

U.S. Patent No. 9,737,154 Claim Listing

No.	Limitation
Claim 1	
1p	A method for adjusting pressure within an air bed including an air chamber and a pump having a pump housing comprising:
1a	receiving a selection for a desired pressure setpoint for the air chamber;
1b	calculating a pressure target for the pump housing, wherein the pressure target for the pump housing is calculated based upon the desired pressure setpoint for the air chamber and a pressure adjustment factor;
1c	adjusting pressure within the air chamber until a pressure sensed within the pump housing is substantially equal to the pressure target;
1d	determining an actual chamber pressure within the air chamber;
1e	comparing the actual chamber pressure to the desired pressure setpoint to determine an adjustment factor error; and
1f	modifying the pressure adjustment factor based upon the adjustment factor error.
Claim 2	
2	The method of claim 1, wherein the pressure sensed within the pump housing is sensed simultaneously while adjusting pressure within the air chamber.
Claim 3	
3	The method of claim 1, wherein pressure is sensed with a pressure transducer.
Claim 4	
4	The method of claim 1, wherein the pressure target for the pump housing is a deflate pressure target for the pump housing.
Claim 5	
5	The method of claim 4, wherein the pressure adjustment factor is a multiplicative pressure adjustment factor.
Claim 6	
6	The method of claim 5, wherein the deflate pressure target for the pump housing is calculated by dividing the desired pressure setpoint for the air chamber by the multiplicative pressure

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	adjustment factor.
Claim 7	
7	The method of claim 1, wherein the pressure target for the pump housing is an inflate pressure target.
Claim 8	
8	The method of claim 7, wherein the pressure adjustment factor is an additive pressure adjustment factor.
Claim 9	
9	The method of claim 7, wherein the inflate pressure target for the pump housing is calculated by determining the sum of the desired pressure setpoint for the air chamber and the additive pressure adjustment factor.
Claim 10	
10a	The method of claim 1, wherein modifying the pressure adjustment factor based on the adjustment factor error creates a modified pressure adjustment factor, wherein the method further comprises:
10b	calculating a modified pressure target that is different than the desired pressure setpoint, wherein the modified pressure target is calculated based upon the desired pressure setpoint and the modified pressure adjustment factor; and
10c	adjusting pressure within the air chamber until the pressure sensed within the pump housing is substantially equal to the modified pressure target.
Claim 11	
11	The method of claim 1, wherein the pressure sensed within the pump housing is sensed in a manifold in the pump housing.
Claim 12	
12p	A method for adjusting pressure within an air bed having an air chamber, a pump, a pump manifold, and a tube extending between the air chamber and the pump manifold comprising:
12a	selecting a desired pressure setpoint for the air chamber;
12b	calculating a manifold pressure target,
12c	wherein the manifold pressure target is calculated based upon the desired pressure setpoint for the air chamber and a pressure adjustment factor,

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12d	wherein the manifold pressure target is calculated to approximate the desired pressure setpoint for the air chamber as modified by the pressure adjustment factor to account for differences between sensing pressure in the manifold and sensing pressure in the air chamber;
12e	sensing pressure within the pump manifold;
12f	adjusting pressure within the air chamber until the sensed manifold pressure is within an acceptable pressure target error range of the manifold pressure target;
12g	determining an actual chamber pressure within the air chamber;
12h	comparing the actual chamber pressure to the desired pressure setpoint for the air chamber to determine an adjustment factor error;
12i	modifying the pressure adjustment factor based upon the adjustment factor error to create a modified pressure adjustment factor configured to more accurately account for differences between sensing pressure in the manifold and sensing pressure in the air chamber; and
12j	storing the modified pressure adjustment factor in memory;
12k	calculating a modified manifold pressure target, wherein the modified manifold pressure target is calculated based upon the desired pressure setpoint for the air chamber and the modified pressure adjustment factor; and
12l	adjusting pressure within the air chamber until pressure sensed within the pump manifold is substantially equal to the modified manifold pressure target.
Claim 13	
13	The method of claim 12, wherein pressure is sensed with a pressure transducer.
Claim 14	
14	The method of claim 12, wherein the manifold pressure target is a manifold deflate pressure target that is different than a manifold inflate pressure target.
Claim 15	
15	The method of claim 14, wherein the manifold deflate pressure target is calculated by dividing the desired pressure setpoint for

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	the air chamber by a manifold deflate pressure adjustment factor.
Claim 16	
16	The method of claim 12, wherein the manifold pressure target is a manifold inflate pressure target that is different than a manifold deflate pressure target.
Claim 17	
17	The method of claim 16, wherein the manifold inflate pressure target is calculated by determining the sum of the desired pressure setpoint for the air chamber and a manifold inflate pressure adjustment factor.
Claim 18	
18p	A method for adjusting pressure within an air bed comprising:
18a	(a) providing an air bed, the air bed including an air chamber and a pump having a pump housing;
18b	(b) receiving a selection for a desired pressure setpoint for the air chamber;
18c	(c) calculating a pressure target for the pump housing that is different than the desired pressure setpoint for the air chamber, wherein the pressure target is calculated based upon the desired pressure setpoint for the air chamber and a pressure adjustment factor;
18d	(d) adjusting pressure within the air chamber until a pressure within the pump housing is substantially equal to the pressure target;
18e	(e) determining an actual chamber pressure within the air chamber;
18f	(f) comparing the actual chamber pressure within the air chamber to the desired pressure setpoint for the air chamber to determine an adjustment factor error;
18g	(g) calculating an updated pressure adjustment factor based upon the adjustment factor error; and
18h	(h) repeating steps (b)-(g) using the updated pressure adjustment factor in place of the pressure adjustment factor.
Claim 19	
19	The method of claim 18, wherein the pressure within the pump housing is a pressure within a manifold in the pump housing.

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Claim 20	
20p	A pressure adjustment system for an air bed comprising:
20a	an air chamber;
20b	a pump in fluid communication with the air chamber, the pump including a pump manifold and at least one valve;
20c	an input device adapted to receive a desired pressure setpoint selected by a user;
20d	a pressure sensing means adapted to monitor pressure within the pump manifold; and
20e	a control device operably connected to the input device and to the pressure sensing means,
20f	the control device having control logic that is programmed to determine a manifold pressure target that corresponds to and is different than the desired pressure setpoint,
20g	adjust pressure in the air chamber until a sensed pump manifold pressure is substantially equal to the manifold pressure target,
20h	determining an actual chamber pressure within the air chamber after adjusting pressure,
20i	determining an adjustment factor error as a function of a difference between the desired pressure setpoint and the actual chamber pressure within the air chamber after adjusting pressure,
20j	calculating a modified manifold pressure target that corresponds to and is different than the desired pressure setpoint as a function of the adjustment factor error, and
20k	subsequently adjusting pressure in the air chamber until the sensed pump manifold pressure is substantially equal to modified manifold pressure target in response to the input device receiving a selection of the desired pressure setpoint at a subsequent time.
Claim 21	
21	The pressure adjustment system of claim 20, wherein the pressure sensing means is a pressure transducer.
Claim 22	
22	The pressure adjustment system of claim 20, wherein the sensed pump manifold pressure is sensed by the pressure sensing means while adjusting pressure in the air chamber and the actual chamber pressure is determined via the pressure sensing means

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