

# 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 programmable logic
- ✓ 2000 event log. Up to 100 oscillography seconds
- ✓ Alphanumeric or graphic display
- ✓ Easy HW expansion without FW updates
- ✓ Unused protection elements can be hidden
- ✓ Custom mapping of physical current and voltage inputs to protection elements
- ✓ Can be used to protect multiple bays
- ✓ Up to 20 analog channels, 160 DI, 80 DO, and 22 LEDs
- ✓ Bonding, RSTP, PRP and HSR redundancy
- ✓ IEC 61850 ed. 1 & ed. 2 protocols, DNP3.0, Modbus RTU and PROCOME
- ✓ 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 and IEEE 1686-2013 standards. RBAC, secure keys, physical and logical port disabling, cybersecurity event log, and securing of management protocols (PROCOME, HTTPS, SFTP, SSH)
- ✓ 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** or **double breaker**, and single pole 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 5 terminals**, even with a transformer in the protection zone, providing **excellent reliability** even in the most adverse conditions.

The **breaker failure protection** and **synchrocheck** can supervise **two circuit breakers**. Also, the **recloser** function allows sequential breaker closing using a master-slave scheme.



## Characteristics

### Phase Differential Unit

Configurable with up to six three-phase current inputs, to protect 5-terminal lines with single breakers, and 3-terminal lines with breaker-and-a-half.

### Neutral and Negative Sequence Differential Unit

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

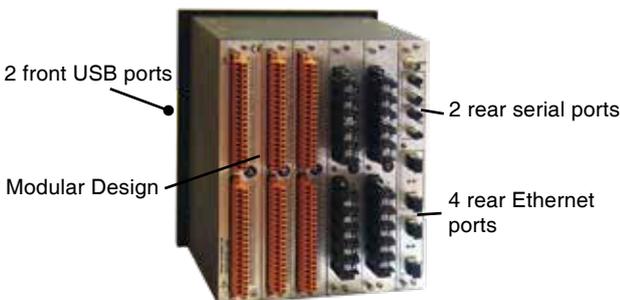
### Multi-Terminal Fault Locator

### 8 Distance zones

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

### Communication between IEDs

- Up to 4 ports: Communication without redundancy with up to 4 remote ends or with redundancy with up to 2 remote ends.
- Selectable speed: from 1 x 64 kbit/s up to 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 and V35 output interfaces.
- Up to 16 digital signals can be exchanged between terminals to implement teleprotection schemes.



Three sizes: Full 19" rack, 1/2 rack, or 1/3 rack with 6U high

## Protection units

ANSI	FUNCTIONS	
87PH/87N	Restrained phase and Neutral differential	1
87PH/50	Unrestrained phase differential	1
21P	Phase distance	(8 zones)
21N	Ground distance	(8 zones)
50SUP	Distance overcurrent supervision	1
87/50FD	Fault detector	1
87P	External fault detector	1
87N	Restricted earth fault	1
68/78	Power swing blocking / Tripping	1
50	Instantaneous phase overcurrent	3
51	Time phase overcurrent	3
50N	Instantaneous neutral overcurrent	3
51N	Time Neutral overcurrent	3
50Q	Instantaneous negative-sequence overcurrent	3
51Q	Time negative-sequence overcurrent	3
50G	Instantaneous ground overcurrent	3
51G	Time ground overcurrent	3
50STUB	Stub Bus Protection	1
50V	Instantaneous voltage restrained overcurrent	1
51V	Time voltage restrained overcurrent	1
67	Phase directional overcurrent	1
67N	Neutral directional overcurrent	1
67G	Ground directional overcurrent	1
67P	Positive-sequence directional overcurrent	1
67Q	Negative-sequence directional overcurrent	1
49	Thermal image	1
27	Phase undervoltage	3
59	Phase overvoltage	3
59N	Neutral overvoltage	3
64	Ground overvoltage	3
81M	Overfrequency	4
81m	Underfrequency	4
81D	Frequency Rate of change	4
59V/Hz	Overexcitation	4
25	Synchrocheck	2
50BF	Breaker failure	2
85-21	Teleprotection schemes for distance units	1
85-67	Teleprotection schemes for overcurrent units	1
60VT	VT supervision and Fuse failure detector	1
60CT	CT supervision	1
3	Coil supervision (up to 12 coils)	
2	Pole discrepancy	2
79	Recloser	2
	Additional functions (1): Cold load, Harmonic Blocking, Load shedding, Load Encroachment, Phase selector, Dead line detector, Fault locator	1
	Additional functions (2): Breaker supervision, Open pole detector, Saturation detector, Trip logic	2

