

# **WHEATON SCIENCE PRODUCTS**

**BIOSTIR<sup>®</sup>**

**DIGITAL MAGNETIC STIRRER**

**INSTRUCTION MANUAL**

**100 - 120V SINGLE PLACE CAT #W900702 A and B**

**100 - 120V FOUR PLACE CAT #W900703 A and B**

**Wheaton Science Products**

**1501 North Tenth Street**

**Millville, NJ, 08332 USA**

**(856)-825-1100**

**Fax: (856)-825-1368**

**[www.wheatonsci.com](http://www.wheatonsci.com)**

## WARRANTY

Wheaton Science Products warrants this product to be free from defects in material and workmanship for a period of two (2) years from the date of shipment. Belts in the four place Biostir® and Micro-Stir® are warranted for one (1) year from the date of shipment. If repair or adjustment is necessary within the warranty period and has not been the result of mishandling or abuse, the unit may be returned prepaid, provided that return authorization has been obtained. Wheaton Science Products will correct the defect or adjust the unit at no charge.

Items returned for repair or adjustment should be packed very carefully to prevent damage and should also be insured against carrier damage. Should the unit arrive damaged as a result of transit, a claim will need to be made against the carrier. The shipping carton should not be discarded but retained until inspection by a representative of the carrier is made.

Wheaton Science Products will repair or adjust out of warranty products at a nominal charge.

## GENERAL SAFETY INSTRUCTIONS

**NOTE: EVEN THE SAFEST EQUIPMENT CAN CAUSE INJURY IF THE USER IS CARELESS.**

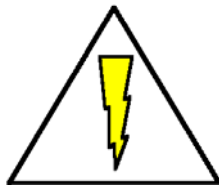
1. **KNOW YOUR INSTRUMENT** - Read the operating manual carefully. Learn the equipment's application and limitations.
2. **GROUND ALL EQUIPMENT** - If electrical, this instrument is equipped with a grounding type plug. The green/yellow conductor in the cord is the grounding wire and should never be connected to a live terminal.
3. **AVOID DANGEROUS ENVIRONMENT** - Electrical instruments designed to process liquids must be operated with extreme caution. If liquid comes in contact with internal electrical components or wires, fire or electrical shock may occur. Adequate surrounding work space should be provided during use. Do not operate electrical instrumentation in a combustible atmosphere.
4. **WORK SURFACE** - Keep well lighted. Be certain the work surface is clean, level and sturdy enough to support the weight of the unit, particularly if it is to be filled with liquid.
5. **WEAR PROPER APPAREL** - Do not wear loose clothing, neckties or jewelry that might get caught in moving parts. Non-slip footwear is recommended. Wear protective hair covering to contain long hair.
6. **WEAR SAFETY GOGGLES** - Wear safety goggles at all times. Everyday eyeglasses only have impact resistant lenses, they are NOT safety glasses.
7. **DON'T OVERREACH** - Keep proper footing and balance at all times.
8. **MAINTAIN INSTRUMENT WITH CARE** - Keep screws tight and unit clean. Check periodically for worn or damaged parts. Inspect the plug and cord before each use. Do not operate this instrument if there are signs of damage.
9. **AVOID ACCIDENTAL START UP** - If electrical, always make sure the switch is in the "OFF" position before plugging instrument into outlet.
10. **DISCONNECT INSTRUMENT** - Always disconnect the instrument from the power source before servicing.
11. **DO NOT BLOCK COOLING VENTS IF PROVIDED**
12. **DO NOT OPERATE THIS EQUIPMENT IN ANY MANNER NOT SPECIFIED IN THIS MANUAL**
13. **KEEP THE OPERATING MANUAL FOR THE INSTRUMENT IN A SAFE PLACE NEAR THE INSTRUMENT FOR QUICK AND EASY REFERENCE.**
14. **IT IS RECOMMENDED THAT A FIRE EXTINGUISHER ALWAYS BE LOCATED IN AREAS WHERE ELECTRICAL INSTRUMENTS ARE BEING USED.**

**WSP-305**

## SAFETY SYMBOLS USED IN THIS MANUAL



A **Warning** symbol indicates attention to an operation, which can cause operator injury, improper function of or damage to the equipment and possible problems with the process.



A **Danger** symbol indicates attention to an operation, which could cause electrocution or severe injury or death.

## TABLE OF CONTENTS

### **Biostir®**

1.0	SPECIFICATIONS
2.0	INTRODUCTION
3.0	SAFETY CONSIDERATIONS
4.0	MAJOR COMPONENT IDENTIFICATION
5.0	INITIAL INSPECTION
5.1	INSTALLATION
5.2	INPUT POWER REQUIREMENTS
5.3	POWER CORD SET
6.0	UNIT SETUP AND OPERATION
6.1	KEYPAD AND DISPLAY
6.2	VESSEL PLACEMENT
6.3	BASIC CONSTANT SPEED STIRRING
6.4	CYCLE STIRRING
6.5	TWO SPEED STIRRING
6.6	COMBINATION CYCLE AND TWO SPEED STIRRING
6.7	STIRRER STATE IN CASE OF POWER INTERRUPTION
7.0	DRY CONTACT RELAY FUNCTIONS
8.0	REMOTE CONTROL OPERATION
8.1	OPTIONAL REMOTE CONTROL BOX
8.2	SERIAL COMMAND PROTOCOL
9.0	MAINTENANCE AND TROUBLESHOOTING
9.1	GUIDELINES ON SURFACE CLEANING
9.2	FOUR PLACE BELT REPLACEMENT AND TENSIONING
9.3	MOTOR REPLACEMENT
9.4	DISPLAY BOARD REPLACEMENT
9.5	TROUBLESHOOTING
9.6	FUSE REPLACEMENT

### **BIOSTIR® - PARTS LISTS AND ILLUSTRATIONS**

FIG A	LINE CORD AND FUSE - REMOVAL AND INSTALLATION
FIG B	MAIN UNIT ASSEMBLY SINGLE PLACE
FIG C	MAIN UNIT ASSEMBLY FOUR PLACE
FIG D	MAIN UNIT WIRING DIAGRAM
FIG E	REMOTE UNIT ASSEMBLY
	NOTICE

## 1.0 SPECIFICATIONS – BIOSTIR®

OPERATING VOLTAGE:	100-120 VAC 50/60 Hz
POWER CONSUMPTION:	15 Watts
FUSE:	(1) ¼" x 1 ¼" 3AG 1.50AT 250V
POLLUTION DEGREE:	Class 2
ENVIRONMENTAL:	
Operating temperature:	15 °C to 40 °C
Humidity:	80% up to 31°C. 50% at 40°C.
Altitude limit	2000 meters
OVERALL DIMENSIONS:	
Single Place:	3.6" H x 8.0" W x 9.8" D 9.2 H x 20.3 W x 24.9 D cm
Four Place:	4.0" H x 15.5" W x 17.5" D 10.2 H x 39.4 W x 44.5 D cm
WEIGHT:	
Single Place:	4.5 lbs. (1.9kg)
Four Place:	10 lbs. (4.5kg)
OPERATING SPEED:	150-1200 RPM
Tolerance:	± 5 RPM
OPERATING TORQUE:	3ozin.
CYCLE TIME RANGE:	1-1055 minutes, 1 min. resolution
NUMBER OF CYCLES:	32
ALARM CONDITIONS	Motor Stalled, Speed Deviation
DRY CONTACT RELAY:	Normally Closed, Open on alarm. 250V @ 1/8 amps.
REMOTE CONTROL:	Full Duplex RS485 proprietary protocol. Optional Remote Control Available.

## 2.0 INTRODUCTION

The latest line of Wheaton Biostir<sup>®</sup> magnetic stirrers answers the call to many modern laboratory needs. Features include wide speed ranges, increased torque, easy user interface, and remote control options allow the Biostir<sup>®</sup> to cover a wide range of applications. A new addition of interval and two speed stirring modes adds to the versatility of the unit.

The Biostir<sup>®</sup> utilizes a brushless motor and powerful magnet for increased efficiency and positive magnetic coupling over the entire speed range. Reduced power consumption through the use of microprocessor based electronics helps eliminate heat transfer to the medium being stirred. The unit is housed in an enamel finished aluminum cabinet, which is both durable and stain resistant.

## 3.0 SAFETY CONSIDERATIONS

**WARNING ! IMPROPER GROUNDING CAN RESULT IN ELECTRICAL SHOCK. IN THE EVENT OF A SHORT CIRCUIT, GROUNDING REDUCES THE RISK OF SHOCK. THIS INSTRUMENT MUST BE GROUNDED.**

1. This instrument is equipped with a cord having a grounding wire and an appropriate grounding plug. The plug must be used with an outlet that has been installed and grounded in accordance with all local codes and ordinances. The outlet must have the same configuration as the plug. **DO NOT USE AN ADAPTER.**
2. Do not modify the line cord that has been provided. If it does not fit the available outlet, contact your nearest Wheaton Science Products (WSP) distributor for the proper line cord for your area.

## 4.0 MAJOR COMPONENT IDENTIFICATION



### FRONT OF UNIT

1. Display –When the unit is running, the display shows the current operating status of the unit, including operating speeds and cycle times. While the unit is idle, the display shows entered data from the keypad and remote communications status.
2. Keypad – When unit is idle, the keypad is used to program the unit in several different modes. While the unit is running, the keypad can be used to toggle the display to show current operating status of the unit.
3. Power Switch – The mains power switch illuminates when the unit is on and power is applied.



### REAR OF THE UNIT

1. Power Entry Module - Location of the line cord entry and fuse(s) drawer.
2. RS-485 Interface Connection - Allows remote control of the unit via an optional remote control unit and contains the remote alarm relay dry contacts.



## **5.0 INITIAL INSPECTION**

When you receive your new Biostir<sup>®</sup>, inspect it for any obvious damage that may have occurred during shipment. If any damage is found, notify the carrier at once. Warranty information is shown in the front of this manual. Check to confirm that there are no broken switches, displays or missing parts, and that the unit is not dented or scratched.

### **5.1 Installation**

Install the unit where there will be adequate room for the unit to operate. Provide enough clearance around the unit to maintain safety. Install the unit on a level surface to make sure vessels don't slide off the top.

### **5.2 Input Power Requirements**

This equipment is designed to operate from a 100-120V single-phase AC power source at 47 to 63 Hz nominal. The line voltage / fuse label located on the upper rear of the unit shows the nominal input voltage set for the unit at the factory.

### **5.3 Power Cord Set**

This unit has been shipped from the factory with a power line cord that has a plug appropriate for your area. If the wrong power cord has been shipped for your particular application, contact your nearest Wheaton Science Products (WSP) dealer for the proper cord. The Biostir<sup>®</sup> has been equipped with a 3-wire grounding type power cord. The unit is only grounded when it is plugged into an appropriate receptacle. Do not operate the unit without adequate grounding protection.

## 6.0 UNIT SETUP AND OPERATION

The Biostir<sup>®</sup> slow speed stirrer can be configured in several different modes to allow for simple constant speed stirring, to advanced interval and two speed stirring for the most demanding applications.

### 6.1 Keypad and Display

The Biostir<sup>®</sup> keypad and display provide useful information to the setup and performance of the unit. LED indicators on each side of the main display guide the user through the setup and operation of the unit. A description of the LED indicators is below:



**RUN RPM** – Indicates the primary programmed constant stirring speed.

**CYCLE TIME ON (0 – 1055 minutes)** - Indicates the programmed running time of the stirrer. This can be used to set a repetitive run and idle time, or can be used to set a two stage-stirring mode with an initial timed running speed, and then a second final running speed.

**CYCLE TIME OFF (0 – 1055 minutes)** - Indicates the programmed idle time of the stirrer. This is used to set the idle time during a repetitive run and idle time mode of stirring.

**CYCLE RPM** – Indicates the programmed initial running speed of the unit. This can be used to set a two stage-stirring mode with an initial timed running speed, and then a constant final running speed.

**CYCLE COUNT (0-32 cycles)** – Indicates the programmed number of cycles for repetitive run and idle cycle stirring.

**RUN** – Indicates that the unit is running and is performing properly. The RUN LED will remain lit even while the unit is in a programmed idle mode. The RUN LED turns off when the unit is stopped, or is being programmed from the keypad.

**REMOTE** – Indicates that the unit is being controlled from a remote location.

**ALARM** – Indicates a problem with the unit. Consult the troubleshooting section of this manual to help correct any alarm conditions.

## 6.2 Vessel Placement

Make sure the vessel is centered on the “target” area on the top of the stirrer. A vessel that is not centered may cause uneven stirring, resulting in less than optimum results.



### 6.3 Basic Constant Speed Stirring

The Biostir® is capable of basic stirring as well as advanced stirring modes for demanding applications. To run in basic constant-speed stirring mode, set the unit as follows:

IF THE UNIT IS RUNNING, OR AUTOMATICALLY STARTS WHEN POWER IS APPLIED:

- Press the RUN / STOP Button.



The unit will ramp down to a stop, the RUN light will go OFF, and will now accept programming from the keypad.

- Press the \* key until the RUN RPM light turns on.



- Use the UP and DOWN arrow keys to set the desired running speed.



- Press the \* key until the CYCLE TIME ON light turns on.



- Use the DOWN arrow key to make sure the CYCLE TIME ON is set to ZERO.



- Press the \* key until the RUN RPM light turns on again.



- Press RUN / STOP to start the unit running at the set constant speed. The RUN light will blink while the unit is ramping to the set speed. The RUN light will light constant once the set speed is achieved, indicating the unit is working properly.



- Pressing the UP and DOWN keys during constant speed running will change the set speed of the unit.



- To stop the unit, press the RUN/STOP button. The RUN light will blink while the unit ramps down, and then go off when the unit stops.

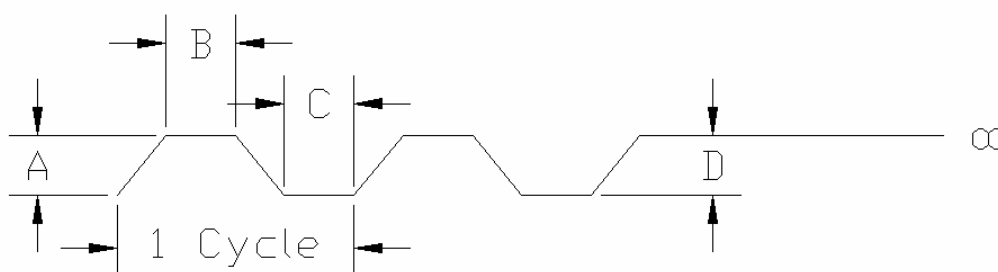


## 6.4 Cycle Stirring

The Biostir® can be set to run in cycle stirring mode, where the unit will run a set number of alternating stirring and idle times.

This type of stirring may be especially helpful in cell culture applications during initial seeding where cells need a set idle time during the stirrer / growth cycle. Both running times and idle times can be independently adjusted.

Below is a typical cycle stirring profile, showing the unit ramping up to a set speed (A), running for a set time (B), then ramping down to a set idle time (C). This cycle is repeated for a set number of times and then returns to a constant speed (D).



A stirring cycle consists of one running period and one idle period as shown above.

IF THE UNIT IS RUNNING, OR AUTOMATICALLY STARTS WHEN POWER IS APPLIED:

- Press the RUN / STOP Key. The unit will ramp down and stop and the RUN light will go out.
- Press the \* key until the RUN RPM light turns on.



- Use the UP and DOWN arrow keys to set the final running speed of the unit (D).



- Press the \* key until the CYCLE TIME ON light turns on.



- Use the UP and DOWN arrow keys to set the cycle ON time (B) in hours and minutes (hh.mm). The example below shows the setting at 1hr and 10 min.



- Press the \* key until the CYCLE TIME OFF light turns on.





- Use the UP and DOWN arrow keys to set the cycle idle time (C) in hours and minutes (hh.mm). The example below shows the setting at 1hr and 45 min.



- Press the \* key until the CYCLE RPM light turns on.



- Use the UP and DOWN arrow keys to set the CYCLE RPM (A) to the same speed as the RUN RPM speed (D).
- Press the \* key until the CYCLE COUNT light turns on.
- Use the UP and DOWN arrow keys to set the number of cycles.



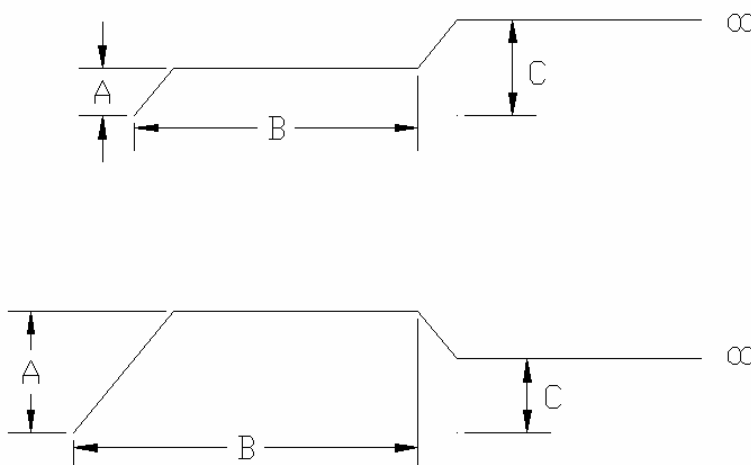
- Press RUN/STOP to start the unit. The RUN LED will blink until the unit attains full set speed.
- During the CYCLE ON time, the CYCLE ON light and the CYCLE RPM light will alternately blink, and display the remaining CYCLE ON time, and the set CYCLE RUN speed.
- Once the CYCLE ON time counts down to ZERO, the unit RUN light will blink as the unit ramps down to a stop.
- When in the CYCLE OFF time, the CYCLE TIME OFF light and CYCLE COUNT lights alternately blink, showing the remaining CYCLE OFF time, and remaining cycles to be run.
- Once the cycles are complete, the unit will run at its set final RUN RPM speed.

## 6.5 Two Speed Stirring

The Biostir® can be set to run in two speed stirring mode, where the unit will run at a set stirring speed for a programmed time, and then run at a final constant speed after that.

This type of stirring may be especially helpful in cell culture applications during initial seeding where cells may need a slow stirring time to reach maturity, and then a faster running speed for the remainder of the growth time.

Below are typical cycle stirring profiles, showing an initial stirring speed for a set time, and then the unit ramping to a final constant speed. The upper profile shows the unit ramping to a higher speed, while the lower profile shows the unit ramping to a slower speed.



IF THE UNIT IS RUNNING, OR AUTOMATICALLY STARTS WHEN POWER IS APPLIED:

- Press the RUN / STOP Key.
- Press the \* key until the RUN RPM light turns on.
- Use the UP and DOWN arrow keys to set the FINAL running speed (C) of the unit.
- Press the \* key until the CYCLE TIME ON light turns on.



- Use the UP and DOWN arrow keys to set the initial running time,(B) in hours and minutes (hh.mm).
- Press the \* key until the CYCLE TIME OFF light turns on.



- Use the DOWN arrow keys to set the CYCLE TIME OFF time to ZERO.

- Press the \* key until the CYCLE RPM light turns on.

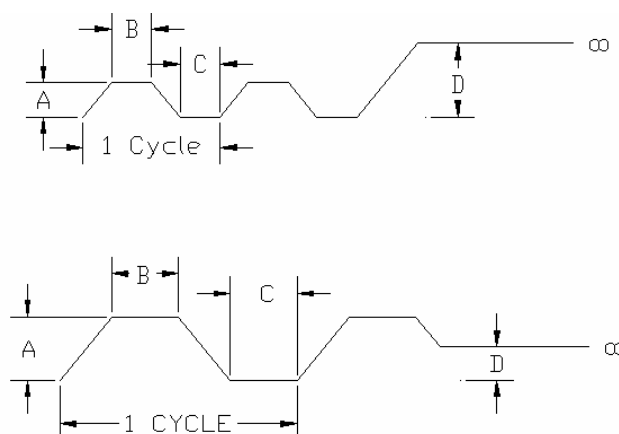


- Use the UP and DOWN arrow keys to set the INITIAL running speed of the unit (A).
- Press RUN / STOP to start the unit running in two speed stirring mode. The RUN light will BLINK until the unit reaches full set speed.
- While the unit is running during the initial stirring time (B), the CYCLE RPM and CYCLE TIME ON time lights will alternately blink to show remaining initial stirring time, and initial stirring speed (A).
- Once the initial stirring time (B) expires, the unit will revert to the final running speed (C).

## 6.6 Combination Cycle and Two Speed Stirring

The Biostir® can be set to run in a combination cycle and two speed stirring mode, where an advanced stirring profile is needed for demanding applications.

Below, is a typical combination cycle and two speed stirring profiles, showing a running cycle pattern at an initial stirring speed (A), and then the unit ramping to a final programmed constant speed (D). The upper profile shows the unit ramping to a higher speed, while the lower profile shows the unit ramping to a slower speed.



A stirring cycle consists of one running period and one idle period as shown above.

IF THE UNIT IS RUNNING, OR AUTOMATICALLY STARTS WHEN POWER IS APPLIED:

- Press the RUN / STOP Key.
- Press the \* key until the RUN RPM light turns on.
- Use the UP and DOWN arrow keys to set the FINAL running speed (D) of the unit.
- Press the \* key until the CYCLE TIME ON light turns on.



- Use the UP and DOWN arrow keys to set the cycle ON time (B).
- Press the \* key until the CYCLE TIME OFF light turns on.



- Use the UP and DOWN arrow keys to set the cycle idle time (C).

- Press the \* key until the CYCLE RPM light turns on.



- Use the UP and DOWN arrow keys to set the INITIAL running speed (A) of the unit.
- Press the \* key until the CYCLE COUNT light turns on.



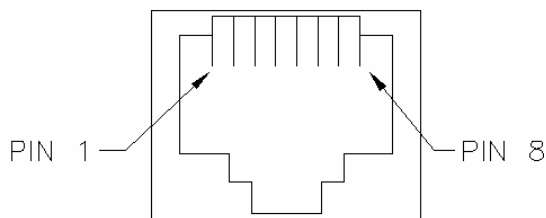
- Use the UP and DOWN arrow keys to set the number of cycles.
- Press RUN / STOP to start the unit running in combination cycle and two speed stirring mode. The RUN light will turn on, indicating the unit is working properly.

## 6.7 Stirrer State In Case of Power Interruption

The internal electronics of the Biostir® are able to store certain operational settings of the unit in RAM that will not be erased when power is lost to the unit. The RUN RPM value is preserved, while all other set values are lost, such as cycle run time, cycle off time, cycle RPM and cycle count. If power is interrupted to the unit, while running a programmed cycle, two speed or combination stirring format, the Biostir® will revert to a constant speed stirrer, stirring at the last RUN RPM value. All other set values, such as cycle time on, cycle time off, cycle RPM, and cycle count will be lost.

## 7.0 DRY CONTACT RELAY FUNCTIONS

The Biostir® contains an internal dry contact relay, accessible from the RS485 port. Below is the pinout of the rear RS485 port showing the dry contact pins.



PIN	FUNCTION	PIN	FUNCTION
1	RS485 Rx-	5	+5V DC
2	RS485 Rx+	6	GROUND
3	RS485 Tx-	7	CONTACT 1
4	RS485 Tx+	8	CONTACT 2

The dry contact relay is energized and contacts are closed, during normal operation. During an alarm condition, or power loss, the relay deenergizes and the contacts are open. The relay is non-latching, and will reset automatically once the alarm condition clears.

## 8.0 REMOTE CONTROL OPERATIONS

The Biostir® can be operated remotely, using the optional remote control box, or by issuing serial interface protocol commands via a RS485 link from a remote PC or other instrumentation.

### 8.1 Optional Remote Control Box

The optional remote control box is plugged into the unit via the rear RS485 port.



The remote control can then be placed in a more convenient location away from the main unit. The remote control front panel has the identical appearance and functions as the front panel on the main unit. When the remote is in operation, the main unit front panel is locked from user changes. The REMOTE light on the front panel will light, indicating that the unit is being operated remotely.





## 8.2 Serial Command Protocol (see figure in section 7.0)

The Biostir® can be operated remotely via a remote RS-485 serial link from a PC or other instrumentation device. The communications protocol to the Micro-Stir® follows the following format.

### Format

C0000<CRC><CR>

**C** = Command

**0000** = 4 ASCII Hex digits of Data

**CRC** = 2 ASCII Decimal digit of CRC

```
// calculate the CRC example
CRC = 0;
for (s = offset ; s != (offset +5); s++)
{
    CRC = CRC + (int)instr[s];
}
```

Simply add the command and the 4 digits of data together in HEX and convert the least significant byte to ASCII. Decimal.

**CR** – Carriage return, 0x0D Hex or 13 DEC.

## **Command and response list**

### Command "S"

Sets the Run speed

Ex. S0120<CRC><CR>

Sets run speed to 120RPM

### Command "C"

Sets the Cycle RPM speed

Ex. C0120<CRC><CR>

Sets cycle run speed to 120RPM

### Command "N"

Sets the Cycle count

Ex. N0020<CRC><CR>

Sets cycle count to 20.

### Command "O"

Sets the Cycle on Time in seconds

Ex. O51F0<CRC><CR>

Sets cycle count to 0x51F0 hex or 20976 DEC seconds or 5:82 (5 Hrs. 82 min.)

## Command "F"

Sets the Cycle off Time in seconds

Ex. F51F0<CRC><CR>

Sets cycle count to 0x51F0 hex or 20976 DEC seconds or 5:82 (5 Hrs. 82 min.)

## Command "R"

Starts or stops the unit, 0000 = off, 0001 = on.

Ex. R0000<CRC><CR>

Turns stirrer off.

## Command "A"

ACK acknowledgement

Ex. A0000<CRC><CR>

The Stirrer returns this if the command is received and accepted and the CRC is correct

## Command "X"

NACK error acknowledgement or resend command

Ex. X0000<CRC><CR>

The Stirrer returns this if the command is in error or CRC is incorrect

## Command "Q"

Queries stirrer if it is a high or low speed unit.

Ex. Q0000<CRC><CR>

## Command “L”

Response to “Q” command tells that is low speed unit, Also can be sent to set unit as a Low speed unit.

Ex. L0000<CRC><CR>

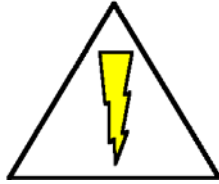
## Command “H”

Response to “Q” command tells that is high speed unit, Also can be sent to set unit as a High speed unit.

Ex. H0000<CRC><CR>

## 9.0 MAINTENANCE AND TROUBLESHOOTING

### FOR QUALIFIED PERSONNEL ONLY!



**DANGER! NEVER ATTEMPT TO PERFORM REPAIRS IF THIS INSTRUMENT IS PLUGGED IN! IN ORDER TO AVOID SERIOUS ELECTRIC SHOCK OR ELECTROCUTION, THIS INSTRUMENT MUST BE DISCONNECTED FROM THE SOURCE OF AC POWER BEFORE REPAIRS ARE INITIATED.**

As with any piece of laboratory equipment, periodic inspection for worn and or damaged parts should be performed on a regular basis in order to maintain optimum performance. How often is dependent upon the amount of usage, working environment, motor speed and instrument age. The maintenance interval is best determined by the user.

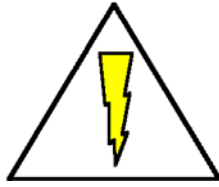
#### 9.1 Guidelines on Surface Cleaning

The housing of the main unit, as well as the housing of the optional remote control is made of aluminum with an enamel paint coating. The keypads are made of a rugged industrial polycarbonate. The whole unit may be cleaned with warm water and any mild household cleaning solution, or mild laboratory cleaner. If liquid entry into the unit is suspected, the unit should be disconnected from the AC power source immediately, the cover removed, and the unit carefully dried with towels and forced warm air.

#### 9.2 Four Place Belt Replacement and Tensioning (see figure C)

1. Disconnect unit from the AC power source. Perform all repairs on a clean, flat surface covered with a protective cloth or pad.
2. Remove the screws that hold the lid, and carefully slide the lid off the base.
3. To replace the belt, loosen the screws on the adjustment plate, and slide the adjustment plate towards the rear of the unit to loosen the belt tension. Remove the belt.
4. Follow figure C, and route the new belt around the pulleys. Slide the adjustment plate towards the front of the unit to re-tension the belt and tighten the screws.

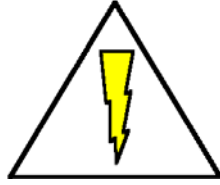
### 9.3 Motor Replacement (See figures B, C, and D)



**DANGER! BE CERTAIN UNIT IS DISCONNECTED FROM THE AC POWER SOURCE.**

1. Disconnect unit from the AC power source. Perform all repairs on a clean, flat surface covered with a protective cloth or pad.
2. Remove the screws that hold the lid, and carefully slide the lid off the base.
3. Unplug the motor from the display board.
4. Remove the magnet plate from the unit by removing the four mounting screws from underneath the base. Remove the magnet plate assembly from the unit.
5. If removing the motor from a four-place unit, loosen the screws on the adjustment plate, and slide the adjustment plate towards the rear of the unit to loosen the belt tension. Remove the belt.
6. Remove the pulley mechanism from the motor (four-place) or the magnet mechanism (single-place).
7. Remove the motor from either the magnet plate (single place) or the adjustment plate (four place).
8. For reassembly, reverse the above procedure using new motor.

#### 9.4 Display Board Replacement (see figures B,C and D)



**DANGER! BE CERTAIN UNIT IS DISCONNECTED FROM THE AC POWER SOURCE.**

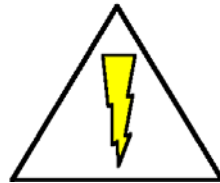
1. Disconnect unit from the AC power source. Perform all repairs on a clean, flat surface covered with a protective cloth or pad.
2. Remove the screws that hold the lid, and carefully slide the lid off the base.
3. Note connections to the display board, (see figure D), and unplug display board from unit.
4. Remove the four screws that hold the display board to the base chassis and remove the display board from the unit.
5. For reassembly, reverse the above procedure using the new display board.

## 9.5 Troubleshooting

Unit will not operate:

Cause:	On/off power switch in “off” position, or unit unplugged.
Remedy:	Turn on the power switch on
Cause:	Fuse blown.
Remedy:	Replace fuse with proper size and type. (see fuse replacement)
Cause:	Supply voltage low or at zero.
Remedy:	Check house receptacle with a voltmeter.
Cause:	Motor defective.
Remedy:	Replace defective motor.
Cause:	Display board defective.
Remedy:	Replace defective board
Cause:	Motor sounds from cabinet but no stirring (four place)
Remedy:	Belt loose or broken. Replace belt.

## 9.6 Fuse Replacement (see figure A)

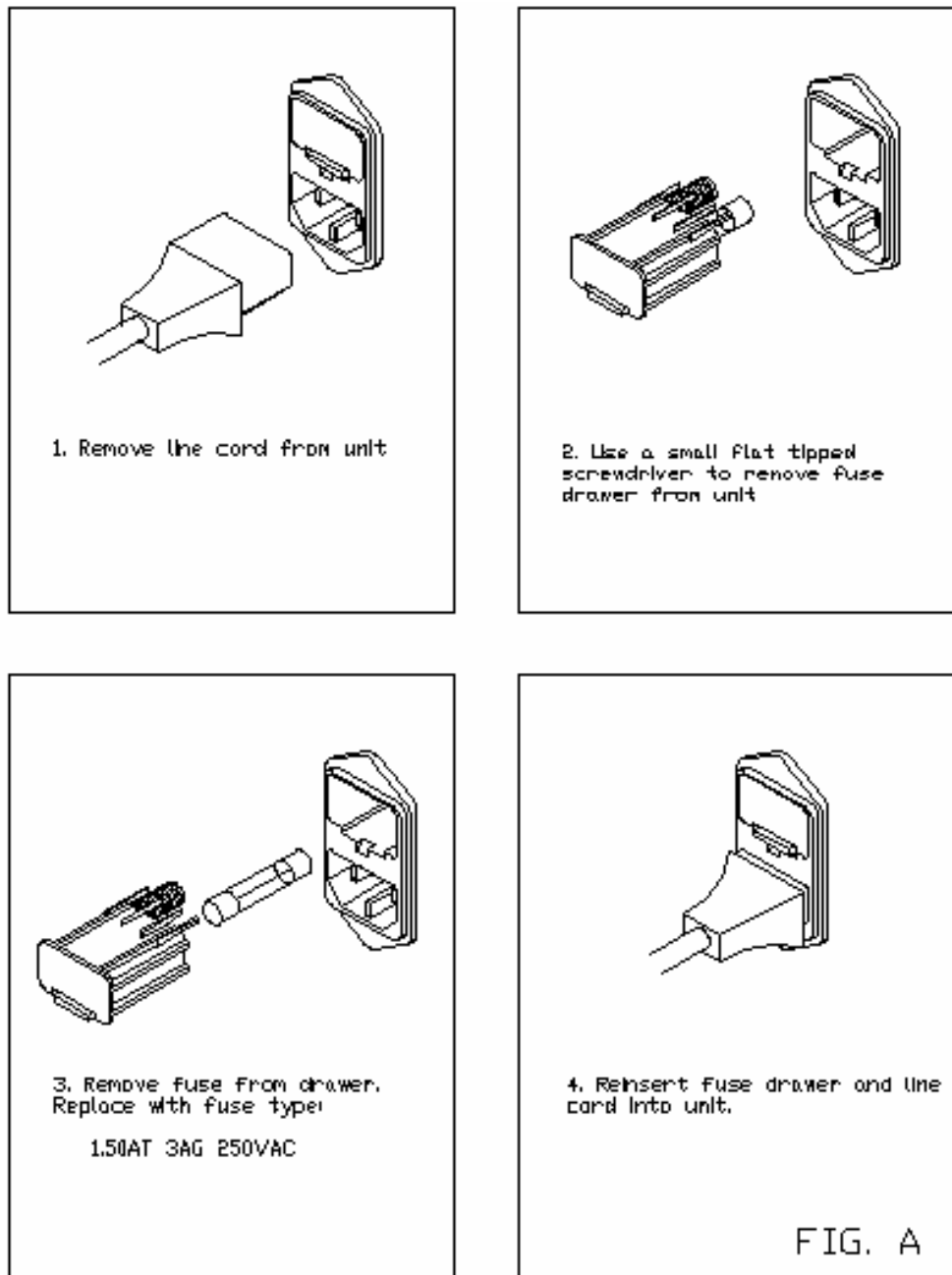


**DANGER! BE CERTAIN UNIT IS DISCONNECTED FROM THE AC POWER SOURCE.**

1. Disconnect unit from the AC power source.
2. Locate the fuse holder on the rear of the unit.
3. Use a flat blade screwdriver to remove the fuse carrier and remove the fuse.
4. Replace with new fuse. See specification for proper rating.



## FIGURE A – FUSE REPLACEMENT



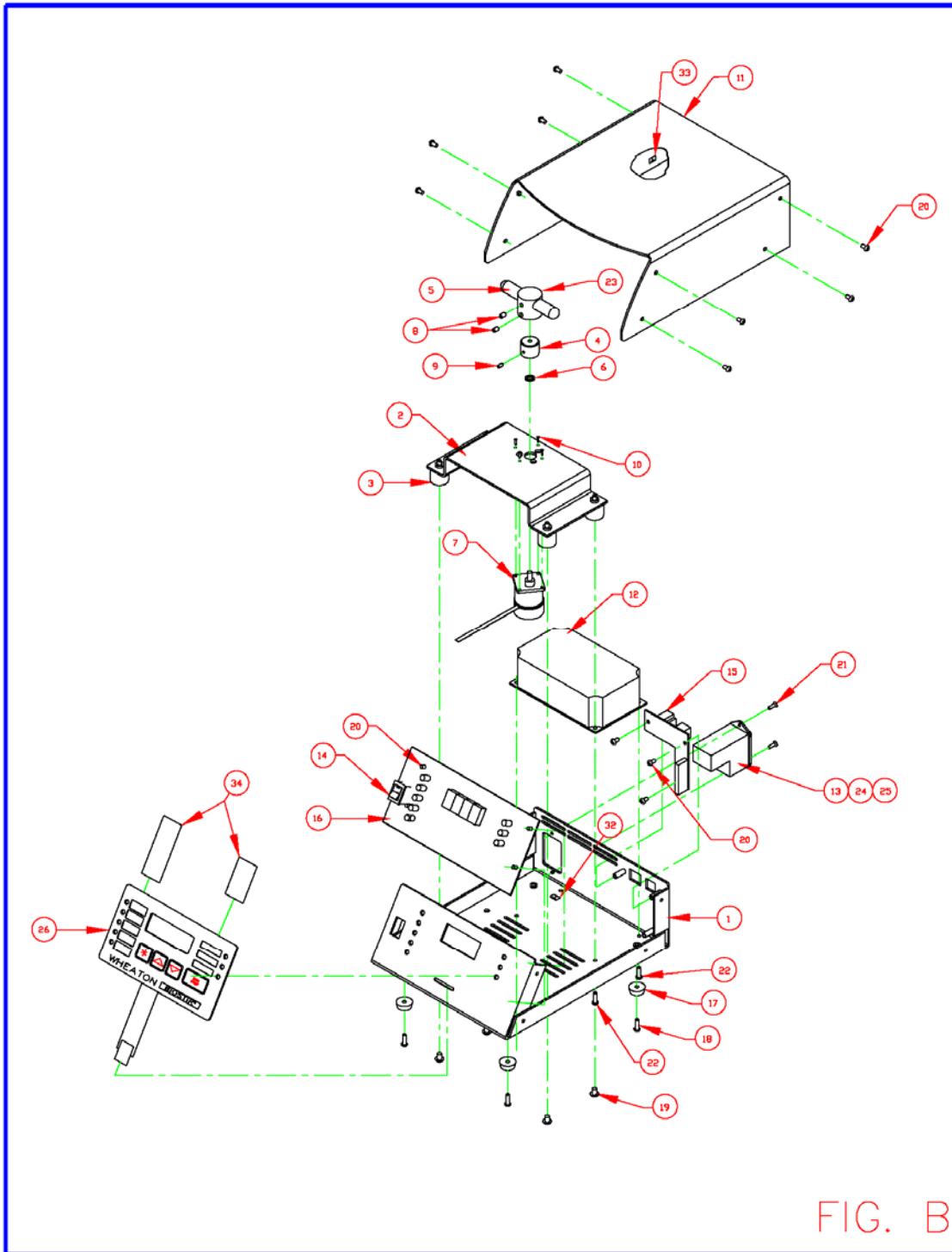
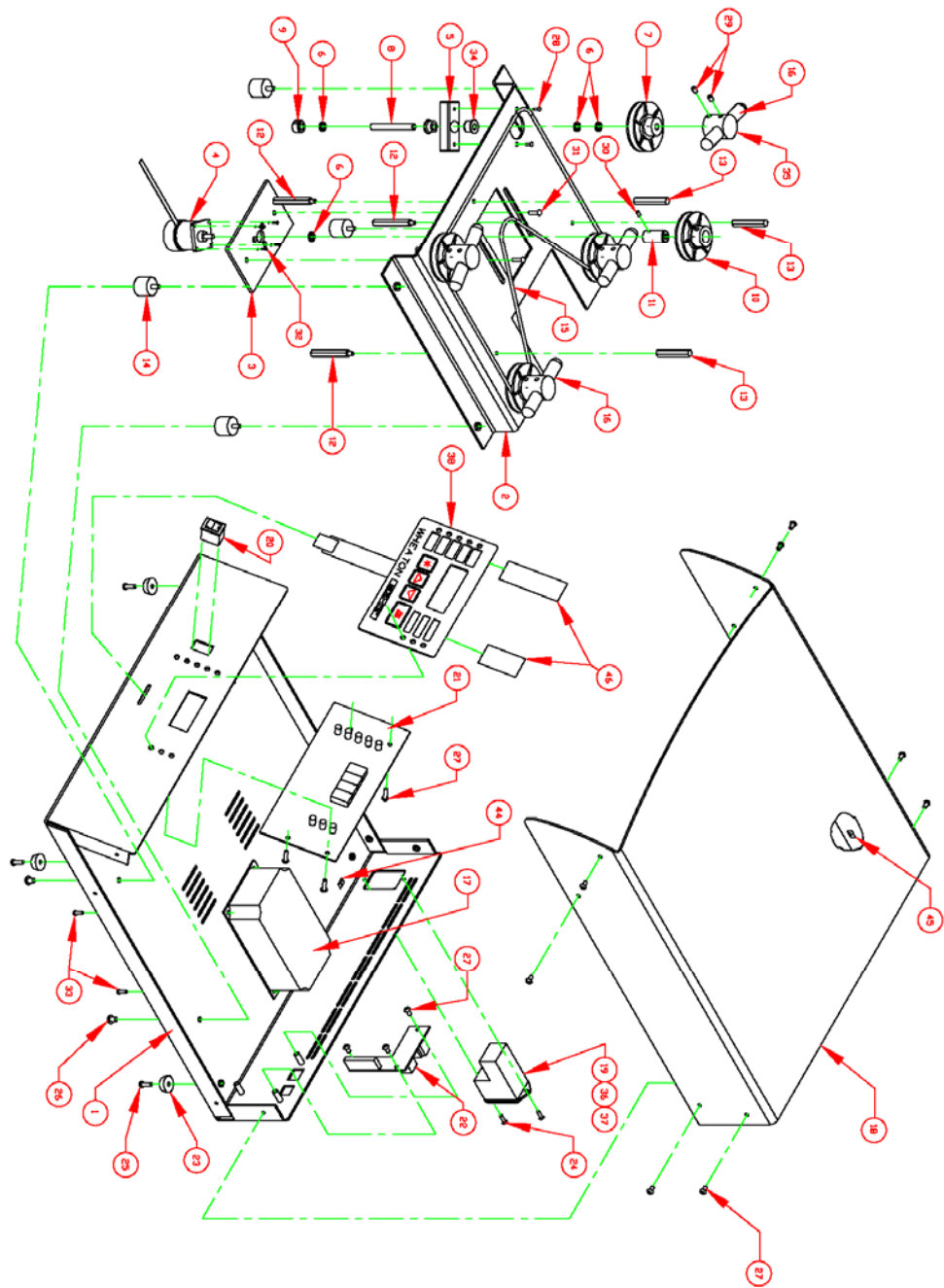


FIG. B

## FIGURE B – WHEATON BIOSTIR® -120V SINGLE PLACE PARTS LIST

Item	Qty	Part No.	Description	
1	1	50083166	CABINET BASE, STIRRERS, SINGLE PL.	
2	1	50083145	MAGNET PLATE, STIRRERS, SINGLE PL.	
3	4	I051325	SHOCK MOUNT	
4	1	50083167	SHAFT ADAPTER, BIOSTIR 1PL	
5	1	I050556	MAGNET 1/2" X 3"	
6	1	I052149	WASHER,NYL,.375 X .255 X .062	
7	1	WI056146	MOTOR, BRUSHLESS, 50W	
8	2	50029992	SCW,SET,8-32 X 1/4	
9	1	50029914	SCW,SET,6-32 X 1/8	
10	3	50083191	SCW,M3 X .250 LG FH	
11	1	50083170	CABINET TOP, STIRRERS, SINGLE PL.	
12	1	WI056150	POWER SUPPLY, SW, 24V, 50W	
13	1	WL055583	POWER ENTRY MODULE, KEC SERIES - R2P	
14	1	WI056151	POWER SWITCH, LIGHTED, STIRRERS	
15	1	WI056152	PCBA, COMMUNICATIONS, STIRRERS	
16	1	WI056153	PCBA, DISPLAY, STIRRERS	
17	4	50029504	FOOT,GRAY,SMITH#2178	
18	4	50029897	SCW,6-32 X 1/2"LG,PPHM	
19	4	50029961	SCW,10-32 X 1/4"LG PPHM	
20	7	I052239	SCW, 6-32X1/4" LG, PPHM	
21	2	I053401	SCW,4-40 X 3/8" LG FH	
22	5	I052240	SCW,6-32 X 3/8"LG PPHM	
23	1	WL054895	HOLDER, MAGNET	
24	1	WL055581	FUSE DRAWER, 1-1/4 X 1/4" GREY	110V
25	1	WI056155	FUSE, 3AG, 1.50AT, 250V	110V
26	1	50083227	ASS'Y, KEYPAD, BIOSTIR	
27	1	50028414	LABEL, CAUTION	
29	1	50027794	LABEL,UL APPROVED - SERIAL #	
30	1	50028826	LABEL, LINE VOLTAGE	
31	1	50028394	LABEL,MET NRTL LISTED,OMNI/FLO	
32	1	50028527	LABEL, MAIN GROUND	
33	1	50028530	LABEL, GROUND	
34	1	50083231	TEXT CARD SET, STIRRERS, ENGLISH	
35	1	50083232	WIRE HARNESS, STIRRERS, SINGLE PLACE	
36	8	50029902	SCW, 6-32 X 3/8" SS PFHM	
37	3	50029919	NUT, HEX, 6-32	
38	7	I052273	WASHER, STAR, #6, INT TOOTH	
39	1	WI056154	PCBA, PIGTAIL BOARD, STIRRERS	
40	1	I051479	CBL TIE, PANDUIT, #PLT1M-M	

FIG. C



## FIGURE C – WHEATON BIOSTIR® -120V FOUR PLACE PARTS LIST

Item	Qty	Part No.	Description	
1	1	50083192	CABINET BASE, STIRRERS, FOUR PL.	
2	1	50083193	MAGNET PLATE, STIRRERS, FOUR PL.	
3	1	50083194	ADJUSTMENT PLATE, STIRRERS, FOUR PL.	
4	1	WI056146	MOTOR, BRUSHLESS, 50W	
5	4	I050717	BEARING BLOCK	
6	9	I052149	WASHER,NYL,.375 X .255 X .062	
7	4	I050761	2"PULLEY 1/4" BORE206661	
8	4	I051716	SHAFT, 1/4"DIA X 2 1/8"LG	
9	4	I051372	SHAFT,COLLAR 1/4 ID 1/2 OD	
10	1	I050762	2"PULLEY 1/4" BORE206662	
11	1	50083195	SHAFT ADAPTER, HIGH SPEED STIRRER 4 POS	
12	3	50083229	1/4" HEX, MALE-FEMALE, STF, 6-32 X 1 3/4" LG	
13	3	50083230	1/4" HEX, FEMALE, STF, 6-32 X 1 9/16" LG	
14	4	I051325	SHOCK MOUNT	
15	1	I050357	BIOSTIR 4 BELT 204158	
16	4	I050556	MAGNET, 1/2" X 3"	
17	1	WI056150	POWER SUPPLY, SW, 24V, 50W	
18	1	50083226	CABINET, TOP, STIRRERS, FOUR PL.	
19	1	WL055583	POWER ENTRY MODULE, KEC SERIES - R2P	
20	1	WI056151	POWER SWITCH, LIGHTED, STIRRERS	
21	1	WI056153	PCBA, DISPLAY, STIRRERS	
22	1	WI056152	PCBA, COMMUNICATIONS, STIRRERS	
23	4	50029504	FOOT, GRAY, SMITH #2178	
24	2	I053401	SCW, 4-40 X 3/8" LG, FH	
25	4	50029897	SCW, 6-32 X 1/2" LG, PPHM	
26	4	50029961	SCW, 10-32 X 1/4" LG PPHM	
27	7	I052239	SCW, 6-32 X 1/4" LG PPHM	
28	16	50029902	SCW,6-32 X 3/8 SS PFHM	
29	9	50029992	SCW, SET, 8-32 X 1/4	
30	1	50083168	SCW, SET, 6-32 X 1/8	
31	2	I052320	SCW, 10-32 X 1/2" LG	
32	3	50083191	SCW,M3 X .250 LG FH	
33	5	I052240	SCW, 6-32 X 3/8" LG PPHM	
34	8	I050458	BEARING 206094	
35	4	WL054895	HOLDER, MAGNET	
36	1	WL055581	FUSE DRAWER, 1-1/4 X 1/4" GREY	110V
37	1	WI056155	FUSE, 3AG, 1.50AT, 250V	110V
38	1	50083227	ASS'Y, KEYPAD, BIOSTIR	
39	1	50028394	LABEL,MET NRTL LISTED,OMNI/FLO	
41	1	50028826	LABEL, LINE VOLTAGE	
42	1	50027794	LABEL, UL APPROVED - SERIAL #	
43	1	50028414	LABEL, CAUTION	
44	1	50028527	LABEL, MAIN GROUND	
45	1	50028530	LABEL, GROUND	
46	1	50083231	TEXT CARD SET, STIRRERS, ENGLISH	
47	1	50083233	WIRE HARNESS, STIRRERS, FOUR PLACE	
48	3	50029919	NUT, HEX, 6-32	
49	7	I052273	WASHER, STAR, #6 INT. TOOTH	
50	1	WI056154	PCBA, PIGTAIL BOARD, STIRRERS	
51	2	I051479	CBL TIE, PANDUIT, #PLT1M-M	

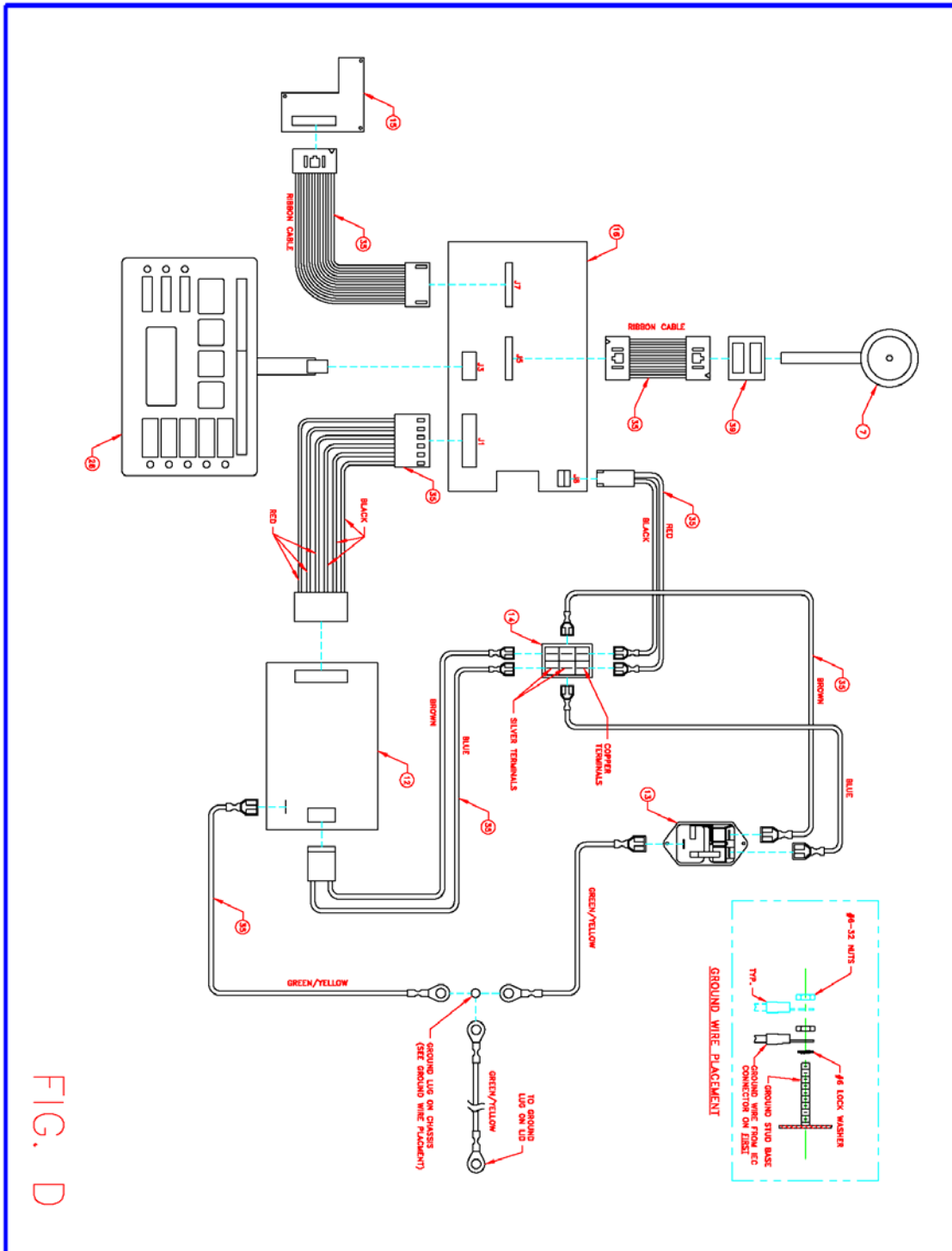


FIG. D

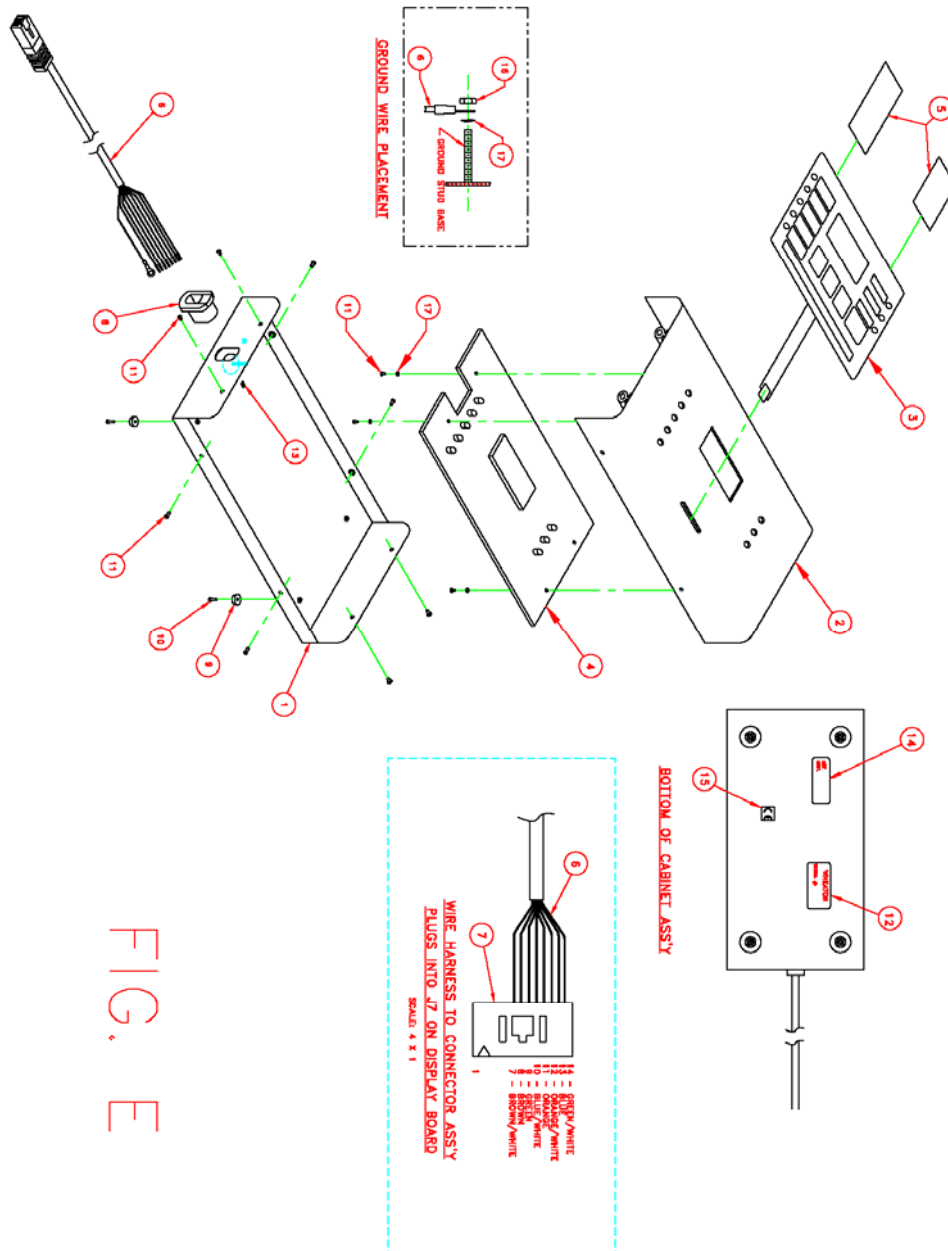


FIG. E

## FIGURE E – WHEATON STIRRER REMOTE CONTROL UNIT

Item	Qty	Part No.	Description
1	1	50083234	CABINET BASE, REMOTE, STIRRERS
2	1	50083235	CABINET TOP, REMOTE, STIRRERS
3	1	50083236	KEYPAD, STIRRERS, BLANK
4	1	Wi056153	PCBA, DISPLAY, STIRRERS
5	1	50083231	TEXT CARD SET, STIRRERS, ENGLISH
6	1	50083237	WIRE HARNESS, STIRRERS, REMOTE
7	1	50083240	CONN., .100, 1X14, 1-104257-3, AMP
8	1	50083239	STRAIN RELIEF, #1147, HEYCO
9	4	50029504	FOOT, GREY, SMITH#2178
10	4	50029897	SCW, 6-32 X 1/2" LG, PPHM
11	12	I052239	SCW, 6-32 X 1/4" LG, PPHM
12	1	50027794	LABEL, UL APPROVED - SERIAL #
13	1	50028527	LABEL, MAIN GROUND
14	1	50028530	LABEL, GROUND
15	1	50028394	LABEL, MET NRTL LISTED, OMNI/FLO
16	1	50028416	LABEL, CE (MARK)
17	1	50029919	NUT, HEX, 6-32
18	5	I052273	WASHER, STAR, #6, INT TOOTH



## **NOTICE**

### **Canada**

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel du Canada

### **United States**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.