K(i) Ratedappnotes
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K(i) Rated Power Conditioners & Voltage Regulators

General

When performing an imaging scan or treatment procedure, most medical equipment has a high surge current — meaning that the current will rise 3 to 5 times the steady state current, or higher! Medical imaging modalities in particular exhibit a very high "momentary power demand", typically lasting for less than 5 seconds. Nevertheless, these seconds are critical and the power source must deliver the current required while staying within the line voltage tolerance of the imaging equipment.

Some medical OEMs take the "better safe than sorry" approach of over-sizing a dedicated distribution transformer and feeder cables to match the worst case momentary power demand of their equipment. This is done in an effort to minimize the voltage drop when stepping from stand-by mode to scan mode. However, the imaging equipment spends most of its time in the stand-by mode, requiring a fraction of the momentary power demand. This over-sizing can lead to an expensive and inefficient installation, but there is another option. Instead of over-sizing the transformer and associated conductors, a UL listed, K(i) rated power conditioning transformer or voltage regulator may be used. These K(i) rated systems are designed to supply the maximum momentary power demand, while continuing to provide the stable voltage required.

Design and Performance of K(i) Rated Systems

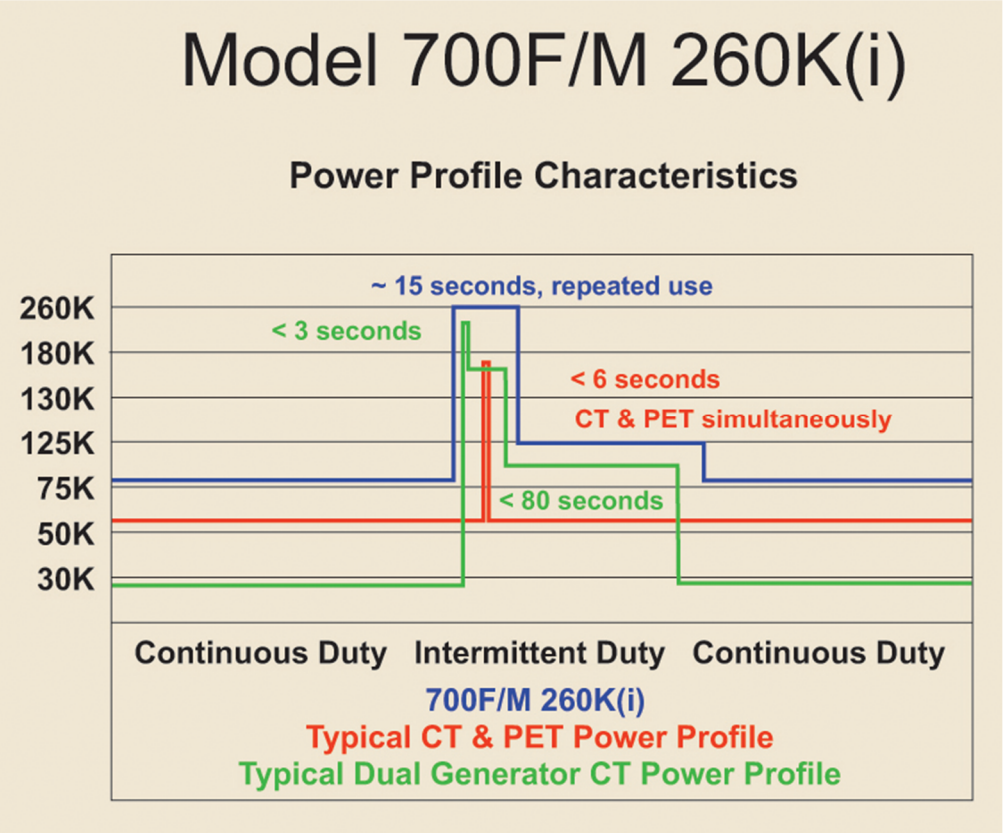
A "K(i) rating" refers to the intermittent kVA or momentary power demand rating. K(i) rated systems also have a continuous KVA rating.

K(i) rated power conditioning transformers and voltage regulators are often installed upstream from medical imaging modalities. These K(i) rated systems are designed to meet the high momentary power demand of imaging equipment, while continuing to provide stable voltage.

When sizing a K(i) rated power conditioning system, the medical imaging equipment's maximum momentary KVA should not exceed the power conditioner's K(i) rating. Secondly, the imaging equipment's maximum steady state KVA should not exceed the power conditioner's continuous KVA rating. In most applications, the imaging equipment's maximum steady state KVA is <50% of the power conditioner's continuous KVA rating.

A key consideration in the design of a K(i) rated system is output impedance (%Z). The %Z will determine the load voltage regulation of the system, as well as the output voltage total harmonic distortion (THD). A desired low output impedance of <2% will supply the maximum momentary KVA required, while minimizing the voltage drop. In the case of K(i) rated line voltage regulators with isolation & power conditioning, regulating devices are surge rated to handle the K(i) demand on a repeat basis.

On the next page is a typical medical equipment power profile that illustrates the proper application of a K(i) rated power conditioner or voltage regulator.



Note: The illustration above is a typical medical equipment power profile that depicts the proper application of a K(i) rated power conditioner or voltage regulator.

The Controlled Power Company Solution

The Controlled Power Company *SureImage* Model Ultra-K/M Power Conditioning Transformer and Model 700F/M Voltage Regulator with Power Conditioning are K(i) rated systems designed to meet the high momentary power demand of today's imaging equipment, while continuing to provide stable voltage.

Most manufacturers of commercial or industrial transformers, power conditioners, and voltage regulators "over-size" their units to regulate voltage well under these dynamic load conditions. This approach results in increased operating costs, a more expensive installation, and typically a larger unit footprint. A few regulator manufacturers utilize a static transfer switch, which could divert untreated utility power to the medical equipment during normal operation if the switch isn't properly sized.

In contrast, the *SureImage* products are sized properly for the continuous load rating, providing high efficiency and lower operating costs. In addition, all models are surge-rated to optimize performance, providing your medical equipment with exactly the power it needs.