PowerFactory Monitoring Systems Contingency FCAS

POWER SYSTEM SOLUTIONS

DIgSILENT Pacific provides PowerFactory Monitoring Systems that satisfy the rigorous requirements for contingency Frequency Control Ancillary Services (FCAS) in Australia's National Electricity Market.

The FCAS requirements are detailed in the Market Ancillary Services Specification (MASS) and cover the following contingency services:

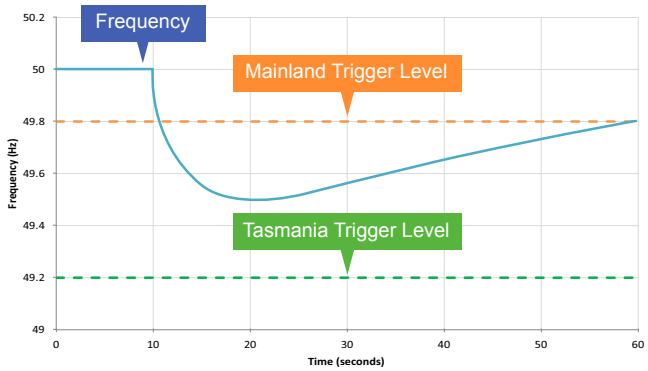
1. Fast raise or lower (6 second markets)
2. Slow raise or lower (60 second markets)
3. Delayed raise or lower (5 minute markets)

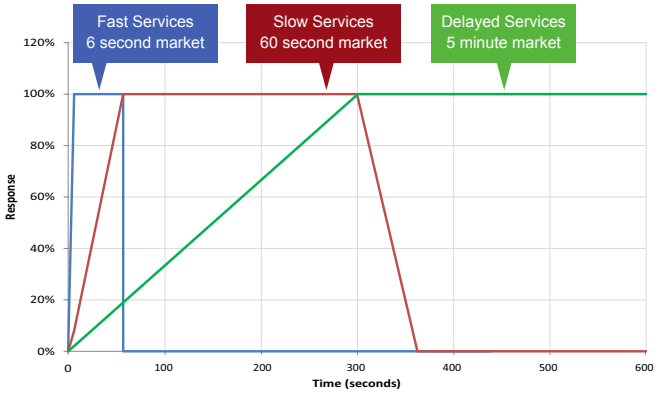
To participate in the FCAS markets, it is necessary to have a measurement system that meets the MASS. DIgSILENT Pacific's PowerFactory Monitor (PFM) fulfills these requirements.

DIgSILENT Pacific offers:

- PFM systems that meet the MASS
- Design and commissioning services with experience in various installations and requirement
- Ongoing technical support and assistance.

Underfrequency Contingency Event





The PFM is an integrated, multi-functional data acquistion system that monitors, records and analyses in all relevant time frames.

PFM300 Mass Compliance

- ✓ Flexible recording locations
- ✓ Supports frequency and power measurements
- ✓ 2% error on power measurement range
- ✓ 0.2% resolution on power measurement range
- ✓ 0.01 Hz error on frequency range
- ✓ 0.0025 Hz resolution on frequency range
- ✓ Configurable recording intervals and durations
- ✓ 50 ms measurement setting time
- ✓ Frequency threshold and gradient triggering
- ✓ Long-term storage of digital data files

Remote Point of Connection Solution

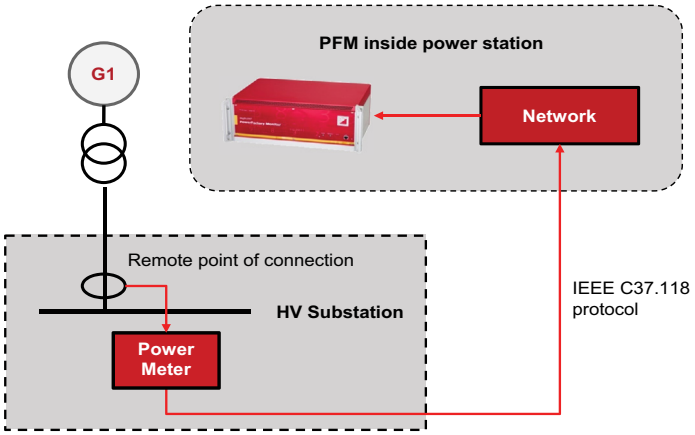
For a remote point of connection, the PFM can receive real-time measurement data from a revenue-grade meter that supports IEEE C37.118 protocol using a fast communications link.

This configuration utilises the streaming functionality of the PFM, providing additional installation and commissioning flexibility.

This solution also leverages the accurate and remote measurements in combination with the processing and reporting capability of the PFM.

PFM and IEEE C37.118

The IEEE C37.118 standard allows for communicating accurate measurement data using time synchronised digital packets. The PFM supports the 2005 and 2011 standards so it is uniquely equipped to operate within this standard.



Advantages

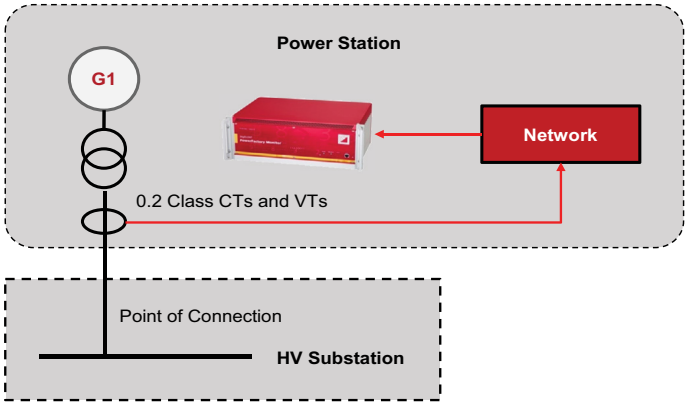
- ✓ Complies with the MASS
- ✓ Utilises approved power meters at HV substation
- ✓ Utilises IEEE C37.118 for power data
- ✓ Minimises HV connections to power station
- ✓ Allows for reliability and improved maintenance

Local Solution

Another popular solution is to connect PFM voltage and current inputs directly to revenue-grade CTs and VTs from the generator terminals.

This traditional configuration utilises the participant's existing generator signals and limits complexity of commissioning.

This solution leverages the accurate measurements already available within the power station in combination with the processing and reporting capability of the PFM.



DIgSILENT PFM Service Options

- ✓ Data analysis software
- ✓ Email event and report automation software
- ✓ Status monitoring software
- ✓ Hardware warranty
- ✓ Software support
- ✓ Additional and ongoing technical support

Advantages

- ✓ Complies with the MASS*
- ✓ Utilises revenue-grade signals at the power station
- ✓ Improves accessibility and maintenance

** Approval required for measurement locations different to the point of connection*

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