GENERATOR SET
SYNCHRONISING AND PARALLELING

THEORY OF SYNCHRONISING

When two generators are to be paralleled the voltages on either side of the paralleling circuit breaker must be matched. This matching process is called "synchronising".
To synchronise two generators, three parameters of the voltage across the open paralleling circuit breaker must be controlled:

- The **voltage magnitudes**
- The **frequency** of the voltages
- The **phase angle** between the voltages

Generator paralleling control systems normally utilise automatic synchronisers to control these parameters. The automatic synchroniser controls the engine governor (speed and frequency) and the alternator voltage regulator (voltage magnitude). When both generator output voltages are in synchronism the automatic synchroniser parallels the generators by closing the paralleling circuit breaker.

SYNCHRONISING PARAMETERS

A maximum **voltage magnitude** difference of **0.5%** is recommended.
If the **voltage magnitude** is not matched reactive power (kVARs) may flow between the two generators.

A maximum **frequency** difference of **0.1Hz** is recommended.
If the **frequency** is not matched active power (kW) may flow between the two generators.

A maximum **phase angle** difference of **10 degrees** is recommended.
If the **phase angle** of the voltages is not matched, active power (kW) may flow between the two generators.