

Automatic Power Factor Controller by Using Arduino

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Abstract: *In recent times, the quality of power in AC systems has become a significant concern due to the proliferation of electronic devices, power electronics, and high-voltage power systems. Many commercial and industrial setups have hefty electrical loads, often inductive in nature, leading to a lagging power factor. This lagging power factor results in hefty penalties imposed by electricity boards on consumers. To address this issue, power factor correction (PFC) steps in. PFC involves the capacity to absorb the reactive power generated by a load. While fixed loads can have their power factor corrected manually by switching capacitors, the challenge arises with rapidly changing and scattered loads. It becomes impractical to maintain a high power factor by manually toggling capacitors on/off in response to load variations across an installation. This dilemma is effectively tackled by utilizing an Automatic Power Factor Correction (APFC) panel. In this context, the paper proposes a solution utilizing an Atmega328 microcontroller to measure the power factor from the load. Based on this measurement, the system triggers the required capacitors to compensate for reactive power, thereby bringing the power factor closer to unity. This automated approach ensures efficient power factor correction, even in scenarios with fluctuating and dispersed loads, offering a more reliable and cost-effective solution for maintaining power quality in electrical installations.*

Keywords: Automatic power factor correction, embedded technology, Arduino

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