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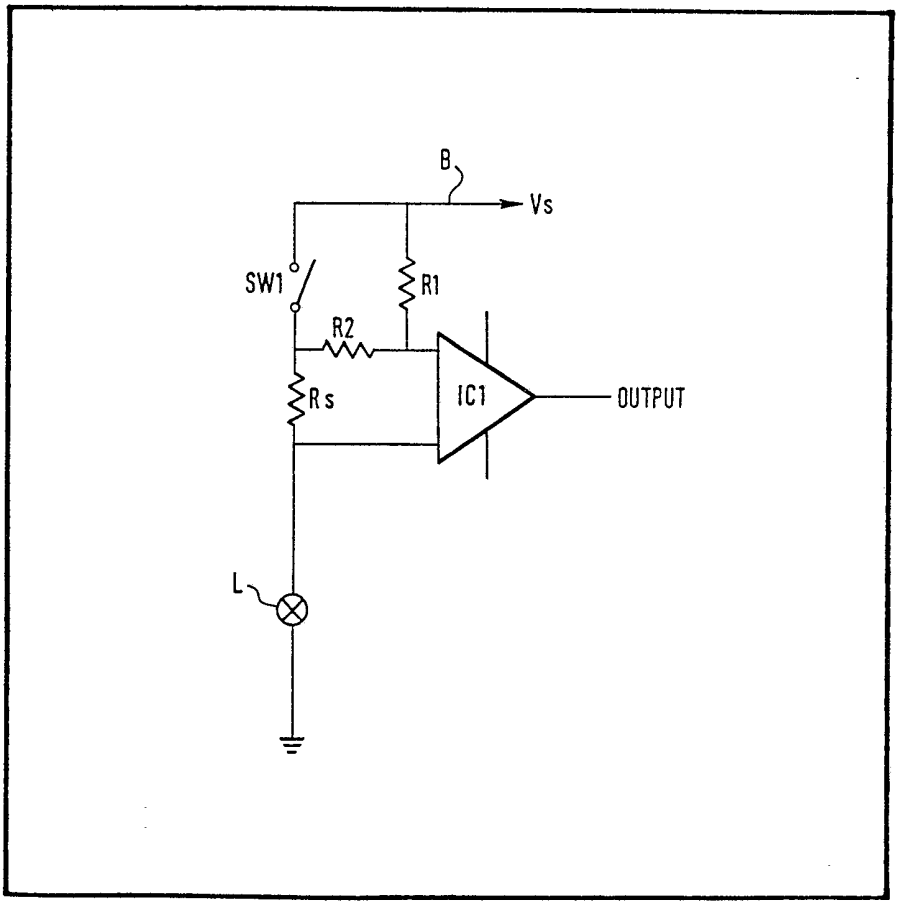
(71) Applicant
AB Electronic Components Limited, (United Kingdom), Abercynon, Mountain Ash, Mid-Glamorgan, CF45 4SF, Wales
(72) Inventors
Derek Morris Embrey, Stuart Frederick Webb, Graham John Legg
(74) Agent and/or address for service
Stanley Popplewell Poole, 57 Lincoln's Inn Fields, London, WC2A 3LS

(54) Lamp monitoring circuit

(57) In order to provide a circuit for monitoring the filament of a lamp L, both when the lamp is illuminated and when it is non-illuminated, a sensing resistance RS is connected in series with the lamp L. When lamp-energising switch S1 is closed this gives rise to a potential difference which can be sensed by an amplifier IC1. There are also provided additional resistances R1 and R2 so that when switch SW1 is open a reduced current flows through the lamp L and generates a potential difference across the augmented sensing resistance formed by resistances R2 and RS. This potential difference is similar to that developed across RS alone when SW1 is closed.



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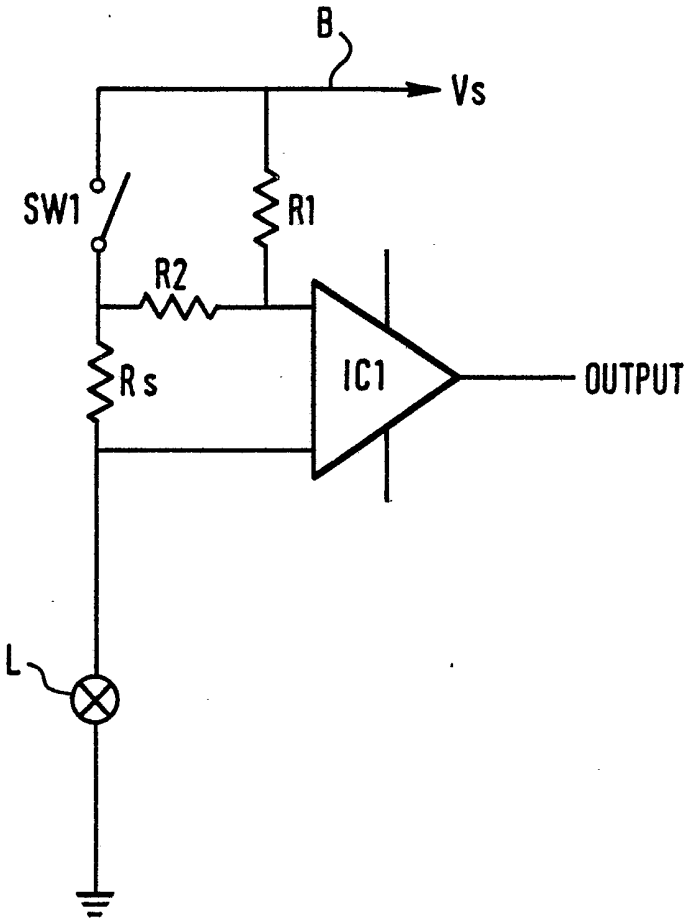

SPECIFICATION

Lamp monitoring circuit

This invention relates to lamp monitoring circuits, particularly for motor vehicles.

It is frequently not possible for a driver to know if a lamp has failed since the brightness of the light is insufficient for the difference in illumination to be detected from the driver's seat. This is particularly so in the case of side lights and rear lights.

Failure of a lamp such as a side light or a rear lamp can be potentially dangerous both to the driver and occupants of the vehicle and to other road users, and to drive with a failed mandatory light is illegal.

Systems have been designed that will warn the driver that there is a defective lamp when an attempt is made to switch them on. These are the so called "hot" sensing systems.

However, notice of failure only when a lamp has to be used is not wholly satisfactory, since, even if a spare bulb is available, the need for immediate replacement may be inconvenient.

It is much more convenient if the driver can be made aware of a lamp failure when the lamps are unilluminated, i.e. cold and also when they are illuminated, i.e. hot.

According to the present invention, there is provided a lamp monitoring circuit in which the lamp is in series with a sensing resistance so that lamp current generates a potential difference across the sensing resistance, and including means for sensing the presence of a potential difference of similar magnitude to that obtained when the lamp is operating normally, and additional resistances in series with the lamp and sensing resistance, when the lamp is not switched on to allow a sensing current to pass through the lamp to generate a potential difference across the sensing means of similar magnitude to that obtained across the sensing resistance when the lamp is operating normally.

The invention will be further described with reference to the accompanying drawing, of which the single figure is a circuit diagram of a preferred form of circuit in accordance with the invention.

Turning now to the single figure of drawing, the normal battery potential V_s is applied to the line B and the lamp is shown at L. A lamp switch contact is shown at SW1 and full battery potential is applied to the lamp L in series with a sensing resistor R_s. In normal operation, a potential appears across resistance R_s and this is sensed by an amplifier IC1 which gives an output. Should the lamp go open circuit, the potential across the sensing resistor R_s goes to zero and the output from the amplifier disappears. This phenomenon may be used to trigger a suitable visual and/or audible alarm circuit.

In order to provide for cold sensing, additional resistors R_1 and R_2 are provided so that a reduced and non-illuminating current passes through the lamp L. The values of the resistances R_1 and R_2 are chosen so as to limit the current, and therefore heat dissipation necessary, and also so that the potential difference developed across the augmented sensing resistor constituted by the resistors R_2 and R_s is substantially similar to that developed across the sensing resistor R_s alone when the switch SW1 is closed. This is achieved if R_2/R_1 equals R_s lamp resistance.

With switch SW1 open (lamp not illuminated) current will be drawn through R_1, R_2 and R_s and the lamp. This current will be applied to the inputs of the amplifier IC1. The potential difference will turn the amplifier on and an output is obtained. If the lamp should go open circuit the current will cease with the result that the two amplifier inputs will both be at the supply voltage Vs. With no potential difference to the inputs the amplifier will switch off and no output is obtained.

With switch SW1 closed (lamp on) the lamp current passes through the sensing resistor Rs and develops a potential difference.

This potential difference is applied to the inputs of the amplifier IC1 which is turned on and an output obtained. Should the lamp go open circuit the current will cease with the result that both inputs will be taken to Vs. This condition will turn the amplifier off and the output will cease.

Various modifications may be made within the scope of the invention.

Alternative moves of operation can be produced: (1) by causing the differential input of the amplifier IC1 to have a known offset; (2) by designing the supply system to have known potentials about a datum.

Claims

1. A lamp monitoring circuit in which the lamp is in series with a sensing resistance so that lamp current generates a potential difference across the sensing resistance, and including means for sensing the presence of a potential difference of similar magnitude to that obtained when the lamp is operating normally, and additional resistances in series with the lamp and sensing resistance, when the lamp is not switched on to allow a sensing current to pass through the lamp to generate a potential difference across the sensing means of similar magnitude to that obtained across the sensing resistance when the lamp is operating normally.

2. A lamp monitoring circuit as claimed in claim 1, wherein the additional resistances comprise one resistance in series with the sensing resistance across the sensing means and a further resistance.

3. A lamp monitoring circuit as claimed in claim 2, in which the ratio between the said one resistance and the said further resistance is substantially equal to the ratio between the sensing resistance and the normal lamp resistance.

4. A lamp monitoring circuit as claimed in any of the preceding claims, in which the detector means is an amplifier.

5. A lamp monitoring circuit substantially as hereinbefore described with reference to the accompanying drawing.

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