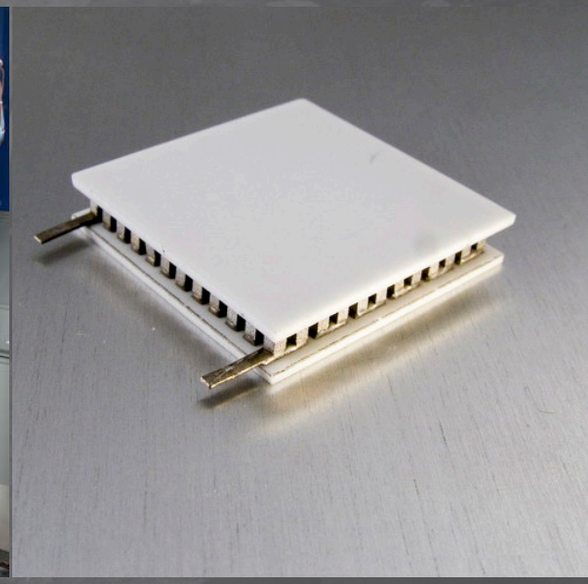
Ecogen Technology

www.ecogentech.ru

Thermoelectric generators

2015



Company profile

ECOGEN
ECOGEN technology

Production Company “Ecogen technology” united all modern principles in the field of thermoelectric technology. Experts and engineers of company - is a recognized authority in the field of thermoelectricity. Own high-tech production lines allow to instantly respond to the needs of the market.

QUALITY MANAGEMENT

The quality management system complies with international standards and covers the entire production cycle, and also includes all the activities of the company.

FIELDS OF ACTIVITY

“Ecogen technology” company - is an innovative company which produces reliable thermoelectric generators. Our products have been used in the following areas:

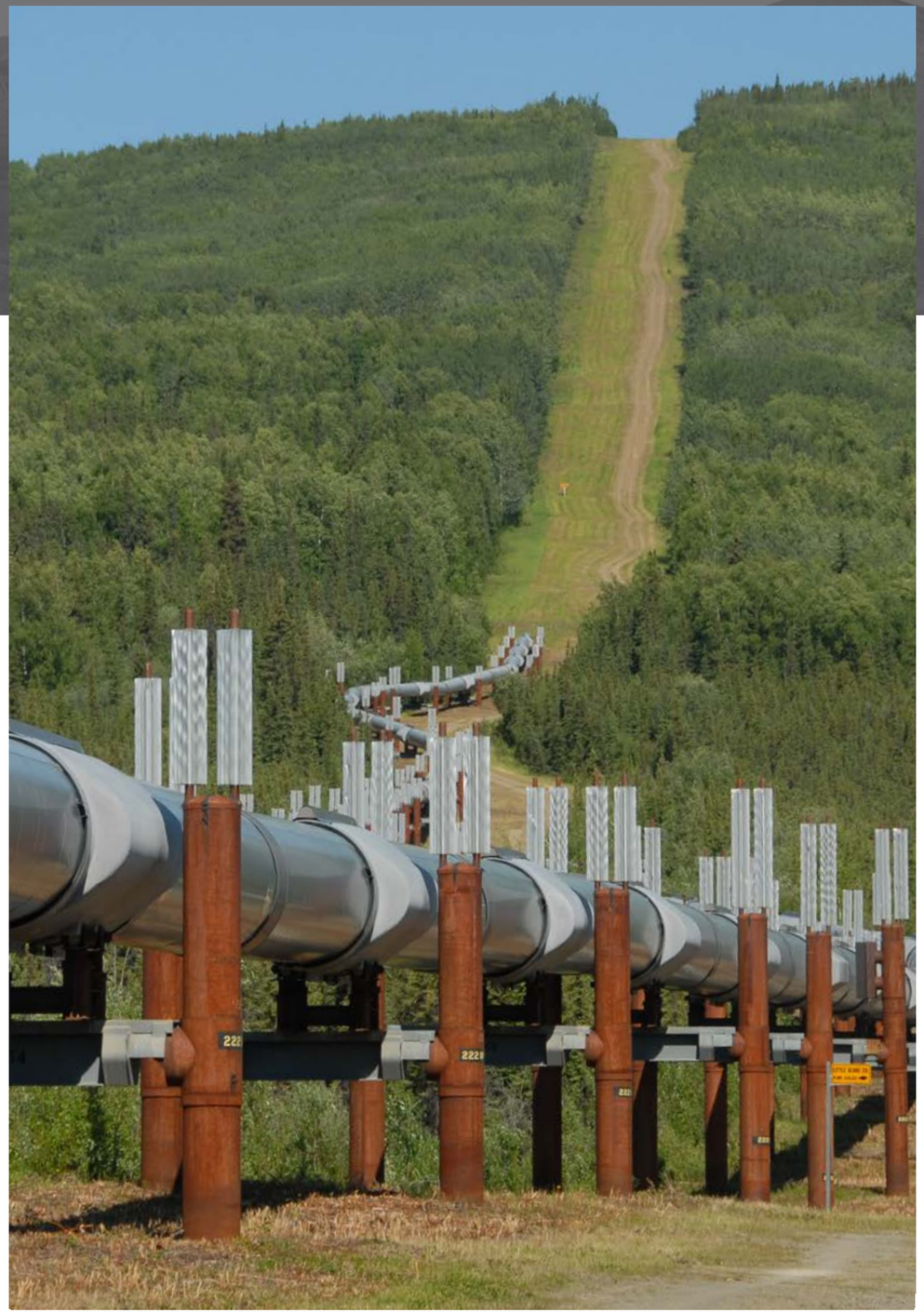
- **Oil and gas industry.** Power for cathodic protection pipelines and well casings; power for remote control and monitoring of oil or gas pipelines and production facilities; power for navigational aids, telecommunications systems;
- **Government projects.** Creating power sources in space and underwater vehicles;
- **Industry.** Power sources when disposing of waste heat in the exhaust pipes, engines, turbines;
- **General application.** Creating an electrical energy independent heating systems and electricity supply.

Complete production cycle **25 years of experience** **High quality of the products and level of service**

Contents

Thermoelectric generators

Thermoelectric generating modules



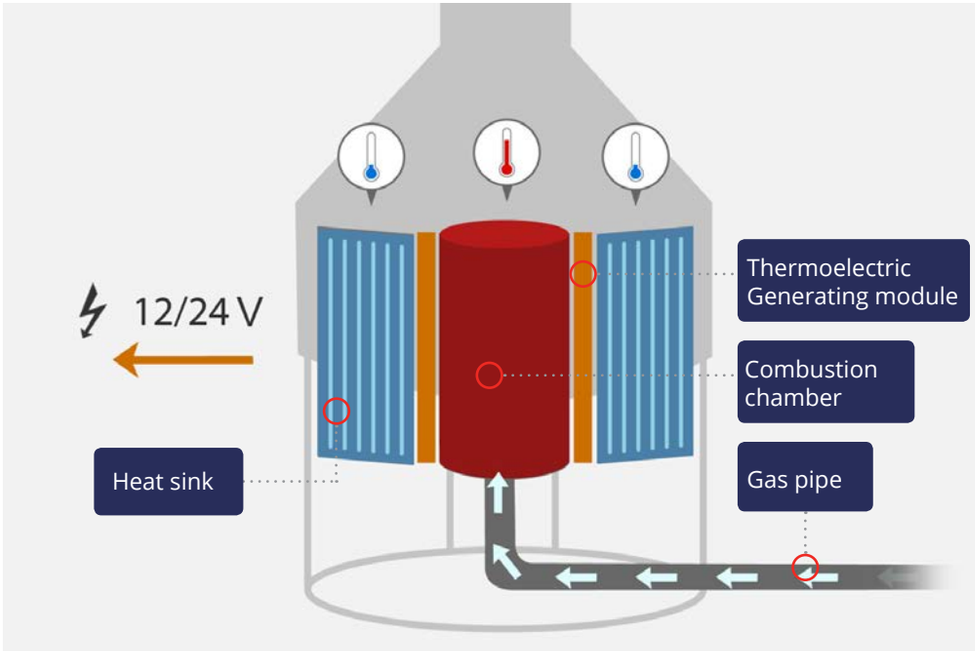
Thermoelectric generators for oil and gas industry

Thermoelectric generators TEG-200 and TEG-500 provide direct current power for a variety of remote power applications in the oil and gas industry.

APPLICATIONS

- **Power for cathodic protection** of pipelines and well casings;
- **Power for remote control** and monitoring of oil or gas pipelines and production facilities;
- **Power for navigational aids**, telecommunications systems.

Thermoelectric generators TEG-200
*Photo courtesy Ltd «Saratovgazavtomatika»



Scheme of the thermoelectric generator TEG-200

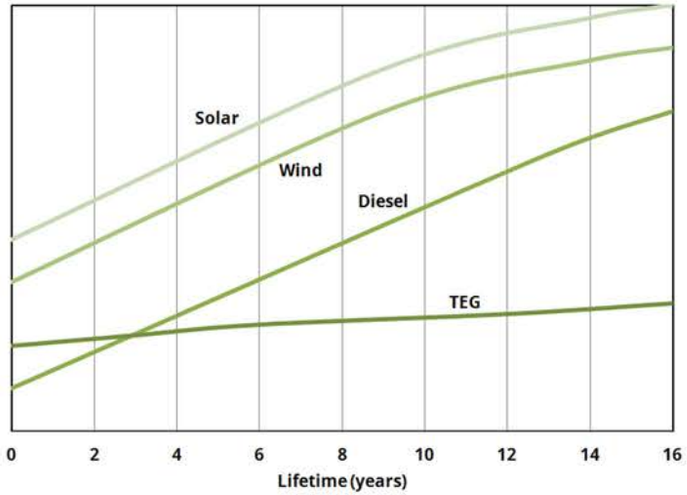
TYPES OF HEAT SOURCES

- **Fuel combustion: natural gas**, liquefied petroleum gas (LPG), diesel, kerosene;
- **The hot surface** with a temperatures from 250°C to 600°C;
- **Overheated steam** or hot water.

Thermoelectric generators

FEATURES

- Converts heat directly into electricity;
- Power range from up to 500 W;
- Wide load range: works with partial loads and short circuits;
- Cost-effective power source for remote or unattended locations;
- Works in extreme environments: arctic, desert and marine (off-shore);
- Anti-vandal and anti-theft protected full-metal housing;
- Two designs: air-cooled (TEG up to 200 W) and liquid-cooled (TEG 500 W);
- Simple and reliable design (no moving parts in gas combustion circuit);
- Automatic spark ignition (upon request);
- Automatic safety shut-off;
- Rapid and simple installation;
- Minimal maintenance (< 2 hours once per year);
- Long-term life-time (more than 25 years).



Life cycle cost comparison of different generator types

Thermoelectric generator TEG-200 in the remote power unit

*Photo courtesy Ltd «Saratovgazavtomatika»

TEG-500 thermoelectric generator

*Photo courtesy Ltd «Saratovgazavtomatika»

Cost-effective power source with 25 years life-time. Minimal maintenance in extreme environments: arctic, desert and marine (offshore).

Features

- TEG-500 operated by fuel combustion: natural gas, liquefied petroleum gas (LPG).
- Liquid-cooled design.
- Works in Remote Power Units with output power from 500 to 5000 W.
- For indoor and outdoor use.

Technical parameters	Unit	Value
Useful output power, not less	W	500
Output DC voltage	V	27
Life-time, more than	years	25
Overall dimensions	mm	ø710 x 1100
Weight	kg	220

TEG-200 thermoelectric generator

*Photo courtesy Ltd «Saratovgazavtomatika»

Cost-effective power source with 25 years life-time. Minimal maintenance in extreme environments: arctic, desert and marine (offshore).

Features

- TEG-200 operated by fuel combustion: natural gas, liquefied petroleum gas (LPG).
- Air-cooled design.
- Works in Remote Power Units with output power from 200 to 5000 W.
- For indoor and outdoor use.

Technical parameters	Unit	Value
Useful output power, not less	W	200
Output DC voltage	V	27
Life-time, more than	years	25
Overall dimensions	mm	ø600 x 770
Weight	kg	130

TEG-30
thermoelectric generator

The power for gas distribution points equipment.

Features

- TEG-30 operated by fuel combustion: natural gas, liquefied petroleum gas (LPG).
- Air-cooled design.
- Works in Remote Power Units with output power from 30 to 120 W.

Technical parameters	Unit	Value
Useful output power, not less	W	30
Output DC voltage	V	24
Life-time, more than	years	25
Overall dimensions	mm	400 x 700 x 930
Weight	kg	76

TEG-5
thermoelectric generator

Features

- TEG-5 operated by steam heat power.
- Air-cooled design.
- Steam temperature from 110°C to 190°C.
- For indoor and outdoor use.

Technical parameters	Unit	Value
Useful output power, not less	W	5
Output DC voltage	V	24
Life-time, more than	years	25
Overall dimensions	mm	310 x 700 x 670
Weight	kg	63

B4-M
thermoelectric generator

Features

- B4-M operated by steam heat power.
- Air-cooled design.
- Mounting on vertical hot surfaces with temperature 250°C.

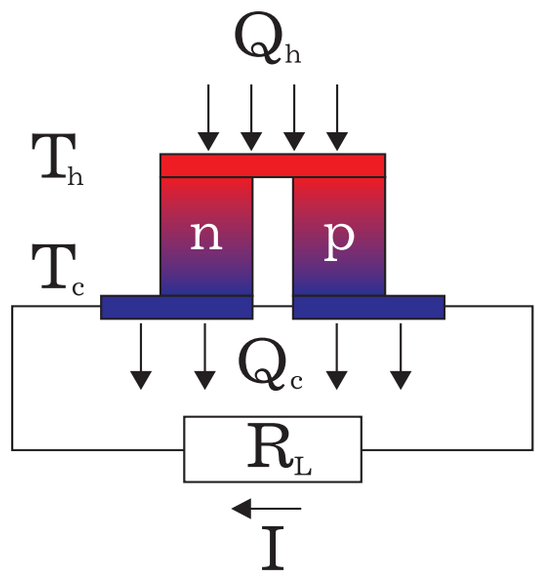
Technical parameters	Unit	Value
Useful output power, not less	W	2
Output DC voltage	V	12
Life-time, more than	years	25
Overall dimensions	mm	162 x 100 x 93
Weight	kg	2

Seebeck's effect

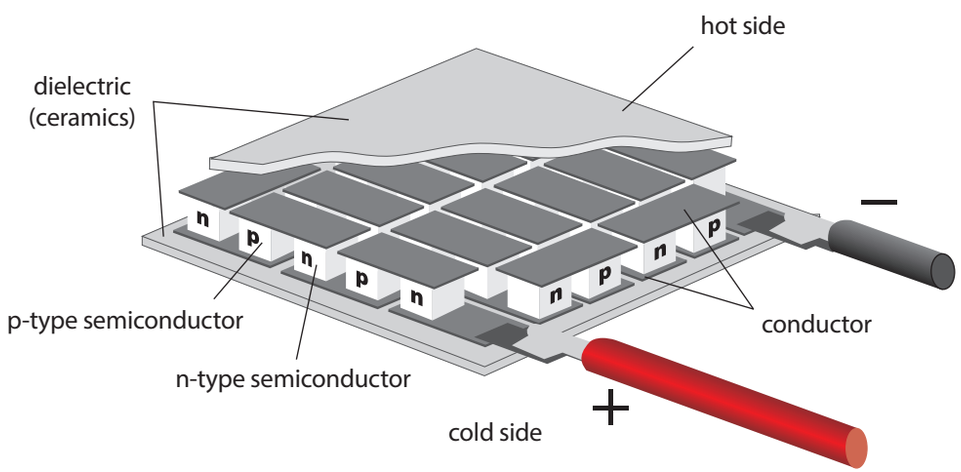
Back in 1822 a scientist from Revel (now Tallinn) discovered that if the ends of the circuit consisting of two heterogeneous metals soldered under different temperature conditions were closed, a magnetic needle placed near it would rotate as if there were a magnet applied. Later this effect was named after its discoverer, Thomas Johann Seebeck. This event, which took place over 180 years ago, is considered the beginning the study of thermoelectric phenomenon. However, the practical use it was applied only from the middle of the XX century with respect to the work of the Soviet academician A. Ioffe.

Ecogen Technology carries on traditions that were founded by Abram Ioffe and his research institute. Within the last few years our engineers and researchers have done a great breakthrough in the development of high effective thermoelectric materials and manufacturing of power generating systems and cooling devices. The range of thermoelectric applications grows constantly. Following this trend, Ecogen Technology constantly widens its product range.

We are sure that environmentally friendly cooling devices and power generating systems based on thermoelectric effect would be the core of the most prospective technologies of the future.



A thermoelectric generator consists of materials with different Seebeck coefficients (p- and n-semiconductor). By removing the load current stops flowing and the circuit operates as a thermocouple.



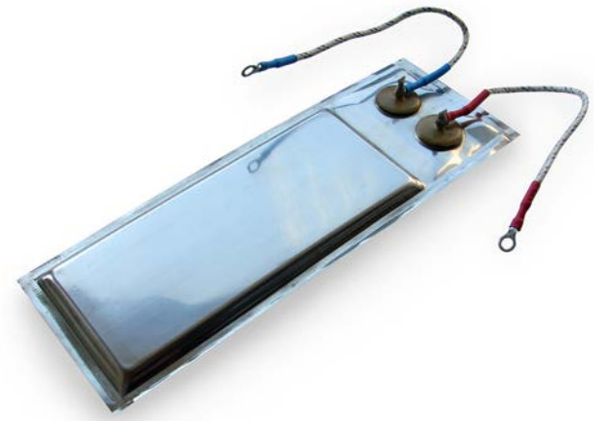
Drawing and construction of generating module

Medium temperature generating modules

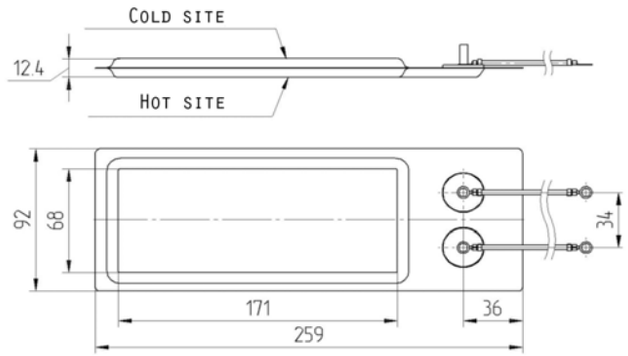
Medium temperature range generating modules Mars type produces from 35 to 65 Watt of electric power under the temperature difference 385 ÷ 500°C. Thermoelectric generating modules works with heat source temperature up to 570°C.

Thermoelectric modules are hermetically sealed for 25 years life-time.

Thermoelectric generating module is a heart of the thermoelectric generators TEG-200 and TEG-500.



[Generating module Mars]



[Dimensional drawing]

Type	Operating conditions	Overall dimension	Fitting dimensions	Output parameters					Weight
				I_L	U_L	Ri*	P	Perfor-mance	
		mm	mm	A	V	Ohm	W	%	kg
Mars-35	cold side=115°C, hot side=500°C	260x92x30,0	171x68x12,5	7,1	4,9	0,69	35	6,2	0,855
Mars-65	cold side=70°C, hot side=570°C	260x92x30,0	171x68x12,5	9,6	6,8	0,70	65	7,4	0,855

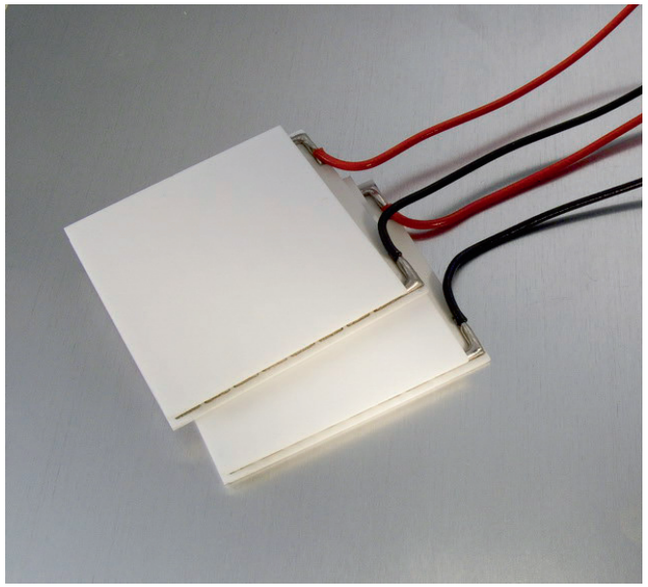
Low temperature Generating modules

Using of thermoelectric generating modules (TGM) manufactured by “ECOGEN Technology” company, with a temperature difference of 100°C, allows to produce electric power up to 10 W at a voltage of DC to 6 V within a single module.

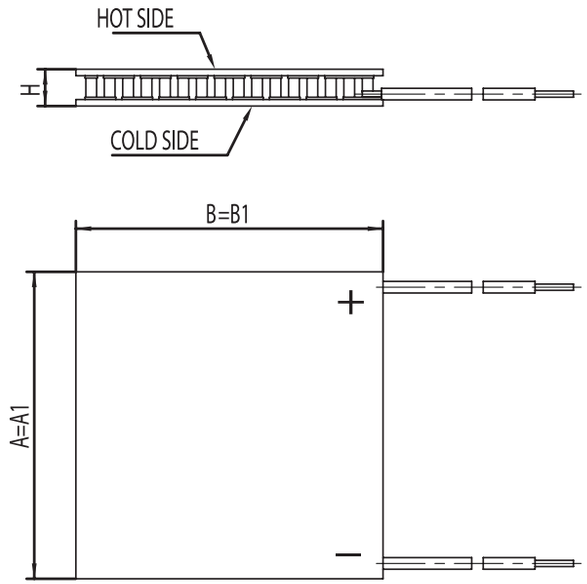
Applications:

Among main spheres of TGM application the following can be singled out:

- Utilization of waste heat at transport installations (automobiles, ships);
- Autonomic supply of energy to electronic blocks for water boilers and disposal plants;
- Cathodic protection of the oil and gas pipelines;
- Conversion of natural heat resources - geothermal waters, etc into electric energy;
- Autonomic power supply of low-power electric devices.



Low temperature Generating modules



Dimensional drawing

Type	A, mm	B, mm	H, mm	Rac, Ohm	Rac22°C, Ohm	Rt, K/W	U, V	I, A	P, W	ŋ, %
TGM-127-1,0-0,8	30	30	3,1	1,84	1,29	1,69	3,0	1,66	5,1	4,7
TGM-127-1,0-1,3	30	30	3,6	3,00	2,10	2,70	3,4	1,12	3,8	5,1
TGM-127-1,0-2,5	30	30	4,8	5,80	4,00	5,00	3,7	0,63	2,3	5,4
TGM-127-1,4-0,8	40	40	3,1	0,95	0,66	0,87	3,0	3,10	9,4	4,6
TGM-127-1,4-1,2	40	40	3,5	1,42	0,99	1,28	3,3	2,30	7,5	4,9
TGM-127-1,4-1,5	40	40	3,9	1,89	1,31	1,69	3,4	1,81	6,2	5,1
TGM-127-1,4-2,0	40	40	4,3	2,40	1,64	2,10	3,5	1,50	5,3	5,3
TGM-127-1,4-2,5	40	40	4,8	3,00	2,00	2,60	3,6	1,23	4,5	5,4
TGM-199-1,4-0,8	40	40	3,2	1,46	1,03	0,57	4,1	2,80	11,4	4,1
TGM-199-1,4-2,0	40	40	4,4	3,70	2,60	1,39	5,2	1,41	7,3	5,1

For your notes

Headquarter

6 Aerodromnaya street, Saint-Petersburg,
197348 Russia
Tel.: +7 812 394 34 39
Fax: +7 812 394 12 67
info@ecogentech.ru
www.ecogentech.ru