



GENERATOR CONTROL AND PROTECTION

- Automatic voltage regulators
- Generator protection equipment
- Load control systems
- Automatic synchronisers



Control and protection equipment for electrical generators

Automatic voltage regulator

Supply and installation of automatic voltage regulators (AVR) as stand-alone controllers or as part of a complete retrofit system.

TCL have designed and supplied AVR equipment for gas and steam turbine generators in single and duty/standby configuration.

The supply would include:

- Engineering analysis of the existing plant to select the most suitable and cost-effective hardware
- Design and integration of the hardware into the existing control system
- Configuration and testing of the hardware
- Installation and commissioning

Typical control functions include:

- Voltage control
- Manual field current regulation (FCR)
- Under/over excitation limits
- Under/over excitation alarm and trip
- Generator rotor heating limit
- Generator stator heating limit
- Quadrature droop control
- Power factor control
- MVAR limit control

Generator protection

Supply and installation of generator protection equipment as stand-alone devices or as part of a complete retrofit system.

TCL have designed and supplied generator protection equipment for gas and steam turbine electrical generators.

The supply would include:

- Engineering analysis of the existing plant to select the most suitable and cost-effective hardware
- Calculation of the protection settings to ensure stable operation
- Design and integration of the hardware with the existing sensors, VT's, CT's etc
- Configuration and testing of the hardware
- Installation and commissioning

TCL have experience of most makes of generator protection equipment including Alstom, ABB, GE Multilin and Siemens devices.

TCL also have the engineers and injection equipment to provide maintenance of existing protection, including calibration and overhaul. This can be carried out at site or in our workshops.

Load control

Small localised grid systems need to be protected from the effects of one or more generators tripping from the system. If no action is taken the system can suffer complete collapse if the other generators fail to pick up the load.

A load control system needs to know the individual loads connected and the maximum possible load generation. From this information a load shedding matrix can be developed to trip load from the system in the event of loss of generation.

Load control can be programmed into the turbine control system or supplied as a standalone system and typical control functions include:

- Load shedding
- Calculation of spinning reserve
- Automatic start up and shutdown of generators
- Frequency control
- Load sharing between generators

TCL have installed load controllers on a number of offshore oil rigs to control system frequency and share load.

Automatic synchronisers

Automatic synchronisers are used in generator applications which require automatic run-up and or remote operation.

TCL have supplied and installed automatic synchronisers in many applications and can supply a standalone device or incorporate the necessary control functions within the control system.

TCL have developed a phase matching control algorithm which can be added to the control software of a PLC or DCS control system. The algorithms match the phase of the incoming and running voltages and issue a circuit breaker close signal. The phase matching control allows much faster synchronising times which may be critical in emergency generator applications.



Dual channel AVR

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