



Utility Systems Technologies, Inc.

Installation, Operation and Maintenance Manual

Sure-Volt™ Electronic Voltage Regulator

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SAFETY INFORMATION

NOTICE!

READ THIS MANUAL COMPLETELY BEFORE INSTALLING OR USING EQUIPMENT

SAVE THESE INSTRUCTIONS.

FOR ASSISTANCE, CALL 518 377 8550

FAILURE TO FOLLOW THESE INSTRUCTIONS WILL RESULT IN DEATH OR SERIOUS INJURY.

DANGEROUS VOLTAGES ARE PRESENT INSIDE THE ENCLOSURE OF THE UNIT AND THE HAZARD OF ELECTRIC SHOCK, ARC FLASH AND EXPLOSION ARE PRESENT.

UNDER NO CIRCUMSTANCES SHOULD ANYONE BE PERMITTED TO OPERATE OR ENERGIZE THE UNIT WITHOUT ALL COVERS IN PLACE, DOORS CLOSED AND SAFEGUARDS INSTALLED AND OPERATIONAL.

UNDER NO CIRCUMSTANCES SHOULD ANYONE BE PERMITTED TO REACH INTO THE ENCLOSURE UNLESS THE UNIT HAS BEEN PROPERLY DE-ENERGIZED AND GROUNDED AND STATIC IN COILS DISCHARGED.

ONLY QUALIFIED PERSONNEL SHOULD BE PERMITTED TO INSTALL, SERVICE OR OPERATE THE UNIT. FOLLOW ALL SAFE ELECTRICAL WORK PRACTICES. USE PERSONAL PROTECTIVE EQUIPMENT (PPE).

THE UNIT MUST BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES.

ENCLOSURE(S) MUST BE GROUNDED USING THE GROUNDING LUGS AND/OR STUDS PROVIDED.

THE UNIT SHOULD BE INSTALLED A MINIMUM OF TWELVE INCHES AWAY FROM ANY COMBUSTIBLE SURFACE UNLESS SEPARATED AND SHIELDED BY APPROPRIATE FIRE RESISTANT AND HEAT DISSIPATING BARRIERS IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC) AND LOCAL CODES.

THE UNIT MUST NEVER BE ACCESSIBLE TO THE GENERAL PUBLIC, AND ANY ACCESS MUST BE LIMITED TO PERSONS QUALIFIED TO WORK WITH OR ON INDUSTRIAL ELECTRIC EQUIPMENT.

INSTALL THE UNIT ONLY IN LOCATIONS SUITABLE FOR THE PROTECTION AFFORDED BY THE ENCLOSURE TYPE.

NO CLAIM IS MADE THAT THESE INSTRUCTIONS COVER ALL DETAILS OR VARIATIONS IN THE UNIT DESIGN OR MANUFACTURE OR ADDRESS ALL POSSIBLE CONTINGENCIES THAT MIGHT BE ENCOUNTERED DURING THE INSTALLATION, OPERATION OR MAINTENANCE OF THE UNIT.

ALL QUESTIONS, CONCERNS, INFORMATION NEEDS OR PARTICULAR PROBLEMS THAT ARISE REGARDING THE RECEIVING, LIFTING, INSTALLATION, OPERATION OR MAINTENANCE OF THE UNIT PURCHASED WHICH ARE NOT SUFFICIENTLY ADDRESSED IN THESE INSTRUCTIONS SHOULD BE REFERRED TO THE MANUFACTURER.

⚠ DANGER

FIRE, ELECTRIC SHOCK, ARC FLASH, OR EXPLOSION HAZARD

FAILURE TO FOLLOW THESE DIRECTIONS WILL RESULT IN SERIOUS INJURY OR DEATH

Do not attempt to install, operate or service the unit if you are not qualified and familiar with all applicable work, safety and electrical codes, proper safety practices for electrical equipment and the use of personal protective clothing and equipment

SURE-VOLT™ SPECIFICATIONS (TYPICAL)

Application				
Power Rating/Size (kVA)	150 kVA			
Phase - Frequency (Hz)	3 phase – 60 Hz			
Input Voltage Range	480 +10%/-25% VAC			
Output Voltage Regulation	480 ±3% VAC			
Connections	Delta input / Wye output standard			
Cable Entry/Termination	Sides, bottom, back – hardwired to terminal blocks			
Operating Characteristics				
Regulation Variation	None – regulation constant for 0 to 100% load and any load power factor			
Overload Capacity	1000% for 1 second, 500% for 5 seconds, 200% for 1 minute - 1000% fault clearing			
Minimum Load	No minimum load or part load limitations			
Load Power Factor	No limitations, compatible with all load types			
Tap Switching	No load current interruption on switching at any load or power factor			
Zero Crossing Sensitivity	Tap switching not dependent on determining load current zero crossing			
Harmonic Distortion	No distortion added at any load or power factor			
Response Time	1 cycle typical regardless of load or load power factor			
Efficiency	97% typical			
Operating Frequency	±3% of nominal frequency			
Noise Suppression/Load Protection				
Noise Attenuation	150 dB at 100 kHz common mode; 65 dB at 100 kHz normal mode (excluding autotransformer)			
Surge Suppression	Included, complies with ANSI/IEEE C62.41			
Input Circuit Breaker	Included, standard			
Failsafe Electronic Bypass	Actuates on high temp., over-current, component failure, with no loss of load			
Construction				
Technology	Electronically-controlled tap switching series transformer design			
Switching Semiconductors	Non-full power semiconductors – individual SCRs do not carry full unit current			
Controls	Microprocessor-based control			
Cooling	Natural convection, no cooling fans used			
Isolation Transformer	Shielded; meets ANSI specs			
Enclosure	NEMA 1			
Environmental Requirements & Conditions				
Audible Sound Level	Meets or exceeds NEMA standards			
Temperature - Humidity	Ambient 32 to 104°F (0 to 40°C) – Relative humidity 0-95% non-condensing			
Operating Altitude	0 to 10,000 ft (3000m)			
Weight/Size	Wgt 2200 lbs/998 kg	Height 78 in/198 cm	Width 38 in/97 cm	Depth 26 in/66 cm
Minimum Clearances	Front – 36", either side – 12", back – 2", top – 12"			
Standard Options				
	None			

OVERVIEW

The standard Sure-Volt™ voltage regulator - power conditioner provides the broadest range of protection available to guard your valuable equipment and maximize your bottom line and features:

- Industry-leading overload capacity for compatibility with all loads types
- Built-in surge suppression for surges and spikes
- Line isolation to minimize transient events and noise
- Transformer shielding to further reduce line noise and deliver clean power
- Very fast response quickly to correct under/over voltage, sags, and swells
- Independent phase regulation for correction of voltage imbalance
- Input circuit breaker for protection against damaging overcurrent
- High fault clearing capacity for reliable system operation
- Failsafe electronic bypass to keep the load powered

The Sure-Volt™ is a microprocessor-controlled, electronic tap switching voltage regulator using a non-full power semiconductor design. It is compatible with all load types and load power factors and provides a minimum 1000% fault clearing capability. The unique design of the Sure-Volt™ creates no load current interruption during switching regardless of applied load or load type or power factor.

The standard Sure-Volt™ uses natural convection cooling and has no fans or other moving parts.

The standard automatic electronic failsafe bypass in the Sure-Volt™ maintains power to the load in the event of a unit malfunction.

The Sure-Volt™ works automatically to regulate voltage and condition power with no operator effort or programming required. The standard LCD display provides information on the status and then-current operation of the unit while alarm contacts are provided to permit remote indication of any problem.

Installation of the Sure-Volt™ is simple: the unit arrives completely assembled and requires no programming, testing, measuring, setting of switches or internal wiring. Maintenance is just as easy. With no moving parts, wear parts or fans, the Sure-Volt™ requires no regularly scheduled maintenance.

NOTICE!

CONTACT THE MANUFACTURER IF YOU HAVE ANY QUESTIONS ABOUT THE PROPER OR SAFE INSTALLATION, OPERATION, MAINTENANCE OR ANY OTHER MATTER INVOLVING THIS EQUIPMENT

Refer to the "OPTIONS & ADDENDUM" section for information on options that may be included with your Sure-Volt™ unit. Contact the manufacturer if you have any questions about the installation, operation or maintenance of the unit.

RECEIVING AND UNPACKING

The unopened, packaged unit must be immediately inspected upon receipt for any indication of damage sustained during shipping. During unpacking, inspect the unit for any signs of dents, scrapes, bent or loose parts or other problems as these are signs of shipping damage. If there is any sign of damage: 1) note the damage on the shipping documentation, if possible, prior to acknowledging receipt 2) photograph any damage found, 3) notify the transportation company of the damage, and 3) contact the manufacturer.

MOVING AND LIFTING

All Sure-Volt™ units are designed to be lifted only by the unit base by pallet jack, forklift or appropriate slings with spreader bars to prevent crushing the enclosure. On some units, the center of gravity may be indicated on the exterior of the packing. Use appropriate procedures for lifting unbalanced loads.

⚠ CAUTION	
FAILURE TO FOLLOW THESE DIRECTIONS WILL RESULT IN SERIOUS INJURY OR DEATH	
The center of gravity of the unit may not be in the middle of the unit. Take all precautions needed for lifting unbalanced loads. ---	
The unit is surprisingly heavy! Check the unit weight in the specifications or on the unit nameplate before lifting to ensure adequate capacity of any lifting equipment. ---	
Never lift a Sure-Volt™ unit from the top.	

INSTALLATION

The unit should be located in an area appropriate for industrial electrical equipment: concrete/non-combustible floor, adequately ventilated, free of flammable or combustible materials, liquids, gases or dust, secured from unauthorized access by the public, and in accordance with the duty of the enclosure as specified in NEMA Standards Publication 250-2003.

Refer to the specifications in this document for the operating environment and clearance requirements.

⚠ DANGER	
FIRE, ELECTRIC SHOCK, ARC FLASH, OR EXPLOSION HAZARD ---	
FAILURE TO FOLLOW THESE DIRECTIONS WILL RESULT IN SERIOUS INJURY OR DEATH	
The unit must have adequate ventilation and be installed a minimum of twelve inches away from any combustible surface unless separated and shielded by appropriate fire resistant and heat dissipating barriers in accordance with the national electric code (NEC) and local codes. ---	
Ensure the kVA capacity, frequency and voltage(s) of the unit match those required for the application. ---	
The Sure-Volt™ should only be installed in controlled areas where it is not accessible to the general public or unauthorized or unqualified personnel or in areas potentially subject to deliberate, unintended or accidental acts by such persons.	

ELECTRICAL CONNECTIONS

The Sure-Volt™ Electronic Voltage Regulator is designed to operate from a voltage source as indicated on the nameplate, and to power loads whose maximum continuous kVA does not exceed that indicated on the nameplate. Ensure that the source voltage and maximum load kVA conform to the nameplate rating on the front of the unit.

The Electronic Voltage Regulator is installed like a transformer, in series between the supply lines and the load(s) being protected.

⚠ DANGER
FIRE, ELECTRIC SHOCK, ARC FLASH, OR EXPLOSION HAZARD --- FAILURE TO FOLLOW THESE DIRECTIONS WILL RESULT IN SERIOUS INJURY OR DEATH
Only qualified personnel should be permitted to install, service or operate the unit. --- The unit must be installed in accordance with all applicable federal, state and local codes. --- Enclosure(s) must be grounded using the grounding lugs and/or studs provided. --- Follow all safe electrical work practices. Use personal protection protective equipment (PPE).

To install the Sure-Volt™:

1. Make sure the area where the Sure-Volt™ is to be installed is secured and that all electrical circuits are properly de-energized and locked out
2. Access the terminal connectors inside the Sure-Volt™:
 - a. For Sure-Volt™ units without hinged doors, access to the inside of the unit is obtained by removing the top cover and the front and/or rear panels (NOTE: The circuit breaker must be in the OFF position to remove the front panel)
 - b. For Sure-Volt™ units with hinged doors, access to the inside of the unit is obtained by opening the door(s) on the front of the unit (NOTE: The circuit breaker must be in the OFF position to open the front door(s))
3. Determine the desired entry points for the source and load cabling (NOTE: DO NOT run source and/or load cabling through any removable panel or door as this will impede access to the inside of the unit for inspection)

⚠ CAUTION
FIRE, ELECTRIC SHOCK, ARC FLASH, OR EXPLOSION HAZARD --- FAILURE TO FOLLOW THESE DIRECTIONS WILL RESULT IN SERIOUS INJURY OR DEATH
To avoid excessive or hazardous heating of the enclosure make sure that all leads to a three phase load pass through a single knockout/hole in the enclosure so that no part of the enclosure is between the load leads and that all leads from a three phase source pass through a another single knockout/hole in the enclosure so that no part of the enclosure is between the source leads.

4. Properly route, restrain and connect the source and load cabling inside the unit so that it is not in contact with any components or surfaces (NOTE: Source and load cabling must be sized and installed in accordance with all applicable federal, state and local codes) (NOTE: Properly support or brace the enclosure sheet metal to prevent damage when pulling cables/wiring)

5. The wiring of remote alarm contacts, surge suppressor(s) (MOVs) contacts and any other instrumentation provided inside the unit is optional. If installed, properly size and shield this wiring and route, restrain and connect it so that it is not in contact with any components or surfaces inside the unit
6. After installation of the source and load cabling, inspect ALL wiring and components inside the unit to ensure that all connections are tight and there are no signs of damage to the insulation, components or connectors (NOTE: Report any signs or possibility of wiring or component damage to the manufacturer before energizing the unit)
7. Make sure that the auxiliary circuit breakers (CB2, CB3 and CB4, if applicable) are in the ON (closed) position and all fuses, if any, are properly installed and in good condition
8. Replace all panels removed and/or close all doors on the unit

START UP

The unit has been fully calibrated at the factory and requires no user adjustment.

⚠ DANGER
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FAILURE TO FOLLOW THESE DIRECTIONS WILL RESULT IN SERIOUS INJURY OR DEATH
Prior to energizing the unit:
<ol style="list-style-type: none"> 1. All power and grounding connections must be secure 2. All panels must be securely installed and all doors closed on the unit 3. The input circuit breaker included in the Sure-Volt™ unit must be in the OFF (open) position

NOTE: The LCD display will not be illuminated until voltage is applied and the input circuit breaker is set to ON (closed)

Input Circuit Breaker Operation

The unit's input circuit breaker is operated by manual switch (handle) on the front panel/door of the unit. Turning the input circuit breaker handle to the ON (closed) position will immediately energize the Sure-Volt™, supply power to the load and start an initialization and self-diagnostic sequence by the unit. Once the initialization and self-diagnostic sequence is completed (in a few seconds), voltage regulation will commence and the normal display on the LCD will appear.

NOTE: If the LCD display does not illuminate or fails to have a normal display (see Normal Operation) within 10 seconds after turning the input circuit breaker ON (closed), immediately turn the input circuit breaker OFF (open) and refer to "Troubleshooting".

OPERATION

Normal Operation

Under normal operation the LCD display will appear as in the following example:

Phase	A	B	C
Boost#	1	2	1

The number under each phase indicates the relative buck or boost level provided to each output voltage phase. A negative value indicates that the unit is bucking (reducing) the output voltage in response to the input voltage being too high. A positive value indicates that the unit is boosting (increasing) the output voltage in response to the input voltage being too low.

NOTE: Immediately set the input circuit breaker to OFF (open) and refer to “Troubleshooting” if the display shows anything other than the buck or boost described above or if the display is blank or not illuminated.

The Sure-Volt™ continuously and automatically regulates the incoming voltage to the output regulation range specified. The Sure-Volt™ automatically changes discrete taps to provide the optimum output voltage in response to changes in the incoming voltage level. Under normal operation, it is likely that the output voltage may be on the high side of the output voltage range even if the incoming voltage is low, and vice versa. As long as the output voltage is within the specified output voltage range (for an input voltage with the specified range), the Sure-Volt™ is operating properly.

The Sure-Volt™ responds to changes in incoming voltage levels very quickly by changing taps in a non-sequential manner. This means that the unit might change from the maximum buck (voltage reducing) tap to the maximum boost (voltage increasing) tap almost instantly to maintain the output voltage within the regulation range. During tap changes, it is not unusual to see the output voltage change an amount equal to the total output voltage regulation range (e.g. 7v for an output regulation range of 120v \pm 3%). This is normal operation.

If the incoming voltage is below the specified operating range, the Sure-Volt™ will continue to boost the output voltage to its maximum capability; however the output voltage will fall below the specified minimum in proportion to the incoming voltage level. Similarly, if the incoming voltage is above the specified operating range, the Sure-Volt™ will continue to buck the output voltage to its maximum capability, however the output voltage will rise above the specified maximum in proportion to the incoming voltage level. Once the incoming voltage level returns to the specified operating range, the output voltage will be regulated to the specified regulation range.

The Sure-Volt™ regulates all phases independently to the optimum level within the output regulation range.

Automatic Internal Bypass

The Sure-Volt™ incorporates an automatic failsafe internal bypass to protect the unit from internal and external problems. The internal bypass is designed to actuate upon:

- Failure or malfunction of internal components such as switching semiconductor(s), internal power supply, microprocessor, printed circuit board, etc.
- Overload/overheating of the unit that causes the thermal protection of an internal component to de-activate that component

If the automatic internal bypass actuates, voltage regulation will cease and the output voltage will be the nominal, unregulated voltage, but power to the load will not be interrupted.

On units without voltage step up or step down, the output voltage will be approximately the same as the input voltage.

On units with voltage step up or step down, the output voltage will be proportional to the input voltage. For example, on a unit with a nominal 480v input and a nominal 208v output, if the unit internal bypass actuates and the incoming voltage is 5% low (456v), then the output voltage will be approximately 5% low (198v).

If the automatic internal bypass actuates, the LCD display will receive no power and will not be illuminated (blank).

The Sure-Volt™ may be operated indefinitely with the automatic internal bypass actuated until such time as the user chooses to de-energize the unit for troubleshooting or resetting the automatic internal bypass.

Refer to “Troubleshooting” if the LCD display is not illuminated (black).

Remote Alarm Contacts

The Sure-Volt™ unit is equipped with remote alarm contacts (rated 0.6A, 120VAC) that are normally open when the unit is powered and operating properly. Connections for the alarm contacts are labeled next to the output terminal connector(s). The alarm contact will be CLOSED (on) under the following circumstances:

- There is no power applied to the unit
- Power is applied, but the main input circuit breaker has tripped or is OFF (open)
- The unit internal power supply has failed
- There has been a component failure
- The thermal protection of an internal component has tripped
- The automatic internal bypass has actuated
- An auxiliary circuit breaker has tripped

It is recommended that the alarm contacts be wired to some type of external indicator/annunciator since the Sure-Volt™ will maintain power to the load even if the automatic internal bypass has actuated and voltage regulation is no longer being provided. An appropriate piezoelectric annunciator with a disconnect switch located where it can be heard, is a simple method.

Refer to "Troubleshooting" if the alarm contacts indicate a problem with the unit.

Transient Voltage Surge Suppression

Transient voltage surge suppression in the Sure-Volt™ is provided through a number of metal oxide varistors (MOVs). These MOVs act automatically to protect the unit and downstream equipment and wiring from excessively high voltage transients. MOVs are quite durable and reliable but can fail due the effects of recurring or severe voltage transients. The MOVs supplied in the Sure-Volt™ are equipped with both visual indication and contacts for a remote alarm to indicate a fault in the MOV.

In some Sure-Volt™ units the visual indication of MOV fault may be visible through ventilation screens or louvers on the front on the unit.

For maximum protection from transient voltages:

- The fault-indicating contacts on the MOVs should be connected to an appropriate alarm or annunciator
- If any MOV(s) indicate a fault, all MOVs should be replaced immediately with the same type and model

MAINTENANCE

The Sure-Volt™ is an all solid state device and requires no scheduled maintenance. It is recommended that for operation in clean, dry, dust-free environments, the unit be visually inspected internally at least annually for loose connections, damaged insulation, signs of overheating or other distress and collection of dust, dirt, debris or any liquids. The unit should be cleaned in accordance with good cleaning practices for electrical/electronic equipment at the time of each visual inspection. Any damage or problems observed should be corrected or otherwise made safe and proper in accordance with safe operation and work practices prior to energizing or operating then unit.

For operation in other environments, the inspection interval should be reduced appropriately.

⚠ DANGER

ELECTRIC SHOCK, ARC FLASH, OR EXPLOSION HAZARD

FAILURE TO FOLLOW THESE DIRECTIONS WILL RESULT IN SERIOUS INJURY OR DEATH

Only qualified personnel should be permitted to install, service or operate the unit.

Follow all safe electrical work practices. Use personal protective equipment (PPE).

Any questions about the condition, maintenance or operation of the unit should be immediately referred to the manufacturer prior to energizing the unit.

All panels must be securely installed and all doors closed prior to energizing the unit

TROUBLESHOOTING

<p>⚠ DANGER</p> <p>FIRE, ELECTRIC SHOCK, ARC FLASH, OR EXPLOSION HAZARD</p> <p>FAILURE TO FOLLOW THESE DIRECTIONS WILL RESULT IN SERIOUS INJURY OR DEATH</p> <p>Only qualified personnel should be permitted to install, service or operate the unit.</p> <p>Follow all safe electrical work practices. Use personal protection protective equipment (PPE).</p> <p>All troubleshooting is to be performed by qualified personnel only, with the unit de-energized and locked out, except as may required to measure voltages. <u>EXTREME CAUTION AND ALL SAFETY MEASURES MUST BE EXERCIZED WHEN WORKING AROUND ENERGIZED EQUIPMENT!</u></p> <p>Any questions about the condition, maintenance or operation of the unit should be immediately referred to the manufacturer prior to energizing the unit.</p>

	Problem/Symptom	Troubleshooting
1	LCD display is not illuminated (black display) after unit is energized OR LCD display is not illuminated (blank display) after unit has been working properly OR Alarm contacts indicate a fault condition	<ul style="list-style-type: none"> • Ensure the unit is properly energized • Ensure source and load voltages are correct • Ensure load does not exceed the capacity of the unit shown on the nameplate • Ensure there are no short circuits in the load or in the wiring to the load • Ensure the input circuit breaker is closed • Reset the unit protection See “Resetting unit protection” • If problem persists, contact the manufacturer
2	LCD displays “Lost Input Signal”	<ul style="list-style-type: none"> • Contact the manufacturer
3	Input circuit breaker tripped	<ul style="list-style-type: none"> • Ensure source and load voltages are correct • Ensure load does not exceed the capacity of the unit shown on the nameplate • Ensure there are no short circuits in the load or in the wiring to the load • If problem persists, contact the manufacturer
4	MOV fault alarm or visual indication	<ul style="list-style-type: none"> • Follow steps 1 and 2 of the “Resetting unit protection” instructions • Replace all MOVs in the unit with the same type and model • Follow steps 3 through 7 of the “Resetting unit protection” instructions

Resetting unit protection

1. Properly de-energize and lock out the unit
2. Open the front panel/door
3. Make sure the ribbon cable from the printed circuit board to the LCD display is in place and connections to both are secure
4. Locate auxiliary breakers CB2, CB3 and CB4 (if applicable) and reset all these breakers (reset these breakers by moving the breaker lever to the fully OFF (open) position and then to the ON (closed) position until the

- lever locks into place)
5. Locate and reset thermal protection switch on the resistor (the switch is reset by pressing it until it locks in the "IN" position)
 6. Properly close the unit by replacing all panels/closing all doors
 7. Follow the procedures and observe all warnings under "Start Up" to restart the unit

SAMPLE

LUG SIZES

kVA/Voltage	Input Circuit Breaker		Output Distribution Block	
	208/240	380/480/600	208/240	380/480/600
Single Phase				
5	#10-1/0	#10-1/0	#14-2/0	#14-2/0
10	#14-4/0	#10-1/0	#14-2/0	#14-2/0
15	#14-4/0	#10-1/0	(2) #6-350	#14-2/0
20	#14-4/0	#10-1/0	(2) #6-350	#14-2/0
30	250-500	#14-4/0	(2) #6-350	#6-350
50	(2) 3/0-350	#14-4/0	(2)#4-500	(2)#6-350
Three Phase				
5	#10-1/0	#10-1/0	#14-2/0	#14-2/0
10	#10-1/0	#10-1/0	#14-2/0	#14-2/0
15	#10-1/0	#10-1/0	#14-2/0	#14-2/0
20	#10-1/0	#10-1/0	#14-2/0	#14-2/0
50	#14-4/0	#10-1/0	#14-2/0	#14-2/0
75	#14-4/0	#10-1/0	(2) #6-350	#14-2/0
100	250-500	#14-4/0	(2) #6-350	#6-350
150	(2) 3/0-350	#14-4/0	(2)#4-500	(2)#6-350
200	(2) 400-500	#4-350	(2)#4-500	(2)#6-350
250	(2) 500-750	250-500	**	(2)#6-350
300	(3) 3/0-400	(2) 3/0-250	**	(2)#4-500
400	*	4/0-600	**	**
500+	*	*	**	**
* Contact factory			** No distribution block	

INPUT CIRCUIT BREAKER AMPERAGE RATING

Single Phase Units

KVA	5 kVA	10	15	20	25	30	50	75	100
208VAC	20 A	40	60	80	100	125	200	300	400
380VAC	15	30	40	50	60	70	125	200	250
480VAC	10	20	30	40	50	50	90	150	200
600VAC	10	15	20	30	40	40	70	100	150

Three Phase Units

KVA	5 kVA	10	15	20	25	30	50	75	100
208	20 A	40	60	80	100	125	200	300	400
380	15	30	40	50	60	70	125	200	250
480	10	20	30	40	50	50	90	150	200
600	10	15	20	30	40	40	70	100	150

For sizes larger than 100 kVA, contact the manufacturer.

DRAWINGS

OPTIONS & ADDENDUM

CONTACT MANUFACTURER

NOTICE!

CONTACT THE MANUFACTURER IF YOU HAVE ANY QUESTIONS ABOUT THE PROPER OR SAFE INSTALLATION, OPERATION, MAINTENANCE OR ANY OTHER MATTER INVOLVING THIS EQUIPMENT

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