

IDF

Transformer Protection (ZIV e-NET flex family)



General characteristics

- ✓ Powerful programable logic.
- ✓ 2000 event log. Up to 100 oscillography seconds.
- ✓ Alphanumeric or graphic display.
- ✓ Up to 20 analog channels, 160 DI, 80 DO, and 22 LEDs
- ✓ Bonding, RSTP, PRP and HSR Redundancy.
- ✓ IEC 61850 Ed. 2, DNP3.0, 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).

Protection for two or three Winding Transformer or Autotransformer, of any voltage level, with **Single or Double Circuit Breaker**

Suitable for **Phase-Shifting Transformers**, **Scott** or **Leblanc** transformers.

Can be applied as a **Differential Protection** for reactances, SVCs, generators and motors.

A fast **Differential Unit**, complemented by advanced **Blocking** and **Harmonic Restraint Logics** and an **External Fault Detector**, provides great reliability in all types of conditions.



Characteristics

Differential Units

Includes one unit with percentage restraint and harmonic restraint/blocking, and another unrestrained. The latter allows to accelerate tripping of internal faults with high fault currents that cause CT saturation. Both differential units have up to four three-phase current inputs, allowing protection of windings transformers in breaker-and-a-half or ring-bus schemes.

Harmonic Restraint / Blocking

The harmonic restraint and blocking units avoid trips under transformer inrush and overexcitation conditions. The wide variety of cross-blocking logics provide great security during transformer energization with low second harmonic percentage, common in new power transformer designs. Additionally, the dynamic harmonic blocking / restraint logic allows accelerating internal fault trips with CT saturation. Thanks to this last logic and the use of fast outputs, the differential unit trips in subcycle times.

External Fault Detector

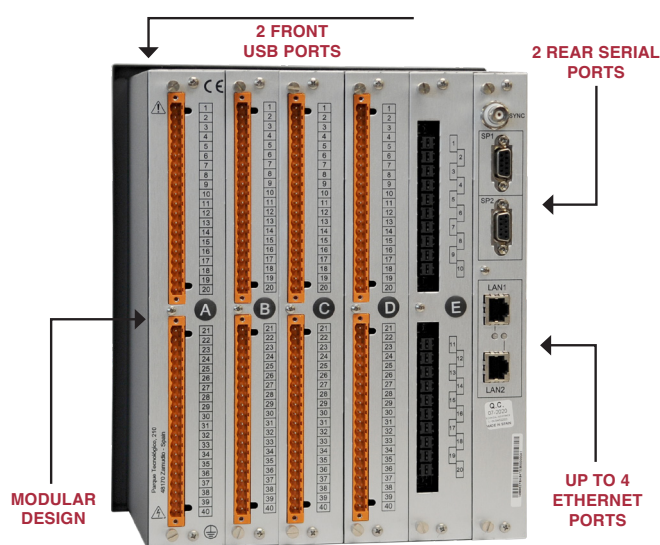
Blocks the differential unit against external faults with very high CT saturation, providing exceptional security.

Restricted Earth Faults

The restricted earth faults unit detects ground faults in one of the windings of the machine, located very close to the neutral point. In addition to the neutral differential unit, the restricted earth faults unit includes a directional comparison unit that increases its security against external faults with CT saturation. The IED has low and high impedance Restricted Earth Faults units.

Backup Units

The **IDF** has up to nine overcurrent units of each type (phase, neutral, negative sequence, ground). Each of them can be configured as a directional unit.



Protection Units

ANSI	Function	Uns.
87	Restrained Differential Unit	1
87/50	Unrestrained Differential Unit	1
87FD	Fault Detector	1
50FD	Fault Detector (sequence magnitudes)	1
87P	External Fault Detector	1
50	Instantaneous Phase Overcurrent	9
51	Time-delayed Phase Overcurrent	9
50N	Instantaneous Neutral Overcurrent	9
51N	Time-delayed Neutral Overcurrent	9
50G	Instantaneous Ground Overcurrent	6/12
51G	Time-delayed Ground Overcurrent	6/12
50Q	Instantaneous Negative Sequence Overcurrent	9
51Q	Time-delayed Negative Sequence Overcurrent	9
50V	Instantaneous Voltage Dependent Overcurrent	1
51V	Time-delayed Voltage Dependent Overcurrent	1
67	Phase Directional	1
67N	Neutral Directional	3
67P	Positive-Sequence Directional	1
67Q	Negative Sequence Directional	1
	Harmonic Blocking	3
	Phase Selector	1
27	Phase Undervoltage	3
59	Phase Overvoltage	3
59N	Neutral Overvoltage	3
47	Negative Sequence Overvoltage	1
49	Thermal Image (configurable with RMS or TRUE RMS)	3
49HS	Hot Spot Thermmal Image	1
50OL	Instantaneous Overload unit	1
51OL	Time-delayed Overload unit	1
81M	Overfrequency	4
81m	Underfrequency	4
81D	Rate of Change of the Frequency	4
	Load Shedding	1
50BF	Breaker Failure Protection	3
59V/Hz	Overexcitation	4
87N	Restricted Earth Faults Unit	3
60VT	Fuse Failure Detector	1
60VT	VT Supervision	1
60CT	CT Supervision	3
3	Coil Supervision (Depending on the Hardware Selection)	
	Breaker Supervision	3
2	Trip Logic and Command	3
	Open Pole Detector	3
	Saturation Detector (for all current channels)	1
	Cold Load	1