

# OVERLOADS

## General

An electrical overload is a condition in which everyone has seen the result of. Dim lights, shrunken pictures on TV or computer screens, slow running motors, overheated wires, and tripped breakers are all signs of overloads. Devices with high start-up currents (large motors) and power distribution systems that have too much machinery cause these occurrences. Some disastrous

effects of overloads are wiring and distribution failure when operated continuously on overloaded circuits. The short term effects are annoying: computer re-boots, erroneous machine operation, reduced performance of electrical devices and tripped circuit breakers.

Overloads occur when an electrical device (load) draws an

excessive amount of current from the power source, or from faults in a short circuit condition. Power sources such as transformers are designed to perform optimally at or near full load. Small changes in current draw from this point do not effect the transformer. But when excessively large current draws occur the output voltage from the transformer decreases rapidly.

## Power

Usable power is a product of voltage and current. When voltage decreases, for typical non-regulated electrical devices, the current also decreases by the same percentage. This can be seen by Ohm's Law, where the current is directly proportional to

the voltage. A 10% voltage decrease causes the current to also decrease by 10%, resulting in a power loss of 20%. Regulated loads draw more current to make up for reduced voltages, decreasing their efficiency. This increases the heat generated by the load;

shortening the life of the equipment. In this case, a 10% decrease in voltage will result in a 10% increase of current, further complicating the under voltage with current overload conditions.

## Ferroresonant Transformers

Ferroresonant transformers are designed to handle overloads of 150%, which is their current limit point. As the current proceeds past this point, the transformer's output approaches zero by rapidly decreasing the voltage, providing an automatic safety feature. This

action is analogous to over-current protection devices in a building's breaker panel. The difference is that the transformer is dynamic. Once the overload subsides, the transformer will begin operating instantly, while breakers need to be manually switched back on.

In a bolt fault condition, the ferroresonant transformer will deliver 40 times it's full rated operating current for 1/2 cycle, allowing properly coordinated over current devices to clear.

## Power Purifier

The *Power Purifier* supplies full rated current over a 100% duty cycle, as well as, operates into a dead short circuit safely without any detrimental effects to the transformer. *"In fact, the primary current, under a secondary short*

*circuit condition, reduces to magnitudes less than the no load quiescent line current."* The *Power Purifier* is a brute force industrial grade voltage regulating isolation transformer that should be used anywhere trouble-free operation

and clean regulated power is needed. No other regulating / conditioning topology offers the assurance of longevity under adverse conditions.



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