TERUMO PENPOL®

Blood Storage Cabinet

TÜVRheinland®
CERT
ISO 9001

User Manual

IMPORTANT

This user manual is written for the person responsible for the operation of *Blood Storage Cabinet.* The operational method and routines are drawn to ensure reliable, safe and effective operation of *Blood Storage Cabinet*. It is important that the operator has studied and understood the contents of this manual before using *Blood Storage Cabinet*.

WARRANTY

1. The warranty includes equipment or a component that proves to have faults during the warranty period. In such case, Terumo Penpol Limited will, without cost to the customer, repair or replace the components or equipment.

2. The warranty is not valid if the equipment has been repaired by anyone else other than qualified personnel that are approved by Terumo Penpol Limited / Branch Office.

3. The warranty is not valid if the equipment has been changed in any way that, according to Terumo Penpol Limited's opinion, affects the reliability and stability of the product.

4. The warranty is not valid, if the equipment has been used in any other way than that described in the operating procedure.

5. The warranty is not valid when the serial number has been changed, crossed over or been removed or if the fault has been caused by misuse or abnormal use.

Contents

1. INTRODUCTION

The *Blood Storage Cabinets* are designed for safe storage of blood – filled bags at prescribed conditions of storage.

Features

- ***Temperature Recorder and Controller Unit***: The *Blood Storage Cabinets* are equipped with a built in Temperature Recorder and Controller Unit (records on a circular chart), which has a digital temperature sensor for temperature recording. This does not require manual calibration hence this is more reliable and accurate. Having a record like a circular chart helps to identify variations in temperature, which may affect the yield, shelf life or even the viability of components.
- ***Alarms:*** Audio and Visual alarms indicate
  - When the temperature exceeds the acceptable range
  - Door open
  - Sensor failure
  - Chart change
  - Power failure
  - System OK
  - Compressor ON
  - Battery indication
- ***Internal lighting***: Provided with a flicker free CF lamp.
- ***Security***: Safety lock ensures security.

■ **Models**

165L	o Solid door * o Glass door	o 4 Slide out trays
300L	o Solid door* o Glass door	o 6 Slide out trays
600L	o Solid door* o Glass door	o 5 Slide out trays

* Stainless Steel and CRCA Powder Coated Models are available

2. INSTALLATION DETAILS

Unpacking

- Inspect the packing for shipping damages. If you find any, notify Terumo Penpol Limited / Branch Office.
- The items received may be cross verified against the P.O and packing list. Any missing or damaged item must be reported immediately to the carrier and Terumo Penpol Limited / Branch Office.

Packing Details

The package contains the following items

Item	165L	300L	600L
Blood Storage Cabinet	1 No	1No	1No
Keys	2 No	2 No	2 No
CF lamp	1 No	1 No	1 No
Acrylic door	2 Nos	3 Nos	3 Nos
Tray	4 Nos	6 Nos	5 Nos
Paper or Pressure chart	50 Nos	50 Nos	50 Nos
Chart holding knob	1 No	1 No	1 No
Ink pen for paper chart	5 Nos	5 Nos	5 Nos
Sensor bottle	1 No	1 No	1 No
User manual	1 No	1 No	1 No
Test certificate	1 No	1 No	1 No
Packing List	1 No	1 No	1 No
Do's & Don'ts	1 No	1 No	1 No

Installation Procedure

The installation of the unit consists of the following steps.

- **Ensure proper earthing of power point**
- Ensure the mains voltage is within the range as in the specification. If the voltage fluctuation is high, provide a servo voltage stabilizer.

- Ensure the serial No: in the warranty card in the user manual and serial No: on the equipment are same.
- Carefully remove the packing materials without damaging parts of the equipment.
- The *Blood Storage Cabinet* will be found bolted to a wooden base with 4 bolts. With the help of appropriate tools the bolts can be removed. After removing the bolts, remove the wooden base.
- Place the *Blood Storage Cabinet* on a level surface.
- Bunch of keys will be found tied in back grill of the equipment. Take the keys and open the equipment.
- The handle, CF lamp, chart, chart holding knob, sensor bottle etc. will be found packed and tied to one tray inside the *Blood Storage Cabinet*. Unpack and fix the handle (the required screws are provided) and the lamp.
- Fill the sensor bottle with correct composition i.e., 0.25% of glycerine in water and keep the sensor dipped in this.
- Place a new chart in the TRCU and place the chart holding knob on the chart holder.

- Insert the pen into the needle in the case of paper chart.
- Plug the unit and switch ON
- Switch ON TRCU
- The *Blood Storage Cabinet* is now ready for use.

Precautions for Installation and Use

- The unit is shipped in a complete condition. Generally no adjustments are required to be done to any of the components of this unit.
- Install *Blood Storage Cabinet* away from heating appliances.
- Install *Blood Storage Cabinet* away from the wall by about 30cm, which provides good ventilation for the condenser.
- Provide a separate power socket for *Blood Storage Cabinet*.
- Good air circulation is necessary inside the cabinet for keeping all the bags at the desired temperature. Hence place all bags neatly and do not overload beyond its maximum capacity.
- Keep door opening time at minimum.

3. SPECIFICATIONS

Product Code	165L Solid Door	BBR165S
	165L Glass Door	BBR165G
	300L Solid Door	BBR300S
	300L Glass Door	BBR300G
	600L Solid Door	BBR600S
	600L Glass Door	BBR600G
Input Voltage*	230 ± 10% V, 50Hz, single phase AC	
Capacity	165 L	96 Nos. of 450ml blood bags
	300 L	144 Nos. of 450ml blood bags
	600 L	300 Nos. of 450ml blood bags
Voltage Stabilizer	Built in 1KVA stabilizer	
Compressor	Hermetically sealed compressor	
Refrigerant	R134a (CFC Free)	
Trays	Stainless steel slide out trays	
Chamber temperature	4 ± 2°C	
Chart Range	0 - 40°C	
Chart Resolution	1°C	
Duration of the chart	7 days	
Display	4x7 segment LED (Red)	
Display Resolution	0.5°C	
Method of recording	Ink pen on paper chart / pressure pen on pressure sensitive chart	
Battery Backup for TRCU	2hr backup with Rechargeable Sealed Maintenance free Lead Acid Battery.	
Mounting	The unit is mounted on castor wheels	
Internal Lighting	Provided using flicker free CFL	

Note:

The Blood Bank Refrigerators are to be kept at standard air-conditioned room as specified by Indian Drug & Cosmetic Act and is designed accordingly. However, it can work up to a maximum of +33°C ambient temperature.

4. TEMPERATURE RECORDER AND CONTROL UNIT

1. Chart 2. Chart holding knob 3. Pen 4. Needle rest 5. Zero sensor 6. Door hinge 7. Optical sensor 8. Display 9. LED indications 10. Switches 11. Fuse 12. Battery ON/OFF switch

TRCU (Temperature Recorder and Control unit) performs the dual functions of Recording the temperature on the circular chart and controlling the temperature of the *Blood Storage Cabinets*.

Features:

- The TRCU has a digital temperature sensor for temperature sensing. This does not require manual calibration.
- **Chart Change Switch:** Used for changing the chart without damaging the pen holding arm. When you press this switch, needle moves to the needle rest position outside the chart.
- **Alarm Ack** / **Chart set:** This switch has two functions.

1. To set starting time of recording during chart change.
2. Acknowledge power failure and other alarm conditions.

- **Reset Switch**: Used to reset the system if it is not working or to re-initialize the system, if required.
- **Battery Backup**: The TRCU is incorporated with a 12V 2.3Ah rechargeable sealed maintenance free lead acid battery for monitoring and recording the temperature during power failure. A fully charged battery will operate the TRCU for 2 hours. When power fails a "b" will blink in the left side of the 7 segment display with an audible alarm.

Note: Changing of the battery must be done by approved Service Personnel.

5. ALARMS AND VISUAL INDICATIONS

TRCU is provided with the following alarms indicating the operating conditions of Blood Storage Cabinets. The audio alarm has to be viewed in conjunction with the visual indications.

***Power*:** Indicates that the power to the internal voltage stabiliser is OK

***Line In*:** Indicates that the power to the entire system from the voltage stabiliser is OK

***Compressor On*:** If the "*Compressor On*" indication is glowing it shows that the compressor has been switched ON to bring down the temperature so that it remains within the specified range.

***Heater On*:** Not operational in Blood Storage Cabinets.

***Temperature High*:** This indication shows that the temperature is above the acceptable range. Audible alarm is also present.

***Temperature Low*:** This indication shows that the temperature has gone below the acceptable range. Audible alarm is also present.

Agitator Off: Not operational in Blood Storage Cabinets.

***Door Open*:** The visual indication shows that the door has been left open. An audible alarm comes if the door is left open for more than one and half minutes.

***System Ok*:** This LED indicates that the sensor is working properly.

Note: If the sensor is removed this indication goes OFF and an error signal (- E2 -) comes on the display, indicating that the sensor is faulty or that the sensor has worked loose. If the sensor is then replaced the system Ok LED may light up again. Please reset the system.

Battery Low: This indication shows that the battery charge is low.

When power fails a "b" will blink in the left side of the 7 segment display.

6. OPERATING INSTRUCTIONS

- Switch ON the equipment by plugging the input power cord.
- Monitor the circular chart and temperature display and make sure that both are indicating the same value.

TRCU Initialisation Cycle

The initialisation cycle is a very important diagnostic tool. The following actions will be performed by the TRCU in order.

1. All the relays will be switched OFF.
2. The LED's will turn ON and then turn OFF

3. The display will be initialised to '0000'

4. The needle will move to the left, detect the opto- sensor and stop. If the needle does not stop then the opto-sensor is defective. The needle will then climb on to the needle rest.

5. The LED's will again turn ON and Turn OFF indicating that the initialisation routine is now over.

6. The actual temperature will be displayed and the needle will move to the corresponding mark on the chart.

7. Appropriate LED's and alarm will turn ON.

The operation of TRCU is extremely simple, the user has to replace the chart once in a week and in the case of ink pen the user has to replace plotting pen when it runs out of ink.

Replacement of pen in the case ink pen

1. Switch OFF the TRCU.

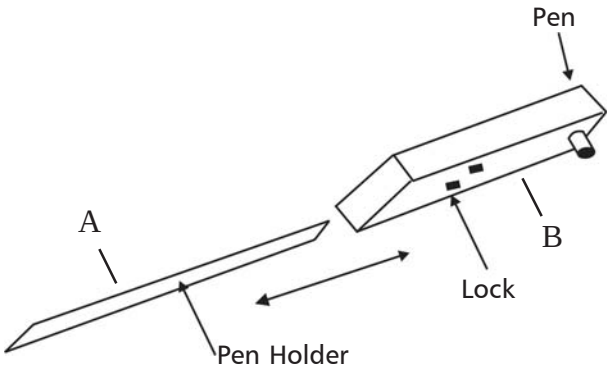
2. Slide the pen out of the pen holder.

3. Slide a new pen back into the pen holder.

4. Switch ON the unit.

5. Ensure that the pen is marking properly.

The unit does not require any other user level calibration.

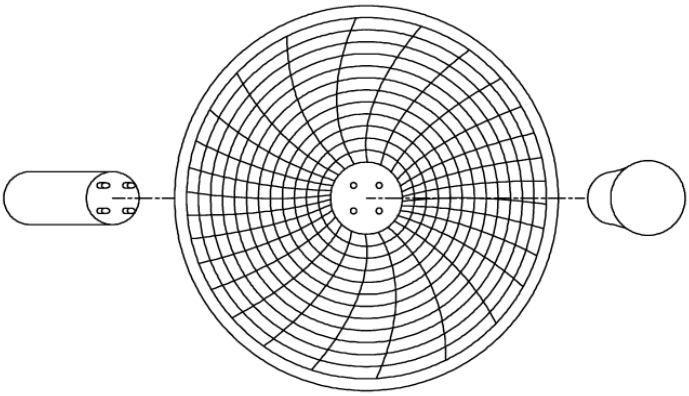


A and B has to coincide for proper marking.

Changing the Chart

- To change the chart, first press the Chart Change switch on the front panel. The needle moves to the needle rest position outside the chart and display shows “c”.
- Pull the chart holding knob out. Do not try to rotate. The chart holding knob is magnetic and comes out on a pull. (Refer to figure)
- Replace the chart. And put the knob back.
- Press the Alarm Acknowledge / Chart set switch on the front panel to adjust the starting time of the recording. When you hold the switch down the chart rotates.
- Press Chart Change again to restart the recording, the “c” in the display will go OFF

Note: Do not remove the chart with the pen still on it. It may damage the pen holder.



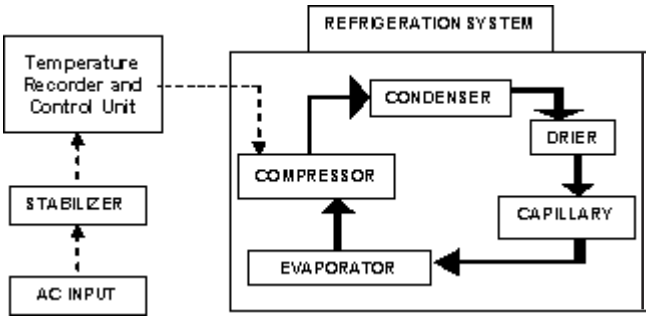
Battery Backup

The TRCU is incorporated with a 12V 2.3Ah rechargeable sealed maintenance free Lead acid battery for monitoring and recording the temperature. A fully charged battery can be used for 2 hours. When the power goes there is an alarm with blinking 'b' indication on the 7 segment display.

☛ *Changing of the battery must be done by approved service personnel only*

7. TECHNICAL DESCRIPTION

Functional Block Diagram



Functional Description

The main components of the **refrigeration system** are:

Compressor: The compressor compresses low pressure low temperature refrigerant to high-pressure high temperature refrigerant.

Condenser: The condenser reduces the temperature of the high temperature, high-pressure refrigerant to room temperature (ideally), high-pressure refrigerant.

Drier: This room temperature, high-pressure refrigerant passes through the drier where any traces of water vapour in the system are removed.

Capillary: From the drier, the refrigerant passes through the capillary where it is throttled to low-temperature low-pressure liquid.

Evaporator: This low pressure, low temperature liquid then passes through the evaporator. The evaporator is located within the cabinet whose temperature is to be maintained. The low temperature, low-pressure liquid absorbs heat from the cabinet, which is being refrigerated and is subsequently sucked into the compressor. The cycle then repeats.

The cabinet is of a single body structure with rust – proof stainless steel interior and CRCA powder coated / stainless steel exterior. The stainless steel interior aids in temperature stability and simplifies cleaning. The inner acrylic tray doors provide protection from temperature loss. Adequate insulation is provided by using high-density foamed polyurethane, which ensures steady temperature maintenance and keeps the temperature losses to a minimum. The inner trays, made of stainless steel are rust free. To avoid sweating during humid conditions or in monsoon seasons, delivery line of the compressor is routed near the door, which keeps the area warm.

The Temperature Recorder and Control Unit controls the "switching ON" and "switching OFF" of the compressor. The TRCU has a digital sensor that senses the temperature inside the refrigerated space. Based on this input the TRCU controls and Records the temperature inside the Blood Storage Cabinet. The recording is done on a seven-day chart.

The stabiliser ensures that the Temperature Recording and Control Unit and the Refrigeration System gets the proper operating voltage. LED indications are provided on the front panel of the *Blood Storage Cabinet* to show the status of power input to the stabiliser and power out into the system.

Cleaning

- Before cleaning, be sure to switch OFF the equipment and disconnect the power cord.
- Do not use corrosive products, abrasive products, steel wool, chemical solvents etc. for cleaning.
- Do not rub the stickers/labels with hospital spirit or iso -propyle alcohol.
- Clean the unit regularly by using clean cloth. Do not clean with cloth dipped in ether, or other organic solvents.
- The finned condenser can become clogged with dust. The openings between the fins should be kept clean. A vacuum cleaner with a small brush can be used for this purpose. Failure to keep the condenser fins free of dust will result in erratic operation and may damage the system.
- Clean the unit frequently, so that dust does not accumulate.
- Be sure to dry the equipment, especially the power supply connector before using.
- Do not open the compressor chamber.
- Do not try to clean any internal parts which are not accessible.
- Do not lubricate any internal part.

11. TROUBLE SHOOTING

Problems Observed	Possible Cause	Possible Remedy
The Storage Cabinet does not work.	No input supply	Switch ON the input supply (and MCB in the case of Glass Door equipment) to the equipment. Provide another inlet if the existing is defective.
	ON/OFF switch of the TRCU is OFF	Switch ON the TRCU
	TRCU not working	Check if the fuse of the TRCU is Blown. Replace if defective.
Unit hums and shuts OFF	Low voltage or voltage fluctuation.	Switch OFF the unit and switch ON after voltage regains or provide a voltage stabilizer.
Unit runs excessively	Frequent door opening	Do not open the door frequently and keep the time for which the door is open at minimum.
	High ambient temperature	Keep the equipment in air conditioned room
	Equipment is close to the wall	Provide required space between the wall and the equipment.
	Condenser is not clean.	Clean the condenser properly.
High noise level	Out of level floor	Place the *Blood Storage Cabinet* on a level surface or provide some packing at the required position.

High rate of climb of temperature on opening the door	The sensor is not dipping in the glycerine solution or the level of glycerine is not sufficient.	Position the sensor or fill the bottle to the required level.
The temperature indication shows -E- and alarm sounds.	The sensor is not connected Properly.	Connect the sensor properly, and then reset the system.
The chart is not moving	The unit may have been left in the chart change mode.	Press chart change. Then press alarm ack. / chart set switch.
The TRCU does not turn on. "Line in" and "power " LED are glowing	Fuse of TRCU blown	Check rating of the fuse and replace if defective
	TRCU not switched ON	Check the TRCU ON/OFF switch.
"Power" LED is glowing, but "Line in" LED is not glowing.	High / Low Voltage input has cause the stabiliser to shut down.	Check input voltage and correct.

Other problems should be corrected by Authorised Service Personnel only. Do not make an attempt to open the equipment under any circumstances. Warranty will be void if the equipment is opened.

12. CONTACT ADDRESS

For complaints / suggestions please contact your nearest authorized service personnel or contact nearest Terumo Branch:

TERUMO PENPOL Limited

Medical Systems Group

TC 27/373, Andoor Buildings,

General Hosp. Road, Trivandrum

Kerala, India - 695 035.

Tel: +91-471-3015800.

Fax: +91-471-3015805

Email: service@terumopenpol.com

Corporate Office:
I - 2, Jawahar Nagar
Trivandrum-695003, Kerala, India.
Tel: 91- 471-3015500 / 3015501.
Fax: 91- 471-2721519

In the event you require further technical clarifications / help, do contact us at info@terumopenpol.com. Our technical experts will be able to provide you with the required support. Do let us have your feedback regarding the Equipment. Continuing with our Vision of ***"Better Ways to Better Health Care"*** your feedback will help us in serving you better.

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Visit www.terumo.co.jp for TERUMO worldwide offices.

* Due to continuous development, specifications are likely to change without prior notice.

This product is manufactured by Terumo Penpol Limited.

UM/BBR/APR2010/Rev 5

WARRANTY

Dear Customer,

Please accept our hearty congratulations on choosing TERUMO PENPOL equipment. We are sure that this marks the beginning of a long and mutually satisfying relationship.

Details of the warranty period and terms of validity are outlined in this document. We would request you to go through the same.

Apart from covering your installation through the warranty with which your equipment comes, we have post warranty service options available. Your nearest Terumo Branch / Distributor will be happy to give you the details. It is advisable to get in touch before the warranty expires. This will enable us to work out an option that suits you best. Once again we thank you for placing your trust in **TERUMO PENPOL Limited.**

Best Regards,

Authorised Signatory
Medical Systems Group
TERUMO PENPOL Limited

TERMS OF WARRANTY

The warranty covers repairing/replacement of any defective hardware items from the configuration listed in the Warranty Card, contingent to these defect having arisen only out of faulty design or workmanship if brought to the notice of TERUMO PENPOL Limited, in writing, on or before the date at expiry of warranty mentioned on the Warranty Card. Warranty is valid for a period of one year from the date of installation or 15 months from the date of delivery specifically agreed in writing by TERUMO Branch officials.

TERUMO PENPOL®

WARRANTY

Warranty Number Date:

Customer Code :

Customer Name :

Installation Address :

Date of despatch :

Date of Installation :

DC No.	Description	Eqpt. Sl.No.

TERUMO PENPOL Limited, undertake to repair/replace any defective items from the products listed above subect to the conditions mentioned overleaf.

Installation Remarks :

TERUMO PENPOL LImited, Medical Systems Group
TC 27/373, Andoor Buildings, General Hospital Road, Trivandrum, India
Registered Office : I-2, Jawahar Nagar, Trivandrum 695 003