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- (72) **Inventor; and**
- (71) **Applicant :** RAGHUNATHAN, Valagam, Rajagopal [IN/IN]; No: 6, 12th Avenue, Ashok Nagar, Chennai 600083 (IN).
- (74) **Agents:** ALTACIT GLOBAL et al.; Creative Enclave, III Floor, 148-150, Luz Church Road, Mylapore, Chennai 600004 (IN).
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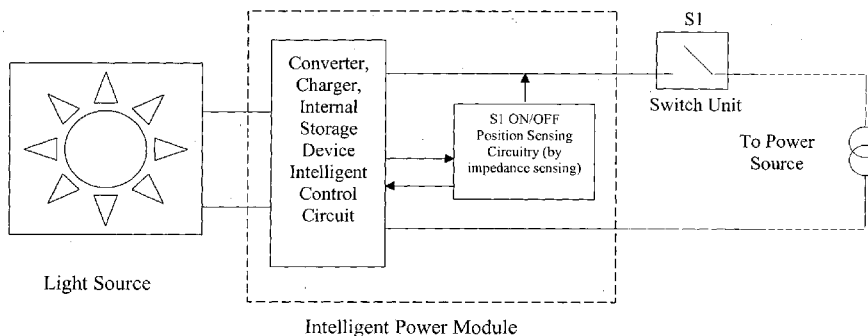
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(54) **Title:** INTELLIGENT APPLIANCES



(57) **Abstract:** A system and a method for providing requisite back up power to activate and deactivate electrical appliances. The said system comprises an intelligent power module, a switch unit, and power supply source. The intelligent power module comprises an energy storage device, and a sensing circuit. The energy storage device is inbuilt to the electrical appliance. The energy storage device, switch unit and sensing circuit are powered by the power supply source. The switch position sensing circuit for sensing the position of the switch unit and the status of the electrical appliance is the status of the switch unit.

## INTELLIGENT APPLIANCES

### FIELD OF INVENTION

The present invention relates to the field of power-line-operated non portable (i.e., plug-in) electrical products during power failure without warranting the need of exclusive wiring system as well as to the field of standby emergency systems. Particularly, the present invention relates to an intelligent appliance, which can provide back up power to activate and deactivate electrical appliances.

### 10 BACKGROUND ART

Electrical products intended for use in a commercial, residential, industrial or similar application operates at a main supply voltage. This keeps the current drawn by the appliances at a comparatively low level and this, in turn, means that the sizes of the electrical conductors which are connected to the electrical products are reduced. The appliances are wired in normal or traditional way of connecting directly to the power source without any intelligence involved. When the power source is not available, the appliance will be either switched off or operated through an inverter. A huge network of electrically wired installations and buildings exists worldwide, reflecting the aforementioned characteristics.

20 If an appliance fails due to a faulty power supply then it is convenient, and in many cases vital, to have a backup or exclusive wiring system for operating the pre determined electrical systems. Battery powered units are used for this purpose, as are stand-by generators and other schemes. The provision of a backup or alternative source requires a separate apparatus or installation which might be coupled to a main supply network but which, invariably, is capable of independent operation.

A significant drawback of a typical backup power source is that it usually stands on the floor or on a tabletop or the like or is often overhead. Consequently, the level of illumination from a backup source, although welcome, is normally not directed in a suitable or desired way.

30 The cost and problems associated with providing standby power systems that can function in the event of power failures can be substantial. Known in prior art is a display lamp being lit up using commercial power at normal time and lights up using a storage battery built in the

lamp in case of power outage. Also, known in prior art is a display lamp, which can emit light for a long time reducing the consumption power of the storage battery in case of power outage. An optical source is intermittently lighted by use of the power of the storage battery by controlling the discharge of the storage battery by using a timer, an optical sensor, or a human sensor. When the light is on, light is stored in a light storage plate. When the light is off, the display lamp is allowed to emit light by the remaining light of the light storage plate.

Conventional inverter available in the industry requires the usage of two switches as the main switch and the inverter switch. The inverter switch is sensed for the switching on of the battery in cases of power failure. While using the inverter, a separate wiring connection needs to be established between the inverter and the required loads that needs to be switched on upon power failure and the loads need to be connected to the output of the inverter.

Accordingly, the present invention aims to provide an intelligent appliance which is compatible with a conventional electrical wiring used with a main supply and which can provide a power backup function by utilizing the power in a storage device attached to the each of the individual electrical appliances.

### **OBJECTS OF INVENTION**

One or more of the problems of the conventional prior art may be overcome by various embodiments of the present invention. The basic object of the present invention is directed to provide an intelligent appliance, which can provide back up power to activate and deactivate electrical appliances upon faulty conditions from the main source of power supply.

It is another object of the invention to provide an intelligent appliance comprising of inbuilt energy storage device for each of the electrical appliances connected in parallel to the appliance and the main power supply source.

It is yet another object of the present invention to provide an intelligent appliance comprising of a switch unit connected in series to the main power supply unit and the electrical appliance with built in energy storage device for controlling the power supply to the electrical appliance.

It is further object of the present invention to provide an intelligent appliance comprising of a switch position sensing circuitry for determining the position of the switch unit and correspondingly activate or deactivate the electrical appliances.

- 5 It is another object of the invention to provide an intelligent appliance which replaces the existing systems without changing or disturbing the existing wiring set up.

### **SUMMARY OF INVENTION**

Thus according to the basic aspect of the present invention there is provided a system for  
10 providing requisite back up power to electrical appliances comprising:

an intelligent power module;

a switch unit; and

power supply source,

wherein the intelligent power module comprising:

- 15 an energy storage device; and

a sensing circuit,

wherein the energy storage device is inbuilt to the electrical appliance,

wherein the energy storage device, switch unit and sensing circuit are powered by the power supply source,

- 20 wherein the sensing circuit is a switch position sensing circuit for sensing the position of the switch unit, and

wherein the status of the electrical appliance is the status of the switch unit.

It is another aspect of the present invention, wherein the energy storage device comprising:

- 25 a control circuit;

a converter;

an internal storage device; and

a charger,

wherein the control circuit measures the impedance between the power source terminals  
30 under various conditions of the switch positions,

wherein the charger charges and stores the power in the internal storage device and supplies the power to the electrical appliance, and

wherein the energy storage device is charged continuously upon the availability of power and is not charged upon the non-availability of power irrespective of the position of the switch unit.

- 5 It is another aspect of the present invention, wherein the sensing circuit continuously monitors the difference in impedance measured.

It is another aspect of the present invention, wherein the internal storage device is batteries.

- 10 It is another aspect of the present invention, wherein the electrical appliance is operable in both power source mode and backup source mode.

It is another aspect of the present invention, wherein in the power source mode, the electrical appliance is activated by the power supply source and simultaneously by the internal storage device and the internal storage device is charged when the switch unit is in ON position.

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It is another aspect of the present invention, wherein in the backup source mode, the electrical appliance is activated by the internal storage device without charging when the switch unit is in ON position.

- 20 In another aspect of the present invention there is provided a method of providing the requisite back up power to the electrical appliances using the system comprising:  
Determining the position of the switch unit by the switch position sensing circuit;  
Determining the availability of power from the main power supply source;  
25 Determining the status of the energy storage device; and  
Providing the requisite back up power to the electrical appliances.

In another aspect of the present invention there is provided a method, wherein upon determining the ON position of the switch unit and the availability of power from the power supply source, the energy storage device is charged and simultaneously provides the requisite power for activating the electrical appliance.

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In another aspect of the present invention there is provided a method, wherein upon determining the OFF position of the switch unit and the availability of power from the power supply source, the energy storage device is charged without providing the requisite power to the electrical appliance.

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In another aspect of the present invention there is provided a method, wherein upon determining the ON position of the switch unit and the non-availability of power from the power supply source, the energy storage device is not charged but provide the requisite power to the electrical appliance.

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In another aspect of the present invention there is provided a method, wherein upon determining the OFF position of the switch unit and the non-availability of power from the power supply source, the energy storage device is not charged and do not provide the requisite power to the electrical appliance.

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#### **BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS**

Figure 1 illustrates the schematic diagram of the circuit arrangement for providing the requisite back up power to all the electrical appliances without altering the conventional wiring system.

20 Figure 2 illustrates the tabular form of the various operating scenarios of the circuit arrangement.

#### **DETAILED DESCRIPTION OF THE INVENTION WITH REFERENCE TO THE ACCOMPANYING DRAWINGS**

25 The present invention as discussed hereinbefore relates to an intelligent appliance which is compatible with a conventional electrical wiring used with a main supply and which can provide a power backup function by utilizing the power in a storage device attached to the each of the individual electrical appliances. The appliance is powered up using internal storage device only. However, if the mains power source is available then the internal storage  
30 device will be charged in parallel, apart from supplying the power to the appliance as well. The present invention does not utilize any optical sensor or human sensor mechanism in the complete system. The intelligence is built in such a way that the appliances will be enabled only if the main power switch unit (S1) is in ON condition and there is no necessity for

changing the existing electrical system such as wiring, switches etc., except the change of the intelligence appliances module.

Reference is now invited to accompanying Figure 1 that illustrates the circuit arrangement/system for providing the requisite back up power to the electrical appliances  
5 without altering the conventional wiring system comprising of housing; connectors for connecting the housing to a main supply; an intelligent power module and a switch unit. The intelligent power module comprises of an energy storage device and a sensing circuit. The energy storage device is inbuilt to the electrical appliance and connected in parallel to the  
10 main power supply source. The switch unit is connected in series to the power supply source and is powered by the main power supply source for charging the energy storage device and for operating the electrical appliance. The sensing circuit is a switch position sensing circuitry for sensing the ON / OFF and working position of the switch unit and for activating the energy storage device. The electrical appliance is powered by the main supply or by the  
15 energy storage device if the main supply is faulty.

The term "faulty" as used herein includes any condition, including interruption of the main supply, which impedes normal operation of the electrical devices such as the light sources by the main supply. The energy storage device, switch unit and switch position sensing circuitry  
20 are preferably connected in parallel to the electrical appliance and the main supply. The electrical appliance includes conventional light source to be operated at all conditions. Electrical appliances such as LEDs based on DC voltage are powered by backup means (inbuilt with the intelligent power module unit) such as battery.

25 The energy storage device comprises of an intelligent control circuit, a converter, an internal storage device and a charger for simultaneously charging and storing the power at normal power supply conditions from the main power supply and for supplying the power to the electrical appliances. The internal storage device includes batteries. The intelligent control circuit measures impedance between the power source terminals under various conditions of  
30 the switch positions. The energy storage device is identical for and positioned as inbuilt with each of the electrical appliance. The switch unit (S1) is connected in series between the main power supply source and the energy storage device. The switch position sensing circuitry connected to the energy storage device determines the ON / OFF position of the switch unit

(S1) by constantly monitoring the difference in impedance measured during the power off mode. The switch position sensing circuitry activates the electrical appliance upon the ON condition of the switch unit and deactivates the electrical appliance upon the OFF condition of the switch unit. The energy storage device is charged continuously upon the availability of power from the main power supply source and is not charged upon the non-availability of power from the main power supply source irrespective of the position of the switch unit.

Working of the invention:

The intelligent power module of the present invention replaces the existing systems without changing or disturbing the existing wiring setup. By detecting the status of the switch unit (S1) and the availability of the power source from the main power supply source, the setup is made to operate intelligently.

Figure 2 illustrates the various modes of operation of the intelligence system such as (a) power source mode and (b) backup source mode. In power source mode, the electrical appliance is powered by the main power supply source so that simultaneously the electrical appliance will be powered by the inbuilt internal storage device as well as charged by the mains power source. In the backup source mode, when there is no availability of the power source and the switch unit (S1) is in ON status makes the electrical appliance powered by the internal storage device and there is no charging operation involved. The status of the electrical appliance is the status of the switch unit (S1).

In another aspect, a method for providing the requisite back up power to the electrical appliances without altering the conventional wiring system comprises the steps of:

- Determining the position of the switch unit by the switch position sensing circuit;
- Determining the availability of power from the main power supply source;
- Determining the status of the energy storage device; and
- Providing the requisite back up power to the electrical appliances.

The status of the switch unit (S1) is detected by means of the intelligent control circuit which measures impedance between the power source terminals under various conditions of the switch positions. The switch position sensing circuitry determines the ON / OFF position of the switch unit (S1) by constantly monitoring the difference in impedance measured during the power off mode. The impedance as seen towards the power source is low in ON condition



and high in case of OFF condition and thereby activates or deactivates the electrical appliance. Based on readings of the impedance the switch position will be known so as to handle ON/OFF status of the appliances. The energy storage device is charged by the system but do not provide the requisite power to the electrical appliance upon determining the OFF  
5 condition of the switch unit and upon sensing the availability of power from the main power supply source. While the system does not charge the energy storage device but supply the requisite power to the electrical appliance upon determining the ON condition of the switch unit and the non availability of power from the main power supply source. In another aspect, the system does not charge the energy storage device and also arrests the supply of the  
10 requisite power to the electrical appliance upon determining the OFF condition of the switch unit and the non availability of power from the main power supply source.

The system of the present invention requires only one main switch connected in series with the load and the main source of power supply and the switch is sensed intelligently for its  
15 position and accordingly the electrical appliances are either activated or deactivated. The system does not require the usage of special wiring mechanism and are incorporated in the usual wiring implemented in the factories and households with the loads being connected to the normal power sockets. Further the system does not warrant the conversion from DC to AC for the power back up as required by the inverter.

20 It will be obvious to a person skilled in the art that with the advance of technology, the basic idea of the invention can be implemented in a plurality of ways. The invention and its embodiments are thus not restricted to the above examples but may vary within the scope of the claims.

25 Further the above-described embodiments of the present invention are intended to be examples only. Alterations, modifications and variations may be effected to the particular embodiments by those of skill in the art without departing from the scope of the invention, which is defined solely by the claims appended hereto.

30

**I CLAIM:**

1. A system for providing requisite back up power to electrical appliances comprising:  
an intelligent power module;  
5 a switch unit; and  
power supply source,  
wherein the intelligent power module comprising:  
an energy storage device; and  
a sensing circuit,  
10 wherein the energy storage device is inbuilt to the electrical appliance,  
wherein the energy storage device, switch unit and sensing circuit are powered by the power  
supply source,  
wherein the sensing circuit is a switch position sensing circuit for sensing the position of the  
switch unit, and  
15 wherein the status of the electrical appliance is the status of the switch unit.
2. A system as claimed in claim 1, wherein the energy storage device comprising:  
a control circuit;  
a converter;  
20 an internal storage device; and  
a charger,  
wherein the control circuit measures the impedance between the power source terminals  
under various conditions of the switch positions,  
wherein the charger charges and stores the power in the internal storage device and supplies  
25 the power to the electrical appliance, and  
wherein the energy storage device is charged continuously upon the availability of power and  
is not charged upon the non-availability of power irrespective of the position of the switch  
unit.
- 30 3. A system as claimed in claims 1 and 2, wherein the sensing circuit continuously monitors  
the difference in impedance measured.
4. A system as claimed in claim 2, wherein the internal storage device is batteries.

5. A system as claimed in anyone of claims 1 to 4, wherein the electrical appliance is operable in both power source mode and backup source mode.
6. A system as claimed in claim 5, wherein in the power source mode, the electrical appliance is activated by the power supply source and simultaneously by the internal storage device and the internal storage device is charged when the switch unit is in ON position.
7. A system as claimed in claim 5, wherein in the backup source mode, the electrical appliance is activated by the internal storage device without charging when the switch unit is in ON position.
8. A method of providing the requisite back up power to the electrical appliances using the system as claimed in anyone of claims 1 to 7 comprising:  
Determining the position of the switch unit by the switch position sensing circuit;  
Determining the availability of power from the main power supply source;  
Determining the status of the energy storage device; and  
Providing the requisite back up power to the electrical appliances.
9. A method as claimed in claim 8, wherein upon determining the ON position of the switch unit and the availability of power from the power supply source, the energy storage device is charged and simultaneously provides the requisite power for activating the electrical appliance.
10. A method as claimed in claim 8, wherein upon determining the OFF position of the switch unit and the availability of power from the power supply source, the energy storage device is charged without providing the requisite power to the electrical appliance.
11. A method as claimed in claim 8, wherein upon determining the ON position of the switch unit and the non-availability of power from the power supply source, the energy storage device is not charged but provide the requisite power to the electrical appliance.
12. A method as claimed in claim 8, wherein upon determining the OFF position of the switch unit and the non-availability of power from the power supply source, the energy storage device is not charged and do not provide the requisite power to the electrical appliance.

FIGURE 1:

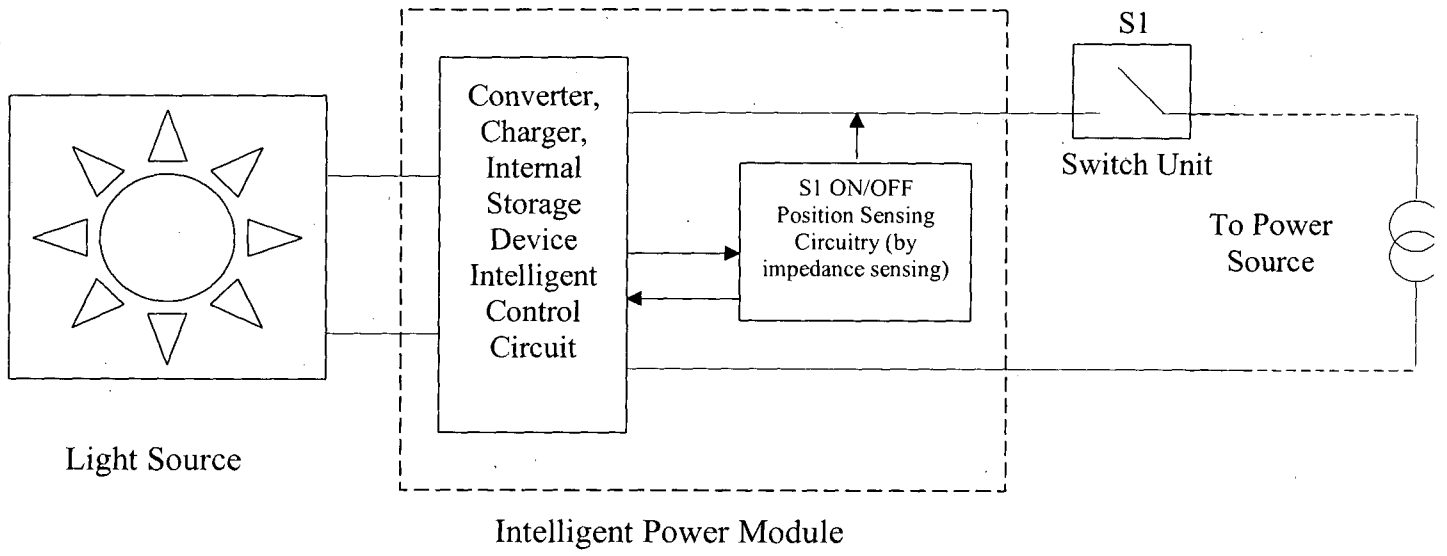


FIGURE 2:

Sl.No:	Switch Position (S1)	Power source	Internal Storage Device	Appliances Status	Operation Mode
1	OFF	Available	Charging	OFF	Power source mode
2	ON	Available	Charging	ON	
3	OFF	Not-Available	Not Charging	OFF	Backup Source mode
4	ON	Not Available	Not Charging	ON	

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/IN2012/000417

## A. CLASSIFICATION OF SUBJECT MATTER

H02J 9/06 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: H02J, G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

VEN,CNABS,CNTXT:

sens???, detect???, switch, circuit, back, up, backup, power, source, position, impedance, standby, stand, by, second+, vice, auxiliary, assistant, energy, intelligent, electrical, appliance

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN101499675A (DELTA ELECTRONICS IN), 05 Aug.2009 (05.08.2009), Full text	1-12
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A	US5671131A (DELL USA LP), 23 Sep.1997 (23.09.1997), Full text	1-12

Further documents are listed in the continuation of Box C.       See patent family annex.

<p>* Special categories of cited documents:</p> <p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent but published on or after the international filing date</p> <p>“L” document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p>	<p>“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>“&amp;” document member of the same patent family</p>
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Date of the actual completion of the international search 01 November 2012 (01.11.2012)	Date of mailing of the international search report <b>15 Nov. 2012 (15.11.2012)</b>
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Name and mailing address of the ISA/CN  
The State Intellectual Property Office, the P.R.China  
6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China  
100088  
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Authorized officer  
**CHEN, Junzhu**  
Telephone No. (86-10)62085840

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.  
PCT/IN2012/000417

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
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