



TOM THUMB RESUSCITATION UNIT (TT400 SERIES).

SERVICING MANUAL.



CE 0086



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This manual is intended to provide information to help qualified maintenance personnel service and repair the Tom Thumb Infant Resuscitation Units; TT460, TT480, TT490 & 490-15, TT495. General engineering knowledge and the ability to follow technical instructions are assumed, as are knowledge of oxygen flow rates and the characteristics of operational pressures.

The equipment needed to service the Tom Thumb is laid down in this Service manual. In addition, a calibrated “Manometer” will be required for test and calibration of the units.

Diagrammatic representations of disassembly and re-assembly are shown in this Service manual.

Servicing personnel must be aware of the potential clinical implications of incorrectly serviced equipment.



1. Introduction.

Service of the Tom Thumb Resuscitation Unit.

The Tom Thumb has been designed to require minimal service with very few replaceable items. The accuracy of the pressure gauge, adjustable valve and precision valve should be checked at least every 12 months or when the gauge at zero pressure reads outside the black band.

It is recommended that all hoses be checked every 3 months, for connections, damage and possible degrading and / or rupture of hose and coatings. The hoses should be replaced, regardless of condition, every 4 years (maximum).

It is recommended that all O-rings should be replaced every 2-3 years.

The adjustable valve has no user replaceable parts or parts that should suffer from wear; adjustment by the user is not recommended as specialist tools are required to dismantle and reset.

Setting of the adjustable valve pressure when carried out in accordance with the relevant procedure will ensure accuracy to ± 2 cmH₂O.

The precision valve is factory pre-set and sealed; adjustment by the user is not recommended as specialist tools are required to dismantle and reset.

The precision valve pressure may have been set at manufacture to 20, 30, 40 & 50 cmH₂O to a tolerance of ± 2 cmH₂O, dependent on customer requirements. Setting of the precision valve when carried out in accordance with the relevant procedure will ensure accuracy to ± 2 cmH₂O.

If the setting of either the adjustable valve or the precision valve is proven to be outside the required tolerance, the Tom Thumb should be returned to Viamed for servicing. Both valves require specialist tooling to dismantle and reset.

The Tom Thumb pressure gauge is accurate to ± 6 cmH₂O subject to a reading within the black band at zero pressure. If the gauge is removed, a single-use diamond copper washer, part no. 0330212, must be replaced.



Do not re-use the original “Diamond Copper Washer”.



2. TT460 Servicing.

Important: Use only “O₂ Compatible” grease during assembly of Tom Thumbs. Do not use or allow organic greases to enter the Tom Thumb. Ensure all parts are clean before assembly.

Equipment required. 14mm spanner, pick, isopropyl alcohol, kitchen tissue, adjustable spanner.
PTFE tape

Parts list.		
Qty.	Description.	Part No.
If req'd	Body block	0330200
1	Thick O ring – 3/32 section	0330213
3	Thin O ring – 1/16 section	0330214
If req'd	Flowmeter bolt	0330205
If req'd	Flowmeter	0320060
If req'd	Precision valve	0330210
If req'd	10mm outlet	0330208
If req'd	Details / serial no. Label	0390008
If req'd	“O ₂ Flow” label	0390013
If req'd	CE label	0390011
as req'd	“O ₂ Compatible” grease	0330220

Servicing.

1. Unscrew the 10mm inlet from the left hand face of the body block. Ensure the port, and threads, are free of foreign matter. Replace the thin O-ring (p/n 0330214) and refit the 10mm inlet.



2. Remove the precision valve. Ensure the port, and threads, are free of foreign matter. Remove the original PTFE tape / or the thin “O” Ring and replace with new tape or “O” Ring (p/n 0330214). Refit the precision valve into the upper left hand threaded hole.





3. Unscrew the flowmeter and remove the flowmeter bolt from the left hand non-threaded hole in the body block. Ensure the port and threads are free of foreign matter. Replace the thin O-ring (p/n 0330214) & Thick O-ring (p/n 0330213) and refit the flowmeter bolt and flowmeter.



Testing & Calibration: TT460.
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1. Check the TT460 for damage.
2. Set the Flowmeter to minimum (fully clockwise).
3. Connect the inlet hose to the oxygen supply at a pressure of 4 bar.
4. Connect the digital manometer (on 0-100.0 mbar range) to the Tom Thumb outlet.
5. Set the flowmeter to 15 Lpm.
6. Check all mechanical connections between parts for leaks; use Snoop fluid (p/n and check for bubbling).
7. Set up the precision valve: Ensure a reading on the digital manometer of 44.1 – 49.0 mbar. Record the digital manometer reading. If a valid reading cannot be obtained, slightly unscrew the precision valve adjustable screw and apply Loctite 272 (p/n 0330221) to the exposed threads. Screw into the precision valve body until flush. Cover the T piece adapter port. Carefully adjust the precision valve screw in quarter turns to achieve a reading on the digital manometer of 44.1 – 49.0 mbar (clockwise adjustment on precision valve screw to increase). Record the digital manometer reading on test sheet.
8. Turn the flowmeter to minimum. Disconnect from the oxygen supply and disconnect the manometer.
9. Clean the Tom Thumb with isopropyl alcohol.
10. Do not use the Tom Thumb until the thread lock has set.



3. 0310030 TT480 Servicing.

Important: Use only “O2 Compatible” grease during assembly of Tom Thumbs. Do not use or allow organic greases to enter the Tom Thumb. Ensure all parts are clean before assembly.

Equipment required. 14mm open ended spanner, pick, isopropyl alcohol, kitchen tissue, adjustable spanner, 3mm Allen key, PTFE tape, Viamed adjustable valve tool.

Parts list.		
Qty.	Description.	Part No.
If req'd	Body block	0330201
1	Diamond copper washer	0330212
If req'd	Pressure gauge	0330203
1	Thick O ring – 3/32 section	0330213
7	Thin O ring – 1/16 section	0330214
If req'd	Flowmeter bolt	0330205
If req'd	Flowmeter blocking bolt & nut	0330206
If req'd	Precision valve	0330210
If req'd	Blanking bolt	0330207
If req'd	Adjustable valve	0330211
If req'd	15mm outlet	0330219
If req'd	Details / serial no. label	0390008
If req'd	Spacer block	0330215
If req'd	Rail clamp	0330055
If req'd	M4x10mm hex drive bolts	0330216
If req'd	“Tom Thumb” label	0390009
If req'd	Adjustable valve label	0390010
If req'd	CE label	0390011
as req'd	“O2 Compatible” grease	0330220

Servicing.

1. Detach the rail clamp from the spacer block by removing the M4x10mm hex drive bolts.



2. Detach the spacer block from the body block by removing the M4x10mm hex drive bolts.





3. Unscrew the 15mm outlet from the threaded hole in the right face of the body block. Ensure the port, and threads, are free of foreign matter. Replace the thin O-ring (p/n 0330214) and refit the 15mm outlet.



4. Unscrew the blanking bolt from the right hand threaded hole in the bottom face of the body block. Ensure the port, and threads, are free of foreign matter. Replace the thin O-ring (p/n 0330214) and refit the blanking bolt.



5. Unscrew the 10mm inlet from the left hand face of the body block. Ensure the port, and threads, are free of foreign matter. Replace the thin O-ring (p/n 0330214) and refit the 10mm inlet.

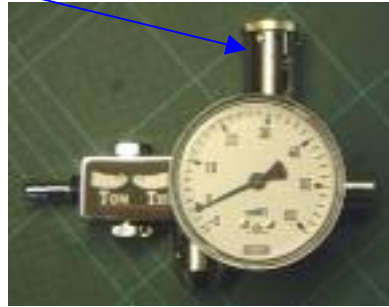


6. Unscrew and remove the precision valve. Ensure the port, and threads, are free of foreign matter. Remove the original PTFE tape / or the thin "O" Ring and replace with new tape or "O" Ring (p/n 0330214). Refit the precision valve into the centre bottom threaded hole.





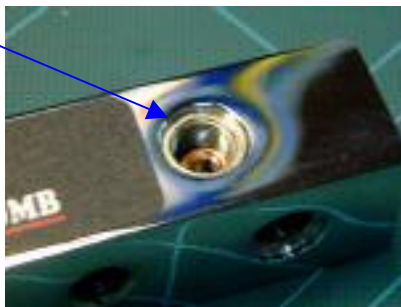
7. Unscrew the adjustable valve from the right hand threaded hole on the top face of the body block. Ensure the port, and threads, are free of foreign matter. Disassemble the adjustable valve and re-grease the valve seat and valve screw – (see Valve Servicing Manual). Replace the thin O-ring (p/n 0330214) and refit the adjustable valve.



8. Unscrew the Flowmeter blocking bolt and nut from the left hand non-threaded hole in the body block. Ensure the port, and threads, are free of foreign matter. Replace the thin O-rings (p/n 0330214), the refit the blocking bolt.



9. a). Unscrew the pressure gauge. b). Ensure the port, and threads, are free of foreign matter. c). Insert a **new** diamond copper washer into the single threaded hole on the label side of body block. d). Screw in the pressure gauge and use the 14mm open ended spanner to tighten; the gauge should appear straight in comparison to the block and not able to be removed without the aid of tools.



Testing & Calibration: TT480.

1. Check the TT480 for damage.
2. Set the adjustable valve to minimum (fully counter clockwise).
3. Connect the inlet to the oxygen supply at a pressure of 4 bar via the existing flowmeter.
4. Connect the digital manometer (on 0-100.0 mbar range) with T piece adapter to the Tom Thumb outlet.



5. Set the flow of oxygen to 15 Lpm.
6. Check all mechanical connections between parts for leaks; use Snoop fluid and check for bubbling.
7. Check for minimum pressure out: Cover the T piece adapter port. Check the TT pressure gauge is less than 5.0 cmH₂O. Check that the digital manometer reading is less than 4.9 mbar and record.
8. Set up the adjustable valve: Set the adjustable valve control to maximum. Cover the holes in the precision valve and the T piece adapter port. Alter the adjustable valve collar until a reading of 43 - 47 cmH₂O is achieved on the TT pressure gauge. Ensure a reading of 42.2 – 46.1 mbar on the digital manometer and record. Slightly unscrew the adjustable valve and apply Loctite 272 to the exposed threads. Retighten the adjustable valve with the adjustable spanner.



9. Check for TT pressure gauge sticking: Release and cover the T piece adapter port a number of times, ensuring that TT pressure gauge returns to 43 - 47 cmH₂O. Uncover the precision valve holes.
10. Set up the precision valve: Cover the holes in the adjustable valve and the T piece adapter port. Ensure a reading on the TT pressure gauge of 3.0 cmH₂O greater than the reading recorded at (8). Record the digital manometer reading. If a valid reading cannot be obtained, slightly unscrew the precision valve adjustable screw and apply Loctite 272 to the exposed threads. Screw into the precision valve body until flush. Cover the holes in the adjustable valve and the T piece adapter port. Carefully adjust the precision valve screw in quarter turns to achieve a reading on the TT pressure gauge of 3.0 cmH₂O greater than the reading recorded at (8) (Clockwise adjustment on precision valve screw to increase). Record the digital manometer reading.



11. TT pressure gauge accuracy check: Cover the T piece adapter port and increase the flow of gas to achieve a displayed reading of 50 cmH₂O on the TT pressure gauge. Ensure a reading of 48.0 – 52.0 mbar on the digital manometer and record.
12. Turn the flowmeter and adjustable valve to minimum. Disconnect from oxygen supply and disconnect the digital manometer.
13. Clean the Tom Thumb with isopropyl alcohol. Replace labels as necessary.
14. Attach the TT480 Instructions for Use card (p/n 0390006).



4. 0310031 TT490 / 0310033 TT490 (1m & 3m hoses) Servicing. 0310032 TT490-15 / 0310034 TT490-15 (1m & 3m hoses) Servicing.

Important: Use only “O₂ Compatible” grease during assembly of Tom Thumbs. Do not use or allow organic greases to enter the Tom Thumb. Ensure all parts are clean before assembly.

Equipment required. 14mm open-ended spanner, pick, isopropyl alcohol, kitchen tissue, adjustable spanner, PTFE tape, 3mm Allen key, Viamed adjustable valve tool.

Parts list.		
Qty.	Description.	Part No.
If req'd	Body block	0330201
1	Diamond copper washer	0330212
If req'd	Pressure gauge	0330203
1	Thick O ring – 3/32 section	0330213
6	Thin O ring – 1/16 section	0330214
If req'd	Flowmeter bolt	0330205
If req'd	Flowmeter (5 Lpm for TT490) or Flowmeter (15 Lpm for TT490-15)	0320060
If req'd	Precision valve	0330210
If req'd	Blanking bolt	0330207
If req'd	Adjustable valve	0330211
If req'd	15mm outlet	0330209
If req'd	Details / serial no. label	0390008
If req'd	Inlet hose right angle adapter	0330219
If req'd	Inlet hose (1m) Inlet hose (3m)	0330217 or 0330218
If req'd	Spacer block	0330215
If req'd	Rail Clamp	0330055
If req'd	M4x10mm hex drive bolts	0330216
If req'd	“Tom Thumb” label	0390009
If req'd	Flowmeter label	0390012
If req'd	Adjustable valve label	0390010
If req'd	CE label	0390011
as req'd	O ₂ Compatible grease	0330220

Servicing.

1. Detach rail clamp from the spacer block.





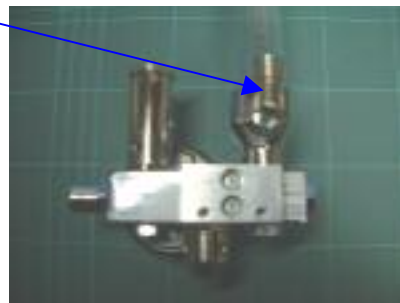
2. Detach the spacer block from the body block.



3. Unscrew the 15mm outlet from the threaded hole in the right face of the body block. Ensure the port, and threads, are free of foreign matter. Replace the thin O-ring (p/n 0330214) and refit the 15mm outlet.



4. Unscrew the hose from the right angle adapter and the right angle adapter from the flowmeter. Remove the original PTFE tape from the right angle adapter, rewind with 2 complete layers of new PTFE tape and refit the adapter into the flowmeter.



5. Unscrew the adjustable valve from the right hand threaded hole on the top face of the body block. Ensure the port, and threads, are free of foreign matter. Disassemble the adjustable valve and regrease the valve seat and valve screw. Replace the thin O-ring (p/n 0330214) and refit the valve.

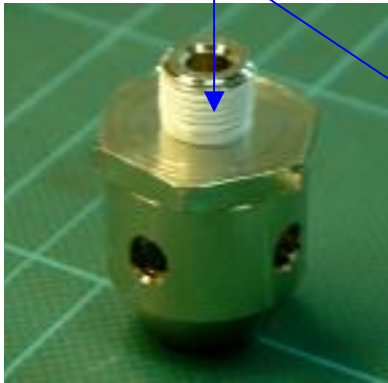




6. Unscrew the blanking bolts from the threaded left side hole and remaining threaded hole on the bottom face of the body block respectively. Ensure the ports, and threads, are free of foreign matter. Replace the thin O-rings (p/n 0330214) on the blanking bolts and refit into the body block.



7. Remove the precision valve. Ensure the port, and threads, are free of foreign matter. Remove the original PTFE tape / or the thin "O" Ring and replace with new tape or "O" Ring (p/n 0330214). Refit the precision valve into the centre bottom threaded hole.

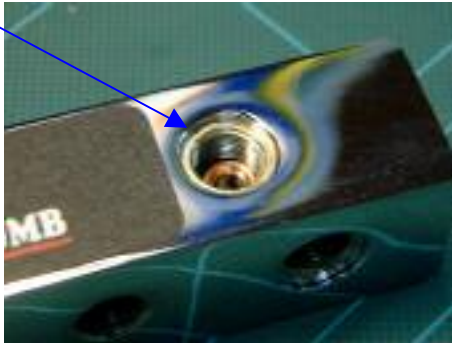


8. Unscrew the Flowmeter and remove the flowmeter bolt from the right hand non-threaded hole in the body block. Ensure the port, and threads, are free of foreign matter. Replace the thin O-ring (p/n 0330214) & thick O-ring (p/n 0330213) and refit the flowmeter bolt and flowmeter.





9. a). Unscrew the pressure gauge. b). Ensure the port and threads are free of foreign matter. c). Insert a new diamond copper washer into the single threaded hole on the label side of body block. d). Screw in the pressure gauge and use the 14mm open ended spanner to tighten; the gauge should appear straight in comparison to the block and not able to be removed without the aid of tools.



10. Attach the spacer block to the body block.



11. Attach rail clamp to the spacer block.



12. Remove the original PTFE from the inlet hose threads and right angle adapter. Line the thread of the inlet hose with two complete layers of new PTFE tape and refit the hose into the inlet hose right angle adapter using 12mm open-ended spanner ensuring it is tight.





Testing & Calibration: TT490 & TT490-15.

1. Check the TT490 / TT490-15 for damage.
2. Set the adjustable valve to minimum (fully counter clockwise) and the flowmeter to minimum (fully clockwise).
3. Connect the inlet hose to the oxygen supply at a pressure of 4 bar.
4. Connect the digital manometer (on 0-100.0 mbar range) with T piece adapter to the Tom Thumb outlet.
5. Set the flow meter to 5 Lpm (TT490) or 15 Lpm (TT490-15).
6. Check all mechanical connections between parts for leaks; use Snoop fluid and check for bubbling.
7. Check for minimum pressure out: Cover the T piece adapter port. Check the TT pressure gauge is less than 5.0 cmH₂O. Check that the digital manometer reading is less than 4.9 mbar and record.
8. Set up the adjustable valve: Set the adjustable valve control to maximum. Cover the holes in the precision valve and the T piece adapter port. Alter the adjustable valve collar until a reading of 43 - 47 cmH₂O is achieved on the TT pressure gauge. Ensure a reading of 42.2 – 46.1 mbar on the digital manometer and record. Slightly unscrew the adjustable valve and apply Loctite 272 to the exposed threads. Retighten the adjustable valve with the adjustable spanner.



9. Check for TT pressure gauge sticking: Release and cover the T piece adapter port a number of times, ensuring that TT pressure gauge returns to 43 - 47 cmH₂O. Uncover the precision valve holes.
10. Set up the precision valve: Cover the holes in the adjustable valve and the T piece adapter port. Ensure a reading on the TT pressure gauge of 3.0 cmH₂O greater than the reading recorded at (8). Record the digital manometer reading. If a valid reading cannot be obtained, slightly unscrew the precision valve adjustable screw and apply Loctite 272 to the exposed threads. Screw into the precision valve body until flush. Cover the holes in the adjustable valve and the T piece adapter port. Carefully adjust the precision valve screw in quarter turns to achieve a reading on the TT pressure gauge of 3.0 cmH₂O greater than the reading recorded at (8) (Clockwise adjustment on precision valve screw to increase). Record the digital manometer reading.





11. TT pressure gauge accuracy check: Cover the T piece adapter port and increase the flow of gas to achieve a displayed reading of 50 cmH₂O on the TT pressure gauge. Ensure a reading of 48.0 – 52.0 mbar on the digital manometer and record.
12. Turn the Flowmeter and adjustable valve to minimum. Disconnect from oxygen supply and disconnect the digital manometer.
13. Clean the Tom Thumb with isopropyl alcohol.
14. Attach the TT490 / TT490-15 Instructions for Use card (p/n 0390007).



5. TT495 Servicing.

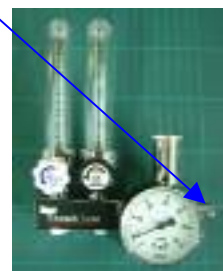
Important: Use only “O2 Compatible” grease during assembly of Tom Thumbs. Do not use or allow organic greases to enter the Tom Thumb. Ensure all parts are clean before assembly.

Equipment required. 14mm open ended spanner, pick, isopropyl alcohol, kitchen tissue, adjustable spanner, PTFE tape, 3mm Allen key.

Parts list.		
Qty.	Description.	Part No.
If req'd	Body block	0330202
1	Diamond copper washer	0330212
If req'd	Pressure gauge	0330203
2	Thick O ring – 3/32 section	0330213
5	Thin O ring – 1/16 section	0330214
If req'd	Flowmeter bolt	0330205
If req'd	Flowmeter (15 Lpm, oxygen)	0320060
If req'd	Flowmeter (15 Lpm, air)	0330204
If req'd	Precision valve	0330210
If req'd	Adjustable valve	0330211
If req'd	15mm outlet	0330219
If req'd	Details / serial no. label	0390008
If req'd	“Thumb Vent” label	0390014
If req'd	Adjustable valve label	0390010
as req'd	O2 Compatible grease	0330220
If req'd	CE label	0390011

Servicing.

1. Unscrew the 15mm outlet from the threaded hole in the right face of the body block. Ensure the port and threads are free of foreign matter. Replace the thin O-ring (p/n 0330214) and refit the 15mm outlet.



2. Unscrew the adjustable valve from the right hand threaded hole on the top face of the body block. Ensure the port, and threads, are free of foreign matter. Disassemble the adjustable valve and re-grease the valve seat and valve screw. Replace the thin O-ring (p/n 0330214) and refit the valve.





3. Remove the precision valve. Ensure the port, and threads, are free of foreign matter. Remove the original PTFE tape / or the thin "O" Ring and replace with new tape or "O" Ring (p/n 0330214) and refit the precision valve into the centre bottom threaded hole.



4. Unscrew the oxygen flowmeter and remove the flowmeter bolt from the left hand non-threaded hole in the body block. Ensure the port, and threads, are free of foreign matter.



5. Unscrew the air flowmeter and remove the flowmeter bolt from the right hand non-threaded hole in the body block. Ensure the port, and threads, are free of foreign matter. Replace the thin O-ring (p/n 0330214) & thick O ring (p/n 0330213) on the Flowmeter bolt and refit the flowmeter bolt and Flowmeter.

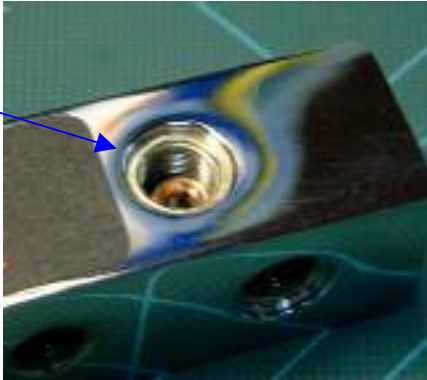


6. Refit the oxygen flowmeter into the left hand non-threaded hole.





7. a). Unscrew the pressure gauge. b). Ensure the port, and threads, are free of foreign matter. c). Insert a new diamond copper washer into the single threaded hole on the label side of body block. d). Screw in the pressure gauge and use the 14mm open ended spanner to tighten; the gauge should appear straight in comparison to the block and not able to be removed without the aid of tools.



Testing & Calibration: TT495.
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1. Check the TT495 for damage.
2. Set the adjustable valve to minimum (fully counter clockwise) and flowmeters to minimum (fully clockwise).
3. Connect the digital manometer (on 0-100.0 mbar range) with T piece adapter to the Tom Thumb outlet.
4. Connect the air flowmeter to the oxygen supply at a pressure of 4 bar.
5. Set the air flow meter to 15 Lpm.
6. Check all mechanical connections between parts for leaks; use Snoop fluid and check for bubbling.
7. Disconnect the air flowmeter from the oxygen supply.
8. Connect the oxygen flowmeter to the oxygen supply at a pressure of 4 bar.
9. Set the oxygen flow meter to 15 Lpm.
10. Check all mechanical connections between parts for leaks; use Snoop fluid and check for bubbling.
11. Check for minimum pressure out: Cover the T piece adapter port. Check the TT pressure gauge is less than 7.0 cmH₂O. Check that the digital manometer reading is less than 6.8 mbar and record.
12. Set up the adjustable valve: Set the adjustable valve control to maximum. Cover the holes in the precision valve and the T piece adapter port. Alter the adjustable valve collar until a reading of 43 - 47 cmH₂O is achieved on the TT pressure gauge. Ensure a reading of 42.2 – 46.1 mbar on the digital manometer and record. Slightly unscrew the adjustable valve and apply Loctite 272 to the exposed threads. Retighten the adjustable valve with the adjustable spanner.



13. Check for TT pressure gauge sticking: Release and cover the T piece adapter port a number of times, ensuring that TT pressure gauge returns to 43 - 47 cmH₂O. Uncover the precision valve holes.
14. Set up the precision valve: Cover the holes in the adjustable valve and the T piece adapter port. Ensure a reading on the TT pressure gauge of 3.0 cmH₂O greater than the reading recorded at (12). Record the digital manometer reading. If a valid reading cannot be obtained, slightly unscrew the precision valve adjustable screw and apply Loctite 272 to the exposed threads. Screw into the precision valve body until flush. Cover the holes in the adjustable valve and the T piece adapter port. Carefully adjust the precision valve screw in quarter turns to achieve a reading on the TT pressure gauge of 3.0 cmH₂O greater than the reading recorded at (12) (Clockwise adjustment on precision valve screw to increase). Record the digital manometer reading.



15. TT pressure gauge accuracy check: Cover the T piece adapter port and increase the flow of gas to achieve a displayed reading of 50 cmH₂O on the TT pressure gauge. Ensure a reading of 48.0 – 52.0 mbar on the digital manometer and record.
16. Check oxygen flowmeter accuracy: Connect the master flowmeter between the oxygen supply and the Tom Thumb oxygen flowmeter. Adjust the Tom Thumb oxygen flowmeter to 10 Lpm. Ensure a flow rate on the master flowmeter of 10 ± 1 Lpm. Record this reading. Disconnect the master flowmeter.
17. Check air flowmeter accuracy: Connect the master flowmeter between the oxygen supply and the Tom Thumb air flowmeter. Adjust the Tom Thumb air flowmeter to 10 Lpm. Ensure a flow rate on the master flowmeter of 10 ± 1 Lpm. Record this reading. Disconnect the master flowmeter.
18. Turn the flowmeters and adjustable valve to minimum and disconnect the digital manometer.
19. Clean the Tom Thumb with isopropyl alcohol.