AUTOMATION OF CRITICAL FACILITIES

IMPULSE

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OUR MISSION:
TO MAKE PROGRESS SAFE

History

• **1956 – 1991.** Development and supply of redundant fault-tolerant control computer systems based on M-6000, M-7000, SM-1M, SM-2M minicomputers.

• More than 20,000 systems were delivered to various industrial facilities and research centers.

• **From 1982** - the Main organization in the USSR for the production of instrumentation and control systems for nuclear power plants.

• **To 1991** instrumentation and control systems based on the SM-2M mini-computer were implemented at 22 NPP units.

• **1992 – 2000.** Creation of a family of ternary fault-tolerant microprocessor-based industrial controllers of the MSKU series and other components for building fault-tolerant control systems.

• **2001 – 2010.** The entire range of digital monitoring and control systems for VVER-1000 and VVER-440 reactors was developed.
About 200 I&C systems systems were manufactured and delivered to NPPs in Ukraine, Armenia, and Bulgaria.
Power supply panels for electrical centralization systems on railways were developed.
Beginning of development of railway automation systems (SZAT).

• **2011 – 2021.** Modification of the in-core monitoring system (SVRK) to control mixed fuel loads of TVSA and Westinghouse. Development and testing of the proprietary calculation code “ImCore”.

Development and supplies of:

- local and integrated diagnostic systems for reactor plants;
- turbine control and protection systems;
- control systems for backup diesel power plants;
- boron control systems.

Digital fault-tolerant NKU RTZO with diagnostic functions for electric drive valves were created.

Relay protection and automation equipment for power grids were developed and tested.

SRPA “Impulse” is the leader of the Ukrainian market of instrumentation and control systems (I&C) for critical infrastructure facilities

About 300 I&C systems were manufactured and commissioned at NPPs in Ukraine, Bulgaria, and Slovakia.

Finishing of development of:

- microprocessor interlocking system (MPC-U) and microprocessor centralized traffic control system (MDC-U);
- train separation on level-crossing based on digital rail circuits (MRC-U) and axle counting equipment (MSSO-U);
- of locomotive safety systems (SLB “ImproTRAIN-250”);
- wayside rolling stock diagnostic and monitoring system AKRO in the scope of Hot Box Detection & Hot Wheel Detection control functions and means for constructing hierarchical centralized structures.

About 100 systems of railway automation and telemechanics were manufactured and commissioned, including for the Sindel station (Bulgaria). SIL4 certificate was obtained for the software and hardware platform of the railway automation and telemechanics system.

Today

NPP I&C Systems direction

- Participation in the projects of the NNEGC «Energoatom» to improve the safety of NPP power units. Completion of projects financed by loans from the European Bank for Reconstruction and Development and EURATOM. Manufacturing and commissioning of the I&C Systems at Ukrainian NPPs.
- Modernization of the SVRK at 7 power units for mixed and new fuel loads based on ImCore and Beacon (Westinghouse).

Railway automation and telemechanics system direction

- Completion of a large-scale project for the manufacture and commissioning of centralized traffic control system for JSC «Ukrzaliznytsia», covering **1148** km of railway lines, including **122** stations, **267** open tracks/level crossings, **3466** points, **4725** traffic lights, **4304** track circuits.
- The next stages of supplies of microprocessor track circuits (2460 track circuits in total) for Estonian Railways under a contract with Siemens.
- Commissioning of the locomotive safety system at JSC «Ukrzaliznytsia», JSC «Lithuanian Railways», JSC «LTG Infra», JSC «LTG Link» and JSC «LTG Cargo» (Lithuania).
- Supply of **230** sets of AKRO-B to the facilities of JSC «Ukrzaliznytsia».

Future

NPP I&C Systems direction

Increase in sales volumes within the framework of reconstruction programs and lifetime extension of NPP power units by:

- launch of a new generation of digital innovative systems that provide redundancy technologies of different multiplicity “2 of 3” and “2 of 4”, as well as a significant reduction in the cost of cable systems and their installation through the use of digital low-voltage complete devices with built-in diagnostic tools for actuators;
- promotion of the SVRK-M2 to the markets of VVER reactors with alternative fuel;
- supply of the entire range of NPP I&C Systems for new units under construction in Ukraine and Europe;
- providing maintenance and life-cycle support services for operating systems.

Railway automation and telemechanics system direction

Expanding the market by:

- supply of developed products;
- release of new modifications of the MPC-U based on EULINX specifications with the integration of ERTMS/ETCS technologies;
- development and launch of a modern level crossing automation system;
- production of locomotive safety systems with integration of ETCS technologies and locomotive control systems;
- expanding the capabilities of AKRO-B with the functions of detecting wheel defects along the rolling circle, detecting dragging parts, and controlling the descent of rolling stock;
- production of static converters and distribution cabinets for providing and controlling the power supply of passenger cars.

Relay protection and automation direction:

- production of RZA equipment and systems based on it for use:
  - at thermal, nuclear and other power plants;
  - at substations and distribution networks of voltage classes up to 150 kV and above;
  - in power supply systems on railways, including AC and DC traction power supply systems;
- development and testing of Smart Greed class systems.

The company has certificates ISO 9001:2015, ISO 14001:2015, ISO 45001:2018.

The railway automation platform is certified in the EU for compliance with SIL4 level (according to CENELEC standards).

Relay protection and automation devices are certified for compliance with the IEC 61850 standard.

The company conducts innovative developments, improves existing products and develops new ones.

Branches and representative offices of SRPA “IMPULSE”

BRANCHES:

- Kharkiv,
- Netishyn,
- Sofia,
- Almaty.

REPRESENTATIVE OFFICES:

- EU (Pilsen),
- Baltic States (Vilnius),
- Tashkent.

SRPA “Impulse” is your reliable partner at all stages of the life cycle: from development to technical support of operation. We continue to offer the most innovative and advanced solutions for automation of nuclear power, railways and power supply systems. Our engineers always find the perfect solution for each individual application.

Close cooperation with the specialists of partner companies allows us to create the highest quality systems that meet the specifics of a particular automation object. Business partnerships are the basis for further development of products and services for the domestic and foreign markets.

ЕНЕРГОАТОМ

JSC «NNEGC «Energoatom»

State Nuclear Regulatory Inspectorate of Ukraine

SSTC NRS

State Scientific and Technical Center for Nuclear and Radiation Safety

Національний науковий центр «ІНСТИТУТ МЕТРОЛОГІЇ»

National Scientific Center “Institute of Metrology”

Institute for Nuclear Research of the National Academy of Sciences of Ukraine

Kozloduy NPP EAD

SLOVENSKÉ ELEKTRÁRNE

Slovenské elektrárne, a.s.

Ukrainian Power Machines JSC

ŠKODA JS

ŠKODA JS a.s., Czech Republic

JSC «Ukrzaliznytsia»,
Ukraine

State Enterprise
“National Railway Infrastructure Company”,
Bulgaria

JSC «Lithuanian Railways»,
Lithuania

JSC «Latvian Railways»,
Latvia

JSC «Estonian Railways»,
Estonia

Gigastroy Ltd,
Bulgaria

SVI S.P.A.,
Italy

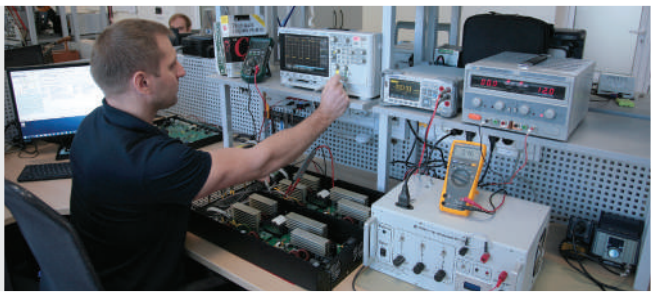
Frauscher Sensortechnik GmbH,
Austria

TTC MARCONI,
Czech Republic

AT SRPA “IMPULSE” ALL STAGES OF THE LIFE CYCLE OF I&C SYSTEMS HAVE BEEN REALIZED

Preparation of requirements

Development



Production

Testing

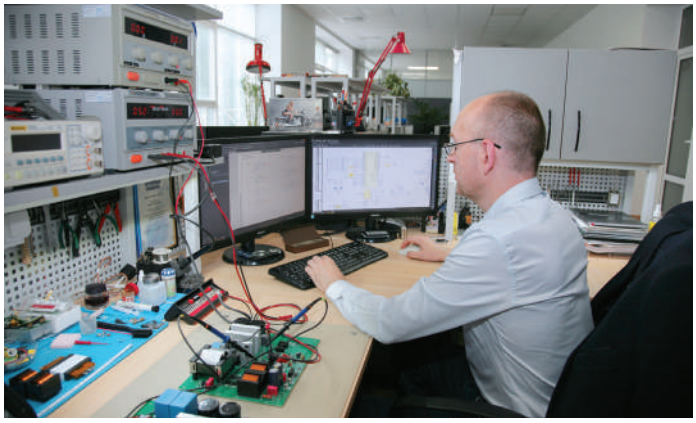
Commissioning

Maintenance of operation

RESEARCH AND DEVELOPMENT

The project management system covers all processes of development, production and commissioning.

New devices, design and programming tools are used.



PRODUCTION

I&C systems technical equipment is manufactured at a high-tech facility. We use the most modern equipment with numerical control.

Production processes are carried out in accordance with standards, quality assurance programs and product reliability.

HIGH QUALITY OF PRODUCTS

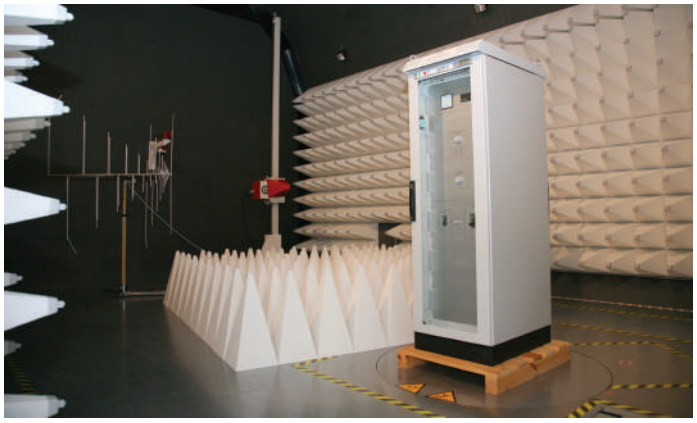
Verification and validation procedures are used in the development of products.

During manufacturing, quality control is carried out at all stages of the production cycle.

Suppliers of materials and components are carefully selected. The requirements of the quality system apply to suppliers and subcontractors.

The characteristics of the products are confirmed by research in the independent testing laboratory EUTEST, accredited for compliance with DSTU EN ISO/IEC 17025.

SRPA “Impulse” regularly invites independent experts from the IAEA, the European Bank for Reconstruction and Development, representatives of major customers to audit the development and production processes.



Special attention is paid to technical support

The Company provides:

- 24/7 engineering and technical support for the personnel of operating organizations;
- modifications, including replacement of obsolete and discontinued components to maintain the current technical level of equipment;
- performing warranty and post-warranty repairs with comprehensive testing to monitor the effectiveness of the work performed.

In cooperation with research and operating organizations, a I&C systems was created that surpasses similar systems used in the global nuclear power industry by many criteria.

The I&C systems ensures the performance of all functions important for the safety of NPP power units.

The report of the IAEA inspection mission cites positive characteristics of the I&C systems manufactured by SRPA “Impulse”: high level of development, production, testing and operation support, their compliance with the IAEA Safety Manual.

Fierce competition and positive experience of participating in joint projects with leading manufacturers motivate the specialists of SRPA “Impulse” to continuous growth, development and search for new solutions.

I&C SYSTEMS NPP REFERENTIALITY

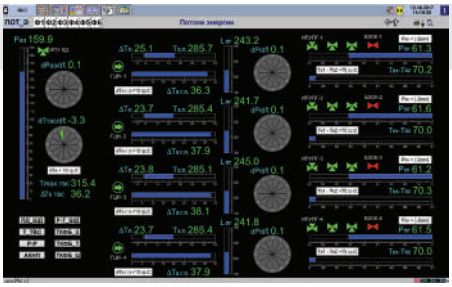
SYSTEM	FACILITY	POWER UNIT
Process information system (unit's upper level)	ZNPP KhNPP RNPP SUNPP	1-6 1, 2 1-4 3
In-core monitoring system	ZNPP KhNPP RNPP SUNPP	1-6 1, 2 1-4 1, 2
Neutron flux monitoring system	ZNPP KhNPP RNPP SUNPP Armenian NPP	1-6 1, 2 1-4 1-3 2
Control rod control system	ZNPP RNPP	1, 2, 6 1-3
Safety control system (technological)	ZNPP KhNPP	1-5 2
Automatic control system of safety control systems	KhNPP	2
Normal operation control systems for reactor and turbine divisions	ZNPP KhNPP	1-5 2
Automatic regulating system of a turbine division	ZNPP	1, 2
Turbine regulating system	ZNPP	1, 2
Standby diesel generator station automatic control system	ZNPP	1-6
Complex diagnostics system for equipment of a reactor facility's consisting of: • upper level KSD system; • in-reactor vibronoise diagnostics system; • free and loose items detection system in the primary coolant; • monitoring the leak of the first circuit coolant system; • vibration monitoring and diagnostics system of the main circulation pumps; • remaining lifetime diagnostics system of RU equipment; • pipelines displacement monitoring system.	ZNPP KhNPP RNPP SUNPP Kozloduy NPP	1-5 1, 2 1-4 1-3 5, 6

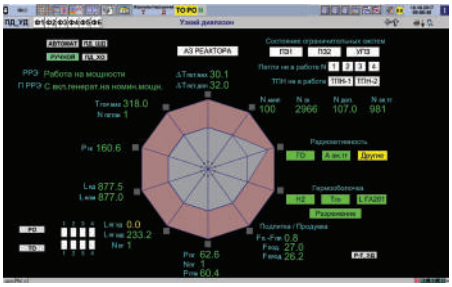
I&C SYSTEMS NPP REFERENTIALITY

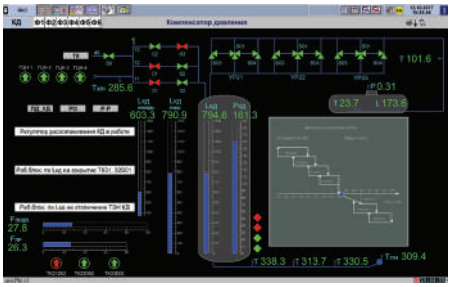
SYSTEM	FACILITY	POWER UNIT
Post-accident monitoring system for a reactor facility's	ZNPP KhNPP RNPP	1, 2 1, 2 1-4
System to monitor boron-10 isotope (boric acid) concentration	ZNPP KhNPP RNPP SUNPP Armenian NPP Mokhovce NPP	1-5 1, 2 1-3 1, 3 2 3, 4
System for register important operating parameter	ZNPP KhNPP RNPP	1-5 1, 2 1-4
Centre for technical support of operators in emergency situations	SUNPP KhNPP	3, 4 1, 2
Power unit safety control system based on hard logic	KhNPP	1, 2
Normal operation control systems of a power unit based on hard logic	ZNPP KhNPP	3, 4 1
Control rod drive system for software and hardware complex SGIU-M	KhNPP	1, 2
Protection system for start-up and standby transformers	SUNPP	1, 2

Process information system (unit's upper level)

Centralized power unit control system. Provides visualization, registration and documentation of process parameters in all power unit operating modes, control of critical functions and key safety parameters.





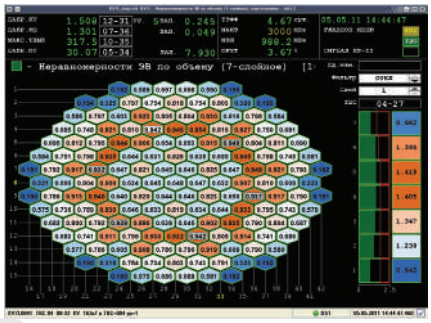


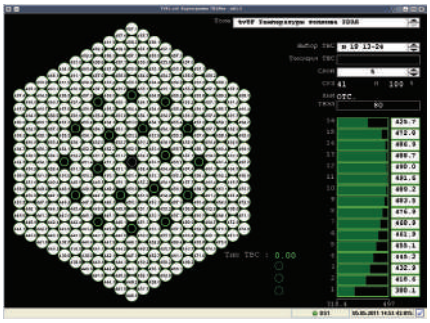
Process information system (unit's upper level) equipment, ready for supply

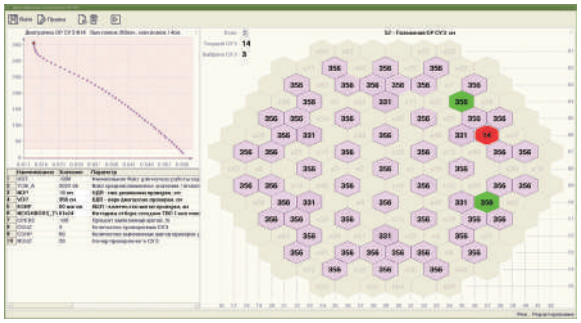
In-core monitoring system

It provides control of neutron-physical and thermal-hydraulic parameters of the first reactor circuit and information support to the operator. It monitors cores with TVS-WR fuel produced by Westinghouse, including cores with mixed loads.

In the SVRK-M2, the calculation of neutron-physical parameters of the core is implemented using two software packages: the national calculation complex ImCore (SRPA "Impulse") and "Beacon-TSM" (Westinghouse).

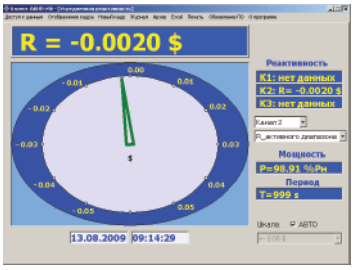


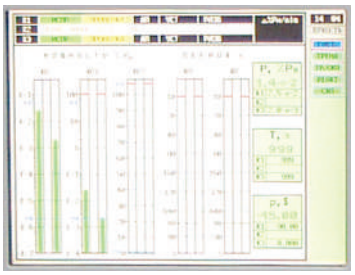




Neutron flux monitoring equipment AKNP-IF

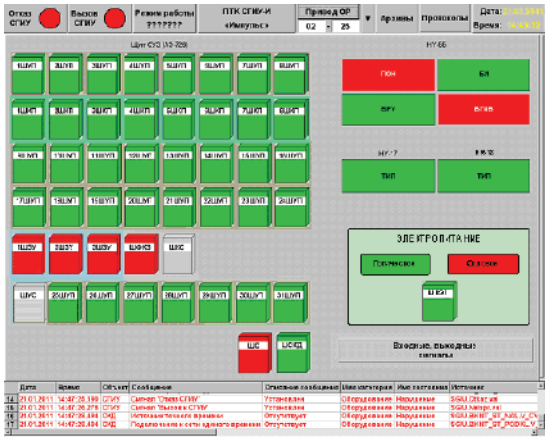
It is part of the control and protection system of a nuclear power unit. It controls the reactor power, the rate of its change, determines reactivity, generates warning and emergency protection signals.

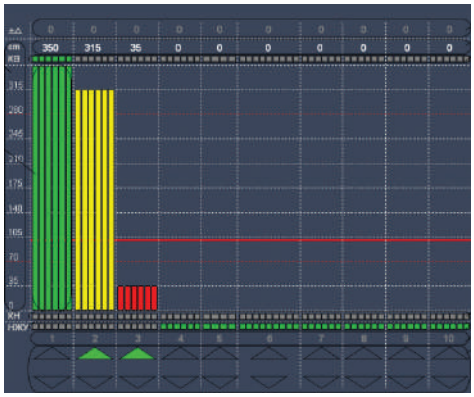


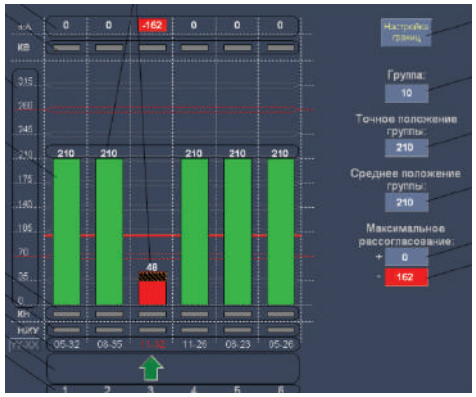


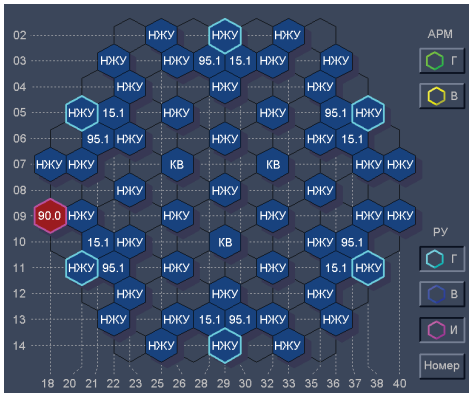
Control rod control system

It is an executive part of the control and protection system of NPP power units. It automatically controls the movement of control bodies based on protection signals, automatic power controllers or operator commands.



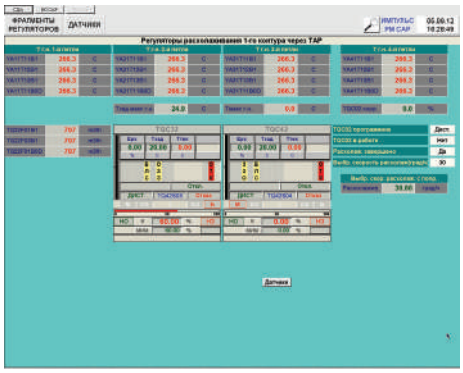


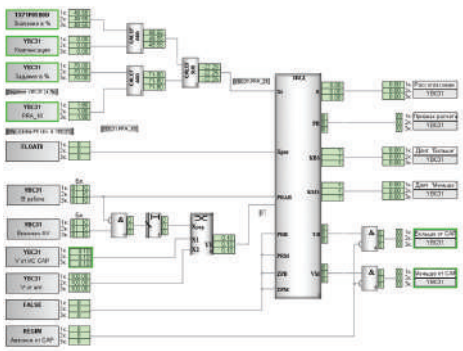




Safety control system (technological)

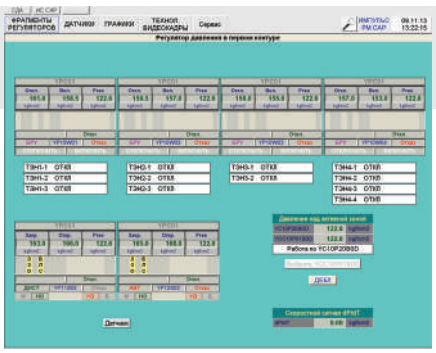
The system is intended to initiate and control power unit safety systems. It is possible to build the system equipment with different redundancy schemes (“2 of 3”, “2 of 4”, “1 of 2”, etc.). It has a sabotage channel for launching safety systems. Control and monitoring of mechanisms are realized with the use of digital RTZO.

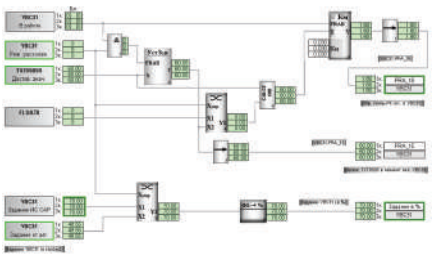


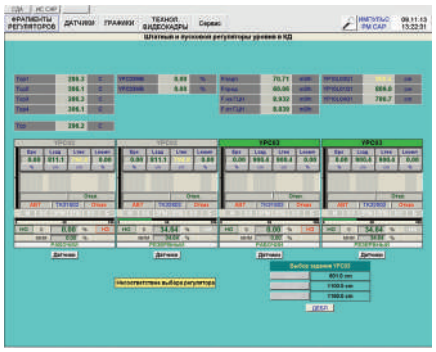


Normal operation control systems for reactor and turbine divisions

They are intended to implement the functions of controlling the normal operation of technological systems of NPP power units. Control and monitoring of mechanisms are realized with the use of digital RTZO.

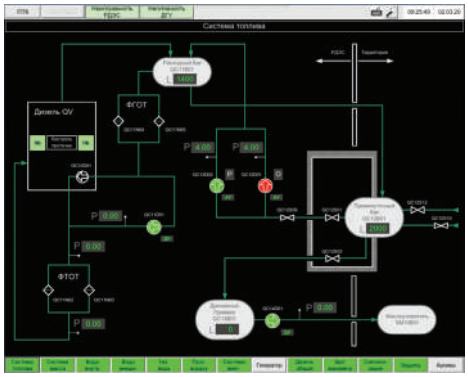


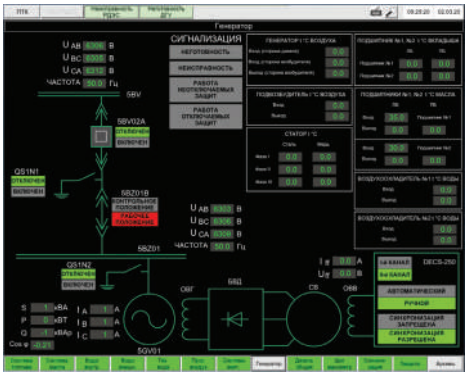




Standby diesel generator station automatic control system

Provides control over the start-up, connection to the network and operation at the power of the diesel generator set, control of excitation and protection of the generator, control of auxiliary equipment and auxiliary equipment.



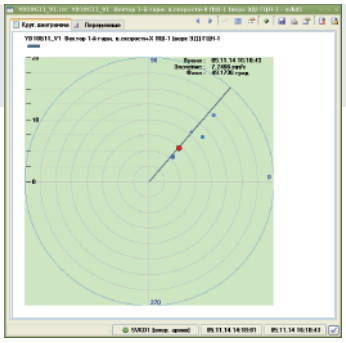


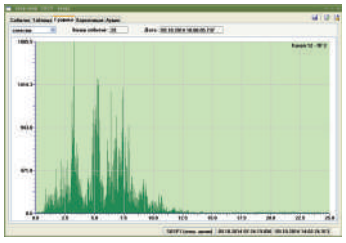
Complex diagnostics system for equipment of a reactor facility's primary circuit

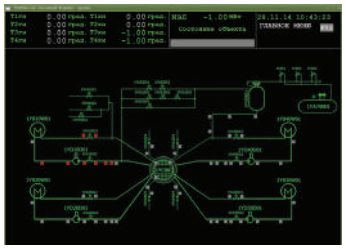
It provides complex technical diagnostics of the primary circuit equipment by analyzing diagnostic information received from power unit monitoring and control systems, local diagnostic systems and its own databases.

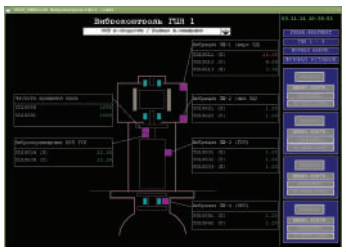
Composition of KSD:

- upper level KSD system;
- in-reactor vibronoise diagnostics system;
- free and loose items detection system in the primary coolant;
- monitoring the leak of the first circuit coolant system;
- vibration monitoring and diagnostics system of the main circulation pumps;
- remaining lifetime diagnostics system of RU equipment;
- pipelines displacement monitoring system.



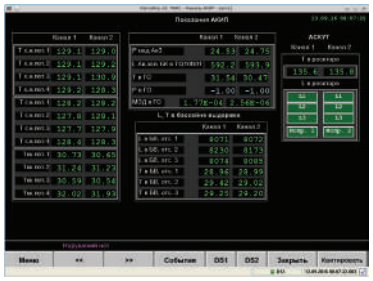


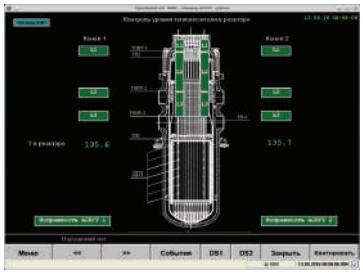


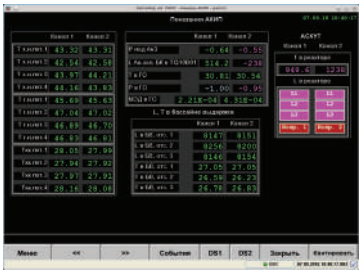


PAMS accident and post-accident monitoring system

It is intended to monitor safety parameters and the state of reactor systems during design basis and beyond design basis accidents at NPPs.

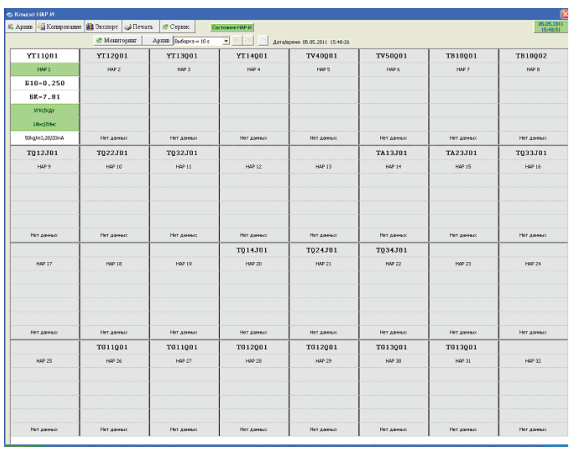


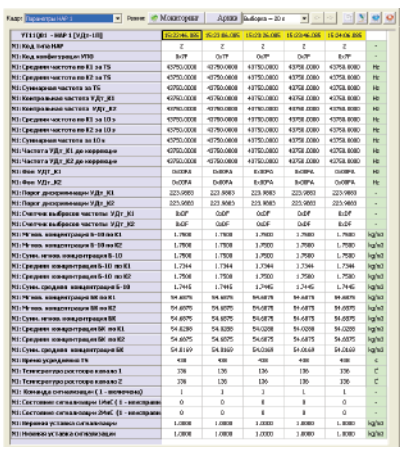


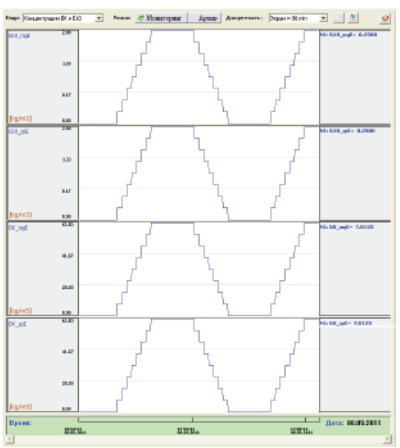


System to monitor boron-10 isotope (boric acid) concentration

The system provides continuous measurement of the concentration of boron-10 isotope (boric acid) in coolants at NPP power units. The system is based on the NAR-I and NAR-I2 neutron solution analyzers manufactured by SRPA “Impulse”.

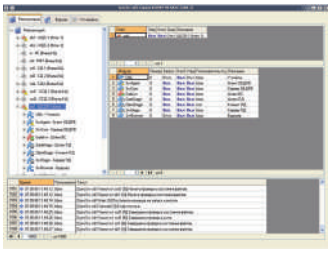






System for register important operating parameters

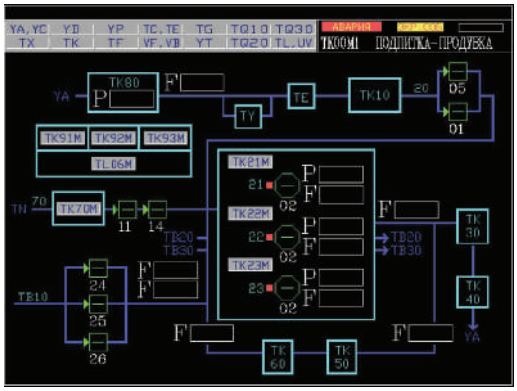
Intended to store and provide personnel with information on the parameters of NPP power units in emergency, post-accident conditions of design basis and beyond design basis accidents.

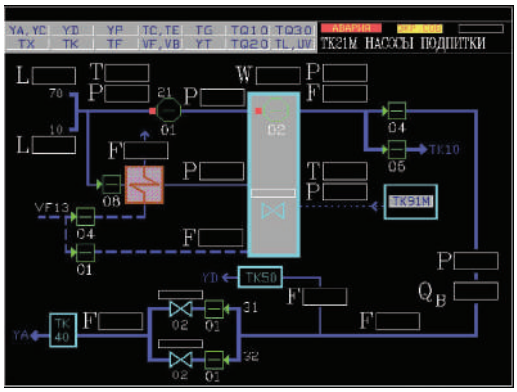


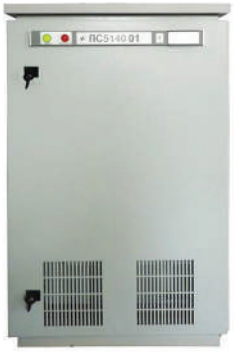
Centre for technical support of operators in emergency situations

Provides expert support for the actions of the operational personnel of the Block control panel in controlling power units in emergency mode and during accident mitigation.

During normal operation, it provides control over the technological process and makes recommendations for its optimization.







Automatic regulating system of turbine division

Performs automatic control of technological parameters of the turbine compartment and functional group control of the electro-hydraulic turbine control system.

Turbine regulating system

It performs automatic and semi-automatic turbine turning, synchronization of the turbine generator with the power grid, maintenance of the turbine generator parameters at a given level in start-up and operating modes, remote control of the turbine control valves by operator commands, protective actions in emergency situations.

Highly reliable digital railway automation systems (SZAT) are intended to operate in the most severe operating conditions on sections of any length and with any traffic intensity.

Together, the SZAT form a modern integrated intelligent system for safe train traffic control.

The platform of railway automation systems is certified for compliance with

EN 50126 **EN 50128** **EN 50129**

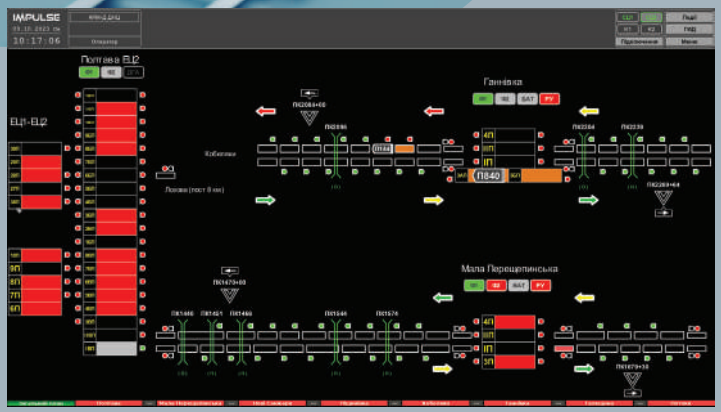
safety level

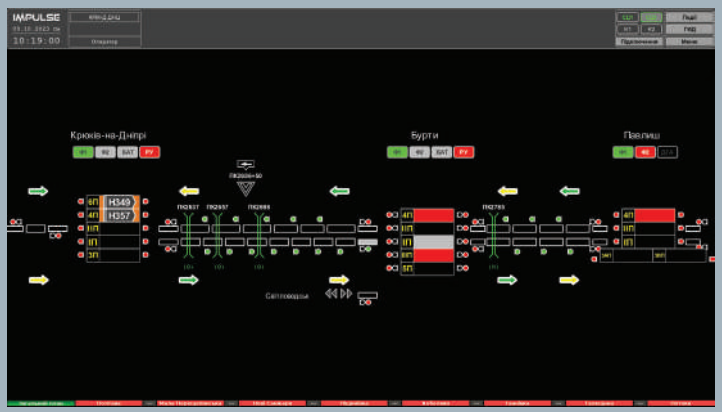
SIL4

state standard

DSTU 4178, level 4

The systems are successfully operated at the facilities of JSC «Ukrzaliznytsia», Bulgarian, Lithuanian and Estonian railways.

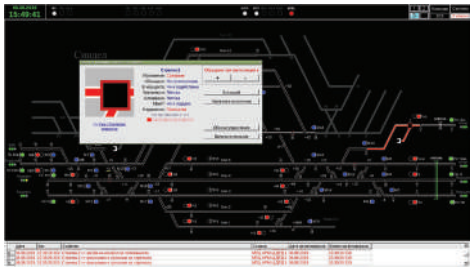




SYSTEM	FACILITY
Microprocessor interlocking system MPC-U with auto-locking functions	At 10 stations of JSC «Ukrzaliznytsia» and Bulgarian Railways.
Microprocessor audio frequency track circuits MRC-U	Stations Kozyatyn, Dubove, Stanishivka - Zhytomyr section. Tartu-Koidula section of Estonian Railways.
Microprocessor centralized traffic control system MDC-U	In 7 sections of JSC «Ukrzaliznytsia», including 1148 km. railway lines, which include: 122 - stations 267 - open tracks/level crossings 3466 - points 4725 - traffic lights 4304 - track circuits.
Microprocessor axle counting system MSSO-U	Vasylkiv-1 - Vasylkiv-Center span
Microprocessor semi-automatic locking system based on axle counting MPAB-U	Vasylkiv-1 - Vasylkiv-Center span
Locomotive safety system ImproTRAIN-250:	• Freight mainline and shunting locomotives: - JSC «Ukrzaliznytsia» - diesel locomotives 2TE116, electric locomotives VL80S; - LTG Cargo, Lithuanian Railways JSC - diesel locomotives 2M62, TEM2 and ER20 (manufactured by Siemens); - Vilnius Locomotive Depot - diesel locomotives 2M62 and TEM2. • Passenger mainline locomotives and trains: - JSC «Ukrzaliznytsia» - electric locomotive ChS8 (manufactured by Skoda); - Ukrainian Railways High-Speed Company - diesel train DPKr-3. • Laboratory-wagon: LTG INFRA (joint project with TESMEC RAIL S.R.L., Italy); • APV520 self-propelled rolling stock: SVI S.P.A. (Italy).
Rolling stock diagnostic and monitoring system AKRO	At 12 stations of JSC «Ukrzaliznytsia»
Power supply systems for small, medium and large stations	More than 30 in Ukraine and abroad

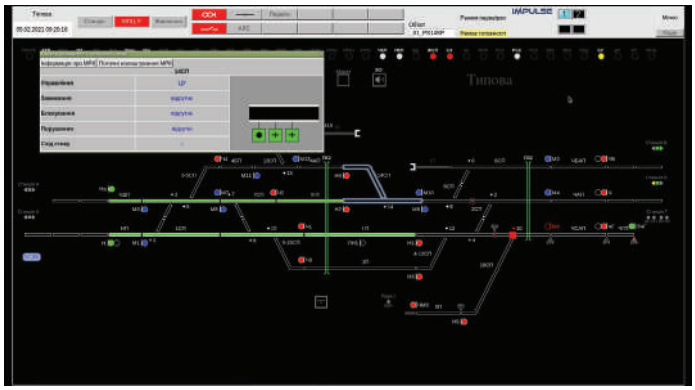
Microprocessor interlocking system MPC-U

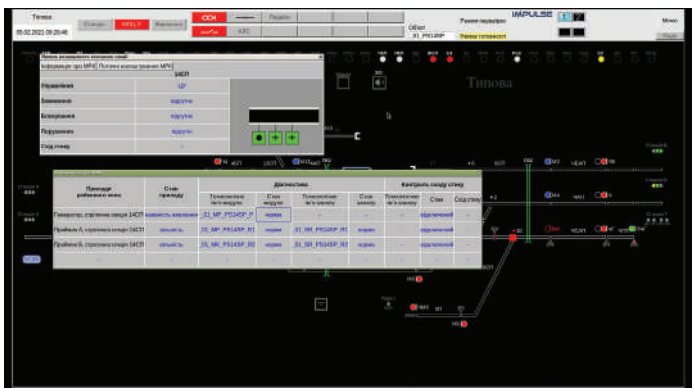
Performs all functions of monitoring and control of train movement. It implements route and individual control of field equipment, management of shunting areas and parks. On the platform of microprocessor interlocking system MPC-U automatic blocking MAB-U, semi-automatic locking MPAB-U, rail circles MRC-U, axle counting system MSSO-U is implemented.



Microprocessor audio frequency track circuits MRC-U

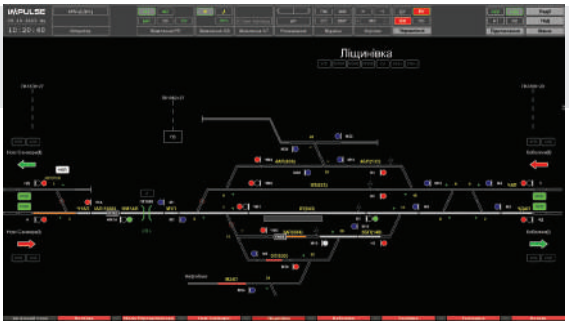
They monitor the occupancy of track sections and the integrity of rail lines, and transmit code signals for ALS from track devices to the locomotive. They can be used on mainline and industrial rail transport, in subways.

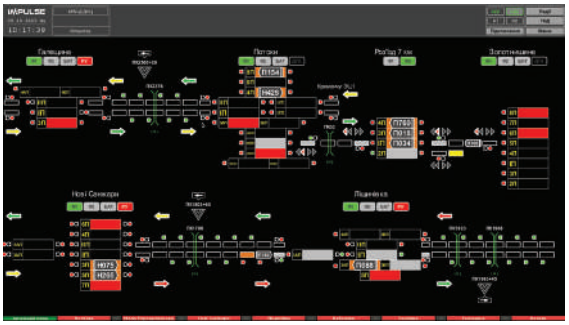


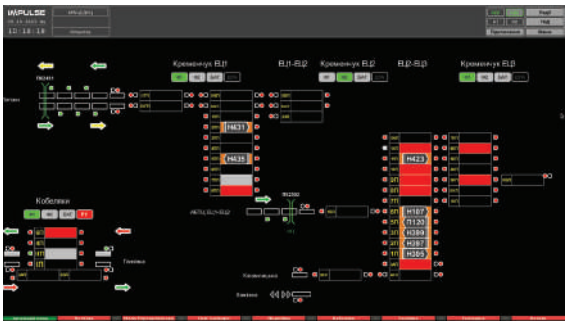


Microprocessor centralized traffic control system MDC-U

Provides: instrumentation and control of train traffic at stations and tracks from the transportation control center; maintaining the schedule of executed traffic; automation of the control process in accordance with the forecast traffic schedule; providing personnel with information about the situation at the control area, the status of signaling, SCB devices and MDC-U.







Locomotive safety system «ImproTRAIN-250»

On-board safety system for passenger and freight trains, self-propelled rolling stock and shunting locomotives.


SZUTEST CE

CERTIFICATE OF COMPLIANCE
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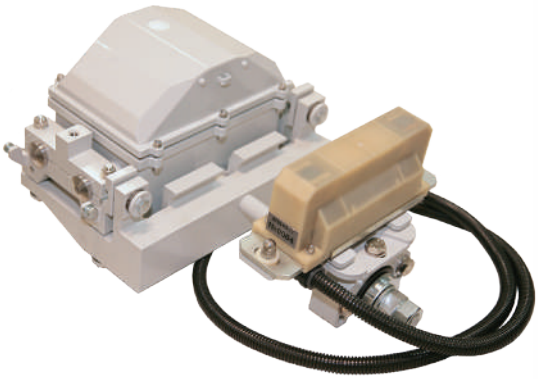
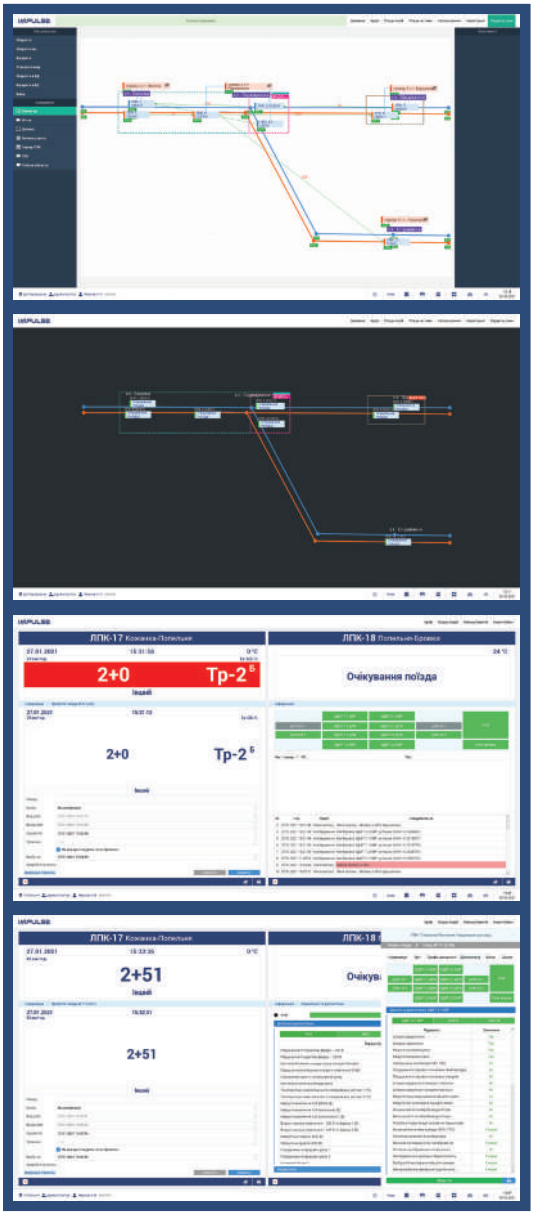
Rolling stock diagnostic and monitoring system AKRO

Control and diagnostic system for remote monitoring of rolling stock chassis condition.





There is a wide range of guaranteed power supply systems and devices depending on power consumption, operating conditions and other factors.

MAIN FUNCTIONS:

- Distribution, conversion and metering of electricity consumption;
- Formation of redundant AC and DC power supply for relay and microprocessor-based EC devices (panel board, relay cabinet, traffic lights, rail circuits, switch electric drives, etc;)
- Remote power outage in case of emergency (disconnection of input feeders, diesel generator set (DGS) and battery);
- Protection against lightning discharges and short circuits;
- Monitoring and diagnostics of devices, input/output voltages and currents, insulation resistance.

Design-assembled power supply system PKSEZh

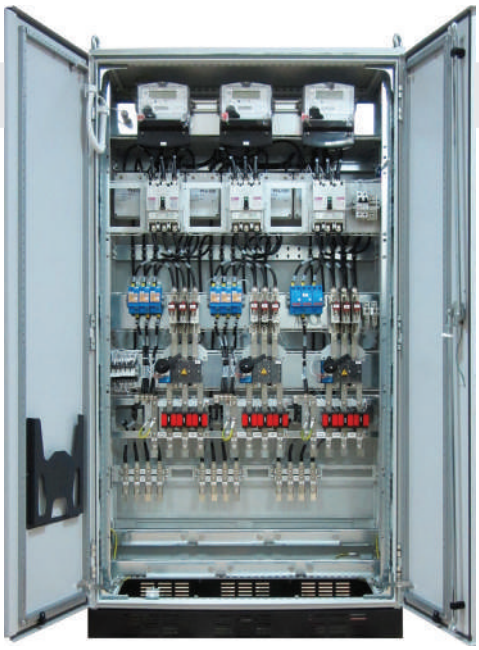
The PKSEZh is intended to supply power to relay and microprocessor-based centralization devices of medium and large stations on railway sections with any type of traction. The design-assembled power supply system includes the following devices:

- **Input panel;**
- **Back-up power supply disconnection/connection panel;**
- **Rectifying distribution cabinet;**
- **Input distribution cabinet;**
- **Cabinets of guaranteed power supply;**
- **Transformer cabinet;**
- **Switch power supply cabinets;**
- **Diagnostic cabinets.**

Input panel ShchV-1

It is intended for input, metering of power consumption from three three-phase voltage feeders.

Provides protection against pulsed lightning surges and remote disconnection of input feeders and diesel generator set in case of emergency.



Back-up power supply disconnection/connection panel ShchOAB-1

Intended to control and protect backup power sources such as a battery or diesel generator. Both remote and manual disconnection of the external DC source is possible. It is available as a wall-mounted and cabinet version.

Rectifying distribution cabinet ShVpR-1

Performs:

- input of power supply from three-phase alternating current feeders with a voltage of 230/400 V;
- generating and outputting a redundant DC voltage of 240 V;
- charging an external battery.

Input distribution cabinet ShVR-1

Performs:

- input of power supply from two feeders of alternating three-phase current with voltage 230/400 V from a diesel generator set and from a battery with voltage 24 V;
- automatic load switching from one feeder to another or to the diesel generator set;
- automatic switching of the load from the diesel generator set to any of the two feeders;
- formation and distribution of the guaranteed voltage 230/400 V;
- manual switching of the load from one feeder to another or diesel generator set.

Transformer cabinet without battery backup ShTr-1

Intended to generate a backup power supply with alternating voltage for SCB devices.

Provides:

- generation of 230 V alternating current for traffic lights, route signs, control circuits of points, audio frequency track circuits and other loads, as well as backup power supply of 240 V from the battery;
- generation of pulse power supply for traffic lights and rolling stock fencing panels;
- power supply with a voltage of 30 V, 110 V, 12 and 16 V for shunting speakers, local control relays and decoder cells.

Cabinets of guaranteed power supply ShPGL-1

Provides power supply to electronic devices of software and hardware complexes of railway automation systems.

Points cabinet

They are intended to supply power to points electric drives and their heating.

Version: without redundancy (ShSt-1) and with redundancy from the battery (ShStP-1).

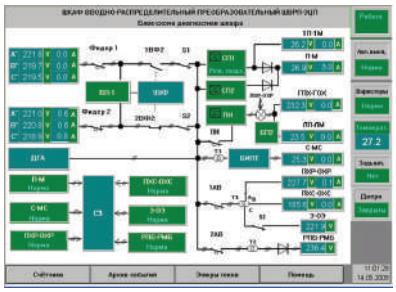
Diagnostic cabinet ShD-1

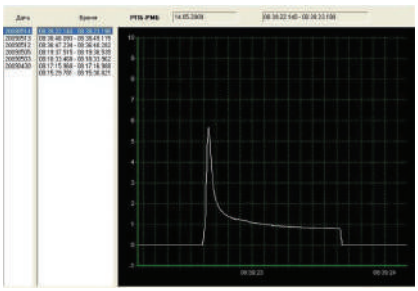
Performs:

- Receiving data on the status of the PKSEP from digital fiber-optic Ethernet communication lines;
- Archiving, processing and visualization of data on the state of the PKSEP;
- Transmission of diagnostic information to the upper level system (microprocessor interlocking system and/or centralized traffic control system).

Power supply system for small and medium stations (based on the input distribution converter cabinet ShVRP-EC)

It is intended for power supply of devices of interlocking posts of railway stations equipped with tone or phase-sensitive rail circuits, switch electric drives of direct or alternating current (based on the ShVRP-ECP cabinet) or alternating three-phase current (based on the ShVRP cabinet).





Power supply system for small and medium stations (based on a power supply cabinet ShP-8)

It is intended to supply power to microprocessor interlocking of railway stations. Realized on the basis of a power supply cabinet ShP-8.

Track box PYa-1 and Cable couplings of SCB

PYa-1 intended for placing and connecting equipment of rail circuits (transformers, resistors, fuses, surge protectors, terminals), as well as switching equipment of traffic lights and switch drives.

Provides reliable protection of equipment against environmental influences (degree of protection IP54).

Cable universal couplings UKM-1 and branching couplings PM-4, PM-7, PM-8 are intended for switching and branching cables connected to the equipment of rail circuits, switch drives and traffic lights.

The composition of the parts of each coupling is determined by its specific purpose.

They provide reliable protection of connection points from the external environment (protection degree IP54).

SRPA “Impulse” produces a wide range of electrotechnical products for various applications:

- automation devices for digital substations;
- microprocessor relay protection and automatics devices;
- power-supply distribution systems;
- low-voltage complete devices;
- electronic multi-channel recorders;
- soft start devices;
- leakage current control units;
- insulation resistance control units;
- signal converters, etc.

Electrotechnical products manufactured by SRPA "Impulse" are used in various industries: railways, generating power, power distribution systems, energy facilities of industrial enterprises, etc. They allow automating electrical substations in compliance with international standards IEC 61850.

Automation devices for digital substations

Ensure automation of digital substations in compliance with IEC 61850: operation of relay protection and automatics systems (RZA), automation of the power distribution process, and recording of emergency events.

They allow you to design software and hardware systems for digital substations in accordance with the required parameters.

Composition:

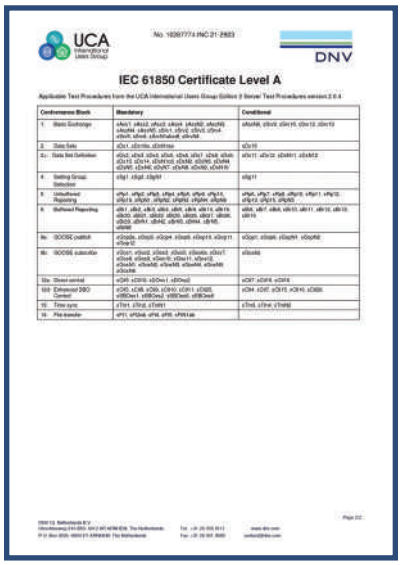
- Automated workstation for operational personnel, protection and automation systems and automated control system, top-level servers and telemechanics based on industrial workstations of PS5150 series;
- Terminals based on microprocessor-based relay protection devices ImPR1;
- Arc protection devices;
- Current and voltage sensors;
- Ethernet network switches.

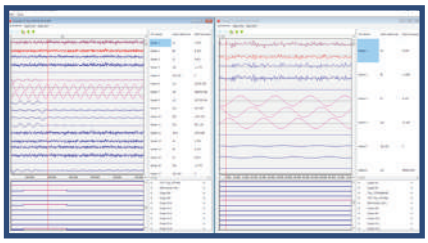
Microprocessor-based relay protection and automatics devices ImPR1

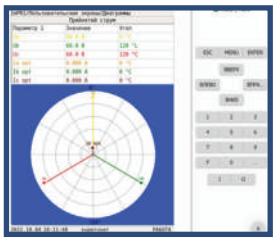
Microprocessor devices ImPR1 are intended for relay protection, automation and control of power generation, transmission and distribution systems.

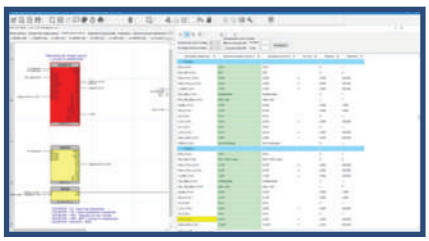
They are distinguished by a variety of versions in terms of the nomenclature and number of analog and digital inputs, output relays, digital communication channels and three design options.


UCA International Users Group
DNV
IEC 61850 Certificate Level A'
IEC 61850 Edition 2 Parts 6, 7-1, 7-2, 7-3, 7-4 and 8-1


UCA International Users Group
DNV
IEC 61850 Certificate Level A



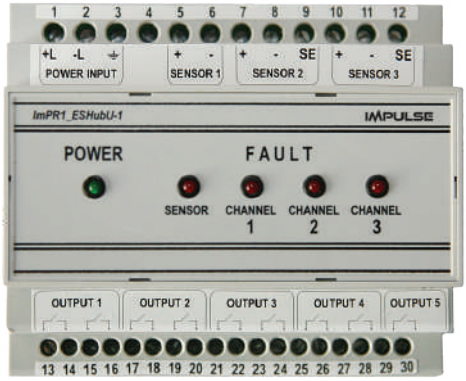




Arc protection device

Switching unit ImPR1_ESHubU-1 with optical sensors ImPR1_ESensU-1 is intended to detect short-circuit arcs in switchgear in real time and transmit information to RZA (electromechanical, semiconductor and microprocessor).

ImPR1_ESHubU-1 has three inputs for connecting optical sensors, three outputs for displaying the status of each sensor, one generalized output and a discrete output of the unit's operability status.



Current and voltage sensor

Sensor PSensU-1 is intended to measure current up to 6 kA, voltage up to 6.5 kV and transmit data via fiber optic channels to the protection device.

Provides the ability to program the microcontroller via a 100Base-FX interface for remote firmware updates. It has an additional diagnostic input of the primary voltage.

Main functions:

- measurement of current and voltage in power supply lines;
- converting analog signals to digital signals;
- transmission of converted signals via duplicated channels;
- ability to measure voltage at two points.

low-voltage switchgears RTZO-I

Low-voltage switchgear - three-phase alternating current distributors of closed design, one-way service - RTZO-I are intended to distribute electricity to low-power consumers.

Composition of RTZO-I: input cabinet (ShV); functional control cabinet (ShFnK) with control units for shut-off valves, motor control, valve control, and distribution units. RTZO-I can be assembled with up to seven ShFnK with one ShV.

Advantages of the RTZO-I (compared to RTZO-69 and RTZO-88):

- significant reduction of equipment due to an increase in the number of connections in one cabinet (up to 12 connections depending on the version);
- reduction of cable connections up to 8 times due to the optical digital interface with the upper control level.

Input cabinet ShchV-1

Intended for input, protection against impulse lightning surges and metering of electric power consumption of three three-phase voltage feeders depending on the configuration.

Provides:

- remote disconnection of feeders;
- manual selective disconnection of feeders;
- protection of input and output circuits against overloads and short-circuit currents;
- metering of electricity consumption for each feeder;
- control and diagnostics of the panel components;
- light indication of the fault.

Distribution cabinet ShR-1

ShR-1 is intended to connect 21 consumers (rated power up to 880 V•A each) to the power supply network from two independent feeders.

It is divided into two sections, each of which has 3 three-phase inputs with 7 single-phase outgoing lines and a “LOCK” panel. ShR-1 can be used in both mounted and floor-mounted versions.

Are you interested in the products and services of SRPA “Impulse”? Please contact our company representatives.

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