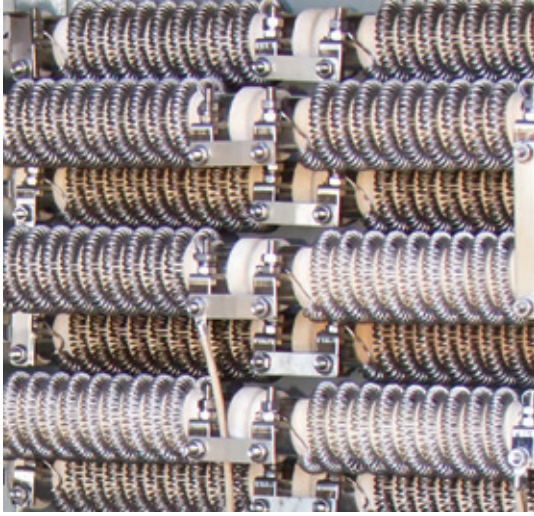
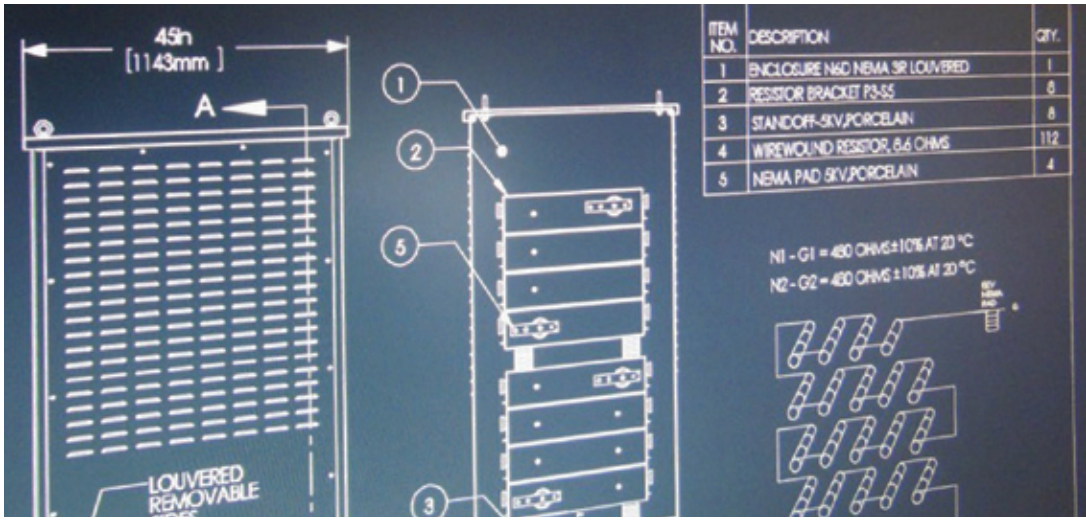
MegaResistors

Your best choice for power resistors

www.megaresistors.com

CUSTOMIZABLE





EFFICIENT

HIGH QUALITY

MegaResistors
Your best choice for power resistors

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OUR PHILOSOPHY

Our mission is to become a driving force of innovation and quality in the global market for power resistors. MegaResistors is fully committed to achieving sustainable growth for all stakeholders, including customers, employees, and society in general.

Accountability is important to us, we use a certified quality management system, along with national and international standards for every product we design and manufacture. Our products are designed, verified and validated through rigorous inspection and testing. We know that our products are deployed to prevent loss of life, serious injury, capital loss, and to help you meet statutory requirements and workplace efficiency needs. Efficiency, reliability and quality are at the core of our product design and production. We strive to make it easy for you to configure and to order the product you need through quote forms, direct email, phone and faxing.

Certified System
SAI GLOBAL
ISO 9001
Quality

WHAT WE DO

We build resistors.

Resistors fulfill a variety of important power system needs in all industries, from preventing electrical hazards and downtime due to ground faults in factories, mines and hospitals to dissipating excess energy in electrical machinery and even filtering out electrical frequencies that can be harmful to wildlife. They are an essential component to electrical safety and operation.

Call us, visit our website, or email us to learn more and see how we can satisfy your electrical resistance requirements.

905.908.2376

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sales@megaresistors.com

www.megaresistors.com

PRODUCT OVERVIEW

We manufacture standard and custom made power resistors. In the industry these types of resistors are commonly referred to with various names that describe the application rather than the resistor itself such as Neutral Grounding Resistor, Dynamic Braking Resistor, Motor Control Resistor etc.

- CUSTOMIZABLE
- EFFICIENT
- HIGH QUALITY

NEUTRAL GROUNDING

HIGH RESISTANCE

DYNAMIC BRAKING

MOTOR CONTROL

HARMONIC FILTER

NEUTRAL GROUNDING

Also known as Neutral Earthing

The purpose of a NEUTRAL GROUNDING RESISTOR is to limit the ground fault current to a safe level so that all the electrical equipment in the power system is protected. The resistor should be the only current path between the neutral of power transformers or power generators and ground.

When the neutral of a system is not grounded it is possible for destructive transient overvoltages to appear from line to ground during normal switching of a circuit having a line-to-ground fault. Experience has proved that these overvoltages cause aging and failure of insulation at locations on the system other than at the point of fault. In this way, a relatively unimportant line-to-ground fault on one circuit may result in considerable damage to equipment and interruption of service on other circuits, not to mention the increased difficulty in finding the original location of the problem.

A neutral grounding resistor is designed to limit the ground fault current to a safe value while at the same time letting enough current to flow to operate the protective relays that will alarm or clear the fault. While the disturbance lasts the resistor must be capable of absorbing and dissipating the energy generated without exceeding the temperature limits established by international standards. In this way the fault is safely limited, isolated, and the power system is protected against overvoltages.

Advantages

- ✔ Reduced operation and maintenance expenses.
- ✔ Fast isolation of the original fault.
- ✔ Reduced transient overvoltages.
- ✔ Reduced physical damage on the equipment at fault.
- ✔ Simplification of ground fault location.
- ✔ Increased life and protection of transformers, generators and related equipment.
- ✔ Reduced frequency of faults.
- ✔ Improved service reliability.
- ✔ Increased protection in the use of lightning arresters.
- ✔ Increased safety for personnel.

CUSTOMIZABLE

EFFICIENT

HIGH QUALITY

HIGH RESISTANCE

Advantages

- ✔ Continuous operation even with a phase to ground fault
- ✔ Reduced transient overvoltages
- ✔ Reduced physical damage on the equipment at fault
- ✔ Increased life and protection of transformers, generators and related equipment
- ✔ Reduced occurrence of faults
- ✔ Improved service reliability
- ✔ Increased safety for personnel

HIGH RESISTANCE GROUNDING RESISTORS are recommended for installations that require continuous service even after a phase ground fault occurs.

A phase to ground fault will not cause a large current to flow and will not trip the breakers because the neutral grounding resistor will limit the current to a very low value, typically 5 Amps.

For added security it is required that a suitable ground detection device, or ground fault relay, be used to indicate the presence of a ground fault.

Pulsing devices can be used with high resistance systems to reduce the time required to find and remove the ground fault.

Second ground fault protection will only trip the low priority feeders in the case of a second ground fault allowing the rest of the installation to continue uninterrupted.

This type of Neutral Grounding Resistor should limit the fault to a value greater than the capacitive charging current of the system to avoid overvoltages caused by intermittent faults. While the disturbance lasts the resistor must be capable of absorbing and dissipating the energy generated without exceeding the temperature limits established by national and international standards.

Optional Features

- ✔ Pulsing
- ✔ Zig-zag transformer
- ✔ Resistor monitoring
- ✔ Second ground fault protection
- ✔ Network communications
- ✔ Touchscreen operator panel
- ✔ Buzzer
- ✔ Meters and indicating lights
- ✔ Events Storage

Accessories

Flexible Current Probes

LOW RESISTANCE

Features

- Up to 5,000 amperes and up to 115,000 volts line to neutral.
- Stainless steel nuts and bolts.
- Stainless steel and tin plated copper connectors and internal connections for positive contact and reduced oxidation.
- Indoor or indoor-outdoor service with ventilated or non-ventilated top and sides.
- Removable top or side covers and optional side or front doors.
- Solid or perforated bottom for protection against the entrance of rodents, birds or accidental contact by personnel.
- High-temperature mica, porcelain and synthetic insulators.
- Optional entrance and exit bushings located according to customer's needs.
- Optional current transformers, voltage transformers and relays for fault detection, mounted inside the enclosure with optional external terminal box.
- Optional enclosure heaters, thermostats and temperature relays.
- Manual, test report and optional CSA code special inspection and blue label.
- Optional aluminum, stainless steel and lamacoid nameplates and tags.
- 24 month guarantee.

Optional Features

Resistive Elements
Wirewound
Edgewound
Stamped Grid

Enclosures
NEMA 1
NEMA 3R**
NEMA 4
NEMA 4X

Enclosure Materials
Galvanized Steel**
Stainless Steel
Anodized Aluminum

Enclosure Mounting
Floor-mounting**
Wall-mounting

** Standard Models

Enclosure Features
Door with Lock
Tamperproofing
Seismic Zone Special Bracing
Tower or Trailer Mounting

Transformers
Current Transformer
Voltage Transformer
Zigzag Transformer
Step/Down Transformer

Bushings
Top Neutral
Side Neutral
Top Ground
Side Ground

Other Features
Special Colors
High Altitude
Forced Cooling
Multiple Taps

Protection Relays	Sensor resistor	Heater	Disconnect
Used to alarm or trip in the case of a ground fault.	Allows the protective relay to determine if the resistor has failed.	Used in humid environments to prevent condensation of water into the system.	Turn off the resistive circuit at any time.

Standard Models

	Initial Current, A	Time Rating	Temp. Rise	Type	Dimensions (in)	Dimensions (mm)
277 V	25	10 seconds	760°C	60-3001	22"x 22"x 13"	559 x 559 x 330 mm
	50	10 seconds	760°C	60-3002	22"x 22"x 13"	559 x 559 x 330 mm
	200	10 seconds	760°C	60-4002	22"x 22"x 13"	559 x 559 x 330 mm
	5	Continuous	375°C	60-3006	22"x 22"x 13"	559 x 559 x 330 mm
	10	Continuous	375°C	60-3008	22"x 22"x 13"	559 x 559 x 330 mm
347 V	25	10 seconds	760°C	60-3001	22"x 22"x 13"	559 x 559 x 330 mm
	50	10 seconds	760°C	60-3002	22"x 22"x 13"	559 x 559 x 330 mm
	100	10 seconds	760°C	60-3004	22"x 22"x 13"	559 x 559 x 330 mm
	200	10 seconds	760°C	60-4003	22"x 22"x 13"	559 x 559 x 330 mm
	5	Continuous	375°C	60-3008	22"x 22"x 13"	559 x 559 x 330 mm
	10	Continuous	375°C	60-3010	22"x 22"x 13"	559 x 559 x 330 mm
1390 V	50	10 seconds	760°C	61-3006	45"x 50"x 23.5"	1143 x 1270 x 597 mm
	100	10 seconds	760°C	61-3012	45"x 50"x 23.5"	1143 x 1270 x 597 mm
	200	10 seconds	760°C	61-4005	45"x 50"x 23.5"	1143 x 1270 x 597 mm
	400	10 seconds	760°C	61-4007	45"x 50"x 23.5"	1143 x 1270 x 597 mm
	5	Continuous	375°C	61-3032	45"x 50"x 38.75"	1143 x 1270 x 984 mm
	10	Continuous	375°C	61-3040	45"x 50"x 38.75"	1143 x 1270 x 984 mm
2400 V	25	10 seconds	760°C	62-3008	45"x 37"x 23.5"	1143 x 940 x 597 mm
	50	10 seconds	760°C	62-3010	45"x 37"x 23.5"	1143 x 940 x 597 mm
	100	10 seconds	760°C	62-3020	45"x 37"x 38.75"	1143 x 940 x 984 mm
	200	10 seconds	760°C	62-4010	45"x 37"x 38.75"	1143 x 940 x 984 mm
	400	10 seconds	760°C	62-4013	45"x 37"x 38.75"	1143 x 940 x 984 mm
	5	Continuous	375°C	62-3056	45"x 37"x 38.75"	1143 x 940 x 984 mm
	10	Continuous	375°C	62-3069	50"x 45"x 38.75"	1270 x 1143 x 984 mm
	25	Continuous	375°C	62-4038	62"x 45"x 50.5"	1574 x 1143 x 1282 mm
4160 V	25	10 seconds	760°C	63-3013	45"x 37"x 38.75"	1143 x 940 x 984 mm
	50	10 seconds	760°C	63-3018	45"x 37"x 38.75"	1143 x 940 x 984 mm
	100	10 seconds	760°C	63-3036	45"x 37"x 38.75"	1143 x 940 x 984 mm
	200	10 seconds	760°C	63-4015	50"x 45"x 38.75"	1270 x 940 x 984 mm
	400	10 seconds	760°C	63-4020	50"x 45"x 38.75"	1270 x 940 x 984 mm
	5	Continuous	375°C	63-3096	45"x 37"x 72"	1143 x 940 x 1823 mm
	10	Continuous	375°C	63-3119	50"x 45"x 72"	1270 x 1143 x 1823 mm
8000 V	25	10 seconds	760°C	64-3025	45"x 37"x 38.75"	1143 x 940 x 984 mm
	50	10 seconds	760°C	64-3036	50"x 37"x 38.75"	1270 x 940 x 984 mm
	100	10 seconds	760°C	64-3069	50"x 37"x 38.75"	1270 x 940 x 984 mm
	200	10 seconds	760°C	64-4029	50"x 45"x 72"	1270 x 1143 x 1823 mm
	400	10 seconds	760°C	64-4038	50"x 45"x 72"	1270 x 1143 x 1823 mm
	5	Continuous	375°C	64-3186	76"x 56"x 59"	1930 x 1522 x 1499 mm
	10	Continuous	375°C	64-3228	81"x 61"x 73.5"	2058 x 1549 x 1867 mm

DYNAMIC BRAKING RESISTOR

The purpose of a DYNAMIC BRAKING RESISTOR is to slow down or to quickly stop a motor by draining excess voltage and keeping it within safe tolerances. This can help to lower the wear and tear of friction braking components, enable faster braking and eliminate the risk of a runaway due to overheating.

When removed from a power supply, most DC motors will act as electrical generators due to their permanent magnets. If a resistor is then connected as a load, the energy produced by the rotational inertia of the DC motor will be dissipated by the resistor slowing down the motor. While AC motors do not have permanent magnets in their rotors, they do have an induced magnetic field created by the rotating magnetic field in the stator. The energy lost in the stator will backfeed into the variable frequency drive (VFD), which will rise the voltage on the DC bus in the VFD. The greater the difference between the output of the VFD and the rotor's actual speed, the more energy will be fed into the VFD. If the VFD tries to brake the motor too quickly, the voltage will rise too much and damage the VFD. Most VFDs will shut down as a safety feature before this happens, and the motor will coast to a stop by friction alone. With appropriately sized braking resistors the motor can be stopped much more quickly without raising the voltage to unsafe levels.

Braking resistors with smaller ohmic values will help motors stop faster but will also dissipate more heat. This will require the use of more mass in the resistor or a heat sink to keep its temperature within a safe limit.

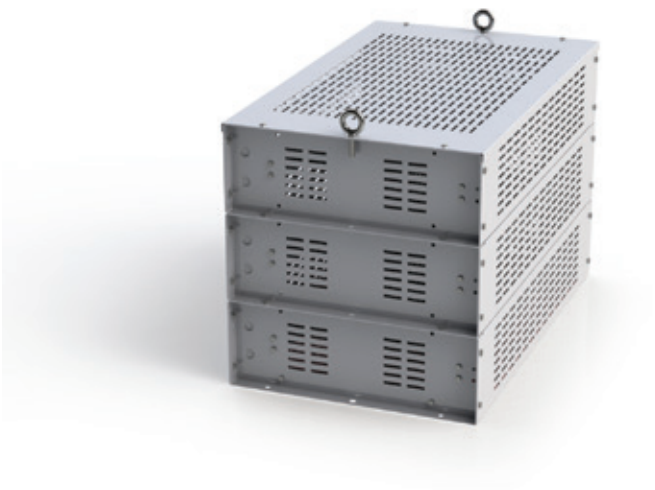
Advantages

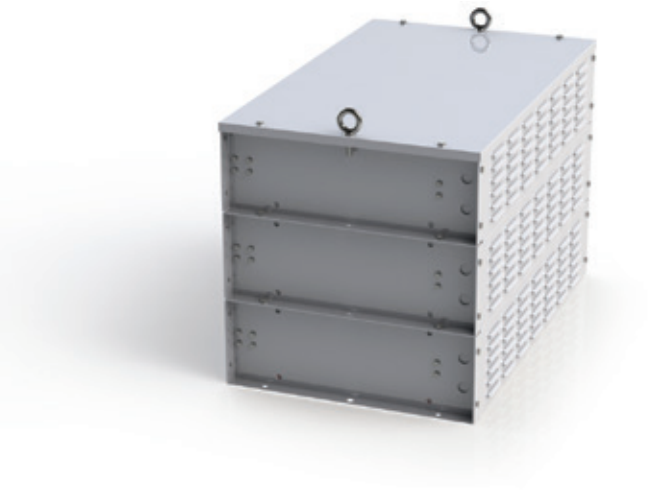
- ✔ Faster braking of DC and AC motors.
- ✔ Lower wear and tear of friction braking components.
- ✔ Keep motor voltages within safe levels.
- ✔ Eliminate risk of a runaway due to overheated friction brakes in some motors.
- ✔ Reduce wasted time during braking.
- ✔ Increase life of the equipment.
- ✔ Improved service reliability.
- ✔ Designed to absorb thermal expansions and contractions.

CUSTOMIZABLE

EFFICIENT

HIGH QUALITY





Features

- Terminal block normally closed thermal switch.
- Stainless steel nuts and bolts.
- Stainless steel and tin plated copper connectors and internal connections for positive contact and reduced oxidation.
- Optional outdoor service with removable covers and ventilated bottom screen for protection against the entrance of rodents, birds or accidental contact by personnel.
- High-temperature mica, porcelain and synthetic insulators.
- Rated, designed, manufactured and tested according to national and international standards.

Optional Features

Resistive Elements
Wirewound
Edgewound
Stamped Grid

Enclosures
NEMA 1**
NEMA 3R
NEMA 4
NEMA 4X

** Standard Models

Enclosure Materials
Galvanized Steel**
Stainless Steel
Anodized Aluminum

Enclosure Features
Drip Hood
Elevating Stand

Optional Features
Normally open thermal switch
Forced cooling

Standard Models

Type	Power	Dimensions (in)	Dimensions (mm)
DB 2	0.1-0.8 KW	15" x 8" x 5.25"	381 x 203 x 133 mm
DB 4	0.8-1.6 KW	15" x 14" x 5.25"	381 x 356 x 133 mm
DB 8	1.6-4 KW	22" x 14" x 5.25"	559 x 356 x 133 mm
DB 16	4-8 KW	20" x 18" x 8.25"	508 x 457 x 210 mm
DB 24	8-12 KW	20" x 24" x 8.25"	508 x 610 x 210 mm
DB 18-2	12-18 KW	34.5" x 21.6" x 15"	876 x 549 x 383 mm
DB 18-3	18-27 KW	34.5" x 21.6" x 22.5"	876 x 549 x 574 mm
DB 18-4	27-36 KW	34.5" x 21.6" x 30"	876 x 549 x 762 mm
DB 18-5	36-45 KW	34.5" x 21.6" x 37.5"	876 x 549 x 953 mm
DB 18-6	45-54 KW	34.5" x 21.6" x 45"	876 x 549 x 1143 mm

MOTOR CONTROL

MOTOR CONTROL RESISTORS are used to control the torque and speed of AC and DC motors, by limiting in-rush current. To avoid confusion it should be noted that these resistors are used to control power input into motors while Dynamic Braking Resistors are used to brake and drain energy.

These resistors are commonly used with wound-rotor motors as an external resistor circuit. Conductors in the rotor are connected to slip rings, these slip rings provide the contact to the resistor circuit. By changing the level of resistance in the circuit speed and torque can be adjusted. In other words, higher resistance means reduced torque and speed.

For multiple levels of torque and speed control, Motor Control Resistors use "steps" or "speeds". Steps/speeds essentially provide intervals for levels of resistance. For most applications, a 4-step/5-speed Motor Control Resistor is recommended. 1-step/2-speed resistors are available, all the way up to 10-step/11-speed. In general we recommend that you use a higher number of steps if the motor is powerful and used for large-scale purposes. Usually there will always be one more speed level than resistor steps, because the maximum speed is achieved with all steps cut out; exceptions occur when a permanent slip resistor is required to reduce internal heating of the motor.

To enable manufacturers to test resistors under the same conditions, NEMA has defined resistor classes based on duty and the type of application. We use these classes to conform to standards and making it easier for you to order your product. You can refer to the NEMA Resistor Applications and then the NEMA Resistor Classes to configure the resistor required for your motor.

Advantages

- ✔ Limit torque and speed of wound rotor motors to safe levels.
- ✔ Keep motor voltages within safe levels.
- ✔ Reduce overheating.
- ✔ Reduce wasted time during braking.
- ✔ Increase life of the equipment.
- ✔ Improved service reliability.

Features

- Very wide range of power and resistance ratings.
- Stainless steel bolts and nuts.
- Rating, design, manufacturing and testing according to national and international standards.
- 24 month guarantee.

Optional Features

Resistive Elements
Wirewound
Edgewound
Stamped Grid

Enclosure Materials
Galvanized Steel**
Stainless Steel
Anodized Aluminum

Enclosures
NEMA 1**
NEMA 3R

** Standard Models

HARMONIC FILTER

HARMONIC FILTER RESISTORS are often used, in combination with inductors and capacitors, as harmonic frequency filters.

The purpose of these filters is to reduce distortions in power systems, produced by non linear loads such as arc welders, induction furnaces, variable frequency drives, ballasts, computer equipment, phones, uninterruptible power supplies etc., which can cause failure of motors, transformers and switchgear through insulation breakdown, arcing and overheating.

In a normal AC power system, supply voltage varies sinusoidally with a fundamental frequency of 50 or 60 hertz. When linear loads, such as resistive heaters, incandescent lamps, constant speed induction and synchronous motors, are connected to the system, sinusoidal currents will be drawn from the system at the same frequency as the voltage. However when non-linear loads are connected, a series of sinusoidal currents, called harmonics, will be drawn at integer multiples of the fundamental frequency.

Many industrial and commercial electrical systems have capacitors installed to offset the effect of low power factor. Most capacitors are designed to operate at a maximum of 110% of rated voltage and at 135% of their kvar ratings. Since capacitive reactance is inversely proportional to frequency, harmonic currents may result in capacitor banks overload and failure.

Features

- Very wide range of power and resistance ratings.
- Stainless steel nuts and bolts.
- Designed for three-phase stacked or side by side installation.
- Continuous wirewound, edgewound and stamped corrosion resistant elements selected to meet power rating, inductance limits and voltage requirements0
- Low coefficient of change in resistance with changes in operating temperature
- High-temperature, porcelain or synthetic insulators selected to meet special creepage and clearance requirements .
- Conductive parts connected to a defined potentials.

Advantages

- ✔ Reduced neutral currents and resonance.
- ✔ Improved voltage stability.
- ✔ Reduced system losses.
- ✔ Improved system reliability.

Optional Features

Resistive Elements
Wirewound
Edgewound
Stamped Grid

Enclosure Materials
Galvanized Steel**
Stainless Steel
Anodized Aluminum

Enclosures
NEMA 1**
NEMA 3R

Enclosure Features
Drip Hood
Elevating Stand

** Standard Models

Bushings
Top Neutral
Side Neutral
Top Ground

DISCHARGE RESISTORS

Also known as Bleeder Resistors

DISCHARGE RESISTORS are placed in parallel with high-voltage supplies to discharge an electric charge stored in a capacitor or battery. This is done whenever the equipment containing the capacitor or battery may need to be serviced or repaired.

A discharge resistor may be either switched across the capacitor for rapid discharge without quiescent dissipation, or permanently connected for high reliability and low cost. In the latter case there is a tradeoff between the time to reach safe discharge and the quiescent power loss.

Advantages

- ✔ Faster discharge of capacitors and batteries.
- ✔ Personnel safety.
- ✔ Easier equipment handling.
- ✔ More control over speed of discharge.
- ✔ Compliance with statutory regulations.

NEUTRAL GROUNDING CABINETS

We can supply custom made generator neutral grounding cabinets including line side and neutral side single or multiple enclosures with neutral grounding resistors, disconnects, bus bars, neutral formation, current and voltage transformers, step-down transformers, arresters and capacitors.

CUSTOM ASSEMBLIES

We can create custom assemblies to your specifications. Including load banks and other products not listed in our catalogue.

Please do not hesitate to contact us. We can help you meet you unique resistance needs.

All of our products are designed, built and tested according to the most recognized national and international applicable standards.

International Organization for Standardization

The ISO develops and publishes international standards including the ISO 9001:2008 standard.

Our quality management system includes all of our fundamental processes and has been developed according to the ISO 9001:2008 standard. It requires periodic review of the quality management system and training and certification of our employees. It details how we take your product requirements and turn them into products with consistent and measurable quality, how we control our measurement of quality, how we deal with nonconformances etc.

National Electrical Manufacturers Association

NEMA provides a forum for the standardization of electrical equipment, enabling consumers to select from a range of safe, effective, and compatible electrical products.

Canadian Standards Association

The Canadian Standards Association develops standards and installation codes in multiple areas including management, construction, electrical, energy and the environment. CSA offers global solutions for product testing and certification that help streamline access to markets in North America and around the world.

Institute of Electrical and Electronics Engineers

The IEEE Standards Association (IEEE-SA) is a leading developer of global industry standards in a broad-range of industries, including Power and Energy.

International Electro Technical Commission

The IEC is a world's leading organization for the preparation and publication of International Standards for all electrical, electronic and related technologies.

Underwriters Laboratories

UL is a global independent safety science company with more than a century of expertise innovating safety solutions.

UL certifies, validates, tests, verifies, inspects, audits, advises, educates and collaborates to establish standards that create level playing fields and work to develop new pathways for the latest innovations.

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