



SuperTAPP n+® Voltage Control for Active Networks

SuperTAPP n+ is an innovative tap changer control system which incorporates market-leading and unrivalled functionality to provide complete AVC (Automatic Voltage Control) for modern power networks. SuperTAPP n+ solves problems associated with distributed generation, network interconnections, busbar configuration changes, troublesome loads and other voltage control issues.

With more and more distributed generation becoming integrated into the network these problems are bound to increase. SuperTAPP n+ functionality and adaptability ensures that it can accommodate the connection of more and more distributed generation from a wide range of sources. It can be configured as a standard AVC system and is easily upgraded to enable advanced AVC. It has been future proofed.



Key Features

- Solutions for embedded generation
- Reverse power functions
- Load correction for abnormal power factor loads
- Double-secondary winding transformers
- Standard voltage control functions
- SCADA communications
- Remote application web monitoring
- Flexible and future-proof

Key Benefits

- Optimise network voltages
- Reduce operational costs
- Reduce tap changer maintenance costs
- Reduce risk of tap changer failure/damage
- Reduce network reinforcement costs
- Maximise headroom for generation connections
- Reduce generator curtailment
- Fewer customer complaints



Flexible and Future-Proof

SuperTAPP n+ is available as a 'basic' relay with standard AVC functions and can be easily and economically upgraded to an 'advanced' version to activate extra innovative functions with no software or hardware changes required:

Solutions for Distributed Generation

Countries are turning increasingly to distributed generation in order to achieve carbon emissions obligations. Electrical power grids were designed to accommodate uni-directional power flow from the 'top' of the network where it is generated down to consumers at the 'bottom'. The emergence of distributed generation has therefore introduced a number of technical problems for network operation relating to bi-directional power flow such as quality, thermal limits and voltage control. Increased protection and control are required for the new grid.

Fundamentals is widely recognised as the leading expertise for voltage control and are well known for SuperTAPP system and later MicroTAPP system (co-developed with Reyrolle Protection). More than two decades of experience with network applications has identified the effect of distributed generation on voltage control to include:

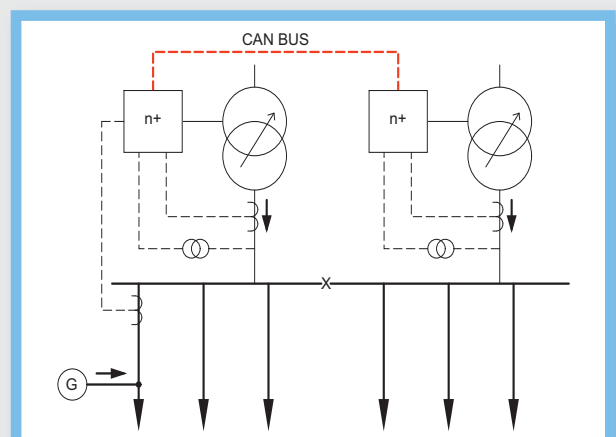
- Voltage rise at the point of generator connection(s)
- Compromised LDC (load/line drop compensation)
- Compromised control of paralleled transformers
- Reverse power flow on transformers beyond OLTC rating

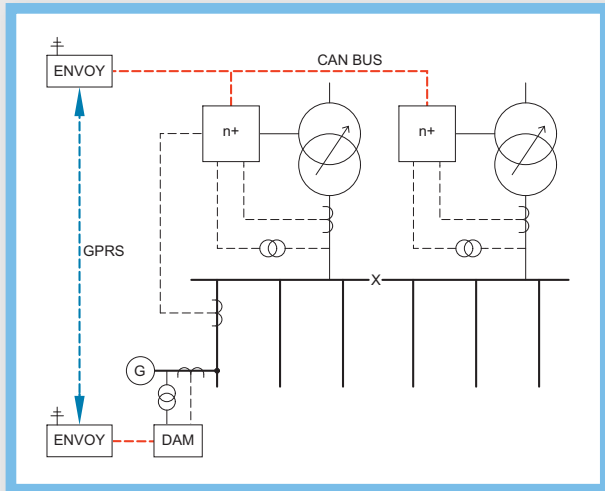
- Solutions for Distributed Generation
- Remote Measurements and Monitoring
- Load Exclusion/Correction for Abnormal Power Factor Loads
- Double-Secondary Winding Transformers

The result can be unacceptable and unpredictable voltage levels throughout the network leading to increased customer complaints, generator curtailment and/or requirement for network reinforcement, increased tap changer operations and therefore maintenance, increased alarms on the system and related engineering/support costs, increased outages and possible tap changer failure, transformer damage and H&S issues.

SuperTAPP n+ has been developed to incorporate functions to address these issues which are enabled by use of built-in current measurements for feeders to which generation is connected:

- Generator compensation
- Accurate load drop compensation
- Advanced transformer paralleling principle
- Reverse power OLTC blocking
- Facility to implement remote network measurements



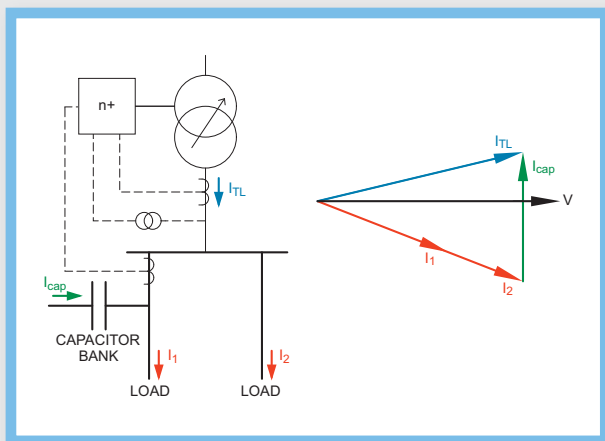


Remote Measurements and Monitoring

Increased accuracy can be realised by incorporation of remote network measurements via communications, e.g. at the point of connection of downstream generation.

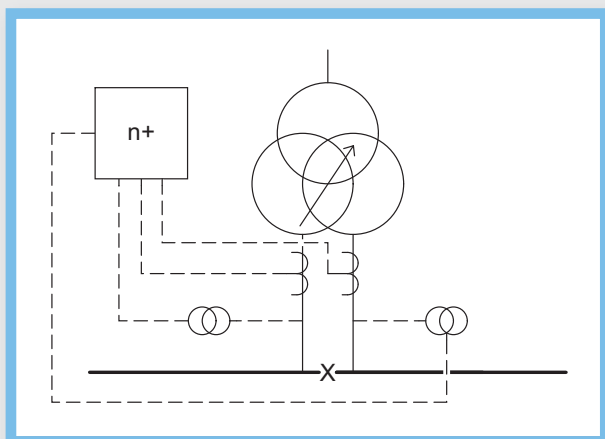
No system should be totally reliant on remote communications and SuperTAPP n+ offers distinct advantages due to its ability to optimise the 'view' of the network each time it receives network measurements. If communication links are lost, accurate voltage control is maintained by use of local measurements and an estimation algorithm based on the most up-to-date network data.

Remote monitoring and management of SuperTAPP n+ applications is possible through a dedicated web interface. This enables configurable alerts and notifications, data gathering and performance analysis to provide the ultimate support tool.



Load Correction for Abnormal Power Factor Loads

There are network components other than generation connections which can cause problems for voltage control because of their effect on the measured transformer load power factor. Examples are heavy industrial loads, capacitor banks and other compensation equipment. SuperTAPP n+ can reduce or remove the effects of such components by manipulation of measured load power factors.



Double Secondary Winding Transformers

Voltage control for double-secondary winding transformers is possible with SuperTAPP n+. Built-in voltage averaging and load current summation, with auto-detection of single-secondary winding operation result in a compact and efficient solution for these critical transformers.

Specification

- Power Supply
 - 80 – 260 V AC
 - 90 – 140 V DC
- Voltage Measurement Inputs
 - 2 inputs available
 - Nominal 110 V
 - Rated up to 150 V
- Current Measurement Inputs
 - 3 inputs available*
 - External interposer CTs used
 - Safe, flexible and low burden
 - Rated up to 10 A
- Digital Status Inputs
 - 6 available
 - Operating range 20- 250 V AC/DC
- Outputs
 - 6 available
 - Rated 12 A continuous
- CAN bus peer-to-peer communications
- SCADA interface for DNP3, IEC 61850 etc.
- Fully type tested to ENATS 48-5 (protection relays)
- Compatible with TMU (tap changer monitor unit)

**more current measurements can be accommodated with use of the Data Acquisition Module*

Contact

Fundamentals Ltd can assist with all applications concerning voltage control of electrical networks:

- Technical support
- Troubleshooting
- Design and engineering
- Installation
- Site surveys
- Commissioning
- Power system analysis
- Generation connection assessment
- Consultancy
- Panel / cubicle build



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