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| NPRR Number | [790](http://www.ercot.com/mktrules/issues/NPRR790) | NPRR Title | Addition of Phase Angle Limits to the Network Operations Model |
| Date Posted | July 20, 2016 |
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| Requested Resolution  | Normal  |
| Nodal Protocol Sections Requiring Revision  | 3.10.7.1.3, Transmission Breakers and Switches |
| Related Documents Requiring Revision/Related Revision Requests | None |
| Revision Description | This Nodal Protocol Revision Request (NPRR) adds phase angle limitations to the ERCOT Network Operations Modeling process. |
| Reason for Revision |  Addresses current operational issues. Meets Strategic goals (tied to the [ERCOT Strategic Plan](http://www.ercot.com/content/news/presentations/2013/ERCOT%20Strat%20Plan%20FINAL%20112213.pdf) or directed by the ERCOT Board). Market efficiencies or enhancements Administrative Regulatory requirements Other: (explain)*(please select all that apply)* |
| Business Case | The North American Electric Reliability Corporation (NERC) Reliability Standards now require the inclusion of phase angle equipment limitations in Real-Time monitoring, Real-Time assessments, and operational planning analysis. ERCOT will collect this information through the Network Operations Modeling process. |

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| Market Segment | Not applicable |

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| Proposed Protocol Language Revision |

***3.10.7.1.3 Transmission Breakers and Switches***

(1) ERCOT’s Network Operations Model must include all transmission breakers and switches, the operation of which may cause a change in the flow on transmission lines or Electrical Buses. Breakers and switches may only be connected to defined Electrical Buses.

(2) Each TSP and Resource Entity shall provide ERCOT with the following information, subject to the naming conventions in Section 3.10.7.1, Modeling of Transmission Elements and Parameters:

(a) Equipment owner(s);

(b) Equipment operator(s);

(c) The Transmission Element name;

(d) The substation name;

(e) Connectivity;

(f) Normal status; and

(g) Transmission breaker phase angle limits

(h) Other data necessary to model Transmission Element(s).

(3) ERCOT shall develop methods to accurately model changes in transmission line loading resulting from Load rollover schemes transferring more than ten MW. This may include modeling distribution circuit breakers, dead line sensing, or other methods that signal when the Load should be transferred from one transmission line to another transmission line. ERCOT may employ heuristic rule sets for all manual Load transfers and for automated transfers where feasible. ERCOT application software is required to model the effects of automatic or manual schemes in the field transfer Load under line outage conditions. Each TSP and as applicable, Resource Entity, shall define the Load rollover schemes under Section 3.10.7.2, Modeling of Resources and Transmission Loads, and furnish this information to ERCOT. Transmission field (right-of-way) switches must be connected to a named Electrical Bus and be included in the Network Operations Model.