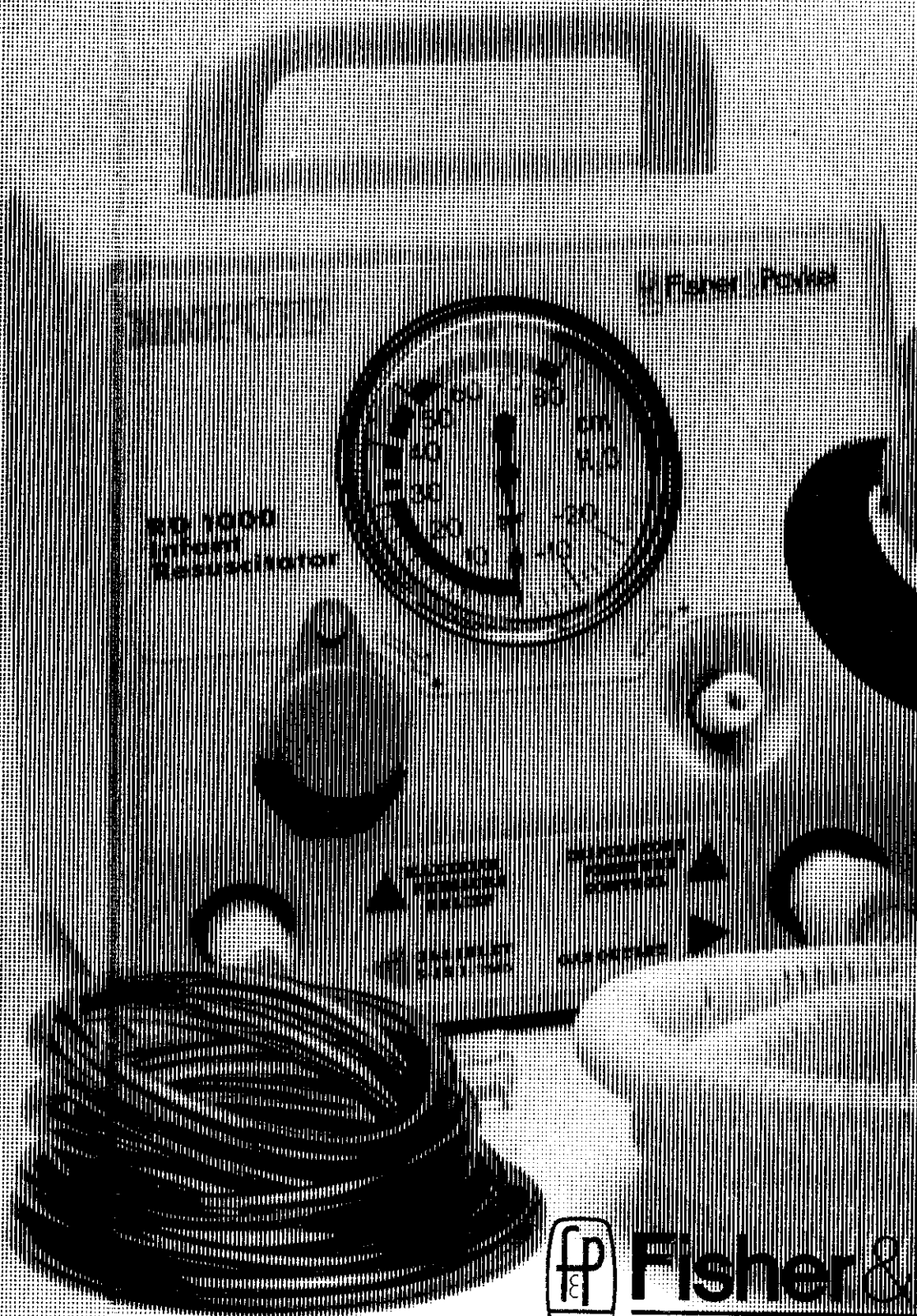


# RD1000

INFANT RESUSCITATOR



RD 1000  
Infant  
Resuscitator

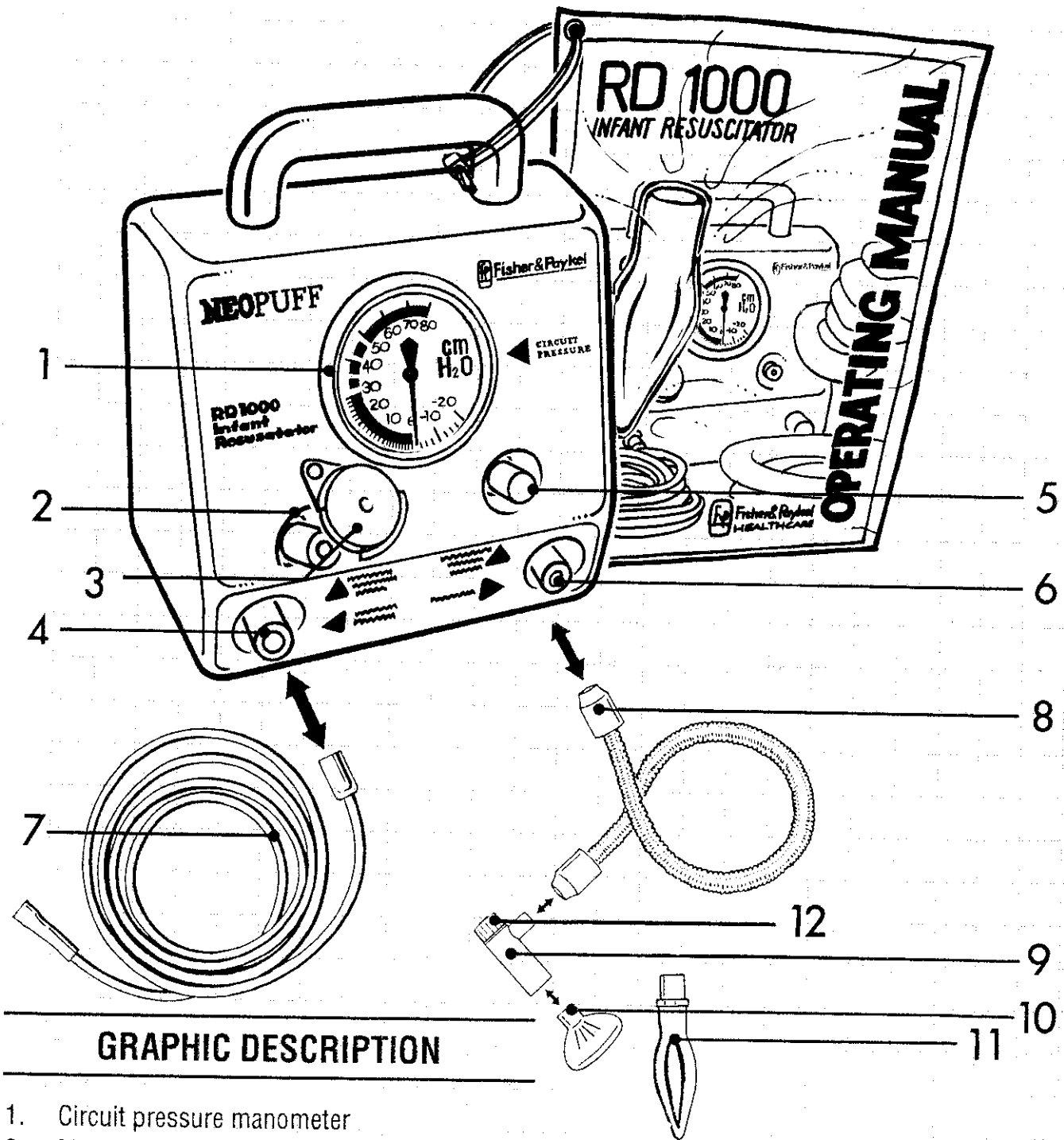
Fisher & Paykel

OPERATING MANUAL



**Fisher & Paykel**  
HEALTHCARE

# CHART 1



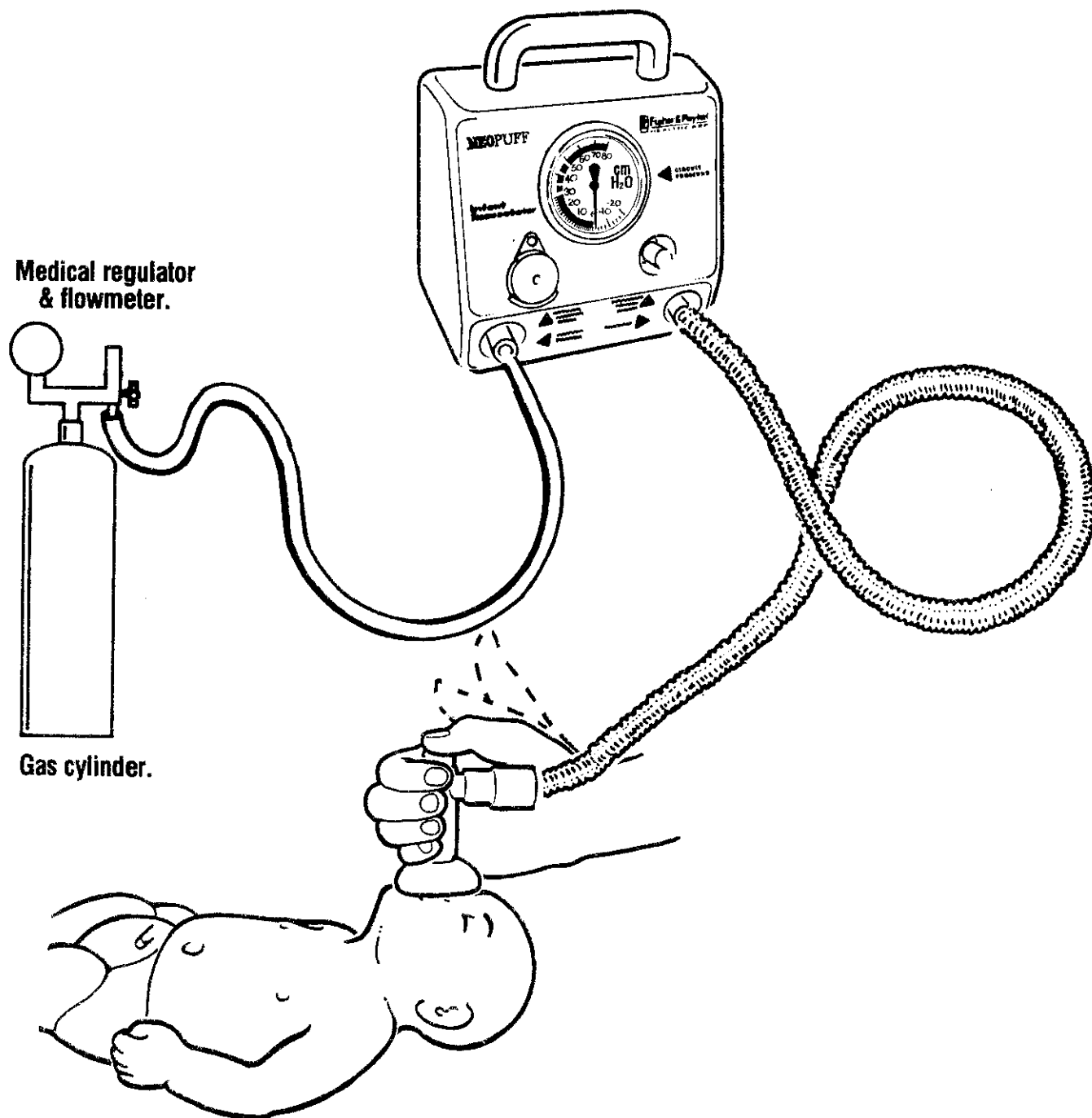
## GRAPHIC DESCRIPTION

1. Circuit pressure manometer
2. Maximum pressure relief valve adjustment knob
3. Pressure relief valve safety cap
4. Gas inlet port (10mm I.D)
5. Peak inspiratory pressure adjustment knob
6. Gas outlet port (10mm O.D)
7. Oxygen supply tube
8. Patient supply tube
9. Patient "T-piece"
10. Breathing mask
11. Test lung
12. PEEP (Positive end expiratory pressure) control

PATENT APPLIED FOR IN PRINCIPAL COUNTRIES OF THE WORLD

# CHART 2

This illustration shows a typical RD1000 set up and operation.



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## SET - UP & OPERATION

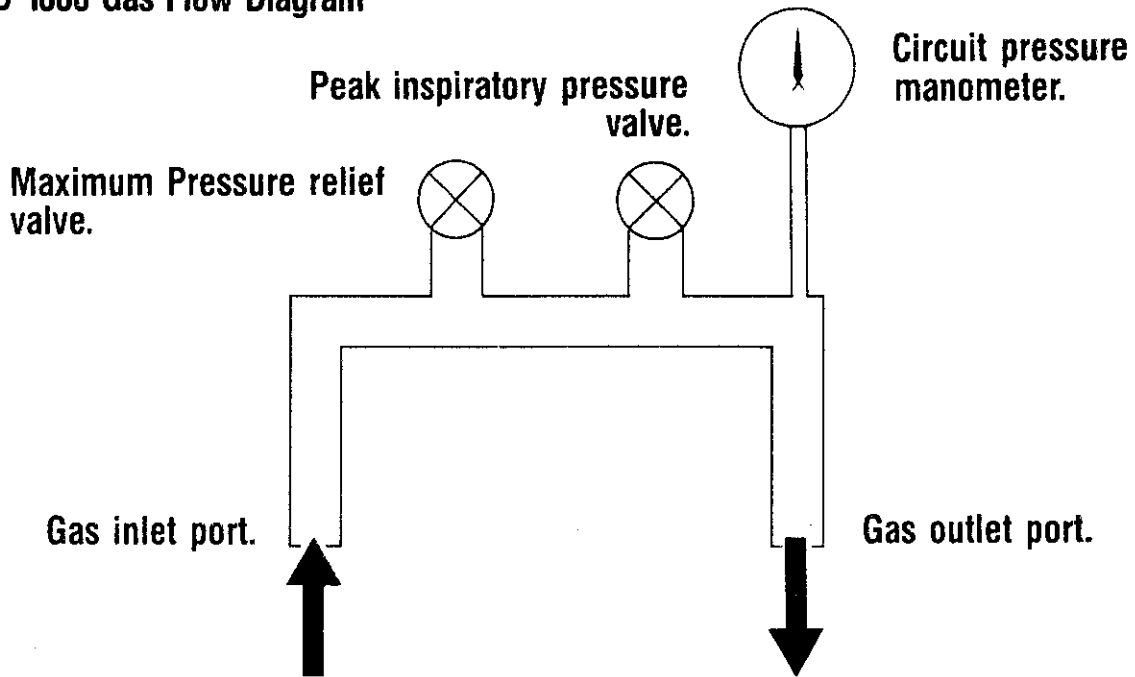
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### TO RESUSCITATE

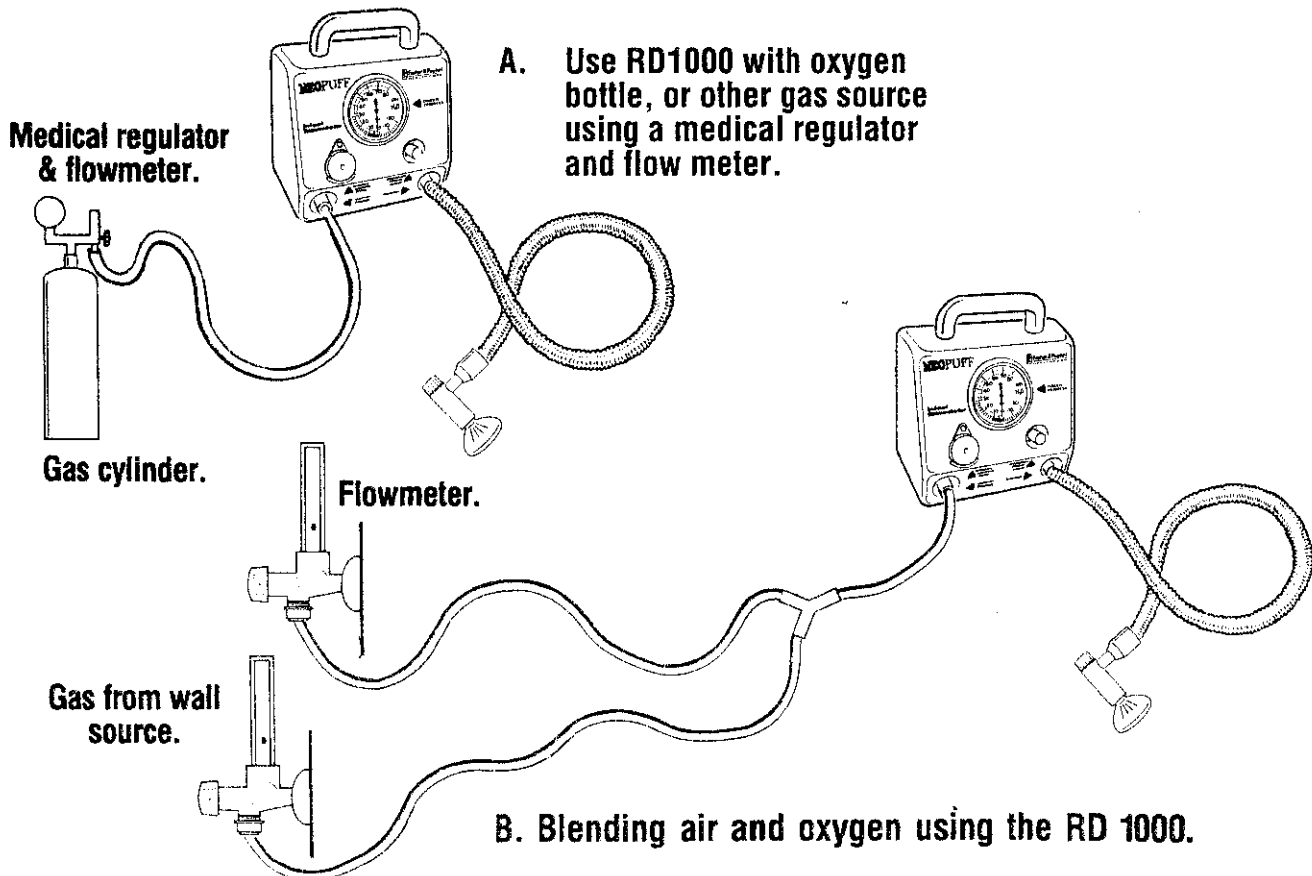
- a) Place thumb OVER white cap aperture on 'T-piece' during inspiratory phase.
- b) REMOVE thumb from aperture for expiratory phase.

# CHART 3

RD 1000 Gas Flow Diagram



# CHART 4



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## **WARNING**

1. Read this manual fully before using the RD1000 Infant Resuscitator.
2. Federal law restricts this device to use by, or on the order of a physician.
3. The RD1000 Infant Resuscitator is to be used only by persons trained in Infant Resuscitation. It is the responsibility of the purchaser to ensure that all users of this device have been adequately trained in resuscitation techniques.
4. No smoking, naked flames or sources of ignition while unit is in use.
5. For connection to flow regulated oxygen or oxygen/air mixture only.
6. Recommended operating gas flow rate 5 l/min. Do not attempt to use a higher flow than 15 l/min.
7. Factory setting of Pressure Relief Valve is at 40cm H<sub>2</sub>O. This setting is user adjustable up to 80cm H<sub>2</sub>O. Do not attempt to set the pressure relief valve above 80cm H<sub>2</sub>O.
8. Use only Fisher and Paykel "T-pieces".
9. If ventilation is not achieved with this device, expired air ventilation should be used.
10. No user servicable parts inside.
11. Service to be carried out by authorised service person.

## I. INTRODUCTION:

The RD1000 Infant Resuscitator is a device intended for the emergency resuscitation of newborn infants. The unit is designed for use in delivery suites, neonatal intensive care, nurseries or transport.

Key features of the RD1000 Infant Resuscitator are:

1. Simple, tireless operation. To resuscitate:
  - a) Place thumb OVER white cap aperture "T-piece" during inspiratory phase (inhalation).
  - b) REMOVE thumb for expiratory phase (exhalation).
2. Lightweight handpiece ("T-piece") is ideal for use over extended resuscitation periods.
3. Constant monitoring of airway pressure, which is indicated in cm H<sub>2</sub>O.
4. Peak inspiratory pressure control, allows easy adjustment of delivered airway pressure.
5. Adjustable "PEEP" (positive end expiratory pressure) valve at patient "T-piece".
6. Maximum pressure relief valve:
  1. "Pop off"
  2. Overall limit on achievable circuit pressures (as pre-set by medical staff).
  3. "Back up" inspiratory pressure control.
7. Pressure limiting valve — safety feature for avoidance of barotrauma.
8. Up to 100% oxygen delivery (can be used with an air blender for air O<sub>2</sub> mix).

## II. PERFORMANCE CHARACTERISTICS AND SPECIFICATIONS

### A) TYPICAL OPERATING FEATURES

Inspiratory Pressure Range @ 10 l/min : 2 to 80 cm H <sub>2</sub> O.	
Peep Range At:	
5 l/min	: 1-5 cm H <sub>2</sub> O
10 l/min	: 2-15 cm H <sub>2</sub> O
15 l/min	: 4-25 cm H <sub>2</sub> O

If the gas flow rate increases from 5 to 15 l/min, peak pressure values will increase by approximately 8 cm H<sub>2</sub>O.

Recommended body weight range: Up to 10 kg (22lb)

Operating time:

With a standard 400 litre oxygen cylinder (USA = D size cylinder), the following will serve as a guide:

5 l/min	=	80	minutes
10 l/min	=	40	minutes
15 l/min	=	26.6	minutes

PLEASE NOTE: THESE ARE TYPICAL FIGURES ONLY

**B) TECHNICAL SPECIFICATIONS OF RD1000**

Manometer range	: -20 to 80 cm H <sub>2</sub> O.
Maximum Pressure Relief	Between : 70 cm H <sub>2</sub> O. (Minimum) and : 84 cm H <sub>2</sub> O. (Maximum)
Dimensions	: Height : 195 mm (7.67") Width : 173 mm (6.81") Depth : 108 mm (4.25") Weight : 890 gm (31 oz)
Input Gas Flow Range	: 5 l/min Minimum 15 l/min Maximum
Operating & Storage environmental limits	: -20°C to 50°C Up to 95% humidity
Delivered oxygen concentration	: Up to 100%

**C) DESCRIPTION & CATALOGUE NUMBERS**

Descriptions:	Catalogue number
• Infant resuscitator	:RD1000
• Standard accessory pack (reusable breathing circuit)	:500RD001
• Disposable breathing circuit (with mask)	Box of 30 :500RD050
• Disposable breathing circuit (no mask)	Box of 30 :500RD051
• Test lung	:500RD106
• Standard reusable accessory pack includes:	
Oxygen supply tube	:500RD107
Oxygen outlet tube (patient supply tube, autoclavable)	:500RD103
Patient "T-piece", autoclavable	:500RD104
Neonatal breathing mask, autoclavable	:500RD105
• Operating Manual (supplied with RD1000)	:185040544

NOTE: A complete and fully functional operating unit requires ordering the RD1000 with either the standard accessory pack (500RD001) OR disposable breathing circuits (500RD050 OR 500RD051).

### III. SET UP AND USE OF THE RD1000

- See Chart 1

When the RD1000 leaves our factory, the "maximum pressure relief" valve is preset to 40cm H<sub>2</sub>O. The "maximum pressure relief" valve and the "peak inspiratory pressure" valve are in the same circuit. The "peak inspiratory pressure" valve is intended for regular use to adjust and control desired circuit pressure, up to the pressure set by the "maximum pressure relief" valve. The "maximum pressure relief" valve acts as an overall limit on achievable circuit pressures. Ventilation above 40cm H<sub>2</sub>O cannot be achieved unless the "maximum pressure relief valve" is readjusted.

NOTE: The "maximum pressure relief" valve is adjustable up to a nominal 80cm H<sub>2</sub>O. This should only be done in exceptional circumstances. **Do not attempt to set the pressure relief valve above 80cm H<sub>2</sub>O.**

#### A) TO SET UP THE RD1000 FOR USE:

1. Connect oxygen supply to RD1000 "gas inlet port" using oxygen tubing supplied by Fisher & Paykel. (500RD107)
2. Connect patient supply tube (500RD103) to RD1000 "gas outlet port".
3. Turn oxygen flow to between 5 and 15 litres per minute.  
**Do not attempt to use a higher flow than 15 l/min.**
4. To Check "maximum pressure relief" setting: (Factory set at 40cm H<sub>2</sub>O)
  - i. Connect test lung to "T-piece" (if test lung unavailable, block "T-piece" gas outlet port with palm of the hand or against a flat surface).
  - ii. With gas flowing through the patient supply tube, cover the hole in the white cap of the "T-piece" with thumb.
  - iii. Turn the "peak inspiratory pressure" control knob clockwise until the manometer needle stops. This may require a few rotations. Manometer needle now shows the current "maximum pressure relief" setting (i.e. pop-off level).
5. To adjust the maximum pressure relief setting:
  - i. Determine current "maximum pressure relief" setting (pop-off level) Step 4 above.
  - ii. If the **desired** "pop-off" level is LESS than the manometer reading demonstrated above, then rotate the maximum pressure relief knob (left hand side) counter-clockwise to desired "pop-off" level (maximum pressure relief level).
  - iii. If the **desired** "pop-off" level is GREATER than the current manometer reading then:
    - a. Rotate the PIP knob (right hand side) clockwise 5-6 revolutions OR completely if a very high "pop-off" level is desired e.g. over 65cm H<sub>2</sub>O
    - b. Rotate the maximum pressure relief knob (left hand side) clockwise to desired "pop-off" level.
    - c. Rotate PIP knob clockwise (right hand side) until manometer needle stops (this should tally with the "pop-off" level you have set above).
6. To adjust "peak inspiratory pressure":  
With the test lung attached to the "T-piece", white cap aperture occluded and gas flowing, turn the "peak inspiratory pressure" control knob (right hand side) to set the desired inspiratory pressure level.
7. To adjust the PEEP control at "T-piece" to the desired level:
  - i. Remove thumb from aperture on "T-piece" to allow gas to flow through PEEP valve.
  - ii. Adjust PEEP control knob to set the desired PEEP level displayed on the manometer.
8. Remove test lung from "T-piece". Fit the neonatal resuscitation mask or endotracheal tube (ET tube) to the "T-piece".



## B) TO USE THE RD1000

- See Chart 2

1. Place mask over infant's mouth and nose to create a good seal.
2. Resuscitate by:
  - i. Placing thumb OVER white cap aperture on "T-piece" during inspiratory phase.
  - ii. REMOVE thumb for expiratory phase.
3. If ventilation is not achieved with this device, expired air ventilation should be used.

### WARNING

1. After use with the pressure relief valve set above 40cm H<sub>2</sub>O it should be reset to 40cm H<sub>2</sub>O for future use.
2. The RD1000 should not be used without going through the set up procedures to ensure that the correct pressure is delivered to the patient.

## IV. CLEANING METHODS

	Reusable accessories: 500RDOX				
	Infant resuscitator RD1000	Test Lung 500RD106	Mask 500RD105	Patient Supply tube 500RD103	T-piece 500RD104
Steam Autoclavable 136°C (276.8°F) 220 KPa (32psi) gauge 4 minutes			✓	✓	✓
Steam Autoclavable 120°C (248°F) 96 KPa (14.1psi) gauge 15 minutes			✓	✓	✓
Ethylene Oxide Gas Some carrier gases can cause stress cracking and are not suitable. If in doubt check with chemical supplier.		✓	✓	✓	✓
Chemical liquid immersion. Some chemicals can be harmful to plastics. If in doubt check with chemical supplier.				✓	✓
Wipe with a damp cloth	✓				

**WARNING:** The above methods of sterilising are suitable for the components but the suitability of any method for a particular bacteriological situation is the responsibility of the user.

## V. SERVICE INFORMATION

All maintenance must be carried out by qualified personnel using only Fisher & Paykel parts. For further information and technical data contact Fisher & Paykel Healthcare, Auckland, New Zealand.

### EQUIPMENT REQUIRED:

Gas Source, Phillips Screw Driver Number 1, Torque Driver, Special C-Spanner and Special Adaptor for Torque Driver. (Fisher & Paykel Part Number 500RD521 Service Kit RD1000.)

### DISASSEMBLY OF RD1000

1. Remove back cover, fixed by four screws. They unscrew anti-clockwise.
2. Remove gas inlet and outlet connectors using torque driver and special adaptor. They unscrew anti-clockwise.
3. Unscrew two manifold retaining screws on bottom of unit. They unscrew anti-clockwise.
4. Disconnect manometer tube at top of T-connector by pushing down on collar of T-connector and pulling tube free.
5. Remove manifold assembly.

### REPLACING MANOMETER

The manometer is not a serviceable item and must be replaced by Manometer Kit 500RD520 (contains manometer, new case and labels) or 500RD520B Manometer Kit — German version.

1. Disassemble RD1000 as outlined above.
2. Remove relief valve safety cap by levering retaining pin free.
3. Remove two screws retaining pink handle. They unscrew anti-clockwise.
4. Re-attach pink handle and relief valve safety cap to new case.
5. Record date code on back of manometer and serial number of RD1000 from back cover and send a copy to Fisher & Paykel Healthcare, New Zealand — Attention: Regulatory Affairs.
6. Reassemble RD1000 as instructed in the next page.

### REPLACING VALVE ASSEMBLIES

1. Disassemble RD1000 as outlined above.
2. Remove the inspiratory valve assembly using the special C-spanner. Valve unscrews anti-clockwise.
3. Fit new inspiratory valve assembly, tighten clockwise with C-spanner. The inspiratory valve assembly can be identified by the white restrictor plug located at the bottom end of the valve.
4. Remove maximum pressure relief valve assembly using C-spanner. Unscrews anti-clockwise.
5. Fit new maximum pressure relief valve assembly, tighten clockwise with C-spanner. The maximum pressure relief valve has no restrictor plug.
6. Record valves serial numbers and serial number of RD1000 and send copy to Fisher & Paykel Healthcare — Attention: Regulatory Affairs.
7. Reassemble RD1000 as instructed below.

### REASSEMBLY INSTRUCTIONS OF RD1000

1. Replace manifold assembly in case, retain with 2 screws. Ensure valve adjustment knobs are clear of case and easy to turn before tightening the screws. Tighten screws clockwise.
2. Reconnect manometer tube by inserting tube into top of T-connector.
3. Replace gas inlet and outlet connectors. Gas inlet has female connector, gas outlet is male connector. They tighten clockwise. Use torque driver and special adaptor to tighten to 1.2 Newton metre.
4. Fit back cover using 4 retaining screws. They tighten clockwise.
5. Calibrate.

### CLEANING INSTRUCTIONS

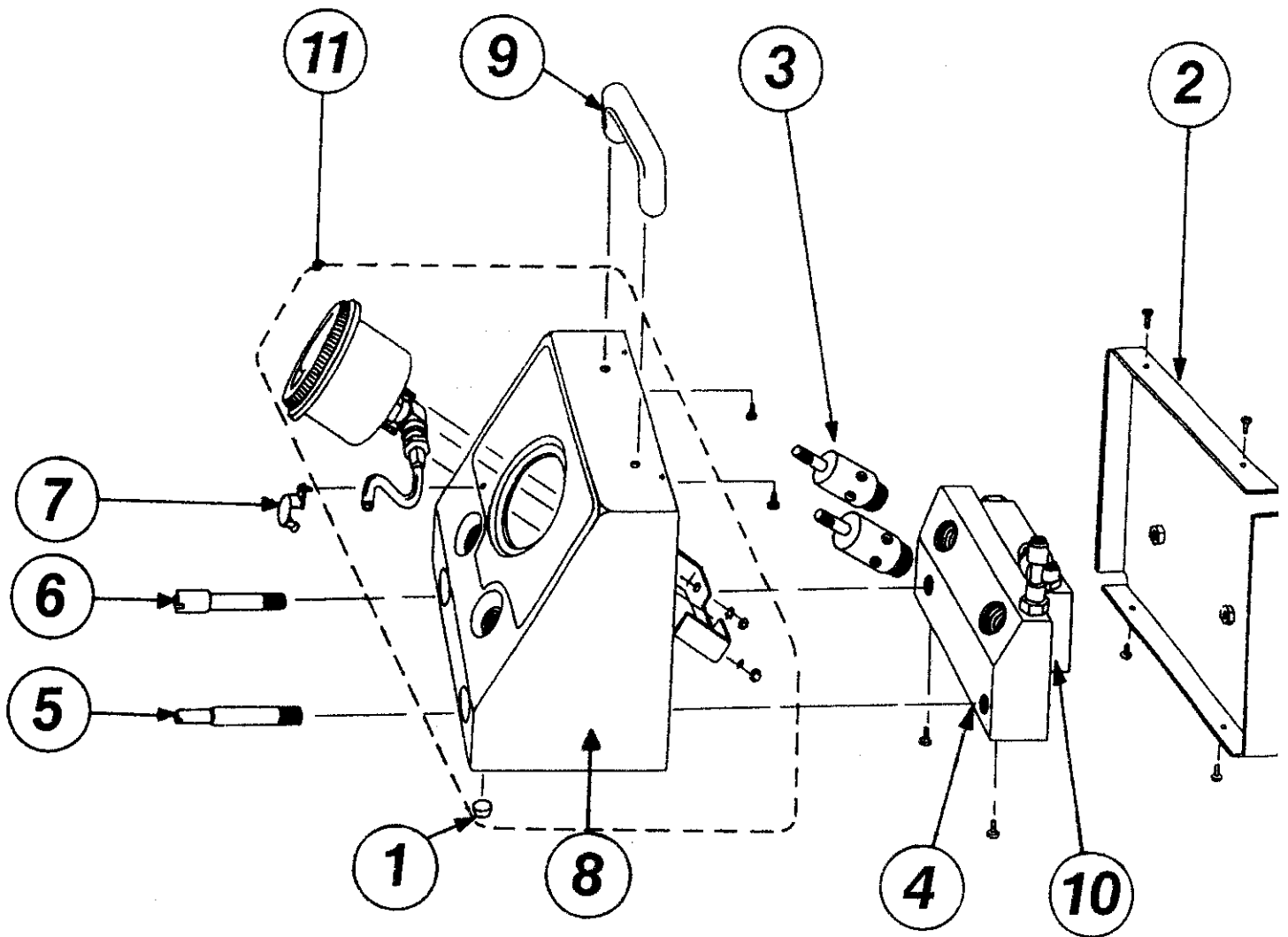
1. Wipe infant resuscitator case with damp cloth and mild detergent.
2. Clean interior parts in warm water and mild detergent.

**Warning:** always ensure gas passages are free from contaminants, especially hydrocarbons, prior to reassembly.

### CALIBRATION

The integrity of the system and manometer should be checked every three months and after servicing. Connect a known calibrated manometer to the patient 'T-Piece' and check that the readings agree with the RD1000 manometer to within 3cm H<sub>2</sub>O over all operations. (Refer to Operating Manual — Set Up and Use of the RD1000).

## RD1000 Exploded Diagram



### VI. SPARE PARTS LIST

Key to Diagram	Catalogue Number	Description
1	500RD501	Rubber mounting feet, 4 per pack.
2	500RD505	Back cover plate. Includes English and German labelling and 4-screws.
3	500RD506	Valve assemblies, pair.
4	500RD007	Manifold block. Includes plug, T-piece, tube and 2 screws.
5	500RD508	Connector 10mm male gas outlet.
6	500RD509	Connector 10mm female gas inlet.
7	500RD510	Pressure relief valve safety cap and fastener.
8	500RD512	Case RD1000. Includes English and German labelling and 4 rubber mounting feet.
9	500RD513	Pink handle and 2 screws.
10	500RD519	Reservoir. Includes 2 bungs, fitting and tube.
11	500RD520	Manometer kit. English version. Includes manometer and bracket, angle piece and connector, tube and 500RD512 Case.
	500RD520B	Manometer kit. German version. Includes manometer and bracket, angle piece and connector, tube and 500RD512 Case.
	500RD521	Service kit. Includes special C-spanner and adaptor for torque driver.

**Patent applied for in principal countries of the world.**

25 Carbine Road, Panmure  
PO Box 14-348, Panmure  
Auckland  
NEW ZEALAND

Telephone: +64-9-570 5655  
Facsimile: +64-9-570 9500  
Telex: NZ2985  
Cables: ALLIND



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