

A Novel Concept for Fault Current Tolerable Contactors

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Abstract - It is critical in the development of new contactors and starters to enable the product to avoid or minimize contact welding during short circuit events. The IEC 60947-4-1 or UL 508E Type II coordination requires that a contact weld can be easily broken without significant deformation after short circuit events, and the new standard of IEC 60947-6-2 mandates no contact welds after short circuit events.

In this paper, a novel concept has been developed and investigated to allow significant fault current tolerance improvement for next generation contactor and starter product lines. An innovative design of the movable contact bridge utilizes the magnetic force generated by the fault current to 'latch' the contacts open until current zero and re-close after current zero. This delay of contact re-closing allows the molten contact surface to solidify and minimizes or even eliminates contact welding altogether. This design does not require a size increase of the product to achieve this performance and adds minimal cost. Test evaluation has been carried out to verify this concept. The test results show that the contacts close about 1.5ms to 2ms after current zero and achieve no contact welding after short circuit events with proper current limiting by the upstream circuit protector.

Keywords: *Contactor, Starter, Contact-weld, Type II coordination, Short circuit, Fault-current tolerable*