TRIOL
everything new emerges now

2014

Submersible equipment

SUBMERSIBLE PUMPS, MOTORS AND DOWNHOLE SENSORS

www.triolcorp.com

TRIOL SUBMERSIBLE EQUIPMENT

SUBMERSIBLE PUMPS, MOTORS AND DOWNHOLE SENSORS

TRIOL
everything new emerges now

Innovations through years — our path to grow

Since our birth back in 1993 Triol Corporation began to offer wide range of services (R&D, project implementation, manufacturing, after-sale services) for different industries. From the very beginning innovation has been our main driving force. We have applied this approach to our equipment for oil production. Our first innovative solutions have been implemented in artificial lift surface equipment. Now we would like to present our innovative solutions for submersible equipment. Ensure your oil well productivity by selecting Triol series!

Facing up-to-date oil industry challenges

Triol downhole equipment has been designed to face nowadays requirements of the artificial lift: challenging environments with increased temperatures and pressures. More advanced technologies have been used to increase reliability, flexibility, speed and performance. We were focused on harsh well conditions including high temperatures, abrasive and corrosive fluids, and highly deviated wells. Today we are happy to offer you our best artificial lift solutions for challenging well conditions: ESP installations, downhole sensors, pumps and motors.

Optimize production and maximize uptime

Our ESP systems offer you the highest level of reliability in the harshest downhole conditions. Intervention costs and lost production of critical wells can dramatically reduce your revenue. To extend run life in critical wells many technological innovations we build into our products. With high mean time between failures, our systems increase cash flow per well. We are working to optimize production for thousands of wells around the world in a broad range of applications.

Triol submersible–plunger pump complex installation is a unique solution for the world practice. This solution enables a new way to exploit the numerous marginal wells, especially with the depth of 1500–3000 meters (flow rate of 25 cubic meters), including those with complex inclinometer. Furthermore the installation has been provided with reasonable price and high efficiency.

Triol Corporation is well-known in the oil–production market with its downhole sensors Triol TM-01. Triol downhole sensors capture real-time downhole data for a variety of artificial lift systems that can be used to extend product run–life, optimize control and increase production. Triol downhole sensors have reliably served the oil market for many years. A big variety of its lines allows offering an individual approach to each customer.

Our business values at your disposal

Integrity, respect, customer–oriented strategy and striving for excellence are core values that define Triol Corporation, and they're the values we offer our Customers and Partners. We are working to help our Clients to meet their objectives providing them with cooperation, trust, reliability and communication. Our guiding principles have been designed to encourage high–quality collaboration with our business partners. These principles are flexible competitive pricing; high functionality, flexible competitive pricing, special warranty policy, solid delivery performance, and effective after-sales support.

Investing in a sustainable future

Through our business, Triol Corporation contributes to a more sustainable society with a fair access to resources, health and well–being. Our manufacturing processes are environmentally friendly and energy-efficient. We design eco-efficient and recyclable products. Safety is our first priority. We are constantly improving working conditions, limiting work–related accidents, occupational illnesses, and anticipating regulatory change. Our equipment covers all requirements placed upon the functional safety of machines and systems. All of our manufacturing facilities and products comply with ISO and EU standards.

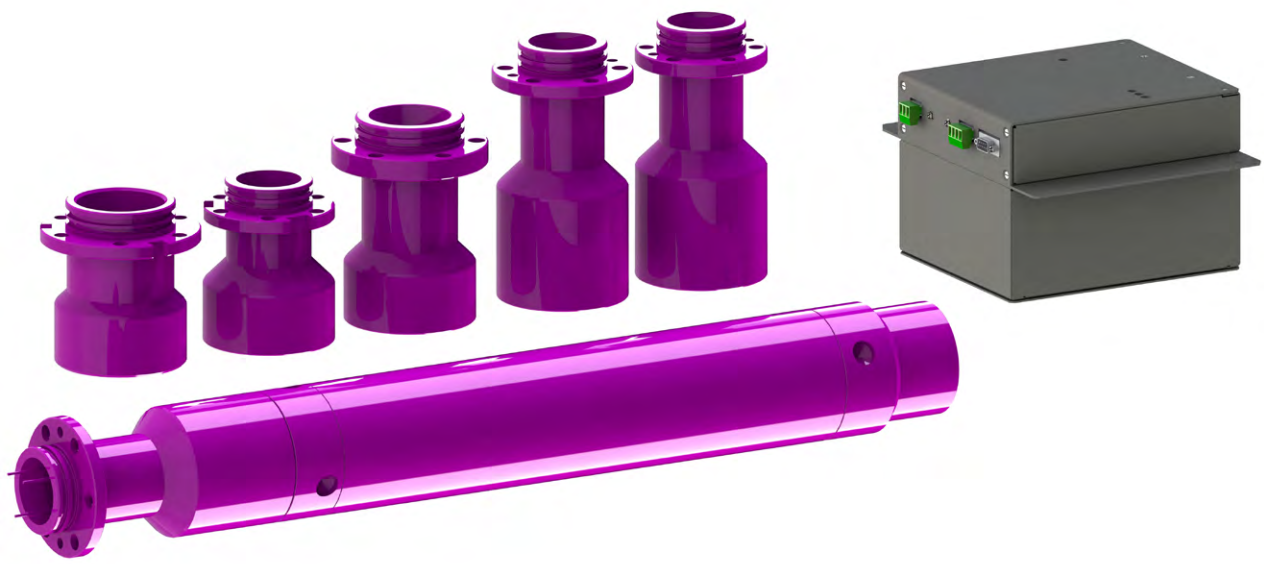
Triol Corporation is driven by the energy of people dedicated to making a difference

Today, Triol Corporation represents a consolidation of experience and innovation, young and talented specialists and expert managers; development, production, reliable supply and after–sales service to different world corners; commitment to a great world, scientific traditions and application of the new approaches in management and business–planning. Our corporate culture supports talented people, allowing them to approach their work with energy, enthusiasm, and the promise of success. We are a forward-thinking company built on a solid foundation of developing innovative solutions. Wherever our customers need excellence, our precision–engineered oil field equipment sets the standard for performance, reliability and efficiency.

We appreciate our partners and customers and are always open for cooperation!

Triol TM01–03

Downhole sensor system Triol TM01–03 (standard modification)



- Stainless steel corrosion-resistant downhole unit;
- Downhole unit ambient parameters:
  — Temperature up to 150 °C (302 °F);
  — Pressure up to 400 atm (5 878 psig);
  — Well depth up to 3500 m (11483 ft);
- MODBUS RTU communication protocol;
- Surface unit with NEMA1/IP21 enclosure, to be installed inside the VSD or switchboard;
- Connection of up to 2 tons equipment to the downhole unit;
- ESP's dimensions:
  — Connection with GOST standard motor diameters 96, 103, 117, 130 mm (0.32, 0.34, 0.38, 0.43 ft);
  — A450 – Connection with 450, 562 and 725 series Centrilift submersible motors;
  — C450 – Connection with 450 series Reliant submersible motors;
  — A375 – Connection with 275 series of Centrilift submersible motors;
- Motor winding temperature measurement (optional);
- Operation with VFD's of different manufacturers;
- Measurement range:
  — Pressure 0...400 atm (0...5 878 psig) ±1 %;
  — Base oil temperature 0...150 °C (32...302 °F) ±1 %;
  — Electric submersible motor winding temperature 0..250 °C (482 °F) ±1 %;
  — Vibration 0...50 м/с (164 ft/s²) ±5 %;
  — Insulation resistance from 10 kOhm to 10000 kOhm (to 1000 kOhm ± 2 %, over 1000 kOhm ± 5 %);
- RS232 and RS485 interfaces with a data transfer rate of 9600 bps.

Triol TM01–03 downhole sensor system with standard modification is specially designed to monitor oil well and ESP operation parameters with its further transfer to VFD controller. It helps to optimize oil production and protect ESP installation.

Triol TM01–03–CA downhole sensor

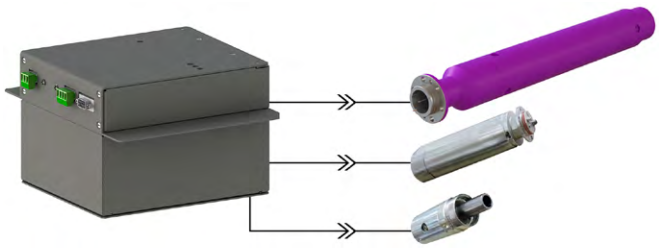
Surface unit for outdoor installation TM01–03–CA (IP54)

- Stand alone NEMA4/IP54 surface unit;
- Operation of the surface unit:
  — Stand alone NEMA4/IP54 enclosure;
  — Ambient temperature from - 60 °C (-76 °F) to +75 °C (167 °F);
- Measurement range:
  — Pressure 0..400 atm (0...5802 psig) ±1 %;
  — Base oil temperature 0...150 °C (32...302°F) ±1 %;
  — Electric submersible motor winding temperature 0...250 °C (32...482 °F) ±1 %;
  — Vibration 0...50 m/s² (164 ft/s²) ±5 %;
  — Insulation resistance 10 kOhm to 10000 kOhm (to 1000 kOhm ± 2 %, over 1000 kOhm ± 5 %);
- RS232 and RS485 interfaces with a data transfer rate of 9600 bps;
- Operation with VFD's of different manufacturers;
- MODBUS RTU communication protocol.

Triol TM01–03–CA downhole sensor surface unit for outdoor installation TM01–03–CA (IP54) is a reliable and secure solution that can easily operate under a wide range of temperatures providing ongoing oil well and ESP monitoring.

Triol TM01–03–U Downhole sensor

Multipurpose Surface unit Triol TM01–03–U



- Operation with VFD's of different manufacturers;
- MODBUS RTU communication protocol;
- RS232 and RS485 interfaces with a data transfer rate of 9600 bps;
- Surface unit operates with downhole units of «IRZ», «Borets»,»Electon» manufacturers;
- Operation under the ambient temperature from -60 °C (-76 °F) to +75 °C (167 °F);
- Measurement range:
  — Pressure 0...400 atm (0...5 878 psig) ±1 %;
  — The temperature of the formation fluid 0...150 °C (32...302 °F) ± 1 %;
  — Winding temperature (oil) ESP 0...250 °C (32...482 °F) ±1 %;
  — Vibration 0...50 m/s² (0...164 ft/s²) ± 5 %;
  — Insulation resistance from 10 ohms to 10,000 ohms (1000 ohms ± 2 % above 1000 ohms ± 5 %).

Triol TM01–03–U surface unit is specially designed to transfer the information from the downhole units «IRZ», «Borets», «Electon» to VFD's controllers. Its reliability and versatility help to optimize and facilitate operation process for Customer convenience.

Triol TM01–04

High-precision downhole sensor system Triol TM01-04

- Nonvolatile memory;
- Stainless steel corrosion-resistant downhole unit;
- Connection of up to 2 tons equipment to the downhole unit;
- High pressure measurement accuracy ± 0,25 %;
- Two operation modes – standard one (data update period 2,5 minutes) and pressure scan mode; (with the data update period no more than 14 seconds);
- Base oil temperature up to 150 °C (302 °F);
- Downhole unit operational pressure up to 400 atm (5878 psig);
- Measurement of formation fluid with a precision of ± 0,25 %;
- Measurement functions:
  — Measurement of reservoir pressure;
  — Measuring the vibration level of 2 or 3 axes;
- Motor winding temperature measurement (optional).

High-precision downhole sensor system Triol TM01–04 can easily replace a big number of instruments used for hydrodynamic researches. Application of Triol TM01–04 allows reducing oil wells down time, getting actual information about the well operation and its immediately analyzing.

Triol TM01–05

Downhole sensor system Triol TM01–05 with the temperature and fluid pressure measurement at the pump discharge

- Base oil temperature up to 150 °C (302 °F);
- Downhole unit operational pressure up to 400 atm (5878 psig);
- Temperature and base oil measurement on the pump discharge (ESP).

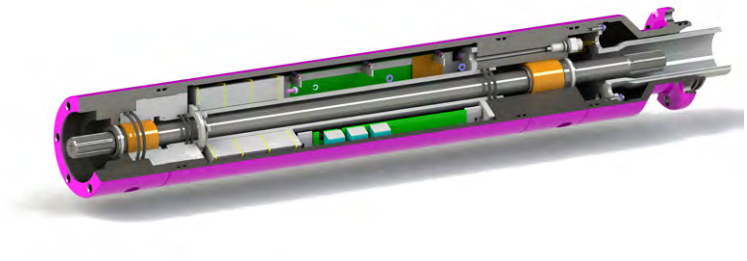
Downhole sensor system Triol TM01–05 consists of three units: surface one and two downhole units, placed on the ESP bottom and dedicated to measure and transfer such parameters to VFD controller:

— Oil temperature near the ESP stator;
— Base oil temperature;
— Base oil pressure;
— ESP vibration of 3 axes;
— Insulation resistance of the system «Step-up transformer — Downhole cable — ESP».

Downhole sensor system Triol TM01–05 with the temperature and fluid pressure measurement at the pump discharge provides ESP operational modes control and pump technical parameters evaluation. It also allows avoiding saline deposit at the ESP working bodies.

Triol TM01–06

Downhole sensor system with the thru shaft Triol TM01–06



- Stainless steel corrosion-resistant downhole unit;
- Downhole unit operational pressure up to 500 atm (7348 psig);
- Measurement functions:
  — Reservoir fluid temperature 150 °C (302 °F);
  — ESP upper front part winding temperature up to 250 °C (482 °F);
  — ESP oil pressure;
- Operates with dual ESP installations.

Triol TM01–06 downhole sensor system is specially designed to measure dual ESP installation current parameters:

— Oil temperature near the ESP stator;
— Base oil temperature;
— Base oil pressure;
— ESP vibration of 3 axes;
— Insulation resistance of the system «Step-up transformer — Downhole cable — ESP».

Triol TM01–06 downhole sensor system can be easily integrated in the dual ESP installation. It operates under the pressure of 500 atm (7 348 psig). The use of this downhole system provides total control and safe operation of the dual ESP installation, increases nonfailure operating time and reduces energy consumption on the fluid lifting.

To simplify Triol downhole sensors operation and maintenance we have developed special documentation:

- Product Passport — here you can find the information about main characteristics, technical parameters, product lifetime, guaranties from manufacturer and package contents.
- Operation Manual — contains information about the TM series installation, commissioning, main– tenance as well as products' technical parameters.
- Installation Instructions — provide detailed information about the security measures, preparing products for assembly and its installation, operability inspection.

We are also happy to offer you actual service software for our products. Service Software allows you to analyze equipment history event log. For convenience in operation, you can export to Excel for displaying schedules, energy consumption and other parameters. Its more detailed description could be found at our SCADA and software advertizing material.

If you would like to leave your feedback on this advertizing material you can always do it on our website. We welcome feedback from our Customers and Partners and are always open for conversation.

All this documentation can be found on our official website www.triolcorp.com. The information here included can be periodically modified and updated and all those modifications will be incorporated in later editions. To consult the most updated information of this product you might access though our website where the last version of our advertizing materials can be down–loaded. Also, we provide ongoing technical support through our website.

We are happy to help you 24 hours a day!

EDR103

Electric submersible motor EDR103 (28, 32, 45, 56, 63, 70, 80, 90,125)

- Maximum base oil temperature up to 170 °C (338 °F);
- High construction reliability, increased mean time between failures (MTBF), reduced heating;
- High efficiency in difficult wells: high viscosity, high solid part content, unstable reservoir pressure;
- Wells after hydraulic fracturing or casing repair;
- Stainless steel enclosure for operation in high corrosive environments;
- Minimal energy consumption and high efficiency;
- Heat-resistant rubber up to 220 °C (442.4 °F);
- Easy transportation, installation and maintenance due to compact dimensions and minimal weight.

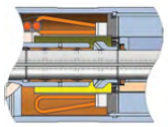
Triol submersible asynchronous electric motors (EDR) are used as a centrifugal pump drive to lift the fluid from the oil wells.

Triol EDR 103 series have a power range from 28 to 90 kW and are available in the following modifications:

— Standard modification (up to 90 °C (194 °F)) – EDR;
— Heat–resistant modification (up to 120 °C (248 °F)) – EDRT;
— Increased heat–resistant modification (up to 170 °C (338 °F)) – EDRT1;
— Corrosion–resistant modification – EDRK;
— Heat–corrosion-resistant modification – EDRKT;
— Corrosion–resistant modification with increased heat-resistance – EDRKT1.

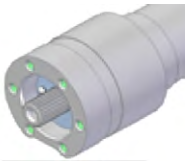
Electric motors with power and voltage different from the nominal could be manufactured upon Customer request.

Highly reliable cable connection.



Optimal winding configuration.

Centrifugal cooling element.



Involute type connections.

Highly reliable Silicon carbide radial bearings.

Detachable motor base to exclude welding and simplify maintenance.

EDR117

Electric submersible motor EDR117 (28, 32, 45, 56, 63, 70, 80, 90, 125)

- High efficiency up to 84,5 % and capacity rate up to 0,87;
- Maximum base oil temperature up to 170 °C (338 °F);
- Low vibration;
- High-precision assembly;
- Increased reliability at overload due to involute type connections;
- High torque overload capacity;
- Optimum geometry of the stator slots provides enhanced torque and efficiency characteristics;
- High motor reliability – reduced heating due to low stator current;
- Full testing of products on self-designed testing equipment that imitate real oil well operation;
- Motors modifications: standard, heat-resistant, incresed heat-resistant, corrosion-resistant and heatcorrosion-resistant.

Our company offers you a wide range of submersible electric motors – EDR117 with power from 28 to 125 kW.

High–grade and well–weighed technical solutions, modern production base, quality control at all stages of production, the use of high quality materials, advanced international technology and modern design solutions allow you to use the motors of our production in the harshest ambient conditions.

Modification	EDR	EDRT	EDRT1	EDRK	EDRKT	EDRKT1
Up to 90 °C (194 °F)	•			•		
Up to 120 °C (248 °F)		•			•	
Up to 170 °C (338 °F);			•			•
Corrosion-resistant enclosure				•	•	•

EDR series support documentation consists of product passport and operation manual. The package also includes specification, assembly drawing and technical datasheets.

- Product Passport presents information about main characteristics, technical parameters, product lifetime, the guaranties from manufacturer and completeness data.
- Operation Manual contains information about the EDR series installation, commissioning, maintenance, products' technical parameters as well as information needed for product full and safe operation during all its lifetime stages.
- Technical datasheets — a document that contains a complete list of requirements for product quality and safety, for production conditions, storage and transportation.
- Specification — a document that defines the structure of the product. Contains components designations, their name and number.
- Assembly drawing — a graphical document that contains an image of the assembly units, and other data necessary for its assembly (manufacturing) and control.

All this documentation can be found on our official website www.rustmash.ru.

ESPR5

Electric submersible pump ESPR5 – (25...300) – (600...3200)

- The design is adapted to oil production, including reservoir additional heating operations;
- Additional cable protection at round-trip;
- Reduced shaft vibration;
- Easy maintenance due to the use of a detachable base;
- Corrosion-resistant design, with the pump's head and the base made of special steel;
- Wear-corrosion-resistant, wear-resistant, corrosion-resistant, heat-resistant designs;
- Involute connections provides reliable operation in harsh conditions;
- Silicon carbide bearings;
- Forced cooling of bearings;
- Rotating parts from low–alloyed and high-alloyed powder, Ni–resist cast iron provide the following features:
  — Smooth surfaces of low channels and excellent performance in corrosive environments;
  — Extended operation lifetime;
- High wear resistance of the pump is insured even in the basic version;
- Floater and compression assemblies;
- Wear and corrosion-resistant models with extra light impellers and extended hub of composite polymer.

Triol Corporation produces a wide range of submersible pumps with the capacity from 25 to 300 м^3/day (from 157 to 18867 barrel/day), and pressure from 600 to 3200 m (1968.5...10498.6 ft).

Application of the intermediate bearings with smaller increments, as well as the upper and lower poles of hard alloys provides ESP operability under the concentration of abrasive particles up to 1000 mg/L (0.12 oz/gal) and the particles hardness up to magnitude 7 on the Mohs scale.

For the operation in corrosive environments Triol Corporation offers pumps with corrosive-resistant and wear-resistant metalized coating that is characterized by high hardness and ductility. It prevents equipment deformation during transportation and round-trip operations.

Impeller and diffuser of the ESP

ESP stage head

ESP stage base

Specially designed impellers and diffusers for floater and compression assemblies.

Different materials from composite polymer to Ni-resist type 4. To be used in Wear-corrosion-resistant ESP types.

ESPR5A

ESP ESPR5A – (25...250) – (600...3800)

- Additional cable protection during tripping operations;
- Wear–corrosion-resistant, wear–resistant, corrosion–resistant, heat–resistant designs;
- Involute connections provides reliable operation in harsh conditions;
- Silicon carbide bearings;
- Forced cooling of bearings;
- Rotating parts from low-alloyed and high-alloyed powder, Ni-resist cast iron provide the following features:
  — Smooth surfaces of low channels and excellent performance in corrosive environments;
  — Extended operation lifetime;
- High wear resistance of the pump is insured even in the basic version;
- Floater and compression assemblies;
- Wear and corrosion-resistant models with extra light impellers and extended hub of composite polymer;
- Heat-resistant design – perfect for wells with artificial reservoir heating;
- The use of special steel for corrosion-resistant design of the pump head and the base.

Triol Corporation produces a wide range of submersible pumps with the capacity from 25 to 250 m^3/day (1 572 bbl/day) , and pressure from 600 to 3200 m (1968.5...10498.6 ft).

Floater assembly provided low pump vibration that with the application of the intermediate bearings with smaller increments, as well as the upper and lower poles of hard alloys provides ESP operability under the concentration of abrasive particles up to 1000 mg/L (0.12 oz/gal) and the particles hardness up to magnitude 7 on the Mohs scale.

Operation in corrosive environments Triol Corporation is insured by the use of corrosive-resistant and wear-resistant metalized coating that is characterized by high hardness and ductility. It prevents equipment deformation during transportation and round-trip operations.

EDR series support documentation consists of product passport and operation manual. The package also includes specification (for the pump, its section and modules), assembly drawing (for the pump, its section and modules) and technical datasheets and packing list.

- Product Passport presents information about main characteristics, technical parameters, product lifetime, the guaranties from manufacturer and completeness data.
- Operation Manual contains information about the EDR series installation, commissioning, maintenance, products' technical parameters as well as information needed for product full and safe operation during all its lifetime stages.
- Technical datasheets — a document that contains a complete list of requirements for product quality and safety, for production conditions, storage and transportation.
- Specification — a document that defines the structure of the product. Contains components designations, their name and number.
- Assembly drawing — a graphical document that contains an image of the assembly units, and other data necessary for its assembly (manufacturing) and control.
- Packing list — a document that contains a list of parts, components, assemblies, packed in several product areas, describing the content of each site.

All this documentation can be found on our official website www.rustmash.ru.
Also at our website you can find the relevant service software for our products.

Electric Submersible motor test bench

- Fully automated testing process with the instant report generation;
- Possibility to test ESP's of different dimensions with length up to 7 m (22.9 ft);
- Measured parameters:
  - — Radial shaft vibration;
  - — Mounting dimensions;
  - — Motor winding resistance by DC current;
  - — Insulation resistance of the stator windings (voltage up to 2.5 kV);
  - — Windings to chasis insulation resistance;
  - — Polarization density;
  - — Short–circuit electrical parameters;
  - — Idle speed electrical parameters;
  - — Acceleration voltage;
  - — Voltage (per phases and average);
  - — Current (per phases and average);
  - — Active and full power (per phases and total);
  - — Power factor (per phases and average);
  - — Stator chasis temperature (number of points upon Customer request);
  - — Stator winding temperature;
  - — Vibration level (number of points upon Customer request);
  - — Starting torque;
  - — Efficiency, power factor and slip;
  - — Maximum torque;
  - — Minimum torque while motor starting;
  - — Rotor run–down time;
- Motor shaft rotation direction measurement.

Triol Electric Submersible motor test bench is characterized with wide application range. Test bench with minimal functionality can be used for electric submersible motor spinning and flushing. Modifications with more extended functionality allow acceptance, commissioning, periodic and qualification testing with an instant report generation. The most intellectual test benches are used during new products research and development.

Scalability and versatility, high automation, possibility of software development upon the Customer request are the key benefits of the present equipment.

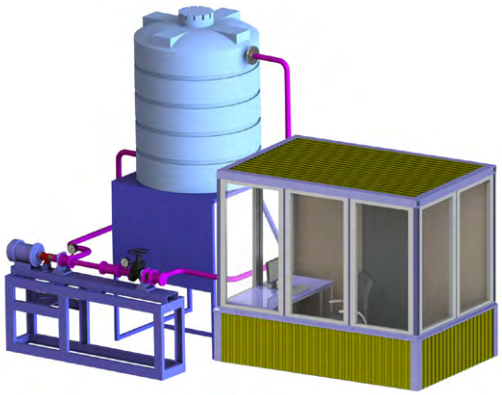
Electric submersible pump test bench

- Fully automated testing process with the instant report generation;
- Measurement of the mechanical losses in the ESP;
- Full pumps testing that imitate real oil well operation (high pressure, high temperature);
- Drawing pump curves;
- Measured parameters:
  — Head, m (ft);
  — Full ESP power, kW;
  — Effective ESP power, kW;
  — Flow rate, m^3/day (bbls/day);
  — ESP intake pressure, Pa (psig);
  — ESP discharge pressure, Pa (psig);
  — Pump rotational speed, rpm;
  — Pump torque;
  — ESP vibration at three points;
  — ESP intake and discharge fluid temperature;
  — ESP chasis temperature at two points.

Electric submersible pump test bench imitate the real oil well operation parameters (for example it produces hydraulic and thermal load). The test bench can automatically create the reports with a big number of parameters gained during the tests.

High automation reduces the terms of products development and manufacture. Test bench's key benefit is a software package of its own design. It allows extending software functionality upon Customer request.

Electric submersible pump impellers and diffusers test bench



- Fully automated testing process with the instant report generation;
- Measurement of the stages vibration in 3 planes;
- Control and maintaining of the following parameters:
  — Fluid gas content;
  — Fluid viscosity;
  — Abrasive particles content;
- Measurement of radial and axial forces.

ESP impellers and diffusers test bench is specially designed to draw pump curves and to hold endurance tests automatically during R&D process. Low-cost version for tests during pilot and mass production is available.

Downhole sensor test bench

- Ambient temperature 150 °C (302 °F);
- Up to 16 units on testing or calibrations at the same time;
- Calibration of measuring vibration in the radial and axial directions in the suspension zone SEM — up to 30 m/s² (ft/s²);
- Testing pressure up to 720 atm (10 580 psig);
- Downhole units calibration upon pressure measurement with accuracy: ±1 %, ± 0,5 %, ± 0,25 %;
- Submersible units diameter up to 117 mm (4,6 in);
- High-pressure vessel for leakage tests is situated in high-protected armored enclosure.

Downhole sensor test bench is specially designed to check downhole units working capacity and calibration at discharge. It also allows testing self–designed equipment as well as downhole units of other manufactures.

Shaft washing test bench

- Fireproof low-toxic flush water;
- 200 L (52,8 gal) expansion tank;
- Renewable metal ceramic filter;
- Quick-detachable components;
- Operating pressure up to 20 MPa (2900,8 psig);
- High ergonomics due to the use of shelves;
- Operated by one person.

Shaft washing test bench was developed by Triol Corporation based on the experience of electric submersible motors production and maintenance. It is used for the shaft interior washing before the straightening and its cleaning during the repair works.

ESP and EDR assembly test bench

- High construction reliability;
- Non-magnetic stainless steel for permanent magnet motors assembly;
- Ergonomic design;
- Comfortable access to the equipment and operational safety;
- Dimensions: diameter from 96 to 189 mm (3.8 to 7.44 in), length 9.5 m (31.2 ft).

ESP and EDR assembly test bench is specially designed for assembly and disassembly operations during products development or maintenance. Simple test bench construction provides easy service and no necessity in additional adjustment.

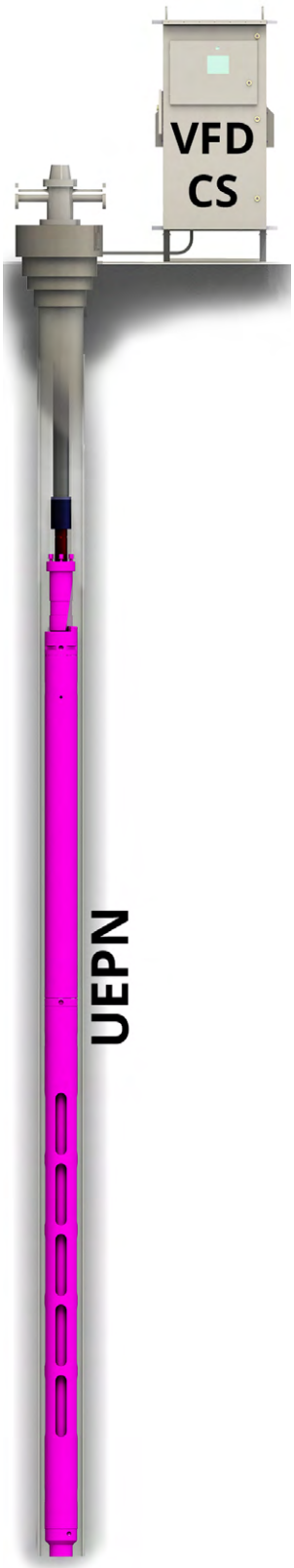
Test benches support documentation consists of product passport, operation manual and user manual.

- Product Passport presents information about main characteristics, technical parameters, product lifetime, guaranties from manufacturer and completeness data.
- Operation Manual contains information about the EDR series installation, commissioning, maintenance, products' technical parameters as well as information needed for product full and safe operation during all its lifetime stages.

User manual offers the minimal information for the safe equipment exploitation.
All this documentation can be found on our official website www.rustmash.ru.

PRODUCTION IN 2015

Reciprocating Electric Submersible Pump UEPN–15–2500–1 installation



- Complete solution for marginal wells;
- Production up from 0 to 25 m^3/day (157 barrel/day), pressure from 600 to 3200 m (1968.5...10498.6 ft);
- High efficiency;
- Effective work in marginal wells and wells with viscous oil;
- Faultless operation in deviated, horizontal and curved trunk wells;
- Increased reliability due to the minimal number of moving parts;
- Occupies smaller area at the wellhead;
- Low installation cost;
- Integrated hydroprotection and downhole sensor;
- A large range of operating modes, individual approach to the mode selection based on oil well parameters to ensure optimum efficiency.

The following construction represents specially adopted reciprocating electric submersible pump with a drive from the electric linear motor.

Reciprocating electric submersible pump installation represents the complex solution for production in margin wells:

- Linear motor that ensures wide range of supply regulation;
- Deep submersible pump that ensures high energy and technology indicators with minimal weight and dimensions;
- Variable speed drive provides the optimal control algorithms and considerable energy savings.

Reciprocating electric submersible pump installation is an innovative product that combines the advantages of the traditional oil production methods.

We offer:

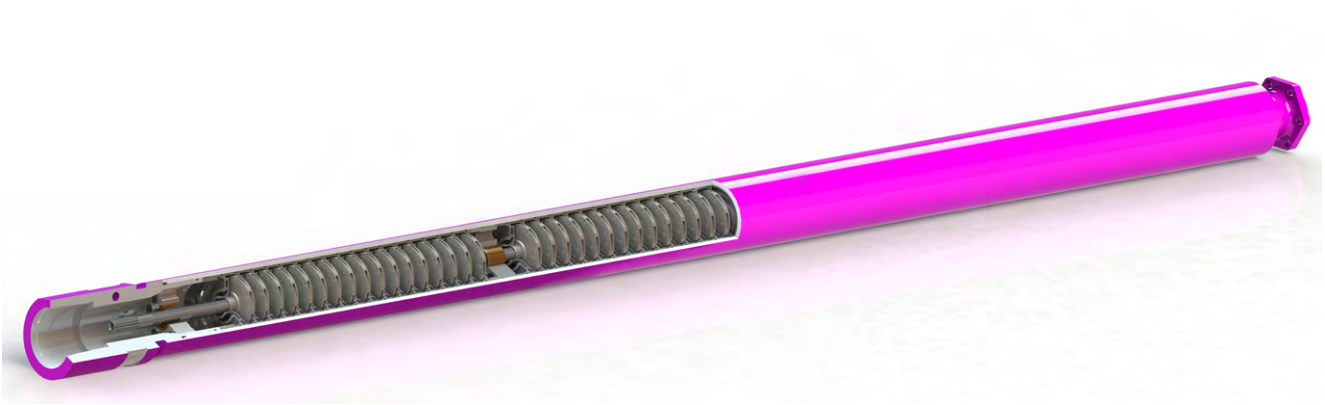
- Compared with ESP:
  - — Increased efficiency in 1,2 times increases oil production efficiency;
  - — Avoiding periodic operation of the well and related problems – check valve leaks, freezing in the winter time, removal of mechanical impurities – reduces operating costs;
  - — Compact installation dimensions allow minimizing round-trip risks;
  - — Operation under the minimal well flow rates when the plunger pump installation is not profitable allows extending the wells' operation fund.

- Compared with sucker-rod pump installation:
  - — Considerable reduce in metal intensity and requirements to the installation site decreases the cost of the well outfitting;
  - — Large landing depth – up to 2500 m (8202 ft) – allows successfully using of the equipment in the Western Siberia;
  - — Increased construction reliability due to the lack of the sucker-rod.

- Compared with sucker–rod pump installation with linear actuator rod:
  - — Large landing depth;
  - — Flexible requirements for the well geometry.

- Compared with progressing cavity pump installation:
  - — High efficiency;
  - — Versatility – no requirements to individual pump materials selection for a particular well.

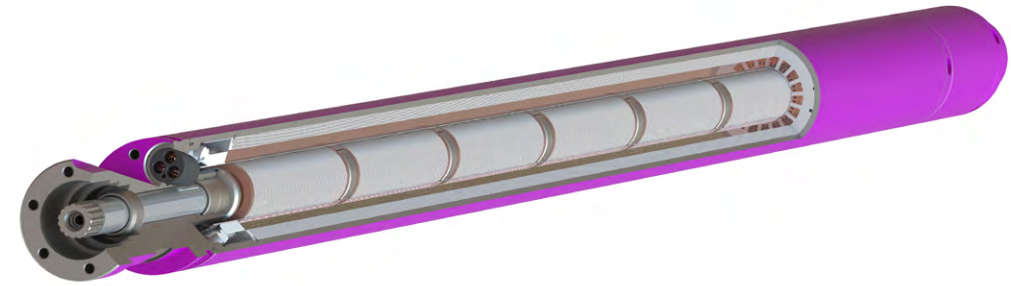
ESP5A Pumps – (300...800) – (350...3800)



- Increased pumps' durability due to the application of the following:
  — Floater and compression assemblies;
  — Reduced to 350 mm (13.8 in) distance between the bearing assemblies;
- Reduced radial loads in bearing applications by reducing the calculation of the optimal distance between the intermediate supports for each type of stage;
- Increased thermal stability ESPR due to the synthetic motor oil and special seals.

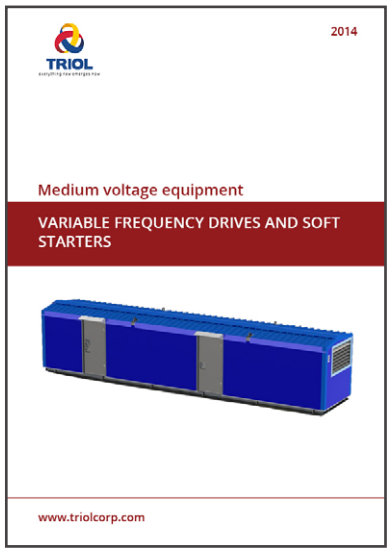
Triol Corporation offers you perspective pumping units with the diameter of 103 mm (4.055 in), developed on the basis of the best time–proved solutions. It represents perfect solution for the oil wells exploitation in difficult conditions (high content of mechanical impurities, gas content and fluid temperature).

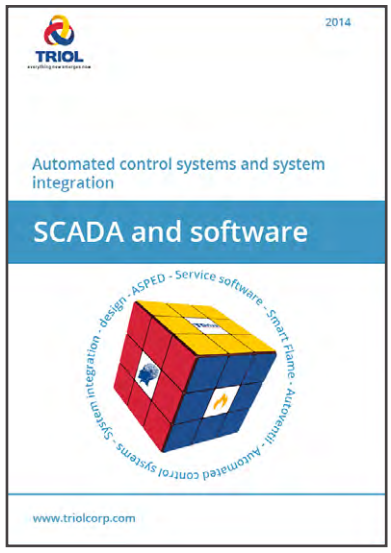
Energy efficient high-voltage Submersible electric motors (with 117 mm (4.6 in) diameter)

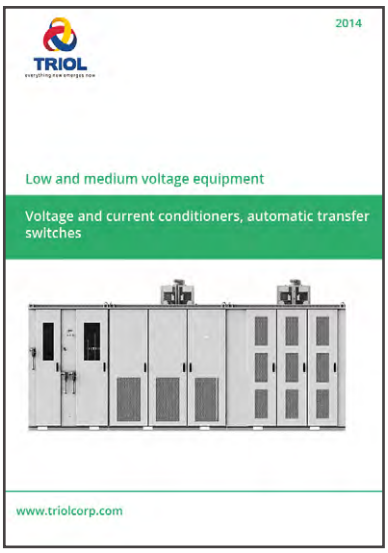


- Efficiency up to 86 %;
- Reduced motor overheating due to the operating current decrease;
- Low energy consumption decrease due to the reduced losses in the cable;
- Increased overload capacity at the torque;
- Use of the high–temperature materials;
- High mean time between failures.

Triol submersible electric motors with the increased supply voltage are specially designed to reduce the losses electrical power supply lines. Smart engineering solutions, modern production base, high quality materials, advanced technologies allow you to use the motors of our production in the toughest conditions.







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