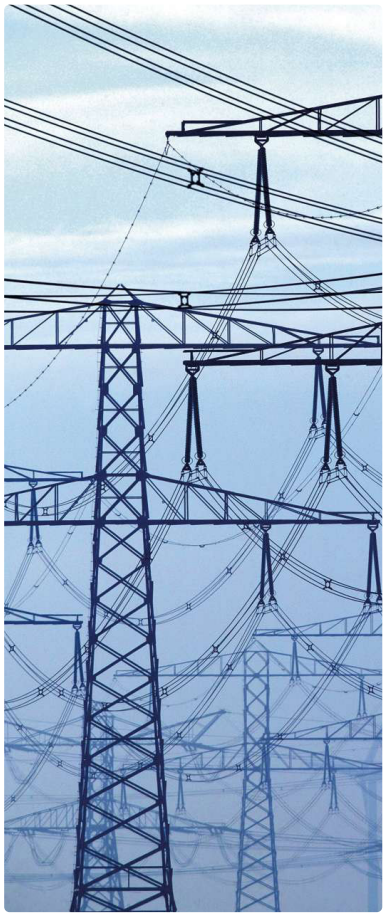
INGEPAC

# EF PB

## SAMU Stand Alone Merging Unit




**INGEPAC™ EF PB** is the family of devices that Ingeteam has designed as a SAMU (Stand Alone Merging Unit); the device acquires conventional transformer currents and voltages (CT and VT), and **converts them into digital values**, transmitting them to an Ethernet network, also called a process bus.

The data is published as **Multicast Sampled Values** (MSV), complying with the **IEC 61850 9-2** or **IEC 61869** standards.

Merging units do not only notably **reduce expenses** derived from conventional wiring (installation, maintenance, etc.) but also permit **access to captured information** from any IED connected to the network, quickly, efficiently and reliably.

Additionally, INGEPAC™ EF PB allows you to include **I/O modules** that allow **GOOSE** transmission/ reception in accordance with **IEC 61850-8-1** standard.

### 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.

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### Functions

- Multicast sampled values emitter IEC 61850-9-2LE or IEC 61869
- Redundant power source option for greater reliability
- Communications supervision, device power supply, temperature, etc.
- Binary inputs and outputs
- Chronological events log
- PRP or HSR redundant communications
- Synchronisation via PPS or IEEE 1588
- Cybersecurity features; Firewall, sFTP, HTTPs
- Server/RTU communications protocols: DNP 3.0, IEC 60870-5-103, IEC 60870-5-104

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# Overview

INGEPAC EF

### Insulation and Electromagnetic

| | |
|---|---|
| Dielectric strength | **IEC 60255-27** |
| Insulation resistance | **IEC 60255-27** |
| Input voltage test (shock wave) | **IEC 60255-27** |
| Immunity to industrial frequencies | **IEC 60255-22-7** |
| Electrostatic discharge immunity | **IEC 61000-4-2** |
| Immunity to radiofrequency radiated fields | **IEC 61000-4-3** |
| Electrical fast transients immunity | **IEC 61000-4-4** |
| Surge pulses immunity | **IEC 61000-4-5** |
| Immunity to radiofrequency induced signals | **IEC 61000-4-6** |
| Immunity to 50Hz magnetic fields | **IEC 61000-4-8** |
| Immunity to pulsing magnetic fields | **IEC 61000-4-9** |
| Immunity to damped oscillatory magnetic fields | **IEC 61000-4-10** |
| Ripple immunity in DC power supply | **IEC 61000-4-17** |
| Damped oscillatory wave immunity | **IEC 61000-4-18** |
| Immunity to interruptions, dips and variations in DC power supply | **IEC 61000-4-29** |
| Radiated radio-electric emissions measurements | **EN 55022** |
| Conducted radio-electric emissions measurements | **EN 55022** |
| Immunity to radiofrequency radiated fields | **IEEE 37.90.2** |

### Climatic

| | |
|---|---|
| Cold low temperature | **IEC 60068-2-1** |
| Dry heat | **IEC 60068-2-2** |
| Thermal shock | **IEC 60068-2-14** |
| Humid heat, cyclical | **IEC 60068-2-30** |
| Humid heat continuous | **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

- Reduction in installation costs, related to the reduction in cabling
- Fewer windings needed for CTs and VTs given that the sampled values are captured by one or more IEDs
- Easier when performing the engineering for panels
- Improves substation maintenance, facilitating relay replacements without the need to change panel cabling given that it is minimal
- Graphical and textual logic programming based on IEC 61131-3
- Ethernet for local communication and front USB for loading/unloading CID
- Web server for monitoring and adjustments without needing in-house tools
- Communications status monitoring
- Substation bus protocols

## Options

- Different models for quality analysis (Sags, swells, THD and harmonics):
  - **INGEPAC EF PB1:** 4 I + 4 V
  - **INGEPAC EF PBQ:** 4 I + 4 V + 4 I (quality)
- Different types of housing with a wide selection of I/Os boards that covers different needs
- PRP or HSR redundancy with glass optic fibre or RJ45 Ethernet ports
- Redundant power supply source

## Applications

- Conversion to conventional voltage or current transformer sampled values
- Remote inputs/outputs



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