


Making the Smartgrid real

Index

Introduction

Electrical energy has become the fundamental factor for the development of modern society. The availability of electricity has a direct impact on people's quality of life, becoming, in recent times, one of the key factors for economic growth and countries' competitiveness.

The sector faces important challenges: to effectively meet the growing energy needs of users, to give response to a growing environmental awareness and to improve financial performance in an increasingly demanding economic enviroment.

In addition to these factors, the present evolution of the power companies, with mergers, acquisitions, or restructuring, creates a complex, rapidly-changing scenario, in which technological innovation becomes the key factor to achieve the desired results. ZIV is aware of this environment. For more than 16 years ZIV has been committed to the industry in being a proactive agent, promoting technological changes and offering innovative and competitive solutions that help its users to gain a better position in their respective markets.

ZIV constantly increases its product range, based in close collaboration with experts from the power companies. We believe that the challenges we face require a customer/supplier relationship in permanent evolution in order to facilitate technological changes, to decrease risks and to reduce cost.

In this situation, suppliers are more and more forced to complement their products with the necessary services to facilitate installation and commissioning tasks.

With this view, ZIV has complemented its catalog with three new organizations, taking advantage of the experience accumulated in the group, providing teams of specialists, able to fulfill customer expectations, even in this new environment.

Today, ZIV is a team of more than 350 professionals, working in 10 organizations, specialized in serving the needs of the electrical industry in protection, control, metering, communications and related engineering services in over 50 countries.

The purpose of this publication is to provide you information on what we do today, but also and above all, on how we are and what spirit moves us, in order to promote new opportunities for collaboration which will be the basis for future catalogs.

Norberto Santiago Elustondo
President

ZIV Culture

Mission

The mission defines "the goal" of the company, must be "measurable", and show what makes the company different from others.

ZIV's mission is:

To improve the safety, quality of service and profitability of Electric Systems.

Vision

The vision focuses the creative efforts in a common direction, and serves as a guide in the moments of doubt. LIGHTHOUSE.

ZIV's vision is:

To lead the market thru excellence in innovative, cost effective, customer oriented solutions.

Values

Values …. Valued by the user because he has identified them as elements that in a customer / supplier relationship help him to grow.

Innovation…always being proactive, offering innovative solutions that using the most advance technologies provide competitive advantages to the user.

Cooperation…sharing the knowledge increases the knowledge. Between specialists from different areas and above all, "teaming up" with our users to better understand their needs, thus accelerating the technological progress and minimizing risks.

Never enough…continuous improvement, seeking for new goals, which motivate us to "look higher"... Never satisfied, as professionals and as an organization.

Agility…the agile mentality is reflected in a simple structure, providing users with a rapid and effective response to their needs.

ZIV professionals are the owners and developers of these values

Culture

is structured as a group of companies based on a team of professionals with a permanent spirit of collaboration and commitment to continuous improvement.

All members assume the compromise with their customers to provide them with products and services that exceed the market standards on quality and features while providing useful innovations to the user.

Such spirit is reflected in annual plans with defined actions, along with the required control procedures to measure them.

We understand that the loyalty to this commitment, forcing ourselves to exceed the user expectations every day, is the way to achieve total quality in every one of our activities, to secure market leadership, and to attain the profitability that guarantees the future of our company.

Sustainable development

Sustainable development aims to meet human needs while preserving the environment so that these needs can be met not only in the present, but also for future generations.

Our Commitment

considers the commitment to sustainable development, as one of the basic elements of its growing business strategy.

We understand that professional and company success, environmental protection, and social responsibility are closely related and each one can only be stable over time when they advance together.

Given the scope of our products and services, we believe that can contribute significantly in improving the efficiency of energy systems and thus helping to reduce consumption of resources while generating wealth and prosperity for us, our users, and our environment.

The organizational structure of many of our businesses, involves a close relationship with many suppliers, and pays particular attention to promote relations with those organizations that have as their objective the development of social sectors in difficulty.

The management systems employed, include work methods to assess the "environmental" and "social" results of all companies in the group at the end of each fiscal year.

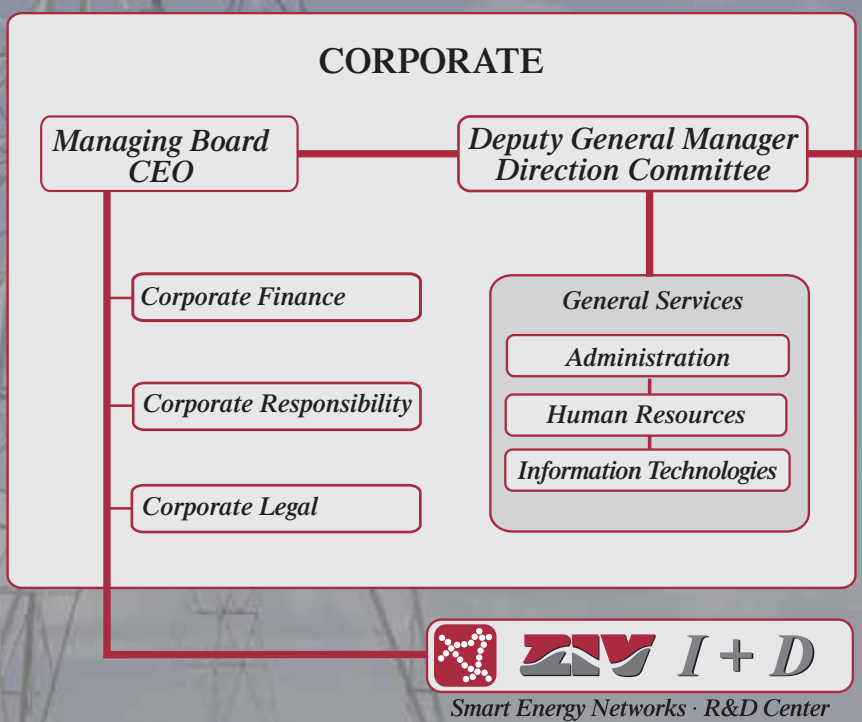
The objectives assumed, allow us to quantify the impact of our activities to ensure not only that we do not cause harm but even more that we contribute to environmental improvement.

As an example, all members have compromised to meet the goal that all activities and those of our suppliers have a balance of zero CO_2 emissions by the end of 2010.

is member of the United Nations Foundations for the Global Compact for sustainable development and follows the OECD Guidelines for Multinational Enterprises.

Organization Chart

ZIV Aplicaciones y Tecnología S.L.



ZIV I+D

Smart Energy Networks · R&D Center

Research Center provider of Technology and Innovation for the products and services of the associated companies

A group that puts together Technology, Quality, Creativity and Service.

Always seeking for “the complete satisfaction of customer expectations”

ZIV p + c

Equipment and technological solutions providing the electrical Grid with the required intelligence for the Protection and Control of the system.

Softekia Electrical Software Engineering

Engineering solutions and software services for the Electric Power industry.

ZIV medida

Design and manufacturing of digital equipment and systems for electric energy metering, AMR and energy management.

intekia ENGINEERING

Engineering projectss for the Electric Power industry.

intekia SYSTEMS

Panel and cabinet assembly for the Electric Power industry.

intekia SERVICES

Field services for the Electric Power industry, including installation, commissioning and preventive maintenance.

µSysCom

Advance telecommunication systems for the Electric Power industry.

ZIV USA Inc.

A dedicated team of application engineers to facilitate deployment of the ZIV Group solutions adapting them to the customer needs.

ZIV do BRASIL Ltda.

Specific solutions applied to the reality of the Brazilian market.

DIMAT

Equipment and systems for data transmission via the electrical grid.

PLC coupling

Coupling devices for communications in HV lines.

P+C

Power grids have evolved at the same pace than the Community they serve, always keeping their main goal: electric power transmission and distribution, from the source to the consumers, in the most secure and reliable manner. In the course of their development, power grids have become one of the most complex systems built by humanity.

Nowadays, power grid development is determined by new conditions: necessary and urgent commitment with the environment, deployment of new power generation techniques, and more dispersed distribution fully integrated into the lowest voltage levels of the grid. Such conditions push the grid closer to its operating limit, while the Community's increasing power needs demand more capacity with higher quality of service and security. In this complex landscape, the power market players and specifically technology and equipment suppliers must provide innovative solutions to turn the power transmission network into a flexible and intelligent system in order to comply with Community expectations and needs.

At p+c , we are aware of this challenge as shown in this brochure. New protection and control equipment, and solutions that combine technology and knowledge to provide the network with the required intelligence. New systems designed for the future.

A successful future is built on the strength of the present and the experience of the past. Therefore, we at p+c do not forget the components and systems, which our customers have relied upon for years, and which, having been designed to last, have proven to be valuable in the past and continue to be nowadays. This new brochure is a combination between experience and insight in which our customers can trust for present and future projects.

Rafael Quintanilla Adánez
General Manager

IRV

IRV

compliant IEC 61850

Protection, control and metering

Protection and control IED for power lines, transformers, generators and feeders in general, features leading edge technology and top reliability in protection, control, metering and automation functions both for electrical transmission and subtransmission lines.

Models

	A	B	C	D	E	F	G	K
50/51	●	●	●	●	●		●	●
50N/51N	●	●		●	●		●	●
50Q/51Q	●	●		●	●		●	●
50Ns/51Ns	●	●		●	●			●
51V	●	●	●	●	●		●	●
67	●	●		●	●		●	●
67N	●	●		●	●		●	●
67Ns	●	●		●	●			●
67Na			●				●	
67Nc			●				●	
67Q				●			●	
61	●	●	●	●	●			
64		●	●	●				
46	●	●	●	●	●		●	●
47	●	●	●	●	●	●	●	●
50D	●	●	●	●	●	●	●	●
49	●	●	●	●	●		●	①
37	●	●	●	●	●		●	●
27	●	●	●	●	●	●	●	●
59	●	●	●	●	●	●	●	●
59N	●		●	●	●	●	●	●
81M/m	●	●	●	●	●	●	●	●
81D	●	●	●	●	●	●	●	●
87N	●			●	●			
78	●	●	●	●	●	●	●	●
32P/Q	●	●	●	●	●		●	●
50BF	●	●	●	●	●		●	●
25	●	●	●	●	●		●	●
79	●	●	●	●	●		●	●
85				●			●	

1: Thermal Image and Thermal Sounds.

Functions

- Cold load pick-up.
- Trip and close coil supervision.
- Breaker (KA2) supervision and excessive number of trips.
- Fault locator.
- Phase sequence selection.
- Selection of the number:
  - Alphanumeric display (3/7/8IRV).
  - Two (2) dedicated Open – Close buttons (model 3/8IRV).
  - Six (6) configurable command or control buttons (model 3/8IRV).
  - Graphic display and dedicated control buttons (model 7IRV).
- Four (4) settings tables.
- Time delay elements with curve selection (IEC and ANSI).
- Integrated simulator.
- Programmable logic.
- Communications ports and protocols.
- LEDs.
- Configurable digital inputs (from 8 to 50).
- Configurable digital outputs (from 5 to 50).
- Time synchronization (protocol IRIG-B 003 and 123) or via communications.
- Event and metering history records.
- Oscillographic record (COMTRADE 99 format).
- Power supply voltage monitoring (depending on model).
- ercomplus® communications software.

IRX

IRX

compliant IEC 61850

Protection, control and metering

IRX relays provide an integrated solution for the protection, control and metering of overhead lines, underground cables and feeders in general, as well as back up for buses and transformers. The IRX is specifically designed for installation in confined spaces.

Models

	A	B	C
50/51	●	●	●
50N/51N	●	●	●
50Q/51Q	●	●	●
50Ns/51Ns	●	●	
51V		●	●
67		●	●
67N		●	●
67Ns		●	
67Na			●
67Nc			●
67Q			●
61	●	●	●
64		●	
46	●	●	●
47		●	●
50D	●	●	●
49	●	●	●
37	●	●	●
27		●	●
59		●	●
59N			●
81M/m		●	●
81D		●	●
87N		●	●
78		●	●
32P/Q		●	●
50BF	●	●	●
25		●	●
79	●	●	●

Functions

- Cold load pick-up.
- Trip and close coil supervision.
- Breaker (KA2) supervision and excessive number of trips.
- Fault locator.
- Phase sequence selection.
- Selection of the number of voltage transformers.
- Four (4) settings tables.
- Control and monitoring:
  - Alphanumeric display.
  - Two (2) dedicated Open/Close buttons.
  - Six (6) command buttons.
  - One (1) dedicated button for recloser blocking.
  - Graphic display (optional).
- Time delay elements with curve selection (IEC and ANSI).
- Integrated simulator.
- Programmable logic.
- Communications ports and protocols.
- LEDs.
- Configurable digital inputs (from 8 to 50).
- Configurable digital outputs (from 5 to 50).
- Time synchronization (protocol IRIG-B 003 and 123) or via communications.
- Event and metering history records.
- Oscillographic record (COMTRADE 99 format).
- Power supply voltage monitoring (depending on model).
- ercomplus® communications software.

6MCV

6MCV

compliant
IEC 61850

Bay control and metering unit

6MCV relays are the ideal support of protection terminals for intelligent management of a greater number of analog and digital signals. The are provided both with local and remote control, graphic bay location, logics and communications.

Models

	A	B
With graphic display	●	
Without graphic display		●

Functions

· Phase sequence selection.
· Trip and close coil supervision.
· Alphanumeric display (Models 6MCV-A/B).
· Two (2) dedicated Open/Close buttons.
· Six (6) configurable command or control buttons .
· Graphic display and dedicated control buttons (Model 6MCV-B).
· Programmable logic.
· Communications ports and protocols.
· LEDs.
· Configurable digital inputs (from 8 to 82).
· Configurable digital outputs (from 6 to 34).
· Time synchronization (protocol IRIG-B 003 and 123) or via communications.
· Event and metering history records.
· Oscillographic record (COMTRADE 99 format).
· Power supply voltage monitoring (depending on model).
· ZIVercomplus® communications software.

Control functions

· Captures digital inputs and internal status.
· Local and remote control via output contacts.
· Local HMI via liquid crystal display for bay graphic display and associated command buttons.
· Input / output logic, interlocks, operator hierarchy level and programmable controls.
· Communications link with the Substation Central Unit or directly with the Control Room (Control Center or SCADA)

DRV

DRV

compliant
IEC 61850

Busbar differential / feeder protection bay unit

DRV relays feature the same functionality as the IRV models with an additional module for distributed bus differential protection. The DRV relays can be integrated as bay units into the bus differential central unit model DBC.

Models

	C	D
50/51	●	●
50N/51N	●	●
50Q/51Q	●	●
50Ns/51Ns	●	●
51V	●	●
67	●	●
67N	●	●
67Ns	●	●
37	●	●
27	●	●
59	●	●
59N	●	●
64	●	●
47		●
81M/m	●	●
81D	●	●
79	●	●
25	●	●
32P/Q	●	●
49	●	●
50BF	●	●
46	●	●
87N(REF)	●	●
78	●	

Bus differential bay module

· One overcurrent supervision element per phase of the differential protection trip and the remote end trip via communications.
· One overcurrent supervision element per phase of the breaker failure trip bus differential bay module
· Dynamic Zone logic element to disable the bay when this has no influence on the differential protection zone

Functions

· Cold load pick-up.
· Trip and close coil supervision.
· Breaker (KA2) supervision and excessive number of trips.
· Fault locator.
· Phase sequence selection.
· Selection of the number:
  - Alphanumeric display (3/7/8IRV).
  - Two (2) dedicated Open – Close buttons (model 3/8IRV).
  - Six (6) configurable command or control buttons (model 3/8IRV).
  - Graphic display and dedicated control buttons (model 7IRV).
· Four (4) settings tables.
· Time delay elements with curve selection (IEC and ANSI).
· Integrated simulator.
· Programmable logic.
· Communications ports and protocols.
· LEDs.
· Configurable digital inputs (from 8 to 50).
· Configurable digital outputs (from 5 to 50).
· Time synchronization (protocol IRIG-B 003 and 123) or via communications.
· Event and metering history records.
· Oscillographic record (COMTRADE 99 format).
· Power supply voltage monitoring (depending on model).
· ZIVercomplus® communications software.

IDV

IDV

compliant IEC 61850

Differential protection, control and metering

IDV differential protection relays are designed to provide reliable and secure protection both for internal faults and faults occurring within the CTs zone in power transformers, autotransformers,reactances and rotating machines.

Models

	A	B	D	E	F
87	●				
87		●			
87			●	●	❶
87I					●
21				●	●
87/50	●	●	●	●	●
87N	●	●	●	●	
50/51	●	●	●	●	●
50N/51N	●	●	●	●	●
50Q/51Q	●	●	●	●	●
50G/51G	●	●	●	●	
67N	●	●	●	❸	
50FA		●			
64	●	●			
49	●	●	●	●	
49G			●		
27	●	●		●	
59	●	●		●	
59G				●	
60				●	●
81M/m	●	●		●	
81D	●	●		●	
24	●	●		●	
50BF	●	●	●	●	
68/78					●

3: assignable to a winding.
4: possibility of breaker-and-a-half in MV and HV.

1: possibility of breaker-and-a-half in HV.
2: two (2) selectable channels.

Functions

· Zero sequence filter.
· Adapting the connection group.
· Tap compensation.
· Compensation for different CT ratios.
· 2nd and 5th harmonic restraint.
· Lockout (86).
· Breaker trip logic.
· Cold Load Pick-Up.
· Trip and Close Coil Supervision.
· Breaker (KA2) monitoring and excessive number of trips
· Phase sequence selection.
· Integrated simulator.
· Four (4) settings tables.
· Time delay elements with curve selection (IEC and ANSI).
· Control and monitoring:
 - Two (2) dedicated Open/Close buttons (model 3/8IDV).
 - Six (6) configurable command or control buttons (model 3/8IDV).
· Programmable logic.
· Communications ports and protocols.
· LEDs.
· Configurable digital inputs (from 8 to 37).
· Configurable digital outputs (from 6 to 44).
· Time synchronization (protocol IRIG-B 003 and 123) or via communications.
· Event and metering history records.
· Oscillographic record (COMTRADE 99 format).
· Power supply voltage monitoring (depending on model).
· ercomplus® communications software.

Additional functions IDV-F

· External fault detection element.
· Distance protection:
 - 4 reversible zones assignable to the primary or secondary winding.
 - Mho characteristic or Quadrilateral separate for phases or ground.
 - Overcurrent supervision elements.
 - Phase selector, Fuse failure detector, Load Encroachment,...

BCV

BCV

compliant IEC 61850

Capacitor bank protection and control

BCV relays incorporate protection, control, and metering functions for capacitor bank and reactance applications combining the specific protection functions with complete bay protection in a single IED.

Models

	A	B	C	D	E
50/51	●	●	●	●	●
50N/51N	●	●	●	●	●
67Na					●
67Nc					●
50Q/51Q	●	●	●	●	
50Nd/51Nd	●	●		●	
50Nd2/51Nd2		●			
59Cd			●		
64	●	●	●		
46		●	●		●
47	●	●	●	●	●
60	●	●	●	●	●
50D	●	●	●	●	
27	●	●	●	●	●
59	●	●	●	●	●
59N			●	●	●
50BF	●	●	●	❶	●
	●		●		●
		●		●	
86					●
2					●

1: for banks 1 and 2.

Functions

· Trip and Close coil supervision.
· Breaker (KA2) monitoring and excessive number of trips.
· Phase sequence selection.
· Selection of the number of voltage transformers.
· Integrated simulator.
· Four (4) settings tables.
· Time delay elements with curve selection (IEC and ANSI).
· Control and monitoring:
 - Two (2) dedicated Open/Close buttons (model 3/8BCV).
 - Six (6) configurable command or control buttons (model 3/8BCV).
 - Graphic display and dedicated control buttons (model 7BCV).
· Programmable logic.
· Communications ports and protocols.
· LEDs.
· Configurable digital inputs (from 8 to 44).
· Configurable digital outputs (from 6 to 24).
· Time synchronization (protocol IRIG-B 003 and 123) or via communications.
· Event and metering history records.
· Oscillographic record (COMTRADE 99 format).
· Power supply voltage monitoring (depending on model).
· ercomplus® communications software.

DCV

DCV

compliant
IEC 61850

Bus differential protection bay / capacitor bank

DCV relays feature the same functionality as the BCV models with an additional module for distributed bus differential protection. The DCV relays can be integrated as bay units into the bus differential central unit model DBC.

Models

	A
50BF (Mono/Tri) + 48m/c)	●
50/51	●
50N/51N	●
50Q/51Q	●
50Nd/51Nd	●
27	●
59	●
64	●
60	●
	●

Bus differential bay module

· One overcurrent supervision element per phase of the differential protection trip and the remote end trip via communications.

· One overcurrent supervision element per phase of the breaker failure trip.

· Dynamic Zone logic element to disable the bay when this has no influence on the differential protection zone.

Functions

Same as stated for BCV relays.

6RTV

6RTV

compliant
IEC 61850

Transformer voltage regulator

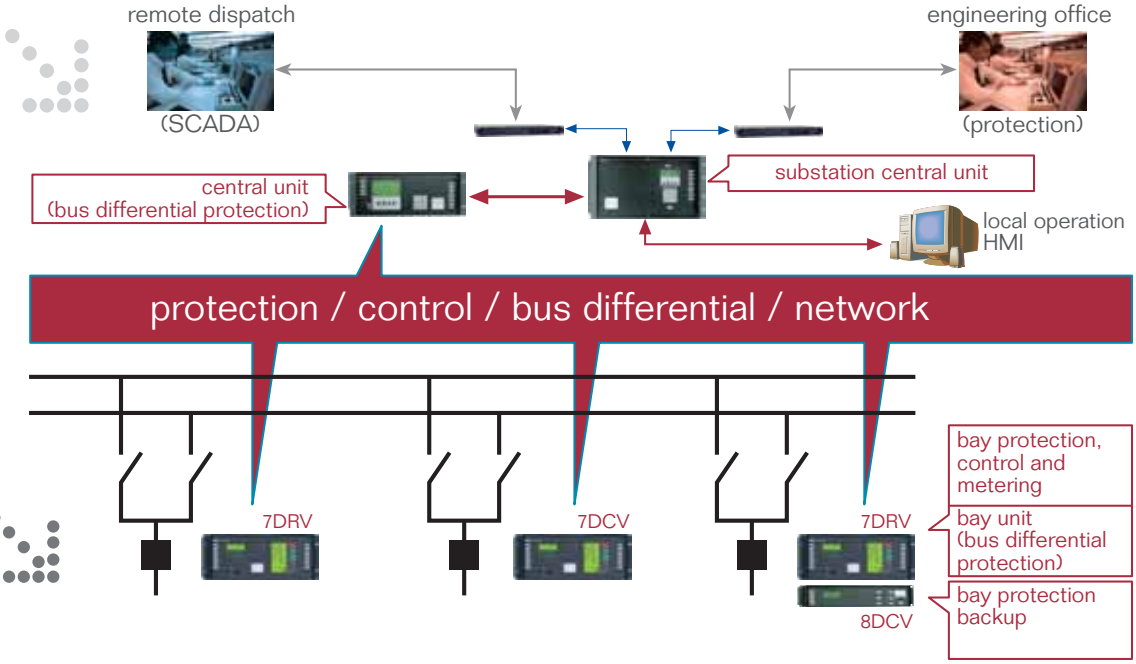
6RTV units integrate power transformer voltage regulation via tap changer control, maintaining the voltage within constant. It is of application when voltage must be kept within constant values with the transformer in operation.

Models

	D
Voltage regulator 90	●
Raise / lower tap	●
Reference voltage control (setpoint)	●
Runback voltage	●
Automatic -Manual operation	●
Local - Remote operation	●
Current compensation	●
Reactive current compensation	●
Regulator blocking (on minimum voltage, maximum current)	●
Power reversal detection	●

Functions

· Phase angle correction of VTs and CTs.
· Tap / Voltage ratio selection.
· Pulse or level operating outputs.
· BCD code tap inputs.
· Tap Signalling and supervision.
· Voltage band recording.
· Operation counters.
· Control and monitoring.
- Alphanumeric display.
- Two (2) dedicated control buttons (A/M, L/R).
- Six (6) configurable command or control buttons .
· Programmable logic.
· Communications ports and protocols.
· LEDs.
· Configurable digital inputs (from 8 to 44).
· Configurable digital outputs (from 6 to 24).
· Time synchronization (protocol IRIG-B 003 and 123) or via communications.
· Event and metering history records.
· Oscillographic record (COMTRADE 99 format).
· Power supply voltage monitoring (depending on model).
· ercomplus® communications software.



ZLV

ZLV

compliant
IEC 61850

Distance protection

ZLV relays provide distance protection for power transmission and subtransmission lines. They feature a complete package of functions and protection schemes offering selective, quick and reliable protection both for underground and overhead lines, with or without series compensation.

Models

	A	B	E	F	G*
21 (3F)	●		●		
21 (1F/3F)		●			
21 (1F/3F)				●	●
79	●	●	●	●	●
25	●	●	●	●	●
27	●	●	●	●	●
59	●	●	●	●	●
59N	●	●	●	●	●
67	●	●	●	●	●
50/51	●	●	●	●	●
67N	●	●	●	●	●
50N/51N	●	●	●	●	●
67Q	●	●	●	●	●
50Q/51Q	●	●	●	●	●
27WI	●	●		●	●
81M/m	●	●		●	●
81D	●	●		●	●
49	●	●	●	●	●
68	●	●	●	●	●
78	●	●		●	●
46	●	●		●	●
50SOF	●	●	●	●	●
50Sup	●	●	●	●	●
50STUB	●	●		●	●
85	●	●		●	●
50BF	●	❶		❶	❶
3	●	●		●	●
2	●	●	●	●	●
FL	●	●	●	●	●
OSC	●	●	●	●	●
DL					●

(*) Applied to a breaker and a half.
1: 1-Phase / 3-Phase.

Functions

· Protection schemes:
 - Step distance trip.
 - Extension zone 1.
 - Permissive underreach trip .
 - Direct transfer trip.
 - Permissive overreach trip.
 - Directional comparison unblocking.
 - Directional comparison blocking.
 - Additional logic: current reversal blocking, load limiters (load encroachment logic).
· Series compensation line logic.
· Breaker (KA^2) supervision and excessive number of trips.
· Integrated simulator.
· Four (4) settings tables.
· Time delay elements with curve selection (IEC and ANSI).
· Control and monitoring:
 - Alphanumeric display.
 - Two (2) dedicated Open/Close buttons.
 - Six (6) configurable command or control buttons.
· Programmable logic.
· Communications ports and protocols.
· LEDs.
· Configurable digital inputs (from 8 to 39)
· Configurable digital outputs (from 6 to 36)
· Time synchronization (protocol IRIG-B 003 and 123) or via communications.
· Event and metering history records.
· Oscillographic recording (CONTRADE 99 format).
· Power supply voltage monitoring (depending on model).
· ZIVercomplus® communications software.

Communications program

The ZIVercomplus® software package provides a friendly interface to program all the IED features and settings, and access all the recorded information. Communications can be established directly via local or remote ports, with flexibility to use RS232C ports with direct null-modem cable, modem connections, LAN connections, or via the Substation Central Unit for TCP/IP environments.

The software includes an oscillography display and analysis tool, which can be used with oscillograpic files captured by any relay in the platform, or any other IED from ZIV P+C or different vendors capable of recording in COMTRADE format.

Functions

· Read and write settings.
· Edit settings.
· Save settings for later edition.
· Read relay status:
 - Captured and calculated measurements.
 - Digital input status.
 - Auxiliary and command output status: open and close.
 - Protection element status.
 - Programmed internal logic signal status.
 - Self-test function status.
· PC synchronization.
· Retrieve, display and save relay-generated entries:
 - Events.
 - Fault reports.
 - Oscillographic records.
 - Event history.
· Loading configuration files, which define all configurable relay issues.
· Configuration file retrieval from the relay.
· Relay language configuration.

Emulation mode:
· Edit settings file.
· Define digital input, auxiliary output and LEDs configuration.
· Edit relay logic, through scheme capture logic.
· Define signals to be saved into the event record and their measurements.
· Define programmable signals to be stored into the captured oscillograms.
· Define displayed settings names.
· Define signals to be sent via installed communications protocols.
· Convert retrieved oscillographic records to COMTRADE format.

IRD

IRD

Overcurrent protection

IRD relays are used in MV lines, transformers and generators for phase-to-phase or ground fault protection whether directional or not, as well as ungrounded MV networks for which a highly sensitive zero sequence directional protection is required.

Models

	A	B	C	D	E	F	G	H	I	J	K	L	M	T	S	U	V	W
50/51	●		●	●	●	●	●	●	●	❷	●	●	●		●	●		❷
50N/51N	●		●		●		❶			❷	●	❶	●		●	●		❷
50Ns/51Ns			●								●			●			●	
67		●												●			●	
67N		●				●								●		●		
67Na				●							●							
95/95R					●													
61																		
50N	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
I2/I1	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
50BF	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
25																	●	
79	●	●	●	●			●	●		●	●			●	●	●	●	

1: two ground elements
2: I>>> element

Functions

- Cold Load Pick-Up (Optional).
- Trip and close coil circuit supervision.
- Breaker (KA^2) monitoring and excessive number of trips.
- Fault locator (Model B and T).
- Phase sequence selection.
- Selection of the number of voltage transformers.
- Integrated simulator.
- Three (3) settings table.
- Time elements with IEC curves.
- Control and monitoring:
  - Alphanumeric display (3/7/8IRD).
  - Two (2) Open / Close buttons (model 7IRD).
  - Graphic control display (model 7IRD).
- Programmable logic.
- Communications ports:
  - One (1) local port RS232.
  - Up to two (2) remote ports:
    RP1: F.O or RS232 or RS485.
    RP2: F.O or RS232/RS485 (optional).
- Communications protocols:
  - Procome 3.0.
  - DNP 3.0, Modbus (optional).
- LEDs.
- Configurable digital inputs (from 8 to 40).
- Configurable digital outputs (from 7 to 38).
- Analog metering inputs (I,V).
- Measuring board with dedicated transformers (3I, 3V, P, Q, PF, Hz, Energies) (Models 7IRD).
- Transducer inputs (Models 7IRD).
- Counter input (Models 7IRD).
- Time synchronization.
- Event and metering history records.
- Oscillographic record (COMTRADE 99 format) (optional).
- Communications software ercom.
- erlog logic configuration software (for 7IRD relays).

IVD

IVD

Overcurrent and voltage protection

IVD relays are mainly used in circuits (feeders, motors, transformers, etc.) where overload, phase to phase and ground short circuit, and maximum and minimum voltage protection are required.

Models

	A	B	C	D	E	F	G	H	J	K	L	M	N	S	T	U	V
50/51	●	●	●	●	●	●	●	●	❹	●	●	●	●		●		●
50N/51N	●	●	●	●	●			●	❹	●	●	●	●		●		●
50Ns/51Ns															●		●
67											●		●	●	●	●	●
67N											●		●	●	●	●	●
67Na														●		●	
64				●													
46													●				
47												●					
												●					
27	❶	❶				❷		●	●	●	●	●	●	●	●	●	●
59					●			●	●	●	●	●	●	●	●	●	●
59N	●		●				❸	●						❸			
59FA					●												
81M/m									●	●	●	●		❺	●	●	❺
50N	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
I2/I1	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
50BF	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
25														●			
79										●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
													●	●	●	●	●

1: Two 27 elements+ two 27R elements.
2: Unintentional energisation.
3: Two ground elements (2 x 59N).
4: I>>> elements.
5: Load Shedding function.

Functions

Trip and close coil circuit supervision.
- Breaker (KA^2) monitoring and excessive number of trips.
- Fault locator (Model B and T).
- Three (3) settings table.
- Time elements with IEC curves.
- Control and monitoring:
  - Alphanumeric display (3/7/8IVD).
  - Two (2) Open/Close buttons (model 7IVD).
  - Graphic control display (model 7IVD).
- Programmable logic.
- Communications ports:
  - One (1) local port RS232.
  - Up to two (2) remote ports:
    RP1: F.O or RS232 or RS485.
    RP2: F.O or RS232/RS485 (optional).
- Communications protocols:
  - Procome 3.0.
  - DNP 3.0 , Modbus (optional).
- LEDs.
- Configurable digital inputs (from 8 to 40).
- Configurable digital outputs (from 7 to 38).
- Analog metering inputs (I,V).
- Measuring board with dedicated transformers (3I, 3V, P, Q, PF, Hz, Energies) (Models 7IVD).
- Transducer inputs (Models 7IVD).
- Counter input (Models 7IVD).
- Event and metering history records.
- Oscillographic record (COMTRADE 99 format) (optional).
- Communications software ercom .
- erlog logic configuration software (for 7IVD relays)

6MCD

6MCD

Control and metering

6MCD relays are used in all bays without protection or that do not require integrating protection and control functions into the same relay.

Models

	K	P
Analog inputs and digital I/O	●	
Digital I/O		●

Functions

· Control and monitoring:
 - Alphanumeric display.
 - Two (2) Open/Close buttons.
 - Graphic bay control display.
· Programmable logic.
· Communications ports:
 - One (1) local port RS232.
 - One (1) remote port: RS232 or F.O.
· Communications protocols:
 - Procome 3.0.
 - DNP 3.0 , Modbus (optional).
· LEDs.
· Configurable digital inputs (from 8 to 72).
· Configurable digital outputs (from 7 to 46).
· Analog metering inputs (I,V).
· Measuring board with dedicated transformers (3I, 3V, P, Q, PF, Hz, Energies).
· Transducer inputs.
· Counter input.
· Time synchronization.
· Event recording.
· erlog configuration software.

MPI

MPI

Multifunction motor protection

MPI protection is used in all installations requiring reliable medium and high voltage motor protection.

Models

	A	B
50	●	●
50N	●	●
46	●	●
49	●	●
51RB	●	●
66	●	●
37		●

Functions

· Trip and close coil circuit supervision.
· Breaker (KA2) monitoring and excessive number of trips.
· Three (3) settings table.
· Time elements with IEC curves.
· Control and monitoring: Alphanumeric display.
· Programmable logic.
· Communications ports:
 - One (1) local port (RS232).
 - One (1) remote port (F.O or RS232 or RS485).
· Communications protocol Procome 3.0.
· LEDs.
· Configurable digital inputs (8).
· Configurable digital outputs (7).
· Analog metering inputs (I,V).
· Time synchronization.
· Event and metering history records.
· Oscillographic record (COMTRADE 99 format) (optional).
· Communications software ercom.

IDN

IDN

Differential protection relay

The current differential protection, with percentage restraint, represents the ideal way for power transformer protection against internal faults. The restraint slope must cover, apart from CT's errors, the difference between the transformer ratios of winding CTs, as well as the tap changer voltage regulation range.

Models

	A	B	C	D	E	F	G
87	●		●		●	●	●
87		●		●			
87N							●
50Ns/51Ns					●	●	●
49			●	●		●	●

Functions

· Zero sequence filter.
· Connection group adjustment.
· Tap compensation.
· Compensation for different CT ratios.
· 2nd and 5th harmonic restraint.
· Lockout (86).
· Three (3) settings table.
· Time elements with IEC curves.
· Control and monitoring:
 - Alphanumeric display.
 - Lockout and reset module (86).
· Communications ports:
 - One (1) local port RS232.
 - Up to two (2) remote ports:
  RP1: F.O or RS232 or RS485.
  RP2: F.O or RS232/RS485 (optional).
 - One (1) remote port: RS232 or F.O.
· Communications protocols:
 - Procome 3.0, DNP 3.0 and Modbus (optional).
· LEDs.
· Configurable digital inputs (from 8 to 16).
· Configurable digital outputs (from 7 to 14).
· Time synchronization (protocol IRIG-B 003 and 123) or via communications.
· Event and metering history records.
· I metering, restraint and harmonics.
· Fault report.
· Oscillographic record (COMTRADE 99 format)
· ercom communications software.

RTN

RTN

Transformer voltage regulator

RTN provides power transformer voltage regulation via load tap changer control. The RTN hardware and software platform is comparable to the protection relays in this family, providing easy integration in the substation protection and control system.

Models

		C	D	E
Voltage regulator	90	●	●	●
Raise / lower tap		●	●	
Reference voltage control (set value)		●	●	
Fast voltage drop		●	●	
Automatic/Manual operation			●	●
Local /Remote operation			●	
Current compensation			●	
Reactive current compensation (parallel operation)			●	
Tap change supervision				●
BCD code tap control				●

Functions

· Pulse or level operation outputs.
· Voltage band record.
· Operation counters.
· Power supply voltage monitoring.
· Control and monitoring:
 - Alphanumeric display.
 - Two (2) dedicated control buttons:
  A/M (Automatic / Manual).
  R/L (Raise Tap / Lower Tap).
· Communications ports:
 - One (1) local port (RS232 and USB).
 - One (1) remote port (F.O or RS232 or RS485).
· Communications protocols:
 - Procome 3.0, DNP 3.0 and Modbus (optional).
· LEDs.
· Digital inputs.
· Digital outputs.
· Time synchronization (protocol IRIG-B 003 and 123) or via communications.
· Event and metering history records.
· Required voltage indication.
· Tap position indication.
· Voltage out of range indication.
· ercom® communications software.

BCD

BCD

Capacitor bank protection

BCD systems include all the functions needed for capacitor bank protection. The various models allow adapting to different architectures and topologies (single or double ground isolated wye, single grounded wye...). They can also incorporate bank automatic switching control, using a time clock or reactive power as the control variable.

Models

	E	F	G	H	J	K	L	M	N
50/51	●	●	●	●	●	●	●	●	
50N/51N	●	●	●	●	●	●	●	●	
50Nd/51Nd	●	①		●			●	●	
50Nd2/51Nd2									
67							●		
67Na				●		●	●		
64			●		●				
46					●				
I2/I1	●	●	●	●	●	●	●	●	●
27	●	●	●	●	●	●	●	●	●
59	●	●	●	●	●	●	●	●	●
50BF	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●		

1: Three ground elements.

Functions

· Breaker (KA^2) monitoring and excessive number of trips.
· Three (3) settings table.
· Time elements with IEC curves.
· Control and monitoring:
 - Alphanumeric display (3/7/8BCD).
 - Two (2) Open/Close buttons (model7BCD).
 - Graphic control display (model 7BCD).
· Programmable logic.
· Communications ports:
 - One (1) local port RS232.
 - Up to two (2) remote ports:
  RP1: F.O or RS232 or RS485.
  RP2: F.O or RS232/RS485 (optional).
 - One (1) remote port: RS232 or F.O.
· Communications protocols:
 - Procome 3.0,
 - DNP 3.0, Modbus (optional).
· LEDs.
· Configurable digital inputs (from 8 to 40).
· Configurable digital outputs (from 7 to 38).
· Analog metering inputs (I,V).
· Measuring board with dedicated transformers (3I, 3V, P, Q, PF, Hz, Energies) (7BCD relays only).
· Transducer inputs (7BCD relays only).
· Counter input (7BCD relays only).
· Time synchronization.
· Event and metering history records.
· I measuring, restraint and harmonics.
· Fault report.
· Oscillographic record (COMTRADE 99 format) (optional).
· ercom® communications software .
· Logic configuration software erlog® (for 7BCD).

CPI / TPI / FGI / SCI / MXI / WDI / IFD

CPI / TPI / FGI / SCI MXI / WDI / IFD

Industrial relays

The industrial relay family provides an ample range of protection functions, compact design and optimized cost for use in line and machine bays. This economic relay family includes single-function and multi-function protective relays where simplicity is the main feature.

Models

	CPI							TPI				FGI			WDI		MXI	SCI	IFD
	A	B	C	D	E	S	T	A	B	C	E	A	B	C	A	B	A	A	A
50/51	●	●				●	●										●		
50N/51N		●	●				●												
67N				●							●								
67Na					●														
49						●	●										●		
27								●	●		●			●				●	●
59								●	●		●			●					
59N											●			●					
81M/m												●	●	●					
78														●					
40															●				
32															●				
25																		●	●
37																	●		
46																	●		
51RB																	●		
66																	●		
59/81																			●

1: Single - phase element. 2: Three - phase element. 3: With load shedding.

Special models

- Model CPI-**S: includes breaker failure element, open phase element and sensitive zero sequence current element.
- Model CPI-**T: model "S" + Oscillographic recording.
- Model CPI-**R: model "T" + recloser function.
- The above models include:
  - Breaker control.
  - Breaker supervision.
  - Fault report.
  - Metering history log.

Functions

- Time elements with selectable IEC curves.
- Monitoring:
  - Alphanumeric display.
  - Three (3) selection and settings buttons.
- Communications ports:
  - One (1) local communications port (RS232).
  - One (1) remote communications port (RS232 or RS485 or F.O) (optional).
- Communications protocols:
  - Procome 3.0 or DNP 3.0 or Modbus (optional).
- LEDs (7 LEDs configurable).
- Configurable digital inputs (2). Model “T” includes 8 ED.
- Configurable digital outputs (2). Model “T” includes 8 SD.
- Trip outputs (2).
- Event recording.
- ercom® communications software.

FIT

FIT

Breaker failure protection

FIT provides breaker failure protection by measuring the current flowing through the bay to determine the breaker status. The breaker is considered open only when the current flow ceases. The FIT main feature is the fast reset speed after breaker opening, ensuring consistent operation.

Models

	A
50s + 62	●

Functions

- Single-phase three-phase trip.
- Three (3) instantaneous phase current detecting elements supervised by the trip command of each phase.
- Separate timer settings for each phase.
- Breaker (KA2) monitoring and excessive number of trips.
- Three (3) settings table.
- Control and monitoring: Alphanumeric display.
- Programmable logic.
- Communications ports:
  - One (1) local port RS232.
  - Up to two (2) remote ports (optional):
    RP1: F.O or RS232 or RS485.
    RP2: F.O or RS232/RS485.
  - One (1) remote port: RS232 or F.O.
- Communications protocols:
  - Procome 3.0.
  - DNP 3.0, Modbus (optional).
- LEDs.
- Configurable digital inputs (8).
- Configurable digital outputs (7).
- Time synchronization.
- Event and metering history records.
- Oscillographic record (COMTRADE 99 format) (optional).
- ercom® communications software.

SCT

SCT

Trip and close circuits monitoring

Models

	C
3	●

Functions

- Control and monitoring: Alphanumeric display.
- Communications ports:
  - One (1) local port RS232.
  - One (1) remote port: RS232 or F.O.
- Communications protocols: Procome 3.0.
- LEDs.
- Configurable digital inputs (8).
- Configurable digital outputs (7).
- Time synchronization.
- Event recording.
- ercom® communications software.

ZLS

ZLS

Distance protection

ZLS provides distance protection for lines with shifting operating conditions (loads, short circuit power, load direction, power supply conditions...) rendering impossible the use of overcurrent protection, even with directionality.

Models

	I	J	L
21 (3F)	●		
21 (1F/3F)		●	●
67N	●	●	●
49			●
27	●	●	●
59	●	●	●
25	●	●	●
79	●	●	●
2	●	●	●
85	●	●	●

Functions

· Protection schemes:
- Step distance tripping.
- Permissive underreach tripping.
- Permissive overreach tripping.
- Directional comparison blocking.
- Hybrid (weak infeed) scheme tripping.

· Fault locator.
· Power swing detector.
· Close onto fault detector.
· Fuse failure detector.
· Trip and Close coil circuit supervision supervision.
· Breaker (KA2) monitoring and excessive number of trips.
· Up to three (3) settings table.
· Control and monitoring: Alphanumeric display.
· Programmable logic.
· Communications ports:
- One (1) local port (RS232 and USB).
- Up to two (2) remote ports (optional):
RP1: F.O or RS232 or RS485.
RP2: F.O (optional).

· Communications protocols: Procome 3.0 or DNP 3.0.
· LEDs.
· Configurable digital inputs (8).
· Configurable digital outputs (7).
· Fault distance transducer output (mA). Only model "L".
· Time synchronization (protocol IRIG-B 003 and 123) or via communications.
· Event and metering history records.
· Oscillographic record (COMTRADE 99 format) (optional).
· ZIVercom® communications software.

DBN

DBN

Bus differential protection

The most important features of the bus differential protection are speed and stability under external faults. The DBN provides reliable operation for this critical application, where the large number of circuits involved can cause major disturbances in the grid and the loss of service of major load centers.

DBC functions: bus differential protection

		A
Bus differential protection:	87B	●
Differential element with percentage restraint	87B	
Supervision differential element		
Differential alarm element		
Lockout element	86	

DBP functions: bus units (1)

	B	A
Bus differential bay module (current)	●	
Differential element trip supervision overcurrent element		
Breaker failure trip supervision overcurrent element		
Breaker failure element (retrip function)		
Dynamic protection zone logic and remote trip through communications element		
Bus differential bay module (voltage) (optional)		●
Undervoltage supervision element		

(1) Bay unit models DCV and DRV can replace DBP units.

Functions

· Lockout reset.
· Trip blocking / unblocking for different busbars, on differential element operation.
· Trip blocking / unblocking for different busbars, on breaker failure or digital input.
· Sealed breaker failure signal reset.
· Directional blocking detector.
· CT saturation detector.
· Oscillograph triggering.
· Bus coupling logic:
- Combined coupling logic.
- Longitudinal-transversal coupling logic.
- Transfer bus with combined coupling logic.

· Distributed architecture.
· Up to 28 bays and four busbars.
· Provided with twelve (12) single-phase differential elements (three phases x four busbars).
· CT ratio setting.
· Three (3) settings table.
· Control and monitoring:
- Alphanumeric display
- Keypad.

· Programmable logic.
· Communications ports:
- One (1) local port RS232.
- Up to two (2) remote ports:
RP1: F.O or RS232 or RS485.

· Communications protocols:
- Procome 3.0.
- DNP 3.0 , Modbus (Optional)

· LEDs.
· Configurable digital inputs : 8 in DBC and up to 16 in DBP´s.
· Configurable digital outputs :7 in DBC and up to 14 in DBP´s.
· Time synchronization.
· Event and metering history records.
· Oscillographic record (COMTRADE 99 format).
· ZIVercom® communications software.

PRN

PRN

Disturbance recorder

8PRN recorders cover oscillographic applications requiring very high performance signal acquisition and data storage, where the recording functions of digital relays do not meet the application requirements. A typical use of these recorders is in power generation where the frequency spectrum of the relevant events require extremely high sampling speed of several hundreds of samples per cycle for accurate representation.

Models

	A	B
Disturbance recorder	●	
Disturbance recorder + Fault recorder		●

Recording functions

Recording triggered on:
· Analog channels (threshold, gradient, harmonic contents).
· Calculated frequency (threshold, gradient).
· Calculated positive sequence (threshold, gradient).
· Calculated negative sequence (threshold, gradient).
· Calculated zero sequence (threshold).
· Digital channels (triggered on leading / trailing edge).
· Other: external pickup, keypad, communications.

Additional functions

· Sampling frequency (selectable from 16 to 384 samples / cycle).
· Metering accuracy: less than 0.1%.
· Analog inputs: 8 and 16 AI.
· Digital inputs: 16 and 32 DI.
· Digital outputs: 8DO.
· Connection to portable recording storage device.
· Control and monitoring:
 - Alphanumeric display.
 - Keyboard.
· Communications ports (local):
 - One (1) port RS232
 - One (1) port USB (removable disk connection).
· Communications ports (remote 1):
 - One (1) port RS232 (Full Modem).
 - One (1) port F.O.
· Communications ports (remote 2):
 - One (1) port RS232.
 - One (1) port RS485.
 - One (1) port F.O.
· Communications ports (remote 3):
 - One (1) Ethernet 10/100 base T, RJ45.
 - One (1) port USB (printer output).
 - One (1) port BNC (IRIG-B connection).
 - One (1) port NMEA (synchronism input).
 - One (1) port F.O, for relay synchronization (Cross-Trigger).
· Communications protocols: Procome 3.0.
· LEDs.
· Time synchronization.
· Event and metering history records.
· Oscillographic record (COMTRADE 99 format).
· ZIVercom® communications software.

CPX

CPX

Substation central unit

The Substation Central Unit links all bay IEDs, centralizing substation data, running logic functions comprising multiple bays, and serving as the gateway to the SCADA system, and central or regional enterprise level applications.

Models

	B
Substation central unit	●

Functions

· Communications front-end.
· IED communication management.
· Automation and programmable logic modules.
· Management of communications with higher levels (Scada).
· Management of local and remote communications with HMI.
· Real time database generation of all substation variables.
Communications ports:
· One (1) local communications port (RS232).
· Remote ports (serial):
 RP1: RS232 (Scada).
 RP2: RS232 (Scada).
 RP3: RS232 (connection to remote HMI or protocol emulation).
 RP4: RS232 (protocol emulation).
· Remote ports (F.O):
 RP1 - PR6: F.O. (IED connection).
 RP7 - PR12: F.O. (IED connection) (optional).

Additional functions

· Automation and logic operations.
· Event, metering and counters history record.
· Redundancy:
 - Redundant network operation (Double Star and Double Ring).
 - Operation with a second spare UCS in double or "Hot-Stand-By" mode.
· Integrated signal, metering, counter and command simulator.
· WAN communications through telephone network (switched, leased, or GPRS) via external modem and through corporate Ethernet:
 - Dial up service for connection to remote access server (RAS) through standard PPP protocol.
 - Remote access server (RAS) through PPP protocol, accepting incoming remote connections.
 - Routing operation within shared LAN of substation IEDs, allowing remote connection to IEDs via the Substation Central Unit.
· Servers: Web, FTP, files, printing, TELNET.
· SNP protocol Client / Server service.
· User management and login passwords for every service provided by the Substation Central Unit, through SSPL authentication services.
· Communications protocols
 - Modules with asynchronous serial protocols for relay communications (Level 1) PROCOME, DNP 3.0, IEC 870-5-10, SPABUS, MODBUS, etc.
 - Modules with asynchronous serial protocols for Telecontrol communications (Level 3) IEC 870-5-101, 104, DNP 3.0, GESTEL, PID1, INDACTIC 2033, SEVCO 6802, WISP, etc.
 - Server modules for HMI communications. Local and remote connection via protocol through TCP/IP (Ethernet or asynchronous serial channel).

CPP

CPP

Compact substation central unit

The CPP is used to handle communications and data management of substation protection, control and metering IEDs. The CPP design makes it suitable for applications requiring a reduced number of communication channels.

Models

	B
Substation central unit	●

Functions

· Communications front-end.
· Management of communications with different protection relays.
· Automation and programmable logic modules.
· Management of communications with higher level (Scada).
· Management of local and remote communications with HMI.
· Generation of real time databases of all substation variables.

Communications ports:
· One (1) local communications port (USB).
· Remote ports (serial):
RP1: RS232.
RP2: RS232.
RP3: F.O.
RP4: F.O.
· Ethernet ports (LAN):
RP1: 100TX - RJ45.

Additional functions

· Automation and logic operations
· Event, metering and counters history record.
· Redundancy:
- Redundant network operation (Double Star and Double Ring).
- Operation with a second central unit for full redundancy or "Hot-Stand-By" mode.
· Integrated signal, metering, counter and command simulator.
· WAN communications through telephone network (switched, leased, or GPRS) via external modem and through corporate Ethernet:
- Dial up service for connection to remote access server (RAS) through standard PPP protocol.
- Remote access server (RAS) through PPP protocol, accepting incoming remote connections.
- Routing operation within shared LAN of substation IEDs, allowing remote connection to IEDs via the

Substation Central Unit.
· Servers: Web, FTP, files, printing, TELNET.
· SNP protocol Client / Server service.
· User management and login passwords for every service provided by the Substation Central Unit, through SSPI authentication services.

Communications protocols:
· Complete TCP/IP protocol and hard wire communications 802.3 (LAN).
· Communications module:
- Common, compatible and extended data models.
- Modules with asynchronous serial protocols for relay communications (Level 1) PROCOME, DNP 3.0, IEC 870-5-103, SPABUS, MODBUS, etc.
- Modules with asynchronous serial protocols for Telecontrol communications (Level 3) IEC 870-5-101, 104, DNP 3.0, GESTEL, PID1, INDACTIC 2033, SEVECO 6802, WISP, etc.
- Server modules for HMI communications. Local and remote connection via protocol through TCP/IP (Ethernet or asynchronous serial channel).

CPT

CPT

Substation central unit IEC61850

The CPT can operate as a Substation Central Unit or as a RTU, solving the communications and data management of substation protection, control, and metering IEDs.

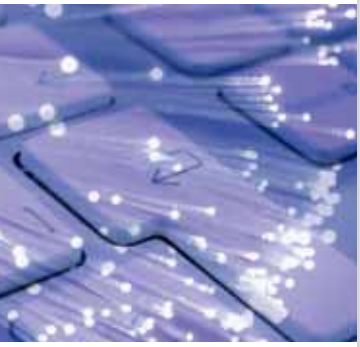
The CPT design allows the operation as a client or as a server, in installations with communications architecture based on IEC61850 standard, where protection, control and metering IEDs are linked via Ethernet. The CPT eases the migration process towards advance substation automation systems, allowing the integration of the new communications standards into the existing installations.

Models

	A	B	C	D	E	F	G
Substation central unit + web HMI	●						
RTU function		●					
A + B function			●				
Gateway function				●			
Configuration server function					●		
A+E function						●	
C+E function							●

Functions

· Substation IEC61850 client, managing communications with different distributed protection, control and metering relays.
· IEC61850 server, with the corresponding data models and services, including GOOSEs.
· Module for the system central automation and programmable logic operation.
· Management of communications with higher levels (Scada).
· Management of local and remote communications with ZIVerdesk HMI.
· Generation of real time databases of all substation variables: alarms, metering, status, counters, etc.
· Substation configuration management module in charge of updating SCD file as a function of the CID files of the associated IEDs.
· FTP server.
· Time synchronization protocol SNTP Client/Server service.
· Redundant operating modes:
· Redundant communications network operation (Double Star and Double Ring topology).
· Operation with a second spare central unit in dual or "Hot-Stand-By" mode.
· Local and remote HMI (console) based on a web server.
· Gateway between conventional and IEC61850 systems.
· Integrated signal, metering, counter and control command simulator.



4CCY

4CCY

Intelligent optical communications concentrator/diffuser

4CCY models allow cyclical interrogation of protection or control relays (from ZIV or other manufacturers) by a Control Unit (UCI or RTU), while simultaneously communicating with a Protection System or Protection Information Management Unit.

Models

	B4	B8
Remote communications inputs PFO	●	
Remote communications inputs PFO (ST)		●

Additional functions

- Two remote ports (PFO, GFO or RS232) for communication with the Protection System; one port (RS232 or PFO) for communication with the Control System and one fourth front port (RS232) for local PC connection.
- Outputs to protection or control relays: with 4, 8, 12,16, 20, 32, 40 or 60 ports (PFO or GFO), depending on model.
- Two activity LED targets per communications port plus one LED for unit “In service”.
- Display of operations and records via ercom® communications software.
- Self-test and monitoring.
- Auxiliary power supply: 48/250 Vdc.

4CCN

4CCN

Communications concentrator / diffuser

4CCN relays are transparent optical concentrators / diffusers, designed to organize communications networks, at substation level, between protection and control relays and relays or concentrators at a higher level.

Models

	A	B	C	D
Input: RS232	●			
Input: Plastic F.O. (1mm)		●		
Input: Glass F.O. (SMA connector)			●	
Input: Glass F.O. (ST connector)				●

GIX / GIT

GIX / GIT

Protection information management systems

GIX / GIT systems are used for the management of communications between substation protection and recording IEDs and higher levels. They drastically reduce the time required for making substation captured data available.

Through different configurations, they simplify remote access to every IED, providing direct communications from a single communications port. Through the incorporation of the SGP software, GIX/GIT systems convert the data received from every digital relay into a common format, filtering, summarizing, and unifying the information. Therefore, minimizing the time required for remote data transmission.

Functions

- Transparent IED communications: allow users to connect to the different relays from a remote terminal via a single link (i.e., via LAN):
- Cyclical interrogation of IEDs: captures settings, events, fault reports and oscillograpic records by emulating the protocols of the relays connected.
- Synchronism: BNC connector IED to connect to the external synchronization system IRIG-B.
- Communications ports GIX: 4 serial ports and 6, 12 or 18 O.F. ports (depending on model).
- Communications ports GIT: 2 O.F. ports.

Features

- Modular HW and SW architecture.
- Multitask operating system prepared for data acquisition and management.
- Switched power supply 110 Vdc ±20%.
- 2 F.O. asynchronous serial communications channels.
- 2 electrical asynchronous serial communications channels (RS232C and RS485).
- 1 Ethernet 10 Base-T(RJ-45) connection.
- 1 Time synchronization IRIG-B decoder.
- 8 digital inputs and 8 digital outputs.
- Keyboard and LCD Display.
- Communication channel activity LED targets.
- 4 general purpose LEDs.
- Communication protocol emulation.
- Dedicated data acquisition and formatting software.

SGP Software

Remote unified protection information management systems

SGP Software is an advanced Information System to automatically capture and store relevant network data. System analysts can assess system response before, during, and after disturbance occurrence.

This tool easily manages all the utility's protection data, displaying data collected from different relay brands in a common format.

SGP Software is a profitable system, even for small companies, providing valuable data to different departments within the company. The license for multiple simultaneous users, allows reading retrieved data and generated system reports at any time by the different company experts:

· Protection system designer.
· Disturbance analysts.
· Maintenance personnel (work order management).
· Scada and fault location.
· Communications personnel (error detection).
· Quality and other departmental managers (data, reports and statistical reports).

Functions

· On-demand or scheduled data acquisition using protocol emulation (individual relays or concentrated via GIX/GIT).
· Unified data processing (single inventory). Displays data from different relay models under a common format, linked to a browser tree representing the set of active elements in the inventory (i.e. region/ subregion/ substation/ relay).
· Disturbance analysis: report, statistics, and command generation.
· Alarm management: alarm annunciator and communication status monitor.
· Document management: generation of documents containing system processed data linked to the single inventory, accessible in read-only mode by other applications and users.

Online analysis of grid disturbances

· Automated tasks: saving acquired data, disturbance analysis, and resources.
· Time related data (accessible at any time from any location).
· Disturbance analysis and follow up tools.
· Multiple exporting formats for reports and statistical data.
· Controlled access of simultaneous users.
· Read only mode available to share data between departments.

ZIVercom®

Communications program for protection and control terminals

ZIVERCOM is a graphic, user friendly software designed to provide local or remote access to every protection and control IED function, allowing also the retrieval of stored historical and real time data.

Functions

· Access, display and listing all relay generated data (status, alarms, etc.).
· Change configuration and settings.
· Operate permitted commands.
· Edit settings off-line.
· Create databases (settings, relays, substations, passwords, users...).

Standard communications protocol:
· Ensures compatibility between relays from different manufacturers.
· Asynchronous serial transmission, in half-duplex link mode according to IEC-870-5.
· 3 layer OSI architecture EPA.
· Compatible with VDEW/ZVEI for protection users.
· Public domain with "User Group" support.

Configuration program for control and protection and control terminals

ZIVERLOG allows easy configuration of the control module of integrated protection and control IEDs. Configurations are programmed and compiled off-line for convenient file uploading to the IEDs.

Functions

· Logic
 - Interlocks
 - Automatic control functions
 - Combinational logic
 - Sequential logic
 - Signal generation
· Physical Inputs / Outputs
 - Any logic generated signal.
 - Any physical input or protection signal.
· Alarm system
 - Any physical input or signal coming from the protection or logic signal.
 - Text definition for every alarm.
 - The alarm system can be configured to operate with or without acknowledgement.
· Communications
 - Any physical input or logic signal can be mapped to the communications profile.
 - Any logic input or physical output can be configured to be activated or deactivated from the Central Unit.
· Single line diagram
 - Fully customizable single line diagram.
 - Configurable single line diagram elements.
· Automatic signal connection
 - Enables the automatic connection of configured signals and logic.
· Compilation and reports
 - Configuration error checking.
 - Configuration print-outs.

PCD

PCD

System operation local HMI

The integrated system operation local HMI consists of an industrial PC, color monitor, alphanumeric keyboard and mouse for the following functions:

Functions

· Display dynamic substation single line diagrams.
· Control and operation of system devices and automatic controls.
· Display and change protection settings.
· Display of stored protection relay data.
· Display real time metering.
· Alarm acknowledgement.
· Adjust automatic control parameter settings.
· Report processing.

HMI and central unit editing software

The ZIVERGRAPH software has been designed to configure the substation central unit and HMIs, in integrated Protection and Control Systems. The software enables designing new configurations or modifying existing configurations stored into the database and generating files required for these devices.

Funciones

· Design central unit and HMI configurations: create new configurations based on user defined elements or existing elements included in the libraries.
· Modify preselected configurations: enables the modification of essential configuration design elements, including the possibility of adding new relays, central units, HMIs, etc.
· Creation of configuration files to be uploaded in the Central Unit and the HMI: the software generates configuration files to be uploaded in the Central Unit and the HMI.
· Configuration management: the software enables the storage and retrieval of various configuration versions into and from the application database, as well as create and retrieve backup copies saved in portable storage.
· Report generation: produce reports on any of the generated configurations in three different formats: on screen, print-outs or postscript files.
· Communications with other software: enables reading tables or databases from other software retrieving useful data into the application database to configure central units or consoles.

Assistance

Maintenance

p+c technically qualified personnel can provide both preventive and corrective maintenance to the complete product range.

Local services

p+c Service in Spain is provided through our regional offices in Andalusia, Aragon, Catalonia, Madrid, Canary Islands and Basque Country. Also, telephonic assistance is provided on a permanent basis (24 hours /365 days).

24 hour assistance for all ZIV products

International assistance

p+c provides high quality international customer service, either through own personnel (Brazil, United States and Canada) or an extensive network of local collaborators in other countries. In addition,several telephone service numbers are provided for immediate assistance (24 hours/ 365 days)

24 hour assistance in Brazil and South America

24 hour assistance in USA and Canada

p+c	
Technical Support:	**677 551 037**
Purchasing Dpto.:	**946 409 157**
Sales Assitance:	**677 551 079**

Warranty ZIV

All new p+c products sold to customers are warranted against defects in design, materials, and workmanship for a period of ten years from the time of delivery (at the moment the product leaves p+c premises, as indicated in the shipping documents).

Customer is responsible of notifying p+c of any faulty conditions as soon as they are detected. If it is determined that the new product defect is covered by the warranty, p+c will repair, or substitute the product at its own discretion to the customer at no charge.

Quality

p+c team of professionals has a permanent spirit of collaboration and commitment to continuous improvement, as expressed in the Quality Declaration and Environmental Statement.

www.zivpmasc.es
www.zivpmasc.com

List of device function numbers and terminology ANSI (Serie “V”)

Functions	ANSI	IRV	IRX	DRV	IDV	BCV	DCV	RTV	DRV	ZLV	IRD	IVD	MPI	IDN	RTN	BCD	CPI	TPI	FGI	SCI	MXI	WDI	IFD	FIT	SCT	ZLS	DBN	PRN
Phase overcurrent	50/51	●	●	●	●	●	●		●	●	●	●	●			●	●				●							
Ground overcurrent	50N/51N	●	●	●	●	●	●		●	●	●	●	●			●	●											
Negative sequence overcurrent	50Q/51Q	●	●	●	●	●	●		●	●																		
Sensitive ground overcurrent	50Ns/51Ns	●	●	●					●		●	●		●		●												
Ground unbalance overcurrent	50Nd/51Nd					●	●									●												
Ground fault overcurrent	50G				●																							
Tertiary winding overcurrent (2nd and 3rd harmonic restraint)	50FA				●																							
Restrained voltage overcurrent	51V	●	●	●					●																			
Directional phase overcurrent	67	●	●	●					●	●	●	●				●	●											
Directional ground overcurrent	67N	●	●	●	●				●	●	●	●						●								●		
Sensitive ground overcurrent	67Ns	●	●	●					●																			
Directional isolated ground overcurrent	67Na	●	●			●					●	●				●	●											
Directional compensated ground overcurrent	67Nc	●	●			●																						
Directional negative sequence overcurrent	67Q	●	●							●																		
Distance protection	21				●					●																●		
Weak Infeed logic	27WI									●																		
Power swing blocking /Stability loss trip	68/78				●					●																		
Close-onto-Fault detector	50SOF																											
Distance detection overcurrent supervision	50Sup									●																		
Stub bus protection	50STUB									●																		
Teleprotection scheme	85	●								●																●		
Trip and Close Coil Circuit Supervision	3	●	●	●	●	●	●			●	●	●													●	●		
Pole Discordance Detector	2					●			●	●																●		
Fault locator	FL	●	●	●						●	●	●														●		●
Oscillographic recorder	OSC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●									●		●
Three phase differential protection for 2 or 3 windings	87								●																			
Instantaneous or unrestrained differential protection	87I				●									●														
Unrestrained differential protection	87/50				●									●														
Restricted fault differential protection	87N	●	●	●	●									●														
Residual overcurrent detection	61	●	●																									
Ground overvoltage	64	●	●	●	●	●	●				●					●												
Negative sequence overcurrent (I Unb.)	46	●	●	●		●			●		●		●			●	●				●							
Negative sequence overvoltage (V Unb.)	47	●	●	●		●				●		●																
Voltage regulator	90							●	●						●													
Current detection element	50D	●	●			●																						
Thermal image element	49	●	●	●	●						●		●	●			●				●					●		
Ground thermal image element	49G				●				●	●																		
Minimum current	37	●	●	●									●															
Minimum voltage	27	●	●	●	●	●	●		●			●	●			●		●	●	●			●			●		
Maximum voltage	59	●	●	●	●	●	●		●	●		●				●		●	●							●		
Maximum neutral voltage	59N	●	●	●		●			●	●		●						●	●									
Maximum zero sequence voltage	59G				●				●	●																		
Voltage circuit fault detection	60				●	●	●																					
Maximum / minimum frequency	81M/m	●	●	●	●							●							●									
Rate of Change	81D	●	●	●	●				●	●																		
Out-of-step	78	●	●	●															●									
Directional power	32P/Q	●	●	●					●													●						
Breaker failure	50BF	●	●	●	●	●	●		●	●	●	●				●	●							●				
Overexcitation protection (69V/Hz or 59/81)	24				●				●														●					
Synchronism check	25	●	●	●					●	●	●	●								●			●			●		
Recloser	79	●	●	●							●	●					●						●			●		
Bus differential bay				●			●		●	●																	●	
Automatic control for 1 stage / 2 stages with calendar (I,V,FP,P and Q)						●	●		●	●																		
		IRV	IRX	DRV	IDV	BCV	DCV	RTV	DRV	ZLV	IRD	IVD	MPI	IDN	RTN	BCD	CPI	TPI	FGI	SCI	MXI	WDI	IFD	FIT	SCT	ZLS	DBN	PRN

Communications ports and protocols

Relays are provided with multiple rear communication ports for remote access and one front port for local access. Depending on the model, there are multiple communication protocol options for the rear ports.

Ports

COM1: local port
- RS232 + USB

COM2 - remote port 1 (RP1), selectable between:
- RS232 (FULL MODEM)
- F.O.
- Double ring F.O.
- Ethernet (RJ45).

COM3 - remote port 2 (RP2), selectable between:
- RS232/RS485.
- F.O.
- Double ring F.O.
- Ethernet (RJ45).

COM4 - remote port 3 (RP3), selectable between:
- RS232/RS485.
- F.O.

COM5 - remote port 4 (RP4):
- Electric CAN.

Protocols

- Local Port: only PROCOME protocol.
- Remote ports 1 and 2: PROCOME, DNP3.0, MODBUS and Virtual Inputs / Outputs are possible options.
- Remote port 3: PROCOME, DNP3.0 and MODBUS are possible options.
- Remote port 4: CAN and CAN MULTIMASTER are possible options.
- Ports LAN 1 and 2: can be linked through the IEC61850 and PROCOME protocols.

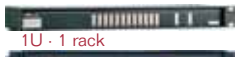
Note that communications can be maintained through all ports simultaneously. The PROCOME protocol complies with IEC-870-5 standards and is used, the same as IEC61850, both for protection and control data management.

Modular System Construction

Devices are mounted in graphite grey enclosures of 1, 1/2, 1/4 and 1/7 for 19” rack installation with two, three, four, or six standard rack height units, depending on the number of inputs and outputs.

The boards or modules can be extracted by removing the front panel. External connections are made through plug-in terminal blocks located at the rear of the chassis with ring-lug terminals.


6U · 1rack


1U · 1 rack


4U · 1 rack


3U / 1 rack


2U · 1 rack

6U · 1/2 rack


6U · 1/4 rack


6U · 1/7 rack

4U · 1/2 rack

Enclosure	size	rack	height	width	depth
A	6U	1	266	482,6	234
B	6U	1/2	266	268,5	234
C	6U	1/4	266	162	234
D	6U	1/7	275	68	225,5
E	1U	1	43,6	482,6	256
F	2U	1	88	482,6	256

Enclosure	size	rack	height	width	depth
G	4U	1/2	173,5	246,5	128
K	4U	1	177	482,6	256
M	2U	1	88	482,6	270
S	3U	1	132,5	482,6	270
Q	4U	1	177	482,6	270
V	6U	1	265,9	482,6	270

Standards and type tests

Insulation

· Insulation Test (Dielectric Strength)	IEC-60255-5
· Metering of Insulation Resistance	IEC-60255-5
· Voltage Impulse Test	IEC-60255-5 (UNE 21-136-83/ 5)

Electromagnetic compatibility

· 1 MHz Burst Test	IEC-60255-22-1 Class III (UNE 21-136-92/22-1)
· Fast Transient Disturbance Test	IEC-60255-22-4 Class IV (UNE 21-136-92/22-4) (IEC 61000-4-4)
· Radiated Electromagnetic Field Disturbance	IEC 61000-4-3 Class III
· Conducted Electromagnetic Field Disturbance	IEC 61000-4-6 Class III (EN 50141)
· Electrostatic Discharge	IEC 60255-22-2 Class IV (UNE 21-136-92/22-2) (IEC 61000-4-2)
· Surge Immunity Test	EIC-61000-4-5 (UNE 61000-4-5)
· Radiated Electromagnetic Field Disturbance at Industrial Frequency (50/60 Hz)	IEC61000-4-8
· Radio Frequency Emissivity	EN55022 (Radiated) EN55011 (Conducted)

Power supply

· Power Supply Interference and Ripple	IEC 60255-11 / UNE 21-136-83 (11) [< 20 % and 100 ms]
· Inverse Polarity of the Power Supply	IEC 61131-2
· Resistance of Ground Connection	IEC 61131-2 [< 0.1]Q
· Gradual Stop / Start Test	IEC 61131-2 (Test A)
· Surge Capacity	IEC 60044-1

Vibration test

· Vibration (sinusoidal)	IEC 60255-21-1 Class I
· Mechanical Shock and Bump Test	IEC 60255-21-2 Class I
· External Protection Levels	IEC 60529/IEC 60068-2-75 (IP30 / IK07)

Environmental test

· Temperature	IEC 60068-2
Cold work	IEC 60068-2-1 [-5º C, 2 hours
Cold work limit conditions	IEC 60068-2-1 [-10º C, 2 hours]
Dry heat	IEC 60068-2-2 [+45º C, 2 hours]
Dry heat limit conditions	IEC 60068-2-2 [+55º C, 2 hours]
Humid heat	IEC 60068-2-78 [+40º C, 93% relative humidity, 4 days]
Quick temperature changes	IEC 60068-2-14 / IEC 61131-2 IED open: -25º C for 3h and +70º C for 3h (5 cycles)
Changes in humidity	IEC 60068-2-30/IEC 61131-2 [+55ºC (12h) and +25ºC (12h) (6 cycles)]
Endurance test	+55º C in 1000 hours
Operating range From	-40º C to + 85º C
Storage range From	-40º C to + 85º C
Humidity	95 % (non-condensing)
· Climate Test	55º, 99% humidity, 72 hours
· Time / Current Characteristic	ANSI C37.60 Class II

Softekia



softekia
Electrical Software Engineering

Softekia aims to be the leader in software solutions and services for the Electric Power Industry.

We are a software engineering firm 100% power systems. An innovative company, part of ZIV, born with a vocation for independence.

A company that counts with the advantage of having a thorough knowledge of the protection, control, metering and communication equipment with which our applications will work.

Nowadays we all believe that we need to improve the efficiency of the existing infrastructure. The smart grid goal means not only the need to have at our disposal excellent equipment and engineering services, but also a good information management system able to help us take the best decision in a reasonable time.

Softekia applications enhance the effectiveness of the existing infrastructure. We create unique solutions that allow our customers to manage every protective relay with the same software, simplifying the daily work of analysts, maintenance staff, protection engineers, and other utility personnel.

We understand that each application is one more solution to integrate into the overall Information Technology system of each company. Therefore, all our software solutions are designed based on criteria of security, accessibility, compatibility and scalability to enable the sharing of information and the creation of value expected by the users.

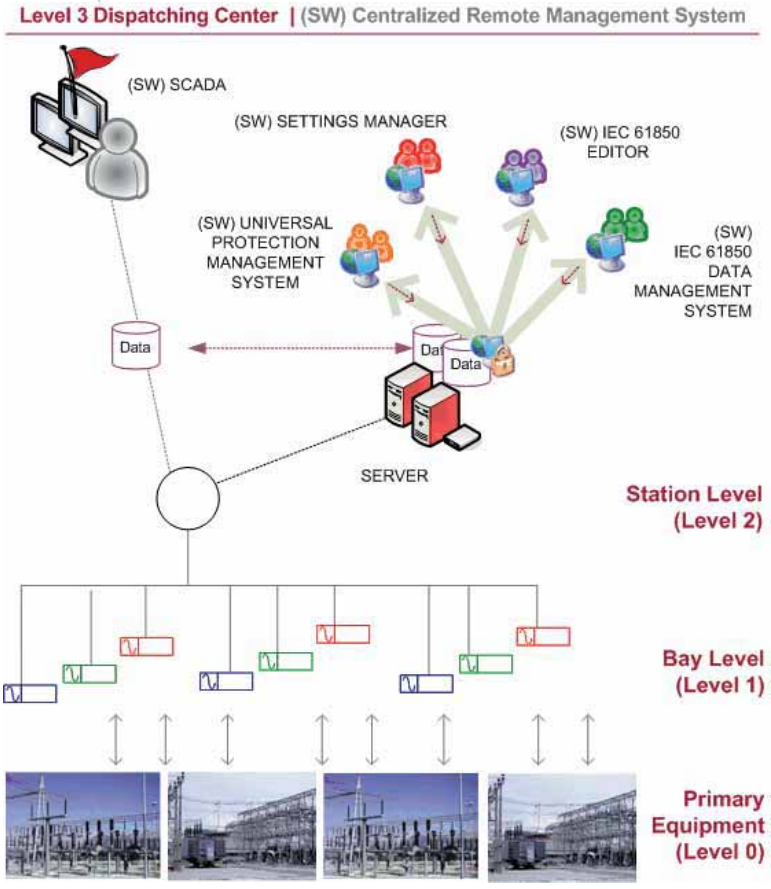
Rafael Quintanilla
General Manager

Softekia

Effective Solutions

Unified software platform to manage equipment from multiple manufacturers.

Simplify your work and perform the same task with a single tool, avoiding the traditional complexity of using different software packages for each manufacturer.



Specific solutions for each type of user.

Analysts, operators, maintenance crews, or power plant operators: each of you require different information, with different urgency levels, as well as different tools to facilitate your daily job.

Results used by the entire organization.

All the applications are compatible. You can share databases and exchange the information generated by each system to create valuable information for the whole organization: setting reports, oscillography, statistics, work orders, reports, inventory of network elements, and more.

Controlled access to data and applications anytime, anywhere

Universal Protection Management System

SGP Software is a multi-user Web application for centralized management of protective relay information.

Communicates with the substation relays, directly or through a substation hardware device (Model GIX) functioning as a local data query unit and IED concentrator. The system presents the collected field data in a unified format, through a standard Web browser. It also offers additional functions for processing the information received: reports generation, statistics, work orders, disturbance log, alarm management, report distribution via email, and more.

Fault Recorder Management System

"SGR software is an application for the automatic capture of oscillographic records from multiple devices.

IED Settings Management System

"SGA software is a settings management system serving as a central repository for storage and analysis of all available settings information.

Works as a standalone application or as a software **module integrated into the SGP**.

The database is updated through automatic and / or manual data input.

Allows operators and / or analysts to enter and link information regarding setting criteria, schematics, test data from analysis and routine equipment maintenance. It includes setting changes tracking.

Integrated Solution for Protection and Control

SGP < > SCADA .

The interrelationship between the protective relay management system and the SCADA system enables optimizing the performance of the whole system. This interaction can be achieved by exchanging data between the SGP system and the SCADA, whether the SCADA was integrated by Softekia or another software provider.

IEC 61850 Editor

XML editor for the configuration of equipment from multiple manufacturers.

This advanced editor verifies the validity of the data entered into the system and its compliance with the standard. It also, verifies that the data points are within range and highlights the differences between two ICD files, taking as a valid reference the structure of the original ICD file.

Allows configuration of descriptors, settings, and main IEC 61850 services (Goose, reports, logs ...).

IEC 61850 Manager

It is a multi-user°Web application for the centralized management of all information relating to IEC 61850 substation equipment.

Softekia

Universal Protection Management System

GP Software is an advanced information system that captures and automatically stores relevant grid data (before, during and after disturbance occurrence) to help analysts assessing the system response.

Allows easy management of the protective relaying information, presenting in a unified format all the data collected from devices of multiple manufacturers.

GP Software is a Web accessible application, allowing secure and controlled access to multiple users.

This scalable and cost effective solution is designed for any company that requires remote and centralized management of protective relaying information. It can be used by large transmission and distribution utilities, as well as smaller local distribution companies or independent generators.

Allows simultaneous online access to multiple users for analysis of the collected data and the generated reports.

Functions

- **Immediate or scheduled data capture based on the use of protocol emulators** (individually or through GIX / GIT devices to centralize data collection at the substation).
- **Unified data management** (single inventory).
- **Access Control** (historic log).
- Distinct access by user profile (with settable permissions).
- **Data Display: events, fault reports, oscillography records, and setting reports.**
- Information Filters: Chronological, location, bay type, model, and more.
- Disturbance log. Association of field data pertaining to a disturbance.
- **Oscillography display.**
- Generation of reports, work orders and statistics.
- Alarm Management: alarm notification and communications verification.
- Data export to Excel, Word and PDF.

- **Document management:** creating a common repository to store all the files imported from the system (lists, reports) and external documentation (manuals, schematics, maintenance protocols, and more).

- **Daily Reporting**: automatically generates a report with the most relevant information gathered by the system and distributes it via email to the recipient list specified by the administrator.

Features

Remote access to information.

A single unified inventory update: events, fault reports, oscillography and settings.

Multi-vendor application (multi-protocol).

Significant savings of time and resources.

- Avoid traveling to collect information.

- No need to use different manufacturer software packages. All information is collected automatically by SGP V.2.0 software and stored in the database.

Specialized Services

The success of a software solution not only lies in its excellence but on the client's ability to make good use of it.

At Softekia , we are aware that many times resources are limited; therefore we offer a complete range of services to support our clients in improving their results.

We work closely together to maximize the benefits of using our applications.

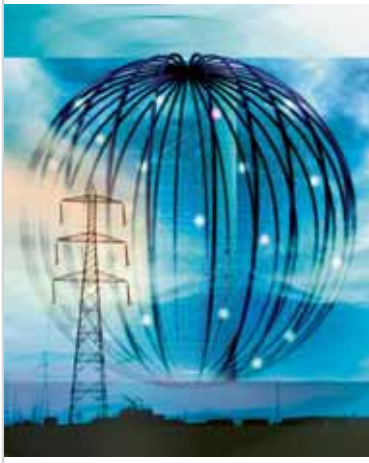
Support for requirements definition:
Technical Consulting.

Support for Integration:
Commissioning Services.

Technical Support:
Periodical maintenance.

Training.

Software Maintenance and Support.



Medida



ZIV medida

medida is the ZIV company specialized in the design, manufacture and marketing of Digital Metering Equipment and Systems.

As shown in this catalog, medida covers a broad range of metering equipment from the single phase meters for residential use up to the sophisticated and accurate high precision meters for the large consumers through the small and medium size industrial and commercial companies.

In addition to the above mentioned equipment, medida can supply turn key solutions that include, besides the meters, the communication equipment, the data acquisition and billing software as well as the project engineering and personnel training if required.

At present, medida is one of the leading meter suppliers in the Spanish market with important trade references in the utility market as well as in the industrial, co-generation and the end-users market.

medida is committed to continue innovating and providing advanced metering solutions to its customers.

Rafael Massot Redondo
General Manager

The 5CTE and 5CTR meter families are being used for measuring the energy in the generation, transmission and large customers frontier points where a high accury is required.

5CTE

C E

Three-phase multifunction high precision energy meter

Mod.	Function
1	Meter + Max. Demand+ Load profile. + TOU +(network access fees)

Characteristics

- Metering Operation Principle: simultaneous digital sampling of currents and voltages
- Bi-directional active energy measurement (Ea)
- Four quadrants reactive energy measurement (Er)
- Active, reactive and apparent power
- Instantaneous metering values: U and I (per phase), F and PF
- 5 programmable digital inputs
- 8 programmable digital outputs (according to model)
- Event recording with time tag
- TOU:
  - 3 active contracts
  - 3 latent contracts
  - 12 time periods per contract
  - 40 holidays or special days per contract
- Maximum demand and network access fees
- 2 load profiles (hourly + programmable)
- Communications (according to models)
  - protocol IEC 60870-5 profile 102
- HMI: display LCD (4 lines) and keypad.
- DLMS
- Optical port + RS232 and / or RS485 (4 wires)
- FO crystal or plastic

Accuracy class (according to model)

- 0.2S Ea and 0.5 Er
- 0.5S Ea and 1 Er

Reference values*

- Phase to phase voltage: 100, 110, 115 and 120 V.
- Currents: 1 and 5 A.

5CTD

C

Three-phase multifunction energy meter for commercial and industrial clients

Mod.	Function
1	Meter + Demand+Load profile+TOU+Network access fees and 3 contracts
2	Meter+Demand+TOU and 1 contract

Characteristics

- Metering Operation Principle: simultaneous digital sampling of I and U
- Bi-directional active energy measurement (Ea)
- Four quadrants reactive energy measurement (Er)
- Active, reactive and apparent power
- Instantaneous metering values: U and I (per phase), F and PF
- Event recording with time tag
- TOU:
  - 3 active contracts
  - 3 latent contracts
  - 12 time periods per contract
- 40 holidays or special days per contract
- Maximum demand and network access fees
- Communications (according to models)
- protocol IEC 60870-5 profile 102
- HMI: display LCD (4 lines) and keypad.
- DLMS
- Optical port + RS232 and / or RS485 (2 or 4 wires)
- Ethernet port

Accuracy class (according to model)

- 1S Ea and 2 Er
- 0.5S Ea and 1 Er

Reference values

- Transformer rated: X/110 V and X/5 A..
- Transformer rated (CT´s only): 230 V and X/5 A.
- Self contained: 230 V and 10(80) A.

* Transformer connected

5CTU

5CTM

C U

Three-phase multifunction energy meter for transforming stations

Mod.	Function
1	Meter + Demand+Load profile+TOU+Network access fees and 3 contracts
2	Meter+Demand+TOU and 1 contract

Characteristics

- Metering Operation Principle: simultaneous digital sampling of I and U
- Bi-directional active energy measurement (Ea)
- Four quadrants reactive energy measurement (Er)
- Active, reactive and apparent power
- Instantaneous metering values: U and I (per phase), F and PF
- Event recording with time tag
- TOU:
  - 3 active contracts
  - 3 latent contracts
  - 12 time periods per contract
- 40 holidays or special days per contract
- Maximum demand and network access fees
- Communications (according to models)
- protocol IEC 60870-5 profile 102
- HMI: display LCD (4 lines) and keypad.
- DLMS
- Optical port + RS232 and / or RS485 (2 or 4 wires)
- Ethernet port

Accuracy class (according to model)

- 1S Ea and 2 Er
- 0.5S Ea and 1 Er

Reference values

- Transformer rated: X/110 V and X/5 A..
- Transformer rated (CT´s only): 230 V and X/5 A.
- Self contained: 230 V and 10(80) A.

C M

Digital single phase energy meter for residential customers

Mod.	Function
0	Active energy meter
1	0 + load profile
2	1 + Time of Use

Characteristics

- Metering Operation Principle: simultaneous digital sampling of I and U
- Bi-directional active energy measurement (Ea)
- Four quadrants reactive energy measurement (Er)
- Active, reactive and apparent power
- Instantaneous metering values: U and I (per phase), F and PF
- Event recording with time tag
- Load profile
- Maximum demand and network access fees
- Communications (according to models)
  - protocol IEC 60870-5 profile 102
- HMI: display LCD (1 line) and keypad.
- Optical port (IEC-61107)

Options

- PLC communication via low voltage network (230 V)
- Pulse inputs
- Built-in remote power control

Accuracy class

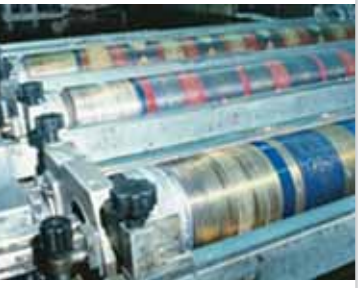
- 1 Ea and 2 Er

Reference values

- Self contained: 127-230 V and 10(80) A

The 5CTD family has been designed for low voltage metering for small and medium size industrial and commercial customers. The 5CTM is a digital single phase multifunction meter for residential use

The 5CTQ equipment has been designed to provide to the utilities and to users with high demand of power quality with the appropriate instrument to measure, control and store the quality of the energy supply.



4CCT

CC

Meter data concentrator

Mod.	Function
A	Data manager (master)
M	Modem (slave)

Characteristics

- Concentrates the data from all the meters connected to the same distribution transformer
  - Up to 800 single and/or three-phase
  - Keeps all meters synchronized

  Detects automatically the inclusion of new meter in the circuit
- Acts as bridge between the meters and the network operator

Communication elements

- 5 PLC modems
- 1 Ethernet port
- 2 serial ports
  - Port 1: RS-232 or RS-485, to connect with a local modem
  - Port 2: RS-485 for other functionality
- 1 optical port IEC 608750-5-102
- Inputs/outputs
  - 6 digital inputs AC/DC
  - 4 digital outputs MOS (400 mA max)

Type of enclosure:
Rack (19") 3U high, aluminum made
Cat# LCCTI611A

5CTQ

C

Power Quality Management

Function

The **5CTQ** has been designed based on the standard IEC 61000-4-30, meeting all the required specifications to satisfy the class A.

Characteristics

- Spot Power Quality analysis at the user's premises
- Zoning Power Quality analysis: the equipment is installed permanently in the HV/MV bus bars and data is collected systematically for statistical purposes.

Metering values:
- Fundamental components:
- Average current per phase
- Compounded average current
- Quadratic average current
- Compounded average voltage
- Quadratic average voltage

- Voltage and current harmonics per phase (up to number 40). The 5CTQ carries out a signal analysis using a digital filter tuned to each of the harmonics to be measured. The measurements of those harmonics are taken in accordance to the standard IEC-EN 61000-4-7.

- Flicker: periodical variations or series of aleatory changes in the network voltage that are sensitive to the human eye. The 5CTQ provides indications about the flicker severity every 10 minutes or every 2 hours (PST and PLT) according to standard IEC 61000-4-15.

- Voltage unbalance: Direct, indirect and zero sequence values for voltages and currents
- Recording: the 5CTQ keeps records of the short time voltage interruptions (VTCD):
- Voltage sags
- Voltage swells
- Up to 10 events can be chronologically recorded containing the following information:
- Time and date when the event is taking place (instant in which a programmable threshold is reached)
- Phase voltages before and after the event.
- Sags and swells indication.
- Voltage depth (in % of the reference voltage)
- Duration of the event.
- Oscilography (optional). The 5CTQ can offer Oscilography recording functionality showing the wave form of voltages and currents (per phase) with up to 6 channels at the rate of 96 samples per cycle during 1.000 cycles approximately.

4CGC

4SPL (Conector RS232)

C C

Metering Data Communications Manager

Mod. Function

A	Communications manager + web server
B	Communications manager + remote control
C	Communications manager + load profile aggregation
D	Communications manager + data concentrator (PLC)
E	C + remote control

Functionality

- Metering data concentrator for 2 or more meters
- Load profile aggregation: the result is a “virtual” meter that, based on the data coming from the connected meters, builds a single meter by aggregation of the different individual load curves.
- Local Area Network integration: Metering data arrive to the 4CGC through RS-232 or RS-485 communication ports and depart to the LAN through one Ethernet port.
- Protocol conversion. This function allows the connection of one metering system, supporting a given protocol with other metering system (SCADA type) using a different protocol.
- GPS synchronization. 4CGC synchronizes a metering system connected to the corresponding port via a RS-485 bus. The time reference is provided by a GPS clock connected to a RS-232 port.
- Web server. The 4CGC can either host a webpage or facilitates the connection to a server via TCP/IP protocol to gain access to a number of connected meters.
- Remote Terminal Unit (RTU). The 4CGC can work as a RTU for remote reading and control functions of several metering points.

Characteristics

- Local communication through keypad and display
- Configuration program (Windows™ based) through the RJ-45 port and FTP server
- Data collection and processing through the data acquisition software ZIVERLEC or any other program supporting IEC-60870-5-102
- Three RS232 ports: COM1, COM2 and COM4
- One RS485 port: COM3
- One (RJ45) Ethernet port
- One RJ11 port for the modem
- Four physical digital opt coupled inputs
- Four solid state (OPTOMOS) voltage free digital outputs
- Auxiliary power supply: 24 - 48 Vdc / 110 - 125 Vdc / 220 - 250 Vdc / 80 - 220 Vdc and 220 Vac

SP

Optical probe with RS232 or USB connector

Characteristics

- Speed: up to 38,400 bauds
- Magnetic head
- Wire length: 1 to 2.5 m
- External power supply: not required

Options

- RS232 connection. Type of connectors:
  - DB9.
  - RJ45.
  - DB15.
  - Mini DIN9.
  - Lemo.
- USB connection

4SPL (Conector USB)

The 4SPL optical probes are used for the local connection between a laptop or HHU (Hand Held Unit) and a meter through its optical port

The 4CGC is been used in those installations with high demand of data processing in very short time or with some connectivity problems

Meter ca inets

ziverlec medida offers to its customers the complete solution for the meter point, integrating in a standard cabinet: meters, modems, telephone line protections, shor-circuitable terminal blocks and all the required accesories by the different utilities. Optionally, to simplify the commissioning, the meter equipment can be delivered already configured and tested.

ziverlec®

Meter Data Acquisition Software

Functionality

ziverlec® has been developed to manage the meter data acquisition of any meter device supporting the IEC EN 60870-5 protocol. ZIVERLEC runs on personal computers and is Windows based (95, 98, XP and NT versions).

ziverlec® allows a manual and/or automatic meter data collection through a series of functions which are presented in a window fashion. Those meter data are necessary for energy management and revenue purposes (load profiles, resets, digital signature, etc..).

Characteristics

- Equipment management
  Configuration of the individual data for each metering point (phone number, passwords, link address, etc.) and the selection of required data (load profile, resets, etc.).

- Data collection
  Manual and/or automatic retrieval of the data stored in the meters
  The automatic data collection consists of 3 individually configurable reading cycles which can operate simultaneously. The calling process is being monitored until the communication is terminated.
  This application can send the collected data via e-mail

- Reports and graphics
  ZIVERLEC can elaborate personalized reports with fully configurable charts and graphics (load profiles). The reports can either be displayed or printed

- Compatibility
  Ziverlec is compatible with any type of meter supporting IEC-60870-5-102 protocol

Reading Terminal Interface

Functionality

tpl is an universal local meter reading program. This application is resident in a laptop or in hand held reading units (HHU). The collected data consists of the following:

- Load curves: hourly and quarter-hourly
- Resets
- Instantaneous values
- Events
- Digital signatures

Meter Reading and Programming Interface

Versions

- For utilities: reading and programming capabilities
- For end-users: only reading capabilities

Characteristics

- Local mode: via optical probe and optical port
- Remote mode: via modem
- Emulation mode: no meter required (programming)

Meter Billing Software

Functionality

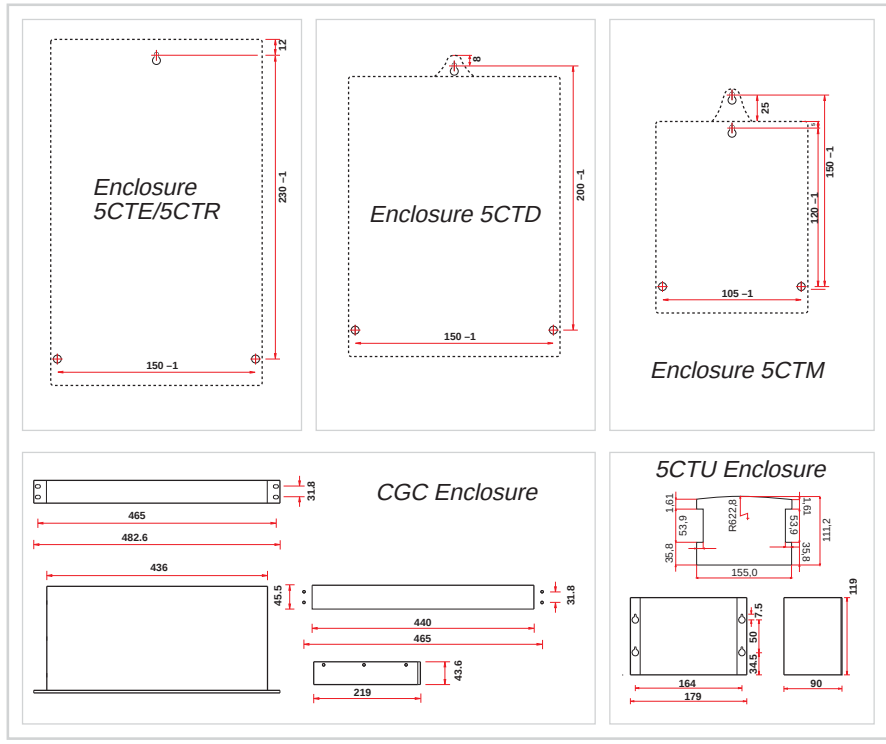
erpay is a powerful software tool PC based, designed for the integral management of a meter system: reading, simulation, billing, energy management and the like.

Characteristics

- As in the ertec it also incorporates:
  - Parameters and invoices adapted to each contractual arrangement
  - Graphics, billing charts and statistics. Characteristics of each contract may be displayed for review.

The medida software applications, briefly described in this catalog, are excelent and user friendly tools to take advantage of the large amount of data stored in our ZIV meters or any other meter supporting the IEC-60870-5-102 protocol.

imensions



Standards ype est

Insulation test
IEC 60060-1

Between circuits and ground	2 kV, 50 Hz, during 1 m
Between independent circuits	2 kV, 50 Hz, during 1 m

Impulse voltage test
IEC 60060-1
5 kV; 1.2/50 μs; 0.5J

Electromagnetic compatibility

Oscillatory waves inmunity test
IEC 61000-4-12

Common mode	2.5 kV
Differential mode	1.0 kV

Fast transients burst test
IEC 61000-4-4
4 kV ±10%

Test of immunity to electromagnetic RF fields
IEC 61000-4-3

Amplitude modulated (EN 50140)	10 V/m
Impulse modulated (EN 50204)	10 V/m

Surge inmunity test
IEC 61000-4-5

U and I circuits	±4 kV

Test of immunity to electrostatic discharges
IEC 61000-4-2
8 kV ±10%

Test of immunity to conducted disturbances, induced by RF fields
IEC 61000-4-6

Frequency interval	150 kHz to 80 MHz

Tests of the effect of the climatic environments

Cold test	-20º **(IEC 60068-2-1)**
Dry heat test	55ºC **(IECI 60068-2-2)**
Damp heat cycle test	25º-40ºC/95% **(IEC 60068-2-3)**
Protection against solar radiation	**IEC 60068-2-5**

Mechanical requirements and tests

Shock test	**IEC 60068-2-27**
Vibration test (sinusoidal)	**IEC 60068-2-6**
Resistance to heat and fire	650ºC ±10ºC/30s ±1s **IEC 60695-2-11**
Spring hammer test	0.22 nm ±0,05 nm **IEC 60068-2-75**

Temperature range
IEC 60721-3-3

Specified operating range	-10ºC to +55ºC
Limit range for storage and transport	-25ºC to +70ºC
Relative humidity	95% (non-condensing)

Power supply ripple
IEC 60255-11 < 20 %

Protection against penetration of dust and water
IEC 60529
IP 51

The meters satisfy the electromagnetic compatibility requirements per 89/336/CEE

ssistance

Maintenance

medida technically qualified personnel can provide both preventive and corrective maintenance to the complete product range.

ocal services

medida Service in Spain is provided through our regional offices in Andalusia, Aragon, Catalonia, Madrid, Canary Islands and Basque Country. Also, telephonic assistance is provided on a permanent basis (24 hours /365 days).

24 hour assistance for all products

nternational assistance

medida provides high quality international customer service, either through own personnel (Brazil, United States and Canada) or an extensive network of local collaborators in other countries. In addition,several telephone service numbers are provided for immediate assistance (24 hours/ 365 days)

24 hour assistance in Brazil and South America

24 hour assistance in USA and Canada

medida

Technical Support:	**677 551 373**
Purchasing Dpto.:	**946 409 151**
Sales Assistance:	**677 551 437**

arranty

medida warranty applies to all products delivered to buyer from the time of delivery (at the moment the product leaves medida premises, as indicated in the shipping documents).

Customer is responsible of notifying medida of any faulty conditions as soon as they are detected. If it is determined that the new product defect is covered by the warranty, medida will repair, or substitute the product at its own discretion to the customer at no charge.

uality

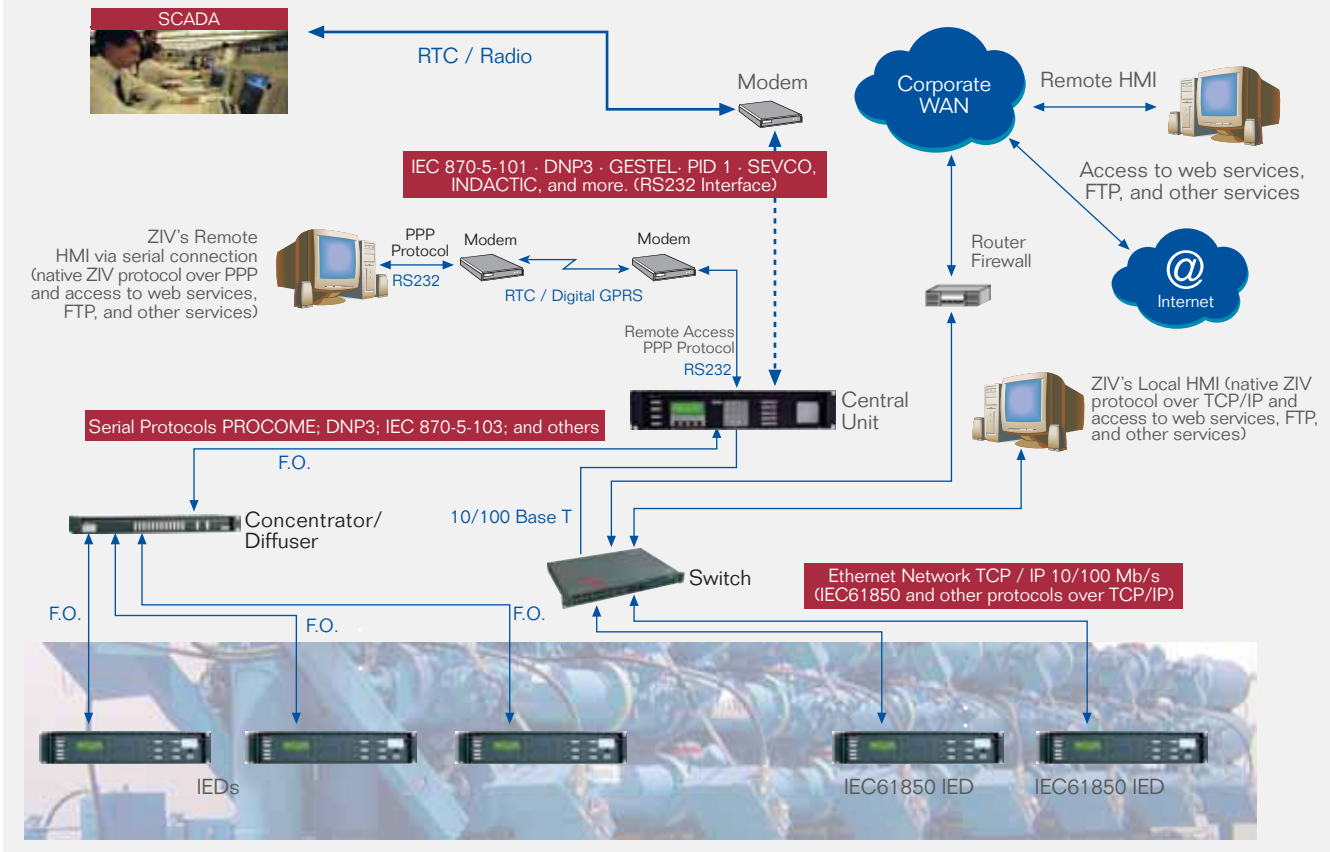
medida team of professionals has a permanent spirit of collaboration and commitment to continuous improvement, as expressed in the Quality Declaration and Environmental Statement

www.zivmedida.com

Intekia Engineering



intekia
ENGINEERING



Engineering projects in the electric power industry have been subjected to an important transformation in recent years, requiring high levels of efficiency that can only be achieved through specialization. These projects must be planned and accomplished by coordinating different teams of experts.

intekia is an organization grounded on two basic foundations: First, the know-how of its personnel, acquired over many years of experience and continued training in new techniques and development philosophies (i.e. IEC61850), and second, the direct contact with customers / partners to always listen and meet their needs.

intekia goal is to complement and adapt to the requirements of power utilities, engineering companies, integrators and builders, and industrial customers depending on the characteristics and particularities of each project, while offering the best solution in the electrical, civil, and communications aspects of the projects. In conjunction with Intekia Systems and Intekia Services, intekia has the capability to become the project manager for the electrical, civil, and communications engineering from definition to commissioning.

At intekia we strive to become the industry expert to support your Protection, Control, Metering, and Communications projects.

Vidal Ortega
General Manager

Intekia Engineering

Areas of Activity and Services

The purpose of intekia is to provide users with efficient customized solutions:

- Solutions for automation / retrofitting of electrical installations, both for power utilities and industrial power systems.
- Solutions tailored to the best cost - quality - benefit ratio, integrating high technology products.

At intekia we also provide engineering consulting in the fields of Protection, Control, Metering, and Communications, addressing these services with first-class effort, dedication and experience, independent of the project size, seeking the best solution that fits every case.

intekia offerings range from specialized studies to complete turn-key projects (in collaboration with Intekia Systems and Intekia Services) including:

- **Complete substation engineering**
- **Relay settings calculations and coordination studies**
- **Communications engineering and consulting**
- **IEC 61850 engineering**
- **Renewable energy engineering**
- **SCADA system engineering**
- **Feasibility studies and consulting**

Complete substation engineering

intekia has qualified technical personnel for project development of Medium and High Voltage Substations, either for new construction or for retrofitting and automation of existing installations.

In these areas we offer basic and detail engineering, from the definition of the single line diagrams, to the electromechanical and civil engineering, including communications, applying the most advanced technology available.

In Control Engineering projects, intekia maintains a strong commitment to solutions based on digital protection and control equipment. Intekia has a dedicated R & D department devoted to developing tools that integrate both the design stage with the configuration and commissioning portions of the project.

intekia has the capability to resolve and advise its customers with optimized solutions when confronted to any specific difficulty in their installations thanks to the extensive knowledge gained in the numerous power system projects completed.

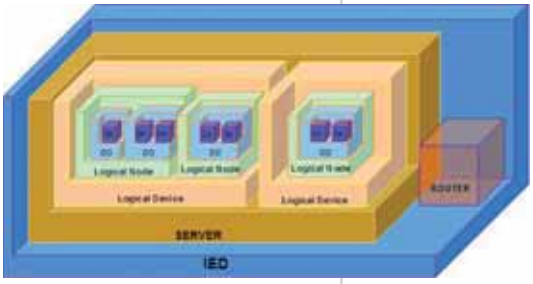
Within the scope of power systems project management, we perform the following activities:

- **Improvement / optimization of installations**
- **Feasibility studies**
- **Basic and detail engineering**
- **Integrated Protection and Control Systems**
- **Electromechanical Projects**
- **Complete Electrical Engineering Projects**
- **Civil Engineering Projects**
- **Communications Engineering**

Intekia Engineering

IEC 61850 Engineering

intekia strongly believes in the development of the IEC61850 standard. Since the first drafts of the standard until now, Intekia's engineering team is in continuous training, and constantly working with multiple manufacturers to develop tools for processing information from IEC61850 IEDs.



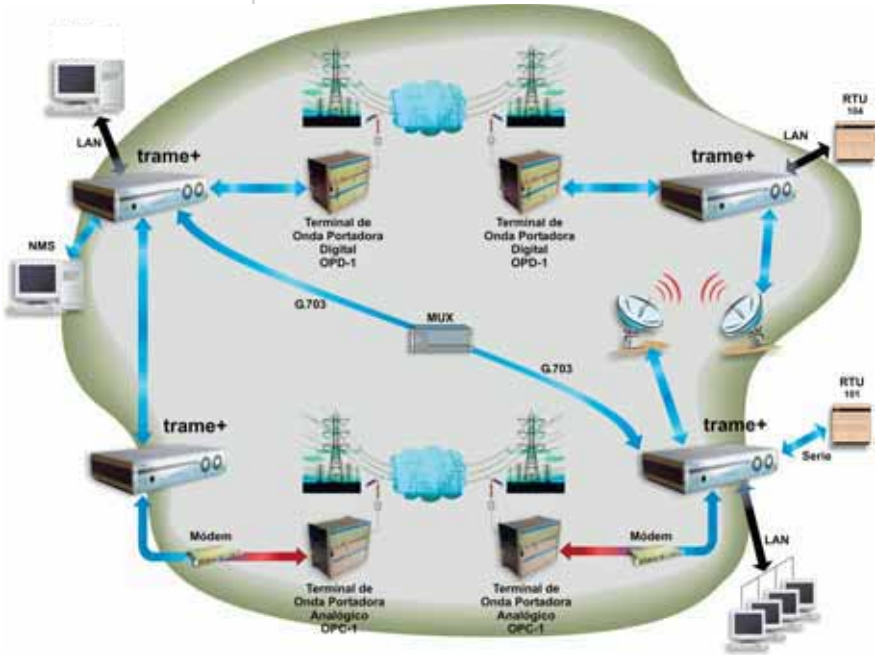
The specification of the IEC61850 standard presents important innovations regarding the modeling of the information circulating in electrical substations, the way that the information is exchanged between the different devices, and the file formats that are described.

In addition to intekia extensive experience in the field of electrical engineering, we offer expertise on communications, Ethernet, TCP / IP, and XML languages needed to face the new challenges introduced by the IEC61850 standard on modern electrical substations.

intekia is actively involved in the deployment of the earliest IEC61850 multivendor substations, integrating IED's from different manufacturers in the same installation proving complete interoperability.

intekia is able to access information from any manufacturer's IED, for a complete integration into the substation automation system.

As a result of this experience, intekia is an important part of the new generations of IED's and software tools that will make easier the configuration and management of the information of those substations based on IEC61850.



Communications Engineering and Consulting

One of intekia objectives is to be the complement to resolve communication needs according to the customer's requirements regardless of their nature: power utilities, final users, or engineering and project management companies.

According to such requirements, services provided may include analysis of technical requirements, specification and definition of the project, project management, documentation services, and end user training.

The goal in the area of communications is to optimize costs and resources, and to design systems easy to use and maintain.

Each case involves the use of a specific technology or a combination of several. Among the solutions provided are:

- Power line carrier
- Satellite communications
- Telephony & Radiotelephony
- Fiber Optic Systems
- Radio links
- PLC Communication Systems (Power Line Communication)

Studies and Consulting

intekia offers a wide range of studies that focus on the following:

¥ Project feasibility

¥ Analysis of requirements and project specification consulting

¥ Protective relay settings calculations

¥ Protective relay coordination studies

¥ Systems stability studies

¥ Fault and disturbance analysis

¥ Protection system audits

Quality and Environmental Policies

intekia holds the ISO 9001 and ISO 14001certificates of compliance.

We are firmly committed to a Continuous Improvement Plan within our policy of Total Quality, from the feasibility study to the commissioning of the project.

Equally, our commitment to the environment is reflected in our policy of waste minimization and adherence to systems for reducing greenhouse gases.

Technical Support in Spain and Europe for the products of intekia

24 hour assistance for all products

Intekia Systems

intekia SYSTEMS

The evolution of the electric power industry requires organizations specialized in offering products and/or services that resolve the client's needs in an optimal way, both at the technical and project management levels, while simplifying the project implementation and commissioning.

intekia is a company dedicated to the manufacture of electrical control panels, racks and integrated protection and control, communications and metering systems for electrical installations such as substations, power plants, industrial facilities, and power systems in general.

The experience of our people, acquired over many years, is based on continuous training, allowing us to face new challenges with confidence and enthusiasm.

The main objective of intekia is customer satisfaction. Therefore, we adapt our processes to achieve compliance with the client's specifications on the services and products provided. Our believe in continuous improvement also forces us to align with the expectations of our suppliers and employees, as well as the environment.

intekia makes its experience available to any organization with power system projects in the areas of Protection, Control, Metering and Communications.

Begoña Aranzabe
Systems Director

Intekia Systems

Areas of Activity and Services

intekia scope of activities covers the following areas:

- **Panels for conventional protection and control systems**
- **Panels for integrated protection and control systems**
- **Integrated Panels**
- **Panels for Communication Systems**
- **Cabinets for revenue metering**
- **Auxiliary services panels**
- **Chassis for training or centralization**
- **Control systems based on PLC**
- **Special Configurations**

intekia integration projects include protection, control, metering, and communication equipment from any manufacturer, depending on the characteristics and needs of each client.

intekia identifies and promotes elements that are key to the project success, providing the necessary support regarding the product knowledge.

intekia delivers fully tested systems to customers. This complete test is the added value we provide, which results in a significant project cost reduction for customers, since the time required to commission the complete system is highly reduced.

The experience and know-how of our team allow us to collaborate with the client in choosing the best solution based on the following points:

- Choosing the most appropriate materials to optimize the cost / functionality.
- Drafting of construction drawings for custom manufacturing.
- Development of the most suitable configuration for the system.

We count with the most advanced technologies for assembling and wiring (marking and wire identification software, labeling systems) and final testing (three-phase test sets, simulators, and other equipment)

The scope of services offered by Intekia extend through the following phases:

Specification and project launch

Intekia has expertise in electrical engineering and control systems, with the ability to review and complete the engineering from the initial stage, avoiding mistakes that could lead to costly "re-engineering" during the construction of the system.

Construction

Intekia manufacturing facilities are dedicated to the assembly and wiring of panels, auxiliary services cabinets, outdoor marshalling enclosures, metering cabinets, and other assemblies, following the standards of each client.

Final System Testing

Intekia's team is highly trained to configure and test any protection and control equipment in the market.

Permanent Assistance Service
91 352 80 30
24h hours 365 days

24 hour assistance for all products

To ensure the proper operation of each system we perform stringent quality control at every stage of the process establishing the following check and test points:

- **Materials procurement**
- **Documentation°**
- **Element arrangement**
- **Wiring°**
- **Dielectric strength testing**
- **Metering testing**
- **Functional testing°**
- **Protocol generation**
- **Final verification (visual inspection and confirmation of performed tests)°**
- **Packaging and shipment**

Technical Assistance
intekia SYSTEMS
677 551 932

Technical Support in Spain and Europe for the products of intekia

Intekia Services

intekia SERVICES

The quality, flexibility, agility and efficiency of engineering and other services rendered directly in the job site, condition the operational life of the equipment, securing the return on investment for our clients.

These are the principles that have inspired us and conform the basis of intekia personnel in all our activities, ensuring the safety of our jobs.

The versatility of our personnel has been developed over many years of experience and training in protection, control, metering, and communications for power systems, both in electrical substations and industrial facilities.

Our know-how includes hardware and software from multiple manufacturers in the power systems market. Our customers, such as utilities, engineering firms, integrators, developers and industrial installations, have counted on us for many years, as an unconditional partner.

To satisfy our customers' needs is our primary motivation to stay on the crest of the wave on new techniques, industry standards and / or philosophies, such as the IEC 61850 standard, commissioning techniques, preventive and predictive maintenance, construction jobs, etc.., both for new installations and existing infrastructures. This is our main focus for business.

Therefore, intekia puts its skills and good practices at the service of any organization with power system projects in the areas of Protection, Control, Measurement and Communications.

Alejandro Rodriguez Angarita
Services Director

Intekia Services

Areas of Activity and Services

The goal of intekia fits within the philosophy of collaboration and / or implementation of commissioning, maintenance and construction jobs in our customers installations.

intekia activities range from training courses, ad hoc maintenance support, commissioning, or fault and disturbance analysis, to complete power system protection, control, metering, and communication systems verification.

For these purposes, intekia counts with the tools, testing equipment and other advanced equipment, always appropriate to the circumstances (polyphase test sets, dielectric test, primary injection, phases sequencing, measuring equipment, and more).

intekia provides to customers a complete report of the full service, including recommendations for implementation and operation aimed at improving the functioning of their systems.

As a result of the experience accumulated in the many projects and field jobs done, Intekia Services can work closely with the other companies of intekia dedicated to engineering services for electrical substations and to the supply of electrical power systems.

- Protective Relay Testing.
- Control Systems Commissioning.
- Functional Tests in electrical substations.
- Revenue Metering System Commissioning.
- Power Line Carrier, Transfer Trip, and Teleprotection Equipment Commissioning.
- Communication Systems Commissioning.
- Preventive and Predictive Maintenance.
- IEC 61850 System Commissioning.
- Pre-Commissioning Consulting, Analysis and Identification of Issues.
- Training

Systems Commissioning

Commissioning of complete systems for Protection, Control, Communications, and Metering equipment from different manufacturers, assuming responsibility as a single provider, allowing the responsibilities in this type of projects to be clearly defined.

Training

intekia conducts training with a special dedication to the implementation of new technologies, oriented to the function, operation, maintenance, and change control in Protection, Control, Metering, and Communications for Power Systems.

Our training focuses on:

- Protective Relaying.
- Integrated Protection and Control Systems.
- Software Tools from different vendors.
- Communications.

Systems Integration

intekia commissions, detects and corrects problems in installations including integration of equipment from multiple manufacturers, with diverse protection and control communication protocols, both at the local level (MODBUS, DNP 3.0, SPABUS, PROCOM , IEC-60870-5-103, and others) or remotely with higher hierarchy levels (PID-1, INDATIC, WISP + ext, DNP 3, SEVCO 6802, SAP20, Gestel, IEC-60870-5 - 101/104, MODBUS, and more).

Component Commissioning

Commissioning of system components, performing upgrades and / or improvements adapted to the needs of our customers.

Maintenance

Preventive and corrective maintenance for Protection, Control, Metering, and Communication Systems.

Technical Assistance
intekia SERVICES
677 551 520

Technical Support in Spain and Europe for the products of intekia SERVICES

Permanent Assistance Service
ZIV
91 352 80 30
24h hours
365 days

24 hour assistance for all ZIV products

µSysCom

µSysCom

Telecommunications is a very dynamic industry. New technologies or improvements on existing technologies occur very quickly.

µSysCom expertise in Telecom ranges from wireless Technologies, such as Bluetooth, WiFi, WiMax, GPRS/UMTS/HSDPA, to networking Technologies such as fast and gigabit Ethernet, NTP GPS based clocks, metro Ethernet solutions (fiber optics).

µSysCom understands the high demanding requirements imposed on telecom equipment intended to transport critical life systems data in industrial installations.

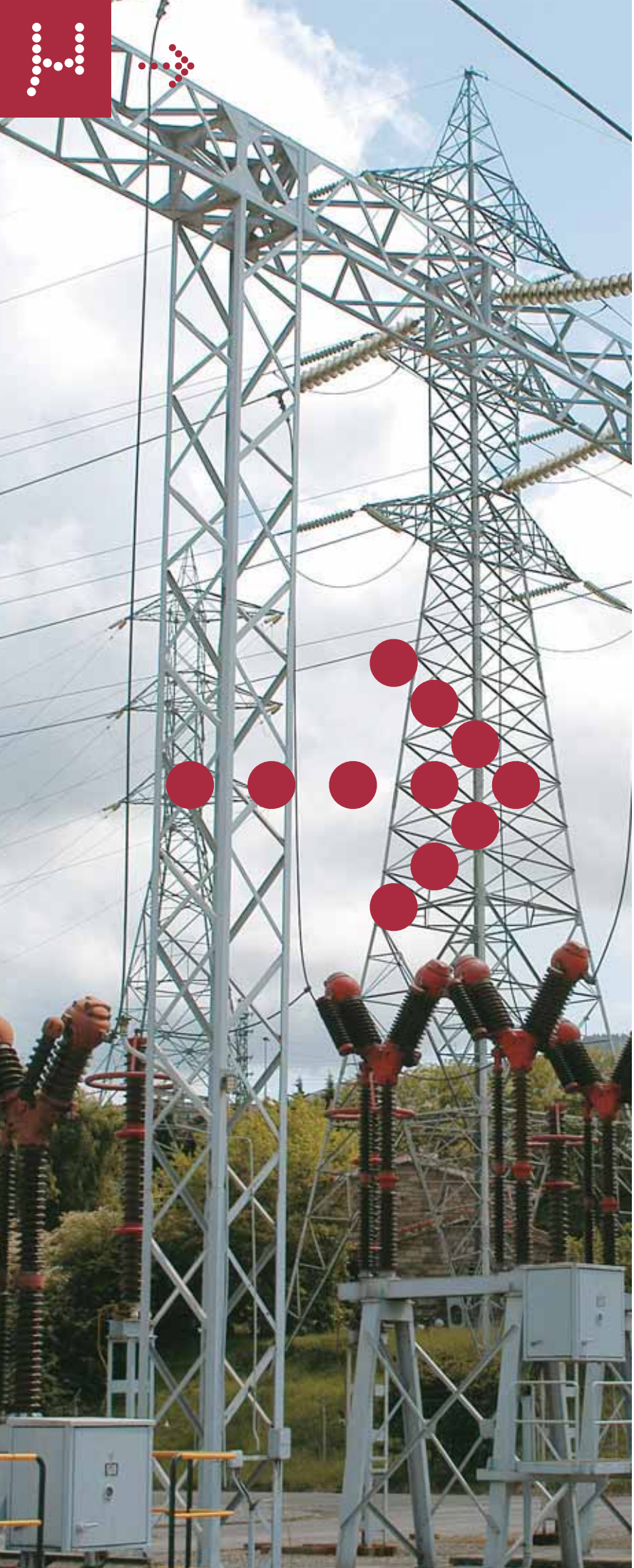
µSysCom applies its telecom Technologies expertise and its knowledge of different industrial requirements to supply innovative industrial telecom products.

Our product offer is divided into three different categories.

- Secure access. It includes routers and modems that allow a secure access to industrial remote sites.
- Industrial networking. Ethernet is de-facto Standard for local area networks. uSysCom proposes a complete family of Fast Ethernet / Gigabit Ethernet products specially designed for industrial installations, such as electrical substations.
- Easy to connect. It includes a group of products that expedite many daily connectivity problems. Some examples are fiber optics to electrical converters, serial diffusers, ISM radio modems...

Finally, I would like to thank our customers, because many features in our products include their suggestions. Our products are more and more reliable thanks to their advice and expertise. This joint work is the basis upon which we have built the power of secure communications.

José Miguel Arzuaga
Director General



EMR

EMR

WAN Compact Routers

Description

uSysCom industrial compact routers constitute a reliable way of providing layer 3 connectivity to LAN's deployed inside industrial plants, trains, trucks or electrical substations.

Features

1 Fast Ethernet unmanaged switch (4 ports)
1 WAN connection
1 serial console RS232 port
IP routing: Static routing rules and dynamic routing protocols (RIP, OSPF).
NAT: Flexible S-NAT and D-NAT rules
VPN: Easy to establish LAN to LAN tunnels. IP over IP, GRE or IPSec.
VRRP: Virtual Router Redundancy Protocol.
Stateful IP firewall.
DHCP Server.
QoS based on different IP traffic patterns.
NTP client.
Management options (SNMP, https, CLI)
Advanced authentication protocols support (TACACS, RADIUS...)
Firmware upgrade via https.

Options

Fast Ethernet managed switch
1 Fast Ethernet port may be either 10/100BaseT or 100BaseFx
Type of WAN connection:

- Fast Ethernet
- DSL
- GPRS / Edge
- GPRS / Edge / UMTS / HSPA
- Mobile WiMax

Enclosure: Wall Mount & 19" rack mount

Power supply:

- I: 14 Vdc – 75 Vdc
- II: (60Vdc - 360 Vdc) or (60Vac - 260Vac; 50/60 Hz)

Accessories

- Antenna cables
- Antennas
- Ethernet cables
- Fiber pigtails

Certifications

- CE Marked
- Designed for Industrial Applications
- Designed for Electrical Substations
- Designed for Railway Applications

SIP

SIP

Intelligent Serial to IP Devices

Description

uSysCom intelligent serial to IP devices allow an easy integration of non IP electronic devices to an IP network. uSysCom SIP take into account the peculiarities of industrial serial protocols so they can be properly transported over different IP networks (either fast ethernet networks or high latency GPRS networks).

Features

1 Fast Ethernet port
1 Serial async port (RS232/RS485) selectable via SW
1 WAN connection (optional)
1 serial console RS232 port
Easy serial to IP connections
Optimized for transporting IEC 60870-5-101/102 serial protocol over IP networks
DHCP Server
NTP client
Management options (SNMP, https, CLI)
Firmware upgrade via https

Options

Fast Ethernet Port: 10/100BaseT or 100BaseFx
Type of WAN connection:
- none
- DSL
- GPRS / Edge
- GPRS / Edge / UMTS / HSPA

Security function: IPSec client or SSL/TLS.
Enclosure: Wall Mount & DIN Rail

Power supply:
- I: 20 Vdc – 75 Vdc
- II: (60Vdc - 360 Vdc) or (60Vac - 260Vac; 50/60 Hz)
- III: 12 Vdc – 60 Vdc

Accessories

- Antenna cables
- Antennas
- Ethernet cables
- Serial cables
- Fiber pigtails

Certifications

- CE Marked
- Designed for Industrial Applications
- Designed for Electrical Substations

CIC

CIC

Communications IP concentrator

Description

IP networks are becoming de-facto standard for industrial networks. Legacy bus applications can be easily migrated to an all-IP solution thanks to uSysCom CIC.

Features

1 Fast Ethernet port
1 WAN connection (optional)
1 serial async port (RS232/RS485) selectable via SW
Up to 7 serial async ports (RS232)
1 serial console RS232 port
Easy serial to IP connections
Easy serial to serial connections
Optimized for transporting IEC 60870-5-101/102 serial protocols over IP networks
DHCP Server
NTP client
Management options (SNMP, https, CLI)
Firmware upgrade via https

Options

Type of WAN connection:
- none
- Fast Ethernet
- DSL
- GPRS / Edge
- GPRS / Edge / UMTS / HSPA

Serial Port type: electrical / GOF / POF
Fast Ethernet Port: 10/100BaseT or 100BaseFX
Security function: IPSec client or SSL/TLS option.
Enclosure: Wall Mount & 19'' rack

Power supply:
- I: 16 Vdc – 75 Vdc
- II: (60Vdc - 360 Vdc) or (80Vac - 260Vac; 50/60 Hz)

Accessories

- Antenna cables
- Antennas
- Ethernet cables
- Serial cables
- Fiber pigtails

Certifications

- CE Marked
- Designed for Industrial Applications
- Designed for Electrical Substations
- Designed for Railway Applications

IP networks are a reality today. Ethernet local area networks are being deployed in industrial installations. All legacy serial based electronic devices can be smoothly integrated into IP networks thanks to uSysCom SIP and CIC products

uSysCom industrial communication equipment allow connectivity with distant locations where the electrical and environmental disturbances make the usage of standard communication devices unsuitable.

RCU

RCU

Wireless Micro Remote Terminal Unit

Description

uSysCom wireless micro remote terminal units allow electrical utilities to monitor and control small remote installations in a cost effective way.

Features

Up to 16 integrated isolated digital inputs
Up to 8 integrated isolated digital outputs
Up to 2 integrated isolated analog inputs
1 WAN connection
1 serial async port (RS232/RS485) either for connecting an end device or for adding additional inputs/outputs modules.
1 serial console RS232 port – SRV
Direct integration with a supervisory centre via its supported IEC 870 telecontrol protocols
NTP client.
Management options (SNMP, CLI) either locally or remotely (GSM data call or telnet)
Firmware upgrade via GSM data call or via telnet

Options

I/O integrated card types:
- · **16** digital input & **8** digital output
- · **16** digital input
- · **8** digital input & **4** analog input

Telecontrol protocols:
- · IEC 60870-5-101
- · IEC 60870-5-104
- · DLMS

Security function: IPSec client or SSL/TLS option.
Enclosure: Wall Mount & DIN Rail

Power supply:
- · I: 16 Vdc – 75 Vdc
- · II: (40Vdc - 360 Vdc) or (50Vac - 260Vac; 50/60 Hz)
- · III: 12 Vdc – 48 Vdc

Accessories

· Digital Inputs / Outputs module
· Analog Inputs module card
· Special Enclosure (IP 67)
· Backup batteries for extra secure power supply.
· Antenna cables
· Antennas
· Serial cables

Certifications

· CE Marked
· Designed for Electrical Substations

UMMG

UMMG

Compact GPRS/GSM modem

Description

UMMG is a quad band modem that works on the GSM 900/1800 or 850/1900 bands, as used in Europe and America respectively.

UMMG is a compact device optimized for data transmission making use of various services offered by mobile network operators.

Features

1 Serial async port (RS232/RS485) selectable via HW switch
1 WAN connection: GPRS class 10, class B.
Quad band: 850 / 900 / 1800 / 1900 Mhz
GSM Fallback
Intelligent GPRS context management
Flexible TCP / UDP sockets configuration
Data interchange monitoring
Internal log for recording main wireless network events & alarms
NTP client.
Management options (extended uSysCom AT commands for GPRS) either locally or remotely (GSM data call or telnet)
Daily reset
SNMPv1 trap delivery.
Firmware upgrade via GSM data call or via telnet

Options

Enclosure: Wall Mount & 19'' rack & DIN rail

Power supply:
- · I 10 Vdc a 62 V dc
- · II: (40Vdc - 360 Vdc) or (50Vac - 260Vac; 50/60 Hz)

Accessories

· WAN connection: CDMA option – ask our sales team for more information.
· DIN rail mounting kit
· Antenna cables
· Antennas
· Serial cables
· Security cover

Certifications

· CE Marked
· Designed for Industrial Applications
· Designed for Electrical Substations

UMMT

UMMT

Compact PSTN modem

Description

UMMT is a compact PSTN modem optimized for data transmission in industrial applications. UMMT offers a cost efficient solution for remote data communication using a 2-wire connection, either leased line or public landline phone network.

Features

Universal AC/DC Power supply (60 Vdc - 360 Vdc) (40 a 360 Vdc/50-260 Vac)
1 Serial async port (RS232/RS485) selectable via HW switch
1 Global PSTN WAN connection.
Includes PSTN line surge suppression.
Daily reset
Management options (complete AT command suite).

Recommendations:
- · ITU-T V.34, V.32bis, V32, V22bis, V.22
- · ITU-T V.29, V.42, V.42bis
- · ITU-T V.21 & V.23 (international version)

Options

Enclosure: Wall Mount & 19" rack & DIN rail

Accesorios

· DIN rail mounting kit
· Serial cables
· Security cover

Certifications

· CE Marked
· Designed for Industrial Applications
· Designed for Electrical Substations

SWT

SWT

Managed Gigabit / Fast Ethernet Switch (19" rack mount)

Description

SWT is intended for those big scale LAN's deployments where port density, switching performance and logical complexity are the main challenges to surpass.

Features

Full Duplex Wired Speed switching core
In factory flexible configuration:
- · Up to 48 Fast Ethernet ports with up to 4 Gigabit ports
- · Up to 4 Gigabit ready ports

Port speed automatic detection
Multiple VLAN policies
Q-in-Q support
QoS: Diffserv architecture (Per Hop Behaviour).
- · Within a QoS domain – IEEE 802.1p / CoS fields.
- · Outside a QoS domain, SWT can assign IEEE 802.1p priorities based on origin MAC, destination MAC, physical port or VLAN

UltraFast Ring Recovery – 4 ms via standard RSTP – the fastest market implementation
MSTP
DHCP relay match opt-82
IGMP Snooping
Port security based on IEEE 802.1x a MAC access control list
Port mirroring
Flexible Gigabit connectivity via industrial SFP modules
Management options (snmp, https, CLI)
Firmware upgrade via https
Enclosure: 19" rack mount

Options

Power supply:
- · I: 20 Vdc - 75 Vdc
- · II: (60Vdc - 360 Vdc) or (60Vac - 260Vac; 50/60 Hz)

PoE (4 Fast Ethernet ports)
Redundant Power supply
Flexible Fast Ethernet configuration:
- · 10/100BaseT
- · 100BaseFX

All Gigabit

Accessories

· SFP modules
· Pigtail cables and fibers

Certifications

· CE Marked
· IEC 61850 Approved
· Designed for industrial applications
· Designed for Electrical Substations

uSysCom networking devices bring the capabilities of Fast and Gigabit Ethernet to IEC-61850 electrical substations. Thanks to SWT and SWD it is easy to deploy a Local Area Network inside the substation fence.

Wireless access points allow a permanent wireless connection to any network from any mobile device with wireless capability.

Likewise, wireless repeaters allow a link between networks physically separated by several kilometers.

SWD

SWD

Managed Fast Ethernet Switch (DIN rail)

Description

SWD is the best choice for Ethernet LAN's that are to be deployed under the most stringent EMC environments.

Features

Full Duplex Wired Speed switching core
In factory flexible configuration:
· Up to 8 Fast Ethernet ports with 2 Gigabit ports
Same features as SWT
Enclosure: DIN Rail mount

Options

Power supply:
· I: 20 Vdc – 75 Vdc
· II: (60Vdc - 360 Vdc) or (60Vac - 260Vac; 50/60 Hz)

Redundant Power supply

Flexible Fast Ethernet configuration:
· 10/100BaseT
· 100BaseFX

Accessories

Same accesories as SWT

Certifications

Same certifications as SWT

MSW

MSW

Unmanaged Fast Ethernet switch

Description

MSW is a compact 5 Fast Ethernet port switch intended for those applications that require a simple Ethernet connection. It is intended for industrial applications and electrical substations. Its LED's inform of the Fast Ethernet ports activity.

Accesories

· DIN rail mounting kit

Options

Power supply:
· I: (60 Vdc – 360 Vdc) or (60Vdc - 260 Vac 50/60 Hz)

Flexible Fast Ethernet configuration:
· 10/100BaseT
· 100BaseFX

URT

URT

IEC 61850 Micro Remote Terminal Unit

Description

uSysCom IEC-61850 micro remote terminal units are intended to allow Electrical Utilities a quick, easy, secure and cost effective IEC 61850 integration.

Features

Up to 16 integrated isolated digital inputs
Up to 8 integrated isolated digital outputs
Up to 2 integrated isolated analog inputs
1 Fast Ethernet port
1 serial async port (RS232/RS485) either for connecting an end device or for adding additional inputs/outputs modules.
1 serial console RS232 port – SRV
Direct integration with an IEC 61850 network
- · Logical nodes: LLN0, LPHD, GGIO
- · GOOSE's
- · Reports

SNTP client
Possibility of adding 2 additional inputs/outputs modules.
Management options (SNMP, CLI, https)
Firmware upgrade via https

Options

I/O integrated card types:
- · 16 digital input & 8 digital output
- · 16 digital input
- · 8 digital input & 4 analog input

Flexible Fast Ethernet configuration:
- · 10/100BaseT
- · 100BaseFX

Enclosure: Wall Mount & DIN Rail

Power supply:
- · I: 16 Vdc – 75 Vdc
- · II: (60Vdc - 360 Vdc) or (60Vac - 260Vac; 50/60 Hz)

Accesorios

· Digital Inputs / Outputs module
· Analog Inputs module card
· Ethernet cables
· Serial cables
· Fiber pigtails

Certifications

· CE Marked
· IEC 61850 Approved
· Designed for Electrical Substations

WLS

WLS

Wireless IEEE 802.11 Access Point & Repeater

Descripción

WLS is a family of products that allows both, the establishment of a Robust Secure Network (Access Point function) and the deployment of wireless links between different sites. It conforms with IEEE 802.11 protocol suite.

Features

1 Fast Ethernet port
1 IEEE 802.11 b/g/a radio
Virtual Access Point – multiple SSID
Authenticaction
- · Open System
- · Shared Key
- · IEEE 802.1x
- · WPA with RADIUS / Pre-shared key
- · WPA2 with RADIUS / Pre-shared key

Dynamic key exchange
- · EAP-MD5, EAP-TLS, EAP-TTLS, EAP-PEAP

Data Encryption
- · TKIP
- · AES

VLAN
Rapid Spanning Tree Protocol
Management options (SNMP, CLI, https)
Firmware upgrade via https Firmware upgrade via https

Options

Flexible Fast Ethernet configuration:
- · 10/100BaseT
- · 100BaseFX

Enclosure: Wall Mount & 19'' rack

Power supply:
- · I: 20Vdc – 75 Vdc
- · II: (60Vdc - 360 Vdc) or (60Vac - 260Vac; 50/60 Hz)

Accessories

· Antenna cables
· Antennas
· Special Enclosure (IP 67)
· Ethernet cables
· Serial cables
· Fiber pigtails

Certificaciones

· CE Marked
· Designed for Industrial Applications
· Designed for Electrical Substations

uSysCom offers a complete product range of PRIME networking devices that allow the development of a safe and robust telecommunication network that runs over the LV grid.

PBN

PBN

PRIME Base Node

Description

uSysCom PBN is a compact and robust PRIME Base Node especially designed for secondary substations or tranforming stations. It is able to manage up to 1000 PRIME service nodes.

Features

· Advanced coupling capabilities, being able to simustaneously transmit / receive information over the three phases.
· It can identify which LV phase a service node is connected to
· Advanced management features via snmp, http/https or UPRMMT
  · Physical layer diagnostic too
  · PRIME subnetwork topology management
  · PRIME protocol analyzer
  · Firmware upgrade of all ZIV PRIME network devices (multicast)

PSN

PSN

PRIME Service Node

Description

uSysCom PSN is a robust service node designed for metering applications whenever several electrical meters need to share a single PRIME connection.

uSysCom PMD can connect to multiple meters either via radio (IEEE 802.15.4) or via cable (RS-485 or ethernet)

Features

· Capability to multiplex 256 DLMS connections over a single PRIME connection
· Optionally, an IEEE 802.15.4 coordinator can be integrated
· Optionally, serial device server functionality can be included, allowing to simultaneously access a RS485 meter bus via a single PRIME connection and an ethernet link.

GPS

GPS

GPS Synchronizing Clock

Description

Synchronizing electronic devices with GPS allows for precise analysis of events that affect geographically diverse areas of the entire system.

The robust design makes GPS the ideal choice for harsh environments, such as electrical substations.

Features

GPS based
  · Supports active antenna , with short or open circuit detection.
  · L1 band, C/A code, 16 channels
  · Acquisition
    · Cold Start: 42 seconds
    · Warm Start: 38 seconds
    · Hot Start: < 8 seconds
2 Fast Ethernet port (only for IEC 61850 clock)
NTP/SNTP server (only for IEC 61850 clock
Different synchronizing channels
  · IEC 61850
  · IRIG-B; analog
  · IRG-B digital
  · Programmable time pulse: Pulses of configurable duration and frequency
  · High Precision Pulse Per Second
  · ASCII based protocols
Loss of synch alarm
Management options (CLI, https)

Options

IEC 61850 clock:
  · Flexible Fast Ethernet configuration:
    · 10/100BaseT
    · 100BaseFX

Display and configuration wheel
Enclosure: 19" rack

Power supply:
  · I: 16 Vdc – 75 Vdc
  · II: (60Vdc - 360 Vdc) or (80Vac - 260Vac; 50/60 Hz)

Accessories

· Antenna cables
· Antennas

Certifications

· CE Marked
· Designed for Industrial Applications
· Designed for Electrical Substations

URF

URF

Compact radio modem

Description

URF is a compact radio modem optimized for low range data transmission applications. It provides wireless connectivity to any device that has a RS-232 or RS-485 serial port.

URF works in the ISM frequencies – open usage – so there are no additional costs for the spectrum usage.

Options

· 433 – 434 Mhz: 10 mW output Tx Power (250 m)
· 868 – 870 Mhx: 10 mW output Tx Power (150m)
· Bluetooth class 1. 100 mW output Tx Power (100 m)

E2F

10/100BaseT to 100BaseFx

Description

This device converts any 100BaseTx Ethernet port signal into a fiber optic 100BaseFx signal. This can achieve longer connectivity distances and immunity to electrical disturbances. The E2F has an integrated isolated multirrange power supply to regenerate all the signals properly.

Options

C	Ethernet to Multimode fiber
M	Ethernet to Single mode fiber

F2F

Fiber –to-fiber Optic repeater

Description

When the fiber optic signal is weak, due to distance, the repeater regenerates the signal, allowing the total connectivity to span a much greater distance. It can also act as a medium change (from singlemode fiber to multimode fiber, from plastic fiber to multimode fiber, etc.). The F2F has an integrated isolated multirrange power supply.

Options

	C	M	P
C	MM-MM		
M	SM-MM	SM-SM	
P	PL-MM	PL-SM	PL-PL

S2F

S2F

Serial-to-fiber optic converter

Description

The adapter converts incoming signals from a serial port into fiber optic signals. These devices allow connectivity over greater distances than normal cables and are immune to electrical disturbances. The S2F has an integrated isolated multirrange power supply to regenerate all the signals properly.

Options

C	Serial to Multimode fiber
M	Serial to Single mode fiber
P	Serial to Plastic Fiber

DFU

Serial diffuser

Description

The DFU multiplexes a serial port into 4 or 8 different ports. All these serial ports can be selected as DB9 connectors or fiber optics (glass multimode or plastic). The 2DFU has an integrated isolated multirrange power supply to regenerate all the signals properly.

Options

	4/8 C	4/8 S	4/8 P
C	MM(I)-MM(4/8-O)		
S	DB9(I)-MM(4/8-O)	DB9(I)-DB9(4/8-O)	
P	PL(I)-MM(4/8-O)	PL(I)-DB9(4/8-O)	PL(I)-PL(4/8-O)

The precise synchronization of GPS Sync allows for accurate event analysis from data collected from various devices distributed throughout the network.

Standards and Type Tests

Insulation Test	**IEC 255-5**
Between Circuits and Ground	2kV, 50/60 Hz - 1 minute
Between Independent Circuits	2kV, 50/60 Hz - 1 minute
Surge Immunity Test	**IEC 61000-4-5**
Common Mode	4 kV; 1,2/50 µs;0.5 J
Differential Mode	2 kV; 1,2/50 µs;0.5 J
Fast Transient Burst Test	**IEC 61000-4-4 Class IV**
Power	4 kV±10%
Data	2 kV±10%
Test of Immunity to electromagnetic RF fields	**IEC 61000-4-3**
Amplitude Modulated	10 V/m
Pulse Modulated	10 V/m
Conducted Electromagnetic Field Disturbance	**IEC 61000-4-6**
Amplitude Modulated	10 V
Test of Immunity to Electrostatic Discharges	**IEC 61000-4-2 Class IV**
	15 kV±10%
Radio Frequency Emissivity	**EN 55011 Class B, EN 55022 Class B**
Electromagnetic Compatibility	**EN 61000-6-2; EN 61000-6-3; EN 61000-6-4**
Temperature	**IEC 255-6**
Operating Range	-40 ºC to +85 ºC
Storage Range	-50 ºC to +100 ºC
Relative Humidity	95% (non condensing)
Power Supply Dips and Interruptions	**IEC 61000-4-11**
	30% 500 ms
	60% 100 ms
	100% 10 ms
Vibration Test (sinusoidal)	**IEC 255-21-1 Class I**
Shock and Bump Test	**IEC 255-21-2 Class I**

All the models comply with the 89/336/CEE electromagnetic compatibility European directive.

CE

Accesories

Cables

Standard cables

· 4GL00970006 Flat serial cable DB9F - DB9M (1,5m long.)
· 4GL03000121 Antenna cable LMR200 (10m long.)
· 4GL03000141 Flat RJ45 STP CAT6 (3m long.)

Fiber Optics pigtails

· 4CZ05000010 Multimode Fiber MTRJ-MTRJ (2m long.)
· 4CZ05000011 Multimode Fiber MTRJ-SC (2m long.)
· 4CZ05000012 Multimode Fiber MTRJ-ST (2m long.)
· 4CZ05000013 Multimode Fiber MTRJ-LC (2m long.)
· 4CZ05000014 Multimode Fiber LC-LC (2m long.)
· 4CZ05000015 Singlemode Fiber LC-LC (2m long.)

Antennas

GSM/GPRS/UMTS/HSDPA antennas

· 4CZ03670002 Omnidirectional antenna 900/1800 (2dBi) - magnetic base
· 4CZ03670003 Directive antenna 900/1800 (12dBi) - for pole mounting
· 4CZ03670007 Omnidirectional antenna 900/1800/2100 (2dBi) - magnetic base
· 4CZ03670009 Omnidirectional antenna 900/1800 (2dBi) - for ceiling mounting

WiFi antennas

· 4CZ03630002 Omnidirectional indoor antenna (3,5dBi)
· 4CZ03630004 Directive outdoor antenna (12 dBi)
· 4CZ03630006 Directive outdoor antenna (14 dBi)
· 4CZ03630007 Omnidirectional outdoor antenna (15 dBi)

GPS antennas

. 4CZ03710001 Active GPS antenna for pole mounting (40dB)
. 4CZ03710003 Active GPS patch antenna (20 dB)

SFP Modules for expansion slots

· 4CZ07980001 SFP 1000BaseT
· 4CZ07980002 SFP 1000BaseSx, 850 nm, multimode, LC (distance 550 m)
· 4CZ07980004 SFP 1000BaseZx, 1550nm, singlemode, LC (distance 80 km)
· 4CZ07980005 SFP 1000BaseLx, 1310nm, singlemode, LC (distance 10 km)
· 4CZ07980006 SFP 100BaseFx, 1310nm, singlemode, LC (distance 10 km)
· 4CZ07980007 SFP 100BaseFx, 1310nm, multimode, LC (distance 2 km)
· 4CZ07980008 SFP 1000BaseLx, 1310nm, singlemode, LC (distance 40 km)

Other

· 4CZ07810001 DIN rail adapter

Training

µSysCom offers in site training to facilitate the understanding of the different technologies used in the products developed. Same way, there are also training courses about products configuration and management.

Assistance

µSysCom offers a high quality local support service wherever you are. In Spain, Brazil and U.S.A. it is directly offered by ZIV resources. For the rest of the world, there is a local partner network to offer support service.

Additionally, there are different permanent assistance services (24 hours /day, 365 days/year) for inmediate support

24 hour assistance for all ZIV products

24 h. Service for Brazil and South America

24 h. Service for U.S.A. and Canada

µSysCom

Technical assistance:	**677 551 536**
Sales Assistance:	**677 551 564**

Warranty

µSysCom warranty applies to all products delivered to customer from the time of delivery (at the moment the product leaves µSysCom promises, as indicated in the shipping documents).

Customer is responsible of notifying µSysCom of any faulty conditions as soon as they are detected. If it is determined that the new product defect is covered by the warranty, µSysCom will repair, or substitute the product at its own discretion to the customer at no charge.

Quality

µSysCom has ISO 9001and ISO 14001 certificates.

At µSysCom, we are highly commited to Quality with a Continuous Improvement Plan, based in Total Quality Policies.

www.usyscom.com

DIMAT

DIMAT ZV

DIMAT is located in Barcelona and since it was set up in 1967 it has been a leading designer and manufacturer of communications and networking solutions for power utilities.

DIMAT is a company of ZIV, whose headquarters are in Zamudio (Vizcaya) formed by a a group of companies with its own technology, that supply products and services to the electrical, energy, rail and telecommunications sectors.

This new general catalogue of DIMAT includes, from systems and equipment that have already demonstrated its efficiency and reliability, to the latest state-of-the-art equipment made with the most modern technologies and guaranteed by long design experience. They all represent a competitive offer that includes unique products developed with our own technology and in compliance with industry-leading reliability requirements.

Furthermore, as an indication of its innovative commitment, DIMAT has a highly qualified R+D team representing over 30% of the company staff, and is an active member of several recognized international organizations (CIGRE, IEC, IEEE…).

All this, supported by our clients, with installations all over the world, assures and explains why DIMAT is one of the world leaders in the field of telecommunication terminals for utilities, always setting up the path by introducing new products and technology.

Javier Osés
General Manager

OPU-1

OPU-1

Universal
Power-Line Carrier Terminal

Its modular design and

extensive features ensure a

perfect fit to every

user need

ar n an t n at r

The use of the most advanced technology in digital signal processing together with DIMAT's wide experience in digital and analog power-line carrier terminals have resulted in a highly flexible, robust and reliable Universal Power-Line Carrier terminal.

The modular design of the OPU-1 terminal and advanced features ensure a perfect fit to every user need. It can integrate a great variety of interfaces that allow the transmission of all type of services through high-voltage lines.

This modularity allows OPU-1 terminals to transmit analog, digital or both analog and digital channels simultaneously, including teleprotection if be the case.

When working with analog channels, the OPU-1 terminal can transmit one or two 4 kHz standard channels in each direction. The effective band of the channel can be used for the transmission of data at high speed, various VF telegraph channels, teleprotection signals or for a speech-plus service.

When working with a digital channel, the OPU-1 terminal can support two different digital modulation schemes (QAM or OFDM).

When using QAM, it offers a transmission rate of 81 kbit/s in a bandwidth of 16 kHz, in each direction. Thanks to the use of a built-in echo canceller, the transmission and reception bands can be superimposed, resulting in a total bandwidth of 16 kHz. A bandwidth of 8 kHz is also possible, single for superimposed bands or in each direction for non-adjacent bands.

With the OFDM digital modulation scheme, the OPU-1 terminal can support a maximum transmission rate of 256 kbit/s in a bandwidth of 32 kHz, in each direction.

The OPU-1 terminal can transmit in separated bands using different frequency slots in the same high-voltage line or even independent lines. In this case, an additional high-frequency line filter is required. Apart from frequency congestion solution, this additional filter allows special topology applications like Teed lines.

The digital user interface can be chosen from a number of different possibilities: Ethernet, G.703, V.35, V.11 and V.24/V.28.

One remarkable feature of the OPU-1 terminal is the automatic fall-back rate when there is unfavourable line noise and/or signal reflection conditions. When the line conditions improve, the transmission rate is automatically re-established. This feature can be disabled from the programming software if necessary.

Furthermore, the OPU-1 terminal offers the possibility of using the FEC (Forward Error Correction) built-in optional functionality when the link quality is unsatisfactory. The link quality measurement is based on the G.821 standard concepts.

When using the OPU-1 terminal for the interconnection of different line segments, a built-in Ethernet bridge selects the frames to be transmitted to the remote end, thus making a more efficient use of the communications channel. The terminal has an internal service channel that can be connected in cascade with the internal service channel of different OPU-1 links. This is a useful feature that makes the remote management of the OPU-1 terminals possible when not all of them have the possibility of connection to an IP network.

The OPU-1 terminals, furthermore, include an SNMP agent that makes it possible to remotely monitor them via IP network, from any management platform.

y at r

- Modular design
- Simultaneous transmission of analog and digital channels including teleprotection
- Frequency range of 36 kHz to 512 kHz (from 24 kHz to 1 MHz upon request)
- QAM or OFDM for best compromise between SNR, BW and transmission rate
- Independent bands to overcome congestion solution and special topology applications
- 10 ms internal latency in QAM mode
- Fully programmable (full coverage of the transmission frequency range with a single set of capacitors)
- Automatic fall back/increase rates
- Integrated optional Reed-Solomon FEC
- Integrated G.821 statistics
- Ethernet user interface with built-in bridge functionality
- Redundant power supply (optional)
- 1 or 2 standard 4 kHz channels in each direction plus a large variety of analog options: speech module, asynchronous programmable modem, synchronous and asynchronous configurable modem, 2 or 4-command teleprotection system using tones in a 4 kHz or 2 kHz bandwidth, digital transit filter, input an output combiner, etc.
- 81 kbit/s in 16 kHz bandwidth (QAM) plus an optional internal TDM multiplexer
- 256 kbit/s in 32 kHz bandwidth in each direction (OFDM)
- 20, 40 or 80 W PEP, shared between the analog and digital channels
- Compact 19"/9 s.u. shelf for 20 W and 40 W
- An additional 19"/3 s.u. shelf for 80 W or an extra line filter
- SNMP agent
- Web Management system with LAN connection
- Cascaded internal service channel
- IRIG-B port for GPS time synchronization
- Chronological register (1000 alarms and events) with 1 ms resolution

OPC-2

Multi-function platform

A simple and reliable solution for PLC networks with frequency congestion

The OPC-2 is a highly flexible platform that is conceived with a dual purpose: Power-Line Carrier functionality or, alternately, Narrow-Band High-Frequency Teleprotection functionality.

The required OPC-2 functionality is established by simply configuring some microswitches in the management & process unit and line filter modules.

The output power (20, 40 or 80 W P.E.P.) determines the OPC-2 platform version. 20 W and 40 W versions are integrated in a single 6 s.u. shelf, while an additional 3 s.u. shelf is required in 80 W versions.

All OPC-2 versions can be equipped with a redundant power-supply module.

r n arr r n t na ty

The Power-Line Carrier functionality is a well-proven, cost effective solution to enable electrical power utilities to use high-voltage lines to transmit different types of information (telecontrol data, speech and teleprotection signals) over long distances, using one or two standard 4 kHz channels in each direction.

A large variety of optional modules can be added to an OPC-2 platform with PLC functionality. Examples include: a speech module, a 2 or 4-command teleprotection system, an asynchronous programmable modem, a digital transit filter and an input/output combiner. When equipped with the optional synchronous and asynchronous configurable modem, the effective band of the channel can be used exclusively for transmission of synchronous or asynchronous data at a speed of up to 28.8 kbit/s.

r t t n n t na ty

The High-Frequency Teleprotection functionality enables electrical power utilities to transmit teleprotection commands between protection relays over high-voltage lines in a single 4 kHz bandwidth, using 2 kHz for transmission and 2 kHz for reception.

The OPC-2 platform allows three nominal transmission times to be programmed. The system meets the security and dependability requirements specified in IEC 60834-1 Recommendation for the three types of teleprotection command schemes: Permissive tripping schemes, Intertripping schemes (Direct or transfer tripping) and Blocking protection schemes.

y at r

· Intelligent bandwidth use
· A single 6 s.u. shelf for 20 or 40 W
· Single side-band (SSB) with suppressed carrier
· Frequency range of 36 kHz to 508 kHz
· Fully programmable (full coverage of the transmission frequency range thanks to the set of capacitors)
· IRIG-B port for GPS time synchronization
· Chronological register (1000 alarms and events) with 1 ms resolution
· Web Management System with LAN connection for both functionalities
· Internal channel for end-to-end supervision
· Redundant power supply (optional)
· 3 programmable alarm relays and 1 relay per power supply

a at n ara t r t

· Versions for data transmission (D-type) or for speech-plus transmission (T-type)
· Single and twin-channel versions
· Erect or inverted, adjacent or non-adjacent programmable bands
· Available band of 300 to 3850 Hz with pilot tone out of band
· Service telephony channel
· Optional modules:
- Asynchronous programmable modem
- Synchronous and asynchronous configurable modem
- 2 or 4-command teleprotection system by tones for a 4 kHz bandwidth
- 2 or 4-command teleprotection system by FSK channels for a 4 kHz bandwidth
- Speech
- Digital transit filter
- Input/Output combiner
· Meets International Recommendation IEC 60495, regarding PLC equipment

a at n ara t r t

· 2-command and 4-command versions
· Only one standard 4 kHz channel (2 kHz for Tx and 2 kHz for Rx) is needed
· Guard and command frequencies located in the 300-2000 Hz band
· High dependability and extremely high security
· Meets Recommendation IEC 60834-1 regarding teleprotection systems
· Intended for blocking, direct tripping and permissive tripping schemes as well as for telesignalling
· Three programmable nominal transmission times depending on application
· From 1 to 4 command inputs (optocoupled)
· From 1 to 4 command outputs by solid-state relay, with voltage-free contact and current limitation

A single platform with two applications: Power-Line Carrier functionality (telecontrol data, speech and teleprotection signals) or Narrow-Band High-Frequency Teleprotection functionality

OPL-1

OPD-2+

Compact Analog Power-Line Carrier Terminal

r a ty an r tn

The OPL-1 analog Power-Line Carrier terminal is an extremely compact equipment where all the basic operating elements are contained in only four main modules.

The basic terminal has one standard 4 kHz channel with an output power (PEP), measured at the coaxial-connector output, of 20 W or 40 W.

The twin-channel version of the OPL-1 terminal can be supplied on demand, the use of both channels having to be specified.

Both types, single-channel and twin-channel, allow teleprotection commands proceeding from an external analog teleprotection unit to be transmitted.

As far as optional equipment is concerned, apart from the speech module and the external analog teleprotection unit, an asynchronous programmable narrowband modem can be added to the OPL-1 terminal. Furthermore, an AF transit option can be configured from the Management System.

y at r

- Compact design
- A single 5 s.u. shelf
- 20 W or 40 W PEP
- Single side-band (SSB) with suppressed carrier modulation
- Single-channel and, optionally, twin-channel
- Frequency range of 40 kHz to 500 kHz
- Fully programmable (full coverage of the transmission frequency range thanks to the set of capacitors)
- 3 programmable alarm relays
- IRIG-B port for GPS time synchronization
- Chronological register (1000 alarms and events) with 1 ms resolution
- Internal channel for end-to-end supervision
- Local management system based on a Web interface
- Integrated options: speech, AF transit and an asynchronous programmable modem
- Optional external analog teleprotection unit
- Optional external connection by means of cabinet-mounting terminal blocks

Digital Power-Line Carrier Terminal

t n t a an t ana y t

The DIMAT OPD-2+ system is the result of the combination of the well-proven OPC-2 terminal together with a high-performance digital multiplexer. Thanks to that, the DIMAT OPD-2+ makes the most of the advantages of the voice and data multiplexing in the 4+4 kHz or 8+8 kHz bandwidth of the single or twin-channel analog PLC's.

There are two models of the OPD-2+ terminal, single-channel and twin-channel, with a range of output power of 20, 40 or 80 W PEP.

OPD-2+ single-channel terminals can be equipped with up to four ports, two for data and two for voice, with a transmission speed of up to 31.2 kbit/s in total.

OPD-2+ twin-channel terminals can be equipped with twice the ports of the single-channel terminal, with a transmission speed of up to 31.2+31.2 kbit/s, or even with the ports of the single-channel terminal plus one 4 kHz analog audio channel, for the cases on which digital signals and analog signals have to be transmitted in the same link.

The OPD-2+ can also be equipped with a built-in teleprotection system of up 4 commands.

y at r

- Built-in multiplexer for voice and data
- 20 W, 40 W and 80 W PEP
- Frequency range of 36 kHz to 508 kHz
- QAM modulation combined with single side-band modulation with suppressed carrier modulation
- Fully programmable (full coverage of the transmission frequency range thanks to the set of capacitors)
- Erect or inverted, adjacent or non-adjacent programmable bands
- 31.2 kbit/s in single-channel terminals and 31.2 kbit/s + 31.2 kbit/s in twin-channel terminals
- IRIG-B port for GPS time synchronization
- Chronological register (1000 alarms and events) with 1 ms resolution
- Web management system with LAN connection (the management of the multiplexer functions is carried out locally and by means of a Windows-based software)
- Internal channel for end-to-end supervision
- Redundant power supply (optional)
- 3 programmable alarm relays and 1 relay per power supply
- Optional built in teleprotection system of up to 4 commands

OPD-1

MAFP y MQBT

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Digital
Power-Line CarrierTerminal

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Digital Power-Line Carrier technology provides high performance against channel impairments, high traffic-handling capacity, and easy integration into existing analog Power-Line Carrier networks. It represents a simple and reliable solution to the increasing demand for communication channels in power utilities and to the problem of frequency spectrum congestion of Power-Line Carrier networks.

DIMAT OPD-1 terminals have a gross bit rate of 81 kbit/s, being 79 kbit/s available for the user.

The base configuration of the OPD-1 terminal includes two ports: one for synchronous data at a maximum transmission speed of 72 kbit/s, and the other for asynchronous data at a maximum speed of 14400 bit/s.

The number of available ports can be increased to a maximum of 11 using an optional internal multiplexer. This consists of up to three additional modules with up to three ports each. These ports can be either for speech or data, providing maximum flexibility for each customer.

Upgrade options include a built-in teleprotection system of up to 4 commands that does not reduce the transmission capacity.

y at r

· Frequency range of 40 kHz to 500 kHz
· QAM with Trellis coding modulation
· Fully programmable (full coverage of the transmission frequency range thanks to the set of capacitors)
· Superimposed or non-adjacent 16 kHz transmission and reception bands
· Programmable at 3 different gross bit rates: 81 kbit/s, 40.5 kbit/s and 27 kbit/s
· 79 kbit/s, 39.5 kbit/s or 26.3 kbit/s fully available for the user
· 10 ms internal latency and of 15 ms with internal multiplexer
· Local management system based on a Web interface and optional Web management shelf with LAN connection
· Internal channel for end-to-end supervision
· Service telephony channel
· 4 programmable alarm relays
· Optional modules:
 - Built-in multiplexer for up to 9 speech and/or data ports
 - Teleprotection system of up to 4 commands

The MAFP is an asynchronous narrowband modem with frequency-shift keying (FSK) modulation for the transmission of data at speeds of 50 to 1200 Bd. The technology used in the MAFP modem is based on digital signal processing and allows the transmission speed and central frequency of each channel to be programmed by the user. The MAFP modem is capable of operating at 1200 Bd in superimposed band and, in this way, share the channel of the PLC terminal with speech frequencies up to 2000 Hz and with a DIMAT teleprotection terminal working with a guard frequency of 3800 Hz. The data interface complies with specifications V.24 and V.28 of the ITU-T and RS-232C of EIA.

The MQBT is a modem with a programmable modulation scheme, capable of operating with frequency-shift keying (FSK) modulation according to Recommendations V.23 and V.21 of ITU-T, as well as with multi-level modulations (DPSK, QAM and TCM) according to Recommendations V.34, V.32bis, V.32, V.22bis and V.22 of ITU-T. It can transmit synchronous or asynchronous data at a speed of up to 28800 bit/s in line. It has two types of interface: V.24/V.28 of the ITU-T (with one clock for emission and another for reception) and V.11 in accordance with standard ISO4903 (a single clock).

MAS-2

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The MAS-2 modem consists of a shelf that is one standard unit (s.u.) in height and 19" in width, incorporating a single-printed modem board type MAFP. The said modem board can be inserted in MDD-2 shelves, allowing up to 14 boards to be installed.

DIMAT also has additional terminals for Power-line Carrier Systems

NRTR

Ability to build any network topology over a wide variety of interfaces.

Real time router especially suited for telecontrol transport services

NRTR equipment is a real time router that uses proprietary technology allowing to manage any network topology and is not restricted to the use of specific topologies such as rings, stars or trees, and therefore the configuration of the network can be most suitable for the requirements of companies.

NRTR equipment also supports a proprietary operating mode (TRAME).

The routing procedure used by the NRTR adapts automatically to changing topological conditions. In the case of a link failure, the network can automatically re-route the data.

The NRTR has different interfaces that allows links of different types and speeds, both analog and digital, to be integrated into a single network.

In both operating modes, the NRTR is capable to accept clients for many standard and legacy telecontrol protocols, such as: IEC 870-5-101, IEC 870-5-104, DNP 3.0, Vancomm, Mobdus, and Optomux. A built-in 104-101 Gateway enables the NMS (Network Management System) to manage a RTU based on 101 protocol as it was a RTU running 104 protocol.

In order to fulfil security and reliability requirements, our proprietary link protocols, in addition to those already present in standard routers, are specially developed to be deployed over owned or hired transport resources, including analog communication channels, and across existing network structures using PDH/SDH or LAN.

The NRTR equipment has the standard routing protocols (OSPF, RIP), as well as a proprietary routing protocol to support highly meshed networks, multipath and load balance.

In propietary operating mode, data management is carried out in accordance with the priority assigned to them by the user. The different equipment organise queues of packets according to priority, which ensures that packets of greater priority suffer less delay.

y at r

- Ability to build any network topology
- Automatic adaptability to topological and traffic changes
- High immunity against electromagnetic disturbances
- Proprietary integrated network supervision / SNMP V1, V2c and V3 agent
- High degree of data integrity
- Built-in Gateway 104-101 service
- Standard routing protocols (OSPF, RIP) and a proprietary routing protocol (to support highly meshed networks, multipath and load balance)
- Proprietary link protocols, in addition to those already present in standard routers, to be deployed over owned or hired transport resources
- Up to 8 priority levels (TRAME proprietary operating mode)
- Supports hot-swap
- Available interfaces:
  - Local area network interfaces type Ethernet at 10/100 Mbit/s, with electrical or optical interface
  - Low-speed line serial interfaces (V.24/V.28, V.24/V.11, V.35, EIA-530-A, V.36 and X.21)
  - Medium and high-speed line serial interfaces (G.703 at 64 kbit/s, G.703 at 2 Mbit/s)

NRTR interfaces

TPU-1

Universal Teleprotection Terminal

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a at n r ty

The modular design of TPU-1 terminals allows the use of different types of modules according to teleprotection needs of each application. This modularity allows TPU-1 terminals to manage one or two digital and/or analog channels. In cases where the TPU-1 terminal manages two channels, it can be configured to operate as two independent teleprotection terminals (in a single shelf) or one teleprotection with main and back-up channels.

TPU-1 terminals operating in analog channels can transmit and receive up to four teleprotection commands. TPU-1 terminals configured to operate in digital channels (with electrical or optical interface) enable two-way transmission of up to eight teleprotection commands. An input logic that allows the command transmission process to begin can be established using an AND or OR combination of up to sixteen inputs, and on the other, establish the output logic for each command received.

TPU-1 terminals are IEC 61850 compatibles, so communication between a TPU-1 and a protection device inside a substation can be carried out according to this standard (GOOSE messages). However, if a protection device is not compatible with IEC 61850 standard, TPU-1 terminals can also communicate with it using analog protection interfaces (optoisolated inputs and solid-state relays).

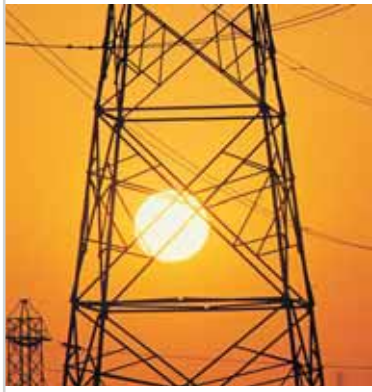
One outstanding feature of the TPU-1 termina is that it can transit the received information towards another terminal being possible, for example, connect various TPU-1 terminals in a ring configuration or in T (Teed-line).

The TPU-1 terminals, furthermore, include an SNMP agent able to send notifications (unsolicited information spontaneously transmitted) about alarms and events of the terminal to the devices specified by the user, and this makes it possible to monitor the TPU-1 terminal from an SNMP management application, such as, HP Openview.

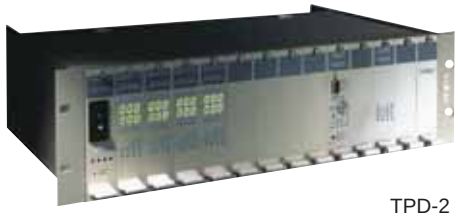
All variables of the TPU-1 terminal that can be monitored are to be found in the MIB of the terminal, which can be integrated into the management platform.
TPU-1 terminals comply with ANSI C37.90.1 and ANSI C37.90.2 standards.

y at r

- Modular design
- Extremely high security and dependability
- Compatible with IEC 61850 standard
- Complies with ANSI C37.90.1 and ANSI C37.90.2 standards
- Complies with IEC 60834-1 standard
- SNMP agent
- Operates in analog and/or digital channels
- Up to four commands in analog channels; Power-Line Carrier links, telephone cables, radio links, etc.
- Up to eight commands in digital channels; E1/T1 interfaces (G.703), 64 kbit/s (G.703, V.11 or V.35 or X.21) and 64 kbit/s with optical interface
- Input and output logic programmable by the user (up to sixteen analog inputs and outputs and up to sixteen inputs and outputs in accordance with IEC 61850 standard)
- Can be used for blocking, direct and permissive tripping schemes as well as for telesignalling systems
- Two independent teleprotection terminals or one terminal with a main and a back-up channel
- Command transits in a ring and in T (Teed-line)
- IRIG-B port for GPS time synchronization
- Synchronization via Ethernet using the NTP protocol
- Chronological register (1400 alarms and events) with 1 ms resolution
- Web management system with LAN connection
- Internal channel for end-to-end supervision
- Signalling and alarm relays programmable by the user
- Additional optional features like LCD screen for command-counters, power-supply redundancy, shielded cables for cabinet-mounting terminal blocks, etc.



The DIMAT teleprotection terminals provide an optimal combination of security, dependability and transmission time



TPD-2

TPC-2

Digital Teleprotection Terminal

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TPD-2 permits two-way transmission of up to 8 independent and simultaneous teleprotection commands, through electrical (G.703, V.11 and V.35) and optical digital channels. Each command can be programmed independently for direct trip, permissive trip or blocking applications, as well as for telesignalling.

TPD-2 terminals can manage two simultaneous line interfaces to enhance dependability: a main line and an alternative backup line, in case a fault occurs on the main line.

y at r

· Modular design
· Extremely high security and dependability
· Transmission of up to 8 independent and simultaneous commands
· 32 kbit/s, 64 kbit/s or 2 Mbit/s transmission speed with electrical interfaces and 64 kbit/s with optical interface
· Possibility of managing a back-up line interface
· Two 0 to 999 counters per command, one for transmission and one for reception
· Two inputs per command, optoisolated, with decision logic programmable by the user
· One solid-state output relay per command, with voltage-free contact and current limitation
· One command-transmission signaling and one command-reception signaling per command
· 4 programmable alarm relays
· Internal channel for end-to-end supervision
· Local management system based on a Web interface and optional Web management system with LAN connection

Analog Teleprotection Terminal

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DIMAT's highly secure analog teleprotection terminal is designed to be used with any analog transmission channel such as Power-Line Carrier links over high-voltage lines, telephone cables, radio links...
It is designed and developed according to the IEC 60834-1 Recommendation for teleprotection systems.

TPC-2 terminals can be equipped to transmit and receive two or four commands. These commands can be used for blocking, permissive and direct tripping teleprotection schemes, achieving in each case an optimal combination of security, dependability and transmission time.

y at r

· High dependability and extremely high security
· Meets Recommendation IEC 60834-1 regarding teleprotection systems
· Intended for blocking, direct tripping and permissive tripping schemes as well as for telesignalling
· Compatible with the transmission of speech and data across the same channel
· 2-command and 4-command versions
· Three programmable nominal transmission times
· Two 0 to 99 counters per command, one for transmission and one for reception
· One input per command, optoisolated
· One solid-state output relay per command, with voltage-free contact and current limitation
· One command-transmission signaling and one command-reception signaling per command
· Optional IRIG-B port for GPS time synchronization
· Internal channel for end-to-end supervision
· Local management system based on a Web interface and optional Web management system with LAN connection

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DIMAT technically qualified personnel can provide both preventive and corrective maintenance to the complete product range.

a r

DIMAT Service in Spain is provided through our regional offices in Andalusia, Aragon, Catalonia, Madrid, Canary Islands and Basque Country. Also, telephonic assistance is provided on a permanent basis (24 hours /365 days).

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DIMAT provides high quality international customer service, either through own personnel (Brazil, United States and Canada) or an extensive network of local collaborators in other countries. In addition,several telephone service numbers are provided for immediate assistance (24 hours/ 365 days)

24 hour assistance in Brazil and South America

24 hour assistance in USA and Canada

DIMAT

Technical assistance:	**677 551 589**
Purchasing contact:	**931 930 338**
Sales contact:	**931 930 337**

Warranty

All new DIMAT products sold to customers are warranted against defects in design, materials, and workmanship for a period of two years from the time of delivery (at the moment the product leaves DIMAT premises, as indicated in the shipping documents).

Customer is responsible of notifying DIMAT of any faulty conditions as soon as they are detected. If it is determined that the new product defect is covered by the warranty, DIMAT will repair, or substitute the product at its own discretion to the customer at no charge.

a ty

Each product of DIMAT is subjected to rigorous quality controls to guarantee customer satisfaction.

At DIMAT , we take quality as seriously as our users. Our quality management program aims to bring you industry-leading quality in our products and services.

DIMAT is ISO 9001 certified. Quality is built into our products every step of the way.

http://www.dimat.com

24 hour assistance for all products

PLC

PLC coupling

Since its begining in 2004, PLC the coupling division of DIMAT, has designed and manufactured new, more adaptable couplers for high voltage lines. PLC is an active participant in both national (MATELEC) and international events (CIGRE).

Within the working group WP1 of the OPERA project on phases 1 and 2, PLC has participated in the development of inductive and capacitive couplers for the transmission of wide-band PLC signals over underground and overhead lines.

PLC has developed the DPF Fault Circuit Indicator system via PLC in response to the continuous efforts of electrical power utilities to improve the quality of service, and in particular to reduce interruption times of the electrical power service.

The DPF System major innovation is the integration of Powerline Communications (PLC) technology. The use of the shield in the distribution cables as a transmission medium makes the communication system independent from the network topology changes produced by the distribution requirements, and offers a PLC intercommunication path between transformation centers.

José Antonio Moreno
General Manager

The main objective of the DPF Fault Circuit Indicator is to be used by electrical power utilities for intelligent and rapid physical location of the sections under fault in the event of temporal or permanent shortcircuits in their distribution systems

DPF-4

SCXI

a t r t n at r y t r

The Fault Circuit Indicator System based on DPF units is suitable for the detection and location of short-circuit currents in underground medium-voltage distribution systems.

This system developed by PLCoupling uses Powerline Communications (PLC) technology to transmit the information of the transformation centres where the fault current has been detected to the control centers, using the shields of the cables of the network as a physical medium for the transmission.

The Stand Alone Model DPF-3 version connects to a GPRS transmitter where the narrow-band PLC technology cannot be used. It is also possible to connect via a wideband PLC modem using RS-232C to Ethernet converters.

The DPF-4 version includes a PLC modem that works in Band A CENELEC (EN 50065A).

The DPF unit programmed as master recognizes the identification of its slaves (DPF-4) connected via PLC, and pools them to find out whether the settings have been exceeded. The detection of the short-circuit current by the slaves enable fast location of the section under fault providing fast restoration.

y at r

- Detection of short-circuit currents between phases and phase-to-earth in non-isolated neutral networks
- Use in underground MV power lines
- Location of the fault between 15 s and 30 s (PLC System)
- Up to 16 slaves controlled by the master (PLC System)
- Metering inputs: 3 per Fault Circuit Indicator (one for each phase) protected. (Optional: 2 phase sensors and 1 zero-sequence sensor)
- Detection currents: programmable between 4 A and 850 A
- Power supply: 220 VAC. Lithium battery of 3.6 V (service life: 10 years min.)
- Configuration of Fault Circuit Indicator operating mode by DPFGUI management software
- Other programmable parameters: tests, load trend, internal battery activation time, etc.
- Status monitoring of external signalling outputs and of the fault, alarm and events logging in real time by DPFGUI management software
- Interface RS-232C or RS-422 optional for connection to PC or external GPRS/GSM modem
- 3 optoisolated outputs for power-supply alarm, battery and exceeded alternative current threshold signalling
- 1 optoisolated output for zero-sequence or phase-to-phase fault indication
- 4 auxiliary optoisolated inputs

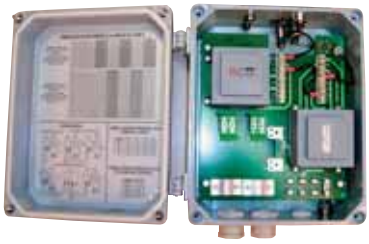
rr nt n r

Current measurement core suitable for underground medium-voltage cables.

y at r

- Easy to install
- Suitable for shielded cable of 50 mm maximum diameter
- Minimum saturation current of 1000 A
- Dynamic thermal current of 20 kA (EN 60044-1)
- Transformation ratio of 500:1

UAPA-1



UAM-4

a ta n t nn nt

The UAPA-1 line-tuning unit is based on the field proven UAM coupling device family.

Given its great adaptability, it can be configured with band-pass or high-pass filter structure, providing optimum adjustment according to bandwidth and line parameters requirements.

Depending on the model, the UAPA-1 can also be configured with or without a differential transformer, acting as a hybrid circuit. In this way, a phase-to-phase coupling is obtained using only two units connected through the differential transformer included in one of them.

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- Designed according to IEC 60481 standard
- Insulation higher than 10 kVrms
- Frequency range of 40 to 500 kHz
- Nominal power (P.E.P.) of 400 W
- Equipment-side nominal impedance of 50 and 75 Ω (other values on request)
- Line-side nominal impedance selectable between 100 and 600 Ω for phase-to-earth coupling
- Distortion and intermodulation: 80 dB below the level corresponding to the nominal power (P.E.P.)
- Return loss higher than 12 dB
- Composite loss lower than 2 dB
- Operates with coupling capacitors of 2 nF to 10 nF
- Optional line connection at the bottom of the chassis.
- Available models:
  - · UAPA-1/B: Band-pass.
  - · UAPA-1/A: High-pass or Band-pass.
  - · UAPA-1/H: Band-pass and Differential transformer.
  - · UAPA-1/HA: High-pass or Band-pass and Differential transformer.
- UAPA-1 coupling units with special application details can be developed upon request.

an a n t nn nt

The wide-band UAM-4 line-tuning unit fits a wide range of line impedances and is suitable for phase-to-ground and phase-to-phase coupling.

High insulation ensures the complete safety and protection of the users and the Power-line Carrier (PLC) equipment.

The functions accomplished by UAM-4 line-tuning units are:
· Tuning of coupling capacitor
· Impedance matching between power line and PLC equipment
· Draining to earth of power frequency current
· Limitation of incoming voltage surges from the power line
· Earthing of the coupling device for protection purposes during maintenance operations

A single line-tuning unit is used for phase-to-earth coupling. Another line-tuning unit plus a differential transformer are required for phase-to-phase coupling.

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- Designed according to IEC 60481 standard
- Frequency range of 40 to 500 kHz
- Nominal power (P.E.P.) of 400 W
- Equipment-side nominal impedance of 75, 125, 150 and 250 Ω (other values on request)
- Line-side nominal impedance selectable between 25 and 750 Ω for phase-to-earth coupling
- Special models for underground cables
- Distortion and intermodulation: 80 dB below the level corresponding to the nominal power (P.E.P.)
- Return loss higher than 12 dB
- Composite loss lower than 2 dB
- Operates with coupling capacitors of 2 nF (or higher)

All the PLCoupling devices are designed to guarantee the highest safety and protection for personnel and communication equipment

PLCoupling performs specific measurements for the characterization of the overhead and underground lines to be used on PLC applications

CAMT

a a t n nt

CAMT coupling units for Powerline Communications over MV lines are highly compact, combining both the coupling capacitor and coupling circuit in the same device.

ESMC coupling units only include the coupling circuit for those cases in which a coupling capacitor is already available. The ESMC coupling unit can be designed according to each particular specification of the coupling capacitor.

Both devices maximize the communication bandwidth and optimize impedance-matching between the MV line and the PLC equipment. High insulation ensures the complete safety and protection of the users and the communications equipment.

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- Compact design
- No maintenance requirement
- High safety
- Phase-to-earth capacitive coupling
- Bandwidth from 2 to 38 MHz
- Three versions available of CAMT coupling units:
  - · 24 kV indoor
  - · 24 kV outdoor
  - · 36 kV indoor
- Special designs of ESMC units on demand; development of "tailor made" coupling units according to bandwidth and/or impedance requirements
- The CAMT units comply with the UNE 21333 standard and with the application parts of the IEC 60932 standard.

AIMT-2

n t n nt

AIMT coupling units for Powerline Communications over MV lines are wide-band, high-performance inductive couplers, especially designed for underground cables or overhead lines with protected cable.

Two versions are available, one for line currents up to 60 A and one for line currents up to 300 A. Both units include insulation elements to provide complete safety and protection to the users and the communications equipment.

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- Compact design
- Easy to install
- BNC connector included
- No maintenance requirement
- High safety
- Phase-to-earth inductive coupling
- Bandwidth from 1 to 40 MHz
- Average value of losses lower than 3.5 dB in the available band
- Low distortion
- Three versions available:
  - · For lines up to 60 A
  - · For lines up to 300 A
  - · For lines up to 300 A and use in AMR (Automatic Meter Reading) applications in CENELEC band, according to EN 50065.

AIBZ-1

n t n nt

The AIBZ coupling units are inductive couplers specially designed for transmission in the CENELEC band, according to EN 50065, by means of the MV-cable shields.

The AIBZ-1 type is used in AMR (Automatic Meter Reading) applications.

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- Compact design
- No maintenance requirement
- High insulation (3 kV/1 min)
- Inductive coupling by means of earth shield
- CENELEC band
- Insertion losses of 1.5 dB at 80 kHz

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PLC technically qualified personnel can provide both preventive and corrective maintenance to the complete product range.

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PLC Service in Spain is provided through our regional offices in Andalusia, Aragon, Catalonia, Madrid, Canary Islands and Basque Country. Also, telephonic assistance is provided on a permanent basis (24 hours /365 days).

24 hour assistance in Europe and Africa of the DIMAT products

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PLC provides high quality international customer service, either through own personnel (Brazil, United States and Canada) or an extensive network of local collaborators in other countries. In addition,several telephone service numbers are provided for immediate assistance (24 hours/ 365 days)

24 hour assistance in Brazil and South America

24 hour assistance in USA and Canada

DIMAT	
Technical assistance:	**677 551 589**
Purchasing contact:	**931 930 338**
Sales contact:	**931 930 337**

Warranty ZIV

All new PLC products sold to customers are warranted against defects in design, materials, and workmanship for a period of two years from the time of delivery (at the moment the product leaves PLC premises, as indicated in the shipping documents).

Customer is responsible of notifying PLC of any faulty conditions as soon as they are detected. If it is determined that the new product defect is covered by the warranty, PLC will repair, or substitute the product at its own discretion to the customer at no charge.

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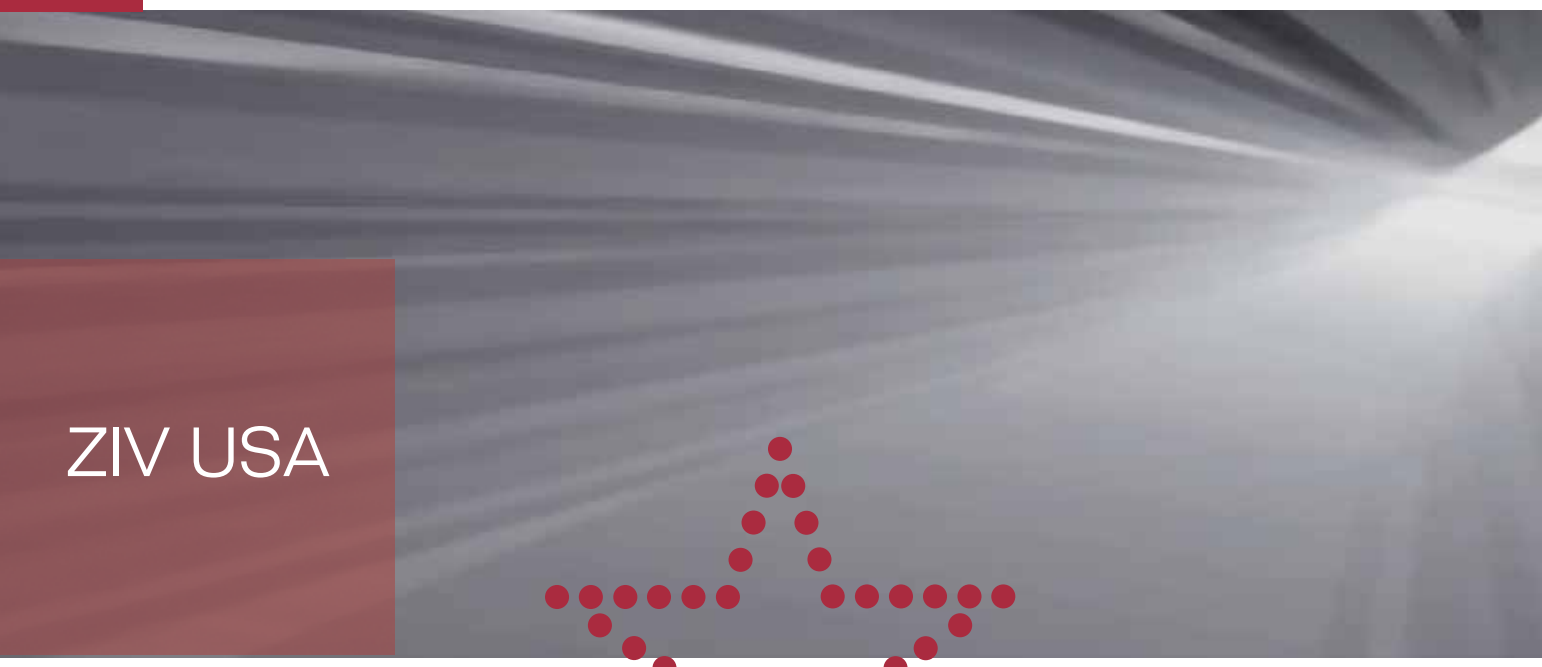
At DIMAT , we take quality as seriously as our users.
Our quality management program aims to bring you industry-leading quality in our products and services.

DIMAT is ISO 9001 certified.
Quality is built into our products every step of the way.

DIMAT is certified for the following field of activities:
The design and production of telecommunication equipment for information transmission over power lines. Switching equipment for control networks.

www.plcoupling.es

24 hour assistance for all ZIV products



ZIV USA

ZIV USA is steadily growing and servicing our customer through our representatives

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Since 1996, ZIV has been serving the North American market with a clear commitment to customer satisfaction. Our goal is to be our customers partner not just a supplier. In 1999, ZIV consolidated this commitment establishing ZIV USA Inc., with a specialized team of application engineers to provide local customer service and technical support to cover the needs of ZIV end-users, representatives and partners in the North American market.

To meet the demands of modern electrical systems ZIV focuses in developing innovative solutions with the flexibility to adapt the particular requirements of each client. Over a decade ago, ZIV introduced integrated Protection and Control Systems with substantial cost savings compared to traditional solutions.

In an effort to better serve customers, we continuously expand our team and product selection to provide complete substation systems, including protection, control, metering and communications, and engineering services. ZIV approach to system integration with modular components offer cost effective solutions for either complete installations or individual devices.

ZIV first-class production and test facilities, combined with an ISO-certified quality control program, guarantee a continuous stream of the best products the market has to offer. This commitment to quality is backed by industry leading guarantees.

Oscar Bolado
General Manager

ZIV Brasil

ZIV is steadily growing in the Brazilian market. The considerable amount of equipment installed proves the confidence of the utilities and the engineering companies in our Group.

ZIV do BRASIL Ltda.

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Assistência Técnica Permanente
ZIV
(021) 36028511
24h durante 365 dias ao ano

ZIV do BRASIL was incorporated in 1998 to meet the needs of the Brazilian market, supplying and servicing protection, control, metering and communication equipment manufactured by the companies integrated in the ZIV GROUP.

ZIV do BRASIL offers a line of products both flexible and adaptable to the different customer's requirements. A highly qualified professional team will be helping you to select the best solutions for your electric system.

We provide the most convenient and competitive solutions according to our customers' needs.

Our equipment is technologically advanced and is manufactured according to the most demanding quality standards

ZIV do BRASIL has a deep knowledge of the Brazilian Electric Power Network as well as the customer's expectations and has a total commitment to customer satisfaction.

Yolanda Urquizu
General Manager

R&D



ZIV I+D

Smart Energy Networks R&D Center


ZIV's Research, Development and Innovation center main objective is to provide its associated companies with the basic and applied technology required to contribute towards the company wide objectives of technological excellence, market leadership, quality, competitiveness, and continuous improvement in all the products and services of the group.

Established in the ENERGY sector , in ELECTRONICS and TELECOMMUNICATIONS areas, ZIV I+D Smart Energy Networks R&D Center expertise is the technology aimed at the development, improvement, optimization, safety and quality of the electric energy generation, transmission and distribution systems.

The main focus is on technologies that provide "intelligence" to the power systems: advanced sensors and actuators, intelligent electronics, networking and communication equipment, distributed processing systems, signal processing algorithms, transient measurement, forecast and detection, and energy management.

ZIV I+D Smart Energy Networks R&D Center Associated Companies position their range of products and services in these areas of expertise and are internationally acknowledged as suppliers of competitive and innovative products and solutions in Protection, Control, Metering, Automation and Communications. Our associates ensure that virtually all of our research effort is used in the creation of useful market ready products and applications.

Ricardo Orgaz
Project Manager

R&D

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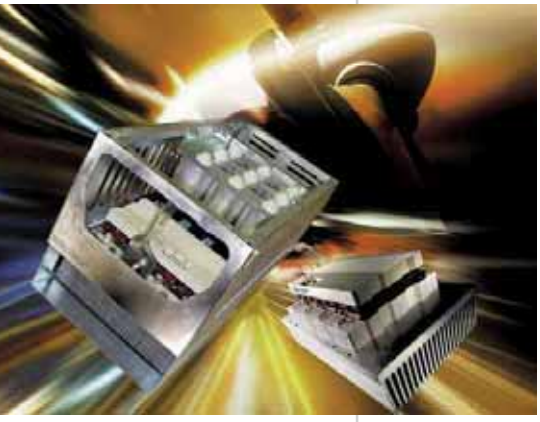
With specialized expertise as the main objective, I+D Smart Energy Networks R&D Center investigation focuses in the following scientific-technological areas and lines of research



- Electronic technologies (intelligent devices):
  - Embedded software
  - Real time Operating Systems
  - Hardware architecture
  - Electromagnetic compatibility
  - Non conventional sensors / Actuators
- Real time communication and data transmission technologies:
  - Communication / Security protocols
  - Access / Wireless / PLC
  - Synchronization
  - Networking
- Metering, data acquisition, remote control, regulation, automatic control, protection and teleprotection technologies:
  - Signal processing algorithms
  - Simulation / Modeling / Forecasting
  - Transients / Faults
- Distributed intelligence and management systems:
  - Operation, SCADA, and management at network level
  - Forecasting, energy efficiency, and quality of service
  - Cooperation between agents, applications, and services
  - System integration, interoperability, and security
  - Tools, configuration, adaptability
- New distribution networks:
  - Distributed generation / Microgrids
  - Demand response management
  - Power electronics
    - MV and HV components and applications
    - LV intelligent converters
- Ultra High Capacity Fiber Optic Communications
  - Access networks
    - PLC (Power Line Communication) solutions in LV grids
    - Fiber optic solutions (both active and passive)
  - Multiservice transport networks
    - BPL (Broadband PowerLine) solutions in MV grids
    - WDM fiber optic solutions

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Based on the research center strategic plan, the current research lines and the areas of major emphasis are:

- Hardware and software for intelligent devices.
- Platforms for local networks and remote access. Since 2006 the scope of this research line has been extended to include the technologies of broadband network access with multiservice protocols.
- Distributed intelligence and management systems. This line focuses in the field of automatic incident detection applications, electricity consumption management, and demand control.
- Intelligent sensors for electrical parameters.
- Innovations on Power Electronics.

an a t n

ZIV R+D's plan of action is outlined as follows:

- Specialization projects. Various specialization projects are executed within different knowledge areas
  - Cooperation projects
  - Cooperation agreements
    - University Departments
    - Cooperative Research Centers (CRC's)
    - European Centers
    - USA / Brazil centers
- Active participation in the European Commission FP7 networks and platforms.
- Exchange programs for specialized personnel.
- Active participation in technical forums and national and international standard bodies within the area of expertise.

a t an a rat r

ZIV R+D is located in the Bizkaia Technology Park in Zamudio, Building number 210. It is equipped with specialized laboratories, with all the necessary equipment for:

- Hardware and software development
- Analysis of communication systems and device
- Electromagnetic compatibility testing
- Simulation of system components, power systems, and power grids
- IEC61850 standard substation simulator
- Anechoic chamber for radiofrequency testing

ZIV Worldwide


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Tropic of Cancer

Equator

Tropic of Capricorn

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Cook Islands (NZ)

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C. African R.

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Ostrov Kotel'nyj (Russia)

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Queen Elizabeth Islands

Victoria Island

Baffi Bland

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Sard.

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Sicilia

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Howland I. (US)

Jarvis I. (US)

Midway Is. (US)

Johnston I. (US)

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Palmyra Atoll (US)

Wake I. (US)

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Curaçao (Neth.)

Netherlands Antilles (Neth.)

Cayman Is. (UK)

Jamaica

Haiti

Dominican Rep.

Bahamas

Cuba

Turks & C. Is. (UK)

Bermuda (UK)

Falkland I. (UK.)

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