Guide to Operations

Excella™ E-5 Classic Platform Shaker

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CAUTION!

This equipment *must* be operated as described in this manual. If operational guidelines are not followed, equipment damage and personal injury *can* occur. Please read the entire User's Guide before attempting to use this unit.

Do not use this equipment in a hazardous atmosphere or with hazardous materials for which the equipment was not designed.

New Brunswick Scientific Co., Inc. (NBS) is not responsible for any damage to this equipment that may result from the use of an accessory not manufactured by NBS.

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New Brunswick Scientific Co., Inc. reserves the right to change information in this document without notice. Updates to information in this document reflect our commitment to continuing product development and improvement.

Manual Conventions

NOTE:	**Notes contain essential information that deserves special attention.**
CAUTION!	***Caution* messages appear before procedures which, if caution is not observed, could result in damage to the equipment.**
WARNING!	***Warning* messages alert you to specific procedures or practices which, if not followed correctly, could result in serious personal injury.**
Bold	**Text in boldface type emphasizes key words or phrases.**
	**This particular *Warning* message, whether found in the manual or on the unit, means HOT SURFACE–and therefore represents a potential danger to touch.**
 ***CRUSH WARNING!***	***Crush Warning* messages alert you to specific procedures or practices <u>regarding heavy objects</u> which, if not followed correctly, could result in serious personal injury .**

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 obligation under this warranty is limited to repairing or replacing the instrument or part thereof, which shall, upon our examination, prove to be defective. The warranty period begins at the date of shipment. This warranty does not extend to any NBS products which have been subjected to misuse, neglect, accident or improper installation or application; nor shall it extend to products which have been repaired or altered outside the NBS factory without prior authorization from the New Brunswick Scientific Co., Inc.

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1 OVERVIEW

The Excella™ E-5 Classic Platform Shaker is a portable benchtop shaker utilizing a UniCentric™ counterbalanced drive to provide horizontal plane rotary motion in a ¾-inch (1.9 cm) circular orbit. A Proportional/Integral (PI) Microprocessor controls the speed over a range of 50-400 rpm.

The shaker may be operated either continuously or in a timed mode via a programmable timer for shaking periods of 0.1 hour to 99.9 hours.

The E-5 is equipped with an audible alarm which is activated when an alarm condition exists, as follows:

- The end of a timed run
- Deviations of shaking speed

A wide variety of platforms can be used with the E-5. Dedicated platforms are available for a variety of flask sizes. Universal platforms, utility trays, utility carriers and test tube racks are also available.

2 UNPACKING

2.1 Inspection of Boxes

After you receive your order from New Brunswick Scientific, inspect the boxes carefully for any damage that may have occurred during shipping. Report any damage immediately to the carrier and to your local NBS Sales Order Department.

2.2 Packing List Verification

Verify against your NBS packing list that you have received the correct materials.

2.3 Unpacking of Equipment

Save all packing materials and User's Guide.

WARNING!
The unit is heavy. Two or more people are required to lift the shaker.

If any part of your order was damaged during shipping, if any pieces are missing, or if the unit fails to operate properly, please fill out the *Customer Satisfaction Form 6300* and return it by fax.

3 PREPARING THE LOCATION

3.1 Physical Location

It is essential that the instrument be situated in a area where there is sufficient space for the shaker and platform to clear walls and obstructions during operation.

The surface on which the unit is placed must be smooth, level, and able to support the shaker under full load operating conditions.

3.2 Operating Environment

The shaker is designed to operate optimally in the following ambient conditions:

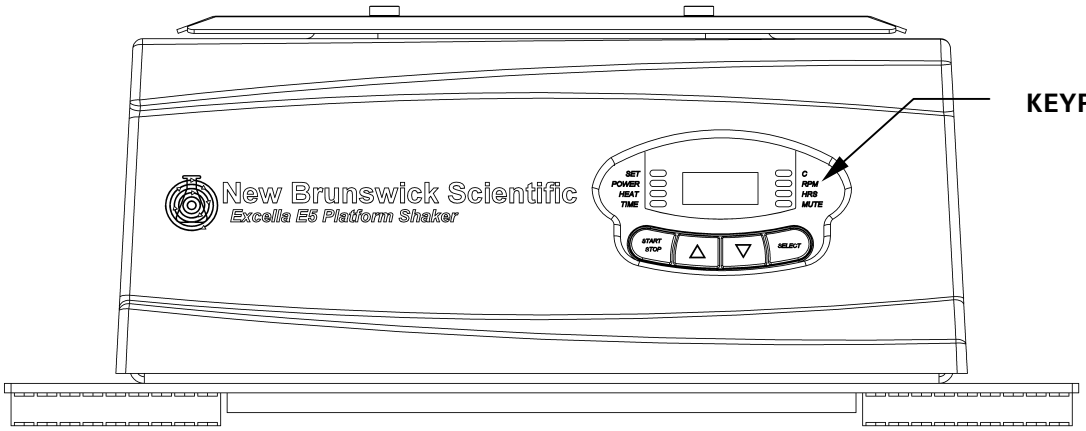
- 5 - 45°C
- 20 to 80% Relative Humidity non-condensing

4 FEATURES

4.1 Front Panel

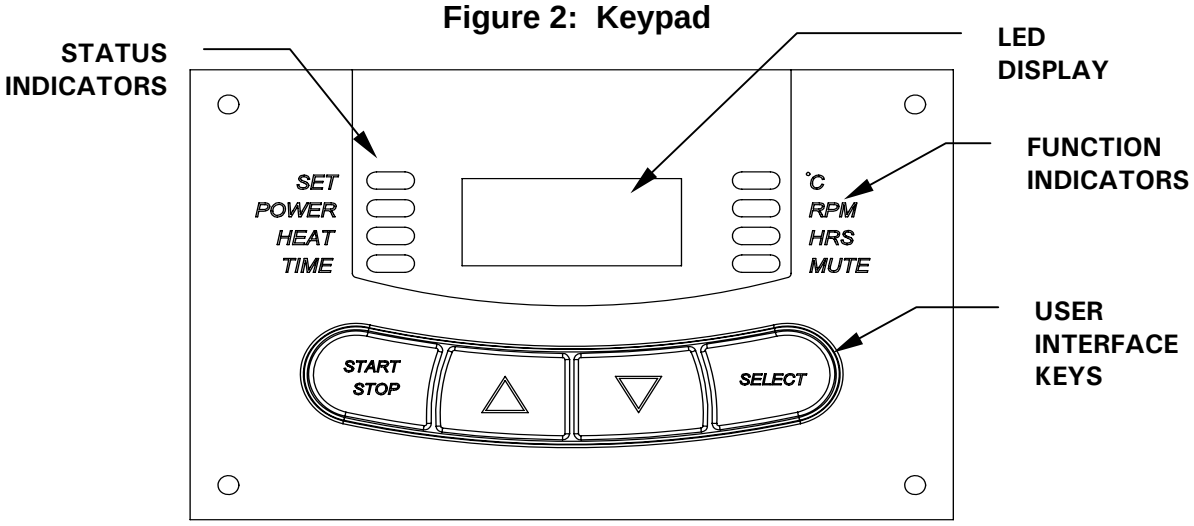
The keypad on the front panel is the primary user interface to command the Excella E-5. This section will acquaint you with the keypad's user interface keys, LED display, status indicators and function indicators.

Figure 1: Front Panel



4.1.1 User Interface Keys

Figure 2: Keypad



As you can see in Figure 2 above, the keypad has four user interface keys: **START/STOP**, ▲, ▼ and **SELECT**. This is how they are used:

- **START/STOP** This key is used to start or stop the shaker. It will also activate or stop the timer when a timed run is desired.

- **▲(UP), ▼(DOWN)** These keys are used to adjust the setpoint of a displayed parameter up or down. They also allow the user to enter the **SET MODE** for setpoint changes.

- **SELECT** This key is used to change the displayed parameter.

4.1.2 LED Display

The digital display on the control panel is a three-digit **LED DISPLAY**. During normal shaker operation, the display will indicate:

- Shaker status (On/Off)
- Shaking speed
- Setpoints
- Hours remaining (in a timed run)

4.1.3 Status Indicators

Four status indicator lights are located to the left of the **LED DISPLAY**. They are:

- **SET** Indicates that the shaker is in the **SET MODE**, when setpoints are being displayed and can be altered. This is activated by the **SELECT** key or by pressing the **▲(UP)** or **▼(DOWN)** arrow.

- **POWER** Illuminates and blinks during power up or if power is interrupted during a run. Press the **SELECT** key and change to another function to turn off this indicator.

- **HEAT** Not applicable

- **TIME** Indicates that the timer is in operation. The shaker can be programmed to run for a preset time from 0.1 to 99.9 hours. The timer can be disengaged without stopping an ongoing run.

4.1.4 Function Indicators

Four function indicator lights are located to the right of the **LED DISPLAY**. They indicate the current parameter(s) being displayed:

- **°C** — Not applicable
- **RPM** — Revolutions per minute. When in **SET MODE**, use the ▲**(UP)** or ▼**(DOWN)** arrow key to change the speed. It indexes at 1 RPM increments unless the key is pressed for 4 seconds, after which it indexes by increments of 10 RPM.
- **HRS** — Time remaining in a timed run. Can be set from 0.1 to 99.9 hours, in 0.1 increments or, if the ▲**(UP)** or ▼**(DOWN)** arrow key is pressed for 4 seconds, in increments of 5 hours.

  The countdown begins when the **START/STOP** key is pressed. If the **START/STOP** key is pressed again, the shaking stops (but temperature is maintained) and the timer pauses until the **START/STOP** key is pressed again.

  When a timed run ends, the **HRS** indicator will blink. Press the **SELECT** key and change to another function to turn off this indicator.
- **MUTE** — This feature is activated by the **SELECT** key. When activated, the audible alarm is muted, and remains so until is is reactivated with the **SELECT** key. If **MUTE** is activated when the shaker is turned off using the **ON/OFF** switch, it will remain engaged when the machine is powered up again. To activate (or deactivate) the **MUTE** function, press the **SELECT** key until the **MUTE** indicator illuminates (or goes out), then press **START/STOP** key.

4.2 Platform Assemblies

A platform is a separate item and is required for operation.

The Excella E-5 can be used with a wide variety of NBS 18-inch x 18-inch (46 x 46 cm) platforms that will accept a variety of clamps for flasks test tubes, etc.

Refer to Section 8, *Parts & Accessories,* for details.

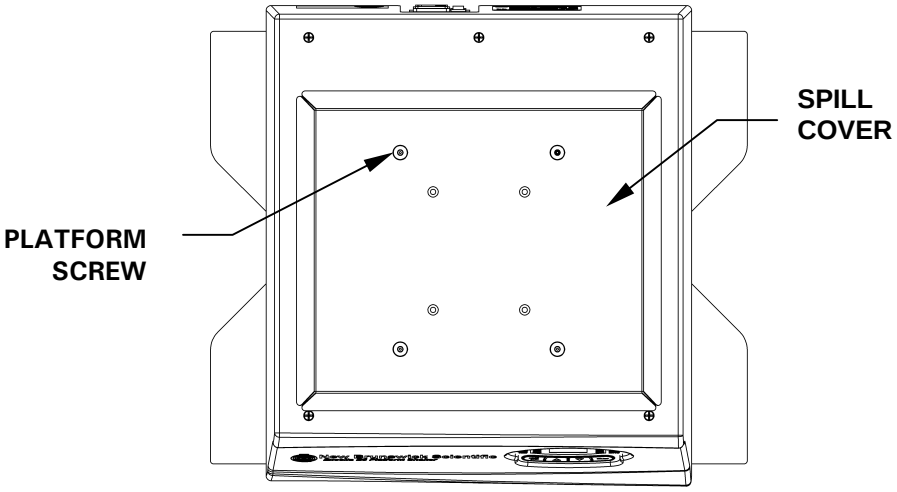
5 GETTING STARTED

5.1 Installing a Platform

A platform is required for operation. The unit is shipped with four Allen head platform screws installed in the spill cover over the bearing housing. These screws must be removed (and set aside for use) before a platform can be installed:

1. Using the 7/32-inch hex wrench provided, remove the four Allen head platform screws from the bearing housing spill cover (*see Figure 3*). Set them aside for reuse.

Figure 3: Platform Installation (top view)



2. Place the selected platform on the spill cover. Align the mounting holes of the platform with the platform screw locations in the spill cover.

3. Insert the four Allen head platform screws previously removed and set aside. Tighten them with the 7/32-inch hex wrench to secure the platform.

5.2 Installing Flask Clamps

Flask clamps purchased for use with universal platforms (*see Section 8.2*) 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.

Clamps for 2-, 2.8- and 4-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 4b 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 4a*), 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 4a: Double Girdle Clamp Installation

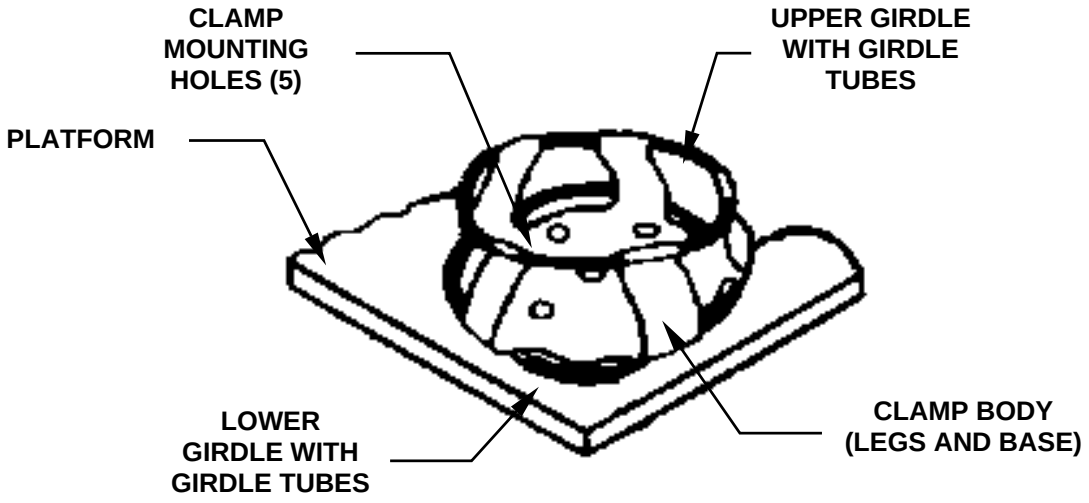


Figure 4b: Clamp Fastener

NOTE:

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

NBS flask clamps are used on a variety of shaker platforms. Flat head screws of different lengths and thread pitch are used to secure the clamp. To identify the proper screw for your shaker application by reference to the head style, consult Table 1 below, find the proper screws and set the others aside.

Table 1: Clamp Hardware Application Chart

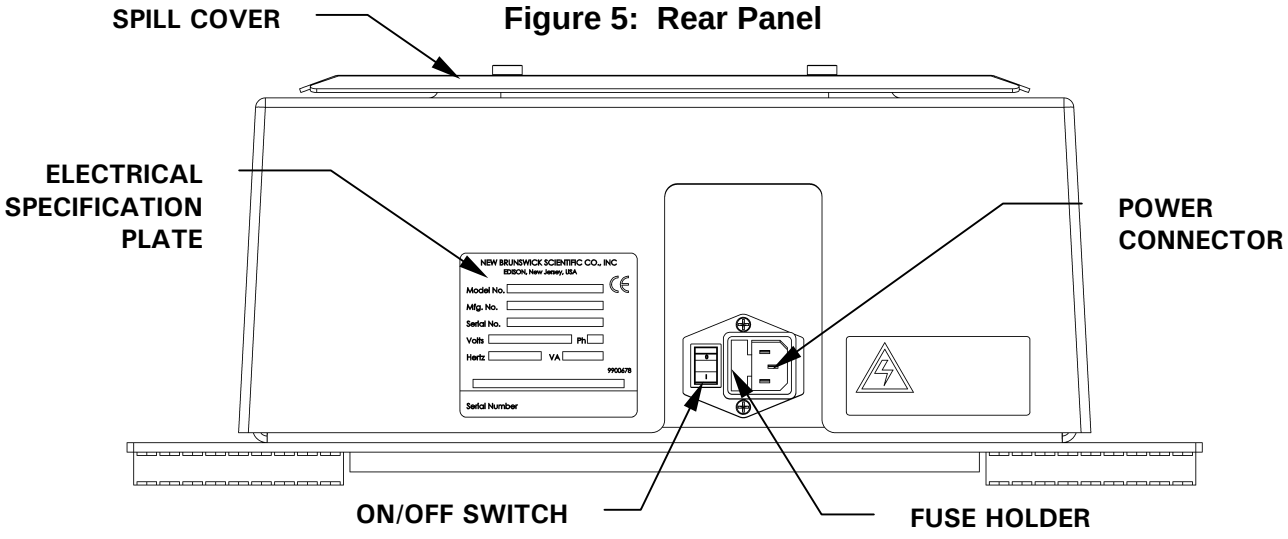
No matter what size the clamp, use these screws to fasten them to your platform:

Description	*Part Number*	*Qty.*	*Application*
 10-24 x 5/16 (7.9 mm) flat Phillips (+) head screw	S2116-3051	1	5/16" (7.9 mm) thick aluminum, phenolic and stainless steel platforms.

5.3 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** and the **ON/OFF SWITCH** are located on the rear panel (*see Figure 5*).

Figure 5: Rear Panel



Connect the **POWER CORD** to the **POWER CONNECTOR** on the rear panel and the other end to a suitable, grounded receptacle.

6 OPERATION

6.1 Starting the Shaker

To initially start the shaker, turn the **ON/OFF SWITCH** on the rear panel (*see Figure 3*) to the **ON** position. If the shaker begins to operate, the **LED DISPLAY** will track the speed as it accelerates to the last entered setpoint. The shaking action may be stopped or started by pressing the **START/STOP KEY** on the **KEYPAD**.

6.2 Continuous (Unlimited) 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 ▲ or ▼ **KEY** to enter **SET MODE** (the **SET INDICATOR** will illuminate).
4. Set the speed by using the ▲ or ▼ **KEY** until the desired setpoint is displayed. Holding the ▲ or ▼ **KEY** will cause the setting to change more rapidly.

NOTE:

The setpoint may be changed during a run without stopping the shaker by following steps 1-4 above.

6.3 Checking Any Setpoint

1. Press **SELECT** until the desired indicator is illuminated.
2. Briefly press either ▲ or ▼ **KEY** to enter the **SET MODE** and display the current setpoint.

CAUTION!

Holding the ▲ or ▼ for more than 0.5 seconds causes the speed setpoint to change. Should this occur, resetting will be necessary.

6.4 Timed Functions

The shaker may be programmed to automatically stop after a preset time period of 0.1 hour - 99.9 hours. There must be power to the shaker in order to set the timer, although a timed run can be initiated while the unit is either shaking or stopped.

6.4.1 Setting the Timer

To set the timer:

1. Press the **SELECT KEY** until the **HRS INDICATOR** is illuminated.
2. Press either ▲ or ▼ **KEY** to enter the **SET MODE** and set the desired run time, between 0.1 - 99.9 hours.

If the shaker is stopped, skip to Step 5 below. If the shaker is already running:

3. Press the **START/STOP KEY**. The shaker will stop and the display will read **OFF**.
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.

6.4.2 Cancelling the Timer

To cancel the timer *while the shaker is running*:

1. Press the **SELECT KEY** until the **HRS INDICATOR** is illuminated.
2. Press either the ▼ **KEY** until 0.0 is displayed, then press the **START/STOP KEY**. The display will read **OFF**, the shaker will stop, and the **TIME INDICATOR** light will turn off.
3. Press the **START/STOP KEY** to continue in untimed mode.

To cancel the timer *while the shaker is stopped*:

1. Press the ▼ **KEY** until 0.0 is displayed, then press the **START/STOP KEY**. The **TIME INDICATOR** light will turn on and the shaker will run.
2. Press the **START/STOP KEY**. The shaker will stop and the **TIME INDICATOR** will turn off.
3. Press the **START/STOP KEY** a third time, and the shaker will run in untimed mode.

6.5 Alarm Functions

The Excella E-5 shaker has an audible alarm which is activated at predetermined times.

6.5.1 Deactivating the Alarm

To deactivate the alarm, use the **MUTE** function:

1. Press the **SELECT KEY** until the **MUTE** indicator illuminates.
2. Press the ▲ or ▼ **KEY** to display **ON**, then press the **SELECT KEY**.

6.5.2 Reactivating the Alarm

To reactivate the audible alarm:

1. Press the **SELECT KEY** until the **MUTE** indicator illuminates.
2. Press the ▲ or ▼ **KEY** to display **OFF**, then press the **SELECT KEY**.

The **MUTE INDICATOR** will turn off when the alarm has been reactivated.

6.6 Automatic Restart

In the event of a power failure, the Excella E-5 shaker is equipped with an automatic restart function.

If the shaker was in operation prior to the power interruption, when power is restored 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 cease the flashing in the display.

6.7 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 ▲ and ▼ KEYS simultaneously. The display will indicate **CAL**.
3. Press either the ▲ or ▼ KEY to change the displayed value to match the measured speed.
4. Press the ▲ and ▼ KEYS simultaneously to save the adjustment.
5. Turn unit **OFF** using the power switch, then turn it back **ON**.

7 MAINTENANCE & SERVICE

WARNING!
Always turn off the shaker and disconnect the power cord from the power supply before performing any maintenance on the unit.

7.1 Cleaning External Surfaces

Use a cloth dampened with water or any standard, household or laboratory cleaner to wipe down the shaker's outer surfaces.

Never use abrasive or corrosive compounds to clean this instrument, as they may damage the unit and void the warranty.

WARNING!
The following procedures are provided <u>for your information only</u>.
Do not attempt to perform these service interventions yourself unless you are an authorized service technician.

7.2 Belt Replacement

To gain access to the drive belt, your service technician will follow these steps:

WARNING!
***Always* keep fingers clear of the drive belt and pulley.**

1. Set the **ON**/**OFF** power switch to **OFF** and disconnect the power cord from the electrical outlet.
2. Remove the platform by removing the four Allen head platform screws with the 7/32 hex wrench (*see Figure 3, repeated for easy reference on the following page*). Remove the platform, setting the platform and screws aside.
3. Remove the four Phillips head screws that secure the spill cover to the upper bearing housing (*see Figure 3*), and remove the spill cover. Set the spill cover and screws aside.
4. Remove the five Phillips head screws (*see Figure 6 on the following page*) that hold the shaker cover in place over the upper bearing housing and drive assembly. Lift the cover up and away, then set the cover and screws aside.

Figure 3: Platform Installation (top view)

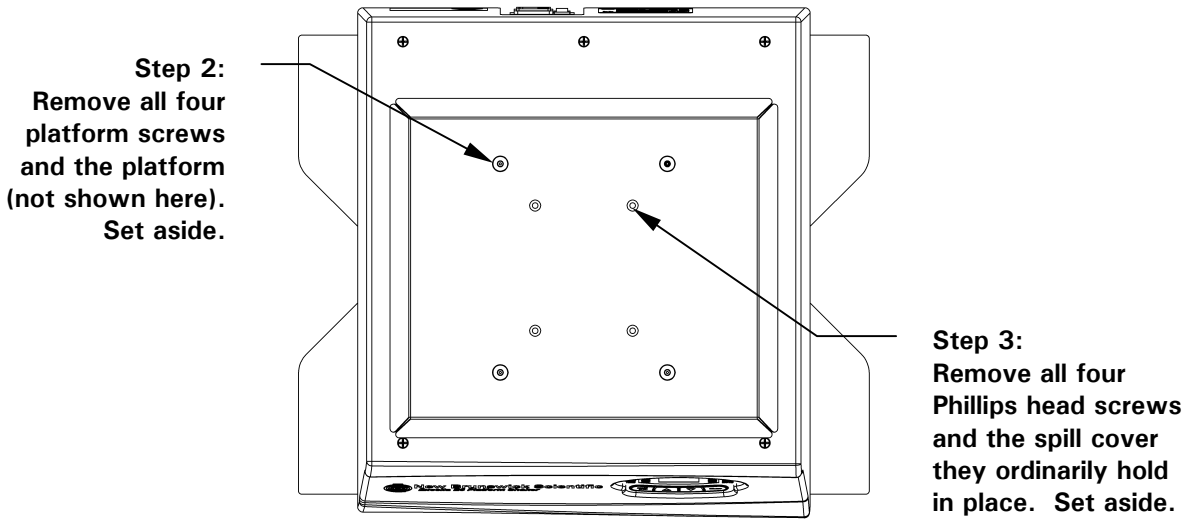


Figure 6: Removing the Shaker Cover (top view)

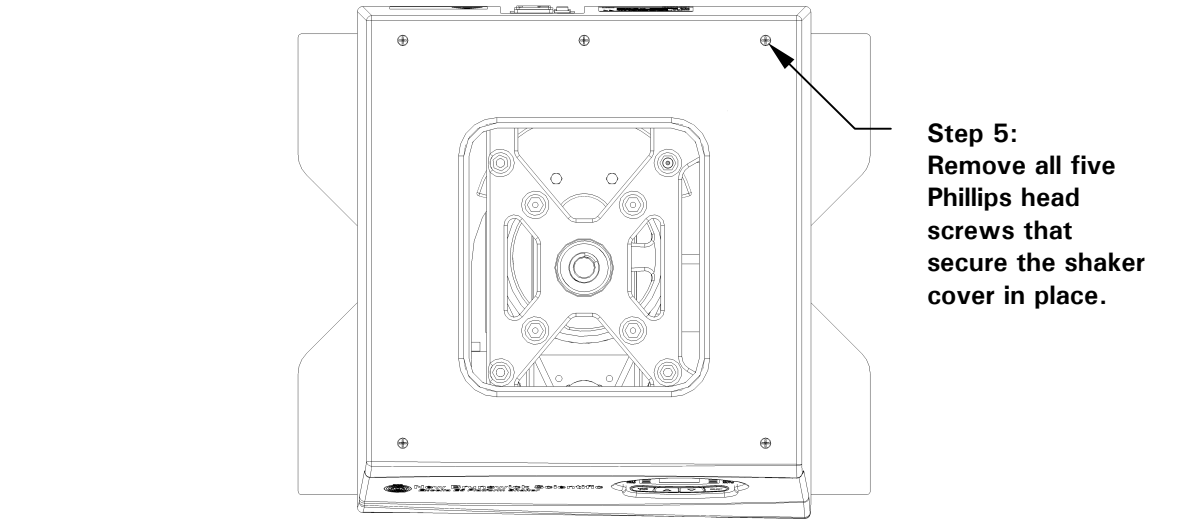


Figure 7: Shaker Cover Removed (top view)

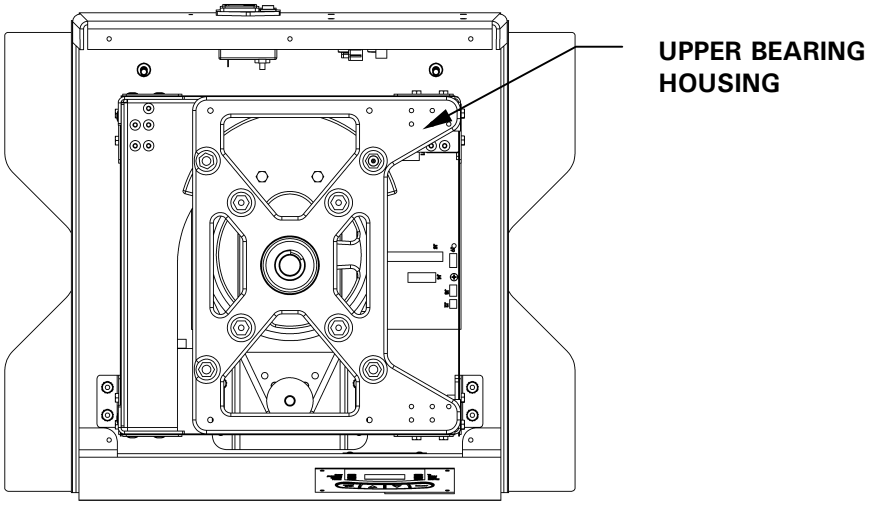
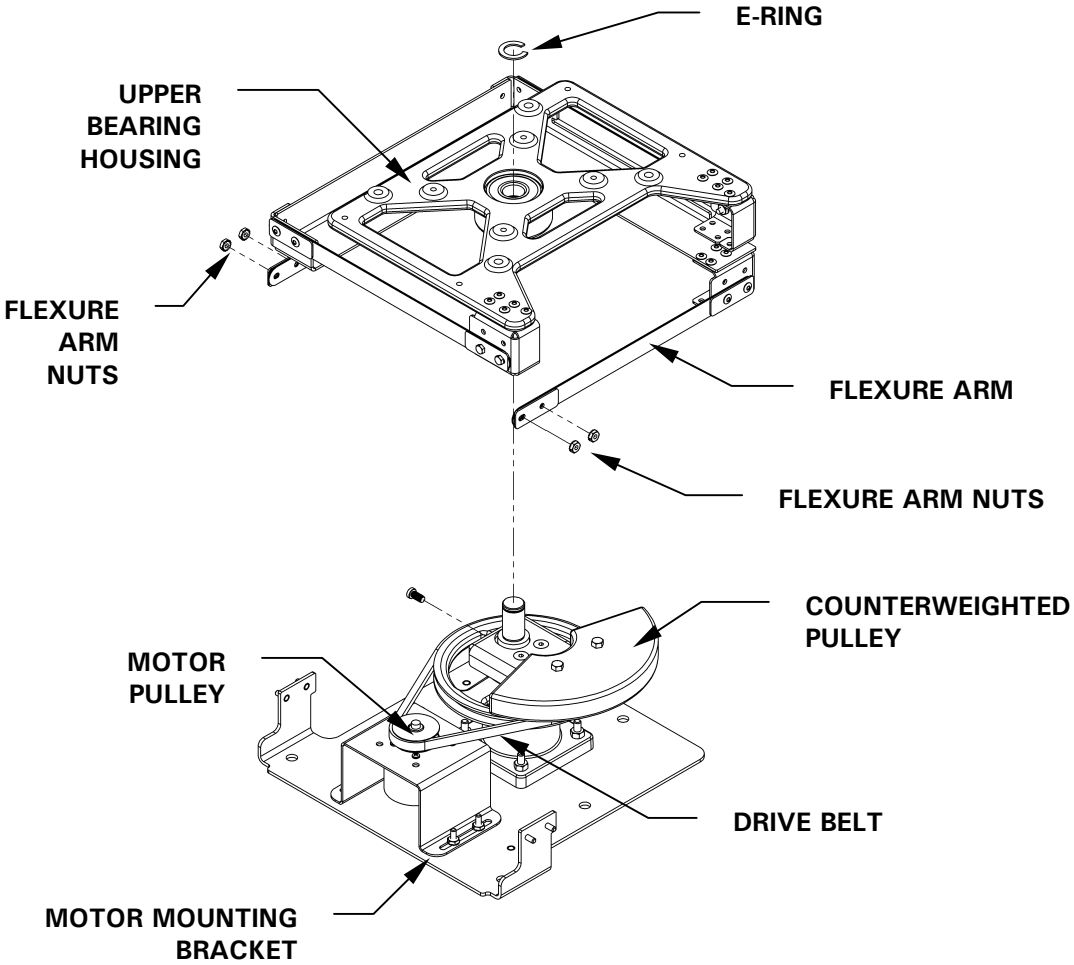


Figure 8: Drive Belt Replacement



5. *With reference to Figure 8 on the previous page*, remove the E-ring that holds the upper bearing housing to the shaft.
6. Remove the four nuts (two on either side) from the bearing housing mounting plate. These nuts hold the flexure arms in place.
7. Slide the upper bearing housing off the shaft, and set it aside.
8. Use the hex wrench to loosen the four hex nuts on the motor mounting bracket.
9. Gently slide the motor mounting bracket toward the righthand side of the shaker. This loosens the drive belt from the motor pulley and the large counterweighted pulley. Moving the motor mounting bracket forward will cause the belt to fall from both belt tracks.
10. Remove the old belt.
11. With one hand, place the new belt around the motor pulley, and with the other hand guide the belt around the large counterweighted pulley.
12. Move the motor mounting bracket back, until there is a slight resistance.
13. Verify that the drive belt has a slight pressure near the center. The recommended deflection is 3/8 inch (9.5 mm).
14. Use the hex wrench to tighten the four hex nuts on the motor mounting bracket.
15. Reinstall the upper bearing housing on the shaft.
16. Reattach the flexure arms to the bearing housing mounting plate with the four nuts previously removed.
17. Reattach the E-ring to the shaft.
18. Reinstall the shaker cover using the five screws you previously set aside.
19. Reinstall the spill cover using the four screws you previously set aside.
20. Reinstall the platform, using the four spill cover knobs you previously set aside.
21. Reconnect the power cord to the power source.

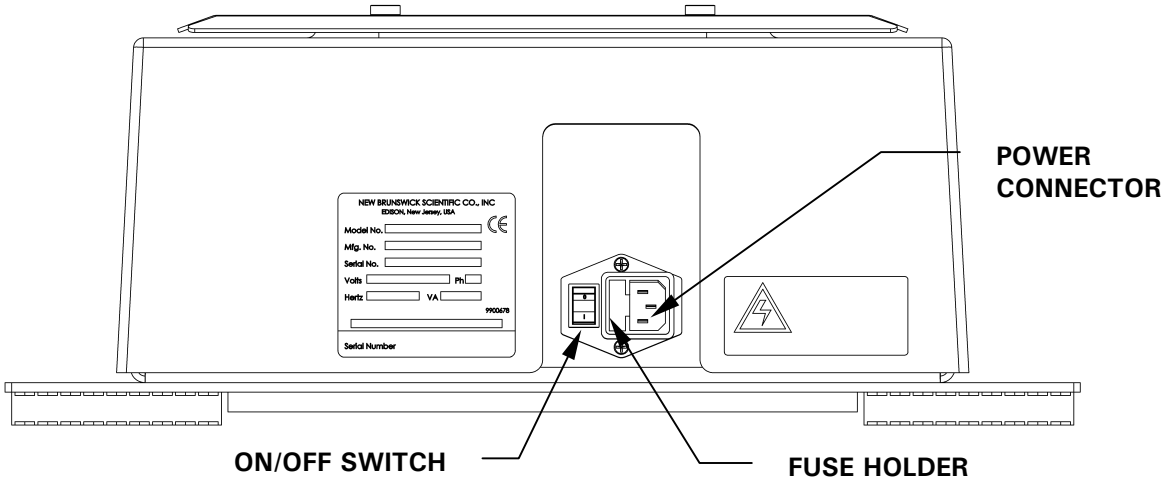
7.3 Fuse Replacement

The shaker's electrical fuse unit is housed in the fuse holder on the rear panel of the unit, next to the power cord connector.

To check or replace the fuse:

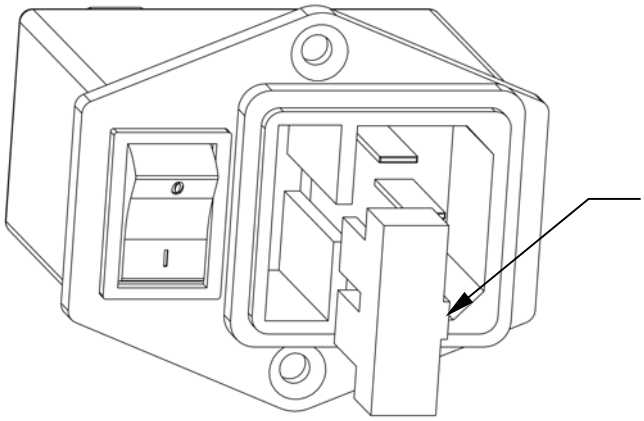
1. If you have not already done so, set the **ON**/**OFF** power switch to **OFF** and disconnect the **POWER CORD** from both the power source and the **POWER CONNECTOR** on the back of the shaker (*see Figure 5, repeated on the following page for easy reference*).

Figure 5: Rear Panel



2. Using a small flat-bladed screwdriver, pull the fuse holder out of the power connector assembly (*see Figure 9 below*). **Be careful:** the fuses may spring out of the holder.

Figure 9: Fuse Holder (detail)



3. Check the fuses. If either has failed, replace the fuse. (For fuse part number and description, see Section 8.1.)

7.4 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 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 side panel of the unit near the **ON/OFF SWITCH**.

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

Symptom(s)	Probable Cause(s) & Solution(s)
Shaker does not run.	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.
	On/Off switch is not working: call for service.
	If you recently replaced a fuse, it may not have been seated properly: remove and reinstall the fuse carefully.
	Defective main board: call for service
	Defective display controller board: call for service.
	Jammed shaking mechanism: call for service
	Defective motor: call for service
	Drive belt out of alignment or worn: call for service.
Shaker runs slowly and/or no speed indication.	If you recently replaced a fuse, it may not have been seated properly: remove and reinstall the fuse carefully.
	Incorrect speed calibration: recalibrate shaking speed.
	Defective main board: call for service.
	Defective motor: call for service.
	Drive belt is out of alignment or worn: call for service.
Shaker does not run at set speed.	Shaker is overloaded and/or you are using baffled flasks: remove some contents & balance load.
	Defective motor: call for service.
	Drive belt out of alignment or worn: call for service.
Operating noise	Load out of balance: unload all contents, then reload.
	Loose component(s) in platform, subplatform and/or drive assembly: call for service.

8 PARTS & ACCESSORIES

When ordering replacement or accessory parts, or requesting service, please 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.

8.1 Replacement Parts

Part Description	*Quantity*	*NBS Part Number*
Fuse, Slo-Blo® 4A, 250V	1	P0380-3780
V-Belt	1	R-243

8.2 Accessories

8.2.1 Utility Carrier

Accessory Description	*NBS Part Number*
Utility Carrier holds glassware between rubber-cushioned crossbars	M1194-9909

8.2.2 Dedicated Platforms & Capacities

Accessory Description	*Clamps/Holders*	*NBS Part Number*
50 ml Erlenmeyer Flasks	64	M1194-9903
125 mL Erlenmeyer Flasks	34	M1194-9904
250 ml Erlenmeyer Flasks	25	M1194-9905
500 ml Erlenmeyer Flasks	16	M1194-9906
1-liter Erlenmeyer Flasks	9	M1194-9907
2-liter Erlenmeyer Flasks	5	M1194-9908
2.8-liter Fernbach Flasks	4	M1233-9932
4-liter Erlenmeyer Flasks	4	M1233-9930

8.2.3 Universal Platform

The following is a list of flask capacities for Universal Platform number M1001-0240. Flask clamps are ordered separately.

Flask Type	*Capacity*
10 ml Erlenmeyer Flasks	109
25 ml Erlenmeyer Flasks	64
50 ml Erlenmeyer Flasks	45
125 ml Erlenmeyer Flasks	21
250 ml Erlenmeyer Flasks	18
500 ml Erlenmeyer Flasks	14
1-liter Erlenmeyer Flasks	8
2-liter Erlenmeyer Flasks	5
2.8-liter Fernbach Flasks	4
4-liter Erlenmeyer Flasks	4
5-liter Erlenmeyer Flasks	4
6-liter Erlenmeyer Flasks	2

8.2.4 Accessory Flask Clamps

Clamp Type	*NBS Part Number*
10 ml Erlenmeyer Clamp, stainless steel	ACE-10S
25 ml Erlenmeyer Clamp, stainless steel	M1190-9004
50 ml Erlenmeyer Clamp, stainless steel	M1190-9000
125 ml Erlenmeyer Clamp, stainless steel	M1190-9001
250 ml Erlenmeyer Clamp, stainless steel	M1190-9002
500 ml Erlenmeyer Clamp, stainless steel	M1190-9003
1-liter Erlenmeyer Clamp, stainless steel	ACE-1000S
2-liter Erlenmeyer Clamp, stainless steel	ACE-2000S
2.8-liter Fernbach Clamp, stainless steel	ACE-2800S
4-liter Erlenmeyer Clamp, stainless steel	ACE-4000S
5-liter Erlenmeyer Clamp, stainless steel	ACE-5000S
6-liter Erlenmeyer Clamp, stainless steel	ACE-6000S

8.2.5 Adjustable-Angle Test Tube Racks

Large Racks (4/platform)		
Test Tubes/Rack	**Test Tube Diameter**	**NBS Part Number**
80	8-11 mm	M1298-0100
60	12-15 mm	M1298-0200
42	15-18 mm	M1298-0300
30	18-21 mm	M1298-0400
22	22-26 mm	M1298-0500
20	26-30 mm	M1298-0600
Medium Racks (5/platform)		
Test Tubes/Rack	**Test Tube Diameter**	**NBS Part Number**
60	8-11 mm	M1298-0010
44	12-15 mm	M1298-0020
31	15-18 mm	M1298-0030
23	18-21 mm	M1298-0040
16	22-26 mm	M1298-0050
16	26-30 mm	M1298-0060
Small Racks (5/platform)		
Test Tubes/Rack	**Test Tube Diameter**	**NBS Part Number**
48	8-11 mm	M1298-0001
34	12-15 mm	M1298-0002
24	15-18 mm	M1298-0003
18	18-21 mm	M1298-0004
13	22-26 mm	M1298-0005
12	26-30 mm	M1298-0006

9 SPECIFICATIONS

Shaking		
Speed	50-400 rpm	
Motion	¾-inch (1.9 cm) diameter circular orbit	
Indication	LED digital electric display, 1 rpm increments	
Setpoint & Control	Digital adjustment with PI microprocessor control and instantaneous visual feedback.	
Accuracy	± 2 rpm	
Drive		
UniCentric™ counterbalanced ball bearing drive		
Keypad Timer		
• Programmable shaking periods from 0.1 hour to 99.9 hours by a digital timer that shuts off at the end of period and energizes status light. • Timer counts down and digital display indicates remaining time. • Can be deactivated for continuous operation. • Additionally, unit will display total accumulated running time for service information.		
Operating Ambient Environment		
5°C - 45°C, 20 - 80% humidity, non-condensing		
Alarms		
• Warning signal (audible and visible) indicates when shaking speed deviates more than 5 rpm from setpoint and when timer operation has expired. • Audible alarm can be muted by the operator.		
Automatic Restart		
• Unit will automatically restart after undesired power interruption. • Setpoints are maintained by non-volatile memory. • Interruption is indicated by a flashing display.		
Electrical Service		
• 110V/120V AC, 50/60 Hz, 1320 VA • 220V/240V AC, 50/60 Hz, 1320 VA		
Dimensions		
Width	16.25 inches	(41 cm)
Depth	18.3 inches	(46.5 cm)
Height	7.13 inches	(18 cm)
Platform Dimensions		
18 x 18 inches (46 x 46 cm)		
Weight		
Net	70 pounds	31.8 kg
Gross	100 pounds	45.4 kg

9.1 Certifications

The Excella E-5 shaker has been tested to ETL standards, to comply with the following electrical safety standards: UL 61010A-1, UL 61010A-2-010, CAN/CSA-C22.2 No. 1010.1 and CAN/CSA-C22.2 No. 1010.2.010.

As attested in the CE Declaration of Conformity reproduced on the following page, they also conform to the appropriate CE standards.

New Brunswick Scientific

CE CE

DECLARATION OF CONFORMITY

New Brunswick Scientific, Hereby declares that the product(s) listed below conform to the European Union directive and standards identified in this declaration.

Product(s)

I-26/I-26R, E-25/E-25R, I-25/I-25R, E-24/E-24R, I-24/ I-24R, E-1, E-2, E-5, E-10, I-20, I-21, I-23

EU Directive(s)

Low Voltage (73/23/EEC/93/68/EEC)
Electromagnetic Compatibility (89/336/EEC/93/68/EEC)

Standard(s)

EN61010-1: 2001 (2nd Edition)	EN61000-4-2
EN61010-2-010 (2003)	EN61000-4-4
EN61326: 1997+A1: 1998 +A2:2001 Emissions	EN61000-4-5
EN61326: 1997+A1: 1998 +A2:2001 Immunity	EN61000-4-11
EN61000-3-2: 1995	
EN61000-3-3: 1995	

The conformity assessment procedure were performed at the following locations:

- **Intertek Testing Services, 40 Commerce Way, Totowa, NJ 07512 and New Brunswick Scientific, 44 Talmadge RD, Edison, NJ 08818.**

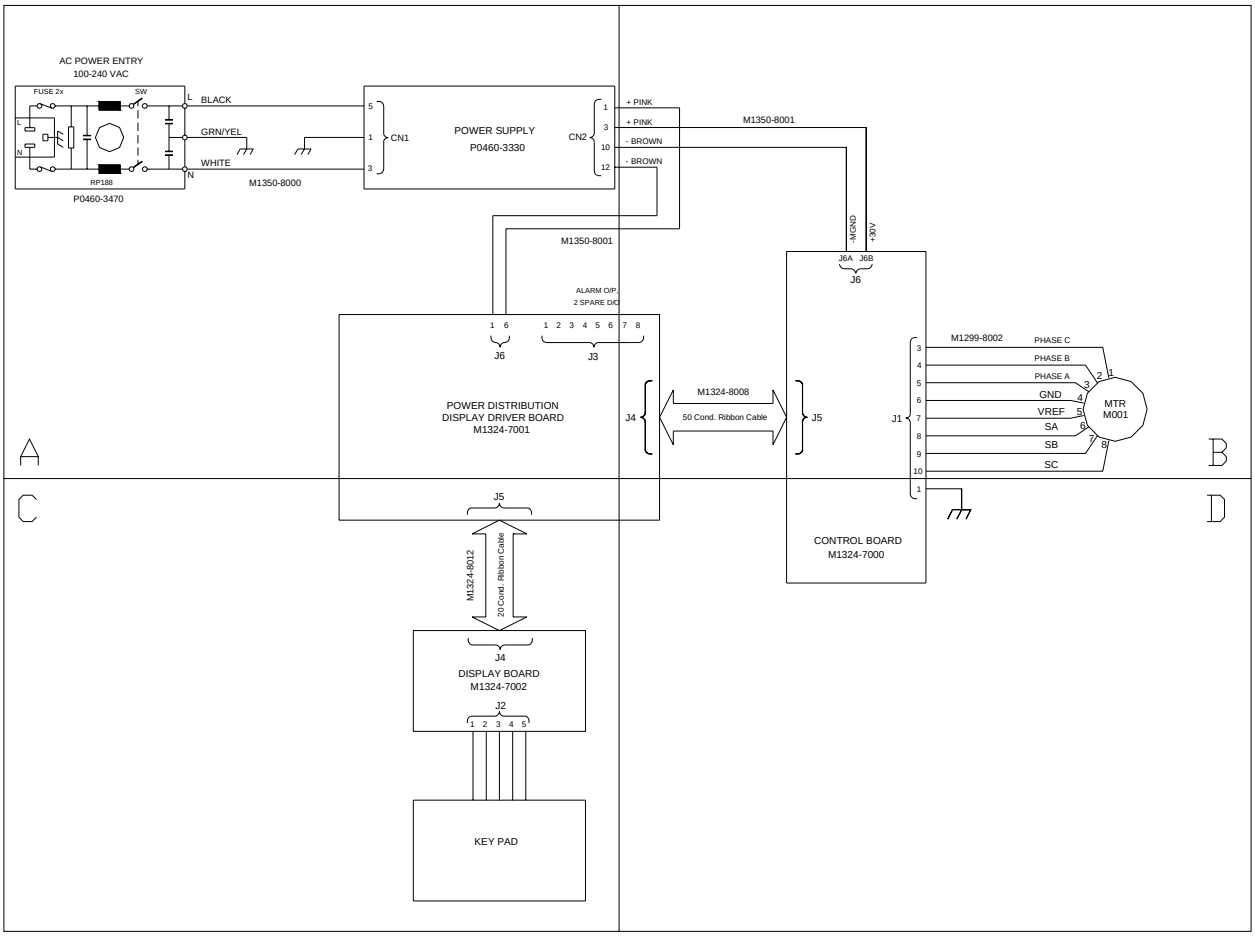
The technical documentation relevant to the above equipment will be held at:
New Brunswick Scientific Company
PO Box 4005
44 Talmadge Road
Edison, New Jersey 08818-4005 U.S.A
Tel. (732) 287-1200
Fax. (732) 287-4222

Lee Eppstein
VP of Science & Technology

23 Feb, 2006
Date

10 DRAWINGS

Figure 10: Control Schematic (overview)



NOTE:

See Figures 10a-10d for details.

Figure 10a: Control Schematic (Quadrant A)

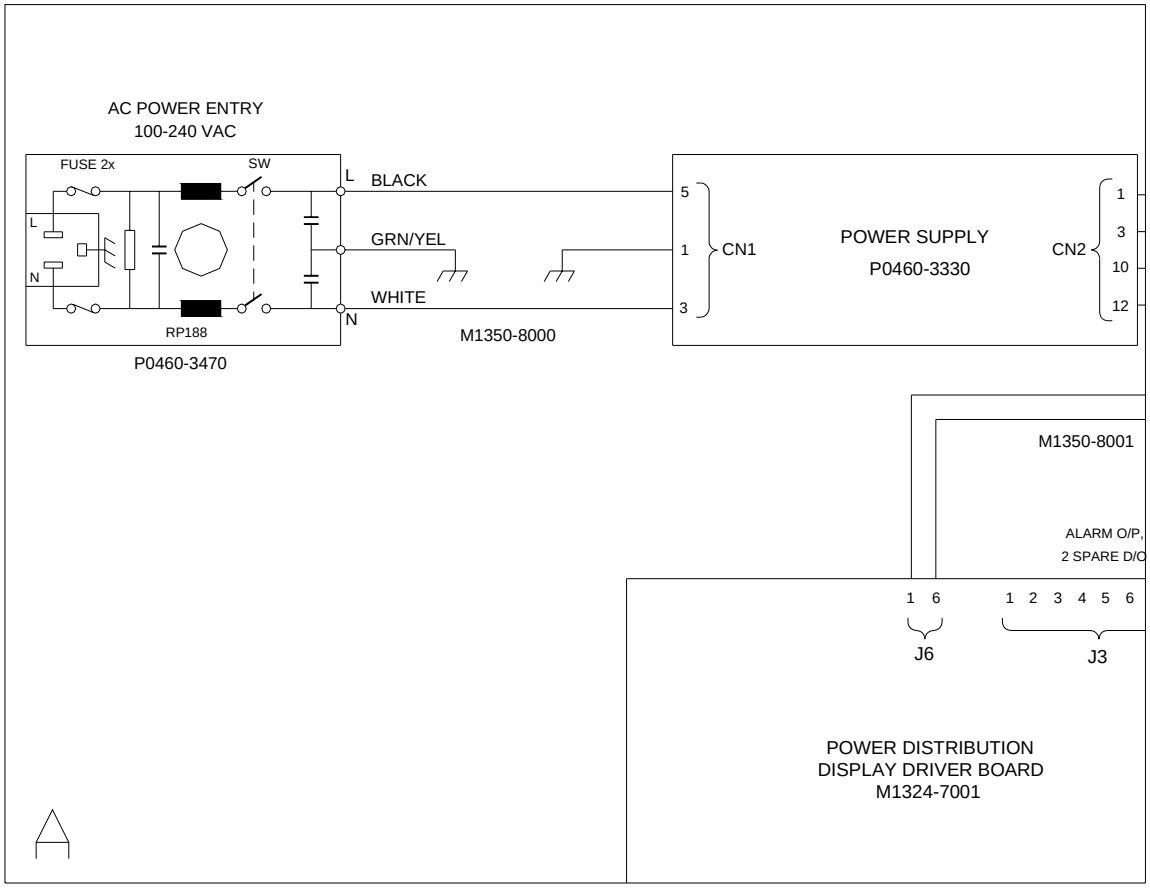


Figure 10b: Control Schematic (Quadrant B)

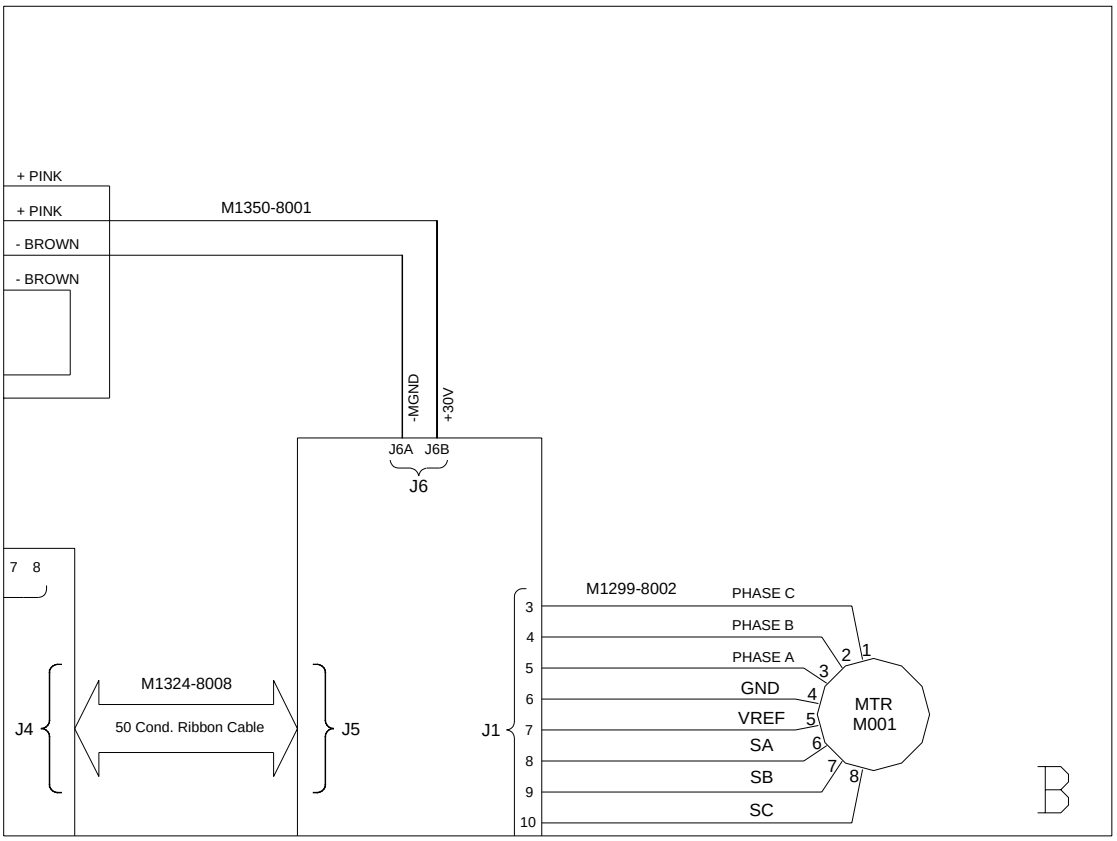


Figure 10c: Control Schematic (Quadrant C)

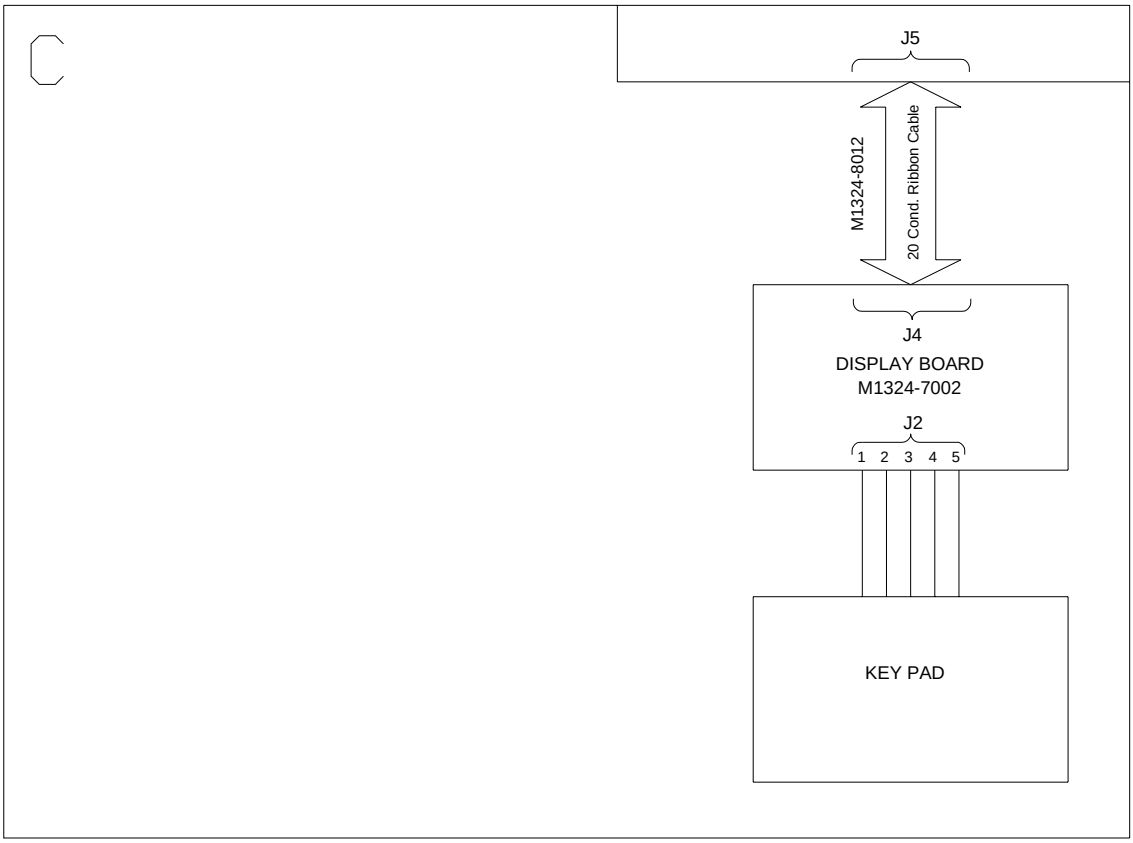
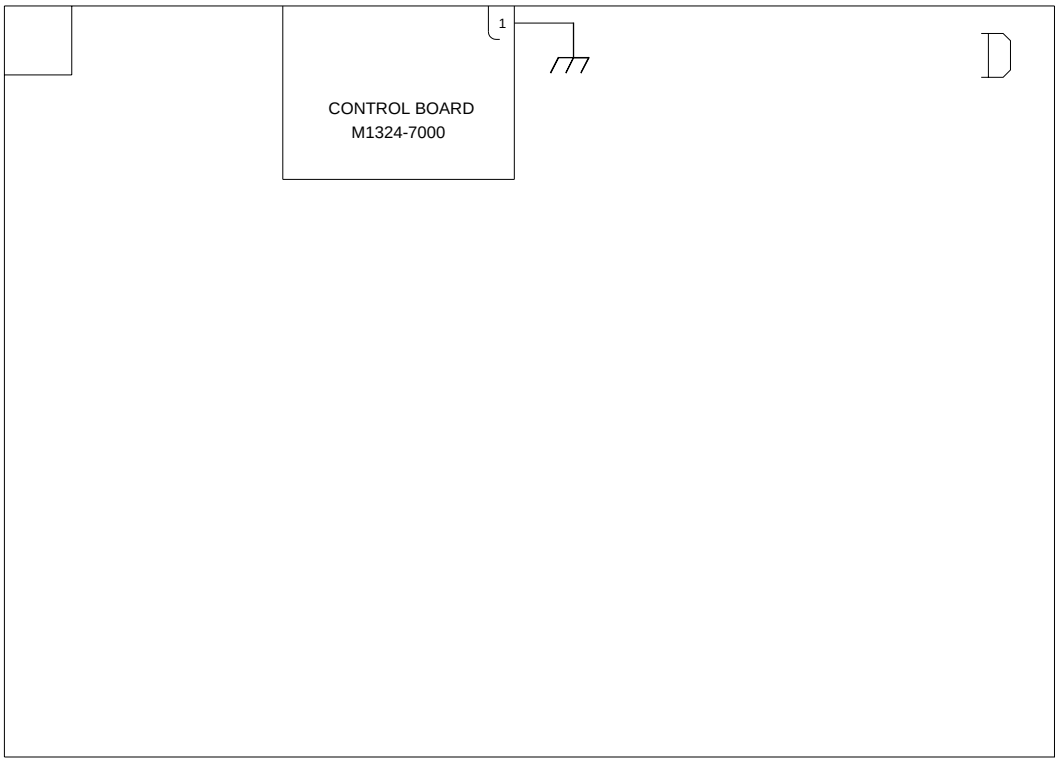


Figure 10d: Control Schematic (Quadrant D)



10.1 Drawing List

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