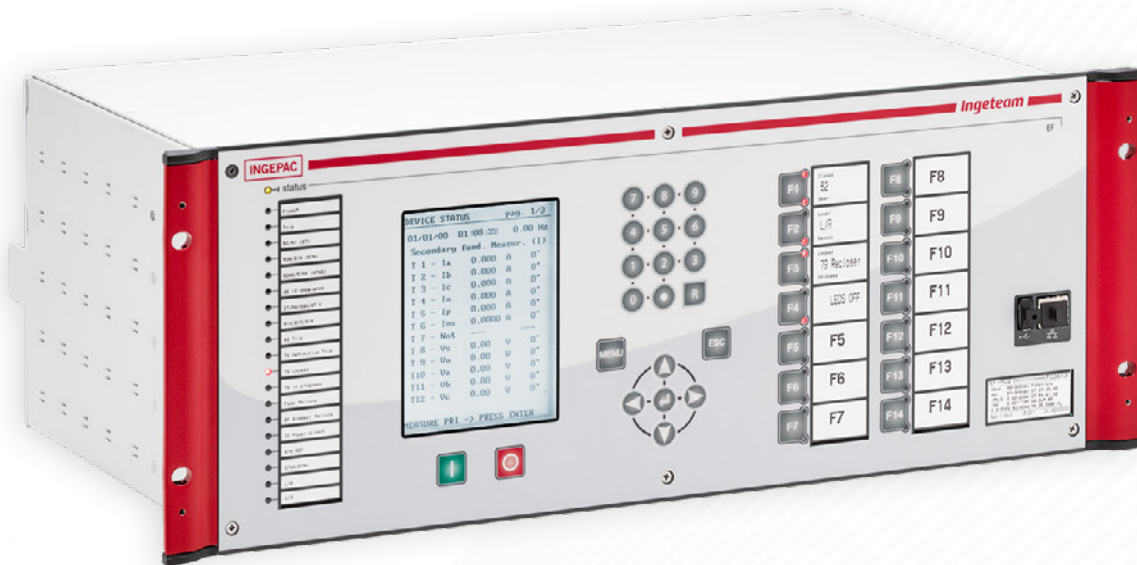




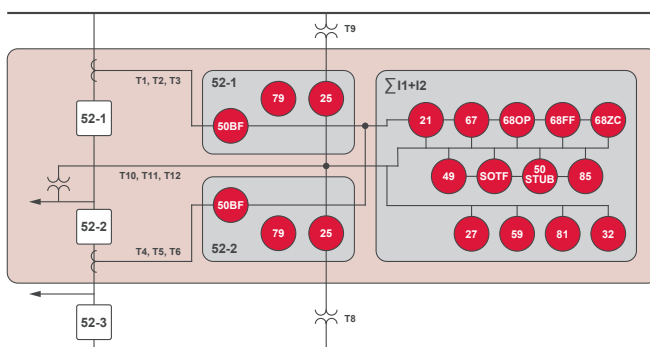
Distance protection

INGEPAC EF ZT is a distance protection relay with **5 independent zones of operation** on which **MHO or quadrilateral** characteristic can be set independently, suitable for transmission lines, or multibreaker configurations such as, breaker and a half or ring. It determines the type of fault, differentiating among **three-phase, two-phase and earth faults**.

INGEPAC EF ZT includes **backup units** for one or two breakers, **synchronism checking** functions or **automatic reclose** with different timings for single-pole or three-pole trips. It also provides **teleprotection** schemes or fault locator function that provides distance to the fault.

Applications

- Primary or secondary protection for cables, overhead or mixed lines in transmission and under-transmission grids (INGEPAC EF ZT0 model)
- Primary or secondary protection for breaker-and-a-half schemes (INGEPAC EF ZT1 model)



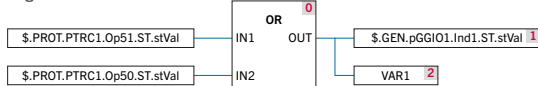
Functions

21 Quadrilateral and MHO
21 High speed zone
Zone 1 extension
Double line adaptation,
Serial compensation
line adaptation, Lines
with CVT
3x50/51 (67), 50N/51N
(67N)
50G/51G
46TOC (67Q), 46IOC
(67Q)
46BC Broken Conductor
50 CSC Second harmonic
restraint
SOTF Switch onto fault
27, 59, 59N, 47,

Minimum voltage

81M/m, 81 ROCOF
37 Undercurrent
49 Thermal image
32 Power
Stub bus
85 Teleprotection (21,
67/67Q)
68ZC, 68FF
78 Power swing
25 Synchrocheck
79 One/three poles
50 BF Breaker Failure
with monopolar/tripolar
trip
Fault Locator
Breaker monitoring

Logics based on IEC 61131-3



Local HMI

4,9" display
Graphical displays
I/O/L/R pushbuttons
19 LEDs
Keyboard



Data acquisition

SOE (1000), faults (20)
Oscillography (12 analog and 100 digital channels)
Measurements: I, V, P, U, Q, f, T, etc.
Quality: sags and swells, THD, harmonics (15)

Synchronization

IEEE 1588 v2
IRIG-B
SNTP

Communications

Protocols: IEC 61850, IEC 60870-5-103/104, DNP3, Modbus, PROCOM
Redundancy: PRP, HSR, D-link failure, switch mode
Web services: HTTP/HTTPS, FTP/SFTP, SSH

INSULATION AND ELECTROMAGNETIC TESTS

Electromagnetic compatibility requirements	IEC 60255-26
Dielectric withstand	IEC 60255-27
Insulation resistance measurement	IEC 60255-27
Voltage impulse	IEC 60255-27
Electrostatic discharge immunity	IEC 61000-4-2
Radiated radiofrequency electromagnetic field immunity	IEC 61000-4-3
Electrical fast transient / burst immunity	IEC 61000-4-4
Surge immunity	IEC 61000-4-5
Immunity to conducted disturbances, induced by radiofrequency fields	IEC 61000-4-6
Power frequency magnetic field immunity	IEC 61000-4-8
Impulse magnetic field immunity	IEC 61000-4-9
Damped oscillatory magnetic field immunity	IEC 61000-4-10
Immunity to conducted, common mode disturbances	IEC 61000-4-16
Ripple on DC input power port	IEC 61000-4-17
Damped oscillatory wave immunity	IEC 61000-4-18
Voltage dips, short interruptions and voltage variations immunity	IEC 61000-4-29
Withstand to radiated electromagnetic interference from transceivers	IEEE 37.90.2

CLIMATIC TESTS

Cold	IEC 60068-2-1
Dry heat	IEC 60068-2-2
Change of temperature	IEC 60068-2-14
Damp heat cyclic	IEC 60068-2-30
Damp heat steady	IEC 60068-2-78
External protection level	IEC 60529

MECHANICAL TESTS

Vibrations	IEC 60255-21-1
Shock and bump	IEC 60255-21-2
Seismic	IEC 60255-21-3

MAIN FEATURES

5 zones on which MHO or quadrilateral characteristic can be applied independently; each zone can be set as forward, reverse or non-directional

Independent analysis per each phase combination (AN, BN, CN, AB, BC, CA), characteristic (quadrilateral and MHO) and zone

Single-phase or three-phase trip; applicable with or without teleprotection schemes

Wide range current inputs allowing the same device to be connected to 1 A and 5 A CT secondary

Through the front USB you can access the equipment to retrieve reports and equipment CID, load an external CID, load the firewall configuration or update the equipment firmware

Synchronization from communications protocols, SNTP, IEEE 1588 v2 (PTP), demodulated IRIG-B input or PPS input, pacFactory or display

Web server for monitoring and setting without needing additional software

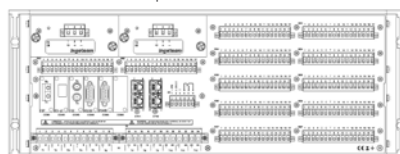
Cybersecurity features: sFTP, HTTPs, firewall, audit log, password accessing, RBAC, LDAP, session management, etc.

Acquisition of sampled values as per IEC 61869-9 (NCIT) and IEC 61850-9-2LE (SAMU) standards (optional)

HARDWARE OPTIONS

Mounting options

- 19" 4U rack (up to 6 I/O slots)



- ½ x 19" 5U rack (up to 2 I/O slots)



Optional

- High break contact outputs
- High speed outputs

Optional IP54 front protection

Boards options

- CPU: 6 DI + 4 DO
- 11 DI + 9 DO
- 32 DI
- 16 DI + 8 DO
- 16 DI + 16 DO
- 16 DI + 8 AI (mA)
- 8 DI + 8 DO
- 11 RTD + 4 AO
- 100 Ω platinum, 100 Ω nickel, 120 Ω nickel, 10 Ω copper

Communication ports

Front:

- RJ45
- USB

Rear:

- Up to 2 Ethernet (FO or RJ45)
- Up to 6 serial (FO, RS232, RS485)

Power supply

- 24, 48, 125 and 220 Vdc
- Power: 40 W
- Optionally redundant power supply

SOFTWARE

All the devices in the INGEpac™ product range can be accessed using powerful software tools developed by Ingeteam which run on Windows®

Application specifically designed for simple and user-friendly access to the equipment

INGESYS eFS

