DLX

Line Differential Protection IED

Complete and flexible protection for overhead and underground lines

Designed for installation in reduced spaces

Combines with external IEDs for flexible architecture

Easy integration using standard protocols: IEC870-5; DNP3; ModBus and IEC61850

Contributing to improve safety, quality of service and profitability of electrical systems

Functions

87L	Phase Line Differential
87N	Neutral Line Differential
87Q	Negative Sequence Line Differential
87P	Phase Directional Comparison
87PN	Neutral Directional Comparison
87PQ	Negative Sequence Directional Comparison
50	Phase Instantaneous Overcurrent (3 units)
50Q	Negative Sequence Instantaneous Overcurrent I2 (3 units)
50N	Neutral Instantaneous Overcurrent (3 units)
50Ns	Sensitive Neutral Instantaneous Overcurrent, with Independent Analog Input
51	Phase Time Overcurrent (inverse/definite) (3 units)
51Q	Negative Sequence (I2) Time Overcurrent (inverse/definite) (3 units)
51N	Neutral Time Overcurrent (inverse/definite) (3 units)
51Ns	Sensitive Neutral Time Overcurrent (inverse/definite) (3 units), with Independent Analog Input
67	Phase Directional Overcurrent
67N	Neutral Directional Overcurrent
67Q	Negative Sequence Directional Overcurrent
67Ns	Sensitive Neutral Directional Overcurrent
85-67	Overcurrent Protection Schemes
27	Undervoltage with Selectable Line or Phase Voltage Input (3 units)
59	Overvoltage with Selectable Line or Phase Voltage Input (3 units)
59N	Neutral Overvoltage (2 units)
81M	Overfrequency (4 units)
81m	Underfrequency (4 units)
81D	Frequency Rate of Change (4 units)
79	Recloser
25	Synchrocheck by voltage, phase, and slip
49	Thermal Image
50BF	Breaker Failure
27WI	Weak Infeed Logic
46	Phase Unbalance I2/I1 (Current Reverse Phase)
27DL	Dead Line Detector
3	Breaker Coil Circuit Monitoring
2	Pole Position Checking
FL	Fault Locator

DLX

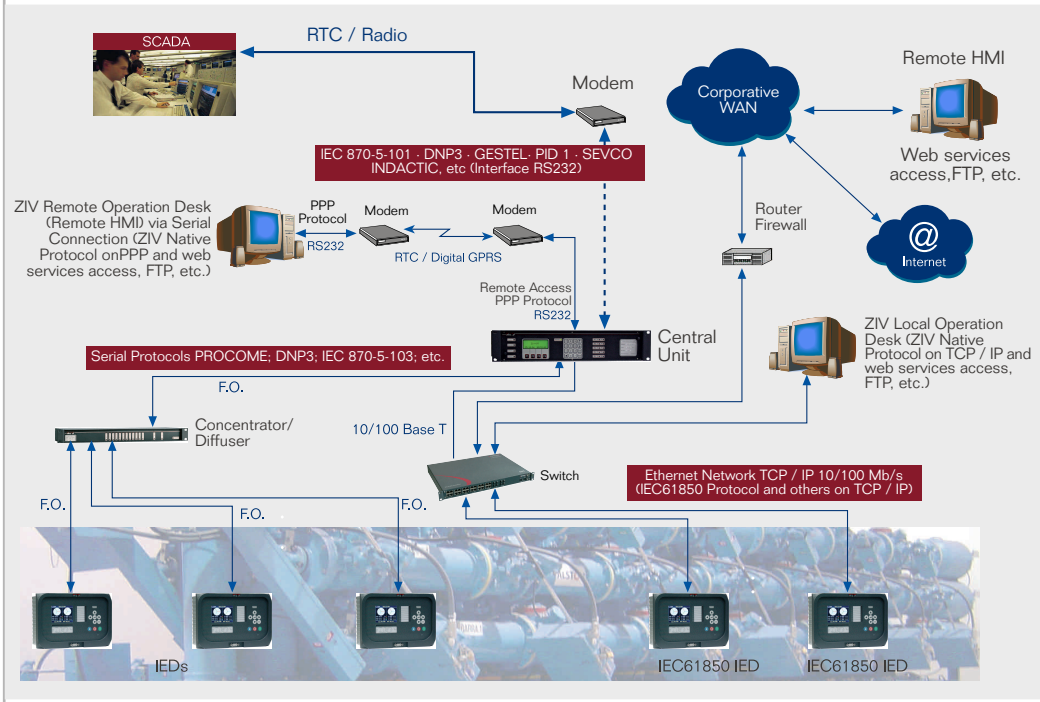
Description

The **DLX** design provides an integrated and complete solution for protection, control, and metering for overhead lines and underground cables.

The included programmable module allows users to define the operation logic for both protection and control functions, according to the requirements of each application.

An easy to use communication and programming toolset complements this IED line, providing a user friendly environment to define applications.

The DLX models provide complete protection for lines and cables, also incorporating control logic.



The DLX is equipped with two types of communication ports. One type connects the unit with the remote end, exchanging digital and analog signals required by the protection functions and any other user programmed logic. The second port type is for the remote interface, one for protection functions and one for control connectivity.

Each port is connected to its associated network, managing each subsystem independently by the corresponding upper level. Such architecture supports different communication protocols for each case if required.

Application

ZIV model **DLX** is designed to provide selective, fast, and reliable protection for overhead lines and underground cables.

DLX models include a complete set of protection functions to cover every application requirement. Complementing the protection functions, the unit includes control functions that support commands, logic, and metering both from measured and calculated parameters.

The versatile communication structure makes the units an optimal solution for stand alone applications and integrated systems, either conventional or based on the **IEC61850** standard.

The **DLX** modular construction and reduced size are specific design requirements for applications in distribution switchgear and metal clad applications.

The DLX modular design drastically minimizes panel wiring.

Protection Functions

Phase Differential Unit

The **DLX** includes a segregated phase differential unit with dual slope percentage restraint characteristic, compensating the different CT ratios, and including a capacitive current compensating algorithm to provide optimal sensitivity on cables or very long overhead lines.

Neutral and Negative Sequence Differential Units

These units allow increasing the relay sensitivity for internal faults with low current contribution that may not be detected by the phase differential unit.

Phase, Neutral and Negative Sequence Directional Comparison Units

The directional comparison units complement the differential units providing security against external faults with saturation in any of the CTs without the need to reduce the differential sensitivity.

Fault Detector

The detector monitors the differential unit trip with an independent principle of operation, providing increased security against problems in the communication channel.

Enhanced Fault Locator

The fault locator utilizes current and voltage information from both line ends, obtaining more precise results than locators using only local information.

Single Pole / Three Pole Trip Logic

The DLX unit is capable of generating single pole trip commands for single phase faults. The differential and the overcurrent neutral and negative sequence units are able to issue single pole commands based on the fault type selector algorithm included.

Additional Functions:

The DLX includes overcurrent, over/undervoltage, thermal image, frequency elements, and open phase units. These protection units can be set as backup to the differential units, operating if a communication channel failure is detected.

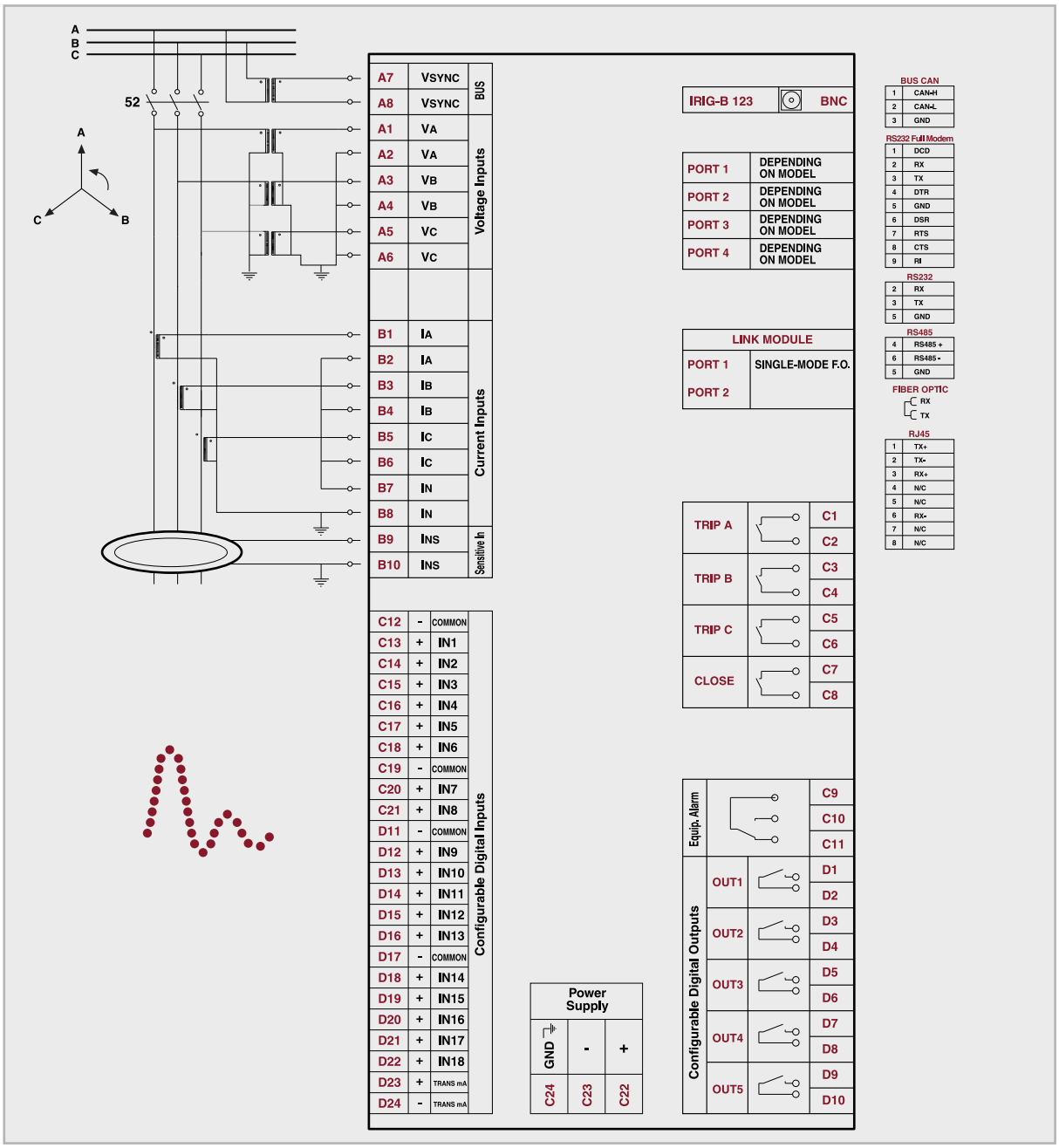
Overcurrent Protection Schemes:

Permissive underreach transfer trip (PUTT), permissive overreach transfer trip (POTT), directional comparison unblocking (DCUB) and directional comparison blocking (DCB). Such protection schemes can be complemented by echo logic or weak infeed logic, and current inversion blocking logic.

Recloser:

The recloser algorithm includes up to four shots programmed in four different modes to create single pole or three pole reclosing cycles based on the type of trip or fault detected.

External Connections



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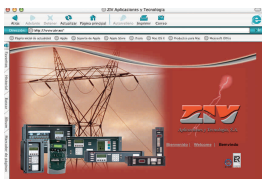

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