TRACTION SUBSTATIONS

- CITY ELECTRIC TRANSPORT
- RAILWAYS
- METRO
Company actively operates at the market of energy-saving technologies producing AC and DC electric drive systems for voltage up to 600 V and 6000 V.

One of the key activities is development and supply of automatic process control systems, SCADA systems.

Over the past years we have successfully expanded the range of products and geography of our supplies. PLUTON produces more than 70 different types of equipment which correspond modern international requirements and standards, and this is confirmed by testing and certification in the international test center IPH Institut (Germany).

High-level engineering provides a team of highly qualified engineers, who make up the brain power that creates our equipment.

Our main goal is to remain being the leader in production of high-quality equipment, and what helps us is the basic principles of the Company, which we follow and implement in reality: high quality of products, social responsibility, occupational and environmental safety of the company’s activities. We are building future, creating products of up-to-date level in compliance with international standards, innovative technologies that ensure safety and comfort of people.


Internal inspection of electric equipment quality performed in all production stages allows to provide guaranteed quality of produced goods.

We always aspire to be at the peak of the latest achievements of science and technology in the field of transport, electric drive, automatic control systems, and we apply latest achievements for constant updating of our products.

Over the many years period of successful work we have shown our leadership and professionalism. Currently PLUTON represents technological progress, reliability, quality and international cooperation.

Metros and railways, enterprises of city electric transport, industrial plants and companies of Russian Federation, Belarus, Kazakhstan, Ukraine, Uzbekistan, Baltic countries, Azerbaijan, Germany, Canada, Sweden and other countries of the world are among our customers.

Our partners are the largest companies: ABB, Schneider Electric, Secheron, General Electric, Elpro, Transresch Antriebssysteme, Vacon, Driescher, B&R, etc.
PLUTON offers complete solutions for metro, city electric transport and railway traction substations. Main idea of equipment supply concept is turn-key supply of traction substation equipment package starting with design and finishing with the facility commissioning.

Turnkey project includes:
- design,
- production and supply of traction substation equipment,
- assembling, installation supervision,
- pre-commissioning,
- integrated tests,
- commissioning,
- personnel training,
- warranty support during warranty period, as well as post-warranty maintenance.

We have many years of experience in development and production of equipment based on the latest achievements of world technologies in the field of electric equipment construction, automation, modern technologies of data transfer.

Decisive role in effective implementation of turnkey objective belongs to advanced schematic, technologic, design solutions of equipment and automation systems construction.

PLUTON manufactures electric equipment in accordance with all requirements and conditions of the Customer, and accepts complete responsibility for failure-free operation of equipment during warranty and post-warranty period, trouble-free startup of equipment.

We are sure that our innovations in the field of power supply will promote increase of power supply reliability upon general decrease of capital costs for construction, as well as operational costs for consumed electric power and equipment maintenance. Here with we accept complete responsibility for the positive and effective result.

Distinct advantages of PLUTON equipment for traction substations:
- high degree of reliability and safety;
- technical solutions aimed at advanced world level in order to satisfy consumers modern requirements;
- all equipment for traction substations is a unified automated system requiring minimum attention of maintenance staff, without periodic maintenance and repair;
- complete automation of traction substation control, equipment condition monitoring, self-diagnosis of equipment;
- small overall dimensions, weight and materials consumption of equipment;
- 100% quality control;
- conformity of equipment to international standards.

Equipment reliability and safety factors:
- application of equipment components produced by world-leading manufacturers;
- application of components with high switching capacity, dynamic stability to short-circuit currents, sufficient mechanical durability;
- high protection level preventing ingress of dust into equipment, as a result – increase of reliability and fire safety;
- interlocks and protection necessary to guarantee high level of safety and reliability for equipment and for maintenance staff;
- monitoring of traction substation equipment condition with equipment self-diagnosis function.
EQUIPMENT FOR TRACTION SUBSTATIONS

Medium voltage switchgear (air insulation, SF6 insulation)  
Rated voltage: 7.2 ... 40.5 kV  
Rated current: up to 2500 A

DC Switchgear  
Rated voltage: 600 ... 3300 V DC  
Rated current: up to 6000 A

Switchgear up to 1000 V, Auxiliaries and uninterruptible power supply equipment

Power transformers,  
Low voltage switchgear,  
Power factor compensating units,  
Uninterruptible power supply units,  
DC and AC Switchboards,  
Accumulator batteries, Charging units, etc.

SCADA equipment and software

Three-level structure  
1) equipment control level  
2) substation control level  
3) power operator level

Rectifiers, inverters with traction transformers

Rated voltage: 600 ... 3300 V DC  
Rated current: up to 6000 A  
Dry rectifier transformers, capacity 630 ... 12 500 kVA

Modular traction substations

One-, two- and three-unit modular traction substations for city electric transport

Metro and Light rail transport overhead line power supply equipment

Disconnector Switchgear,  
Cable connection cabinets,  
Third rail power supply cabinets,  
Contactors, grounding switches, etc.

Equipment of various application

Filter units,  
Smoothing reactors,  
Cables combined protection cabinets,  
Stray currents monitoring units,  
Substations microclimate control systems,  
Burglar and fire signaling equipment,  
Automatic systems for commercial metering of power consumption, etc.
One of the key factors for successful implementation of our equipment for traction substations supply concept is complete automation and control of traction substations, diagnosis, analysis, monitoring and protection of substation equipment and overhead line. Company PLUTON offers the best integrated SCADA solutions for traction substations.

Key features of SCADA system equipment, implemented by PLUTON:
- distributed control system (DCS), building-block concept;
- easy maintenance and operation;
- reliable components with a high protection level;
- reliable switching equipment;
- uninterruptible power supply;
- application of ring topology for organization of local computer network for all the substation equipment and backup communication link with upper level system;
- PLC and software compliance with international standards (IEC 61131-2, IEC 61131-3);
- application of industrial equipment from the best world manufacturers;
- modern SCADA system;
- first line professional support during operation.

SCADA system offered by PLUTON has three-level structure.

Traction substation equipment (switchgear, rectifiers, auxiliary equipment, etc.) is controlled at the first level. The first level of control is implemented on the basis of modern industrial controllers built into the equipment. Controllers monitor and control equipment, as well as perform protection functions.

The second level provides complete substation control, and includes redundant controller. This controller is communicatively coupled to a controller installed in the substation equipment and to substation parameters measurement systems.

Substation control level allows to control substation main circuit current mode and state from operating staff workstation, to control switching devices in normal and emergency modes, to log alarm messages, to keep events records, to display traction substation equipment, as well as hardware and software operation current state on the monitor mimics, etc.

The third level of control combines dispersed traction substations into a single system, which provides remote control and monitoring using software and hardware of power operator point. Modern backup servers are applied for collecting and processing of data from substation controllers. Power operators workstations, as well as video wall displaying the state of all substations electrical equipment is provided for substations operational control.

Basic technical characteristics of SCADA system:
- response time on object status change – up to 2-5 sec;
- system response on command and receipt of its fulfillment confirmation - up to 3 sec;
- mean time to failure for commands conditioning and data gaining functions – 50 thous. hours;
- operation mode – 7/24.

Baku Metro is one of the sites where PLUTON has implemented complete SCADA complex. The project provides control of 30 metro traction substations. Implementation of SCADA complex allowed to improve reliability and efficiency of metro power supply system control, to provide high system fault tolerance and backup of critical components, to decrease service charges on SCADA system and to optimize the number of operational and maintenance personnel.
MAIN IMPLEMENTED PROJECTS

Metro

Republic of Kazakhstan
Almaty Metro
Supply of 7 combined traction step-down and 4 step-down substations, tunnels and depot overhead line equipment (“turn-key” projects).

Republic of Azerbaijan
Baku Metro
Supply of 3 combined traction step-down substations, supply tunnels and depot overhead line equipment (“turn-key” projects);
Modernization of SCADA system on 27 substations. Implementation of Power operator center.

Republic of Belarus
Minsk Metro
Supply of 16 traction “turn-key” substations, tunnels and depot overhead line equipment.

Kharkiv Metro
Supply of 4 traction “turn-key” substations, tunnels overhead line equipment.

Republic of Tatarstan, Russian Federation
Kazan Metro
Supply of power transformers and low voltage switchgear for traction substation.

Russian Federation
Yekaterinburg Metro
Supply of 2 traction “turn-key” substations, tunnels overhead line equipment;

Moscow Metro
Supply of rectifiers, low voltage switchgear for traction substations, tunnels overhead line equipment;

Nizhny Novgorod Metro
“Turn-key” supply of traction substations;

St. Petersburg Metro
Supply of rectifiers for traction substations and overhead line equipment.

Republic of Korea
Busan City Metro
Supply of DC switchgear for traction substation.

Republic of Uzbekistan
Tashkent Metro
Supply of 18 rectifiers and 1 traction “turn-key” substation.

Republic of Latvia
Supply of rectifiers for traction substations of Riga city electric transport.

Republic of Italy
DAWONSYS Company
Supply of equipment for Dawonsys Company own requirements.

Romania
Bucharest Metro
Implementation of project on outdated rectifier replacement for a new one for traction substation.

Republic of Turkey
Izmir Metro
Supply of equipment for Halkapinar Depo substation.

City electric transport

Sweden
Supply of equipment for 8 traction substations in Stockholm.

Republic of Poland
Supply of traction “turn-key” substation for Lodz city electric transport.

Romania
“Turn-key” supply of two-unit modular traction substation for Oradea city electric transport.

Reconstruction of 1 traction substation for Vinnytsia city electric transport;
Modernization of Control Center and 19 Traction Substations for Power Supply of Liviv City Electric Transport Network (“turn-key” project);
“Turn-key” supply of three-unit modular traction substation for Liviv city electric transport;
“Turn-key” supply of three-unit modular traction substation for Kramatorsk city electric transport.

Georgian Railway
Supply of three-unit modular traction substation for Crimean Trolleybus;
Supply 2 “turn-key” traction substations for Kerch city electric transport;
Supply 2 “turn-key” traction substations for Crimean Trolleybus;
“Turn-key” supply of three-unit modular traction substation for Kramatorsk city electric transport.

Russian Federation
Supply of equipment for traction substations of Moscow, St. Petersburg, Rybinsk, Volgograd, Ufa, Khimki, Tomsk, Lipetsk city electric transport;
Supply of rectifiers and low voltage equipment for traction substations of Moscow monorail transport system, supply of overhead line equipment;
Supply of three-unit modular traction substation for Naberezhnye Chelny City Electric Transport (“turn-key” project).

Ukraine
Supply 2 “turn-key” traction substations for Kramatorsk city electric transport;
Reconstruction of 1 traction substation for Vinnytsia city electric transport;
Modernization of Control Center and 19 Traction Substations for Power Supply of Liviv City Electric Transport Network (“turn-key” project);
“Turn-key” supply of three-unit modular traction substation for Liviv city electric transport;
“Turn-key” supply of three-unit modular traction substation for Kramatorsk city electric transport.

Georgian Railway
Supply of PSK-3.3k-3.0k sectioning point.

Ukraine
Supply of equipment, installation supervision and adjustment for reconstruction of 1.65 kV DC部门al railway traction substations.

Republic of Moldova
Modernization of 4 traction substations for Beltsy city electric transport power supply network.

Republic of Tajikistan
“Turn-key” modernization of 3 trolleybus substations and supply of equipment for 6 traction substations of Dushanbe city electric transport.

Railways

Russian Federation
Magnitogorsk Iron and Steel Works
Supply and commissioning of 1.65 kV DC industrial railway 6 traction substations.

Orenburg Minerals (Yasniy)
Supply and commissioning of rectifiers for modernization of 1.65 kV DC industrial railway traction substations.

Georgia
Georgian Railway
Supply of equipment, installation supervision and adjustment for reconstruction of 1.65 kV DC departmental railway traction substations.

Ukrainian Railways
Supply of rectifiers and switchgear 3.3 kV for 6 substations of main railway line.

Southern Mining Company
Supply of equipment, installation supervision and adjustment for reconstruction of 1.65 kV DC departmental railway traction substations.

Georgian Railway
Supply of three-unit modular traction substation for Naberezhnye Chelny City Electric Transport (“turn-key” project).