

# Guide to Operations





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## Manual Conventions

### NOTE:

**Notes contain essential information that deserves special attention.**



Every Instrument manufactured by the New Brunswick Scientific Co., Inc. is warranted to be free from defects in material and workmanship. This apparatus, with the exception of glassware, lamps and electrodes (where supplied), is warranted against faulty components and assembly for 2 years in the United States & Canada and for 1 year elsewhere. Our

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## 2 INSPECTION & UNPACKING OF EQUIPMENT

### 2.1 *Inspection of Boxes*

After you receive your order, inspect the boxes carefully for any damage that may have occurred during shipping. Report any damage immediately to the carrier and to your local sales representative.



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## 3 PREPARING THE LOCATION

### 3.1 *Physical Location*





## 4 INSTALLATION

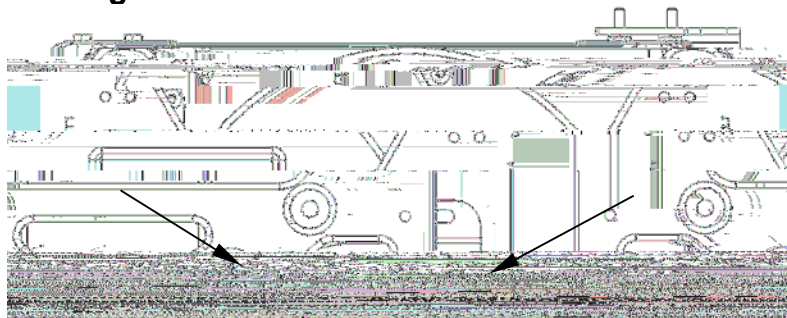
### 4.1 Installation of Platform

#### NOTE:

There are two small plastic straps that hold the bearing housing in place for shipping. The straps must be removed from the unit.

Prior to use, a platform must be installed on the unit. The unit is shipped with four Allen head PLATFORM SCREWS installed in the SUBPLATFORM of the BEARING HOUSING. These screws must be removed and set aside for use before a platform can be installed:

**Figure 2: Platform Screw Locations**



SUBPLATFORM

1. Using the 7/32-inch hex wrench provided, remove the four Allen head platform screws from the subplatform. Set them aside.
2. Place the selected PLATFORM on the subplatform. Align the mounting holes of the platform with the platform screw locations in the subplatform.
3. Insert the four Allen head platform screws previously removed and set aside. Tighten them with the 7/32-inch hex wrench provided to secure the platform.

## 4.2 **Flask Clamp Installation**

Flask clamps purchased for use with universal platforms (*see Section 9.1.1*) require installation. Clamps are installed by securing the base of the clamp to the platform with the correct type and number of screws. All clamps are shipped complete with hardware.

### **NOTE:**

**The Excella E-24 and E-24R platforms require 10-24 x 5/16-inch screws, which are the smaller Phillips head screws supplied, to fasten flask clamps.**

Clamps for 2- and 2.8-liter flasks are shipped with an additional girdle to keep the flasks in place. The girdle is an assembly of springs and sections of rubber tubing. One girdle is already in place on the clamp, the other is packed separately. To install these double girdle clamps:

1. Place the clamp on the platform, aligning its mounting holes with holes on the platform. Secure the clamp in place using the flat Phillips head screws provided (#S2116-3051, 10-24 x 5/16-inch). *Use Figure 3b to help you identify the proper screws, as three different types of screws are shipped with the clamps.*
2. With the first girdle in place, as delivered, on the upper part of the clamp body (*see Figure 3a*), insert an empty flask into the clamp.
3. After making sure the sections of tubing are located between the clamp legs, roll the first girdle down the legs of the clamp as far as it can go. The tubing sections will rest against the platform, and the springs will be under the clamp base.
4. Place the second girdle around the upper portion of clamp body (just as the first girdle was initially). Make sure that its spring sections rest against the clamp legs, while its rubber tubing sections sit against the flask, in between the clamp legs.

### **Figure 3a: Double Girdle Clamp Installation**



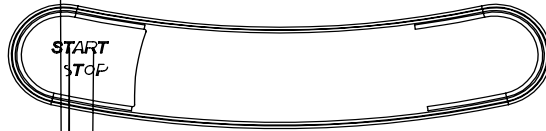
### Figure 3b: Clamp Fastener

**NOTE:**

The upper girdle secures the flask within the clamp, and the bottom girdle keeps the flask from spinning.



**Figure 4a: Keypad**





- **HRS** Time remaining in a timed run. Can be set from 0.1 to 99.9 hours, in 0.1 increments or, if the **g (UP)**

# 6 OPERATION

## 6.1 *Electrical Connections*

Before making electrical connections, verify that the power source voltage matches the voltage on the **ELECTRICAL SPECIFICATION PLATE** and that the **ON/OFF SWITCH** is on the **OFF** position. The **ELECTRICAL SPECIFICATION PLATE** is located on the rear panel of the unit near the **POWER CONNECTOR**. Connect the **POWER CORDOR** and

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### **6.3      *Continuous (Untimed) Run***

1. Press SELECT until the RPM INDICATOR is illuminated.
2. If the display indicates that the shaker is OFF, press the START/STOP KEY.
3. Press either g (UP) or h (DOWN) KEY to enter SET MODE (the SET INDICATOR will illuminate).
4. Set the speed by using the g or h KEY until the desired setpoint is displayed.  
Continued pressure on the g or

4. Press the **START/STOP KEY** again; the **TIME INDICATOR** will light and the shaker will start the timed run.

*If the shaker is stopped:*

5. Press the **START/STOP KEY**. The shaker will start in untimed mode.
6. Press the **START/STOP KEY** again. The shaker will stop and the display will read **OFF**.
7. Press the **START/STOP KEY** a third time; the **TIME INDICATOR** will light and the shaker will start the timed run.

**To disable the visual alarm** (flashing **TIME INDICATOR**), press the **SELECT KEY** and change to any other function.

**To cancel the timer without stopping the shaker:**

Repeat steps 1 and 2 above, then immediately press the **START/STOP KEY**. The **TIME INDICATOR** will cease to flash and the display will read **OFF**.

## 6.6 Alarm Functions

The Excella E-24/24R shakers have an audible alarm that is activated at predetermined times, as explained in Section 1 (*Overview*). It can be deactivated by using the **MUTE** function:

1. Press the **SELECT** key until the **MUTE** indicator illuminates.
2. Press the **g** or **h** **KEY** to display **ON**, then press the **SELECT KEY**.

To reactivate the audible alarm:

1. Press the **SELECT** key until the **MUTE** indicator illuminates.
2. Press the **g** or **h** **KEY** to display **OFF**, then press the **SELECT KEY**.

## 6.7 Temperature Setpoint

Press the **SELECT KEY** until the function **°C INDICATOR** illuminates. The temperature can



During operation, if the temperature of the chamber is more than 1.0°C higher or lower than the temperature setpoint, an alarm is triggered. This alarm consists of a flashing °C INDICATOR and audible beep. The alarm will automatically deactivate as the unit achieves the set temperature.

## 6.8 Temperature Offset Calibration

The temperature probe and the temperature controller are calibrated together at the factory. The temperature probe measures the temperature of the air at the probe's location, near the heat exchanger return vent. The controller uses the probe input to adjust air temperature, up or down, to match the temperature setpoint.

Depending on various conditions within the chamber, such as flask placement and size, the heat produced by growing organisms, heat losses due to liquid evaporation from flasks, etc., the display temperature may differ from temperatures within the flasks themselves.

If you wish to have the temperature display ("Indicated Temperature") match the temperature at a given point, or match the average of a series of points within the chamber ("Actual Temperature"), proceed as follows:

1. Let the unit equilibrate at or near the desired temperature. Record the Indicated Temperature.
2. Record the Actual Temperature.
3. Calculate the temperature correction value: Actual Temperature – Indicated Temperature = Temperature Correction Value.
4. Press the SELECT KEY until the function °C INDICATOR illuminates.
5. Simultaneously press the g and h KEYS. The display will indicate CAL.
6. Using the numeric keypad, enter the Temperature Correction Value calculated in Step 3 above.
7. Simultaneously press the g and h KEYS to save the Temperature Correction Value to memory.

### NOTE:

The °C light will pulse rapidly to indicate W

## 6.9 **Power Failure**

In the event of a power failure, the Excella E-24/24R shakers are equipped with an **automatic restart** function.

If the shaker was in operation prior to the power interruption, the shaker will begin to operate at its last entered setpoint. The **LED DISPLAY** will flash, indicating that a power failure has occurred. Press any key to stop the flashing of the LED display.

## 6.10 **Speed Calibration**

To calibrate the shaking speed:

1. Set the shaker to a speed that can easily be measured. If you are using a strobe, minimum speed should be 250 RPM.
2. Compare the reading on the display to the measured reading.

If an adjustment is needed:

1. Press the **SELECT KEY** until the **RPM** indicator light illuminates.
2. Press the **g** and **h** **KEYS** simultaneously. The display will indicate **CAL**.
3. Press either the **g** or **h** **KEY** to change the displayed value to match the measured speed.
4. Press the **g** and **h** **KEYS** simultaneously to save the adjustment.
5. Turn unit **OFF** using the power switch, then turn it back **ON**.





## 8 SERVICE

### 8.1 *Troubleshooting*

If any problems occur with your shaker, do not attempt to perform any service on the unit other than specified in this manual. Unauthorized servicing may void the warranty. Please contact your local NBS Customer Service Department

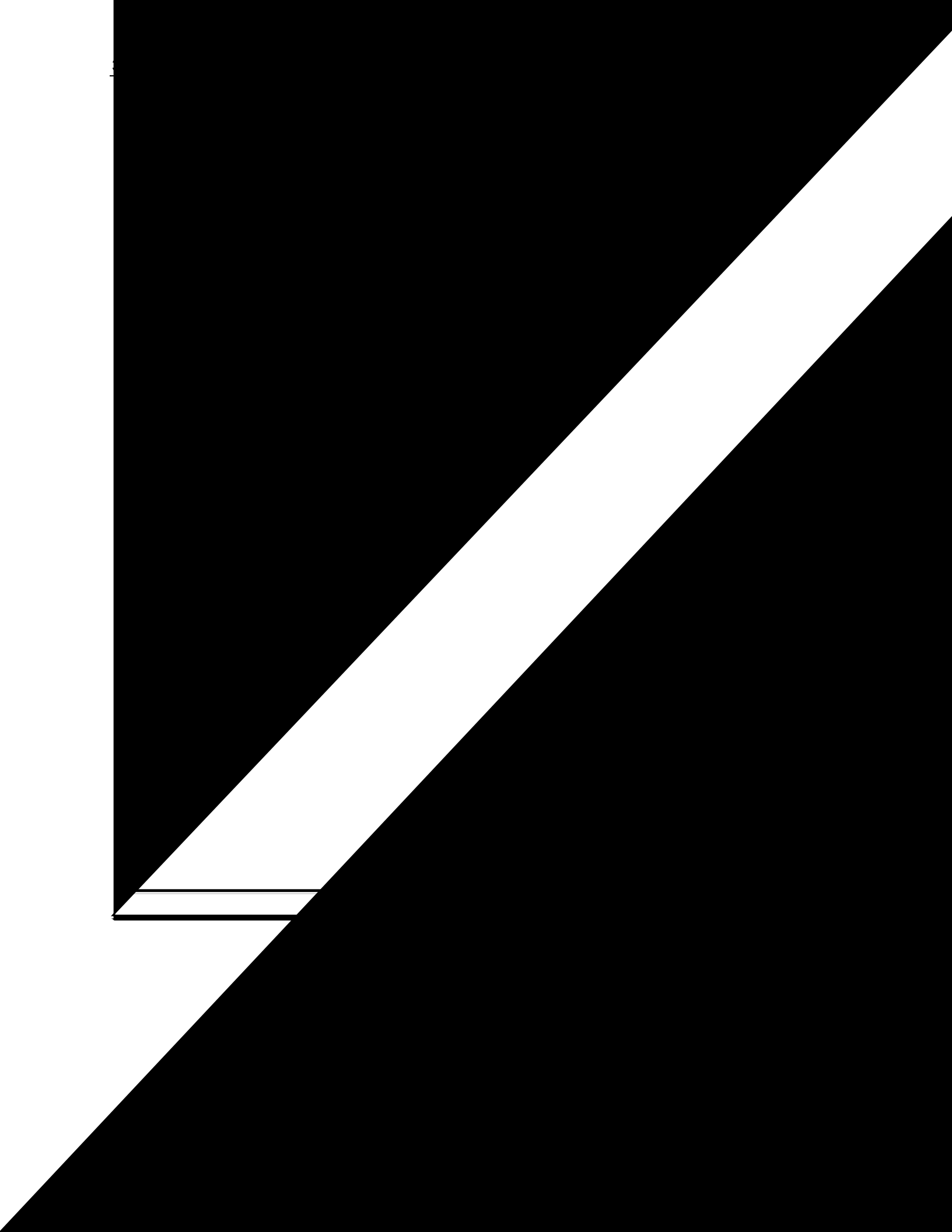
In any correspondence with NBS, please refer to the model number and serial number of your unit. This information is on the electrical specification plate, located on the rear panel of the unit, above the power connector.

There are some problems, however, that you can investigate and correct yourself. Refer to the following Troubleshooting Guide:

<b>Symptom(s)</b>	<b>Probable Cause(s) &amp; Solution(s)</b>
	Power cord is not plugged in and/or power switch is off: plug in power cord (to working electric outlet), and turn on power switch.









## **8.5      *Belt Replacement or Adjustment***





## 9 ACCESSORIES

When ordering accessories, you may be asked to provide the model number and serial number of your shaker. This information is on the electrical specification plate, located on the rear panel of the unit.

### 9.1.1 Platforms

**Table 3: Available Platforms**

<i>Description</i>	<i>Capacity</i>	
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<i>Accessory Description</i>	<i>NBS Part Number</i>	<i>Platform Capacity</i>
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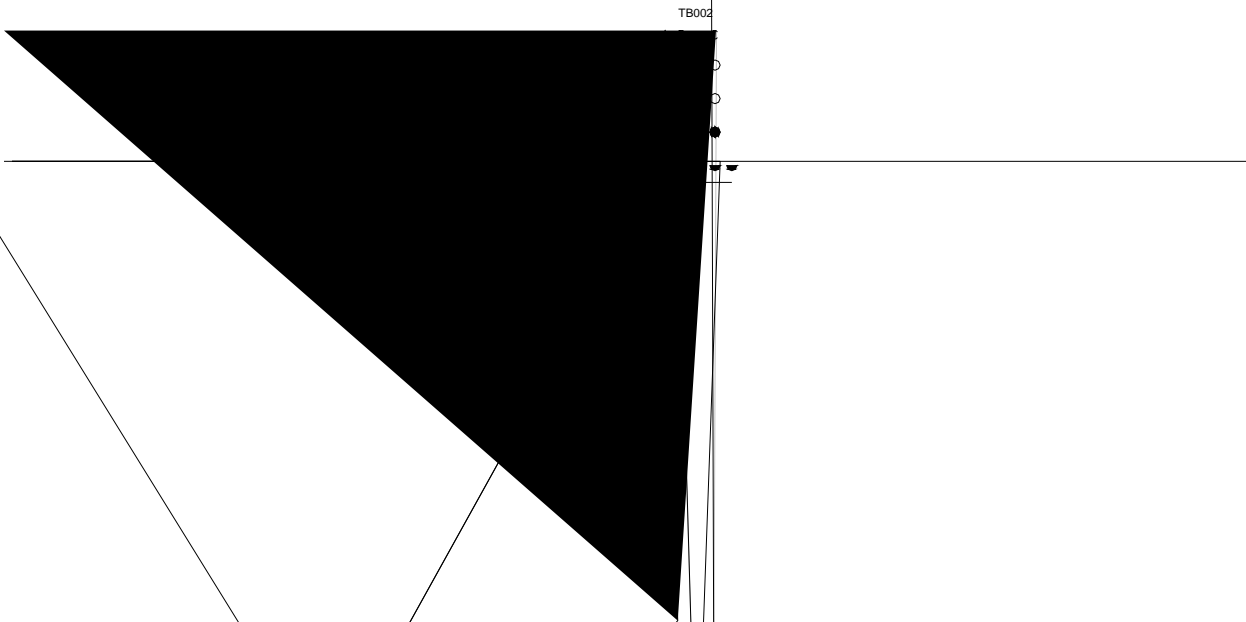
# 10 DRAWINGS & TABLES

## 10.1 Schematics

Figure 9: Control Schematics (overview)



**Figure 9a: Control Schematics (Quadrant A)**



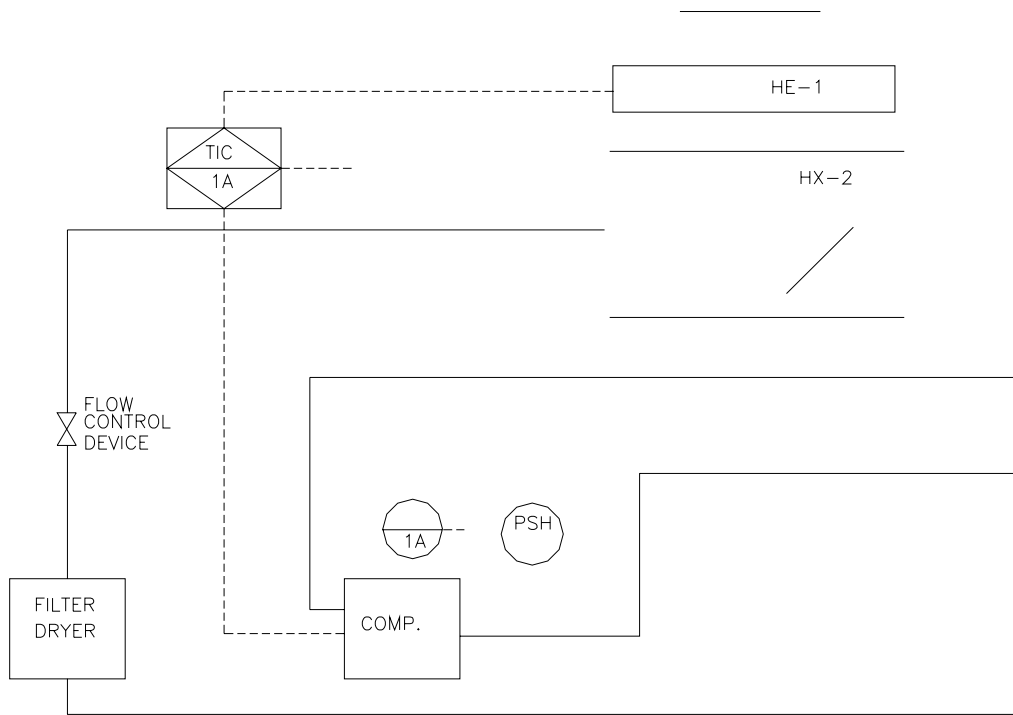
REDBLACKW









**Figure 11: Refrigeration Schematic**

	<i>Description</i>	<i>Page</i>
10a	230VAC/50 Hz Schematic	42
10b	100VAC/60 Hz Schematic	42
10c	100VAC/50 Hz Schematic	43
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11	Refrigeration Schematic	44

### 10.3 *List of Tables*

**Table**

# 11 SPECIFICATIONS

These specifications assume a **1**

<b><i>Excella E-24 &amp; E-24R Incubator Shaker</i></b>	
<b>CHAMBER DIMENSIONS</b>	21 inches deep x 20 inches wide x 13 9/16 inches high (53.3 cm deep x 51.7 cm wide x 34.4 cm high) from top of platform
<b>PLATFORM</b>	Aluminum, 18" X 18" (46 X 46 cm). Select universal or dedicated styles.
<b>NET WEIGHT</b>	
<b>24</b>	138 lbs (62.7 kg)
<b>24R</b>	184 lbs (83.6 kg)

**NOTE:**

**Use of baffled flasks will significantly reduce maximum speed for any shaker. We may be able to improve this maximum speed by using an alternative motor pulley. Contact your NBS representative for more information.**

**11.1 Certifications**

The Excella E-24 and E-24R have been tested to ETL standards, to comply with UL and CAN/CSA electrical safety standards (see “ETL Regulatory Standards” in the specifications table).

As attested in the *CE Declaration of Conformity* reproduced on the following page, the Excella E-24 and E-24R also conform to the appropriate CE standards (see also “CE Regulatory Standards” in the specifications table).





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# 12 APPENDIX: PRODUCT RETURNS

## **12.1 Return Procedure**

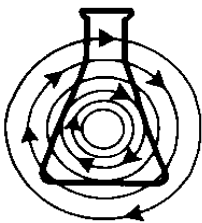
As explained in Section 8.2, should you need to return your Excella E-24/24R to NBS for any reason, first contact Customer Service to obtain a Returned Material Authorization (RMA) number. This number must appear on the outside of the shipping container, otherwise NBS Receiving will refuse to accept the shipment.

In addition, you must also certify that the instrument being returned has been thoroughly cleaned and decontaminated. A form for this purpose is provided on the following page; you can photocopy it and fill it out by hand. It can also be downloaded from our website ([www.nbsc.com](http://www.nbsc.com)), if you prefer to fill it out electronically.

A copy of the completed Return Authorization and Decontamination Certificate must be attached to the outside of the container, with a second copy packed inside with the instrument.

## **12.2 Return Authorization and Decontamination Certificate**

A sample form for you to copy and fill out is provided on the following page.



## New Brunswick Scientific Return Authorization and Decontamination Certificate

Contact New Brunswick Scientific for an RMA number prior to returning any equipment, then complete this form and attach it to the outside container of the equipment being returned to our facility. In addition, please enclose a completed, duplicate copy of this form with the returned item.

Returned Material Authorization (RMA) Number \_\_\_\_\_

Equipment being returned: Model Number \_\_\_\_\_ Serial Number \_\_\_\_\_

Reason for its return:

\_\_\_\_\_

This equipment (check all that apply):

### New Product

Never used

### Biohazards

Not used

Used, but decontaminated with

\_\_\_\_\_

### Hazardous Chemicals

Not used

Used, but decontaminated with

\_\_\_\_\_

### Radioactive Materials

Not used

Used, but decontaminated with

\_\_\_\_\_

**I certify that the equipment described above has been thoroughly cleaned and decontaminated of all chemical, biological and radioactive contaminants and also certify that the returned unit is safe for unprotected human contact.**

By: \_\_\_\_\_  
Signature \_\_\_\_\_ Print name \_\_\_\_\_

Title: \_\_\_\_\_ Date: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ email: \_\_\_\_\_

Form 2847



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