

## Design of the LCL Harmonic Filter with Grid-Connected Transformer

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**Abstract :** Large-scale integration based on power electronic systems gives rise to new challenges to modern power grids' power quality and stability. Power converters are the key elements of the power system that are actively involved in improving power quality and increase penetration of new energy sources to the power grid. Integration magnetic components allow reducing the overall size and even increasing energy efficiency. Additionally, the parasitic elements of the power transformer model investigated by the analytical approach. Moreover, the harmonic issues are critical, which are emerged due to the deployment of converters. Low pass LCL filters are usually deployed between the inverter and grid-connected transformers to mitigate harmonic pollution produced by the inverter. Passive filter, connected to the grid inverter, requires a small filter size and the harmonic limitations defined by the standard IEEE-519. A significant part of the overall cost and size of the power converter is the magnetic components. This paper illustrates a low-pass LCL harmonic filter design using the power transformer's parasitic parameters for grid-connected inverter by theoretical and practical analysis, simulated in MATLAB-Simulink.

**Keywords :** harmonics, integration, inverter, LCL filter

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