

MARATHON[®]

Sprinter[®]

SECTION 43.30 2010-12

RACK & ACCESSORY GUIDE



GNB[®]
INDUSTRIAL POWER



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Section 1

Battery Sizing

Sizing Marathon Batteries for a Constant Current Load:

In order to correctly size any battery for a constant current load, the following information will be required:

1. Required load in amperes.
2. Required back-up time.
3. Final system voltage.
4. Nominal system operating voltage.
5. Any correction factors that will affect the battery sizing.

Example: A nominal 48 volt (24 cell) telecommunications system requires 20 amps constant current and will operate satisfactorily down to a minimum of 42 volts. Calculate the battery required for 4 hours standby duration on the basis of

- a) 25°C operating temperature
- b) 0°C operating temperature

Step 1 - Load

Total battery duty = 20 amps

Step 2 – Calculating End Voltage per Cell (VPC)

Minimum allowable volts per cell = 42 volts/24 cells = 1.75vpc

Hence cell performance requirement is 20 amperes to 1.75 vpc.

Step 3 – Determination of appropriate cell size

Refer to the Marathon performance specification table for 1.75 vpc end voltage @ 25°C. (Table A)

- a) @ 25°C, the required battery type would be an M12V90 (If load required falls between cell sizes, always select the larger cell. This will ensure that the battery is not undersized). *Conclusion: Use 4 M12V90 Batteries.*

- b) @ 0°C, temperature correction for battery performance is required (See Table C, pg. 4). In this case, a 4 hour backup time at 0°C will require a 0.82 temperature correction factor. Multiplying the 25°C values in TABLE A by 0.82 yields temperature corrected cell capacities @ 0°C (Table B).

- For the given 20 ampere load @ 0°C, the appropriate cell size would now be M6V190(F).

Table A

Model Number	Hours		
	5	4	3
M12V40/M12V40F	7.6	9.3	11.9
M12V70/M12V70F	13.4	16.5	21.2
M12V90/M12V90F	16.7	20.2	25.9
M6V190/M6V190F	35.9	43.7	56.0

Table B

Temp. Corrected Cell Capacities for 0°C			
Model Number	Hours		
	5	4	3
M12V40/M12V40F	6.2	7.6	9.7
M12V70/M12V70F	11.0	13.3	16.9
M12V90/M12V90F	13.7	16.6	21.2
M6V190/M6V190F	29.4	35.8	46.6

Conclusion: Use eight (8) M6V190(F) batteries connected in series.

Helpful Data for Constant Current Sizing

Table C

Discharge Time	Temperature Correction Factor					
	0°C	5°C	10°C	15°C	20°C	25°C
5 min to 59 min	0.74	0.80	0.86	0.91	0.96	1
60 Minutes and up	0.82	0.86	0.90	0.93	0.97	1

Note: temperature correction for capacity is not used above 25°C

- **To convert from degrees Fahrenheit to degrees Celsius:**

$$^{\circ}\text{C} = \frac{(^{\circ}\text{F}-32) \times 5}{9}$$

- **IEEE compliance with respect to Design Margins and Aging Factors**

Sizing batteries per IEEE 485 recommends the use of both an aging factor and a design margin. The recommended aging factor is 1.25 and the recommended design margin is 1.10.

Therefore, if a battery was required to be sized for a 20 ampere load in accordance with IEEE Standard 485, the load would be modified as follows:

Given load = 20 Amps

Aging Factor = 1.25

Design Margin = 1.10

Corrected Load = 20 amps X 1.25 X 1.10

Corrected Load = 27.5 amperes

- Therefore, to meet IEEE standard 485 specifications, the battery must be sized to 27.5 amps, NOT 20 amps.

- **Series/Parallel Strings**

Marathon/Sprinter batteries are available in either 12 volt or 6 volt units. When connected in series (positive post of one battery to the negative post of the next), the battery string voltage will increase by the voltage of the battery added. The amp-hour rating, however, will remain the same.

Series connected example:

Two Marathon M12V90 batteries (each battery is a 12 volt, 90 amp-hour battery) connected in series (positive post of battery 1 to negative post of battery 2) will provide a total nominal string voltage of 24 volts. The total string amp-hour capacity will remain 90 amp-hours.

Parallel connected example:

The same two M12V90 batteries connected in parallel (positive post of battery 1 to positive post of battery 2 and negative post of battery 1 connected to negative post of battery 2) will deliver a total nominal string voltage of 12 volts. The total string amp-hour capacity, however, will be 180 amp-hours.

Sizing Sprinter Batteries for a Constant Power Load

To size any battery for a constant power load, the load must be expressed as Watts DC. The data required for correctly sizing the cells is as follows:

1. Load given in either kilowatts or watts
2. System limits such as maximum and minimum voltages.
3. Discharge duration.

Example: Sizing a Sprinter battery for a 3kW load with the following system restrictions:

Required back-up time: 60 minutes
Maximum system voltage: 58 volts
Minimum system voltage: 41.5 volts
Operating Temperature: a) 25°C
 b) 5°C

Step 1 - Calculating the DC Load

$$W = kW \times 1,000$$
$$W = 3kW \times 1,000 = 3,000 \text{ watts}$$

Step 2 - Determining the required number of cells

Number of cells = $\frac{\text{Maximum system Voltage}}{\text{Equalize voltage per cell}}$
(typical equalize voltage per cell for Sprinter Batteries is 2.35 volts)

$$N \text{ (Number of cells)} = \frac{58 \text{ volts}}{2.35 \text{ vpc}}$$
$$N = 24.68 \rightarrow 24 \text{ cells}$$

Step 3 – Determining the End voltage

$$\text{End Voltage} = \frac{\text{Minimum System Voltage}}{N}$$
$$= \frac{41.5 \text{ volts}}{24 \text{ cells}}$$
$$= 1.73 \text{ volts/cell} \rightarrow 1.75 \text{ vpc}$$

Note: 1.73 volts per cell was raised to 1.75 volts per cell to ensure that the minimum system voltage is never reached.

Step 4 – determining the required load per cell

$$WPC = \frac{W}{N}$$
$$= \frac{3,000 \text{ watts}}{24 \text{ cells}}$$
$$= 125 \text{ watts/cell}$$

Step 5a – Selecting Appropriate Cell Size for an operating Temperature of 25°C

By referring to the Sprinter constant power table for a cell end voltage of 1.75 vpc at 25°C (Table D) and reading down the 60 minute column, it can be found that the Sprinter S12V370(F) will be required. This model will deliver 129 wpc where the actual system requirement is for 125 wpc.

Table D

Model Number	Minutes		
	45	60	75
S12V120/S12V120F	51	40	33
S12V170/S12V170F	73	58	48
S12V300/S12V300F	130	104	88
S12V370/S12V370F	163	129	107
S6V740/S6V740F	326	258	212

Step 5b – Selecting Appropriate Cell Size for an operating Temperature of 5°C

At 5°C, temperature correction for battery performance is required (See TABLE C, pg 4). In this case, a 60 minute backup time at 5°C will require a 0.86 temperature correction factor. Multiplying the 25°C values in TABLE D by 0.86 yields temperature corrected cell capacities @ 5°C (TABLE E).

Table E

Temp. Corrected Cell Capacities for 5°C			
Model Number	Minutes		
	45	60	75
S12V120/S12V120F	43	34	28
S12V170/S12V170F	62	49	41
S12V300/S12V300F	111	89	75
S12V370/S12V370F	140	110	92
S6V740/S6V740F	280	221	182

Conclusion:

- For the given 125 WPC load

The appropriate temperature corrected cell size would be S6V740(F).

Therefore, use *eight (8) S6V740(F) batteries connected in series.*

Helpful Data for Constant Power Sizing

- ***To convert from degrees***

Fahrenheit to degrees Celsius:

$$^{\circ}\text{C} = \frac{(^{\circ}\text{F} - 32) \times 5}{9}$$

- ***To convert from KVA to KWB:***

$$\text{KWB} = \frac{\text{KVA} \times \text{P.F.}}{e}$$

Where:

KVA = Kilovolt Amps

KWB = Kilowatt Battery

P.F. = Power Factor (if not listed use 0.8)

e = Efficiency (if not listed use 0.9)

ex. The given power requirements are listed as 11.25KVA. What is the corresponding Battery load?

As the power factor and efficiency are not listed, 0.8 and 0.9 will be used respectively.

$$\text{KWB} = \frac{11.25 \times 0.8}{0.9} = 10 \text{ KWB}$$

- **IEEE compliance with respect to Design Margins and Aging Factors**

Sizing batteries per IEEE 485 recommends the use of both an aging factor and a design margin. The recommended aging factor is 1.25 and the recommended design factor is 1.10.

Therefore, if a battery was required to be sized for the above 10KWB load in accordance with IEEE Standard 485, the load would be modified as follows:

Given load = 10KWB

Aging Factor = 1.25

Design Margin = 1.10

Corrected Load = 10KWB X 1.25 X 1.10

Corrected Load = 13.75 KWB

Therefore, to meet IEEE standard 485 specifications, the battery must be sized to 13.75KWB, NOT 10KWB.

Section 2

Marathon Front Terminal Seismic Racks

Marathon Front Terminal TWO Shelf Seismic Rack Systems

System includes rack, batteries, and interunit connectors

105/125/155 Rack Only Dimensions 24.05" Length, 23.30" Depth, 26.63" Height, 95 lbs. Weight

180 Rack Only Dimensions: 23.84" Length, 24.16" Depth, 29.09" Height, 150 lbs. Weight

M12V125FT (24 Volt System)			
	Ah Capacity	# Batteries	System Part #
2 String	208 Ah	4	M97-004-M105F-S2-LF-2P
3 String	312 Ah	6	M97-006-M105F-S2-LF-3P
4 String	416 Ah	8	M97-008-M105F-S2-LF-4P

M12V125FT (24 Volt System)			
	Ah Capacity	# Batteries	System Part #
2 String	250 Ah	4	M97-004-M125F-S2-LF-2P
3 String	375 Ah	6	M97-006-M125F-S2-LF-3P
4 String	500 Ah	8	M97-008-M125F-S2-LF-4P

M12V155FT (24 Volt System)			
	Ah Capacity	# Batteries	System Part #
2 String	310 Ah	4	M97-004-M155F-S2-LF-2P
3 String	465 Ah	6	M97-006-M155F-S2-LF-3P
4 String	620 Ah	8	M97-008-M155F-S2-LF-4P

M12V180FT (24 Volt System)			
	Ah Capacity	# Batteries	System Part #
2 String	360 Ah	4	M97-004-M180F-S2-LF-2P
3 String	540 Ah	6	M97-006-M180F-S2-LF-3P
4 String	720 Ah	8	M97-008-M180F-S2-LF-4P

M12V105FT (48 Volt System)			
	Ah Capacity	# Batteries	System Part #
1 String	104 Ah	4	M97-004-M105F-S2-LF
2 String	208 Ah	8	M97-008-M105F-S2-LF-2P

M12V125FT (48 Volt System)			
	Ah Capacity	# Batteries	System Part #
1 String	125 Ah	4	M97-004-M125F-S2-LF
2 String	250 Ah	8	M97-008-M125F-S2-LF-2P

M12V155FT (48 Volt System)			
	Ah Capacity	# Batteries	System Part #
1 String	155 Ah	4	M97-004-M155F-S2-LF
2 String	310 Ah	8	M97-008-M155F-S2-LF-2P

M12V180FT (48 Volt System)			
	Ah Capacity	# Batteries	System Part #
1 String	180 Ah	4	M97-004-M180F-S2-LF
2 String	360 Ah	8	M97-008-M180F-S2-LF-2P

Marathon Front Terminal THREE Shelf Seismic Rack Systems

System includes rack, batteries, and interunit connectors

105/125/155 Rack Only Dimensions 24.05" Length, 23.30" Depth, 38.89" Height, 135 lbs. Weight

180 Rack Only Dimensions: 23.84" Length, 24.16" Depth, 42.61" Height, 200 lbs. Weight

M12V105FT (24 Volt System)

	Ah Capacity	# Batteries	System Part #
2 String	208 Ah	4	M97-004-M105F-S3-LF-2P
3 String	312 Ah	6	M97-006-M105F-S3-LF-3P
4 String	416 Ah	8	M97-008-M105F-S3-LF-4P
5 String	520 Ah	10	M97-010-M105F-S3-LF-5P
6 String	624 Ah	12	M97-012-M105F-S3-LF-6P

M12V125FT (24 Volt System)

	Ah Capacity	# Batteries	System Part #
2 String	250 Ah	4	M97-004-M125F-S3-LF-2P
3 String	375 Ah	6	M97-006-M125F-S3-LF-3P
4 String	500 Ah	8	M97-008-M125F-S3-LF-4P
5 String	625 Ah	10	M97-010-M125F-S3-LF-5P
6 String	750 Ah	12	M97-012-M125F-S3-LF-6P

M12V155FT (24 Volt System)

	Ah Capacity	# Batteries	System Part #
2 String	310 Ah	4	M97-004-M155F-S3-LF-2P
3 String	465 Ah	6	M97-006-M155F-S3-LF-3P
4 String	620 Ah	8	M97-008-M155F-S3-LF-4P
5 String	775 Ah	10	M97-010-M155F-S3-LF-5P
6 String	930 Ah	12	M97-012-M155F-S3-LF-6P

M12V180FT (24 Volt System)

	Ah Capacity	# Batteries	System Part #
2 String	360 Ah	4	M97-004-M180F-S3-LF-2P
3 String	540 Ah	6	M97-006-M180F-S3-LF-3P
4 String	720 Ah	8	M97-008-M180F-S3-LF-4P
5 String	900 Ah	10	M97-010-M180F-S3-LF-5P
6 String	1080 Ah	12	M97-012-M180F-S3-LF-6P

M12V105FT (48 Volt System)

	Ah Capacity	# Batteries	System Part #
1 String	104 Ah	4	M97-004-M105F-S3-LF
2 String	208 Ah	8	M97-008-M105F-S3-LF-2P
3 String	312 Ah	12	M97-012-M105F-S3-LF-3P

M12V125FT (48 Volt System)

	Ah Capacity	# Batteries	System Part #
1 String	125 Ah	4	M97-004-M125F-S3-LF
2 String	250 Ah	8	M97-008-M125F-S3-LF-2P
3 String	375 Ah	12	M97-012-M125F-S3-LF-3P

M12V155FT (48 Volt System)

	Ah Capacity	# Batteries	System Part #
1 String	155 Ah	4	M97-004-M155F-S3-LF
2 String	310 Ah	8	M97-008-M155F-S3-LF-2P
3 String	465 Ah	12	M97-012-M155F-S3-LF-3P

M12V180FT (48 Volt System)

	Ah Capacity	# Batteries	System Part #
1 String	180 Ah	4	M97-004-M180F-S3-LF
2 String	360 Ah	8	M97-008-M180F-S3-LF-2P
3 String	540 Ah	12	M97-012-M180F-S3-LF-3P

Marathon Front Terminal FOUR Shelf Seismic Rack Systems

System includes rack, batteries, and interunit connectors

105/125/155 Rack Only Dimensions: 24.05" Length, 23.30" Depth, 51.16" Height, 175 lbs. Weight

180 Rack Only Dimensions: 23.87" Length, 24.70" Depth, 56.24" Height, 250 lbs. Weight

UBC ZONE 4 PART NUMBERS SHOWN BELOW. FOR NEBS PART NUMBER SUBSTITUTE "NEB" IN LIEU OF "SEI"

M12V105FT (24 Volt System)			
	Ah Capacity	# Batteries	System Part #
2 String	208 Ah	4	M97-004-M105F-SEI-LF-2P
3 String	312 Ah	6	M97-006-M105F-SEI-LF-3P
4 String	416 Ah	8	M97-008-M105F-SEI-LF-4P
5 String	520 Ah	10	M97-010-M105F-SEI-LF-5P
6 String	624 Ah	12	M97-012-M105F-SEI-LF-6P
7 String	728 Ah	14	M97-014-M105F-SEI-LF-7P
8 String	832 Ah	16	M97-016-M105F-SEI-LF-8P

M12V125FT (24 Volt System)			
	Ah Capacity	# Batteries	System Part #
2 String	250 Ah	4	M97-004-M125F-SEI-LF-2P
3 String	375 Ah	6	M97-006-M125F-SEI-LF-3P
4 String	500 Ah	8	M97-008-M125F-SEI-LF-4P
5 String	625 Ah	10	M97-010-M125F-SEI-LF-5P
6 String	750 Ah	12	M97-012-M125F-SEI-LF-6P
7 String	875 Ah	14	M97-014-M125F-SEI-LF-7P
8 String	1000 Ah	16	M97-016-M125F-SEI-LF-8P

M12V155FT (24 Volt System)			
	Ah Capacity	# Batteries	System Part #
2 String	310 Ah	4	M97-004-M155F-SEI-LF-2P
3 String	465 Ah	6	M97-006-M155F-SEI-LF-3P
4 String	620 Ah	8	M97-008-M155F-SEI-LF-4P
5 String	775 Ah	10	M97-010-M155F-SEI-LF-5P
6 String	930 Ah	12	M97-012-M155F-SEI-LF-6P
7 String	1085 Ah	14	M97-014-M155F-SEI-LF-7P
8 String	1240 Ah	16	M97-016-M155F-SEI-LF-8P

M12V180FT (24 Volt System)			
	Ah Capacity	# Batteries	System Part #
2 String	360 Ah	4	M97-004-M180F-SEI-LF-2P
3 String	540 Ah	6	M97-006-M180F-SEI-LF-3P
4 String	720 Ah	8	M97-008-M180F-SEI-LF-4P
5 String	900 Ah	10	M97-010-M180F-SEI-LF-5P
6 String	1080 Ah	12	M97-012-M180F-SEI-LF-6P
7 String	1260 Ah	14	M97-014-M180F-SEI-LF-7P
8 String	1440 Ah	16	M97-016-M180F-SEI-LF-8P

M12V105FT (48 Volt System)			
	Ah Capacity	# Batteries	System Part #
1 String	104 Ah	4	M97-004-M105F-SEI-LF
2 String	208 Ah	8	M97-008-M105F-SEI-LF-2P
3 String	312 Ah	12	M97-012-M105F-SEI-LF-3P
4 String	416 Ah	16	M97-016-M105F-SEI-LF-4P

M12V125FT (48 Volt System)			
	Ah Capacity	# Batteries	System Part #
1 String	125 Ah	4	M97-004-M125F-SEI-LF
2 String	250 Ah	8	M97-008-M125F-SEI-LF-2P
3 String	375 Ah	12	M97-012-M125F-SEI-LF-3P
4 String	500 Ah	16	M97-016-M125F-SEI-LF-4P

M12V155FT (48 Volt System)			
	Ah Capacity	# Batteries	System Part #
1 String	155 Ah	4	M97-004-M155F-SEI-LF
2 String	310 Ah	8	M97-008-M155F-SEI-LF-2P
3 String	465 Ah	12	M97-012-M155F-SEI-LF-3P
4 String	620 Ah	16	M97-016-M155F-SEI-LF-4P

M12V180FT (48 Volt System)			
	Ah Capacity	# Batteries	System Part #
1 String	180 Ah	4	M97-004-M180F-SEI-LF
2 String	360 Ah	8	M97-008-M180F-SEI-LF-2P
3 String	540 Ah	12	M97-012-M180F-SEI-LF-3P
4 String	720 Ah	16	M97-016-M180F-SEI-LF-4P

Marathon Front Terminal FIVE Shelf Seismic Rack Systems

System includes rack, batteries, and interunit connectors

Rack Only Dimensions 24.05" Length, 23.30" Depth, 63.42" Height, 215 lbs. Weight

M12V105FT (24 Volt System)			
	Ah Capacity	# Batteries	System Part #
2 String	208 Ah	4	M97-004-M105F-S5-LF-2P
3 String	312 Ah	6	M97-006-M105F-S5-LF-3P
4 String	416 Ah	8	M97-008-M105F-S5-LF-4P
5 String	520 Ah	10	M97-010-M105F-S5-LF-5P
6 String	624 Ah	12	M97-012-M105F-S5-LF-6P
7 String	728 Ah	14	M97-014-M105F-S5-LF-7P
8 String	832 Ah	16	M97-016-M105F-S5-LF-8P
9 String	936 Ah	18	M97-018-M105F-S5-LF-9P
10 String	1040 Ah	20	M97-020-M105F-S5-LF-10P

M12V125FT (24 Volt System)			
	Ah Capacity	# Batteries	System Part #
2 String	250 Ah	4	M97-004-M125F-S5-LF-2P
3 String	375 Ah	6	M97-006-M125F-S5-LF-3P
4 String	500 Ah	8	M97-008-M125F-S5-LF-4P
5 String	625 Ah	10	M97-010-M125F-S5-LF-5P
6 String	750 Ah	12	M97-012-M125F-S5-LF-6P
7 String	875 Ah	14	M97-014-M125F-S5-LF-7P
8 String	1000 Ah	16	M97-016-M125F-S5-LF-8P
9 String	1125 Ah	18	M97-018-M125F-S5-LF-9P
10 String	1250 Ah	20	M97-020-M125F-S5-LF-10P

M12V155FT (24 Volt System)			
	Ah Capacity	# Batteries	System Part #
2 String	310 Ah	4	M97-004-M155F-S5-LF-2P
3 String	465 Ah	6	M97-006-M155F-S5-LF-3P
4 String	620 Ah	8	M97-008-M155F-S5-LF-4P
5 String	775 Ah	10	M97-010-M155F-S5-LF-5P
6 String	930 Ah	12	M97-012-M155F-S5-LF-6P
7 String	1085 Ah	14	M97-014-M155F-S5-LF-7P
8 String	1240 Ah	16	M97-016-M155F-S5-LF-8P
9 String	1395 Ah	18	M97-018-M155F-S5-LF-9P
10 String	1550 Ah	20	M97-020-M155F-S5-LF-10P

M12V105FT (48 Volt System)			
	Ah Capacity	# Batteries	System Part #
1 String	104 Ah	4	M97-004-M105F-S5-LF
2 String	208 Ah	8	M97-008-M105F-S5-LF-2P
3 String	312 Ah	12	M97-012-M105F-S5-LF-3P
4 String	416 Ah	16	M97-016-M105F-S5-LF-4P
5 String	520 Ah	20	M97-020-M105F-S5-LF-5P

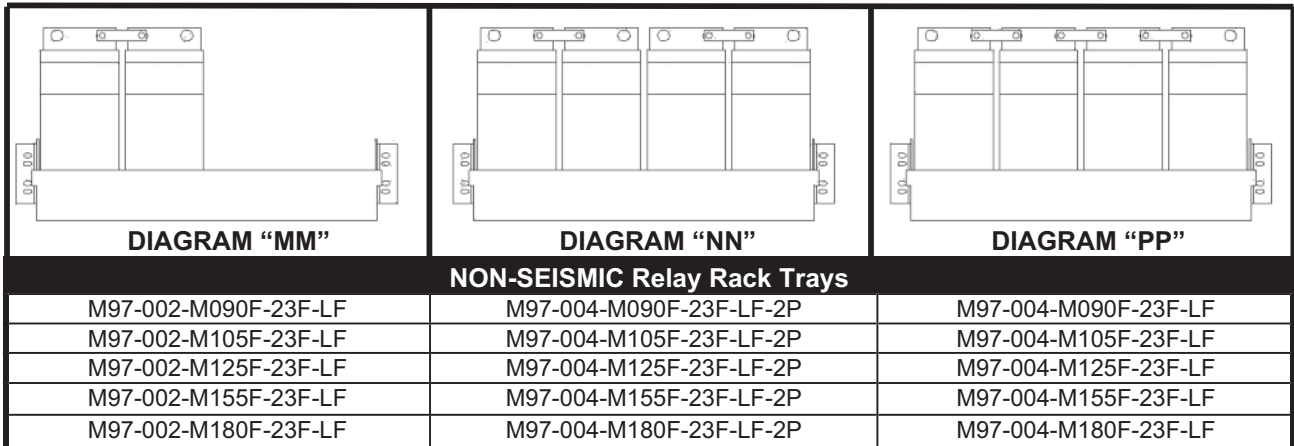
M12V125FT (48 Volt System)			
	Ah Capacity	# Batteries	System Part #
1 String	125 Ah	4	M97-004-M125F-S5-LF
2 String	250 Ah	8	M97-008-M125F-S5-LF-2P
3 String	375 Ah	12	M97-012-M125F-S5-LF-3P
4 String	500 Ah	16	M97-016-M125F-S5-LF-4P
5 String	625 Ah	20	M97-020-M125F-S5-LF-5P

M12V155FT (48 Volt System)			
	Ah Capacity	# Batteries	System Part #
1 String	155 Ah	4	M97-004-M155F-S5-LF
2 String	310 Ah	8	M97-008-M155F-S5-LF-2P
3 String	465 Ah	12	M97-012-M155F-S5-LF-3P
4 String	620 Ah	16	M97-016-M155F-S5-LF-4P
5 String	775 Ah	20	M97-020-M155F-S5-LF-5P

Section 3
Non-Seismic
23" Relay Rack Trays

Marathon Front Terminal 23" Relay Rack Tray**

System includes Tray, Batteries, and Inter-unit Connectors. If required, Order 23" Relay Rack Equipment Stand, (part # S07-420153-001) separately.



M12V90FT (24 Volt System)				
	Ah Capacity	# Batteries	System Part #	Reference Diagram
1 String	86 Ah	2	M97-002-M090F-23F-LF	MM
2 String	172 Ah	4	M97-004-M090F-23F-LF-2P	NN

M12V105FT (24 Volt System)				
	Ah Capacity	# Batteries	System Part #	Reference Diagram
1 String	104 Ah	2	M97-002-M105F-23F-LF	MM
2 String	208 Ah	4	M97-004-M105F-23F-LF-2P	NN

M12V125FT (24 Volt System)				
	Ah Capacity	# Batteries	System Part #	Reference Diagram
1 String	125 Ah	2	M97-002-M125F-23F-LF	MM
2 String	250 Ah	4	M97-004-M125F-23F-LF-2P	NN

M12V155FT (24 Volt System)				
	Ah Capacity	# Batteries	System Part #	Reference Diagram
1 String	155 Ah	2	M97-002-M155F-23F-LF	MM
2 String	310 Ah	4	M97-004-M155F-23F-LF-2P	NN

M12V90FT (48 Volt System)				
	Ah Capacity	# Batteries	System Part #	Reference Diagram
1 String	86 Ah	4	M97-004-M090F-23F-LF	PP

M12V105FT (48 Volt System)				
	Ah Capacity	# Batteries	System Part #	Reference Diagram
1 String	104 Ah	4	M97-004-M105F-23F-LF	PP

M12V125FT (48 Volt System)				
	Ah Capacity	# Batteries	System Part #	Reference Diagram
1 String	125 Ah	4	M97-004-M125F-23F-LF	PP

M12V155FT (48 Volt System)				
	Ah Capacity	# Batteries	System Part #	Reference Diagram
1 String	155 Ah	4	M97-004-M155F-23F-LF	PP

** 19" Relay Rack TRAY available for Marathon M12V90FT (Max 4 batteries) and Marathon M12V105FT/125FT/155FT/180FT (Max 2 batteries). To specify this option, change "23F" to "19F" in the system part number. If required, order 19" Relay Rack Equipment Stand, (part # S07-420399-001), separately.

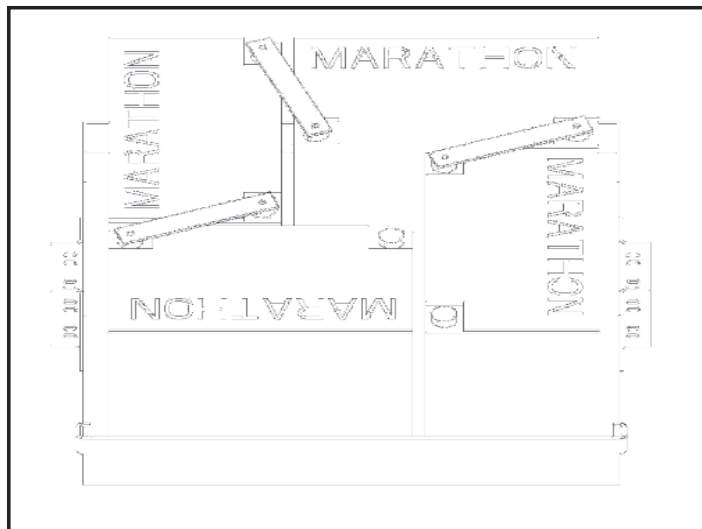
Marathon Front Terminal 23" Relay Rack Tray** (continued)

M12V180FT (24 Volt System)				
	Ah Capacity	# Batteries	System Part #	Reference Diagram
1 String	180 Ah	2	M97-002-M180F-23F-LF	MM
2 String	360 Ah	4	M97-004-M180F-23F-LF-2P	NN

M12V180FT (48 Volt System)				
	Ah Capacity	# Batteries	System Part #	Reference Diagram
1 String	180 Ah	4	M97-004-M180F-23F-LF	PP

Marathon Top Terminal 23" Relay Rack Tray**

System Includes Tray, Batteries, Inter-Unit Connectors, Connector Covers, and Lugboots
 If Required, Order 23" Relay Rack Equipment Stand (Part # S07-420153-001) Separately



M12V40(F) [48 Volt System]				
# Strings	AH Capacity	# Batteries	Jar / Cover Material	System Part Number
1 String	40	4	Standard	M97-004-M040T-23F-LN
1 String	40	4	Flame Retardant	M97-004-M040T-23F-LF

M12V45F [48 Volt System]				
# Strings	AH Capacity	# Batteries	Jar / Cover Material	System Part Number
1 String	46	4	Flame Retardant	M97-004-M045T-23F-LF

M12V70(F) [48 Volt System]				
# Strings	AH Capacity	# Batteries	Jar / Cover Material	System Part Number
1 String	72	4	Standard	M97-004-M070T-23F-LN
1 String	72	4	Flame Retardant	M97-004-M070T-23F-LF

M12V90(F) [48 Volt System]				
# Strings	AH Capacity	# Batteries	Jar / Cover Material	System Part Number
1 String	90	4	Standard	M97-004-M090T-23F-LN
1 String	90	4	Flame Retardant	M97-004-M090T-23F-LF

M6V190(F) [24 Volt System]				
# Strings	AH Capacity	# Batteries	Jar / Cover Material	System Part Number
1 String	190	4	Standard	M97-004-M190T-23F-LN
1 String	190	4	Flame Retardant	M97-004-M190T-23F-LF

**19" Relay Rack TRAY available for Marathon M12V40(F)/M12V45F.

To specify this option, change "23F" to "19F" in the system part number.

If required, order 19" Relay Rack Equipment Stand, (part # S07-420399-001), separately.

Section 4

Bookshelf Racking & Accessories

System Configuration Bookshelf Racking

This section will take you through the process of developing a battery system utilizing a bookshelf rack. The batteries used will be the M12V90 model type that was that was developed in example (a) of Section 1.

Step 1. Determine Rack Configuration.

As calculated in Section I, the number of M12V90 battery units required is 4. The next step is to determine the rack style. Referencing the “MAX UNITS” column of the “NON-SEISMIC & SEISMIC RACKS” table on page 22, the smallest compatible rack configuration is 1-Tier, 1 Row.

Step 2. Determine Rack Part Number

The next step is to identify the seismic requirements for the rack. A -Z0 suffix indicates Zone 0. A -Z4 suffix indicates Zone 1-4. For this example, a non-seismic, Zone 0 rack will be used. The corresponding rack part number for four (4) M12V90 battery units is:

GNB114S370Z0

Step 3. Determine Number of Connectors

The formula for number of connectors is:

$$\text{Connectors} = ((N/(\# \text{ tiers}))-1)*(\# \text{ tiers})$$

For this example, the number of connectors required for 4 M12V90s would be:

$$\begin{aligned} \text{Connectors} &= ((4/(1))-1)*(1) \\ &= 3 \end{aligned}$$

Low and medium-rate applications require a single layer of connectors. Some high & ultra high applications will require more than 1 layer of connectors.

Step 4. Determine Connector Part Number

Refer to connector selection sketch on page 22, for the appropriate battery configuration. Note that for typical 1-row bookshelf rack configurations, connection number 2 in the connector selection sketch is the standard connector used.

For the example of the M12V90s mentioned above, the correct connector selection would be number 2. The part number for this connector is:

L03-109210-034

Note: For a two-row system, an inter-row connector bar is also required. This is selected from the same table and is typically connection number 3.

5. Determine Connector Cover Requirements

Connector covers for the M12V90s are located in the “CONNECTOR BAR COVERS” table and correspond to the connection number (CONN #). For this example, the correct connector cover would be number 2. The part number for this connector cover is:

L14-401130

The quantity of connector covers should match the number of connectors.

Step 6. Determine Cable Kit Requirements

If a cable kit is required, (tier to tier connection only) refer to the “CABLE KITS” table. Cable kits are available for low and medium rates for Marathon. High and ultra-high rate cable kits are available for Sprinter products. The standard length is 36”. Cross aisle cables are not available.

For this example, a cable kit is not required.

Step 7. Determine Terminal Kit Requirements

If more than one cable will be attached to a post, a terminal plate kit will be required.

For this example, it is assumed that the installation uses 2 runs of cable from the rectifier to the battery terminal. This would require a terminal kit. From the “MARATHON M12V90(F) ACCESSORIES AND RACKS” Sheet, the correct part number for the terminal kit is:

K17-MSBTP

Step 8. Determine Lug Insulator Requirements

If a cable lug insulator is required, the part number can be found on the same page and is:

L14-LUGBOOT

Step 9. Determine Grease & Number Requirements

If grease and cell numbers are required refer to the “CELL NUMERALS & GREASE” table For this example of four (4) M12V90 units, the correct part number is:

K17-418291S

Step 10. Determine Handle Requirements

To determine the number of handles required, use the following formula:

$$\text{Handle qty.} = \text{Units}/5$$

Refer to the appropriate battery accessories and racks sheet for the correct P/N. For this example, the correct part number is:

K01-M12V90

The correct number of handles to order is:

$$\begin{aligned} \text{Handle qty.} &= 4/5 \\ &= 1 \end{aligned}$$

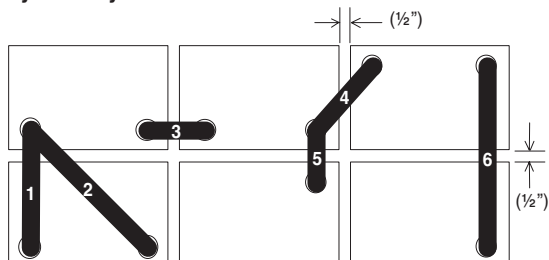
Step 11. System Summary

For the example of four (4) Marathon M12V90 batteries, the following line items would make up the system:

Line Item	Description	Part #	Qty
1	Battery	M12V90F	4
2	Rack	GNB114S370Z0	1
3	Connectors	L03-109210-034	3
4	Connector Covers	L14-401130	3
5	Cable Kit	N/A	0
6	Terminal Kit	K17-MSBTP	1
7	Lug Insulator	L14-LUGBOOT	0
8	Cell Numbers & Grease	K17-418291S	1
9	Handles	K01-M12V90	1

MARATHON M12V30(F)* ACCESSORIES AND RACKS

The sketch shown below is for connector selection only; it does not represent a typical system layout.



COPPER CONNECTOR BARS		
CONN #	LOW RATE ^A	MEDIUM RATE ^A
1	L03-106397-026	L03-106397-026
2*	L03-109210-016	L03-109210-016
3	L03-109210-001	L03-109210-001
4	L03-109210-009	L03-109210-009
5	L03-106397-003	L03-106397-003
6	L03-106397-038	L03-106397-038

* Standard inter-unit connector for racks.

CENTER TO CENTER LENGTH		
CONN #	INCHES	MILLIMETERS
1	7.00	177.8
2	8.75	222.3
3	2.12	53.8
4	4.81	122.2
5	2.62	66.5
6	11.63	295.4

CONNECTOR BAR COVERS	
CONN #	PART NUMBER
1	L14-401128
2	L14-401129
3	L14-401126
4	L14-401127
5	L14-401126
6	L14-401130

CELL NUMERALS & GREASE	
# UNITS	PART NUMBER
1-30	K17-418291S
31-60	K17-418292S
61-120	K17-418293S
121-150	K17-418294S
151-180	K17-418295S
181-210	K17-418296S
211-240	K17-418299S

CABLE KITS		
RATE	PART NUMBER	KIT CONTENTS
LOW	K17-CABLMSB-001	(qty 1) #2 AWG, 36" long, 1 hole lug
MEDIUM	K17-CABLMSB-001	(qty 1) #2 AWG, 36" long, 1 hole lug

CROSS-AISLE CABLES ARE NOT PROVIDED

I & O MANUAL	TERMINAL PLATE KIT
Z99-MARSPT	K17-MSBTP ^B

BATTERY HANDLE	CABLE LUG INSULATOR
K01-M12V30	L14-LUGBOOT ^C

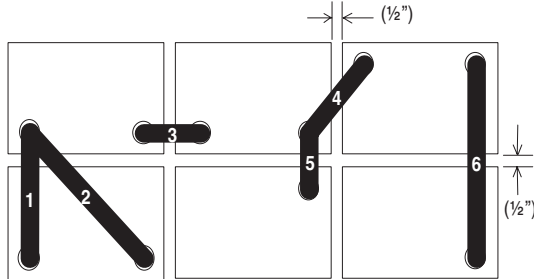
NON-SEISMIC (ZONE 0) RACKS		
DESCRIPTION	PART NUMBER	MAX UNITS
1-TIER, 1-ROW ^D	GNB114S120Z0	4
	GNB115S120Z0	5
	GNB116S120Z0	6
2-TIER, 1-ROW ^D	GNB214S120Z0	8
	GNB215S120Z0	10
	GNB216S120Z0	12
3-TIER, 1-ROW ^D	GNB314S120Z0	12
	GNB315S120Z0	15
	GNB316S120Z0	18
4-TIER, 1-ROW ^D	GNB414S120Z0	16
	GNB415S120Z0	20
	GNB416S120Z0	24
5-TIER, 1-ROW ^D	GNB514S120Z0	20
	GNB515S120Z0	25
	GNB516S120Z0	30

*** THIS BATTERY HAS BEEN DISCONTINUED. THIS SHEET IS FOR REFERENCE ONLY FOR EXISTING SYSTEMS**

^A Low rate = 180 minutes or longer to 1.75 VPC Medium rate = 60-179 minutes to 1.75 VPC
^B Terminal plate will accept two cables.
^C Lugboot will accept one cable.
^D This rack style is available in a seismic (Zone 1 - 4) version; use -Z4 suffix in lieu of -Z0 suffix.

MARATHON M12V40(F) ACCESSORIES AND RACKS

The sketch shown below is for connector selection only; it does not represent a typical system layout.



COPPER CONNECTOR BARS		
CONN #	LOW RATE ^A	MEDIUM RATE ^A
1	L03-106397-026	L03-106397-026
2*	L03-109210-041	L03-109210-041
3	L03-109210-001	L03-109210-001
4	L03-106397-007	L03-106397-007
5	L03-106397-003	L03-106397-003
6	L03-106397-038	L03-106397-038

* Standard inter-unit connector for racks.

CENTER TO CENTER LENGTH		
CONN #	INCHES	MILLIMETERS
1	7.00	177.8
2	9.38	238.3
3	2.12	53.8
4	4.91	124.7
5	2.62	66.5
6	11.63	295.4

CONNECTOR BAR COVERS	
CONN #	PART NUMBER
1	L14-401128
2	L14-401129
3	L14-401126
4	L14-401127
5	L14-401126
6	L14-401130

CELL NUMERALS & GREASE	
# UNITS	PART NUMBER
1-30	K17-418291S
31-60	K17-418292S
61-120	K17-418293S
121-150	K17-418294S
151-180	K17-418295S
181-210	K17-418296S
211-240	K17-418299S

CABLE KITS		
RATE	PART NUMBER	KIT CONTENTS
LOW	K17-CABLMSB-001	(qty 1) #2 AWG, 36" long, 1 hole lug
MEDIUM	K17-CABLMSB-001	(qty 1) #2 AWG, 36" long, 1 hole lug
CROSS-AISLE CABLES ARE NOT PROVIDED		

I & O MANUAL	TERMINAL PLATE KIT
Z99-MARSPT	K17-MSBTP ^B

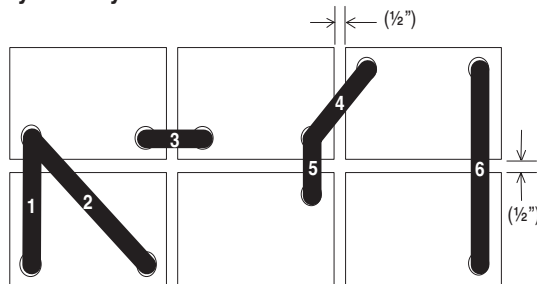
BATTERY HANDLE	CABLE LUG INSULATOR
K01-M12V40	L14-LUGBOOT ^C

NON-SEISMIC (ZONE 0) RACKS		
DESCRIPTION	PART NUMBER	MAX UNITS
1-TIER, 1-ROW ^D	GNB114S170Z0	4
	GNB115S170Z0	5
	GNB116S170Z0	6
2-TIER, 1-ROW ^D	GNB214S170Z0	8
	GNB215S170Z0	10
	GNB216S170Z0	12
3-TIER, 1-ROW ^D	GNB314S170Z0	12
	GNB315S170Z0	15
	GNB316S170Z0	18
4-TIER, 1-ROW ^D	GNB414S170Z0	16
	GNB415S170Z0	20
	GNB416S170Z0	24
5-TIER, 1-ROW ^D	GNB514S170Z0	20
	GNB515S170Z0	25
	GNB516S170Z0	30

^A Low rate = 180+ minutes to 1.75 VPC
Medium rate = 60-179 minutes to 1.75 VPC
^B Terminal plate will accept two cables.
^C Lugboot will accept one cable.
^D This rack style is available in a seismic (Zone 1 - 4) version; use -Z4 suffix in lieu of -Z0 suffix.

MARATHON M12V45(F) ACCESSORIES AND RACKS

The sketch shown below is for connector selection only; it does not represent a typical system layout.



COPPER CONNECTOR BARS		
CONN #	LOW RATE ^A	MEDIUM RATE ^A
1	L03-109210-010	L03-109210-010
2*	L03-106397-041	L03-106397-041
3	L03-109210-046	L03-109210-046
4	L03-109210-004	L03-109210-004
5	L03-109210-001	L03-109210-001
6	L03-109210-016	L03-109210-016

* Standard inter-unit connector for racks.

CENTER TO CENTER LENGTH		
CONN #	INCHES	MILLIMETERS
1	5.80	147.3
2	8.50	215.9
3	2.43	61.7
4	4.31	109.5
5	2.12	53.8
6	8.75	222.3

CONNECTOR BAR COVERS	
CONN #	PART NUMBER
1	L14-401127
2	L14-401129
3	L14-401126
4	L14-401199
5	L14-401126
6	L14-401129

CELL NUMERALS & GREASE	
# UNITS	PART NUMBER
1-30	K17-418291S
31-60	K17-418292S
61-120	K17-418293S
121-150	K17-418294S
151-180	K17-418295S
181-210	K17-418296S
211-240	K17-418299S

CABLE KITS		
RATE	PART NUMBER	KIT CONTENTS
LOW	K17-CABLMSB-001	(qty 1) #2 AWG, 36" long, 1 hole lug
MEDIUM	K17-CABLMSB-001	(qty 1) #2 AWG, 36" long, 1 hole lug
CROSS-AISLE CABLES ARE NOT PROVIDED		

I & O MANUAL	TERMINAL PLATE KIT
Z99-MARSPT	K17-MSBTP ^B

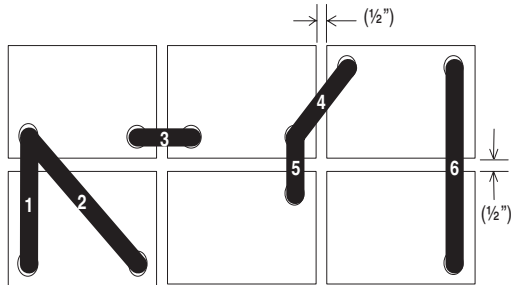
BATTERY HANDLE	CABLE LUG INSULATOR
K01-M12V45	L14-LUGBOOT ^C

NON-SEISMIC (ZONE 0) RACKS		
DESCRIPTION	PART NUMBER	MAX UNITS
1-TIER, 1-ROW ^D	GNB114M45FZ0	4
	GNB115M45FZ0	5
	GNB116M45FZ0	6
2-TIER, 1-ROW ^D	GNB214M45FZ0	8
	GNB215M45FZ0	10
	GNB216M45FZ0	12
3-TIER, 1-ROW ^D	GNB314M45FZ0	12
	GNB315M45FZ0	15
	GNB316M45FZ0	18
4-TIER, 1-ROW ^D	GNB414M45FZ0	16
	GNB415M45FZ0	20
	GNB416M45FZ0	24
5-TIER, 1-ROW ^D	GNB514M45FZ0	20
	GNB515M45FZ0	25
	GNB516M45FZ0	30

^A Low rate = 180+ minutes to 1.75 VPC
Medium rate = 60-179 minutes to 1.75 VPC
^B Terminal plate will accept two cables.
^C Lugboot will accept one cable.
^D This rack style is available in a seismic (Zone 1 - 4) version; use -Z4 suffix in lieu of -Z0 suffix.

MARATHON M12V70(F) ACCESSORIES AND RACKS

The sketch shown below is for connector selection only; it does not represent a typical system layout.



COPPER CONNECTOR BARS		
CONN #	LOW RATE ^A	MEDIUM RATE ^A
1	L03-106397-006	L03-106397-006
2*	L03-109210-033	L03-109210-033
3	L03-106397-003	L03-106397-003
4	L03-106397-025	L03-106397-025
5	L03-106397-003	L03-106397-003
6	L03-109210-034	L03-109210-034

* Standard inter-unit connector for racks.

CENTER TO CENTER LENGTH		
CONN #	INCHES	MILLIMETERS
1	7.38	187.5
2	10.81	274.6
3	2.62	66.5
4	5.63	143.0
5	2.62	66.5
6	12.25	311.2

CONNECTOR BAR COVERS	
CONN #	PART NUMBER
1	L14-401128
2	L14-401130
3	L14-401126
4	L14-401127
5	L14-401126
6	L14-401130

CELL NUMERALS & GREASE	
# UNITS	PART NUMBER
1-30	K17-418291S
31-60	K17-418292S
61-120	K17-418293S
121-150	K17-418294S
151-180	K17-418295S
181-210	K17-418296S
211-240	K17-418299S

CABLE KITS		
RATE	PART NUMBER	KIT CONTENTS
LOW	K17-CABLMSB-001	(qty 1) #2 AWG, 36" long, 1 hole lug
MEDIUM	K17-CABLMSB-001	(qty 1) #2 AWG, 36" long, 1 hole lug
CROSS-AISLE CABLES ARE NOT PROVIDED		

I & O MANUAL	TERMINAL PLATE KIT
Z99-MARSPT	K17-MSBTP ^B

BATTERY HANDLE	CABLE LUG INSULATOR
K01-M12V70	L14-LUGBOOT ^C

NON-SEISMIC (ZONE 0) RACKS		
DESCRIPTION	PART NUMBER	MAX UNITS
1-TIER, 1-ROW ^D	GNB114S285Z0	4
	GNB115S285Z0	5
	GNB116S285Z0	6
2-TIER, 1-ROW ^D	GNB214S285Z0	8
	GNB215S285Z0	10
	GNB216S285Z0	12
3-TIER, 1-ROW ^D	GNB314S285Z0	12
	GNB315S285Z0	15
	GNB316S285Z0	18
4-TIER, 1-ROW ^D	GNB414S285Z0	16
	GNB415S285Z0	20
	GNB416S285Z0	24
5-TIER, 1-ROW ^D	GNB514S285Z0	20
	GNB515S285Z0	25
	GNB516S285Z0	30

^A Low rate = 180+ minutes to 1.75 VPC
Medium rate = 60-179 minutes to 1.75 VPC

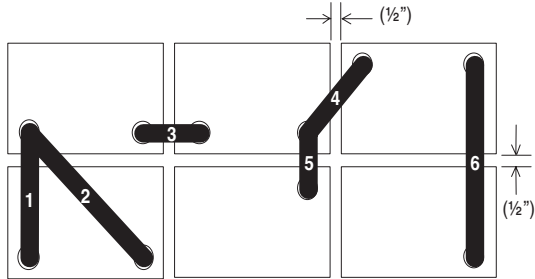
^B Terminal plate will accept two cables.

^C Lugboot will accept one cable.

^D This rack style is available in a seismic (Zone 1 - 4) version; use -Z4 suffix in lieu of -Z0 suffix.

MARATHON M12V90(F) ACCESSORIES AND RACKS^E

The sketch shown below is for connector selection only; it does not represent a typical system layout.



COPPER CONNECTOR BARS		
CONN #	LOW RATE ^A	MEDIUM RATE ^A
1	L03-106397-006	L03-106397-006
2*	L03-109210-034	L03-109210-034
3	L03-109210-002	L03-109210-002
4	L03-106397-025	L03-106397-025
5	L03-106397-003	L03-106397-003
6	L03-109210-034	L03-109210-034

* Standard inter-unit connector for racks.

CENTER TO CENTER LENGTH		
CONN #	INCHES	MILLIMETERS
1	7.38	187.5
2	12.25	311.2
3	2.81	71.4
4	5.63	143.0
5	2.62	66.5
6	12.25	311.2

CONNECTOR BAR COVERS	
CONN #	PART NUMBER
1	L14-401128
2	L14-401130
3	L14-401126
4	L14-401127
5	L14-401126
6	L14-401130

CELL NUMERALS & GREASE	
# UNITS	PART NUMBER
1-30	K17-418291S
31-60	K17-418292S
61-120	K17-418293S
121-150	K17-418294S
151-180	K17-418295S
181-210	K17-418296S
211-240	K17-418299S

CABLE KITS		
RATE	PART NUMBER	KIT CONTENTS
LOW	K17-CABLMSB-001	(qty 1) #2 AWG, 36" long, 1 hole lug
MEDIUM	K17-CABLMSB-001	(qty 1) #2 AWG, 36" long, 1 hole lug
CROSS-AISLE CABLES ARE NOT PROVIDED		

I & O MANUAL	TERMINAL PLATE KIT
Z99-MARSPT	K17-MSBTP ^B

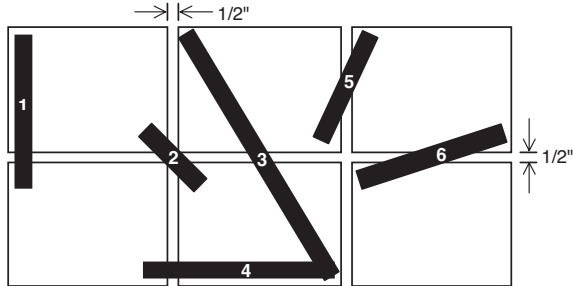
BATTERY HANDLE	CABLE LUG INSULATOR
K01-M12V90	L14-LUGBOOT ^C

NON-SEISMIC (ZONE 0) RACKS		
DESCRIPTION	PART NUMBER	MAX UNITS
1-TIER, 1-ROW ^D	GNB114S370Z0	4
	GNB115S370Z0	5
	GNB116S370Z0	6
2-TIER, 1-ROW ^D	GNB214S370Z0	8
	GNB215S370Z0	10
	GNB216S370Z0	12
3-TIER, 1-ROW ^D	GNB314S370Z0	12
	GNB315S370Z0	15
	GNB316S370Z0	18
4-TIER, 1-ROW ^D	GNB414S370Z0	16
	GNB415S370Z0	20
	GNB416S370Z0	24
5-TIER, 1-ROW ^D	GNB514S370Z0	20
	GNB515S370Z0	25
	GNB516S370Z0	30

- ^A Low rate = 180+ minutes to 1.75 VPC
Medium rate = 60-179 minutes to 1.75 VPC
- ^B Terminal plate will accept two cables.
- ^C Lugboot will accept one cable.
- ^D This rack style is available in a seismic (Zone 1 - 4) version; use -Z4 suffix in lieu of -Z0 suffix.
- ^E Accessories and racks applicable for Sunlyte 12-5000X

MARATHON M6V190(F) ACCESSORIES AND RACKS

The sketch shown below is for connector selection only; it does not represent a typical system layout.



COPPER CONNECTOR BARS		
CONN #	LOW RATE ^A	MEDIUM RATE ^A
1	L03-106397-006	L03-106397-006
2	L03-410820-004	L03-410820-004
3	L03-109210-050	L03-109210-050
4	L03-109210-052	L03-109210-052
5	L03-106397-001	L03-106397-001
6*	L03-109210-048	L03-109210-048

* Standard inter-unit connector for racks.

CENTER TO CENTER LENGTH		
CONN #	INCHES	MILLIMETERS
1	7.38	187.5
2	3.87	98.3
3	15.46	392.7
4	12.39	314.7
5	5.68	144.3
6	9.84	249.9

CONNECTOR BAR COVERS	
CONN #	PART NUMBER
1	L14-401128
2	L14-401199
3	L14-401201
4	L14-401130
5	L14-401127
6	L14-401200

CELL NUMERALS & GREASE	
# UNITS	PART NUMBER
1-30	K17-418291S
31-60	K17-418292S
61-120	K17-418293S
121-150	K17-418294S
151-180	K17-418295S
181-210	K17-418296S
211-240	K17-418299S

CABLE KITS		
RATE	PART NUMBER	KIT CONTENTS
LOW	K17-CABLMSB-001	(qty 1) #2 AWG, 36" long, 1 hole lug
MEDIUM	K17-CABLMSB-002	(qty 1) 3/0 AWG, 36" long, 1 hole lug
CROSS-AISLE CABLES ARE NOT PROVIDED		

I & O MANUAL	TERMINAL PLATE KIT
Z99-MARSPT	K17-MSBTP ^B

BATTERY HANDLE	CABLE LUG INSULATOR
K01-M12V90	L14-LUGBOOT ^C

NON-SEISMIC (ZONE 0) RACKS		
DESCRIPTION	PART NUMBER	MAX UNITS
1-TIER, 1-ROW ^D	GNB114S370Z0	4
	GNB115S370Z0	5
	GNB116S370Z0	6
2-TIER, 1-ROW ^D	GNB214S370Z0	8
	GNB215S370Z0	10
	GNB216S370Z0	12
3-TIER, 1-ROW ^D	GNB314S370Z0	12
	GNB315S370Z0	15
	GNB316S370Z0	18
4-TIER, 1-ROW ^D	GNB414S370Z0	16
	GNB415S370Z0	20
	GNB416S370Z0	24
5-TIER, 1-ROW ^D	GNB514S370Z0	20
	GNB515S370Z0	25
	GNB516S370Z0	30

^A Low rate = 180+ minutes to 1.75 VPC
Medium rate = 60-179 minutes to 1.75 VPC

^B Terminal plate will accept two cables.

^C Lugboot will accept one cable.

^D This rack style is available in a seismic (Zone 1 - 4) version; use -Z4 suffix in lieu of -Z0 suffix.

MARATHON FRONT TERMINAL ACCESSORIES

COPPER CONNECTOR BARS		
CONN #	LOW RATE ^A	MEDIUM RATE ^A
1*	L03-420254-001	L03-420254-001

* Standard inter-unit connector.

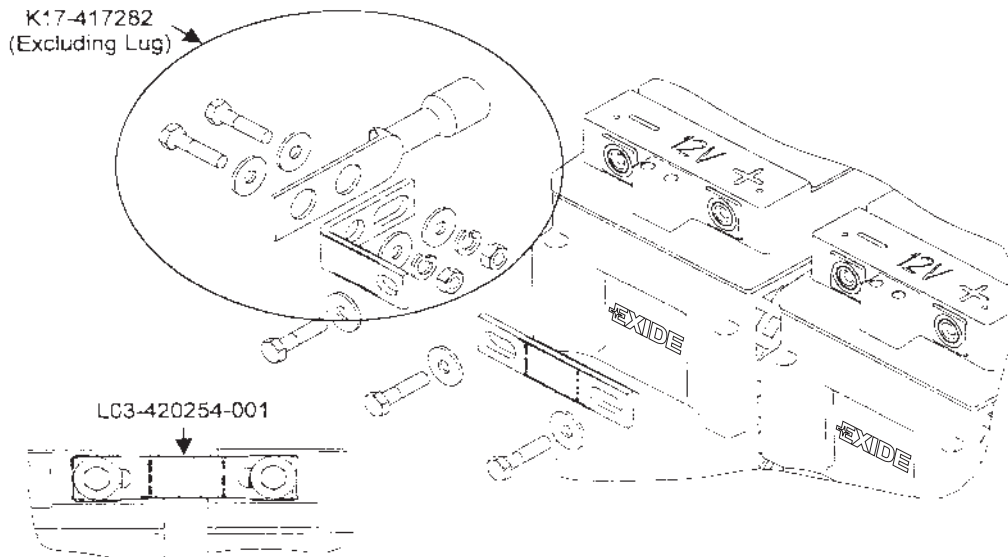
NOTE: Use L03-420428-001 for M12V35FT, M12V50FT, M12V60FT, M12V90FT in 19" relay rack applications

I & O MANUAL	TERMINAL PLATE KIT ^B
Z99-MARSPT	K17-417282

CELL NUMERALS & GREASE	
# UNITS	PART NUMBER
1-30	K17-418291S
31-60	K17-418292S
61-120	K17-418293S
121-150	K17-418294S
151-180	K17-418295S
181-210	K17-418296S
211-240	K17-418299S

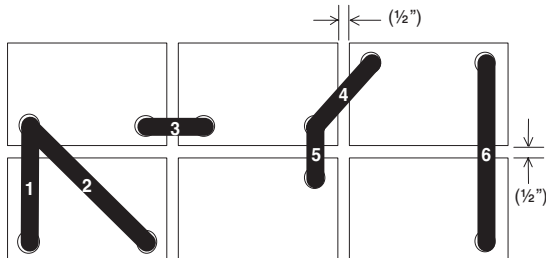
POST PROTECTOR COVERS	
BATTERY	PART NUMBER
M12V35FT	N05-M12V60FT-PCVR
M12V50FT	N05-M12V60FT-PCVR
M12V60FT	N05-M12V60FT-PCVR
M12V90FT	N05-M12V90FT-PCVR
M12V105FT	N05-M12V105FT-PCVR
M12V125FT	N05-M12V125FT-PCVR
M12V155FT	N05-M12V155FT-PCVR
M12V180FT	N05-M12V155FT-PCVR

^A Low rate = 180+ minutes to 1.75 VPC
 Medium rate = 60-179 minutes to 1.75 VPC
^B Terminal plate will accept one cable. Terminal plate kit contains one plate and hardware for cable attachment (i.e., require 2 kits per string).



SPRINTER S12V120(F) ACCESSORIES AND RACKS

The sketch shown below is for connector selection only; it does not represent a typical system layout.



COPPER CONNECTOR BARS: L03-			
CONN #	MEDIUM RATE ^A	HIGH RATE ^A	ULTRA-HIGH RATE ^A
1	106397-026	106397-026	106397-026
2*	109210-016	109210-016	109210-016
3	109210-001	109210-001	109210-001
4	109210-009	109210-009	109210-009
5	106397-003	106397-003	106397-003
6	106397-038	106397-038	106397-038

* Standard inter-unit connector for racks.

CENTER TO CENTER LENGTH		
CONN #	INCHES	MILLIMETERS
1	7.00	177.8
2	8.75	222.3
3	2.12	53.8
4	4.81	122.2
5	2.62	66.5
6	11.63	295.4

CONNECTOR BAR COVERS	
CONN #	PART NUMBER
1	L14-401128
2	L14-401129
3	L14-401126
4	L14-401127
5	L14-401126
6	L14-401130

CELL NUMERALS & GREASE	
# UNITS	PART NUMBER
1-30	K17-418291S
31-60	K17-418292S
61-120	K17-418293S
121-150	K17-418294S
151-180	K17-418295S
181-210	K17-418296S
211-240	K17-418299S

CABLE KITS		
RATE	PART NUMBER	KIT CONTENTS
MEDIUM	K17-CABLMSB-001	(qty 1) #2 AWG, 36" long, 1 hole lug
HIGH	K17-CABLMSB-001	(qty 1) #2 AWG, 36" long, 1 hole lug
U-HIGH	K17-CABLMSB-002	(qty 1) 3/0 AWG, 36" long, 1 hole lug
CROSS-AISLE CABLES ARE NOT PROVIDED		

I & O MANUAL	TERMINAL PLATE KIT
Z99-MARSPT	K17-MSBTP ^B

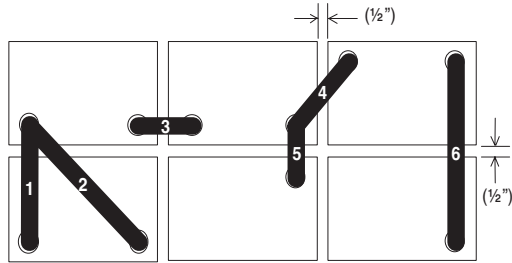
BATTERY HANDLE	CABLE LUG INSULATOR
K01-M12V30	L14-LUGBOOT ^C

NON-SEISMIC (ZONE 0) RACKS		
DESCRIPTION	PART NUMBER	MAX UNITS
1-TIER, 1-ROW ^D	GNB114S120Z0	4
	GNB115S120Z0	5
	GNB116S120Z0	6
2-TIER, 1-ROW ^D	GNB214S120Z0	8
	GNB215S120Z0	10
	GNB216S120Z0	12
3-TIER, 1-ROW ^D	GNB314S120Z0	12
	GNB315S120Z0	15
	GNB316S120Z0	18
4-TIER, 1-ROW ^D	GNB414S120Z0	16
	GNB415S120Z0	20
	GNB416S120Z0	24
5-TIER, 1-ROW ^D	GNB514S120Z0	20
	GNB515S120Z0	25
	GNB516S120Z0	30

^A Medium rate = 60-179 minutes to 1.75 VPC High rate = 10-59 minutes to 1.67 VPC Ultra-High rate = 5-9 minutes to 1.67 VPC
^B Terminal plate will accept two cables.
^C Lugboot will accept one cable.
^D This rack style is available in a seismic (Zone 1 - 4) version; use -Z4 suffix in lieu of -Z0 suffix.

SPRINTER S12V170(F) ACCESSORIES AND RACKS

The sketch shown below is for connector selection only; it does not represent a typical system layout.



COPPER CONNECTOR BARS: L03-			
CONN #	MEDIUM RATE ^A	HIGH RATE ^A	ULTRA-HIGH RATE ^A
1	106397-026	106397-026	106397-026
2*	109210-041	109210-041	109210-041
3	109210-001	109210-001	109210-001
4	106397-007	106397-007	106397-007
5	106397-003	106397-003	106397-003
6	106397-038	106397-038	106397-038

* Standard inter-unit connector for racks.

CENTER TO CENTER LENGTH		
CONN #	INCHES	MILLIMETERS
1	7.00	177.8
2	9.38	238.3
3	2.12	53.8
4	4.91	124.7
5	2.62	66.5
6	11.63	295.4

CONNECTOR BAR COVERS	
CONN #	PART NUMBER
1	L14-401128
2	L14-401129
3	L14-401126
4	L14-401127
5	L14-401126
6	L14-401130

CELL NUMERALS & GREASE	
# UNITS	PART NUMBER
1-30	K17-418291S
31-60	K17-418292S
61-120	K17-418293S
121-150	K17-418294S
151-180	K17-418295S
181-210	K17-418296S
211-240	K17-418299S

CABLE KITS		
RATE	PART NUMBER	KIT CONTENTS
MEDIUM	K17-CABLMSB-001	(qty 1) #2 AWG, 36" long, 1 hole lug
HIGH	K17-CABLMSB-001	(qty 1) #2 AWG, 36" long, 1 hole lug
U-HIGH	K17-CABLMSB-002	(qty 1) 3/0 AWG, 36" long, 1 hole lug
CROSS-AISLE CABLES ARE NOT PROVIDED		

I & O MANUAL	TERMINAL PLATE KIT
Z99-MARSPT	K17-MSBTP ^B

BATTERY HANDLE	CABLE LUG INSULATOR
K01-M12V40	L14-LUGBOOT ^C

NON-SEISMIC (ZONE 0) RACKS		
DESCRIPTION	PART NUMBER	MAX UNITS
1-TIER, 1-ROW ^D	GNB114S170Z0	4
	GNB115S170Z0	5
	GNB116S170Z0	6
2-TIER, 1-ROW ^D	GNB214S170Z0	8
	GNB215S170Z0	10
	GNB216S170Z0	12
3-TIER, 1-ROW ^D	GNB314S170Z0	12
	GNB315S170Z0	15
	GNB316S170Z0	18
4-TIER, 1-ROW ^D	GNB414S170Z0	16
	GNB415S170Z0	20
	GNB416S170Z0	24
5-TIER, 1-ROW ^D	GNB514S170Z0	20
	GNB515S170Z0	25
	GNB516S170Z0	30

^A Medium rate = 60-179 minutes to 1.75 VPC
 High rate = 10-59 minutes to 1.67 VPC
 Ultra-high rate = 5-9 minutes to 1.67 VPC

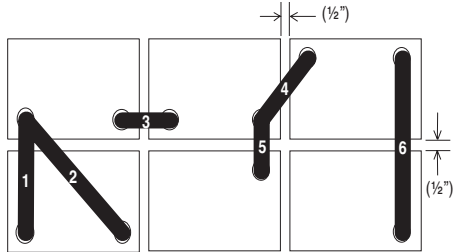
^B Terminal plate will accept two cables.

^C Lugboot will accept one cable.

^D This rack style is available in a seismic (Zone 1 - 4) version; use -Z4 suffix in lieu of -Z0 suffix.

SPRINTER S12V285(F) & S12V300(F) ACCESSORIES AND RACKS

The sketch shown below is for connector selection only; it does not represent a typical system layout.



COPPER CONNECTOR BARS: L03-			
CONN #	MEDIUM RATE ^A	HIGH RATE ^A	ULTRA-HIGH RATE ^A
1	106397-006	106397-006	106397-006
2*	109210-033	109210-033	109210-033 ^B
3	106397-003	106397-003	106397-003
4	106397-025	106397-025	106397-025
5	106397-003	106397-003	106397-003
6	109210-034	109210-034	109210-034 ^B

* Standard inter-unit connector for racks.

CENTER TO CENTER LENGTH		
CONN #	INCHES	MILLIMETERS
1	7.38	187.5
2	10.81	274.6
3	2.62	66.5
4	5.63	143.0
5	2.62	66.5
6	12.25	311.2

CONNECTOR BAR COVERS	
CONN #	PART NUMBER
1	L14-401128
2	L14-401130
3	L14-401126
4	L14-401127
5	L14-401126
6	L14-401130

CELL NUMERALS & GREASE	
# UNITS	PART NUMBER
1-30	K17-418291S
31-60	K17-418292S
61-120	K17-418293S
121-150	K17-418294S
151-180	K17-418295S
181-210	K17-418296S
211-240	K17-418299S

CABLE KITS		
RATE	PART NUMBER	KIT CONTENTS
MEDIUM	K17-CABLMSB-001	(qty 1) #2 AWG, 36" long, 1 hole lug
HIGH	K17-CABLMSB-002	(qty 1) 3/0 AWG, 36" long, 1 hole lug
U-HIGH	K17-CABLMSB-003	(qty 2) 3/0 AWG, 36" long, 1 hole lug
CROSS-AISLE CABLES ARE NOT PROVIDED		

I & O MANUAL	TERMINAL PLATE KIT
Z99-MARSPT	K17-MSBTP ^C

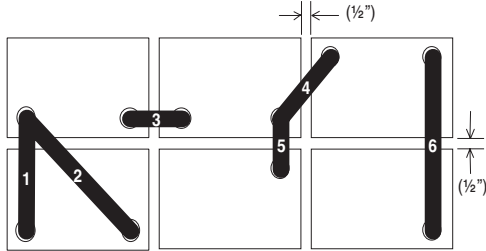
BATTERY HANDLE	CABLE LUG INSULATOR
K01-M12V70	L14-LUGBOOT ^D

NON-SEISMIC (ZONE 0) RACKS		
DESCRIPTION	PART NUMBER	MAX UNITS
1-TIER, 1-ROW ^E	GNB114S285Z0	4
	GNB115S285Z0	5
	GNB116S285Z0	6
2-TIER, 1-ROW ^E	GNB214S285Z0	8
	GNB215S285Z0	10
	GNB216S285Z0	12
3-TIER, 1-ROW ^E	GNB314S285Z0	12
	GNB315S285Z0	15
	GNB316S285Z0	18
4-TIER, 1-ROW ^E	GNB414S285Z0	16
	GNB415S285Z0	20
	GNB416S285Z0	24
5-TIER, 1-ROW ^E	GNB514S285Z0	20
	GNB515S285Z0	25
	GNB516S285Z0	30

^A Medium rate = 60-179 minutes to 1.75 VPC
 High rate = 10-59 minutes to 1.67 VPC
 Ultra-high rate = 5-9 minutes to 1.67 VPC
^B Use two connector bars per connection.
^C K17-MSBTP2 is available for termination of 4 cables maximum.
^D Lugboot will accept one cable.
^E This rack style is available in a seismic (Zone 1 - 4) version; use -Z4 suffix in lieu of -Z0 suffix.

SPRINTER S12V370(F) ACCESSORIES AND RACKS

The sketch shown below is for connector selection only; it does not represent a typical system layout.



COPPER CONNECTOR BARS: L03-			
CONN #	MEDIUM RATE ^A	HIGH RATE ^A	ULTRA-HIGH RATE ^A
1	106397-006	106397-006	106397-006
2*	109210-034	109210-034	109210-034 ^B
3	109210-002	109210-002	109210-002
4	106397-025	106397-025	106397-025
5	106397-003	106397-003	106397-003
6	109210-034	109210-034	109210-034 ^B

* Standard inter-unit connector for racks.

CENTER TO CENTER LENGTH		
CONN #	INCHES	MILLIMETERS
1	7.38	187.5
2	12.25	311.2
3	2.81	71.4
4	5.63	143.0
5	2.62	66.5
6	12.25	311.2

CONNECTOR BAR COVERS	
CONN #	PART NUMBER
1	L14-401128
2	L14-401130
3	L14-401126
4	L14-401127
5	L14-401126
6	L14-401130

CELL NUMERALS & GREASE	
# UNITS	PART NUMBER
1-30	K17-418291S
31-60	K17-418292S
61-120	K17-418293S
121-150	K17-418294S
151-180	K17-418295S
181-210	K17-418296S
211-240	K17-418299S

CABLE KITS		
RATE	PART NUMBER	KIT CONTENTS
MEDIUM	K17-CABLMSB-001	(qty 1) #2 AWG, 36" long, 1 hole lug
HIGH	K17-CABLMSB-002	(qty 1) 3/0 AWG, 36" long, 1 hole lug
U-HIGH	K17-CABLMSB-003	(qty 2) 3/0 AWG, 36" long, 1 hole lug
CROSS-AISLE CABLES ARE NOT PROVIDED		

I & O MANUAL	TERMINAL PLATE KIT
Z99-MARSPT	K17-MSBTP ^C

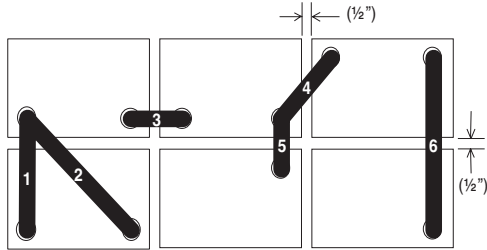
BATTERY HANDLE	CABLE LUG INSULATOR
K01-M12V90	L14-LUGBOOT ^D

NON-SEISMIC (ZONE 0) RACKS		
DESCRIPTION	PART NUMBER	MAX UNITS
1-TIER, 1-ROW ^E	GNB114S370Z0	4
	GNB115S370Z0	5
	GNB116S370Z0	6
2-TIER, 1-ROW ^E	GNB214S370Z0	8
	GNB215S370Z0	10
	GNB216S370Z0	12
3-TIER, 1-ROW ^E	GNB314S370Z0	12
	GNB315S370Z0	15
	GNB316S370Z0	18
4-TIER, 1-ROW ^E	GNB414S370Z0	16
	GNB415S370Z0	20
	GNB416S370Z0	24
5-TIER, 1-ROW ^E	GNB514S370Z0	20
	GNB515S370Z0	25
	GNB516S370Z0	30

^A Medium rate = 60-179 minutes to 1.75 VPC High rate = 10-59 minutes to 1.67 VPC Ultra-high rate = 5-9 minutes to 1.67 VPC
^B Use two connector bars per connection.
^C K17-MSBTP2 is available for termination of 4 cables maximum.
^D Lugboot will accept one cable.
^E This rack style is available in a seismic (Zone 1 - 4) version; use -Z4 suffix in lieu of -Z0 suffix.

SPRINTER S12V500(F) ACCESSORIES AND RACKS

The sketch shown below is for connector selection only; it does not represent a typical system layout.



COPPER CONNECTOR BARS: L03-			
CONN #	MEDIUM RATE ^A	HIGH RATE ^A	ULTRA-HIGH RATE ^A
1	109210-015	109210-015	109210-015
2*	109210-035	109210-035 ^B	109210-035 ^B
3	109210-044	109210-044	109210-044
4	109210-006	109210-006	109210-006
5	109210-046	109210-046	109210-046
6	109210-051	109210-051 ^B	109210-051 ^B

* Standard inter-unit connector for racks.

CENTER TO CENTER LENGTH		
CONN #	INCHES	MILLIMETERS
1	7.25	184.2
2	12.96	329.2
3	3.21	81.5
4	5.81	147.6
5	2.43	61.7
6	12.03	305.6

CONNECTOR BAR COVERS	
CONN #	PART NUMBER
1	L14-401128
2	L14-401130
3	L14-401126
4	L14-401127
5	L14-401126
6	L14-401130

CELL NUMERALS & GREASE	
# UNITS	PART NUMBER
1-30	K17-418291S
31-60	K17-418292S
61-120	K17-418293S
121-150	K17-418294S
151-180	K17-418295S
181-210	K17-418296S
211-240	K17-418299S

CABLE KITS		
RATE	PART NUMBER	KIT CONTENTS
MEDIUM	K17-CABLMSB-001	(qty 1) #2 AWG, 36" long, 1 hole lug
HIGH	K17-CABLMSB-003	(qty 2) 3/0 AWG, 36" long, 1 hole lug
U-HIGH	K17-CABLMSB-003	(qty 2) 3/0 AWG, 36" long, 1 hole lug
CROSS-AISLE CABLES ARE NOT PROVIDED		

I & O MANUAL	TERMINAL PLATE KIT
Z99-MARSPT	K17-MSBTP ^C

BATTERY HANDLE	CABLE LUG INSULATOR
K01-S12V500	L14-LUGBOOT ^D

NON-SEISMIC (ZONE 0) RACKS		
DESCRIPTION	PART NUMBER	MAX UNITS
1-TIER, 1-ROW ^E	GNB114S500Z0	4
	GNB115S500Z0	5
	GNB116S500Z0	6
2-TIER, 1-ROW ^E	GNB214S500Z0	8
	GNB215S500Z0	10
	GNB216S500Z0	12
3-TIER, 1-ROW ^E	GNB314S500Z0	12
	GNB315S500Z0	15
	GNB316S500Z0	18
4-TIER, 1-ROW ^E	GNB414S500Z0	16
	GNB415S500Z0	20
	GNB416S500Z0	24
5-TIER, 1-ROW ^E	GNB514S500Z0	20
	GNB515S500Z0	25
	GNB516S500Z0	30

^A Medium rate = 60-179 minutes to 1.75 VPC
 High rate = 10-59 minutes to 1.67 VPC
 Ultra-high rate = 5-9 minutes to 1.67 VPC

^B Use two connector bars per connection.

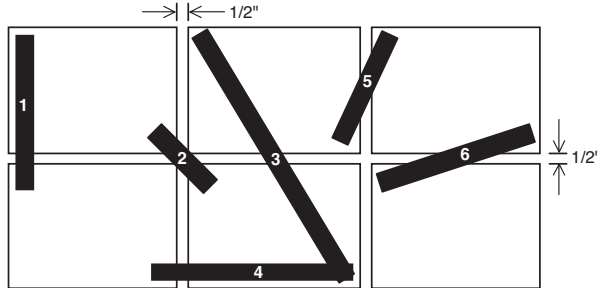
^C K17-MSBTP2 is available for termination of 4 cables maximum.

^D Lugboot will accept one cable.

^E This rack style is available in a seismic (Zone 1 - 4) version; use -Z4 suffix in lieu of -Z0 suffix.

SPRINTER S6V740(F) ACCESSORIES AND RACKS

The sketch shown below is for connector selection only; it does not represent a typical system layout.



COPPER CONNECTOR BARS: L03-			
CONN #	MEDIUM RATE ^A	HIGH RATE ^A	ULTRA-HIGH RATE ^A
1	106397-006	106397-006 ^B	106397-006 ^B
2	410820-004	410820-004	410820-004
3	109210-050	109210-050 ^C	109210-050 ^C
4	109210-052	109210-052 ^B	109210-052 ^C
5	106397-001	106397-001	106397-001 ^B
6*	109210-048	109210-048 ^B	109210-048 ^C

* Standard inter-unit connector for racks.

CENTER TO CENTER LENGTH		
CONN #	INCHES	MILLIMETERS
1	7.38	187.5
2	3.87	98.3
3	15.46	392.7
4	12.39	314.7
5	5.68	144.3
6	9.84	249.9

CONNECTOR BAR COVERS	
CONN #	PART NUMBER
1	L14-401128
2	L14-401199
3	L14-401201
4	L14-401130
5	L14-401127
6	L14-401200

CELL NUMERALS & GREASE	
# UNITS	PART NUMBER
1-30	K17-418291S
31-60	K17-418292S
61-120	K17-418293S
121-150	K17-418294S
151-180	K17-418295S
181-210	K17-418296S
211-240	K17-418299S

CABLE KITS		
RATE	PART NUMBER	KIT CONTENTS
MEDIUM	K17-CABLMSB-002	(qty 1) 3/0 AWG, 36" long, 1 hole lug
HIGH	K17-CABLMSB-003	(qty 2) 3/0 AWG, 36" long, 1 hole lug
U-HIGH	K17-CABLMSB-002	(qty 1) 3/0 AWG, 36" long, 1 hole lug
	K17-CABLMSB-003	(qty 2) 3/0 AWG, 36" long, 1 hole lug
CROSS-AISLE CABLES ARE NOT PROVIDED		

I & O MANUAL	TERMINAL PLATE KIT
Z99-MARSPT	K17-MSBTP ^D

BATTERY HANDLE	CABLE LUG INSULATOR
K01-M12V90	L14-LUGBOOT ^E

NON-SEISMIC (ZONE 0) RACKS		
DESCRIPTION	PART NUMBER	MAX UNITS
1-TIER, 1-ROW ^F	GNB114S370Z0	4
	GNB115S370Z0	5
	GNB116S370Z0	6
2-TIER, 1-ROW ^F	GNB214S370Z0	8
	GNB215S370Z0	10
	GNB216S370Z0	12
3-TIER, 1-ROW ^F	GNB314S370Z0	12
	GNB315S370Z0	15
	GNB316S370Z0	18
4-TIER, 1-ROW ^F	GNB414S370Z0	16
	GNB415S370Z0	20
	GNB416S370Z0	24
5-TIER, 1-ROW ^F	GNB514S370Z0	20
	GNB515S370Z0	25
	GNB516S370Z0	30

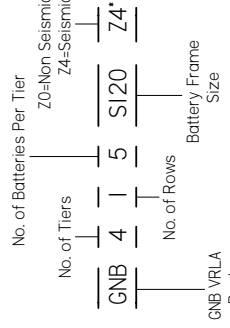
^A Medium rate = 60-179 minutes to 1.75 VPC
 High rate = 10-59 minutes to 1.67 VPC
 Ultra-high rate = 5-9 minutes to 1.67 VPC
^B Use two connector bars per connection.
^C Use three connector bars per connection -- requires bolt W02-063001
^D K17-MSBTP2 is required for ultra-high rate applications.
^E Lugboot will accept one cable.
^F This rack style is available in a seismic (Zone 1 - 4) version; use -Z4 suffix in lieu of -Z0 suffix.

S12V120

	Batteries Per Tier	Batteries Per Rack	"A"	"B"	Part Number
1 Tier	4	4	30.6	28.6	GNB114S120Z*
	5	5	37.7	35.7	GNB115S120Z*
	6	6	44.8	42.8	GNB116S120Z*
2 Tier	4	8	30.6	28.6	GNB214S120Z*
	5	10	37.7	35.7	GNB215S120Z*
	6	12	44.8	42.8	GNB216S120Z*
3 Tier	4	12	30.6	28.6	GNB314S120Z*
	5	15	37.7	35.7	GNB315S120Z*
	6	18	44.8	42.8	GNB316S120Z*
4 Tier	4	16	30.6	28.6	GNB414S120Z*
	5	20	37.7	35.7	GNB415S120Z*
	6	24	44.8	42.8	GNB416S120Z*
5 Tier	4	20	30.6	28.6	GNB514S120Z*
	5	25	37.7	35.7	GNB515S120Z*
	6	30	44.8	42.8	GNB516S120Z*

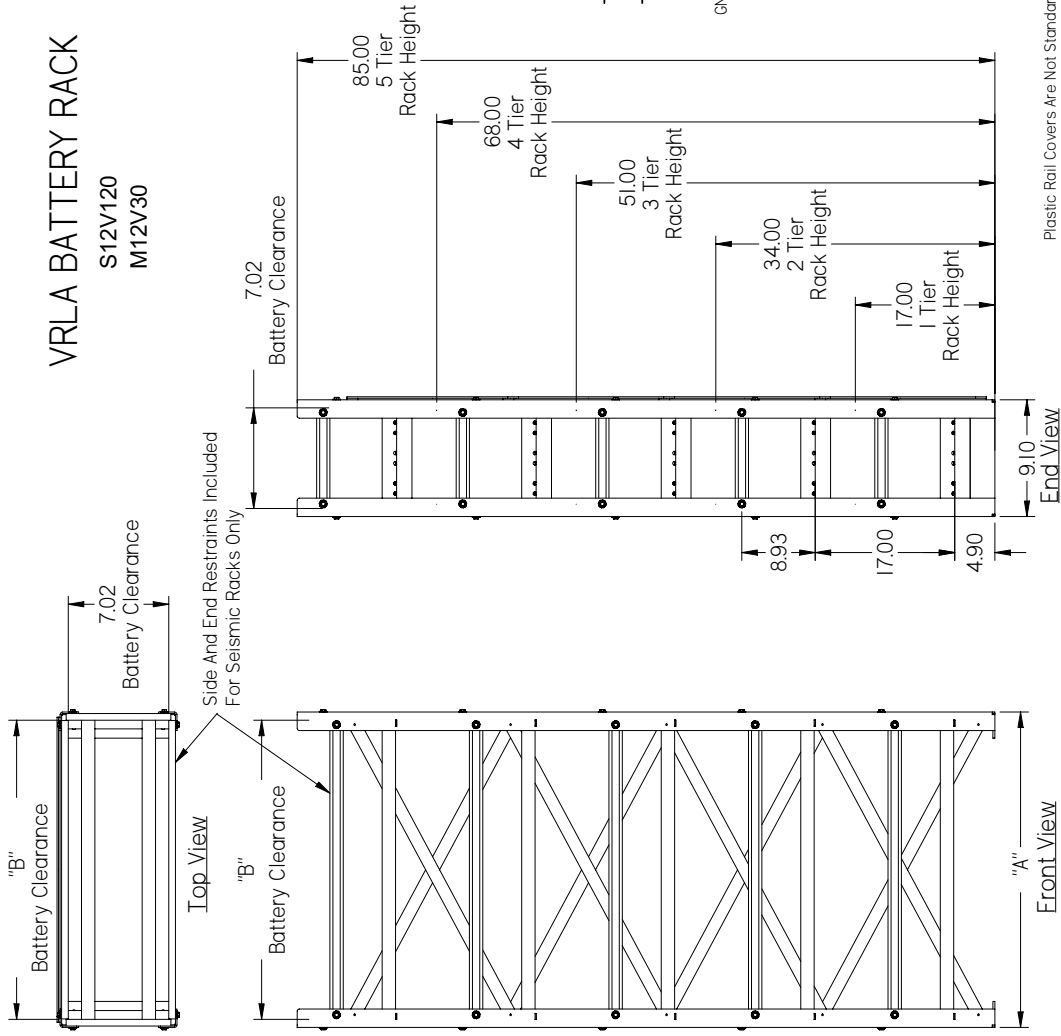
Painted Rails Are Standard When Racks Are Ordered Through GNB.

Part Number Breakdown



VRLA BATTERY RACK

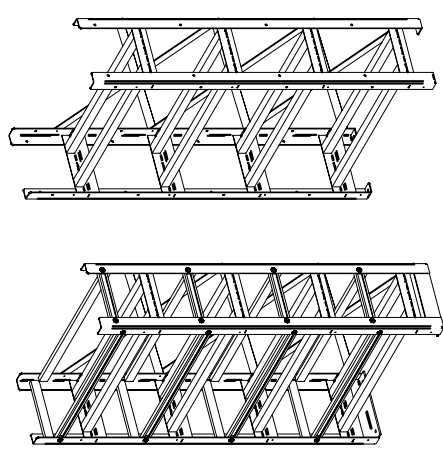
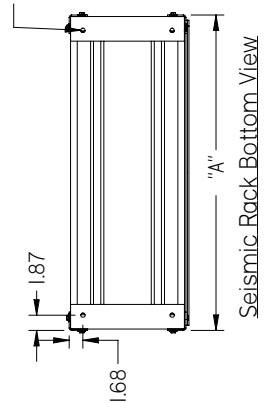
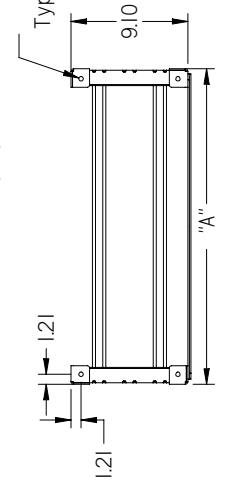
S12V120
M12V30



Plastic Rail Covers Are Not Standard Items on VRLA Racks. They May Be Ordered Separately.

Ø .54
Typical Hole Size

Ø .54
Typical Hole Size



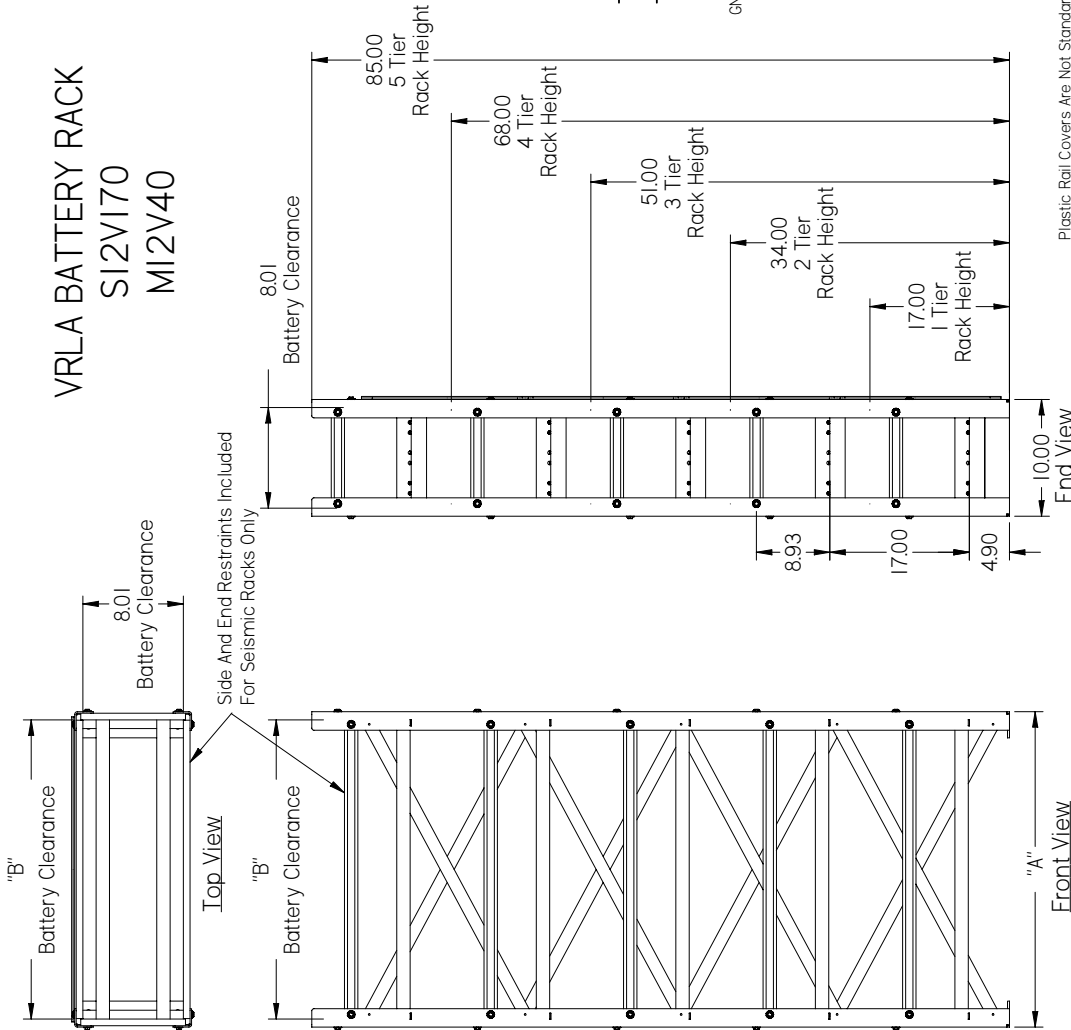
DRAWING SIZE A	DIMENSIONS ARE IN INCHES TOLERANCES ARE: 1 PLACE DECIMALS ±.1 2 PLACE DECIMALS ±.06
DO NOT SCALE DRAWING	
CLASS CODE	DESCRIPTION S12V120, M12V30
MANUFACTURED DATE	
SHEET 1 OF 1	Valve Regulated Battery Racks
06/11/2008	DRW0010-ILS
REV	A

SI2V170, MI2V40

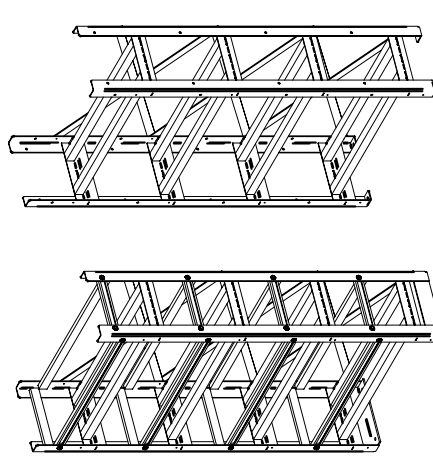
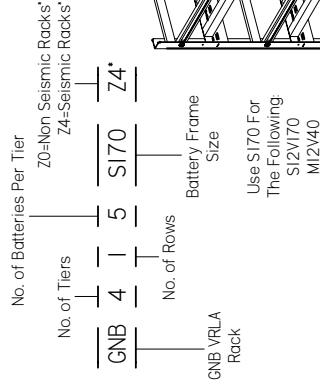
Batteries Per Tier	Batteries Per Rack	"A"	"B"	Part Number
4	4	30.6	28.6	GNB14S170Z*
5	5	37.7	35.7	GNB15S170Z*
6	6	44.8	42.8	GNB16S170Z*
4	8	30.6	28.6	GNB214S170Z*
5	10	37.7	35.7	GNB215S170Z*
6	12	44.8	42.8	GNB216S170Z*
4	12	30.6	28.6	GNB314S170Z*
5	15	37.7	35.7	GNB315S170Z*
6	18	44.8	42.8	GNB316S170Z*
4	16	30.6	28.6	GNB414S170Z*
5	20	37.7	35.7	GNB415S170Z*
6	24	44.8	42.8	GNB416S170Z*
4	20	30.6	28.6	GNB514S170Z*
5	25	37.7	35.7	GNB515S170Z*
6	30	44.8	42.8	GNB516S170Z*

Painted Rails Are Standard When Racks Are Ordered Through GNB.

VRLA BATTERY RACK SI2V170 MI2V40



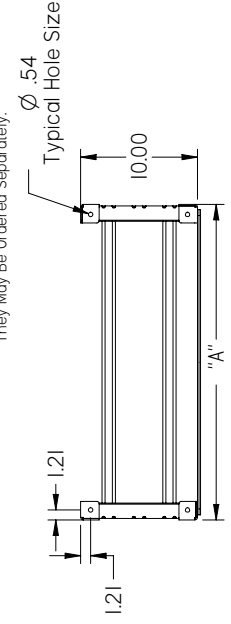
Part Number Breakdown



Seismic Rack

Non-Seismic Rack

Plastic Rail Covers Are Not Standard Items on VRLA Racks. They May Be Ordered Separately.

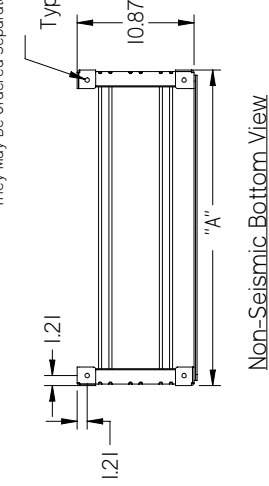
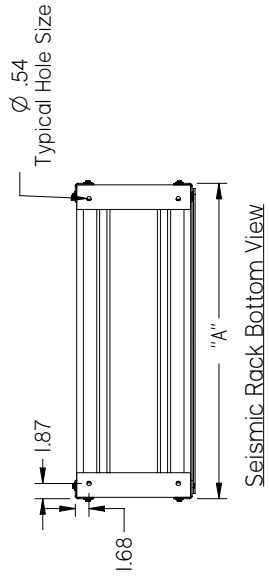
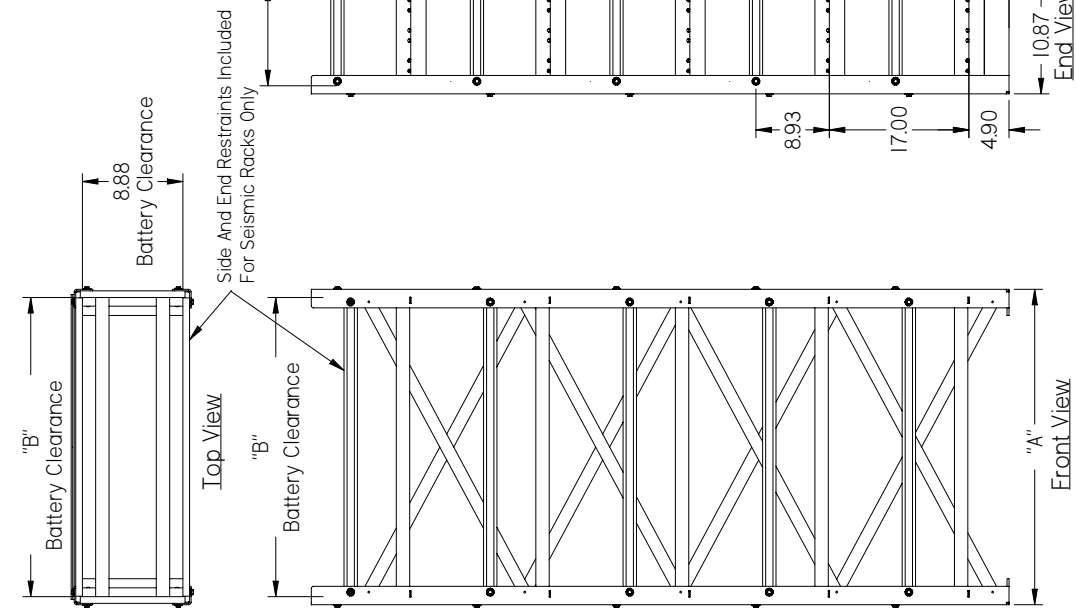


Seismic Rack Bottom View

Non-Seismic Bottom View

DRAWING SIZE A	DESCRIPTION SI2V170, MI2V40 Valve Regulated Battery Racks
DIMENSIONS ARE IN INCHES TOLERANCES ARE: 1 PLACE DECIMALS $\pm .1$ 2 PLACE DECIMALS $\pm .06$	
DO NOT SCALE DRAWING	
CLASS CODE MANUFACTURED	
DATE 06/11/2008	SHEET 1 OF 1
	REV. A
	DRW0008-ILS

VRLA BATTERY RACK MI2V45F

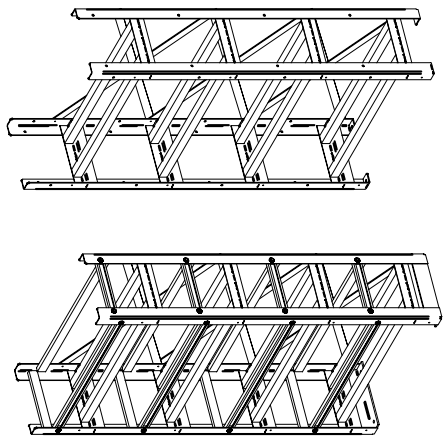
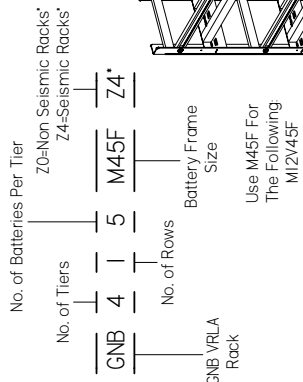


Plastic Rail Covers Are Not Standard Items on VRLA Racks.
They May Be Ordered Separately.

MI2V45F					
	Batteries Per Tier	Batteries Per Rack	"A"	"B"	Part Number
1 Tier	4	4	23.4	21.4	GNB114M45FZ*
	5	5	28.7	26.7	GNB115M45FZ*
	6	6	33.4	31.4	GNB116M45FZ*
2 Tier	4	8	23.4	21.4	GNB214M45FZ*
	5	10	28.7	26.7	GNB215M45FZ*
	6	12	33.4	31.4	GNB216M45FZ*
3 Tier	4	12	23.4	21.4	GNB314M45FZ*
	5	15	28.7	26.7	GNB315M45FZ*
	6	18	33.4	31.4	GNB316M45FZ*
4 Tier	4	16	23.4	21.4	GNB414M45FZ*
	5	20	28.7	26.7	GNB415M45FZ*
	6	24	33.4	31.4	GNB416M45FZ*
5 Tier	4	20	23.4	21.4	GNB514M45FZ*
	5	25	28.7	26.7	GNB515M45FZ*
	6	30	33.4	31.4	GNB516M45FZ*

Painted Rails Are Standard When Racks Are Ordered Through GNB.

Part Number Breakdown



DRAWING SIZE A	DESCRIPTION MI2V45F Valve Regulated Battery Racks
DIMENSIONS ARE IN INCHES TOLERANCES ARE: 1 PLACE DECIMALS ±.1 2 PLACE DECIMALS ±.06	CLASS CODE MANUFACTURED DATE
DO NOT SCALE DRAWING	SHEET 1 OF 1
06/11/2008	REV A
	DRW0011-ILS

VRLA BATTERY RACK SI2V285-SI2V300 MI2V70

SI2V285-SI2V300-MI2V70				
Batteries Per Tier	Batteries Per Rack	"A"	"B"	Part Number
4	4	31.1	29.1	GNB14S285Z*
5	5	38.5	36.5	GNB15S285Z*
6	6	45.8	43.8	GNB16S285Z*
4	8	31.1	29.1	GNB214S285Z*
5	10	38.5	36.5	GNB215S285Z*
6	12	45.8	43.8	GNB216S285Z*
4	12	31.1	29.1	GNB314S285Z*
5	15	38.5	36.5	GNB315S285Z*
6	18	45.8	43.8	GNB316S285Z*
4	16	31.1	29.1	GNB414S285Z*
5	20	38.5	36.5	GNB415S285Z*
6	24	45.8	43.8	GNB416S285Z*
4	20	31.1	29.1	GNB514S285Z*
5	25	38.5	36.5	GNB515S285Z*
6	30	45.8	43.8	GNB516S285Z*

Painted Rails Are Standard When Racks Are Ordered Through GNB.

Part Number Breakdown

No. of Batteries Per Tier

No. of Tiers

No. of Rows

Battery Frame Size

Battery Frame Size

Use S285 For The Following

SI2V285

SI2V300

MI2V70

Z0=Non Seismic Racks*

Z4=Seismic Racks*

GNB VRLA Rack

GNB VRLA Rack

Seismic Rack

Non-Seismic Rack

Plastic Rail Covers Are Not Standard Items on VRLA Racks. They May Be Ordered Separately.

Typical Hole Size

Typical Hole Size

Typical Hole Size

Typical Hole Size

Typical Hole Size

Typical Hole Size

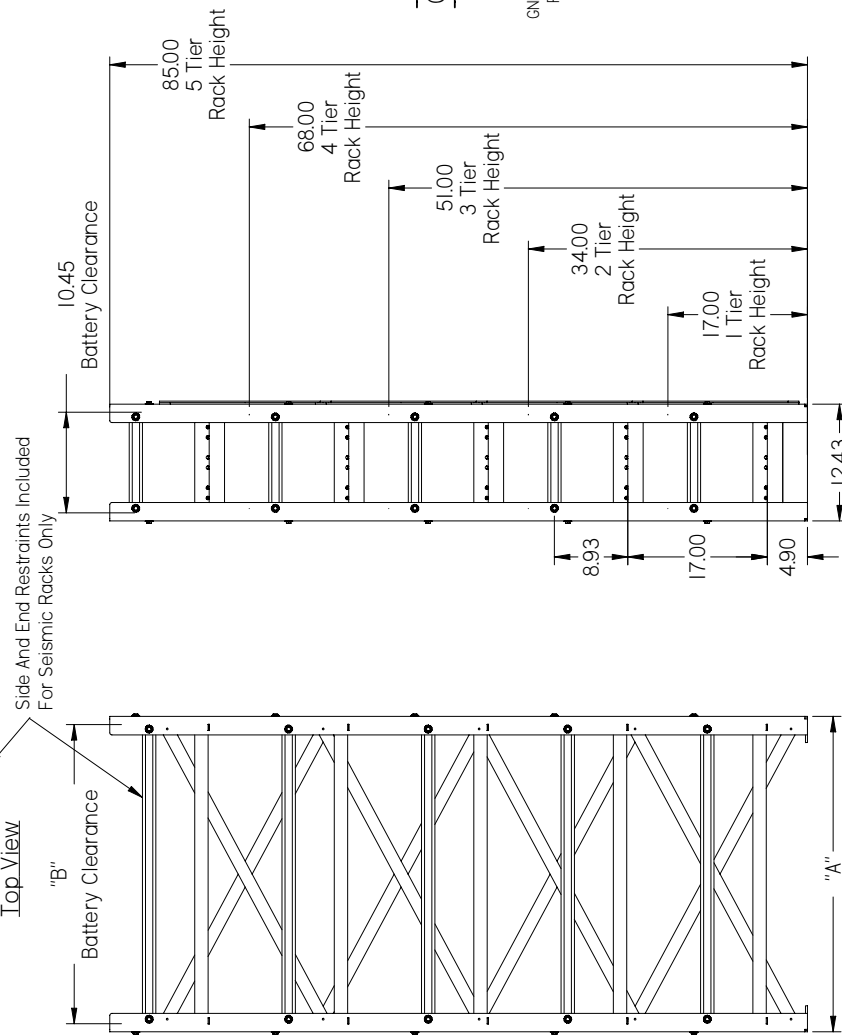
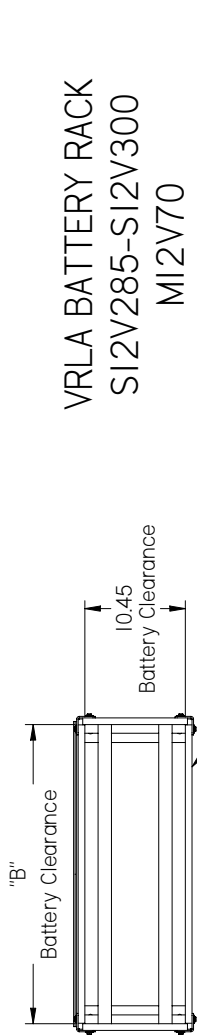
Typical Hole Size

Typical Hole Size

Typical Hole Size

Typical Hole Size

Typical Hole Size



Plastic Rail Covers Are Not Standard Items on VRLA Racks. They May Be Ordered Separately.

Typical Hole Size

Typical Hole Size

Typical Hole Size

Typical Hole Size

Typical Hole Size

Typical Hole Size

Typical Hole Size

Typical Hole Size

Typical Hole Size



Seismic Rack Bottom View

Non-Seismic Bottom View

Seismic Rack Bottom View

Non-Seismic Bottom View

Seismic Rack Bottom View

Non-Seismic Bottom View

Seismic Rack Bottom View

Non-Seismic Bottom View

Seismic Rack Bottom View

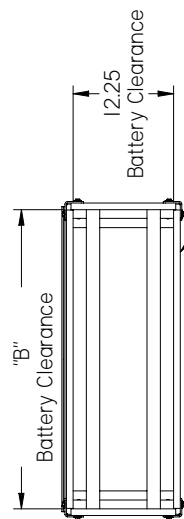
Non-Seismic Bottom View

DRAWING SIZE A	DESCRIPTION SI2V285, SI2V300, MI2V70, Valve Regulated Battery Racks
DIMENSIONS ARE IN INCHES TOLERANCES ARE: 1 PLACE DECIMALS ±.1 2 PLACE DECIMALS ±.06	
DO NOT SCALE DRAWING	
CLASS CODE	
MANUFACTURED DATE	
06/11/2008	
SHEET 1 OF 1	REV A
DRW0007-ILS	

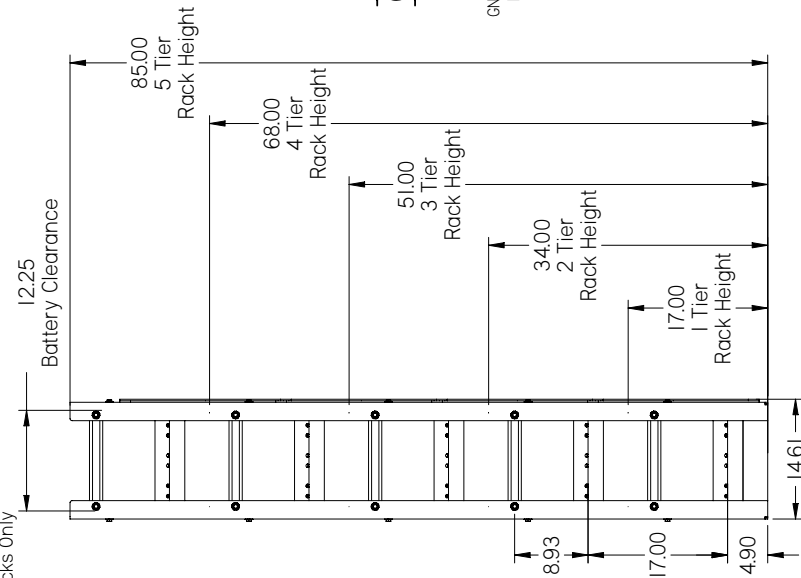
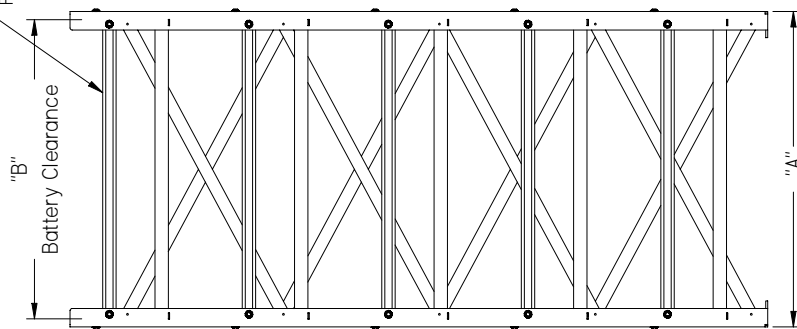
VRLA BATTERY RACK

S12V370-S6V740

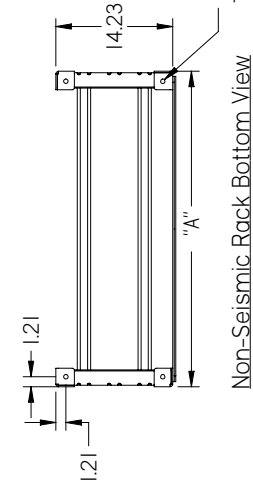
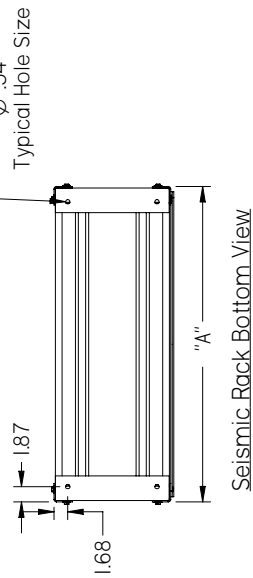
M12V90 - M6V190



Side And End Restraints Included For Seismic Racks Only



Plastic Rail Covers Are Not Standard Items on VRLA Racks. They May Be Ordered Separately.



Ø .54
Typical Hole Size

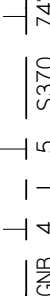
S12V370-S6V740-M12V90-M6V190			
Batteries Per Tier	Batteries Per Rack	"A"	"B"
4	4	31.1	29.1
5	5	38.5	36.5
6	6	45.8	43.8
4	8	31.1	29.1
5	10	38.5	36.5
6	12	45.8	43.8
4	12	31.1	29.1
5	15	38.5	36.5
6	18	45.8	43.8
4	16	31.1	29.1
5	20	38.5	36.5
6	24	45.8	43.8
4	20	31.1	29.1
5	25	38.5	36.5
6	30	45.8	43.8

Painted Rails Are Standard When Racks Are Ordered Through GNB.

Part Number Breakdown

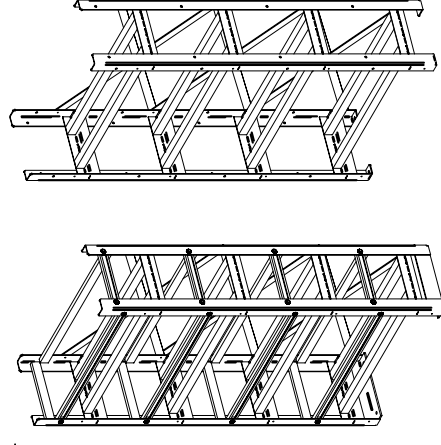
No. of Batteries Per Tier

Z0=Non Seismic Racks*
Z4=Seismic Racks*



Use S370 For The Following

- S12V370
- S6V740
- M12V90
- M6V190
- Sunlyte



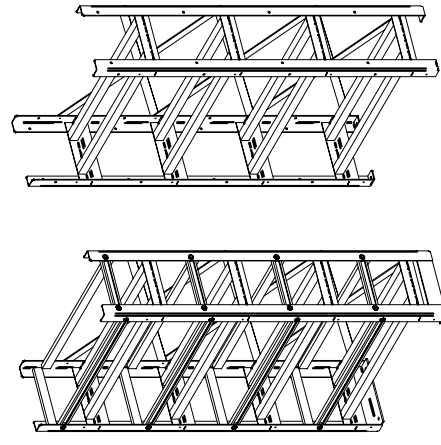
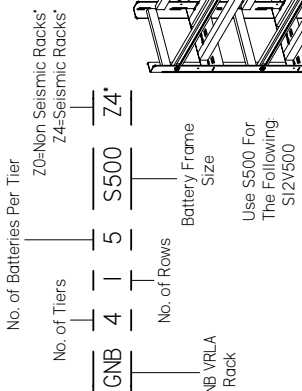
DRAWING SIZE A		DESCRIPTION S12V370, S6V740, M12V90, M6V190, Valve Regulated Battery Racks
DIMENSIONS ARE IN INCHES TOLERANCES ARE: 1 PLACE DECIMALS ±.1 2 PLACE DECIMALS ±.06		
DO NOT SCALE DRAWING		REV A
CLASS CODE	DATE	
MANUFACTURED	06/11/2008	DRW0006-ILS

VRLA BATTERY RACK SI2V500

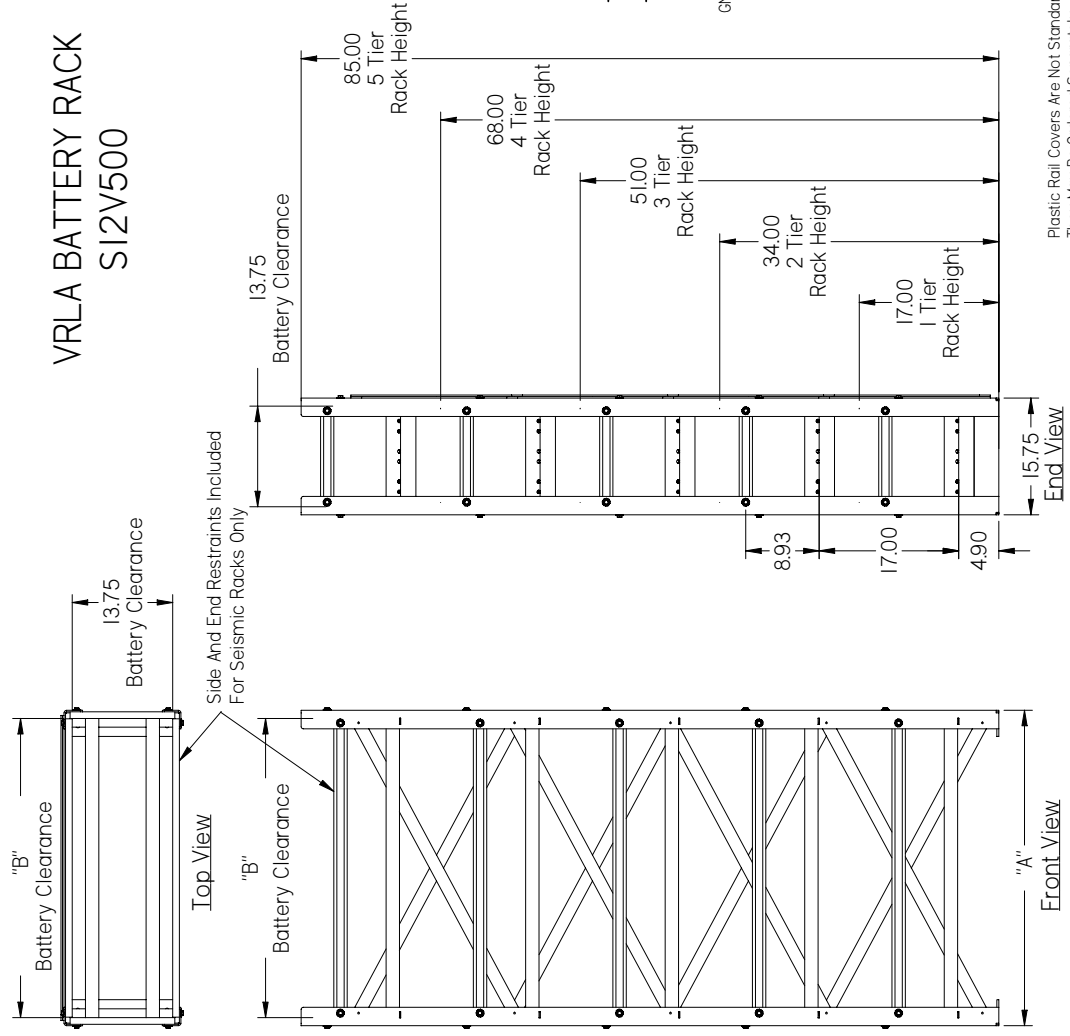
SI2V500				
	Batteries Per Tier	"A"	"B"	Part Number
1 Tier	4	30.8	288	GNB114S500Z*
	5	38.0	360	GNB115S500Z*
	6	45.3	433	GNB116S500Z*
2 Tier	4	30.8	288	GNB214S500Z*
	5	38.0	360	GNB215S500Z*
	6	45.3	433	GNB216S500Z*
3 Tier	4	30.8	288	GNB314S500Z*
	5	38.0	360	GNB315S500Z*
	6	45.3	433	GNB316S500Z*
4 Tier	4	30.8	288	GNB414S500Z*
	5	38.0	360	GNB415S500Z*
	6	45.3	433	GNB416S500Z*
5 Tier	4	30.8	288	GNB514S500Z*
	5	38.0	360	GNB515S500Z*
	6	45.3	433	GNB516S500Z*

Painted Rails Are Standard When Racks Are Ordered Through GNB.

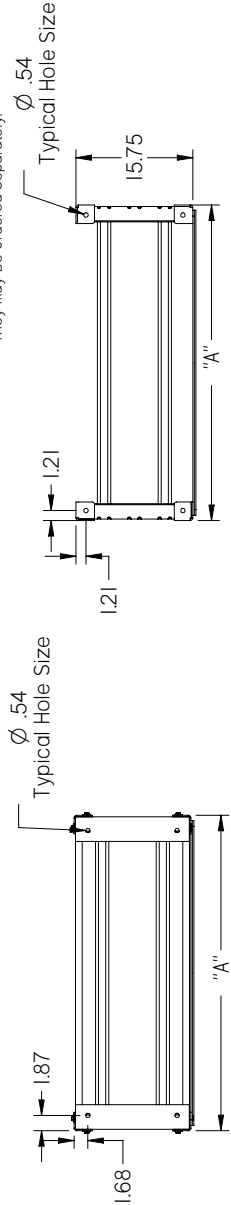
Part Number Breakdown



Seismic Rack Non-Seismic Rack



Plastic Rail Covers Are Not Standard Items on VRLA Racks. They May Be Ordered Separately.



Seismic Rack Bottom View Non-Seismic Bottom View

DRAWING SIZE A		DESCRIPTION SI2V500	
DIMENSIONS ARE IN INCHES TOLERANCES ARE: 1 PLACE DECIMALS ±.1 2 PLACE DECIMALS ±.06		Valve Regulated Battery Racks	
DO NOT SCALE DRAWING		CLASS CODE	
MANUFACTURED DATE		SHEET 1 OF 1	
06/11/2008		DRAWING NO. DRW0009-ILS	
REV A		REV A	

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GNB Industrial Power, a division of Exide technologies, is a global leader in network power applications including communication/data networks, UPS systems for computers and control systems, electrical power generation and distribution systems, as well as a wide range of other industrial standby power applications. With a strong manufacturing base in both North America and Europe and a truly global reach (operations in more than 80 countries) in sales and service, GNB Industrial Power is best positioned to satisfy your back up power needs locally as well as all over the world.

Based on over 100 years of technological innovation the Network Power group leads the industry with the most recognized global brands such as ABSOLYTE®, GNB® FLOODED CLASSIC®, MARATHON®, ONYX™, RELAY GEL®, SONNENSCHNEIN®, and SPRINTER®. They have come to symbolize quality, reliability, performance and excellence in all the markets served.

GNB Industrial Power takes pride in its commitment to a better environment. Its Total Battery Management program, an integrated approach to manufacturing, distributing and recycling of lead acid batteries, has been developed to ensure a safe and responsible life cycle for all of its products.

GNB Industrial Power
USA – Tel: 888.898.4462
Canada – Tel: 800.268.2698

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