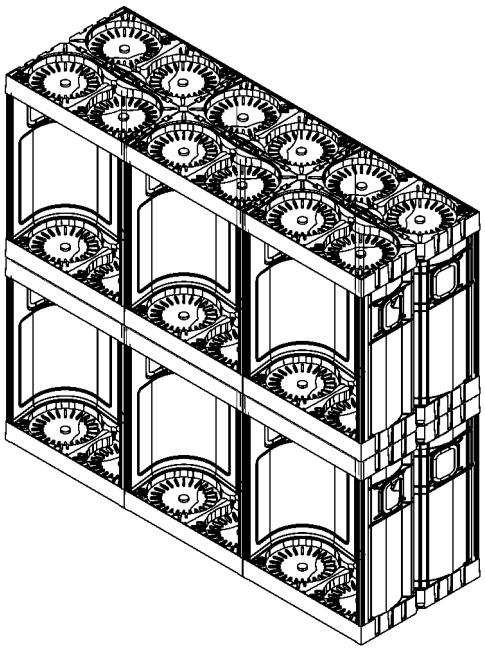


Figure 1-1: Typical 2-Tier, 2-Row, 7'-6" Long Battery Stand

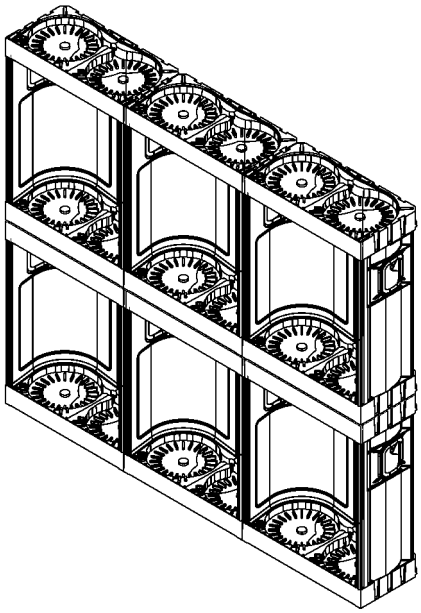


Figure 1-2: Typical 2-Tier, 1-Row, 7'-6" Long Battery Stand

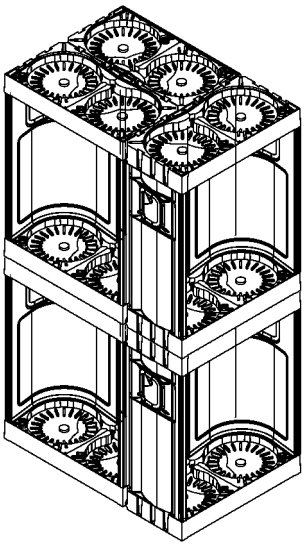


Figure 1-3: Typical 2-Tier, 2-Row, T-Configuration Battery Stand

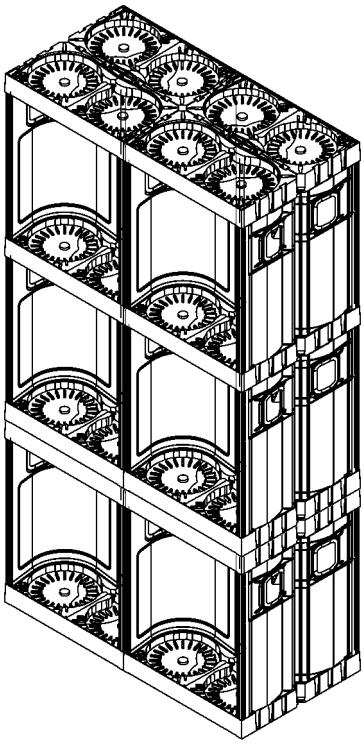


Figure 1-4: Typical 3-Tier, 2-Row, 5'-0" Long Battery Stand

Round Cell Battery

The Round Cell battery is a stationary, lead-acid, flooded cell. All of the components in the Round Cell battery meet Lineage Power strict specifications and quality standards. Nearly one million Round Cells are in service today – an unparalleled record of experience and trustworthiness.

Designed to provide long reliable service life and reduced lifetime maintenance costs, the Round Cell is appropriate for both high discharge rate uninterruptible power supply (UPS) applications and low discharge rate (standby reserve) applications. Applications include telephone central offices, microwave stations, rapid rail systems, power utility sub-stations, and generating plants.

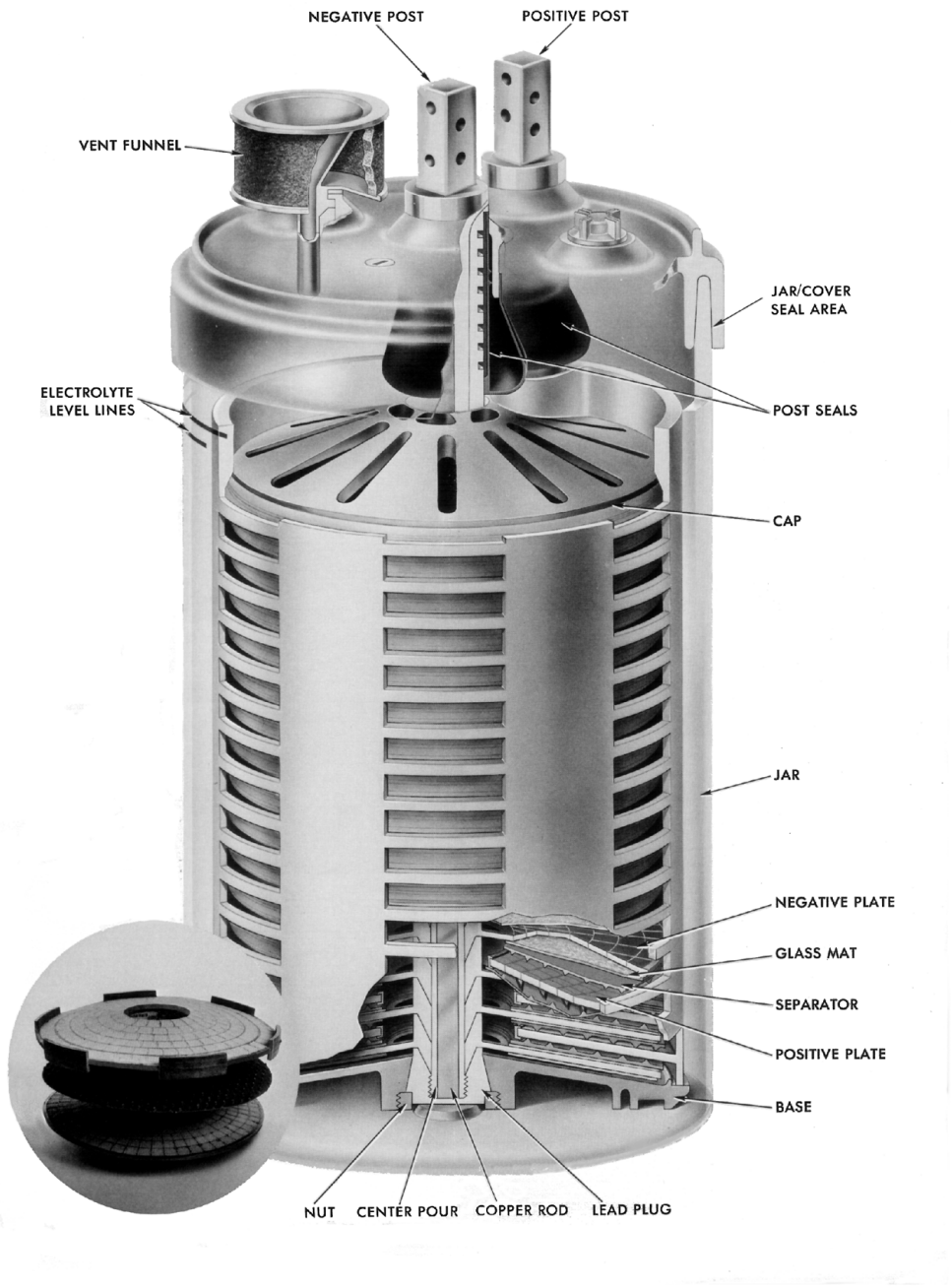


Figure 1-5: Round Cell Battery

Code Summary

Originally prompted by the UFC article 64 introduced in the late 1990ís spill containment has become a concern to code enforcement officials, building managers, and worker safety. Intended originally to prevent spilled battery electrolyte (acid) from propagating beyond the floor area beneath and immediately around flooded battery stands various code writing bodies as wells as those developing recommended practices have developed a loose set of guidelines for spill containment. From the beginning varying answers to the spill containment requirement have been developed, but none have taken and applied the concern directly to the design of the battery stand. In addition, the Electro-Tyte RC Battery Stands have considered and eliminated the concerns of clean up and disposal associated with an electrolyte spill, worker safety and installation and maintenance.

By incorporating spill containment into the design of the Electro-Tyte RC Battery Stands Lineage Power has improved on one of the best properties of the Round Cell Battery Stand. Manufactured with Sheet Molding Compound (SMC) this stand is not affected by the corrosion effects of the battery electrolyte. This assures the structural stability of the stand over the life of the product and also makes clean up of a spill far easier than with any other stand. A simple wash down with water and Soda followed by clean water will remove any residual hazard to the user around the stand. Removal and replacement of the spill pan after the spill will then completely remove evidence of the spill.

By fully containing the spill, and removing the contact hazard associated there is no need to neutralize the electrolyte. The electrolyte is fully contained in a removable spill pan that is sealed by a screw in cap making the pan ready for transport, and removing the exposure hazard associated with the handling of absorbed and/or neutralized materials. This eliminates concerns of oxygen displacement during the neutralization process that further reduces any risk to personnel. Another advantage is that a passive neutralization system is not required under or around the stand eliminating concerns like maintenance, and the recording of expiration/service dates for expendable materials associated with neutralization.

Other answers to spill containment include expensive and maintenance intensive epoxy coatings on floors and walls, barriers constructed around battery stands that impede access to equipment, and flexible liners or epoxy used in conjunction with the barriers. All of these solutions have addressed the concern for spill containment, but none have made it as simple to install, maintain, or clean up. With this stand there is; no need for product specific installation training for installers to assure proper installation of spill containment, no maintenance associated with wear and tear due to office traffic, or removal and

replacement of components associated with battery maintenance, no need for spill neutralization or absorption pillows or materials for the removal of the spill. Once installed, all spilled electrolyte from a battery drains directly into a spill pan located beneath the battery stand. After being allowed to drain completely the battery can be removed from the battery stand. The battery stand can be washed, and then the entire spill can be easily transported to a reclamation facility for disposal.

One issue not addressed by any of the other battery stands is the conductive path to ground associated with an electrolyte spill. The Electro-Tyte RC Battery Stand being made from SMC that is non-conductive prevents the creation of a conductive path to a ground source. The only means to create a conductive path with this stand is through direct contact with the electrolyte. Typical metal battery stands attempt to address this concern through the application of electrical insulating coatings that may withstand exposure to electrolyte for a short period of time, but once degraded, it provides a direct conductive path to the metal battery stand. This conductive path can be a hazard to personnel when accidental contact is made with the stand while also promoting corrosion of the structure.

Customer Service Contacts

Customer Service, Technical Support, Product Repair and Return, and Warranty Service

For customers in the United States, Canada, Puerto Rico, and the US Virgin Islands, call 1-800-THE-1PWR (1-800-843-1797). This number is staffed from 7:00 am to 5:00 pm Central Time (zone 6), Monday through Friday, on normal business days. At other times this number is still available, but for emergencies only. Services provided through this contact include initiating the spare parts procurement process, ordering documents, product warranty administration, and providing other product and service information.

For other customers worldwide the 800 number may be accessed after first dialing the AT&T Direct country code for the country where the call is originating, or you may contact your local field support center or your sales representative to discuss your specific needs.

Customer Training

Lineage Power offers customer training on many Power Systems products. For information call 1-972-284-2163. This number is answered from 8:00 a.m. until 4:30 p.m., Central Time Zone (Zone 6), Monday through Friday.

Downloads and Software

To download the latest product information, product software and software upgrades, visit our web site at http://www.lineagepower.com

2 Product Descriptions

Specifications

The Electro-Tyte RC and Round Cell Battery Stands and Round Cell battery Stand comprise multiple components. The primary building blocks of these battery stands are the Base, Backpanel and Dovetail keys. Many varying arrangements of battery stands can be configured for the Round Cell Battery utilizing these components. The major distinguishing differences between these battery stands and all other battery stands used in conjunction with flooded lead acid batteries is that these parts are compression molded using a glass fiber reinforced sheet molding compound (SMC) formulated to meet the flammability requirements of UL 94 5VA, and they require no tools to be assembled. In addition to its flammability rating this material has proven exposure resistance to sulfuric acid and aging. With 30+ years of product in service these components and the material they are made of are sure to provide you with the type of service you would expect from Lineage Power.

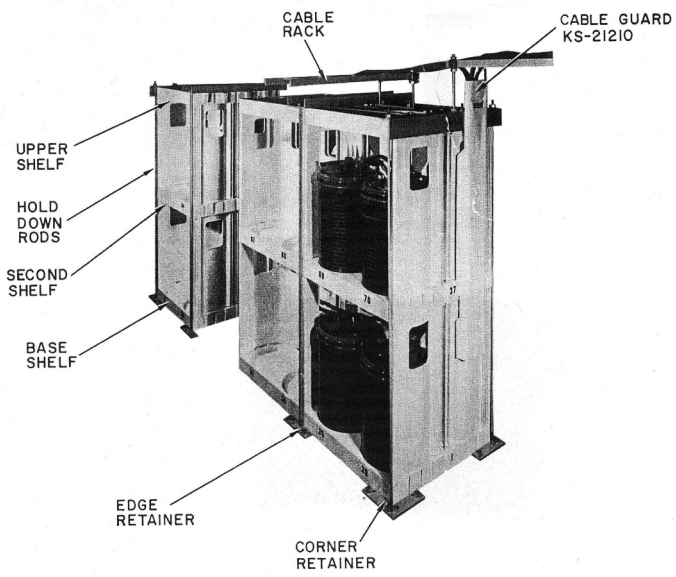


Figure 2-1: Typical Battery Stand Components

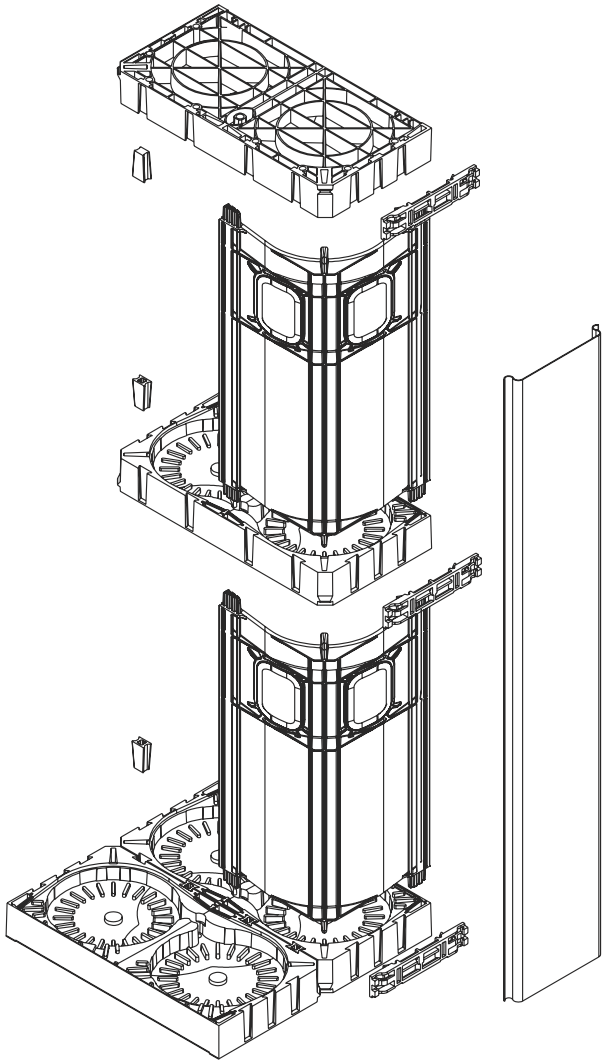


Figure 2-2: Electro-Tyte RC Battery Stand Components

Other components of the battery stand include a clear front cover shield, spill containment pan, seismic bracing, and other miscellaneous accessories and hardware. The front cover shield is a liquid clear cover that is installed in the front of every battery stand section to prevent a leaking battery from spilling out onto the floor. In addition to preventing leaks this cover also serves to restrict access to the batteries. The cover is manufactured with a material meeting the flammability requirement UL 94 5VA and is not affected by exposure to sulfuric acid. Assembly and removal is performed without the need for any tools.

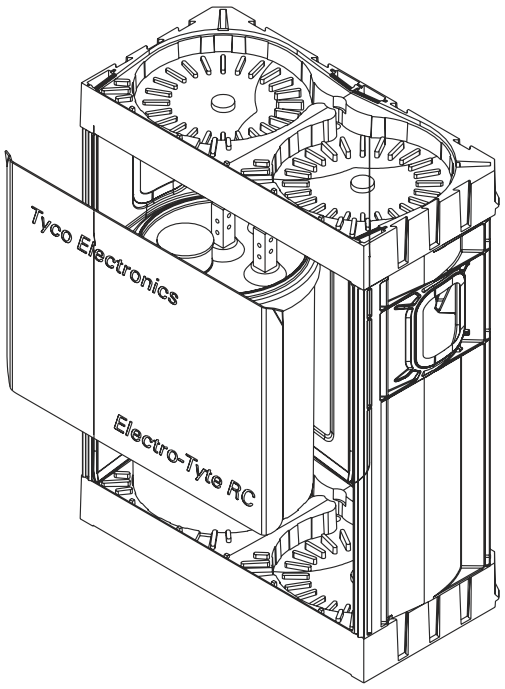


Figure 2-3: Front Cover Shield

The spill containment pan (SCP) is a container that is specifically designed for use with this battery stand. It is a container designed to hold the liquid contents of one round cell battery. It slides out easily from under the battery stand, and is sealed liquid tight with provided bung plug. DOT certification of the SCP is pending for the transport of battery electrolyte (sulfuric acid). The SCP is manufactured using a roto-molding process that eliminates any seams in the design that may crack or leak and also provides for labeling that becomes an integral part of the container. A recess is provided on the top of the SCP for convenient storage of the bung plug while the pan is in service under the battery stand. The markings on the container meet all the labeling requirements for the transport of the filled container per the current requirements for the year of manufacture. Before offering a filled container for transport current transportation regulations should be verified One SCP is required under each battery stand section.

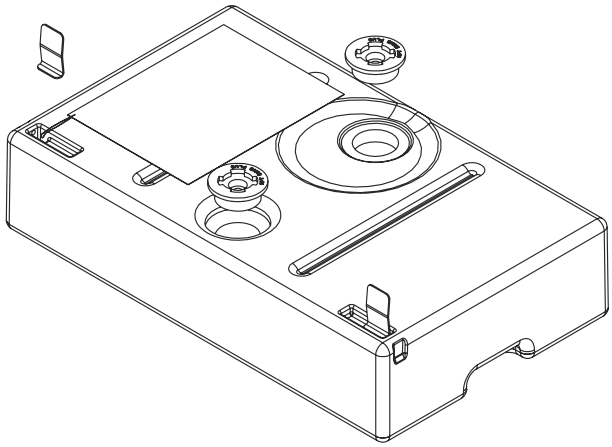


Figure 2-4: Spill Containment Pan (SCP)

Cable lacing brackets and Covers provide for a quick means of securing power cables to the battery stand and eliminate the stress that would otherwise be applied to the battery posts. The covers prevent casual contact and provide for a clean un-cluttered look for the installed battery system. The lacing brackets slide easily into the mortises found along the perimeter of the base and provide a convenient means to secure cables. The covers snap into position on the lacing brackets. Lacing brackets are provided with the various battery stand configurations, while the covers are available for order in addition to the battery stands.

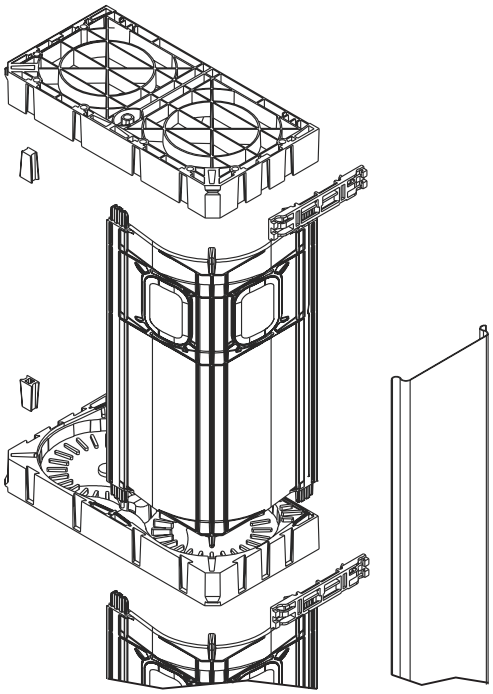
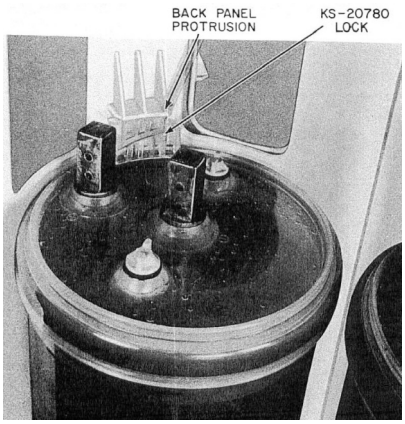


Figure 2-5: Cable Lacing Brackets and End Covers

The battery locks comprise three components that are used to secure the round cell battery in the battery stand. These locks are only required in seismic applications, or whenever the customer feels he would like them installed. Seismic hold-down of the battery stand is required when using battery locks.



Seismic bracing and miscellaneous accessories and hardware include the feet that raise and support the battery stand for application of the spill containment, seismic retention hardware (lateral retention feet, threaded

rods, top support braces), and other components that make for easy assembly and support of auxiliary bus work, and cable racks. (See Figure 2-6.)

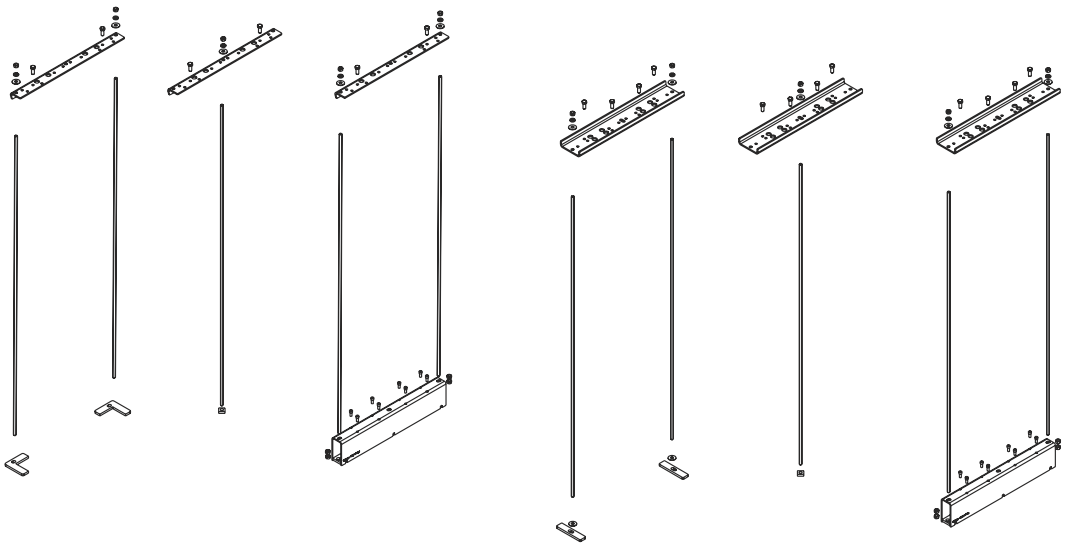


Figure 2-6: Seismic Retention and Spill Containment Hardware

Features and Overview

- Integrated spill containment within the footprint of the battery stand.
- Configurations and hardware to meet your seismic needs through NEBs zone 4
- Better fit, quicker and easier to install system than old version
- Feet raise bottom base, spill pan slides beneath base and drain hole is automatically aligned
- No tools required to assemble the battery stand
- Only one torque wrench is required for seismic bracing and anchoring.
- Battery stand parts are rated UL 94 5VA
- Spill Pan rated UL 94 V-0 (DOT certification pending)
- UL listing (pending)
- Integral front cover shield for spill containment (easily removable)
- Assembly time for a 15ft battery stand approximately 1/2 hr. Seismic bracing will require additional time
- Proven material performance (aging, acid exposure, abuse, re-application) of over 30 years

- Meets or exceeds the intent of spill containment requirements as specified in such codes as: (UFC, NFPA, IFCÖ..)
  Note: Due to the variations in these codes and the variety of local codes, Lineage Power can not guarantee that the local authority having jurisdiction will not require additional spill containment around the room or around the battery stand even with the use of the Electro-Tyte RC Battery Stand. Local code requirements should be verified before installing this system.
- Minimize or eliminates personnel hazards associated with leaking batteries
- Reduces or eliminates installation, maintenance and removal concerns associated with acid containment barriers and battery maintenance.

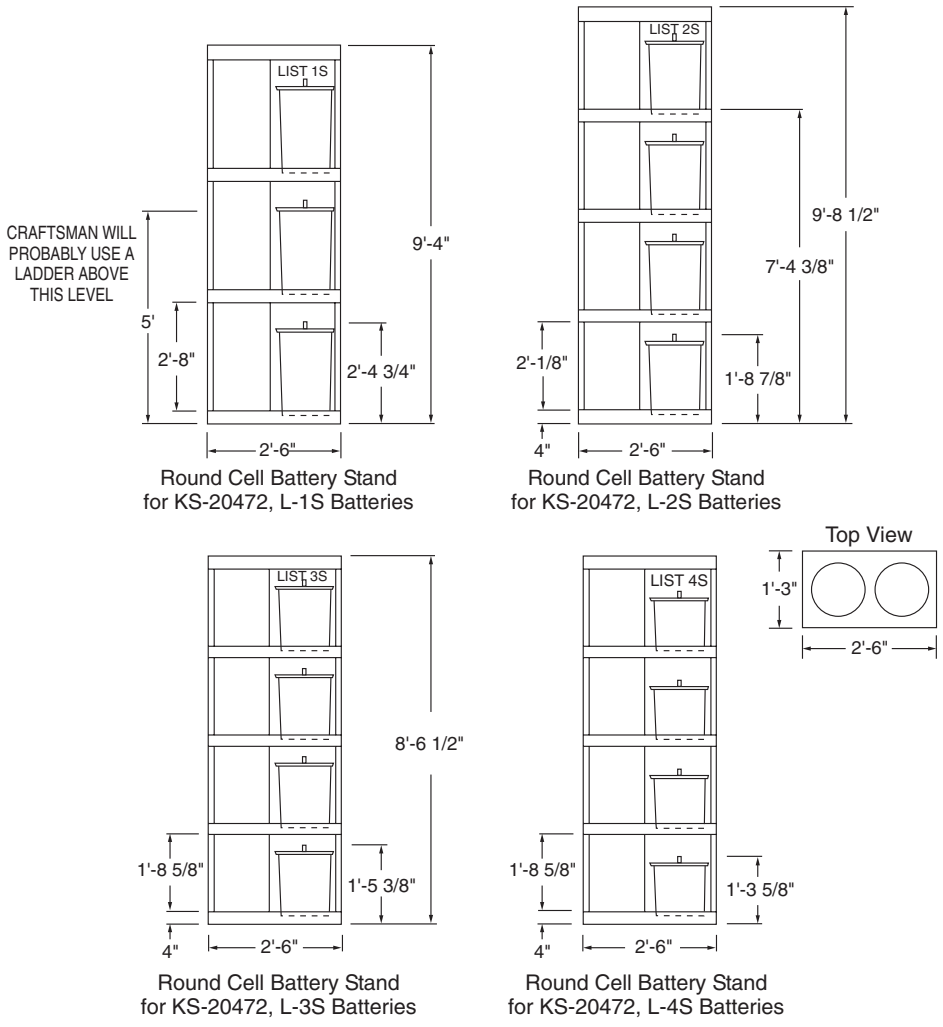


Figure 2-7: Battery Stand Configurations

Table 2-A: Battery Stand Heights

		1s			2s		3s		4s	
Tiers	**Description**	**Non-Seismic**	**Seismic**	**Spill**	**Non-Seismic**	**Seismic**	**Non-Seismic**	**Seismic**	**Non-Seismic**	**Seismic**
1	Top of Stand	4	40	46.25	4	32.13	4	28.64	4	28.64
1	Top of upper Cell	29.125	29.125	35.38	21.13	21.13	17.63	17.63	15.88	15.88
1	Overall Height	29.125	42.05	48.30	21.13	38.13	17.63	34.64	15.88	34.64
2	Top of Stand	40	76	82.25	32.13	60.26	28.64	53.28	28.64	53.28
2	Top of upper Cell	65.125	65.125	71.38	49.26	49.26	42.27	42.27	40.52	40.52
2	Overall Height	65.125	78.05	84.30	49.26	66.26	42.27	59.28	40.52	59.28
3	Top of Stand	76	112	118.25	60.26	88.39	53.28	77.92	53.28	77.92
3	Top of upper Cell	101.125	101.125	107.38	77.39	77.39	66.91	66.91	65.16	65.16
3	Overall Height	101.125	114.05	120.30	77.39	94.39	66.91	83.92	65.16	83.92
4	Top of Stand	112	148	154.25	88.39	116.52	77.92	102.56	77.92	102.56
4	Top of upper Cell	137.125	137.125	143.38	105.52	105.52	91.55	91.55	89.8	89.8
4	Overall Height	137.125	150.05	156.30	105.52	122.52	91.55	108.56	89.8	108.56

3 Ordering Information

To select the battery stand that meets your requirements answer the following questions:

•Battery Type/Size to be used (L1S, L2S, L3S or L4S) *Battery type is determined by amp-hour capacity (1600, 864, 488, or 296 amps)* *When determining the battery size remember to consider the number of hours of reserve capacity that will be required*	
•Battery string voltage (multiples of 2 volts)	
•Number of strings of batteries required (1, 2, etc.)	
•Number of rows (1 or 2)	
•Number of tiers (1, 2, 3 or 4)	
•Seismic zone requirements (zone 0, 2 or 4)	
•Is Spill Containment required (L1S batteries only) *Spill containment for L2s, L3S and L4S is available but must be ordered in addition to the battery stand*	

To select the battery stand that meets your requirements answer the following questions:

•Battery Type/Size to be used (L1S, L2S, L3S or L4S) *Battery type is determined by amp-hour capacity (1600, 864, 488, or 296 amps)* *When determining the battery size remember to consider the number of hours of reserve capacity that will be required*	L1S
•Battery string voltage (multiples of 2 volts)	24V
•Number of strings of batteries required (1, 2, etc.)	2
•Number of rows (1 or 2)	1R
•Number of tiers (1, 2, 3 or 4)	2T
•Seismic zone requirements (zone 0, 2 or 4)	Z0
•Is Spill Containment required (L1S batteries only) *Spill containment for L2s, L3S and L4S is available but must be ordered in addition to the battery stand*	NS

Many configurations of battery stands are available. Table 3-A describes those configurations and provides the sizing and ordering information that is needed to help fulfill your power needs. The descriptions for these stands are described as follows. See "General Definitions" at the end of this section for a description of terms used:

L1S2T1R7.5FTZ0NS24V1S
| | | | | | | |
| | | | | | | Number of strings
| | | | | | String Voltage
| | | | | Spill Containment/No Spill Containment
| | | | Seismic Zone
| | | Battery Stand Length
| | Number of rows wide
| Number of Tiers (tall)
Battery Type

For applications requiring a configuration not shown here please contact your Lineage Power sales representative. They can help to set up a battery stand to meet your needs. At the current time spill containment is only available for battery stands associated with List 1S Round Cell Batteries. See "General Definitions" at the end of this section for definitions of table headings.

Table 3-A: Battery Stand Ordering Information

										Spill	Battery Stand		Overall (ft)		
List	List Description	Comcode	Cell Type	Volts	No. of Strings	Cells	Tiers	Rows	EQ Zone	S/NS	Length	Width	Length (LOA)	Width (WOA)	Amps
1	L1S2T1R7.5FTZ0NS24V1S	408556311	1	24	1	12	2	1	0	NS	7.5	1.25	7.5	1.25	1600
2	L1S2T1R7.5FTZ2NS24V1S	408556328	1	24	1	12	2	1	2	NS	7.5	1.25	7.67	1.25	1600
3	L1S2T2R7.5FTZ0NS24V2S	408556336	1	24	2	24	2	2	0	NS	7.5	2.5	7.5	2.5	3200
4	L1S2T2R7.5FTZ2NS24V2S	408556344	1	24	2	24	2	2	2	NS	7.5	2.5	7.67	2.5	3200
5	L1S2T2R7.5FTZ4NS24V2S	408556352	1	24	2	24	2	2	4	NS	7.5	2.5	7.81	2.81	3200
6	L1S2T1R15FTZ0NS48V1S	408556360	1	48	1	24	2	1	0	NS	15	1.25	15	1.25	1600
7	L1S2T1R15FTZ2NS48V1S	408556377	1	48	1	24	2	1	2	NS	15	1.25	15.17	1.25	1600
8	L1S2T2R15FTZ0NS48V2S	408556385	1	48	2	48	2	2	0	NS	15	2.5	15	2.5	3200
9	L1S2T2R15FTZ2NS48V2S	408556393	1	48	2	48	2	2	2	NS	15	2.5	15.17	2.5	3200
10	L1S2T2R15FTZ4NS48V2S	408556402	1	48	2	48	2	2	4	NS	15	2.5	15.31	2.81	3200
11	L1S3T2R5FTZ0NS48V1S	408556410	1	48	1	24	3	2	0	NS	5	2.5	5	2.5	1600
12	L1S3T2R5FTZ2NS48V1S	408556427	1	48	1	24	3	2	2	NS	5	2.5	5.17	2.5	1600
13	L1S3T2R10FTZ0NS48V2S	408556435	1	48	2	48	3	2	0	NS	10	2.5	10	2.5	3200
14	L1S3T2R10FTZ2NS48V2S	408556443	1	48	2	48	3	2	2	NS	10	2.5	10.17	2.5	3200
15	L1S3T2R15FTZ0NS48V3S	408556451	1	48	3	72	3	2	0	NS	15	2.5	15	2.5	4800
16	L1S3T2R15FTZ2NS48V3S	408556468	1	48	3	72	3	2	2	NS	15	2.5	15.17	2.5	4800
17	L1S2T2R18.75FTZ0NS120V1S		1	120	1	60	2	2	0	NS	18.75	2.5	18.75	2.5	1600
18	L1S2T2R18.75FTZ2NS120V1S		1	120	1	60	2	2	2	NS	18.75	2.5	18.92	2.5	1600
19	L1S2T2R18.75FTZ4NS120V1S		1	120	1	60	2	2	4	NS	18.75	2.5	19.06	2.81	1600
20	L1S2T1R7.5FTZ0S24V1S	408556105	1	24	1	12	2	1	0	S	7.5	1.25	7.75	1.46	1600
21	L1S2T1R7.5FTZ2S24V1S	408556113	1	24	1	12	2	1	2	S	7.5	1.25	7.75	1.46	1600
22	L1S2T2R7.5FTZ0S24V2S	408556121	1	24	2	24	2	2	0	S	7.5	2.5	7.75	2.71	3200
23	L1S2T2R7.5FTZ2S24V2S	408556138	1	24	2	24	2	2	2	S	7.5	2.5	7.75	2.71	3200
24	L1S2T2R7.5FTZ4S24V2S	408556146	1	24	2	24	2	2	4	S	7.5	2.5	7.75	2.71	3200
25	L1S2T1R15FTZ0S48V1S	408556154	1	48	1	24	2	1	0	S	15	1.25	15.25	1.46	1600
26	L1S2T1R15FTZ2S48V1S	408556162	1	48	1	24	2	1	2	S	15	1.25	15.25	1.46	1600
27	L1S2T2R15FTZ0S48V2S	408556170	1	48	2	48	2	2	0	S	15	2.5	15.25	2.71	3200
28	L1S2T2R15FTZ2S48V2S	408556187	1	48	2	48	2	2	2	S	15	2.5	15.25	2.71	3200
29	L1S2T2R15FTZ4S48V2S	408556195	1	48	2	48	2	2	4	S	15	2.5	15.25	2.71	3200
30	L1S3T2R5FTZ0S48V1S	408556204	1	48	1	24	3	2	0	S	5	2.5	5.25	2.71	1600
31	L1S3T2R5FTZ2S48V1S	408556212	1	48	1	24	3	2	2	S	5	2.5	5.25	2.71	1600
32	L1S3T2R10FTZ0S48V2S	408556220	1	48	2	48	3	2	0	S	10	2.5	10.25	2.71	3200
33	L1S3T2R10FTZ2S48V2S	408556237	1	48	2	48	3	2	2	S	10	2.5	10.25	2.71	3200
34	L1S3T2R15FTZ0S48V3S	408556245	1	48	3	72	3	2	0	S	15	2.5	15.25	2.71	4800
35	L1S3T2R15FTZ2S48V3S	408556253	1	48	3	72	3	2	2	S	15	2.5	15.25	2.71	4800
36	L1S2T2R18.75FTZ0S120V1S		1	120	1	60	2	2	0	S	18.75	2.5	19	2.71	1600
37	L1S2T2R18.75FTZ2S120V1S		1	120	1	60	2	2	2	S	18.75	2.5	19	2.71	1600
38	L1S2T2R18.75FTZ4S120V1S		1	120	1	60	2	2	4	S	18.75	2.5	19	2.71	1600
101	L2S2T2R7.5FTZ0NS48V1S	408556484	2	48	1	24	2	2	0	NS	7.5	2.5	7.5	2.5	864
102	L2S2T2R7.5FTZ2NS48V1S	408556492	2	48	1	24	2	2	2	NS	7.5	2.5	7.81	2.81	864
103	L2S2T2R7.5FTZ4NS48V1S	408556501	2	48	1	24	2	2	4	NS	7.5	2.5	7.81	2.81	864
104	L2S2T1R15FTZ0NS48V1S	408556518	2	48	1	24	2	1	0	NS	15	1.25	15	1.25	864
105	L2S2T1R15FTZ2NS48V1S	408556526	2	48	1	24	2	1	2	NS	15	1.25	15.31	1.56	864
106	L2S2T2R7.5FTZ0NS48V1S	408556534	2	48	1	24	2	2	0	NS	7.5	2.5	7.5	2.5	864
107	L2S2T2R7.5FTZ2NS48V1S	408556542	2	48	1	24	2	2	2	NS	7.5	2.5	7.81	2.81	864
108	L2S2T2R7.5FTZ4NS48V1S	408556550	2	48	1	24	2	2	4	NS	7.5	2.5	7.81	2.81	864
109	L2S3T1R10FTZ0NS48V1S	408556567	2	48	1	24	3	1	0	NS	10	1.25	10	1.25	864
110	L2S3T1R10FTZ2NS48V1S	408556575	2	48	1	24	3	1	2	NS	10	1.25	10.31	1.56	864

Table 3-A: Battery Stand Ordering Information (Continued)

										Spill	Battery Stand		Overall (ft)		
List	List Description	Comcode	Cell Type	Volts	No. of Strings	Cells	Tiers	Rows	EQ Zone	S/NS	Length	Width	Length (LOA)	Width (WOA)	Amps
111	L2S3T2R5FTZ0NS48V1S	408556583	2	48	1	24	3	2	0	NS	5	2.5	5	2.5	864
112	L2S3T2R5FTZ2NS48V1S	408556591	2	48	1	24	3	2	2	NS	5	2.5	5.31	2.81	864
113	L2S3T2R5FTZ4NS48V1S	408556600	2	48	1	24	3	2	4	NS	5	2.5	5.31	2.81	864
114	L2S4T1R7.5FTZ0NS48V1S	408556617	2	48	1	24	4	1	0	NS	7.5	1.25	7.5	1.25	864
115	L2S4T1R7.5FTZ2NS48V1S	408556625	2	48	1	24	4	1	2	NS	7.5	1.25	7.81	1.56	864
116	L2S4T2R3.75FTZ0NS48V1S	408556633	2	48	1	24	4	2	0	NS	3.75	2.5	3.75	2.5	864
117	L2S4T2R3.75FTZ2NS48V1S	408556641	2	48	1	24	4	2	2	NS	3.75	2.5	4.06	2.81	864
118	L2S4T2R3.75FTZ4NS48V1S	408556658	2	48	1	24	4	2	4	NS	3.75	2.5	4.06	2.81	864
119	L2S2T2R18.75FTZ0NS120V1S		2	120	1	60	2	2	0	NS	18.75	2.5	18.75	2.5	864
120	L2S2T2R18.75FTZ2NS120V1S		2	120	1	60	2	2	2	NS	18.75	2.5	19.06	2.81	864
121	L2S2T2R18.75FTZ4NS120V1S		2	120	1	60	2	2	4	NS	18.75	2.5	19.06	2.81	864
122	L2S3T2R12.5FTZ0NS120V1S		2	120	1	60	3	2	0	NS	12.5	2.5	12.5	2.5	864
123	L2S3T2R12.5FTZ2NS120V1S		2	120	1	60	3	2	2	NS	12.5	2.5	12.81	2.81	864
124	L2S3T2R12.5FTZ4NS120V1S		2	120	1	60	3	2	4	NS	12.5	2.5	12.81	2.81	864
125	L2S4T1R20FTZ0NS128V1S		2	128	1	64	4	1	0	NS	20	1.25	20	1.25	864
126	L2S4T1R20FTZ2NS128V1S		2	128	1	64	4	1	2	NS	20	1.25	20.31	1.56	864
127	L2S4T2R10FTZ0NS128V1S		2	128	1	64	4	2	0	NS	10	2.5	10	2.5	864
128	L2S4T2R10FTZ2NS128V1S		2	128	1	64	4	2	2	NS	10	2.5	10.31	2.81	864
151	L3S3T1R10FTZ0NS48V1S	408556666	3	48	1	24	3	1	0	NS	10	1.25	10	1.25	488
152	L3S3T1R10FTZ2NS48V1S	408556674	3	48	1	24	3	1	2	NS	10	1.25	10.31	1.56	488
153	L3S3T2R5FTZ0NS48V1S	408556682	3	48	1	24	3	2	0	NS	5	2.5	5	2.5	488
154	L3S3T2R5FTZ2NS48V1S	408556708	3	48	1	24	3	2	2	NS	5	2.5	5.31	2.81	488
155	L3S3T2R5FTZ4NS48V1S	408556716	3	48	1	24	3	2	4	NS	5	2.5	5.31	2.81	488
156	L3S4T1R7.5FTZ0NS48V1S	408556724	3	48	1	24	4	1	0	NS	7.5	1.25	7.5	1.25	488
157	L3S4T1R7.5FTZ2NS48V1S	408556732	3	48	1	24	4	1	2	NS	7.5	1.25	7.81	1.56	488
158	L3S4T2R3.75FTZ0NS48V1S	408556740	3	48	1	24	4	2	0	NS	3.75	2.5	3.75	2.5	488
159	L3S4T2R3.75FTZ2NS48V1S	408556757	3	48	1	24	4	2	2	NS	3.75	2.5	4.06	2.81	488
160	L3S4T2R3.75FTZ4NS48V1S	408556765	3	48	1	24	4	2	4	NS	3.75	2.5	4.06	2.81	488
161	L3S2T2R18.75FTZ0NS120V1S		3	120	1	60	2	2	0	NS	18.75	2.5	18.75	2.5	488
162	L3S2T2R18.75FTZ2NS120V1S		3	120	1	60	2	2	2	NS	18.75	2.5	19.06	2.81	488
163	L3S2T2R18.75FTZ4NS120V1S		3	120	1	60	2	2	4	NS	18.75	2.5	19.06	2.81	488
164	L3S3T2R12.5FTZ0NS120V1S		3	120	1	60	3	2	0	NS	12.5	2.5	12.5	2.5	488
165	L3S3T2R12.5FTZ2NS120V1S		3	120	1	60	3	2	2	NS	12.5	2.5	12.81	2.81	488
166	L3S3T2R12.5FTZ4NS120V1S		3	120	1	60	3	2	4	NS	12.5	2.5	12.81	2.81	488
167	L3S4T1R20FTZ0NS128V1S		3	128	1	64	4	1	0	NS	20	1.25	20	1.25	488
168	L3S4T1R20FTZ2NS128V1S		3	128	1	64	4	1	2	NS	20	1.25	20.31	1.56	488
169	L3S4T2R10FTZ0NS128V1S		3	128	1	64	4	2	0	NS	10	2.5	10	2.5	488
170	L3S4T2R10FTZ2NS128V1S		3	128	1	64	4	2	2	NS	10	2.5	10.31	2.81	488

Accessories

The following is a list of optional accessories available for ordering in addition to the battery stand.

The cable kits described below provide 4/0 KS20921 cable, terminals, and bolting material require d to connect initial and supplementary battery strings to the plant distribution bus work. The cables are terminated on one end and include terminal lug and heat shrink tubing for terminating the other end after the cable is cut to fit.

Table 3-B: Accessories

Comcode New	Description
Hydrometer and Thermometer	
402242697	Hydrometer
997525555	Hydrometer Holder
997992615	Thermometer
802101907	Screw, RHM
403925423	Star Plug 0312-1000
Battery Connecting Hardware	
402467245	Bolt Assy, Battery Connector 5/16-18 x 2.50 lg
901272997	Bolt Assy, Battery Connector 5/16-18 x 2.25 lg
408040962	Bolt Assy, Battery Connector 5/16-18 x 2.00 lg
408554760	Bolt Assy, Battery Connector 5/16-18 x 2.12 lg
408554777	Bolt Assy, Battery Connector 5/16-18 x 2.38 lg
402467252	Inter-Cell Connecting Strap
407302926	Tubing, Heat Shrink 1.00 in ID X 12 in lg Polyolefin (Clear)
405347923	Lug, Terminal 2 hole 4/O WP91412 L27
402017198	Lug, Terminal 251-30485-1022 (T&B)
	Lug, Terminal YAV28G28 (Burndy)
Battery Stand End Covers	
401864574	Cable Guard, 78 inches long
401866686	Cable Guard, 88 inches long
401866678	Cable Guard, 102 inches long
401856489	Cable Guard, 118 inches long
Miscellaneous	
408551048	Standoff, Insulating 1872-3E (Glastic)

The cable kits in the following tables provide 4/0 KS24194 cable, terminals, and bolting material required to inter-connect batteries between tiers of the battery stand, and to connect initial and supplementary battery strings to the plant distribution bus work. See Tables 3-C and 3-D for connecting hardware provided with cable kits.

The Inter-tier cable kits are cut to length and terminated at each end with 5/16 single hole lead plated lugs for connection to the round cell battery. Choose the proper cable base on the size of the battery. All battery stands order per drawing J85504A-2 are already provided with sufficient cables to connect batteries into strings as specified.

The End Cell Termination cable kits provide 2 cables of specified length terminated on each end with 5/16 single hole lead plated lugs. The cables must be split and terminated to desired length at installation. If split into two equal pieces these kit will provide four cables of equal length as specified in the table. Terminating lugs (3/8, 2 hole) are provided in the kit for connection to the plant bus work.

Cable runs longer than 30 ft are not provided/recommended due to voltage drop limitations. For cable runs over 30 feet long larger gauge cables are recommended, but 4/0 cables should be the maximum size cable that is connected to the battery posts.

Table 3-C: Inter-Tier Cable Kits
(J85504A-2 Table F1)

Inter-Tier Cables Comcode	Provides 2 sets 4/0 cable assemblies	Cables 1 and 2	Cables 3 and 4
846646149	L1S Batteries	45	46.5
848680633	L2S Batteries	37.12	38.62
848680641	L3/4S Batteries	33.62	35.12

Table 3-D: End Cell Termination Cable Kits
(J85504A-2 Table F2)

		Cable Comcode	
Cable Length (See Note F1)	Provides 4 cables of length	Wire type KS24194 L2	Wire type KS24194 L3
10	5	848733931	848733997
20	10	848733948	848734005
30	15	848733956	848734013
40	20	848733964	848734021
50	25	848733972	848734038
60	30	848733980	848734046

The following table describes that hardware provided with each of the cable assemblies listed above.

Table 3-E: Cable Kit Contents
(J85504A-2 Table F3)

Qty	Comcode	Description
Inter Tier Cable Kits		
8	408554760	Bolt Assy, Battery Connector 5/16-18 x 2.12 lg (KS22385 L5)
End Cell Termination Cable Kits		
8	408554777	Bolt Assy, Battery Connector 5/16-18 x 2.38 lg (KS22385 L6)
Distribution Bus Connection Hardware		
8	802286773	Lockwasher .382 id x .74 od x .12 thk Steel, Zinc
8	841064777	Nut, Hex 3/8-16UNC-2B .32 thk Steel, Zinc
16	802841635	Washer, Flat .406 id x .734 od x .06 thk Steel, Zinc
8	801472846	Screw, Hex Head Cap, 3/8-16 x 1.25 lg Steel, Zinc
8	801273129	Screw, Hex Head Cap, 3/8-16 x 1.00 lg Steel, Zinc
4	405347923	Connector, Lug, 2 hole WP91412 L27
4	407302926	Tubing, Heatshrink, Clear 1.0 id x 2.0 lg

General Definitions

The Electro-Tyte RC and Round Cell Battery Stands is generally defined by the following three terms:

Rows	Depth or number of rows wide (either 15 or 30 inches)
Tiers	Height or number of shelves (bases) high
Columns (long)	Stand length or number of bases long (base length dimension is 30 inches)
S	Spill Containment provided
NS	No Spill containment provided
Length	Length of the battery stand only in feet
Width	Width of the battery stand only in feet
LOA	Length of the battery stand overall including seismic bracing and supporting feet
WOA	Width of the battery stand overall including seismic bracing and supporting feet
Strings	The numbers of strings supported by the battery stand at the specified voltage
Cell	The list number of the Round Cell battery supported by the battery stand
Cells	The total number of Round Cell Batteries the battery stand supports
Zone	The NEBs seismic zone the battery stand is provisioned for

The above terms describe how the bases and backpanels are stacked on top of one another (Tiers), joined to one another to form one and two row configurations (Rows) and the stacks of components forming columns that are also joined together (length of the stand) to accommodate the number of batteries required on each tier.

Round Cell Battery Stand: A composite Battery Stand designed to accommodate the entire family of Round Cell Batteries. This battery stand is comprised of four major components; base and 3 different back panels designed for application with the Lists 1S, 2S, 3S, or 4S batteries. This battery stand cannot be retrofitted with the Electro-Tyte RC Spill Containment option. The Round Cell Battery Stand for the L1S Round Cell Batteries will be discontinued in the near future.

Electro-Tyte RC Battery Stand: This new composite battery stand derives it basic design from the above Round Cell Battery Stand, but incorporates new features for spill containment. This new feature requires additional components for the spill containment option. The Electro-Tyte RC battery stand is primarily characterized by new ribs on the top surface of the base. This stand is only available for the List 1S Round Cell battery, and is assembled just like the Round Cell Stand except when spill containment and/or seismic bracing is ordered.

4 Installation Instructions

This section describes the procedures for installing the Electro-Tyte RC Battery Stands (for List 1S Round Cell batteries only) as well as the Round Cell Battery Stand (for List 2S, 3S and 4S Round Cell Batteries. Please read the safety statements and precautions in Section 4 of the Round Cell Battery Product Manual before unpacking and installing the batteries.

Tools, Materials and Preparation

No actual tools are required to assemble the battery stand; however, a small piece of 2" x 4" lumber or a rubber mallet may be used for tapping parts into place. The bases are interconnected by inserting the tapered dovetail keys in the slots formed by 2 adjacent bases. The installation instructions provided in this manual cover applications described as ***Electro-Tyte RC Battery Stands without Spill Containment (List 1S batteries only), Electro-Tyte RC Battery Stands with Spill Containment (List 1S batteries only), and Round Cell Battery Stand (List 2S, 3S and 4S batteries).*** Both Seismic (NEBs zones 2 and 4) and Non-Seismic applications (NEBs zone 0) or covered.

Battery Stand Installation Tools

- Rubber mallet or small piece of 2" x 4" lumber
- Flashlight with plastic or rubber housing
- Cleaning cloth
- 120 grit sandpaper

Seismic Retention Installation tools

- Torque Wrench and 15/16 socket
- Drill bit and Drill to meet hold down anchoring specifications

Battery Installation Tools

- Battery Support Plate (need to make a drawing here
- Battery hoisting tools
- Hoist and battery lifting clamp
- Gantry extension (required for 3-tier arrangements) R4701
- Platypus Hoist R4800
- Manual Pump Jack and support R4900

Battery Installation

For complete list of tools and materials see the Round Cell Battery Product Manual)

- Flashlight with plastic or rubber housing
- Cleaning cloth
- Insulated torque wrench capable of measuring 150 inch-pounds
- Insulated 1/2-inch box wrench
- 3-inch and 6-inch wrench extensions
- Scotch Brite Pads
- Small, stiff brush
- DMM (Digital Multimeter) with an accuracy of 0.02 percent on the dc scale
- Battery Charger or other dc power source capable of supplying 2.55 volts per cell and a current capability of at least 10 amperes

Misc Materials (Accessories)

- Eyewash kit (KS-21527, L3)
- Eyewash solution (KS-21527, L4)
- Soda (sodium bicarbonate or sal soda) and/or lime to neutralize spilled electrolyte
- Hydrometer (range 1.150 to 1.240) (KS-5499 List 1306)
- Thermometer (KS-5499 List 1352, List 1353)
- Personal Protective Equipment (PPE)

Unpacking and Handling

Upon receipt (while transport agent is still present) of product carefully inspect all packages and packings for damage. In the event of damage, make appropriate notes and file respective claims with the transport company. Any suspect package (damaged package) should be opened and product visually inspected. Complete records should include written notes of all aspects of the inspection. The battery stand base and backpanels should be thoroughly inspected for visible cracks, chipping, or holes. Record all indications of damage prior to signing the bill of lading. In the event of damaged goods the transport agent (truck drivers) signature is also required.

Broken or damaged parts must be replaced before assembling the battery stand.

Before beginning the assembly of any parts a thorough inspection of all battery stand parts for visible cracks, chips or damage is recommended. In the event of excess dust on the parts use a soft cloth to wipe the dust away. The supplier of these parts takes great care to minimize the amount of dust on the parts, but the amount of dust does vary due to weather conditions. Dampening the cloth with a little water will help to eliminate any flying dust. No other cleaning agents should be used to remove the dust.

The above inspection should also include a check to determine that the proper number of parts has been received. Review the packing list and/ or bill of materials for the job and sort and count all the parts. An early check for defective and adequate quantity of parts will minimize the time to replace lost parts and site installation.

Safety and Handling

It is conceivable that the glass fibers in the polyester may cause skin irritation to those highly allergic to this form of irritation. In such cases, the use of gloves is recommended.

Much consideration has been made to reduce sharp angles edges and corners, however, backpanels as well as bases may still have some edges not properly cleaned or chamfered. Exercise care so as not to slide the hand or arm along the edges or allow the part to slide through the hands.

It is recommended that two people assemble the battery stand. Even thought the weight of each of the components is manageable by one person.

This manual does not cover the safety and handling of the batteries. Please refer to the battery product manual for all concerns regarding battery safety and handling.

Floor Layout

It is recommended that aisle spacing between adjacent stands be a minimum of 30 inches, or comply with customer requirements. This spacing will accommodate the hoists necessary to install, maintain, and remove the battery, and/or Spill Containment Pan (SPC). Smaller Aisles may be considered, but careful consideration of the personnel needing to work with and around the batteries, and the various building codes and floor loading is also essential.

Floor load is determined in various ways, but is typically defined as the total weight of the battery stand (pounds) divided by the floor area under the stand (square feet). The two most commonly used methods are: Lets see what other product manuals are doing here.

Absolute floor load (load on the floor immediately under the stand).

Average floor load (load imparted on the floor area immediately under the stand and half the aisle space adjacent to the battery stand on all sides)

Review local building codes and check with code enforcement officials for floor loading concerns. Typical codes describe floor loading in terms of Uniform and Concentrated loads on floors that vary with occupancy or use.

The operating environment must comply with the National Electric Code Article 110, “Requirements for Electrical Installations,” and Article 480-8, “Battery Locations,” and any applicable state and local regulations.

When it is necessary to install the stands where the cells will be exposed to heat radiation or direct sunlight or where there may be temperature differences due to the use of multi-tiered stands, building maintenance should provide shields for the radiators, blinds for the windows, or special ventilation for the multi-tiered stands to provide less than a 5°F (2.8°C) temperature variation anywhere in a string.

The following figures provide examples of the floor layout for the various battery stand applications for this product. Table 4-A, Floor Load Data, provides the overall length (LOA) and the overall Width (WOA) for each of the standard battery stand configurations described in the ordering information section of this manual. In addition the table also provides floor load data based on the number of cells specified. The floor load is provided in two formats: The first is the load averaged over the area described by the overall length and width of the battery stand; the second is the load averaged over the area described by the overall length and width plus the addition of half an aisle on all sides (one half

aisle = 15.00 inches). The battery stand weight is the sum total of all the components provided with the battery stand specified including anchoring.

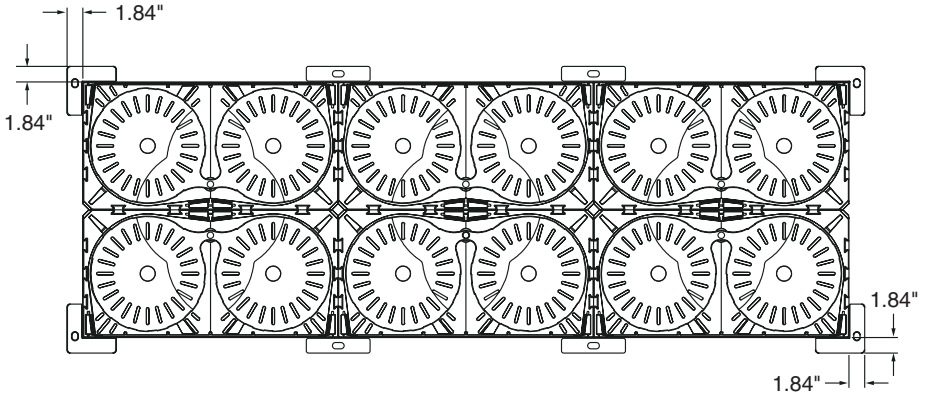


Figure 4-1: Floor Layout - Seismic Applications - No Spill Containment

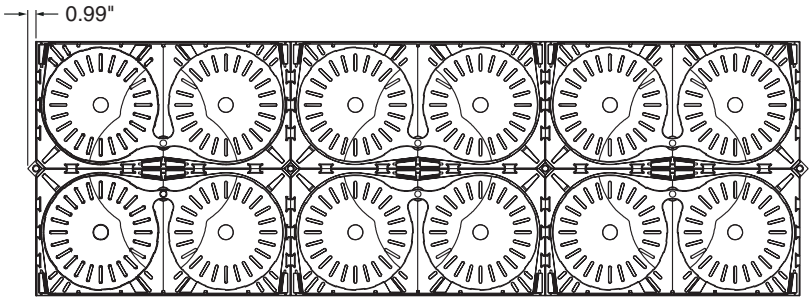


Figure 4-2: Floor Layout - Zone 2 - Electro-Tyte RC Battery Stand Only

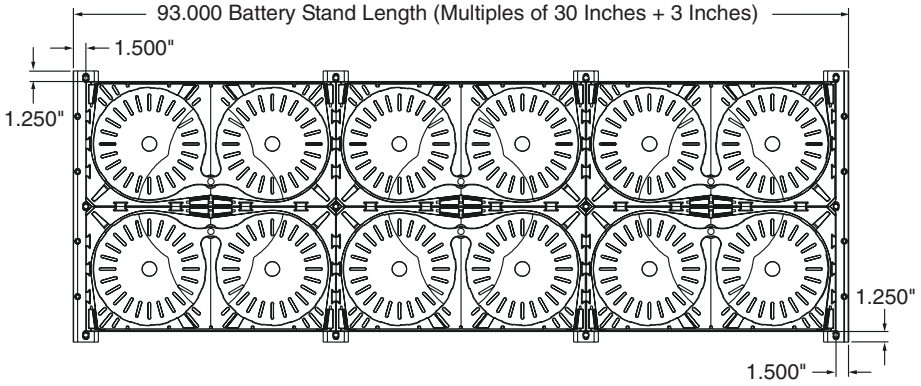


Figure 4-3: Floor Layout - Zone 2 - Electro-Tyte RC Battery Stand Spill Containment Applications

Table 4-A: Floor Load Data

List	List Description	Cell Type	No. of Cells	Lgth	Wdth	Lgth LOA	Width WOA	Area Batt Stnd	Area Overall Batt Stnd	Area w/ 1/2 Aisle	Battery Weight	Battery Stand Weight	Floor Load	Floor Load w/ Aisles
1	L1S2T1R7.5FTZ0NS24V1S	1	12	7.5	1.25	7.5	1.25	9.38	9.38	37.50	4152	344	480	120
2	L1S2T1R7.5FTZ2NS24V1S	1	12	7.5	1.25	7.67	1.25	9.38	9.59	38.14	4152	644	501	126
3	L1S2T2R7.5FTZ0NS24V2S	1	24	7.5	2.5	7.5	2.5	18.75	18.75	50.00	8304	670	479	180
3	L1S2T2R7.5FTZ0NS48V1S	1	24	7.5	2.5	7.5	2.5	18.75	18.75	50.00	8304	670	479	180
4	L1S2T2R7.5FTZ2NS24V2S	1	24	7.5	2.5	7.67	2.5	18.75	19.18	50.85	8304	1218	497	188
4	L1S2T2R7.5FTZ2NS48V1S	1	24	7.5	2.5	7.67	2.5	18.75	19.18	50.85	8304	1218	497	188
5	L1S2T2R7.5FTZ4NS24V2S	1	24	7.5	2.5	7.81	2.81	18.75	21.95	54.75	8304	1238	435	175
5	L1S2T2R7.5FTZ4NS48V1S	1	24	7.5	2.5	7.81	2.81	18.75	21.95	54.75	8304	1238	435	175
6	L1S2T1R15FTZ0NS48V1S	1	24	15	1.25	15	1.25	18.75	18.75	65.63	8304	659	479	137
7	L1S2T1R15FTZ2NS48V1S	1	24	15	1.25	15.17	1.25	18.75	18.96	66.26	8304	1252	504	145
8	L1S2T2R15FTZ0NS48V2S	1	48	15	2.5	15	2.5	37.50	37.50	87.50	16608	1292	478	205
9	L1S2T2R15FTZ2NS48V2S	1	48	15	2.5	15.17	2.5	37.50	37.93	88.35	16608	2381	501	215
10	L1S2T2R15FTZ4NS48V2S	1	48	15	2.5	15.31	2.81	37.50	43.02	94.57	16608	2412	443	202
11	L1S3T2R5FTZ0NS48V1S	1	24	5	2.5	5	2.5	12.50	12.50	37.50	8304	739	724	242
12	L1S3T2R5FTZ2NS48V1S	1	24	5	2.5	5.17	2.5	12.50	12.93	38.35	8304	1144	731	247
13	L1S3T2R10FTZ0NS48V2S	1	48	10	2.5	10	2.5	25.00	25.00	62.50	16608	1466	723	290
14	L1S3T2R10FTZ2NS48V2S	1	48	10	2.5	10.17	2.5	25.00	25.43	63.35	16608	2256	742	298
15	L1S3T2R15FTZ0NS48V3S	1	72	15	2.5	15	2.5	37.50	37.50	87.50	24912	2194	723	310
16	L1S3T2R15FTZ2NS48V3S	1	72	15	2.5	15.17	2.5	37.50	37.93	88.35	24912	3368	746	321
17	L1S2T2R18.75FTZ0NS120V1S	1	60	18.75	2.5	18.75	2.5	46.88	46.88	106.25	20760	1584	477	211
18	L1S2T2R18.75FTZ2NS120V1S	1	60	18.75	2.5	18.92	2.5	46.88	47.30	107.10	20760	2951	502	222
19	L1S2T2R18.75FTZ4NS120V1S	1	60	18.75	2.5	19.06	2.81	46.88	53.56	114.48	20760	2988	444	208
20	L1S2T1R7.5FTZ0S24V1S	1	12	7.5	1.25	7.75	1.46	9.38	11.32	40.59	4152	697	429	120
21	L1S2T1R7.5FTZ2S24V1S	1	12	7.5	1.25	7.75	1.46	9.38	11.32	40.59	4152	758	434	121
22	L1S2T2R7.5FTZ0S24V2S	1	24	7.5	2.5	7.75	2.71	18.75	21.00	53.40	8304	1368	461	182
23	L1S2T2R7.5FTZ2S24V2S	1	24	7.5	2.5	7.75	2.71	18.75	21.00	53.40	8304	1432	464	183
24	L1S2T2R7.5FTZ4S24V2S	1	24	7.5	2.5	7.75	2.71	18.75	21.00	53.40	8304	1433	464	183
25	L1S2T1R15FTZ0S48V1S	1	24	15	1.25	15.25	1.46	18.75	22.27	70.29	8304	1350	434	138
26	L1S2T1R15FTZ2S48V1S	1	24	15	1.25	15.25	1.46	18.75	22.27	70.29	8304	1458	439	139
27	L1S2T2R15FTZ0S48V2S	1	48	15	2.5	15.25	2.71	37.50	41.33	92.48	16608	2655	467	209
28	L1S2T2R15FTZ2S48V2S	1	48	15	2.5	15.25	2.71	37.50	41.33	92.48	16608	2770	469	210
29	L1S2T2R15FTZ4S48V2S	1	48	15	2.5	15.25	2.71	37.50	41.33	92.48	16608	2772	469	210
30	L1S3T2R5FTZ0S48V1S	1	24	5	2.5	5.25	2.71	12.50	14.23	40.38	8304	1224	670	236
31	L1S3T2R5FTZ2S48V1S	1	24	5	2.5	5.25	2.71	12.50	14.23	40.38	8304	1294	675	238
32	L1S3T2R10FTZ0S48V2S	1	48	10	2.5	10.25	2.71	25.00	27.78	66.43	16608	2405	685	287
33	L1S3T2R10FTZ2S48V2S	1	48	10	2.5	10.25	2.71	25.00	27.78	66.43	16608	2525	689	289
34	L1S3T2R15FTZ0S48V3S	1	72	15	2.5	15.25	2.71	37.50	41.33	92.48	24912	3586	690	309
35	L1S3T2R15FTZ2S48V3S	1	72	15	2.5	15.25	2.71	37.50	41.33	92.48	24912	3757	694	311
36	L1S2T2R18.75FTZ0S120V1S	1	60	18.75	2.5	19	2.71	46.88	51.49	112.02	20760	3280	467	215
37	L1S2T2R18.75FTZ2S120V1S	1	60	18.75	2.5	19	2.71	46.88	51.49	112.02	20760	3427	470	216
38	L1S2T2R18.75FTZ4S120V1S	1	60	18.75	2.5	19	2.71	46.88	51.49	112.02	20760	3430	470	216
101	L2S2T2R7.5FTZ0NS48V1S	2	24	7.5	2.5	7.5	2.5	18.75	18.75	50.00	4752	465	279	105
102	L2S2T2R7.5FTZ2NS48V1S	2	24	7.5	2.5	7.81	2.81	18.75	21.95	54.75	4752	617	245	99
103	L2S2T2R7.5FTZ4NS48V1S	2	24	7.5	2.5	7.81	2.81	18.75	21.95	54.75	4752	636	246	99
104	L2S2T1R15FTZ0NS48V1S	2	24	15	1.25	15	1.25	18.75	18.75	65.63	4752	471	279	80
105	L2S2T1R15FTZ2NS48V1S	2	24	15	1.25	15.31	1.56	18.75	23.88	72.31	4752	664	227	75
106	L2S2T2R7.5FTZ0NS48V1S	2	24	7.5	2.5	7.5	2.5	18.75	18.75	50.00	4752	465	279	105

Table 4-A: Floor Load Data (Continued)

List	List Description	Cell Type	No. of Cells	Lgth	Wdth	Lgth LOA	Width WOA	Area Batt Stnd	Area Overall Batt Stnd	Area w/ 1/2 Aisle	Battery Weight	Battery Stand Weight	Floor Load	Floor Load w/ Aisles
107	L2S2T2R7.5FTZ2NS48V1S	2	24	7.5	2.5	7.81	2.81	18.75	21.95	54.75	4752	617	245	99
108	L2S2T2R7.5FTZ4NS48V1S	2	24	7.5	2.5	7.81	2.81	18.75	21.95	54.75	4752	636	246	99
109	L2S3T1R10FTZ0NS48V1S	2	24	10	1.25	10	1.25	12.50	12.50	46.88	4752	529	423	113
110	L2S3T1R10FTZ2NS48V1S	2	24	10	1.25	10.31	1.56	12.50	16.08	52.01	4752	708	340	105
111	L2S3T2R5FTZ0NS48V1S	2	24	5	2.5	5	2.5	12.50	12.50	37.50	4752	524	423	141
112	L2S3T2R5FTZ2NS48V1S	2	24	5	2.5	5.31	2.81	12.50	14.92	41.47	4752	661	363	131
113	L2S3T2R5FTZ4NS48V1S	2	24	5	2.5	5.31	2.81	12.50	14.92	41.47	4752	840	375	135
114	L2S4T1R7.5FTZ0NS48V1S	2	24	7.5	1.25	7.5	1.25	9.38	9.38	37.50	4752	562	567	142
115	L2S4T1R7.5FTZ2NS48V1S	2	24	7.5	1.25	7.81	1.56	9.38	12.18	41.86	4752	862	461	135
116	L2S4T2R3.75FTZ0NS48V1S	2	24	3.75	2.5	3.75	2.5	9.38	9.38	31.25	4752	560	567	170
117	L2S4T2R3.75FTZ2NS48V1S	2	24	3.75	2.5	4.06	2.81	9.38	11.41	34.83	4752	828	490	161
118	L2S4T2R3.75FTZ4NS48V1S	2	24	3.75	2.5	4.06	2.81	9.38	11.41	34.83	4752	829	490	161
119	L2S2T2R18.75FTZ0NS120V1S	2	60	18.75	2.5	18.75	2.5	46.88	46.88	106.25	11880	1120	278	123
120	L2S2T2R18.75FTZ2NS120V1S	2	60	18.75	2.5	19.06	2.81	46.88	53.56	114.48	11880	2149	262	123
121	L2S2T2R18.75FTZ4NS120V1S	2	60	18.75	2.5	19.06	2.81	46.88	53.56	114.48	11880	2184	263	123
122	L2S3T2R12.5FTZ0NS120V1S	2	60	12.5	2.5	12.5	2.5	31.25	31.25	75.00	11880	1247	421	176
123	L2S3T2R12.5FTZ2NS120V1S	2	60	12.5	2.5	12.81	2.81	31.25	36.00	81.30	11880	1992	386	171
124	L2S3T2R12.5FTZ4NS120V1S	2	60	12.5	2.5	12.81	2.81	31.25	36.00	81.30	11880	1995	386	171
125	L2S4T1R20FTZ0NS128V1S	2	64	20	1.25	20	1.25	25.00	25.00	84.38	12672	1405	564	167
126	L2S4T1R20FTZ2NS128V1S	2	64	20	1.25	20.31	1.56	25.00	31.68	92.61	12672	2148	468	161
127	L2S4T2R10FTZ0NS128V1S	2	64	10	2.5	10	2.5	25.00	25.00	62.50	12672	1397	563	226
128	L2S4T2R10FTZ2NS128V1S	2	64	10	2.5	10.31	2.81	25.00	28.97	68.02	12672	2034	508	217
151	L3S3T1R10FTZ0NS48V1S	3	24	10	1.25	10	1.25	12.50	12.50	46.88	3192	492	295	79
152	L3S3T1R10FTZ2NS48V1S	3	24	10	1.25	10.31	1.56	12.50	16.08	52.01	3192	822	250	78
153	L3S3T2R5FTZ0NS48V1S	3	24	5	2.5	5	2.5	12.50	12.50	37.50	3192	487	295	99
154	L3S3T2R5FTZ2NS48V1S	3	24	5	2.5	5.31	2.81	12.50	14.92	41.47	3192	779	267	96
155	L3S3T2R5FTZ4NS48V1S	3	24	5	2.5	5.31	2.81	12.50	14.92	41.47	3192	780	267	96
156	L3S4T1R7.5FTZ0NS48V1S	3	24	7.5	1.25	7.5	1.25	9.38	9.38	37.50	3192	520	396	99
157	L3S4T1R7.5FTZ2NS48V1S	3	24	7.5	1.25	7.81	1.56	9.38	12.18	41.86	3192	796	328	96
158	L3S4T2R3.75FTZ0NS48V1S	3	24	3.75	2.5	3.75	2.5	9.38	9.38	31.25	3192	517	396	119
159	L3S4T2R3.75FTZ2NS48V1S	3	24	3.75	2.5	4.06	2.81	9.38	11.41	34.83	3192	765	347	114
160	L3S4T2R3.75FTZ4NS48V1S	3	24	3.75	2.5	4.06	2.81	9.38	11.41	34.83	3192	766	347	114
161	L3S2T2R18.75FTZ0NS120V1S	3	60	18.75	2.5	18.75	2.5	46.88	46.88	106.25	7980	1053	193	86
162	L3S2T2R18.75FTZ2NS120V1S	3	60	18.75	2.5	19.06	2.81	46.88	53.56	114.48	7980	1911	185	87
163	L3S2T2R18.75FTZ4NS120V1S	3	60	18.75	2.5	19.06	2.81	46.88	53.56	114.48	7980	1945	186	87
164	L3S3T2R12.5FTZ0NS120V1S	3	60	12.5	2.5	12.5	2.5	31.25	31.25	75.00	7980	1157	293	122
165	L3S3T2R12.5FTZ2NS120V1S	3	60	12.5	2.5	12.81	2.81	31.25	36.00	81.30	7980	1848	274	121
166	L3S3T2R12.5FTZ4NS120V1S	3	60	12.5	2.5	12.81	2.81	31.25	36.00	81.30	7980	1851	274	121
167	L3S4T1R20FTZ0NS128V1S	3	64	20	1.25	20	1.25	25.00	25.00	84.38	8512	1296	393	117
168	L3S4T1R20FTZ2NS128V1S	3	64	20	1.25	20.31	1.56	25.00	31.68	92.61	8512	1982	332	114
169	L3S4T2R10FTZ0NS128V1S	3	64	10	2.5	10	2.5	25.00	25.00	62.50	8512	1289	393	157
170	L3S4T2R10FTZ2NS128V1S	3	64	10	2.5	10.31	2.81	25.00	28.97	68.02	8512	1878	359	153

In some applications there is concern for the actual contact footprint under the battery stand. For the Electro-Tyte RC Battery Stand Figure 4-4 shows the actual contact area on the underside of the base of the battery stand. This only applies for the Electro-Tyte RC Battery Stand in Non Spill containment applications. For spill containment applications refer to Figure 4-3 (the battery stand feet are 3 inches wide). The footprint for the Round Cell Battery Stand is not available at this time.

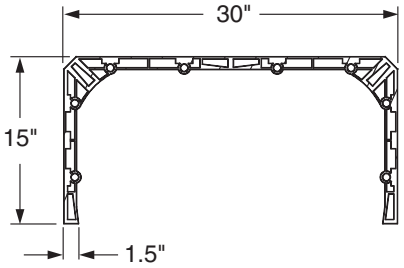


Figure 4-4: Electro-Tyte RC Battery Stand Contact Footprint for Non Spill Containment Applications

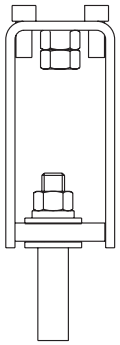


Figure 4-5: Battery Stand Contact Foot for Spill Containment Applications

Shimming Instructions

These battery stands have been designed to accept a 1/8-inch tolerance over their 30-inch length. This is the maximum that any 1 base should be shimmed, but it is not necessary for the entire stand to be leveled within a 1/8-inch tolerance.

Where practicable the battery stand base should be shimmed so as to maximize that contact area under the battery stand base. There is a raised area on the underside of the base that is the main load-bearing surface of the base. This surface is where all shimming should be done. Use the R-2995 (1/8") or R-2996 (1/16") frame shim(s). The shims measure 6-1/4" x 1-1/2". When a corner requires shims, use 2 shims side by side on 1 side of the corner. This will provide 9-1/4" linear distance of shimming as measured around the corner. Place the shims so the outer edge is flush with the edge of the base.

Avoid shimming more than 1/8" per base as shimming is not to be used to compensate for improperly finished floors.

Anchoring

For non-seismic applications of these battery stands without spill containment there are no anchoring requirements for the battery stand, but is recommended for certain applications. For all other applications anchoring of the battery stand is required. Hold down requirements may vary with each application depending on customer requirements (standards as described by the customer), local codes, (building, fire and mechanical codes, code enforcing official recommendations), and unique building characteristics (maximum floor loads, strength of concrete, thickness of floor or substrate). All anchoring provided with these battery stands are sized to meet the hold-down requirements for the configured stand to meet the NEBs seismic requirements specified. The following table describes the anchoring hold-down requirements for the various battery stand configurations

Table 4-B: Seismic Retention Requirements

Seismic Zone	Battery	Location	1t-1/2r	2t-1r	2t-2r	3t-1r	3t-2r	4t-1r	4t-2r
0	1S	All Floors	nr (note 4)	nr (note 4)	nr (note 4)	eqr (notes 1,2,4)	eqr (notes 2,4)	r	r
0	2S		nr	nr	nr	nr	nr	eqs (note 1)	eqr
0	3/4S		nr	nr	nr	rn	nr	eqr	eqr
2	1S		eqs (note 2)	eqs (note 2)	eqs (note 2)	eqs (note 2)	eqs (note 2)	r	r
2	2S		eqs (note 2)	eqs (note 2)	eqs (note 2)	eqs (notes 2,3)	eqs (note 2)	r	r
2	3/4S		eqs (note 2)	eqs (note 2)	eqs (note 2)	r	eqs (note 2)	eqs (notes 2,3)	eqs (notes 2,3)
4	1S		eqs (note 2)	eqs (note 2)	eqs (note 2)	r	r	r	r
4	2S		eqs (note 2)	eqs (notes 2,3)	eqs (notes 2,3)	r	eqs (notes 2,3)	r	r
4	3/4S		eqs (note 2)	eqs (notes 2,3)	eqs (notes 2,3)	r	eqs (note 2)	r	r

Key

nr No requirements for earthquake bracing
r **Restricted = Do Not Use**
eqs Seismic holddown or wall mounting **Required**
eqr Seismic holddown or wall mounting **Recommended**

Notes

1 Attach to building wall
2 Earthquake hold-down assembly required
3 Joints must be epoxied
4 For spill containment applications floor anchoring is required in the four corners of the battery stand only

All battery stand configurations available are provided with anchoring materials to meet the retention requirements or recommendations of the specific seismic zone specified. In the event that different anchors are to be used selection and certification for each application is left to the customer. Improperly sized anchoring is grounds for warranty invalidation. The minimum anchoring criteria for proper hold down is described in the following table

Installation Setup Instructions

Do not assemble the stands in advance when the gantry or overhead hoist is to be used to install batteries. When the gantry hoist is used the battery stand must be assembled one level (tier) at a time as the installation of the batteries progresses.

Unpack all components per unpacking instructions provided in "Unpacking and Handling". The battery stands are shipped with extra parts that may not be required in all applications.

Layout battery stand bases in accordance with job drawing information and ensure that a logical pattern of cabling to and from the batteries and from module to module is understood.

The floor should be laid out in accordance with job information and the entire stand base should fit within the dimensions shown. The stand may be placed directly on a concrete floor or on a concrete floor covered with asphalt or vinyl tile without removing the covering. The stand shall not be placed on wooden floors without structural reinforcement and a floor load distribution arrangement.

Battery stands can be installed on floors that meet the building engineering standard x7450 requirement. The maximum deviation from a true straightedge 8 feet in length placed anywhere on the floor should be 1/4 inch. Refer to installation engineering handbook 18 for specific requirements.

Installation Instructions

The following detailed instructions are broken down to specific instructions for the installation of the Electro-Tyte RC Battery Stands (List 1S Round Cell Batteries Only) and the Round Cell Battery Stand.

The sequence of installation for the battery stand and batteries should be carefully considered before beginning the assembly of the battery stand. The type of battery lifting device used to install the batteries (i.e. gantry hoist) may require that batteries be installed in conjunction with the battery stand assembly process. The installation instructions provided in this manual only describe the assembly of the battery stand only. For assistance with battery stand installations not covered in this manual contact Lineage Power.

Electro-Tyte RC and Round Cell Battery Stands without Spill Containment (List 1S batteries only)

1. Place the bases on the floor with the cell cavities upwards and in the configuration called for (ensure that the alignment is correct for the Customer's layout or drawing). Check each base to ensure all four corners are touching the floor by applying light pressure on diagonally opposite corners. Should the base rock back and forth, try exchanging it with other bases. Should some rocking still exist, and should the space under one corner (other 3 corners touching) be 1/16 inch or greater it must be shimmed (see "Shimming Instructions"). Assemble the bases together using dovetail keys loosely inserted into the respective slots.

2. Assemble the bases together using dovetail keys loosely inserted into the respective slots of adjoining bases. Dovetail keys do not require being inserted into each slot at this point in the assembly.

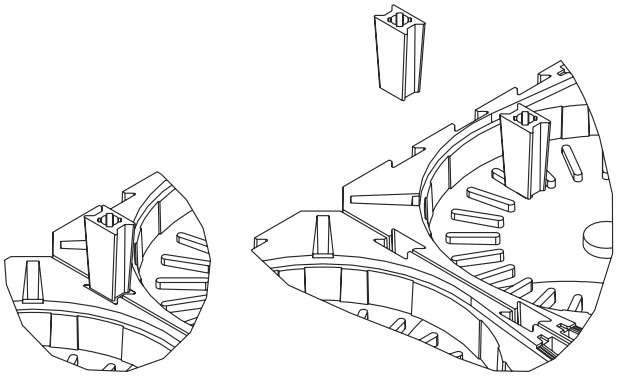


Figure 4-6: Dovetail Key Assembly

3. For seismic zone 2 - 2 row applications only (for all other seismic applications refer to Step 4) a straight line can be drawn on the floor down the center of the battery stand length. Locate holes on 30-inch centers on the line for the entire length of the battery stand. For this application the pre-assembly of bases is not required before locating holes.

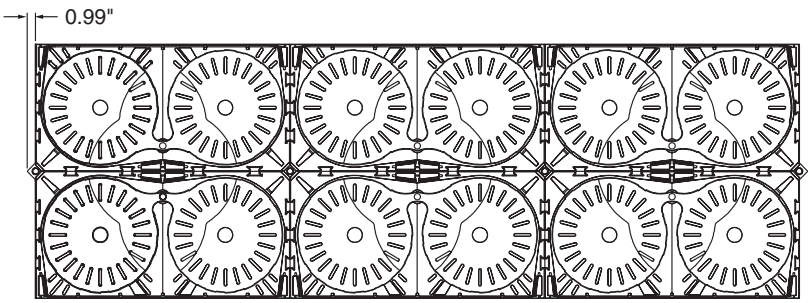


Figure 4-7: Seismic Anchoring for L1S Zone 2 Applications Only

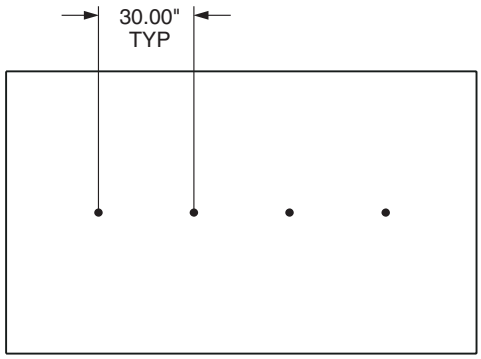


Figure 4-8: Anchor Drilling Pattern for L1S Zone 2 Applications

4. For seismic zone 4, all zone 2 – 3 tier, and all single row seismic applications position corner and side retention plates in respective corners and junction points where bases meet. Note orientation of corner plates. The anchoring hole for the corner plates is required to be located at the short ends of the battery stands. Using a marker, or other marking device, trace the outline of the floor anchoring holes onto the floor.

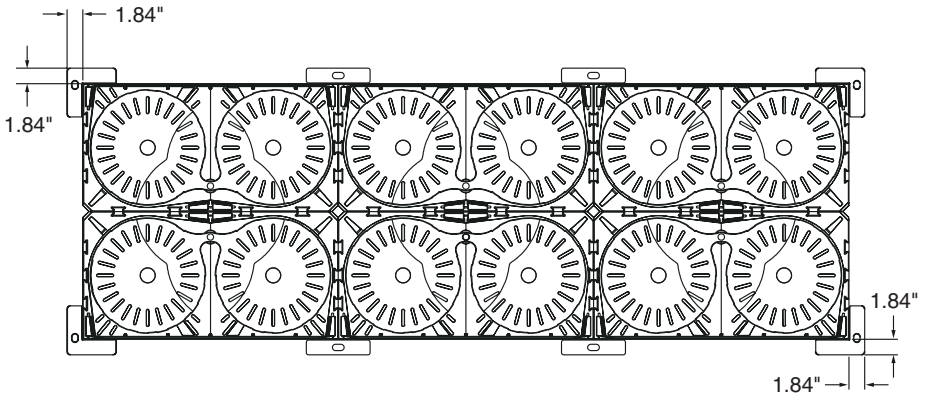


Figure 4-9: Corner and Junction Retention Plate Application

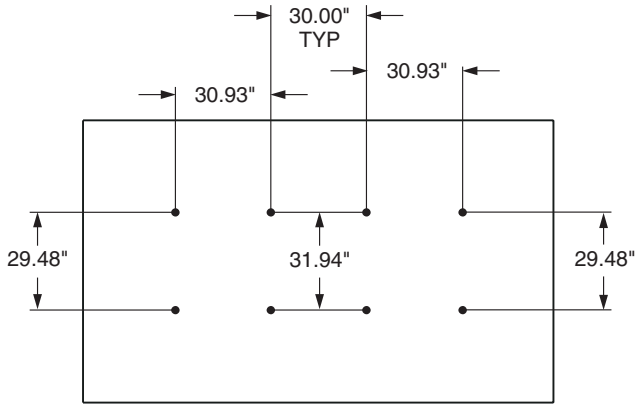
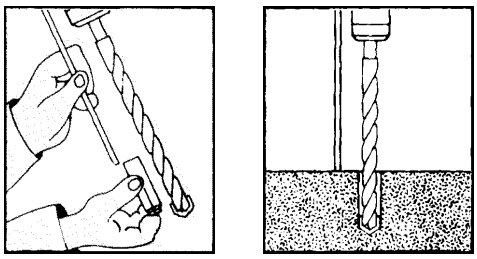


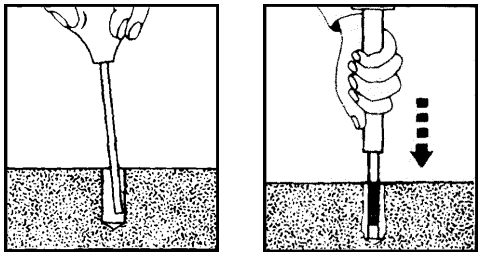
Figure 4-10: Anchor Drilling Pattern

5. Reposition, or disassemble the first tier of the battery stand to provide for drilling of the anchor holes.

6. Drill holes using drill bit (size and type) as specified by the anchor manufacturer.



7. After drilling the holes clean up all residue created during the drilling process (and dispose of according to the Customer's requirements), and install the anchoring hardware per manufactures specifications.



8. Install anchors into holes just prepared per manufacturers specifications.

9. Reposition, or re-assemble the first tier of the battery stand. Every effort should be made to re-align the battery stand with the anchoring devices before proceeding.

10. If KS-21723 Cable Brackets are to be installed they must be attached prior to the installation of the backpanels. The backpanels overlap the key slots and, if installed first, would prevent the attachment of the cable bracket.

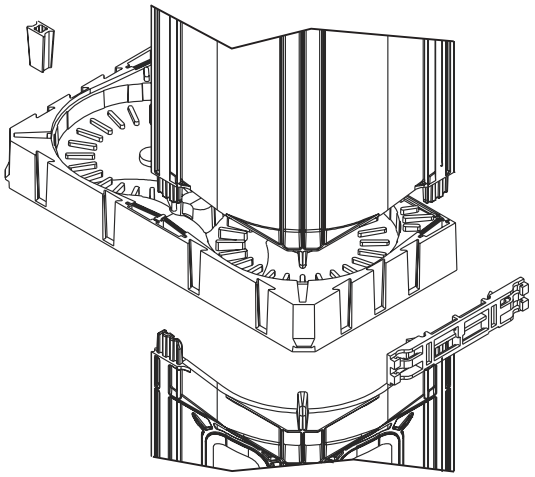


Figure 4-11: Cable Lacing Bracket Assembly

11. Place dovetail keys into the key slots of adjoining bases. With the narrow end of a spare key, press the keys down until they are flush to under flush with the surface of the base. Make sure all keys are in place because once the back panels are installed, the keyways are blocked. Dovetail keys should be inserted into each slot.

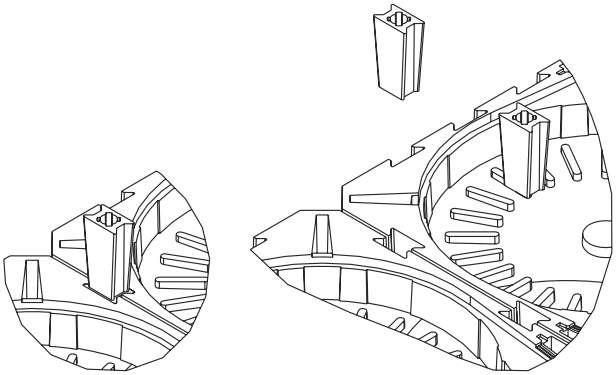


Figure 4-12: Dovetail Key Assembly

12. Turn backpanels so that the large hole in the panel is upward. Place Backpanel tenons into the sockets (mortises) of the base shelf. Apply full weight of the person to engage fully as required. Should

they not engage fully, placement of the second shelf (base) will fully seat the panel. Place a 2" x 4" piece of lumber on it side across 2 adjacent backpanels. This temporary spacer aids in preventing the second shelf from cocking and reduces the chance of pinching the fingers. Place the second tier shelf over the first tier backpanels, so that the back panel tenons engage the sockets of the second tier base shelf. Be careful to keep fingers out of the way while tapping the base down over the backpanels. Do not tap surface directly, but rather place a bearing surface of lumber over the base before striking with another small piece of 2" x 4" lumber or rubber mallet to seat base and back panels fully. Make sure all bases and back panels are fully seated over the tenons and resting against the shoulders of the backpanels.

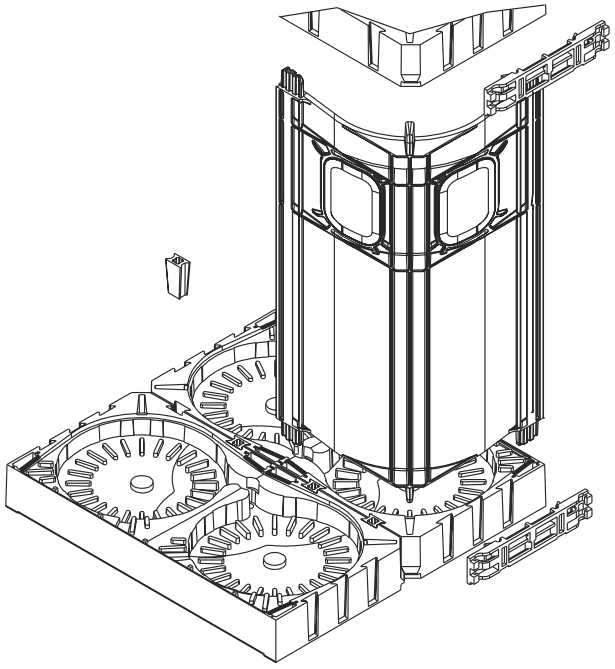


Figure 4-13: Backpanel Assembly and Orientation

13. For each additional tier of batteries, or seismic bracing applications repeat the previous instructions until all backpanels and bases are assembled. Seismic applications require a top level of backpanels and bases to secure the stands and batteries. **NOTE: The upper base panel is inverted for seismic applications.**

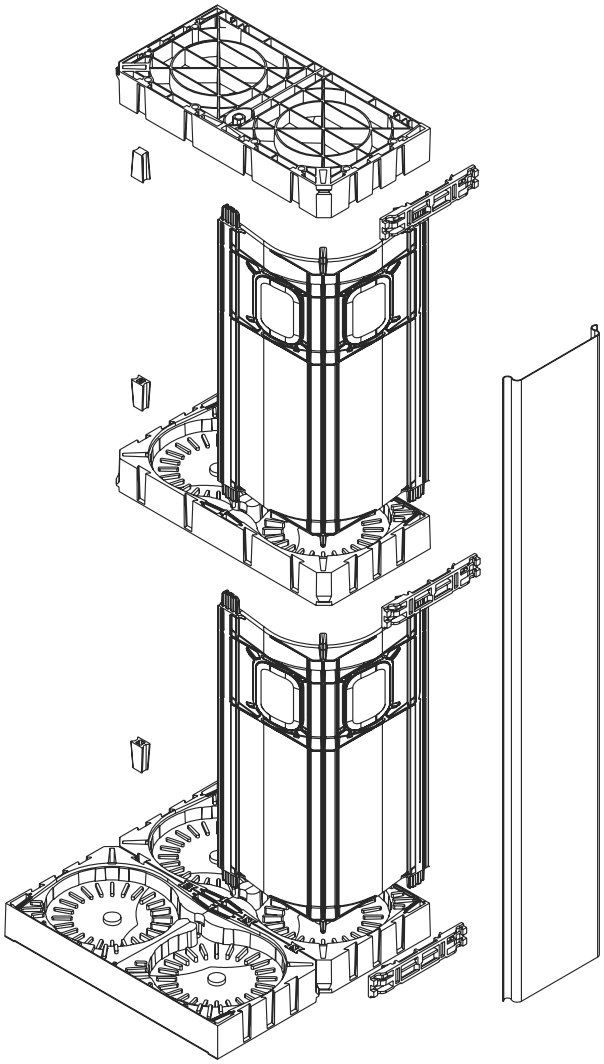


Figure 4-14: Stand Assembly

14. For seismic applications the top most tier of bases (not supporting batteries) must be installed with the cell cavities facing down (see Figure 4-14). Dovetail keys require being installed into each base before being assemble on top of the stand. Starting at one end of the stand, the dovetail key should be inserted into the first base on two adjacent sides. Each successive base only requires one side to have dovetail keys to be installed.

15. Ensure that all bases and backpanels are fully assembled before proceeding. Place a bearing surface of lumber over the base before striking with another small piece of 2" x 4" lumber or rubber mallet to seat base and back panels fully. Make sure all bases and back panels are fully seated over the tenons and resting against the shoulders of the backpanels.

16. After completing the battery stand assembly assemble 5/8-11 x 1.5 long hex bolts into threaded holes in the top hold down brackets (angles and channels). Locate bolts in holes that align with the receiving holes in the bottom face of the top inverted base. The screws should fully engage the bracket and provide extension into the base by a minimum of 1.00 inch.

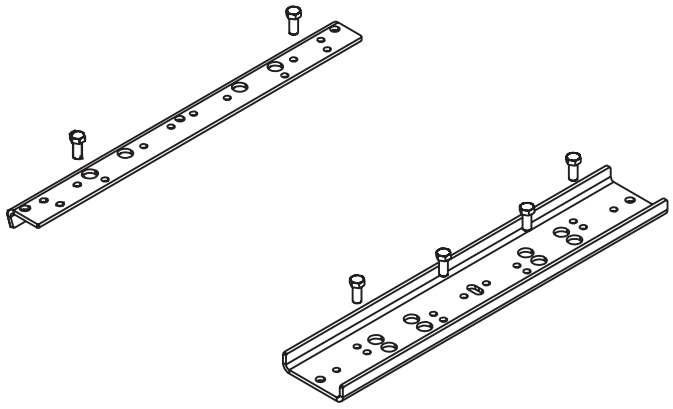


Figure 4-15: Hold-Down Bracket Assembly

17. Assemble the hold down brackets on top of the stand. The angles are used at the two ends of the stands, and the channels are used at each junction between two bases.

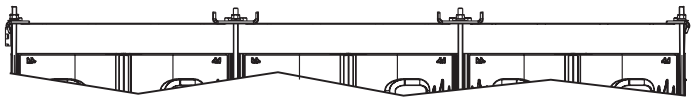


Figure 4-16: Hold-Down Bracket Assembly2

18. Before proceeding with the assembly of the threaded rod hold down assembly each rod should first be assembled with insulating sleeving. Care should be taken when handling the threaded rods to avoid any sharp edges. The sleeving will protect personnel from injury once installed. The sleeving shall be cut to cover all exposed threaded rod. A utility knife can be used to cut the sleeving to length. The sleeving should be trimmed to minimize thread exposure.

19. In applications where multiple threaded rods are required for the hold down assembly assemble threaded rods such that the maximum thread engage is made by both threaded rods. Using a permanent marker indicate on the two threaded rods the maximum engagement depth to which the rods can be inserted (1.00 inch approx.). Assemble the jam nuts onto the ends of the threaded rods to be joined. Insert the threaded rods into the coupling nut up to the

indicated depth. After inserting fully continue inserting until the threaded rods meet in the middle. Spin and lock the jam nuts to each face of the coupling nut.

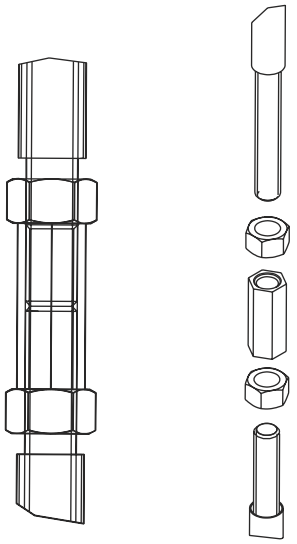


Figure 4-17: Threaded Rod and Coupling Nut Assembly

20. Assembly of the hold down rods is best performed by first feeding the rods through the respective holes in the hold down brackets (feed the threaded rod up through the top bracket and then reposition the threaded rod into the floor anchor). Hold the rods in position with flat washer, lock washer and nut at the top of the stand to hang the rod.

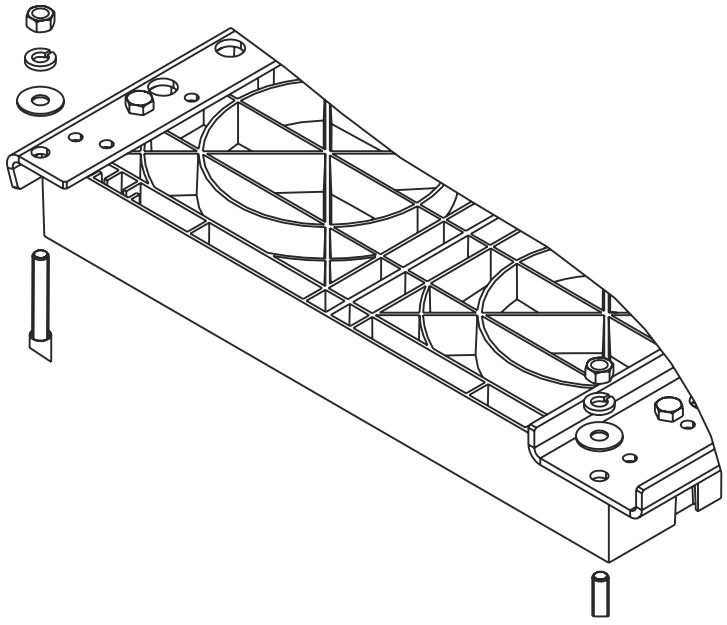


Figure 4-18: Hold-Down Rod Assembly

21. Lift the rod and feed the bottom end through the retention feet into the receiving anchor(s). The threaded rods are assembled/inserted directly into the HDI type floor anchors. A flat washer, lockwasher and Nut are required when using HDI type anchors. For zone 2 application no jam nut or additional hardware is required in top of the square retention plate (the plate is secured by the protrusions on the back corners of the battery stand bases.

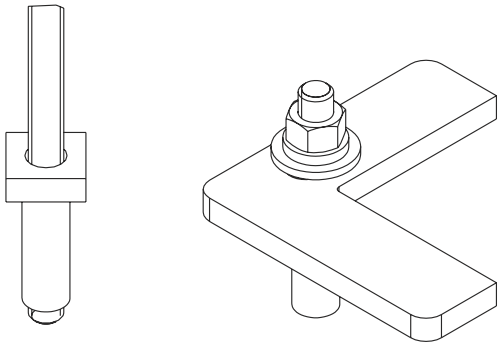


Figure 4-19: Threaded Rod and Retainer Plate Assembly

22. For applications with 16mm HSL anchors the anchors are provided with studs that should be screwed into the anchors. Position the retention plate over the anchor and secure using a jam nut on top of the retention plate to hold the plate to the floor. The adapter-coupling nut provided should be secured to the top of the stud. The threaded rods should be assembled to the opposite end of the coupling nut. The coupling nut should be assembled such that all usable thread is used. A jam nut is required on top of the retention plate to hold the plate to the floor, but where usable thread is limited the jam nut can be omitted using the coupling nut as the jam nut.

23. Torque jam nut on top of the retention plates to anchor manufactures recommended values (HSL anchors – 150 ft-lbs, HDI anchors – 60 ft-lbs).

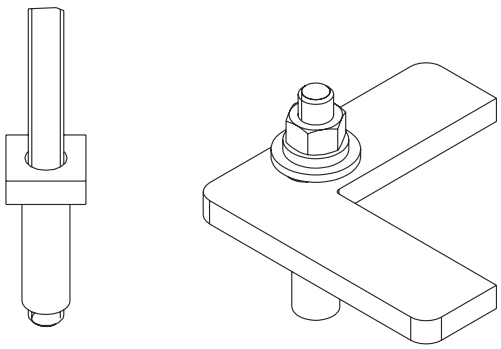


Figure 4-20: Anchor Tightening Torque

24. After securing the bottom end of the threaded rods torque the top of the threaded rods to 12 ft-lbs.

25. Install rubber corner bumpers on the ends of the hold-down angles and channels.

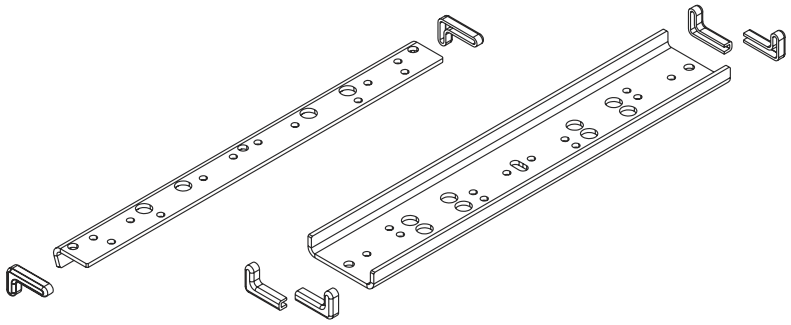


Figure 4-21: Corner Bumper Installation

26. Apply numeric stencils/labels to front face of battery stand bases per job information, or customer's requirements.

Upon completion of these steps, the battery stand is secured to the floor and ready for the batteries to be installed.

Electro-Tyte RC and Round Cell Battery Stands with Spill Containment (List 1S Batteries Only)

1. For spill containment applications position the battery stand feet on the floor. Assemble the socket head cap screws provided with the feet into the respective holes and then assemble the first tier of battery stand bases. The screws fit loosely into the holes on the top of the feet and mate with corresponding holes in the bottom of the battery stand bases. Assemble the bases on top of the feet with the cell cavities upwards and in the configuration called for. The battery stand feet are required to be shimmed level and anchored per the requirements in Table 4-B. In all applications the ends of the feet must be fully supported (see section 4.5 - Shimming Instructions). Assemble the bases together using dovetail keys loosely inserted into the respective slots.

2. Assemble the bases together using dovetail keys loosely inserted into the respective slots of adjoining bases. Dovetail keys do not require being inserted into each slot at this point in the assembly.

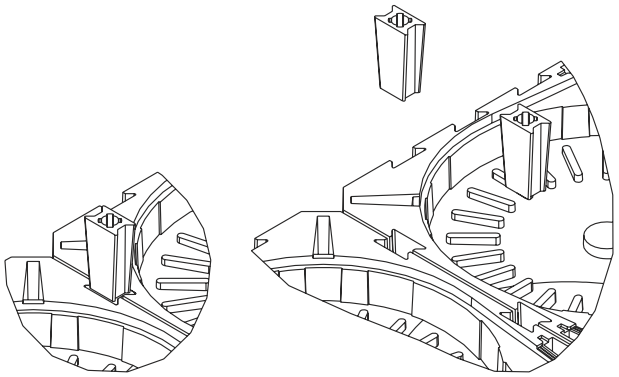


Figure 4-22: Dovetail Key Assembly

3. Using a marker, or other marking device, trace the outline of the floor anchoring holes onto the floor (2 holes per foot). For seismic zone 0 applications, anchoring is only required in the four corners of the battery stand.

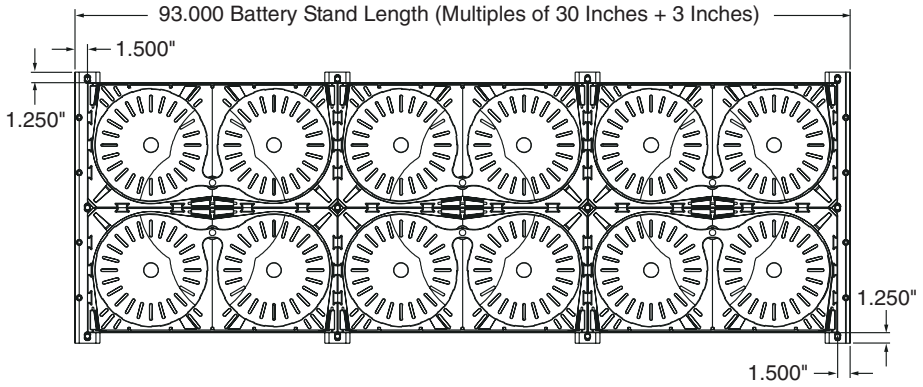


Figure 4-23: Spill Containment Anchoring

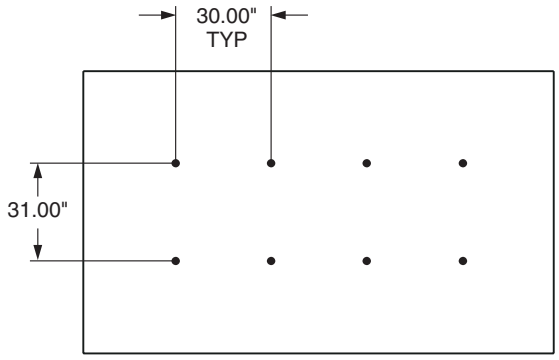


Figure 4-24: Anchor Drilling Pattern for Seismic Applications

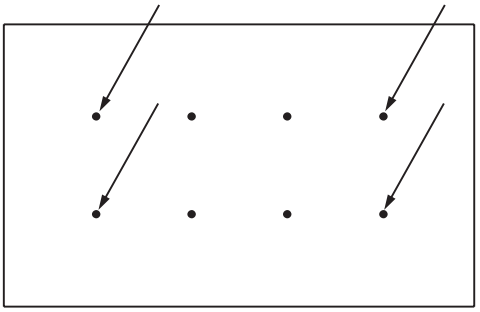
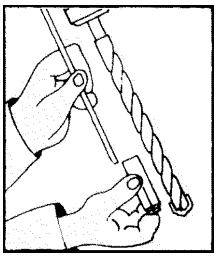
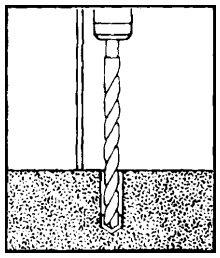


Figure 4-25: Anchor Drilling Pattern for NON-Seismic Applications

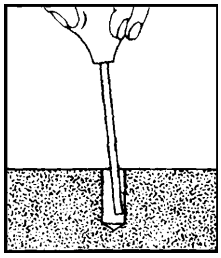
4. Reposition, or disassemble the first tier of the battery stand to provide for drilling of the anchor holes.

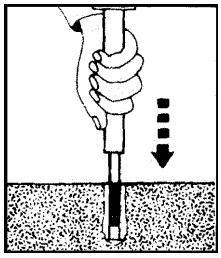
5. Drill holes using drill bit (size and type) as specified by the anchor manufacturer.





6. After drilling the holes clean up all residue created during the drilling process (and dispose of according to the Customer's requirements), and install the anchoring hardware per manufactures specifications.

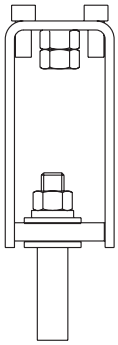




7. Install anchors into holes just prepared per manufacturers specifications.

8. Reposition, or re-assemble the first tier of the battery stand. Every effort should be made to re-align the battery stand with the anchoring devices before proceeding

9. Anchor the battery stand feet to the floor hand tight using the anchoring hardware specified per job information. This will allow for small adjustment of the feet and the battery stand during assembly. One washer is required under the foot assembly when assembling the anchors to prevent the anchor from working up out of the hole.



10. If re-assembling the first tier of the battery stand be sure to install the socket head cap screws in the feet. These screws ensure that the bases do not slide off the battery stand feet.

11. If KS-21723 Cable Brackets are to be installed they must be attached prior to the installation of the backpanels. The backpanels overlap the key slots and, if installed first, would prevent the attachment of the cable bracket.

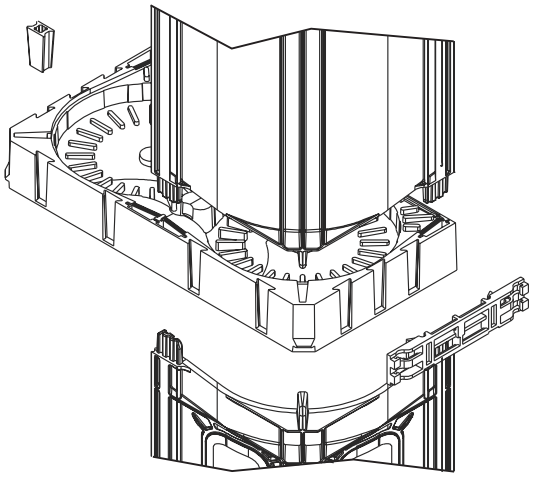


Figure 4-26: Cable Lacing Bracket Assembly

12. Place dovetail keys into the key slots of adjoining bases. With the narrow end of a spare key, press the keys down until they are flush to under flush with the surface of the base. Make sure all keys are in place because once the back panels are installed, the keyways are blocked. Dovetail keys should be inserted into each slot.

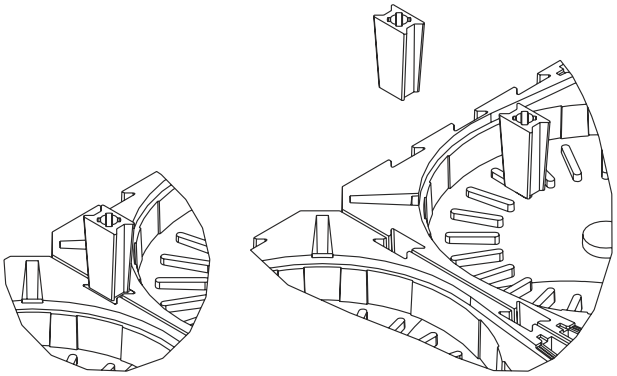


Figure 4-27: Dovetail Key Assembly

13. Turn backpanels so that the large hole in the panel is upward. Place Backpanel tenons into the sockets (mortises) of the base shelf. Apply full weight of the person to engage fully as required. Should

they not engage fully, placement of the second shelf (base) will fully seat the panel. Place a 2" x 4" piece of lumber on it side across 2 adjacent backpanels. This temporary spacer aids in preventing the second shelf from cocking and reduces the chance of pinching the fingers. Place the second tier shelf over the first tier backpanels, so that the back panel tenons engage the sockets of the second tier base shelf. Be careful to keep fingers out of the way while tapping the base down over the backpanels. Do not tap surface directly, but rather place a bearing surface of lumber over the base before striking with another small piece of 2" x 4" lumber or rubber mallet to seat base and back panels fully. Make sure all bases and back panels are fully seated over the tenons and resting against the shoulders of the backpanels.

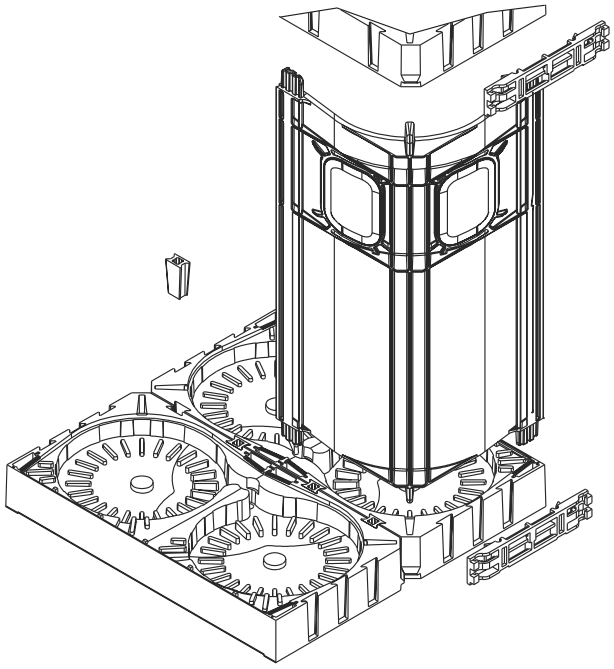


Figure 4-28: Backpanel and Orientation

14. For each additional tier of batteries repeat the previous instructions until all backpanels and bases are assembled. Spill Containment applications require a top level of backpanels and bases to secure the stands and batteries. **NOTE: The upper base panel is inverted.**

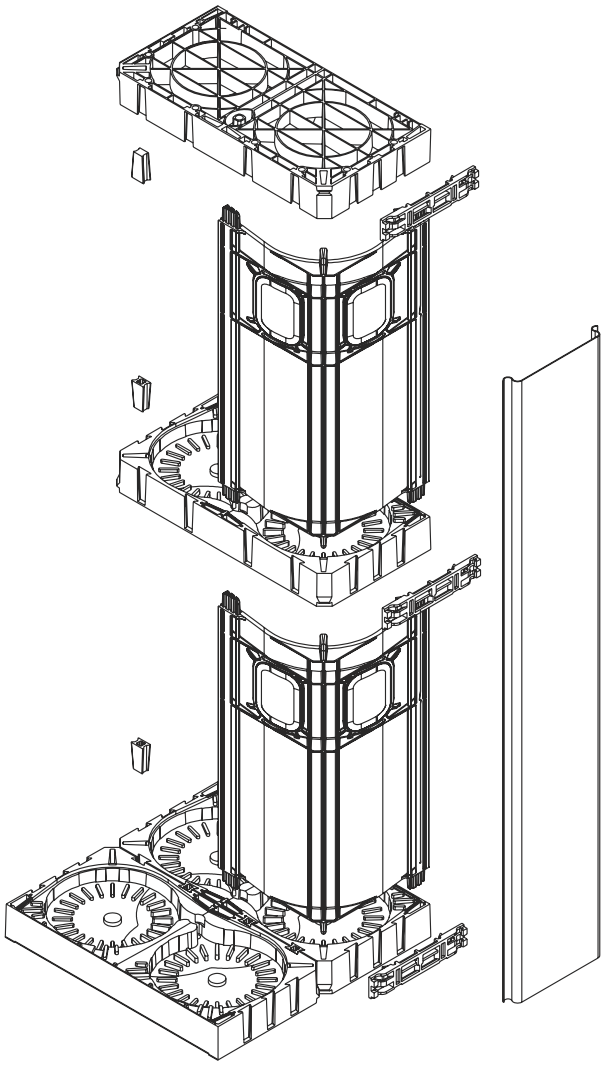


Figure 4-29: Stand Assembly

15. For spill containment applications the top most tier of bases (not supporting batteries) must be installed with the cell cavities facing down (see Figure 4-29). Dovetail keys require being installed into each base before being assemble on top of the stand. Starting at one end of the stand, the dovetail keys should be inserted into the first base on two adjacent sides. Each successive base only requires one side to have dovetail keys to be installed.

16. Ensure that all bases and backpanels are fully assembled before proceeding. Place a bearing surface of lumber over the base before striking with another small piece of 2" x 4" lumber or rubber mallet to seat base and back panels fully. Make sure all bases and back panels are fully seated over the tenons and resting against the shoulders of the backpanels.

17. After completing the battery stand assembly assemble 5/8-11 x 1.5 long hex bolts into threaded holes in the top hold down brackets (angles and channels). Locate bolts in holes that align with the receiving holes in the bottom face of the top inverted base. The screws should fully engage the bracket and provide extension into the base by a minimum of 1.00 inch.

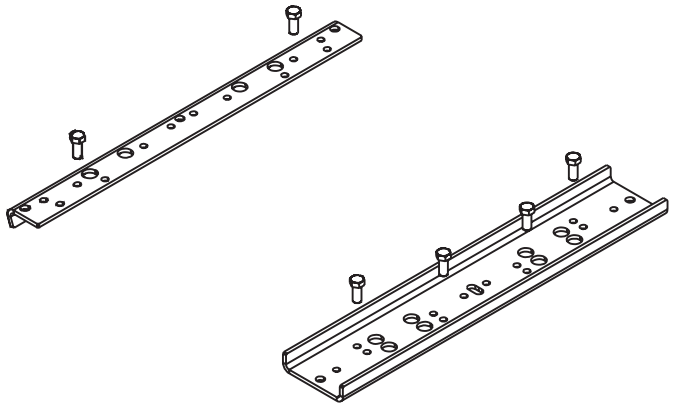


Figure 4-30: Hold-Down Bracket Assembly

18. Assemble the hold down brackets on top of the stand. The angles are used at the two ends of the stands, and the channels are used at each junction between two bases.

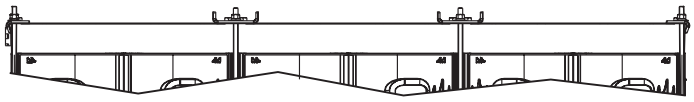


Figure 4-31: Hold-Down BracketAssembly2

19. Before proceeding with the assembly of the threaded rod hold down assembly each rod should first be assembled with insulating sleeving. Care should be taken when handling the threaded rods to avoid any sharp edges. The sleeving will protect personnel from injury once installed. The sleeving shall be cut to cover all exposed threaded rod. A utility knife can be used to cut the sleeving to length.

20. In applications where multiple threaded rods are required for the hold down assembly, assemble threaded rods such that the maximum thread engaged is made by both threaded rods. Using a permanent marker indicate on the two threaded rods the maximum engagement depth to which the rods can be inserted (1.00 inch approx.). Assemble the jam nuts onto the ends of the threaded rods to be joined. Insert the threaded rods into the coupling nut up to the indicated depth. After inserting fully, continue inserting until the

threaded rods meet in the middle. Spin and lock the jam nuts to each face of the coupling nut.

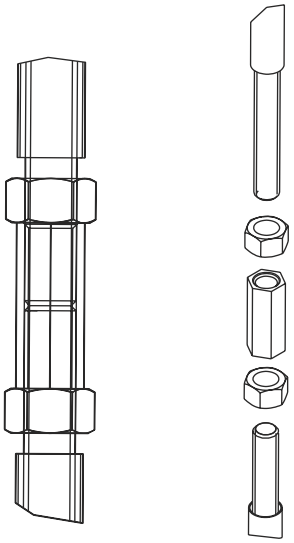


Figure 4-32: Threaded Rod and Coupling Nut Assembly

21. Assembly of the hold down rods is best performed by first feeding the rods through the respective holes in the hold down brackets (feed the threaded rod up through the top bracket and then reposition the threaded rod into the floor anchor). Hold the rods in position with flat washer, lock washer and nut at the top of the stand to hang the rod.

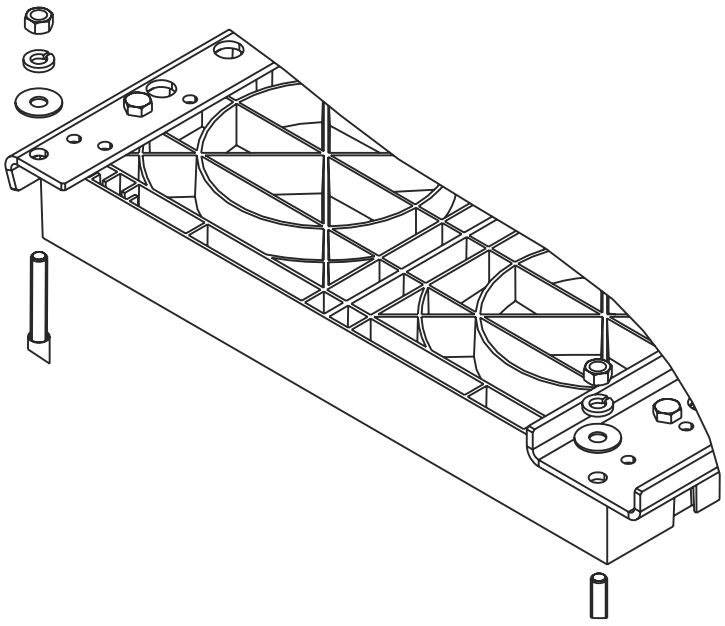


Figure 4-33: Hold-Down Rod Assembly

22. Lift the rod and feed the bottom end through the retention feet into the receiving hole in the top of the battery stand feet. Assemble the jam nuts on the underside face of the feet as shown.

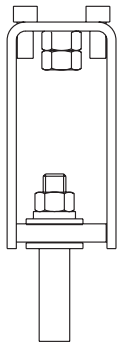


Figure 4-34: Threaded Rod and Foot Assembly

23. After securing the bottom end of the threaded rods torque the top of the threaded rods to 12 ft-lbs (see Figure 4-33).

24. Torque jam nut on the bottom of the threaded rod (see Figure 4-34).

25. Torque the battery stand anchors to manufactures recommended values (HSL anchors ñ 150 ft-lbs, HDI anchors ñ 60 ft-lbs).

26. Install rubber corner bumpers on the ends of the hold-down angles and channels

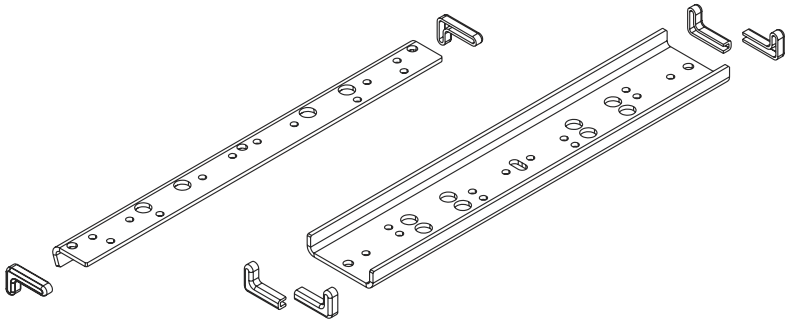


Figure 4-35: Corner Bumper Installation

27. Install tier to tier spill drain hose. Hoses are install on the underside of each base that is supporting batteries above the first tier. The hose connected to the underside of the upper base, and must be fully seated. Flex the hose for insertion into the receiving recess in the top face base below.

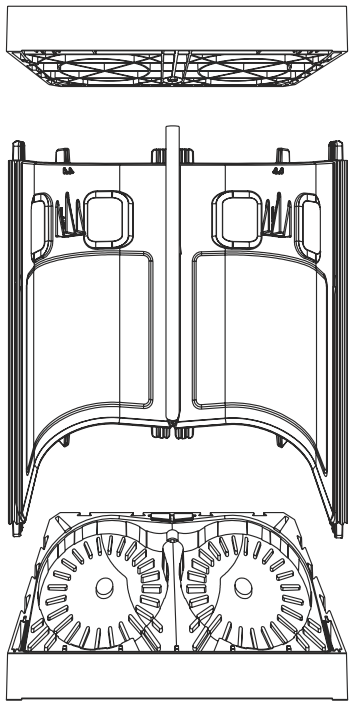


Figure 4-36: Drain Hose Installation

28. Install spill pan retention brackets in the bottom side of first tier of bases. The brackets slide into slots and when fully inserted will hold in position. These brackets must be installed before positioning the spill pan.

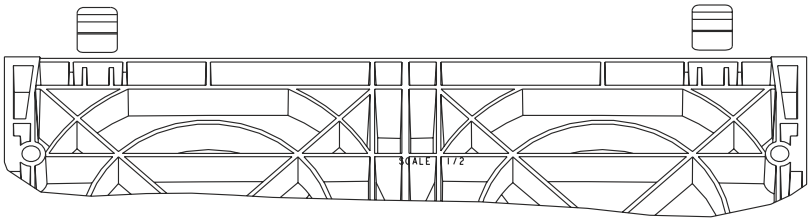


Figure 4-37: Spill Pan Retention Bracket Installation

29. Unscrew the spill pan cap in place in the keeper hole provided on the top face of the spill pan. The drain hole must be open before inserting the spill pan. After inserting the spill pan to the proper depth retract the spill pan retention brackets such that they fully seat into the recesses in the top face of the spill pan. These brackets will ensure that the spill pan does not accidentally slide out from under the battery stand, but does allow for easy removal and replacement with the aid of a flat bladed screw driver as needed. This step can also be performed after assembly of the batteries (optional).

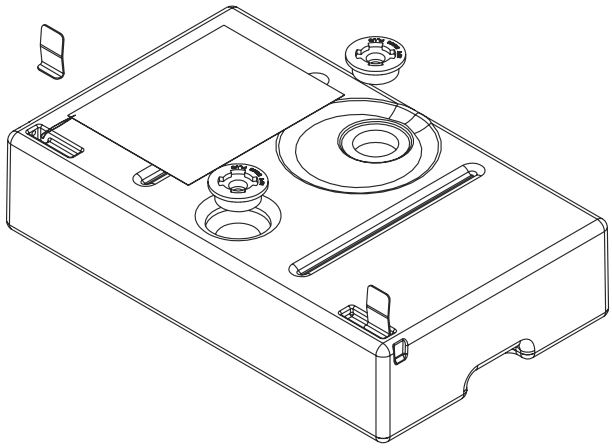


Figure 4-38: Spill Pan Installation

30. Apply numeric stencils/labels to front face of battery stand bases per job information, and customer requirements.

31. Upon completion of these steps, the battery stand is secured to the floor and ready for the batteries to be installed.

32. After completing the battery installation install the front cover shields. Care should be taken not to damage the seals along the edge of the covers while handling or assembling. The covers should be flexed to insert in the tracks on the forward edges of the backpanels. Once inserted into the tracks slide the covers downward until they firmly seat on the battery stand base and securely lock in the track of the backpanels on both sides. The covers should snap in place assuring a snug fit.

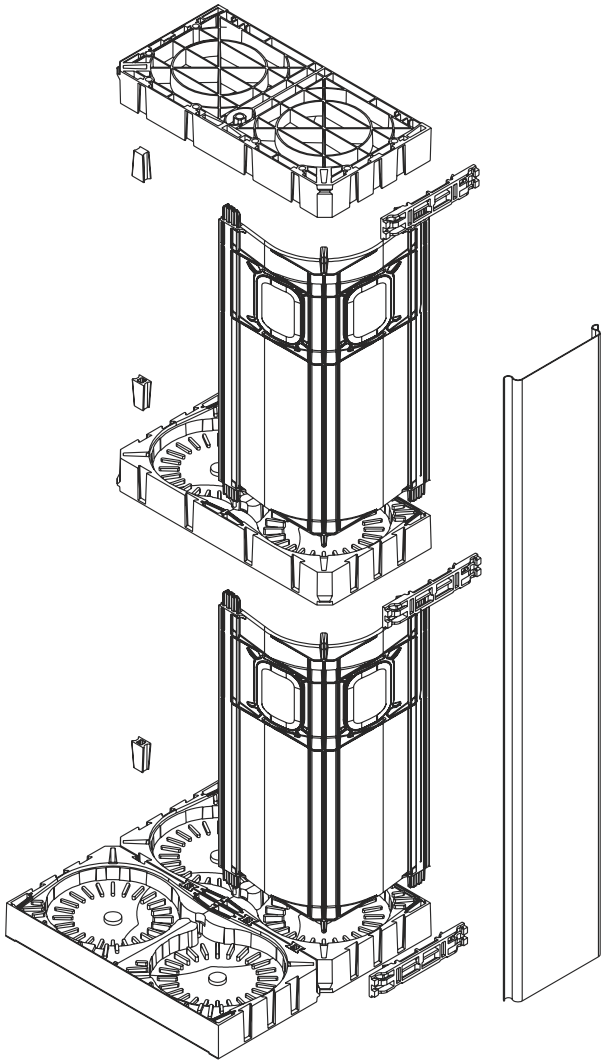


Figure 4-39: Front Cover Shield Installation

Round Cell Battery Stand (List 2S, 3S and 4S batteries)

1. Place the bases on the floor with the cell cavities upwards and in the configuration called for. Check each base to ensure all four corners are touching the floor by applying light pressure on diagonally opposite corners. Should the base rock back and forth, try exchanging it with other bases. Should some rocking still exist, and should the space under one corner (other 3 corners touching) be 1/16 inch or greater it must be shimmed (see section 4.5 - Shimming Instructions). Assemble the bases together using dovetail keys loosely inserted into the respective slots.

2. Assemble the bases together using dovetail keys loosely inserted into the respective slots of adjoining bases. Dovetail keys do not require being inserted into each slot at this point in the assembly.

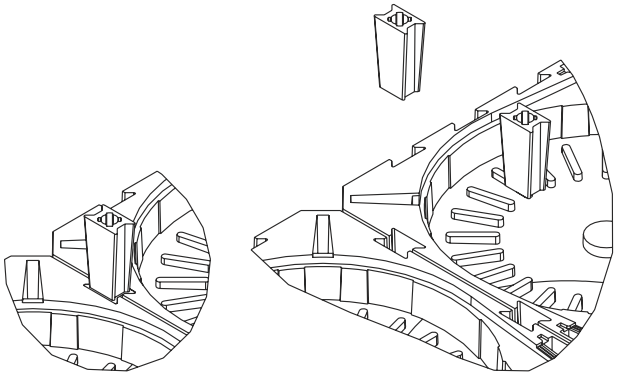


Figure 4-40: Dovetail Key Assembly

3. For all seismic applications, position corner and side retention plates in respective corners and junction points where bases meet. Note orientation of corner plates. The anchoring hole for the corner plates is required to be located at the short ends of the battery stands.

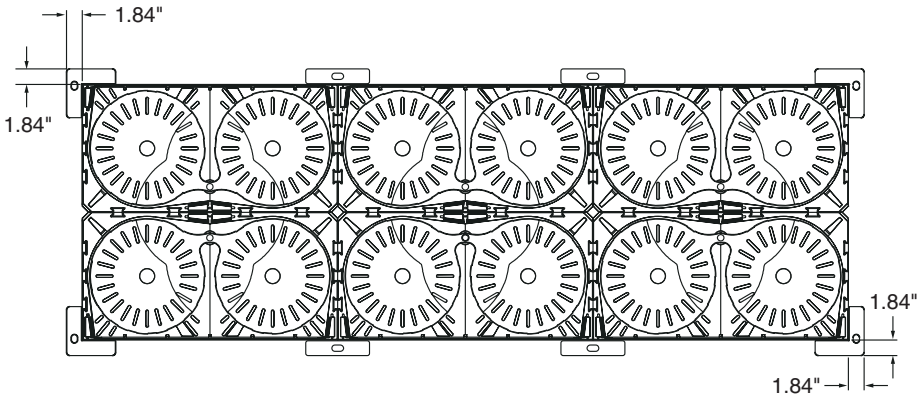


Figure 4-41: Corner and Junction Retention Plate Application

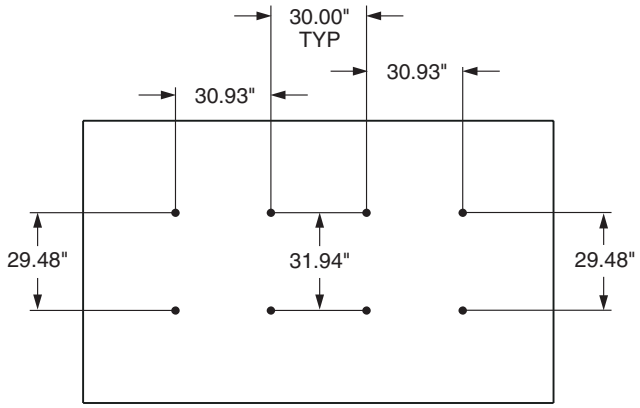
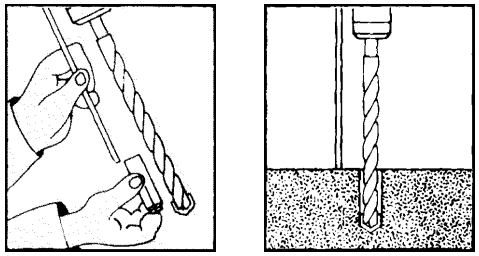


Figure 4-42: Anchor Drilling Pattern

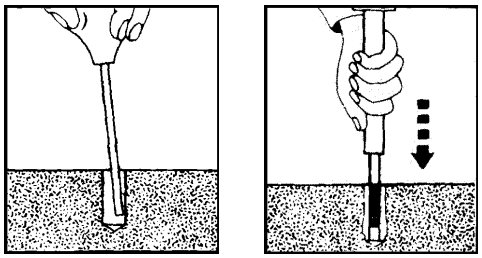
4. Using a marker, or other marking device, trace the outline of the floor anchoring holes onto the floor (1 hole per foot).

5. Reposition, or disassemble the first tier of the battery stand to provide for drilling of the anchor holes.

6. Drill holes using drill bit (size and type) as specified by the anchor manufacturer.



7. After drilling the holes clean up all residue created during the drilling process (and dispose of according to the customer requirements), and install the anchoring hardware per manufactures specifications.



8. Install anchors into holes just prepared per manufacturers specifications.

9. Reposition, or re-assemble the first tier of the battery stand. Every effort should be made to re-align the battery stand with the anchoring devices before proceeding.

10. If KS-21723 Cable Brackets are to be installed they must be attached prior to the installation of the backpanels. The backpanels overlap the key slots and, if installed first, would prevent the attachment of the cable bracket.

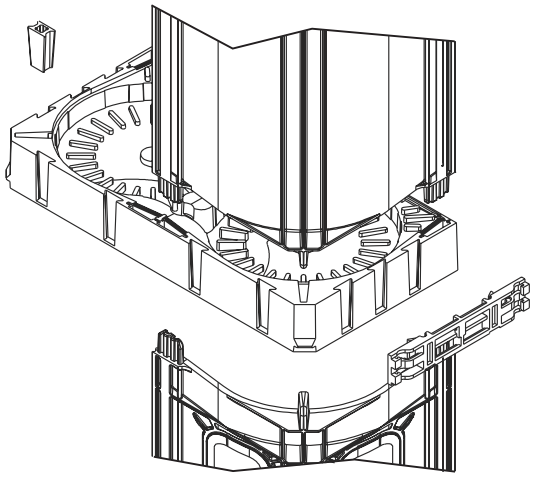


Figure 4-43: Cable Lacing Bracket Assembly

11. For seismic applications the battery stand bases and backpanels are assembled the same as non-seismic applications except that silicone rubber sealant (RTV) is used to secure the tapered keys and the backpanels. Keys are inserted in all slots.

12. In applications requiring RTV (all seismic applications) roughen or otherwise break the surface on the sides of all the dovetail keys using an abrasive paper (120 grit approx).

13. Have available a package of paper towels and an empty carton for disposal.

14. Verify that bases are laid out correctly and are leveled.

15. Holding the dovetail key with the thumb and forefinger in the recessed area while applying an ample coating of RTV to all sides of the keys except the top (side with hole). Two parallel 1/8 inch beads around the perimeter of the dovetail is the approximate amount

required to assure full contact on all sides of the dovetail key when inserted. Always lay the gun down with the nozzle over a paper towel to prevent spills.

16. Place dovetail keys into the key slots of adjoining bases. With the narrow end of a spare key, press the keys down until they are under flush with the surface of the base. Clean up any spilled RTV with paper towels and wipe off excess around keys. Make sure all keys are in place because once the back panels are installed, the keyways are blocked. Dovetail keys should be inserted into each slot.

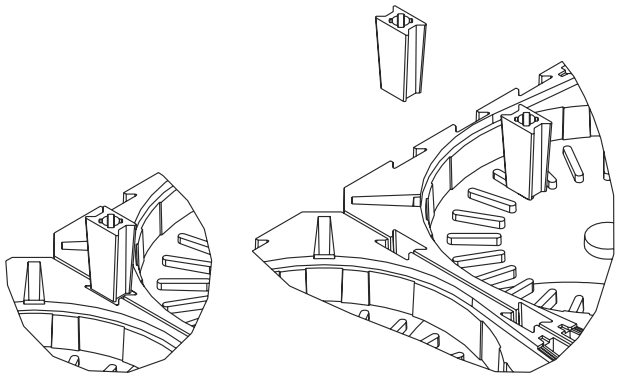


Figure 4-44: Dovetail Key Assembly

17. In preparation for the second tier, fill all mortises or sockets in base between 1/3 to ¾ full of RTV. Keep paper towels under nozzle to prevent dripping when going from one socket to the next.

18. Turn backpanels so that the large hole in the panel is upward. Place Backpanel tenons into the sockets (mortises) of the base shelf. Apply full weight of the person to engage fully as required. With paper towels, wipe up excess RTV forced onto the base. Should they not engage fully, placement of the second shelf (base) will fully seat the panel. Place a 2" x 4" piece of lumber on it side across 2 adjacent backpanels. This temporary spacer aids in preventing the second shelf from cocking and reduces the chance of pinching the fingers.

19. At this point, it is essential that the work be continued until the top (bases) and keys have been assembled. Adjustments are always required in the back panels to guide its tenons into the sockets of the second tier shelf. The second tier shelf should therefore be installed immediately while the RTV in the first tier is still very pliable.

20. Make readily available all additional bases required and turn them upside down. Fill all corresponding sockets 1/3 to ¾ full with RTV.

Turn bases over and fit down fully over tenons extending upwards from the backpanels. Be careful to keep finger out of the way as the tenons are covered slightly to align with holes in underside of bases. Place a bearing surface of lumber over base before striking. Tap lightly with another small piece of lumber, or rubber mallet, to ensure each base bottoms against the shoulder of the Backpanel.

21. Place the second tier shelf over the first tier backpanels, so that the back panel tenons engage the sockets of the second tier base shelf. Be careful to keep fingers out of the way while tapping the base down over the backpanels. Do not tap surface directly, but rather place a bearing surface of lumber over the base before striking with another small piece of 2" x 4" lumber or rubber mallet to seat base and back panels fully. Make sure all bases and back panels are fully seated over the tenons and resting against the shoulders of the backpanels.

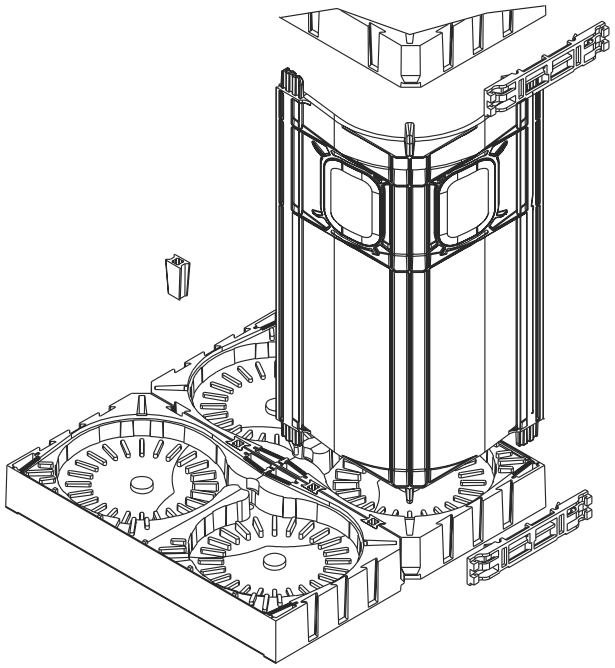


Figure 4-45: Backpanel Assembly and Orientation

22. Continue by inserting dovetail keys for the second tier shelf. Dovetail keys should be inserted into each slot.

23. Check back occasionally to see if any RTV has started to run down the backpanels. If so, remove with paper towels

24. Assemble additional tiers as required per job information.

25. For seismic applications a top tier of bases (not supporting batteries) is required. The bases used in these applications have not been revised like the bases used in conjunction with the List 1S batteries. These bases have a protrusion on the top face for alignment of the backpanels. For the those application still using old hold-down brackets (angles 843779562, 841765258 or channels 843779570, 841155997) the triangular protrusions on the top face of the base is required to be removed. The protrusions are best removed with a hand grinder. This work should be performed in an area not affected by dust. Applications using the new hold-down brackets (angles 848723783, 848723791, or channels 848723800, 848723817) do not require modification.

26. In preparation for the second tier, fill all mortises or sockets on the bottom side of the bases between 1/3 to ¾ full of RTV. Keep paper towels under nozzle to prevent dripping when going from one socket to the next

27. Assemble the top tier of bases with the cell cavities upward (THIS IS DIFFERENT THAN ASSEMBLY OF THE ELECTRO-TYTE RC BATTERY STAND).

28. Ensure that all bases and backpanels are fully assembled before proceeding. Place a bearing surface of lumber over the base before striking with another small piece of 2" x 4" lumber or rubber mallet to seat base and back panels fully. Make sure all bases and back panels are fully seated over the tenons and resting against the shoulders of the backpanels.

29. For all applications requiring Seismic Hold-down floor anchoring is required. Anchors are provided with each battery stand. Anchoring requirements are specified in Table 4-B.

30. Assemble the hold down brackets on top of the stand. The angles are used at the two ends of the stands, and the channels are used at each junction between two bases.

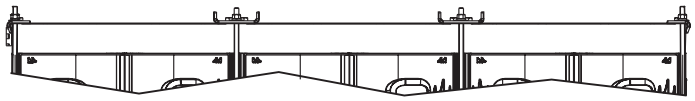


Figure 4-46: Hold-Down Bracket Assembly2

31. Before proceeding with the assembly of the threaded rod hold down assembly, each rod should first be assembled with insulating sleeving. Care should be taken when handling the threaded rods to avoid any sharp edges. The sleeving will protect personnel from

injury once installed. The sleeving shall be cut to cover all exposed threaded rod. A utility knife can be used to cut the sleeving to length. The sleeving should be trimmed to minimize thread exposure.

32. In applications where multiple threaded rods are required for the hold down assembly, assemble threaded rods such that the maximum thread engaged is made by both threaded rods. Using a permanent marker indicate on the two threaded rods the maximum engagement depth to which the rods can be inserted (1.00 inch approx.). Assemble the jam nuts onto the ends of the threaded rods to be joined. Insert the threaded rods into the coupling nut up to the indicated depth. After inserting fully continue inserting until the threaded rods meet in the middle. Spin and lock the jam nuts to each face of the coupling nut.

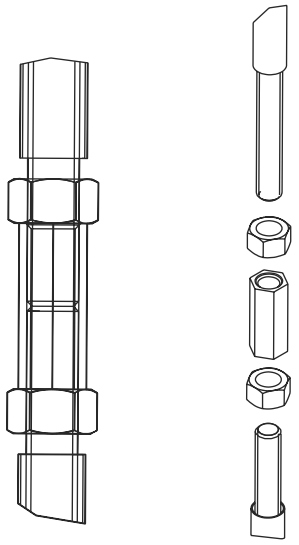


Figure 4-47: Threaded Rod and Coupling Nut Assembly2

33. Assembly of the hold down rods is best performed by first feeding the rods through the respective holes in the hold down brackets (feed the threaded rod up through the top bracket and then reposition the threaded rod into the floor anchor). Hold the rods in position with flat washer, lock washer and nut at the top of the stand to hang the rod.

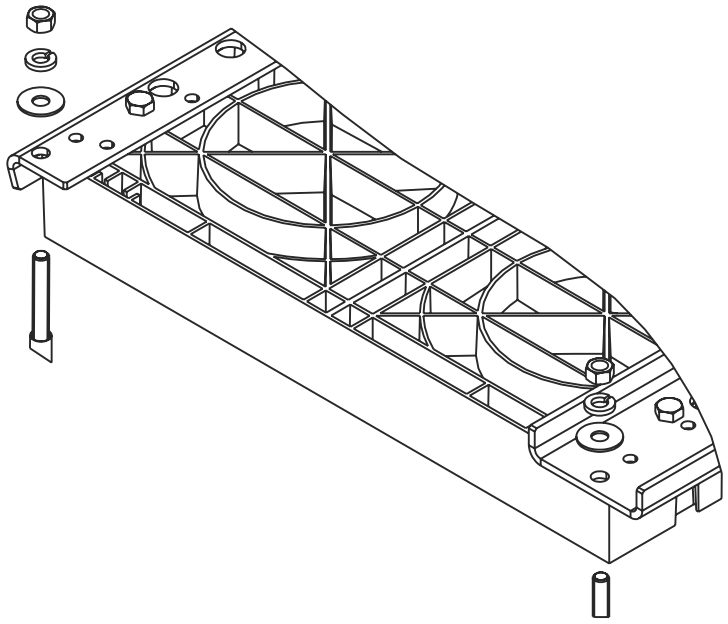


Figure 4-48: Hold-Down Rod Assembly

34. Lift the rod and feed the bottom end through the retention feet into the receiving anchor(s). The threaded rods are assembled/inserted directly into the HDI type floor anchors. A flat washer, lockwasher and Nut are required when using HDI type anchors. For zone 2 application no jam nut or additional hardware is required on the top of the square retention plate (the plate is secured by the protrusions on the back corners of the battery stand bases.

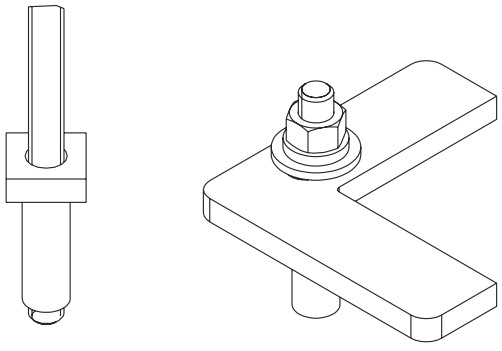


Figure 4-49: Threaded Rod and Retainer Plate Assembly

35. For applications with 16mm HSL anchors the anchors are provided with studs that should be screwed into the anchors. Position the retention plate over the anchor and secure using a jam nut on top of the retention plate to hold the plate to the floor. The adapter-coupling nut provided should be secured to the top of the stud. The threaded rods should be assembled to the opposite end of

the coupling nut. The coupling nut should be assembled such that all usable thread is used. A jam nut is required on top of the retention plate to hold the plate to the floor, but where usable thread is limited the jam nut can be omitted using the coupling nut as the jam nut.

36. Torque jam nut on top of the retention plates to anchor manufactures recommended values (HSL anchors – 150 ft-lbs, HDI anchors – 60 ft-lbs).

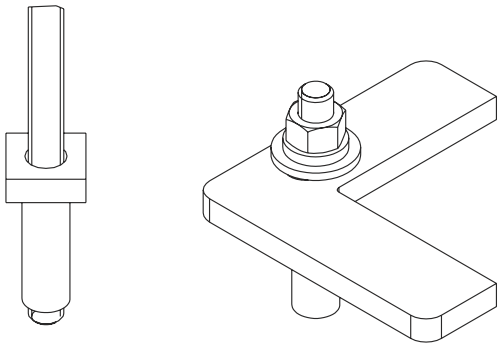


Figure 4-50: Anchor Tightening Torque

37. After securing the bottom end of the threaded rods torque the top of the threaded rods to 12 ft-lbs

38. Assemble bar 840728786 in four positions as shown in the figures below. These bars are used to ensure that the angles do not slide off the top of the battery stand during a seismic event. Assemble using 1 inch long 5/8-16 screws, lockwashers and flat washers provided. Torque to 86 ft-lbs.

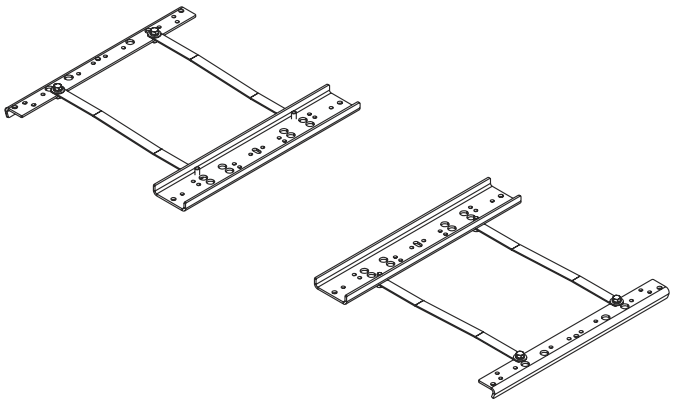


Figure 4-51: Assembly of Hold-Down Bracket for Retention Bar 840728786

Figure 4-52: End View of Hold-Down Bracket for Retention Bar Assembly

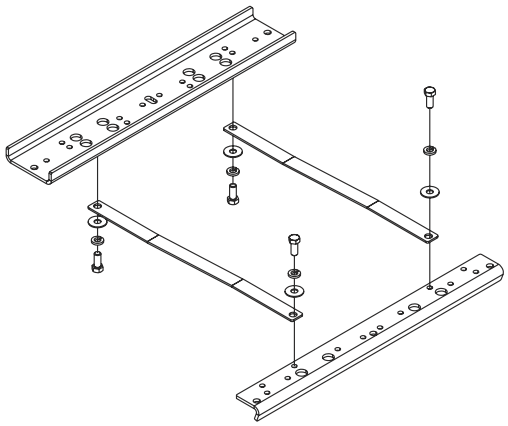


Figure 4-53: Assembly Procedure for Hold-Down Bracket Retention Bar

39. Install rubber corner bumpers on the ends of the hold-down angles and channels.

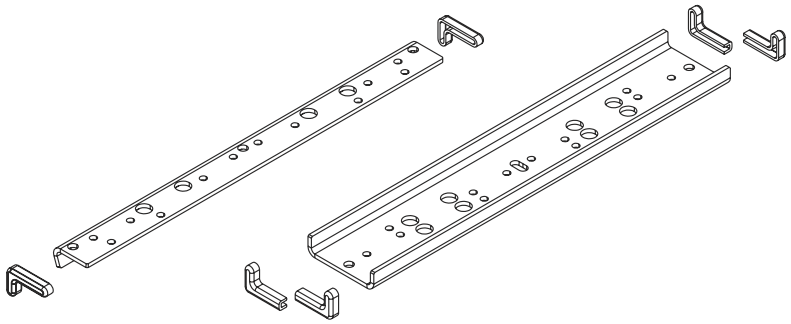


Figure 4-54: Corner Bumper Installation

40. Apply numeric stencils/labels to front face of battery stand bases per job info or customer requirements.

Upon completion of these steps, the battery stand is secured to the floor and ready for the batteries to be installed.

Wall Retention for One Row battery stand applications

1. For wall retention application complete the 1 row battery stand assembly as described above for the stand type being install.

2. Wall retention brackets shall be assembled at each junction between bases in the first dovetail key position adjacent to the wall. The threaded stud provided with the kit shall be screwed into the respective threaded hole of the hold-down channel.

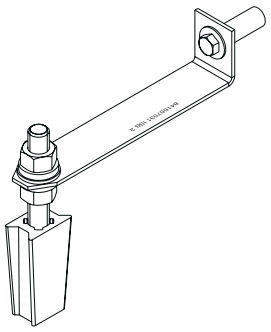


Figure 4-55: Wall Retention Kit

3. Assemble the bracket to the threaded stud hand tight as shown in Figure 4-55 and Figure 4-56.

4. Drill a 3/4 diameter hole in the wall 1-9/16 deep (per the anchor manufacturers specification).

5. Assemble the bolt and washer into the wall anchor and torque to 11 ft-lbs.

6. Torque the hardware assembled in Step 3 to 86 ft-lbs.

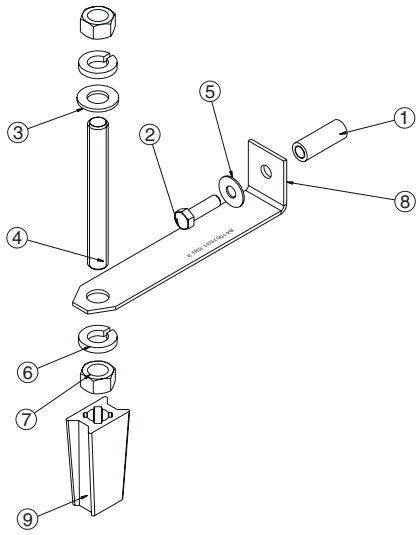


Figure 4-56: Wall Retention Kit Contents

Hydrometer and Thermometer Installation

The Hydrometer should be located in a convenient location and mounted as shown.

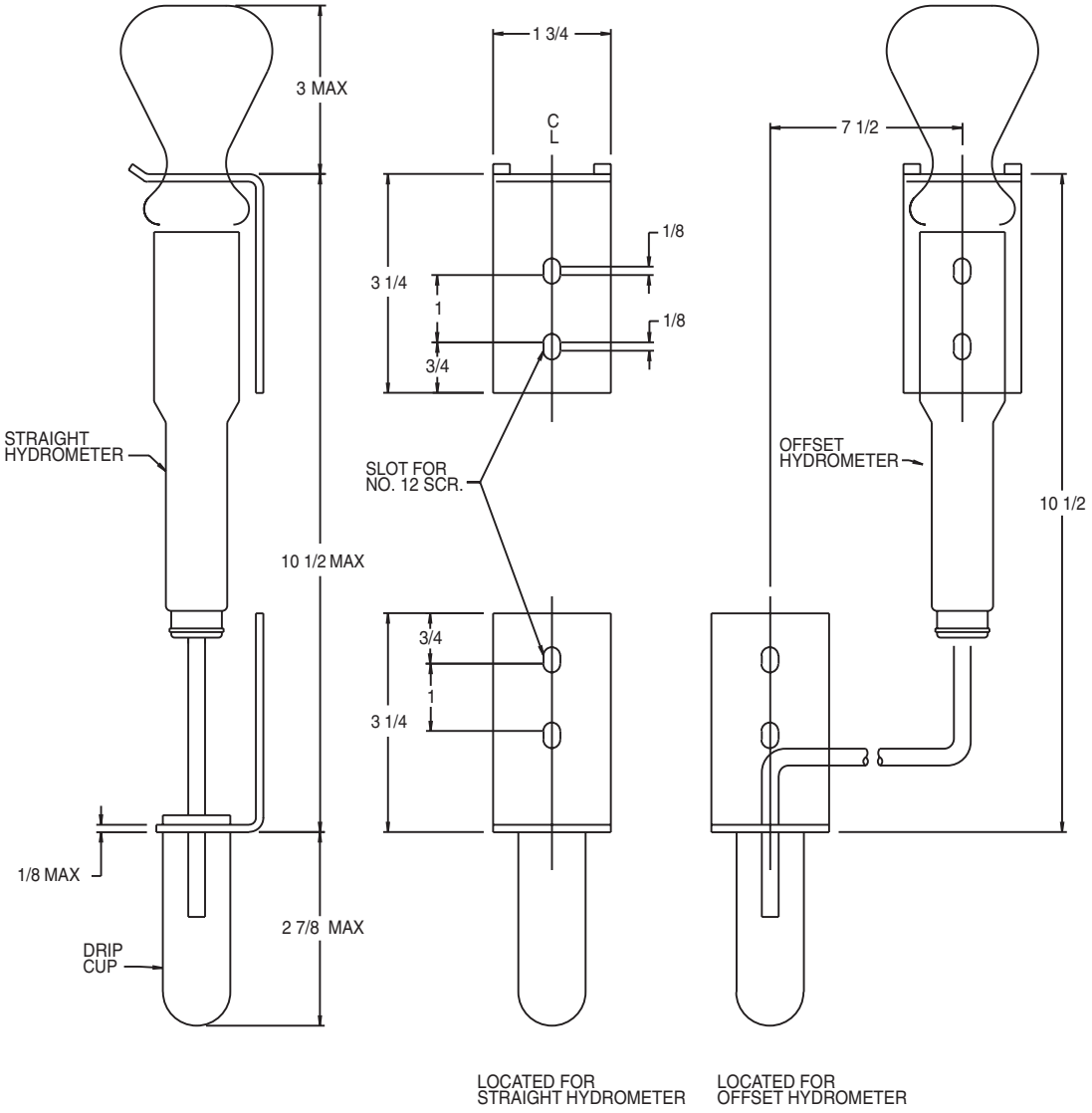


Figure 4-57: Hydrometer and Thermometer Installation

Warning and Safety Information

Please read and follow all safety instructions and warnings before servicing or installing batteries associated with the product listed in this manual. Reference the individual module product manuals for additional safety statements specific to the modules

- Install only in a restricted access area (dedicated equipment rooms, equipment closets, or the like) in accordance with articles 110-16, 110-17, and 110-18 240 of the U.S. National Electric Code (NEC), ANSI/NFPA No. 70, and pursuant to applicable local codes.
- Torque electrical connections to the values specified on labels or in the product documentation.
- Refer to the product documentation for the proper hardware. Use only the parts specified in the equipment documentation.

Warning and Safety Symbols

The symbols may sometimes be accompanied by some type of statement; e.g., "Hazardous voltage/energy inside. Risk of injury. This unit must be accessed only by qualified personnel." Signal words as described below may also be used to indicate the level of hazard.

DANGER Indicates the presence of a hazard that will cause death or severe personal injury if the hazard is not avoided.

WARNING Indicates the presence of a hazard that can cause death or severe personal injury if the hazard is not avoided.

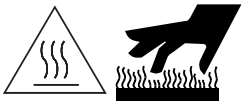
CAUTION Indicates the presence of a hazard that will or can cause minor personal injury or property damage if the hazard is not avoided.

This symbol identifies the need to refer to the equipment instructions for important information.

These symbols (or equivalent) are used to identify the presence of hazardous ac mains voltage.

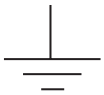
This symbol is used to identify the presence of hazardous ac or dc voltages. It may also be used to warn of hazardous energy levels.

One of these two symbols (or equivalent) may be used to identify the presence of rectifier and battery voltages. The symbol may sometimes be accompanied by some type of statement, for example: "Battery voltage present. Risk of injury due to high current. Avoid contacting conductors with uninsulated metal objects. Follow safety precautions."



One of these two symbols may be used to identify the presence of a hot surface. It may also be accompanied by a statement explaining the hazard. A symbol like this with a lightning bolt through the hand also means that the part is or could be at hazardous voltage levels.

This symbol is used to identify the protective safety earth ground for the equipment.



This symbol is used to identify other bonding points within the equipment.

This symbol is used to identify the need for safety glasses and may sometimes be accompanied by some type of statement, for example: "Fuses can cause arcing and sparks. Risk of eye injury. Always wear safety glasses."

Precautions When working on or using this type of equipment, the following precautions should be noted:

- This unit must be installed, serviced, and operated only by skilled and qualified personnel who have the necessary knowledge and practical experience with electrical equipment and who understand the hazards that can arise when working on this type of equipment.
- Hazardous energy and voltages are present in the assembled unit and on the interface cables that can shock or cause serious injury. Follow all safety warnings and practices when servicing this equipment. Exercise care when servicing this area.
- Electricity produces magnetic fields that can affect implanted medical electronic devices, such as pacemakers. The strength of the magnetic field depends on the amount of current in the circuit, as well as other conditions (such as number of conductors, placement, and distance from the conductor). DC power and distribution systems, including the batteries, that are typically used in telecommunications utility rooms can operate at high current levels. Personnel with electronic medical devices need to be aware of their restrictions when working around electricity.
- In addition to proper job training and safety procedures, the following are some basic precautions that should always be used:
  - –Use only properly insulated tools.
  - –Remove all metallic objects (key chains, glasses, rings, watches, or any other jewelry).
  - –Wear safety glasses.
  - –Test circuits before touching.
  - –Lock out and tag any circuit breakers/fuses when possible to prevent accidental turn on.
  - –Be aware of potential hazards before servicing equipment.
  - –Identify exposed hazardous electrical potentials on connectors, wiring, etc. (note the condition of these circuits, especially any wiring).
  - –Use care when removing or replacing any covers - avoid contacting any circuits.

Battery Installation

The battery stand must not be pre-assembled when the B\Gantry Hoist is to be used to install cells.

Regardless of which hoist is to be used, cells should be installed on the bottom tier first to provide stability prior to placement of cells on the upper tiers. When removing cells, this process is reversed with the cells on the upper tier being removed first. This does not prohibit the removal of defective cells from the lower tiers with the upper tier cells in place

Whenever possible, the cells should be installed before the floor and overhead area is restricted by power bays, superstructure, lights, etc. this will greatly facilitate the installation of cells because of the room required by the various hoists.

Proceed with battery installation following the guidelines in the product manual provided with the batteries.

5 Troubleshooting and Spill Cleanup

Spill Cleanup

Spills Happen! All styles and types of batteries are capable of spilling some quantity of highly corrosive and hazardous electrolyte. Having a battery acid spill kit and people trained and equipped to respond is crucial.

Training your spill responders is important if the spill is to be dealt with safely and before the spill spreads and has time to do severe damage to facilities and equipment. This same training is required if employees of contractors are involved with spill clean-up.

OSHA 29 CFR Part 1910.120 covers Hazardous Waste Operations and Emergency Response (HAZWOPER). It requires written spill response plans, provision of personnel protective equipment and clean-up equipment. Fines for noncompliance, particularly post-incident, are expensive.

Disposal after clean-up in a chemical spill situation must be decided upon by the waste generator. Normally that is the same organization that "owned" the spill. Characterization of the waste and decisions about its disposal (i.e. hazardous waste vs. Non-hazardous waste) have to do with the total contents of the cleaned-up waste. After the spill clean-up is complete the personal protective equipment, clean-up tools, and unused clean-up materials can be recouped for use in future spills.

In the event of a spill from the batteries the following instruction should be used as a guide to the proper cleanup of the spill:

1. Personal protective gear should be worn before beginning any of the following steps

2. Follow battery replacement procedures as described in the battery product manual. Lineage Power recommends disconnecting the existing string from the load and charger before replacing cells. However, if circumstances require that a cell be replaced in an existing string without removing the string from the plant bus, follow guidelines in "String Connected to Load/Charger" in the battery product manual.

3. For an actively leaking battery allow the battery to drain until flow of electrolyte stops. Where the leak consists of an occasional drip (not flowing) proceed to the next step.

4. Remove the battery stand front cover shield after the leak has been identified and flow has stopped.

5. Dry the surface around the leak and attempt to temporarily plug or close the leak with duct tape or other sealing mechanism to avoid any additional spillage during handling. Duct tape or a 2 inch wide vinyl tape is recommended to assure a good temporary seal that should secure the leak for the time required to remove the battery from the string and place it into a containment vessel. Multiple layers of tape are recommended so as to maximize the contact surface area under the tape.

   Note: The use of Duct tape for temporary sealing of a hole poses no secondary risk to the personnel performing operations around the battery. However, work should be performed quickly after applying the tape due to the breakdown of the adhesive after exposure to the electrolyte.

6. Wipe/Rinse the battery with water to remove residual electrolyte from the surface of the battery. If rinsing, use only a small amount of water so as not to overflow the spill containment pan (maximum 1 quart). **DO NOT USE** a neutralizing solution like soda water at this time.

   Warning: Use of a neutralizing solution that enters the inside of the spill containment pan with electrolyte may cause an exothermic reaction inside the pan that may result in excessive eruption of gases, bubbling, splatter of electrolyte and pressure that could rupture the container and/or cause personnel injury.

7. Remove the battery and place it into an approved containment vessel for transport and disposal.

8. Replace the spill containment pan beneath the section of battery stand where the battery was leaking with a new an empty one. Remove the full spill containment pan slowly so as to minimize any movement (sloshing) of the contained fluid. Once accessible insert the bung plug (cap) into the drain opening to seal the container to prevent any spillage. Move the full spill containment to a safe area away from where the spill occurred to minimize obstructions in the cleanup area.

Note: Be sure the seal is in place when assembling the bung plug.

9. Position the new spill containment pan and continue cleaning the battery stand section where the leak occured.

10. Flushing or wiping the entire section of the battery stand with a mild soda solution is recommended. Follow the soda rinse with a fresh water rinse. Repeat this step for all tiers of the battery stand section where the leak occurred. Be sure to rinse thoroughly with water to remove any soda residue. Once dry the soda residue will turn to a white powder that may look like dried electrolyte. Wiping the stand dry after rinsing is recommended to minimize water spots.

    Caution: When rinsing use only a maximum of 8.5 gallons of fluid to rinse per spill containment pan. Replace the spill containment pan as required to assure proper clean-up of the spill electrolyte.

    Note: The waste product contained in each spill containment pan should be considered a hazardous waste.

    Note: By fully containing the spill, and removing the contact hazard, there is no need to neutralize the electrolyte. The electrolyte is fully contained in the removable spill pan that is sealed by a screw in cap making the pan ready for transport, and removing the exposure hazard associated with the handling of absorbed and/or neutralized materials. This eliminates concerns of oxygen displacement during the neutralization process that further reduces any risk to personnel.

11. Clean-up any excess spillage that may have occurred during the clean-up process and handling.

12. Careful attention should be made of the clean-up associated with any metal parts and the floor that may have been exposed to battery electrolyte during the cleanup operation. Neutralization and proper clean-up of these exposed parts of the building or structure are essential. The plastic battery stand components are not affected by exposure to the battery electrolyte but thorough cleaning is required to eliminate contact hazards to personal and conductive paths to ground associated with dry electrolyte traces.

13. Proper disposal of the hazardous waste products, including the leaking battery, is the responsibility of the generator and shall be handled, transported and disposed of according to local, state, federal and all other regulations that apply.

14. For final clean up of the battery stand wipe the stand and adjacent battery with a soft cloth dampened in a weak soda solution, then wipe with a cloth dampened in clean water.

    Note: Electrolyte is considered to be Hazardous Waste. After cleaning dispose of spent cleaning materials according to local, state, and federal regulations.

The historic use of water, bicarbonate of soda, sodium carbonate, ammonia, and other chemicals on acid spills has been challenged. These are not the recommended method for cleaning large acid spills and in certain circumstances may be unsafe, ineffective, and non-compliant with codes and regulations. These chemicals often cause exothermic reactions and generate asphyxiating and potentially toxic gases. They react with vigorous splatter and bubbling. When working in confined spaces, like battery rooms, their use can be quite dangerous. Simple absorbers are totally inappropriate for use on corrosive acid spills. They do not neutralize and will always become hazardous and require extreme care in handling and expensive hazardous waste disposal.

DO NOT clean batteries or battery stand with any chemical containing petroleum distillates. Severe damage to the battery and battery stand plastics may result.

After a Seismic Event - ?????

In the event of a seismic event the entire stand should be inspected for any damage. The Electro-Tyte battery stand has been subjected to seismic simulation testing per NEBs GR63-CORE. No parts were damaged during any of the simulation testing. In the event of damage after an actual event please contact Lineage Power for evaluation of the battery stand integrity and corrective actions required.

The Round Cell battery stand (battery stands containing the List 2S, 3S or 4S batteries) has been subjected to the same seismic simulation testing per NEBs GR63-CORE, but cracks have been observed after completion of the test. These same cracks have also been observed in product having been subjected to actual seismic event. It has been shown by additional testing that these cracks minimally affect the stands ability to withstand repeated seimic events, and still perform their basic function of supporting the batteries. The elimination of this cracking was a driving factor in the development of the Electro-Tyte battery stand. What has been learned with the additional testing is that the structural integrity of the stand is only minimally affected by cracks in the parts, but that parts having a full cross-sectional break will need to be replaced.

Front Cover Shield Seals are Damaged

If during the course of regular maintenance of the batteries the front cover shields are required to be removed, a thorough inspection of the cover seal is required to ensure its integrity. In the event that the seal is damaged, contact Lineage Power to obtain replacement seal information. The covers have been designed such that removal is not required unless the batteries require being cleaned, removed or replaced. Repeated removal of the covers should be avoided.

6 Product Warranty

A. Seller warrants to Customer only, that:

1. As of the date title to Products passes, Seller will have the right to sell, transfer, and assign such Products and the title conveyed by Seller shall be good;
2. During the warranty period stated in Sub-Article B below, Seller's Manufactured Products (products manufactured by Seller), which have been paid for by Customer, will conform to industry standards and Seller's specifications and shall be free from material defects;
3. With respect to Vendor items (items not manufactured by Seller), Seller warrants that such Vendor items, which have been paid for by Customer, will be free from material defects for a period of sixty (60) days commencing from the date of shipment from Seller's facility.

B. The Warranty Period listed below is applicable to Seller's Manufactured Products furnished pursuant to this Agreement, commencing from date of shipment from Seller's facility, unless otherwise agreed to in writing:

Warranty Period

Product Type	New Product	Repaired Product*
Central Office Power Equipment	24 Months	6 Months

**The Warranty Period for a repaired Product or part thereof is six (6) months or, the remainder of the unexpired term of the new Product Warranty Period, whichever is longer.*

C. If, under normal and proper use during the applicable Warranty Period, a defect or nonconformity is identified in a Product and Customer notifies Seller in writing of such defect or nonconformity promptly after Customer discovers such defect or nonconformity, and follows Seller's instructions regarding return of defective or nonconforming Products, Seller shall, at its option attempt first to repair or replace such Product without charge at its facility or, if not feasible, provide a refund or credit based on the original purchase price and installation charges if installed by Seller. Where Seller has elected to repair a Seller's Manufactured Product (other than Cable and Wire Products) which has been installed by Seller and Seller ascertains that the Product is not readily returnable for repair, Seller will repair the Product at Customer's site.

With respect to Cable and Wire Products manufactured by Seller which Seller elects to repair but which are not readily returnable for repair, whether or not installed by Seller, Seller at its option, may repair the cable and Wire Products at Customer's site.

D. If Seller has elected to repair or replace a defective Product, Customer shall have the option of removing and reinstalling or having Seller remove and reinstall the defective or nonconforming Product. The cost of the removal and the reinstallation shall be borne by Customer. With respect to Cable and Wire Products, Customer has the further responsibility, at its expense, to make the Cable and Wire Products accessible for repair or replacement and to restore the site. Products returned for repair or replacement will be accepted by Seller only in accordance with its instructions and procedures for such returns. The transportation expense associated with returning such Product to Seller shall be borne by Customer. Seller shall pay the cost of transportation of the repaired or replacing Product to the destination designated by Customer.

E. Except for batteries, the defective or nonconforming Products or parts which are replaced shall become Seller's property. Customer shall be solely responsible for the disposition of any batteries.

F. If Seller determines that a Product for which warranty service is claimed is not defective or nonconforming, Customer shall pay Seller all costs of handling, inspecting, testing, and transportation and, if applicable, traveling and related expenses.

G. Seller makes no warranty with respect to defective conditions or nonconformities resulting from actions of anyone other than Seller or its subcontractors, caused by any of the following: modifications, misuse, neglect, accident, or abuse; improper wiring, repairing, splicing, alteration, installation, storage, or maintenance; use in a manner not in accordance with Seller's or Vendor's specifications or operating instructions, or failure of Customer to apply previously applicable Seller modifications and corrections. In addition, Seller makes no warranty with respect to Products which have had their serial numbers or month and year of manufacture removed, altered, or experimental products or prototypes or with respect to expendable items, including, without limitation, fuses, light bulbs, motor brushes, and the like. Seller's warranty does not extend to any system into which the Product is incorporated. This warranty applies to Customer only and may not be assigned or extended by Customer to any of its customers or other users of the Product.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND ARE IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. CUSTOMER'S SOLE AND EXCLUSIVE REMEDY SHALL BE SELLER'S OBLIGATION TO REPAIR, REPLACE, CREDIT, OR REFUND AS SET FORTH ABOVE IN THIS WARRANTY.

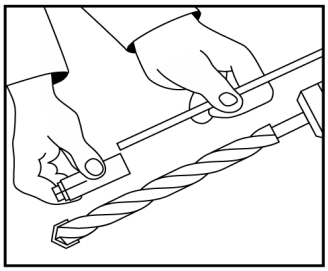
7 Appendix

HDI Anchor Installation Instructions

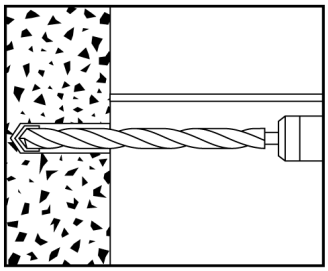
Anchoring Systems

HDI / HDI-L Drop-In Anchor **4.3.5**

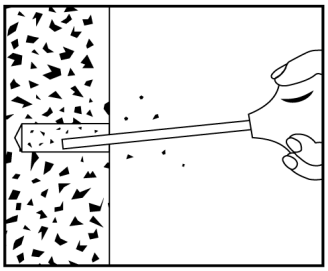
4.3.5.4 Installation Instructions



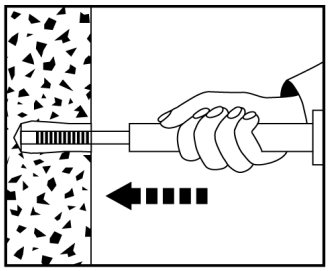
1. Adjust depth gauge so that anchor will be flush with the concrete surface when installed.



2. Hammer drill hole.



3. Clean hole.



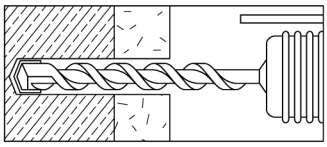
4. Install anchor using proper setting tool. Setting tool to be driven into anchor until setting tool shoulder meets top of anchor.

HSL Anchor Installation Instructions

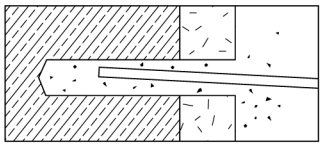
Anchoring Systems

HSL Heavy Duty Sleeve Anchor 4.3.2

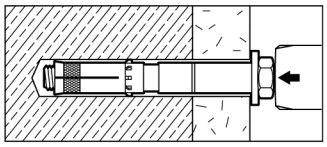
4.3.2.4 Installation Instructions



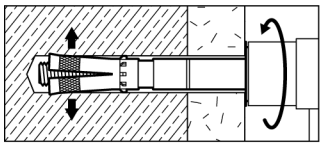
1. Drill a hole with the prescribed Hilti metric carbide or diamond core bit.
Note: the HSL can be installed in a bottomless hole.



2. Clean the hole using compressed air.

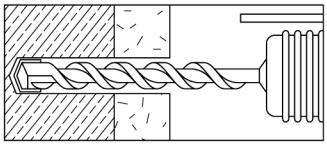


3. Using a hammer, tap the preassembled anchor through the object being anchored and into the hole. The anchor should be seated firmly against the base plate.
Note: Do not expand the anchor by hand before tapping it into the hole.

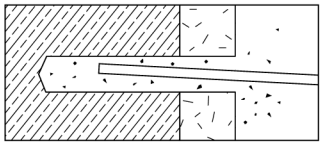


5. Tighten bolt or nut to the specified torque, using a torque wrench.
Note: When using an HSLB anchor, no torque wrench is required. The torque cap shears off at the appropriate torque value.

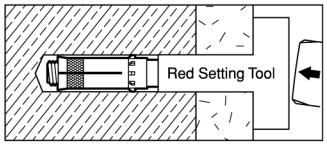
Setting Instructions for the HSL-I M12



1. Drill an 18 mm hole to an embedment depth of 90 mm (3 1/2") with a Hilti metric bit (Item No. 28002) TE-C+ 18/22 bit or Hilti Matched Tolerance diamond core bit (Item No. 239908) with BI connector for DD100.

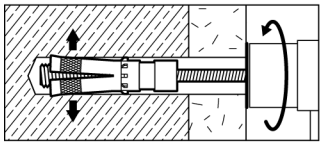


2. Clean the hole using a Hilti Blow Out Pump (Item No. 60579) or compressed air with a nozzle (Item No. 63964) to reach the bottom of the hole.



3. Use a hammer to tap the anchor flush with the concrete (do not install the threaded rod). Insert the blade of the red handle setting tool into the anchor and engage the blade into the slot of the anchor. Tap the setting tool with a hammer until flush with the concrete. (If there is no setting tool available, a standard screwdriver can be used. Use the screwdriver and hammer to tap the anchor into the hole until the top of the anchor is 6 mm (1/4") below the surface of the concrete.)

4. Turn the setting tool clockwise until snug. (A screwdriver can be used if a setting tool is unavailable.)



5. A. Installations with equipment or base plates: Install equipment or base plate over the anchor. Insert the threaded rod through the base plate or equipment into the anchor a minimum of four full threads. Place washer and torque nut on the threaded rod and hand tighten. Use a box end or socket wrench to tighten the torque nut until the torque nut shears off. **Caution - The torque nut shears off suddenly - Gloves are recommended.** The torque nut shears off at approximately 60 ft-lbs.
B. Installations with stand-off connections such as raised computer floors: Insert the threaded rod into the set anchor a minimum of four full threads. Place washer and torque nut on the threaded rod and hand tighten against the concrete. Use a box end wrench to tighten the torque nut until the torque nut shears off. **Caution-The torque nut shears off suddenly-Gloves are recommended.** The torque nut shears off at approximately 60 ft-lbs. Complete the stand-off connection using two metric 12 mm nuts and washers to clamp the apparatus at the correct stand-off height.

1. Drill holes with rotary impact hammer drills using carbide-tipped bits] [and] [core drills using diamond core bits]. Drill bits shall be of diameters as specified by the anchor manufacturer. Unless otherwise shown on the Drawings, all holes shall be drilled perpendicular to the concrete surface.

a. Cored Holes: Where anchors are to be installed in cored holes, use core bits with matched tolerances as specified by the manufacturer. HIT HY-150 and HIT ICE shall not be installed in core drilled holes.

b. Embedded Items: Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Exercise care in coring or drilling to avoid damaging existing reinforcing or embedded items. Notify the Engineer if reinforcing steel or other embedded items are encountered during drilling. Take precautions as necessary to avoid damaging prestressing tendons, electrical and telecommunications conduit, and gas lines.

c. Base Material Strength: Unless otherwise specified, do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.

2. Perform anchor installation in accordance with manufacturer instructions.

3. Wedge Anchors, Heavy-Duty Sleeve Anchors, and Undercut Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in part to be fastened. Set anchors to manufacturerís recommended torque, using a torque wrench. Following attainment of 10% of the specified torque, 100% of the specified torque shall be reached within 7 or fewer complete turns of the nut. If the specified torque is not achieved within the required number of turns, the anchor shall be removed and replaced unless otherwise directed by the Engineer.

A. Remove and replace misplaced or malfunctioning anchors. Fill empty anchor holes and patch failed anchor locations with high-strength non-shrink, nonmetallic grout. Anchors that fail to meet proof load or installation torque requirements shall be regarded as malfunctioning.

3.03 FIELD QUALITY CONTROL

Specifier Note: Job site testing is a common method of assuring correct installation of anchor systems. In order to achieve the appropriate level of quality control, testing should be performed by the ownerís inspector in consultation with the manufacturer representative. Adjust testing requirements to suit job and local jurisdiction conditions. Select percentage of anchors to be tested. Smaller or more critical installations may warrant a higher percentage of anchors to be tested and a greater

penalty for malfunctioning anchors. Verify that anchor embedments and proof loads are shown on the Drawings.

A. Testing: [10%] [25%] _____ of each type and size of drilled-in anchor shall be proof loaded by the independent testing laboratory. If [any] [more than 10%] _____ of the tested anchors fail to achieve the specified torque or proof load within the limits as defined on the Drawings, all anchors of the same diameter and type as the failed anchor shall be tested, unless otherwise instructed by the Engineer.

    1. Torque shall be applied with a calibrated torque wrench.

    2. Proof loads shall be applied with a calibrated hydraulic ram. Displacement of adhesive and capsule anchors at proof load shall not exceed D/10, where D is the nominal anchor diameter.

B. Minimum anchor embedments, proof loads and torques shall be as shown on the Drawings.

The anchors provided with this battery stand product have certifications per the following:

1. ICBO ES Evaluation Report indicating conformance with current applicable ICBO ES Acceptance Criteria.

2. European Technical Approval indicating conformance with the European Technical Approval Guideline (ETAG) No. 001, Parts 2, 3 or 5.

Installation Checklist

Material and Equipment Inventory	Inventory Battery stand material Inventory installation tools and material Battery Hoist
Parts Inspection	Inspect all battery stand Backpanels and Bases for a indications of damage that may have occurred during transport.
Initial Installation Check	MOP Floor Layout Cabling options
Battery Stand Assembly	Seismic Bracing Jam nuts on bottom of threaded rods Anchor bolt jam nuts torqued to anchor manufacturers requirements Holddown Tension rods torqued to 12 ft-lbs
Battery Installation	Battery orientation Battery inter-cell connection Connection Torque
Spill Pan installation	Retention bracket installation Drain hole open and drum plug stored in recess
Leak Testing	