APPLICATION FOR HCAI SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0359

HCAI Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: OTIS ELEVATOR COMPANY

Manufacturer's Technical Representative: John Kleine

Mailing Address: 1500 OTIS Way, Florence, SC 29501

Telephone: (843) 432-4134 Email: john.kleine@otis.com

Product Information

Product Name: Elevator Equipment

Product Type: Elevator Controllers

Product Model Number: HydroFit & HydroAccel GCS Hydraulic Control System

General Description: Components for elevator cab control and propulsion. 3 Phase 208V to 600V, 18A to 121A. (See Attachment 1, Table 1)

Mounting Description: Hydraulic Machine – Rigid Base Mounted., GCSHH Controllers – Equipment Wall Mounted & Rigid Wall Mounted. See Attachments 1 & 2.

Tested Seismic Enhancements: None

Applicant Information

Applicant Company Name: EASE LLC

Contact Person: Jonathan Roberson

Mailing Address: 5877 Pine Ave Suite 210, Chino Hills, CA 91709

Telephone: (909) 606-7622 Email: j.roberson@easeco.com

Title: Principal Engineer

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

Company Name: EASE LLC

Name: Jonathan Roberson California License Number: S4197

Mailing Address: 5877 Pine Ave., Suite 210, Chino Hills, CA 91709

Telephone: (951) 295-1892 Email: jon@EASECo.com

Certification Method

☐ GR-63-Core ☒ ICC-ES AC156 ☐ IEEE 344 ☐ IEEE 693 ☐ NEBS 3

☐ Other (Please Specify):

Testing Laboratory

Company Name: ENVIRONMENTAL TESTING LABORATORIES, INC. (ETL)

Contact Person: Brady Richard

Mailing Address: 11034 Indian Trail, Dallas TX 75229-3513

Telephone: (972) 247-9657 Email: brady@etldallas.com

Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 0.936 (Sds = 1.30 @ z/h = 1) & 1.125 (Sds = 2.50 @ z/h = 0)

S_{DS} (Design spectral response acceleration at short period, g) = 1.30 (z/h = 1) & 2.50 (z/h = 0)

a_p (Amplification factor) = 1

R_p (Response modification factor) = 2.5

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height ratio factor) = 1 and 0

Natural frequencies (Hz) = See Attachment

Overall dimensions and weight = See Attachment

HCAI Approval (For Office Use Only) - Approval Expires on 10/06/2028

Date: 10/6/2022

Name: Mohammad Karim Title: Supervisor, Health Facilities

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

Condition of Approval (if applicable):

ATTACHMENT 1: SEISMIC CERTIFIED COMPONENTS

TABLE 1: SEISMIC CERTIFIED SYSTEMS & COMPONENTS

MANUFACTURER	**OTIS ELEVATOR COMPANY**
SYSTEM	**HYDROFIT™/ HYDROACCEL GCS HYDRAULIC CONTROL SYSTEM**

SYSTEM COMPONENT	MODEL NO.	DIMENSIONS (IN.) W	D	H	MAX WT (LB.)	MOUNT	BASIS [1]
TANK & CONTROLLER ASSEMBLY (A-A203390H)							
Hydraulic Machine [2] – 80 Gallon Tank Assembly	AAA20390AF	42.25	19.12	40.50	403 (dry) / 993 (full) [3]	Rigid Base	UUT1
Hydraulic Machine – 100 Gallon Tank Assembly	AAA20390AA	44	23.12	40.5	1445 (full) [3]	Rigid Base	INT
Hydraulic Machine – 140 Gallon Tank Assembly	AAD20390Q	46	29.25	40.5	1768 (full) [3]	Rigid Base	INT
Hydraulic Machine – 190 Gallon Tank Assembly	AAD20390P	51	29.37	48.15	715 (dry) / 2086 (full) [3]	Rigid Base	UUT2
GCSHH Controller	AAA21242E3	37.1	11.36	36	147	Tank	UUT1 UUT2
GCS CONTROLLER							
GCSHH Controller	AAA21242E3	37.1	11.36	36	147	Wall	UUT1B UUT2B UUTA1 UUTA2

MOUNTING	RIGID BASE (FLOOR): free-standing, base-mounted configuration with the component rigidly attached to a supporting structure and no lateral support above the base. WALL: unit is mounted to and fully supported by a building wall or partition. TANK: unit is mounted to and fully supported by the tank wall of the Hydraulic Machine
NOTES	1. Basis: • UUT#: Indicates that a specimen matching these characteristics was tested. • INT (Interpolated or Extrapolated): indicates a model that was not specifically tested, and by which seismic certification is established through evaluation of testing of other, similar models in the product line. 2. Hydraulic Machine is also referred to as Hydraulic Power Unit 3. Hydraulic Machine weights exclude weight of tank-mounted GCSHH controller. 4. Certification applies to components in Table 1 using subcomponents in Tables 2 & 3 to form a complete assembly.

TABLE 2: SEISMIC CERTIFIED SUBCOMPONENTS: HYDRAULIC MACHINE

SUBCOMPONENT	MANUFACTURER	PART No.	DESCRIPTION/RATING	BASIS
TANKS				
AA_20390AF				
Power Unit Tank	Otis	AAA148AQ5	80 Gallon HydroFit™/Hydro Accel Tank	UUT1
Power Unit Tank Lid	Otis	AAA285SK4	80 Gallon HydroFit™/Hydro Accel Tank	UUT1
AA_20390Q				
Power Unit Tank	Otis	AAA148AQ6	140 Gallon HydroFit™/Hydro Accel Tank	INT
Power Unit Tank Lid	Otis	AAA285SK5	140 Gallon HydroFit™/Hydro Accel Tank	INT
AA_20390AA				
Power Unit Tank	Otis	AAA148AQ8	100 Gallon HydroFit™/Hydro Accel Tank	INT
Power Unit Tank Lid	Otis	AAA285SK7	100 Gallon HydroFit™/Hydro Accel Tank	INT
AA_20390P				
Power Unit Tank	Otis	AAA148AQ7	190 Gallon HydroFit™/Hydro Accel Tank	UUT2
Power Unit Tank Lid	Otis	AAA285SK6	190 Gallon HydroFit™/Hydro Accel Tank	UUT2

Table continues next page

TABLE 2: SEISMIC CERTIFIED SUBCOMPONENTS: HYDRAULIC MACHINE

SUBCOMPONENT	MANUFACTURER	PART No.	DESCRIPTION/RATING	BASIS
CONTROL VALVES				
Control Valve	MaXton MFG	271AP11	Pressure: 50 - 800 psi; Flow: 20-80gpm; 56gpm (factory set)	UUT1
Control Valve	MaXton MFG	271AP12	Pressure: 50 - 800 psi; Flow: 20-185gpm; 75-94gpm (factory set)	INT
Control Valve	MaXton MFG	271AP13	Pressure: 50 - 800 psi; Flow: 20-185gpm; 120-180gpm (factory set)	INT
Control Valve	MaXton MFG	AAA271DL13	Pressure: 50 - 800 psi; Flow: 20-185gpm; 56gpm (factory set)	INT
Control Valve	MaXton MFG	AAA271DL14	Pressure: 50 - 800 psi; Flow: 20-185gpm; 75-94gpm (factory set)	INT
Control Valve	MaXton MFG	AAA271DL15	Pressure: 50 - 800 psi; Flow: 20-185gpm; 120-180gpm (factory set)	INT
Control Valve	MaXton MFG	271AL2	Pressure: 50 - 595 psi; Flow: 85 - 360 gpm	UUT2
SUBMERSIBLE MOTORS				
AC Submersible Motor	NIDEC (US Motor)	6333DD21	HP: 15HP; Volt: 230/460v	UUT1
AC Submersible Motor	NIDEC (US Motor)	6333DD22	HP: 20HP; Volt: 230/460v	INT
AC Submersible Motor	NIDEC (US Motor)	6333DD23	HP: 25HP; Volt: 230/460v	INT
AC Submersible Motor	NIDEC (US Motor)	6333DD24	HP: 30HP; Volt: 230/460v	INT
AC Submersible Motor	NIDEC (US Motor)	6333DD25	HP: 40HP; Volt: 230/460v	INT
AC Submersible Motor	NIDEC (US Motor)	6333DD27	HP: 50HP; Volt: 230/460v	INT
AC Submersible Motor	NIDEC (US Motor)	AAA6333ER5	HP: 50HP; Volt: 230/460v	UUT2
SUBMERSIBLE PUMP				
Pump	Allweiler	6962Y26	Pressure: 450 psi; Flow Rate: 59	UUT1
Pump	Allweiler	6962Y27	Pressure: 450 psi; Flow Rate: 76	INT
Pump	Allweiler	6962Y21	Pressure: 450 psi; Flow Rate: 94	INT
Pump	Allweiler	6962Y22	Pressure: 450 psi; Flow Rate: 117	INT
Pump	Allweiler	6962Y23	Pressure: 450 psi; Flow Rate: 137	INT
Pump	Allweiler	6962Y25	Pressure: 450 psi; Flow Rate: 177	INT
Pump	Allweiler	6962AE3	Pressure: 250 psi; Flow Rate: 201	INT
Pump	Allweiler	6962AE4	Pressure: 250 psi; Flow Rate: 256	UUT2
MUFFLER				
Muffler	Otis	AAA726D1		UUT1 / UUT2
PRESSURE SWITCH				
Low Pressure Switch	GEM Sensor & Controls	AAA20300L2	Pressure: Actuation: 75 psi, Working Pressure: 1000 psi, Electrical: 120V @ 6 Amps	UUT1 / UUT2

Notes

1. BASIS:
   - UUT#: Indicates that a test specimen matching these characteristics was tested as part of this testing program.
   - INT (Interpolate/Extrapolate): indicates a model that was not specifically tested, and by which seismic certification is established through evaluation of testing of other, similar models in the product line.
2. Seismic qualification is limited subcomponents installed as part of a complete assembly of the equipment defined in Table 1.
3. Table excludes all Electrical Controllers, Switches, Transformers, Circuit Breakers and Fuses up to 10 lbs. or 10 amperes, except as noted.

TABLE 3: SEISMIC CERTIFIED SUBCOMPONENTS: CONTROLLER

SUBCOMPONENT	MANUFACTURER	PART No.	DESCRIPTION/RATING	BASIS
TRANSFORMER				
Controller Power Distribution Transformer	Grand Transformer (OTIS Design Part)	AAA225JT21	Volt: 440-480v; Front Only; AT400 Door Operator Winding: Copper, Core: Open, Rating: 152VA	UUT1 / UUT1B UUT2 / UUT2B
Controller Power Distribution Transformer	Grand Transformer (OTIS Design Part)	AAA225JT20	Volt: 208-240v; Front Only; AT400 Door Operator Winding: Copper, Core: Open, Rating: 152VA	INT
Controller Power Distribution Transformer	Grand Transformer (OTIS Design Part)	AAA225JT23	Volt: 208-240v; Front & Rear; AT400 Door Operator Winding: Copper, Core: Open, Rating: 250VA	INT
Controller Power Distribution Transformer	Grand Transformer (OTIS Design Part)	AAA225JT24	Volt: 440-480v; Front & Rear; AT400 Door Operator Winding: Copper, Core: Open, Rating: 250VA	INT
Controller Power Distribution Transformer	Grand Transformer (OTIS Design Part)	AAA225JT27	Volt: 440-480v; Front Only; NGAOK Door Operator Winding: Copper, Core: Open, Rating: 100VA	INT
Controller Power Distribution Transformer	Grand Transformer (OTIS Design Part)	AAA225JT29	Volt: 208-240v; Front & Rear; NGAOK Door Operator Winding: Copper, Core: Open, Rating: 200VA	INT
Controller Power Distribution Transformer	Grand Transformer (OTIS Design Part)	AAA225JT32	Volt: 208 -240v; Front & Rear; NGAOK Door Operator Winding: Copper, Core: Open, Rating: 918	INT
Controller Power Distribution Transformer	Grand Transformer (OTIS Design Part)	AAA225JT33	Volt: 440-480v; Front & Rear; NGAOK Door Operator Winding: Copper, Core: Open, Rating: 918	INT
Controller Power Distribution Transformer	Grand Transformer (OTIS Design Part)	AAA225JT35	Volt: 208-240 & 440-480v; Front & Rear; MOD Winding: Copper, Core: Open, Rating: 1302	INT
Controller Power Distribution Transformer	Grand Transformer (OTIS Design Part)	AAA225JT30	Volt: 440-480v; Front & Rear; NGAOK Door Operator Winding: Copper, Core: Open, Rating: 200VA	UUTA1 / UUTA2
MOTOR STARTER				
AC Semiconductor Motor Starter	Siemens	AAA21240AD5	Amps: 17-68 Amps; HP: 15-50HP; Volt: 208-480v	UUT1 / UUT1B UUT2 / UUT2B
AC Semiconductor Motor Starter	Siemens	AAA21240AD7	Amps: 26 - 105 Amps; HP: 30-75HP; Volt: 208-480v	INT
AC Semiconductor Motor Starter	Siemens	AAA21240AD8	Amps: 32 - 130 Amps; HP: 40-100HP; Volt: 208-480v	INT
AC Semiconductor Motor Starter	Siemens	AAA21240AD9	Amps: 39 - 156 Amps; HP: 50 - 125HP; Volt: 208-480v	UUTA1 / UUTA2

Notes

1. BASIS:
   - UUT#: Indicates that a test specimen matching these characteristics was tested as part of this testing program.
   - INT (Interpolate/Extrapolate): indicates a model that was not specifically tested, and by which seismic certification is established through evaluation of testing of other, similar models in the product line.
2. Seismic qualification is limited subcomponents installed as part of a complete assembly of the equipment defined in Table 1.
3. Table excludes all Electrical Controllers, Switches, Transformers, Circuit Breakers and Fuses up to 10 lbs. or 10 amperes, except as noted.

ATTACHMENT 2: TEST SPECIMEN SUMMARY

UUT- 1 80 Gallon Tank & Controller Assembly

MANUFACTURER:	Otis Elevator Company	
IDENTIFICATION:	Component:	Model No.
	80-gal Tank	AAA20390AFI
	GCS Controller	AAA21242E3
DESCRIPTION:	Tank & Controller Assembly consisting of: • Hydraulic Machine (Power Unit) w/ 80-Gal Tank assembly, motor & pump : 15HP 480V • GCS Controller mounted to wall of tank Weight includes tank filled with oil and controller mounted to the side of the unit. Includes subcomponents listed in Tables 2 & 3 in a complete assembly.	
MOUNTING:	Rigid Base (Floor) Mounted using (4) – ½" Grade 8 bolts.	

PROPERTIES:

DIMENSIONS (in.)			Weight (lb.)	LOWEST RESONANT FREQUENCY (Hz.)		
Width	Depth	Height		Front-Axis	Side-Axis	Vert-Axis
42.25	19.12 +11.36	40.50	1134	27.6	20.8	18.7

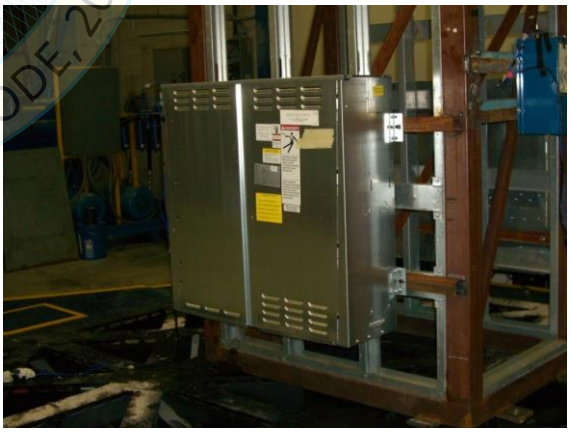
SHAKE TABLE TEST PARAMETERS

TEST CRITERIA	S_{DS} (g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
ICC-ES AC156	1.30 2.50	1 0	1.5	2.08 2.50	1.56 1.00	0.87 1.68	0.35 0.68

Unit maintained structural integrity and functionality after the ICC-ES AC 156 test. Unit was full of content during test.

UUT-1B GCS Controller

MANUFACTURER:	Otis Elevator Company
IDENTIFICATION:	Model No.: AAA21242E3
	Serial No.: 3581303
DESCRIPTION:	Same controller test specimen as mounted to the 80 gallon tank test specimen. Includes subcomponents listed in Tables 2 & 3 in a complete assembly.
MOUNTING:	Rigid Wall Mount w/ (4) – 3/8" dia Allen head cap screws through steel tubing with nuts and washers on rear side.



PROPERTIES:

DIMENSIONS (in.)			Weight (lb.)	LOWEST RESONANT FREQUENCY (Hz.)		
Width	Depth	Height		Front-Axis	Side-Axis	Vert-Axis
37.1	11.36	36	140.5	N/A	N/A	N/A

SHAKE TABLE TEST PARAMETERS

TEST CRITERIA	S_{DS} (g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
ICC-ES AC156	1.30 2.50	1 0	1.5	2.08 2.50	1.56 1.00	0.87 1.68	0.35 0.68

Unit maintained structural integrity and functionality after the ICC-ES AC 156 test. Unit was full of content during test.

ATTACHMENT 2: TEST SPECIMEN SUMMARY

UUT- 2 — 190 Gallon Tank & Controller Assembly

MANUFACTURER: Otis Elevator Company

IDENTIFICATION:

Component	Model No.	Serial No.
190 Gal Tank	AAD20390P1	----
GCS Controller	AAA21242E3	3591303

DESCRIPTION: Tank & Controller Assembly consisting of:
- Hydraulic Machine (Power Unit) w/ 190-Gal Tank assembly, motor & pump : 50HP 480V
- GCS Controller mounted to wall of tank

Weight includes tank filled with oil and controller mounted to the side of the unit. Includes subcomponents listed in Tables 2 & 3 in a complete assembly.

MOUNTING: Rigid Base (Floor) Mounted using (4) – 1/2" dia. Grade 8 bolts to aluminum interface plate.

PROPERTIES:

DIMENSIONS (in.)			Weight (lb.)	LOWEST RESONANT FREQUENCY (Hz.)		
Width	Depth	Height		Front-Axis	Side-Axis	Vert-Axis
51	29.37+11.36	48.15	2226	8.8	>50	32.2

SHAKE TABLE TEST PARAMETERS

TEST CRITERIA	S_{DS} (g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
ICC-ES AC156	1.30 2.50	1 0	1.5	2.08 2.50	1.56 1.00	0.87 1.68	0.35 0.68

Unit maintained structural integrity and functionality after the ICC-ES AC 156 test. Unit was full of content during test.

UUT-2B — GCS Controller

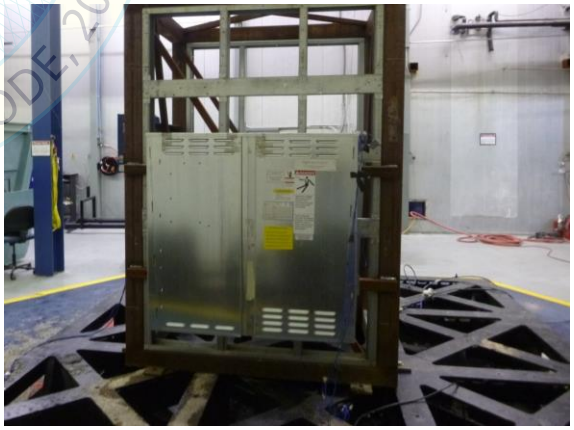
MANUFACTURER: Otis Elevator Company

IDENTIFICATION: Model No.: AAA21242E3

Serial No.: 3591303

DESCRIPTION: Same controller test specimen as mounted to the 190 gallon tank test specimen. Includes subcomponents listed in Tables 2 & 3 in a complete assembly.

MOUNTING: Rigid Wall Mount w/ (4) – 3/8" dia Allen head cap screws through steel tubing with nuts and washers on rear side.



PROPERTIES:

DIMENSIONS (in.)			Weight (lb.)	LOWEST RESONANT FREQUENCY (Hz.)		
Width	Depth	Height		Front-Axis	Side-Axis	Vert-Axis
37.1	11.36	36	137.5	N/A	N/A	N/A

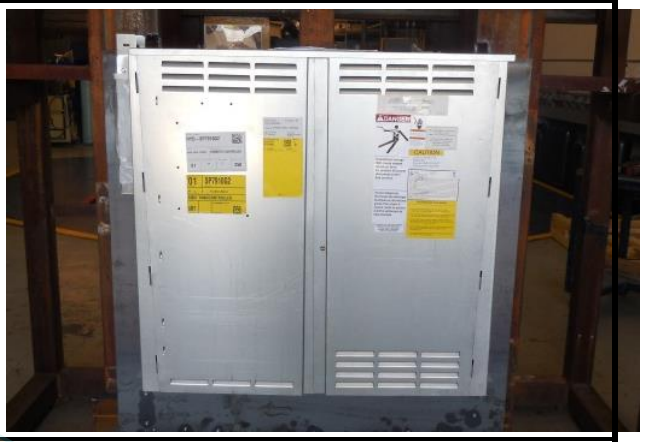
SHAKE TABLE TEST PARAMETERS

TEST CRITERIA	S_{DS} (g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
ICC-ES AC156	1.30 2.50	1 0	1.5	2.08 2.50	1.56 1.00	0.87 1.68	0.35 0.68

Unit maintained structural integrity and functionality after the ICC-ES AC 156 test. Unit was full of content during test.

UUT- A1 GCS Controller on Rigid Wall Mount

MANUFACTURER:	Otis Elevator Company
IDENTIFICATION:	Model No.: AAA21242E3 S/N: 50641715
DESCRIPTION:	Main component of elevator control system. UUT-A1 & UUT-A2 are the same test specimen with different mounting types. Includes subcomponents listed in Tables 2 & 3 in a complete assembly.
MOUNTING:	Wall mounted using (3) – 20 x 1/4" diameter hex head threaded rolling screws (2 top, 1 bottom). Interface frame rigidly attached to shake table using (6) – 5/8" diameter grade 8 bolts.



PROPERTIES:

DIMENSIONS (in.)			Weight (lb.)	LOWEST RESONANT FREQUENCY (Hz.)		
Width	Depth	Height		Front-Axis	Side-Axis	Vert-Axis
37.1	11.36	36	147	N/A	N/A	N/A

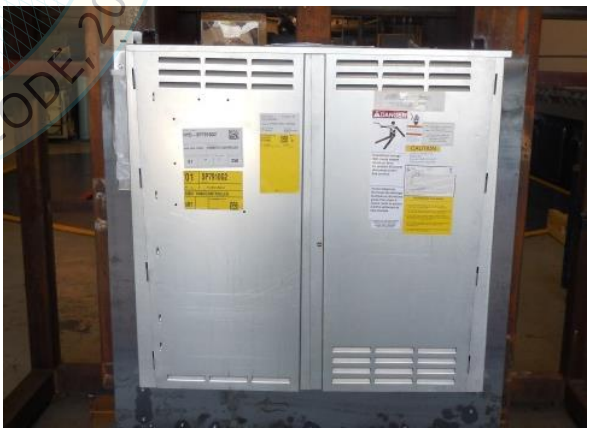
SHAKE TABLE TEST PARAMETERS

TEST CRITERIA	S_{DS} (g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
ICC-ES AC156	1.30 2.50	1 0	1.5	2.08 2.50	1.56 1.00	0.87 1.68	0.35 0.68

Unit maintained structural integrity and functionality after the ICC-ES AC 156 test. Unit was full of content during test.

UUT- A2 GCS Controller on Flexible Wall Mount

MANUFACTURER:	Otis Elevator Company
IDENTIFICATION:	Model No.: AAA21242E3 S/N: 50641715
DESCRIPTION:	Main component of elevator control system UUT-A1 & UUT-A2 are the same test specimen with different mounting types. Includes subcomponents listed in Tables 2 & 3 in a complete assembly.
MOUNTING:	Wall mounted using (3) – 20 x 1/4" diameter hex head threaded rolling screws (2 top, 1 bottom). Interface frame flexibly attached to (4) vibration spring isolators using 1" diameter bolt integral with isolator. The isolators were attached to 30"square x 1" interface plates using (4) – 5/8" diameter grade 8 bolts. The interface plates were attached to shake table using (4) – 5/8" diameter grade 8 bolts.



PROPERTIES:

DIMENSIONS (in.)			Weight (lb.)	LOWEST RESONANT FREQUENCY (Hz.)		
Width	Depth	Height		Front-Axis	Side-Axis	Vert-Axis
37.1	11.36	36	147	N/A	N/A	N/A

SHAKE TABLE TEST PARAMETERS

TEST CRITERIA	S_{DS} (g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
ICC-ES AC156	1.30 2.50	1 0	1.5	2.08 2.50	1.56 1.00	0.87 1.68	0.35 0.68

Unit maintained structural integrity and functionality after the ICC-ES AC 156 test. Unit was full of content during test.