

FCAS Conformance Monitoring

with QUALITROL IDM+ and Autopoll Software

The regulation of frequency in the National Electricity Market is managed through frequency control ancillary services (FCAS) – one of four ancillary services used by AEMO to manage the power system securely and safeguard supply quality.

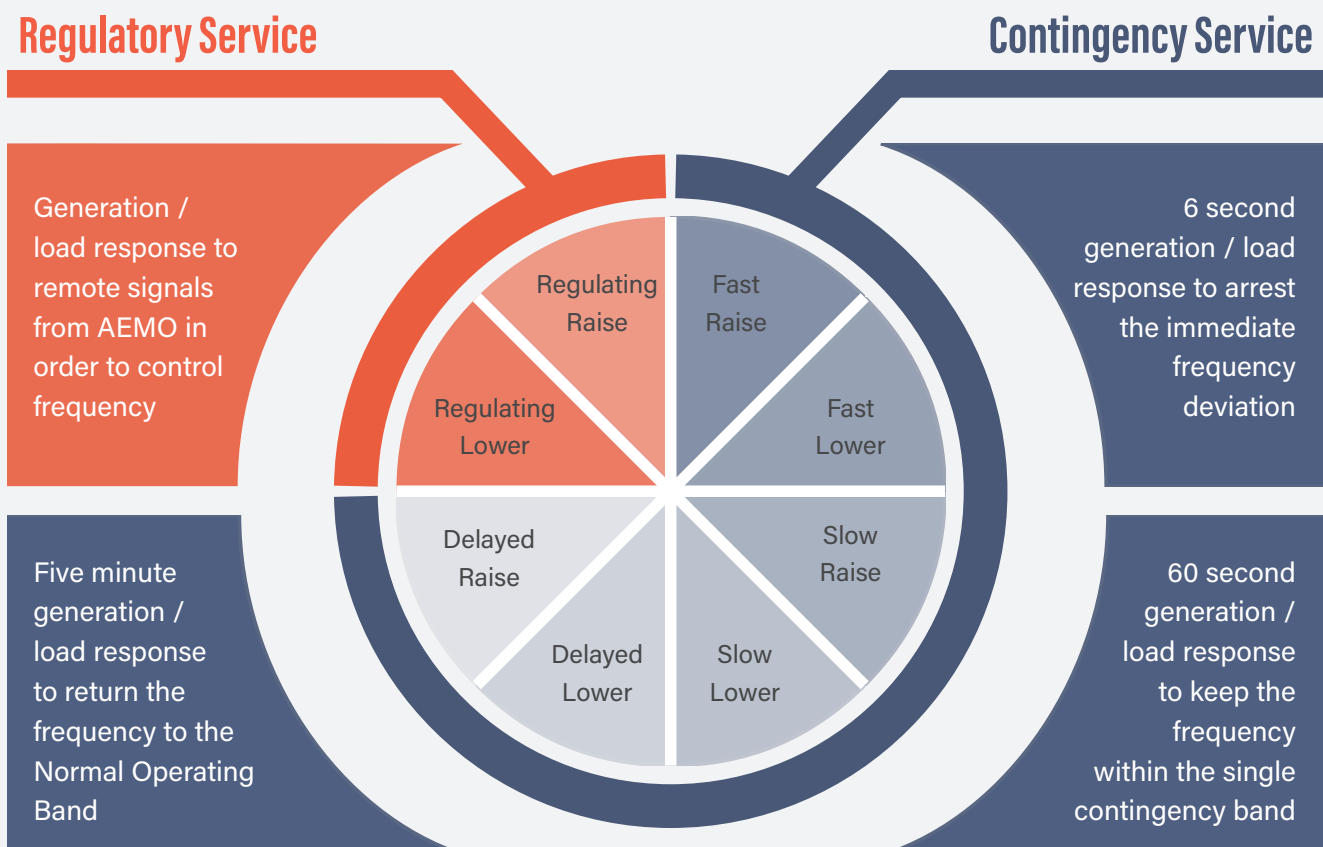
FCAS providers (registered power generators) bid their services into the FCAS markets in a similar way to how generators bid into the energy market, and are financially rewarded for availability and for delivery of these services. Service providers must be able to show their conformance to the ancillary services specification. Insulect have a conformance monitoring solution that is operating in numerous monitoring applications across the power system.

FCAS APPLICATION AND SERVICES

FCAS is concerned with balancing power supply and demand over short time intervals throughout the power system. This is done by maintaining appropriate levels of contingency reserve and regulating reserve.

AEMO procures FCAS to ensure that when an event occurs on the power system – e.g. loss of the largest generator or loss of an inter-connector and subsequent islanding of a region – frequency is maintained within the standards.

Constraint equations are used by AEMO to determine the amount of FCAS required for each of the 8 services. Constraints are used to specify global requirements, local requirements for one or more regions, and for co-optimisation of local FCAS requirements against inter-connector flow in the event of the inter-connector being declared a credible contingency risk.



References:

- AEMO, *Ancillary Services*, www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Security-and-reliability/Ancillary-services.
- AEMO, *Market Ancillary Services Specification (MASS) version 4.0* (30 Mar 2012).
- AEMO, *Guide to Ancillary Services in the National Electricity Market* (updated April 2015).

CONFORMANCE MONITORING REQUISITES

In order to capture the required FCAS conformance data, the power flow representing the amount of generation and the local frequency must be measured at or close to each of the relevant connection points (National Electricity Rules 3.11.7a). For each of the four service groups, the following table shows the required measurements. From these figures we can conclude that the capture of FCAS conformance data requires a monitoring device with a minimum Sampling Rate of 20Hz to meet the fast raise service and a Decimation Application to meet the slow raise services.

Service Type	Response Time	Sampling Interval	Recording Time Before Frequency Disturbance	Recording Time After Frequency Disturbance
Fast Raise and Lower	6 s	≤ 50 ms	≥ 5 s	≥ 60 s
Slow Raise and Lower	60 s	≤ 4 s	≥ 20 s	≥ 5 min
Delayed Raise and Lower	5 min	≤ 4 s	≥ 20 s	≥ 10 min
Regulating Raise and Lower	as system demands	≤ 4 s	Continuous recording	

THE INSULECT SOLUTION

The combination of the modular Qualitrol IDM+ monitor and Autopoll software is being utilised in several monitoring applications across Australia, New Zealand and the world, in generation, transmission, distribution and industrial power systems.

They are contributing to more efficient and stable networks through fault and disturbance monitoring, highly accurate fault location, power quality analysis, regulatory compliance reporting, and phasor measurement data.



KEY SYSTEM BENEFITS FOR FCAS MONITORING

HARDWARE: Qualitrol IDM+

1. **Highly accurate** 20 bit A/D converter produces great accuracy at low levels of load current
2. **Simultaneous measuring of the fault current** eliminates need to decrease full scale deflection (FSD) of analogue channels to achieve better accuracy
3. **Flexible DFR sampling rates** of up to 512 samples per cycle meets both Fast Raise and Slow Raise services required for FCAS
4. **Flexible DDR sampling rates** of up to 100 Hz for continuous recording

SOFTWARE: Autopoll

1. **Standalone polling software** provides simple solution for FCAS data capture - does not require iQ+ software
2. **Polling up to 50Hz** with a maximum of 5 devices - auto-comtrade, auto-CSV
3. **Polling up to 1Hz** with unlimited devices - auto-comtrade, auto-CSV
4. **Includes DDR-T and DDR-C** triggered and continuous data capture

GENERATION & POWER PLANT MONITORING

In addition to FCAS conformance, the IDM+ / iQ+ system is well suited to broader generation power system monitoring. The modular hardware and multi-functional software support the monitoring and analysis of internal faults and disturbances; power quality; embedded generation connectivity; and AEMO compliance.

