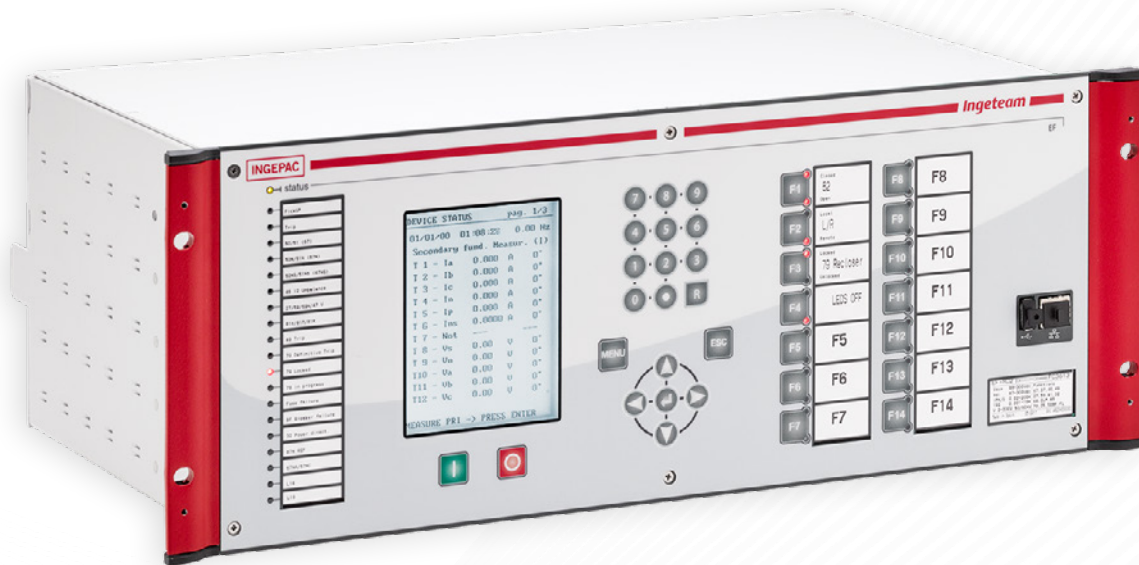




General purpose and Bay Control Unit

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. It provides also powerful user logic capabilities that allow the user to develop any automation process for the facility.

Applications

- 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

Current measurement (depending on model)

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 measurement (depending on model)

Voltage and frequency
A, B and C phase-neutral
Average phase-neutral
Average open delta (V0)
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 measurement (depending on model)

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)

Synchronization

IEEE 1588 v2
IRIG-B
SNTP

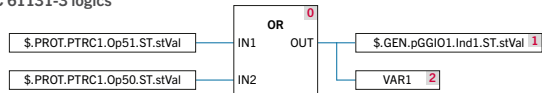
Communications

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

Data acquisition

SOE (1000), faults (20)
Oscillography (12 analog and 100 digital channels)
Measurements: I, V, P, U, Q, f, T

IEC 61131-3 logics



Local HMI

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



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

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

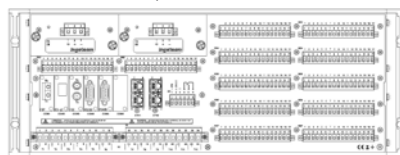
Cybersecurity features: sFTP, HTTPs, firewall, audit log, password accessing, RBAC, LDAP, session management...

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



CYBERSECURITY