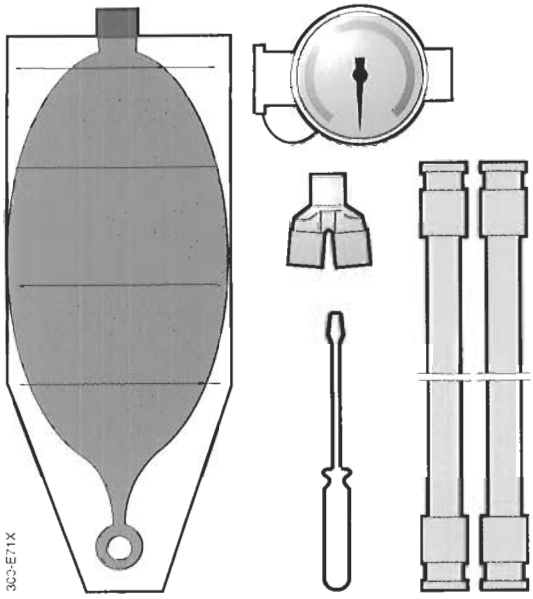
Contents

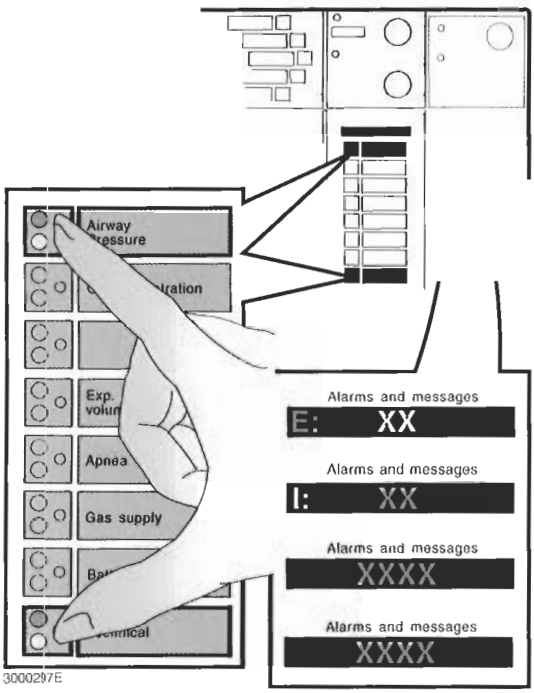
The maximum time interval between calibrations is 3000 hours of operation. If any malfunction is detected during the calibration procedure, the ventilator shall not be connected to patient before remedy of malfunction. The malfunction shall be remedied by local technical staff trained by Siemens or a service technician from Siemens.
In the Servo Ventilator 300/SV 300A flow measurements and all preset and indicated volumes are referenced to standard pressure (1013 mbar, 760 mm Hg).

For those who do not have access to tubings and other accessories for adults a Neonatal kit, P/N 64 06 487 E380E, is available. The kit includes an alternative Operating Manual with Pre-use check, Calibration and Function check adapted for neonatal use.



Equipment

- Calibration manometer.
- Screwdriver.
- 2 patient tubes, adult.
- Y-piece.
- Test lung. Only a Siemens test lung shall be used.
- Gas supply: Air and oxygen.



Use of touchpads

To get information on the "Alarms and messages" display during calibration, use the touchpads as follows:

Put fingers **simultaneously** on the "Airway pressure" and "Technical" touchpads.

E: display mode

First touch gives the E: display mode where the pressure at the expiratory pressure transducer is shown.

I: display mode

Second touch gives the I: display mode where the pressure at the inspiratory pressure transducer is shown.

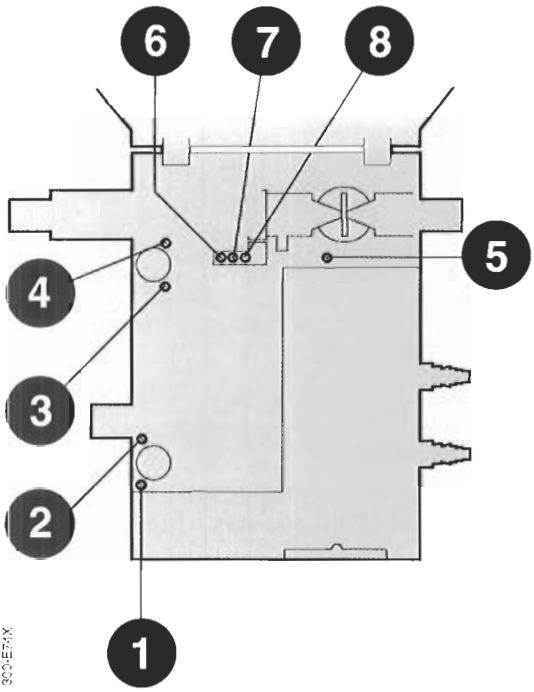
Barometer display mode

Third touch gives the Barometer display mode where the internally measured barometric pressure in mbar or mm Hg is shown.

Selection of the displayed unit (mbar or mm Hg) is described in the Service Manual, chapter Adjustments.

Normal display mode

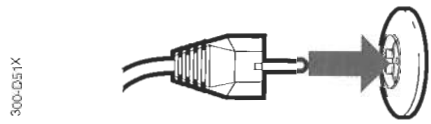
Fourth touch brings back normal display mode. Normal display mode will also automatically be back after one minute.



Trimmer location

1. Inspiratory pressure transducer, zero (P_{insp} →○←).
2. Inspiratory pressure transducer, gain (P_{insp} ◁).
3. Expiratory pressure transducer, gain (P_{exp} ◁).
4. Expiratory pressure transducer, zero (P_{exp} →○←).
5. O_2 % gain, (O_2 % ◁).
6. Expiratory flow transducer, gain (V_{exp} ◁).
7. Expiratory flow transducer balance, (V_{exp} ☼).
8. Light emitting diode.

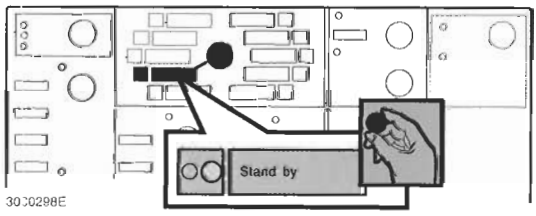
Each trimmer is protected by a plastic cover. Lift the cover to get access to the trimmer.



Preparations

- Connect the ventilator to mains.

Note! Do not connect patient tubes or gas supply to the ventilator.

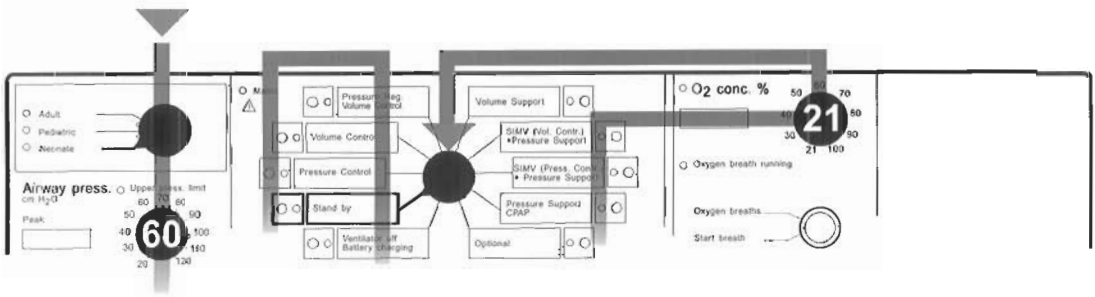


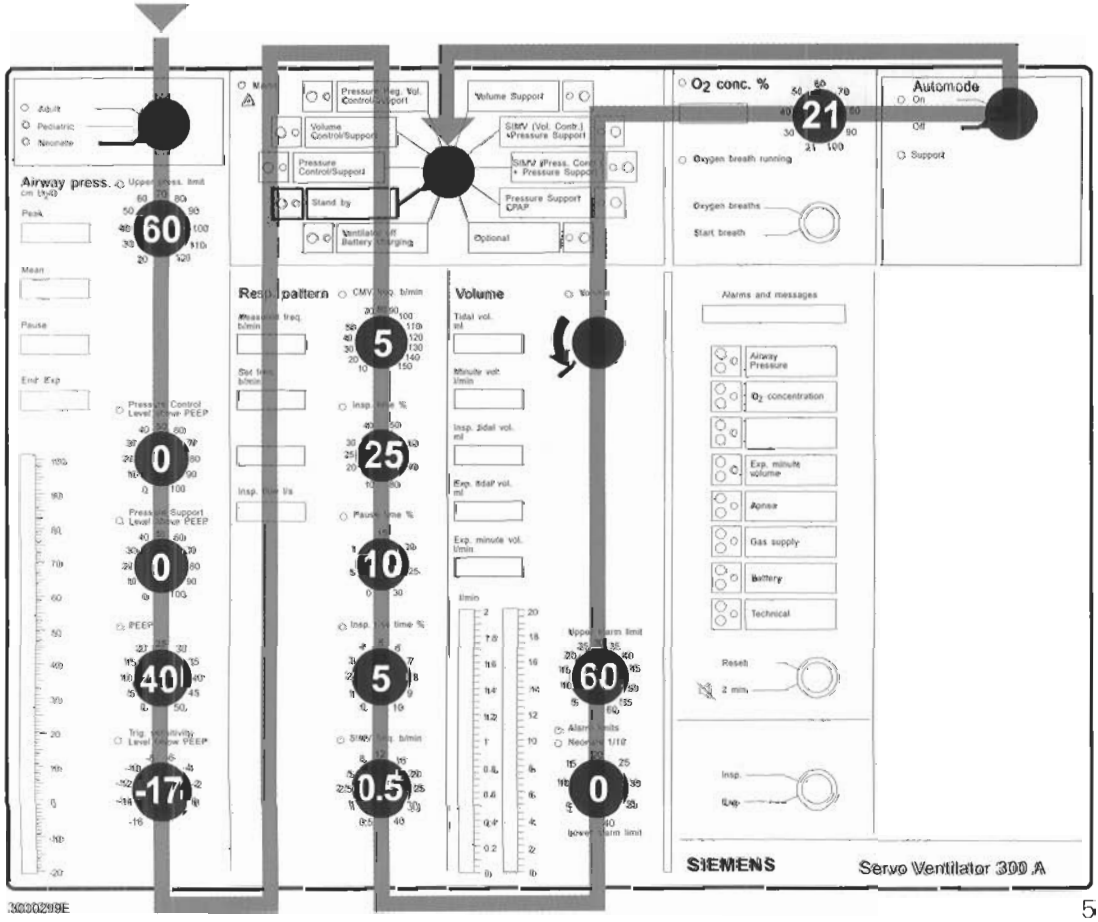
- Set the mode selector to "Stand by" and allow at least 15 minutes for warming up.
- Open the lid on the patient unit.

Settings for calibration

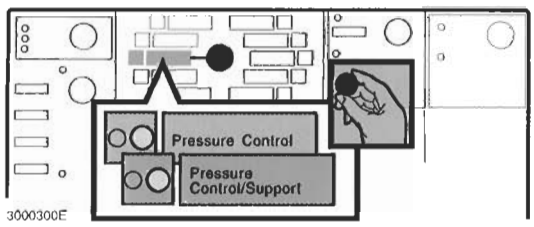
- Set the front panel controls as shown.

Alarms activated during calibration can be muted with the " 2 min" control.





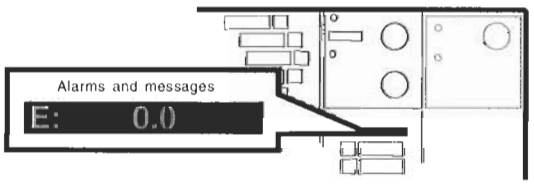
Balancing of pressure transducers

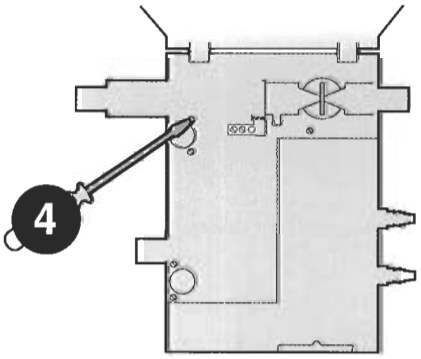


3000300E

- Set to "Pressure Control" mode.

Expiratory pressure

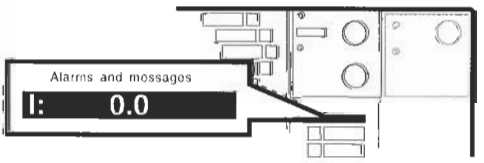


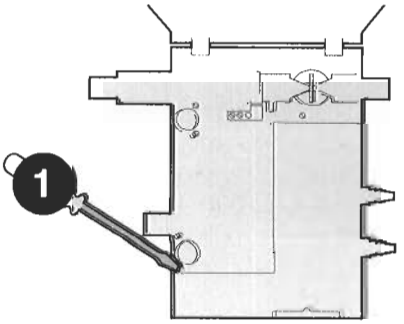


3000301E

- Use the touchpads to get into E: display mode.
- Check that the display "Alarms and messages" shows E: 0.0 ±0.1 cm H_2O
- If not, adjust trimmer 4 (P_{exp} →○←) to correct reading.

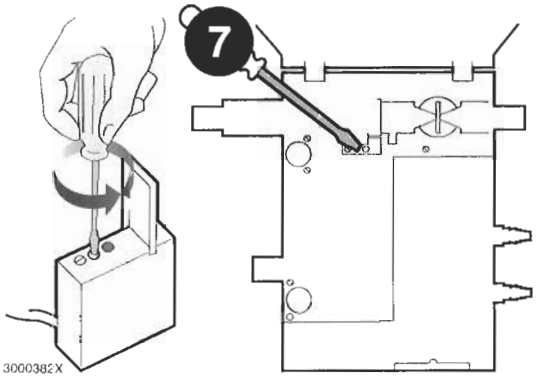
Inspiratory pressure





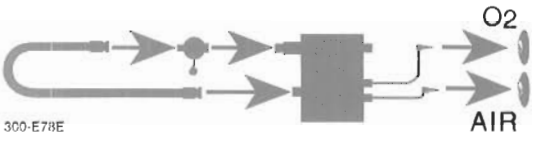
3000302E

- Use the touchpads to get into I: display mode.
- Check that the display "Alarms and messages" shows I: 0.0 ±0.1 cm H_2O.
- If not, adjust trimmer 1 (P_{insp} →○←) to correct reading.



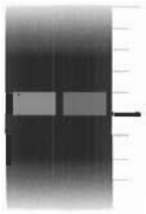
Balancing of expiratory flow transducer

- Open the lid on the expiratory flow amplifier.
- Check that the green diode is lit.
- If not, adjust trimmer 7 (V_{exp} ☼) until the diode is lit.



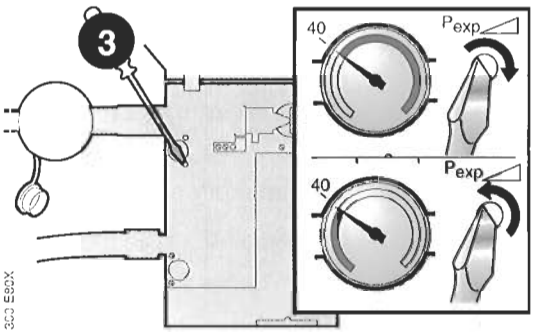
Leakage test, patient unit

- Connect gas supply (air and O_2). The safety valve will close when gas supply is connected.
- Connect the calibration manometer to the expiratory inlet and connect the inspiratory outlet and the calibration manometer with a patient tube.



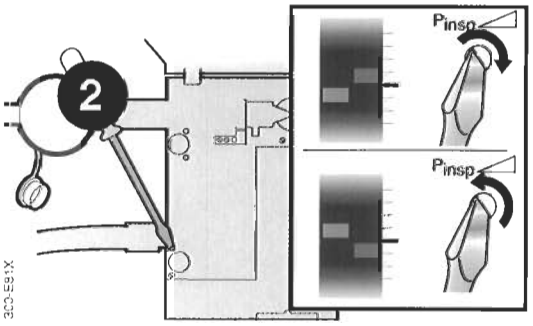
- If the left and right diode, showing the actual pressure on the "Airway press." bargraph, differ less than 5 cm H_2O from each other, go directly to page 9.

Calibration



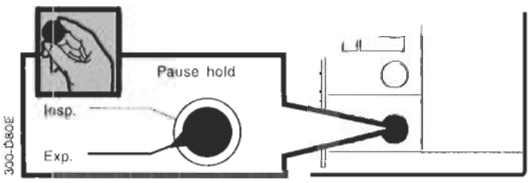
If not, the following preliminary calibrations must be made (normally, this will not be necessary):

- Check the calibration manometer reading.
- If the **calibration manometer** continuously shows:
  - a value **higher** than 40, adjust trimmer 3 (P_{exp} ◿) clockwise
  - a value **lower** than 40, adjust trimmer 3 (P_{exp} ◿) counter-clockwise.

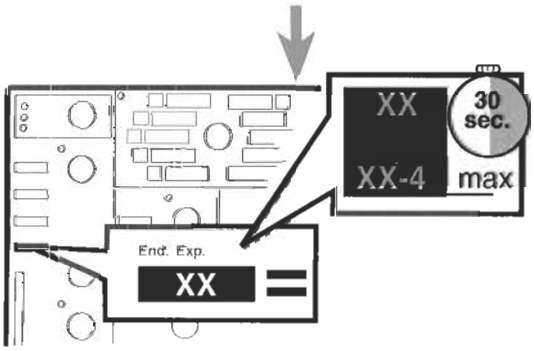


- If the **left diode** on the "Airway press." bargraph (actual insp. pressure) shows:
  - a **lower** value than the right (actual exp. pressure), adjust trimmer 2 (P_{insp} ◿) clockwise
  - a **higher** value than the right (actual exp. pressure), adjust trimmer 2 (P_{insp} ◿) counter-clockwise.

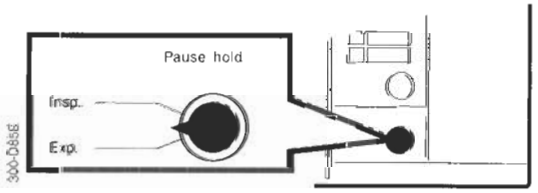
Calibration



- Keep "Pause hold" at "Exp." and make sure:



– the reading on the display "End exp." does not fall more than 4 cm H_2O during the expiratory pause hold time (30 seconds).

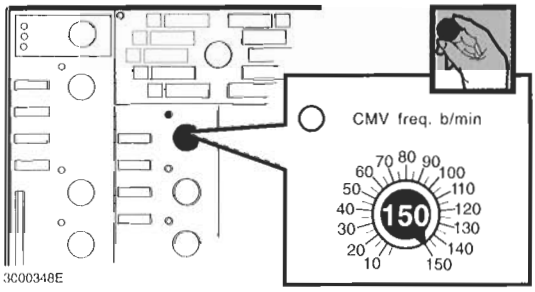


- Release "Pause hold".

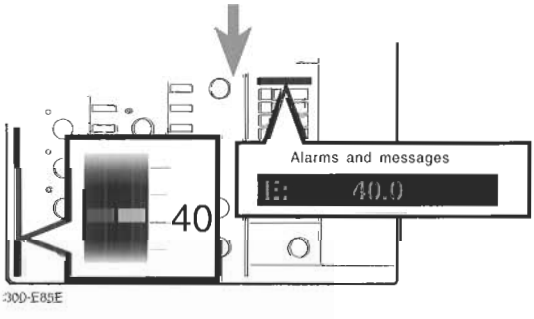
Pressure calibration

Expiratory pressure

- Connect patient tubes, Y-piece and test lung.

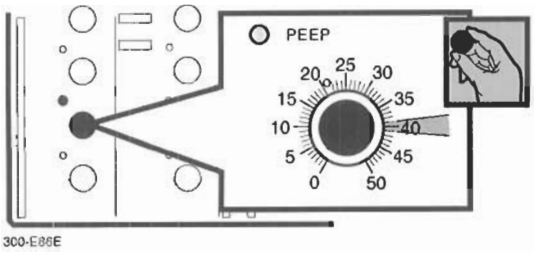


- Set "CMV freq. b/min" to 150 b/min.

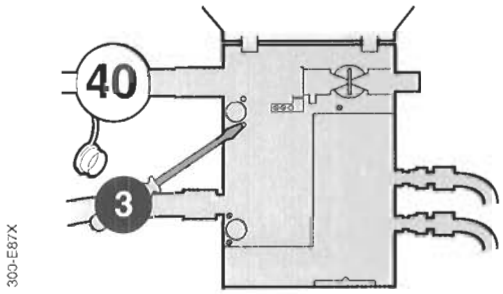


- Make sure:
  - the display "Alarms and messages" shows 40.0 ±0.5 cm H_2O in E: display mode.
  - the right diode (actual exp. pressure) on the "Airway press." bargraph shows 40 cm H_2O.

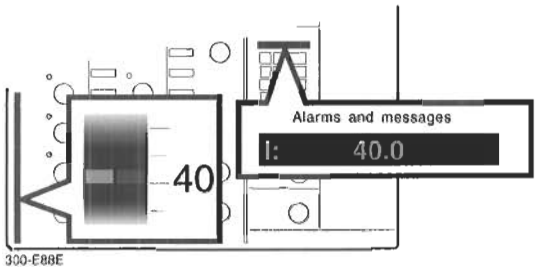
Calibration



- If not, adjust to correct reading with "PEEP".



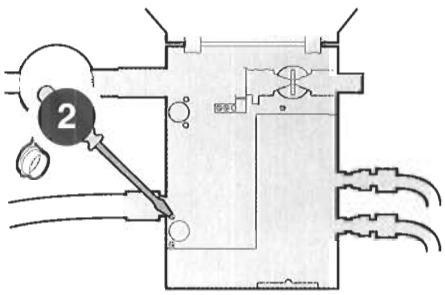
- Make sure the calibration manometer shows 40 cm H_2O.
- If not, adjust trimmer 3 (P_{exp} ◿) to correct reading.



300-E88E

Inspiratory pressure

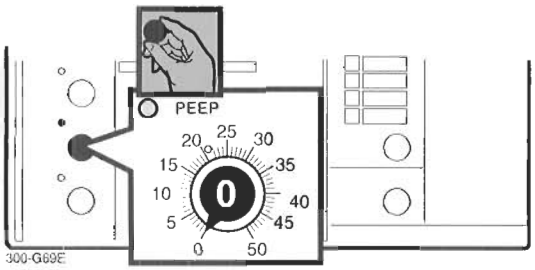
- Make sure:
  - the display "Alarms and messages" shows 40.0 ±0.5 cm H_2O in I: display mode.
  - the left diode (actual insp. pressure) on the "Airway press." bargraph shows 40 cm H_2O.



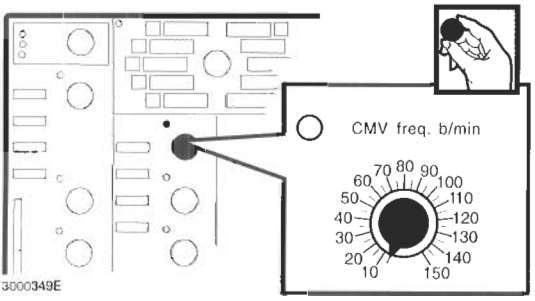
300-E99X

- If not, adjust trimmer 2 (P_{insp} ◁) to correct reading.

Calibration



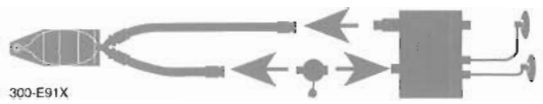
- Set "PEEP" to 0 cm H_2O.



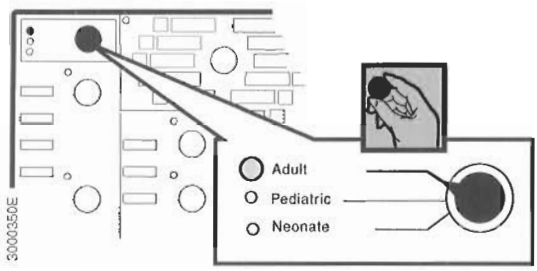
- Set "CMV freq. b/min" to minimum.

Check of inspiratory flow

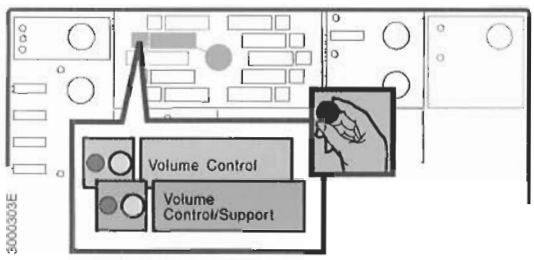
Air flow



- Remove the patient tubes and test lung and move the calibration manometer to the inspiratory outlet.

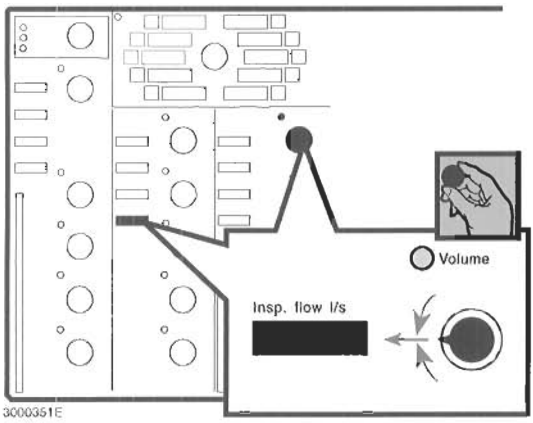


- Set the patient range selector to "Adult".



- Set to "Volume Control" mode.

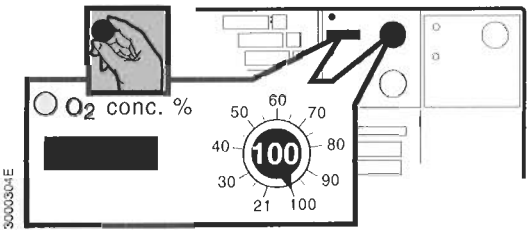
Calibration



- Adjust "Volume" until the display "Insp. flow l/s" shows 0.50 l/s.

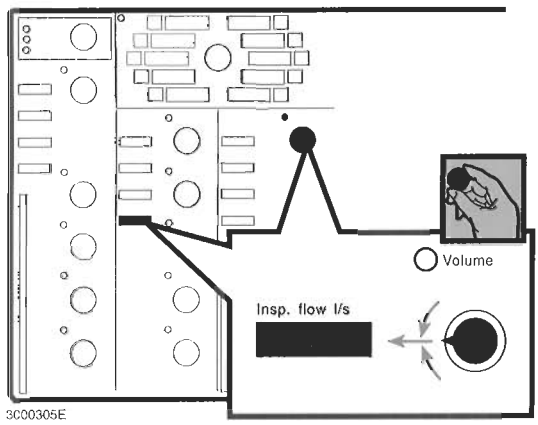
Barometric pressure		**Calibration manometer reading**
mbar	**mm Hg**	**cm H_2O**
700	525	65
720	540	64
740	555	62
760	570	60
780	585	59
800	600	57
820	615	56
840	630	54
860	645	53
880	660	52
900	675	51
920	690	50
940	705	49
960	720	48
980	735	47
1000	750	46
1013	760	45
1020	765	45
1040	780	44
1060	795	43
1080	810	42
1100	825	42

- Use the touchpads to get into Barometer mode.
- Read the barometric pressure on the "Alarms and messages" display.
- In the table find the **Barometric pressure** value closest to the displayed value.
- Wait 6 - 8 breaths.
- During inspiration, check that the calibration manometer reading is equal to the **Calibration manometer reading** value in the table ±5 cm H_2O.



O_2 flow

- Set "O_2 conc. %" to 100%.

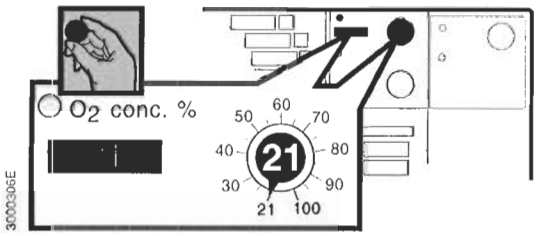


- Make sure the display "Insp. flow l/s" still shows 0.50 l/s. If not, adjust "Volume" to correct reading.

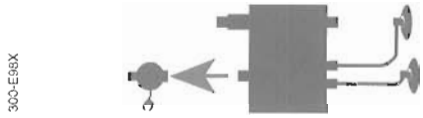
Barometric pressure		Calibration manometer reading
mbar	**mm Hg**	**cm H_2O**
700	525	73
720	540	71
740	555	69
760	570	67
780	585	66
800	600	64
820	615	62
840	630	61
860	645	60
880	660	58
900	675	57
920	690	56
940	705	55
960	720	53
980	735	52
1000	750	51
1013	760	51
1020	765	50
1040	780	49
1060	795	48
1080	810	47
1100	825	47

- Use the touchpads to get into Barometer mode.
- Read the barometric pressure on the "Alarms and messages" display.
- In the table find the **Barometric pressure** value closest to the displayed value.
- Wait 6 - 8 breaths.
- During inspiration, check that the calibration manometer reading is equal to the **Calibration manometer reading** value in the table ±5 cm H_2O.

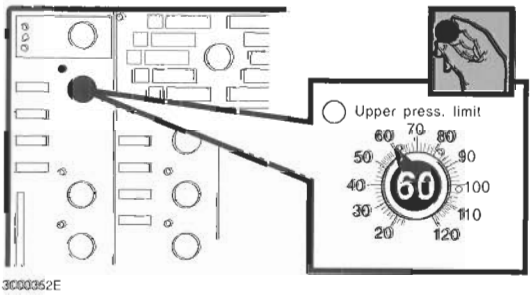
Calibration



- Set "O_2 conc.%" to 21%.

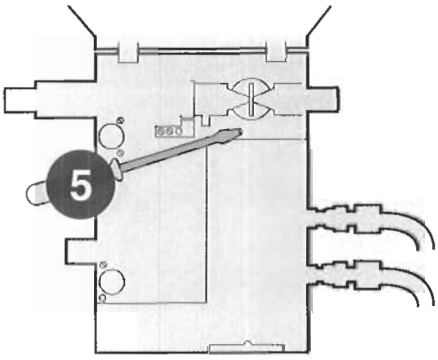


- Remove the calibration manometer.



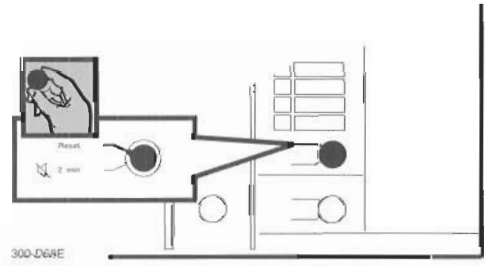
- Make sure "Upper press. limit" is set to 60 cm H_2O.

O_2 concentration calibration

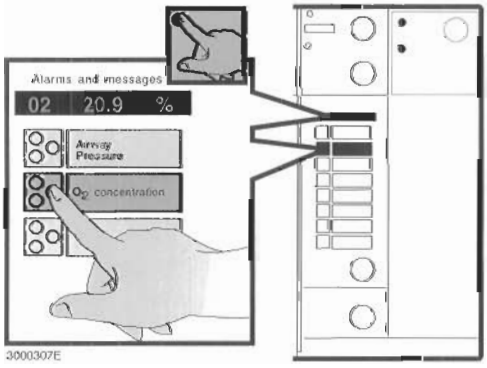


300-F00X

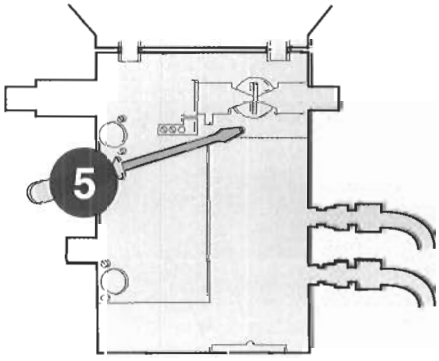
- If O_2 concentration alarm is active, turn trimmer 5 (O_2 %◿) until the alarm stops.



- Reset the alarm.



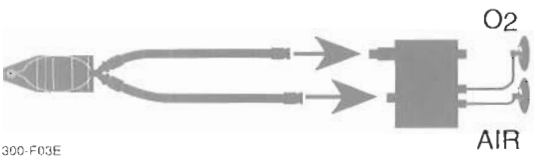
- Touch the "O_2 concentration" touchpad and check that the display "Alarms and messages" shows 20.9 ±0.1%.



300-F00X

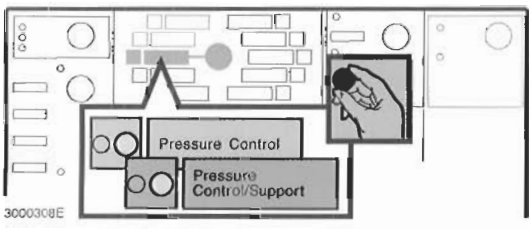
- If not, adjust with trimmer 5 (O_2 %◿).

Leakage test of patient tubes and test lung



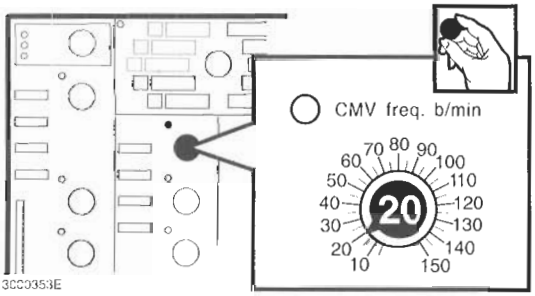
300-F03E

- Connect patient tubes, Y-piece and test lung.



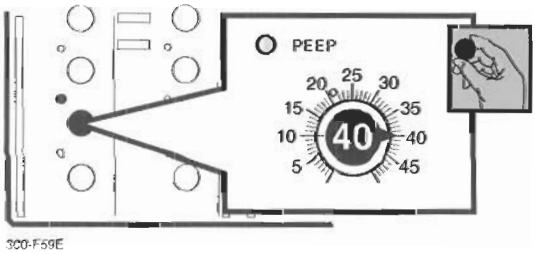
3000308E

- Set to "Pressure Control" mode.



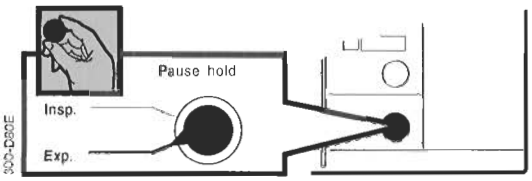
3CC0353E

- Set "CMV freq. b/min" to 20 b/min.



3C0-F59E

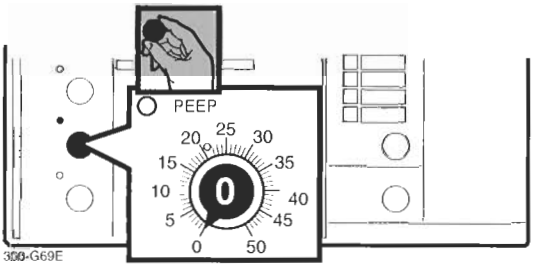
- Set "PEEP" to 40 cm H_2O.



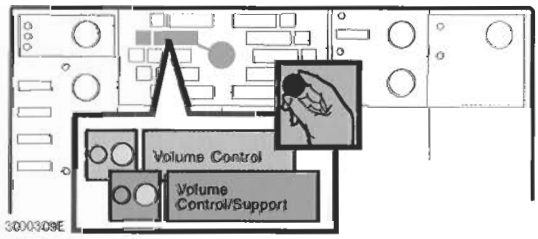
- Keep "Pause hold" at "Exp." and make sure:
  - the reading on the display "End exp." does not fall more than 10 cm H_2O during the expiratory pause hold time (30 sec).

In case of leakage, exchange the patient tubes/test lung before continuing the calibration.

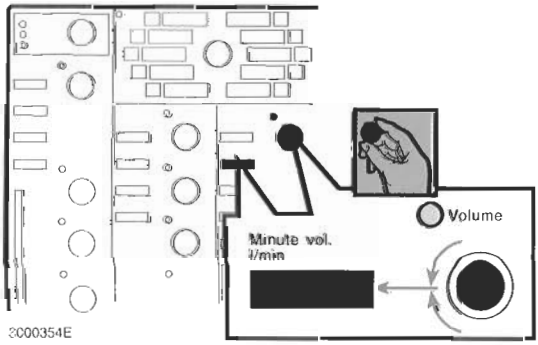
Expiratory flow calibration



- Set "PEEP" to 0 cm H_2O.

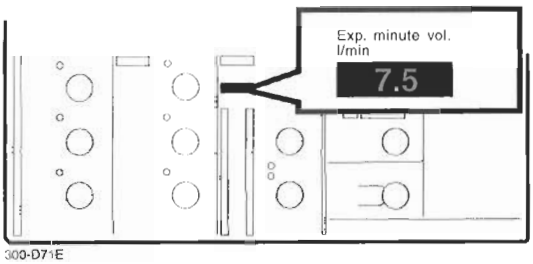


- Set to "Volume Control" mode.

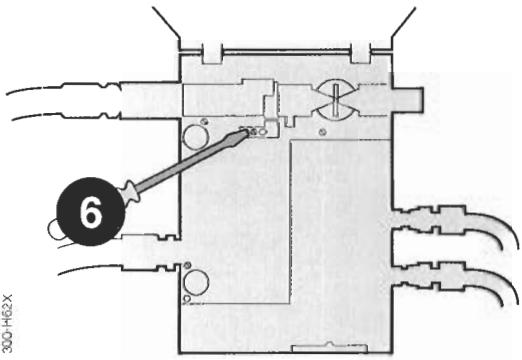


- Adjust "Volume" until the green display "Minute vol. l/min" shows 7.5 l/min.

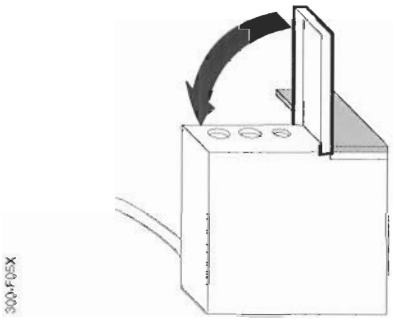
Calibration



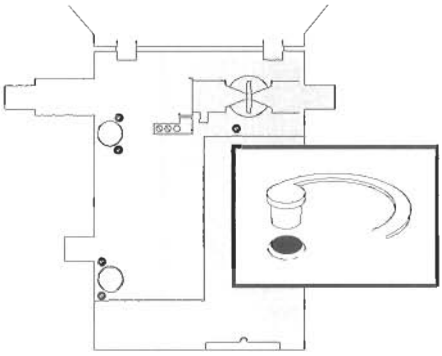
- Wait a few breaths, then check that the red display "Exp. minute vol. l/min" shows 7.5 ±0.1 l/min.



- If not, adjust trimmer 6 (V_{exp}) to correct reading.



- Close the lid on the flow amplifier.



300-F07X

- Make sure all plastic covers over trimmers are closed.

- Check the ventilator as described in chapter Function check.

Log sheet

- Note on a log sheet that a calibration has been performed.