

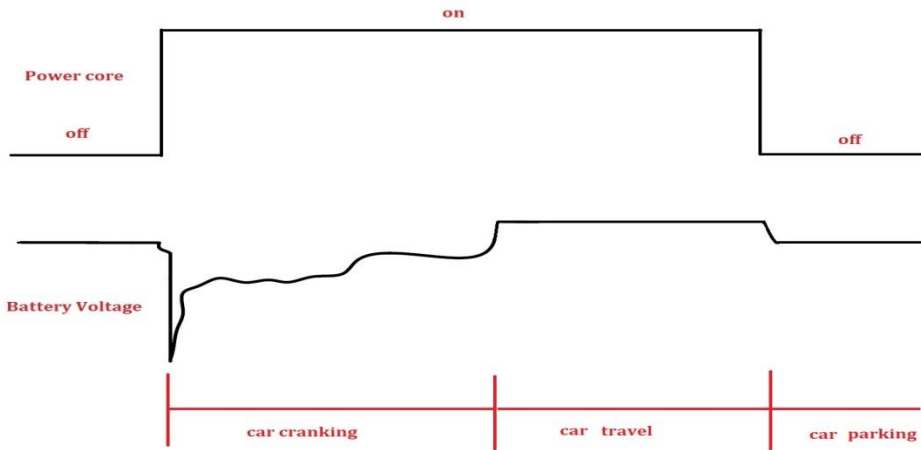
Power Core- The Most Unique Internal Combustion Engine Electronics Intelligent Management System

Power Core is the intelligent system composed of microprocessors, pcb and ultracapacitors . The smart system is parallel to the battery. Power Core supports the power system of the whole car. The intelligent system supports the electronic-controlled ignition and fuel injection system to achieve fuel economy and lower emissions, while still maintaining high level of performance and convenience. Functions such as, engine control unit, transmission control, climate control, antilock braking, passive safety system, navigation and others can be reinforced by Power Core. The advantage of Power Core outputs very powerful electric current in transient without any influence to any system of an internal combustion engine. It will make delay no happening at kickdown. Power Core contributes to stress-free, proper, precise and easy operation and enables the drivers to concentrate on “running, turning and stopping. Power Core will diminish extra noise and unpleasant shaking. Thus, driving the vehicle will be the most enjoyable experience. Power Core has the management ability to automatically shut down when the voltage of the battery is too low for protection. With intelligent power supervision, the power of battery will not be dragged out to keep cranking ability of a vehicle.

The application electronic current of Power Core is range from 80A to 3000A. With steady stream of energy supplied, cars can be used and treated as electric motors. The prompt and precise electricity energy to electrical equipment necessary for moving the car, electrical equipment for enhanced comfort and electrical equipment for improved safety is so unbelievable.

The working temperature of Power Core is ranged from $-40\sim 65^{\circ}\text{C}$. This is the best solution for people in the unexpected, unusual or even unpredictable weather. With special and delicate mechanism, users can press one button for few seconds to have electricity power in ultracapacitors from the battery. In the very much short time, any driver is able to crank the car. Power Core, which has one button for cranking, really helps to improve the quality and suitability of people’s daily lives.

Power Core is the solution to the electronic systems used in vehicles, including engine control unit, ignition, radio, carputers, telematics, in-car entertainment systems and others. Ignition, engine, and transmission electronics are used in motorcycles, trucks, off-road vehicles, and other internal combustion-powered engines for example: forklifts, tractors, and excavators, recreational vehicles, military vehicles and boats.

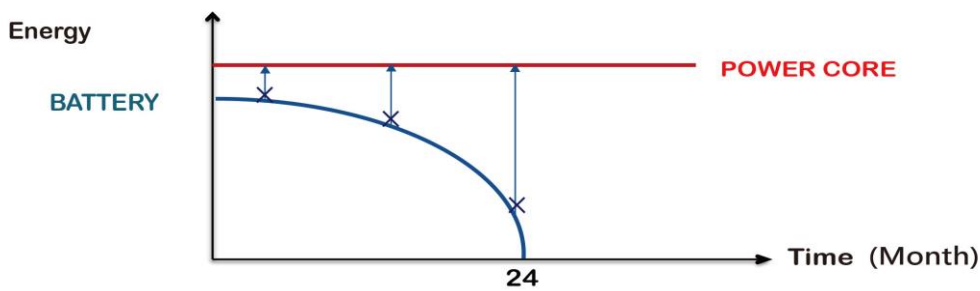


Power Core is the remarkable solutions to the all energy in needs, for example:

1. Engine starts – start-stop system:

The main purpose of a battery is to feed the starter, which start the engine. Once the engine is running, power for the car electrical system is supplied by the alternator and battery. Automotive batteries are designed to deliver maximum current for a short period of time, especially for starting, lighting and ignition. At this important moment- starting the engine, Power Core supplies the necessary power when the vehicle’s electrical requirements exceed the supply from the power system. Power Core also functions as a stabilizer, evening out potential damage voltage spikes. Power Core can help the battery not reduce its lifespan.

A start-stop system automatically shuts down and restarts the internal combustion engine to reduce the amount of time the engine spends idling, therefore reducing fuel consumption and emissions. Power Core also plays an important role in supporting this system in automobiles. Star-stop system is the most advantageous for automobiles spending much significant amounts of time waiting at traffic lights or frequently come to a stop in traffic jams. With Power Core’s unbelievable management system, Power Core can do great help an increased number of charging cycles and increased load. This is so important because all of the car’s electrical system must be maintained by the battery after the alternator quits generating current.



2. Accelerating and shifting gear, simply more efficient and no more chance to stay behind

For no electric power stored in the circuits, the different working states of engine (idling · shifting · accelerating · decelerating...and so on) will demand much more electricity voltage. Under this situation, the voltage fluctuation will do critical influence to working stabilization of automobiles, reliability of engine ignition, accurate fuel injection... and all aspects of automobile performance. These can be found commonly in all vehicles, especially those with the small engine displacement and heavy car body. Power Core can be the solution to slow starting, low speed at accelerating and questionable kickdown (automatic transmission).

Taking the following leisure driving for example-slower, twister tracks & high speed circuits:

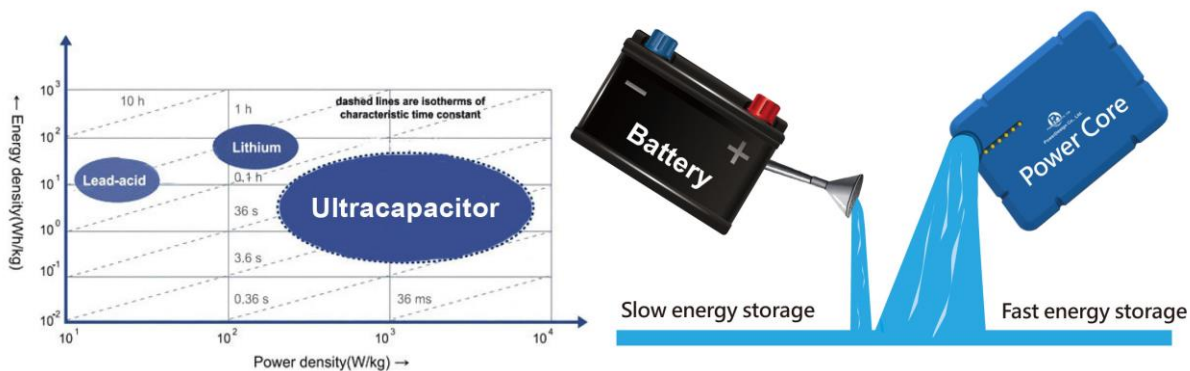
Depending upon the nature of the circuit, the Engine mapping can be made so much different completely. On slower and twister tracks, Power Core can help the engine for the drivers to have more control on the throttle input by making the first half of the pedal movement very sensitive.

Without Power Core, at high speed circuits, a driver has to jump on the throttle more. Sometimes, this brings not confident and not comfortable driving experience. Instead, Power Core can help the drivers to gradually apply full throttle. The accelerator will be set so that only a small movement will lead to full engine acceleration.

In the city running, Power Core will help the accelerating pedal and power run. It will definitely let cars move much easier and freer in the cars crowd. The easier to control the throttle helps to the car as if weightless than used to be. In this way, Power Core not only makes the cars move easier and, more important, much safer.

3. Easy to have engine started

Car used 6A and even higher electric power to start in 2~4 milliseconds. The single cylinder also needs 1-3A in 2 milliseconds. Without electric power storage in engine, any change of loading, any proportion of difference, the time usage of difference in the electric circuits will be the extra burden of a generator. The delay of electricity supply of a generator results in the problems of unstable electric power supply, not-perfect ignition and insufficient oil injection...and so on. Moreover, the critical delay also lowers the car handling performance. Power Core can make the performance perfect.



4. Environment protection

Power Core has the ability of power management and fuel efficiency without sacrificing any speed. The fuel delivery and ignition timing is perfectly under Power Core's management. The smart system determines which cylinder needs fuel and how much, opens the requisite injector to deliver it, then causes a spark at the right moment to burn it.

Power Core, the unbelievable power management system, provides sufficient electricity to fuel to alter the position of fuel molecules. The importance is as follows: 1. The particles burn more completely, allowing the engine to create more energy out of each serving of fuel. 2. It reduces the amount of pollution pouring out of the cars, because most harmful emissions result from the fuel not burning completely.

With unique system inside, Power Core can save the extra loss and no needless current output of the battery. This will be the best protection system for the battery and help to prolong the battery life. The goal of saving the environment will be achieved for certain.

Users of Power Core can receive the messages about battery condition from manufacturers of battery, drivers to the recycling companies. Information of the battery will help to prevent the battery to do second pollution to the nature by much more efficient recycling works.

5. Strong and powerful energy to the whole car system:

Power Core has the most obvious improvement to an automobile is the vehicle climate control system. The damage spikes can occur in milliseconds. The second is the headlights brightness enhancement. Power Core can supply the large electricity for HID switching-on. Power Core will help the efficiency of car audio video systems, such as car stereos & radios, car subwoofers, car speakers, car amplifiers, car videos & GPS...etc. Taking car amplifiers for example, users interested in the amplifiers generally add additional capacitors in the car amplifier and speaker. In this way, the users can get more dynamic response. Power Core is the solutions to no extra additions to the cars. With Power Core, cars will have lots more space and higher performance in car stereo system. Automobiles drivers will have the best driving experience and stay entertained with Power Core.

Power Core can be the key factor of cost saving because the electronic systems have become an increasingly large component of the cost of an automobile until the modern century. Power Core is with the very powerful performance at the following cost effective aspects:

Voltage stabilization, automobiles start-go system, increasing torque, fuel efficiency, kickdown & automatic transmission, lighter throttle, battery monitor device, interference reduction, battery protection, low battery power consumption and battery management system.

With protection of both battery and ultracapacitor, Power Core can further play a vital role in vehicle's electric systems. Power Core with smart PCB and ultracapacitors can help to last the longevity of any internal combustion engine for consumer's daily usage. The smart system, Power Core, even coexists with each system without causing interference and makes users have the unbelievable fun of driving.

Power Core with ultracapacitors is an incredible energy storage system to offer high power and high energy simultaneously. The application electronic current of Power Core is range from 80A to 3000A. The very unbelievable system, Power Core, can release energy much faster and more powerful so that motorcycles, moto cars, large heavy vehicles, such as the transit& coach bus, special vehicles - construction, military and mining, recreational vehicle, military vehicle and boat ... can work much more efficient and safer.

-The Performance of Power Core

- **Voltage Stabilization**

Power Core can help the electric supply system output steady and consistent electricity power to the vehicle. Electricity power in need will be steady accordingly. Electric power load of the automobiles will even be improved to achieve users' expectation. Audio power amplifiers, global navigation satellite system, automotive infotainment, radio receiver, telematics and connectivity and power Management are all installed on the automobiles for drivers' safety and entertainment. Power Core has the ability to supply the needed electricity steadily and also protects the battery of a vehicle.

For example: car stereo system with Power core 's steady power supply and noise absorbing will deliver a powerful ,deeper bass for drivers' best audio entertainment experience. Power Core can enhance vehicle audio power and maximize audio quality. Most important for subwoofer, Power Core can provide instantaneous high current to support subwoofer for the best performance for drivers' best audio entertainment.

- **Automobiles Stop-GO system:**

Power Core helps a start-stop system or stop-start system automatically shut down and restarted the internal combustion engine in order to reduce the amount of time the engine spends idling. Power Core reduces fuel consumption and emissions.

- **Increasing torque:**

Power Core retakes the power loss due to bad electric circuits. Power Core helps to increase the turning power in the automobile and helps drivers to accelerate a car even faster. Power Core makes the engine that can output this large amount of torque over a wide range of engine speeds.

- **Fuel Efficiency:**

Power Core, helping vehicles not guzzling gas, has ways squeeze out and save the best results. Making sure that an automobile is getting efficient fuel economy can save the consumers money at the gas station and sizable cut down on a vehicle's air pollution. Misfiring due to bad spark plugs can decrease fuel economy. Power Core can get the proper combustion-generating spark at the right time. The engine power of the automobile is saved, and the gas mileage moves up. Spark plugs will not have chances to start misfiring. Aggressive driving, including speeding and accelerating suddenly, automobiles with Power Core will not gobble up gas. While each vehicle reaches its optimal mileage at different speed, efficiency would not decrease rapidly as before. Instead, Power Core will not only just keep steady efficiency but also strengthen it of the vehicle.

- **Kick down & Transmission-**

Truly, getting a car's transmission and engine to work together seamlessly is part of science, part of art. With Power Core, drivers will never think twice about it. The transmission kicks down readily enough, resulting in no lack of needed power. It kicks down less frequently because the powerful supply of Power Core. Power Core is the answer to the problem if the kickdown comes with a delay in the downshift. With Power Core, driving the vehicle will be no-intrusive and confidence-inspiring.

- **Lighter throttle:**

Power Core burns up fuel even more completely and makes the explosion effect in cylinder significantly improved. The throttle is driven by Power Core to be much lighter. There is no need to do extra step-on gas to achieve fuel – efficiency effect.

- **Battery Monitor System :**

Vehicles require predictable and reliable performance of the batteries that are integrated into those systems. It is important to monitor the precise information of battery ,including Battery Voltage Test 、 Battery RC 、 Battery OHM Test 、 Battery CCA and Temperature.

- **Interference reduction:**

Power Core can efficiently lower the ripple at charging of vehicle batteries and functioning of generators to raise the efficiency of the engine.

- **Battery protection-communicating with users:**

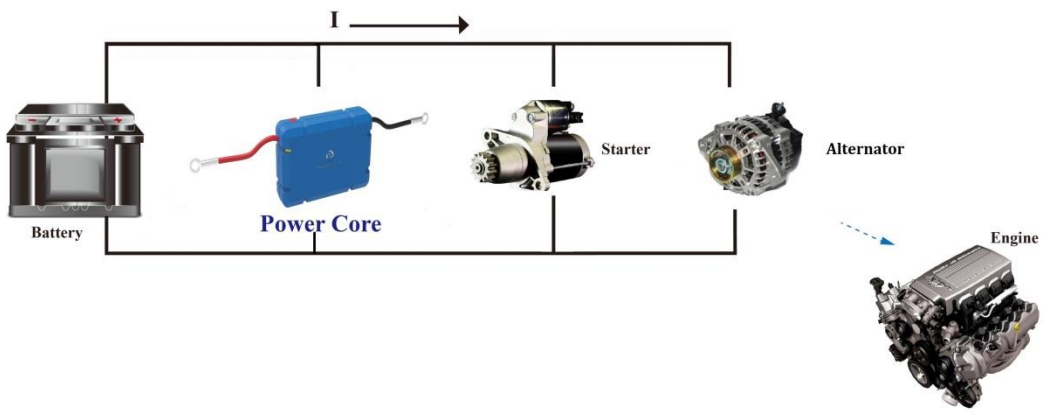
As designed APP specially for Power Core, Power Core will send out the warning messages and battery health status to communicate to a user (for example, to the owner of a private vehicle, or to the service manager of a fleet of vehicles, even the vehicle's operating system.

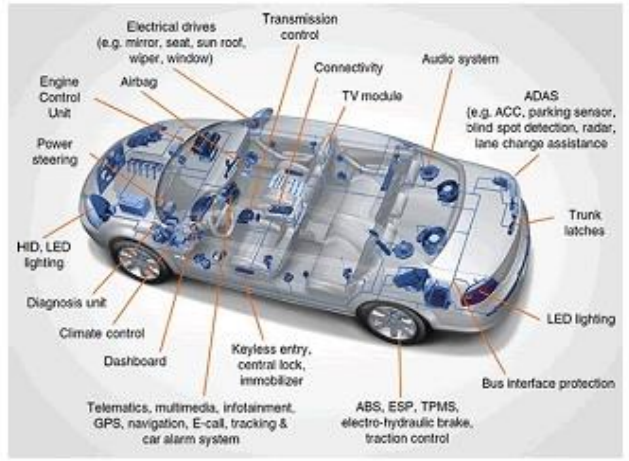
- **Low power consumption from a battery:**

With steady in-out electricity current of a battery, the life of battery will be surely extended. Consumers can even choose to use lower battery capacity than he or she used to use before. This can leave spaces for gears-upgrading or redecorating in a vehicle.

- **One unbelievable function button:**

In the unexpected, unusual, unpredictable, low temperature and severe weather, with special and delicate mechanism, users can press one button for few seconds to have electricity power in ultracapacitors from the battery. In the very much short time, any driver is able to crank the car. In the daily life, he or she shall not need chargers and jumpstars anymore. Power Core, which has one button for cranking, really helps to improve the quality and suitability of people's daily lives.





© 2014 Volkswagen Group of America. All rights reserved. Volkswagen Group of America is a registered trademark of Volkswagen Group of America.

SPECIFICATION-Power Core

	PDC-2100	PDC-2430	PDC-21500	PDC-23000
	20F 12V	86F 12V	300F 12V	600F 12V
BUTTON	x	√	√	√
RC STATUS LED	x	√	√	√
BATTERY STATUS LED	√ (including RC status)	√ (including CAPACITOR status)	√ (including CAPACITOR status)	√ (including CAPACITOR status)
CAPACITOR STATUS LED	√	x	x	x
I/O PORT	x	√	√	√
MAX CURRENT	79A	282A	1585A	2600A
OUTER KEY CONTROL	√	√	√	√
MOVEMENT DETECT	√	√	√	√
ONE BUTTON FOR CRANKING	x	√	√	√
WORKING TEMPERATURE	-40~65	-40~65	-40~65	-40~65