

# Multiphase Interleaved IPT Based Current-Source Converter for High-Current Application

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## ABSTRACT

This paper presented a multiphase interleaved current-source converter for high-current applications based on inductive power transfer (IPT). The series-series compensated IPT system is adopted to achieve load-independent output current, and the scalable multiphase configuration enables high-current capability. Interleaved control strategy is applied to an  $N$ -phase IPT system with an angle shift of  $360^\circ/(2 \times N)$  to eliminate output current ripples. A 3-phase interleaved IPT based 2kW dc-dc converter prototype is implemented with considerations of zero-voltage-switching (ZVS) operation and harmonic loss suppression. A 101.5A output current is realized at 480V input with a small current ripple of 0.87A and a dc-dc efficiency of 91.39% at 2.07kW.

## EXPERIMENTAL PROTOTYPE

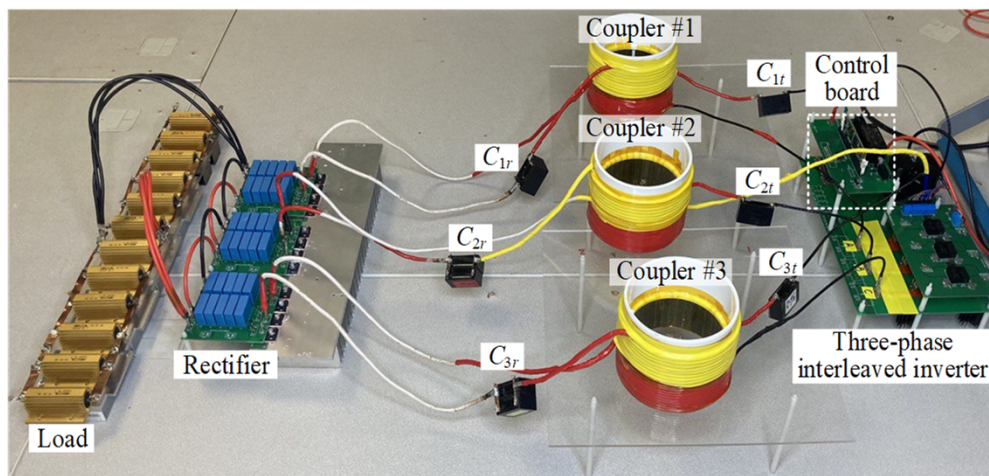


Fig.2. Three-phase interleaved IPT based high-current source.

## KEY CONTRIBUTIONS

- Load-independent high output current up to 100A.
- Interleaved control strategy with low current ripple of 0.87A.
- ZVS operation and input current harmonics suppression .

## CIRCUIT TOPOLOGY

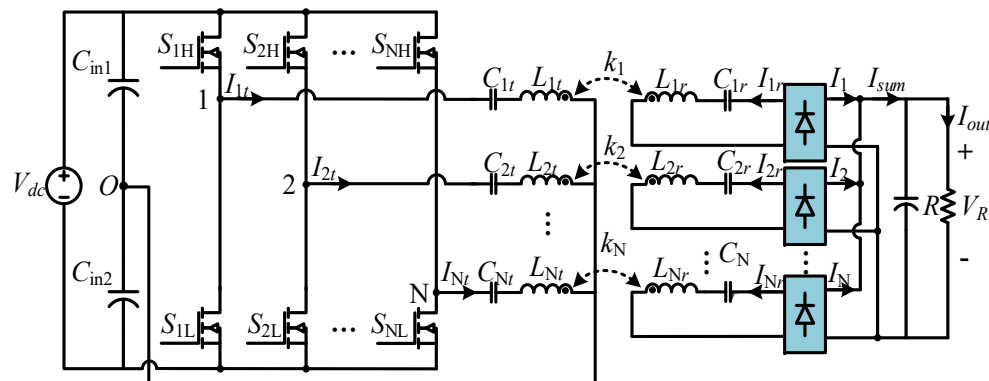


Fig.1. Multiphase interleaved IPT based current-source converter.

## EXPERIMENTAL RESULTS

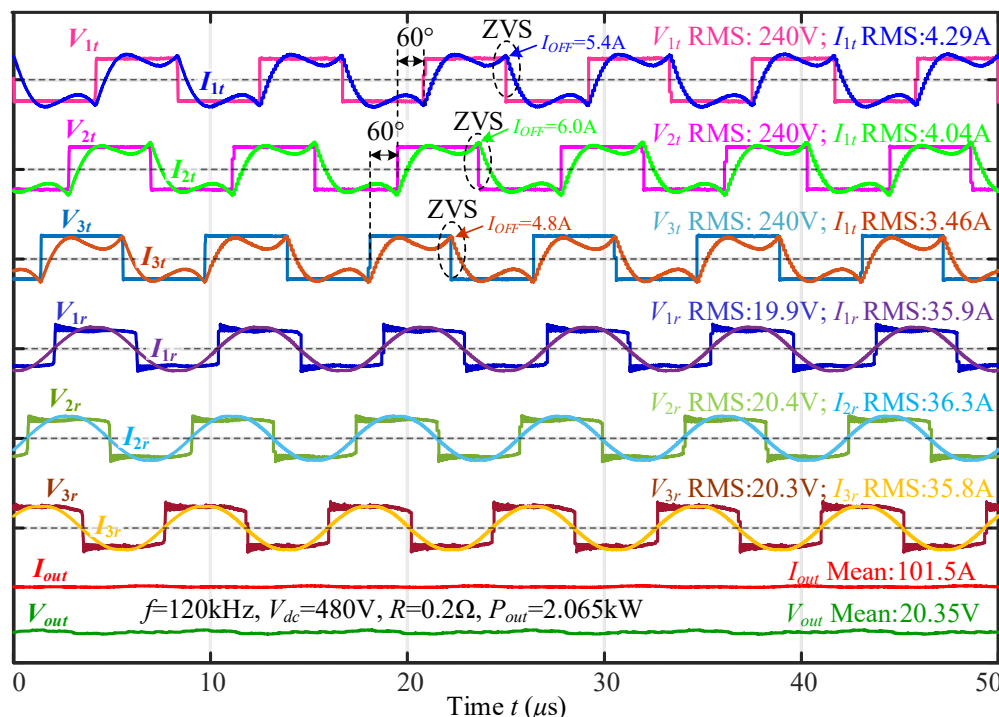


Fig.3. Experimental waveforms of input and output voltages and currents