INGEPAC™ EF MD — Multifunction protection and control
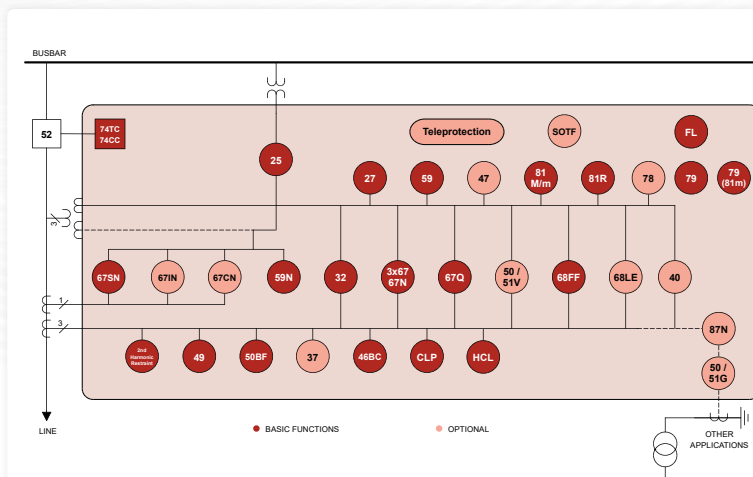

Multifunction protection and control

INGEPAC™ EF MD is a range of Intelligent Electronic Devices that provide **all the protection and control functionalities** required for **medium voltage feeders**, as well as back up protection for **high voltage systems** and **big electric machines**.

Applications

· Multifunction protection and control of medium and high voltage positions
· Subfrequency load shedding
· Bay unit in a distributed busbar protection scheme
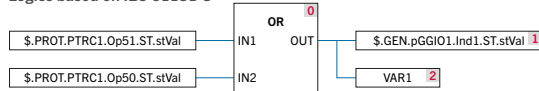

Protection functions
Functions
· 3x50/51 (67), 50N/51N (67N)
· 50SN/51SN (67SN)
· 50G/51G*
· 67IN*, 67CN*
· 46TOC (67Q), 46IOC(67Q)
· 46BC Open phase / broken conductor
· Overcurrent second harmonic restraint
· SOTF Switch on-to fault*
· 27, 59, 59N, 47
· 81M/m, 81 ROCOF
· 37 Undercurrent*
· 49 Thermal image
· 32 High / low / reverse power
· 78 Vector shift / Out-of-step*

· 40 Field loss*
· HCL, CLP
· 51V Voltage restrained / controlled overcurrent*
· 87R REF Restricted earth fault*
· 50BF Breaker failure
· 85 Teleprotection (67/67Q)*
· 68LE*, 68FF
· 25 Synchronism check
· 79, 79 (81m)
Fault location
Breaker monitoring
Optional
· 49T Thermal overload protection RTD (with 11 RTD and 4 SA module)
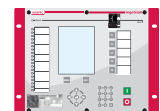
Data acquisition
SOE (1000), faults (20)
Oscillography: 12 analog and 100 digital
Measurements: I, V, P, U, Q, f, T, fault distance, etc.
Quality: sags & swells, THD, harmonics (15)

Logics based on IEC 61131-3

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

Synchrophasors*
According to IEEE C37.118 standard (class P filter available)

Synchronization
IEEE 1588 v2
IRIG-B
SNTP

Communications
Protocols: IEC 61850, IEC 60870-5-103/104, DNP3, Modbus, PROCOME
Redundancy: PRP, HSR, D-link failure, switch mode
Web services: HTTP/HTTPs, FTP/sFTP, SSH

*Only in selected models

Ingeteam
ELECTRIFYING A SUSTAINABLE FUTURE

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

High precision in direct measurements (class 0.2 in currents and voltages)

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

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

Different hardware options allow to define the most suitable configuration for the application

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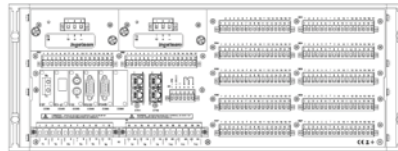
Cybersecurity features: sFTP, HTTPs, firewall, audit log, password accessing, RBAC, LDAP, session management...

Depending on the model and the application, it can function as a Sampled Values (SV) emitter or receiver, following the IEC 61850-9-2 or IEC 61869-9 standards.
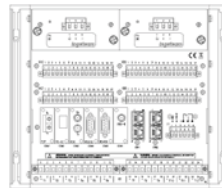
HARDWARE OPTIONS

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

CE | UK CA

CYBERSECURITY

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Ingeteam
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A SUSTAINABLE FUTURE