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Burst Fire Control in HVAC Heating Loads

Due to legislation concerning the generation of electrical noise - either mains-borne in supply cables or air-borne as radiated waves - various techniques have been developed to comply with controlling heating loads for HVAC.

Basically there are two methods of meeting todays' requirements using thyristor-controlled equipment. One is to use "phase angle" control where the thyristor is turned on at a specific point in each half cycle of the mains frequency. Varying this point of turn-on between the initial and final zero-voltage-points of the sine wave provides a variation from 100% down to 0% of the load voltage (and hence heater power). The second method is to turn the thyristors on and off for complete half-cycles over a set period of time (usually a few seconds). This is known as "burst fire" control and varying the ratio of "on" to "off" cycles provides a similar variation of load power.

Phase angle control allows a smooth control of the load but will generate a significant amount of electrical noise unless substantial filter networks are employed. The level of electrical interference increases as the switch-on point approaches the maximum peak voltage of the sine wave. The phase angle control method is used for loads having a short time constant, such as brightness control of theatre and studio lighting.

Burst fire control regulates the power to the load in pulses over a pre-set time. This pre-set time is usually between 4 to 10 seconds, so to generate a 50% output the thyristor is on for 50% of the time and off for 50% of the time. By ensuring that the thyristors are always switched on at the zero-voltage point of the mains half-cycle, fast-rising high voltage wave-fronts are avoided which significantly reduces the level of generated electrical noise.

This technique is cost effective, as the requirement for substantial filtering is now eliminated.

So to comply in a cost-effective way with the demands of modern HVAC heating control the burst fire control technique is the preferred method. The phase angle approach may be required for loads having a short time constant but the costs per equipment are significantly higher.

For more information please contact :-

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