APPLICATION FOR VARIANCE

State Form 44400 (R7 / 10-13)
Approved by State Board of Accounts, 2013

INDIANA DEPARTMENT OF HOMELAND SECURITY
CODE SERVICES SECTION
302 West Washington Street, Room W246
Indianapolis, IN 46204-2739
http://www.in.gov/dhs/fire/fp_bs_comm_code/

INSTRUCTIONS: ***Please refer to the attached four (4) page instructions.***
Attach additional pages as needed to complete this application.

Variance number *(Assigned by department)*: 15-11-01(a)

1. APPLICANT INFORMATION *(Person who would be in violation if variance is not granted; usually this is the owner)*

Name of applicant	Title
Grace Schools / T.A. Dunn	Operations
Name of organization	**Telephone number**
Grace Schools	(574) 372 5100 x 6395

Address *(number and street, city, state, and ZIP code)*: 200 Seminary Dr., Winona Lake, IN 46590

2. PERSON SUBMITTING APPLICATION ON BEHALF OF THE APPLICANT *(If not submitted by the applicant)*

Name of applicant	Title
Susan Ruhana	Field Coordinator
Name of organization	**Telephone number**
Schindler Elevator Corp	(317) 616-7981

Address *(number and street, city, state, and ZIP code)*: 2325 Executive Dr., Indianapolis, IN 46241

3. DESIGN PROFESSIONAL OF RECORD *(If applicable)*

Name of design professional	License number
Name of organization	**Telephone number**
	( )

Address *(number and street, city, state, and ZIP code)*:

4. PROJECT IDENTIFICATION

Name of project	State project number	County
GRACE COLLEGE 2016 HALL		Kosciusko

Address of site *(number and street, city, state, and ZIP code)*: 200 SEMINARY DR., WINONA LAKE, IN 46590

Type of project

☒ New ☐ Addition ☐ Alteration ☐ Change of occupancy ☐ Existing

5. REQUIRED ADDITIONAL INFORMATION

The following required information has been included with this application *(check as applicable)*:

☒ A check made payable to the Indiana Department of Homeland Security for the appropriate amount. *(see instructions)*

☒ One (1) set of plans or drawings and supporting data that describe the area affected by the requested variance and any proposed alternatives.

☐ Written documentation showing that the local fire official has received a copy of the variance application.

☐ Written documentation showing that the local building official has received a copy of the variance application.

6. VIOLATION INFORMATION

Has the Plan Review Section of the Division of Fire and Building Safety issued a Correction Order?

☐ Yes *(If yes, attach a copy of the Correction Order.)* ☒ No

Has a violation been issued?

☐ Yes *(If yes, attach a copy of the Violation and answer the following.)* ☒ No

Violation issued by:

☐ Local Building Department ☐ State Fire and Building Code Enforcement Section ☐ Local Fire Department

7. DESCRIPTION OF REQUESTED VARIANCE

Name of code or standard and edition involved	Specific code section
ANSI ASME A 17.1-2007	2.20.1,2.20.4,2.20.9 1 and 2.18.5.1

Nature of non-compliance *(Include a description of spaces, equipment, etc. involved as necessary.)*

Schindler Elevator will utilize 6mm steel wire governor rope instead of the required minimum dia. of 9.5mm per Section 2.18.5., this cable meets ASME code Section 2.18.5.1 Factor of Safety.

8. DEMONSTRATION THAT PUBLIC HEALTH, SAFETY, AND WELFARE WILL BE PROTECTED

Select one of the following statements:

☒ Non-compliance with the rule will not be adverse to the public health, safety or welfare; or

☐ Applicant will undertake alternative actions in lieu of compliance with the rule to ensure that granting of the variance will not be adverse to public health, safety, or welfare. Explain why alternative actions would be adequate *(be specific)*.

Facts demonstrating that the above selected statement is true:

1) The elastomeric coated elevator suspension is designed to conform with ASME A 17. 1, 2010 and ASME A 17.6, 2010 and is ANSI AECO certified to ASME A 17.7, 2007. The A 17.7 ANSI AECO certification was submitted to Mr. John Haines on December 6, 2010. The suspension members and its terminations have a factor of safety equivalent to the factor of safety for the same suspension capacity
as specified in ASME A 17.1, 2007.
2) The 6mm steel governor rope is designed to conform with ASME A 17.1, 2010 and ASME A 17.6-2010 and is ANSI AECO certified to
ASME A17.7, 2007. The A17.7 ANSI AECO certification was submitted to Mr. John Haines on December 6, 2010. The rope has a factor
of safety 29 which is approximately six times the minimum factor of safety of 5 for 9.5mm governor ropes in ASME A 17.1 .. 2007.
*Schindler will provide the tooling and training for State inspectors to conduct the required inspections of equipment.

9. DEMONSTRATION OF UNDUE HARDSHIP OR HISTORICALLY SIGNIFICANT STRUCTURE

Select at least one of the following statements:

☐ Imposition of the rule would result in an undue hardship *(unusual difficulty)* because of physical limitations of the construction site or its utility services.

☐ Imposition of the rule would result in an undue hardship *(unusual difficulty)* because of major operational problems in the use of the building or structure.

☒ Imposition of the rule would result in an undue hardship *(unusual difficulty)* because of excessive costs of additional or altered construction elements.

☐ Imposition of the rule would prevent the preservation of an architecturally or a historically significant part of the building or structure.

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10. STATEMENT OF ACCURACY

I hereby certify under penalty of perjury that the information contained in this application is accurate.

Signature of applicant or person submitting application	Please print name	Date of signature *(month, day, year)*
	Susan Ruhana	
Signature of design professional *(if applicable)*	Please print name	Date of signature *(month, day, year)*

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Signature of applicant	Please print name	Date of signature *(month, day, year)*
	Thomas Dunn	9-14-15

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Schindler Elevator will utilize 6mm steel wire governor rope instead of the required minimum dia. of 9.5mm per Section 2.18.5., this cable meets ASME code Section 2.18.5.1 Factor of Safety.

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Facts demonstrating that the above selected statement is true:

1) The elastomeric coated elevator suspension is designed to conform with ASME A 17. 1, 2010 and ASME A 17.6, 2010 and is ANSI AECO certified to ASME A 17.7, 2007. The A 17.7 ANSI AECO certification was submitted to Mr. John Haines on December 6, 2010. The suspension members and its terminations have a factor of safety equivalent to the factor of safety for the same suspension capacity
as specified in ASME A 17.1, 2007.
2) The 6mm steel governor rope is designed to conform with ASME A 17.1, 2010 and ASME A 17.6-2010 and is ANSI AECO certified to
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*Schindler will provide the tooling and training for State inspectors to conduct the required inspections of equipment.

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☒ Imposition of the rule would result in an undue hardship *(unusual difficulty)* because of excessive costs of additional or altered construction elements.

☐ Imposition of the rule would prevent the preservation of an architecturally or a historically significant part of the building or structure.

Facts demonstrating that the above selected statement is true:

Excessive cost for construction for equivalent equipment using steel ropes suspension and governor ropes covered under A17 1-2007
1) The elastomeric coated elevator suspension, terminations, and its monitoring is designed to conform with ASME A 17. 1, 2010 and ASME A 17.6, 2010 and is ANSI AECO certified to ASME A 17.7, 2007. The A 17.7 ANSI AECO certification was submitted to Mr. John Haines on December 6, 2010 and is updated in this submission. The suspension members and its terminations have a factor of safety equivalent to the factor of safety for the same suspension capacity as specified in ASME A 17.1, 2007.
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	Susan Ruhana	9-18-15
Signature of design professional *(if applicable)*	Please print name	Date of signature *(month, day, year)*

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	Thomas Dunn	9-14-15

Table for Electrical Contractor – Elevator Power System Parameters

SECTION 1: BUILDING POWER SUPPLY		
Parameter	Value	Notes
Utility Building Supply (VAC/phase/Freq)	480 Volts 3 Phase 60 Hz	3 Phase, balanced line to line, 3 wire, no neutral, and Ground to be provided. Voltage fluctuation of building service provided by local utility to be within +/- 10% of the specified voltage.3% maximum phase to phase fluctuation.
Permissible Voltage Drop (%) from building to TSU	3%	Not to exceed 3% under any condition in the feeders within the building from the building service provided by the local utility to the motor control (TSU).
SECTION 2: MOTOR CONTROL XFMR		
Motor Control Transformer ident number	NA	If required. (See Sec. 2 of contractor sheet for details)
Motor Control XFMR power rating (KVA)	NA	
Primary Voltage (Input)	NA	Should be same as building supply voltage
TA XFMR Secondary Voltage (Output)	NA	Should be same as Motor Control Input Voltage
Motor Control XFMR Rated Input Current (Amps)	NA	Maximum capability
Motor Control Transformer Inrush Current (Amps)	NA	Motor Control Transformer In-rush (for 0.1 second)
Motor Control Transformer Output Current (Amps)	NA	Maximum capability
SECTION 3: DISCONNECTS AND PROTECTION DEVICES		
Current consumption by Drive (Amps)	29.00 Amps	Drive – Accelerating (non-continuous) <3.5 Secs
	22.00 Amps	Drive – Running (non-continuous) < 60 Secs
Rated Motor HP	10.5	Rated Motor HP
Current consumption by LDU	1.6 Amps	Control (continuous component of total current)
	3.4 Amps	Control (maximum non-continuous current)
SCCR rating of system	5000 Amps	Maximum RMS Symmetrical Let-Thru current of fuses at mains disconnect cannot exceed this value.
JH Disconnect Switch (Amps)	Sized by GC	To be determined by GC/EC based on input current to downstream device and rules in NEC/CEC or local code.
JH Disconnect Switch Location		See section 2 of contractor sheet for details
Recommended Overcurrent protection (located within mainline disconnect JH) current rating max: (Amps)	20 Amps	Maximum fuse value at mains disconnect (JH). The following must be considered by contractor in selecting fuse type: - Motor Control Transformer Inrush current - I2t curve must not allow fuse to open with current loads identified above. - prospective Short Circuit Fault current at mains disconnect - SCCR of elevator equipment. - Current-limiting fuses are recommended. - Contractor should size wires from xfmr secondary (when applicable), to TSU such that the derated ampacity of the wires exceeds the current output of the xfmr NA. All wiring to be carried out per relevant rules in NEC/CEC or local code.
JH1 Disconnect Switch (Amps)	Sized by GC	See section 2 of contractor sheet for details. Must be unfused. Must be provided with auxiliary contact per schematics.
Hoistway Disconnect switch (JH1) Location	In Hoistway	See section 2 of contractor sheet for details. Must be provided with auxiliary contact per schematics.
Motor Control Input Voltage	480 VAC	Input Voltage to Motor Drive
Required Motor Control protection fuses (in fuse box)	35 Amps	Type – BUSSMANN DFJ, Qty - 3
Required LDU feeder protection fuses in fuse box)	5 Amps	Type – Class CC, Qty – 2, Location – In fuse box.
Recommended LDU Transformer	51516255	See Section 3 of contractor sheet for details
LDU transformer (TAS) Primary Voltage	480 VAC Single Phase	See Section 3 of contractor sheet for details
LDU transformer (TAS) Secondary Voltage	208 VAC	See section 3 of contractor sheet for details
Recommended LDU transformer (TAS) Sec Fuses	8 Amps	Location – In TAS (LDU Xfmr), in hoistway, Qty 2
SECTION 4: HEAT EMISSIONS		
Motor Control transformer heat emissions(Btu/Hr)	NA	Typically not in hoistway
Hoistway Heat Emissions (Btu/Hr)	4620 BTU/hr	Includes LDU, TSU, VFD, Machine and TAS. Does not include the MOTOR CONTROL XFMR

By_____	Approval	Date_____

Table for Electrical Contractor - Physical Wiring & Conduit Limitations

Parameter Description	Motor Control (TSU)	Inspection & Test Panel (LDU))	unit
	value	value	
JH Aux1,2 wire size	------	18	AWG
Terminal Temperature Rating	60	60	Deg C
Power Input Min AWG *	20	14	AWG
Power Input Max AWG *	4	4	AWG
Equip Ground Conductor Min AWG *	14	26	AWG
Equip Ground Conductor Max AWG *	4	12	AWG
Minimum Input Power Conduit KO trade size	1.00	0.5	inches

- Physical size only. No consideration made for electrical requirements.

Notes:

a. To minimize harmonic distortion interference with other equipment, dedicated transformers and feeders shall be provided for elevator use only.
b. Electrical contractor to supply feeders and ground of copper conductors, and circuit protective devices from the building service to our Motor Control (TSU) and Test and Inspection panel (LDU) in compliance with local code requirements. All three legs of the 3-phase feeder must be hot with respect to ground. Center-tap grounded leg configuration (a.k.a. wild leg) is not supported.
c. The permissible voltage drop for elevator feeders shall not exceed 3% from the service within the building delivered to our motor controller supply terminals. Feeders are to be sized by the electrical contractor to ensure this requirement.
d. Schindler does not size feeder wires. All calculations for feeder sizes and insulation type are to be performed by electrical contractor.
e. Fusebox, Motor control transformer and test and Inspection panel transformer when required will be supplied by Schindler. All Wiring up to LDU and TSU to be provided by GC.
f. The continuous load due to the Control is taken from two phases of the input and will result in an unbalanced load on the line.
g. Contractor should size wires from XFMR to secondary (when applicable) to the TSU such that the derated ampacity of the wires can withstand the current output of the XFMR NA. All wiring to be carried out per relevant rules in NEC/CEC or local code.
h. The JH and JH1 disconnects each require one auxiliary contact per car to prevent unintended initiation of the automatic evacuation feature. This auxiliary contact in each disconnect a) must open when the disconnect is in the "OFF" state and b) must be wired by the Electrical Contractor in series with each other, and c) must terminate in the Inspection & Test Panel (LDU). Auxiliary contact within JH & JH1 are to be rated for the following: 24Volts DC, 2000 milliamperes (Max), 135 milliamperes (Min) non-inductive.

09/02/2015
Schindler Elevator Corporation
3300 Elevator Power Data

Grace College 2016 Hall
200 Seminary Dr
Winona Lake, IN 46590

Neg#: 716063
Unit(s): 01
Product Code: 450
Sales Office: 1810
Installing Office: 1812

GO#: J6736
Capacity: 3000 lbs
Speed: 150 fpm
Travel: 32 ft. 6 in.

Detailed Sheet for Electrical Contractor

REQUIREMENT	CONTRACTOR- SPECIFICATIONS, RECOMMENDATIONS AND DATA. Refer to the layout drawings for placement and maximum size of electrical boxes.
ABBREVIATIONS/ACRONYMS	**Please read the following acronyms. These acronyms will be used in this document for simplicity. Refer back to this list if necessary to understand what any acronym used in this document means.** BTU – British Thermal Units CEC – Canadian Electric Code (Check to see eqiv) JH – Mainline Disconnect JH1 – Hoistway Auxiliary Disconnect JHS – Inspection and Test Panel Switch KVA – Kilo Volt Amperes LDU – Inspection and Test Panel NEC – National Electric Code (NFPA 70) NA – Not Applicable OCPD – Over Current Protection Device (ie. Fuse) SCCR – Short Circuit Current Rating TA – 3 Phase Autotransformer TSU – Motor Control TAS – Test and Inspection panel Autotransformer VAC – Volts AC VFD – Variable Frequency Drive XFMR – Transformer
1. POWER DISTRIBUTION REQUIREMENTS OVERVIEW	Elevator system consists of two loads that require appropriately sized equipment and feeders: 1. Motor Control (TSU) located at the top of the Hoistway 2. Inspection & Test Panel (LDU) located within the door jamb at floor 4. Building shall supply and install the following equipment (and wiring/conduit) per requirements identified elsewhere within this document: In Machinery Space outside Hoistway: 1. Fusible main line disconnect (JH) with auxiliary contact & shunt trip, for elevator system 2. Overcurrent protective devices within Motor Control Autotransformer when applicable 3. Disconnecting means (JHL) for auxiliary power and car lighting 4. Overcurrent protective devices within main line disconnect (JH). 5. Ground Fault Protection, as required per NEC 620-61 6. Disconnecting means for top of hoistway machinery space 7. Disconnecitng means for hoistway pit lighting In Machinery space at top of hoistway 8. Non-fusible disconnect (JH1) with auxiliary contact, for motor control

	Schindler will supply and building shall install the following equipment (and wiring/conduit) per requirements identified elsewhere within this document: In Machinery space outside hoistway: 9. Motor Control Autotransformer as required In Machinery Space at top of hoistway: 10. Inspection and Test Panel Autotransformer (TAS) as required 11. Fuse box and Overcurrent protective devices within Fuse Box
AVAILABLE MAINLINE VOLTAGE	**Per site survey, the available mainline voltage is 480 VAC, 3-Phase, 60Hz.**

2. MAIN POWER SOURCE FOR **MOTOR CONTROL**	480 Volts, 3 Phase, 60 Hertz. 22.00 Amperes RMS; Due to nature of operation, input current to motor control shall be considered to be non-continuous unless prohibited by local codes.
SUPPLY CHARACTERISTICS	3 Phase , balanced line to line, 3 wire, no neutral, and ground wire to be provided. Voltage fluctuation of building service provided by local utility to be within +/- 10% of the specified voltage. 3% maximum phase to phase fluctuation. One supply feeder per motor control.
VOLTAGE TOLERANCE	1. Voltage fluctuation of the building service provided by the local utility shall be within ±10% of the specified Motor Control supply voltage. 2. Maximum phase-to-phase voltage imbalance shall be ±3%.
PERMISSIBLE VOLTAGE DROP	Not to exceed 3% under any condition in the feeders within the building from the building service provided by the local utility to the motor control (TSU). Feeders are to be sized by electrical contractor to ensure this requirement.
MOTOR CONTROL PARAMETERS	Motor Control Input Current: 1. At constant speed: 22.00 Amperes RMS 2. While accelerating: 29.00 Amperes RMS for maximum duration of 3.5 sec. 3. Maximum run time (Constant speed): 40 seconds 4. Input Voltage: NA 5. Required Motor Control protection fuses (within fuse box) If the required motor control supply voltage is not available from the building, an autotransformer with a secondary output voltage & output current capability meeting the requirements below shall be provided.
MOTOR CONTROL POWER FEEDERS	Building shall supply and install properly sized feeders, ground, and conduit, from: 1. the building mains service to the elevator main disconnect (JH) 2a. the elevator main disconnect (JH) to the MOTOR CONTROL XMFR (if installed) -or- 2b. elevator main disconnect (JH) to the Hoistway Auxiliary disconnect (JH1) If MOTOR CONTROL XFMR is not installed 6. JH1 disconnect to the fuse box. 7. fuse box to the motor control (TSU). The TSU unit is wired to the VFD (Drive) TSU requirements are as follows: 1. The TSU terminal temperature rating is 60 deg C.

	2. All TSU wiring terminals are rated for use with copper only. 3. The minimum power input wire at the TSU is 20 AWG. 4. The maximum power input wire at the TSU is 4 AWG. 5. The minimum equipment grounding conductor at the TSU is 14 AWG. 6. The maximum equipment grounding conductor at the TSU is 4 AWG. 7. The conduit knockout trade size at the TSU is 1.00 inches. Please note: Schindler does not size feeder wires. All calculations for feeder sizes and insulation type are to be performed by electrical contractor. Contractor should size wires from xfmr secondary (when applicable) to the TSU such that the derated ampacity of the wires can withstand the current output of the xfmr NA. All wiring to be carried out per relevant rules in NEC/CEC or local code.
MAIN AND MOTOR CONTROL: DISCONNECTING MEANS & OVERCURRENT PROTECTION	1. The main elevator system disconnect (JH) shall be a lockable fusible three-pole device and shall be located outside the hoistway, in a common location with the (JHL) disconnecting means for auxiliary power and lighting. (see "AUXILIARY POWER SOURCE FOR CAR LIGHTS & FAN" for JHL requirements; also see job layout drawings). The JH and JHL disconnects shall be located in a key lockable electrical enclosure or electric utility closet, reserved exclusively for the elevator equipment, preferably at the landing floor 4 per NEC 620-51 or per local requirements. For optimal space usage, disconnects from elevators in the same group/bank may be grouped together in a single enclosure/utility closet 2. An additional three-pole non-fused disconnect (JH1) shall be located within the hoistway, within sight of the motor control (TSU/VFD). See job layout drawings for additional details. 3. A fuse box shall be located within the hoistway, within sight of the motor control (TSU) and Drive (VFD). See job layout drawings for additional details. This fuse box shall contain the following A. 3 Pole class J fuse block and required DFJ fuses 35 for drive protection B. 2 Pole class CC fuse block and required class CC fuses 5A, to protect wiring to test and inspection panel (LDU) or test and inspection panel autotransformer (TAS). NOTE: The 3 drive protection fuses in the fuse box are intended to protect the drive against damage in the event of a drive component failure. They are not intended to function as overcurrent protective fuses for the system wiring.
	JH and JH1 disconnects each require provisions to be locked out and tagged out by a qualified elevator service technician, in order to perform maintenance and or repair. (Provisions for locking or adding a lock to the disconnecting means shall be installed and remain in place with or without the lock installed.) . The Electrical contractor should supply a lockable disconnect per NEC 620-51(a), (b), and NEC 620-62, with appropriate signage per NEC 620-51(c), (d), and NEC 620-52(a), (b), and (c). The JH and JH1 disconnects each require one auxiliary contact per car to prevent unintended initiation of the automatic evacuation feature. This auxiliary contact in each disconnect a) must open when the disconnect is in the "OFF" state and b) must be wired by the Electrical Contractor in series with each other, and c) must terminate in the Inspection & Test Panel (LDU). Auxiliary contact within JH & JH1 are to be rated for the following:

	24 Volts DC 2000 milliamperes (Max) 135 milliamperes (Min) Auxiliary contact wiring terminals shall be suitable for use with 18 AWG copper conductors. Each JH and JH1 disconnect must be clearly marked with the designation of the elevator for which it serves. Recommended Overcurrent protection (within JH) current rating max: 20 Amps (based on xfmr nameplate). This is the recommended overcurrent protection device (OCPD) size. Schindler does not size the main OCPD or disconnects and this is to be carried out by the electrical contractor. Schindler recommends the use of fuses for overcurrent protection. Required Drive Protection (within fuse box): In addition to the OCPD required within JH, additional drive /.semiconductor fuses are required to protect the motor control. These three Class-J fuses are to be located within the fuse box . The required DFJ Class J fuses that meet the SCCR and let-through requirements of the TSU, as well as the fuse box for the system, are as follows: Required Fuse: Bussmann DFJ 35 ampere, Qty 3 Additional requirements for JH and JH1 disconnects (common unless otherwise specified): 1. SCCR rating of the motor control (TSU) is 5000 Amps 2. If a sprinkler system is installed in the hoistway or on the 4th floor: The building shall provide shunt trip activation of the main elevator disconnect (JH) triggered by contacts of the building heat detectors which provides independent disconnection of electrical power to both machine/motor control and Inspection & Test Panel prior to sprinkler activation as required per ASME A17.1 2.8.2.3 and/or local jurisdictions. This function is not part of the elevator control or any other equipment provided by Schindler Elevator Corp. 3. JH and JH1 disconnect shall be NEMA 1 rated or greater.
	In addition to the JH and JH1 disconnects, a fuse box shall be provided by SEC (Schindler) and be wired by the building. The short circuit current rating (SCCR) of the LDU and TSU that is supplied by the disconnects and the fuse box is 5000 Amperes 4. Fuse Box shall be Nema 1 Rated and CSA or UL certified/listed 5. Electrical contractor to supply motor-feeder/motor-branch short circuit protection as required per NEC 620-61 (c) and (d)

3. POWER SOURCE FOR **INSPECTION AND TEST PANEL (LDU)**	208V, 1 phase, 60 Hz., ± 10% 1.6 Amps continuous + 1.8 Amps Non-continuous.

INSPECTION & TEST PANEL AUTOTRANSFORMER (as required)	For installations where 208VAC is unavailable, an autotransformer with a dedicated secondary for the Inspection & Test Panel (LDU) per the following specifications shall be supplied and installed by the building: • Power Rating : 1KVA or larger • Primary voltage: 480 VAC Single Phase • Secondary Phases: Single (line-line) • Output Neutral: none • Secondary voltage : 208 VAC • Secondary output current, continuous portion: 1.6 Amperes RMS • Secondary output current, non-continuous portion: 1.8 Amperes RMS • Frequency 60Hz • Primary fusing: as required per applicable code. Recommended fuse 5 amps per table 3 (In Fuse Box). • Secondary tap fusing: as required per applicable code and per design. Recommended fuse 8 amps per table 3. If the Inspection & Test Panel (LDU) autotransformer (TAS) is required: 1. Its primary shall be connected to the output of the two pole fuse block in the fuse box and shall be protected with two class CC current limiting fuses whose max rating shall not be greater than 5 AMPS 2. It was determined that the secondary shall be protected with two class CC current limiting fuses whose rating shall not be greater than 8 AMPS and shall be connected to the JHS circuit breaker input in the LDU. The fuses to protect the secondary will reside in a class CC fuse block in the autotransformer casing which will be provided as part of the autotransformer assembly if supplied by Schindler.
SUPPLY CHARACTERISTICS	208VAC line to line. One supply per Inspection & Test Panel (LDU).
VOLTAGE TOLERANCE	1. Voltage fluctuation provided to the Inspection & Test Panel (LDU) shall be within ±10% of the specified Inspection & Test Panel (LDU) supply voltage. 2. Maximum phase-to-phase voltage imbalance shall be ±3%.
INSPECTION & TEST PANEL FEEDERS	Building shall supply and install properly sized feeders, ground, and conduit, from: 1. The building mains service to the elevator main disconnect (JH) 2. The elevator main disconnect (JH) to the hoistway motor control disconnect (JH1) and then from the JH1 disconnect to the fuse box . 3a. Fuse box to the Inspection & Test Panel autotransformer primary (if required and installed), and from the Inspection & Test Panel autotransformer secondary to the Inspection & Test Panel breaker (JHS) in the LDU -or- 3b. Fuse box to to the Inspection & Test Panel breaker (JHS) in the LDU if autotransformer is not required/installed. The LDU wiring requirements are as follows:

	1. The LDU terminal temperature rating is 60 deg C. 2. All LDU wiring terminals are rated for use with copper only. 3. The minimum power input wire at the LDU is 14 AWG. 4. The maximum power input wire at the LDU is 4 AWG. 5. The minimum equipment grounding conductor at the LDU is 26 AWG. 6. The maximum equipment grounding conductor at the LDU is 12 AWG. 7. The conduit knockout trade size at the LDU is 0.5 inches. Please note: Schindler does not size feeder wires. All calculations for feeder sizes and insulation type are to be performed by the electrical contractor.

4. AUXILIARY POWER SOURCE FOR CAR LIGHTS & FAN (CAR LIGHTING)	120 Volts, 1 Phase, 60 Hertz, 15 Amps. One Supply per Car Controller for Car Lights, Fan and Receptacle per NEC 620-22. A lockable disconnect (JHL) is required per NEC 620-53. A single pole Circuit Breaker or fused disconnect is required (per car). The JHL disconnect shall be located outside the hoistway, in a common location with the (JH) Main elevator System disconnect. (see "MAIN AND MOTOR CONTROL: DISCONNECTING MEANS" for JH requirements; also see job layout drawings). The JHL and JH disconnects shall be located in a key-lockable electrical enclosure or electric utility closet, reserved exclusively for the elevator equipment, preferably at the landing floor 4 per NEC 620-51 or per local requirements. For optimal space usage, disconnects from elevators in the same group / bank may be grouped together in a single enclosure or utility closet. Each JHL disconnect must be NEMA1-rated. The Electrical Contractor shall supply the feeder and ground wire in a conduit from the JHL disconnect to the Inspection & Test Panel (LDU). The following are the requirements of the feeder and conduit: Maximum Feeder Gauge Size: 14AWG Conduit Size: 3/4" Provisions must be made for automatically providing power to this circuit from the building auxiliary (emergency) power generator.

5. CONVENIENCE FEATURES	Lighting, light switch and duplex convenience outlet(s) in each elevator pit, at each Inspection & Test Panel (LDU), and within each motor control (TSU) space are to be provided by the Electrical Contractor per NEC620.22 thru 620.25. Each 125-volt, single-phase, 20-ampere receptacle must be of the ground-fault circuit-interrupt (GFCI) type per NEC 620-85. The permanent lighting fixture that is provided in the pit shall provide an illumination of not less than 100 lux at the pit floor and at the pit platform, when provided. The light bulb(s) shall be externally guarded to prevent contact and accidental breakage. The light switch shall be so located as to be accessible from the pit access door.

	ANSI A17.1 rule # 2.7.9.1 and rule # 2.7.6.5.2 require the permanent illumination for the TSU and LDU spaces to be a minimum of 200 lux at floor level or working platform level. • The light switch for the working platform level about the TSU/VFD in the hoistway shall be within easy reach of the access to the hoistway. • A switch placed inside or close to the enclosure for the LDU shall control lighting of the enclosure. Where practicable, locate the light control switch on the lock-jamb side of the access door to the LDU. • Disconnecting means for top of hoistway machinery space and for hoistway pit lighting to be provided by building.
HOISTWAY WIRING	For all wiring in the hoistway, flexible cords and cables that are components of approved elevator equipment shall be supported and protected from physical damage by routing within appropriate conduit.
HEATING AND COOLING FOR INSPECTION & TEST PANEL (LDU) & MOTOR CONTROL (TSU)	The ambient temperature at the LDU and TSU must be maintained between 32 and 104 degrees Fahrenheit (0 to 40 Celsius). • Heating and/or cooling may be required to maintain the required temperatures. • Acceptable humidity level shall be maintained at 95% or less non-condensing. For sizing any required heating and/or cooling equipment: • The heat emission for the Inspection & Test Panel (LDU) is 600 BTU/Hour with normal load cycle conditions. • The heat emission for the hoistway equipment is 4620 BTU/Hour with normal load cycle conditions. • The heat emission for the motor control XFMR is NA with normal load cycle conditions.
UTILIZATION EQUIPMENT POWER SOURCE	Additional branch circuits, other than the lighting feed, shall be provided to supply other equipment such as displays, intercoms, TVs, etc., as required per NEC 620.25 and 620.55 and CEC 38-025.
POWER SOURCE FOR EARTHQUAKE SENSOR	If an earthquake sensor (Seismic Switch) is required for the installation per Seismic Zone 2 or 3 requirements, an additional single phase 120VAC branch circuit, in addition to the car lighting feed, shall be provided by the building and routed in appropriate conduits to power the sensor.
SMOKE DETECTOR NOTES	Smoke Detectors required for firefighters service ASME A17.1-2000 2.27.3.2 (ASME Rule 211.3b) shall provide normally closed contacts rated for application of 24Vdc at 10mA resistive for each smoke detector that opens upon activation. The following Smoke Detector outputs are required to be supplied to the LDU: • Main Floor Smoke Detector • Landing Floor Smoke Detectors (All but main floor) • Machinery Space (Hoistway) Smoke Detector: Where the hoistway contains the motor controller or is equipped with sprinklers, a smoke detector shall also be located in the hoistway in the machinery space. In jurisdictions adopting A17.1-2010, this smoke detector is always required.
POWER SUPPLY FOR INSTALLATION (Optional if Power Hoist is used)	A temporary power supply is required per group of elevators for installation work. • 220 V, 1 phase, 50/60 Hz, 20 Amp power supply, GFCI protected. • A Time-Delay fuse is recommended for over current protection.
EMERGENCY POWER (Option)	1. An emergency generator is to be provided that has the same voltage characteristics as the normal power supply, and has the capacity to delivery sufficient power to the main disconnect switches for the elevator for operating the specified number of elevators, used during the emergency at full speed and full load.

	• Transformer in-rush current (typically) may have significant impact to the generator performance when the power is restored after a loss of power on the elevator feeder. • For emergency generator selection, during operation the mains current for each operating elevator ramps up to 29.00 amps within 0.25 seconds and then decreases to less than 22.00 amps after 3.5 seconds. 2. Automatic transfer switch, or switches, is (are) to be provided for transferring from the normal to the emergency power source and back. 3. Emergency power operation signals – The following separate indicating signals will be required from the automatic transfer switch to the RCC in the control space for each group of elevators 3.1. One dry contact ("RNO") to close on emergency power and open on normal power. Rated for application of 24Vdc 2000 mA resistive. Provide two #18 AWG stranded copper wires. 3.2. One normally open dry contact ("RNOPRW") rated for application of 24Vdc at 2000 mA resistive to close 30 to 60 seconds prior to a) transfer onto emergency power or b) back to normal power. This is to prevent transfer of power while an elevator is moving, which can occur during return to normal power or on an operating test. Provide two #18 AWG stranded copper. It is required that the car lighting and remote lobby monitoring/communications equipment be arranged to operate from the emergency power supply in accordance with the applicable building code. It is required that the emergency indicator or panel be installed within sight of the elevators to enable emergency personnel to view the elevators and the panel/indicator at the same time.
By _____	Date Time_____