APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY	
APPLICATION #:	OSP – 0419

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Motion Control Engineering

Manufacturer's Technical Representative: Debbie Prince

Mailing Address: 11380 White Rock Road, Rancho Cordova, CA 95742

Telephone: On File Email: On File

Product Information

Product Name: Elevator Control Panels

Product Type: Control Panels

Product Model Number: HMC-2000, mGroup, M4000-AC-01, i-AC-01, i-DC-01, i-CENTRAL-CUE, RESIST-R-C, and Filter Cabinets
(List all unique product identification numbers and/or part numbers)

General Description: Painted carbon steel or aluminum enclosures, NEMA 1, containing various subcomponents as described in the attachment. Seismic enhancements made to the test units and required to address the anomalies observed during the tests shall be incorporated into the production units.

Mounting Description: Control panels were tested in various mounting configurations: rigid wall mounted, flexible wall mounted, rigid base mounted or flexible base mounted, as shown in the attachment.

Applicant Information

Applicant Company Name: VMC Group

Contact Person: John Giuliano

Mailing Address: 113 Main Street, Bloomingdale, NJ 07403

Telephone: (973) 838-1780 Email: john.giuliano@thevmcgroup.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: Joel P. Giuliano Date: 12/11/19

Title: President Company Name: VMC Group

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

Company Name: VMC Group

Name: Kenneth Tarlow California License Number: SE-2851

Mailing Address: 113 Main Street, Bloomingdale, NJ 07403

Telephone: (973) 838-1780 Email: ken.tarlow@thevmcgroup.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: DCL Labs

Contact Name: Josh Sailer, Laboratory Manager

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

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

Seismic Parameters

Design in accordance with ASCE 7-16 Chapter 13: ☒ Yes ☐ No

Design Basis of Equipment or Components (F_p/W_p) = 1.58 (Sds = 2.10); 1.88 (Sds = 2.50)

S_{DS} (Design spectral response acceleration at short period, g) = 2.10 (M4000-AC-01, i-AC-01, i-CENTRAL-CUE) 2.50 (all other units)

a_p (In-structure equipment or component amplification factor) = 2.5

R_p (Equipment or component response modification factor) = 6.0

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 7-16 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, 2025

Signature: Date: July 12, 2021

Print Name: William Staehlin Title: Senior Structural Engineer

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

Condition of Approval (if applicable):

Table 1: Certified Components, HMC-2000 and mGroup

Manufacturer: Motion Control Engineering

Product Line: HMC-2000 and mGroup

Certified Product Construction: NEMA 1 enclosures; painted carbon steel or aluminum

Certified Options: Enclosures, fuses, capacitors, solid state starters, battery rescue devices, p.c. boards, terminals, power modules, power supplies, receptacles, relays, surge protectors, contactors, resistors, transformers.

Mounting Description: Rigid or flexible wall mounted (HMC-2000 and mGroup)

Model	Description	Enclosure Material	NEMA Rating	Maximum Dimensions (inches)			Max. Weight (lb)	Mounting	Sds (g), z/h=1	Unit
				Depth	Width	Height				
HMC-2000	Size 2	Painted carbon steel	1	12.5	36.3	42.6	250	Rigid or flexible wall	2.50	UUT3a,b
HMC-2000	Size 1	Painted carbon steel	1	13.0	48.5	36.5	318	Rigid or flexible wall	2.50	UUT1a,b
mGROUP	One Size	Painted carbon steel	1	6.3	18.3	44.0	96	Rigid or flexible wall	2.50	UUT2a,b, UUT4a,b

Table 2: Certified Subcomponents, HMC-2000 and mGroup

Enclosures

Manufacturer: Motion Control Engineering

Product Line: HMC-2000 and mGroup

Subcomponent: Enclosures

Seismic Level: Sds = 2.5g, z/h =1.0

Enclosures								
Model Number	MCE Part #	Manufacturer	Material	Dimensions (inches)			NEMA Type	Unit
				Depth	Width	Height		
190RQ	15-10-0022	Hoffman	Painted carbon steel	6.3	18.3	44.0	1	UUT2a,b, UUT4a,b
106RJ-TAN	15-01-0047	Hoffman	Painted carbon steel	12.5	36.3	42.6	1	UUT3a,b
115RS REV B	15-02-0027-ID-D	Hoffman	Painted carbon steel	13.0	48.5	36.5	1	UUT1a,b

Table 3: Certified Subcomponents, HMC-2000 and mGroup

Fuses

Manufacturer: Motion Control Engineering

Product Line: HMC-2000 and mGroup

Subcomponent: Fuses

Seismic Level: Sds = 2.5g, z/h =1.0

Fuses			
Model Number	Manufacturer	Material Description	Unit
354 812-GY	Littelfuse	FUSE BLOCK 300V 1 POSITION	UUT1a,b, UUT2a,b, UUT3a,b, UUT4a,b
312001P		FUSE 250V 1AMP GLASS	UUT1a,b, UUT2a,b,UUT3a,b, UUT4a,b
312002		FUSE 250V 2AMP GLASS	UUT4a,b
312003.P		FUSE 250V 3AMP GLASS	UUT1a,b, UUT3a,b
312004		FUSE 250V 4AMP GLASS	UUT1a,b
313001P		Fuse Slo-Blo 250V 1A MDQ/313	UUT1a,b, UUT2a,b, UUT3a,b, UUT4a,b
313002		Fuse Slo-Blo 250V 2A MDQ/313	UUT1a,b, UUT3a,b
31303.2		Fuse Slo-Blo 250V 32/10A MDQ/313	UUT1a,b
313004		Fuse Slo-Blo 250V 4A MDQ/313	UUT1a,b, UUT3a,b
313600		Fuse Slo-Blo 250V 6/10A MDQ/313	UUT2a,b, UUT4a,b
FLN-R 12		FUSE 250V 12AMP FRN-R	UUT1a,b
FLQ-3 2/10		FUSE 500V 3 2/10AMP FNQ	UUT1a,b, UUT3a,b
FLQ-4		FUSE SLOBLO 500V 4A FNQ/FLQ	UUT3a,b
FLQ-7		Fuse Slo-Blo 500V 7A FNQ/FLQ	UUT1a,b
FLSR 30_ID		Fuse Slo-Blo 600V 30A FRSR/FLSR	UUT3a,b
78025802558		Fuse 600V 300Amp FRS-R/FLSR	UUT1a,b
L60030M-1SQ		FUSE BLK 600V30AMP 1 POS GANG	UUT1a,b
LFR250302S		FUSE BLOCK 250V 30AMP 2 POS FRN-R	UUT1a,b
LFR604003C		Fuse Holder 600V 400A 3P PNL MT FRS/F	UUT1a,b
LFR600303SID		FUSE BLOCK 600V 30AMP 3 POS FRS-R	UUT3a,b

Table 4: Certified Subcomponents, HMC-2000 and mGroup

Capacitors and Solid State Starters

Manufacturer: Motion Control Engineering

Product Line: HMC-2000 and mGroup

Subcomponent: Capacitors and Solid State Starters

Seismic Level: Sds = 2.5g, z/h =1.0

Capacitors				
Model Number	Manufacturer	Material	Electrical Ratings	Unit
E81D630VNN682MA50T	UCC	Aluminum	6800uF, 63V	UUT1(a,b), UUT2(a,b), UUT3(a,b), UUT4(a,b)

Solid State Starters				
Model Number	Manufacturer	Material	Power	Unit
72EG34AFP	Siemens	Solid state components in plastic housing	208-480VAC; 5-125 HP; 22-252 FLA	UUT3a,b
72GG34AFP				Interpolated
72HG34AFP				Interpolated
72JG34AFP				Interpolated
72KG34AFP				Interpolated
72LG34AFP				Interpolated
72MG34AFP				Interpolated
72NG34AFP				Interpolated
72PG34AFP				Interpolated
72RG32AFP				UUT1a,b

Table 5: Certified Subcomponents, HMC-2000

Battery Rescue Devices

Manufacturer: Motion Control Engineering

Product Line: HMC-2000

Subcomponent: Battery Rescue Devices

Seismic Level: Sds = 2.5g, z/h = 1.0

Battery Rescue Devices				
Model Number	Manufacturer	Material	Description	Unit
HAPS-2B-208V	MCE	Circuit board assembly	Battery lowering unit, 2 batteries, 208VAC	UUT1a,b
HAPS-2-208-208			Battery lowering unit, 2 batteries, 208VAC, 208V output	Interpolated
HAPS-2-208-220			Battery lowering unit, 2 batteries, 208VAC, 220V output	Interpolated
HAPS-2-208-240			Battery lowering unit, 2 batteries, 208VAC, 240V output	Interpolated
HAPS-2B-220V			Battery lowering unit, 2 batteries, 220VAC	Interpolated
HAPS-2-220-208			Battery lowering unit, 2 batteries, 220VAC, 208V output	Interpolated
HAPS-2-220-220			Battery lowering unit, 2 batteries, 220VAC, 220V output	Interpolated
HAPS-2-220-240			Battery lowering unit, 2 batteries, 220VAC, 240V output	Interpolated
HAPS-2B-240V			Battery lowering unit, 2 batteries, 240VAC	Interpolated
HAPS-2-240-208			Battery lowering unit, 2 batteries, 240VAC, 208V output	Interpolated
HAPS-2-240-220			Battery lowering unit, 2 batteries, 240VAC, 220V output	Interpolated
HAPS-2-240-240			Battery lowering unit, 2 batteries, 240VAC, 240V output	Interpolated
HAPS-2B-480V			Battery lowering unit, 2 batteries, 480VAC	Interpolated
HAPS-2-480-208			Battery lowering unit, 2 batteries, 480VAC, 208V output	Interpolated
HAPS-2-480-220			Battery lowering unit, 2 batteries, 480VAC, 220V output	Interpolated
HAPS-2-480-240			Battery lowering unit, 2 batteries, 480VAC, 240V output	Interpolated
HAPS-2-480-480			Battery lowering unit, 2 batteries, 480VAC, 480V output	Interpolated
HAPS-4B-208V			Battery lowering unit, 4 batteries, 208VAC	Interpolated
HAPS-4-208-208			Battery lowering unit, 4 batteries, 208VAC, 208V output	Interpolated
HAPS-4-208-220			Battery lowering unit, 4 batteries, 208VAC, 220V output	Interpolated
HAPS-4-208-240			Battery lowering unit, 4 batteries, 208VAC, 240V output	Interpolated
HAPS-4B-220V			Battery lowering unit, 4 batteries, 220VAC	Interpolated
HAPS-4-220-208			Battery lowering unit, 4 batteries, 220VAC, 208V output	Interpolated
HAPS-4-220-220			Battery lowering unit, 4 batteries, 220VAC, 220V output	Interpolated
HAPS-4-220-240			Battery lowering unit, 4 batteries, 220VAC, 240V output	Interpolated
HAPS-4B-240V			Battery lowering unit, 4 batteries, 240VAC	Interpolated
HAPS-4-240-208			Battery lowering unit, 4 batteries, 240VAC, 208V output	Interpolated
HAPS-4-240-220			Battery lowering unit, 4 batteries, 240VAC, 220V output	Interpolated
HAPS-4-240-240			Battery lowering unit, 4 batteries, 240VAC, 240V output	Interpolated
HAPS-4-480-208			Battery lowering unit, 4 batteries, 480VAC, 208V output	Interpolated
HAPS-4-480-220			Battery lowering unit, 4 batteries, 480VAC, 220V output	Interpolated
HAPS-4-480-240			Battery lowering unit, 4 batteries, 480VAC, 240V output	Interpolated
HAPS-4-480-480			Battery lowering unit, 4 batteries, 480VAC, 480V output	Interpolated
HAPS-4B-480V			Battery lowering unit, 4 batteries, 480VAC	UUT3a,b

Table 6: Certified Subcomponents, HMC-2000 and mGroup

Printed Circuit Boards and Terminals

Manufacturer: Motion Control Engineering

Product Line: HMC-2000 and mGroup

Subcomponent: Printed Circuit Boards and Terminals

Seismic Level: Sds = 2.5g, z/h = 1.0

Printed Circuit Boards			
Model Number	Manufacturer	Material	Unit
CE2849F with M00393 Piggyback board	MCE	Epoxy glass with plated copper	UUT1a,b, UUT3a,b
HC-CHP			UUT1a,b, UUT2a,b, UUT3a,b, UUT4a,b
HC-CTL			UUT1a,b, UUT3a,b
HC-DAB			UUT1a,b, UUT2a,b, UUT3a,b, UUT4a,b
HC-DB-MOD			UUT1a,b, UUT3a,b
HC-DB-MOD-R			UUT1a,b, UUT3a,b
HC-DVR			UUT1a,b, UUT3a,b
HC-GB-4			UUT1a,b, UUT3a,b
HC-MPU			UUT1a,b, UUT3a,b
HC-RDR			UUT1a,b, UUT3a,b
HC-RT20			UUT1a,b, UUT3a,b
HC-UIO			UUT1a,b, UUT2a,b, UUT3a,b, UUT4a,b
MC-DLC			UUT1a,b, UUT3a,b
MC-M2C			UUT1a,b, UUT3a,b
MC-MCP			UUT2a,b, UUT4a,b

Terminals			
Model Number	Manufacturer	Material Description	Unit
970-5100	Marathon	Lug, Double Ground	UUT1a,b, UUT2a,b, UUT4a,b
1433559		Terminal Block 3POS 350A 3/8 Stud	UUT1a,b
1423553		Terminal Block 3POS 175A 1/4 Stud	UUT3a,b
1853950000	Weidmuller	Term Pnlmnt 1R 1P 4 26-10AWG GRY	UUT1a,b, UUT2a,b, UUT4a,b

Table 7: Certified Subcomponents, HMC-2000 and mGroup

Power Modules and Power Supplies

Manufacturer: Motion Control Engineering

Product Line: HMC-2000 and mGroup

Subcomponent: Power Modules and Power Supplies

Seismic Level: Sds = 2.5g, z/h = 1.0

Power Modules				
Model Number	Manufacturer	Description	Power	Unit
HAPS	MCE	Circuit boards; solid state devices; terminal blocks; 12V, 5AH batteries; etc., in open housing	100-240 VAC / 24 VDC	UUT1a,b, UUT3a,b

Power Supplies				
Model Number	Manufacturer	Material	Power	Unit
DSP 100-24	Lamda	Plastic housing	Input: 100VAC-240VAC Output: 24V	UUT2a,b, UUT4a,b

Table 8: Certified Subcomponents, HMC-2000 and mGroup

Relays & Relay Sockets, Surge Protectors, Contactors, and Resistors

Manufacturer: Motion Control Engineering

Product Line: HMC-2000 and mGroup

Subcomponent: Relays and Relay Sockets, Surge Protectors, Contactors, Resistors

Seismic Level: Sds = 2.5g, z/h = 1.0

Relays & Relay Sockets, Surge Protectors, Contactors					
Model Number	Manufacturer	Material	Description	Power	Unit
PRD-11AH0-120V	Potter & Brumfield	Contact material: silver Case: plastic	Relay	120VAC coil; 20A, 125VDC contacts	UUT1a,b, UUT3a,b
MY4N-AC110/120(S)	Omron	Contact material: silver Case: plastic	Relay	120VAC coil, 5A	UUT1a,b, UUT2a,b, UUT3a,b, UUT4a,b
PYF14A-C	Omron	Case: plastic	Relay Socket	Used for relays with up to 120VAC coils, 5A contacts	UUT1a,b, UUT2a,b, UUT3a,b UUT4a,b
BSPM3480WYGR	Cooper-Bussmann	Enclosure material: thermoplastic UL 94VO	Surge Protector	227/480VAC	UUT4a,b
RL4RA031TJ	G.E.	Contact material: silver alloy Case: plastic	Auxiliary contactors	120VAC coil, 10A	UUT1a,b, UUT2a,b, UUT3a,b

Resistors					
Model Number	Manufacturer	Material	Description	Power	Unit
AVT025-XX	Vishay	Element: copper-nickel alloy or nickel-chrome alloy, depending on resistance value Core: ceramic, steatite or cordierite	Wirewound resistors, industrial power, adjustable tubular	25W	UUT1a,b, UUT3a,b
AVT050-XX				50W	Interpolated
AVT100-XX				100W	Interpolated
AVT200-XX				225W	UUT1a,b, UUT3a,b
FVT025-XX			Wirewound resistors, industrial power, fixed tubular	25W	UUT1a,b, UUT3a,b
FVT050-XX				50W	Interpolated
FVT100-XX				100W	Interpolated
FVT200-XX				225W	UUT1a,b, UUT3a,b

Table 9: Certified Subcomponents, HMC-2000

Transformers

Manufacturer: Motion Control Engineering

Product Line: HMC-2000

Subcomponent: Transformers

Seismic Level: Sds = 2.5g, z/h = 1.0

Transformers						
Model Number	Manufacturer	Core Material	Winding Material	Capacity (VA)	Voltages (VAC)	Unit
4-06-5024	MCI	Carbon steel	Copper	12	12/24	UUT1a,b
4-49-6016				80	115/230-8/16	UUT1a,b, UUT3a,b
4-54-0540				650	110, 120, 160, 220, 240, 16, 24	UUT1a,b
4-54-0740				900	110, 120, 160, 220, 240, 16, 24	Interpolated
4-54-2040				2150	110, 120, 160, 220, 240, 16, 24	UUT3a,b

Table 10: RESIST-R-C, Certified Components

Manufacturer: Motion Control Engineering

Product Line: RESIST-R-C

Certified Product Construction: NEMA 1 enclosures; painted carbon steel or aluminum

Certified Options: Enclosures, Terminal Blocks and Resistors

Mounting Description: Rigid base or wall mounted (RESIST-R-C)

Model	Description	Enclosure Material	NEMA Rating	Maximum Dimensions (inches)			Max. Weight (lb)	Mounting	Sds (g), z/h=1	Unit
				Depth	Width	Height				
RESIST-R-C	Size 1	Aluminum	1	10.3	18.0	32.0	40	Rigid base or wall mount	2.50	UUT15a,b
RESIST-R-C	Size 2	Aluminum	1	10.0	20.8	32.0	51	Rigid base or wall mount	2.50	UUT16a,b

Table 11: Certified Subcomponents, RESIST-R-C

Enclosures

Manufacturer: Motion Control Engineering

Product Line: RESIST-R-C

Subcomponent: Enclosures

Seismic Level: Sds = 2.5g, z/h = 1.0

Enclosures								
Model Number	MCE Part #	Manufacturer	Material	Dimensions (inches)			NEMA Type	Unit
				Depth	Width	Height		
PRO 1281	31-RA-0005	Milwaukee	Aluminum	21.0	32.0	10.0	1	UUT16a,b
49-0009.800-08-P1279	31-RA-0008	Milwaukee	Aluminum	18.0	32.0	10.0	1	UUT15a,b

Table 12: Certified Subcomponents, RESIST-R-C

Terminal Blocks and Resistors

Manufacturer: Motion Control Engineering

Product Line: RESIST-R-C

Subcomponent: Terminal blocks and Resistors

Seismic Level: Sds = 2.5g, z/h = 1.0

Terminal Blocks					
Model Number	Manufacturer	Material	Description	Power	Unit
1322572	Marathon	Copper and aluminum box lug	Terminal block	175A	UUT15a,b UUT16a,b

Resistors					
Model Number	Manufacturer	Material	Description	Power	Unit
M-214881	Vishay	Element: stainless steel, copper-nickel, nickel-chrome; Core: electrical porcelain; Terminals: Stainless steel	Edgewound Power Resistors	1600W	UUT16a,b
M-214882				1600W	Interpolated
M-214883				1600W	Interpolated
M-214884				1600W	Interpolated
M-214885				1600W	UUT15a,b

Table 13: Certified Components, M4000-AC-01, i-AC-01, i-CENTRAL-CUE

Manufacturer: Motion Control Engineering

Product Line: M4000-AC-01, i-AC-01, i-CENTRAL-CUE

Certified Product Construction: NEMA 1 enclosures; painted carbon steel or aluminum

Certified Options: Enclosures, fuses, terminals, capacitors, contactors, drives, fans, power modules, power supplies, filters and chokes, p.c. boards, computers and peripherals, receptacles and power strips, relays, timers, surge protectors, contactors, resistors and transformers

Mounting Description: Rigid base mounted

Model	Description	Enclosure Material	NEMA Rating	Maximum Dimensions (inches)			Max. Weight (lb)	Mounting	Sds (g), z/h=1	Unit
				Depth	Width	Height				
M4000-AC-01	Size 1	Painted carbon steel	1	16.0	42.0	72.0	481	Rigid base	2.10	UUT5
M4000-AC-01	Size 2	Painted carbon steel	1	17.0	61.0*	72.0	960	Rigid base	2.10	UUT6
i-AC-01	Size 1	Painted carbon steel	1	16.0	42.0	72.0	560	Rigid base	2.10	UUT7
i-AC-01	Size 2	Painted carbon steel	1	17.0	61.0*	72.0	1,050	Rigid base	2.10	UUT8
i-CENTRAL-CUE	One Size	Painted carbon steel	1	23.0	28.0	72.0	402	Rigid base	2.10	UUT11, UUT12

*Note: UUT6 and UUT8 cabinet width is 61.0" with optional side enclosure, and 46.0" without.

Table 14: Certified Subcomponents, M4000-AC-01 , i-AC-01, i-CENTRAL-CUE

Enclosures

Manufacturer: Motion Control Engineering

Product Line: M4000-AC-01, i-AC-01, i-CENTRAL-CUE

Subcomponent: Enclosures

Seismic Level: Sds = 2.1g, z/h = 1.0

Enclosures								
Model Number	MCE Part #	Manufacturer	Material	Dimensions (inches)			NEMA Type	Unit
				Depth	Width	Height		
349RH	15-02-0012	Hoffman	Painted carbon steel	13.0	13.0	39.0	1	UUT6, UUT8*
331RH	15-50-0003	Hoffman	Painted carbon steel	23.0	28.0	72.0	1	UUT11, UUT12
300RH	15-50-0002	Hoffman	Painted carbon steel	16.0	42.0	72.0	1	UUT5, UUT7
329RH	15-50-0001	Hoffman	Painted carbon steel	17.0	46.0	72.0	1	UUT6, UUT8*

*Note: UUT6 and UUT8 were tested with main enclosure, Model 15-50-0001, and side enclosure, Model 15-02-0012.

Table 15: Certified Subcomponents, M4000-AC-01, i-AC-01, i-CENTRAL-CUE

Fuses

Manufacturer: Motion Control Engineering

Product Line: M4000-AC-01, i-AC-01, i-CENTRAL-CUE

Subcomponent: Fuses

Seismic Level: Sds = 2.1g, z/h =1.0

Fuses			
Model Number	Manufacturer	Material Description	Unit
AGC-9	BUSSMANN	FUSE 250V 9AMP GLASS	UUT7, UUT8
312001.HXP	Littelfuse	FUSE 250V 1AMP GLASS	UUT5, UUT6, UUT7, UUT8, UUT11, UUT12
312002		FUSE 250V 2AMP GLASS	UUT7
312003		FUSE 250V 3AMP GLASS	UUT5, UUT6, UUT11
313001		Fuse Slo-Blo 250V 1A MDQ/313	UUT6, UUT7, UUT8, UUT11, UUT12
313004		Fuse Slo-Blo 250V 4A MDQ/313	UUT6, UUT7, UUT8, UUT11, UUT12
313002		Fuse Slo-Blo 250V 2A MDQ/313	UUT6, UUT7, UUT8, UUT11
313600		Fuse Slo-Blo 250V 6/10A MDQ/313	UUT5, UUT6
313003		Fuse Slo-Blo 250V 3A MDQ/313	UUT6, UUT7, UUT8, UUT11, UUT12
313.250MXP		Fuse Slo-Blo 250V 1/4A MDQ/313	UUT5, UUT6
312.500H		FUSE 250V .5AMP GLASS	UUT6, UUT11, UUT12
0313.500HXP		Fuse Slo-Blo 250V 1/2A MDQ/313	UUT11, UUT12
FLQ-3		FUSE SLOBLO 500V 3A FNQ/FLQ	UUT6
FLQ-4		FUSE SLOBLO 500V 4A FNQ/FLQ	UUT6, UUT7, UUT8
FLQ-5		FUSE SLOBLO 500V 5A FNQ/FLQ	UUT7
FLQ-5		Fuse Holder Class J 30A 3P PNL Box Lug	UUT7
FLQ-5		Fuse Fst-Blo 600V 30A JLS UL/CSA	UUT7
FLQ-6		FUSE SLOBLO 500V 6A FNQ/FLQ	UUT5
FLQ-7		Fuse Slo-Blo 500V 7A FNQ/FLQ	UUT5
FLQ-8		FUSE SLOBLO 500V 8A FNQ/FLQ	UUT11, UUT12
FLQ-12		FUSE SLOBLO 500V 12A FNQ/FLQ	UUT7, UUT8
FLSR90		FUSE 600V 90A FUSETRON	UUT7, UUT8
FLN-R 12		FUSE 250V 12AMP FRN-R	UUT5

Table 16: Certified Subcomponents, M4000-AC-01, i-AC-01, i-CENTRAL-CUE

Fuses (Continued)

Manufacturer: Motion Control Engineering

Product Line: M4000-AC-01, i-AC-01, i-CENTRAL-CUE

Subcomponent: Fuses

Seismic Level: Sds = 2.1g, z/h =1.0

Fuses			
Model Number	Manufacturer	Material Description	Unit
KLDR005	Littelfuse	Fuse Time Delay 600V 5A Class CC KLDR	UUT6
KLDR007		Fuse Time Delay 600V 7A Class CC KLDR	UUT7, UUT8
L60030M2SQ		FUSE BLK 600V FNQ 30AMP 2 POS	UUT5, UUT6, UUT11, UUT12
L60030C-1SQ		Fuse Holder Class CC 30A 1P Scr Lug	UUT6
LFJ601003CID		Fuse Holder Class J 100A 3P PNL Box Lug	UUT5, UUT6
LFR601003CID		FUSE BLOCK 600V 100AMP 3POSN FRS-R	UUT7, UUT8
LFJ602003C		Fuse Holder Class J 200A 3P PNL Box Lug	UUT8
0JLS090.T		Fuse Fst-Blo 600V 90A JLS UL/CSA	UUT5, UUT6
JTD150		Fuse 600V 150A Class J Time Delay CSA	UUT8
31.1661	Schruter	Fuse Cap Fau for 17-03-0067	UUT8, UUT11, UUT12

Table 17: Certified Subcomponents, M4000-AC-01, i-AC-01, i-CENTRAL-CUE

Terminals

Manufacturer: Motion Control Engineering

Product Line: M4000-AC-01, i-AC-01, i-CENTRAL-CUE

Subcomponent: Terminals

Seismic Level: Sds = 2.1g, z/h =1.0

Terminals			
Model Number	Manufacturer	Material Description	Unit
1320574	MARATHON	Terminal Block Adder 600V CU9AL 90	UUT5, UUT6
1423572		Power TB 3 POS 600V 175A	UUT7, UUT8
1431559		Shunt Block TB 1 POS 600V 350A	UUT6, UUT7, UUT8
970-5100		Lug, Double Ground	UUT6, UUT7, UUT8
1432126		Power TB 2 POS 600V 310A	UUT7, UUT8
1423553		Terminal Block 3 Pos 175A 1/4 Stud	UUT5, UUT6, UUT7, UUT8
1433559		Terminal Block 3POS 350A 3/8 Stud	UUT7, UUT8
1853950000	WEIDMULLER	Term Pnlmnt 1R 1P 4 26-10AWG GRY	UUT5, UUT6, UUT7, UUT8, UUT11, UUT12
1853960000		Term Pnlmnt 1R 1P 10 14-6AWG GRY	UUT7, UUT8, UUT11, UUT12
1853970000		Term End Cover for 37-03-0001 & 0002	UUT5, UUT6, UUT7, UUT8, UUT11, UUT12
1854410000		Term End Cap for standard din rail	UUT5, UUT6, UUT7, UUT8, UUT11, UUT12
995451		Term Jumper 6P for 37-03-0001	UUT7, UUT8, UUT11, UUT12
23650		DIN RAIL PERFORATED FOR UKH PWR BLKS	UUT7
687900000		Bracket Mounting Steel Base M4	UUT7
282600000		FERRULES 20 AWG	UUT7
1612170000		Plug Panel Mount 9 Pin 25A 600V	UUT7
1859200000		Term End Cap for UKH terminal blocks	UUT5, UUT6, UUT11, UUT12
1943640000		Term Plugin 1R 8P 5.08 26-12AWG 180 ORG	UUT5, UUT6
1948040000		Term Plugin 1R 6P 5.08 26-12AWG 90 ORG	UUT5, UUT6
1137460000		Term Plugin 1R 2P 5.08 26-12AWG 270 BLU	UUT5, UUT6
1137360000		Term Plugin 1R 3P 5.08 26-12AWG 270 BLU	UUT6
336800000		Term Jumper 3P for 37-03-0001	UUT5, UUT6, UUT11, UUT12

Table 18: Certified Subcomponents, M4000-AC-01, i-AC-01, i-CENTRAL-CUE

Terminals (Continued)

Manufacturer: Motion Control Engineering

Product Line: M4000-AC-01, i-AC-01, i-CENTRAL-CUE

Subcomponent: Terminals

Seismic Level: Sds = 2.1g, z/h =1.0

Terminals			
Model Number	Manufacturer	Material Description	Unit
336700000	WEIDMULLER	Term Jumper 2P for 37-03-0001	UUT5, UUT6, UUT11, UUT12
6760004258 REV B		Plug Set for HC-CTL J27 J12 Printed	UUT5, UUT6
1948150000		Term Plugin 1R 16P 5.08 26-12AWG 90 Org	UUT5
3010013	PHOENIX C	Power TB, 1 Pos 200A	UUT6
3003541	PHOENIX C	Pick Off TB AGK10 For UKH95	UUT6
MPDB63141	MERSEN	Terminal Block 1 POS Box To Stud	UUT5, UUT6
3008	ABBATRON	Terminal Strip 8 POS	UUT8
3010	ABBATRON	Terminal Strip 10 POS	UUT6, UUT8, UUT11, UUT12

Table 19: Certified Subcomponents, M4000-AC-01 , i-AC-01

Capacitors and Contactors

Manufacturer: Motion Control Engineering

Product Line: M4000-AC-01, i-AC-01

Subcomponent: Capacitors and Contactors

Seismic Level: Sds = 2.1g, z/h = 1.0

Capacitors				
Model Number	Manufacturer	Material	Electrical Ratings	Unit
940C10W1K-F	CDE	Case Material: UL510 Polyester Tape Wrap; Resin Material: UL94V-0 Epoxy Fill; Terminal Material: Tin Plated Copper	1uF, 500VAC/1000VDC	UUT6, UUT7, UUT8
E81D630VNN682MA50T	UCC	Aluminum	6800uF, 63V	UUT5, UUT6, UUT7, UUT8, UUT11, UUT12
97F5300BX	Genteq	Metalized polypropylene film	10uF, 440VAC	UUT5, UUT6
97F9622	Genteq	Metalized polypropylene film	50uF, 370VAC	UUT7, UUT8

Contactors				
Model Number	Manufacturer	Material	Power	Unit
3RT1026-1AK60	Siemens	Housing material: Plastic; Contact material: AgSnO	7.5/15HP; 25A	UUT5, UUT7, UUT8
3RT2026-1AK60			7.5/15HP; 25A	Interpolated
3RT1033-1AK60			10/20HP; 28A	Interpolated
3RT1034-1AK60			10/25HP; 32A	Interpolated
3RT1035-1AK60			15/30HP; 40A	UUT5, UUT6
3RT2035-1AK60			15/30HP; 40A	Interpolated
3RT2046-1AK60			30/75HP; 95A	Interpolated
3RT1054-6AF36			50/100HP; 115A	Interpolated
3RT1055-6AF36			60/125HP; 150A	Interpolated
3RT1056-6AF36			60/125HP; 185A	Interpolated
3RT1064-6AF36			75/150HP; 225A	Interpolated
3RT1065-6AF36			100/200HP; 265A	Interpolated
3RT1066-6AF36			125/250HP; 300A	UUT6, UUT8

Table 20: Certified Subcomponents, M4000-AC-01 , i-AC-01

Drives

Manufacturer: Motion Control Engineering

Product Line: M4000-AC-01, i-AC-01

Subcomponent: Drives

Seismic Level: Sds = 2.1g, z/h = 1.0

Drives					
Model Number	Manufacturer	Material	Description	Power	Unit
13.F5.A1E-PP00	KEBCO	Circuit boards, solid state devices and terminal blocks in plastic housing	TORQMAX F5 Inverter Drives	180-260VAC; 7.5-60 HP; 22-154 FLA	UUT5, UUT7
14.F5.A1E-PP00					Interpolated
15.F5.A1G-PP00					Interpolated
15.F5.A1G-PP0A					Interpolated
15.F5.A1H-PP00					Interpolated
16.F5.A1H-PP00					Interpolated
17.F5.A1H-PP00					Interpolated
17.F5.A1H-PP0A					Interpolated
19.F5.A1R-PP00					Interpolated
19.F5.A1R-PP0A					Interpolated
20.F5.A1R-PP00					Interpolated
21.F5.A1R-PP00					UUT6, UUT8
23.F5.A1U-PP00					Extrapolated[1]
13.F5.A1E-RP00	KEBCO	Circuit boards, solid state devices and terminal blocks in plastic housing	TORQMAX F5 Inverter Drives	305-500VAC; 7.5-175 HP; 11-231 FLA	UUT5, UUT7
14.F5.A1E-RP00					Interpolated
15.F5.A1E-RP00					Interpolated
16.F5.A1G-RP00					Interpolated
17.F5.A1G-RP00					Interpolated
18.F5.A1H-RP00					Interpolated
19.F5.A1H-RP00					Interpolated
20.F5.A1H-RP00					Interpolated
21.F5.A1R-RP00					Interpolated
22.F5.A1R-RP00					Interpolated
22.F5.A1R-RP0A					Interpolated
22.F5.A1R-RP0C					Interpolated
24.F5.A1U-RP00					Interpolated
26.F5.A1U-RP00					UUT6, UUT8
26.F5.A1U-RP0A					Extrapolated[2]
19.R6.S3E-RP00	KEBCO	Circuit boards, solid state devices and terminal blocks in plastic housing	R6 Regen Unit	180-500VAC; 65-195A	UUT5, UUT6, UUT7, UUT8

1. Extrapolated drive has the same dimensions and weight as the 305-500VAC drives tested in UUT6 and UUT8. The only difference is the voltage range.
2. Extrapolated drive has the same dimensions and weight as those tested in UUT6 and UUT8.

Table 21: Certified Subcomponents, M4000-AC-01 , i-AC-01, i-CENTRAL-CUE

Fans, Power Modules, Power Supplies

Manufacturer: Motion Control Engineering

Product Line: M4000-AC-01, i-AC-01, i-CENTRAL-CUE

Subcomponent: Fans, Power Modules, Power Supplies

Seismic Level: Sds = 2.1g, z/h = 1.0

Fans				
Model Number	Manufacturer	Material	Electrical Ratings	Unit
SP100A-1123XBT.GN	Sunon	Aluminum alloy	115V, 60 Hz, 12W	UUT6, UUT7, UUT8
A1175-HBT-TC.GN	Sunon	Aluminum alloy	115V, 60 Hz, 33W	UUT5, UUT6, UUT11, UUT12

Power Modules				
Model Number	Manufacturer	Material	Power	Unit
i-Box-1	MCE	Circuit boards, solid state devices and terminal blocks, in plastic housing	120VAC / 110VDC	UUT7, UUT8
I-PowerBox-2	MCE		600V, 30A	UUT7, UUT8
M-BRAKE-MODULE	MCE	Circuit boards, solid state devices, transformer, terminal blocks, in open housing	Input: 300 VAC max., 1 or 3 Phase, 50/60 Hz, 15 A max. Output: 300 VDC, 15 A max.	UUT5, UUT6

Power Supplies				
Model Number	Manufacturer	Material	Power	Unit
DSP 100-24	Lamda	Plastic housing	Input: 100VAC-240VAC Output: 24V	UUT5, UUT6, UUT7, UUT8
LFWLT40-3002-A	EOS	PC board, open	Input: 90 - 264 V, Universal Output: 5.2V, 14.6V, 14.8V	UUT7, UUT8
8951360000	Weidmuller	Metal housing	Input: 100-240 V AC Output: 22.5-29.5 V	UUT11, UUT12

Table 22: Certified Subcomponents, M4000-AC-01 , i-AC-01

Filters & Chokes

Manufacturer: Motion Control Engineering

Product Line: M4000-AC-01, i-AC-01

Subcomponent: Filters and Chokes

Seismic Level: Sds = 2.1g, z/h = 1.0

Filters & Chokes					
Model Number	Manufacturer	Material	Description	Electrical Ratings	Unit
19.Z1.B05-1000	KEBCO	Carbon steel housing	Commutation choke	550VAC, 70A (max)	UUT5, UUT6, UUT7, UUT8
2-30-2173F-CHINA	MCI	Core: Ferrite; Windings: Copper; Terminals: Extruded brass UL Listed terminal attached to G10 terminal board using brass hardware (bolts, nuts, washers); Capacitors: Cornel Dublier #940C12W1K-F attached to assembly using Panduit cable tie and capacitor saddles.	EMI filter assembly	70A	UUT5, UUT7
2-30-2135		Core: Ferrite; Windings: Copper; Terminals: Copper buss bar		140A	UUT6, UUT8
RL-01802	MTE	Core Steel: Electrical grade high frequency silicon steel Windings: High dielectric withstand solid copper conductor (220° C)	Line inductor	18A, 1.5mH	UUT5, UUT7
RL-02502				25A, 1.2mH	Interpolated
RL-03502				35A, 0.8mH	Interpolated
RL-04502				45A, 0.7mH	Interpolated
RL-08002				80A, 0.4mH	Interpolated
RL-10002				100A, 0.3mH	Interpolated
RL-13002				130A, 0.2mH	Interpolated
RL-16002				160A, 0.15mH	Interpolated
RL-20002B14				200A, 0.11mH	UUT6, UUT8

Table 23: Certified Subcomponents, M4000-AC-01 , i-AC-01, i-CENTRAL-CUE

Printed Circuit Boards

Manufacturer: Motion Control Engineering

Product Line: M4000-AC-01, i-AC-01, i-CENTRAL-CUE

Subcomponent: Printed Circuit Boards

Seismic Level: Sds = 2.1g, z/h = 1.0

Printed Circuit Boards			
Model Number	Manufacturer	Material	Unit
CE2849F with M00393 Piggyback board	MCE	Epoxy glass with plated copper	UUT5, UUT6
HC-CHP			UUT5, UUT6
HC-CTL			UUT5, UUT6
HC-DAB			UUT5, UUT6, UUT11, UUT12
HC-DB-MOD			UUT5, UUT6
HC-DB-MOD-R			UUT5, UUT6
HC-GB-4			UUT5, UUT6
HC-MPU			UUT5, UUT6
HC-OA			UUT7, UUT8, UUT11, UUT12
HC-RDR			UUT5, UUT6
HC-RT20			UUT5, UUT6
HC-UIO			UUT5, UUT6
ICE-FB1P			UUT7, UUT8
ICE-FB2P			UUT7, UUT8
ICE-FB4			UUT7, UUT8, UUT11, UUT12
ICE-IEQ			UUT7, UUT8
ICE-IMP			UUT7, UUT8
ICE-IRB-2			UUT7, UUT8
ICE-IRD			UUT7, UUT8
ICE-MIAC			UUT7, UUT8
ICE-MOR			UUT7, UUT8
ICE-PFD			UUT7, UUT8
ICE-PRB			UUT7, UUT8
ICE-RG			UUT7, UUT8
ICE-SAF			UUT7, UUT8
ICE-SF			UUT7, UUT8
MC-DLC			UUT5, UUT6
MC-M2C			UUT5, UUT6
SC-HCDA			UUT11, UUT12
SC-HCE-2			UUT11, UUT12
SC-ION			UUT11, UUT12
TC-MPI			UUT5, UUT6

Table 24: Certified Subcomponents, i-CENTRAL-CUE

Computers & Peripherals

Manufacturer: Motion Control Engineering

Product Line: i-CENTRAL-CUE

Subcomponent: Computers and Peripherals

Seismic Level: Sds = 2.1g, z/h = 1.0

Computers & Peripherals					
Model Number	Manufacturer	Material	Description	Electrical Ratings	Unit
UM.BV6AA.002	Acer	Plastic	Monitor 17" Black LCD	Input Voltage: 110 / 220 VAC Operating Power Consumption: 13 W	UUT12
UM.CV6AA.001	Acer	Plastic	Monitor 19" Black LCD Wide Screen	Input Voltage: 110 / 220 VAC Operating Power Consumption: 13 W	UUT11
920002478	Logitech	Plastic	Keyboard USB Internet Black	5V; 100mA	UUT11, UUT12
1240900000	Weidmuller	Housing main material: aluminium	8 port ethernet switch	N/A	UUT11, UUT12
OPTIPLEX 3020MT CTO (210-ABIW)	Dell	PC Housing main material: painted carbon steel; mouse: plastic	DELL Optiplex 3020 P.C. w/WIN 7 64BIT	Computer: 100-240V, 5.4A, 50-60 Hz Mouse: 5V; 100mA	UUT11, UUT12
OPTIPLEX 3050 Tower	Dell	PC Housing main material: painted carbon steel; mouse: plastic	PC DELL OPTIPLEX 3050 Mini Tower	Computer: 100-240V, 4A, 50-60 Hz Mouse: 5V; 100mA	UUT11, UUT12
UR-12-PLUS	Connectpro	Housing main material: painted carbon steel	KVM switch, 2 PORT USB	5VDC	UUT11, UUT12

Table 25: Certified Subcomponents, M4000-AC-01 , i-AC-01, i-CENTRAL-CUE

Receptacles & Power Strips, Relays & Relay Sockets, Timers, Surge Protectors, Contactors

Manufacturer: Motion Control Engineering

Product Line: M4000-AC-01, i-AC-01, i-CENTRAL-CUE

Subcomponent: Receptacles and Power Strips, Relays, Relay Sockets, Timers, Surge Protectors, Contactors

Seismic Level: Sds = 2.1g, z/h = 1.0

Receptacles & Power Strips					
Model Number	Manufacturer	Material	Description	Power	Unit
5325W	Leviton	Thermoplastic	Duplex receptacle, 15A 125V	15A, 125V	UUT11, UUT12
PS2408	Tripplite	Aluminum	Power strip, 15A 120v AC	15A, 120V	UUT11, UUT12

Relays & Relay Sockets, Timers, Surge Protectors, Contactors					
Model Number	Manufacturer	Material	Description	Power	Unit
KUP-14A15-120	Potter & Brumfield	Contact material: silver alloy Case: plastic	Relay	120VAC coil, 10A contacts	UUT5, UUT6
PRD-11AY0-120	Potter & Brumfield	Contact material: silver Case: plastic	Relay	120VAC coil; 25A, 240VAC contacts	UUT7, UUT8, UUT11, UUT12
PRD-11AH0-120V	Potter & Brumfield		Relay	120VAC coil; 20A, 125VDC contacts	UUT5, UUT6
MY4-DC24(S)	Omron	Contact material: silver Case: plastic	Relay	24VDC coil, 3A contacts	UUT7, UUT8, UUT11, UUT12
MY4N-AC110/120(S)	Omron		Relay	120VAC coil, 5A	UUT5, UUT6, UUT7, UUT8, UUT11, UUT12
PYF14A-C	Omron	Case: plastic	Relay Socket	Used for relays with up to 120VAC coils, 5A contacts	UUT5, UUT6, UUT7, UUT8, UUT11, UUT12
438A-115-1	Artisan	Contact material: silver alloy Case: plastic	Timer	115VAC, 1A	UUT7, UUT8
438-USA	Artisan	Contact material: silver alloy Case: plastic	Timer	19 - 288 VAC/DC; 1A	UUT7, UUT8
70-463-1	Magnecraft	Internal metal tracks: copper alloy, zinc plated; Screw terminals: zinc plated carbon steel; Body: thermoplastic UL 94VO	Relay Sockets	15A, 300V	UUT5, UUT6
BSPM3208WYGR	Cooper-Bussmann	Enclosure material: thermoplastic UL 94VO	Surge Protector	120/208VAC 3	UUT5
RL4RA031TJ	G.E.	Contact material: silver alloy Case: plastic	Auxiliary contactors	120VAC coil, 10A	UUT5, UUT6

Table 26: Certified Subcomponents, M4000-AC-01 , i-AC-01

Resistors

Manufacturer: Motion Control Engineering

Product Line: M4000-AC-01, i-AC-01

Subcomponent: Resistors

Seismic Level: Sds = 2.1g, z/h = 1.0

Resistors					
Model Number	Manufacturer	Material	Description	Power	Unit
AVT025-XX	Vishay	Element: copper-nickel alloy or nickel-chrome alloy, depending on resistance value Core: ceramic, steatite or cordierite	Wirewound resistors, industrial power, adjustable tubular	25W	UUT5, UUT6, UUT7, UUT8
AVT050-XX				50W	Interpolated
AVT100-XX				100W	Interpolated
AVT200-XX				225W	UUT5, UUT6, UUT7, UUT8
FVT025-XX			Wirewound resistors, industrial power, fixed tubular	25W	UUT5, UUT6, UUT7, UUT8
FVT050-XX				50W	Interpolated
FVT100-XX				100W	Interpolated
FVT200-XX				225W	UUT5, UUT6, UUT7, UUT8
40-240-30ARCXBRKT		Resistance-alloy ribbon wire is coiled on edge and supported on specially designed porcelain insulators	Wirewound resistors, industrial power, tubular, ribwound (RB), adjustable, 1000W 30 OHM	1000W	UUT5, UUT6, UUT7, UUT8
40-320-3RC		Element: copper-nickel, nickel-chrome, iron-chrome-aluminum; Core: cordierite, steatite; Coating: special high temperature silicone or vitreous enamel; Terminals: nickel-iron	Wirewound resistors, industrial power, tubular, ribwound (RB), fixed	1500W	UUT5, UUT6, UUT7, UUT8
40-320-8RCX				1500W	UUT5, UUT6, UUT7, UUT8
51-007.8-2-8313				1100W	Extrapolated*
51-012.6-2-8313				1100W	UUT5, UUT7
51-015.6-2-8313				1100W	Interpolated
51-020.0-2-8313				1100W	Interpolated
51-025.0-2-8313				1100W	Interpolated
51-030.0-2-8313				1100W	Interpolated
51-031.8-2-8313				1100W	Interpolated
51-036.0-2-8313				1100W	UUT6, UUT8
51-045.6-2-8313				1100W	Extrapolated*
51-075.0-2-8313				1100W	Extrapolated*
51-120.0-2-8313				1100W	Extrapolated*

*Extrapolated resistors are the same size as the resistors tested in UUT6 and UUT8.

Table 27: Certified Subcomponents, M4000-AC-01 , i-AC-01

Resistors (Continued)

Manufacturer: Motion Control Engineering

Product Line: M4000-AC-01, i-AC-01

Subcomponent: Resistors (continued)

Seismic Level: Sds = 2.1g, z/h = 1.0

Resistors (Continued)

Model Number	Manufacturer	Material	Description	Power	Unit
M-214745	Vishay	Element: stainless steel, copper-nickel, nickel-chrome; Core: electrical porcelain; Terminals: Stainless steel	Edgewound Power Resistors	1000W	Interpolated
M-214749				1000W	Interpolated
M-214751				1000W	Interpolated
M-214757				1000W	Interpolated
M-214758				1000W	Interpolated
M-214762				1000W	Interpolated
M-214765				1000W	Interpolated
M-214766				1000W	Interpolated
M-214790				1200W	Interpolated
M-214791				1100W	Interpolated
M-214824				1400W	Interpolated
M-214833				1400W	Interpolated
M-214835				1400W	Interpolated
M-214837				1400W	Interpolated
M-214858				1600W	Interpolated
M-214865				1600W	Interpolated
M-214867				1600W	Interpolated
M-214869				1600W	Interpolated
M-214870				1600W	Interpolated
M-214871				1600W	Interpolated
M-214872				1600W	Interpolated
M-214873				1600W	Interpolated
M-214874				1600W	Interpolated
M-214875				1600W	Interpolated
M-214877				1600W	Interpolated
M-214878				1600W	Interpolated
M-214879				1600W	UUT5, UUT7
M-214880				1600W	Interpolated
M-214886				1600W	UUT6, UUT8

Table 28: Certified Subcomponents, M4000-AC-01 , i-AC-01

Resistors (Continued)

Manufacturer: Motion Control Engineering

Product Line: M4000-AC-01, i-AC-01

Subcomponent: Resistors (continued)

Seismic Level: Sds = 2.1g, z/h = 1.0

Resistors (Continued)					
Model Number	Manufacturer	Material	Description	Power	Unit
FSE1000-10 OHM	Vishay	Element: copper-nickel, nickel-chrome, iron-chrome-aluminum; Core: cordierite, steatite; Coating: special high temperature silicone or vitreous enamel; Terminals: nickel-iron	Wirewound Resistors, Industrial Power, Silicone Coated, Fixed Edgewound Tubular	1000W	UUT5, UUT6, UUT7, UUT8
PFE5K1R00E	Ohmite	Heavy resistance alloy mounted on ceramic insulators	Wirewound Resistors	1000W	UUT5, UUT6, UUT7, UUT8
PFE5KR100	Ohmite		Wirewound Resistors	1000W	UUT5, UUT6, UUT7, UUT8
PRM-214739	Powerohm	Resistance-alloy ribbon wire is coiled on edge and supported on specially designed porcelain insulators	Power Resistor	1000W	UUT5, UUT6, UUT7, UUT8

Table 29: Certified Subcomponents, M4000-AC-01 , i-AC-01, i-CENTRAL-CUE

Transformers

Manufacturer: Motion Control Engineering

Product Line: M4000-AC-01, i-AC-01, i-CENTRAL-CUE

Subcomponent: Transformers

Seismic Level: Sds = 2.1g, z/h = 1.0

Transformers						
Model Number	Manufacturer	Core Material	Winding Material	Capacity (VA)	Voltages (VAC)	Unit
4-06-5024	MCI	Carbon steel	Copper	12	12/24	UUT5, UUT6
4-06-6036				30	18/36	UUT11, UUT12
4-06-6016				30	16	UUT5, UUT6, UUT11, UUT12
4-49-6016				80	115/230-8/16	UUT5, UUT6, UUT11, UUT12
4-06-8024				100	12/24	UUT5, UUT6, UUT11, UUT12
4-06-8020				100	20	UUT5, UUT6
4-49-8036				175	115, 36/18	UUT7, UUT8
4-54-0540				650	110, 120, 160, 220, 240, 16, 24	UUT5, UUT6, UUT7, UUT8
4-54-0740				900	110, 120, 160, 220, 240, 16, 24	Interpolated
4-54-1040				1150	110, 120, 160, 220, 240, 16, 24	UUT5, UUT6, UUT7, UUT8
4-54-1540				1650	110, 120, 160, 220, 240, 16, 24	UUT5, UUT6
4-54-2040				2150	110, 120, 160, 220, 240, 16, 24	UUT7, UUT8
TCT40-01E07AB-B	Triad	Carbon steel	Copper	40	24	UUT11, UUT12
A41-80-28-CSA	SIGNAL	Carbon steel	Copper	80	115 /230, 14/28	UUT5, UUT6

Table 30: Certified Components: i-DC-01, Filter

Manufacturer: Motion Control Engineering

Product Line: i-DC-01, Filter

Certified Product Construction: NEMA 1 enclosures; painted carbon steel or aluminum

Certified Options: Enclosures, fuses and fuse blocks, terminals, capacitors, fans, drives, filters, chokes, p.c. boards, power modules, power supplies, receptacles, relays, timers resistors, and transformers

Mounting Description: Rigid base mounted

Model	Description	Enclosure Material	NEMA Rating	Maximum Dimensions (inches)			Max. Weight (lb)	Mounting	Sds (g), z/h=1	Unit
				Depth	Width	Height				
i-DC-01	One Size	Painted carbon steel	1	16.0	42.0	72.0	540	Rigid base	2.50	UUT9
i-DC-01	One Size	Painted carbon steel	1	16.0	42.0	72.0	550	Rigid base	2.50	UUT10
Filter	One Size	Painted carbon steel	1	14.3	30.0	25.8	166	Rigid base	2.50	UUT13, UUT14

Table 31: Certified Subcomponents, i-DC-01, Filter

Enclosures

Manufacturer: Motion Control Engineering

Product Line: i-DC-01, Filter

Subcomponent: Enclosures

Seismic Level: Sds = 2.5g, z/h = 1.0

Enclosures								
Model Number	MCE Part #	Manufacturer	Material	Dimensions (inches)			NEMA Type	Unit
				Depth	Width	Height		
300RH	15-50-0002	Hoffman	Painted carbon steel	16.0	42.0	72.0	1	UUT9, UUT10
312RH-TAN	15-09-0050	Hoffman	Painted carbon steel	14.0	26.0	26.0	1	UUT13, UUT14

Table 32: Certified Subcomponents, i-DC-01, Filter

Fuses and Terminals

Manufacturer: Motion Control Engineering

Product Line: i-DC-01, Filter

Subcomponent: Fuses and Terminals

Seismic Level: Sds = 2.5g, z/h =1.0

Fuses			
Model Number	Manufacturer	Material Description	Unit
312001.HXP	Littelfuse	FUSE 250V 1AMP GLASS	UUT9, UUT10
312002		FUSE 250V 2AMP GLASS	UUT9, UUT10
313002		Fuse Slo-Blo 250V 2A MDQ/313	UUT9, UUT10
313004		Fuse Slo-Blo 250V 4A MDQ/313	UUT9, UUT10
FLQ-4		FUSE SLOBLO 500V 4A FNQ/FLQ	UUT9, UUT10
FLQ-5		FUSE SLOBLO 500V 5A FNQ/FLQ	UUT9, UUT10
FLQ-20		FUSE SLOBLO 500V 20A FNQ/FLQ	UUT9, UUT10
FLQ-25		Fuse Slo-Blo 500V 25A FNQ/FLQ	UUT10
FLQ-30		Fuse Slo-Blo 500V 30A FNQ/FLQ	UUT10
L60030M2SQ		FUSE BLK 600V FNQ 30AMP 2 POS	UUT9, UUT10
LSCR001		FUSE BLOCK L50S 60-400A STUD	UUT9, UUT10
31.1661		Fuse Cap Fau for 17-03-0067	UUT9, UUT10
A50QS80-4		Fuse 500VAC 80 AMP Semiconductor	UUT9, UUT10
354 812-GY		FUSE BLOCK 300V 1 POSITION	UUT9, UUT10

Terminals			
Model Number	Manufacturer	Material Description	Unit
1422572	MARATHON	Power TB 2 POS 600V 175A	UUT13, UUT14
1423572		Power TB 3 POS 600V 175A	UUT9, UUT10
970-5100		Lug, Double Ground	UUT9, UUT10, UUT13, UUT14
1432126		Power TB 2 POS 600V 310A	UUT9
1423553		Terminal Block 3 Pos 175A 1/4 Stud	UUT9, UUT10
1422570		Terminal Block 2POS 600V 175A 1/4O	UUT9, UUT10
1853950000	WEIDMULLER	Term Pnlmnt 1R 1P 4 26-10AWG GRY	UUT9, UUT10, UUT13, UUT14
MPDB63141	MERSEN	Terminal Block 1 POS Box To Stud	UUT9, UUT10
3010	ABBATRON	Terminal Strip 10 POS	UUT9, UUT10
LAM2A250-38-6	PANDUIT	Ground Lug Dual Barrel LAM2A	UUT10

Table 33: Certified Subcomponents, i-DC-01, Filter

Capacitors and Fans

Manufacturer: Motion Control Engineering

Product Line: i-DC-01, Filter

Subcomponent: Capacitors and Fans

Seismic Level: Sds = 2.5g, z/h = 1.0

Capacitors				
Model Number	Manufacturer	Material	Electrical Ratings	Unit
E81D630VNN682MA50T	UCC	Aluminum	6800uF, 63V	UUT9, UUT10
97F5704	Genteq	Metalized polypropylene film	4uF, 370VAC	UUT9
97F9622	Genteq	Metalized polypropylene film	50uF, 370VAC	UUT9
97F5320BX	Genteq	Metalized polypropylene film	50uF, 440VAC	UUT10

Fans				
Model Number	Manufacturer	Material	Electrical Ratings	Unit
SP100A-1123XBT.GN	Sunon	Aluminum alloy	115V, 60 Hz, 12W	UUT13, UUT14

Table 34: Certified Subcomponents, i-DC-01, Filter

Drives, Filters & Chokes

Manufacturer: Motion Control Engineering

Product Line: i-DC-01, Filter

Subcomponent: Drives, Filters and Chokes

Seismic Level: Sds = 2.5g, z/h = 1.0

Drives					
Model Number	Manufacturer	Material	Description	Power	Unit
DSL18-S	MCE	Circuit boards, solid state devices and terminal blocks in plastic housing	SCR Drive	Rated inputs: 120-240V ac, 6 phase, 50/60 Hz Rated output: 0-240V dc, 0-180A dc	UUT9
DSH18-S	MCE		SCR Drive	Rated inputs: 240-600V ac, 6 phase, 50/60 Hz Rated output: 0-500V dc, 0-180A dc	UUT10

Filters & Chokes					
Model Number	Manufacturer	Material	Description	Electrical Ratings	Unit
2-30-2052	MCI	Core: Electrical grade steel laminate; Windings: Copper; Terminals: Copper buss bar;	Inductor for DC filter	110A, 240V, 0.75mH	UUT13
2-30-2036				190A, 240V, 0.75mH	Interpolated
2-30-2048				255A, 240V, 0.75mH	Interpolated
2-30-2047				340A, 240V, 0.75mH	Interpolated
2-30-2053				110A, 500V, 0.75mH	Interpolated
2-30-2035				190A, 500V, 0.75mH	UUT14

Table 35: Certified Subcomponents, i-DC-01

Printed Circuit Boards

Manufacturer: Motion Control Engineering

Product Line: i-DC-01

Subcomponent: Printed circuit boards

Seismic Level: Sds = 2.5g, z/h = 1.0

Printed Circuit Boards			
Model Number	Manufacturer	Material	Unit
HC-OA	MCE	Epoxy glass with plated copper	UUT9, UUT10
ICE-FB1P			UUT9, UUT10
ICE-FB2P			UUT9, UUT10
ICE-FB4			UUT9, UUT10
ICE-IEQ			UUT9, UUT10
ICE-IMP			UUT9, UUT10
ICE-IRB-2			UUT9, UUT10
ICE-IRD			UUT9, UUT10
ICE-MIAC			UUT9, UUT10
ICE-MOR			UUT9, UUT10
ICE-PFD			UUT9, UUT10
ICE-PRB			UUT9, UUT10
ICE-RG			UUT9, UUT10
ICE-SAF			UUT9, UUT10
ICE-SF			UUT9, UUT10
SC-HCDA			UUT9, UUT10
SC-ION			UUT9, UUT10

Table 36: Certified Subcomponents: i-DC-01

Power Modules and Power Supplies

Manufacturer: Motion Control Engineering

Product Line: i-DC-01

Subcomponent: Power modules and Power Supplies

Seismic Level: Sds = 2.5g, z/h = 1.0

Power Modules

Model Number	Manufacturer	Material	Power	Unit
i-Box-1	MCE	Circuit boards, solid state devices and terminal blocks, in plastic housing	120VAC / 110VDC	UUT9, UUT10
I-PowerBox-3	MCE		600V, 30A	UUT9, UUT10

Power Supplies

Model Number	Manufacturer	Material	Power	Unit
DSP 100-24	Lamda	Plastic housing	Input: 100VAC-240VAC Output: 24V	UUT9
LFWLT40-3002-A	EOS	PC board, open	Input: 90 - 264 V, Universal Output: 5.2V, 14.6V, 14.8V	UUT9, UUT10

Table 37: Certified Subcomponents, i-DC-01

Relays & Relay Sockets, Timers, and Resistors

Manufacturer: Motion Control Engineering

Product Line: i-DC-01

Subcomponent: Relays and Relay Sockets, Timers, Resistors

Seismic Level: Sds = 2.5g, z/h = 1.0

Relays & Relay Sockets, Timers					
Model Number	Manufacturer	Material	Description	Power	Unit
KUP-14A15-120	Potter & Brumfield	Contact material: silver alloy Case: plastic	Relay	120VAC coil, 10A contacts	UUT9, UUT10
MY4-DC24(S)	Omron	Contact material: silver Case: plastic	Relay	24VDC coil, 3A contacts	UUT9, UUT10
MY4N-AC110/120(S)	Omron		Relay	120VAC coil, 5A	UUT9, UUT10
PYF14A-C	Omron	Case: plastic	Relay Socket	Used for relays with up to 120VAC coils, 5A contacts	UUT9, UUT10
70-463-1	Magnecraft	Internal metal tracks: copper alloy, zinc plated; Screw terminals: zinc plated carbon steel; Body: thermoplastic UL 94VO	Relay Socket	15A, 300V	UUT9, UUT10
438-USA	Artisan	Contact material: silver alloy Case: plastic	Timer	19 - 288 VAC/DC; 1A	UUT9, UUT10

Resistors					
Model Number	Manufacturer	Material	Description	Power	Unit
AVT025-XX	Vishay	Element: copper-nickel alloy or nickel-chrome alloy, depending on resistance value Core: ceramic, steatite or cordierite	Wirewound resistors, industrial power, adjustable tubular	25W	UUT9, UUT10
AVT050-XX				50W	Interpolated
AVT100-XX				100W	Interpolated
AVT200-XX				225W	UUT9, UUT10
FVT025-XX			Wirewound resistors, industrial power, fixed tubular	25W	UUT9, UUT10
FVT050-XX				50W	Interpolated
FVT100-XX				100W	Interpolated
FVT200-XX				225W	UUT9, UUT10

Table 38: Certified Subcomponents, i-DC-01

Transformers

Manufacturer: Motion Control Engineering

Product Line: i-DC-01

Subcomponent: Transformers

Seismic Level: Sds = 2.5g, z/h = 1.0

Transformers						
Model Number	Manufacturer	Core Material	Winding Material	Capacity (VA)	Voltages (VAC)	Unit
4-49-8036	MCI	Carbon steel	Copper	175	115, 36/18	UUT9, UUT10
4-54-0540				650	110, 120, 160, 220, 240, 16, 24	UUT9, UUT10
4-54-0740				900	110, 120, 160, 220, 240, 16, 24	Interpolated
4-54-1040				1150	110, 120, 160, 220, 240, 16, 24	UUT9, UUT10

Table 39: Special Seismic Certification

Tested Components

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Tested Product Construction: NEMA 1 enclosures; painted carbon steel or aluminum

Tested Options: Solid state starters, battery rescue devices, capacitors, contactors, fuses and fuse blocks, p.c. boards, power modules, power supplies, receptacles, relays, resistors, terminals, transformers, drives, fans, filters and chokes, peripherals

Tested Mounting Description: Rigid or flexible wall mounted (HMC-2000 and mGroup), rigid base or wall mounted (RESIST-R-C), rigid base mounted (all other models)

Model	Description	Enclosure Material	NEMA Rating	Dimensions (inches)			Weight (lb)	Mounting	Sds (g), z/h=1	Unit
				Depth	Width	Height				
HMC-2000	Size 1	Painted carbon steel	1	13.0	48.5	36.5	318	Rigid wall	2.50	UUT1a
HMC-2000	Size 1	Painted carbon steel	1	13.0	48.5	36.5	318	Flexible wall	2.50	UUT1b
mGROUP	One Size	Painted carbon steel	1	6.3	18.3	44.0	96	Rigid wall	2.50	UUT2a
mGROUP	One Size	Painted carbon steel	1	6.3	18.3	44.0	96	Flexible wall	2.50	UUT2b
HMC-2000	Size 2	Painted carbon steel	1	12.5	36.3	42.6	250	Rigid wall	2.50	UUT3a
HMC-2000	Size 2	Painted carbon steel	1	12.5	36.3	42.6	250	Flexible wall	2.50	UUT3b
mGROUP	One Size	Painted carbon steel	1	6.3	18.3	44.0	95	Rigid wall	2.50	UUT4a
mGROUP	One Size	Painted carbon steel	1	6.3	18.3	44.0	95	Flexible wall	2.50	UUT4b
M4000-AC-01	Size 1	Painted carbon steel	1	16.0	42.0	72.0	481	Rigid base	2.10	UUT5
M4000-AC-01	Size 2	Painted carbon steel	1	17.0	61.0*	72.0	960	Rigid base	2.10	UUT6
i-AC-01	Size 1	Painted carbon steel	1	16.0	42.0	72.0	560	Rigid base	2.10	UUT7
i-AC-01	Size 2	Painted carbon steel	1	17.0	61.0*	72.0	1,050	Rigid base	2.10	UUT8
i-DC-01		Painted carbon steel	1	16.0	42.0	72.0	540	Rigid base	2.50	UUT9
i-DC-01	Size 2	Painted carbon steel	1	16.0	42.0	72.0	550	Rigid base	2.50	UUT10
i-CENTRAL-CUE	One Size	Painted carbon steel	1	23.0	28.0	72.0	402	Rigid base	2.10	UUT11
i-CENTRAL-CUE	One Size	Painted carbon steel	1	23.0	28.0	72.0	380	Rigid base	2.10	UUT12
*Note: UUT6 and UUT8 cabinet width is 61.0" with optional side enclosure, and 46.0" without.										
Filter	One Size	Painted carbon steel	1	14.0	26.0	26.0	111	Rigid base	2.50	UUT13
Filter	One Size	Painted carbon steel	1	14.0	26.0	26.0	166	Rigid base	2.50	UUT14
RESIST-R-C	Size 1	Aluminum	1	10.3	18.0	32.0	40	Rigid base or wall mount	2.50	UUT15a,b
RESIST-R-C	Size 2	Aluminum	1	10.0	20.8	32.0	51	Rigid base or wall mount	2.50	UUT16a,b

UNIT UNDER TEST - Summary Sheet
UUT1 (a,b)

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Model Number: HMC-2000

Product Construction Summary: Painted carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: 208V, enclosures, fuses, capacitors, solid state starters, battery rescue devices, P.C. boards, power moudles, contactors, relays, resistors, transformers

Unit Mounting Description:

UUT1a,b were mounted to the DCL shake table interface frame with four 3/8-inch diameter Grade 5 bolts per panel. The bolts were spaced 38 inches on center width-wise and 34 inches on center height-wise.

Rigid wall mount (UUT1a): The DCL shake table interface frame was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.

Flexible wall mount (UUT1b): The DCL shake table interface frame was flexibly attached to four vibration spring isolators with two 3/4"-diameter Grade 5 bolts per isolator. The isolators were welded to the DCL shake table interface plate which was attached to the shake table with M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

UUT1 (a,b)	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	318	13.0	48.5	36.5	N/A	N/A	N/A

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 2019	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.68	0.68

Rigid test setup (UUT1a), cover removed for photograph

Flexible test setup (UUT1b)

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

UNIT UNDER TEST - Summary Sheet
UUT2 (a,b)

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Model Number: mGROUP

Product Construction Summary: Painted carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: 120V, enclosures, fuses, capacitors, P.C. boards, power supplies, contactors, relays

Unit Mounting Description:
UUT2a,b were mounted to the DCL shake table interface frame with four 1/4-inch diameter Grade 5 bolts per panel. The bolts were placed on the unit flanges that were spaced 22.75 inches on center width-wise, and 42.25 inches on center height-wise.
Rigid wall mount (UUT2a): The DCL shake table interface frame was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.
Flexible wall mount (UUT2b): The DCL shake table interface frame was flexibly attached to four vibration spring isolators with two 3/4"-dia Grade 5 bolts per isolator. The isolators were welded to the DCL shake table interface plate which was attached to the shake table with M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

UUT2 (a,b)	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	96	6.0	18.0	44.0	N/A	N/A	N/A

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 2019	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.68	0.68

Rigid test setup (UUT2a)

Flexible test setup (UUT2b)

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

UNIT UNDER TEST - Summary Sheet
UUT3 (a,b)

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Model Number: HMC-2000

Product Construction Summary: Painted carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: 480V, enclosures, fuses, capacitors, solid state starters, battery rescue devices, P.C. boards, power modules, contactors, relays, resistors, transformers

Unit Mounting Description:

UUT3a,b were mounted to the DCL shake table interface frame with four 3/8-inch diameter Grade 5 bolts per panel. The bolts were spaced 28 inches on center width-wise and 40 inches on center height-wise.

Rigid wall mount (UUT3a): The DCL shake table interface frame was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.

Flexible wall mount (UUT3b): The DCL shake table interface frame was flexibly attached to four vibration spring isolators with two 3/4"-dia Grade 5 bolts per isolator. The isolators were welded to the DCL shake table interface plate which was attached to the shake table with M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

UUT3 (a,b)	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	250	12.5	36.3	42.6	N/A	N/A	N/A

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 2019	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.68	0.68

Rigid test setup (UUT3a), cover removed for photograph

Flexible test setup (UUT3b)

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

UNIT UNDER TEST - Summary Sheet
UUT4 (a,b)

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Model Number: mGROUP

Product Construction Summary: Painted carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: 120V, enclosures, fuses, capacitors, P.C. boards, power supplies, surge protector

Unit Mounting Description:
UUT4a,b were mounted to the DCL shake table interface frame with four 1/4-inch diameter Grade 5 bolts per panel. The bolts were placed on the unit flanges that were spaced 22.75 inches on center width-wise, and 42.25 inches on center height-wise.
Rigid wall mount (UUT4a): The DCL shake table interface frame was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.
Flexible wall mount (UUT4b): The DCL shake table interface frame was flexibly attached to four vibration spring isolators with two 3/4"-dia Grade 5 bolts per isolator. The isolators were welded to the DCL shake table interface plate which was attached to the shake table with M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

UUT4 (a,b)	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	95	6.0	18.0	44.0	N/A	N/A	N/A

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 2019	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.68	0.68

Rigid test setup (UUT4a)

Flexible test setup (UUT4b)

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

UNIT UNDER TEST - Summary Sheet
UUT5

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Model Number: M4000-AC-01

Product Construction Summary: Painted carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: 208V, enclosures, fuses, terminals, capacitors, contactors, drives, fans, filters, chokes, P.C. boards, relays, surge protector, auxilliary contactors, resistors, transformers

Unit Mounting Description:
UUT5 was rigid base mounted to the DCL shake table interface plate with six 1/2-inch Grade 5 bolts. Four of the innermost bolts were spaced 27.5 inches on center width-wise and 12 inches on center length-wise. The two outermost bolts were spaced 33.5 inches on center width-wise and placed 8 inches from each edge of the unit length-wise. The DCL shake table interface plate was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

UUT5	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	481	16.0	42.0	72.0	4.5	8.8	28.0

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 2019	ICC-ES AC156	2.10	1.0	1.5	3.36	2.52	1.41	0.57

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

UNIT UNDER TEST - Summary Sheet
UUT6

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Model Number: M4000-AC-01

Product Construction Summary: Painted carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: 480V, eclosures, fuses, terminals, capacitors, contactors, drives, fans, filters, chokes, P.C. boards, relays, resistors, transformers

Unit Mounting Description:
UUT6 was rigid base mounted to the DCL shake table interface plate with four 1/2-inch Grade 5 bolts for the main cabinet. The bolts were spaced 48 inches on center width-wise and 11 inches on center length-wise. Four 1/2-inch Grade 5 bolts for the optional side enclosure were used. The outermost bolts were spaced 8.75 inches on center length-wise while the innermost bolts were spaced 6 inches on center length-wise. The inner and outermost bolts were spaced 2 inches on center width-wise. The optional side enclosure was tested with the main cabinet. The DCL shake table interface plate was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

UUT6	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	960	17.0	61.0*	72.0	5.0	10.8	25.5

*Width with optional side enclosure is 61", and without optional side enclosure is 46".

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 2019	ICC-ES AC156	2.10	1.0	1.5	3.36	2.52	1.41	0.57

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

UNIT UNDER TEST - Summary Sheet
UUT7

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Model Number: i-AC-01

Product Construction Summary: Painted carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: 208V, eclosures, fuses, terminals, capacitors, contactors, drives, fans, filters, chokes, P.C. boards, relays, resistors, transformers, timers

Unit Mounting Description:
UUT7 was rigid base mounted to the DCL shake table interface plate with six 1/2-inch Grade 5 bolts per unit. Four of the innermost bolts were spaced 27.5 inches on center width-wise and 12 inches on center length-wise. The two outermost bolts were spaced 33.5 inches on center width-wise and placed 8 inches from each edge of the unit length-wise. The DCL shake table interface plate was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

UUT7	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	560	16.0	42.0	72.0	4.3	8.3	29.5

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 2019	ICC-ES AC156	2.10	1.0	1.5	3.36	2.52	1.41	0.57

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

UNIT UNDER TEST - Summary Sheet
UUT8

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Model Number: i-AC-01

Product Construction Summary: Painted carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: 480V, eclosures, fuses, terminals, capacitors, contactors, drives, fans, filters, chokes, P.C. boards, relays, resistors, transformers, timers

Unit Mounting Description:
UUT8 was rigid base mounted to the DCL shake table interface plate with four 1/2-inch Grade 5 bolts for the main cabinet. The bolts were spaced 48 inches on center width-wise and 11 inches on center length-wise. Four 1/2-inch Grade 5 bolts for the optional side enclosure were used. The outermost bolts were spaced 8.75 inches on center length-wise while the innermost bolts were spaced 6 inches on center length-wise. The inner and outermost bolts were spaced 2 inches on center width-wise. The optional side enclosure was tested with the main cabinet. The DCL shake table interface plate was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

UUT8	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	1,050	17.0	61.0*	72.0	5.5	5.8	20.3

*Width with optional side enclosure is 61", and without optional side enclosure is 46".

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 2019	ICC-ES AC156	2.10	1.0	1.5	3.36	2.52	1.41	0.57

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

UNIT UNDER TEST - Summary Sheet
UUT9

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Model Number: i-DC-01

Product Construction Summary: Painted carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: 120V, enclosures, fuses, terminals, capacitors, drives, P.C. boards, power modules, power supplies, relays, timers, resistors, transformers

Unit Mounting Description:
UUT9 was rigid base mounted to the DCL shake table interface plate with six 1/2-inch Grade 5 bolts per unit. Four of the innermost bolts were spaced 27.5 inches on center width-wise and 12 inches on center length-wise. The two outermost bolts were spaced 33.5 inches on center width-wise and placed 8 inches from each edge of the unit length-wise. The DCL shake table interface plate was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

UUT9	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	540	16.0	42.0	72.0	7.5	11.5	20.3

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 2019	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.68	0.68

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

UNIT UNDER TEST - Summary Sheet
UUT10

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Model Number: i-DC-01

Product Construction Summary: Painted carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: 120V, enclosures, fuses, terminals, capacitors, drives, P.C. boards, power modules, power supplies, relays, timers, resistors, transformers

Unit Mounting Description:
UUT10 was rigid base mounted to the DCL shake table interface plate with six 1/2-inch Grade 5 bolts per unit. Four of the innermost bolts were spaced 27.5 inches on center width-wise and 12 inches on center length-wise. The two outermost bolts were spaced 33.5 inches on center width-wise and placed 8 inches from each edge of the unit length-wise. The DCL shake table interface plate was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

UUT10	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	550	17.0	46.0	72.0	7.0	11.0	19.8

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 2019	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.68	0.68

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

UNIT UNDER TEST - Summary Sheet
UUT11

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Model Number: i-CENTRAL-CUE

Product Construction Summary: Painted carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: 120V, enclosures, terminals, fans, P.C. boards, computers and peripherals, receptacles, power strips, relays, transformers

Unit Mounting Description:

UUT11 was rigid base mounted to the DCL shake table interface plate with eight 1/2-inch Grade 5 bolts. Two bolts were spaced 3.5 inches on center length-wise apart from each other with an 11-inch gap between the next set of two bolts. Each bolt was spaced 30 inches on center width-wise. The DCL shake table interface plate was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

UUT11	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	402	23.0	28.0	72.0	23.3	12.0	27.5

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 2019	ICC-ES AC156	2.10	1.0	1.5	3.36	2.52	1.41	0.57

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

UNIT UNDER TEST - Summary Sheet
UUT12

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Model Number: i-CENTRAL-CUE

Product Construction Summary: Painted carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: 120V, enclosures, fuses, terminals, fans, P.C. boards, computers and peripherals, receptacles, power strips, relays, transformers

Unit Mounting Description:
UUT12 was rigid base mounted to the DCL shake table interface plate with eight 1/2-inch Grade 5 bolts. Two bolts were spaced 3.5 inches on center length-wise apart from each other with an 11-inch gap between the next set of two bolts. Each bolt was spaced 30 inches on center width-wise. The DCL shake table interface plate was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

UUT12	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	380	23.0	28.0	72.0	13.8	13.0	26.8

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 2019	ICC-ES AC156	2.10	1.0	1.5	3.36	2.52	1.41	0.57

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

UNIT UNDER TEST - Summary Sheet
UUT13

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Model Number: Filter

Product Construction Summary: Painted carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: 120V, enclosures, fan, filter, chokes, terminals

Unit Mounting Description:
UUT13 was rigid base mounted to the DCL shake table interface plate with four 1/2-inch Grade 5 bolts. The bolts were spaced approximately 28 inches on center width-wise and 11 inches on center length-wise. The DCL shake table interface plate was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

UUT13	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	111	14.3	30.0	25.8	27.0	>33.3	26.5

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 2019	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.68	0.68

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

UNIT UNDER TEST - Summary Sheet
UUT14

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Model Number: Filter

Product Construction Summary: Painted carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: 120V, enclosures, fan, filter, chokes, terminals

Unit Mounting Description:

UUT14 was rigid base mounted to the DCL shake table interface plate with eight 1/2-inch Grade 5 bolts. The bolts were spaced approximately 28 inches on center width-wise and 11 inches on center length-wise. The DCL shake table interface plate was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

UUT14	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	166	14.0	26.0	26.0	>33.3	>33.3	16.3

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 2019	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.68	0.68

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

UNIT UNDER TEST - Summary Sheet
UUT15a

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Model Number: RESIST-R-C

Product Construction Summary: Aluminum enclosure, NEMA 1

Options / Subcomponent Summary: 4.9 ohm, 1600W resistors, enclosures, and terminal blocks

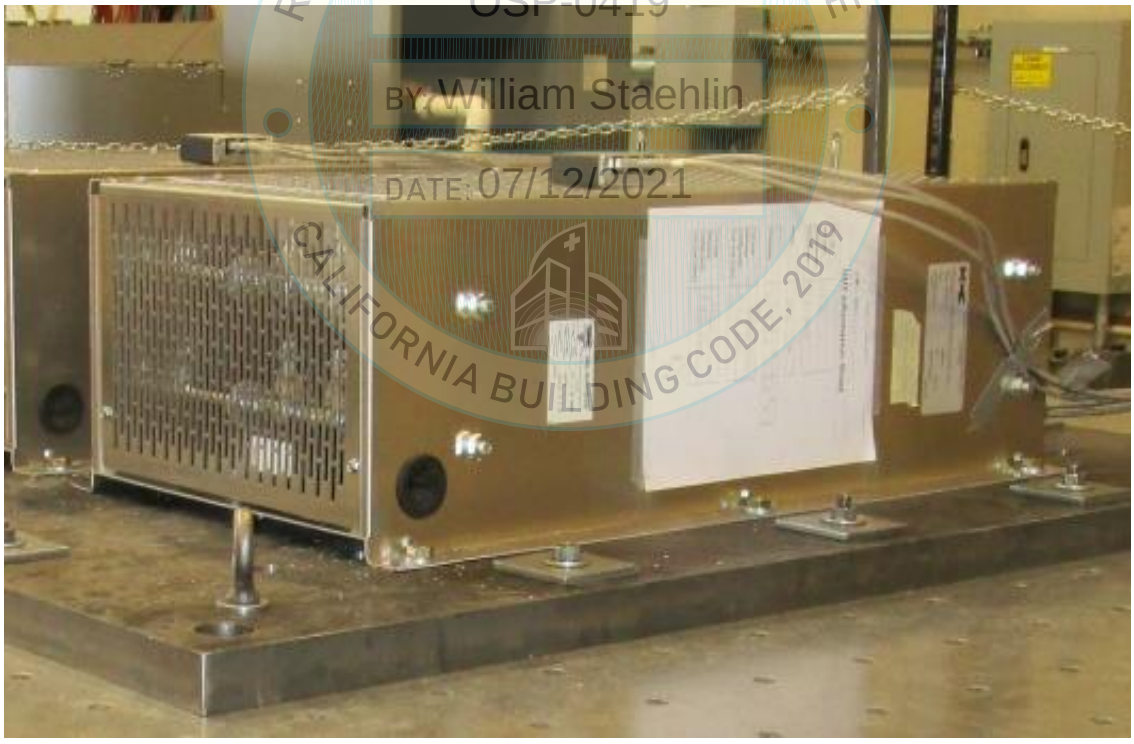
Unit Mounting Description:
UUT15a was rigid base mounted to the DCL shake table interface plate with six 1/2-inch Grade 8 bolts. The bolts were spaced 14.5 inches on center length-wise, and 16.5 inches on center width-wise. The DCL shake table interface plate was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

UUT15a	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	40	10.3	18.0	32.0	>33.3	20.8	23.8

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 2019	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.68	0.68



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

UNIT UNDER TEST - Summary Sheet
UUT16a

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Model Number: RESIST-R-C

Product Construction Summary: Aluminum enclosure, NEMA 1

Options / Subcomponent Summary: 3.32 ohm, 1600W resistors, enclosures, and terminal blocks

Unit Mounting Description:
UUT16a was rigid base mounted to the DCL shake table interface plate with six 1/2-inch Grade 8 bolts. The bolts were spaced 14.5 inches on center length-wise, and 19.5 inches on center width-wise. The DCL shake table interface plate was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

UUT16a	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	51	10.0	20.8	32.0	>33.3	20.0	19.3

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 2019	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.68	0.68

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

UNIT UNDER TEST - Summary Sheet
UUT15b

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Model Number: RESIST-R-C

Product Construction Summary: Aluminum enclosure, NEMA 1

Options / Subcomponent Summary: 4.9 ohm, 1600W resistors, enclosures, and terminal blocks

Unit Mounting Description:
UUT15b was rigid wall mounted to the DCL shake table interface frame with six 1/2-inch Grade 8 bolts. The bolts were spaced 14.5 inches on center height-wise and 16.5 inches on center width-wise. The DCL shake table interface frame was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

UUT15b	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	40	10.3	18.0	32.0	N/A	N/A	N/A

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 2019	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.68	0.68

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

UNIT UNDER TEST - Summary Sheet
UUT16b

Manufacturer: Motion Control Engineering

Product Line: Elevator Control Panels

Model Number: RESIST-R-C

Product Construction Summary: Aluminum enclosure, NEMA 1

Options / Subcomponent Summary: 3.32 ohm, 1600W resistors, enclosures, and terminal blocks

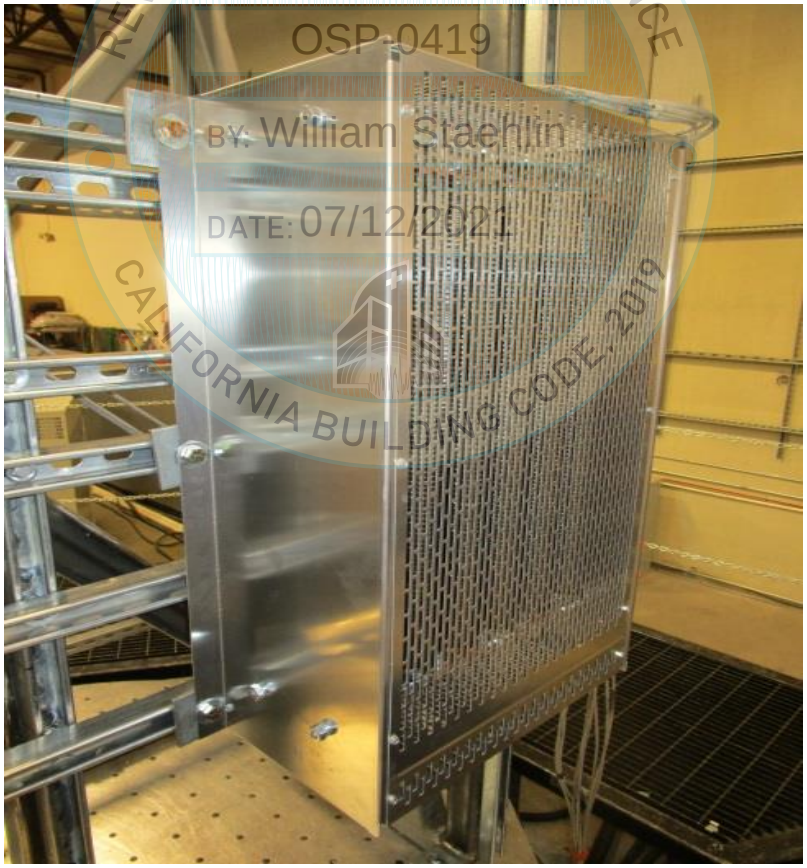
Unit Mounting Description:
UUT16b was rigid wall mounted to the DCL shake table interface frame with six 1/2-inch Grade 8 bolts. The bolts were spaced 14.5 inches on center height-wise, and 19.5 inches on center width-wise. The DCL shake table interface frame was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

UUT16b	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	51	10.0	20.8	32.0	N/A	N/A	N/A

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 2019	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.68	0.68



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