The claims defining the invention are as follows

1. A respiratory system for providing a flow of respiratory gases to a patient, the system comprising:

a flow modulator;

a controller configured to receive an input of a flow rate and a pressure of the flow of respiratory gases in the system, and configured to:

control the flow modulator to provide the flow of respiratory gases at a target flow rate to a patient; and

control the flow modulator to modulate the flow of respiratory gases to a target pressure when the pressure of the flow of respiratory gases in the system meets or exceeds a pressure threshold value corresponding to that target flow rate.

2. The respiratory system of claim 1, wherein the target pressure comprises the pressure threshold value corresponding to the target flow rate or a pressure threshold value corresponding to a flow rate less than the target flow rate, and/or

wherein the controller is configured to control the flow modulator to modulate the flow of respiratory gases to the target pressure when the flow rate of the flow of respiratory gases is less than the target flow rate, and/or

wherein the controller is configured to control the flow modulator to modulate the flow of respiratory gases to the target flow rate when the flow rate of the flow of respiratory gases is above the target flow rate, and/or

wherein the controller is configured to control the flow modulator to the target pressure when the pressure of the flow of respiratory gases exceeds the pressure threshold value corresponding to the target flow rate or a pressure threshold value corresponding to flow rates less than the target flow rate.

3. The respiratory system according to any one of the preceding claims, wherein when the system begins operation from an ‘off’ or dormant state, the controller is configured to monitor the flow rate of the flow of respiratory gases in the system and is configured to control the flow modulator to modulate the flow of respiratory gases to the target flow rate, and optionally wherein the target flow rate changes over time to increase from a current value to a flow rate set point.

4. The respiratory system according to any one of the preceding claims, wherein the target flow rate is a flow rate set point, and/or
wherein the flow rate set point is determined by a user of the respiratory system.

5. The respiratory system according to any one of the preceding claims, wherein the controller comprises a flow rate controller providing a flow rate control output and a pressure controller providing a pressure control output, wherein the control input to the flow modulator is the minimum of the flow rate control output and the pressure control output.

6. The respiratory system according to claim 5, wherein the flow modulator comprises a blower, and the flow rate control output and pressure control output comprise an angular velocity of the blower, and/or wherein the flow modulator comprises:

a proportional valve, and the flow rate control output and pressure control output comprise a size of a flow path restriction through the proportional valve, and/or

a flow generator configured to be controlled by the controller to modulate the flow of respiratory gases to a patient; and/or

a proportional valve configured to be controlled by the controller to modulate the flow of respiratory gases, and optionally wherein the flow generator comprises a blower configured to be controlled by the controller to generate the flow of respiratory gases.

7. The respiratory system according to any one of the preceding claims, wherein the controller is configured to receive a flow rate value indicative of flow rate of respiratory gases provided to the patient, and/or wherein the respiratory system comprises one or more flow rate sensors configured to sense a flow rate of the flow of respiratory gases in the system to the patient, and/or wherein the respiratory system comprises one or more pressure sensors configured to sense a pressure of the flow of respiratory gases in the system to the patient, and/or wherein the controller is further configured to receive an input indicative of the flow rate of the flow of respiratory gases in the system from the one or more flow rate sensors, and an input

indicative of the pressure of the flow of respiratory gases in the system from the one or more pressure sensors.

8. The respiratory system according to claim 7, wherein the controller is operable in a first control mode when the flow rate is above the target flow rate to control the flow rate to the target flow rate, and the controller is operable in a second control mode when the pressure of the flow of respiratory gases is above the pressure threshold value corresponding to the target flow rate or is above a or the pressure threshold value corresponding to a flow rate less than the target flow rate, to control the pressure to the target pressure.

9. The respiratory system according to any one of the preceding claims, further comprising a delivery conduit for providing a flow of gases from the flow modulator to a patient interface, wherein the patient interface is configured to deliver the flow of respiratory gases to the patient; and optionally,

wherein the patient interface comprises a gases delivery side arm in fluid communication with the delivery conduit, a manifold provided at an end of the gases delivery side arm, and one or more nasal elements extending from the manifold, the one or more nasal element configured to provide the flow of respiratory gases to one or more nares of the patient, wherein the gases delivery side member comprises a collapsible portion,

and further optionally wherein the collapsible portion is operable in a first configuration in which the collapsible portion is in a substantially open condition, and in a second configuration in which the collapsible portion is in a substantially closed condition, and/or

wherein the patient interface comprises a nasal cannula, optionally a non-sealing nasal cannula, and/or

wherein the delivery conduit further comprises a delivery circuit and a patient breathing circuit disposed between the delivery circuit and the patient interface, and wherein the patient breathing circuit is connected to the delivery circuit by an outlet connector.

10. The respiratory system according to any one of the preceding claims, wherein when the controller controls the flow modulator to the target pressure, flow to the patient is reduced to a reduced flow rate which is: about 15L/min or less; or about 10L/min or less; or about 10L/min; or about 5L/min to about 10L/min or less than about 5L/min or 0L/min and/or

wherein the controller is configured to control the flow modulator to increase the flow of respiratory gases towards the target flow rate.

11. The respiratory system according to any one of the preceding claims, comprising an Oxygen (O_2) pressure sensor configured to sense pressure in an O_2 delivery circuit of the respiratory system.

12. The respiratory system according to any one of the preceding claims, comprising an Oxygen (O_2) flow rate sensor configured to sense flow rate of a flow of O_2 in an or the O_2 delivery circuit of the respiratory system.

13. The respiratory system of claim 12 when dependent on claim 11, comprising a proportional valve disposed between the O_2 pressure sensor and the O_2 flow rate sensor in the O_2 delivery circuit.

14. The respiratory system of any one of claims 11 to 13, when dependent on claim 9, wherein the patient breathing circuit is connected to the O_2 delivery circuit and an air delivery circuit and the patient breathing circuit and/or the patient interface further comprises a patient pressure sensor and a patient flow rate sensor.

15. The respiratory system of claim 14, wherein the flow modulator comprises a blower, and the blower is disposed in the patient breathing circuit before the patient pressure sensor and the patient flow rate sensor.

16. The respiratory system of any one of the preceding claims, wherein the controller is in operative communication with, or comprises, a memory component

storing one or more of a function, a curve, a look up table or algorithm providing a relationship between the pressure threshold values and corresponding flow rates.

17. The respiratory system of claim 16, wherein the controller is configured to control the flow modulator to reduce the flow of respiratory gases by a variable rate of decrease, and/or

wherein the relationship between the pressure threshold values and corresponding flow rates may be represented by a pressure limit curve or function defining a curve having a sigmoidal shape, and/or

wherein the relationship between the pressure threshold values and corresponding flow rates comprises a first pressure region, a second pressure region, and a transition region disposed between the first pressure region and the second pressure region.

18. The respiratory system of claim 16, when dependent on claim 9, wherein the first pressure region corresponds to when the collapsible portion is substantially in the first configuration and the second region corresponds to when the collapsible portion is substantially in the second configuration, and optionally,

wherein the first pressure region comprises pressure threshold values offset from baseline pressure values by a first pressure margin and, the second pressure region comprises pressure threshold values offset from baseline pressure values by a second pressure margin, whereby the first pressure margin is greater than the second pressure margin, and optionally,

wherein the first and second margins provide an offset of the pressure threshold values in the first pressure region which is substantially parallel to an offset of the pressure threshold values in the second pressure region of the pressure limit curve, and the first pressure region and the second pressure region correspond to a minimum rate of change in the flow of respiratory gases.

19. A respiratory system of claim 16 or claim 17, wherein the gradient of the transition region of the pressure limit curve corresponds to a maximum rate of change in the flow of respiratory gases, and/or

wherein the transition region of the pressure limit curve is centred about a transition flow rate, and optionally

wherein the controller is configured to control the flow modulator to achieve a flow of respiratory gases at the maximum rate of change when the pressure and the corresponding flow rate is in the transition region of the pressure limit curve.

20. A respiratory system of any one of claims 17 to 19, wherein the first and the second pressure margins provide a margin for a temporary decrease in system pressure of the flow of respiratory gases from below the pressure threshold values without the controller controlling the flow modulator to increase the flow of respiratory gases.