DLF

Line Differential Protection (ZIV e-NET Flex Family)

Line Differential Protection with **Distance Backup.** Both units are suitable for lines of any **Voltage Level**, **Overhead** or **Under Ground**, **Multiterminal**, and **Single** or **Parallel Circuits**

General Characteristics

- ✓ Powerful programable logic.
- ✓ 2000 event log. Up to 100 oscillography seconds.
- ✓ Alphanumeric or graphic display.
- ✓ 10 analog channels (12 in DLFB models), 160 DI, 80 DO and 22 LEDs.
- ✓ Bonding, RSTP, PRP and HSR Redundancy.
- ✓ IEC 61850 Ed. 2, DNP3, Modbus RTU and PROCOME protocols.
- ✓ Native process bus. Analog input cards operate as Merging Units for the CPU. Synchronized samples at 4800 Hz (as per IEC 61869-9).
- ✓ Cybersecurity in accordance with IEC 62351, IEC 62443 and IEEE 1686-2013 standards. RBAC, secure keys, physical and logical port disabling, cybersecurity event log, securing of management protocols (PROCOME, HTTPS, SFTP, SSH), remote authentication (LDAP, RADIUS) and digital firmware securitization.
- ✓ Time synchronization by IRIG-B, SNTP and PTP (Ordinary Clock / Transparent Clock).

The **DLF** includes all the protection, control and measurement functions for a power line with or without **Series Compensation**, **Single Breaker**, and **Single** or **Three Pole Tripping**.

The fast **Differential Unit**, complemented by the **External Fault Detector** and the **Capacitive Current Compensation** unit**,** protects lines with **up to 3 terminals**, even with a transformer in the protection zone, providing excellent reliability even in the most adverse conditions. Breaker and a Half or Double Busbar (with CT group on the line) configuration capability added in **DLF-B**.

DLF IEDs combine the **Differential** protection units with **Distance** metering elements (and complementary units such as **Close-onto-Fault**, **Dead-Line**, **Remote Breaker Open**, **VT Fuse Failure**, **Power Swing** and **Load Encroachment** detectors), **Over / Undervoltage** and **Over / Underfrequency** protection, **Recloser**, **Synchronism** Supervision, **Control** and **Metering** functions.

Features

Phase Differential Unit

Configurable with 3 three-phase current inputs, to protect up to 3-terminal lines.

Neutral, Negative Sequence and Positive Sequence Differential Units

Increases sensitivity during internal faults with low current contribution, such as very resistive faults, which may not be detected by the differential phase unit.

External Fault Detector

Blocks the differential unit against external faults with very high CT saturation, providing exceptional security.

Capacitive Current Compensation

The differential unit maintains good sensitivity in cables and very long overhead lines.

Transformer-Line Protection Zone

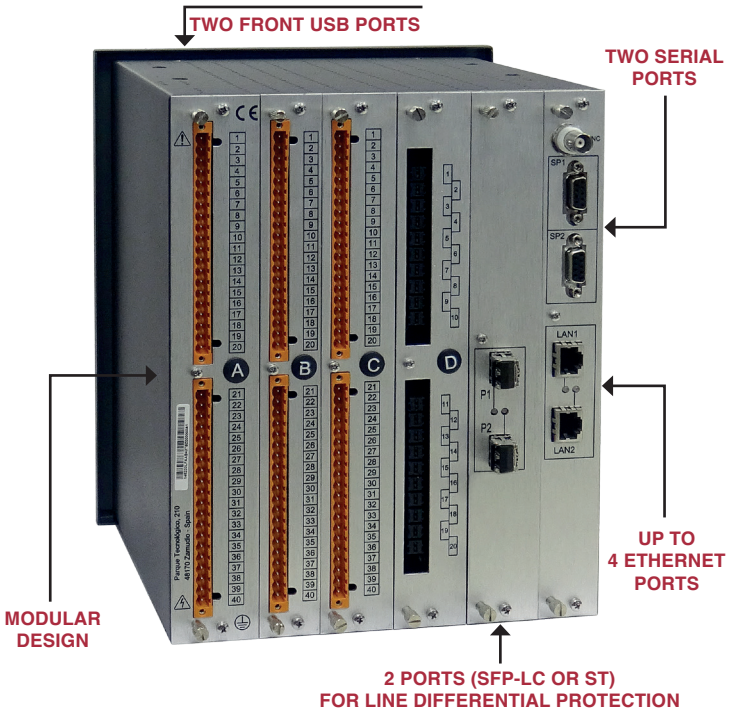
Multi-End Fault Locator

8 Distance Zones

Reversible distance zones with Mho or quadrilateral characteristic. Independent characteristic selection for ground and phase-to-phase faults.

Communication between IEDs

- 2 ports: Communication without redundancy with up to 2 remote ends or with redundancy with one remote end.
- Selectable speed: from 1..12 x 64 kbit/s (C37.94) and 2 Mbit/s.
- Multimode or single mode FO interfaces (optional SFPs).
- Communication with SDH multiplexers via C37.94 or via ZIV model F2MUX optical-electric converter that integrates G703 output interfaces.
- Up to 16 digital signals can be exchanged between terminals to implement teleprotection schemes.



Protection Units

ANSI	Function	DLF-A	DLF-B
87PH	Phase Differential unit with Restraint	1	1
87PH/50	Phase Differential unit without Restraint	1	1
87N	Neutral Differential unit with Restraint	1	1
87POS	Positive Sequence Differential with Restraint	1	1
87NEG	Negative Sequence Differential with Restraint	1	1
87/50FD	Fault Detector	1	1
27FD	Fault Detector in Weak Infeed conditions	1	1
87P	External Fault Detector	1	1
64REF	Restricted Earth Faults	1	0
50OF	Close-onto-Fault Detector	1	1
50/51	Phase O/C	3/3	4/4
50N/51N	Neutral O/C (calculated IN)	3/3	4/4
50Q/51Q	Negative Sequence O/C	3/3	4/4
50G/51G	Ground O/C	3/3	4/4
50V/51V	Voltage Dependent O/C	3/3	4/4
67	Phase Directional	1	1
67N	Neutral Directional	1	1
67G	Ground Directional	1	1
67P	Positive-Sequence Directional	1	1
67Q	Negative Sequence Directional	1	1
	Harmonics Blocking	1	1
49W	Line Thermal Image	1	1
26	Hot Spot Thermal Image	1	0
50OL/51OL	Overload Instantaneous / Time units	1/1	0
27	Phase Undervoltage	3	4
59	Phase Overvoltage	3	4
59N	Neutral Overvoltage	3	4
47	Negative Sequence Overvoltage	1	0
64	Ground Overvoltage	3	4
81M	Overfrequency	4	2
81m	Underfrequency	4	2
81D	Rate of Change of the Frequency	4	2
	Load Shedding	1	0
59V/Hz	Overexcitation	4	0
25	Synchrocheck	2	4
50BF	Breaker Failure	1	1*
	Cold Load	1	1
21N/21P	Ground / Phase Distance Zones (8 / 8 zones)		
50SUP	Phase Overcurrent for Distance Supervision	1	1
	Load Encroachment	1	1
85-21	Teleprotection Schemes for Distance Units	1	1
85-67	Teleprotection Schemes for Overcurrent Units	1	1
	Open Phase Detector	1	1
	Remote Open Breaker Detector	1	1
60FF	Fuse Failure Detector	1	1
60VT	VT Supervision	1	1
68/78	Power Swing Detector	1	1
60CT	CT Supervision	1	1
3	Coil Supervision	Up to 12 coils	
	Breaker Supervision	1	1*
	Phase Selector	1	1
	Open Pole Detector	1	2
2	Pole Discordancy	1	2
	Dead-Line Detector	1	1
	Saturation Detector	1	1
79	Recloser	1	2
	Trip logic and Command	1	1
	Fault Locator & Multi Far-End Fault locator	1/1	1/1

(*) Only for single breaker.

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