

TRANSPOWER



Manapouri Generation Intertrip Scheme Scheme Overview

Purpose of the Document	This document provides information on the operation and procedures related to the Manapouri Generation Intertrip Scheme.
System need	<p>The transient stability limit for a close-in double circuit fault at MAN is 775 MW (when all circuits are in service (without this scheme). The MAN station has a maximum output of approximately 840 MW which is above the transient stability limit.</p> <p>Without having this special protection scheme, MAN generation is constrained by the stability limits.</p>
Purpose of the Scheme	This scheme increases the stability limit close to the maximum station output.
When to Enable the Scheme	The scheme is normally enabled.
When to Disable the Scheme	<p>Disabling of the scheme will be necessary when:</p> <ol style="list-style-type: none"> 1. An outage of two MAN circuits. 2. MAN bus coupler outages, with or without an associated bus outage. 3. An outage or failure (suspected or actual) of the scheme.
Overview of the Scheme	<p>The transient stability limit for a close-in double circuit fault at MAN is 775MW (scheme disabled) and 815MW (scheme enabled) when all circuits are in service. The MAN station has a maximum output of approximately 840MW which is above the transient stability limit.</p> <p>The generator intertrip scheme is designed to automatically reduce generation to below 755 MW should a double circuit tripping occur, or one circuit trips when another is already on outage.</p>

If activated, the generator intertrip scheme will result in the following:

- when generation is above 755 MW (Stage 1), trip G7
- when generation is above 795 MW (Stage 2), trip G1 (along with G7)

The intertrip scheme consists of two independent and fully duplicated intertrip systems, implemented as “Gen ltrip 1” and “Gen ltrip 2”.

Each system separately determines:

- the existing level of MAN generation
- whether MAN circuit protection has operated
- whether intertrip is required following a single circuit fault (as would be the case with one MAN circuit on outage) or a double circuit fault (no MAN circuit outages)
- whether intertrip is required of G7 only (>755 MW), or G1 as well as G7 (>795 MW)

Gen lTrip 1 and 2 separately monitor (through duplicate means) the switch status (i.e. the open or closed status of the 2 disconnectors and the CB) on each of the four circuits at MAN. This information is used to determine whether any circuit is on outage, in which case Gen lTrip 1 and 2 arming will automatically change from “armed for double circuit fault” to “armed for single circuit fault”.

**Other
Supporting
Information**

The Manapouri (MAN) Generation Intertrip scheme is offered to the System Operator to be used on *as and when required* basis subject to use being as per the conditions set out.

The scheme is to manage a stability issue, but there can also be a thermal issue with the 220 kV circuits connecting Manapouri when summer ratings apply. Reducing the Stage 1 trigger value from 760 MW to 755 MW ensures the thermal limit (using 15-minute circuit ratings) always occurs after the stability limit.
