NZ P97 4110.02

BLOOD REFRIGERATOR
ELECTROLUX RCB42P

NZ P97 OPERATOR MANUAL

Issue 1, Feb 00

AMENDMENT RECORD

It is certified that the amendments promulgated in the undermentioned Amendments Lists have been incorporated in this copy of the publication:

Serial	Date of Issue	Pages Affected	Amended By	Date
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				

THIS PAGE IS INTENTIONALLY BLANK

TABLE OF CONTENTS

THIS PAGE IS INTENTIONALLY BLANK

LIST OF ASSOCIATED PUBLICATIONS

1. Minimum Standards for the Collection, Processing and Quality Assurance of Blood and Medicines Derived from Human Blood and Plasma (GMP).

2. Aust Std 3846-1997.

3. QSTAG 289.

4. Complete Equipment Schedule (CES) 002332.

THIS PAGE IS INTENTIONALLY BLANK

LIST OF ILLUSTRATIONS

THIS PAGE IS INTENTIONALLY BLANK

EXPLANATION OF WARNINGS, CAUTIONS AND NOTES

WARNING

A WARNING SHALL IMMEDIATELY PRECEDE AN OPERATING PROCEDURE OR MAINTENANCE PRACTICE WHICH, IF NOT CORRECTLY FOLLOWED, COULD RESULT IN PERSONAL INJURY OR LOSS OF LIFE.

CAUTION

A CAUTION SHALL IMMEDIATELY PRECEDE AN OPERATING PROCEDURE OR MAINTENANCE PRACTICE WHICH, IF NOT STRICTLY OBSERVED, COULD RESULT IN DAMAGE TO, OR DESTRUCTION OF, THE EQUIPMENT OR CORRUPTION OF THE DATA.

NOTE

A note shall immediately precede or follow an operating procedure, maintenance practice or condition which requires highlighting.

LIST OF WARNINGS

LIST OF WARNINGS

SECTION 1

INTRODUCTION

GENERAL INFORMATION

Scope

101. This manual is for use by personnel responsible for operation and operator maintenance of the Electrolux RCB42P Blood Refrigerator.

102. The refrigerator has been designed to store and transport blood and blood products. The manual has been compiled and written to conform with this requirement in accordance with the following publications:

a. Aust Std 3864-1997.

b. The Minimum Standards for the Collection, Processing and Quality Assurance of Blood and Medicines Derived from Human Blood and Plasma (GMP).

c. The Code for Good Manufacturing of Therapeutic Products. The New Zealand Army Blood Policy details responsibilities and delegated authorities for any army personnel involved in the transportation of blood.

WARNING

BLOOD AND BLOOD PRODUCTS TRANSPORTED IN THE ELECTROLUX RCB42P BLOOD REFRIGERATOR HAVE BEEN SUPPLIED BY CONTRACTUAL AGREEMENT BETWEEN THE NZ ARMY AND THE NZ BLOOD SERVICE. A NUMBER OF STANDARDS (CIVILIAN AND MILITARY) MUST BE ADHERED TO WHEN HANDLING THESE PRODUCTS. FAILURE TO COMPLY WITH THESE STANDARDS WILL BE IN CONTRADICTION TO THE CONTRACT AND COULD RESULT IN SIGNIFICANT LEGAL CONSEQUENCES.

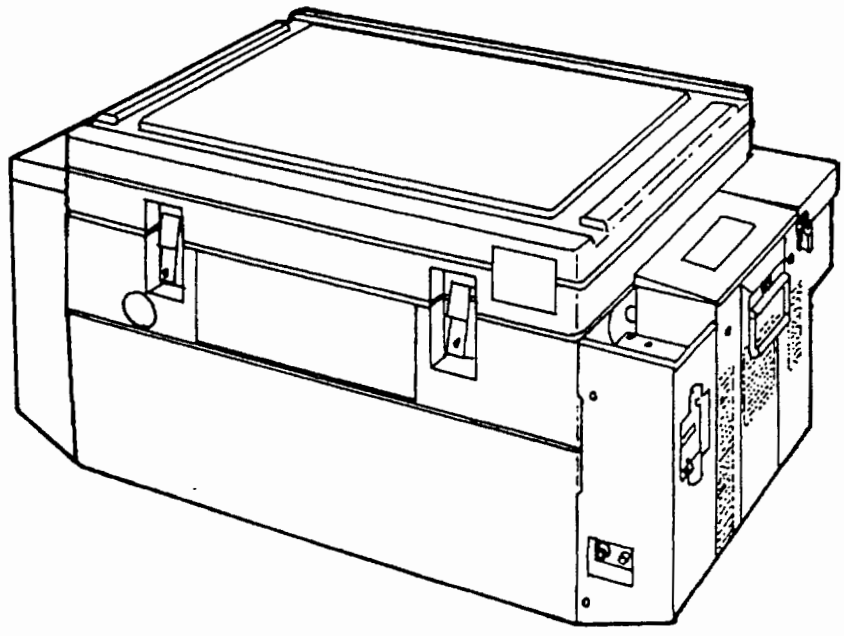

Figure 1-1 — Blood Refrigerator

Function

103. The blood refrigerator is an electrically operated, electronically controlled, 43 litre, insulated thermostabilizer container for the transport of blood products.

104. The blood refrigerator must not be used for the storage of human consumable products e.g. food and beverages.

Capabilities and Features

105. The general features and capabilities of the refrigerator are as follows:

a. two wire baskets with space for 25 (400 mls) blood bags,

b. battery powered dual (internal, external) temperature gauge,

c. independent data logger module,

d. 230 Volt, three pin plug power cable,

e. 24 Volt, Unimog power cable,

f. 24 Volt, Aircraft power cable,

g. 24 Volt, Land Rover power cable,

h. 24 Volt extension cable,

i. 12 Volt vehicle power cable,

j. internal fan unit, and

k. internal temperature probe.

SECTION 2

EQUIPMENT DESCRIPTION

EQUIPMENT IDENTIFICATION

Blood Refrigerator Identification Plate

201. Each blood refrigerator is fitted with an identification plate located on the external rear side of the container (Fig 2-1).

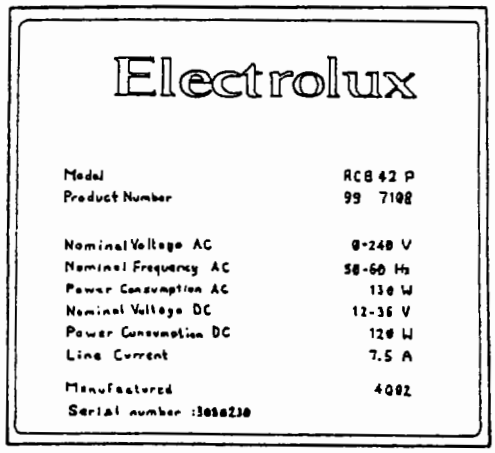

Figure 2-1 — Blood Refrigerator Identification Plate

Specifications

202. The following list details the specifications for the blood refrigerator and its accessories:

a. Length: 970 mm

b. Width: 550 mm

c. Height: 500mm

d. Weight (Empty): 44.5 kg

e. Weight (Loaded): 53.4 kg

f. AC Power Range: 90 to 264V @ 48-62Hz,

g. DC Power Range: 11 to 42V & 90 to 264V.

Terminology

203. The following headings describe the major components referred to in this manual. Numbers after each heading refer to the items locations on Fig 2-2.

a. **Control Panel (1).** This panel contains all the controls required for the operation of the unit.

b. **Dual Temperature Gauge (2).** The dual temperature gauge monitors the internal and external ambient temperatures.

c. **Batteries (3).** Four rechargeable NiCad batteries are used to operate the alarm system.

d. **Power Supply Panel (4).** The connection panel for incoming power supply.

e. **Baskets (5).** Two wire baskets with fabric pockets hold the blood products.

f. **Lid Seal (6).** The rubber seal ring located in the lid seals the interior from the ambient temperatures.

g. **Data Logger (7).** Two sealed data recording devices are positioned in the load area during storage and transportation of blood.

h. **Temperature Probe (8).** A temperature sensitive probe which transmits the data to the temperature gauge and electronic controller.

i. **Fan Unit (9).** The distribution fan and heat exchange module of the refrigeration plant.

j. **Catches (10).** Two positive locking catches to secure and hold the lid in sealed position.

k. **Packing Instruction Sleeve (11).** A clear plastic sleeve to hold the packing instructions.

l. **Circuit Breakers (12).** Two circuit breakers located on the front of the unit will pop out when overloaded, push in to reset.

m. **Carry Handles (13).** Two carry handles are fitted on each end.

n. **Cable Box (14).** The box with hinged lid allows storage for power cables and includes an inner pocket for the Operator Manual.

o. **Power Cables.** A choice of six different power cables depending on the transport vehicle (refer Fig 2 to Fig 8).

p. **Travel Adapter Plugs.** Used to plug NZ power cables into European, UK or USA style AC power outlets (refer Fig 12 to Fig 14.

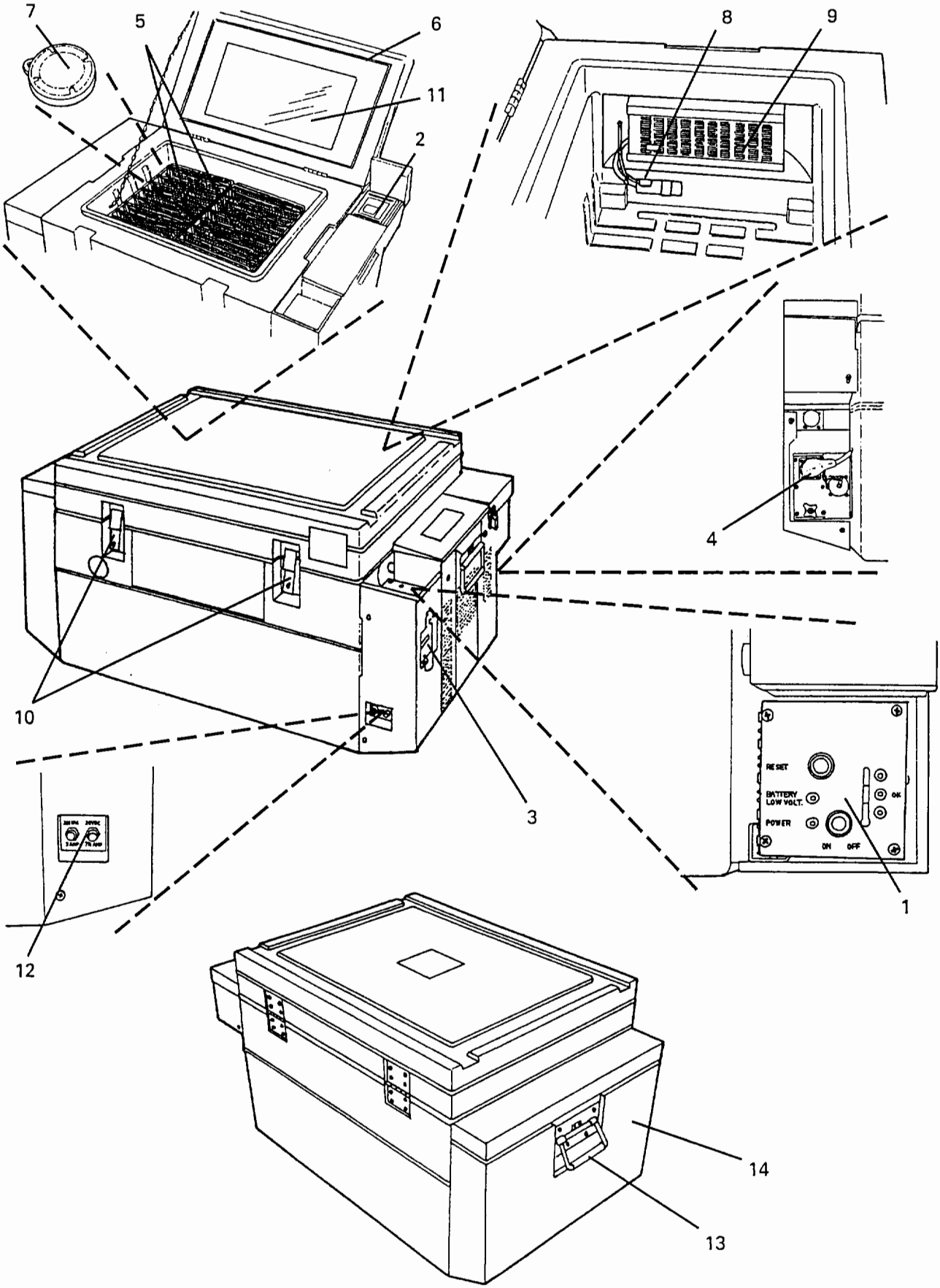

Figure 2-2 — Blood Refrigerator Components

Accessories

204. The Blood Refrigerator accessories (NZCES 2332) are listed in Table 2-1 and Fig 2-3 to Fig 2-11.

Table 2-1 — Accessories

Item	NSN	Description	Quantity	Fig No
1	6150-98-204-4019	Power Cable, 230 volt, c/w PDL56 Series P310 Plug	1	2-3
2	6150-98-204-9885	Power Cable, 24 Volt, Unimog	1	2-4
3	TBA	Power Cable, 24 Volt, Aircraft	1	2-5
4	6150-98-204-9884	Power Cable, 24 Volt, Land Rover	1	2-6
5	6150-13-115-9883	Power Cable, Extension	1	2-7
6	TBA	Power Cable, 12 Volt, Vehicle	1	2-8
7	4140-13-115-6634	Wire Basket	2	2-9 (1)
8	8105-98--205-2671	Pouch (2)	8	2-9 (2)
9	6685-98-205-2607	Data Logger	2	2-10
10	5330-13-115-6132	Lid Seal, Gasket, Two Metres Long	1	2-11
11	5935-66-142-7041	Adapter, European	1	2-12
11	5935-66-142-7042	Adapter, UK	1	2-13
11	5935-66-142-7043	Adapter, USA	1	2-14

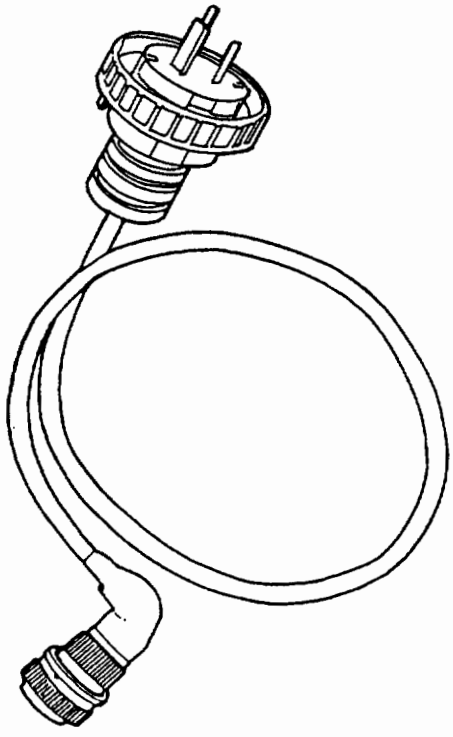

Figure 2-3 — Power Cable, 230 Volt

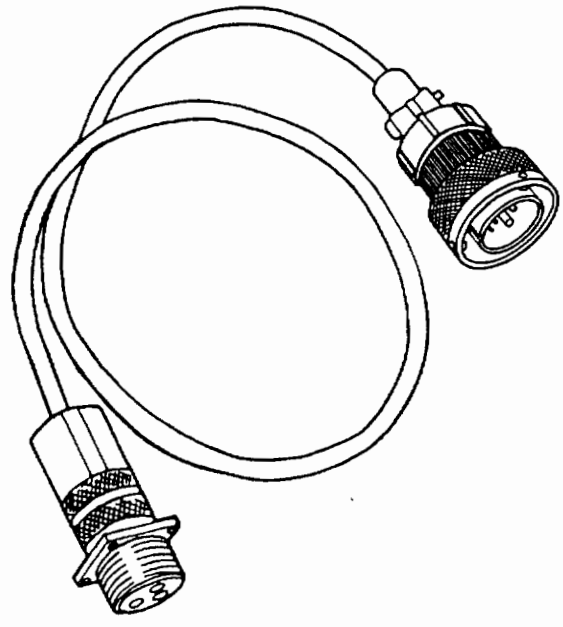

Figure 2-4 — Power Cable, 24 Volt, Unimog

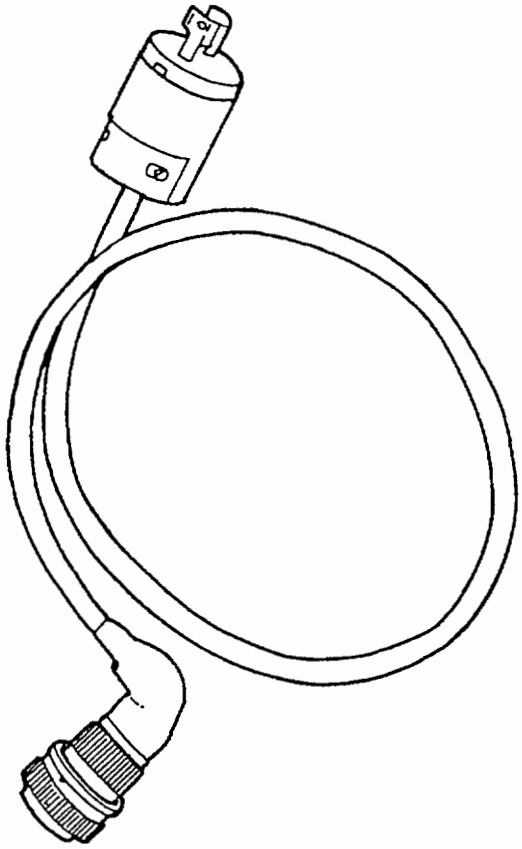

Figure 2-5 — Power Cable, 24 Volt, Aircraft

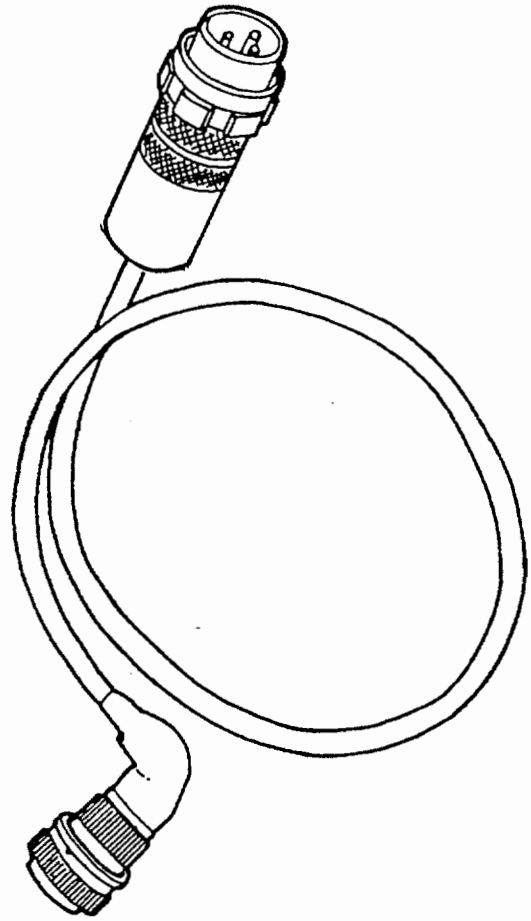

Figure 2-7 — Power Cable, Extension

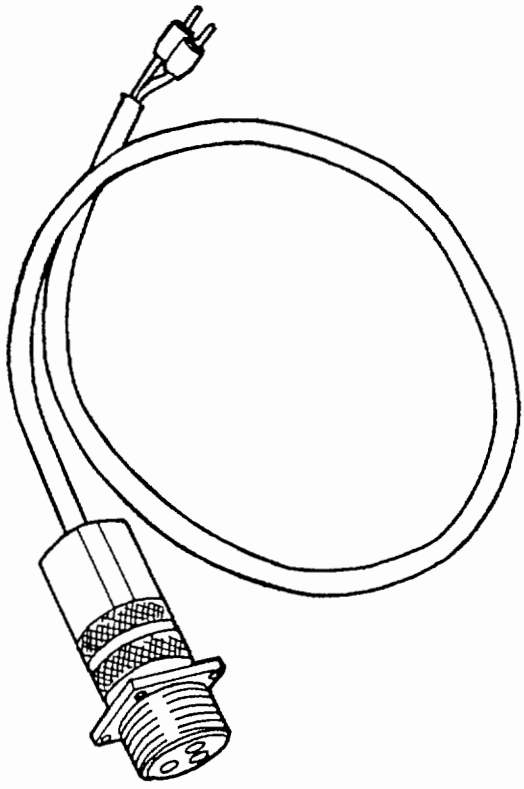

Figure 2-6 — Power Cable, 24 Volt, Land Rover

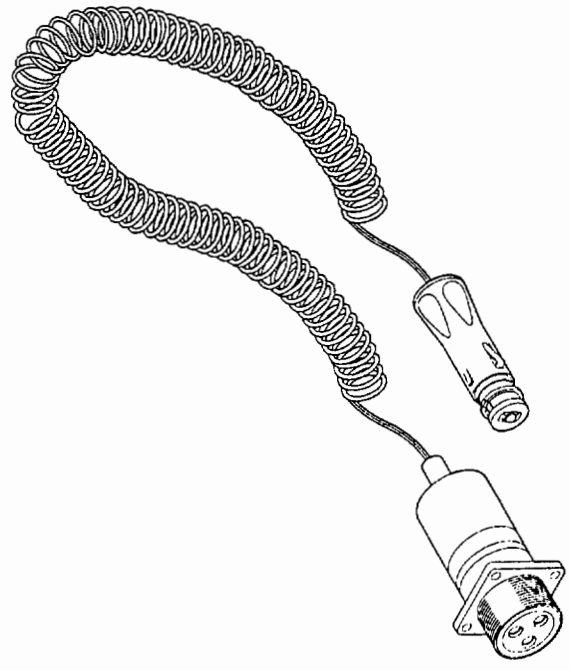

Figure 2-8 — Power Cable, 12 Volt, Vehicle

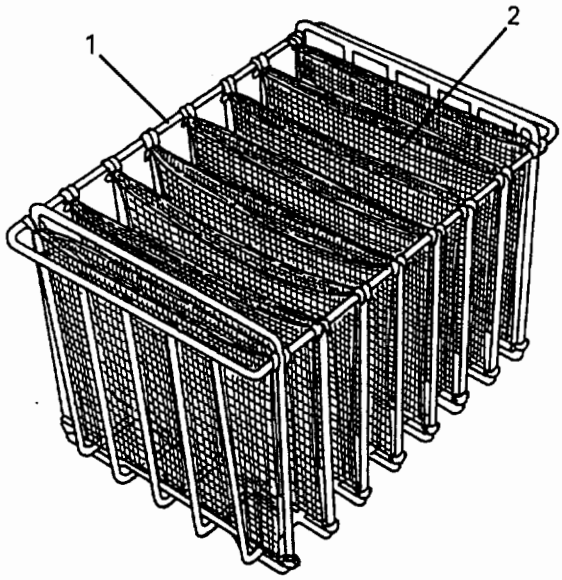

Figure 2-9 — Wire Basket

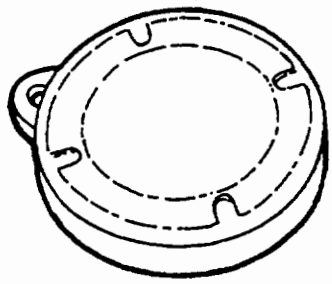

Figure 2-10 — Data Logger

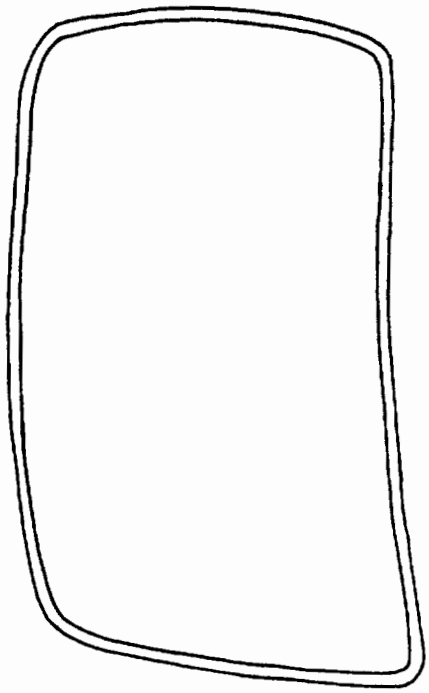

Figure 2-11 — Lid Seal, Gasket, Two Metres Long

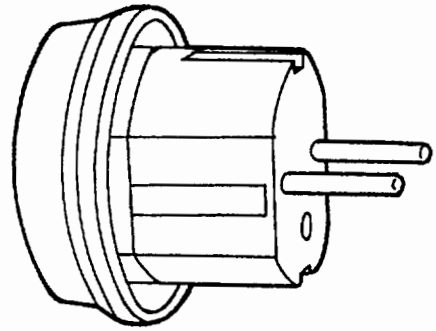

Figure 2-12 — Adapter, European

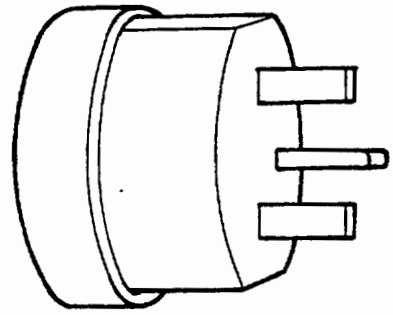

Figure 2-13 — Adapter, UK

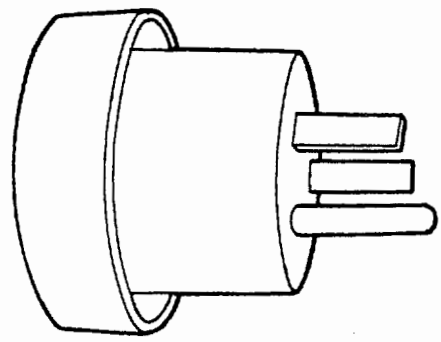

Figure 2-14 — Adapter, USA

Blood Products

205. The products for packing in the refrigerator are listed in Table 2-2 and shown in Fig 2-15 to Fig 2-17.

Table 2-2 — Products For Packing

Item	NSN	Description	Quantity	Fig
1	As per standard unit load	Unit of Blood	A/R	2-15
2		Vial, Sceening Cells	3	2-16
3		Reagent Bottle	5	2-17

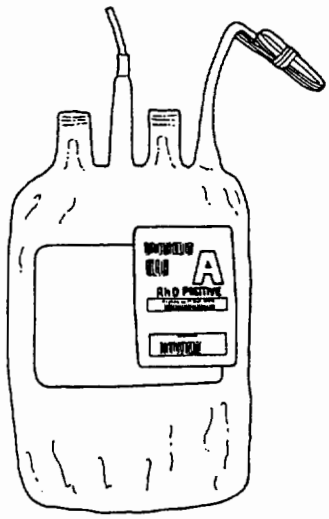

Figure 2-15 — Unit of Blood

Figure 2-16 — Vial, Sceening Cells

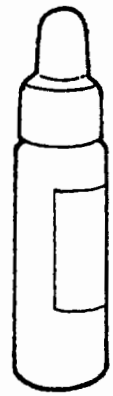

Figure 2-17 — Reagent Bottle

Consumables

206. The Blood Refrigerator consumables (NZCES 2332) are listed in Table 2-3 and shown in Fig 2-18 to Fig 2-21.

Table 2-3 — Consumables

Item	NSN	Description	Quantity	Qty
1	7690-98-205-2670	Label, "Not For Transfusion", Roll	1 Roll	2-18
2	6140-98-107-6582	Batteries, Controller, AA, NiCad Rechargeable	4	2-19
3	6135-01-435-4921	Batteries, Data Logger, NiCad Rechargeable	1	2-20
4	6135-00-826-4798	Batteries, Temp Alert Gauge, AAA, Alkaline	1	2-21
5	6840-99-301-4776	Virkon, Cleaning Agent	1	Not Illustrated

Figure 2-18 — Label, "Not For Transfusion"

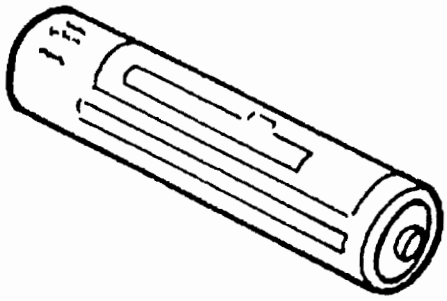

Figure 2-19 — Batteries, Controller, AA, NiCad Rechargeable

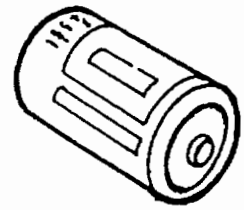

Figure 2-20 — Batteries, Data Logger, NiCad Rechargeable

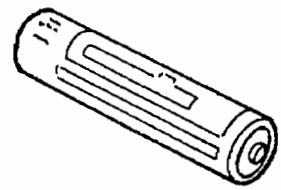

Figure 2-21 — Batteries, Temp Alert Gauge, AAA, Alkaline

THIS PAGE IS INTENTIONALLY BLANK

SECTION 3

OPERATING PROCEDURES

INTRODUCTION

Pre-Start

301. Detailed below are the pre-start requirements prior to using the blood refrigerator:

a. The blood refrigerator requires an Annual Validation. Do not use the refrigerator if the validation period has expired.

WARNING

DO NOT USE THE BLOOD REFRIGERATOR IF THE VALIDATION PERIOD HAS EXPIRED. REFER THE EQUIPMENT TO THE SUPPORTING RNZALR WORKSHOP.

b. To check the validation certificate open the lid of the cable box, the certificate is located on the underside of the lid.

c. Check the physical condition (seepage, swelling and corrosion) of the AA NiCad batteries (refer Section 4, Maintenance),

WARNING

DO NOT USE THE BLOOD REFRIGERATOR IF THE AA BATTERIES ARE FAULTY.

d. Check the condition of the container and lid, and the gasket seal in the lid (refer Section 4, Maintenance),

WARNING

DO NOT USE THE BLOOD REFRIGERATOR IF ANY PART OF THE CONTAINER IS DAMAGED.

e. Connect the power cable for the required application, and check the operation of the entire unit.

WARNING

DO NOT USE ODOROUS CLEANING AGENTS OR POLISHING MATERIALS TO CLEAN THE BLOOD REFRIGERATOR.

f. If the refrigerator interior is dirty or contaminated clean the interior surfaces with "Vircon" and dry carefully.

CONNECTING THE BLOOD REFRIGERATOR TO THE POWER SUPPLY

302. The blood refrigerator is supplied with six different power cables as follows:

a. 230 Volt Mains Power Cable,

b. 24 Volt Unimog Power Cable,

c. 24 Volt Aircraft Power Cable,

d. 24 Volt Land Rover Power Cable,

e. 12 Volt Vehicle Power Cable, and

f. Power Cable Extension.

303. The cables are stored in a side box on the refrigerator.

AC Mains Power

304. Connect the angled socket (1) to the power inlet on the blood refrigerator and the three pin plug (2) to the power supply outlet. Where the European (3), UK (4) or USA (5) power sockets are fitted used the appropriate adapter plug (Fig 3-1).

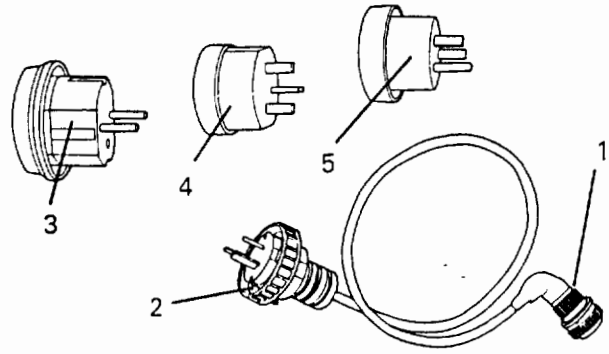

Figure 3-1 — 230 Volt Mains Power Cable

Unimog Power

WARNING

MAINTAIN A MINIMUM OF 100MM CLEAR AROUND THE REFRIGERATOR.

305. Connect the angled socket (1) of the extension cable (2) to the blood refrigerator. Connect the 24 V Unimog cable (3) to the extension cable, and connect the plug (4) to the Unimog outlet socket (5) (Fig 3-2).

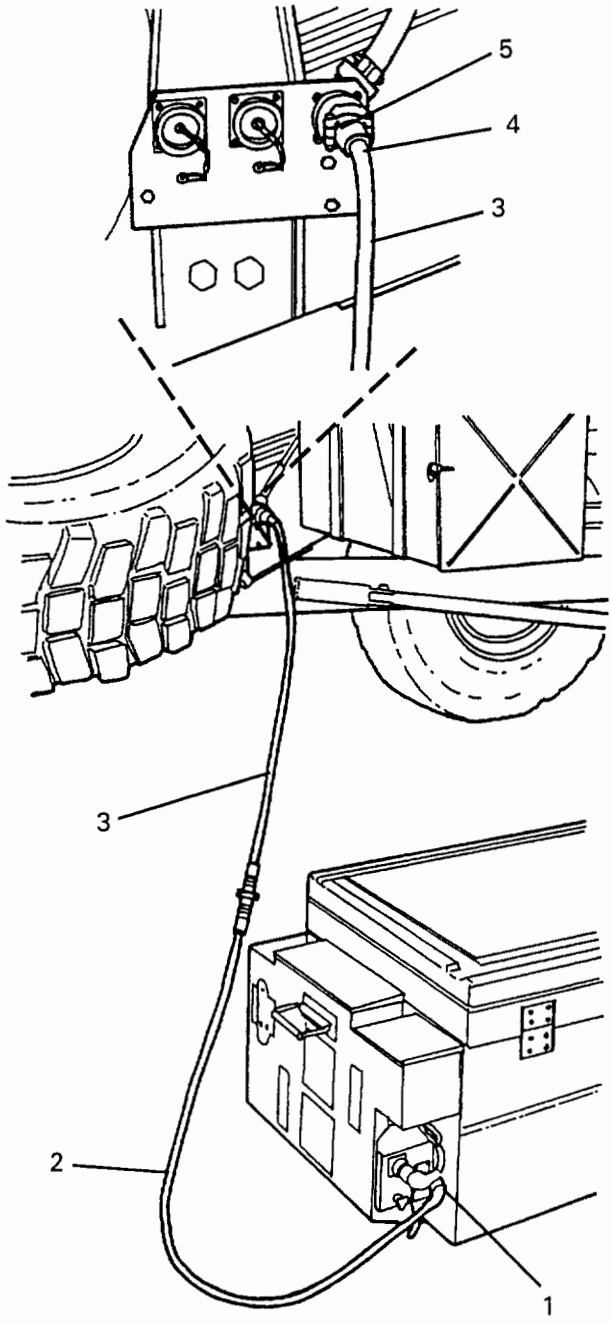

Figure 3-2 — 24 Volt Unimog Power Cable

Aircraft Power

WARNING

MAINTAIN A MINIMUM OF 100MM CLEAR AROUND THE REFRIGERATOR.

306. Connect the angled socket (1) of the cable to the blood refrigerator input socket and the two pin plug (2) into the socket (3) in the aircraft. In the event of the transport of the blood refrigerator in a Boeing 727 a 115 volt AC to 28 VDC converter (4) is supplied in the aircraft (Fig 3-3).

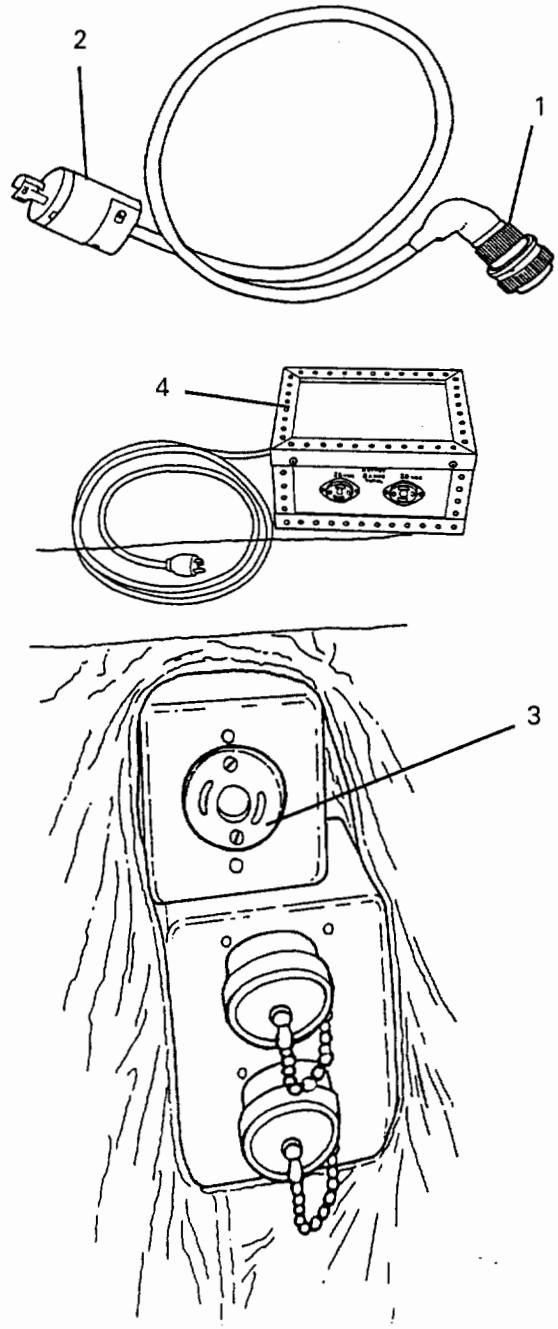

Figure 3-3 — 24 Volt Aircraft Power Cable

Battery Charger Power

WARNING

MAINTAIN A MINIMUM OF 100MM CLEAR AROUND THE REFRIGERATOR.

307. Connect the extension cable (1) from the blood refrigerator (2) to either power outlet (3) on the battery charger (4) (Fig 3-4).

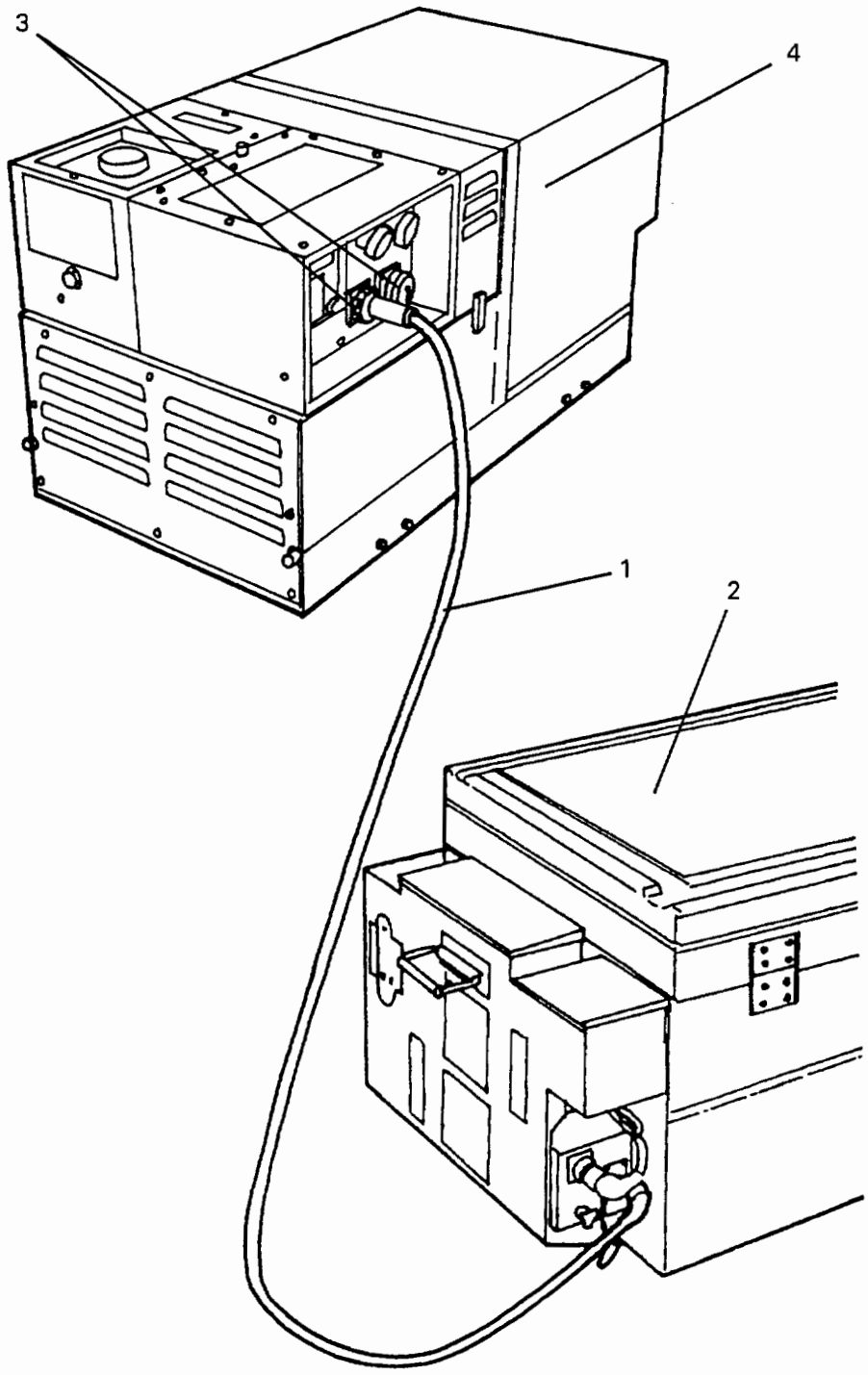

Figure 3-4 — Battery Charger Power Cable

Land Rover Power (Behind Drivers Seat)

WARNING

MAINTAIN A MINIMUM OF 100MM CLEAR AROUND THE REFRIGERATOR.

308. Connect the extension cable (1) from the blood refrigerator (2) to the power outlet (3) located behind the drivers seat (4) (Fig 3-5).

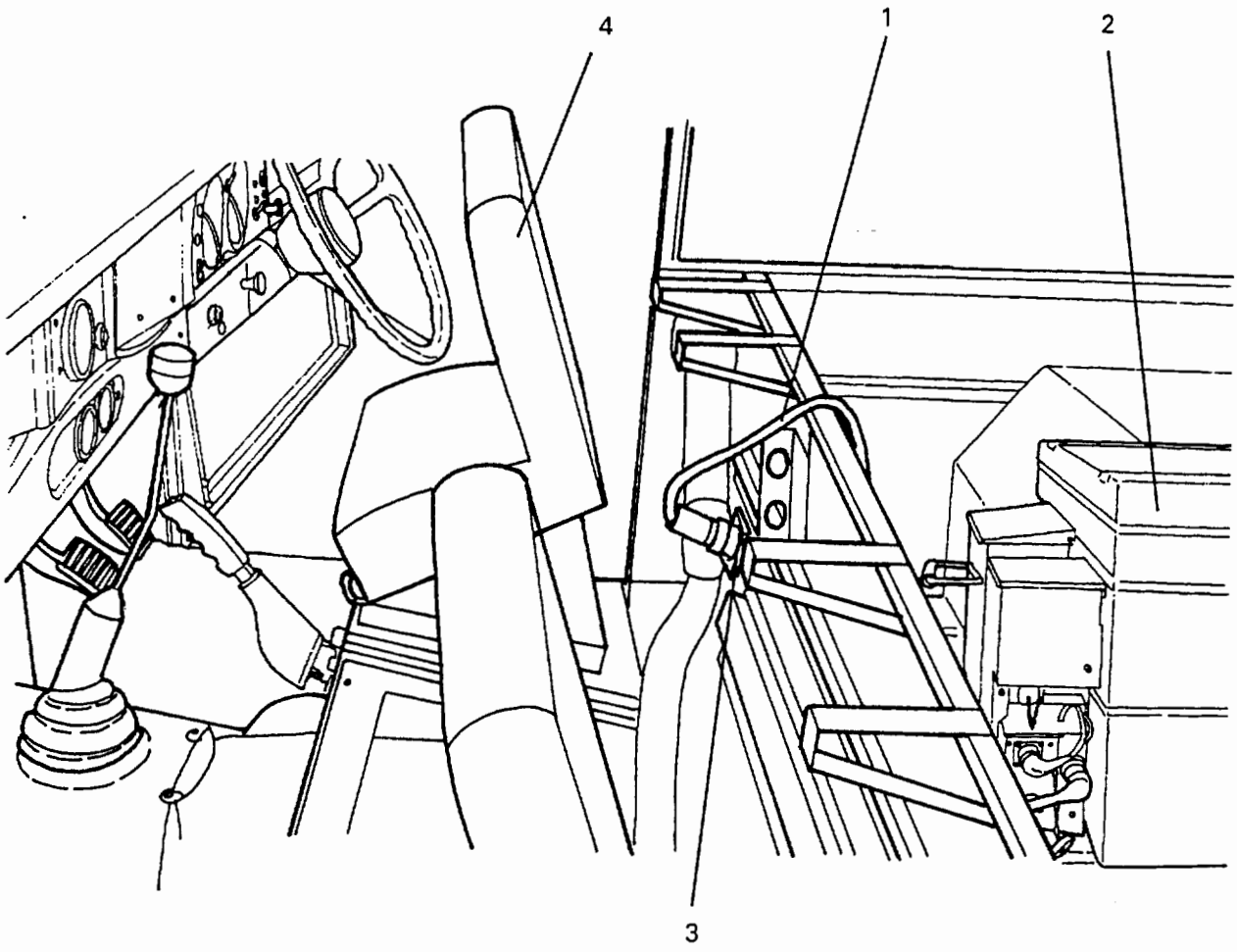

Figure 3-5 — 24 Volt Land Rover Power Cable

Land Rover Power (Dashboard)

WARNING

MAINTAIN A MINIMUM OF 100MM CLEAR AROUND THE REFRIGERATOR.

309. Connect the angled socket (1) of the extension cable (2) to the blood refrigerator (3) (Fig 3-6).

310. Connect the 24 V Land Rover cable (4) to the extension cable, and connect the twin plugs (5) to the Land Rover dash panel outlet socket (6), red plug to red socket, black plug to black socket (Fig 3-6).

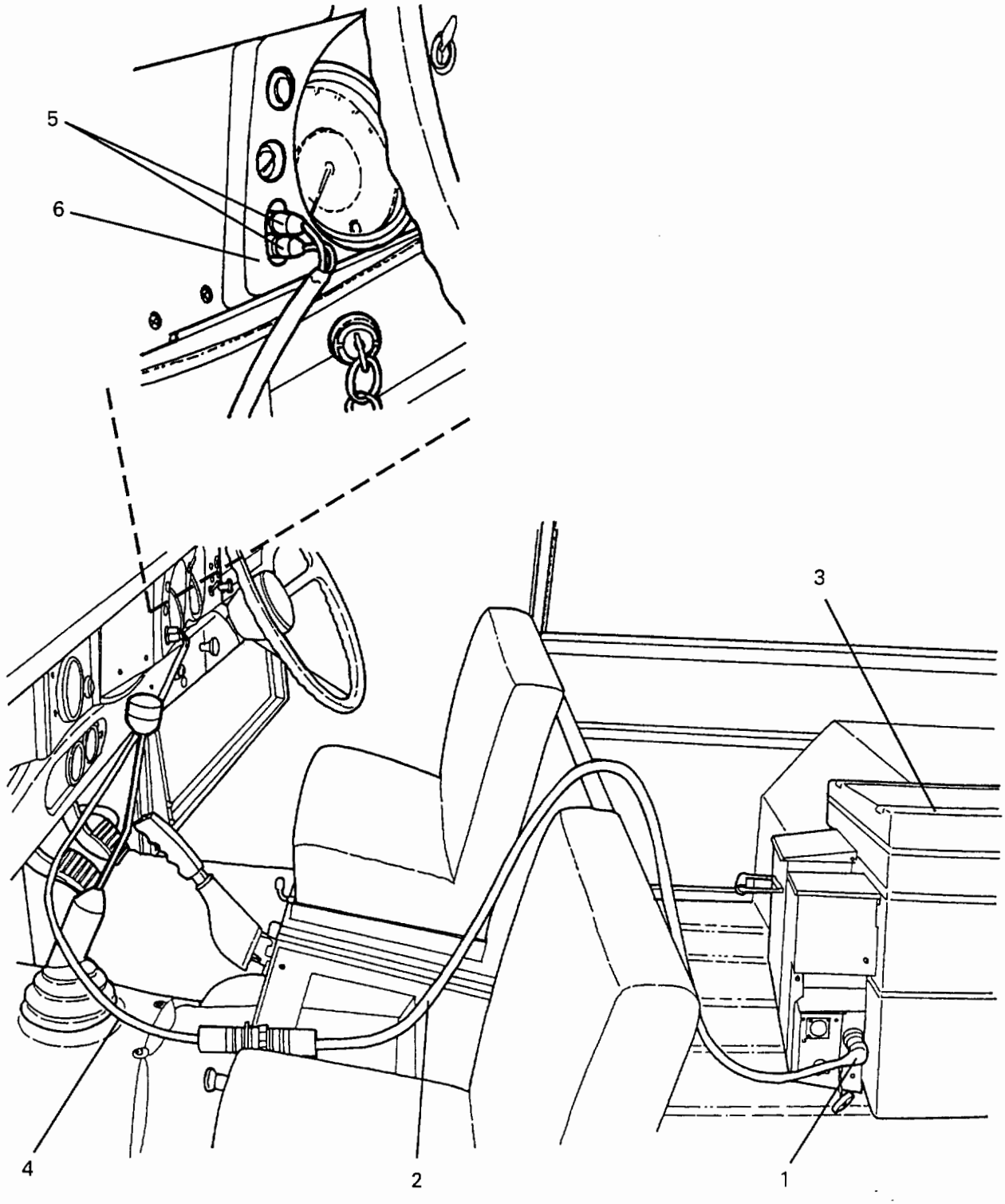

Figure 3-6 — 24 Volt Land Rover Power Cable

Passenger Vehicle

WARNING

MAINTAIN A MINIMUM OF 100MM CLEAR AROUND THE REFRIGERATOR.

311. Plug the vehicle lead (1) into the cigarette lighter (2). Connect the vehicle cable into the extension cable and connect the angle plug of the extension cable (3) to the refrigerator (Fig 3-7).

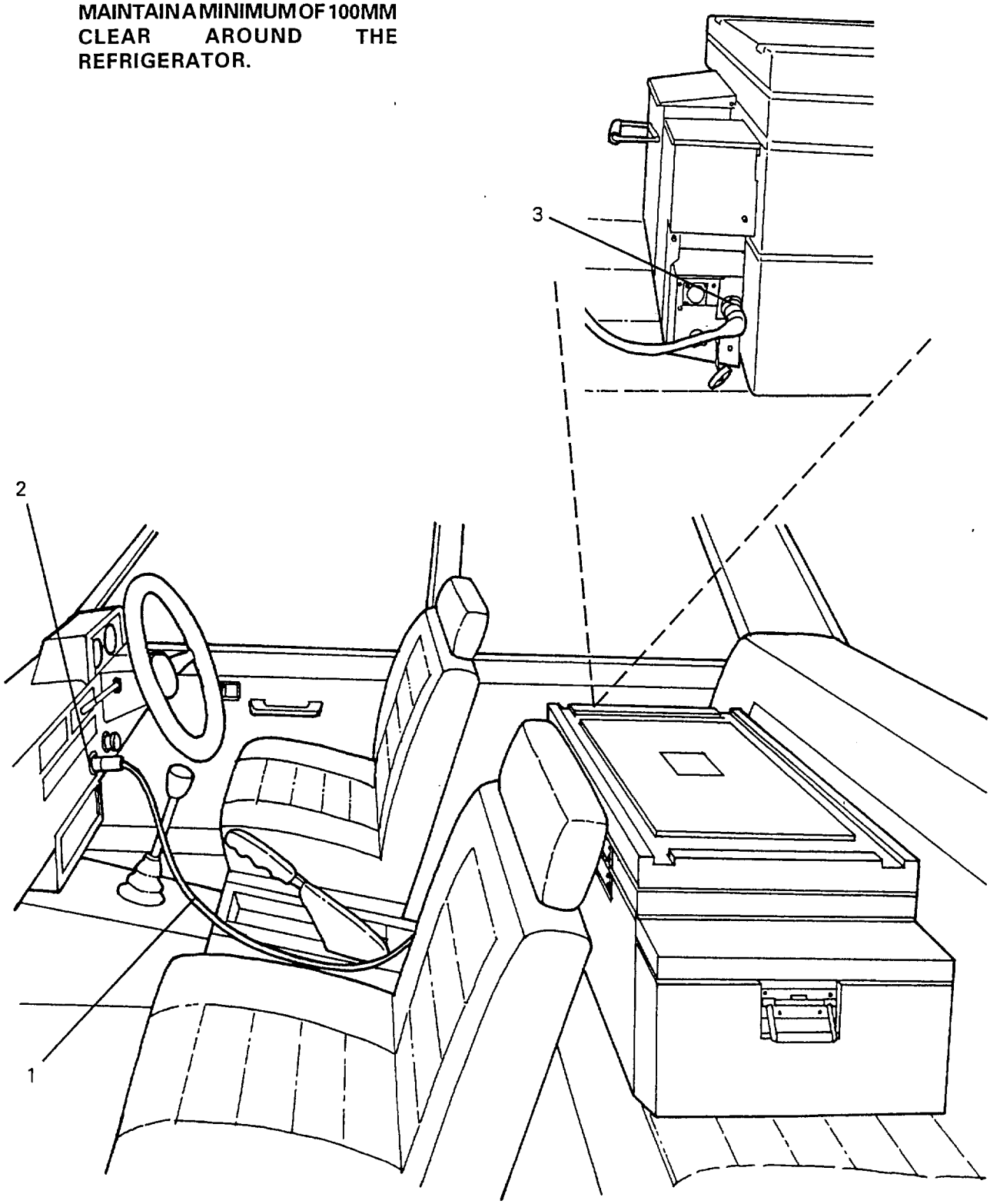

Figure 3-7 — 12 Volt Vehicle Power Cable

OPERATING THE BLOOD REFRIGERATOR

WARNING

THE TEMP ALERT MODE USED FOR TRANSPORTING BLOOD IN THE REFRIGERATOR BY THE NZ ARMY IS COVERED BY PARA 323 "TWO POINT TEMP CONTROL" SUB PARA (B) INTERNAL TEMP ALERT. THE ADDITIONAL MODES DETAILED ARE FOR INFORMATION ONLY.

Starting

NOTE

It is recommended that the blood refrigerator is started, run and the interior temperature is stabilised for 24 hours prior to loading with blood and blood products.

312. Place the power switch (1) in the On position. The green power LED (2) should be continuously lit, if the green LED flashes there is a power loss and the refrigerator will not operate (Fig 3-8).

313. During the cool down period the red temperature LED (3) will flash (Fig 3-8).

314. When the operating temperature is reached (between 3°C to 6°C) the green temperature LED (4) will light. The red temperature LED (3) will continue to flash indicating the temperature was too high (Fig 3-8).

315. Push down the reset button (5), this will stop the red temperature LED from flashing (Fig 3-8).

WARNING

THE AUDIBLE ALARM IS NOT ACTIVATED ON INITIAL START UP UNTIL THE OPERATING TEMPERATURE (3°C TO 6°C) HAS BEEN REACHED AND THE GREEN TEMPERATURE LED IS ILLUMINATED.

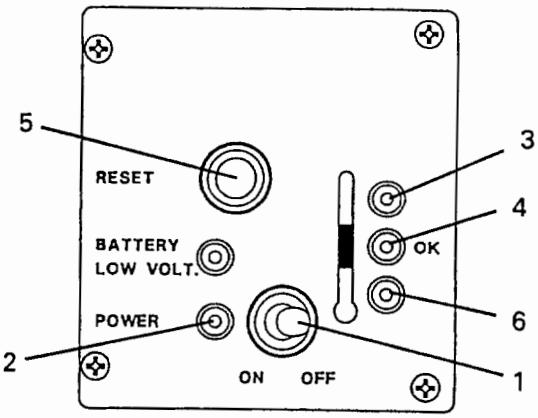

Figure 3-8 — Control Panel

316. Push the Temp/Alert slide switch (1) to the "Alert" position, press the "Alert On/Off" switch (2) to activate the alarm within the gauge (Fig 3-9).

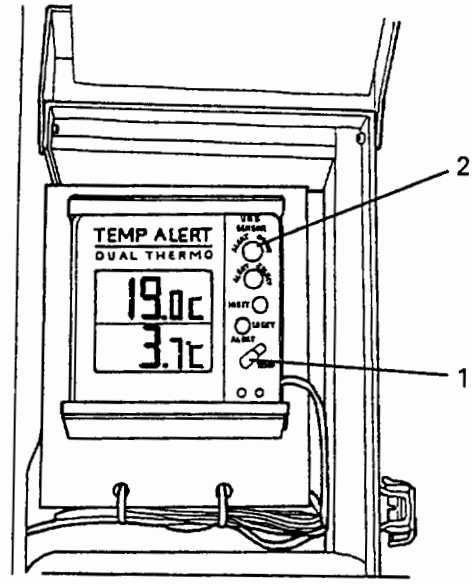

Figure 3-9 — Temp Alert, Dual Temperature Gauge

317. Following the above activation the "Alert" symbol (1) will appear in the display. When all the above is complete, push the slide switch to the "Temp" position (Fig 3-10).

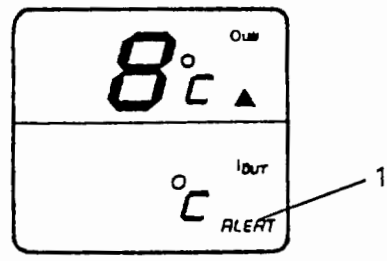

Figure 3-10 — Alert Symbol

318. Should the temperature drop below 3°C the red low temperature LED (6) will flash (Fig 3-8).

Temp Alert, Dual Temperature Gauge

319. The dual temperature gauge (1) monitors the blood refrigerator internal operating temperature (2) and the external ambient temperature (3) (Fig 3-11).

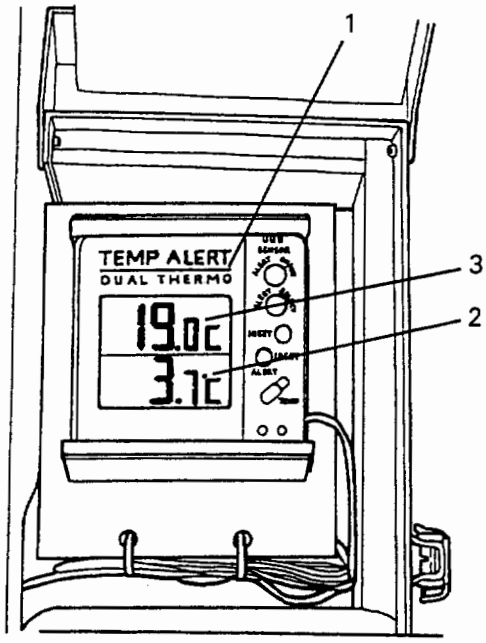

Figure 3-11 — Temp Alert, Dual Temperature Gauge

320. The controls of the gauge (Fig 3-12) are as follows:

a. Ambient temperature reading (1),

b. Internal temperature reading (2),

c. Ambient temperature sensor (3),

d. Alert On/Off (4),

e. Alert select (5),

f. Hi set (6),

g. Low set (7),

h. Two position slide switch (8),

i. Alert position (9), and

j. Temperature position (10).

321. The digital display shows the temperature readings in 1/10 degree increments.

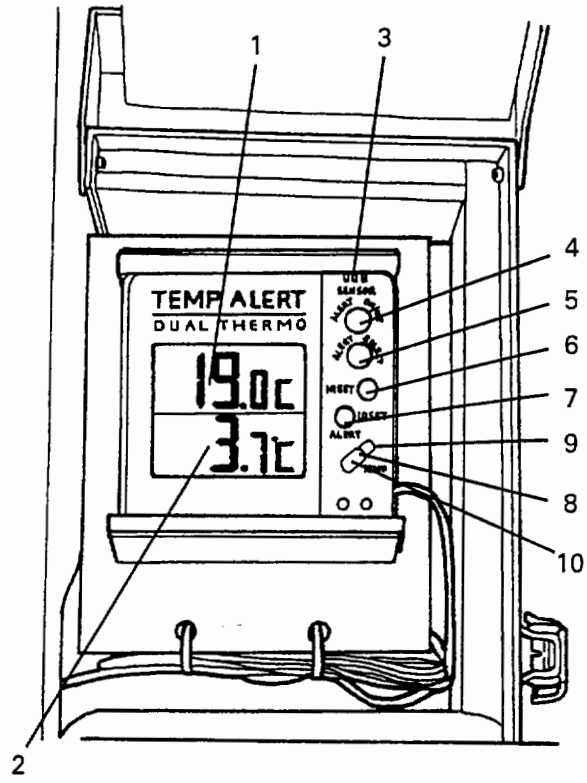

Figure 3-12 — Temperature Gauge Controls

322. **One Point Temperature Control.** The following details the procedure for set-up.

a. **High Temp Alert "▲".** Slide the switch (8) to the "Alert" position (9), press the "Alert Select" (5) (Fig 3-12) to select "High Temp Alert, ▲" mode (1, Fig 3-13).

Press the "Hi Set" (6) (Fig 3-12) to set the desired High Temp Alert.

Press the "Alert On/Off" (4) (Fig 3-12) to turn on the High Temp Alert ("Alert" flag appears on the display).

Slide the switch (8) (Fig 3-12) to the "Temp" position.

Alarms and LED flash for 5 seconds every minute when the sensed temperature is higher than the set temperature.

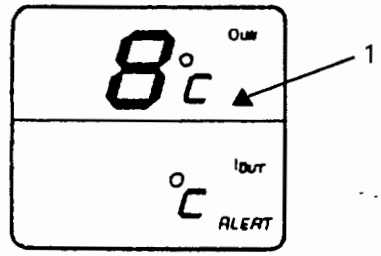

Figure 3-13 — High Temp Alert

b. **Low Temp Alert.**"▼" Slide the switch (8) to the "Alert" position (9), press the "Alert Select" (5) (Fig 3-12) to select "Low Temp Alert, "▼" mode (1, Fig 3-14).

Press the "Low Set" (7) (Fig 3-12) to set the desired Low Temp Alert.

Press the "Alert On/Off" to turn on the Low Temp Alert ("Alert" flag appears on the display).

Slide the switch (8) (Fig 3-12) to the "Temp" position.

Alarms and LED flash for 5 seconds every minute when the sensed the temperature is lower than the set temperature.

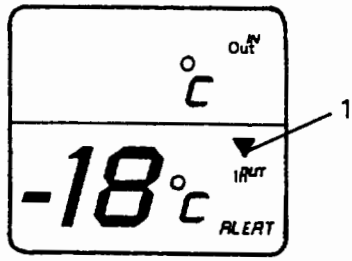

Figure 3-14 — Low Temp Alert

323. **Two Point Temperature Control.** The following details the procedure for set-up.

a. **Ambient Temp Alert.**"⧗" Slide the switch (8) to the "Alert" position (9), press the "Alert Select" (5) (Fig 3-12) to select "Ambient Temp Alert, "⧗" mode (1, Fig 3-15).

Press the "Hi Set" (6) (Fig 3-12) to set the desired Upper Temp Alert.

Press the "Low Set" (7) (Fig 3-12) to set the desired Lower Temp Alert.

Press the "Alert On/Off" to turn on the Ambient Temp Alert ("Alert" flag appears on the display).

Slide the switch (8) (Fig 3-12) to the "Temp" position.

Alarms and LED flash for 5 seconds every minute when the sensed the temperature is higher than the set temperature.

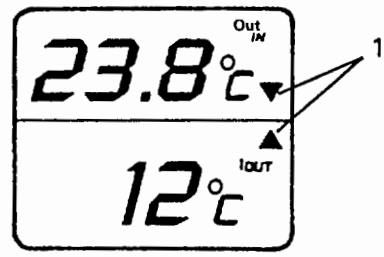

Figure 3-15 — Ambient Temp Alert

WARNING

THE TEMP ALERT MODE USED FOR TRANSPORTING BLOOD IN THE REFRIGERATOR BY THE NZ ARMY IS COVERED BY THE FOLLOWING SUB PARAGRAPH, THE ADDITIONAL MODES DETAILED ARE FOR INFORMATION ONLY.

b. **Internal Temp Alert.**"▲▼" Slide the switch (8) to the "Alert" position (9), press the "Alert Select" (5) (Fig 3-12) to select "Internal Temp Alert, "▲▼" mode (1, Fig 3-16).

Press the "Hi Set" (6) (Fig 3-12) to set the desired Upper Temp Alert (8.0°C).

Press the "Low Set" (7) (Fig 3-12) to set the desired Lower Temp Alert (2.0°C).

Press the "Alert On/Off" to turn on the Temp Alert ("Alert" flag appears on the display).

Slide the switch (8) (Fig 3-12) to the "Temp" position.

Alarms and LED flash for 5 seconds every minute when the sensed temperature inside the refrigerator is outside the required internal temperature range.

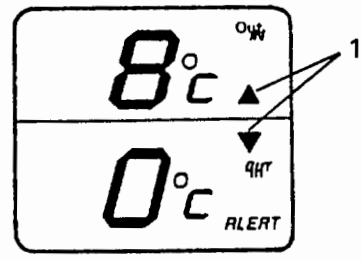

Figure 3-16 — Internal Temp Alert

Loading the Blood Refrigerator

325. Ensure the internal temperature is within the required limits (between 3°C to 6°C), this can take up to four hours from start up.

326. Ensure the controls are all correctly set and the temperature gauge is operating, the unit can then be loaded.

327. Remove the wire baskets, close the lid to retain the temperature level.

WARNING

TO MAXIMISE AIR FLOW WITHIN THE REFRIGERATED AREA AND MAINTAIN THE TEMPERATURE OF THE PRODUCT. THE UNITS OF BLOOD MUST BE PACKED AS DETAILED IN THE FOLLOWING PARAGRAPHS.

328. The units of blood are normally transported in 25 unit lots, this volume of blood is either transported in one refrigerator or spilt between two refrigerator. If the load is split one refrigerator will contain 12 units of blood the other will contain 13 units of blood.

329. Pack the basket pockets in a sequence starting close to the lid moving towards the front (Fig 3-17).

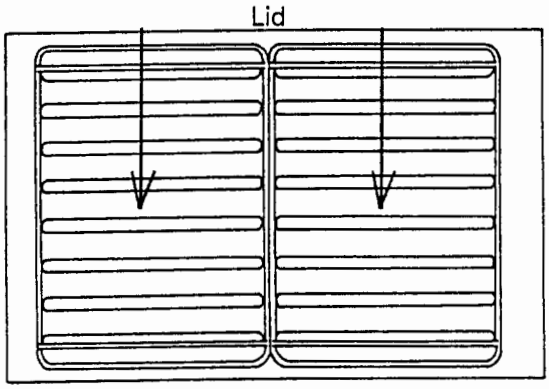

Figure 3-17 — Packing Sequence

330. **25 Units of Blood.** Pack each pocket with two units of blood (1), the one remaining unit of blood (2) should be packed singularly in the right hand pocket (Fig 3-18).

331. Pack the vials (3) and plasma bottles (4) in the end pockets (5) (Fig 3-18).

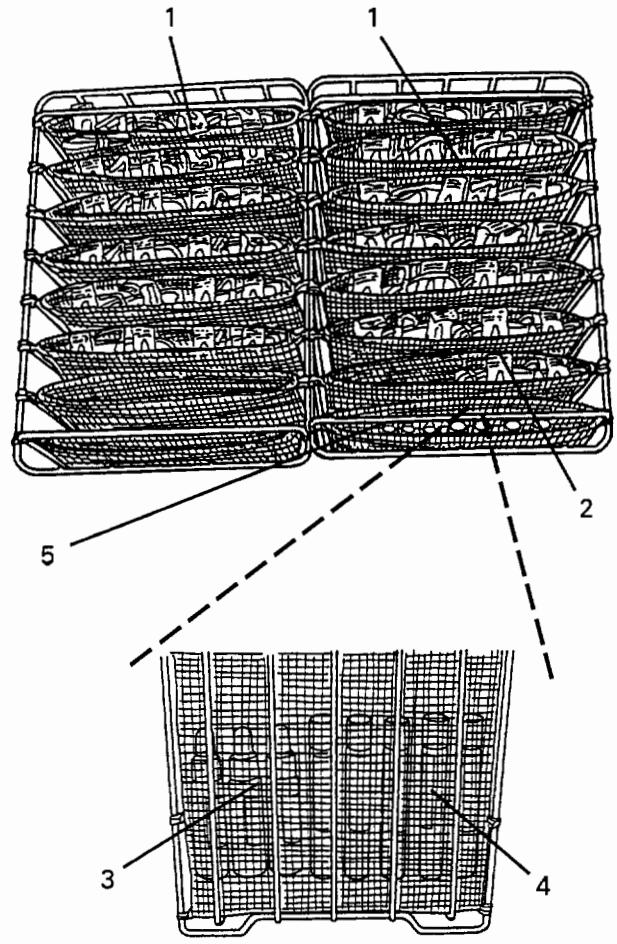

Figure 3-18 — Packing Sequence

332. **12 Unit of bloods.** Starting one pocket from the hinge, pack each pocket with one unit of blood (1) (Fig 3-19).

333. Pack the vials (3) and plasma bottles (4) in the end pockets (2) (Fig 3-19).

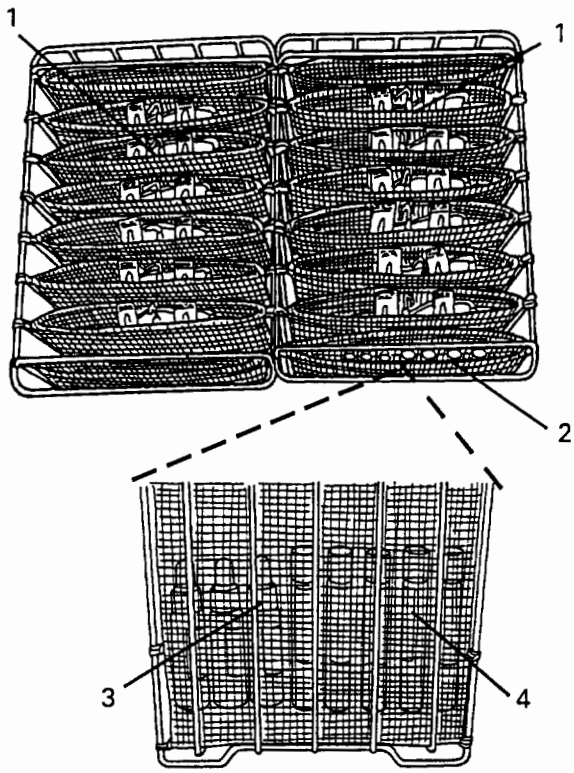

Figure 3-19 — Packing Sequence

334. **13 Unit of bloods.** Starting the left side, insert one unit of blood in each pocket (1) from the hinge, on the right side start packing units of blood from the second pocket (2) (Fig 3-20).

335. Pack the vials (3) and plasma bottles (4) in the end pockets (2) (Fig 3-20).

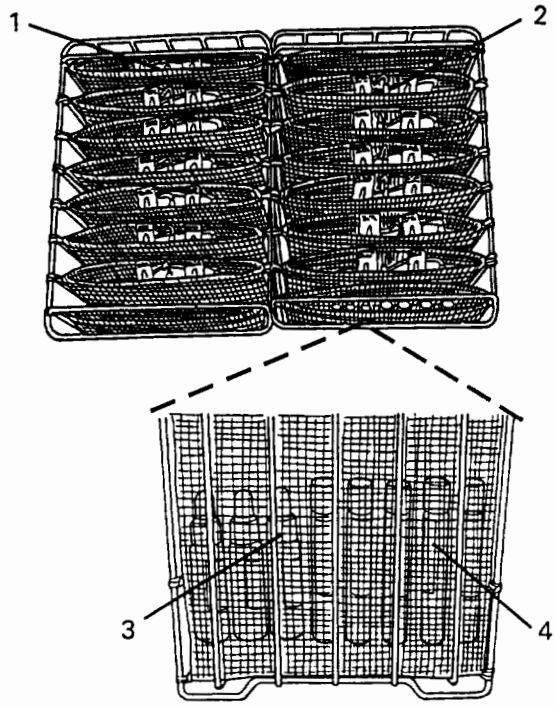

Figure 3-20 — Packing Sequence

336. Open the lid and place the baskets in the blood refrigerator quickly to minimise temperature changes.

337. When the blood is fully packed, take two data loggers (1), check the green LED is flashing, this shows the data logger has been activated (do not use if not activated) (Fig 3-21).

338. Insert two data loggers, one in each basket (1) into the centre of the unit (2) resting directly against the units of blood (Fig 3-21).

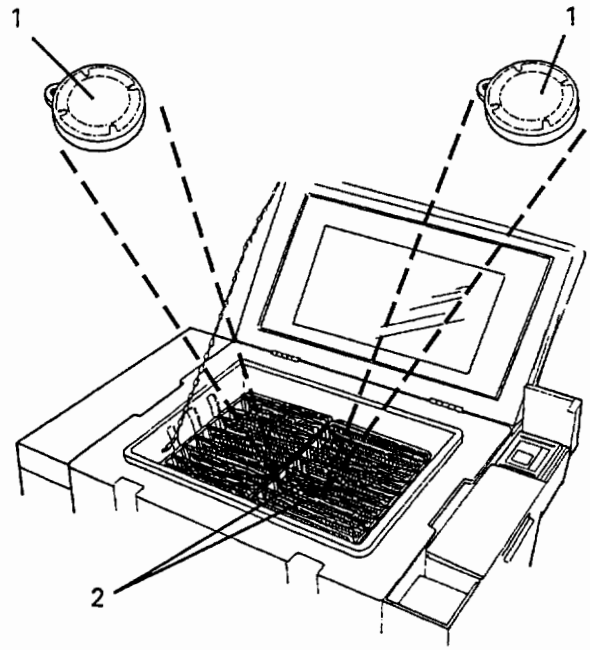

Figure 3-21 — Packing Sequence

NOTE

If the temperature within the refrigerated compartment moves outside the acceptable range (between 3° C to 6° C) both the visual and audible alarms will activate simultaneously.

Abnormal Conditions During Loading

339. The following sub-paragraphs detail abnormal conditions during opening and loading the unit:

a. When the lid of the refrigerator is opened for a short period, the temperature probe may be exposed to the ambient air temperature this will activate the alarm.

b. Close the blood refrigerator lid immediately.

c. Shortly after the green temperature LED (4) will light again, reset the alarm system by pushing the reset button (Fig 3-22).

Alarm Conditions During Operation

WARNING

IN THE EVENT OF THE ALARM BEING ACTIVATED DURING THE OPERATION OF A LOADED UNIT, THERE IS ONLY A TOTAL OF 30 MINUTES TO FIX THE PROBLEM AND GET THE UNIT OPERATING WITHIN THE REQUIRED TEMPERATURE RANGE.

340. If an alarm condition occurs when the blood refrigerator is loaded with blood products, and if the refrigerator is not opened, there is an absolute maximum of 30 minutes to fix the problem and keep the unit operating within its operating temperature range.

341. The following sub-paragraphs detail abnormal conditions during operation:

a. The green power LED (2) starts flashing and the audible alarm sounds. This indicates a power loss to the unit (Fig 3-22).

b. The red high temperature LED (3) starts flashing and the audible alarm sounds. This indicates the interior temperature has risen above the 6° C operating range (Fig 3-22).

c. The red low temperature LED (6) starts flashing and the audible alarm sounds. This indicates the interior temperature has fallen below the 3° C operating range (Fig 3-22).

d. The red battery low volt LED (7) starts flashing and the audible alarm sounds. This indicates the AA NiCad battery voltage is too low. As the batteries are normally constantly charged when the unit is operating this condition indicates the batteries are defective and require changing (Fig 3-22).

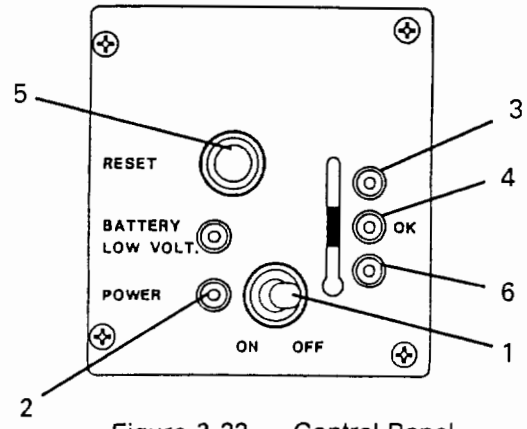

Figure 3-22 — Control Panel

NOTE

The alarm system will operate for 24 hours on battery power only.

342. During all the above conditions the audible alarm can be switch off by pressing the reset button, but the visual alarm can only reset when the abnormal condition has been eliminated.

NOTE

During all out of temperature range faults the Temp Alert Dual Temperature Gauge will alarm for five seconds every minute.

WARNING

THE BLOOD REFRIGERATOR MUST NEVER BE TURNED OFF WHEN LOADED WITH BLOOD OR BLOOD PRODUCTS.

343. In the event the alarms are activated the following procedures must be actioned:

a. Mute the audible alarm,

b. Check there is a minimum of a 100mm clearance around the entire blood refrigerator and all grills are clear.

c. Check the power supply leads are correctly connected.

d. Ensure the DBCA is informed of the alarm condition.

e. If the condition continues for more than half an hour turn off the Dual Temp Alarm.

Transporting and Handling of Blood

344. The blood refrigerator must remained sealed for the entire period of transportation.

WARNING

THE BLOOD REFRIGERATOR MUST NOT BE OPENED DURING TRANSPORTATION. ON ARRIVAL AT IT DESTINATION ONLY THE DEPLOYED BLOOD CONTACT AUTHORITY (DBCA) IS RESPONSIBLE FOR THE REMOVAL OF THE CONTENTS.

345. Always transport the blood refrigerator in an upright position with the lid upper most.

346. When handling the blood refrigerator always lift using two people. The container is not well balanced and is far heavier at the refrigerator end making it difficult for one person to handle.

Shutting Down the Blood Refrigerator

WARNING

THE BLOOD REFRIGERATOR MUST NEVER BE TURNED OFF WHEN LOADED WITH BLOOD OR BLOOD PRODUCTS.

347. Turn the power switch (1) to the Off position. The alarm system is de-energised and the refrigerator unit stops operating (Fig 3-22).

348. Turn off the Temp Alert gauge by moving the slide switch to the "Alert" position then pushing the Alert On/Off switch. Following the above the "Alert" symbol on the display will be turned off.

349. Move the slide switch to the "Temp" position.

350. If the power cable is removed without the power switch being turned off, the refrigerator unit will cease to operate but the alarm system will continue to operate until the four AA NiCad batteries are discharged.

Refrigerator Unit Temperature Setting

WARNING

DO NOT ATTEMPT TO CHANGE THE TEMPERATURE SETTINGS.

351. The temperature setting for the refrigerator is preset and should not be changed by the operator.

Refrigeration Failure

WARNING

NEVER ATTEMPT TO USE BLOOD PRODUCTS WHICH HAVE BEEN EXPOSED TO TEMPERATURES OUTSIDE THE REGULATED LIMITS.

352. The clinical decision to use or not to use the blood or blood products rests with the DBCA.

353. When the refrigerator temperature and blood products have exceeded the acceptable limits the following procedure must be enforced by the DBCA.

a. Remove all units of blood (1, 2) from the refrigerator (Fig 3-23).

b. Complete a "Not for Transfusion" label (3) with the details from each unit of blood (Fig 3-23).

c. Peel of the label from the roll and fix it over the blood type label (4) on the unit of blood (Fig 3-23).

d Destroy all blood according to 2 Field Hospital SOP as soon as possible.

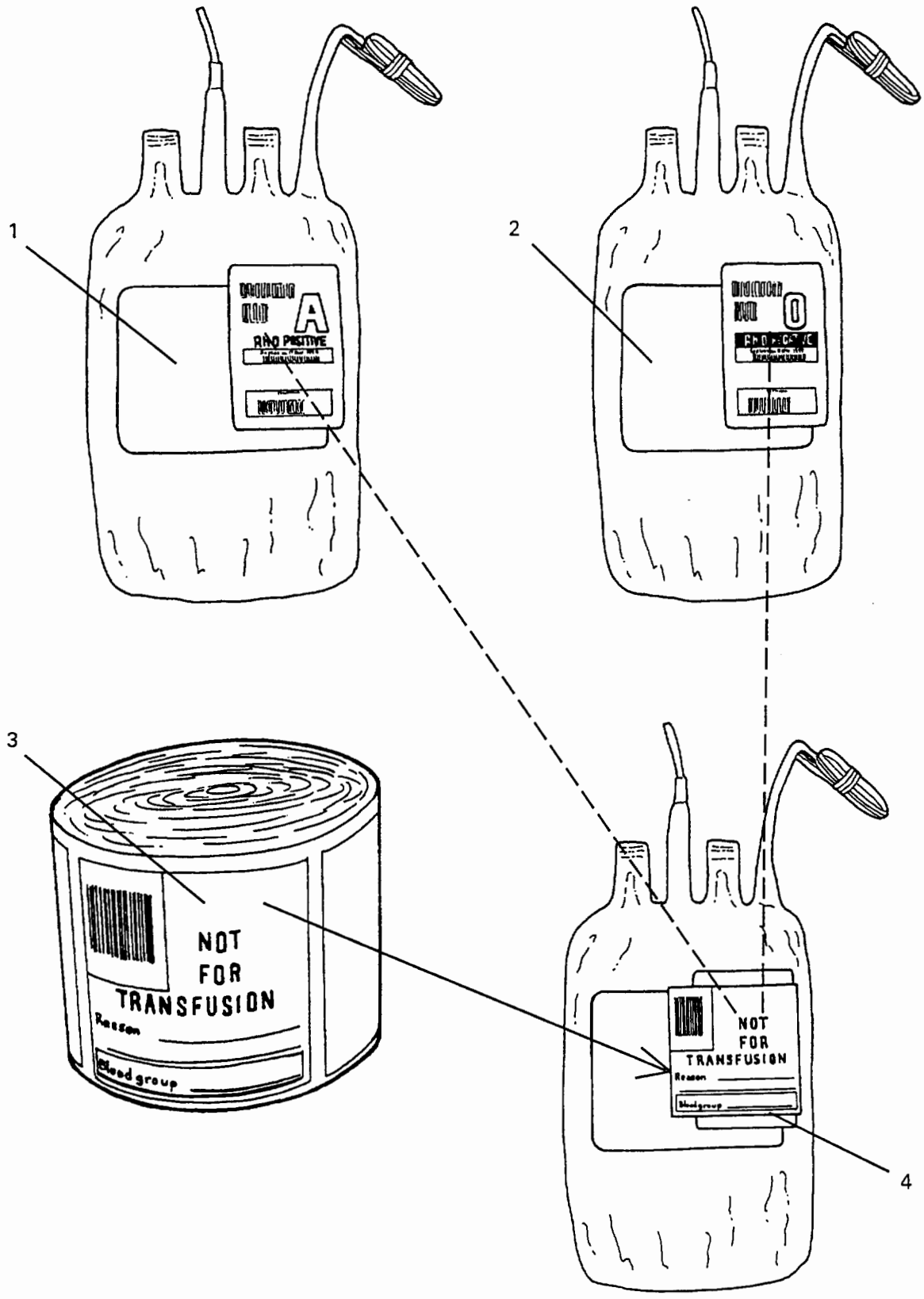

Figure 3-23 — Contaminated Units of Blood Labelling Procedure

SECTION 4

MAINTENANCE

MAINTENANCE

Pre-Operation Maintenance

401. The following procedures detail the maintenance prior to operation of the blood refrigerator:

a. Check the condition of the four NiCad batteries.

b. Plug in the power cable and perform a functional check on all controls,

c. Check the operation of the dual temperature gauge,

d. Check the condition of the gasket seal in the lid, replace if required (refer Para 411),

e. Check the physical condition of the entire container,

f. If the refrigerator is dirty or contaminated wash the interior surfaces with Vircon and dry carefully.

Monthly Maintenance

402. The following procedures are to be actioned monthly to maintain the blood refrigerator:

a. Check the operation of each alarm by starting the unit, and

b. Undertake a complete functional check of all operations (refer Section 3, Operating Procedures).

Six Monthly Maintenance

403. The following procedures are to be actioned six monthly to maintain the blood refrigerator:

a. Remove and check the physical condition of the four rechargeable AA NiCad batteries, if any swelling or leakage is observed replace all four batteries, to be undertaken by DBCA or attached tradesman (refer Para 405).

12 Monthly Maintenance

404. The following procedures detail the 12 monthly maintenance of the blood refrigerator:

a. The refrigerator requires an Annual Validation. Do not use the refrigerator if the validation period has terminated.

b. Data logger to be validated to zero point, to be undertaken in conjunction with the NZ Blood Service.

c. Have the electrical continuity and safety of each power cable checked through the supporting RNZALR Workshop.

d. Check the entire unit for loose or missing screws, loose covers, loose or damaged retaining chain, and

e. Check the condition of the carrying handles.

Refrigerator Battery Replacement

405. The following sub-paragraphs detail the procedures to change the refrigerator batteries:

a. Release (do not remove) the two retaining screws (1) securing the battery cover (2) (Fig 4-1).

b. Push the battery cover (2) up and remove the cover (Fig 4-1).

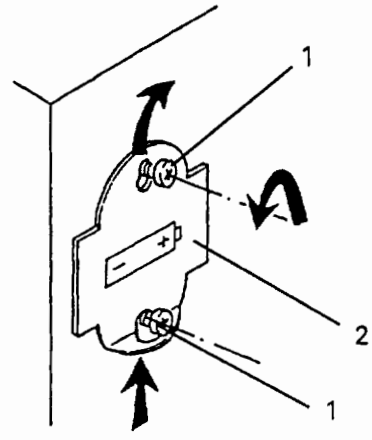

Figure 4-1 — Remove Battery Cover

c. Remove the battery holder (1) from the blood refrigerator (2) (Fig 4-2).

CAUTION

CARE MUST BE TAKEN NOT TO PULL ON THE POWER CABLES, THESE ARE NOT DETACHABLE.

d. Release the slotted screw (3) in the end section (4) of the battery holder and separate the two sections, remove the batteries (Fig 4-2).

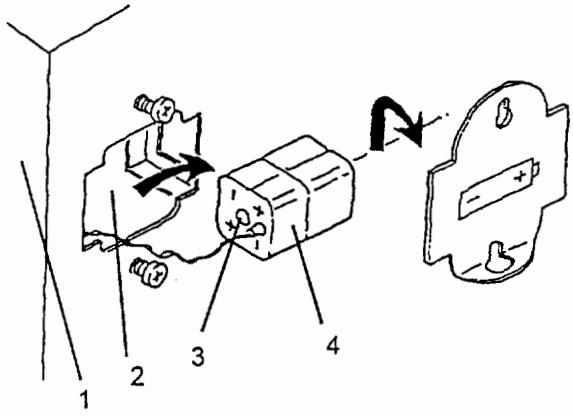

Figure 4-2 — Opening the Battery Holder

CAUTION

ENSURE THE POLARITY OF THE BATTERIES IS CORRECT WHEN LOADING.

e. Install the batteries (1) taking care to orientate the battery + and - terminals (2) according to the marks (3) on the battery cover (Fig 4-3).

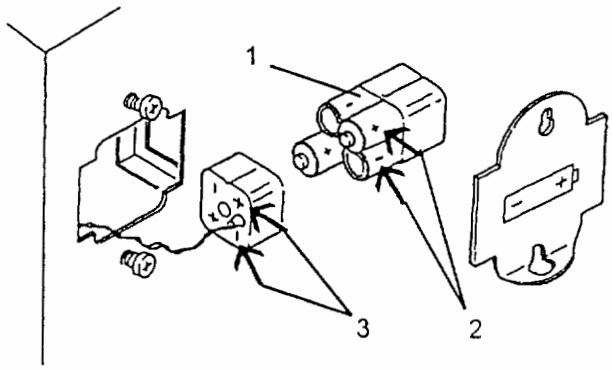

Figure 4-3 — Installing the Batteries

f. Close the holder and secure with the centre screw, insert in the recess, and

g. Replace the cover and secure the two cover retaining screws.

406. As a general rule rechargeable batteries should be replaced every five years.

Dual Temp Gauge Battery Replacement

407. The following sub-paragraphs detail the procedures to change the gauge batteries:

CAUTION

ENSURE THE POLARITY OF THE BATTERY IS CORRECT WHEN LOADING.

a. Remove the gauge from the refrigerator,

b. Open the battery cover (1) and replace the battery (Fig 4-4).

c. Ensure the polarity is not reversed.

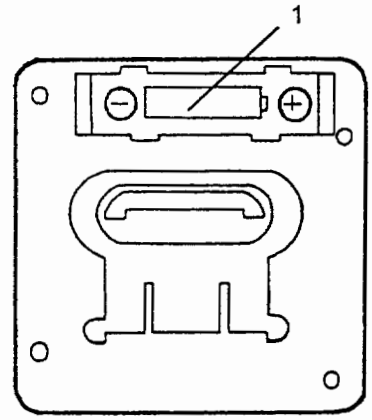

Figure 4-4 — Replacing Duel Temperature Gauge Batteries

Data Logger Battery Replacement

CAUTION

ENSURE THE POLARITY OF THE BATTERY IS CORRECT WHEN LOADING.

408. Remove the rear cover by twisting in a rotating action, remove the battery (1), coat the spring terminals (2) with silicon grease and replace the battery, ensuring the polarity is correct (Fig 4-5).

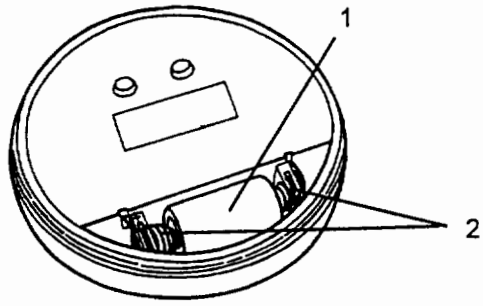

Figure 4-5 — Installing the Battery

Cleaning

409. Remove any accumulated dirt from the grills and covers (1) around the refrigerator unit (Fig 4-6).

410. Wash the unit with Vircon only, do not use other detergents and cleaning agents.

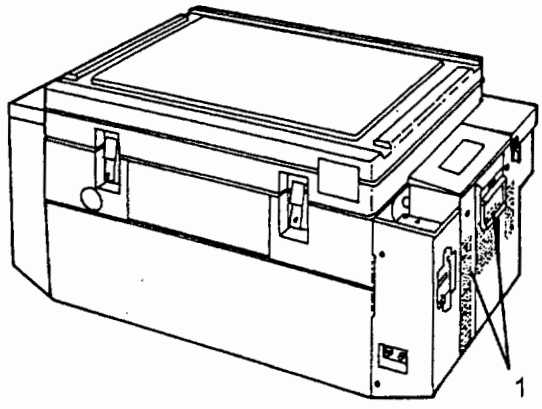

Figure 4-6 — Covers and Grills

Lid Seal

411. The lid seal (1) is a very important component in keeping the interior of the unit at the required temperature (Fig 4-7).

412. To replace the seal release the lid holding chain (2) at one end (Fig 4-7).

413. Carefully remove the seal from its recess with finger pressure, do not use a screw driver or any sharp object that may deform the lid.

414. When installing the new seal, depress each section length ways, then press it in the recess.

415. Starting at one point work all round the recess from one direction until the whole seal is correctly pressed in the recess.

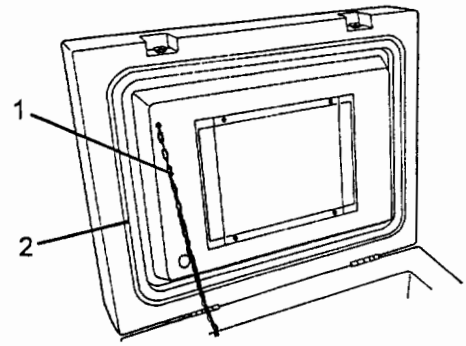

Figure 4-7 — Installing Lid Seal

Cable Storage

416. When the blood refrigerator is not in use store the cables in the storage box (1) on the side of the refrigerator (Fig 4-8).

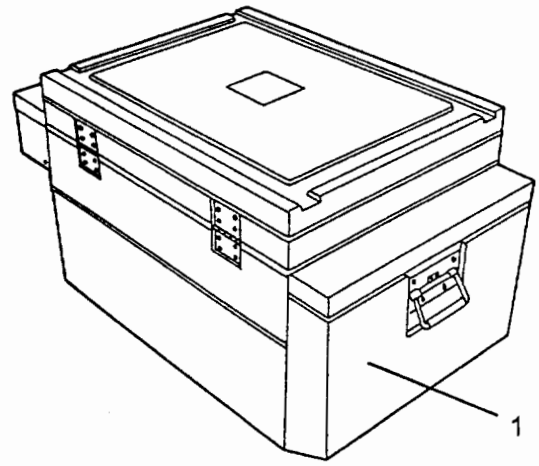

Figure 4-8 — Cable Storage

External Storage

417. It is recommended the blood refrigerator is protected against heavy rain, snow and frost with a weather proof cover and stored in an upright position with the lid upper most.

Internal Storage

418. There are no special requirements for the blood refrigerator unit when stored in a weather proof building and stored in an upright position with the lid upper most.

THIS PAGE IS INTENTIONALLY BLANK