

## CLAIMS

1. A device for enclosing a positive end valve (PEEP valve) and converting the PEEP valve to an inline valve for use in a differential multi-ventilation system, the device comprising:

a housing configured to enclose the PEEP valve, the housing including a ventilator-side arm, a pass-through arm and a patient-side arm, the pass-through arm permitting extension of the multi-ventilation system to add one or more patient circuits to the system.

2. The device of claim 1, wherein the ventilator-side arm and the pass-through arm are dimensioned for direct connection to each other such that the pass-through arm of a first device as recited in claim 1 is connectable to the ventilator-side arm of a second device, wherein the second device has the same features as the first device.

3. The device of claim 1 or 2, wherein the device is configured for use as an inspiratory inline valve, wherein the ventilator-side arm together with the pass-through arm are co-axial with a first conduit through the housing, the first conduit contiguous with a substantially perpendicular second conduit substantially centralized within the housing, the second conduit configured to connect to a valve port of the PEEP valve when the PEEP valve is installed in the device.

4. The device of claim 3, wherein the second conduit is isolated from the patient-side arm when the PEEP valve is installed in the device and the PEEP valve is closed, and wherein the second conduit permits gas flow to the patient-side arm when the PEEP valve is installed in the device and the PEEP valve is open.

5. The device of claim 1 or 2, wherein the device is configured for use as an expiratory inline valve, wherein the patient-side arm is contiguous with a substantially perpendicular second conduit substantially centralized within the housing, the second conduit configured to connect to a main sleeve of the PEEP valve when the PEEP valve is installed in the device.

6. The device of claim 5, wherein the second conduit is isolated from the ventilator-side arm and the pass-through arm when the PEEP valve is installed in the device and the PEEP valve is closed, and wherein the second conduit permits gas flow to the ventilator-side arm when the PEEP valve is installed in the device and the PEEP valve is open.

7. The device of any one of claims 1 to 6, wherein the housing is defined by a main opening and a cap is coupled to the body over the main opening, the cap having an inner structure configured to connect to a pressure adjustment head of the PEEP valve, thereby permitting the cap to control the pressure adjustment head of the PEEP valve.

8. The device of claim 7, wherein the inner structure of the cap is a sleeve dimensioned to couple to the pressure adjustment head of the PEEP valve when the PEEP valve is installed in the device.

9. The device of claim 7 or 8, wherein the cap is coupled to the housing by threading, wherein the threading permits adjustment of the pressure adjustment head of the PEEP valve.

10. The device of claim 9, wherein an outer sidewall of the housing includes markings indicating valve pressure, wherein positioning of an edge of the cap with respect to the markings indicates the valve pressure according to an extent of the threading.

11. The device of any one of claims 1 to 10, wherein an inner sidewall of the housing includes a PEEP-valve retaining element.

12. A set of devices for assembling and connecting inspiratory and expiratory inline valves to each other, the set comprising:

an inspiratory device as recited in claim 3 or 4 and further including: a first connector on the body of the inspiratory device;

an expiratory device as recited in claim 5 or 6 and further including: a second connector on the housing of the expiratory device;

wherein the first connector and the second connector are configured to connect to each other.

13. The set of devices of claim 12, wherein the housing of the inspiratory device includes a first visual indicator to indicate inspiration and the housing of the expiratory device includes a second visual indicator to indicate expiration.

14. A kit comprising the set of devices of claim 12 or 13, the kit further comprising instructions for assembling a differential multi-ventilator system using the set of devices.

15. The kit of claim 14, further comprising a plurality of PEEP valves.

16. A ventilator system comprising:

a ventilator and a set of inline valves formed from devices as recited in claim 12 having PEEP valves installed therein, wherein the ventilator-side arms of both the inspiratory device and the expiratory device are connected to the ventilator, the patient-side arms of both the inspiratory device and the expiratory device are connected to a first patient circuit, and a bypass conduit is connected between the pass-through arms of the inspiratory device and the expiratory device.

17. A differential multi-ventilator system comprising:

a ventilator and a first set of inline valves formed from devices as recited in claim 12 having PEEP valves installed therein, wherein the ventilator-side arms of both the inspiratory device and the expiratory device of the first set of inline valves are connected to the ventilator, and the patient-side arms of both the inspiratory device and the expiratory device of the first set of inline valves are connected to a first patient circuit;

a second set of inline valves formed from devices as recited in claim 12 having PEEP valves installed therein, the second set of inline valves connected to the first set of inline valves, wherein the pass-through arms of the inspiratory device and the expiratory device of the first set of inline valves are connected to the ventilator-side arms of the inspiratory device and the expiratory device of the second set of inline valves and the

patient-side arms of both the inspiratory device and the expiratory device of the second set of inline valves are connected to at least a second patient; and

a bypass conduit is connected between the pass-through arms of the second set of inline valves or connected between the pass-through arms of a final set of inline valves connected after the second set of devices.

18. A method for assembling a differential multi-ventilator system, the method comprising:

constructing a plurality of sets of inline valves by installing PEEP valves in a plurality of inspiratory devices and expiratory devices as recited in claim 12;

connecting a first set of inline valves of the plurality of inline valves to a ventilator via the ventilator-side arm of the inspiratory device and the ventilator-side arm of the expiratory device of the first set of devices and connecting a first patient circuit to the patient-side arms of the first set of inline valves;

connecting at least a second set of inline valves to the first set of inline valves by connecting the pass-through arm of the inspiratory device of the first set of inline valves to the ventilator-side arm of the second set of inline valves and connecting at least a second patient circuit to the patient-side arms of the second set of inline valves; thereby providing an extended set of inline valves; and

connecting a bypass conduit between the pass-through arms of a final set of inline valves in the extended set of inline valves.

19. The method of claim 18, wherein the extended set of inline valves includes, 2, 3, 4, 5 or 6 sets of inline valves.

20. The method of claim 18 or 19, wherein for each set of inline valves of the extended set of inline valves, the inspiratory device is connected to the expiratory device by making a connection between the first connector and the second connector.

21. The method of claim any one of claims 18 to 20, further comprising removing the bypass conduit from the final set of inline valves, connecting an additional set of inline

valves to the final set of inline valves and connecting the bypass conduit between the pass-through arms of the additional set of inline valves, thereby adding the additional set of inline valves to the extended set of inline valves.

22. The method of any one of claims 17 to 21, wherein the ventilator is retained in continuous operation and the first patient circuit continues to operate during the step of connecting at least a second set of inline valves.