APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY	
APPLICATION #:	OSP – 0429 – 10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☒ New ☐ Renewal

Manufacturer Information

Manufacturer: Eaton Corporation

Manufacturer's Technical Representative: Mike W Melville, Lead Certification Engineer

Mailing Address: W126N7250 Flint Drive, Menomonee Falls, WI 53051

Telephone: (414) 449-6000 Email: MikeWMelville@eaton.com

Product Information

Product Name: HMXE Drives

Product Type: Variable Frequency Drives

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

General Description: Variable frequency drives in NEMA 1 and NEMA 3R carbon steel enclosures, containing disconnects, contactors, overloads, transformers, relays, heaters and fuses.

Mounting Description: Wall mounted (rigid or flexible).

Applicant Information

Applicant Company Name: Dynamic Certification Laboratories

Contact Person: Joseph L. La Brie, S.E., Managing 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, 2013.

Signature of Applicant:  Date: 4/13/15

Title: Managing Partner 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) = 1.88 (S_{DS}=2.50g, R_p=6.0); 5.63 (S_{DS}=2.50g, R_p=2.0)

S_{DS} (Design spectral response acceleration at short period, g) = 2.50 g

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

R_p (Equipment or component response modification factor) = 6.0 (rigid wall mount); 2.0 (flexible wall mount)

Ω_0 (System overstrength factor) = 2.5

I_p (Importance factor) = 1.5

z/h (Height factor ratio) = 1.0

Equipment or Component Natural Frequencies (Hz) = See attachments

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

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, 2010: ☐ 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, 2019

Signature:  Date: 4/15/15

Print Name: M. R. Karim Title: SHFR

Special Seismic Certification Valid Up to : S_{DS} (g) = 2.50 z/h = 1.0

Condition of Approval (if applicable):

Special Seismic Certification
Certified Components

DCL Dynamic Certification Laboratories

Manufacturer: Eaton Corporation

Product Line: Variable frequency drives

Certified Product Construction: Galvanized carbon steel and painted carbon steel enclosures, NEMA 1 and 3R

Certified Options: 208-230/480V; drives, disconnects, contactors, overloads, transformers, relays, heaters and fuses

Certified Mounting Description: Rigid or flexible wall mount

Manufacturer	Panel Description	Model	VFD Frame	Design	Enclosure Material	NEMA Rating	Voltage		Enclosure				Sds (g), z/h=1	Mounting	Unit
							208, 230, 460		Size						
							Min HP	Max HP	Height (in.)	Width (in.)	Depth (in.)	Weight (lb)			
Eaton	VFD without Bypass and with Fused and Non-Fused Disconnects (NEMA 1)	HMXE	4, 5	A1	Galvanized carbon steel or painted carbon steel	1	1	7.5	20.5	8.3	10.0	28	2.5	Rigid or flexible wall mount	UUT4-r,f
			5	A2			7.5	15	26.5	8.3	10.4	63	2.5		Interpolated
			5,6	A3			15	30	32.5	9.0	10.2	115			
			6,7,8	A4			25	75	40.5	12.0	13.5	362			
			8	A5			100	100	43.0	12.0	15.1	366			
			8	A6			50	125	48.0	16.0	18.6	366			
	VFD with Bypass and with Fused and Non-Fused Disconnects (NEMA 1)	HMXE	4,5	B1			1	7.5	23.0	16.0	14.2	61	2.5		UUT1-r,f
			5	B2			7.5	15	26.0	16.0	14.3	95	2.5		Interpolated
			5,6	B3			15	30	27.5	19.0	14.2	160			
			6,7,8	B4			25	75	39.5	30.0	16.2	460			
			8	B5			100	100	44.0	33.0	16.3	461			
			8	B6			50	125	44.0	33.0	16.3	465			
	VFD without Bypass and with Fused and Non-Fused Disconnects (NEMA 3R)	HMXE	4,5	C1	Painted carbon steel	3R	1	7.5	22.4	13.0	12.4	75	2.5	Rigid or flexible wall mount	Interpolated
			5	C2			7.5	15	28.4	13.0	12.4	87			
			5,6	C3			15	30	31.9	16.0	12.4	140			
			6,7,8	C4			25	75	43.4	15.5	14.4	388			
			8	C5			100	100	47.5	19.3	16.4	405			
			8	C6			50	125	54.6	20.8	19.4	405			
	VFD with Bypass and with Fused and Non-Fused Disconnects (NEMA 3R)	HMXE	4,5	D1			1	7.5	19.5	16.0	15.4	102			Interpolated
			5	D2			7.5	15	22.5	16.0	15.4	116			
			5,6	D3			15	30	28.0	19.0	15.4	180			
			6,7,8	D4			25	75	40.0	26.0	16.4	423			
			8	D5			100	100	44.0	30.0	20.4	455			
			8	D6			50	125	50.0	30.0	20.4	460	2.5		UUT 2a-r,f

Horizon EATON version Catalog Numbering Scheme

Character No.	1	2	3	4	5	6	7	8	9	10	11	12
Description	Product	Product	Product	Product	Full Load Amp	Full Load Amp	Full Load Amp	Enclosure Rating/style	Voltage	Braking Application	Software Series	Disconnect Type
Character	**H**	**M**	**X**	**E**	**0**	**1**	**1**	**A**	**1**	**N**	_	**F**

Product

HMXE= HVAC drive economical

Enclosure Style

3 = NEMA Type 1 Bypass
A = NEMA Type 1 Disconnect
4 = NEMA Type 3R Bypass
B = NEMA Type 3R Disconnect

Disconnect Type

F = Fused
N = Non-Fused

Amps / Hp

Voltage

1 = 208V
2 = 230V
4 = 480V

Braking Application

N = No Brake Chopper

Software Series

A-Z

NEC 208, 230 Volts 3-Phase

4D8 = 4.8 Amp (1 Hp)
8D0 = 8.0 Amp (2 Hp)
011 = 11 Amp (3 Hp)
018 = 18 Amp (5 Hp)
025 = 25 Amp (7.5 Hp)
031 = 31 Amp (10 Hp)
048 = 48 Amp (15 Hp)
062 = 62 Amp (20 Hp)
075 = 75 Amp (25 Hp)
088 = 88 Amp (30 Hp)
115 = 115 Amp (40 Hp)
140 = 140 Amp (40 Hp)
150 = 150 Amp (50 Hp)
170 = 170 Amp (40 Hp)

Exception for 230V bypass:
016 = 16 Amp (5 Hp)
024 = 24 Amp (7.5 Hp)
070 = 70 Amp (25 Hp)
115 = 115 Amp (40 Hp)
150 = 150 Amp (50 Hp)

NEC 460 Volts 3-Phase (Max 480V)

3D4 = 3.4 Amp (1 Hp)
4D8 = 4.8 Amp (2 Hp)
5D6 = 5.6 Amp (3 Hp)
9D6 = 9.6 Amp (5 Hp)
012 = 12 Amp (7.5 Hp)
016 = 16 Amp (10 Hp)
023 = 23 Amp (15 Hp)
031 = 31 Amp (20 Hp)
038 = 38 Amp (25 Hp)
046 = 46 Amp (30 Hp)
061 = 61 Amp (40 Hp)
072 = 72 Amp (50 Hp)
087 = 87 Amp (60 Hp)
105 = 105 Amp (75 Hp)
140 = 140 Amp (100 Hp)
170 = 170 Amp (125 Hp)

Exception for 460V bypass:
2D4 = 2.4 Amp (1 Hp)
4D0 = 4.0 Amp (2 Hp)
9D0 = 9.0 Amp (5 Hp)
080 = 80 Amp (60 Hp)

200-240 Volts 3-Phase

2D8 = 2.8 Amp (0.5 Hp)
3D7 = 3.7 Amp (0.75 Hp)
4D8 = 4.8 Amp (1 Hp)
7D0 = 7.0 Amp (1.5 Hp)

NEC 380-480 Volts 3-Phase

1D3 = 1.3 Amp (0.5 Hp)
1D9 = 1.9 Amp (0.75 Hp)
2D4 = 2.4 Amp (1 Hp)
3D3 = 3.3 Amp (1.5 Hp)

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Eaton Corporation

Product Line: Variable frequency drives

Subcomponent: Drives

Drives					
Model Number	Manufacturer	Power		Enclosure Material	Unit
		Amperage	Voltage		
HMX32AG4D821-N	Eaton	4.8	208/230	Painted carbon steel or galvanized carbon steel	UUT4-r,f
HMX32AG8D021-N		8			Interpolated
HMX32AG01121-N		11			Interpolated
HMX32AG01821-N		18			Interpolated
HMX32AG03121-N		31			Interpolated
HMX32AG04821-N		48			Interpolated
HMX32AG04822-N		48			Interpolated
HMX32AG06221-N		62			Interpolated
HMX32AG07521-N		75			Interpolated
HMX32AG08821-N		88			Interpolated
HMX32AG14021-N		140			Interpolated
HMX32AG17021-N		170			UUT2-r,f
HMX34AG3D421-N		3.4	480		Interpolated
HMX34AG4D821-N		4.8			Interpolated
HMX34AG5D621-N		5.6			Interpolated
HMX34AG9D621-N		9.6			Interpolated
HMX34AG01221-N		12			UUT1-r,f
HMX34AG01621-N		16			Interpolated
HMX34AG02321-N		23			Interpolated
HMX34AG03121-N		31			Interpolated
HMX34AG03821-N		38			Interpolated
HMX34AG04621-N		46			Interpolated
HMX34AG06121-N		61			Interpolated
HMX34AG07221-N		72			Interpolated
HMX34AG08721-N		87			Interpolated
HMX34AG10521-N		105			Interpolated
HMX34AG14021-N		140			Interpolated
HMX34AG17021-N		170			Interpolated

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Eaton Corporation

Product Line: Variable frequency drives

Subcomponent: Disconnects

Disconnects				
Model Number	**Manufacturer**	**Description**	**Material**	**Unit**
R5A3030U	Eaton	NON-FUSIBLE, 30A	Molded plastic, copper, steel	UUT1-r,f, UUT4-r,f
R5B3060U	Eaton	NON-FUSIBLE, 60A	Molded plastic, copper, steel	Interpolated
R9C3100U	Eaton	NON-FUSIBLE, 100A	Molded plastic, copper, steel	Interpolated
R9D3100U	Eaton	NON-FUSIBLE, 100A	Molded plastic, copper, steel	Interpolated
R9D3200U	Eaton	NON-FUSIBLE, 200A	Molded plastic, copper, steel	UUT2-r,f
R9J3030FJ	Eaton	FUSIBLE, 30A	Molded plastic, copper, steel	UUT2-r,f
R9J3060FJ	Eaton	FUSIBLE, 60A	Molded plastic, copper, steel	Interpolated
R9K3060FJ	Eaton	FUSIBLE, 60A	Molded plastic, copper, steel	Interpolated
R9K3100FJ	Eaton	FUSIBLE, 100A	Molded plastic, copper, steel	Interpolated
R9L3200FJ	Eaton	FUSIBLE, 200A	Molded plastic, copper, steel	UUT2-r,f

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Eaton Corporation

Product Line: Variable frequency drives

Subcomponent: Contactors

Contactors				
Model Number	**Manufacturer**	**Amperage**	**Material**	**Unit**
XTCE007B01A	Eaton	7A	Molded plastic, copper and steel	UUT1-r,f
XTCE009B01A	Eaton	9A	Molded plastic, copper and steel	Interpolated
XTCE012B01A	Eaton	12A	Molded plastic, copper and steel	Interpolated
XTCE018C01A	Eaton	18A	Molded plastic, copper and steel	Interpolated
XTCE025C01A	Eaton	25A	Molded plastic, copper and steel	Interpolated
XTCE032C01A	Eaton	32A	Molded plastic, copper and steel	Interpolated
XTCE040DS1A	Eaton	40A	Molded plastic, copper and steel	Interpolated
XTCE050DS1A	Eaton	50A	Molded plastic, copper and steel	Interpolated
XTCE065DS1A	Eaton	65A	Molded plastic, copper and steel	Interpolated
XTCE080FS1A	Eaton	80A	Molded plastic, copper and steel	Interpolated
XTCE095FS1A	Eaton	95A	Molded plastic, copper and steel	Interpolated
XTCE115GS1A	Eaton	115A	Molded plastic, copper and steel	Interpolated
XTCE170GS1A	Eaton	170A	Molded plastic, copper and steel	UUT2-r,f

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Eaton Corporation

Product Line: Variable frequency drives

Subcomponent: Overloads

Overloads					
Model Number	**Manufacturer**	**Description**	**Material**	**Weight (lb)**	**Unit**
XTOB006BC1	Eaton	Electric Overload	Molded plastic, copper and steel	0.3	Interpolated
XTOB010BC1	Eaton		Molded plastic, copper and steel	0.3	Interpolated
XTOB012BC1	Eaton		Molded plastic, copper and steel	0.3	UUT1-r,f
XTOB024CC1	Eaton		Molded plastic, copper and steel	0.3	Interpolated
XTOB032CC1	Eaton		Molded plastic, copper and steel	0.3	Interpolated
XTOB057DC1	Eaton		Molded plastic, copper and steel	0.6	Interpolated
XTOB065DC1	Eaton		Molded plastic, copper and steel	0.6	Interpolated
XTOB100GC1	Eaton		Molded plastic, copper and steel	3.0	Interpolated
XTOB125GC1	Eaton		Molded plastic, copper and steel	3.0	Interpolated
XTOB016CC1	Eaton		Molded plastic, copper and steel	0.3	Interpolated
XTOB070GC1	Eaton		Molded plastic, copper and steel	2.9	Interpolated
XTOB040DC1	Eaton		Molded plastic, copper and steel	0.6	Interpolated
XTOB075DC1	Eaton		Molded plastic, copper and steel	0.6	Interpolated
XTOB150GC1	Eaton		Molded plastic, copper and steel	3.0	UUT2-r,f
XTOB2P4BC1	Eaton		Molded plastic, copper and steel	0.3	Interpolated
XTOB004BC1	Eaton		Molded plastic, copper and steel	0.3	Interpolated
XTOB175GC1	Eaton		Molded plastic, copper and steel	3.0	Interpolated

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Eaton Corporation

Product Line: Variable frequency drives

Subcomponent: Transformers

Transformers				
Model Number	**Manufacturer**	**Description**	**Material**	**Unit**
C0075E5EFB	MTE	75W	Iron	UUT1-r,f
C0200E5EFB	MTE	200W	Iron	Interpolated
C0350E5EFB	MTE	350W	Iron	Interpolated
C0500E5EFB	MTE	500W	Iron	UUT2-r,f

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Eaton Corporation

Product Line: Variable frequency drives

Subcomponent: Relays

Relays				
Model Number	**Manufacturer**	**Description**	**Material**	**Unit**
D2PR4A	Eaton	Run relay	Molded plastic, copper and steel	UUT1-r,f, UUT2-r,f
D2PAP	Eaton	Relay socket	Molded plastic, copper and steel	UUT1-r,f, UUT2-r,f

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Eaton Corporation

Product Line: Variable frequency drives

Subcomponent: Heaters

Heaters				
Model Number	**Manufacturer**	**Description**	**Material**	**Unit**
02800.9-00	Stego	150W, 120V HEATER	Molded plastic, copper and steel	UUT2-r,f
02811.9-00	Stego	250W, 120V HEATER	Molded plastic, copper and steel	Interpolated
02810.9-00	Stego	400W, 120V HEATER	Molded plastic, copper and steel	UUT2-r,f
01142.9-00	Stego	THERMOSTAT (+10F to +122F)	Molded plastic, copper and steel	UUT1-r,f, UUT2-r,f

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Eaton Corporation

Product Line: Variable frequency drives

Subcomponent: Fuses

Fuses				
Model Number	**Manufacturer**	**Description**	**Material**	**Unit**
DFJ-100	Bussmann	J TYPE FUSE, 100A	Copper	Interpolated
DFJ-12	Bussmann	J TYPE FUSE, 12A	Copper	Interpolated
DFJ-125	Bussmann	J TYPE FUSE, 125A	Copper	Interpolated
DFJ-150	Bussmann	J TYPE FUSE, 150A	Copper	Interpolated
DFJ-175	Bussmann	J TYPE FUSE, 175A	Copper	Interpolated
DFJ-20	Bussmann	J TYPE FUSE, 20A	Copper	Interpolated
DFJ-200	Bussmann	J TYPE FUSE, 200A	Copper	UUT2-r,f
DFJ-25	Bussmann	J TYPE FUSE, 25A	Copper	Interpolated
DFJ-30	Bussmann	J TYPE FUSE, 30A	Copper	Interpolated
DFJ-6	Bussmann	J TYPE FUSE, 6A	Copper	UUT2-r,f
DFJ-60	Bussmann	J TYPE FUSE, 60A	Copper	Interpolated
DFJ-8	Bussmann	J TYPE FUSE, 8A	Copper	Interpolated
LPJ-100SP	Bussmann	J TYPE FUSE, 100A	Copper	Interpolated
LPJ-125SP	Bussmann	J TYPE FUSE, 125A	Copper	Interpolated
LPJ-12SP	Bussmann	J TYPE FUSE, 12A	Copper	Interpolated
LPJ-150SP	Bussmann	J TYPE FUSE, 150A	Copper	Interpolated
LPJ-175SP	Bussmann	J TYPE FUSE, 175A	Copper	Interpolated
LPJ-200SP	Bussmann	J TYPE FUSE, 200A	Copper	UUT2-r,f
LPJ-20SP	Bussmann	J TYPE FUSE, 20A	Copper	Interpolated
LPJ-25SP	Bussmann	J TYPE FUSE, 25A	Copper	Interpolated
LPJ-30SP	Bussmann	J TYPE FUSE, 30A	Copper	Interpolated
LPJ-60SP	Bussmann	J TYPE FUSE, 60A	Copper	Interpolated
LPJ-6SP	Bussmann	J TYPE FUSE, 6A	Copper	UUT2-r,f
LPJ-8SP	Bussmann	J TYPE FUSE, 8A	Copper	Interpolated
TCF6	Bussmann	CUBE FUSE, 6A	Copper	UUT1-r,f
TCF10	Bussmann	CUBE FUSE, 10A	Copper	UUT4-r,f
TCF20	Bussmann	CUBE FUSE, 20A	Copper	Interpolated
TCF25	Bussmann	CUBE FUSE, 25A	Copper	Interpolated
TCF30	Bussmann	CUBE FUSE, 30A	Copper	Interpolated
TCF60	Bussmann	CUBE FUSE, 60A	Copper	Interpolated
TCF100	Bussmann	CUBE FUSE, 100A	Copper	UUT4-r,f
FNQ-R-1	Bussmann	TIME DELAY CPT FUSE, 1A	Copper	UUT1-r,f
FNQ-R-2	Bussmann	TIME DELAY CPT FUSE, 2A	Copper	Interpolated
FNQ-R-4	Bussmann	TIME DELAY CPT FUSE, 4A	Copper	Interpolated
FNQ-R-5	Bussmann	TIME DELAY CPT FUSE, 5A	Copper	UUT2-r,f
FNM-1	Bussmann	TIME DELAY CPT FUSE, 1A	Copper	UUT1-r,f
FNM-2	Bussmann	TIME DELAY CPT FUSE, 2A	Copper	Interpolated
FNM-5	Bussmann	TIME DELAY CPT FUSE, 5A	Copper	Interpolated
FNM-6	Bussmann	TIME DELAY CPT FUSE, 6A	Copper	UUT2-r,f

Special Seismic Certification
Tested Components

DCL Dynamic Certification Laboratories

Manufacturer: Eaton Corporation

Product Line: Variable frequency drives

Tested Product Construction: Galvanized carbon steel and painted carbon steel enclosures, NEMA 1 or 3R

Tested Options: 208-230/480V; drives, disconnects, contactors, overloads, transformers, relays, heaters and fuses

Tested Mounting Description: Rigid and flexible wall mount

Manufacturer	Panel Description	Type	Tested Drive	VFD Frame	Design	Enclosure Material	NEMA Rating	HP	Voltage	Height (in.)	Width (in.)	Depth (in.)	Measured Weight (lb)	Sds (g), z/h=1	Mounting	Unit
Eaton	VFD with Bypass and with Fused and Non-Fused Disconnects (NEMA 1)	HMXE	HMX34AG01221-N	4,5	B1	Galvanized carbon steel	1	7.5	480	23.0	16.0	14.2	61	2.5	Rigid wall mount	UUT 1-r
														2.5	Flexible wall mount	UUT1-f
	VFD without Bypass and with Fused and Non-Fused Disconnects (NEMA 1)	HMXE	HMX32AG4D821-N	4, 5	A1	Galvanized carbon steel	1	1	208	20.5	8.3	10.0	28	2.5	Rigid wall mount	UUT 4-r
														2.5	Flexible wall mount	UUT 4-f
	VFD with Bypass and with Fused and Non-Fused Disconnects (NEMA 3R)	HMXE	HMX32AG17021-N	8	D6	Painted carbon Steel	3R	50	208	50.0	30.0	20.4	460	2.5	Rigid wall mount	UUT 2-r
														2.5	Flexible wall mount	UUT 2-f

UNIT UNDER TEST - Summary Sheet
UUT1-r,f

DCL Dynamic Certification Laboratories

Manufacturer: Eaton Corporation

Product Line: Variable frequency drives

Model Number: Eaton drive model HMX34AG01221-N

Product Construction Summary: Galvanized carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: 480V , 30A non-fusible disconnect switch, 7A contactor, electric overload, 75W transformer, relay, thermostat and fuses

Unit Mounting Description:

UUT1-r,f were mounted to the DCL shake table interface frame with four 3/8-inch diameter Grade 5 bolts.

Rigid wall mount (UUT1-r): The DCL shake table interface frame was rigidly attached to the shake table using M12 threaded rod spaced approximately 8-inches on-center.

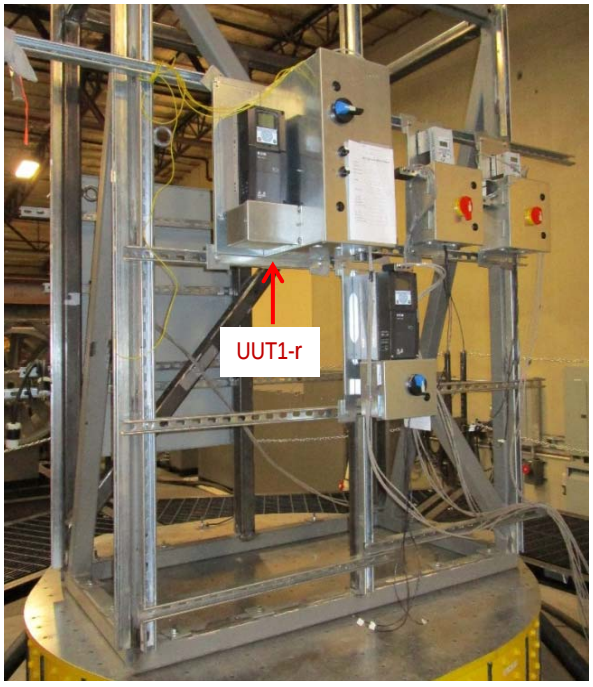
Flexible wall mount (UUT1-f): The DCL shake table interface frame was flexibly attached to four vibration spring isolators with two 3/4"-dia Grade 5 bolts per isolator. The isolators were welded to the DCL shake table interface plate which was attached to the shake table with M12 threaded rod spaced approximately 8-inches on-center.

UUT Properties

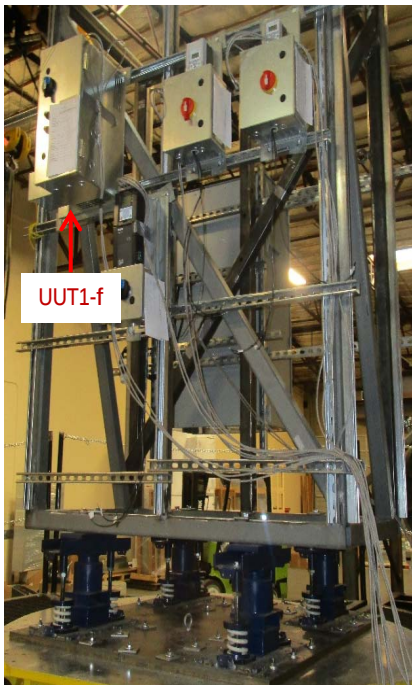
UUT1-r,f	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	61	16.0	15.6	23.0	N/A	N/A	N/A

Seismic Test Parameters

Building Code	Test Criteria	Sds	z/h	Ip	Aflx-H	Arig-H	Aflx-V	Arig-V
CBC 2013	2012 ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.67	0.67



Rigid test setup (UUT1-r)



Flexible test setup (UUT1-f)

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-r,f

DCL Dynamic Certification Laboratories

Manufacturer: Eaton Corporation

Product Line: Variable frequency drives

Model Number: Eaton drive model HMX32AG17021-N

Product Construction Summary: Painted carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: 208-230V , 200A non-fusible disconnect switch, 30A and 200A fusible disconnect switches, 170A contactor, electric overload, 500W transformer, relay, 150W and 400W heaters, and fuses

Unit Mounting Description:

UUT2-r,f were mounted to the DCL shake table interface frame with four 3/8-inch diameter Grade 5 bolts.
Rigid wall mount (UUT2-r): 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 (UUT2-f): 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-r,f	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	460	19.5	32.0	50.0	N/A	N/A	N/A

Seismic Test Parameters

Building Code	Test Criteria	Sds	z/h	Ip	Aflx-H	Arig-H	Aflx-V	Arig-V
CBC 2013	2012 ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.67	0.67

Rigid test setup (UUT2-r)

Flexible test setup (UUT2-f)

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-r,f

DCL Dynamic Certification Laboratories

Manufacturer: Eaton Corporation

Product Line: Variable frequency drives

Model Number: Eaton drive model HMX32AG4D821-N

Product Construction Summary: Galvanized carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: 208V , 30A non-fusible disconnect switch and fuses

Unit Mounting Description:

UUT4-r,f were mounted to the DCL shake table interface frame with four 3/8-inch diameter Grade 5 bolts.
Rigid wall mount (UUT4-r): 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 (UUT4-f): 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.

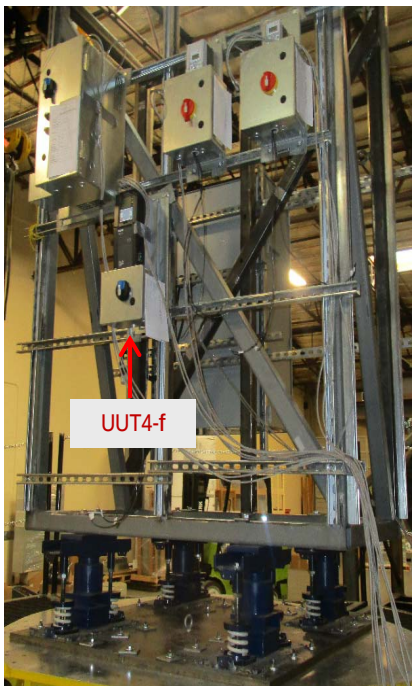
UUT Properties

UUT4-r,f	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	28	8.6	10.4	20.5	N/A	N/A	N/A

Seismic Test Parameters

Building Code	Test Criteria	Sds	z/h	Ip	Aflx-H	Arig-H	Aflx-V	Arig-V
CBC 2013	2012 ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.67	0.67

Rigid test setup (UUT4-r)



Flexible test setup (UUT4-f)

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.