NIMEC LIMITED

Fast-Easy-Amazing

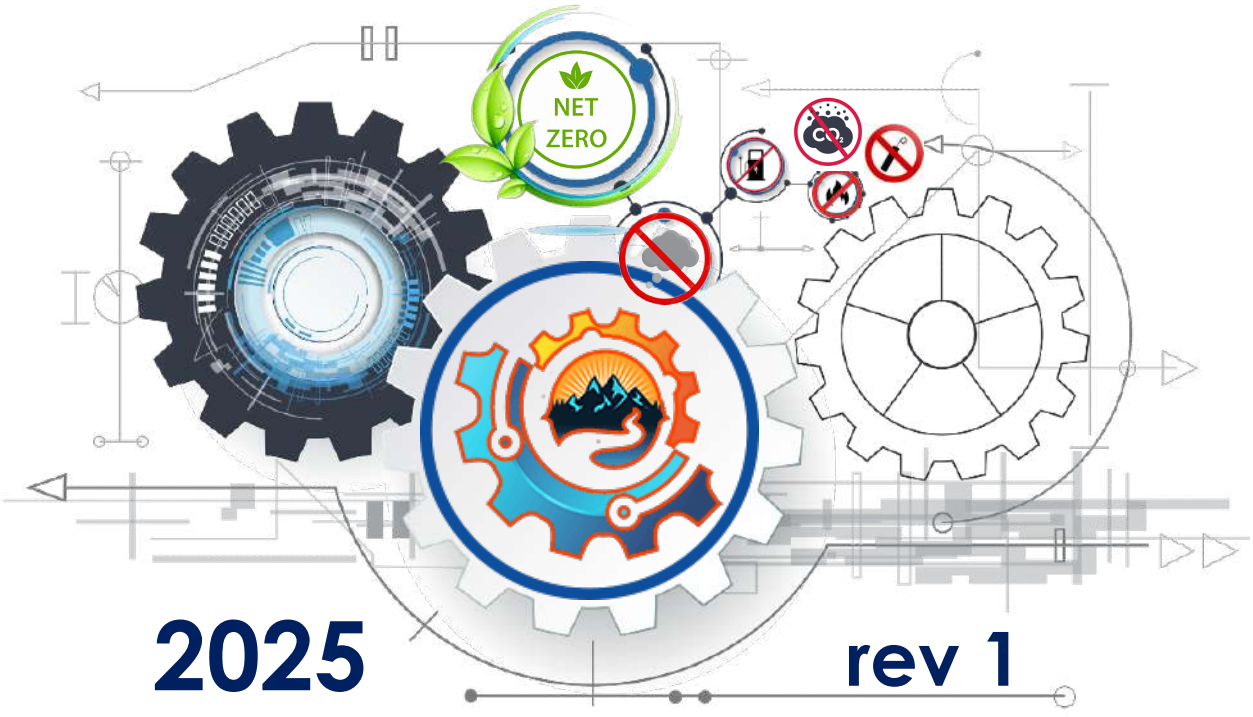
MAGNET TO POWER

Product and Technology Presentation

CO_2 Zero carbon emissions

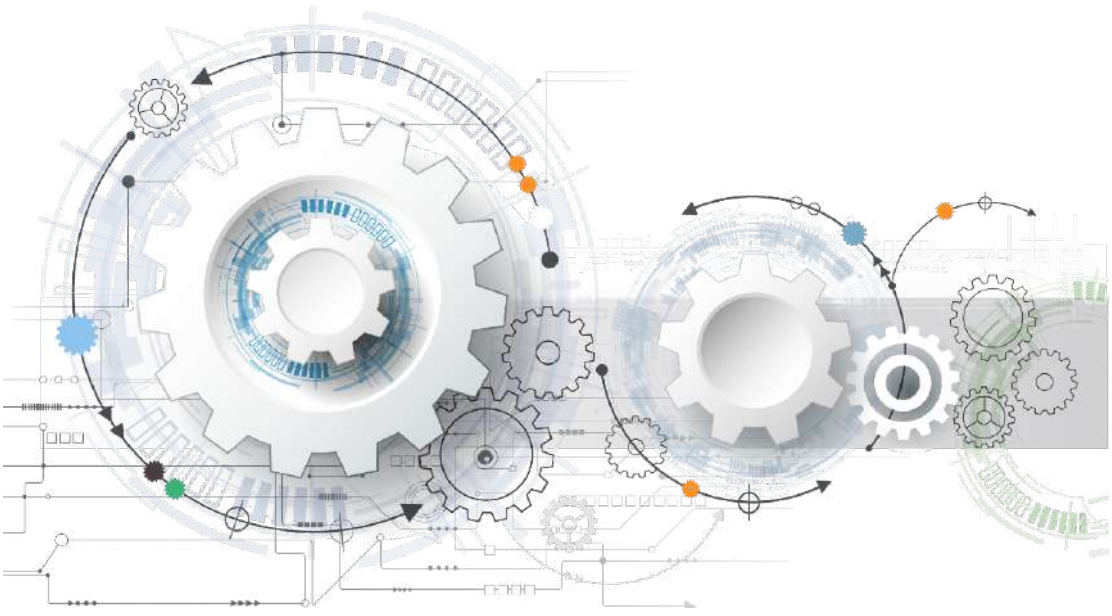
Stable power generation

Modular structure



2025 **rev 1**

Content



1. Introduction

This document provides basic information on the operating principles and applications of power units that use a flywheel with permanent magnets as a working part.

This document can be used as a presentation of power units, an explanation of their operating principles and areas of application, and can assist in selecting a power unit and its area of application.

These power units are designed to operate in continuous mode and are intended to supply cheap and high-quality energy to any consumer. These power units are ideal for:

- placement in remote and hard-to-reach places;
- when used on islands, autonomous platforms and/or ships;
- when used to provide electricity for cryptocurrency mining;
- in case of connecting electric generators - to supply electricity to the network with consumers;
- in case of connecting hydraulic pumps - ensure operation of the hydraulic system and/or movement, which is based on the rotation of hydraulic motors (this option is not described in this document, the necessary description can be provided upon request).

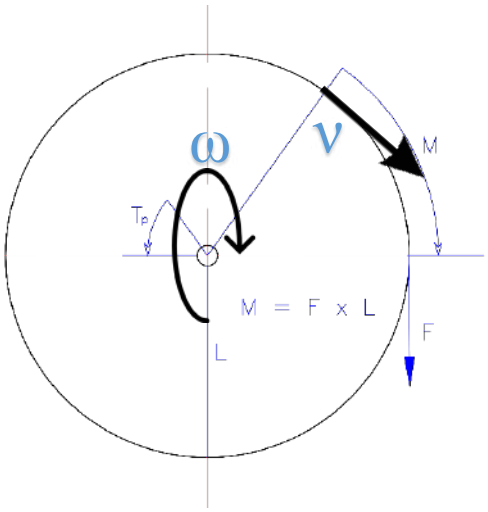
This document should be read in conjunction with the Units Range document – ultimate edition of it.

2. The Principle of Action from the Point of View of Physics

In this section we will consider the principle of operation of the power unit from the point of view of Physics, we will make a theoretical calculation of the power unit with a capacity of 50 kW for clarity.

At this stage it is necessary to make a statement - the power unit is not a "perpetual motion machine" and does not take energy for its work from "air", "zero point", etc.

2.1. Definitions



ω - **angular velocity** - the time rate at which an object rotates or revolves about an axis.
$\boldsymbol{v}$ - **linear velocity** - defined as the rate of change of linear displacement – in our case the velocity of wheel border.
P - **power** - the amount of energy transferred or converted per unit time.
F - **force** - an influence that can cause an object to change its velocity unless counterbalanced by other forces.
$T(M)$ - **torque** - the rotational analogue of linear force.
L - **distance** (lever - a simple machine consisting of a beam or rigid rod pivoted at a fixed hinge, or fulcrum).
G - **gravity** - gives weight to physical objects. $g = 9.80665\,{}^{m}/_{s^2}$ - **nominal "average"** value at the Earth's surface, known as standard gravity by definition.

2.2. Formulas

Power in W	$P = T \cdot \omega$	
Angular velocity in rad/s	$\omega = \frac{2\pi n}{60}$	where n – rotation per minute (rpm)
Torque in Nm	$T = F \cdot L$	
Force in N	$F = mg$	where m is the mass in kg

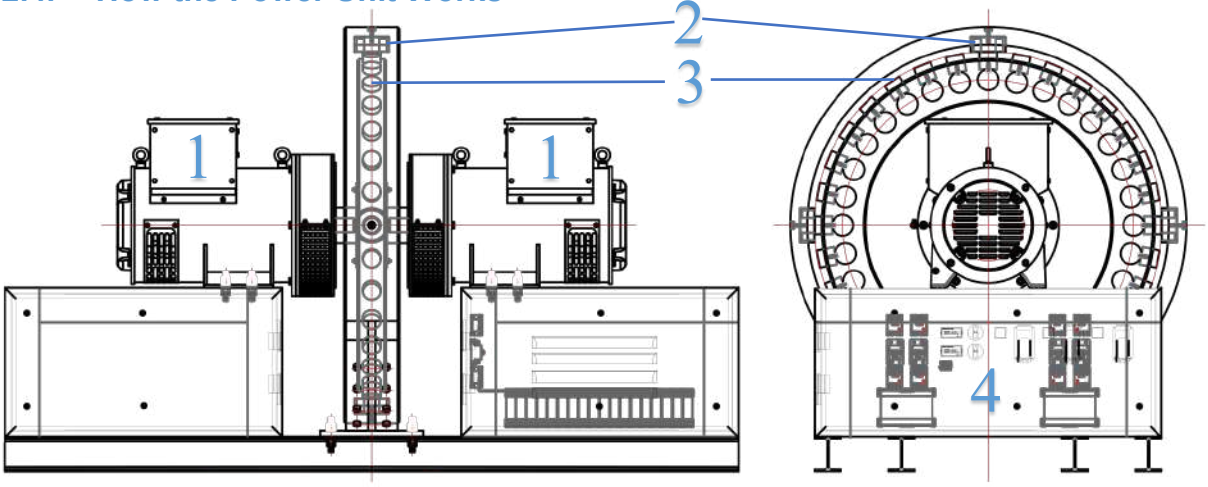
2.3. Power Unit Calc

Taking into account what is written above, we will calculate the forces and other conditions necessary for a **50kW Power Unit**. $P = 50kW = 50{,}000W$

The standard Stanford type generator has $n = 1500rpm$n for 50Hz power supply, from where the angular velocity is $\omega = \frac{2\pi 1500}{60} = 157\,{}^{rad}/_{s}$.

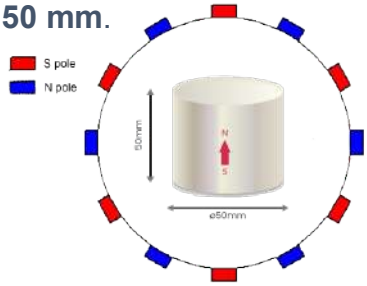
Now we can calculate the required torque as $T = \frac{50000}{157} \approx 319Nm$. So, we need to have the force of $F = 319N \approx 33kg$ on distance $L = 1m$ in order to rotate the shaft of the generator due to full load of it. That is, if we hang a load **weighing 33 kilograms** at a **distance of 1 meter** (with a lever of 1 meter), we will turn the generator shaft with a load of **50 kW**.

2.4. How the Power Unit Works



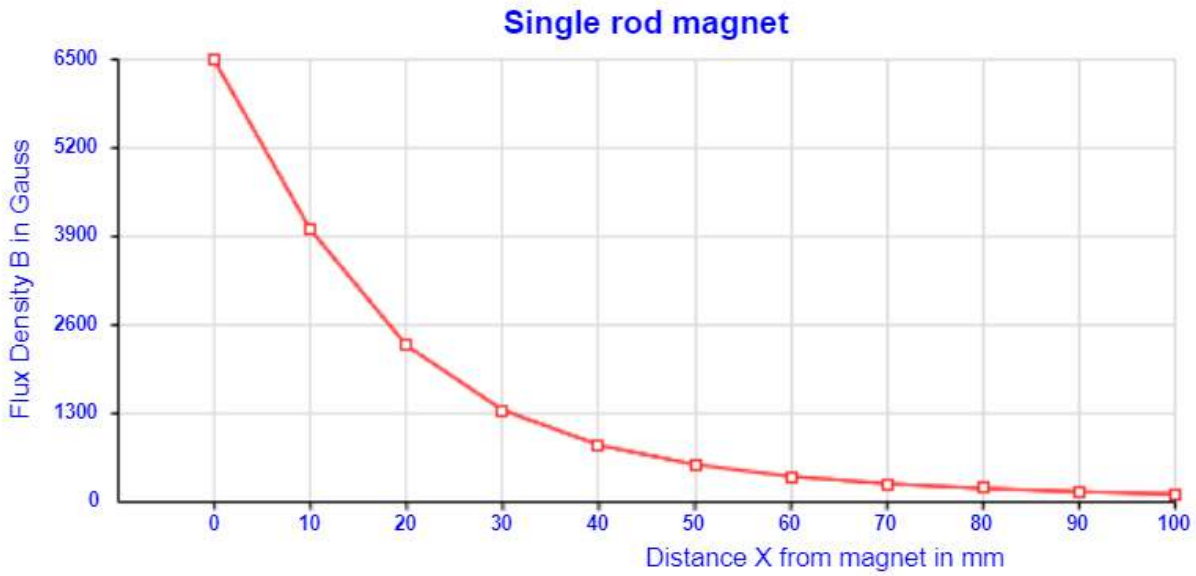
The Power Unit consists **exclusively of standard (widely used) components** and does not contain any time-tested or newly invented parts, assemblies or components. The kit includes two generators with right and left rotation respectively - **1**. Electromagnets - **2**. Wheel with permanent magnets attached to it - **3**. System for monitoring the operation of the Power Unit and providing power to the electromagnets - **4**.

Now let's take the wheel and equip it with magnets as shown in the picture. In this case, let's take a cylindrical magnet **NdFeB N52M** with a **diameter of 50 mm** and a **height of 50 mm**.

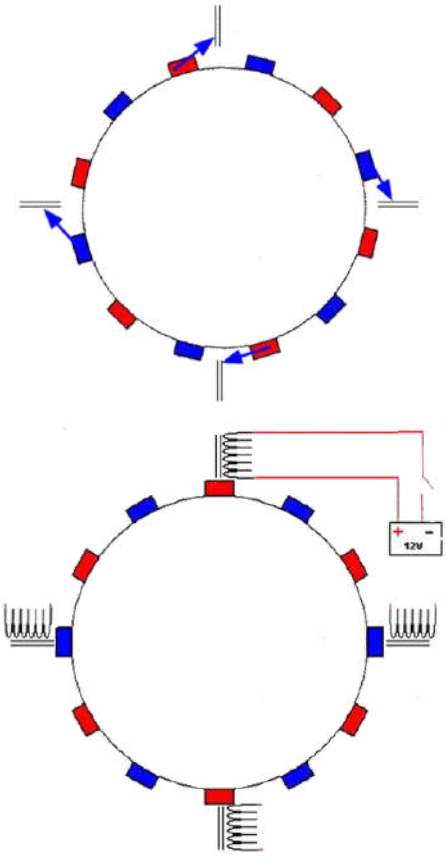


Cyl Neodymium N52 50x50mm NiCuNi Axial	Lifting power: 189.95kg = 418.77lb
D: ø50mm, T: 50mm	Weight: 726.49 Grams
Br (Gauss): 14500 Material grade constant	Max Temperature: 80°C = 176°F
Bz (Gauss): 6481.96	Magnetization Direction: Axial

https://hyab.com/magnetcalculator.php?lang=en



According to the diagram above, the magnetic field strength depending on the distance to the magnet, we see that at a distance of more than **50 mm** the field is greatly weakened. That is, the distance between our magnets should **not be more than 50 mm**, which corresponds to **32 magnets with a diameter of 50 mm** located on the rim of a wheel with a **diameter of 1 meter**.



Let's allow the wheel with magnets to rotate, thus we get a rotor. Now if we make a stator with iron (magnetic material) cores around the rotor, then our rotor will turn and thus turn the generator shaft with the force we need.

In order to obtain constant rotation, we must wind an induction coil around the core and thereby obtain an electromagnet. Since we cannot increase the diameter of our wheel, we will increase the power of our installation by increasing the number of electromagnets and their power. For an installation with a power of **50 kW**, we will use **4 electromagnets** as shown in the figure below.

Now, by turning on and off the electromagnets we can control the rotation of the rotor. When the electromagnet is turned on, it has the same polarity as the magnet that is already at its core and thus the magnet does not stick to the core and passes through it freely, while the next magnet has the opposite polarity and is attracted to the core of the electromagnet faster.

The speed of rotation of the rotor is determined by the frequency of polarity reversal of the electromagnet. As an electromagnet we will take https://eshop.sollau.com/holding-electromagnet/ Model E919006 with Power $P = 20.5\ W$ and lifting force (magnet holding force) $F = 3400N\ \approx 340kg$.

Below is a diagram of magnetic field strength versus distance.

According to the above data and the magnetic field strength dependence diagrams, we come to the conclusion that **4 electromagnets**, interacting with permanent magnets, will be able to ensure the rotation of a **wheel with a diameter of 1 m** while simultaneously overcoming a **force of 66 kg or 319 Nm**. This proves the legitimacy and operability of the Power Unit design.

Total power consumption of 4 electromagnets is $\boldsymbol{P_{total} = 4 \cdot 20.5W = 82W}$. There is nothing unusual in this conclusion, since this energy is necessary only to change the polarity of electromagnets and thereby ensuring the rotation of the wheel. The main energy is contained in the strength of constant magnets (in their production, huge energy was spent, some of which we will stir).

3. Control System

In this section we will consider the features and functions of the system for ensuring control over the operation of the Power Unit and the power supply system for the electromagnets.

The peculiarity of this system is the original software "NIC" developed by the specialists of our company.

3.1. Components

The system consists of:

A. 4 of BMOD0165 P048 C0B modules. Rated Capacitance – 165F. Rated Voltage – 48V. Certifications – RoHS. Projected DC Life at 25°C - 10 years. Max Current – 100A. Manufacture - MAXWELL TECHNOLOGIES.

compare table

Super Capacitor Module	Parameter	Lithium Battery
✓	Hight Power (Large Current Discharge)	✗
✓	High Energy Density (Energy Storage)	✓

Super Capacitor Module	Parameter	Lithium Battery
✓	Fast Charging (80% Charging in few min)	✗
✓	Security Performance (Not Easy to Explode)	✗
✓	Long Life (>20000 cycles)	✗

B. 4 sets based on Arduino Nano Pro. Each set is connected to the Super Capacitor Module and control its charge, running and start/stop operations.

The Arduino Nano is Arduino's classic breadboard friendly designed board with the smallest dimensions. The Arduino Nano comes with pin headers that allow for an easy attachment onto a breadboard and features a Mini-B USB connector.

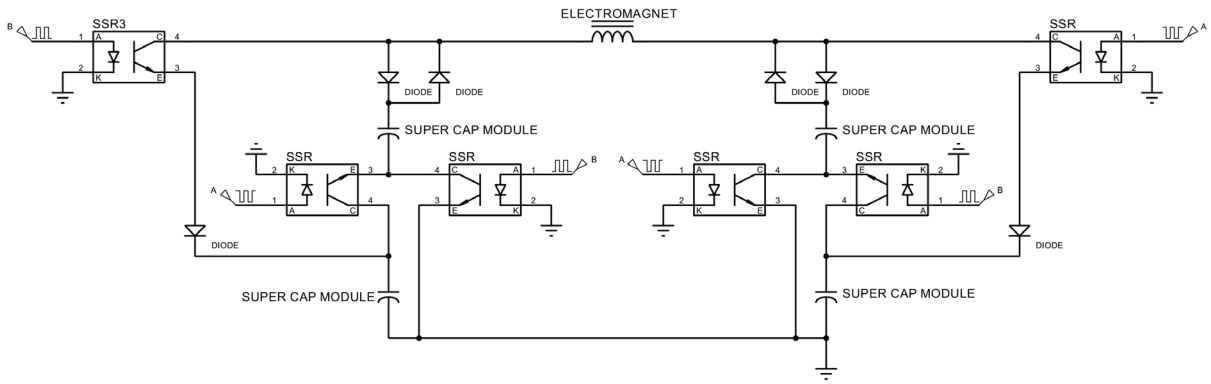
C. 1 of Arduino Mega 2560 controller-based set including the LCD display, Hall sensors, temperature and current gauges. Set is responsible for the wheel running speed, start/stop and other operations.

The Arduino Mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

D. 1 of PWR33 MODEL 48VDC 60A CHARGER.
E. Set based on 6 SSR DC/DC relays and required to it work components.

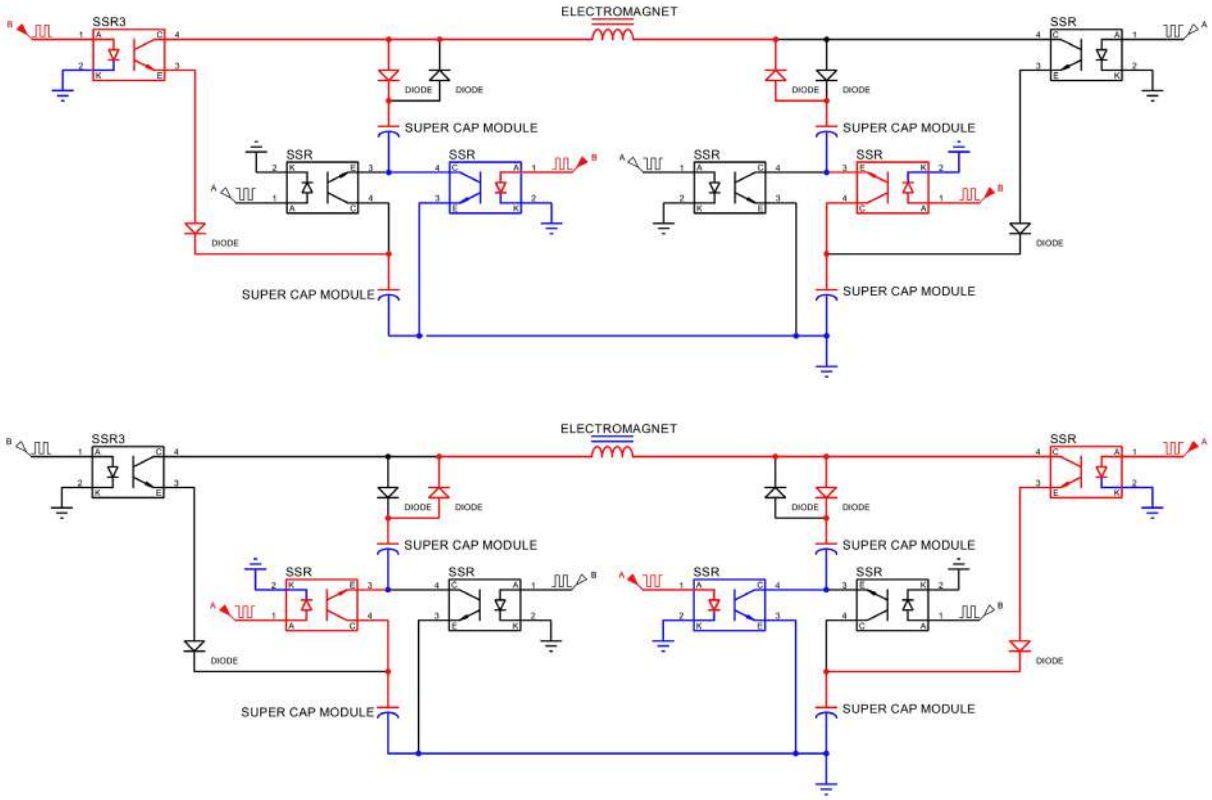
3.2. Basic Connection Diagramm

Unique is our use of the Nikola Tesla switch to increase the service life of the electromagnet energy unit and controller power supply.



This circuit allows us to switch the polarity of the electromagnet with the frequency we need at the moment and thus monitor the rotation of the wheel, which is critical for the correct operation of alternators.

Considering that the interaction of the inductance coil (electromagnet) and the permanent magnet determines the appearance of an emf in the inductance coil, we use this emf for additional charging of the supercapacitor modules.



The diagrams above show the operation of the power switching system and electromagnets (their polarity change).

3.3. Software

The software is loaded directly into the Arduino controllers. Each controller has its own program and is responsible for its part. The main controller receives data from lower-level controllers and reacts to them. The program controls: a) rotation speed relative to the load, b) smooth start and stop, c) charge level of supercapacitor modules, d) does not allow overcharging of supercapacitor modules, e) monitors the correct operation of switches.

Each system has an automatic operating mode and, with special permission, a manual control mode.

4. Application areas

In this section we will consider the connection options of the Power Unit and its application areas. It should be noted that since the Power Unit does not emit gases or other substances, does not have any chemical reactions (such as combustion or nuclear fission), the Power Module can be located in any room (residential or non-residential), at any height or in the basement (at any depth).

When ordering a Power Unit, it is very important to pay attention to only one point - the maximum operating temperature. Permanent magnets lose their magnetic properties at high temperatures.

We recommend that you carefully study the operating mode you require and pay close attention to the power consumption (total Power Unit Power).

4.1. Electricity Generation

The Power Unit is initially designed and intended for autonomous power supply (supplying electricity to a local set of electrical appliances). You need to carefully calculate your installed power (the total power of all your electrical appliances) and then determine the actual power consumption (usually 25% of the installed power). The actual power should correspond to 75% of the Power Unit.

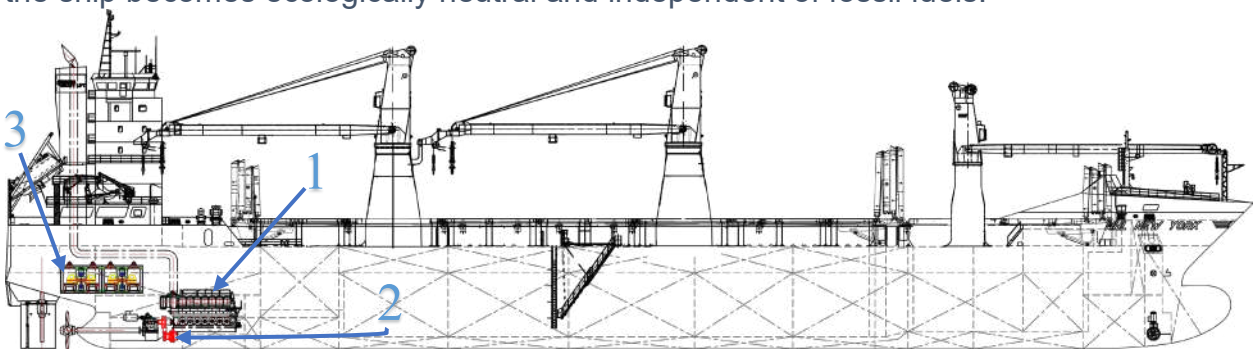
The Power Unit can also supply electricity to a local or national power grid, for this you need to provide us with the parameters of the connection to the grid and we will provide you with an interconnector.

The Power Unit can supply electricity to cryptocurrency mining devices or to charge electric vehicles (batteries). To do this, you need to contact us (see the last page) and we will provide a solution suitable for your case.

4.2. Marine Use

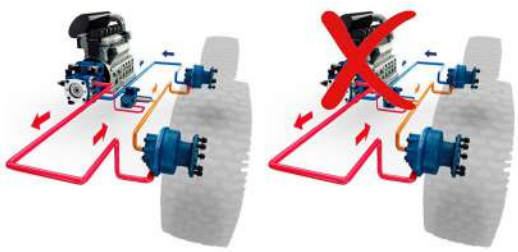
The Marine Power Unit (in a waterproof case) is ideal for supplying electricity and/or charging batteries for vessels of any class and configuration.

An additional option is to connect hydraulic pumps instead of electric generators. This design allows connecting a hydraulic motor and using it to rotate the propeller. Thus, the ship becomes ecologically neutral “Net Zero” and independent of fossil fuels “Fossil Fuel Free”. An additional option is to connect hydraulic pumps instead of electric generators. This design allows connecting a hydraulic motor and using it to rotate the propeller. Thus, the ship becomes ecologically neutral and independent of fossil fuels.



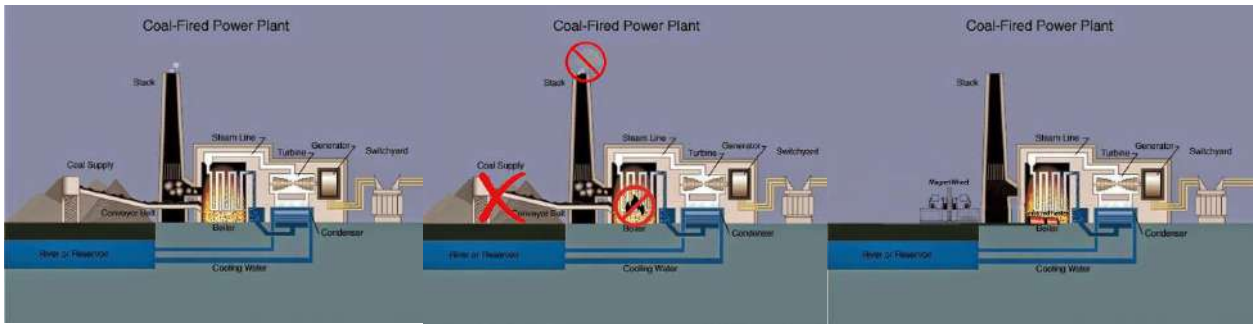
3 – our Power Unit (electrical and hydraulic), 3 – hydro motor, 1 – existing power unit.

4.3. Net Zero Transformation

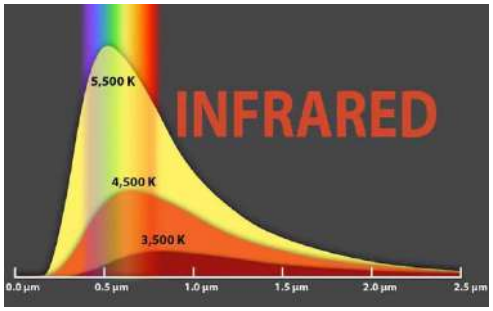


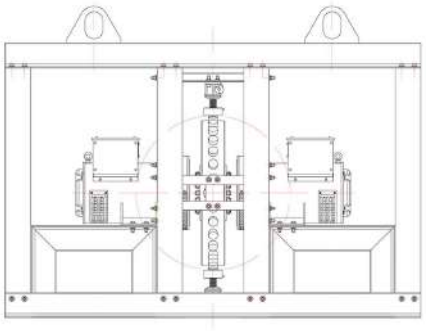
By using the Power Unit with hydraulic pumps, it is possible to avoid using the internal combustion engine to move large machines (rotate hydro motors). In this case, there is no need for fossil fuels and heavy vehicles stop producing exhaust emissions into the atmosphere.

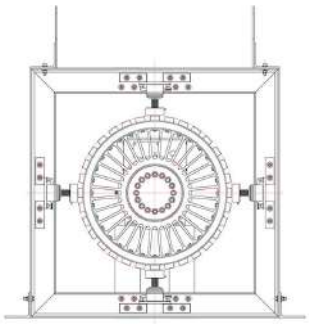
Another transformation could be the conversion of existing fossil fuel power plants. Today, electricity production occurs according to the following cycle: using fossil fuels, water is heated to the state of dry steam, then the steam rotates a turbine and cools down, the turbine, in turn, rotates a generator.

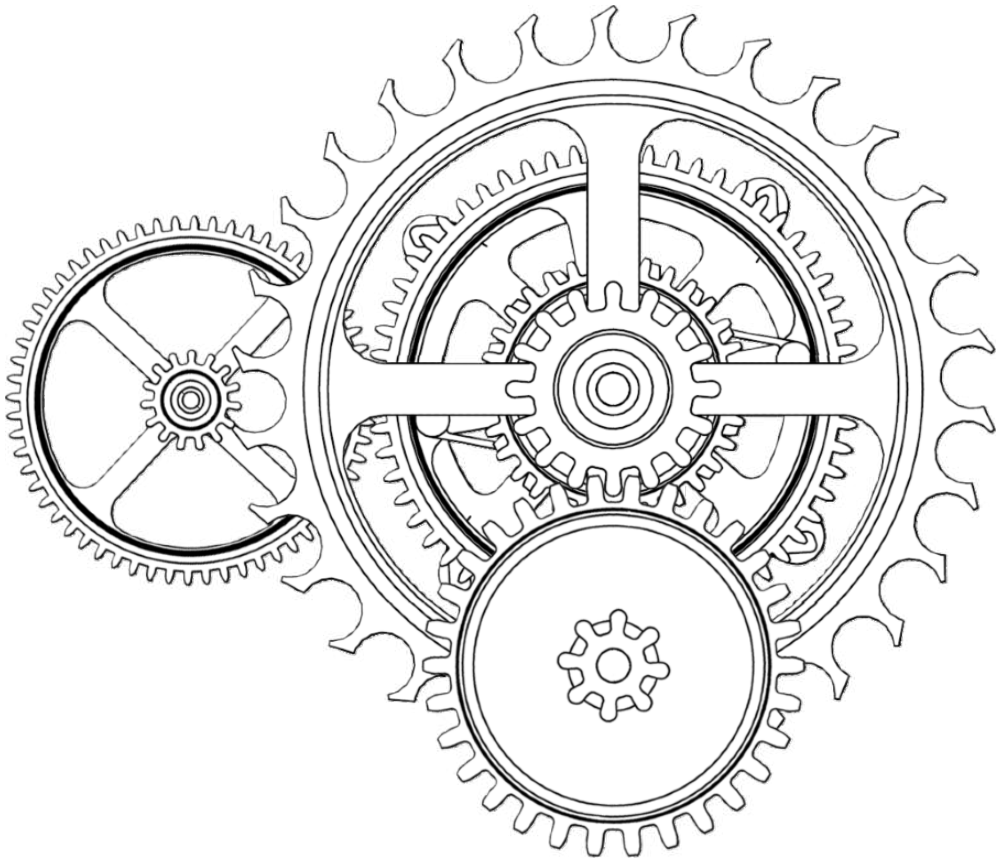


Power Units power electric infrared heaters that are located in the fossil fuel combustion chamber of the hot water boiler. This ensures the required temperature in the combustion chamber of the water boiler and the system operates stably without the use of fossil fuels.









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