

IRF-A

High Impedance Protection (ZIV e-NET flex family)





Protection for **Distribution** Feeders, Transformers and Busbars

General characteristics

- ✓ Powerful programable logic.
- ✓ 2000 event log. Up to 100 oscillography seconds.
- ✓ Alphanumeric or graphic display.
- ✓ Multiple combinations of DI & DO, with up to 216 DI, or 160 DO, and up to 18 output transducers.
- ✓ 6 or 12 programmable push buttons.
- ✓ 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).

The **IRF** is applicable in any **substation scheme**. The protection functions are suitable **for any neutral configuration**, solid-grounded, resistor-grounded, Petersen coil compensated and isolated.

The powerful **programmable logic** features **selectable execution times** according to the required priority (2 ms, 10 ms and 20 ms). Includes many digital and analog operators, which allows the creation of complex protection and control functions.

Making the Smart Grid Real



Outstanding features

High Impedance Busbar, CT Supervision and Restricted Earth Fault.

In systems where busbar differential and transient earth faults protection are applied with the aid of external wiring, High Impedance units are used for the detection of phase and earth faults by applying the principles of overcurrent units. In addition, and alarm unit for CT failure is provided, which can be used to block the trip of the unit.

Transient Earth Fault

At Medium Voltage Distribution level, transient faults are very common in high impedance systems with high capacitance in feeders, as isolated, compensated, resistive, inductive, or combined neutral system, where earth fault current is so low that faults self-extinguishing a few milliseconds and reappearing again when voltage reaches its maximum value. Transient and sensitive transient earth fault protection units (TEFP and STEFP) work with the instantaneous neutral voltage and current samples of the

Protection Units

ANSI	Function	Uns.
50	Instantaneous Phase Overcurrent	4***
51	Time-delayed Phase Overcurrent (Inverse/Fixed)	4***
50N	Instantaneous Neutral Overcurrent	4***
51N	Time-delayed Neutral Overcurrent (Inverse/Fixed)	4***
50G	Instantaneous Ground Overcurrent (*)	4***
51G	Time-delayed Ground Overcurrent (Inverse/Fixed)	4***
50Q	Instantaneous Negative Sequence Overcurrent (I2)	4***
51Q	Time-delayed Negative Sequence Overcurrent	4***
50Ns	Instantaneous Sensitive Ground Overcurrent	1
51Ns	Time-delayed Sensitive Ground Overcurrent	1
51Ns EPTR_C	Time-delayed Sensitive Ground O/C with EPTR_C	1
51Ni/c	Ungrounded/Compensated Neutral Overcurrent	1
50V	Instantaneous Voltage Dependent Overcurrent	1
51V	Time-delayed Voltage Dependent Overcurrent	1
67	Phase Directional	1
67N	Neutral Directional	1
67G	Ground Directional	1
67Ns	Sensitive Neutral Directional	1
67P	Positive-Sequence Directional	1
67Q	Negative Sequence Directional	1
67Ni/c	Isolated / Compensated Neutral Directional	1
85	Overcurrent Teleprotection Schemes	1
	High Impedance Restricted Earth Fault Unit	1
	High Impedance Differential Busbar Unit	1
	High Impedance Differential Alarm Unit	1
50BF	Breaker Failure Unit with Retrip Function	1
87N	Restricted Earth Faults Unit	1
67TEFP	Transient Earth Faults Protection	2
	Saturation Detector	1
	Harmonics Blocking	1
37	Time-Delayed Phase Undercurrent	1
46	Open Phase Unit	1
49	Thermal Image Unit	1
27	Phase Undervoltage	4***
27SPH	Single-Phase Undervoltage (Vsyn)	2
59	Phase Overvoltage	4***
59SPH	Single-Phase Overvoltage (Vsyn)	2
59N	Neutral Overvoltage	4***
64	Ground Overvoltage	4***
47	Negative Sequence Overvoltage	1

Models with digit X9=3. Dependign on FW digits X27+X28. Model with FW digits X27+X28 under 13 feature 3 units, models with FW digits X27+X28 equal or greater than 13 feature 4 units. first half cycle of the fault signal, with a sampling rate of 4800 Hz which, in combination with an adjustable directional characteristic is able to detect transient earth faults.

Restricted Earth Fault

The REF unit detects transformer winding faults located very close to the neutral point. In addition to the neutral differential unit, the Restricted Earth Fault Unit includes a directional comparison unit that increases security against external faults with CT saturation. The IED has low and high impedance Restricted Earth Faults unit.

Saturation Detector

CT saturation detection is based on the current derivative. The detector modifies the overcurrent units operating principle when activated. Overcurrent units use instantaneous voltage besides RMS voltage, allowing for less strict CT requirements.

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ANSI	Function	Uns.
81M	Overfrequency	4
81m	Underfrequency	4
81D	Rate of Change of the Frequency	4
	Load Shedding	1
59V/Hz	Overexcitation	4
78	Out-of-Step	1
32P/Q	Directional Power (active / reactive)	2
79	Recloser	1
50FD	Fault Detector	1
60FF	Fuse Failure Detector	1
	Phase Selector	1
25	Synchronism Check Unit	2
	Cold-Load Unit	1
60VT	VT Supervision	1
60CT	CT Supervision	1
60CTI2	CT Supervision by Negative Sequence Current	1
60CTINDIF	CT Supervision by Neutral Differential Current	1
3	Coil Supervision	*
	Breaker Supervision	1
21FL	Fault Locator	1
	Transducer Voltage Supervision	1**
2	Pole Discrepancy	1
	Open Pole Detector	1
	Dead Line Detector	1
	Trip Logic	1
	Calendar	1



ZIV Automation Headquarters

Depending on the Hardware Selection.

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