

# Distribution Mode

## Simulate large distribution networks with RSCAD V5

RSCAD Version 5 includes Distribution Mode, a new feature allowing users to simulate large distribution networks and feeders for the first time ever using the RTDS® Simulator. These networks can include several hundred to over a thousand nodes, and are typically made up of short lines and cables which do not allow the circuit to be separated into subsystems. With Distribution Mode, these very large networks can now be simulated in one tightly coupled area.



Distribution Mode relies on the distribution feeder being radial in structure, which creates a highly sparse admittance matrix compared to non-distribution cases and reduces the computational burden on the network solution. Furthermore, the simulation timestep for Distribution Mode is in the range of 150-200 microseconds to provide more time for the calculation of the network solution. The combination of the highly sparse admittance matrix as well as the larger timestep allow a vastly larger number of nodes to be modelled in one subsystem.

The Distribution Mode component library is a limited subset of components from the RSCAD library. It does not include travelling wave transmission line or cable models, synchronous machine models, or switching models for power electronics. Power electronic converters can only be modelled using average models in Distribution Mode.

### RTDS Simulator Requirements for using Distribution Mode

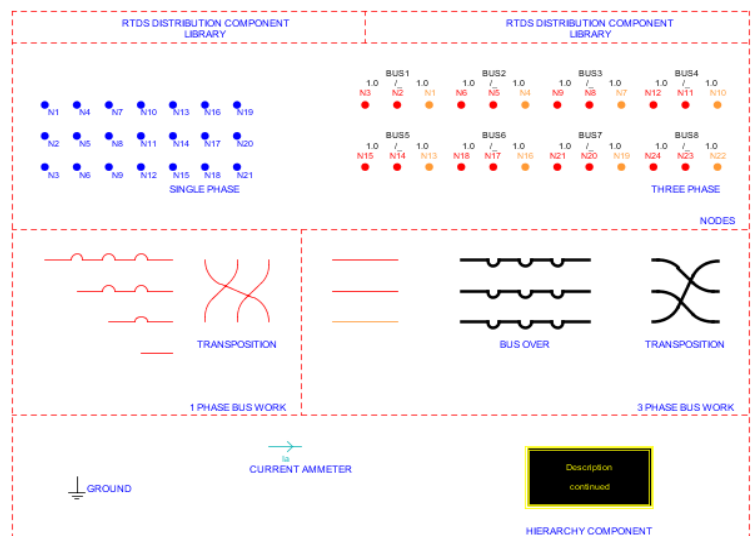
Distribution Mode can be used with RSCAD Version 5.0 or higher.

Distribution Mode cannot be run on GPC cards or older processor cards, and is only compatible with the PB5 processor card.

The circuit components for a given Distribution Mode case must be run on one rack, and cannot be connected to standard mode circuits in any way. Control components can be placed on a separate rack if necessary, and can be communicated cross-rack to the Distribution Mode electrical circuit.

### IEEE 34 Bus Feeder Case

The IEEE 34 bus feeder network has been modelled using Distribution Mode and is available for users in the **SAMPLES** directory in RSCAD. The travelling wave transmission line that previously split this case into two subsystems has been eliminated, and the entire case is represented using pi-section models.



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