CLAIMS

1. A breathing assistance apparatus comprising:

a humidifier configured to be pneumatically connected to a flow generator and to humidify the flow of gases generated by the flow generator, wherein the humidifier comprises a heater,

wherein the apparatus is configured to be connected to a conduit that conveys the flow of gases, wherein the conduit comprises a heater configured to heat the flow of gases within the conduit,

a battery, wherein the apparatus is configured to be powered by the battery or a mains power supply,

a controller configured to control the heater of the conduit and heater of the humidifier according to at least a first control scheme and a second control scheme,

wherein when the apparatus is powered by the battery the controller is configured to control the heater of the conduit and the heater of the humidifier according to a first control scheme, the first control scheme comprising controlling the heater of the conduit by analog control and providing the heater of the humidifier with a high frequency pulse-width modulation signal, and

wherein when the apparatus is powered by a mains power supply the controller is configured to control the heater of the conduit and the heater of the humidifier according to a second control scheme, the second control scheme comprising controlling the heater of the conduit by digital control by providing a pulse-width modulation signal and providing the heater of the humidifier with a low frequency pulse-width modulation signal, and

wherein the frequency of the high frequency pulse-width modulation signal is greater than the frequency of the low frequency pulse-width modulation signal.

2. The breathing assistance apparatus of claim 1, wherein the heater of the humidifier comprises a heater plate, and the heater plate is configured to heat a fluid in a humidification chamber to humidify the flow of gases, and wherein the heater of the humidifier comprises an electrically conductive heating element.

3. The breathing assistance apparatus of claim 1 or claim 2, wherein the heater of the conduit comprises a heater wire, wherein the heater wire is an electrically conductive heating element.

4. The breathing assistance apparatus of claim 3, wherein the heater wire is:

a) in a lumen of the conduit,
b) within the wall of the conduit
c) embedded in a wall of the conduit
d) embedded in a bead which forms the breathing conduit.
e) located on an external surface of the conduit

f) any combination of a)-e).

5. The breathing assistance apparatus of any one of claims 1 to 4, wherein the apparatus comprises a flow generator configured to generate the flow of gases.

6. The breathing assistance apparatus of any one of claims 1 to 5, wherein the apparatus is configured to detect whether the apparatus is operating on the battery or the mains power supply, wherein the apparatus is configured to operate on the battery where no mains power supply is detected.

7. The breathing assistance apparatus of any one of claims 1 to 6, wherein the apparatus is configured to operate on a battery based on an input from a user.

8. The breathing assistance apparatus of any one of claims 1 to 7, wherein the battery is located in the apparatus.

9. The breathing assistance apparatus of any one of claims 1 to 8, wherein the apparatus comprises at least one battery as part of a battery module.

10. The breathing assistance apparatus of any one of claims 1 to 9, wherein the battery is configured to be connectable and disconnectable from the apparatus.

11. The breathing assistance apparatus of any one of claims 1 to 10, wherein the apparatus comprises one or more supply rail capacitors.

12. The breathing assistance apparatus of claim 11, wherein the supply rail capacitors are configured to be located:

a) At an output of the battery
b) at an output of the mains power supply
c) at one or more of an output of the battery or an output of the mains power supply conversion circuits
d) any combination of a)-c).

13. The breathing assistance apparatus of any one of claims 1 to 12, wherein the apparatus comprises digital control circuitry configured to generate the pulse-width modulation signal for the heater of the conduit and/or the high frequency pulse-width modulation signal and/or the low frequency pulse-width modulation signal.

14. The breathing assistance apparatus of claim 13, wherein the digital control circuitry comprises one or more switching circuits.

15. The breathing assistance apparatus of claim 13 or claim 14, wherein the digital control circuity comprises one or more pulse-width modulation drivers.

16. The breathing assistance apparatus of any one of claims 13 to 15, wherein the digital control circuity comprises a pulse-width modulation driver for the heater of the humidifier configured to generate the high frequency pulse-width modulation signal and the low frequency pulse-width modulation signal.

17. The breathing assistance apparatus of any one of claims 13 to 16, wherein the digital control circuity comprises a heater of the conduit pulse-width modulation driver for the heater of the conduit configured to generate the pulse-width modulation signal.

18. The breathing assistance apparatus of any one of claims 13 to 17, wherein when the apparatus is controlling the heater of the conduit according to a first control scheme the heater of the conduit pulse-width modulation driver is disabled.

19. The breathing assistance apparatus of any one of claims 1 to 18, wherein the apparatus comprises a housing, and the flow generator and/or humidifier are located in the housing.

20. The breathing assistance apparatus of any one of claims 1 to 19, wherein the apparatus comprises a gases inlet and a gases outlet, wherein the conduit is configured to be connected to the gases outlet.