TRANSTECTOR®
an INFINITE brand

Series 700 A/V-S Power Conditioner

Designed for the Halcyon

Input Voltages: 208V, 220V, 240V, 480V or 600 VAC (60 Hz) Output Voltages: 480/277 VAC

- Integrated Input and Output Breakers (1 input breaker - 1 output breaker)
- Intelligent Voltage Regulation (+/- 2.5% Output)
- Internal Bypass Switch
- Triple Shielded Isolation Transformer
- Internal TVSS
- User-Friendly LED Monitor Panel
- Front Access “Zero Clearance” Cabinet

Submittal Package with Specifications

30kVA (60k(i)) Power Conditioner with Voltage Regulation (60 Hz)

TRANSTECTOR SERIES 700 A/V-S
Specifications for 60K(i) Power Conditioner with Voltage Regulator (60Hz)

1.0 SCOPE

This specification covers the electrical characteristics of the Transtector Power Conditioner which provides clean regulated power for Varian Accelerators.

2.0 GENERAL

The Power Line Conditioner consists of a front access power cabinet incorporating an all copper, multiple tapped, triple shield isolation/regulation transformer. The ultra-low output impedance of the transformer in conjunction with the electrostatic shields assures precision hospital grade performance with excellent noise and transient attenuation. Independently controlled inverse parallel electronic switches for each of the 7 taps per phase provide tight regulation over a wide input range. Linear devices are used for line synchronization to prevent phase shift errors normally associated with simple CT zero current crossing acquisition. The microprocessor control accurately selects the correct tap to provide line voltage regulation of +/- 2.5% typical, correcting for voltage disturbances within one cycle. Digital processing technique provides fast and accurate regulation without output voltage over or undershoots.

2.01 MODEL NUMBERS

MODEL	INPUT VOLTAGE	OUTPUT VOLTAGES
Standard models		
8BNX-60K(I)-700A/V-S	208 VAC nominal input	480/277 VAC output
8INX-60K(I)-700A/V-S	220 VAC nominal input	480/277 VAC output
8CNX-60K(I)-700A/V-S	240 VAC nominal input	480/277 VAC output
8DNX-60K(I)-700A/V-S	480 VAC nominal input	480/277 VAC output
8ENX-60K(I)-700A/V-S-C	600 VAC nominal input	480/277 VAC output

2.1 AGENCIES

2.1.1 STANDARDS
The systems shall be designed in accordance with:

- American National Standards Institute
- Institute of Electrical and Electronic Engineers
- National Electric Code (NEC)
- National Fire Protection Association (NFPA Article 70)
- Underwriters Laboratories (UL) 1449, 1012
- FCC Article 15, Section J, Class A
- ISO 9001:2008

2.1.2 LISTINGS

- CUL listed to CSA-C22.2 No. 107.1
- The system shall be listed to UL standard UL1012
- The system shall comply to: FCC Article 15, Section J, Class A and ANSI C62.14 (electromagnetic compatibility)
- The TVSS shall be UL 1449 4th Edition listed/recognized

3.0 DYNAMIC ELECTRICAL CHARACTERISTICS

3.1 OPERATING VOLTAGE AND OUTPUTS

The input voltage shall be 208 VAC, 220 VAC, 240 VAC, 480 VAC or 600 VAC Delta, three phase, 60Hz.

The standard transformer design shall be capable of accepting three (3) input voltages, 208 VAC, 240 VAC or 480 VAC. Each unit will be pre-wired at the factory to accommodate the selected nominal input voltage. The input voltage and input breaker can be changed in the field to accommodate an alternative input voltage.

3.2 LINE VOLTAGE REGULATION
Useable Input Voltage +15% to -23%
Nominal Input Line Voltage +10% to –20%

3.2.1 Output Line Voltage Regulation is typically ±2.5%

3.3 OUTPUT VOLTAGE
The output voltage shall be 480/277 VAC, 3 phase 4 wire, in a WYE configuration.

3.4 OUTPUT CONNECTIONS
A 60 Amp three (3) pole circuit breaker is provided for the 480/277 VAC output.

3.5 INPUT/OUTPUT WIRING
The input/output wiring sizes are dependent upon the terminals provided by the circuit breakers. Input wiring sizes:

208 VAC through 600 VAC	#14 AWG to #3/0 AWG

Output wiring sizes:

480/277 VAC 60 Amp breaker	#14 AWG to #3/0 AWG

The ILSCO TA-2/0 terminal allows wire sizes from #14 to 2/0 AWG to be connected to the ground.

3.6 RESPONSE TIME
Response time is less than 1/2 cycle.

3.7 CORRECTION TIME
The output voltage is corrected within 1 cycle.

3.8 LOAD REGULATION
The output is maintained to within 2.5% of nominal or less, from no load to full load.

3.9 IMPEDANCE
Output impedance shall be less than 2.5%.

3.10 OPERATING FREQUENCY
60 Hertz +/- 3 Hertz or 50 Hertz +/- 3 Hertz.

3.11 HARMONIC DISTORTION
Less than 1% THD added to the output waveform under any dynamic linear loading conditions presented to the line regulator.

3.12 TURN-ON CHARACTERISTICS
When energized the voltage overshoot is 5% or less of the nominal voltage for less than 1 cycle.

3.13 OVERLOAD RATING
200% for ten seconds.
1000% for one cycle.

3.14 NOISE ATTENUATION
Common mode noise attenuation is typically 140 dB or greater.
Transverse mode noise attenuation is 3 dB down at 1000 Hertz, 40 dB down per decade to below 50 dB with a resistive load.

3.15 AUDIBLE NOISE
Not to exceed 55dB measured @1 meter.

3.16 EFFICIENCY
Efficiency shall be > 96% typical at full load. Excitation losses shall be less than 1.5% of KVA rating.

3.17 BTU
The Power Line Conditioner shall generate no more than 3,090 BTU/Hour in typical use.

3.18 POWER FACTOR
Input power factor shall be greater than .95 with a resistive load and reflect no triplen harmonics to the utility under non-linear loads.

3.19 LINE TO LINE BALANCE
The Power Line Conditioner shall maintain the phase to phase imbalance under 2.5%.

3.20 MTBF
The system shall exhibit a MTBF > 10,000Hr.

3.21 ENHANCED TRANSIENT OVER VOLTAGE SURGE SUPPRESSION

For 480V outputs an enhanced surge protection device (SPD) shall be installed parallel to the secondary output of the power line conditioner to provide all mode, bi-directional and bi-polar surge protection. The SPD is rated for 100 Ka per phase, all mode protection. (L-L, L-N, L-G, N-G) The suppression network systems shall be UL recognized/listed and conform to UL 1449 ratings when subjected to ANSI/ IEEE 62.41-1991 category C1/B3 waveforms. The surge suppressor is installed on the load side of the transformer, connected in parallel.

4.0 MAIN TRANSFORMER

4.1 BASIC CONSTRUCTION
The transformer windings are of all copper conductor construction with separate primary and secondary isolated windings.

4.2 MAGNETIC
Fully processed, low carbon, silicon-iron transformer steel shall be utilized to minimize losses and provide high efficiency. Flux density shall not exceed 14k gauss.

4.3 INSULATION
Class N (200° C) insulation is utilized throughout.

4.4 SHIELDING
The transformer has multiple (three) copper shields to minimize inner winding capacitance, transient and noise coupling between primary and secondary windings. Inner winding capacitance is limited to .001 pf or less.

4.5 COOLING
The transformer is designed for natural convection cooling. Fans are inside the unit.

4.6 OPERATING TEMPERATURE
The system operating range: 0 to 40 degrees C, 32 to 104 degrees F.

4.7 OPERATING HUMIDITY
0-95% relative humidity, non-condensing.

4.8 ALTITUDE
The system will operate within project specifications at installations up to 3000 meters above sea level.

5.0 MAIN INPUT BREAKER

A main input molded case, thermal magnetic circuit breaker, rated at 125 % of the full load input current, is furnished as an integral part of the unit. For example, an 110 Amp input breaker will be provided for 208 VAC and 220 VAC inputs, a 100 Amp breaker will be provided for a 240 VAC input, or a 60 Amp input breaker will be provided for 480 VAC input. A 40 Amp input breaker will be provided for 600 VAC input.

6.0 BY-PASS SWITCH

A manually operated rotary bypass switch provides bypassing of the SCR controlled voltage regulator portion of the Power Line Conditioner. The Power Line Conditioner can be operated in either the on-line or bypassed mode with one turn of the switch. The transformer and surge suppression circuitry remains in the circuit when in the bypass mode. The output will remain at 480/277 VAC, three (3) phase 4 wire WYE. The bypass switch is located on the front of the unit.

7.0 MONITORING

7.1 ALERT LIGHT
An indicator light shall annunciate that the output has been disabled by one of the following conditions.
(1) Transformer over-temperature.
(2) SCR thermal over-temperature.

7.2 INDICATING LAMPS
Output “ON” indicating lamps shall provided for each phase.

8.0 CABINET

8.1 TERMINATION
Input and output terminations shall be front access. Input terminations shall be made directly to the main input circuit breaker and the input ground terminal provided. Output terminations shall be made directly to the output circuit breaker and neutral & ground copper bus provided.

The unit is constructed using an isolation transformer and is considered to be a “separately derived system”. It should be grounded in accordance with the NFPA 70 article 250.20 “Alternating-Current Circuits and Systems to be Grounded”, article 250.20 (D) “Separately Derived Systems” and article 250.30 “Grounding Separately Derived Alternating-Current Systems”.

The Output Neutral and Ground is bonded at the output of the transformer and is considered a single, separately derived, power source and should be wired accordingly.

8.2 VENTILATION
Ventilation originates from the front of the cabinet, exiting through the top.

8.3 MOBILITY
The Power Line Conditioner cabinets are equipped with angle iron supports that allow for transport by pallet jack or fork lift. These can be used for mounting unit to the floor in seismic zones.

8.4 ACCESSIBILITY
The Power Line Conditioner cabinets will allow for front access to the status lights, input circuit breaker, output circuit breaker, all wiring terminations, serviceable parts, and bypass switch. No side or rear access shall be required for system installation, operation or service. The power conditioner will also incorporate lift off side panels.

8.5 WEIGHT
Unit weight: Approximately 403.6972kg (890 lbs).

8.6 DIMENSIONS
736.6 mm x 609.6 mm x 1498.6 mm (29” x 24” x 59”)

9.0 CONTROLS

The control portion of the cabinet containing the circuit boards and connection to the semi-conductor devices is separate from the transformer section and apart from the input and output power connections.

10.0 WARRANTY

All units are provided with a standard one (1) year parts and workmanship warranty, beginning from date of shipment. In geographic areas covered, during the first year, the warranty will cover parts and workmanship, inclusive of on-site labor and travel expenses. Consult factory for details.

11.0 SERVICE

Transtector shall provide immediate phone support/consultation and if possible, same day parts shipment. (contact must be prior to 12:00 PM PST). Typical service hours are 8 AM to 5 PM PST Monday through Friday.

12.0 CONTACT

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Hayden Lake ID 83835	

INPUT AND OUTPUT BREAKER SIZE

OUTPUT KVA CONTINUOUS	INPUT BREAKER SIZE	OUTPUT BREAKER SIZE
30 kVA (60kVA Intermittent)	110A @ 208V, 220VAC 100A @ 240V 60A @ 480V 40A @ 600V	60A, 3P @ 480V

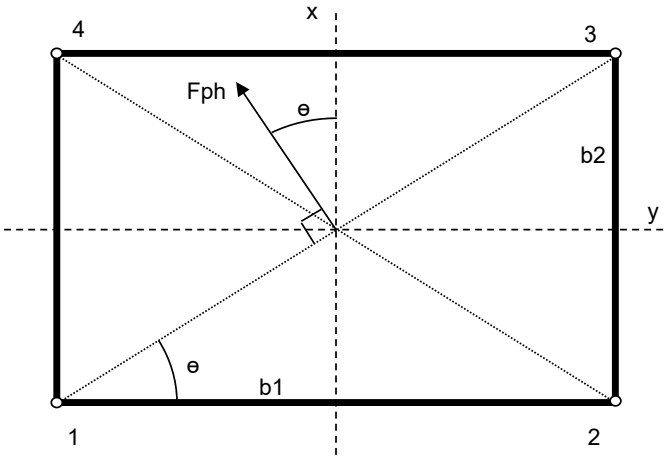
WEIGHTS, BTU AND DIMENSIONS

OUTPUT KVA	WEIGHT	OPERATIONAL BTU/HR TYPICAL	MAXIMUM BTU/HR	DIMENSIONS
60 k(i)	403.6972kg (890 lbs)	1,545*	3,090	736.6mm x 609.6mm x 1498.6mm 29” x 24” x 59” inches

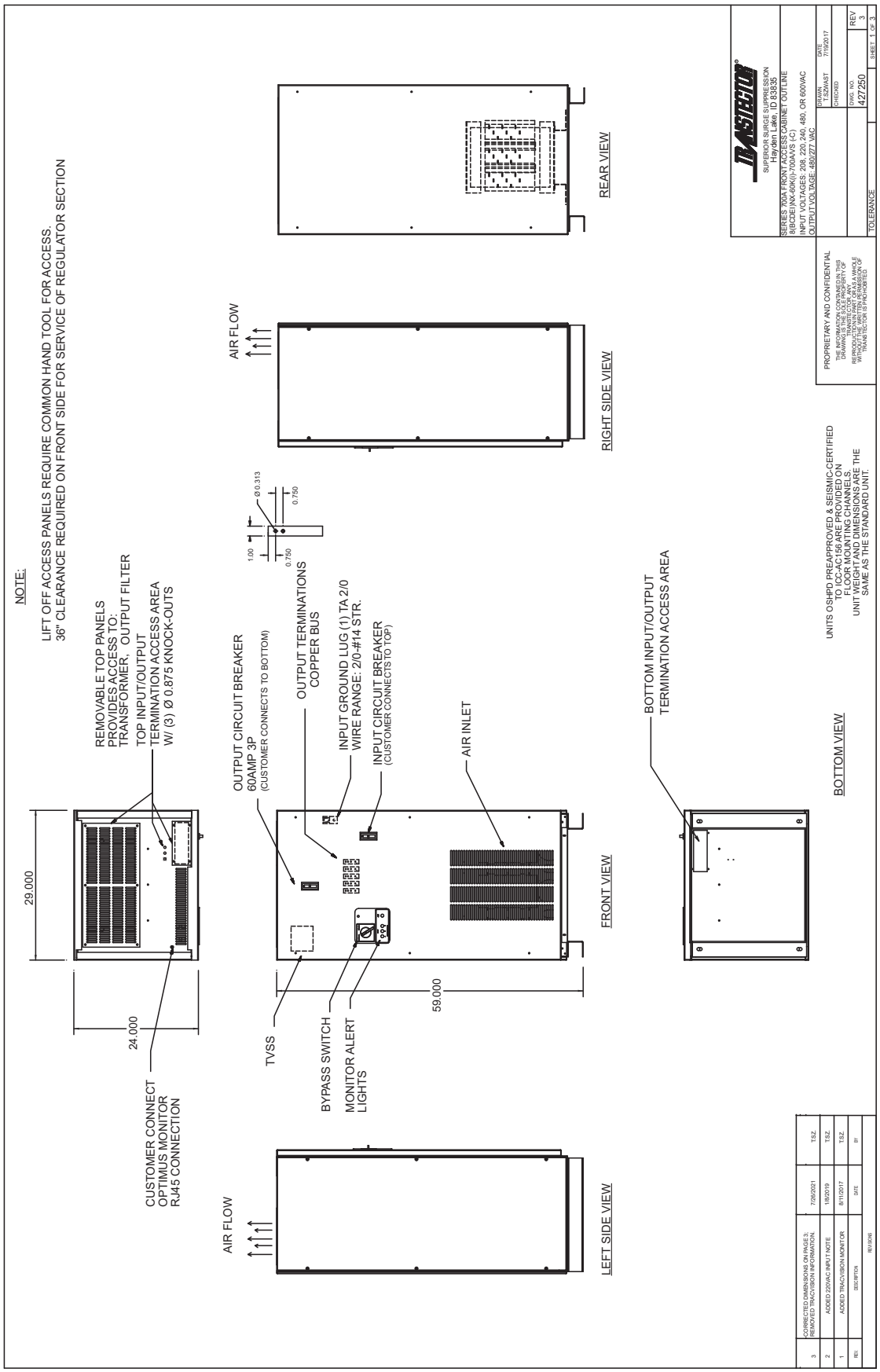
* Stated BTU’s / Hr is at 30KVA rated load, 100% duty cycle. Operational BTU’s / Hr is typically at 50% of rated load. Input over current protection provided by others.

SEISMIC CALCULATIONS

W_p	890	Weight of Unit
a_p	1.00	Component Amplification Factor (ASCE 7-10 Table 13.6-1)
R_p	2.50	Component Response Modification Factor (ASCE 7-10 Table 13.6-1)
S_s	2.35	Seismic Spectra Response (ASCE 7-10)
F_a	1.00	Site Coefficient - Site Class D (ASCE 7-10 Table 11.4-1)
I_p	1.50	Component Importance Factor (ASCE 7-10 Section 13.1.3)
z	1.00	Component Attachment Elevation with respect to grade (ASCE 7-10 Eq. 13.3-1)
h	1.00	Structure Roof Elevation with respect to grade (ASCE 7-10 Eq. 13.3-1)
S_{DS}	1.57	Design spectra response acceleration (ASCE 7-10 Section 11.4.4)
$F_{ph\ (calc.)}$	1004	Calculated seismic Horizontal Force (ASCE 7-10 Eq. 13.3-1)
$F_{ph\ (min.)}$	627	Minimum seismic Horizontal Force (ASCE 7-10 Eq. 13.3-3)
$F_{ph\ (max.)}$	3346	Maximum seismic Horizontal Force (ASCE 7-10 Eq. 13.3-2)
$F_{ph(a)}$	717	Allowable Hoizontal Force (ACI 318 sec. D.4.4)
$F_{pv(a)}$	279	Allowable Vertical Force (ASCE 7-10 Section 13.3.1)
Seismic Force Ratio	0.81	= $F_{ph(a)}$ / W_p
b1	24.75	Maximum length (between anchors)
b2	19.25	Maximum width (between anchors)
h	25.50	C.G. height
N	4	Number of anchors
Spacing Req'd Min	19.25	Minimum distance between any two anchors
Req'd Edge Distance	6.50	Minimum distance from anchor to concrete pad edge
*Tbolt (max. allow)	1225	Max allowable tension force per anchor
*Vbolt (max. allow)	1710	Max allowable shear force per anchor
Concrete Comp. Strength	2000	Minimum PSI
n	1	Number of anchors per location
Anch. Dia.	1/2	
Anch. Embedment	2 1/2	
I_{xx}	613	Moment of inertia x-axis
I_{yy}	371	Moment of inertia y-axis
theta(deg)	37.87	Angle between applied force (at c.g.) and x-axis
P_t	-449	Net uplift load on Anchor 2
P_c	894	Net compressive load on Anchor 4
P_s	179	Maximum shear per location
Unity	1.18	U ≤ 1.2



CABINET OUTLINE



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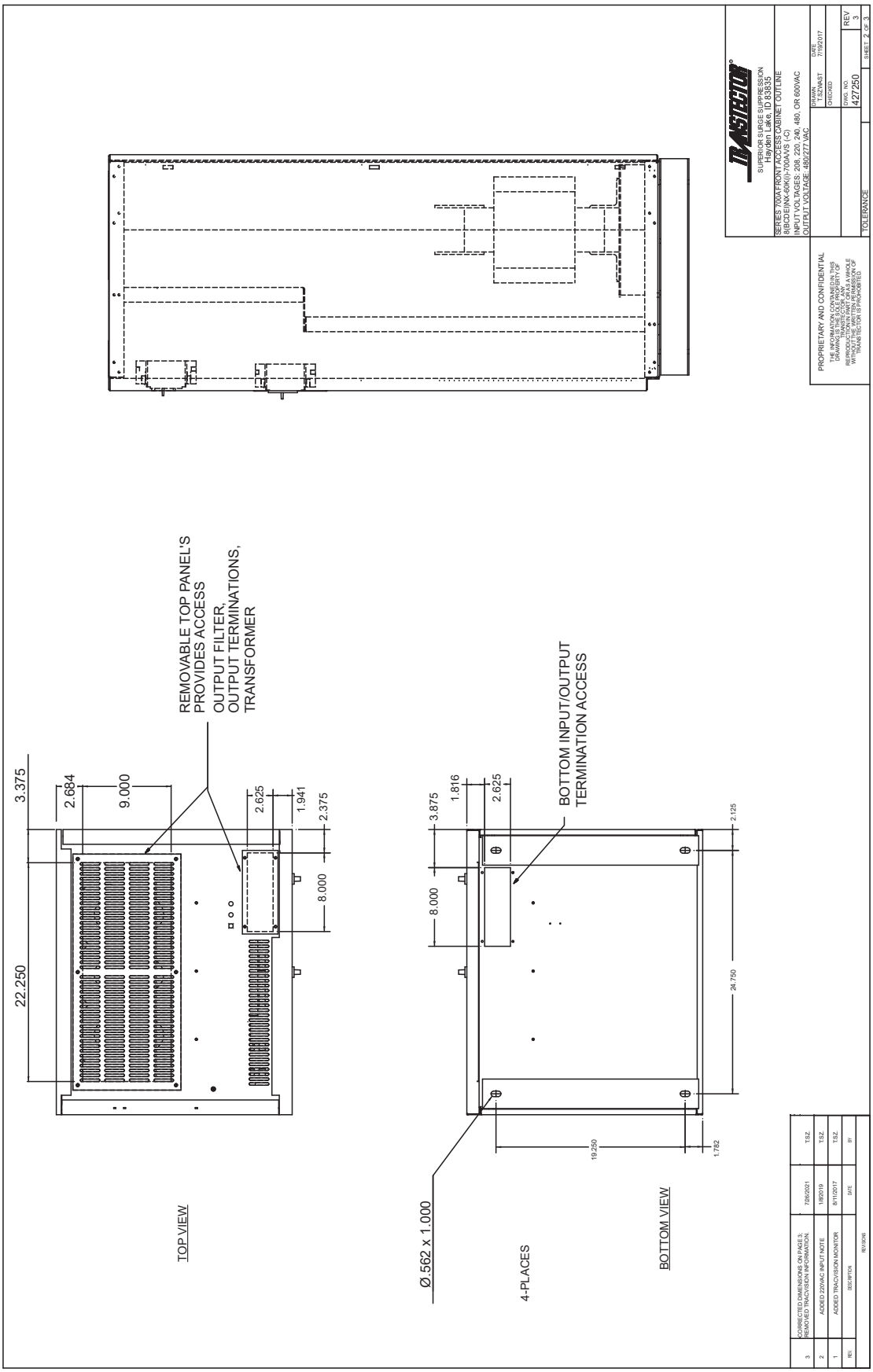

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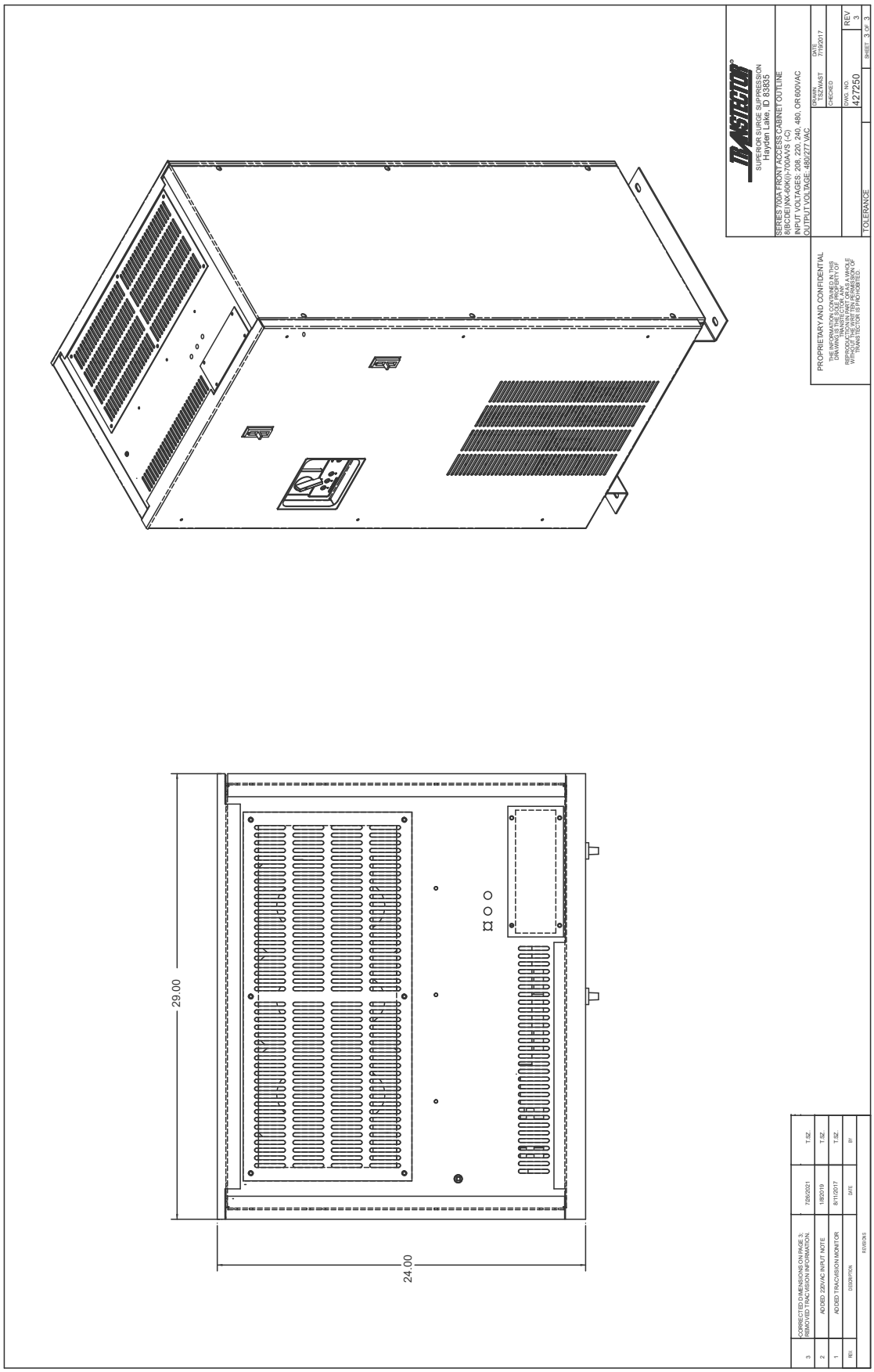

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