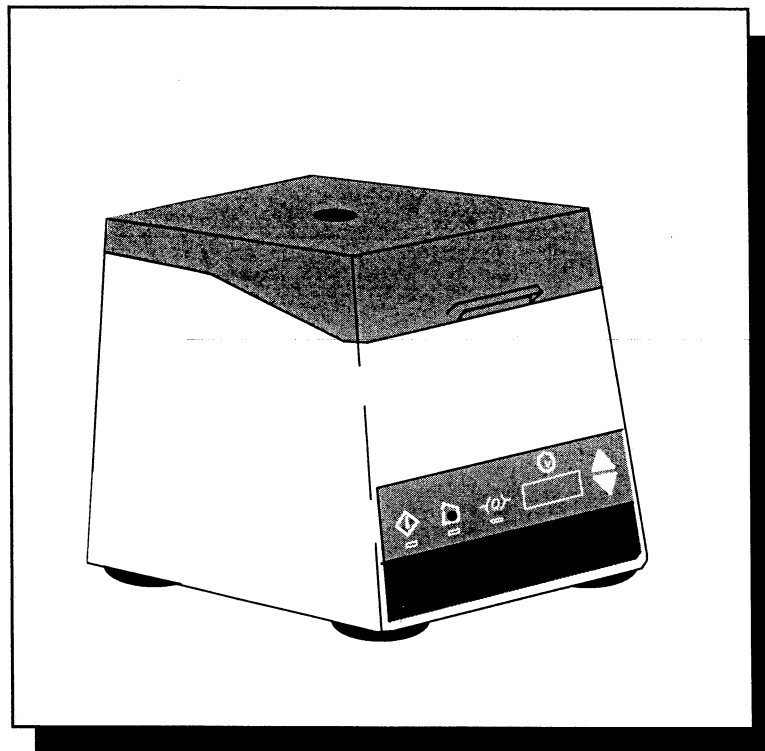


**Thermo**  
ELECTRON CORPORATION

**INSTRUCTION  
MANUAL  
IM-3131**

Revision 4



**Centra-B Plus  
Centrifuge**

Cat. No. 3131 -- For 120 VAC, 60 Hz

Cat. No. 3132 -- For 240 VAC, 50 Hz

**Thermo**  
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## **SIMPLIFIED OPERATION INSTRUCTIONS**

### **GENERAL**

The IEC Centra-B *Plus* is a portable benchtop centrifuge designed specifically for immunohematology applications, or the hematology laboratory to perform separations by centrifugal force, and not for any other purpose. Note: Typical sound level emissions do not exceed 70 dB(A)

### **INSTALLATION**

The location of the centrifuge must be clean and dry to allow the suction cup feet to properly and safely secure the centrifuge. The location must be level and rigid to provide quiet and vibration free performance. Allow a space of 3 in. (7.6 cm) on each side and 4 in. (10.2 cm) in the rear of the unit for ventilation. International Electrotechnical Commission standard 1010 part 2-20 limits permitted movement of a centrifuge to 300mm in the event of a disruption. Therefore, mark this clearance envelope boundary around the centrifuge. Laboratory procedures should require that no person or any hazardous materials are within this boundary during operation of the centrifuge.

Using a voltmeter, measure the line voltage to ensure it is within the limits for your model. For Cat. No. 3131 the line voltage should be between 108 and 132 VAC. For Cat. No. 3132 the line voltage should be between 216 and 264 VAC. At the rear of the centrifuge, install the appropriate fuse as follows:

For 100, 120V install the 4A fuse.  
For 220, 240V install the 2A fuse.

### **OPERATION**

*To open the cover*, press the STOP/COVER OPEN button and lift the cover. The cover cannot be opened until the red stop light is illuminated. *The rotor is installed* by orienting it on the shaft and pressing down on its center hub. Close the cover securely, ensuring that the latch is fully engaged. *To start a run*, use the ARROW buttons to set the desired run time (0 to 15 minutes) in the TIME display. For runs of infinite duration, set the timer to zero minutes (the word 'HOLD' appears). Press the START button. *A run is stopped* by either pressing the STOP/COVER OPEN button or by allowing the time to expire. Wait until the rotor stopped indicator light is fully illuminated and then press the STOP/COVER OPEN button and lift the cover. *To select the brake*, press the BRAKE button so that the yellow light under it is illuminated. To select coast, press the BRAKE button so that the light is not illuminated.

### **SAFETY**

Below are listed *warnings* against operating procedures which could result in an accident and/or personal injury. Also listed are *cautions* against procedures which could result in damage to your centrifuge or accessory equipment.

#### **Warnings**






- Plug the power cord into a grounded outlet.
- Never remove the grounding prong from the power plug, or use any adapter which does not complete the grounding circuit.
- Always unplug the power cord before attempting to clean or service the centrifuge.

#### **Cautions**

- For proper operation and to ensure good separation, always load the rotor symmetrically with a full (or paired) set of tubes. Verify that each tube is filled equally (by weight or at least visually) to its corresponding opposite.
- Do not block the vents, otherwise, airflow will be restricted.
- Be sure the rotor is completely seated on the drive shaft before attempting to close the cover or start a run.

### **WARRANTY & SERVICE**

For warranty information, or to obtain service, contact your local IEC authorized distributor.

	ARROW		BRAKE
	TIME		STOP/COVER OPEN
	START		

## Table of Contents

1	INTRODUCTION .....	2
2	INSTALLATION .....	3
3	OPERATION .....	4
3.1	Warnings and Cautions .....	4
3.2	Rotor Installation .....	5
3.3	Starting And Stopping A Run .....	5
3.4	Opening The Cover .....	5
3.5	Rotor Removal .....	6
3.6	Brake .....	6
4	MAINTENANCE .....	7
4.1	Cleaning .....	7
4.2	Rotor Spring Replacement .....	7
4.3	Cover Interlock Bypass .....	8
4.4	Calibration .....	8
5	SERVICE .....	9
5.1	General .....	9
5.2	Interlock .....	9
5.3	Timer PCB .....	10
5.4	Motor .....	10
5.5	Interlock PCB .....	10
5.6	Warranty .....	11
5.7	Condition of Returned Equipment .....	11
6	SPECIFICATIONS .....	12
7	DRAWINGS .....	13

### IMPORTANT

This manual may not contain information on all changes that have occurred to the subject instrument since the manual issue date. It was prepared for use by IEC authorized factory-trained service or dealer personnel who are kept current through a program of service letters and bulletins and training seminars.

This manual contains *warnings* against operating procedures which could result in an accident and/or personal injury. It also contains *cautions* against procedures which could result in damage to your centrifuge or accessory equipment. Read this manual thoroughly before operating or servicing this centrifuge.

# 1 INTRODUCTION

The IEC Centra-B *Plus* is a portable benchtop centrifuge designed specifically for immunohematology applications, or the hematology laboratory to perform separations by centrifugal force.

There are two models:

- Cat. No. 3131 for 120 V, 60 Hz
- Cat. No. 3132 for 240 V, 50 Hz

Included with each model is a Cat. No. 209 rotor which is transparent for easy pellet inspection. Tubes are held captive in the rotor by a spring that allows them to swing out to a 45-degree angle during centrifugation. A disposable liner (part no. 43779) for easy clean up is also included. All cell washing procedures (saline and reagent addition, centrifugation, decanting, transport and incubation) can be performed while the tubes are in the rotor.

## 2 INSTALLATION

After unpacking, place the unit on a clean, level surface. The surface must be level to ensure quiet, vibration-free operation. A rigid, stable location is important since an improperly loaded unit can vibrate or even move. Allow a space of 3 in. (7.6 cm) on each side and 4 in. (10.2 cm) in the rear of the unit for ventilation.

Using a voltmeter, measure the line voltage to ensure it is within the limits for your model. For Cat. No. 3131 the line voltage should be between 108 and 132 VAC. For Cat. No. 3132 the line voltage should be between 216 and 264 VAC.

At the rear of the centrifuge, install the appropriate fuse as follows:

	<u>Voltage</u>	<u>Fuse</u>	<u>Part No.</u>
	100, 120	4A	40340
	220,240	2A	50129

1/4-inch (6mm)  
CCW  
FUSEHOLDER  
CAP  
FUSE  
1. Push cap in and turn CCW.  
CAP  
2. Separate cap from fuse.  
3. Insert new fuse into cap.  
CW  
4. Insert cap and fuse into holder.

Tool required: Flat blade screwdriver with blade width of 1/4-inch (6mm).

# 3 OPERATION

## 3.1 Warnings and Cautions

---

### **Warnings** To Avoid Electric Shock:

- Plug the power cord into a grounded outlet.
- Never remove the grounding prong from the power plug, or use any adapter which does not complete the grounding circuit.
- Always unplug the power cord before attempting to clean or service the centrifuge.

### **Cautions**

- For proper operation and to ensure good separation, always load the rotor symmetrically with a full (or paired) set of tubes. Verify that each tube is filled equally (by weight or at least visually) to its corresponding opposite.
- Do not block the vents, otherwise, airflow will be restricted.
- Be sure the rotor is completely seated on the drive shaft before attempting to close the cover or start a run.

## 3.2 Rotor Installation

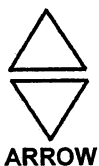
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When the unit has power, the light under the STOP/COVER OPEN button is illuminated. This is also an indication that the rotor is stopped and the cover can be opened. Push the STOP/COVER OPEN button and lift the cover. Grasp the rotor by its center ring and place it on the motor shaft (as shown in Section 3.5). Press down on the rotor and, if necessary, turn the rotor back and forth to seat it properly and engage the drive pins. Gently lower the cover. If it will not close, reseal the rotor. Press down until you hear the latch engage (an audible 'click').

To load the rotor, insert the tubes inside the perimeter of the spring (closest to the center of the rotor). The spring provides gentle support of the tubes as they swing out to 45 degrees.

## 3.3 Starting And Stopping A Run

---



To start a run, use the ARROW buttons to set the desired run time (0 to 15 minutes) in the TIME display. Press the START button. The green light under the START button will illuminate, and the time display will begin counting down. The centrifuge will run for the set duration and decelerate (brake or coast) to a stop. To terminate a run before time expires, press the STOP/COVER OPEN button. The red light under the STOP/COVER OPEN button illuminates when STOP/COVER OPEN is pressed or time expires, and it flashes until the rotor comes to a stop.

Note: The cover may be opened when the rotor speed is below 20 RPM.

The time setting cannot be changed during a run. A new run cannot be started until the rotor has come to a complete stop.

For infinite spins (hold mode), use the arrow keys to scroll down to zero. The word 'HOLD' appears in the display. Pressing the START button will begin a run which can only be terminated by pressing the STOP button. In the hold mode, the timer counts up.

## 3.4 Opening The Cover

---



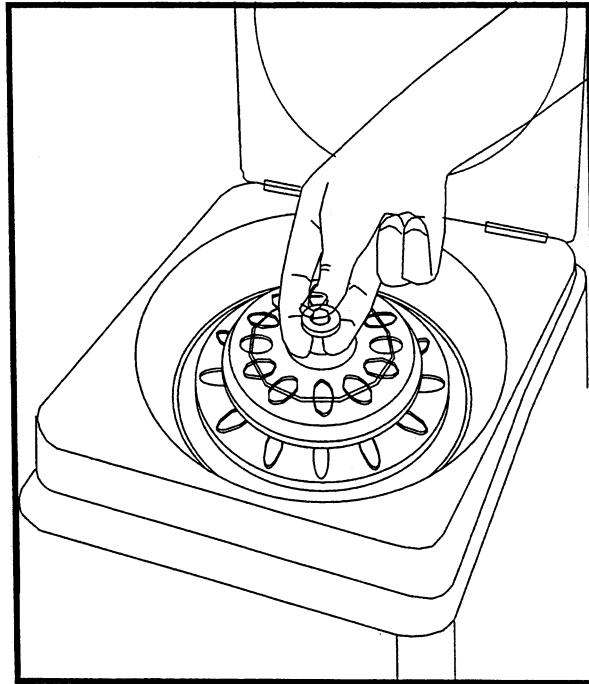
Once the red light under the STOP/COVER OPEN button is steadily illuminated (no longer flashing) pressing the STOP/COVER OPEN button will release the interlock, allowing the cover to be opened.



### 3.5 Rotor Removal

---

To remove the rotor, place two fingers underneath the center ring of the rotor and pull up while pressing down on the motor shaft with your thumb. (As shown below.) This action will free the rotor for easy removal.



### 3.6 Brake

---



To select the brake, press the BRAKE button so that the yellow light under it is illuminated. To select coast, press the BRAKE button so that the light is not illuminated. An operational brake will stop a rotor in approximately half the time of coasting to a stop. The BRAKE selection may be changed at any time during a run.

# 4 MAINTENANCE

## 4.1 Cleaning

---

This section describes the proper method of cleaning your centrifuge. **Always unplug the unit before cleaning.**

1. Open the cover and unplug the unit.
2. Check the chamber for spillage or broken glass. If present, remove with a sponge dampened with water.
3. Clean the outside of the unit, the rotor, and the chamber with a sponge dampened with warm water and a mild detergent. Repeat as needed to keep the unit clean.

Note: Grey dust is the result of broken glass which becomes finely ground during centrifugation.

**Warning:** *Never pour water into the chamber, and never use an abrasive cleanser or steel wool pads. Remove stubborn stains with a plastic scrub pad, or replace the disposable liner (part no. 43779).*

4. Dry the unit thoroughly, and check that the vent holes (underneath) are not blocked.

## 4.2 Rotor Spring Replacement

---

The spring that holds the tubes in place will require replacement when it no longer returns the tubes to the vertical position. To replace it, remove the three screws at the top of the rotor. Use a fingernail to pry around the edge of the rotor to separate the top portion of it. Note the spring location. Remove and replace the spring (IEC Part No. 47001). Align the three studs on the underside of the rotor top with the holes in the bottom part of the rotor and squeeze the two together. Replace the screws in the top of the rotor.

### 4.3 Cover Interlock Bypass

---

The Centra-B *Plus* has an interlock bypass for easy sample retrieval in the event of a power failure. To bypass the safety interlock, unplug the centrifuge and tilt it backward. Using a small screwdriver, pry out the plastic plug on the underside of the centrifuge and pull on the attached cord. Do not perform this bypass routinely. The cover interlock provides user safety and allows the cover to be opened promptly whenever rotation has stopped.

### 4.4 Calibration

---

The brushless motor used in the Centra-B *Plus* runs at one speed, and requires no calibration. IEC recommends verifying its speed once every 24 months. This can be done easily using an optical tachometer through the clear plastic viewport in the lid. If this measurement indicates instrument failure, please notify IEC Technical Service.

## 5.1 General

---

**Trouble Shooting** If the centrifuge won't start, check the following in order to isolate a problem:

If the rotor stopped indicator is lit, there is power to the centrifuge. If not, check the fuse(s).

If the interlock releases, the zero speed pickup and latch power are good.

Spin the rotor by hand to see that the rotor stopped indicator begins flashing. This will further verify the function of the speed pickup.

**The information in the following sections is provided for the use of qualified service personnel ONLY.**

The latch switch must be closed for the centrifuge to start. Once the interlock is verified functional, the timer should be the next device inspected. Continue with the motor and PC board until the faulty component is identified.

**To access the components**, open the cover, remove the rotor, and unplug the centrifuge. Carefully place the unit upside down on its cover and remove the four Phillips head screws which secure the baseplate. Lift the baseplate off taking care to disconnect the ground leads and interlock bypass cord..

## 5.2 Interlock

---

The IEC Centra-B *Plus* has a safety interlock which prevents the cover from being opened unless the rotor is turning 20 RPM or less. When pressed, the STOP/COVER OPEN button releases the safety interlock. There is a switch in the interlock assembly which senses that the cover is closed and locked. It is a normally open switch and closes when the solenoid is in the locked position. The STOP/COVER OPEN button powers the solenoid through the Interlock PC board if the rotor is stopped. Verify the function of the switch using an ohmmeter.

The solenoid coil has a resistance of approximately 5Ω. Power to the solenoid should be approximately 160 VDC. It can be read coming off the

Interlock PCB when the cover open button is pressed. A voltmeter with peak hold is necessary, as the voltage is delivered quickly (approximately .5 sec.).

To replace the interlock, remove the two screws which secure it to the cabinet (cover must be open to access the screws).

### 5.3 Timer PCB

---

The IEC Centra-B *Plus* has a Timer/Display PCB mounted behind the membrane control panel. It incorporates a hold mode for indefinite spins. The timer PCB delivers power to the motor. To replace it, the base plate must first be removed. The PCB is secured to the cabinet by four screws

Note: To prevent damage to the PC board, always use a static protective device (such as wriststrap) when handling or servicing.

### 5.4 Motor

---

The IEC Centra-B *Plus* uses a brushless induction drive motor. It requires no maintenance. The speed of the motor is 3350 rpm (60 Hz) or 2750 rpm (50 Hz). This can be verified using an optical tachometer through the viewport in the cover.

Note: Less than nominal line voltage will affect the centrifuges top speed.

When isolated, the motor resistance should be approximately 13  $\Omega$ . To replace the motor, remove the four screws (inside the guard bowl) which secure it to the base. Disconnect the wiring harnesses to it and remove the Interlock PC board (use caution to prevent damage to the PCB speed sensor).

Note: To prevent damage to the PC board, always use a static protective device (such as wriststrap) when handling or servicing.

### 5.5 Interlock PC Board

---

The InterlockPCB in the IEC Centra-B *Plus* disables power to the interlock during rotation. This PC board is mounted to the motor. To sense rotation, it uses a Hall effect sensor to pickup pulses form a magnetic disk mounted on the motor shaft.

To replace the PCB, remove the four mounting screws which secure the PCB to the motor. Take care not to damage the speed sensor when lifting the PCB off of the motor.

Note: To prevent damage to the PC board, always use a static protective device (such as wriststrap) when handling or servicing.

## 5.6 Warranty

---

Warranty information is provided on the warranty card supplied with the centrifuge.

## 5.7 Condition of Returned Equipment

---

Before returning equipment to IEC, you must contact IEC or your dealer and receive a return goods authorization (RGA). **All returned units must be decontaminated, free of radioactivity, and free of hazardous and infectious materials.** The RGA paperwork includes a Certificate of Decontamination for you to sign indicating that you have performed these steps. IEC will not accept the shipment until this signed certificate is received.

You must prepay transportation to the service depot.

## 6 SPECIFICATIONS

Rotation Speed	Minimum 3350 rpm (Cat. No. 3131) Minimum 2750 rpm (Cat. No. 3132) (Not to exceed 3600 rpm)
Maximum RCF	1000 xg (Cat. No. 3131) 675 xg (Cat. No. 3132)
Acceleration Deceleration	Eight seconds to 3350 rpm. Fifteen seconds (brake) Forty-five seconds (coast)
Brake	Dynamic Electric
Capacity	Twelve 10x75 mm, or Twelve 12x75 mm tubes.
Maximum O.D.	12.4 mm
Timer	
Range	0 to 15 minutes
Increments	0 to 1 minute by 5 seconds 1 to 5 minutes by 15 seconds 5 to 15 minutes by 30 seconds
Accuracy	HOLD mode ±1.0 %
Centrifuge Motor	Brushless induction
Power Requirement	120 VAC ± 10%, 60 Hz (Cat. No. 3131) 240 VAC ± 10%, 50 Hz (Cat. No. 3132)
Power Consumption	80 Watts (operating)
Height	
Cover Closed:	25.8 cm (10.12 in.)
Cover Opened:	55.9 cm (22 in.)
Width	25.8 cm (10.12 in.)
Depth	31.8 cm (12.5 in.)
Net Weight	7.1 kg (15.5 lbs.)
Shipping Weight	9.3 kg (20.5 lbs.)

***Specifications Subject To Change Without Notice***

# 7 DRAWINGS

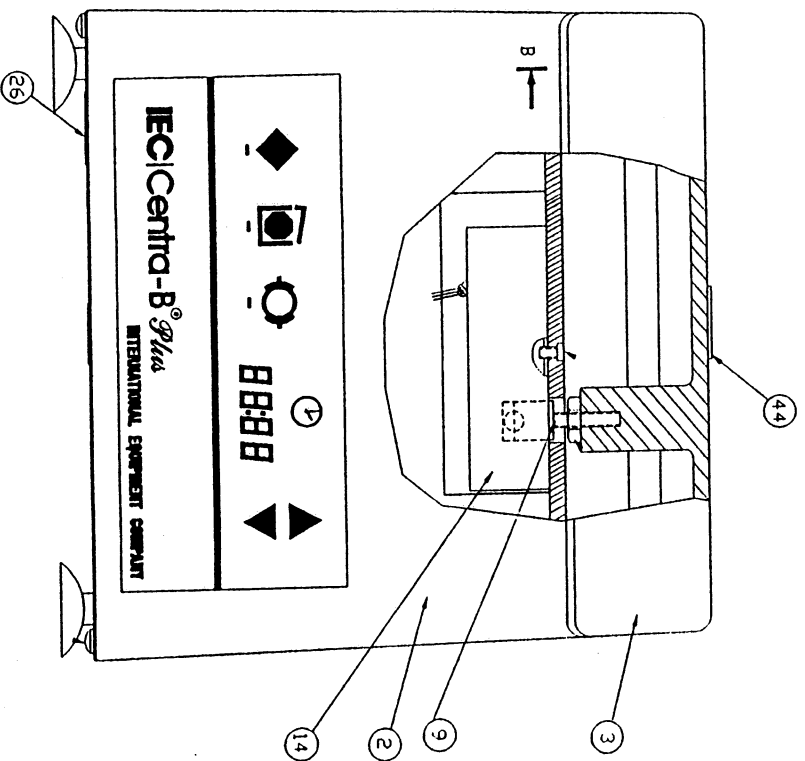
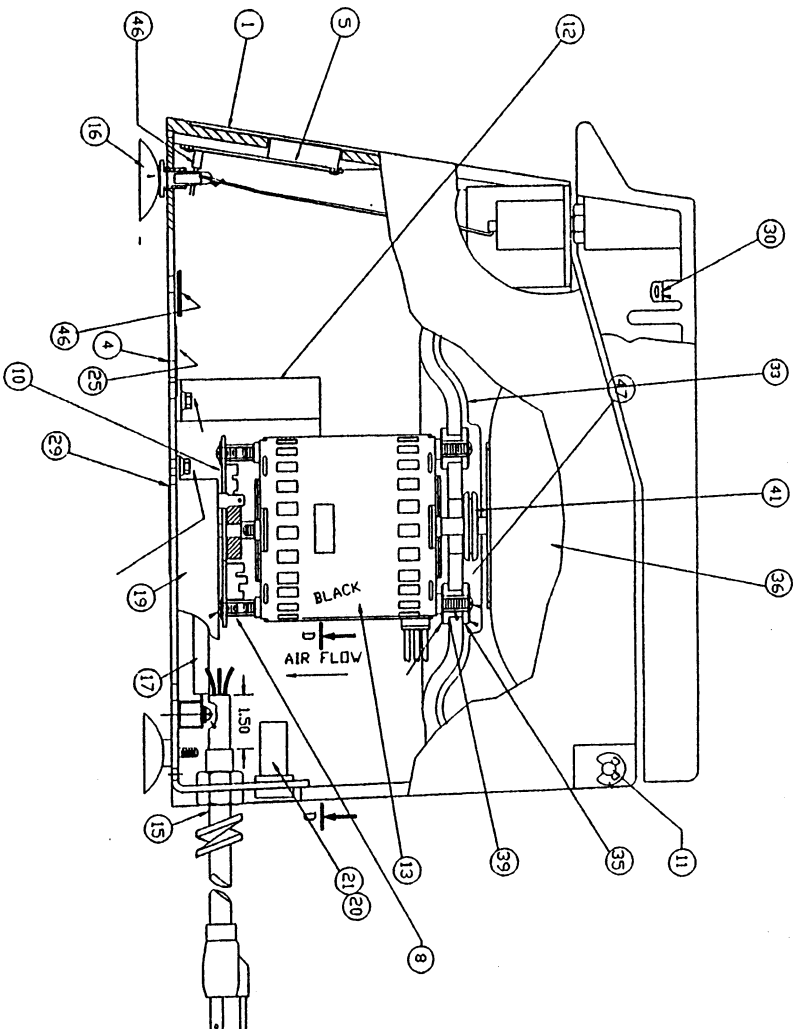
The following drawing are included in this manual.

<u>Dwg. No.</u>	<u>Description</u>	<u>Page</u>
10861	Timer/Display PCB Schematic	14
10850	Interlock PCB Schematic	15
10864	Wiring Diagram	16
	Parts Identification	18

These drawings were accurate at the time of publication. Changes do occur. If you have any questions regarding these drawings, please contact IEC Technical Support at (800) 843-1113 ext.2002.

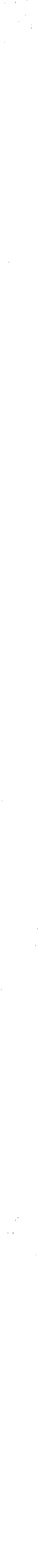
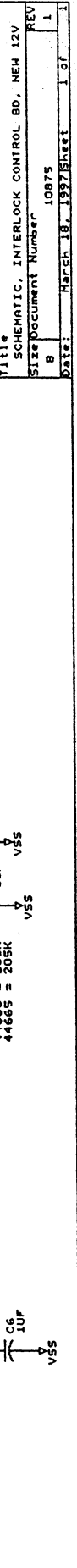
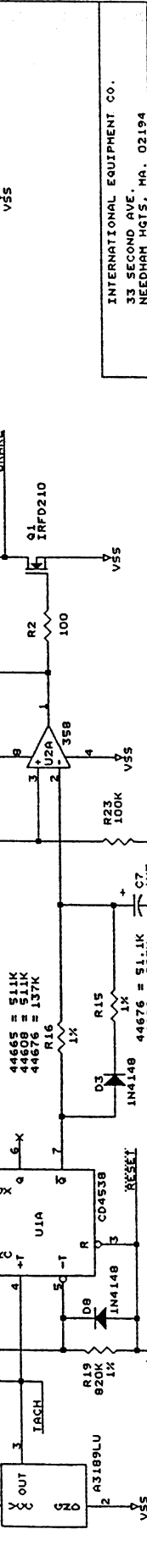
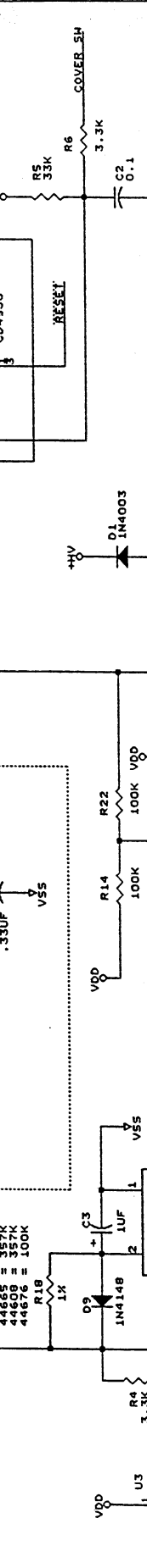
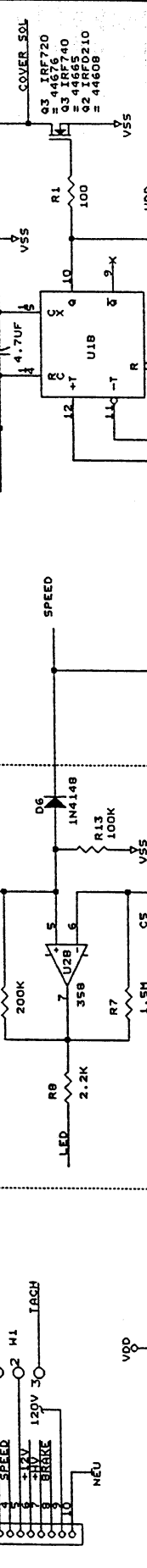
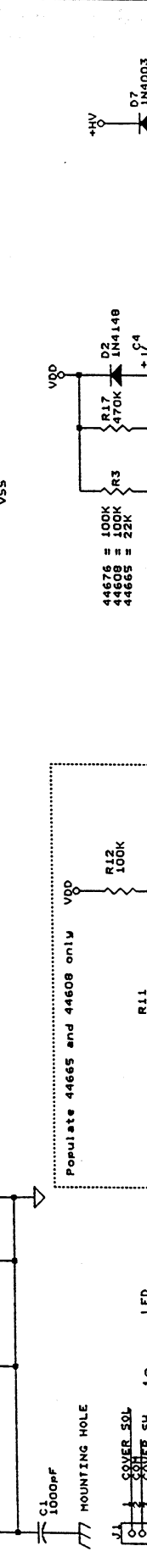
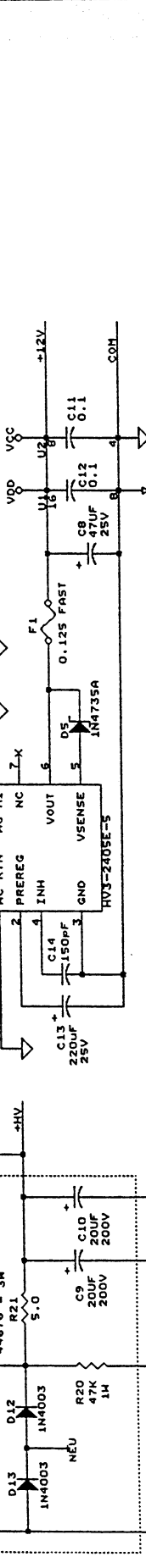
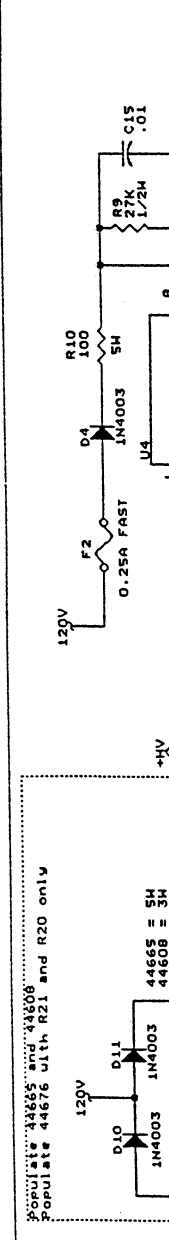






REVIEWS				
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1	DMH	3888	DMH	2/25/97

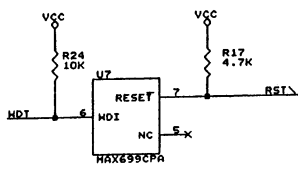
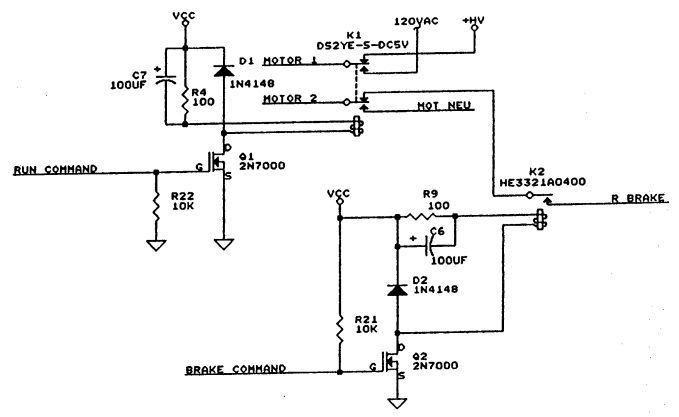
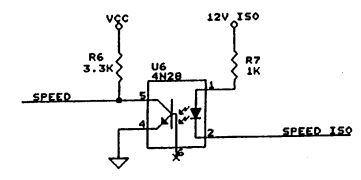
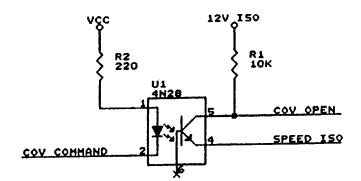
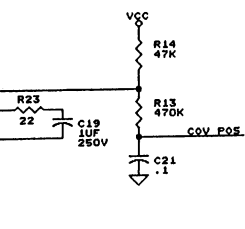
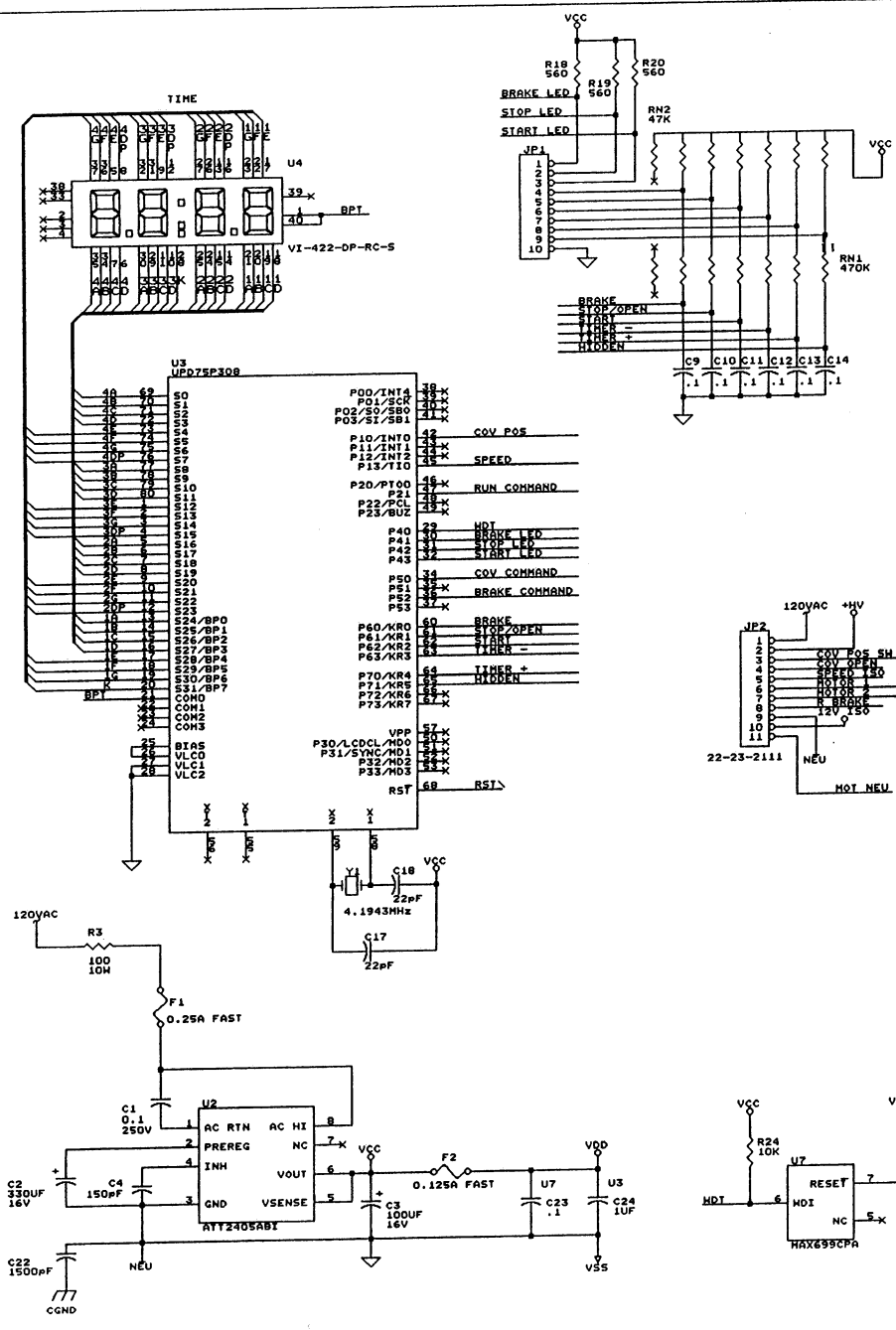
ASSY KEY	
Model	ASS'Y
CL2	44676
Headlamp	44608
Center B+	44665



INTERNATIONAL EQUIPMENT CO.  
 33 SECOND AVE.  
 NEEDHAM HIGHS, MA. 02194

FILE # SCHEMATIC, INTERLOCK CONTROL BD, NEW 12V  
 Size of Document Number 10875  
 Date: March 18, 1997 Sheet 1 of 1

REVISIONS					
REV	BY	DATE	ECO	APP'D	DATE
A	JAB	10/3/94	2746	JAB	10/3/94
0	JAB	1/3/95		JAB	1/3/95
1	DHM	2/7/97	3899	DHM	2/7/97



INTERNATIONAL EQUIPMENT COMPANY  
 300 SECOND AVE  
 NEEDHAM HEIGHTS, MA 02194

Title: CENTRA B PLUS DIGITAL TIMER

Size: Document Number 10861 REV 1

Date: May 1, 1997 Sheet 1 of 1

### Parts Identification

<u>No.</u>	<u>Part Description</u>	<u>IEC No.</u>
1	Control Panel	50468
2	Housing	50460
3	Cover Assy.	50365
4	Baseplate	50307
5	Timer PCB	445630R
8	Standoff	44611
9	Latch Striker	50405B
10	Interlock PCB	445640R
11	Pin	41355B
12	Transformer	61261 (International model only)
13	Motor	44609
14	Latch Assy.	50405A <sup>R</sup>
15	Line Cord	46761 (Domestic) 40322 (International)
16	Foot (4)	46618
17	Resistor	50408
19	Brake Resistor	50367
20	Fuse Holder	50130
21	Fuse(s)	40340 (4A) 50129 (2A)
30	Cover Gasket	New # 508970R 48405
35	Motor Mount Ring(4)	40769
36	Rotor	209
39	Motor Mount Bushing(4)	40768
41	Drip Shield	42524
44	Viewport	48116
46	Wiring Harness	50528
	Liner	440790F