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(54) **A CONTROL CARD AND A CONTROL METHOD FOR DOMESTIC APPLIANCES**

EINE STEUERKARTE UND EIN KONTROLLVERFAHREN FÜR HAUSHALTSGERÄTE

CARTE DE COMMANDE ET PROCEDE DE COMMANDE POUR APPAREILS ELECTROMENAGERS

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(56) References cited:

EP-A- 1 041 533 US-A- 4 922 243

US-A- 6 166 726 US-A1- 2002 038 553

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Description

[0001] This invention relates to a display unit control card and control method used in domestic appliances.

[0002] Energy is provided to the electronic control cards comprised in domestic appliances by a feeder circuit that converts the alternative current from the network to a direct current and when the network current decreases below the standards the feeder circuit, in order to stabilize the energy that it provides to the control cards, draws more current from the network. A withdrawal of a high current is also needed to illuminate the display units which inform the operator and which are used in electrical domestic appliances at low network voltage. Low voltage and high current intense electrical current, due to over heating, damages the electronic circuits such as the resistance, the diode and the coil through which the current passes. In cases where the network current is unsteady the electronic circuit elements can burn out due to over heating and may cause fire threats.

[0003] US 20022038553 numbered American Patent Application is related to a power saving apparatus and method for a display portion of a refrigerator in which brightness of the display portion is controlled only when a user utilizes the refrigerator.

[0004] US 2003022699 numbered American Patent Application is related to a cellular phone having a display which regulates the background brightness of the display brightness according to the measuring a voltage between two terminals of the photosensitive element.

[0005] US 5745085 numbered American Patent is related to reducing energy consumption by controlling the display brightness according to the turn on frequency of the display as a function of the frequency of discharge sustaining voltage pulses.

[0006] US 6271813 numbered American Patent is related to decreasing/increasing the brightness of car indicators relative to daytime and nighttime conditions by applying preselected voltage level to the pixels.

[0007] The objective of this invention is to provide a control card and a control method which ensures energy saving and maintains electronic circuit elements in cases where the network voltage is unsteady by adjusting the display units' brightness of domestic appliances according to the network voltage.

These objectives are achieved with devices and methods comprising the features of the independent claims.

[0008] A control card and a control method for domestic appliances realized in order to attain above-mentioned objects of the invention has been illustrated in the attached drawings, wherein;

[0009] Figure 1- is a schematic view of a control card and a display unit.

[0010] Figure 2 - is a flow diagram of a display control method.

[0011] The figures have been each numbered corresponding the following:

1. Control card
2. Display unit
3. 23. Resistance
4. 24. Diode
5. Capacitor
6. Feeder circuit
7. Input circuit
8. Output circuit
9. Display screen
10. Function button
11. Led
12. Display driver circuit
13. Measuring circuit
14. Micro processor
15. Memory
16. Brightness adjusting button
17. Varistor

[0012] The domestic appliances, particularly refrigerators, ovens, washing machines or dish washers, comprise a control card (1) which controls its performance and a display unit (2) which displays and/or adjusts its functions.

[0013] The control card (1) comprises one or more resistances (3) which restrict the electric current, one or more diodes (4) which directs the network voltage in a half wave, one or more capacitors (5) which filters signals that are directed half waves in order to provide the direct current, a varistor (17) which normalizes high network voltage, a feeder circuit (6) which provides the direct current to the control card (1) and to the display unit (2), an input circuit (7) which transmits the signals it receives from sensors which senses the data, such as heat, light, sound, switch position, that must be sensed on the product, an output circuit (8) which enables a controlled transmission of high and low voltage which is necessary for the functioning of components, such as motor, fan, compressor, heater, lamp, that need to be controlled on the domestic appliance, a display driver circuit (12) which regulates the function of the display unit (2), a measuring circuit (13) which enables measurement of the network voltage, a memory (15) wherein the limit function value information, such as the voltage values that shall be compared with the measurable network voltage, belonging to the domestic appliance is installed and a micro processor (14) which forms the signals that increases or decreases the brightness of the display unit (2) by comparing the signals that it receives from the measuring circuit (13) with the information in the memory (15) .

[0014] The measuring circuit (13) comprises one or more resistances (23) or one or more diodes (24) which form low level and half wave or full wave directed signal required for network voltage to be measured by the micro processor (14).

[0015] Display unit (2) comprises a display screen (9) which displays information regarding the domestic appliance, one or more function buttons (10) which adjusts the functions of the domestic appliance and one or more

LEDs (11) which illuminate the display screen (9) by operating in an on-off manner at a frequency that human eye could not detect.

[0016] The feeder circuit (6) in the control card (1) withdraws current above normal levels in order to provide a steady energy to the input circuit (7), output circuit (8), and micro processor (14) and to the display driver circuit (12) when the network voltage decreases below the standards. The display unit (2) being able to remain in the same brightness level at low network voltage is an important factor in high current withdrawal. In the embodiment, which is the subject of the invention, the network voltage's (Vnetwork) level is decreased by the measuring circuit (13) and it is transmitted to the micro processor (14) with half wave directing and the transmitted signals are continuously measured in the micro processor (14). Vnetwork is compared with the limit voltage values which are installed in the memory (15) of micro processor (14) and it adjusts the brightness value of the display unit (2) by determining LEDs' (11) on-off function interval ratio to each other according to the results of the above-mentioned comparison. Thus, withdrawal of high current is prevented by making the brightness of the display unit (2) compatible with the unsteady Vnetwork values.

[0017] In another embodiment of the invention the display unit (2) comprises one or more brightness adjusting buttons (16) which enable the operator to adjust the brightness manually.

[0018] The network voltage (Vnetwork) values measured by the measuring circuit (13) are compared with the limit values below which are after certain experimental studies determined by the manufacturer and installed in the memory (15).

[0019] V1: The limit network voltage value, at which the electronic circuit elements such as resistance (3) are heated above normal, is approximately 130V (e.g. in systems which have 220-230V network voltage).

[0020] V2: The limit network voltage value, at which the operation of the domestic appliance needs to be halted, is approximately 100V (e.g. in systems which have 220-230V network voltage).

[0021] The brightness values (P1, P2) of the display unit (2), which are needed to be adjusted according to the measured network voltage, are pre-installed in the memory (15) by the manufacturer.

[0022] P1: It is the brightness value assessed by determining the LEDs' (11) on/off function interval ratio to each other in order for the display unit (2) to operate under normal brightness value when $V_{\text{network}} > V1$. The LEDs' (11), which have P1 brightness value, on/off function interval ratio to each other is approximately 1/50.

[0023] P2: It is the brightness value assessed by determining the LEDs' (11) on/off function interval ratio to each other in order for the display unit (2) to operate under partial brightness value ($P2 < P1$ preferably $P2 = 0.5 P1$) when the $V1 > V_{\text{network}} > V2$. The LEDs' (11), which have P2 brightness value, on/off function interval

ratio to each other is approximately 1/100.

[0024] The operation of the domestic appliance is halted and the display unit (2) is darkened when $V_{\text{network}} < V2$.

[0025] The brightness of the display unit (2) is controlled in the following way:

- Starting the domestic appliance (100),
- Measuring the network voltage (Vnetwork) by the micro processor (14) (101),
- Comparing the measured network voltage with the limit network value (V2) at which the electronic circuit elements are heated above normal temperature by the micro processor (14) (102),
- Adjusting the display unit (2) to P1 brightness value if $V_{\text{network}} > V1$ (103),
- Returning back to the stage (101) where the network voltage is measured.
- Moving to the stage (104) where the network voltage is compared with the limit voltage value at which the domestic appliance's operation shall be halted if $V_{\text{network}} < V1$ at the stage (102) where the measured network voltage is compared with V1,
- The network voltage is compared with the limit voltage value (V2) at which the domestic appliance's operation shall be halted (104),
- Adjusting the display unit (2) to P2 brightness value if $V_{\text{network}} > V2$ (105),
- Returning back to the stage (101) where the network voltage is measured,
- Adjusting the display unit (2) to a darkened stage if $V_{\text{network}} < V2$ at the stage (104) where the measured voltage is compared with V2 (106),
- Returning back to the stage (101) where the network voltage is measured.

[0026] As a result of making the display unit's (2) brightness compatible with the low network voltage that is below the standards, the current above normal values is not withdrawn by the main control unit (1) thus burning out due to over heating of electronic circuit elements such as resistance (3) is prevented.

[0027] Maintenance of electronic circuit elements and improvement of malfunction estimates, user safety and energy saving are provided.

Claims

1. A domestic appliance comprising a display unit (2), comprising a display screen (9) which is arranged to display information regarding the domestic appliance and one or more leds (11) which are arranged to illuminate the display screen (9) by operating in an on-off manner at a frequency that human eye could not detect, and a control card (1), **characterized in that**, the control card (1) comprises:

- a measuring circuit (13) adapted to measure the network voltage supplied to the control card (1), a memory (15) arranged to store the limiting operating values, such as the voltage values that shall be compared with the measured network voltage, and
- a micro processor (14) arranged to compare the signals received from the measuring circuit (13) with the information in the memory (15) and to form signals so that the display unit (2) is adjusted to a darkened stage, if the measured network voltage is below a limit voltage value, denoted V2, at which the domestic appliance's operation shall be halted,
- or so that the display unit's (2) brightness is decreased to a partial brightness value, denoted P2, if the measured network voltage is below a limit network value at which the electronic circuit elements are heated above normal temperature, denoted V1, wherein V2 is smaller than V1,
- or, if else, is increased to a normal brightness value, denoted by P1, P1 being larger than P2.
2. A domestic appliance as defined in claim 1 **characterized by** the measuring circuit (13) comprising one or more resistances (23) and one or more diodes (24) which are adapted to form low level and half wave or full wave directed signal required for the network voltage to be measured by the micro processor (14).
 3. A domestic appliance as defined in claim 1 **characterized in that** the control card (1) comprises a display driver circuit (12) arranged to regulate the function of the display unit (2).
 4. A domestic appliance as defined in claim 1 **characterized in that** the control card (1) comprises one or more resistances (3) arranged to restrict electric currents, one or more diodes (4) arranged to direct the network resistance in a half wave, one or more condensers (5) arranged to filter signals that are directed half waves in order to provide the direct current, a feeder circuit (6) arranged to provide the direct current to the control card (1) and the display unit (2), an input circuit (7) arranged to transmit the signals it receives from sensors which senses the data, such as heat, light, sound, switch position, that must be sensed on the product, and output circuit (8) arranged to enable a controlled transmission of high and low voltage which is necessary for the functioning of components, such as motor, fan, compressor, heater, lamp, that need to be controlled on the domestic appliance.
 5. A domestic appliance as defined in claim 1 **characterized in that** the control card (1) comprises a vari-
- tor (17) adapted to normalize high network voltage.
6. A control method for a domestic appliance according to any one of the claims above, comprising the steps of:
 - Starting the domestic appliance (100),
 - Measuring by the micro processor (14) of the network voltage supplied to the control card (1), denoted Vnetwork (101),
 - Comparing by the micro processor (14) of the measured network voltage Vnetwork with the limit network value V1 at which the electronic circuit elements are heated above normal temperature (102),
 - If it is found at the step (102) where the measured network voltage Vnetwork is compared with V1 that $V_{\text{network}} > V1$, adjusting the display unit (2) to P1 brightness value (103) and, thereafter returning back to the stage (101) where the network voltage Vnetwork is measured.
 - If it is found at the step (102) where the measured network voltage Vnetwork is compared with V1 that $V_{\text{network}} < V1$, moving to the stage (104) where the network voltage Vnetwork is compared with the limit voltage value V2 at which the domestic appliance's operation shall be halted, wherein V2 is smaller than V1,
 - Comparing the network voltage Vnetwork with the limit voltage value V2 at which the domestic appliance's operation shall be halted (104),
 - If it is found at the step (104) where the measured network voltage Vnetwork is compared with V2 that $V_{\text{network}} > V2$, adjusting the display unit (2) to P2 brightness value (105), wherein P2 is smaller than P1, and thereafter returning back to the stage (101) where the network voltage is measured,
 - If it is found at the step (104) where the measured network voltage Vnetwork is compared with V2 that $V_{\text{network}} < V2$, adjusting the display unit (2) to a darkened stage (106), and thereafter returning back to the stage (101) where the network voltage is measured.
 7. A control method as defined in claim 6 **characterized by** adjusting the display unit (2) to P1 brightness value (103) wherein the LED's (11) on-off function interval ratio to each other is approximately 1/50.
 8. - A control method as defined in claim 6 **characterized by** adjusting the display unit (2) to P2 brightness value (105) wherein the LED's (11) on-off function interval ratio to each other is approximately 1/100.

Patentansprüche

1. Haushaltsgerät, umfassend:

eine Anzeigeeinheit (2) mit einem Anzeigebildschirm (9), der dazu angeordnet ist, Informationen zu dem Haushaltsgerät anzuzeigen, und einer oder mehrerer LEDs (11), die dazu angeordnet sind, den Anzeigebildschirm (9) zu beleuchten, indem sie bei einer Frequenz, die das menschliche Auge nicht wahrnehmen kann, in einer Ein-aus-Weise arbeiten, und einer Steuerkarte (1), **dadurch gekennzeichnet, dass** die Steuerkarte (1) Folgendes umfasst:

einen Messschaltkreis (13), der dazu angepasst ist, die Netzspannung zu messen, die der Steuerkarte (1) zugeführt wird, einen Speicher (15), der dazu angeordnet ist, die Betriebsgrenzwerte wie z. B. die Spannungswerte zu speichern, die mit der gemessenen Netzspannung verglichen werden sollen, und

einen Mikroprozessor (14), der dazu angeordnet ist, die Signale, die von dem Messschaltkreis (13) empfangen werden, mit den Informationen im Speicher (15) zu vergleichen und Signale zu bilden, derart, dass die Anzeigeeinheit (2) in einen abgedunkelten Zustand gebracht wird, wenn die gemessene Netzspannung unter einem Grenzspannungswert, mit V2 gekennzeichnet liegt, bei dem der Betrieb des Haushaltsgeräts angehalten werden soll, oder derart, dass die Helligkeit der Anzeigeeinheit (2) auf einen Helligkeitsteilwert mit P2 gekennzeichnet gesenkt wird, wenn die gemessene Netzspannung unter einem Grenznetspannungswert mit V1 gekennzeichnet liegt, bei dem die elektronischen Schaltkreiselemente über Normaltemperatur erwärmt werden, wobei V2 kleiner als V1 ist, oder anderenfalls auf einen Helligkeitsnormalwert mit P1 gekennzeichnet erhöht wird, wobei P1 größer als P2 ist.

2. Haushaltsgerät nach Anspruch 1, **dadurch gekennzeichnet, dass** der Messschaltkreis (13) einen oder mehrere Widerstände (23) und eine oder mehrere Dioden (24) umfasst, die dazu angepasst sind, ein schwaches gerichtetes Halbwellen- oder Vollwellensignale zu bilden, das notwendig ist, damit der Mikroprozessor (14) die Netzspannung messen kann.

3. Haushaltsgerät nach Anspruch 1, **dadurch gekennzeichnet, dass** die Steuerkarte (1) einen Anzeigee-

treiberschaltkreis (12) umfasst, der dazu angeordnet ist, die Funktion der Anzeigeeinheit (2) zu regeln.

4. Haushaltsgerät nach Anspruch 1, **dadurch gekennzeichnet, dass** die Steuerkarte (1) einen oder mehrere Widerstände (3) umfasst, die dazu angeordnet sind, elektrische Ströme einzuschränken, eine oder mehrere Dioden (4), die dazu angeordnet sind, den Netzwiderstand in eine Halbwelle richten, einen oder mehrere Kondensatoren (5), die dazu angeordnet sind, Signale zu filtern, die gerichtete Halbwellen sind, um den Gleichstrom bereitzustellen, einen Zuführschaltkreis (6), der dazu angeordnet ist, den Gleichstrom der Steuerkarte (1) und der Anzeigeeinheit (2) zuzuführen, einen Eingangsschaltkreis (7), der dazu angeordnet ist, die Signale zu übertragen, die er von Sensoren empfängt, die die Daten wie z. B. Wärme, Licht, Ton, Schaltposition, die am Produkt erfasst werden müssen, erfassen, und einen Ausgangsschaltkreis (8), der eine gesteuerte Übertragung von Hoch- und Niederspannung ermöglicht, die für die Funktion der Bauelemente wie Motor, Gebläse, Verdichter, Heizung, Lampe, die am Haushaltsgerät gesteuert werden müssen, notwendig ist.

5. Haushaltsgerät nach Anspruch 1, **dadurch gekennzeichnet, dass** die Steuerkarte (1) einen Varistor (17) umfasst, der dazu angepasst ist, hohe Netzspannung zu normieren.

6. Steuerungsverfahren für ein Haushaltsgerät nach einem der vorangehenden Ansprüche, folgende Schritte umfassend:

- Starten des Haushaltsgeräts (100),
- Messen der Netzspannung mit Vnetwork gekennzeichnet, die der Steuerkarte (1) zugeführt wird, durch den Mikroprozessor (14) (101),
- Vergleichen der gemessenen Netzspannung Vnetwork mit dem Grenzwert V1, an dem sich die elektronischen Schaltkreiselemente über Normaltemperatur erwärmen, durch den Mikroprozessor (14) (102),
- wenn in Schritt (102), in dem die gemessene Netzspannung Vnetwork mit V1 verglichen wird, festgestellt wird, dass $V_{network} > V1$, Anpassen der Anzeigeeinheit (2) auf einen Helligkeitsteilwert P1 (103), und anschließend Zurückkehren zu Schritt (101), wobei die Netzspannung Vnetwork gemessen wird,
- Wenn in Schritt (102), in dem die gemessene Netzspannung Vnetwork mit V1 verglichen wird, festgestellt wird, dass $V_{network} < V1$, Fortfahren mit Schritt (104), wobei die Netzspannung Vnetwork mit dem Grenzspannungswert V2 verglichen wird, bei dem der Betrieb des Haushaltsgeräts angehalten werden soll, wobei V2 kleiner

als V1 ist,

- Vergleichen der Netzspannung Vnetwork mit dem Grenzspannungswert V2, bei dem der Betrieb des Haushaltsgerät angehalten werden soll (104),

- Wenn in Schritt (104), in dem die gemessene Netzspannung Vnetwork mit V2 verglichen wird, festgestellt wird, dass $V_{\text{network}} > V2$, Anpassen der Anzeigeeinheit (2) auf einen Helligkeitswert P2 (105), wobei P2 kleiner ist als P1, und anschließend Zurückkehren zu Schritt (101), wobei die Netzspannung Vnetwork gemessen wird,

- Wenn in Schritt (104), in dem die gemessene Netzspannung Vnetwork mit V2 verglichen wird, festgestellt wird, dass $V_{\text{network}} < V2$, Anpassen der Anzeigeeinheit (2) auf eine Abdunklungsstufe (106), und anschließend Zurückkehren zu Schritt (101), wobei die Netzspannung Vnetwork gemessen wird,

7. Steuerverfahren nach Anspruch 6, **gekennzeichnet durch** das Anpassen der Anzeigeeinheit (2) auf den Helligkeitswert P1 (103), wobei das Intervallverhältnis der Ein-aus-Funktion der LED (11) zueinander etwa 1/50 beträgt.

8. Steuerverfahren nach Anspruch 6, **gekennzeichnet durch** das Anpassen der Anzeigeeinheit (2) auf den Helligkeitswert P2 (105), wobei das Intervallverhältnis der Ein-aus-Funktion der LED (11) zueinander etwa 1/100 beträgt.

Revendications

1. Un électroménager comprenant une unité d'affichage (2) qui a un écran d'affichage (9) qui est disposé à afficher des informations concernant l'électroménager et une ou plusieurs LEDs (11) qui sont disposées à éclairer l'écran d'affichage (9) en opérant de façon marche-arrêt à une fréquence que l'oeil humain ne peut pas détecter et une carte de commande (1), **caractérisé en ce que** la carte de commande (1) comprenant :

un circuit de mesure (13) adapté à mesurer la tension d'alimentation fournie à la carte de commande (1),

une mémoire (15) disposée à stocker les valeurs limites de fonctionnement, telles que les valeurs de tension qui sera comparé avec la tension d'alimentation mesurée, et

un microprocesseur (14) disposé à comparer les signaux reçus du circuit de mesure (13) avec les informations dans la mémoire (15) et à former des signaux de telle sorte que l'unité d'affi-

chage (2) est adaptée à un état assombri, si la tension d'alimentation mesurée est inférieure à une valeur de tension limitée, c'est-à-dire V2, à laquelle l'électroménager est arrêté.

ou de telle sorte que la luminosité de l'unité d'affichage (2) est réduite à une valeur de luminosité partielle, c'est-à-dire P2, si la tension d'alimentation mesurée est inférieure à une valeur de réseau limitée à laquelle les éléments de circuit électronique sont chauffés jusqu'à une valeur supérieure à la température normale, c'est-à-dire V1, où V2 est inférieure à V1,

ou, sinon, est augmentée à une valeur de luminosité normale, c'est-à-dire P1, P1 étant supérieure à P2.

2. Un électroménager selon la Revendication 1, **caractérisé par** le circuit de mesure (13) comprenant une ou plusieurs résistances (23) et une ou plusieurs diodes (24) qui sont adaptées à former un signal dirigé à basse fréquence et à demi-onde ou pleine onde qui est nécessaire afin que la tension d'alimentation puisse être mesurée par le microprocesseur (14).

3. Un électroménager selon la Revendication 1, **caractérisé en ce que** la carte de commande (1) comprend un circuit de commande d'affichage (12) qui est disposé à régler le fonctionnement de l'unité d'affichage (2).

4. Un électroménager selon la Revendication 1, **caractérisé en ce que** la carte de commande (1) comprend une ou plusieurs résistances (3) disposées à restreindre les courants électriques, une ou plusieurs diodes (4) disposées à diriger la résistance de réseau en demi-onde, un ou plusieurs condensateurs (5) disposés à filtrer les signaux qui sont dirigés en demi-onde afin de fournir le courant continu, un circuit d'alimentation (6) disposé à fournir le courant continu à la carte de commande (1) et l'unité d'affichage (2), un circuit d'entrée (7) disposé à transmettre les signaux qu'il reçoit des capteurs qui détectent les données sur la température, la lumière, le son, la position de l'interrupteur, qui doivent être détectées du produit et un circuit de sortie (8) qui permet une transmission contrôlée des haute et basse tension qui est nécessaire pour le fonctionnement des éléments, tels que le moteur, le ventilateur, le compresseur, l'appareil de chauffage, la lampe, qui doivent être contrôlés sur l'électroménager.

5. Un électroménager selon la Revendication 1, **caractérisé en ce que** la carte de commande (1) comprend une varistance (17) qui est adaptée à normaliser la haute tension d'alimentation.

6. Un procédé de commande pour un électroménager selon l'une quelconque des revendications précé-

dententes, comprenant les étapes de

- Démarrer l'électroménager (100),
 - Mesurer la tension d'alimentation fournie à la carte de commande (1), c'est-à-dire Vnetwork, par le microprocesseur (14) (101), 5
 - Comparer la tension d'alimentation mesurée Vnetwork avec la valeur d'alimentation limitée V1 à laquelle les éléments de circuit électronique sont chauffés jusqu'à une valeur supérieure à la température normale par le microprocesseur (14) (102), 10
 - Si il est constaté que Vnetwork > V1 à l'étape (102) où la tension d'alimentation mesurée Vnetwork est comparée avec V1, adapter l'unité d'affichage (2) à la valeur de luminosité P1 (103) et, par la suite retourner à l'étape (101) où la tension d'alimentation Vnetwork est mesurée, 15
 - Si il est constaté que Vnetwork < V1 à l'étape (102) où la tension d'alimentation mesurée Vnetwork est comparée avec V1, aller à l'étape (104) où la tension d'alimentation Vnetwork est comparée avec la valeur de tension limitée V2 à laquelle l'électroménager est arrêté, où V2 est inférieure à V1, 20
 - Comparer la tension d'alimentation Vnetwork avec la valeur de tension limitée V2 où l'électroménager est arrêté (104), 25
 - Si il est constaté que Vnetwork > V2 à l'étape (104) où la tension d'alimentation mesurée Vnetwork est comparée avec V2, adapter l'unité d'affichage (2) à la valeur de luminosité P2 (105), où P2 est inférieure à P1, et par la suite retourner à l'étape (101) où la tension d'alimentation Vnetwork est mesurée, 30
 - Si il est constaté que Vnetwork < V2 à l'étape (104) où la tension d'alimentation mesurée Vnetwork est comparée avec V2, adapter l'unité d'affichage (2) à un état assombri (106) et par la suite retourner à l'étape (101) où la tension d'alimentation Vnetwork est mesurée. 35
7. Un procédé de commande selon la Revendication 6, **caractérisé par** adapter l'unité d'affichage (2) à la valeur de luminosité P1 (103) où la proportion d'intervalle de fonction marche-arrêt de la LED (11) l'une à l'autre est environ 1/50. 45
8. Un procédé de commande selon la Revendication 6, **caractérisé par** adapter l'unité d'affichage (2) à la valeur de luminosité P2 (105) où la proportion d'intervalle de fonction marche-arrêt de la LED (11) l'une à l'autre est environ 1/100. 50

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Figure 1

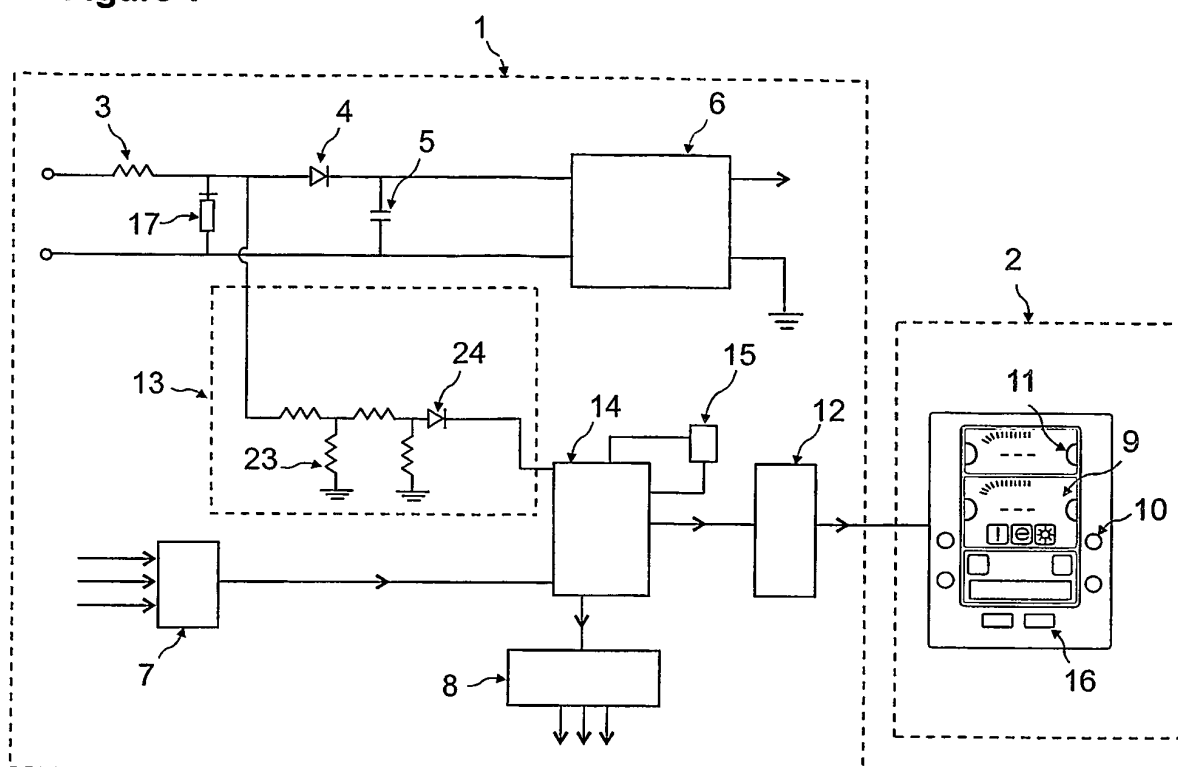
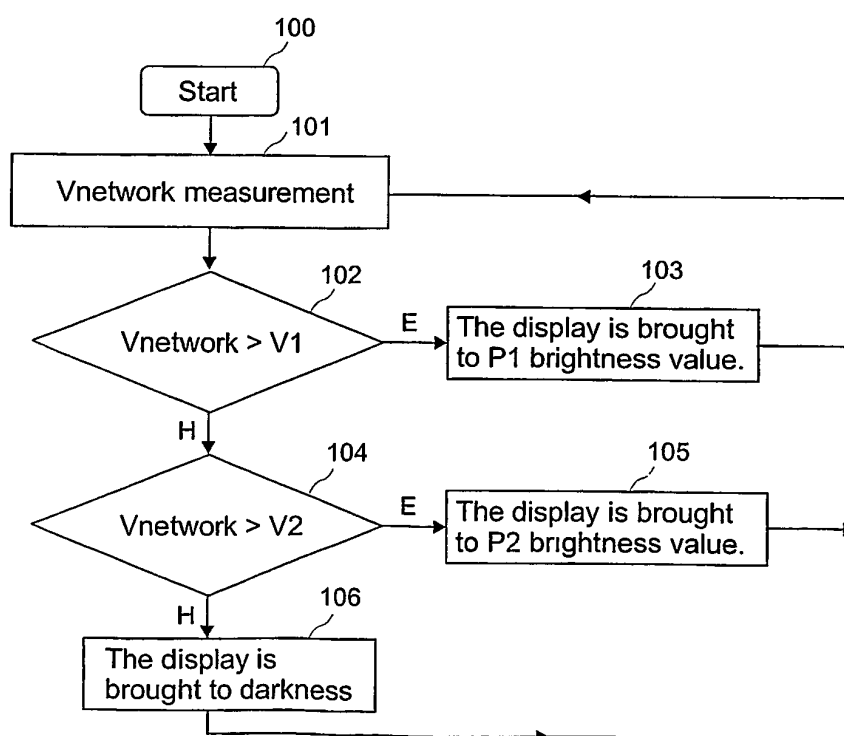


Figure 2



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 20022038553 A [0003]
- US 2003022699 A [0004]
- US 5745085 A [0005]
- US 6271813 B [0006]