APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY	
APPLICATION #:	OSP – 0339 – 10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Johnson Controls, Inc.

Manufacturer's Technical Representative: Dave Nicholson

Mailing Address: 77 Academy Drive, Hattiesburg, MS 39401

Telephone: (601) 554-7167 Email: David.nicholson@jci.com

Product Information

Product Name: AYK550, YK and YM Variable Frequency Drives

Product Type: Motor control centers

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

General Description: Variable speed drive units in NEMA 1 and 3R enclosures, containing various drives, disconnects, service switches, disconnect fuses, contactors, mechanical interlocks, transformers, heaters and thermostats. Seismic enhancements made to the test units required to address the anomalies observed during the tests shall be incorporated into the production units.

Mounting Description: Rigid or flexible wall mount

Applicant Information

Applicant Company Name: Dynamic Certification Laboratories

Contact Person: Joseph L. LaBrie, 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: 4/10/15

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) = 1.45 (S_{DS}=1.93g, R_p=6.0); 4.34 (S_{DS}=1.93g, R_p=2.0) 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) = 1.93 g (AYK550); 2.50 g (YK and YM)

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: 4/17/2015

Print Name: M. R. Karim Title: SHFR

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

Condition of Approval (if applicable): _____

Special Seismic Certification
Certified Components

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

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

Certified Options: Type 1 and 3R NEMA rating; 230V, 460V; bypass, fused and non-fused integral disconnects, service switch, contactors, mechanical interlocks, transformers, heater and thermostat

Certified Mounting Description: Wall mount (rigid or flexible)

Manufac.	Panel Description	Model	Frame	Base	Voltage		Enclosure				Sds (g), z/h=1	DCL Test Report	Unit
					200, 230, 460, 575		Dimensions (in)			Weight (lb)			
					Min HP	Max HP	Height	Width	Depth				
JCI	VFD without Bypass and with Fused and Non-Fused Disconnects (NEMA1)	AYK550	R1	G11	1	7.5	20.5	8.3	11.7	36	1.93	N/A	Extrapolated
			R2	G12	7.5	15	24.8	8.3	12.2	44			
			R3	G13	15	30	32.5	9.0	12.0	56			
			R4	G14	25	75	40.5	12.0	15.2	88			
			R5	G15	100	100	43.0	12.0	16.9	125			
			R6	G16	50	150	48.0	16.0	20.4	150			
	VFD with Bypass and Fused and Non-Fused Integral Disconnects and Service Switch (NEMA1)		R1	G20	1	7.5	23.0	16.0	16.0	70		50849-1301	UUT31a-r, UUT31a-f
												50849-1301	UUT31b-r, UUT31b-f
			R2	G21	7.5	15	26.0	16.0	16.0	89		N/A	Interpolated
			R3	G22	15	30	27.3	19.0	16.0	111			
			R4	G23	25	75	39.5	30.0	18.0	215			
			R5	G24	100	100	44.0	33.0	18.0	278			
			R6	G25	50	150	44.0	33.0	18.0	376			
	VFD without Bypass and with Fused and Non-Fused Disconnects (NEMA3R Self Ventilated)		R1	G11	1	7.5	22.4	15.2	14.4	62		N/A	Interpolated
			R2	G12	7.5	15	28.4	15.2	14.4	76			
			R3	G13	15	30	35.1	18.5	14.4	112			
			R4	G14	25	75	45.6	18.0	16.5	170			
			R5	G15	100	100	49.7	21.8	18.5	216			
			R6	G16	50	150	56.8	23.3	21.5	335			
	VFD with and without Bypass Fused and Non-Fused Disconnect (NEMA3R Self Ventilated)		R1	G20	1	7.5	19.5	18.2	17.5	78		N/A	Interpolated
			R2	G21	7.5	15	22.5	18.2	17.5	96			
			R3	G22	15	30	31.1	21.5	17.5	164			
			R4	G23	25	75	42.1	28.5	18.5	238			
			R5	G24	100	100	46.2	32.5	22.5	300			
			R6	G25	50	150	52.2	32.5	22.5	440		50849-1301	UUT32a-r, UUT32a-f
												50849-1301	UUT32b-r, UUT32b-f

Special Seismic Certification
Certified Components

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

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

Certified Options: Type 1 and 3R NEMA rating; 208V, 230V, 460V; bypass, fused and non-fused integral disconnects, contactors, transformers, heater and thermostat

Certified Mounting Description: Wall mount (rigid or flexible)

Manufac.	Panel Description	Model	Frame	Base	Voltage		Enclosure				Sds (g), z/h=1	DCL Test Report	Unit
					200, 230, 460		Dimensions (in)			Weight (lb)			
					Min HP	Max HP	Height	Width	Depth				
JCI	VFD without Bypass and with Fused and Non-Fused Disconnects (NEMA 1)	YK	4, 5	A1	1	7.5	20.5	8.3	10.0	28	2.50	40446-1401	UUT4-r, UUT4-f
			5	A2	7.5	15	26.5	8.3	10.4	63		N/A	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			
		YM	FS1	M0	0.5	1	19.8	9.0	6.9	17		40446-1401	UUT3b-r, UUT3b-f
			FS2	M1	0.75	2	19.8	9.0	6.9	18		40446-1401	UUT3a-r, UUT3a-f
	VFD with Bypass and with Fused and Non-Fused Disconnects (NEMA 1)	YK	4,5	B1	1	7.5	23.0	16.0	14.2	61		40446-1401	UUT1-r, UUT1-f
			5	B2	7.5	15	26.0	16.0	14.3	95		N/A	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)	YK	4,5	C1	1	7.5	22.4	13.0	12.4	75		N/A	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)	YK	4,5	D1	1	7.5	19.5	16.0	15.4	102		N/A	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		40446-1401	UUT2-r, UUT2-f

AYK 550 Air-Modulator Type Code Sheet — 1 - 150 HP, Cabinet built

1…6 | A | Y | K | 5 | 5 | 0 | **Product Series**

7…9 | - | X | X | **Construction**

- **UH** AYK550 Base Drive (with +B058 or UL Type 3R is becomes a packaged drive
- **CF** AYK550 Drive Pack with two contactor classic bypass and input fused disconnect
- **CD** AYK550 Drive Pack with two contactor classic bypass and input non-fused disconnect
- **PF** AYK550 Drive Pack with input fused disconnect
- **PD** AYK550 Drive Pack with input non-fused disconnect

10…14 | - | | | | | **Size**

Frame Size	R1	R2	R3	R4	R5	R6
208/230 V	04A6 06A6 07A5 012A 017A	024A 031A	046A 059A	075A 088A 114A		143A 178A 221A 248A
480V	03A3 04A1 06A9 08A8 012A	015A 023A	031A 038A 045A	059A 072A 078A 097A	125A	157A 0180A 246A
575V		02A7 03A 06A1 09A0 011 017A	022A 027A	032A 041A 052A 062A		077A 099A 125A 144A

15…16 | - | | **Voltage Rating**

2=208/230V
4 = 460 V
6= 575 V

X	B058	UL type 3R
X	F267	Service Switch (applicable to drives with bypass)
X	G300	Space Heater (for use with +B058)
X	K465	The drive includes the following commmunication protocals as standard; Johnson Controls N2, Modbus RTU, Seimens FLN (P1) and Bacnet (BTL Listed). This feature is embedded in every AYK550

YK/YM Type Code Sheet

Character N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Description	Product	Product	Full Load Amp	Full Load Amp	Full Load Amp	Voltage	Enclosure Rating/style	Style	Revision #	Dash	Communications	Option 1	Option 2	Option 3	Option 4
Character	**Y**	**K**	**3**	**D**	**4**	**4**	**1**	**1**	**B**	**-**	**0**	**0**	**0**	**0**	**0**

Base Product
YK - H-Max Drive
YM- M-Max Drive

Amps / Hp

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)
4D3 = 4.3 Amp (2 Hp)

Voltage
1 = 208V (YK only)
2 = 230V (YK only)
4 = 460V (YK only)
6 = 200-240V (YM only)
7 = 380-480V (YM only)

Enclosure /type
1 = Nema-UL Type 1
2 = Nema-UL Type 3R (YK only)

Style
1- Standard w/Non fused Disconnect
2- Standard w/Fused Disconnect (only option for YM)
3- Bypass w/Fused Disconnect
4- Bypass w/Non fused Disconnect

Revision

RS-485 Communications
S = SA Bus, CS card ***Slot D/E*** (YK only)
0 = Standard

Options (Ordered Separately)
VS-XMX-K9-FS4-5 = Aux Contacts - Qty 2 (FS4-5 Bypass and Drive Output Contactors)
VS-XMX-K9-FS6-9 = Aux Contacts - Qty 2 (FS6-9 Bypass and Drive Output Contactors)

Extended I/O & Comm Options in Slot D & E (Ordered Separately)
VS-XMX-B1 = 6 DI or DO, 1 ext +24V DC/EXT +24V DC Programmable
VS-XMX-B2 = 1 RO (NC/NO), 1 RO (NO), 1 Thermistor
VS-XMX-B4 = 1 AI (mA isolated), 2 AO (mA isolated)
VS-XMX-B5 = Card-3 Relay Dry Contact
VS-XMX-B9 = 1 RO (NO), 5 DI 42 – 240V AC Input
VS-XMX-BF = Expander IO - 1*AO, 1*DO, 1*RO
VS-XMX-CS = SA Bus (JC-VSD only)
VS-XMX-C4 = Lon Works Comm Card

I/O Options in Slot B (Ordered Separately)
VS-XMX-F1 = 3 relay (spare/replacement part only- not option w/standard VSD)
VS-XMX-F2 = 2 relay and 1 Thermistor- not available with L3/L4 Pilot light option replaces standard Relay1 pcb in Slot B and Fault Relay function

Parts (Ordered Separately)
VS-REM-USB-LOAD = USB to RJ-45 cable with software driver
VS-RMT-KEYPAD2 = Series II Keypad Remote Mounting Kit
VS-KEYPAD-SER2 = Series II Graphic Bypass HOA Keypad

Special Seismic Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Subcomponent: Drives

Drives

Model Number	Manufacturer	Amperage	Voltage	Main Enclosure Material	Drive Cover Material	Sds (g), z/h=1	Unit
AYK550-UH-03A3-4+K465	ABB	3	460V	Painted carbon steel or galvanized carbon steel	Plastic	1.93	UUT31a, UUT31b
AYK550-UH-04A1-4+K465	ABB	4					Interpolated
AYK550-UH-06A9-4+K465	ABB	7					Interpolated
AYK550-UH-08A8-4+K465	ABB	9					Interpolated
AYK550-UH-012A-4+K465	ABB	12					Interpolated
AYK550-UH-015A-4+K465	ABB	15					Interpolated
AYK550-UH-023A-4+K465	ABB	23					Interpolated
AYK550-UH-031A-4+K465	ABB	31					Interpolated
AYK550-UH-038A-4+K465	ABB	38					Interpolated
AYK550-UH-045A-4+K465	ABB	45					Interpolated
AYK550-UH-059A-4+K465	ABB	59					Interpolated
AYK550-UH-072A-4+K465	ABB	72					Interpolated
AYK550-UH-078A-4+K465	ABB	78					Interpolated
AYK550-UH-097A-4+K465	ABB	97					Interpolated
AYK550-UH-125A-4+K465	ABB	125					Interpolated
AYK550-UH-157A-4+K465	ABB	157					Interpolated
AYK550-UH-180A-4+K465	ABB	180					Interpolated
AYK550-UH-02A7-6+K465	ABB	3	575V*				Interpolated
AYK550-UH-03A9-6+K465	ABB	4					Interpolated
AYK550-UH-06A1-6+K465	ABB	6					Interpolated
AYK550-UH-09A0-6+K465	ABB	9					Interpolated
AYK550-UH-011A-6+K465	ABB	11					Interpolated
AYK550-UH-017A-6+K465	ABB	17					Interpolated
AYK550-UH-022A-6+K465	ABB	22					Interpolated
AYK550-UH-027A-6+K465	ABB	27					Interpolated
AYK550-UH-032A-6+K465	ABB	32					Interpolated
AYK550-UH-041A-6+K465	ABB	41					Interpolated
AYK550-UH-052A-6+K465	ABB	52					Interpolated
AYK550-UH-062A-6+K465	ABB	62					Interpolated
AYK550-UH-077A-6+K465	ABB	77					Interpolated
AYK550-UH-099A-6+K465	ABB	99					Interpolated
AYK550-UH-125A-6+K465	ABB	125					Interpolated
AYK550-UH-144A-6+K465	ABB	144					Interpolated
AYK550-UH-04A6-2+K465	ABB	5	208/230V				Interpolated
AYK550-UH-06A6-2+K465	ABB	7					Interpolated
AYK550-UH-07A5-2+K465	ABB	8					Interpolated
AYK550-UH-012A-2+K465	ABB	12					Interpolated
AYK550-UH-017A-2+K465	ABB	17					Interpolated
AYK550-UH-024A-2+K465	ABB	24					Interpolated
AYK550-UH-031A-2+K465	ABB	31					Interpolated
AYK550-UH-046A-2+K465	ABB	46					Interpolated
AYK550-UH-059A-2+K465	ABB	59					Interpolated
AYK550-UH-075A-2+K465	ABB	75					Interpolated
AYK550-UH-088A-2+K465	ABB	88					Interpolated
AYK550-UH-114A-2+K465	ABB	114					Interpolated
AYK550-UH-143A-2+K465	ABB	143					Interpolated
AYK550-UH-178A-2+K465	ABB	178					Interpolated
AYK550-UH-221A-2+K465	ABB	221					UUT32a, UUT32b

*The 460V and 230V tested units cover the range of frame sizes (R1-R6), as well as the components used in the 575V drives. The electrical components are sized based on amperage; with 575V applied, the components will have less amperage. Less amperage equates to smaller, lighter components in a smaller frame size.

Special Seismic Certified Subcomponents

((●)) DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Subcomponent: Drives (Continued)

Drives							
Model Number	**Manufacturer**	**Amperage**	**Voltage**	**Main Enclosure Material**	**Drive Cover Material**	**Sds (g), z/h=1**	**Unit**
VS4D8210B-00000	Eaton	4.8	208/230	Painted carbon steel or galvanized carbon steel	Plastic	2.50	UUT4
VS8D0210B-00000		8	208/230				Interpolated
VS011210B-00000		11	208/230				Interpolated
VS018210B-00000		18	208/230				Interpolated
VS031210B-00000		31	208/230				Interpolated
VS048210B-00000		48	208				Interpolated
VS048220B-00000		48	230				Interpolated
VS062210B-00000		62	208/230				Interpolated
VS075210B-00000		75	208/230				Interpolated
VS088210B-00000		88	208/230				Interpolated
VS140210B-00000		140	208/230				Interpolated
VS170210B-00000		170	208/230				UUT2
VS3D4410B-00000		3.4	480				Interpolated
VS4D8410B-00000		4.8	480				Interpolated
VS5D6410B-00000		5.6	480				Interpolated
VS9D6410B-00000		9.6	480				Interpolated
VS012410B-00000		12	480				UUT1
VS016410B-00000		16	480				Interpolated
VS023410B-00000		23	480				Interpolated
VS031410B-00000		31	480				Interpolated
VS038410B-00000		38	480				Interpolated
VS046410B-00000		46	480				Interpolated
VS061410B-00000		61	480				Interpolated
VS072410B-00000		72	480				Interpolated
VS087410B-00000		87	480				Interpolated
VS105410B-00000		105	480				Interpolated
VS140410B-00000		140	480				Interpolated
VS170410B-00000		170	480				Interpolated
VS2D8203B-M0000	Eaton	2.5	208/230				Interpolated
VS3D7203B-M0000		3.7	208/230				Interpolated
VS4D8203B-M0000		4.8	208/230				Interpolated
VS7D0203B-M0000		6.9	208/230				Interpolated
VS1D3403B-M0000		1.3	480				UUT3a
VS1D9403B-M0000		1.7	480				Interpolated
VS2D4403B-M0000		2.3	480				Interpolated
VS3D3403B-M0000		3.3	480				Interpolated
VS4D3403B-M0000		4.3	480				UUT3b

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Subcomponent: Service Switches and Mechanical Interlocks

Service Switch

Model Number	Manufacturer	Description	Material	Sds (g), z/h=1	Unit
OT25F3	ABB	25 A	Plastic cover	1.93	UUT31a, UUT31b
OT40F3	ABB	40 A			Interpolated
OT63F3	ABB	63 A			Interpolated
OT80F3	ABB	80 A			Interpolated
OT100F3	ABB	100 A			Interpolated
OT160E3	ABB	125 A			Interpolated
OT200U03	ABB	200 A			Interpolated
OT400U03	ABB	400 A			UUT32a, UUT32b

Mechanical Interlocks

Model Number	Manufacturer	Description	Material	Sds (g), z/h=1	Unit
VM5-1	ABB	Interlock	Plastic cover	1.93	UUT31a, UUT31b
VE5-2	ABB	Interlock			Interpolated*
VM300H	ABB	Interlock			UUT32a, UUT32b

*Note: The VE5-2 electrical/mechanical interlock is sized between the VM5-1 and VM300H mechanical interlocks. The VE5-2 has a terminal connection that can be used to sense the status of the interlock; however, this feature is not used for the AYK 550 Air-Modulator product line.

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Subcomponent: Disconnects

Disconnects					
Model Number	**Manufacturer**	**Description**	**Material**	**Sds (g), z/h=1**	**Unit**
OT25F3	ABB	Non-Fusible, 25 A	Molded plastic, copper and carbon steel	1.93	UUT31a, UUT31b
OT40F3	ABB	Non-Fusible, 40 A			Interpolated
OT63F3	ABB	Non-Fusible, 63 A			Interpolated
OT80F3	ABB	Non-Fusible, 80 A			Interpolated
OT100F3	ABB	Non-Fusible, 100 A			Interpolated
OT160E3	ABB	Non-Fusible, 160 A			Interpolated
OT200U03	ABB	Non-Fusible, 200 A			Interpolated
OT200U12	ABB	Non-Fusible, 200 A			Interpolated
OT400U03	ABB	Non-Fusible, 400 A			UUT32a, UUT32b
OS30FAJ12	ABB	Fusible, 30 A	Molded plastic, copper and carbon steel		UUT31a
OS60J12	ABB	Fusible, 60 A			Interpolated
OS100J03	ABB	Fusible, 100 A			Interpolated
OS200J03	ABB	Fusible, 200 A			Interpolated
OS400J03	ABB	Fusible, 400 A			UUT32a
R5A3030U	Eaton	Non-Fusible, 30A	Molded plastic, copper and carbon steel	2.50	UUT1, UUT3a, UUT3b, UUT4
R5B3060U	Eaton	Non-Fusible, 60A			Interpolated
R9C3100U	Eaton	Non-Fusible, 100A			Interpolated
R9D3100U	Eaton	Non-Fusible, 100A			Interpolated
R9D3200U	Eaton	Non-Fusible, 200A			UUT2
R9J3030FJ	Eaton	Fusible, 30A	Molded plastic, copper and carbon steel		UUT2
R9J3060FJ	Eaton	Fusible, 60A			Interpolated
R9K3060FJ	Eaton	Fusible, 60A			Interpolated
R9K3100FJ	Eaton	Fusible, 100A			Interpolated
R9L3200FJ	Eaton	Fusible, 200A			UUT2

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Subcomponent: Contactors

Contactors					
Model Number	**Manufacturer**	**Description**	**Material**	**Sds (g), z/h=1**	**Unit**
A9-30-10-84	ABB	9A	Molded plastic, copper, carbon steel	1.93	UUT31a, UUT31b
A12-30-10-84	ABB	12A			UUT31a, UUT31b
A16-30-10-84	ABB	16A			Interpolated
A26-30-10-84	ABB	26A			Interpolated
A30-30-10-84	ABB	30A			Interpolated
A40-30-10-84	ABB	40A			Interpolated
A50-30-11-84	ABB	50A			Interpolated
A63-30-11-84	ABB	63A			Interpolated
A75-30-11-84	ABB	75A			Interpolated
A95-30-11-84	ABB	95A			Interpolated
A110-30-11-84	ABB	110A			Interpolated
A145-30-11-84	ABB	145A			UUT32a, UUT32b
A185-30-11-84	ABB	185A			Interpolated
A210-30-11-84	ABB	210A			Interpolated
A260-30-11-84	ABB	260A			UUT32a, UUT32b
XTCE007B01A	Eaton	7A	Molded plastic, copper, carbon steel	2.50	UUT1
XTCE009B01A	Eaton	9A			Interpolated
XTCE012B01A	Eaton	12A			Interpolated
XTCE018C01A	Eaton	18A			Interpolated
XTCE025C01A	Eaton	25A			Interpolated
XTCE032C01A	Eaton	32A			Interpolated
XTCE040DS1A	Eaton	40A			Interpolated
XTCE050DS1A	Eaton	50A			Interpolated
XTCE065DS1A	Eaton	65A			Interpolated
XTCE080FS1A	Eaton	80A			Interpolated
XTCE095FS1A	Eaton	95A			Interpolated
XTCE115GS1A	Eaton	115A			Interpolated
XTCE170GS1A	Eaton	170A			UUT2

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Subcomponent: Overloads

Overloads						
Model Number	**Manufacturer**	**Description**	**Material**	**Weight (lb)**	**Sds (g), z/h=1**	**Unit**
XTOB006BC1	Eaton	Electric Overload	Molded plastic, copper and carbon steel	0.3	2.50	Extrapolated
XTOB010BC1	Eaton			0.3		Extrapolated
XTOB012BC1	Eaton			0.3		UUT1
XTOB024CC1	Eaton			0.3		Interpolated
XTOB032CC1	Eaton			0.3		Interpolated
XTOB016CC1	Eaton			0.3		Interpolated
XTOB2P4BC1	Eaton			0.3		Interpolated
XTOB004BC1	Eaton			0.3		Interpolated
XTOB057DC1	Eaton			0.6		Interpolated
XTOB065DC1	Eaton			0.6		Interpolated
XTOB040DC1	Eaton			0.6		Interpolated
XTOB075DC1	Eaton			0.6		Interpolated
XTOB070GC1	Eaton			2.9		Interpolated
XTOB100GC1	Eaton			3.0		Interpolated
XTOB125GC1	Eaton			3.0		Interpolated
XTOB150GC1	Eaton			3.0		UUT2
XTOB175GC1	Eaton			3.0		Extrapolated

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Subcomponent: Transformers

Transformers					
Model Number	**Manufacturer**	**Capacity**	**Material**	**Sds (g), z/h=1**	**Unit**
B150MBT13RKF	Micron	150VA	Iron	1.93	UUT31a, UUT31b
B150WZ13RKF	Micron	150VA	Iron		Interpolated
B300WZ13RKF	Micron	300VA	Iron		Interpolated
B300MBT13RKF	Micron	300VA	Iron		UUT32a, UUT32b
C0075E5EFB	MTE	75W	Iron	2.50	UUT1
C0200E5EFB	MTE	200W	Iron		Interpolated
C0350E5EFB	MTE	350W	Iron		Interpolated
C0500E5EFB	MTE	500W	Iron		UUT2

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Subcomponent: Relays

Relays					
Model Number	**Manufacturer**	**Description**	**Material**	**Sds (g), z/h=1**	**Unit**
D2PR4A	Eaton	Run relay	Molded plastic, copper, steel	2.50	UUT1, UUT2
D2PAP	Eaton	Relay socket	Molded plastic, copper, steel		UUT1, UUT2

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Subcomponent: Heaters

Heater and Thermostat					
Model Number	**Manufacturer**	**Description**	**Material**	**Sds (g), z/h=1**	**Unit**
020100C1-F001F	Watlow	Heater	Silicone rubber	1.93	UUT32a, UUT32b
FLZ520	Pfannenberg	Thermostat	Plastic cover		UUT32a, UUT32b
02800.9-00	Stego	150W, 120V HEATER	Molded plastic, copper and carbon steel	2.50	UUT2
02811.9-00	Stego	250W, 120V HEATER			Interpolated
02810.9-00	Stego	400W, 120V HEATER			UUT2
01142.9-00	Stego	THERMOSTAT (+10F to +122F)	Plastic cover		UUT1, UUT2

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Subcomponent: Fuses

Fuses					
Model Number	**Manufacturer**	**Description**	**Material**	**Sds (g), z/h=1**	**Unit**
LPJ-5SP	Bussman	5 A	Copper	1.93	UUT31a
LPJ-6SP	Bussman	6 A	Copper		Interpolated
LPJ-7SP	Bussman	7 A	Copper		Interpolated
LPJ-9SP	Bussman	9 A	Copper		Interpolated
LPJ-10SP	Bussman	10 A	Copper		Interpolated
LPJ-12SP	Bussman	12 A	Copper		Interpolated
LPJ-15SP	Bussman	15 A	Copper		Interpolated
LPJ-17-1/2SP	Bussman	17.5 A	Copper		Interpolated
LPJ-20SP	Bussman	20 A	Copper		Interpolated
LPJ-25SP	Bussman	25 A	Copper		Interpolated
LPJ-30SP	Bussman	30 A	Copper		Interpolated
LPJ-40SP	Bussman	40 A	Copper		Interpolated
LPJ-50SP	Bussman	50 A	Copper		Interpolated
LPJ-60SP	Bussman	60 A	Copper		Interpolated
LPJ-70SP	Bussman	70 A	Copper		Interpolated
LPJ-80SP	Bussman	80 A	Copper		Interpolated
LPJ-90SP	Bussman	90 A	Copper		Interpolated
LPJ-100SP	Bussman	100 A	Copper		Interpolated
LPJ-125SP	Bussman	125 A	Copper		Interpolated
LPJ-175SP	Bussman	175 A	Copper		Interpolated
LPJ-200SP	Bussman	200 A	Copper		Interpolated
LPJ-250SP	Bussman	250 A	Copper		Interpolated
LPJ-300SP	Bussman	300 A	Copper		Interpolated
LPJ-350SP	Bussman	350 A	Copper		UUT32a

Special Seismic Certification
Certified Subcomponents

((●)) DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Subcomponent: Fuses (Continued)

Fuses (Continued)					
Model Number	**Manufacturer**	**Description**	**Material**	**Sds (g), z/h=1**	**Unit**
DFJ-6	Bussmann	J TYPE FUSE, 6A	Copper		UUT2
DFJ-8	Bussmann	J TYPE FUSE, 8A	Copper		Interpolated
DFJ-12	Bussmann	J TYPE FUSE, 12A	Copper		Interpolated
DFJ-20	Bussmann	J TYPE FUSE, 20A	Copper		Interpolated
DFJ-25	Bussmann	J TYPE FUSE, 25A	Copper		Interpolated
DFJ-30	Bussmann	J TYPE FUSE, 30A	Copper		Interpolated
DFJ-60	Bussmann	J TYPE FUSE, 60A	Copper		Interpolated
DFJ-100	Bussmann	J TYPE FUSE, 100A	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-200	Bussmann	J TYPE FUSE, 200A	Copper		UUT2
LPJ-6SP	Bussmann	J TYPE FUSE, 6A	Copper		UUT2
LPJ-8SP	Bussmann	J TYPE FUSE, 8A	Copper		Interpolated
LPJ-12SP	Bussmann	J TYPE FUSE, 12A	Copper		Interpolated
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-100SP	Bussmann	J TYPE FUSE, 100A	Copper	2.50	Interpolated
LPJ-125SP	Bussmann	J TYPE FUSE, 125A	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
TCF6	Bussmann	CUBE FUSE, 6A	Copper		UUT1
TCF10	Bussmann	CUBE FUSE, 10A	Copper		UUT3a, UUT3b, UUT4
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
FNQ-R-1	Bussmann	TIME DELAY CPT FUSE, 1A	Copper		UUT1
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
FNM-1	Bussmann	TIME DELAY CPT FUSE, 1A	Copper		UUT1
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

Special Seismic Certification
Tested Components

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

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

Tested Options: Type 1 and 3R NEMA rating; 230V, 460V; bypass, fused and non-fused integral disconnects, service switch, contactors, mechanical interlocks, transformers, heater and thermostat

Tested Mounting Description: Wall mount (rigid or flexible)

Manufac.	Panel Description	Model	Frame	Base	Main Enclosure Material	NEMA Rating	Voltage		Enclosure				Sds (g), z/h=1	DCL Test Report	Unit
							200, 230, 460, 575		Dimensions (in)			Weight (lb)			
							Min HP	Max HP	Height	Width	Depth				
JCI	VFD with Bypass and Fused and Non-Fused Integral Disconnects and Service Switch	AYK550	R1	G20	Galvanized carbon steel	1	1	7.5	23.0	16.0	16.0	70	1.93	50849-1301	UUT31a-r, UUT31a-f
													1.93	50849-1301	UUT31b-r, UUT31b-f
	VFD with and without Bypass Fused and Non-Fused Disconnect	AYK550	R6	G25	Painted carbon steel	3R	50	150	52.2	32.5	22.5	440	1.93	50849-1301	UUT32a-r, UUT32a-f
													1.93	50849-1301	UUT32b-r, UUT32b-f
	VFD without Bypass and with Fused and Non-Fused Disconnects	YK	4, 5	A1	Galvanized carbon steel	1	1	7.5	20.5	8.3	10.0	28	2.50	40446-1401	UUT4-r, UUT4-f
		YM	FS1	M0	Galvanized carbon steel	1	0.5	1	19.8	9.0	6.9	17	2.50	40446-1401	UUT3b-r, UUT3b-f
		YM	FS2	M1	Galvanized carbon steel	1	0.75	2	19.8	9.0	6.9	18	2.50	40446-1401	UUT3a-r, UUT3a-f
	VFD with Bypass and with Fused and Non-Fused Disconnects	YK	4,5	B1	Galvanized carbon steel	1	1	7.5	23.0	16.0	14.2	61	2.50	40446-1401	UUT1-r, UUT1-f
	VFD with Bypass and with Fused and Non-Fused Disconnects	YK	8	D6	Painted carbon steel	3R	50	125	50.0	30.0	20.4	460	2.50	40446-1401	UUT2-r, UUT2-f

UUT31 a-r

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Model Number: AYK550-CF-03A3-4+F267+K465

Product Construction Summary: Galvanized carbon steel enclosure, NEMA 1

Options / Component Summary:

460V, 3 Amp VFD with bypass, fused and non-fused integral disconnects, service switch, contactors, mechanical interlock and transformer

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

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
70	16.0	16.0	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

Unit Mounting Description:

Rigid Wall Mount: UUT31 was wall mounted to the DCL steel shake table interface frame stud wall with (4) 3/8-inch diameter Grade 5 bolts, using the manufacturer-provided holes at the back of the panel. The unit was tested with the stud wall rigidly mounted to the shake table using M12 threaded rod.

UUT31 b-r

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Model Number: AYK550-CD-03A3-4+F267+K465

Product Construction Summary: Galvanized carbon steel enclosure, NEMA 1

Options / Component Summary:

460V, 3 Amp VFD with bypass, non-fused integral disconnects, service switch, contactors, mechanical interlock and transformer

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

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
70	16.0	16.0	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

Unit Mounting Description:

Rigid Wall Mount: UUT31 was wall mounted to the DCL steel shake table interface frame stud wall with (4) 3/8-inch diameter Grade 5 bolts, using the manufacturer-provided holes at the back of the panel. The unit was tested with the stud wall rigidly mounted to the shake table using M12 threaded rod.

UUT32 a-r

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Model Number: AYK550-CF-221A-2+B058+F267+G300+K465

Product Construction Summary: Painted carbon steel enclosure, NEMA 3R self-ventilated

Options / Component Summary:

208/230V, 221 Amp VFD, fused and non-fused disconnect, service switch, contactors, mechanical interlock, transformer, heater and thermostat

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

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
440	22.5	32.5	52.2	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

Unit Mounting Description:

Rigid Wall Mount: UUT32 was wall mounted to the stud wall with (10) 3/8-inch diameter Grade 5 bolts, using the manufacturer-provided holes on each side at the back of the panel. The unit was tested with the stud wall rigidly mounted to the shake table using M12 threaded rod.

UUT32 b-r

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Model Number: AYK550-CD-221A-2+B058+F267+G300+K465

Product Construction Summary: Painted carbon steel enclosure, NEMA 3R self-ventilated

Options / Component Summary:

208/230V, 221 Amp VFD, non-fused disconnect, service switch, contactors, mechanical interlock, transformer, heater and thermostat

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

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
440	22.5	32.5	52.2	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	1.93	1.0	1.5	3.09	2.32	1.29	0.51

Unit Mounting Description:

Rigid Wall Mount: UUT32 was wall mounted to the stud wall with (10) 3/8-inch diameter Grade 5 bolts, using the manufacturer-provided holes on each side at the back of the panel. The unit was tested with the stud wall rigidly mounted to the shake table using M12 threaded rod.

UUT31 a-f

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Model Number: AYK550-CF-03A3-4+F267+K465

Product Construction Summary: Galvanized carbon steel enclosure, NEMA 1

Options / Component Summary:

460V, 3 Amp VFD with bypass and fused and non-fused integral disconnects, service switch, contactors, mechanical interlock and transformer

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

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
70	16.0	16.0	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	1.93	1.0	1.5	3.09	2.32	1.29	0.51

Unit Mounting Description:

Flexible Wall Mount: UUT31 was wall mounted to the DCL steel shake table interface frame stud wall with (4) 3/8-inch diameter Grade 5 bolts, using the manufacturer-provided holes at the back of the panel. The unit was tested with the stud wall mounted to the shake table using spring isolators, in order to represent a flexible-mount condition. The shake table interface frame setup was attached to the shake table with M12 threaded rod.

UUT31 b-f

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Model Number: AYK550-CD-03A3-4+F267+K465

Product Construction Summary: Galvanized carbon steel enclosure, NEMA 1

Options / Component Summary:

460V, 3 Amp VFD with bypass, non-fused integral disconnects, service switch, contactors, mechanical interlock and transformer

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

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
70	16.0	16.0	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	1.93	1.0	1.5	3.09	2.32	1.29	0.51

Unit Mounting Description:

Flexible Wall Mount: UUT31 was wall mounted to the DCL steel shake table interface frame stud wall with (4) 3/8-inch diameter Grade 5 bolts, using the manufacturer-provided holes at the back of the panel. The unit was tested with the stud wall mounted to the shake table using spring isolators, in order to represent a flexible-mount condition. The shake table interface frame setup was attached to the shake table with M12 threaded rod.

UUT32 a-f

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Model Number: AYK550-CF-221A-2+B058+F267+G300+K465

Product Construction Summary: Painted carbon steel enclosure, NEMA 3R self-ventilated

Options / Component Summary:

208/230V, 221 Amp VFD, fused and non-fused disconnect, service switch, contactors, mechanical interlock, transformer, heater and thermostat

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

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
440	22.5	32.5	52.2	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	1.93	1.0	1.5	3.09	2.32	1.29	0.51

Unit Mounting Description:

Flexible Wall Mount: UUT32 was wall mounted to the stud wall with (10) 3/8-inch diameter Grade 5 bolts, using the manufacturer-provided holes on each side at the back of the panel. The unit was tested with the stud wall mounted to the shake table using spring isolators, in order to represent a flexible-mount condition. The shake table interface frame setup was attached to the shake table with M12 threaded rod.

UUT32 b-f

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Model Number: AYK550-CD-221A-2+B058+F267+G300+K465

Product Construction Summary: Painted carbon steel enclosure, NEMA 3R self-ventilated

Options / Component Summary:

208/230V, 221 Amp VFD, non-fusible disconnect, service switch, contactors, mechanical interlock, transformer, heater and thermostat

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

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
440	22.5	32.5	52.2	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	1.93	1.0	1.5	3.09	2.32	1.29	0.51

Unit Mounting Description:

Flexible Wall Mount: UUT32 was wall mounted to the stud wall with (10) 3/8-inch diameter Grade 5 bolts, using the manufacturer-provided holes on each side at the back of the panel. The unit was tested with the stud wall mounted to the shake table using spring isolators, in order to represent a flexible-mount condition. The shake table interface frame setup was attached to the shake table with M12 threaded rod.

UUT1-r,f

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Model Number: JCI drive model VS012410B-00000

Product Construction Summary: Galvanized carbon steel enclosure, NEMA 1

Options / Component Summary:

480V, 12 Amp VFD, non-fusible disconnect, contactors, overloads, transformer, relays, thermostat, fuses

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

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
61	14.2	16.0	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

Unit Mounting Description:

Rigid Base Mount: UUT1-r

Flexible Base Mount: UUT1-f

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

Rigid Wall Mount: 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: 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.

UUT2-r,f

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Model Number: JCI drive model VS170210B-00000

Product Construction Summary: Painted carbon steel enclosure, NEMA 3R

Options / Component Summary:

208/230V, 170 Amp VFD, non-fusible and fusible disconnects, contactors, overloads, transformer, relays, heater, thermostat, fuses

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

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
460	20.4	30.0	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

Unit Mounting Description:

Rigid Base Mount: UUT2-r

Flexible Base Mount: UUT2-f

UUT2-r,f were each mounted to the DCL shake table interface frame with four 3/8-inch diameter Grade 5 bolts.

Rigid Wall Mount: 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: 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.

UUT3a-r,f

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Model Number: JCI drive model VS1D3403B-M0000

Product Construction Summary: Galvanized carbon steel enclosure, NEMA 1

Options / Component Summary:

480V, 1.3 Amp VFD, non-fusible disconnect, fuses

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

UUT Properties

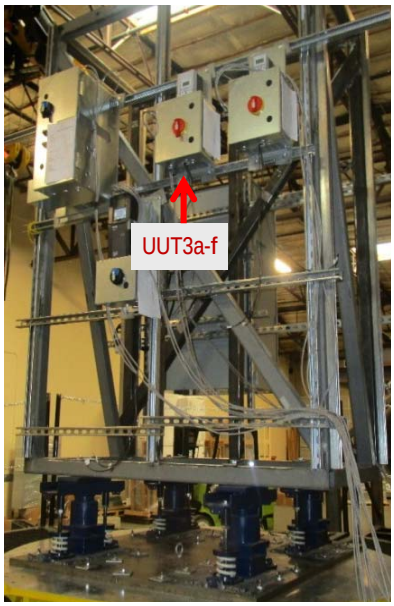
Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
18	6.9	9.0	19.8	N/A	N/A	N/A

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

Unit Mounting Description:

Rigid Base Mount: UUT3a-r



Flexible Base Mount: UUT3a-f

UUT3a-r,f were each mounted to the DCL shake table interface frame with four 1/4-inch diameter Grade 5 bolts.

Rigid Wall Mount: 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: 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.

UUT3b-r,f

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Model Number: JCI drive model VS4D3403B-M0000

Product Construction Summary: Galvanized carbon steel enclosure, NEMA 1

Options / Component Summary:

480V, 4.3 Amp VFD, non-fusible disconnect, fuses

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

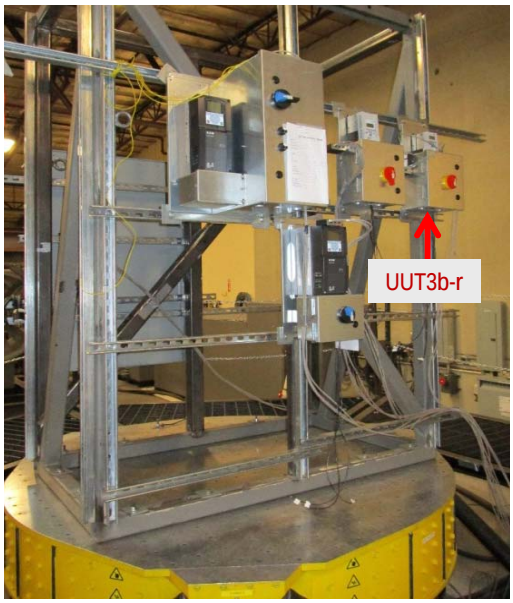
UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
17	6.9	9.0	19.8	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

Unit Mounting Description:



Rigid Base Mount: UUT3b-r

Flexible Base Mount: UUT3b-f

UUT3b-r,f were each mounted to the DCL shake table interface frame with four 1/4-inch diameter Grade 5 bolts.

Rigid Wall Mount: 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: 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.

UUT4-r,f

Unit Under Test Summary Sheet

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls, Inc.

Product Line: Variable Frequency Drives

Model Number: JCI drive model VS4D8210B-00000

Product Construction Summary: Galvanized carbon steel enclosure, NEMA 1

Options / Component Summary:

208/230V, 4.8 Amp VFD, non-fusible disconnect, fuses

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

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
28	10.0	8.3	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

Unit Mounting Description:

Rigid Base Mount: UUT4-r

Flexible Base Mount: UUT4-f

UUT4-r,f were each mounted to the DCL shake table interface frame with four 3/8-inch diameter Grade 5 bolts.

Rigid Wall Mount: 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: 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.