APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY	
APPLICATION #:	OSP – 0140 – 10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Johnson Controls Incorporated

Manufacturer's Technical Representative: Larry Weinert

Mailing Address: 507 E. Michigan Street, Milwaukee, WI 53202

Telephone: (414) 524-5943 Email: larry.alan.weinert@jci.com

Product Information

Product Name: Control panels

Product Type: Electrical equipment

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

General Description: The units are custom control panels, powder-coated carbon steel or aluminum (NEMA 1, 3R, 4, 4X, 12), containing controllers, repeaters, surge protectors, network switches, displays, transformers, batteries and circuit breakers.

Mounting Description: The units were tested in both rigid and flexible wall mounted conditions to allow for any wall type surface-mounted attachments.

Applicant Information

Applicant Company Name: The 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: 8/18/16

Title: President Company Name: The VMC Group

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

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) = 1.70

S_{DS} (Design spectral response acceleration at short period, g) = 2.26

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) = 2.5

I_p (Importance factor) = 1.5

z/h (Height factor ratio) = 1

Equipment or Component Natural Frequencies (Hz) = See attached

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

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

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

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

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

R (Response modification coefficient) =

Ω_0 (System overstrength factor) =

C_d (Deflection amplification factor) =

I_p (Importance factor) = 1.5

Height to Center of Gravity above base =

Equipment or Component Natural Frequencies (Hz) =

Overall dimensions and weight (or range thereof) =

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

List of Attachments Supporting Special Seismic Certification

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

☐ Other(s) (Please Specify):

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

Signature: Date: 9/13/2016

Print Name: M. R. Karim Title: SHFR

Special Seismic Certification Valid Up to : S_{DS} (g) = 2.26 z/h = 1.0

Condition of Approval (if applicable):

Special Seismic Certification
Certified Components

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Certified Product Construction: Powder-coated carbon steel or aluminum (NEMA 1, 3R, 4, 4X, 12)

Certified Options: Enclosures, controllers, repeater, surge protectors, network switches, display, transformers, batteries and circuit breakers

Mounting Description: Wall mount (rigid or flexible)

Tested Enclosures

Product line	Enclosure Manufacturer	NEMA Rating	Material	Dimensions (inches)			Max. Operating Weight (lb)	Mounting	Sds (g), z/h=1	UUT
				Depth	Width	Height				
Custom control panels	Hoffman	1, 3R	Powder-coated carbon steel	4.5 - 12.0	10.0 - 36.0	13.0 - 48.0	179	Wall mount (rigid or flexible)	2.26	UUT1-UUT6, UUT8, UUT10
Custom control panels	Hoffman	12	Aluminum	6.0 - 8.0	20.0 - 36.0	24.0 - 48.0	81		2.26	UUT9, UUT7
Mercury Enclosures	Life Safety Power	1	Powder-coated carbon steel	4.5	12.0 - 20.0	14.0 - 24.0	34		2.26	UUT11-UUT16

Certified Enclosures

Product line	Enclosure Manufacturer	NEMA Rating	Material	Dimensions (inches)			Max. Operating Weight (lb)	Mounting	Sds (g), z/h=1	UUT
				Depth	Width	Height				
Custom control panels	Hoffman	1, 3R, 4, 4X, 12[1]	Powder-coated carbon steel, or aluminum	4.5 -12.0	10.0 - 36.0	13.0 - 48.0	196.9	Wall mount (rigid or flexible)	2.26	UUT1-UUT10
Mercury Enclosures	Life Safety Power	1	Powder-coated carbon steel	4.5	12.0 - 20.0	14.0 - 24.0	37	Wall mount (rigid or flexible)	2.26	UUT11-UUT16

1. NEMA 4, 4X and 12 enclosures are identical in construction; only the enclosure seal varies.

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Network Controllers

Model Number	Manufacturer	Material	Power	Mounting	Remark	Unit
MS-NIE35xx-xx	JCI	Circuit board in plastic housing	24 VAC	DIN rail mount	x may be any number from 0 to 9, or any alpha character from A to Z (marketing change only)	Extrapolated[1]
MS-NIE45xx-xx						Extrapolated[1]
MS-NIE55xx-xx						UUT4
MS-NAE35xx-xx	JCI	Circuit board in plastic housing	24 VAC	DIN rail mount	x may be any number from 0 to 9, or any alpha character from A to Z (marketing change only)	Extrapolated[1]
MS-NAE45xx-xx						UUT9
MS-NAE55xx-xx						Extrapolated[2]
MS-NCE2**5**xx-xx	JCI	Circuit board in plastic housing	24 VAC	DIN rail mount	x may be any number from 0 to 9, or any alpha character from A to Z (marketing change only)	Extrapolated[3]
MS-NCM45xx-xx	JCI	Circuit board in plastic housing	24 VAC	DIN rail mount	x may be any number from 0 to 9, or any alpha character from A to Z (marketing change only)	Extrapolated[2]

1. Software change only from tested NAE45 controller
2. Software change only from tested NIE55 controller
3. Software change only from tested NAE45 controller, with same display as tested in the MS-FEC1621 (see field controllers tab)

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Door Access controllers						
Model Number	**Manufacturer**	**Material**	**Description**	**Mounting**	**Remark**	**Unit**
S300-DIN-RDR2SA	JCI	Circuit board in plastic housing	Controller	DIN rail mount	All models listed use the same plastic housing enclosing different circuit boards. There is no variation in size. S300-DIN-I8O4 has the same plastic housing as the S300-RDR2SA	UUT5, UUT6
S300-DIN-I8O4						Extrapolated[1]
S321IP						UUT6
S300-DIN-RDR8S						UUT6 (x2)
S300-DIN-I32O16						Extrapolated[2]
CK7xxx	JCI	Circuit board in plastic housing	Controller	DIN rail mount	x may be any number from 0 to 9, or any alpha character from A to Z (marketing change only)	UUT6 (x2)
S300-DIN-L-PS	Electronic Security Devices	Circuit Board in Aluminium Housing	Power Supply	DIN rail mount	N/A	UUT5, UUT6

1. Same as S300-DIN-RDR2SA (software and labeling change only)
2. Same as S300-DIN-RDR8S (software and labeling change only)

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Field Controllers						
Model Number	**Manufacturer**	**Material**	**Size (mm)**	**Mounting**	**Remark**	**Unit**
MS-FAC2611-xx	JCI	Circuit Board in Plastic Housing	150 x 190	DIN rail mounted	x may be any number from 0 to 9, or any alpha character from A to Z (marketing change only)	Extrapolated[1]
MS-FAC2612-xx			150 x 164			Extrapolated[1]
MS-FAC3611-xx			150 x 220			UUT9
MS-FEC1611-xx			150 x 164			Interpolated
MS-FEC1621-xx			150 x 164			UUT9
MS-FEC2611-xx			150 x 190			Interpolated
MS-FEC2611-xx			150 x 190			Interpolated
MS-FEU1610-xx			150 x 164			Interpolated
MS-FEU2610-xx			150 x 190			Interpolated
MS-IOM1710-xx			150 x 120			Interpolated
MS-IOM1711-xx			150 x 120			UUT3, UUT4
MS-IOM2710-xx			150 x 120			Interpolated
MS-IOM2711-xx			150 x 120			Interpolated
MS-IOM2721-xx			150 x 164			Interpolated
MS-IOM3721-xx			150 x 164			Interpolated
MS-IOM3731-xx			150 x 164			Interpolated
MS-IOM4711-xx			150 x 190			Interpolated
MS-IOU4710-xx			150 x 190			Interpolated
MS-IOU4711-xx			150 x 190			UUT3, UUT4
FX-PCG1611-xx	JCI	Circuit Board in Plastic Housing	150 x 164	DIN rail mounted	x may be any number from 0 to 9, or any alpha character from A to Z (marketing change only)	Extrapolated[3]
FX-PCG1621-xx			150 x 164			Extrapolated[3]
FX-PCG2611-xx			150 x 190			Extrapolated[3]
FX-PCG2621-xx			150 x 190			Extrapolated[3]
FX-PCA2611-xx			150 x 190			Extrapolated[2]
FX-PCA2612-xx			150 x 164			Extrapolated[2]
FX-PCX1711-xx			150 x 120			Extrapolated[4]
FX-PCX2711-xx			150 x 120			Extrapolated[4]
FX-PCX2721-xx			150 x 164			Extrapolated[4]
FX-PCX3721-xx			150 x 164			Extrapolated[4]
FX-PCX3731-xx			150 x 164			Extrapolated[4]
FX-PCX4711-xx			150 x 190			Extrapolated[4]
FX-PCX3721-xx			150 x 164			Extrapolated[4]
FX-PCX3731-xx			150 x 164			Extrapolated[4]

1. Controllers are bookended by the subcomponents tested in UUT9 (identical in construction)
2. Same as MS-FACxxxx-x models (different branding)
3. Same as MS-FECxxxx-x models (different branding)
4. Same as MS-IOMxxxx-x models (different branding)

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Mercury Panel Controllers						
Model Number	**Manufacturer**	**Material**	**Size (in)**	**Mounting**	**Remark**	**Unit**
CKM-FP0150	LifeSafety Power	Circuit Board	5.5 x 8.25	Mounted to back panel with screws and standoffs	None	UUT13, UUT16
CKM-F8P			5.5 x 8.26			UUT11, UUT12, UUT13, UUT14, UUT15, UUT16
CKM-MUX-8			5 x 6			UUT13, UUT16
CKM-EP2500			5 x 6			UUT12, UUT13, UUT15, UUT16
CKM-FP075			4 x 6			UUT11, UUT12, UUT14, UUT15
CKM-MR15E			5.5 x 2.75			UUT11, UUT14
CKM-EP1501			5.5 x 3.6			UUT11, UUT14
CKM-MR50			2.75 x 4.25			UUT12, UUT15
CKM-EP1502			6 x 8			UUT12, UUT15
CKM-MR52			6 x 8			UUT12, UUT15
CKM-MR16OUT			6 x 8			UUT13, UUT16
CKM-MR16IN			6 x 8			UUT13, UUT16

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Other Controllers				
Model Number	**Manufacturer**	**Material**	**Description**	**Unit**
LP-FXNDIO16-0	Tridium (Private labeled for JCI)	Circuit board in plastic housing	3.6 "x 4.0"	Extrapolated[1]
LP-FXRIO16-0			3.6 "x 4.0"	Extrapolated[1]
LP-FXPM24-0			3.6 "x 4.0"	Extrapolated[1]
LP-FXPM263-0			3.6 "x 4.0"	UUT4
LP-FXNDIO34-0			6.3" x 4.0"	Interpolated
LP-FX3011E-1 FX30E			6.3" x 4.0"	Interpolated
LP-FX3021E-1 FX30E			6.3" x 4.0"	Interpolated
LP-FX6011E-1 FX60E			6.3" x 4.0"	Interpolated
LP-FX6021E-1 FX60E			6.3" x 4.0"	Interpolated
LP-FX7011N-0 FX70			8.5" x 6"	Interpolated
LP-FX7021N-0 FX70			8.5" x 6"	UUT8
FX30	Tridium (Private labeled for JCI)	Circuit board in plastic housing	6.3" x 4.8"	UUT8
FX60			6.3" x 4.8"	Interpolated
FX70			8.5" x 6"	UUT8
FX80			6.3" x 4.8"	Extrapolated[2]
DX-9xxx-xxxx [3]	JCI	Circuit board in plastic housing	Plant controller	UUT4
TEC20-xx [3]	JCI	Circuit board in plastic housing	Wireless controller	UUT4
xx-ZFR181x-x [3]	JCI	Circuit board in plastic housing	Wireless controller	UUT4
RIBMNLB	Functional Devices	Circuit board in plastic housing	AHU fan safety alarm circuit, 24VAC	UUT9
RIBMNLB-1	Functional Devices	Circuit board in plastic housing	AHU fan safety alarm circuit, 24VAC	UUT9
RIBM2401D	Functional Devices	Circuit board in plastic housing	10 Amp control relay	UUT9
RIBMU1C	Functional Devices	Circuit board in plastic housing	15 Amp control relay	UUT9
RIBM2401B	Functional Devices	Circuit board in plastic housing	20 Amp control relay	UUT9

1. Identical to controller tested in UUT4 (software change only)

2. Extrapolated FX80 is the same size as FX60, mounted in the same location, and under 10 lb / 10 Amps

3. "x" may be any number from 0 to 9, or any alpha character from A to Z (marketing change only)

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

MSTP Repeater					
Model Number	**Manufacturer**	**Material**	**Mounting**	**Remark**	**Unit**
NU-RPTxxx-xx	Acromag	Circuit board in Plastic housing	Rigid Base Mount	x may be any number from 0 to 9, or any alpha character from A to Z (marketing change only)	UUT4[1]

1. Manufacturing process is ISO 9001 certified.

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Network Components				
Model Number	**Manufacturer**	**Material**	**Description**	**Unit**
PNET1GB	APC	Wires and connectors in plastic housing	Surge protector	UUT4, UUT9
ISOBAR12ULTRA	Tripplite	Wires and connectors in plastic housing	Surge protector	UUT4
ISOBAR8ULTRA			Surge protector	UUT7
FS105	NetGear	Circuit board in metal housing	Network switch	UUT8
FS108			Network switch	UUT4
2960-24TC-S	Cisco	Wires and connectors in plastic housing	Network switch	UUT8
EIMK100T-FT	Ccontrols.com	Circuit board in plastic housing	Network switch	UUT9
DS-EISK1000B			Network switch	UUT4
EISK5-100T			Network switch	Interpolated
EIS8-100T			Network switch	UUT9

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Metasys Display					
Model Number	**Manufacturer**	**Material**	**Mounting**	**Remark**	**Unit**
MS-DIS1710-xx	JCI	Circuit board in Plastic housing	Mounted through panel or enclosure door	x may be any number from 0 to 9, or any alpha character from A to Z (marketing change only)	UUT4
FX-DIS1710-xx				x may be any number from 0 to 9, or any alpha character from A to Z (marketing change only)	Extrapolated[1]

1. Marketing name change only (MS displays are identical to FX displays)

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Transformers

Model Number	Manufacturer	Housing Material	Winding Material	Capacity (VA)	Output Voltage	Mounting	Unit
Y65A13-0	V&F Transformer Company	Carbon steel frame with stainless steel bell housing	Copper	40	24 VAC	Foot mounted	UUT7
Y65G13-0				40			Interpolated
Y65T31-0				40			Interpolated
Y65T54-0				40			Interpolated
Y65S13-0				40			Interpolated
Y65F13-0				40			Interpolated
Y63T31-0				50			Interpolated
Y66T12-0				75			Interpolated
Y66T13-0				75			Interpolated
Y66F12-0				75			Interpolated
Y66F13-0				75			Interpolated
Y64T15-0				92			UUT4
Y69T15-0				300			UUT4
PAN-PWRSPx-xx		Carbon steel frame with no bell housing	Copper	96	24 VAC		UUT3, UUT4, UUT8
PAN-96VAXFR-xx				96			UUT2, UUT3
AS-XFR050-xx				50			UUT4, UUT9

Power Supplies

Model Number	Manufacturer	Housing Material	Output Voltage	Mounting	Unit
DR-4515	Meanwell	Circuit board in plastic housing	15 VDC	DIN rail mounted	UUT7[1]
DSP30-15	Lamda	Circuit board in plastic housing	15 VDC	DIN rail mounted	UUT7[1]

1. Manufacturing process is ISO 9001 certified.

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Gel Cell Battery Backup and Mounting Bracket					
Model Number	**Manufacturer**	**Material**	**Description**	**Mounting**	**Unit**
PS-1270F1	Power Sonic	Sealed gel	12V battery	Secured with JCI battery bracket kit	UUT6 (x2)
PS-1270	Power Sonic	Sealed gel	12V battery	Secured with JCI battery bracket kit	Extrapolated[1]
NP7-12	Yausa	Sealed gel	12V battery	Secured with JCI battery bracket kit	UUT10 (x2)
SEC-ENCBATBRK	JCI	Galvanized carbon steel	Mounting bracket	n/a	UUT6, UUT10
S300-DIN-BRK	JCI	Galvanized carbon steel	Mounting bracket	n/a	UUT6, UUT10

1. Identical to subcomponents tested in UUT6 (marketing name change only)

Special Seismic Certification
Certified Subcomponents

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Circuit Breakers

Model Number	Manufacturer	Material	Current Rating (Amp)	Weight (lb)	Mounting	Unit
QOU110	Square D	Plastic cover	10	0.4	DIN rail mounted	Extrapolated
QOU115			15			UUT6
QOU120			20			Interpolated
QOU125			25			Interpolated
QOU130			30			Interpolated
QOU135			35			Interpolated
QOU140			40			Interpolated
QOU145			45			Interpolated
QOU150			50			Interpolated
QOU160			60			Interpolated
QOU170			70			UUT7
QOU180			80			Extrapolated[1]
QOU190			90			Extrapolated[1]
1GU03M	Altek	Plastic cover	0.3	3.9	DIN rail mounted	Extrapolated[2]
1GU05M			0.5			Extrapolated[2]
1GU08M			0.8			Extrapolated[2]
1GU1M			1			Extrapolated[2]
1GU1.6M			1.6			Extrapolated[2]
1GU2M			2			Extrapolated[2]
1GU2.5M			2.5			Extrapolated[2]
1GU3M			3			Extrapolated[2]
1GU3.5M			3.5			Extrapolated[2]
1GU4M			4			Extrapolated[2]
1GU5M			5			UUT1
1GU6M			6			Interpolated
1GU8M			8			Interpolated
1GU10M			10			Interpolated
1GU12M			12			Interpolated
1GU13M			13			Interpolated
1GU15M			15			UUT8

1. Extrapolated subcomponents are represented by the subcomponents tested in UUT6 and UUT7.
2. Extrapolated subcomponents are represented by the subcomponents tested in UUT1 and UUT8.

Special Seismic Certification
Tested Components

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Tested Product Construction: Powder-coated carbon steel or aluminum (NEMA 1, 3R, 12)

Tested Options: Enclosures, controllers, repeater, surge protectors, network switches, display, transformers, batteries and circuit breakers

Tested Mounting Description: Wall mount (rigid and flexible)

Product line	Description	Enclosure Manufacturer	NEMA Rating	Dimensions (inches)			Weight (lb)	Mounting	Sds (g), z/h=1	UUT
				Depth	Width	Height				
Custom control panels	FX07 HVAC Panel	Hoffman	1	4.5	10.0	13.0	12	Wall mount (rigid and flexible)	2.26	UUT1 (a,b)
	PA0P0010FC0 HVAC Panel		1	6.5	16.0	20.0	45		2.26	UUT2 (a,b)
	Metasys Control Panel		1	9.0	24.0	36.0	92		2.26	UUT3 (a,b)
	Multi-System Panel		1	9.0	30.0	42.0	162		2.26	UUT4 (a,b)
	Security Panel		1	6.0	16.0	16.0	38		2.26	UUT5 (a,b)
	Security Panel		1	6.0	30.0	42.0	138		2.26	UUT6 (a,b)
	Custom Control Panel		12	6.0	20.0	24.0	25		2.26	UUT7 (a,b)
	Custom Control Panel		3R	12.0	36.0	48.0	179		2.26	UUT8 (a,b)
	Custom Control Panel		12	8.0	36.0	48.0	81		2.26	UUT9 (a,b)
	Custom Control Panel		1	6.0	16.0	16.0	32		2.26	UUT10 (a,b)
	Mercury Enclosure 1	Life Safety Power	1	4.5	12.0	14.0	12		2.26	UUT11 (a,b)
	Mercury Enclosure 2		1	4.5	16.0	20.0	21		2.26	UUT12 (a,b)
	Mercury Enclosure 3		1	4.5	20.0	24.0	34		2.26	UUT13 (a,b)
	Mercury Enclosure 4		1	4.5	12.0	14.0	12		2.26	UUT14 (a,b)
	Mercury Enclosure 5		1	4.5	16.0	20.0	21		2.26	UUT15 (a,b)
	Mercury Enclosure 6		1	4.5	20.0	24.0	34		2.26	UUT16 (a,b)

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

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Model Number: FX07 HVAC Panel

Product Construction Summary: Powder coated carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: Hoffman enclosure, Altek circuit breaker.

Unit Mounting Description:

UUT1a,b were attached to the stud wall on the shake table interface frame at four corners utilizing 1/4-inch 20x1 hex cap bolts and the existing openings in the back of the back-box.

UUT1a (rigid wall mount): The DCL shake table interface frame was rigidly attached to the shake table using M12 threaded rod spaced approximately 12-inches on-center.

UUT1b (flexible wall mount): Eight Mason A-625 springs were attached to the stud wall using the provided 3/8-inch bolts. Four of the springs were oriented in the horizontal plane and sandwiched between the back of the stud wall and front of the steel fixture frame. The springs were attached to the fixture frame with 1/2-inch bolts. The remaining four springs were oriented in the vertical plane and sandwiched between the bottom of the stud wall and a piece of standard 12-gage Unistrut which was attached to the shake table using M12 threaded rod. The springs were attached to the Unistrut with 1/2-inch bolts and spring clips.

UUT Properties

UUT1	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	12	4.5	10.0	13.0	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 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.61

Rigid test setup (UUT1a)

Flexible test setup (UUT1b)

Interior view of panel.

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)

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Model Number: PA0P0010FC0 HVAC Panel

Product Construction Summary: Powder coated carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: Hoffman enclosure, V&F transformer (24VAC).

Unit Mounting Description:

UUT2a,b were attached to the stud wall on the shake table interface frame at four corners utilizing 1/4-inch 20x1 hex cap bolts and the existing openings in the back of the back-box.

UUT2a (rigid wall mount): The DCL shake table interface frame was rigidly attached to the shake table using M12 threaded rod spaced approximately 12-inches on-center.

UUT2b (flexible wall mount): Eight Mason A-625 springs were attached to the stud wall using the provided 3/8-inch bolts. Four of the springs were oriented in the horizontal plane and sandwiched between the back of the stud wall and front of the steel fixture frame. The springs were attached to the fixture frame with 1/2-inch bolts. The remaining four springs were oriented in the vertical plane and sandwiched between the bottom of the stud wall and a piece of standard 12-gage Unistrut which was attached to the shake table using M12 threaded rod. The springs were attached to the Unistrut with 1/2-inch bolts and spring clips.

UUT Properties

UUT2	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	45	6.5	16.0	20.0	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 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.61

Rigid test setup (UUT2a)

Flexible test setup (UUT2b)

Interior view of panel.

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)

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Model Number: Metasys Control Panel

Product Construction Summary: Powder coated carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: Hoffman enclosure, V&F transformers (24VAC).

Unit Mounting Description:

UUT3a,b were attached to the stud wall on the shake table interface frame at four corners utilizing 1/4-inch 20x1 hex cap bolts and the existing openings in the back of the back-box.

UUT3a (rigid wall mount): The DCL shake table interface frame was rigidly attached to the shake table using M12 threaded rod spaced approximately 12-inches on-center.

UUT3b (flexible wall mount): Eight Mason A-625 springs were attached to the stud wall using the provided 3/8-inch bolts. Four of the springs were oriented in the horizontal plane and sandwiched between the back of the stud wall and front of the steel fixture frame. The springs were attached to the fixture frame with 1/2-inch bolts. The remaining four springs were oriented in the vertical plane and sandwiched between the bottom of the stud wall and a piece of standard 12-gage Unistrut which was attached to the shake table using M12 threaded rod. The springs were attached to the Unistrut with 1/2-inch bolts and spring clips.

UUT Properties

UUT3	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	92	9.0	24.0	36.0	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 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.61

Rigid test setup (UUT3a)

Flexible test setup (UUT3b)

Interior view of panel.

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)

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Model Number: Multi-System Panel

Product Construction Summary: Powder coated carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: Hoffman enclosure, JCI network controller, JCI field controllers, Tridium controller, JCI plant controller, JCI wireless controllers, Acromag repeater, APC surge protector, Tripplite surge protector, NetGear network switch, Ccontrols.com network switch, JCI Metasys display, V&F transformers (24VAC).

Unit Mounting Description:

UUT4a,b were attached to the stud wall on the shake table interface frame at four corners utilizing 1/4-inch 20x1 hex cap bolts and the existing openings in the back of the back-box.

UUT4a (rigid wall mount): The DCL shake table interface frame was rigidly attached to the shake table using M12 threaded rod spaced approximately 12-inches on-center.

UUT4b (flexible wall mount): Eight Mason A-625 springs were attached to the stud wall using the provided 3/8-inch bolts. Four of the springs were oriented in the horizontal plane and sandwiched between the back of the stud wall and front of the steel fixture frame. The springs were attached to the fixture frame with 1/2-inch bolts. The remaining four springs were oriented in the vertical plane and sandwiched between the bottom of the stud wall and a piece of standard 12-gage Unistrut which was attached to the shake table using M12 threaded rod. The springs were attached to the Unistrut with 1/2-inch bolts and spring clips.

UUT Properties

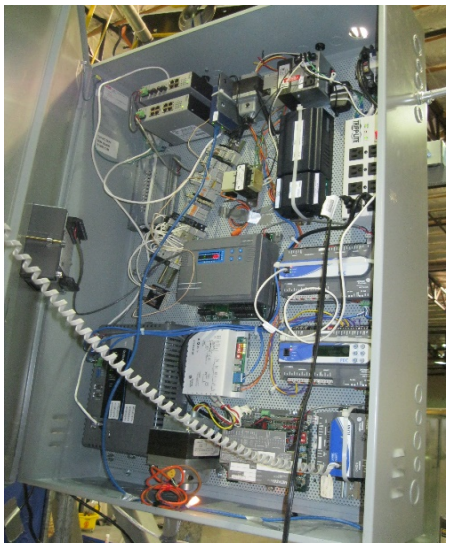
UUT4	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	162	9.0	30.0	42.0	N/A	N/A	N/A

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 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.61

Rigid test setup (UUT4a)

Flexible test setup (UUT4b)



Interior view of panel.

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 (a,b)

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Model Number: Security Panel

Product Construction Summary: Powder coated carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: Hoffman enclosure, JCI door access controller, Electronic Security Devices power supply.

Unit Mounting Description:

UUT5a,b were attached to the stud wall on the shake table interface frame at four corners utilizing 1/4-inch 20x1 hex cap bolts and the existing openings in the back of the back-box.

UUT5a (rigid wall mount): The DCL shake table interface frame was rigidly attached to the shake table using M12 threaded rod spaced approximately 12-inches on-center.

UUT5b (flexible wall mount): Eight Mason A-625 springs were attached to the stud wall using the provided 3/8-inch bolts. Four of the springs were oriented in the horizontal plane and sandwiched between the back of the stud wall and front of the steel fixture frame. The springs were attached to the fixture frame with 1/2-inch bolts. The remaining four springs were oriented in the vertical plane and sandwiched between the bottom of the stud wall and a piece of standard 12-gage Unistrut which was attached to the shake table using M12 threaded rod. The springs were attached to the Unistrut with 1/2-inch bolts and spring clips.

UUT Properties

UUT5	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	38	6.0	16.0	16.0	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 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.61

Rigid test setup (UUT5a)

Flexible test setup (UUT5b)

Interior view of panel.

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 (a,b)

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Model Number: Security Panel

Product Construction Summary: Powder coated carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: Hoffman enclosure, JCI door access controllers, Electronic Security Devices power supply, Power Sonic 12V battery, JCI battery mounting brackets, Square D circuit breaker.

Unit Mounting Description:

UUT6a,b were attached to the stud wall on the shake table interface frame at four corners utilizing 1/4-inch 20x1 hex cap bolts and the existing openings in the back of the back-box.

UUT6a (rigid wall mount): The DCL shake table interface frame was rigidly attached to the shake table using M12 threaded rod spaced approximately 12-inches on-center.

UUT6b (flexible wall mount): Eight Mason A-625 springs were attached to the stud wall using the provided 3/8-inch bolts. Four of the springs were oriented in the horizontal plane and sandwiched between the back of the stud wall and front of the steel fixture frame. The springs were attached to the fixture frame with 1/2-inch bolts. The remaining four springs were oriented in the vertical plane and sandwiched between the bottom of the stud wall and a piece of standard 12-gage Unistrut which was attached to the shake table using M12 threaded rod. The springs were attached to the Unistrut with 1/2-inch bolts and spring clips.

UUT Properties

UUT6	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	138	6.0	30.0	42.0	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 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.61

Rigid test setup (UUT6a)

Flexible test setup (UUT6b)

Interior view of panel.

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 (a,b)

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Model Number: Custom control panel

Product Construction Summary: Aluminum enclosure, NEMA 12

Options / Subcomponent Summary: Hoffman enclosure, Tripplite surge protector, V&F transformer (24VAC), Meanwell transformer (15VDC), Lamda transformer (15VDC), Square D circuit breaker.

Unit Mounting Description:

UUT7a,b were attached to the shake table interface frame with four 3/8-inch diameter Grade 5 bolts using the manufacturer-provided mounting holes at the back of the panel.
UUT7a (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.
UUT7b (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

UUT Properties

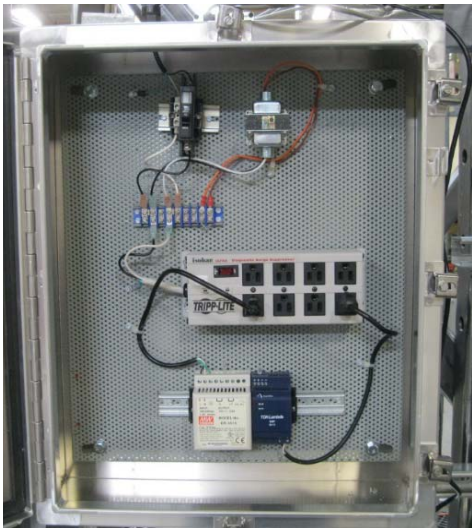
UUT7	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	25	6.0	20.0	24.0	N/A	N/A	N/A

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 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.61

Rigid test setup (UUT7a)

Flexible test setup (UUT7b)



Interior view of panel.

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 (a,b)

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Model Number: Custom control panel

Product Construction Summary: Powder coated carbon steel enclosure, NEMA 3R

Options / Subcomponent Summary: Hoffman enclosure, Tridium controllers, NetGear network switch, Cisco network switch, V&F transformer (24VAC), Altek circuit breaker.

Unit Mounting Description:

UUT8a,b were attached to the shake table interface frame with six 5/16-inch diameter Grade 5 bolts using the manufacturer-provided mounting holes at the back of the panel.

UUT8a (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.

UUT8b (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

UUT Properties

UUT8	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	179	12.0	36.0	48.0	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 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.61

Rigid test setup (UUT8a)

Flexible test setup (UUT8b)

Interior view of panel.

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 (a,b)

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Model Number: Custom control panel

Product Construction Summary: Aluminum enclosure, NEMA 12

Options / Subcomponent Summary: Hoffman enclosure, JCI network controller, JCI field controllers, Functional Devices AHU fan safety alarm circuit (24VAC), Functional Devices 10, 15 and 20 Amp control relays, APC surge protector, Ccontrols.com network switches, V&F transformer (24VAC).

Unit Mounting Description:

UUT9a,b were attached to the shake table interface frame with four 3/8-inch diameter Grade 5 bolts using the manufacturer-provided mounting holes at the back of the panel.
UUT9a (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.
UUT9b (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

UUT Properties

UUT9	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	81	8.0	36.0	48.0	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 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.61

Rigid test setup (UUT9a)

Flexible test setup (UUT9b)

Interior view of panel.

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 (a,b)

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Model Number: Custom control panel

Product Construction Summary: Powder coated carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: Hoffman enclosure, Yausa 12V batteries, JCI battery mounting brackets.

Unit Mounting Description:

UUT10a,b were attached to the shake table interface frame with four 1/4-inch diameter Grade 5 bolts using the manufacturer-provided mounting holes at the back of the panel.

UUT10a (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.

UUT10b (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

UUT Properties

UUT10	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	32	6.0	16.0	16.0	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 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.61

Rigid test setup (UUT10a)

Flexible test setup (UUT10b)

Interior view of panel.

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 (a,b)

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Model Number: Custom control panel

Product Construction Summary: Powder coated carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: Life Safety Power enclosure, Life Safety Power mercury panel controllers (CKM-F8P, CKM-FP075, CKM-MR15E, CKM-EP1501)

Unit Mounting Description:

UUT11a,b were mounted with six drywall screws (1-5/8" / 4,12 cm, coarse) through the manufacturer-provided holes at the back of the panel.

UUT11a (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.

UUT11b (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

UUT Properties

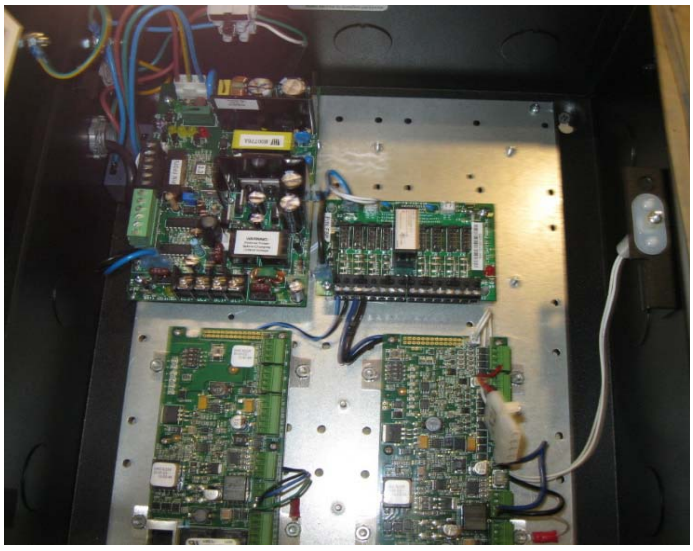
UUT11	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	12	4.5	12.0	14.0	N/A	N/A	N/A

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 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.61

Rigid test setup (UUT11a)

Flexible test setup (UUT11b)



Interior view of panel.

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 (a,b)

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Model Number: Custom control panel

Product Construction Summary: Powder coated carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: Life Safety Power enclosure, Life Safety Power mercury panel controllers (CKM-F8P, CKM-EP2500, CKM-FP075, CKM-MR50, CKM-EP1502, CKM-MR52)

Unit Mounting Description:

UUT12a,b were mounted with six drywall screws (1-5/8" / 4,12 cm, coarse) through the manufacturer-provided holes at the back of the panel.

UUT12a (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.

UUT12b (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

UUT Properties

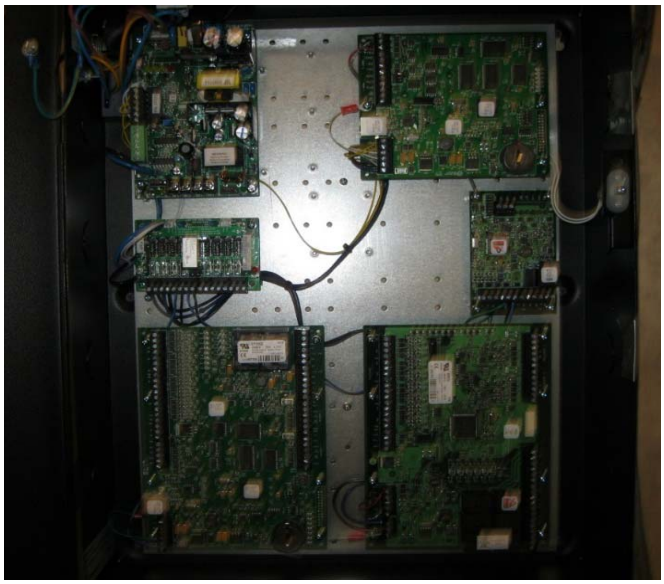
UUT12	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	21	4.5	16.0	20.0	N/A	N/A	N/A

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 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.61

Rigid test setup (UUT12a)

Flexible test setup (UUT12b)



Interior view of panel.

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 (a,b)

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Model Number: Custom control panel

Product Construction Summary: Powder coated carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: Life Safety Power enclosure, Life Safety Power mercury panel controllers (CKM-FP0150, CKM-F8P, CKM-MUX-8, CKM-EP2500, CKM-MR16OUT, CKM-MR16IN)

Unit Mounting Description:

UUT13a,b were mounted with six drywall screws (1-5/8" / 4,12 cm, coarse) through the manufacturer-provided holes at the back of the panel.

UUT13a (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.

UUT13b (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

UUT Properties

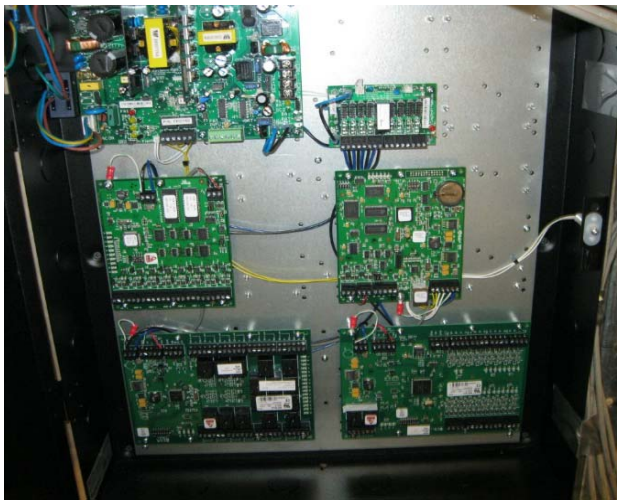
UUT13	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	34	4.5	20.0	24.0	N/A	N/A	N/A

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 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.61

Rigid test setup (UUT13a)

Flexible test setup (UUT13b)



Interior view of panel.

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 (a,b)

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Model Number: Custom control panel

Product Construction Summary: Powder coated carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: Life Safety Power enclosure, Life Safety Power mercury panel controllers (CKM-F8P, CKM-FP075, CKM-MR15E, CKM-EP1501)

Unit Mounting Description:

UUT14a,b were mounted with six drywall screws (1-5/8" / 4,12 cm, coarse) through the manufacturer-provided holes at the back of the panel.

UUT14a (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.

UUT14b (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

UUT Properties

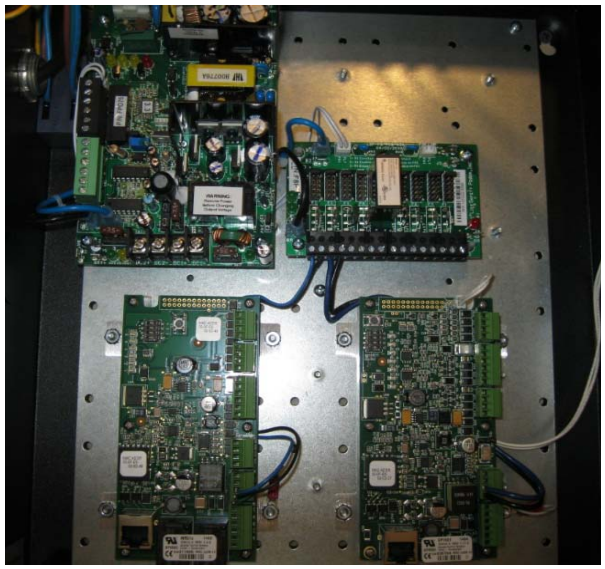
UUT14	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	12	4.5	12.0	14.0	N/A	N/A	N/A

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 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.61

Rigid test setup (UUT14a)

Flexible test setup (UUT14b)



Interior view of panel.

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
UUT15 (a,b)

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Model Number: Custom control panel

Product Construction Summary: Powder coated carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: Life Safety Power enclosure, Life Safety Power mercury panel controllers (CKM-F8P, CKM-EP2500, CKM-FP075, CKM-MR50, CKM-EP1502, CKM-MR52)

Unit Mounting Description:

UUT15a,b were mounted with six drywall screws (1-5/8" / 4,12 cm, coarse) through the manufacturer-provided holes at the back of the panel.

UUT15a (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.

UUT15b (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

UUT Properties

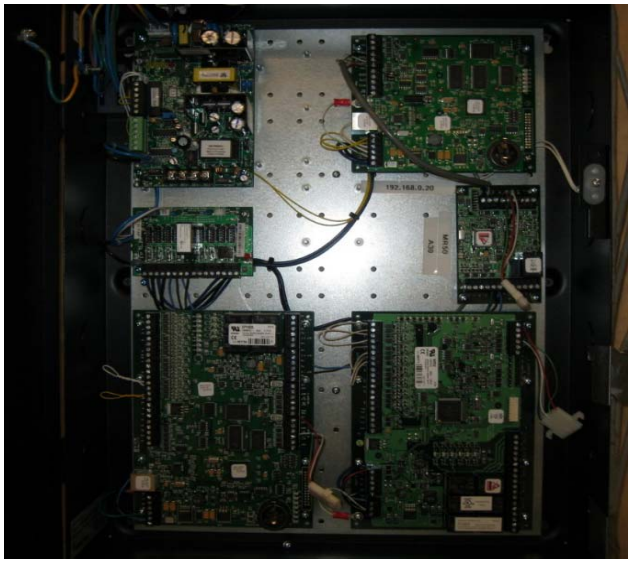
UUT15	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	21	4.5	16.0	20.0	N/A	N/A	N/A

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 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.61

Rigid test setup (UUT15a)

Flexible test setup (UUT15b)



Interior view of panel.

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
UUT16 (a,b)

DCL Dynamic Certification Laboratories

Manufacturer: Johnson Controls

Product Line: Control panels

Model Number: Custom control panel

Product Construction Summary: Powder coated carbon steel enclosure, NEMA 1

Options / Subcomponent Summary: Life Safety Power enclosure, Life Safety Power mercury panel controllers (CKM-FP0150, CKM-F8P, CKM-MUX-8, CKM-EP2500, CKM-MR16OUT, CKM-MR16IN)

Unit Mounting Description:

UUT16a,b were mounted with six drywall screws (1-5/8" / 4,12 cm, coarse) through the manufacturer-provided holes at the back of the panel.

UUT16a (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.

UUT16b (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

UUT Properties

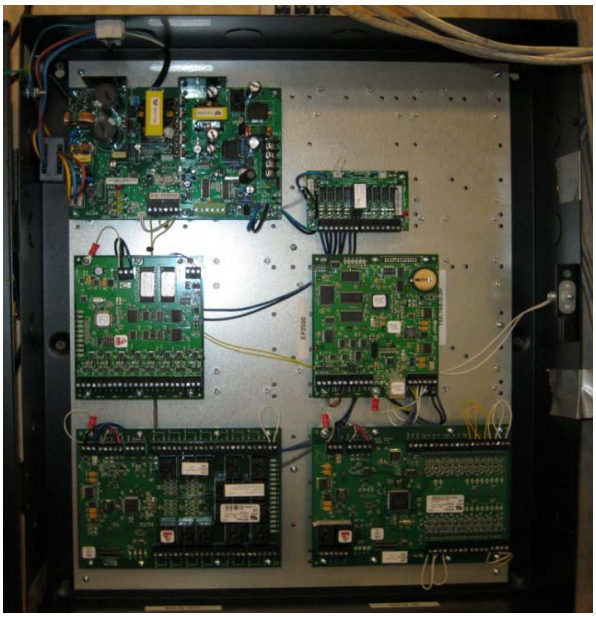
UUT16	Operating Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
		Depth	Width	Height	Front-Back	Side-Side	Vertical
	34	4.5	20.0	24.0	N/A	N/A	N/A

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 2016	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.61

Rigid test setup (UUT15a)

Flexible test setup (UUT15b)



Interior view of panel.

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.