

INGEPAC

EF CD

General purpose and bay control unit



INGEPAC™ EF CD range offers comprehensive control features and **statistical metering for HV and MV switchgear**, and for substation general services

Its design is compliant with all the requirements of standards in the electrical sector, including **IEC 61850**. INGEpac EF CD is not only a high capacity **local and remote control and monitoring system**, but it also provides **powerful user logic capabilities** that allow the user to **develop any automation process** for the facility.



Current

- Phase A, B and C
- Average
- Neutral
- Phase A, B and C (fundamental)
- Neutral (fundamental)
- Phase A, B and C (THD)
- Average (THD)
- Neutral (THD)
- Zero, negative and positive sequences

Voltage and frequency

- A, B and C phase-neutral
- Average phase-neutral
- Average open delta (V_o)
- A, B and C phase-neutral (fundamental)
- Open delta (fundamental)
- AB, BC and CA phase-phase
- Average phase-phase
- AB, BC and CA phase-phase (fundamental)
- Average (THD)
- Open delta (THD)
- Zero, negative and positive sequences
- Frequency

Power

- Total active (P)
- Total reactive (Q)
- Total apparent (S)
- Phase A, B and C active
- Phase A, B and C reactive
- Phase A, B and C apparent
- Phase A, B and C cos(ϕ) (rms)
- Average cos(ϕ) (rms)
- Total active (fundamental)
- Total reactive (fundamental)
- Total apparent (fundamental)
- Phase A, B and C active (fundamental)
- Phase A, B and C reactive (fundamental)

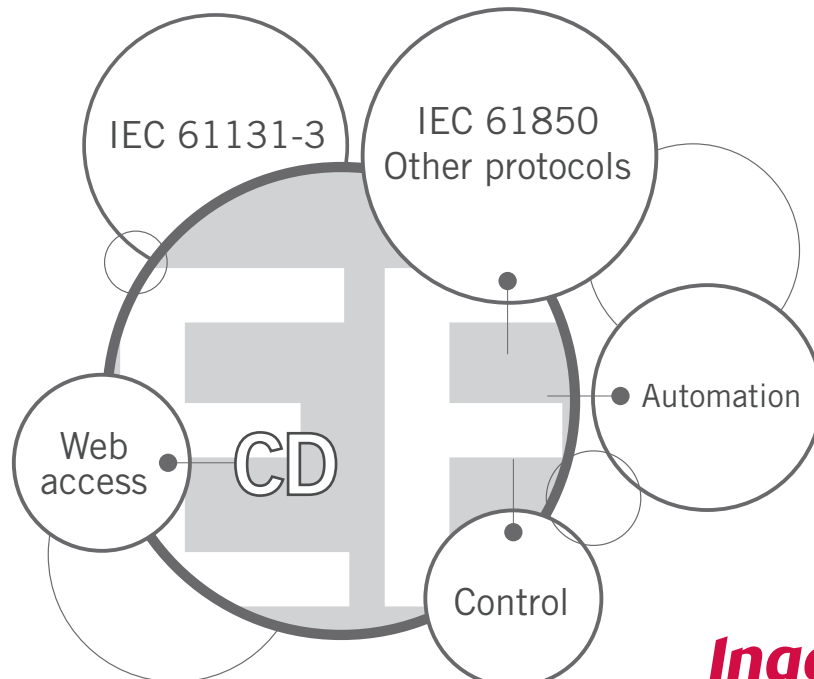
- Phase A, B and C apparent (fundamental)
- Phase A, B and C cos(ϕ) (fundamental)
- Average cos(ϕ) (fundamental)

Software

All the equipment in the INGEpac™ family can be accessed using powerful software tools developed by Ingeteam and which run on Windows®.

The application software is specifically designed for simple and user-friendly access to the equipment.

INGESYS EFS



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Ingeteam

Insulation and electromagnetic tests

· Dielectric withstand	IEC 60255-27
· Insulation resistance measurement	IEC 60255-27
· Impulse voltage	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
· 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
· Power frequency immunity	IEC 60255-22-7
· Withstand to radiated electromagnetic interference from transceivers	IEEE 37.90.2
· Measurements of radiated and conducted radiofrequency disturbances	EN 55022

Climatic

· 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

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

Main features

- Multi-protocol, native IEC 61850 platform
- 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
- Graphical and textual logic programming based on IEC 61131-3
- Different hardware options allow to define the most suitable configuration for the application
- Historic analogue values record, including currents (demand), voltage and power
- Front panel with 4.9" monochromatic graphic display, programmable function keys with 2 LED each, 19 programmable LED and 1 fixed two-colour hardware status LED, numerical keypad and menu keys
- Digital inputs for control and automation functions
- Digital outputs for operation/tripping and signalling
- Front Ethernet RJ45 and USB ports
- Up to 6 serial and 2 Ethernet rear ports
- Communication protocols: IEC 61850 Ed. 1 and 2, DNP 3.0, IEC 60870-5-103, IEC 60870-5-104, PROCOME
- Master Modbus-RTU communication
- Synchronisation from communications protocols, SNTP, IEEE 1588 (PTP), demodulated IRIG-B input or PPS input
- Web server for monitoring and setting without needing additional software
- Cybersecurity features: sFTP, HTTPs, firewall, audit log, password access

Options

- Two housing types: 5U 1/2 x 19" rack and 4U 19" rack, which can contain the following modules in different configurations:
 - 11 digital inputs and 9 digital outputs
 - 16 digital inputs and 16 digital outputs
 - 16 digital inputs and 8 digital outputs
 - 32 digital inputs
 - 16 digital inputs and 8 analog inputs
 - 16 digital inputs and 8 analog inputs (4 isolated)
 - 8 digital inputs, 4 digital outputs and 4 high break contact outputs
 - 8 digital inputs, 4 digital outputs and 4 high speed, high break contact outputs
 - 8 digital inputs and 8 digital outputs
- Selectable rear port connectivity:
 - Up to 6 serial communications
 - Up to 2 Ethernet communications
- Serial ports in glass fibre optic, plastic fibre optic, RS232 or RS485
- Ethernet ports in glass optic fibre or RJ45
- HSR, PRP and D-Link redundancy
- Captures analog measurements using Sampled Values (SV) protocol, through IEC 61850-9-2 or IEC 61869-9 standards
- Different models for auxiliary voltages most commonly found in electrical installations
- IP54 front protection
- 9 programmable graphic pages in local display
- RIO module sensing (remote input/output)
- Synchronism verification
- Redundant power supply

Applications

- Grid automation
- User-defined automatic operations: interlockings, automatic sequences, alarms, signal grouping, etc.
- Local and/or remote signalling, control and measurement of the substation's electrical position for any voltage level
- Signalling, control and measurement for the substation's ancillary services
- Lane bay controller in breaker-and-a-half topologies

