Protection and sensing

zillion

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Physical layer

This is the point where electrical protection is provided and where the solution is physically installed in the switchboard.

It includes devices such as Zillion SAL and Zillion SFS, which combine protection, switchboard integration and readiness for electrical signal acquisition.

Within this layer, Zillion SFS acts as the physical foundation, integrating electrical protection and signal acquisition.

This layer turns the protection point into the first digitisation node in the grid.

Sensing and measurement

This is the layer where electrical signals are converted into structured, actionable data.

Zillion TSA, LRS and LRG, together with Zillion SFS configurations incorporating measurement electronics, enable real-time measurement of grid behaviour in both new installations and retrofit environments without interrupting the power supply.

Within this layer, Zillion SFS can evolve into a comprehensive solution by incorporating measurement electronics, such as TSA, enabling it not only to capture signals but also to convert them directly into data ready for monitoring.

This layer provides the information required for monitoring, diagnostics, and operational decision-making.

Key range functions

Electrical protection at the grid connection point

- Electrical signal capture directly at feeders, incoming supplies and transformers
- Conversion of electrical signals into measurable data, depending on the configuration
- Real-time monitoring of electrical behaviour
- Adaptability to new installations and retrofit environments
- Flexible installation, with or without interruption to the power supply, depending on the solution
- Integration with the Zillion architecture for monitoring, analysis and operation

01.1 Zillion SFS – Smart fuse switch

Zillion SFS (smart fuse switch) is a range of low-voltage fuse switches that combine electrical protection, sensing and monitoring capabilities in a single device.

Current transformers and voltage taps are integrated directly into the fuse switch, enabling electrical signals to be captured at the protection point and converted into data for grid monitoring.

Thanks to its compact design and native integration with solutions such as SAL or TSA, Zillion SFS makes it possible to transform conventional switchboards into monitored systems, simplifying installation and reducing wiring complexity.

Available configurations:

Zillion SFS
Lower solution

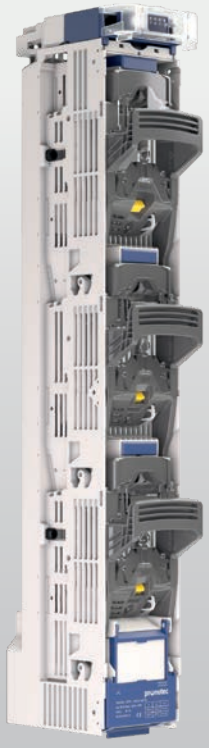
The electronics are integrated into the lower section of the fuse switch, including the feeder meter, while the current transformers and voltage taps form part of the assembly. This configuration reduces wiring requirements and optimises the system's internal layout.
Electronic boards can be replaced safely thanks to fuse protection.

Zillion SFS
Upper solution

The meter is integrated into the upper section, providing easier access to the electronics and facilitating installation, operation, and maintenance tasks. This solution is particularly suitable for compact switchboards where accessibility is required in confined spaces.



Zillion SFS
Smart fuse switch
Protected by Pronutec



Zillion SFS
Smart fuse switch
Protected by Pronutec

01.1 Zillion SFS – Smart fuse switch

Zillion SFS is available in different configurations to meet a range of installation requirements:

FUNCTIONS AND FEATURES

Protection and operation
- Protection using NH fuses.
- Feeder disconnection and protection function.
- Maintains the electrical functionality of the switchboard.

Signal capture and digitalisation
- Integrated current transformers for each phase and voltage taps.
- Signal capture at the protection point.
- Foundation for monitoring, diagnostics and control.

Architecture and design
- Compact, integrated design.
- Electronics embedded in the fuse switch.
- Reduced external wiring.

Installation and integration
- Compatible with NH00, NH1, NH2 and NH3.
- Retrofit-ready for existing installations.
- Straightforward installation, requiring interruption of the power supply.
- Integration with SAL and TSA.
- Daisy-chain architecture, using RS485 or Ethernet depending on the solution.

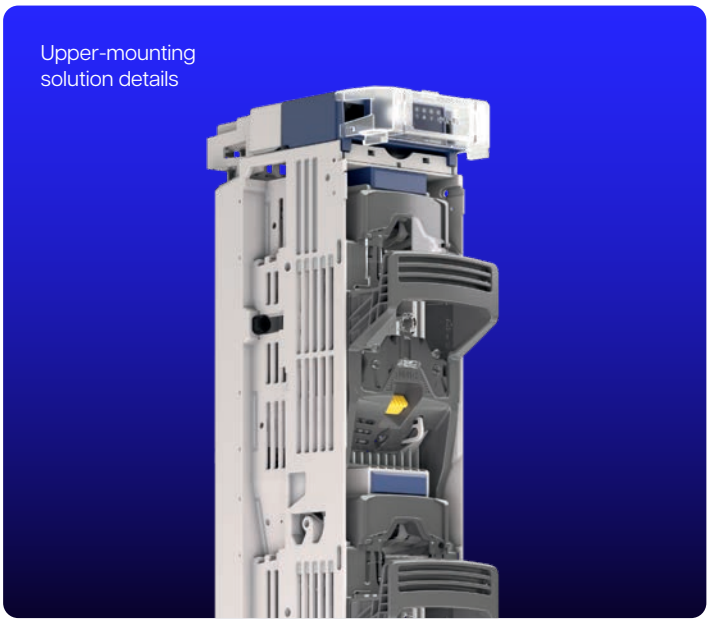
Electrical design and connection
- No complex external wiring required.
- Simplified connection between components.
- Different terminals available depending on the outgoing connection configuration.

MAIN USE CASES

Digitalisation of conventional switchboards
Enables monitoring to be added without completely redesigning the switchboard, supporting the transformation of traditional infrastructure into monitored systems.

Integrated protection and sensing solution
Combines fuse protection, electrical data capture and readiness for advanced monitoring in a single device, reducing the number of components and simplifying system design.





01.2 Zillion SAL – Line advanced supervisor

Zillion SAL (Line Advanced Supervisor) is a compact device designed for monitoring low-voltage feeders. It is installed as a lower extension of the fuse switches. It captures electrical signals through current transformers and voltage taps integrated into each phase, providing accurate data for monitoring and diagnosing the status of the grid.

Thanks to its adaptable design, it enables monitoring capabilities to be added to existing infrastructure, providing an efficient solution for environments where full system digitalisation is not required.

FUNCTIONS AND FEATURES

Electrical measurement

- Signal capture through current transformers integrated into each phase.
- Integrated voltage connections.
- Measurement of basic electrical parameters at feeder level.
- Accurate data captured directly from the fuse switches.

Adaptability and configuration

- Available with multiple transformation ratios: 250 A, 400 A and 600 A.
- Other configurations available on request.
- Adaptable to different switchboard configurations.

Installation and deployment

- Designed for integration with fuse switches in low-voltage switchboards.
- Compatible with existing installations for retrofit applications.
- Straightforward installation, although interruption of the power supply is required.

Design and application

- Compact device.
- Designed for advanced monitoring applications.
- Compatible with the full range of Pronutec accessories and terminals.

Safety and operation

- Voltage taps protected by fuses.
- Designed for conventional electrical environments.

MAIN USE CASES

Adding monitoring capabilities to existing fuse switches
Enables measurement capabilities to be added to unmonitored low-voltage switchboards, improving grid visibility without the need to redesign the installation.

Electrical monitoring in conventional environments
Provides reliable electrical data for grid monitoring and diagnostics in applications where a complete digitalisation solution is not required, supporting maintenance and operation through straightforward deployment.



Zillion SAL
Line advanced supervisor
Protected by Pronutec



01.3 Zillion TSA – Line Feeder Meter

Zillion TSA (Line Feeder Meter) is a three-phase feeder meter integrated into advanced line supervisors such as Zillion SAL. It converts electrical signals into digital data ready for processing, enabling key variables such as voltage, current, power, and energy to be monitored for each phase.

Through its integration into modular architectures and connection to the Zillion RTU, it enables feeder-level grid digitalisation, providing reliable data for monitoring, diagnostics, and operational control.

FUNCTIONS AND FEATURES

Advanced electrical measurement

- Three-phase voltage and current measurement (neutral calculation).
- Calculation of active, reactive and apparent power, power factor and frequency.
- Active and reactive energy measurement, including import and export.
- Real-time RMS value calculation.
- Temperature probe measurement coming soon.

Monitoring and diagnostics

- Continuous monitoring of electrical variables for each phase.
- Phase presence and deviation detection.
- Event logging, including blown fuses, overloads and short circuits.
- Oscillography capture associated with alarms.
- Identification of feeder incidents.

Data management

- Storage of load profiles and average, maximum and incremental values.
- Periodic data transmission to the node.

Communications and integration

- Communication with the node via DLMS/COSEM over RS485/IP.
- Daisy-chain architecture.
- Power supply and communication via RJ45.

Interfaces

- 2 RJ45 Ethernet ports for daisy-chain connection.
- Measurement connections: voltage (3 poles) and current (6 poles).



Zillion TSA
Line Feeder Meter
Sensed by Merytronic

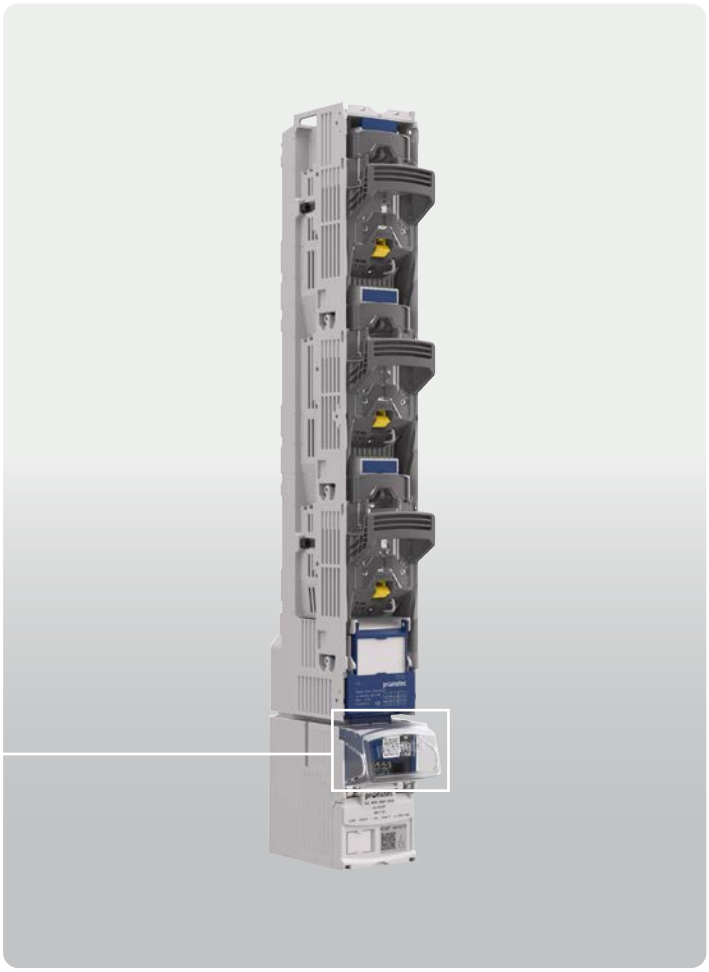
MAIN USE CASES

Digital monitoring of low-voltage feeders

Enables the electrical behaviour of each feeder to be monitored in real time, providing phase-level visibility to detect incidents, assess grid status, and improve operations without the need for complex additional instrumentation.

Data foundation for grid diagnostics and control

Converts electrical signals into structured data for higher-level systems, such as nodes and platforms, enabling advanced analysis, issue detection, and data-driven decision-making.



01.4 Zillion LRS – Feeder retrofit supervisor

Zillion LRS (Feeder Retrofit Supervisor) is an advanced low-voltage feeder monitoring solution designed for installation while the network remains energized, without interrupting the power supply.

Designed for retrofit environments, it enables monitoring capabilities to be added to any type of low-voltage switchboard, regardless of its configuration or manufacturer. Its adaptable design allows it to be installed directly on the outgoing feeder cables.

Equipped with electronics from the Zillion ecosystem, including Zillion TSA, it provides advanced measurement and analysis capabilities, enabling existing grids to be digitalized quickly and safely without disrupting operations.

FUNCTIONS AND FEATURES

Digitalisation of existing low-voltage switchboards (retrofit)
- Installation while in service, without interrupting the power supply.
- Compatible with existing switchboards fitted with either fuse switches or circuit breakers.
- Flexible, plug-and-play deployment.
- No prior switchboard inspection required.

Electrical measurement and monitoring
- Voltage and current measurement at feeder and phase level.
- Real-time monitoring.
- Integrates Zillion TSA, the Line Feeder Meter.

In-service installation
- Split-core current transformers.
- Rapid installation on existing cables.

Architecture and design
- Compact, modular components.
- Reduced wiring per feeder.
- Flexible positioning.

Voltage connection options
- Insulation-piercing connection, enabling direct connection without stripping the cable.
- Metric terminal, using a washer and screw.
- V-type terminal for connection in confined spaces.

Integration and communications
- Protocols compatible with universal solutions.
- Integration with the RTU and monitoring systems.

Operational safety
- Fuse-protected signal interface.
- Designed for safe field installation.

Compatible with circuit breakers



Voltage connection: insulation-piercing connector for direct connection without stripping the cable



01.4 Zillion LRS – Feeder retrofit supervisor

MAIN USE CASES

Digitalisation of existing grids without service interruption
Enables advanced monitoring to be added to low-voltage feeders without interrupting the power supply, making it suitable for environments where continuity of service is critical.

Flexible monitoring across different switchboard configurations
Adapts to both fuse switches and circuit breakers, enabling monitoring to be deployed across mixed infrastructure without the need for prior standardization.



Zillion LRS
Feeder retrofit supervisor
Protected by Pronutec



Voltage connection:
screw terminal



Voltage connection:
V-type terminal



01.5 Zillion LRG – Feeder retrofit Rogowski

Zillion LRG (Feeder Retrofit Rogowski) is an advanced low-voltage monitoring solution designed for retrofit environments, enabling electrical feeders to be monitored without interrupting the power supply.

By using Rogowski coils, lightweight and flexible sensors without a ferromagnetic core, the system enables accurate and safe current measurement, even in existing installations with limited space or where invasive work is not possible.

It combines comprehensive electrical measurement, straightforward installation, and universal compatibility with low-voltage switchboards, enabling grids already in operation to be digitalized without disrupting service.

FUNCTIONS AND FEATURES

Benefits

- In-service installation, without interrupting the power supply.
- Compatible with existing switchboards fitted with fuse switches or circuit breakers.
- Flexible, plug-and-play deployment.
- No prior switchboard inspection or specific inventories required.

Electrical measurement

- Feeder- and phase-level current measurement using Rogowski coils, with neutral current measurement available on request.
- Voltage measurement using insulation-piercing, screw-and-nut or V-type connectors.
- Integrated fuse protection, enhancing operator safety.

Rogowski technology

- Lightweight, flexible sensors.
- No ferromagnetic core, providing high accuracy without the risk of saturation.
- Suitable for installation in confined spaces.

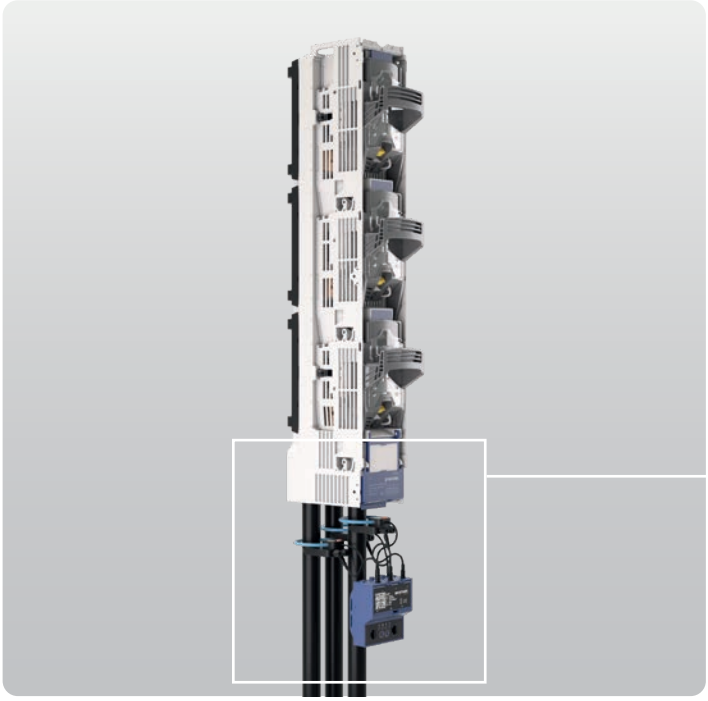
Integration and architecture

- Compatible with the Zillion ecosystem and monitoring systems through standard protocols.

MAIN USE CASES

In-service monitoring (without interrupting the power supply)
Enables measurement systems to be installed on low-voltage feeders without disconnecting the installation, making it suitable for environments where continuity of service is critical.

Digitalisation of existing infrastructure (efficient retrofit)
Integrates into any existing low-voltage switchboard, enabling advanced monitoring to be added without complex modifications or equipment replacement.





Zillion LRG
Feeder retrofit Rogowski
Sensed by Merytronic

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