

# Series 700A Power Processor

**VOLTAGE REGULATION, ISOLATION, AND  
POWER DISTRIBUTION FOR CLEAN,  
SPIKE-FREE, STABLE VOLTAGE**

## **When Power Quality Is A Must And Failure Is Not An Option!**

- Medical Facilities / Labs / Equipment
- Government / Commercial Buildings
- Broadcast Communications
- Telecommunications
- Audio-Visual
- Concert Halls & Theaters
- Wastewater Treatment Plants
- Refineries & Chemical Plants
- HVAC Equipment
- Machine Tools / CNC Equipment
- Co-generation & Power Generation
- Manufacturing / Automation / Robotics
- UPS Bypass & Power Distribution



**CONTROLLED POWER COMPANY**

*"World's recognized authority in power treatment"*

# SERIES 700A POWER PROCESSOR



Controlled Power Company engineers and manufactures the industry's highest quality power conditioning equipment, capitalizing on 3 decades of expertise. We have an enviable reputation for quality, which is reflected in the design, workmanship, and performance of our products.

We provide a wide range of performance-proven technologies for the regulation, conditioning, isolation, and distribution of clean and stable electrical power. This product range allows us to optimize solutions that best fit the performance characteristics of our customers' varied applications. As a result, we don't have to fit a "square peg" solution into a "round hole" problem! Our products protect sensitive electronic systems from erratic operation and failure due to power line transients, noise, brownouts, sags, surges, and total power outages.



## Power Quality ... And Its Importance

Great leaps in computing power have made high-speed, accurate, and repeatable data acquisitions and calculations an expectation in the 21st century. Analog and digital system operations include everything from airline ticketing, to the manufacture of semi-conductors, corrugated boxes, and the automated control of livestock buildings. Our reliance on these systems and the continual increase in computing power, speed, and performance brings us to a critical juncture.

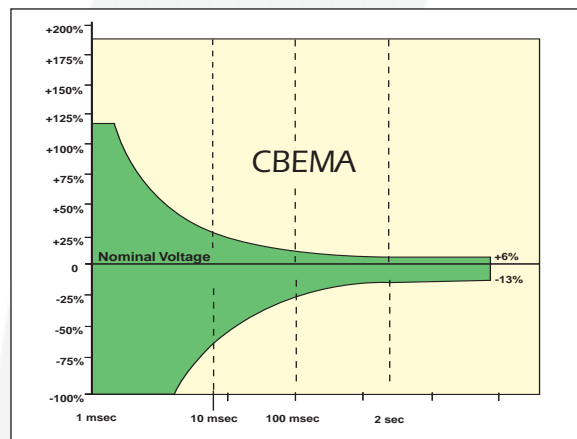
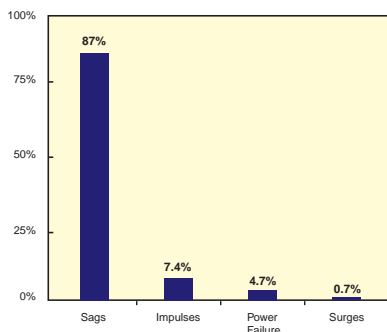


Figure 1

As the speeds and sophistication of these systems have increased, so has the sensitivity of all the electronic / electrical systems. In other words, power line problems which had little effect in the past, now cause the malfunction and shutdown of your equipment. The bottom line is that all electronic / electrical systems require clean, stable electrical power. Unstable or erratic power translates into an unreliable system and lost productivity.

**Steady State Voltages** — 56% of the sites experienced voltages that went outside ANSI Band B 106 Volt to 127 Volt utilization. Result: Brownouts or Overvoltage.



## What is Power Conditioning?

Basic power conditioning isolates the critical load from the power source in a way that minimizes the line impedance effects, inhibits the common ground noise, and produces a known clean power source for the load. In some cases, a multi-shielded transformer with low output impedance resolves most power quality problems. However, for more sensitive equipment, adding a fast-acting Controlled Power Company voltage regulator accompanied by high-frequency filtering resolves all power-related problems except power outages.

## The Need For Power Conditioning

Local utility companies generate clean, sinusoidal electrical waveforms, which is the technical phrase for “good power”. However, once the power is transmitted and goes through the distribution journey to the end-users, it is exposed to influences that cause changes and distortions to the waveform. These influences include power grid-switching, power factor correction oscillations, re-strikes, weather, auto accidents, and even animal damage. All of these factors, as well as industrial, commercial, and residential users contribute to the degradation of the power with non-linear loads, high cyclic power demands, and periodic faults.

## Optimizing Operation For Repeatability, Accuracy, And Longevity

Threats to the power integrity and quality are no longer just speculation, but front-page news! Subjecting electrical / electronic systems to such a harsh, “polluted” electrical environment increases downtime, maintenance costs, and lost productivity. Maintaining steady, spike-free voltage and keeping ground noise away from the controls, prolongs the life of all electronic equipment, and contributes to the overall quality of data, products, and work life.

## Knowing What To Use

Controlled Power Company offers several solutions to power conditioning problems. However, if you are concerned about the effects of voltage stability to your equipment, consider the **Series 700A Power Processor**, which is a solid-state, automatic voltage regulator that guards against both high and low voltage conditions.

**The Series 700A Power Processor** corrects voltage deviations of wide input to within the safe operating limits recommended by CBEMA standards, while addressing the concerns of standards such as IEEE 1159, P1433, P1654, and ANSI C62.41 which define power anomalies, occurrences, and impact on operations. (See Figure 1.)

In extreme cases of voltage stability requirements, the *Extended Range* option can correct voltage variations of +13% to -40%.



## Characteristics Of A Power Line Conditioner

Power quality addresses ALL the power disturbances that affect your operation. Look for the following features of a first-class system:

- Galvanic isolation with a minimum of 140 dB common mode noise rejection
- Input operating range of at least +10% to -20%
- Low output impedance of <3%
- Voltage correction within one cycle
- $\pm 3\%$  voltage regulation
- Low operating temperature
- High efficiency
- 1000% system overload
- Spike and transient protection
- Immunity to high harmonic content loads
- Able to withstand and regulate to within specification, with loads of .5 leading to .5 lagging power factor



# FEATURES & COMMON APPLICATIONS

The Series 700A Power Processor solves over 99% of all power-related problems.

## FEATURES

Energy Efficient

Output Regulation  $\pm 3\%$

Deep Sag Protection

Surge Suppression

Microprocessor-Controlled

High Overload Capability

Low Output Impedance

Linear Zero Crossing

140 dB Attenuation

.5 Leading And Lagging  $F_p$

## STANDARDS

NEMA1 Enclosure

Triple-Shielded Isolation Transformer

Regulating 7-Tap System

K-Rated For A Mixture Of Loads

Input Circuit Breaker

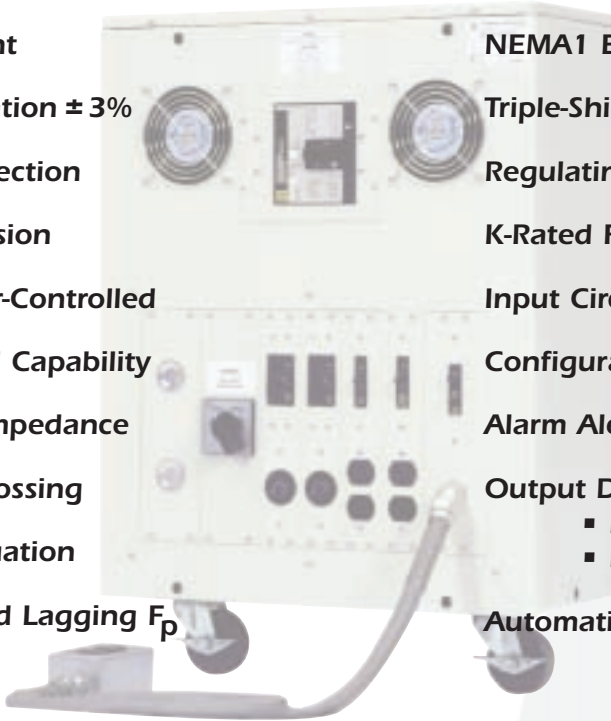
Configurable Options

Alarm Alert Indicator

Output Distribution

- Receptacles
- Flex Cable

Automatic Restart Following Loss Of Power



## Performance Characteristics That Get The Job Done

### Regulation

Automation, refineries, pulp and paper, robotics, medical, computers, aerospace, laboratories, CNC, EDM, machine tool, flight simulators, semiconductor fabrication — all require correct and steady voltage for secure operation. The 7-tap, microprocessor-controlled **Series 700A Power Processor**, precisely maintains the correct voltage to  $\pm 3\%$  within one cycle, and maintains regulation during extended brownouts.

### One Box Solution

Flexibility to convert standard U.S. voltages to the equivalent European or Asian voltages.

### Output Impedance

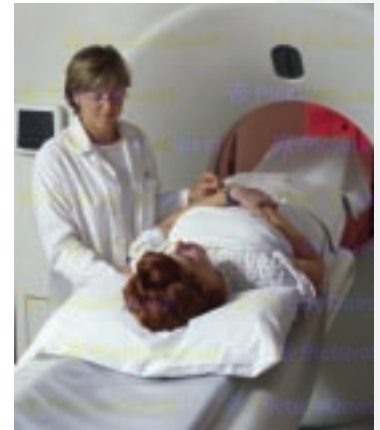
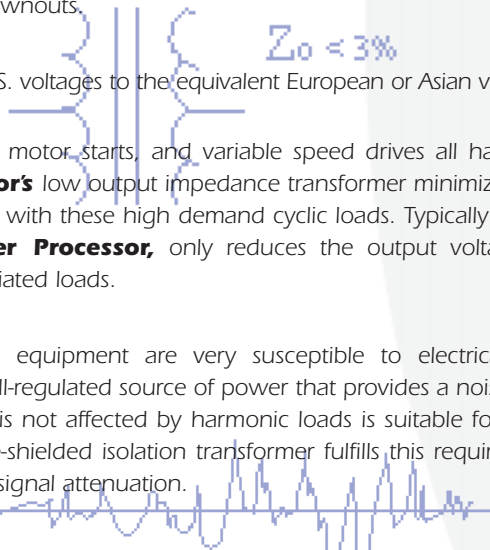
Linear accelerators, X-ray, MRI, motor starts, and variable speed drives all have enormous surge currents. The **Power Processor's** low output impedance transformer minimizes voltage distortion and sags commonly associated with these high demand cyclic loads. Typically a surge/overload of 600% imposed on the **Power Processor**, only reduces the output voltage by 6%; greatly minimizing the effects on associated loads.

### Common Mode Noise

Sound and video production equipment are very susceptible to electrical interference and fluctuating voltages. Only a well-regulated source of power that provides a noise-free ground, does not introduce harmonics, and is not affected by harmonic loads is suitable for these applications. The **Power Processor's** triple-shielded isolation transformer fulfills this requirement, providing in excess of 140dB ground noise signal attenuation.

### Transient Protection

Commercial and industrial facilities, computer rooms, universities etc., are continually subjected to voltage transients and spikes; a leading cause of electronic failures. The **Power Processor's** high-level spike suppression system protects your equipment by virtually eliminating these transients.



# OPTIONS

Any of the following options can be included in the Series 700A Power Processor:

### PM2020 Three Phase Output Monitor

Digitally displays the output voltages and output currents. It also includes the neutral current and line-to-line voltages. Minimum and maximum values are recorded in EPROM. Alarm fault detection is programmable on all readings.

### AOM2020 Three Phase Advanced Output Monitor

Digitally displays the output voltages and output currents. It also includes the neutral current, line-to-line voltages, watts, VARS, VA, PF, frequency, watt/hour, VA/hour, and VAR/hour. Minimum and maximum values are recorded in EPROM. Alarm fault detection is programmable on all readings.

Optional on AMO2020: K-factor and %THD; measuring harmonics to the 31st order.

Optional Communications Capability on AMO2020:

- RS232
- RS485
- Ethernet TCP / IP
- Modbus Plus
- Modbus RTU / ASCII
- DNP 3.0

NOTE: PM2020 and AOM2020 available only on 30 kVA and above

### RBS2020 Regulator Bypass Switch

If the electronic voltage regulator fails, this option bypasses the regulator, leaving the main isolation transformer active. Therefore, power conditioning is not affected.

### ERR1040 Extended Regulator Range

Provides +10%, -40% input voltage regulation range. Output regulation is +5%, -6%. Note: Loads below 60% permit continuous operation at -40% input.

### UOV2020 Under / Over Voltage Shutoff

When the output voltage goes above or below the preset value, the unit electronically shuts off. The system must be reset by cycling the input breaker. The preset voltages can be set from 75% of nominal, up to 115% of nominal.

### PSO2020 Under / Over Voltage Shutdown And Loss Of Power Shutoff

When the output voltage goes above or below the preset value or detects a loss of power, the shunt trip coil is energized, which in turn shuts off the main breaker. The preset voltages can be set from 75% of nominal, up to 115% of nominal. To turn on the system, manually reset the main circuit breaker.

Includes the STC2020 Shunt Trip option.

### REP2020 Remote Emergency Power Off (REPO)

Consists of a guarded "Emergency OFF" button which when depressed, trips the **Power Processor's** input circuit breaker. The REPO station is equipped with a 50-foot cable, and can be remotely located. To turn on the system, manually reset the main circuit breaker.

Includes the Shunt Trip STC2020 option.

### STC2020 Shunt Trip

Consists of a 120v AC shunt trip coil solenoid, which is added to the main circuit breaker. When the shunt trip coil is energized, the main input circuit breaker shuts off. A manual reset is required. 120v AC power is supplied by the customer.

OUTPUT PARAMETERS DISPLAYED	ADVANCED (AMO2020)	STANDARD (PM2020)
Volts L-N, L-L	•	•
Amps Phase-Neutral	•	•
Phase Reversal	•	•
Voltage Imbalance	•	•
F <sub>p</sub>	•	
kW	•	
kVA	•	
kVAR	•	
Frequency	•	Opt
kVAH	•	
kWH	•	
kVARH	Opt	
Limit Condition Relays	Opt	Opt
%THD (Harmonics)	Opt	
K-Factor	Opt	
RS232	Opt	
RS485	Opt	
MODBUS Plus	Opt	
Up to 10 channel analog outputs	Opt	

True RMS accuracy  $\pm 2\%$ , volts & amps. All minimum and maximum readings are stored. Fully programmable alarm settings for all parameters.

• = Standard Opt = Optional



**AMO2020**  
Advanced Monitor



**PM2020**  
Standard Monitor

# SPECIFICATIONS

The **Series 700A Power Processor** consists of an all-copper, multiple-tapped, triple-shielded isolation transformer. In conjunction with the electrostatic shields, the low output impedance of the transformer assures computer-grade performance with excellent noise and transient attenuation. For each of the 7 taps per phase, independently-controlled inverse parallel electronic switches provide tight regulation.

Linear devices are used for line synchronization, which prevents phase shift errors normally associated with simple current transformer zero current crossing acquisition circuits. The microprocessor-control accurately selects the correct tap to maintain the output, typically at 2.5% of nominal, and corrects for voltage disturbances within one cycle. Digital processing provides fast and accurate regulation without over- or under-shoot.

## Load Regulation

The output is maintained to within 3%.

## Output Status Lights

Status indicator for each phase.

## Alert Light

Indicates that the output has been disabled by one of the following conditions: Transformer over-temperature and SCR thermal over-temperature.

## Noise Attenuation

Common mode: Typically  $\geq 140$  dB

Transverse mode: 3 dB down at 1000 Hertz, 40 dB down per decade to below 50 dB with resistive load.

## Shielding

The transformer has 3 copper shields to minimize inner winding capacitance, transients, and noise coupling between primary and secondary windings. Inner winding capacitance is limited to .001 pF or less.

## Device Overload Rating

200% for 10 seconds.

1000% for 1 cycle.

## Correction Time

The output voltage is corrected within 1 cycle

## Efficiency

97% typical

## Harmonic Distortion

Less than 1% THD added to the output waveform

## Line Voltage Regulation

Input Line Voltage: +10%, -20%

Output Line Voltage:  $\pm 2.5\%$  typical ( $\pm 3\%$  maximum)

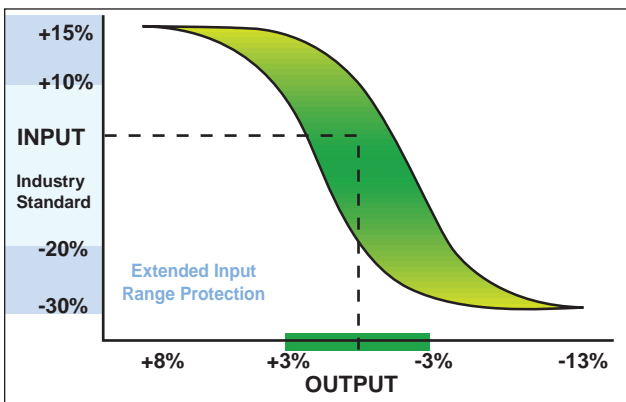
## Extended Line Voltage Regulation

*Optional* Extended Range for Intermittent Duty only:

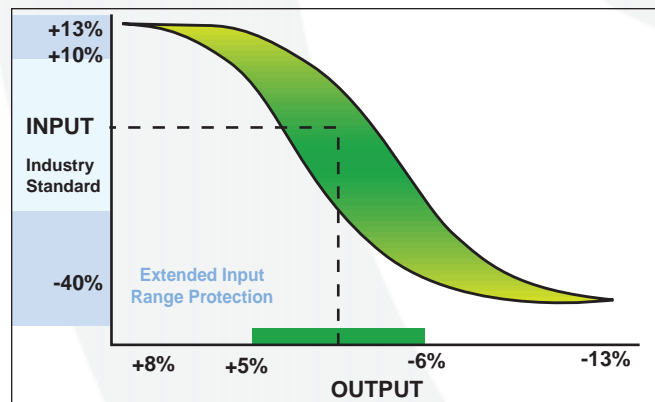
Input Line Voltage: +10%, -40%

Output Line Voltage:  $\pm 5.5\%$  typical ( $\pm 6\%$  maximum)

### Wide Range Protection



### Extended Range Protection



# SELECTION GUIDE

## Single Phase

		STANDARD VOLTAGES					
MODEL NUMBER	kVA RATING	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT DISTRIBUTION	CABINET ENCLOSURE (INCHES)	WEIGHT (LBS)	BTU
5**X-5K-7D	5	208/240	120/240, 120/208	See Below(1)	21.5W x 29D x 30H	344	510
5**X-8K-7D	8	208/240	120/240, 120/208	See Below(1)	21.5W x 29D x 30H	364	810
5**X-10K-7D	10	208/240	120/240, 120/208	See Below(1)	21.5W x 29D x 30H	438	1020
5**X-15K-7D	15	208/240	120/240, 120/208	See Below(1)	21.5W x 29D x 30H	501	1540
5**X-20K-7D	20	208/240	120/240, 120/208	See Below(1)	21.5W x 29D x 30H	554	2050
5**X-25K-7D	25	208/240	120/240, 120/208	See Below(1)	21.5W x 29D x 30H	634	2560

## Three Phase

		STANDARD VOLTAGES					
MODEL NUMBER	kVA RATING	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT DISTRIBUTION	CABINET ENCLOSURE (INCHES)	WEIGHT (LBS)	BTU
8**X-10K-7A	10	208/240/480/600	208/120, 480/277	See Below(1)	21.5W x 29D x 30H	440	1025
8**X-15K-7A	15	208/240/480/600	208/120, 480/277	See Below(1)	21.5W x 29D x 30H	520	1540
8**X-25K-7A	25	208/240/480/600	208/120, 480/277	See Below(1)	21.5W x 29D x 44H	700	2560
8**X-30K-7A	30	208/240/480/600	208/120, 480/277	See Below(1)	21.5W x 29D x 44H	720	3090
8**X-45K-7A	45	208/240/480/600	208/120, 480/277	Hardwired	45W x 29D x 44H	950	4600
8**X-50K-7A	50	208/240/480/600	208/120, 480/277	Hardwired	45W x 29D x 44H	970	5110
8**X-75K-7A	75	208/240/480/600	208/120, 480/277	Hardwired	45W x 29D x 44H	1100	7670
8**X-100K-7A	100	208/240/480/600	208/120, 480/277	Hardwired	45W x 29D x 44H	1660	10250
8**X-125K-7A	125	208/240/480/600	208/120, 480/277	Hardwired	45W x 29D x 44H	1980	12790
8**X-150K-7A	150	480/600	208/120, 480/277	Hardwired	45W x 29D x 44H	2200	15400
8**X-225K-7A	225	480/600	208/120, 480/277	Hardwired	56W x 41.5D x 77H	3300	23000
8**X-300K-7A	300	480/600	208/120, 480/277	Hardwired	56W x 41.5D x 77H	4000	30750
8**X-500K-7A	500	480/600	208/120, 480/277	Hardwired	72W x 48.5D x 77H	5500	51250

### Distribution Panel Options

(1) The Distribution Panel for a 5 - 30 kVA is 14"W x 10.5"H. Patch plates are available in 2"W x 10.5"H and 3"W x 10.5"H sizes. Consult factory for "Flush Mounted Receptacle and Output Breaker Combinations." Other configurations and plate sizes are available, please contact factory for details. Distribution Panel Options for 45kVA - 500kVA are available, consult factory for details.

(2) Option ERR1040 and certain voltage selections and options may change the cabinet size.

(3) Consult factory for agency verification.

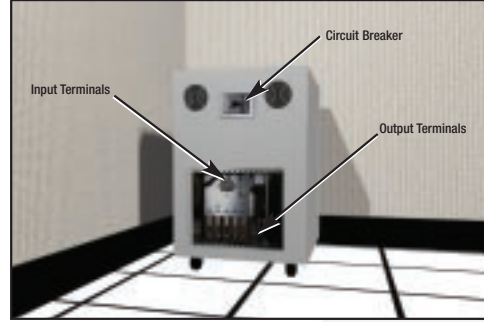
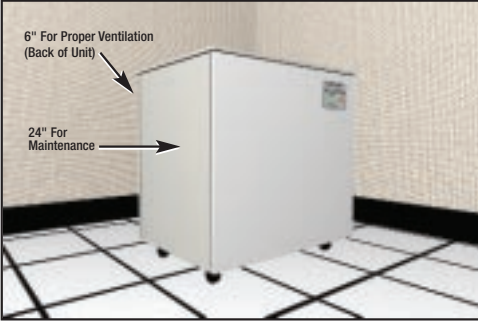
Consult factory for prices on non-standard sizes or voltages not shown.  
Listings - UL Listed. CSA. ESA.

### Model Number

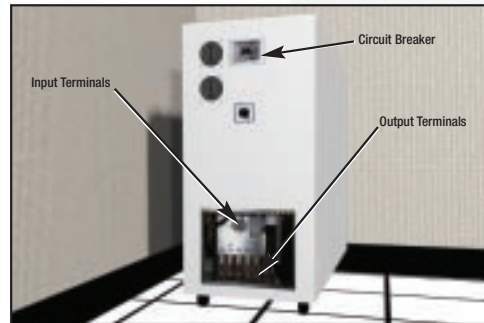
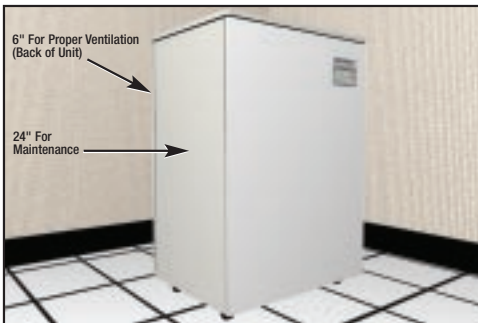
Position:	1st	2nd	3rd	4th	—	5th	—	6th
Meaning:	Phase	Input	Output	Frequency		kVA		Series
	5= Single	B=208	L=208/120	X=60Hz				1ph=7D
	8= Three	C=240	G=240/120	W=50Hz				3ph=7A
		D=480	N=480/277					
		E=600	E=600/346					
		I=220	P=380/220					
		Q=380						

# INSTALLATION

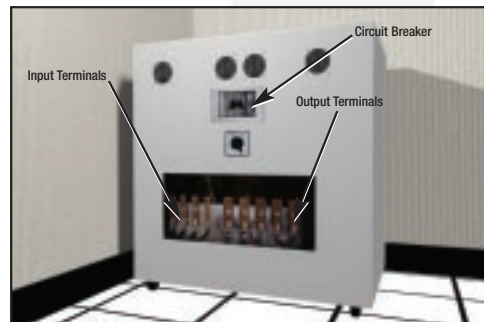
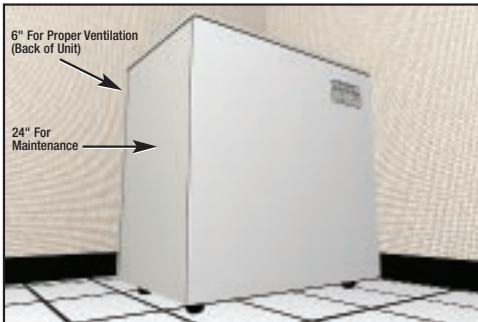
## 10kVA - 25kVA Single Phase & 10kVA - 15kVA Three Phase



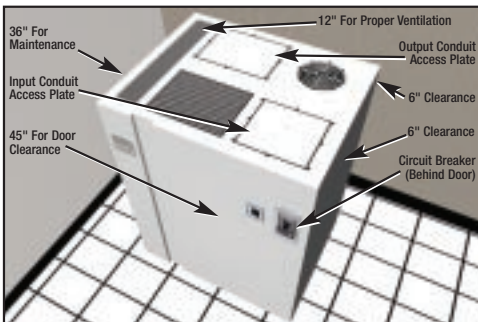
## 25kVA - 30kVA Three Phase



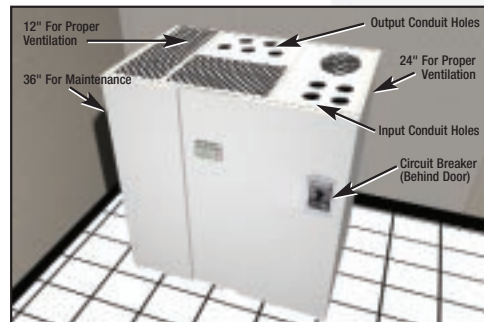
## 45kVA - 150kVA Three Phase



## 225kVA - 300kVA Three Phase



## 500kVA Three Phase



Note: Cabinet drawings may vary from actual unit.

Represented by:



 **CONTROLLED POWER COMPANY**  
 "World's recognized authority in power treatment"

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