

What is claimed is:

1. A device configured for electrical connection with a load to control an output of the load, the device including:

circuitry for varying a conduction angle of an input AC supply voltage applied to the load;
 a current scanner for scanning at least one current form flowing through the load in response to the varying conduction angle of the input AC supply voltage applied to the load;
 a digital signal processing unit electrically coupled to the current scanner and the circuitry, the digital signal processing unit being configured for identifying an operational load type of the load by reference to a pattern indicative of a relationship between the scanned at least one current form and the varying conduction angle of the input AC supply voltage;
 wherein the digital signal processing unit is configured for applying at least one of a plurality of predetermined operational modes to control the output of the load based upon the identified operational load type of the load;

wherein the circuitry for varying the conduction angle of the input AC supply voltage is configured to vary the conduction angle by at least one of gradually increasing the conduction angle within a first predetermined conduction angle range, and, gradually decreasing the conduction angle within a second predetermined conduction angle range.

2. A device as claimed in claim 1 wherein the load includes at least one of a light emitting device, a fan and a space heater.

~~3. A device as claimed in claims 1 or 2 wherein the circuitry for varying the conduction angle of the input AC supply voltage is configured to vary the conduction angle by at least one of gradually increasing the conduction angle within a first predetermined conduction angle range, and, gradually decreasing the conduction angle within a second predetermined conduction angle range.~~

43. A device as claimed in claim 1 wherein the current scanner is configured to scan at least one of the following current forms:

- (a) an absolute current average;
- (b) a half-cycle current average;
- (c) a root mean square current; and
- (d) a current integration.

~~5~~4. A device as claimed in claim 1 wherein the digital signal processing unit is configured for identifying the operational load type of the load by reference to at least one feature of the pattern.

~~6~~5. A device as claimed in claim ~~5~~4 wherein the feature includes at least one of:

- (a) a turning point in the pattern;
- (b) a maximum slope in the pattern;
- (c) a minimum slope in the pattern;
- (d) a monotonic decrease in the pattern;
- (e) a monotonic increase in the pattern;
- (f) a local valley in the pattern; and
- (g) a peak in the pattern.

~~7~~6. A device as claimed in claim ~~6~~5 wherein, by reference to the at least one feature of the pattern, the digital signal processing unit is further configured for identifying at least one of:

- (a) a minimum kick-start conduction angle for enabling suitable start-up output of the load; and
- (b) a minimum portion of the conduction angle to be blocked in order to enable varying of the output of the load towards a relatively lower end output.

~~8~~7. A device as claimed in claim 1 wherein the operational load type of the load includes at least one of a linear load, a dimmable non-linear load, and a non-dimmable non-linear load,

~~9~~8. A device as claimed in claim 1 wherein the digital signal processing unit is configured to execute a pattern recognition algorithm for recognising the operational load type of the load.

~~10~~9. A device as claimed in claim 1 wherein the digital signal processing unit is configured for digitising the at least one scanned current form.

~~11~~10. A device as claimed in claim 1 wherein the digital signal processing unit is configured for normalising the at least one scanned current form.

~~12~~11. A device as claimed in claim 1 wherein the digital signal processing unit is configured for filtering noise from the at least one scanned current form.

~~13~~12. A device as claimed in claim ~~7~~6 wherein the predetermined operational modes include at least one of:

- (a) a linear operational mode for controlling operation of the load of a linear load type;
- (b) a dimmable non-linear operational mode for controlling operation of the load of a dimmable non-linear load type, said dimmable non-linear operational mode being configured for applying at least one of the minimum kick-start angle for enabling suitable start-up output of the load, and, the minimum portion of the conduction angle to be blocked in order to enable varying of the output of the load towards the relatively lower end output; and
- (c) a non-dimmable non-linear operational mode for controlling operation of the load of a non-dimmable non-linear load type.

~~14~~13. A device as claimed in claim 1 wherein at least one of the predetermined operational modes is configured for providing trailing-edge phase cut dimming of the input AC supply voltage in response to the load being resistive or capacitive, and, leading-edge phase cut dimming of the input AC supply voltage in response to the load being inductive.

~~15~~14. A device as claimed in claim ~~13~~12 wherein the non-dimmable non-linear operational mode is configured to provide switching on/off of the input AC supply voltage to the non-dimmable non-linear load.

~~16~~15. A device as claimed in claim ~~14~~13 wherein a dimming range is able to be set for the conduction angle between 0-180° for trailing-edge or leading edge phase cut dimming.

~~17~~16. A method for controlling an output of a load including the steps of:

- (i) scanning at least one current form flowing through the load in response to a varying conduction angle of an input AC supply voltage being applied to the load;
- (ii) identifying an operational load type of the load by reference to a pattern indicative of a relationship between the at least one scanned current form and the varied conduction angle of the input AC supply voltage; and
- (iii) applying at least one of a plurality of predetermined operational modes to control the output of the load based upon the identified operational load type of the load;

wherein the conduction angle of the input AC supply voltage is varied by at least one of gradually increasing the conduction angle within a first predetermined conduction angle range,

and, gradually decreasing the conduction angle within a second predetermined conduction angle range.

~~18~~17. A method as claimed in claim ~~17~~16 wherein the load includes at least one of a light emitting device, a fan and a space heater.

~~19. — A method as claimed in claims 17 or 18 wherein the conduction angle of the input AC supply voltage is varied by at least one of gradually increasing the conduction angle within a first predetermined conduction angle range, and, gradually decreasing the conduction angle within a second predetermined conduction angle range.~~

~~20~~18. A method as claimed in claim ~~17~~16 wherein at least one of the following current forms is scanned:

- (a) an absolute current average;
- (b) a half-cycle current average;
- (c) a root mean square current; and
- (d) a current integration.

~~21~~19. A method as claimed in claim ~~17~~16 wherein the operational load type of the load is identified by reference to at least one feature of the pattern.

~~22~~20. A method as claimed in claim ~~21~~19 wherein the feature includes at least one of:

- (a) a turning point in the pattern;
- (b) a maximum slope in the pattern;
- (c) a minimum slope in the pattern;
- (d) a monotonic decrease in the pattern;
- (e) a monotonic increase in the pattern;
- (f) a local valley in the pattern; and
- (g) a peak in the pattern.

~~23~~21. A method as claimed in claim ~~22~~20 wherein, by reference to the at least one feature of the pattern, at least one of following is identified:

- (a) a minimum kick-start conduction angle for enabling suitable start-up output of the load;
- and

(b) a minimum portion of the conduction angle to be blocked in order to enable dimming of the output of the load towards a relatively lower end output,

2422. A method as claimed in claim 1716 wherein the operational load type of the load includes at least one of a linear load, a dimmable non-linear load, and a non-dimmable- non-linear load.

2523. A method as claimed in claim 1716 wherein the operational load type of the load is identified by applying a pattern recognition algorithm.

2624. A method as claimed in claim 1716 wherein the at least one scanned current form is digitised.

2725. A method as claimed in claim 1716 wherein the at least one scanned current form is normalised.

2826. A method as claimed in claim 1716 wherein the at least one scanned current form is filtered to remove noise,

2927. A method as claimed in claim 2321 wherein the predetermined operational modes include at least one of:

- (a) a linear operational mode for controlling operation of the output of the load of a linear load type;
- (b) a dimmable non-linear operational mode for controlling operation of the output of the load of a dimmable non-linear load type, the dimmable non-linear operational mode being configured for providing at least one of the minimum kick-start conduction angle for enabling suitable start-up output of the load, and, the minimum portion of the conduction angle to be blocked in order to enable varying of the output of the load towards the relatively lower end output; and
- (c) a non-dimmable non-linear operational mode for controlling operation of the output of the load of a non-dimmable non-linear load type.

3028. A method as claimed in claim 1716 wherein at least one of the predetermined operational modes is configured for providing trailing-edge phase cut dimming of the input AC

supply voltage in response to the load being resistive or capacitive, and, leading-edge phase cut dimming of the input AC supply voltage in response to the load being inductive.

3129. A method as claimed in claim 2927 wherein the non-dimmable non-linear operational mode is configured to provide switching on/off of the input AC supply voltage to the non-dimmable non-linear load.

3230. A method as claimed in claim 3028 wherein a dimming range is able to be set for the conduction angle between 0-180° for trailing-edge or leading edge phase cut dimming.