

4SLV

Advanced Low Voltage Supervision



Provides **full visibility** of the **LV Network**, by monitoring each one of the outputs of the **LV Fuse Boards**, to enable **Advanced Supervision** functionality



Overview

The solution consists of current sensors (**LPCT**), up to 16 measurement units (**5CTI**), a Neutral Voltage Monitor (**5VTN**) and a controller (**4SLV**) that are either integrated in the LV panel or in a cabinet.

The measurement data and events are transmitted to a head end system to enable applications such as **energy balancing**, **phase load balancing** or **feeder mapping of meters**.

Combined with **ZIV's MV monitoring systems** allows monitoring distribution transformers and operating smart transformers.

General Functionalities

- ✓ Three-phase feeder metering for energy balancing (5CTIs). Bidirectional active and reactive energy recording in all 4 quadrants.
- ✓ Load profile recording (5CTIs).
- ✓ Instantaneous Voltage, current, active and reactive power measurement.
- ✓ Average voltage and current per phase, apparent power and neutral current (calculated).
- ✓ Maximum voltage and current per phase, apparent power and neutral current (calculated).
- ✓ Blown fuse detection.
- ✓ Overcurrent, Overload, Sag and Swell alarms.
- ✓ Class S Power Quality measurement according to IEC 61000-4-30 and IEC 62586-2.
- ✓ Ground fault detection.
- ✓ Oscillograph recorder: when the 4LVS detects any QoS event, an oscillography will be generated with the voltage values measured in the three phases during the previous 10 cycles and the 10 cycles after the detection of the event. The oscillographs are stored in COMTRADE format. The device will keep stored the last 100 oscillographs registered.
- ✓ VTN (Neutral Voltage Monitor). Measurement of the potential difference between neutral plate of the low voltage panel and earth in order to detect possible current – to – earth leakage on LV lines. Measurement profile with 1 second integration period.
- ✓ Enables mapping of smart meters to LV feeders.
- ✓ Event and alarms management.
- ✓ Temperature sensor to emit an alarm if a threshold is exceeded.
- ✓ Time synchronization using SNTP protocol.
- ✓ Web User Interface (WEB UI).
- ✓ Cybersecurity: authentication and encryption.
- ✓ Secure access and protocols: HTTPS, SSH v2, SFTP, LDAP v3, LDAPS.

Secondary Substation LV Feeder Advanced Supervision

Allows monitoring every LV feeder output of the low voltage switchboard on the secondary (LV side) of the Distribution Transformer (DT).

It enables the implementation of advanced low voltage monitoring functionality such as detection of blown fuses, load imbalances among the feeders and phases and quality of supply assessment.

Combining smart meter data and energy balancing allows identifying technical and non-technical losses.

Earth Fault Detection

For the detection of earth faults in LV networks, which are masked by the load current due to the low fault current, **4SLV** provides two methods: one based on the neutral to earth current and another in the neutral to earth voltage.

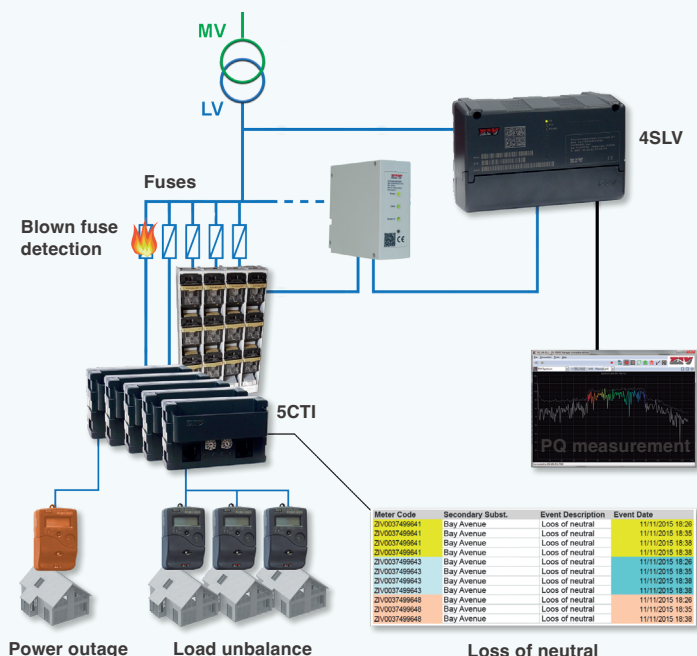
Mapping of Meters to Feeders

5CTI provides two methods to determine the electrical location of the meters and obtain a reliable topological information of the LV network: load variations and PLC signal strength.

This information helps in reducing the impact of LV power outages and in improving the information to clients.

Power Quality Measurement

The **4SLV** controller is also a Power Quality analyser (licker, supply voltage interruptions, sags/dips and swells, harmonic distortion, voltage variations) class S certified according to IEC 62586-2.

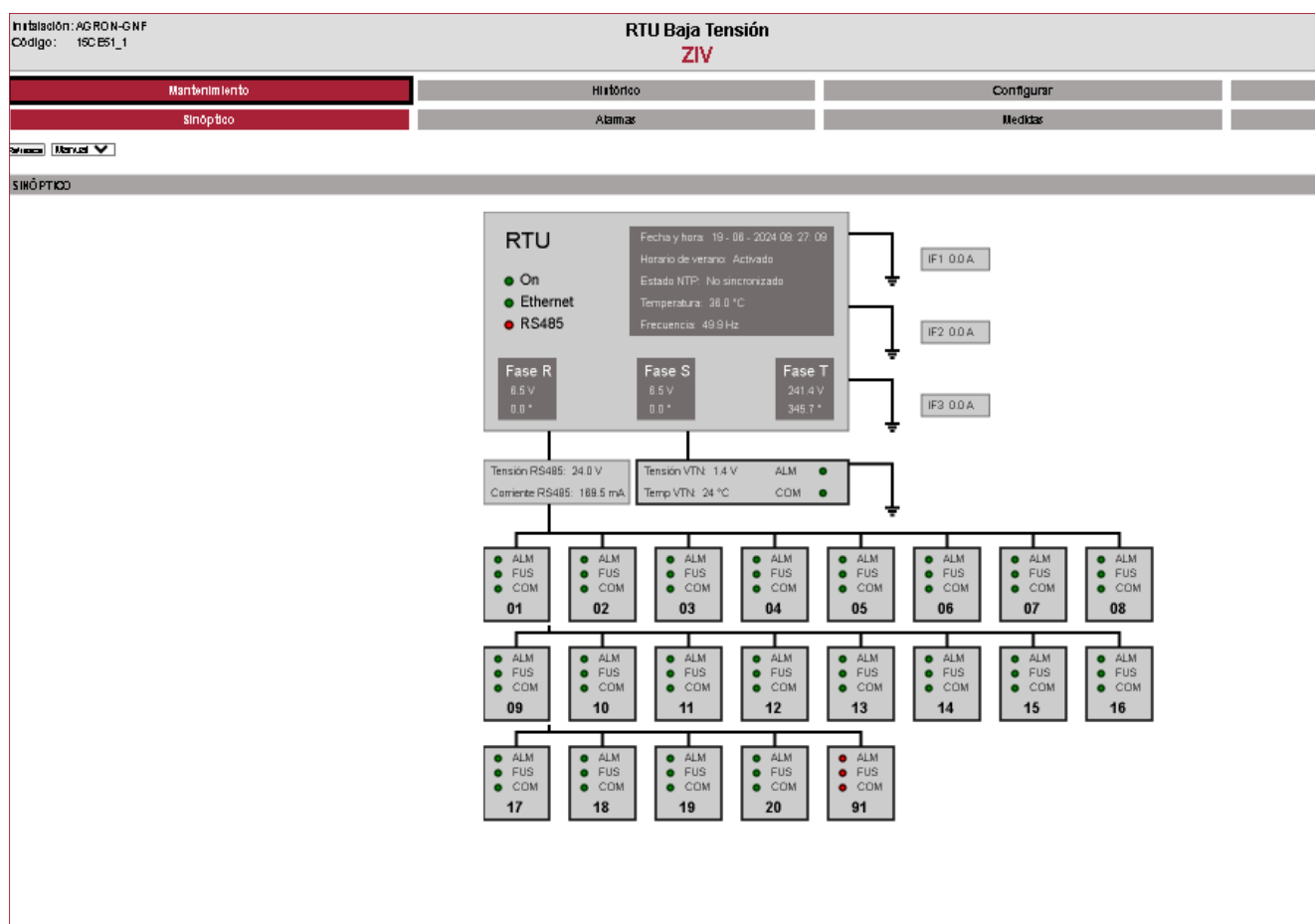


WEB UI

4SLV has a WEB User Interface for the device's configuration or data collection. The Web UI also offers the system synopsis with the detailed status of the 4SLV, VTN and the registered 5CTI devices.

Key features

- Compact devices to be installed in the low voltage panel where space may be limited.
 - Without moving or mechanical elements. Passive cooling.
 - Standardized plug-in connectors.
 - Surveillance and monitoring of internal processes. Watchdog hardware and firmware. Generation of alarms due to internal error or external event.
 - Remote firmware upgrade of all the devices.
 - Automatic device discovery (plug and play).
 - Non-volatile memory that allows the storage of the equipment configuration, events, alarms and all types of data records, in the absence of power.
- All system devices and their packaging are constructed in such a way that they meet the following mechanical conditions:
 - Vibration test (sinusoidal): UNE-EN 60255-21-1 Class I.
 - Shock and shock test: UNE-EN 60255-21-2 Class I.
 - Seismic test: UNE-EN 60255-21-3 Class I.
 - Drops with packaging: 2 drops of 0.5 m.
 - All devices have been designed so that the risk of fire is minimal. All components have been chosen and all circuits have been designed in such a way that if a component fails, no damage will occur to any cables, wires, interconnecting assembly or any other device.

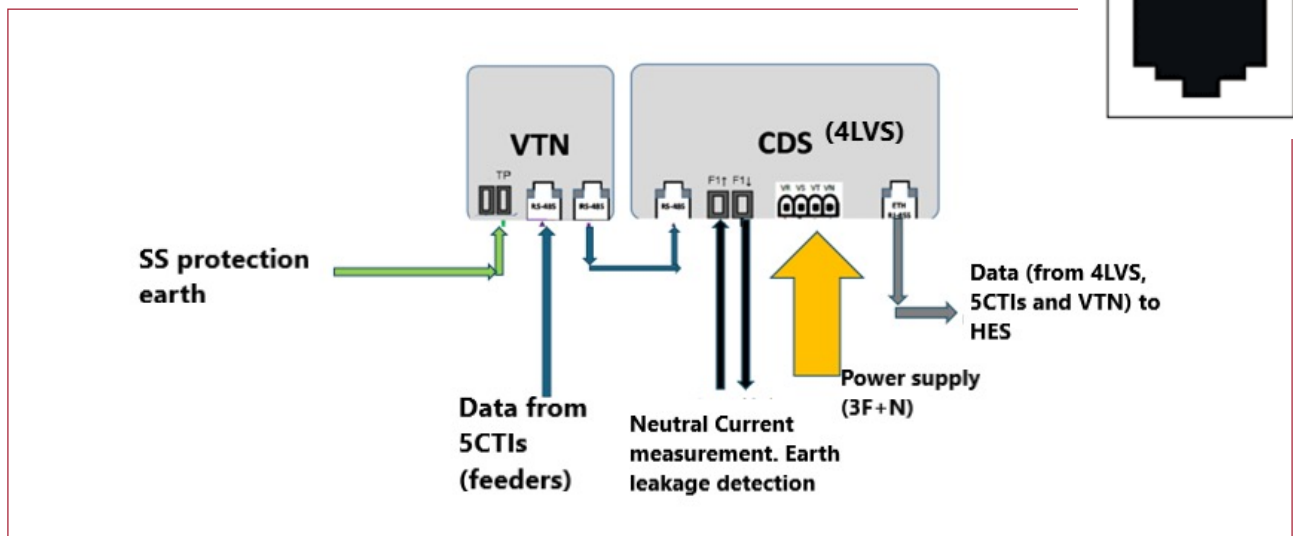
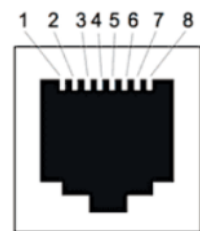


Devices Interconnection using RS485 Daisy Chain Topology

The communication between all the elements of the system is done through a RS485 bus with the following characteristics:

- Physical layer: RS485 - 2 wires. (RJ45 connector).
- VTN and 5CTIS are powered up through this connection (24 Vcc).
- Link layer: HDLC Half duplex 8N1 and 115200 bps.
- Application protocol: DLMS /COSEM (UNE-EN 62056-46) . 4LVS master and VTN/5CTIs slaves.

Pin1	B-
Pin2	A+
Pin3	No conneted
Pin4	GND
Pin5	GND
Pin6	No connected
Pin7	+24Vcc
Pin8	+24Vcc



Technical Information

	4SLV (CMP)	5CTI	5VTN
Enclosure	ZIV Polycarbonate box	ZIV Polycarbonate	Polycarbonate. Phenix compact Reference:
Dimensions	220 x 140 x 93,6 mm	59 x 93 x 30 mm	118 x 137,5 x 45 mm
Mounting	DIN rail	DIN rail	DIN rail
Communications port	✓RS485 (1) / HDLC / DLMS COSEM (R45 connector). ✓ETHERNET 10/100 Base T (auto-negotiation and auto MDI). WAN communication. IPv4	✓RS 485 (2) / HDLC / DLMS COSEM (RJ45 connectors).	✓RS 485 (2) / HDLC / DLMS COSEM (RJ45 connectors).
Leds	3: power, eth, rs485	4: power, rs485, V, I	3
Power supply	3 x 230/400 VAC (±20%) Power supply through any of the phases, two phases or three phases	24 Vcc (±10%)	24 Vcc (±10%)
Power supply conditions (IEC 60870-2-1)	Frequency: class F2 (+-1%, 1%) Harmonics: class H2 (<10%)	E-(negative to ground) VR1	E-(negative to ground) VR1
Consumption (at reference voltage)	< 10 W	< 0,4 W	< 0,3 W
Current measurement	x/5 A	x/5 A	NA
Current accuracy	<0,5%	<0,5%	NA
Voltage accuracy	Class S (IEC 61000-4-30)	NA	<+/-10% (from 2 V to 150Vrms)
Energy Accuracy	Active: Class B (EN 50470-3) Reactive: Class 2 (EN 62053-23)	Active: Class B (EN 50470-3) Reactive: Class 2 (EN 62053-23)	NA
Frequency	50/60 Hz	50/60 Hz	
Environmental conditions	-25°C ~ +70°C < 95% (non-condensing) Altitude < 2000 m	-25°C ~ +70°C < 95% (non-condensing) Altitude < 2000 m	-25°C ~ +70°C < 95% (non-condensing) Altitude < 2000 m
Dielectric characteristics	Class II 10 kV (50 Hz) 20 kV (impulse) between Ethernet port and other circuits.	Class II 500 V (50 Hz) 5 kV (impulse) Between all circuits and GND	Class II 10 kV (50 Hz) between Earth connector and RJ45+case+earth
Protection grade (EN 60529)	IP 2xB	IP 2xB	IP 2xB
Memory	Flash memory (non volatile memory) 50% capacity free for future functionalities	Flash memory (non volatile memory)	Flash memory (non volatile memory)
Backup power	Supercap 1F (at least this maintains RTC for a 1 week)	NA	NA
Useful life	20 years	20 years	20 years
Certification/ normative	CE Marking according to applicable directives (EMC, safety, RoSh and Reach) (*)		
		✓2 x 10 position rotary switches (for communication address) ✓1 sturdy handle for easy connection/ disconnection	

(*) CE conformity declaration and test certificates available .



Making the Smart Grid Real



★ HEADQUARTERS

● MANUFACTURING & SYSTEMS INTEGRATION

▲ + Indonesia, Malaysia, Mexico, Australia, UAE

ZIV continually strives to improve products and services. The technical information included in this document is subject to change without prior notice.

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