APPLICATION FOR HCAI SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0559

HCAI Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: OTIS Elevator Company

Manufacturer's Technical Representative: Eric Mayer

Mailing Address: 212 West Newberry Road, Bloomfield, CT 06002

Telephone: (860) 286-4497 Email: Eric.Mayer@otis.com

Product Information

Product Name: 416 Drive, 428 Drive & other elevator components

Product Model Number(s): See Attachments

Product Category: Elevator Equipment

Product Sub-Category: Elevator Control Panels

General Description: Elevator variable frequency drives for the control of elevator machines.Standard drive cabinet modified by attachment of external steel brace frame available as a standardized option provided by Otis Elevator Company. Also includes transformers and ripple filter.

Mounting Description: Base Mounted Rigid -

Tested Seismic Enhancements: Seismic enhancements made to the test units and/or modifications required to address anomalies during the tests shall be incorporated into the production units.

Applicant Information

Applicant Company Name: EASE Co.

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 Structural 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: Jeremy Lange

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

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

Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 1.50 (SDS=2.00 @ z/h=1) & 1.13 (SDS=2.50 @ z/h=0)

S_{DS} (Design spectral response acceleration at short period, g) = 2.00 (z/h=1) & 2.50 (z/h=0)

a_p (Amplification factor) = 2.5

R_p (Response modification factor) = 6

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 2

Overall dimensions and weight = See Attachment 1

HCAI Approval (For Office Use Only) - Approval Expires on 05/28/2031

Date: 5/28/2025

Name: Mohammad Karim Title: Supervisor, Health Facilities

Special Seismic Certification Valid Up to: S_{DS} (g) = 2.0 z/h = 1

Condition of Approval (if applicable):

ATTACHMENT 1: SEISMIC CERTIFIED COMPONENTS

TABLE 1:

Manufacturer	**Otis Elevator Company**	**S_{DS} = 2.0 at z/h = 1** **S_{DS} = 2.5 at z/h = 0**
Product Type	**Elevator Components**	

COMPONENT	OTIS IDENTIFICATION NO.	APPROX. DIMENSIONS (IN.) W	D	H	APPROX. WT. (LB.)	MOUNT	BASIS [1]	F_P/W_P	a_P	R_P	Ω_0
428 Drive [2]	JAA21310ACK7#	29.5	24	80.75	1047.5 [6]	Rigid Base	UUT-1705-1	1.50 1.13	2 ½	6	2
416 Drive [3]	GAA21310GJ	23.6	15	63	427.5 [6]	Rigid Base	UUT-1705-2	1.50 1.13	2 ½	6	2
OVF428G-R2 Drive 280 Amp AC Drive Assembly [4]	JAA21310ADB102	41.3	26	84	1049 [6]	Rigid Base	UUT-2405-1	1.50 1.13	2 ½	6	2
OVFR02E-416 Drive 160 Amp AC Drive Assembly [5]	GGA21310GJ999	35.3	17.6	65	427 [6]	Rigid Base	UUT-2405-2	1.50 1.13	2 ½	6	2
DC Ripple Filter (190 Amp) for DC Drives (Mfr.: Macro Magnetics)	AAA21799E25-2122	36.13	24.31	34.25	715	Rigid Base	UUT-2405-3	1.50 1.13	2 ½	6	2
Otis Mainline Isolation Transformer (111A 480V) [6] (Mfr.: Macro Magnetics)	AAA21799B10-233	42.25	29.38	43	879	Rigid Base	UUT-2405-4	1.50 1.13	2 ½	6	2
Otis Mainline Auto-Transformer (66.5 kVA 3-Phase) (Mfr.: Transformer Technology, Inc.)	AAA21799L21	26.75	20.25	34.25	478	Rigid Base	UUT-2405-5	1.50 1.13	2 ½	6	2

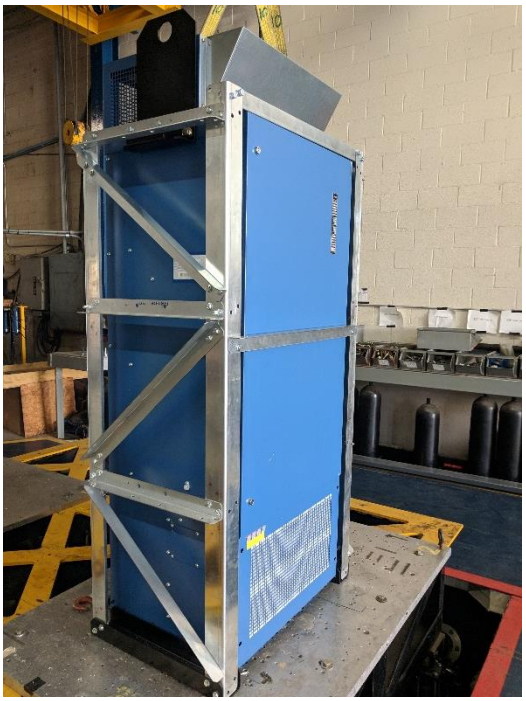
Mount RIGID BASE: free-standing, base-mounted tower configuration with the component rigidly attached to a supporting structure and no lateral support above the base.

Notes

1. BASIS:
   - UUT-#: Indicates that a test specimen matching these characteristics was tested as part of this testing program.
2. Requires use of OTIS Seismic Kit P/N: AAA374AEW
3. Requires use of OTIS Seismic Kit P/N: AAA374AEV
4. Requires use of OTIS Seismic Kit P/N: AAA374AEW401
5. Requires use of OTIS Seismic Kit P/N: AAA374AEV401
6. 1-Hour rating

ATTACHMENT 2: TEST SPECIMEN SUMMARY

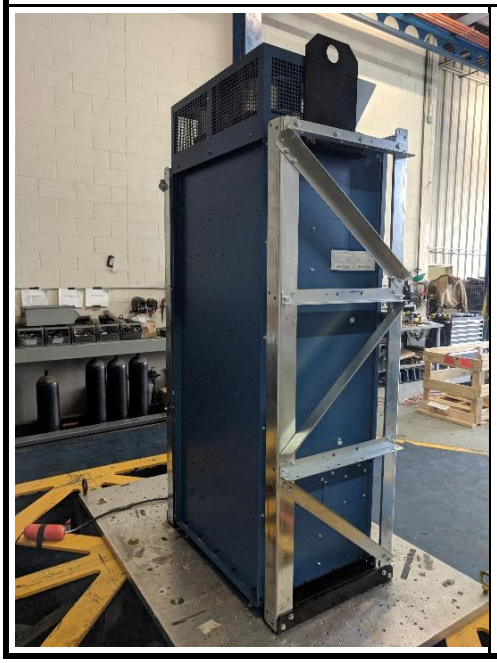
UUT-1705-1	**428 Drive**
MANUFACTURER:	Otis Elevator Company
IDENTIFICATION:	Part No.: JAA21310ACK7# Serial No.: N/A
DESCRIPTION:	150A adjustable speed elevator drive Input: 480V 60Hz 3PH AC 95A Rated Output: 150A 0-520V 0-68.8Hz 3PH AC I50A Rated Test unit included an Otis-provided external steel brace frame bolted to the cabinet. Frame members bolted together with M10 serrated flange bolts and serrated flange nuts. Following completion of testing, Otis assigned the frame to a new standardized seismic option kit # AAA374AEW. (15) – M6-Class 4.6 screws attaching cabinet to base (approx. 3" above floor) were replaced by (15) – M6-Class 10.9 screws. (5 each on left & right sides & 5 at rear of cabinet)
MOUNTING:	Rigid Base (Floor) Mounted using: (4)- ½" diameter J429 Grade 8 bolts to cabinet base & (4)- ½" diameter J429 Grade 8 bolts to external frame. (Torque = 40 ft-lb).

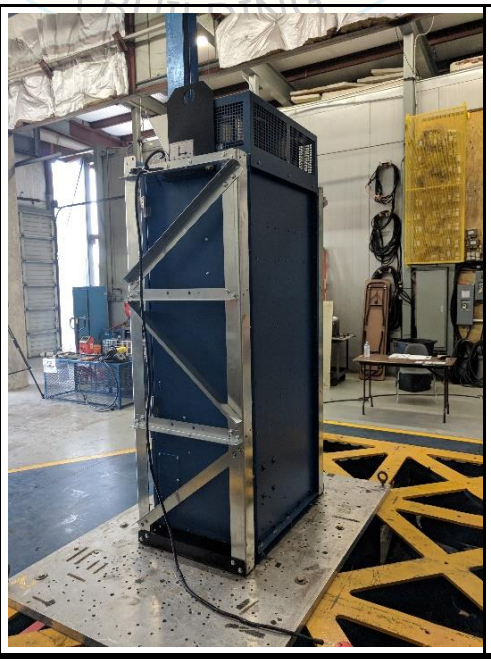


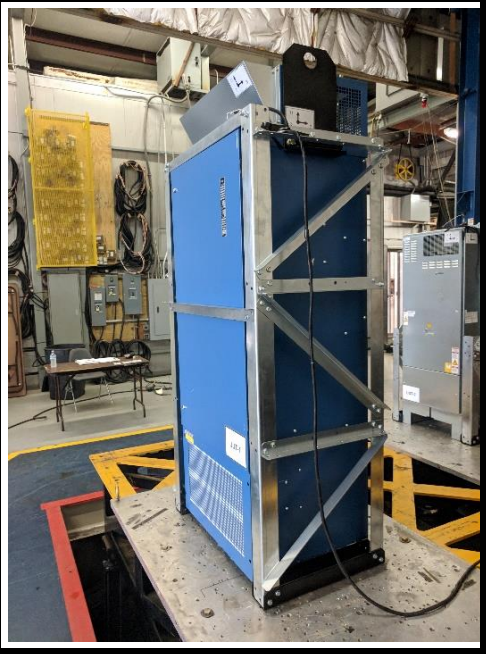
Dimensions (in.)				**Lowest Resonant Frequency (Hz)**		
Width	Depth	Height	Weight (lb.)	Side-Axis	Front-Axis	Vert-Axis
29.5	24	80.75	891.5 (drive) 1047.5 (w/ frame)	12.6	20.7	24.5

ICC-ES AC156 Shake Table Test Parameters						**Code: 2022 CBC**
S_{DS} (G)	z/h	I_P	A_{FLX-H} (G)	A_{RIG-H} (G)	A_{FLX-V} (G)	A_{RIG-V} (G)
2.0 2.5	1 0	1.5	3.20	2.40	1.68	0.68

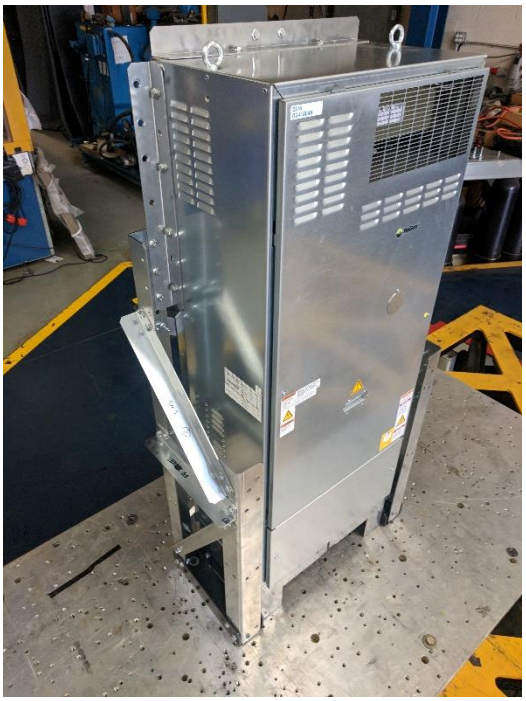
Unit maintained structural integrity and remained functional per manufacturer requirement after AC156 test.







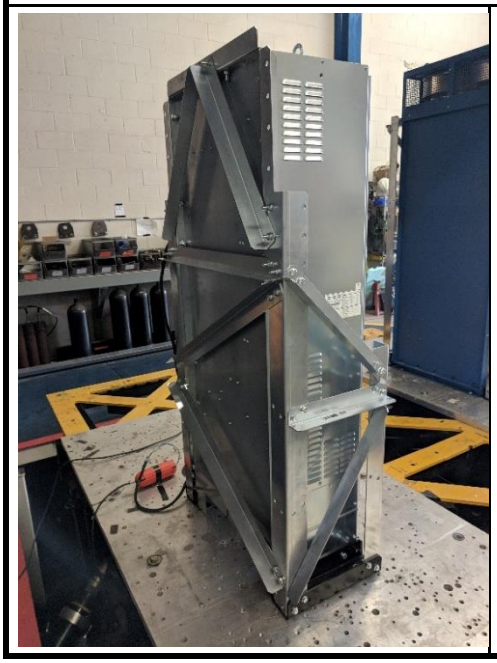
UUT-1705-2	416 Drive
MANUFACTURER:	Otis Elevator Company
IDENTIFICATION:	Part No.: GAA21310GJ Serial No.: N/A
DESCRIPTION:	80A adjustable speed elevator drive: Input: 380-480V 50/60Hz 3PH AC Output: 80A 0-513V 0-100Hz 3PH AC Test unit included an Otis-provided external steel brace frame bolted to the cabinet. Frame members bolted together with M10 serrated flange bolts and serrated flange nuts. Following completion of testing, the frame became part of a a standardized seismic option kit # AAA374AEV Connection of cabinet to pedestal base: hollow shank rivets replaced w/ M5 thread rolling screws all locations.
MOUNTING:	Rigid Base (Floor) Mounted using (4)- ½" diameter J429 Grade 8 bolts to cabinet base & (4)- ½" diameter J429 Grade 8 bolts to external frame. (Torque = 40 ft-lb).

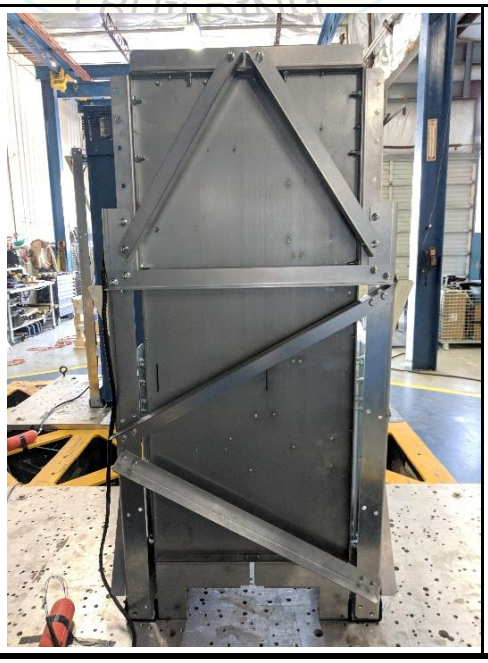


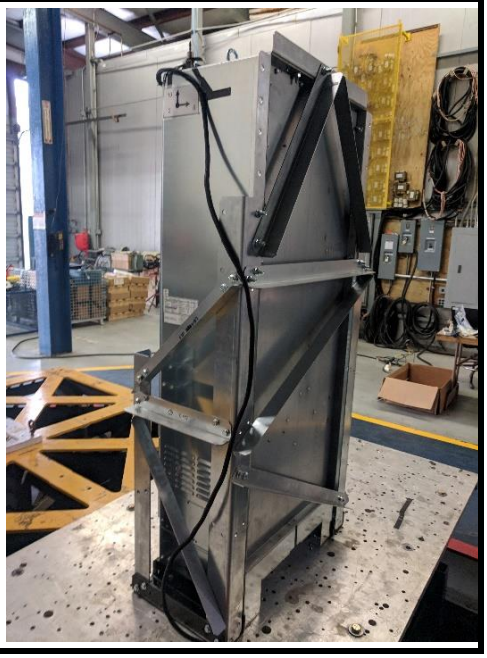
Dimensions (in.)				Lowest Resonant Frequency (Hz)		
Width	Depth	Height	Weight (lb.)	Side-Axis	Front-Axis	Vert-Axis
23.6	15	63	335.5 (Drive) 427.5 (w/ Frame)	10.8	12.6	>50

ICC-ES AC156 Shake Table Test Parameters						Code: 2022 CBC
S_{DS} (G)	z/h	I_P	A_{FLX-H} (G)	A_{RIG-H} (G)	A_{FLX-V} (G)	A_{RIG-V} (G)
2.0 2.5	1 0	1.5	3.20	2.40	1.68	0.68

Unit maintained structural integrity and remained functional per manufacturer requirement after AC156 test.

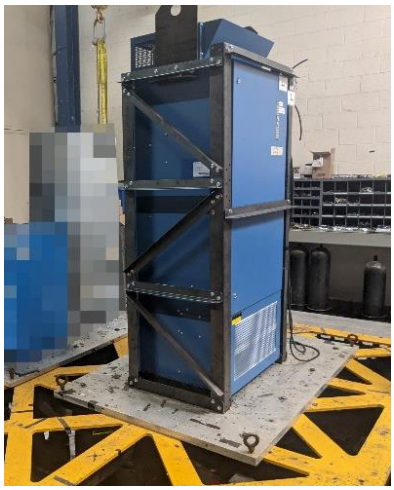






UUT-2405-1 OVF428G-R2 Drive 280 Amp AC Drive Assembly

Manufacturer:	Otis Elevator Company
Identification:	Part No.: JAA21310ADB102 Serial No.: N/A
Description:	280 Amp AC Drive 150A (continuous) Adjustable Speed Elevator Drive Input: 480V 60Hz 3PH AC 112A Output: 150A 0-520V 0-68 8Hz 3PH AC 150A Rated Production Equivalent Prototype Includes Seismic Kit P/N AAA374AEW401 (external skeleton) Weight includes external skeleton.
Mounting:	Rigid Base (Floor) mounted using (8) – 1/2" dia. SAE J429 Grade 5 Hex Head Bolts w/ Standard Washers. (Torque =40-ft-lb)



Dimensions (in.)				Lowest Resonant Frequency (Hz)		
Width	Depth	Height	Weight (lb.)	Front - Axis	Side - Axis	Vert - Axis
41.3	26	84	1049	16.10	12.22	>50

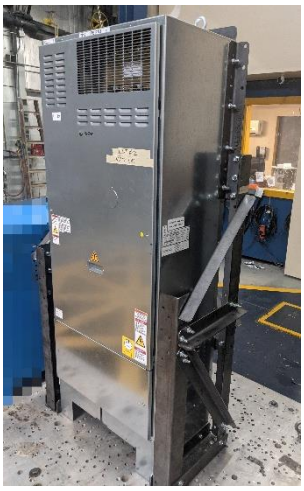
ICC-ES AC156 Shake Table Test Parameters — **Code: 2022 CBC**

S_{DS} (G)	z/h	I_P	A_{FLX-H} (G)	A_{RIG-H} (G)	A_{FLX-V} (G)	A_{RIG-V} (G)
2.0 2.5	1 0	1.5	3.20	2.40	1.68	0.68

Unit satisfied AC156 requirements for structural integrity and manufacturer requirements for functionality after AC156 test.

UUT-2405-2 OVFR02E-416 Drive 160 Amp AC Drive Assembly

Manufacturer:	Otis Elevator Company
Identification:	Part No.: GGA21310GJ999 Serial No.: N/A
Description:	160Amp AC Drive 80A (continuous) Adjustable Speed Elevator Drive Input: 380-480V 50/60Hz 3PH AC Output: 80A 0-513V 0-100Hz 3PH AC Production Equivalent Prototype Includes seismic kit AAA374AEV401 (external skeleton) Weight includes external skeleton.
Mounting:	Rigid Base (Floor) mounted using (8) – 1/2" dia. SAE J429 Grade 5 Hex Head Bolts w/ Standard Washers. (Torque =40-ft-lb)



Dimensions (in.)				Lowest Resonant Frequency (Hz)		
Width	Depth	Height	Weight (lb.)	Front - Axis	Side - Axis	Vert - Axis
35.3	17.6	65	427	15.64	11.50	15.48

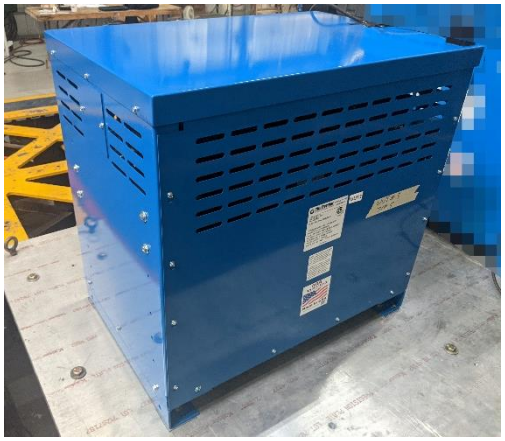
ICC-ES AC156 Shake Table Test Parameters — **Code: 2022 CBC**

S_{DS} (G)	z/h	I_P	A_{FLX-H} (G)	A_{RIG-H} (G)	A_{FLX-V} (G)	A_{RIG-V} (G)
2.0 2.5	1 0	1.5	3.20	2.40	1.68	0.68

Unit satisfied AC156 requirements for structural integrity and manufacturer requirements for functionality after AC156 test.

UUT-2405-3 DC Ripple Filter (190 Amp) for DC Drives

Manufacturer:	Macro Magnetics
Identification:	Otis Model No.: AAA21799E25-2122 Serial No.: N/A
Description:	DC Ripple Filter (190 Amp) Mfr. Model No.: GT-R252122-29 Mfr. P/N: GT-H131E-29 Max. Temp Rise: 125°C @ 40°C Ambient DC Resistance: 0.010 OHMS Inductance: 5 mH @ 235 ADC Peak Current: 605 ADC DC Filter Voltage: 770V P-P @ 360 HZ
Mounting:	Rigid Base (Floor) mounted using (4) – 1/2" dia. SAE J429 Grade 5 Hex Head Bolts w/ Standard Washers. (Torque =40-ft-lb)



Dimensions (in.)				Lowest Resonant Frequency (Hz)		
Width	Depth	Height	Weight (lb.)	Front - Axis	Side - Axis	Vert - Axis
36.13	24.31	34.25	715	>50	22.41	23.40

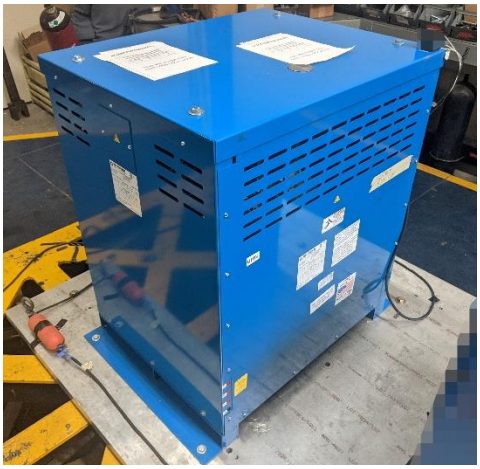
ICC-ES AC156 Shake Table Test Parameters **Code: 2022 CBC**

S_{DS} (G)	z/h	I_P	A_{FLX-H} (G)	A_{RIG-H} (G)	A_{FLX-V} (G)	A_{RIG-V} (G)
2.0 2.5	1 0	1.5	3.20	2.40	1.68	0.68

Unit satisfied AC156 requirements for structural integrity and manufacturer requirements for functionality after AC156 test.

UUT-2405-4 Otis Mainline Isolation Transformer (111A 480V)

Manufacturer:	Macro Magnetics
Identification:	Otis Part No.: AAA21799B10-233 Serial No.: N/A
Description:	Isolation Transformer for Mainline Power and/or DC Field Voltage. 3-Phase Isolation Transformer Model No. TRF480064N210 INPUT: 111A, 480V, 80 1-HR KVA, 60hz OUTPUT: 210V, 209A, 75.9 1-HR KVA Dry type transformer, Copper windings, Open Core Coil NEMA 1 Enclosure
Mounting:	Rigid Base (Floor) mounted using (4) – 1/2" dia. SAE J429 Grade 5 Hex Head Bolts w/ Standard Washers. (Torque =40-ft-lb)



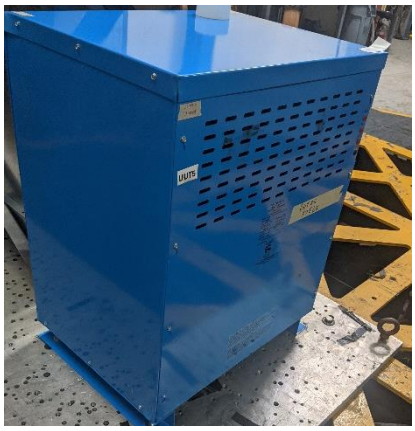
Dimensions (in.)				Lowest Resonant Frequency (Hz)		
Width	Depth	Height	Weight (lb.)	Front - Axis	Side - Axis	Vert - Axis
42.25	29.38	43	879	35.36	17.28	16.16

ICC-ES AC156 Shake Table Test Parameters **Code: 2022 CBC**

S_{DS} (G)	z/h	I_P	A_{FLX-H} (G)	A_{RIG-H} (G)	A_{FLX-V} (G)	A_{RIG-V} (G)
2.0 2.5	1 0	1.5	3.20	2.40	1.68	0.68

Unit satisfied AC156 requirements for structural integrity and manufacturer requirements for functionality after AC156 test.

UUT-2405-5	Otis Mainline Auto-Transformer (66.5 kVA 3-Phase)
Manufacturer:	Transformer Technology, Inc.
Identification:	Otis Part No.: AAA21799L21 Serial No.: L2110312401
Description:	66.5 kVA 3-Phase Auto-Transformer Windings: Copper Core: Open Core NEMA 1 Enclosure
Mounting:	Rigid Base (Floor) mounted using (4) – 1/2" dia. SAE J429 Grade 5 Hex Head Bolts w/ Standard Washers. (Torque =40-ft-lb)



Dimensions (in.)				Lowest Resonant Frequency (Hz)		
Width	Depth	Height	Weight (lb.)	Front - Axis	Side - Axis	Vert - Axis
26.75	20.25	34.25	478	18.50	10.17	18.57

ICC-ES AC156 Shake Table Test Parameters						Code: 2022 CBC
S_{DS} (G)	z/h	I_P	A_{FLX-H} (G)	A_{RIG-H} (G)	A_{FLX-V} (G)	A_{RIG-V} (G)
2.0 2.5	1 0	1.5	3.20	2.40	1.68	0.68

Unit satisfied AC156 requirements for structural integrity and manufacturer requirements for functionality after AC156 test.