



Power Plant Electrical Technologies (Pty) Ltd

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MAG-Flex

Power Transformer Pre-Magnetisation System

Controlled Energisation. Protected Networks. Assured Reliability.

Mag-Flex is a freestanding; isolated pre-magnetisation system designed to enhance Medium Voltage (MV) reticulation systems. It is engineered to pre-magnetise large power transformers prior to initial energisation, significantly reducing inrush current during switching.

By eliminating uncontrolled magnetising inrush currents, Mag-Flex mitigates:

- ☐ Voltage sags
- ☐ Protection relay overcurrent tripping
- ☐ Electro-mechanical stress
- ☐ Electro-magnetic shock on windings and core
- ☐ Disturbances to adjacent network equipment

Intelligent Pre-Magnetisation for Safe, Controlled Transformer Energisation

Mag-Flex introduces a controlled, linear current ramp into the transformer's low-voltage terminals until the no-load magnetising current is reached. Once pre-magnetised, the transformer can be energised with confidence as Mag-Flex provides:

- ☐ Galvanic isolation
- ☐ Voltage matching
- ☐ Reduced Electro-mechanical stress
- ☐ Vector group matching
- ☐ Synchronous alignment with primary supply

Synchronised Ramp-Up Technology for Precision Transformer Start-Up and Built-In Protection

The system is synchronised with the transformer's primary supply. Controlled ramp-up ensures that magnetisation occurs gradually, typically within 30-120 seconds, depending on transformer size.

After reaching the calculated target current (matching transformer no-load current), the system releases a "Ready to Close" signal for breaker operation. A timed operating window ensures controlled energisation. Post-operation, a cool down lockout period protects system components from potential thermal stress, after each magnetising operation.





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Design Technology Options

Typical Mag-Flex Cabinet



Mag-Flex - Technology Options

Thyristor Power Controlled System

- ☐ Three-phase input
- ☐ Solid-state AC regulation
- ☐ Precise linear current ramp
- ☐ Direct interface transformer connection
- ☐ PLC-controlled, remotely operable
- ☐ Suitable for most industrial and substation environments

The thyristor controller provides measured AC output without disturbing surrounding systems. Motorized breaker control ensures safe isolation switching and operational integrity.

Saturable Reactor Controlled System

- ☐ Saturable reactor based current control, with mini ramp controller
- ☐ Gradual reactor output increase
- ☐ Highly robust architecture
- ☐ Optimized for arid and harsh environments

This design employs a traditional saturable reactor approach for extreme environmental durability while maintaining controlled magnetization performance. Motorized breaker control ensures safe isolation switching and operational integrity.

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