APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY	
APPLICATION #:	OSP – 0177 – 10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Post Glover Resistors, Inc.

Manufacturer's Technical Representative: Jonathan Nash, Engineering Manager

Mailing Address: 4750 Olympic Blvd., Erlanger, KY 41018

Telephone: (859) 372-8919 Email: Jonathan.Nash@postglover.com

Product Information

Product Name: Neutral grounding resistors

Product Type: Electrical equipment

Product Model Number: Reference attachment
(List all unique product identification numbers and/or part numbers)

General Description: Each unit consists of one to four power resistor banks, cap and pin standoff type insulators, Current transformer, and grounded NEMA 3R safety enclosure. Tested units included those with and without additional seismic bracing/restraint.

Mounting Description: Rigid base mounted

Applicant Information

Applicant Company Name: Dynamic Certification Laboratories

Contact Person: Joseph L. La Brie, S.E., Partner

Mailing Address: 1315 Greg Street, Suite 109, Sparks, NV 89431

Telephone: (775) 358-5085 Email: labrie@shaketest.com

I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2016.

Signature of Applicant: Date: 4/26/16

Title: Joseph L. La Brie, S.E. Company Name: Dynamic Certification Laboratories

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

Company Name: Dynamic Certification Laboratories

Name: Dr. Ahmad Itani, S.E. California License Number: SE-5220

Mailing Address: 1315 Greg Street, Suite 109, Sparks, NV 89431

Telephone: (775) 358-5085 Email: Itani@shaketest.com

Supports and Attachments Preapproval

☐ Supports and attachments are preapproved under OPM- _____
(Separate application for OSHPD Preapproval of Manufacturer's Certification (OPM) of Supports and attachments is required)

☒ Supports and attachments are not preapproved

Certification Method

☒ Testing in accordance with: ☒ ICC-ES AC156

☐ Other (Please Specify): _____

Testing Laboratory

Company Name: Dynamic Certification Laboratories

Contact Name: Kelly Laplace, Project Manager

Mailing Address: 1315 Greg Street, Suite 109, Sparks, NV 89431

Telephone: (775) 358-5085 Email: Kelly@shaketest.com

Seismic Parameters

Design in accordance with ASCE 7-10 Chapter 13: ☒ Yes ☐ No

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

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

a_p (In-structure equipment or component amplification factor) = 1.0

R_p (Equipment or component response modification factor) = 2.5

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height factor ratio) = 1.0

Equipment or Component Natural Frequencies (Hz) = See attachment

Overall dimensions and weight (or range thereof) = See attachment

Equipment or Components @ grade designed in accordance with ASCE 7-10 Chapter 15: ☐ Yes ☒ No

Design Basis of Equipment or Components (V/W) =

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

S_{D1} (Design spectral response acceleration at 1 second period, g) =

R (Response modification coefficient) =

Ω_0 (System overstrength factor) =

C_d (Deflection amplification factor) =

I_p (Importance factor) = 1.5

Height to Center of Gravity above base =

Equipment or Component Natural Frequencies (Hz) =

Overall dimensions and weight (or range thereof) =

Tank(s) designed in accordance with ASME BPVC, 2015: ☐ Yes ☒ No

List of Attachments Supporting Special Seismic Certification

☒ Test Report(s) ☒ Drawings ☐ Calculations ☒ Manufacturer's Catalog

☐ Other(s) (Please Specify):

OSHPD Approval (For Office Use Only) – Approval Expires on December 31, 2022

Signature: Date: 8/9/16

Print Name: M. R. Karim Title: SHFR

Special Seismic Certification Valid Up to : S_{DS} (g) = See Above z/h = 1.0

Condition of Approval (if applicable):

Special Seismic Certification
Certified Components

((●)) DCL Dynamic Certification Laboratories

Manufacturer: Post Glover Resistors, Inc.

Product Line: Neutral Grounding Resistors

Certified Product Construction: NEMA 3R enclosure; stainless steel or mill galvanized carbon steel

Certified Subcomponents: Insulators, junction box, current transformers and resistor banks

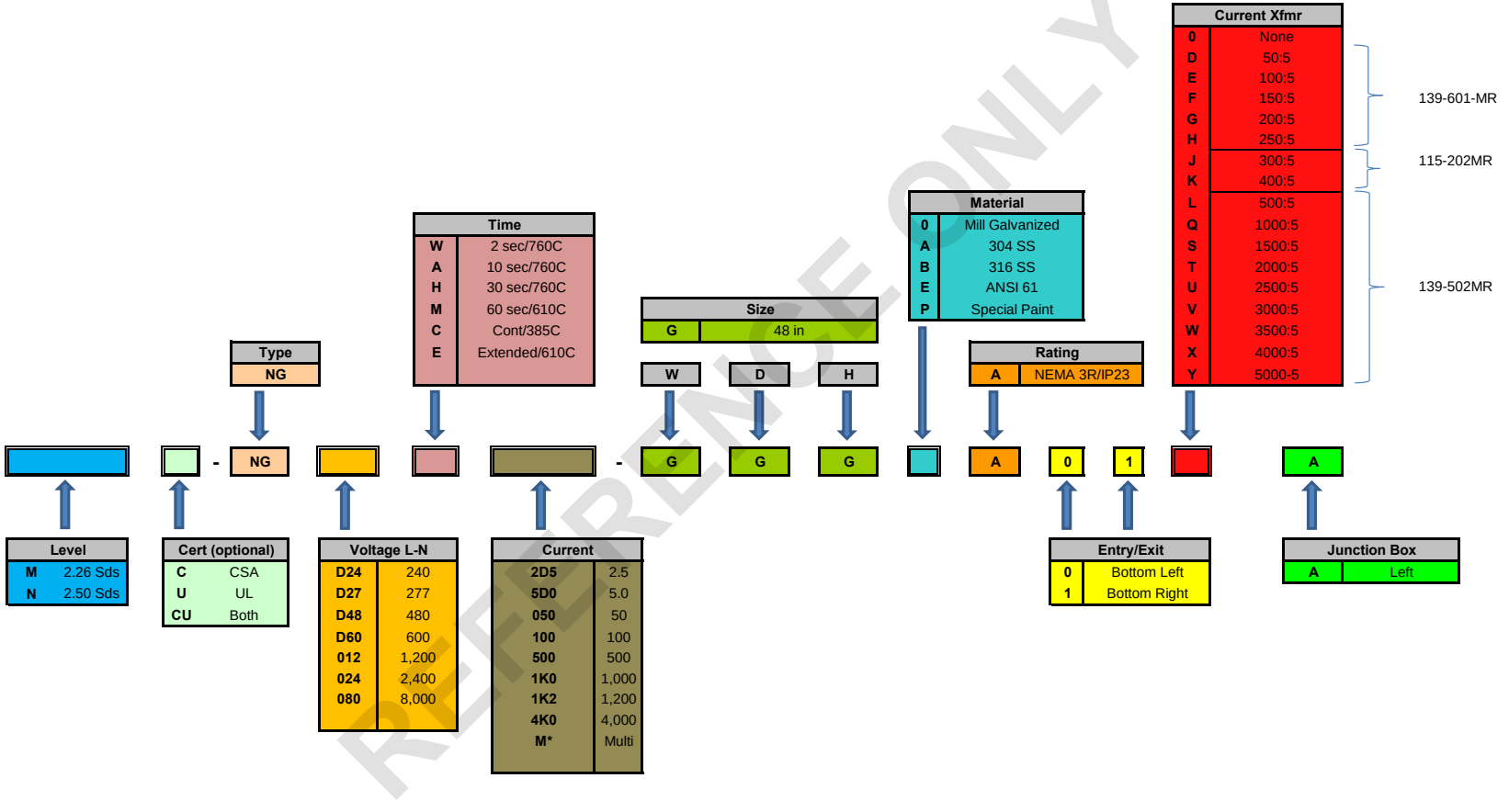
Mounting Description: Rigid base mounted

Model	Seismically Braced Enclosure	Voltage [1] (Model digit 6-8)	Time [1] (Model digit 9)	Current [1] (Model digit 10-12)	Current Transformer [1] (Model digit 20)	Dimensions (in)			Weight (lb)	Sds (g), z/h=1	Fp/Wp	Unit
						Length	Width	Height				
NU_-NGD27C030-GGG0A01JA	Yes	277	Cont/385C	30	300:5 to 400:5	48	48	48	720	2.5	1.8	UUT4A
NU_-NG049C1D3-GGG0A01DA		4,900	Cont/385C	1.3	50:5 to 250:5				750	2.5	1.8	UUT3A
NU_-NG013C019-GGGAA01LA		1,300	Cont/385C	19	500:5 to 5000:5				1,070	2.4	1.73	UUT2A
NCU-NGxxxxxxx-GGG0A01xA		Varies	Varies	Varies	50:5 to 5000:5				720 to 1,230			Interpolated
NCU-NGxxxxxxx-GGGAA01xA												Interpolated
NCU-NGxxxxxxx-GGGBA01xA												Interpolated
NCU-NGxxxxxxx-GGGEA01xA												Interpolated
NCU-NGxxxxxxx-GGGPA01xA												Interpolated
NU_-NGD10C360-GGGAA01LA		100	Cont/385C	360	50:5 to 250:5				1,230	2.5	1.8	UUT1A
MU_-NGD27C030-GGG0A01JA	No	277	Cont/385C	30	300:5 to 400:5	48	48	48	580	2.26	1.63	UUT4B
MU_-NG049C1D3-GGG0A01DA		4,900	Cont/385C	1.3	50:5 to 250:5				620			UUT3B
MU_-NG013C019-GGGAA01LA		1,300	Cont/385C	19	500:5 to 5000:5				920			UUT2B
MCU-NGxxxxxxx-GGG0A01xA		Varies	Varies	Varies	50:5 to 5000:5				580 to 1,060			Interpolated
MCU-NGxxxxxxx-GGGAA01xA												Interpolated
MCU-NGxxxxxxx-GGGBA01xA												Interpolated
MCU-NGxxxxxxx-GGGEA01xA												Interpolated
MCU-NGxxxxxxx-GGGPA01xA												Interpolated
MU_-NGD10C360-GGGAA01LA		100	Cont/385C	360	50:5 to 250:5				1,060			UUT1B

Note:

1. Voltage, Time, Current and Current Transformer Ratio are a function of the properties of the tested and certified subcomponents.

Seismic Neutral Grounding Resistor Part Number Configuration



Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Post Glover Resistors, Inc.

Product Line: Neutral Grounding Resistors

Certified Subcomponent: Enclosures

ENCLOSURES								
Model Number	Manufacturer	Seismically Braced Enclosure	Size	Material	Notes	Sds (g), z/h=1	Fp/Wp	Unit
NG444-S-2D50	Post Glover	Yes	48"x48"x48"	Mill Galvanized	NEMA 3R/IP23	2.5	1.8	UUT3A, UUT4A
NG444-S-2D50-304				304 Stainless Steel				interpolated
NG444-S-2D50-316				316 Stainless Steel				interpolated
NG444-S-2D50-PG				Galvanneal, Painted				interpolated
NG444-S-2D50-2				Mill Galvanized				interpolated
NG444-S-2D50-2-304				304 Stainless Steel				interpolated
NG444-S-2D50-2-316				316 Stainless Steel				interpolated
NG444-S-2D50-2-PG				Galvanneal, Painted				interpolated
NG444-S-2D50-3				Mill Galvanized				interpolated
NG444-S-2D50-3-304				304 Stainless Steel				interpolated
NG444-S-2D50-3-316				316 Stainless Steel				interpolated
NG444-S-2D50-3-PG				Galvanneal, Painted				interpolated
NG444-S-2D50-4				Mill Galvanized				interpolated
NG444-S-2D50-4-304				304 Stainless Steel				UUT1A
NG444-S-2D50-4-316				316 Stainless Steel				interpolated
NG444-S-2D50-4-PG				Galvanneal, Painted				interpolated
NG444-S-2D26	Post Glover	No	48"x48"x48"	Mill Galvanized	NEMA 3R/IP23	2.26	1.63	UUT3B, UUT4B
NG444-S-2D26-304				304 Stainless Steel				interpolated
NG444-S-2D26-316				316 Stainless Steel				interpolated
NG444-S-2D26-PG				Galvanneal, Painted				interpolated
NG444-S-2D26-2				Mill Galvanized				interpolated
NG444-S-2D26-2-304				304 Stainless Steel				interpolated
NG444-S-2D26-2-316				316 Stainless Steel				interpolated
NG444-S-2D26-2-PG				Galvanneal, Painted				interpolated
NG444-S-2D26-3				Mill Galvanized				interpolated
NG444-S-2D26-3-304				304 Stainless Steel				UUT1B, UUT2B
NG444-S-2D26-3-316				316 Stainless Steel				interpolated
NG444-S-2D26-3-PG				Galvanneal, Painted				interpolated

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Post Glover Resistors, Inc.

Product Line: Neutral Grounding Resistors

Certified Subcomponent: Insulators, junction box and current transformers

INSULATORS

Model Number	Manufacturer	Notes	Sds (g), z/h=1	Fp/Wp	Unit
KIT-I5-1-304	Meister Intl.	Stand off, 5kV, 60kV BIL	2.5	1.8	UUT1A, UUT1B, UUT2B
KIT-I15-1-304		Stand off, 15kV, 110 kV BIL			UUT1A, UUT1B, UUT2B, UUT3A, UUT3B, UUT4A, UUT4B

JUNCTION BOX

Model Number	Manufacturer	Notes	Sds (g), z/h=1	Fp/Wp	Unit
BN4060604CHSS-ALT1	Weigman	6x6x4, 304 SS, NEMA 4X, w/4 point shorting block	2.5	1.8	UUT1A, UUT1B, UUT2B, UUT3A, UUT3B, UUT4A, UUT4B

CURRENT TRANSFORMERS

Model Number	Manufacturer	Notes	Sds (g), z/h=1	Fp/Wp	Unit
139-601-MR	Spectrum Ind.	50:5 to 250:5 ratio	2.5	1.8	UUT1A, UUT3A
115-202-MR		300:5 to 400:5 ratio	2.5	1.8	UUT4A
139-502-MR		500:5 to 5000:5 ratio	2.4	1.73	UUT2A

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Post Glover Resistors, Inc.

Product Line: Neutral Grounding Resistors

Certified Subcomponent: Resistor Banks - Grid Element and Wirewound Element Type

RESISTOR BANKS, GRID ELEMENT TYPE

Model Number	Manufacturer	Material	Grid Width	Number of Stacks	Grid Shape	Grid Thickness (Gauge)	Sds (g), z/h=1	Fp/Wp	Unit
SG226-18SR-A1-S-SUB	Post Glover	Mill Galv.	A1	1	T	26 (thinnest)	2.5	1.8	UUT4A
SG226-18SR-A1-S-SUB		304 or 316 SS	A1	1 to 4	T	↓			Interpolated
SG311-A1-S-SUB to SG315-A1-S-SUB		Mill Galv., 304, or 316 SS	A1		H				
SG211-A1-S-SUB to SG224-A1-S-SUB			A1		T				
SG311-A2-S-SUB to SG315-A2-S-SUB			A2		H				
SG211-A2-S-SUB to SG224-A2-S-SUB			A2		T				
SG226-18SR-A2-S-SUB			A2		T				
SG311-A3-S-SUB to SG315-A3-S-SUB			A3		H				
SG211-A3-S-SUB to SG224-A3-S-SUB			A3		T				
SG226-18SR-A3-S-SUB			A3		T				
SG311-A3-S-SUB		304 SS	A3	4	H				UUT1A
SG313-A3-S-SUB			A3		H				UUT1A
SG211-A3-S-SUB			A3		T				UUT1A
SG213-A3-S-SUB			A3		T	11 (thickest)			UUT1A

RESISTOR BANKS, WIREWOUND ELEMENT TYPE

Model Number	Manufacturer	Material	Grid Width	Number of Stacks	Grid Shape	Wire Thickness (Gauge)	Sds (g), z/h=1	Fp/Wp	Unit
21FDL115500-A3-S-SUB	Post Glover	Mill Galv.	A3	1	n/a	24	2.5	1.8	UUT3A
01FDL115500-A3-S-SUB to 21FDL2400-A3-S-SUB		Mill Galv. 304, or 316 SS	A3	1 to 4	n/a	24-11	2.5	1.8	Interpolated
			A3						
21FDL2400-A3-S-SUB		304 SS	A3	4	n/a	11	2.4	1.73	UUT2A

Notes:

1. Ratings (voltage, time, current) determine element type (wirewound or grid), width of grid (A1,A2,A3), number of stacks (1-4), gauge of wire or grid plate (24-11Ga wire, 26-11Ga plate) and grid shape (H or T).

Special Seismic Certification
Tested Components

DCL Dynamic Certification Laboratories

Manufacturer: Post Glover Resistors, Inc.

Product Line: Neutral Grounding Resistors

Tested Product Construction: NEMA 3R enclosure, stainless steel or mill galvanized carbon steel

Tested Subcomponents: Insulators, junction box, current transformers and resistor banks

Mounting Description: Rigid base mounted

Model	Dimensions (in)			Weight (lb)	Lowest Natural Frequency (Hz)			Sds (g), z/h=1	Fp/Wp	Unit
	Length	Width	Height		F-B	S-S	V			
NU_-NGD10C360-GGGAA01LA	48	48	48	1230	19.7	18.6	25.6	2.5	1.8	UUT1A
MU_-NGD10C360-GGGAA01LA				1060	15.1	7.3	24.2	2.26	1.63	UUT1B
NU_-NG013C019-GGGAA01LA				1070	26.7	26.4	>33	2.4	1.73	UUT2A
MU_-NG013C019-GGGAA01LA				920	18.4	19.7	>33	2.26	1.63	UUT2B
NU_-NG049C1D3-GGG0A01DA				750	>33	>33	>33	2.5	1.8	UUT3A
MU_-NG049C1D3-GGG0A01DA				620	>33	>33	>33	2.26	1.63	UUT3B
NU_-NGD27C030-GGG0A01JA				720	>33	>33	>33	2.5	1.8	UUT4A
MU_-NGD27C030-GGG0A01JA				580	20.3	18	>33	2.26	1.63	UUT4B

UUT1A

Unit Under Test (UUT)
Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Post Glover Resistors

Product Line: Neutral Grounding Resistor

Model Number: NU_-NGD10C360-GGGAA01LA

Product Construction Summary:

NEMA 3R / IP23 enclosure, stainless steel (enclosure seismically braced)

Options / Component Summary:

Tested unit contained four A3 resistor grids (90A-185A), 5kV and 15kV insulators, standoff insulators, NEMA 4X junction box, and multi-ratio current transformer

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

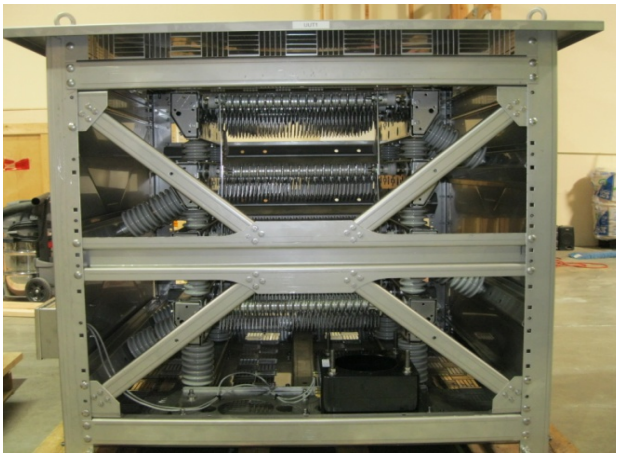
Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
1,230	48	48	48	19.7	18.6	25.6

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.67	0.67
		2.50	0.0	1.5	2.50	1.00	1.67	0.67

Unit Mounting Description:

UUT1A mounted to shake table and ready for test.



Side panel removed to photograph UUT1A interior.

The unit was rigidly mounted to the shake table using the factory-mounted brackets and forklift tubes. A total of twelve 1/2-inch A307 bolts were used, one on each corner, and two on either side of the two forklift tubes.

UUT1B

Unit Under Test (UUT)
Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Post Glover Resistors

Product Line: Neutral Grounding Resistor

Model Number: MU_-NGD10C360-GGGAA01LA

Product Construction Summary:

NEMA 3R / IP23 enclosure, stainless steel (enclosure not seismically braced)

Options / Component Summary:

Tested unit contained four A3 resistor grids (90A-185A), 5kV and 15kV insulators, standoff insulators, NEMA 4X junction box, and multi-ratio current transformer

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained.

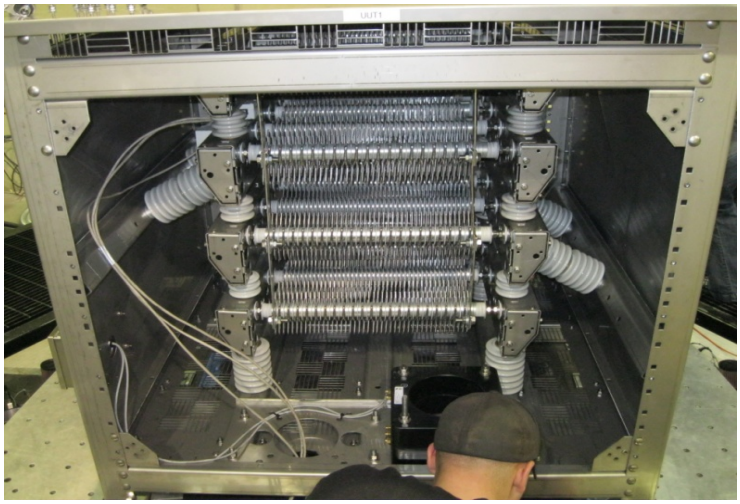
UUT Properties

Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
1,060	48	48	48	15.1	7.3	24.2

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.60
		2.26	0.0	1.5	2.26	0.90	1.51	0.60

Unit Mounting Description:



Side panel removed to photograph interior. Notice seismic bracing has been removed and number of insulators have been reduced.

The unit was rigidly mounted to the shake table using the factory-mounted brackets. A total of four 1/2-inch A307 bolts were used, one on each corner.

UUT2A

Unit Under Test (UUT)
Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Post Glover Resistors

Product Line: Neutral Grounding Resistor

Model Number: NU_-NG013C019-GGGAA01LA

Product Construction Summary:

NEMA 3R / IP23 enclosure, stainless steel (enclosure seismically braced)

Options / Component Summary:

Tested unit contained four wirewound A3 11A resistor grids, 5kV and 15kV insulators, standoff insulators, NEMA 4X junction box, and multi-ratio current transformer

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained.

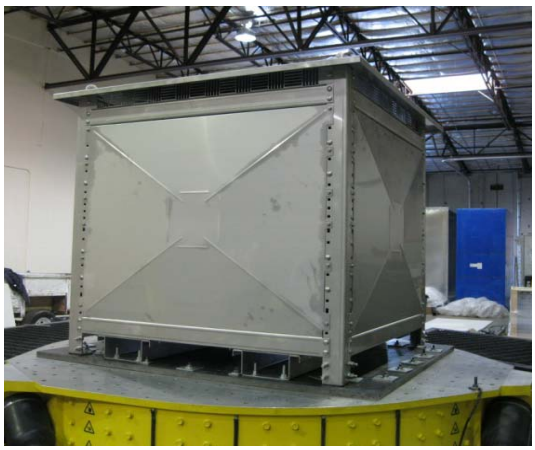
UUT Properties

Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
1,070	48	48	48	26.7	26.4	>33

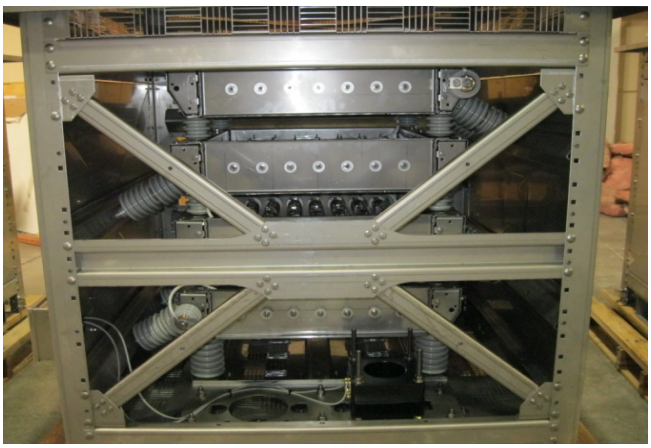
Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.40	1.0	1.5	3.84	2.88	1.67	0.67
		2.50	0.0	1.5	2.50	1.00	1.67	0.67

Unit Mounting Description:



UUT2A mounted to shake table and ready for test.



Side panel removed to photograph UUT2A interior.

The unit was rigidly mounted to the shake table using the factory-mounted brackets and forklift tubes. A total of twelve 1/2-inch A307 bolts were used, one on each corner, and two on either side of the two forklift tubes.

UUT2B

Unit Under Test (UUT)
Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Post Glover Resistors

Product Line: Neutral Grounding Resistor

Model Number: MU_-NG013C019-GGGAA01LA

Product Construction Summary:

NEMA 3R / IP23 enclosure, stainless steel (enclosure not seismically braced)

Options / Component Summary:

Tested unit contained four wirewound A3 11A resistor grids, 5kV and 15kV insulators, standoff insulators, NEMA 4X junction box, and multi-ratio current transformer

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
920	48	48	48	18.4	19.7	>33

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.60
		2.26	0.0	1.5	2.26	0.90	1.51	0.60

Unit Mounting Description:

Side panels removed to photograph interior. Notice seismic bracing has been removed and number of insulators have been reduced.

Unit mounted on shake table and ready for test (side panel removed for photograph).

The unit was rigidly mounted to the shake table using the factory-mounted brackets. A total of four 1/2-inch A307 bolts were used, one on each corner.

UUT3A

Unit Under Test (UUT)
Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Post Glover Resistors

Product Line: Neutral Grounding Resistor

Model Number: NU_-NG049C1D3-GGG0A01DA

Product Construction Summary:

NEMA 3R / IP23 enclosure, mill galvanized (enclosure seismically braced)

Options / Component Summary:

Tested unit contained one wirewound A3 11A resistor grid, 5kV and 15kV insulators, standoff insulators, NEMA 4X junction box, and multi-ratio current transformer

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained.

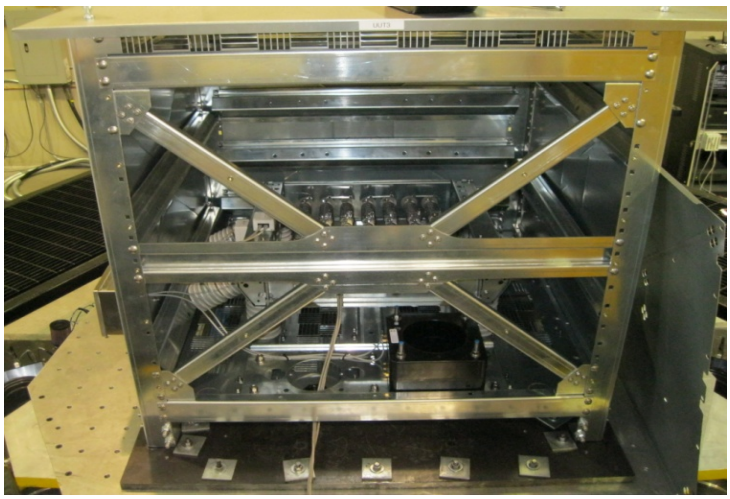
UUT Properties

Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
750	48	48	48	>33	>33	>33

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.67	0.67
		2.50	0.0	1.5	2.50	1.00	1.67	0.67

Unit Mounting Description:



UUT3A mounted to shake table and ready for test. Side panel removed for viewing of interior.

The unit was rigidly mounted to the shake table using the factory-mounted brackets and forklift tubes. A total of twelve 1/2-inch A307 bolts were used, one on each corner, and two on either side of the two forklift tubes.

UUT3B

Unit Under Test (UUT)
Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Post Glover Resistors

Product Line: Neutral Grounding Resistor

Model Number: MU_-NG049C1D3-GGG0A01DA

Product Construction Summary:

NEMA 3R / IP23 enclosure, mill galvanized (enclosure not seismically braced)

Options / Component Summary:

Tested unit contained one wirewound A3 1.6A resistor grid, 5kV and 15kV insulators, standoff insulators, NEMA 4X junction box, and multi-ratio current transformer

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained.

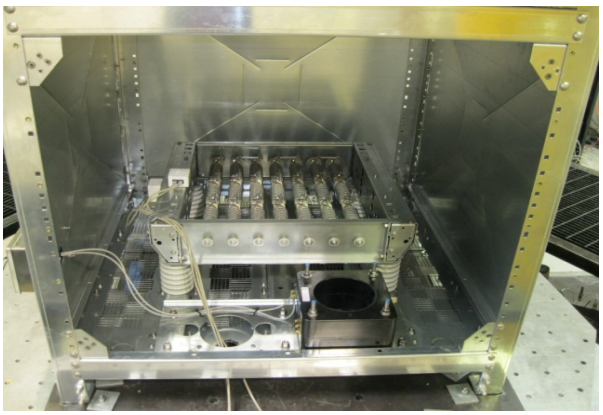
UUT Properties

Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
620	48	48	48	>33	>33	>33

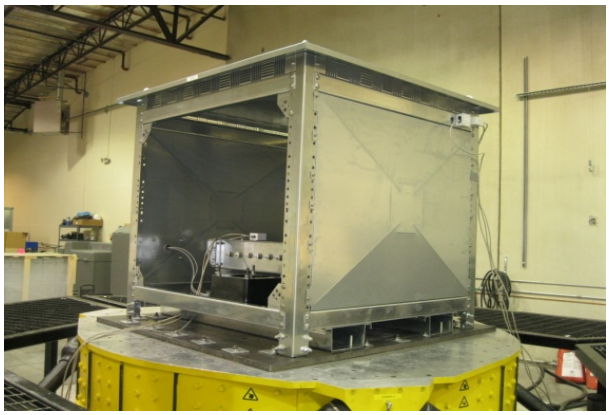
Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.60
		2.26	0.0	1.5	2.26	0.90	1.51	0.60

Unit Mounting Description:



Side panel removed to photograph interior. Notice seismic bracing has been removed and number of insulators have been reduced.



Unit mounted on shake table and ready for test (side panel removed for photograph).

The unit was rigidly mounted to the shake table using the factory-mounted brackets. A total of four 1/2-inch A307 bolts were used, one on each corner.

UUT4A

Unit Under Test (UUT)
Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Post Glover Resistors

Product Line: Neutral Grounding Resistor

Model Number: NU_-NGD27C030-GGG0A01JA

Product Construction Summary:

NEMA 3R / IP23 enclosure, mill galvanized (enclosure seismically braced)

Options / Component Summary:

Tested unit contained one A1 30A resistor grid, 15kV insulators, standoff insulators, NEMA 4X junction box, and multi-ratio current transformer

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained.

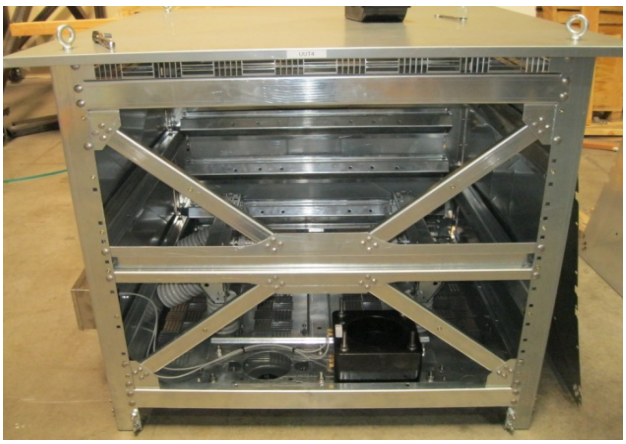
UUT Properties

Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
720	48	48	48	>33	>33	>33

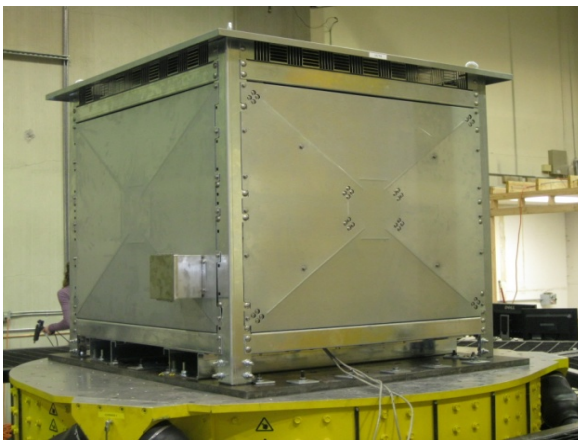
Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.67	0.67
		2.50	0.0	1.5	2.50	1.00	1.67	0.67

Unit Mounting Description:



UUT4A with side panel removed for viewing of internal components.



UUT4A mounted to shake table and ready for test.

The unit was rigidly mounted to the shake table using the factory-mounted brackets and forklift tubes. A total of twelve 1/2-inch A307 bolts were used, one on each corner, and two on either side of the two forklift tubes.

UUT4B

Unit Under Test (UUT) Summary Sheet

Manufacturer: Post Glover Resistors

Product Line: Neutral Grounding Resistor

Model Number: MU_-NGD27C030-GGG0A01JA

Product Construction Summary:

NEMA 3R / IP23 enclosure, mill galvanized (enclosure not seismically braced)

Options / Component Summary:

Tested unit contained one A1 30A resistor grid, 15kV insulators, standoff insulators, NEMA 4X junction box, and multi-ratio current transformer

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

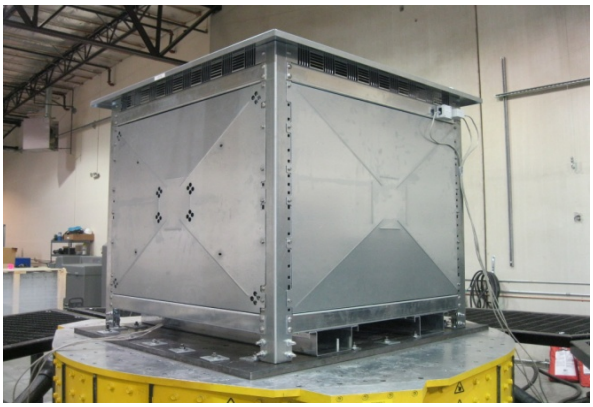
Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
620	48	48	48	>33	>33	>33

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.60
		2.26	0.0	1.5	2.26	0.90	1.51	0.60

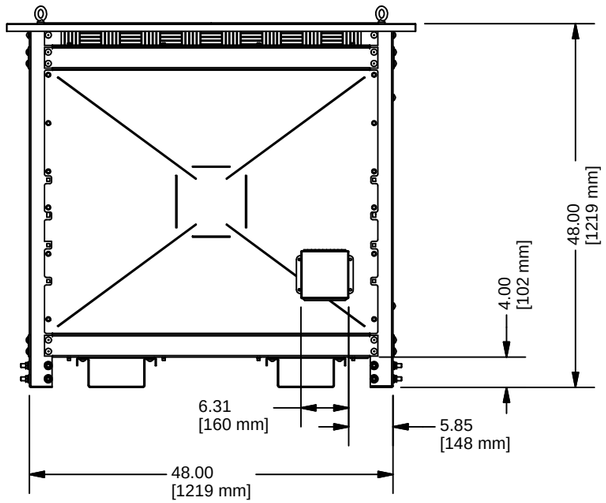
Unit Mounting Description:

Side panel removed to photograph interior. Notice seismic bracing has been removed and number of insulators have been reduced.

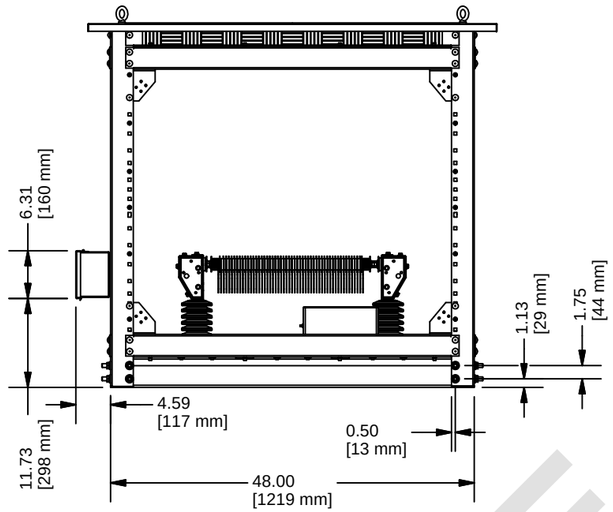


Unit mounted on shake table and ready for test.

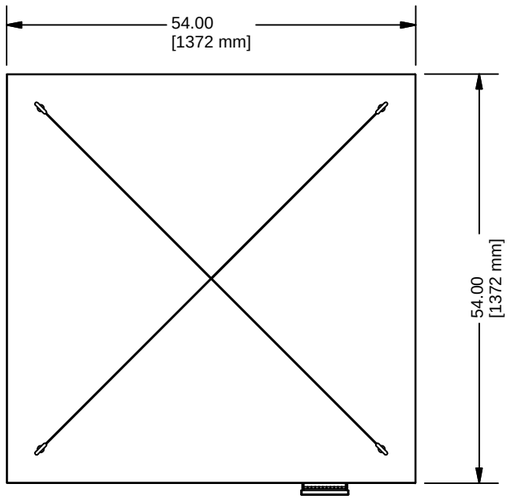
The unit was rigidly mounted to the shake table using the factory-mounted brackets. A total of four 1/2-inch A307 bolts were used, one on each corner.



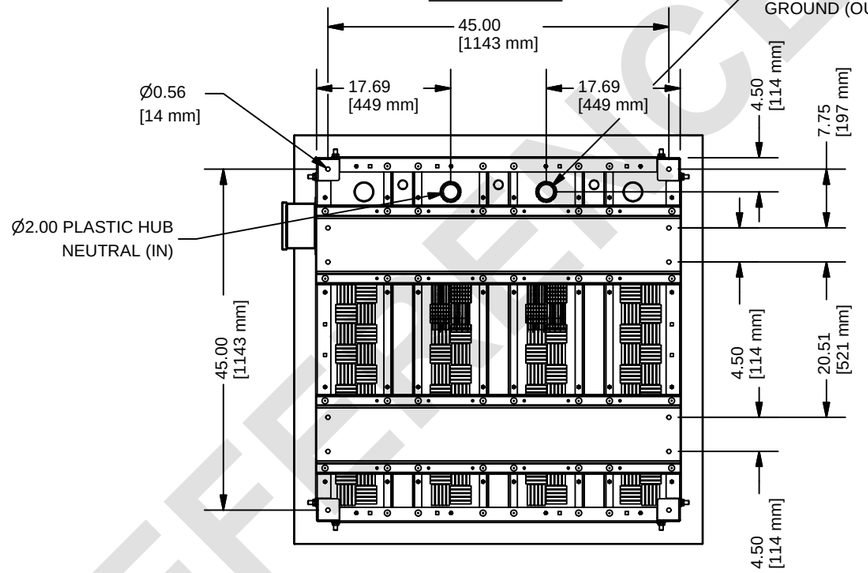
LEFT SIDE VIEW



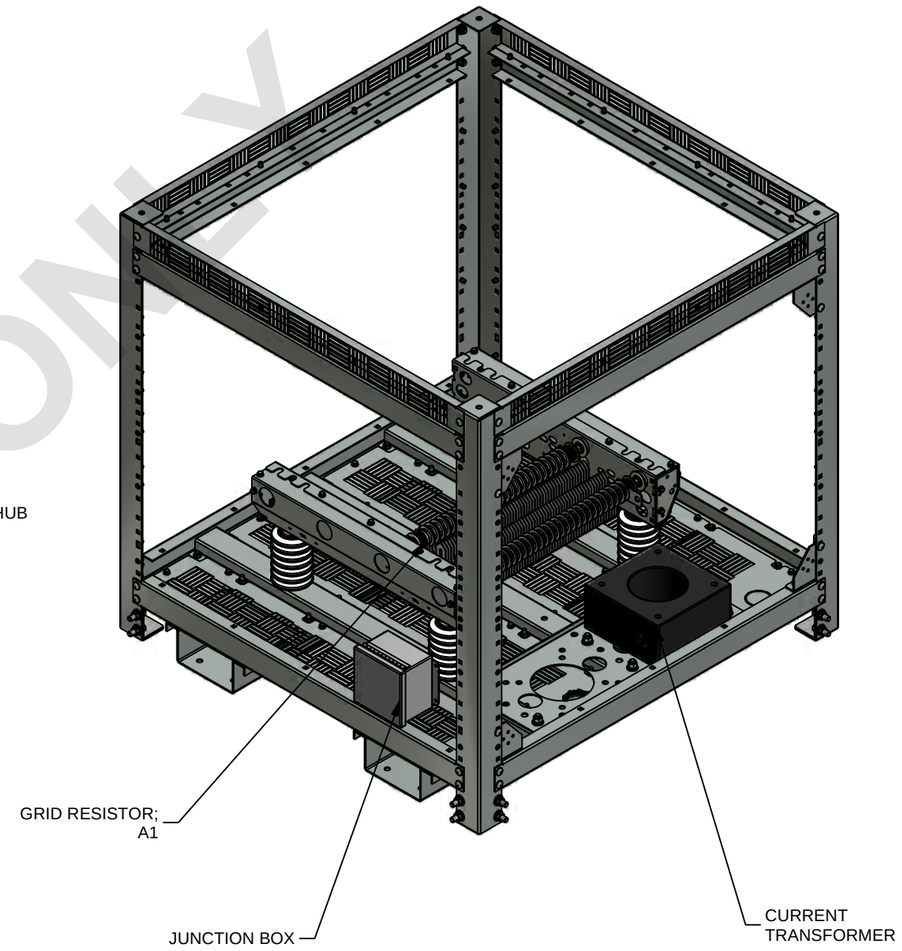
FRONT VIEW



TOP VIEW



BOTTOM VIEW



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Fax: 859.283.2978
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TITLE/DESCRIPTION:
assembly, siesmic NGR, (1) A1, SDS = 2.26

DATE: 2/15/2011
SHEET: 1 OF 1
DRAWN: MAB
APPROVED: FLS
DRAWING NUMBER: NG444-S-2D26-JBL-A11
REVISION: 00

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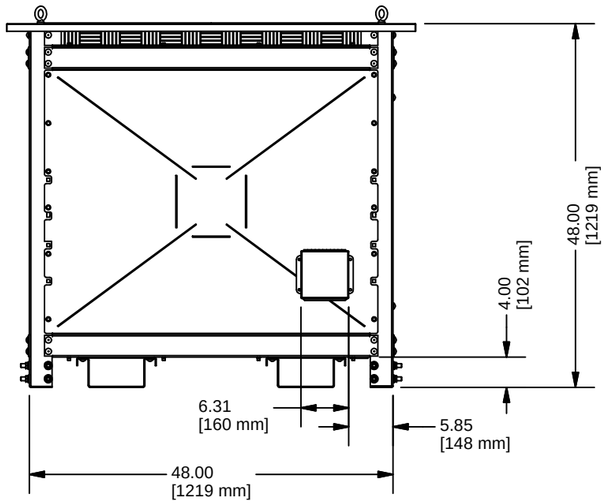
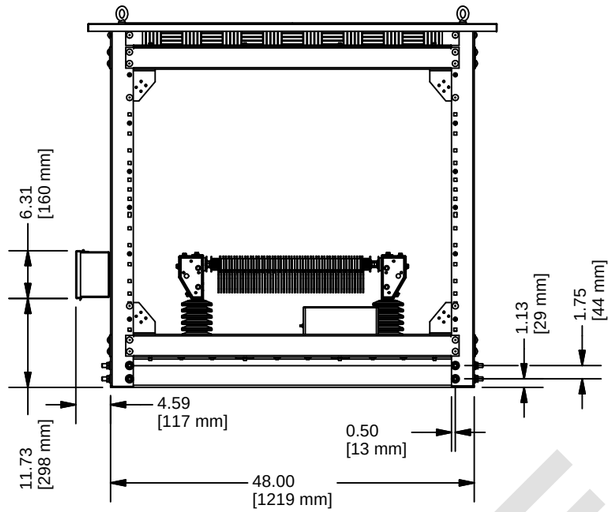
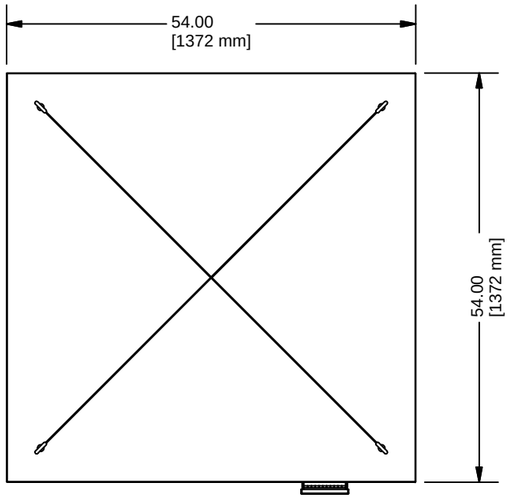


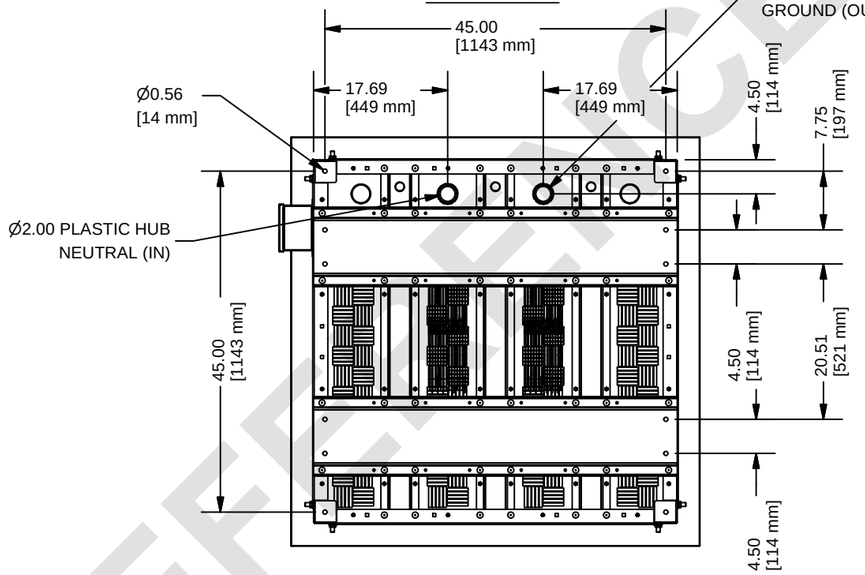
LEFT SIDE VIEW



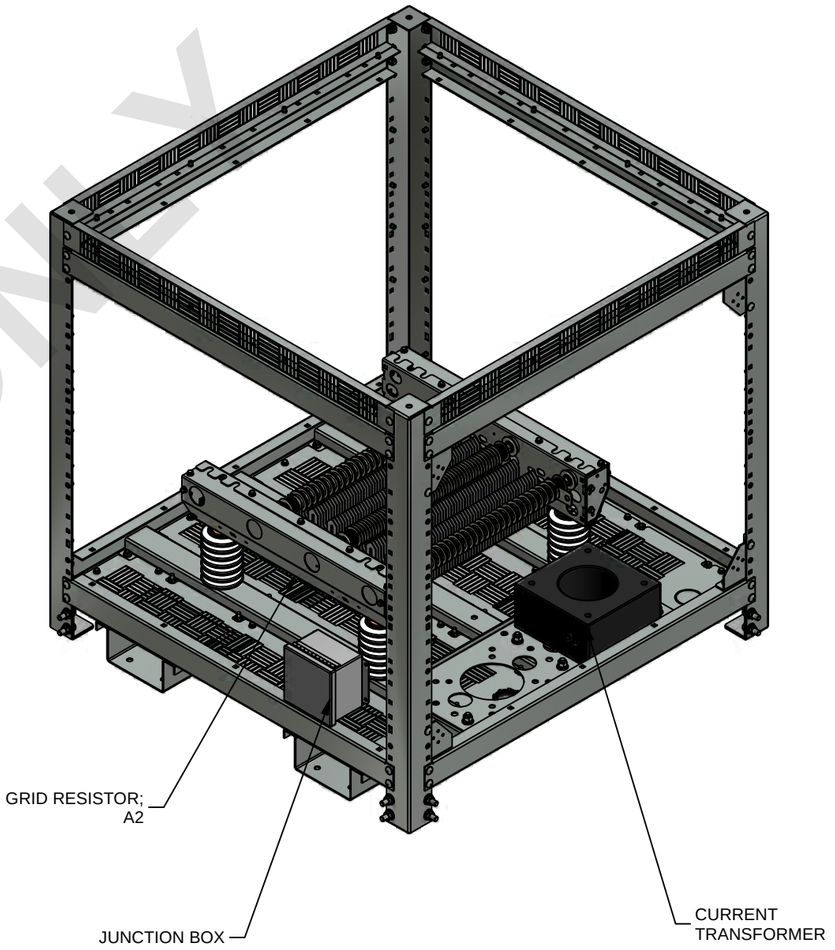
FRONT VIEW



TOP VIEW



BOTTOM VIEW



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		DATE: 2/15/2011	DRAWN: MAB / APPROVED: FLS
		SHEET: 1 OF 1	
		DRAWING NUMBER: NG444-S-2D26-JBL-A21	REVISION: 00

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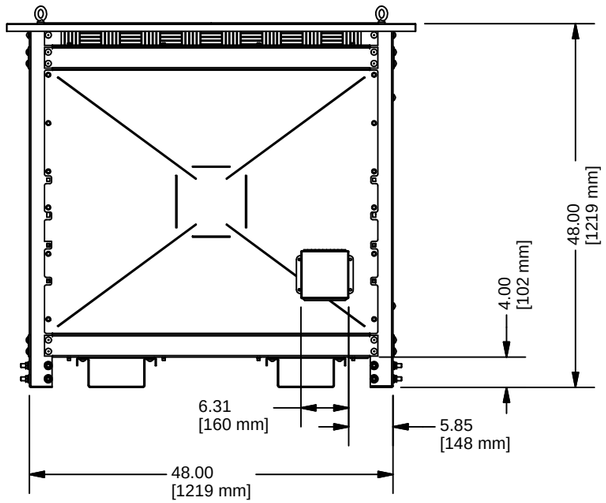
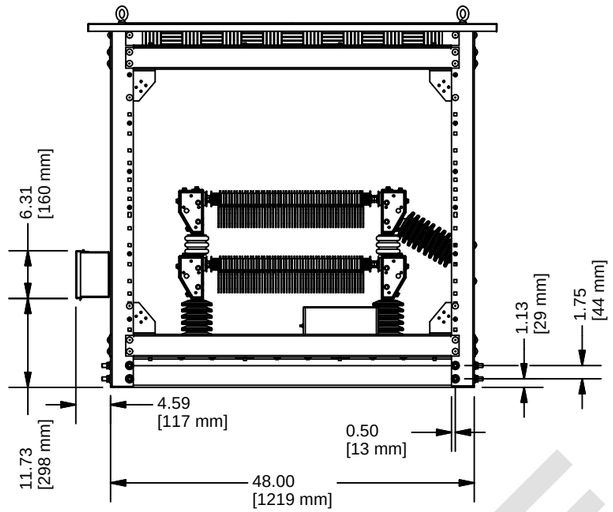


LEFT SIDE VIEW



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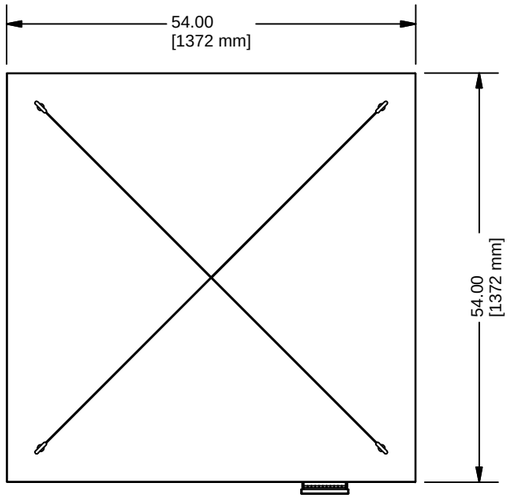
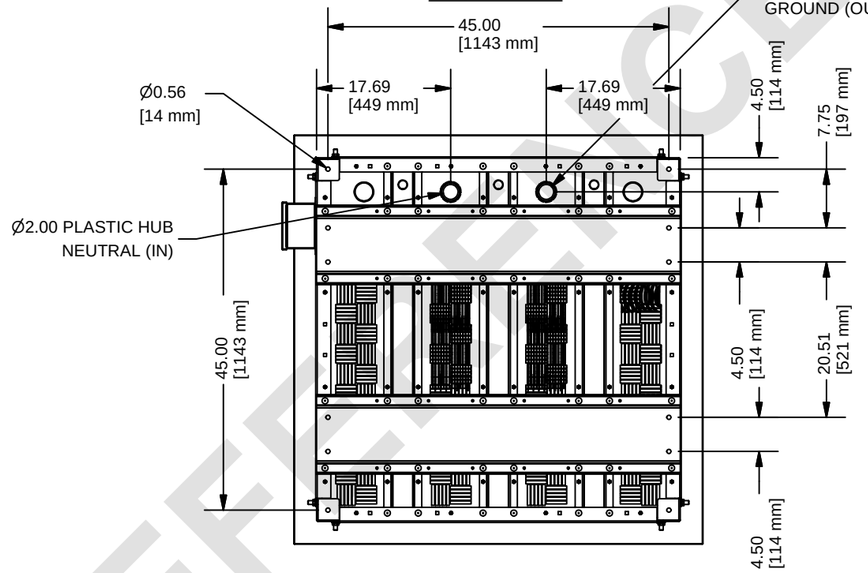
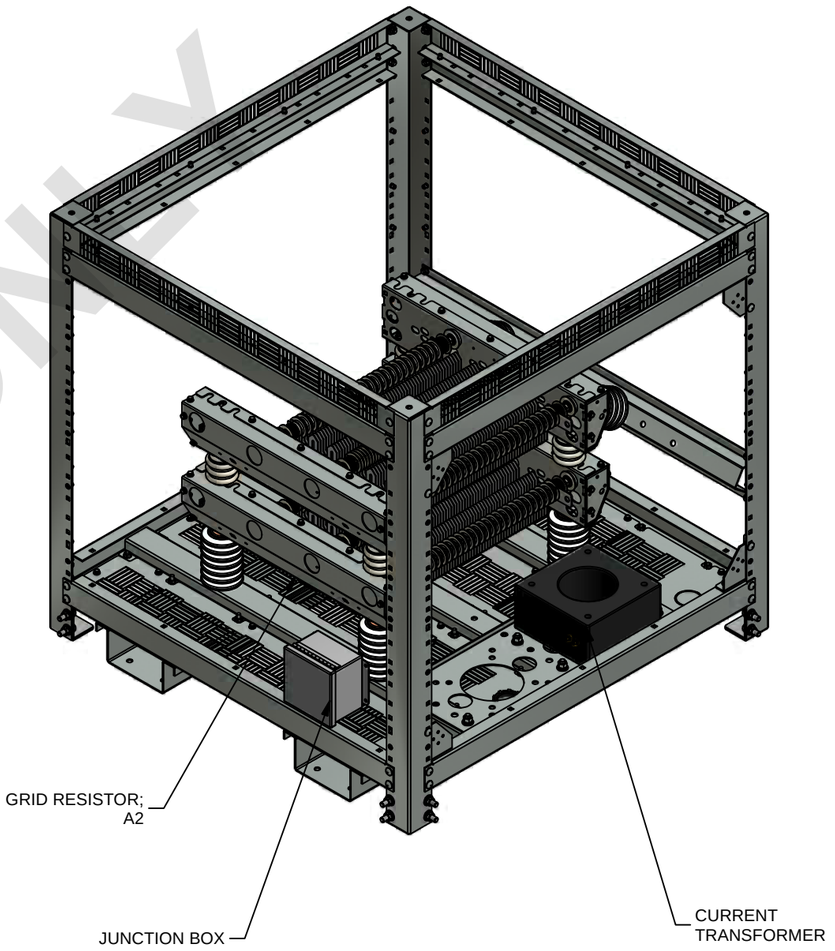


TOP VIEW



BOTTOM VIEW



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TITLE/DESCRIPTION:
assembly, siesmic NGR, (2) A2, SDS = 2.26

DATE: 2/15/2011
SHEET: 1 OF 1

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MAB	FLS

DRAWING NUMBER: NG444-S-2D26-JBL-A22
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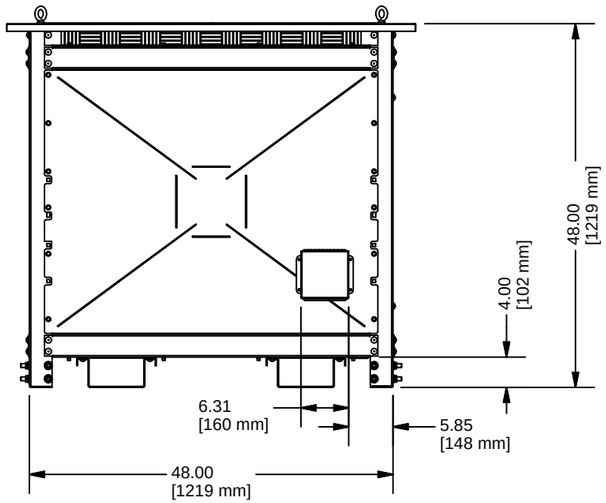
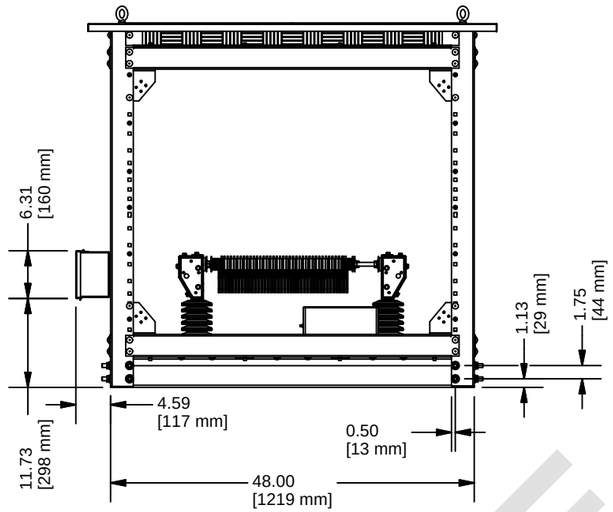


LEFT SIDE VIEW



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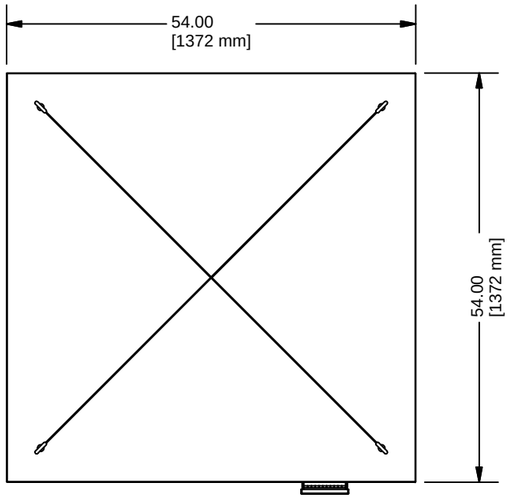
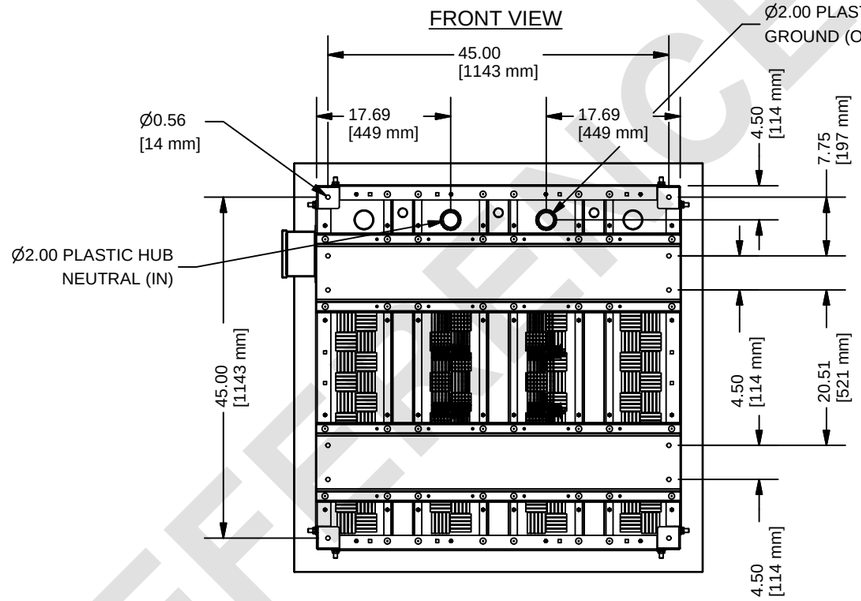
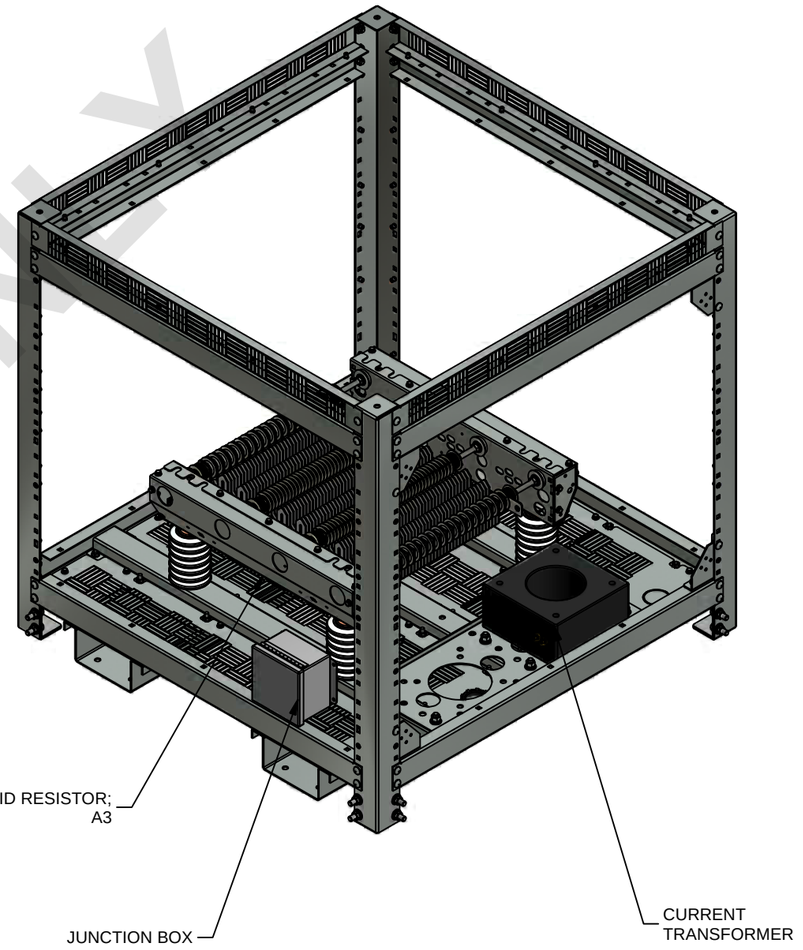


TOP VIEW



BOTTOM VIEW



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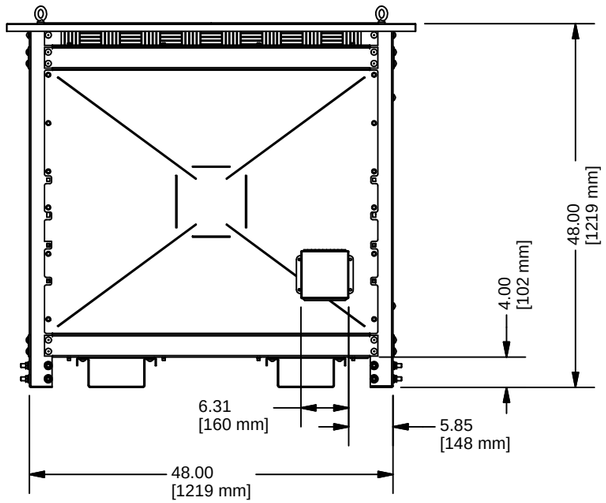
TITLE/DESCRIPTION:
assembly, siesmic NGR, (1) A3, SDS = 2.26

DATE: 2/15/2011	DRAWN	APPROVED
SHEET: 1 OF 1	MAB	FLS

DRAWING NUMBER	REVISION
NG444-S-2D26-JBL-A31	00



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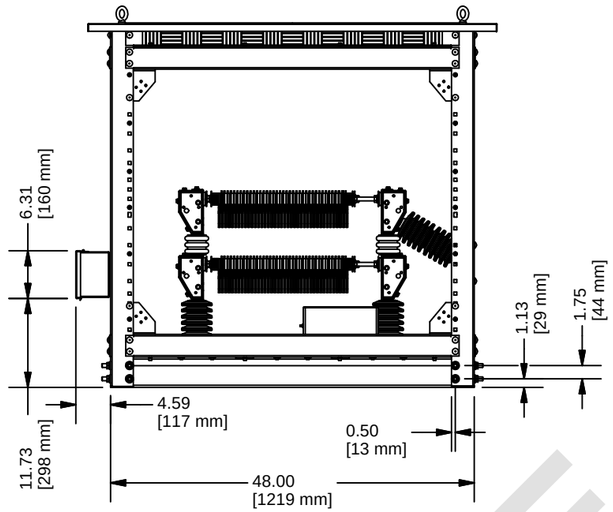

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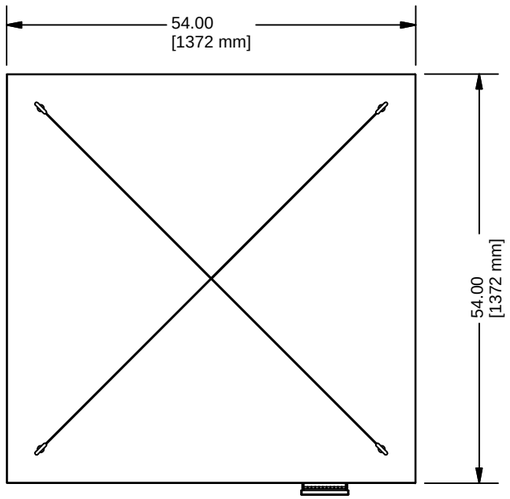

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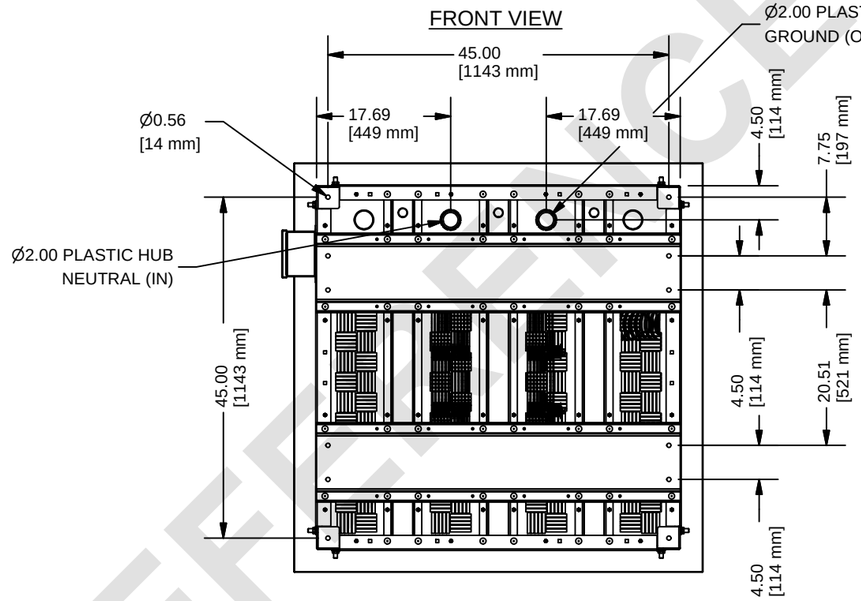
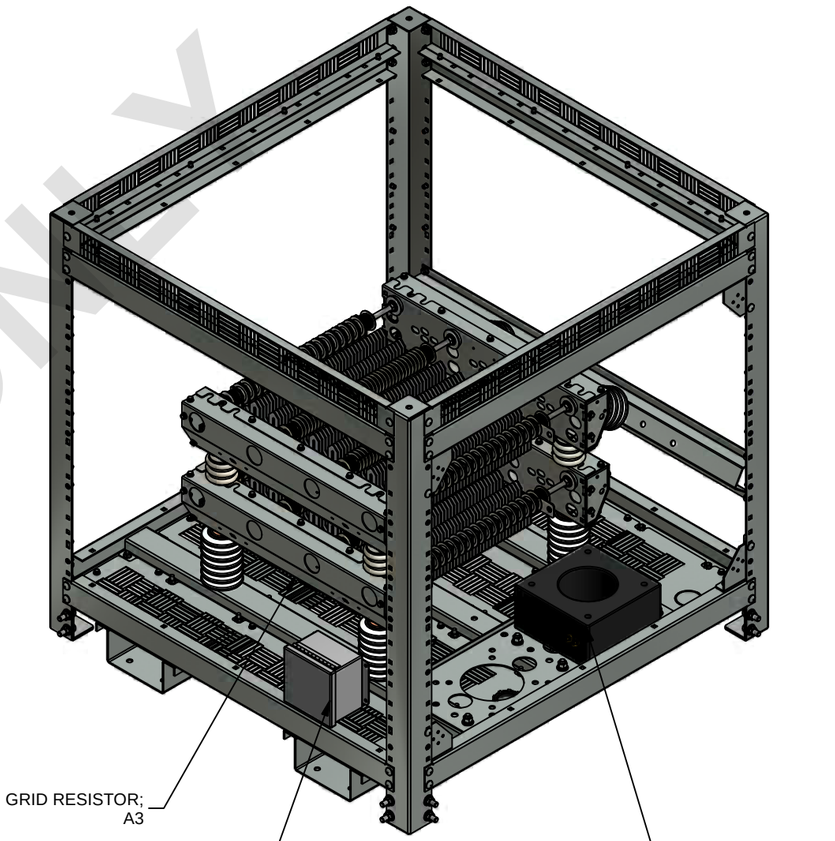


BOTTOM VIEW



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		DATE: 2/15/2011	DRAWN: MAB / APPROVED: FLS
		SHEET: 1 OF 1	
		DRAWING NUMBER: NG444-S-2D26-JBL-A32	REVISION: 00

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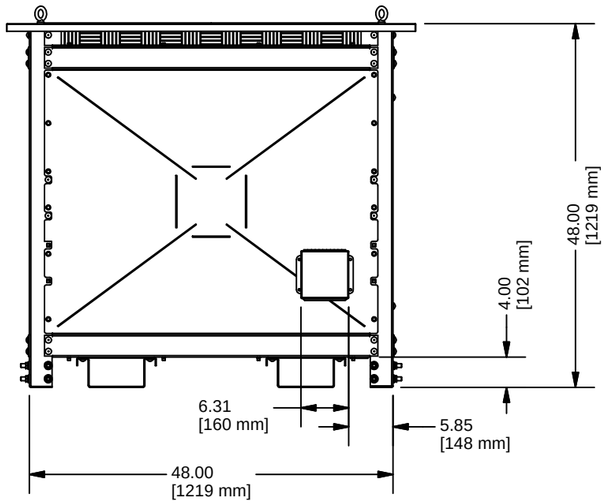
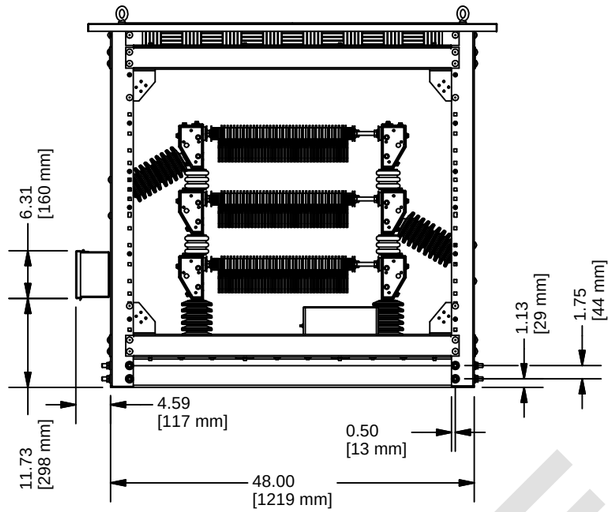
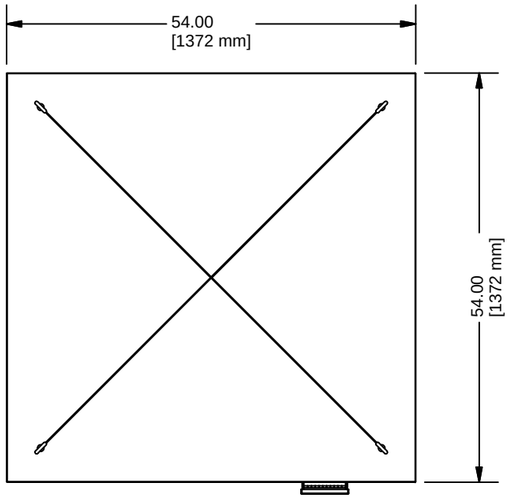


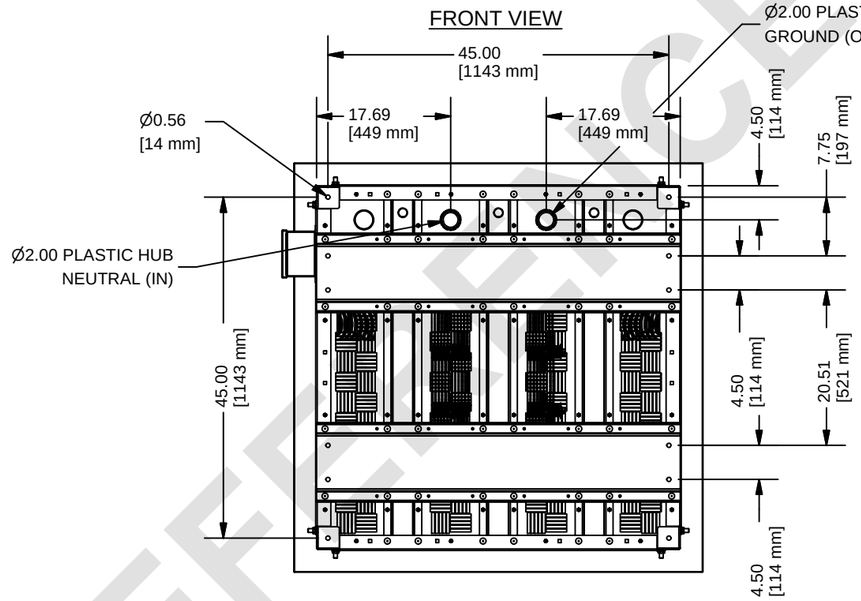
LEFT SIDE VIEW



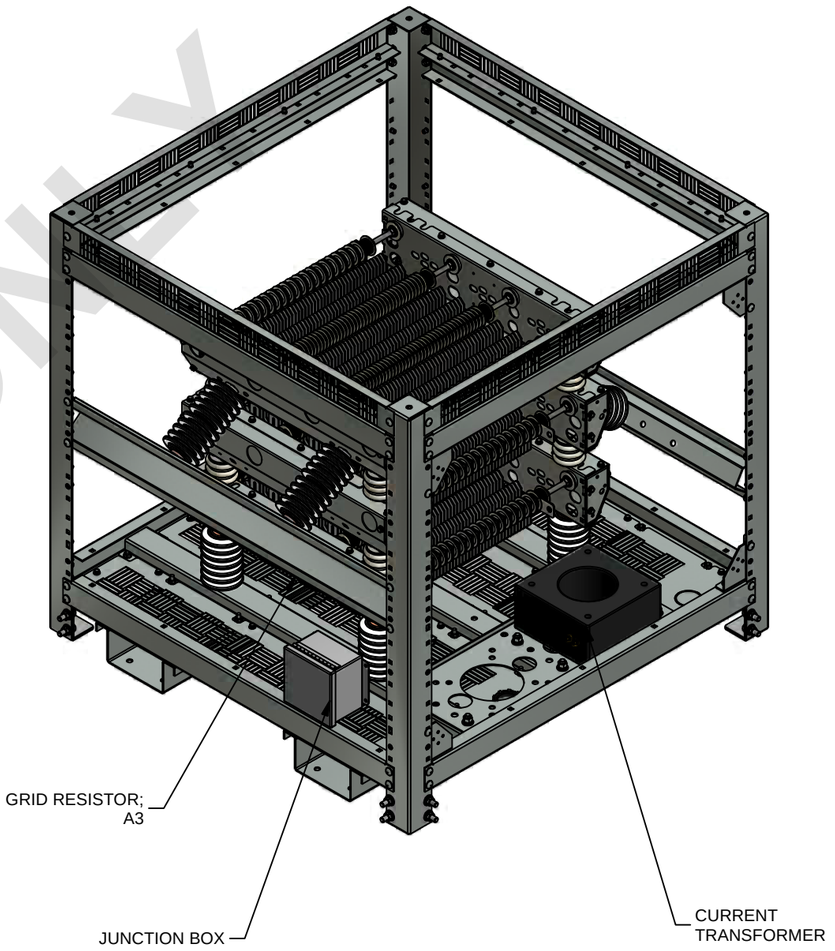
FRONT VIEW



TOP VIEW



BOTTOM VIEW



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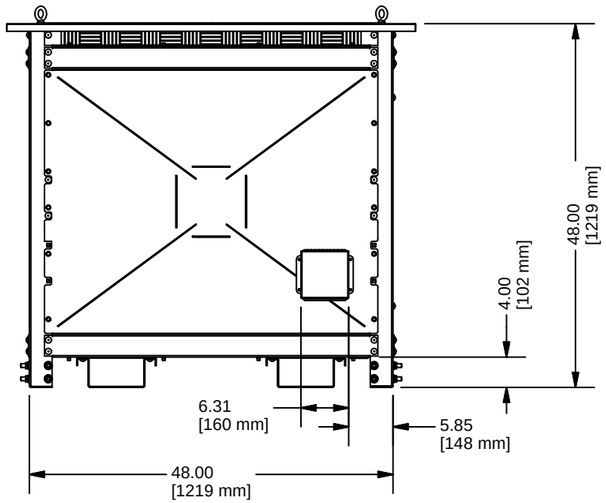
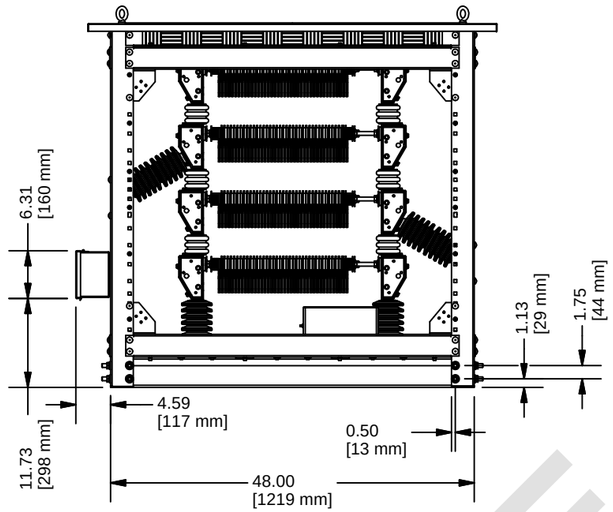
TITLE/DESCRIPTION:
assembly, siesmic NGR, (3) A3, SDS = 2.26

DATE: 2/15/2011
SHEET: 1 OF 1
DRAWN: MAB
APPROVED: FLS
DRAWING NUMBER: NG444-S-2D26-JBL-A33
REVISION: 00



LEFT SIDE VIEW



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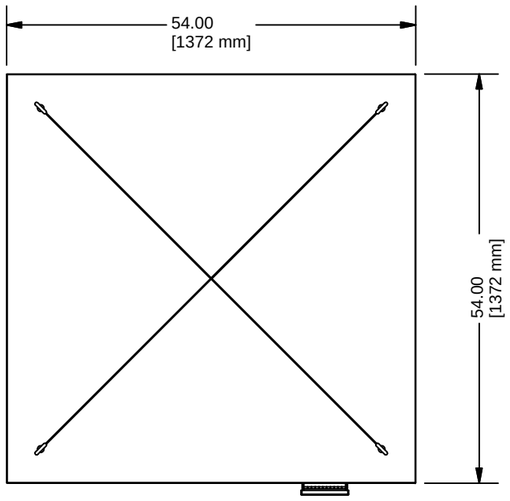
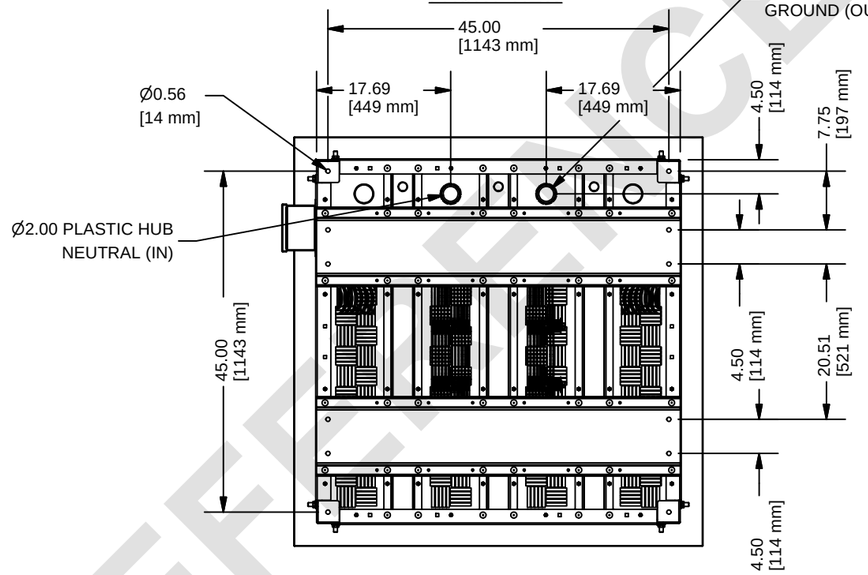
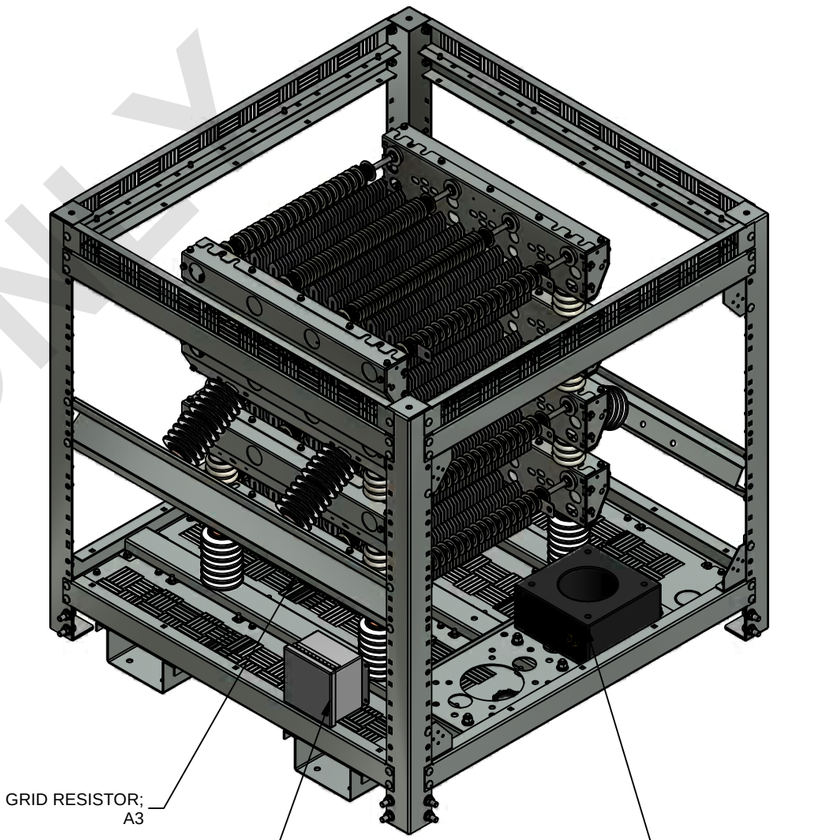


TOP VIEW



BOTTOM VIEW



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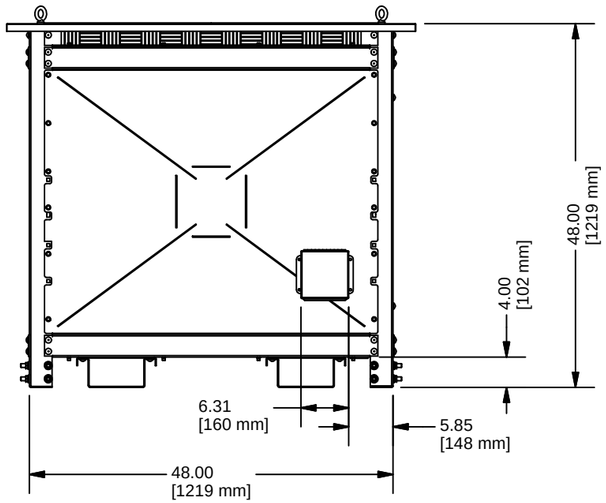
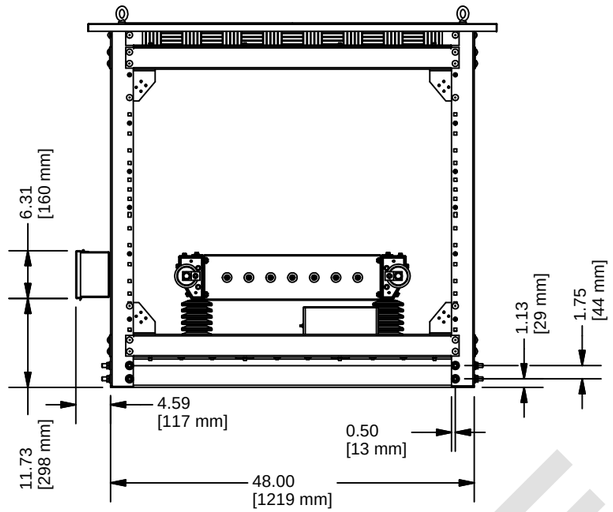
TITLE/DESCRIPTION:
assembly, siesmic NGR, (4) A3, SDS = 2.26

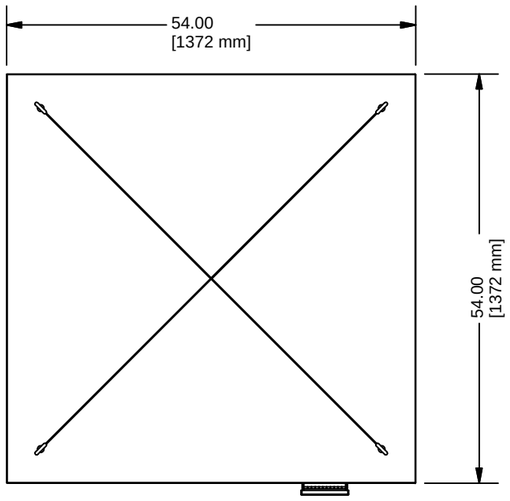
DATE: 2/15/2011
SHEET: 1 OF 1
DRAWN: MAB
APPROVED: FLS
DRAWING NUMBER: NG444-S-2D26-JBL-A34
REVISION: 00



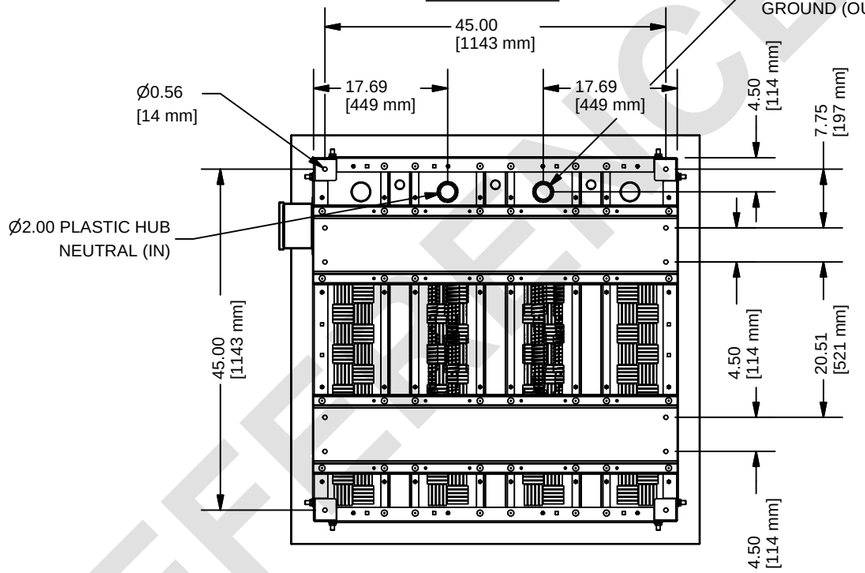
LEFT SIDE VIEW



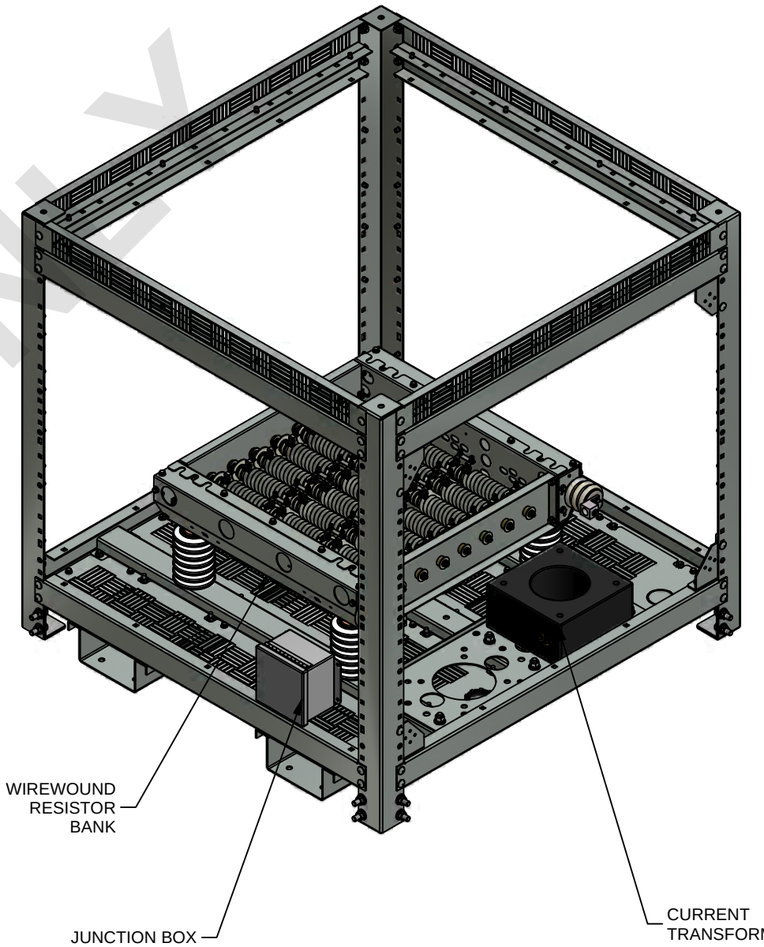
FRONT VIEW



TOP VIEW



BOTTOM VIEW



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TITLE/DESCRIPTION:
assembly, siesmic NGR, (1) FDL-A3, SDS = 2.26

DATE: 2/15/2011
SHEET: 1 OF 1
DRAWN: MAB
APPROVED: FLS
DRAWING NUMBER: NG444-S-2D26-JBL-FDL1
REVISION: 00

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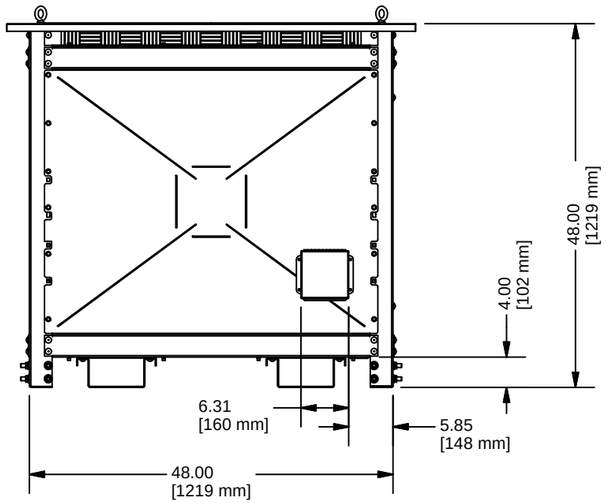
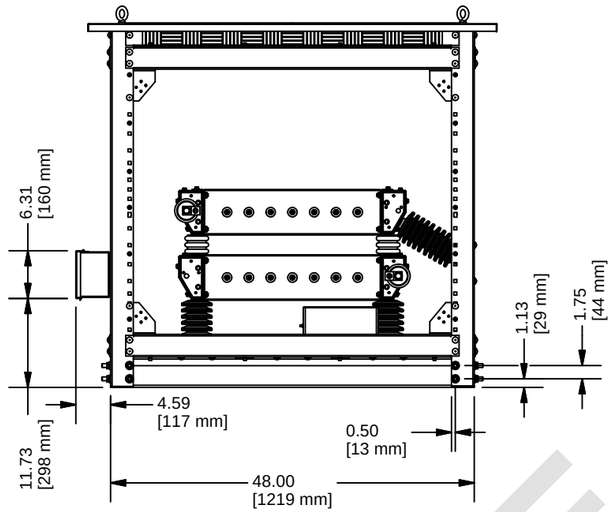
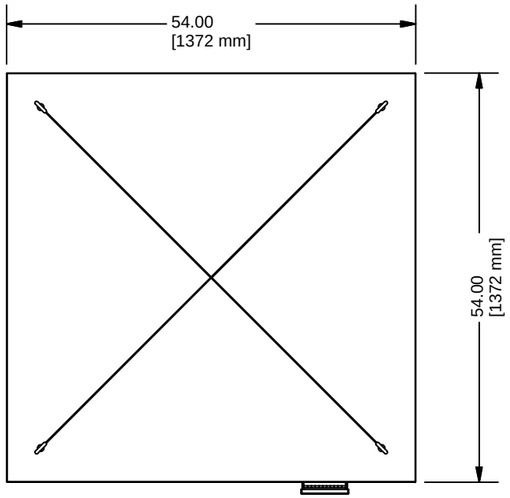


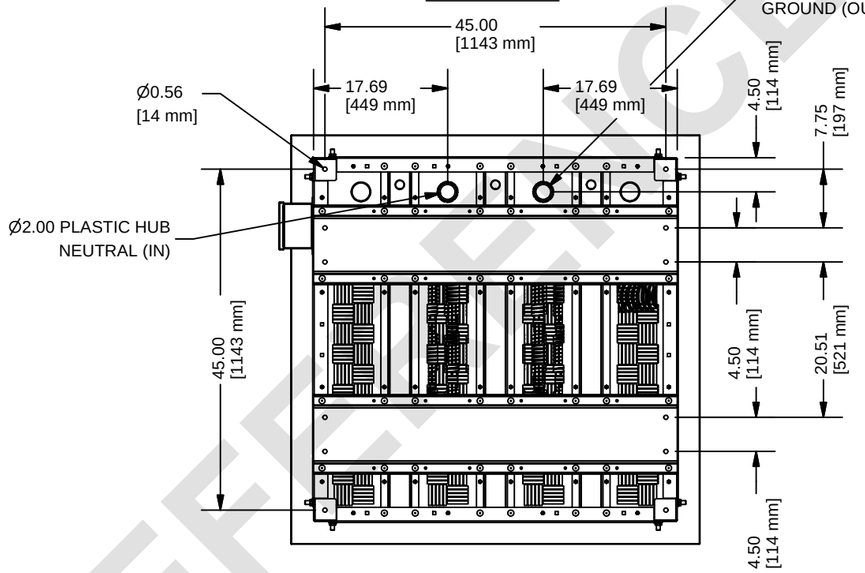
LEFT SIDE VIEW



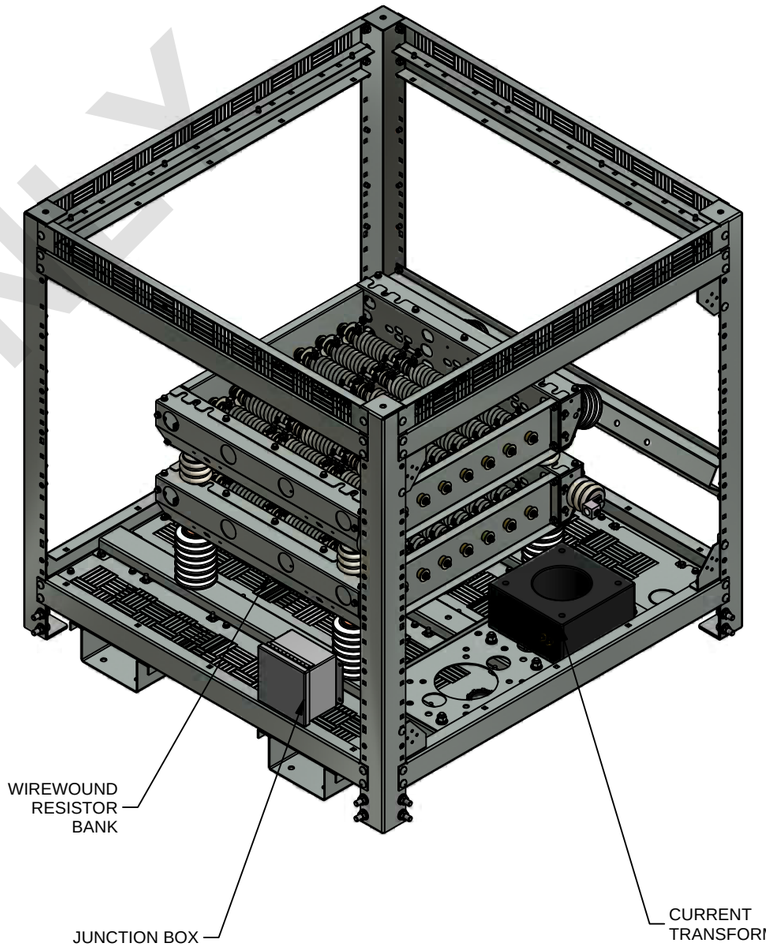
FRONT VIEW



TOP VIEW



BOTTOM VIEW



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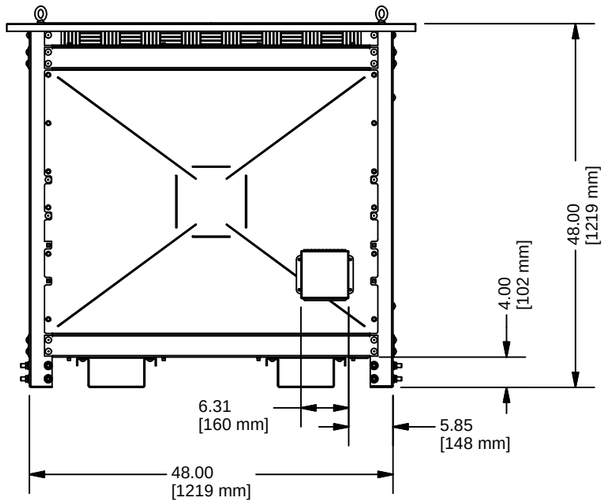
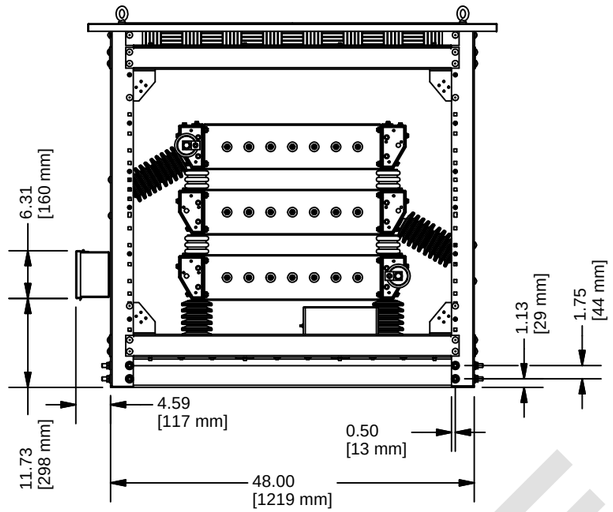
TITLE/DESCRIPTION:
assembly, siesmic NGR, (2) FDL-A3, SDS = 2.26

DATE: 2/15/2011	DRAWN	APPROVED
SHEET: 1 OF 1	MAB	FLS

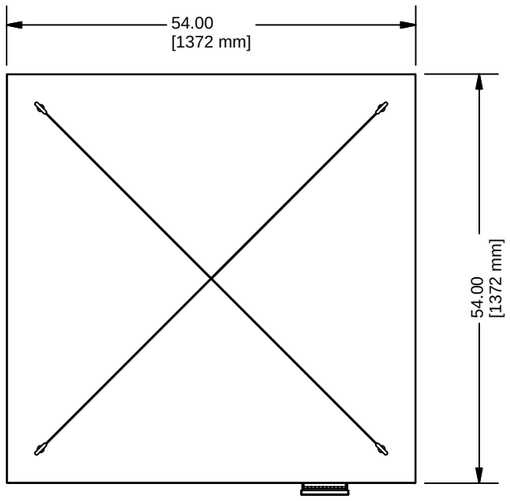
DRAWING NUMBER	REVISION
NG444-S-2D26-JBL-FDL2	00



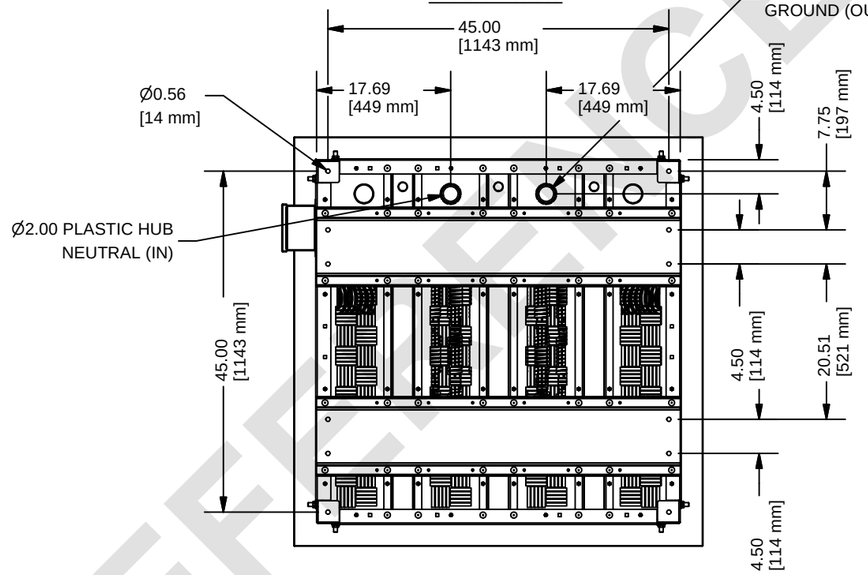
LEFT SIDE VIEW



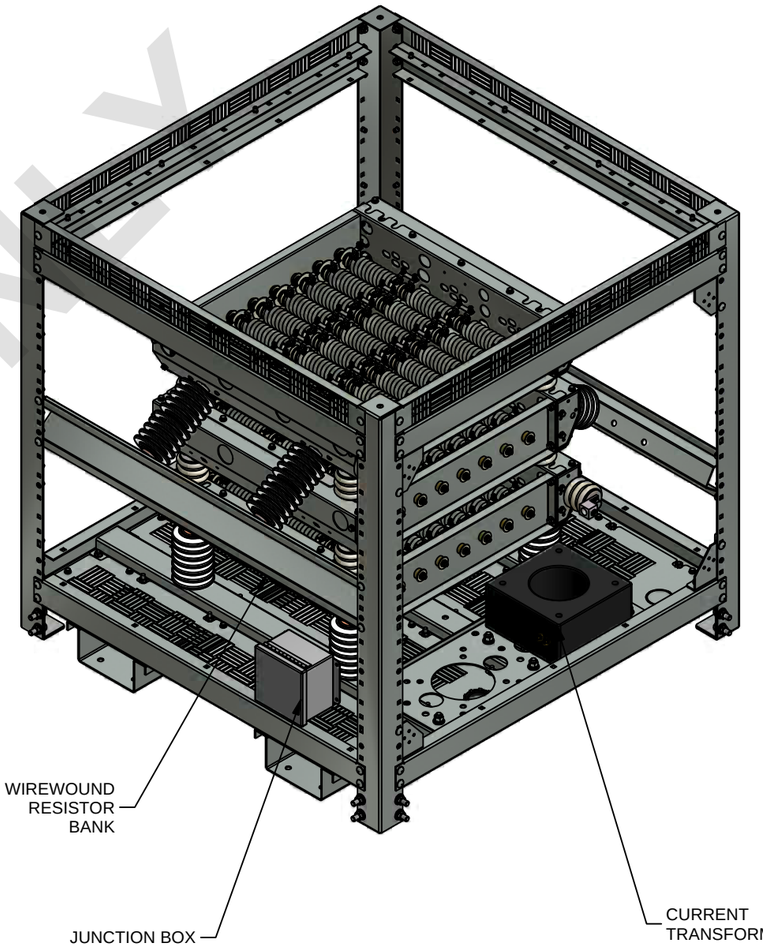
FRONT VIEW



TOP VIEW



BOTTOM VIEW



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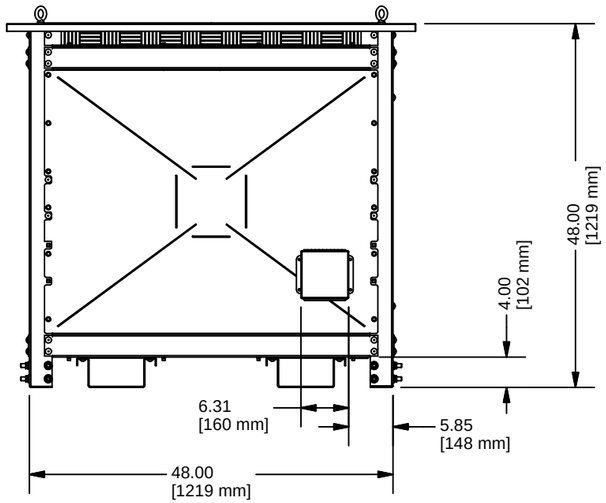
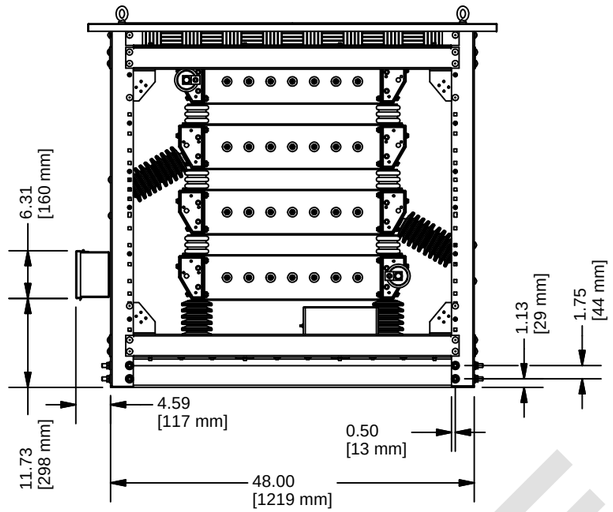
TITLE/DESCRIPTION:
assembly, siesmic NGR, (3) FDL-A3, SDS = 2.26

DATE: 2/15/2011	DRAWN	APPROVED
SHEET: 1 OF 1	MAB	FLS

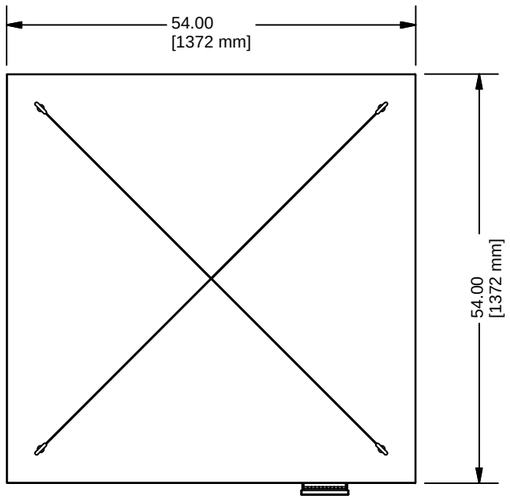
DRAWING NUMBER	REVISION
NG444-S-2D26-JBL-FDL3	00



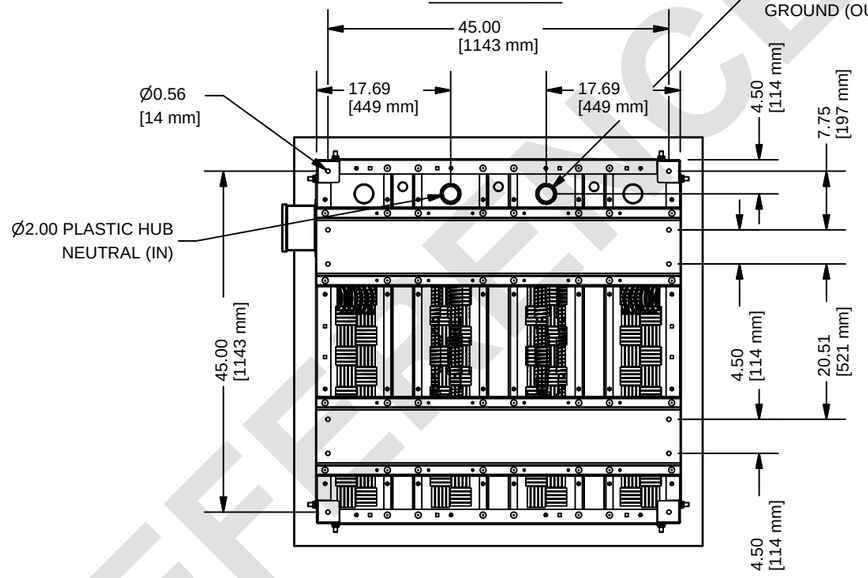
LEFT SIDE VIEW



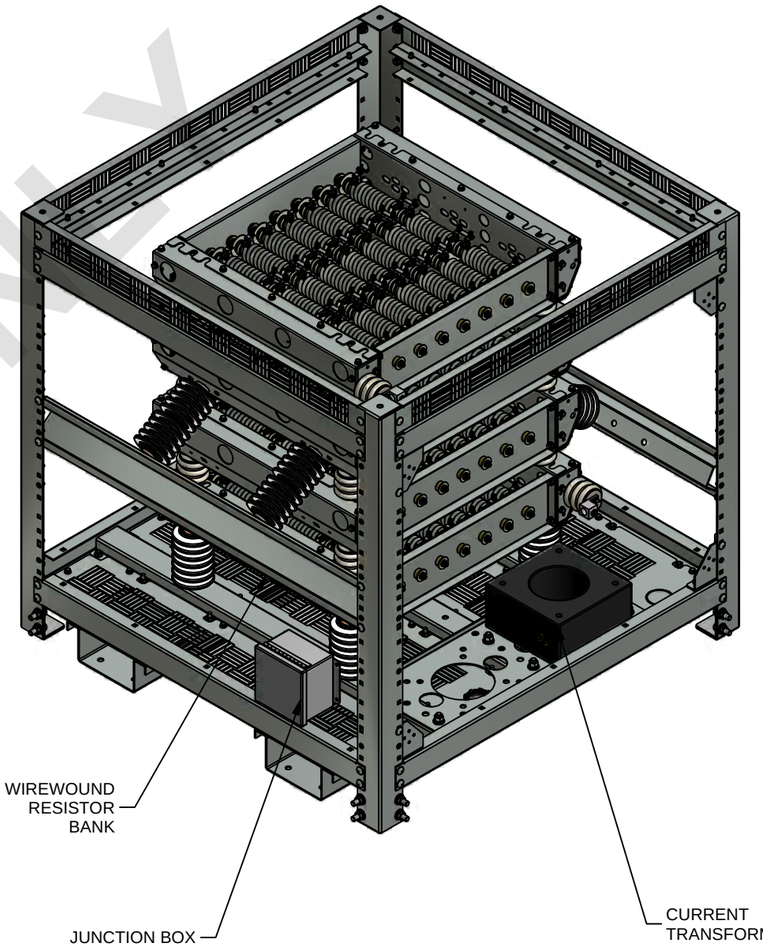
FRONT VIEW



TOP VIEW



BOTTOM VIEW



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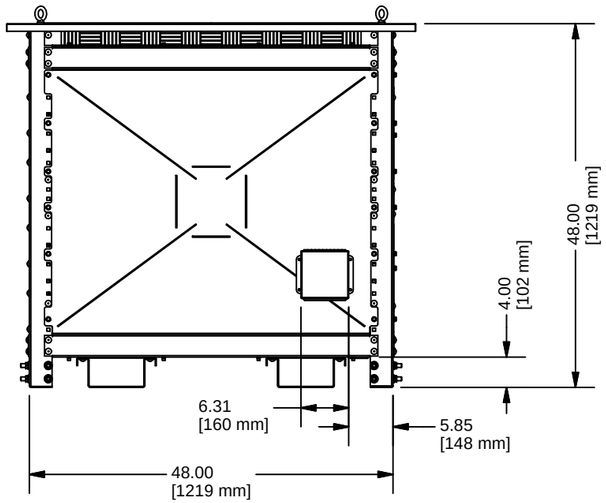
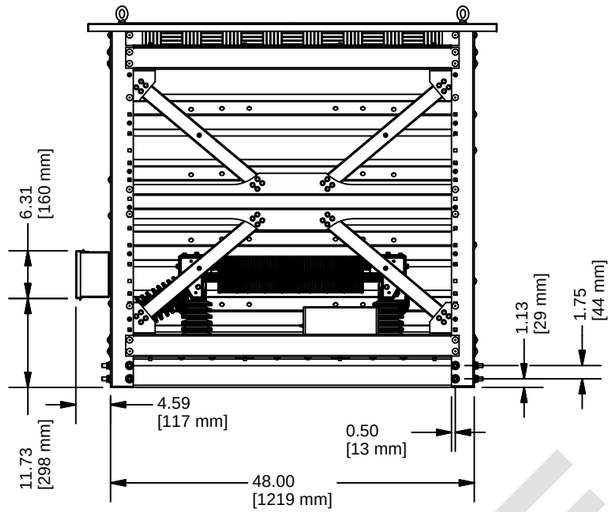
TITLE/DESCRIPTION:
assembly, siesmic NGR, (4) FDL-A3, SDS = 2.26

DATE: 2/15/2011	DRAWN	APPROVED
SHEET: 1 OF 1	MAB	FLS

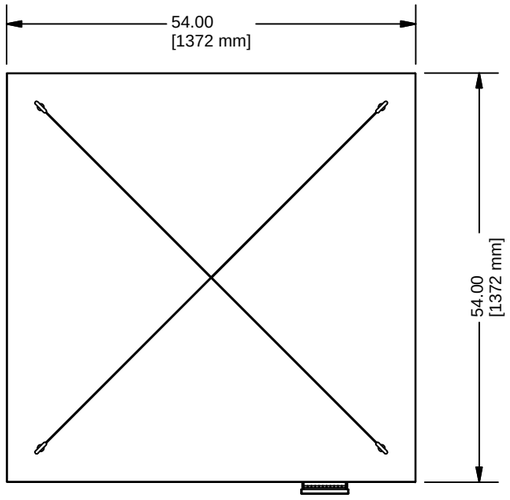
DRAWING NUMBER	REVISION
NG444-S-2D26-JBL-FDL4	00



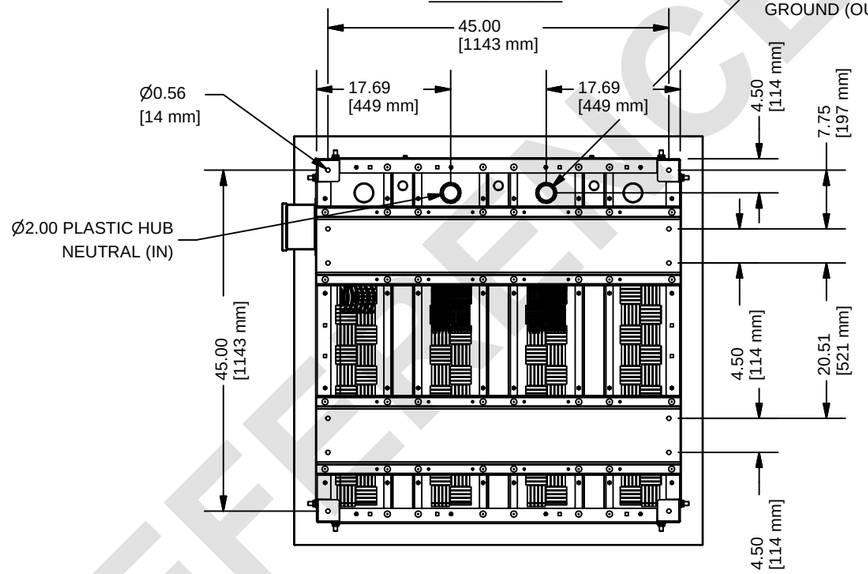
LEFT SIDE VIEW



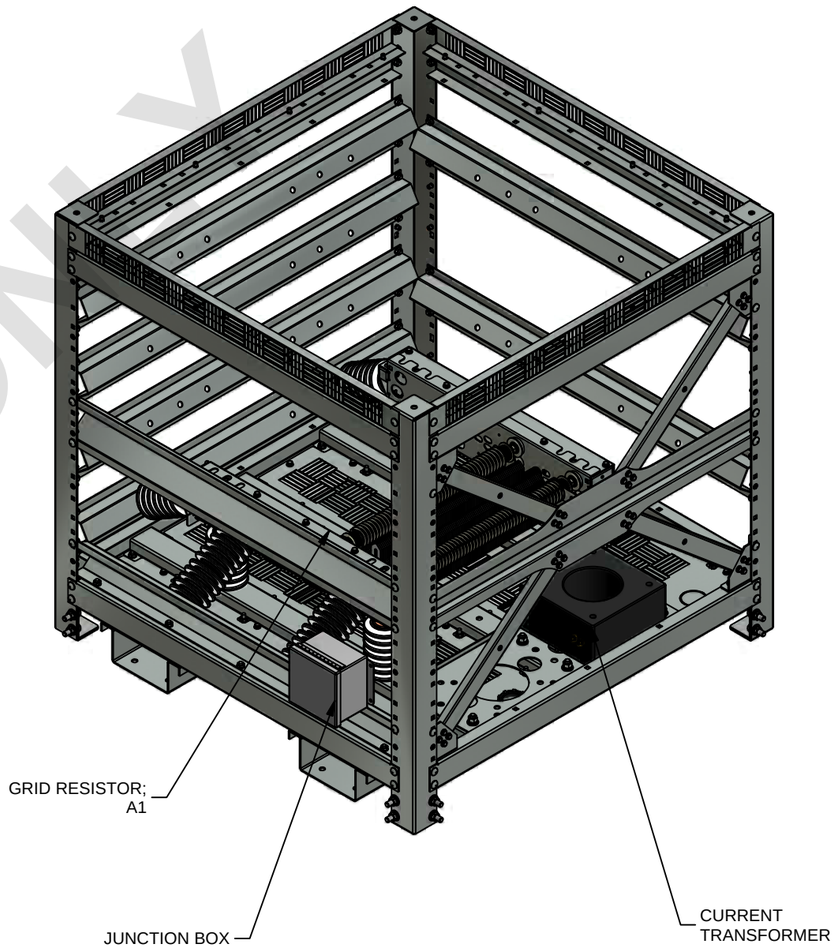
FRONT VIEW



TOP VIEW



BOTTOM VIEW



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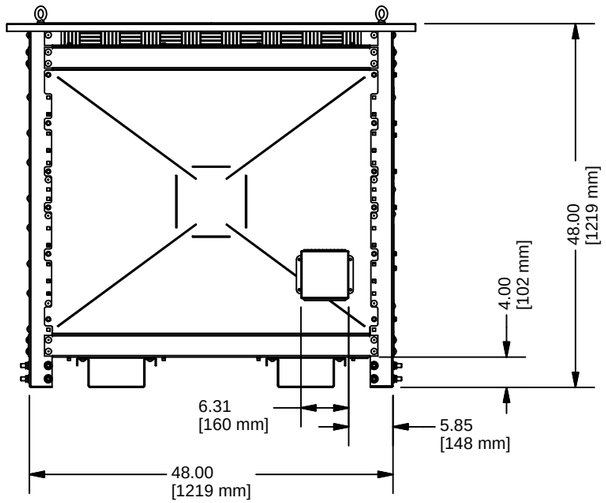
TITLE/DESCRIPTION:
assembly, siesmic NGR, (1) A1, SDS = 2.50

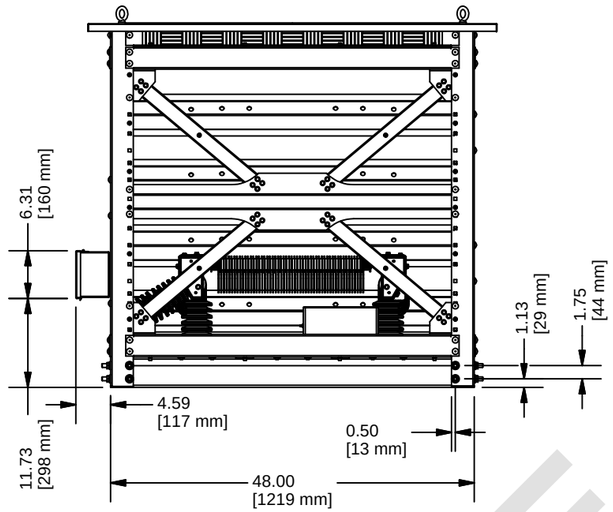
DATE: 2/17/2011
SHEET: 1 OF 1

DRAWN	APPROVED
MAB	FLS

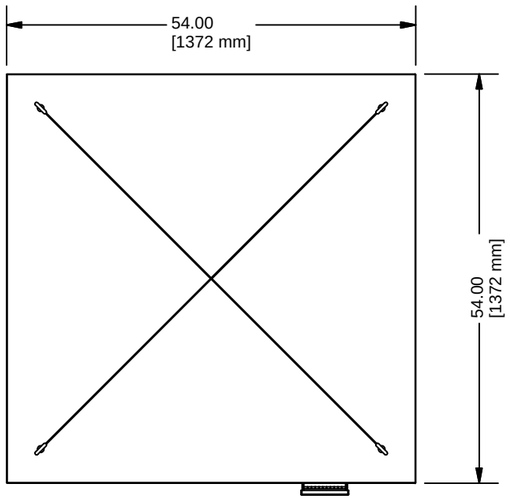
DRAWING NUMBER	REVISION
NG444-S-JBL-A11	00



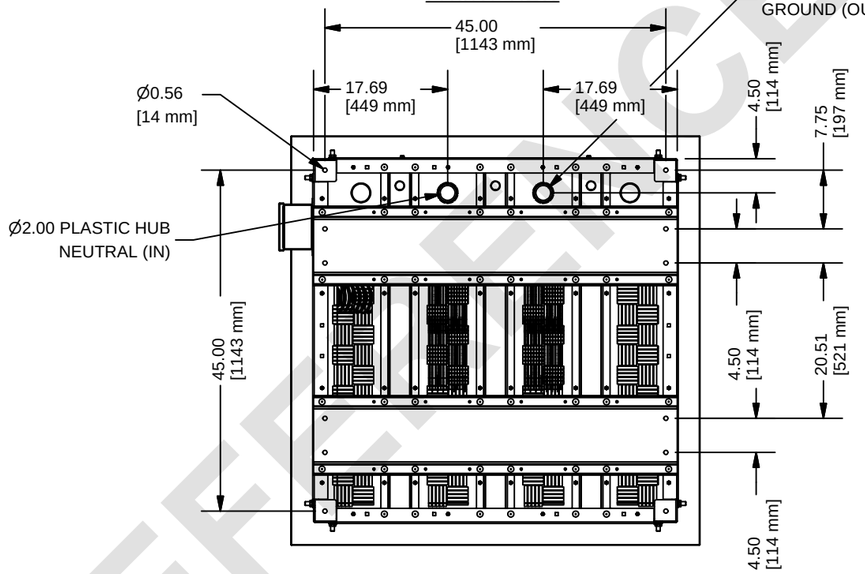
LEFT SIDE VIEW



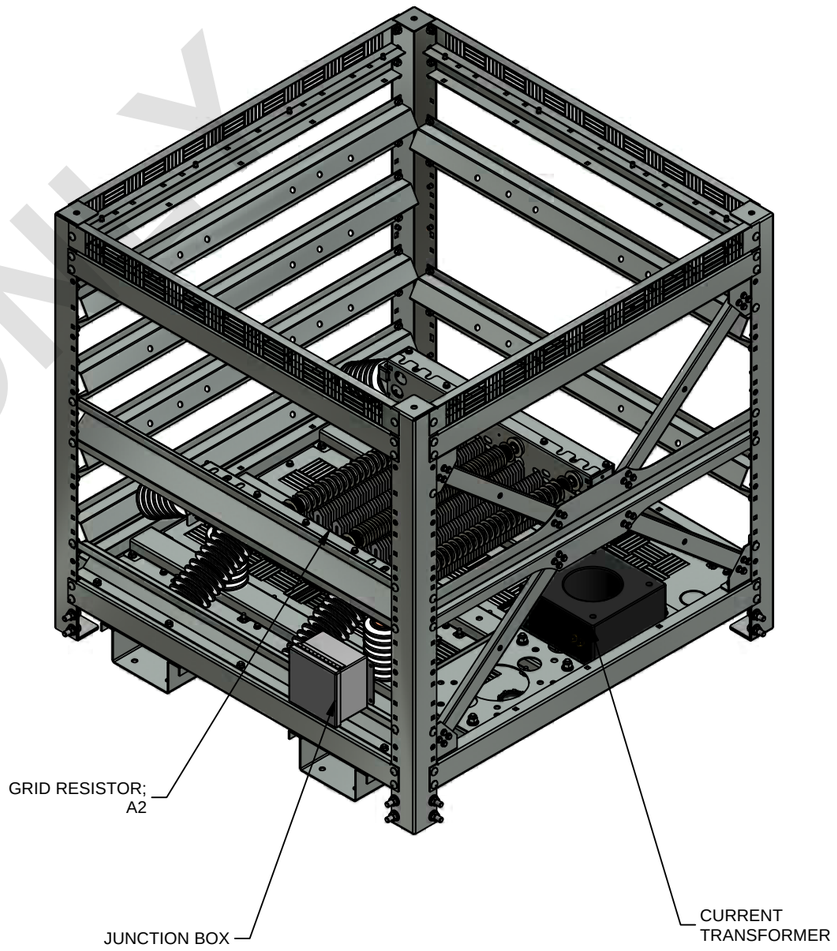
FRONT VIEW



TOP VIEW



BOTTOM VIEW



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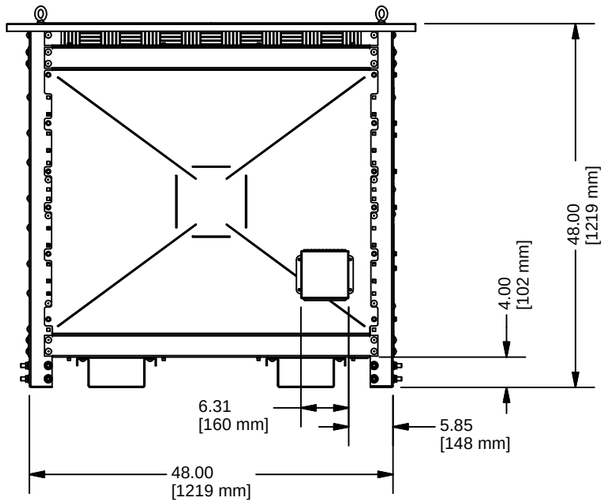
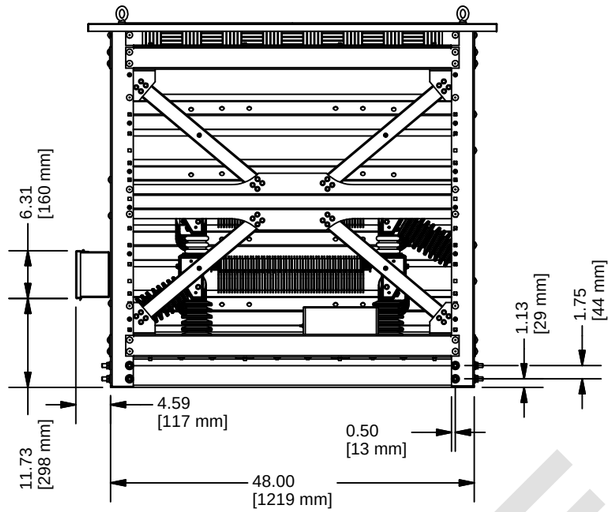
TITLE/DESCRIPTION:
assembly, siesmic NGR, (1) A2, SDS = 2.50

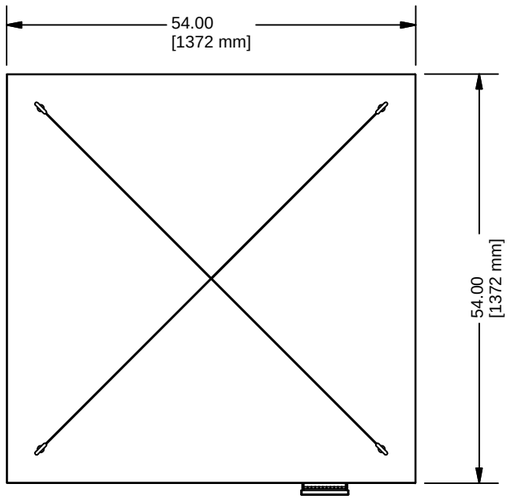
DATE: 2/17/2011
SHEET: 1 OF 1
DRAWN: MAB
APPROVED: FLS
DRAWING NUMBER: NG444-S-JBL-A21
REVISION: 00



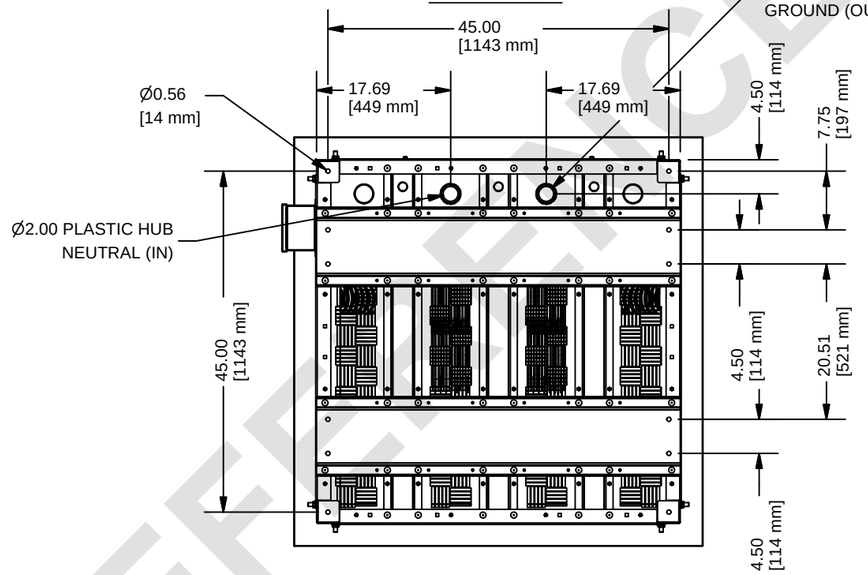
LEFT SIDE VIEW



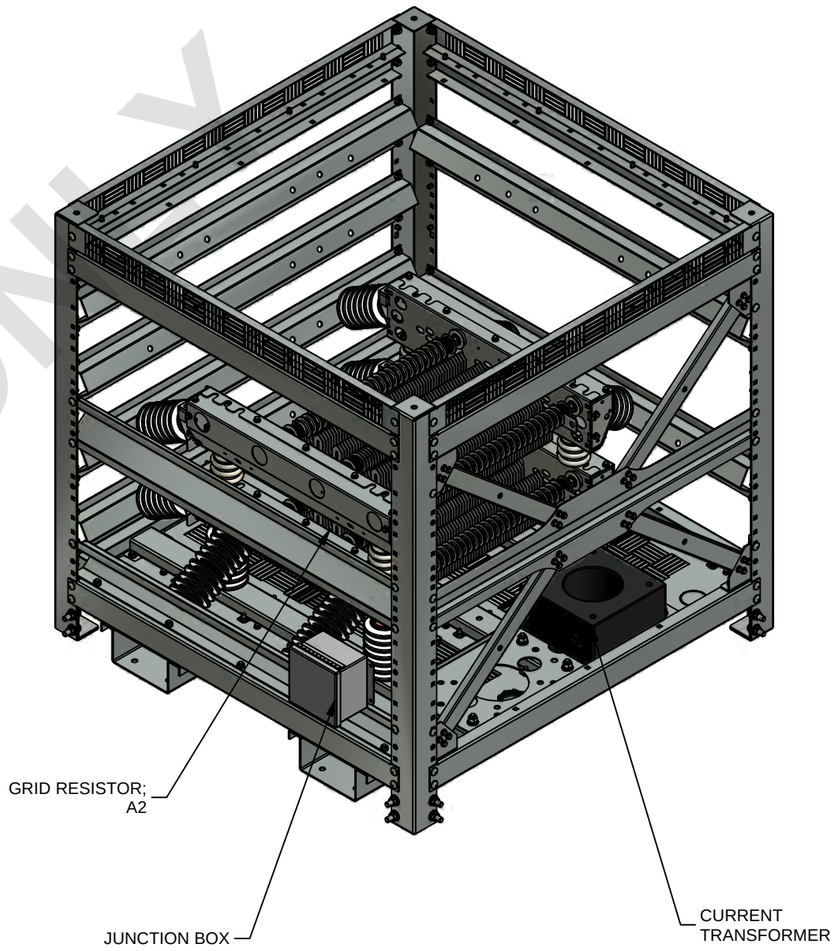
FRONT VIEW



TOP VIEW



BOTTOM VIEW



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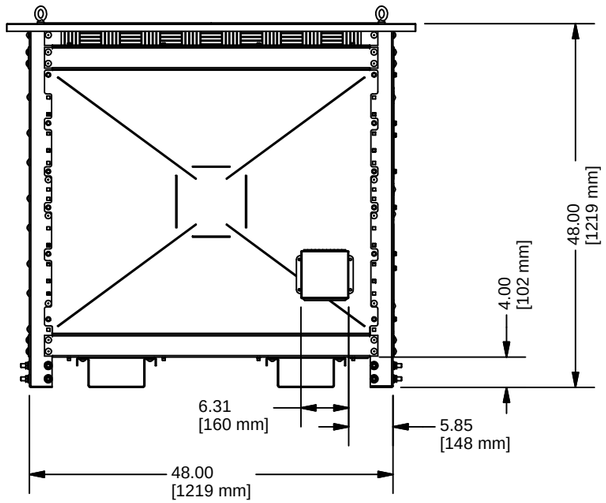
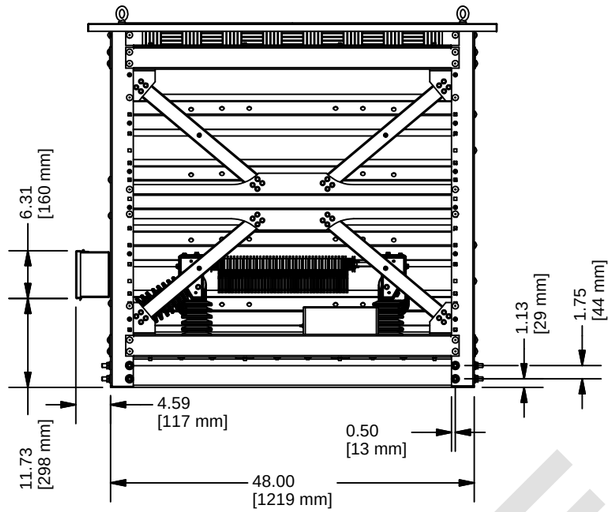
TITLE/DESCRIPTION:
assembly, siesmic NGR, (2) A2, SDS = 2.50

DATE: 2/17/2011	DRAWN	APPROVED
SHEET: 1 OF 1	MAB	FLS

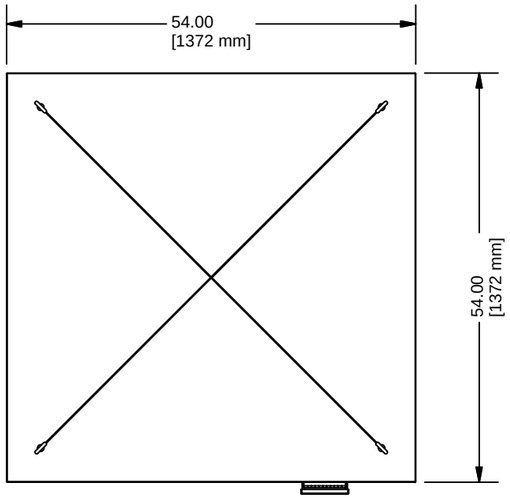
DRAWING NUMBER	REVISION
NG444-S-JBL-A22	00



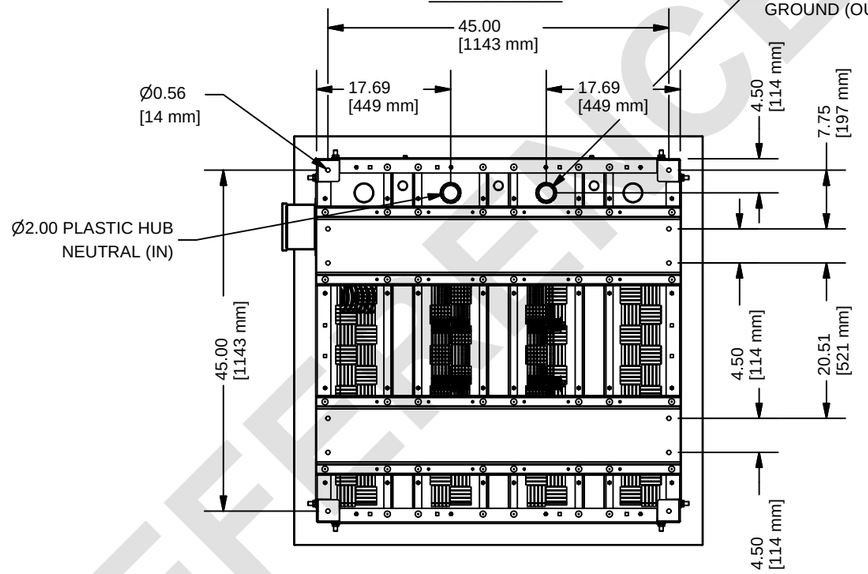
LEFT SIDE VIEW



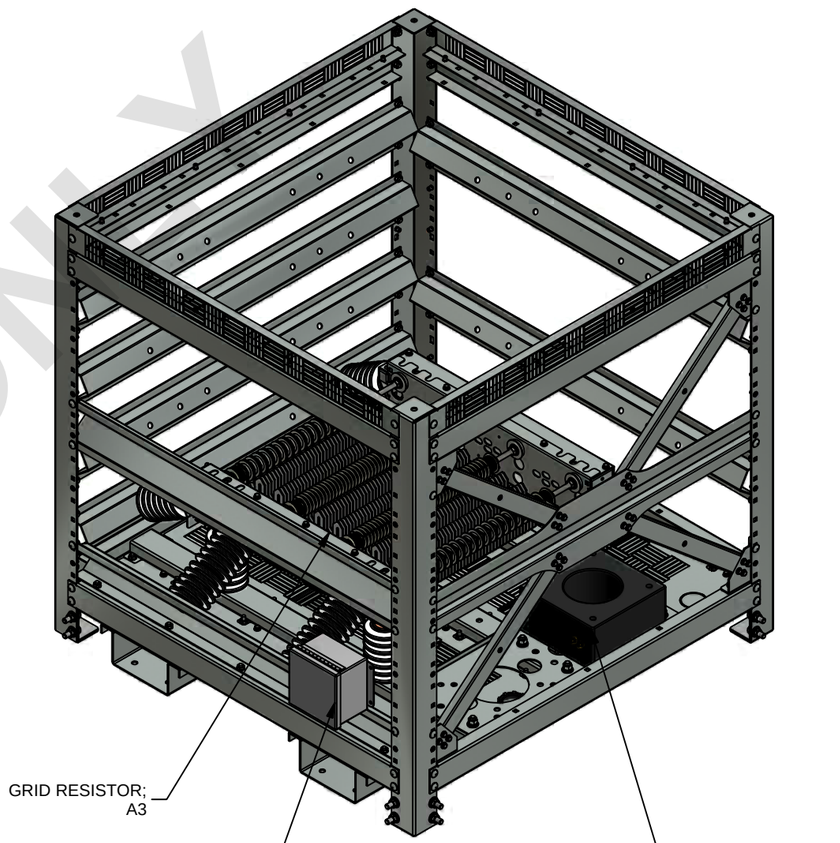
FRONT VIEW



TOP VIEW



BOTTOM VIEW



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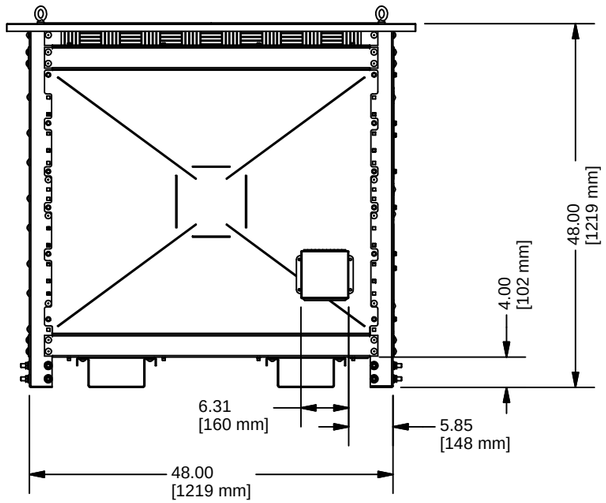
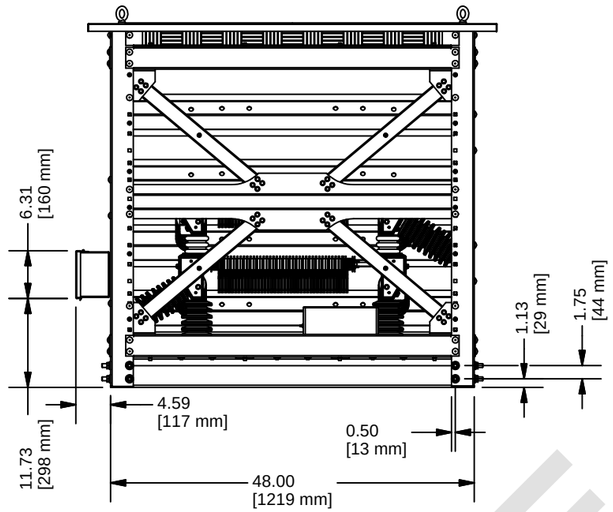
TITLE/DESCRIPTION:
assembly, siesmic NGR, (1) A3, SDS = 2.50

DATE: 2/17/2011	DRAWN	APPROVED
SHEET: 1 OF 1	MAB	FLS

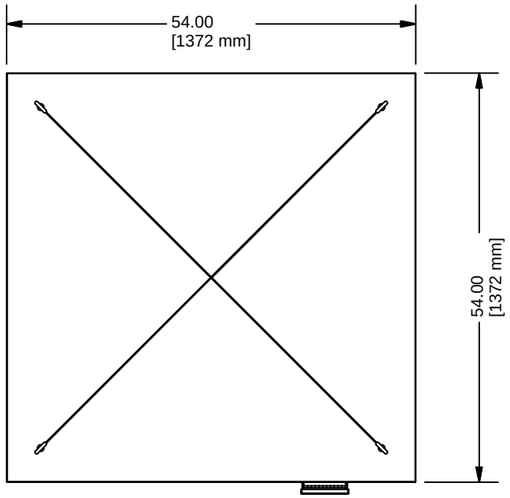
DRAWING NUMBER	REVISION
NG444-S-JBL-A31	00



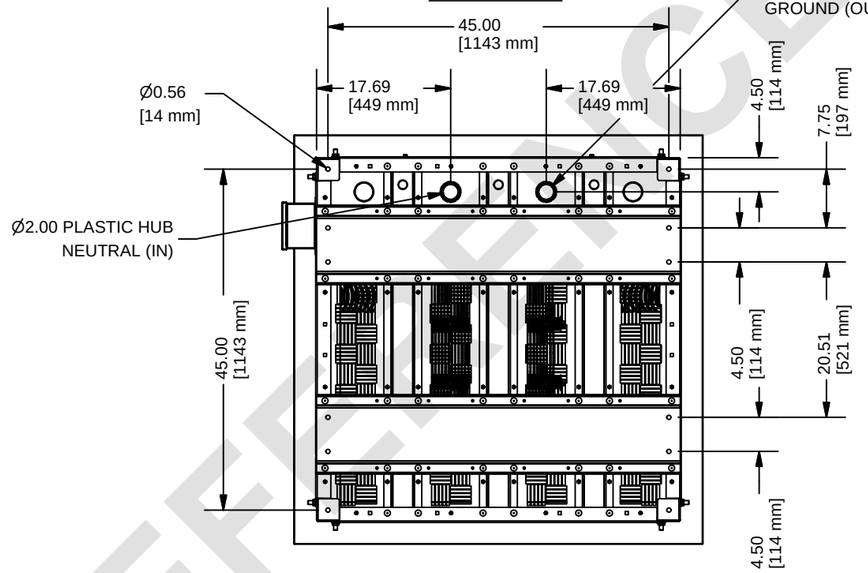
LEFT SIDE VIEW



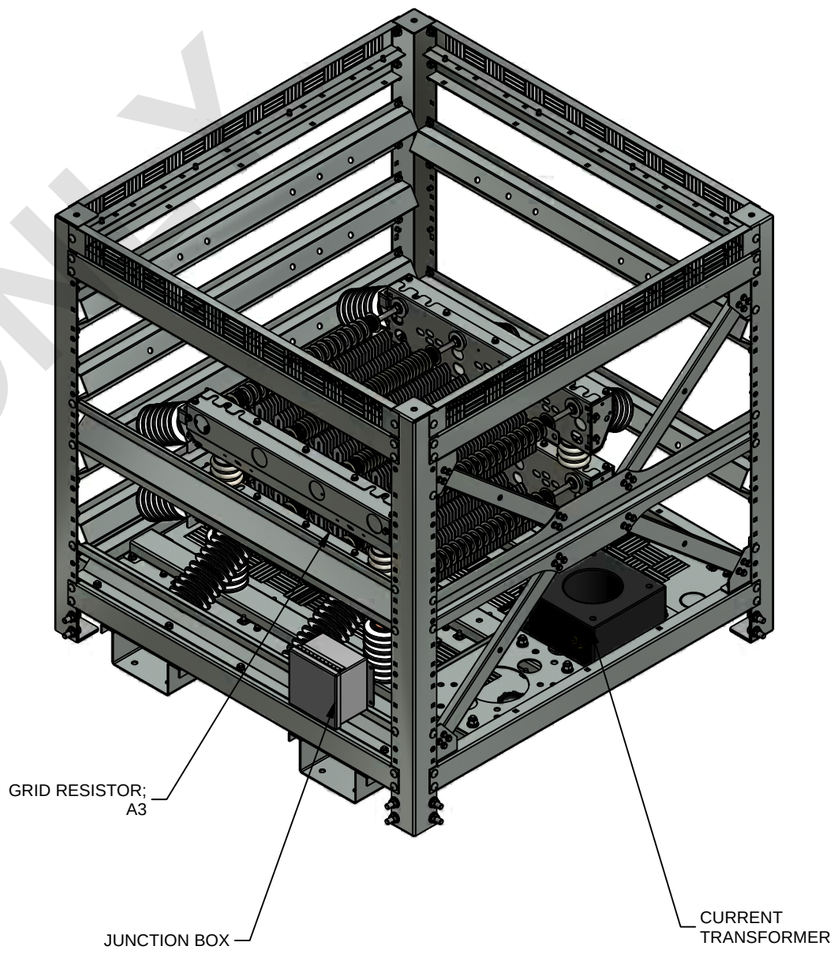
FRONT VIEW



TOP VIEW



BOTTOM VIEW



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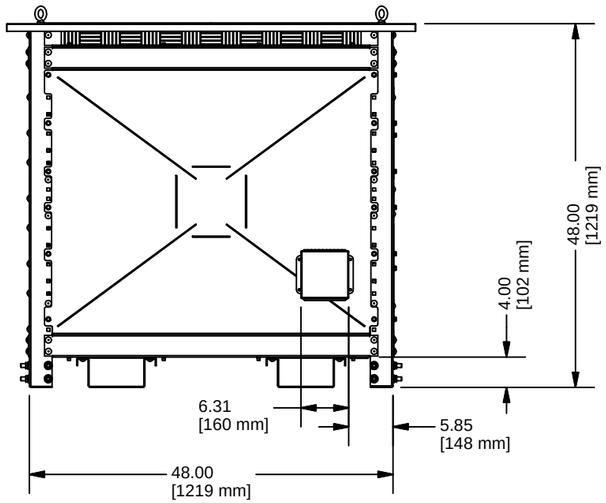
TITLE/DESCRIPTION:
assembly, siesmic NGR, (2) A3, SDS = 2.50

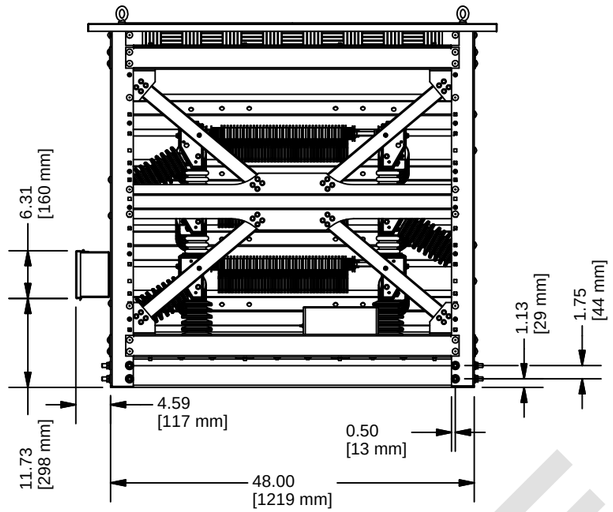
DATE: 2/17/2011
SHEET: 1 OF 1

DRAWN	APPROVED
MAB	FLS

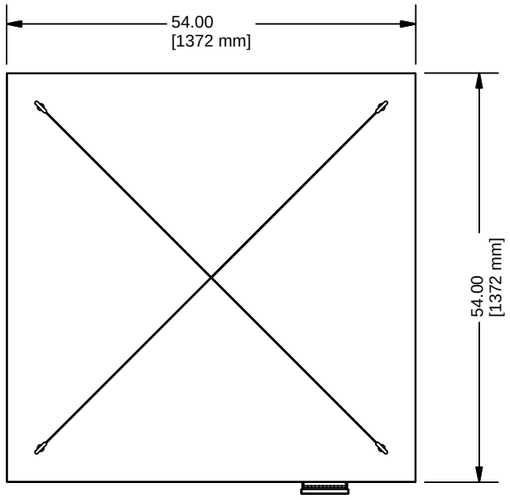
DRAWING NUMBER	REVISION
NG444-S-JBL-A32	00



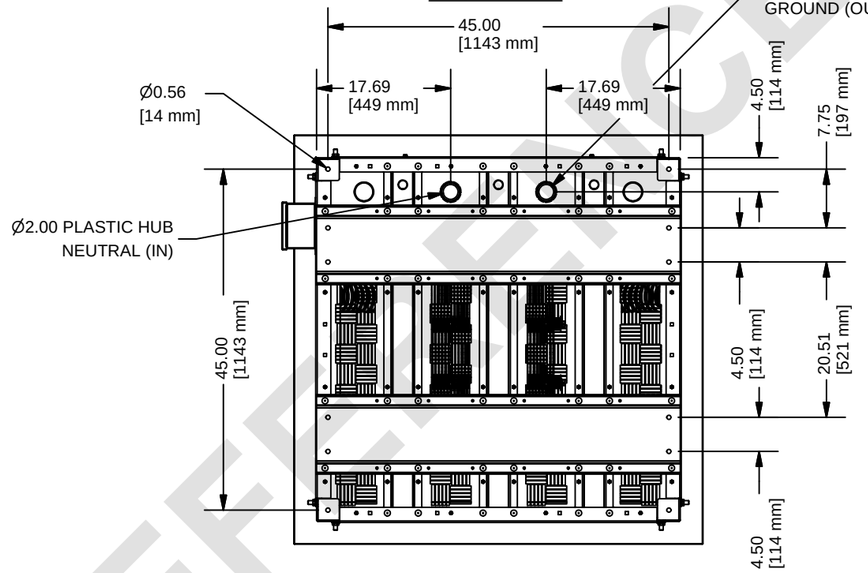
LEFT SIDE VIEW



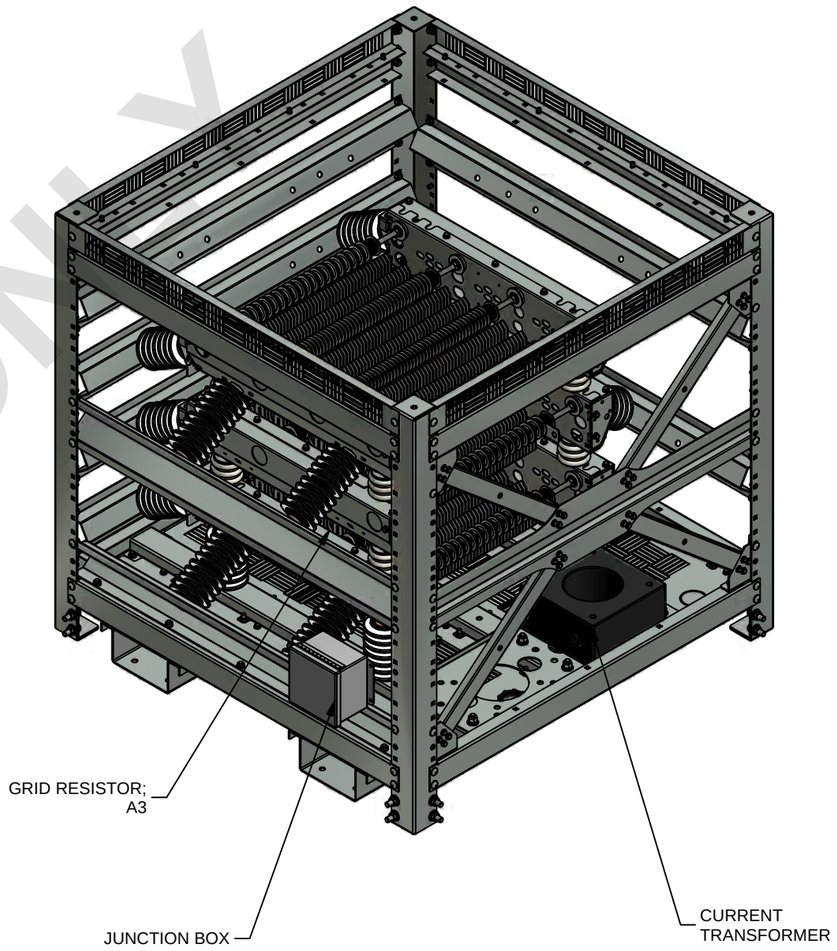
FRONT VIEW



TOP VIEW



BOTTOM VIEW



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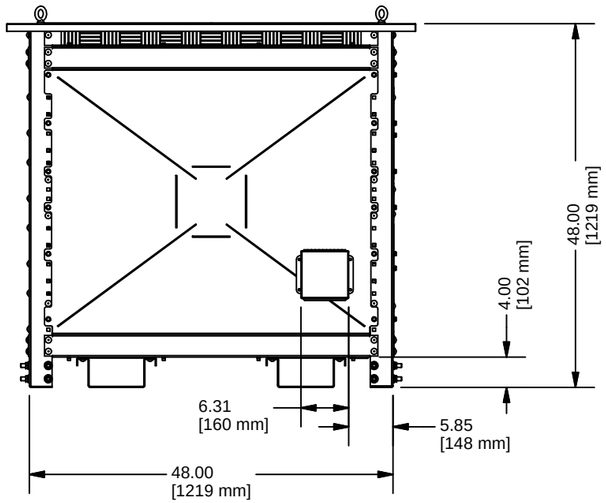
TITLE/DESCRIPTION:
assembly, siesmic NGR, (3) A3, SDS = 2.50

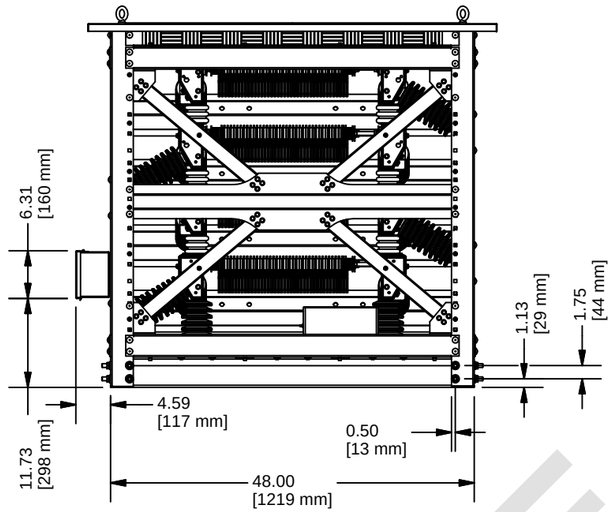
DATE: 2/17/2011
SHEET: 1 OF 1

DRAWN	APPROVED
MAB	FLS

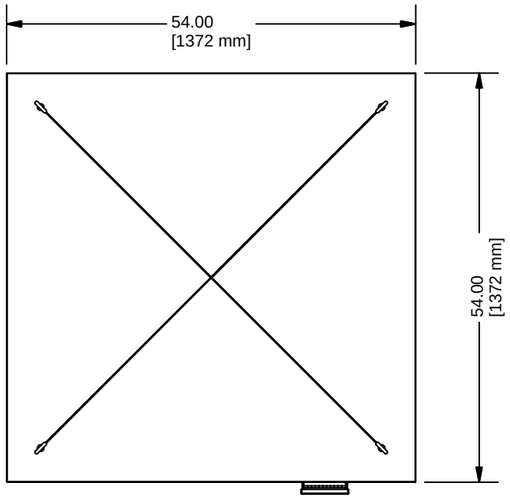
DRAWING NUMBER	REVISION
NG444-S-JBL-A33	00



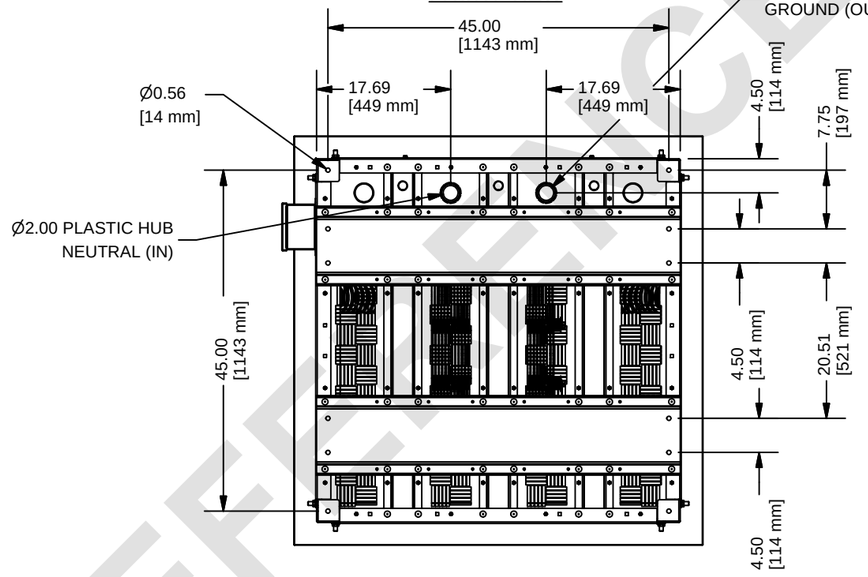
LEFT SIDE VIEW



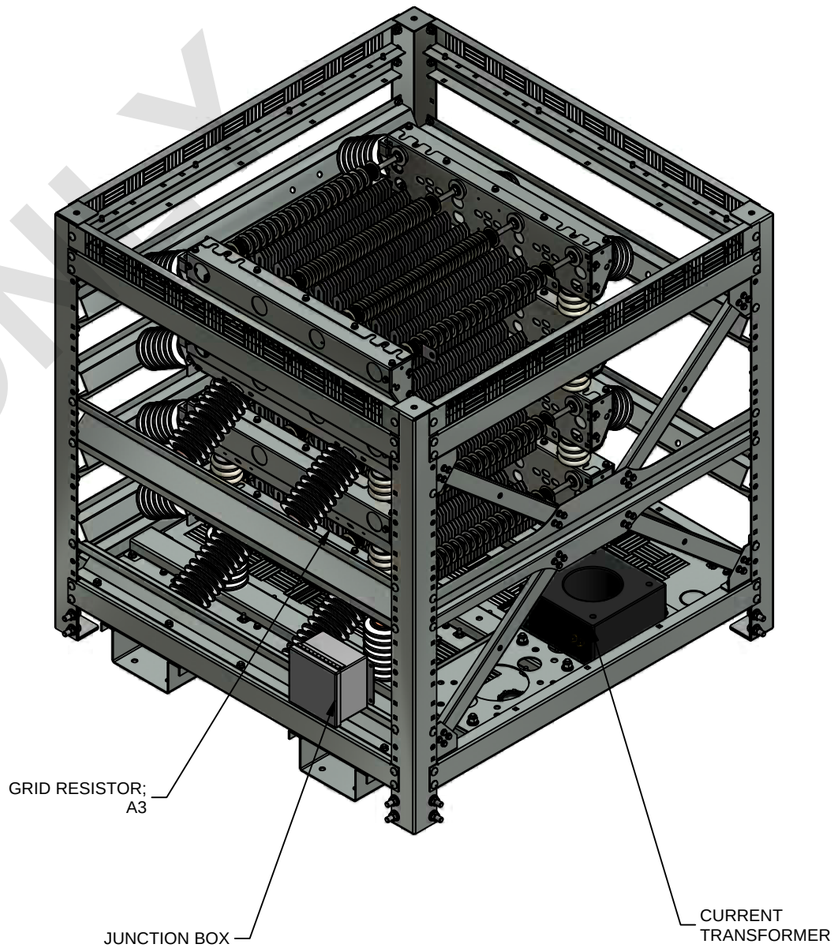
FRONT VIEW



TOP VIEW



BOTTOM VIEW



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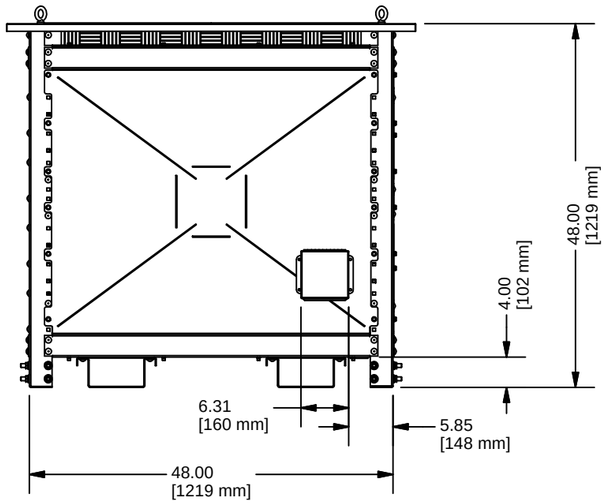
TITLE/DESCRIPTION:
assembly, siesmic NGR, (4) A3, SDS = 2.50

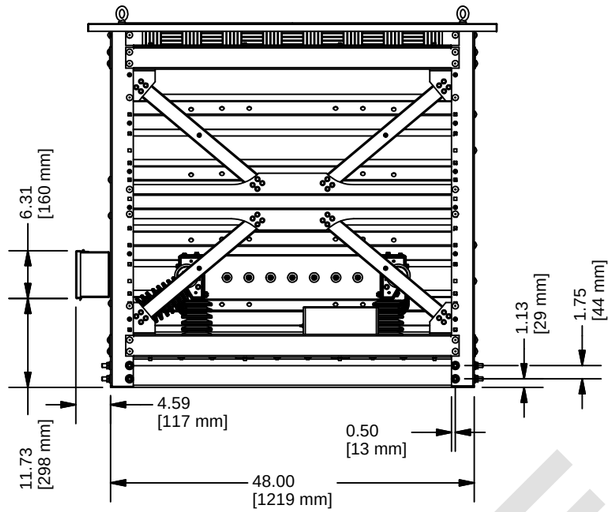
DATE: 2/17/2011
SHEET: 1 OF 1

DRAWN	APPROVED
MAB	FLS

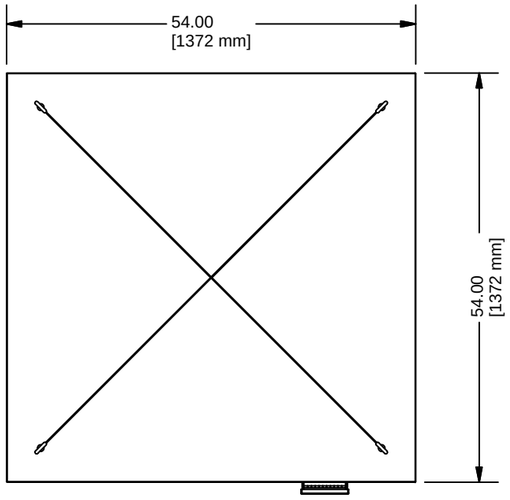
DRAWING NUMBER	REVISION
NG444-S-JBL-A34	00



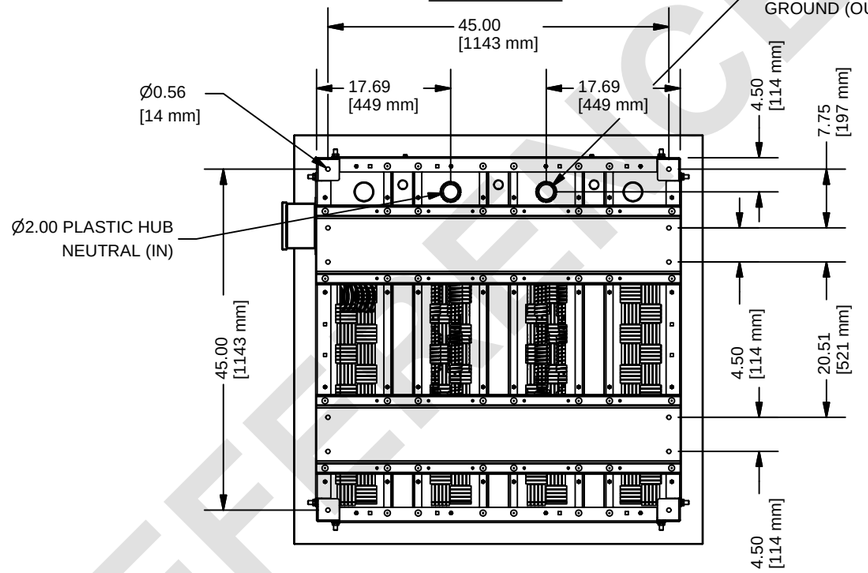
LEFT SIDE VIEW



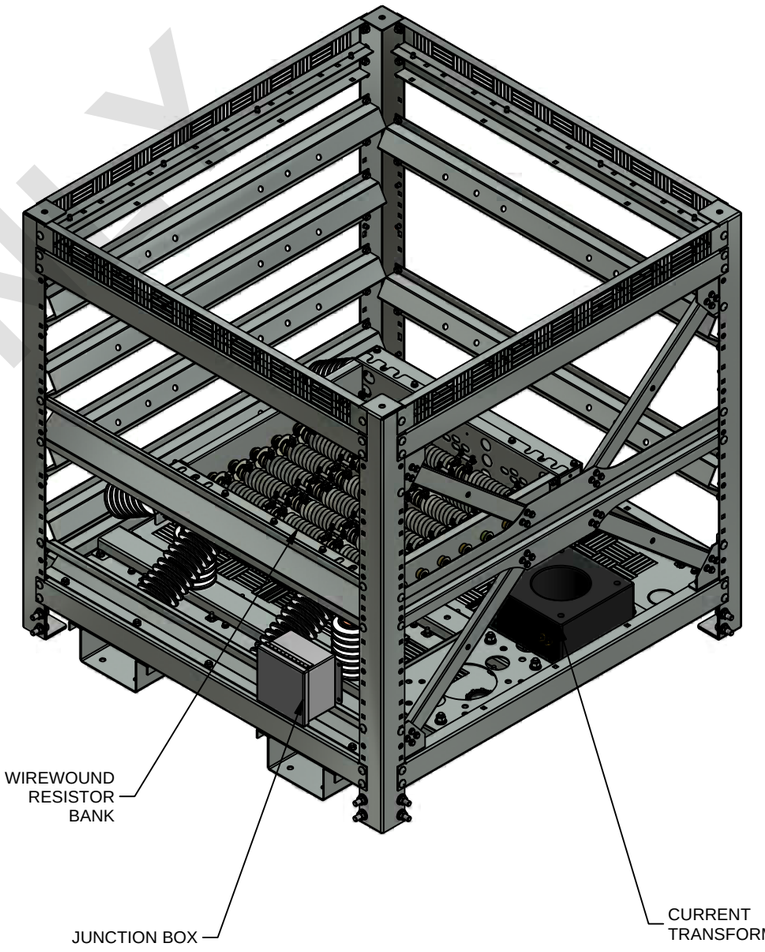
FRONT VIEW



TOP VIEW



BOTTOM VIEW



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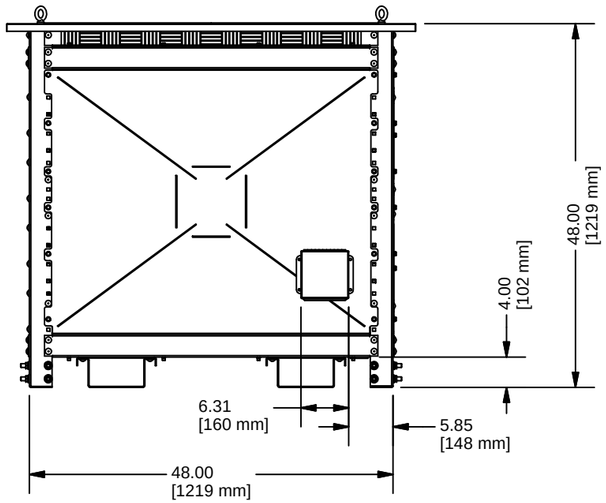
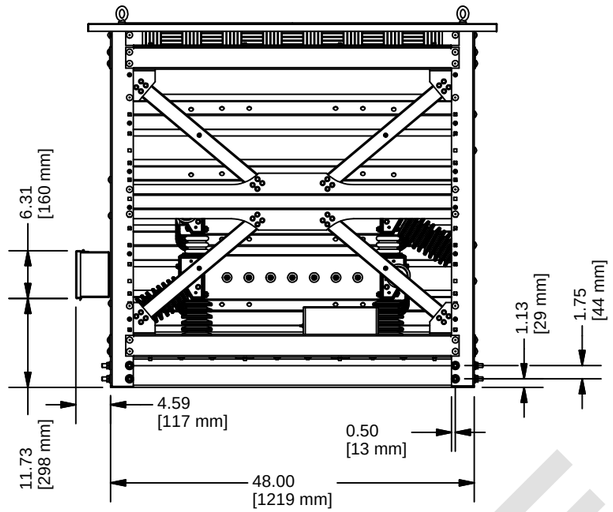
TITLE/DESCRIPTION:
assembly, siesmic NGR, (1) FDL-A3, SDS = 2.50

DATE: 2/17/2011	DRAWN	APPROVED
SHEET: 1 OF 1	MAB	FLS

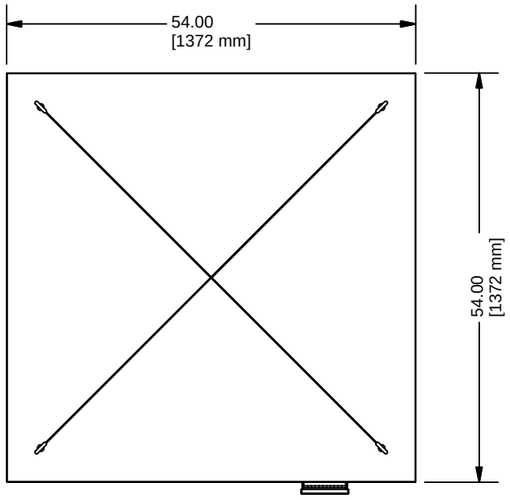
DRAWING NUMBER	REVISION
NG444-S-JBL-FDL1	00



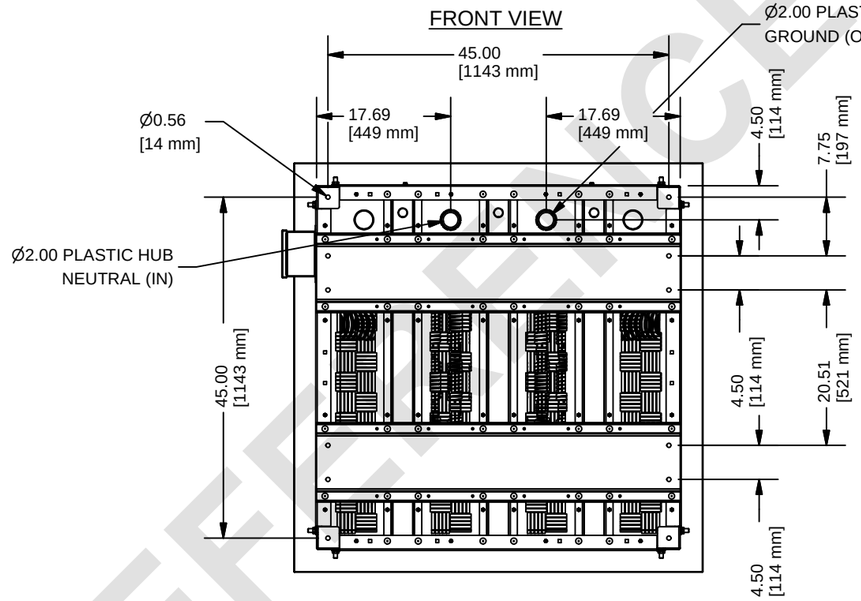
LEFT SIDE VIEW



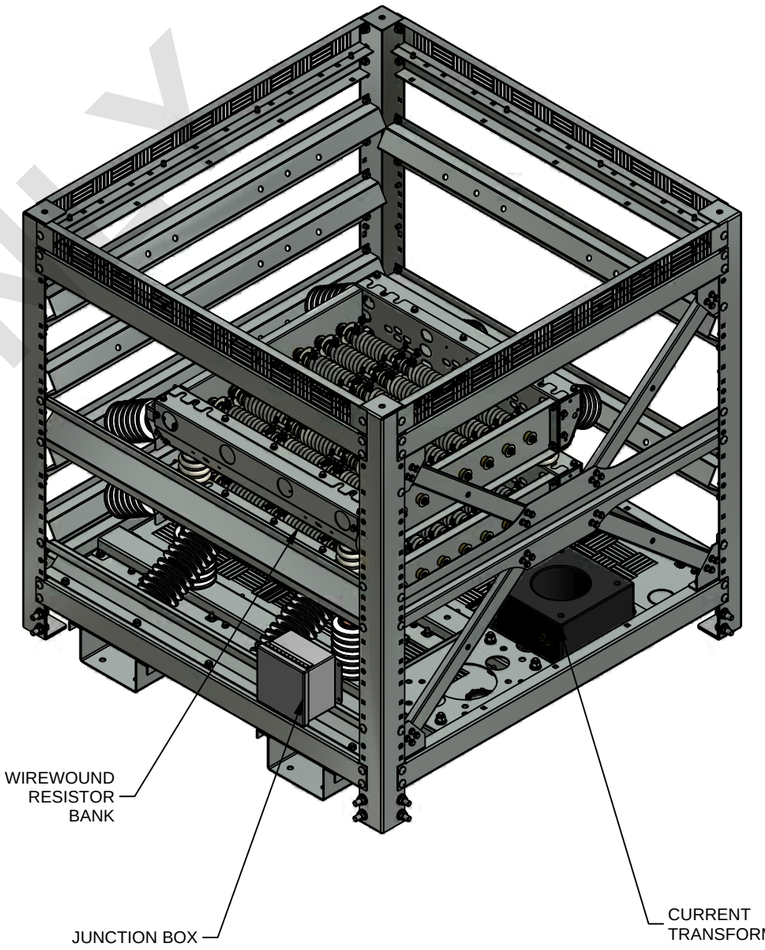
FRONT VIEW



TOP VIEW



BOTTOM VIEW



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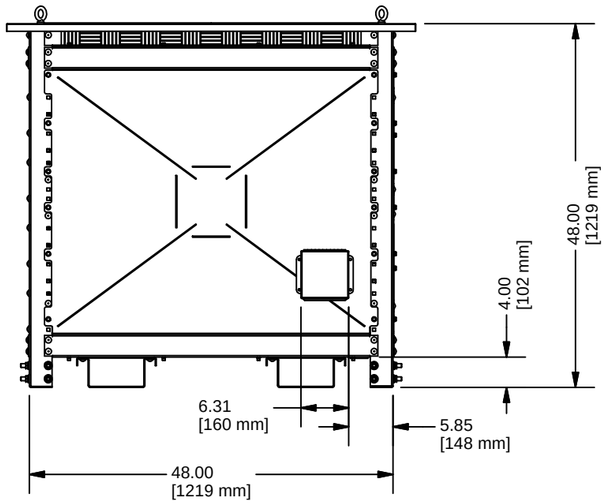
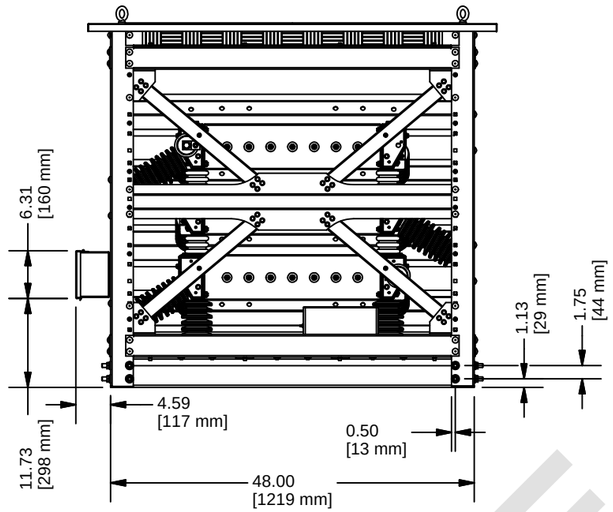
TITLE/DESCRIPTION:
assembly, siesmic NGR, (2) FDL-A3, SDS = 2.50

DATE: 2/17/2011	DRAWN	APPROVED
SHEET: 1 OF 1	MAB	FLS

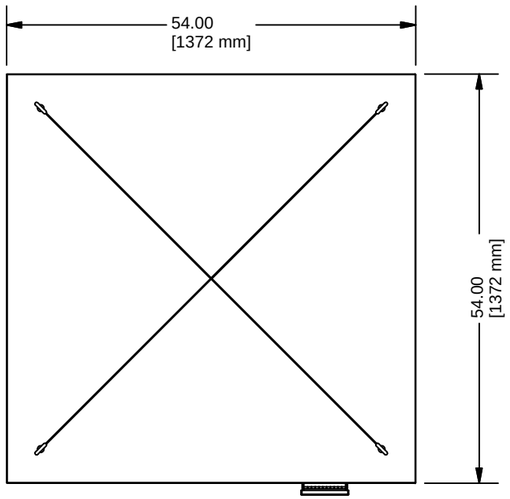
DRAWING NUMBER	REVISION
NG444-S-JBL-FDL2	00



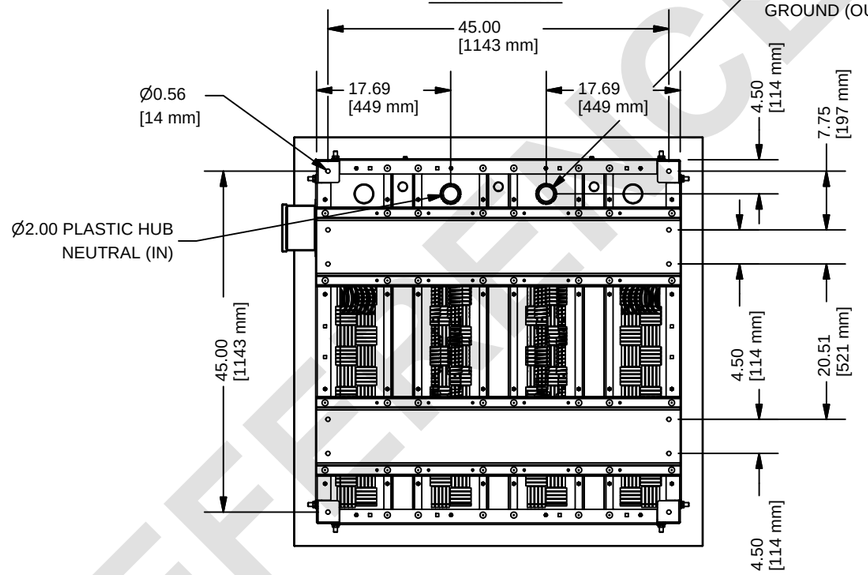
LEFT SIDE VIEW



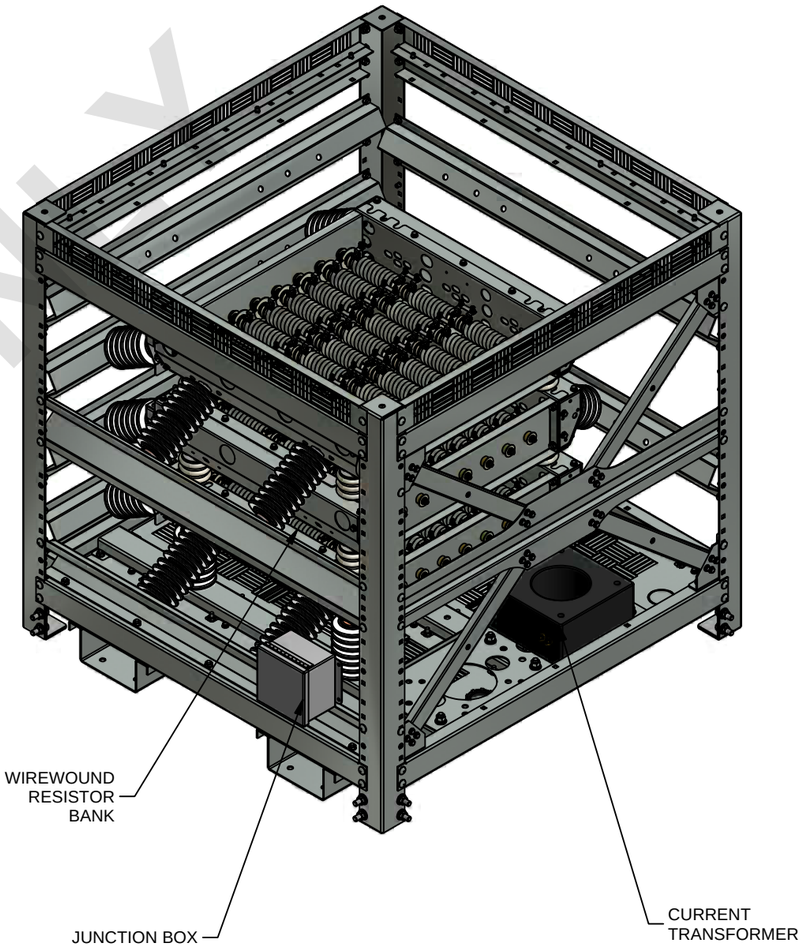
FRONT VIEW



TOP VIEW



BOTTOM VIEW



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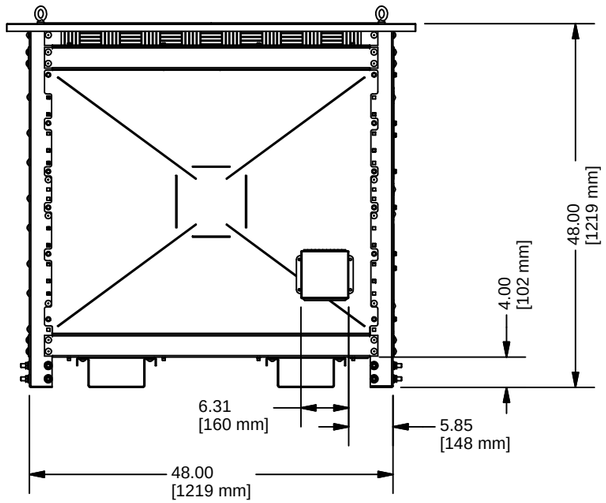
TITLE/DESCRIPTION:
assembly, siesmic NGR, (3) FDL-A3, SDS = 2.50

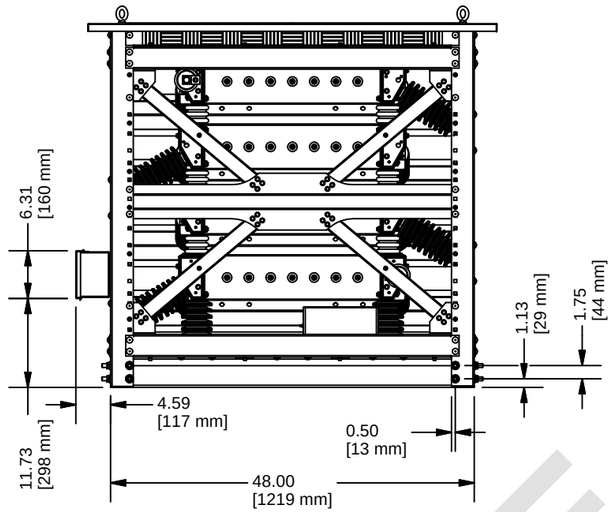
DATE: 2/17/2011
SHEET: 1 OF 1

DRAWN	APPROVED
MAB	FLS

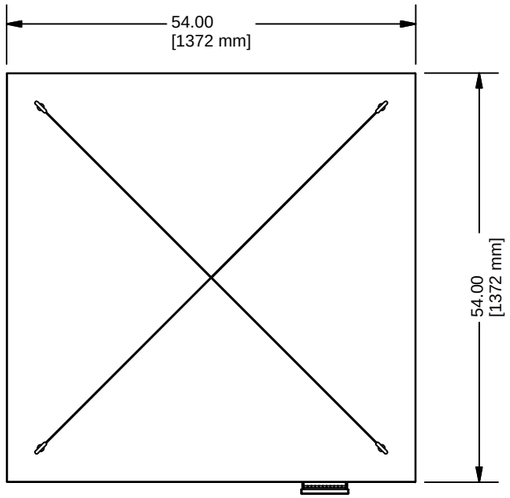
DRAWING NUMBER	REVISION
NG444-S-JBL-FDL3	00



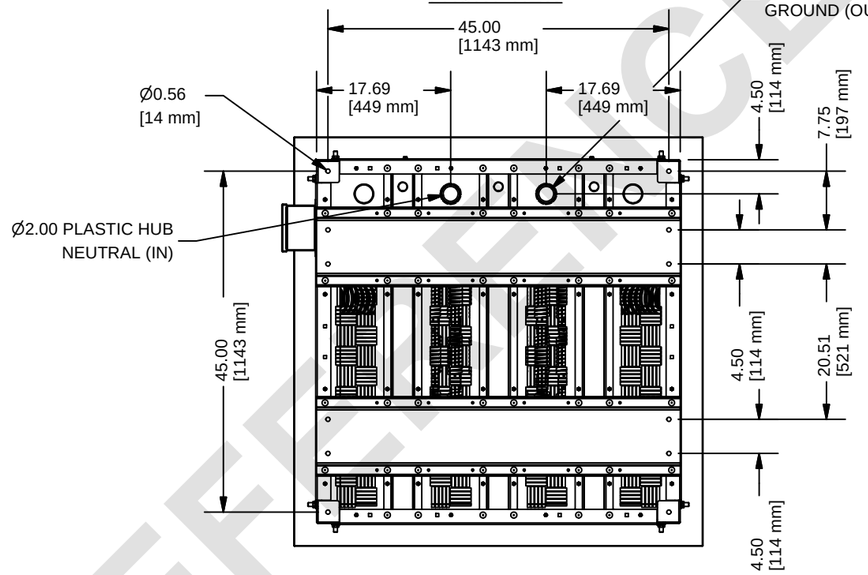
LEFT SIDE VIEW



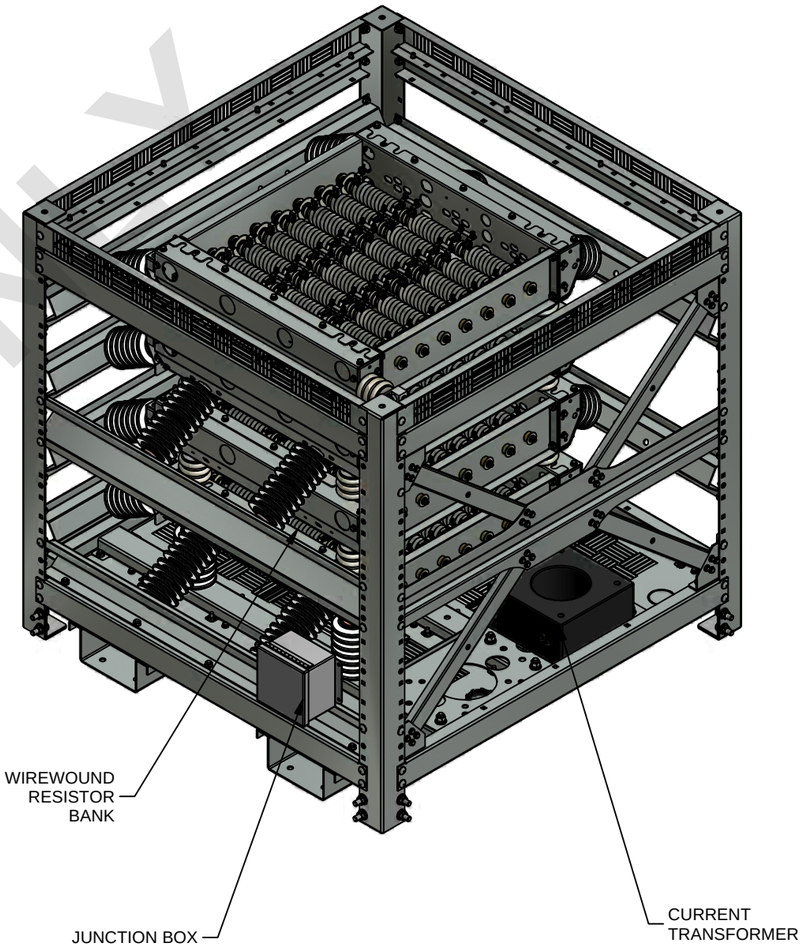
FRONT VIEW



TOP VIEW



BOTTOM VIEW



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TITLE/DESCRIPTION:
assembly, siesmic NGR, (4) FDL-A3, SDS = 2.50

DATE: 2/17/2011	DRAWN	APPROVED
SHEET: 1 OF 1	MAB	FLS

DRAWING NUMBER	REVISION
NG444-S-JBL-FDL4	00