APPLICATION FOR HCAI SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0264

HCAI Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Montanaro Industrial Battery Components GmbH

Manufacturer's Technical Representative: Franz Berger

Mailing Address: Hauptstraße 119, Feistritz im Rosental, Ca 9181

Telephone: (664) 261-7852 Email: berger@montanaro.at

Product Information

Product Name: AlphaRac

Product Model Number(s): See attached Certified Component Table

Product Category: UPS and Batteries

Product Sub-Category: Batteries

General Description: Battery racks to support KM 250 P Ni-Cd batteries. Modular painted carbon steel construction using tubes, bent plate clips, plates, angles, bent rods, bolts and nuts. See attached drawings. Only 2P and 2G rack systems are part of this OSP.

Mounting Description: Base Mounted Rigid -

Tested Seismic Enhancements: Seismic enhancements made to the test units and/or modifications required to address anomalies during the tests shall be incorporated into the production units.

Applicant Information

Applicant Company Name: ZFA Structural Engineers

Contact Person: Andrew Zafrin

Mailing Address: 1212 4th St Suite Z, Santa Rosa, CA 95404

Telephone: (707) 526-0992 Email: andrewz@zfa.com

Title: Principal

California Licensed Structural Engineer Responsible for the Engineering and Test Report(s)

Company Name: ZFA STRUCTURAL ENGINEERS

Name: Andrew Zafrin California License Number: S5921

Mailing Address: 1212 Fourth Street Suite Z, Santa Rosa, CA 95404

Telephone: (707) 526-0992 Email: andrewz@zfa.com

Certification Method

☐ GR-63-Core ☒ ICC-ES AC156 ☐ IEEE 344 ☐ IEEE 693 ☐ NEBS 3

☐ Other (Please Specify):

Testing Laboratory

Company Name: ANCO ENGINEERS, INC.

Contact Person: Paul Ibanez

Mailing Address: 1965 33rd Street, Suite A, Boulder CO 80301

Telephone: (303) 443-7580 Email: paul@ancoengineers.com

Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 1.13

S_{DS} (Design spectral response acceleration at short period, g) = 2.5

a_p (Amplification factor) = 1.0

R_p (Response modification factor) = 2.5

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height ratio factor) = 0

Natural frequencies (Hz) = See Attachment

Overall dimensions and weight = See Attachment

HCAI Approval (For Office Use Only) - Approval Expires on 08/29/2030

Date: 8/29/2024

Name: Mohammad Karim Title: Supervisor, Health Facilities

Special Seismic Certification Valid Up to: S_{DS} (g) = 2.5 z/h = 0

Condition of Approval (if applicable):

AlphaRac Certified Component Table

Unit designation	Description	tested	In test envelope	Dimensions	weight
2P350/5500SEK	125V, 1 row, 2 tiers high with (92)KM 250 P Ni-Cd batteries in series, 7 frames	yes (UUT1)	-	14" x 217" x 35"	2816#
2P350/1200SEK	24V, 1 row, 2 tiers high with (20)KM 250 P Ni-Cd batteries in series, 2 frames	no	yes	14" x 47" x 35"	587#
2G470/5500SEK	24V, 2 rows, 1 tier high with (92) KM 250 P Ni-Cd batteries in series, 10 frames	no	yes	18.5" x 217" x 13.3"	2615#
2G470/1200SEK2	24V, 2 rows, 1 tier high with (20) KM 250 P Ni-Cd batteries in series, 2 frames	yes (UUT2)	-	18.5" x 47" x 13.3"	573#
2G470/1200SEK	24V, 2 rows, 1 tier high with (19)KM 250 P Ni-Cd batteries in series, 2 frames	no	yes	18.5" x 47" x 13.3"	546#

The SEK designator signifies seismic (SE) and the battery "family" (batteries with the same physical dimensions). "K" in this instance signifies Ni-Cd batteries that have dimensions of 108mm L x 164mm W x 364mm H. The "2" designator in the instance of the 2G470/1200SEK2 rack was a method of differentiating the quantity of batteries on the rack. The 2G470/1200SEK rack holds a quantity of (19) KM 250P batteries; the 2G470/1200SEK2 batteries holds a quantity of (20)KM 250P batteries. The only difference between these two racks is the length of the hold-down bars for the row of 9 batteries; the hold-downs are 1032mm in length for 9 batteries, 1180 mm in length for 10 batteries.

Code: CBC 2022, Sds=2.5; z/h=0; Rigid Floor Mounted unit

Certified Components:

Battery Manufacturer: GAZ Geräte See attached battery data Sheets attached to the end

Battery Part Number: KM 250 P

Rack Manufacturer: Montanaro

Appendix E – AlphaRac Model Number Guide (partial- includes racks in report) and Rack Drawings

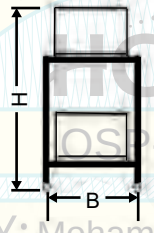
Every battery rack will be marked with the rack type, depth of the rack and the length of the battery rack.

2P – 350 / 2700

Total Length of the rack in mm

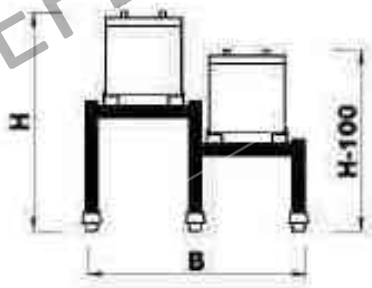
Total Depth of the rack in mm

Battery Rack Type See section 2.2



2P ~ 2 Tier – single row

Depths(B): 350;

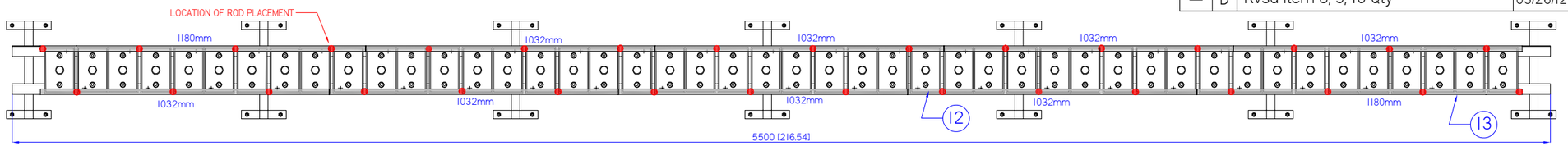


2G ~ 2 Step

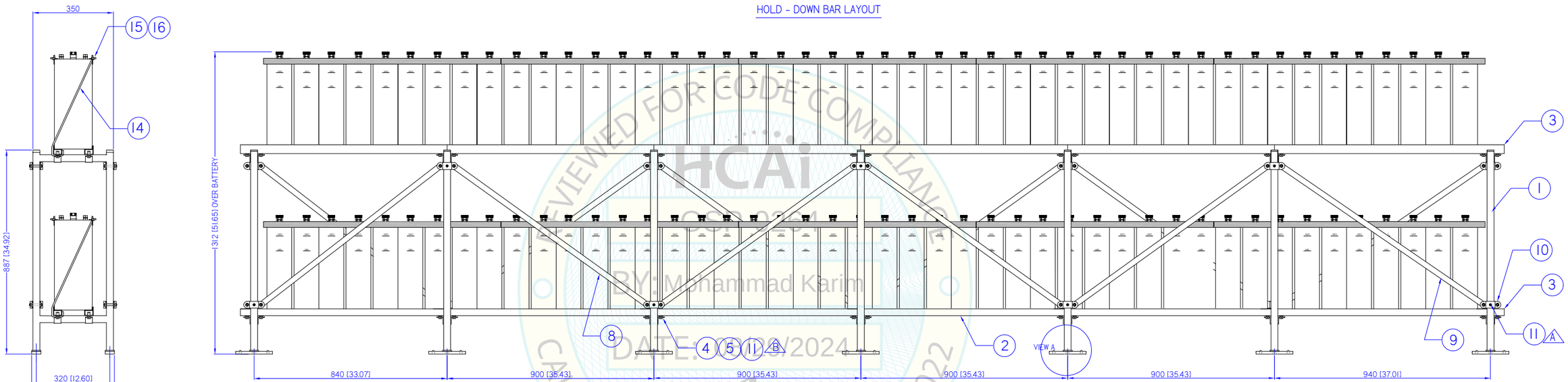
Depths(B): 470;

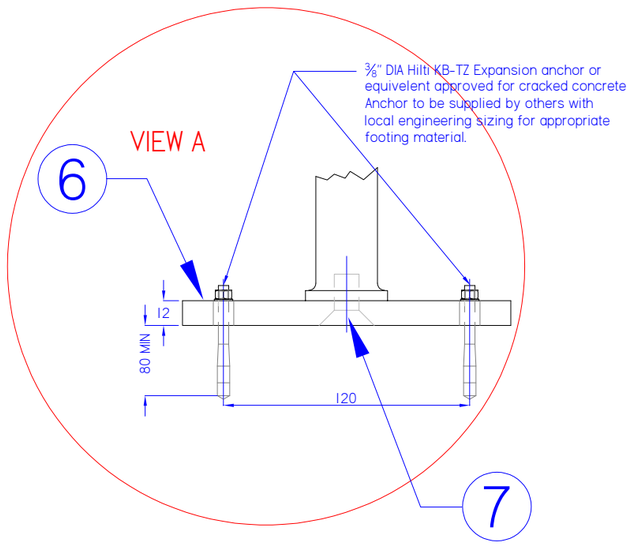
Figure 8. Model number guide

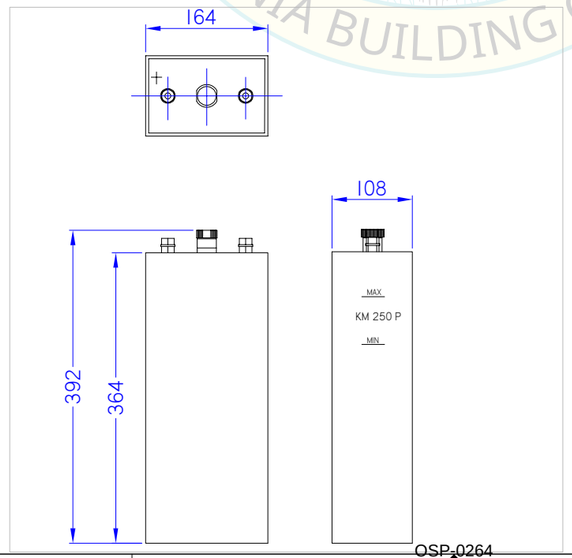
REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
—	A	Release to Production	06/22/11	
—	B	Rvsd seismic foot direction	06/30/11	
—	C	Rvsd seismic foot part number Rvsd item 11 qty; Add note B	03/19/12	
—	D	Rvsd Item 8, 9, 10 Qty	03/26/12	



HOLD - DOWN BAR LAYOUT







A After installation of diagonal braces drill hole for M10 self tapping screw - 14X

B After installation of M90LH angle clips, drill hole for M10 self tapping screw - 28X

DIMENSIONS: mm [inches]

Battery termination removed for clarity. For hardware layout please see battery layout drawing.

Item	Qty	Part Number	Description
16	64	AIP634-0006-10	Wing nut, M6
15	64	AIP633-0001-12	Washer, Flat, M6
14	64	AIP601-0191-10	Hold down rod, 26° 405mm
13	4	AIP601-0291-10	Hold down bar, 1180mm
12	16	AIP601-0292-10	Hold down bar, 1032mm
11	56	AIP630-0051-12	Screw, self tapping, M10 x 22
10	28	M90DH	Angle clip, DH
9	2	D1050	Diagonal brace, 1050mm
8	10	D950	Diagonal brace, 950mm
7	14	AIP630-0019-12	Screw, M12 x 25
6	14	AIP601-0439-10	Seismic Foot
5	84	AIP630-0001-12	Bolt, M8 X 20
4	28	M90LH	Angle Clip L
3	4	L1000A	Rail, outside, 1000mm
2	20	L900A	Rail, outside, 900mm
1	7	2P350	2 Tier Frame - 350mm

ALPHA INDUSTRIAL POWER

BATTERY ASSEMBLY LAYOUT

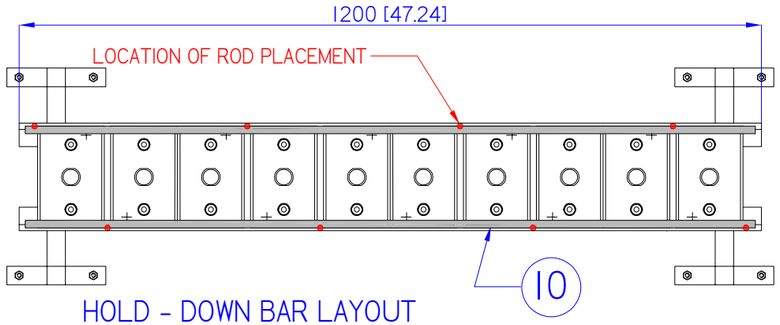
92 X KM 250 P Assembly
Mounted on a Seismic 2 Tier Rack

Date	Drawn by	Approved by	SIZE	FSCM NO.	DWG NO.	REV
04/01/11	PK				2P350/5500SEK	

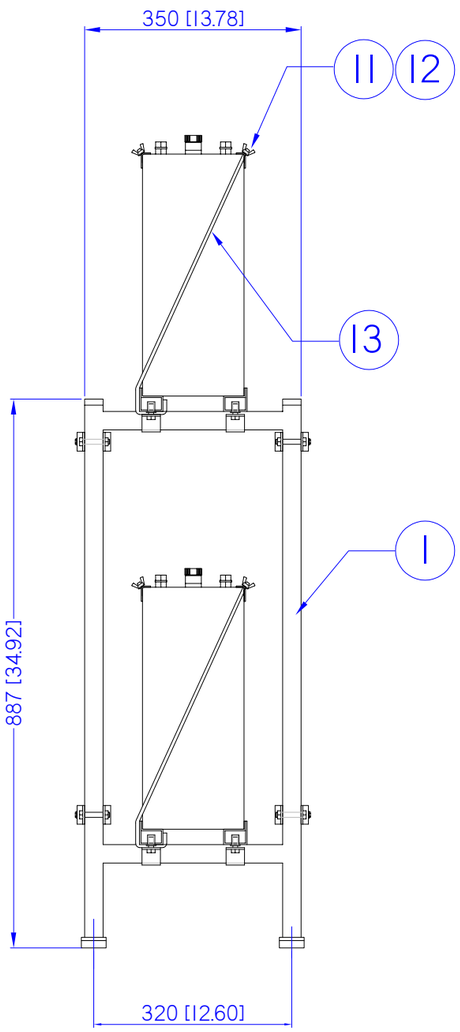
Unless otherwise specified, All dimensions are in inches. Do not scale drawing. Tolerances are: XX ± .02 XXX ± .010 Angular ± 1° Holes ± .005

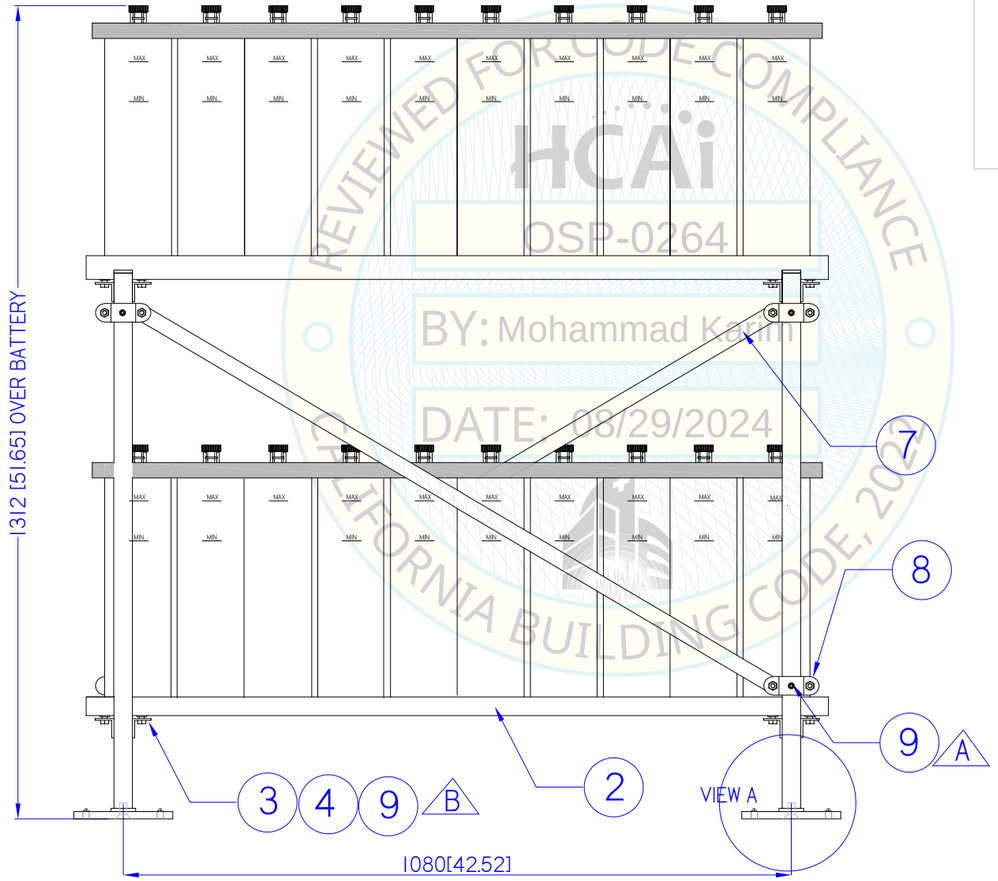
SCALE N/A SHEET 3 of 10

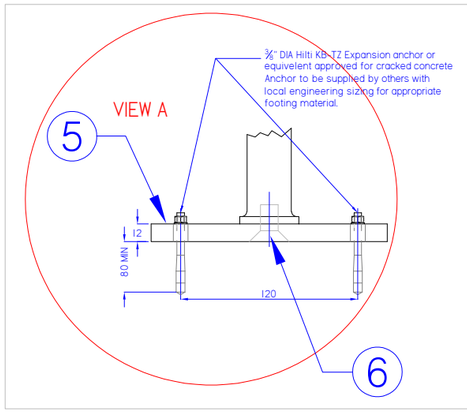
REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
—	A	Release to Production	03/20/12	

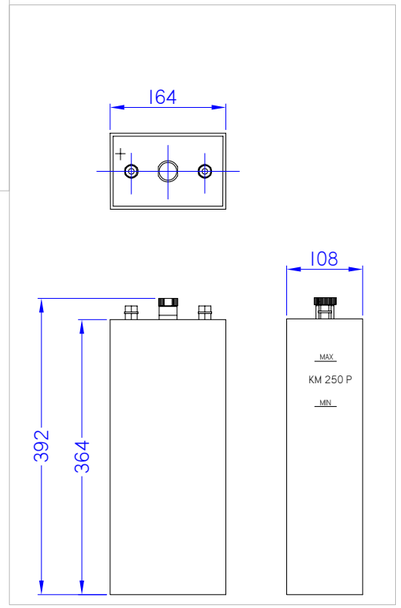


HOLD - DOWN BAR LAYOUT









DIMENSIONS: mm [inches]

Item	Qty	Part Number	Description
13	16	AIP601-0191-10	Hold down rod, 26° 405mm
12	16	AIP634-0006-10	Wing nut, M6
11	16	AIP633-0001-12	Washer, Flat, M6
10	4	AIP601-0291-10	Hold down bar, 1080mm
9	16	AIP630-0051-12	Screw, self tapping, M10 x 22
8	16	M90DH	Angle clip, DH
7	4	D1250	Diagonal brace, 1250mm
6	4	AIP630-0019-12	Screw, M12 x 25
5	4	AIP601-0439-10	Seismic Foot
4	32	AIP630-0001-12	Bolt, M8 X 20
3	8	M90LH	Angle Clip L
2	4	L1200A	Rail, outside, 1200mm
1	2	2P350	2 Tier Frame - 350mm

A After installation of diagonal braces drill hole for M10 self tapping screw - 8X

B After installation of M90LH angle clips drill hole for M10 self tapping screw - 16X

Battery termination removed for clarity. For hardware layout please see battery layout drawing.

ALPHA INDUSTRIAL POWER

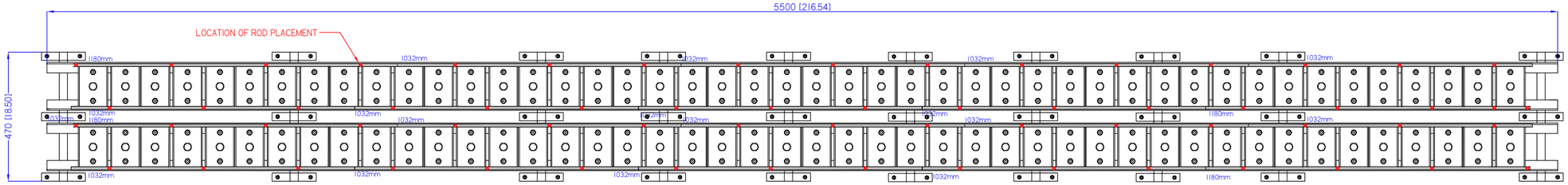
BATTERY ASSEMBLY LAYOUT
20 X KM 250 P Assembly
Mounted on a Seismic 2 Tier Rack

Date	Drawn by	Approved by	SIZE	FSCM NO.	DWG NO.	REV
03/20/12	PK				2P350/1200SEK	

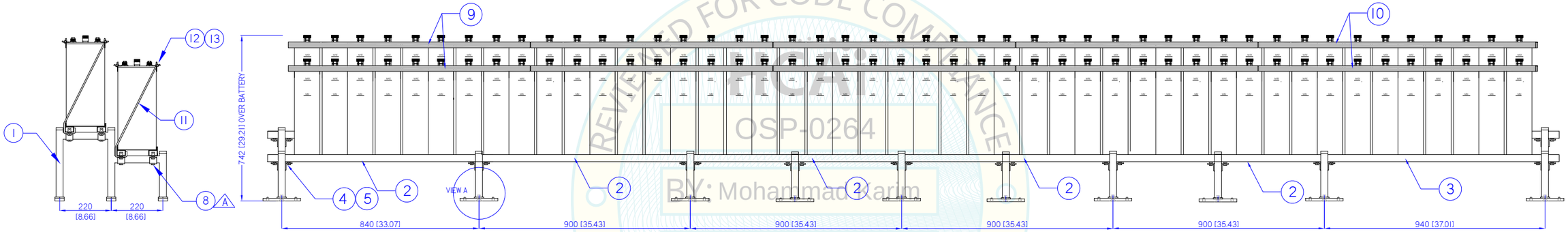
Unless otherwise specified, All dimensions are in inches. Do not scale drawing. Tolerances are: .XX ± .02 .XXX ± .010 Angular ± 1° Holes ± .002

SCALE N/A SHEET 4 of 10

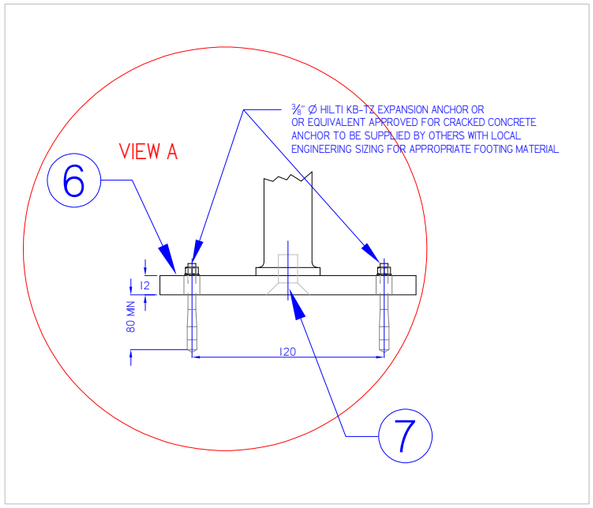
REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
—	A	Release to Production	03/20/12	

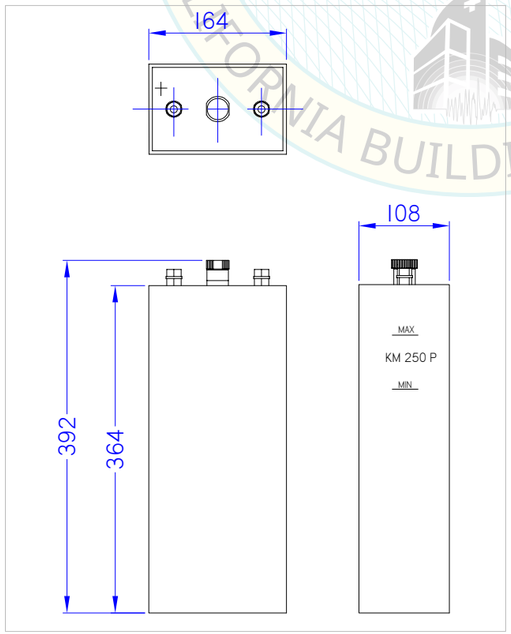


HOLD - DOWN BAR LAYOUT



A After installation of M90LH angle clips drill hole for MI0 self tapping screw - 28X





Battery termination removed for clarity. For hardware layout please see battery layout drawing.

DIMENSIONS: mm [inches]

Item	Qty	Part Number	Description
13	64	AIP634-0006-10	Wing nut, M6
12	64	AIP633-0001-12	Washer, Flat, M6
11	64	AIP601-0191-10	Hold down rod, 26° 405mm
10	4	AIP601-0291-10	Hold down bar, 1180mm
9	16	AIP601-0292-10	Hold down bar, 1032mm
8	40	AIP630-0051-12	Screw, self tapping, MI0 x 22
7	30	AIP630-0019-12	Screw, MI2 x 25
6	30	AIP601-0439-10	Seismic Foot
5	80	AIP630-0001-12	Bolt, M8 X 20
4	40	M90LH	Angle Clip L
3	4	L1000A	Rail, outside, 1000mm
2	20	L900A	Rail, outside, 900mm
1	10	2G-470	2 Step Frame - 470mm

ALPHA INDUSTRIAL POWER

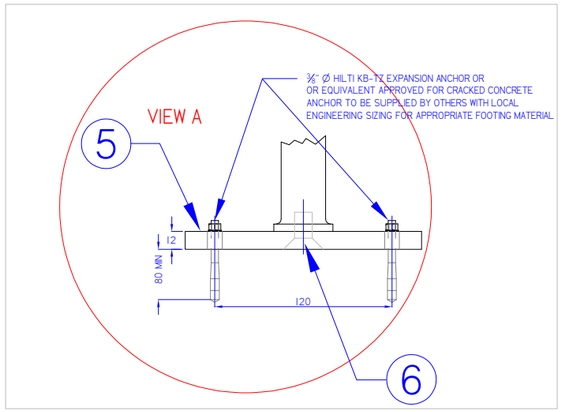
BATTERY ASSEMBLY LAYOUT
92 X KM 250 P Assembly
Mounted on a Seismic 2 Step Rack

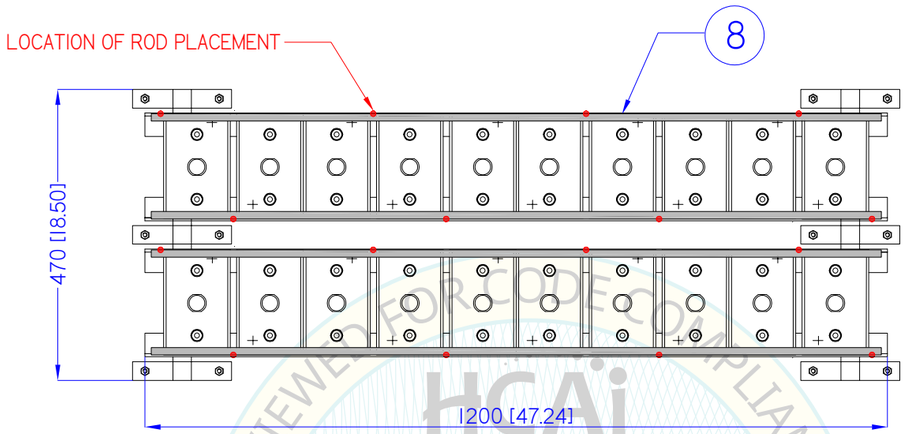
Date	Drawn by	Approved by	SIZE	FSCM NO.	DWG NO.	REV
03/20/12	PK				2G470/5500SEK	

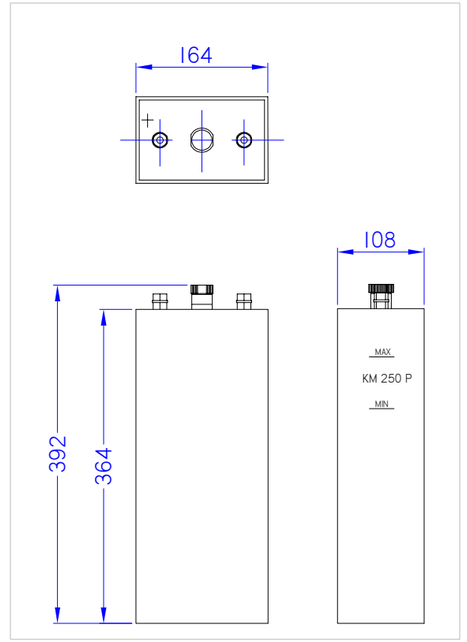
Unless otherwise specified, All dimensions are in inches. Do not scale drawing. Tolerances are: .XX = ± .02 .XXX = ± .010 Angular = ± 1° Holes = ± .002

SCALE N/A SHEET 5 of 10

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
—	A	Release to Production	03/20/12	



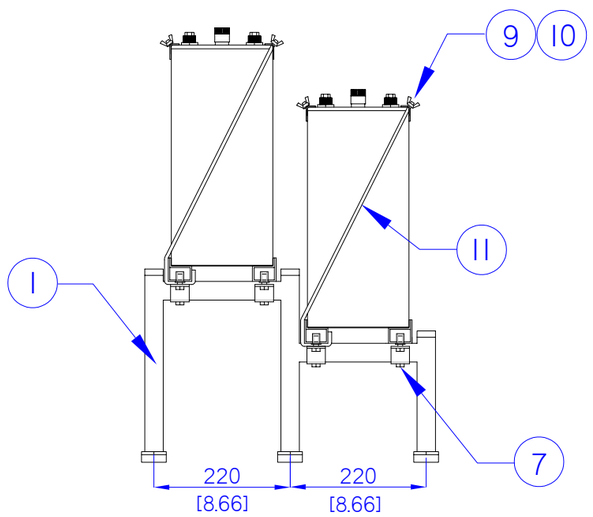


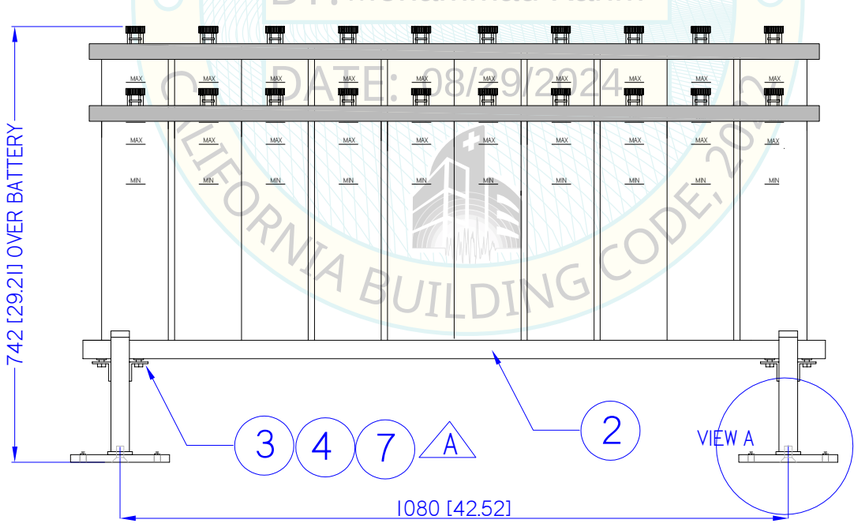


HOLD - DOWN BAR LAYOUT

BY: Mohammad Karim

DATE: 08/29/2024





DIMENSIONS: mm [inches]

Item	Qty	Part Number	Description
11	16	AIP601-0191-10	Hold down rod, 26° 405mm
10	16	AIP634-0006-10	Wing nut, M6
9	16	AIP633-0001-12	Washer, Flat, M6
8	4	AIP601-0291-10	Hold down bar, 1080mm
7	8	AIP630-0051-12	Screw, self tapping, M10 x 22
6	6	AIP630-0019-12	Screw, M12 x 25
5	6	AIP601-0439-10	Seismic Foot
4	16	AIP630-0001-12	Bolt, M8 X 20
3	8	M90LH	Angle Clip L
2	4	L1200A	Rail, outside, 1200mm
1	2	2G-470	2 Step Frame - 470mm

△A After installation of M90LH angle clips drill hole for M10 self tapping screw - 8X

Battery termination removed for clarity. For hardware layout please see battery layout drawing.

ALPHA INDUSTRIAL POWER

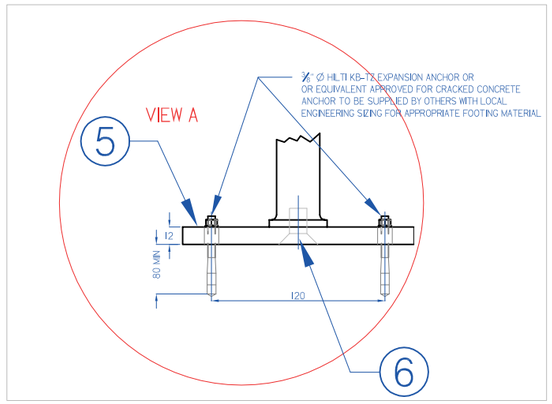
BATTERY ASSEMBLY LAYOUT
20 X KM 250 P Assembly
Mounted on a Seismic 2 Step Rack

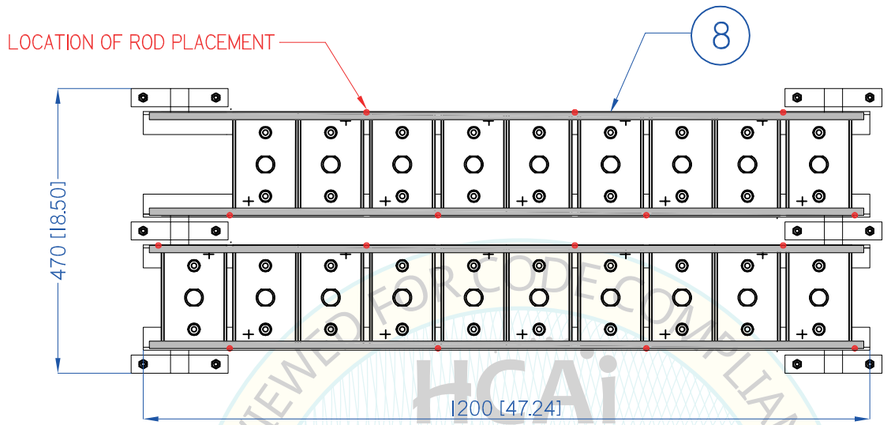
Date	Drawn by	Approved by	SIZE	FSCM NO.	DWG NO.	REV
03/20/12	PK				2G470/1200SEK2	

Unless otherwise specified, All dimensions are in inches. Do not scale drawing. Tolerances are: .XX = ± .02 .XXX = ± .010 Angular = ± 1° Holes = ± .002

SCALE N/A SHEET 6 of 10

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
—	A	Release to Production	03/20/12	

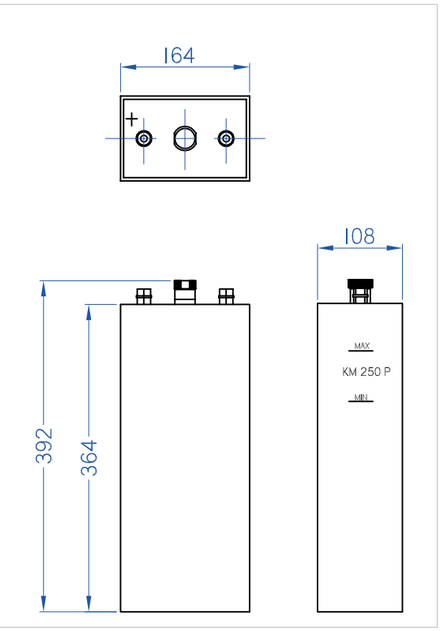




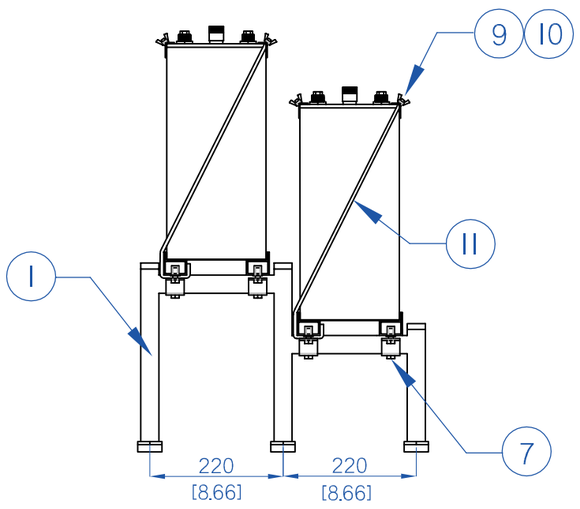
HOLD - DOWN BAR LAYOUT

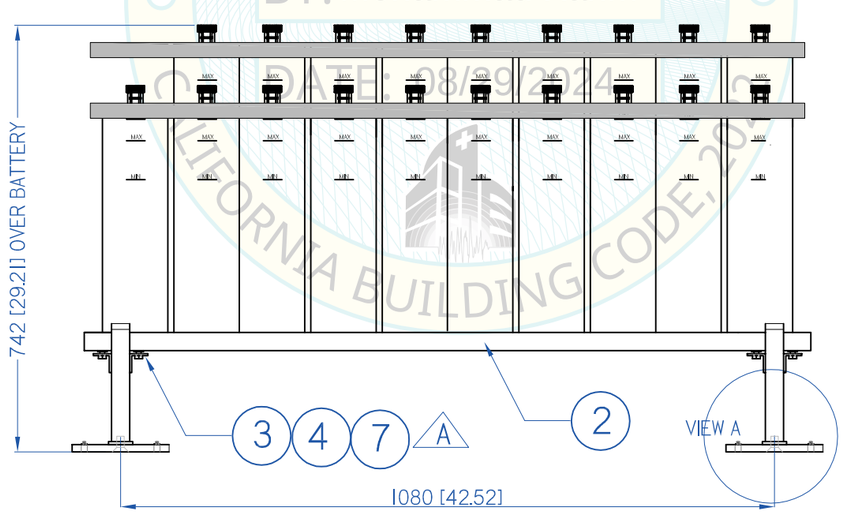
BY: Mohammad Karim

DATE: 08/9/2024



DIMENSIONS: mm [inches]





Item	Qty	Part Number	Description
11	15	AIP601-0191-10	Hold down rod, 26° 405mm
10	15	AIP634-0006-10	Wing nut, M6
9	15	AIP633-0001-12	Washer, Flat, M6
8	4	AIP601-0291-10	Hold down bar, 1080mm
7	8	AIP630-0051-12	Screw, self tapping, M10 x 22
6	6	AIP630-0019-12	Screw, M12 x 25
5	6	AIP601-0439-10	Seismic Foot
4	16	AIP630-0001-12	Bolt, M8 X 20
3	8	M90LH	Angle Clip L
2	4	L1200A	Rail, outside, 1200mm
1	2	2G470/1200SEK	2 Step Frame - 470mm

A After installation of M90LH angle clips drill hole for M10 self tapping screw - 8X

Battery termination removed for clarity. For hardware layout please see battery layout drawing.

ALPHA INDUSTRIAL POWER

BATTERY ASSEMBLY LAYOUT
19 x KM 250P Assembly
Mounted in a Seismic 2 Step Rack

Date	Drawn by	Approved by
03/20/12	PK	

Unless otherwise specified, All dimensions are in Inches. Do not scale drawing Tolerances are: .XX ± .02 .XXX ± .010 Angulars ± 1° Holes ± .002

SIZE | FSCM NO. | DWG No 2G470/1200SEK

SCALE N/A | SHEET 7 of 10

ANCO Engineers, Inc.
1965A 33rd Street
Boulder, CO 80301
(303)443-7580

UUT #1

Unit Under Test (UUT) Summary Sheet

ANCO Project Number: 3325.01

Manufacturer:	Montanaro for Alpha Industrial Power Inc
Model Line:	AlphaRac Battery Racks and Cabinets
Model Number:	2P350/5500SEK
Product Construction Summary:	Painted carbon steel battery rack with Ni-Cd batteries
Options/ Subcomponent Summary:	125V configuration 1 battery deep and 2 tiers high. 92 KM 250 P batteries connected in series (46 per tier). (14"Wx216.5"L, 2T, Z4)

UUT Properties

Weight (lb)	**Dimensions (in)**			**Lowest Natural Frequency (Hz)**		
	Depth	**Width**	**Height**	**Front-Back**	**Side-Side**	**Vertical**
2816	13.75	217	35	9.1	6.55	5.7

UUT Highest Passed Seismic Run Information

Building Code	**Test Criteria**	**S_{DS}**	**z/h**	**I_P**	**A_{FLX-H}**	**A_{RIG-H}**	**A_{FLX-V}**	**A_{RIG-V}**
CBC 2022	ICC-ES AC-156	2.5	0	1.5	2.5	1.0	1.68	0.68

Test Mounting Details:

Originally, fourteen grade 8 1/4"-20 bolts were used to hold the rack to the fixture, but because of the foot design, this allowed the feet to spin. As such, ANCO modified the feet to represent a new design in which the feet were attached to the fame at the center of the foot, but have two through holes for anchor bolts. With this modification the rack passed. Final assembly is composed of (14) legs with a total of (28) grade 8 1/4"-20 bolts.
Units were full of contents during tests and units maintained structural integrity and functionality after test. Unit mounted to a rigid floor mount.

1965-A 33rd Street
Boulder, Colorado 80301
303-443-7580 Voice
303-443-8034 Fax
anco@ancoengineers.com
www.ancoengineers.com

16 January, 2012

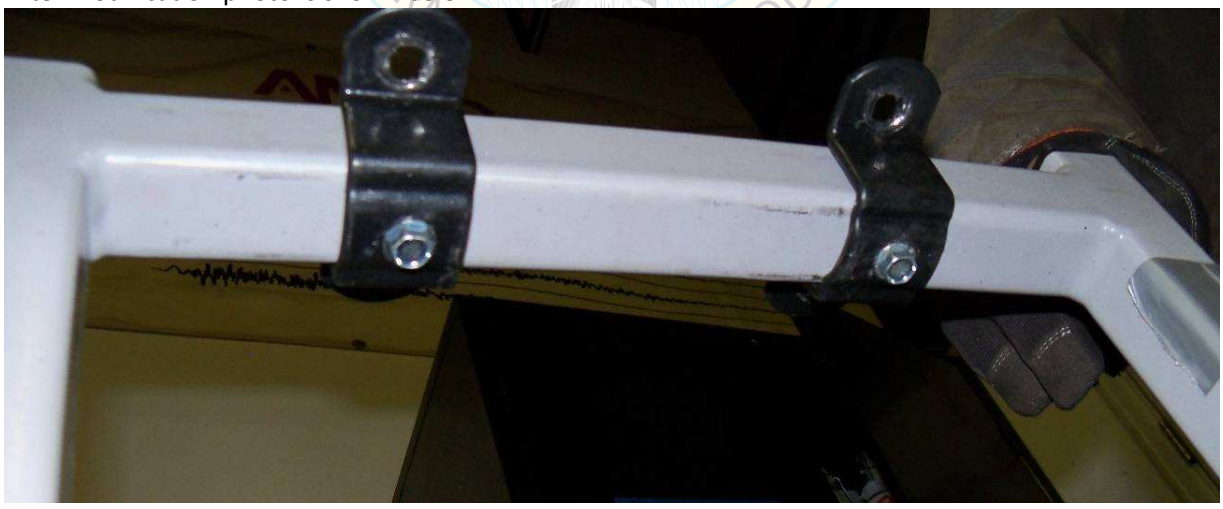
AlphaRac 2P350/5500SEK Structural Modifications

During seismic testing of the 2P350/5500SEK emergency backup power battery rack, it was discovered that the clamp method of holding the battery mounting rails to the structure of the rack frames did not provide enough clamping force to keep the mounting rails from sliding around during testing. As such, Anco recommended the following changes to the manufacturer and re-tested the units:

1. All battery mounting rail clamps on the top shelf must have one 1/4" diameter hold drilled in the center of the clamp.
2. All structural rack frames must be marked in two locations such that they line up with the center of the top row clamps when the battery mounting rails are installed.
3. All top row battery mounting rail clamps should be screwed into to the structural rack frames using #10 self-drilling/self-tapping sheet metal screws. This provides shear support in addition to the frictional clamping force. The pre-tension of the screw also increases the initial friction force.

Note: Good workmanship must be used to ensure that the self tapping screws do not strip in the wall of the box tube rack frames.

After modification photo is shown below:



After the installation of these screws, the racks were re-tested and no slippage of the battery mounting rails was observed

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UUT #2

Unit Under Test (UUT) Summary Sheet

ANCO Project Number: 3325.01

Manufacturer:	Montanaro for Alpha Industrial Power Inc
Model Line:	AlphaRac Battery Racks and Cabinets
Model Number:	2G470/1200SEK2
Product Construction Summary:	Painted carbon steel battery rack with Ni-Cd batteries
Options/ Subcomponent Summary:	24V configuration 2 batteries deep and 1 tier high. 20 KM 250 P batteries connected in series (10 per tier). (18.5"Wx47"L, 2S, Z4)

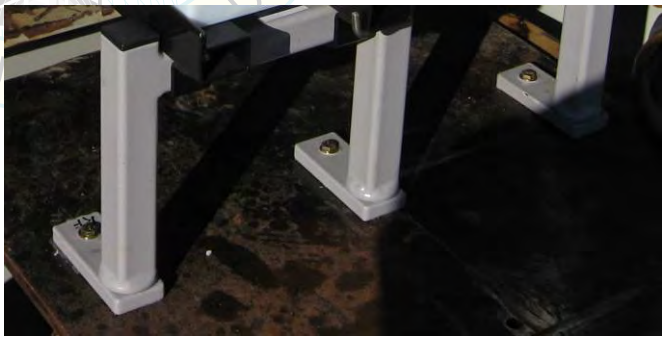
UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
573	18.5	47.25	13.3	11	12.5	24.9

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2022	ICC-ES AC-156	2.5	0	1.5	2.5	1.0	1.68	0.68

Test Mounting Details:



The unit was mounted to steel plates using six grade 8 1/4"-20 bolts with standard washers (one in each foot).

Units were full of contents during tests and units maintained structural integrity and functionality after test. Unit mounted to a rigid floor mount.