DBF

Distributed Busbar Differential Protection (ZIV e-NET Flex Family)

Designed for up to **24 bays** and **4 busbars,** with ethernet **HSR** or **PRP** redundant communication between the central and bay units, based on process bus **IEC 61869-9 SV**, **IEC 61850-8-1 GOOSE** and **PTP IEC 61850-9-3**

General features of central and bay units

- ✓ Powerful programable logic.
- ✓ 2000 event log. Up to 100 oscillography seconds.
- ✓ Alphanumeric or graphic display.
- ✓ 160 DI, 80 DO and 22 LEDs.
- ✓ Bonding, RSTP, PRP and HSR Redundancy for station bus; PRP and HSR redundancy for process bus.
- ✓ IEC 61850 Ed.2, DNP3.0, Modbus RTU and PROCOME Protocols.
- ✓ Native process bus 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) for station bus; PTP for process bus.

The **DBF** includes 4 main differential units, with percentage restraint and double slope. The differential unit has typical subcycle tripping times.

DBF device can be applied to any substation configuration, with up to 4 busbars, including two transfer busbars, with up to 4 ties, with simple and double CT and with up to 24 bays.

The communication between the bay units and the central unit is based on IEC 61869-9 SV and IEC 61850-8-1 GOOSE. The bay units are synchronized by PTP IEC 61850-9-3. The master clock can be the own central unit or an external device.

Redundant communication based on HSR or PRP can be used. These features allows **DBF** to be applied to both digital and conventional substations

Making the Smart Grid Real

Features

External Fault Detector

This detector is based on the ratio between instantaneous differential and restraint currents and on two directional comparison units. It allows blocking the differential unit when external faults with severe CT saturation occur, providing a great security.

Alarm Unit

This unit allows detecting open CTs, allowing the main differential unit to be blocked.

Supervision Unit

This unit takes into account all the bays in the substation, avoiding false trips of the main differential units due to erroneous status in the secondary contacts of the busbar isolators.

Dynamic Zone

The dynamic zone logic provides better security and dependability for faults located between the CT and the breaker if the last one was opened.

The logic removes the bay current in the differential unit calculation accelerating trips when the CT is on the bus side and blocking the trip when the CT is on the line side.
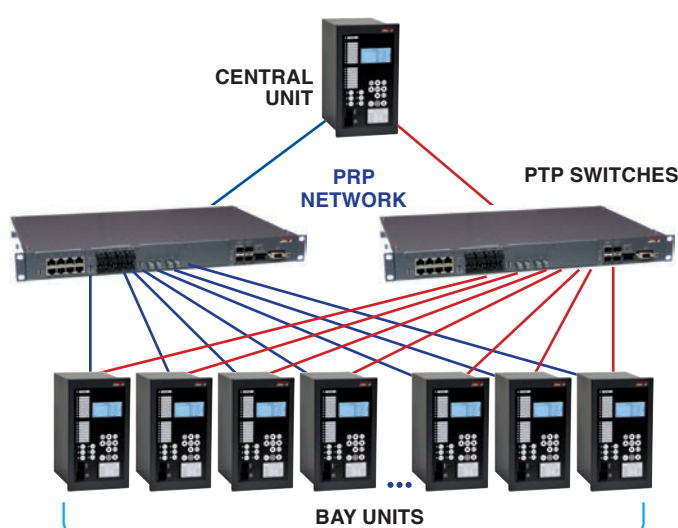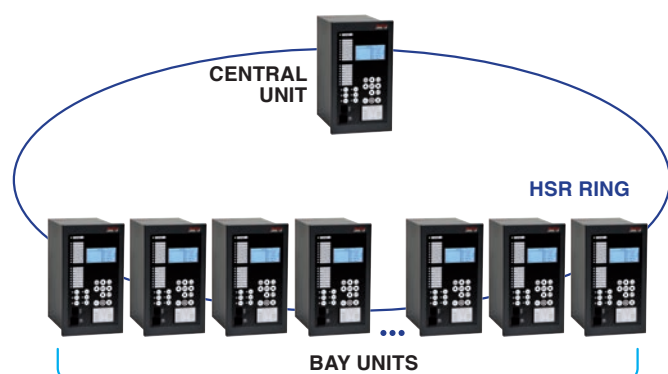
Cost-Effective Solution

The bay units, not only operate as SV publishers and GOOSE publishers / subscribers but they can also be used as Protection and Control IEDs, as they can run the protection functions of a feeder relay. This makes this solution very cost-effective for MV busbar differential protection.

Protection Units

ANSI	Function	Uns.
50/51	Phase Overcurrent	3/3
50N/51N	Neutral Overcurrent (calculated IN)	3/3
50G/51G	Ground Overcurrent (measured IG)	3/3
50Q/51Q	Negative Sequence Overcurrent	3/3
50Ns/51Ns	Sensible Neutral Overcurrent	1/1
51Ns EPTR_C	Sensible Neutral O/C with EPTR_C	1
51Ni/c	Isolated / Compensated Neutral O/C	1
50V/51V	Voltage Dependent Overcurrent	1/1
67	Phase Directional	1
67N	Neutral Directional	1
67G	Ground Directional	1
67Ns	Sensible Neutral Directional	1
67P	Positive-Sequence Directional	1
67Ni / c	Isolated / Compensated Neutral Directional	1
67Q	Negative Sequence Directional	1
85	Teleprotection schemes	1
50FD	Fault Detector	1
	Phase Selector	1
49HS	Hot Spot Thermal Unit	0
50OL	Overload Instantaneous	0
51OL	Time-Delayed Overload	0
	Differential Trip O/C Supervision	1
	Breaker Failure Trip O/C Supervision	1
	Remote Trip	1

HSR redundancy between central and bay units

CENTRAL UNIT

HSR RING

BAY UNITS

CENTRAL UNIT

PRP NETWORK

PTP SWITCHES

BAY UNITS

PRP network between central and bay units

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