

# ISO Rules

## Part 500 Facilities

### Division 503 Technical & Operating Requirements

#### Section 503.7 Power System Stabilizer



#### Applicability

- 1 Section 503.7 applies to:
  - (a) the **legal owner** of a **generating unit, aggregated facility, or energy storage resource** that is directly connected to the **transmission system** or to **transmission facilities** within the City of Medicine Hat, including a **generating unit, aggregated facility, or energy storage resource** situated within an industrial complex that is directly connected to the **transmission system**; and
  - (b) the **ISO**.

#### Requirements

##### Power System Stabilizer for Synchronous Resources and Facilities

**2(1)** The **legal owner** must, in accordance with this subsection 2, install a power system stabilizer on each synchronous:

- (a) **generating unit or energy storage resource** that has a **maximum authorized real power** greater than 27 MW; or
- (b) **generating unit or energy storage resource** that is a part of a facility with other **generating units or energy storage resources**, where the total **maximum authorized real power** of the facility is greater than 67.5 MW.

**(2)** The **legal owner** is, notwithstanding subsection 2(1), not required to install a power system stabilizer on a synchronous:

- (a) **generating unit**;
- (b) **aggregated facility**; or
- (c) **energy storage resource**,

if the closed loop phase lag between the voltage at the stator winding terminals or **collector bus** of the **generating unit, aggregated facility, or energy storage resource** and the reference input for the **automatic voltage regulator or voltage regulating system** is greater than 135 degrees.

**(3)** The **legal owner** referred to in subsection 2(1) must ensure that the power system stabilizer:

- (a) is designed to be in continuous operation while the **generating unit, aggregated facility, or energy storage resource** is on-line, except when the **generating unit, aggregated facility, or energy storage resource** is producing less **real power** than its design limit for effective power system stabilizer operation;
- (b) is reviewed and retuned if any **automatic voltage regulator or voltage regulating system** response parameters are modified;
- (c) is either:
  - (i) a dual-input integral of accelerating **real power** type; or
  - (ii) a single-input speed or frequency type;
- (d) provides a compensated frequency response of the excitation system such that, through the frequency range from 0.1 Hz to 1.0 Hz, the phase shift will not exceed plus or minus 30 degrees;

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- (e) is capable of output limits between plus or minus 5% of the operating voltage value submitted under Section 503.3 of the **ISO rules**, *Reactive Power*, and is approved by the **ISO**;
- (f) has the gain set to provide a gain margin of no less than 6 dB and no more than 10 dB; and
- (g) has the washout time constant set as low as possible while maintaining the compensated phase criteria.

(4) The **legal owner** of a synchronous **energy storage resource** must, if the **energy storage resource** is equipped with a power system stabilizer and is capable of operating in a mode that consumes active power while electrically connected, such that the power system stabilizer does not produce negative damping, design the power system stabilizer to be in service while consuming active power.

(5) The **legal owner** referred to in subsection 2(1) is prohibited from using a power system stabilizer of the **real power** type.

(6) The **ISO** must, notwithstanding subsection 2(1), approve the use of a single power system stabilizer for an **aggregated facility** containing directly-coupled synchronous **generating units** and document the approval within the functional specification.

#### Power System Stabilizer for Asynchronous Resources and Facilities

3(1) The **ISO** may, by written notice, require the **legal owner** of an asynchronous **energy storage resource** or **aggregated facility** containing an asynchronous **energy storage resource** to use a power system stabilizer that is specified by the **WECC**.

(2) The **legal owner** of an asynchronous **energy storage resource** or an **aggregated facility** containing an asynchronous **energy storage resource** must, upon receipt of the written notice described in subsection 3(1), install and enable a power system stabilizer, as specified by the **WECC**.

#### Revision History

Date	Description
2024-04-01	Initial release.