

NETS WA

MANSELL NEOSLED MANUAL



Newborn Emergency Transport Service
Mobile Intensive Care for Babies

The Mansell transport system consists of the following equipment:

- Mansell Power Lifter
- Mansell Neocot transport incubator
- Stephan reanimator F 120 ventilator
- Propaq monitor
- Linde MicroGas Transcutaneous monitor
- Braun perfusor compact syringe pumps
- Medela portable suction unit
- Teledyne TED 60-T portable oxygen analyser
- 2 Inhalo oxygen cylinders
- Available space for a PrinterNox monitor and Nitric Oxide gas cylinder

If you have any suggestions or comments about the manual please contact either:

- ◆ Dr Steven Resnick: steven.resnick@health.wa.gov.au
Medical Director, NETS WA
- ◆ Jo Blacker: joanne.blacker@health.wa.gov.au
Clinical Nurse Consultant, NETS WA

General email: NETS.PMH@health.wa.gov.au

Telephone (08) 9340 8536

Fax (08) 9340 8037

EMERGENCY LINE
1300 NETS WA
1300 6387 92



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1. Power Supply

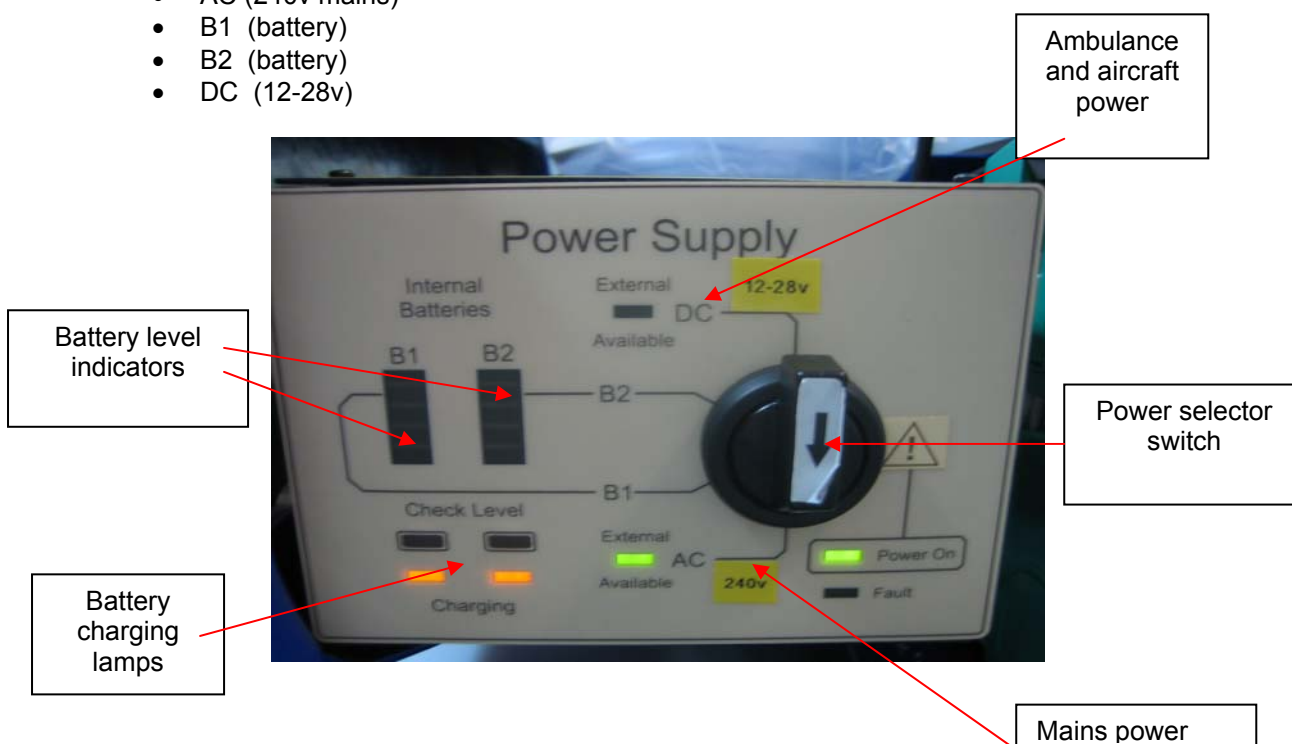
The Mansell cot is powered in 3 ways:

- External mains power
- Internal batteries
- External ambulance / aircraft power

The type of power is selected by turning the power selector switch on the power supply box to the desired point.

The power selector switch has 4 positions:

- AC (240v mains)
- B1 (battery)
- B2 (battery)
- DC (12-28v)



IMPORTANT NOTE: The Mansell Cot has NO automatic power change-over mechanism. The appropriate power source must be manually selected at each stage of the transport.

AC is normally selected when the Neocot is standing idle, or when in use in the nursery at a hospital.

When loaded onto the B200SE (Lifeport) aircraft at RFDS the cot is also plugged into a mains outlet and the 'AC' position on the power supply is selected.

Note: When the cot is connected to a reliable AC mains power supply, the 'External Available' AC lamp will illuminate and all batteries will be charging, as shown by the 2 illuminated orange 'Charging' lamps.

DC is selected when the Neocot is used in a road ambulance or on an aircraft (see 'AC' above for aircraft exceptions).

B1 and B2 are the 2 batteries that are permanently located in the battery box on the Neosled. Each battery has sufficient capacity to operate the whole system for at least 45 minutes giving

a total “run” time 90 minutes. A “Low Battery” alarm will sound after approximately 30mins for each battery.

Battery Capacity Gauges

Each battery has a vertical bar display which assists in determining its capacity status. Underneath the displays are 2 buttons which when pressed will activate the respective bar display. This feature, while not totally accurate, is a fair indicator of battery status.

- A fully lit display indicates maximum battery capacity
- 1 bar indicates approximately 20% capacity



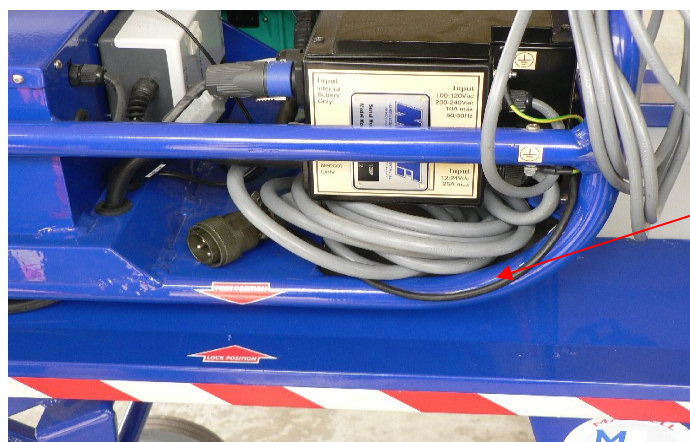
Vertical bar display illuminated to show batteries fully charged

‘Check level’ buttons to activate vertical bar display

When a battery (B1 or B2) is selected for use, its corresponding “level indicator” will extinguish. To check the capacity of this battery at any time, simply press the appropriate “Check level” button.

Important Note: Cot batteries will only recharge when the unit is plugged in to the mains power and the power selector switch is turned to the “AC” setting. The cot will not recharge when plugged in to a 12-28v outlet.

The batteries can take up to 6 hours to fully recharge after use and once fully charged will continue to ‘trickle charge’ to ensure full battery capacity is maintained.



Neocot power cables – AC & DC storage area beneath battery at back of cot

2. Oxygen

Oxygen can be delivered via the ventilator, directly into the incubator, via the bagging circuit or by low-flow nasal cannula (PBF).

The transport cot carries two Inhalo oxygen cylinders secured in an upright position behind the Stephan ventilator. Each cylinder contains 630 litres of oxygen when full. The contents gauge on the front of the cylinder indicates the contents level at all times – **'bleeding' the cylinder will not cause the gauge to show zero**. One of the two cylinders should be full prior to transport, and one should contain not less than $\frac{1}{4}$.

To open the Inhalo oxygen cylinder, turn the grey valve on the side of the cylinder anti-clockwise. Only open one cylinder at a time, and open one prior to commencing a transport. **It is important that at the completion of a transport the oxygen flow meter, ventilator oxygen rotameter and the oxygen cylinder are all turned off.**

Oxygen Supply Indicator

The manual indicator switch must be used to indicate the oxygen supply source. Oxygen **will not be delivered** unless this is carried out*. Always ensure supply is available before changing the indicator i.e. when preparing to leave the referring hospital, change the indicator to 'INTERNAL' **before** disconnecting from wall oxygen.

Note: To preserve transport cot oxygen supplies, the oxygen hose on the transport cot must always be connected to another oxygen supply where available; i.e., piped oxygen at a hospital, ambulance/aircraft 'D' sized oxygen bottles or any other oxygen bottle with a regulator.

REMEMBER TO MANUALLY INDICATE WHICH SOURCE IS IN USE*

[*The newer Mansell 'Interstate Cot' has automatic changeover. The cylinders must be turned off for the cot to take from the external hose, turn cylinders on when leaving the hospital/ambulance or aircraft.]

Delivering bag & mask oxygen

Oxygen via bag & mask can be delivered by connecting the green O₂ tubing directly to the flow meter on the top of the Inhalo cylinder and dialing up the required flow, but to preserve the cylinder supply, attach the green tubing to the O₂ flow meter on the right side of the ventilator. The ventilator does not need to be switched on. Ensure a cylinder is open, and that the oxygen indicator is turned appropriately – 'INTERNAL' for cylinder O₂, & 'EXTERNAL' for piped O₂ from the aircraft, ambulance or wall supply*.



Oxygen outlet beneath regulator



O₂ regulator
Open/close valve
O₂ tubing connector

Delivering low-flow nasal oxygen (PBF)

Replace the flow meter with a 'low-flow' flow meter and attach the PBF tubing.

Delivering cot oxygen

Cot O₂ can be delivered utilizing the same methods as bag & mask O₂. Ensure a cylinder is open and the external oxygen hose is connected to the appropriate outlet. Remember to use the O₂ analyser.

How to calculate time that an oxygen cylinder will last:

Time (in minutes) of supply = capacity of oxygen cylinder divided by oxygen flow rate.

A full Inhale cylinder contains 630 litres of oxygen.

For example:

1. A baby is in 100% oxygen, with an oxygen flow rate of 8 l/min using a full Inhale cylinder:
Time of supply = $630/8 = 78$ minutes
2. A baby is in 50% oxygen, with an oxygen flow rate of 3 l/min using a full Inhale cylinder:
Time of supply = $630/3 = 210$ minutes.

A full 'D' sized cylinder contains 1400 litres of oxygen.

WARNING: There is no alarm to indicate when an oxygen cylinder is empty. You will need to observe the level of oxygen left on the cylinder gauges. However, there is a 'disconnect' alarm on the ventilator, which will alarm when the total gas flow is inadequate.

St. John Ambulance oxygen supplies:

Ambulances in the Perth metropolitan area always carries 2 'D' sized oxygen bottles, one of which must be full. There is also a 'C' sized bottle attached to an air-viva and one spare 'C' sized bottle. There are 3 oxygen outlets; 1 at the front left hand side, 1 at the back right hand side and 1 at the front right hand side. The switch for changing to a new 'D' sized bottle is in the front right hand corner of the ambulance. Switching over to a new bottle would normally be the responsibility of the ambulance crew.

Telethon Ambulance:

Carries 2 'D' sized oxygen bottles & 2 air bottles. The new cot (coming in 2011) uses air/O₂ & does not have a compressor.

Royal Flying Doctor Service aircraft oxygen supplies:

All RFDS aircraft including the RFDS Jet carry 5000-7000 litres of oxygen in a combination of 'C' and 'D' sized oxygen bottles and oxygen tanks. Some of the oxygen bottles are removable from the aircraft for use in remote areas.

How to change transport cot Inhale oxygen cylinders

1. New cylinders are stored either in the NETS office, or in the Biomedics room.
2. Turn off oxygen cylinder by rotating the grey open/close valve in a clock wise direction.
3. Empty any oxygen in system by turning on O₂ regulator on top of cylinder. Remember that the gauge will not indicate 'empty' just because of bleeding.
4. Turn regulator off.
5. Unclip both black elastic securing bands from the clips on the carry handle, and then remove pink metal clips.
6. Unscrew white oxygen hose & lift empty oxygen cylinder out.
7. Remove grey protective cover over open/close valve by pulling firmly to the right.
8. Remove grey cover over oxygen port.
9. Place full cylinder in holder.
10. Attach the pink metal clips to the carry handle, and then attach both elastic securing bands to the clips.
11. Attach the oxygen hose. Check that the gauge on the front of the cylinder shows 'full'.



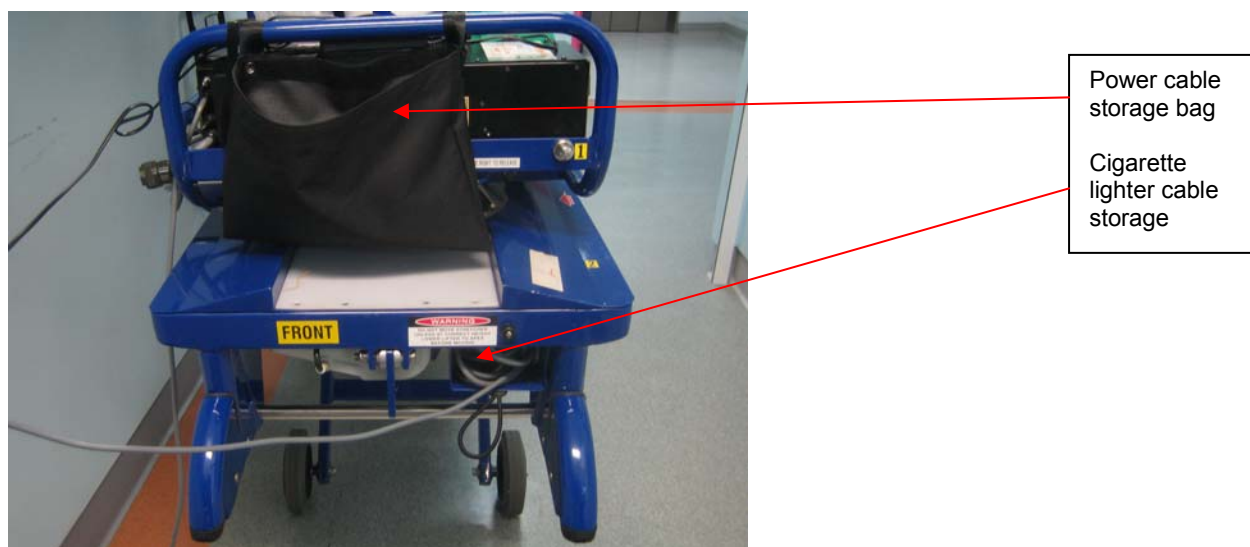
Black
securing
straps

3. Power Lifter

Power Supply

The Power lifter has its own independent power supply, and should be plugged into mains power (AC) at all times. The power cable is stored coiled in a Velcro bag on the cot rail when not connected to mains.

In the case of an electrical failure or flat batteries, a DC cable capable of being plugged into a 'cigarette lighter' socket is available, stored under the front end of the lifter.



Front end of Power lifter: Cable storage

The control panel is at the rear (steering) end of the lifter. For normal use, the power should be switched ON, as indicated by a green 'POWER ON' light on the control panel. During charging, an orange 'CHARGING' light is activated on the control panel. When the batteries are fully charged the orange light will extinguish and the green 'CHARGED' light will activate.

The power lifter can lift its maximum load (190kgs) up and down at least 30 times on a fully charged set of batteries. (Fully loaded, including nitric oxide equipment and allowing 10kgs for a patient, the cot weighs 124 kgs).

When not in use the power lifter should be left plugged into mains but switched 'OFF' to preserve battery power. If the lifter is left switched 'ON' for periods longer than 10 minutes, an automatic timer will switch off the power to extend battery life. Should this happen, the lifter should be switched 'OFF' for approximately 10 seconds, then 'ON' again to operate normally.



Power lifter control panel: power is off, battery is fully charged

After the power has been switched 'ON', the control panel may be used to operate the 'EXTEND' and 'RETRACT' buttons. Whilst standing, 'EXTEND' will raise the cot, and 'RETRACT' will lower it. Any button can be operated in any direction at any time, but this may lead to uneven lifting, causing the cot to tilt.

The cot can be unstable if moved whilst fully extended. It should be lowered ('RETRACT' both front and rear) to a safe height for transport. Leg sections should form an apex.

Always switch the lifter 'OFF' when loaded in the ambulance.

GENERAL INFORMATION FOR NEONATAL TRANSPORTS USING THE MANSELL COT & POWER LIFTER IN THE METRO AREA

1. The Telethon vehicle is located at PMH Emergency Dept and keys held at ward 6B. It is available mon-fri 0730-0030 and Ambulance Transport Officers should use it for all neonatal transfers where possible. Disconnect vehicle power supply from right hand side of the vehicle. Retrievals out of these hours & all Priority 1 transfers will be with the SJA paramedic crew's own vehicle.
2. The Bluey Day Ambulance is located at KEMH Emergency Dept, keys are located in the Area Managers Office in SCN. It is available mon-fri 0800-1600 for cross-site transfers & back transfers.
3. The NETS Team is responsible for the neonate cot and will direct officers to the one which is ready for the transport. They will also ensure equipment bags are correct.
4. Turn power supply for the cot over to battery supply before detaching power from wall. **B1 for out B2 for back.** Note batteries for **B1 and B2** will last for approximately **40 minutes each**.
5. After changing the power supply indicator detach the **AC** power cable for the cot & Power Lifter from the wall and store power leads in the Velcro bag on the end of the cot. The **DC** cable is also stored in this bag.
6. Ensure the unit is at a safe transport height (raise or lower leg sections so centre supports meet to form an apex. **CAUTION: The lifter must never be transported or left unattended in the fully raised position. At the full height the lifter is unstable and can tip over at the front end.**
7. Should there be power failure, the cot is to be removed manually and the lifter removed by lifting it from the vehicle as is in the collapsed state. If the cot is in the vicinity of the ambulance, the cigarette lighter power cable should be attached and the lifter powered in this way. Report problems to PMH Biomedical Services Dept.

'Cigarette lighter' cord storage for power lifter



CORD

LOADING

Two people must control the stretcher. One to operate the controls, the other to support and check.



Markings show optimum height for safe use of the cot & power lifter.

1. Wheel the lifter to the ambulance. Push from the rear end.
2. Remove Ferno Washington Stretcher and store stretcher at the pickup location.
3. Mark 5 vehicles, remove the two floor buttons (if in situ) as shown below. Locate the extension floor plate, aligning the pegs to match floor holes.



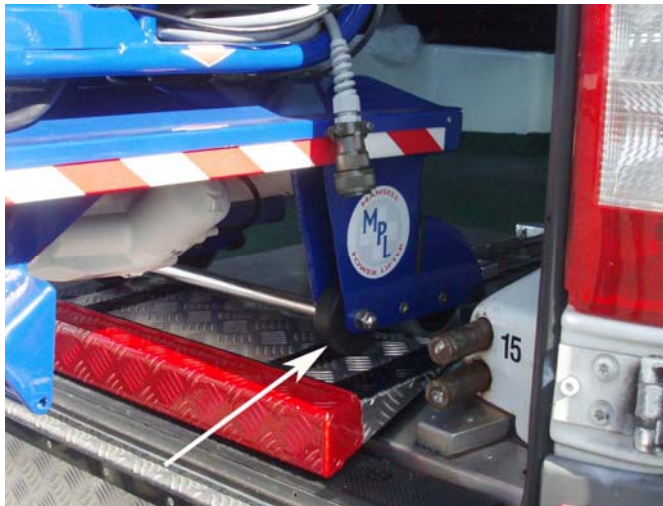
4. Align the lifter squarely to the rear of the open vehicle keeping the load wheels aligned between the black stripes marked on the floor plate **Ensure all power cables are safely stowed to avoid being caught under wheels or in the locking mechanism whilst loading.**



5. Raise the lifter up fully to a working height by pressing the **front** and **rear extend** buttons together.

If the lifter buttons do not work, flick the power button on and off once.

6. Roll the front of the lifter into the ambulance ensuring the 4 front load wheels are safely over the floor plate. Centre the rear two of the wheels on the extension floor plate.
7. Press the **front retract** button on the control panel to lower the front load wheels onto the ambulance. Note: Ensure the rear front load wheels remain centred on the extension floor plate.



8. **Retract** the **front** load wheels fully so the front leg section fully lifts up against the underside of the stretcher.

Caution: As the legs are raised the step may interfere with the transport wheels. Watch carefully; do not allow the transport wheels to jam on the step. See below.



9. As the wheels continue to lift up roll the stretcher into the ambulance. Two people are to hold the lifter in place preventing the lifter from rolling backward.
10. Continue to roll the lifter in until the rear leg section is against the vehicle step.

11. Control stretcher to prevent the lifter from rolling back and retract the rear transport wheels by pressing the **rear retract** button. Note the weight of the stretcher will change noticeably as the vehicle takes on the weight.
12. The stretcher can be rolled further into the ambulance as the leg section lifts fully up.
13. Align the locking mechanism and lock the Ferno floor lock.
14. Remove and store floor plate safely on the back of the cot.
15. Switch the power off on the lifter
16. Plug and screw in the power cord to connect with the ambulance then switch the power to **DC 12 – 28v (external). Make sure the green DC light is on.**
17. Attach oxygen external supply tubing from the cot to the wall supply of the vehicle then switch oxygen supply from 'internal' to 'external'. (Note: Oxygen does not have to be connected if there is no patient in the Neocot).

UNLOAD

1. Switch oxygen supply back to 'internal' then disconnect the oxygen from the ambulance.
2. Switch power supply back to B1 or B2 then disconnect power supply from the ambulance.
3. **Switch on the power to the lifter.** Pull the lifter out from the vehicle so that the rear load wheels are located centre on the floor plate
4. Lower the rear transport wheels by pressing the **rear extend** button. Watch the leg section as it is lowered. The lifter will push outward as the leg section moves against the vehicle floor/step. Extend rear to full height.
5. Once the lifter is supported on the rear transport wheels, roll the lifter out from the ambulance floor leaving the rear front transport wheels centered on the extension floor plate.
6. **Caution:** control the rolling movement of the lifter so the centre loading wheels remain on the ambulance floor until the weight is transferred onto the transport wheels.
7. **Caution:** During the next stage two people must view both the front load wheels and the front transport wheels and step. Press the **front extend** button and watch carefully as the front transport wheels lower. Ensure the wheels do not catch on the vehicle step or that the load wheels roll from the vehicle floor.
8. **Extend front** transport wheels **fully** so that the load wheels lift clear from the vehicle floor.
9. Pull the lifter clear from the vehicle. Lower the stretcher to a safe transport height. Leg sections meet to form an apex.



10. Remove floor plate and leave with the Mansell cot at end of journey.
11. Attach the external power supply to the vehicle.

4. The Neocot (Incubator)



Manufacturers' recommendations are that the incubator is switched on at all times with the temperature set between 30 – 36°C. It is not recommended to try to heat the Neocot from cold in the ambulance as the cot may demand more power from the ambulance batteries than is available. To increase the cot temperature whilst on DC power, increase the setting gradually or the incubator may alarm, and may require to be powered by battery until AC power is available.

Set the incubator at 32°C.

To switch on, press and hold the capsule power button on the control panel. Wait for ~15 seconds before pressing any of the control buttons to allow initialisation. The system goes through a self-check, with all the indicator lights going through red, to yellow and then to green. Normal operation is indicated by a green light. The heater will default to 36°C, and should be manually adjusted using the ↓ button, to a setting of 32°C. When the 'set temperature' shows green, the present set temperature is indicated. After a few seconds the temperature display automatically reverts to the measured internal temperature, and the green light will go out.

The heater is not servo-controlled, and must be manually adjusted to the infants' requirements.

The infant temperature reading is taken by a skin probe (T2) **attached to the Propaq monitor**. The read-out shows as **T2** and flashes alternately with the ventilator temperature (T1) at the top right hand of the monitor screen.

The incubator has a Perspex hood that rotates back fully for access. Ensure both access panel doors are secure before attempting to rotate the hood. Prior to lifting the canopy, pull back and rotate the catch at the outer right side of the incubator. This catch acts as a locking

devise when the hood is both fully open, and when it is closed. Always rotate the hood fully open or fully closed. Never leave it partially open to prevent injury to the infant or damage to equipment and cables.

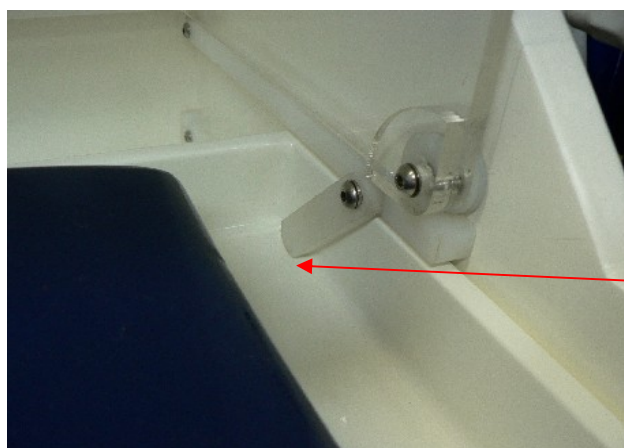
The Neocot has a radiant heater, with heat delivered down through the roof of the incubator. The radiant heater is controlled by rotating the knob at the right side of the control panel. The heater can be used with the canopy open and when the incubator is switched off. It is important to monitor the infants' temperature regularly whilst using the radiant heater as it is not linked to the electronic monitoring system.

A warning alarm will sound every 14 minutes and the heater lamp will indicate red at this time as a reminder that the heater is in use.

There are two outer locking devices at either side of the incubator that allow the inner platform to be pulled out and forward. Both devices must be unclamped to be able to pull the platform out. A locking foot is located on the inner right side of the canopy, to hold the mattress platform in place. This locking foot must be correctly positioned to ensure the platform does not pull all the way out and fall. Ensure all locking devices are placed correctly whilst the cot is in use.

To secure the patient safety belt, pull the inner platform out slightly. This makes access to either the front and back securing bars easier to reach.

Outer
locking
mechanism



Locking foot

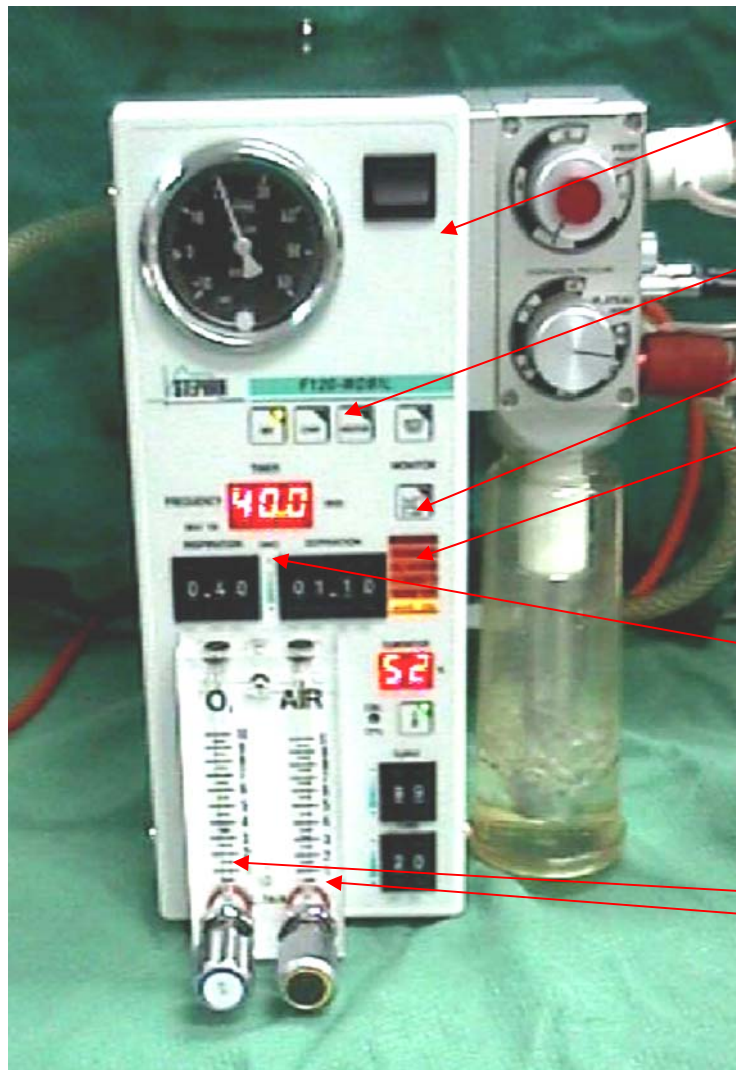
5. Stephan Reanimator F 120 Ventilator

Standard Ventilator Settings

The ventilator should routinely be started on the following settings and altered according to patient needs. The pressure setting should be read from the pressure gauge only.

PIP	20
PEEP	5
Inspiratory time:	0.4 sec
Expiratory time:	1.1 sec
This will give a rate of:	40 breaths per minute

Ventilator front panel



ON/OFF Switch

IMV function key **ON**
CPAP function key
Heater **ON/OFF**

Alarm Silence key

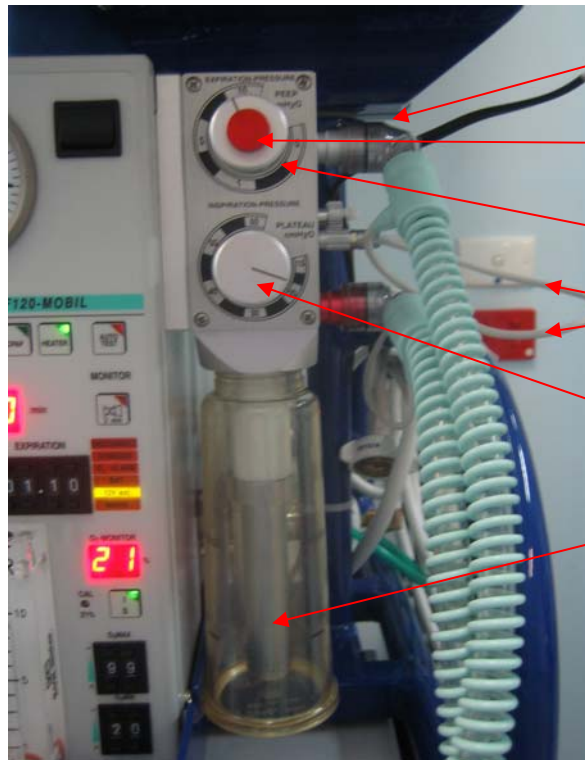
Power source
indicator lights

Rate display.
Inspiratory and
expiratory times
settings

Gas flow rotameters

Oxygen

Air



Swivel connectors

Red manual breath button

Peak end expiratory pressure (PEEP) control

Inspiratory and expiratory tubing heater connections

Peak inspiratory pressure (PIP) control

Humidifier bottle

Ventilator: patient block

Ventilator Circuit Assembly

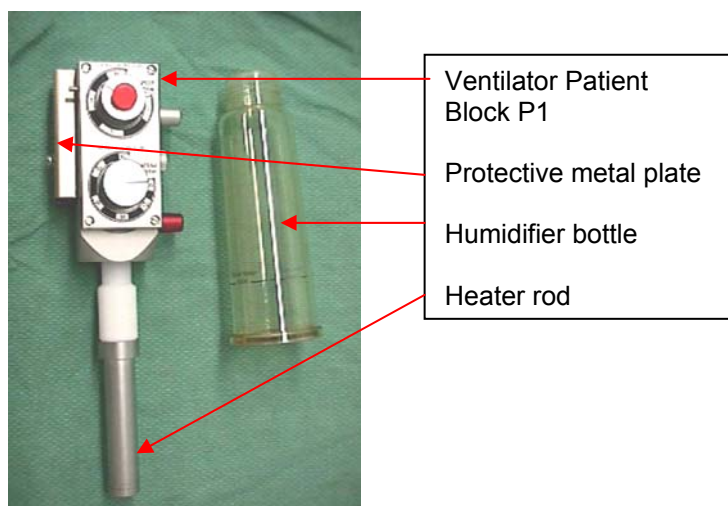


Heater connections

Swivel connectors

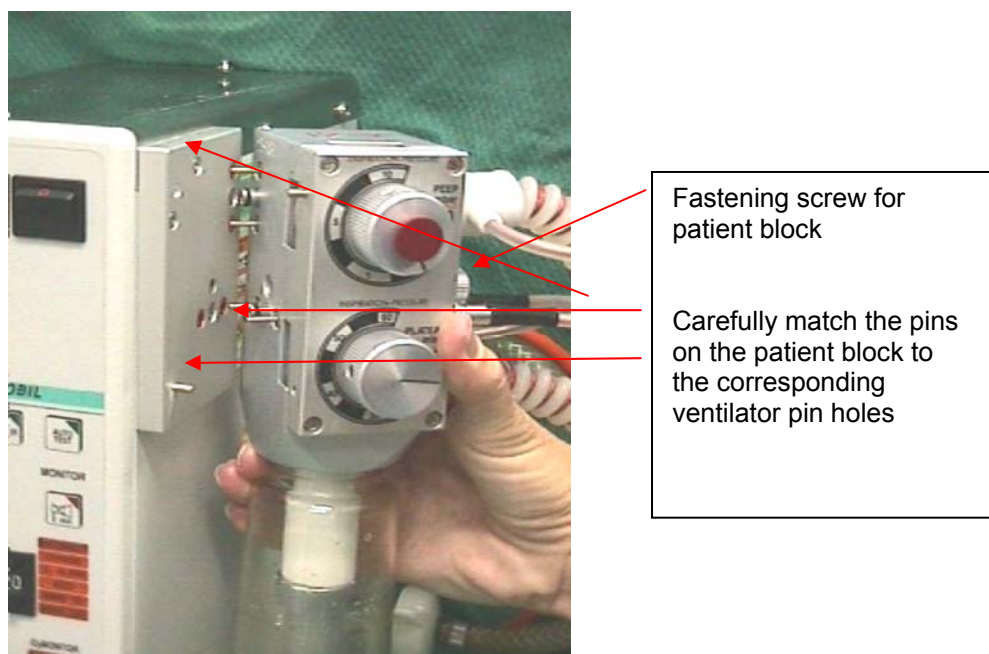
Temperature probe connection port

Ventilator circuit



Ventilator block with protective plate and humidifier bottle

1. Obtain a clean circuit, ventilator patient block and humidifier bottle.
2. Check that the metal heater rod is firmly screwed to the white plastic connection, and screw the whole rod firmly into the patient block. Ensure that the rod has not been cross threaded when attaching.
3. Screw the humidifier bottle to the patient block.
4. Carefully attach the ventilator patient block to the ventilator, matching up the pins.



Attachment of patient block to the ventilator.

5. Tighten large fastening screw – firm but not over tight.
6. Both the inspiratory tubing and the expiratory tubing have heater connections that connect below the fastening screw. The connections can go in either hole.

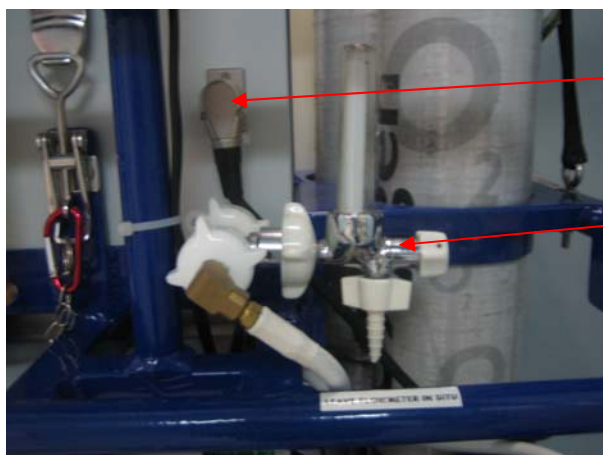
NOTE: Connect heater connections carefully, matching the red dots on the side of each metal connector. DO NOT FORCE THEM

7. Attach swivel connectors to both arms of tubing before connecting them to the patient block. These connectors protect the circuit from continual bending and splitting. (Spare swivel connectors are stored in the NETS shelves in the compactus).

8. Attach one arm of the patient circuit to the top silver connector on the patient block (expiratory tubing).
9. Attach the second arm (the one that has the connector for the temperature probe) to the bottom red connector on the patient block (inspiratory tubing).
10. Connect the ventilator temperature probe to the Y-piece of the circuit and to the Temperature 1 (T1) socket on the left-hand side of the Propaq monitor.

Testing ventilator function

1. Check both transport cot "Inhalo" oxygen cylinders. At least one cylinder must be full and the other must contain more than 1/4. Open one of the cylinders **ensuring the oxygen indicator is turned to 'INTERNAL'**. * see interstate cot instructions for variation.
2. Check that standard settings for inspiratory time, expiratory time and pressures are correct.
3. Turn the O₂ rotameter flow to 8 l/min.
4. Switch on the ventilator. The air rotameter can now be turned on and the O₂ rotameter reduced.
5. Turn both to 4 litres and check that the O₂ analyser shows approximately 60% oxygen. Press & hold the 'AUTO TEST' button. The ventilator will perform a self-check, which includes 5 audible alarms and 5 rapid breaths. Then let the ventilator run at the standard settings for a few breaths.
6. Unplug the 12V cable on the right side of the ventilator to ensure the ventilator will run on battery. Plug the cable back in before switching the ventilator off.



12V lead in situ on Rt side of ventilator

O₂ flow meter
(replace with 'low-flow' PBF flow meter when required)

12V power cable and oxygen flow meter on Rt side of ventilator

Note: Inhalo cylinders cannot be replaced with 'C' sized oxygen cylinders.

The air supply is provided by the compressor in the ventilator. The ventilator entrains environmental air to provide the required oxygen concentration. The total flow rate should be 8 litres a minute. To achieve high pressures with a short Inspiratory Time, flow rates of 10-14 litres/minute may be necessary.

O ₂ Flow (l/Min)	Air Flow (l/min)	O ₂ Concentration
8	0	100
7	1	90
6	2	80
5	3	70
4	4	60
3	5	51
2	6	41
1	7	31
0	8	21

O₂ and air mix concentrations (total of 8 l/min)

- Check that the internal ventilator O₂ analyzer is switched on (green light should be illuminated).
- Set the desired O₂ high and low alarms. Remember that there is no alarm when the O₂ cylinder runs out so it is important to set a lower limit.
- (Calibration of the internal O₂ analyzer is done by biomedical staff when the ventilator is serviced).

WARNING: Excessive gas flow (>15 l/min) can 'push' water from the humidifier into the patient circuit.

Setting the rate

The rate is set by selecting an inspiratory time and then calculating the expiratory time that will deliver the desired rate. Pushing the buttons above the inspiratory and expiratory settings display lower than that number, & vice versa.

Default setting: **Inspiratory Time 0.4 Expiratory Time 1.1** This gives a rate of **40 BPM**

1. Set the desired inspiratory time (IT).
2. Alter the expiratory time to deliver the desired rate.

NOTE: Never change the rate by increasing the inspiratory time.

As a guide, the following table gives the required expiratory times to deliver different rates when the inspiratory time is 0.4 sec.

INSPIRATORY TIME = 0.4 sec	
Rate	Expiratory Time
10	5.6
15	3.6
20	2.6
25	2.0
30	1.6
35	1.3
40	1.1
45	0.93
50	0.8
55	0.69
60	0.6

Ventilator humidifier

The humidifier should be used for both ventilated babies and those on CPAP. The humidifier needs to be filled before the circuit is attached to the baby.

1. Detach the bottom arm of the inspiratory tubing from the patient ventilator block.
2. Using a 20ml syringe filled with sterile water, carefully fill the humidifier chamber through the red inspiratory connection outlet. Fill to the line with sterile water (approximately 65 mls).
3. Do not 'squirt' water in as this will result in the water washing back out of the port.
4. Remember to reconnect the inspiratory tubing to the patient block.

Humidifier special precautions

- **Ensure that the patient circuit drapes in the space between the ventilator and the incubator so any 'rain-out' in the patient circuit will collect in the lowest part on the circuit.**
- **Handle the patient circuit with care. Keep it lower than the baby at all times. Elevating the circuit may result in 'rain-out' entering the baby's airways.**



Disconnect inspiratory tubing and **slowly** syringe in sterile water via the red port.

Filling the humidifier through the inspiratory connection outlet.

Refilling the humidifier during transport

1st person: Ensure that an Inhalo oxygen cylinder is open. (The oxygen indicator may be at 'External' if the cot is connected to either the hospital, ambulance or aircraft oxygen supply. **Do not change the indicator:** you can only bag directly from the cylinder). Connect the baby to the bagging circuit, and hand-ventilate.

2nd person: Turn off the ventilator alarms and disconnect the inspiratory limb from the patient ventilator block. Carefully refill the humidifier reservoir as described above.

Ventilator heater

1. Ensure that the ventilator temperature probe is attached to Temperature 1 (T1) on the Propaq monitor and a temperature reading is displayed on the top right of the screen.
2. Check the high alarm on the Propaq monitor T1 is set at 37.1°C. (Do not alter this parameter).
3. Turn on the heater on the ventilator front panel.

- **WARNING: The heater is not servo controlled so there may be a danger of overheating when the air temperature is above 30°C. Always continuously monitor the ventilator temperature on the Propaq monitor. The circuit should be warm but not hot when touched.**
- **Turn off the ventilator heater when T1 reaches 37.1°C. Turn it back on when T1 is 35°C.**
- **If there is no temperature probe, or the probe does not work, do not use the heater.**

Ventilator power source

AC power - Plug in the mains power cord.

Even though mains power is in use, the 'MAINS 12V' (older style ventilator) or '12V ext' (newer style) light is lit on the alarm panel on the Stephan ventilator.

Ambulance and aircraft power

Plug in 12/28v power lead (stored under the main battery unit at the back of the cot).

When operating on ambulance or aircraft power, the **'MAINS 12V'/'12V ext'** light is lit on the alarm panel.

Ventilator internal battery

Where there are no other power sources connected, the ventilator will automatically run off an internal battery. When on internal battery power, the '**ACCU**' or '**BAT**' light is lit on the alarm panel. The internal battery can operate the ventilator and heater for 45 minutes. After this time the heater will switch off and the ventilator will continue to run for a further 90 minutes. Turning off the ventilator heater will preserve the life of the internal battery and extend the time you will be able to run the ventilator. Remember to put a humidivent mini in the circuit.

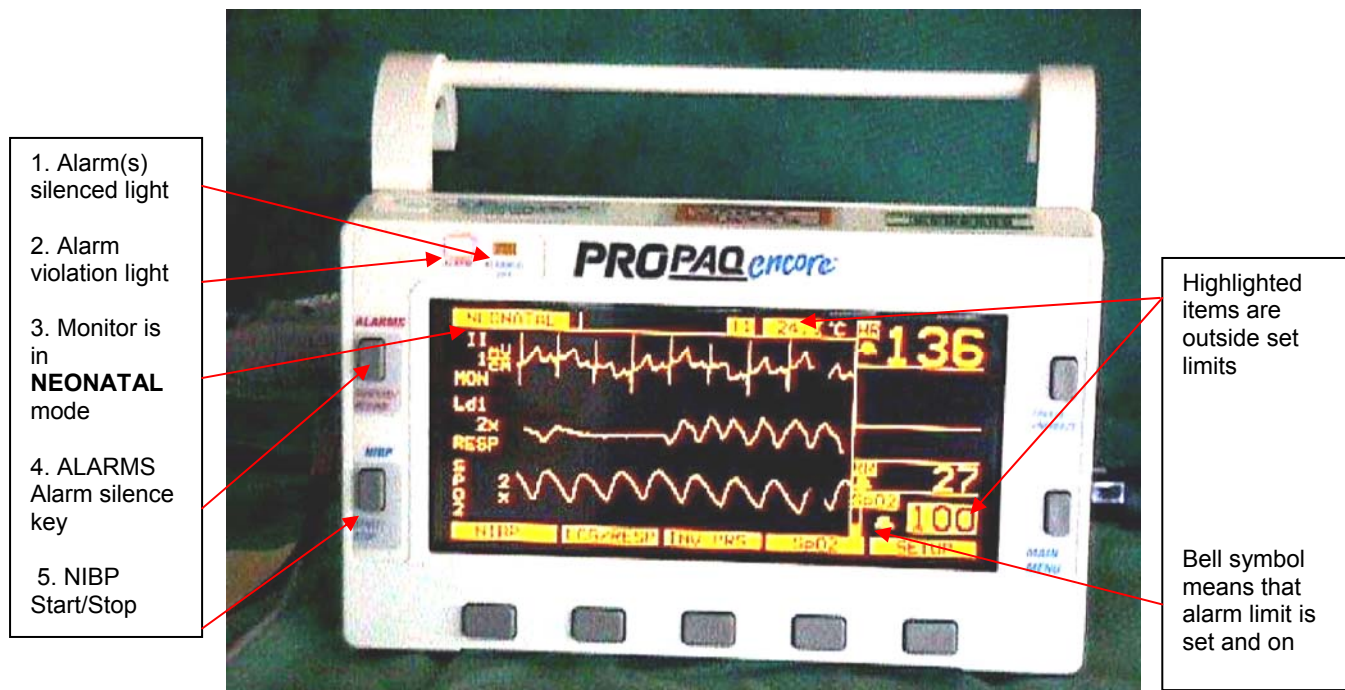
Ventilator power failure

If the ventilator power fails, it is possible to ventilate the baby using the preset pressures. As the compressor providing air for the ventilator is electrically driven, only 100% O₂ can be used when there is no power.

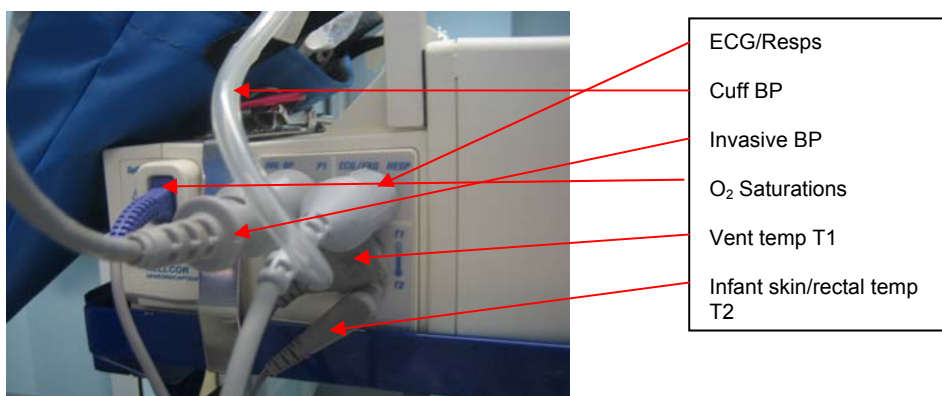
1. Turn up O₂ flow to 8 l/min.
2. Depress red button located in the middle of PEEP dial. Each time the button is pressed, a breath (of the preset pressure) is delivered. OR
3. Hand-ventilate using the Laerdal bag and oxygen.

6. PROPAQ MONITOR

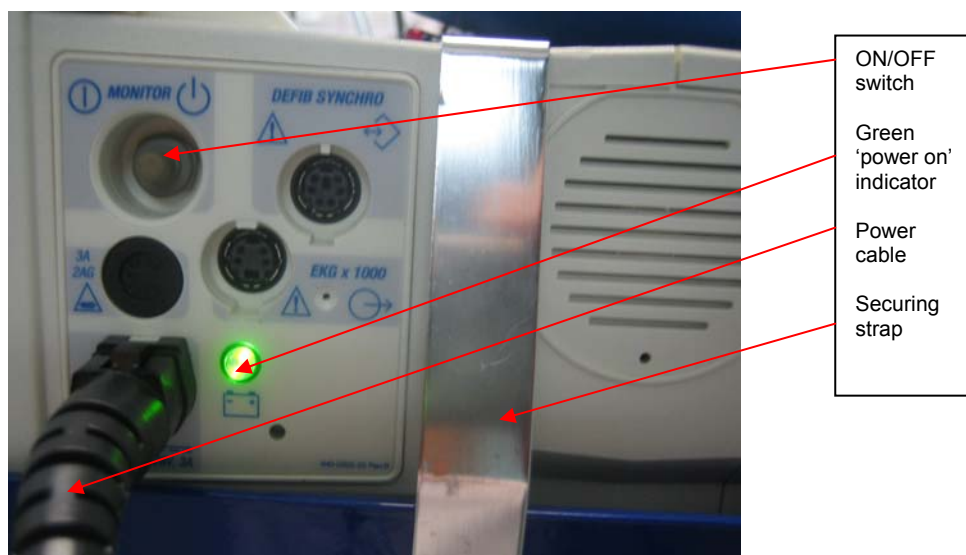
The Propaq Vital Signs Monitor is a portable intensive care monitoring system offering the facility to monitor a range of parameters simultaneously. The parameters monitored on transports are: SpO₂, ECG, respiratory rate, infant skin or rectal temperature, invasive blood pressure (art line, UAC), non-invasive blood pressure and inspiratory gas temperature in various combinations.



Propaq monitor: front screen



Propaq monitor: left side view



Power Sources

The Propaq uses whatever power source the transport cot is connected to.

Note: The monitor will not recharge whilst the DC power source is in use.

When fully charged, the Propaq can run on its own battery for about 4.5 hours. This will be shortened if multiple functions are used, particularly the NIBP function.

Start-up

- Turn on the monitor at the power switch on right hand side.
- The default monitoring mode should always be on 'NEONATAL' which will be displayed in the top left hand corner of the screen.
- If the default mode reads 'PAEDIATRIC' or 'ADULT' change it by:
Pressing **SETUP→MORE**
Go to **PATIENT MODE** and push **CHANGE→NEONATAL**
- Verify change by pressing **YES (cont.....)**
- Then, **MORE→PROGRAM→CURRENT** and **YES**. Without this final verification, the monitor will default to the previous setting the next time it is switched on.

The monitor will now default to the pre-programmed Neonatal alarm settings and BP cuff inflation pressures.

The following parameters can be monitored:

- | | | |
|----|------------------------|---|
| 1. | NIBP | Non-invasive blood pressure |
| 2. | ECG/RESP | ECG trace and respiratory rate |
| 3. | INV PRS | Invasive blood pressure (arterial line) |
| 4. | SpO₂ | Oxygen saturation |
| 5. | T1 | Ventilator temperature |
| 6. | T2 | Infant skin temperature |

All individual parameters (apart from temperatures) can be accessed by pushing the corresponding grey key below the icon on the screen when **MAIN MENU** has been pressed.

Alarms

Alarm settings for each parameter may be altered by going through the following sequence: **MAIN MENU→SET UP→ALARMS→LIMITS→NEXT** (until required parameter reached).

The bell symbol on the screen beside each parameter means that the alarm setting has been set and is active for that parameter.

Should a brief alarm sound that has stopped before the problem was identified, press **ALARMS→LIMITS**. An asterisk (*) will appear next to the vital sign that caused the alarm. Press **NEXT PAGE** to locate all asterisks. Returning to **MAIN SCREEN** will erase all asterisks.

Default Neonatal Alarm Settings

NIBP Mean	30-60 mm Hg
ECG	100-200 beats/minute
RESP RATE	8-80 breaths/minute
INV PRS (Arterial pressure)	
Mean	30-60 mm Hg
SpO ₂	88-100%
T1 (Ventilator temperature)	24-37.1 °C
T2 (Infant skin temperature)	35 – 37.8 °C

Suspending and Reactivating Alarms

- All alarms may be silenced for 90 seconds by pressing the alarm silence button on the top left of the monitor.
- The red alarm indicator at the top of the monitor is illuminated when the alarms are suspended.
- Push the button again to resume alarm monitoring within the 90 second period.

**WARNING: High alarm setting for T1 (Ventilator temperature) is 37.1°C.
DO NOT ALTER THIS.**

NIBP (Non-invasive blood pressure)

Use the correct size single hose BP cuff (#1- #4).

To activate Non-invasive blood pressure (NIBP):

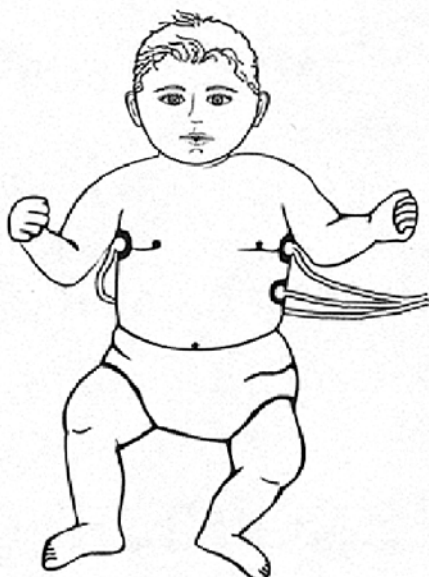
- Press left hand side, bottom button blue **NIBP**

Or

For pre-set automatic inflation:

- Press 1st left hand bottom grey key (**NIBP** on screen) and
 - set to **AUTO**
 - select required interval (generally every 15-30 minutes in transport).

WARNING: This function uses a large amount of power and should be used with caution when the monitor is operating on battery power.



Neonate 3-lead Configuration

Optimum lead placement

Place chest leads at nipple level, lateral to nipple. Not on the front of the chest.

Place 3rd lead on bottom rib, left side of chest.

ECG/RESP (Heart and respiratory rate)

The size of either the ECG or respiratory wave can be altered by pushing

MAIN MENU→**ECG/RESP**→ followed by the relevant key.

INV PRS (Arterial pressure)

The Propaq invasive pressure monitoring lead is used with the Abbott single use pressure monitoring transducer.

Once attached to the primed monitoring line, zero the pressure by:

- Opening the transducer to air
- Press **ZERO P1** and wait for the monitor to indicate the pressure has “zeroed”
- Return the 3 way tap to the usual position, replacing the white cap with a yellow one.
- Return the monitor to “Main Screen”

SpO₂ (Oxygen saturation)

Only Nellcor reusable or disposable oximeter probes can be used with the Propaq monitor. If for some reason the connecting cable is missing, the Nellcor saturation probe will connect directly to the Propaq monitor.

T1 (Ventilator temperature)

This is the temperature of the inspiratory gas from the ventilator and must be displayed at all times when the ventilator is in use, whether for IMV or CPAP. The temperature sensor is situated in the Y-piece in the ventilator circuit.

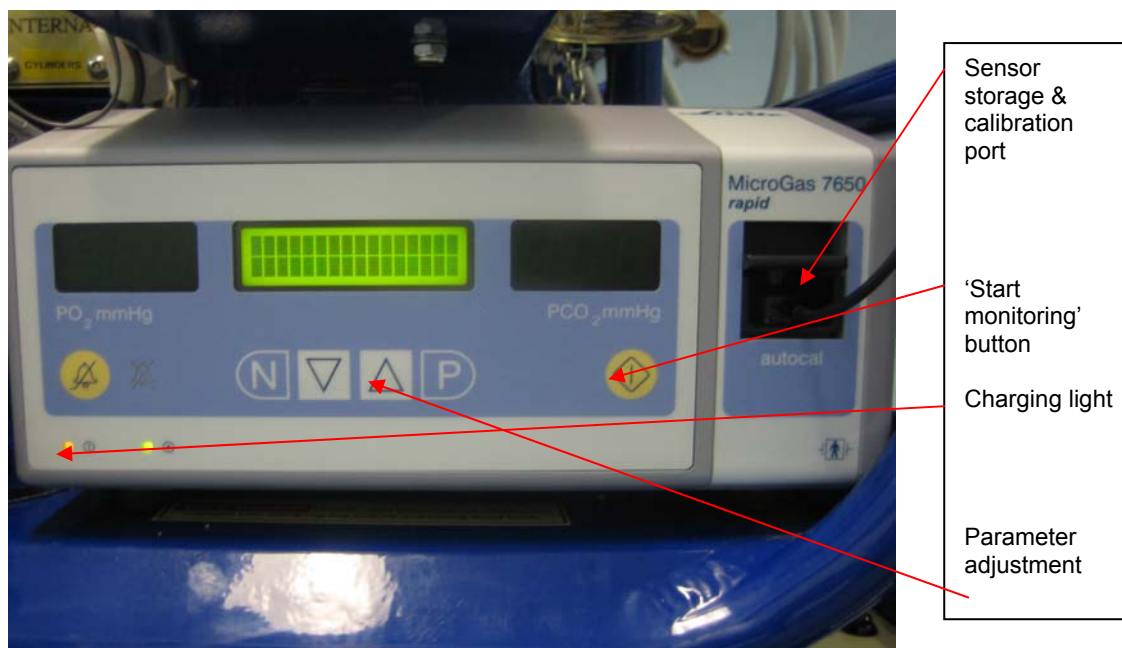
T2 (Infant skin temperature)

The temperature probe is not disposable. The reading flashes alternately with T1 at the top right hand of the Propaq monitor screen.

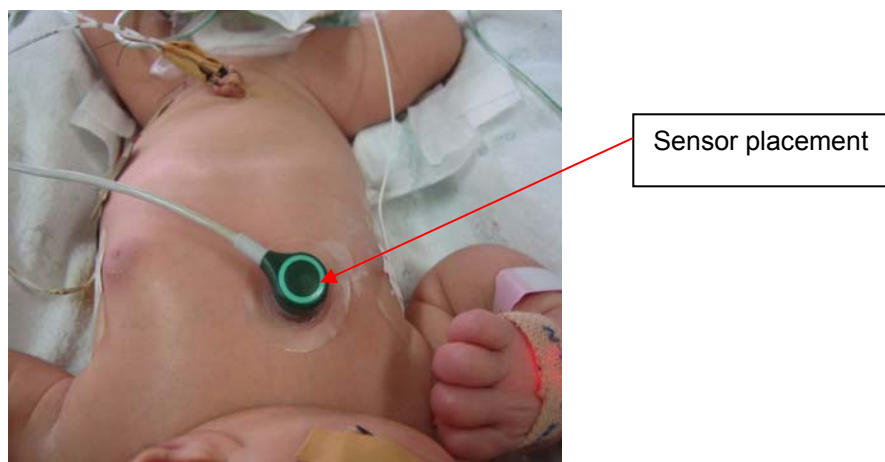
Default settings are: Upper - 37° C Lower - 35° C

For encephalopathic infants who require rectal temperature recordings, replace the skin temperature probe and cable in T2 with the rectal temperature probe and cable provided in the 'COOLING' esky.

7. LINDE MicroGas 7650 Transcutaneous Monitor (integrated calibrator).



Transcutaneous monitoring (TCM) measures the partial pressure of oxygen and carbon dioxide that passes through the cutaneous layer of the skin of a patient by attaching a sensor to the surface of the skin. In neonates the most suitable sites are centrally located, such as the left or right sides of the thorax, just below the clavicle. (TCM is not recommended in infants < 27 weeks gestation unless specified by medical staff).



Calibration is performed automatically whenever the unit is switched on and the sensor is placed into the calibration chamber. Calibration time on average is 2+ minutes.

Power is supplied by connection to the Neocot's mains/battery supply. The ON/OFF button is on the rear of the monitor between the calibration gas bottle and the power inlet for the battery adaptor. For optimum usage, the monitor should be switched on and calibrated at least once every week and **immediately prior to leaving on a transport**. Each gas bottle contains on average enough gas for 300 calibrations. When the gas bottle is empty, the message "GAS BOTTLE EMPTY. CHANGE GAS BOTTLE" will show.

The calibration gas switches on automatically – an audible 'click' can be heard. Once the sensor is calibrated, the middle window will show 'READY TO USE', **Leave the monitor switched on until it is required for use at the referring hospital.** A calibration is performed automatically every 4 hours and the monitor is ready to use at any time.

Every 14 days, the sensor is programmed to ask for automatic remembrance and this will be indicated in the middle window with the following message: 'S. REMEMBRANED? If the sensor is still in good condition, take the sensor out of the housing port for 30 secs, then reinsert it & press the ▲ 'YES' key. If remembraning is needed then remembrane the sensor as described below, and confirm the preparation by pressing the ▲ 'YES' key. If 'YES' is not accepted, switch the monitor off for 10 seconds then switch on again to reboot. Remembraning kits are available in the NETS office.

The parameter key - **P** - is used to select all parameter settings. These can be adjusted by pressing the up ▲ and down ▼ keys. If the up or down key is held down for more than one second, the parameter is changed accordingly.

Adhesive rings and Contact gel are stored in the blue bag on the back of the Propaq.

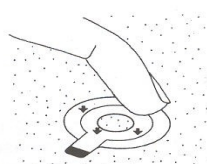
Apply the adhesive ring to the skin as per instructions and press the 'start monitoring' key ◇. The timer starts when this key is pressed.

MicroGas

Linde

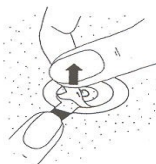
B. The adhesive ring is first attached to the skin

1.



Remove the adhesive ring from the foil by pulling the blue tab. Attach the ring to the monitoring site and press gently to fasten it.

2.



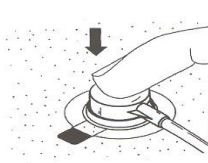
Lightly press down the blue tab and lift the inner cover ring.

3.



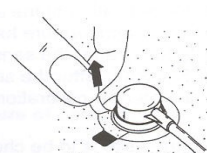
Apply a small drop of "Contact Gel" to the skin area in the centre of the adhesive ring.

4.



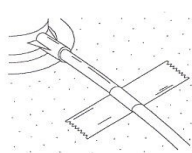
Attach the sensor to the adhesive layer in the centre of the ring and press sensor gently against skin to spread the "Contact Gel".

(5).



It is impractical to use the outer ring during monitoring (in case of uneven skin area) it can be removed by lifting the ring at its edge adjacent to the blue tab.

6.

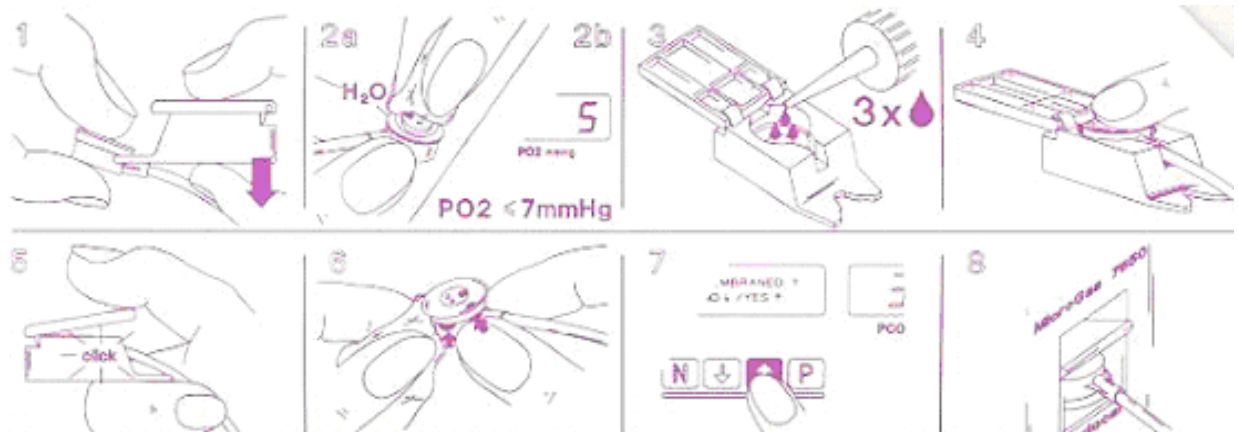


It is recommended to secure the cable with adhesive tape at a distance of 5 to 10 cm from the sensor head.

Instructions for sensor attachment –

Alternatively you can attach the ring to the sensor then stick it on to the baby.

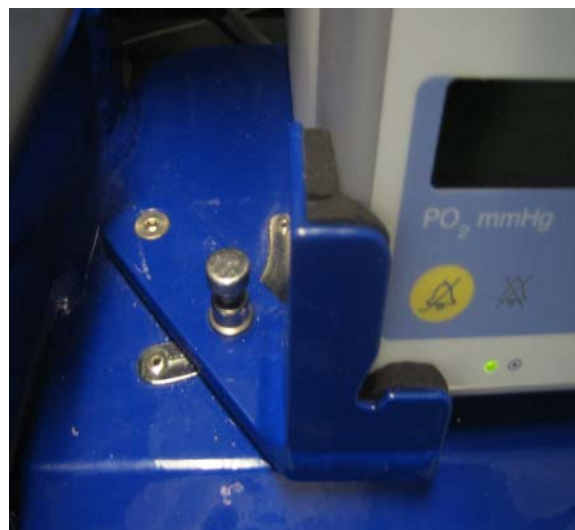
Remembraning the sensor



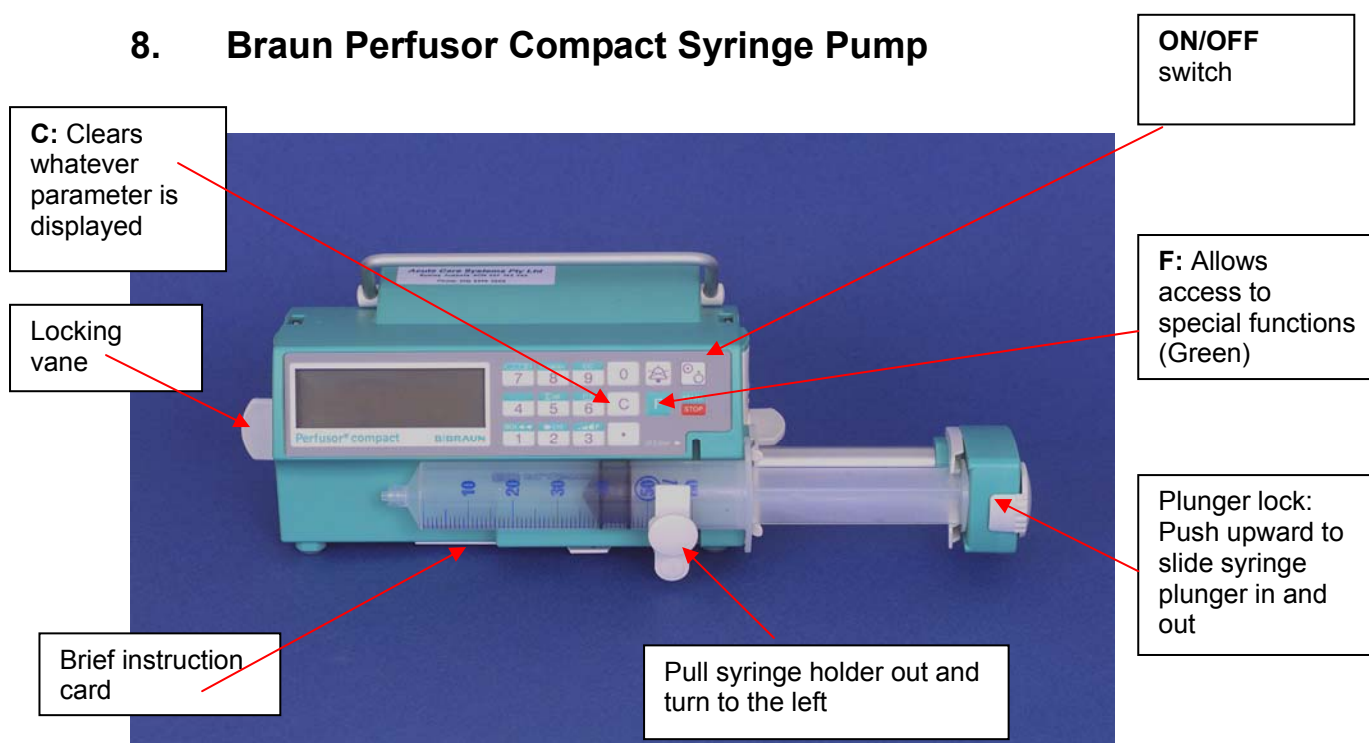
To change the calibration gas bottle

Lift the silver locking pin holding the corner bracket in place at the right hand corner of the monitor. Swing the corner back and to the left. Pull the monitor gently forward until it is **half way out**.

Do not pull out completely as this will damage the power cord. Balancing the monitor in one hand, unscrew the gas bottle and replace with a new one. (Stored in the compactus). When replacing the monitor ensure the back right hand corner sits against the groove in the cot, and be careful not to snag the sensor cable. Ensure the corner bracket clicks back into place.



8. Braun Perfusor Compact Syringe Pump



Function Key Operation

When the green **F** (function) key is pressed and **F** is displayed on the right hand side of the screen, a range of special functions are available by selecting the relevant key.

These special functions allow you to:

Deliver a bolus (**BOL** ←←)

Read the volume infused (Σ ml)

Preset a volume limit (\rightarrow | ml)

To start: Hold **ON/OFF** switch (top right hand corner) for approximately 2 seconds. A self-test will be automatically carried out.

Insert syringe: Each pump is labelled and set with the correct code number for a BD 50ml syringe. Ensure that the syringe code on the pump is set for the correct syringe type. (if not see [Syringe Codes/Changing Syringe Code](#) below).

Set rate: Once the syringe type has been accepted the rate may be entered by pressing the numeric keys. The pump will deliver rates from 0.1-99.9 ml/hr in 0.1-ml increments.

Start infusion: Press **START/STOP** button.

Altering the rate

1. Press **STOP**.
2. Press **C** (Clear).
3. Enter the new rate.
4. Press **START**.

Delivering a bolus (old Braun's)

- Press and hold **F** then press and hold **BOL** ←←.
- There will be a beep every time 1ml is delivered.
- The infusion is only delivered while the keys are depressed.
- The total bolus delivered is included in the total volume infused if the pump is not on hold.

- Stop administering the bolus approximately 0.1-0.2ml short of your desired bolus. This allows for the pump to “run-on” for a moment and prevents extra fluid being administered.

Delivering a bolus (new Braun S)

- With the infusion running. Press F then press BOL once, bolus rate blinks, then press & hold BOL again as long as required.
- There will be a beep every time 1ml is delivered.
- The infusion is only delivered while the keys are depressed.
- The total bolus delivered is included in the total volume infused if the pump is not on hold.
- Stop administering the bolus approximately 0.1-0.2ml short of your desired bolus. This allows for the pump to “run-on” for a moment and prevents extra fluid being administered.

Reading the volume infused

- Press F
- Press Σml.
- The volume infused will appear in the display window.

Clearing the volume infused

- Press STOP
- Press F
- Press Σml
- Press C
- Press F to go back to the rate display.

Presetting volume

- Press STOP
- Press F
- Press → | ml
- Enter the volume required
- Press F to go back to rate
- Commence the infusion.

Clearing a preset volume

- Press STOP
- Press F Press → | ml
- Press C to clear the volume
- Press F to go back to rate
- Recommence the infusion

Syringe codes

The pump will take a limited number of other types and sizes of syringes. When a compatible syringe is inserted, the following codes are usually automatically displayed. This list is also found on the white plastic sheet under the pump. Press F to accept the syringe. If the correct syringe code is not displayed, follow the instructions to change the code.

Changing the syringe type

Turn on the pump. The current syringe type will be displayed

Press F

- Press the green ‘syringe’ key (top left hand key, with 7 in white)
- Press C (clear)
- Enter the new syringe code (see table previous page)
- Press F to confirm
- Insert the new syringe and commence the infusion as usual.

WARNING: Newer pumps have different syringe codes. The pumps are identified by a label found in the syringe well on each pump.

Braun syringe pump, compatible types and sizes of syringes and code numbers

SYRINGE TYPE	CODE NUMBER	
	OLD	NEW & COMPACT 'S'
OPS 20 ml	20	
B-D PLASTIPAK 20ml	21	24
B-D PLASTIPAK 30ML		31
OMNIFIX LL	22	
OPS 50 ml	50	
PROINJECT 50 ml	51	
OMNIFIX 50 ml	52	
B-D PLASTIPAK 50/60 ml	53	61
TERUMO 50/60 ml	54	54
SHERWOOD 50/60 ml	55	







Alarms

In case of alarm, a bell symbol flashes in the bottom left hand corner of the display. The symbol for the cause of the alarm also flashes on the screen.





Alarm sources (Source: Perfusor® compact , instructions for use. B(BRAUN)

Alarms

Causes of Alarm

- ▶ Audible alarm: the alarm signal blinks in cases of alarm.
-  Battery empty, battery pre-alarm beginning 30 min. before the battery is empty.
-  Pressure alarm because of an occlusion; automatic bolus reduction.
-  Pre-alarm 3 min. before syringe is empty (only black field is blinking) resp. infusion end.
-  Reminder alarm if the awaited input has not been received and pre-alarms
-  Syringe frame pressure plate has not been correctly positioned.
-  +  Pressure alarm, automatic bolus reduction has been interrupted. Bolus has to be reduced manually.
-  Syringe catch at the drive head has not clicked into place.
- ml Volume alarm, quantity reached.
- ▶ Eliminate the cause of alarm and then press the start button. If the alarm sounds again, contact the service unit.
-  Interrupts the alarm for a period of 2 min.

Displays

- F Special function is active
-  Mains operation
- ml Vol. preselection active
-  +  Service mode of operation; blinks when the service interval has elapsed.
-  Operation / Running control

Power Supply

The Braun pumps are powered by connection to the cot's own power source (battery or external power) and also by back up batteries located behind a panel at the rear of the pump. *The approximate battery life is >80 hours if pump running ≤ 10 ml/hr.* The batteries should be renewed when the battery display on the screen has only one of the three bars lit or the "battery empty" or "battery pre-alarm" is given.

Replacing the batteries

1. To detach the pump from the cot frame: unscrew the wing nut situated on the blue frame below and to the left of the stacked pumps. Remove the nut and holding rod, and then lift the metal bracket over the pumps upwards and away from the pumps.



Wing nut to release metal bracket holding Braun pumps

2. Unlock the side vanes (See: Stacking & locking pumps together) and disconnect the black power inlet.
3. At the back of the pump there is a grey metal pole bracket. Release the pump by depressing the black rubber button and lifting the pump out and upwards.
4. Using a Phillips head screwdriver to carefully remove the black plastic screw at the back of the pump. Depress the small green catch at base of the pump and slide the grey cover down.
5. Change the 4 'AA' sized batteries and replace the battery cover.

Stacking and locking pumps together

There are 3 Braun pumps for each transport cot. They are attached by a bracket to the cot frame at the left of the incubator.



- **Locking the syringe pumps together** - Place the pumps on top of each other with the grey connecting slide in the horizontal position, slide it down until it clicks into place. Lock by turning the vane to the vertical position.
- **Unlocking the pumps** - Unlock by pushing the vanes to the horizontal position. Push vane inwards as you lift to disconnect.

9. Medela 'Clario' Portable Suction Device



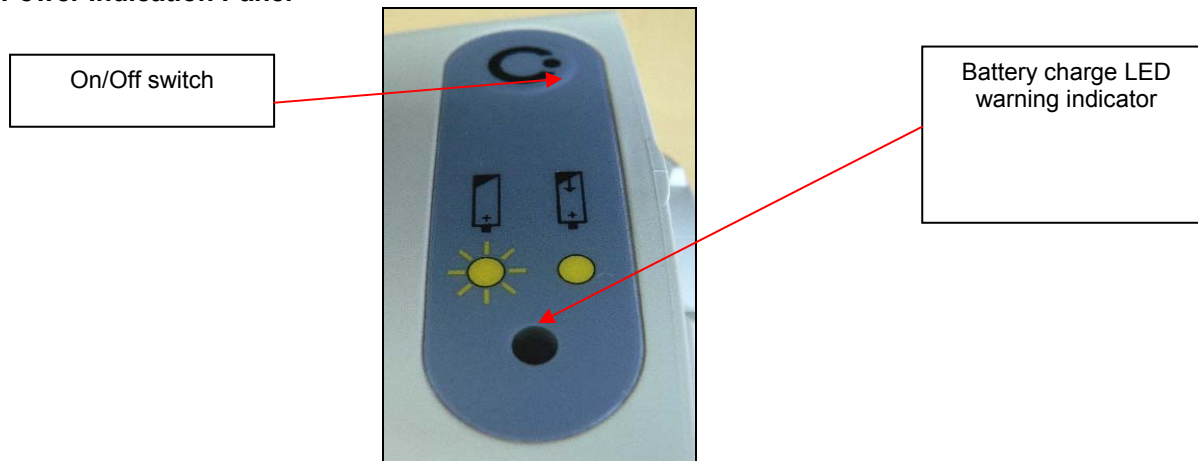
Medela 'Clario' portable suction device

**WARNING: This device is not to be used for the application of continuous suction.
Eg. Chest drains & relogyle tubes.**

- The pump must stand upright when in operation
- Ensure the device is plugged into the mansell battery
- Avoid placing the device where the plug or the on/off switch will become wet or damp.

OPERATING ELEMENTS

Power Indication Panel

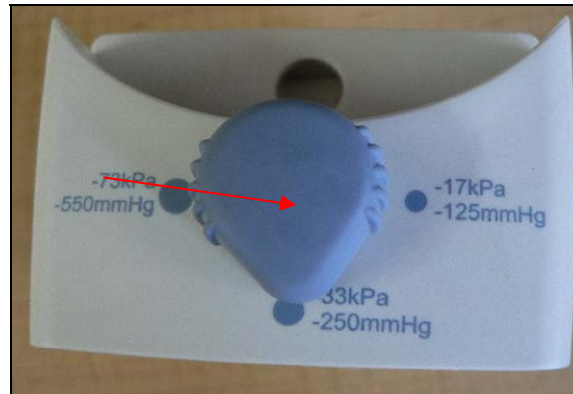


Indicators

Indicator	LED Indicator	Interpretation
During Battery Operation	Does not light up	Rechargeable battery is fully charged or totally empty
During Battery Operation	Blinks	Rechargeable battery has <10 minutes to empty
During Mains Operation	Lights up	Rechargeable battery is being charged
During Mains Operation	Does not light up	Rechargeable battery is fully charged
During Mains Operation	Blinks	Rechargeable battery or mains cable is defective – replace STAT

Suction Control Dial

Suction settings
Use on 250mmHg



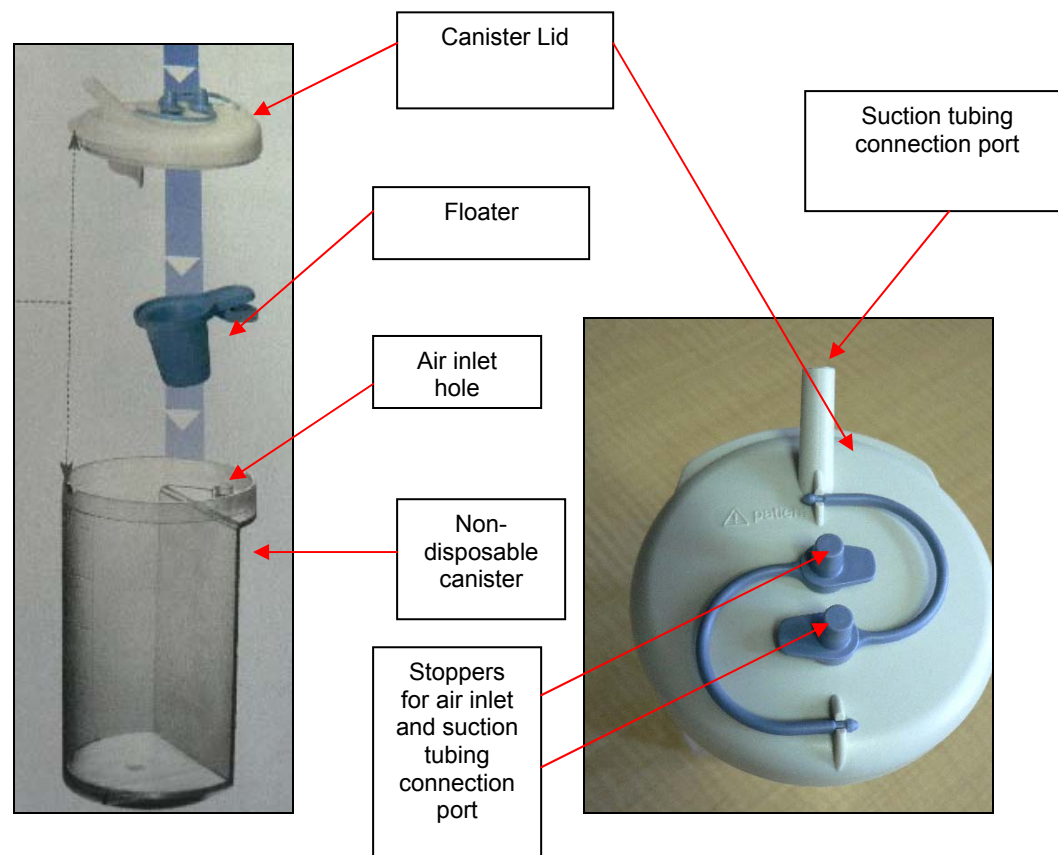
Canister Removal



Pull canister directly upwards to
remove from the unit.

Push canister directly downwards
to reinsert into the unit.

Fluid Collection Canister



New canisters are available from the NETS stock shelves in the compactus at 6B.

Safety Chamber

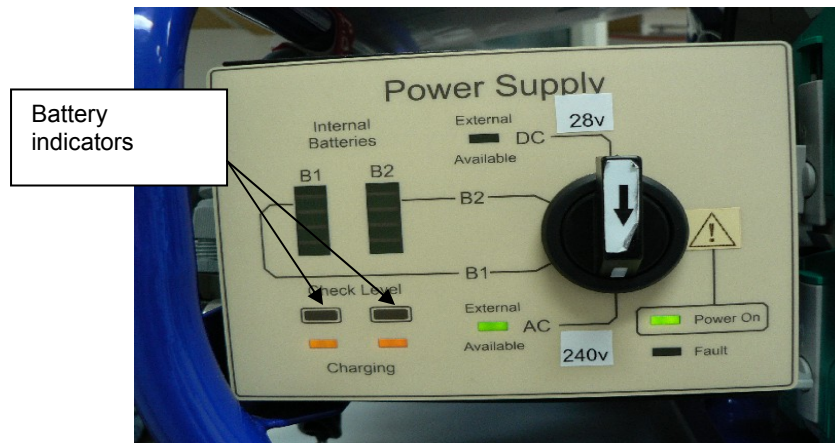


Unlock the chamber by turning it 45 degrees in an anti-clockwise direction. The chamber is then able to be removed from the suction device.

APPENDIX A - CLEANING

Mansell Cot – Cleaning Instructions

Prior to moving the cot, ensure the power indicator is changed to either B1 or B2 (batteries) BEFORE unplugging it. The alarm will sound if the power source that is indicated is not available. If this happens, put your left hand over the round white speaker at the far left of the control panel, (this deadens the noise!) then switch the capsule power OFF (press & hold the 0 button). Change the power indicator to B1 or B2. Remember to change back to 240v AC power once the cot is plugged back in.



Switch off the incubator power using the Capsule Power '0' button.



To raise or lower the cot, switch the power lifter on. Then adjust the height by holding down both of the 'EXTEND' (cot goes up) or 'RETRACT' (cot goes down) buttons together. Switch power off when not in use.



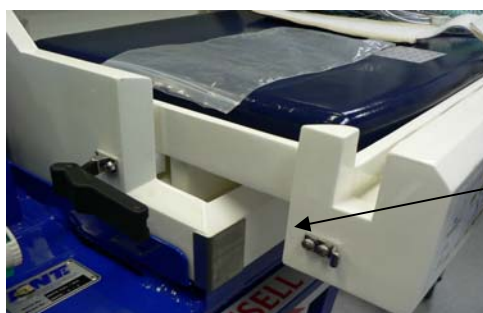
The whole Perspex canopy rotates back to open. Pull out and rotate the catch on the upper right side of the incubator to enable the canopy to lift. (If you don't rotate and hold back the catch it will scratch the Perspex.)



Remove blue mattress.



To remove mattress platform, unclamp the locking devices located on either side of incubator. The platform will then slide part way out. You will need to lift the locking foot located in the right rear of tray to slide the tray fully out.



Locking device open, platform slid part way out

Locking foot in position



To remove bottom platform, unscrew the two wing nuts and then carefully lift the flap and remove the fan. This will then allow the bottom platform to be lifted off.

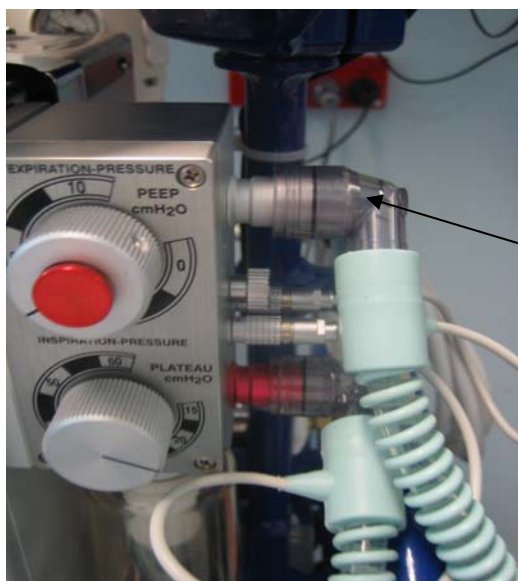


All sections removed are then thoroughly washed with a mild detergent solution, and then rinsed. Assess whether the incubator has been contaminated (blood, urine etc). If so, clean with Hypochlorite 0.125% solution. If not, wipe over with detergent solution.



Note: The rear interior of the cot is only accessible when the canopy is down in the normal position, so the back area needs to be cleaned through the portholes of the incubator.

- ◆ The Incubator is then thoroughly dried along with all the removed sections.
- ◆ All monitor leads need to be wiped over with detergent solution and dried thoroughly. All the equipment on the transport cot and lifter is wiped over carefully with detergent solution so as not to get water into any electrics, and dried thoroughly.
- ◆ If the Medela suction has been used, discard both the canister and tubing and replace.
- ◆ Ensure locking foot is placed correctly.
- ◆ Make up cot as before, ensuring one of the longer seat-belts is used (marked Mansell).
- ◆ Attach the seat-belt at the back, leaving the front loose. (Easiest to do with the both locking devices undone and the platform pulled out. Ensure all ventilator circuits have swivel connections. This allows the circuit to connect to the block without bending.



Swivel
connectors

1. Place canopy down
2. Return cot to storage area
3. Plug cot, Power lifter and suction pump in to mains power.
4. Ensure power indicator is turned to 240v AC power.

PMH / KEMH

Turn the cot on by pressing and holding the capsule power 'i' button. The cot will perform a self check, with the indicator lights changing from red through yellow to green. The alarm will sound when this is done. Put your left hand over the white alarm speaker at the left end of the consul to deaden the noise again. Then set the temp to 32 degrees by pressing and holding the ↓ button.

RFDS

Leave the capsule switched off. Cover the cot with a sheet or other dust protector.

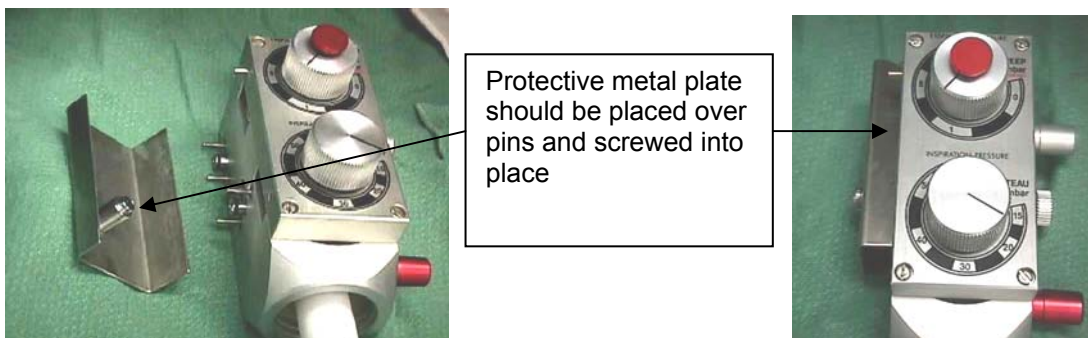
Cleaning in between transports

Not all transports require the cot to undergo a full clean. For most transports a general clean will be sufficient.

Disassembling and cleaning the ventilator

1. Disconnect the ventilator temperature probe from T1 socket, left hand side of the Propaq monitor and remove the temperature probe from the Y-piece on the circuit.
2. Disconnect both arms of the patient circuit from the connectors on the patient block.
3. Loosen the large fastening screw at the side of the patient block and carefully remove the block.
4. Disconnect the heating connectors from the side of the patient block.
5. Disconnect the humidifier bottle from the patient block and empty contents.
6. Cover the ventilator block pins with the protective metal plate by screwing the plate into position.

Protective metal plate for patient block.



7. Place the circuit, bottle and patient block in a plastic bag and send to HSSU for decontamination.
8. Damp wipe the ventilator with neutral detergent solution.
9. Wipe the temperature probe with 70% methylated spirit.
10. Attach a clean circuit, patient block and humidifier bottle and switch on the ventilator to check patency.

Cleaning of the Propaq and accessories

The Propaq monitor, ECG and arterial pressure cables, NIBP connection and cuffs, oximeter probe and skin probe can be damp cleaned with neutral detergent solution using paper towel. Please do not use abrasive cloths on the monitor as this may damage the casing and the screen.

The T1 (ventilator temperature) probe should be disconnected from the Propaq and the ventilator circuit. Wipe the temperature probe with neutral detergent solution followed by special methylated spirit (70%). Reconnect it to the Y-piece of a clean ventilator circuit and to the Propaq T1 socket.

If the medela suction unit not used for an extended period of time. Ensure the front and rear removable valve disc seals are removed and cleaned also. Use warm soapy water, rinse well and dry thoroughly. If heavily contaminated the unit may go to HSSD for cleaning.

Power Supply - Rechargeable Battery Pack



Duration of Operation

At maximum vacuum - 30mins. At minimum – medium vacuum > 50 minutes
Charging time – approximately 5hrs to 100% charged.

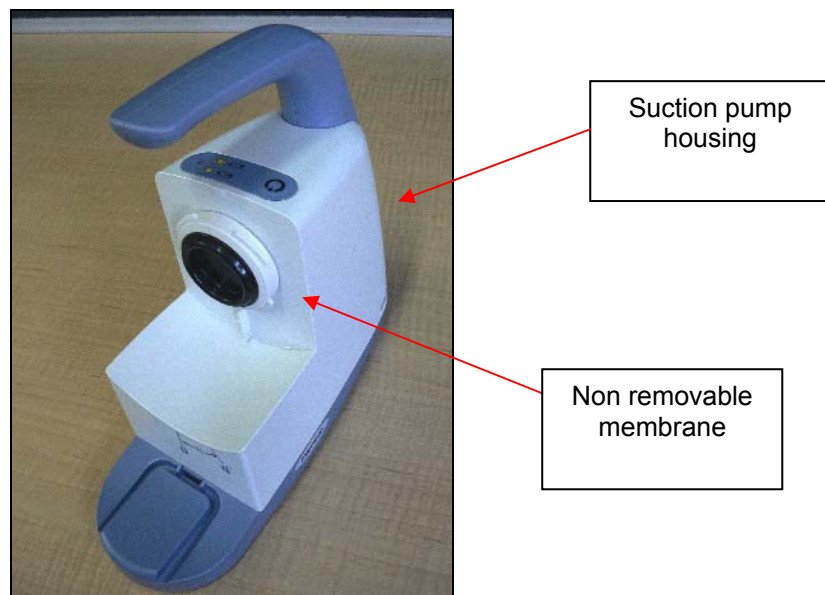
WARNING: Only recharge the unit when the charging indicator blinks slowly

240v Operation



Prior to plugging the unit in to a 240v outlet ensure the cable and plugs are not damaged. The unit is normally powered by the mansell power supply but can be used independently with its own power supply.

Housing and Membrane



General Checks

- Check the membrane and has no tears and is clean
- Check that the floater is attached to the canister and is in good condition
- Check the canister and lid for cracks or areas of discolouration or brittleness
- Are the valve discs in the safety chamber in good condition and do they seal well.

APPENDIX B - BATTERIES

Stephan ventilator and ventilator heater

Standard is 45 minutes. After this time, heater will switch itself off and the ventilator may run for a further 30 minutes.

To preserve power, turn off ventilator humidifier heater sooner.

Approximate running time on each individual internal re-chargeable battery (note: Mansell batteries last approx 40 mins each.)
To conserve Mansell batteries unplug equipment that is powered by Mansell batteries onto their own independent internal battery.

Propaq monitor

4.0 hours. This is reduced by using the NIBP function.

To preserve power, reduce use of NIBP.

Medela suction unit

30 mins if continuous.

Braun syringe pump

Greater than 80 hours if pump running at less than 10 mls an hour.

Change the 4 'AA' batteries when 'battery empty' or 'battery pre-alarm' given. There is about 30 minutes of battery left when the 'battery pre-alarm' starts.

Power Lifter

At least 30 full lifts if fully charged

Note: power lifter battery is separate to the Neocot/ventilator battery.

Transcutaneous Monitor

Minimum 30 minutes. (90 – 120 mins most likely).

APPENDIX C - TROUBLESHOOTING GUIDE

Oxygen Supply		
Problem	Possible cause	Action
No external oxygen delivered to ventilator. ('disconnect' alarm may show, depending how much O ₂ required. Infant will desat.)	The O ₂ indicator has not been changed to 'External' External O ₂ hose not connected to outside source	<ul style="list-style-type: none"> Ensure that the indicator has been changed over. Connect O₂ hose to wall/ambulance/aircraft O₂. <u>Ensure O₂ indicator is at 'External'</u>
No O ₂ flow from hospital cylinder or wall outlet	Cylinder empty Wall outlet faulty	<u>Ensure cot O₂ is switched on & indicated manually while problem is rectified.</u> <ul style="list-style-type: none"> Check hospital cylinder is turned on. Check contents of cylinder. Change to another wall outlet and/or regulator
No O ₂ flow from ambulance flow meters.	Ambulance cylinder empty	<u>Ensure cot O₂ is switched on & indicated manually while problem is rectified.</u> <ul style="list-style-type: none"> Ask SJA officers to check contents of their cylinder & switch over if required
No O ₂ flow from aircraft flow meters	Aircraft cylinder empty	<u>Ensure cot O₂ is switched on & indicated manually while problem is rectified.</u> <ul style="list-style-type: none"> Turn on aircraft O₂ at relevant control point. In B200C and PC12 turn on "D" cylinders if O₂ empty or inaccessible
No flow from cot O ₂ when turned on	Cylinder not open Cylinder empty	<ul style="list-style-type: none"> Open cylinder Select & open 2nd cylinder

Power Supply		
Problem	Possible cause	Action
Cot alarms when unplugged	Power indicator not switched to B1/ B2/DC	Indicate correct power source prior to unplugging cot
		<p>Check if power is getting to the cot If no power conserve batteries as noted below Tag and remove equipment from service on return to base and advise Biomedical Engineering. If power is getting to cot use as per usual and on return to base tag and remove cot from service. Advise Biomedical Engineering.</p>
	Ambulance / aircraft power problems.	<p>Conserve equipment internal batteries by:</p> <ul style="list-style-type: none"> • Turn off ventilator heater • Turn off cot light • Place blanket over incubator • Increase ambient temperature if possible. • Ensure that no fans or air-blowers are on over cot. • Restrict use of Propaq NIBP <p>Notify ambulance crew or pilot that they may have a power problem that needs checking.</p>

Stephan ventilator		
Problem	Possible cause	Action
Disconnect alarm sounds	Patient circuit tubing is disconnected from ventilator or connections are loose.	Check to see if the inspiratory and expiratory limbs of the circuit are connected to the ventilator patient block. Check that the temperature probe and both inspiratory and expiratory limbs of the circuit are firmly attached to the 'Y' piece
	Patient circuit is disconnected from ETT.	Check if the ETT is still connected to patient circuit and re-connect it. Reposition or restrain the baby if necessary.
	Humidifier bottle is loose.	Tighten it if necessary.
	Insufficient gas supply	Ensure that total gas flow is 6-8 litres/ minute & adjust if required. Check to see that O ₂ cylinders are not empty Check wall supply
	No gas flow.	Ensure that the transport O ₂ bottles are turned on. Check contents of cylinder. Change over cylinders if empty Check wall supply
Stenosis alarm	Patient circuit is obstructed.	Check that the patient circuit is not kinked or caught e.g., in incubator door.
	ETT obstructed	<ul style="list-style-type: none"> • Check the baby's air entry. • Suction as required • Institute emergency airway management procedures as needed.
Peak Inspiratory Pressure gauge readout less than set Peak Inspiratory Pressure	Patient circuit tubing is partially disconnected from ventilator or connections are loose.	<ul style="list-style-type: none"> • Check that inspiratory and expiratory limbs of the circuit are connected to the ventilator patient block. • Check that the non-heated parts of the circuit are well secured to the heated (coiled) parts of circuit. • Check that the temperature probe and both inspiratory and expiratory limbs of the circuit are firmly attached to the 'Y' piece

Problem	Possible cause	Action
	Insufficient gas supply	<ul style="list-style-type: none"> • Ensure that total gas flow is 8 litres/ minute. • Check to see that O₂ cylinder is not empty • Check wall supply
	Humidifier bottle is not connected properly or may have a broken seal at the bottom.	<ul style="list-style-type: none"> • Reattach the bottle correctly. • Check for air leaks around base of bottle. • Use sleek to repair as able and replace on return to base.
ACCU (battery) light is illuminated when thought to be connected to AC power	Ventilator 12V power cord is disconnected	Attach 12v power cord to side of ventilator
No external power despite cot being plugged in.	Power indicator not switched over to either B1/B2 or DC 12-28V Faulty power point	Switch over power indicator to appropriate source. Check that the power point is on. Find another power outlet.
ACCU (battery) light on when connected to aircraft or ambulance power	Cot 12/28V power plug not connected to other power source.	Plug in 12/28V power plug to ambulance or aircraft outlet correctly.
	Aircraft medical battery not switched on.	Ask Pilot to turn on medical battery
	Failure of ambulance or aircraft power	Conserve equipment internal batteries as noted above Advice SJA officers or Pilot that there is a problem

Problem	Possible cause	Action
	Switch is in wrong position	Select external DC
No power to ventilator	Flat battery	Manually ventilate the baby in 100% oxygen by depressing the red button on the ventilator patient block at the required rate. Use Laerdal bag to manually ventilate baby Where possible, connect to external power source.
Oxygen concentration alarm	O ₂ concentration required is outside the set alarm limits.	Reset the O ₂ alarm setting to appropriate limits.
	Required O ₂ concentration is 100% Highest O ₂ alarm setting is 99%	While using 100% O ₂ , turn off O ₂ concentration display by pressing the O ₂ ON/OFF switch which is below the O ₂ display. Turn on if change in baby's ventilation needs
Heater temperature (temp 1 on Propaq) greater than 37.1°C	High environmental temperature	Turn off the heater until the ventilator temperature (T 1 on Propaq) less than 35°C. Protect the transport cot from direct sunlight by staying in ambulance, under cover or in hangar while awaiting loading
Heater temperature (temp 1 on Propaq) greater than 37.1°C	Heated (coiled) part of circuit in incubator	Turn off heater until ventilator temperature less than 35°C Remove heated (coiled) part of ventilator circuit from incubator.
	Temperature probe is faulty	Turn off the ventilator heater, as the temperature cannot be monitored. Replace temp probe on return to base and inform Biomed

Problem	Possible cause	Action
Excessive rainout in ventilator tubing	<p>Heated (coiled) part of circuit in incubator</p> <p>Ventilator circuit not draping freely in the space between the ventilator and the incubator</p> <p>Ventilator circuit not entering the incubator through the tubing grommets.</p>	<p>Remove the heated (coiled) part of ventilator circuit from the incubator</p> <p>Remove any items from the space between the ventilator and incubator.</p> <p>Ensure the ventilator circuit enters the incubator through the tubing grommets adjacent to the head-end door.</p>
Humidifier empty	<p>Lengthy transport</p> <p>Leaking humidifier jar</p>	<p>Refill humidifier chamber as per instructions (see P39)</p> <p>If able repair with waterproof tape and replace on return to base</p> <p>Wrap plastic bag around jar to protect cot wiring from drips</p> <p>Insert humid vent onto ETT if unable to fix leak</p>
New patient block hard to attach to ventilator	Patient block problem, e.g. damaged 'O' ring (small black rubber ring), bent connecting pins or improper attachment of block	<p>Check attachment of block and adjust as needed</p> <p>Check pins for signs of damage</p> <p>Try another block, if this fails it may be the mount on the ventilator</p> <p>Send ventilator and/or block to Biomedical Services for checking</p>

Propaq Monitor		
Problem	Possible cause	Action
Green charging light (right side of monitor) not lit when attached to external power source. Monitor running on battery.	Power cable not properly attached	Check attachment of power cable on right side of monitor
	Cot power source not indicated correctly	Indicate correct power source
	Aircraft medical battery not switched on	Ask pilot to switch on medical battery
	Failure of ambulance or aircraft power	Restrict use of NIBP to conserve battery. Notify ambulance crew or pilot of potential power problem.
	Wall power point not switched on or unserviceable	Turn power on at wall Find another power point.
Poor ECG or respiratory trace	Poor contact between skin and leads	Clean skin then apply dots. Run fingernail along contact surface on dot to improve contact with skin. Try to moisten re-useable lead and re-apply Access spare leads in NETS bag & replace

Problem	Possible cause	Action
	Incorrect position of leads	Place chest leads at nipple level, distal to nipple. Place 3rd lead on bottom rib, right side of chest.
Frozen trace	Freeze mode in use	<ul style="list-style-type: none"> • Push 'FREEZE/UNFREEZE' button on top right front of monitor to recommence monitoring
No ventilator temperature displayed for ventilator (Propaq T1)	Temperature probe is not connected to the Propaq T1 socket	<ul style="list-style-type: none"> • Connect probe to the Propaq T1 socket.
	Temperature probe is faulty	<ul style="list-style-type: none"> • Turn off the ventilator heater, as the temperature cannot be monitored. • Replace probe as soon as possible.

Other Equipment

LAERDAL BAG		
Problem	Possible cause	Action
Reservoir bag does not inflate.	No oxygen supply	<ul style="list-style-type: none"> • Turn on the oxygen flow tap.
	Torn oxygen reservoir bag	<ul style="list-style-type: none"> • Patch the hole with tape while on transport. • Replace with new reservoir on return
MANSELL LIFTER Lifting and lowering mechanism does not function	Lifter automatically turns off after period of inaction	<ul style="list-style-type: none"> • Turn lifter power switch on then off to reset.

Braun Syringe Pump		
Problem	Possible cause	Action
'Battery empty' alarm	Flat batteries	Check that mains connectors are attached to rear of pumps. Change batteries on return to base.
'High pressure' alarm	<p>IV infiltrated or blocked</p> <p>Baby occluding site with movement</p> <p>Clamp on T-piece is on or 3-way tap turned off</p> <p>IV tubing kinked or caught in other equipment such as the incubator door</p> <p>Excessive pressure caused when two pumps are in use and infusions connected via 3-way taps, one is running very rapidly and other is running very slowly. The slow pump may alarm 'high pressure'</p>	<p>Check IV site and flush with 0.9% NaCl, if necessary. Remove IVC if tissue</p> <p>Restrain the limb or attempt to settle baby.</p> <p>Check all clamps are off and 3-way taps are open as appropriate.</p> <p>Trace the IV tubing back from the pump to the baby and correct the problem.</p> <p>Use a 'Y' connection, if possible, instead of a 3-way tap. Assess the infusion rates. If neither can be changed, a 2nd IV maybe needed. If rapid infusion for a short period only, assess importance of slow infusion and whether it can be stopped for short time</p>
When syringe inserted, message-53 not cancelled by pushing F	B-D 50/60 ml syringe is not in use.	Re-programme the pump to accept the syringe. Swap to B-D 50/60 ml syringe or other compatible syringe