APPLICATION FOR HCAI SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0794

HCAI Special Seismic Certification Preapproval (OSP)

Type: [X] New [ ] Renewal

Manufacturer Information

Manufacturer: Switching Systems, LLC

Manufacturer's Technical Representative: Brad Bell

Mailing Address: 1000 N Grove, Oak Park, IL 60302

Telephone: (708) 870-4711 Email: brad@switchingsystems.net

Product Information

Product Name: Switchgear/Switchboards

Product Type: Switchgear - Low Voltage

Product Model Number: Control Panels for Switchgear

General Description: Carbon steel enclosures with integrated control subcomponents for low voltage switchgear.

Mounting Description: Rigid, Floor Mounted

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: Manwill Engineering LLC

Contact Person: Derek Manwill

Mailing Address: PO Box 1194, Bend, OR 97709

Telephone: (541) 241-2102 Email: derek@manwillse.com

Title: President

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

Company Name: MANWILL ENGINEERING LLC

Name: Derek Manwill California License Number: S6266

Mailing Address: PO Box 1194, Bend, OR 97709

Telephone: (541) 241-2102 Email: derek@manwillse.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) = 0.83 (SDS=1.10, z/h=1), 0.79 (SDS=1.76, z/h=0)

S_{DS} (Design spectral response acceleration at short period, g) = 1.10 (z/h=1), 1.76 (z/h=0)

a_p (Amplification factor) = 2.5

R_p (Response modification factor) = 6.0

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 01/05/2030

Date: 1/5/2024

Name: Mohammad Aliaari Title: Senior Structural Engineer

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

Condition of Approval (if applicable):

SWITCHING SYSTEMS
Control Panels for Switchgear

TABLE 1

Model Number	Dimensions (in)			Max. Wt. (lb)	Description / Notes	Basis
	Depth	Width	Height			
Control Panels for Switchgear						
CUSTOM-28X28X54	28.0	28.0	54.0	600	-	EXTRAP
…	…	…	…	…	Extrapolated Sizes	EXTRAP
CUSTOM-30X28X90	28.0	30.0	90.0	680	-	**UUT 2**
…	…	…	…	…	Interpolated Sizes	INTERP
CUSTOM-36X36X90	36.0	36.0	90.0	802	-	**UUT 1**
Mounting: Rigid floor mounted.				**Seismic Levels:**	S_{DS} = 1.10g for z/h = 1 S_{DS} = 1.76g for z/h = 0	I_P = 1.5

Product Construction: Carbon steel frame, doors, panels, and subpanels.

Options/Subcomponents: Control Panel may contain any combination of subcomponents listed in Table 2. Total weight must be less than the values listed above. Enclosures must have all side, back, and top panels installed and positively attached to the frame. Open/removed panels are not allowed. Anchorage must be through the base member that sits flush with the floor. In addition to the three locking latches, the door must be secured with two 1/4-in screws into the frame (one near top, one near bottom).

SWITCHING SYSTEMS
Control Panels for Switchgear

TABLE 2. SUBCOMPONENTS

Model Number	Dimensions (in)			Max. Wt. (lb)	Description / Notes	Basis
	Depth	Width	Height			
Type: HMI - Mfr: ComAp						
IV12	-	-	-	-	12" HMI	**UUT 2**
Type: HMI - Mfr: Maple						
PC1219APH-B05M6C	-	-	-	-	19" HMI	**UUT 1**
Type: Switich/Buttom/Light - Mfr: Siemens						
3SU1000-2AS60-0AA0	-	-	-	-	Engine control switch	**UUT 2**
3SU1000-1HB20-0AA00	-	-	-	-	E-stop red 40mm head	**UUT 2**
3SU1130-0AB10-1BA0	-	-	-	-	Reset (22mm black push button)	**UUT 2**
3SU1130-0AB50-1BA0	-	-	-	-	LTS (22mm black push button)	**UUT 1, 2**
3SU1102-6AA20-1AA0	-	-	-	-	Red closed pilot light	**UUT 2**
3SU1102-6AA40-1AA0	-	-	-	-	Green open pilot light	**UUT 2**
3SU1102-6AA30-1AA0	-	-	-	-	Amber locked out light	**UUT 2**
52SA2AABA1	-	-	-	-	AUMS 22mm 2 position knob	**UUT 1**
8189D	-	-	-	-	SPD display	**UUT 1**
3SU1102-6AA20-1AA0	-	-	-	-	Red pilot light	**UUT 1**
Type: Switich/Buttom/Light - Mfr: Crompton						
007-05GA-PTUJ-C6SN	-	-	-	-	VM	**UUT 1**
Type: Switich/Buttom/Light - Mfr: Electroswitch						
2404C	-	-	-	-	VSS	**UUT 1**
Type: Controller - Mfr: ComAp						
IG-NTC-BB	-	-	-	-	Gen controller IG-NTC-BB	**UUT 2**
IO8/8	-	-	-	-	Expansion IO8/8	**UUT 2**
IG-AVRI	-	-	-	-	AVRi module	**UUT 2**
IG-AVRI-TRANS/LV	-	-	-	-	IG-AVRI-TRANS/LV	**UUT 2**
Type: Controller - Mfr: Emerson						
IC695CPL410	-	-	-	-	RX3i CPU	**UUT 1**
IC695PSD140	-	-	-	-	RX3i power supply	**UUT 1**
IC695CHS012	-	-	-	-	RX3i 12 slot universal base	**UUT 1**
IC694MDL655	-	-	-	-	Discrete Input Module	**UUT 1**
IC694MDL753	-	-	-	-	Discrete Output Module	**UUT 1**
IC695PNS001	-	-	-	-	RX3I profinet scanner module	**UUT 1**
IC694ALG222	-	-	-	-	Analog input module	INTERP
IC693CBL327	-	-	-	-	Cable for card PLC A-B	**UUT 1**
IC693CBL328	-	-	-	-	Cable for card PLC C-D	**UUT 1**
Type: Power Supply - Mfr: Weidmuller						
2001800000	-	-	-	-	24-24VDC converter, 120 Watt	**UUT 2**
2001810000	-	-	-	-	24-24VDC converter, 240 Watt	**UUT 1**
Type: Power Supply - Mfr: Meanwell						
SD-1000L-24	-	-	-	-	48-24VDC converter, 960 Watt	**UUT 1**
Type: Power Supply - Mfr: Siemens						
US2:TPS4F0630X2	-	-	-	-	SPD	**UUT 1**

Notes: Table continues on the next page. Additional notes, information, and seismic parameters are shown at the end of the table.

SWITCHING SYSTEMS
Control Panels for Switchgear

TABLE 2. SUBCOMPONENTS (CONTINUED)

Model Number	Dimensions (in)			Max. Wt. (lb)	Description / Notes	Basis
	Depth	Width	Height			
Type: Power Supply - Mfr: Phoenix						
2866776	-	-	-	-	120VAC-24VDC converter	**UUT 2**
Type: Networking - Mfr: N-Tron						
108TX	-	-	-	-	Ethernet switch	**UUT 1**
Type: Fuse/Block/Relay - Mfr: Mersen						
ATM1/16	-	-	-	-	1/16A fuse	**UUT 2**
ATM2	-	-	-	-	2A fuse	**UUT 2**
ATM3	-	-	-	-	3A fuse	**UUT 1, 2**
ATM5	-	-	-	-	5A fuse	**UUT 1, 2**
ATM6	-	-	-	-	6A fuse	**UUT 1**
ATM10	-	-	-	-	10A fuse	**UUT 1**
ATDR6	-	-	-	-	6A fuse	**UUT 1, 2**
ATDR10	-	-	-	-	10A fuse	**UUT 1, 2**
ATDR15	-	-	-	-	15A fuse	**UUT 1**
ATDR30	-	-	-	-	6A fuse	**UUT 1**
ATM15	-	-	-	-	15A fuse	**UUT 2**
USCC1	-	-	-	-	Single pole fuse holder	**UUT 2**
USCC2	-	-	-	-	Double pole fuse holder	**UUT 1, 2**
USM1	-	-	-	-	Single pole fuse holder	**UUT 1**
Type: Fuse/Block/Relay - Mfr: B and B Electric						
ELINX MESR92x	-	-	-	-	8 port Modbus Gateway	**UUT 1**
Type: Fuse/Block/Relay - Mfr: Weidmuller						
1020100000(WDU 4)	-	-	-	-	Control Terminal Blocks	**UUT 1, 2**
Type: Fuse/Block/Relay - Mfr: Omron						
LY2 DC24	-	-	-	-	2P relay, 10A with base	**UUT 2**
MY2N-GS DC24	-	-	-	-	2P relay, 5A with base	**UUT 1, 2**
MY4N-GS DC24	-	-	-	-	4P relay with base	**UUT 2**
Type: Fuse/Block/Relay - Mfr: Phoenix						
RIF-0-RPT-24DC/1	-	-	-	-	1P relay	**UUT 1**
Type: Fuse/Block/Relay - Mfr: Crompton						
253-PHD	-	-	-	-	Under Over Frequency Meter	**UUT 1**
Type: Fuse/Block/Relay - Mfr: AB						
1492-L4-RE	-	-	-	-	Terminal blocks 20A	**UUT 2**
Type: Fuse/Block/Relay - Mfr: Siemens						
3RH2122-1AK20	-	-	-	-	Heavy duty relay	**UUT 2**
6ES7214-1HG40-0XB0	-	-	-	-	Simatic S7-1200, CPU 1214C	**UUT 2**
6ES7223-1PH32-0XB0	-	-	-	-	8 DI and 8 DO module	**UUT 2**

Notes: Table continues on the next page. Additional notes, information, and seismic parameters are shown at the end of the table.

SWITCHING SYSTEMS
Control Panels for Switchgear

TABLE 2. SUBCOMPONENTS (CONTINUED)

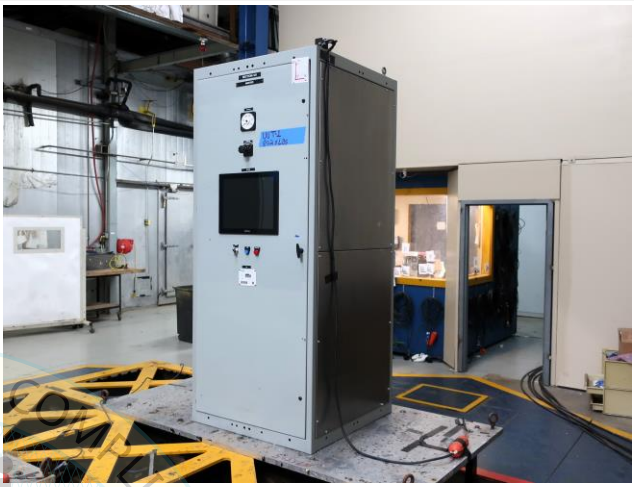
Model Number	Dimensions (in)			Max. Wt. (lb)	Description / Notes	Basis
	Depth	Width	Height			
Type: Fuse/Block/Relay - Mfr: ATO						
DVRD-24	-	-	-	-	DC Over Voltage Relay, 24VDC	**UUT 2**
Type: Fuse/Block/Relay - Mfr: Crydom						
F1842D400	-	-	-	-	DC power diodes, 30A, 600V	**UUT 1, 2**
Type: Fuse/Block/Relay - Mfr: Ideal						
89-507	-	-	-	-	CTTB	**UUT 2**
Type: Fuse/Block/Relay - Mfr: Basler						
ES-27/59 4FA1N2N0	-	-	-	-	Sync check relay	**UUT 1, 2**
Mounting: Mounted within unit.				**Seismic Levels:**	S_{DS} = 1.10g for z/h = 1 S_{DS} = 1.76g for z/h = 0	I_P = 1.5

Construction/Options: Model number uniquely identifies manufacturer, materials, and configuration of subcomponents.

UUT 1

Manufacturer: SWITCHING SYSTEMS
Model number: CUSTOM-36X36X90
Unit function: CONTROL PANELS
Serial number: N/A

Dimensions (in)			Weight	Res. Freq. (Hz)		
Depth	Width	Height	(lb)	F-B	S-S	V
36.0	36.0	90.0	802	14.7	11.4	>33.3



Code & criteria: 2022 CBC, ICC-ES AC156
Test laboratory: ENVIRONMENTAL TESTING LABORATORY
Report: 23034TR1.0 (dated 12-18-23), tested on 12-7-23

S_{DS} (g)	z/h	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
1.10	1	1.76	1.32	1.18	0.48
1.76	0				

Importance Factor, I_P = 1.5: Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

Mounting: Rigid floor mounted using (4) 1/2-in diameter Grade 8 bolts.

Construction: Carbon steel frame, doors, panels, and subpanels.

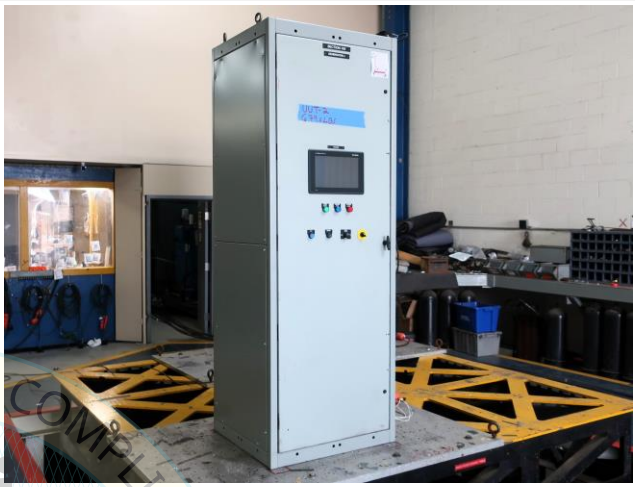
Subcomponents: Maple - HMI (PC1219APH-B05M6C), Siemens - Switch/Buttom/Light (3SU1130-0AB50-1BA0, 52SA2AABA1, 8189D, 3SU1102-6AA20-1AA0), Crompton - Switch/Buttom/Light (007-05GA-PTUJ-C6SN), Electroswitch - Switch/Buttom/Light (2404C), Emerson - Controller (IC695CPL410, IC695PSD140, IC695CHS012, IC694MDL655, IC694MDL753, IC695PNS001, IC693CBL327, IC693CBL328), Weidmuller - Power Supply (2001810000), Meanwell - Power Supply (SD-1000L-24), Siemens - Power Supply (US2:TPS4F0630X2), N-Tron - Networking (108TX), Mersen - Fuse/Block/Relay (ATM3, ATM5, ATM6, ATM10, ATDR6, ATDR10, ATDR15, ATDR30, USCC2, USM1), B and B Electric - Fuse/Block/Relay (ELINX MESR92x), Weidmuller - Fuse/Block/Relay (1020100000(WDU 4)), Omron - Fuse/Block/Relay (MY2N-GS DC24), Phoenix - Fuse/Block/Relay (RIF-0-RPT-24DC/1), Crompton - Fuse/Block/Relay (253-PHD), Crydom - Fuse/Block/Relay (F1842D400), Basler - Fuse/Block/Relay (ES-27/59 4FA1N2N0).

Testing notes: Enclosure had all side, back, and top panels installed and positively attached to the frame. Anchorage was through the base member that sits flush with the floor (outermost holes in the front and back). In addition to the three locking latches, the door was secured with two 1/4-in screws into the frame (one near top, one near bottom).

UUT 2

Manufacturer: SWITCHING SYSTEMS
Model number: CUSTOM-30X28X90
Unit function: CONTROL PANELS
Serial number: N/A

Dimensions (in)			Weight	Res. Freq. (Hz)		
Depth	Width	Height	(lb)	F-B	S-S	V
28.0	30.0	90.0	680	15.7	11.5	>33.3



Code & criteria: 2022 CBC, ICC-ES AC156
Test laboratory: ENVIRONMENTAL TESTING LABORATORY
Report: 23034TR1.0 (dated 12-18-23), tested on 12-7-23

S_{DS} (g)	z/h	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
1.10	1	1.76	1.32	1.18	0.48
1.76	0				

Importance Factor, I_P = 1.5: Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

Mounting: Rigid floor mounted using (4) 1/2-in diameter Grade 8 bolts.

Construction: Carbon steel frame, doors, panels, and subpanels.

Subcomponents: ComAp - HMI (IV12), Siemens - Switich/Buttom/Light (3SU1000-2AS60-0AA0, 3SU1000-1HB20-0AA00, 3SU1130-0AB10-1BA0, 3SU1130-0AB50-1BA0, 3SU1102-6AA20-1AA0, 3SU1102-6AA40-1AA0, 3SU1102-6AA30-1AA0), ComAp - Controller (IG-NTC-BB, IO8/8, IG-AVRI, IG-AVRI-TRANS/LV), Weidmuller - Power Supply (2001800000), Phoenix - Power Supply (2866776), Mersen - Fuse/Block/Relay (ATM1/16, ATM2, ATM3, ATM5, ATDR6, ATDR10, ATM15, USCC1, USCC2), Weidmuller - Fuse/Block/Relay (1020100000(WDU 4)), Omron - Fuse/Block/Relay (LY2 DC24, MY2N-GS DC24, MY4N-GS DC24), AB - Fuse/Block/Relay (1492-L4-RE), Siemens - Fuse/Block/Relay (3RH2122-1AK20, 6ES7214-1HG40-0XB0, 6ES7223-1PH32-0XB0), ATO - Fuse/Block/Relay (DVRD-24), Crydom - Fuse/Block/Relay (F1842D400), Ideal - Fuse/Block/Relay (89-507), Basler - Fuse/Block/Relay (ES-27/59 4FA1N2N0).

Testing notes: Enclosure had all side, back, and top panels installed and positively attached to the frame. Anchorage was through the base member that sits flush with the floor (outermost holes in the front and back). In addition to the three locking latches, the door was secured with two 1/4-in screws into the frame (one near top, one near bottom).