



QR code (abbreviated from Quick Response Code) is the trademark for a type of matrix barcode (or two-dimensional barcode); a barcode is an optically machine-readable label that is attached to an item and that records information related to that item.

How to use:

- Take mobile phone with camera;
- Launch a program for QR-codes scanning (QR Droid, QR Barcode Scanner, Scanner Pro, etc);
- Direct your camera objective to the QR-code;
- Get contact of «Rolt Engineering» which you can save in your addressbook.



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ROLT
POWER PLANTS
PS SERIES

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What shall a company do to extend its business or release a new product? The first and foremost is to organize constant power supply. Connecting to the grids will lead to substantial losses of power supply and increase the prices for electricity. Moreover, in some cases the cost of connection is rather high. The owners of big power-consuming companies face such problems while trying to decrease expenses for power and heat. The solution can be found – it is autonomous generation!

If you read this text, it means that the topic «autonomous power supply» is familiar for you. We are sure that in some time the majority of companies will come up to the idea of construction of their own CHP.

Unfortunately, sometimes the projects of autonomous generation remain on paper. It happens not only because of high expenditures or administrative barriers but also because of newness of such approach, doubts of a company, troubles in handling surplus power, etc.

Although, after the project is finished most of the clients of Rolt Engineering evaluate economic effect of autonomous mini-CHP and wonder why they hesitated so long.

Nowadays the companies mostly deal with low quality of power supply, constantly growing prices and power limits set by local energy service companies. High costs of connection to electrical and heat grids lead to sufficient capital and maintenance charges and as a result it influences the cost of final product.

So it is not a surprise that more and more modern companies prefer autonomous power supply to centralized one and the number of projects of distributed generation increases.

Nowadays in Russia distributed generation consists 1.5% of total generation capacities and this share constantly growth.

In EU distributed generation takes about 10% of energy industry, and, for example, in Denmark it is even 45%. In US there are about 12 millions of mini-CHP plants of total capacity more than 220 GW. Every year American distributed generation grow for 5 GW. In Russia yearly appear much less mini-CHP plants – their total capacity is 1 GW.



Power centers of gas reciprocating generation plants built by our company can produce the necessary amount of electrical and heat power and sufficiently reduce tariffs for energy sources. Judging from our experience of construction of energy plants we can say that for **1kW** of electricity including gas supply and maintenance costs you will pay not more than **\$0,05***! And heat you will get almost for free!

We are sure that you pay due attention to power supply of your company. Although nowadays you can't rely only on centralized power supply because of deficit of electrical capacity, serious equipment and grid deterioration, unpredictable tariffs for connection and other factors.

Rolt Engineering occupies the leading position in Russian distributed generation market and is ready to offer solutions to improve the quality of power supply, reduce costs for electricity and provide your company with «free» heat.

Power plants Rolt PS allow you to get reliable, qualitative and cheap power, make you independent from power distribution during peak demands and also lower self-cost of produced goods strengthening your market position.

Rolt Engineering offers turnkey projects of autonomous generation plants which include:

- preparing of project documentations;
- manufacturing of CHP plants at company's production facilities;
- commissioning of CHP;
- maintenance and service.



Our specialists have large experience of exploiting gas-reciprocating power plants that allows them to calculate benefits from usage of autonomous generation.

For example, 2 MW of power in a distribution company will cost \$2 million* each year. Another three hundred thousand dollars per year a consumer will spend for heat. Autonomous power center including all maintenance costs (gas, scheduled maintenance, etc) will cost about half million dollars per year. It means that in this case you reduce expenditures at least at 4 times! Simple calculation shows how much money you can save using your own power plant.

As our customers say the payback period of power plant is less than 3 years including loan funds. Often mini-CHP pays back in 1.5 - 2 years and sometimes (when the cost of connection is really high) this term reduces to 8-10 months.

* – the calculation was made for CHP located on the territory of Russia.

You can see the economic effect of autonomous generation and calculate the pay-back period by using online-module* at our web-site:

www.roltpower.ru

* – this function shows approximate results and is based on aggregate parameters. For more details, please, address to our manager.

www.roltpower.ru

* – the calculation was made for CHP located on the territory of Russia.



REVIEW OF THE COMPANY

Rolt Engineering, JSC is a leading Russian manufacturer of modular power plants. The company owns production facilities located in Kolomna (Moscow region) with production capacity of simultaneous packaging up to 19 modular gas and diesel power plants under Rolt PS brand. The company offers a wide range of work and services for power plant planning and construction from development of design documentation and own production to commissioning and startup services with further maintenance support.

Basing on extensive production and service expertise Rolt Engineering offers comprehensive solutions in:

- packaging of generating equipment (up to 3,5 MW) in modular units of own design;
- installation of CHP plants in built and/or reconstructed facilities;
- equipping of gas reciprocating and diesel power plants with heat recovery systems of own design;
- development and integration of monitoring software for automated control over generating and utility equipment at power plants;
- utilization of associated petroleum gas at power plants equipped with generating sets from world's leading manufacturers;
- maintenance and after-sale services for energy objects at oil and gas fields.

Rolt Engineering is one of a few Russian companies with full production cycle offering turnkey energy projects.

The structure of the company facilitates the construction of energy centers of any complexity in Russia and abroad. The central office is situated in Moscow, the factory —

STRUCTURE OF THE COMPANY (MAIN BUSINESS PROCESSES)

The specialists of **design-engineering department** prepare project documentation, integrate new technologies and modernize the old ones basing on the latest scientific researches, results of cost-effective analysis, requirements to specification documents and customer's demands.

Project support department gets approvals for all project documents from local authorities, study the site and carry out topographical surveys. The specialists of this department together with our customers work-out technical inquiries, construction documents, calendar plans and agree them with local authorities.

Capital construction department is responsible for contraction of power centers. It elaborates and fulfills construction plans, deals with contractors, carries out engineering supervision on all stages of project: delivery of goods and materials, pre-commissioning and commissioning.

Logistic department coordinates delivery of equipment and components to our factory and then final products – to customer's premises. The specialists of the department project logistic systems, optimize their costs and manages logistic risks.

Engineers of **commissioning and service department** connect and troubleshoot channels, adjust control algorithms and forms of data indication, test equipment. They also take part in 72 hour tests before commissioning of power plant. During this period they train customer's employees. Then they consult the maintenance staff on difficult technical questions, do service works during guarantee period, delivery spares and consumables from regional warehouses in Moscow, Usinsk and Kaliningrad.

in Kolomna, Moscow region. Regional branches maintain the solutions we offer on the whole territory of our country — from Kaliningrad to Siberia. Our company also has branches in the UK and CIS. During its presence in Russian market our company proved to be the leading supplier of generating capacities.

Production capacities of the company occupy the territory of 11 ha. At the factory we produce block-module gas reciprocating and diesel power plants Rolt PS and other energy and engineering equipment. Among the advantages of our factory we can name excellent infrastructure and highly professional team. Our plant is located near the federal highways and railroad junctions so it facilitates the delivery of our production by automobile and railway transport.

Nowadays the production of the company is being extended.

PRODUCTION FACILITIES REVIEW

Location — Kolomna, Moscow region
 Area of production facilities — 11 ha
 Area of a division — 11 000 m²
 Area of warehouses — 7 000 m²
 Final product storage — 1 000 m²
 Engineering staff — 23
 Working staff — more than 100
 Number of block-posts — 4
 Simultaneous packaging of CHP — 19 items

Technical passport of Rolt Engineering production facilities

Beam crane of bearing capacity 10 t	2
Beam crane of bearing capacity 15 t	4
Beam crane of bearing capacity 35 t	1
Welding jig	6
Assembling station of service equipment	10
Paint-spraying booth	4
Electric welding equipment	19
Metalworking machines	6
Metal saw	2
Buzz saw	3
Welding station of stainless still	3
Welding station of ferrous metal	15
Non-destructive testing laboratory	1
Electric laboratory	1
Testing lab	1



COMPANY'S MISSION

We create generating capacities to guarantee our clients reliable power supply and good tariffs thanks to outstanding quality and excellent service, highly qualified staff and constant investment in production.



The main product of Rolt Engineering is block-module cogeneration power plant. Gas reciprocating and diesel power plants Rolt PS embody the best constructor ideas of our engineers. Nowadays we can say that our power plants and mini-CHP Rolt PS (produced serially) set standards of package. These plants are ready to difficulties which may occur during transportation, commissioning and, the most important, operation of complex technical equipment.

How did we manage to do it? For several years our specialists maintained power centers at distant gas and oilfields in Russia and Kazakhstan. In 2005 we understood that the best module power plants did not correspond to the requirements of maintenance team.

So we decided to create a module which will correspond to the requirements of our customers and even anticipate them. And now we can say that we succeeded! Indeed we do know everything about each detail of power plant. Rolt PS has outstanding technical and operational characteristics thanks to the long and scrupulous work of our specialists.

To achieve our goals we bought premises in

Kolomna, equipped them with the most modern machinery, and attracted qualified staff. We set our strategy during the startup period. The first stage to gain the leading position in the market of distributed generation was implementation of our program to provide outstanding quality of our goods.

It is not a secret that the quality of any equipment mainly depends on the quality of its parts and consumables – substructures, pipe fittings, hardware, etc. By the most conservative estimate only piping of fuel system contains more than 1000 welds. Before our customer gets the product we check the pipes for leakage. And we have never come across any rejects! Our welders used to work in submarine industry. It is also worth saying that our welding team and quality control managers have NAKS certificates.

We always study Russian and foreign markets of block-module constructions and know all main packagers in Russia and abroad so we can confirm that our goods have reasonable prices. It became possible because of a lot of procurements and long partner relations with the main distributors of generating, engineering and heat-exchanging equipment.

Gas reciprocating power plants Rolt PSG produce power and heat from gas. Power is made from gas fuel by reciprocating generating unit. It is a unit installed on the frame of gas reciprocating engine and an alternator. If the unit is combined with heat recovery system, it can also produce heat (see p. 14-15).

Gas reciprocating unit is the main part of power plant Rolt PSG. The type of module and engineering systems depend on it. Also long and reliable work of Rolt PSG depends on brand and manufacturer of the unit.

Rolt Engineering takes care on its reputation and carefully chooses producers of gas reciprocating units for its goods. After operational experience and cost-effective analysis we have chosen the following companies:

- Caterpillar Inc. (USA)
- Jenbacher Gas Engine (Austria, the company is a part of American multinational corporation GE)
- MWM (Germany, till 2008 the company worked under Deutz brand).

One of the main criteria is the price of power plant. But it is better to say not «price» but «price of possession». We analyze capital costs (the cost of the unit), efficiency and maintenance cost during 10 years period. We take into account all expenditures — technological liquids, SPTA, cost of service works, etc.

The manufactures chosen by Rolt Engineering offer reasonable price of possession, high quality and many design and engineering developments that improve specifications of the turnkey power plant.

We produce ROLT PSG power plants in full accordance to Russian state standards such as GOST and ROSTECHNADSOR. Our CHP have compliance certificates valid on the territory of Russian Federation. All equipment of Rolt Engineering has English manuals compiled under Russian norms and standards.

The latest information about technical specifications of our power plants in ROLT PSG series you can get at the web-site www.rolt.com in the section «Equipment» or contact our managers.

After operational experience and cost-effective analysis we have chosen the following companies:

- Caterpillar Inc. (USA)



- Jenbacher Gas Engine (Austria, the company is a part of GE corporation)



- MWM (Germany, till 2008 the company worked under Deutz brand).



Rolt PS power plants have outstanding technical specifications. They are easy to operate and look perfect!



Product range of ROLT PSG (Gas reciprocating Power Plants)

Product	Capacity, kW	Type of power unit	Block-module dimensions, mm	Heat recovery system is set inside/outside
ROLT PSG 360	360	Caterpillar G3412C	12000x3000x3000	inside
ROLT PSG 400	400	MWM TCG 2016 V8	12000x3000x3000	inside
ROLT PSG 500	510	Caterpillar G3508	12000x3000x3000	inside
ROLT PSG 600	600-625	GE Jenbacher J312 MWM TCG 2016 V12	12000x3000x3000	inside
ROLT PSG 800	770-834	Caterpillar G3512 GE Jenbacher J316 MWM TCG 2016 V16	12000x3000x3000	inside
ROLT PSG 1000	1000-1063	Caterpillar G3512 E Caterpillar G3516 GE Jenbacher J320	12000x3000x3000	inside
ROLT PSG 1200	1200	Caterpillar G3512 E MWM TCG 2020 V12	12000x3000x3000	inside
ROLT PSG 1600	1560-1600	Caterpillar G3516C MWM TCG 2020 V16	12000x3200x3200	outside
ROLT PSG 2000	2000	Caterpillar G3516 H Caterpillar G3520 E MWM TCG 2020 V20 GE Jenbacher J612	12000x3400x3400	outside



For ROLT PSD are equipped with diesel power plants from the following manufacturers:

- Caterpillar Inc (USA)



- Cummins Inc. (USA)



- MTU (Germany)



- FG Wilson (UK)



Diesel power plants Rolt PSD can be used for primary or standby electrical supply (less often heat supply) from diesel fuel. Diesel plants are widely used in Oil&Gas industry and in distant areas. Diesel unit specifications you can find at the web-site www.rolt.com in the section «Equipment» or contact our managers.

Product range of ROLT PSG* (Diesel Power Plants)

Product	Capacity, kW		Block-module dimensions, mm	Type of power unit
	primary	standby		
ROLT PSD 250	256	280	9000x2400x2400	Caterpillar 3406 Cummins C330D5 MWM TCG 2016 V8
ROLT PSD 320	320-328	352-360	9000x2400x2400	Caterpillar C15 Cummins C400D5
ROLT PSD 360	364	400	9000x2400x2400	Caterpillar C15 MTU 10V 1600 G10 FG Wilson P350P4-P400E4
ROLT PSD 500	491-508	546-560	12000x3000x3000	Caterpillar C18 MTU 12V 1600 G10 FG Wilson P591P2 - P650E2
ROLT PSD 800	800-820	880-910	12000x3000x3000	Caterpillar C32 MTU 16V 2000 G63 FG Wilson P 910P1 - P1000E1
ROLT PSD 1000	999-1088	1110-1200	12000x3000x3000	Caterpillar 3512 MTU 18V 2000 G65 Cummins C1400D5
ROLT PSD 1200	1200-1260	1280-1400	12000x3000x3000	Caterpillar 3512B MTU 12V 4000 G23 R2F
ROLT PSD 1500	1460-1485	1600-1650	12000x3000x3000	Caterpillar 3512B MTU 12V 4000 G63 FG Wilson P1350P1 - P1500E1
ROLT PSD 1800	1820-1832	2000-2035	12000x3000x3000	Caterpillar 3516B HD MTU 16V 4000 G63 Cummins C2500D5A
ROLT PSD 2400	2400-2525	2805	12000x3000x3000	Caterpillar C175 MTU 20V4000G63

* – all diesel plants Rolt PSD can be compiled with heat recovery system for production of heat.

Product range of ROLT PSHF (Gas reciprocating Power Plants)

Product	Capacity, kW		Block-module dimensions, mm	Type of power unit
	750 rpm	1000 rpm		
ROLT PS HF 1500	1420	1760	under request	Caterpillar 3606
ROLT PS HF 2200	1890	2350	under request	Caterpillar 3608
ROLT PS HF 3300	2840	3520	under request	Caterpillar 3612
ROLT PS HF 4400	3780	4700	under request	Caterpillar 3616

CHP ROLT PSHF is designed to work on heavy liquid fuel: masut, crude oil, heavy diesel oil and others. The main quality of these liquids is HV. Caterpillar engines which forms ROLT PSHF series are low speed ones. It sets high weight-and-dimensional characteristics of CHPs and hence requires exact engineering evaluation of metal ware structure in accordance with TDA. You can find the unit characteristics at the web-site www.rolt.com in the section «Equipment» or contact our managers.

At first site, block-modules for CHP have much in common with the standard transport containers. But only specialists understand that their simple forms hide complicated engineering systems allowing generating equipment to produce power and maintenance team to do service works.

Rolt Engineering has great experience of production and servicing block-module power centers. We stick to the most modern approaches in package of generating equipment using reliable technological solutions, materials and tools.

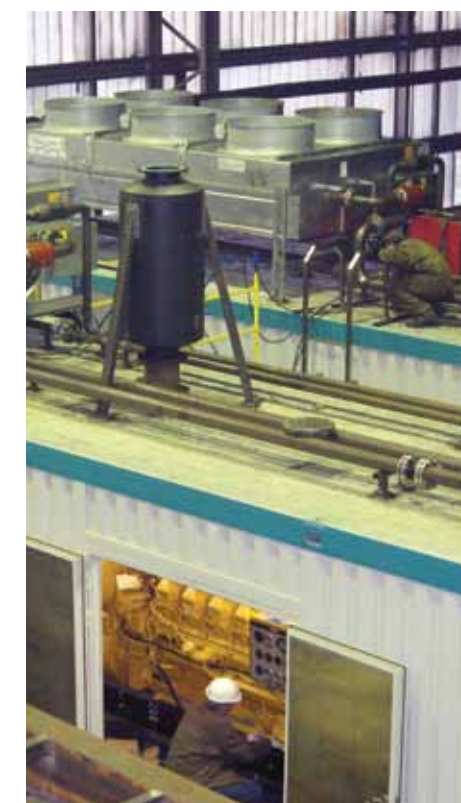
Our constructor solutions allow us placing into standard block-modules generating sets from many leading manufacturers of gas and diesel equipment. Engineering documentation contains any specification for any power equipment which determines the places for doors, gaps, slots, valves, etc.

Block-module dimensions allow to transport it by truck or railway.

Containerisation enables to form a power center from separate blocks with joint machinery compartment for several modules.



A whole metal structure of container for ROLT PS is made under Technical Conditions TU 3377-001-46856605-2010 «Metal arctic module-container for gas or diesel power plants».



Our specialists analyzed structural reliability of block-module for each series of generating equipment. Engineering documentation is elaborated for all types of power plants from the product line.



4 enforced upper fittings for loading works and transportation. Bearing structure of container is rigid and firm enough for transporting heavy engines and engineering systems of 80 t.



The dimensions of container of Rolt PS correspond to all transport requirements by truck or railway.



According to safety requirements there are stairs and rails which prevent the staff from falling down. They are made from stainless steel.



The enforced roof of container allows placing offset equipment (muffer, dry cooling tower, heat recovery system, exhaust system, etc). The roof is inclined so atmospheric fallout does not gather on it.



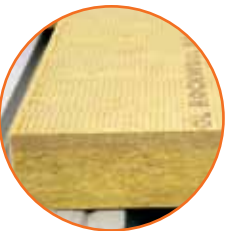
Technological ventilation gaps in the walls of container and swinging doors are equipped with snowshields made from stainless steel.



Ventilation slots guarantee cooling of the hottest parts of engine and generator and supply hot air to the necessary equipment.



The outside walls of module is 1,5 mm thick. Inoxidizing coating of inside and outside walls corresponds to the requirements of GOST 9.032, GOST 15150 and SNiP 2.03.11. The color of painting and logotype depend on customer requirements.



The walls, floor and ceiling of container are covered with soundproof mineral cotton with increased sound absorbing characteristics. The level of noise in about 1 m away from power plant is 73 dB.

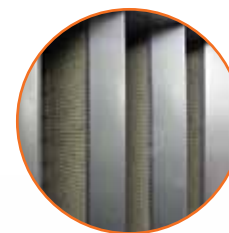


Bearing structures of block-module are made from special rectangular pipes. The frame distribute to the basement load and vibrations appearing while combustion engine is working. Welding substructure of container bears many loading operations and transportation.



The doors on the sides of container provide easy approach to the main details and parts of gas reciprocating or diesel power plant. All doors have mortise locks produced by "Antipanika" company and door rubbers. One of side slabs is detachable.

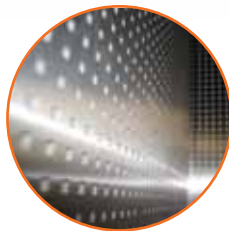
Ventilation gaps have electric driven heated blinds. Soundproof box is situated on the outside of the container. It changes airstream and preserves noise inside the container.



Two crane beams with load capacity of 7 t are installed along the machinery compartment and have blocks and mechanical tackle. This mechanism allows to do scheduled service (including overhaul) of generating equipment inside container.



The walls, ceiling and floor of block-module are covered with metal perforated lists. To improve soundproof characteristics 2 layers of incombustible cover are integrated into coating.



There are several types of lights in block-module: working Lighting which lights the inside of block-module at the level of 50-100 Lk, emergency Lighting which works during emergency situations, outside lightning, maintenance Lighting of 24-3d V DC.



Generating equipment is installed using special materials suppressing vibration from the engine. Dampers reduce remaining vibration up to 3%. Low vibration allows to use serial road plates as a basement for container.



Switchers and sockets inside container have voltage marks. Electric communications are placed inside metal boxes fixed on the walls of container. It is aimed at improving of wiring and its further repair.



All components of engineering systems of power plants Rolt PS were many times tested in real conditions.

Fuel system

Fuel system consists of gas line, gas reciprocating unit, gas rout of block-module and gas detection system.



made by high temperature and low temperature circuits of gas reciprocating engine.

While power plant is working in standby regime, the necessary temperature of coolant is kept automatically by electric heaters on engine. When power plant starts, the heaters automatically switch off. Remote cooling tank with low level of noise is situated on the roof of the container on special metal structure. In remote tank the low temperature and high temperature circuits are cooled by circulating air.

Startup system

Electric starting system modifies electric power of starter into mechanical power to swirl the crankshaft of generating unit. The system consists of automatic charger, starter battery and electric starter. Starter battery is charged by automatic charger. Moreover, CHP has two electric resistor heaters for regulation of temperature of standby engine to facilitate dry motoring and startup of engine.



Automatic fire-extinguishing system

The system detects and extinguishes fire at early stage. It gives signals of emergency stop of CHP, emergency shutdown of valves and alarm signals. Fire extinguishing stuff (gas, aerosol, powder) is automatically emitted inside container. Powder modules of fire suppression are installed above extinguishing zones on the ceiling.

Oil system

Oil system constantly supplies filtered or cooled oil from crankcase to all friction joints of gas reciprocating engine.

Oil system includes: oil pump, ball valve, solenoid valve, system of automatic power supply, oil tank, level of visual control.

The necessary level of oil in engine crankcase is constantly kept by automatic oil charging. For this purpose on the frame there is a filling-up oil tank which connects crankcase and oil-and-petrol resistant sleeve. To discharge or top up the tank there is an output manhole.

Cooling system

This system draws heat from hot parts of engine.

Cooling system is radiator type system with separate cooling circuits for high and low temperature. High temperature circuit cool cylinders, cylinder heads and oil, low temperature circuit — boost air.

Cooling system includes remote tank with fans installed on the roof of container, thermostats for engine coolant, pipes and isolation valve, hydrophores to decrease pressure in the system and pumps. The heat is taken from hot parts of engine by air convection and coolant circulation in remote cooling unit



Auxiliaries cabinet

Auxiliaries cabinet provides power supply and controls the systems of auxiliaries of CHP. Auxiliaries cabinet is combined with control cabinet of CHP and is situated in module of CHP. It is a metal cabinet with one front door.

Auxiliaries cabinet can:

- Accept and distribute voltage between consumers 380V and 220V,
- Automatic turn to standby regime
- Keep power plant ready to start
- Control cooling tank
- Automatically and manually control oil pump
- Supply power to electric heat convectors of containers
- Supply power to fire extinguishing and security systems of block-module
- Supply power to gas security system of block-module,
- Control lights: main and emergency
- Control voltage alarm of 380V at input
- Switch off voltage and emergency stop.

Ventilation and heat system

The system gives filtered air for combustion to gas reciprocating engine in order to cool CHP and keep the necessary air temperature in power plant

The system consists of:

- air valves,
- mufflers,



- motor electric valve,
- fans,
- louvered shutters,
- ventilation dust,
- snow shields.

Ventilation gaps are places in accordance with engineering calculations to provide equal cooling of the hottest parts of the plant. Air valves look like a box with louvre shutters inside. They are opened and closed automatically by electro-magnetic DC.



Air valves are opened when the plant starts and closed when it stops. When fire alarm appears all louvre shutters close despite the mode of work. The shutters are equipped with spring return mechanism and valves close for less than 10 seconds. Ventilation gaps have electric driven heated blinds. Soundproof box is mounted on the outside of the container.

Heat system consists of electric convectors placed on the walls of block-module. They are controlled manually.



We know that long and constant work of power center depends on the quality of its engineering systems. So among our partners you can find only reliable companies:

Exhaust system

It removes products of combustion and consists of heat expansions, pipe sleeve, exhaust pipe, muffler with fittings on the roof. A flap on the pipe prevents water from muffler



The advantages of co-generation cycle of gas or diesel power plants in comparison with the main cycle are evident: increase of fuel effectiveness up to 90%, high economic performance, self-containment, minimal level of heat losses because of short distance between power plant and consumer, etc.

Payback period of the investments in autonomous power center depends on effective use of fuel (trunk gas, oil associated gas or diesel). It is a fact that during generation chemical energy of hydrocarbon fuel is modified to electric one with efficiency of 27-45% depending on generating equipment and its manufacturer. Remaining energy turns to heat which can be useful.

The principle of work on CHP is combined production of electric and heat energy from one source. The advantages of cogeneration cycle of gas or diesel power plants in comparison with the main cycle are evident: increase of fuel effectiveness up to 90%, high economic performance, self-containment, minimal level of heat losses because of short distance between power plant and consumer, etc. Global experience shows that cogeneration increases energy saving up to 40% or even more compared with separate production of electricity and heat. The most effective and useful are engineering solutions based on gas reciprocating engines with heat recovery system.

The heat produced by gas or diesel power plant can be used for production of hot water, steam, cold (trigeneration) or technological processes which require a lot of heat energy. In internal combustion engines you can successfully use several sources of heat:

- Exhaust gases of internal combustion engine;
- High temperature circuit (cooling jacket, cylinder heads, turbocharged inlet air of first stage).

The amount of heat which can be collected from each of them depends on the manufacturer and the brand of equipment but usually they are in proportion 1:1. So heat capacity which can be collected from high temperature circuit of gas reciprocating plant G3515E (power 1200 kW) is 595 kW, from exhaust gases – 522 kW.

The heat from cooling circuit of intercooler (so called low temperature circuit) usually is

not properly used as the temperature of coolant does not exceed +45-50 °C. But in some technological processes of draining and heating (protected ground industry, production of building materials, food, etc) you can easily use this heat energy.

The specialists of "Rolt Engineering" can offer you suitable cogeneration schemes which would correspond to the technological processes in your factory and maximize fuel utilization factor. As a result mini-CHP reduces unit costs and strengthens your market position.

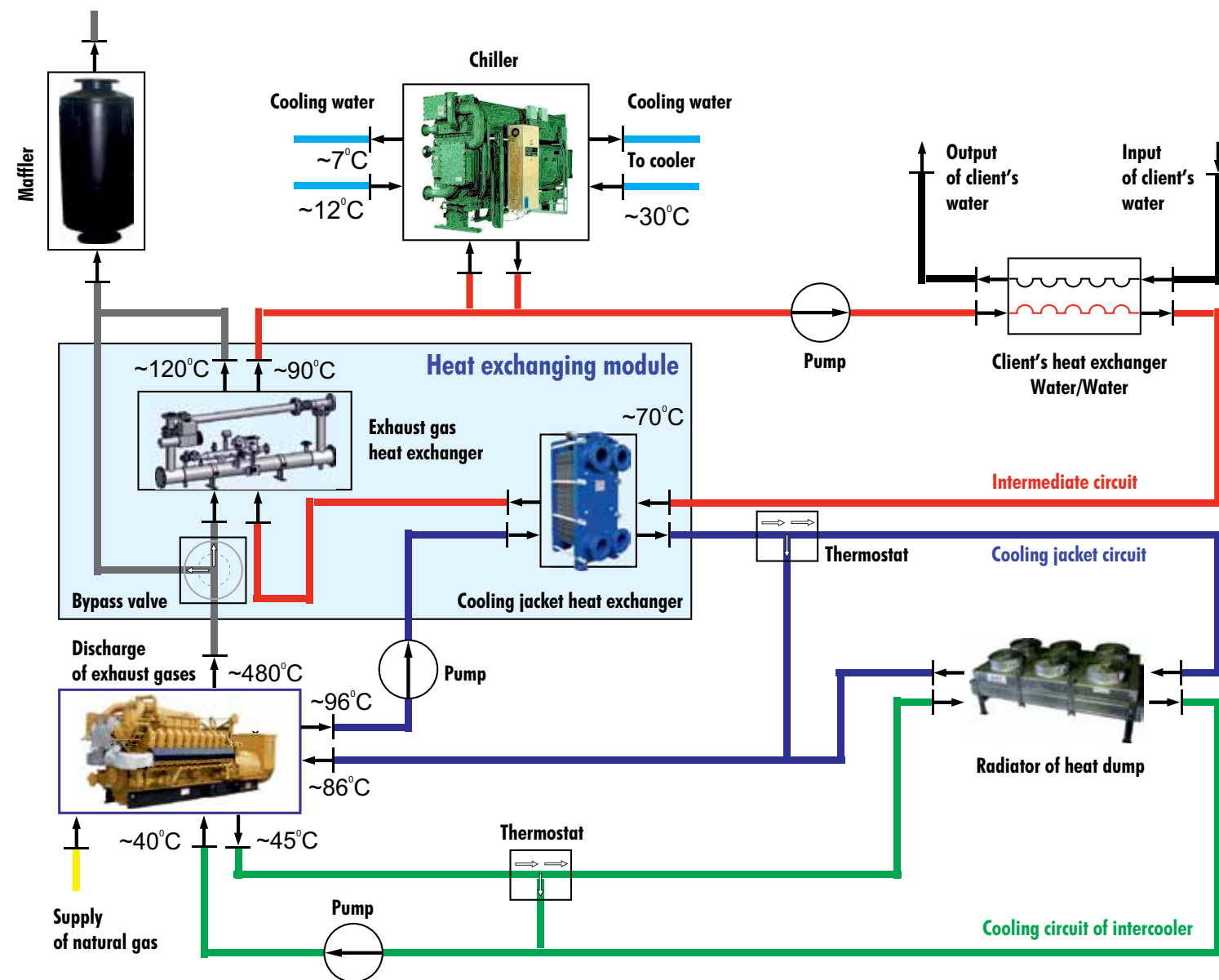
Wasteheat exchanger used by Rolt Engineering in heat recovering system is a fire-tube so it can be equipped with the system of automatic cleaning.

It is worth mentioning that heat recovery system ROLT PS eliminates contacts between coolant of the customer and wasteheat exchanger circuit. Thanks to this engineering solution heat exchanger is not contaminated with mechanical admixtures, salts, cinder, etc. Contact of unprepared water with highly heated walls could lead to deposit of scale. It could cause unequal heating of wasteheat exchanger and decrease its heat output. Very often it leads to breakdown of an expensive exchanger.

Heat recovery system is equipped with flanges for connecting of heat pipes of the customer. The system is automatic and supports the necessary temperature regimes. Almost all elements of heat recovery system are made from inoxidizing stainless steel that provides high reliability and long operation life.



The heat produced by gas or diesel power plant can be used for production of hot water, steam, cold (trigeneration). The heat can also be used in technological processes which require a lot of heat energy. Trigeneration is necessary in the process of manufacturing of consumer goods.



Control panel of Rolt PS power plant is based on extended control of single or multiple machines generating units working in primary or standby modes. Controller is optimized to operate complex power centers working under the principle of cogeneration.

Control System manages all engineering system and auxiliaries of cogeneration heat power plant. To fulfill this function the specialist of Rolt Engineering elaborated control panel.

Power plants Rolt PS are automatic on the 3d level of automation under State Standard GOST 14288-80 «Automatic diesel and gas engines. Classification by the level of automation».

Control functions of gas or diesel power plants and engineering systems are combined and situated in one cabinet. Usually automatic control systems of Rolt PS power plants are based on controllers and additional modules of extended production from leading manufacturers of automation industry: ComAp, Woodward and Terberg.

System of automatic control of power plant provides:

- Local, automatic and remote control of start, stop and prestart operations according to GOST 10032-80;
 - Automatic load acceptance in autonomous mode, automatic synchronization and distribution of active and reactive load (equal or set by active capacity) during simultaneous work with similar equipment;
 - Automatic work of alarm and protection system: warning signals of protection according to emergency parameters;
 - Automatic unloading of CHP before finishing simultaneous work of generator and grid;
 - Rate of rotation is kept automatically;
 - Protection from increase/reduction of rotation of generator or other parameters;
 - Measurement, control and frequency indication, electric frequency, active or reactive capacity, voltage capacity, generator voltage, phase shift during synchronization, number of starts, amount of operating hours, amount of produced energy.
 - Readiness to start in autonomous mode.
- Autonomous control panel of Rolt PS has these functions:
- Automatic monitoring of readiness to start;
 - Automatic or manual start of unit and setting up of the necessary load;
 - Automatic stabilization of the necessary mode of work of the equipment;
 - Automatic switching-on of power plant and switching-off of fuel gas supply when system of gas detection sends emergency signals to automated station;
 - Automatic heating of power plant;
 - Automatic supply of gas or diesel fuel to power plant;
 - Simultaneous work of several CHPs on joint bus with set parameters of distribution of active and reactive load between working machines or under the algorithm of equal distribution of both types of load without interruption of supply;
 - Control and visualization of parameters at the display in automated computer work station.

Power plant as a part of CHP Rolt PS has its own control panel.

The panel allows to start or stop the engine, monitor main parameters of power module even when higher control system does not work.

Besides, standard panel acts as a channel for passing signals to automatic system of higher level.



We use our own control system for operating control and monitoring of power plant Rolt PS and its engineering systems.

Monitoring system allows to get and analyze a lot of digital and analog signals of controlling parameters of the equipment from different manufactures and having different communication protocols (gas reciprocating power plant, diesel power plant, packaged switchgear, low-voltage package module, etc).

Operation and control parameters of power

center can be controlled on the display of personal computer of the operator of automated station. Operator signals about emergencies by visual row and by alarm.

All data can be found in the data storage as diagrams or tables so user could analyze operating parameters which led to emergency.

The interface of monitoring system is very simple and easy to use. Data can be shared via the Internet or any radio channel. So you can control your power center even being hundreds of miles away.



Operator of power plant uses the control display which is on the front side of the auxiliaries cabinet and can set the following modes of operation:

AUTO is an automatic regime. The controller forms launch and stop orders for gas reciprocating engines, switching on and off Automatic Generator Switcher (AGS). Launch and stop buttons of gas power plant, AGS switches on and off buttons on the controller display are blocked.

SEMI-AUTO is a semi-automatic regime. The orders to launch and stop gas fueled engine and AGS switching are formed by operator pushing buttons on the controller's display but the operations are made automatically and conducted by controller. Switching on of AGS to the charged tires is automatically synchronized. After that the capacities are distributed between gas power stations which work simultaneously. AGS switches off with unload of generator (in case of simultaneous work of two or more gas reciprocating power plants) and without unload in case of single work of gas plant.

MANUAL is absolutely manual regime. Operator can launch or stop generator by pushing the necessary buttons on the controller display. Frequency can't be controlled, generator can't be charged and capacity is not distributed between generators. Switching on of AGS to the charged tires is made in case the conditions of synchronization coincide (difference of frequencies, phases and voltage shall be within the parameters set by controller INTELISYS NT meanings). Switching on of AGS to the discharged tires is made without synchronization. Switching off of AGS is made without unload.

OFF – controller does not work, the plant is blocked, switching off button of AGS is blocked.



Block-module is rather flexible designer solution which allows to place equipment in rather limited space.



Block-module is rather flexible designer solution which allows to place equipment in rather limited space. Besides, optimized dimensions of container enable to form a power center from separate blocks. For large complex power centers it is preferable to use quick-erected buildings from sandwich panels. This designer solution provides

reliable and long-life operation and easy-to-maintain conditions.

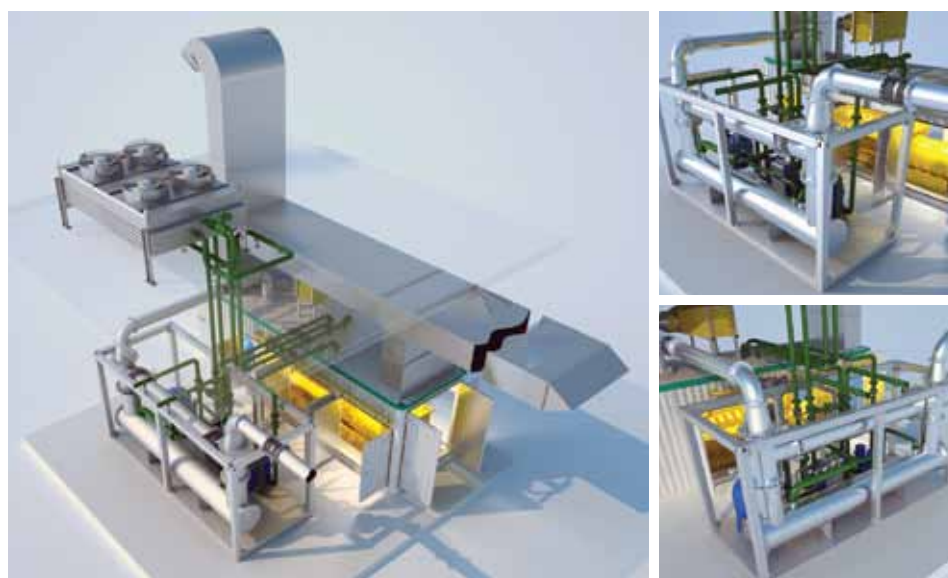
Quick-erected buildings easily fit mini-CHP into sophisticated urban or industrial landscape. In case of lack of space Rolt Engineering uses multilayer space arrangements.



For capital buildings engineers of our company worked out technical solutions of integration into engineering systems of buildings. In this case envelope structure functions as separate soundproof cover providing effective air circulation to cool generator bearing, cylinder block, and supplying air for combustion. Soundproof

cover is also equipped with a crane beam for scheduled maintenance and repair of generating equipment.

Engineering systems of a plant are separated into functional joints which are tested (hydraulic, UT, etc) at the production site before the delivery to customers.

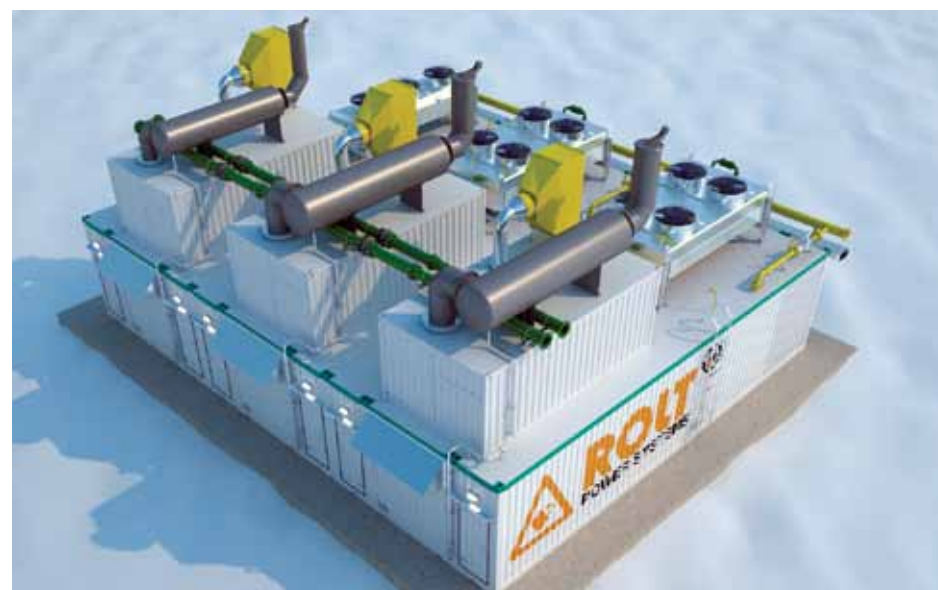


Container power plants have one peculiar characteristic – they can make one power center with joint machinery compartment from several blocks.

This technical solution does not require common walls of modules set next to each other. It sufficiently facilitates use of power plants and

supposes more comfortable areas for work of service team. Besides, power plants with joint machinery compartment are preferable to quick-erected buildings because of their flexibility. Indeed you can easily dismount the power center and move it to another site.

Quick-erected building is not so mobile.



Mobile diesel power plants Rolt Mobile Power Systems were elaborated by our engineers for the Federal Program «State program of reforming of housing utility sector, achieving of goals of energy efficiency and energy safety in housing utility sector».

Mobile diesel power plant Rolt Mobile Pow-

er Systems is practically the only solution in case of emergency at the site of constant power supply.

You can move the equipment of portable diesel power plant from working position into transportable one for half an hour.



For limited spaces our specialists worked out and nowadays successfully use solutions with joint machinery compartment.



Mobile diesel power plant Rolt Mobile Power Systems is a turnkey product. It consists of diesel power plant of block-module type and its transport base which is automobile low frame platform (semitrailer tuck with vehicle dolly).

Mobile power plant can be transported by drive truck or by special means of transport with technological vehicle dolly (included).

Automobile low frame platform has «Approval of the means of transport», vehicle registration certificate, invoice statement and corresponds to GOST R 52281-2004.

Overall transport dimensions correspond to all requirements and allow to move block-modules by public roads without special permissions for transportation.

Unlike other engineering solutions offered in Russian market, Rolt Engineering produced mobile units of wide power range — from 500 to 2500 kW based on generating equipment of world leading manufacturers.

Thanks to our highly qualified staff and modern technical infrastructure our service remains constantly excellent.

We offer:

- Commissioning
- Testing (defection)
- Regular overhaul and renovation
- Remote monitoring
- Modernization
- Compiling of SPTA funds
- Consulting of the customer maintenance team

There are 24-hour operations control center.

Specialists of «Rolt Engineering» have a wide experience of commissioning of power centers on the generating equipment by different manufacturers.

Mainly commissioning includes: adjustment of control systems and all additional engineering systems (ventilation, fire suppression, etc.) of power center, mechanical leveling of the equipment for engine and generator alignment installed on one frame. Then the engine is filled with technological liquids, adjustment of relay protection fitting, testing and measuring in accordance to technical documents.

After commissioning we do complex probationations for 72 hours, the act is signed and the equipment is ready-to-use. During commissioning we train service brigade of the customer to maintain power center. Training can take place in our training center in Kolomna and at customer premises. Our company maintains the equipment in Russia and in neighboring countries. Thanks to our highly qualified staff and modern technical

infrastructure our service remains constantly excellent.

«Rolt Engineering» offers:

- Scheduled maintenance of CHP and of gas or diesel engines within engineering equipment (compressor plants, pumps, etc);
- Testing (defection) of gas reciprocating and diesel engines, also CHP and plants on their base;
- Scheduled maintenance and repair of generating units and engines;
- Technical maintenance and 24-hour remote monitoring;
- Modernization of generating equipment end its control and monitoring systems;
- Delivery of spare parts and consumables for power plants, compiling of SPTA funds at customer's warehouse.

JSC «Rolt Engineering» has gained wide experience of managing difficult tasks that increase effectiveness of your business by improving the work of power centers at the sites.

Our company offers the way to increase effectiveness of power objects – the service and maintenance program for energy equipment under the conditions of outsourcing.



Maintenance of power plants under the conditions of outsourcing:

We will serve and maintain your power center and you can fully devote yourself to your business!

This solution allows our customers to concentrate on their business, plan expenditures, optimize distribution of its own resources and, as a result, increase their profit.

Our company has been offering the service and maintenance program for energy equipment under the conditions of outsourcing from

2006 on the territory of Russia. Our certified specialists make everything's possible to avoid emergency blackouts of energy and offer different measures to increase efficiency of your business. We will serve and maintain your power center and you can fully devote yourself to your business!

JSC «Rolt Engineering» has a variety of lease gas reciprocating and diesel power plants of unit capacity form 300 kW to 6 MW. The types of equipment (open type on frame, in block-module, on mobile platform and others) can be leased for 3 months and more (even several years). It solves the problem of temporary power supply and eliminates the necessity of heavy investments in the equipment.

Our specialists will quickly deliver the goods to the site, connect the necessary load and maintain CHP during lease period. In case of breakdowns there is emergency stock of SPTA enough for any lease equipment in our main warehouse in Kolomna and in regional warehouses. For repair period the customer gets the equipment from temporary stock. Apart from generating capacities «Rolt Engineering» leases:

- Additional oil tanks for diesel power plants;
- Operator cabins;
- Electric cables of different sizes;
- Transformer plants;
- Trays and tray holders for cables;
- Commutation cabinets with control panels produced by our company and allowing to synchronized any mount of gas or diesel power plants;
- Fire points and other equipment.

Under an average contract «Rolt Engineering» maintains equipment, supplies fuel and technological liquids.



Our company has a variety of lease gas reciprocating and diesel power plants of unit capacity form 300 kW to 6 MW. The types of equipment (open type on frame, in block-module, on mobile platform and others) and additional equipment can be leased for 3 months and more (even several years).

Rolt Engineering delivers SPTA for gas reciprocating and diesel power plants by Caterpillar, MWM, Jenbacher, Cummins, Perkins, MTU, etc.

Besides, we offer a great variety of special tools and consumables for technical support and repair of the mentioned above equipment.

In the central warehouse in Kolomna always there are about 10000 items of different spare parts – from consumables to details for overhaul of equipment. We constantly renew our warehouses and most rapidly wearing parts of CHP.

Do you need a rare detail or an item which is taken out of production? Under your request all necessary details will be quickly ordered from the manufacturers or their dealers and delivered to your premises.



Rolt Engineering is now supplying engine parts and components for all types of diesel engines, with a focus on:

- Caterpillar
- Cummins
- MTU
- FG Wilson

We now offer a full range of engine overhaul kits and also components at competitive price such as crankshafts, camshafts, cylinder heads, electronic unit injectors, fuel injection pumps, conventional injectors and much more.

Rolt Engineering is also an independent industrial diesel repair and re-manufacturing company for both the oil and mining industries. Our reputation for experience and top-quality work allowed our customer base to grow and the company to evolve into a heavy diesel service organization.

Being in the Oil and Gas industry often means being in remote locations and working under harsh conditions. And because crews depend on diesel engines to power just about everything on the jobsite, reliable operation, good performance, and operational longevity are critical factors.

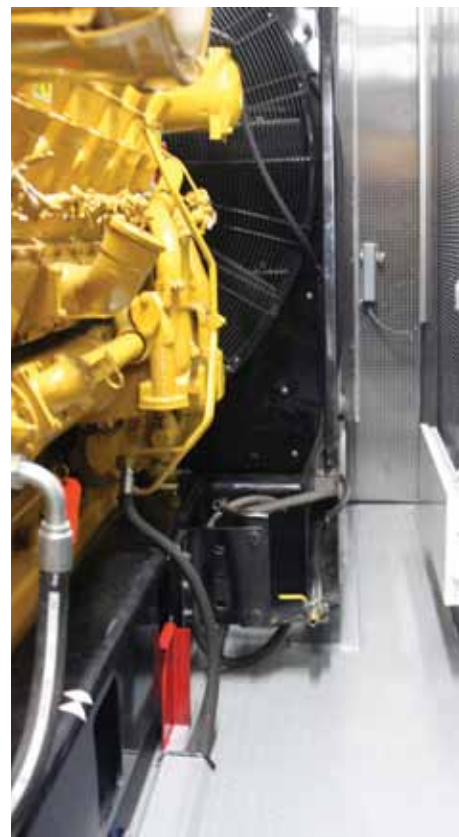
Rolt Engineering knows those demands better than most. We began servicing clients working in Arctic oil exploration over 10 years ago, and today we're pleased to count many organizations in oil and gas exploration, drilling and delivery among our loyal customers.

Our new workshop will have state-of-the-art facilities and highly trained engine rebuild teams which have made us a reliable company for industrial diesel re-builds and maintenance for leading oil and gas operations around Europe, our meticulous attention to quality and detail ensures that all our engines, whether they're on deep sea platforms or remote pipelines, deliver the reliability and longevity our customers depend on.

Rolt Engineering is now supplying engine parts and components for all types of diesel engines, with a focus on CAT, CUMMINS, and MTU Engines

It's all about having access to the quality rebuilt engine parts and kits that you need when your engine isn't working. You also want to ensure it will keep performing for as long as possible. Our rebuilt engine kits are made to protect your rebuilt diesel engines from wear and tear so that they will perform better and longer.

Rolt Engineering knows that many companies rely on old equipment to do their work every day. When they stop working, they need cost-effective options for getting them back in use so that they can get back to work as quickly as possible. Our rebuilt engines, engine kits and components are available



for the brands of engines that you rely on and that you want to keep relying on in the future.

We now offer a full range of engine overhaul kits and also components at competitive price such as crankshafts, camshafts, cylinder heads, electronic unit injectors, fuel injection pumps, conventional injectors and much more.



Product range of ROLT PSG (Gas reciprocating Power Plants)

Product	Capacity, kW	Type of power unit	Block-module dimensions, mm	Heat recovery system is set inside/outside
ROLT PSG 360	360	Caterpillar G3412C	12000x3000x3000	inside
ROLT PSG 400	400	MWM TCG 2016 V8	12000x3000x3000	inside
ROLT PSG 500	510	Caterpillar G3508	12000x3000x3000	inside
ROLT PSG 600	600-625	GE Jenbacher J312 MWM TCG 2016 V12	12000x3000x3000	inside
ROLT PSG 800	770-834	Caterpillar G3512 GE Jenbacher J316 MWM TCG 2016 V16	12000x3000x3000	inside
ROLT PSG 1000	1000-1063	Caterpillar G3512 E Caterpillar G3516 GE Jenbacher J320	12000x3000x3000	inside
ROLT PSG 1200	1200	Caterpillar G3512 E MWM TCG 2020 V12	12000x3000x3000	inside
ROLT PSG 1600	1560-1600	Caterpillar G3516C MWM TCG 2020 V16	12000x3200x3200	outside
ROLT PSG 2000	2000	Caterpillar G3516 H Caterpillar G3520 E MWM TCG 2020 V20 GE Jenbacher J612	12000x3400x3400	outside

Product range of ROLT PSG* (Diesel Power Plants)

Product	Capacity, kW		Block-module dimensions, mm	Type of power unit
	primary	standby		
ROLT PSD 250	256	280	9000x2400x2400	Caterpillar 3406 Cummins C330D5 MWM TCG 2016 V8
ROLT PSD 320	320-328	352-360	9000x2400x2400	Caterpillar C15 Cummins C400D5
ROLT PSD 360	364	400	9000x2400x2400	Caterpillar C15 MTU 10V 1600 G10 FG Wilson P350P4-P400E4
ROLT PSD 500	491-508	546-560	12000x3000x3000	Caterpillar C18 MTU 12V 1600 G10 FG Wilson P591P2 - P650E2
ROLT PSD 800	800-820	880-910	12000x3000x3000	Caterpillar C32 MTU 16V 2000 G63 FG Wilson P 910P1 - P1000E1
ROLT PSD 1000	999-1088	1110-1200	12000x3000x3000	Caterpillar 3512 MTU 18V 2000 G65 Cummins C1400D5
ROLT PSD 1200	1200-1260	1280-1400	12000x3000x3000	Caterpillar 3512B MTU 12V 4000 G23 R2F
ROLT PSD 1500	1460-1485	1600-1650	12000x3000x3000	Caterpillar 3512B MTU 12V 4000 G63 FG Wilson P1350P1 - P1500E1
ROLT PSD 1800	1820-1832	2000-2035	12000x3000x3000	Caterpillar 3516B HD MTU 16V 4000 G63 Cummins C2500D5A
ROLT PSD 2400	2400-2525	2805	12000x3000x3000	Caterpillar C175 MTU 20V4000G63

