CONTROLLED POWER COMPANY

TROY, MICHIGAN

Ultra-K

High Efficiency

K-Rated

Power Conditioning Transformer

SERIES 600K - *he*

OWNERS MANUAL

5KVA - 25KVA

SINGLE PHASE, 60Hz

SINGLE PHASE, 50Hz

IMPORTANT - SAVE THESE INSTRUCTIONS - PLEASE READ THIS MANUAL
BEFORE USING EQUIPMENT

UL® LISTED c UL® us LISTED

PART # 114526 - Rev 6
10/09/2019

Caution

The following symbol indicates that caution should be taken when performing the process required in this manual. Damage to the unit or personal harm could happen if proper precautions are not taken.

Shock Hazard

The following symbol indicates that there is a risk of electrical shock if proper precautions are not followed. Only qualified personnel should perform the actions required in this manual.

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ABOUT THIS MANUAL

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GENERAL DESCRIPTION

Controlled Power Company engineers and manufactures the industry's highest quality power conditioning transformers, capitalizing on over 45 years of expertise. This enviable reputation for quality is reflected in the design, workmanship, and performance of our products.

Subjecting commercial and industrial electrical systems to a harsh, "polluted" electrical environment increases downtime, maintenance costs, and lost productivity. Maintaining spike-free voltage and keeping electrical noise away from the sensitive electronics, increases the reliability of electronic equipment, contributes to the overall integrity of data, and enhances workflow and productivity.

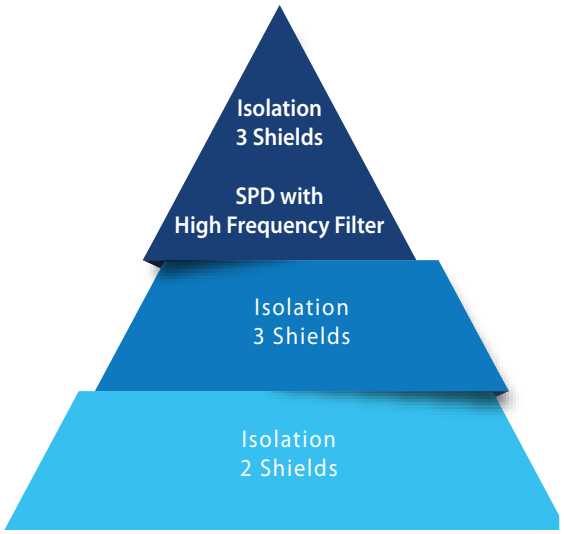
Controlled Power Company's ULTRA-K Series 600K-he High Efficiency, K-Rated, Power Conditioning Transformers are specifically designed to provide a high degree of electrical noise attenuation and optional transient voltage suppression to sensitive electronic loads. In addition, the ULTRA-K is offered with four different K-factor ratings (K4, K7, K13, K20) for full compatibility with harmonic-rich, non-linear loads.

The ULTRA-K Series 600K-he meets and exceeds the high efficiency levels defined by the U.S. Department of Energy (DOE) 2016 Standard, thus providing true energy savings under both linear and non-linear loads.

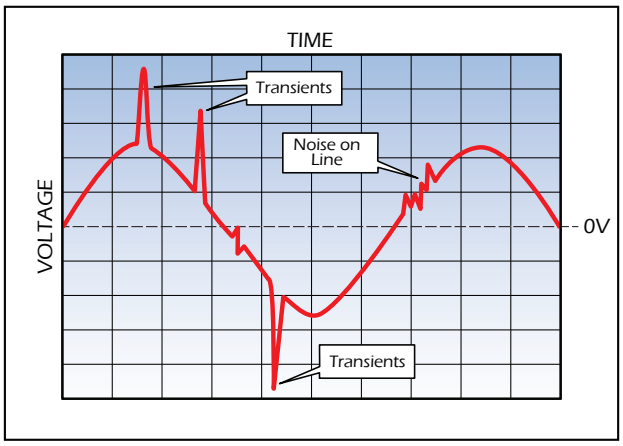
Electrical Noise & Voltage Transients

Electrical noise is a high frequency, low energy signal that travels on the power and ground lines of an electrical distribution system. While conditions external to a facility can cause electrical noise and impulses, the majority of these disturbances are generated by electronic and electrical equipment within the facility. Examples of this equipment include photocopiers, lighting controls, variable speed drives, and motor loads.

The electrical noise produced by this equipment can harm digital circuitry, because the high frequencies can easily be coupled into the signal path and cause data corruption. This corruption often results in system upset, unexpected restarts, and nuisance equipment behavior. In addition to electrical noise and impulses, high energy transients may also exist which lead to component failure within critical electronics and controls.



Building the ULTRA-K solution to power problems.



Electrical noise and voltage transients illustrated.

ULTRA-K Series 600K-he Solution

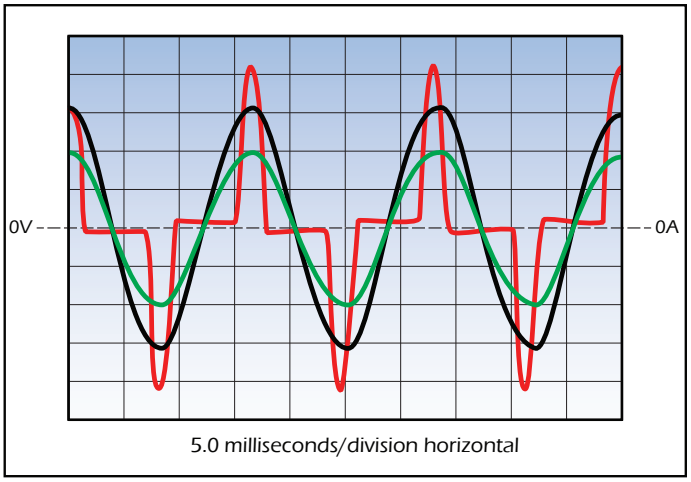
The ULTRA-K is provided standard with 2 full-length electrostatic shields which provide 126dB common mode noise attenuation. An optional 3rd shield is available which increases the attenuation to 146dB. That is 20dB greater in decibels, but the noise attenuation is actually 10 times greater! The ULTRA-K not only attenuates noise from input to output ... but also prohibits system back feed from noise generating loads. In addition, an optional pre-wired, high frequency filter and category B3 surge protection device (SPD) provide your critical loads with optimum protection from noise and impulses, as well as high energy voltage transients.

The ULTRA-K's noise attenuation is critical for any application in which digital circuitry is used to scan, measure or monitor critical data, control a critical process, or reproduce high quality audio / video signals!

Harmonics & K-Factor Ratings

Commercial and industrial facilities contain a myriad of electronic and electrical equipment that represent “non-linear” loads. Examples include non-PFC power supplies found in computers and lighting, as well as high-powered electronic controls. Linear loads draw current throughout the entire 60Hz waveform, tracking the applied voltage. Non-linear loads draw current in short intervals with extraordinarily high magnitudes (see illustration to the right), generating harmonics (multiples of the fundamental 60Hz). These harmonics create additional heat within the transformer windings, and may increase the output neutral current up to 200% on 3 phase models with line-to-neutral loading.

To overcome this safety problem, an ULTRA-K transformer is designed specifically to handle the harmonics, heating effects, and increased output neutral current created by non-linear loads. Its K4 through K20 selections allow it to be properly applied for both linear and non-linear loads!



Voltage and Current Waveforms:
Output Voltage
Linear Load Current
Non-linear Load Current

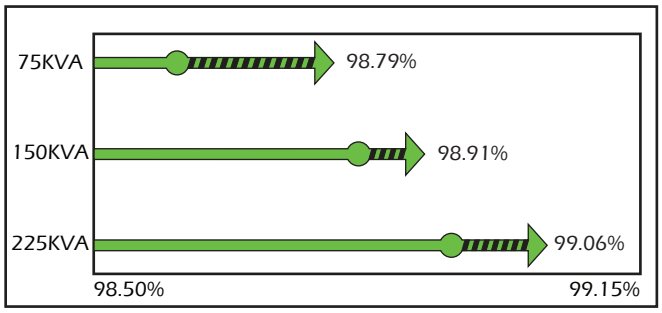
ULTRA-K High Efficiency Advantage

The ULTRA-K is uniquely designed to provide efficiencies that meet and exceed the DOE 2016 Standard.

Energy savings are easily seen when comparing the power losses of the ULTRA-K to a transformer only meeting the DOE minimum efficiency. For example, our 150 kVA ULTRA-K tested 99% efficient at 35% load; that’s only 530 W of losses, compared to the minimum required efficiency of 98.83% which represents 621 W of losses. The ULTRA-K power losses were 17% lower, which reflect a decrease in operating costs over the life of the transformer.

Efficiency for a given KVA size will vary from transformer to transformer, but the ULTRA-K’s design allows its efficiency to still exceed the minimum DOE-mandated level.

Ultra-K Series 600K-he Efficiency Examples



NOTE: The chart above illustrates the efficiency measured on (3) sample transformers. The “green dots” are positioned to reflect the DOE minimum efficiencies in comparison to the ULTRA-K efficiencies measured.

● DOE 2016 minimum efficiency levels at 35% of nameplate-rated load with a transformer operating temperature of 75°C: 45kVA (98.40%); 75kVA (98.60%); 150kVA (98.83%).

SPECIFICATIONS AND OPTIONS

Power Output

Single Phase	5, 8, 10, 15, 20, 25 kVA
Three Phase	15, 30, 45, 75, 112.5, 150, 225, 300, 500 kVA

Operating Frequency

Frequency	60Hz +/- 5% Note: 50Hz models available, consult factory

Electrical Input

Single Phase (5-25kVA)	208, 240, 480, or 600 VAC
Voltage Taps	(2) 2.5% Full Capacity Above Nominal (4) 2.5% Full Capacity Below Nominal
Three Phase	(15-150kVA) 208, 240, 480, or 600 VAC (Delta) (225-500kVA) 480, 600 VAC (Delta)
Voltage Taps (15-300kVA*)	(2) 2.5% Full Capacity Above Nominal (4) 2.5% Full Capacity Below Nominal
* Exception (112.5kVA - 150kVA at 208 VAC or 240 VAC)	(1) 5% Full Capacity Above Nominal (2) 5% Full Capacity Below Nominal
(500kVA)	(1) 3.5% Full Capacity Above Nominal (2) 3.5% Full Capacity Below Nominal

NOTE: Special voltages and kVA sizes available for both single and three phase models.

Electrical Output

Single Phase	120, 120/240, or 208 VAC
Three Phase	208/120 or 480/277 VAC (Wye) Note: Special voltages available
Output Impedance	2% to 3.5% typical
Output Distortion	Less than 1.0% THD added under linear load
Load Regulation	2% typical, no load to full load
Overload	Up to 500% for 10 seconds, 1000% for 1 cycle
Isolated Neutral	Establishes a new neutral to ground bond on the transformer's output

Noise Attenuation

Common Mode	126dB - Standard double (2) shield 146dB - Optional triple (3) shield
Transverse Mode	3dB down at 10kHz, decaying 20 dB per decade; decaying 40 dB with "SPD With High Frequency" option

Environmental

Operating Ambient Temperature	-25° C to +40° C
Relative Humidity	0 to 95% non-condensing
Altitude	Up to 5000 feet above sea level without de-rating
Audible Noise	45 to 60dBA @ 1 meter, depending on kVA size

Efficiency

U.S.	Meets and exceeds U.S. Department of Energy (DOE) 2016 high efficiency standards identified under DOE 10 CFR Part 431
Canada	Meets and exceeds CSA Standard C802.2-12

K-factor Ratings

Ratings	K4, K7, K13, K20
Neutral Size	Twice the ampacity of the secondary phase conductor on three phase models

Harmonic Handling Capability

Designed to handle the following percentages of fundamental and harmonic currents, without exceeding temperature rise limits.

	K4	K7	K13	K20
Fundamental 60 Hertz	100%	100%	100%	100%
3rd Harmonic	25%	35%	40%	45%
5th Harmonic	20%	30%	42%	48%
7th Harmonic	12%	18%	25%	38%
9th Harmonic	3%	5%	7%	9%
11th Harmonic	5%	6%	10%	12%
13th Harmonic	4%	4%	8%	10%
15th Harmonic	2%	2%	3%	3%
17th Harmonic	1%	1%	2%	2%

$K=\sum I_h(pu)^2h^2$, h=harmonic, I=RMS current of harmonic

NOTE: The chart above represents only one scenario (per K-factor rating) of an infinite combination of harmonic content that could add up to a specific K-factor. Consult factory with your harmonic load profile for assistance in K-factor selection.

Harmonic Elimination

The load generated triplen harmonics of the fundamental (3rd, 9th, 15th, 21st, etc.) are eliminated from the input lines, thus reducing the overall THD content.

General

Transformer Construction	All copper winding and conductor construction, dry type transformer with M3, grain-oriented silicon steel
Electrical Connection	Copper bus provided for hardwired input and output. Note: Optional lug kits available
Basic Impulse Level	10KV
Temperature Rise	135° C rise above ambient, under non-linear loading per UL 1561 standard
Cooling	Convection cooled
Enclosure	Standard, floor mounted: NEMA 2 up to 225kVA; NEMA 1 at 300kVA and 500kVA Note: Optional NEMA 3R outdoor enclosure available up to 225kVA

Certifications

Safety	UL 1561 Listed, labeled for operation with or below a specific K-factor rating; C-UL listed to CSA Standard C22.2, No. 47-13
RoHS	Compliant
Quality	ISO 9001:2015

Isolated Output Neutral

The ULTRA-K establishes a new neutral to ground bond on the transformer's output, meeting the definition of a separately derived power source as defined in NFPA 70, Article 250.20 (D). Its isolated wye secondary provides a new single point ground reference to which critical load neutral and ground conductors are wired, thus preventing potential N-G circulating currents.

Application Note:

The ULTRA-K may be paired with a transformer-less uninterruptible power system (UPS). This is critical if the input neutral to the UPS is shared with other electrical noise-producing loads, creating noise voltage with respect to ground. The transformer provides an isolated, clean neutral bond for IT/data center equipment. Locating the transformer at the input or output of the UPS is dictated by the UPS configuration and grounding requirements. In either case, the ULTRA-K ensures that the critical load is provided with the highest power quality, even when the UPS is in bypass mode.

Options

Output SPD With High Frequency Filter

Surge Protection Device (SPD) network comprised of high energy MOVs with <5 nanosecond response time and a maximum peak surge current capacity of 40 kA (8/20 µs) per mode. High frequency filter increases transverse mode noise attenuation to 3 dB down at 10kHz, decaying 40 dB per decade. A single status indicator light (pictured on NEMA 2 enclosure shown) is provided to show that the SPD and filter are fully operational and functioning properly.

NOTE: SPD with peak surge current capacity ratings from 50 kA to 200 kA per phase are available, UL 1449 Listed, Type 2. Includes EMI/RFI filtering, Form C relay contacts, and LED protection status indicators. See Page 16 for Specifications. (See **NOTE** below)

Input / Output Circuit Breaker

Circuit breaker (15A – 800A ratings) provided in a separate NEMA 1 enclosure for external mounting and installation.

High / Over Temperature Alarm Contacts

Thermal warning alarm contacts for customer's hardwired connection. Thermal sensors at 180° C and 200° C. (See **NOTE** below)

NOTE: Option not available for 300kVA and 500kVA models.

Model shown with standard NEMA 2 enclosure, and optional SPD status indicator light. (30 kVA model shown)

SPECIFICATIONS AND OPTIONS CONTINUED

NEMA 3R Enclosure
UL Listed NEMA 3R enclosure for outdoor installations. Enclosure is constructed using 14 gauge galvanized steel and provided with a durable powder coat paint finish. (See **NOTE** below)

IR Scanning Window
Infrared, transparent polymer IR window(s) for safe routine thermal scanning of transformer connections under load, without exposing personnel to arc flash hazards. Durable IR windows are industrial-grade with a patented reinforced grill, fully impact-resistant, and UL and C-UL Listed. This option adds 2” to the depth of the 112.5 kVA – 225 kVA enclosure. (See **NOTE** below)

Lug Kit
Mechanical (screw-type) lugs shipped for installer convenience. Consult factory for number of conductors per lug and wire range.

Special Designs
Special voltage configurations are available, including “high leg delta” designs.

NOTE: Option not available for 300kVA and 500kVA models.

Model shown with optional NEMA 3R enclosure, and optional IR scanning window. (75 kVA model shown)

****** WARNING ******

THERE ARE DANGEROUSLY HIGH VOLTAGES PRESENT WITHIN THE ENCLOSURE OF THE POWER SUPPLY SYSTEM.

CAUTION MUST BE TAKEN WHEN WORKING WITH THE SYSTEM.

IT IS RECOMMENDED THAT ALL WORK BE PERFORMED BY QUALIFIED ELECTRICAL PERSONNEL ONLY.

****** CAUTION ******

RISK OF ELECTRICAL SHOCK AND HIGH SHORT CIRCUIT CURRENT. THE FOLLOWING PRECAUTIONS SHOULD BE OBSERVED WHEN WORKING ON THE UNIT:

1) REMOVE WATCHES, RINGS, OR OTHER METAL OBJECTS.
2) USE TOOLS WITH INSULATED HANDLES.
3) WEAR RUBBER GLOVES AND BOOTS.

****** CAUTION ******

- FOLLOW ALL STANDARD AND LOCAL ELECTRICAL CODES.
- DO NOT ALLOW WATER OR FOREIGN OBJECTS TO GET INSIDE THE UNIT.
- DO NOT PLACE OBJECTS OR LIQUIDS ON TOP OF THE UNIT.
- DO NOT LOCATE THE UNIT NEAR RUNNING WATER.

INSPECTION

Upon receipt of the unit, visually inspect for shipping damage. Open the enclosure(s) and inspect inside the unit for shipping damage. If any damage is found, the Purchaser must contact the Carrier immediately and file a shipping damage claim.

If any damage has occurred that could affect the operation of the unit, please contact Controlled Power Company.

Call -1-800-521-4792 Ext 222.

IMPORTANT NOTICE

This shipment has been carefully inspected, checked and properly packaged at our company.

When it was delivered to the carrier it was in good condition and technically it became your property at that time. Thus, any damage, whether obvious or hidden, must be reported to the transportation company within FIVE days of receipt of the shipment at your premises to avoid forfeiting claims for damages.

FOR ALL SHIPMENTS DAMAGED IN TRANSIT

Leave the items, packing material and carton “AS IS”. Notify your carrier’s local office and ask for immediate inspection of the carton and contents.

After inspection has been made by the carrier, and you have received acknowledgment in writing as to the damage, notify our Customer Service Department to make any required repair arrangements.

It is your responsibility to follow the above instructions or the carrier will not honor any claims for damage. Also, if there are any shortages or questions regarding this shipment, please notify us within FIVE days.

Please note that we cannot be responsible for any service work or back-charges unless authorized by us in writing, before the work is performed.

STORING

If it is necessary to store the unit for a period of time before it is installed, be sure to place the unit in a clean, dry area. To prevent excessive dust from accumulating on the unit, it is advisable to protect it by replacing it in the original container (if possible). If the original container is not available it is recommended that all openings that lead internally into the unit are covered so that dust, water or any other substance cannot enter the internal components of the system. The unit must be handled at all times with the same care you would give to any piece of precision industrial equipment.

REMOVING THE UNIT FROM PALLET

Please take special care when removing the unit from the pallet and/or container. Proper equipment must be used when lifting and moving. Safety precautions should be taken. Larger sized units are bolted to a wooden pallet. In order to properly remove the cabinet from the pallet, all bolts connecting the unit to the pallet must be removed completely. Larger sizes must be lifted off with a pallet jack or a fork lift.

When removing the unit from the pallet and/or container, be sure to take proper safety precautions. Serious injury and/or unit damage can result from not taking proper precautions.

INSTALLATION CONSIDERATIONS

Prior to installing the Power Conditioner, be sure to take into consideration the installation site you have selected. Power Purifiers produce heat and therefore require ventilation as well as accessibility. Consider these factors:

- Ventilation
- Size of the Power Conditioner
- Weight Load
- Audible Noise Requirements
- Clearances
- Options
- Clean Environment
- Input Source Voltage
- Receiving Facilities
- Distribution of Power
- Room Temperature
- Accessibility
- Excessively Long Power Runs
- Proper Ground Techniques

CHOICE OF LOCATION

The unit has been completely inspected and extensively tested under various load conditions prior to shipment. Care to install it at a proper location will assure long trouble-free operation.

The unit is air cooled with the air intake at the bottom and exhausts at the top, front or at the sides. Therefore, it should be installed in a clean, dry place with enough clearance to allow a free flow of air. Allow at least 6 inches of space between the unit and the wall or other equipment. Allow enough space for maintenance on all four sides of the unit.

INSPECTION

Check by thorough inspection if any electrical connection has become loose because of vibration during shipment. Check the nameplate to be sure that the voltage and frequency match the available power supply. Under no circumstance should the unit be connected to a power source which does not conform to the nameplate rating.

CABINET DIMENSIONS AND WEIGHTS

CABINET DIMENSIONS AND WEIGHTS - NEMA 2 CABINET ONLY*					
SINGLE PHASE					
MODEL NUMBERS	OUTPUT kVA	INPUT VOLTAGE	OUTPUT VOLTAGE	CABINET DIMENSIONS	WEIGHT
5**X-5K6HE-*-***	5	208, 240, or 480	120, 120/240, or 208	23W x 20D x 28H	170
5**X-8K6HE-*-***	8	208, 240, or 480	120, 120/240, or 208	23W x 20D x 28H	225
5**X-10K6HE-*-***	10	208, 240, or 480	120, 120/240, or 208	23W x 20D x 28H	300
5**X-15K6HE-*-***	15	208, 240, or 480	120, 120/240, or 208	23W x 20D x 28H	370
5**X-20K6HE-*-***	20	208, 240, or 480	120, 120/240, or 208	23W x 20D x 28H	390
5**X-25K6HE-*-***	25	208, 240, or 480	120, 120/240, or 208	23W x 20D x 28H	420
***SEE *"APPENDIX A - CABINET OUTLINES"* FOR NEMA 3R CABINET DIMENSIONS**					

SINGLE PHASE MODELS

5kVA

Voltage	FL Input Amps	Optional Input CB	FL Output Amps	Optional Output CB
120*	43.5	60	41.7	60
208	25.1	35	24.0	30
120/240	---	---	20.8	30
240	21.7	30	20.8	30
480	10.9	15	10.4	15
600	8.7	15	8.3	15

Cabinet Dims: 23"W x 20"D x 28"H
Max Installed Weight: 170 lbs. (add 12 lbs. for NEMA 3R)
BTUs/Hr: 710

8kVA

Voltage	FL Input Amps	Optional Input CB	FL Output Amps	Optional Output CB
120*	69.4	90	66.7	90
208	40.1	50	38.5	50
120/240	---	---	33.3	45
240	34.7	45	33.3	45
480	17.4	25	16.7	25
600	13.9	20	13.3	20

Cabinet Dims: 23"W x 20"D x 28"H
Max Installed Weight: 225 lbs. (add 12 lbs. for NEMA 3R)
BTUs/Hr: 1140

10kVA

Voltage	FL Input Amps	Optional Input CB	FL Output Amps	Optional Output CB
120*	86.8	---	83.3	110
208	50.1	70	48.1	60
220	47.3	60	45.5	60
120/240	---	---	41.7	60
240	43.4	60	41.7	60
480	21.7	30	20.8	30
600	17.4	25	16.7	25

Cabinet Dims: 23"W x 20"D x 28"H
Max Installed Weight: 300 lbs. (add 12 lbs. for NEMA 3R)
BTUs/Hr: 1420

15kVA

Voltage	FL Input Amps	Optional Input CB	FL Output Amps	Optional Output CB
120*	129.5	---	125.0	---
208	74.7	100	72.1	90
120/240	---	---	62.5	80
240	64.8	80	62.5	80
480	32.4	40	31.3	40
600	25.9	35	25.0	35

Cabinet Dims: 23"W x 20"D x 28"H
Max Installed Weight: 370 lbs. (add 12 lbs. for NEMA 3R)
BTUs/Hr: 1790

20kVA

Voltage	FL Input Amps	Optional Input CB	FL Output Amps	Optional Output CB
120*	172.7	225	166.7	225
208	99.6	125	96.2	125
120/240	---	---	83.3	110
240	86.4	110	83.3	110
480	43.2	60	41.7	60
600	34.5	45	33.3	45

Cabinet Dims: 23"W x 20"D x 28"H
Max Installed Weight: 390 lbs. (add 12 lbs. for NEMA 3R)
BTUs/Hr: 2390

25kVA

Voltage	FL Input Amps	Optional Input CB	FL Output Amps	Optional Output CB
120*	215.9	300	208.3	300
208	124.6	175	120.2	150
120/240	---	---	104.2	150
240	107.9	150	104.2	150
480	54.0	70	52.1	70
600	43.2	60	41.7	60

Cabinet Dims: 23"W x 20"D x 28"H
Max Installed Weight: 420 lbs. (add 12 lbs. for NEMA 3R)
BTUs/Hr: 2990

*** Not UL Listed**

Before installing the Power Conditioner make sure that the input voltage and the output voltages match the unit's specification plate.

INPUT / OUTPUT WIRE SIZE, AND GROUNDING

1. Conduit should be used for both input and output wiring.

2. Minimum ground wire size is based on the latest National Electric Code. Full current ground conductors while not required by code are a good practice for power conditioning equipment.

3. Input wire size is based on NEC Table 310-16 specifying not more than 3 conductors in a raceway based on ambient of 30° Celsius, and wire rated at 75° Celsius.

4. Output neutral to ground is already bonded during manufacturing of the Power Conditioner.

5. Output requires 4 (5 including ground wire) conductors in a raceway assuming neutral as a current carrying conductor.

NOTE: Installation is subject to local codes - verify with a local electrical inspector.

REFER TO *"APPENDIX A - CABINET OUTLINES"* FOR CONDUIT ENTRY POINTS AND INPUT/OUTPUT TERMINAL LOCATION AND WIRE RANGES.

ALSO SEE *"RECOMMENDED INPUT / OUTPUT LUGS"* PAGE 14.

Before installing the Power Conditioner make sure that the input voltage and the output voltages match the unit's specification plate.

RECOMMENDED INPUT / OUTPUT LUGS / TERMINALS

Lug Kits Available - Mechanical (screw-type) lugs for installer convenience. Contact factory for further information.

RECOMMENDED INPUT LUGS / TERMINALS			
KVA	**208V**	**240V**	**480V**
5	(2) AB 1492-CE2 195A[1](2-L)	(2) AB 1492-CE2 195A[1](2-L)	(2) AB 1492-CE2 195A[1](2-L)
8	(2) AB 1492-CE2 195A[1](2-L)	(2) AB 1492-CE2 195A[1](2-L)	(2) AB 1492-CE2 195A[1](2-L)
10	(2) AB 1492-CE2 195A[1](2-L)	(2) AB 1492-CE2 195A[1](2-L)	(2) AB 1492-CE2 195A[1](2-L)
15	(2) ILSCO TA-2/0[2] (2-L)	(2) ILSCO TA-2/0[2] (2-L)	(2) ILSCO TA-2/0[2] (2-L)
20	(2) ILSCO TA-2/0[2] (2-L)	(2) ILSCO TA-2/0[2] (2-L)	(2) ILSCO TA-2/0[2] (2-L)
25	(2) ILSCO TA-2/0[2] (2-L)	(2) ILSCO TA-2/0[2] (2-L)	(2) ILSCO TA-2/0[2] (2-L)
(2) ILSCO TA-2/0[1 2] GROUND LUGS PROVIDED ON ALL SIZES			
[1] PROVIDED [2] OR EQUIVALENT			

RECOMMENDED OUTPUT LUGS / TERMINALS			
KVA	**120V**	**120V / 240V**	**208V**
5	(2) AB 1492-CE2 195A[1](1-L, 1-N)	(3) AB 1492-CE2 195A[1](2-L, 1-N)	(2) AB 1492-CE2 195A[1](2-L)
8	(2) AB 1492-CE2 195A[1](1-L, 1-N)	(3) AB 1492-CE2 195A[1](2-L, 1-N)	(2) AB 1492-CE2 195A[1](2-L)
10	(2) AB 1492-CE2 195A[1](1-L, 1-N)	(3) AB 1492-CE2 195A[1](2-L, 1-N)	(2) AB 1492-CE2 195A[1](2-L)
15	(2) ILSCO TA-250[2](1-L, 1-N)	(3) ILSCO TA-2/0[2](2-L, 1-N)	(2) ILSCO TA-2/0[2](2-L)
20	(2) ILSCO TA-250[2](1-L, 1-N)	(3) ILSCO TA-2/0[2](2-L, 1-N)	(2) ILSCO TA-2/0[2](2-L)
25	(2) ILSCO TA-250[2](1-L, 1-N)	(3) ILSCO TA-2/0[2](2-L, 1-N)	(2) ILSCO TA-2/0[2](2-L)
[1] PROVIDED [2] OR EQUIVALENT			

WIRE RANGES AND TORQUE RATINGS

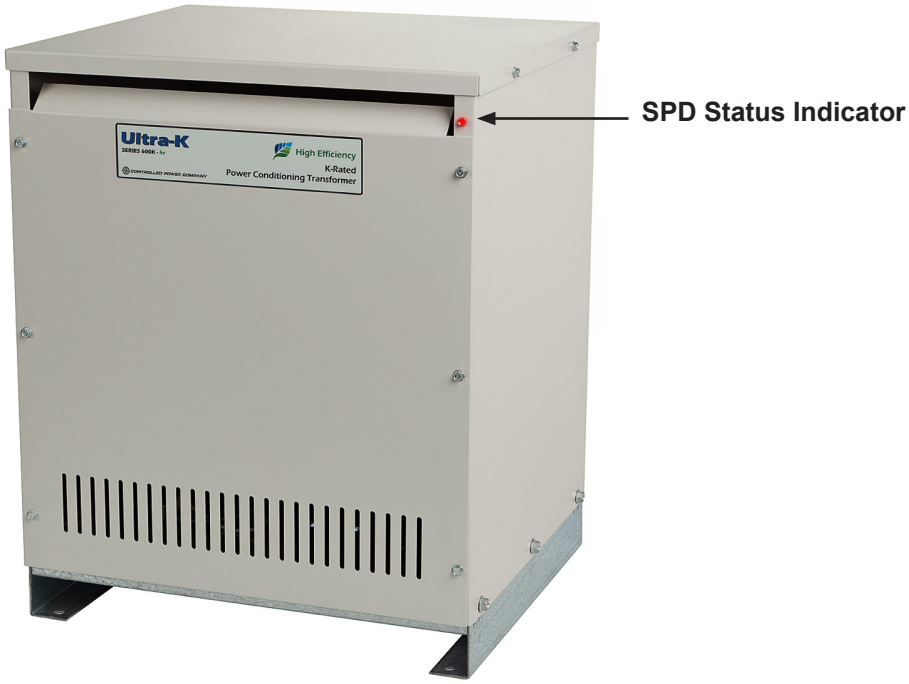
LUG/TERMINAL	WIRE RANGE	TORQUE RATING
AB 1492-CE2 195A	# 12 - 1/0	50 IN*LB
ILSCO TA-2/0	#14 - 2/0	120 IN*LB
ILSCO TA-250	#6 - 250 MCM	275 IN*LB

Refer to the latest edition of the National Electric Code.
NOTE: Installation is subject to local codes - verify with a local electrical inspector.

Options

Optional Output SPD With High Frequency Filter

This option is factory installed. SPD with High Frequency Filter. The SPD is an integral, fused, three phase, secondary connected, 6 mode transient voltage suppression network comprised of high energy metal oxide varistors with less than a 5 nanosecond response time and a maximum peak current handling capability of 40kA (8x20 µsec) per mode. The suppression network will remain functional when subjected to ANSI/IEEE C62.41 Category B-3 waveforms. The SPD includes a high frequency noise filter that increases the transverse mode noise attenuation to 3 dB down at 10kHz, decaying 40 dB per decade. A single status indicator light is provided to show that the SPD and filter are fully operational and functioning properly. See “Appendix A - Cabinet Outlines” for SPD location.



Model shown with standard NEMA 2 enclosure, and optional SPD status indicator light. (30 kVA model shown)

Optional Output SPD (SPD; UL1449 Listed, Type 2)

This option is factory installed. SPD with peak surge current capacity ratings from 50kA to 200kA per phase, UL 1449 4th Edition Listed, Type 2. The SPD has a nominal discharge current rating of 20kA, and a short circuit current rating (SCCR) of 200kA. Includes EMI/RFI filtering, Form C relay contacts rated for 2 amps at 30VDC or 250VAC, and LED protection status indicators. (Option not available for 300kVA and 500kVA models.)

Form C relay contact ratings: 2 A at 30 Vdc or 250 Vac
Form C relay contact logic:
Power ON, normal state—NO contact = open, NC contact = closed
Power OFF or fault state—NO contact = closed, NC contact = open

See *"Appendix A - Cabinet Outlines"* for Form C terminal location. Also refer to the circuit diagram provided with the unit.

Tri-colored LED protection status indicators
Tri-colored protection status indicators show results of continuous self-diagnostic testing, including neutral-ground mode. The LED protection status indicators on the device have three LED color states and are viewable through the front panel viewing slot (where applicable):

- Green—Fully protected
- Yellow—Loss of neutral-to-ground protection
- Red—Loss of protection

SPD; UL1449 Listed, Type 2 Specifications

kA per Phase	50, 80, 100, 120, 150, 160, 200
Nominal Discharge Current	20kA
Single Phase Voltages	120, 240, 277, 480
Split Phase Voltages	120/240
Wye System Voltages	120/208, 240/415, 277/480, 347/600
Delta System Voltages	240, 480, 600
High Leg Delta Voltage	240
Input Power Frequency	50/60 Hz
Protection Modes	Single Phase L-N, N-G, L-G
	Split Phase L-N, N-G, L-G, L-L
	Wye L-N, N-G, L-G, L-L
	Delta L-G, L-L
	High Leg L-N,N-G,L-G,L-L,H-N,H-G,H-L
Mounting feet Torque rating	20.3 lb-in (2.3 N·m)
Conduit locknut Torque rating	Not to exceed 200 lb-in (22.5 N·m)
Max. altitude	2000 m
Certification/Listing	UL 1449 4th edition, UL1283 6th edition, CSA 269.1-14, 269.2-15, C22.2 No. 8-13 EMI Filter
SPD Type	UL1449 4th edition & CSA Type 1 and Type 2 SPD
RoHS Compliant	Yes
EMI/RFI filtering attenuation	Up to 40dB from 10kHz to 100MHz.

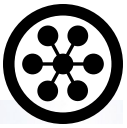
Input / Output Circuit Breaker
Circuit breaker (15A – 800A ratings) provided in a separate NEMA 1 enclosure for external mounting and installation. See the installation manual provided with this option for enclosure dimensions, breaker lug and wire ranges, and installation instructions.

High / Over Temperature Alarm Contacts
Thermal warning alarm contacts for customer's hardwired connection. Thermal sensors at 180° C and 200° C. See *"Appendix A - Cabinet Outlines"* for High / Over Temperature Alarm contact terminal location and ratings. Also refer to the circuit diagram provided with the unit.

NEMA 3R Enclosure
UL Listed NEMA 3R enclosure for outdoor installations. Enclosure is constructed using 14 gauge galvanized steel and provided with a durable powder coat paint finish. (See *"Appendix A - Cabinet Outlines"* for further information)

IR Scanning Window
Infrared, transparent polymer IR window(s) for safe routine thermal scanning of transformer connections under load, without exposing personnel to arc flash hazards. Durable IR windows are industrial-grade with a patented reinforced grill, fully impact-resistant, and UL and C-UL Listed. This option adds 2" to the depth of the 112.5 kVA – 225 kVA enclosure. (Option not available for 300kVA and 500kVA models.)

Lug Kit
Mechanical (screw-type) lugs shipped for installer convenience. Contact factory for further information.



*****WARNING*****

THERE ARE DANGEROUSLY HIGH VOLTAGES PRESENT WITHIN THE ENCLOSURE OF THE POWER SUPPLY SYSTEM. CAUTION MUST BE TAKEN WHEN WORKING WITH THE ENCLOSURE. IT IS RECOMMENDED THAT ALL WORK BE PERFORMED BY QUALIFIED ELECTRICAL PERSONNEL ONLY.

NOTE: INITIAL START-UP SHOULD BE PERFORMED WITH NO LOAD ON SYSTEM.

1. Make sure the input circuit breaker feeding the Ultra-K is in the **off** position.
2. Re-install all panels that may have been removed during installation.
3. Turn on the main AC input breaker feeding the Ultra-K.
4. Verify that the output voltage is within the specified range.
5. Turn the system off.
6. Connect the loads one at a time and repeat Step 4.

*****WARNING*****

DANGER OF ELECTRICAL SHOCK, TURN OFF ALL POWER SUPPLYING THIS EQUIPMENT PRIOR TO MAINTENANCE.

PREVENTIVE MAINTENANCE

To ensure longer component life and trouble-free operation, minor preventive maintenance procedures should be performed at regular intervals, for example once every year. More frequent inspection intervals would be needed for more severe operating conditions and larger number of hours of continuous operation. At each service inspection any accumulated dust, dirt or foreign particles should be carefully removed. A light pull should be used to test if there is any loose electrical connections which need to be tightened.

This Warranty applies only to the original purchaser who must properly register the product within thirty (30) days of receipt.

https://controlledpwr.com/customer-support/warranty-registration/

Controlled Power Company warrants that the Series 600K-he transformer (core and coil) to be free from defects in material and workmanship for a period of 1 full year, and an additional 24 years prorated from the date of shipment and agrees to replace, F.O.B. its factory, any parts which fault through defect in material or workmanship during such period. All other unit components are covered by a 2 year full replacement warranty. Non payment for the product to either the reseller, rep, distributor or the factory direct will result in revocation of warranty, technical support and service contracts. **Warranty begins from date of shipment unless a factory start-up is purchased, then the warranty begins from date of Start-up or 90 days from ship date; whichever comes first.**

If a Start-Up is purchased with the unit(s) or within 30 days from original ship date, the 1st year warranty is upgraded to include onsite labor and expenses during normal business hours (Monday - Friday, 8AM - 4PM). Start-up includes all travel and living expenses. Start-up description: Visual Inspection - Input and output parameter check - Air intake / exhaust check - Re-torque all high current terminals - Input/Output verification - Written report. User training to be done at time of start-up (no return visits). Product installation is required to be complete before start-up can be scheduled.

Products:

- Series 600K-he / 25 Years (1 year full and 24 years prorated on Core and Coil*), All other unit components are covered by a 2 year full replacement warranty.*

* From original shipment date / Excludes on site labor and expenses unless otherwise noted.

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1. This Warranty shall be effective only if and so long as the system is installed and operated in the manner specified in the manual which accompanied the product, and is operated within the ratings on the nameplate of the system.

2. This Warranty shall be effective provided the purchaser pays the cost of transporting the faulty component(s) to and from Controlled Power Company's factory at the purchaser's own expense, unless the item covered under service contract with Controlled Power Company. There is no cost for installation of the replacement component(s) when done at the factory. Otherwise installation of the replacement component(s) are the responsibility of the purchaser, unless the item is covered under service contract with Controlled Power Company. If after inspection the faulty component has been caused by misuse or abnormal conditions in the judgment of Controlled Power Company, the purchaser will be charged for repairs based on parts and labor required. This Warranty does not cover fuses, light bulbs, and other normally expendable items. Controlled Power Company service personnel are not included in this warranty unless covered by a Controlled Power Company service contract.

3. This Warranty shall be void if any alteration is made to the system, or any of its components are altered by anyone other than an authorized Controlled Power Company service person, without the written permission of Controlled Power Company.

4. This Warranty is in lieu of all other warranties, expressed or implied. Controlled Power Company neither assumes, nor authorizes any person to assume for it, any liability other than that specifically set forth in this Warranty. Except for its obligations, Controlled Power Company assumes no liability or responsibility for personal injury, loss of life, consequential or other damages resulting from defects in, or failure of, the system or any of its components.

https://controlledpwr.com/customer-support/warranty-registration/

SERIES 600K-he POWER CONDITIONER

Contact Controlled Power Company.

CONTROLLED POWER NATIONWIDE CUSTOMER SUPPORT

Controlled Power offers total customer support that assures your critical equipment is maintained properly for trouble-free operation.

WHAT A CUSTOMER SUPPORT PLAN OFFERS

HOT LINE: Call 24 Hours 1-800- 521-4792 or 1-248-528-3700

RESPONSE TIME: Immediate 24 hour phone support. If problem is not solved, we will make every effort to have your system running within 48 hours.

***START-UP:** On site start-up assures equipment is installed and operating properly.

FIELD REPAIRS: Customer Support Plans cover parts, labor, travel, living and freight expenses.

PREVENTIVE MAINTENANCE: Optional scheduled preventive maintenance includes the following:

-Inspection
-Exercising all circuit breakers.
-Re-torquing all high current terminals and connectors.
-Testing all emergency circuitry.
-Calibration
-Clean internal and external
-Verify Cooling System
-Written Report

*Start up may be substituted for preventive maintenance on new units.

PLAN	ON SITE COVERAGE	PARTS COVERED	FIELD REPAIR LABOR COVERED	FACTORY REPAIR LABOR COVERED	FREIGHT COVERED	TRAVEL EXPENSES COVERED
SILVER	NONE	YES	NO	YES	NO	NO
GOLD	M-F 8AM-4PM	YES	YES	YES	YES	YES
PLATINUM	24-7	YES	YES	YES	YES	YES

TRAINING AND PARTS

For customers who maintain their own equipment, Controlled Power offers hands on training at our facility and part kits. For more information, contact Controlled Power Customer Support Department at 1-800-521-4792 or 1-248-528-3700.

Individual components are available upon request, please contact the factory for specific part numbers and prices. When contacting the Parts Department, please have the unit's full model number and serial or system number. Call 1-800-521-4792 or 1-248-528-3700.

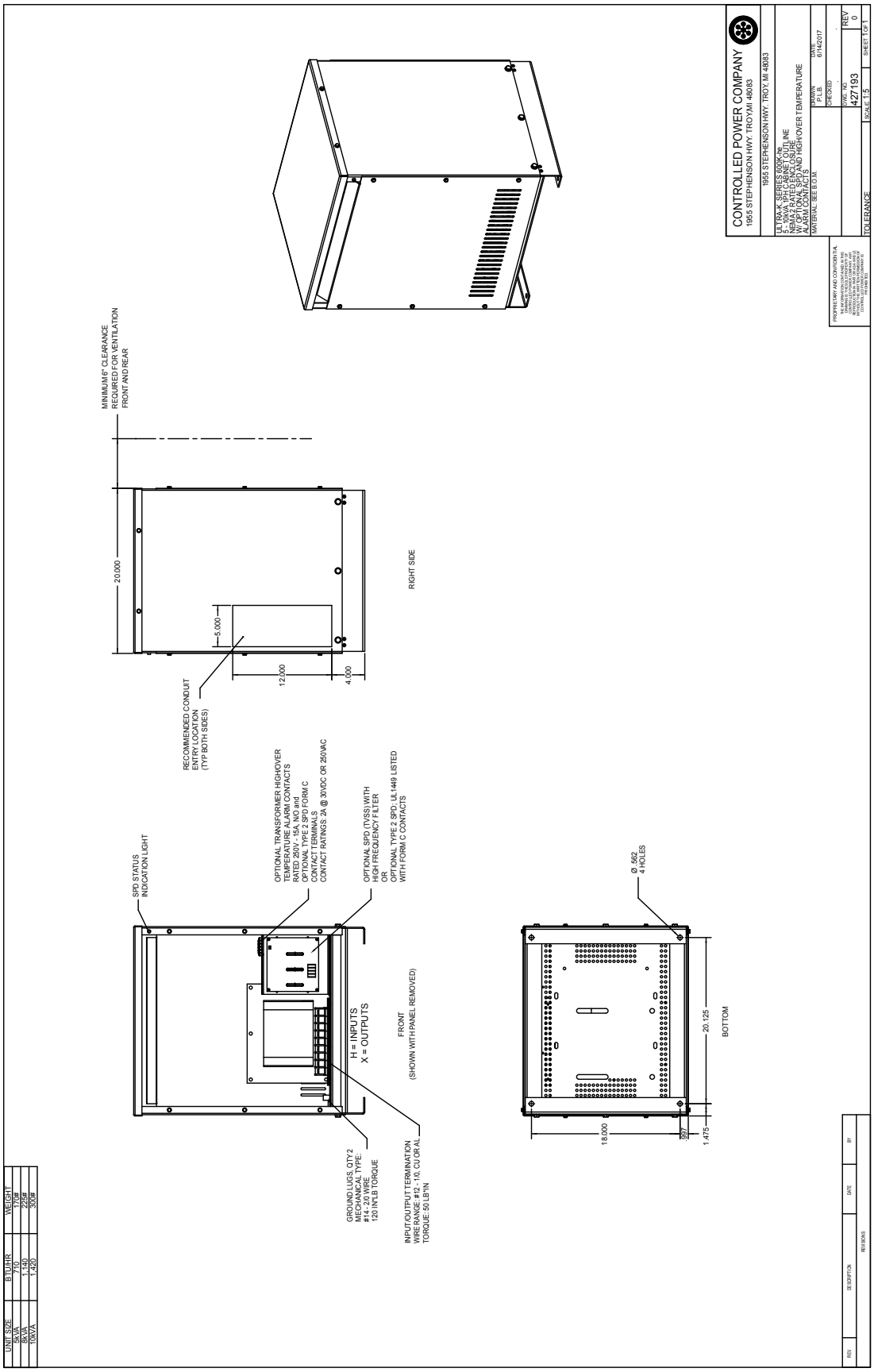
APPENDIX A

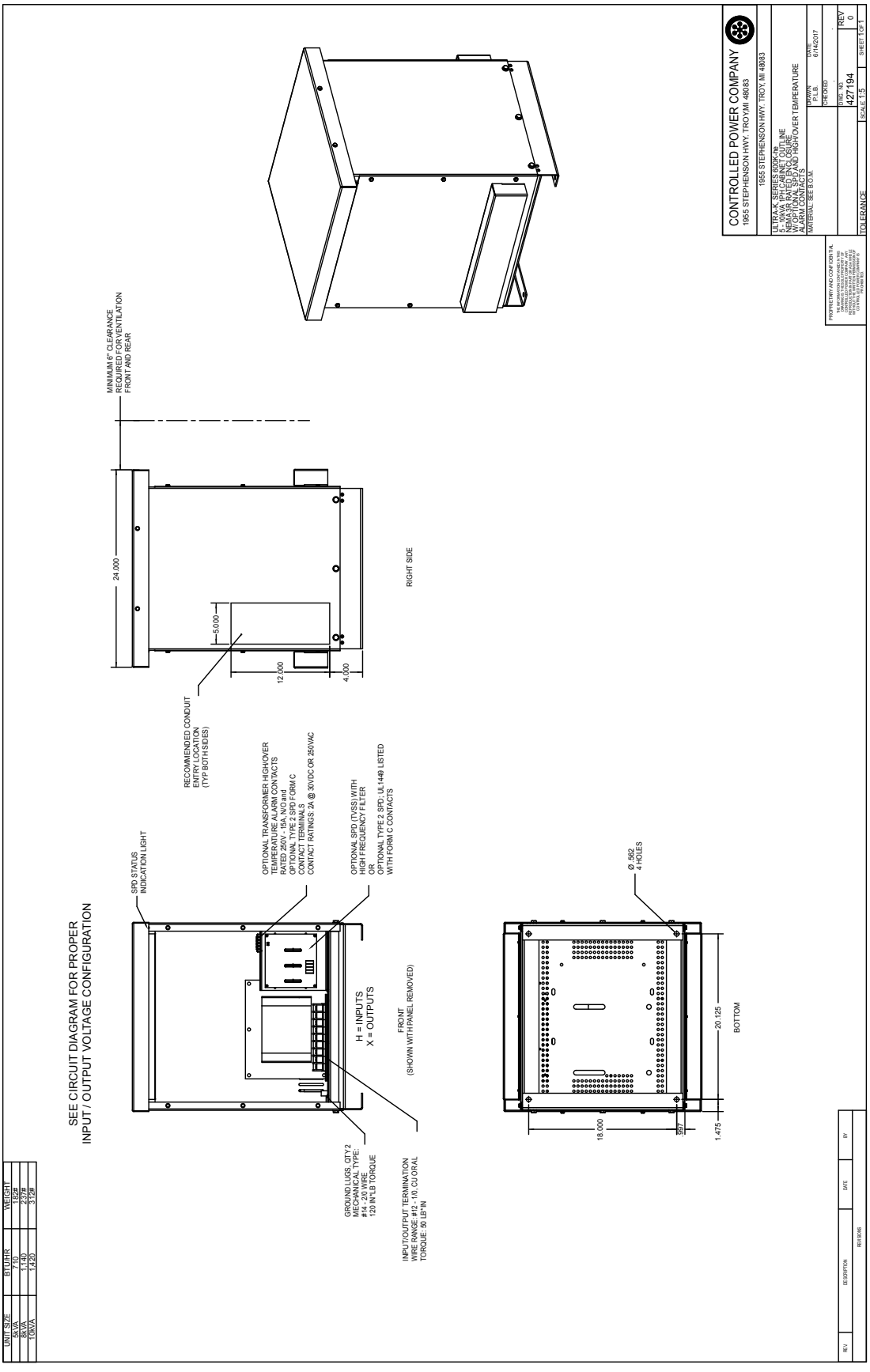
RELATIVE DRAWINGS

&

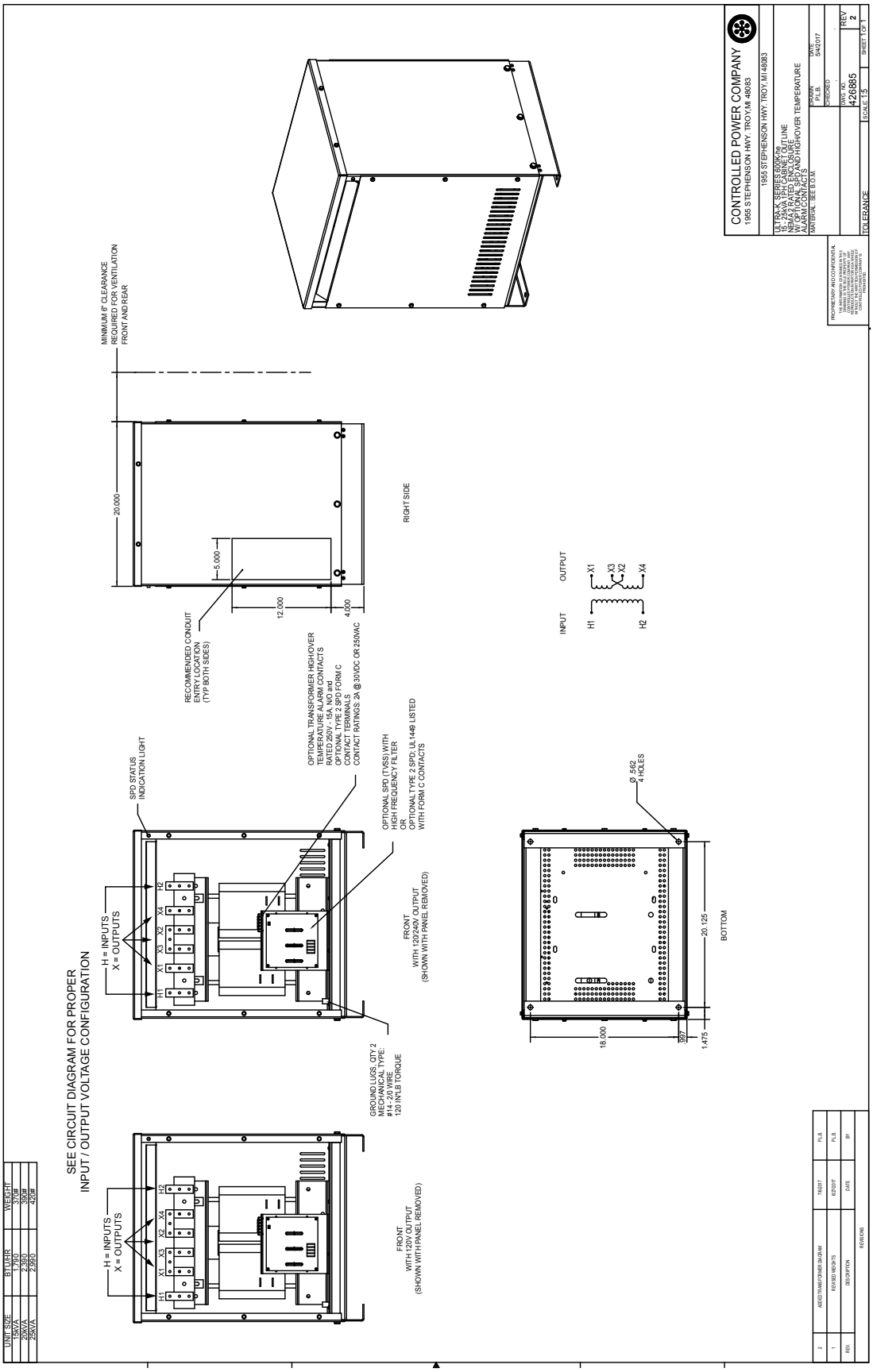
SCHEMATICS

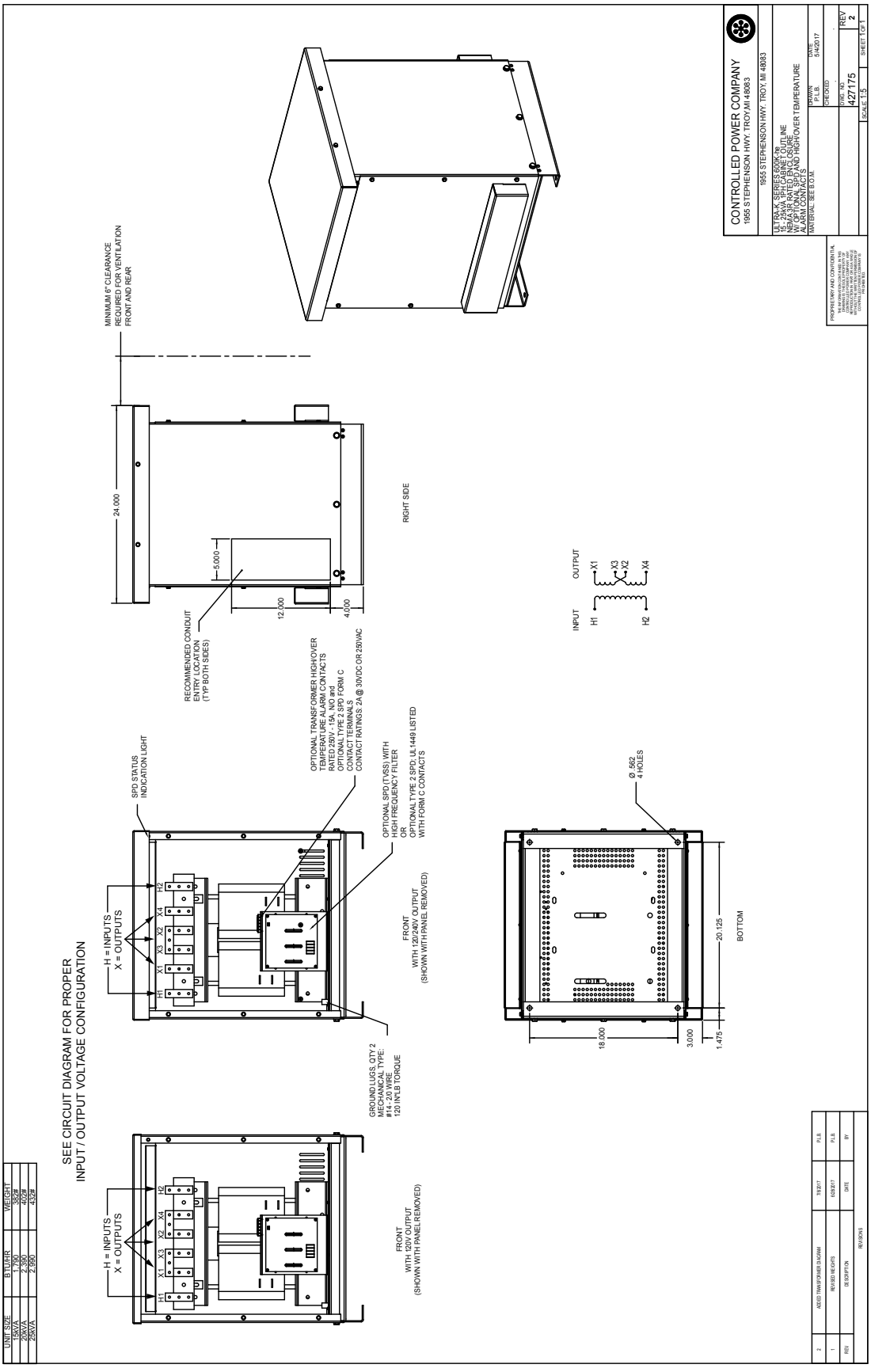
CABINET OUTLINE, 5-10KVA, NEMA 2




CONTROLLED POWER COMPANY
1955 STEPHENSON HWY. TROY,MI 48083
ULTRA-K SERIES 600K-N
5 - 10 KVA IP1C CABINET OUTLINE
NEMA 3R RATED ENCLOSURE
ADDITIONAL OPTIONS: HIGH/OVER TEMPERATURE ALARM CONTACTS
MATERIAL: SEE B.O.M.
DRAWN P.L.B.
CHECKED
DWG. NO. 427194
SCALE 1:5
SHEET 1 OF 1
TOLERANCE
DATE 6/14/2017
REV 0
MINIMUM 6" CLEARANCE REQUIRED FOR VENTILATION FRONT AND REAR
24.000
5.000
12.000
4.000
RIGHT SIDE
RECOMMENDED CONDUIT ENTRY LOCATION (TYP BOTH SIDES)
SPD STATUS INDICATION LIGHT
OPTIONAL TRANSFORMER HIGH/OVER TEMPERATURE ALARM CONTACTS RATED 250V - 15A, N/O and OPTIONAL TYPE 2 SPD FORM C CONTACT TERMINALS CONTACT RATINGS: 2A @ 30VDC OR 250VAC
OPTIONAL SPD (TVSS) WITH HIGH FREQUENCY FILTER OR OPTIONAL TYPE 2 SPD; UL1449 LISTED WITH FORM C CONTACTS
H = INPUTS
X = OUTPUTS
FRONT
(SHOWN WITH PANEL REMOVED)
GROUND LUGS, QTY 2
MECHANICAL TYPE:
#14 - 1/0 WIRE
120 IN*LB TORQUE
INPUT/OUTPUT TERMINATION
WIRE RANGE: #12 - 1/0, CU ORAL
TORQUE: 50 LB*IN
SEE CIRCUIT DIAGRAM FOR PROPER
INPUT / OUTPUT VOLTAGE CONFIGURATION
Ø .562
4 HOLES
18.000
3.97
1.475
20.125
BOTTOM
UNIT SIZE | BTU/HR | WEIGHT
5KVA | 710 | 182#
8KVA | 1140 | 217#
10KVA | 1420 | 313#
REV | DESCRIPTION | DATE | BY
REVISIONS

CABINET OUTLINE, 15-25KVA, NEMA 2




CONTROLLED POWER COMPANY
1955 STEPHENSON HWY, TROY, MI 48083
ULTRA-K SERIES 600K Rb
15 - 25kVA, 1PH CABINET OUTLINE
NEMA 3R RATED ENCLOSURE
MAXIMUM AMBIENT 40°C AND HIGHER TEMPERATURE
ALARM CONTACTS
MATERIAL: SEE B.O.M.
DWG. NO. 427175
REV 2
SCALE 1:5
SHEET 1 OF 1
MINIMUM 6" CLEARANCE REQUIRED FOR VENTILATION FRONT AND REAR
24.000
5.000
12.000
4.000
RIGHT SIDE
RECOMMENDED CONDUIT ENTRY LOCATION (TYP BOTH SIDES)
INPUT
OUTPUT
H1
H2
X1
X2
X3
X4
SEE CIRCUIT DIAGRAM FOR PROPER INPUT / OUTPUT VOLTAGE CONFIGURATION
H = INPUTS
X = OUTPUTS
SPD STATUS INDICATION LIGHT
OPTIONAL TRANSFORMER HIGH/OVER TEMPERATURE ALARM CONTACTS RATED 250V, 1A, 30W MAX
OPTIONAL TYPE 2 SPD FORM C CONTACT TERMINALS
CONTACT RATINGS: 2A @ 30VDC OR 250VAC
OPTIONAL SPD (TVSS) WITH HIGH FREQUENCY FILTER OR OPTIONAL TYPE 2 SPD, UL 1449 LISTED WITH FORM C CONTACTS
FRONT WITH 120/240V OUTPUT (SHOWN WITH PANEL REMOVED)
GROUND LUGS, QTY 2 MECHANICAL TYPE: #14 - 2/0 WIRE 120 IN LB TORQUE
FRONT WITH 120V OUTPUT (SHOWN WITH PANEL REMOVED)
Ø .562 4 HOLES
18.000
3.000
1.475
20.125
BOTTOM
UNIT SIZE | BTU/HR | WEIGHT
15kVA | 1,780 | 382#
20kVA | 2,380 | 402#
25kVA | 2,980 | 424#
ADDED TRANSFORMER DIAGRAM
REVISED WEIGHTS
DESCRIPTION
REVISIONS
DATE
BY