provides the same safety functionality that meets the relevant safety standard requirements but in a smaller package. It is against this background that the embodiments of the invention have been devised.

SUMMARY

According to a first example of the disclosure, there is provided a protection circuit for an electric appliance. The protection circuit is configured to control power supply to an associated electrical component of the appliance such as a heating device, lamp or motor in the event that unsafe conditions are detected such that continued power supply could be hazardous. The protection circuit comprises a first comparator module configured to compare an operating parameter input signal to a threshold value and to output a first control signal to a first switching circuit configured to control power flow to the associated electrical component. The first comparator module is configured to receive an enable/disable signal from a first state-change latching device, wherein the first state-change latching device is responsive to a state change of the first control signal from the first comparator module, in response to which the state-change latching device changes the enable/disable signal from an enable state to a disable state thereby to set the first control signal into an off state and thereby lock the appliance in a non-working safe state..

In one aspect, the present disclosure refers to a protection circuit for an electric appliance, comprising:

a first comparator module configured to compare an operating parameter input signal to a threshold value and to output a first control signal to a first switching circuit configured to control power flow to an associated electrical component,
wherein the first comparator module is configured to receive an enable/disable signal from a first state-change latching device,
wherein the first state-change latching device is responsive to a state change of the first control signal from the first comparator module, in response to which the state-change latching device changes the enable/disable signal from an enable state to a disable state thereby to set the first control signal into an off state and thereby lock the appliance in a non-working safe state.

Advantageously, the protection circuit provides a 100% hardware solution for a permanent electrical cut-out system as used in the appliance and as such the circuit does not make use of a conventional thermal fuse and, moreover, does not require the implementation of safety-critical software. It is worth emphasising that the protection circuit will still cut-out the system even after it is power cycled. The protection circuit of the disclosure therefore provides a particularly cost efficient and space efficient solution which is well suited to unconventional electrical appliances with smaller form factors.

A power cycle refers to the appliance being turned off and then on. In the event that the protection circuit is utilised, and the first control signal is set in an off state, when a user subsequently attempts to switch the appliance on it will not function as it is disabled and locked into the non-working state. There is the possibility of the appliance being serviced, the safety issue resolved and the servicing technician resetting the latch but this requires disassembly of the appliance.

In another example, the first comparator module may include a comparator that outputs the first control signal as a logic high state when the operating parameter input signal exceeds the threshold value, and wherein the threshold value may be provided by the enable/disable signal of the first state-change latching device when that signal is in an enable state.

Conveniently, the protection circuit may be configured to be fault tolerant so that any signal fault in the circuit results in the switch circuit failing to a safe state, thereby cutting power supply to the associated electronic component. As such, the protection circuit may further comprise a second comparator module configured to receive the operating parameter input signal and to compare operating parameter input signal to a threshold value and, in response, to output a second control signal to a second switching circuit configured to control power flow to the associated electrical appliance, wherein the second comparator module is configured to receive an enable/disable signal from a second state-change latching device. The second state-change latching device may also be responsive to a state change of the second control signal from the second comparator module, in response to which the second state-change latching device changes the enable/disable signal from an enable state to a disable state thereby to lock the second control signal into an off state.

Expressed in another way, the protection circuit comprises first and second circuit legs each of which functions in a very similar way to control power flow to the associated switch circuit.

The first switching circuit may be connected to a power control relay, and wherein the power control relay is connected to a power supply. Likewise, the second switching circuit may be connected to the power control relay. The power control relay may be configured to disable the power supply when one or both the first switching circuit and the second switching circuit operate to de-energise the relay

Within the scope of this application it is expressly intended that the various aspects, examples and alternatives set out in the preceding paragraphs, in the claims and/or in the following description and drawings, and in particular the individual features thereof, may be taken independently or in any combination. That is, all examples and/or features of any example can be combined in any way and/or combination, unless such features are incompatible. The applicant reserves the right to change any originally filed claim or file any new claim accordingly,