

CLAIMS:

1. A personal care device drive unit, comprising
a main body (15);
a motor (16) arranged in the main body;
a connection (14) interface arranged on the main body, adapted to enable
5 connection of any selected one of a set of different functional units (12, 30, 32, 34) to the
main body so as to enable driving of a movable functional component of the selected one of
the set of different functional units by the motor;
a current sensor (18) for measuring at least one current parameter relating to
an electric current driving the motor; and
10 a controller (20) adapted to generate an output signal associated with the
selected one of the set of different functional units in dependence on a value of the at least
one current parameter measured by the current sensor;
characterized in that:
the personal care device drive unit further comprises a vibration sensor (19)
15 arranged in the main body for measuring at least one vibration parameter relating to a
vibration of the main body during driving of the selected one of the set of different functional
units when connected to the main body; and
the controller is adapted to generate the output signal associated with the
selected one of the set of different functional units in dependence on the value of the at least
20 one current parameter measured by the current sensor and a value of the at least one vibration
parameter measured by the vibration sensor.
2. A personal care device drive unit as claimed in claim 1, wherein:
the controller comprises a memory (40) adapted to store a plurality of data sets
25 (42);
each data set of the plurality of data sets is associated with a respective one of
the set of different functional units;
the controller is adapted to select a data set from the plurality of data sets in
dependence on the measured value of the at least one current parameter and the measured

value of the at least one vibration parameter, and to generate the output signal such that the output signal relates to the selected data set.

3. A personal care device drive unit as claimed in claim 1 or 2, further

5 comprising a speed feedback control system (70, 72, 74, 76) adapted to control a drive speed of the motor.

4. A personal care device drive unit as claimed in claim 3, wherein the speed feedback control system is adapted to implement speed control of the motor resulting in a

10 deviation of the drive speed of the motor of less than 1% from a target drive speed.

5. A personal care device drive unit as claimed in claim 4, wherein the speed feedback control system is adapted to generate a motor speed feedback signal from the

measured value of the at least one current parameter, and wherein the speed feedback control

15 system comprises a PI controller (72) for processing a difference between the motor speed feedback signal and the target drive speed.

6. A personal care device drive unit as claimed in any one of preceding claims, wherein the controller is adapted to:

20 start the motor with default motor drive characteristics; and

a predetermined time period after starting of the motor, generate the output signal associated with the selected one of the set of different functional units in dependence on the measured value of the at least one current parameter and the measured value of the at least one vibration parameter.

25

7. A personal care device drive unit as claimed in any one of preceding claims, wherein the output signal associated with the selected one of the set of different functional units is associated with predefined motor drive characteristics associated with the selected one of the set of different functional units.

30

8. A personal care device drive unit as claimed in any one of preceding claims, wherein the vibration sensor (19) comprises an accelerometer.

9. A personal care device drive unit as claimed in claim 8, wherein the at least one vibration parameter comprises one or both of a vibration frequency and a vibration amplitude.

5 10. A personal care device drive unit as claimed in 9, wherein the controller is adapted to determine whether a maximum vibration amplitude occurring within a predefined range of vibration frequencies is above a predefined threshold value.

11. A personal care system (10) comprising a personal care device drive unit as
10 claimed in any one of claims 1 to 10 and a set of different functional units each being releasably connectable to the connection interface of the main body of the personal care device drive unit and each comprising a movable functional component.

12. A personal care system as claimed in claim 11, wherein:
15 the set of different functional units comprises at least a first and a second functional unit, each comprising a functional component configured to perform a reciprocating motion, and at least a third and a fourth functional unit, each comprising a functional component configured to perform a rotating motion in a single direction;
the first and the second functional units are associated with the occurrence in
20 the main body of a maximum vibration amplitude above, respectively, a first and a second predefined threshold value in, respectively, mutually different first and second predefined ranges of vibration frequencies;
the third and fourth functional units are associated with the occurrence of a value of the at least one current parameter in, respectively, mutually different first and second
25 predefined ranges of the at least one current parameter;
the controller is adapted to generate, in a first step, an output signal associated with the first or the second functional unit when a maximum vibration amplitude occurring within, respectively, the first or the second predefined range of vibration frequencies is above, respectively, the first or the second predefined threshold value; and
30 the controller is adapted to generate, in a second step following the first step, an output signal associated with the third or the fourth functional unit when the value of the at least one current parameter is in, respectively, said first or said second predefined range of the at least one current parameter.

13. A personal care system as claimed in claim 12, wherein the set of different functional units comprises at least a rotary-type shaving unit, a reciprocating-type precision hair trimmer, a rotary-type facial brushing unit, and a reciprocating-type beard styler.

5 14. A personal care system as claimed in claim 11, wherein the set of different functional units comprises at least two of a shaving unit (12), a facial brushing unit (32), a beard styler (34) and a precision hair trimmer (30).

15. A method of controlling a functional unit connected to a main body of a
10 personal care system, the personal care system comprising said main body, a motor arranged in the main body, a set of different functional units each being releasably connectable to the main body and each comprising a movable functional component, and a connection interface arranged on the main body and adapted to enable connection of any selected one of the set of different functional units to the main body so as to enable driving of the movable functional
15 component thereof by the motor,

wherein the method comprises:

measuring at least one current parameter relating to an electric current driving the motor; and

performing an output function associated with the selected one of the
20 set of different functional units in dependence on a measured value of the at least one current parameter;
characterized in that:

the method further comprises measuring at least one vibration
parameter relating to a vibration of the main body during driving of the selected one of the
25 set of different functional units when connected to the main body; and

the output function associated with the selected one of the set of different functional units is performed in dependence on the measured value of the at least one current parameter and a measured value of the at least one vibration parameter.

30 16. A method as claimed in claim 15, further comprising controlling a drive speed of the motor with a deviation of less than 1% from a target drive speed.

17. A computer program comprising computer program code means which is adapted, when said program is run on a controller of a personal care device, to implement the method of claim 15 or 16.