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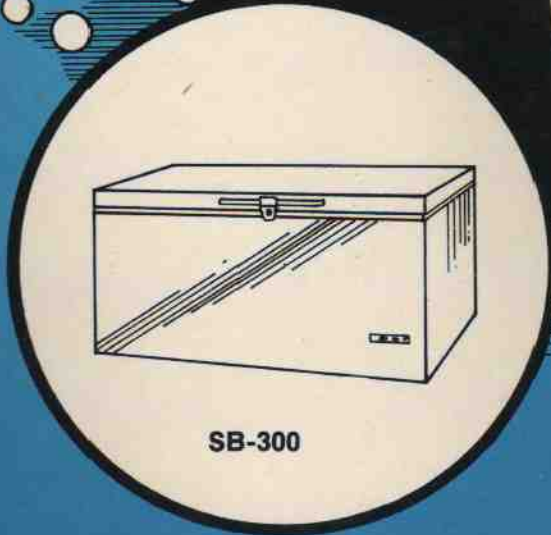
USER MANUAL



SB-140



MK-140



SB-300



Vestfrost

ICE LINED REFRIGERATOR/FREEZER

VESTFROST

ICE-LINED REFRIGERATORS AND FREEZERS

USER MANUAL

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COLD CHAIN

The Cold Chain is a system for distribution of vaccine in a potent state from the manufacturer to the actual vaccination site.

The Cold Chain system is necessary because the vaccines are sensitive to heat. If the vaccines are exposed to heat, they will have a shortened life. Some vaccines are more sensitive than others. The following vaccines are listed in order of heat sensitivity. Polio vaccine is the most sensitive, while Tetanus vaccine is the least sensitive to heat.

- Polio
- Measles
- DPT
- BCG
- Tetanus

When the vaccines lose their potency, they can no longer protect individuals from disease. A vaccine that has lost its potency is useless. Vaccine potency cannot be regained once it is lost. Returning vaccine to the refrigerator or freezer will not restore its potency.

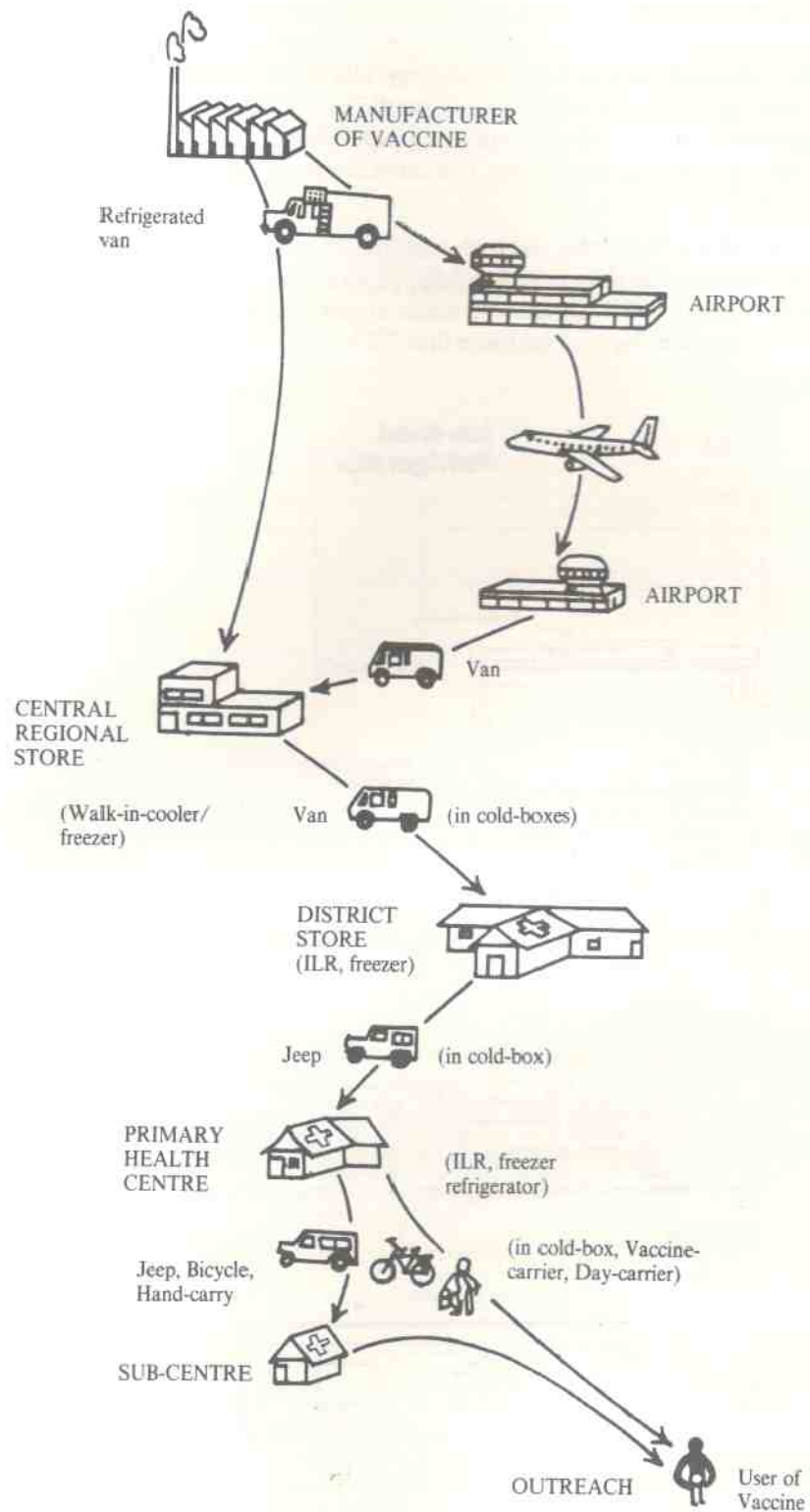
In general if vaccines are kept at recommended minimum temperatures, they will remain potent for an extended period of time. Figure below shows these recommended temperatures at various levels of the Immunization activity. If vaccines are exposed to temperatures above those recommended, they can lose their potency rapidly. For example, measles vaccine kept at + 5°C will maintain potency for at least two years. But the same vaccine exposed to + 40°C will lose its potency in less than one day. It should be noted that the exposures are accumulating even if within limits. If the vaccine is exposed closed to the limit several times the added exposures may destroy it. This can of course be calculated, but is practically handled by keeping the vaccine well below the limits all the time.

RECOMMENDED VACCINE STORAGE TIME AND TEMPERATURE

VACCINES	SHELF LIFE OF VACCINE	TRANSPORT TO STATE/DISTT	STATE/DISTT STORE	TRANSPORT TO PHC	P.H.C.
DPT/DT/TT	1 ¹ / ₂ years at 2-8°C	2-8°C	3 months at 2-8°C	2-8°C	1 month at 2-8°C
BCG	12 months at 2-8°C	2-8°C	3 months at 2-8°C	2-8°C	1 month at 2-8°C
Oral Polio	2 years at - 20°C or 120 days at 2-8°C	- 20°C to + 8°C	3 months at - 20°C	- 20°C to + 8°C	1 month at 2-8°C
Measles	2 years at - 20°C 1 ¹ / ₂ years at 2-8°C	- 20°C to + 8°C	3 months at - 20°C	- 20°C to + 8°C	1 month at 2-8°C

NOTE:

1. STRICTLY FOLLOW MANUFACTURER'S INSTRUCTIONS REGARDING SAFE STORAGE TEMPERATURES AND LIFE OF VACCINE.
2. NEVER USE A VACCINE AFTER ITS EXPIRY DATE.
3. NEVER FREEZE DPT, DT AND TT. ONCE FROZEN THEY ARE NO MORE EFFECTIVE
4. DILUENT MUST ALSO BE STORED AT 2-8°C BEFORE ITS USE.
5. VACCINE COULD BE KEPT EFFECTIVE IN THE FIELD AFTER IT IS TAKEN FROM THE PHC FOR ABOUT A WEEK IF ITS TEMPERATURE IS MAINTAINED AT 2-8°C. INCREASED TEMPERATURE WILL SPOIL THE VACCINE MUCH FASTER.



COLD CHAIN

ICE-LINED REFRIGERATORS AND FREEZERS

A. GENERAL INFORMATION

The ILR (MK-140)

One of the most important links in the cold chain is Ice Lined Refrigerator (ILR). This is an equipment which operates on the principle of vapour compression system, similar to any conventional compressor type refrigerator operating on 220 volts, AC mains supply. However, the ILR has top opening lid to prevent loss of cold air during door opening. The cabinet temperature is normally maintenance between + 2° to + 8°C.

The ILR has a bank of frozen ice on all the four sides, inside the cabinet. The ice lining consists of plastic ice packs filled with water and supplied alongwith the ILR. This lining improves the ability of the equipment to keep the vaccines below + 8°C by upto 60 hours in case of power cut. At ambient temperature below + 30°C the vaccines can be kept for more than 72 hours.

Figure 1 gives details of MK-140 ILR.

Ice-lined Refrigerator

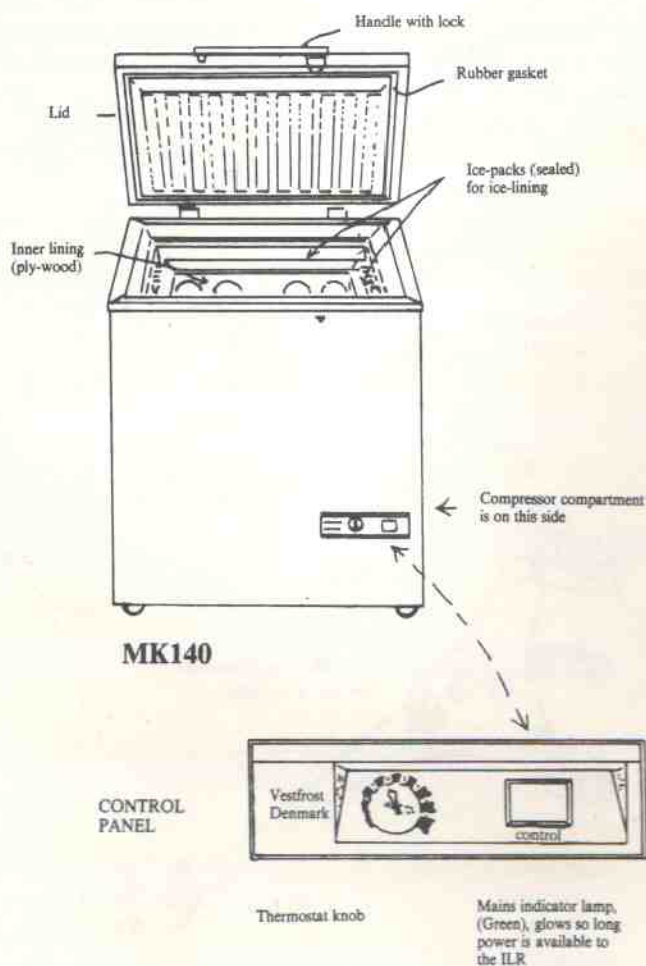


FIGURE 1

Chest Freezers (SB-300 and SB-140)

These equipments are deep freezers which have also a top opening lid. The cooling system is almost similar to that of an ILR but the cabinet temperature is maintained between -18°C to -20°C . This is used for preservation of OPV and Measles vaccine and freezing of ice-packs. In case of power failures, it can maintain the cabinet temperature from 18 to 26 hours below $+8^{\circ}\text{C}$ depending upon the ambient temperature, vaccine load and no. of frozen ice packs inside. There are two sizes of chest freezers presently in use in the UIP. One has a gross volume of about 300 lts (model SB-300) which is used in Regional Stores and District Stores. The smaller one has got a gross volume of about 140 lts (model SB-140) and is used in the PHCs.

Figure 2 gives details of the Chest Freezers

Chest Freezer

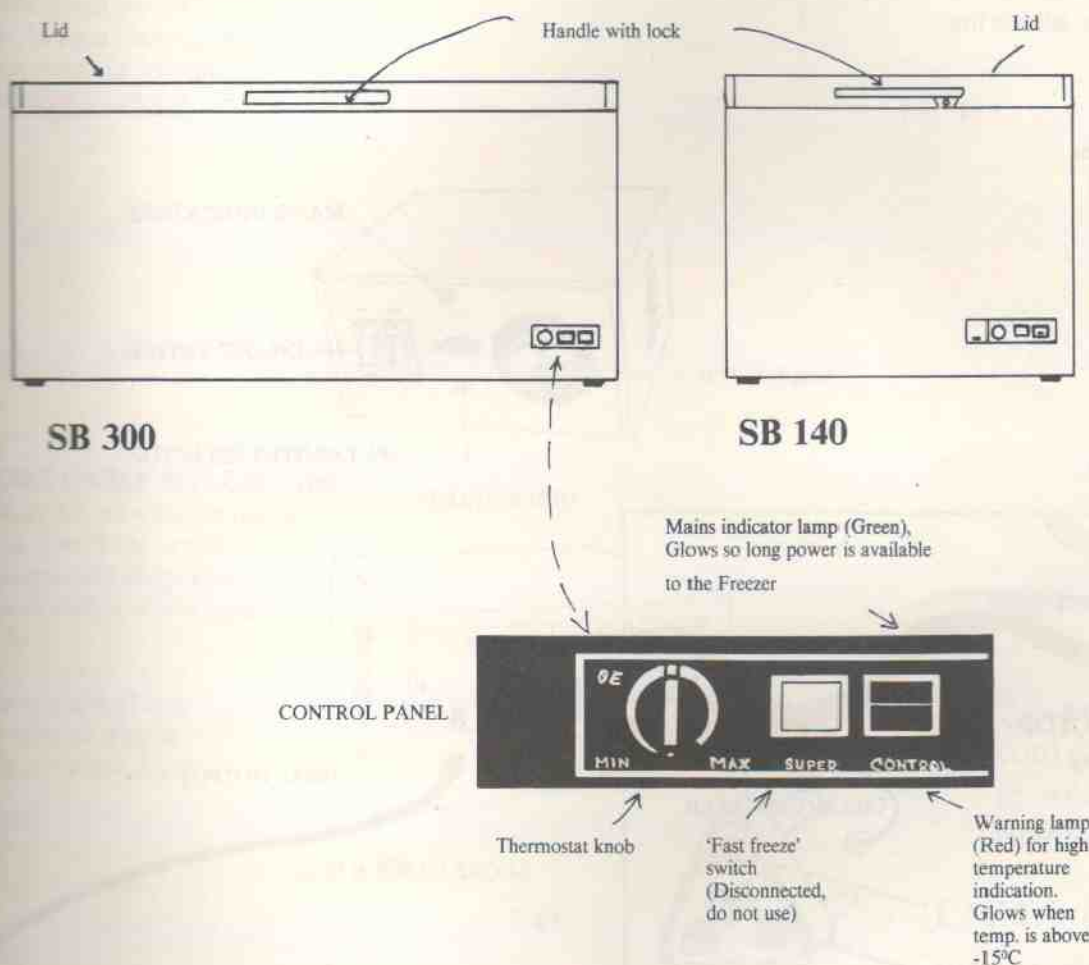


Fig. 2

Power Supply

The equipments operate on 220V 50 Hz AC/. Though the equipments can start at a comparatively low voltage and endure limited voltage variations/fluctuations, it is suggested that a voltage stabilizer, which is provided separately alongwith the equipments, must invariably be used.

P.S. More technical details of the equipments are given at the end of this booklet.

B. Automatic Voltage Stabilizer (1KVA)

The function of the voltage stabilizer is to reduce the range of fluctuations in the mains voltage of 150 to 280 volts to smaller range of 209 to 231 volts.

The voltage stabilizer is also provided with an arrangement to cut off its output supply to the ILR/Freezer in case the main voltage goes below 150 volts or above 280 volts. The output is restored automatically after about 2 minutes when the mains voltage comes within the above range and remains within.

Only one no. of SB-300 Freezer is to be connected from any of the two outlets of the voltage stabilizer. But one SB-140 freezer and one MK-140 ILR are to be connected from one stabilizer in a PHC, from the two outlets of the same voltage stabilizer.

Before installation and use, familiarise yourself with the various features of the Automatic Voltage Stabilizer. (Fig:3)

VOLTMETER: Accurately monitors voltage available and supplied.

INPUT-OUTPUT SELECTOR: Allows the option of observing either input or output voltage.

QUICK START: A snappy press button that allows instant output without the two-minute wait. (The stabilizer has a switch-on time delay of 2 minutes. The mains indicator lamp will also glow and output to equipments will be available after 2 minutes. In case of first switching, you may bypass this time delay by pressing the switch for a few seconds and obtain quick-start)

MAINS INDICATION: This lamp glow to indicate availability of output to the equipments.

VOLTMETER ON/OFF SELECTOR: Continuous use of Voltmeter may be damaging. Keep this switch normally 'OFF'. Only to read 'input' or 'output' voltage on the voltmeter, put this switch 'ON'.

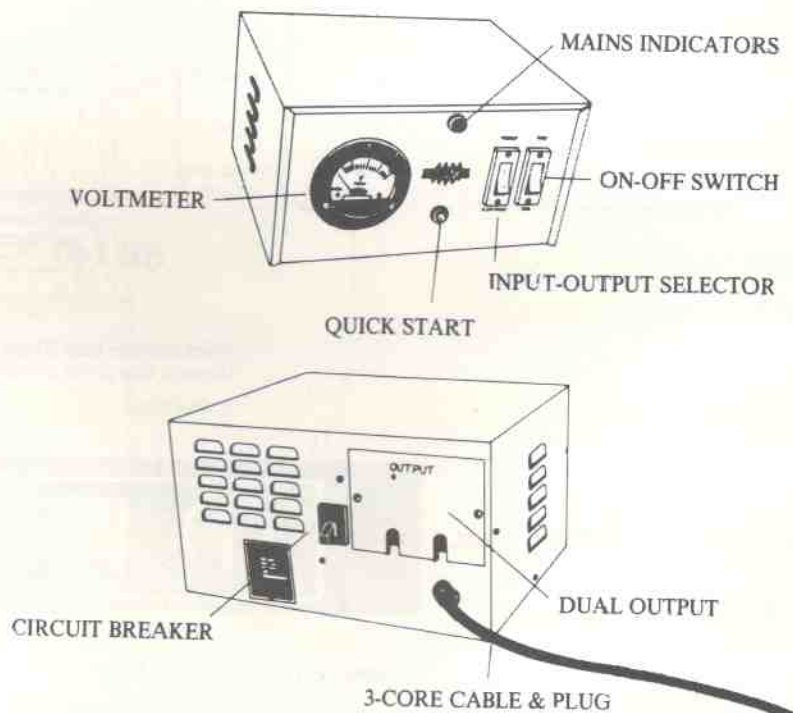


Fig. 3

DUAL OUTPUT: One MK-140 ILR and one SB-140 Freezer can be connected at a time from the two output terminals of the same stabilizer. The special strip provides direct connections to avoid sparking or loose connections. (Fig: 4)

CIRCUIT BREAKER: A safety device that automatically switches off in case of serious overload/short-circuit. This should be kept ON for working of the stabilizer. When tripped due to overload, this should be reset again. If fault in equipments persists, it will trip OFF again. In such case, do not repeat resetting, inform technicians to attend.

CONNECTION DIAGRAM

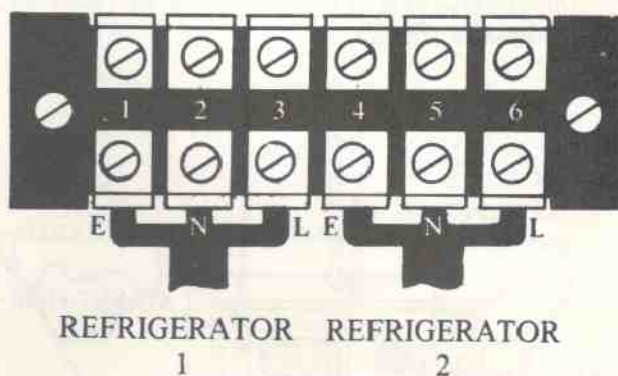


Fig. 4

3-CORE CABLE & PLUG: The stabilizer is connected to mains with its own 3-core cable and a pre-connected plug as per standard wiring colour code. (Fig. 5)

Green — Earth (Top)
Red — Phase (Right)
Black — Neutral (Left)



Fig. 5

C. Required power supply arrangement nearest to the place of installation

For smooth functioning of the equipments it is required to be connected from a 15 Amps 3-pin power plug socket outlet. Wiring to this socket is to be done from the mains with PVC insulated cables of minimum 2.5 mm^2 conductors of Aluminium. The larger size of plug and socket decreases the contact resistance which in turn reduces voltage drop and provides an easy path for the current.

An arrangement of the outlet comprising of 15 Amps socket with switch, fuse and mains indicator lamp, as shown below is advisable. (Fig: 6)

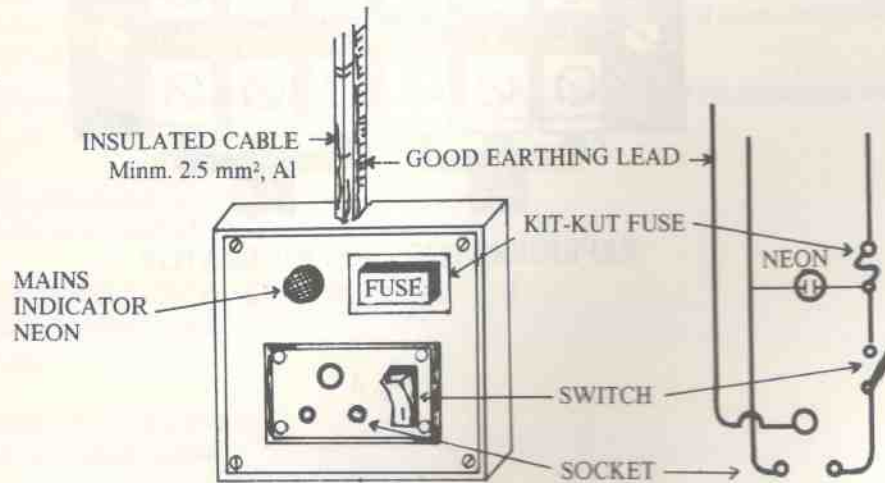


Fig. 6

ICE-LINED REFRIGERATORS AND FREEZERS

D. Unpacking

IMP: Check the packing and the equipment before and after the unpacking. Any damage or loss/irregularities should be reported to the relevant authorities.

1. The following tools may be necessary for the unpacking of the equipment (Fig: 7):

- Cutter for steel
- Screw driver
- Hammer
- Pliers

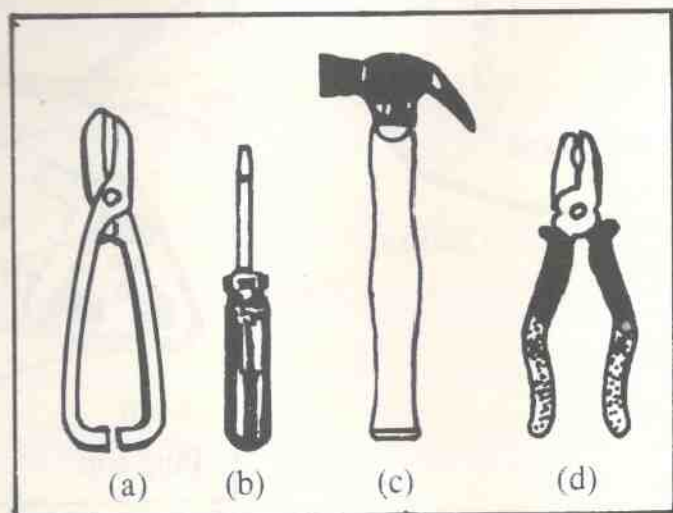


Fig. 7

- Place the crate containing equipment near the installation site, on a level surface.
- Cut off the binding steel straps.

Lift and remove the wooden box (4 walls and the top together). It will be easy to remove if the same is lifted uniformly on all sides. (Fig: 8)

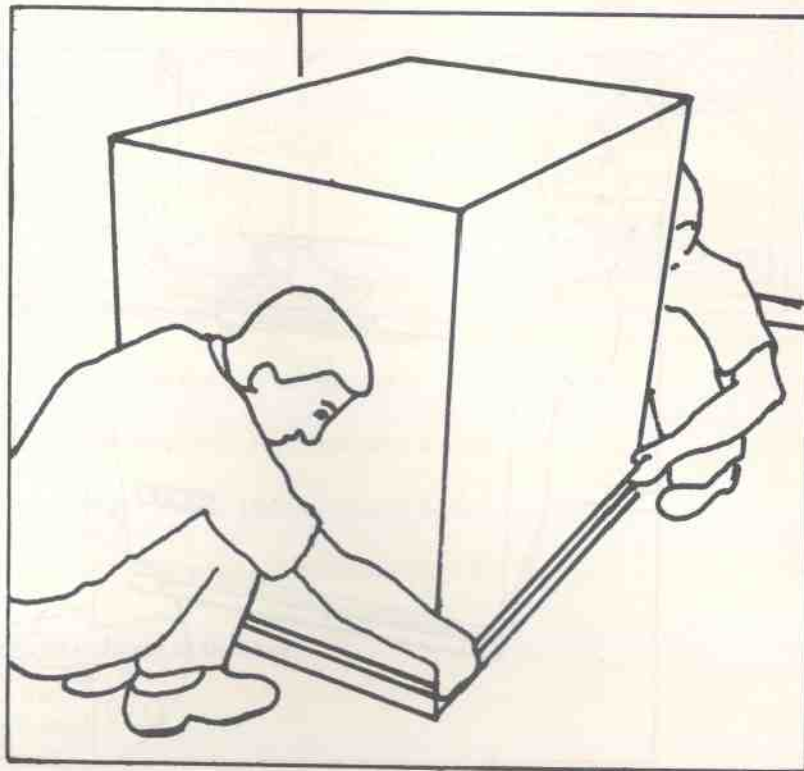


Fig. 8

Remove the wooden top frame and side bars. (Fig: 9)

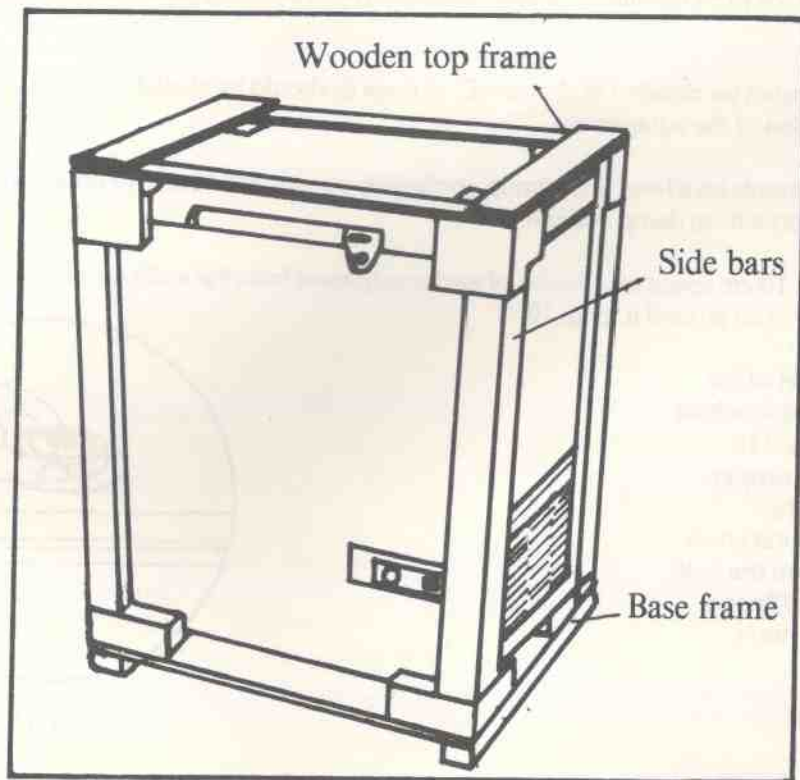


Fig. 9

Carefully cut the plastic foil along the top and down along the ends and remove.

Lift the equipment off the base frame.

Examine for any damage to the equipment physically. Minor dents etc. to the cabinet can be neglected. For damage of major nature, intimate relevant authorities.

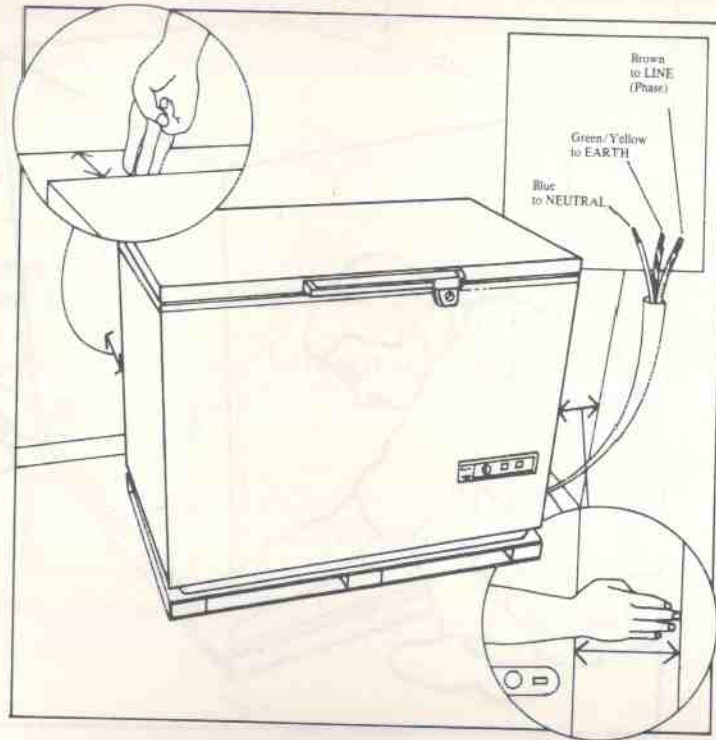


Fig-10

E. Installation

1. The equipments are to be installed in a well ventilated room avoiding direct sunlight or any other source of heat.
2. Power-supply socket (as detailed in chapter 'C' at page 8) should be available nearest to the place of installation of the equipments.
3. Install the equipments on a level floor firmly, preferably on wooden blocks or on wooden platform to protect it from damp and dirt.
4. Leave minimum 10 cm space on all sides of each equipment from the walls (or other objects) for good circulation of air around it. (Fig: 10)
5. Examine the level of the equipment with the help of a spirit level. (Fig: 11)
If the level is not proper, level it properly by putting required thickness of spacer between the foot and the platform/floor at the required corner/s.

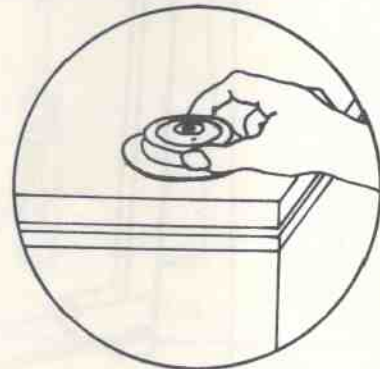


Fig. 11

6. Unscrew and remove the screws holding the side-cover of the compressor compartment which is on the right hand side of the equipment. Remove the side cover.

7. Examine the compressor compartment. (Fig: 12) Check carefully for any damage, dislocation or looseness etc. of the components.

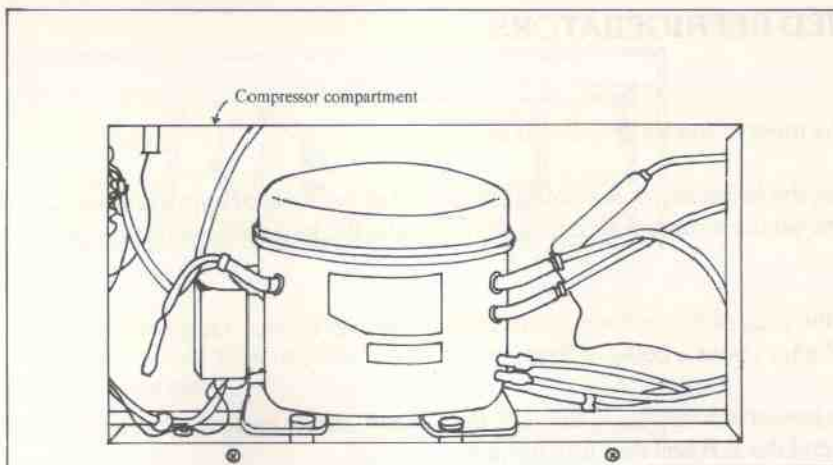


Fig. 12

8. Check and ascertain that the mounting bolts of the compressor are tight.

9. Check the incoming and outgoing electrical connections are in position and are tight.

10. Fit back the side cover of compressor compartment into position and fix back the screws.

11. Connect the leads of the power supply cord to one set of output terminals of the voltage stabilizer as below (Ref: Fig: 10):

Lead of cord

Terminal of voltage stabilizer

BROWN

L (Line)

BLUE

N (Neutral)

GREEN/YELLOW

E (Earth)

NB. Now the equipment is ready for operation. **BUT, FOR CONNECTING TO POWER SUPPLY FOLLOW THE INSTRUCTIONS GIVEN BELOW, RELATING TO THE TYPE OF EQUIPMENT (i.e. CHAPTER 'F' FOR ILR, MK-140 AND CHAPTER 'G' FOR FREEZERS SB-140 and SB-300)**

F. ICE-LINED REFRIGERATORS

Operation

1. Inspect the inner lining for any defect or damage.
2. Check that the Icepacks for Ice-lining are placed at intervals of approximately 25 mm. This is required to secure a natural air circulation to make the temperature distribution as even as possible.
3. Connect the plug of the voltage stabilizer to the power socket. Output from the stabilizer will go to the ILR after about a delay of 2 minutes.
4. When the power is available to the ILR, the 'Green' mains indicator lamp on the control panel will glow and the ILR will start functioning.
5. When the ILR is running, the outside walls of the cabinet will become warm. This is an indication that cooling action is taking place inside.
6. Keep a thermometer inside the ILR to measure the cabinet temperature and close the lid. The temperature near the bottom is slightly lower than the other portions.

7. Turn the thermostat knob by means of a coin to the right (clockwise) to maximum position (Fig: 13). Allow the ILR to run continuously without any vaccine in it. Observe the cabinet temperature time to time.

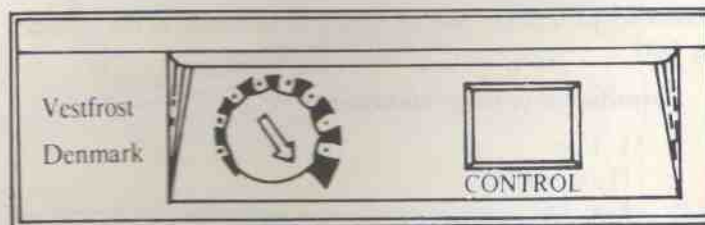


Fig. 13

8. The temperature inside the ILR will decrease slowly. It will be observed after a considerable period that the temperature is not decreasing anymore and is steady within a small range. The temperature is now steady because the ice-lining is being formed. It may take at least two days or more for constitution of the Ice lining.

9. After the Ice lining is constituted,

- (a) In most probability, it will be observed that the cabinet temperature has gone **lower** than the required range. Turn the thermostat knob anti-clockwise to a lower setting (Fig: 14). (you can start with setting '4') Observe for several hours. Select more lower setting, if required, until the required temperature range is obtained and the same remains steady.

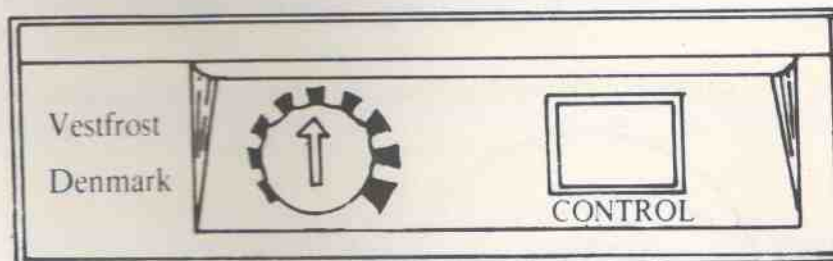


Fig. 14

- (b) If it is observed that the cabinet temperature remains steady at a **higher** temperature than the required range of + 2° to + 8°C, turn the thermostat knob clockwise to a higher setting (Fig: 15).

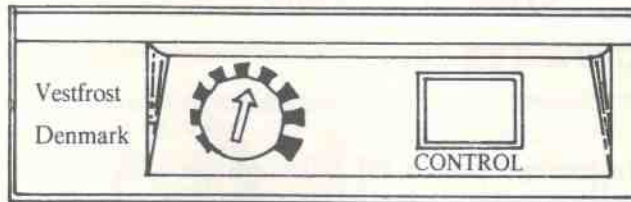


Fig. 15

Observe for several hours. Select more higher setting, if required, until the required temperature is obtained and the same remains steady.

Note: Higher the thermostat setting, colder will be the cabinet temp. Lower the setting, warmer will the cabinet temp.

10. When the temperature inside the ILR will be observed to be steady within + 2° to + 8°C for several hours, then only the vaccines to be preserved should be transferred to the ILR.

DPT and TT vaccines get damaged when they are frozen. Store them in the baskets in the ILR (if provided) or such a way that they will not touch any of the colder surface of the ILR on the sides or bottom.

11. After storing the vaccines, keep the lid properly closed and locked.

12. When fresh vaccines are stored in the ILR, the cabinet temperature may go up initially but should fall and come to the required range after few hours.

If it is seen that the temperature does not come down to the required level, but remains steady at a higher degree, the thermostat may have to be adjusted to a higher setting. After adjustment always observe till the cabinet temperature comes down to the required level and remain steady at that.

13. The cabinet temperature may vary depending upon various factors, such as:

- the ambient temperature,
- amount of vaccine preserved in the ILR,
- frequency of lid opening,
- circulation of air around the ILR, etc. etc.

If such variations are observed to be continued for longer time, the ILR temperature may be brought to the required range, by adjusting the thermostat as described earlier (see 9 a and b above)

After installation or after defrosting remember to re-freeze the ice-lining by running the ILR for minimum 48 HOURS ON MAXIMUM SETTING OF THERMOSTAT. Only thereafter put back the vaccine in the ILR, and RETURN THERMOSTAT TO NORMAL SETTING.

Remember to monitor temperature twice daily.

CHEST FREEZERS

G. Chest Freezer (SB-300 and SB-140)

Operation

Both the Freezers are similar in operation. However, SB-300 is of larger volume than SB-140.

Do not operate the 'SUPER' switch (if any).

1. Inspect the interior of the Freezer for any defect or damage.
2. Connect the plug of the voltage stabilizer to the wall socket. Output from the stabilizer will go to the Freezer after a delay of about 2 minutes.
3. When the power is available to the Freezer the 'Green' main indicator lamp on the control panel will glow and the Freezer will start functioning.
4. At the time of initial starting (when the inside temperature of the freezer is high) and also if at any time the inside temperature is above about -15°C , the 'Red' warning lamp will glow. This lamp indicates that the freezer temperature is above -15°C . This light will go off when the freezer temperature will come below -15°C . But the 'Green' main indicator light will be always ON so long power is available to the freezer.
5. When the freezer is running, the outside walls of the cabinet will be warm. This indicates that cooling action is there inside

6. Turn the thermostat knob to 'MAX' position (fully clockwise) with the help of a coin (Fig: 16). Allow the freezer to run continuously, without any vaccine or icepacks inside. Observe the inside temperature time to time on the thermometer provided.



Fig. 16

7. Initially the temperature inside the freezer will decrease slowly. It will be observed after a considerable period that the temperature will reach -20°C . Now, turn the thermostat knob to 'N' position (Fig: 17) and continue to observe the temperature inside the Freezer, time to time.

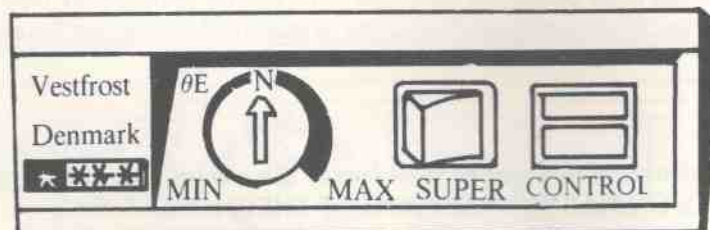


Fig. 17

8. Observe if a steady temperature is attained between -18° to -20°C .

- a) If it is observed that the cabinet temperature remains steady at a **higher** temperature than required range of -18° to -20°C , increase thermostat setting by turning some angle (towards your right) clockwise. (Fig: 18) observe for several hours.



Fig. 18

If required, turn thermostat knob more clockwise, and continue to observe the temperature till it becomes steady within the above range.

- b) If it is observed that the cabinet temperature is **lower** than -20°C after several hours of setting the thermostat at 'N' position, turn the knob more anticlockwise (towards your left) (Fig: 19)



Fig. 19

and continue observation. If required, turn it more anticlockwise and continue to observe the temperature till it becomes steady within the required range of -18° to -20°C .

When steady temperature -18° to -20°C . is obtained, the vaccines can be stored and ice packs may be kept for freezing in the freezer.

Depending upon ambient temperature and other local conditions, the SB-300 freezer can freeze about 36 ice packs and SB-140 can freeze 24 nos per 24 hours. It is advised not to add all the non-frozen ice packs together at a time for freezing. Better, if you put them in batches of 10-12. Put the next batch after the first batch is frozen.

Always keep a layer of frozen ice packs in the freezer. This will help prolonging the hold-over time during power failure.

IMPORTANT

1. There is a 'SUPER' switch on the control panel (Fig: 20). The compressor operates continuously so long this switch is 'on'. 'On' position is indicated by a lamp glowing inside the switch. **DO NOT USE THIS SWITCH.** This may harm the compressor if special care in operation is not taken. **(In many units this has been disconnected, and the new ones do not have this switch).**

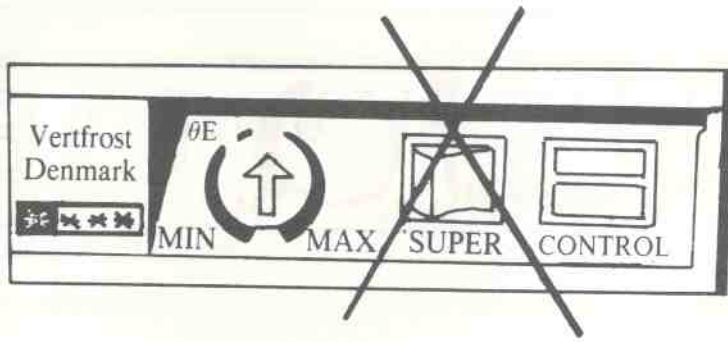


Fig-20.

2. **Once the lid of the freezer is opened and closed, while the freezer is running, it will not be possible to open the lid immediately.**

Do not try to exert pressure for opening it. This may damage the freezer. This happens due to partial vacuum, created by (shrinkage) of freshly entered warm air.

You will have to wait for 15-30 minutes to open the lid with ease. By this time the pressure inside and outside will be equalized through the fine holes in the lid gasket.

So always plan well your actions before opening the freezer to avoid 2nd immediate opening and also prolonged openings.

ICE-LINED REFRIGERATORS AND FREEZERS

DEFROSTING & CLEANING:

The moisture in the air, which enters the ILR/Freezer due to lid opening (and also may be due to defective lid-gasket or door alignment) is attracted by the cold surfaces inside the ILR/Freezer. So, formation of frost and ice occurs on the inside walls of the compartment. When the frost layer is 1/4" to 1/2" (6-12 mm) thick, it is time for 'defrosting' the ILR/Freezer.

MOST IMPORTANT:

- Before defrosting the ILR/Freezer, the vaccines preserved in it will have to be removed and stored temporarily in other working ILR or Refrigerator.
- If a second ILR or Refrigerator is not available, the Vaccines will have to be preserved in Cold-box or Vaccine carrier, properly lining the same with frozen ice packs, such that the vaccine temperature remains within the recommended storage temperature during the defrosting of the ILR/Freezer.

DEFROSTING & CLEANING PROCEDURE:

1. Switch OFF the power supply to the ILR/Freezer and remove the plug of the power supply cord from the wall socket.
2. Prepare the temporary storage and transfer the vaccines and preserve them properly with care.
3. In case of Freezer, take the frozen ice packs out. Keep them in a cold-box or close together wrapping them together with a thick blanket or similar insulating material.

This will keep the coldness of the ice packs during defrosting of the Freezer.

4. Open the defrost water outlet plug at the bottom, inside the cabinet.
Keep a suitable container under the drain hose to collect the defrost water.
5. Keep the lid open and allow the frost to melt completely. **Never use** any heat source other than warm water to speed up defrosting. **Never use** any sharp-edged instrument for removing frost or for cleaning.

6. **Clean the ILR/Freezer** carefully as below:

- (a) Wash all parts inside the cabinet with warm water and mild detergent. Wipe it dry with clean cloth.
- (b) Clean the lid and the lid seal (gasket) similarly. After the rubber seal (gasket) is wiped and dried, it should be rubbed with unscented talcum powder (or french chalk) specially on the hinge side.

Never use any strong detergent or rubber reactive material for cleaning the rubber seal.

- (c) Clean the outside of the ILR/Freezer also, with warm water and mild detergent and wipe dry with clean dry cloth.

7. Allow the cleaned parts to dry completely.
8. Reset the drain outlet plug at its position at the bottom.
9. In case of Freezer, replace the layer of the frozen ice packs on the bottom, as before, wiping each ice pack dry before placing.
10. Close the lid. Connect the power supply plug to the wall socket and switch ON supply to the ILR/Freezer.
11. (a) In case of **ILRs**, follow steps 7 to 10 on pages 12-13, for reconstitution of the ice lining and adjustment of thermostat for proper storage temperature.
- (b) In case of **Freezers**, follow steps 6 to 10 on pages 14-15.

ICE-LINED REFRIGERATORS AND FREEZERS

PERIODIC OBSERVATIONS/CHECKS/ACTIONS:

DAILY:

1. Take temperature readings periodically from the thermometers and note down the temperature and the time of reading. Keep the temperature records systematically. It is suggested that minimum 2 readings should be taken (in the morning and afternoon) preferably at the same hours of each day.

If the temperature is observed to be **below or above** the required range, adjust the thermostat by steps, allow the ILR/Freezer to run for about one hour under observation. If required, adjust the thermostat further until the required temperature range is obtained.

To make the inside **more cooler**, the thermostat knob is to be turned **clockwise to a higher setting**.

To make the inside **more warmer**, the thermostat knob is to be turned **anti-clockwise to a lower setting**.

2. Clean the exterior of the ILR/Freezer with a clean dry cloth.
3. Restrict and reduce frequency of opening the ILR/Freezer. Open only when absolutely necessary.

WEEKLY:

1. Examine the inside walls of the cabinet and see if frost formation is more than 1/4" (6 mm). If so, DEFROST the ILR/Freezer as described earlier.

2. Examine the rubber seal on the lid, if it sits properly. Any gap between the cabinet and lid seal can be checked by placing a visiting-card between them (Fig: 21). The card should resist being pulled out freely. If the card can be pulled out freely, there exists a gap. Such gap will allow outside air to

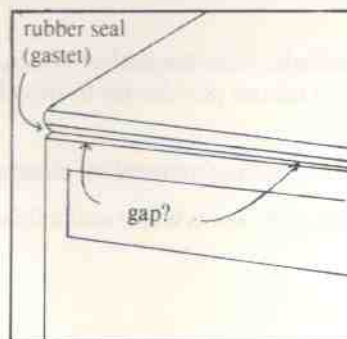


Fig-21

go in and form frost early. In such cases the lid hinges may have to be adjusted or the rubber seal should be changed. Bring it to the notice of Technician.

MONTHLY:

Clean the compressor compartment:

- (a) Put off the power supply and take out the plug from the wall socket.
- (b) Take out the side-cover of the compressor compartment by removing the two screws. Clean the interior of the compressor compartment with a soft brush and remove the dust.
- (c) Check the mounting bolts of compressor if they are tight. If not, rectify.
- (d) Fit back the side cover and fix back the screws.

Clean the lid seal.

If possible, put a standard thermometer inside the cabinet and compare the readings with those of the stem/dial thermometers and see if they are correct.

Thermometers with incorrect readings may have to be re-adjusted or replaced, as incorrect readings may lead to wrong storage temperature and loss of the potency of the vaccines preserved.

TROUBLE SHOOTING:

IMPORTANT:

- When an ILR/Freezer is found to be not working at all or not working properly, see that the vaccine temperature is within the recommended limits.
- Do not open the lid unless very essential.
- Observe temperature from time to time and if you feel that temperature may exceed the higher limit before the equipment is repaired—transfer the vaccines to other working ILR/refrigerator or cold-box. If required use smaller pieces of commercial ice in polythene bags in the cold-box—in absence of frozen ice packs.
- # For any **abnormal sound, smoke, smell etc.** in the ILR/Freezer **disconnect the power supply to it** and intimate refrigerator technician.

THE ILR/FREEZER IS NOT WORKING:

Observe the 'Green' mains-on indicator light on right, on the front panel:

IF NOT GLOWING:

- i) Check if wall socket switch is OFF.
- ii) Check if the voltage stabilizer is working or not. (see Voltage stabilizer details).
- iii) Check if power supply is available at the wall socket. This can be tested by connecting an electric lamp or other appliances to the socket. The lamp should glow or the appliances should work, if supply is available at the socket.

If not available—there may be some defect in the power supply circuit (viz: blow-off of fuse, loose connections, faulty switch or socket, single phasing etc.) which should be rectified through competent Electrical Maintenance Technicians.

If power is available at the socket—

- iv) Check that the plug is inserted properly into the socket.
- v) Check the plug for loose connection or dislocation of power supply cable connections—rectify if required.
- vi) Check if the output indicator 'Red' lamp on the voltage stabilizer is glowing and voltmeter indicates proper output voltage.
- vii) **Remove the plug from socket.** Check the incoming and outgoing cable connections from the output terminals of voltage stabilizers and on the terminal strip in the compressor compartment if they are proper.
- viii) Even after actions as above, the 'Green' lamp is not glowing—Notify Refrigerator Technician.

(b) IF GLOWING:

- i) Observe if the compressor is working.

If working—check the thermostat setting if it is wrongly turned completely anti-clockwise. If so, turn it clockwise to a higher setting and observe if the compressor is working and cooling is obtained now. Allow the ILR/Freezer to run and adjust thermostat to obtain recommended temperature.

If not working—Notify Refrigerator Technician.

(B) COMPRESSOR IS WORKING, BUT CABINET TEMPERATURE IS HIGHER THAN NORMAL:

NOTE: The cabinet temperature may go little higher than normal but should come down after sometime, when:

- New vaccines are stored,
- The lid is opened frequently or kept open for longer duration,
- Unfrozen ice packs are put in for freezing.

1. Check if recommended space is left on back and sides of the ILR/Freezer for air circulation, no heat source is nearby and the ventilation is proper.
2. Check if there is too much frost formation in the cabinet on the inside walls. If so, defrost.
3. Check if the lid gasket seals properly.
4. Check if the compressor is cut 'off' by the thermostat before required temperature is attained. If so, adjust thermostat setting.
5. If the compressor is observed to be running continuously but no cooling is obtained—this may be due to leakage of refrigerant gas from the system or defect in the unit—Notify Refrigerator Technician.
6. Check if the compressor tries to start but trips-off early by the over-load protector. This may be either due to too low supply voltage or defect in the compressor or starting relay—put 'off' the ILR/Freezer till return of normal voltage and try to run once again. If the defect prevails disconnect the defective ILR/Freezer from voltage stabilizer and notify Refrigerator Technician.

(C) CABINET TEMPERATURE IS LOWER THAN NORMAL:

Turn the thermostat knob, anti-clockwise, to a lower setting and observe if the compressor is cut 'off' by the thermostat. If the same does not cut 'off' even at the lowest setting—the thermostat may be defective and may have to be replaced—notify Refrigerator Technician.

NOTE: In such cases, till the repair is done, the vaccines should be preserved as follows:

- (a) Take out the layer of ice packs, if any;
- (b) Put one layer of fresh (non-frozen) ice packs on the bottom;
- (c) Keep some not-frozen ice packs on and around the vaccines also;
- (d) Run the ILR/Freezer under surveillance and put it 'off' when lowest recommended temperature is attained. Put the ILR/Freezer 'on' again when the highest recommended temperature is reached and keep it running until the lowest recommended temperature is attained again. Repeat as above till the ILR/Freezer is repaired.

ABNORMAL NOISE IN THE ILR/FREEZER:

In case of any abnormal noise coming out from the ILR/Freezer try to locate the source of the noise. Generally it may come from the compressor compartment. In such cases:

Take out the power plug from socket and open the side cover of the compressor compartment.

Examine the mounting bolts of the compressor, are tight. If required, tighten the loose ones.

Check if any pipe or component has come out of its position and also touching others. If so, rectify carefully.

Check if the ILR/Freezer is level and firm on its base. If not, rectify.

Even after actions as above if it is observed that the noise is still present or it is coming from the inside of the compressor—notify Refrigerator Technician.

SHUTTING DOWN:

ILR/Freezer is to be shut down for transportation etc.

Disconnect the power supply cable from voltage stabilizer.

Defrost and clean the interior.

Leave the lid open till the ILR/Freezer is absolutely dry.

Roll the power supply cord into a coil and bind and place it carefully to avoid damage.

STORAGE OF VACCINE:

CAUTION: Special care should be taken to preserve the vaccines that get damaged by freezing (DPT, TT, DT). Never store them in a 'Freezer' or touching the bottom or side surfaces in the cabinet of an ILR. The above surfaces are at a lower temperature than that in the other parts inside the cabinet.

It is advisable to preserve such vaccines (viz. DPT, TT, DT) in the baskets in an ILR (if provided).

STORING VACCINES:

Keep the packets containing the vaccines in neat rows;

Different vaccines should be kept separately to facilitate easy identification;

Keep about 2 cm. space between rows for circulation of air;

Store DPT and TT vaccines, **not touching** the inside walls or bottom of the ILR. It is better to keep them in the baskets in an ILR.

Keep a separate thermometer among the vaccines to ascertain the actual vaccine temperature.

POINTS TO REMEMBER (DOS)

For Vestfrost ILRs/Freezers:

1. Keep the equipment in cool and well ventilated place away from direct sunlight or any other heat source.
2. Equipment should be away from walls on all four sides. Minimum distance is 10 cms.
3. While installing Freezer and Ice Lined Refrigerators together, keep them minimum 10 cms apart.
4. Equipment should be level and firm on the four legs.
5. Electric supply socket should be close to the unit. The unit should be connected with the voltage stabilizer. All electrical connections should be proper and tight.
6. Place a thermometer inside the ILR/Freezer alongwith the vaccine to note the correct storage temperature inside. Record the temperature twice at morning and evening hours daily. Adjust the thermostat if necessary.
7. All 100% space inside any refrigeration equipment cannot be utilized for storage. Spacing vaccine rows and keeping 1/3 space vacant will help in proper cooling.
8. Keep the unit locked. Open only when required and do not keep the lid open for a long duration.
9. Defrost and clean the equipment periodically.
10. Polish with wax, the outer surfaces of the equipments to prevent rusting.
11. In case of lid sticking (in Freezers) due to vacuum inside, do not force open the lid but wait for 15 to 30 minutes. Lid could be opened easily after this time.
12. Read and follow the instructions pasted on the lid of the equipment.
NOTE: Polio and Measles vaccines may be stored inside the Freezer alongwith the ice packs. DPT, DT, TT and BCG to be stored inside the Ice Lined Refrigerator. Follow instructions of your supervisor.
13. Put a label on the equipment with the following information:
 1. Whom to contact if the equipment is found non-functional.
 2. Location of the fuse of the powerline to the equipments.
 3. Where to shift the vaccine in case of emergencies.
14. Contact District Refrigerator Technicians, State Cold Chain Officers or UNICEF for any difficulties arising with the equipment.

CAUTIONS DURING USE OF EQUIPMENTS (DONT'S)

Do not open the lid frequently and for longer duration.

Do not utilize the entire inside space for storage of vaccine/ice packs. Spacing of vaccine/ice packs and keeping 1/3 space empty inside the equipment is essential for proper functioning of the units.

Do not put more water (ice packs) for freezing in a Freezer than the recommended ice making capacities of the freezers per 24 hours.

Freezer SB 300 can freeze 13 Kg ice per day

Freezer SB 140 can freeze 8 Kg ice per day

Putting more water (ice packs) will affect the functioning of the unit and will not produce the ice as required and may damage the unit.

Do not use knife, screwdriver etc. for removing ice during defrosting. Use only luke warm water if needed.

Do not use high capacity fuse when the fuse is blown off frequently but consult the electrician to check the reason.

Do not open the compressor compartment without disconnecting the unit from the power line.

Do not fiddle with the equipment. Entrust the repair work to experienced technicians only.

Do not run the equipment without voltage stabilizer.

DETAIL INFORMATION

UIP-04/ILR-140L

CHEST REFRIGERATOR (ICE-LINED)-140 LITRES



Model: MK-140 COLOUR: WHITE

Use	:	For storage of vaccines at refrigerator temperature (at PHC level)
Gross Volume	:	140 ltr
Net storage volume	:	85 ltr
Holdover time	:	78 hrs at 32°C & 62 hrs at 43°C
Power requirement	:	220v, 50 Hz, AC, 100W, 0.65 A
Energy consumption/24 hrs	:	0.5 kWh at 32°C 1.2 kWh at 43°C
Ice lining	:	Ice packs, supplied with the equipment, sealed.

UIP-03/FREEZER-140L

CHEST FREEZER-140 LITRES



Model: SB-140 COLOUR: BLUE

Use	:	For storage of measles & polio vaccines and to freeze ice-packs (at PHC level)
Gross Volume	:	140 ltr
Net storage volume	:	128 ltr
Freezing capacity	:	10 kg/24 hr (at 32°C) 8 kg/24 hr (at 43°C)
Holdover time during power cut	:	22 hrs at 32°C 18 hrs at 43°C
Power requirement	:	220/240v, 50 Hz, AC
External dimensions	:	85 × 72 × 68 cm

UIP-02/FREEZER-300L

CHEST FREEZER-300 LITRES



Model: SB-300 COLOUR: WHITE

Use	:	For storage of polio & measles vaccines and freezing ice-packs (at district stores)
Gross Volume	:	296 ltr
Vaccine storage capacity	:	188 ltr
External dimensions	:	85 × 126 × 68 cm (H × L × W)
Ice-pack freezing	:	13 kg/24 hr (at + 32°C) 12 kg/24 hr (at + 43°C)
Internal temperature	:	Min. - 23°C, Max. - 21°C (at + 32°C) Min. - 21°C, Max. - 19°C (at + 43°C)
Holdover time during power cut	:	26 hrs at + 32°C 18 hrs at + 43°C
Power requirement	:	220v AC/50 Hz
Consumption/24 hr	:	1.7 kWh at + 32°C 2.3 kWh at + 43°C

UIP-05/VS-1KVA

VOLTAGE STABILIZER AUTOMATIC-1 kVA

Use	:	With ILR or Chest Refrigerator/Freezer in places of power supply fluctuations and/or high/low voltage
Capacity	:	1 kVA
Input voltage range	:	150 to 280 volts, 50 Hz, AC
Output voltage	:	220 ± 5% volts
Special feature	:	Automatic cut-off if voltage exceeds or goes below the input range. 2 minute time delay to put 'on' automatically. Delay can be avoided by pressing a button on front panel for 'quick start'.
Provided with	:	Voltmeter 'on-off' switch and selector switch to observe input & output voltage. Mains 'on' indicator; 'quick-start' press-button and miniature circuit-breaker.

Note:

To one stabilizer, one MK-140 chest-refrigerator and one SB-140 chest freezer are connected together, but only one SB-300 chest freezer or one TCW-1151 ILR is to be connected.