

TRIAC Centrifuge

Model Nos. 0200 and 0206

OPERATOR'S MANUAL

Clay Adams

Division of
Becton, Dickinson and Company
Parsippany, N. J. 07054



TRIAC Centrifuge

Model No.0200 [115 volts] Model No.0206 [220 volts]

OPERATOR'S MANUAL


— CAUTION —

Read this Manual thoroughly before operating equipment.

Connect only to an approved power source such as a 3-wire grounded receptacle. Where a 2-wire receptacle is encountered, have it replaced with a properly grounded 3-wire receptacle in accordance with the National Electrical Code. Do not, under any circumstances, remove the grounding prong from the power plug.

Should the power cord and plug become cracked, frayed, broken or otherwise damaged, they should be replaced immediately by a serviceman.

Unplug the power cord before servicing. The operator should not perform any servicing except as specifically stated in this manual. Refer servicing to trained service personnel or return the instrument to the factory for service.

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TRIAC Centrifuge

INTENDED USE

The Clay Adams TRIAC Centrifuge (Figure 1) is a multi-speed, table-model centrifuge designed to operate in the following three modes:

MHCT Mode: to obtain quantitative micro-hematocrits from whole blood;

BLOOD Mode: to obtain serum or plasma specimens from whole blood;

URINE Mode: to obtain urine sedimentations for microscopic examination.

INSTALLATION PROCEDURES

A. Accessory Parts

The TRIAC Centrifuge is packaged and delivered with the following spare parts and accessories:

Motor Brushes (2)—for use as spare replacements.

PRE-CAL Tube Compartment Gaskets (4)—for use as spare replacements.

Spanner Wrench (1) — for tightening and removing notched retaining nut on centrifuge head.

PRE-CAL Capillary Tubes, 75mm, Heparinized (1 Vial)—for running MHCT determinations.

SEAL-EASE Tube Sealer (1)—for sealing ends of PRE-CAL Capillary Tubes.

Operators Manual (1)—this document, for use in operator training.

B. Assembling Head, Cover and Trunnions

The TRIAC Centrifuge is shipped completely assembled except for the head, cover, and four trunnions of the centrifuge. After unpacking, place the centrifuge on a level, steady working surface.

To Install the Head (refer to Figure 2):

1. Remove notched Retaining Nut (A) and Washer (B) from the threaded Motor Shaft.
2. Place the Centrifuge Head on the Motor Shaft and align Shaft Pin (C) with Head Slot (D). Press the Head down until it seats.
3. Place Washer (B) on the Motor Shaft, then install Retaining Nut (A).
4. Using the spanner wrench supplied with the Centrifuge **SECURE THE RETAINING NUT AS TIGHT AS POSSIBLE.**

To Attach Head Cover:

The head cover screws onto the motor shaft and is secured by tightening the knurled knob. NOTE: The cover is used only in the MHCT mode. It must always be placed over the centrifuge head as a safety precaution. The cover will not screw onto the motor shaft while trunnions are in place.



Figure 1. Clay Adams TRIAC Centrifuge.

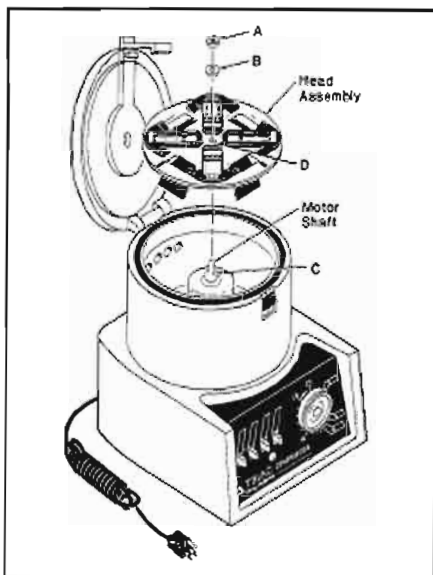


Figure 2. Head Assembly Details.

To Insert Trunnions:

Four trunnions fit into slots provided in the head and are self-positioning. The trunnions are numbered for sample identification.

Always use all four trunnions to maintain balance of the head assembly in the URINE and BLOOD modes. REMOVE THE TRUNNIONS BEFORE OPERATING IN THE MHCT MODE.

C. Centrifuge Controls

Control switches and dials on the front of the TRIAC Centrifuge are shown in Figure 3.

Timer—The TRIAC Centrifuge is equipped with a 15-minute timer. To set the timer, turn the outer ring to the desired time. Push the center button to start the time cycle selected. To repeat the pre-set time cycle it is only necessary to push the center button. Recommended spinning times for each mode are printed on the face plate around the timer as follows:

- MHCT Mode—Three minutes
- BLOOD Mode—Five minutes
- URINE Mode—Six minutes

Push Button Mode Selectors—The mode of operation is selected by depressing the desired mode button. When properly engaged, a mode button will remain fully depressed.

WARNING:

THE SELECTED MODE BUTTON MUST BE FULLY DEPRESSED BEFORE OPERATION.

MHCT Mode and Safety Interlock—A MHCT Safety Interlock (see Figure 3) is provided, which works in conjunction with the MHCT mode button as a check against accidental operation in the MHCT mode while the trunnions are in place. REMOVE THE TRUNNIONS BEFORE OPERATION IN THE MHCT MODE.

To engage the MHCT mode button, the Safety Interlock must first be pushed horizontally toward the left (in the direction of the arrow) while the MHCT button is being pressed.

Brake—The TRIAC Centrifuge is equipped with an electric brake which is designed to bring the head to a gentle stop. To operate:

1. Press down the Brake button and hold it down during braking. The brake will be activated as long as the button is held down.
2. Release the Brake button as soon as the head comes to a stop.

NOTE

Do not hold the Brake button down after the head stops. If the Brake button is held down too long, the head will begin accelerating in the opposite direction.

3. For delicate sedimentations, release the button just before the head comes to a stop and let the head spin to a gentle stop.

Lid Safety Switch—When the lid is closed and properly latched, a safety switch is engaged, activating the motor.

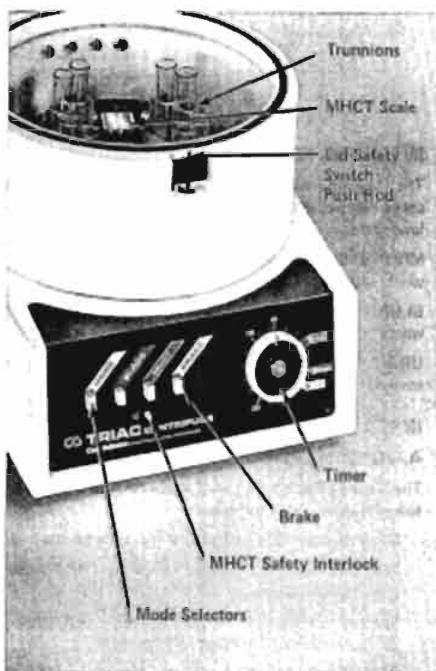


Figure 3. TRIAC Centrifuge Controls

The centrifuge motor will not operate unless the cover latch is closed securely.

NOTE: Never open lid while centrifuge is operating.

CAUTION

When selecting Urine Mode or Blood Mode, be certain the desired mode button is fully depressed and remains depressed. If not fully depressed, the centrifuge may spin at an incorrect or excessively high speed. For example, if the desired mode is Blood and the previous mode was MHCT, failure to depress the Blood Mode button fully could cause operation at MHCT speed, resulting in failure of glass tubes and loss of sample.

PERFORMANCE AND SPECIFICATIONS

- Equipment Identification: Clay Adams TRIAC Centrifuge, Model No. 0200 or Model No. 0206.
- Speeds and Centrifugal Forces (both models):

Mode	Speed RPM at Rated Voltage	RCF (Relative Centrifugal Force)
URINE	2300 (+6%, -5%)	880
BLOOD	3500 (+6%, -5%)	1500
MHCT	10,400 Nominal 9,500 Minimum	12,600 Nominal 10,500 Minimum

- Power Requirements:
Model 0200—115 volts AC/60 Hz/3 amps
Model 0206—220 volts AC/50 Hz/1.5 amps
- Weights and Dimensions (Closed Machine):
Height: 10" Net Weight: 24 lbs.
Width: 12½" Shipping Weight: 38 lbs.
Depth: 14"

OPERATING INSTRUCTIONS

Connect the Model 0200 Centrifuge to a 3-wire grounded AC receptacle rated at 115 volts/60 Hz/15 amps. NOTE: The centrifuge may be operated between 105 volts and 130 volts, but operation at either of these extreme limits of voltage is not recommended because of reduced motor life.

Connect the Model 0206 Centrifuge to a 3-wire grounded AC receptacle rated at 220 volts/50 Hz/7.5 amps. NOTE: The centrifuge may be operated between 210 volts and 260 volts, but operation at either of these extreme limits of voltage is not recommended because of reduced motor life.

CAUTION

Connect the Centrifuge only to a 3-wire grounded receptacle. Where only a 2-wire receptacle is available, replace with a properly grounded 3-wire receptacle. Do not remove grounding prong from power plug of Centrifuge. If an extension cord is required, use only a 3-wire (grounded) extension cord rated for 115 volt or 220 volt service.

A. Urine and Blood Modes

ALL FOUR TRUNNIONS MUST BE INSTALLED IN THE HEAD BEFORE OPERATION IN THE URINE AND BLOOD MODES. TUBES MUST BE BALANCED IN THE TRUNNIONS AS SHOWN IN FIGURE 11 ON PAGE 8.

The following tubes can be accommodated in the trunnions.

TYPE	SIZE	NUMBER
VACUTAINER	16 ml	8
Brand Blood Collection Tubes	10 ml	8
	7 ml	8
Taper Bottom Tube (Heavy Duty) Graduated	17mm x 120mm	8
Taper Bottom Tube (Heavy Duty) Plain	17mm x 120mm	8

The following tubes can be accommodated in the trunnions, but require the indicated adapters and increased spinning times:

TYPE	SIZE	NUMBER	Clay Adams Adapter Catalog No.	Recommended Spinning Time in Blood Mode
VACUTAINER Brand Blood Collector Tubes	3 ml	8	0204	6 Minutes
	2 ml	8	0205	7 Minutes
RTU Disposable Culture Tubes	10mm x 75mm	8	0204	6 Minutes
	12mm x 75mm	8	0204	6 Minutes

Select the desired mode, Urine or Blood, and the correct time cycle. Be sure the lid of the TRIAC Centrifuge is properly latched before depressing time button. Depress timer button to start centrifuge cycle.

B. MHCT Mode

The TRIAC Centrifuge incorporates four built-in MHCT scales (Figure 4). When used with a precalibrated capillary tube, hematocrits may be determined by measuring the length of the packed red cell column. Four tubes per scale, for a total of 12 microhematocrit tubes, can be centrifuged simultaneously.

1. PRE-CAL Capillary Tubes

TRIAC Centrifuge scales are designed for use only with heparinized PRE-CAL Capillary Tubes (Catalog Nos. 1025 and 1035). It is not necessary to measure the overall length of blood used, since this length remains unchanged from one sample to the next.

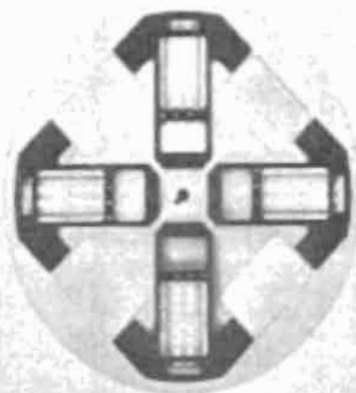


Figure 4. TRIAC Centrifuge Head, Showing PRE-CAL Tube Compartments and Hematocrit Scales.

A PRE-CAL Tube is 75mm long and bears a calibration mark 60mm from one end. The length of the TRIAC Centrifuge scale is exactly the same as the length of the calibrated portion of the tube. The volume of blood used is only about 15mm^3 (0.015 cc).

Figure 5 illustrates the TRIAC Centrifuge MHCT principle, in this case yielding a Hematocrit Value of 30. A PRE-CAL Tube was first filled with blood to the calibration mark, as described below, and then centrifuged. As shown in Figure 5, the length of the packed red cell column when measured against the TRIAC Centrifuge scale equals the hematocrit value.

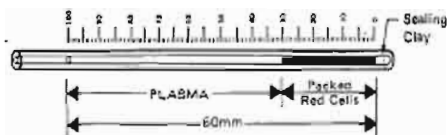


Figure 5. TRIAC Centrifuge MHCT Principle, Illustrating a Hematocrit Value of 30 (scale simplified).

Procedures for using PRE-CAL Tubes and the TRIAC Centrifuge to obtain hematocrit values from patient blood samples taken from finger punctures or from venipunctures are described below:

2. Finger Puncture Blood

□ Filling PRE-CAL Tube:

- Puncture the finger tip with a REDI-LANCE Blood Lancet or equivalent lancet.

- b. Grasp the end of a PRE-CAL Tube, nearest the calibration mark, between the thumb and forefinger. Do not obscure the calibration mark.
- c. Insert the end farthest from the calibration mark into the center of the drop of blood on the finger. **NOTE: THE FINGERTIP SHOULD NEVER BE TIGHTLY SQUEEZED TO INCREASE BLOOD FLOW.** Squeezing the finger will dilute the blood specimen with tissue fluid and cause a falsely low hematocrit reading. Hold the tube level (in a horizontal position) and observe the blood level as it approaches the calibration mark.
- d. **FILL THE TUBE EXACTLY TO THE CALIBRATION MARK.** The rate of filling may be accelerated by tilting the end near the calibration mark below horizontal. The rate may be retarded, stopped or reversed by tilting the same end above the horizontal (Figure 6).

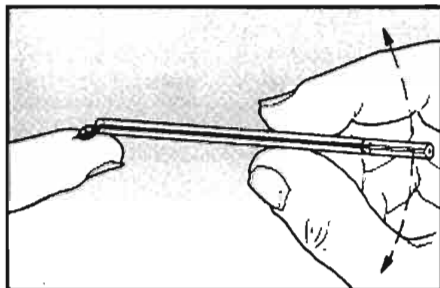


Figure 6. Filling PRE-CAL Tube from Finger Puncture. Rate Can be Controlled by Tilting.

- e. When blood reaches the calibration mark, remove the tube from the finger, holding it level so that blood cannot flow out the end.

NOTE:

In the event the tube has been accidentally filled beyond the calibration mark, remove the excess blood by gently dabbing the wet tip with a cotton or gauze sponge.

- f. Tilt the tube until blood flows about 1/8" in from the blood collecting tip; then keep the tube horizontal so that no blood is lost (Figure 7).

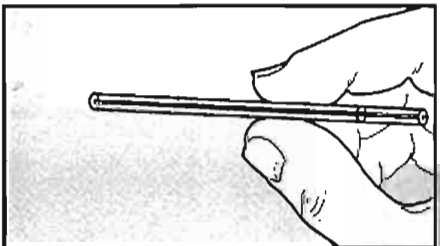


Figure 7. Tilting PRE-CAL Tube to Remove Blood from Collection Tip.

- g. Wipe any blood from the outside of the tube with cotton or gauze.

Sealing PRE-CAL Tube:

Invert the tube so that the blood-free end (end nearest calibration mark) is directed downward. Immediately insert blood-free end into the SEAL-EASE Tube Sealer (Catalog No. 1016) as shown in Figure 8. Push the tube fully into the clay before blood flows to the blood-free end. **NOTE: if blood reaches the end of the tube before the SEAL-EASE Tube Sealer is forced in, some blood may be lost. The tube is now ready for centrifugation.**

NOTE: If the end of the tube used to draw blood is inserted into the SEAL-EASE, some specimen may be lost during centrifugation.

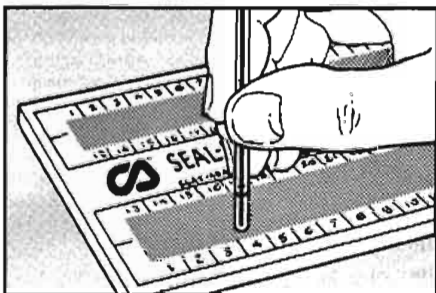


Figure 8. Inserting PRE-CAL Tube in SEAL-EASE Tube Sealer.

Storing Blood Specimens Prior to Centrifugation:

The PRE-CAL Tube is heparinized to prevent blood clotting. It can therefore be stored in the SEAL-EASE Tube Holder for a short period of time between collection and centrifugation. It is recommended that filled PRE-CAL Tubes be centrifuged within 90 MINUTES after collection.

Placing PRE-CAL Tubes in Centrifuge Head:

Place the blood-filled PRE-CAL Tubes in the numbered slots of the PRE-CAL Tube Compartment with the sealed ends toward the outer edge of the head (zero end of printed scale). Slide the tubes so that the sealed ends press against the black rubber gasket (Figure 9). Twelve tubes can be centrifuged simultaneously. Care should be taken to record the slot number of each patient blood specimen.

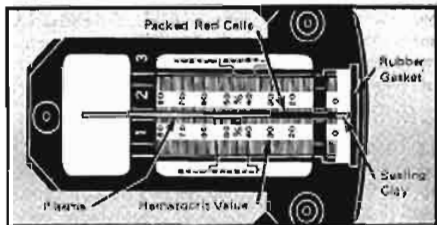


Figure 9. PRE-CAL Tube Compartment Illustrating a Hematocrit Value of 30.

When loading less than 12 tubes, balance the head by loading the opposite numbered slots (i.e., load nos. 1, 7, 2, 8 in this sequence). NOTE: Failure to balance the head in this manner may cause a slight increase in machine noise if all slots on one side are empty. However, this amount of imbalance will not affect the operation of the centrifuge.

After the PRE-CAL Tubes are in position, be sure to install the head cover. Close the lid and latch securely.

Select the MHCT mode by holding the Safety Interlock left while depressing the MHCT mode button. Select the MHCT time cycle and depress the timer button.

3. Reading The Hematocrit

Setting Tube to Zero Mark: Shift the PRE-CAL Tube in its slot so that the interface between the SEAL-EASE Tube sealer and the packed red cell column is exactly aligned with the "0" mark on the centrifuge scale (see Figure 9).

Reading the Hematocrit: Read the mark on the printed scale adjacent to the interface between the plasma and the packed red cells. This value is the hematocrit. Record the correct hematocrit for each patient. Discard PRE-CAL Tubes safely after reading.

4. Venipuncture Blood

Blood from venipunctures can be collected with either a standard syringe or a VACUTAINER Brand Blood Collection Tube. The latter method is recommended. To prepare the blood for a hematocrit determination, proceed as follows:

- Remove the filled VACUTAINER Brand Blood Collection Tube from the holder and needle. Mix the blood by inverting the Tube several times. Remove the rubber stopper and immediately fill a PRE-CAL Tube as described below.
- Grasp the end of the PRE-CAL Tube nearest the calibration mark between the thumb and forefinger. Do not obscure the calibration mark.
- Tilt the VACUTAINER Brand Blood Collection Tube to a near horizontal position so that blood flows toward the mouth of the tube. Dip the end of the PRE-CAL Tube farthest from the calibration mark into the blood sample. Hold the PRE-CAL Tube in a horizontal position and observe the blood level as it approaches the calibration mark.
- THE TUBE MUST BE FILLED EXACTLY TO THE CALIBRATION MARK. The rate of filling may be accelerated by lowering the end near the calibration mark below the horizontal. When tilting, be careful not to spill blood from the VACUTAINER Brand Blood Collection Tube. The rate may be retarded, stopped or reversed by tilting the same end above the horizontal as shown in Figure 10.
- When the blood reaches the calibration mark, remove the PRE-CAL Tube, holding it level so that blood cannot flow out the end.
- Follow same directions for handling, sealing, centrifuging, and tube reading described in 2 and 3 above.

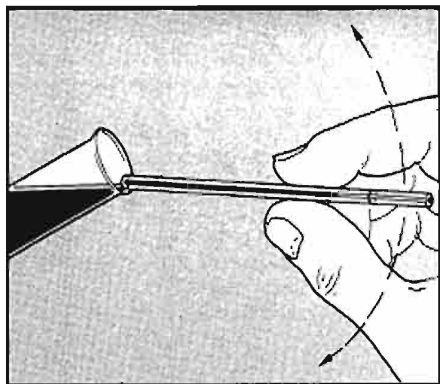


Figure 10. Transferring Blood Specimen from VACUTAINER Tube to PRE-CAL Tube. Rate Can be Controlled by Tilting Tube.

5. Expected HCT Values

Ranges of normal hematocrit values for adult males and females are indicated by the green areas printed on the centrifuge reader scale (see Figure 9). The normal range for males is 40 to 54 and for females, 37 to 47.⁽³⁾

Note: In the example shown in Figure 9, the values 5—12 and 83—100 are hidden under the tube holders in the centrifuge head. These values, however, are rarely found in clinical practice.

6. Interfering Substances

Anticoagulants—It has been reported that the hematocrit value of blood anticoagulated with oxalates is 8% to 13% less than that obtained when using heparin.⁽⁶⁾⁽⁷⁾ It is also reported that reliable hematocrit values cannot be obtained when the concentration of disodium ethylenediaminetetraacetate (EDTA) anticoagulant exceeds 2 mg per ml of whole blood.⁽⁸⁾

Drugs—It has been observed that certain drugs will cause variations in hematocrit levels due to physiological factors. For additional information consult Reference in the Bibliography on page 7.

7. Micro-Blood Collection Kits

The TRIAC Centrifuge has been designed to accommodate capillary tubes supplied with Clay Adams ACCU-STAT Micro-Blood Collection Kits. These Collection Kits are used extensively by laboratories to obtain plasma for a variety of micro-blood chemistry determinations.

It is emphasized that while the TRIAC Centrifuge will accept these special-purpose capillary tubes, its built-in micro-hematocrit scale cannot be used to obtain a hematocrit reading with these capillaries. If a direct reading is required from Micro-Blood Collection Kit capillaries, use an ADAMS Micro-Hematocrit Tube Reader (Cat. No. 1000) or Card-type Tube Reader (Cat. No. 1002).

OPERATING PRECAUTIONS

WARNING

WHOLE BLOOD SPECIMENS MAY CONTAIN VIRAL OR BACTERIAL AGENTS. USE GOOD LABORATORY TECHNIQUES WHEN HANDLING BLOOD. DO NOT ALLOW SPECIMENS TO CONTACT THE SKIN.

In order to obtain properly centrifuged specimens, as well as to prevent damage to the TRIAC Centrifuge, the following basic operating precautions should be carefully observed.

Electrical: Operate the Centrifuge only from an AC power source approved for the particular model.

Load Balancing: For smooth operation and long service life of the TRIAC Centrifuge, it is important that loads be balanced as equally as possible. The use of a balance is recommended for best results.

Equally important to balancing is the even distribution of material to be centrifuged. Follow the balancing instructions specified in this Manual.

CAUTION

NEVER balance by adding weights, mercury or lead shot to the bottom of a tube or trunnion.

Installing Head Cover: Always install the head cover before operating the centrifuge in the MHCT mode. This provides an extra check that trunnions have been removed, and assures that the correct MHCT speed will be obtained.

MHCT Interlock: Before activating the MHCT Safety Interlock, remove trunnions from centrifuge. Damage to the equipment and loss of sample will result if centrifuge is operated in MHCT mode while trunnions are in place.

Timing: For accurate results, follow the recommended timing routines specified in this Manual.

MHCT Readings: Accurate hematocrit readings depend upon proper blood collection and handling techniques. Carefully observe the procedure described in this Manual.

Cleanliness: Keep the TRIAC Centrifuge clean and dust-free in accordance with Maintenance and Service Instructions supplied in this Manual. Avoid spilling liquids into the centrifuge head.

HAZARDS

Basic safety precautions must be carefully observed when operating the TRIAC Centrifuge in order to avoid the hazards of electrical shock or physical injury.

To Avoid Electrical Shock:

- Plug the power cord only into a grounded 3-wire receptacle.
- Never remove the grounding prong from the power plug.
- Always unplug the power cord before attempting to service centrifuge.
- Immediately replace worn or damaged power cord or plug.

To Avoid Physical Injury and Equipment Damage:

- Never, under any circumstances, open the lid of the centrifuge while the motor is running.
- Do not operate the centrifuge in the MHCT mode with the trunnions in place. There will be failure of the blood or urine tubes and continuous operation will cause failure of the motor.
- Never use cracked, scratched or chipped glassware.

WARRANTY

Care has been taken to assure that every component of the TRIAC Centrifuge delivers long, trouble-free service. The instrument is fully guaranteed against defective workmanship and materials for a period of one year, provided it has not been subjected to abuse or misuse.

MAINTENANCE AND SERVICE

Service and maintenance that can be performed in the laboratory are described below. All other service to the TRIAC Centrifuge should be performed by an authorized Clay Adams service center.

A. Lubrication

The sealed ball bearings of the TRIAC Centrifuge motor do not require lubrication.

B. Inspection/Replacement of Motor Brushes

The motor brushes in the TRIAC Centrifuge should be inspected for wear (length) every six months. Brushes should be replaced when they are less than 1/4" long. One extra pair of motor brushes is enclosed within the base housing attached to the power cord. Order only genuine Clay Adams replacement brushes (See Appendix B—Spare Parts and Accessories).

CAUTION

Disconnect power cord from wall receptacle before disassembling the TRIAC Centrifuge.

To inspect and/or replace brushes, proceed as follows:

- a. Remove line cord from outlet.
- b. Remove centrifuge head by removing notched retaining nut from motor shaft using spanner wrench supplied with centrifuge. Close and tightly latch centrifuge lid.
- c. Turn the centrifuge upside down.
- d. Referring to the exploded view in Figure 12 (Page 10), remove the two screws (A) holding the two rear rubber feet (Item 4) and washers, and screw (B) and washer in the front vibration isolator.
- e. Carefully lift off the bottom plate and attached motor assembly.
- f. Using a screwdriver, remove the two brush caps (C) on either side of the centrifuge motor.
- g. Remove the spring and brush assembly (Item 1) from the motor.

NOTE: Brush Orientation—If brushes are still usable, i.e., more than 1/4" long, replace them AS YOU FOUND THEM.

- h. To replace brushes or install new ones, insert the spring and brush assembly into the motor. IT IS IMPORTANT THAT THE CURVED FRONT SURFACE OF THE BRUSH IS ORIENTED TO MATCH THE CURVED SURFACE OF THE MOTOR HOUSING BEFORE INSERTION. Replace brush caps and screw down tightly. Re-install bottom plate and replace rubber feet and plate screws.
- i. Re-install centrifuge head.

NOTE: Always run-in new brushes. Proper performance may not occur until after several hours of operation with the centrifuge head re-installed.

C. Replacement of MHCT Tube Gaskets

Tube gaskets are located at the outer end of each PRE-CAL Tube Compartment. After prolonged use, gaskets may become punctured at regions in contact with the PRE-CAL Tubes. When this occurs, replace with the extra gaskets supplied with the centrifuge. Additional gaskets (Cat. No. 0200-617-000) may be ordered from Clay Adams. (See Appendix B—Spare Parts and Accessories.)

D. Speed Check

Centrifuge speeds in each of the three operating modes may be periodically checked with an accurate tachometer, such as an ADAMS Photo-Electric Tachometer, Model 5205. Mechanical tachometers that contact the motor spindle should not be used. When performing the speed checks, follow the manufacturer's directions. IMPORTANT: BEFORE CHECKING SPEED IN THE MHCT MODE, BE SURE THE TRUNNIONS ARE REMOVED.

E. Cleaning

It is recommended that interior and exterior surfaces of the TRIAC Centrifuge bowl, head, head cover and trunnions be wiped occasionally with a damp cloth. A mild detergent may be used to remove stains. Keeping these parts clean will prolong the life of the centrifuge. The transparent cover of the centrifuge is made of a shatter-proof polycarbonate resin, resistant to a wide range of laboratory chemicals. It is recommended, however, that the cover be kept clean and that spillage be wiped off as soon as possible. A mild detergent should be used. DO NOT USE CARBON TETRACHLORIDE or CHLOROFORM. Other chemicals, such as aromatic hydrocarbons (benzene, toluene, xylene, turpentine, gasoline, acetone) and strong alkalies (sodium and ammonium hydroxide), can damage the cover.

F. Transporting Centrifuge

Though the TRIAC Centrifuge is ruggedly constructed and can withstand the rigors of normal laboratory use, it can be damaged by dropping or by excessive abuse in handling. If the centrifuge must be shipped or returned for repair, package it carefully in a strong insulated container to prevent damage from vibration and impact. ALWAYS REMOVE THE HEAD BEFORE PACKING AND SHIPMENT TO PREVENT DAMAGE TO THE MOTOR SHAFT.

G. Spare Parts and Accessories

Spare parts and accessories for the TRIAC Centrifuge can be obtained through your nearest Clay Adams Automated Laboratory Equipment dealer. Catalog numbers and ordering information are listed in Appendix B. Wiring schematics for the Model 0200 Centrifuge and Model 0206 Centrifuge are shown in Figures 13 and 14.

OPERATOR TRAINING

Operators and technicians unfamiliar with centrifuge operation, blood collecting procedures and micro-hematocrit methods should undergo a training period to familiarize themselves with proper techniques. This training should include a thorough working knowledge of:

- TRIAC Centrifuge set-up and power requirements.
- Handling and preparation of blood samples,
- Reading of hematocrit values, and
- Equipment service and repair.

Beyond the initial indoctrination of operating personnel, laboratory administrators are encouraged to hold periodic refresher training in the correct use of the TRIAC Centrifuge and its related test procedures.

TROUBLESHOOTING

If the TRIAC Centrifuge fails to operate properly, or should inconsistencies be encountered in micro-hematocrit determinations, consult the Troubleshooting Chart in Appendix A to locate the problem.

When attempting to isolate the cause of inconsistent hematocrit readings, it should be realized that the most common source of error is improper handling and preparation of blood specimens. The techniques described in this Manual for collecting and preparing blood specimens and for reading a hematocrit should be carefully followed. General points to question in isolating problems are:

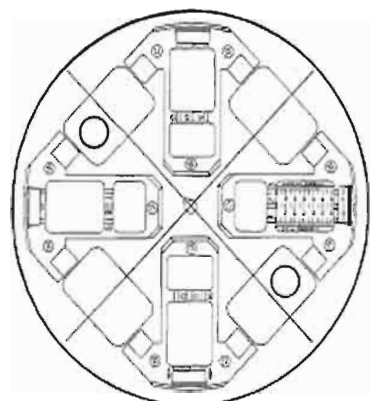
- Have PRE-CAL Tubes been properly filled and sealed?
- Were anticoagulant concentrations correct?
- Were blood specimens centrifuged within 90 minutes of collection and for at least 3 minutes?
- Were individual PRE-CAL Tubes correctly set to the MHCT "0" mark on the hematocrit scale?

BIBLIOGRAPHY

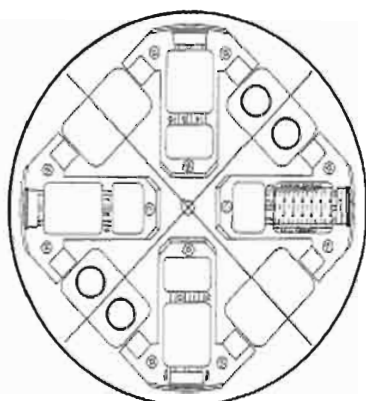
References in the list below may be consulted for additional information on centrifugation techniques, hematocrit reading, interfering substances, and normal values:

1. Wintrobe, M.M. (1929) "Simple and Accurate Hematocrit," *Journal of Laboratory and Clinical Medicine*, 15, 287.
2. Guest, G.M. and Silre, V.E. (1934) "Centrifuge Method for Determination of Volume of Cells in Blood," *Journal of Laboratory and Clinical Medicine*, 19, 757.

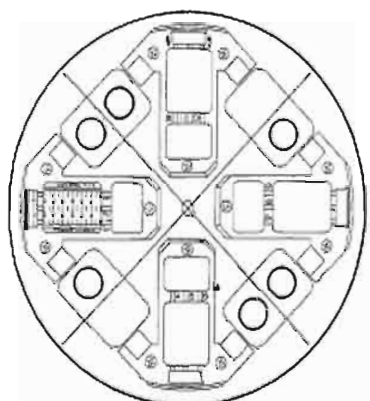
3. Sunderman and Boerner, (1950) *Normal Values in Clinical Medicine*, W.B. Saunders Co., Phila., Pa., 45.
4. Strumia, M.M., Sample, A.B., and Hart, E.D. (1954); "An Improved Micro-Hematocrit Method," *The American Journal of Clinical Pathology*, 24, 1016.
5. Wintrobe, M.M. (1967) *Clinical Hematology*, 6th edition, Lea & Febiger, Phila., Pa., 410.
6. Henry, R.J. (1968) *Clinical Chemistry—Principles and Technics*, Harper & Row, N.Y., 155.
7. Young, D.S., Thomas, D.W., Friedman, R.B., and Pestaner, L.C. (1972) "Effects of Drugs on Clinical Laboratory Tests," *Clinical Chemistry*, 18, 1041.
8. Lampasso, J.A. (1965) "Error in Hematocrit Value Produced by Excessive Ethylenediaminetetraacetate," *American Journal of Clinical Pathology*, 44, 109.



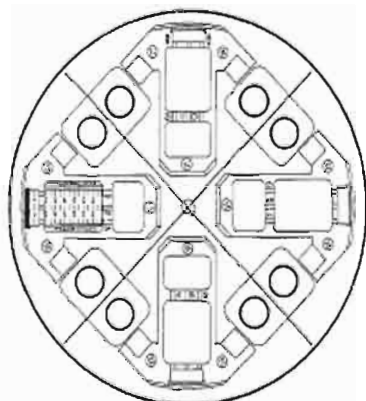
Two tubes



Four tubes



Six tubes



Eight tubes

- a) Four trunnions must always be in place during URINE and BLOOD Modes. (Note: Remove trunnions before operation in MHCT Mode.)
- b) Place filled tubes in opposite trunnions as diagrammed.
- c) If an odd number of tubes are to be spun, balance with an additional water-filled tube. NEVER OPERATE CENTRIFUGE WITH AN ODD NUMBER OF TUBES.

Figure 11. Balancing Tubes in URINE and BLOOD Modes.

APPENDIX A
TRIAC Centrifuge
Troubleshooting Guide

Symptom	Cause	Corrective Action
Centrifuge fails to Operate in <i>Any</i> Mode:	<ul style="list-style-type: none"> A. Power Cord not Plugged B. Start Button not Depressed. C. Cover not Fully Latched. D. Motor Brushes Defective. E. Internal Defect. 	<ul style="list-style-type: none"> A. Plug Power Cord into Receptacle. B. Press Starter Button. C. Securely Latch Cover. D. Replace Brushes in Accordance with Instruction in this Manual. E. Return Centrifuge for Authorized Service.
Centrifuge Fails to Operate in Blood Mode Only	<ul style="list-style-type: none"> A. Blood Mode Button not Fully Depressed. B. Defective Blood Mode Button. 	<ul style="list-style-type: none"> A. Fully Depress Blood Button. B. Return Centrifuge for Authorized Service.
Centrifuge Fails to Operate in Urine Mode Only	<ul style="list-style-type: none"> A. Urine Mode Button not Fully Depressed. B. Defective Urine Mode Button. 	<ul style="list-style-type: none"> A. Fully Depress Urine Button. B. Return Centrifuge for Authorized Service.
Centrifuge Fails to Operate in MHCT Mode Only	<ul style="list-style-type: none"> A. MHCT Safety Interlock and Mode Button Improperly Activated. B. MHCT Interlock or Mode Button Defective. 	<ul style="list-style-type: none"> A. Hold Interlock left, then Fully Depress MHCT Mode Button. B. Return Centrifuge for Authorized Service.
Centrifuge Vibrates Excessively	<ul style="list-style-type: none"> A. Unbalanced Load. B. Rubber Feet Worn. 	<ul style="list-style-type: none"> A. Balance Load According to Instruction in this Manual. B. Replace Feet.
Brake Button Fails to Stop Centrifuge Head	<ul style="list-style-type: none"> A. Brake Assembly Defective. 	<ul style="list-style-type: none"> A. Return Centrifuge for Authorized Service.

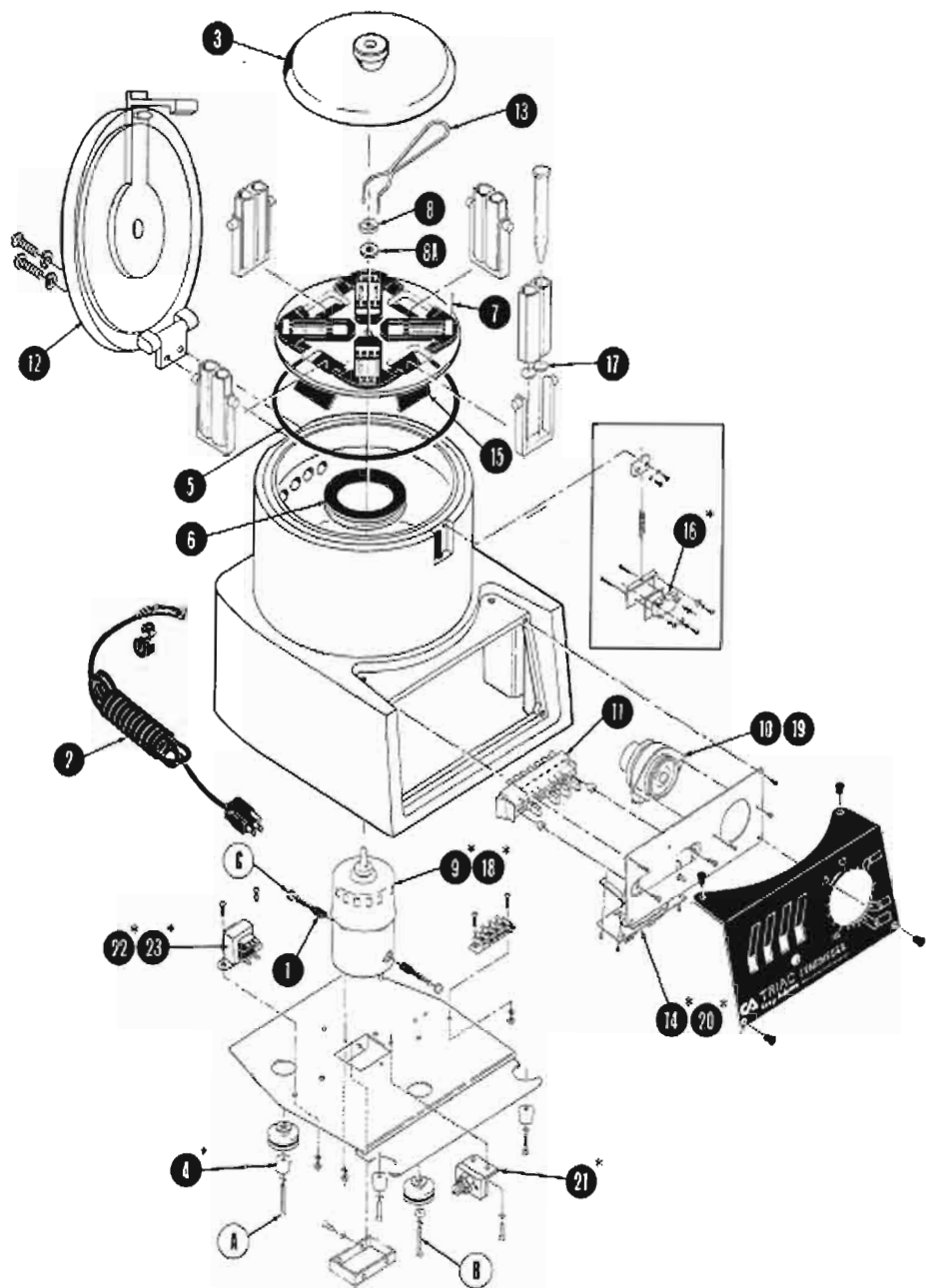


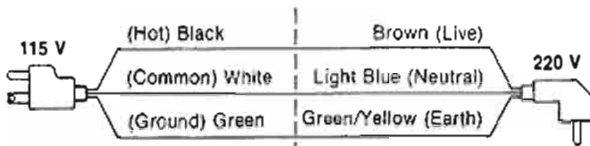
Figure 12. TRIAC Centrifuge Illustrated Spare Parts Breakdown.



IMPORTANT INSTRUCTIONS 220V LINE CORD

This Centrifuge is equipped with a CEE-Approved Type 220V Line Cord and Plug, which is wired as indicated.

LINE CORD PLUG/WIRE COLORS



Replacement Parts are available as follows:

MODEL NO.	CENTRIFUGE	REPLACEMENT PART
0206-001-000	TRIAC Centrifuge	0206-606-000
0106-001-000	DYNAC II Centrifuge	0106-606-000
0592-300-000	READACRIT Centrifuge	0592-618-000
0594-100-000	MP READACRIT Centrifuge	0592-618-000
0562-001-000	MHCT II Centrifuge	0562-620-000
0568-001-000	AUTOCRIT II Centrifuge	0562-620-000


Insert in Manual for Future Reference on Replacement Parts

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Laboratory Instrumentation


**BECTON
DICKINSON**

0568-000-032
REV. A (1/62)

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