(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
30 January 2003 (30.01.2003)

PCT

(10) International Publication Number
WO 03/008983 A2

(51) International Patent Classification[7]: G01R

(21) International Application Number: PCT/IN02/00152

(22) International Filing Date: 19 July 2002 (19.07.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
593/MAS/2001 20 July 2001 (20.07.2001) IN

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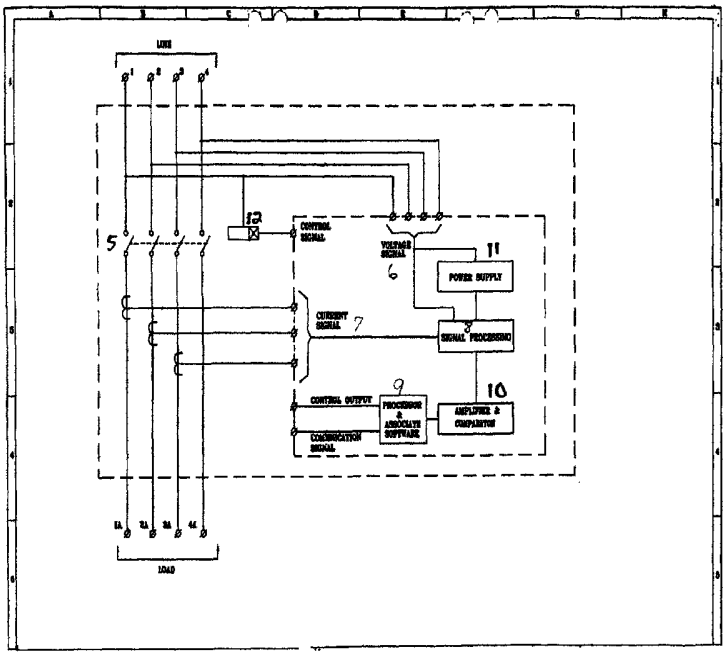
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: ENERGY CONSUMPTION CONTROL UNIT



(57) Abstract: Disclosed herein is an Energy Consumption Control Unit it, which is intended to limit it the consumption of electrical energy to a pre-determined value. Whenever the consumption exceeds the specified value beyond a pre-set time, the power supply to the load gets either disconected or a signal is initiated to take corrective action.

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This invention relates to an energy consumption control Unit which is intended to limit the Consumption of Electrical energy to a pre-determined value. Whenever the electric supply is present and the consumption of the connected load is within the specified limit, the load gets the supply. Whenever the consumption exceeds the specified value beyond a pre-set time, the power supply to the load gets disconnected automatically or a signal is initiated to take corrective action. The reconnection can be automatic, programmable or manual, as desired.

The device is more fully described hereunder:

Electricity is normally supplied by distributing Agencies or a Captive Power Source. For Technical and Commercial reasons, it is often necessary to limit the consumption to any particular load or to a particular consumer. The conventional method that is adopted is to measure the energy (metering) consumed by a load or measure the maximum demand which is the peak load consumed by any consumer. These measurements will provide information regarding consumption of energy by a consumer or load and help in arriving at the cost of consumption. The instruments do not limit the supply of energy to any consumer or load. Hence, the consumer or load can continue to draw power without any limit. The energy meters are normally located with in the consumer premises and

the instances of meter tampering and by-passing are not uncommon which will further aggravate the problem of system overloading and revenue loss to the supply companies.

The energy consumption control unit is a measuring and control/cut off device which checks the consumption to the connected load.

This invention will now be described with reference to the accompanying drawing. The supply of Electricity to a consumer or to a load is connected through the input terminal 1, 2, 3, 4 and through the contacts of an electrically operated disconnecting terminals 5 to terminals 1A, 2A, 3A & 4A to which load terminals will be connected. There will be two each input and output terminals for a single phase system, three each input and output terminals for 3 phase three wire system and four each input and output terminals for 3 phase four wire system. The disconnecting terminals 5 will receive the instruction through the cut off mechanism 12 provided in the control unit.

A voltage signal 6 from the input terminals and a current signal 7 from each of the phases is taken to the signal processing unit 8 for sensing. These signals are proportional to the consumption by the load.

A processor 9 with an embedded software measures the current or power consumption continuously. The processor 9 will be loaded with a set of software instructions such as allowable consumption, allowable excess consumption, allowable time for excess consumption, the nature of output signals to be provided in case of excess consumption, the manner and duration of disconnection of the load on extended excess power drawings from supply sources, the means of re-connection of the load, interruption data storage and data communication. An amplifier and comparator 10 is provided in between the signal processing unit 8 and the processor 9 to amplify the signals received from the processing unit 8. the entire unit is provided with a power supply unit 11. it may be noted that the amplifier and comparator unit can be an individual unit or it can be included in the processor itself.

The actual dynamic values of the consumption parameters are continuously compared to the stored instructions in the processor. Whenever a deviation is seen by way of excess consumption, the processor executes a programmed instruction.

This instruction could be for the execution of one or more of the following tasks:

(i) Full or Partial load disconnection;

(ii) Disconnection for a pre-determined duration;

(iii) Provide a warning signal of excess load;

(iv) Record data of excess load and duration with date and time stamping; and

(v) Provide a communication of excess load data through an appropriate link to a host computer for data logging of individual units and analysis where more than one consumption control units are connected in a supply network. Being a software based system, each device can have its own identity by a specific address code that helps remote monitoring and remote data exchange between a host computer and any specific device through any protocol, including unloading the data through a hand held device, or radio frequency signals.

The device can be used either as an individual piece of equipment or integrated in to a system.

As an individual unit it can be mounted on a pole top or with in a feeder pillar box in an overhead or under ground distribution system, providing supply to individual consumers. It can also be mounted with in the consumer premises or on a specific load. The unit can be put in to any suitable enclosure to make it scalable, tamper proof and weather proof.

On board flashing lamp in the event of supply cut off due to excess load can provide a visual alert.

When integrated with an energy measuring instrument or meter, it can check the energy consumption beyond a pre-determined peak load and initiate a cut off or warning signal. Similarly, when integrated and housed inside a distribution transformer in association with an electrically operated cut off device, it can continuously monitor the load on the distribution transformer and initiate partial or total disconnection of load to protect the transformer from burn-outs due to overload. On the same lines, the device can be integrated with any electrically operated load disconnecting devices such as contactors and breakers and turn them into self regulating switching equipments.

CLAIMS :

1. An energy consumption control unit comprising one or more-input terminals, signal receiver, inbuilt power supply unit, signal processor, comparators, amplifier, communication device, a switching device and output terminals and communication outputs, a processor with an embedded software to monitor:

i) Allowable consumption;

ii) Allowable excess consumption;

iii) Allowable time for excess consumption;

iv) The nature of output signals to be provided in case of excess consumption;

v) The manner and duration of disconnection of the load on extended excess power drawings from supply sources;

vi) The means of reconnection of the load; and

vii) Interruption data storage and data communication,

the said software compares one or more of the actual dynamic values of the consumption parameters continuously to the stored instructions and executes a set of instruction if a deviation is seen by way of excess consumption.

2. An energy consumption control unit as claimed in claim 1, wherein the instructions are for the execution of one or more of the following tasks:

i) Full or partial load disconnection;

ii) Disconnection for a pre-determined period of time;

iii) Provide a warning signal of excess load;

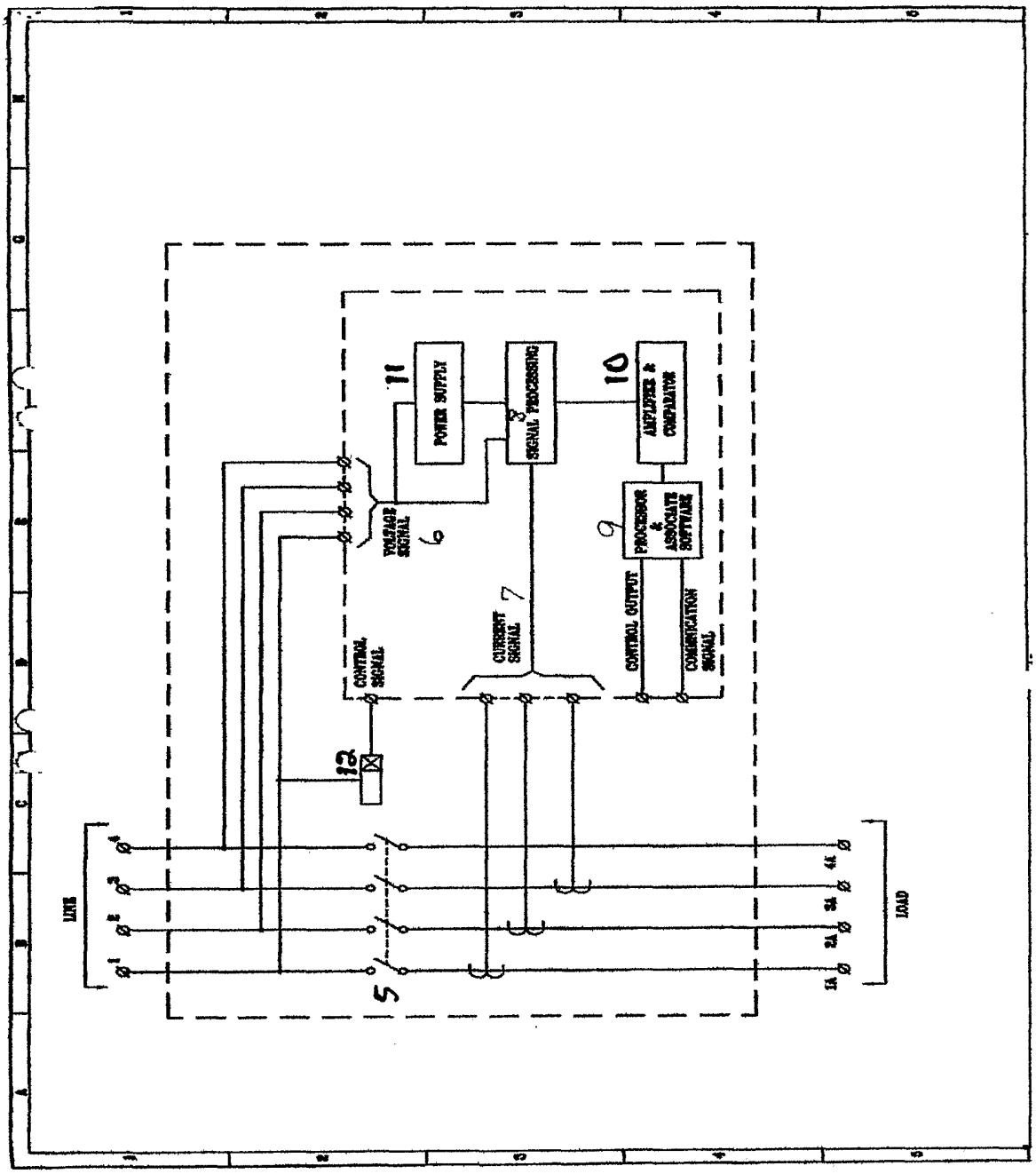
iv) Record data of excess load and duration with date and time stamping; and

v) Provide a communication of excess load data through an appropriate link to a host computer for data logging of individual units where more than one consumption control units are connected in a supply network.

3. An energy consumption control unit as claimed in claim 1 or 2 above which can communicate, warn or cut off supply to the load when the preset load limits are exceeded and which is either housed in its own enclosure or as a sub-system and which can be conveniently mounted on distribution pole, feeder box or directly on a load or at any point between the source of supply and ultimate load.

4. An energy consumption control unit as claimed in claim 1, 2 or 3, wherein a specific address code is allotted to each unit to enable remote monitoring and remote communication between a host computer and any specific device through appropriate communication protocols.

5. An energy consumption control unit as claimed in claims 1 to 4 wherein the said unit can also connected to or integrated with instruments and devices including energy meter, distribution transformer, and manually or electrically operated load disconnecting devices to make then automatically load responsive.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POWER SUPPLY
SIGNAL PROCESSING
10
AMPLIFIER & COMPARATOR
9
PROCESSOR & ASSOCIATE SOFTWARE
CONTROL OUTPUT
COMMUNICATION SIGNAL
VOLTAGE SIGNAL
6
CURRENT SIGNAL
7
CONTROL SIGNAL
12
LINE
LOAD
5