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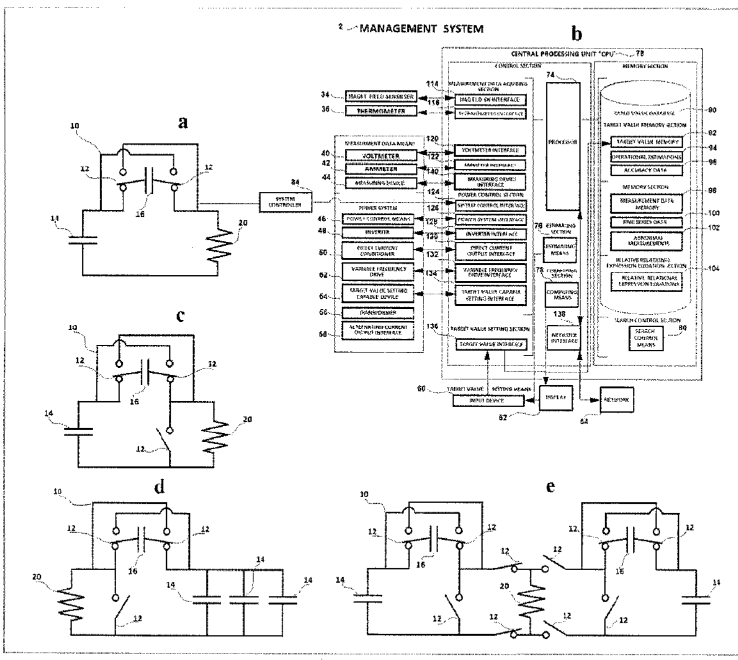
(54) Titre : SYSTEME ET PROCEDE POUR AMELIORER L'EFFICACITE ET AUGMENTER LE POTENTIEL UTILISABLE DISPONIBLE POUR UNE CHARGE FOURNIE PAR UN DISPOSITIF DE STOCKAGE ELECTROSTATIQUE

(54) Title: A SYSTEM AND METHOD FOR IMPROVING THE EFFICIENCY AND INCREASING THE USABLE AND POTENTIONAL AVAILABLE TO A LOAD PROVIDED BY AN ELECTROSTATIC STORAGE DEVISE



(57) Abrégé/Abstract:
A system and method for improving the efficiency and increasing the usable energy and potential available to a load provided by an electrostatic storage devise, the device utilizing electromagnetic fields and potentials to perform desired work in a novel way. This is

(57) Abrégé(suite)/Abstract(continued):
accomplished by utilizing a main reserve capacitor and switching capacitor, exploiting the reserve capacitors electric field to exert a force on a second lower capacity switching capacitor. The force exerted causing the switching capacitor in the circuit to interact with reserve capacitors electric field in which the potential of each capacitor is trying to reach an equilibrium, causing charges in the circuit to continue to migrate through the circuit and preform work, which in turn will cause a negative potential increase or polarity reversal in the switching capacitor that can be reversed through switching, to cause an increased potential or voltage when recombined with the main reserve capacitor.

ABSTRACT

A system and method for improving the efficiency and increasing the usable energy and potential available to a load provided by an electrostatic storage devise, the device utilizing electromagnetic fields and potentials to perform desired work in a novel way. This is accomplished by utilizing a main reserve capacitor and switching capacitor, exploiting the reserve capacitors electric field to exert a force on a second lower capacity switching capacitor. The force exerted causing the switching capacitor in the circuit to interact with reserve capacitors electric field in which the potential of each capacitor is trying to reach an equilibrium, causing charges in the circuit to continue to migrate through the circuit and preform work, which in turn will cause a negative potential increase or polarity reversal in the switching capacitor that can be reversed through switching, to cause an increased potential or voltage when recombined with the main reserve capacitor.

TITLE OF THE INVENTION

A system and method for improving the efficiency and increasing the usable energy and potential available to a load provided by an electrostatic storage devise.

TECHNICAL FIELD

The present disclosure is generally related to energy and, more particularly, is related to systems and methods for the use of available energy supplied to a load provided by an electrostatic storage devise.

BACKGROUND

The concept of using electric, electrostatic and electrochemical storage devises and their interactions are well known, and there are many examples of different variations and uses for such devises, from circuit smoothing to ensuring an uninterrupted supply of electric charge. From the time of Volta, Ewald Georg von Kleist, Pieter van Musschenbroek, Micheal Farady and Benjamin Franklin the advantageous effects of using these devises has been recognized and exploited, and variations on these devises have become fundamental components of our everyday life and way of living.

Summary

Technical Problem

Existing methods of utilizing electrostatic storage device systems and their operation are inefficient, the systems and methods we currently use have not been able to overcome the inefficiencies presented in their operation. Specifically, in the context this disclosed invention and its effect on the operation of capacitors or electrostatic storage devices the efficiency of delivering a usable charge or current has been at the expense of wasted energy.

The efficiency of the capacitors in the basic operation of a device are derived as a factor of the work produced from an electrostatic field of a greater potential forcing through a load or into a lower potential, measured as voltage, the current method of operating these limits the ability of this type of device to achieve anything over 50% efficiency, and this is why equations regarding capacitance, charge and energy are derived using this limitation. The main reason for this limitation is the manner in which these devices operate within the circuit, as a high potential singular direction discharge device.

Solution to Technical Problem

The solution to the technical problem and to the efficiency of electrostatic storage devices is to use the properties inherent in the device in a manner in which yields the best overall deliverable energy output.

When a capacitor is charged to a higher voltage a charge is stored on its metallic plates where two fields are created, a positive field and a negative field. These fields are physical manifestations of higher potential and lower potential; both their positive and negative fields exert an electrostatic force that affects physical materials and devices.

By utilizing both of the devices electromagnetic fields and potentials you can optimize the use of this devise to perform desired work in a novel way not previously discovered. This can be accomplished by utilizing a main reserve or charged capacitor, and exploit the capacitors electric field to exert a force on a second lower capacity switching capacitor, though this operation could be performed by switching either capacitor. The force exerted causing the switching capacitor in the circuit to interact with reserve capacitors electric field in a way in which the potential of each capacitor is trying to reach an equilibrium, the stronger the magnetic field is forcing a physical change in the characteristics of the weaker switching capacitor plates.

This will cause charges in the circuit to continue to migrate through the circuit and preform work, which in turn will cause a negative potential increase in the switching capacitor that can be reversed through switching to cause an increased potential or voltage when recombined with the main reserve capacitor. The switching action causes an increased energy potential, and a reutilization of existing charges within the circuit, resulting in increased efficiency and energy available for usable work.

The increased energy efficiency of this circuit it caused by the electric fields ability to exert a force on charges in the circuit, this is because the internal plates of the two capacitors are directly electrically connected. The higher potential electric field is attempting to equalize, and in the process, causes a continued migration of charges in the circuit and a reversal of polarity on the switching capacitor. Once a potential equilibrium is reached both capacitors will share an equal voltage potential and if the switching capacitor is reversed a gain of voltage, charge and energy is realized.

Traditionally current is designed to flow in DC circuits in a single linear direction, and the use of a capacitor in the circuit can exploit only a few properties one including DC blocking. One predominant and basic implementation of a capacitor in a circuit is to exploit its properties of the relatively fast charge accumulation, and its ability to release its charges in an expedited way.

As a capacitor is charged a potential difference is created, which is the pressure or force that the charges enact upon each other, this concentration of charges exert a force that is trying to reach a lower potential, which can be stated as a more dispersed concentration of charges in a given volume.

I have observed the only effect that can induce a physical reaction in an electric or electromagnetic field is another electromagnetic or magnetic field, which includes even self-induced fields, and my investigations and experimentations have demonstrated the malleability of an electromagnetic field is based upon the concentration of charges in a given area again expressed as the voltage. That being a higher voltage or concentration of charges will exert a force on another concentration of charges, and if the second concentration of charges is of a weaker potential or voltage it will be subjected to pressures and forces that can cause a deformation or change in its characteristics. Maxwell found similar properties and referenced them as the electrical elasticity, which would give a clear explanation of the magnetic field under deformation and then returning to its original form, as I have stated as the malleability of the electromagnetic field.

The novelty of the invention is in the method of operation as well as the construction of the switching circuit, which could also in some circumstances be considered an oscillation circuit. By utilizing a switching means you can basically create an artificial controlled oscillation, directed in a linear fashion and directed into a single path for utilization. And instead of utilizing the potential of an electromagnetic field in an inefficient and wasteful manner, it can be utilized in an advantageous and maximized way.

In order for the storage device to be utilized in a more efficient way the system of operation must be designed to maximize the available energy to a load. In traditional systems, a capacitor is charged by means of a DC voltage applied across its plates. The charging current will continue the flow until the capacitors voltage reaches an equilibrium with the supply voltage the speed in which the current travels through the circuit and into the capacitor can be expressed as an exponential decay function until the point of no current flowing in the circuit. At any point, the capacitor or storage device may be removed from the circuit and perform usable work, or remain in the circuit and perform usable work.

The energy available to a load through a capacitor is a factor derived by considering the capacitance and available voltage which will be explored later on. And the manner in which the energy is delivered to the circuit has remained as the same operational procedure since the first discovery and introduction of the Leyden jar, that is a high potential storage device is placed in a circuit, connected through a load and when a switch is closed the potential is released through the circuit. The high potential neutralizes the low potential of the storage device while performing usable work, as the device performs usable work its potential continues to decrease until equilibrium is reached, and the device has reached a state of neutralization or discharge.

This high potential to low potential system and affect operates in the least efficient manner possible, that being in order to gain energy potential in the storage device usable work must be supplied to the storage device in order to increase its electric field potential. As the electric field potential increases more work has to be continually applied and increased in order to continue to increase the field strength. As well when discharging the storage device, the greatest potential for usable work occurs during the commencement of discharge and as the device continues to discharge the energy and work potential decreases as an exponential function. In other words, you have to continue to work harder and harder to add charge to the storage device and yet when the storage device is in operation it continues to provide less and less energy that can be converted into usable work.

The real realization in novelty of the invention is in the understanding of the natural oscillations in nature, the understanding that there are two sides to a coin and both may be used, if directed in an effective manner. The best way to explain this is to think about a wave created in the tank of water, if you create a wave in a linear direction it will travel along the surface of the water until it hits the wall of the tank. The energy and the wave will be compressed against the side of the tank and then force out a returning wave back across the tank, though it will be of less magnitude and energy, as some of the energy was lost in the original movement of the wave. The way we currently operate our storage devices is in a manner that the wave only travels to the tank wall and then it is eliminated. In the present disclosure, the returning wave is utilized, in other words as the switching capacitor discharges to a neutralized voltage, the electric field of the main or reserve capacitor is forcing a charge up in the switching capacitor into a negative state, or reversed polarity. This in turn accomplishes usable work, and like in the comparison it in effect utilizes the return wave. Then by switching the polarity and reversing the leads of the switching capacitor in the circuit, an increased potential and reutilization of charges can be realized, effectively increasing the energy of the circuit by increasing the voltage potential and by recycling the charges contained within the circuit. This same energy conservation may be demonstrated by plucking a guitar string or releasing a stretched elastic band, both will oscillate back and forth until the energy is entirely utilized and then are returned to a place of rest, though no additional energy was added during each oscillation, a work product of sound or motion was produced.

Though an increase of energy efficiency is realized in the circuit, because charges are recycled within the circuit, there is a reduction in the original energy state of the reserve capacitor. When the switching capacitors potential has been returned to its original state or a neutralized point in the cycle, the force enacted on the switching capacitor for negative polarization is at a lower reserve state. This is because the pressure in the reserve capacitor is always trying to find an equilibrium with the switching capacitor, and since energy was used in the previous oscillation to balance the potentials of the reserve capacitor and switching capacitor before the switch occurs, when after the switch occurs the reserve capacitor potential will begin working to find an equilibrium, and in the current oscillation it will force to a lower state for the remaining portion of the oscillation.

This reduction of energy is directly dependent upon the differential capacity or volume of the switching capacitor and main reserve capacitor. That being a larger differential between the capacity of each capacitor will cause the circuit to be able to produce more oscillations up to almost perfect efficiency of theoretically 99.99%, the effect on exponential decay is a factor directly dependent on the percentage differential between the two capacitors up to the maximum recoverable percentage, and losses. Additionally, the time constant for usable work being performed must be considered in the discharging and then the negative repolarization, or re-charging of the switching capacitor, meaning that the effect the reserve capacitor has on the switching capacitor and its ability to gain an opposite polarity charge is realized as a function of time, applied to usable work, and the strength of the reserve capacitors magnetic field expressed and measured as its voltage.

What this means is in order for the system to be effective a large capacity difference between the two capacitors must be used, the larger the size difference of the capacitors the slower the voltage drop will occur, allowing the system to continue its operation of delivering usable energy to a load, and the difference in percentage between the two capacity sizes determines the amount of cycles able to be realized to perform usable work, the challenge with the implementation is the cost of switching on the system that being more oscillations require more switching losses, so results have been gained with a switching capacitor being as little as 1/2 the capacity of the reserved capacitor, down to 1% of the capacity or even lower to theoretically any division, with 5% of the capacity seeming to find a good balance between recoverable energy and cost of switching, though an increase or decreased in percentage difference may be advantageous for specific applications.

Additionally, the circuit must be allowed time to completely discharge to zero voltage potential, or within an excepted operational range, this is because as the discharging occurs the switching capacitor is gaining an opposing polarity charge, this opposing or negative charge can be considered as a benefit of work product of the reserve capacitors force to find a state of equilibrium.

Then by separating the capacitors in the circuit independently, voltages can be measured, and expressed that they are in equilibrium, though of opposite polarizations. Then by alternating the switching capacitors connection leads the voltages of the two capacitors can be combined, the charges in the switching capacitor may be reintroduced, effectively increasing, or more accurately recycling the energy of the circuit to perform usable work less the percentage of exponential decay. This operation can be continually repeated and offer great advantage over traditional systems as the amount of energy that is able to be utilized can far exceed the traditional 50% efficiency threshold, or termed differently an increase of the systems energy available for utilization, up to a theoretical limit of 99.99% efficiency.

Though the disclosed invention has been presented with the use of only two capacitors two switches and a load, it is possible to have any number of additional components, capacitors, switches, or direct short switches and have the disclosed method operate in the same manner. The goal of which is to create a negative potential usable work product that affects an electric current and a load, and is used to create a voltage increase by means of a polarity reversal or deformation of its characteristics resulting in usable work in any number of switching storage devices.

The efficiency of the disclosed device can be greatly increased by utilizing a larger differential or capacitance volume difference between the reservoir capacitor and the switching capacitor, by doing this the decay rate is substantially reduced while the voltage remains at a higher state, because of this higher state the physical effect on the switching device is maximized, while continuing to deliver stored current with the highest potential in energy density, though in some instances a continued differential in volumes may not be beneficial for efficiency and may result in a higher switching cost that could lower efficiency. Additionally, to utilize lower voltages or control the output current it may be beneficial in some instances to use a voltage booster or multiplier circuit or device.

In some embodiments, it may be greatly beneficial to have multiple pluralities or combinational arrangements of additional "Improved Efficiency Capacitor Circuits" hereinafter referred to as

"IEC2" circuits. This is to allow the operation of devices by utilizing the effective power range of the capacitor or energy storage device, and when the voltage of the IEC2 circuits are diminished to a range that is not effective an additional plurality may be rotated into operation. This will allow power to the main load while the low voltage circuit may be directly shorted to increase the negative polarization voltage, utilizing the ability of the negative potential to perform usable work and maximize the amount of energy able to be utilized during the next discharge oscillation.

Additionally, it may be greatly beneficial to use a plurality of capacitors connected in parallel as the main reserve capacitor, this would allow a large differential in the capacitance, quick charging times and the ability to discharge large volumes of current, this is because the switching capacitor could be easily designed to be multiple farads, or even hundreds or thousands of farads in capacity without the challenges that come with single large storage capacitors. Likewise, it may be very advantageous to use a plurality of switching capacitors operating multiple independent circuits utilizing a large main reserve capacitor or capacitor bank to improve efficiency and circuit design.

The most effective utilization of the disclosed invention is within an operational range, as with most capacitors when potentials reach lower states the difficulty of usage becomes greater, so the most effective operation is in a plurality type arrangement, or for an operational range that can deliver an effective current over a period of time, which depending upon the consumption requirements of the load can vary significantly. In small electronic devices, this operational may range may be in the milliwatts, microwatts or even nanowatts, and in midsize devices may operate within a few watts to a few hundred watts, larger electronics from hundreds of watts to kilowatts, and on an industrial level this range may operate in the kilowatts, megawatts or even gigawatts range. In order to deliver the most benefit both a reserve capacitor or capacitors, and a switching capacitor or capacitors as well as the operational range must be considered, this includes duty cycle as well as switching energy requirements.

When the capacitor reaches a state in which the voltage across the terminals is at an undesirable or minimal level, this is the point where a bypass or shorting switch could be utilized. Then by allowing the fields to interact a power increase occurs and is due to the work produced by the effect of the larger electromagnetic field on the weaker field utilized by this system and method. The increases are realized by increasing voltage potential of the switching capacitor, causing negative polarization of the electrically connected plate of the switching capacitor. This is done by allowing the magnetic fields from the switching capacitor and the reservoir capacitor to work to a potential equilibrium, and in the process, create a potential that may be utilized in the next oscillation.

Efficiency is of primary concern for many applications where in the use of this technology is to expand the efficiency and useful operation of devices such as cell phones, mobile devices computers, transportation would be greatly benefited by the adoption of this technology either as an efficiency increasing method, or power reducing method, this includes vehicles and transportation or devices, air transportation or devices, sea transportation or devices, space transportation or devices and electronic devises. The system and method may be adopted for, and may be scaled up to large-scale industrial applications and for base load power supply, or miniaturized even to the atomic state for the new generation of mini, micro or atomic sized devises.

Mathematical Analysis and Approximations

The discussion and mathematical explanation to the theory and operation of the disclosed invention must first be introduced in the context of current mathematical reasoning, when determining quantities of energy, force, charge, velocity, distance and time.

To determine the amount of charge on a capacitor you are obligated to measure its voltage, which is applied to its capacity. These factors of measurement and operation are so intertwined, and so well know, that applying its operation in such a specific manner and determining the only point in the power generation process where a benefit can be realized, would not present itself to even the most skilled in the art, because under all other operating conditions this line of questioning would not present any unexpected results that would be of great importance or consequence.

This is primarily due to the means of access in which the energy for testing this line of experimentation is attained, those methods being historically a battery for supply, or currently accessing readily available alternating current supply. And as soon as a capacitor or other storage means is connected to the system it becomes a part of this isolated system, and at no point does it become apparent that it can be used as a means to measure the quantity of energy, and more specifically charges, and instead becomes the means for storing a charge that can be released at a high rate in a short period of time, or as a filtering or smoothing means for a current.

This question again struggles with the context, in which this particular device is used within a circuit, and more specifically a capacitor in the circuit is designed to accumulate charges over a given period of time, this is dependent upon the current and voltage that supplies the capacitor. So when mathematically determining factors affecting a capacitor and a circuit the approach would be to determine the current supply, and how this current supply would affect the time rate of charging of the capacitor and the amount of charge the capacitor was able to store, and if the current needed smoothing or filtering, rather than the effect the capacitor has while in operation on the quantity of charges, and electromagnetic field of the current supply and the strength and operation of its two magnetic fields and the operational circuit.

Mathematical expressions are estimations meant to demonstrate the principle of the disclosed invention, there accuracy, definition and scope are not included to limit the scope of the disclosure.

This is the point in which we begin to examine these questions mathematically to determine their effects when constructed in a system that may be affected with regard to the variables discussed. And during this examination theory and methods expressed will be integrated with mathematical analysis from the former, Prof. James Clerk Maxwell and referencing "A Dynamical Theory of the Electromagnetic Field pub. Jan 1 1865".

With regards to context;

"Mutual Action of Two Currents"

"If there are two electric currents in the field, the magnetic force at any point is that compounded of the forces due to each current separately, and since the two currents are in connexion with every point of the field, they will be in connexion with each other, so that any increase or diminution of the one will produce a force acting with or contrary to the other."

"Coefficients of Induction for Two Circuits

In the electromagnetic field the values of L, M, N depend on the distribution of the magnetic effects due to the two circuits, and this distribution depends only form in relative position of the circuits. Hence L, M, N are quantities depending on the form and relative position of the circuits, and are subject to variation with the motion of the conductors. It will be presently seen that L, M, N are geo-metrical quantities of the nature lines, that is, of one dimension in space; L depends on the form the first conductor, which we shall call A, N on that of the second, which we shall call B, and M on the relative position of A and B.

Let E be the electromotive force acting on A, x the strength of the current, and R the resistance, then Rx will be the resisting force. In steady currents the electromotive force just balances the resisting force, but in variable currents the resultant force E=Rx is expended in increasing the" electromagnetic momentum" using the word momentum to express that which is generated by a force acting during a time, that is, a velocity existing in a body."

At this point we will examine the statements made by Maxwell with regard to electromotive force E acting on A, the strength of the current x, and the resistance R. he has expressed that in steady currents in the electromotive force balances the resisting force, though in variable currents there is a resultant force equal $(E = Rx)$.

With regard to this analysis in a system of variable currents we can determine that the force acting on A is;

$(E = Rx)$

Meaning the strength of the current multiplied by the resistance in, for example, multiple turns of copper winding, which would then exude a force on A equal to that of the resistance R, multiplied by the current x. This expression I have concluded is a clear demonstration to the effects that that are observable in the case of accumulating an electric charge in an accumulator, though an expanded statement is required.

Where the energy stored on an accumulator with regards to work done by a continuous fixed voltage, where voltage represents energy per unit of charge dq is work done moving a charge from the negative to positive plate $V\, dq, V$ is an accumulator's voltage proportional to existing charge.

Energy stored; $dU = Vdq = \frac{Q}{C} dq$

If the accumulator has been charged to Q, with the fixed voltage measured across accumulator as a factor of stored energy, the stored energy may by derived from;

$$U = \int_0^Q \frac{q}{C}\, dq = \frac{1}{2}\frac{Q^2}{C}$$

Where energy stored in the accumulator is always considered to be ½ the fixed(F), voltage supply, and the energy supplied is;

$$E = C{V_F}^2$$

What this statement expresses, is that in order to find out what the energy of a capacitor is, you must take into account the energy that was required to produce it. The energy requirement is expressed as; the energy expended equals the capacitance multiplied by the voltage, where the voltage is a fixed amount squared.

So as to the effects of accumulating an electric charge in an accumulator where E is the force acting on A the accumulator, I is the strength of current as a factor of voltage referred to as density, and R is the resistance, and B is the magnetic field in A as a product of the current I ,over a time t, expressed and measured as voltage V, and finally E_1 is the force opposing the current as a factor of a varying magnetic field of B proportional to its strength/ density measured as voltage V, and as a product of the surface are or volume of A stated as C.

When a variable current acts on an accumulator;

$$AV = (Ei)^t / AvE_1 = B$$

When q is the quantity of charges accumulated in the accumulator and the current encounters no resistive force;

$$Aq = Ei^t$$

The effect of a reduction in resistive force as current travels into an accumulator;

$$\Delta\frac{B}{2} = \Delta i^2$$

The effect of an increase of resistive force B, as current (i) travels into an accumulator;

$$\Delta\frac{i}{2} = \Delta B^2$$

Through experimentation, and based on accepted well established scientific principles, charges have been observed to accumulate in a storage devise, such as a capacitor, at an ever-decreasing rate as a factor of time and as a product of a consistent voltage. This relation of resistive accumulation is a factor derived from the inverse square of the charges accumulated, and the current causing the accumulation of charges, which is proportional. This directly results in the quantity of charges that are accumulated over a given period of time.

The explanation is that as a magnetic field grows more energy has to be expended to continue charging the capacitor; each charge has to work harder as it continues fighting the force exerted against it, from an ever-increasing electric field, this electromagnetic field is measurable as the voltage and power density.

This scientific principle stating mathematically the energy and charge of a capacitor is;

$(Q = CV)$

$(W = {}^1\!/_2 VQ)$

$$\left(W = {}^1\!/_2 \frac{Q}{C} \times Q = {}^1\!/_2 \frac{Q^2}{C}\right)$$

$(W = {}^1\!/_2\ V \times C \times V = {}^1\!/_2 V^2 C\,)$

The explanation of the belief of energy being divided in one half, is that the energy supplied to the capacitor is continuously coming in contact with an ever-increasing resistive force. And if you were to test, record and then add up all of the integers of work energy that it took to charge the capacitor from a totally discharged state, to a fully charged state of its electric field it would be equal to exactly double the energy of the capacitor in joules, and stored energy would be one half of the required or expended energy.

What these statements are meant to articulate is that the force exerted for migrating charges, and the act of migrating charges, are both best described as gradients $V = V\nabla$ rather than curves, and will exert a proportional inverse force on one another. That being the act of migrating charges resists the force of additional charges proportionally as the voltage represented as the gradient increases, and inversely the force will be exerted with more strength at a higher voltage, and weaker force will be exerted at a lower weaker voltage, so the force is also best described as a gradient $F = F\nabla$ rather than a curve when used in the disclosed methods context.

This is expressed as;

$\nabla \mathrm{F} = \int_0^1 Fx$ $\qquad \nabla \mathrm{V} = \int_0^1 Vx$

The present disclosure and the explanation of the reserve capacitors operation within the circuit is, it is designed to utilize both its higher potential and lower potential magnetic fields, to enact a force upon the switching capacitor causing both a push and pull motion on its magnetic fields. By controlling the force that acts upon the plates of the switching capacitor an alternating discharge and then re-charge occurs in the switching capacitor, this effectively offers a way to recycle and reintroduce the charges back into the system in a cyclical way.

Since the highest voltage potentials are always combined for the discharge into the circuit a higher amount of energy is deliverable for usable work. Then by utilizing a negative force on the switching capacitor charges continue to flow through the circuit doing usable work, and simultaneously the switching capacitor polarization reverses and charges accumulate on the original positive plate until the point equilibrium is reached with the reserve capacitor. The act of reversing the polarization in the switching capacitor means an increased voltage potential can be reintroduced into the circuit, wherein the charges can be recirculated and the voltage potentials increased.

The explanation of switching capacitor operation is quite straight forward, when the capacitor is connected in the circuit in a normal in series connection with the reserve capacitor, if the switching capacitor is of a lower capacitance this will generally mean smaller conductive area, for example in the case of electrolytic capacitors, that the metallic plate size is also of a smaller dimension. If charges are thought of as a gas we can determine that gas pressure is equal to force divided by the area, the same can be thought of for energy, where the pressure is the voltage, and the force is represented by charges, and the area is the amount of conductive material of the capacitor.

$$P = F/A \qquad V = Q/C$$

Therefor if like the example of gas pressure a new smaller container of a neutral pressure is introduced to a larger container of higher or lower pressure, then the smaller containers pressure will adjust and the overall pressure of both containers will equalize, with the overall pressure adjusted as a factor of both container sizes and pressures.

$$Va = \left(\frac{V}{(Ca + Cb)}\right) Ca \quad Vb = \left(\frac{V}{(Ca + Cb)}\right) Cb$$

This is the same for a multitude of energy storage devises, and in this case capacitors, if operated in an effective manner you can utilize the pressure adjustment (voltage adjustment) and discharge cycles for usable work. This effectively increases the efficiency by a substantial amount and uses the properties inherent to this type of devise for maximum benefit and utilization.

In order to determine actual current and voltage in the circuit during each oscillation the switching capacitors voltage while exiting the previous oscillation needs to be added to the voltage of the reserve capacitor in each current or next oscillation. The reserve capacitors voltage at the start of each oscillation must be the average of the previous oscillations finished voltage that was in equilibrium, divided across the switching capacitors discharged capacity and reserve capacitors capacity, multiplied by the reserve capacitors capacity, this is due to the last have of the current or next oscillation, where the capacities are attempting to reach equilibrium, and the voltage in the switching capacitor reaches zero and then reverses polarization, thereby lowering the average voltage of the reserve capacitor and forcing an inverted polarization on the switching capacitor, and thereby lowering the overall voltage of each oscillation This can be done by determining exponential decay.

$$v = \left(Va = \left(\frac{V}{(Ca + Cb)}\right) Ca(1 - Cb)^{t}\right) + \left(Vb = \left(\frac{V}{(Ca + Cb)}\right) Cb\right)$$

The energy of the discharge cycle or oscillation is;

$$e = \frac{V^2 \times Cb}{2}$$

The Coulombs for the discharge cycle or oscillation is;

$$q = \mathrm{V} \times \mathrm{Cb}$$

With regards to equivalent capacitance, when work is performed in moving a charge from one plate to the opposing plate, the recombination of capacitors that where charged in parallel, and then combined into a series configuration, does not therefore eliminate the work that was performed in moving the charges, instead a chain of charge migration between capacitors is created. And each capacitor exchanges charges increasing voltage and electric field strength, though the strength is increased combining capacitors in series it is at a cost of deliverable charge, though in this case a complete oscillation occurs between at least two capacitors and in this system and method equivalence is not proportional or regraded to traditional equivalence.

Where capacitors are in series in a circuit;

$$\left(\frac{1}{C\ equivalance} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} \ldots\ldots (V = V_1 + V_2 + V_3)\right)$$

Brief description of drawings

The invention will be described by reference to the detailed description of the preferred embodiment and to the drawings thereof in which:

FIG. 1 illustrates a preferred embodiment of the Improved Efficiency Capacitor Circuit (IEC2) and includes the IEC2 design in connection with a management system, and alternate embodiments 1c,1d,1e.

FIG.1a Is the preferred embodiment of the Improved Efficiency Capacitor Circuit (IEC2).

FIG.1b Is the preferred embodiment of the management system.

FIG.1c Is an alternate embodiment of the Improved Efficiency Capacitor Circuit (IEC2).

FIG.1d Is an alternate embodiment of the Improved Efficiency Capacitor Circuit (IEC2).

FIG.1e Is alternate embodiment of the Improved Efficiency Capacitor Circuit (IEC2).

FIG.2 Is a chart plotting the realized Joules per discharge cycle of the Improved Efficiency Capacitor Circuit (IEC2).

FIG.3 Is a chart plotting the realized Coulombs per discharge cycle of the Improved Efficiency Capacitor Circuit (IEC2).

FIG.4 Is a chart plotting the Reserve capacitor voltage per discharge cycle of the Improved Efficiency Capacitor Circuit (IEC2).

FIG.5 Is a chart plotting the Switching capacitor operating cycle of the Improved Efficiency Capacitor Circuit (IEC2).

FIG.6 Is a chart plotting the output voltage characteristics per cycle of the Improved Efficiency Capacitor Circuit (IEC2).

FIG.7 Is a chart plotting the Improved Efficiency Capacitor Circuit (IEC2) operational information per cycle, and long form mathematical proof showing the improved efficiency, for a 10-1 capacitance differential.

FIG.8 Is a chart plotting the Improved Efficiency Capacitor Circuit (IEC2) operational information per cycle, and long form mathematical proof showing the improved efficiency, for a 100-1 capacitance differential.

Detailed description

Therefore a heretofore, unaddressed need exists in the industry to address the aforementioned deficiencies and inadequacies.

Figures and embodiments contained are to demonstrate possible variations and to give a clearer understanding of the theory and method herein, to allow one with ordinary skill in the art to gain the ability to re-create said method.

The Improved efficiency capacitor circuit "IEC2" 10 and management system 2 with reference to figure 1 is a functional block diagram schematically showing a configuration of the management system 2, its power system section, its central processing unit "CPU" 78, which includes the control section and the memory section, 1a Improved efficiency capacitor circuit "IEC2, and load 20, 1b the management system, 1c design for the improved efficiency capacitor circuit "IEC2" 10 with a direct short switch, 1d design for the improved efficiency capacitor circuit "IEC2" 10 with a parallel reserve capacitor 14 configuration, 1e design for the improved efficiency capacitor circuit "IEC2" 10 with a parallel circuit configuration.

Embodiments of the present disclosure can also be viewed as providing systems and methods for managing and controlling the operational voltages and current from an electric and or electrostatic source utilizing an electronic circuit and an improved design and method, this can be briefly described in architecture one embodiment, among others, can be implemented by;

Figure 1,1a illustrates the preferred embodiment of the system of Improved efficiency capacitor circuit (IEC2) comprising a circuit controlling the collection and output of charges, controlled by the management system 2. The design of the circuit allows the main reserve capacitor 14, to control the electromagnetic forces the switching capacitor 16, is subjected too. The switches 12 control the orientation of the switching capacitors leads in the circuit, which could be either the smaller or the larger capacitors and or both of the capacitors, this allows the capacitor to turn 180* in the circuit reversing its in circuit orientation, taking advantage of the reversal in polarity that the switching capacitor 16 has underwent when the load 20, was connected and the capacitors 14,16 where allowed to discharge through the load 20, and re-introduce some of the charges back into the circuit. The difference in size between the reserve capacitor 14 and switching capacitor 16, effects the operation of the IEC2 10 in that more of the voltage or pressure can be recycled in the circuit 10, effectively increasing the energy efficiency if the size of the switching capacitor 16 is lesser than that of the reserve capacitor 14. Additionally as in figure 1c another switch 12 may be added to give a direct short connection between the capacitors 14 and 16, this is due to the fact that the voltage will continue to cause a negative force reversing the polarity of the switching capacitor 16, and ensuring that the in circuit voltage falls to zero will maximize the negative potential on the switching capacitor 16. Figure 1d is an example of numerous reserve capacitors 14 used to expand the capacitance of the reserve capacitor 14 operation, to allow a larger capacity of the switching capacitor 16 without reducing efficiency, and making implementation simpler and potentially more cost effective, operation of the IEC2 can be across the full range of voltages from low voltages to millions of volts. Additionally some embodiments may utilize pluralities of switching capacitors 16 with a single reserve capacitor 14, or pluralities of reserve capacitors 14 with a single switching capacitor 16, or a plurality of reserve capacitors 14 with a plurality of switching capacitors 16. Additionally this system and method takes advantage of the natural oscillation cycle of electric charge potentials and therefor a broad range of possible embodiments may benefit from this system and methods novelty including accumulators, electrostatic accumulators, or storage devices may be substituted or used and will utilize the benefit of the disclosed invention and are hereby claimed in this disclosure.

Additionally, the IEC2 may be connected and controlled by a system controller 84 or microcontroller, embedded microprocessor, integral controller, derivative controller, system-on-a-chip, digital signal processor, transistor oscillation circuit, semiconductor oscillation circuit, silicone controlled rectifier, triac, field programmable gate array, or paired with an existing CPU 78, in a non-limiting example of a master and slave configuration of the management system 2. The system controller 84, is controlled by a computer code or script, embedded system, or artificial intelligence, controlling commands of the system controller 84, connected to the positive and negative, may use a plurality and multitude of different switching devices and current and polarity control devices and may comprise different switching device arrangements, non-limiting examples of possible embodiments include; late switch, momentary switch, devises such as relays, single pole relay, multi pole relay, single throw relay, multi throw relay, reed switches, reed relays, mercury reed switches, contactors or commutators which can utilize a rotary or mechanical movement action, for instance a commutator(s) as the switching devise, utilizing arrangements of contact points or brushes or mercury brushes, to allow charging and discharging, additionally switching mechanisms may include, limit switch, membrane switch, pressure switch, pull switch, push switch, rocker switch, rotary switch, slide switch, thumbwheel switch, push wheel switch, toggle switch, pole switch, throws and form factor switches, trembler switch, vibration switch, tilt switch, air pressure switch, turn switch, key switch, linear switch, rotary switch, limit switch, micro switch, mercury tilt switch, knife switch, analog switch, centrifugal switch, company switch, dead mans switch, firemans switch, hall-effect switch, inertia switch, isolator switch, kill switch, latching switch, load control switch, piezo switch, sense switch, optical switch, stepping switch, thermal switch, time switch, touch switch, transfer switch, zero speed switch.

Electronic devices may be used to control switching and or be the switches 12 such as transistors, thyristors, mosfets, diodes, shockley diodes, avalance diodes, Zener diodes and their reversal breakdown properties, signal diodes, constant current diodes, step recovery diodes, tunnel diodes, varactor diodes, laser diode, transient voltage suppression diode, gold doped diodes, super barrier diodes, peltier diodes, crystal diodes, silicole controlled rectifier, vacuum diodes, pin diodes, gunn diodes, and additionally transistors such as junction transistors, NPN transistors, PNP transistors, FET transistors, JFET transistors, N Channel JFET transistors, P Channel JFEt transistors, MOSFET, N channel MOSET, P Channel MOSFET, Function based transistors, small signal transistors, small switching transistors, power transistors, high frequency transistors, photo transistors, unijunction transistors, thyristors not limited to silicone controlled rectifier, gate turn off thyristor, integrated gate commutated thyristor, MOS controlled thyristor, Static induction thyristor, and any switch or mechanism to perform this desired function. Additionally, artificially created voltage drops could be used to maintain determined voltage range utilized through switching, this could include in series diodes that can be individually bypassed, creating a consistent voltage by continuing to bypass each diode using a switch to eliminate their in-circuit voltage drop.

The preferred embodiment comprising routed available to a load 20 or routed into a voltage booster or inverter for use. Output can then be routed and further controlled by an electronic management system 2 to measure output current and voltage, and then control and regulate the delivery of this current to a load 20 or storage device.

The input and output of each capacitor 14 and or 16 may be connected to separate output switches 12 or not and may include relay poles, which could be any number of different types or styles of relay's or transistors, thyristor, or layered semi-conductive material designed for electronically controlled switching, with all relays 66, controlled by a CPU 78, or microcontroller, embedded microprocessor, integral controller, derivative controller, system-on-a-chip, digital signal processor, transistor oscillation circuit, semiconductor oscillation circuit, silicone controlled rectifier, triac , field programmable gate array, or paired with an existing CPU 78, in a non-limiting example of a master and slave configuration of the management system 2. The CPU 78, is controlled by a computer code or script, embedded system, or artificial intelligence, that tells the system controller 84, to send a signal to relay's or switches 12 which may be connected to a charge booster or multiplier circuit , which may discharge through a load 20, or another storage device to create usable work.

The CPU 78 and system controller 84 may be used to dictate the frequency of the charge and discharge cycle, and the combinations and arrangements of additional switches 12 or capacitors 14 and or 16, to gain the desired voltage level and total current output. Arrangements may include instantaneous discharge, predetermined storage levels before discharge, voltage measurement based storage discharge, continuous sampling and adjustment of current output, and additionally can be arranged to meet virtually any desired and defined frequency, voltage and current with available circuits, and may be multiple different values or tolerance level arrangements, arranged in different configurations or different outputs that can then be used to do desired work or for storage.

This is to give the IEC2 unit the largest operational variance and reduction in losses while maintaining output voltage thresholds at target voltage, so the voltage level remains at a desirable level to increase energy as a product of work when discharged. This design configuration allows the operation voltage with the greatest variance within the target voltage range, so during operation voltage levels can be maintained within target levels.

This system is described with reference to the preferred embodiment of a dc power circuit, though in some embodiments the method involved herein may utilize accumulators and switch operations and may be beneficial for use with other power generation methods such as AC circuits, photovoltaic, piezoelectric, thermoelectric, ambient, RF, fuel cell, and electrochemical, existing induction sources such as wind turbines, hydroelectric, geothermal, coal, natural gas, nuclear, wave energy, liquid gas such as oxygen and other pressure based systems.

Additionally some embodiments may utilize a management system 2 as a component of the device which may control various functions some or all of which may consist of, the operation of all electronically operated components; the charging and discharging and combinational arrangements; power regulation means 46 for regulating power; a memory section, a search starting means for starting a search; measurement data acquiring means for acquiring magnetic field data and electric power data, the magnetic field data being measured values of the energy sources magnetic field. The electric power data representing information associated with electric power that is outputted from the energy source and required for operation, and used by the management system 2. Functions may also include deriving means for deriving a relational equation that holds between the magnetic field data and electric power data to maintain target values including voltage and current output. Monitoring functions for abnormal state determining, and may include means for determining whether or not the energy source, a collection device, or any energy switching, energy transforming, or managed circuits are in an abnormal state. Searching functions and a search procedure, selecting means for selecting, and in accordance with a result of determination of the abnormal state determining means, a procedure for managing abnormal energy sources, magnetic fields, accumulation devises, energy switching devises, transformers, management circuits.

The management system 2 uses a system for managing energy, accumulation, storage, switch, and discharge system hereinafter referred to as "management system 2" defined as; to handle, direct, govern, or control in action or in use, the device and it's functions, processes, actions, tasks, activities, systems, and given or directed instructions, the input and output characteristics of charging and discharging circuits, IEC2 circuits, energy sources or electricity supply, driving actions, motors, magnetic fields, oscillation cycles, memory, controls, and components.

In some embodiments, the management system 2 is needed to facilitate managing an energy, then storing the collected charges, and then discharging collected charges, and then switching accumulators and or electrical storage devices; at a controllable rate, that can be replicated and controlled to an extremely high number of pluralities, to maximize energy from an energy source and or accumulators and or electrical storage devices, which can be accomplished with current and voltage measuring devises, switches, accumulators and or electrical storage devices and or including capacitors, dc-dc charge booster or multiplier, transformers and or sequential and or parallel arrangements. And in some embodiments a simplified management system 2 may be beneficial utilizing some and or different arrangement of listed or other functions, and additionally a mechanical management system 2 in some embodiment may be advantageous, for instance pairing with a commutator switch, or relays, utilizing the driving forced for controlling switching and energy characteristics, and in some embodiments utilizing no management system instead using current oscillators or natural means to control the switching force and or speed, this simplified system may be advantageous for a consistently regulated and or switching energy source.

Each circuit and module is an electrically connected system of components, and is managed by the management system 2, which may include additional devises and systems such as; a display 62, a direct current power conditioner 50, current power output interface 130, voltage booster or multiplier a thermometer 36, a thermometer interface 116, magnetic field sensor 34, magnetic field sensor interface 114,voltmeter 40, voltmeter interface 120, an ammeter 42, an ammeter interface 122, a measuring devise 44, a measuring devise interface 140, an inverter 48, an inverter interface 128, a system controller 84, a system controller interface 124, power control means 46, power system interface 126, a target value setting capable devise 54, a target value capable setting devise interface 134, an input devise 60, a target value interface 136, an alternating current output interface 58,a transformer(s) 56, a variable frequency drive 52, a variable frequency drive interface 132, a central processing unit "CPU" 78, a processor 74, estimating means 76, computing means 78, network interface 138, load 20, search control means 80, relative relational expression equations 104, abnormal measurement memory 102, time series data memory 100, measurement data memory 98, accuracy data memory 96, operating estimations data 94, target value memory 92, a rated value database 90.

The control section serves to control the overall control and operation of various components of the management system 2, circuits, modules, and the memory section serves to store information. The control section is configured to include a measurement data acquiring section (measurement data acquiring means), the amount of current/voltage (current/voltage acquiring means), a computing section (computing means), a target value setting section (target value setting means), a search control section (search starting means), power system section (power system controlling means), and in estimating section (estimating means). Further the memory section is configured to include a target value memory section, a memory section, and a relative relational expression equation section, a rated value database 90.

The memory section serves to store, as measurement data, measurement data obtained from each measuring instrument while the management system 2, is operating. Specifically, the measurement data contains the following measured values measured at the; measure point of time, operating current value, operating voltage value, amount, magnetic field strengths, and temperature. The measure point in time is data representing year, month, day, hour, minute, and second. Further the operating current value in operating voltage value refer to values of an electric current and voltage is measured at a point, respectively.

Further, temperature is measured by the thermometer 36, magnetic fields are measured by a magnetic field sensor 34. The rated value database 90 is provided with a memory section and a target value memory section. The memory section serves to store relative relational expression equations 104, for maintaining operating current values and operating voltage values. The target value memory section 92, serves to store target values of the operational estimations 94, and accuracy of relative relational expression equations 96, that determine power usage and magnetic field strength relations, to ensure optimal system performance and efficiency, that can be interpreted for command allocation.

The measurement data acquiring section, serves to acquire measuring values from each measurement instrument. Specifically, the measurement data acquiring section acquires measurement data of (electrical power data, temperature, magnetic field data), which is time-series data, containing the electric current value, the voltage value, the temperature, the magnetic fields, from the measuring instruments of the ammeter 42 and voltmeter 40, the magnetic sensor 34, thermometer 36, and sends the measurement data to the search control section of the database.

The search control section, searches for relative relational expression equations 104, to interpret historical relations to measurement values, and interpret proportional relationships between stored measurement values, operational characteristics, and predetermined target value ranges, including output characteristics, discharge relational information including combinational arrangement output power data, cluster and module combination data, and duty cycle optimization equations.

The search control section, can compute measurement characteristics if measurements have been measured and stored even once and can compare characteristics with the target value setting section, which may also incorporate a learning effect, or artificial intelligence, interpretations can be interpreted by the central processing unit CPU 78, which can send instructions to the system controller 84, which can then send command signals to active switching and control systems, and components, to control predetermined, or instructed operational target values and functions.

The measurement data acquiring section, also serves to determine faults, by acquiring and comparing measured values from the measurement data memory storage section 98, and by interpreting abnormal operating system measurements 102. Abnormal measurements, are stored in the memory storage section, and additionally may be sent to the display 62, to indicate to users of the management system 2, abnormal measurements 102, or sent to the control section and the target value memory section 92, to perform tasks such as bypassing abnormally operating circuits, modules, systems, or component's, or by compartmentalizing systems containing faults and maintaining predetermined target operating conditions, output power characteristics and functions.

It should be noted that measurements may be computed by performing measurements by measuring each instrument once, or more than once, at a time of introduction of the management system 2, or may be computed as a search performed manually by the user's operating the management system 2, or maybe performed automatically, e.g., regularly. In particular measurements may be performed at predetermined intervals, or from time to time. The exacting control of the electromagnetic fields under the devices management is a main primary concern of the disclosed invention, an electromagnetic field of potential must be created, switching consumption is of concern to not reach an inefficient level, though a certain trade-off of output energy and energy consumption occurs.

The IEC2 circuit may use a plurality and multitude of different storage devices and accumulators and may comprise different storage device arrangements, and may include accumulator balancing or IC's, non-limiting examples of possible embodiments include; single large capacity storage device, multilayer or multi cell configuration, multi storage devices, magnetic field storage device, condensers, capacitors non limiting examples include ceramic(paraelectric, ferroelectric, mixed oxides, class 1, class 2, multilayer, decoupling, suppression, high voltage power, power) film and or foil (nano-structured crystalline thin film, composite ink/ paste, crosslinked gel electrolytes, electrolytes, metalized, plastic, polypropylene, polyester, polyphenylene sulfide, polyethylene naphthalate, polytetrafluoroethylene, RFI, EMI, snubber,motor run, AC capacitors, power film), electrolytic(Aluminum, tantalum, niobium, non solid, solid manganese oxide, solid conductive polymer, bipolar) axial, SMD, chip, radial, hybrid capacitors,Supercapacitors(double layer, pseudocapacitors, hybrid capacitors) electrochemical capacitors, ultracapacitors, electric double layer capacitors, APowerCAP, BestCap, BoostCap, Cap-XX, DLCAP, EneCapTen, EVerCAP, DynaCap, Faradcap, GreenCap, Goldcap, HY-CAP, Kapton capacitor, Super Capacitor, SuperCap, PAS Capacitor, PowerStor, PsuedoCap, Ultracapacitor, Double layer lithium-ion, class X, class Y,carbon capacitors, graphene capacitors, graphite capacitors, integrated capacitors, nano-scale capacitors, glass capacitors, vacuum capacitors, SF6 gas filled capacitors, printed circuit board capacitor, conductive wire capacitor, mica capacitors, air gap capacitors, variable capacitors, tunning capacitors, trimmer capacitor, super dielectric material capacitor.

Additionally, a voltage booster or multiplier may be utilized, or direct feed into a load 20, or utility transmission system, the current may be fed into an inverter 48, charge booster or multiplier booster, jewel thief, dc-dc booster, spark gap, transducer, or used to create bio fuels including methane, helium, or used to control a heat exchange system for instance to control the expansion and contraction of gases to produce water.

Output current characteristics may be controlled a number of different ways and non-limiting examples of possible embodiments include; direct current continuous output 130, direct current intermittent output, pulse width modulation, the larger capacity accumulator could be reversed in the circuit causing a voltage increase in the circuit and recycling the charges in the smaller capacity accumulator and causing an alternating current in the circuit, current may be routed through an inverter 48, or into additional transformer(s) 56 which can be used to create a pulsed alternating current or alternating current output 58, or be arranged with additional modules with positive and negative lead connections arranged in opposite to provide an alternating current, by controlling the discharge alternation between the module into the transformer 56, which may in some embodiment not require the transformer 56. Current may be discharge instantaneously or through a controlled discharge, voltage booster, with the preferred embodiment discharging into a load 20 and or charge booster 8 or inverter 48 available for use.

Arrangements and frequency may include instantaneous discharge, predetermined voltage levels before discharge, voltage measurement based discharge, continuous sampling and adjustment of current output, and additionally can be arranged to meet virtually any desired and defined frequency with available circuits, and modules, this output can then be used to do desired work or for storage.

The load 20 is a target of the power supply; it is illustratively an electric device that is to be put into action by supplying electric power. It should be noted that the management system may be configured to be connected to a commercial power system so as to be able to collaborate with it, or may be configured to independently to operate without collaborating with a commercial power system.

Different Applications and possible uses in our modern electricity based world would be too great a number of possibilities to list in a single document, it should be clear to the reader that because of the sophistication of the many inventors, and institutions of the world that this technology can be utilized for virtually any use that requires power and uses some form of electric, electrostatic, electrochemical, or electromagnetic field storage device or accumulator, so a non-limiting example of a potential use embodiment would be a devise that requires an electric current, or magnetic field to operate from nano sized to commercial industrial sized, with some of the notable examples being transportation (cars, trucks, airplanes, ships, trains, flying craft, automobile, or machinery), electrical production such as(single or multi dwelling, electrical grid supply, commercial or industrial supply, or retrofitting existing electrical generation systems and machines), and electronic devises such as (implantable devises, portable electronics, electronic devices, electrical devices, phones, computers, tv's, heaters, air conditioners, lighting, miniature and or nano-electronics or devises) and all power or electrical consuming devises or equipment.

The present invention is not limited to the description of the embodiments provided but may be altered by skilled person within the scope of the claims. An embodiment based on the proper combination of technical means disclose in different embodiments is encompassed in the technical scope of the present invention.

The blocks or, in particular, the control section of each of the oscillation circuits or the management system may be achieved through hardware logic or through software by using a CPU 78 as described. That is each management system 2 and IEC2 circuit, includes a CPU 78 central processing unit, which executes instructions from a program for achieving the corresponding function; a ROM read-only memory, in which the program is stored; a ram random access memory, to which a program is loaded; a memory device recording medium such as memory, which the program various types of data are stored; and the like.

Moreover, the object of the present invention can be attained by mounting, to each of the circuits or modules or generating device, a recording medium computer readably containing a program code to execute form program, intermediate code program, source program of software for achieving the before mentioned function, in order for the computer CPU 78 or MPU memory processing unit to retrieve and execute the program code recorded in the recording medium, through a non-limiting example of a system controller 84. Examples of the recording medium encompass: tapes, such as magnetic tapes and cassette tapes; discs include magnetic disk, such as floppy disks, and hard disks, and optional desks, such as a CD-ROM's, MO's, MDs, BBs, DVDs, and CD –Rs; cards, such as icy cards including memory cards and optical cards; and semiconductor memories, such as masks ROM's, EEPROM's, EEPROM's, and flash ROM's.

Further each of the management systems 2 can be made connectable to a communications network so the program code can be supplied via the communications network 64. Examples of the communications network can include, but are not limited particularly to, the Internet, and intranet, and extranet, a LAN, ISDN, a VAN, a CATV communication network is not particularly limited. For example it is possible to use, as a transmission medium, a cable such as a IEEE1394, a USB, a power line, a cable TV line, a telephone line, an ADSL line, etc. alternatively, it is possible to use, as a transmission medium, a wireless system such as infrared rays as inIrDA and a remote controller, Bluetooth, 802.11 wireless, HDR, cellular phone network, satellite line, a terrestrial digital network, etc. it should be noted that the present invention can be achieved in the form of a computer data signal realized by electronic transmission of the program code and embedded in a carrier wave.

Further, the present invention can be expressed as follows: an IEC2 circuit and management system 2 according to the present invention is for improving efficiency, a management system 2 for managing the operational voltages and current from the devise utilizing a novel electronic circuit, the management system 2 being configured to include: A control means to control the overall control and operation of various components of the management system 2, a IEC2 circuit, transformer(s) for transforming a current(s) from an IEC2 circuit or an energy source, switching means for switching and may include potentials and or accumulators and or electrical storage devices, a memory storage means to store information in memory, amount of magnetic field /temperature/ acquiring means for acquiring an amount of a magnetic field and/or temperature; current/voltage acquiring means for acquiring an electric current value and/or voltage value, a computing section computing means to compute information and instructions, a target value setting means to set target values, search starting means to control searching, power system controlling means to control power system functions, estimating means to preform estimations, searching means for searching memory deriving means for deriving relational expression equations. Further the memory section is configured to include a target value memory section, a memory section, and a relative relational expression equation section, a rated value database.

Further, the method according to the present invention for managing the operational voltages and current from an IEC2 circuit is a control method for the management, and for controlling the operational voltages and current from an IEC2 circuit and accumulators and or electrical storage devices, utilizing an electronic circuit to control the operation of accumulators and or electrical storage devices their output and characteristics, their orientations in the circuit and combinational arrangement , the method including, a target value setting input step, a discharge frequency setting step, making a connection to an IEC2 10 circuit and accumulators and or electrical storage devise step, a making a connection to a charge controlling and or transforming devise step, a migrating charges from an energy source step, a storing and or transforming charges step, a step of switching capacitor 16 step, a step of connecting to a load 20, and or a step of boosting voltage, a step of acquiring an electric current value and/or voltage value, an amount of magnetic field/ temperature/ acquiring step, a step of recording acquired information in the rated value database memory in appropriate sections, a step of computing and interpreting information based of recorded memory data, a step of forming instructions to send to system controller based on recorded memory data, set target values, and their relational effects to stored and discharged charges, a step of communicating information to the system controller for task execution based on the interpreted and set target values, a step of outputting power through a load 20 or electrical busses based on set target values, relational estimations, and inputted commands, or direct feed and or inverted feed to a load electrical system or other.

The foregoing was intended as a broad summary only and only of some of the aspects of the invention. It was not intended to define the limits or requirements of the invention. Other aspects of the invention will be appreciated to one skilled in the art by reference to the detailed description of the preferred embodiment and to the claims. It is intended that all such additional systems, methods, aspects, and advantages be included with this description, and within the scope of the present disclosure, and be protected by the accompanying claims.

The terms used in this disclosure are not for limiting the inventive concept but for explaining the embodiments. The terms of a singular form may include plural forms unless otherwise specified. Also, the meaning of “include,” “comprise,” “including,” or “comprising,” specifies a property, a region, a fixed number, a step, a process, an element and/or a component but does not exclude other properties, regions, fixed numbers, steps, processes, elements and/or components. The reference numerals presented according to a sequence of explanations are not limited to the sequence.

In addition, some embodiments of the present disclosure may include patents or public disclosures already issued relating to this art, when used in conjunction with this system or method these prior schemes may be able to utilize substantial amounts of usable power and greatly improve efficiency. By using the described system and method many of these previously failed schemes and inventions may be able to manage power in a more efficient commercially viable way, and when referring to these said inventions or schemes when combined with this disclosed system or method these devices should be considered new devices or improvements thereof and confer the protection of this disclosure, or patent, this does not limit the scope of the present disclosure instead giving reference to where some embodiments of this discovery may fit into the art.

CLAIMS

CLAIMS (32)

1. A method for improving the efficiency of an electrostatic storage device wherein;

an electrostatic storage device circuit in operation, delivering to a circuit or load stored energy at greater than 50% efficiency.

2. A method for improving the efficiency of a capacitor wherein;

a capacitor circuit in operation, delivering to a circuit or load stored energy at greater than 50% efficiency.

3. The method of claim 1, wherein the electrostatic storage device circuit comprises a larger capacity accumulator and a smaller capacity accumulator.

4. The method of claim 2, wherein the electrostatic storage device circuit comprises a larger capacity capacitor and a smaller capacity capacitor.

5. The method of claim 1, wherein the electrostatic storage device circuit comprises at least one switch for reversing the leads and orientation of an accumulator.

6. The method of claim 2, wherein the electrostatic storage device circuit comprises at least one switch for reversing the leads and orientation of a capacitor.

7. The method of claim 1, wherein the electrostatic storage device circuit comprises a load.

8. The method of claim 2, wherein the electrostatic storage device circuit comprises a load.

9. The method of claim 1, wherein the smaller capacity accumulator leads are switched for reversing the orientation of the accumulator in the circuit causing an increase in circuit voltage and a recycling of energy.

11. The method of claim 2, wherein the smaller capacity capacitors leads are switched for reversing the orientation of the capacitor in the circuit causing an increase in circuit voltage and a recycling of energy.

12. The method of claim 1, wherein the larger capacity accumulator leads are switched for reversing the orientation of the larger capacity accumulator in the circuit causing an increase in

circuit voltage, and a recycling of energy from the smaller capacity accumulator and reversing the current in the circuit.

13. The method of claim 2, wherein the larger capacity capacitor leads are switched for reversing the orientation of larger capacity capacitor in the circuit causing an increase in circuit voltage, and a recycling of energy from the smaller capacity capacitor and reversing the current in the circuit.

14. The method of claim 1 & 2, wherein the device may comprise a plurality of larger capacity capacitors and or accumulators.

15. The method of claim 1 & 2, wherein the device may comprise a plurality of smaller capacity capacitors and or accumulators.

16. The method of claim 1 & 2, wherein the device utilizes a management system.

17. A system for improving the efficiency of an electrostatic storage device wherein;

an electrostatic storage device circuit in operation,

a circuit or load being delivering stored energy at greater than 50% efficiency.

18. A system for improving the efficiency of an capacitor wherein;

a capacitor circuit device in operation,

a circuit or load being delivering stored energy at greater than 50% efficiency.

19. The system of claim 17, wherein the electrostatic storage device circuit comprises a larger capacity accumulator and a smaller capacity accumulator.

20. The system of claim 18, wherein the electrostatic storage device circuit comprises a larger capacity capacitor and a smaller capacity capacitor.

21. The system of claim 17, wherein the electrostatic storage device circuit comprises at least one switch for reversing the leads and orientation of an accumulator.

22. The system of claim 18, wherein the electrostatic storage device circuit comprises at least one switch for reversing the lead sand orientation of a capacitor.

23. The system of claim 17, wherein the electrostatic storage device circuit comprises a load.

24. The system of claim 18, wherein the electrostatic storage device circuit comprises a load.

25. The system of claim 17, wherein the smaller capacity accumulator leads are switched for reversing the orientation of the accumulator in the circuit causing an increase in circuit voltage and a recycling of energy.

26. The system of claim 18, wherein the smaller capacity capacitors leads are switched for reversing the orientation of the capacitor in the circuit causing an increase in circuit voltage and a recycling of energy.

27. The system of claim 17, wherein the larger capacity accumulator leads are switched for reversing the orientation of the larger capacity accumulator in the circuit causing an increase in circuit voltage, and a recycling of energy from the smaller capacity accumulator and reversing the current in the circuit.

28. The system of claim 18, wherein the larger capacity capacitor leads are switched for reversing the orientation of larger capacity capacitor in the circuit causing an increase in circuit voltage, and a recycling of energy from the smaller capacity capacitor and reversing the current in the circuit.

29. The system of claim 17 & 18, wherein the device may comprise a plurality of larger capacity capacitors and or accumulators.

30. The system of claim 17 & 18, wherein the device may comprise a plurality of smaller capacity capacitors and or accumulators.

31. The method of claim 17 & 18, wherein the device utilizes a management system.

32. A system for improving the efficiency of an electrostatic storage device in operation;
means for gaining an electric charge;
means for storing charges;
means for switching charge storage devices orientations;
means for providing usable voltage and current to a load;
means for increasing storage devices efficiency;
means for providing a controllable energy source system voltage, and controlling an energy source output voltage, current and orientation;
means for managing a device.

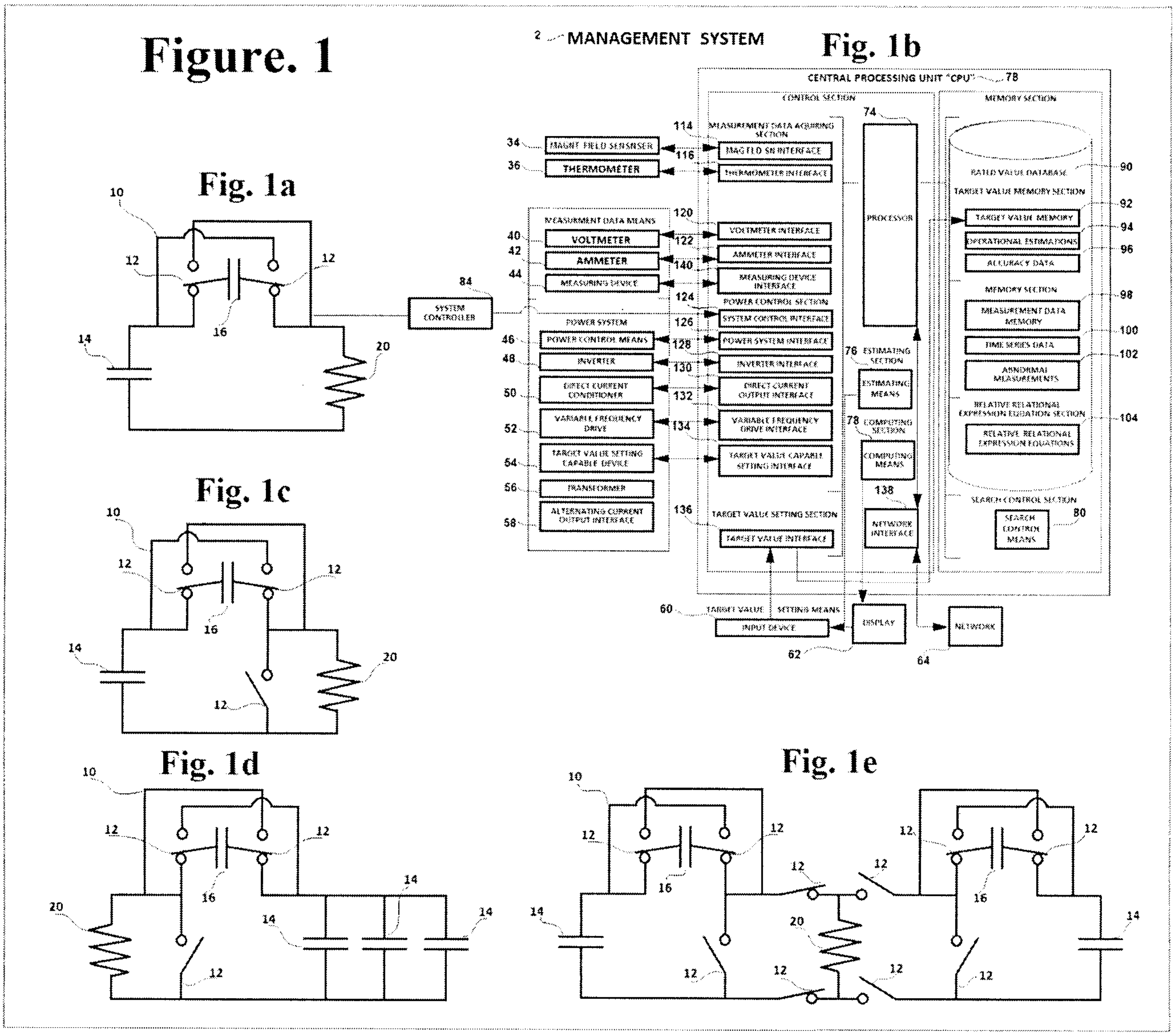


Figure. 1
Fig. 1a
Fig. 1b
Fig. 1c
Fig. 1d
Fig. 1e
MANAGEMENT SYSTEM
CENTRAL PROCESSING UNIT "CPU"
CONTROL SECTION
MEMORY SECTION
MEASUREMENT DATA ACQUIRING SECTION
MAGNT FIELD SENSOR
THERMOMETER
THERMOMETER INTERFACE
PROCESSOR
RATED VALUE DATABASE
TARGET VALUE MEMORY SECTION
TARGET VALUE MEMORY
OPERATIONAL ESTIMATIONS
ACCURACY DATA
MEASUREMENT DATA MEANS
VOLTMETER
AMMETER
MEASURING DEVICE
VOLTMETER INTERFACE
AMMETER INTERFACE
MEASURING DEVICE INTERFACE
POWER CONTROL SECTION
SYSTEM CONTROL INTERFACE
SYSTEM CONTROLLER
POWER SYSTEM
POWER CONTROL MEANS
POWER SYSTEM INTERFACE
INVERTER
INVERTER INTERFACE
DIRECT CURRENT CONDITIONER
DIRECT CURRENT OUTPUT INTERFACE
VARIABLE FREQUENCY DRIVE
VARIABLE FREQUENCY DRIVE INTERFACE
TARGET VALUE SETTING CAPABLE DEVICE
TARGET VALUE CAPABLE SETTING INTERFACE
TRANSFORMER
ALTERNATING CURRENT OUTPUT INTERFACE
MEMORY SECTION
MEASUREMENT DATA MEMORY
TIME SERIES DATA
ABNORMAL MEASUREMENTS
RELATIVE RELATIONAL EXPRESSION EQUATION SECTION
RELATIVE RELATIONAL EXPRESSION EQUATIONS
ESTIMATING SECTION
ESTIMATING MEANS
COMPUTING SECTION
COMPUTING MEANS
NETWORK INTERFACE
SEARCH CONTROL SECTION
SEARCH CONTROL MEANS
TARGET VALUE SETTING SECTION
TARGET VALUE INTERFACE
TARGET VALUE SETTING MEANS
INPUT DEVICE
DISPLAY
NETWORK

FIGURE. 2 JOULES REALIZED PER DISCHARGE CYCLE

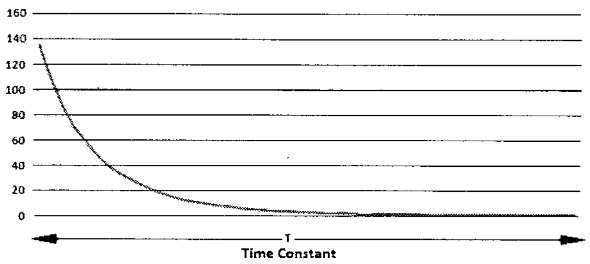


FIGURE. 3 COULOMBS REALIZED PER DISCHARGE CYCLE

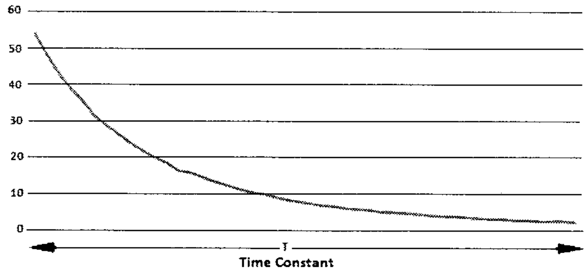


FIGURE. 4 RESERVE CAPACITOR VOLTAGE PER CYCLE

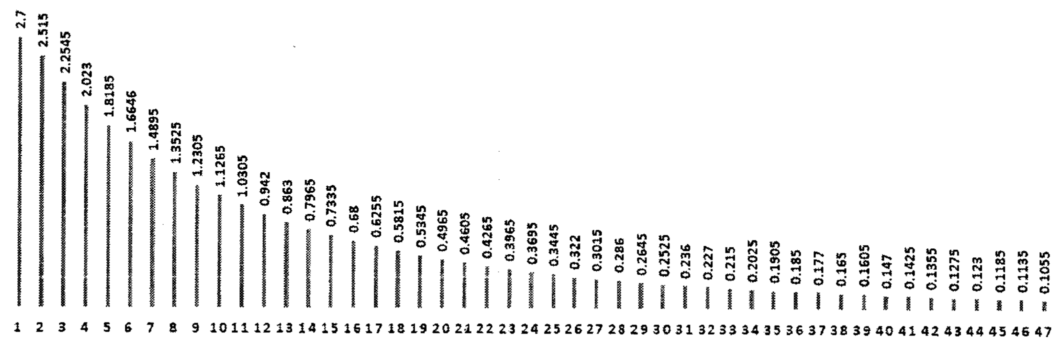


FIGURE. 5 SWITCHING CAPACITOR OPERATION

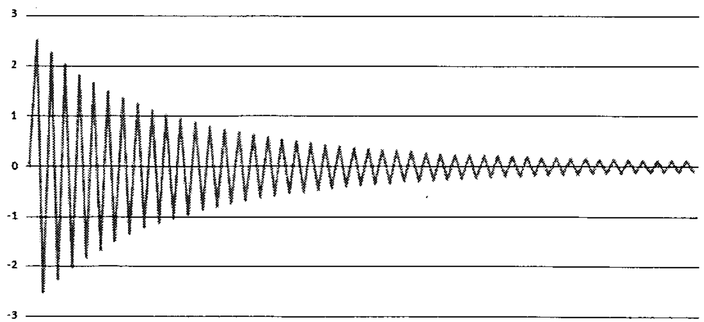


FIGURE. 6 OUTPUT CURRENT VOLTAGE CHARACTERISTICS

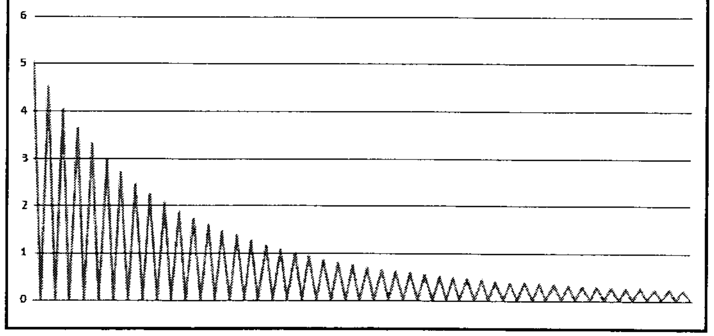


Figure. 7

Cycle	Switch Voltage (B)	Reserve Voltage (C)	Total voltage (D)	Coulombs	Joules
		3V-100F Reserve Capacitor/ 3V@ 0V 10F Switching Capacitor			
			Total of B & C	D X by 10	D X D X 10 X 0.5
		2.727272	2.727272	27.27272	37.19006281
1	2.727272	2.479272727	5.206544727	52.06544727	135.54054
2	2.479272727	2.253884298	4.733157025	47.33157025	112.0138771
3	2.253884298	2.048985725	4.302870023	43.02870023	92.57345215
4	2.048985725	1.862714295	3.91170002	39.1170002	76.50698525
5	1.862714295	1.693376632	3.556090928	35.56090928	63.22891343
6	1.693376632	1.539433302	3.232809934	32.32809934	52.25530036
7	1.539433302	1.39948482	2.938918122	29.38918122	43.18619864
8	1.39948482	1.272258927	2.671743747	26.71743747	35.69107326
9	1.272258927	1.156599025	2.428857952	24.28857952	29.49675476
10	1.156599025	1.051453659	2.208052684	22.08052684	24.37748327
11	1.051453659	0.955866963	2.007320622	20.07320622	20.14668039
12	0.955866963	0.868969966	1.824836929	18.24836929	16.65014908
13	0.868969966	0.789972696	1.658942662	16.58942662	13.76045379
14	0.789972696	0.718156997	1.508129693	15.08129693	11.37227586
15	0.718156997	0.652869997	1.371026994	13.71026994	9.398575088
16	0.652869997	0.593518179	1.246388176	12.46388176	7.767417428
17	0.593518179	0.539561981	1.13308016	11.3308016	6.419353247
18	0.539561981	0.490510892	1.030072873	10.30072873	5.305250617
19	0.490510892	0.445918993	0.936429884	9.364298844	4.384504642
20	0.445918993	0.405380902	0.851299895	8.512998949	3.623557556
21	0.405380902	0.368528093	0.773908995	7.739089954	2.994675666
22	0.368528093	0.335025539	0.703553632	7.035536322	2.474938567
23	0.335025539	0.304568672	0.639594211	6.395942111	2.045403774
24	0.304568672	0.276880611	0.581449283	5.814492828	1.690416342
25	0.276880611	0.251709646	0.528590257	5.285902571	1.397038299
26	0.251709646	0.228826951	0.480536597	4.805365973	1.154577107
27	0.228826951	0.208024501	0.436851452	4.368514521	0.954195956
28	0.208024501	0.189113183	0.397137684	3.971376838	0.788591699
29	0.189113183	0.171921075	0.361034258	3.61034258	0.651728677
30	0.171921075	0.156291887	0.328212962	3.282129618	0.538618741
31	0.156291887	0.142083533	0.29837542	2.983754198	0.445139456
32	0.142083533	0.129166848	0.271250382	2.712503816	0.367883848
33	0.129166848	0.117424408	0.246591256	2.46591256	0.304036238
34	0.117424408	0.106749461	0.224173869	2.241738691	0.251269618
35	0.106749461	0.097044965	0.203794426	2.037944265	0.207660841
36	0.097044965	0.088222695	0.18526766	1.852676604	0.17162053
37	0.088222695	0.08020245	0.168425146	1.684251458	0.141835149

38	0.08020245	0.072911319	0.153113769	1.53113769	0.117219131
39	0.072911319	0.066283017	0.139194335	1.391943354	0.096875315
40	0.066283017	0.060257288	0.126540305	1.265403049	0.080062244
41	0.060257288	0.054779353	0.115036641	1.150366408	0.066167144
42	0.054779353	0.049799412	0.104578764	1.045787644	0.05468359
43	0.049799412	0.045272192	0.095071604	0.95071604	0.045193049
44	0.045272192	0.041156539	0.086428731	0.864287309	0.037349628
45	0.041156539	0.037415035	0.078571574	0.785715736	0.030867461
46	0.037415035	0.034013668	0.071428703	0.714287032	0.025510298
47	0.034013668	0.030921517	0.064935185	0.649351848	0.021082891
48	0.030921517	0.02811047	0.059031986	0.590319861	0.017423877
49	0.02811047	0.025554972	0.053665442	0.536654419	0.014399898
50	0.025554972	0.023231793	0.048786765	0.487867654	0.011900742
51	0.023231793	0.021119812	0.044351605	0.443516049	0.009835324
52	0.021119812	0.019199829	0.040319641	0.403196408	0.008128367
53	0.019199829	0.01745439	0.036654219	0.366542189	0.006717659
54	0.01745439	0.015867627	0.033322017	0.333220172	0.005551784
55	0.015867627	0.014425116	0.030292743	0.302927429	0.004588251
56	0.014425116	0.013113742	0.027538857	0.275388572	0.003791943
57	0.013113742	0.011921583	0.025035325	0.250353247	0.003133837
58	0.011921583	0.010837803	0.022759386	0.227593861	0.002589948
59	0.010837803	0.009852548	0.020690351	0.20690351	0.002140453
60	0.009852548	0.008956862	0.01880941	0.1880941	0.00176897
61	0.008956862	0.008142602	0.017099464	0.170994636	0.001461958
62	0.008142602	0.007402365	0.015544967	0.15544967	0.00120823
63	0.007402365	0.006729423	0.014131788	0.141317881	0.000998537
64	0.006729423	0.006117657	0.01284708	0.128470801	0.000825237
65	0.006117657	0.005561507	0.011679164	0.116791638	0.000682014
66	0.005561507	0.005055915	0.010617422	0.106174216	0.000563648
67	0.005055915	0.004596286	0.009652201	0.096522014	0.000465825
				Coulombs	Joules
				599.0202199	818.1416765

Figure. 8

Cycle	Switch Voltage	Reserve Voltage	Total voltage	Coulombs	Joules
	3V-100F Reserve Capacitor (14) / 3V@ 0V 1F Switching Capacitor (16)				
			Total of B & C	D X by 1	D X D X 1 X 0.5
1	0	2.97029703	2.97029703	2.97029703	4.411332222
2	2.97029703	2.940888148	5.911185178	5.911185178	17.4710551
3	2.940888148	2.911770444	5.852658592	5.852658592	17.1268063

4	2.911770444	2.882941033	5.794711477	5.794711477	16.78934055
5	2.882941033	2.854397063	5.737338096	5.737338096	16.45852422
6	2.854397063	2.826135706	5.680532769	5.680532769	16.13422627
7	2.826135706	2.798154164	5.62428987	5.62428987	15.81631827
8	2.798154164	2.770449667	5.568603832	5.568603832	15.50467432
9	2.770449667	2.743019473	5.51346914	5.51346914	15.19917098
10	2.743019473	2.715860864	5.458880337	5.458880337	14.89968727
11	2.715860864	2.688971153	5.404832017	5.404832017	14.60610456
12	2.688971153	2.662347676	5.351318828	5.351318828	14.3183066
13	2.662347676	2.635987798	5.298335474	5.298335474	14.0361794
14	2.635987798	2.609888909	5.245876707	5.245876707	13.75961121
15	2.609888909	2.584048424	5.193937333	5.193937333	13.48849251
16	2.584048424	2.558463787	5.142512211	5.142512211	13.22271592
17	2.558463787	2.533132462	5.091596249	5.091596249	12.96217618
18	2.533132462	2.508051943	5.041184405	5.041184405	12.7067701
19	2.508051943	2.483219745	4.991271688	4.991271688	12.45639653
20	2.483219745	2.458633411	4.941853156	4.941853156	12.21095631
21	2.458633411	2.434290506	4.892923917	4.892923917	11.97035223
22	2.434290506	2.41018862	4.844479126	4.844479126	11.734489
23	2.41018862	2.386325366	4.796513986	4.796513986	11.50327321
24	2.386325366	2.362698382	4.749023748	4.749023748	11.27661328
25	2.362698382	2.339305329	4.702003711	4.702003711	11.05441945
26	2.339305329	2.31614389	4.655449219	4.655449219	10.83660372
27	2.31614389	2.293211772	4.609355662	4.609355662	10.62307981
28	2.293211772	2.270506705	4.563718478	4.563718478	10.41376317
29	2.270506705	2.248026441	4.518533146	4.518533146	10.2085709
30	2.248026441	2.225768753	4.473795194	4.473795194	10.00742172
31	2.225768753	2.203731439	4.429500192	4.429500192	9.810235977
32	2.203731439	2.181912316	4.385643755	4.385643755	9.616935572
33	2.181912316	2.160309224	4.342221539	4.342221539	9.427443949
34	2.160309224	2.138920023	4.299229247	4.299229247	9.241686059
35	2.138920023	2.117742597	4.256662621	4.256662621	9.059588333
36	2.117742597	2.096774849	4.214517446	4.214517446	8.881078652
37	2.096774849	2.076014702	4.172789551	4.172789551	8.706086317
38	2.076014702	2.055460101	4.131474803	4.131474803	8.534542023
39	2.055460101	2.035109011	4.090569112	4.090569112	8.366377828
40	2.035109011	2.014959417	4.050068427	4.050068427	8.201527133
41	2.014959417	1.995009323	4.00996874	4.00996874	8.039924648
42	1.995009323	1.975256756	3.970266079	3.970266079	7.88150637
43	1.975256756	1.955699758	3.930956514	3.930956514	7.726209557
44	1.955699758	1.936336394	3.892036152	3.892036152	7.573972706
45	1.936336394	1.917164747	3.853501141	3.853501141	7.424735522
46	1.917164747	1.898182918	3.815347664	3.815347664	7.2784389
47	1.898182918	1.879389027	3.777571945	3.777571945	7.1350249
48	1.879389027	1.860781215	3.740170243	3.740170243	6.994436722

49	1.860781215	1.842357639	3.703138854	3.703138854	6.856618686
50	1.842357639	1.824116474	3.666474113	3.666474113	6.72151621
51	1.824116474	1.806055915	3.630172389	3.630172389	6.589075787
52	1.806055915	1.788174173	3.594230088	3.594230088	6.459244963
53	1.788174173	1.770469478	3.558643652	3.558643652	6.331972319
54	1.770469478	1.752940078	3.523409556	3.523409556	6.20720745
55	1.752940078	1.735584235	3.488524313	3.488524313	6.084900941
56	1.735584235	1.718400233	3.453984468	3.453984468	5.965004353
57	1.718400233	1.701386369	3.419786602	3.419786602	5.847470202
58	1.701386369	1.68454096	3.385927329	3.385927329	5.732251938
59	1.68454096	1.667862336	3.352403296	3.352403296	5.619303929
60	1.667862336	1.651348848	3.319211184	3.319211184	5.508581442
61	1.651348848	1.634998859	3.286347707	3.286347707	5.400040626
62	1.634998859	1.618810752	3.253809611	3.253809611	5.293638492
63	1.618810752	1.602782922	3.221593674	3.221593674	5.189332901
64	1.602782922	1.586913785	3.189696707	3.189696707	5.087082542
65	1.586913785	1.571201767	3.158115552	3.158115552	4.986846919
66	1.571201767	1.555645314	3.126847081	3.126847081	4.888586333
67	1.555645314	1.540242885	3.095888199	3.095888199	4.79226187
68	1.540242885	1.524992955	3.06523584	3.06523584	4.697835379
69	1.524992955	1.509894015	3.034886971	3.034886971	4.605269462
70	1.509894015	1.49494457	3.004838585	3.004838585	4.51452746
71	1.49494457	1.480143138	2.975087708	2.975087708	4.425573434
72	1.480143138	1.465488256	2.945631394	2.945631394	4.338372154
73	1.465488256	1.450978471	2.916466727	2.916466727	4.252889084
74	1.450978471	1.436612347	2.887590818	2.887590818	4.169090367
75	1.436612347	1.422388463	2.85900081	2.85900081	4.086942817
76	1.422388463	1.408305409	2.830693872	2.830693872	4.006413897
77	1.408305409	1.394361791	2.8026672	2.8026672	3.927471716
78	1.394361791	1.380556229	2.774918019	2.774918019	3.850085007
79	1.380556229	1.366887355	2.747443584	2.747443584	3.774223122
80	1.366887355	1.353353817	2.720241172	2.720241172	3.699856016
81	1.353353817	1.339954274	2.693308091	2.693308091	3.626954236
82	1.339954274	1.3266874	2.666641674	2.666641674	3.555488909
83	1.3266874	1.313551881	2.640239281	2.640239281	3.485431731
84	1.313551881	1.300546417	2.614098298	2.614098298	3.416754957
85	1.300546417	1.28766972	2.588216137	2.588216137	3.349431386
86	1.28766972	1.274920515	2.562590235	2.562590235	3.283434355
87	1.274920515	1.262297539	2.537218054	2.537218054	3.218737727
88	1.262297539	1.249799544	2.512097083	2.512097083	3.155315878
89	1.249799544	1.237425291	2.487224835	2.487224835	3.09314369
90	1.237425291	1.225173555	2.462598846	2.462598846	3.032196539
91	1.225173555	1.213043124	2.43821668	2.43821668	2.972450289
92	1.213043124	1.201032796	2.41407592	2.41407592	2.913881275
93	1.201032796	1.189141382	2.390174179	2.390174179	2.856466302

94	1.189141382	1.177367705	2.366509088	2.366509088	2.800182631
95	1.177367705	1.165710599	2.343078305	2.343078305	2.745007971
96	1.165710599	1.15416891	2.31987951	2.31987951	2.69092047
97	1.15416891	1.142741495	2.296910406	2.296910406	2.637898706
98	1.142741495	1.131427223	2.274168718	2.274168718	2.58592168
99	1.131427223	1.120224973	2.251652196	2.251652196	2.534968807
100	1.120224973	1.109133637	2.22935861	2.22935861	2.485019907
101	1.109133637	1.098152116	2.207285753	2.207285753	2.436055197
102	1.098152116	1.087279323	2.185431438	2.185431438	2.388055286
103	1.087279323	1.076514181	2.163793503	2.163793503	2.341001163
104	1.076514181	1.065855625	2.142369805	2.142369805	2.294874191
105	1.065855625	1.055302599	2.121158223	2.121158223	2.249656104
106	1.055302599	1.044854058	2.100156657	2.100156657	2.205328991
107	1.044854058	1.034508968	2.079363026	2.079363026	2.161875298
108	1.034508968	1.024266305	2.058775274	2.058775274	2.119277813
109	1.024266305	1.014125055	2.03839136	2.03839136	2.077519668
110	1.014125055	1.004084213	2.018209267	2.018209267	2.036584323
111	1.004084213	0.994142785	1.998226997	1.998226997	1.996455566
112	0.994142785	0.984299787	1.978442572	1.978442572	1.957117505
113	0.984299787	0.974554244	1.958854031	1.958854031	1.918554558
114	0.974554244	0.964905192	1.939459437	1.939459437	1.880751454
115	0.964905192	0.955351676	1.920256868	1.920256868	1.84369322
116	0.955351676	0.945892748	1.901244424	1.901244424	1.80736518
117	0.945892748	0.936527474	1.882420222	1.882420222	1.771752946
118	0.936527474	0.927254924	1.863782398	1.863782398	1.736842413
119	0.927254924	0.918074182	1.845329107	1.845329107	1.702619756
120	0.918074182	0.908984339	1.827058522	1.827058522	1.669071421
121	0.908984339	0.899984494	1.808968833	1.808968833	1.63618412
122	0.899984494	0.891073757	1.791058251	1.791058251	1.603944829
123	0.891073757	0.882251244	1.773325001	1.773325001	1.572340779
124	0.882251244	0.873516083	1.755767327	1.755767327	1.541359454
125	0.873516083	0.864867409	1.738383492	1.738383492	1.510988583
126	0.864867409	0.856304366	1.721171775	1.721171775	1.481216139
127	0.856304366	0.847826104	1.70413047	1.70413047	1.452030329
128	0.847826104	0.839431787	1.687257891	1.687257891	1.423419596
129	0.839431787	0.831120581	1.670552367	1.670552367	1.395372606
130	0.831120581	0.822891664	1.654012245	1.654012245	1.367878253
131	0.822891664	0.814744222	1.637635886	1.637635886	1.340925648
132	0.814744222	0.806677447	1.621421669	1.621421669	1.314504115
133	0.806677447	0.798690542	1.60536799	1.60536799	1.288603191
134	0.798690542	0.790782715	1.589473257	1.589473257	1.263212617
135	0.790782715	0.782953183	1.573735898	1.573735898	1.238322338
136	0.782953183	0.775201171	1.558154354	1.558154354	1.213922496
137	0.775201171	0.767525912	1.542727084	1.542727084	1.190003427
138	0.767525912	0.759926646	1.527452558	1.527452558	1.166555659

139	0.759926646	0.75240262	1.512329265	1.512329265	1.143569903
140	0.75240262	0.744953089	1.497355708	1.497355708	1.121037059
141	0.744953089	0.737577316	1.482530404	1.482530404	1.0989482
142	0.737577316	0.73027457	1.467851885	1.467851885	1.077294579
143	0.73027457	0.723044129	1.453318698	1.453318698	1.05606762
144	0.723044129	0.715885276	1.438929404	1.438929404	1.035258915
145	0.715885276	0.708797303	1.424682579	1.424682579	1.014860225
146	0.708797303	0.701779508	1.41057681	1.41057681	0.994863469
147	0.701779508	0.694831196	1.396610703	1.396610703	0.975260728
148	0.694831196	0.687951679	1.382782875	1.382782875	0.956044239
149	0.687951679	0.681140276	1.369091955	1.369091955	0.937206391
150	0.681140276	0.674396313	1.355536589	1.355536589	0.918739722
151	0.674396313	0.667719122	1.342115435	1.342115435	0.90063692
152	0.667719122	0.661108041	1.328827163	1.328827163	0.882890815
153	0.661108041	0.654562417	1.315670459	1.315670459	0.865494378
154	0.654562417	0.648081601	1.302644018	1.302644018	0.848440719
155	0.648081601	0.641664952	1.289746553	1.289746553	0.831723085
156	0.641664952	0.635311833	1.276976785	1.276976785	0.815334855
157	0.635311833	0.629021617	1.264333451	1.264333451	0.799269537
158	0.629021617	0.62279368	1.251815298	1.251815298	0.78352077
159	0.62279368	0.616627406	1.239421087	1.239421087	0.768082315
160	0.616627406	0.610522185	1.227149591	1.227149591	0.752948059
161	0.610522185	0.60447741	1.214999595	1.214999595	0.738112008
162	0.60447741	0.598492486	1.202969896	1.202969896	0.723568285
163	0.598492486	0.592566817	1.191059303	1.191059303	0.709311132
164	0.592566817	0.586699819	1.179266637	1.179266637	0.6953349
165	0.586699819	0.58089091	1.167590729	1.167590729	0.681634056
166	0.58089091	0.575139515	1.156030425	1.156030425	0.668203172
167	0.575139515	0.569445064	1.144584579	1.144584579	0.655036929
168	0.569445064	0.563806994	1.133252059	1.133252059	0.642130114
169	0.563806994	0.558224747	1.122031741	1.122031741	0.629477614
170	0.558224747	0.552697769	1.110922516	1.110922516	0.617074418
171	0.552697769	0.547225514	1.099923283	1.099923283	0.604915614
172	0.547225514	0.54180744	1.089032954	1.089032954	0.592996387
173	0.54180744	0.53644301	1.078250449	1.078250449	0.581312016
174	0.53644301	0.531131693	1.067574702	1.067574702	0.569857872
175	0.531131693	0.525872963	1.057004656	1.057004656	0.558629421
176	0.525872963	0.5206663	1.046539263	1.046539263	0.547622214
177	0.5206663	0.515511188	1.036177488	1.036177488	0.536831893
178	0.515511188	0.510407117	1.025918305	1.025918305	0.526254184
179	0.510407117	0.505353581	1.015760698	1.015760698	0.515884898
180	0.505353581	0.50035008	1.005703661	1.005703661	0.505719927
181	0.50035008	0.495396119	0.995746199	0.995746199	0.495755247
182	0.495396119	0.490491207	0.985887326	0.985887326	0.48598691
183	0.490491207	0.485634858	0.976126066	0.976126066	0.476411048

184	0.485634858	0.480826593	0.966461451	0.966461451	0.467023868
185	0.480826593	0.476065933	0.956892526	0.956892526	0.457821653
186	0.476065933	0.471352409	0.947418342	0.947418342	0.448800758
187	0.471352409	0.466685554	0.938037963	0.938037963	0.43995761
188	0.466685554	0.462064905	0.928750458	0.928750458	0.431288707
189	0.462064905	0.457490005	0.919554909	0.919554909	0.422790615
190	0.457490005	0.452960401	0.910450405	0.910450405	0.41445997
191	0.452960401	0.448475644	0.901436045	0.901436045	0.406293471
192	0.448475644	0.444035291	0.892510935	0.892510935	0.398287885
193	0.444035291	0.439638902	0.883674193	0.883674193	0.39044004
194	0.439638902	0.435286042	0.874924944	0.874924944	0.382746829
195	0.435286042	0.430976279	0.866262321	0.866262321	0.375205204
196	0.430976279	0.426709187	0.857685466	0.857685466	0.367812179
197	0.426709187	0.422484344	0.849193531	0.849193531	0.360564826
198	0.422484344	0.41830133	0.840785674	0.840785674	0.353460275
199	0.41830133	0.414159733	0.832461063	0.832461063	0.346495711
200	0.414159733	0.410059142	0.824218875	0.824218875	0.339668377
201	0.410059142	0.40599915	0.816058292	0.816058292	0.332975568
202	0.40599915	0.401979356	0.807978507	0.807978507	0.326414634
203	0.401979356	0.397999363	0.799978719	0.799978719	0.319982976
204	0.397999363	0.394058775	0.792058138	0.792058138	0.313678047
205	0.394058775	0.390157203	0.784215978	0.784215978	0.30749735
206	0.390157203	0.38629426	0.776451464	0.776451464	0.301438438
207	0.38629426	0.382469565	0.768763825	0.768763825	0.29549891
208	0.382469565	0.378682737	0.761152302	0.761152302	0.289676414
209	0.378682737	0.374933403	0.753616141	0.753616141	0.283968644
210	0.374933403	0.371221192	0.746154595	0.746154595	0.27837334
211	0.371221192	0.367545734	0.738766926	0.738766926	0.272888285
212	0.367545734	0.363906667	0.731452402	0.731452402	0.267511308
213	0.363906667	0.360303631	0.724210299	0.724210299	0.262240278
214	0.360303631	0.356736268	0.7170399	0.7170399	0.257073109
215	0.356736268	0.353204226	0.709940495	0.709940495	0.252007753
216	0.353204226	0.349707155	0.702911381	0.702911381	0.247042205
217	0.349707155	0.346244708	0.695951862	0.695951862	0.242174497
218	0.346244708	0.342816542	0.68906125	0.68906125	0.237402703
219	0.342816542	0.339422319	0.682238861	0.682238861	0.232724932
220	0.339422319	0.336061702	0.675484021	0.675484021	0.228139331
221	0.336061702	0.332734358	0.66879606	0.66879606	0.223644085
222	0.332734358	0.329439959	0.662174317	0.662174317	0.219237413
223	0.329439959	0.326178177	0.655618136	0.655618136	0.21491757
224	0.326178177	0.32294869	0.649126867	0.649126867	0.210682845
225	0.32294869	0.319751178	0.642699868	0.642699868	0.20653156
226	0.319751178	0.316585325	0.636336503	0.636336503	0.202462073
227	0.316585325	0.313450817	0.630036142	0.630036142	0.19847277
228	0.313450817	0.310347343	0.62379816	0.62379816	0.194562072

229	0.310347343	0.307274598	0.617621941	0.617621941	0.190728431
230	0.307274598	0.304232275	0.611506872	0.611506872	0.186970327
231	0.304232275	0.301220074	0.605452349	0.605452349	0.183286273
232	0.301220074	0.298237697	0.599457771	0.599457771	0.17967481
233	0.298237697	0.295284849	0.593522546	0.593522546	0.176134506
234	0.295284849	0.292361236	0.587646085	0.587646085	0.17266396
235	0.292361236	0.289466571	0.581827807	0.581827807	0.169261798
236	0.289466571	0.286600565	0.576067135	0.576067135	0.165926672
237	0.286600565	0.283762936	0.5703635	0.5703635	0.162657261
238	0.283762936	0.280953401	0.564716337	0.564716337	0.159452271
239	0.280953401	0.278171685	0.559125086	0.559125086	0.156310431
240	0.278171685	0.27541751	0.553589194	0.553589194	0.153230498
241	0.27541751	0.272690604	0.548108113	0.548108113	0.150211252
242	0.272690604	0.269990697	0.5426813	0.5426813	0.147251497
243	0.269990697	0.267317521	0.537308218	0.537308218	0.144350061
244	0.267317521	0.264670813	0.531988335	0.531988335	0.141505794
245	0.264670813	0.26205031	0.526721123	0.526721123	0.138717571
246	0.26205031	0.259455753	0.521506063	0.521506063	0.135984287
247	0.259455753	0.256886884	0.516342636	0.516342636	0.133304859
248	0.256886884	0.254343449	0.511230333	0.511230333	0.130678227
249	0.254343449	0.251825197	0.506168647	0.506168647	0.128103349
250	0.251825197	0.249331878	0.501157076	0.501157076	0.125579207
251	0.249331878	0.246863246	0.496195125	0.496195125	0.123104801
252	0.246863246	0.244419055	0.491282302	0.491282302	0.12067915
253	0.244419055	0.241999065	0.48641812	0.48641812	0.118301294
254	0.241999065	0.239603034	0.481602099	0.481602099	0.115970291
255	0.239603034	0.237230727	0.476833762	0.476833762	0.113685218
256	0.237230727	0.234881908	0.472112635	0.472112635	0.11144517
257	0.234881908	0.232556345	0.467438253	0.467438253	0.10924926
258	0.232556345	0.230253807	0.462810151	0.462810151	0.107096618
259	0.230253807	0.227974066	0.458227873	0.458227873	0.104986392
260	0.227974066	0.225716897	0.453690963	0.453690963	0.102917745
261	0.225716897	0.223482076	0.449198973	0.449198973	0.100889859
262	0.223482076	0.221269382	0.444751459	0.444751459	0.09890193
263	0.221269382	0.219078596	0.440347979	0.440347979	0.096953171
264	0.219078596	0.216909501	0.435988098	0.435988098	0.095042811
265	0.216909501	0.214761883	0.431671384	0.431671384	0.093170092
266	0.214761883	0.212635527	0.42739741	0.42739741	0.091334273
267	0.212635527	0.210530225	0.423165752	0.423165752	0.089534627
268	0.210530225	0.208445767	0.418975992	0.418975992	0.087770441
269	0.208445767	0.206381948	0.414827715	0.414827715	0.086041017
270	0.206381948	0.204338562	0.41072051	0.41072051	0.084345669
271	0.204338562	0.202315408	0.406653971	0.406653971	0.082683726
272	0.202315408	0.200312285	0.402627694	0.402627694	0.08105453
273	0.200312285	0.198328995	0.398641281	0.398641281	0.079457435

274	0.198328995	0.196365342	0.394694337	0.394694337	0.07789181
275	0.196365342	0.194421131	0.390786473	0.390786473	0.076357034
276	0.194421131	0.192496169	0.3869173	0.3869173	0.074852498
277	0.192496169	0.190590266	0.383086435	0.383086435	0.073377608
278	0.190590266	0.188703234	0.3792935	0.3792935	0.07193178
279	0.188703234	0.186834885	0.375538119	0.375538119	0.070514439
280	0.186834885	0.184985035	0.37181992	0.37181992	0.069125026
281	0.184985035	0.1831535	0.368138535	0.368138535	0.06776299
282	0.1831535	0.181340099	0.364493599	0.364493599	0.066427792
283	0.181340099	0.179544652	0.360884751	0.360884751	0.065118902
284	0.179544652	0.177766982	0.357311635	0.357311635	0.063835802
285	0.177766982	0.176006913	0.353773896	0.353773896	0.062577985
286	0.176006913	0.174264271	0.350271184	0.350271184	0.061344951
287	0.174264271	0.172538882	0.346803152	0.346803152	0.060136213
288	0.172538882	0.170830576	0.343369458	0.343369458	0.058951292
289	0.170830576	0.169139184	0.33996976	0.33996976	0.057789719
290	0.169139184	0.167464539	0.336603723	0.336603723	0.056651033
291	0.167464539	0.165806474	0.333271013	0.333271013	0.055534784
292	0.165806474	0.164164826	0.3299713	0.3299713	0.054440529
293	0.164164826	0.162539431	0.326704257	0.326704257	0.053367836
294	0.162539431	0.16093013	0.323469562	0.323469562	0.052316279
295	0.16093013	0.159336763	0.320266893	0.320266893	0.051285441
296	0.159336763	0.157759171	0.317095933	0.317095933	0.050274915
297	0.157759171	0.156197199	0.31395637	0.31395637	0.049284301
298	0.156197199	0.154650692	0.310847891	0.310847891	0.048313206
299	0.154650692	0.153119497	0.307770189	0.307770189	0.047361245
300	0.153119497	0.151603462	0.304722959	0.304722959	0.046428041
301	0.151603462	0.150102438	0.3017059	0.3017059	0.045513225
302	0.150102438	0.148616275	0.298718713	0.298718713	0.044616435
303	0.148616275	0.147144827	0.295761102	0.295761102	0.043737315
304	0.147144827	0.145687947	0.292832774	0.292832774	0.042875517
305	0.145687947	0.144245493	0.28993344	0.28993344	0.0420307
306	0.144245493	0.142817319	0.287062812	0.287062812	0.041202529
307	0.142817319	0.141403286	0.284220606	0.284220606	0.040390676
308	0.141403286	0.140003254	0.28140654	0.28140654	0.039594821
309	0.140003254	0.138617083	0.278620337	0.278620337	0.038814646
310	0.138617083	0.137244637	0.27586172	0.27586172	0.038049844
311	0.137244637	0.135885779	0.273130416	0.273130416	0.037300112
312	0.135885779	0.134540375	0.270426154	0.270426154	0.036565152
313	0.134540375	0.133208292	0.267748668	0.267748668	0.035844674
314	0.133208292	0.131889398	0.265097691	0.265097691	0.035138393
315	0.131889398	0.130583563	0.262472961	0.262472961	0.034446028
316	0.130583563	0.129290656	0.259874219	0.259874219	0.033767305
317	0.129290656	0.128010551	0.257301207	0.257301207	0.033101955
318	0.128010551	0.126743119	0.25475367	0.25475367	0.032449716

319	0.126743119	0.125488237	0.252231356	0.252231356	0.031810329
320	0.125488237	0.124245779	0.249734016	0.249734016	0.031183539
321	0.124245779	0.123015623	0.247261402	0.247261402	0.030569101
322	0.123015623	0.121797647	0.24481327	0.24481327	0.029966768
323	0.121797647	0.120591729	0.242389376	0.242389376	0.029376305
324	0.120591729	0.119397752	0.239989481	0.239989481	0.028797475
325	0.119397752	0.118215596	0.237613348	0.237613348	0.028230051
326	0.118215596	0.117045144	0.23526074	0.23526074	0.027673808
327	0.117045144	0.115886282	0.232931426	0.232931426	0.027128525
328	0.115886282	0.114738893	0.230625174	0.230625174	0.026593985
329	0.114738893	0.113602864	0.228341757	0.228341757	0.026069979
330	0.113602864	0.112478083	0.226080947	0.226080947	0.025556297
331	0.112478083	0.111364439	0.223842522	0.223842522	0.025052737
332	0.111364439	0.110261821	0.221626259	0.221626259	0.024559099
333	0.110261821	0.109170119	0.21943194	0.21943194	0.024075188
334	0.109170119	0.108089227	0.217259346	0.217259346	0.023600812
335	0.108089227	0.107019037	0.215108264	0.215108264	0.023135783
336	0.107019037	0.105959442	0.212978479	0.212978479	0.022679916
337	0.105959442	0.104910339	0.210869781	0.210869781	0.022233032
338	0.104910339	0.103871623	0.208781962	0.208781962	0.021794954
339	0.103871623	0.102843191	0.206714813	0.206714813	0.021365507
340	0.102843191	0.101824941	0.204668132	0.204668132	0.020944522
341	0.101824941	0.100816774	0.202641715	0.202641715	0.020531832
342	0.100816774	0.099818588	0.200635361	0.200635361	0.020127274
343	0.099818588	0.098830285	0.198648873	0.198648873	0.019730687
344	0.098830285	0.097851767	0.196682052	0.196682052	0.019341915
345	0.097851767	0.096882938	0.194734705	0.194734705	0.018960803
346	0.096882938	0.095923701	0.192806639	0.192806639	0.0185872
347	0.095923701	0.094973961	0.190897662	0.190897662	0.018220959
348	0.094973961	0.094033625	0.189007586	0.189007586	0.017861934
349	0.094033625	0.093102599	0.187136224	0.187136224	0.017509983
350	0.093102599	0.092180791	0.18528339	0.18528339	0.017164967
351	0.092180791	0.09126811	0.183448901	0.183448901	0.01682675
352	0.09126811	0.090364465	0.181632575	0.181632575	0.016495196
353	0.090364465	0.089469768	0.179834233	0.179834233	0.016170176
354	0.089469768	0.088583928	0.178053696	0.178053696	0.015851559
355	0.088583928	0.08770686	0.176290788	0.176290788	0.015539221
356	0.08770686	0.086838475	0.174545335	0.174545335	0.015233037
357	0.086838475	0.085978688	0.172817163	0.172817163	0.014932886
358	0.085978688	0.085127414	0.171106102	0.171106102	0.014638649
359	0.085127414	0.084284568	0.169411982	0.169411982	0.01435021
360	0.084284568	0.083450068	0.167734636	0.167734636	0.014067454
361	0.083450068	0.082623829	0.166073897	0.166073897	0.01379027
362	0.082623829	0.081805772	0.164429601	0.164429601	0.013518547
363	0.081805772	0.080995813	0.162801585	0.162801585	0.013252178

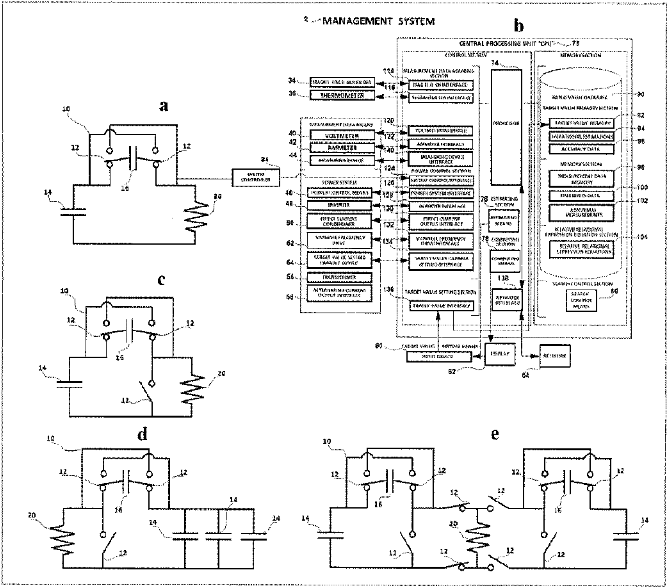
364	0.080995813	0.080193875	0.161189688	0.161189688	0.012991058
365	0.080193875	0.079399876	0.159593751	0.159593751	0.012735083
366	0.079399876	0.078613739	0.158013615	0.158013615	0.012484151
367	0.078613739	0.077835385	0.156449123	0.156449123	0.012238164
368	0.077835385	0.077064737	0.154900122	0.154900122	0.011997024
369	0.077064737	0.07630172	0.153366458	0.153366458	0.011760635
370	0.07630172	0.075546258	0.151847978	0.151847978	0.011528904
371	0.075546258	0.074798275	0.150344532	0.150344532	0.011301739
372	0.074798275	0.074057698	0.148855973	0.148855973	0.01107905
373	0.074057698	0.073324453	0.147382151	0.147382151	0.010860749
374	0.073324453	0.072598469	0.145922922	0.145922922	0.01064675
375	0.072598469	0.071879672	0.144478141	0.144478141	0.010436967
376	0.071879672	0.071167992	0.143047664	0.143047664	0.010231317
377	0.071167992	0.070463358	0.14163135	0.14163135	0.01002972
378	0.070463358	0.069765701	0.14022906	0.14022906	0.009832095
379	0.069765701	0.069074952	0.138840653	0.138840653	0.009638364
380	0.069074952	0.068391041	0.137465993	0.137465993	0.00944845
381	0.068391041	0.067713902	0.136104944	0.136104944	0.009262278
382	0.067713902	0.067043468	0.13475737	0.13475737	0.009079774
383	0.067043468	0.066379671	0.133423139	0.133423139	0.008900867
384	0.066379671	0.065722447	0.132102118	0.132102118	0.008725485
385	0.065722447	0.065071729	0.130794176	0.130794176	0.008553558
386	0.065071729	0.064427455	0.129499184	0.129499184	0.008385019
387	0.064427455	0.063789559	0.128217014	0.128217014	0.008219801
388	0.063789559	0.063157979	0.126947539	0.126947539	0.008057839
389	0.063157979	0.062532653	0.125690632	0.125690632	0.007899068
390	0.062532653	0.061913518	0.124446171	0.124446171	0.007743425
391	0.061913518	0.061300513	0.12321403	0.12321403	0.007590849
392	0.061300513	0.060693577	0.121994089	0.121994089	0.007441279
393	0.060693577	0.06009265	0.120786227	0.120786227	0.007294656
394	0.06009265	0.059497674	0.119590324	0.119590324	0.007150923
395	0.059497674	0.058908588	0.118406261	0.118406261	0.007010021
396	0.058908588	0.058325334	0.117233922	0.117233922	0.006871896
397	0.058325334	0.057747856	0.11607319	0.11607319	0.006736493
398	0.057747856	0.057176095	0.114923951	0.114923951	0.006603757
399	0.057176095	0.056609995	0.11378609	0.11378609	0.006473637
400	0.056609995	0.0560495	0.112659495	0.112659495	0.006346081
401	0.0560495	0.055494554	0.111544054	0.111544054	0.006221038
402	0.055494554	0.054945103	0.110439658	0.110439658	0.006098459
403	0.054945103	0.054401092	0.109346196	0.109346196	0.005978295
404	0.054401092	0.053862468	0.10826356	0.10826356	0.005860499
405	0.053862468	0.053329176	0.107191644	0.107191644	0.005745024
406	0.053329176	0.052801164	0.10613034	0.10613034	0.005631825
407	0.052801164	0.05227838	0.105079545	0.105079545	0.005520855
408	0.05227838	0.051760773	0.104039153	0.104039153	0.005412073

409	0.051760773	0.05124829	0.103009063	0.103009063	0.005305433
410	0.05124829	0.050740881	0.101989171	0.101989171	0.005200895
411	0.050740881	0.050238496	0.100979377	0.100979377	0.005098417
412	0.050238496	0.049741085	0.099979581	0.099979581	0.004997958
413	0.049741085	0.049248599	0.098989684	0.098989684	0.004899479
414	0.049248599	0.048760989	0.098009589	0.098009589	0.00480294
415	0.048760989	0.048278207	0.097039197	0.097039197	0.004708303
416	0.048278207	0.047800205	0.096078412	0.096078412	0.004615531
417	0.047800205	0.047326936	0.095127141	0.095127141	0.004524586
418	0.047326936	0.046858352	0.094185288	0.094185288	0.004435434
419	0.046858352	0.046394408	0.093252761	0.093252761	0.004348039
420	0.046394408	0.045935058	0.092329466	0.092329466	0.004262365
421	0.045935058	0.045480255	0.091415313	0.091415313	0.00417838
422	0.045480255	0.045029956	0.090510211	0.090510211	0.004096049
423	0.045029956	0.044584114	0.08961407	0.08961407	0.004015341
424	0.044584114	0.044142688	0.088726802	0.088726802	0.003936223
425	0.044142688	0.043705631	0.087848319	0.087848319	0.003858664
426	0.043705631	0.043272902	0.086978533	0.086978533	0.003782633
427	0.043272902	0.042844458	0.08611736	0.08611736	0.0037081
428	0.042844458	0.042420255	0.085264713	0.085264713	0.003635036
429	0.042420255	0.042000253	0.084420508	0.084420508	0.003563411
430	0.042000253	0.041584408	0.083584661	0.083584661	0.003493198
431	0.041584408	0.041172682	0.08275709	0.08275709	0.003424368
432	0.041172682	0.040765031	0.081937713	0.081937713	0.003356894
433	0.040765031	0.040361417	0.081126449	0.081126449	0.00329075
434	0.040361417	0.039961799	0.080323216	0.080323216	0.00322591
435	0.039961799	0.039566138	0.079527937	0.079527937	0.003162346
436	0.039566138	0.039174394	0.078740532	0.078740532	0.003100036
437	0.039174394	0.038786529	0.077960922	0.077960922	0.003038953
438	0.038786529	0.038402504	0.077189032	0.077189032	0.002979073
439	0.038402504	0.038022281	0.076424784	0.076424784	0.002920374
440	0.038022281	0.037645823	0.075668103	0.075668103	0.002862831
441	0.037645823	0.037273092	0.074918914	0.074918914	0.002806422
442	0.037273092	0.036904051	0.074177143	0.074177143	0.002751124
443	0.036904051	0.036538664	0.073442716	0.073442716	0.002696916
444	0.036538664	0.036176895	0.07271556	0.07271556	0.002643776
445	0.036176895	0.035818708	0.071995604	0.071995604	0.002591683
446	0.035818708	0.035464068	0.071282776	0.071282776	0.002540617
447	0.035464068	0.035112938	0.070577006	0.070577006	0.002490557
448	0.035112938	0.034765285	0.069878224	0.069878224	0.002441483
449	0.034765285	0.034421075	0.06918636	0.06918636	0.002393376
450	0.034421075	0.034080272	0.068501347	0.068501347	0.002346217
451	0.034080272	0.033742844	0.067823116	0.067823116	0.002299988
452	0.033742844	0.033408756	0.0671516	0.0671516	0.002254669
453	0.033408756	0.033077976	0.066486732	0.066486732	0.002210243

454	0.033077976	0.032750472	0.065828448	0.065828448	0.002166692
455	0.032750472	0.032426209	0.065176681	0.065176681	0.002124
456	0.032426209	0.032105158	0.064531367	0.064531367	0.002082149
457	0.032105158	0.031787285	0.063892443	0.063892443	0.002041122
458	0.031787285	0.031472559	0.063259844	0.063259844	0.002000904
459	0.031472559	0.03116095	0.062633509	0.062633509	0.001961478
460	0.03116095	0.030852426	0.062013376	0.062013376	0.001922829
461	0.030852426	0.030546956	0.061399382	0.061399382	0.001884942
462	0.030546956	0.030244511	0.060791467	0.060791467	0.001847801
463	0.030244511	0.02994506	0.060189571	0.060189571	0.001811392
464	0.02994506	0.029648575	0.059593635	0.059593635	0.001775701
465	0.029648575	0.029355024	0.059003599	0.059003599	0.001740712
466	0.029355024	0.029064381	0.058419405	0.058419405	0.001706413
467	0.029064381	0.028776614	0.057840995	0.057840995	0.00167279
468	0.028776614	0.028491697	0.057268312	0.057268312	0.00163983
469	0.028491697	0.028209601	0.056701299	0.056701299	0.001607519
470	0.028209601	0.027930298	0.0561399	0.0561399	0.001575844
471	0.027930298	0.027653761	0.055584059	0.055584059	0.001544794
472	0.027653761	0.027379961	0.055033722	0.055033722	0.001514355
473	0.027379961	0.027108873	0.054488834	0.054488834	0.001484517
474	0.027108873	0.026840468	0.05394934	0.05394934	0.001455266
475	0.026840468	0.026574721	0.053415189	0.053415189	0.001426591
476	0.026574721	0.026311605	0.052886325	0.052886325	0.001398482
477	0.026311605	0.026051094	0.052362698	0.052362698	0.001370926
478	0.026051094	0.025793162	0.051844256	0.051844256	0.001343913
479	0.025793162	0.025537784	0.051330946	0.051330946	0.001317433
480	0.025537784	0.025284935	0.050822719	0.050822719	0.001291474
481	0.025284935	0.025034589	0.050319524	0.050319524	0.001266027
482	0.025034589	0.024786722	0.049821311	0.049821311	0.001241082
483	0.024786722	0.024541309	0.04932803	0.04932803	0.001216627
484	0.024541309	0.024298325	0.048839634	0.048839634	0.001192655
485	0.024298325	0.024057748	0.048356073	0.048356073	0.001169155
486	0.024057748	0.023819552	0.0478773	0.0478773	0.001146118
487	0.023819552	0.023583715	0.047403268	0.047403268	0.001123535
488	0.023583715	0.023350213	0.046933928	0.046933928	0.001101397
489	0.023350213	0.023119023	0.046469236	0.046469236	0.001079695
490	0.023119023	0.022890122	0.046009145	0.046009145	0.001058421
491	0.022890122	0.022663487	0.045553608	0.045553608	0.001037566
492	0.022663487	0.022439096	0.045102583	0.045102583	0.001017121
493	0.022439096	0.022216927	0.044656022	0.044656022	0.00099708
494	0.022216927	0.021996957	0.044213884	0.044213884	0.000977434
495	0.021996957	0.021779165	0.043776122	0.043776122	0.000958174
496	0.021779165	0.02156353	0.043342695	0.043342695	0.000939295
497	0.02156353	0.02135003	0.04291356	0.04291356	0.000920787
498	0.02135003	0.021138643	0.042488673	0.042488673	0.000902644

499	0.021138643	0.02092935	0.042067993	0.042067993	0.000884858
500	0.02092935	0.020722129	0.041651478	0.041651478	0.000867423
501	0.020722129	0.020516959	0.041239087	0.041239087	0.000850331
502	0.020516959	0.020313821	0.04083078	0.04083078	0.000833576
503	0.020313821	0.020112694	0.040426515	0.040426515	0.000817152
504	0.020112694	0.019913558	0.040026252	0.040026252	0.00080105
505	0.019913558	0.019716394	0.039629953	0.039629953	0.000785267
506	0.019716394	0.019521182	0.039237577	0.039237577	0.000769794
507	0.019521182	0.019327903	0.038849086	0.038849086	0.000754626
508	0.019327903	0.019136538	0.038464441	0.038464441	0.000739757
509	0.019136538	0.018947067	0.038083605	0.038083605	0.000725181
510	0.018947067	0.018759473	0.03770654	0.03770654	0.000710892
511	0.018759473	0.018573735	0.037333208	0.037333208	0.000696884
512	0.018573735	0.018389837	0.036963572	0.036963572	0.000683153
513	0.018389837	0.018207759	0.036597596	0.036597596	0.000669692
514	0.018207759	0.018027484	0.036235244	0.036235244	0.000656496
515	0.018027484	0.017848995	0.035876479	0.035876479	0.000643561
516	0.017848995	0.017672272	0.035521266	0.035521266	0.00063088
517	0.017672272	0.017497299	0.035169571	0.035169571	0.000618449
518	0.017497299	0.017324058	0.034821357	0.034821357	0.000606263
519	0.017324058	0.017152533	0.034476591	0.034476591	0.000594318
520	0.017152533	0.016982706	0.034135239	0.034135239	0.000582607
521	0.016982706	0.01681456	0.033797266	0.033797266	0.000571128
522	0.01681456	0.016648079	0.03346264	0.03346264	0.000559874
523	0.016648079	0.016483247	0.033131326	0.033131326	0.000548842
524	0.016483247	0.016320047	0.032803294	0.032803294	0.000538028
525	0.016320047	0.016158462	0.032478508	0.032478508	0.000527427
526	0.016158462	0.015998477	0.032156939	0.032156939	0.000517034
527	0.015998477	0.015840076	0.031838554	0.031838554	0.000506847
528	0.015840076	0.015683244	0.03152332	0.03152332	0.00049686
529	0.015683244	0.015527964	0.031211208	0.031211208	0.00048707
530	0.015527964	0.015374222	0.030902186	0.030902186	0.000477473
531	0.015374222	0.015222002	0.030596224	0.030596224	0.000468064
532	0.015222002	0.015071289	0.030293291	0.030293291	0.000458842
533	0.015071289	0.014922068	0.029993358	0.029993358	0.000449801
534	0.014922068	0.014774325	0.029696394	0.029696394	0.000440938
535	0.014774325	0.014628045	0.02940237	0.02940237	0.00043225
536	0.014628045	0.014483213	0.029111257	0.029111257	0.000423733
537	0.014483213	0.014339815	0.028823027	0.028823027	0.000415383
538	0.014339815	0.014197836	0.028537651	0.028537651	0.000407199
539	0.014197836	0.014057264	0.0282551	0.0282551	0.000399175
540	0.014057264	0.013918083	0.027975346	0.027975346	0.00039131
541	0.013918083	0.01378028	0.027698363	0.027698363	0.0003836
542	0.01378028	0.013643841	0.027424121	0.027424121	0.000376041
543	0.013643841	0.013508754	0.027152595	0.027152595	0.000368632

544	0.013508754	0.013375004	0.026883758	0.026883758	0.000361368
545	0.013375004	0.013242578	0.026617582	0.026617582	0.000354248
546	0.013242578	0.013111463	0.026354042	0.026354042	0.000347268
547	0.013111463	0.012981647	0.02609311	0.02609311	0.000340425
548	0.012981647	0.012853116	0.025834763	0.025834763	0.000333717
549	0.012853116	0.012725857	0.025578973	0.025578973	0.000327142
550	0.012725857	0.012599859	0.025325716	0.025325716	0.000320696
551	0.012599859	0.012475108	0.025074966	0.025074966	0.000314377
552	0.012475108	0.012351592	0.024826699	0.024826699	0.000308182
553	0.012351592	0.012229299	0.02458089	0.02458089	0.00030211
554	0.012229299	0.012108217	0.024337515	0.024337515	0.000296157
555	0.012108217	0.011988333	0.02409655	0.02409655	0.000290322
556	0.011988333	0.011869637	0.02385797	0.02385797	0.000284601
557	0.011869637	0.011752116	0.023621753	0.023621753	0.000278994
558	0.011752116	0.011635758	0.023387874	0.023387874	0.000273496
559	0.011635758	0.011520553	0.023156311	0.023156311	0.000268107
560	0.011520553	0.011406488	0.02292704	0.02292704	0.000262825
561	0.011406488	0.011293552	0.02270004	0.02270004	0.000257646
562	0.011293552	0.011181735	0.022475287	0.022475287	0.000252569
563	0.011181735	0.011071025	0.022252759	0.022252759	0.000247593
564	0.011071025	0.01096141	0.022032435	0.022032435	0.000242714
565	0.01096141	0.010852882	0.021814292	0.021814292	0.000237932
566	0.010852882	0.010745427	0.021598309	0.021598309	0.000233243
567	0.010745427	0.010639037	0.021384464	0.021384464	0.000228648
568	0.010639037	0.0105337	0.021172737	0.021172737	0.000224142
569	0.0105337	0.010429406	0.020963106	0.020963106	0.000219726
570	0.010429406	0.010326145	0.02075555	0.02075555	0.000215396
571	0.010326145	0.010223905	0.02055005	0.02055005	0.000211152
572	0.010223905	0.010122679	0.020346584	0.020346584	0.000206992
573	0.010122679	0.010022454	0.020145133	0.020145133	0.000202913
574	0.010022454	0.009923222	0.019945676	0.019945676	0.000198915
575	0.009923222	0.009824972	0.019748194	0.019748194	0.000194996
576	0.009824972	0.009727695	0.019552667	0.019552667	0.000191153
577	0.009727695	0.009631381	0.019359077	0.019359077	0.000187387
578	0.009631381	0.009536021	0.019167403	0.019167403	0.000183695
579	0.009536021	0.009441605	0.018977626	0.018977626	0.000180075
580	0.009441605	0.009348124	0.018789729	0.018789729	0.000176527
581	0.009348124	0.009255568	0.018603692	0.018603692	0.000173049
582	0.009255568	0.009163929	0.018419497	0.018419497	0.000169639
583	0.009163929	0.009073197	0.018237126	0.018237126	0.000166296
584	0.009073197	0.008983363	0.01805656	0.01805656	0.00016302
585	0.008983363	0.008894419	0.017877782	0.017877782	0.000159808
586	0.008894419	0.008806356	0.017700775	0.017700775	0.000156659
				Coulombs	Joules
				598.2299225	891.0813149



2
MANAGEMENT SYSTEM
a
b
c
d
e
CENTRAL PROCESSING UNIT "CPU"
CONTROL SECTION
MEMORY SECTION
THERMOMETER
VOLTMETER
AMMETER
SYSTEM CONTROLLER
POWER SYSTEM
INVERTER
TRANSFORMER
PROCESSOR
ESTIMATING SECTION
COMPUTING SECTION
NETWORK INTERFACE
TARGET VALUE SETTING SECTION
TARGET VALUE INTERFACE
SEARCH CONTROL SECTION
RATIO VALUE DATABASE
TARGET VALUE MEMORY
ACCURACY DATA
MEASUREMENT DATA MEMORY
INPUT DEVICE
DISPLAY
NETWORK