IEEE Guide for Bus Design in Air Insulated Substations

IEEE Power & Energy Society

Sponsored by the
Substations Committee

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Abstract: A proper design of the substation bus ensures a safe and reliable operation of the substation and the power system. Two different types of buses are used in substations, the rigid bus and the strain (cable). This guide provides information on the different bus arrangements used in substations stating the advantages and disadvantages of each. Also it provides information as related to each bus type and construction. Once the bus type is selected, this guide provides the calculation tools for each bus type. Based on these calculations, the engineer can specify the bus size, forces acting on the bus structure, number of mounting structures required, and hardware requirements.

Keywords: ampacity, bus support, corona, electromagnetic, finite-element, forces, ice, mounting structure, rigid bus structures, short circuit, strain-bus structures, substation design, wind

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Introduction

This introduction is not part of IEEE Std 605-2008, IEEE Guide for Bus Design in Air Insulated Substations.

This introduction provides some background on the rationale used to develop this guide. This information is meant to aid in the understanding and usage of this guide.

Buses consisting of conductor structures and the associated hardware comprise a large percentage of the substation equipment investment. The proper design of substation bus structures contributes to the safe and reliable operation of the substation and the power system. Two different types of buses are most commonly used in substations: rigid bus and strain bus (cable). This guide provides information on the different bus arrangements used in substations stating the advantages and disadvantages of each. Also, it provides information on each bus type and construction. Once the bus type is selected, this guide provides the calculation tools for each bus type. Based on these calculations, the engineer can specify the bus size, the forces acting on the bus structure, the number of mounting structures required, and the hardware requirements. However, this guide does not provide any guidance on the seismic design of bus structures, which is given in IEEE Std 693™-2005[a] and IEEE Std 1527™-2006.

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IEEE Std 605-2008

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