



# LFCB Replacement

By MiCOM P541/2, P543/5, P544/6

GE provides product upgrades and replacements for legacy devices, enabling users to take advantage of associated key benefits and enhancements. The Grid Solutions support teams will assist customers with plant-wide relay audits in order to help identify legacy products and recommend equivalent product upgrades. GE also offers advanced training services in Protection, Control, Maintenance, Communications and Monitoring to ensure maximum benefit is achieved when upgrading.

## LFCB – Digital Differential Protection Relays

The LFCB is a family of differential protection relays suitable for various transmission, sub transmission and distribution 2 and 3 terminal feeders. It has been deployed on heavily loaded medium and long lines as well as underground cables.

The current portfolio proposed by GE offers a wider range of options to meet applications requirements. To take advantage of the latest technology and new developments in differential line protection, consider LFCB replacement from the MiCOM range of products:

### MiCOM P540 family

- P541/2 Compact Differential Protection, single circuit breaker requiring 3 pole autoreclose
- P543/5 Subcycle Differential Protection or Differential plus Subcycle Distance Protection, single circuit breaker requiring 1/3 pole autoreclose
- P544/6 Differential plus Subcycle Distance Protection, dual circuit breaker requiring 1/3 pole autoreclose

### Key Benefits

- Easy to set with setting philosophy, application and conventions identical to LFCB
- Comparable biased-differential characteristics, no need to re-train
- Phase selectivity without compromise on resistive fault sensitivity
- Neutral differential for detection of high resistance earth faults
- Transient bias feature reduces CT requirements -typically by 25%
- Intuitive Programmable Scheme Logic PSL for building customized applications and schemes
- Accurate fault information provides for in-depth analysis; events and fault records and disturbance records
- Comprehensive measurements facilities: current, voltage, power, energy and frequency
- Comprehensive control and backup protections

## Replacement Benefits

- Expanded communication options station and process bus
- Enhanced diagnostic information
- Increased events Recorder
- Expanded waveform capture
- Compatible line differential algorithms
- Compatible with modern 2 Mbps communications equipment
- Compatible channel-aided schemes
- Identical rack mounting and panel aperture
- Avoids the need of an external recloser
- Subcycle differential protection
- Subcycle backup distance protection
- In-zone transformer-feeder applications



## Key Benefits (Continue from page 1)

- Multiple main protection elements reside in each relay: distance, delta directional comparison protection and directional earth/ground fault unit protection (DEF)
- Integral teleprotection via MODEM, fibre, or MUX channel including direct FO connection to the multiplexer with IEEE C37.94
- Numerous integrated communication protocols (Courier, IEC 60870-5-103, DNP 3.0, IEC 61850 Ed.1 or Ed.2) allow easy interfacing to substation control or SCADA systems. From simple wired serial buses, to Ethernet station and process bus architectures with IEC 61850 and HSR/PRP redundant station bus communications
- Flexible and programmable hotkeys function keys and LEDs to allow for easy control, supervision and commissioning
- Reduce the footprint drastically by using models with process bus IEC 61850-9-2LE Ed.2 (P546)
- The versatile hardware allows deployment with confidence and the PC tool, S1 Agile, makes for easy configuration, application and management of the installed base
- Quality Built-In (QBi) – Harsh environment coating is applied to all circuit boards to shield them from moisture and atmospheric contamination and transit packaging has been designed to ISTA standards

## MiCOM P544/6 Dual Breaker Differential Protection

- Fast, highly selective differential protection for overhead lines and underground cables with backup distance protection
- Dual-breaker circuits requiring single pole/three-pole autoreclosing and independent synchrocheck supervision

### Key Benefits

- Current differential protection applicable to all lines and cables: long or short, strong and weak infeed
- Subcycle backup Distance. High speed operation with superimposed phase selection guarantees tripping in less than a cycle for single and multiphase faults. Five quad or mho zones
- Multi-shot autoreclosing with check synchronism suitable for breaker and a half, or mesh feeding with two sets of CT inputs per end. If an external LFAA102 reclose exists – rationalize two boxes to one

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## MiCOM P543/5 Line Differential Protection

- Subcycle current differential protection -without distance protection
- Fast, highly selective current differential protection for overhead lines and underground cables with backup distance protection
- Single breaker circuits requiring single pole/three-pole autoreclosing and independent synchrocheck supervision.
- In-zone transformer-feeder applications

### Key Benefits

- Current differential protection applicable to all lines and cables: long or short, strong and weak infeed
- Subcycle Backup Distance. High speed operation with superimposed phase selection guarantees tripping in less than a cycle for single and multiphase faults. Five quad or mho zones
- Proven superimposed principle algorithms for more than 30 years are applied to achieve fast directionality, phase selection and power swing detection
- Multi-shot autoreclose with check synchronism suitable for a single breaker. If an external LFAA101 reclose exists – rationalize two boxes to one
- Can be applied in isolated or compensated ground systems

## MiCOM P541/2 Sub-transmission and Distribution Differential Protection

- Highly selective protection for overhead lines and underground cables with three phase tripping
- Single breaker circuits requiring three-pole autoreclosing and synchrocheck supervision
- In-zone transformer-feeder applications

### Key Benefits

- Current differential protection applicable to all lines and cables: long or short, strong and weak infeed
- Multi-shot autoreclose with check synchronism suitable for a single breaker. If an external MVTR reclose exists - rationalize two boxes to one
- Available in 40TE case for retrofit in a compact or vertical case footprint

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